
A DIE SETS



B PRECISION GROUND PLATES AND FLAT BARS



C LIFTING AND CLAMPING DEVICES



D GUIDE ELEMENTS



E GROUND PRECISION COMPONENTS



F SPRINGS



Screw, gas pressure and elastomer springs, spring and spacer units



G ELASTOMERS



H FIBRO-CHEMICAL TOOLING AIDS



J PERIPHERAL EQUIPMENT



K CAM UNITS



L STANDARD PARTS FOR MOULD MAKING



SPRINGS



SPRINGS

Springs for dies, fixtures, moulds, machines, mechanisms.

We have also taken our strict quality philosophy as a basis for our spring range. This applies both to the selection of materials and to the design. With our wide range of products, we are able to meet complex requirements thanks to various systems. Which system is used depends on the individual factors. Either way, we are sure that we have the right spring for you.

We would like to draw your attention in particular to our special helical compression springs, which we supply in 4 load groups for high alternating loads. These springs are made of specially alloyed and heat-treated material. The specially rolled profile enables high alternating and continuous loads.

We reserve the right to make changes, as technology is subject to change due to new findings and further developments.

A special spring range for demanding applications in the manufacture of tools, machinery and jigs & fixtures.

Our spring systems are constantly being developed to cover the most varied requirements.

The spring type is selected to match specific customer requirements.

High performance compression springs

Manufactured to DIN ISO 10243, the springs are available in four grades for high cyclic and constant loads.

The specially rolled wire profile is manufactured from high quality heat treated alloy steel.

FIBROFLEX® Springs

These rubber-elastic spring elements in Shore hardness ratings 80, 90, 95, are made from polyurethane elastomers. Benefits include high spring forces and good resilient damping behaviour.

FIBROELAST® Springs

As a superior alternative to rubber springs we offer polyurethane elastomer springs in Shore A hardness rating of 70.



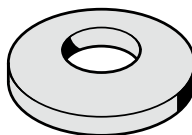
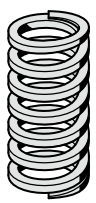
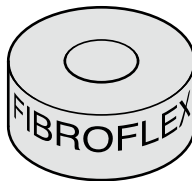
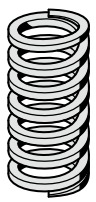
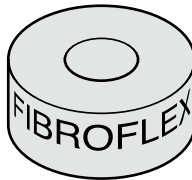
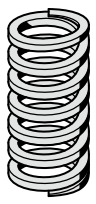
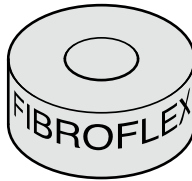
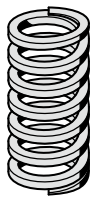
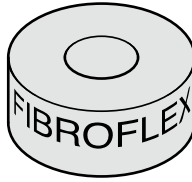
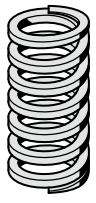

Disc springs

The required spring characteristics result from various laminations with multiple settings and combinations.

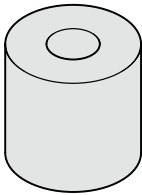
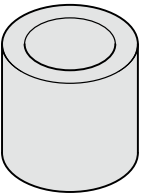
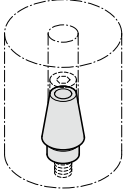
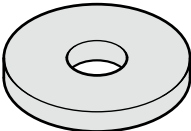
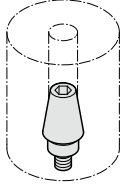
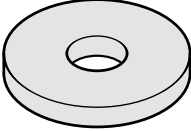
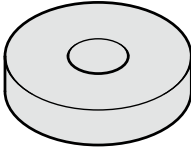
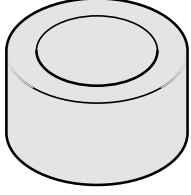
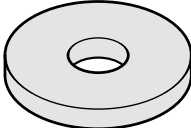
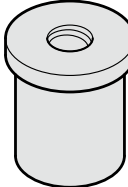

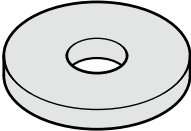
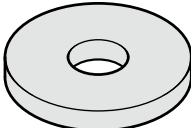
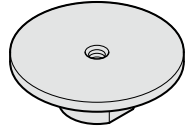
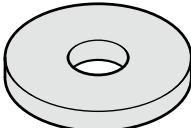

FIBRO Gas Springs

close a gap where ever the accent is on accommodation of the utmost force component within a minimum of space – or where exceedingly large travel is demanded: FIBRO Gas springs take care of both demands, even in combination.

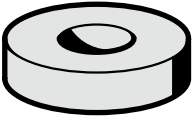
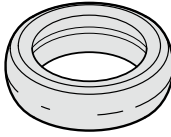
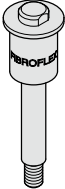
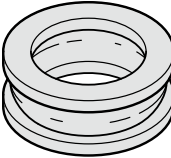
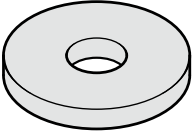
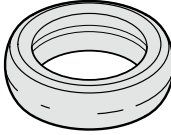
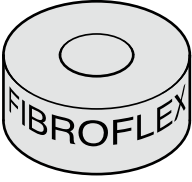
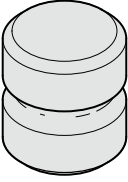
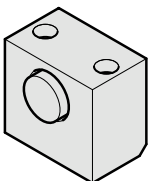
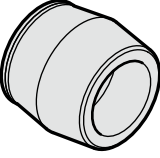
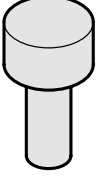

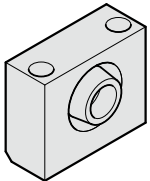


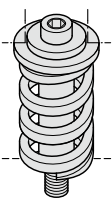
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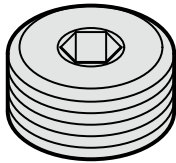
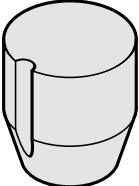
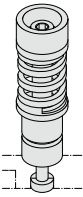
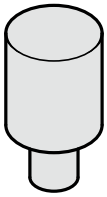
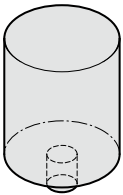
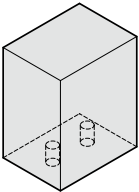
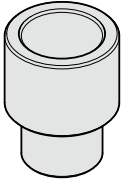

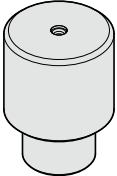
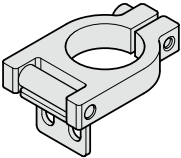
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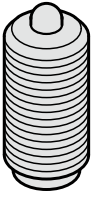

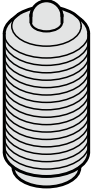

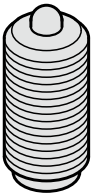

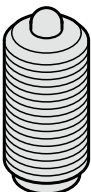

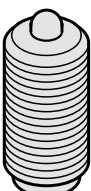

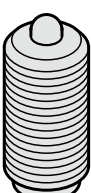

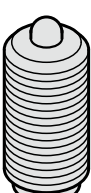
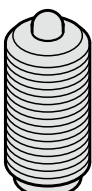
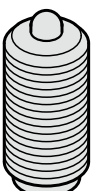
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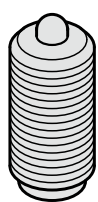
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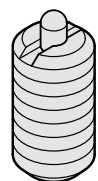
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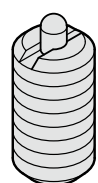
2471.35. **F104**

Spring plunger, with spring loaded ball, with slot, standard spring force



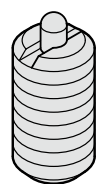
2472.01. **F105**

Spring plunger, with spring loaded pin, with slot, standard spring force



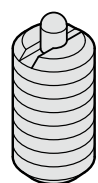
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Spring plunger, with spring loaded pin, with slot, standard spring force



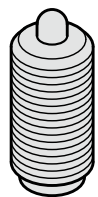
2472.21. **F106**

Spring plunger, with spring loaded pin, with slot, standard spring force



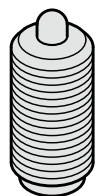
2472.22. **F106**

Spring plunger, with spring loaded pin, with slot, standard spring force



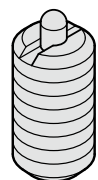
2472.03. **F107**

Spring plunger, with spring loaded pin, with hexagon socket, standard spring force



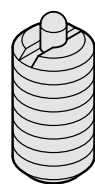
2472.33. **F107**

Spring plunger, with spring loaded pin, with hexagon socket, standard spring force



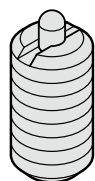
2472.07. **F108**

Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force



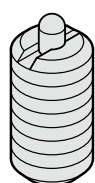
2472.37. **F108**

Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force



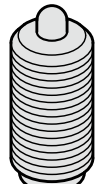
2472.02. **F109**

Spring plunger, with spring loaded pin, with slot, increased spring force



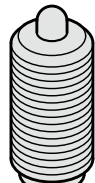
2472.08. **F109**

Spring plunger, with spring loaded pin and seal, with hexagon socket, increased spring force



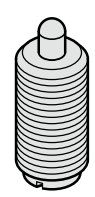
2472.04. **F110**

Spring plunger, with spring loaded pin, with hexagon socket, increased spring force



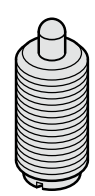
2472.34. **F110**

Spring plunger, with spring loaded pin, with hexagon socket, increased spring force



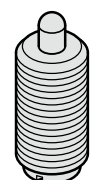
2472.05. **F111**

Spring plunger, with spring loaded pin, with slot, standard spring force



2472.35. **F111**

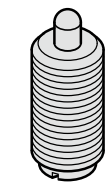
Spring plunger, with spring loaded pin, with slot, standard spring force



2472.06. **F112**

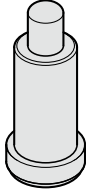
Spring plunger, with spring loaded pin, with slot, increased spring force

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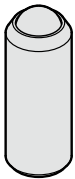
2472.36. **F112**

Spring plunger, with spring loaded pin, with slot, increased spring force



2473.01. **F113**

Spring plunger, with spring loaded pin, straight version, with collar



2473.02. **F113**

Spring plunger, with spring loaded ball, straight version



2475.01. **F114**

Spring plunger, with spring loaded ball, straight version, with collar



2475.02. **F114**

Spring plunger, with spring loaded ball, straight version, with collar



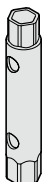
2475.03. **F115**

Spring plunger, with spring loaded ball, straight version, with collar



2475.04. **F115**

Spring plunger, with spring loaded ball, straight version, with collar



2470.10.11 **F116**

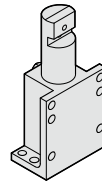
Lock wrench

2470.12.010.017 **F116**

Lock wrench

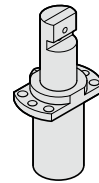
2472.11. **F116**

Lock wrench



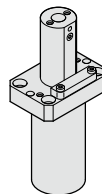
2477. .1.01 **F118**

Stripping unit, wall and bottom mounting



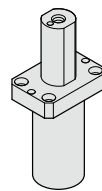
2477. .1.02 **F119**

Stripping unit, flanged mounting



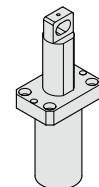
2478.10. **F120**

Stock lifter



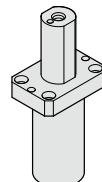
2478.30. .1 **F121**

Stock lifter



2478.30. .2 **F122**

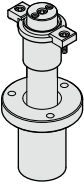
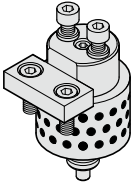

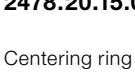
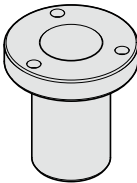
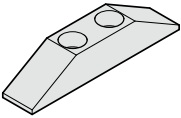
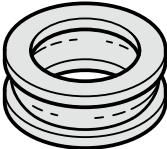
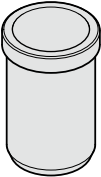
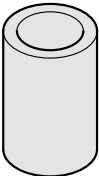
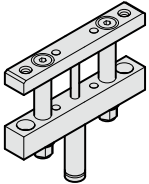
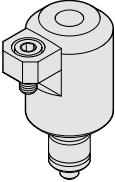
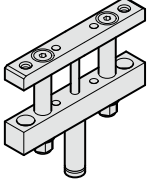
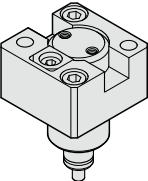

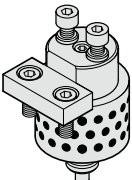
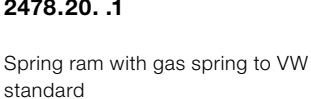
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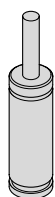
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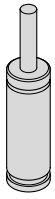
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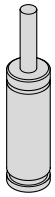
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Gas spring CX - Compact xtreme,

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Compact gas spring

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Compact gas spring

2490.14.01800. F278-279

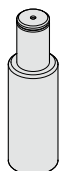
Compact gas spring

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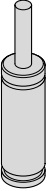
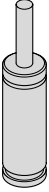
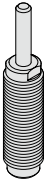
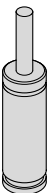
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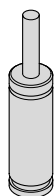
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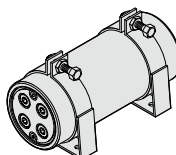
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pressure rise

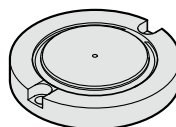


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reservoir

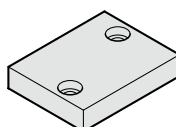
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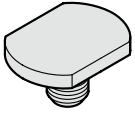
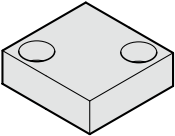
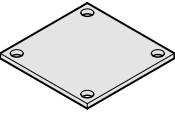
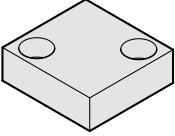

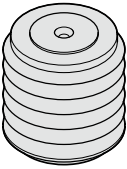
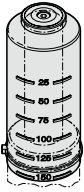



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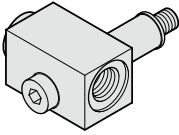
Pressure plate



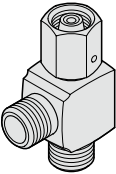
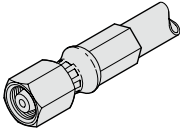
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	2480.019. Pressure plate	F363			2480.00.23.01. Gauging hose Mini, both ends straight F374
	2480.080. Concertina shroud for gas springs	F364-365			2480.00.23.02. Gauging hose Mini, one end straight / 90°-angle F374
	2480.081. Piston rod protection, FIBRO-TEX®	F366			2480.00.23.03. Gauging hose Mini, both ends 90°-angle F375
	2480.081.00.007 Cable tie pliers	F367			2480.00. .12.01 Hose clamp F375, F381, F385, F387
	2480.081.00.057. Retaining plate for saddle flange	F367			2192.50. Self-tapping screw DIN 7516 F375, F381, F385, F387

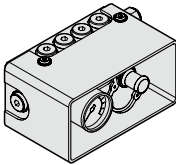
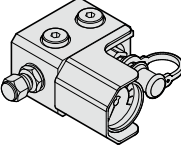
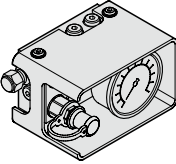
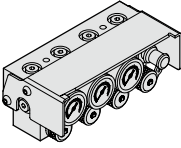
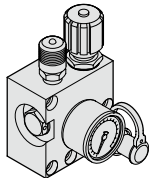
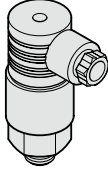
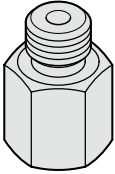
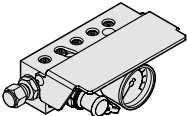
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2480.00.23.13. Anti-scuff spiral	F375, F381, F385, F387	2480.00.24.34 Distributor block G1/8, 4 ports	F378
2480.00.24.16-18 Single adapter	F376	2480.00.24.33 Distributor G1/8, 14 ports	F378
2480.00.24.10-12 Multiple adapter	F376, F379	2480.00.24.30 Distributor block G1/8, 3 ports	F378
2480.00.24.01-04 Gauging coupling	F376, F379	2480.00.24.31 Distributor block G1/8, 6 ports	F378
2480.00.24.13-15 Double adapter	F376	2480.00.10.1x Screw connection -Cutting ring, adjustable	F380
 2480.00.24.53-54 Double adapter M6, horizontal	F377	2480.00.10.0x Direct test connection	F380
2480.00.24.56-57 Double adapter M6, vertical	F377	2480.00.54.02 Vice jaws	F381
2480.00.24.43 Connection fitting M6-G1/8	F377	2480.00.10.20. High-pressure hose	F381

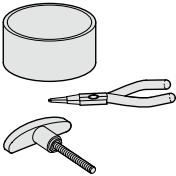
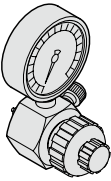
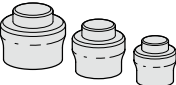
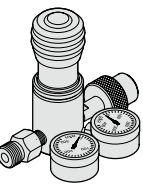
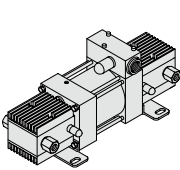
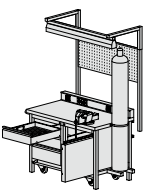
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2480.00.10.22	F381	Hose screw fitting (male)	2480.00.25.03.	F384	Connecting hose DN5 with 24° cone, 90°/90°
2480.00.54.01	F381	Expansion punch for hosing	2480.00.25.04.	F384	Connecting hose DN5 with 24° cone, straight/45°
2480.00.54.03	F381, F408-409	Hose shears	2480.00.25.05.	F385	Connecting hose DN5 with 24° cone, 45°/45°
2480.00.10.21	F381	Hose screw fitting (female)	2480.00.25.06.	F385	Connecting hose DN5 with 24° cone, 45°/90°
Assembly arrangement of gas springs in serial connection compression fitting	F382		2480.00.26.	F386	Screw connection GE-24° conus, DN5
	2480.00.26.	24°-cone screw connections	2480.00.26.21	F386	Screw connection 45°-24° conus, DN5, adjustable
	2480.00.25.01.	Connecting hose DN5 with 24° cone, straight/straight	2480.00.26.22	F386	Screw connection 90°-24° conus, DN5, adjustable
2480.00.25.02.	F384	Connecting hose DN5 with 24° cone, straight/90°	2480.00.26.23	F386	Screw connection L-24° conus, DN5, adjustable

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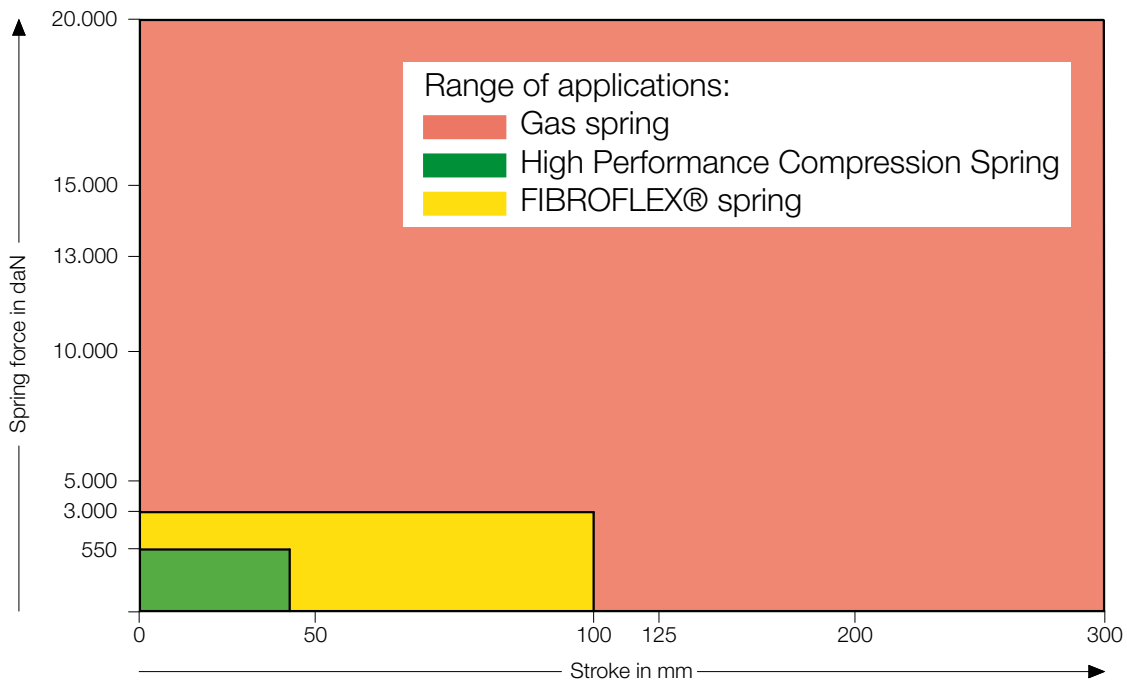
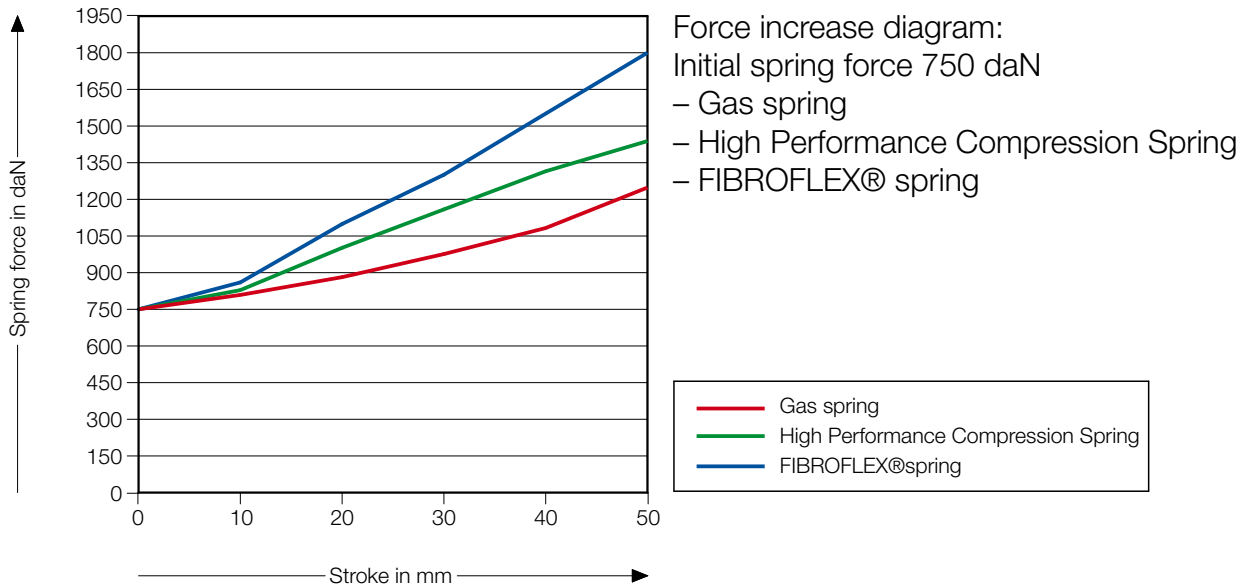
2480.00.26.24	F386	Screw connection T-24° conus, DN5, adjustable		2480.00.30.0x.1	F393	Control fitting
2480.00.27.01	F387	M8x1 hose connector		2480.00.31.0x.1	F393	Control fitting
2480.00.27.11	F388	Pipe -24° conus micro		2480.00.30.1x.1	F394	Control fitting
2480.00.27.00.01	F388	Deburring tool for 24° conus micro		2480.00.39.05.	F395	Multiple control fitting
2480.00.27.00.02	F388	Pipe cutter for 24° conus micro		2480.00.31.11.1	F396	Control fitting
2480.00.28.	F389-391	Connector system, 24° conus micro		2480.00.45.01/02	F397	Diaphragm pressure switch
	2480.00.22.	F390	Connector system, micro	2480.00.45.10	F397	Adapter Block
	2480.00.34.1x.1	F392	Control fitting	2480.00.45.00.01.	F397	Screw connection GE-G1/4-G1/8

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<p>2480.00.45.04 F398</p> <p>Diaphragm pressure switch, digital</p>	<p>2480.00.35.0xx F404</p> <p>Dynamometer for gas springs</p>
<p>2480.00.45.05 F399</p> <p>Diaphragm pressure switch, digital</p>	<p>2480.00.35.04 F405</p> <p>Dynamometer for gas springs</p>
<p>F400</p> <p>Wireless Pressure Monitoring - wireless gas spring monitoring</p>	<p>2480.00.50.11 F406</p> <p>Toolkit for assembling gas springs</p> 
<p>2480.00.32.21 F401, F403</p> <p>Filling and control fitting</p> 	<p>2480.00.50.04. F407</p> <p>Assembling cone</p> 
<p>2480.00.31.02 F401, F403</p> <p>Filling hose</p>	<p>2480.00.54.10 F408</p> <p>Pneumatic hose crimping machine</p>
<p>2480.00.32.07. F401</p> <p>Cylinder pressure regulator</p> 	<p>2480.00.54.20 F409</p> <p>Hand held hose crimping machine, electric (battery powered)</p>
<p>2480.00.32.71 F402-403</p> <p>Compact Nitrogen Booster</p> 	<p>2480.00.50.20. F410</p> <p>Service station, mobile, for gas springs</p> 
<p>2480.00.32.71.02 F403</p> <p>Holding plate</p>	<p>F411-418</p> <p>Gas springs - Example applications</p>

GENERAL OVERVIEW

GAS SPRINGS - HIGH PERFORMANCE COMPRESSION SPRING - FIBROFLEX® SPRINGS



HIGH PERFORMANCE COMPRESSION SPRINGS



HIGH PERFORMANCE COMPRESSION SPRINGS - DESCRIPTION

Service Data for Limited-/Extended Spring Life

The achievable service life of helical compression springs depends to a large extent on the composition of the spring wire, the operating conditions, and on design parameters.

In all applications with oscillating spring displacement, careful selection of both preload values and compressive displacement are prerequisites for extended spring life, as confirmed by the permissible stress values in the loading data tables and the stress/spring life diagram.

Shear stress maxima and spring oscillation stress differentials are a direct function of the quality of the spring wire. FIBRO High Performance Compression Springs are made exclusively from special alloyed chrome-steel.

For extended spring life under oscillating load changes, the maximal shear stress τ_{zul} is 800 N/mm², of which some 400 N/mm² = (τ_h). Higher stress levels are permissible only under the proviso of limited life expectancy, or in cases of static and quasi-static load conditions.

Springs subjected to dynamic load conditions also suffer impairment to their life expectancy through influences such as extreme operating temperatures, transversal stress components, shock loads, and resonant vibration frequencies. In all these instances, a lowering of the stress levels assists towards better spring life.

Working temperature

The spring material used has a working temperature of up to 250 °C. This rating is an approximation since the actual approved working temperature will also depend on factors such as load. It is worth noting that above 100 °C the modulus of elasticity decreases and with a reduction in tension setting starts to occur.

Extended Spring Life: Spring Displacement Values

The largest permissible displacement is indicated by S_6 – offering about 62% of the "total" displacement of the wire-to-wire compacted spring (= S_n). This displacement will induce a shear stress of τ_{admis} of 800 N/mm². The associated stress differential during oscillations should not exceed 400 N/mm² (= τ_h).

Calculation of spring forces

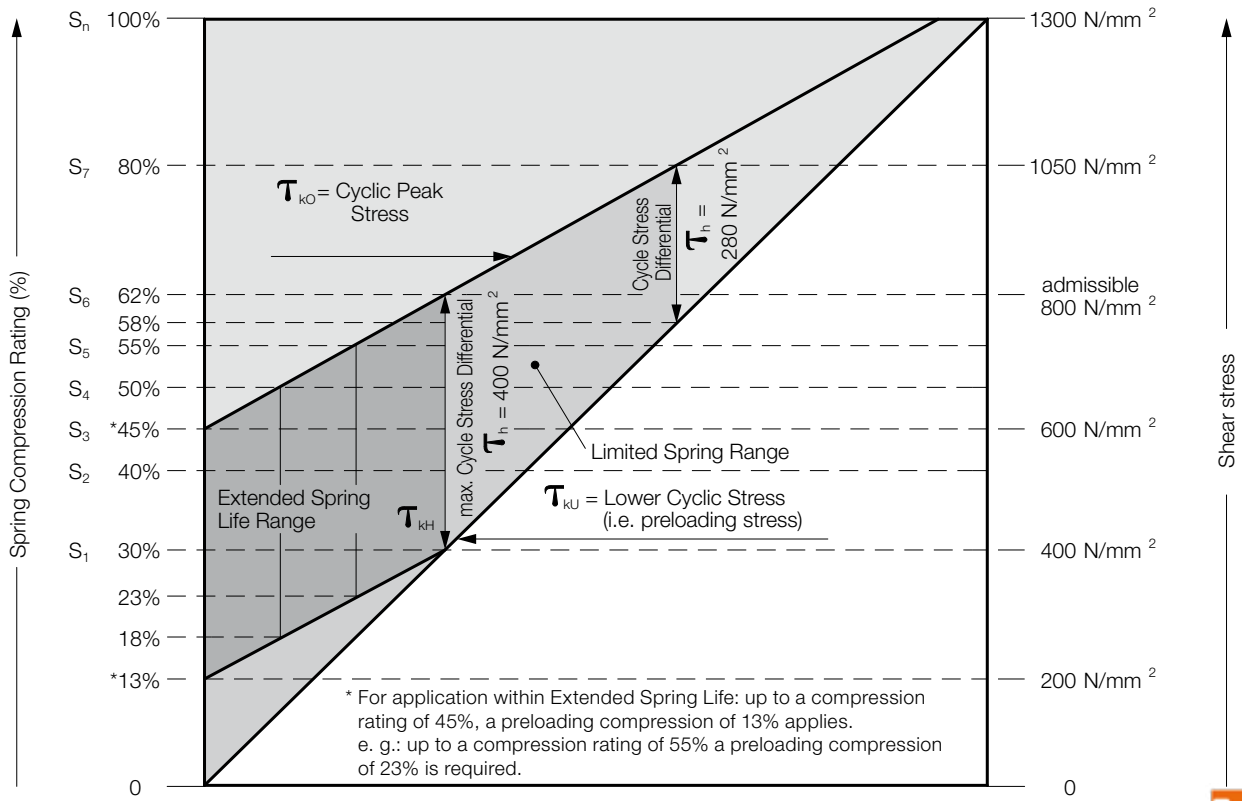
Simple multiplication of the spring coefficient R with the applicable displacement S (mm) yields the spring force value (N).

Spring Force versus Spring Displacement

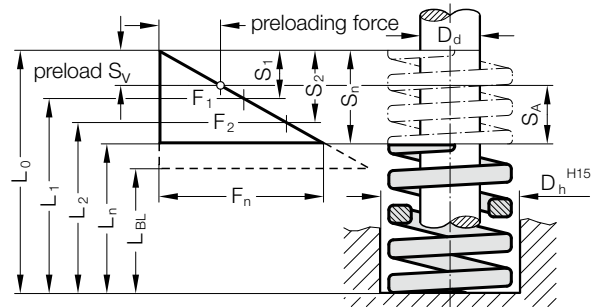
The relevant tables show the force values for selected displacements of 45, 62, 80 and 100% compression. Intermediate force values can be extra-polated from the Stress/Spring Life Diagram.

HIGH PERFORMANCE COMPRESSION SPRINGS - TIME AND SPRING LIFE DIAGRAM

241.



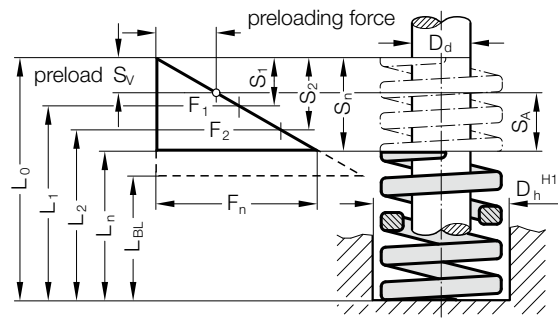
- D_h = Diameter of guide sleeve
- D_d = Diameter of guide pin
- L_0 = Free length of spring
- $L_1 \dots L_n$ = Length of loaded spring, assigned to spring forces $F_1 \dots F_n$
- L_{BL} = Length of compacted spring (i.e. wire-to-wire)
- $F_1 \dots F_n$ = Spring forces in N, assigned to the spring lengths $L_1 \dots L_n$
- $S_{v1} \dots S_{v7}$ = min. spring preload path, assigned to spring range $S_1 \dots S_7$
- $S_1 \dots S_n$ = Spring paths, assigned to spring forces $F_1 \dots F_n$
- R = Spring rate in N/mm
- $S_{A1} \dots S_{A7}$ = Working stroke of spring (stroke)



Working stroke of spring $S_{A1} \dots S_{A7} = \text{Stroke } (S_1 \dots S_7) - \text{Spring preload path } (S_{v1} \dots S_{v7})$

Please note: 80% compression must not be exceeded!

HIGH PERFORMANCE COMPRESSION SPRING, XSF, COLOUR VIOLET

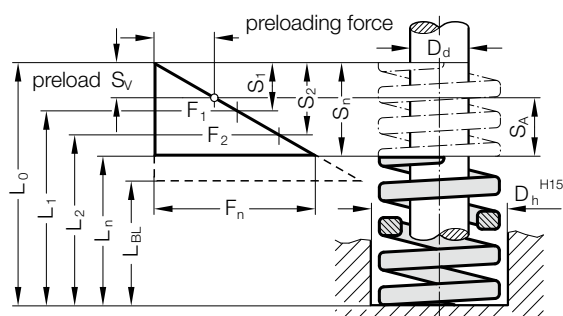


- D_h = diameter of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{V1}...S_{V7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)

241.13. High performance compression spring, XSF, Colour Violet

Order No	D_h	D_d	L_0	R	45%			62%				80%			100%			
					S_1	S_{V1}	S_{A1}	F_1	S_2	S_{V2}	S_{A2}	F_2	S_3	S_{V3}	S_{A3}	F_3	S_n	F_n
241.13.20.025	20	10	25	32.1	6.3	1.8	4.5	202	8.7	4.2	4.5	279	11.2	8.1	3.1	360	14	449
241.13.20.032	20	10	32	24.7	8.1	2.3	5.8	200	11.2	5.4	5.8	276	14.4	10.4	4	356	18	445
241.13.20.038	20	10	38	20.7	9.9	2.9	7	205	13.6	6.6	7	282	17.6	12.8	4.8	364	22	455
241.13.20.044	20	10	44	17.8	11.7	3.4	8.3	208	16.1	7.8	8.3	287	20.8	15.1	5.7	370	26	463
241.13.20.051	20	10	51	15.3	13.5	3.9	9.6	207	18.6	9	9.6	285	24	17.4	6.6	367	30	459
241.13.20.064	20	10	64	12.1	17.1	4.9	12.2	207	23.6	11.4	12.2	285	30.4	22	8.4	368	38	460
241.13.20.076	20	10	76	10.2	20.2	5.8	14.4	207	27.9	13.5	14.4	285	36	26.1	9.9	367	45	459
241.13.20.089	20	10	89	8.6	23.8	6.9	17	205	32.9	15.9	17	283	42.4	30.7	11.7	365	53	456
241.13.20.102	20	10	102	7.5	27.9	8.1	19.8	209	38.4	18.6	19.8	288	49.6	36	13.6	372	62	465
241.13.20.115	20	10	115	6.7	31.5	9.1	22.4	211	43.4	21	22.4	291	56	40.6	15.4	375	70	469
241.13.20.127	20	10	127	6.1	34.6	10	24.6	211	47.7	23.1	24.6	291	61.6	44.7	16.9	376	77	470
241.13.20.139	20	10	139	5.5	38.2	11	27.2	210	52.7	25.5	27.2	290	68	49.3	18.7	374	85	468
241.13.20.152	20	10	152	5.1	41.8	12.1	29.8	213	57.7	27.9	29.8	294	74.4	53.9	20.5	379	93	474
241.13.20.305	20	10	305	2.5	84.6	24.4	60.2	212	116.6	56.4	60.2	291	150.4	109	41.4	376	188	470
241.13.25.025	25	12.5	25	52.7	6.3	1.8	4.5	332	8.7	4.2	4.5	457	11.2	8.1	3.1	590	14	738
241.13.25.032	25	12.5	32	40	8.1	2.3	5.8	324	11.2	5.4	5.8	446	14.4	10.4	4	576	18	720
241.13.25.038	25	12.5	38	33.3	9.9	2.9	7	330	13.6	6.6	7	454	17.6	12.8	4.8	586	22	733
241.13.25.044	25	12.5	44	28.6	11.2	3.2	8	322	15.5	7.5	8	443	20	14.5	5.5	572	25	715
241.13.25.051	25	12.5	51	24.7	13.5	3.9	9.6	333	18.6	9	9.6	459	24	17.4	6.6	593	30	741
241.13.25.064	25	12.5	64	19.4	17.1	4.9	12.2	332	23.6	11.4	12.2	457	30.4	22	8.4	590	38	737
241.13.25.076	25	12.5	76	16.3	20.2	5.8	14.4	330	27.9	13.5	14.4	455	36	26.1	9.9	587	45	734
241.13.25.089	25	12.5	89	15.9	23.8	6.9	17	379	32.9	15.9	17	522	42.4	30.7	11.7	674	53	843
241.13.25.102	25	12.5	102	12.1	27.4	7.9	19.5	332	37.8	18.3	19.5	458	48.8	35.4	13.4	590	61	738
241.13.25.115	25	12.5	115	10.8	31.5	9.1	22.4	340	43.4	21	22.4	469	56	40.6	15.4	605	70	756
241.13.25.127	25	12.5	127	9.8	34.6	10	24.6	340	47.7	23.1	24.6	468	61.6	44.7	16.9	604	77	755
241.13.25.139	25	12.5	139	8.9	38.2	11	27.2	340	52.7	25.5	27.2	469	68	49.3	18.7	605	85	756
241.13.25.152	25	12.5	152	8.1	41.8	12.1	29.8	339	57.7	27.9	29.8	467	74.4	53.9	20.5	603	93	753
241.13.25.178	25	12.5	178	6.9	49	14.2	34.9	338	67.6	32.7	34.9	466	87.2	63.2	24	602	109	752
241.13.25.203	25	12.5	203	6.1	55.8	16.1	39.7	340	76.9	37.2	39.7	469	99.2	71.9	27.3	605	124	756
241.13.25.305	25	12.5	305	4	84.6	24.4	60.2	338	116.6	56.4	60.2	466	150.4	109	41.4	602	188	752
241.13.32.038	32	16	38	43.8	9.9	2.9	7	434	13.6	6.6	7	597	17.6	12.8	4.8	771	22	964
241.13.32.044	32	16	44	37.5	11.7	3.4	8.3	439	16.1	7.8	8.3	604	20.8	15.1	5.7	780	26	975
241.13.32.051	32	16	51	32.3	14	4	9.9	451	19.2	9.3	9.9	621	24.8	18	6.8	801	31	1001
241.13.32.064	32	16	64	25.4	17.6	5.1	12.5	446	24.2	11.7	12.5	614	31.2	22.6	8.6	792	39	991
241.13.32.076	32	16	76	21.3	21.2	6.1	15	450	29.1	14.1	15	621	37.6	27.3	10.3	801	47	1001
241.13.32.089	32	16	89	18.1	25.2	7.3	17.9	456	34.7	16.8	17.9	628	44.8	32.5	12.3	811	56	1014
241.13.32.102	32	16	102	15.8	28.8	8.3	20.5	455	39.7	19.2	20.5	627	51.2	37.1	14.1	809	64	1011
241.13.32.115	32	16	115	13.9	32.8	9.5	23.4	457	45.3	21.9	23.4	629	58.4	42.3	16.1	812	73	1015
241.13.32.127	32	16	127	12.6	36.4	10.5	25.9	459	50.2	24.3	25.9	633	64.8	47	17.8	816	81	1021
241.13.32.139	32	16	139	11.4	40	11.6	28.5	457	55.2	26.7	28.5	629	71.2	51.6	19.6	812	89	1015
241.13.32.152	32	16	152	10.5	43.6	12.6	31	458	60.1	29.1	31	631	77.6	56.3	21.3	815	97	1018
241.13.32.178	32	16	178	8.9	51.3	14.8	36.5	457	70.7	34.2	36.5	629	91.2	66.1	25.1	812	114	1015
241.13.32.203	32	16	203	7.8	59	17	41.9	460	81.2	39.3	41.9	634	104.8	76	28.8	817	131	1022
241.13.32.254	32	16	254	6.2	73.4	21.2	52.2	455	101.1	48.9	52.2	627	130.4	94.5	35.9	808	163	1011

HIGH PERFORMANCE COMPRESSION SPRING, XSF, COLOUR VIOLET



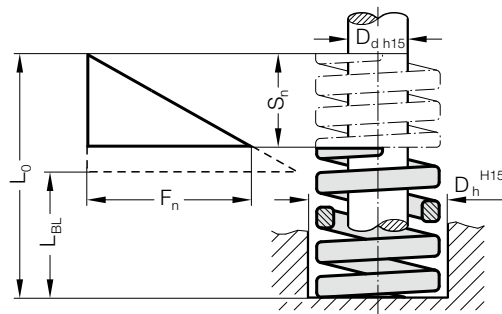
- D_h = diameter of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- $L_1...L_n$ = length of loaded spring (mm) as related to spring forces $F_1...F_n$
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces (N) as related to length of spring $L_1...L_n$
- $S_{v1}...S_{v7}$ = recommend. preload. compression, as relat. to compress. $S_1...S_7$
- $S_1...S_n$ = compr. as related to spring forces $F_1...F_n$
- R = spring rate (N/mm)
- $S_{A1}...S_{A7}$ = working stroke (mm)



241.13. High performance compression spring, XSF, Colour Violet

Order No	D_h	D_d	L_0	R	45%							62%							80%							100%						
					S_1	S_{v1}	S_{A1}	F_1	S_2	S_{v2}	S_{A2}	F_2	S_3	S_{v3}	S_{A3}	F_3	S_n	F_n														
241.13.32.305	32	16	305	5.2	88.6	25.6	63	461	122.1	59.1	63	635	157.6	114.3	43.3	820	197	1024														
241.13.40.051	40	20	51	50.8	11.7	3.4	8.3	594	16.1	7.8	8.3	819	20.8	15.1	5.7	1057	26	1321														
241.13.40.064	40	20	64	39.7	15.3	4.4	10.9	607	21.1	10.2	10.9	837	27.2	19.7	7.5	1080	34	1350														
241.13.40.076	40	20	76	33.1	18	5.2	12.8	596	24.8	12	12.8	821	32	23.2	8.8	1059	40	1324														
241.13.40.089	40	20	89	28.1	21.6	6.2	15.4	607	29.8	14.4	15.4	836	38.4	27.8	10.6	1079	48	1349														
241.13.40.102	40	20	102	24.5	24.8	7.2	17.6	606	34.1	16.5	17.6	835	44	31.9	12.1	1078	55	1348														
241.13.40.115	40	20	115	21.6	28.4	8.2	20.2	612	39.1	18.9	20.2	844	50.4	36.5	13.9	1089	63	1361														
241.13.40.127	40	20	127	19.5	31.5	9.1	22.4	614	43.4	21	22.4	846	56	40.6	15.4	1092	70	1365														
241.13.40.139	40	20	139	17.8	34.2	9.9	24.3	609	47.1	22.8	24.3	839	60.8	44.1	16.7	1082	76	1353														
241.13.40.152	40	20	152	16.3	37.8	10.9	26.9	616	52.1	25.2	26.9	849	67.2	48.7	18.5	1095	84	1369														
241.13.40.178	40	20	178	13.8	44.6	12.9	31.7	615	61.4	29.7	31.7	847	79.2	57.4	21.8	1093	99	1366														
241.13.40.203	40	20	203	12.1	50.8	14.7	36.2	615	70.1	33.9	36.2	848	90.4	65.5	24.9	1094	113	1367														
241.13.40.254	40	20	254	9.7	63.9	18.5	45.4	620	88	42.6	45.4	854	113.6	82.4	31.2	1102	142	1377														
241.13.40.305	40	20	305	8	77	22.2	54.7	616	106	51.3	54.7	848	136.8	99.2	37.6	1094	171	1368														
241.13.50.064	50	25	64	80.2	16.6	4.8	11.8	1335	22.9	11.1	11.8	1840	29.6	21.5	8.1	2374	37	2967														
241.13.50.076	50	25	76	66.9	20.2	5.8	14.4	1355	27.9	13.5	14.4	1867	36	26.1	9.9	2408	45	3010														
241.13.50.089	50	25	89	56.6	23.8	6.9	17	1350	32.9	15.9	17	1860	42.4	30.7	11.7	2400	53	3000														
241.13.50.102	50	25	102	40.3	27.9	8.1	19.8	1124	38.4	18.6	19.8	1549	49.6	36	13.6	1999	62	2499														
241.13.50.115	50	25	115	43.5	31.5	9.1	22.4	1370	43.4	21	22.4	1888	56	40.6	15.4	2436	70	3045														
241.13.50.127	50	25	127	39.3	35.1	10.1	25	1379	48.4	23.4	25	1901	62.4	45.2	17.2	2452	78	3065														
241.13.50.139	50	25	139	35.8	38.2	11	27.2	1369	52.7	25.5	27.2	1887	68	49.3	18.7	2434	85	3043														
241.13.50.152	50	25	152	32.8	42.3	12.2	30.1	1387	58.3	28.2	30.1	1912	75.2	54.5	20.7	2467	94	3083														
241.13.50.178	50	25	178	27.8	49.5	14.3	35.2	1376	68.2	33	35.2	1896	88	63.8	24.2	2446	110	3058														
241.13.50.203	50	25	203	24.2	56.7	16.4	40.3	1372	78.1	37.8	40.3	1891	100.8	73.1	27.7	2439	126	3049														
241.13.50.254	50	25	254	19.2	71.6	20.7	50.9	1374	98.6	47.7	50.9	1893	127.2	92.2	35	2442	159	3053														
241.13.50.305	50	25	305	16	86.4	25	61.4	1382	119	57.6	61.4	1905	153.6	111.4	42.2	2458	192	3072														

HIGH PERFORMANCE COMPRESSION SPRING, 3XLF, COLOUR WHITE



- D_h = diameter of guide sleeve
- D_d = diameter of guide pin
- L_0 = free length of spring
- L_{BL} = length of compacted spring (i.e. wire-to-wire)
- F_n = Spring force in N
- S_n = Stroke
- R = spring rate (N/mm)



Description:

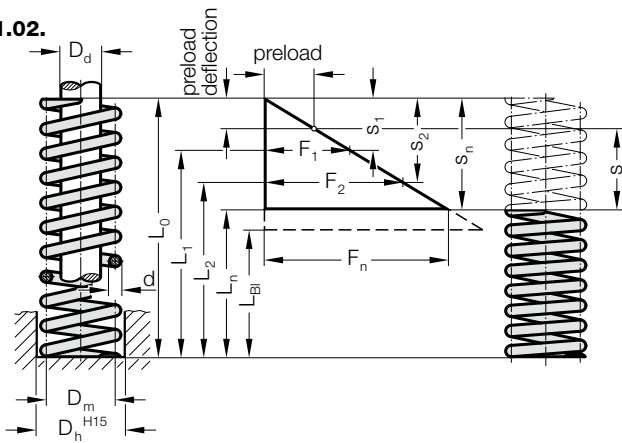
The diameters are comparable with the high performance compression springs DIN ISO 10243. The special flat wound wire cross section brings a reduction of the medium winding diameter for the same winding ratio with an edge-wound spring. Consequently, the high performance compression spring 3XLF has a 6x larger starting spring force than the high performance compression spring DIN ISO 10243 colour code "yellow".

241.19. High performance compression spring, 3XLF, Colour White

Order No	D_h	D_d	L_0	R	s_1	S_{V1}	S_{A1}	F_1	S_n	F_n
241.19.16.020	16	6.3	20	1,818	2.2	1	1.2	3,999.6	3	5,454
241.19.16.035	16	6.3	35	1,000	4	1.75	2.25	4,000	5.5	5,500
241.19.16.050	16	6.3	50	615	6.5	2.5	4	3,997.5	8	4,920
241.19.16.075	16	6.3	75	400	10	3.75	6.25	4,000	12.5	5,000
241.19.16.100	16	6.3	100	286	14	5	9	4,004	16.3	4,661.8
241.19.19.025	19	8	25	2,400	2.5	1.25	1.25	6,000	3.4	8,160
241.19.19.040	19	8	40	1,333	4.5	2	2.5	5,998.5	5.9	7,864.7
241.19.19.050	19	8	50	1,000	6	2.5	3.5	6,000	7.8	7,800
241.19.19.075	19	8	75	600	10	3.75	6.25	6,000	12.4	7,440
241.19.19.100	19	8	100	429	14	5	9	6,006	16.5	7,078.5
241.19.25.030	25	10	30	4,800	2.5	1.5	1	12,000	3	14,400
241.19.25.050	25	10	50	2,400	5	2.5	2.5	12,000	5.9	14,160
241.19.25.075	25	10	75	1,500	8	3.75	4.25	12,000	9.5	14,250
241.19.25.100	25	10	100	1,000	12	5	7	12,000	14.7	14,700
241.19.25.125	25	10	125	857	14	6.25	7.75	11,998	16.9	14,483.3
241.19.32.035	32	12.5	35	6,667	3	1.75	1.25	20,001	3.7	24,667.9
241.19.32.050	32	12.5	50	3,636	5.5	2.5	3	19,998	6.3	22,906.8
241.19.32.075	32	12.5	75	2,222	9	3.75	5.25	19,998	11.3	25,108.6
241.19.32.100	32	12.5	100	1,538	13	5	8	19,994	17.9	27,530.2
241.19.32.125	32	12.5	125	1,250	16	6.25	9.75	20,000	18.3	22,875
241.19.32.150	32	12.5	150	1,053	19	7.5	11.5	20,007	21.7	22,850.1
241.19.38.040	38	16	40	7,143	3.5	2	1.5	25,000.5	4.5	32,143.5
241.19.38.050	38	16	50	5,000	5	2.5	2.5	25,000	5.9	29,500
241.19.38.075	38	16	75	2,778	9	3.75	5.25	25,002	10.4	28,891.2
241.19.38.100	38	16	100	1,923	13	5	8	24,999	15	28,845
241.19.38.150	38	16	150	1,316	19	7.5	11.5	25,004	22.4	29,478.4
241.19.38.200	38	16	200	926	27	10	17	25,002	29.9	27,687.4

ROUND WIRE COMPRESSION SPRING

241.02.



Material:

Spring steel wire class C DIN 17.223 sheet 1, drawn and patented.
For highly stressed compression springs and for loads both static and oscillating.

Execution:

Manufacturing tolerances to DIN 2095 class 2, load-stabilized, surface homogenized by ball-shot, oiled.
Flattened and ground end coils.

Note:

Max. working temperature 100 °C.
All spring sizes listed also available in "making-up"-lengths of 500 mm.
When ordering these, please add "500" at the end of the order number – e. g. 241.02.11.040.500.

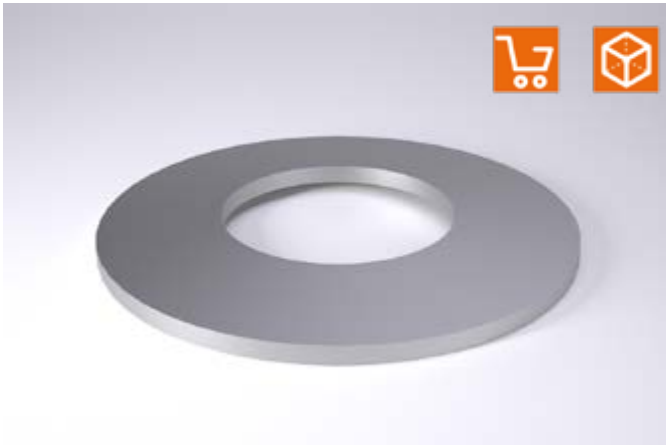
- D_h = diameter of guide sleeve
- D_m = mean coil diameter
- D_d = diameter of guide pin
- d = diameter of spring wire
- L_0 = free length of spring
- $L_1...L_n$ = lengths of loaded spring as related to spring forces $F_1...F_n$
- R = spring rate [N/mm]
- L_{BI} = length of compacted spring (i.e. wire-to-wire)
- $F_1...F_n$ = forces [N] as related to lengths of spring $L_1...L_n$
- $s_1...s_n$ = deflection as related to spring forces $F_1...F_n$
- i_f = number of active coils
- s = working stroke of spring – i. e. working deflection

241.02. Round wire compression spring

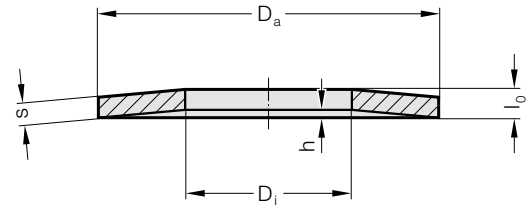
Order No	D_h	D_d	D_m	d	L_0	R	s_1	F_1 [N]*	l_1	s_2	F_2 [N]**	l_2	s_n	F_n [N]***	L_n	i_f
241.02.11.040	11	6.5	8.5	1.5	40	8.08	11.3	91	28.7	13.7	110	26.3	16.1	130	23.9	10.5
241.02.13.055	13	8.5	10.5	1.5	55	3.8	20.8	79	34.2	25.2	95	29.8	29.7	112	25.3	12
241.02.15.040	15	9.5	12	2	40	11.93	12.3	146	27.7	15	178	25	17.6	210	22.4	8
241.02.15.050	15	9.5	12	2	50	10	17.5	175	32.5	21.2	212	28.8	25	250	25	9.5
241.02.16.040	16	10.5	13	2	40	11	14	154	26	17	187	23	20	220	20	7
241.02.18.085	18	12	14.75	2.25	85	5.92	30.8	182	54.2	37.4	221	47.6	44	260	41	14
241.02.19.045	19	11	14.5	3	45	35	9.8	343	35.2	11.9	416	33.1	14	490	31	8
241.02.19.050	19	11	14.5	3	50	30	11.2	336	38.8	13.6	408	36.4	16	480	34	8.5
241.02.19.083	19.5	9	14	4	83	75	12.6	945	70.4	15.3	1,147	67.7	18	1,350	65	16
241.02.20.035	20.5	10	15	4	35	170	5.6	952	29.4	6.8	1,156	28.2	8	1,360	27	4.5
241.02.20.090	20.5	9	14.5	4.5	90	97.8	12.3	1,202	77.7	15	1,467	75	17.6	1,714	72.4	4
241.02.21.035	21	13.5	17	2.5	35	13.32	10.5	139	24.5	12.7	169	22.3	15	200	20	6
241.02.21.040	21	12	16.25	3	40	32.1	9.8	314	30.2	11.9	381	28.1	14	450	26	5.5
241.02.22.095	22	14.5	18	2.5	95	4.1	34.2	140	60.8	41.5	170	53.5	48.8	200	46.2	17
241.02.22.040	22.5	12	17	4	40	105.5	7.7	812	32.3	9.3	981	30.7	11	1,160	29	5
241.02.23.045	23	14.5	18.5	3	45	25.7	15	385	30	18.2	467	26.8	21.4	550	23.6	5
241.02.23.050	23	12.5	17.5	4	50	74.3	11	817	39	13.3	988	36.7	15.6	1,160	34.4	6.5
241.02.26.024	26.5	16	21	4	24	133.2	5	666	19	6.1	812	17.9	7.2	960	16.8	2
241.02.30.070	30	13	20.8	7	70	341	7.7	2,625	62.3	9.3	3,171	60.7	11	3,750	59	8
241.02.32.070	32	21	26	4	70	24.2	23.8	575	46.2	28.9	700	41.1	34	822	36	6
241.02.32.150	32	16	23.5	6.5	150	103.6	19.6	2,030	130.4	23.8	2,465	126	28	2,900	122	14
241.02.34.125	34	19	26	6	125	67.2	22.4	1,505	102.6	27.2	1,827	97.8	32	2,150	93	11.5
241.02.44.130	44	25	34	8	130	108.2	25.2	2,726	104.8	30.6	3,310	99.4	36	3,895	94	10
241.02.44.200	44	25	34	7.5	200	61.8	43.4	2,679	156.6	52.7	3,254	147.3	62	3,847	137.7	17
241.02.48.067	48	25	36	10	67	640	6.3	4,032	60.7	7.6	4,864	59.4	9	5,760	58	3.5
241.02.49.050	49	29	38.5	8.5	50	337	7.7	2,594	42.3	9.3	3,134	40.7	11	3,707	39	2.5
241.02.55.200	55	30	42	11	200	157	30.1	4,725	169.9	36.6	5,746	163.4	43	6,750	157	13
241.02.58.050	58	39	48	8	50	151.2	9.8	1,481	40.2	11.9	1,799	38.1	14	2,117	36	2.5
241.02.63.180	63	38	50	11	180	121	30.1	3,642	149.9	36.6	4,428	143.4	43	5,203	137	10

* = long spring life; ** = medium spring life; *** = max. spring loading

DISC SPRING DIN 2093



242.01.



Material:

50 CrV 4 Vanadium Spring Steel

Note:

FIBRO Disc springs 242.01. are made from 50 CrV 4 premier grade spring steel. This "classic" spring material guarantes optimal performance levels within the temperature range from -15 °C to +150 °C. "Hot pressetting" allows working temperatures from -25 °C to +200 °C.

D_a = outside diameter of spring

D_i = diameter of hole

s = crosssectional thickness of spring

h = concavity of free spring

l_0 = total height of free spring

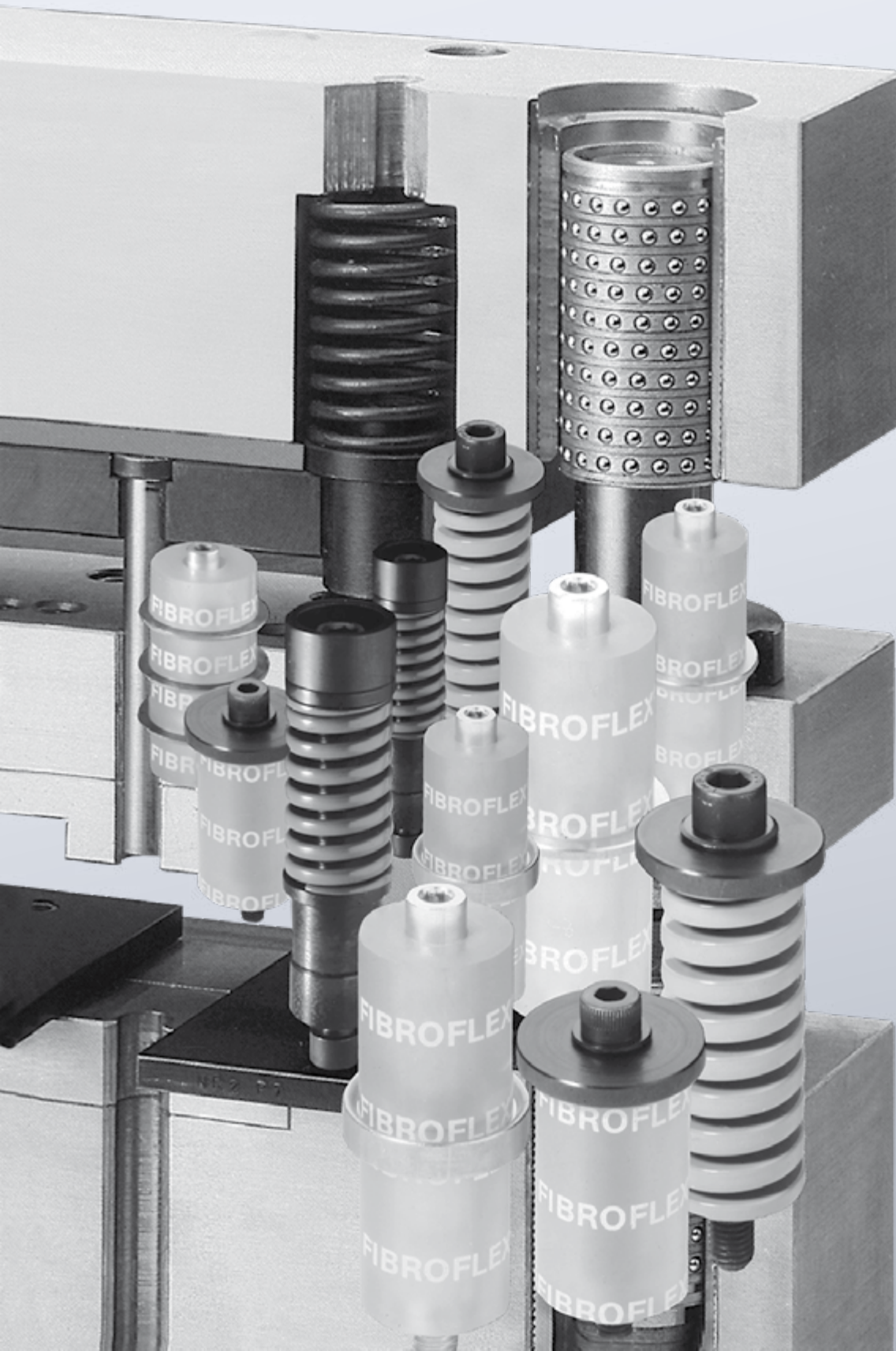
f = deflection of spring, caused by load F

F = load F [N], causing deflection f

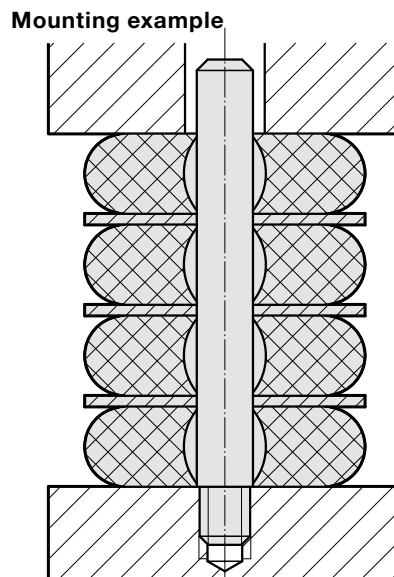
242.01. Disc spring DIN 2093

Order No	in accord. with DIN 2093 series	D_a h12	D_i H12	s	h	l_0	$f_1=$		$f_2=$		$f_3=$		$f_4=$		$f_5=$	
							0,2 h	F_1 [N]	0,4 h	F_2 [N]	0,6 h	F_3	0,7 h	F_4 [N]	0,8 h	F_5 [N]
242.01.080.032.040		8	3.2	0.4	0.2	0.6	0.04	58	0.08	110	0.12	160	0.14	180	0.16	200
242.01.100.052.040	B	10	5.2	0.4	0.3	0.7	0.06	73	0.12	134	0.18	180	0.21	200	0.24	220
242.01.125.062.050	B	12.5	6.2	0.5	0.35	0.85	0.07	100	0.14	180	0.21	250	0.24	280	0.28	310
242.01.140.072.080	A	14	7.2	0.8	0.3	1.1	0.06	230	0.12	450	0.18	660	0.21	770	0.24	870
242.01.150.052.070		15	5.2	0.7	0.4	1.1	0.08	180	0.16	340	0.24	470	0.28	540	0.32	610
242.01.160.082.060	B	16	8.2	0.6	0.45	1.05	0.09	145	0.18	260	0.27	360	0.31	400	0.36	440
242.01.160.082.090	A	16	8.2	0.9	0.35	1.25	0.07	300	0.14	580	0.21	850	0.24	970	0.28	1,100
242.01.180.092.100	A	18	9.2	1	0.4	1.4	0.08	370	0.16	720	0.24	1,050	0.28	1,200	0.32	1,350
242.01.200.102.080	B	20	10.2	0.8	0.55	1.35	0.11	250	0.22	470	0.33	650	0.38	730	0.44	800
242.01.200.102.090		20	10.2	0.9	0.55	1.45	0.11	340	0.22	640	0.33	900	0.38	1,000	0.44	1,150
242.01.200.102.110	A	20	10.2	1.1	0.45	1.55	0.09	450	0.18	870	0.27	1,350	0.31	1,450	0.36	1,650
242.01.230.122.125		23	12.2	1.25	0.6	1.85	0.12	710	0.24	1,360	0.36	1,960	0.42	2,240	0.48	2,520
242.01.250.122.150	A	25	12.2	1.5	0.55	2.05	0.11	860	0.22	1,650	0.33	2,450	0.38	2,800	0.44	3,100
242.01.250.122.100		25	12.2	1	0.6	1.6	0.12	320	0.24	600	0.36	840	0.42	950	0.48	1,050
242.01.280.142.100	B	28	14.2	1	0.8	1.8	0.16	400	0.32	720	0.48	970	0.56	1,100	0.64	1,200
242.01.280.142.150	A	28	14.2	1.5	0.65	2.15	0.13	850	0.26	1,650	0.39	2,400	0.45	2,700	0.52	3,100
242.01.315.163.125	B	31.5	16.3	1.25	0.9	2.15	0.18	660	0.36	1,200	0.54	1,650	0.63	1,850	0.72	2,000
242.01.315.163.175	A	31.5	16.3	1.75	0.7	2.45	0.14	1,150	0.28	2,200	0.42	3,200	0.49	3,700	0.56	4,200
242.01.355.183.200	A	35.5	18.3	2	0.8	2.8	0.16	1,550	0.32	3,000	0.48	4,300	0.56	5,000	0.64	5,600
242.01.400.142.150		40	14.2	1.5	1.25	2.75	0.25	950	0.5	1,700	0.75	2,200	0.87	2,500	1	2,700
242.01.400.204.225	A	40	20.4	2.25	0.9	3.15	0.18	1,900	0.36	3,700	0.54	5,400	0.63	5,200	0.72	7,000
242.01.450.224.250	A	45	22.4	2.5	1	3.5	0.2	2,300	0.4	4,500	0.6	6,400	0.7	7,400	0.8	8,500
242.01.500.183.150		50	18.3	1.5	1.8	3.3	0.36	1,200	0.72	2,000	1.08	2,400	1.26	2,600	1.44	2,700
242.01.500.254.250		50	25.4	2.5	1.4	3.9	0.28	2,850	0.56	5,350	0.84	7,600	0.98	8,650	1.12	9,650
242.01.500.254.300	A	50	25.4	3	1.1	4.1	0.22	3,500	0.44	6,800	0.66	10,000	0.77	11,500	0.88	13,000
242.01.560.285.200	B	56	28.5	2	1.6	3.6	0.32	1,600	0.64	2,900	0.96	3,900	1.12	4,300	1.28	4,700
242.01.600.204.200		60	20.4	2	2.1	4.1	0.42	2,000	0.84	3,400	1.26	4,300	1.47	4,700	1.68	5,000

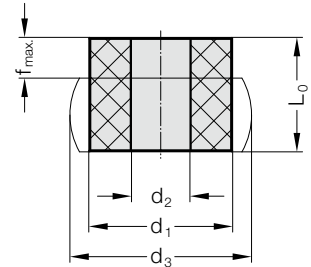
ELASTOMER SPRINGS SPRING AND SPACER UNITS ACCESSORIES



FIBROFLEX®-ELASTOMER SPRING FOR FIBROFLEX®-SPRING SYSTEM



244.1.



Description:

FIBROFLEX® Spring Systems represent a finely graded range of elastomer spring units (material: polyurethane) exhibiting particular suitability for all stamping dies and related tools.

The 244.-Systems comprise FIBROFLEX® Spring Elements 244.1., available in three Shore hardnesses. With the aid of Stacking Washers 244.4. and Guide Pins 244.5., the elements can be stacked.

Note that stacking with interposed stacking washers results in the addition of the individual spring deflections – without addition of the spring forces.

Note:

☞ Physical and chemical properties of FIBROFLEX®-Elastomer – see at the beginning of chapter G.
Dowel pins (235./2351.1.) or guide pins (244.5.), recommended for stacks higher than $1,5 \times d_2$.

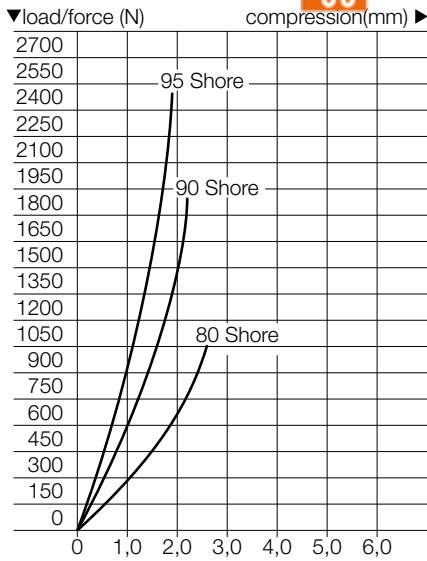
244.1. FIBROFLEX®-Elastomer spring for FIBROFLEX®-Spring system

Order No	Spring hardness	d ₁	d ₂	d ₃	L ₀	f max.	F max. [N]
244.1.16.5	80 Shore A	16	6.5	20	7.5	2.6	1,060
244.1.20.5	80 Shore A	20	8.5	26	10	3.5	1,580
244.1.25.5	80 Shore A	25	10.5	32	12.5	4.3	2,670
244.1.32.5	80 Shore A	32	13.5	40	15	5.2	4,500
244.1.40.5	80 Shore A	40	13.5	50	17.5	6.1	7,200
244.1.16.6	90 Shore A	16	6.5	20	7.5	2.2	1,900
244.1.20.6	90 Shore A	20	8.5	26	10	3	2,650
244.1.25.6	90 Shore A	25	10.5	32	12.5	3.7	4,400
244.1.32.6	90 Shore A	32	13.5	40	15	4.5	6,550
244.1.40.6	90 Shore A	40	13.5	50	17.5	5.2	11,200
244.1.16.7	95 Shore A	16	6.5	20	7.5	1.9	2,500
244.1.20.7	95 Shore A	20	8.5	26	10	2.5	3,500
244.1.25.7	95 Shore A	25	10.5	32	12.5	3.1	4,500
244.1.32.7	95 Shore A	32	13.5	40	15	3.9	7,800
244.1.40.7	95 Shore A	40	13.5	50	17.5	4.4	13,500

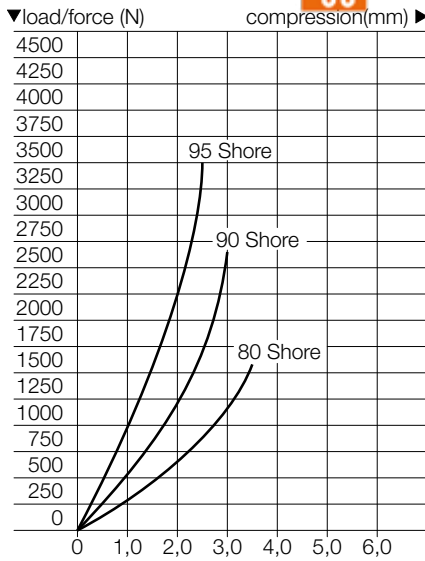


FIBROFLEX®-ELASTOMER SPRING FOR FIBROFLEX®-SPRING SYSTEM

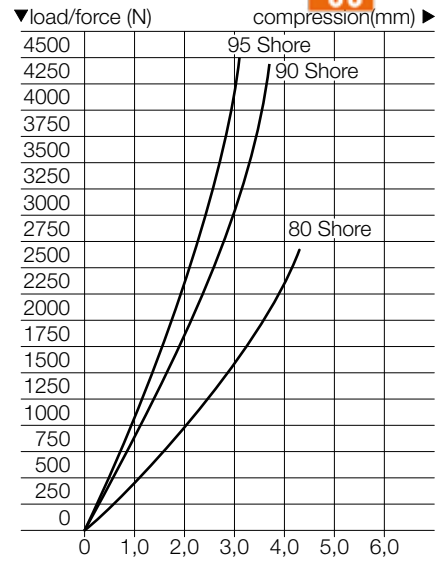
244.1.16. - ø 16



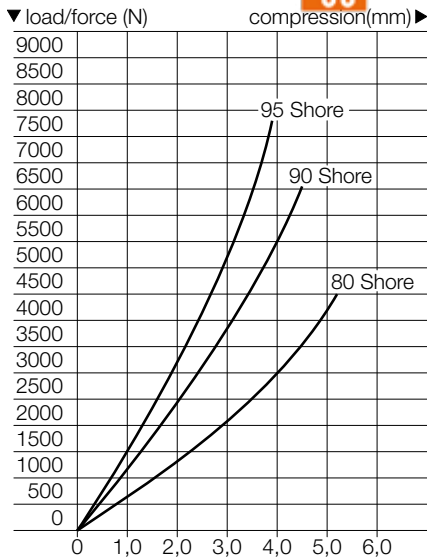
244.1.20. - ø 20



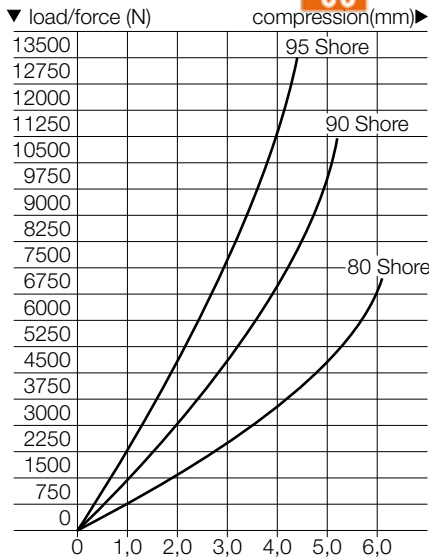
244.1.25. - ø 25



244.1.32. - ø 32



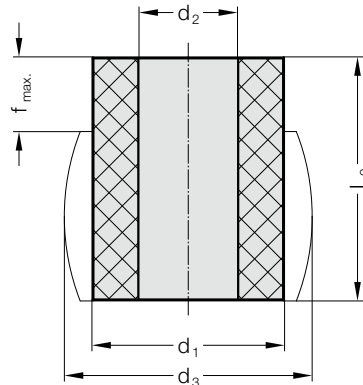
244.1.40. - ø 40



FIBROFLEX®-TUBULAR SPRING ELEMENT 80 SHORE A, TO DIN ISO 10069-1



246.5.



Description:

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX®-Elements. Shore hardness ratings are symbolized by distinctive colour coding.

Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 80 Shore A
Colour: green

Note:

The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness.

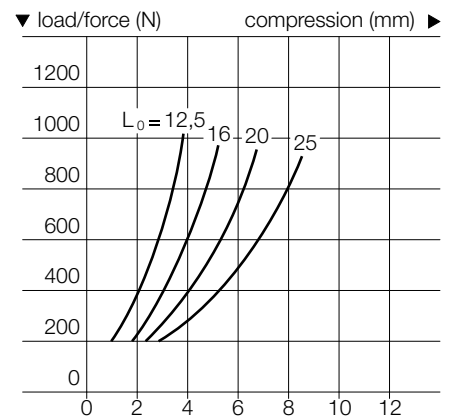
Settlement may be as much as 4 to 7% of the spring length L_0 .

246.5. FIBROFLEX®-Tubular spring element 80 Shore A, to DIN ISO 10069-1

Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]	Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]
246.5.016.012	16	12.5	6.5	21	4.3	1,020	246.5.063.100	63	100	17	81	35	16,200
246.5.016.016	16	16	6.5	21	5.6	980	246.5.063.125	63	125	17	81	43.7	16,000
246.5.016.020	16	20	6.5	21	7	950	246.5.080.032	80	32	21	104	11.2	31,500
246.5.016.025	16	25	6.5	21	8.7	940	246.5.080.040	80	40	21	104	14	30,100
246.5.020.016	20	16	8.5	26	5.6	1,530	246.5.080.050	80	50	21	104	17.5	29,900
246.5.020.020	20	20	8.5	26	7	1,510	246.5.080.063	80	63	21	104	22	28,800
246.5.020.025	20	25	8.5	26	8.7	1,500	246.5.080.080	80	80	21	104	28	28,300
246.5.020.032	20	32	8.5	26	10.6	1,490	246.5.080.100	80	100	21	104	35	28,100
246.5.025.020	25	20	10.5	32	7	2,600	246.5.080.125	80	125	21	104	43.7	28,000
246.5.025.025	25	25	10.5	32	8.7	2,550	246.5.100.032	100	32	21	130	10.6	56,000
246.5.025.032	25	32	10.5	32	10.6	2,520	246.5.100.040	100	40	21	130	14	52,000
246.5.025.040	25	40	10.5	32	14	2,500	246.5.100.050	100	50	21	130	17.5	50,000
246.5.032.032	32	32	13.5	42	10.6	3,900	246.5.100.063	100	63	21	130	22	47,500
246.5.032.040	32	40	13.5	42	14	3,850	246.5.100.080	100	80	21	130	28	45,000
246.5.032.050	32	50	13.5	42	17.5	3,820	246.5.100.100	100	100	21	130	35	43,300
246.5.032.063	32	63	13.5	42	22	3,800	246.5.100.125	100	125	21	130	43.7	41,500
246.5.040.032	40	32	13.5	52	10.6	6,700	246.5.125.032	125	32	27	160	10.6	92,000
246.5.040.040	40	40	13.5	52	14	6,600	246.5.125.040	125	40	27	160	14	85,000
246.5.040.050	40	50	13.5	52	17.5	6,550	246.5.125.050	125	50	27	160	17.5	80,000
246.5.040.063	40	63	13.5	52	22	6,500	246.5.125.063	125	63	27	160	22	75,000
246.5.040.080	40	80	13.5	52	28	6,480	246.5.125.080	125	80	27	160	28	71,000
246.5.050.032	50	32	17	65	10.6	10,800	246.5.125.100	125	100	27	160	35	70,500
246.5.050.040	50	40	17	65	14	10,400	246.5.125.125	125	125	27	160	43.7	70,000
246.5.050.050	50	50	17	65	17.5	10,200	246.5.125.160	125	160	27	160	56	68,000
246.5.050.063	50	63	17	65	22	10,000							
246.5.050.080	50	80	17	65	28	9,950							
246.5.050.100	50	100	17	65	35	9,900							
246.5.063.032	63	32	17	81	11.2	18,650							
246.5.063.040	63	40	17	81	14	18,000							
246.5.063.050	63	50	17	81	17.5	17,500							
246.5.063.063	63	63	17	81	22	17,000							
246.5.063.080	63	80	17	81	28	16,500							

246.5.016.

Ø 16/80 Shore

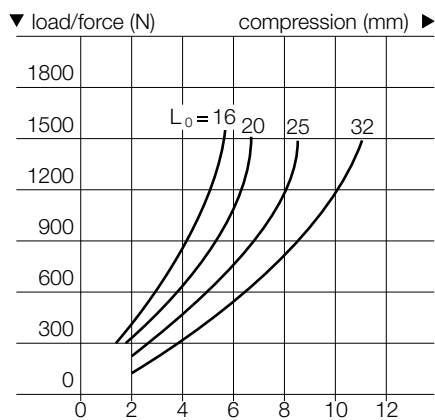




FIBROFLEX®-TUBULAR SPRING ELEMENT 80 SHORE A, TO DIN ISO 10069-1

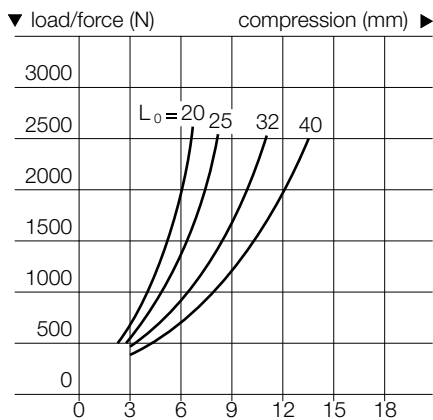
246.5.020.

Ø 20/80 Shore A



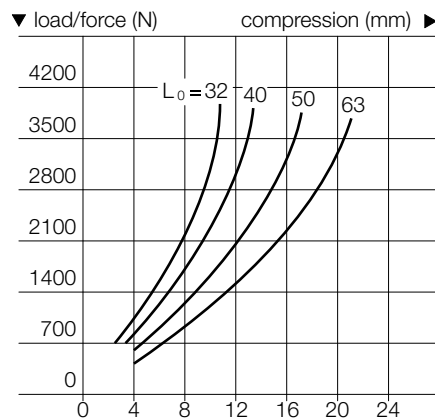
246.5.025.

Ø 25/80 Shore A



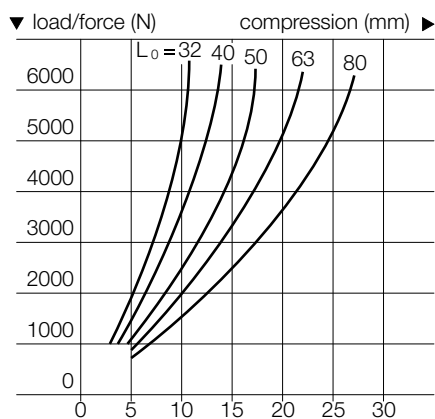
246.5.032.

Ø 32/80 Shore A



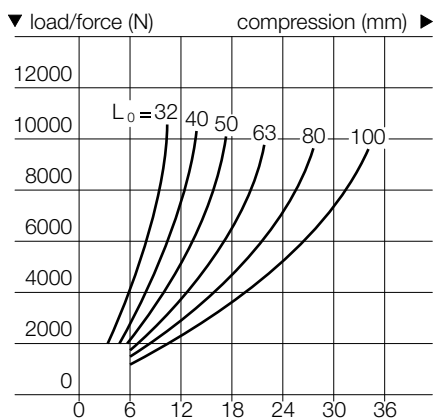
246.5.040.

Ø 40/80 Shore A



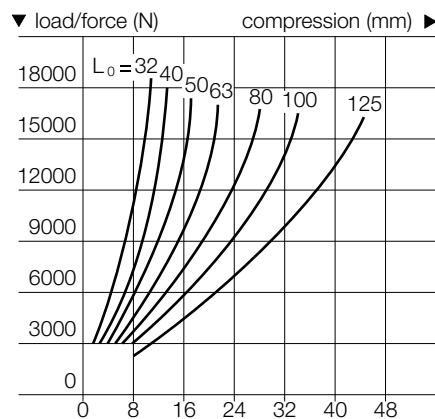
246.5.050.

Ø 50/80 Shore A



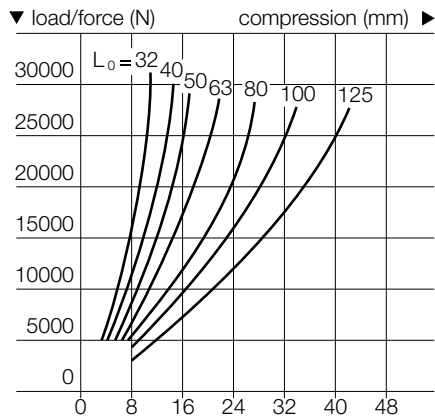
246.5.063.

Ø 63/80 Shore A



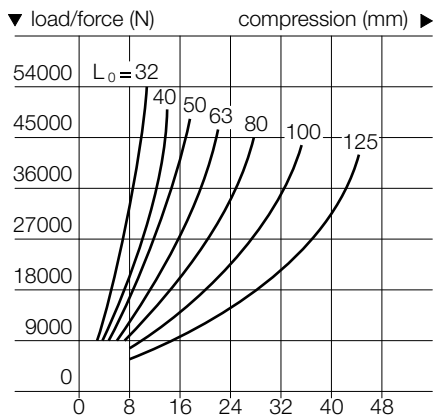
246.5.080.

Ø 80/80 Shore A



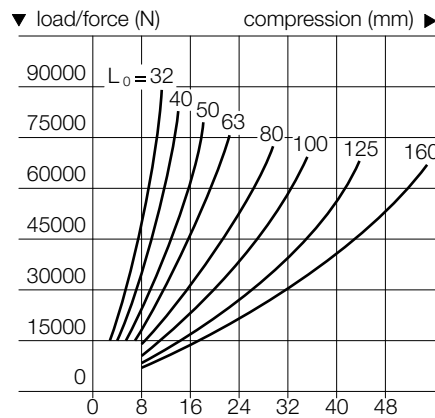
246.5.100.

Ø 100/80 Shore A



246.5.125.

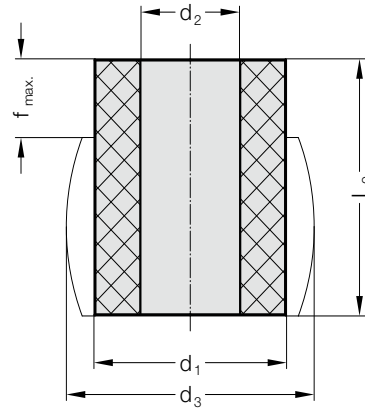
Ø 125/80 Shore A



FIBROFLEX®-TUBULAR SPRING ELEMENT 90 SHORE A, TO DIN ISO 10069-1



246.6.



Description:

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX®-Elements. Shore hardness ratings are symbolized by distinctive colour coding.

Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 90 Shore A
Colour: yellow

Note:

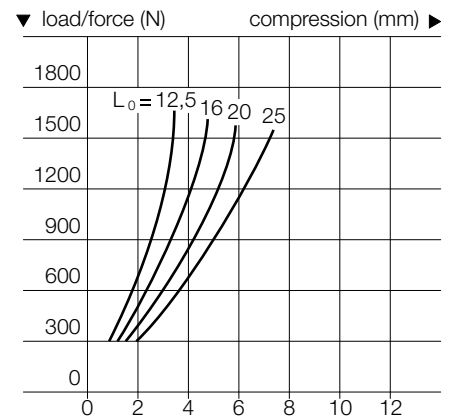
The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness.

Settlement may be as much as 4 to 7% of the spring length L_0 .

246.6. FIBROFLEX®-Tubular spring element 90 Shore A, to DIN ISO 10069-1

Order No	d ₁	l ₀	d ₂	d ₃	f max.	F max. [N]	Order No	d ₁	l ₀	d ₂	d ₃	f max.	F max. [N]
246.6.016.012	16	12.5	6.5	21	3.6	1,680	246.6.063.100	63	100	17	81	30	27,300
246.6.016.016	16	16	6.5	21	4.8	1,650	246.6.063.125	63	125	17	81	37.5	26,800
246.6.016.020	16	20	6.5	21	6	1,620	246.6.080.032	80	32	21	104	9.6	53,000
246.6.016.025	16	25	6.5	21	7.5	1,580	246.6.080.040	80	40	21	104	12	50,500
246.6.020.016	20	16	8.5	26	4.8	2,600	246.6.080.050	80	50	21	104	15	48,000
246.6.020.020	20	20	8.5	26	6	2,550	246.6.080.063	80	63	21	104	18.9	46,500
246.6.020.025	20	25	8.5	26	7.5	2,530	246.6.080.080	80	80	21	104	24	45,500
246.6.020.032	20	32	8.5	26	9.6	2,500	246.6.080.100	80	100	21	104	30	44,900
246.6.025.020	25	20	10.5	32	6	4,300	246.6.080.125	80	125	21	104	37.5	44,000
246.6.025.025	25	25	10.5	32	7.5	4,200	246.6.100.032	100	32	21	130	9.6	90,000
246.6.025.032	25	32	10.5	32	9.6	4,150	246.6.100.040	100	40	21	130	12	84,800
246.6.025.040	25	40	10.5	32	12	4,120	246.6.100.050	100	50	21	130	15	81,000
246.6.032.032	32	32	13.5	42	9.6	6,400	246.6.100.063	100	63	21	130	18.9	78,000
246.6.032.040	32	40	13.5	42	12	6,350	246.6.100.080	100	80	21	130	24	75,000
246.6.032.050	32	50	13.5	42	15	6,300	246.6.100.100	100	100	21	130	30	73,000
246.6.032.063	32	63	13.5	42	18.9	6,250	246.6.100.125	100	125	21	130	37.5	71,000
246.6.040.032	40	32	13.5	52	9.6	11,000	246.6.125.032	125	32	27	160	9.6	150,000
246.6.040.040	40	40	13.5	52	12	10,900	246.6.125.040	125	40	27	160	12	142,500
246.6.040.050	40	50	13.5	52	15	10,800	246.6.125.050	125	50	27	160	15	132,000
246.6.040.063	40	63	13.5	52	18.9	10,750	246.6.125.063	125	63	27	160	18.9	125,000
246.6.040.080	40	80	13.5	52	24	10,700	246.6.125.080	125	80	27	160	24	118,000
246.6.050.032	50	32	17	65	9.6	17,400	246.6.125.100	125	100	27	160	30	115,000
246.6.050.040	50	40	17	65	12	17,300	246.6.125.125	125	125	27	160	37.5	113,000
246.6.050.050	50	50	17	65	15	17,000	246.6.125.160	125	160	27	160	48	111,300
246.6.050.063	50	63	17	65	18.9	16,650							
246.6.050.080	50	80	17	65	24	16,500							
246.6.050.100	50	100	17	65	30	16,400							
246.6.063.032	63	32	17	81	9.6	30,100							
246.6.063.040	63	40	17	81	12	29,500							
246.6.063.050	63	50	17	81	15	28,900							
246.6.063.063	63	63	17	81	18.9	28,000							
246.6.063.080	63	80	17	81	24	27,500							

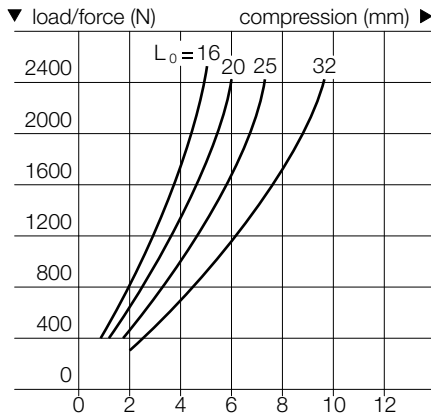
246.6.016. Ø 16/90 Shore A



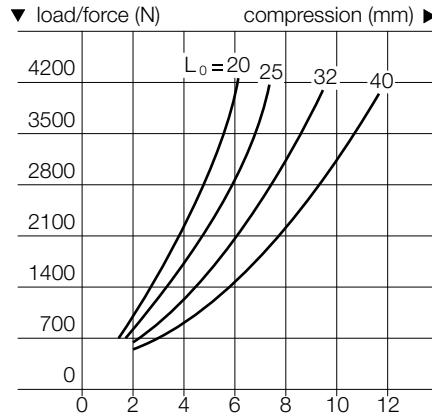


FIBROFLEX®-TUBULAR SPRING ELEMENT 90 SHORE A, TO DIN ISO 10069-1

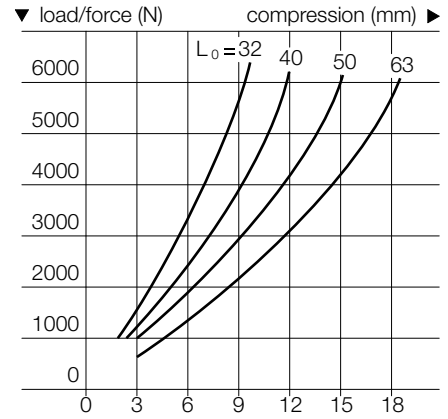
246.6.020.
Ø 20/90 Shore A



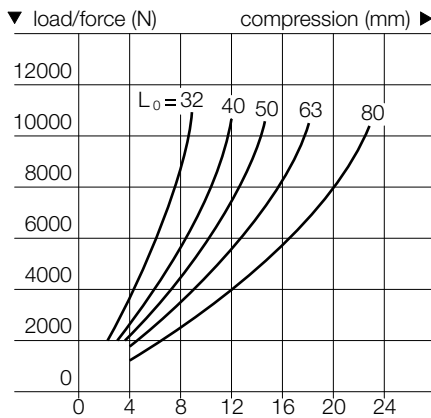
246.6.025.
Ø 25/90 Shore A



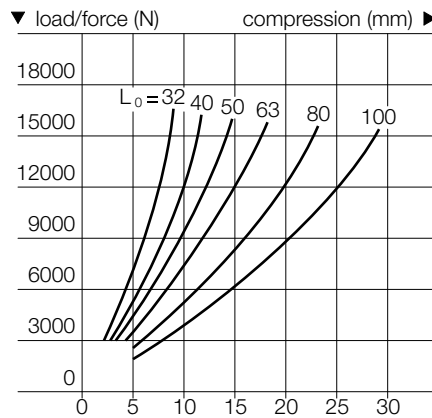
246.6.032.
Ø 32/90 Shore A



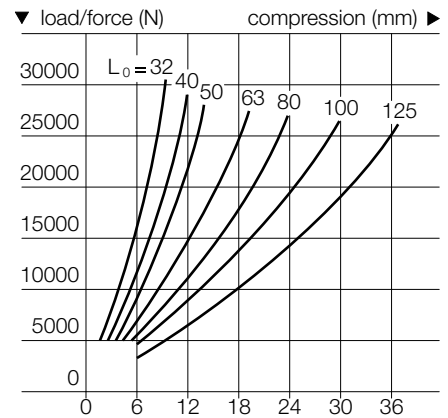
246.6.040.
Ø 40/90 Shore A



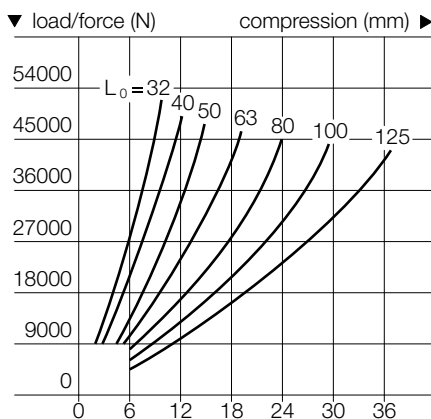
246.6.050.
Ø 50/90 Shore A



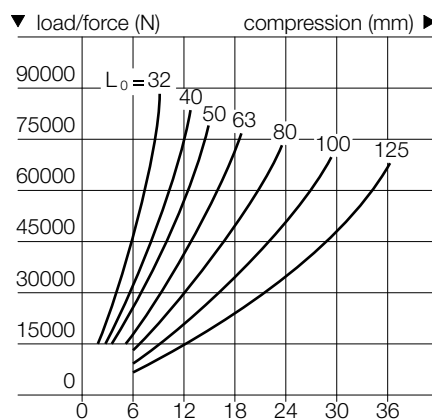
246.6.063.
Ø 63/90 Shore A



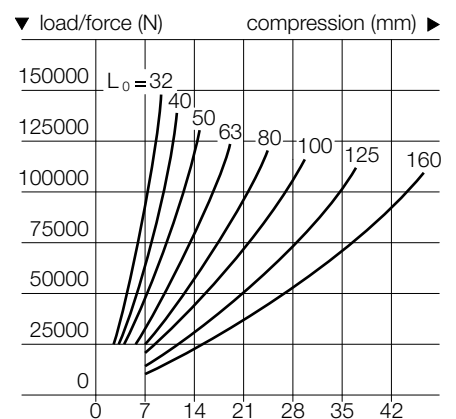
246.6.080.
Ø 80/90 Shore A



246.6.100.
Ø 100/90 Shore A



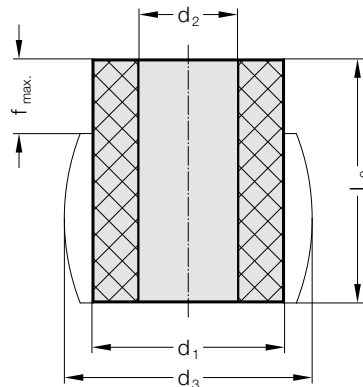
246.6.125.
Ø 125/90 Shore A



FIBROFLEX®-TUBULAR SPRING ELEMENT 95 SHORE A, TO DIN ISO 10069-1



246.7.



Description:

FIBROFLEX® Spring Elements are made from highly elastic polyurethane elastomers. Shore hardness is the most significant rating of the various FIBROFLEX®-Elements. Shore hardness ratings are symbolized by distinctive colour coding.

Correct selection of Shore hardness has a fundamental bearing on the success of FIBROFLEX®-applications.

Material:

Polyurethan 95 Shore A

Colour: red

Note:

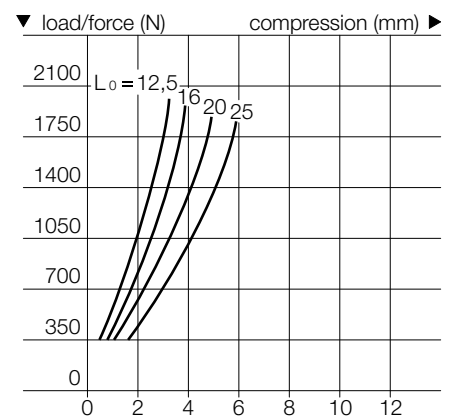
The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness.

Settlement may be as much as 4 to 7% of the spring length L_0 .

246.7. FIBROFLEX®-Tubular spring element 95 Shore A, to DIN ISO 10069-1

Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]	Order No	d ₁	L ₀	d ₂	d ₃	f max.	F max. [N]
246.7.016.012	16	12.5	6.5	21	3.1	2,000	246.7.063.100	63	100	17	81	25	31,800
246.7.016.016	16	16	6.5	21	4	1,920	246.7.063.125	63	125	17	81	31.2	31,600
246.7.016.020	16	20	6.5	21	5	1,900	246.7.080.032	80	32	21	104	8	62,500
246.7.016.025	16	25	6.5	21	6.2	1,870	246.7.080.040	80	40	21	104	10	59,000
246.7.020.016	20	16	8.5	26	4	3,050	246.7.080.050	80	50	21	104	12.5	58,000
246.7.020.020	20	20	8.5	26	5	3,000	246.7.080.063	80	63	21	104	15.7	55,000
246.7.020.025	20	25	8.5	26	6.2	2,980	246.7.080.080	80	80	21	104	20	54,000
246.7.020.032	20	32	8.5	26	8	2,950	246.7.080.100	80	100	21	104	25	53,000
246.7.025.020	25	20	10.5	32	5	5,100	246.7.080.125	80	125	21	104	31.2	52,000
246.7.025.025	25	25	10.5	32	6.2	5,080	246.7.100.032	100	32	21	130	8	110,000
246.7.025.032	25	32	10.5	32	8	5,020	246.7.100.040	100	40	21	130	10	102,500
246.7.025.040	25	40	10.5	32	10	5,000	246.7.100.050	100	50	21	130	12.5	95,000
246.7.032.032	32	32	13.5	42	8	7,600	246.7.100.063	100	63	21	130	15.7	92,000
246.7.032.040	32	40	13.5	42	10	7,500	246.7.100.080	100	80	21	130	20	89,000
246.7.032.050	32	50	13.5	42	12	7,480	246.7.100.100	100	100	21	130	25	87,000
246.7.032.063	32	63	13.5	42	15.7	7,450	246.7.100.125	100	125	21	130	31.2	86,000
246.7.040.032	40	32	13.5	52	8	13,000	246.7.125.032	125	32	27	160	8	178,000
246.7.040.040	40	40	13.5	52	10	12,700	246.7.125.040	125	40	27	160	10	168,000
246.7.040.050	40	50	13.5	52	12.5	12,500	246.7.125.050	125	50	27	160	12.5	157,000
246.7.040.063	40	63	13.5	52	15.7	12,450	246.7.125.063	125	63	27	160	15.7	150,000
246.7.040.080	40	80	13.5	52	20	12,430	246.7.125.080	125	80	27	160	20	142,000
246.7.050.032	50	32	17	65	8	21,000	246.7.125.100	125	100	27	160	25	135,000
246.7.050.040	50	40	17	65	10	20,100	246.7.125.125	125	125	27	160	31.2	133,000
246.7.050.050	50	50	17	65	12.5	19,600	246.7.125.160	125	160	27	160	40	130,000
246.7.050.063	50	63	17	65	15.7	19,200							
246.7.050.080	50	80	17	65	20	19,100							
246.7.050.100	50	100	17	65	25	19,050							
246.7.063.032	63	32	17	81	8	37,000							
246.7.063.040	63	40	17	81	10	35,900							
246.7.063.050	63	50	17	81	12.5	34,000							
246.7.063.063	63	63	17	81	15.7	33,000							
246.7.063.080	63	80	17	81	20	32,000							

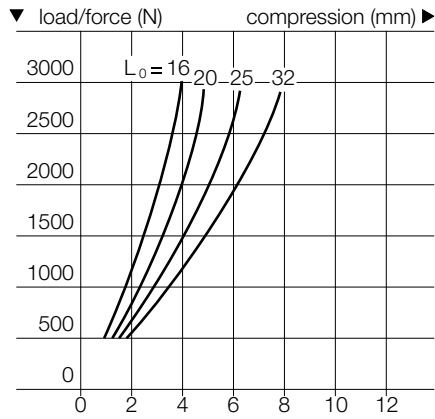
246.7.016.
Ø 16/95 Shore A



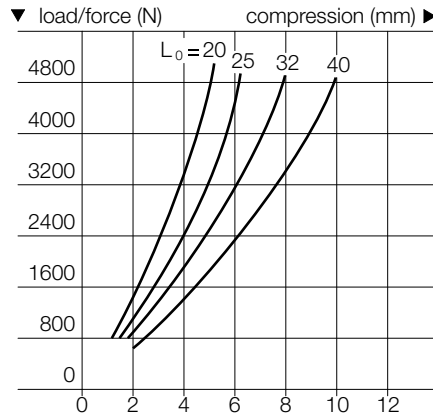


FIBROFLEX®-TUBULAR SPRING ELEMENT 95 SHORE A, TO DIN ISO 10069-1

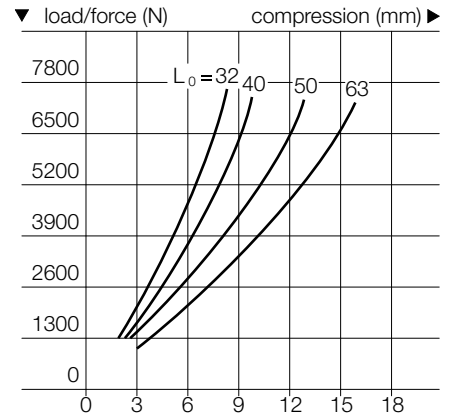
246.7.020.
Ø 20/95 Shore A



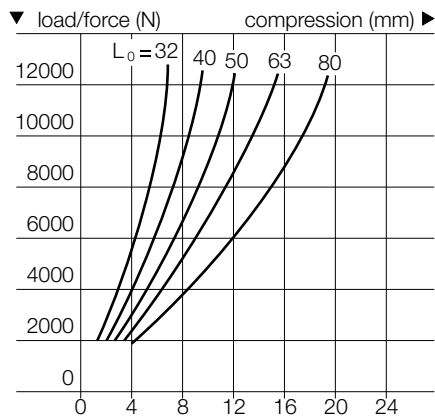
246.7.025.
Ø 25/95 Shore A



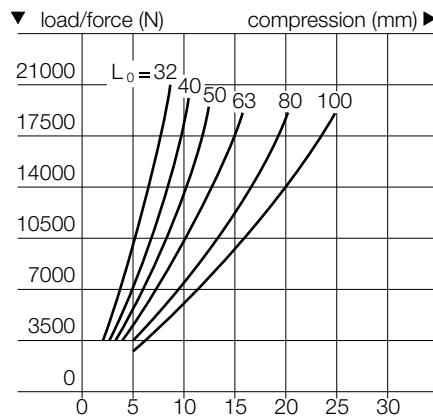
246.7.032.
Ø 32/95 Shore A



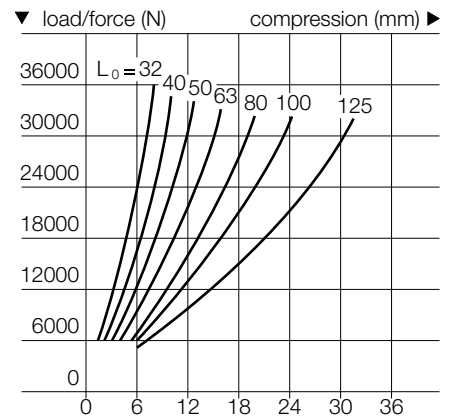
246.7.040.
Ø 40/95 Shore A



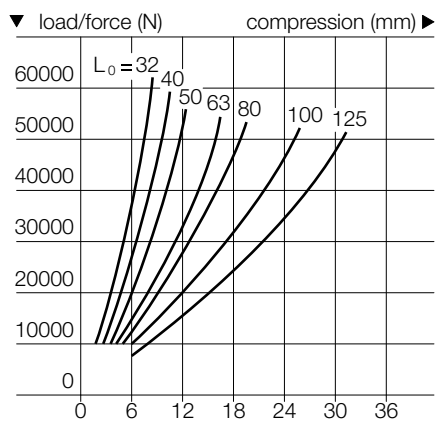
246.7.050.
Ø 50/95 Shore A



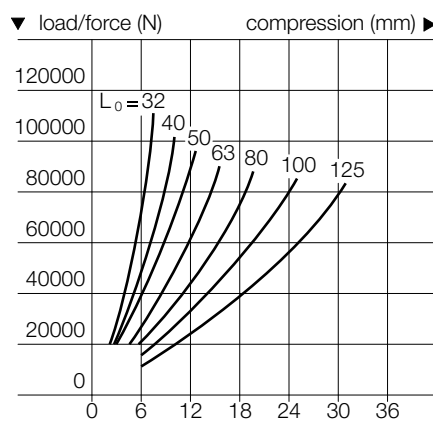
246.7.063.
Ø 63/95 Shore A



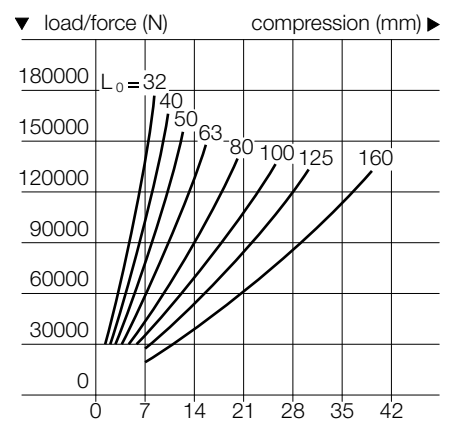
246.7.080.
Ø 80/95 Shore A



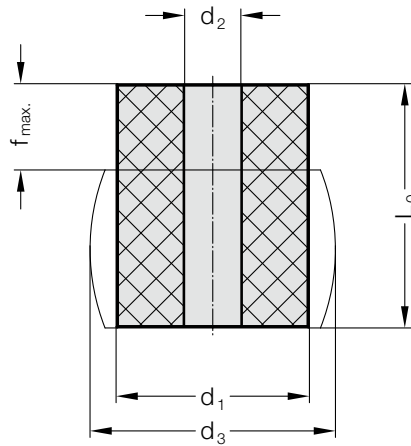
246.7.100.
Ø 100/95 Shore A



246.7.125.
Ø 125/95 Shore A



FIBROELAST® TUBULAR SPRING ELEMENT 70 SHORE A



Material:

Polyester-based polyurethane 70 Shore A
Colour: white

Note:

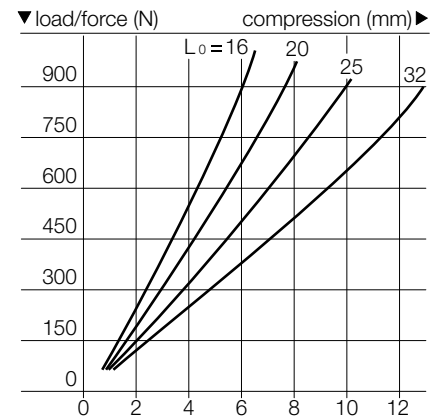
The physical properties of polyurethane elastomers means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness. Settlement may be as much as 4 to 7% of the spring length L_0 .

2461.4. FIBROELAST® Tubular spring element 70 Shore A

Order No	d ₁	L ₀	d ₂	d ₃	f max.	Order No	d ₁	L ₀	d ₂	d ₃	f max.
2461.4.016.012	16	12	6.5	21	4.8	2461.4.063.100	63	100	17	81	40
2461.4.016.016	16	16	6.5	21	6.4	2461.4.063.125	63	125	17	81	50
2461.4.016.020	16	20	6.5	21	8	2461.4.080.032	80	32	21	104	12.8
2461.4.016.025	16	25	6.5	21	10	2461.4.080.040	80	40	21	104	16
2461.4.020.016	20	16	8.5	26	6.4	2461.4.080.050	80	50	21	104	20
2461.4.020.020	20	20	8.5	26	8	2461.4.080.063	80	63	21	104	25.2
2461.4.020.025	20	25	8.5	26	10	2461.4.080.080	80	80	21	104	32
2461.4.020.032	20	32	8.5	26	12.8	2461.4.080.100	80	100	21	104	40
2461.4.025.020	25	20	10.5	32	8	2461.4.080.125	80	125	21	104	50
2461.4.025.025	25	25	10.5	32	10	2461.4.100.032	100	32	21	130	12.8
2461.4.025.032	25	32	10.5	32	12.8	2461.4.100.040	100	40	21	130	16
2461.4.025.040	25	40	10.5	32	16	2461.4.100.050	100	50	21	130	20
2461.4.032.032	32	32	13.5	42	12.8	2461.4.100.063	100	63	21	130	25.2
2461.4.032.040	32	40	13.5	42	16	2461.4.100.080	100	80	21	130	32
2461.4.032.050	32	50	13.5	42	20	2461.4.100.100	100	100	21	130	40
2461.4.032.063	32	63	13.5	42	25.2	2461.4.100.125	100	125	21	130	50
2461.4.040.032	40	32	13.5	52	12.8	2461.4.125.032	125	32	27	160	12.8
2461.4.040.040	40	40	13.5	52	16	2461.4.125.040	125	40	27	160	16
2461.4.040.050	40	50	13.5	52	20	2461.4.125.050	125	50	27	160	20
2461.4.040.063	40	63	13.5	52	25.2	2461.4.125.063	125	63	27	160	25.2
2461.4.040.080	40	80	13.5	52	32	2461.4.125.080	125	80	27	160	32
2461.4.050.032	50	32	17	65	12.8	2461.4.125.100	125	100	27	160	40
2461.4.050.040	50	40	17	65	16	2461.4.125.125	125	125	27	160	50
2461.4.050.050	50	50	17	65	20	2461.4.125.160	125	160	27	160	64
2461.4.050.063	50	63	17	65	25.2						
2461.4.050.080	50	80	17	65	32						
2461.4.050.100	50	100	17	65	40						
2461.4.063.032	63	32	17	81	12.8						
2461.4.063.040	63	40	17	81	16						
2461.4.063.050	63	50	17	81	20						
2461.4.063.063	63	63	17	81	25.2						
2461.4.063.080	63	80	17	81	32						

2461.4.020.

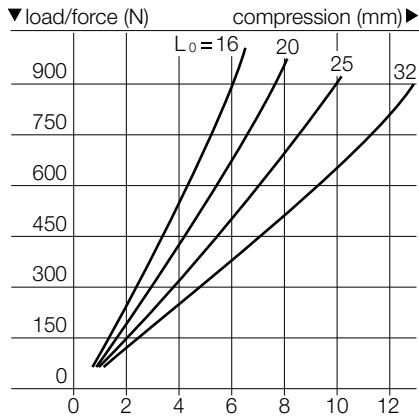
∅ 20/70 Shore A



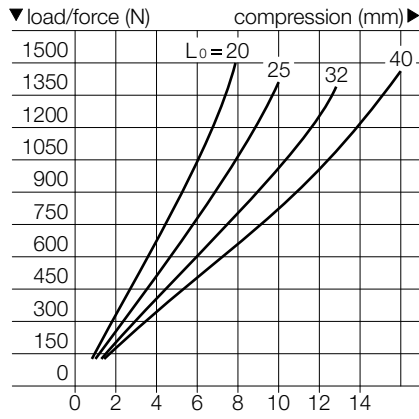


FIBROELAST® TUBULAR SPRING ELEMENT 70 SHORE A

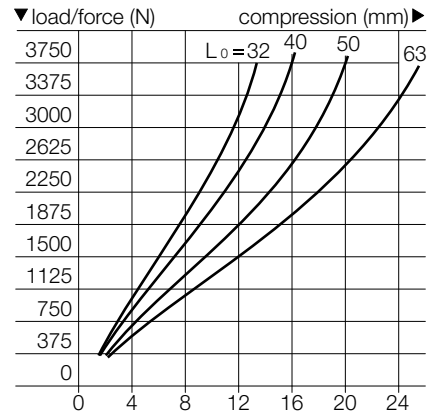
2461.4.020.
Ø 20/70 Shore A



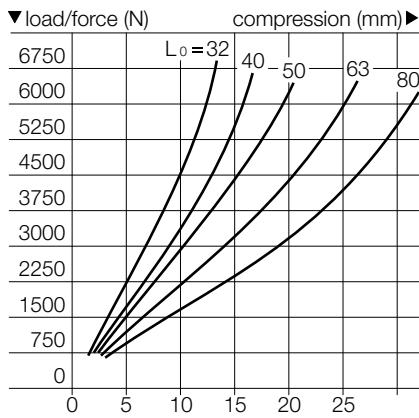
2461.4.025.
Ø 25/70 Shore A



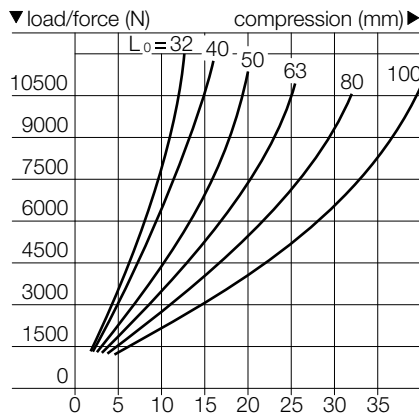
2461.4.032.
Ø 32/70 Shore A



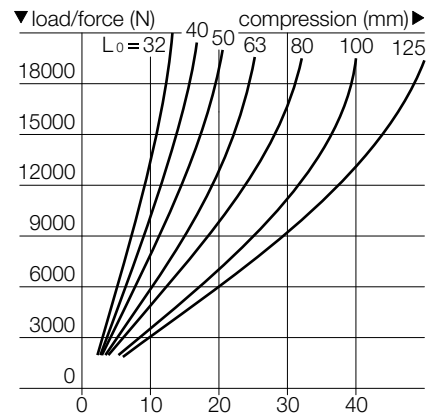
2461.4.040.
Ø 40/70 Shore A



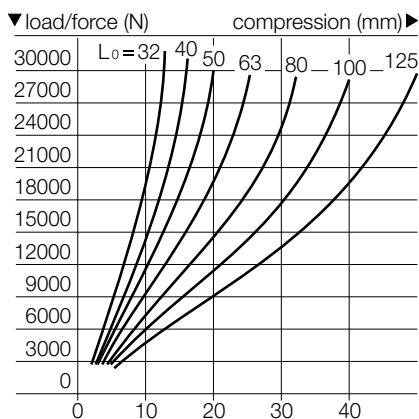
2461.4.050.
Ø 50/70 Shore A



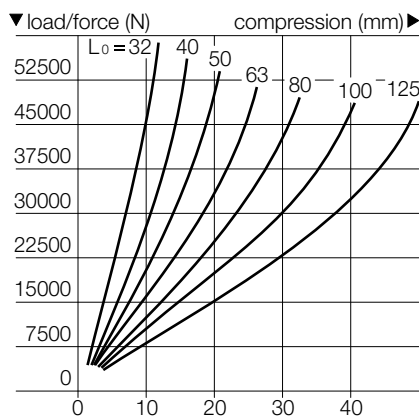
2461.4.063.
Ø 63/70 Shore A



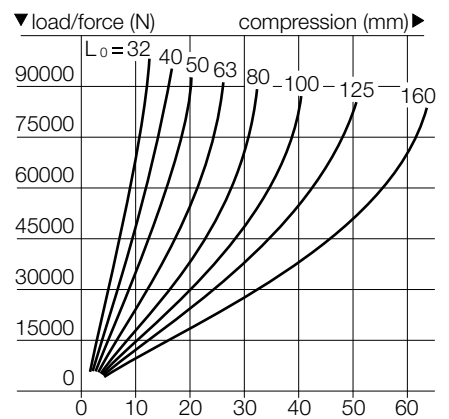
2461.4.080.
Ø 80/70 Shore A



2461.4.100.
Ø 100/70 Shore A



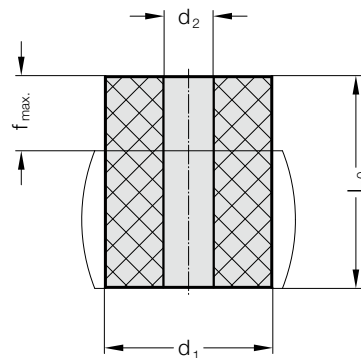
2461.4.125.
Ø 125/70 Shore A



TUBULAR SPRING ELEMENT, RUBBER 70 SHORE A



2461.2.



Material:

Chloroprene rubber 70 shore A
Colour: black

Note:

The physical properties of elastomere springs means that they have a tendency to settle. The extent of such settlement is dependent on the internal heat of friction, speed and number of load changes, the spring travel and the Shore hardness. Settlement may be as much as 3 to 5% of the spring length L_0 .

Physical characteristics:

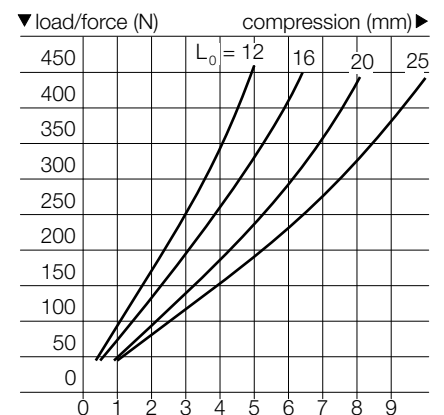
Tensile strength acc. to DIN 53504: $\geq 12 \text{ N/mm}^2$
Elongation at break acc. to DIN 53504: $\geq 250 \%$
Bulk density acc. to DIN 53479: 1.37 g/cm^3
Compression set acc. to DIN 53517: $\leq 20 \%$ (24 h/70 °C)
Temperature scope: -20 °C to 80 °C short-term to max. 120 °C

2461.2. Tubular spring element, Rubber 70 Shore A

Order No	d ₁	L ₀	d ₂	f max.	Order No	d ₁	L ₀	d ₂	f max.
2461.2.016.012	16	12	6.5	4.8	2461.2.063.100	63	100	17	40
2461.2.016.016	16	16	6.5	6.4	2461.2.063.125	63	125	17	50
2461.2.016.020	16	20	6.5	8	2461.2.080.032	80	32	21	12.8
2461.2.016.025	16	25	6.5	10	2461.2.080.040	80	40	21	16
2461.2.020.016	20	16	8.5	6.4	2461.2.080.050	80	50	21	20
2461.2.020.020	20	20	8.5	8	2461.2.080.063	80	63	21	25.2
2461.2.020.025	20	25	8.5	10	2461.2.080.080	80	80	21	32
2461.2.020.032	20	32	8.5	12.8	2461.2.080.100	80	100	21	40
2461.2.025.020	25	20	10.5	8	2461.2.080.125	80	125	21	50
2461.2.025.025	25	25	10.5	10	2461.2.100.032	100	32	21	12.8
2461.2.025.032	25	32	10.5	12.8	2461.2.100.040	100	40	21	16
2461.2.025.040	25	40	10.5	16	2461.2.100.050	100	50	21	20
2461.2.032.032	32	32	13.5	12.8	2461.2.100.063	100	63	21	25.2
2461.2.032.040	32	40	13.5	16	2461.2.100.080	100	80	21	32
2461.2.032.050	32	50	13.5	20	2461.2.100.100	100	100	21	40
2461.2.032.063	32	63	13.5	25.2	2461.2.100.125	100	125	21	50
2461.2.040.032	40	32	13.5	12.8	2461.2.125.032	125	32	27	12.8
2461.2.040.040	40	40	13.5	16	2461.2.125.040	125	40	27	16
2461.2.040.050	40	50	13.5	20	2461.2.125.050	125	50	27	20
2461.2.040.063	40	63	13.5	25.2	2461.2.125.063	125	63	27	25.2
2461.2.040.080	40	80	13.5	32	2461.2.125.080	125	80	27	32
2461.2.050.032	50	32	17	12.8	2461.2.125.100	125	100	27	40
2461.2.050.040	50	40	17	16	2461.2.125.125	125	125	27	50
2461.2.050.050	50	50	17	20	2461.2.125.160	125	160	27	64
2461.2.050.063	50	63	17	25.2					
2461.2.050.080	50	80	17	32					
2461.2.050.100	50	100	17	40					
2461.2.063.032	63	32	17	12.8					
2461.2.063.040	63	40	17	16					
2461.2.063.050	63	50	17	20					
2461.2.063.063	63	63	17	25.2					
2461.2.063.080	63	80	17	32					

2461.2.016.

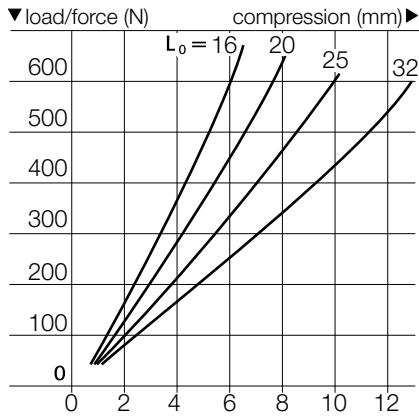
∅ 16/70 Shore A



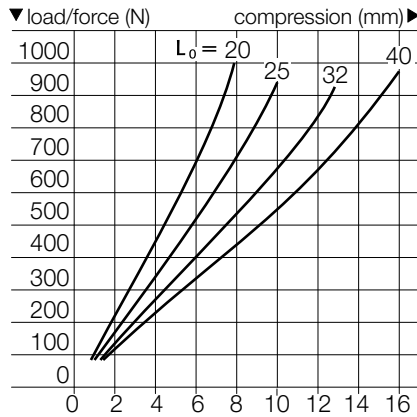


TUBULAR SPRING ELEMENT, RUBBER 70 SHORE A

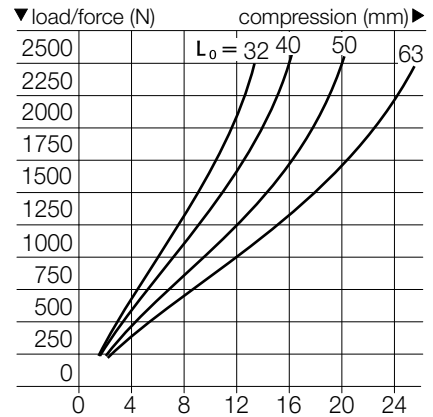
2461.2.020.
Ø 20/70 Shore A



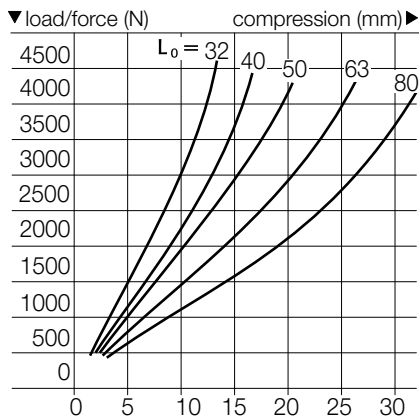
2461.2.025.
Ø 25/70 Shore A



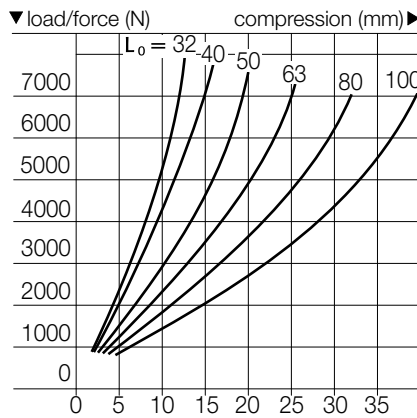
2461.2.032.
Ø 32/70 Shore A



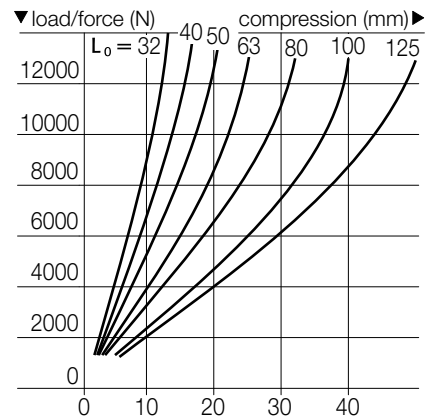
2461.2.040.
Ø 40/70 Shore A



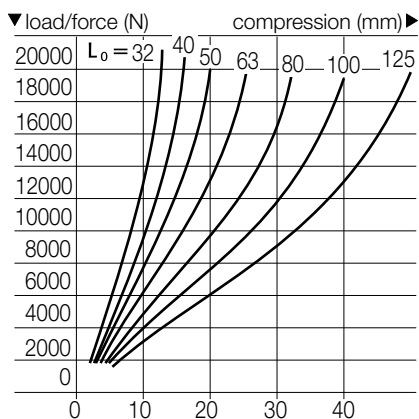
2461.2.050.
Ø 50/70 Shore A



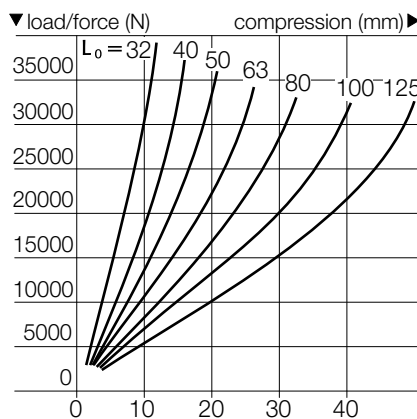
2461.2.063.
Ø 63/70 Shore A



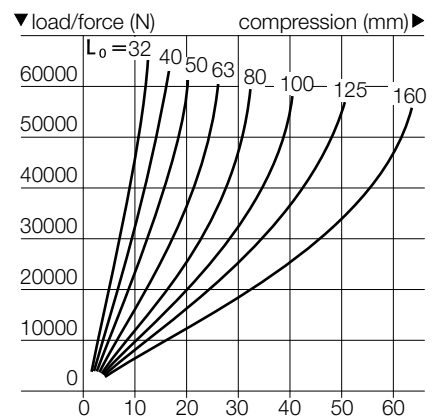
2461.2.080.
Ø 80/70 Shore A



2461.2.100.
Ø 100/70 Shore A



2461.2.125.
Ø 125/70 Shore A

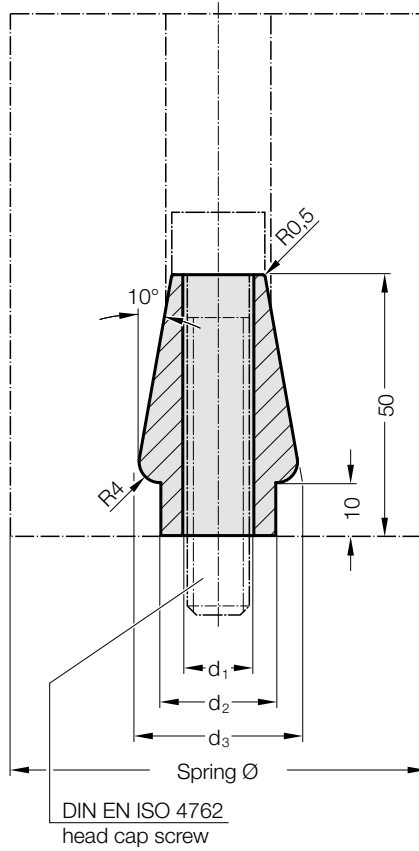


LOCATING BOLT

LOCATING BOLT, THREADED



2441.5.



2441.5.

Locating bolt

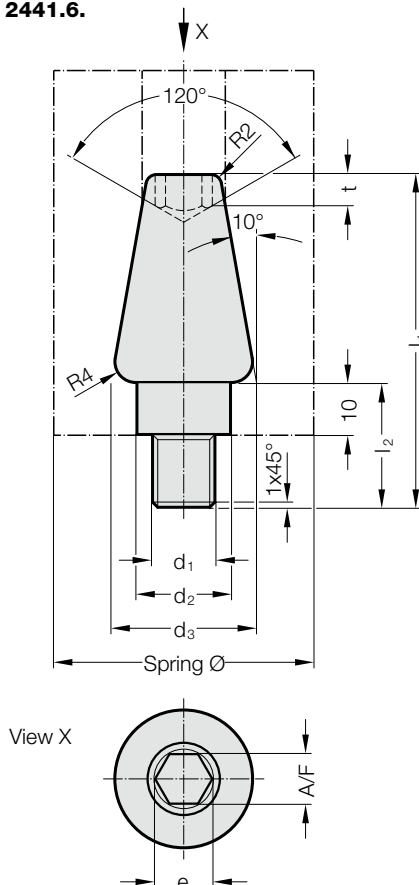
Order No	Spring				Socket cap screw DIN EN ISO 4762	
	\varnothing	d_1	d_2	d_3		
2441.5.10	63	11	18	28	M10x65	
2441.5.12	80	100	13.5	22	32	M12x70
2441.5.16	125	17.5	28	38	M16x70	

Note:

Elastomeric round springs are positioned and secured in place by the locating bolts. Screws are not included.



2441.6.



2441.6.

Locating bolt, threaded

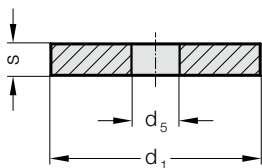
Order No	Spring							
	\varnothing	d_1	d_2	d_3	l_1	l_2	SW	e t
2441.6.12	63	M12	18	28	64	24	10	11.46
2441.6.16	80	100	M16	22	32	68	28	10 11.46
2441.6.20	125	M20	28	38	72	32	14	16 8

Note:

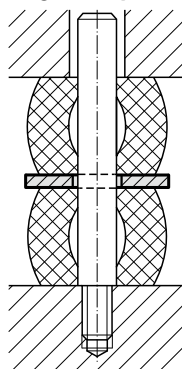
Elastomeric round springs are positioned and secured in place by the locating bolts.

STACKING WASHER DIN ISO 10069-2 THRUST WASHER

2441.3.



Mounting example



2441.3. Stacking washer DIN ISO 10069-2

Spring- ϕ	16	20	25	32	40	50	63	80	100	125
d_1	20	25	30	40	50	60	80	100	120	150
d_5	6.5	8.5	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
s	4	4	5	5	5	6	6	8	8	8

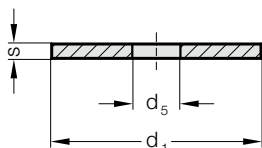
Material:

Brass

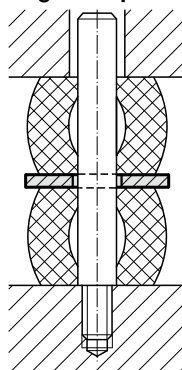
Ordering Code (example):

Stacking washer DIN ISO 10069-2	=	2441.3.
Spring diameter Spring- ϕ	50 mm =	050
Order No	=	2441.3. 050

244.4.



Mounting example



244.4. Thrust washer

Spring- ϕ	16	20	25	32	40	50	63	80	100	125
d_1	20	26	32	40	50	60	80	100	120	150
d_5	6.5	8.5	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
s	1	1.5	2	2.5	2.5	3	3	4	4	5

Material:

St 37

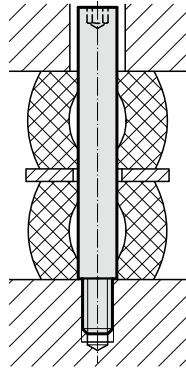
Ordering Code (example):

Thrust washer	=	244.4.
Spring diameter Spring- ϕ	50 mm =	050
Order No	=	244.4. 050

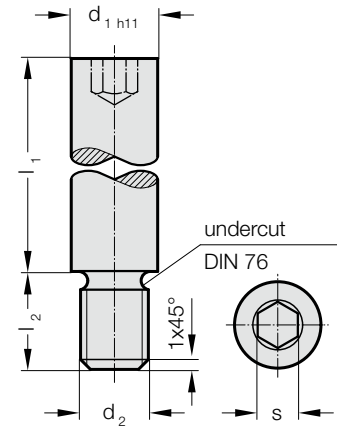
GUIDE PIN TRUST WASHER FOR ELASTOMER SPRINGS



Mounting example



244.5.



Material:

C 15

244.5. Guide pin

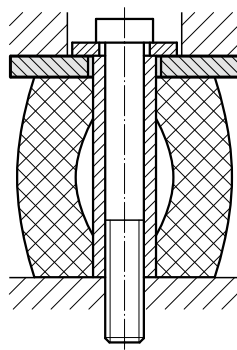
d ₁	6	8	10	13	16	20	25
d ₂	M4	M6	M8	M10	M12	M16	M20
l ₂	6	9	15	15	18	25	30
s	3	4	5	6	8	10	14
l ₁							
20	•	•	•				
25	•	•	•				
32	•	•	•	•	•		
40	•	•	•	•	•		
50		•	•	•	•	•	•
63			•	•	•	•	•
80				•	•	•	•
95				•	•	•	•
118					•	•	•
140					•	•	•
180					•	•	•

Ordering Code (example):

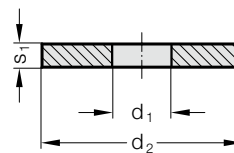
Guide pin	=	244.5.
Nominal diameter d ₁	16 mm =	16.
Guide length l ₁	40 mm =	040
Order No	=	244.5. 16.040



Mounting example



244.6.



Material:

St 37

244.6. Trust washer for elastomer springs

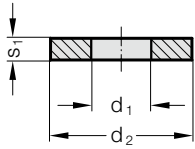
Spring-ø	25	32	40	50	63	80	100	125
d ₁	10.5	13.5	13.5	16.5	16.5	20.5	20.5	26
d ₂	32	40	50	60	80	100	120	150
s ₁	4	5	5	6	8	10	12	15

Ordering Code (example):

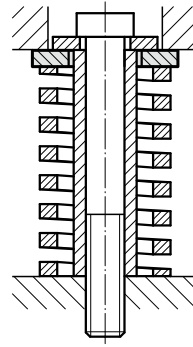
Trust washer for elastomer springs	=	244.6.
Spring diameter Spring-ø	63 mm =	063
Order No	=	244.6. 063

TRUST WASHER FOR COMPRESSION SPRINGS

244.7.



Mounting example



244.7. Trust washer for compression springs

Spring- ϕ	20	25	32	40	50	63
d_1	10.5	12.5	16.5	20.5	25.5	35.5
d_2	25	25	38	38	50	65
s_1	4	4	5	5	6	8

Material:

No 1.1191, heat treated

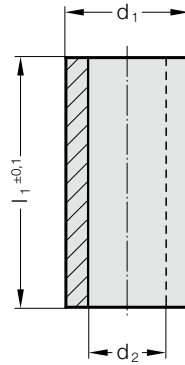
Ordering Code (example):

Trust washer for compression springs	=	244.7.
Spring diameter Spring- ϕ	40 mm =	040
Order No	=	244.7. 040

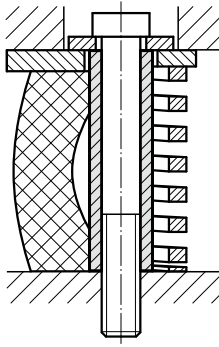
SPACER TUBE



244.9.



Mounting example



Material:

E235 (1.0308), carbonitrided

Note:

Other lengths on request!

244.9. Spacer tube

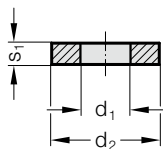
d ₁	10	12	13	16	19	20	25	30	32	35	36	36	42	42	55	
d ₂	6.4	8.4	9	11	13	13	17	22	22	23	22	26	26	32	31	
l ₁																
27	•	•														
30																
33	•	•														
38	•	•														
40																
44	•	•														
48	•	•														
50																
61	•	•														
63																
70																
72	•	•														
80	•	•														
90																
95																
100																
105																
115																
125																
135																
145																
150																
155																
165																
175																
185																
195																
200																
205																
215																
225																
235																
245																
250																
255																

Ordering Code (example):

Spacer tube	=	244.9.
Inner diameter d ₂	6,4 mm	064.
Outer diameter d ₁	10 mm	10.
Length l ₁	27 mm	027
Order No	=	244.9. 064. 10. 027

WASHER

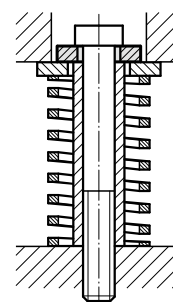
244.10.



244.10. Washer

Order No	d ₁	d ₂	s ₁	Order No	d ₁	d ₂	s ₁
244.10.064.017.03	6.4	17	3	244.10.204.030.05	20.4	30	5
244.10.084.016.04	8.4	16	4	244.10.210.042.06	21	42	6
244.10.084.017.03	8.4	17	3	244.10.210.042.08	21	42	8
244.10.084.023.04	8.4	23	4	244.10.210.044.08	21	44	8
244.10.085.020.04	8.5	20	4	244.10.210.045.08	21	45	8
244.10.090.026.04	9	26	4	244.10.210.045.16	21	45	16
244.10.105.020.04	10.5	20	4	244.10.210.046.06	21	46	6
244.10.105.025.04	10.5	25	4	244.10.210.049.06	21	49	6
244.10.105.025.05	10.5	25	5	244.10.210.050.10	21	50	10
244.10.105.026.04	10.5	26	4	244.10.210.065.08	21	65	8
244.10.105.028.04	10.5	28	4	244.10.210.070.12	21	70	12
244.10.105.030.05	10.5	30	5	244.10.220.065.12	22	65	12
244.10.110.030.06	11	30	6	244.10.220.068.12	22	68	12
244.10.110.036.06	11	36	6	244.10.230.038.07	23	38	7.5
244.10.125.028.04	12.5	28	4	244.10.250.042.09	25	42	9
244.10.130.024.05	13	24	5.5	244.10.250.046.10	25	46	10
244.10.130.030.05	13	30	5	244.10.250.055.10	25	55	10
244.10.130.035.05	13	35	5	244.10.250.056.10	25	56	10
244.10.130.030.06	13	30	6	244.10.250.065.12	25	65	12
244.10.130.035.08	13	35	8	244.10.250.070.10	25	70	10
244.10.130.046.08	13	46	8	244.10.250.090.12	25	90	12
244.10.134.023.04	13.4	23	4	244.10.260.058.06	26	58	6
244.10.135.026.05	13.5	26	5	244.10.260.070.12	26	70	12
244.10.164.026.04	16.4	26	4	244.10.260.080.12	26	80	12
244.10.170.030.06	17	30	6	244.10.290.050.08	29	50	8
244.10.170.034.06	17	34	6	244.10.310.068.08	31	68	8
244.10.170.035.04	17	35	4	244.10.310.068.10	31	68	10
244.10.170.035.06	17	35	6	244.10.310.080.12	31	80	12
244.10.170.036.04	17	36	4	244.10.310.100.15	31	100	15
244.10.170.036.13	17	36	13	244.10.320.090.15	32	90	15
244.10.170.037.06	17	37	6	244.10.320.092.15	32	92	15
244.10.170.038.06	17	38	6	244.10.370.060.08	37	60	8
244.10.170.040.06	17	40	6	244.10.370.080.08	37	80	8
244.10.170.050.06	17	50	6	244.10.430.092.08	43	92	8
244.10.170.050.10	17	50	10				
244.10.170.058.10	17	58	10				

Mounting example

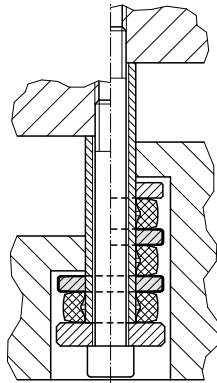


Material:
C 45 heat treated

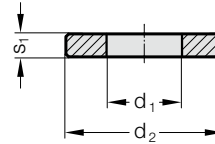
WASHER SPACER SLEEVE



Mounting example



244.10.15.



Material:

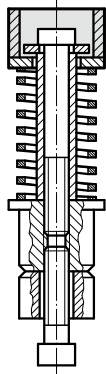
90MnCrV8, hardened

244.10.15. Washer

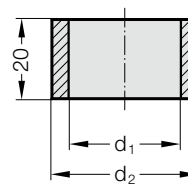
Order No	d ₁	d ₂	s ₁
244.10.15.170.030.04	17	30	4
244.10.15.210.035.06	21	35	6
244.10.15.260.050.06	26	50	6
244.10.15.310.065.08	31	65	8
244.10.15.370.070.08	37	70	8
244.10.15.430.090.08	43	90	8
244.10.15.560.100.08	56	100	8



Mounting example



244.11.



Material:

St 35.4 case-hardened

244.11. Spacer sleeve

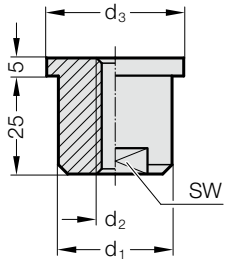
Spring-ø	20 25	32 40
d ₁	20	30
d ₂	25	38
Order code	25	40

Ordering Code (example):

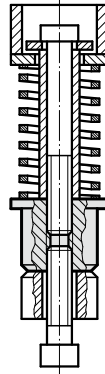
Spacer sleeve	= 244.11.
Order code Diameter 40 mm	= 40
Order No	= 244.11. 40

SPACER PLUG ADJUSTING WASHER

244.12.



Mounting example



244.12. Spacer plug

Spring-ø	20	25	32	40
d ₁	20	20	32	32
d ₂	M6	M8	M10	M12
d ₃	25.3	25.3	38	38
SW	15	15	27	27

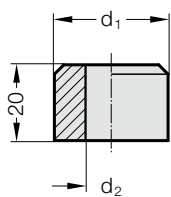
Material:

No. 1.7131 case-hardened

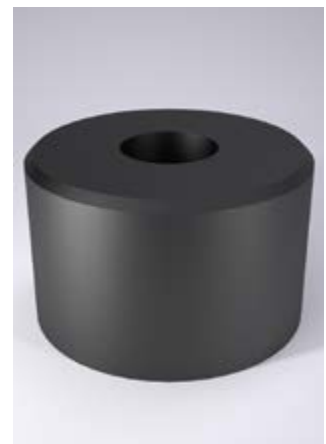
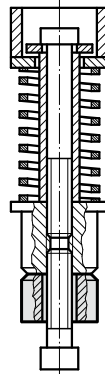
Ordering Code (example):

Spacer plug	=	244.12.
Spring diameter Spring-ø	32 mm =	32
Order No	=	244.12. 32

244.13.



Mounting example



244.13. Adjusting washer

Spring-ø	20	25	32	40
d ₁	20	20	32	32
d ₂	7	9	11	14

Material:

No 1.7131

Ordering Code (example):

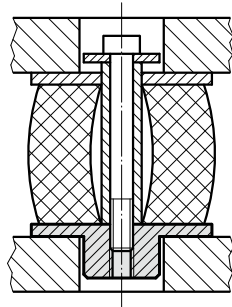
Adjusting washer	=	244.13.
Spring diameter Spring-ø	32 mm =	32
Order No	=	244.13. 32

THREADED DISC FOR ELASTOMER SPRINGS

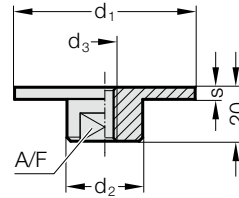
THREADED DISC FOR COMPRESSION SPRINGS



Mounting example



2441.14.



Material:

St 60

2441.14. Threaded disc for elastomer springs

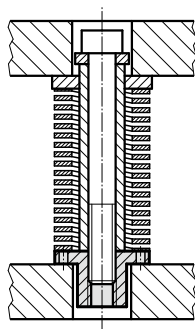
Spring-ø	25	32	40	50	63	80	100
d ₁	32	40	50	60	78	98	120
d ₂	18	18	18	20	20	26	26
d ₃	M6	M8	M8	M10	M10	M12	M12
SW	14	14	14	17	17	22	22
s	5	5	5	6	8	10	12

Ordering Code (example):

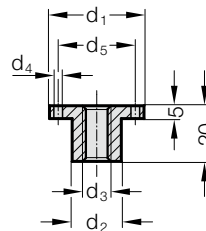
Threaded disc for elastomer springs	=	2441.14.
Spring diameter Spring-ø	50 mm =	050
Order No	=	2441.14. 050



Mounting example



2441.15.



Material:

CK 45 heat treated

2441.15. Threaded disc for compression springs

Spring-ø d ₁	d ₂	d ₃	d ₄	d ₅
20	10	M6	3.2	14
25	12.5	M8	4.2	20
32	16	M10	4.2	25
40	20	M12	4.2	30
50	25	M16	4.2	40

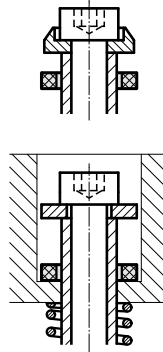
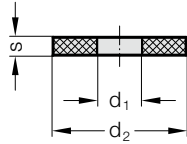
Ordering Code (example):

Threaded disc for compression springs	=	2441.15.
Spring diameter Spring-ø d ₁	32 mm =	032
Order No	=	2441.15. 032

SHOCK ABSORBING WASHER

2450.

Mounting example



Material:

Polyurethan (FIBROFLEX®)

Execution:

2450.6. (90 Shore A) available from stock

2450.5. (80 Shore A) and

2450.7. (95 Shore A) available upon request

2450. Shock absorbing washer

d_1	d_2	s	d_1	d_2	s	d_1	d_2	s
6.4	16	3	21	30	5	32	49	8
11	17	3	13.5	32	4	17	50	6
8.5	20	3	25	32	6	26	50	6
14	23	4	18	32	7	37	53	8
12	24	5	21	35	7	32	60	10
10.5	15	4	23.5	34	4	17	63	6
10.5	25	4	26	35	6	37	65	10
13	19	4	17	38	5	42	70	10
13	25	4	21	38	6	21	80	10
14	26	5	13.5	40	5	21	100	10
15.5	23	4	32	40	6	27	125	10
17	26	4	27	41	7			
18	27	4	31	42	6			
22	28	6	37	46	6			

Ordering Code (example):

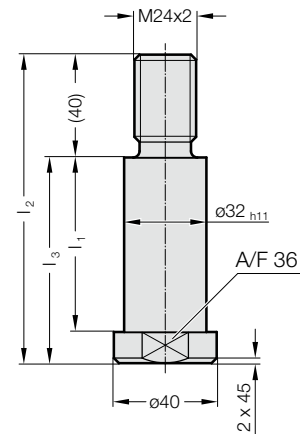
Shock absorbing washer	=	2450.
Shore-A hardness MAT	90 Shore A	= 6.
Inner diameter d_1	23.5 mm	= 23.
Outer diameter d_2	34 mm	= 034.
Thickness s	4 mm	= 04
Order No	=	2450. 6.23.034. 04

RETAINING BOLT THRUST WASHER



Material:
No 1.7225, heat treated

2441.18.



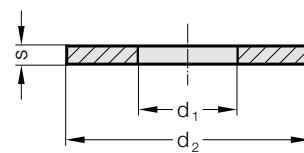
2441.18. Retaining bolt

Order No	l_1	l_2	l_3
2441.18.032.048	48	100	60
2441.18.032.068	68	120	80
2441.18.032.088	88	140	100
2441.18.032.108	108	160	120
2441.18.032.128	128	180	140
2441.18.032.148	148	200	160
2441.18.032.168	168	220	180
2441.18.032.188	188	240	200
2441.18.032.208	208	260	220
2441.18.032.228	228	280	240
2441.18.032.248	248	300	260
2441.18.032.268	268	320	280
2441.18.032.288	288	340	300



Material:
No 1.0570

2441.16.

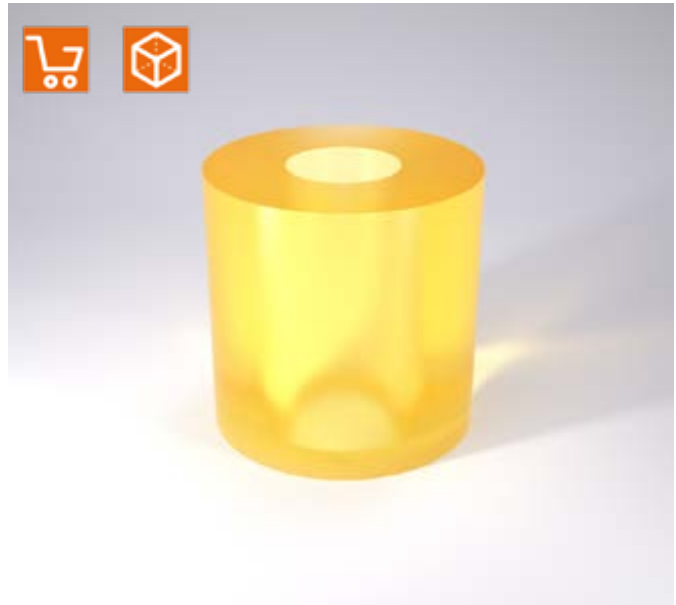
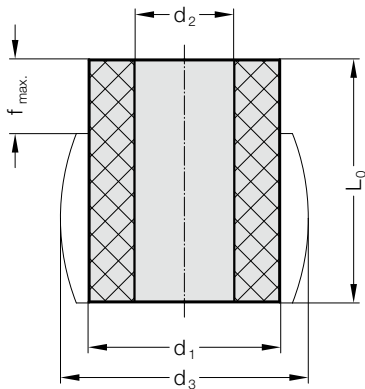


2441.16. Thrust washer

Order No	d_1	d_2	s
2441.16.330.080.06	33	80	6
2441.16.330.100.08	33	100	8

FIBROFLEX®-TUBULAR SPRING ELEMENT

246.6.



246.6. .033. FIBROFLEX®-Tubular spring element

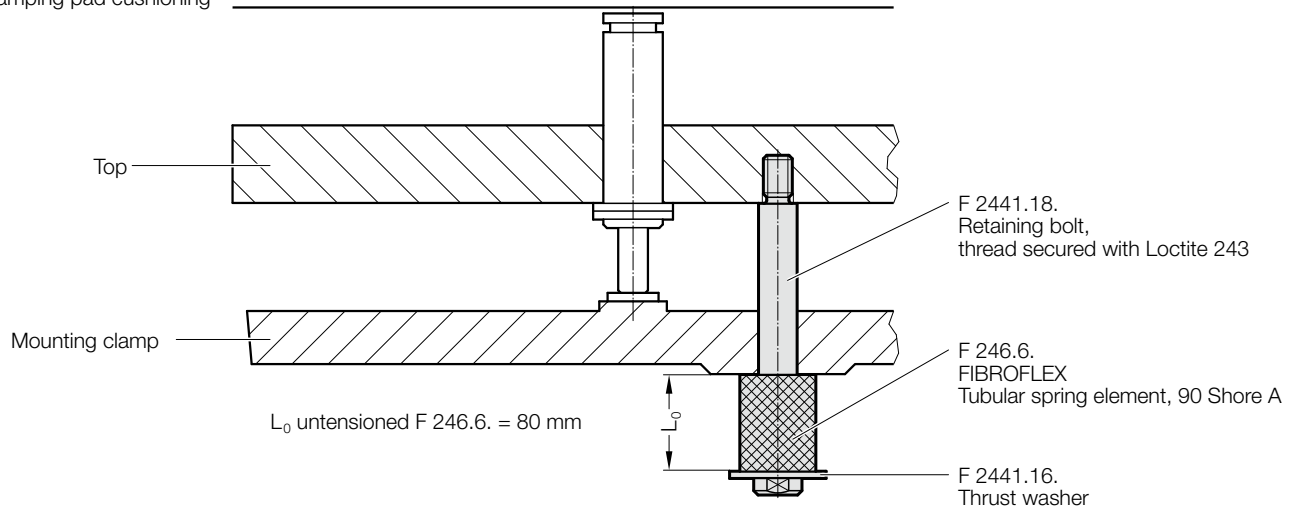
Order No	d ₁	d ₂	d ₃	f max.
246.6.063.033.080	63	33	82	24
246.6.080.033.080	80	33	106	24

Material:

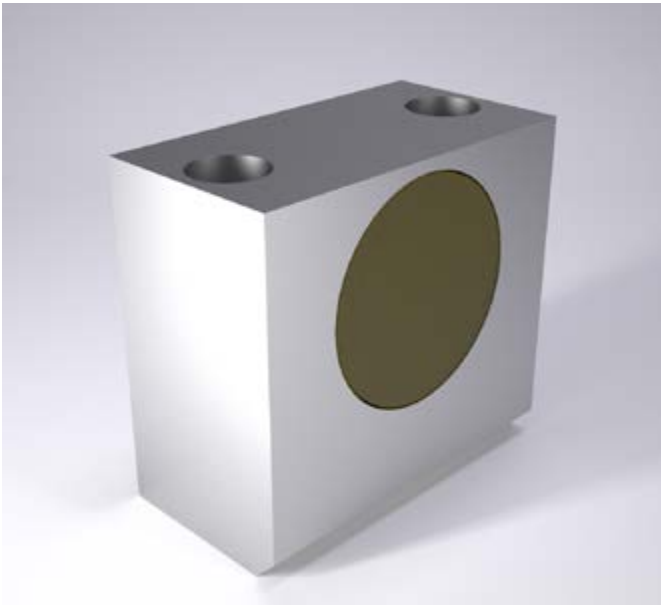
Polyurethane 90 Shore A Colour: yellow

Mounting example:

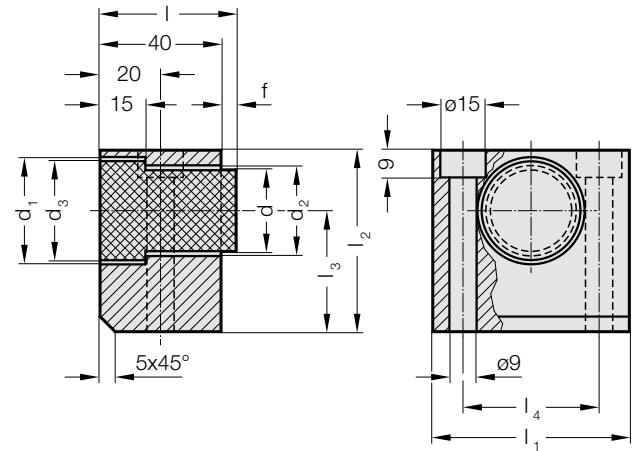
Clamping pad cushioning



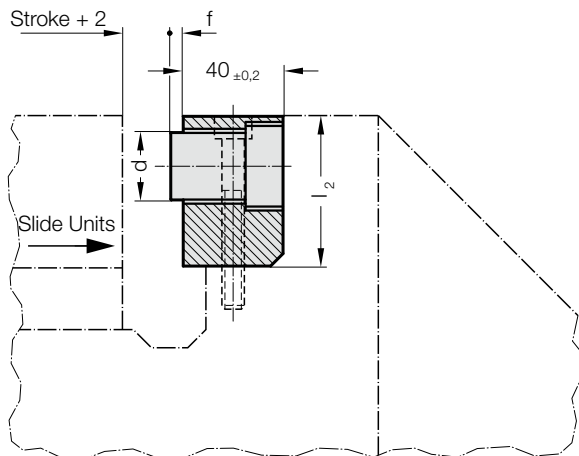
SLIDE STOP



2451.6.



Mounting example



Material:

Mounting block: Steel

Stop buffer: FIBROFLEX®, 90 Shore A

Note:

Screws are not included.

Order No for spare part: Stop buffer 2451.6.□□□.2

Fixing:

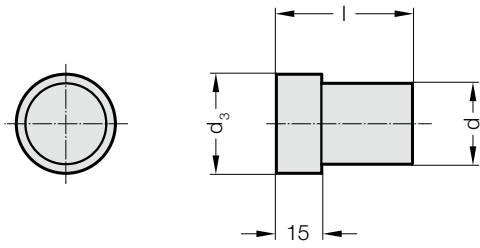
Use socket cap screws DIN EN ISO 4762 M8.

2451.6. Slide stop

Order No	d	d ₁	d ₂	d ₃	l	l ₁	l ₂	l ₃	l ₄	f	Spring force [N]
2451.6.027	27	35	30	34	45	65	60	40	45	5	5,200
2451.6.036	36	45	40	44	45	75	70	45	55	5	9,800

STOP BUFFER

2451.6. .2

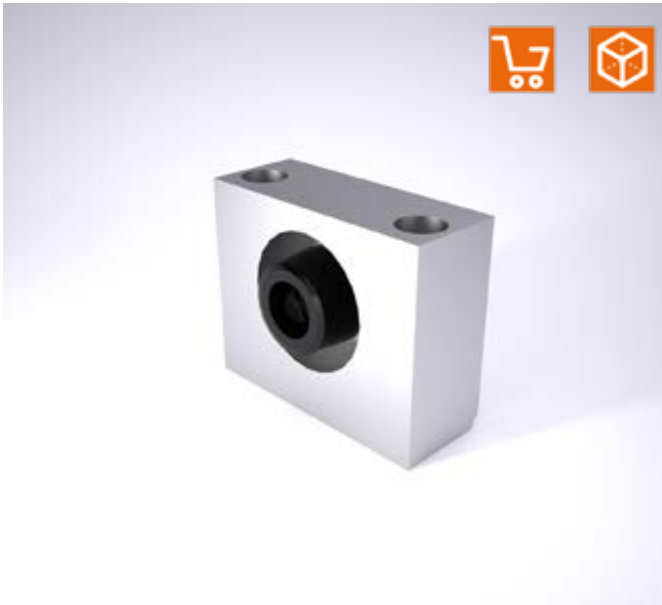


2451.6. .2 Stop buffer

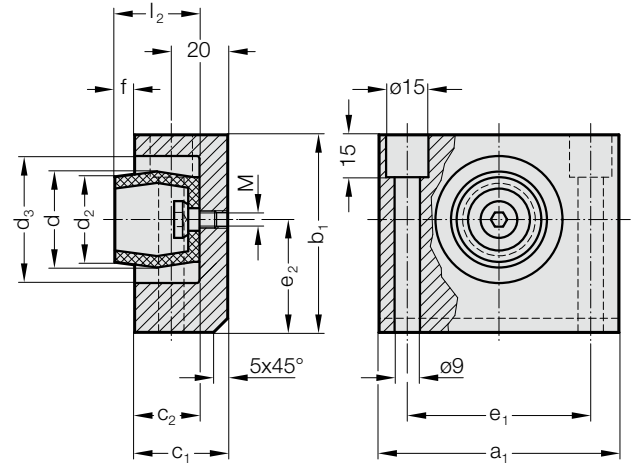
Order No	d	d ₃	l
2451.6.027.2	27	34	45
2451.6.036.2	36	44	45

Material:
FIBROFLEX®, 90 Shore A

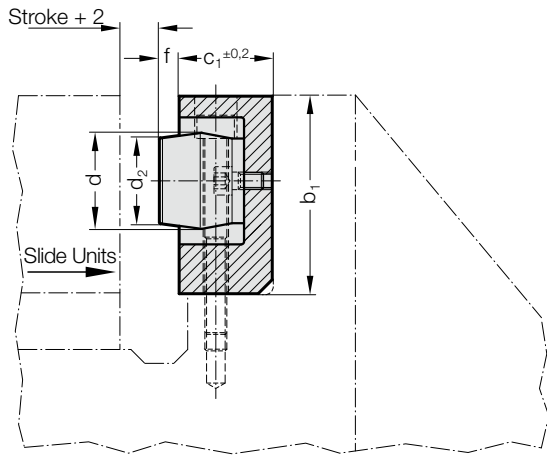
SLIDE STOP



2452.10.



Mounting example



Material:

Mounting block: Steel

Damping unit SD: CO polyester elastomer, 55 Shore D

Note:

Screws are not included.

Order No for spare part: Damping unit SD, with screw 2452.10.034.030.2

For the exchange of the damping unit, the screw tightening torque for the holding screw is 10 Nm.

Fixing:

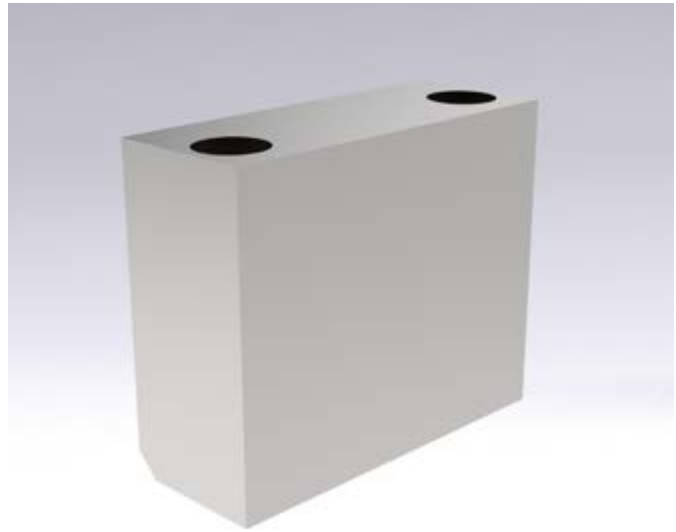
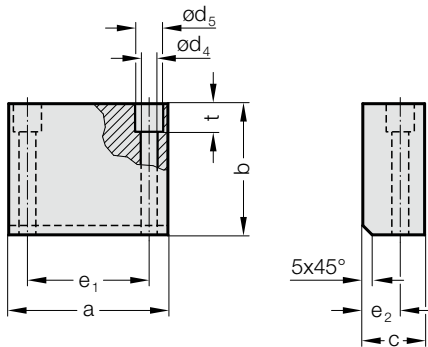
Use socket cap screws DIN EN ISO 4762 M8.

2452.10. Slide stop

Order No	d	d ₂	d ₃	M	a ₁	b ₁	c ₁	c ₂	e ₁	e ₂	l ₂	f	Spring force [N]	Energy absorption per stroke under permanent load [Nm]
2452.10.034	34	30	45	M6	85	70	33	23	65	40	30	7	6,000	27

SLIDE STOP, BMW

2452.10.15.



Material:

Steel

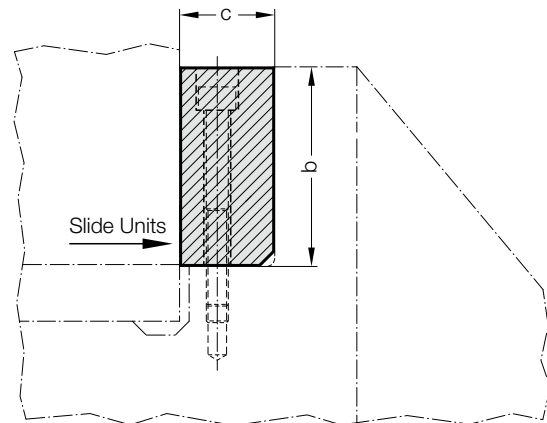
Note:

Screws are not included.

Fixing:

Use socket cap screws DIN EN ISO 4762 M8.

Mounting example



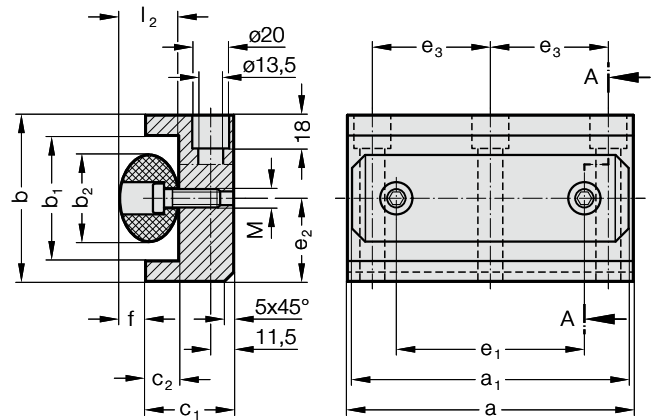
2452.10.15. Slide stop, BMW

Order No	a	b	c	d ₄	d ₅	t	e ₁	e ₂
2452.10.15.085.070.033	85	70	33	9	15	15	65	20

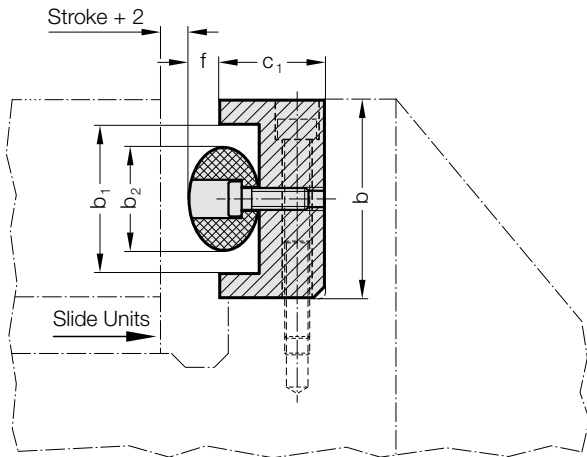
SLIDE STOP, BMW



2452.11.15.



Mounting example



Material:

Retainer: Steel

Damping element: Copolyester elastomer, 55 Shore D

Note:

Screws are not included.

Order No for spare part: Damping unit, with screw 2452.11.15.047.032.2

For the exchange of the damping unit, the screw tightening torque for the holding screw is 7 Nm.

Fixing:

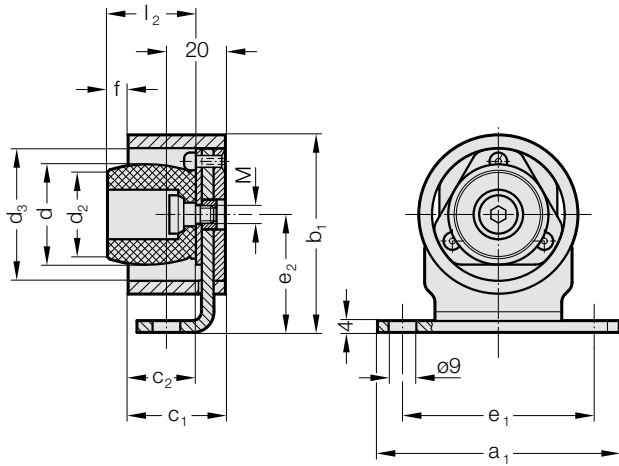
Use socket cap screws DIN EN ISO 4762 M12.

2452.11.15.047.032 Slide stop, BMW

Order No	a	a ₁	b	b ₁	b ₂	c ₁	c ₂	e ₁	e ₂	e ₃	l ₂	f	M	Spring force [N]	Energy absorption per stroke under permanent load [Nm]
2452.11.15.047.032	155	150	90	68	47	47	18	102	45	64	32	14	M10	47000	160

SLIDE STOP, AS PER VW

2452.10.55.



Material:

Retainer: Steel

SD damping element: Copolyester elastomer, 55 Shore D

Note:

Screws are not included.

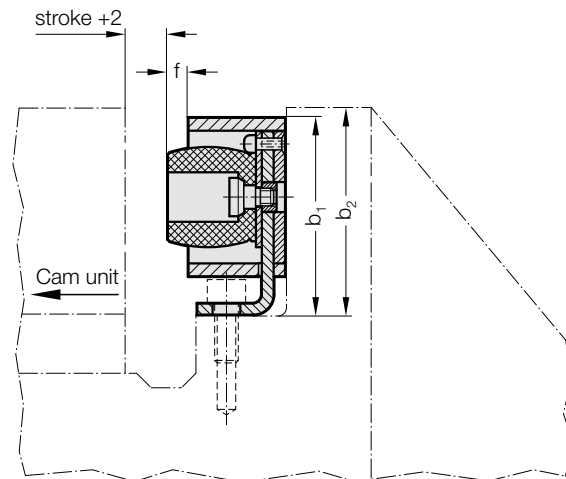
Order No for spare part: Damping unit SD, with screw 2452.10.034.030.2

For the exchange of the damping unit, the screw tightening torque for the holding screw is 6 Nm.

Fixing:

Use socket cap screws DIN EN ISO 4762 M8.

Mounting example



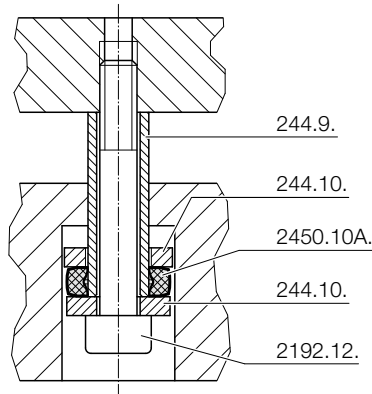
2452.10.55. Slide stop, as per VW

Order No	d	d ₂	d ₃	M	a ₁	b ₁	b ₂	c ₁	c ₂	e ₁	e ₂	l ₂	f	Spring force [N]	Energy absorption per stroke under permanent load [Nm]
2452.10.55.034	34	30	45	M6	82	67	70	33	23	65	40	30	7	6,000	27

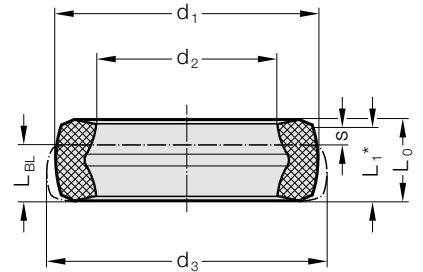
DAMPER, LIGHT-DUTY



Mounting example



2450.10A.



Description:

Dampers, light duty, made of co-polyester elastomer are found in the elevating units in progressive dies in the automotive and white goods industry. The increasing stresses on screws and bolts as well as noise emission are reduced by the light duty dampers.

Benefits:

- High absorption of force and energy
- Long service life and high level of operating safety
- Noise reduction
- High degree of effectiveness

Material:

Co-Polyester-Elastomer

Technical data:

Surroundings: Resistant to microbes, seawater, chemicals.

No absorption of water and no swelling.

Grease and oil resistant.

Approved temperature range: -40 °C to +90 °C (-40°F to +194°F)

Note:

Socket cap screw 2192.12. see Section C

Spacer tube 244.9. see Section F

Washer 244.10. see Section F

2450.10A. Damper, light-duty

Order No	d ₁	d ₂	d ₃	L ₀ ****	L ₁	Stroke (s)	F _{max.} [N] (static)	L _{BL}	W [Nm/stroke (s)]**	W _h [Nm/h]***
2450.10A.0236.0163.073	24.1	16.3	25.3	7.2	6.6	1.9	3,000	5.1	3	7500

*Dimension L₁ is the slump which must be taken into account for the design.

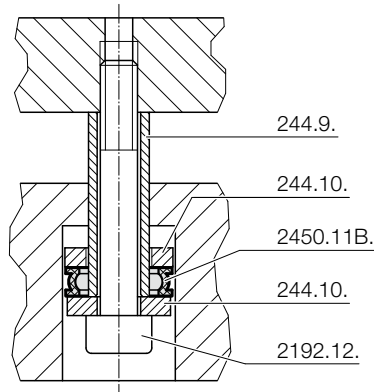
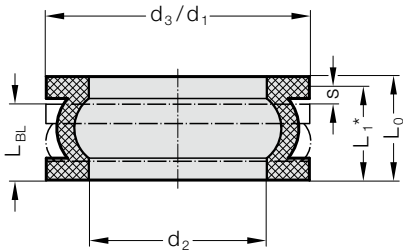
**W = Total energy per stroke

***W_h = Total energy per hour

DAMPER, LIGHT-DUTY

2450.11B.

Mounting example



Description:

Dampers, light duty, made of co-polyester elastomer are found in the elevating units in progressive dies in the automotive and white goods industry. The increasing stresses on screws and bolts as well as noise emission are reduced by the light duty dampers. The two-ply version of the flanged damper can also be used depending on the force or stroke without the use of an additional distance washer.

Benefits:

- High absorption of force and energy
- Long service life and high level of operating safety
- Noise reduction
- High degree of effectiveness

Material:

Co-Polyester-Elastomer

Technical data:

Surroundings: Resistant to microbes, seawater, chemicals.
 No absorption of water and no swelling.
 Grease and oil resistant.
 Approved temperature range: -40 °C to +90 °C (-40 °F to +194 °F)

Note:

Socket cap screw 2192.12. see Section C
 Spacer tube 244.9. see Section F
 Washer 244.10. see Section F

2450.11B. Damper, light-duty

Order No	d ₁	d ₂	d ₃	L ₀ ****	L ₁	Stroke (s)	F _{max} [N] (static)	L _{BL}	W [Nm/stroke (s)]**	W _h [Nm/h]****
2450.11B.0300.0203.118	30	20.3	30.2	11.8	10.8	2.7	5,000	8.7	8	20000

*Dimension L₁ is the slump which must be taken into account for the design.

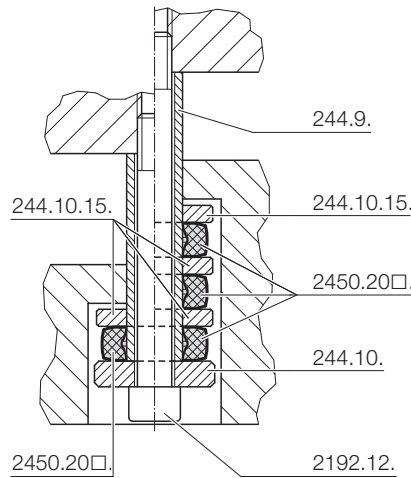
**W = Total energy per stroke

***W_h = Total energy per hour

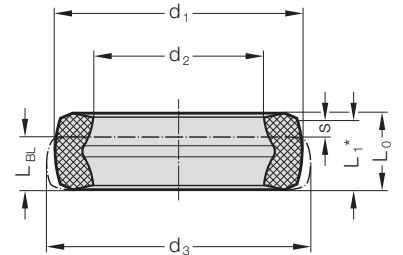
DAMPER, HEAVY-DUTY



Mounting example



2450.20□.



Description:

The co-polyester elastomer dampers, heavy-duty, are used as hold-down dampers in the automotive and white goods industry. Increasing return stroke speeds and the related stresses on screws and bolts in moveable, suspended tool parts are absorbed by the hold-down dampers. Reduced noise emission is a further additional positive sideeffect.

Benefits:

- High absorption of force and energy
- Slight settlement
- Energy absorption between 5 Nm and 269 Nm
- Long service life and high level of operating safety
- Noise reduction
- High degree of effectiveness

Material:

Co-Polyester-Elastomer

Technical data:

Surroundings: Resistant to microbes, seawater, chemicals.

No absorption of water and no swelling.

Grease and oil resistant.

Approved temperature range: -40°C to +90°C (-40°F to +194°F)

Note:

Socket cap screw 2192.12. see Section C

Spacer tube 244.9. see Section F

Washer 244.10. see Section F

2450.20_ Damper, heavy-duty

Order No	d ₁	d ₂	d ₃	L ₀ **	F _{max.} [N] (static)	L _{BL}	W [Nm/stroke (s)]*
2450.20A.0264.0163.078	26.2	16.3	28.4	7.7	5,500	5.5	5
2450.20B.0321.0203.108	32.1	20.3	35.1	10.8	9,000	6	14.2
2450.20B.0458.0253.170	46.3	25.3	49.8	17.7	20,000	11.6	44.6
2450.20A.0546.0303.213	54.6	30.3	61.8	21.6	30,000	13	81.9
2450.20A.0618.0363.215	61.8	36.3	69.9	21.5	46,000	13.2	126.5
2450.20A.0785.0423.294	78.2	42.3	89	30	75,000	17.9	269
2450.20A.1003.0553.327	99.5	55.3	115	33.2	97,000	16.5	370

*Total energy per stroke

**The dimension L₀ is the manufacturing dimension, which must not be used for the calculation.

The limit of L₀ depends on the thickness and can be between ±0.3 mm and ±1.

Temperature fluctuations can also have an influence on the thickness.

DAMPER, HEAVY-DUTY

SELECTION TABLE MULTIPLE LAYERING

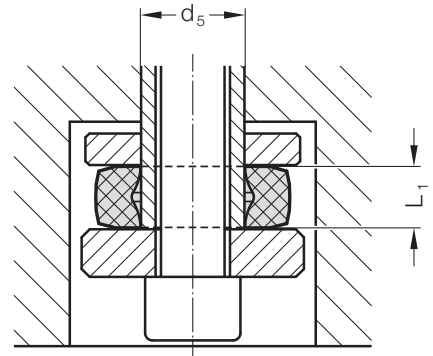
Simple layering

Order No	L_1^*	$F_{1\ max}$ [N] (dynamic >0,1)	W_1 [Nm/stroke (s)]**	W_{H1} [Nm/h]***	Stroke [s]	d_5
2450.20A.0264.0163.078	7,1	4100	3,5	9000	1,5	16
2450.20B.0321.0203.108	10	6600	12	30000	3,1	20
2450.20B.0458.0253.170	16,3	14500	19	45000	2,6	25
2450.20A.0546.0303.213	19	22500	47	67000	6,1	30
2450.20A.0618.0363.215	20,4	37500	76	114000	7,2	36
2450.20A.0785.0423.294	28,5	46000	143	152000	9,2	42
2450.20A.1003.0553.327	31,2	50000	185	261000	10	55

* Dimension „L₁“ is the slump which must be taken into account for the design.

** Total energy per stroke

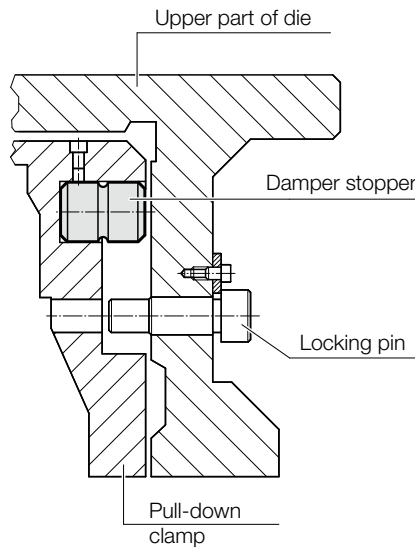
*** Total energy per hour



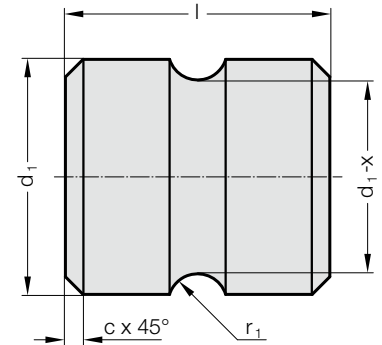
DAMPER STOPPER



Mounting example



2451.10D.



Description:

Damper stopper made of co-polyester elastomer dampen the recoil on the locking and unlocking pins in the manufacturing of jigs. Damper stoppers are used in the automotive and white goods industry. Damper stoppers sit inside the pull-down clamps and are radially stressed. The number and size depends on the weight and the velocity of the pull-down clamps.

Benefits:

- High absorption of force and energy
- Slight settlement
- UV protection
- Long service life and high level of operating safety
- Noise reduction
- High degree of effectiveness

Material:

Co-polyester elastomer, black

Technical data:

Surroundings: Resistant to microbes, seawater, chemicals.

No absorption of water and no swelling.

Grease and oil resistant.

Approved temperature range: -40 °C to +90 °C (-40 °F to +194 °F)

2451.10D. Damper stopper

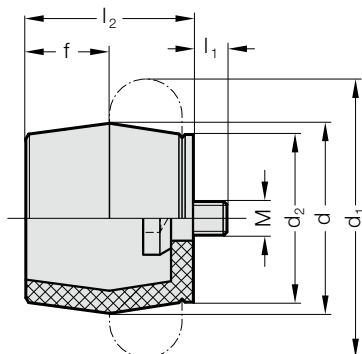
Order No	Size	d ₁	Cut-in depth x	Cut-in radius r ₁	c	l
2451.10D.040.060	B	40	8	7	3	60
2451.10D.050.070	C	50	10	8	4	70
2451.10D.063.080	D	63	12	9	5	80
2451.10D.080.090	E	80	14	10	6	90

Number and size (B, C, D, E) of damper stoppers for cushioning

Pull-down clamp weight kg	Pull-down clamp speed m/s												
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3
100	3 x B	3 x B	3 x B	3 x B	3 x B	3 x B	3 x B	3 x B	3 x B	4 x B	4 x B	4 x B	4 x B
250	3 x B	3 x B	3 x B	3 x B	3 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B
500	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x C	4 x C	4 x C
750	4 x B	4 x B	4 x B	4 x B	4 x B	4 x B	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C
1000	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x D	4 x D
1250	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x D	4 x D	4 x D	4 x D
1500	4 x C	4 x C	4 x C	4 x C	4 x C	4 x C	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x E
1750	4 x C	4 x C	4 x C	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x E	4 x E	4 x E	4 x E
2000	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x E	4 x E	4 x E	4 x E	4 x E
2500	4 x D	4 x D	4 x D	4 x D	4 x D	4 x D	4 x E	4 x E	4 x E	4 x E	4 x E	6 x E	6 x E
3000	4 x D	4 x D	4 x D	4 x D	4 x E	4 x E	4 x E	4 x E	4 x E	4 x E	6 x E	6 x E	6 x E
3500	4 x D	4 x E	4 x E	4 x E	4 x E	4 x E	4 x E	4 x E	6 x E	6 x E	8 x E	8 x E	10 x E
4000	4 x E	4 x E	4 x E	4 x E	4 x E	6 x E	6 x E	6 x E	8 x E	8 x E	10 x E	10 x E	10 x E
4500	6 x E	6 x E	6 x E	6 x E	6 x E	8 x E	10 x E	10 x E	10 x E	10 x E	10 x E	10 x E	10 x E
5000	6 x E	6 x E	8 x E	8 x E	8 x E	10 x E	10 x E	10 x E	10 x E	---	---	---	---

DAMPING UNIT SD

2452.10. .2



Material:

Damping unit SD: CO polyester elastomer, 55 Shore D
Screw: Steel

Technical data:

Resistant to microbes, seawater, and chemicals, as well as very good UV and ozone resistance. No water absorption and no bloating.

Starting speed: up to max. 5 m/s

Installation position: any

Dynamic power consumption: 870 N through 90000 N

Permissible temperature range: -40 °C through 90 °C

Dissipation of energy: 40 % through 66 %

Note:

We are happy to support you in the calculation and design of a suitable damping unit.

Dynamic ($v > 0.5$ m/s) characteristic curves available for all types upon request.

SD damping units can also be used for emergency stop applications.

Further information upon request.

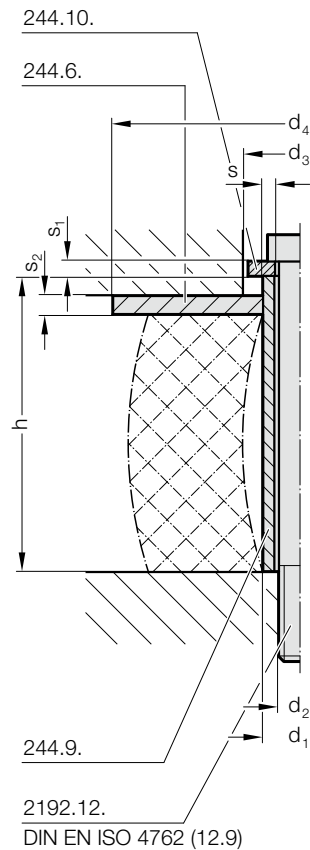
2452.10. .2 Damping unit SD

Order No	d	l_2	d_1	d_2	f	W_3 [Nm/stroke]*	M	l_1	Tightening torque [Nm]
2452.10.012.011.2	12	11	15	11	4	2	M3	3	1
2452.10.017.016.2	17	16	22	15	6	6	M4	4	1.7
2452.10.021.018.2	21	18	26	18	7	10	M5	5	2.3
2452.10.022.019.2	22	19	27	19	6	11.5	M6	6	6
2452.10.028.026.2	28	26	36	25	9	29	M6	6	6
2452.10.034.030.2	34	30	43	30	10	48	M6	6	6
2452.10.037.033.2	37	33	48	33	12	65	M6	6	6
2452.10.040.035.2	40	35	50	34	14	82	M8	8	20
2452.10.043.038.2	43	38	55	38	14	112	M8	8	20
2452.10.047.041.2	47	41	60	41	17	140	M12	12	50
2452.10.050.045.2	50	45	64	44	19	170	M12	12	50
2452.10.054.047.2	54	47	68	47	17	201	M12	12	50
2452.10.057.051.2	57	51	73	50	21	242	M12	12	50
2452.10.062.054.2	62	54	78	53	21	304	M12	12	50
2452.10.065.058.2	65	58	82	57	22	374	M12	12	50
2452.10.070.061.2	70	61	86	60	24	421	M12	12	50
2452.10.072.065.2	72	65	91	63	26	482	M16	16	120
2452.10.080.069.2	80	69	100	69	23	570	M16	16	120
2452.10.082.074.2	82	74	105	72	28	683	M16	16	120
2452.10.085.076.2	85	76	110	75	27	797	M16	16	120
2452.10.090.080.2	90	80	114	78	30	934	M16	16	120
2452.10.098.086.2	98	86	123	85	31	1,147	M16	16	120
2452.10.116.101.2	116	101	146	98	38	2,014	M16	16	120

*Energy absorption per stroke under permanent load

SPRING UNIT FOR ELASTOMER SPRING

244.14.0.



244.14.0. Spring unit for elastomer spring

Execution:

Spring unit consists of:
 Allen screw DIN EN ISO 4762 (12.9) 2192.12.
 Washer 244.6.
 Spacer tube 244.9.
 Sheave 244.10.
 Elastomer spring ordered separately: 246.5., 246.6., 246.7., 2461.2., 2461.4.

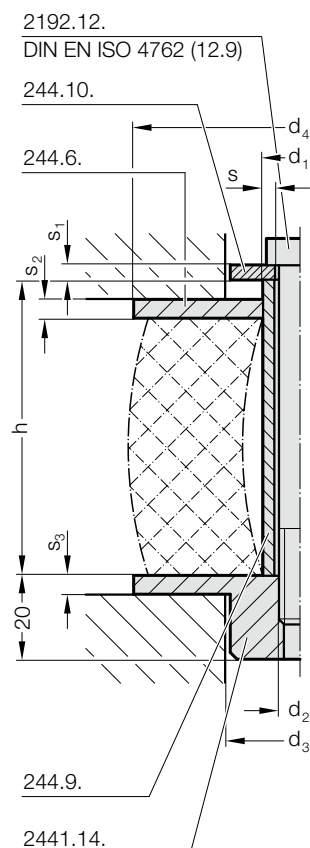
Spring \varnothing	$d_1 \times s$	h^*	d_2	d_3	d_4	s_1	s_2
25	10 × 1,8		M6	18	32	3	4
32	12 × 1,8		M8	18	40	3	5
40	12 × 1,8		M8	30	50	4	5
50	16 × 2,5		M10	30	60	4	6
63	16 × 2,5		M10	30	80	4	8
80	20 × 3,5		M12	30	100	4	10
100	20 × 3,5		M12	30	120	4	12
125	25 × 4,5		M16	39	150	6	15

* h = Spacer tube length 244.9.

Ordering Code (example):

Spring unit for elastomer spring	=	244.14.
not loaded	=	0.
for spring \varnothing = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order No	=	244.14. 0. 040. 048

2441.14.1.



2441.14.1. Spring unit for elastomer spring

Execution:

Spring unit consists of:
 Allen screw DIN EN ISO 4762 (12.9) 2192.12.
 Washer 244.6.
 Spacer tube 244.9.
 Sheave 244.10.
 Threaded disc 2441.14.
 Elastomer spring ordered separately: 246.5., 246.6., 246.7., 2461.2., 2461.4.

Spring \varnothing	$d_1 \times s$	h^*	d_2	d_3	d_4	s_1	s_2	s_3
25	10 × 1,8		M6	20	32	3	4	5
32	12 × 1,8		M8	20	40	3	5	5
40	12 × 1,8		M8	20	50	4	5	5
50	16 × 2,5		M10	22	60	4	6	6
63	16 × 2,5		M10	22	80	4	8	8
80	20 × 3,5		M12	28	100	4	10	10
100	20 × 3,5		M12	28	120	4	12	12

* h = Spacer tube length 244.9.

Ordering Code (example):

Spring unit for elastomer spring	=	2441.14.
preloaded	=	1.
for spring \varnothing = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order No	=	2441.14. 1. 040. 048

SPRING UNIT FOR HELICAL SPRING

244.15.0. Spring unit for helical spring

Execution:

Spring unit consists of:

Allen screw DIN EN ISO 4762 (12.9) 2192.12.

Washer 244.7.

Spacer tube 244.9.

Sheave 244.10.

Compression springs ordered separately: 241.14., 241.15., 241.16., 241.17.



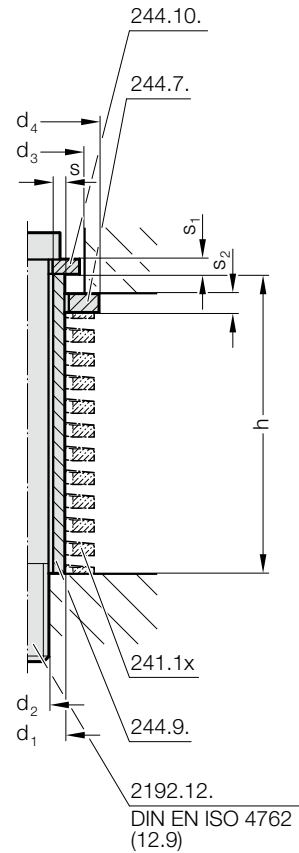
Spring \varnothing	$d_1 \times s$	h^*	d_2	d_3	d_4	s_1	s_2
20	10 × 1,8		M6	18	25	3	4
25	12 × 1,8		M8	18	25	3	4
32	16 × 2,5		M10	30	38	4	5
40	20 × 3,5		M12	30	38	4	5
50	25 × 4,0		M16	39	50	6	6
63	35 × 6,0		M20	52	65	6	8

* h = Spacer tube length 244.9.

Ordering Code (example):

Spring unit for helical spring	=	244.15.
not loaded	=	0.
for spring \varnothing = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order No	=	244.15. 0. 040. 048

244.15.0.



2441.15.1. Spring unit for helical spring

Execution:

Spring unit consists of:

Allen screw DIN EN ISO 4762 (12.9) 2192.12.

Washer 244.7.

Spacer tube 244.9.

Sheave 244.10.

Threaded disc 2441.15.

Compression springs ordered separately: 241.14., 241.15., 241.16., 241.17.



Spring \varnothing	$d_1 \times s$	h^*	d_2	d_3	d_4	s_1	s_2
20	10 × 1,8		M6	11	25	3	4
25	12 × 1,8		M8	14	25	3	4
32	16 × 2,5		M10	18	38	4	5
40	20 × 3,5		M12	22	38	4	5
50	25 × 4,0		M16	27	50	6	6

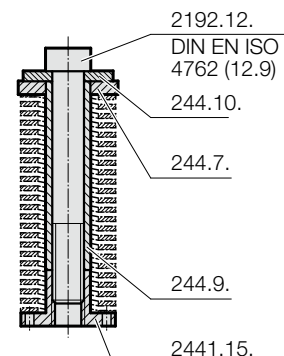
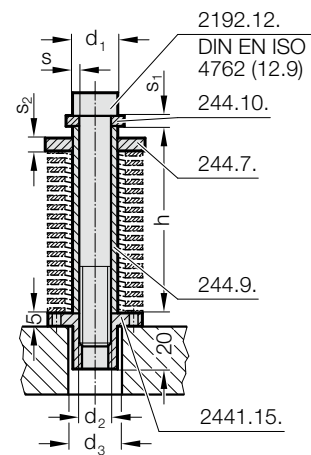
* h = Spacer tube length 244.9.

Ordering Code (example):

Spring unit for helical spring	=	2441.15.
preloaded	=	1.
for spring \varnothing = 40 mm	=	040.
Spacer tube length h = 48 mm	=	048
Order No	=	2441.15. 1. 040. 048

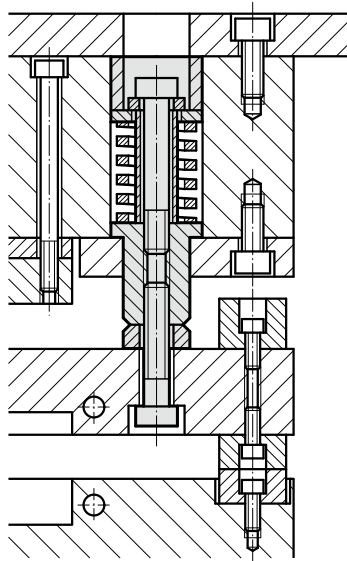
2441.15.1.

Mounting examples



SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, WITHOUT SPACER SLEEVE / SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, WITH SPACER SLEEVE

Mounting example:



Description:

The preloaded combination spring- and spacer unit combines the functions of providing the spring force and of spacing the stripper in one constructional element, whilst conventional designs employed two.

The resulting advantages therefore consist of space savings and reduced machining cost with regard to the various die members.

The execution with spacer sleeve makes it possible to exchange the whole unit by simply removing the top clamping plate.

Removal of the compensation disc gives unimpeded access to the punches – for the purpose of sharpening/grinding.

Note:

Helical compression springs must be ordered separately, see at the beginning of chapter F. After fitting, the resilient collar pins are ground to the same length.

Attention:

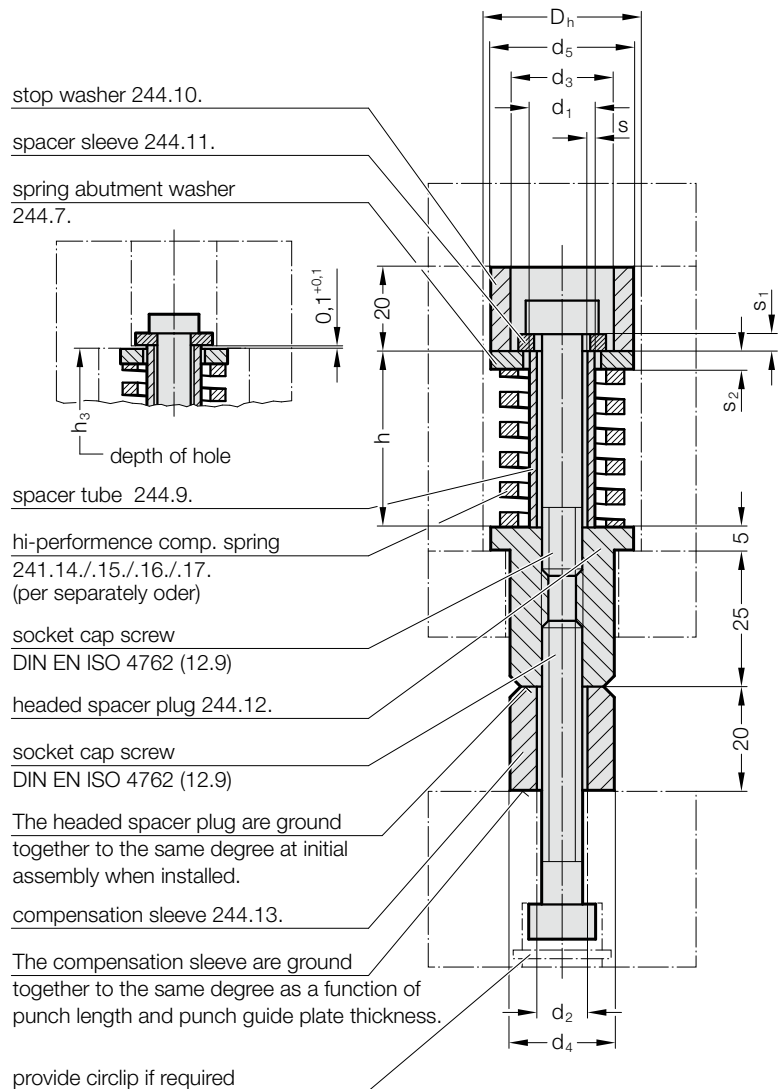
Regrinding of stamp in mm = regrinding of spacer. This means that the spring force and displacement always remain exactly the same. Match the blind hole drill depth h_3 and/or spacer height so that the screw is released by about 0.1 mm.

244.□□.□□□.10

Application without Spacer Sleeve (c'bored hole)

244.□□.□□□.11

Application with Spacer Sleeve (straight hole)



244.xx.xxx.10 Spring- and spacer unit for compression spring, without spacer sleeve

244.xx.xxx.11 Spring- and spacer unit for compression spring, with spacer sleeve

Spring ϕ	$d_1 \times s$	h^*	Socket cap screw	d_3	d_4	d_5	D_h	s_1	d_2
20	10 × 1,8		M6	18	20	25	26	3	4
25	12 × 1,8		M8	18	20	25	26	3	4
32	16 × 2,5		M10	30	32	38	40	4	5
40	20 × 3,5		M12	30	32	38	40	4	5

* h = Spacer tube length 244.9.

Ordering Code (example):

Spring- and spacer unit for compression spring, without spacer sleeve

Spring ϕ = 32 mm = 244.32.

Spacer tube length h = 48 mm = 048.

without spacer sleeve = 10

Order No = 244.32.048. 10

Spring- and spacer unit for compression spring, with spacer sleeve

Spring ϕ = 20 mm = 244.20.

Spacer tube length h = 38 mm = 038.

with spacer sleeve 244.11. = 11

Order No = 244.20.038. 11

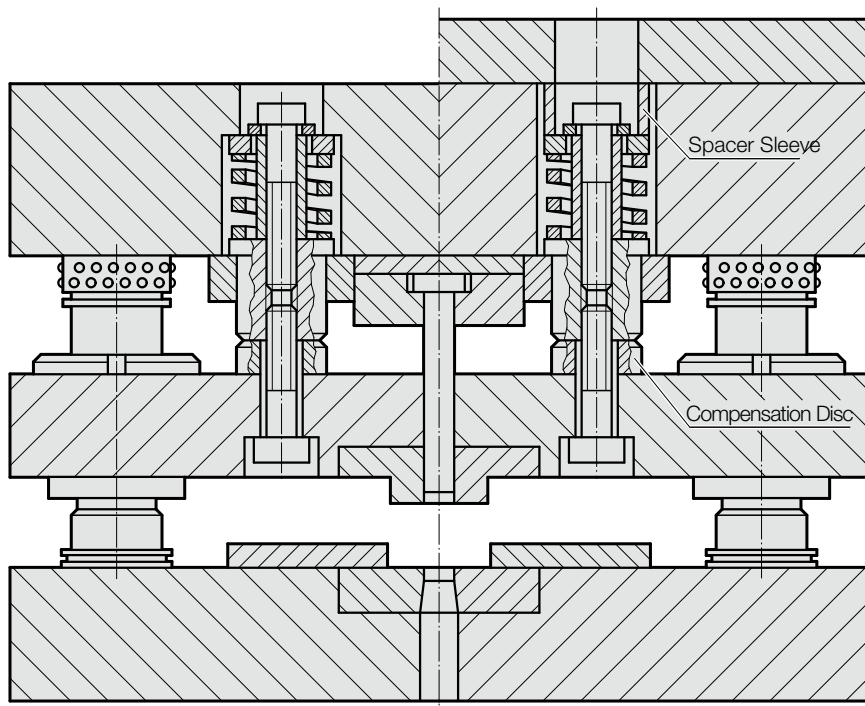
SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, WITHOUT SPACER SLEEVE / SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, WITH SPACER SLEEVE

Without Spacer Sleeve

(with c'bored hole)
244.□□.□□□.10.

With Spacer Sleeve

(with straight hole)
244.□□.□□□.11.



244.xx.xxx.10 Spring- and spacer unit for compression spring, without spacer sleeve

244.xx.xxx.11 Spring- and spacer unit for compression spring, with spacer sleeve

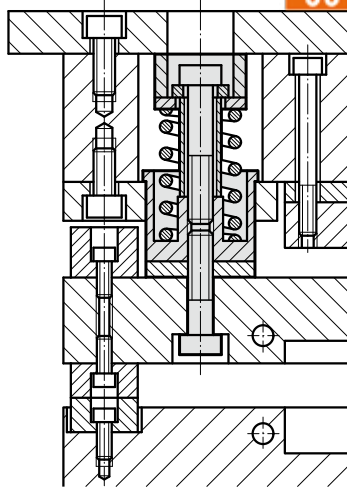
Spring characteristics

Order No.	Spring dimensions D _n × l _o	Pre-tension path	Spring preload force, Type				max. working stroke of spring (excl. preload), Type				Spring rate in N/mm Type				max. spring forces (N) at 80% max. spring range s ₂			
			241.14	241.15	241.16	241.17	.14	.15	.16	.17	.14	.15	.16	.17	.14	.15	.16	.17
244.20.027.□□	20 x 25	2	111,6	196,2	432,0	586,4	10,4	8,8	6,7	6,2	55,8	98,1	216,0	293,2	580	863	1447	1818
244.20.033.□□	20 x 32	3	135,0	218,1	504,0	672,6	12,8	10,4	8,4	7,8	45,0	72,7	168,0	224,2	576	756	1411	1749
244.20.038.□□	20 x 38	4	133,6	224,0	516,0	708,4	15,2	12,8	10,0	9,6	33,4	56,0	129,0	177,1	508	717	1290	1700
244.20.044.□□	20 x 44	4	120,0	190,4	448,0	596,4	18,4	15,2	11,6	11,2	30,0	47,6	112,0	149,1	552	724	1299	1670
244.20.048.□□	20 x 51	7	171,5	291,9	658,0	896,7	20,8	16,8	13,2	12,8	24,5	41,7	94,0	128,1	510	701	1241	1640
244.25.027.□□	25 x 25	2	200,0	294,0	750,0	-	10,4	8,8	7,2	-	100,0	147,0	375,0	-	1040	1294	2700	-
244.25.033.□□	25 x 32	3	240,9	354,3	891,0	1123,8	12,8	10,4	8,4	8,0	80,3	118,1	297,0	374,6	1028	1228	2495	2997
244.25.038.□□	25 x 38	4	248,0	372,4	876,0	1384,8	15,2	12,8	10,4	9,6	62,0	93,1	219,0	346,2	942	1192	2278	3324
244.25.044.□□	25 x 44	4	212,0	323,2	748,0	976,8	18,4	15,2	12,4	11,2	53,0	80,9	187,0	244,2	975	1228	2319	2735
244.25.048.□□	25 x 51	7	308,7	480,9	1092,0	1453,9	20,0	16,8	14,4	12,8	44,1	68,7	156,0	207,7	882	1154	2246	2659
244.32.038.□□	32 x 38	5	470,5	925,5	1940,0	2643,0	15,2	12,8	9,6	8,8	94,1	185,1	388,0	528,6	1430	2369	3725	4652
244.32.044.□□	32 x 44	5	398,0	790,5	1620,0	2135,5	17,6	15,2	11,2	10,4	79,6	158,1	324,0	424,7	1401	2403	3629	4417
244.32.048.□□	32 x 51	8	536,0	1072,8	2176,0	2826,4	20,0	16,8	13,2	12,0	67,0	134,1	272,0	353,3	1340	2253	3590	4240
244.32.061.□□	32 x 64	8	424,0	792,8	1696,0	2155,2	25,6	21,6	17,2	16,0	53,0	99,1	212,0	269,4	1357	2141	3646	4310
244.32.072.□□	32 x 76	9	396,9	724,5	1548,0	1968,3	31,2	25,6	20,8	19,2	44,1	80,5	172,0	218,7	1376	2061	3578	4199
244.40.048.□□	40 x 51	8	736,0	1432,0	2801,6	5027,2	20,0	16,8	13,6	12,0	92,0	179,0	350,2	628,4	1840	3007	4763	7541
244.40.061.□□	40 x 64	8	584,8	1120,0	2152,0	3905,6	25,6	20,8	17,6	15,2	73,1	140,0	269,0	488,2	1871	2912	4734	7421
244.40.072.□□	40 x 76	9	567,9	972,9	1971,0	3413,7	30,4	25,6	21,6	19,2	63,1	108,1	219,0	379,3	1918	2767	4730	7283

SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, LOW INSTALLATION SPACE, WITHOUT SPACER SLEEVE / SPRING- AND SPACER UNIT FOR COMPRESSION SPRING, LOW INSTALLATION SPACE, WITH SPACER SLEEVE

Mounting example:

with spacer sleeve



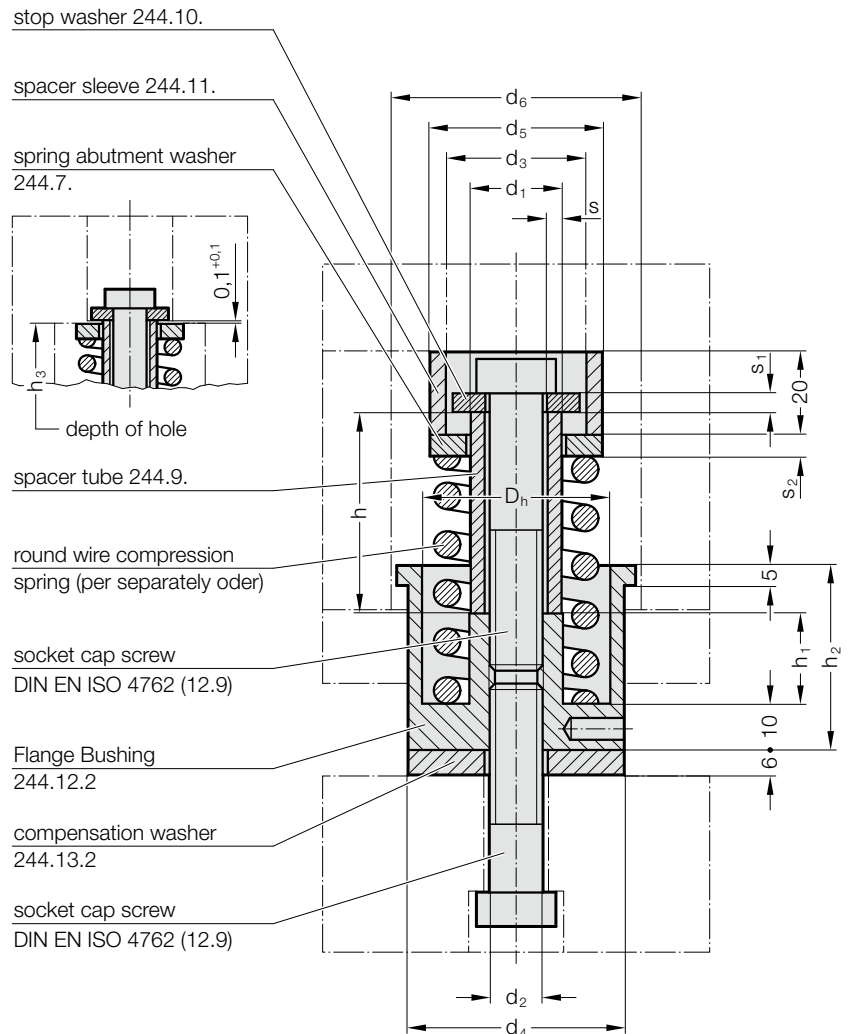
244.□□.3.□□□.10

Application without Spacer Sleeve (c'bored hole)



244.□□.3.□□□.11

Application with Spacer Sleeve (straight hole)



Description:

The preloaded combination spring- and spacer unit combines the functions of providing the spring force and of spacing the stripper in one constructional element, whilst conventional designs employed two.

The resulting advantages therefore consist of space savings and reduced machining cost with regard to the various die members.

The execution with spacer sleeve makes it possible to exchange the whole unit by simply removing the top clamping plate.

Removal of the compensation disc gives unimpeded access to the punches – for the purpose of sharpening/grinding.

Note:

Helical compression springs must be ordered separately, see at the beginning of chapter F. After fitting, the resilient collar pins are ground to the same length.

Attention:

Regrinding of stamp in mm = regrinding of spacer. This means that the spring force and displacement always remain exactly the same. Match the blind hole drill depth h_3 and/or spacer height so that the screw is released by about 0.1 mm.

244.xx.3.xxx.10 Spring- and spacer unit for compression spring, low installation space, without spacer sleeve

244.xx.3.xxx.11 Spring- and spacer unit for compression spring, low installation space, with spacer sleeve

Spring \varnothing	$d_1 \times s$	h^*	d_2	d_3	d_4	d_5	d_6	D_h	s_1	s_2	h_1	h_2
20	10 × 1,8	M6	18	25	25	31	20	3	4	5	36	
25	12 × 1,8	M8	18	32	25	38	25	3	4	10	36	
32	16 × 2,5	M10	30	38	38	44	32	4	5	16	40	
40	20 × 3,5	M12	30	47	38	54	40	4	5	18	40	

* h = Spacer tube length 244.9.

Ordering Code (example):

Spring- and spacer unit for compression spring, low installation space, without spacer sleeve

Spring \varnothing = 32 mm = 244.32.3.

Spacer tube length h = 48 mm = 048.

without spacer sleeve = 10

Order No = 244.32.3. 048. 10

Spring- and spacer unit for compression spring, low installation space, with spacer sleeve

Spring \varnothing = 20 mm = 244.20.3.

Spacer tube length h = 38 mm = 038.

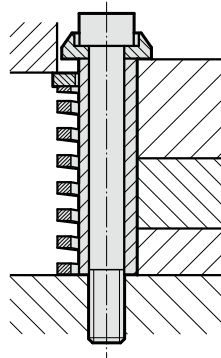
with spacer sleeve 244.11. = 11

Order No = 244.20.3. 038. 11

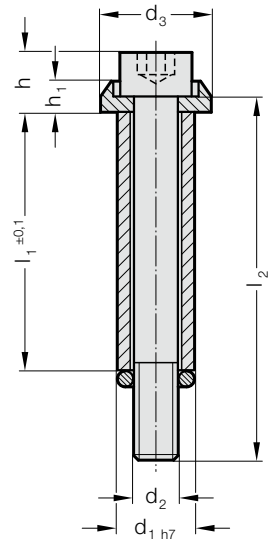
SPRING AND SPACER UNIT



Mounting example



244.16.



Description:

These units can be used as an alternative to shoulder screws.

Advantages:

Precision length adjustments by way of grinding. The units have many uses – as can be seen from the installation examples below.

Material:

Spacer tube: Steel, hardened
 Socket cap screw DIN EN ISO 4762 (12.9)

Execution:

Outside diameter ground
 Tolerance: h_7

Note:

The units are supplied with a retaining O-ring **wich must be removed before application.**

244.16. Spring and spacer unit

d_1	10	12.5	15	17.5	23
d_2	M6	M8	M10	M12	M16
Tightening torque [Nm]	13	32	65	120	290
d_3	15	19	23	27	34
h	10	13	15	18	24
h_1	5.5	6.5	7.5	9	11
l_1	l_2				
20	35	35			
25	40				
30	45	45	50	50	
35	50	50	55		
40	55	55	60	60	
45	60	60	65	65	
50	65	65	70	70	80
55	70	70 80	75	80	
60	80	80	80 90	90	90
70	90	90	90 100	100	100
80	100	100	100 110	110 115 120	110 125 130
90	110	110	110	120	120
100	120	120	120	130 135 140	130 140 145
110				140	140 150
120			140	150	150 160
140				180	180
150					180
160					200

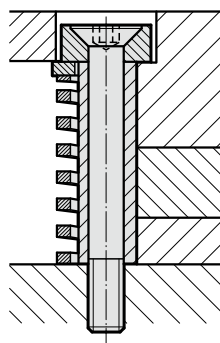
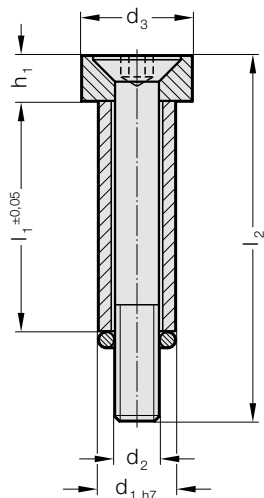
Ordering Code (example):

Spring and spacer unit	=244.16.
Nominal diameter d_1	15 mm = 150.
Length l_1	100 mm = 100.
Scroll length l_2	120 mm = 120
Order No	=244.16. 150.100. 120

SPRING AND SPACER UNIT, WITH HEXAGON SOCKET COUNTERSUNK HEAD CAP SCREW

244.18.

Mounting example



Description:

These units can be used as an alternative to shoulder screws.

Advantages:

Precision length adjustments by way of grinding. The units have many uses – as can be seen from the installation examples below.

Material:

Spacer tube: Steel, hardened

Countersunk head cap screw DIN EN ISO 10642 (10.9)

Execution:

Outside diameter ground

Tolerance: h_7

Note:

The units are supplied with a retaining O-ring **which must be removed before application.**

244.18. Spring and spacer unit, with hexagon socket countersunk head cap screw

d_1	10	12.5	15	17.5	23
d_2	M6	M8	M10	M12	M16
Tightening torque [Nm]	12	28	56	98	240
d_3	15	19	23	27	34
h_1	6	8	10	12	16
l_1	l_2				
20	35				
25	40	45			
30	45	50	55	60	
35	50	55	60	70	
40	55	60	65	70	
45	60	70	70	80	
50	65	70	80	80	90
55		80	80	90	90
60		80	90	90	100
70		90	100	100	110
80		100	110	110	120
90			120	120	140
100					140
110					150
120					150

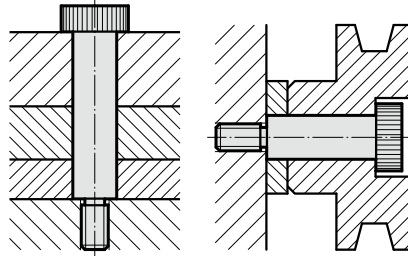
Ordering Code (example):

Spring and spacer unit, with hexagon socket countersunk head cap screw	=244.18.
Nominal diameter d_1	15 mm = 150.
Length l_1	60 mm = 060.
Screw length l_2	90 mm = 090
Order No	=244.18. 150.060. 090

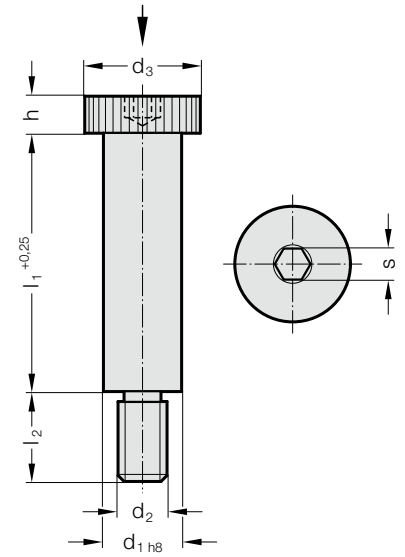
SHOULDER SCREW



Mounting example



244.17.



Material:

High tensile steel,
heat treated to 12.9 ISO 898-1.

Execution:

d₁ ground,
heads knurled.

244.17. Shoulder screw

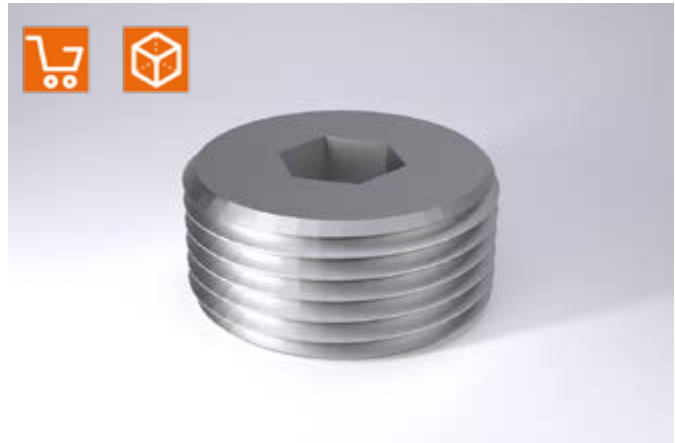
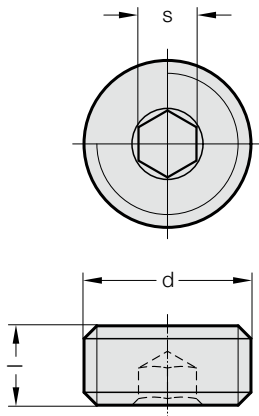
d ₁	6	8	10	12	16	20	24
d ₂	M5	M6	M8	M10	M12	M16	M20
Tightening torque [Nm]	7	13	32	65	120	290	500
d ₃	10	13	16	18	24	30	36
h	4.5	5.5	7	9	11	14	16
s	3	4	5	6	8	10	12
l ₂	9.5	11	13	16	18	22	27
l ₁							
10	●	●					
12	●	●					
16	●	●		●			
20	●	●	●	●			
25	●	●	●	●	●		
30	●	●	●	●	●	●	
35	●	●	●	●	●	●	
40	●	●	●	●	●	●	●
45			●	●	●	●	●
50		●	●	●	●	●	●
55			●	●	●	●	●
60			●	●	●	●	●
65			●	●	●	●	●
70			●	●	●	●	●
80			●	●	●	●	●
90				●	●	●	●
100				●	●	●	●
120					●	●	●

Ordering Code (example):

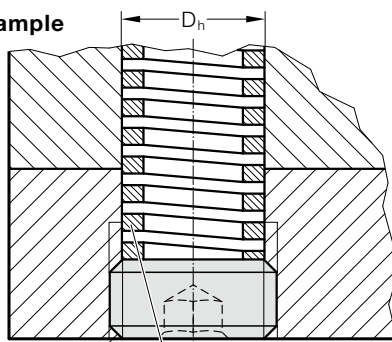
Shoulder screw	=244.17.
Nominal diameter d ₁ 12 mm	= 120.
Guide length l ₁ 55 mm	= 055
Order No	=244.17. 120.055

PIPE PLUG (FOR COMPRESSION SPRING ADJUSTEMENT)

241.00.1.



Mounting example



secured with
LOCTITE
Typ 281.243

compression spring to separate
order - see High Performance
Compression Springs

Description:

These set screws can be used as adjustable spring stops. They are available for all customary spring sizes from \varnothing 10 to \varnothing 40. The set screws are suitable for springs 241.14. to .17.

Their use offers the following advantages:

- Adjustable spring tension from under the bottom bolster, without any dismantling.
- Exchange of springs without dismantling.
- Through-holes instead of blind holes for spring accommodation.

241.00.1. Pipe plug (for compression spring adjustment)

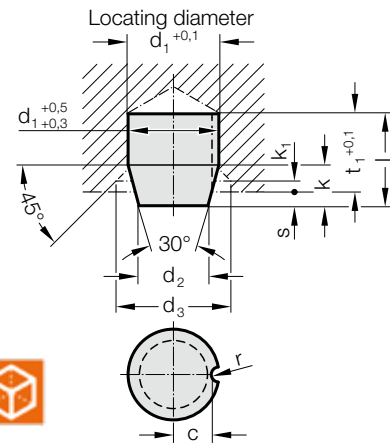
Order No	d	l	s	Spring- \varnothing	D_n
241.00.1.12	M12x1,5	10	6	10	10.5
241.00.1.14	M14x1,5	10	6	12.5	12.5
241.00.1.18	M18x1,5	10	8	16	16.5
241.00.1.22	M22x1,5	10	8	20	20.5
241.00.1.28	M28x1,5	12	10	25	26.5
241.00.1.35	M35x1,5	12	10	32	33.5
241.00.1.42	M42x1,5	12	10	40	40.5

COMPRESSION PAD SHEDDER INSERT



Material:
FIBROFLEX®
Hardness 90 Shore A

2471.6.

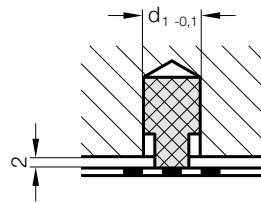


2471.6. Compression Pad

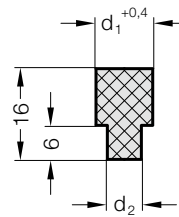
Order No	d ₁	d ₂	d ₃	l	k	k ₁	t ₁	r	c	Compressive force [N]	at s
2471.6.006	6	3,6	10	9,5	4,5	1	8	0	0	100	1,5
2471.6.010	10	6	16	15,5	7,5	2	13	1	4	450	2,5
2471.6.016	16	9,5	22	25	12	5	21	1,5	6,5	1,500	4
2471.6.024	24	18	32	25	10	2	21	2	10	3,000	4
2471.6.030	30	20	38	35	19	10	30	2,5	12,5	3,000	5
2471.6.032	32	24	40	32	14	4	26	3	13	12,000	6
2471.6.039	39,5	30	50	40	16	4,75	34	3	16,8	25,000	6



Mounting example



247.6.

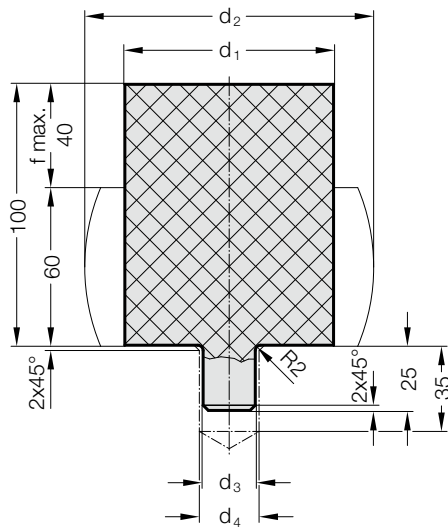


247.6. Shedder insert

Order No	d ₁	d ₂	Stripping force [daN]
247.6.008.016	8	4	20
247.6.010.016	10	6	25
247.6.012.016	12	8	30

SETTING-UP BUMPER, ROUND

2531.7.



Description:

Setting up bumpers are used for setting down and setting up tools and replace shear pins.

Material:

FIBROFLEX®

Hardness 95 Shore A

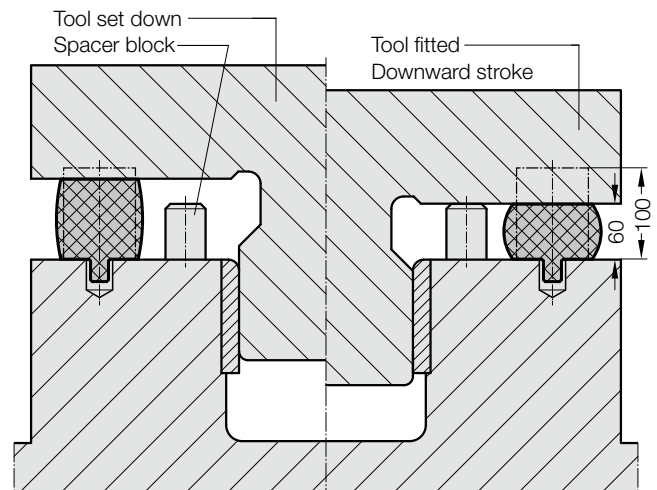
Attention:

Setting up bumpers are not suitable for continuous use. To prevent damage when setting down tools, ensure that the setting up bumpers are large enough to withstand 1.5 times the weight of the tool (see table).

Implementation:

1. When setting up slowly move the ram into the bottom position.
2. Clamp the tool, then move the ram back to the top position (with the setting up bumper compressed to a height of 60 mm).
3. After setting up, remove the setting up bumpers and place them in the storage hole on the tool.

Mounting example



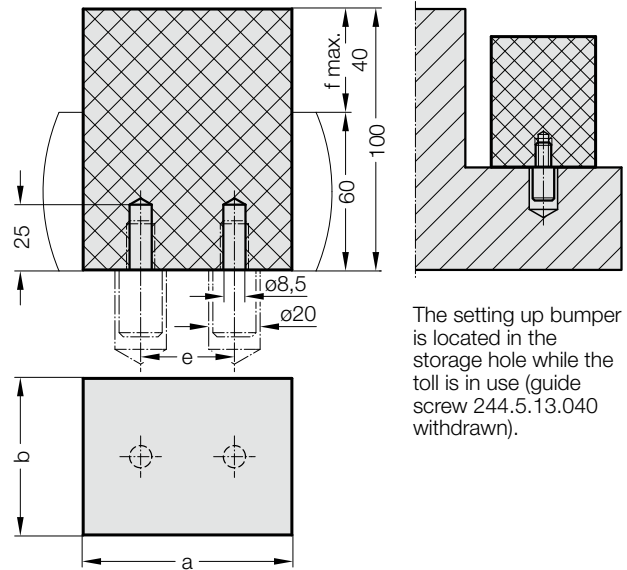
2531.7. Setting-up bumper, round

Order No	d ₁	d ₂	d ₃	d ₄	f max.	Load capacity	Load capacity	Load capacity	Admissible tool weight in kg for 4 setting up bumpers f=20/safety factor 1,5
						in daN bei f=20	in daN bei f=25	in daN bei f=40	
2531.7.063	63	86	16	18	40	2,200	2,800	4,800	5,800
2531.7.080	80	111	20	22	40	3,500	4,600	8,500	9,300
2531.7.100	100	136	20	22	40	5,000	6,700	11,700	13,300
2531.7.125	125	171	25	28	40	7,600	9,400	18,900	20,200

SETTING-UP BUMPER, SQUARE

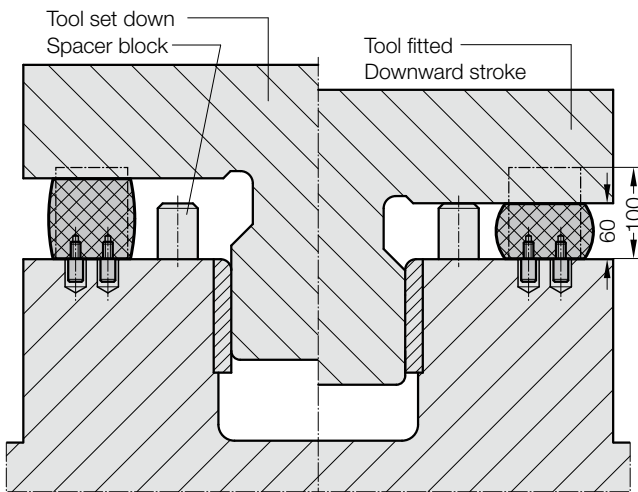


252.7.



The setting up bumper is located in the storage hole while the tool is in use (guide screw 244.5.13.040 withdrawn).

Mounting example



Description:

Setting up bumpers are used for setting down and setting up tools and replace shear pins.

Material:

FIBROFLEX®
Hardness 95 Shore A

Attention:

Setting up bumpers are not suitable for continuous use. To prevent damage when setting down tools, ensure that the setting up bumpers are large enough to withstand 1.5 times the weight of the tool (see table).

Implementation:

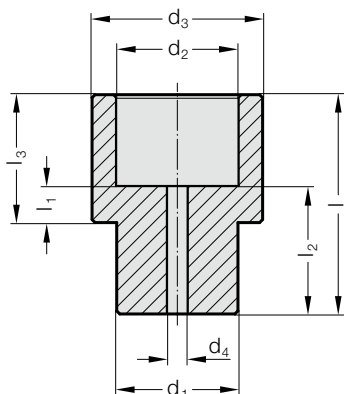
1. When setting up slowly move the ram into the bottom position.
2. Clamp the tool, then move the ram back to the top position (with the setting up bumper compressed to a height of 60 mm).
3. After setting up, remove the setting up bumpers and place them in the storage hole on the tool.

252.7. Setting-up bumper, square

Order No	a	b	e	Load capacity in daN bei f=20	Admissible tool weight in kg for 4 setting up bumpers f=20/safety factor 1,5
252.7.080.060	80	60	36	2,700	7,100
252.7.100.080	100	80	50	6,200	16,500
252.7.125.100	125	100	60	8,600	22,900
252.7.180.100	180	100	100	13,600	36,200

SPACER FOR DIE RELEASE

2533.10.



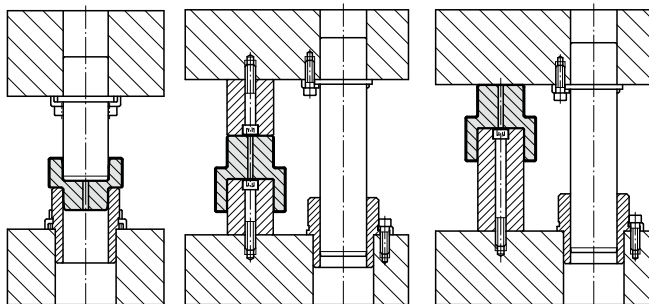
Description:

The spacers are inserted into the die for storage and transport purposes.

Material:

Greenamid PA6 (GF30), colour: yellow

Mounting example



2533.10. Spacer for die release

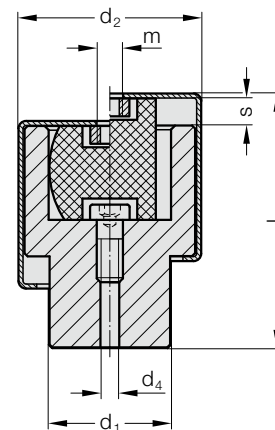
Order No	d_2	d_1	l	l_1	l_2	l_3	d_3	d_4^*	max. carrying capacity [daN]
2533.10.015	15.2	14.8	52	12	32	32	25	7	850
2533.10.016	16.2	15.8	52	12	32	32	26	7	850
2533.10.018	18.2	17.8	52	12	32	32	29	7	1,800
2533.10.019	19.2	18.8	52	12	32	32	30	7	1,800
2533.10.020	20.2	19.8	52	12	32	32	31	7	1,800
2533.10.024	24.2	23.8	56	12	34	34	36	7	3,400
2533.10.025	25.2	24.8	56	12	34	34	37	7	3,400
2533.10.030	30.2	29.8	60	12	36	36	44	7	3,500
2533.10.032	32.2	31.8	60	12	36	36	46	7	3,500
2533.10.038	38.2	37.8	73	12	43	43	54	7	5,500
2533.10.040	40.2	39.8	73	12	43	43	56	7	5,500
2533.10.042	42.2	41.8	73	12	43	43	58	7	5,500
2533.10.048	48.2	47.8	84	12	48	49	66	8.6	6,500
2533.10.050	50.2	49.8	84	12	48	49	68	8.6	6,500
2533.10.052	52.2	51.8	84	12	48	49	70	8.6	6,500
2533.10.060	60.2	59.8	92	12	52	53	79	8.6	10,000
2533.10.063	63.2	62.8	92	12	52	53	82	8.6	10,000
2533.10.080	80.2	79.8	94	14	54	54	102	8.6	15,000
2533.10.100	100.2	99.8	96	16	56	56	123	8.6	15,000
2533.10.125	125.2	124.8	96	16	56	56	150	8.6	15,000

*Tap hole for thread, created by customer

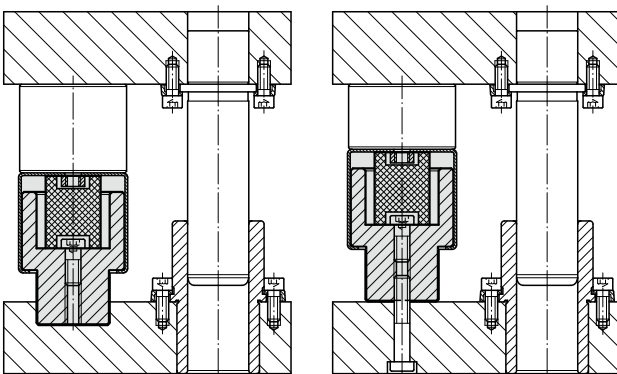
SPACER WITH SPRING FOR DIE RELEASE



2533.20.



Mounting example



Description:

The spacers with springs are inserted into the die for storage and transport purposes.

Material:

Spacer: Greenamid PA6 (GF30), colour: yellow

Spring: PU

Housing: steel, painted yellow

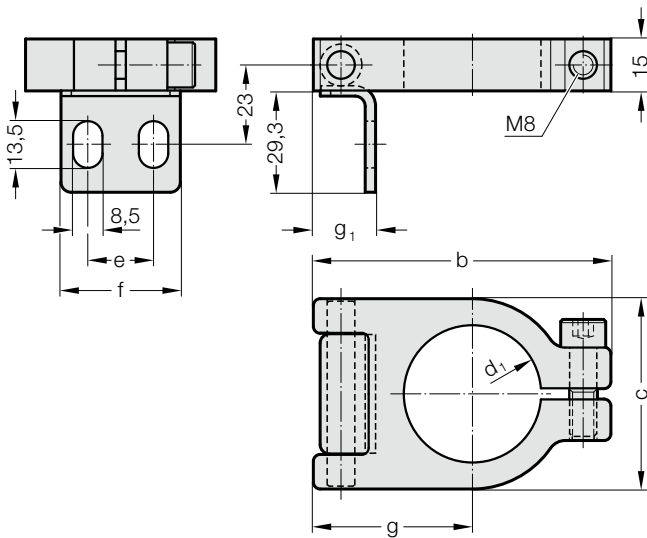
2533.20. Spacer with spring for die release

Order No	d_2	d_1	s	l	m	d_4^*	Spring force [daN]	max. carrying capacity [daN]
2533.20.040	60.5	39.8	10	84	M8	6.8	600	6,000
2533.20.050	72.5	49.8	10	95.5	M10	8.6	800	7,500
2533.20.063	87	62.8	10	103	M10	8.6	1,250	9,400
2533.20.080	109	79.8	10	105.5	M10	8.6	2,300	12,000
2533.20.100	129	99.8	10	107	M10	8.6	3,600	15,000
2533.20.125	155.5	124.8	10	108	M10	8.6	7,000	18,000

*Tap hole for thread, created by customer

HINGE FOR SPACER

2533.00.01.



Material:

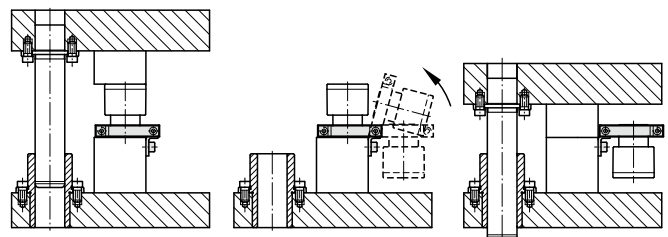
Steel, burnished

Note:

for 2533.10 and 2533.20.

Screws are not included.

Mounting example



2533.00.01. Hinge for spacer

Order No	d ₁	b	c	e	f	g	g ₁
2533.00.01.040	39.8	86	55	19	34.5	46	18
2533.00.01.050	49.8	97	70	25	44.5	53.5	17.5
2533.00.01.063	62.8	106	80	30	49.5	57	17.5
2533.00.01.080	79.8	140	105	40	69.5	72	19
2533.00.01.100	99.8	156	125	50	79.5	80	18.5
2533.00.01.125	124.8	183	150	70	99.5	93	18.5

STRIPPER FOR BLANKING DIES TO MERCEDES-BENZ- / VW STANDARD / VDI 3362



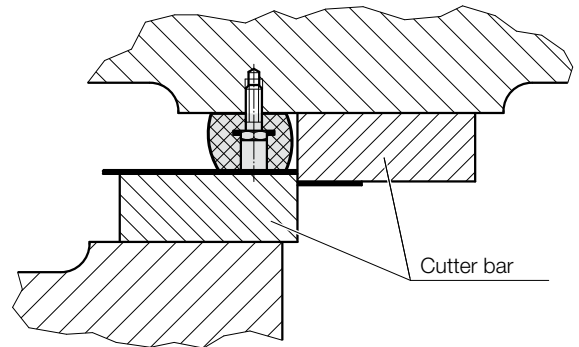
Material:
Perbunan
Hardness according to DIN
53505:
Shore A65±5

Execution:
Tolerances for finished parts to
DIN ISO 3302-1

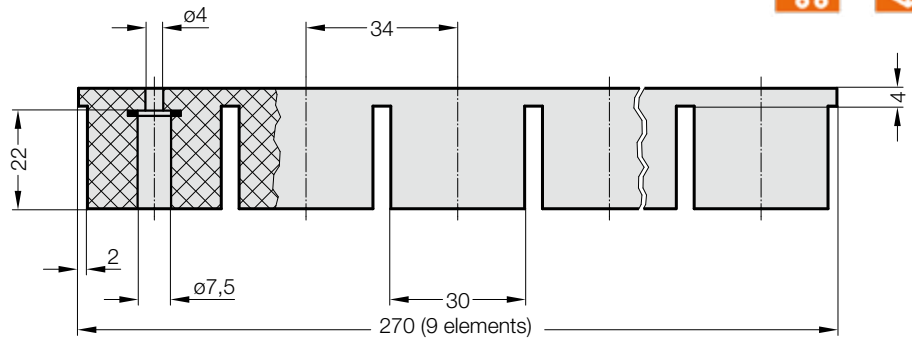
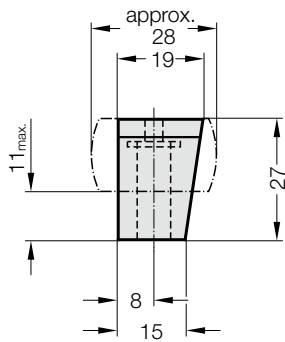
Application:
For blanking die tools

Supplied without screws

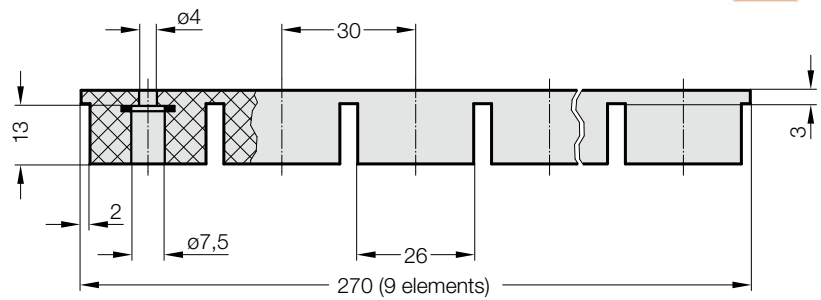
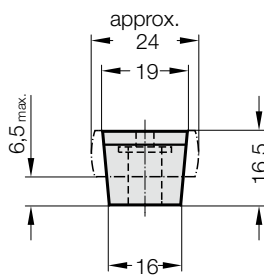
Mounting example



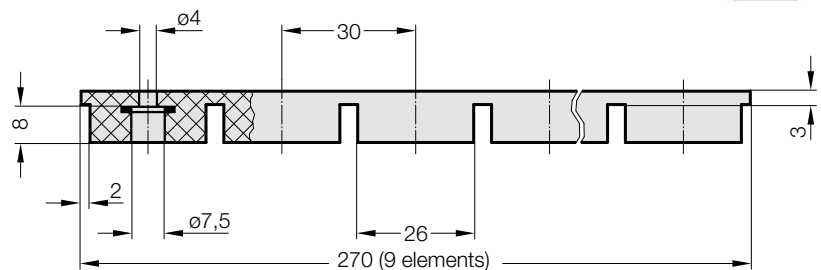
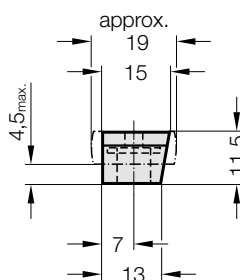
2532.2.190.270.0306



2532.2.190.165.0270



2532.2.150.115.0270



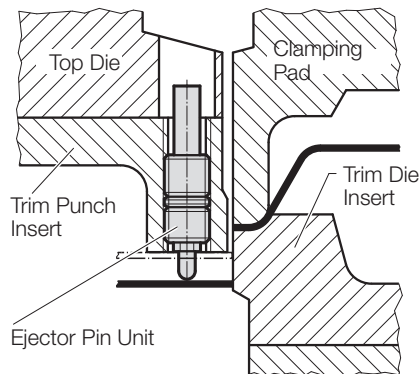
SPRING PLUNGERS



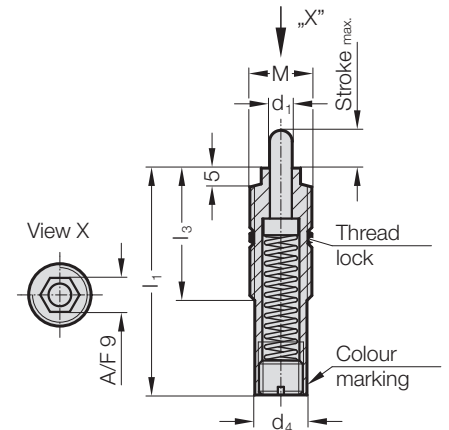
SPRING PLUNGER, STANDARD SPRING FORCE, VDI 3004, COLOUR MARKING: YELLOW



Mounting example



2470.10. .1



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

The spring-loaded pins are hardened.

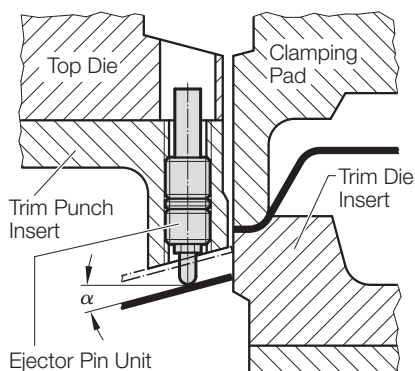
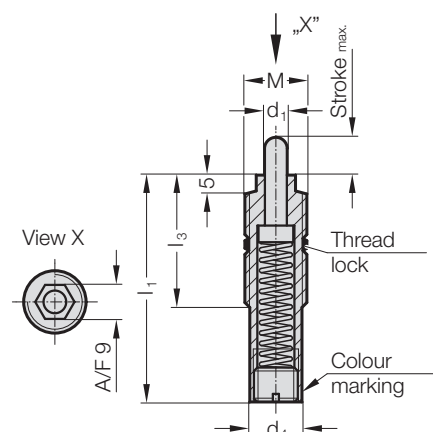
2470.10. .1 Spring plunger, standard spring force, VDI 3004, Colour marking: yellow

Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.060.1	6	13.4	M16x2	60	35	10	0.95	3.8	13.3
2470.10.010.016.060.1	6	13.4	M16x1.5	60	35	10	0.95	3.8	13.3
2470.10.015.060.1	6	13.4	M16x2	60	35	15	2	10	40
2470.10.015.016.060.1	6	13.4	M16x1.5	60	35	15	2	10	40
2470.10.020.080.1	6	13.4	M16x2	80	35	20	1.38	6.9	34.5
2470.10.020.016.080.1	6	13.4	M16x1.5	80	35	20	1.38	6.9	34.5
2470.10.030.080.1	6	13.4	M16x2	80	35	30	1.3	6.5	45.5
2470.10.030.016.080.1	6	13.4	M16x1.5	80	35	30	1.3	6.5	45.5
2470.10.030.120.1	6	13.4	M16x2	120	35	30	0.73	18	40
2470.10.030.016.120.1	6	13.4	M16x1.5	120	35	30	0.73	18	40
2470.10.040.150.1	6	13.4	M16x2	150	35	40	0.6	13.2	37.2
2470.10.040.016.150.1	6	13.4	M16x1.5	150	35	40	0.6	13.2	37.2
2470.10.050.150.1	6	13.4	M16x2	150	35	50	0.6	13.2	43.2
2470.10.050.016.150.1	6	13.4	M16x1.5	150	35	50	0.6	13.2	43.2
2470.10.060.150.1	6	13.4	M16x2	150	35	60	0.6	13.2	49.2
2470.10.060.016.150.1	6	13.4	M16x1.5	150	35	60	0.6	13.2	49.2
2470.10.070.200.1	6	13.4	M16x2	200	35	70	0.44	9.68	40.5
2470.10.070.016.200.1	6	13.4	M16x1.5	200	35	70	0.44	9.68	40.5
2470.10.080.200.1	6	13.4	M16x2	200	35	80	0.44	9.68	44.8
2470.10.080.016.200.1	6	13.4	M16x1.5	200	35	80	0.44	9.68	44.8

SPRING PLUNGER, LOW MAINTENANCE, STANDARD SPRING FORCE, VDI 3004, COLOUR MARKING: YELLOW

2470.20. .1

Mounting example



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamps made from high performance plastic
Lateral load depending on stroke length up to max. 10° permissible (see table).

Note:

Working temperature: 0 °C to +80 °C
Max. recommended extensions per minute: approx. 120 (at 20 °C)
Max. piston speed: 1.6 m/s

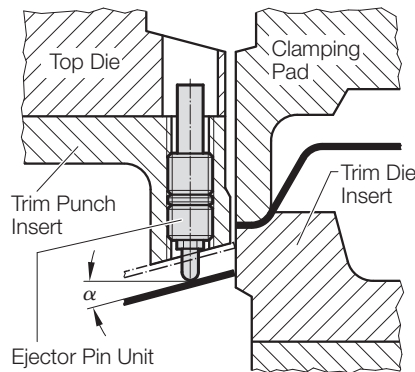
2470.20. .1 Spring plunger, low maintenance, standard spring force, VDI 3004, Colour marking: yellow

Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N]		α
								initial	final	
2470.20.010.060.1	6	13.4	M16x2	60	35	10	0.95	3.8	13.3	10
2470.20.010.016.060.1	6	13.4	M16x1.5	60	35	10	0.95	3.8	13.3	10
2470.20.015.060.1	6	13.4	M16x2	60	35	15	2	10	40	10
2470.20.015.016.060.1	6	13.4	M16x1.5	60	35	15	2	10	40	10
2470.20.020.080.1	6	13.4	M16x2	80	35	20	1.38	6.9	34.5	10
2470.20.020.016.080.1	6	13.4	M16x1.5	80	35	20	1.38	6.9	34.5	10
2470.20.030.080.1	6	13.4	M16x2	80	35	30	1.3	6.5	45.5	5
2470.20.030.016.080.1	6	13.4	M16x1.5	80	35	30	1.3	6.5	45.5	5
2470.20.030.120.1	6	13.4	M16x2	120	35	30	0.73	18	40	5
2470.20.030.016.120.1	6	13.4	M16x1.5	120	35	30	0.73	18	40	5
2470.20.040.150.1	6	13.4	M16x2	150	35	40	0.6	13.2	37.2	5
2470.20.040.016.150.1	6	13.4	M16x1.5	150	35	40	0.6	13.2	37.2	5
2470.20.050.150.1	6	13.4	M16x2	150	35	50	0.6	13.2	43.2	5
2470.20.050.016.150.1	6	13.4	M16x1.5	150	35	50	0.6	13.2	43.2	5

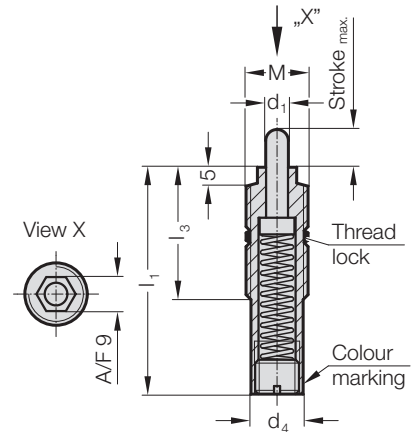
SPRING PLUNGER, MAINTENANCE-FREE, STANDARD SPRING FORCE, VDI 3004, COLOUR MARKING: YELLOW



Mounting example



2470.30. .1



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamp made of high-performance plastic with additives
 Lateral loads up to max. 25° permitted.
 End position damping reduces the kinetic energy on the spring clamps.
 Specially developed thread lock prevents loosening even with strong vibrations in the tool.

Note:

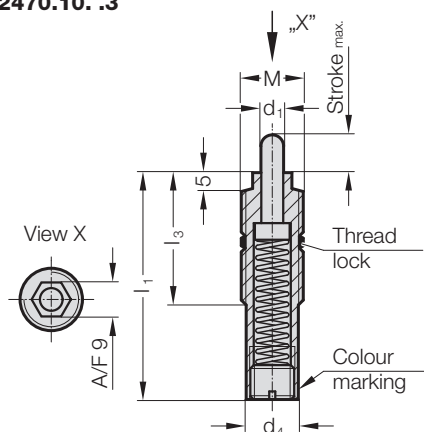
Working temperature: 0 °C to +80 °C
 Max. recommended extensions per minute: approx. 120 (at 20 °C)
 Max. piston speed: 1.6 m/s

2470.30. .1 Spring plunger, maintenance-free, standard spring force, VDI 3004, Colour marking: yellow

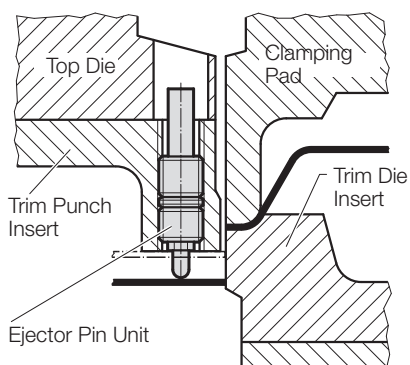
Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final	α
2470.30.010.060.1	6	13.4	M16x2	60	35	10	0.95	3.8	13.3	25
2470.30.010.016.060.1	6	13.4	M16x1.5	60	35	10	0.95	3.8	13.3	25
2470.30.015.060.1	6	13.4	M16x2	60	35	15	2	10	40	25
2470.30.015.016.060.1	6	13.4	M16x1.5	60	35	15	2	10	40	25
2470.30.020.080.1	6	13.4	M16x2	80	35	20	1.38	6.9	34.5	25
2470.30.020.016.080.1	6	13.4	M16x1.5	80	35	20	1.38	6.9	34.5	25
2470.30.030.080.1	6	13.4	M16x2	80	35	30	1.3	6.5	45.5	25
2470.30.030.016.080.1	6	13.4	M16x1.5	80	35	30	1.3	6.5	45.5	25
2470.30.030.120.1	6	13.4	M16x2	120	35	30	0.73	18	40	25
2470.30.030.016.120.1	6	13.4	M16x1.5	120	35	30	0.73	18	40	25

SPRING PLUNGER, MEDIUM SPRING FORCE, VDI 3004, COLOUR MARKING: WHITE

2470.10. .3



Mounting example



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

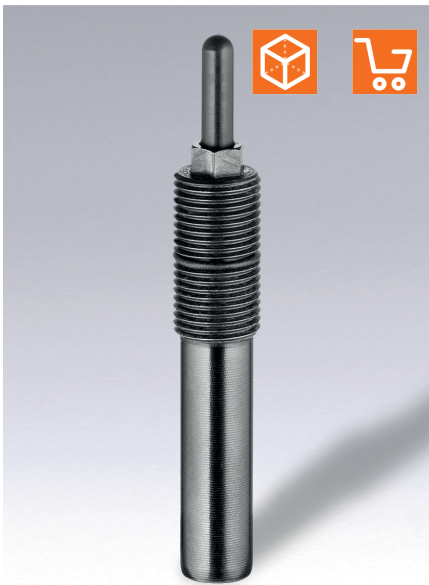
Execution:

The spring-loaded pins are hardened.

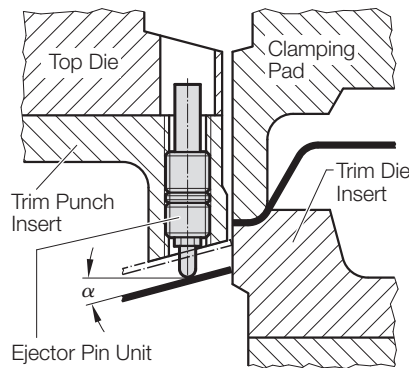
2470.10. .3 Spring plunger, medium spring force, VDI 3004, Colour marking: white

Order No	d_1	d_4	M	l_1	l_3	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.020.080.3	6	13.4	M16x2	80	35	20	3.02	15.1	75.6
2470.10.020.016.080.3	6	13.4	M16x1.5	80	35	20	3.02	15.1	75.6

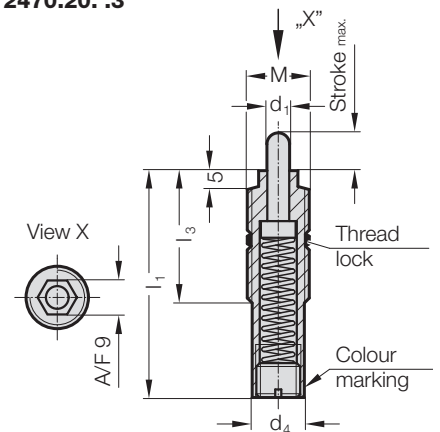
SPRING PLUNGER, LOW MAINTENANCE, MEDIUM SPRING FORCE, VDI 3004, COLOUR MARKING: WHITE



Mounting example



2470.20. .3



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamps made from high performance plastic
Lateral load depending on stroke length up to max. 10° permissible (see table).

Note:

Working temperature: 0 °C to +80 °C
Max. recommended extensions per minute: approx. 120 (at 20 °C)
Max. piston speed: 1.6 m/s

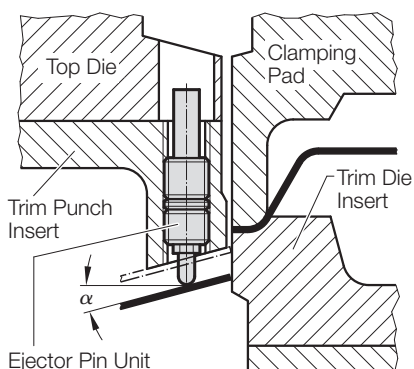
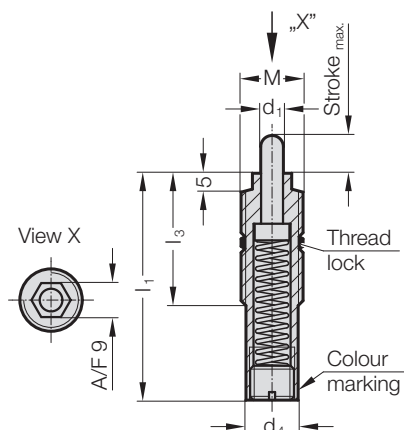
2470.20. .3 Spring plunger, low maintenance, medium spring force, VDI 3004, Colour marking: white

Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final	α
2470.20.020.080.3	6	13.4	M16x2	80	35	20	3.02	15.1	75.6	10
2470.20.020.016.080.3	6	13.4	M16x1.5	80	35	20	3.02	15.1	75.6	10

SPRING PLUNGER, MAINTENANCE-FREE, MEDIUM SPRING FORCE, VDI 3004, COLOUR MARKING: WHITE

2470.30. .3

Mounting example



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamp made of high-performance plastic with additives
Lateral loads up to max. 25° permitted.
End position damping reduces the kinetic energy on the spring clamps.
Specially developed thread lock prevents loosening even with strong vibrations in the tool.

Note:

Working temperature: 0 °C to +80 °C
Max. recommended extensions per minute: approx. 120 (at 20 °C)
Max. piston speed: 1.6 m/s

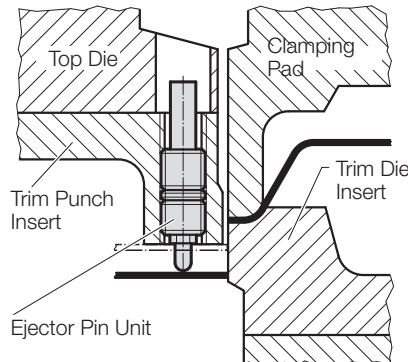
2470.30. .3 Spring plunger, maintenance-free, medium spring force, VDI 3004, Colour marking: white

Order No	d_1	d_4	M	l_1	l_3	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final	α
2470.30.020.080.3	6	13.4	M16x2	80	35	20	3.02	15.1	75.6	25
2470.30.020.016.080.3	6	13.4	M16x1.5	80	35	20	3.02	15.1	75.6	25

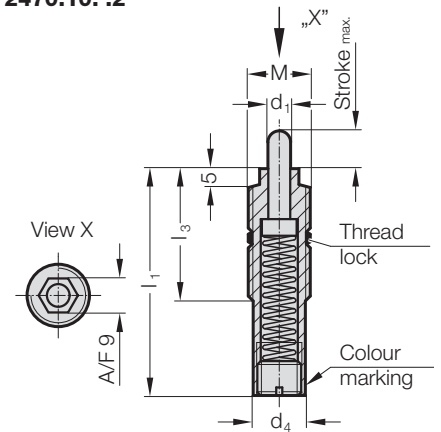
SPRING PLUNGER, INCREASED SPRING FORCE, VDI 3004, COLOUR MARKING: RED



Mounting example



2470.10. .2



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

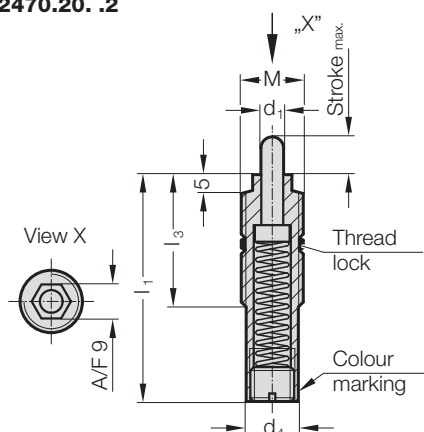
The spring-loaded pins are hardened.

2470.10. .2 Spring plunger, increased spring force, VDI 3004, Colour marking: red

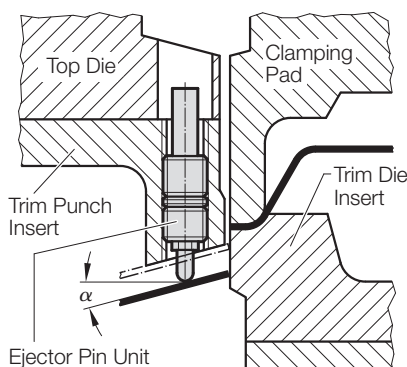
Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.060.2	6	13.4	M16x2	60	35	10	3.25	13	45.5
2470.10.010.016.060.2	6	13.4	M16x1.5	60	35	10	3.25	13	45.5
2470.10.015.060.2	6	13.4	M16x2	60	35	15	2.6	15	56
2470.10.015.016.060.2	6	13.4	M16x1.5	60	35	15	2.6	15	56
2470.10.020.080.2	6	13.4	M16x2	80	35	20	6.9	34.5	172.5
2470.10.020.016.080.2	6	13.4	M16x1.5	80	35	20	6.9	34.5	172.5
2470.10.030.120.2	6	13.4	M16x2	120	35	30	2	20	80
2470.10.030.016.120.2	6	13.4	M16x1.5	120	35	30	2	20	80
2470.10.030.150.2	6	13.4	M16x2	150	35	30	2.55	56.1	132.6
2470.10.030.016.150.2	6	13.4	M16x1.5	150	35	30	2.55	56.1	132.6
2470.10.040.150.2	6	13.4	M16x2	150	35	40	2.55	56.1	158.1
2470.10.040.016.150.2	6	13.4	M16x1.5	150	35	40	2.55	56.1	158.1
2470.10.050.200.2	6	13.4	M16x2	200	35	50	1.61	19.3	99.9
2470.10.050.016.200.2	6	13.4	M16x1.5	200	35	50	1.61	19.3	99.9
2470.10.060.200.2	6	13.4	M16x2	200	35	60	1.61	19.3	116.1
2470.10.060.016.200.2	6	13.4	M16x1.5	200	35	60	1.61	19.3	116.1
2470.10.070.200.2	6	13.4	M16x2	200	35	70	1.61	19.3	132.1
2470.10.070.016.200.2	6	13.4	M16x1.5	200	35	70	1.61	19.3	132.1
2470.10.080.200.2	6	13.4	M16x2	200	35	80	0.94	25	100.1
2470.10.080.016.200.2	6	13.4	M16x1.5	200	35	80	0.94	25	100.1

SPRING PLUNGER, LOW MAINTENANCE, INCREASED SPRING FORCE, VDI 3004, COLOUR MARKING: RED

2470.20..2



Mounting example



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamps made from high performance plastic
Lateral load depending on stroke length up to max. 10° permissible (see table).

Note:

Working temperature: 0 °C to +80 °C
Max. recommended extensions per minute: approx. 120 (at 20 °C)
Max. piston speed: 1.6 m/s

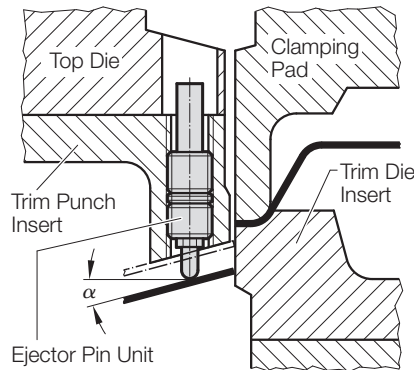
2470.20..2 Spring plunger, low maintenance, increased spring force, VDI 3004, Colour marking: red

Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final	α
2470.20.010.060.2	6	13.4	M16x2	60	35	10	3.25	13	45.5	10
2470.20.010.016.060.2	6	13.4	M16x1.5	60	35	10	3.25	13	45.5	10
2470.20.015.060.2	6	13.4	M16x2	60	35	15	2.6	15	56	10
2470.20.015.016.060.2	6	13.4	M16x1.5	60	35	15	2.6	15	56	10
2470.20.020.080.2	6	13.4	M16x2	80	35	20	6.9	34.5	172.5	10
2470.20.020.016.080.2	6	13.4	M16x1.5	80	35	20	6.9	34.5	172.5	10
2470.20.030.120.2	6	13.4	M16x2	120	35	30	2	20	80	5
2470.20.030.016.120.2	6	13.4	M16x1.5	120	35	30	2	20	80	5
2470.20.030.150.2	6	13.4	M16x2	150	35	30	2.55	56.1	132.6	5
2470.20.030.016.150.2	6	13.4	M16x1.5	150	35	30	2.55	56.1	132.6	5
2470.20.040.150.2	6	13.4	M16x2	150	35	40	2.55	56.1	158.1	5
2470.20.040.016.150.2	6	13.4	M16x1.5	150	35	40	2.55	56.1	158.1	5
2470.20.050.200.2	6	13.4	M16x2	200	35	50	1.61	19.3	99.9	5
2470.20.050.016.200.2	6	13.4	M16x1.5	200	35	50	1.61	19.3	99.9	5

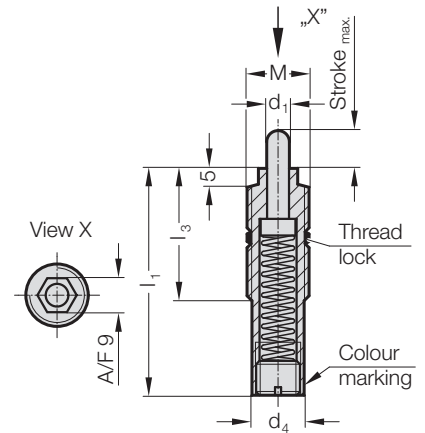
SPRING PLUNGER, MAINTENANCE-FREE, INCREASED SPRING FORCE, VDI 3004, COLOUR MARKING: RED



Mounting example



2470.30. .2



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11).

Execution:

Spring clamp made of high-performance plastic with additives
 Lateral loads up to max. 25° permitted.
 End position damping reduces the kinetic energy on the spring clamps.
 Specially developed thread lock prevents loosening even with strong vibrations in the tool.

Note:

Working temperature: 0 °C to +80 °C
 Max. recommended extensions per minute: approx. 120 (at 20 °C)
 Max. piston speed: 1.6 m/s

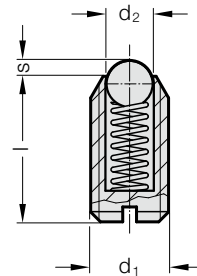
2470.30. .2 Spring plunger, maintenance-free, increased spring force, VDI 3004, Colour marking: red

Order No	d ₁	d ₄	M	l ₁	l ₃	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final	α
2470.30.010.060.2	6	13.4	M16x2	60	35	10	3.25	13	45.5	25
2470.30.010.016.060.2	6	13.4	M16x1.5	60	35	10	3.25	13	45.5	25
2470.30.015.060.2	6	13.4	M16x2	60	35	15	2.6	15	56	25
2470.30.015.016.060.2	6	13.4	M16x1.5	60	35	15	2.6	15	56	25
2470.30.020.080.2	6	13.4	M16x2	80	35	20	6.9	34.5	172.5	25
2470.30.020.016.080.2	6	13.4	M16x1.5	80	35	20	6.9	34.5	172.5	25
2470.30.030.120.2	6	13.4	M16x2	120	35	30	2	20	80	25
2470.30.030.016.120.2	6	13.4	M16x1.5	120	35	30	2	20	80	25
2470.30.030.150.2	6	13.4	M16x2	150	35	30	2.55	56.1	132.6	25
2470.30.030.016.150.2	6	13.4	M16x1.5	150	35	30	2.55	56.1	132.6	25

SPRING PLUNGER, WITH SPRING LOADED BALL, WITH SLOT, STANDARD SPRING FORCE



2471.01.



Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

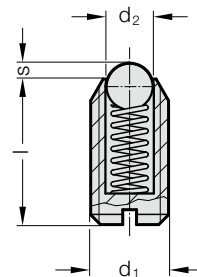
Temperature operating range: max. 250°C

2471.01. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.01.003	M3	7	0.4	1.5	3	4.5
2471.01.004	M4	9	0.8	2.5	8.5	14
2471.01.005	M5	12	0.9	3	8	14
2471.01.006	M6	14	1	3.5	11	18
2471.01.008	M8	16	1.5	4.5	18	31
2471.01.010	M10	19	2	6	24	45
2471.01.012	M12	22	2.5	8	26	49
2471.01.016	M16	24	3.5	10	41	86
2471.01.020	M20	30	4.5	12	56	111
2471.01.024	M24	34	5.5	15	81	151



2471.31.



Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

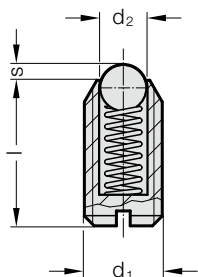
Temperature operating range: max. 250°C

2471.31. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.31.003	M3	7	0.4	1.5	3	4.5
2471.31.004	M4	9	0.8	2.5	8.5	14
2471.31.005	M5	12	0.9	3	8	14
2471.31.006	M6	14	1	3.5	11	18
2471.31.008	M8	16	1.5	4.5	18	31
2471.31.010	M10	19	2	6	24	45
2471.31.012	M12	22	2.5	8	26	49
2471.31.016	M16	24	3.5	10	41	86
2471.31.020	M20	30	4.5	12	56	111
2471.31.024	M24	34	5.5	15	81	151

SPRING PLUNGER, WITH SPRING LOADED BALL, WITH SLOT, INCREASED SPRING FORCE

2471.02.



2471.02. Spring plunger, with spring loaded ball, with slot, increased spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.02.005	M5	12	0.9	3	15	22
2471.02.006	M6	14	1	3.5	19	28
2471.02.008	M8	16	1.5	4.5	36	62
2471.02.010	M10	19	2	6	57	104
2471.02.012	M12	22	2.5	8	61	110
2471.02.016	M16	24	3.5	10	68	142
2471.02.020	M20	30	4.5	12	84	166
2471.02.024	M24	34	5.5	15	127	237

Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

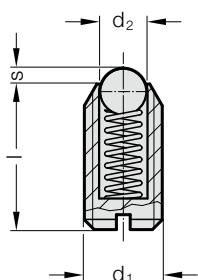
Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2471.32.



2471.32. Spring plunger, with spring loaded ball, with slot, increased spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.32.005	M5	12	0.9	3	15	22
2471.32.006	M6	14	1	3.5	19	28
2471.32.008	M8	16	1.5	4.5	36	62
2471.32.010	M10	19	2	6	57	104
2471.32.012	M12	22	2.5	8	61	110
2471.32.016	M16	24	3.5	10	68	142
2471.32.020	M20	30	4.5	12	84	166
2471.32.024	M24	34	5.5	15	127	237

Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

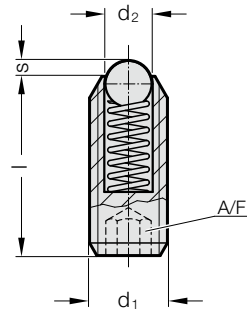
Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

SPRING PLUNGER, WITH SPRING LOADED BALL, WITH HEXAGON SOCKET, STANDARD SPRING FORCE



2471.03.



Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

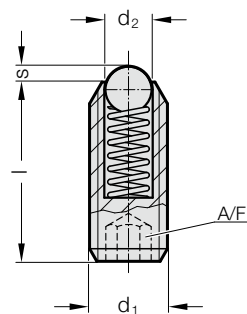
Temperature operating range: max. 250°C

2471.03. Spring plunger, with spring loaded ball, with hexagon socket, standard spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2471.03.003	M3	1.5	1.5	8	0.4	3	4.5
2471.03.004	M4	2.5	2	12	0.8	8.5	14
2471.03.005	M5	3	2.5	14	0.9	8	14
2471.03.006	M6	3.5	3	15	1	11	18
2471.03.008	M8	4.5	4	18	1.5	18	31
2471.03.010	M10	6	5	23	2	24	45
2471.03.012	M12	8	6	26	2.5	26	49
2471.03.016	M16	10	8	33	3.5	41	86
2471.03.020	M20	12	10	43	4.5	56	111
2471.03.024	M24	15	12	48	5.5	81	151



2471.33.



Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

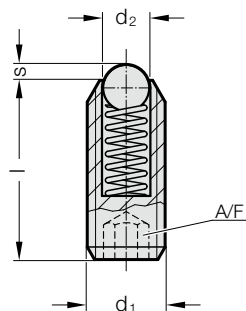
Temperature operating range: max. 250°C

2471.33. Spring plunger, with spring loaded ball, with hexagon socket, standard spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2471.33.003	M3	1.5	1.5	8	0.4	3	4.5
2471.33.004	M4	2.5	2	12	0.8	8.5	14
2471.33.005	M5	3	2.5	14	0.9	8	14
2471.33.006	M6	3.5	3	15	1	11	18
2471.33.008	M8	4.5	4	18	1.5	18	31
2471.33.010	M10	6	5	23	2	24	45
2471.33.012	M12	8	6	26	2.5	26	49
2471.33.016	M16	10	8	33	3.5	41	86
2471.33.020	M20	12	10	43	4.5	56	111
2471.33.024	M24	15	12	48	5.5	81	151

SPRING PLUNGER, WITH SPRING LOADED BALL, WITH HEXAGON SOCKET, INCREASED SPRING FORCE

2471.04.



2471.04. Spring plunger, with spring loaded ball, with hexagon socket, increased spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2471.04.005	M5	3	2.5	14	0.9	15	22
2471.04.006	M6	3.5	3	15	1	19	28
2471.04.008	M8	4.5	4	18	1.5	36	62
2471.04.010	M10	6	5	23	2	57	104
2471.04.012	M12	8	6	26	2.5	61	110
2471.04.016	M16	10	8	33	3.5	68	142
2471.04.020	M20	12	10	43	4.5	84	166
2471.04.024	M24	15	12	48	5.5	127	237

Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

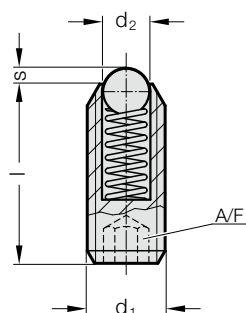
Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2471.34.



2471.34. Spring plunger, with spring loaded ball, with hexagon socket, increased spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2471.34.005	M5	3	2.5	14	0.9	15	22
2471.34.006	M6	3.5	3	15	1	19	28
2471.34.008	M8	4.5	4	18	1.5	36	62
2471.34.010	M10	6	5	23	2	57	104
2471.34.012	M12	8	6	26	2.5	61	110
2471.34.016	M16	10	8	33	3.5	68	142
2471.34.020	M20	12	10	43	4.5	84	166
2471.34.024	M24	15	12	48	5.5	127	237

Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

SPRING PLUNGER, WITH SPRING LOADED BALL, WITH SLOT, STANDARD SPRING FORCE



Material:

Sleeve: Delrin blue (POM)

Ball: Delrin white (POM)

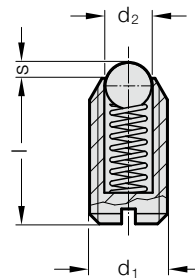
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: -30°C up to 50°C

2471.05.



2471.05. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.05.006	M6	14	0.9	3.5	12	17
2471.05.008	M8	16	1.5	5	20	35
2471.05.010	M10	19	1.9	6	25	45



Material:

Sleeve: Delrin blue (POM)

Ball: Nirosta hardened (POM)

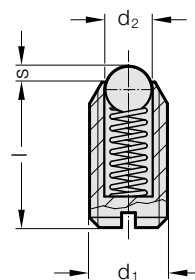
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: -30°C up to 50°C

2471.35.

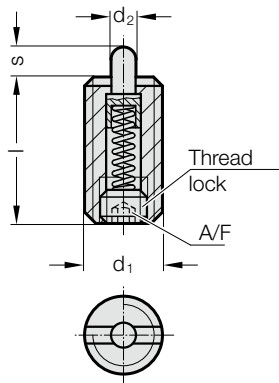


2471.35. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d ₁	l	s	d ₂	Spring force [N]	
					initial	final
2471.35.006	M6	14	0.9	3.5	12	17
2471.35.008	M8	16	1.5	5	20	35
2471.35.010	M10	19	1.9	6	25	45

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH SLOT, STANDARD SPRING FORCE

2472.01.



2472.01. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d_1	d_2	l	s	SW	Spring force [N]	
						initial	final
2472.01.003	M3	1	12	1	0.7	2	4
2472.01.004	M4	1.5	15	1.5	1.3	4.5	16
2472.01.005	M5	2.4	18	2.3	1.5	6	19
2472.01.006	M6	2.7	20	2.5	2	6	19
2472.01.008	M8	3.5	22	3	2.5	10	39
2472.01.010	M10	4	22	3	3	10	39
2472.01.012	M12	6	28	4	4	12	53
2472.01.016	M16	7.5	32	5	5	45	100
2472.01.020	M20	10	40	7	6	52	125
2472.01.024	M24	12	52	10	8	70	170

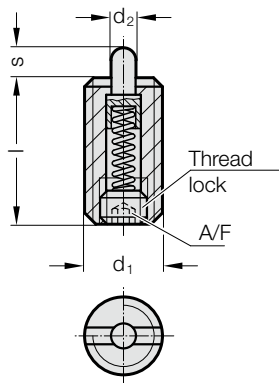
Material:

Sleeve: Free machining steel, burnished
 Pin: Free machining steel hardened, burnished
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

2472.31.



2472.31. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d_1	d_2	l	s	SW	Spring force [N]	
						initial	final
2472.31.004	M4	1.5	15	1.5	1.3	4.5	16
2472.31.005	M5	2.4	18	2.3	1.5	6	19
2472.31.006	M6	2.7	20	2.5	2	6	19
2472.31.008	M8	3.5	22	3	2.5	10	39
2472.31.010	M10	4	22	3	3	10	39
2472.31.012	M12	6	28	4	4	12	53
2472.31.016	M16	7.5	32	5	5	45	100
2472.31.020	M20	10	40	7	6	52	125

Material:

Sleeve: Inox 1.4305
 Pin: Inox 1.4305
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH SLOT, STANDARD SPRING FORCE



Material:

Sleeve: Free machining steel, burnished

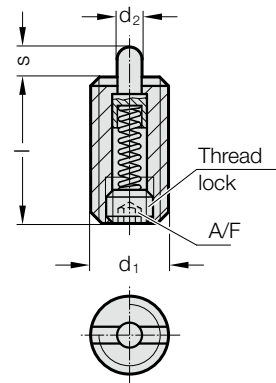
Pin: Delrin white (POM)

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

2472.21.



2472.21. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d ₁	d ₂	l	s	SW	Spring force [N]	
						initial	final
2472.21.004	M4	1.5	15	1.5	1.3	4.5	16
2472.21.005	M5	2.4	18	2.3	1.5	6	19
2472.21.006	M6	2.7	20	2.5	2	6	19
2472.21.008	M8	3.5	22	3	2.5	10	39
2472.21.010	M10	4	22	3	3	10	39
2472.21.012	M12	6	28	4	4	12	53
2472.21.016	M16	7.5	32	5	5	45	100



Material:

Sleeve: Nirosta 1.4305

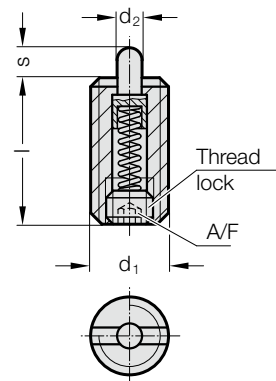
Pin: Delrin white (POM)

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

2472.22.

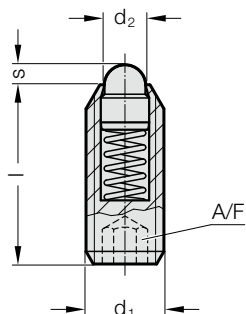


2472.22. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d ₁	d ₂	l	s	SW	Spring force [N]	
						initial	final
2472.22.004	M4	1.5	15	1.5	1.3	4.5	16
2472.22.005	M5	2.4	18	2.3	1.5	6	19
2472.22.006	M6	2.7	20	2.5	2	6	19
2472.22.008	M8	3.5	22	3	2.5	10	39
2472.22.010	M10	4	22	3	3	10	39
2472.22.012	M12	6	28	4	4	12	53
2472.22.016	M16	7.5	32	5	5	45	100

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH HEXAGON SOCKET, STANDARD SPRING FORCE

2472.03.



2472.03. Spring plunger, with spring loaded pin, with hexagon socket, standard spring force

Material:

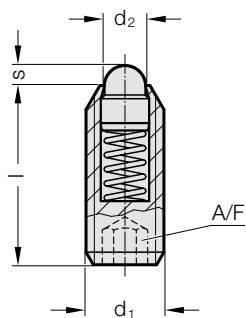
Sleeve: Free machining steel, burnished
Pin: Free machining steel hardened, burnished
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.
Temperature operating range: max. 250°C

Order No	d ₁	d ₂	l	s	SW	Spring force [N]	
						initial	final
2472.03.004	M4	1.8	12	1.5	2	4.5	12.5
2472.03.005	M5	2.4	14	2	2.5	5	13
2472.03.006	M6	2.7	15	2	3	6	17
2472.03.008	M8	3.8	18	2	4	16	33
2472.03.010	M10	4.5	23	2.5	5	19	42
2472.03.012	M12	6	26	3.5	6	22	57
2472.03.016	M16	8.5	33	4.5	8	38	78
2472.03.020	M20	10	43	6.5	10	39	81
2472.03.024	M24	13	48	8	12	72	155

2472.33.



2472.33. Spring plunger, with spring loaded pin, with hexagon socket, standard spring force

Material:

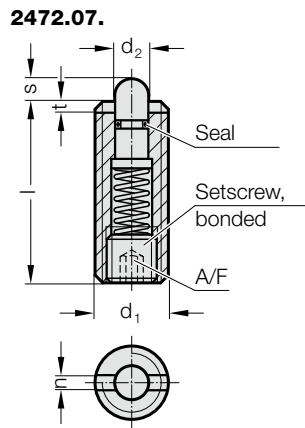
Sleeve: Inox 1.4305
Pin: Inox 1.4305
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.
Temperature operating range: max. 250°C

Order No	d ₁	d ₂	l	s	SW	Spring force [N]	
						initial	final
2472.33.004	M4	1.8	12	1.5	2	4.5	12.5
2472.33.005	M5	2.4	14	2	2.5	5	13
2472.33.006	M6	2.7	15	2	3	6	17
2472.33.008	M8	3.8	18	2	4	16	33
2472.33.010	M10	4.5	23	2.5	5	19	42
2472.33.012	M12	6	26	3.5	6	22	57
2472.33.016	M16	8.5	33	4.5	8	38	78
2472.33.020	M20	10	43	6.5	10	39	81
2472.33.024	M24	13	48	8	12	72	155

SPRING PLUNGER, WITH SPRING LOADED PIN AND SEAL, WITH HEXAGON SOCKET, STANDARD SPRING FORCE



Material:

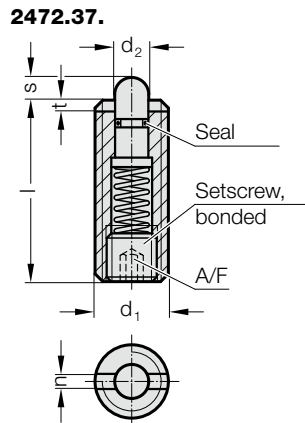
Sleeve: Free machining steel, burnished
 Pin: Free machining steel hardened, burnished
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.
 Temperature operating range: -30°C up to 80°C

2472.07. Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force

[N] Order No	d ₁	d ₂	l	n	s	t	SW	Spring force [N]	
								initial	final
2472.07.008	M8	3.8	26	1.5	3	1.4	2.5	9	24
2472.07.010	M10	4	28	1.5	3.5	1.4	3	15	30
2472.07.012	M12	6	35	2.7	4	2	4	24	50
2472.07.016	M16	7.5	40	3.2	5	2.5	5	36	58



Material:

Sleeve: Inox 1.4305
 Pin: Inox 1.4305
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.
 Temperature operating range: -30°C up to 80°C

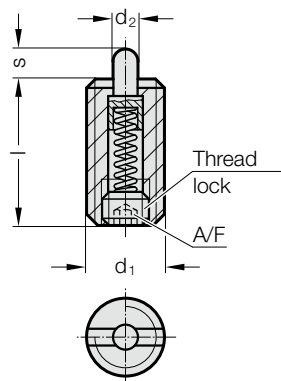
2472.37. Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force

[N] Order No	d ₁	d ₂	l	n	s	t	SW	Spring force [N]	
								initial	final
2472.37.008	M8	3.8	26	1.5	3	1.4	2.5	9	24
2472.37.010	M10	4	28	1.5	3.5	1.4	3	15	30
2472.37.012	M12	6	35	2.7	4	2	4	24	50
2472.37.016	M16	7.5	40	3.2	5	2.5	5	36	58

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH SLOT, INCREASED SPRING FORCE

SPRING PLUNGER, WITH SPRING LOADED PIN AND SEAL, WITH HEXAGON SOCKET, INCREASED SPRING FORCE

2472.02.



2472.02. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2472.02.005	M5	2.4	1.5	18	2.3	11	40
2472.02.006	M6	2.7	2	20	2.5	15	43
2472.02.008	M8	3.5	2.5	22	3	20	75
2472.02.010	M10	4	3	22	3	20	75
2472.02.012	M12	6	4	28	4	45	120
2472.02.016	M16	7.5	5	32	5	64	160
2472.02.020	M20	10	6	40	7	75	195
2472.02.024	M24	12	8	52	10	75	245

Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

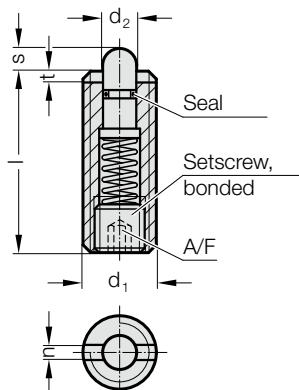
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

Identification of increased spring force by two longitudinal marks on the sleeve.

2472.08.



2472.08. Spring plunger, with spring loaded pin and seal, with hexagon socket, increased spring force

Order No	d ₁	d ₂	l	n	s	t	SW	Spring force [N]	
								initial	final
2472.08.008	M8	3.8	26	1.5	3	1.4	2.5	17	39
2472.08.010	M10	4	28	1.5	3.5	1.4	3	22	43
2472.08.012	M12	6	35	2.7	4	2	4	40	80
2472.08.016	M16	7.5	40	3.2	5	2.5	5	44	113

Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.

Temperature operating range: -30°C up to 80°C

Identification of increased spring force by two longitudinal marks on the sleeve.

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH HEXAGON SOCKET, INCREASED SPRING FORCE



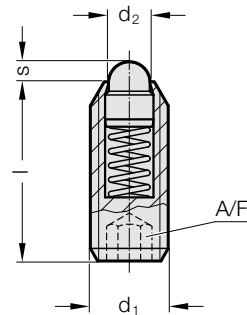
Material:

Sleeve: Free machining steel, burnished
 Pin: Free machining steel hardened, burnished
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.
 Temperature operating range: max. 250°C
 Identification of increased spring force by two longitudinal marks on the sleeve.

2472.04.



2472.04. Spring plunger, with spring loaded pin, with hexagon socket, increased spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2472.04.006	M6	2.7	3	15	2	11	25
2472.04.008	M8	3.8	4	18	2	23	59
2472.04.010	M10	4.5	5	23	2.5	20	54
2472.04.012	M12	6	6	26	3.5	38	96
2472.04.016	M16	8.5	8	33	4.5	50	100
2472.04.020	M20	10	10	43	6.5	52	133
2472.04.024	M24	13	12	48	8	91	223



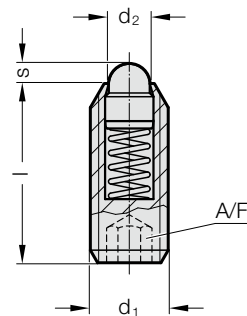
Material:

Sleeve: Inox 1.4305
 Pin: Inox 1.4305
 Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.
 Temperature operating range: max. 250°C
 Identification of increased spring force by two longitudinal marks on the sleeve.

2472.34.

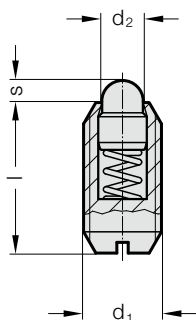


2472.34. Spring plunger, with spring loaded pin, with hexagon socket, increased spring force

Order No	d ₁	d ₂	SW	l	s	Spring force [N]	
						initial	final
2472.34.006	M6	2.7	3	15	2	11	25
2472.34.008	M8	3.8	4	18	2	23	59
2472.34.010	M10	4.5	5	23	2.5	20	54
2472.34.012	M12	6	6	26	3.5	38	96
2472.34.016	M16	8.5	8	33	4.5	50	100
2472.34.020	M20	10	10	43	6.5	52	133
2472.34.024	M24	13	12	48	8	91	223

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH SLOT, STANDARD SPRING FORCE

2472.05.



2472.05. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d ₁	d ₂	l	s	Spring force [N]	
					initial	final
2472.05.004	4	1.8	9	1.5	4.5	12.5
2472.05.005	5	2.4	12	2	5	13
2472.05.006	6	2.7	14	2	6	17
2472.05.008	8	3.8	16	2	16	33
2472.05.010	10	4.5	19	2.5	19	42
2472.05.012	12	6.2	22	3.5	22	57
2472.05.016	16	8.5	24	4.5	38	78
2472.05.020	20	10	30	6.5	39	81
2472.05.024	24	13	34	8	72	155

Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

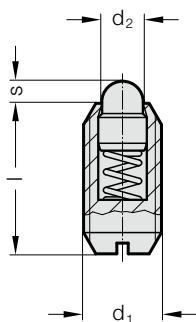
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

2472.35.



2472.35. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d ₁	d ₂	l	s	Spring force [N]	
					initial	final
2472.35.004	4	1.8	9	1.5	4.5	12.5
2472.35.005	5	2.4	12	2	5	13
2472.35.006	6	2.7	14	2	6	17
2472.35.008	8	3.8	16	2	16	33
2472.35.010	10	4.5	19	2.5	19	42
2472.35.012	12	6.2	22	3.5	22	57
2472.35.016	16	8.5	24	4.5	38	78
2472.35.020	20	10	30	6.5	39	81
2472.35.024	24	13	34	8	72	155

Material:

Sleeve: Inox 1.4305

Pin: Inox 1.4305

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

SPRING PLUNGER, WITH SPRING LOADED PIN, WITH SLOT, INCREASED SPRING FORCE



Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

Spring: Nirosta

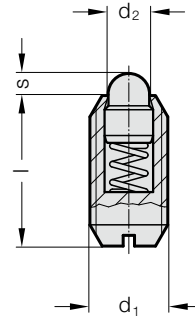
Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2472.06.



2472.06. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d ₁	d ₂	l	s	Spring force [N]	
					initial	final
2472.06.006	M6	2.7	14	2	11	25
2472.06.008	M8	3.8	16	2	23	59
2472.06.010	M10	4.5	19	2.5	20	54
2472.06.012	M12	6.2	22	3.5	38	96
2472.06.016	M16	8.5	24	4.5	50	100
2472.06.020	M20	10	30	6.5	52	133
2472.06.024	M24	13	34	8	91	223



Material:

Sleeve: Inox 1.4305

Pin: Inox 1.4305

Spring: Nirosta

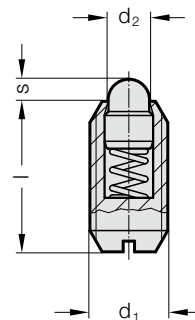
Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2472.36.



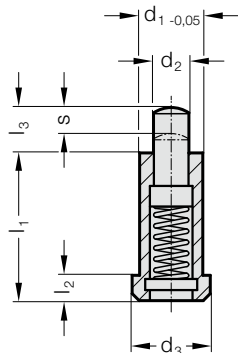
2472.36. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d ₁	d ₂	l	s	Spring force [N]	
					initial	final
2472.36.006	M6	2.7	14	2	11	25
2472.36.008	M8	3.8	16	2	23	59
2472.36.010	M10	4.5	19	2.5	20	54
2472.36.012	M12	6.2	22	3.5	38	96
2472.36.016	M16	8.5	24	4.5	50	100
2472.36.020	M20	10	30	6.5	52	133
2472.36.024	M24	13	34	8	91	223

SPRING PLUNGER, WITH SPRING LOADED PIN, STRAIGHT VERSION, WITH COLLAR

SPRING PLUNGER, WITH SPRING LOADED BALL, STRAIGHT VERSION

2473.01.



**2473.01. Spring plunger, with spring loaded pin,
straight version, with collar**

Order No	d ₁	d ₂	d ₃	l ₁	l ₂	l ₃	s	Spring force [N]	
								initial	final
2473.01.006	6	2.7	8	20	3.2	6	3.5	10	22
2473.01.008	8	3.9	10	24	3.2	8	4.5	30	88
2473.01.010	10	5.9	13	30	4	10	5.5	42	110
2473.01.012	12	7.9	16	36	5	12	6.5	50	130

Material:

Sleeve: Free machining steel, burnished

Pin: Steel, case hardened, burnished

Spring: Nirosta

Note:

For use in toolmaking as forcing pins and spring loaded limit stops.

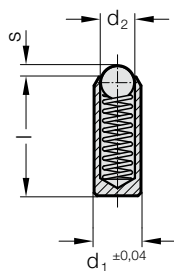
Neither the threaded cartridge nor any of its components can escape from the mounting.

Temperature operating range: max. 250 °C

Mounting:

Spring plunger, with spring loaded pin, straight version, with collar is pressed in.

2473.02.



**2473.02. Spring plunger, with spring loaded ball,
straight version**

Order No	d ₁	d ₂	l	s	Spring force [N]	
					initial	final
2473.02.030	3	2	7	0.65	4.5	7.5
2473.02.035	3.5	2.5	9	0.8	6	14.5
2473.02.040	4	3	11	0.9	8	14
2473.02.045	4.5	3.2	12	0.95	9.5	16.5
2473.02.050	5	3.5	13	1	11	18
2473.02.055	5.5	4	14	1.2	15.5	25
2473.02.060	6	4.5	15	1.5	18	31

Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250 °C

Mounting:

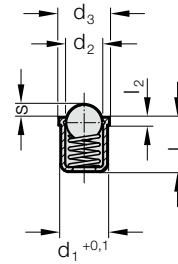
The mounting hole must be adapted for the respective application.

We recommend a fitting dimension of F8 for joint connections and H9 for press connections.

SPRING PLUNGER, WITH SPRING LOADED BALL, STRAIGHT VERSION, WITH COLLAR



2475.01.



Material:

Sleeve: Delrin blue (POM)

Ball: Delrin white (POM)

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: -30°C to +50°C

Mounting:

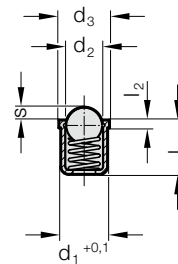
A tolerance of H7 is recommended for the d₁ mounting hole.

2475.01. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d ₁	d ₂	d ₃	l ₁	l ₂	s	Spring force [N]	
							initial	final
2475.01.004	4	3	4.6	5	1	0.8	2.5	6.5
2475.01.005	5	4	5.6	6	1	1	6	9.4
2475.01.006	6	5	6.5	7	1	1.6	6.5	13
2475.01.008	8	6.5	8.5	9	1	1.9	8	18
2475.01.010	10	8	11	13.5	1.5	2.4	12	23
2475.01.012	12	10	13	16	1.5	3.3	13	25



2475.02.



Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta hardened

Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.

Temperature operating range: -30°C to +50°C

Mounting:

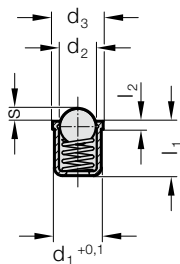
A tolerance of H7 is recommended for the d₁ mounting hole.

2475.02. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d ₁	d ₂	d ₃	l ₁	l ₂	s	Spring force [N]	
							initial	final
2475.02.004	4	3	4.6	5	1	0.8	2.5	6.5
2475.02.005	5	4	5.6	6	1	1	6	9.4
2475.02.006	6	5	6.5	7	1	1.6	6.5	13
2475.02.008	8	6.5	8.5	9	1	1.9	8	18
2475.02.010	10	8	11	13.5	1.5	2.4	12	23
2475.02.012	12	10	13	16	1.5	3.3	13	25

SPRING PLUNGER, WITH SPRING LOADED BALL, STRAIGHT VERSION, WITH COLLAR

2475.03.



2475.03. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d ₁	d ₂	d ₃	l ₁	l ₂	s	Spring force [N]	
							initial	final
2475.03.004	4	3	4.5	5	1	0.8	3	6
2475.03.005	5	4	5.5	6	1	1	4	6.5
2475.03.006	6	5	6.5	7	1	1.6	6	11.5
2475.03.008	8	6.5	8.5	9	1	1.9	8	12.5

Material:

Sleeve: Brass
Ball: Nirosta hardened
Spring: Nirosta

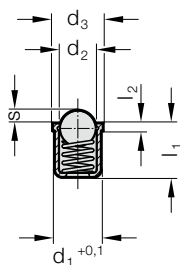
Note:

For locking and for pressing upwards or downwards.
Temperature operating range: max. 250°C

Mounting:

A tolerance of H7 is recommended for the d₁ mounting hole.

2475.04.



2475.04. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d ₁	d ₂	d ₃	l ₁	l ₂	s	Spring force [N]	
							initial	final
2475.04.004	4	3	4.6	5	0.9	1	2.5	6
2475.04.005	5	4	5.6	6	0.9	1.4	3	6.5
2475.04.006	6	5	6.5	7	1	1.8	5.5	11.5
2475.04.008	8	6.5	8.5	9	1.1	2.4	7	12.5
2475.04.010	10	8.5	11	13.5	1.7	3.3	8.5	18.5
2475.04.012	12	10	13	16	2.3	4	12	26.5

Material:

Sleeve: Nirosta 1.4303
Ball: Nirosta hardened
Spring: Nirosta

Note:

For locking and for pressing upwards or downwards.
Temperature operating range: max. 250°C

Mounting:

A tolerance of H7 is recommended for the d₁ mounting hole.

ACCESSORIES FOR SPRING PLUNGERS



2470.10.11
Lock wrench
for 2470.10./20./30.



2470.12.010.017
Lock wrench
for 2479. and 3479.



2472.11.
Lock wrench
for 2472.01./02.

Order No for thread

2472.11.003.1	M3
2472.11.004.1	M4
2472.11.005.1	M5
2472.11.006.1	M6
2472.11.008.1	M8
2472.11.010.1	M10
2472.11.012.1	M12
2472.11.016.1	M16
2472.11.020.1	M20
2472.11.024	M24

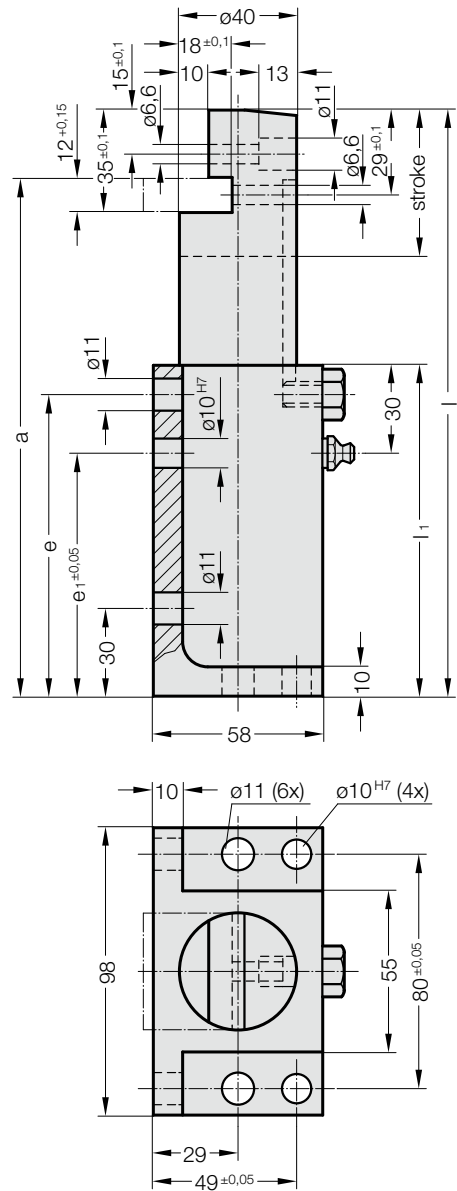
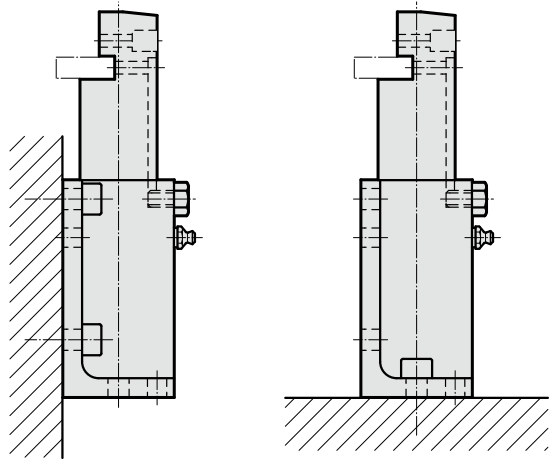
**STRIPPING UNIT, STOCK LIFTER,
LIFTING UNIT, SPRING RAM**



STRIPPING UNIT, WALL AND BOTTOM MOUNTING



2477. .1.01

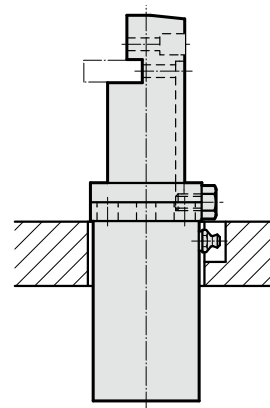
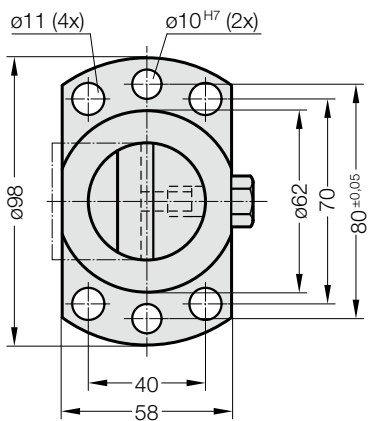
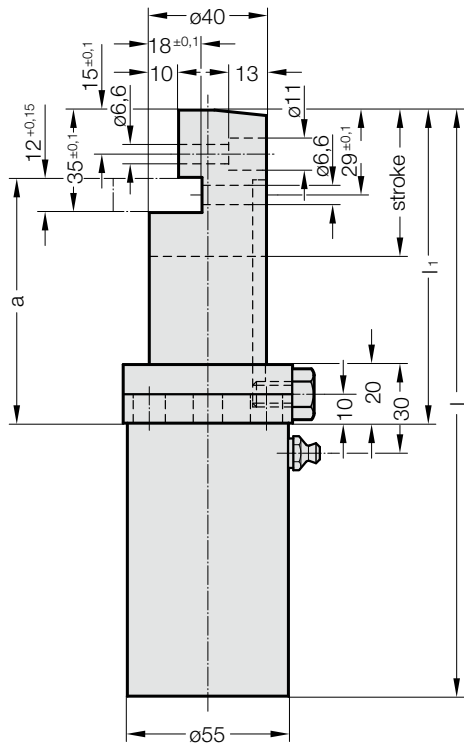


2477. .1.01 Stripping unit, wall and bottom mounting

Order No	Stroke	Initial spring force [daN]	l	l ₁	a	e	e ₁
2477.050.00050.1.01	50	50	200	113	177	103	83
2477.050.00100.1.01	50	100	200	113	177	103	83
2477.050.00150.1.01	50	150	200	113	177	103	83
2477.050.00200.1.01	50	200	200	113	177	103	83
2477.080.00050.1.01	80	50	260	143	237	133	113
2477.080.00100.1.01	80	100	260	143	237	133	113
2477.080.00150.1.01	80	150	260	143	237	133	113
2477.080.00200.1.01	80	200	260	143	237	133	113

STRIPPING UNIT, FLANGED MOUNTING

2477. .1.02



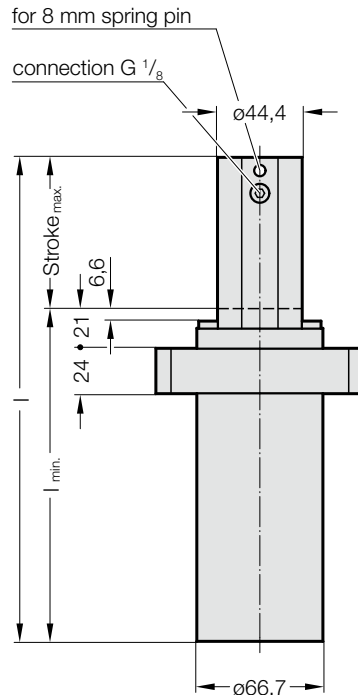
2477. .1.02 Stripping unit, flanged mounting

Order No	Stroke	Initial spring force [daN]	l	l ₁	a
2477.050.00050.1.02	50	50	200	107	84
2477.050.00100.1.02	50	100	200	107	84
2477.050.00150.1.02	50	150	200	107	84
2477.050.00200.1.02	50	200	200	107	84
2477.080.00050.1.02	80	50	260	137	114
2477.080.00100.1.02	80	100	260	137	114
2477.080.00150.1.02	80	150	260	137	114
2477.080.00200.1.02	80	200	260	137	114

STOCK LIFTER



2478.10.



Description:

All component lifters in the various gas spring classes are of the same design and the different spring forces are achieved solely by means of different gas pressures. The pressure can be topped up or reduced via the piston rod.

Note:

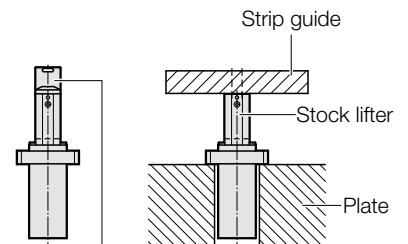
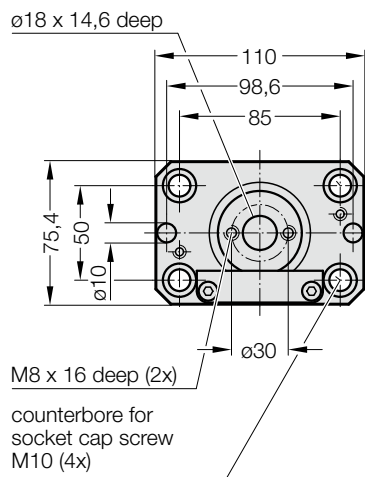
Pressure medium: Nitrogen - N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0,3%/°C
 Max. recommended extensions per minute: approx. 80 to 100 (at 20°C)
 Max. piston speed: 1,6 m/s
 Order No for spare parts kit: 2478.10.00320
 Spring forces as per spring diagram.
 Upon customers request, also available unfilled, Order No 2478.10.00000....

2478.10.

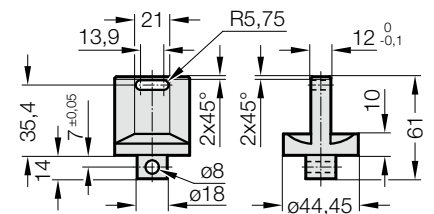
Stock lifter

Order No	Stroke _{max.}	l _{min.}	l
2478.10.□□□□□.025	25	121	146
2478.10.□□□□□.050	50	146	196
2478.10.□□□□□.080	80	176	256
2478.10.□□□□□.100	100	196	296
2478.10.□□□□□.125	125	221	346
2478.10.□□□□□.150	150	246	396
2478.10.□□□□□.163	163	259	422
2478.10.□□□□□.175	175	271	446
2478.10.□□□□□.200	200	296	496
2478.10.□□□□□.210	210	306	516

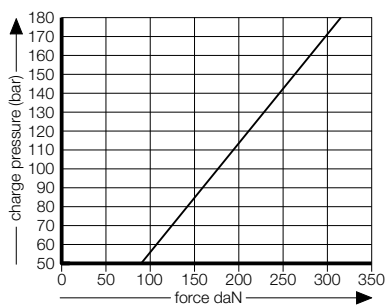
*complete with initial spring force
 Spring force marking:
 Initial spring force [daN] - Pressure [bar]
 .00050. - 28
 .00100. - 56
 .00150. - 84
 .00200. - 113
 .00250. - 141
 .00320. - 180



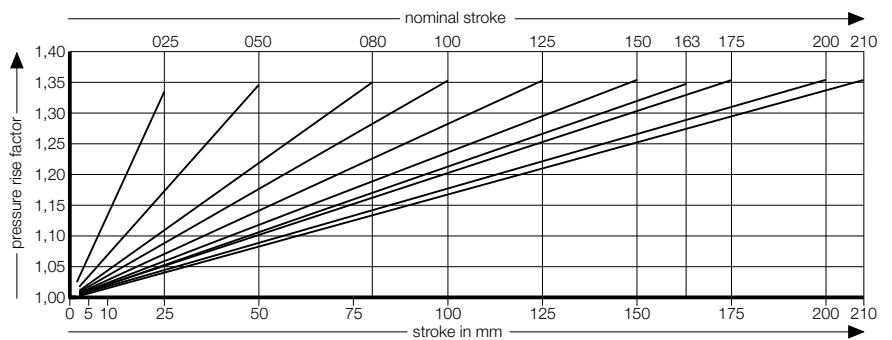
2478.10.00320.01 Fixing adapter order separately



Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

STOCK LIFTER

Description:

The cylinder base can be used for topping up and reducing gas pressure and for inter-connection arrangements.

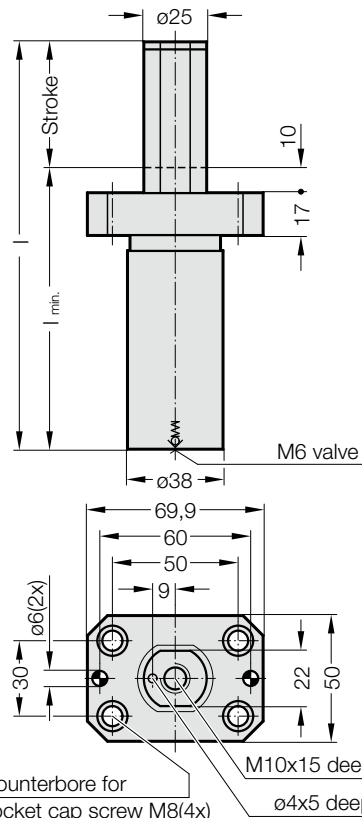
Note:

Stocklifters are equipped with a "PowerLine" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

Initial spring force: 170 daN
 Pressure medium: Nitrogen – N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0,3%/°C
 Max. recommended extensions per minute: approx. 40 to 100 (at 20°C)
 Max. piston speed: 1,6 m/s
 Max. usable stroke: 100%

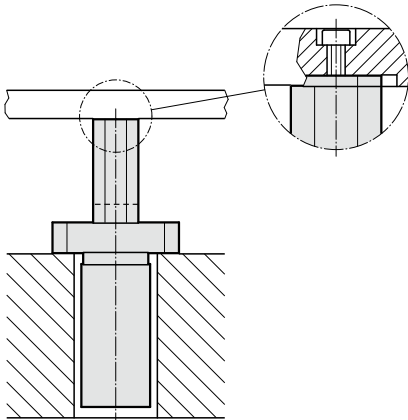
Spring forces as per spring diagram.

2478.30. . 1

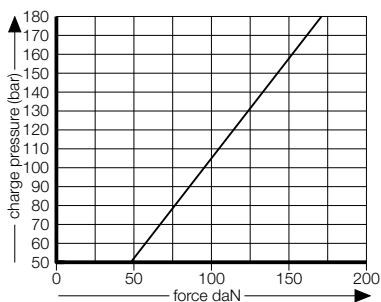


2478.30. . 1 Stock lifter

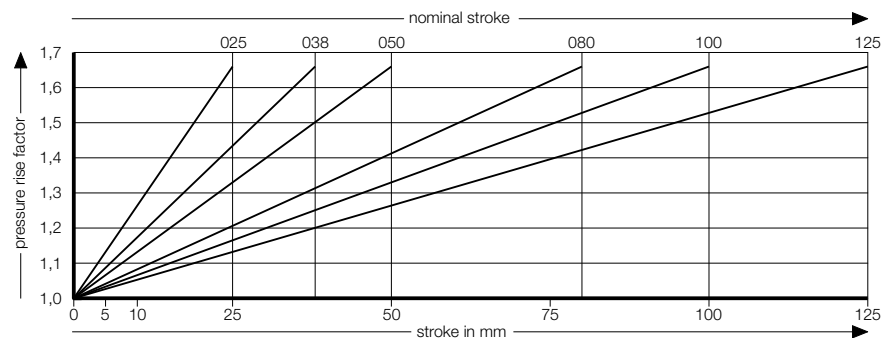
Order No	Stroke _{max.}	l _{min.}	l
2478.30.00170.025.1	25	87	112
2478.30.00170.038.1	38	100	138
2478.30.00170.050.1	50	112	162
2478.30.00170.080.1	80	145	225
2478.30.00170.100.1	100	165	265
2478.30.00170.125.1	125	190	315



Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise

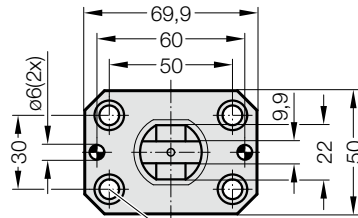
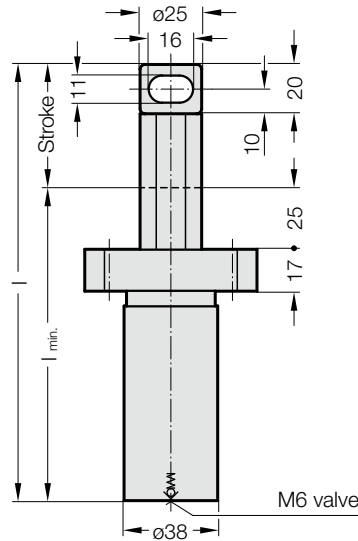


Pressure rise factor accounts for displacement but not external influences!

STOCK LIFTER WITH ATTACHMENT LUG



2478.30. .2



Counterbore for socket cap screw M8(4x)

Description:

The cylinder base can be used for topping up and reducing gas pressure and for inter-connection arrangements.

Note:

Stocklifters are equipped with a "PowerLine" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

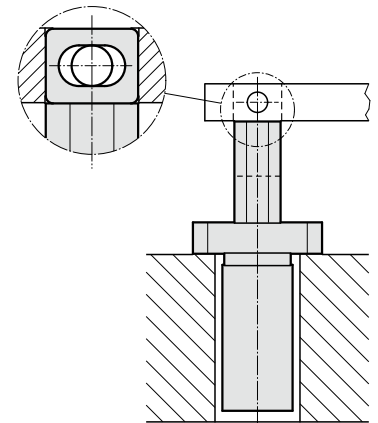
Initial spring force: 170 daN
 Pressure medium: Nitrogen – N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0,3%/°C
 Max. recommended extensions per minute: approx. 40 to 100 (at 20°C)
 Max. piston speed: 1,6 m/s
 Max. usable stroke: 100%

Spring forces as per spring diagram.

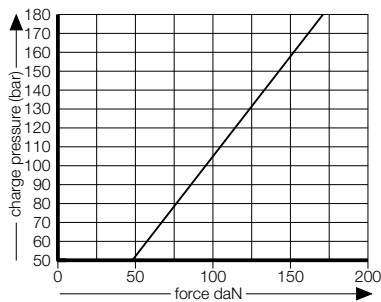
2478.30. .2

Stock lifter with attachment lug

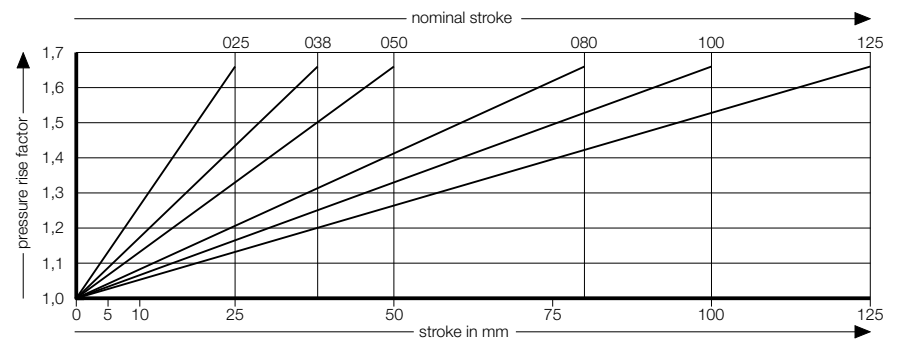
Order No	Stroke _{max.}	l _{min.}	l
2478.30.00170.025.2	25	102	127
2478.30.00170.038.2	38	115	153
2478.30.00170.050.2	50	127	177
2478.30.00170.080.2	80	160	240
2478.30.00170.100.2	100	180	280
2478.30.00170.125.2	125	205	330



Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

STRIPPER

Description:

The stripper is used for stripping 2478.30.00170.3 of sheet metal parts after the forming operation (eg folding functions). Gas refill, reduce and composite assembly are possible over the cylinder tube sheet.

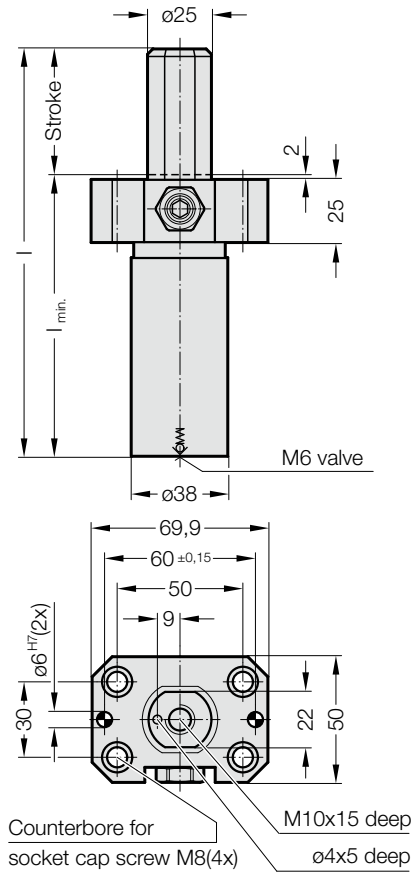
Note:

Strippers are equipped with a "Power Line" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

Initial spring force: 170 daN
 Pressure medium: Nitrogen - N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature force increase: ± 0,3%/°C
 Max. recommended extensions per minute: approx. 40 to 100 (at 20°C)
 Max. piston speed: 1,6 m/s
 Max. usable stroke: 100%

Spring forces as per spring diagram.

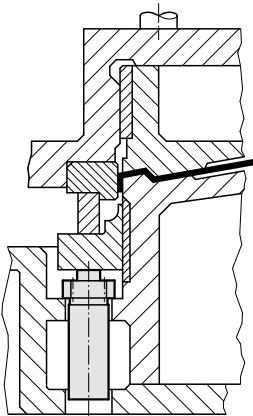
2478.30. .3



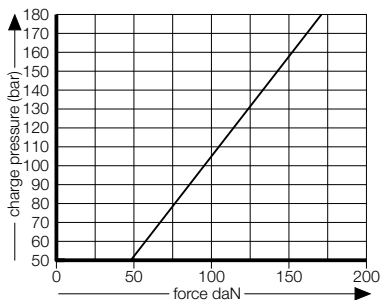
2478.30. .3

Stripper

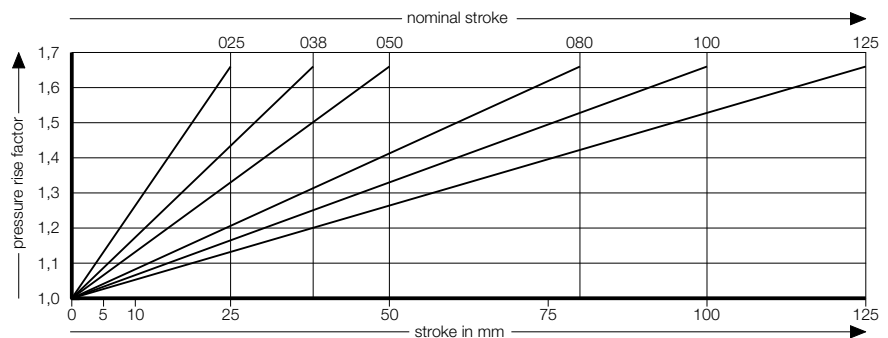
Order No	Stroke _{max.}	l _{min.}	l
2478.30.00170.025.3	25	87	112
2478.30.00170.038.3	38	100	138
2478.30.00170.050.3	50	112	162
2478.30.00170.080.3	80	145	225
2478.30.00170.100.3	100	165	265
2478.30.00170.125.3	125	190	315



Initial spring force versus charge pressure



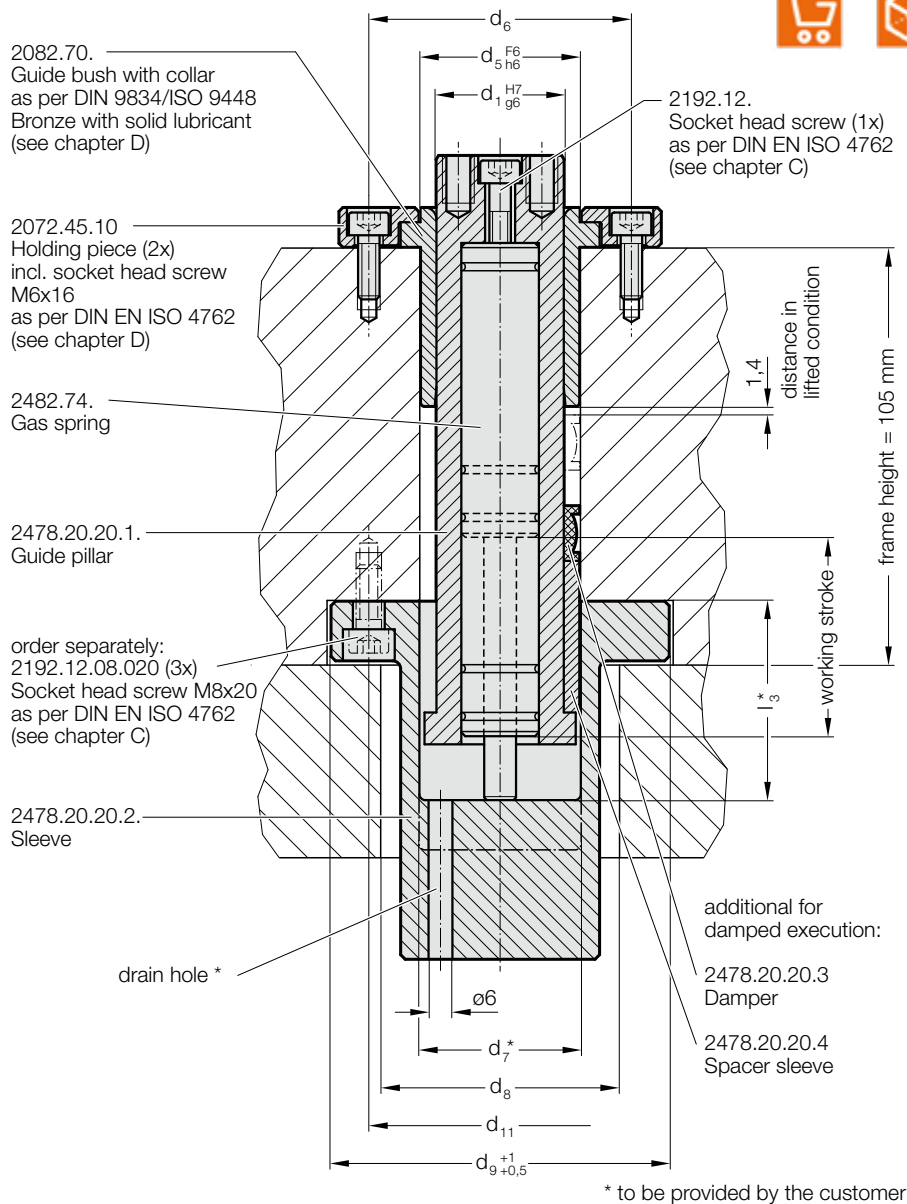
Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

LIFTING UNIT (NOT DAMPED/DAMPED) TO MERCEDES-BENZ

2478.20.20.



Note:

Frame height = 105 mm
Depending on the frame height and the installation type of the sleeve 2478.20.20.2. (I3 - tapped bore in the frame or cut-out in the cast), the countersink varies for the determination of the lifting path.

Size 2* - version, damped

Maximum lifting path 66 mm
Lifting path 66 mm; Distance height 0 mm
Lifting path 30 mm; Distance height 36 mm

Size 3* - version, damped

Maximum lifting path 80 mm
Lifting path 80 mm; spacing height 47 mm
Lifting path 70 mm; spacing height 57 mm

In order to maintain the clearance of 1.4 mm in a raised state (dampener to bushing), a distance sleeve is to be used between the damper and guide post flange.

* Distance height determined at the customer (delivery length: 61 mm)

2478.20.20. Lifting unit (not damped/damped) to Mercedes-Benz

Size	Working stroke	Working stroke, damped	d ₁	d ₅	d ₆	d ₇ *	d ₈	d ₉	d ₁₁	l ₃ *
1	5 - 35	-	32	40	66	40	60	85	67	-
2	40 - 70	30 - 66	32	40	66	40	60	85	67	-
3	75 - 115	70 - 80	32	40	66	40	60	85	67	-

*to be supplied by customer

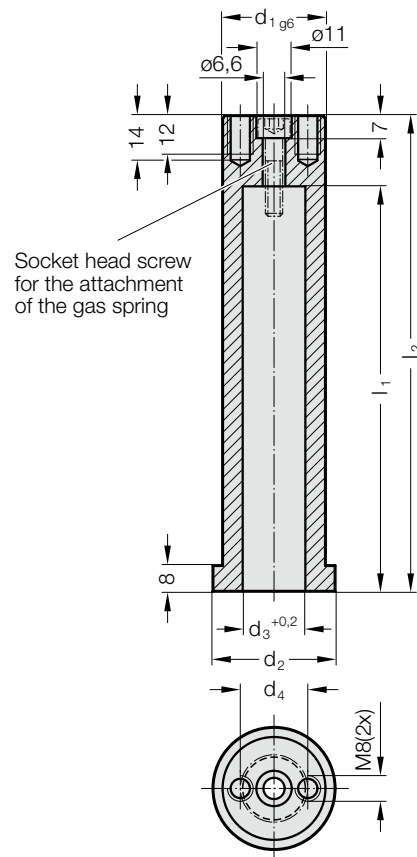
The lifting unit must be ordered in three sizes with the respective order numbers of the individual parts:

Size	1	2	3
Guide pillar	2478.20.20.1.01	2478.20.20.1.02	2478.20.20.1.03
Sleeve	-	2478.20.20.2.02	2478.20.20.2.03
Guide bushing	2082.70.032	2082.70.032	2082.70.032
Gas spring	2482.74.00090.038.2	2482.74.00090.080.2	2482.74.00090.125.2
Holding piece (2x) incl. socket head screw M6x16 DIN EN ISO 4762	2072.45.10	2072.45.10	2072.45.10
Socket cap screw (1x) DIN EN ISO 4762	2192.12.06.030	2192.12.06.020	2192.12.06.030
additional for damped execution:			
Damper	-	2478.20.20.3	2478.20.20.3
Spacer sleeve	-	2478.20.20.4	2478.20.20.4

GUIDE PILLAR FOR LIFTING UNIT TO MERCEDES-BENZ



2478.20.20.1.



Material:

Steel, surface hardened
 induction hardened 60 + 3 HRC
 Hardness penetration depth > 1.8 mm

Note:

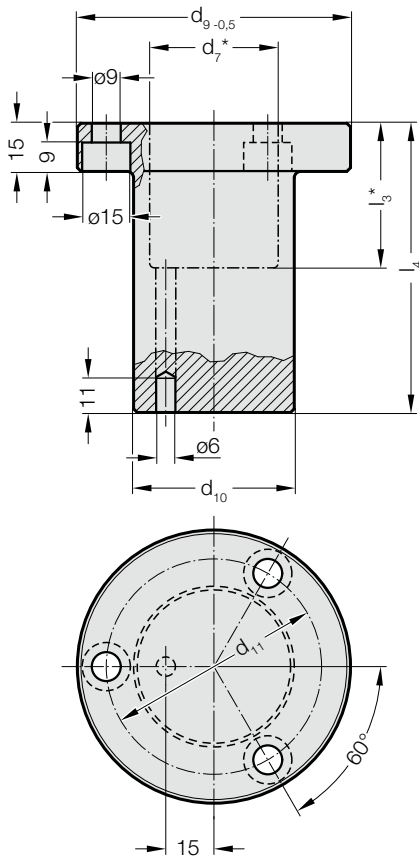
The socket head screw for the attachment of the gas spring is included with delivery.

2478.20.20.1. Guide pillar for lifting unit to Mercedes-Benz

Order No	Size	d_1	d_2	d_3	d_4	l_1	l_2
2478.20.20.1.01	1	32	38	19.5	21	81	113
2478.20.20.1.02	2	32	38	19.5	21	126	148
2478.20.20.1.03	3	32	38	19.5	21	176	208

SLEEVE FOR LIFTING UNIT TO MERCEDES-BENZ

2478.20.20.2.



Material:

Steel

Note:

The sleeve is supplied without countersink. Integrating countersink d_7 ($\varnothing 40$) \times l_3 (*to be provided by the customer) determines the lifting path. The drain hole is pre-drilled as a blind hole with a \varnothing of 6 mm and must also be modified.

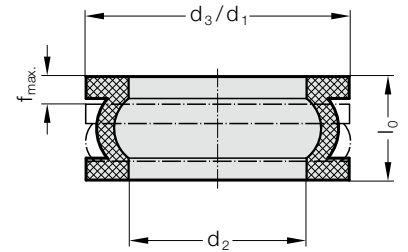
2478.20.20.2. Sleeve for lifting unit to Mercedes-Benz

Order No	Size	d_9	d_{10}	d_{11}	l_4
2478.20.20.2.02	2	85	50	67	90
2478.20.20.2.03	3	85	50	67	150

DAMPER FOR LIFTING UNITS TO MERCEDES-BENZ



2478.20.20.3



Description:

The damper element made of co-polyester elastomer is used in the jacking units in progressive dies in the automotive and white goods industry. Increasing stresses on screws and bolts are reduced by the low stress dampers. Reduced noise emission is also an additional positive side-effect. Two-ply dampers can be used depending on the mass or stroke.

Benefits:

- High absorption of force and energy
- Slight settlement
- Long service life and high level of operating safety
- Noise reduction
- High degree of effectiveness

Material:

Co-Polyester-Elastomer
Available in 55 Shore-D hardness levels.

Technical data:

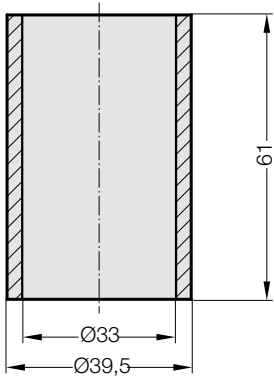
Surroundings: Resistant to microbes, seawater, chemicals.
No absorption of water and no swelling.
Approved temperature range: -40°C to +90°C (-40°F to +194°F)

2478.20.20.3 Damper for lifting units to Mercedes-Benz

Order No	d ₁	d ₂	d ₃	l ₀	f _{max.}	W ₃ [Nm/stroke]*
2478.20.20.3	39.5	32.2	39.6	12.6	3.6	4
Total energy per stroke						

SPACER SLEEVE FOR LIFTING UNITS TO MERCEDES-BENZ

2478.20.20.4



Material:

Steel, hardened

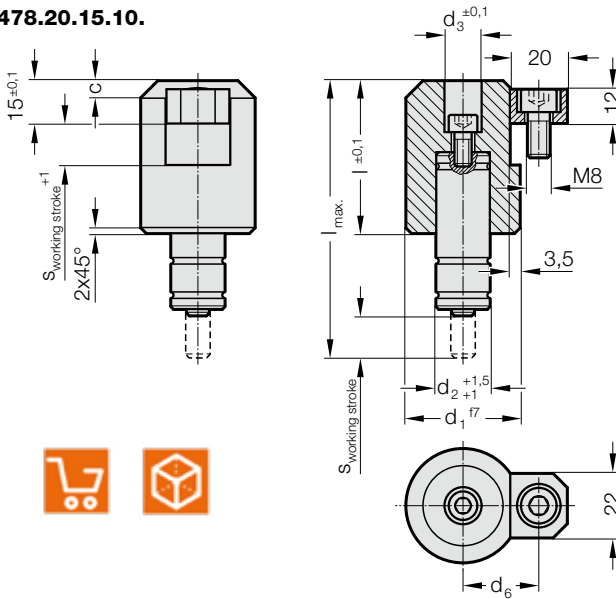
Note:

Height adjustment according to lifting path while using lifting unit
2478.20.20.

2478.20.20.4 Spacer sleeve for lifting units to Mercedes-Benz

LIFTER, ROUND WITH PILOT PIN HOLE TO BMW STANDARD

2478.20.15.10.



Execution:

The assembly consists of:

- Lifter
- Screw clamp
incl. socket cap screw M8 x 16 to ISO 4762
- Gas spring
- ø 19 mm (1) = 2482.74.00090.
Spring force 90 daN
or
- ø 25 mm (2) = 2480.21.00200.
Spring force 200 daN
- Socket cap screw M6x12 according to ISO 4762

Note:

*S_{working stroke} suitable = max. allowable spring stroke minus 10% stroke reserve of nominal stroke length, from stroke of 50 mm only max. 5 mm.

On request, gas spring with a lower spring force available.

2478.20.15.10. Dispositif de levage, rond avec trou viseur selon BMW

	d ₁	28	28	30	30	35	35	40	40	40	40	40	50	50	50	50		
d ₂	19	19	19	19	25	25	19	19	19	25	25	19	19	25	25			
d ₃	10,5	12,5	10,5	12,5	12,5	16,5	10,5	12,5	16,5	12,5	16,5	12,5	16,5	12,5	16,5			
d ₆	20,5	20,5	21,5	21,5	24	24	26,5	26,5	26,5	26,5	26,5	31,5	24	31,5	31,5	31,5		
c	4x45°	4x45°	5x45°	5x45°	5x45°	5x45°	6x45°	6x45°	6x45°	6x45°	6x45°	6x45°	8x45°	8x45°	8x45°	8x45°		
		Course		N° de commande														
		travail		(Pièce 3)		(Pièce 2)												
l	l _{max.}	*S _{course de}																
49	87	9	009	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
53,5	97	13,5	014	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
62,5	117	22,5	023	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
74	143	34	034	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
85	167	45	045	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
98,5	197	58,5	059	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
115	230	75	075	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
135	270	95	095	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
160	320	120	120	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.

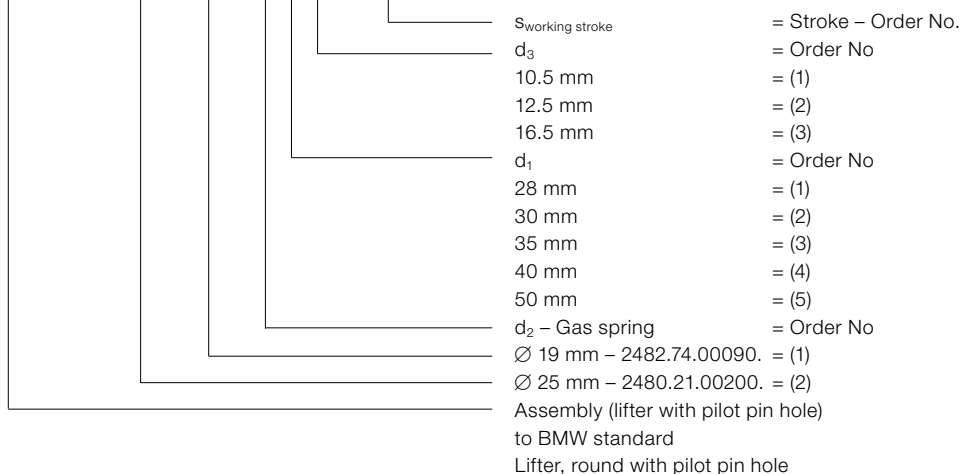
Ordering Code (example):

Order No. Part 1

Part 2

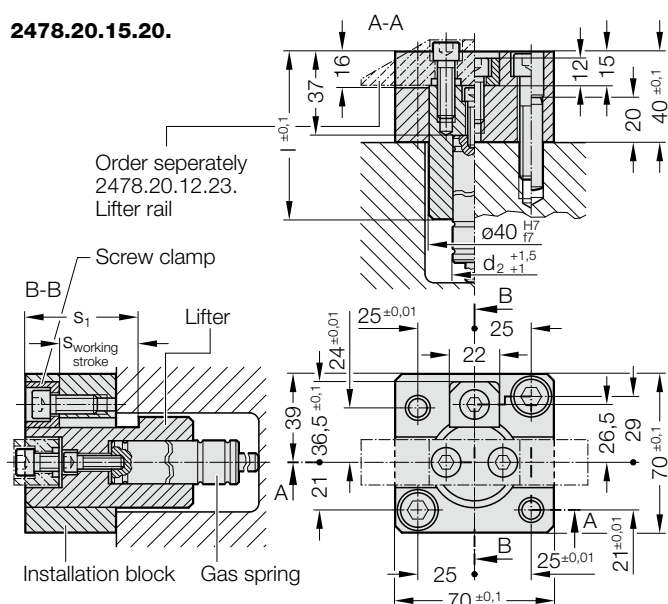
Part 3

2 4 7 8 . 2 0 . 1 5 . 1 0 . 1 5 3 . 0 0 9



LIFTER UNIT WITH INSTALLATION BLOCK ACCORDING TO BMW STANDARD

2478.20.15.20.



Material:

Steel

Execution:

Lifter unit with installation block comprises:

- Installation block
- Lifter
- Screw clamp
- Gas spring 2482.74.00090. or 2480.21.00200.
- Socket cap screw according to ISO 4762
M6×20 (1x), M8×20 (1x), M8×25 (2x), M10×45 (2x)
- Dowel pin according to ISO 8735 \varnothing 10×40 (2x)

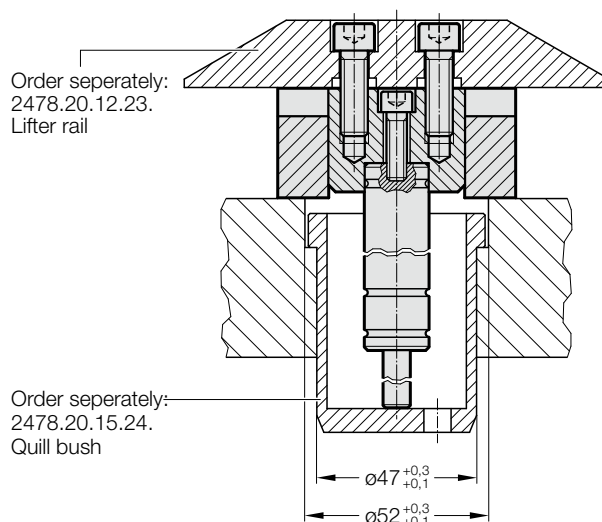
Note:

Order separately (see installation example)

- 2478.20.15.23.: Lifter rail
- 2478.20.15.24.: Holding sleeve

On request, gas spring with a lower spring force available.

Mounting example



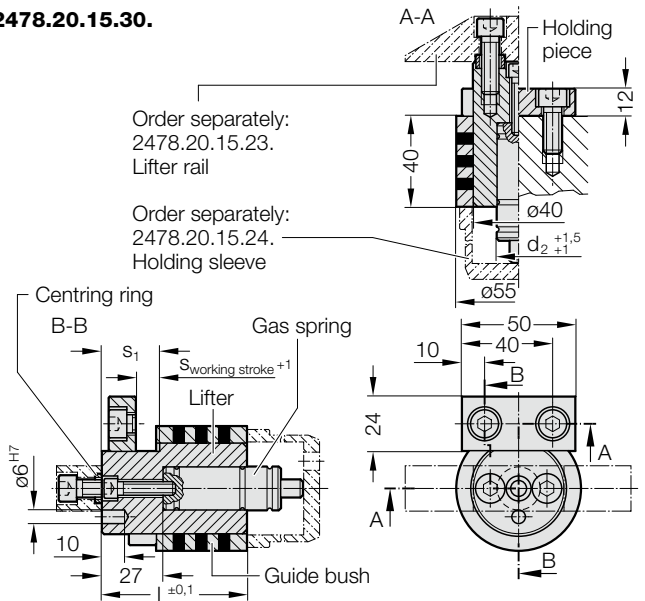
2478.20.15.20. Lifter unit with installation block according to BMW standard

Order No	d_2	l	Sworking stroke	S_1	Gas spring
2478.20.15.20.14.009	19	49	9	25	2482.74.00090.010.2
2478.20.15.20.24.009	25	49	9	25	2480.21.00200.010
2478.20.15.20.14.014	19	53.5	13.5	29.5	2482.74.00090.015.2
2478.20.15.20.24.014	25	53.5	13.5	29.5	2480.21.00200.015
2478.20.15.20.14.023	19	62.5	22.5	38.5	2482.74.00090.025.2
2478.20.15.20.24.023	25	62.5	22.5	38.5	2480.21.00200.025
2478.20.15.20.14.034	19	74	34	50	2482.74.00090.038.2
2478.20.15.20.24.034	25	74	34	50	2480.21.00200.038
2478.20.15.20.14.045	19	85	45	61	2482.74.00090.050.2
2478.20.15.20.24.045	25	85	45	61	2480.21.00200.050
2478.20.15.20.14.059	19	98.5	58.5	74.5	2482.74.00090.063.2
2478.20.15.20.24.059	25	98.5	58.5	74.5	2480.21.00200.063
2478.20.15.20.14.075	19	115	75	91	2482.74.00090.080.2
2478.20.15.20.24.075	25	115	75	91	2480.21.00200.080
2478.20.15.20.14.095	19	135	95	111	2482.74.00090.100.2
2478.20.15.20.24.095	25	135	95	111	2480.21.00200.100
2478.20.15.20.14.120	19	160	120	136	2482.74.00090.125.2
2478.20.15.20.24.120	25	160	120	136	2480.21.00200.125

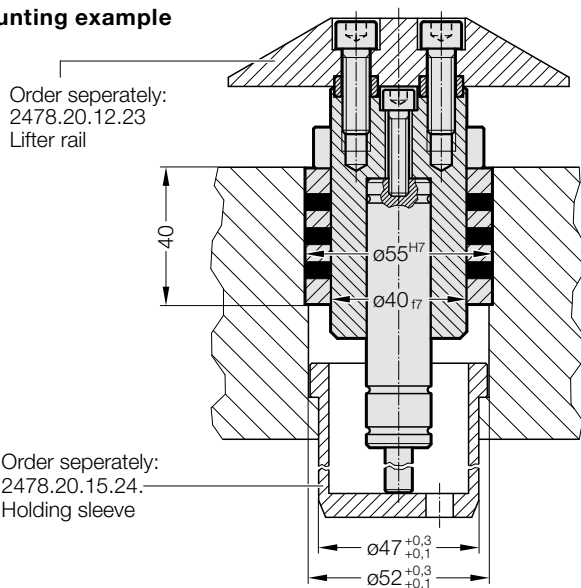
UNIVERSAL LIFTER UNIT, ACCORDING TO BMW STANDARD



2478.20.15.30.



Mounting example



Material:

Steel

Execution:

Universal lifter unit comprises:

- Lifter
- Screw clamp
- Centring rings
- Guide bush
- Gas spring 2482.74.00090. or 2480.21.00200.
- Socket cap screw according to ISO 4762
M6×25 (1x), M8×20 (2x), M8×25 (2x)

Note:

Order separately (see installation example)

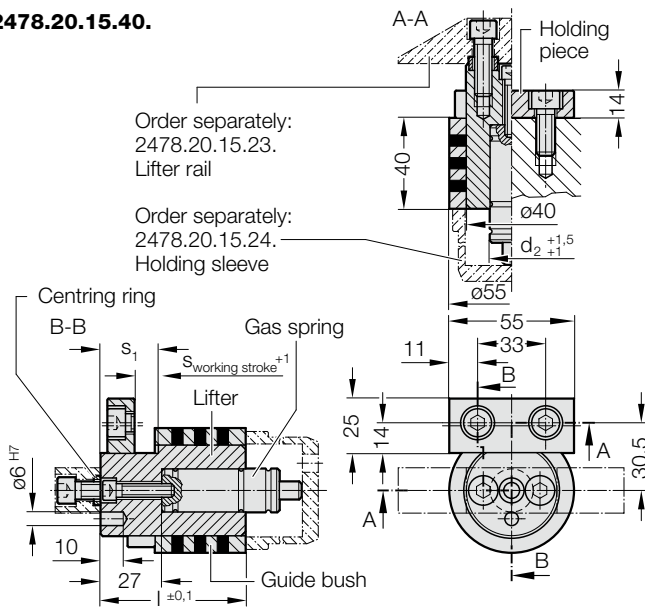
- 2478.20.15.23.: Lifter rail
- 2478.20.15.24.: Holding sleeve

2478.20.15.30. Universal lifter unit, according to BMW standard

Order No	d ₂	l	S _{working stroke}	S ₁	Gas spring
2478.20.15.30.14.9	19	64	9	25	2482.74.00090.010.2
2478.20.15.30.24.9	25	64	9	25	2480.21.00200.010
2478.20.15.30.14.14	19	68.5	13.5	29.5	2482.74.00090.015.2
2478.20.15.30.24.14	25	68.5	13.5	29.5	2480.21.00200.015
2478.20.15.30.14.23	19	77.5	22.5	38.5	2482.74.00090.025.2
2478.20.15.30.24.23	25	77.5	22.5	38.5	2480.21.00200.025
2478.20.15.30.14.34	19	89	34	50	2482.74.00090.038.2
2478.20.15.30.24.34	25	89	34	50	2480.21.00200.038
2478.20.15.30.14.45	19	100	45	63	2482.74.00090.050.2
2478.20.15.30.24.45	25	100	45	63	2480.21.00200.050
2478.20.15.30.14.59	19	113.5	58.5	74.5	2482.74.00090.063.2
2478.20.15.30.24.59	25	113.5	58.5	74.5	2480.21.00200.063
2478.20.15.30.14.75	19	130	75	91	2482.74.00090.080.2
2478.20.15.30.24.75	25	130	75	91	2480.21.00200.080
2478.20.15.30.14.95	19	150	95	111	2482.74.00090.100.2
2478.20.15.30.24.95	25	150	95	111	2480.21.00200.100
2478.20.15.30.14.120	19	175	120	136	2482.74.00090.125.2
2478.20.15.30.24.120	25	175	120	136	2480.21.00200.125

UNIVERSAL LIFTER UNIT, ACCORDING TO BMW STANDARD

2478.20.15.40.



Material:

Steel

Execution:

Universal lifter unit comprises:

- Lifter
- Screw clamp
- Centring rings
- Guide bush
- Gas spring 2482.74.00090. or 2480.21.00200.
- Socket cap screw according to ISO 4762
M6×25 (1x), M8×25 (2x), M10×20 (2x)

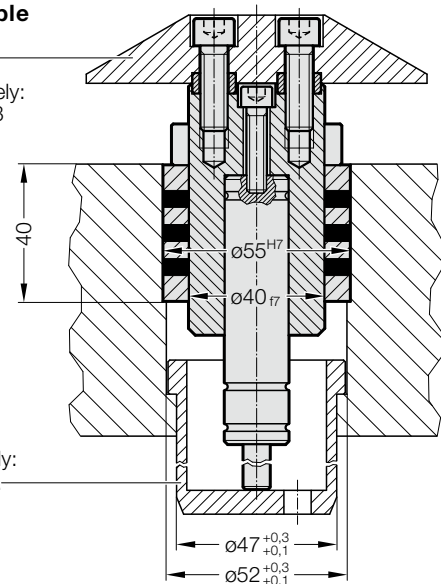
Note:

Order separately (see installation example)

- 2478.20.15.23.: Lifter rail
- 2478.20.15.24.: Holding sleeve

Mounting example

Order separately:
2478.20.12.23
Lifter rail



2478.20.15.40. Universal lifter unit, according to BMW standard

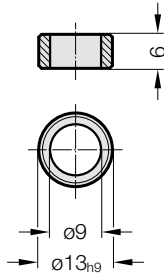
Order No	d ₂	l	s _{working stroke}	s ₁	Gas spring	Order No	d ₂	l	s _{working stroke}	s ₁	Gas spring
2478.20.15.40.14.009	19	64	9	25	2482.74.00090.010.2	2478.20.15.40.14.075	19	130	75	91	2482.74.00090.080.2
2478.20.15.40.24.009	25	64	9	25	2480.21.00200.010	2478.20.15.40.24.075	25	130	75	91	2480.21.00200.080
2478.20.15.40.14.14	19	68.5	13.5	29.5	2482.74.00090.015.2	2478.20.15.40.14.080	19	150	80	96	2482.74.00090.100.2
2478.20.15.40.24.14	25	68.5	13.5	29.5	2480.21.00200.015	2478.20.15.40.24.080	25	150	80	96	2480.21.00200.100
2478.20.15.40.14.23	19	77.5	22.5	38.5	2482.74.00090.025.2	2478.20.15.40.14.085	19	150	85	101	2482.74.00090.100.2
2478.20.15.40.24.23	25	77.5	22.5	38.5	2480.21.00200.025	2478.20.15.40.24.085	25	150	85	101	2480.21.00200.100
2478.20.15.40.14.034	19	89	34	50	2482.74.00090.038.2	2478.20.15.40.14.090	19	150	90	106	2482.74.00090.100.2
2478.20.15.40.24.034	25	89	34	50	2480.21.00200.038	2478.20.15.40.24.090	25	150	90	106	2480.21.00200.100
2478.20.15.40.14.040	19	100	40	56	2482.74.00090.050.2	2478.20.15.40.14.095	19	150	95	111	2482.74.00090.100.2
2478.20.15.40.24.040	25	100	40	56	2480.21.00200.050	2478.20.15.40.24.095	25	150	95	111	2480.21.00200.100
2478.20.15.40.14.045	19	100	45	61	2482.74.00090.050.2	2478.20.15.40.14.100	19	175	100	116	2482.74.00090.125.2
2478.20.15.40.24.045	25	100	45	61	2480.21.00200.050	2478.20.15.40.24.100	25	175	100	116	2480.21.00200.125
2478.20.15.40.14.050	19	113.5	50	66	2482.74.00090.063.2	2478.20.15.40.14.105	19	175	105	121	2482.74.00090.125.2
2478.20.15.40.24.050	25	113.5	50	66	2480.21.00200.063	2478.20.15.40.24.105	25	175	105	121	2480.21.00200.125
2478.20.15.40.14.054	19	113.5	54	70	2482.74.00090.063.2	2478.20.15.40.14.110	19	175	110	126	2482.74.00090.125.2
2478.20.15.40.24.054	25	113.5	54	70	2480.21.00200.063	2478.20.15.40.24.110	25	175	110	126	2480.21.00200.125
2478.20.15.40.14.59	19	113.5	58.5	74.5	2482.74.00090.063.2	2478.20.15.40.14.115	19	175	115	131	2482.74.00090.125.2
2478.20.15.40.24.59	25	113.5	58.5	74.5	2480.21.00200.063	2478.20.15.40.24.115	25	175	115	131	2480.21.00200.125
2478.20.15.40.14.065	19	130	65	81	2482.74.00090.080.2	2478.20.15.40.14.120	19	175	120	136	2482.74.00090.125.2
2478.20.15.40.24.065	25	130	65	81	2480.21.00200.080	2478.20.15.40.24.120	25	175	120	136	2480.21.00200.125
2478.20.15.40.14.070	19	130	70	86	2482.74.00090.080.2						
2478.20.15.40.24.070	25	130	70	86	2480.21.00200.080						

LIFTER RAIL FOR LIFTER UNITS TO BMW STANDARD

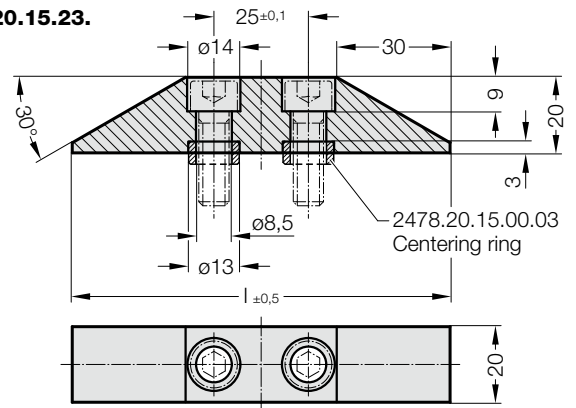
HOLDING SLEEVE FOR LIFTER UNITS TO BMW STANDARD



2478.20.15.00.03
Centering ring
(Order-No. for reordering)



2478.20.15.23.



Material:

Steel

Note:

Delivery without screws and centring rings.

Screws and centring rings are already included in the scope of delivery for the lifter units 2478.20.15.20./30./40.



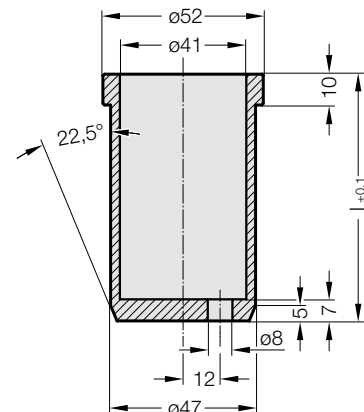
2478.20.15.23.

Lifter rail for lifter units to BMW standard

Order No	l
2478.20.15.23.2020.100	100
2478.20.15.23.2020.125	125
2478.20.15.23.2020.150	150
2478.20.15.23.2020.175	175
2478.20.15.23.2020.200	200
2478.20.15.23.2020.250	250
2478.20.15.23.2020.300	300
2478.20.15.23.2020.350	350
2478.20.15.23.2020.400	400
2478.20.15.23.2020.450	450
2478.20.15.23.2020.500	500
2478.20.15.23.2020.550	550
2478.20.15.23.2020.600	600



2478.20.15.24.



Material:

Steel

Note:

Holding sleeve 2478.20.15.24. can only be used for lifter 2478.20.15.20./30./40. ø 40 mm.

This is required when the panel is not thick enough (see installation example 2478.20.15.20./30./40.).



2478.20.15.24.

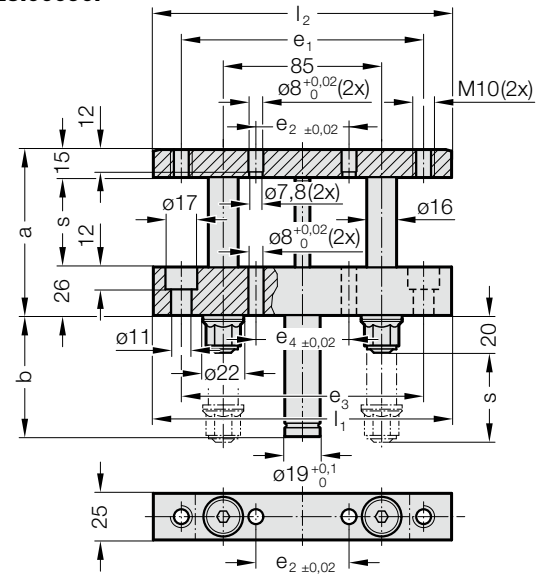
Holding sleeve

Order No	l
2478.20.15.24.04.030	30
2478.20.15.24.04.040	40
2478.20.15.24.04.050	50
2478.20.15.24.04.060	60
2478.20.15.24.04.070	70
2478.20.15.24.04.080	80
2478.20.15.24.04.090	90
2478.20.15.24.04.100	100
2478.20.15.24.04.110	110
2478.20.15.24.04.120	120
2478.20.15.24.04.130	130
2478.20.15.24.04.140	140
2478.20.15.24.04.150	150
2478.20.15.24.04.160	160
2478.20.15.24.04.170	170
2478.20.15.24.04.180	180
2478.20.15.24.04.190	190
2478.20.15.24.04.200	200

LIFTER UNIT WITH PILLAR GUIDANCE



2478.25.00090.



Description:

Filling pressure regulation and a composite arrangement are possible using the cylinder tube base. To attach the strip guide on the lifter rail, use the provided threads. We recommend designing the strip guide for a maximum material width of +0.4 mm (0.2 mm for each side) (View X). When several lifter units are used, only one unit per piece should be pinned in order to prevent redundancy.

Note:

The lifter unit is equipped with gas spring type 2482.74.00090, which cannot be repaired in case of wear and must therefore be exchanged completely.

Initial spring force: 90 daN
 Pressure medium: Nitrogen N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 40 to 100 (at 20°C)
 Max. piston speed: see diagram
 Max. usable stroke: 95%

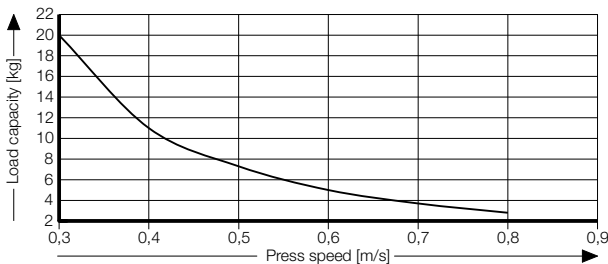
Spring forces as per spring diagram in Chapter F - 2482.74.

2478.25.00090. Lifter unit with pillar guidance

Order No	s Stroke max.	a	b	l ₁	l ₂	e ₁	e ₂	e ₃	e ₄	Spring force [daN]		Gas spring
										initial	final	
2478.25.00090.025	23	64	40	160	115	50	25	130	50	90	130	2482.74.00090.025.2
2478.25.00090.038	36	77	53	160	160	130	50	130	50	90	120	2482.74.00090.038.2
2478.25.00090.050	48	89	65	160	160	130	50	130	50	90	120	2482.74.00090.050.2
2478.25.00090.063	61.5	102.5	81.5	160	160	130	50	130	50	90	120	2482.74.00090.063.2
2478.25.00090.080	78	119	98	160	160	130	50	130	50	90	120	2482.74.00090.080.2
2478.25.00090.100	98	139	118	160	160	130	50	130	50	90	120	2482.74.00090.100.2
2478.25.00090.125	123	164	143	160	160	130	50	130	50	90	120	2482.74.00090.125.2
2478.25.00090.150	148	189	168	160	160	130	50	130	50	90	120	2482.74.00090.150.2

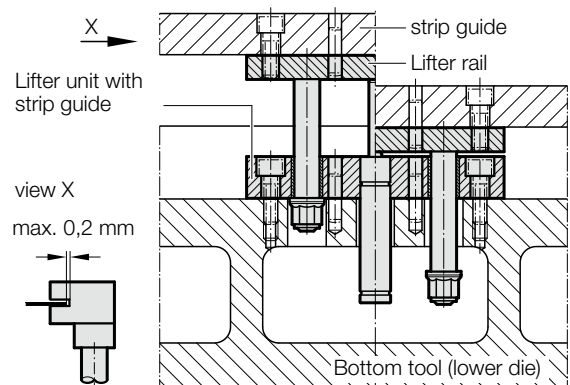
2478.25.00090.

Max. load per lifter unit**



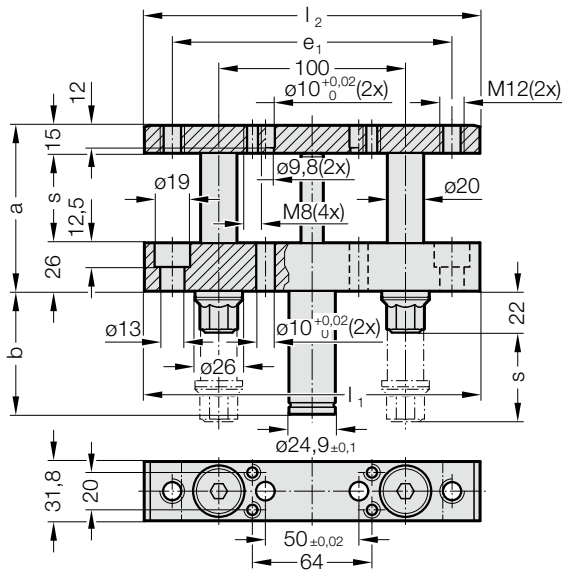
** Only recommended load capacity (per lifter unit) depending on the press speed. Provide an external stop in case of higher loads.

Mounting example



LIFTER UNIT WITH PILLAR GUIDANCE

2478.25.00200.



Description:

Filling pressure regulation and a composite arrangement are possible using the cylinder tube base. To attach the strip guide on the lifter rail, use the provided threads. We recommend designing the strip guide for a maximum material width of +0.4 mm (0.2 mm for each side) (View X). When several lifter units are used, only one unit per piece should be pinned in order to prevent redundancy.

Note:

The lifter unit is equipped with gas spring type 2480.21.00200.

Initial spring force: 200 daN
 Pressure medium: Nitrogen N₂
 Max. filling pressure: 180 bar

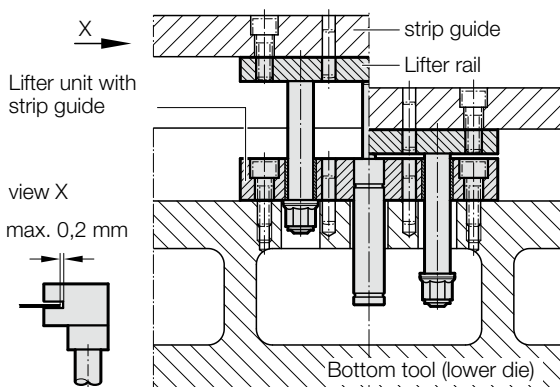
Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute:
 approx. 80 to 100 (at 20°C)
 Max. piston speed: see diagram
 Max. usable stroke: 95%

Order No for spare parts kit: 2480.21.00150
 Spring forces as per spring diagram in Chapter F - 2480.21.

2478.25.00200. Lifter unit with pillar guidance

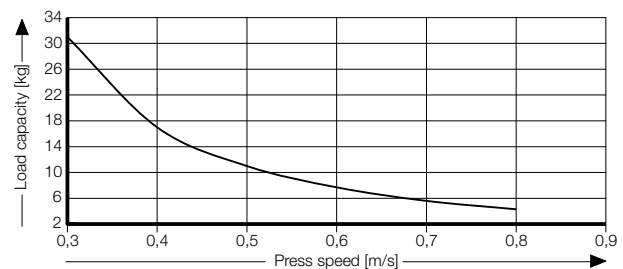
Order No	s Stroke max.	a	b	l ₁	l ₂	e ₁	Spring force [daN]		Gas spring
							initial	final	
2478.25.00200.025	23	64	41	180	140	-	200	308	2480.21.00200.025
2478.25.00200.038	36	77	54	180	180	150	200	309	2480.21.00200.038
2478.25.00200.050	48	89	66	180	180	150	200	309	2480.21.00200.050
2478.25.00200.063	61.5	102.5	82.5	180	180	150	200	302	2480.21.00200.063
2478.25.00200.080	78	119	99	180	180	150	200	304	2480.21.00200.080
2478.25.00200.100	98	139	119	180	180	150	200	305	2480.21.00200.100
2478.25.00200.125	123	164	144	180	180	150	200	306	2480.21.00200.125
2478.25.00200.150	148	189	177	180	180	150	200	300	2480.21.00200.150
2478.25.00200.175	173	214	202	180	180	150	200	298	2480.21.00200.175
2478.25.00200.200	198	239	227	180	180	150	200	297	2480.21.00200.200

Mounting example



2478.25.00200.

Max. load per lifter unit**

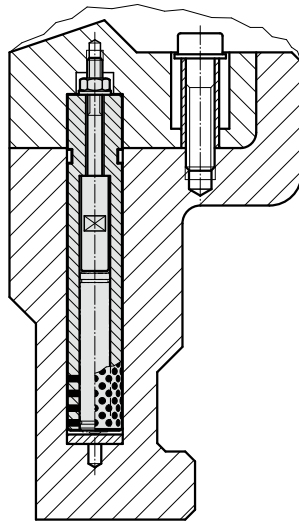


** Only recommended load capacity (per lifter unit) depending on the press speed. Provide an external stop in case of higher loads.

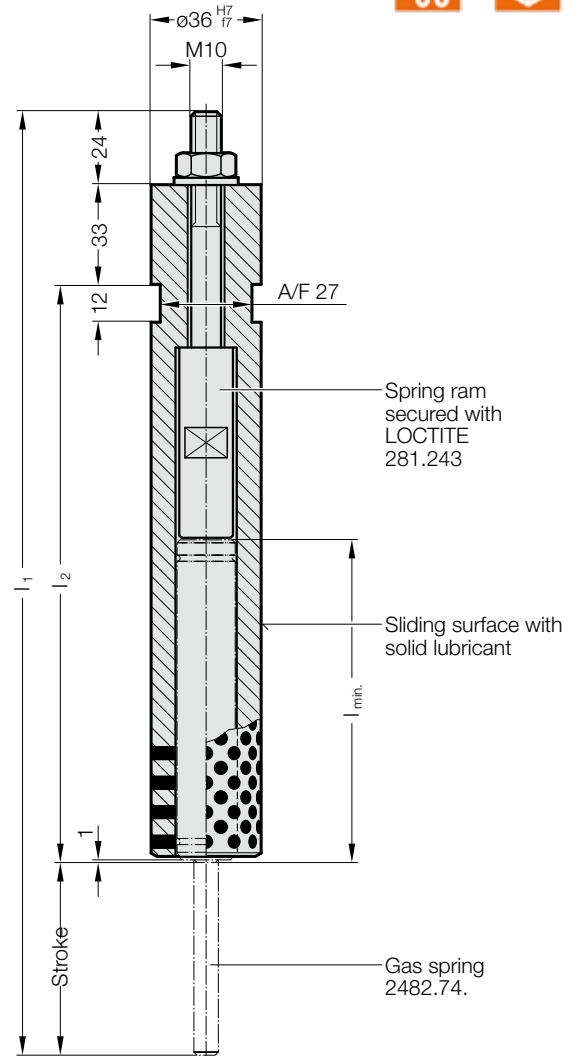
SPRING RAM WITH GAS SPRING



Mounting example



2478.



Material:

C45
 induction hardened 58+4 HRC
 Hardness penetration depth 0,8+0,4

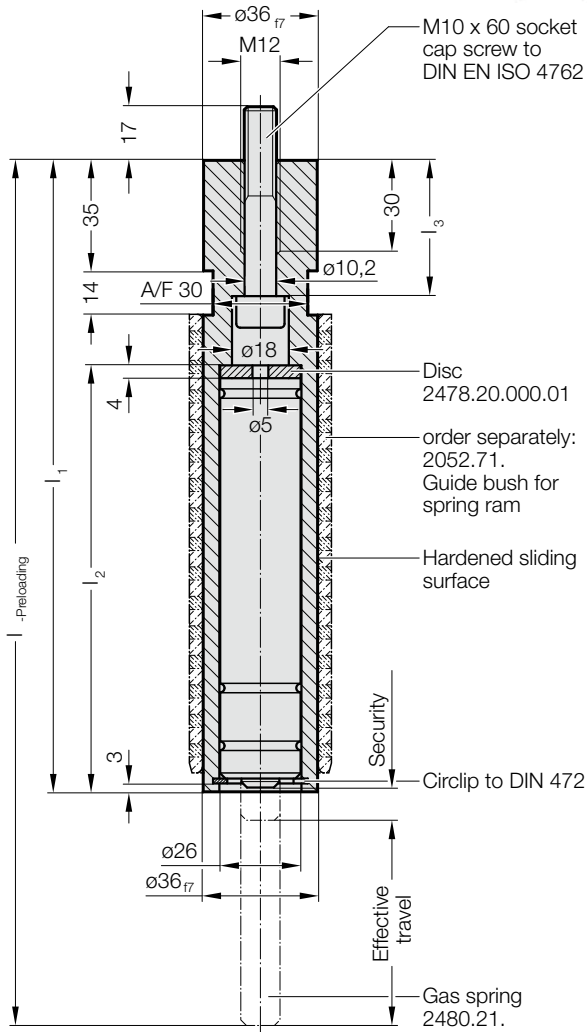
Sliding surface with solid lubricant

2478. Spring ram with gas spring

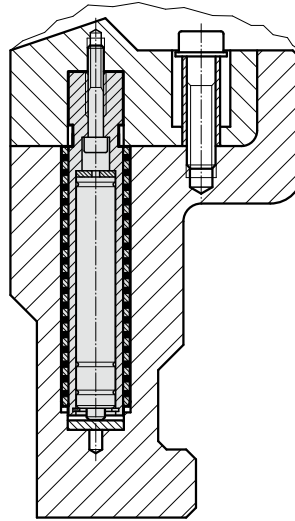
Order No	Stroke _{max.}	$l_{min.}$	l_1	l_2	Spring force [daN] initial	Spring force [daN] final	Gas spring
2478.050.00030.1	50	92	257	150	30	40	2482.74.00030.050.2
2478.050.00050.1	50	92	257	150	50	67	2482.74.00050.050.2
2478.050.00070.1	50	92	257	150	70	94	2482.74.00070.050.2
2478.050.00090.1	50	92	257	150	90	120	2482.74.00090.050.2
2478.063.00030.1	63	109	310	190	30	40	2482.74.00030.063.2
2478.063.00050.1	63	109	310	190	50	67	2482.74.00050.063.2
2478.063.00070.1	63	109	310	190	70	94	2482.74.00070.063.2
2478.063.00090.1	63	109	310	190	90	120	2482.74.00090.063.2
2478.080.00030.1	80	125	360	223	30	40	2482.74.00030.080.2
2478.080.00050.1	80	125	360	223	50	67	2482.74.00050.080.2
2478.080.00070.1	80	125	360	223	70	94	2482.74.00070.080.2
2478.080.00090.1	80	125	360	223	90	120	2482.74.00090.080.2

SPRING RAM WITH GAS SPRING TO VW STANDARD

2478.20. .1



Mounting example



Material:

Spring ram: C45
induction hardened 58+4 HRC Hardness penetration depth 0,8+0,4

Disc: 90MnCrV8
hardened 56+4 HRC

Note:

Use only with matching guide bush 2052.71.!

Spring bolt installed preloaded.

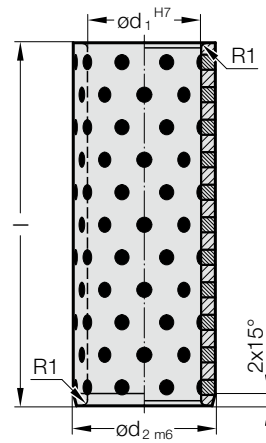
2478.20. .1 Spring ram with gas spring to VW standard

Order No	Stroke _{max.}	l	l ₁	l ₂	l ₃	Spring force [daN]		Gas spring
						initial	final	
2478.20.050.00050.1	50	240	182	118	30	50	68	2480.21.00050.063
2478.20.050.00100.1	50	240	182	118	30	100	137	2480.21.00100.063
2478.20.050.00150.1	50	240	182	118	30	150	206	2480.21.00150.063
2478.20.050.00200.1	50	240	182	118	30	200	275	2480.21.00200.063
2478.20.065.00050.1	65	274	200	135	30	50	68	2480.21.00050.080
2478.20.065.00100.1	65	274	200	135	30	100	137	2480.21.00100.080
2478.20.065.00150.1	65	274	200	135	30	150	206	2480.21.00150.080
2478.20.065.00200.1	65	274	200	135	30	200	275	2480.21.00200.080
2478.20.080.00050.1	80	314	220	155	30	50	68	2480.21.00050.100
2478.20.080.00100.1	80	314	220	155	30	100	137	2480.21.00100.100
2478.20.080.00150.1	80	314	220	155	30	150	206	2480.21.00150.100
2478.20.080.00200.1	80	314	220	155	30	200	275	2480.21.00200.100

GUIDE BUSH FOR SPRING RAM 2478.20. .1



2052.71.



Material:

Bronze with solid lubricant, oilless lubricating

Note:

Recommended locating bore for bonding G7.

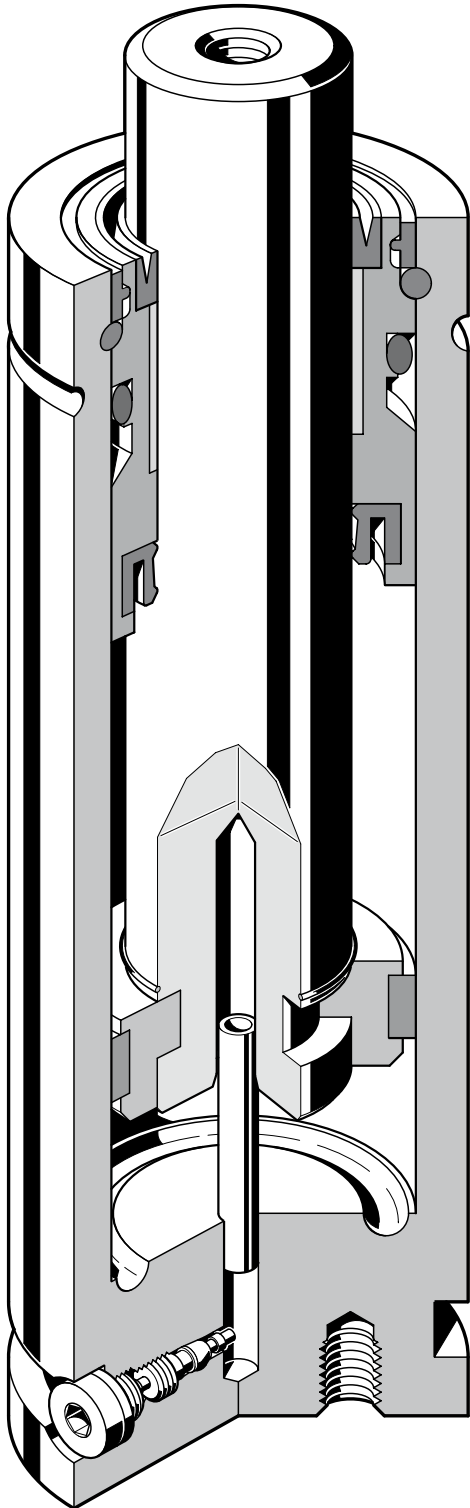
2052.71. Guide bush for spring ram 2478.20. .1

Order No	d_1	d_2	l
2052.71.036.045.115	36	45	115
2052.71.036.045.145	36	45	145
2052.71.036.045.170	36	45	170

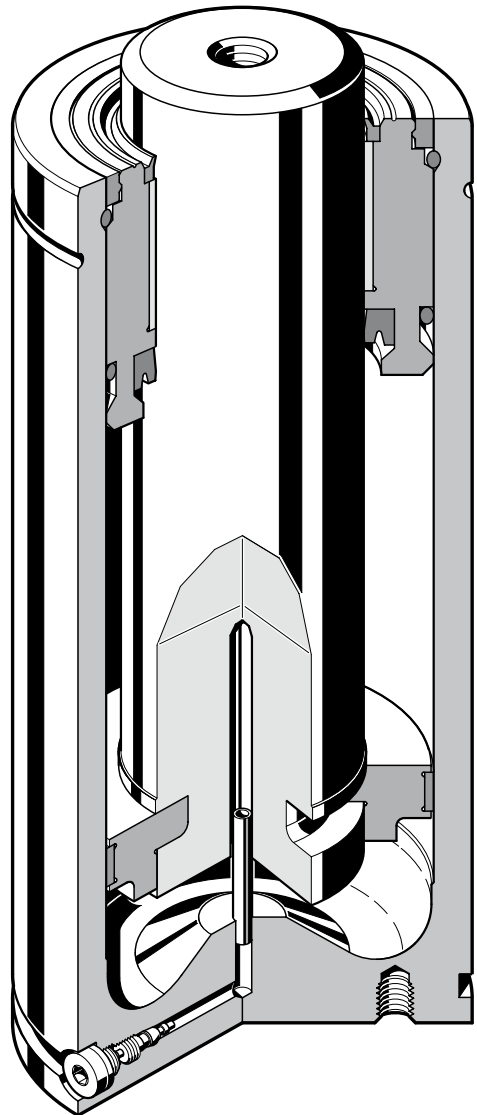
GAS SPRINGS



**GAS SPRING
TWO-CHAMBER SYSTEM**

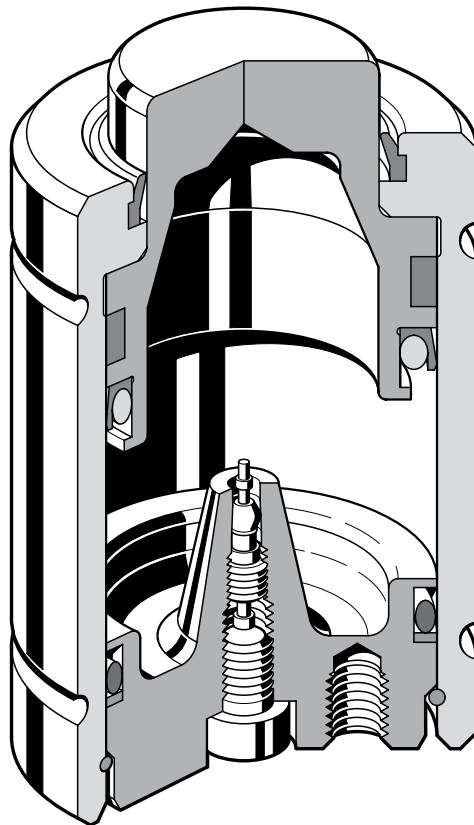


2480.12.



2480.13.

**GAS SPRING
SINGLE-CHAMBER SYSTEM**



2490.

GAS SPRINGS

FIBRO Gas Springs

FIBRO Gas springs are an ideal supplement to and expansion of the traditional FIBRO product lines of helical, disc and elastomer springs for manufacturing tools, devices, moulds and machines.

FIBRO gas springs close a gap where ever the accent is on accommodation of the utmost force component within a minimum of space – or where exceedingly large travel is demanded: FIBRO Gas springs take care of both demands, even in combination.

FIBRO Gas springs are filled with nitrogen and do not require any pressure space that is positioned externally or in tool plates. They also require no gas supply lines.

In certain special cases, however, monitoring of charge pressure in the installed state is required. These may be found in the list of accessory products if needed.

As long as all mounting details are laid out with due circumspection, it is no problem at all to remove and install FIBRO Gas springs.

Operating instructions are included with every delivery of FIBRO Gas springs.

Application examples are shown on the following pages.

Functioning

The pressure medium is a commercially available, environment-friendly nitrogen.

FIBRO gas springs have a standard charge pressure of max. 150 bar

(180 bar).

Depending on the spring size and spring type, starting spring forces of 2 daN to 20000 daN can be realised.

Pressure build-up

In operation the piston rod enters the spring space whose volume is progressively reduced. Depending on the stroke length, the volume of the pressure chamber is reduced. The resulting increase in pressure can be read from the diagram of the spring size as a factor. The final force is therefore the initial spring force 3 Pressure build-up factor.

Operating temp.

The spring temperature should not exceed +80 °C.

Charge pressure

Modification of charge pressure allows variation of the force rating and can be predetermined from the spring diagram.

Installation recommendations

FIBRO gas springs can be used in any installation position. Whether or not external forces act on them when at rest is of no consequence and can therefore be calculated easily.



ALL FIBRO GAS SPRINGS MEET THE REQUIREMENTS OF THE PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU

The Pressure Equipment Directive (2014/68/EU) was ratified by the European parliament and the Council of Europe in May 1997. The requirements of the pressure equipment directive came into force throughout the EU on 29 May 2002.

The directive defines pressure equipment as vessels, pipework, safety devices and pressure accessories. In terms of the directive a vessel is a casing which is designed and manufactured to contain fluids under pressure.

It follows from this definition that nitrogen gas springs of all sizes are deemed to be pressure vessels and must in this respect comply with the pressure equipment directive (2014/68/EU) from 29 May 2002.

GAS SPRINGS

Maintenance

FIBRO gas springs are designed for long-term maintenance-free operation. We recommend lightly oiling the piston rod before using. Sealing and guide elements can be replaced easily in very little time. They are available in a spare parts kit. Each spare parts kit comes with detailed instructions for maintenance of Gas springs.

Attention

When safety functions are triggered (overstroke, return stroke, or over-pressure protection), the gas springs can no longer be repaired!

Caution

Gas springs may only be charged with commercial grade 5.0 nitrogen gas.

Accessories

The range of accessories for gas springs includes fastening devices, charging and control units, screw connections and lines for setting up compound systems.

FIBRO is not liable if fittings that are not original FIBRO fittings or fastening, accessory, and attachment parts that are not released by FIBRO are used.

Warning signs

The signs should be affixed near the springs in as prominent a position as possible.

<p>WARNING</p> <p>This tool is equipped with ___ Gas Springs with a max. pressure of 150 or 180 bar, depending on spring type. Working pressure ___ bar. Read maintenance instructions before working on gas springs.</p> <p>FIBRO</p> <p>Business Area Standard Parts D-74851 Hassmersheim · Postfach 1120 T +49 (0) 6266-73-0* · F +49 (0) 6266-73-237</p>

Size 35 x 50 mm

Language	Order No.
German	2480.00.035.050.1
English	2480.00.035.050.2
French	2480.00.035.050.3
Italian	2480.00.035.050.4
Spanish	2480.00.035.050.5
Polish	2480.00.035.050.PL
Czech	2480.00.035.050.CZ
Turkish	2480.00.035.050.TR
Chinese	2480.00.035.050.CN

<p>WARNING</p> <p>This tool is equipped with ___ Gas Springs with a max. pressure of 150 or 180 bar, depending on spring type.</p> <table border="1"> <thead> <tr> <th>No. pcs.</th> <th>spring type</th> <th>fill.press./bar</th> <th>force/daN</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>2</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>3</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>4</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>5</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> <p>Read maintenance instructions before working on gas springs.</p> <p>FIBRO</p> <p>Business Area Standard Parts D-74851 Hassmersheim · Postfach 1120 T +49 (0) 6266-73-0* · F +49 (0) 6266-73-237</p>	No. pcs.	spring type	fill.press./bar	force/daN	1	_____	_____	_____	2	_____	_____	_____	3	_____	_____	_____	4	_____	_____	_____	5	_____	_____	_____
No. pcs.	spring type	fill.press./bar	force/daN																					
1	_____	_____	_____																					
2	_____	_____	_____																					
3	_____	_____	_____																					
4	_____	_____	_____																					
5	_____	_____	_____																					

Size 75x105 mm

Language	Order No.
German	2480.00.075.105.1
English	2480.00.075.105.2
French	2480.00.075.105.3
Italian	2480.00.075.105.4
Spanish	2480.00.075.105.5
Polish	2480.00.075.105.PL
Czech	2480.00.075.105.CZ
Turkish	2480.00.075.105.TR
Chinese	2480.00.075.105.CN

Size 110 x 150 mm

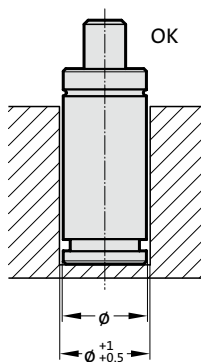
Language	Order No.
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English	2480.00.110.150.2
French	2480.00.110.150.3
Italian	2480.00.110.150.4
Spanish	2480.00.110.150.5
Polish	2480.00.110.150.PL
Czech	2480.00.110.150.CZ
Turkish	2480.00.110.150.TR
Chinese	2480.00.110.150.CN

GAS SPRINGS - INSTALLATION GUIDELINES

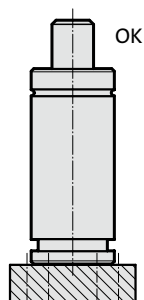
Mounting examples

Mounting possibilities for gas springs are listed below.

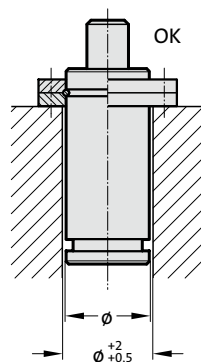
For additional information on mounting, see the corresponding pages in the catalogue.



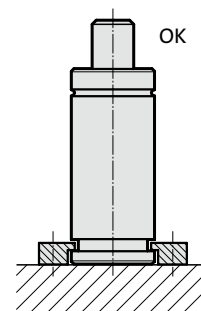
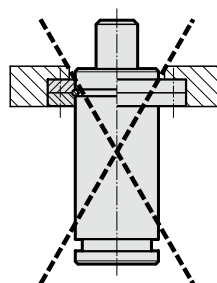
Installed loos in the bore.



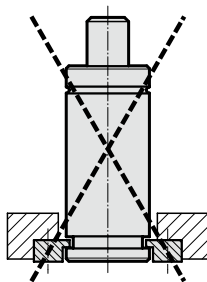
Screw mounted at the base with 2480.011.



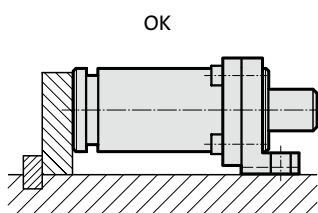
Fixed with 2480.055./057./058./064.



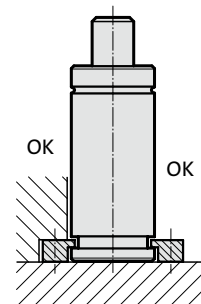
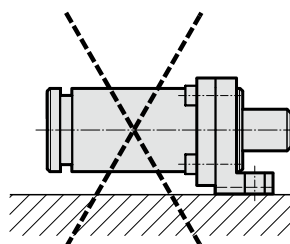
Fixed with 2480.007./008.



Fixed with 2480.007./008.



Fixed with 2480.044./045./047.

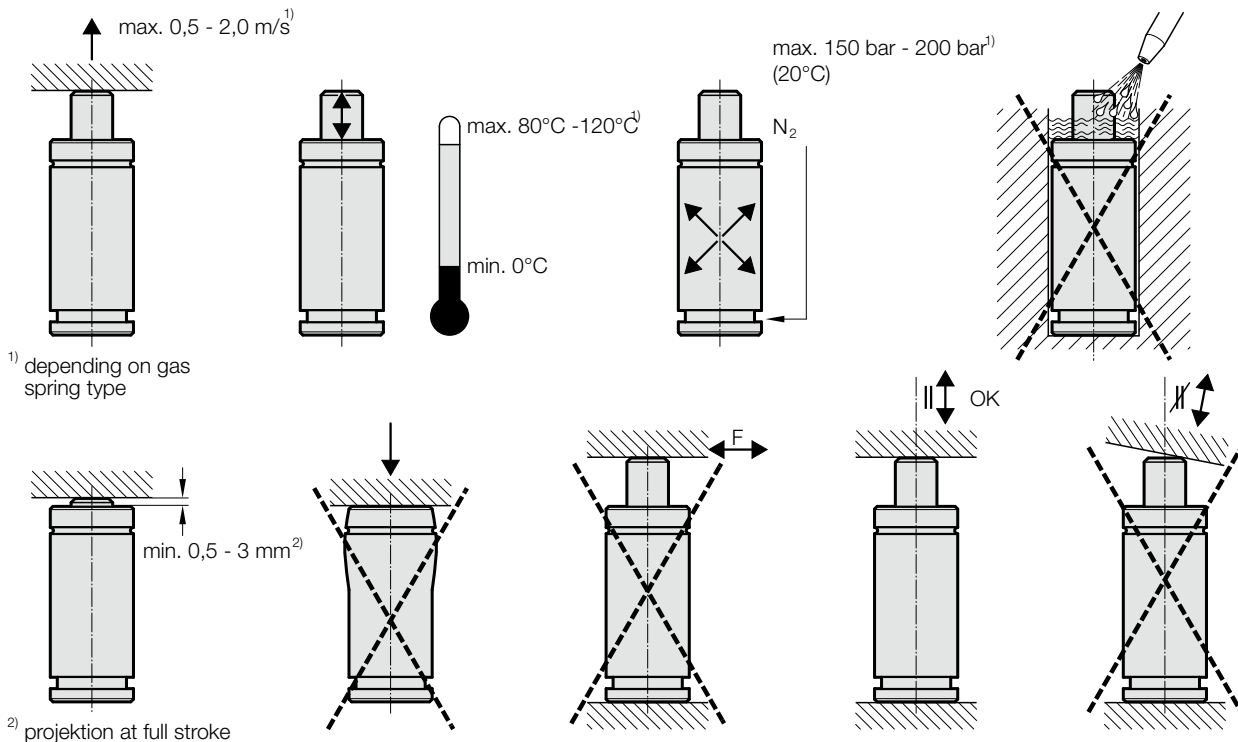


Fixed with 2480.022.

GAS SPRINGS - INSTALLATION GUIDELINES

To achieve the best possible service-life and safety from the gas spring, the directions below must be followed.

Mounting instructions



- Before inserting the gas springs, check the corresponding filling pressure.
- Secure the gas spring to the tool/machine whenever possible, using the threaded hole(s) in the base of the gas spring or a suitable flange. Never exceed the maximum torque values for the threads in the base of the gas spring: (M6 = 10 Nm; M8 = 24 Nm; M10 = 45 Nm; M12 = 80 Nm)
- The threaded hole in the piston rod top should not be used for mounting purposes. It is only to be used when carrying and servicing the gas spring.
- Do not use the gas spring in such a way that the piston rod is realised freely from its compressed position, as this could cause internal damage to the gas spring.
- Make sure the gas spring is mounted parallel to the direction of the compression stroke.
- Ensure the contact surface of the piston rod top is perpendicular to the direction of the compression stroke and is sufficiently hardened.
- The gas spring should not be subjected to the side loads.
- Protect the piston rod against mechanical damage and contact with fluids.
- We recommend providing a stroke reserve of 10% of the nominal stroke length or 5 mm.
- The maximum charging pressure as a function of the working temperature must not be exceeded as it may effect the safety of the product.
- Exceeding the gas spring's recommended operating temperature will shorten the service-life of the gas spring.
- The entire contact surface of the piston rod / piston should be used (except 2479.030./031., 3479.030.).
- Do not remove bottom 2480./2497.00.20. from spring until all gas pressure has been discharged.



FIBRO GAS SPRINGS – THE SAFER CHOICE

OPTIMUM SAFETY FOR TOOLS AND OPERATORS

At FIBRO, safety and reliability are paramount. Particularly when it comes to our gas springs. With their unique range of safety features, FIBRO gas springs are one of the safest on the market.

FIBRO safety features 1)



PED approval for 2 million strokes

FIBRO gas springs are developed, manufactured and tested for a minimum of 2 million* full strokes in accordance with PED 2014/68/EU. The springs deliver this full performance at the maximum permissible limits in terms of filling pressure and operating temperature – even when combined with any of the various mounting types available.

* Calculation value for durability



Normalien · Standard Parts · DE-74855 Hassmersheim FIBRO
 T +49(0)2266-73-0 · F +49(0)2266-73-237

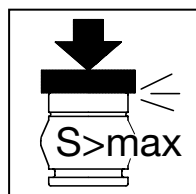
Bestell-Nr.: **2480.13.05000.050**
 Order-No.: Fiederkraft
 Fülldruck: 150 bar Federkraft: 5000 daN
 Filling pressure: 150 bar Spring Force: 5000 daN

PED-zugelassen für 2.000.000 Hübe bei voller Hübauslastung.
 PED-approved for 2,000,000 strokes at full stroke load.

Gasdruckfeder – Warnung! Nicht öffnen - hoher Druck; Fülldruck max. 150 bar. Bitte Bedienungsanleitung beachten!
Gas Spring – Warning! Do not open-high pressure; filling pressure max. 150 bar. Please follow instructions for use!
Ressort à gaz – Attention! Ne pas ouvrir - haute pression; pression de remplissage max. 15 MPa. Veuillez observer les instructions d'emploi!
Molle a gas – Attenzione! Non aprire - pressione alta massima; pressione di riempimento max. 150 bar. Si prega di osservare le istruzioni per l'uso!
¡Muelle de gas – Atención! No abrir - alta presión; cargado a mass. 150 bar. ¡Por favor observar las instrucciones!

The benefit for you: ► **Guaranteed safety and reliability for the entire service life of the spring**

Repair kits and qualified training sessions available through FIBRO Service offer increased effectiveness and process reliability.

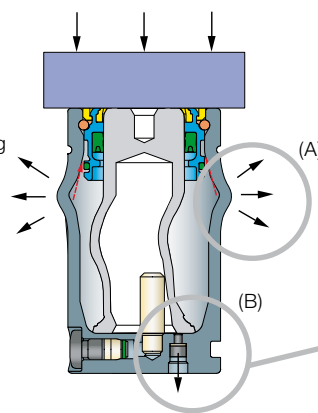


Overstroke protection

Conventional gas springs may burst in the event of an over-extended stroke. Components may come loose and be ejected.

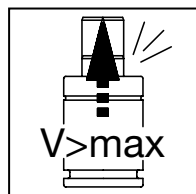
FIBRO gas springs are different:

in the event of an overstroke and depending on the spring type the patented protection system will ensure that either the cylinder wall of the gas spring is deformed in a predefined manner (A) or the piston rod destroys a rupture bolt in the floor of the cylinder (B), thereby allowing the gas to escape into the atmosphere.



The benefit for you: ► **No risk of parts flying around in the event of an overstroke**

Possible causes of triggering: Lack of stroke limitations in the tool/machine and placing the piston rods under a load (e.g. sheet-metal holder, slide reset, etc.), double sheet, incorrect installation position, etc.

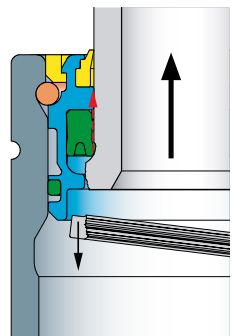


Return stroke protection

If, for any reason, tool components should get stuck and the piston rod should be freely released from its compressed position, conventional gas springs may pose a safety risk as the piston may not be retained in the gas spring.

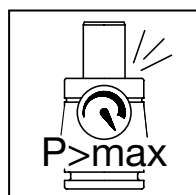
FIBRO gas springs are different:

special guides and a patented safety stop in the piston rods ensure your safety. If the speed is too high during the return stroke, the collar on the piston rod will automatically break. The integrated safety stop then destroys the seal, which allows the gas to escape into the atmosphere and the gas spring to become depressurised.



The benefit for you: ► **No risk of a piston rod firing out if the return stroke is too fast**

Possible causes of triggering: Sudden loosening of jammed components, such as sheet-metal holder, slide, ejector, scraper function, etc.

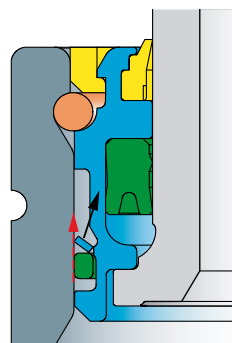


Overpressure protection

Conventional gas springs can burst if the internal pressure rises above a maximum permitted value. If this happens, parts flying around can become dangerous projectiles.

FIBRO gas springs are different:

if the pressure rises above the maximum permitted value, the safety collar on the sealing set is automatically destroyed. The gas then escapes into the atmosphere and the gas spring is depressurised.



The benefit for you: ► **No risk of bursting parts in the event of overpressure**

Possible causes of triggering: Incorrect filling (max. filling pressure 150 or 180 bar, nitrogen), infed of liquid operating material, etc.

After a protection function is triggered, the spring cannot be repaired and can no longer be used. It must be replaced completely.

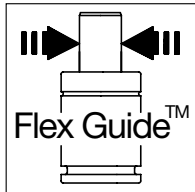
1) The safety features mentioned here have been implemented – with few exceptions – on all FIBRO gas springs.

Please refer to the relevant data sheets to check the current safety equipment which is provided with the gas spring you are interested in, or contact FIBRO GmbH directly for more information. For the safe handling of gas springs and other nitrogen products, the safety regulations must be observed. Maintenance work on the product may only be done, if nitrogen gas is no longer contained in the gas spring.

FIBRO GAS SPRINGS – THE SAFER CHOICE

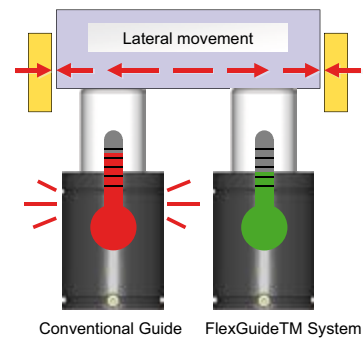
OPTIMUM SAFETY FOR TOOLS AND OPERATORS

FIBRO reliability features



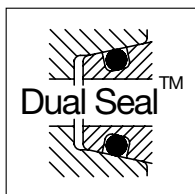
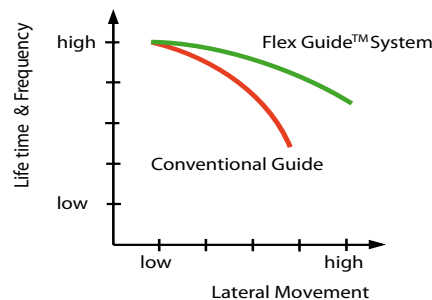
Flexible guides: The Flex Guide™ System

The Flex Guide™ System is a flexible guide in the gas spring which absorbs lateral movements of the piston rod. It minimises friction and lowers the operating temperature.



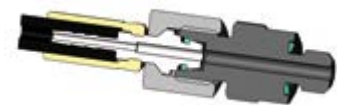
The benefits for you:

- ▶ **Extended service life**
- ▶ **Increased stroke frequency, i.e. more strokes per minute**



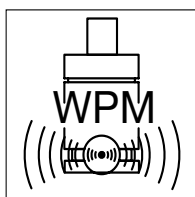
Safe hose connections: The Dual Seal™ System

The FIBRO Dual Seal™ System combines a metal seal with a soft elastomer seal. On hose connection systems, the system provides two leak-tight connections and prevents rotation.



The benefits for you:

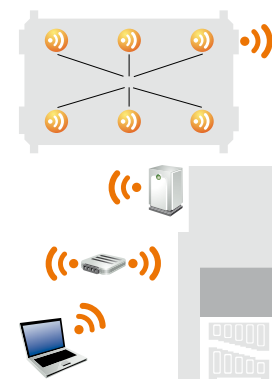
- ▶ **Leak-tight connection, even under vibrations**
- ▶ **High process reliability**
- ▶ **Minimised tool down time**
- ▶ **Simple installation thanks to anti-rotation function**



Wireless monitoring:

The Wireless Pressure Monitoring (WPM) System

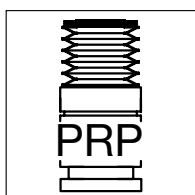
The optional Wireless Pressure Monitoring System (WPM) (patent pending) wirelessly monitors the pressure and temperature of FIBRO gas springs. Before a defective part is produced, the press operator receives a message from the WPM and can take appropriate action.



The benefits for you:

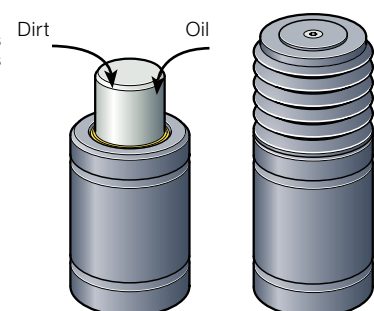
- ▶ **Preventative quality assurance**
- ▶ **High process reliability**
- ▶ **Minimised tool down time**
- ▶ **Reduced maintenance and costs**

Potential faults are individually displayed. As a result, service intervals can be extended. Maintenance and repair costs are reduced.



Protected piston rods: **FIBRO Concertina Shrouds**

The FIBRO Piston Rod Protection (patented) reliably protects the piston rods in gas springs against dirt, oil and emulsion. In this way, the system prevents damage to the piston rod surface and leaks at internal seals.



The benefit for you:

- ▶ **Significantly longer service life for gas springs under harsh operating conditions**

GAS SPRINGS - SYNOPSIS

Nominal force in daN	Outside-Ø in mm	Stroke in mm	Built-in lenght in mm	Standard	Note	Order No.
----------------------	-----------------	--------------	-----------------------	----------	------	-----------

Gas springs, Ejector pin units

5	M16x1,5	10 - 125	65 - 295	VDI		2479.030.00005.
10	M16x1,5	10 - 125	65 - 295	VDI		2479.030.00010.
20	M16x1,5	10 - 125	65 - 295	VDI		2479.030.00020.
40	M16x1,5	10 - 125	65 - 295	VDI		2479.030.00040.
4	M16x2	10 - 125	65 - 295	VDI		2479.031.00004.
5	M16x2	10 - 125	65 - 295	VDI		2479.031.00005.
10	M16x2	10 - 125	65 - 295	VDI		2479.031.00010.
20	M16x2	10 - 125	65 - 295	VDI		2479.031.00020.
40	M16x2	10 - 125	65 - 295	VDI		2479.031.00040.
20	M24x1,5	10 - 125	65 - 295	VDI		2479.032.00020.
40	M24x1,5	10 - 125	65 - 295	VDI		2479.032.00040.
80	M24x1,5	10 - 125	65 - 295	VDI		2479.032.00080.
170	M24x1,5	10 - 125	65 - 295	VDI		2479.032.00170.
20	M24x1,5	10 - 125	65 - 295	WDX		2479.034.00020.
40	M24x1,5	10 - 125	65 - 295	WDX		2479.034.00040.
80	M24x1,5	10 - 125	65 - 295	WDX		2479.034.00080.
170	M24x1,5	10 - 125	65 - 295	WDX		2479.034.00170.

Gas springs, small dimensions

13	12	7 - 125	56 - 295			2482.72.00013.
25	12	7 - 125	56 - 295			2482.72.00025.
38	12	7 - 125	56 - 295			2482.72.00038.
50	12	7 - 125	56 - 295			2482.72.00050.
18	15	7 - 125	56 - 295			2482.73.00018.1
35	15	7 - 125	56 - 295			2482.73.00035.1
50	15	7 - 125	56 - 295			2482.73.00050.1
70	15	7 - 125	56 - 295			2482.73.00070.1
30	19	7 - 125	56 - 295	VDI, ISO		2482.74.00030.2
50	19	7 - 125	56 - 295	VDI, ISO		2482.74.00050.2
70	19	7 - 125	56 - 295	VDI, ISO		2482.74.00070.2
90	19	7 - 125	56 - 295	VDI, ISO		2482.74.00090.2
50	24,9	10 - 125	62 - 295	VDI, ISO		2480.21.00050.
100	24,9	10 - 125	62 - 295	VDI, ISO		2480.21.00100.
150	24,9	10 - 125	62 - 295	VDI, ISO		2480.21.00150.
200	24,9	10 - 125	62 - 295	VDI, ISO		2480.21.00200.
50	32	10 - 125	70 - 300	VDI, ISO		2480.22.00050.1
100	32	10 - 125	70 - 300	VDI, ISO		2480.22.00100.1
150	32	10 - 125	70 - 300	VDI, ISO		2480.22.00150.1
200	32	10 - 125	70 - 300	VDI, ISO		2480.22.00200.1
	24,9	10 - 125	62 - 295			2480.23.

Standard-Gas springs

250	38	10 - 125	70 - 300	VDI, ISO		2480.13.00250.
500	45,2	10 - 160	105 - 405	VDI, ISO		2480.13.00500.
750	50,2	13 - 300	120,4 - 695	VDI, ISO		2480.13.00750.
1500	75,2	13 - 300	135 - 710	VDI, ISO		2480.12.01500.
3000	95,2	13 - 300	145 - 720	VDI, ISO		2480.13.03000.
5000	120,2	25 - 300	190 - 740	VDI, ISO		2480.13.05000.
7500	150,2	25 - 300	205 - 755	VDI, ISO		2480.13.07500.
10000	195	25 - 300	210 - 760	VDI, ISO		2480.12.10000.

Standard-Gas springs – HEAVY DUTY

750	45,2	13 - 200	111 - 485			2488.13.00750
1000	50,2	13 - 300	121 - 695	VDI, ISO		2488.13.01000.
1500	63,2	13 - 300	121 - 695			2488.13.01500
2400	75,2	25 - 300	160 - 710	VDI, ISO		2488.13.02400.
4200	95,2	25 - 300	170 - 720	VDI, ISO		2488.13.04200.
6600	120,2	25 - 300	190 - 740	VDI, ISO		2488.13.06600.
9500	150,2	25 - 300	205 - 755	VDI, ISO		2488.13.09500.
20000	195	25 - 300	210 - 760			2488.13.20000

Gas springs with through bore passage

270	38	16 - 80	108 - 236			2496.12.00270.
490	50,2	16 - 80	112 - 240			2496.12.00490.
1060	75,2	16 - 100	122 - 290			2496.12.01060.

GAS SPRINGS - SYNOPSIS

Nominal force in daN	Outside-Ø in mm	Stroke in mm	Built-in length in mm	Standard	Note	Order No.
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Gas springs with increased spring force – POWERLINE

170	19	7 - 125	44 - 285	VDI, ISO		2487.12.00170.
320	24,9	7 - 125	44 - 285	ISO		2487.12.00320.
350	32	10 - 125	50 - 280	VDI, ISO		2487.12.00350.
500	38	10 - 125	50 - 280	VDI, ISO		2487.12.00500.
750	45,2	10 - 125	52 - 282	VDI, ISO		2487.12.00750.
1000	50,2	13 - 125	64 - 288	VDI, ISO		2487.12.01000.
1500	63,2	13 - 125	70 - 294	VDI, ISO		2487.12.01500.
2400	75,2	16 - 125	77 - 295	VDI, ISO		2487.12.02400.
4200	95,2	16 - 125	90 - 308	VDI, ISO		2487.12.04200.
6600	120,2	16 - 125	100 - 318	VDI, ISO		2487.12.06600.
9500	150,2	19 - 125	116 - 328	VDI, ISO		2487.12.09500.
20000	195	19 - 125	148 - 360			2487.12.20000.

Gas spring with reinforced spring base POWERLINE

350	32	10 - 125	60 - 290			2487.12.33.00350.
500	38	10 - 125	60 - 290			2487.12.33.00500.
750	45,2	10 - 125	67 - 297			2487.12.33.00750.
1000	50,2	13 - 125	78 - 302			2487.12.33.01000.
1500	63,2	13 - 125	78 - 302			2487.12.33.01500.
2400	75,2	16 - 125	91 - 309			2487.12.33.02400.
4200	95,2	16 - 125	94 - 312			2487.12.33.04200.
6600	120,2	16 - 125	104 - 322			2487.12.33.06600.

Gas springs CX – COMPACT XTREME

500	32	10 - 80	75 - 225			2497.12.00500.
1000	38	10 - 80	75 - 240			2497.12.01000.
1900	50,2	10 - 80	80 - 245			2497.12.01900.

Compact-Gas springs

420	24,9	6 - 50	56 - 195			2490.14.00420.
750	32	6 - 50	63 - 195			2490.14.00750.
1000	38	6 - 50	61 - 230			2490.14.01000.
1800	50,2	6 - 65	66 - 271			2490.14.01800.
3000	63,2	10 - 65	85 - 256			2490.14.03000.
4700	75,2	10 - 65	80 - 273			2490.14.04700.
7500	95,2	10 - 65	90 - 279			2490.14.07500.
11800	120,2	10 - 65	100 - 320			2490.14.11800.
18300	150,2	10 - 65	110 - 323			2490.14.18300.

Gas springs low build height

500	45,2	6 - 125	62 - 300			2485.12.00500.
750	50,2	6 - 125	62 - 300			2485.12.00750.
1500	75,2	25 - 100	110 - 260			2485.12.01500.

Gas springs SPC - SPEED CONTROL™, cushioned

750	75,2	125 - 300	360 - 710			2486.12.00750.
1500	95,2	125 - 300	370 - 720			2486.12.01500.
3000	120,2	125 - 300	390 - 740			2486.12.03000.
5000	150,2	125 - 300	405 - 755			2486.12.05000.

Gas springs DS for die separation

3000	95,2	80 - 300	280 - 720			2486.22.03000.
5000	120,2	80 - 300	300 - 740			2486.22.05000.
7500	150,2	80 - 300	315 - 755			2486.22.07500.

Gas springs to WDX Standard / request your catalogue

GAS SPRINGS - SYNOPSIS

Nominal force in daN	Outside-Ø in mm	Stroke in mm	Built-in length in mm	Standard	Note	Order No.
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Gas springs, threaded

50 - 200	M28×1,5	10 - 125	62 - 292			2480.32.00050.-00200.
250	M38×1,5	13 - 100	75,4 - 250			2480.32.00250.
250	38	13 - 100	75,4 - 250			2480.82.00250.
1000	50,2	13 - 125	64 - 288			2487.82.01000.
15	M28×1,5	125	292			2480.33.00015.125
50	M28×1,5	125	292			2480.33.00050.125
100	M28×1,5	125	292			2480.33.00100.125
150	M28×1,5	125	292			2480.33.00150.125
200	M28×1,5	125	292			2480.33.00200.125

Gas springs for working temperatures up to 120°C

Gas springs LCF, damped

750	50,2	13 - 300	120,4 - 695			2484.13.00750.
1500	75,2	25 - 300	160 - 710			2484.12.01500.
3000	95,2	25 - 300	170 - 720			2484.13.03000.
5000	120,2	25 - 300	190 - 740			2484.13.05000.
7500	150,2	25 - 300	205 - 755			2484.13.07500.

Controllable gas springs / request your catalogue **2489.**

Air Springs, to VW standard / request your catalogue **2491.**

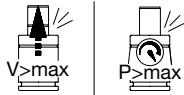
Manifold systems / request your catalogue **2495.**

Composite plates / request your catalogue **2494.**

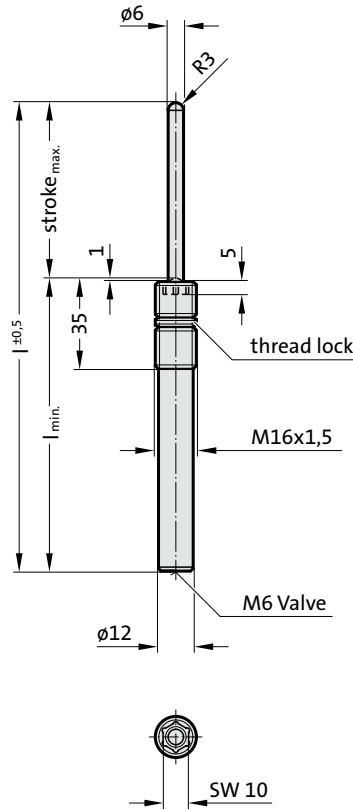
GAS SPRINGS (SPRING-LOADED THRUST PIECES)



GAS SPRING (SPRING PLUNGER), WITH HEXAGON SOCKET, VDI 3004



2479.030.



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 6 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 100 (at 20°C)
 Max. piston speed: 1.6 m/s

Upon customers request, also available unfilled, Order No 2479.030.00000....., Colour: black

²⁾ Hexagon nut order supplementary: 2479.004.016.15 (M16 x 1,5)

2479.030. Gas spring (Spring plunger), with hexagon socket, VDI 3004

Spring type:

Order No*	Stroke _{max.}	l	l _{min.}	.00005.		.00010.		.00020.		.00040.	
				F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]
2479.030.□□□□□.010	10	65	55	6	10.3	11	19	21	36.1	42	73
2479.030.□□□□□.020	20	85	65	6	9.4	11	17.2	21	32.8	42	66.1
2479.030.□□□□□.030	30	105	75	6	9.1	11	16.7	21	31.9	42	64.5
2479.030.□□□□□.040	40	125	85	6	9	11	16.5	21	31.5	42	63.7
2479.030.□□□□□.050	50	145	95	6	9.6	11	17.6	21	33.6	42	67.7
2479.030.□□□□□.060	60	165	105	6	9.4	11	17.3	21	33	42	66.5
2479.030.□□□□□.070	70	185	115	6	9.3	11	17	21	32.5	42	65.7
2479.030.□□□□□.080	80	205	125	6	9.2	11	16.8	21	32.1	42	65.1
2479.030.□□□□□.100	100	245	145	6	9.1	11	16	21	31.9	42	64.3
2479.030.□□□□□.125	125	295	170	6	9	11	16.5	21	31.5	42	63.8

complete with spring type

Spring force marking:

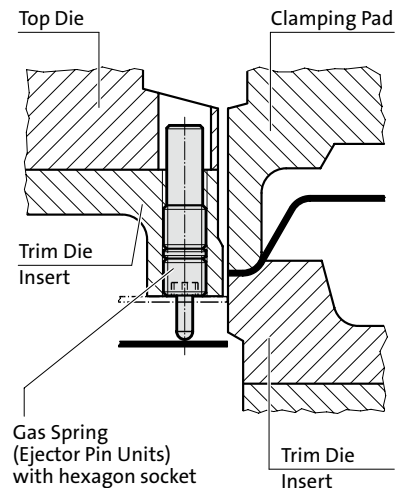
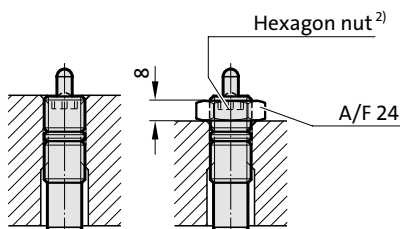
Spring type - Pressure [bar] - Colour:

.00005. - 20 - green

.00010. - 40 - blue

.00020. - 75 - red

.00040. - 150 - yellow



GAS SPRING (SPRING PLUNGER), WITH HEXAGON SOCKET, VDI 3004

Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

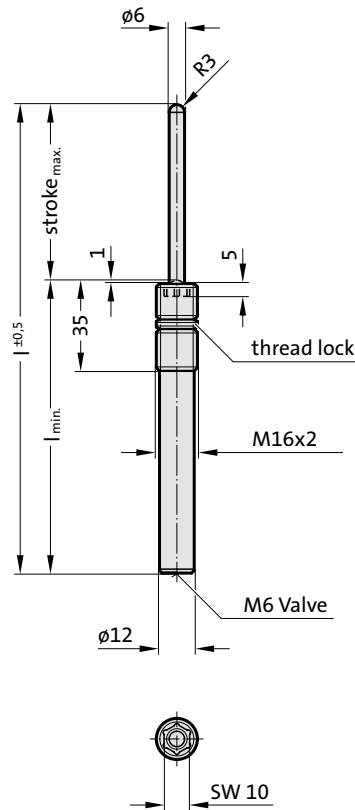
Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 6 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 100 (at 20°C)
 Max. piston speed: 1.6 m/s

Upon customers request, also available unfilled, Order No 2479.031.00000....., Colour: black

²⁾ Hexagon nut order supplementary: 2479.004.016.20 (M16 x 2)

2479.031.



2479.031. Gas spring (Spring plunger), with hexagon socket, VDI 3004

Spring type:

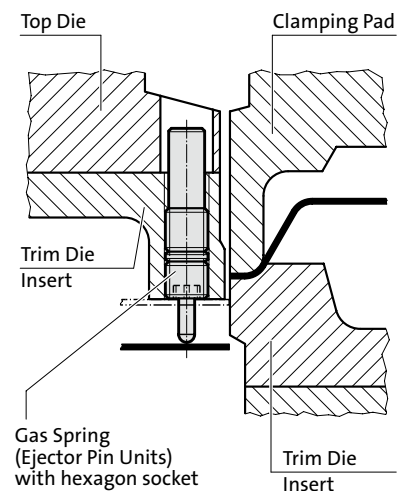
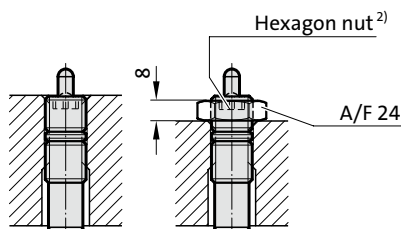
Order No*	Stroke _{max.}	l	l _{min.}	.00004.		.00005.		.00010.		.00020.		.00040.	
				F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]		
2479.031.□□□□□.010	10	65	55	3.4	6	6	10.3	11	19	21	36.1	42	73
2479.031.□□□□□.020	20	85	65	3.4	5.2	6	9.4	11	17.2	21	32.8	42	66.1
2479.031.□□□□□.030	30	105	75	3.4	5.2	6	9.1	11	16.7	21	31.9	42	64.5
2479.031.□□□□□.040	40	125	85	3.4	5.2	6	9	11	16.5	21	31.5	42	63.7
2479.031.□□□□□.050	50	145	95	3.4	5.4	6	9.6	11	17.6	21	33.6	42	67.7
2479.031.□□□□□.060	60	165	105	3.4	5.4	6	9.4	11	17.3	21	33	42	66.5
2479.031.□□□□□.070	70	185	115	3.4	5.4	6	9.3	11	17	21	32.5	42	65.7
2479.031.□□□□□.080	80	205	125	3.4	5.2	6	9.2	11	16.8	21	32.1	42	65.1
2479.031.□□□□□.100	100	245	145	3.4	5.2	6	9.1	11	16	21	31.9	42	64.3
2479.031.□□□□□.125	125	295	170	3.4	5.2	6	9	11	16.5	21	31.5	42	63.8

*complete with spring type

Spring force marking:

Spring type - Pressure [bar] - Colour:

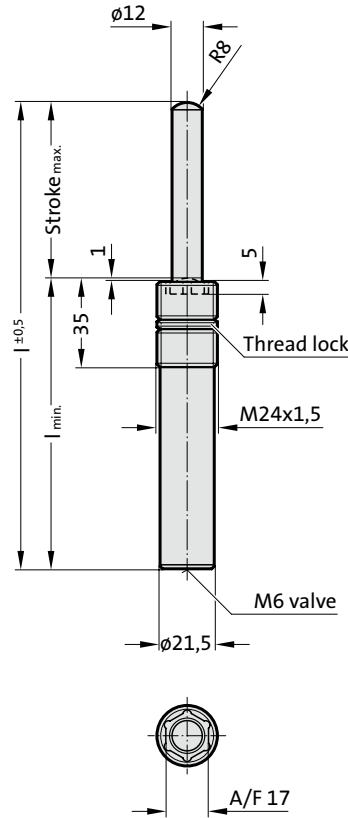
- .00004. - 12 - violet
- .00005. - 20 - green
- .00010. - 40 - blue
- .00020. - 75 - red
- .00040. - 150 - yellow



GAS SPRING (SPRING PLUNGER), WITH HEXAGON SOCKET, VDI 3004



2479.032.



Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N_2
 Max. filling pressure: 150 bar
 Min. filling pressure: 20 bar
 Working temperature: $0^\circ C$ to $+80^\circ C$
 Temperature related force increase: $\pm 0.3\%/^\circ C$
 Max. recommended extensions per minute: approx. 100 (at $20^\circ C$)
 Max. piston speed: 1.6 m/s

Upon customers request, also available unfilled, Order No 2479.032.00000....., Colour: black

²⁾ Hexagon nut order supplementary: 2479.004.024.15



2479.032. Gas spring (Spring plunger), with hexagon socket, VDI 3004

Spring type:

Order No*	Stroke _{max.}	l	l _{min.}	.00020.		.00040.		.00080.		.00170.	
				F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]
2479.032.□□□□□.010	10	65	55	23	33.1	45	64.8	85	122.4	170	244.8
2479.032.□□□□□.020	20	85	65	23	36.3	45	71.1	85	134.3	170	256.6
2479.032.□□□□□.030	30	105	75	23	38.2	45	74.7	85	141.1	170	282.2
2479.032.□□□□□.040	40	125	85	23	39.3	45	76.9	85	145.4	170	290.7
2479.032.□□□□□.050	50	145	95	23	42.5	45	83.2	85	157.3	170	314.5
2479.032.□□□□□.060	60	165	105	23	42.5	45	83.2	85	157.3	170	314.5
2479.032.□□□□□.070	70	185	115	23	42.8	45	83.7	85	158.1	170	316.2
2479.032.□□□□□.080	80	205	125	23	42.8	45	83.7	85	158.1	170	316.2
2479.032.□□□□□.100	100	245	145	23	43	45	84.1	85	159	170	318
2479.032.□□□□□.125	125	295	170	23	43	45	84.1	85	159	170	318

*complete with spring type

Spring force marking:

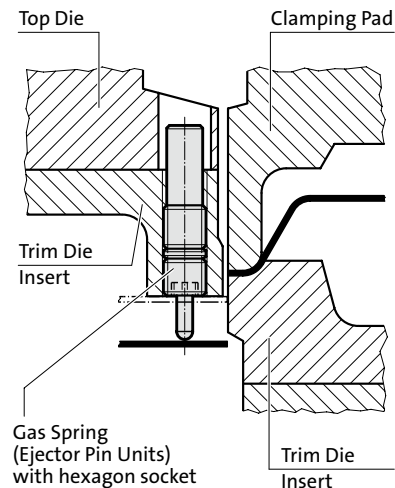
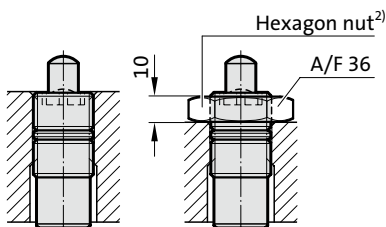
Spring type - Pressure [bar] - Colour:

.00020. - 20 - green

.00040. - 40 - blue

.00080. - 75 - red

.00170. - 150 - yellow



GAS SPRING (SPRING PLUNGER), TO WDX

Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.12.010.017).

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen - N₂

Max. filling pressure: 150 bar

Min. filling pressure: 20 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 30 to 80 (at 20°C)

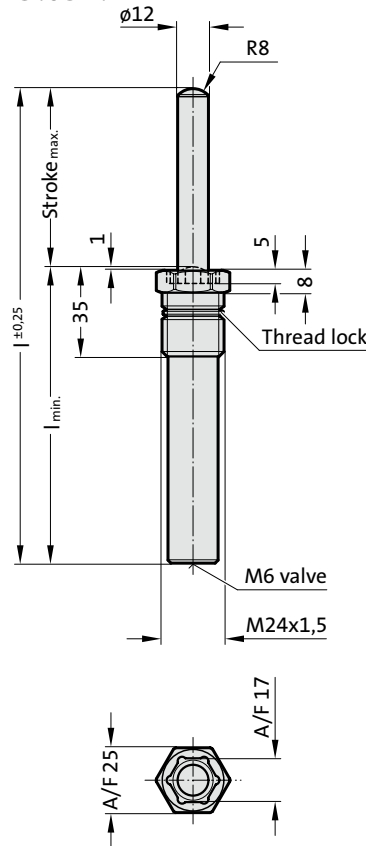
Max. piston speed: 1.6 m/s

Attention!

Different colour coding for spring force used in WDX standard

Upon customers request, also available unfilled, Order No 2479.034.00000....., Colour: black

2479.034.



2479.034. Gas spring (Spring plunger), to WDX

Spring type:

Order No*	Stroke _{max.}	l	l _{min.}	.00020.		.00040.		.00080.		.00170.	
				F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]	F _{initial} [daN]	F _{final} [daN]
2479.034.□□□□□.010	10	65	55	23	32.5	45	65	85	122	170	243.5
2479.034.□□□□□.016	16	77	61	23	36.6	45	73.3	85	137.4	170	274.8
2479.034.□□□□□.020	20	85	65	23	36	45	72	85	134.5	170	268
2479.034.□□□□□.025	25	95	70	23	38.9	45	77.8	85	145.9	170	291.8
2479.034.□□□□□.030	30	105	75	23	37.5	45	75	85	141	170	281.5
2479.034.□□□□□.038	38	121	83	23	40.7	45	81.4	85	152.7	170	305.4
2479.034.□□□□□.040	40	125	85	23	38.5	45	77	85	144.5	170	289
2479.034.□□□□□.050	50	145	95	23	42	45	83.5	85	156.5	170	313
2479.034.□□□□□.060	60	165	105	23	42	45	84	85	157	170	314
2479.034.□□□□□.070	70	185	115	23	42	45	84	85	157.5	170	315
2479.034.□□□□□.080	80	205	125	23	42	45	84	85	159	170	315.5
2479.034.□□□□□.100	100	245	145	23	42	45	84.5	85	158	170	316.5
2479.034.□□□□□.125	125	295	170	23	42	45	84.5	85	158.5	170	317

*complete with spring type

Spring force marking:

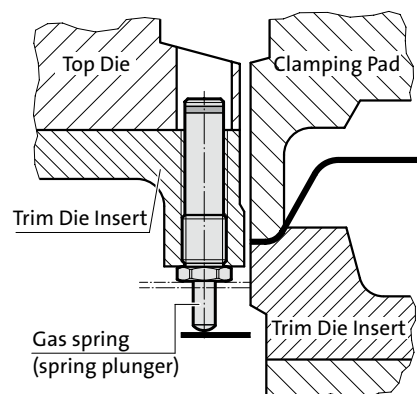
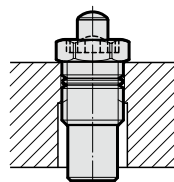
Spring type - Pressure [bar] - Colour:

.00020. - 20 - green

.00040. - 40 - blue

.00080. - 75 - red

.00170. - 150 - yellow

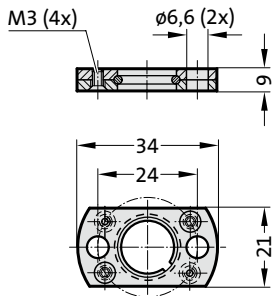


GAS SPRING, SMALL DIMENSION, LOW FORCE



GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

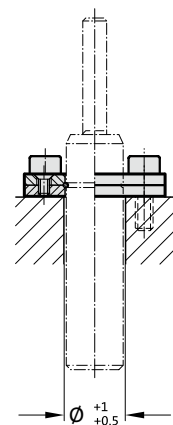
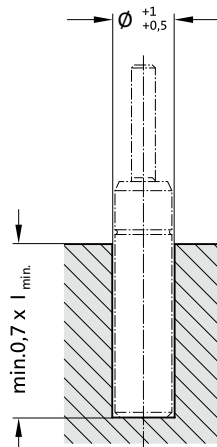
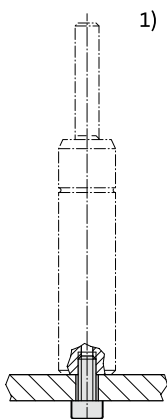
2480.051.00013



Note:

¹⁾ Fixing at bottom thread only recommended for stroke length up to 25 mm.

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 13-25-38-50 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Gas can be added or reduced from below.

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 20 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

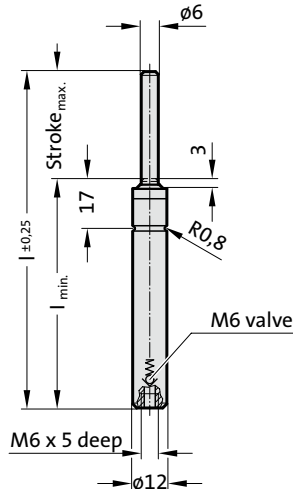
approx. 40 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

Spring forces as per spring diagram.

Upon customers request, also available unfilled, Order No 2482.72.00000...., Colour: black

2482.72.



2482.72. Gas spring, small dimension and low force

Order No*	Stroke _{max.}	l	l _{min.}
2482.72.□□□□□.007	7	56	49
2482.72.□□□□□.010	10	62	52
2482.72.□□□□□.013	12.7	67.4	54.7
2482.72.□□□□□.015	15	72	57
2482.72.□□□□□.019	19	80	61
2482.72.□□□□□.025	25	92	67
2482.72.□□□□□.038	38	118	80
2482.72.□□□□□.050	50	142	92
2482.72.□□□□□.063	63.5	172	108.5
2482.72.□□□□□.075	75	195	120
2482.72.□□□□□.080	80	205	125
2482.72.□□□□□.100	100	245	145
2482.72.□□□□□.125	125	295	170

*complete with initial spring force

Spring force marking: Initial spring force [daN] - Pressure [bar] - Colour:

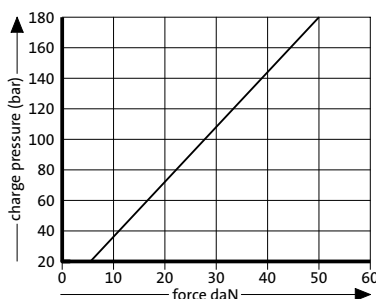
.00013. - 45 - green

.00025. - 90 - blue

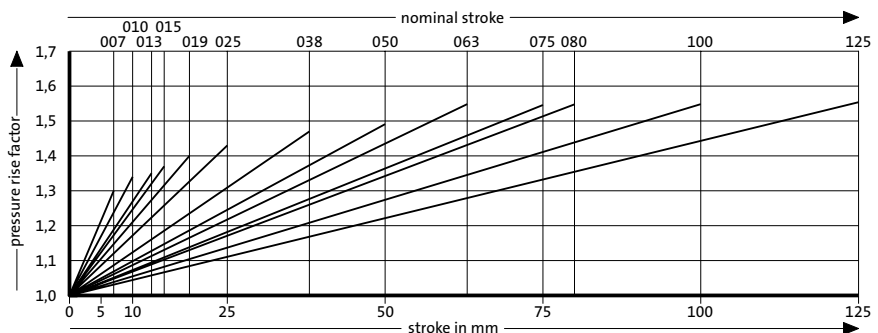
.00038. - 135 - red

.00050. - 180 - yellow

Initial spring force versus charge pressure



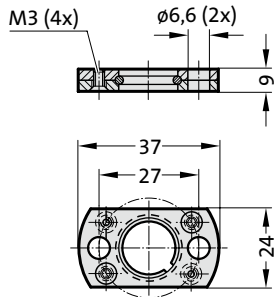
Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

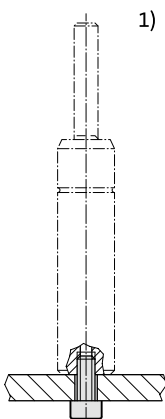
2480.051.00018



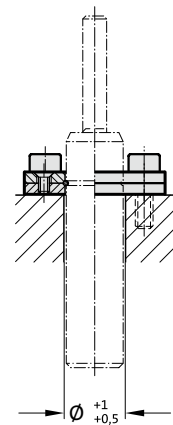
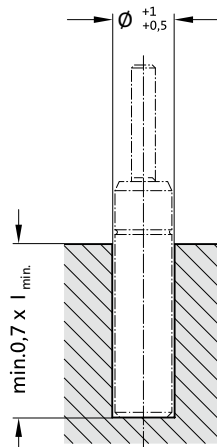
Note:

¹⁾ Fixing at bottom thread only recommended for stroke length up to 25 mm.

Mounting examples:



1)



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 18-35-50-70 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Gas can be added or reduced from below.

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 20 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute: approx. 100 to 150 (at 20°C)

Max. piston speed: 1.6 m/s

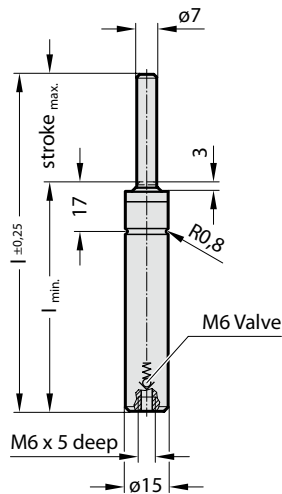
Spring forces as per spring diagram.

Upon customers request, also available

unfilled, Order No 2482.73.00000.1,

Colour: black

2482.73. .1



2482.73. .1 Gas spring, small dimension and low force

Order No*	Stroke _{max.}	l	l _{min.}
2482.73.□□□□□.007.1	7	56	49
2482.73.□□□□□.010.1	10	62	52
2482.73.□□□□□.013.1	12.7	67.4	54.7
2482.73.□□□□□.015.1	15	72	57
2482.73.□□□□□.019.1	19	80	61
2482.73.□□□□□.025.1	25	92	67
2482.73.□□□□□.038.1	38.1	118.2	80.1
2482.73.□□□□□.050.1	50	142	92
2482.73.□□□□□.063.1	63.5	172	108.5
2482.73.□□□□□.075.1	75	195	120
2482.73.□□□□□.080.1	80	205	125
2482.73.□□□□□.100.1	100	245	145
2482.73.□□□□□.125.1	125	295	170

*complete with initial spring force

Spring force marking: Initial spring force [daN] - Pressure [bar] - Colour:

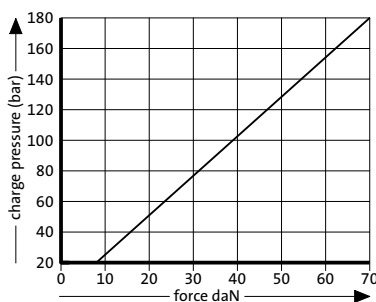
.00018. - 45 - green

.00035. - 90 - blue

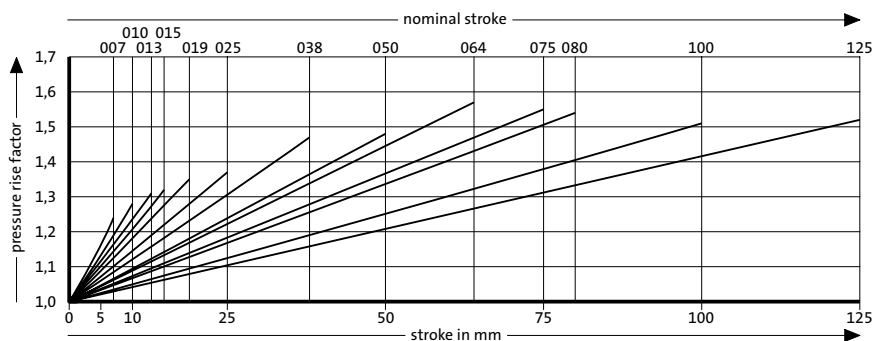
.00050. - 135 - red

.00070. - 180 - yellow

Initial spring force versus charge pressure



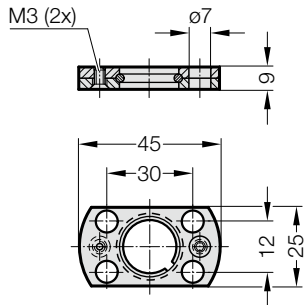
Spring force Diagram displacement versus stroke rise



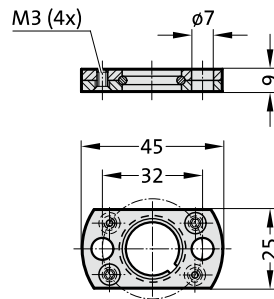
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

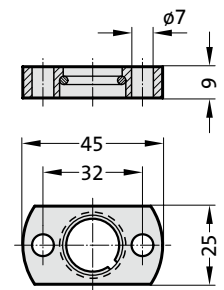
2480.051.01.00030



2480.051.03.00030



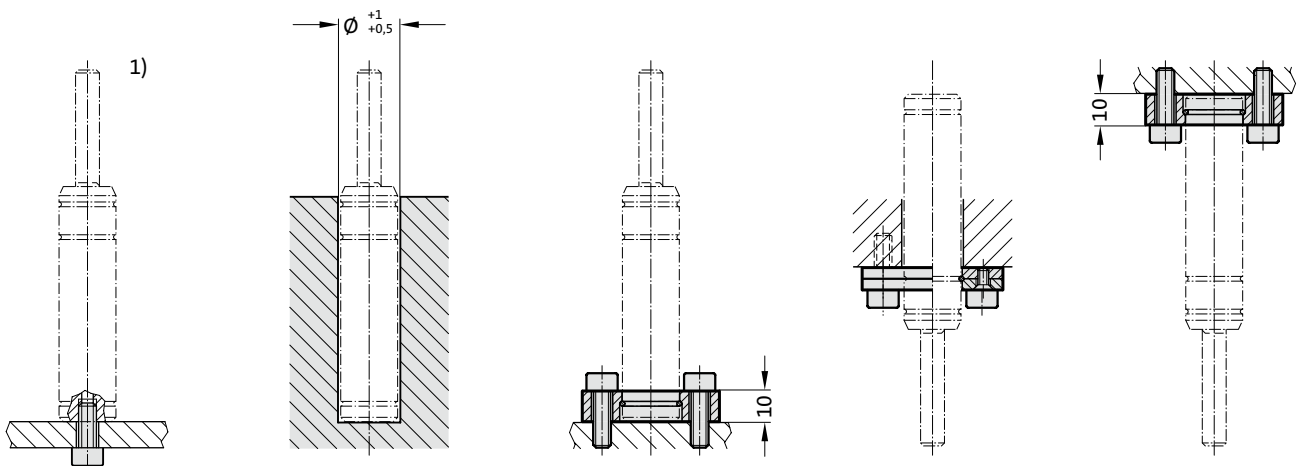
2480.052.00030



Note:

¹⁾ Fixing at bottom thread only recommended for stroke length up to 25 mm.

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 30-50-70-90 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Gas can be added or reduced from below.

Note:

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 100 to 150 (at 20°C)

Max. piston speed: 1.6 m/s

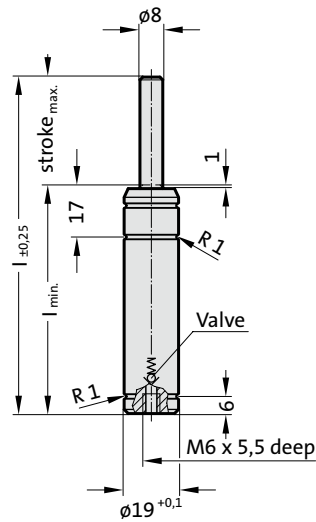
Spring forces as per spring diagram.

Upon customers request, also available

unfilled, Order No 2482.74.00000.2,

Colour: black

2482.74..2



2482.74..2 Gas spring, small dimension and low force

Order No*	Stroke _{max.}	l	l _{min.}
2482.74.□□□□.007.2	7	56	49
2482.74.□□□□.010.2	10	62	52
2482.74.□□□□.015.2	15	72	57
2482.74.□□□□.025.2	25	92	67
2482.74.□□□□.038.2	38.1	118.2	80.1
2482.74.□□□□.050.2	50	142	92
2482.74.□□□□.063.2	63.5	172	108.5
2482.74.□□□□.080.2	80	205	125
2482.74.□□□□.100.2	100	245	145
2482.74.□□□□.125.2	125	295	170

*complete with initial spring force

Spring force marking:

Initial spring force [daN] - Pressure [bar] - Colour:

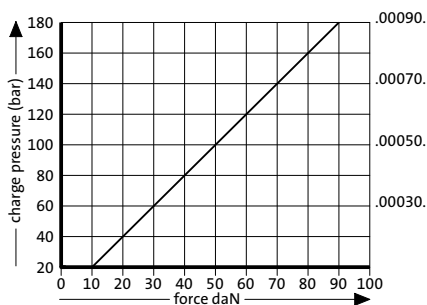
.00030. - 60 - green

.00050. - 100 - blue

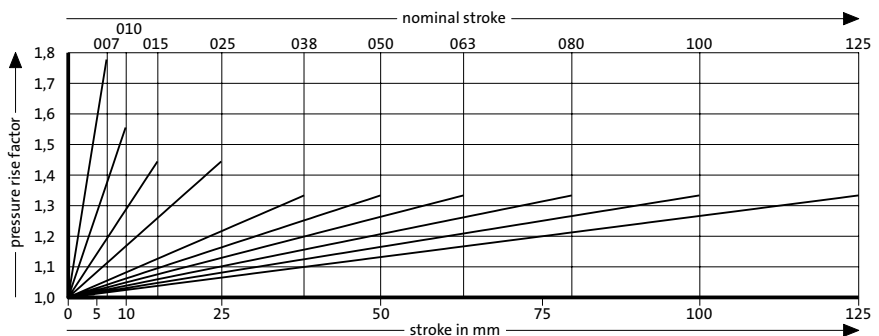
.00070. - 140 - red

.00090. - 180 - yellow

Initial spring force versus charge pressure



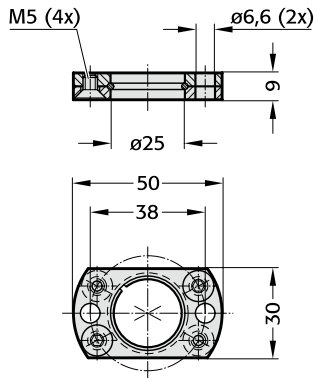
Spring force Diagram displacement versus stroke rise



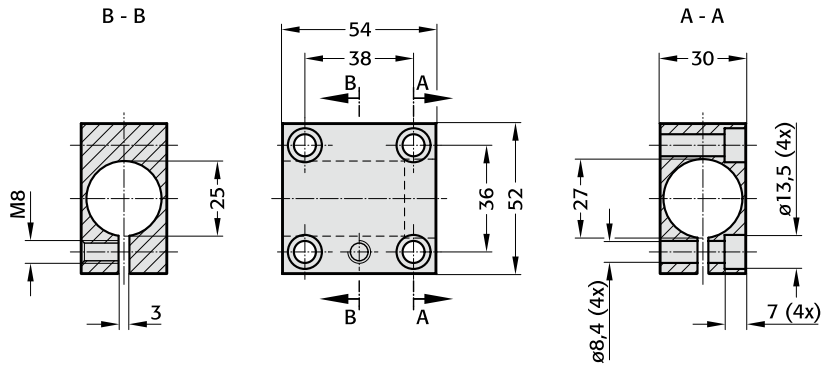
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

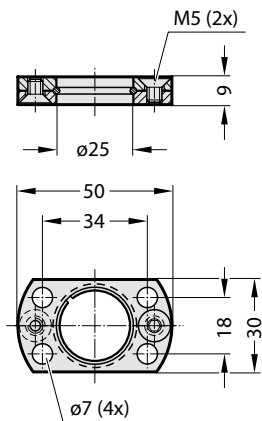
2480.051.00150



2480.053.00150



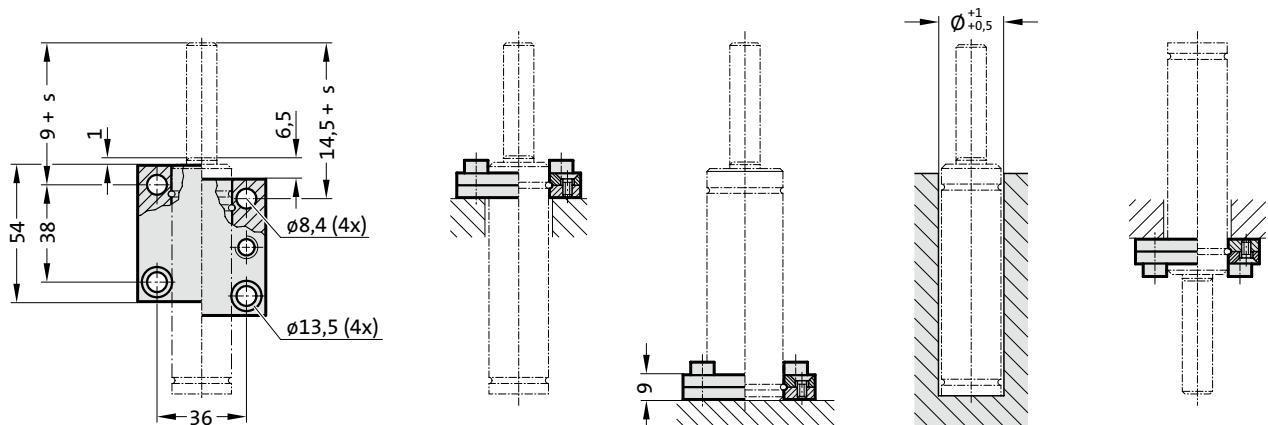
2480.054.00150



Note:

2) Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 50–100–150–200 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Do take into consideration the colour-coded pressure rating during repair work and recharging.

Note:

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

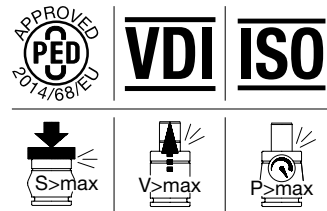
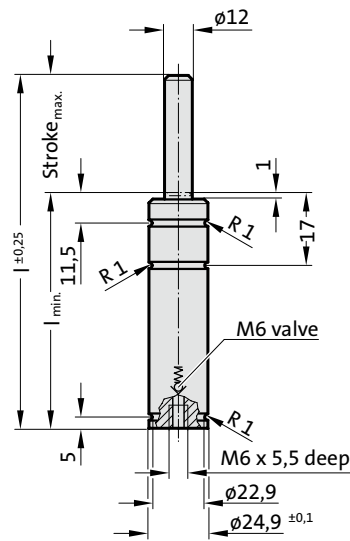
approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

Spring forces as per spring diagram.

Upon customers request, also available unfilled, Order No 2480.21.00000....., Colour: black

2480.21.



2480.21. Gas spring, small dimension and low force

Order No*	Stroke _{max.} (s)	l	l _{min.}
2480.21.□□□□.010	10	62	52
2480.21.□□□□.013	12.7	67.4	54.7
2480.21.□□□□.015	15	72	57
2480.21.□□□□.016	16	74	58
2480.21.□□□□.025	25	92	67
2480.21.□□□□.038	38.1	118.2	80.1
2480.21.□□□□.050	50	142	92
2480.21.□□□□.063	63.5	172	108.5
2480.21.□□□□.080	80	205	125
2480.21.□□□□.100	100	245	145
2480.21.□□□□.125	125	295	170

*complete with initial spring force

Spring force marking:

Initial spring force [daN] - Pressure [bar] - Colour:

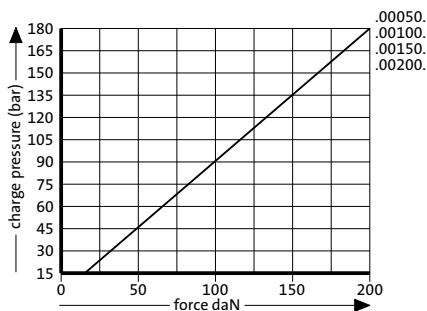
.00050. - 45 - green

.00100. - 90 - blue

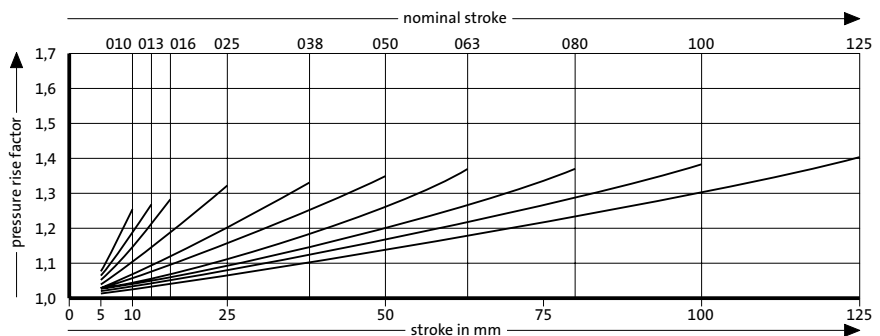
.00150. - 135 - red

.00200. - 180 - yellow

Initial spring force versus charge pressure



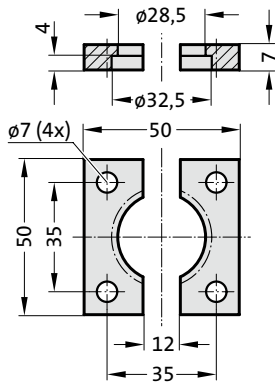
Spring force Diagram displacement versus stroke rise



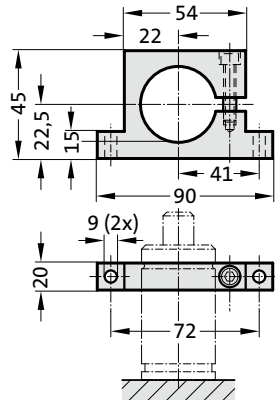
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

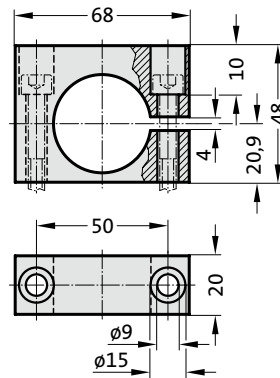
2480.022.00150



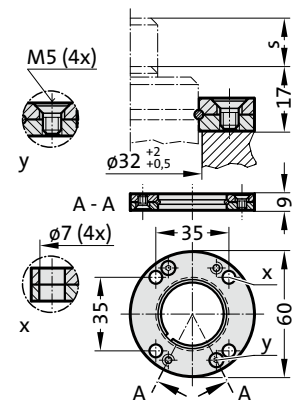
2480.044.00150²⁾



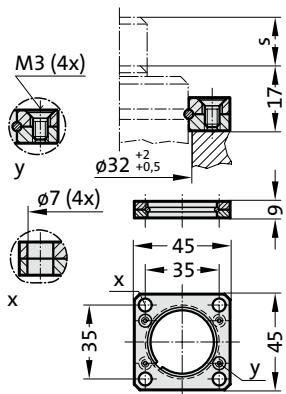
2480.044.03.00150²⁾



2480.055.00150



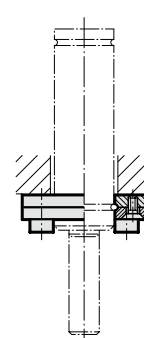
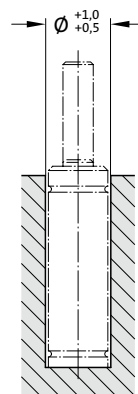
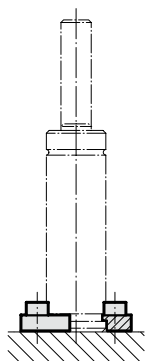
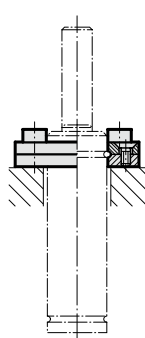
2480.057.00150



Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 50–100–150–200 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Do take into consideration the colour-coded pressure rating during repair work and recharging.

Note:

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

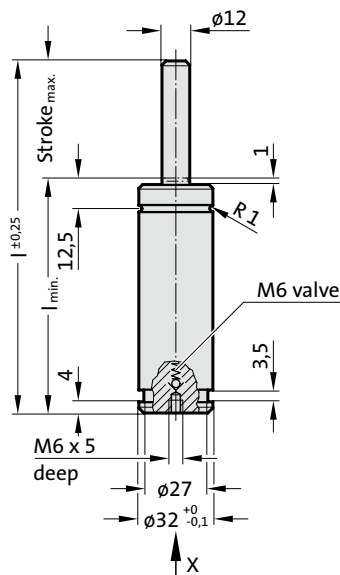
approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

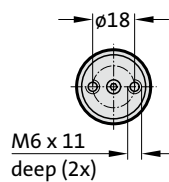
Spring forces as per spring diagram.

Upon customers request, also available unfilled, Order No 2480.22.00000....., Colour: black

2480.22. .1



View X - Gas spring



2480.22. .1 Gas spring, small dimension and low force

Order No*	Stroke _{max.} (s)	l	l _{min.}
2480.22.□□□□□.010.1	10	70	60
2480.22.□□□□□.013.1	12.7	75.4	62.7
2480.22.□□□□□.016.1	16	82	66
2480.22.□□□□□.025.1	25	100	75
2480.22.□□□□□.038.1	38.1	126.2	88.1
2480.22.□□□□□.050.1	50	150	100
2480.22.□□□□□.063.1	63.5	177	113.5
2480.22.□□□□□.080.1	80	210	130
2480.22.□□□□□.100.1	100	250	150
2480.22.□□□□□.125.1	125	300	175

*complete with initial spring force

Spring force marking:

Initial spring force [daN] - Pressure [bar] - Colour:

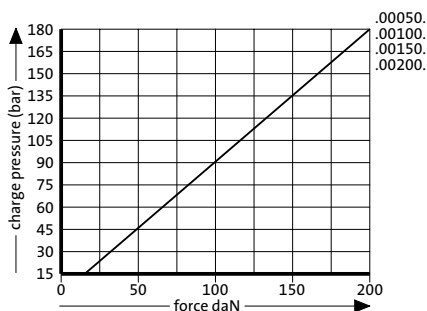
.00050. - 45 - green

.00100. - 90 - blue

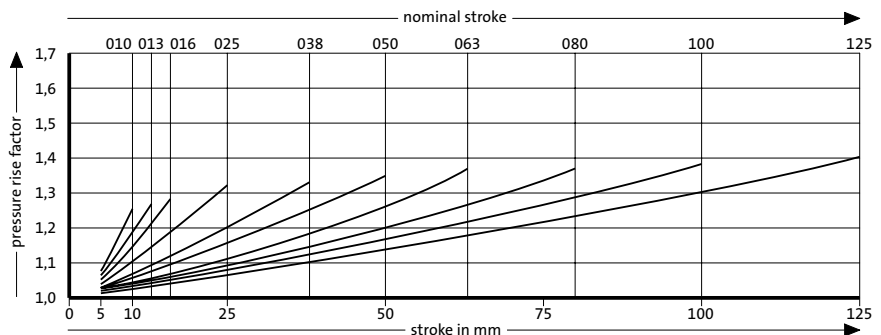
.00150. - 135 - red

.00200. - 180 - yellow

Initial spring force versus charge pressure



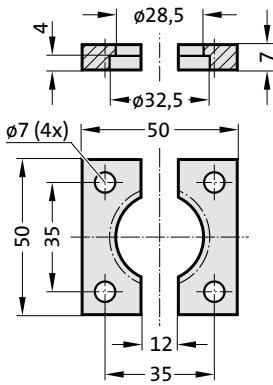
Spring force Diagram displacement versus stroke rise



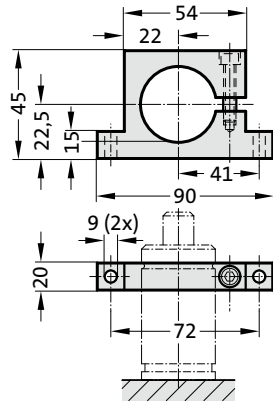
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

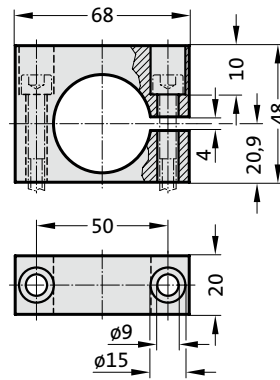
2480.022.00150



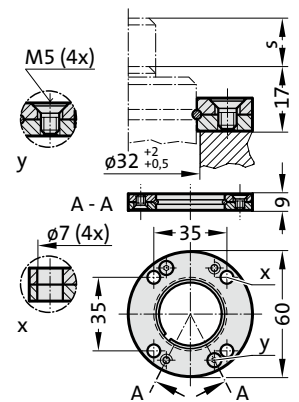
2480.044.00150²⁾



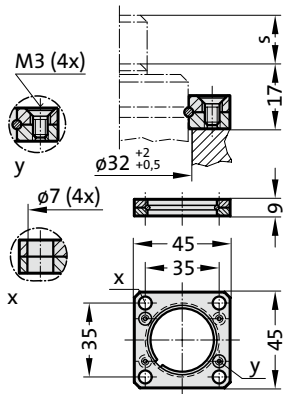
2480.044.03.00150²⁾



2480.055.00150



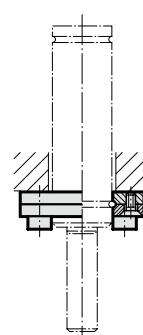
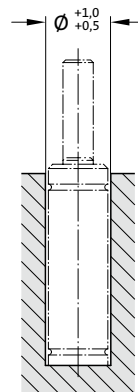
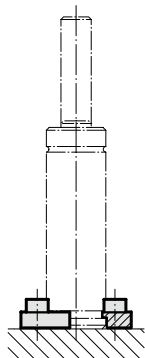
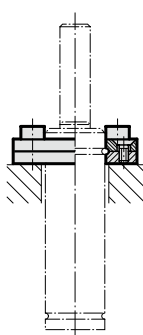
2480.057.00150



Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

The gas springs are colour-coded according to the spring force rating ranges 50–100–150–200 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Do take into consideration the colour-coded pressure rating during repair work and recharging.

Note:

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

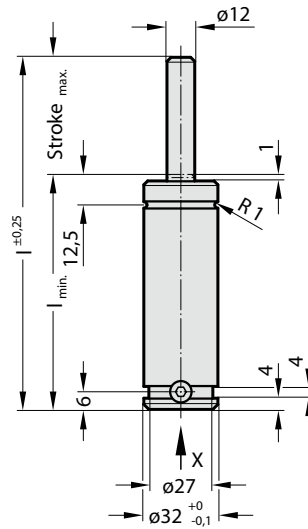
approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

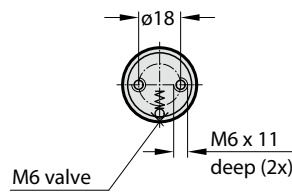
Spring forces as per spring diagram.

Upon customers request, also available unfilled, Order No 2480.22.00000....., Colour: black

2480.22. .2



View X - Gas spring



2480.22. .2 Gas spring, small dimension and low force

Order No*	Stroke _{max.} (s)	l	l _{min.}
2480.22.□□□□□.010.2	10	70	60
2480.22.□□□□□.013.2	12.7	75.4	62.7
2480.22.□□□□□.016.2	16	82	66
2480.22.□□□□□.025.2	25	100	75
2480.22.□□□□□.038.2	38.1	126.2	88.1
2480.22.□□□□□.050.2	50	150	100
2480.22.□□□□□.063.2	63.5	177	113.5
2480.22.□□□□□.080.2	80	210	130
2480.22.□□□□□.100.2	100	250	150
2480.22.□□□□□.125.2	125	300	175

*complete with initial spring force

Spring force marking:

Initial spring force [daN] - Pressure [bar] - Colour:

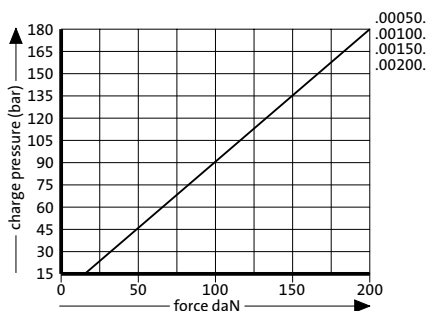
.00050. - 45 - green

.00100. - 90 - blue

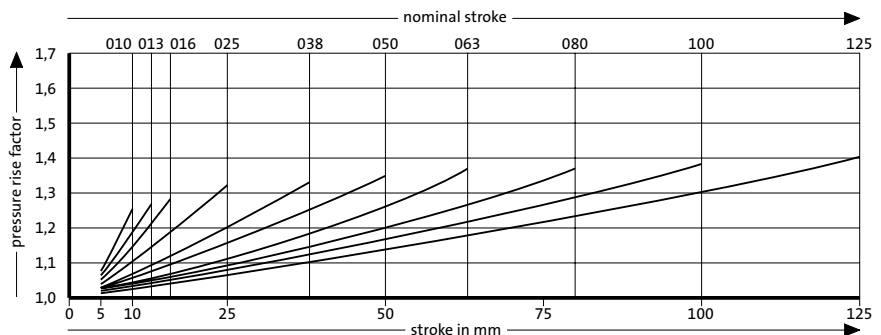
.00150. - 135 - red

.00200. - 180 - yellow

Initial spring force versus charge pressure



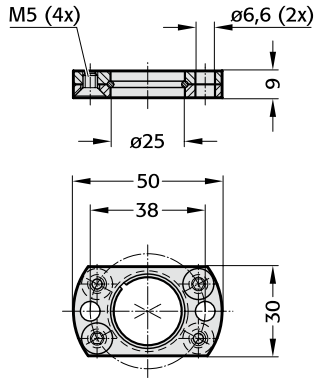
Spring force Diagram displacement versus stroke rise



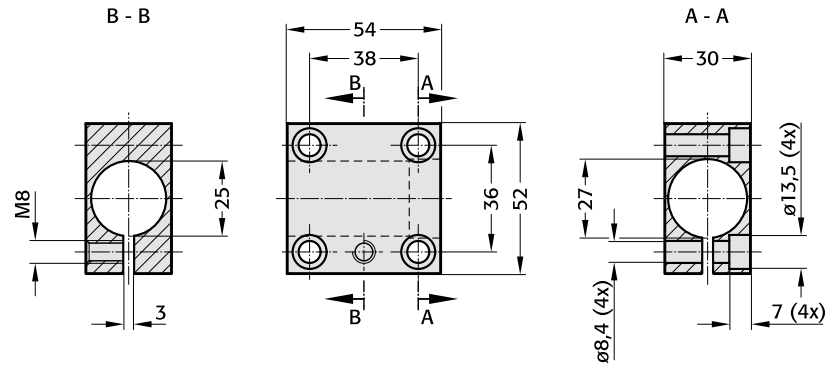
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, SMALL DIMENSION AND LOW FORCE MOUNTING VARIATIONS

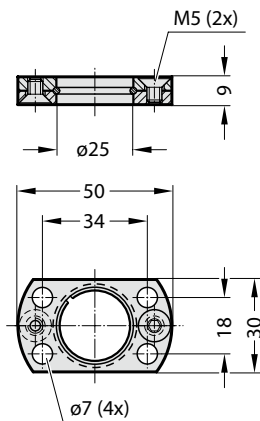
2480.051.00150



2480.053.00150



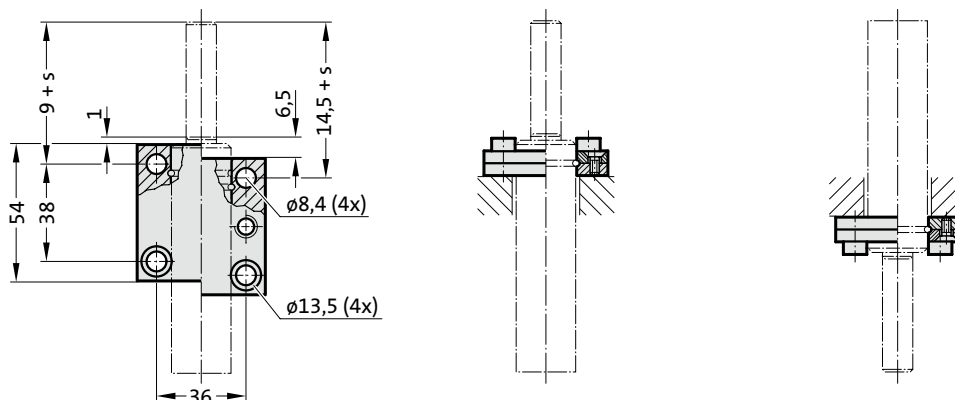
2480.054.00150



Note:

Only gas spring with a stroke of 25 mm or greater can be attached using the upper groove. Only gas spring with a stroke of 38,1 mm or greater can be attached using the lower groove.

Mounting examples:



GAS SPRING, SMALL DIMENSION AND LOW FORCE

Description:

Gas spring will be delivered unfilled and can only be used in a permanent connection (valveless).

Note:

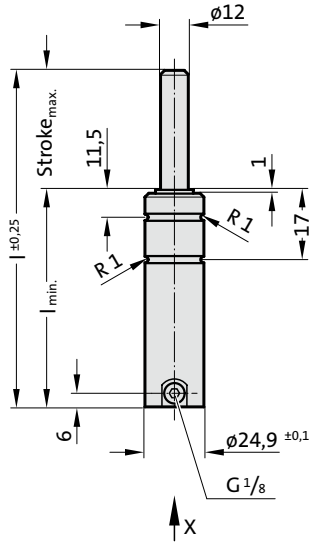
Initial spring force at 180 bar = 200 daN

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen - N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C bis +80°C
 Temperature related force increase: ± 0,3%/°C
 Max. recommended extensions per minute: ca. 80 to 100 (at 20°C)
 Max. piston speed: 1,6 m/s

Spring forces as per spring diagram.

2480.23.



View X

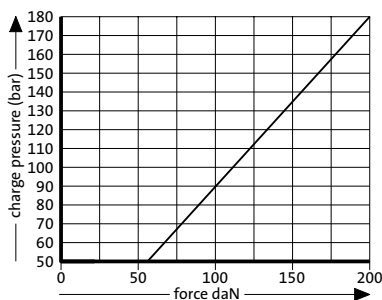


2480.23.

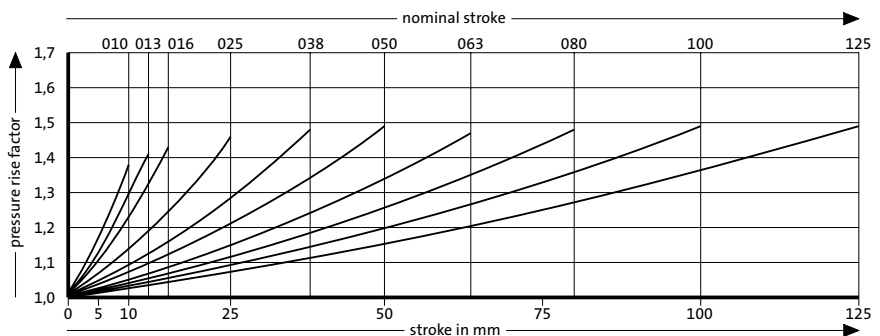
Gas spring, small dimension and low force

Order No	Stroke _{max} (s)	l _{min.}	l
2480.23.00000.010	10	52	62
2480.23.00000.013	12.7	54.7	67.4
2480.23.00000.016	16	58	74
2480.23.00000.025	25	67	92
2480.23.00000.038	38.1	80.1	118.2
2480.23.00000.050	50	92	142
2480.23.00000.063	63.5	108.5	172
2480.23.00000.080	80	125	205
2480.23.00000.100	100	145	245
2480.23.00000.125	125	170	295

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



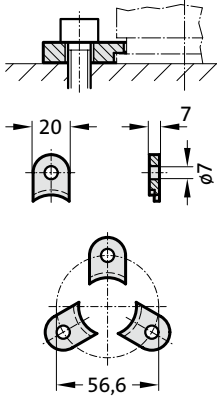
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS STANDARD

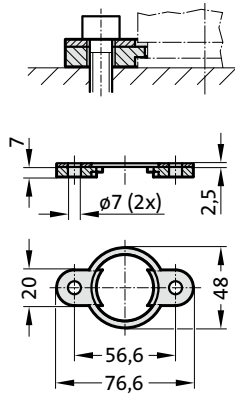


GAS SPRING, STANDARD MOUNTING VARIATIONS

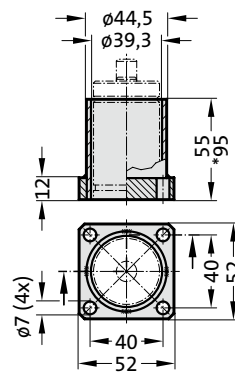
2480.007.00250



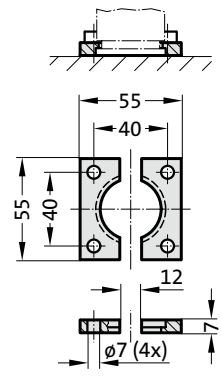
2480.008.00250³⁾



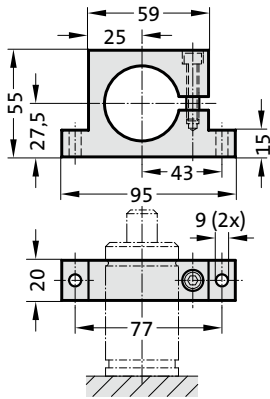
2480.010.00250.055³⁾
2480.010.00250.095*³⁾



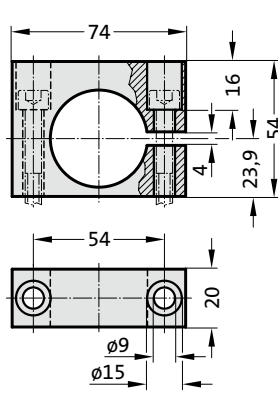
2480.022.00250



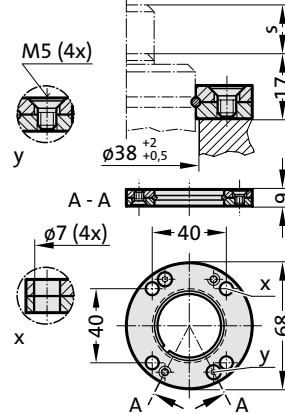
2480.044.00250²⁾



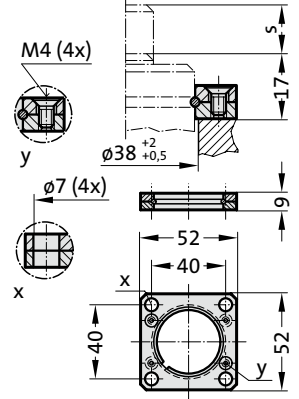
2480.044.03.00250²⁾



2480.055.00250



2480.057.00250



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 250 daN

Order No for spare parts kit: 2480.13.00250

Gas spring without valve

Order No (example): 2480.13.00250. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 50 bar

Working temperature: 0°C to +80°C

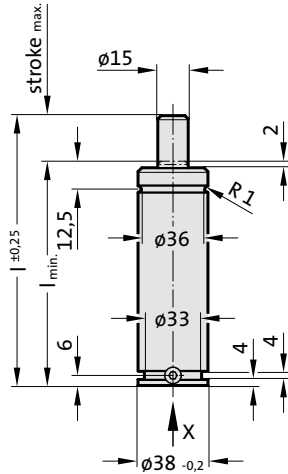
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

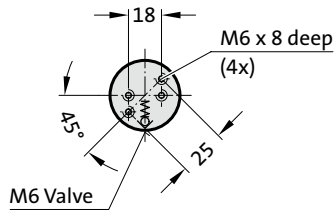
approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2480.13.00250.



View X

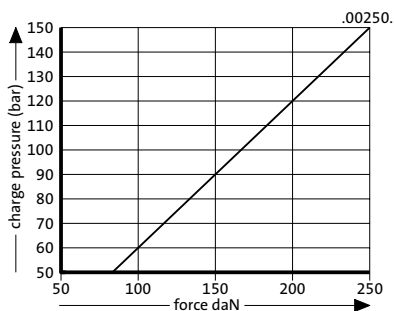


2480.13.00250.

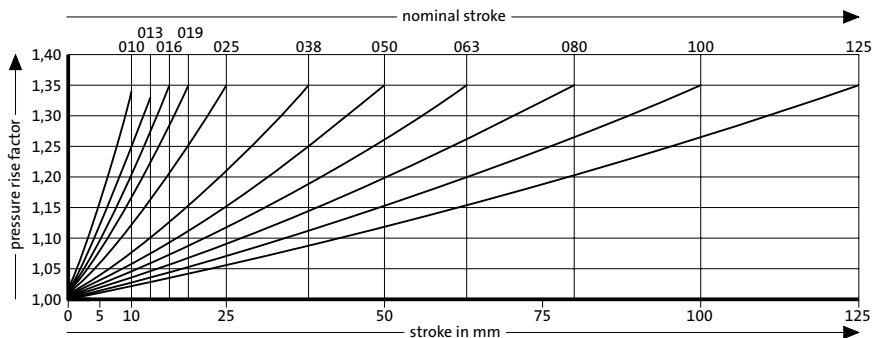
Gas spring, Standard

Order No	Stroke _{max.} (s)	I _{min.}	I
2480.13.00250.010	10	60	70
2480.13.00250.013	12.7	62.7	75.4
2480.13.00250.016	16	66	82
2480.13.00250.019	19	69	88
2480.13.00250.025	25	75	100
2480.13.00250.038	38.1	88.1	126.2
2480.13.00250.050	50	100	150
2480.13.00250.063	63.5	113.5	177
2480.13.00250.080	80	130	210
2480.13.00250.100	100	150	250
2480.13.00250.125	125	175	300

Initial spring force versus charge pressure



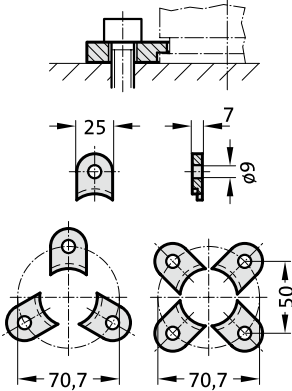
Spring force Diagram displacement versus stroke rise



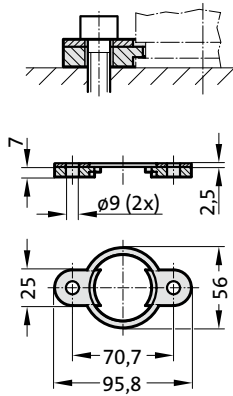
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

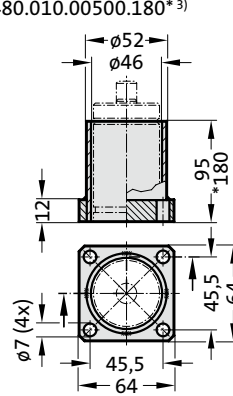
2480.007.00500



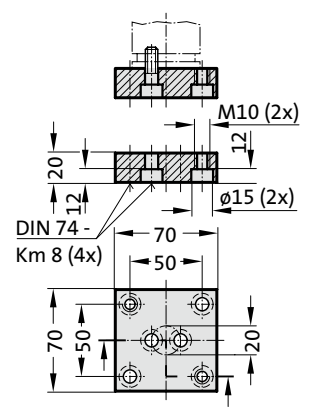
2480.008.00500³⁾



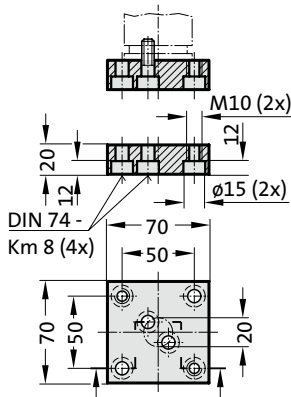
2480.010.00500.095³⁾
2480.010.00500.180*³⁾



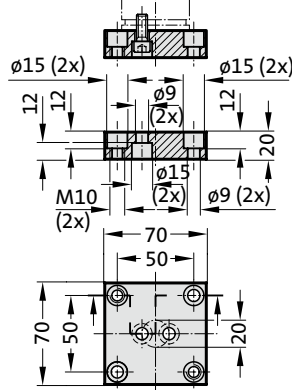
2480.011.00500



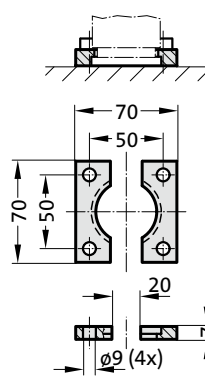
2480.011.00500.1



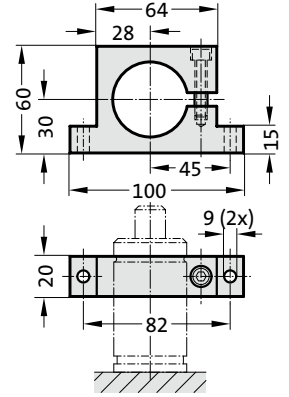
2480.011.00500.2



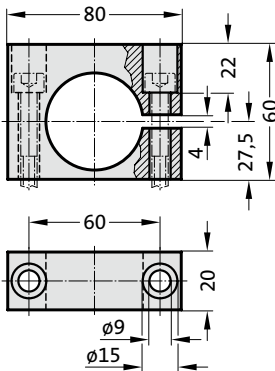
2480.022.00500



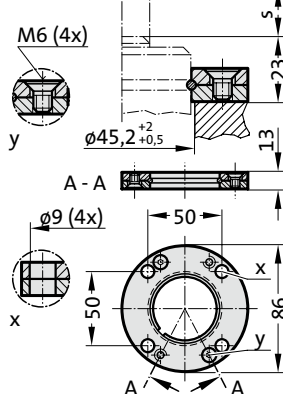
2480.044.00500²⁾



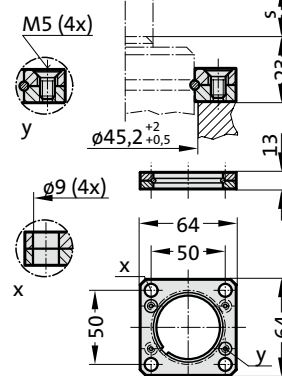
2480.044.03.00500²⁾



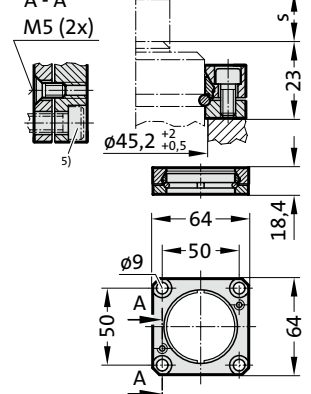
2480.055.00500



2480.057.00500



2480.064.00500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 470 daN

Order No for spare parts kit: 2480.13.00500

Gas spring without valve

Order No (example): 2480.13.00500. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 50 bar

Working temperature: 0°C to +80°C

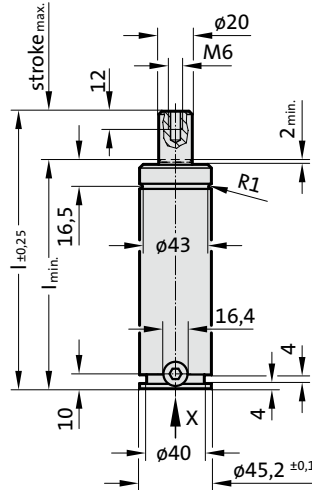
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

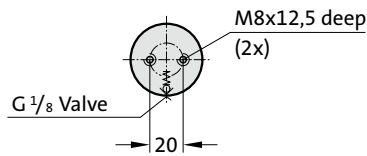
approx. 40 to 80 (at 20°C)

Max. piston speed: 1.6 m/s

2480.13.00500.



View X

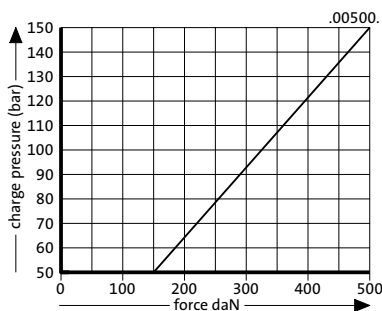


2480.13.00500.

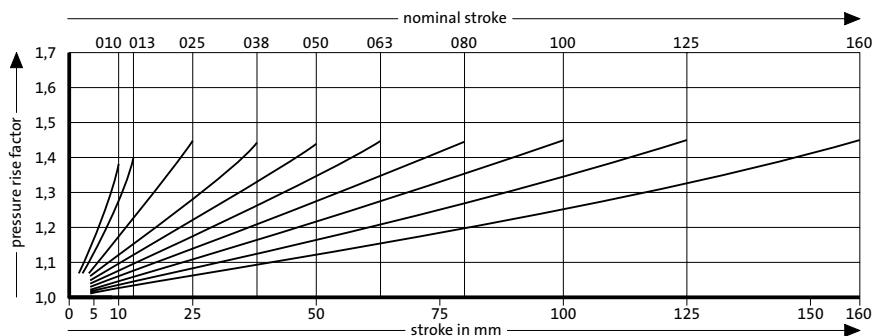
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.13.00500.010	10	95	105
2480.13.00500.013	12.7	97.7	110.4
2480.13.00500.025	25	110	135
2480.13.00500.038	38.1	123.1	161.2
2480.13.00500.050	50	135	185
2480.13.00500.063	63.5	148.5	212
2480.13.00500.080	80	165	245
2480.13.00500.100	100	185	285
2480.13.00500.125	125	210	335
2480.13.00500.160	160	245	405

Initial spring force versus charge pressure



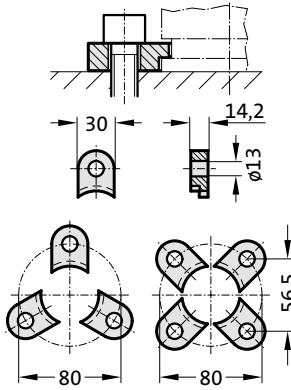
Spring force Diagram displacement versus stroke rise



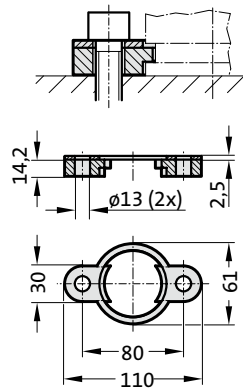
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

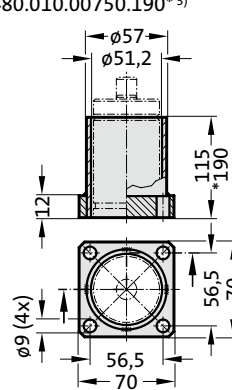
2480.007.00750



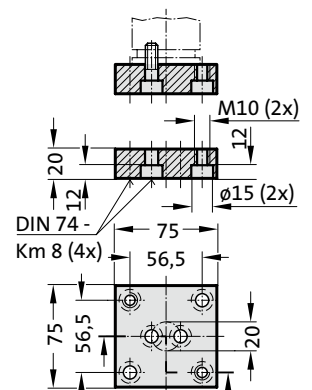
2480.008.00750³⁾



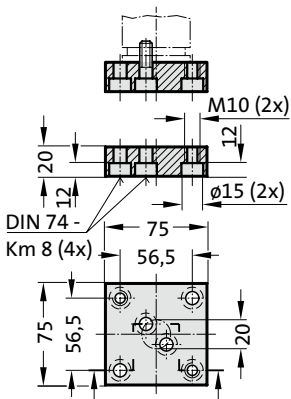
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



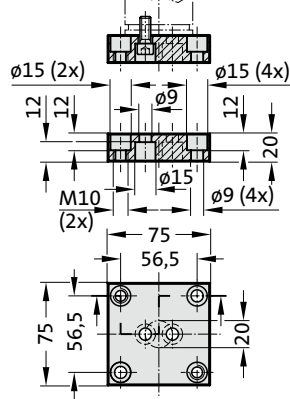
2480.011.00750



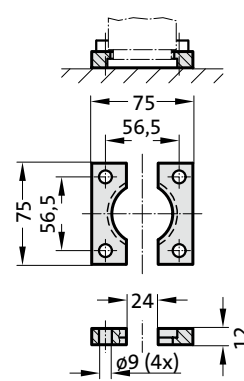
2480.011.00750.1



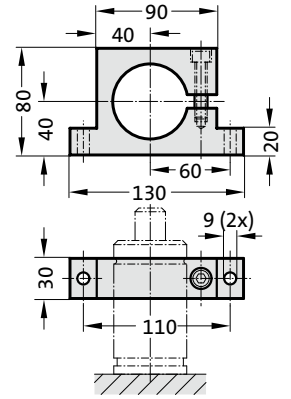
2480.011.00750.3



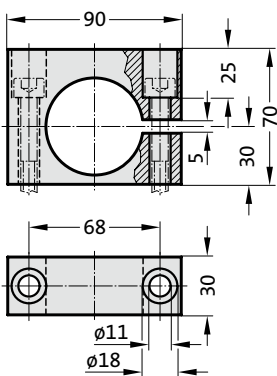
2480.022.00750



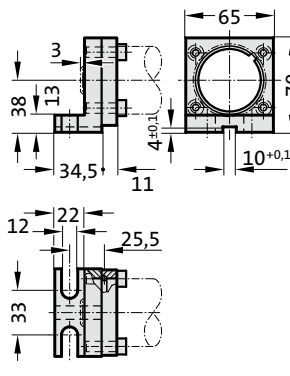
2480.044.00750²⁾



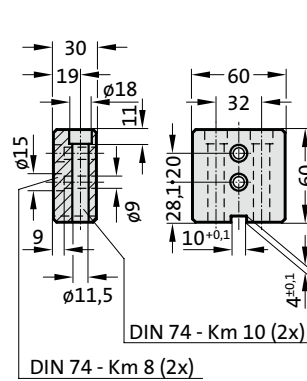
2480.044.03.00750²⁾



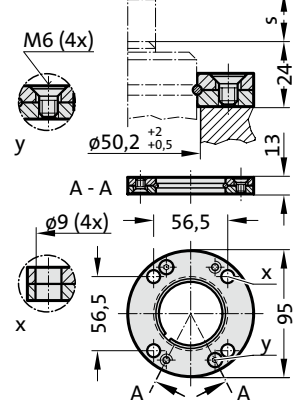
2480.045.00750²⁾



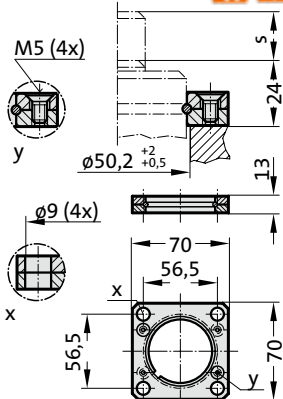
2480.047.00750²⁾



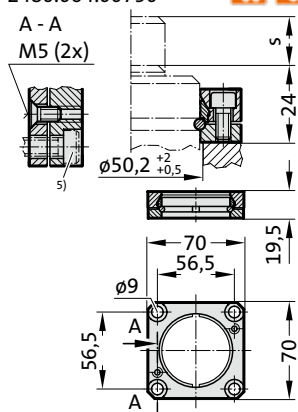
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 750 daN

Order No for spare parts kit: 2480.13.00750
 Order No for spare parts kit: to Renault standard EM24.54.700 2480.13.00750.R

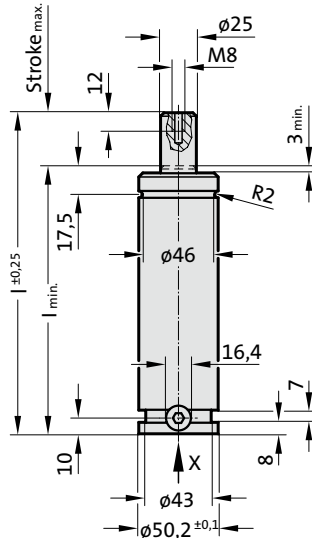
Gas spring without valve
 Order No (example): 2480.13.00750. .P

Gas spring to Renault standard EM24.54.700
 Order No (example): 2480.13.00750. .R
 Gas spring to Renault standard EM24.54.700 without valve
 Order No (example): 2480.13.00750. .R.P

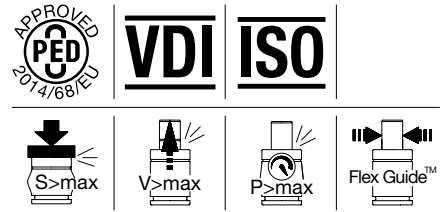
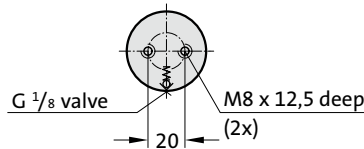
1) Special stroke lengths
 Not for gas springs to Renault Standard EM24.54.700.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s
 for 2480.R: 2.0 m/s

2480.13.00750.



View X - Gas spring

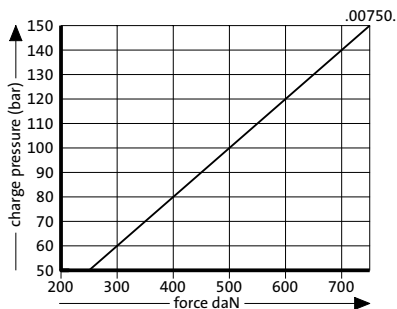


2480.13.00750.

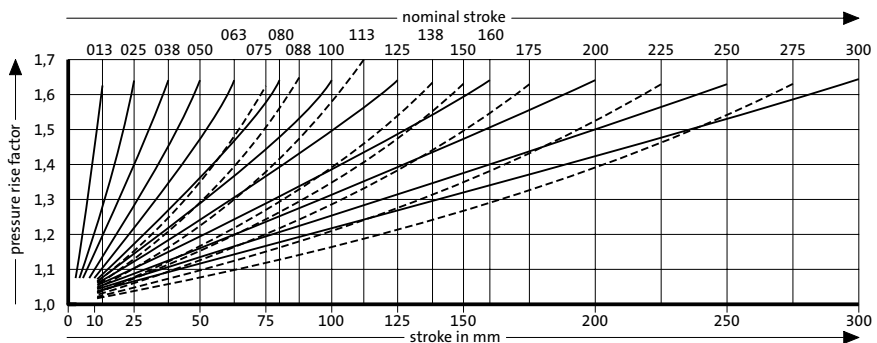
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.13.00750.013	12.7	107.7	120.4
2480.13.00750.025	25	120	145
2480.13.00750.038	38.1	133.1	171.2
2480.13.00750.050	50	145	195
2480.13.00750.063	63.5	158.5	222
2480.13.00750.075 1)	75	170	245
2480.13.00750.080	80	175	255
2480.13.00750.088 1)	87.5	182.5	270
2480.13.00750.100	100	195	295
2480.13.00750.113 1)	112.5	207.5	320
2480.13.00750.125	125	220	345
2480.13.00750.138 1)	137.5	232.5	370
2480.13.00750.150 1)	150	245	395
2480.13.00750.160	160	255	415
2480.13.00750.175 1)	175	270	445
2480.13.00750.200	200	295	495
2480.13.00750.225 1)	225	320	545
2480.13.00750.250	250	345	595
2480.13.00750.275	275	370	645
2480.13.00750.300	300	395	695

Initial spring force versus charge pressure



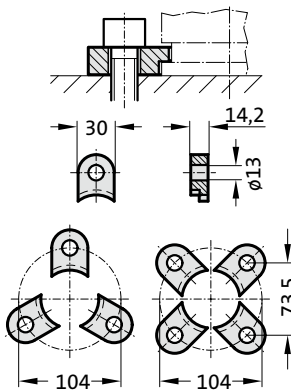
Spring force Diagram displacement versus stroke rise



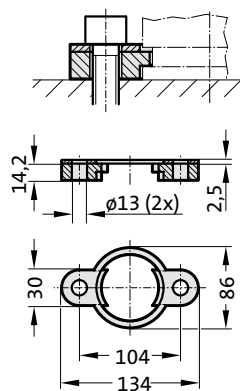
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

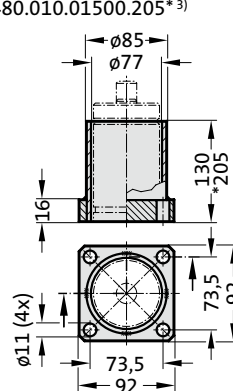
2480.007.01500



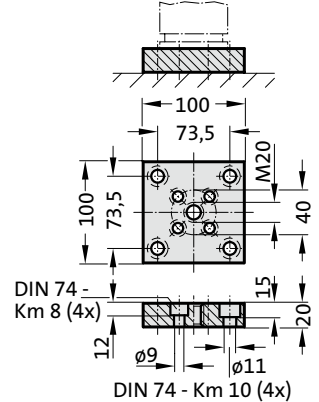
2480.008.01500³⁾



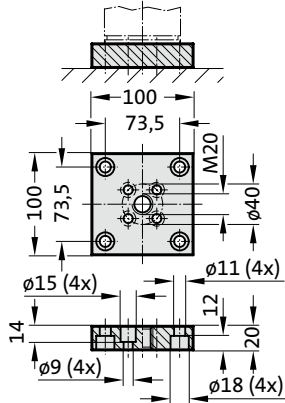
2480.010.01500.130³⁾
2480.010.01500.205³⁾



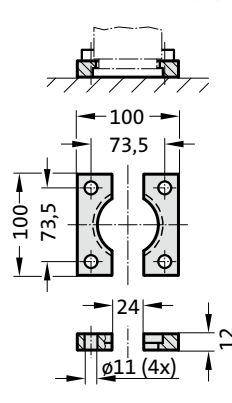
2480.011.01500



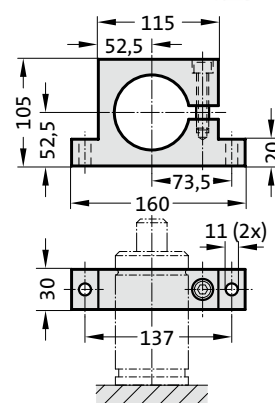
2480.011.01500.2



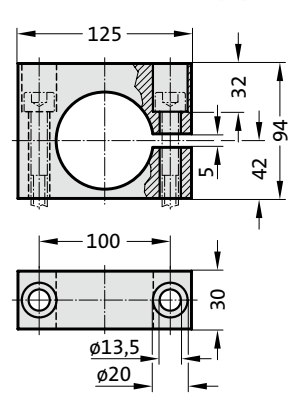
2480.022.01500



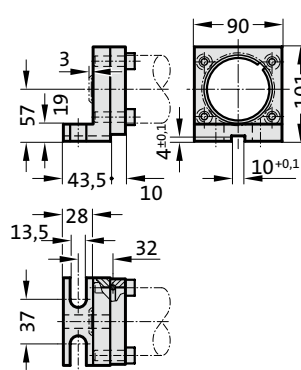
2480.044.01500²⁾



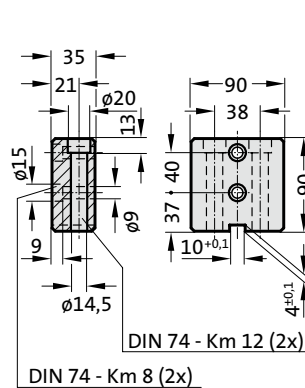
2480.044.03.01500²⁾



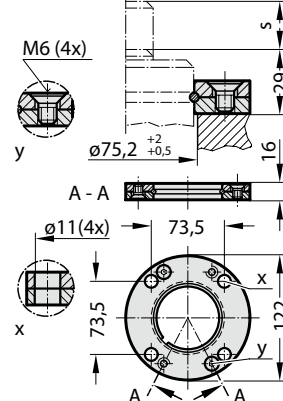
2480.045.01500²⁾



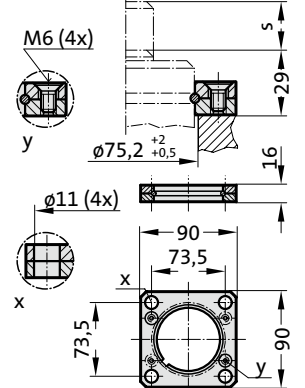
2480.047.01500²⁾



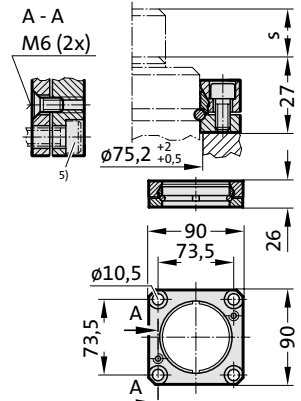
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 1500 daN

Order No for spare parts kit: 2480.12.01500
 Order No for spare parts kit: to Renault standard EM24.54.700 2480.12.01500.R

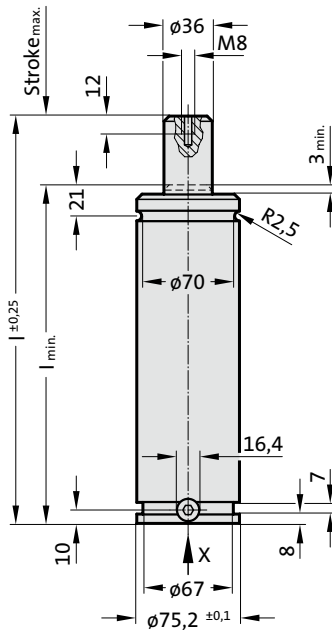
Gas spring without valve
 Order No (example): 2480.13.01500. .P

Gas spring to Renault standard EM24.54.700
 Order No (example): 2480.12.01500. .R
 Gas spring to Renault standard EM24.54.700 without valve
 Order No (example): 2480.13.01500. .R.P

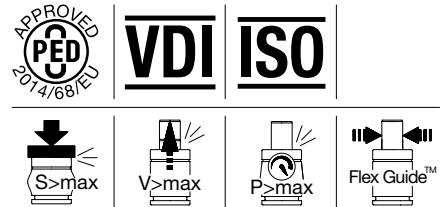
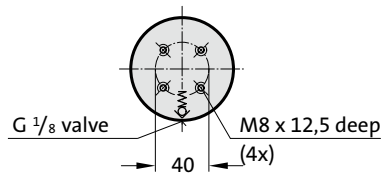
1) Special stroke lengths
 Not for gas springs to Renault Standard EM24.54.700.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s for 2480.R: 2.0 m/s

2480.12.01500.



View X - Gas spring

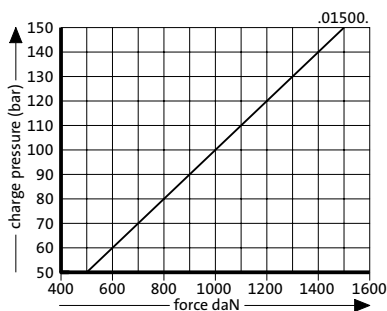


2480.12.01500.

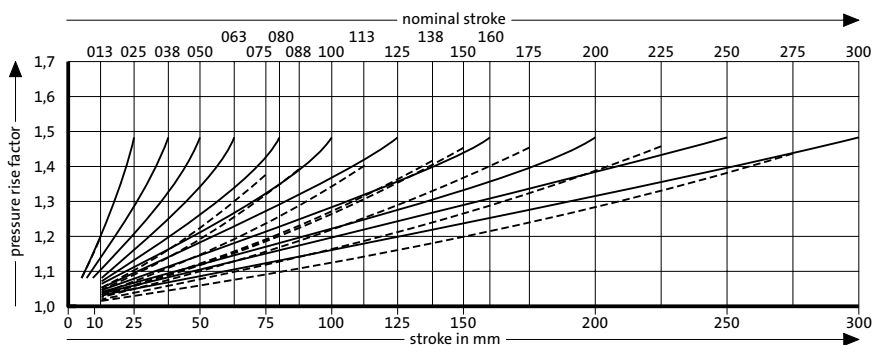
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.12.01500.013 1)	12.7	122.3	135
2480.12.01500.025	25	135	160
2480.12.01500.038	38.1	148.1	186.2
2480.12.01500.050	50	160	210
2480.12.01500.063	63.5	173.5	237
2480.12.01500.075 1)	75	185	260
2480.12.01500.080	80	190	270
2480.12.01500.088 1)	87.5	197.5	285
2480.12.01500.100	100	210	310
2480.12.01500.113 1)	112.5	222.5	335
2480.12.01500.125	125	235	360
2480.12.01500.138 1)	137.5	247.5	385
2480.12.01500.150 1)	150	260	410
2480.12.01500.160	160	270	430
2480.12.01500.175 1)	175	285	460
2480.12.01500.200	200	310	510
2480.12.01500.225 1)	225	335	560
2480.12.01500.250	250	360	610
2480.12.01500.275	275	385	660
2480.12.01500.300	300	410	710

Initial spring force versus charge pressure



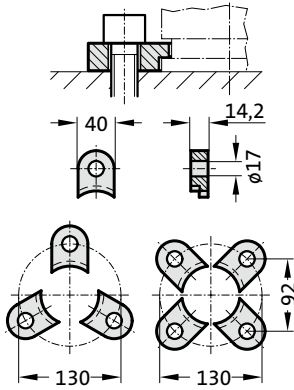
Spring force Diagram displacement versus stroke rise



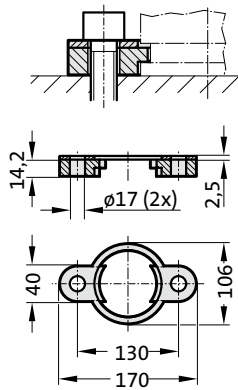
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

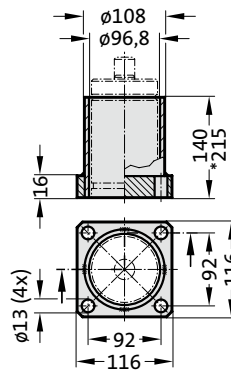
2480.007.03000



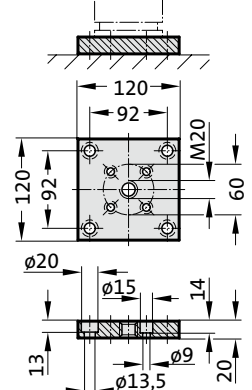
2480.008.03000³⁾



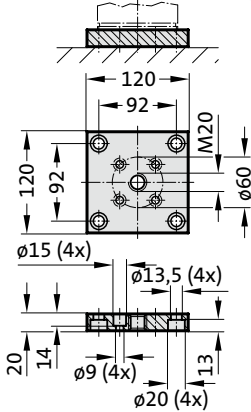
2480.010.03000.140³⁾
2480.010.03000.215*³⁾



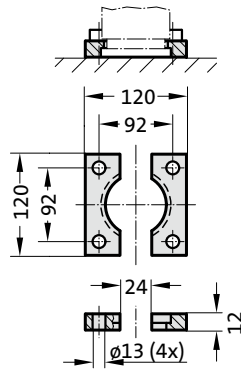
2480.011.03000



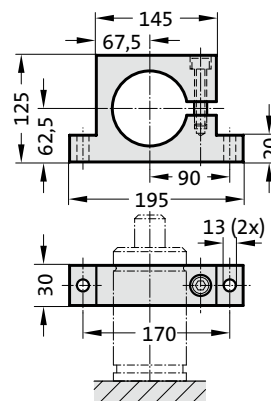
2480.011.03000.2



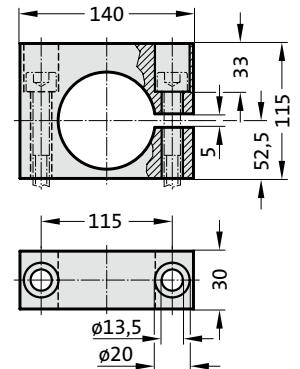
2480.022.03000



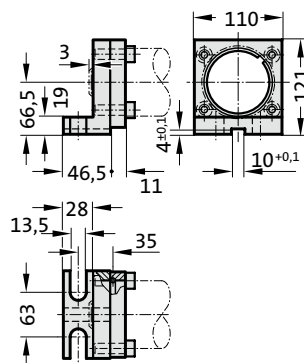
2480.044.03000²⁾



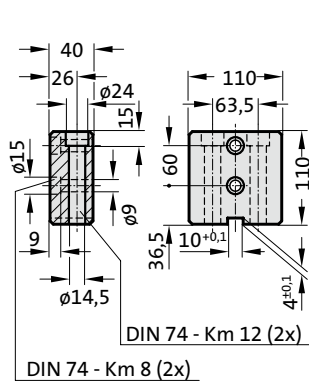
2480.044.03.03000²⁾



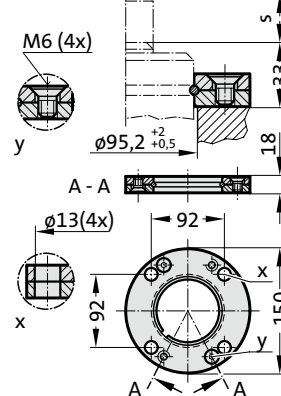
2480.045.03000²⁾



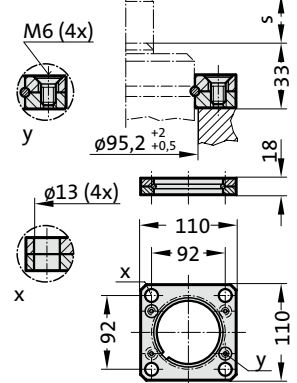
2480.047.03000²⁾



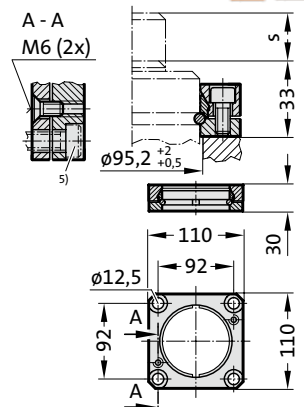
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 3000 daN

Order No for spare parts kit: 2480.13.03000
 Order No for spare parts kit: to Renault standard EM24.54.700 2480.13.03000.R

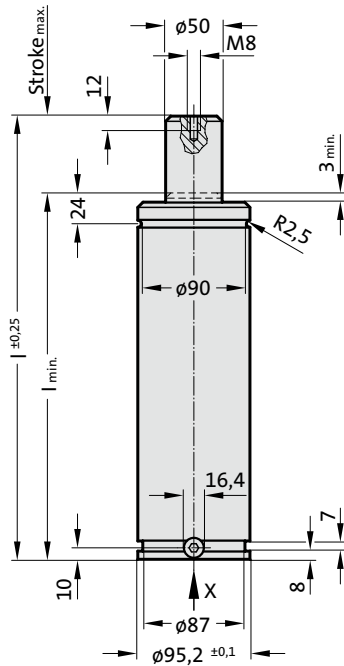
Gas spring without valve
 Order No (example): 2480.13.03000. .P

Gas spring to Renault standard EM24.54.700
 Order No (example): 2480.13.03000. .R
 Gas spring to Renault standard EM24.54.700 without valve
 Order No (example): 2480.13.03000. .R.P

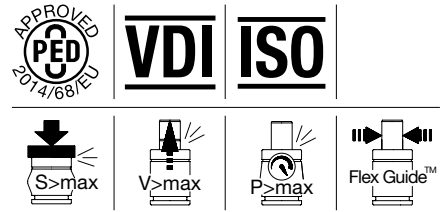
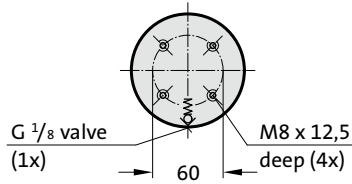
1) Special stroke lengths
 Not for gas springs to Renault Standard EM24.54.700.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s for 2480.R: 2.0 m/s

2480.13.03000.



View X - Gas spring

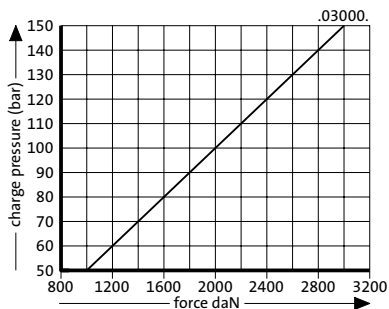


2480.13.03000.

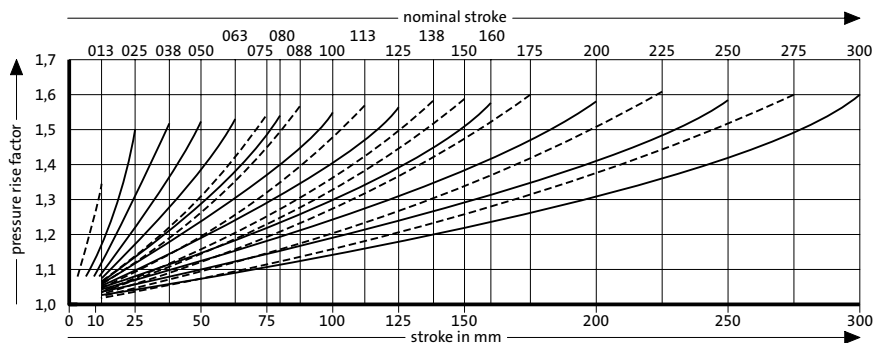
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.13.03000.013	1) 12.7	132.3	145
2480.13.03000.025	25	145	170
2480.13.03000.038	38.1	158.1	196.2
2480.13.03000.050	50	170	220
2480.13.03000.063	63.5	183.5	247
2480.13.03000.075	1) 75	195	270
2480.13.03000.080	80	200	280
2480.13.03000.088.11)	87.5	207.5	295
2480.13.03000.100	100	220	320
2480.13.03000.113	1) 112.5	232.5	345
2480.13.03000.125	125	245	370
2480.13.03000.138	1) 137.5	257.5	395
2480.13.03000.150	1) 150	270	420
2480.13.03000.160	160	280	440
2480.13.03000.175	1) 175	295	470
2480.13.03000.200	200	320	520
2480.13.03000.225	1) 225	345	570
2480.13.03000.250	250	370	620
2480.13.03000.275	1) 275	395	670
2480.13.03000.300	300	420	720

Initial spring force versus charge pressure



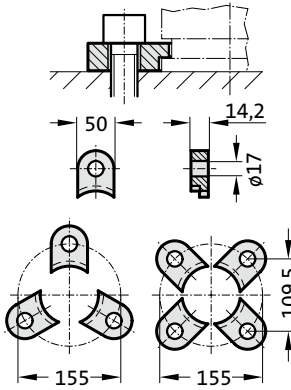
Spring force Diagram displacement versus stroke rise



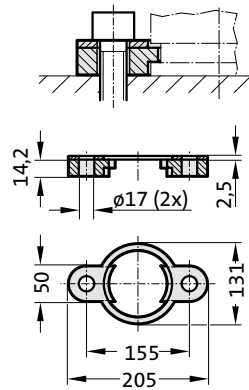
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

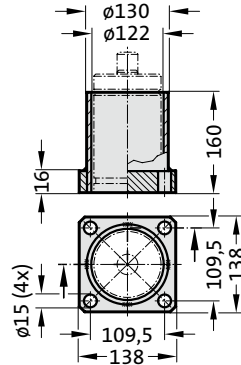
2480.007.05000



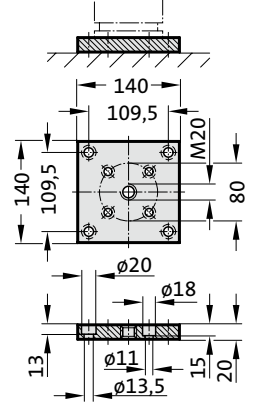
2480.008.05000³⁾



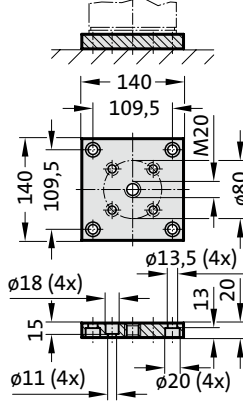
2480.010.05000.160³⁾



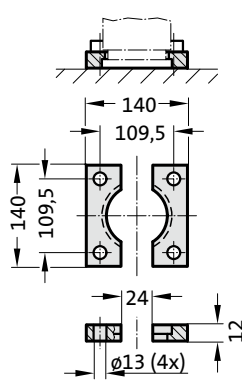
2480.011.05000



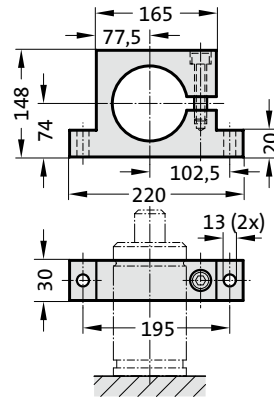
2480.011.05000.2



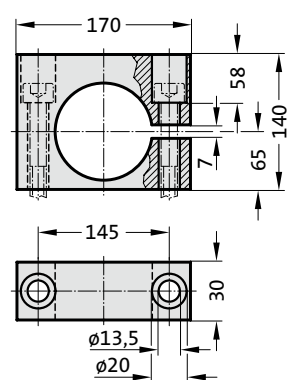
2480.022.05000



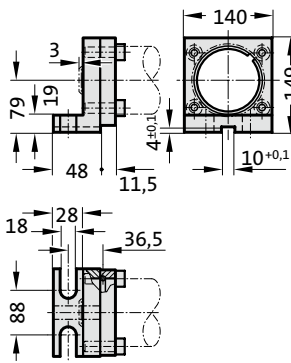
2480.044.05000²⁾



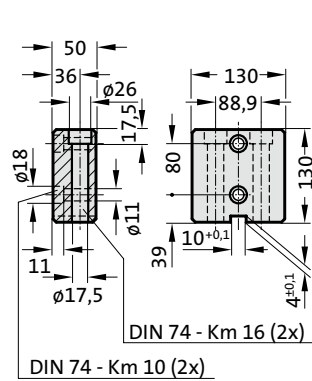
2480.044.03.05000²⁾



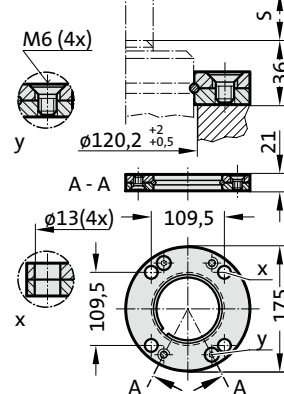
2480.045.05000²⁾



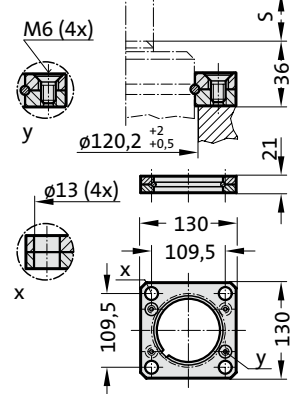
2480.047.05000²⁾



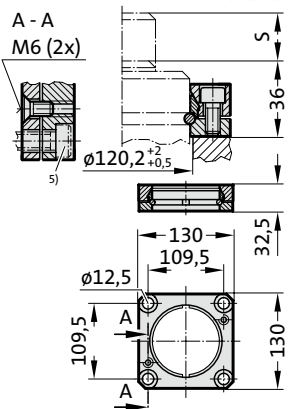
2480.055.05000



2480.057.05000



2480.064.05000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 5000 daN

Order No for spare parts kit: 2480.13.05000
 Order No for spare parts kit: to Renault standard EM24.54.700 2480.13.05000.R

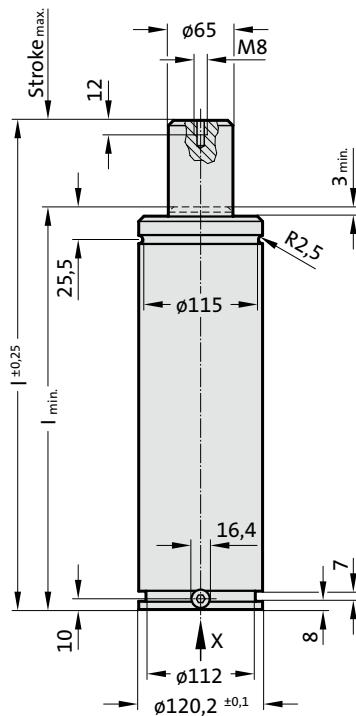
Gas spring without valve
 Order No (example): 2480.13.05000. .P

Gas spring to Renault standard EM24.54.700
 Order No (example): 2480.13.05000. .R
 Gas spring to Renault standard EM24.54.700 without valve
 Order No (example): 2480.13.05000. .R.P

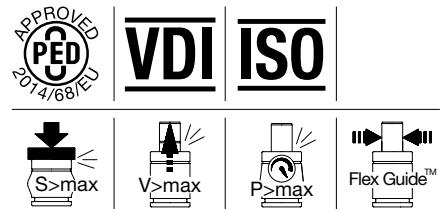
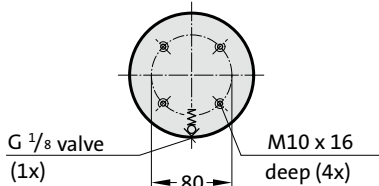
1) Special stroke lengths
 Not for gas springs to Renault Standard EM24.54.700.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s
 for 2480.R: 2.0 m/s

2480.13.05000.



View X - Gas spring

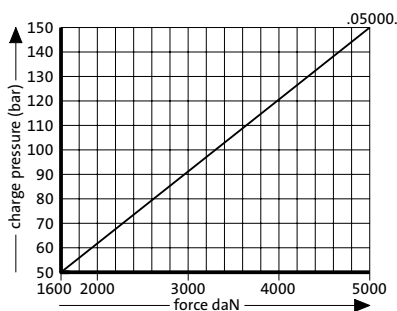


2480.13.05000.

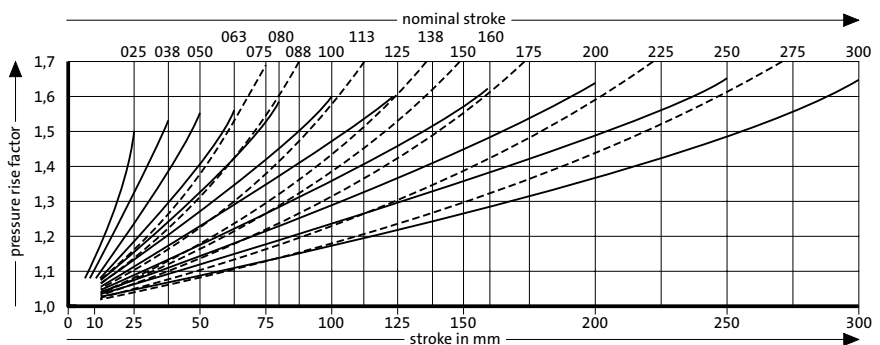
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.13.05000.025	25	165	190
2480.13.05000.038	38.1	178.1	216.2
2480.13.05000.050	50	190	240
2480.13.05000.063	63.5	203.5	267
2480.13.05000.075 1)	75	215	290
2480.13.05000.080	80	220	300
2480.13.05000.088 1)	87.5	227.5	315
2480.13.05000.100	100	240	340
2480.13.05000.113 1)	112.5	252.5	365
2480.13.05000.125	125	265	390
2480.13.05000.138 1)	137.5	277.5	415
2480.13.05000.150 1)	150	290	440
2480.13.05000.160	160	300	460
2480.13.05000.175 1)	175	315	490
2480.13.05000.200	200	340	540
2480.13.05000.225 1)	225	365	590
2480.13.05000.250	250	390	640
2480.13.05000.275 1)	275	415	690
2480.13.05000.300	300	440	740

Initial spring force versus charge pressure



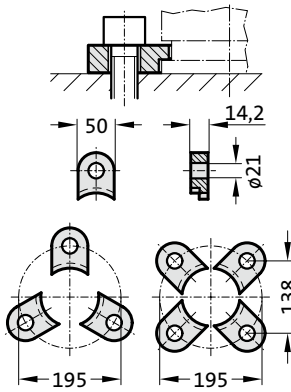
Spring force Diagram displacement versus stroke rise



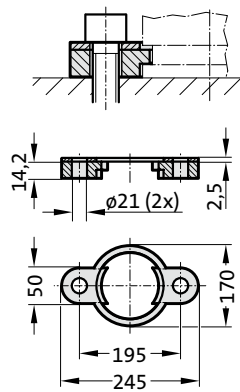
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

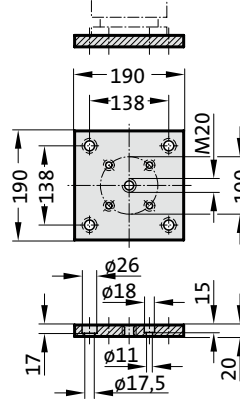
2480.007.07500



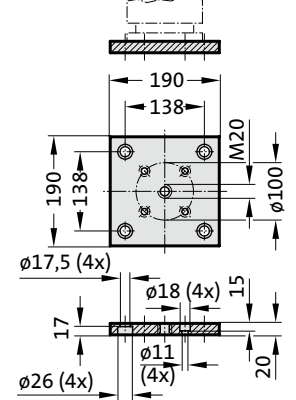
2480.008.07500³⁾



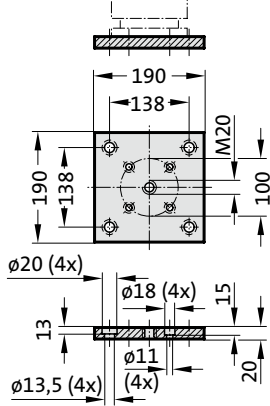
2480.011.07500



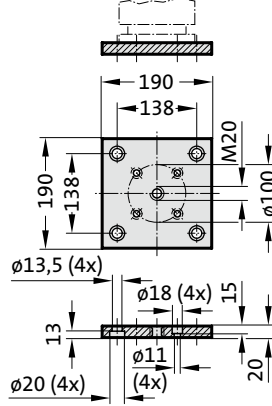
2480.011.07500.2



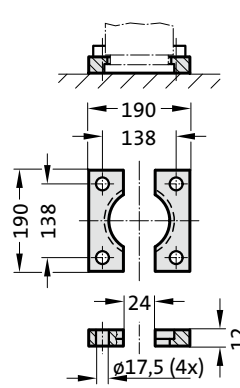
2480.011.03.07500



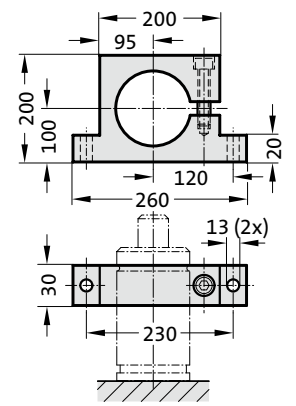
2480.011.03.07500.2



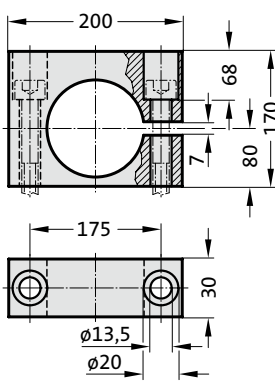
2480.022.07500



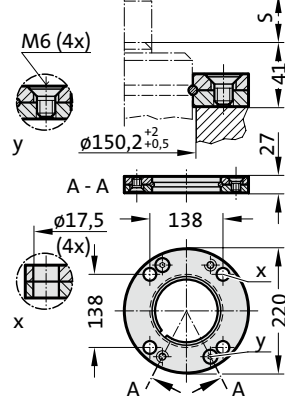
2480.044.07500²⁾



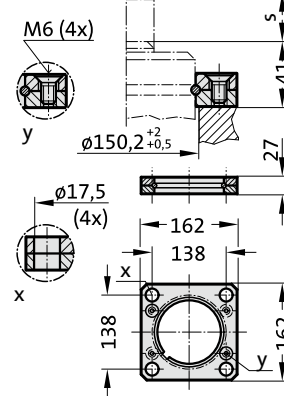
2480.044.03.07500²⁾



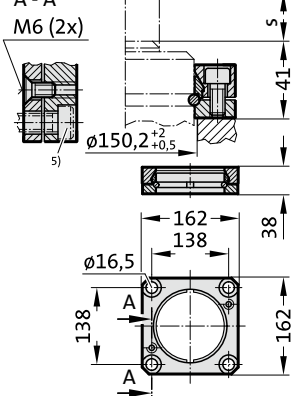
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 7500 daN

Order No for spare parts kit: 2480.13.07500
 Order No for spare parts kit: to Renault standard EM24.54.700 2480.13.07500.R

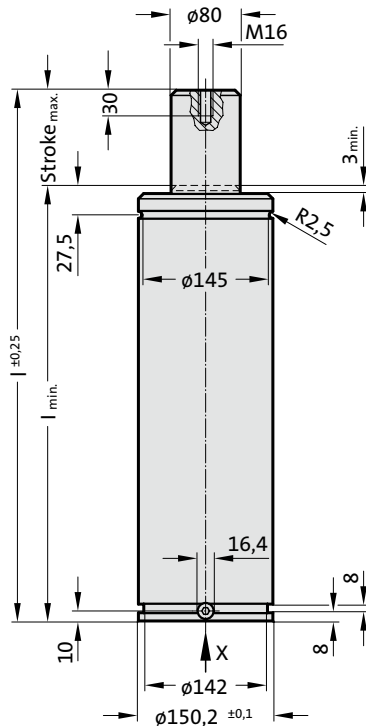
Gas spring without valve
 Order No (example): 2480.13.07500. .P

Gas spring to Renault standard EM24.54.700
 Order No (example): 2480.13.07500. .R
 Gas spring to Renault standard EM24.54.700 without valve
 Order No (example): 2480.13.07500. .R.P

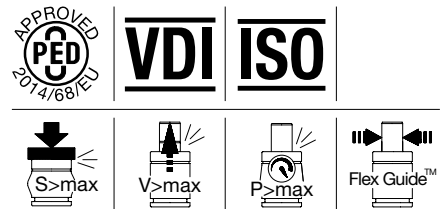
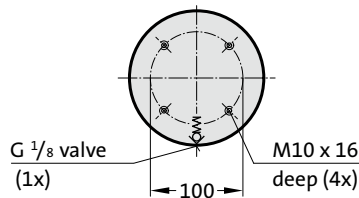
1) Special stroke lengths
 Not for gas springs to Renault Standard EM24.54.700.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s
 for 2480.R: 2.0 m/s

2480.13.07500.



View X - Gas spring

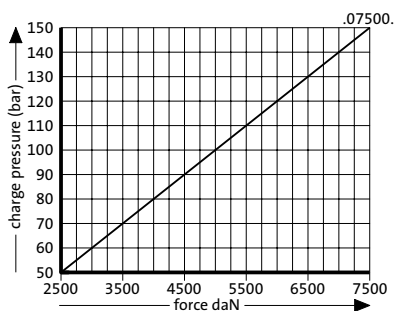


2480.13.07500.

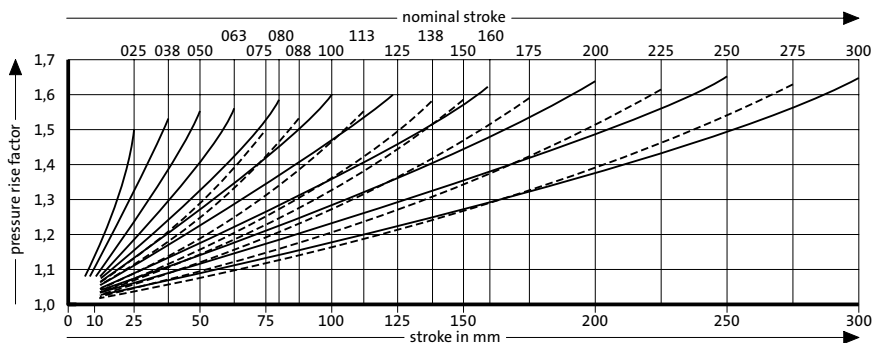
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.13.07500.025	25	180	205
2480.13.07500.038	38.1	193.1	231.2
2480.13.07500.050	50	205	255
2480.13.07500.063	63.5	218.5	282
2480.13.07500.075 1)	75	230	305
2480.13.07500.080	80	235	315
2480.13.07500.088 1)	87.5	242.5	330
2480.13.07500.100	100	255	355
2480.13.07500.113 1)	112.5	267.5	380
2480.13.07500.125	125	280	405
2480.13.07500.138 1)	137.5	292.5	430
2480.13.07500.150 1)	150	305	455
2480.13.07500.160	160	315	475
2480.13.07500.175 1)	175	330	505
2480.13.07500.200	200	355	555
2480.13.07500.225 1)	225	380	605
2480.13.07500.250	250	405	655
2480.13.07500.275 1)	275	430	705
2480.13.07500.300	300	455	755

Initial spring force versus charge pressure



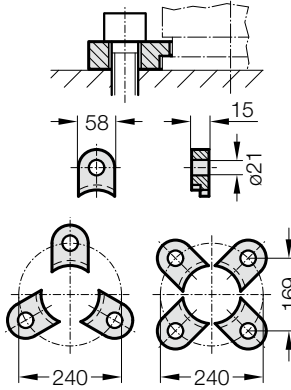
Spring force Diagram displacement versus stroke rise



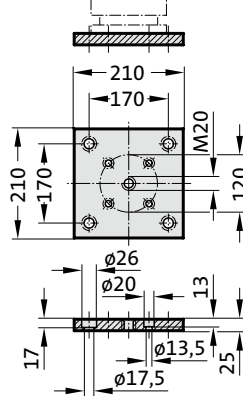
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, STANDARD MOUNTING VARIATIONS

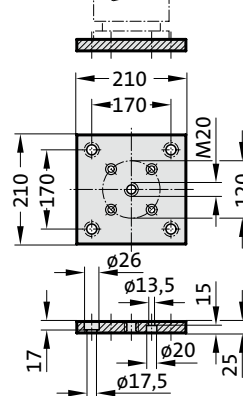
2480.007.10000



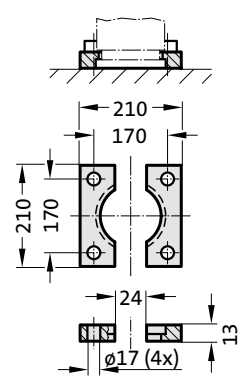
2480.011.10000



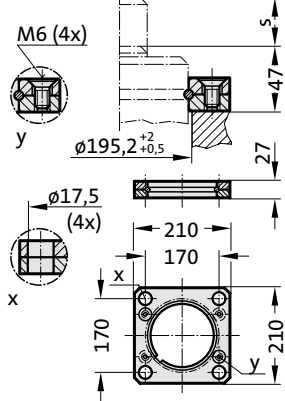
2480.011.10000.2



2480.022.10000



2480.057.10000



GAS SPRING, STANDARD

Note:

Initial spring force at 150 bar = 10000 daN

Order No for spare parts kit: 2480.12.10000

Gas spring without valve

Order No (example): 2480.12.10000. .P

Gas spring to Renault standard EM24.54.700

Order No (example): 2480.12.10000. .R

Gas spring to Renault standard EM24.54.700 without valve

Order No (example): 2480.12.10000. .R.P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

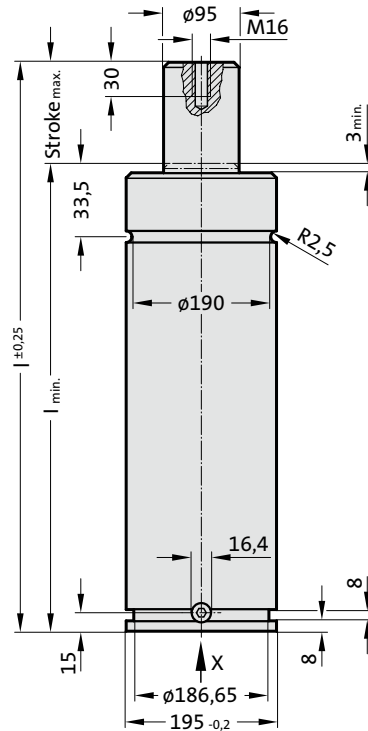
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

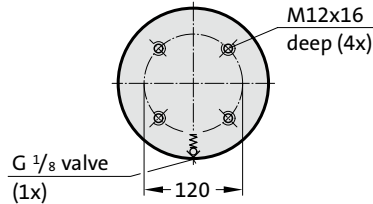
approx. 15 to 40 (at 20°C)

Max. piston speed: 1.6 m/s

2480.12.10000.



View X - Gas spring

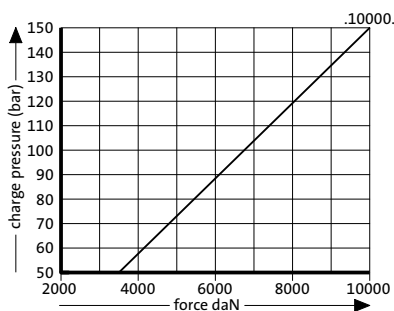


2480.12.10000.

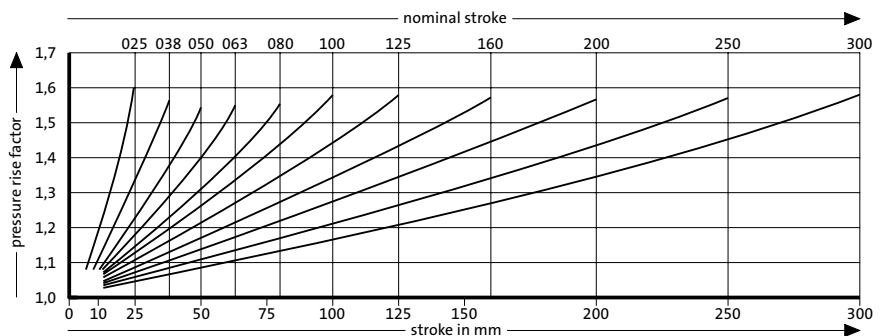
Gas spring, Standard

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.12.10000.025	25	185	210
2480.12.10000.038	38.1	198.1	236.2
2480.12.10000.050	50	210	260
2480.12.10000.063	63.5	223.5	287
2480.12.10000.080	80	240	320
2480.12.10000.100	100	260	360
2480.12.10000.125	125	285	410
2480.12.10000.160	160	320	480
2480.12.10000.200	200	360	560
2480.12.10000.250	250	410	660
2480.12.10000.300	300	460	760

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



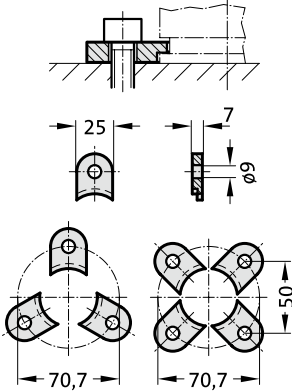
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS HEAVY DUTY

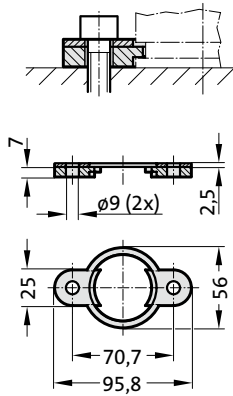


GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

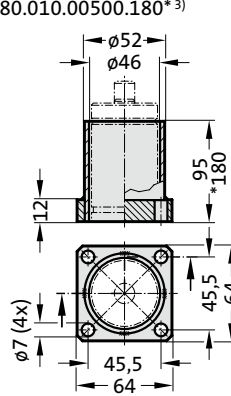
2480.007.00500



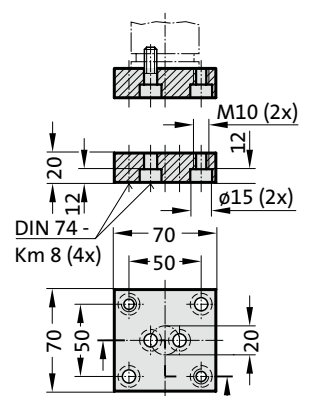
2480.008.00500³⁾



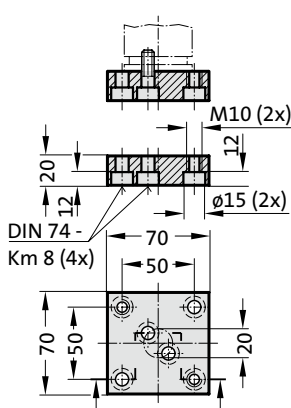
2480.010.00500.095³⁾
2480.010.00500.180*³⁾



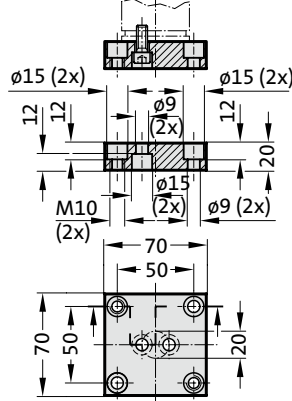
2480.011.00500



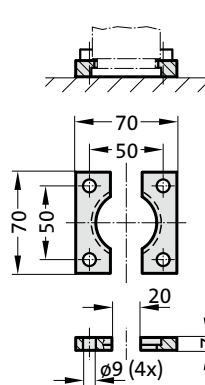
2480.011.00500.1



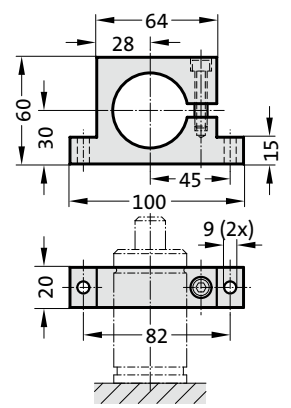
2480.011.00500.2



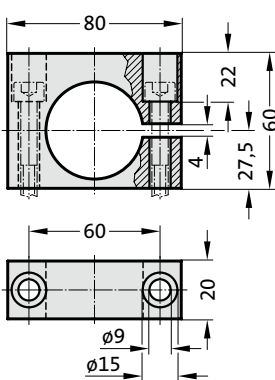
2480.022.00500



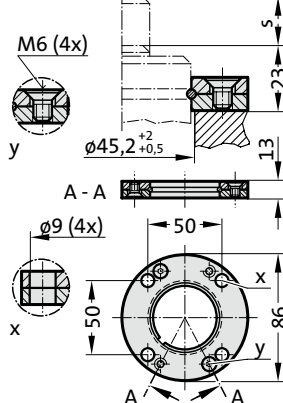
2480.044.00500²⁾



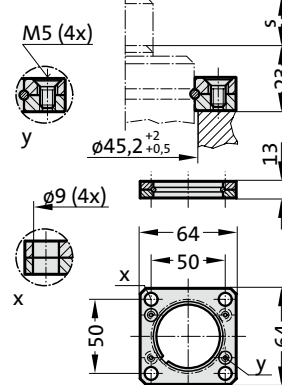
2480.044.03.00500²⁾



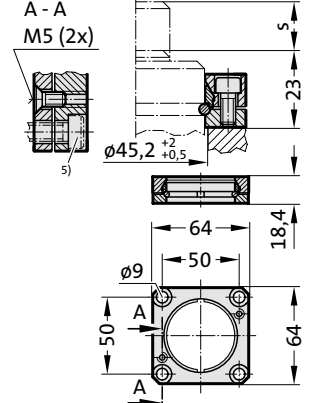
2480.055.00500



2480.057.00500



2480.064.00500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 740 daN

Order No for spare parts kit: 2488.13.00750

Gas spring without valve

Order No (example): 2488.13.00750. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

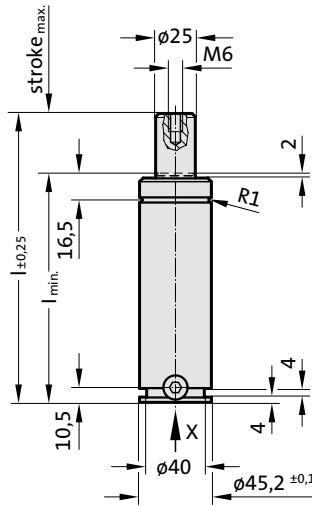
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

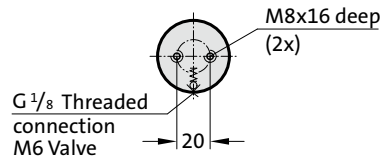
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.00750.



View X

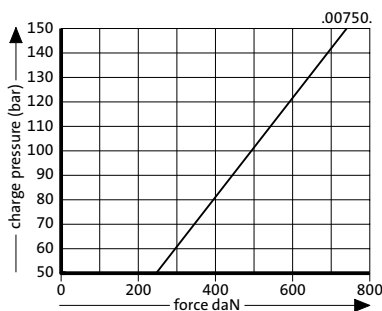


2488.13.00750.

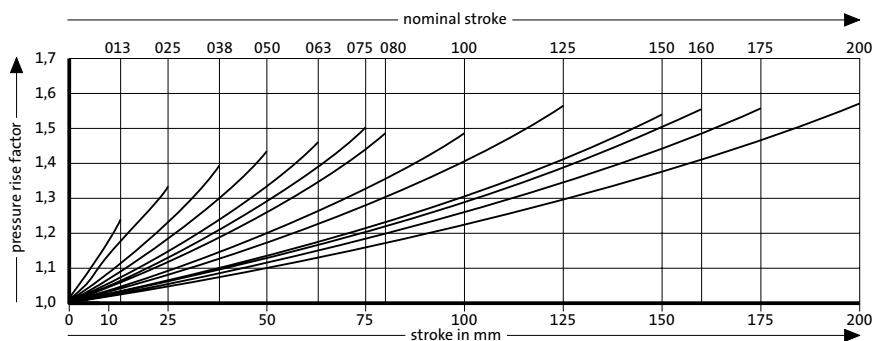
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.00750.013	13	98	111
2488.13.00750.025	25	110	135
2488.13.00750.038	38	123	161
2488.13.00750.050	50	135	185
2488.13.00750.063	63	148	211
2488.13.00750.075	75	160	235
2488.13.00750.080	80	165	245
2488.13.00750.100.	100	185	285
2488.13.00750.125.	125	210	335
2488.13.00750.150.	150	235	385
2488.13.00750.160.	160	245	405
2488.13.00750.175.	175	260	435
2488.13.00750.200.	200	285	485

Initial spring force versus charge pressure



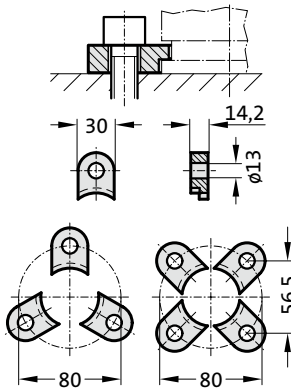
Spring force Diagram displacement versus stroke rise



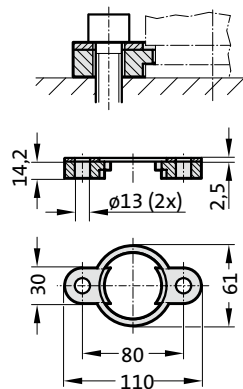
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

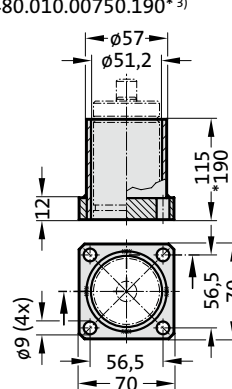
2480.007.00750



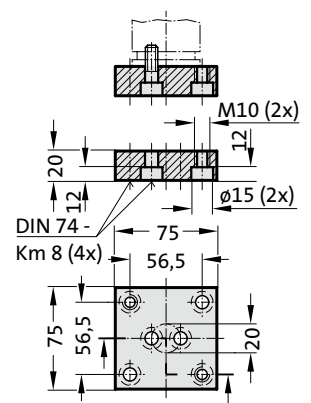
2480.008.00750³⁾



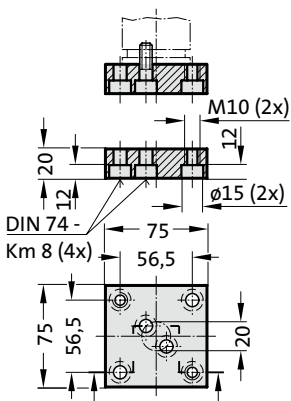
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



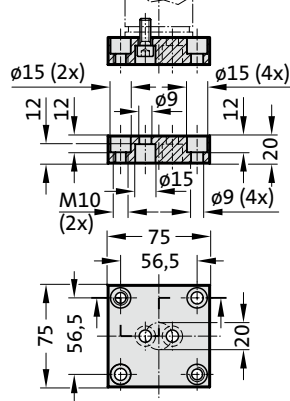
2480.011.00750



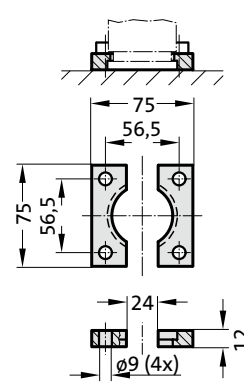
2480.011.00750.1



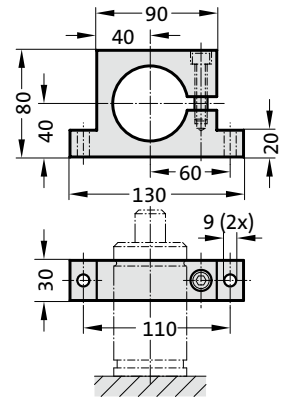
2480.011.00750.3



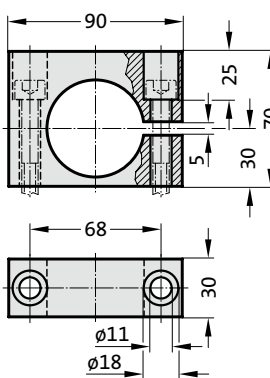
2480.022.00750



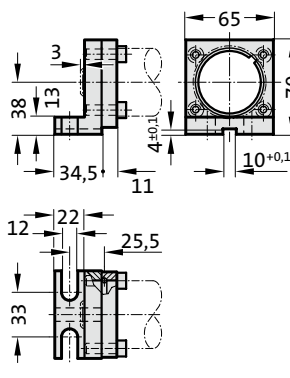
2480.044.00750²⁾



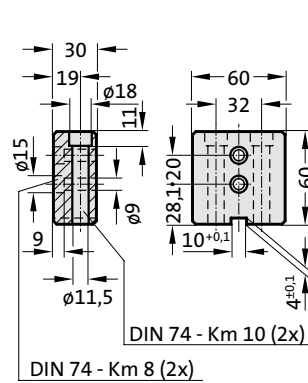
2480.044.03.00750²⁾



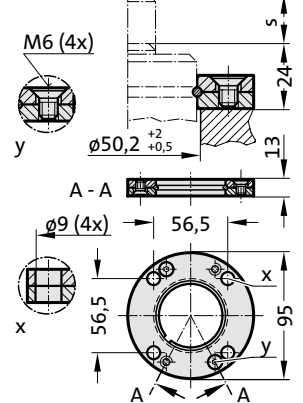
2480.045.00750²⁾



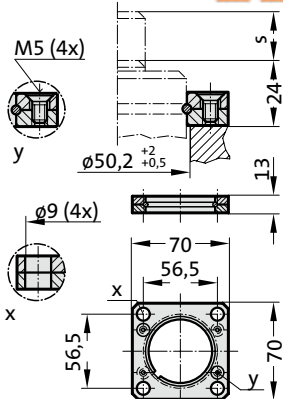
2480.047.00750²⁾



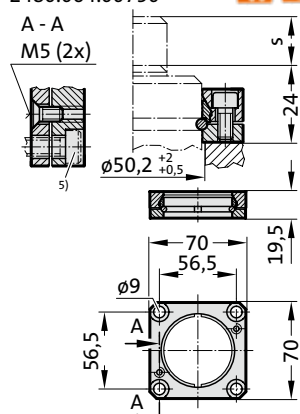
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 920 daN

Order No for spare parts kit: 2488.13.01000

Gas spring without valve

Order No (example): 2488.13.01000. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

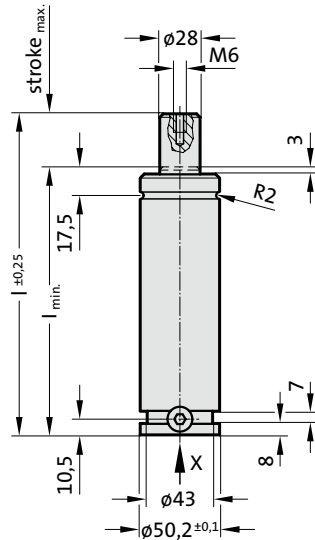
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

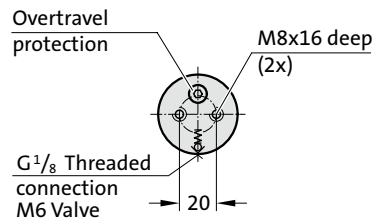
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.01000.



View X

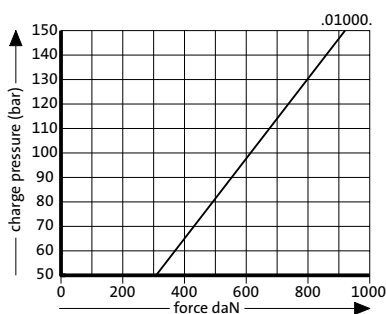


2488.13.01000.

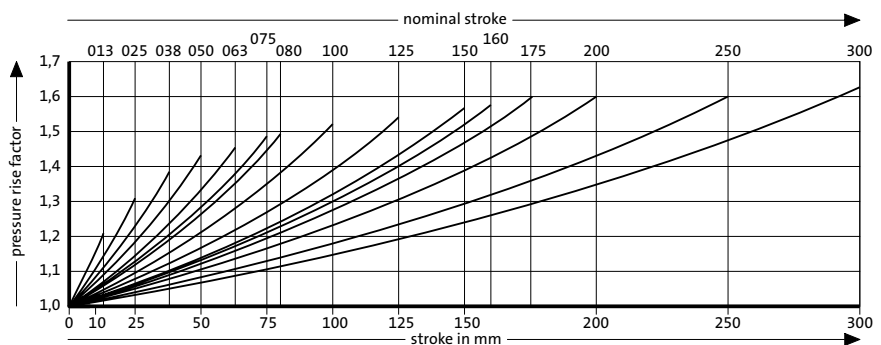
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.01000.013	13	108	121
2488.13.01000.025	25	120	145
2488.13.01000.038	38	133	171
2488.13.01000.050	50	145	195
2488.13.01000.063	63	158	221
2488.13.01000.075	75	170	245
2488.13.01000.080	80	175	255
2488.13.01000.100	100	195	295
2488.13.01000.125	125	220	345
2488.13.01000.150	150	245	395
2488.13.01000.160	160	255	415
2488.13.01000.175	175	270	445
2488.13.01000.200	200	295	495
2488.13.01000.250	250	345	595
2488.13.01000.300	300	395	695

Initial spring force versus charge pressure



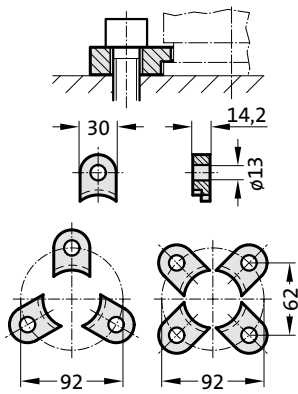
Spring force Diagram displacement versus stroke rise



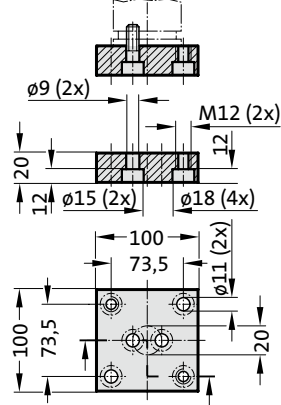
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

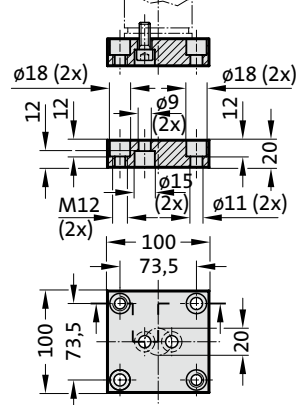
2480.007.01000



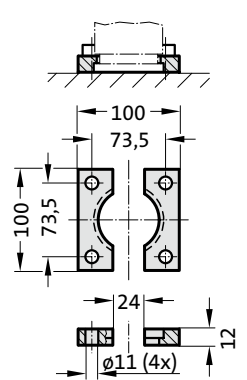
2480.011.01000



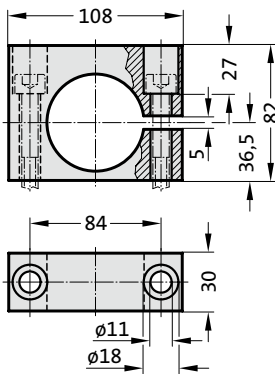
2480.011.01000.2



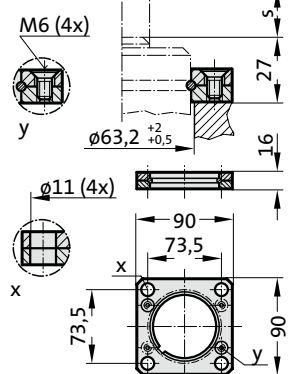
2480.022.01000



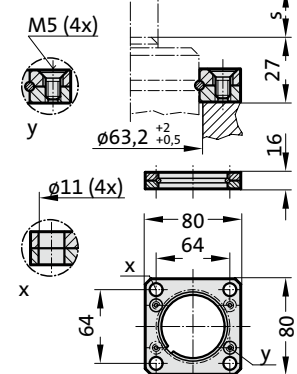
2480.044.03.01000²⁾



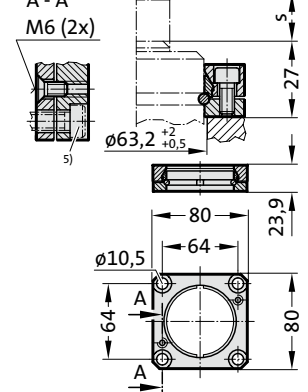
2480.057.01000



2480.057.03.01000



2480.064.01000⁴⁾



Note:

²⁾ Attention:

The spring force must be absorbed by the stop Surface!

⁴⁾ Square collar flange, non-rotating, fixing for composite connection.

⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 1500 daN

Order No for spare parts kit: 2488.13.01500

Gas spring without valve

Order No (example): 2488.13.01500. . P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

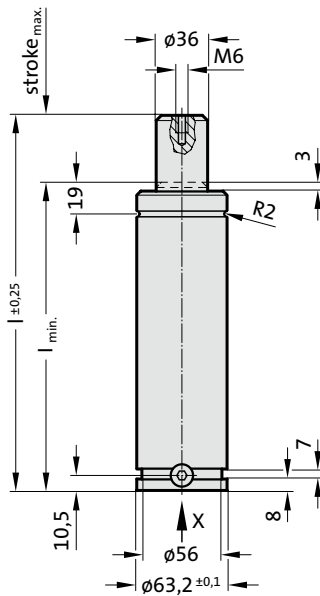
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

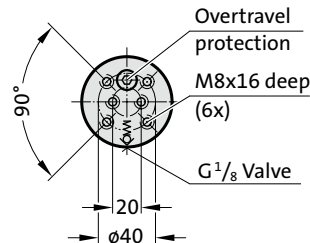
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.01500.



View X

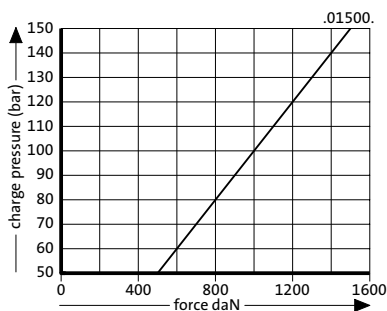


2488.13.01500.

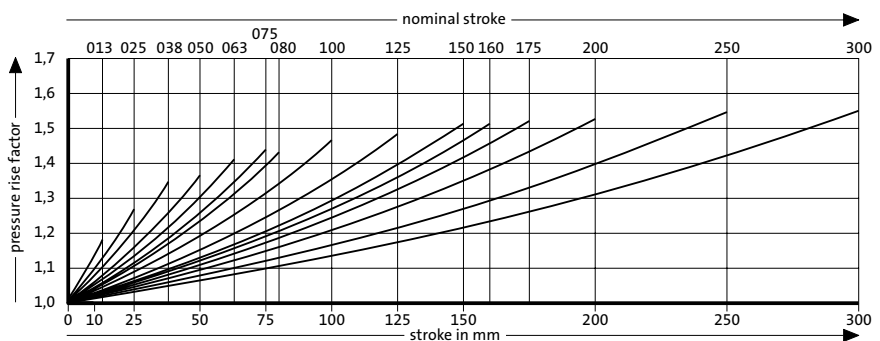
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.01500.013	13	108	121
2488.13.01500.025	25	120	145
2488.13.01500.038	38	133	171
2488.13.01500.050	50	145	195
2488.13.01500.063	63	158	221
2488.13.01500.075	75	170	245
2488.13.01500.080	80	175	255
2488.13.01500.100	100	195	295
2488.13.01500.125	125	220	345
2488.13.01500.150	150	245	395
2488.13.01500.160	160	255	415
2488.13.01500.175	175	270	445
2488.13.01500.200	200	295	495
2488.13.01500.250	250	345	595
2488.13.01500.300	300	395	695

Initial spring force versus charge pressure



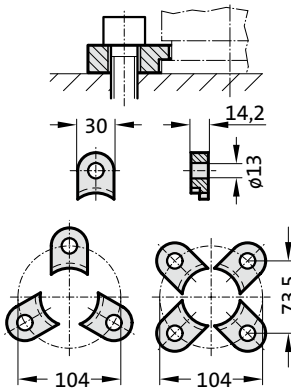
Spring force Diagram displacement versus stroke rise



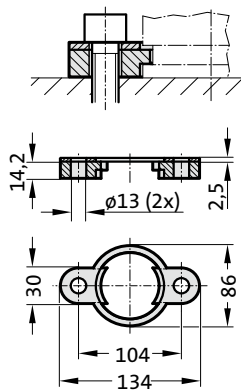
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

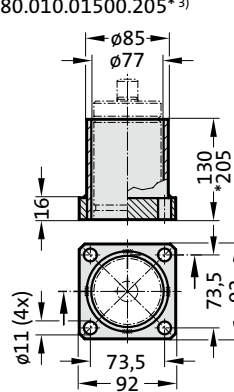
2480.007.01500



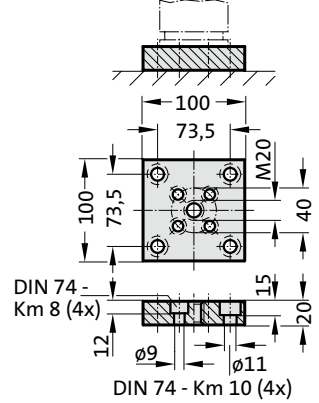
2480.008.01500³⁾



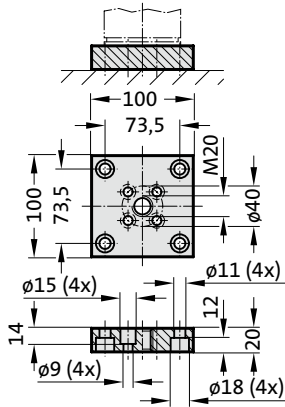
2480.010.01500.130³⁾
2480.010.01500.205*³⁾



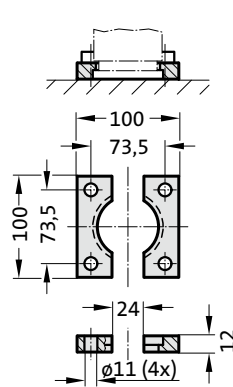
2480.011.01500



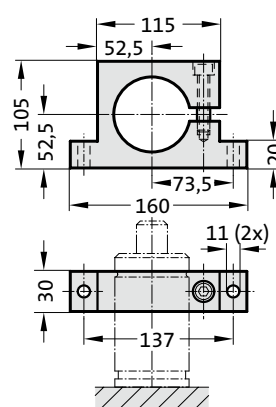
2480.011.01500.2



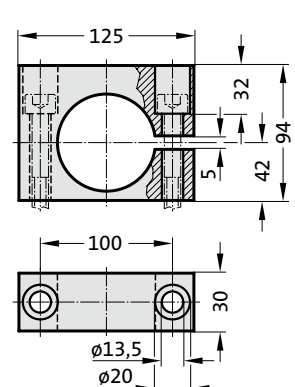
2480.022.01500



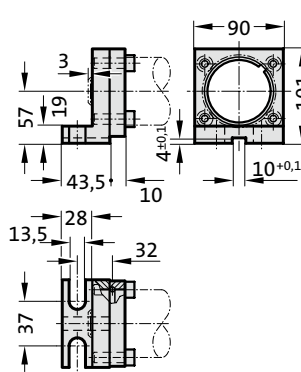
2480.044.01500²⁾



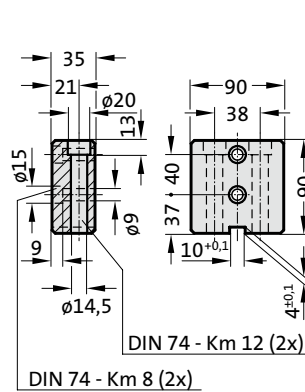
2480.044.03.01500²⁾



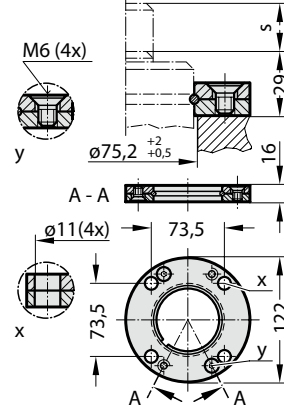
2480.045.01500²⁾



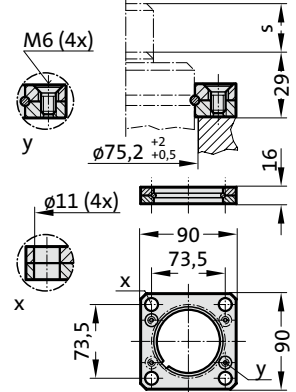
2480.047.01500²⁾



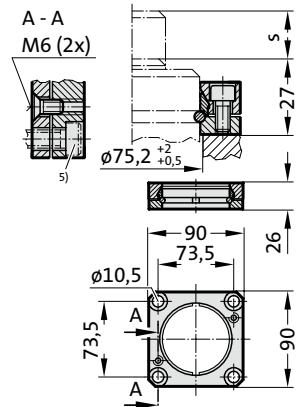
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 2400 daN

Order No for spare parts kit: 2488.13.02400

Gas spring without valve

Order No (example): 2488.13.02400 . P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

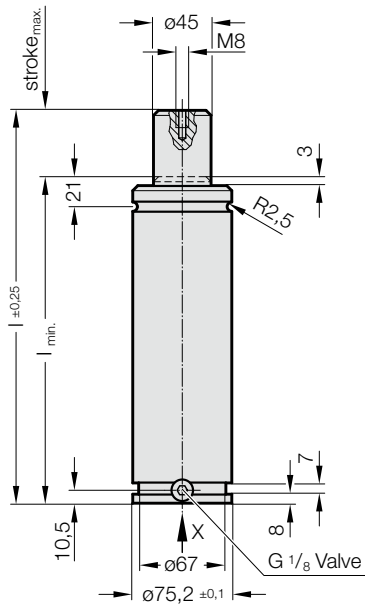
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

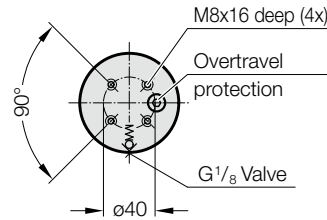
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.02400.



View X

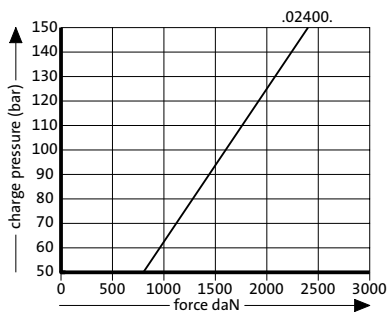


2488.13.02400.

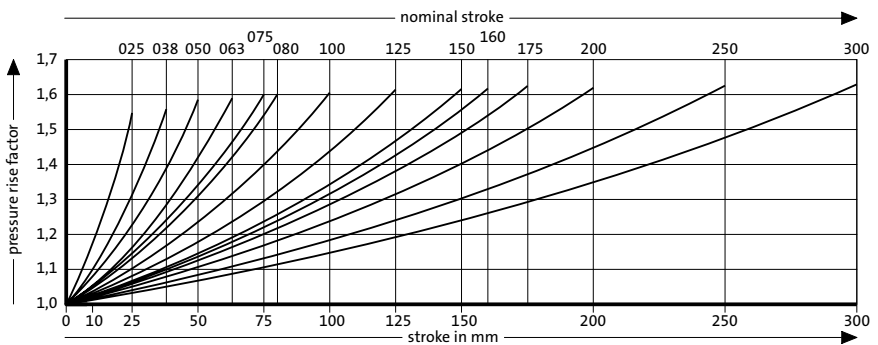
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.02400.025	25	135	160
2488.13.02400.038	38	148	186
2488.13.02400.050	50	160	210
2488.13.02400.063	63	173	236
2488.13.02400.075	75	185	260
2488.13.02400.080	80	190	270
2488.13.02400.100	100	210	310
2488.13.02400.125	125	235	360
2488.13.02400.150	150	260	410
2488.13.02400.160	160	270	430
2488.13.02400.175	175	285	460
2488.13.02400.200	200	310	510
2488.13.02400.250	250	360	610
2488.13.02400.300	300	410	710

Initial spring force versus charge pressure



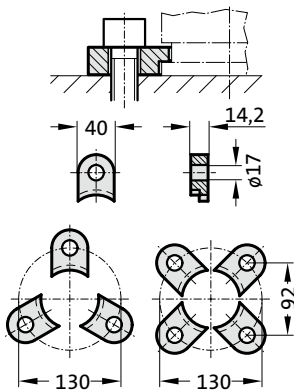
Spring force Diagram displacement versus stroke rise



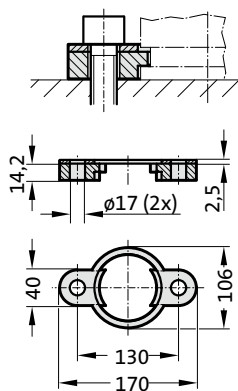
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

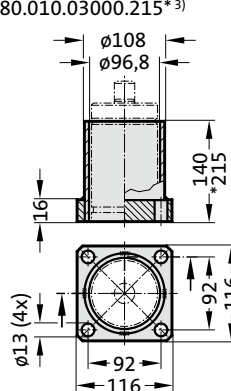
2480.007.03000



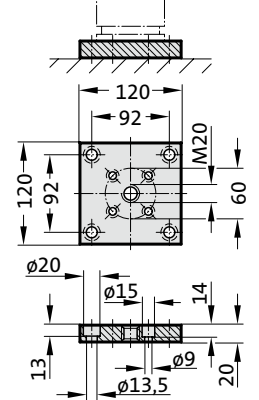
2480.008.03000³⁾



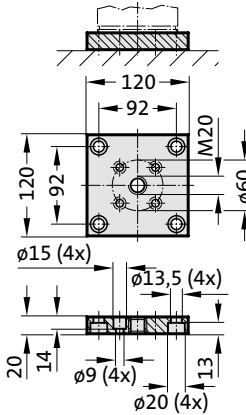
2480.010.03000.140³⁾
2480.010.03000.215*³⁾



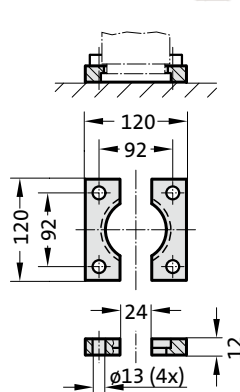
2480.011.03000



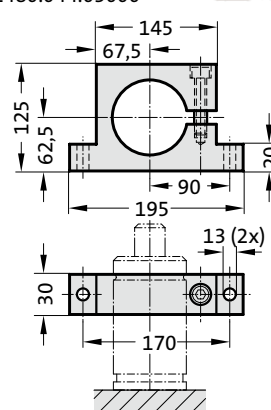
2480.011.03000.2



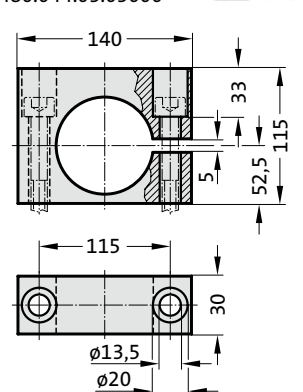
2480.022.03000



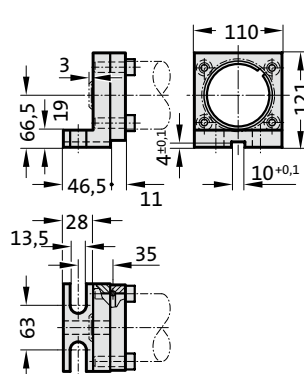
2480.044.03000²⁾



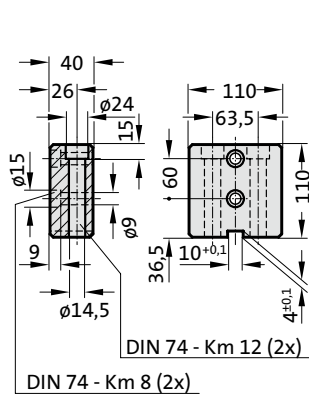
2480.044.03.03000²⁾



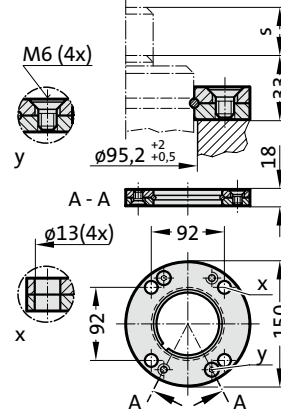
2480.045.03000²⁾



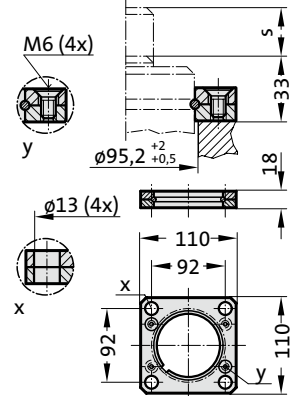
2480.047.03000²⁾



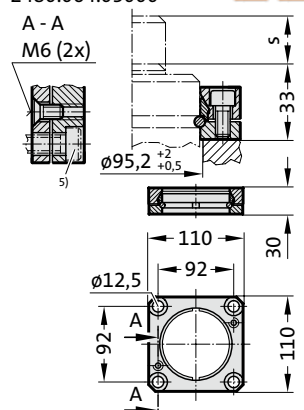
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 4200 daN

Order No for spare parts kit: 2488.13.04200

Gas spring without valve

Order No (example): 2488.13.04200..P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

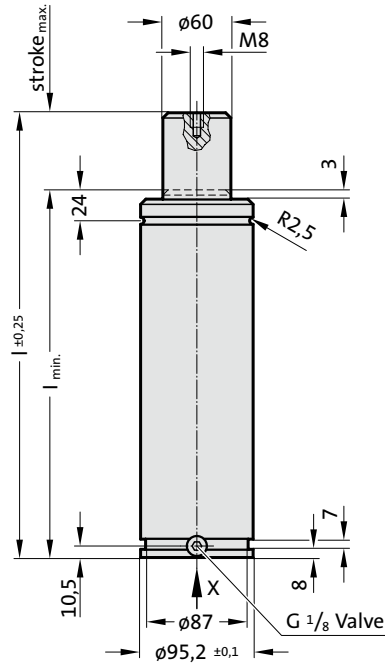
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

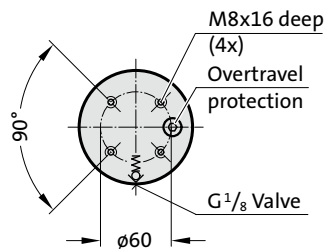
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.04200.



View X

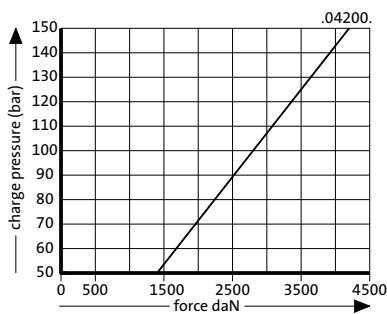


2488.13.04200.

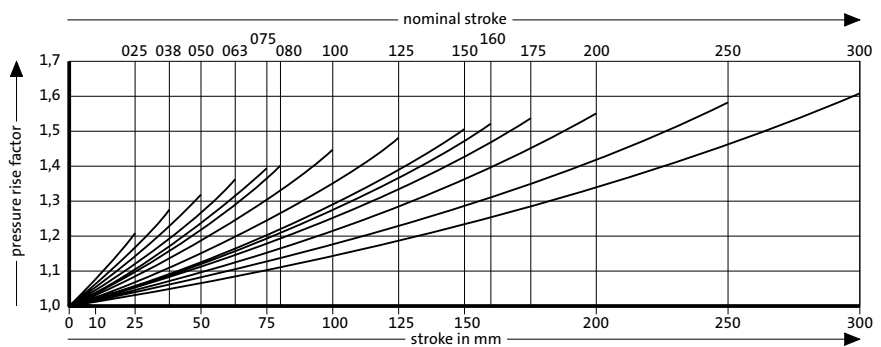
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.04200.025	25	145	170
2488.13.04200.038	38	158	196
2488.13.04200.050	50	170	220
2488.13.04200.063	63	183	246
2488.13.04200.075	75	195	270
2488.13.04200.080	80	200	280
2488.13.04200.100	100	220	320
2488.13.04200.125	125	245	370
2488.13.04200.150	150	270	420
2488.13.04200.160	160	280	440
2488.13.04200.175	175	295	470
2488.13.04200.200	200	320	520
2488.13.04200.250	250	370	620
2488.13.04200.300	300	420	720

Initial spring force versus charge pressure



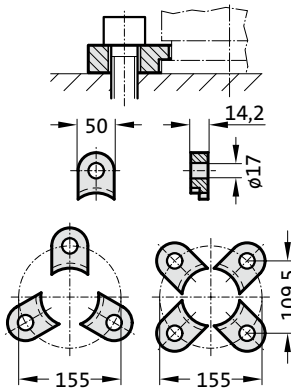
Spring force Diagram displacement versus stroke rise



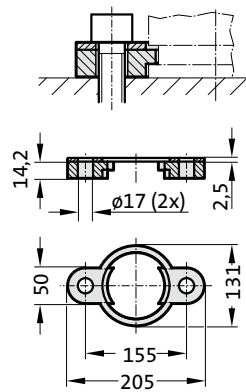
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

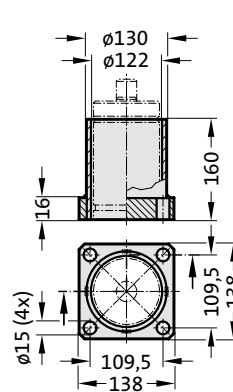
2480.007.05000



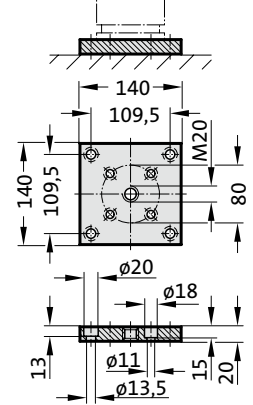
2480.008.05000³⁾



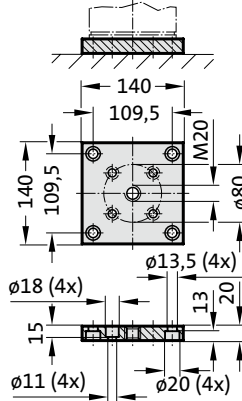
2480.010.05000.160³⁾



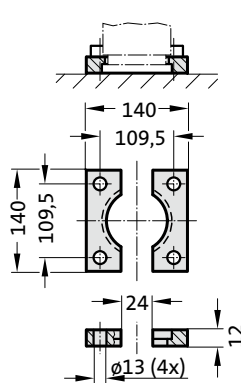
2480.011.05000



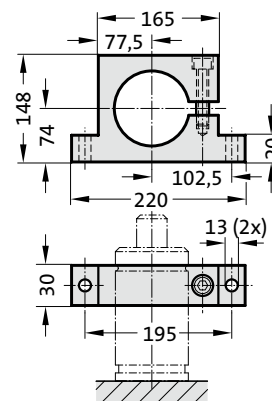
2480.011.05000.2



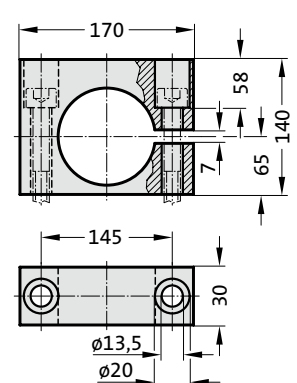
2480.022.05000



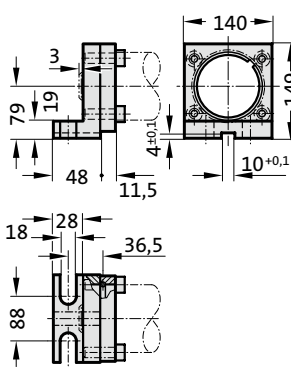
2480.044.05000²⁾



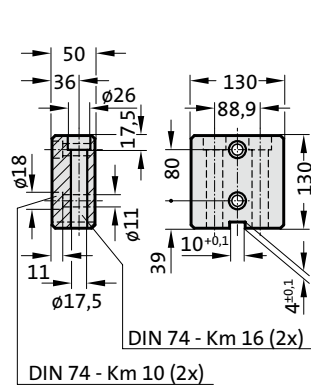
2480.044.03.05000²⁾



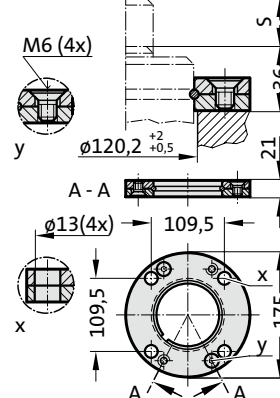
2480.045.05000²⁾



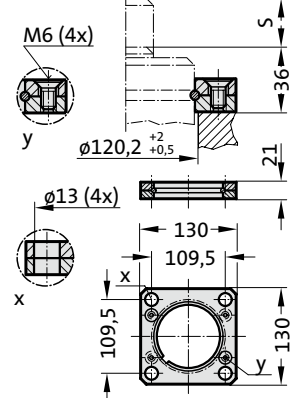
2480.047.05000²⁾



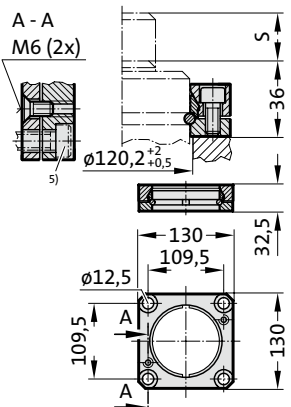
2480.055.05000



2480.057.05000



2480.064.05000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 6600 daN

Order No for spare parts kit: 2488.13.06600

Gas spring without valve

Order No (example): 2488.13.06600..P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

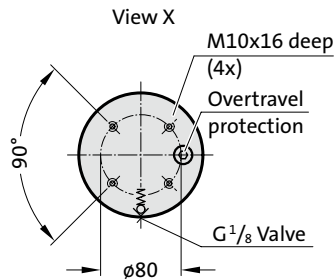
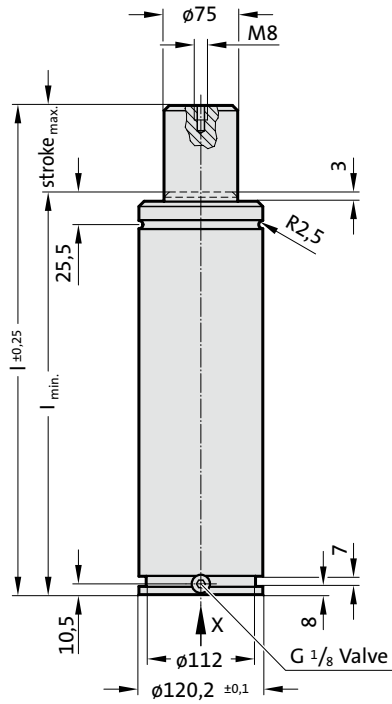
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.06600.

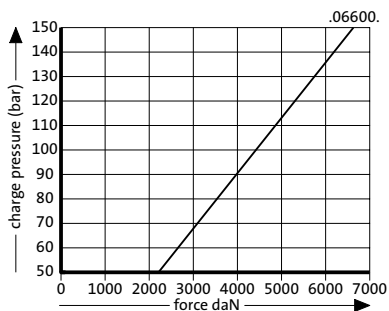


2488.13.06600.

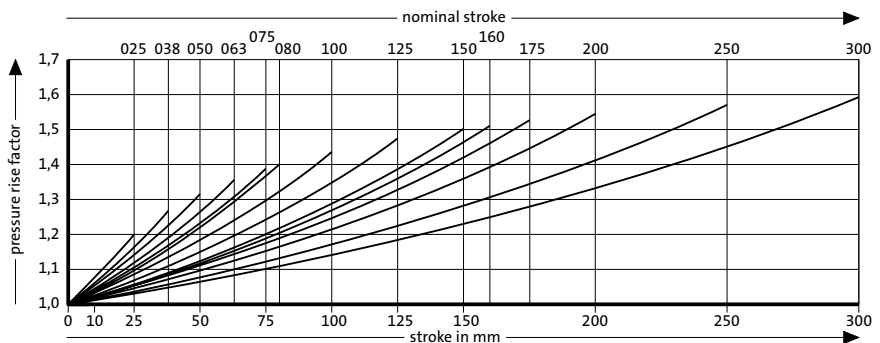
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.06600.025	25	165	190
2488.13.06600.038	38	178	216
2488.13.06600.050	50	190	240
2488.13.06600.063	63	203	266
2488.13.06600.075	75	215	290
2488.13.06600.080	80	220	300
2488.13.06600.100	100	240	340
2488.13.06600.125	125	265	390
2488.13.06600.150	150	290	440
2488.13.06600.160	160	300	460
2488.13.06600.175	175	315	490
2488.13.06600.200	200	340	540
2488.13.06600.250	250	390	640
2488.13.06600.300	300	440	740

Initial spring force versus charge pressure



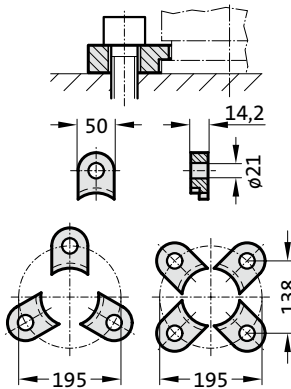
Spring force Diagram displacement versus stroke rise



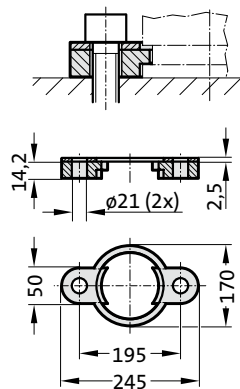
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

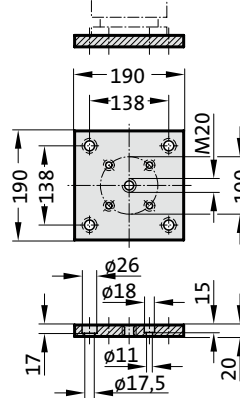
2480.007.07500



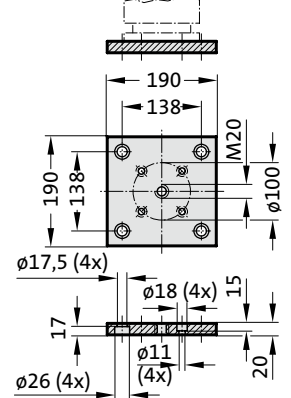
2480.008.07500³⁾



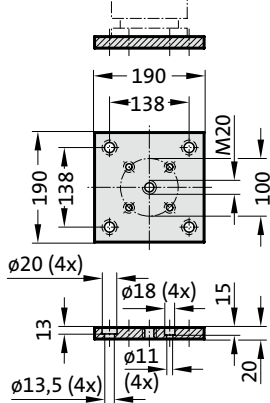
2480.011.07500



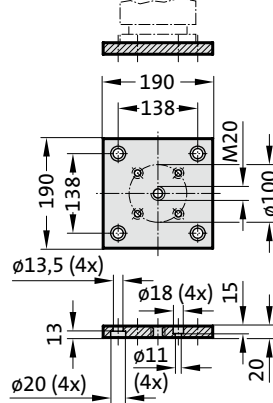
2480.011.07500.2



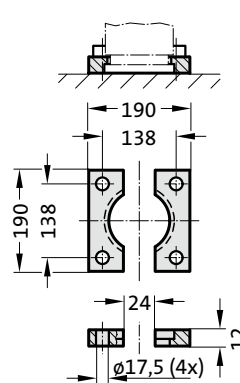
2480.011.03.07500



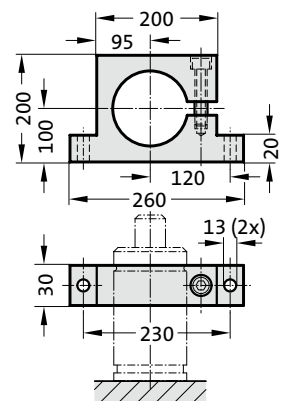
2480.011.03.07500.2



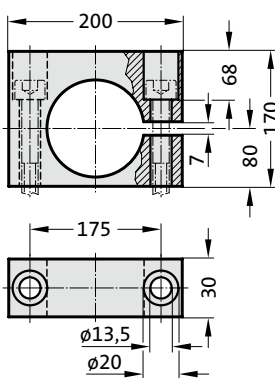
2480.022.07500



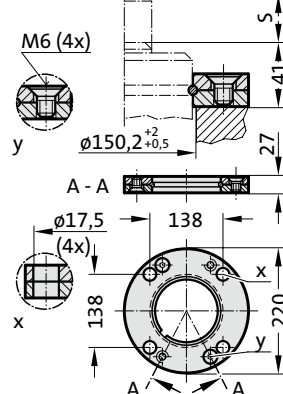
2480.044.07500²⁾



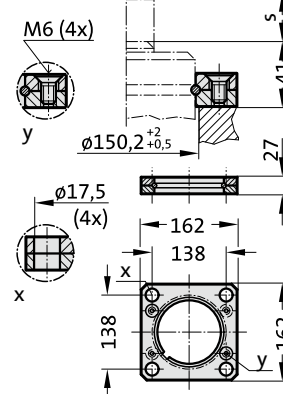
2480.044.03.07500²⁾



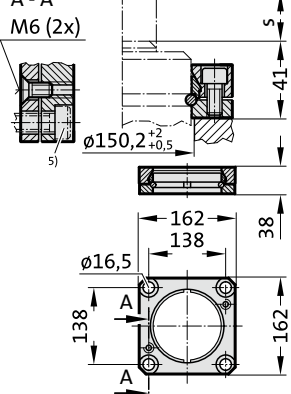
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 9500 daN

Order No for spare parts kit: 2488.13.09500

Gas spring without valve

Order No (example): 2488.13.09500..P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

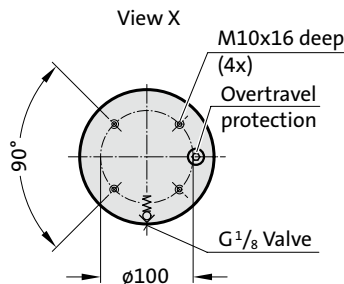
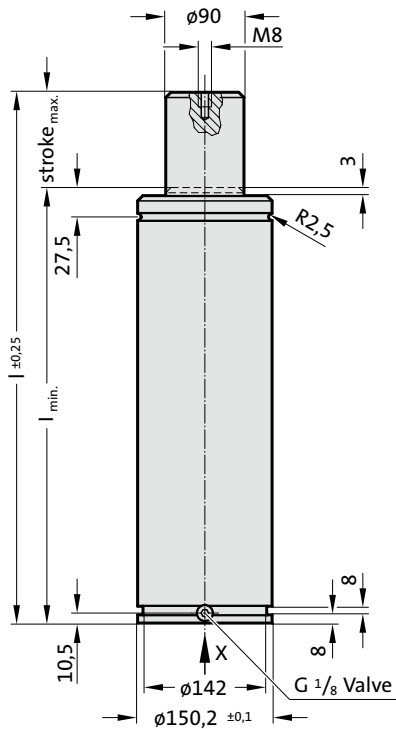
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.09500.

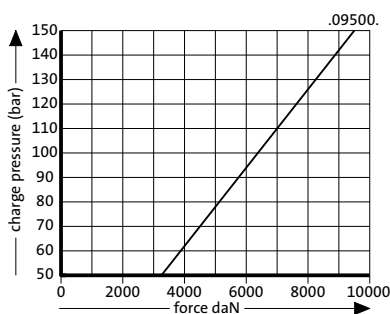


2488.13.09500.

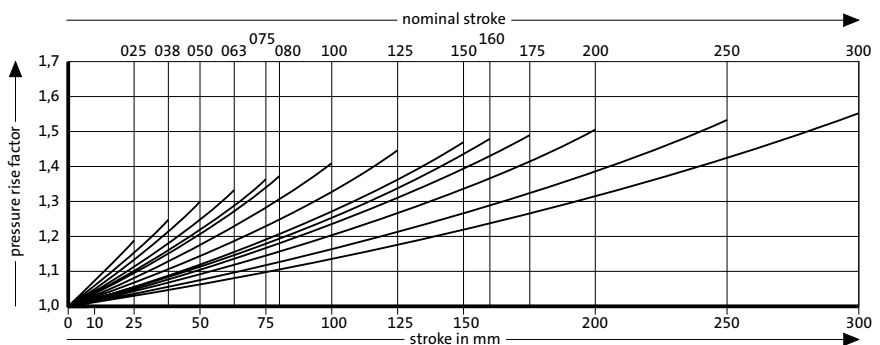
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.09500.025	25	180	205
2488.13.09500.038	38	193	231
2488.13.09500.050	50	205	255
2488.13.09500.063	63	218	281
2488.13.09500.075	75	230	305
2488.13.09500.080	80	235	315
2488.13.09500.100	100	255	355
2488.13.09500.125	125	280	405
2488.13.09500.150	150	305	455
2488.13.09500.160	160	315	475
2488.13.09500.175	175	330	505
2488.13.09500.200	200	355	555
2488.13.09500.250	250	405	655
2488.13.09500.300	300	455	755

Initial spring force versus charge pressure



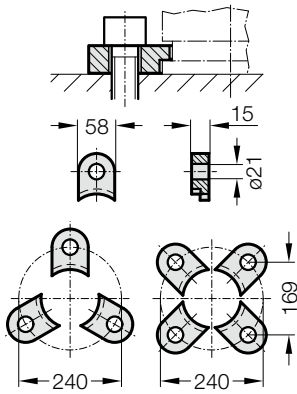
Spring force Diagram displacement versus stroke rise



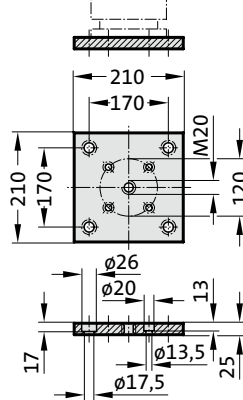
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING HEAVY DUTY MOUNTING VARIATIONS

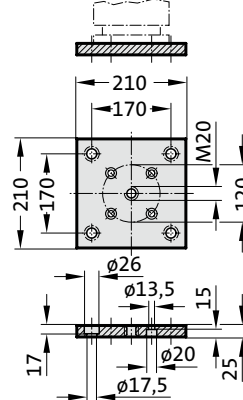
2480.007.10000



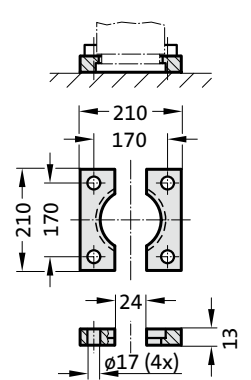
2480.011.10000



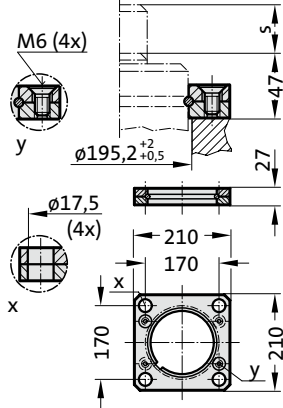
2480.011.10000.2



2480.022.10000



2480.057.10000



GAS SPRING HEAVY DUTY

Note:

Initial spring force at 150 bar = 20000 daN

Order No for spare parts kit: 2488.13.20000

Gas spring without valve

Order No (example): 2488.13.20000. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

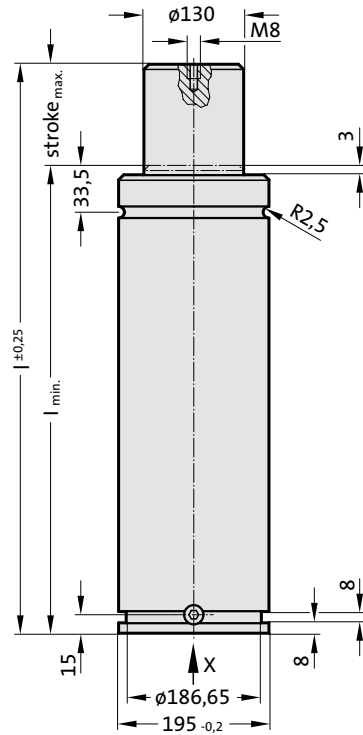
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

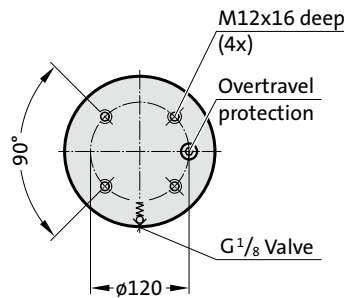
approx. 15 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2488.13.20000.



View X

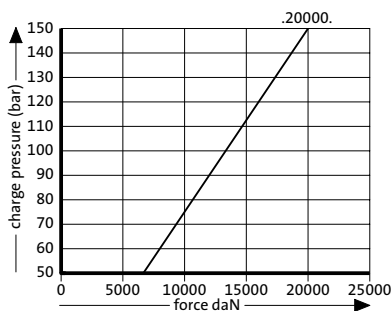


2488.13.20000.

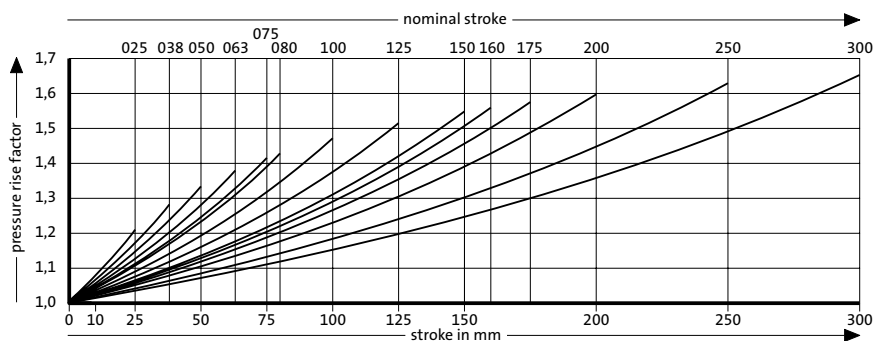
Gas spring HEAVY DUTY

Order No	Stroke _{max.} (s)	l _{min.}	l
2488.13.20000.025	25	185	210
2488.13.20000.038	38	198	236
2488.13.20000.050	50	210	260
2488.13.20000.063	63	223	286
2488.13.20000.075	75	235	310
2488.13.20000.080	80	240	320
2488.13.20000.100	100	260	360
2488.13.20000.125	125	285	410
2488.13.20000.150	150	310	460
2488.13.20000.160	160	320	480
2488.13.20000.175	175	335	510
2488.13.20000.200	200	360	560
2488.13.20000.250	250	410	660
2488.13.20000.300	300	460	760

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



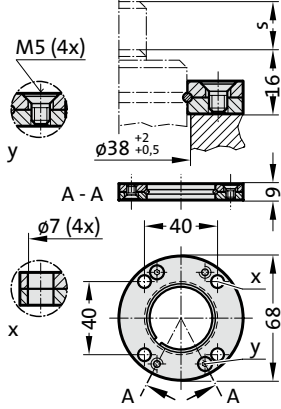
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH THROUGH BORE PASSAGE

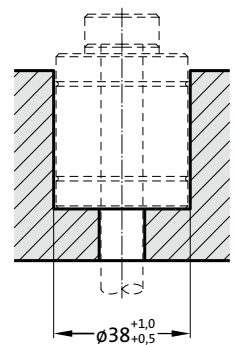
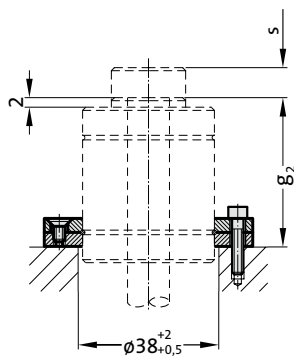
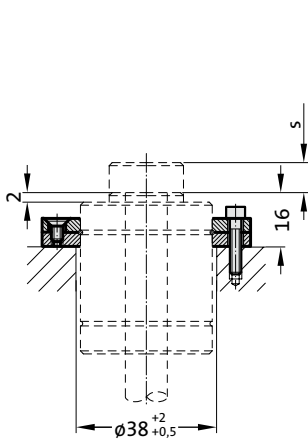
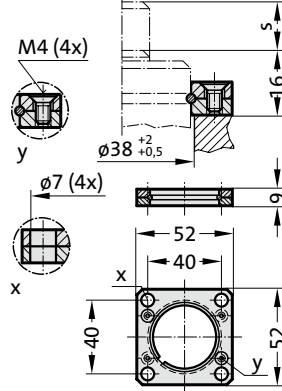


GAS SPRING WITH THROUGH BORE PASSAGE MOUNTING VARIATIONS

2480.055.00250



2480.057.00250



GAS SPRING WITH THROUGH BORE PASSAGE

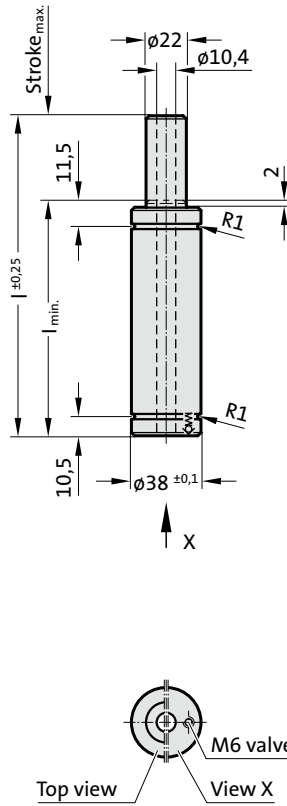
Note:

Initial spring force at 150 bar = 270 daN

Order No for spare parts kit: 2496.12.00270

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 50 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 0.5 m/s

2496.12.00270.



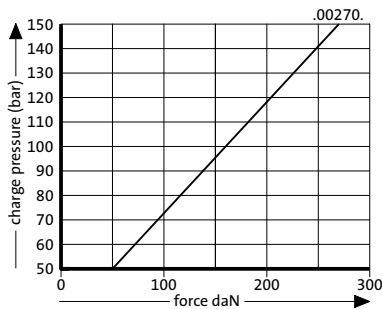
2496.12.00270.

Gas spring with through bore passage

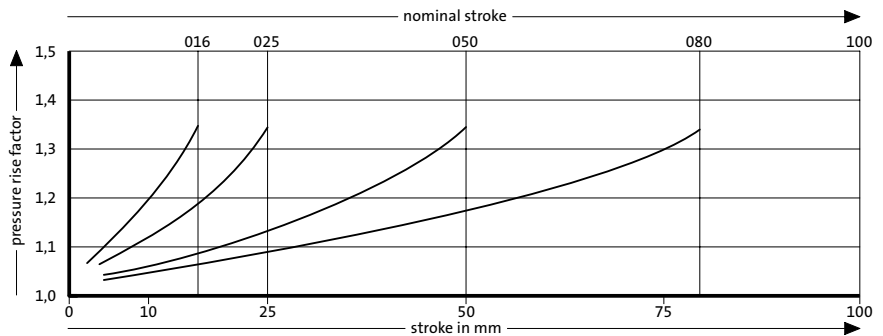
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2496.12.00270.016	16	92	108	86
2496.12.00270.025	25	101	126	95
2496.12.00270.050	50	126	176	120
2496.12.00270.080	80	156	236	150

see mounting example

Initial spring force versus charge pressure



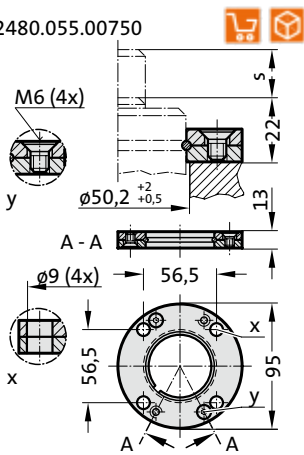
Spring force Diagram displacement versus stroke rise



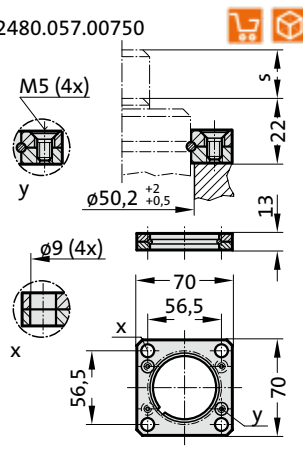
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH THROUGH BORE PASSAGE MOUNTING VARIATIONS

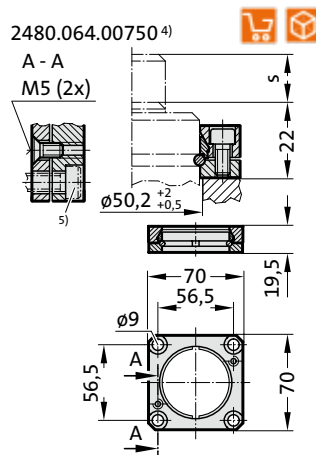
2480.055.00750



2480.057.00750



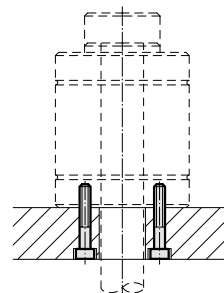
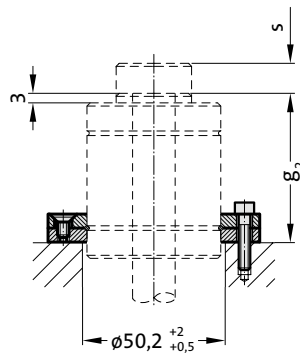
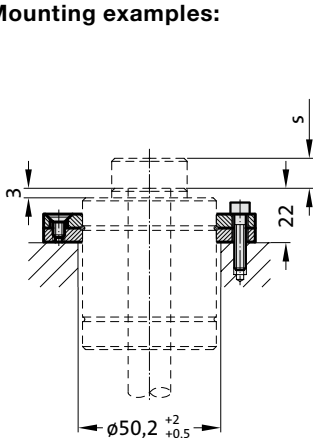
2480.064.00750⁴⁾



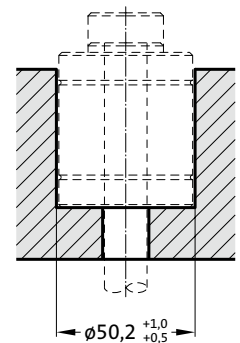
Note:

- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

Mounting examples:



see Note!



GAS SPRING WITH THROUGH BORE PASSAGE

Note:

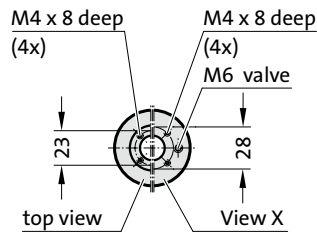
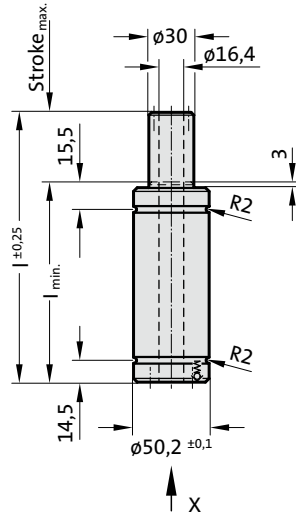
Initial spring force at 150 bar = 490 daN

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured!

Order No for spare parts kit: 2496.12.00490

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 50 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 0.5 m/s

2496.12.00490.



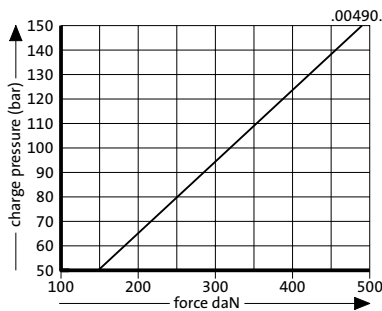
2496.12.00490.

Gas spring with through bore passage

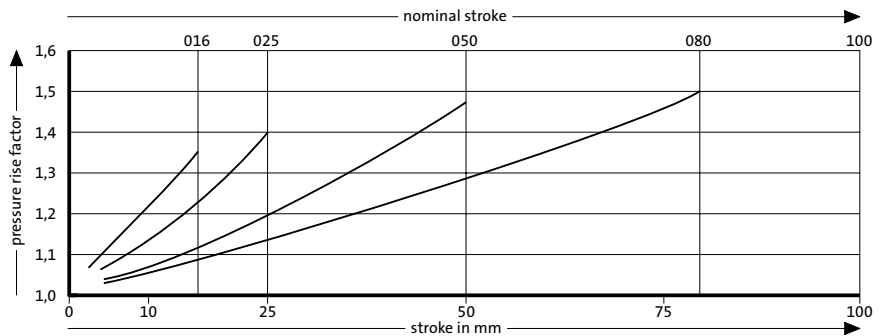
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2496.12.00490.016	16	96	112	88
2496.12.00490.025	25	105	130	97
2496.12.00490.050	50	130	180	122
2496.12.00490.080	80	160	240	152

see mounting example

Initial spring force versus charge pressure



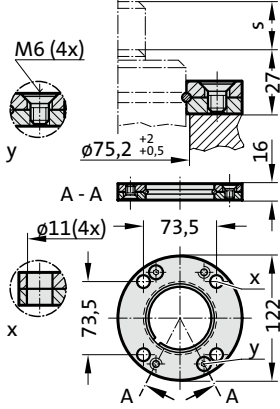
Spring force Diagram displacement versus stroke rise



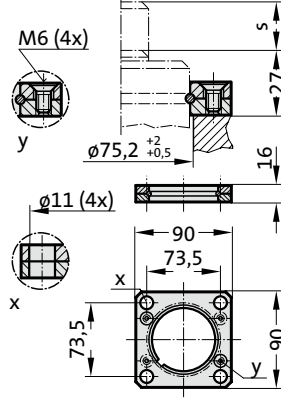
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH THROUGH BORE PASSAGE MOUNTING VARIATIONS

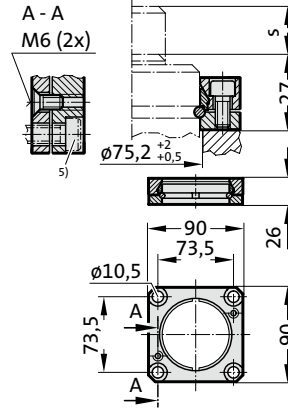
2480.055.01500



2480.057.01500



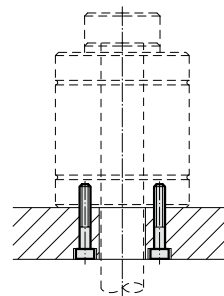
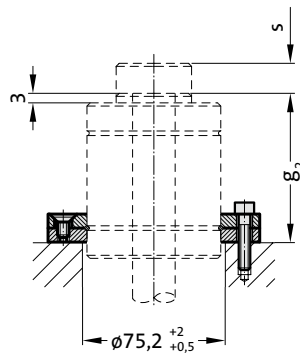
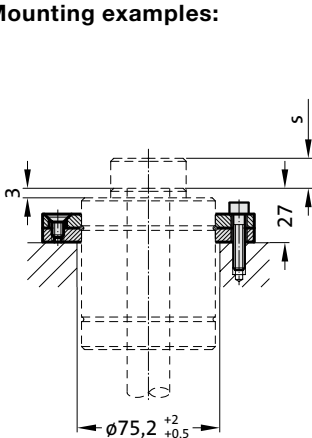
2480.064.01500⁴⁾



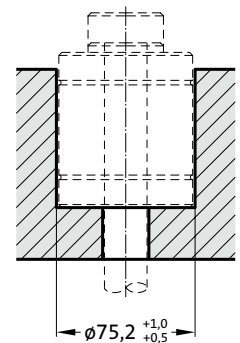
Note:

- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

Mounting examples:



see Note!



GAS SPRING WITH THROUGH BORE PASSAGE

Note:

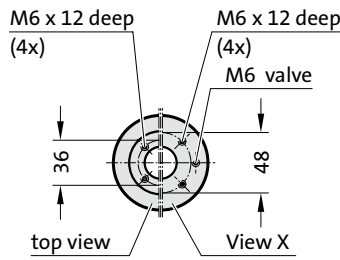
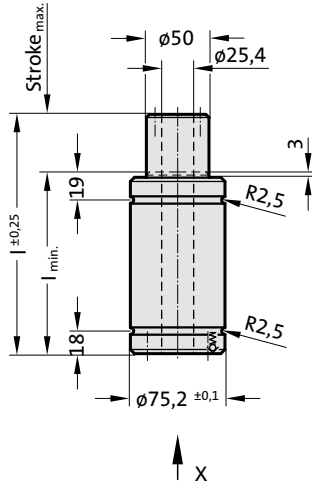
Initial spring force at 150 bar = 1060 daN

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured!

Order No for spare parts kit: 2496.12.01060

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 50 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 15 to 40 (at 20°C)
 Max. piston speed: 0.5 m/s

2496.12.01060.



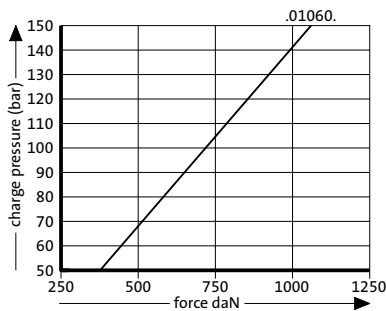
2496.12.01060.

Gas spring with through bore passage

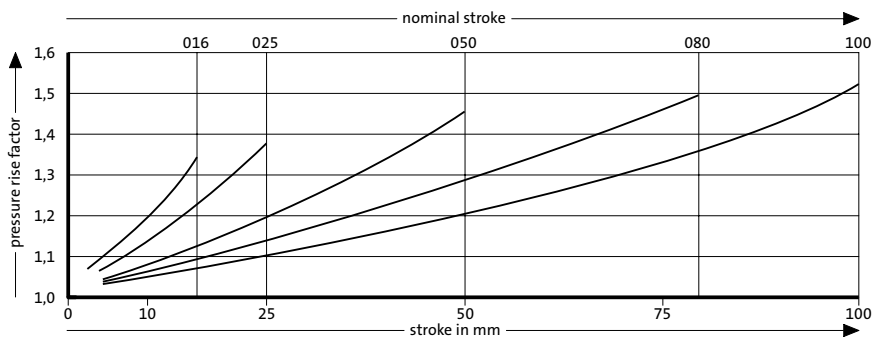
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2496.12.01060.016	16	106	122	96
2496.12.01060.025	25	115	140	105
2496.12.01060.050	50	140	190	130
2496.12.01060.080	80	170	250	160
2496.12.01060.100	100	190	290	180

see mounting example

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



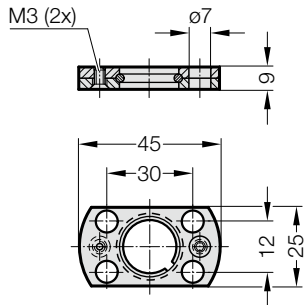
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS POWERLINE

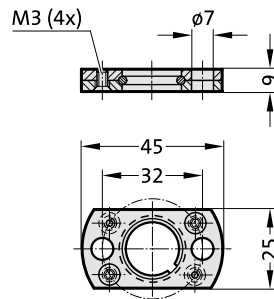


GAS SPRING POWERLINE MOUNTING VARIATIONS

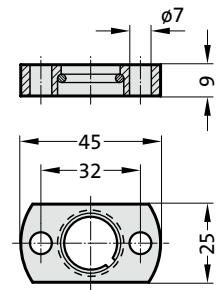
2480.051.01.00030



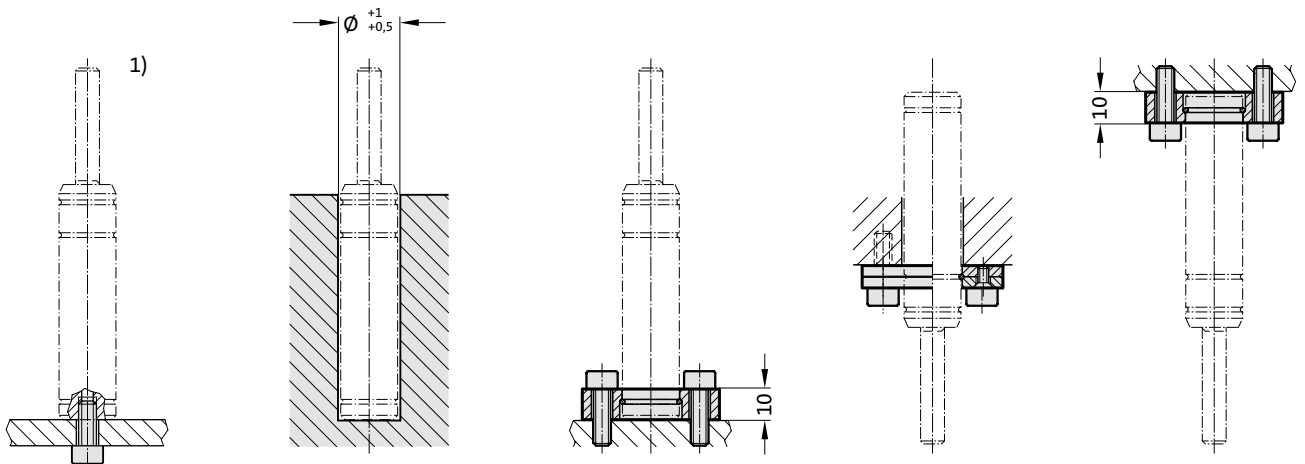
2480.051.03.00030



2480.052.00030



Mounting examples:



GAS SPRING POWERLINE

Note:

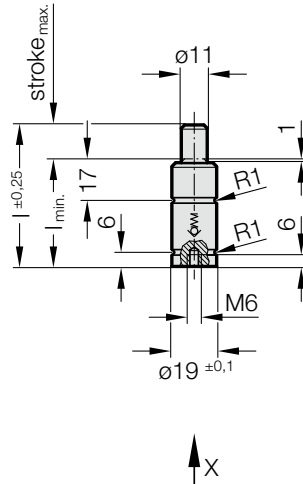
Initial spring force at 180 bar = 170 daN

Worn gas springs cannot be repaired, they have to be replaced completely.

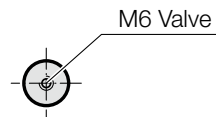
1) Fixing at bottom thread only recommended for stroke length up to 25 mm.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 180 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 40 to 100 (at 20°C)
 Max. piston speed: 1.6 m/s

2487.12.00170.



View X

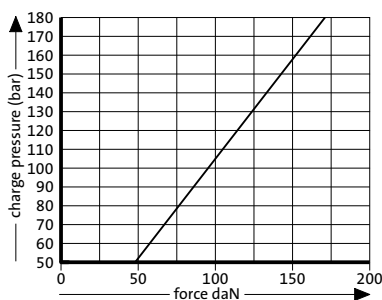


2487.12.00170.

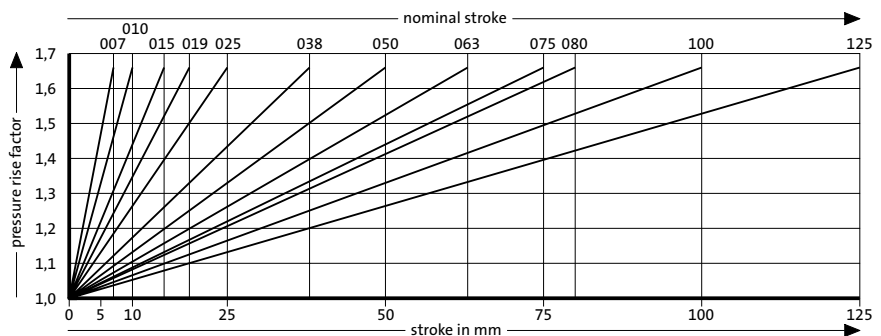
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.00170.007	7	37	44
2487.12.00170.010	10	40	50
2487.12.00170.015	15	45	60
2487.12.00170.019	19	49	68
2487.12.00170.025	25	55	80
2487.12.00170.038	38	68	106
2487.12.00170.050	50	80	130
2487.12.00170.063	63	93	156
2487.12.00170.075	75	110	185
2487.12.00170.080	80	115	195
2487.12.00170.100	100	135	235
2487.12.00170.125	125	160	285

Initial spring force versus charge pressure



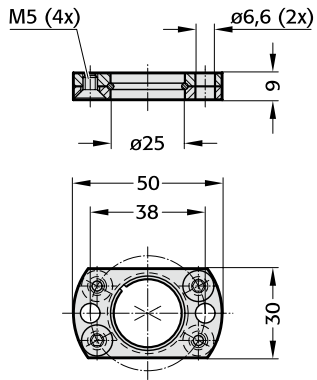
Spring force Diagram displacement versus stroke rise



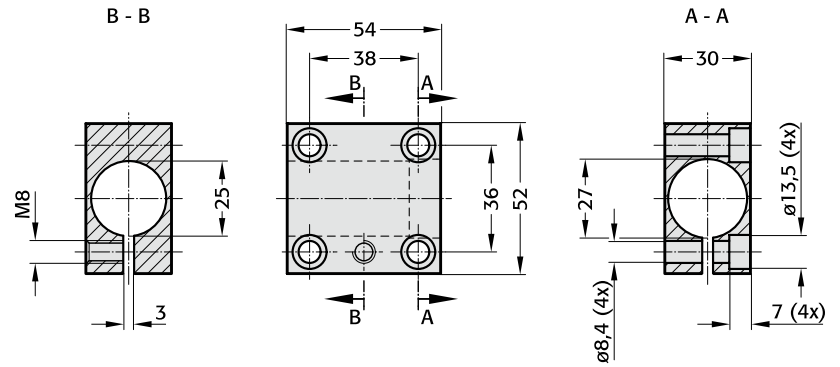
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

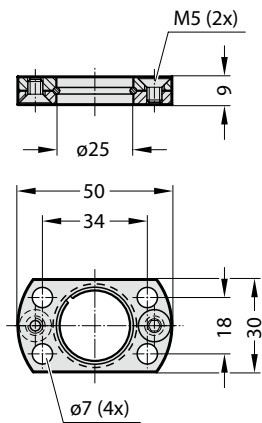
2480.051.00150



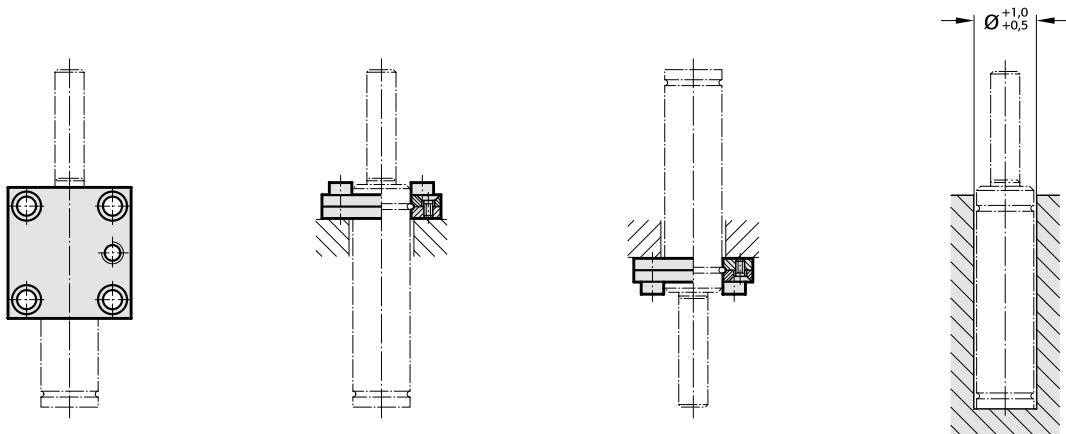
2480.053.00150



2480.054.00150



Mounting examples:



GAS SPRING POWERLINE

Note:

Initial spring force at 180 bar = 320 daN

Worn gas springs cannot be repaired, they have to be replaced completely.

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

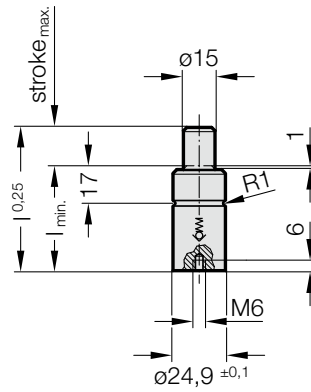
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

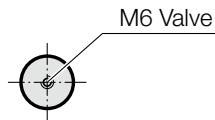
approx. 40 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.00320.



View X

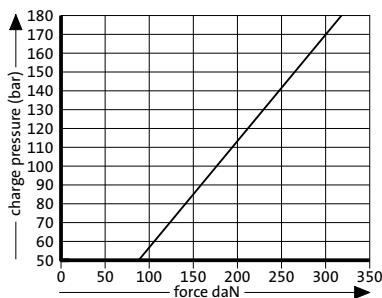


2487.12.00320.

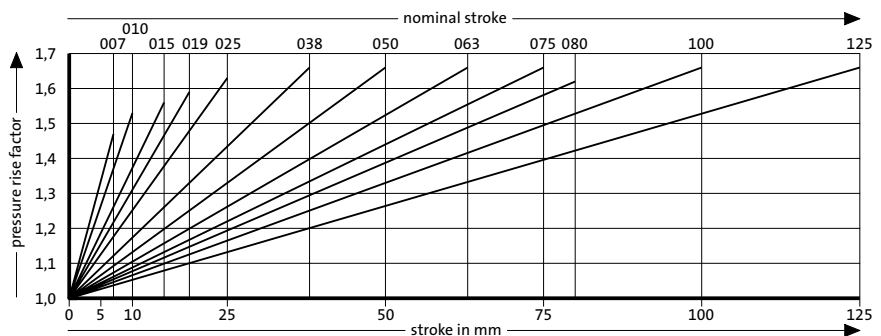
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.00320.007	7	37	44
2487.12.00320.010	10	40	50
2487.12.00320.015	15	45	60
2487.12.00320.019	19	49	68
2487.12.00320.025	25	55	80
2487.12.00320.038	38	68	106
2487.12.00320.050	50	80	130
2487.12.00320.063	63	93	156
2487.12.00320.075	75	110	185
2487.12.00320.080	80	115	195
2487.12.00320.100	100	135	235
2487.12.00320.125	125	160	285

Initial spring force versus charge pressure



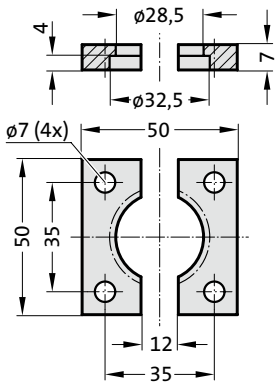
Spring force Diagram displacement versus stroke rise



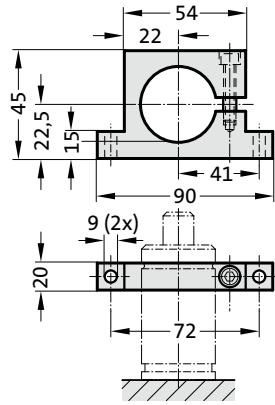
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

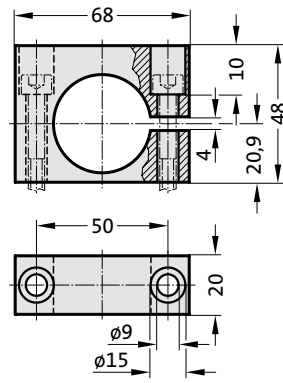
2480.022.00150



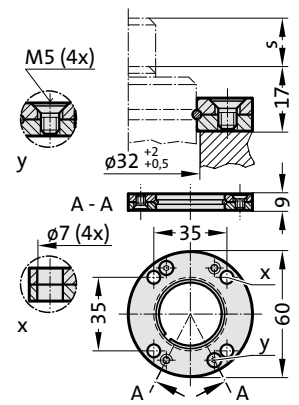
2480.044.00150²⁾



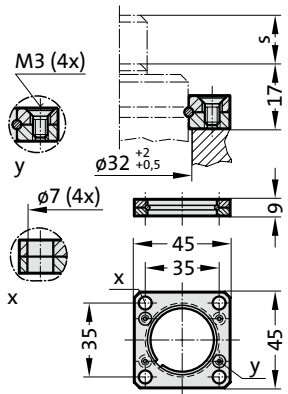
2480.044.03.00150²⁾



2480.055.00150



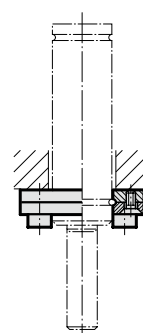
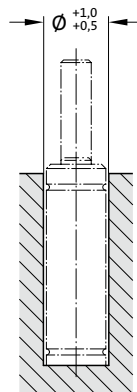
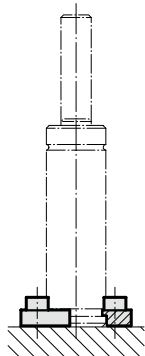
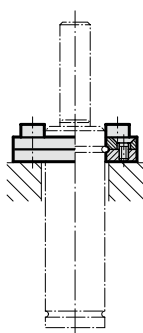
2480.057.00150



Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



GAS SPRING POWERLINE

Note:

Initial spring force at 180 bar = 350 daN

Order No for spare parts kit: 2487.12.00350

Gas spring without valve

Order No (example): 2487.12.00350. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

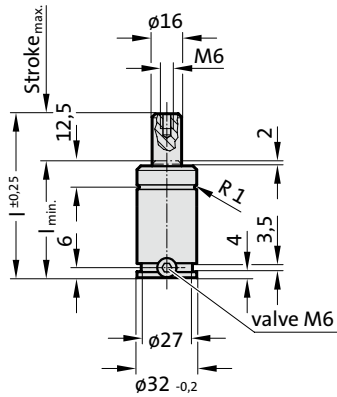
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

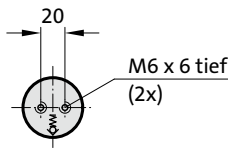
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.00350.



View X

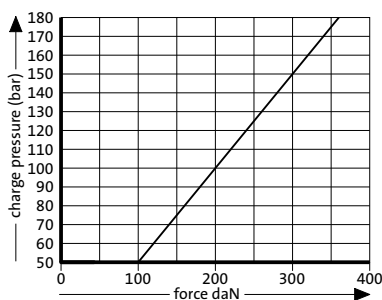


2487.12.00350.

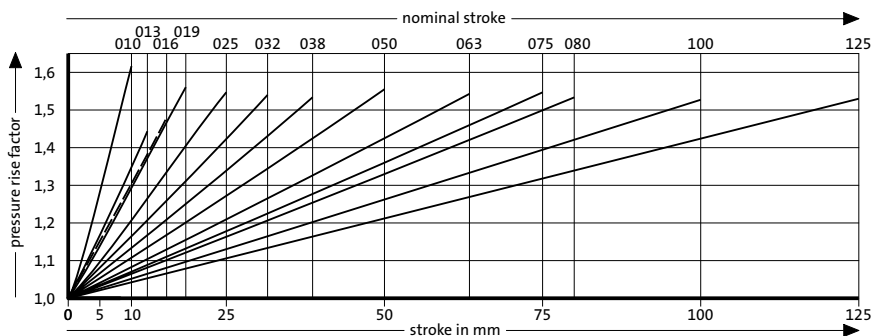
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.00350.010	10	40	50
2487.12.00350.013	13	43	56
2487.12.00350.016	16	46	62
2487.12.00350.019	19	49	68
2487.12.00350.025	25	55	80
2487.12.00350.032	32	62	94
2487.12.00350.038	38	68	106
2487.12.00350.050	50	80	130
2487.12.00350.063	63	93	156
2487.12.00350.075	75	105	180
2487.12.00350.080	80	110	190
2487.12.00350.100	100	130	230
2487.12.00350.125	125	155	280

Initial spring force versus charge pressure



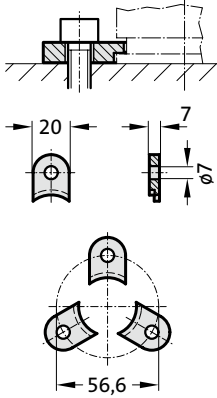
Spring force Diagram displacement versus stroke rise



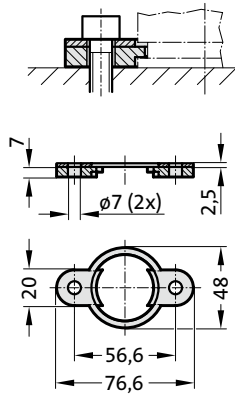
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

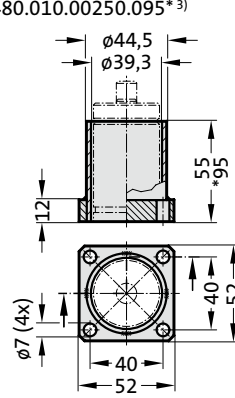
2480.007.00250



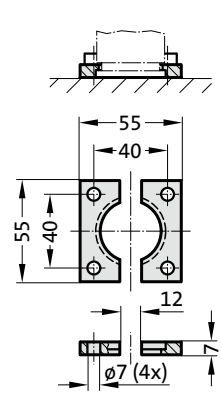
2480.008.00250³⁾



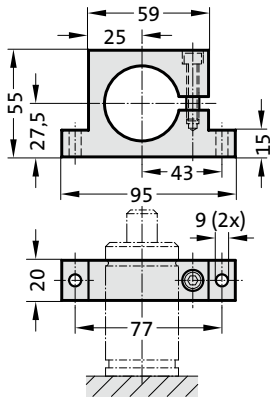
2480.010.00250.055³⁾
2480.010.00250.095*³⁾



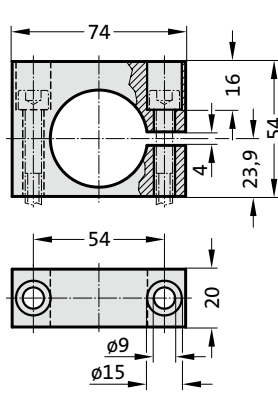
2480.022.00250



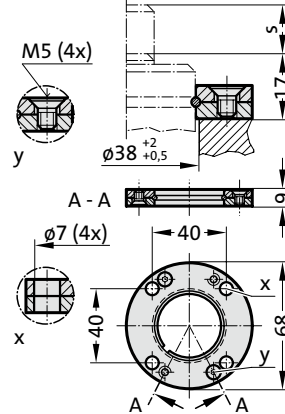
2480.044.00250²⁾



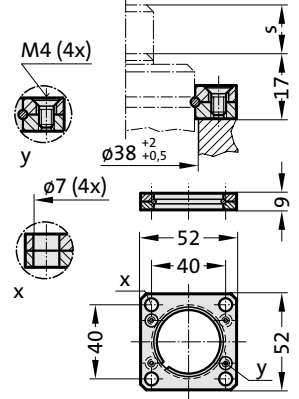
2480.044.03.00250²⁾



2480.055.00250



2480.057.00250



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 470 daN

Order No for spare parts kit: 2487.12.00500

Gas spring without valve

Order No (example): 2487.12.00500. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

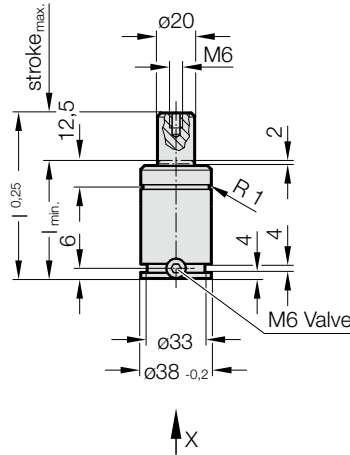
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

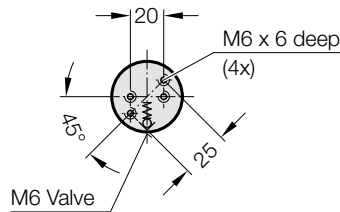
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.00500.



View X

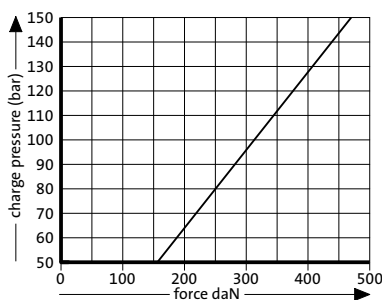


2487.12.00500.

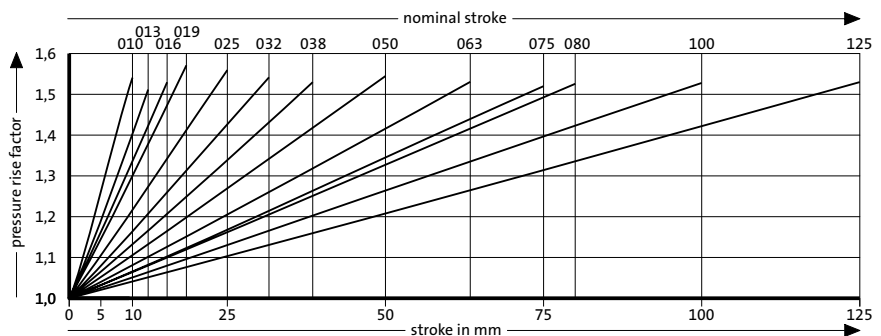
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.00500.010	10	40	50
2487.12.00500.013	13	43	56
2487.12.00500.016	16	46	62
2487.12.00500.019	19	49	68
2487.12.00500.025	25	55	80
2487.12.00500.032	32	62	94
2487.12.00500.038	38	68	106
2487.12.00500.050	50	80	130
2487.12.00500.063	63	93	156
2487.12.00500.075	75	105	180
2487.12.00500.080	80	110	190
2487.12.00500.100	100	130	230
2487.12.00500.125	125	155	280

Initial spring force versus charge pressure



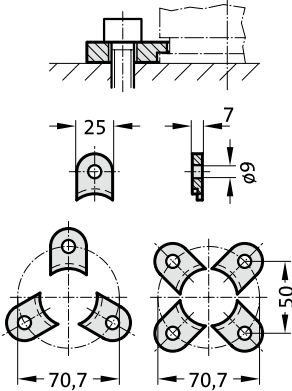
Spring force Diagram displacement versus stroke rise



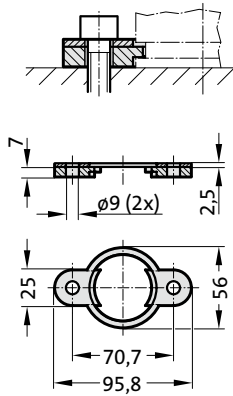
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

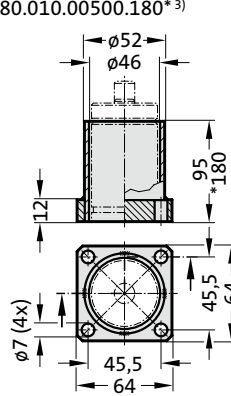
2480.007.00500



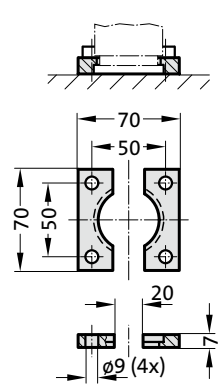
2480.008.00500³⁾



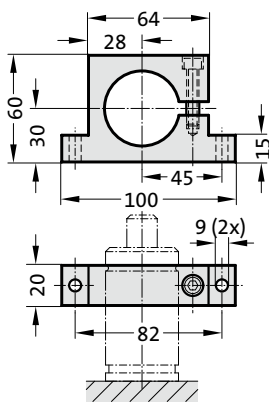
2480.010.00500.095³⁾
2480.010.00500.180*³⁾



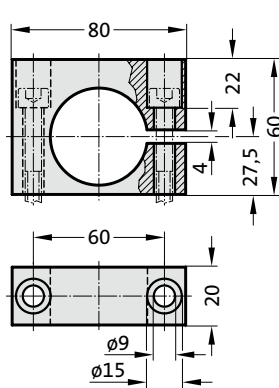
2480.022.00500



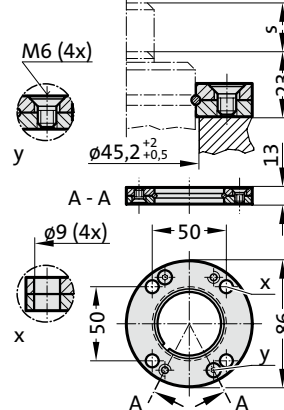
2480.044.00500²⁾



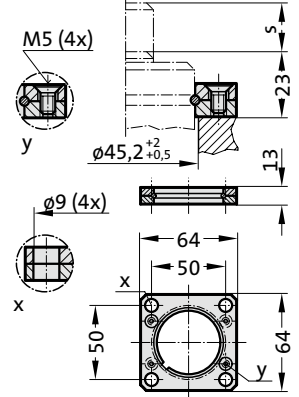
2480.044.03.00500²⁾



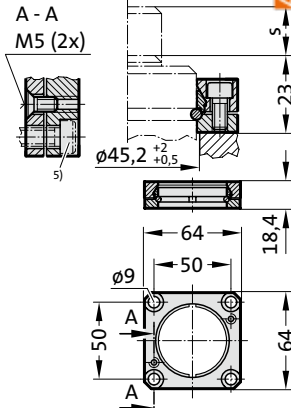
2480.055.00500



2480.057.00500



2480.064.00500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 750 daN

Order No for spare parts kit: 2487.12.00750

Gas spring without valve

Order No (example): 2487.12.00750. .1.P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

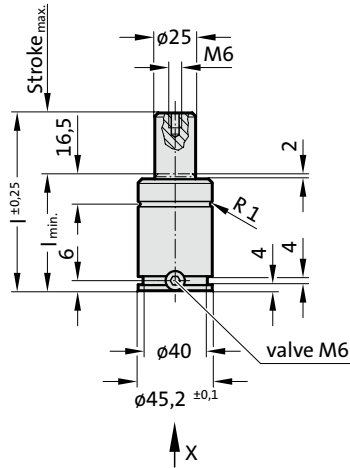
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

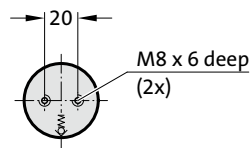
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.00750. .1



View X

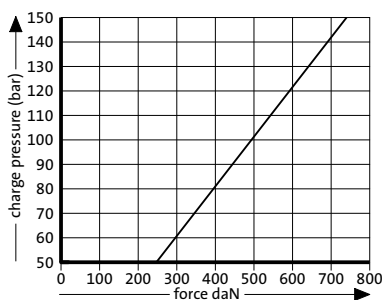


2487.12.00750. .1

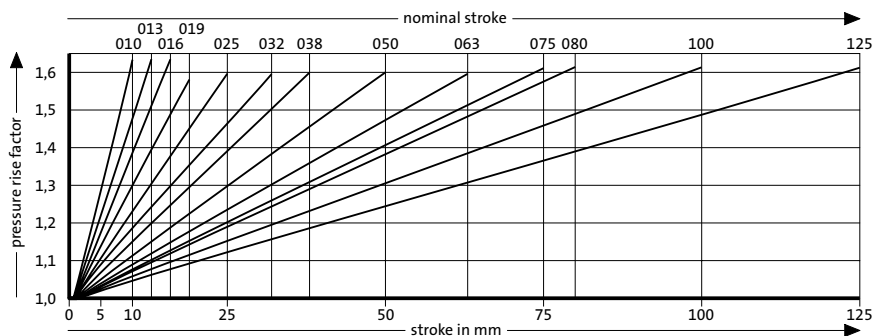
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.00750.010.1	10	42	52
2487.12.00750.013.1	13	45	58
2487.12.00750.016.1	16	48	64
2487.12.00750.019.1	19	51	70
2487.12.00750.025.1	25	57	82
2487.12.00750.032.1	32	64	96
2487.12.00750.038.1	38	70	108
2487.12.00750.050.1	50	82	132
2487.12.00750.063.1	63	95	158
2487.12.00750.075.1	75	107	182
2487.12.00750.080.1	80	112	192
2487.12.00750.100.1	100	132	232
2487.12.00750.125.1	125	157	282

Initial spring force versus charge pressure



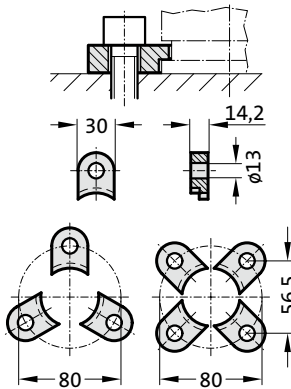
Spring force Diagram displacement versus stroke rise



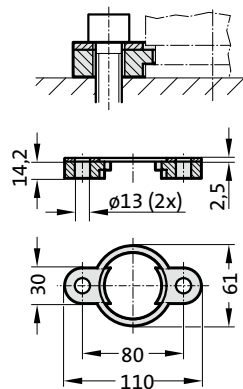
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

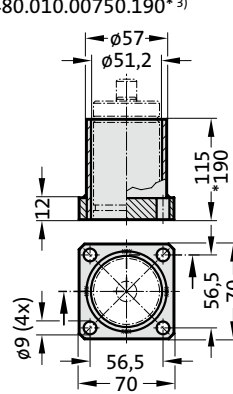
2480.007.00750



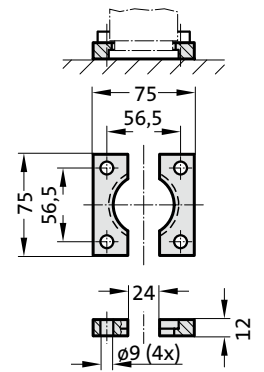
2480.008.00750³⁾



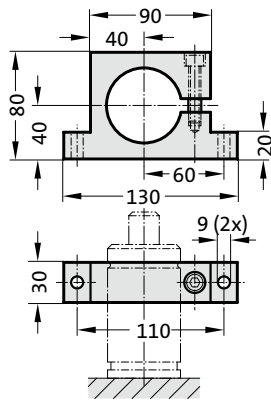
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



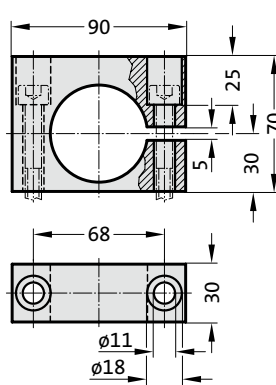
2480.022.00750



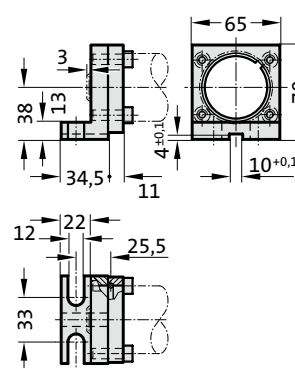
2480.044.00750²⁾



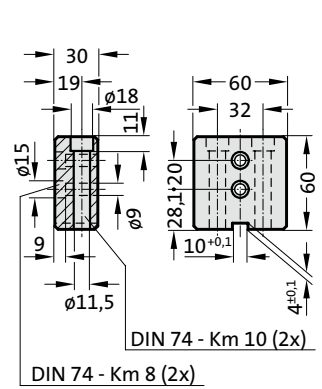
2480.044.03.00750²⁾



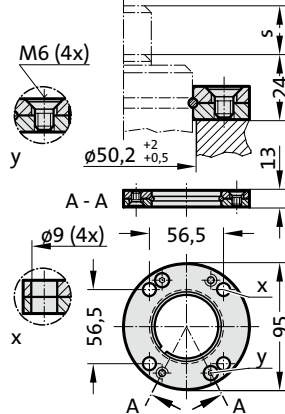
2480.045.00750²⁾



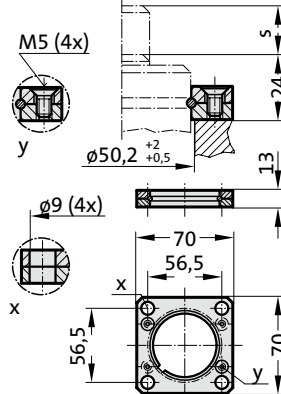
2480.047.00750²⁾



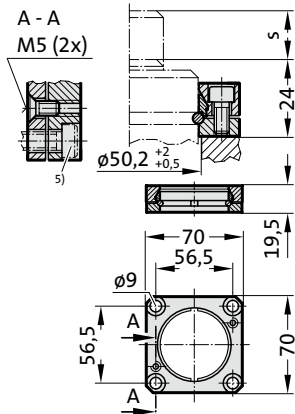
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 920 daN

Order No for spare parts kit: 2487.12.01000

Gas spring without valve

Order No (example): 2487.12.01000. .1.P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

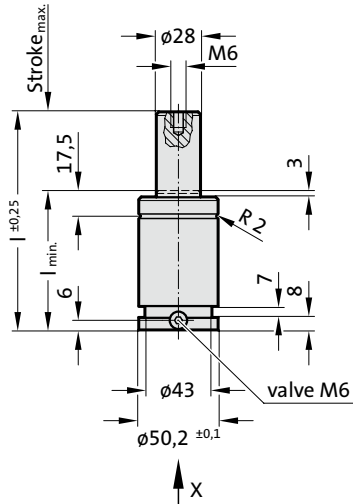
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

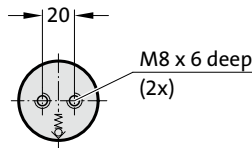
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.01000. .1



View X

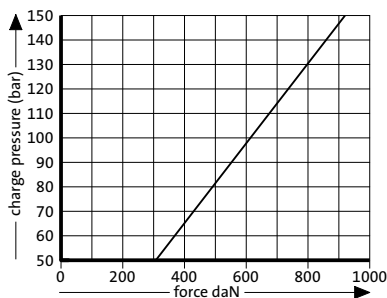


2487.12.01000. .1

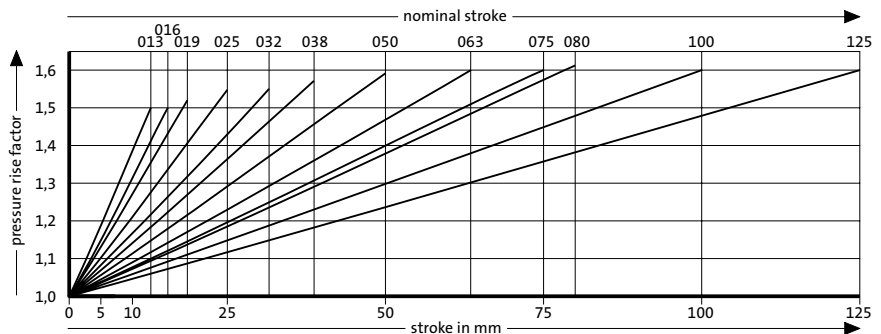
Gas spring POWERLINE

Order No	Stroke _{max} (s)	l _{min}	l
2487.12.01000.013.1	13	51	64
2487.12.01000.016.1	16	54	70
2487.12.01000.019.1	19	57	76
2487.12.01000.025.1	25	63	88
2487.12.01000.032.1	32	70	102
2487.12.01000.038.1	38	76	114
2487.12.01000.050.1	50	88	138
2487.12.01000.063.1	63	101	164
2487.12.01000.075.1	75	113	188
2487.12.01000.080.1	80	118	198
2487.12.01000.100.1	100	138	238
2487.12.01000.125.1	125	163	288

Initial spring force versus charge pressure



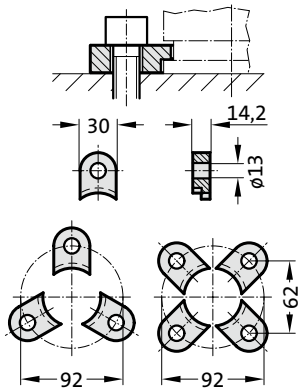
Spring force Diagram displacement versus stroke rise



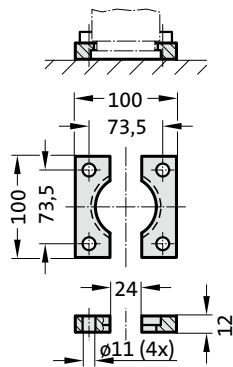
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

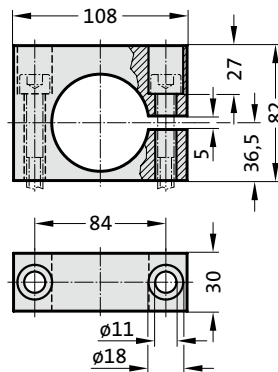
2480.007.01000



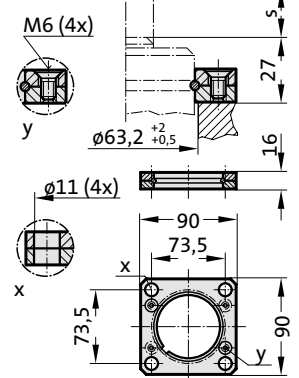
2480.022.01000



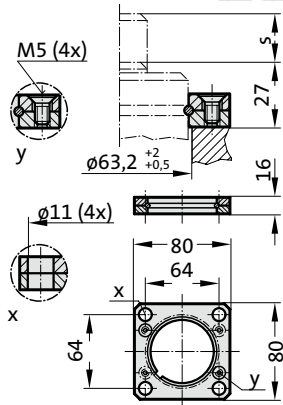
2480.044.03.01000²⁾



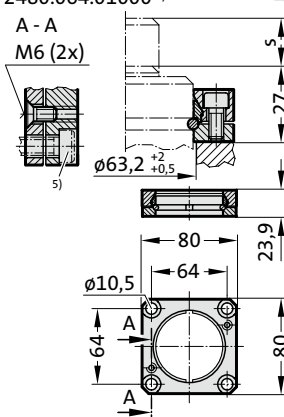
2480.057.01000



2480.057.03.01000



2480.064.01000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 1500 daN

Order No for spare parts kit: 2487.12.01500

Gas spring without valve

Order No (example): 2487.12.01500. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

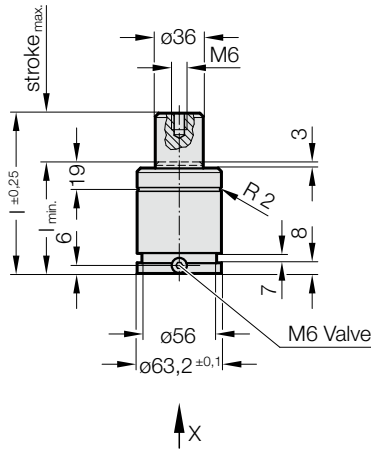
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

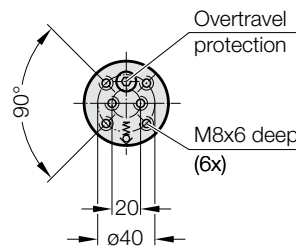
approx. 50 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.01500.



View X

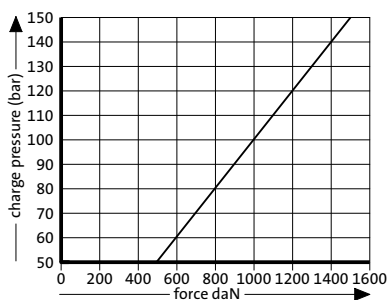


2487.12.01500.

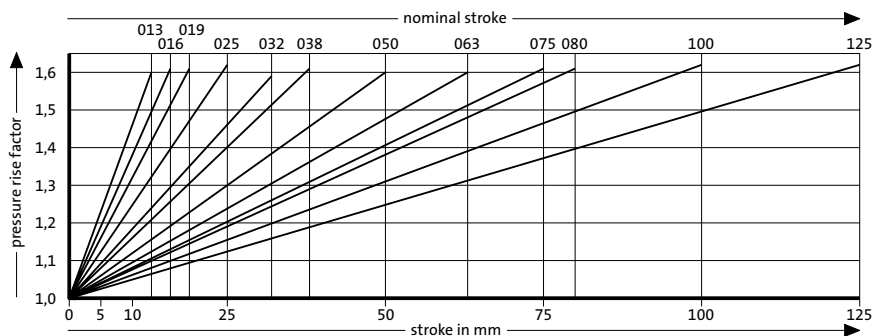
Gas spring POWERLINE

Order No	Stroke _{max} (s)	l _{min}	l
2487.12.01500.013	13	57	70
2487.12.01500.016	16	60	76
2487.12.01500.019	19	63	82
2487.12.01500.025	25	69	94
2487.12.01500.032	32	76	108
2487.12.01500.038	38	82	120
2487.12.01500.050	50	94	144
2487.12.01500.063	63	107	170
2487.12.01500.075	75	119	194
2487.12.01500.080	80	124	204
2487.12.01500.100	100	144	244
2487.12.01500.125	125	169	294

Initial spring force versus charge pressure



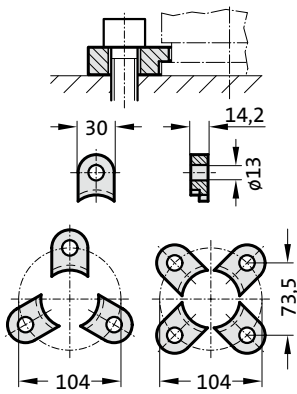
Spring force Diagram displacement versus stroke rise



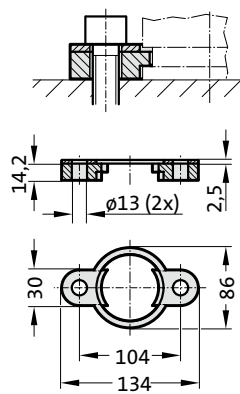
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

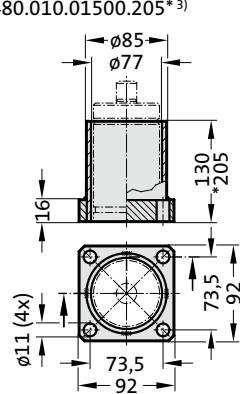
2480.007.01500



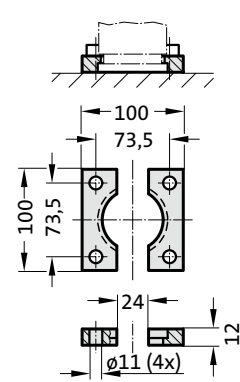
2480.008.01500³⁾



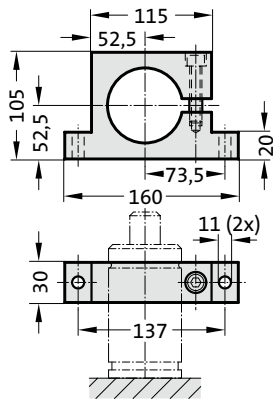
2480.010.01500.130³⁾
2480.010.01500.205³⁾



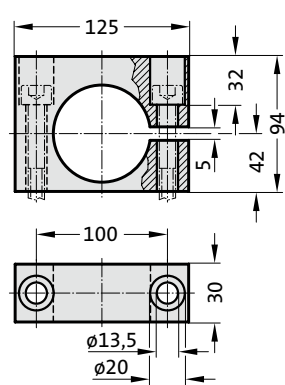
2480.022.01500



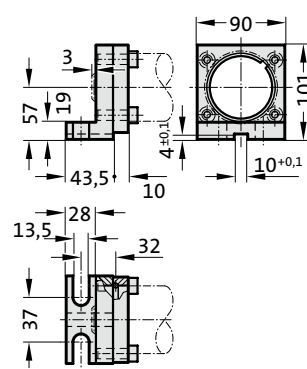
2480.044.01500²⁾



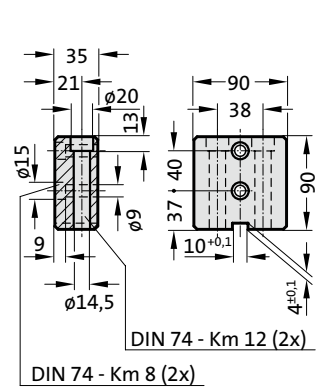
2480.044.03.01500²⁾



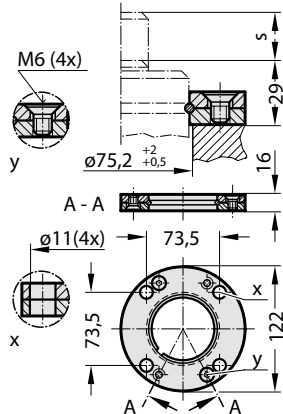
2480.045.01500²⁾



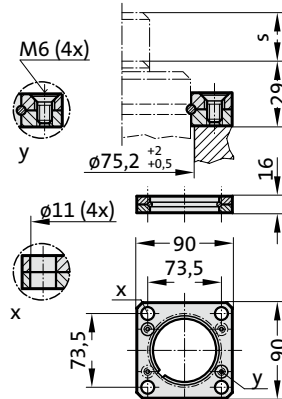
2480.047.01500²⁾



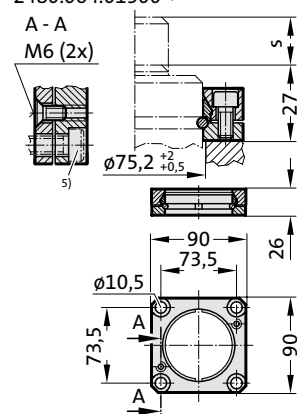
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 2400 daN

Order No for spare parts kit: 2487.12.02400

Gas spring without valve

Order No (example): 2487.12.02400. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

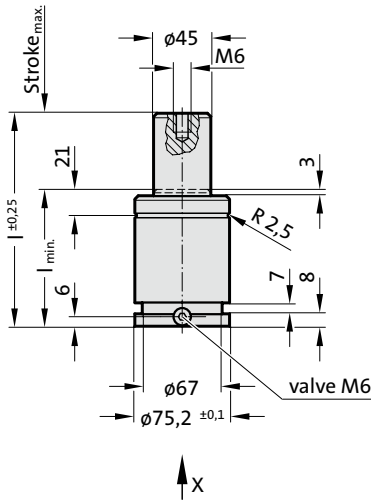
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

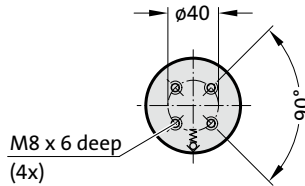
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.02400.



View X

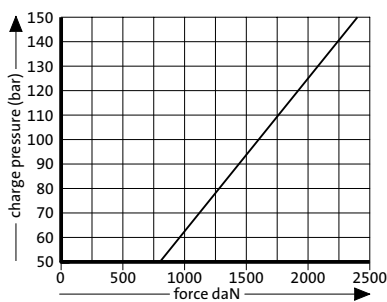


2487.12.02400.

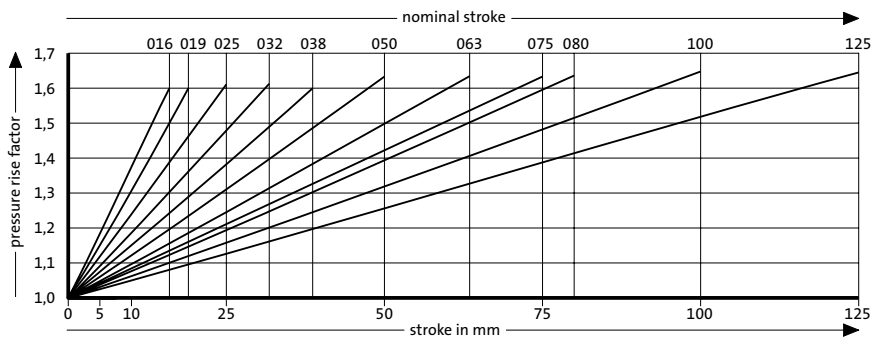
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.02400.016	16	61	77
2487.12.02400.019	19	64	83
2487.12.02400.025	25	70	95
2487.12.02400.032	32	77	109
2487.12.02400.038	38	83	121
2487.12.02400.050	50	95	145
2487.12.02400.063	63	108	171
2487.12.02400.075	75	120	195
2487.12.02400.080	80	125	205
2487.12.02400.100	100	145	245
2487.12.02400.125	125	170	295

Initial spring force versus charge pressure



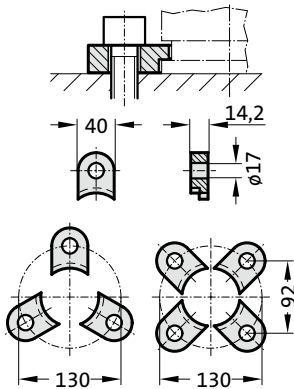
Spring force Diagram displacement versus stroke rise



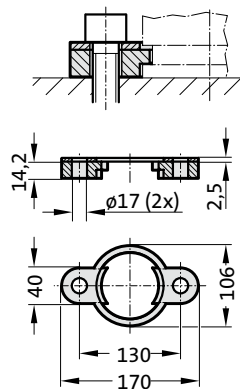
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

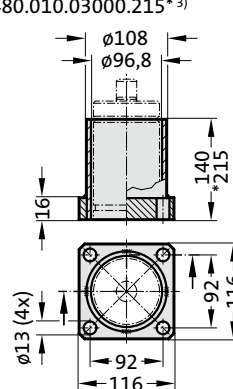
2480.007.03000



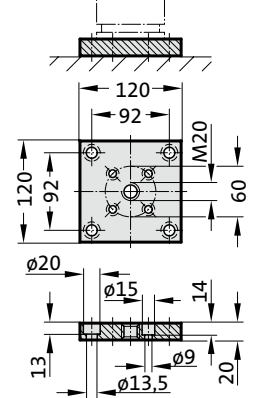
2480.008.03000³⁾



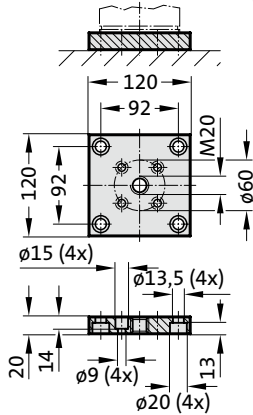
2480.010.03000.140³⁾
2480.010.03000.215*³⁾



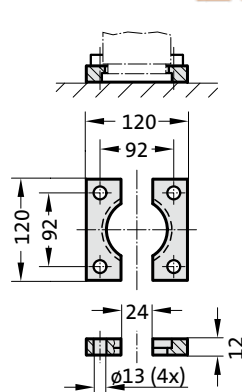
2480.011.03000



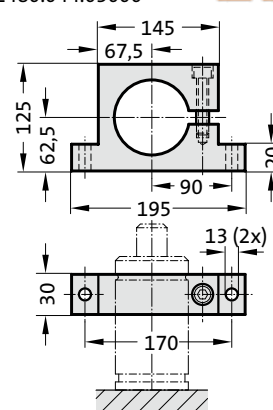
2480.011.03000.2



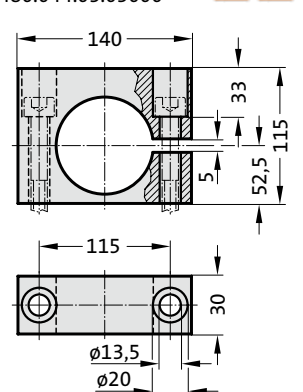
2480.022.03000



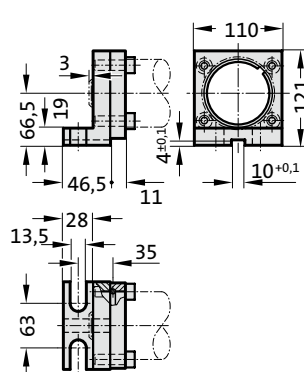
2480.044.03000²⁾



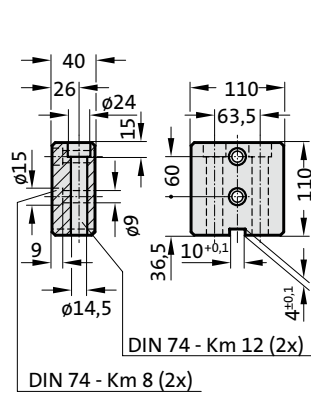
2480.044.03.03000²⁾



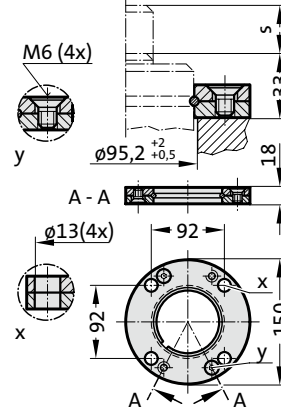
2480.045.03000²⁾



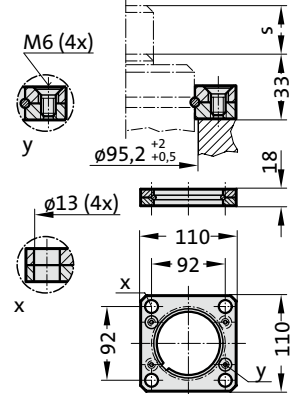
2480.047.03000²⁾



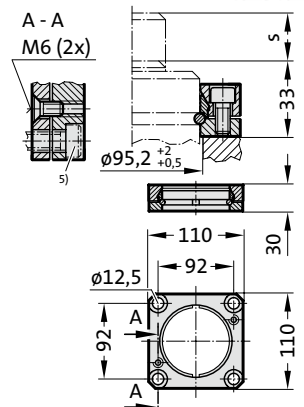
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 4200 daN

Order No for spare parts kit: 2487.12.04200

Gas spring without valve

Order No (example): 2487.12.04200. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

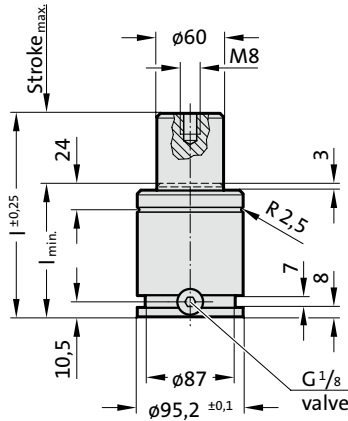
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 20 to 100 (at 20°C)

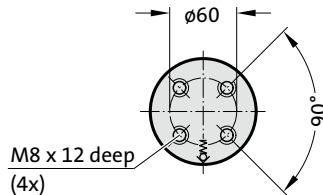
Max. piston speed: 1.6 m/s

2487.12.04200.



X

View X

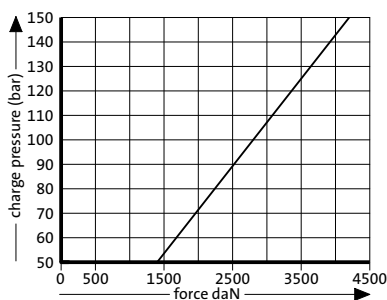


2487.12.04200.

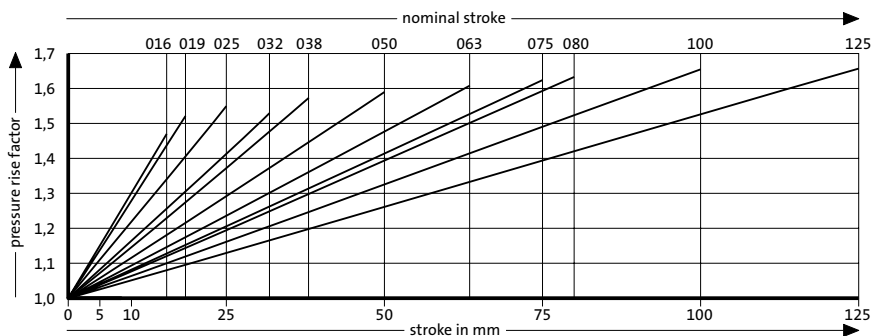
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.04200.016	16	74	90
2487.12.04200.019	19	77	96
2487.12.04200.025	25	83	108
2487.12.04200.032	32	90	122
2487.12.04200.038	38	96	134
2487.12.04200.050	50	108	158
2487.12.04200.063	63	121	184
2487.12.04200.075	75	133	208
2487.12.04200.080	80	138	218
2487.12.04200.100	100	158	258
2487.12.04200.125	125	183	308

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 6630 daN

Order No for spare parts kit: 2487.12.06600

Gas spring without valve

Order No (example): 2487.12.06600. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

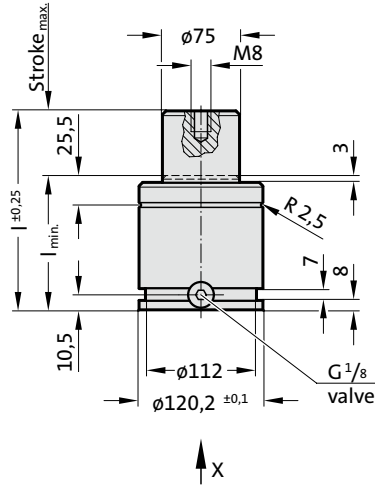
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

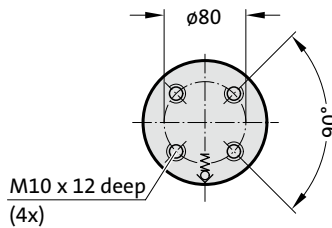
approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.06600.



View X

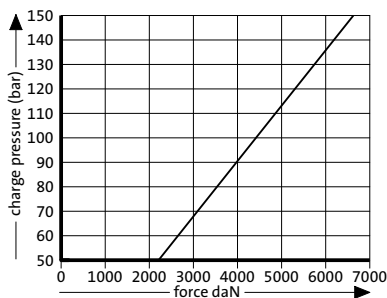


2487.12.06600.

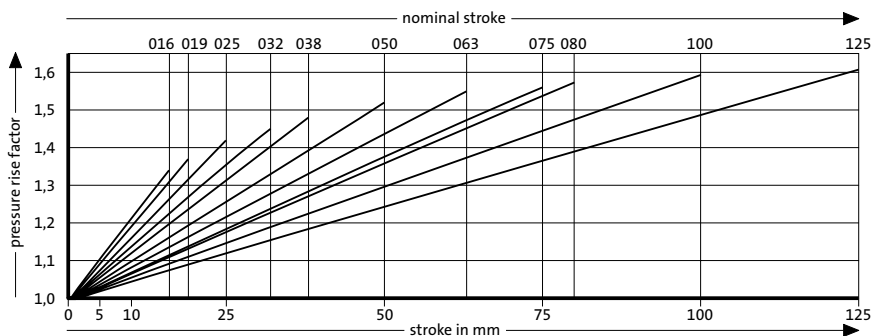
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.06600.016	16	84	100
2487.12.06600.019	19	87	106
2487.12.06600.025	25	93	118
2487.12.06600.032	32	100	132
2487.12.06600.038	38	106	144
2487.12.06600.050	50	118	168
2487.12.06600.063	63	131	194
2487.12.06600.075	75	143	218
2487.12.06600.080	80	148	228
2487.12.06600.100	100	168	268
2487.12.06600.125	125	193	318

Initial spring force versus charge pressure



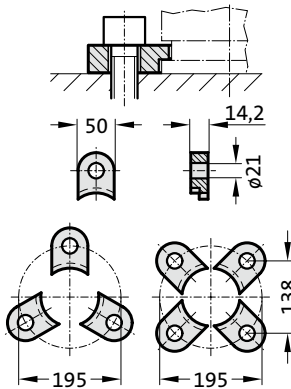
Spring force Diagram displacement versus stroke rise



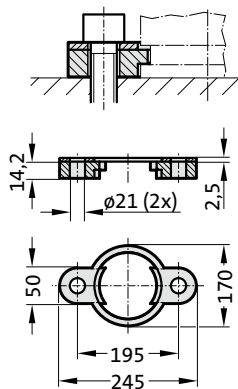
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

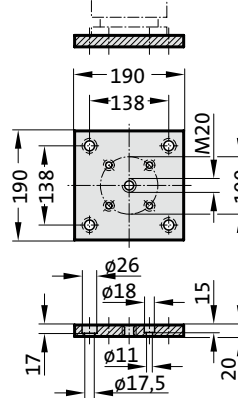
2480.007.07500



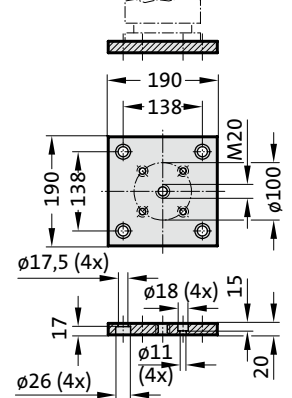
2480.008.07500³⁾



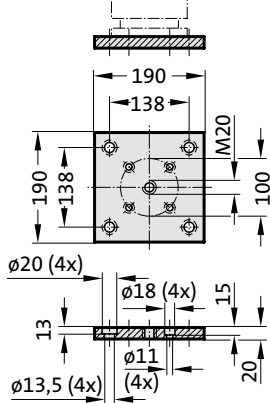
2480.011.07500



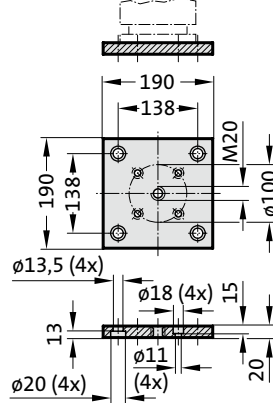
2480.011.07500.2



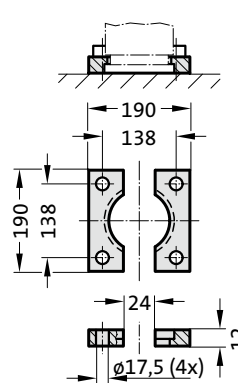
2480.011.03.07500



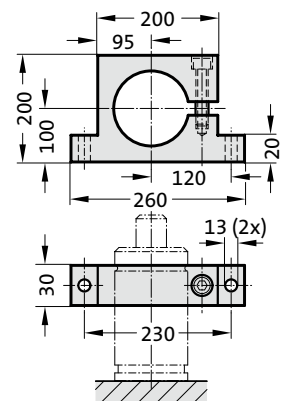
2480.011.03.07500.2



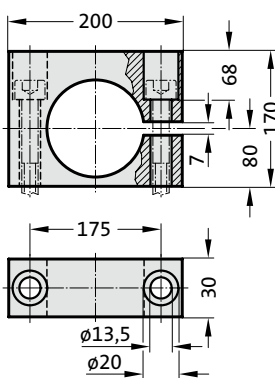
2480.022.07500



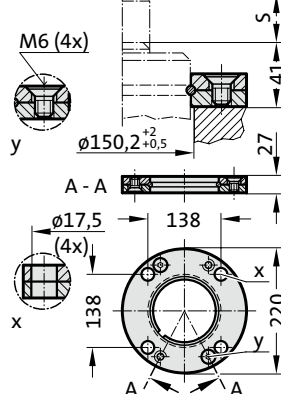
2480.044.07500²⁾



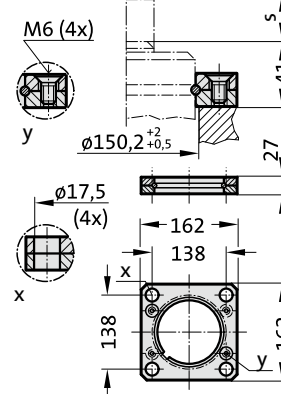
2480.044.03.07500²⁾



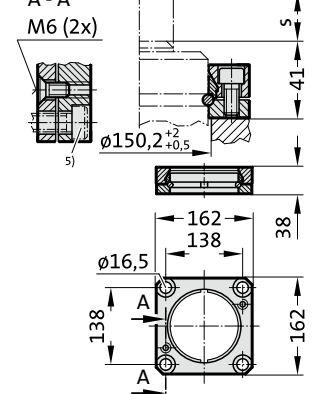
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 9500 daN

Order No for spare parts kit: 2487.12.09500

Gas spring without valve

Order No (example): 2487.12.09500. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

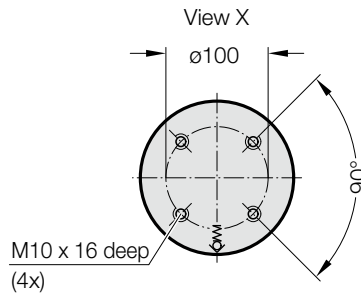
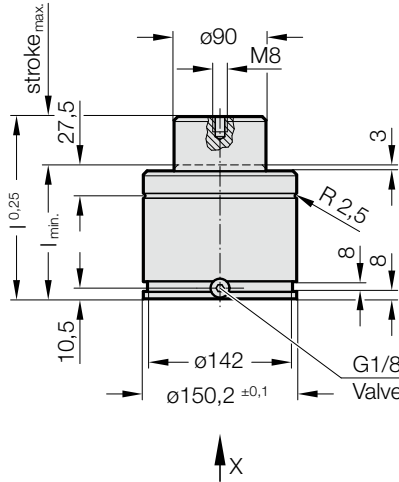
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 20 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.09500.

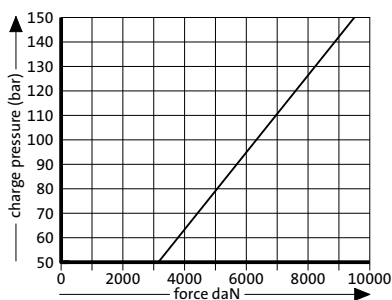


2487.12.09500.

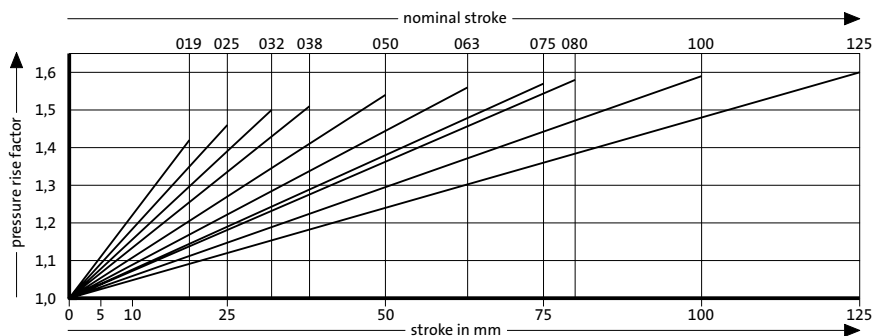
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.09500.019	19	97	116
2487.12.09500.025	25	103	128
2487.12.09500.032	32	110	142
2487.12.09500.038	38	116	154
2487.12.09500.050	50	128	178
2487.12.09500.063	63	141	204
2487.12.09500.075	75	153	228
2487.12.09500.080	80	158	238
2487.12.09500.100.	100	178	278
2487.12.09500.125.	125	203	328

Initial spring force versus charge pressure



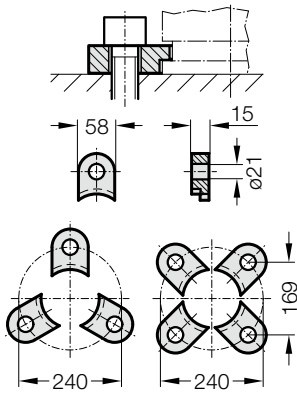
Spring force Diagram displacement versus stroke rise



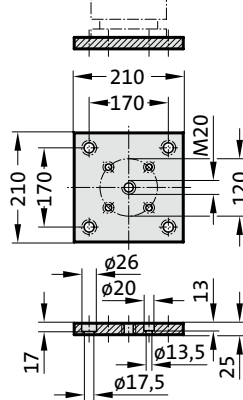
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE MOUNTING VARIATIONS

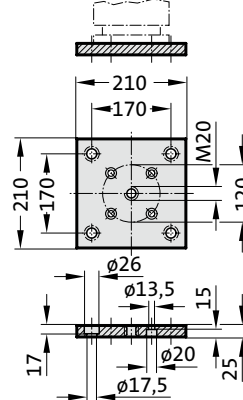
2480.007.10000



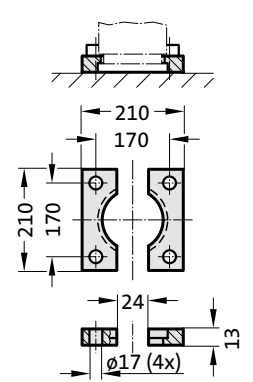
2480.011.10000



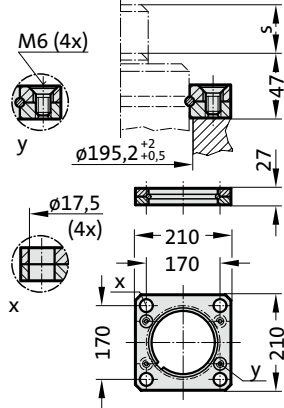
2480.011.10000.2



2480.022.10000



2480.057.10000



GAS SPRING POWERLINE

Note:

Initial spring force at 150 bar = 20000 daN

Order No for spare parts kit: 2487.12.20000

Gas spring without valve

Order No (example): 2487.12.20000. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

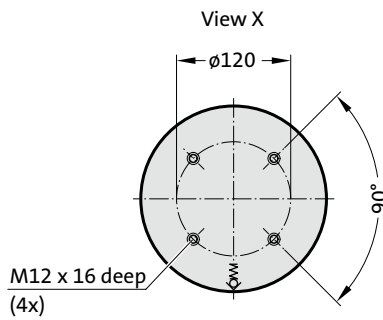
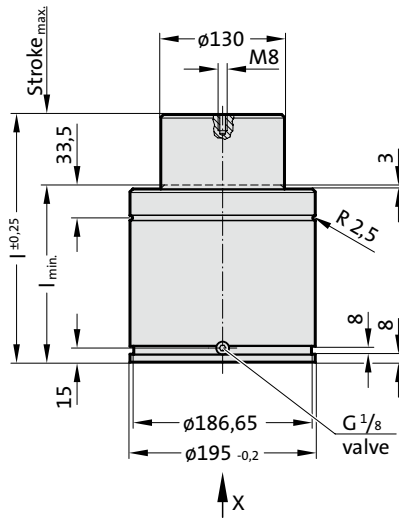
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 10 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

2487.12.20000.

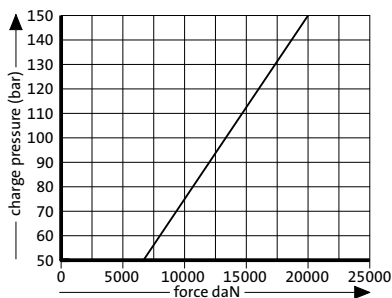


2487.12.20000.

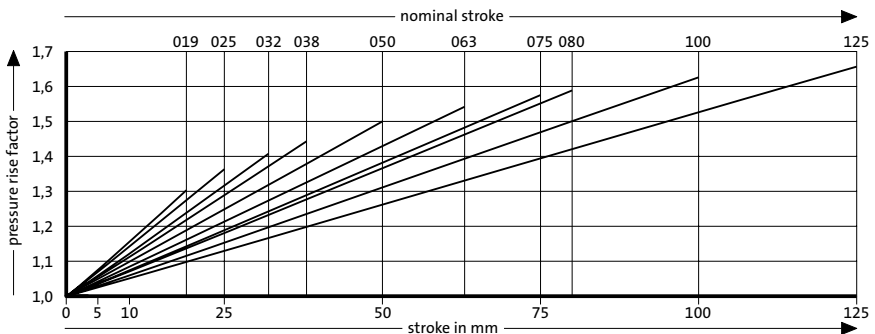
Gas spring POWERLINE

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.20000.019	19	129	148
2487.12.20000.025	25	135	160
2487.12.20000.032	32	142	174
2487.12.20000.038	38	148	186
2487.12.20000.050	50	160	210
2487.12.20000.063	63	173	236
2487.12.20000.075	75	185	260
2487.12.20000.080	80	190	270
2487.12.20000.100	100	210	310
2487.12.20000.125	125	235	360

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



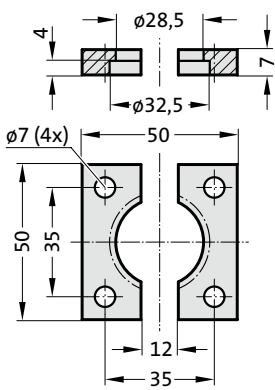
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS POWERLINE, WITH REINFORCED SPRING BASE

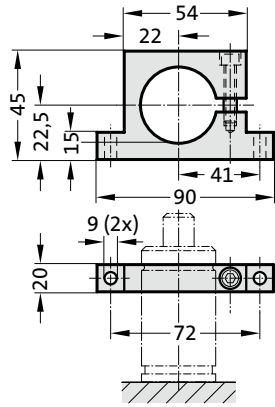


GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

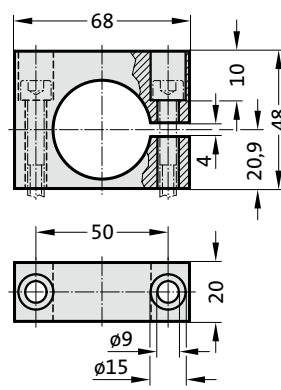
2480.022.00150



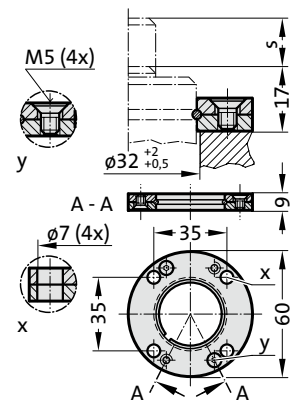
2480.044.00150²⁾



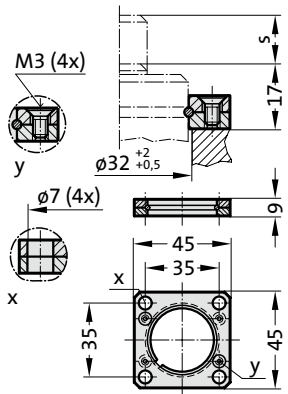
2480.044.03.00150²⁾



2480.055.00150



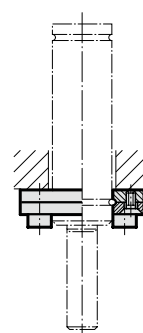
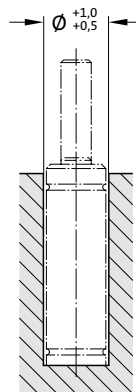
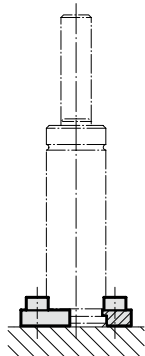
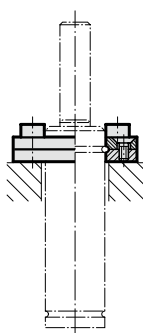
2480.057.00150



Note:

²⁾ Attention:
The spring force must be absorbed by the stop surface!

Mounting examples:



GAS SPRING POWERLINE WITH REINFORCED SPRING BASE

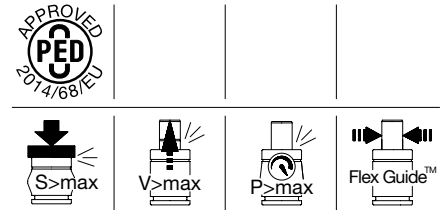
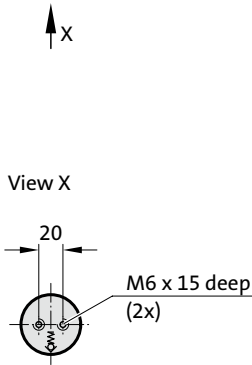
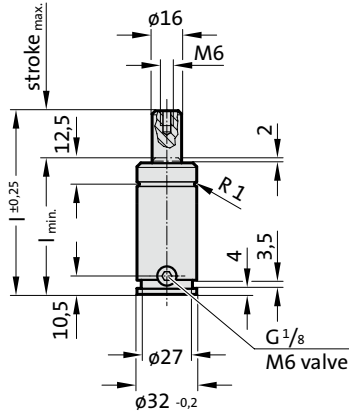
Note:

Initial spring force at 180 bar = 350 daN

Order No for spare parts kit: 2487.12.00350

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 180 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 100 (at 20°C)
- Max. piston speed: 1.6 m/s

2487.12.33.00350.

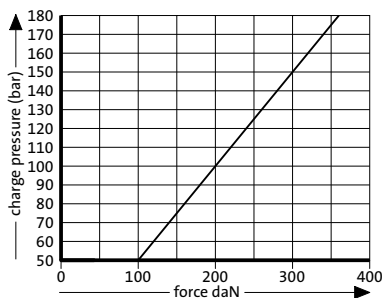


2487.12.33.00350.

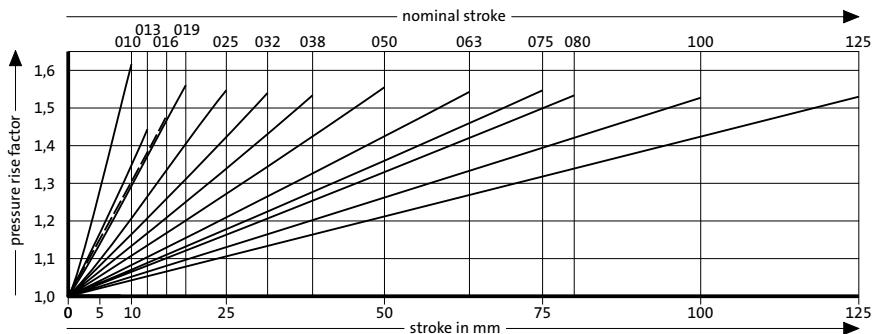
Gas spring POWERLINE with reinforced spring base

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.33.00350.010	10	50	60
2487.12.33.00350.013	13	53	66
2487.12.33.00350.016	16	56	72
2487.12.33.00350.019	19	59	78
2487.12.33.00350.025	25	65	90
2487.12.33.00350.032	32	72	104
2487.12.33.00350.038	38	78	116
2487.12.33.00350.050	50	90	140
2487.12.33.00350.063	63	103	166
2487.12.33.00350.075	75	115	190
2487.12.33.00350.080	80	120	200
2487.12.33.00350.100	100	140	240
2487.12.33.00350.125	125	165	290

Initial spring force versus charge pressure



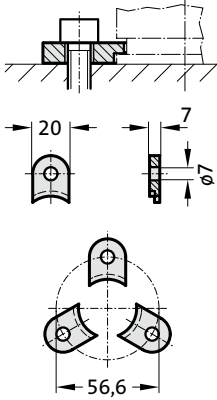
Spring force Diagram displacement versus stroke rise



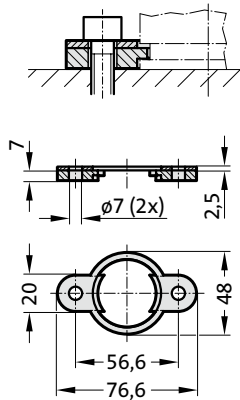
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

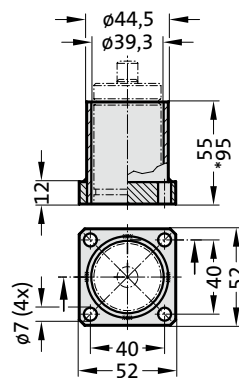
2480.007.00250



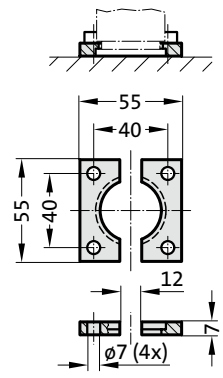
2480.008.00250³⁾



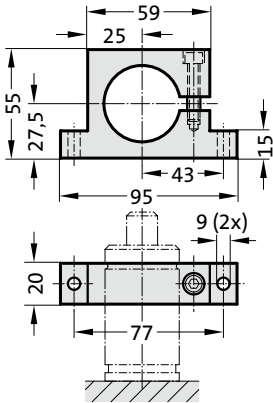
2480.010.00250.055³⁾
2480.010.00250.095*³⁾



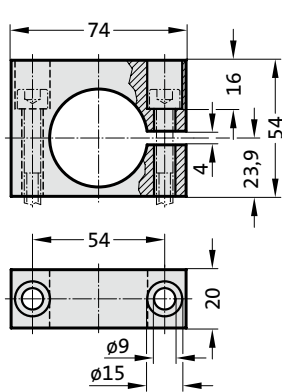
2480.022.00250



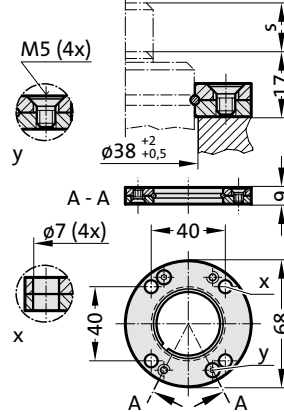
2480.044.00250²⁾



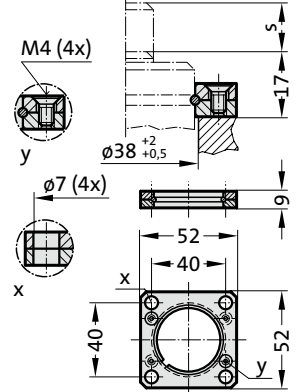
2480.044.03.00250²⁾



2480.055.00250



2480.057.00250



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE

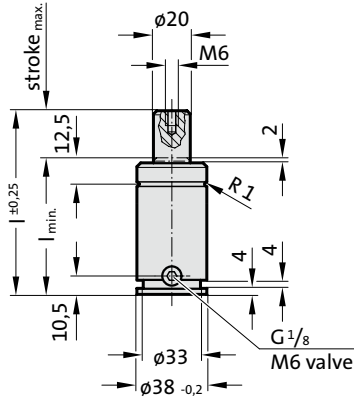
Note:

Initial spring force at 150 bar = 470 daN

Order No for spare parts kit: 2487.12.00500

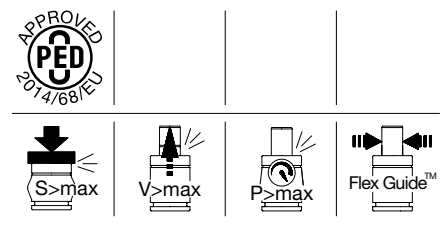
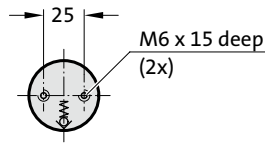
- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 100 (at 20°C)
- Max. piston speed: 1.6 m/s

2487.12.33.00500.



X

View X

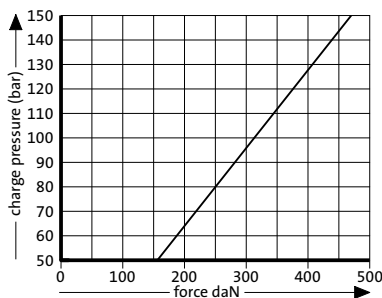


2487.12.33.00500.

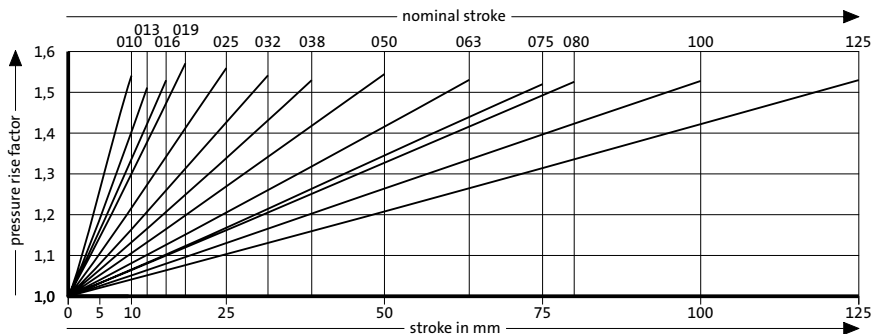
Gas spring POWERLINE with reinforced spring base

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.33.00500.010	10	50	60
2487.12.33.00500.013	13	53	66
2487.12.33.00500.016	16	56	72
2487.12.33.00500.019	19	59	78
2487.12.33.00500.025	25	65	90
2487.12.33.00500.032	32	72	104
2487.12.33.00500.038	38	78	116
2487.12.33.00500.050	50	90	140
2487.12.33.00500.063	63	103	166
2487.12.33.00500.075	75	115	190
2487.12.33.00500.080	80	120	200
2487.12.33.00500.100	100	140	240
2487.12.33.00500.125	125	165	290

Initial spring force versus charge pressure



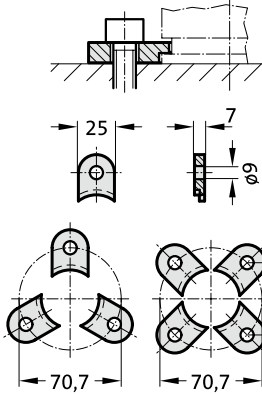
Spring force Diagram displacement versus stroke rise



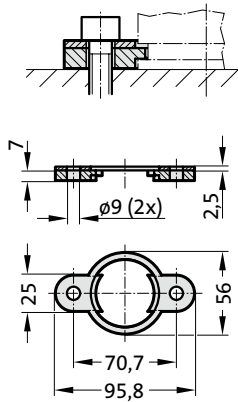
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

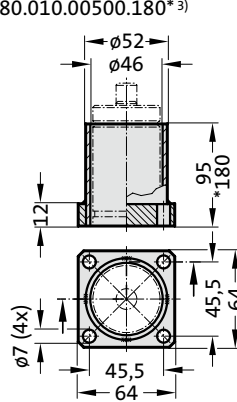
2480.007.00500



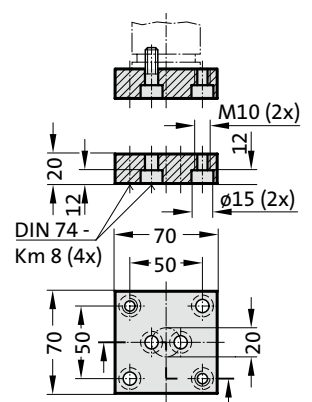
2480.008.00500³⁾



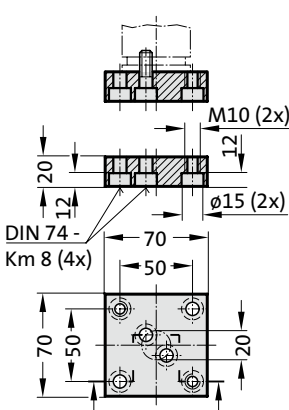
2480.010.00500.095³⁾
2480.010.00500.180*³⁾



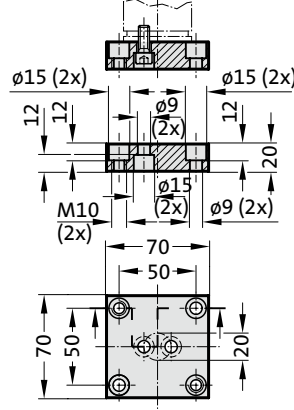
2480.011.00500



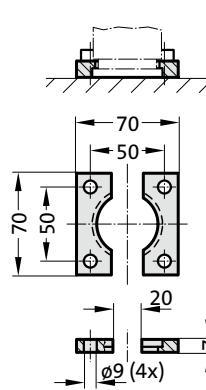
2480.011.00500.1



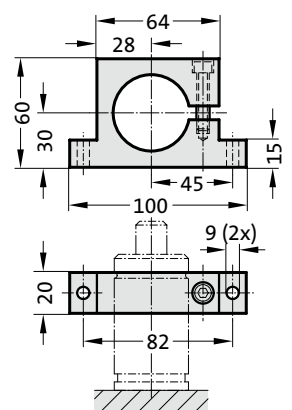
2480.011.00500.2



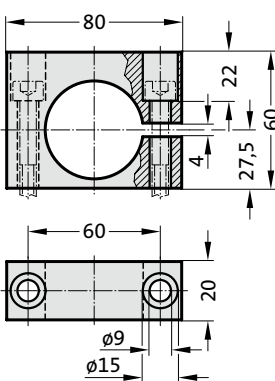
2480.022.00500



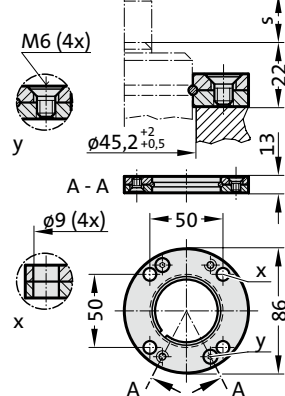
2480.044.00500²⁾



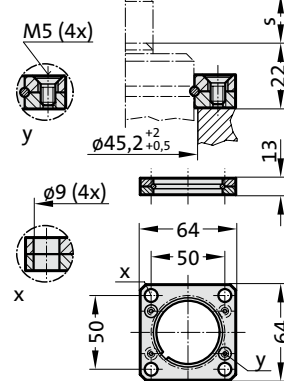
2480.044.03.00500²⁾



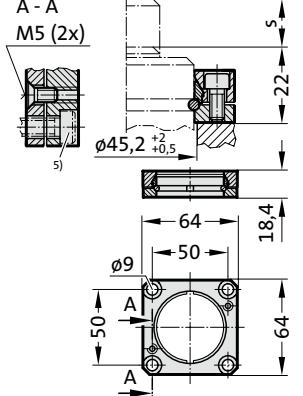
2480.055.00500



2480.057.00500



2480.064.00500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE

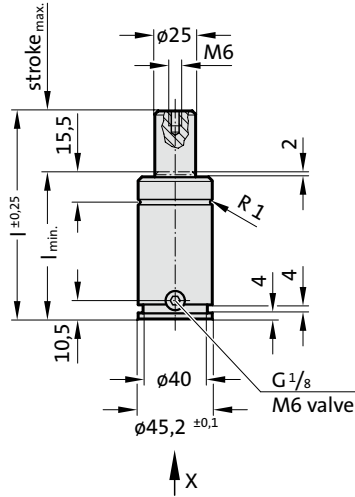
Note:

Initial spring force at 150 bar = 750 daN

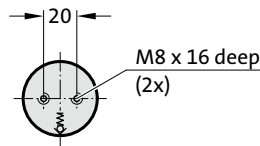
Order No for spare parts kit: 2487.12.00750

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 20 to 100 (at 20°C)
 Max. piston speed: 1.6 m/s

2487.12.33.00750.



View X

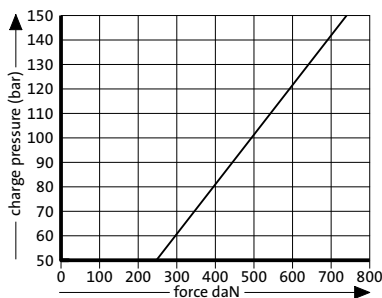


2487.12.33.00750.

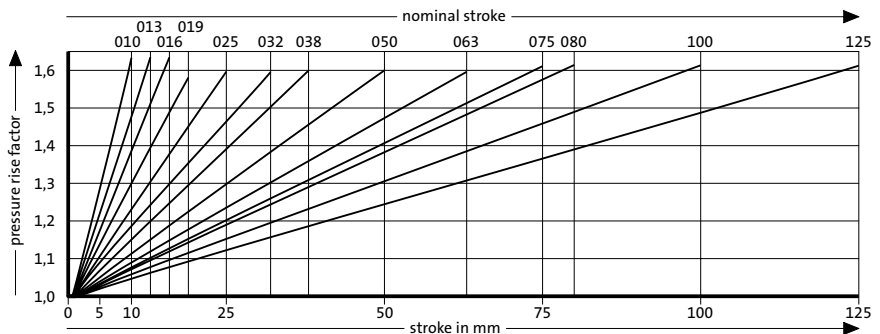
Gas spring POWERLINE with reinforced spring base

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.33.00750.010	10	57	67
2487.12.33.00750.013	13	60	73
2487.12.33.00750.016	16	63	79
2487.12.33.00750.019	19	66	85
2487.12.33.00750.025	25	72	97
2487.12.33.00750.032	32	79	111
2487.12.33.00750.038	38	85	123
2487.12.33.00750.050	50	97	147
2487.12.33.00750.063	63	110	173
2487.12.33.00750.075	75	122	197
2487.12.33.00750.080	80	127	207
2487.12.33.00750.100	100	147	247
2487.12.33.00750.125	125	172	297

Initial spring force versus charge pressure



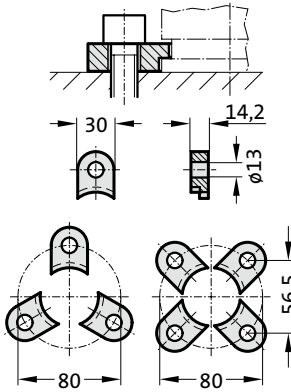
Spring force Diagram displacement versus stroke rise



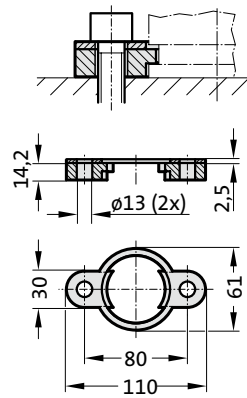
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

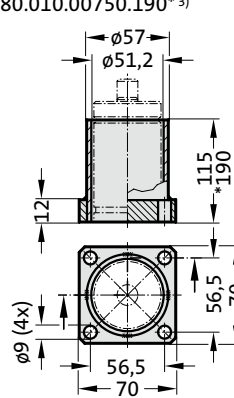
2480.007.00750



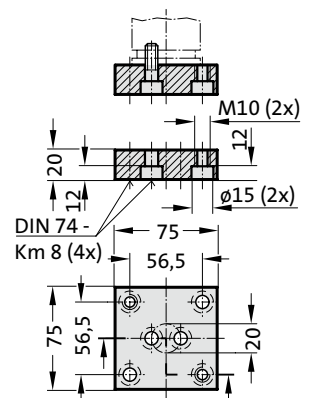
2480.008.00750³⁾



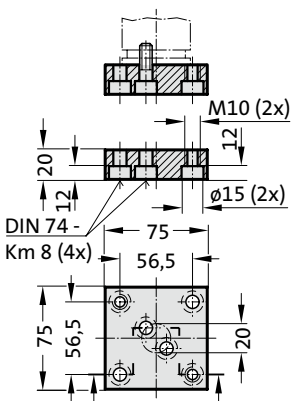
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



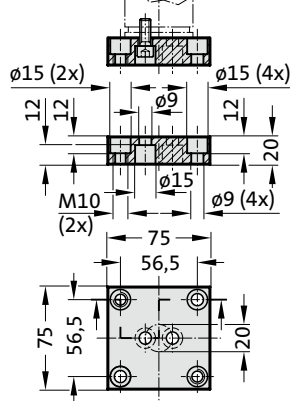
2480.011.00750



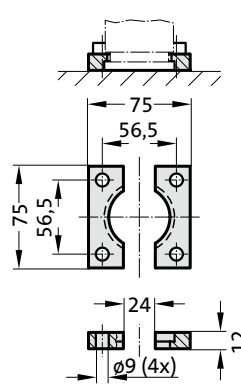
2480.011.00750.1



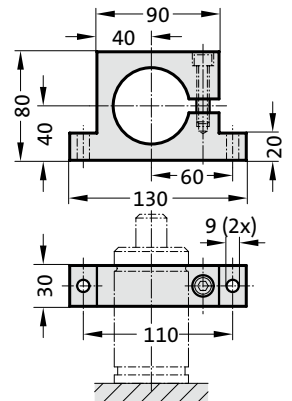
2480.011.00750.3



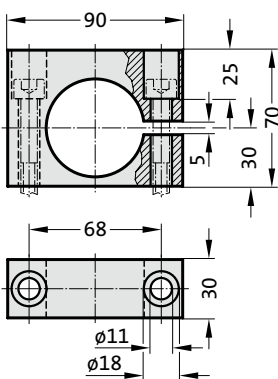
2480.022.00750



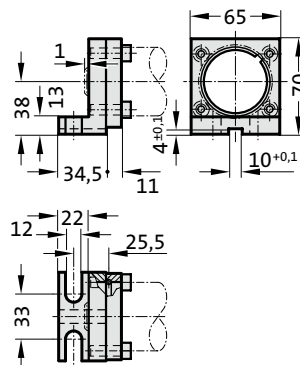
2480.044.00750²⁾



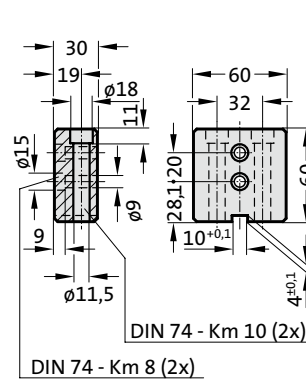
2480.044.03.00750²⁾



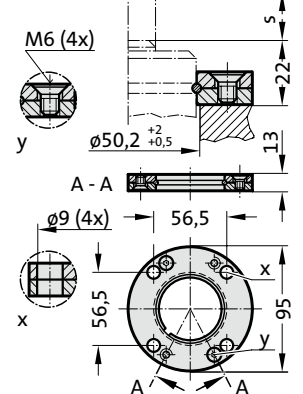
2480.045.00750²⁾



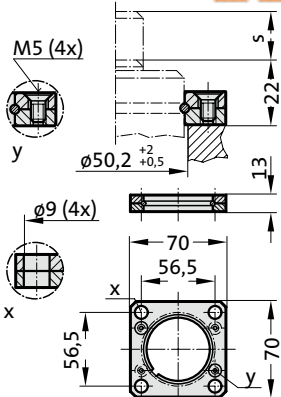
2480.047.00750²⁾



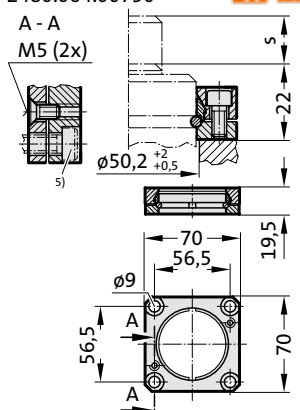
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾

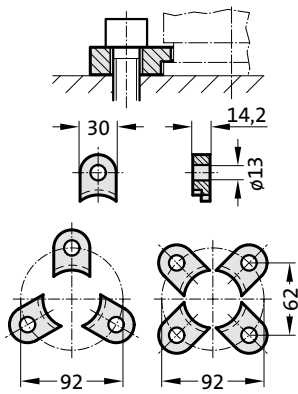


Note:

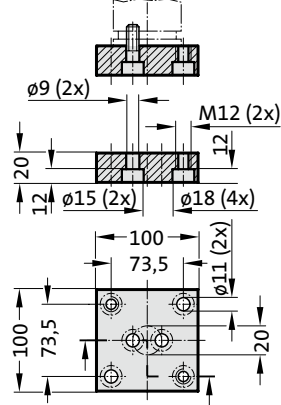
- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

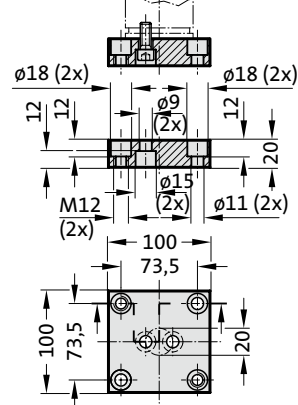
2480.007.01000



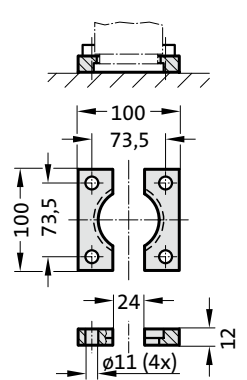
2480.011.01000



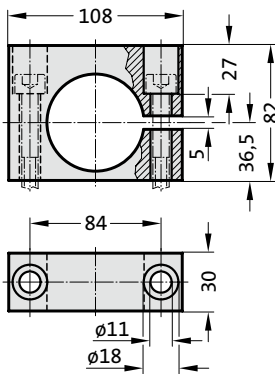
2480.011.01000.2



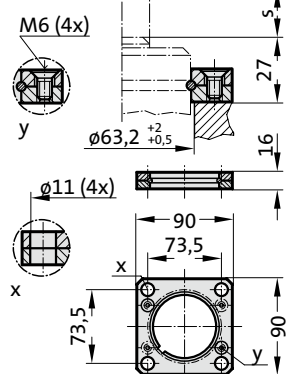
2480.022.01000



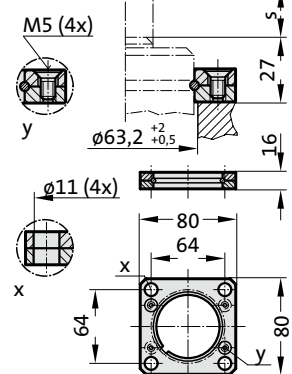
2480.044.03.01000²⁾



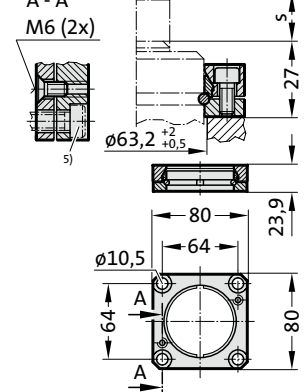
2480.057.01000



2480.057.03.01000



2480.064.01000⁴⁾



Note:

²⁾ Attention:

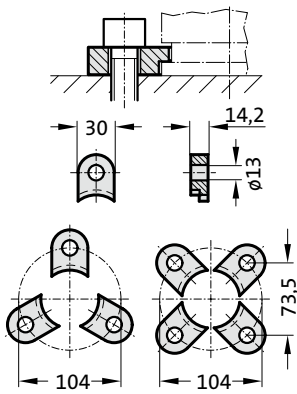
The spring force must be absorbed by the stop Surface!

⁴⁾ Square collar flange, non-rotating, fixing for composite connection.

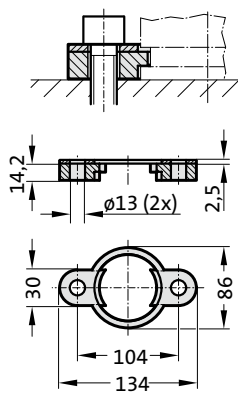
⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

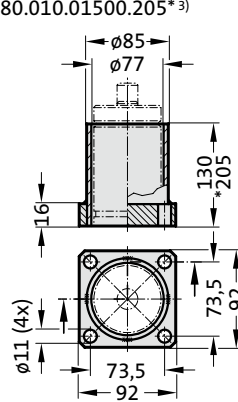
2480.007.01500



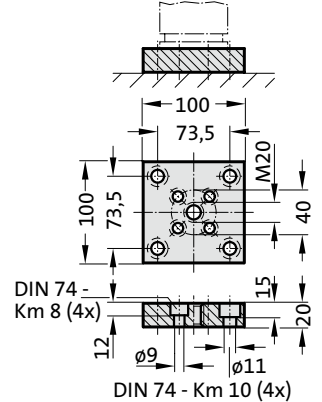
2480.008.01500³⁾



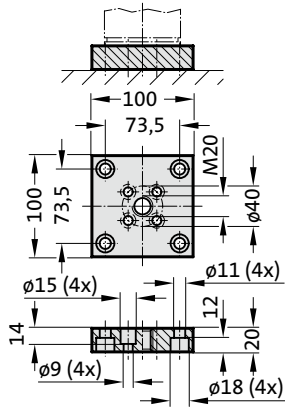
2480.010.01500.130³⁾
2480.010.01500.205*³⁾



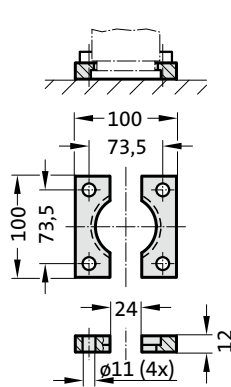
2480.011.01500



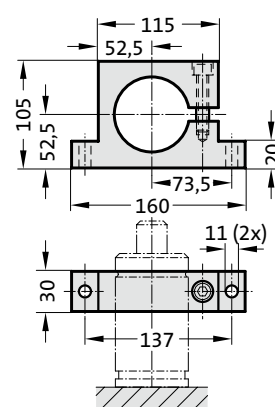
2480.011.01500.2



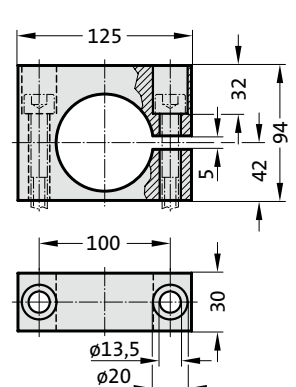
2480.022.01500



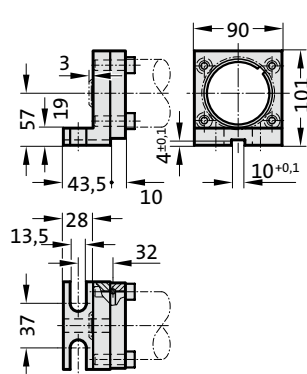
2480.044.01500²⁾



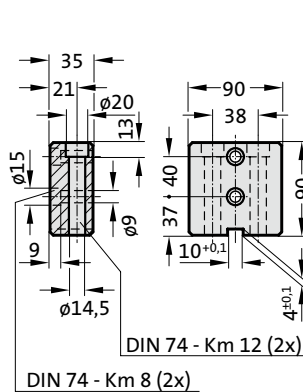
2480.044.03.01500²⁾



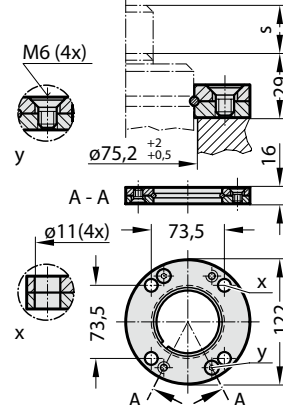
2480.045.01500²⁾



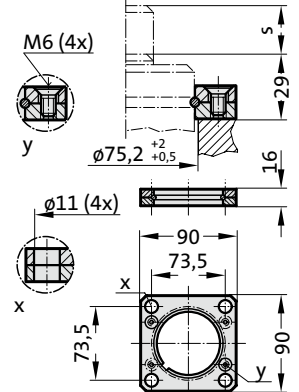
2480.047.01500²⁾



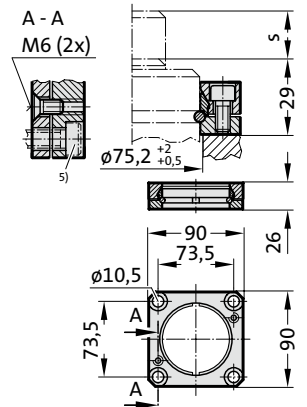
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾

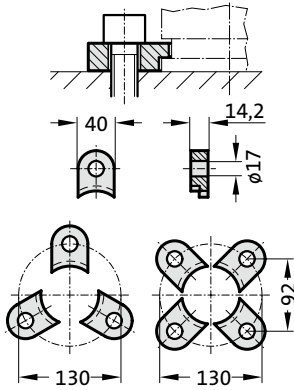


Note:

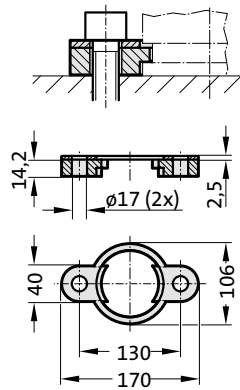
- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

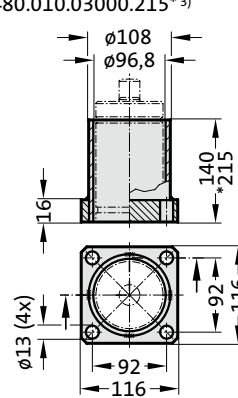
2480.007.03000



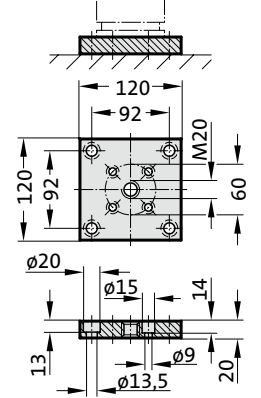
2480.008.03000³⁾



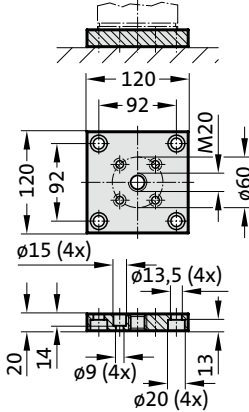
2480.010.03000.140³⁾
2480.010.03000.215*³⁾



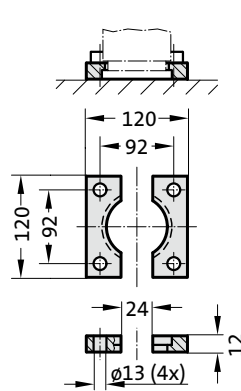
2480.011.03000



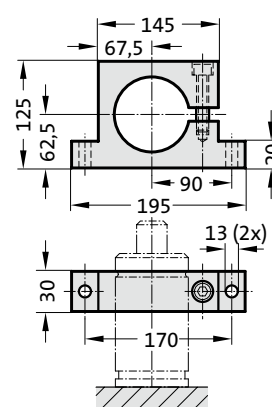
2480.011.03000.2



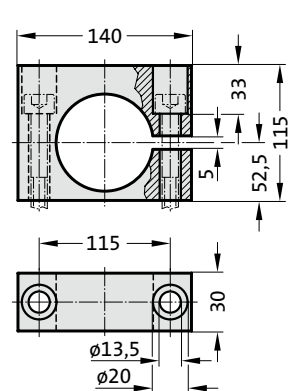
2480.022.03000



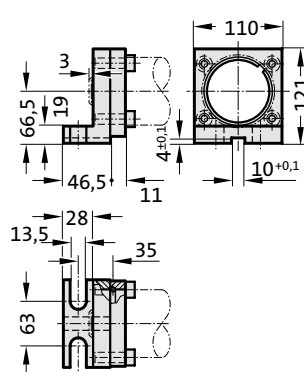
2480.044.03000²⁾



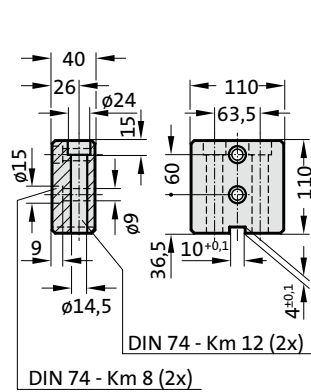
2480.044.03.03000²⁾



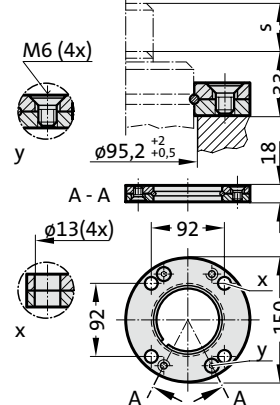
2480.045.03000²⁾



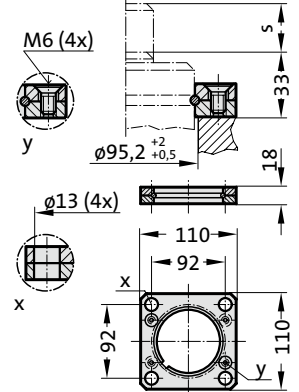
2480.047.03000²⁾



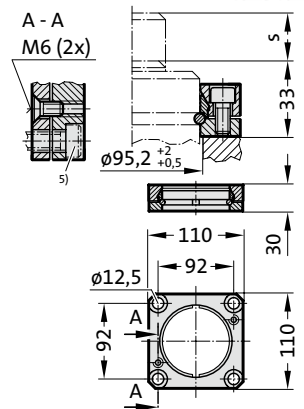
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾

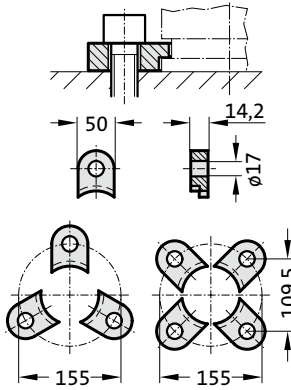


Note:

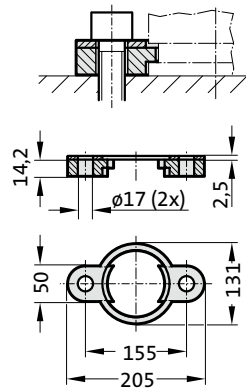
- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE MOUNTING VARIATIONS

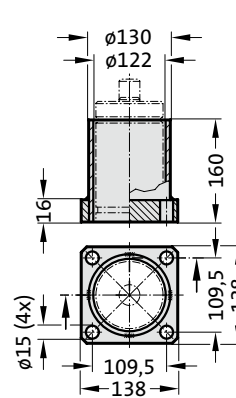
2480.007.05000



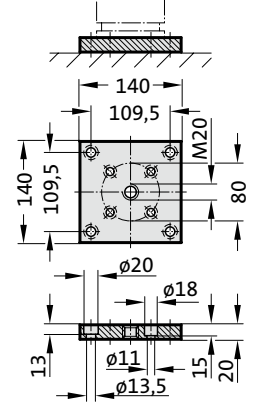
2480.008.05000³⁾



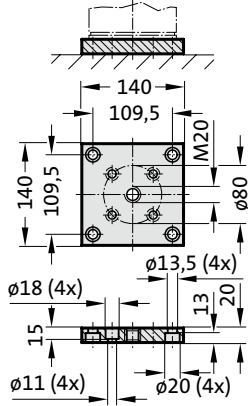
2480.010.05000.160³⁾



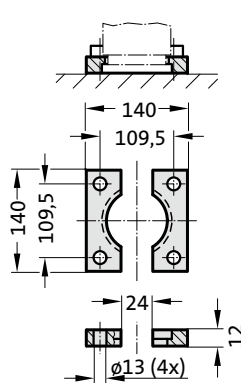
2480.011.05000



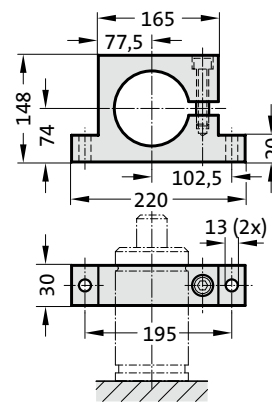
2480.011.05000.2



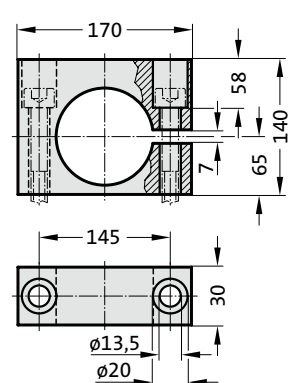
2480.022.05000



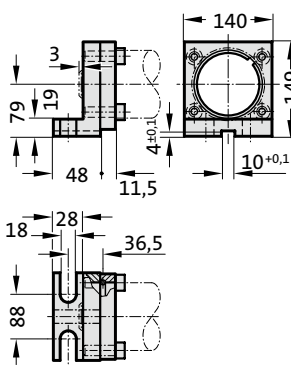
2480.044.05000²⁾



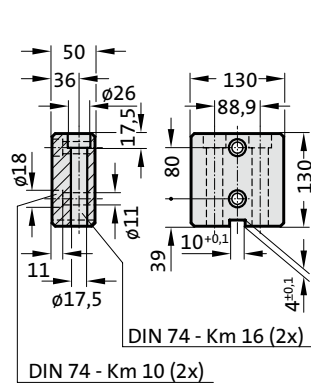
2480.044.03.05000²⁾



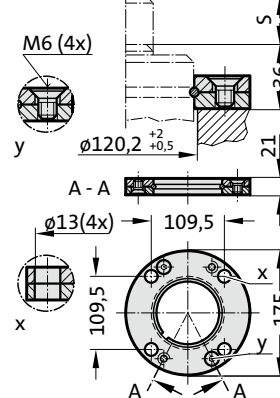
2480.045.05000²⁾



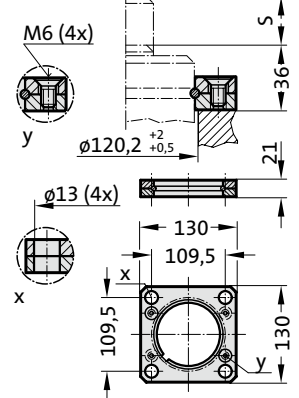
2480.047.05000²⁾



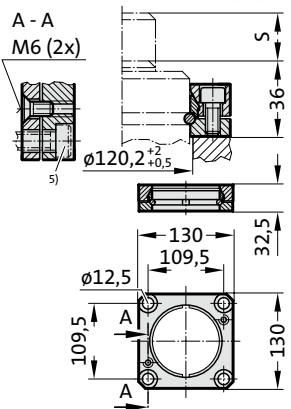
2480.055.05000



2480.057.05000



2480.064.05000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING POWERLINE WITH REINFORCED SPRING BASE

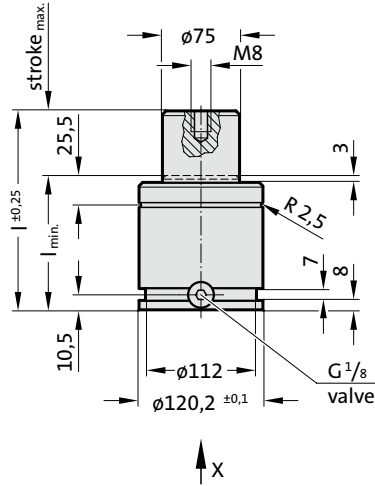
Note:

Initial spring force at 150 bar = 6630 daN

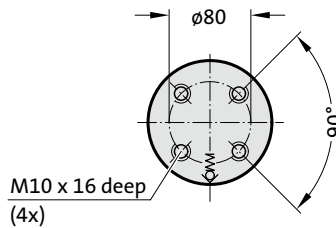
Order No for spare parts kit: 2487.12.06600

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 100 (at 20°C)
- Max. piston speed: 1.6 m/s

2487.12.33.06600.



View X

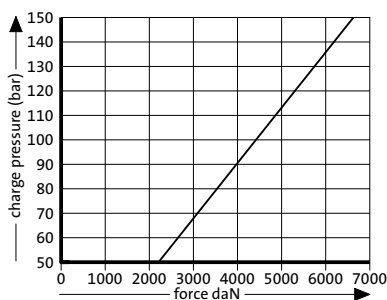


2487.12.33.06600.

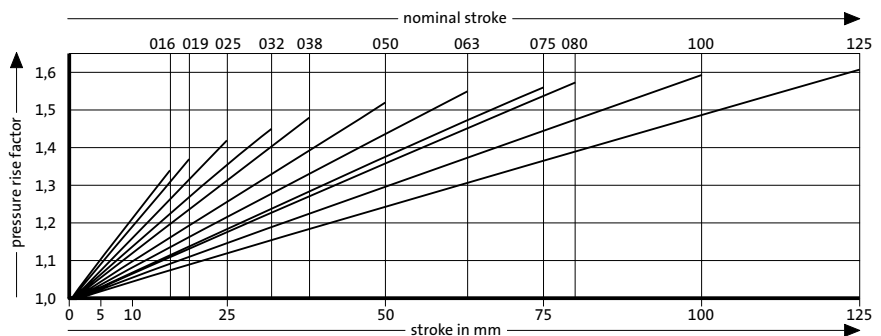
Gas spring POWERLINE with reinforced spring base

Order No	Stroke _{max.} (s)	l _{min.}	l
2487.12.33.06600.016	16	88	104
2487.12.33.06600.019	19	91	110
2487.12.33.06600.025	25	97	122
2487.12.33.06600.032	32	104	136
2487.12.33.06600.038	38	110	148
2487.12.33.06600.050	50	122	172
2487.12.33.06600.063	63	135	198
2487.12.33.06600.075	75	147	222
2487.12.33.06600.080	80	152	232
2487.12.33.06600.100	100	172	272
2487.12.33.06600.125	125	197	322

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



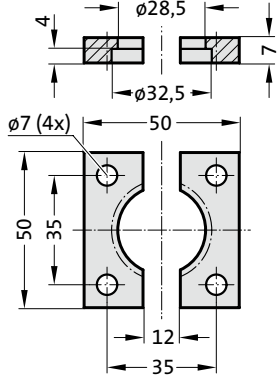
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS CX - COMPACT XTREME

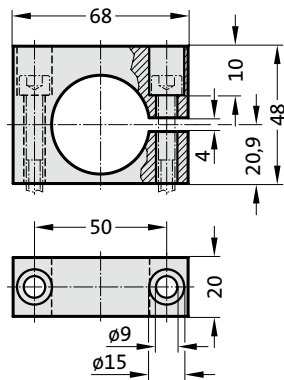


GAS SPRING CX - COMPACT XTREME, MOUNTING VARIATIONS

2480.022.00150



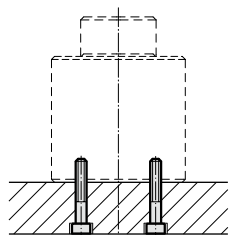
2480.044.03.00150²⁾



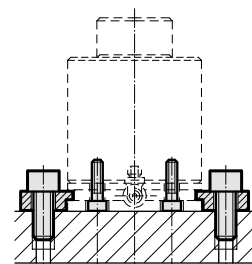
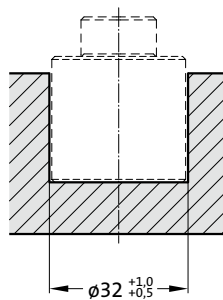
Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



see Note!



with Adapter Baseplate

GAS SPRING CX - COMPACT XTREME,

Note:

Initial spring force at 200 bar = 500 daN

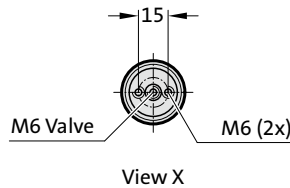
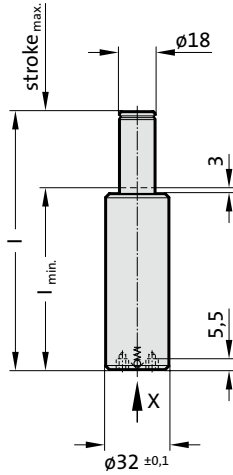
Order No for spare parts kit: 2497.12.00500

For stroke lengths over 25 mm, the gas pressure springs in the tool should be attached to the base through the threaded holes.

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

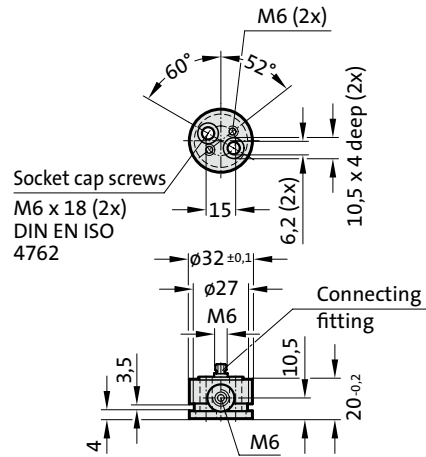
Pressure medium: Nitrogen N₂
 Max. filling pressure: 200 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 70 to 200 (at 20°C)
 Max. piston speed: 1.6 m/s

2497.12.00500.



2497.00.20.00500

Adapter baseplate with connecting fitting, without valve (only for use with composite connections)

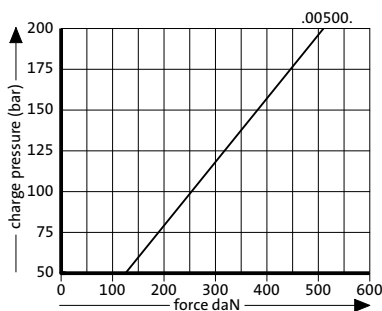


2497.12.00500.

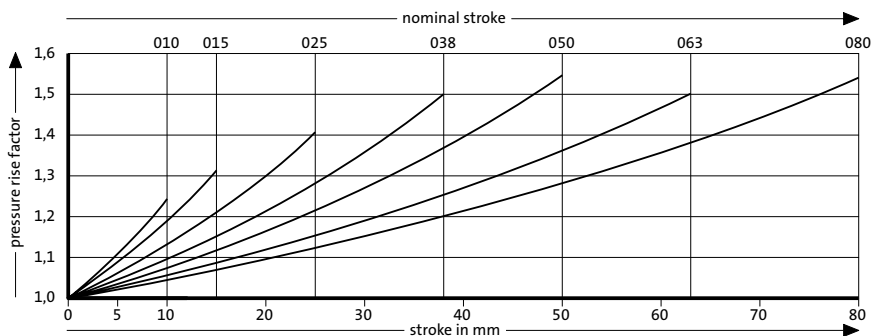
Gas spring CX - Compact xtreme,

Order No	Stroke _{max.} (s)	l _{min.}	l
2497.12.00500.010	10	65	75
2497.12.00500.015	15	70	85
2497.12.00500.025	25	80	105
2497.12.00500.038	38	92	130
2497.12.00500.050	50	105	155
2497.12.00500.063	63	127	190
2497.12.00500.080	80	145	225

Initial spring force versus charge pressure



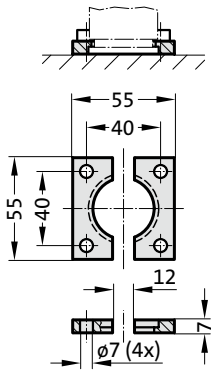
Spring force Diagram displacement versus stroke rise



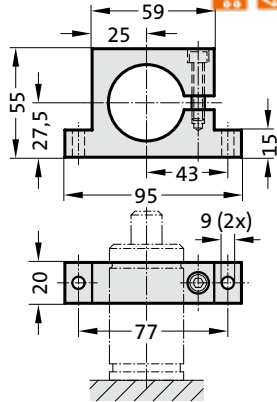
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING CX - COMPACT XTREME, MOUNTING VARIATIONS

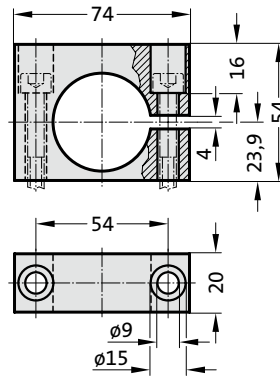
2480.022.00250



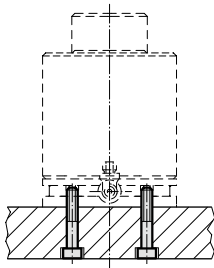
2480.044.00250²⁾



2480.044.03.00250²⁾



Mounting example:

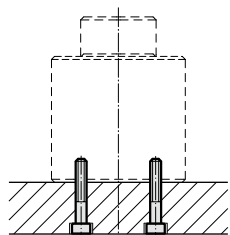


with Adapter Baseplate

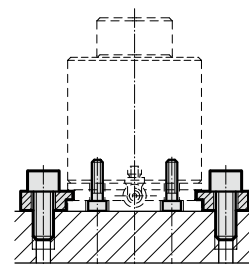
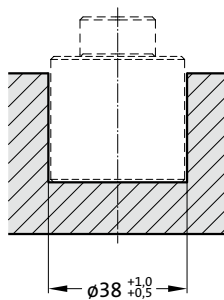
Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



see Note!



with Adapter Baseplate

GAS SPRING CX - COMPACT XTREME,

Note:

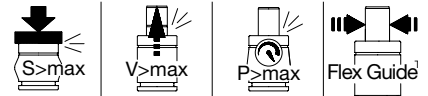
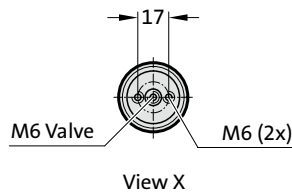
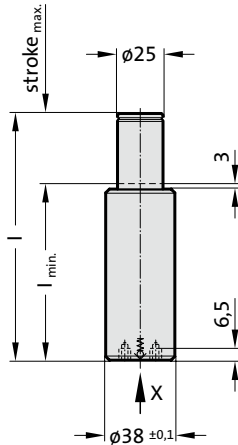
Initial spring force at 200 bar = 1000 daN

Order No for spare parts kit: 2497.12.01000

For stroke lengths over 25 mm, the gas pressure springs in the tool should be attached to the base through the threaded holes.
When mounting to floor, contact over the entire floor of the cylinder tube must be ensured!
Before fitting the adapter base plate remove the valve from the gas spring.
If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂
Max. filling pressure: 200 bar
Min. filling pressure: 25 bar
Working temperature: 0°C to +80°C
Temperature related force increase: ± 0.3%/°C
Max. recommended extensions per minute: approx. 70 to 200 (at 20°C)
Max. piston speed: 1.6 m/s

2497.12.01000.

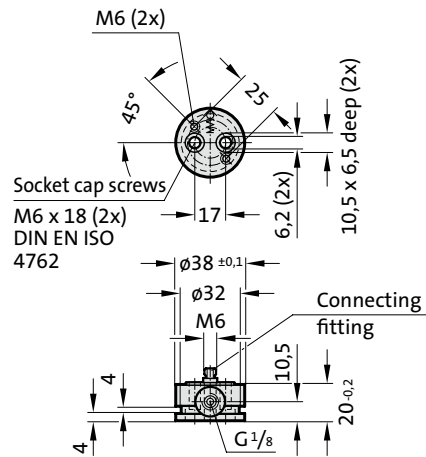


2497.12.01000.

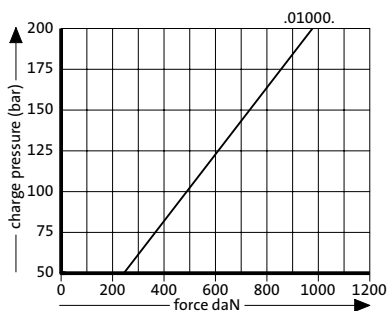
Gas spring CX - Compact xtreme,

2497.00.20.01000

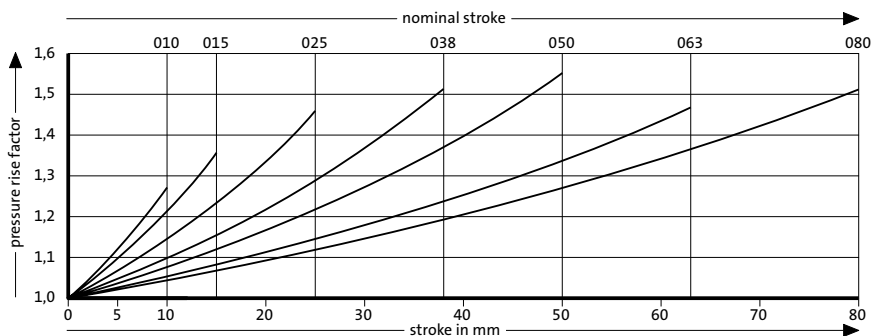
Adapter baseplate with connecting fitting, with valve



Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise

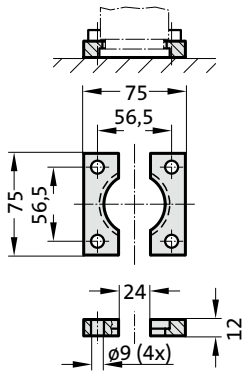


Pressure rise factor accounts for displacement but not external influences!

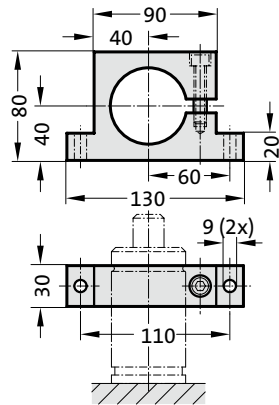
Order No	Stroke _{max.} (s)	l _{min.}	l
2497.12.01000.010	10	65	75
2497.12.01000.015	15	70	85
2497.12.01000.025	25	80	105
2497.12.01000.038	38	97	135
2497.12.01000.050	50	110	160
2497.12.01000.063	63	142	205
2497.12.01000.080	80	160	240

GAS SPRING CX - COMPACT XTREME, MOUNTING VARIATIONS

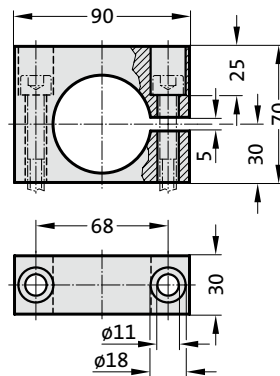
2480.022.00750



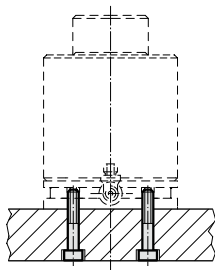
2480.044.00750²⁾



2480.044.03.00750²⁾



Mounting example:

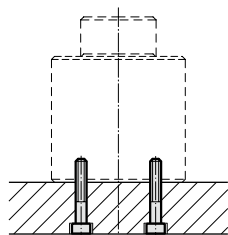


with Adapter Baseplate

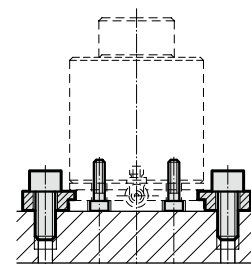
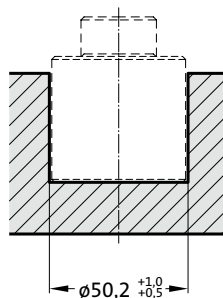
Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



see Note!



with Adapter Baseplate

GAS SPRING CX - COMPACT XTREME,

Note:

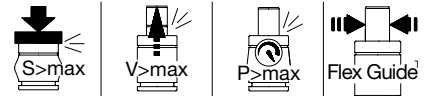
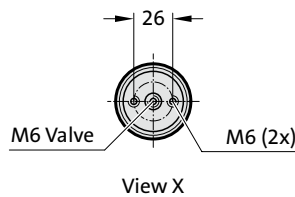
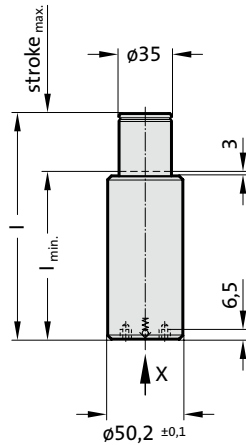
Initial spring force at 200 bar = 1900 daN

Order No for spare parts kit: 2497.12.01900

For stroke lengths over 25 mm, the gas pressure springs in the tool should be attached to the base through the threaded holes.
When mounting to floor, contact over the entire floor of the cylinder tube must be ensured!
Before fitting the adapter base plate remove the valve from the gas spring.
If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂
Max. filling pressure: 200 bar
Min. filling pressure: 25 bar
Working temperature: 0°C to +80°C
Temperature related force increase: ± 0.3%/°C
Max. recommended extensions per minute: approx. 50 to 130 (at 20°C)
Max. piston speed: 1.6 m/s

2497.12.01900.

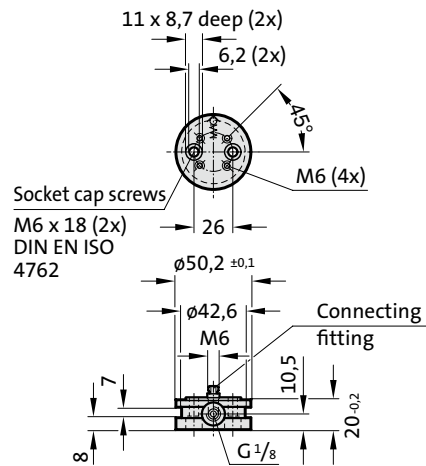


2497.12.01900.

Gas spring CX - Compact xtreme,

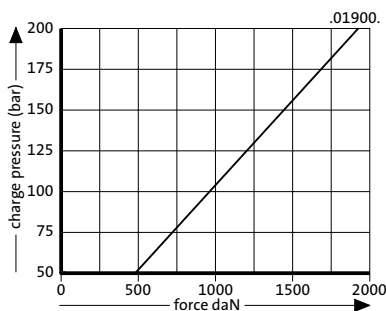
2497.00.20.01900

Adapter baseplate with connecting fitting, with valve

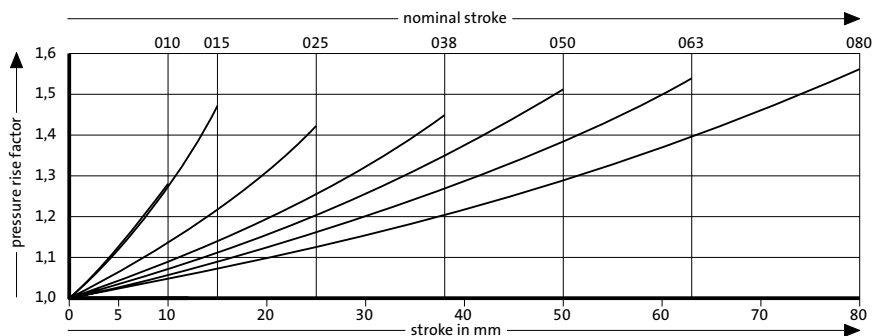


Order No	Stroke _{max.} (s)	l _{min.}	l
2497.12.01900.010	10	70	80
2497.12.01900.015	15	80	95
2497.12.01900.025	25	90	115
2497.12.01900.038	38	112	150
2497.12.01900.050	50	125	175
2497.12.01900.063	63	142	205
2497.12.01900.080	80	165	245

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



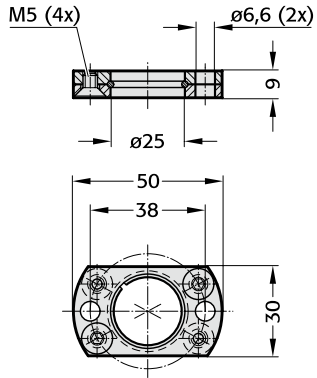
Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS COMPACT FOR SMALL DISPLACEMENTS AND HIGH FORCES

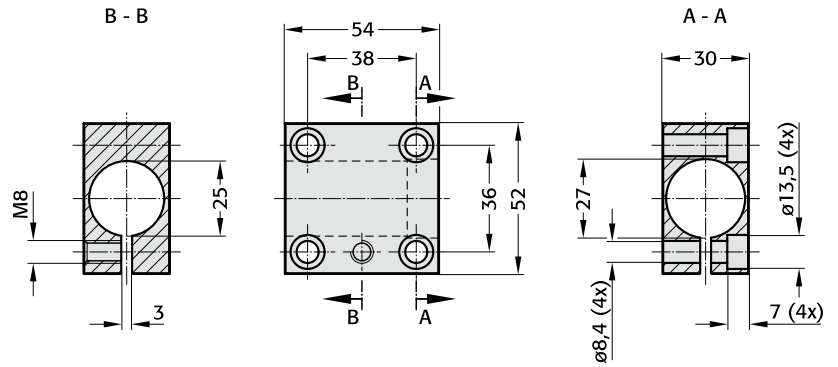


COMPACT GAS SPRING MOUNTING VARIATIONS

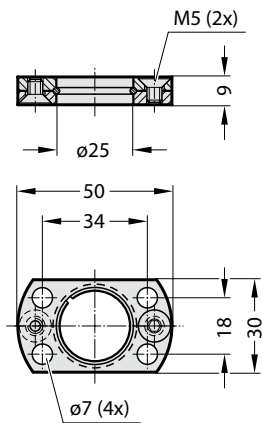
2480.051.00150



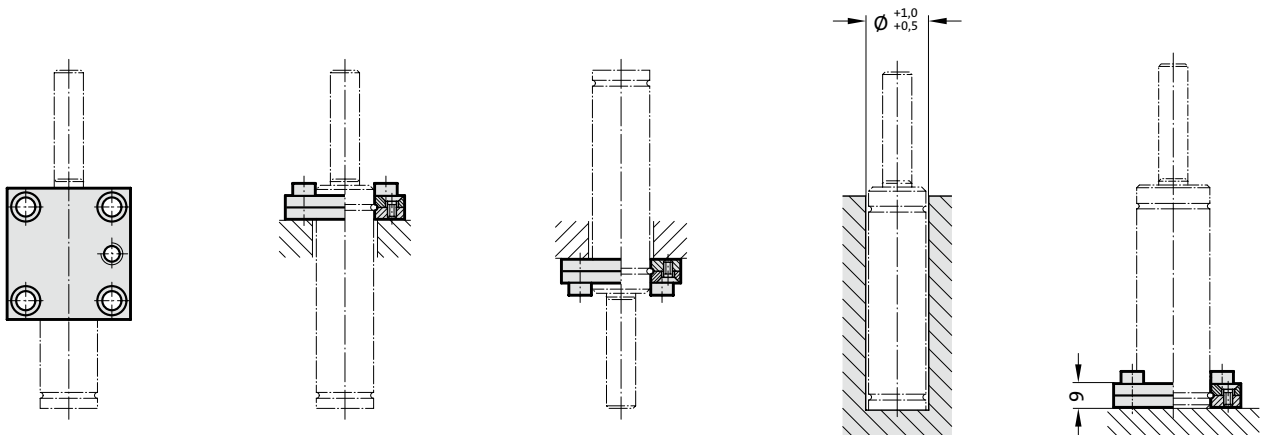
2480.053.00150



2480.054.00150



Mounting examples:



COMPACT GAS SPRING

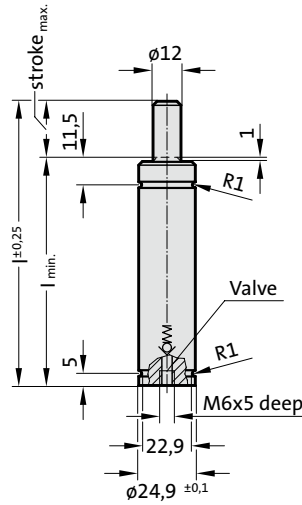
Note:

Initial spring force at 150 bar = 420 daN

Worn gas springs cannot be repaired, they have to be replaced completely.

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 50 to 100 (at 20°C)
- Max. piston speed: 0.8 m/s

2490.14.00420.

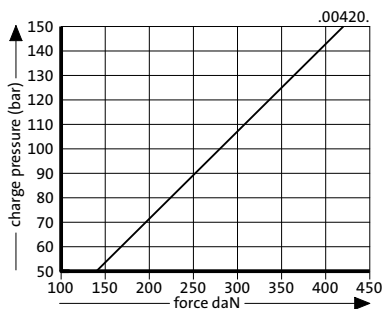


2490.14.00420.

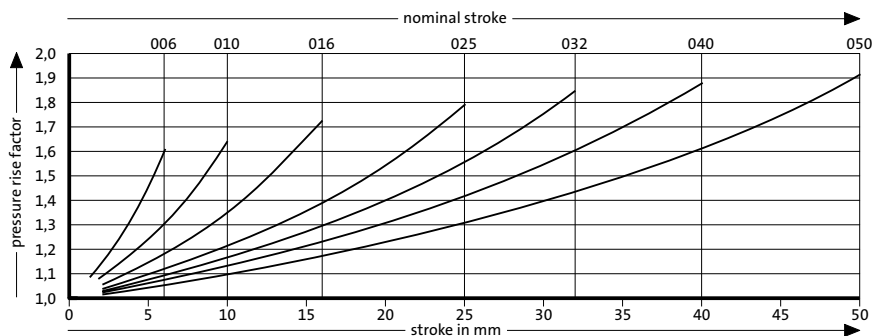
Compact gas spring

Order No	Stroke _{max.} (s)	l _{min.}	l
2490.14.00420.006	6	50	56
2490.14.00420.010	10	60	70
2490.14.00420.016	16	75	91
2490.14.00420.025	25	95	120
2490.14.00420.032	32	108	140
2490.14.00420.040	40	125	165
2490.14.00420.050	50	145	195

Initial spring force versus charge pressure



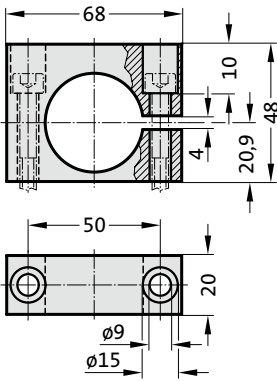
Spring force Diagram displacement versus stroke rise



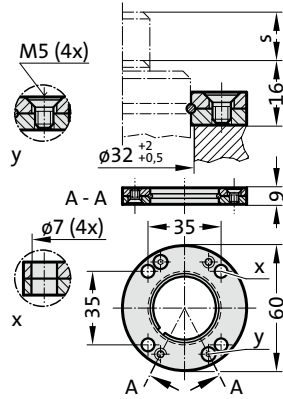
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

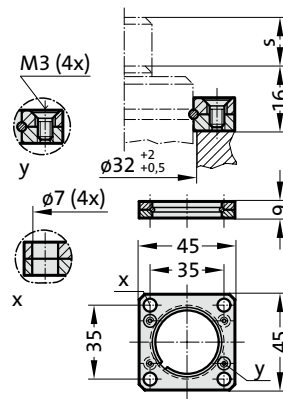
2480.044.03.00150²⁾



2480.055.00150



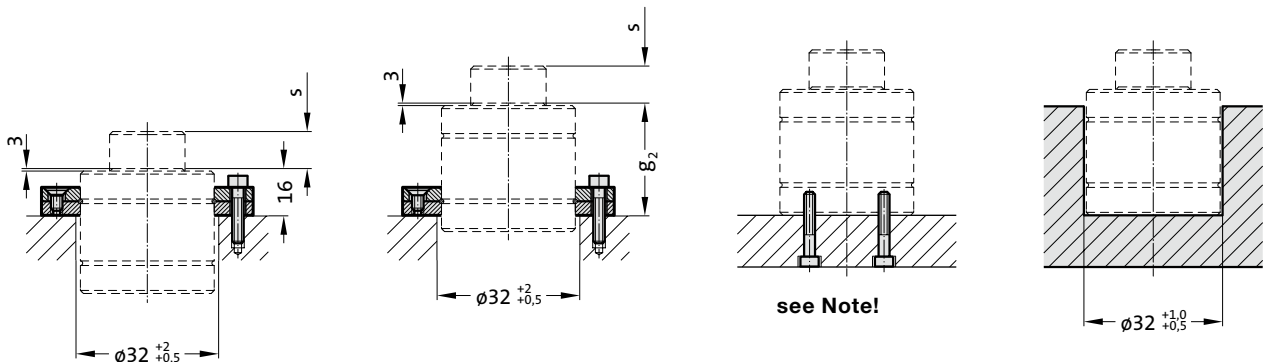
2480.057.00150



Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



COMPACT GAS SPRING

Note:

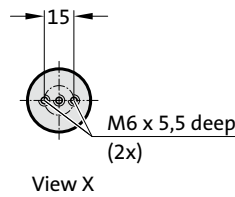
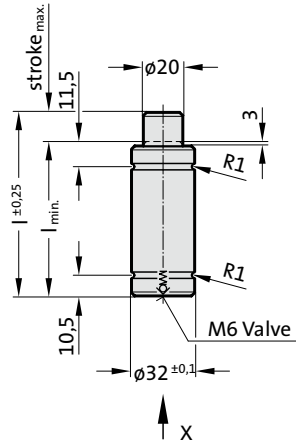
Initial spring force at 150 bar = 750 daN

Worn gas springs cannot be repaired, they have to be replaced completely.

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured!

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 50 to 100 (at 20°C)
- Max. piston speed: 0.8 m/s

2490.14.00750.



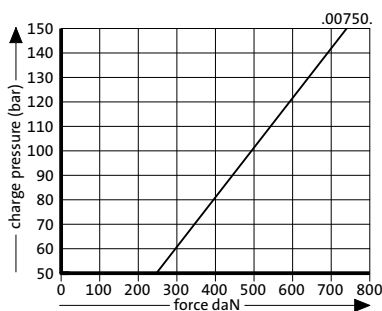
2490.14.00750.

Compact gas spring

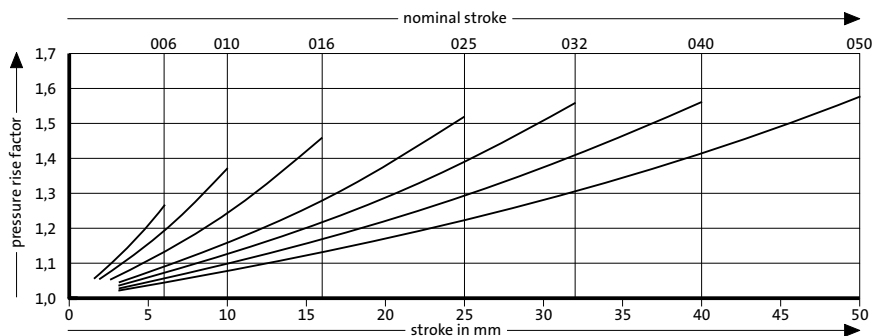
Order No	Stroke _{max} (s)	I _{min.}	I	g ₂ *
2490.14.00750.006	6	57	63	51
2490.14.00750.010	10	65	75	59
2490.14.00750.016	16	77	93	71
2490.14.00750.025	25	95	120	89
2490.14.00750.032	32	108	140	102
2490.14.00750.040	40	125	165	119
2490.14.00750.050	50	145	195	139

*see mounting example

Initial spring force versus charge pressure



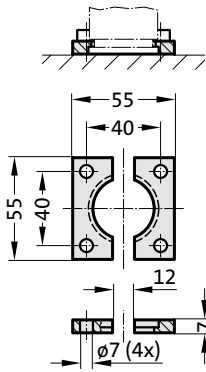
Spring force Diagram displacement versus stroke rise



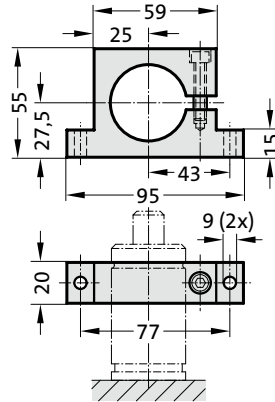
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

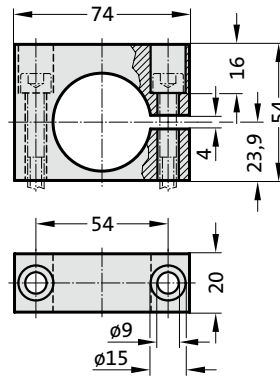
2480.022.00250



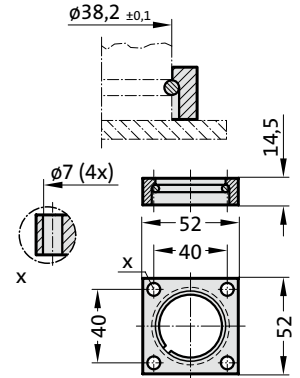
2480.044.00250²⁾



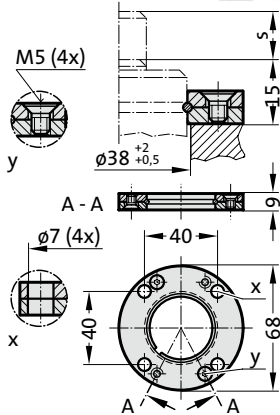
2480.044.03.00250²⁾



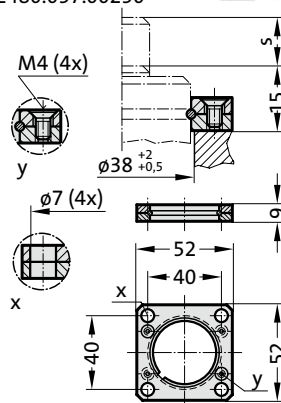
2480.052.01000



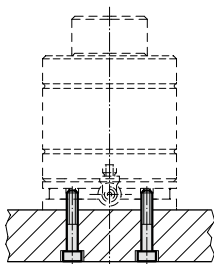
2480.055.00250



2480.057.00250



Mounting example:

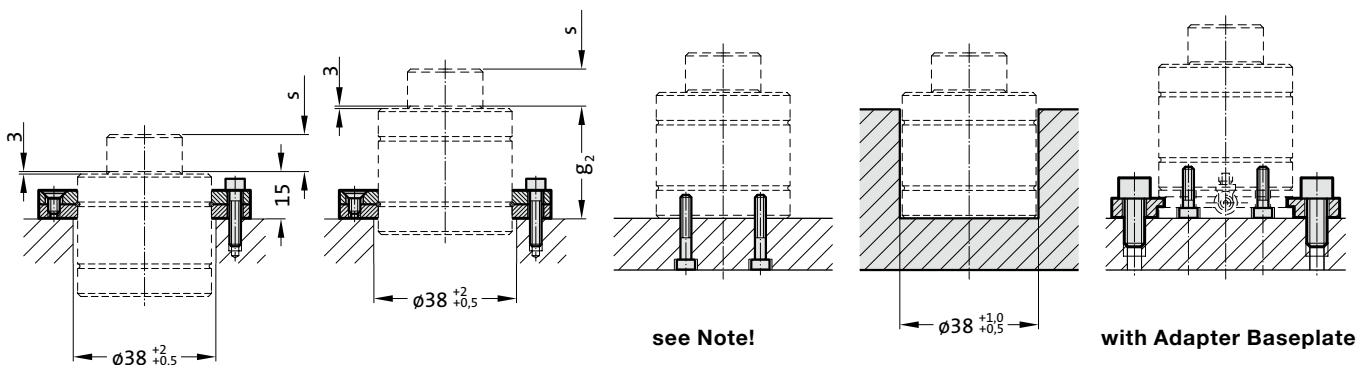


with Adapter Baseplate

Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



see Note!

with Adapter Baseplate

COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 1000 daN

Order No for spare parts kit: 2490.14.01000

Gas spring without valve

Order No (example): 2490.14.01000. .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

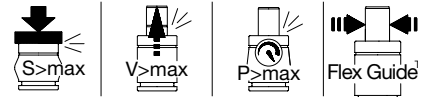
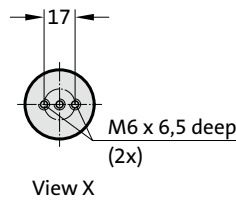
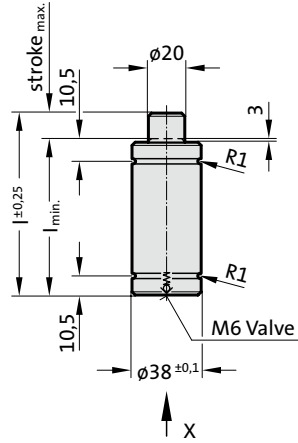
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 100 (at 20°C)

Max. piston speed: 0.8 m/s

2490.14.01000.



2490.14.01000.

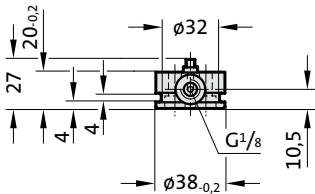
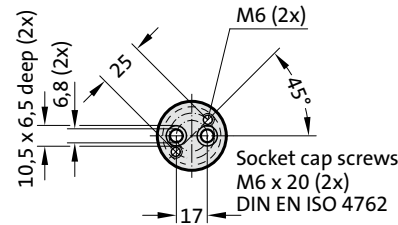
Compact gas spring

Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2490.14.01000.006	6	55	61	49
2490.14.01000.010	10	68	78	62
2490.14.01000.016	16	84	100	78
2490.14.01000.025	25	110	135	104
2490.14.01000.032	32	135	167	129
2490.14.01000.040	40	155	195	149
2490.14.01000.050	50	180	230	174

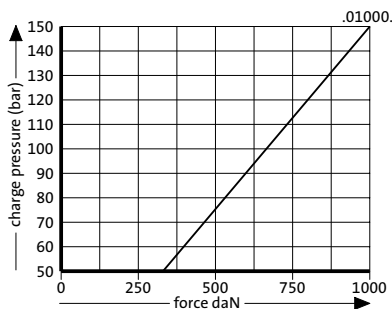
*see mounting example

2480.00.20.01000

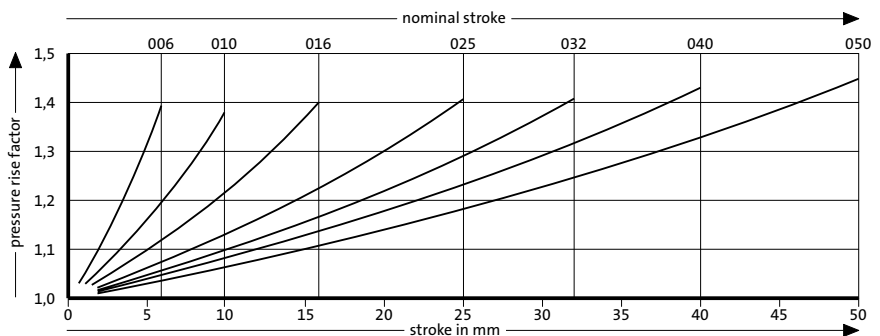
Adapter baseplate with connecting fitting, without valve (only for use with composite connections)



Initial spring force versus charge pressure



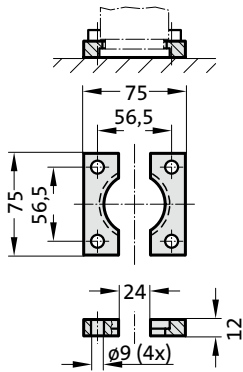
Spring force Diagram displacement versus stroke rise



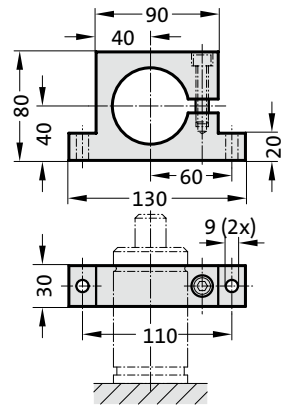
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

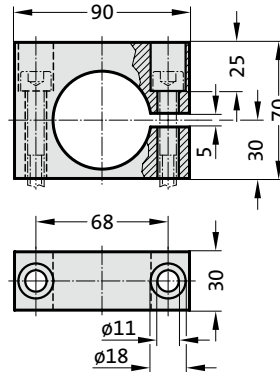
2480.022.00750



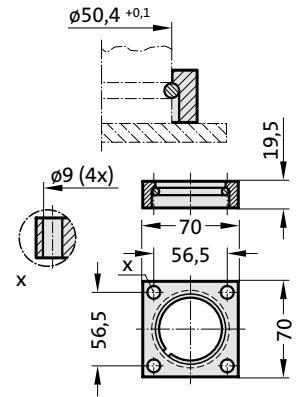
2480.044.00750²⁾



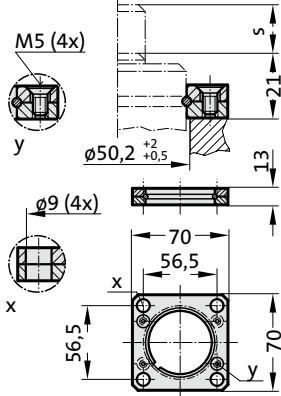
2480.044.03.00750²⁾



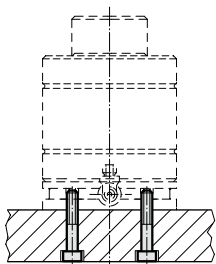
2480.052.1.01800



2480.058.00750



Mounting example:

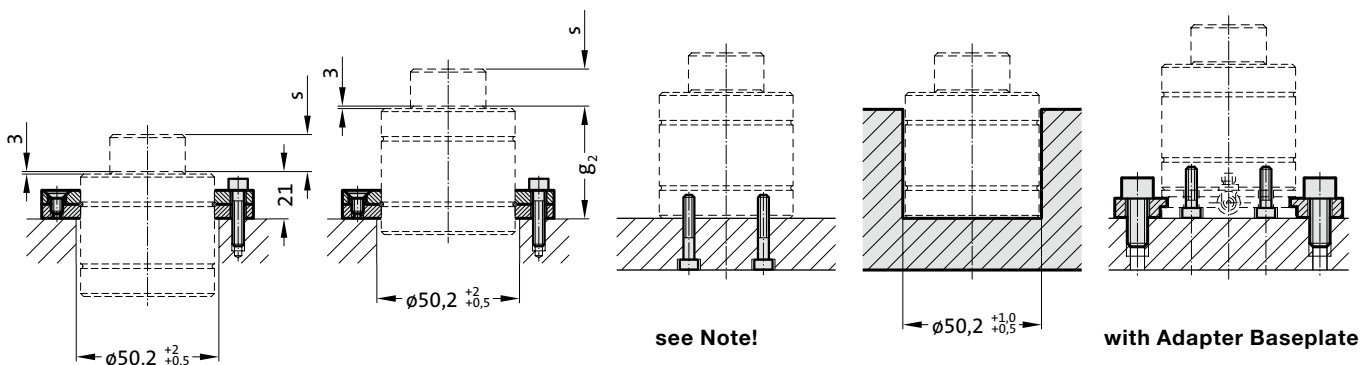


with Adapter Baseplate

Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 1800 daN

Order No for spare parts kit: 2490.14.01800

Gas spring without valve

Order No (example): 2490.14.01800. .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

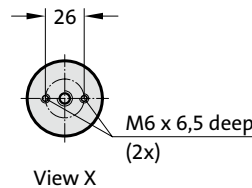
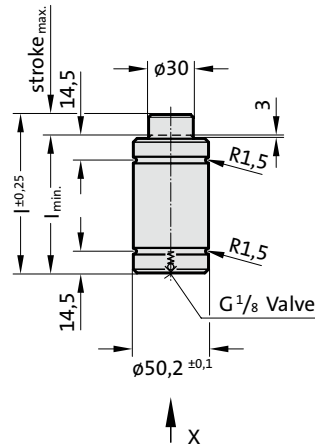
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 50 to 100 (at 20°C)

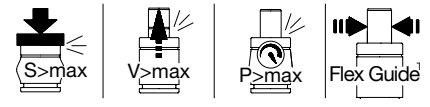
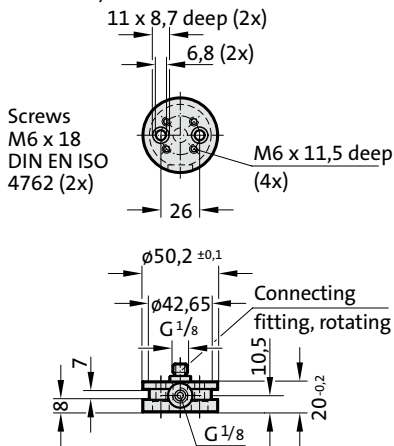
Max. piston speed: 0.8 m/s

2490.14.01800.



2480.00.20.01800

Adapter baseplate with connecting fitting, without valve (only for use with composite connections)



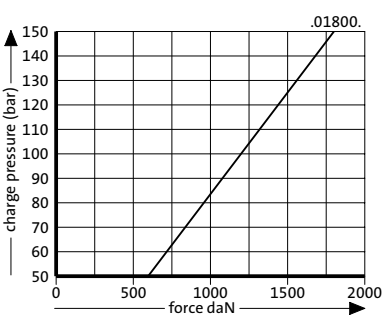
2490.14.01800.

Compact gas spring

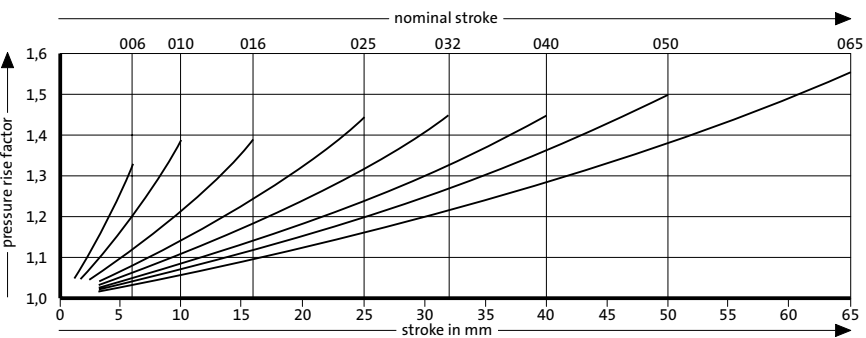
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2490.14.01800.006	6	60	66	52
2490.14.01800.010	10	70	80	62
2490.14.01800.016	16	90	106	82
2490.14.01800.025	25	110	135	102
2490.14.01800.032	32	130	162	122
2490.14.01800.040	40	150	190	142
2490.14.01800.050	50	170	220	162
2490.14.01800.065	65	206	271	198

*see mounting example

Initial spring force versus charge pressure



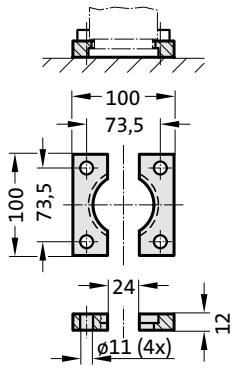
Spring force Diagram displacement versus stroke rise



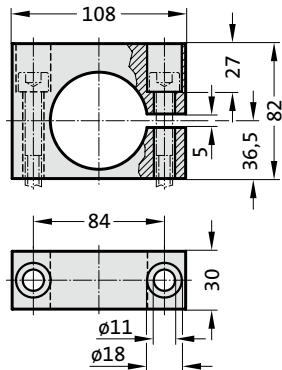
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

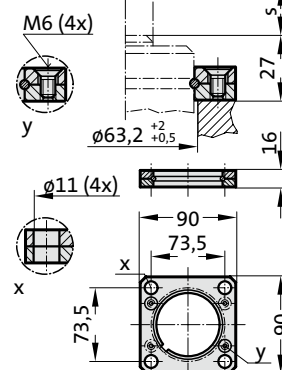
2480.022.01000



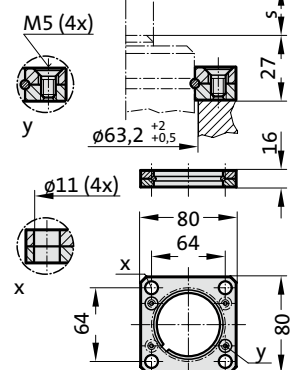
2480.044.03.01000²⁾



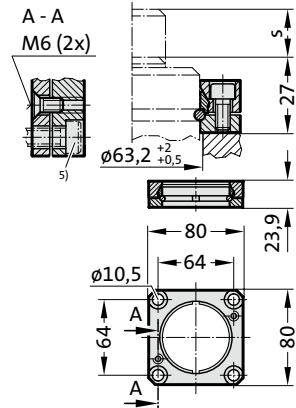
2480.057.01000



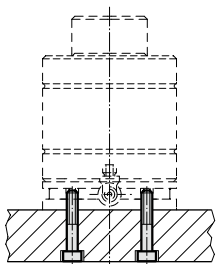
2480.057.03.01000



2480.064.01000⁴⁾



Mounting example:

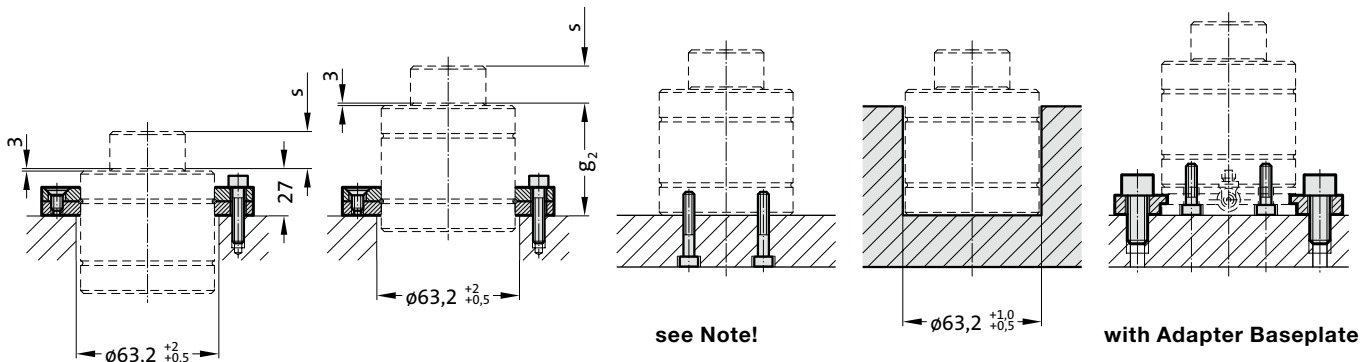


with Adapter Baseplate

Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

Mounting examples:



see Note!

with Adapter Baseplate

COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 3000 daN

Order No for spare parts kit: 2490.14.03000

Gas spring without valve

Order No (example): 2490.14.03000 .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

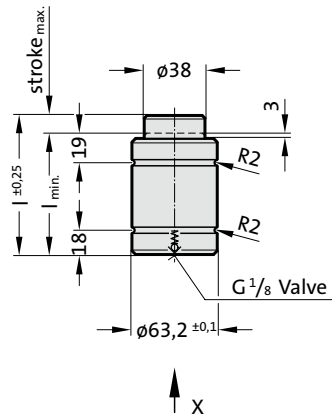
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

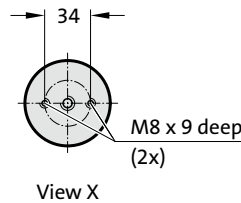
approx. 80 to 100 (at 20°C)

Max. piston speed: 0.8 m/s

2490.14.03000.

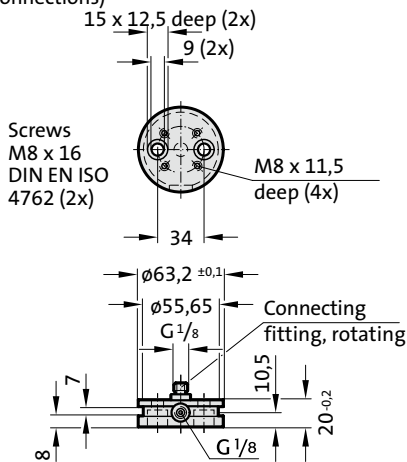


↑ X



2480.00.20.03000

Adapter baseplate with connecting fitting, without valve (only for use with composite connections)



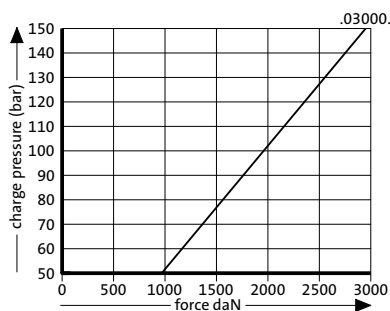
2490.14.03000.

Compact gas spring

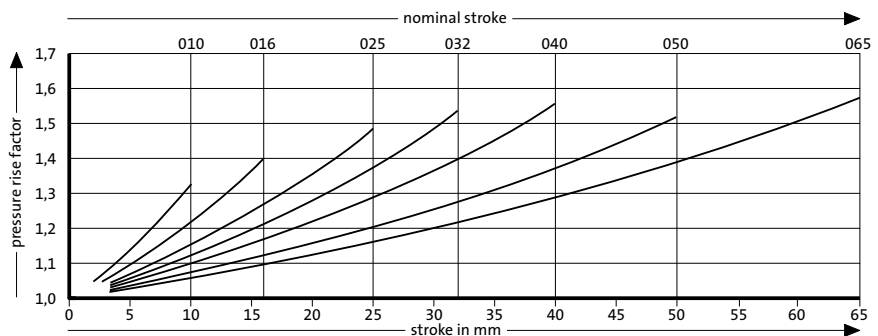
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2490.14.03000.010	10	75	85	65
2490.14.03000.016	16	87	103	77
2490.14.03000.025	25	105	130	95
2490.14.03000.032	32	118	150	108
2490.14.03000.040	40	135	175	125
2490.14.03000.050	50	155	205	145
2490.14.03000.065	65	191	256	181

*see mounting example

Initial spring force versus charge pressure



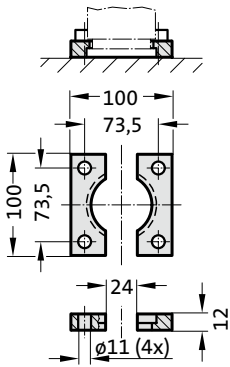
Spring force Diagram displacement versus stroke rise



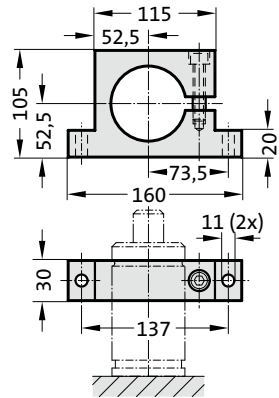
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

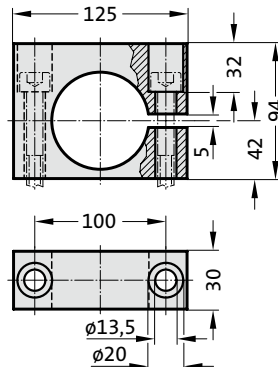
2480.022.01500



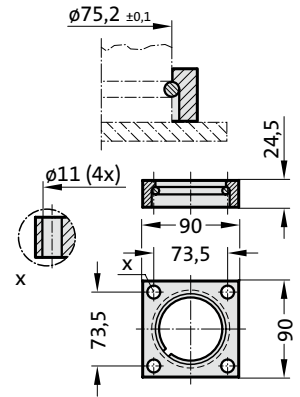
2480.044.01500²⁾



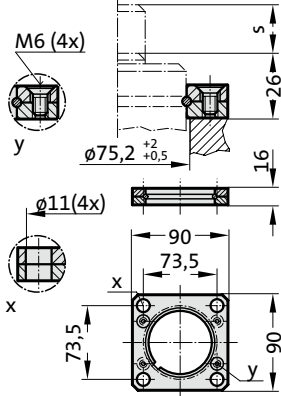
2480.044.03.01500²⁾



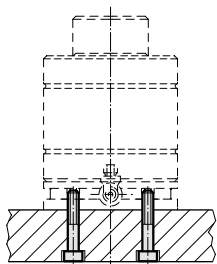
2480.052.04700



2480.058.01500



Mounting example:

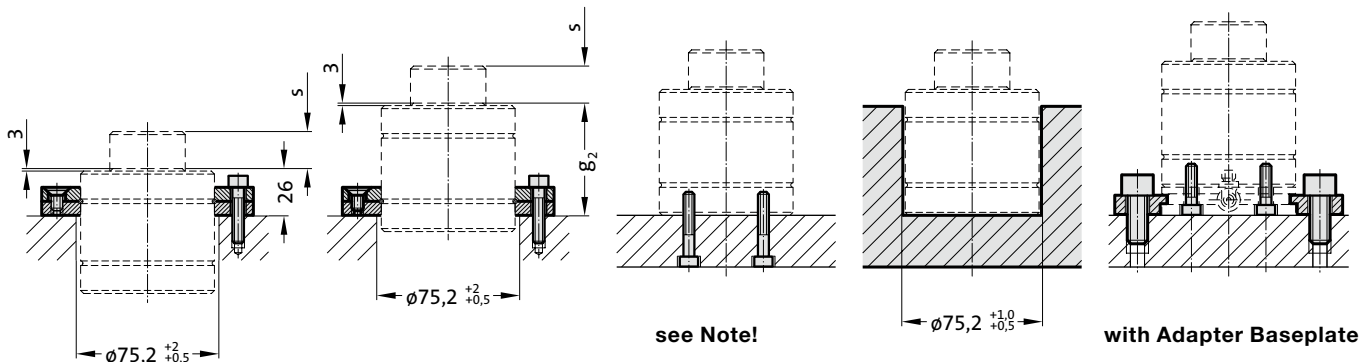


with Adapter Baseplate

Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 4700 daN

Order No for spare parts kit: 2490.14.04700

Gas spring without valve

Order No (example): 2490.14.04700. .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

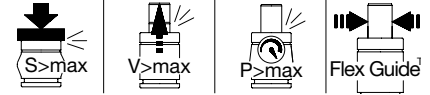
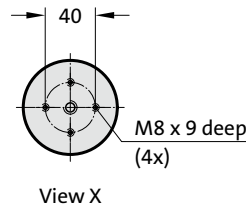
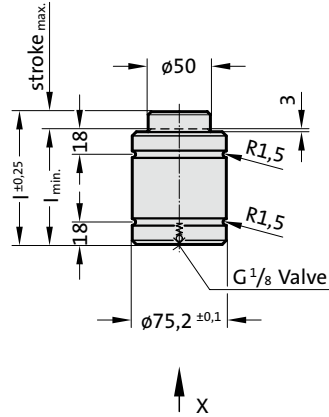
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 80 to 100 (at 20°C)

Max. piston speed: 0.8 m/s

2490.14.04700.



2490.14.04700.

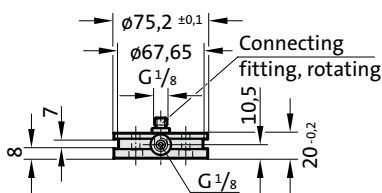
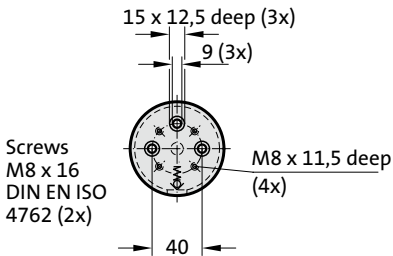
Compact gas spring

Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2490.14.04700.010	10	70	80	60
2490.14.04700.016	16	90	106	80
2490.14.04700.025	25	110	135	100
2490.14.04700.032	32	135	167	125
2490.14.04700.040	40	160	200	150
2490.14.04700.050	50	190	240	180
2490.14.04700.065	65	208	273	198

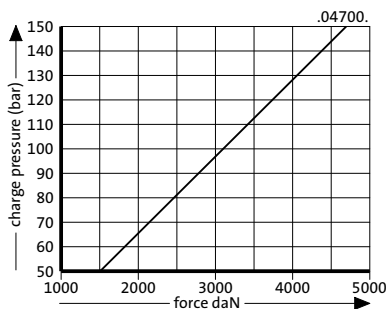
*see mounting example

2480.00.20.04700

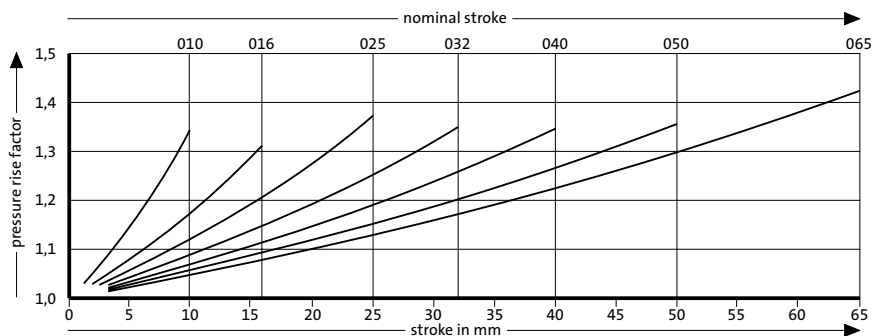
Adapter baseplate with connecting Fitting



Initial spring force versus charge pressure



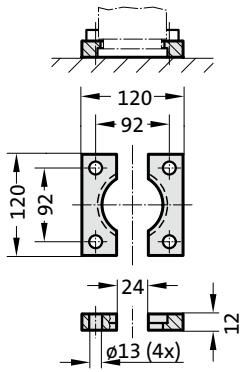
Spring force Diagram displacement versus stroke rise



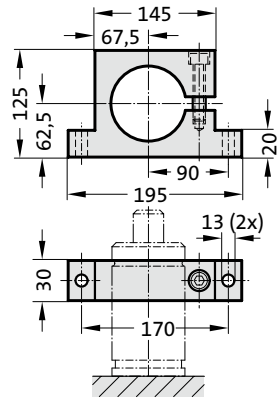
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

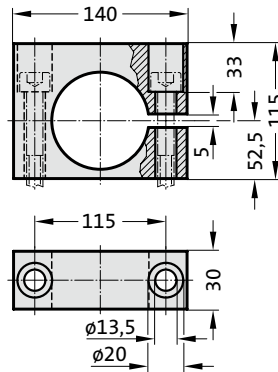
2480.022.03000



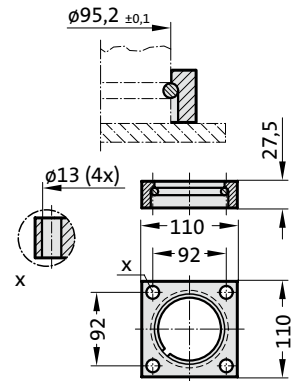
2480.044.03000²⁾



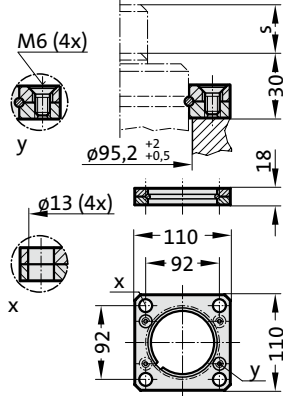
2480.044.03.03000²⁾



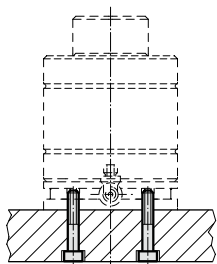
2480.052.07500



2480.058.03000



Mounting example:

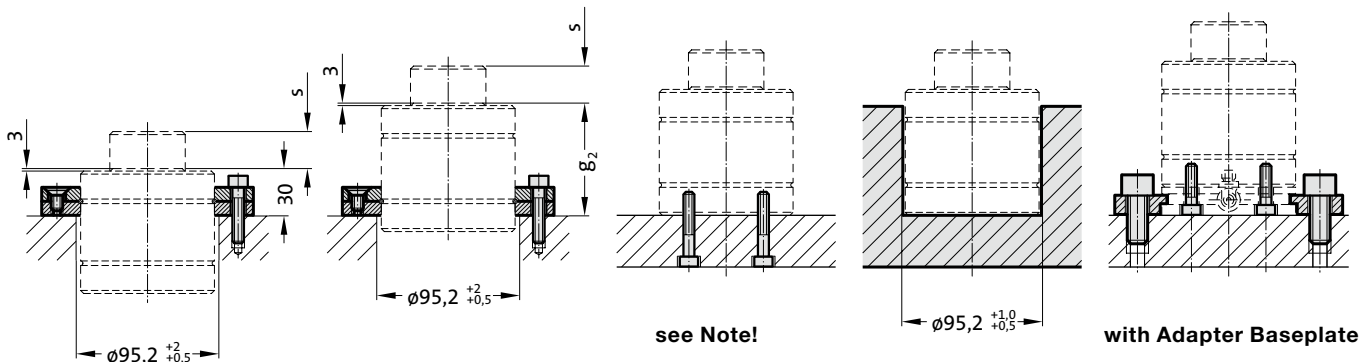


with Adapter Baseplate

Note:

²⁾ Attention:
The spring force must be absorbed by the stop Surface!

Mounting examples:



COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 7500 daN

Order No for spare parts kit: 2490.14.07500

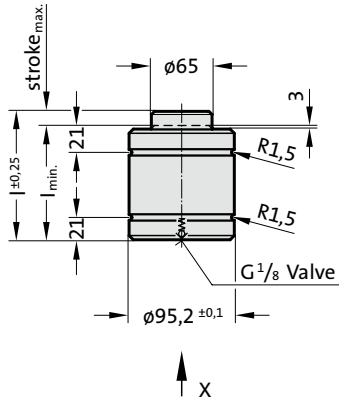
Gas spring without valve

Order No (example): 2490.14.07500. .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 25 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute: approx. 80 to 100 (at 20°C)
 Max. piston speed: 0.8 m/s

2490.14.07500.



2490.14.07500.

Compact gas spring

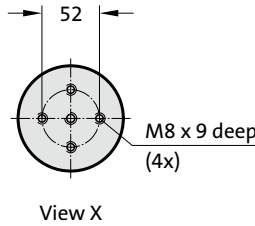
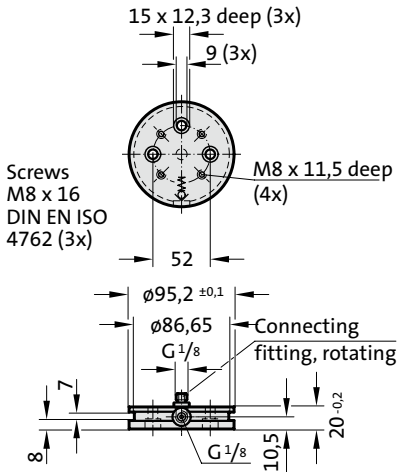
Order No	Stroke _{max.} (s)	l _{min.}	l	g ₂ *
2490.14.07500.010	10	80	90	68
2490.14.07500.016	16	100	116	88
2490.14.07500.025	25	120	145	108
2490.14.07500.032	32	150	182	138
2490.14.07500.040	40	170	210	158
2490.14.07500.050	50	205	255	193
2490.14.07500.065	65	214	279	202

*see mounting example

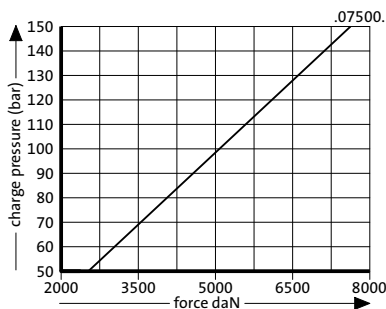


2480.00.20.07500

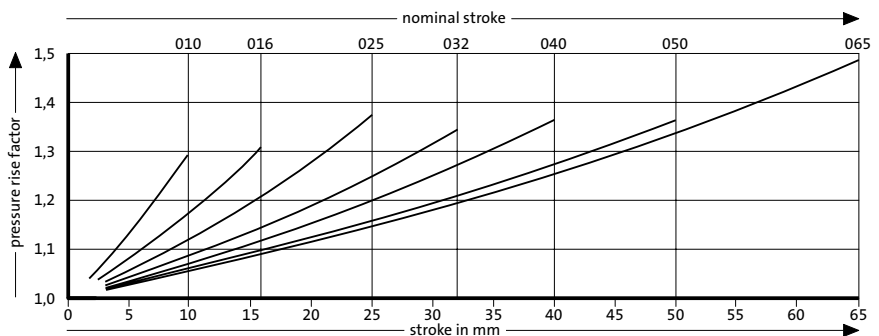
Adapter baseplate with connecting Fitting



Initial spring force versus charge pressure



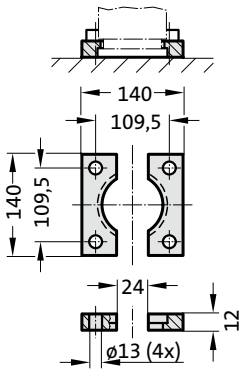
Spring force Diagram displacement versus stroke rise



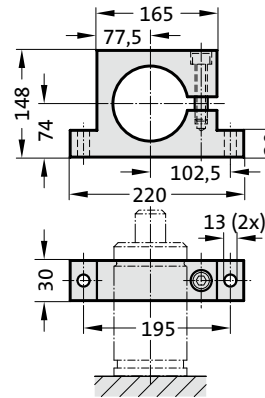
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

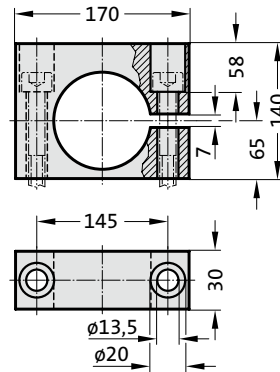
2480.022.05000



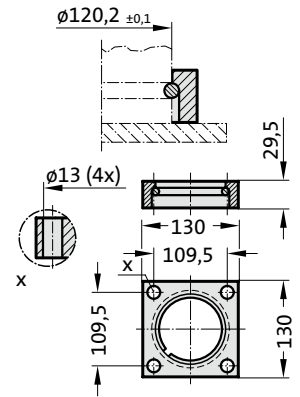
2480.044.05000²⁾



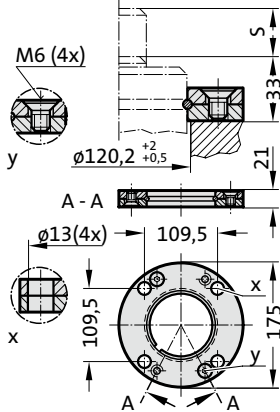
2480.044.03.05000²⁾



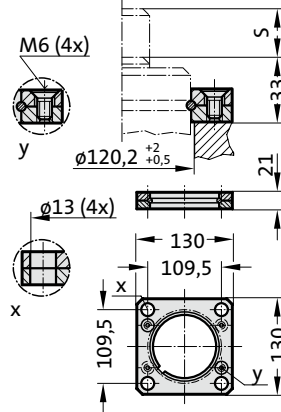
2480.052.11800



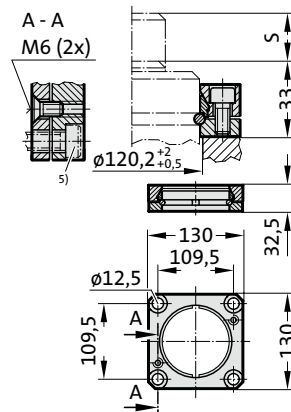
2480.055.05000



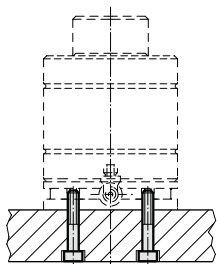
2480.057.05000



2480.064.05000⁴⁾



Mounting example:

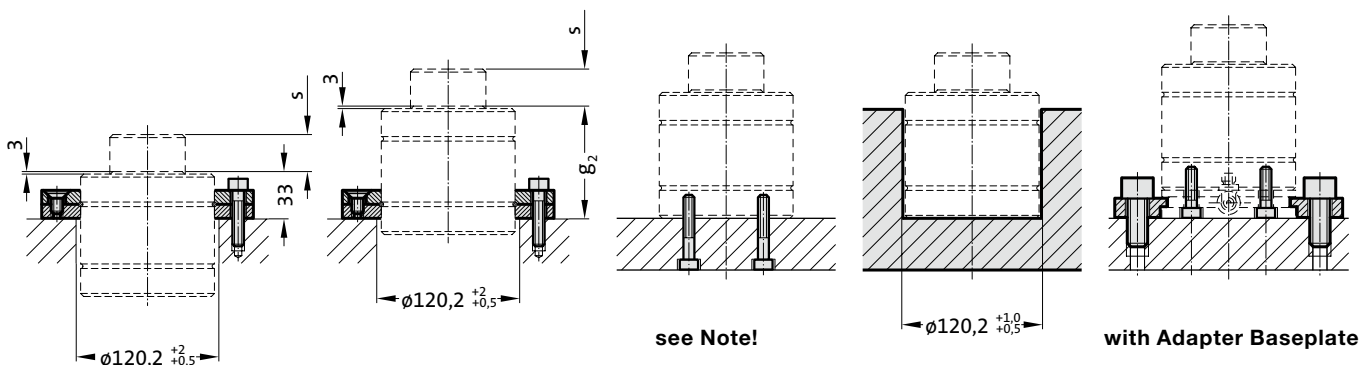


with Adapter Baseplate

Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

Mounting examples:



COMPACT GAS SPRING

Note:

Initial spring force at 150 bar = 11800 daN

Order No for spare parts kit: 2490.14.11800

Gas spring without valve

Order No (example): 2490.14.11800. .P

When mounting to floor, contact over the entire floor of the cylinder tube must be ensured! Before fitting the adapter base plate remove the valve from the gas spring. If vibration occurs, tighten the fixing screws accordingly.

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

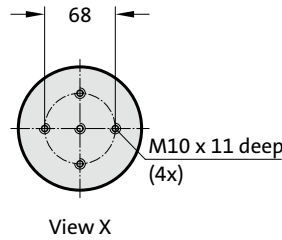
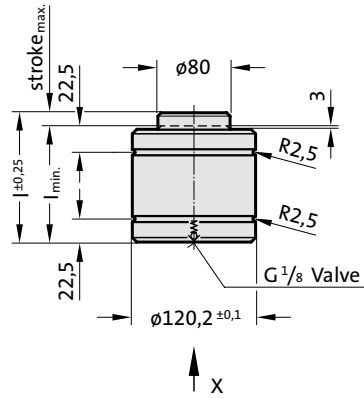
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

approx. 80 to 100 (at 20°C)

Max. piston speed: 0.8 m/s

2490.14.11800.



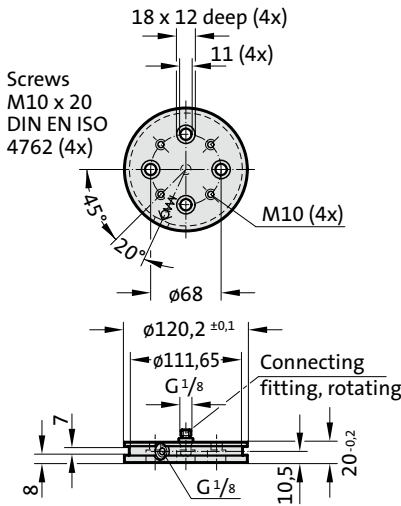
2490.14.11800. Compact gas spring

Order No	Stroke _{max.} (s)	I _{min.}	I	g ₂ *
2490.14.11800.010	10	90	100	78
2490.14.11800.016	16	110	126	98
2490.14.11800.025	25	130	155	118
2490.14.11800.032	32	155	187	143
2490.14.11800.040	40	180	220	168
2490.14.11800.050	50	210	260	198
2490.14.11800.065	65	255	320	243

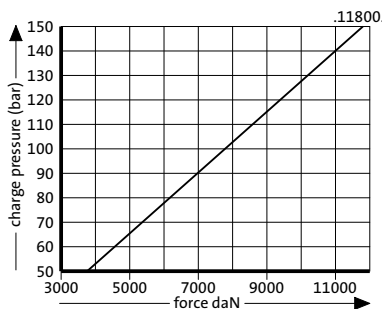
*see mounting example

2480.00.20.11800

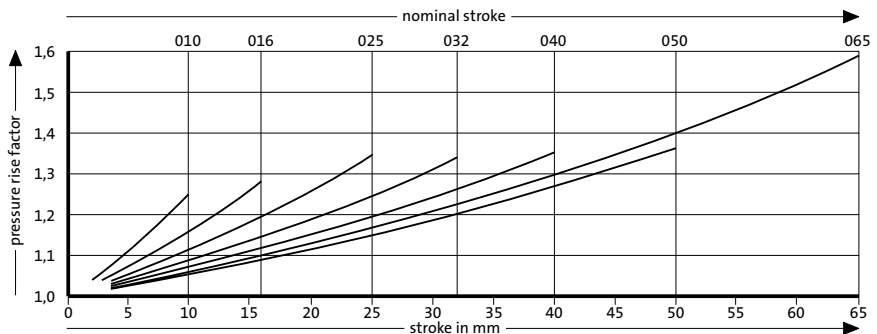
Adapter baseplate with connecting Fitting



Initial spring force versus charge pressure



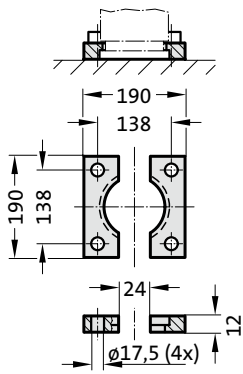
Spring force Diagram displacement versus stroke rise



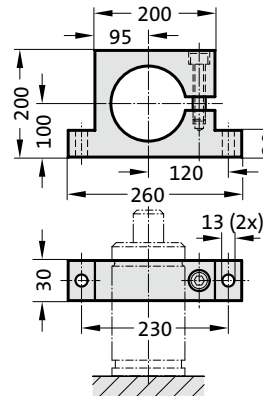
Pressure rise factor accounts for displacement but not external influences!

COMPACT GAS SPRING MOUNTING VARIATIONS

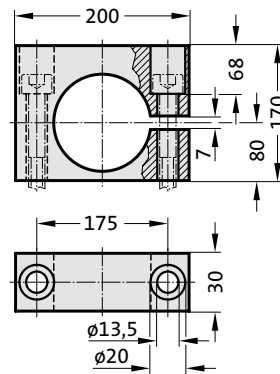
2480.022.07500



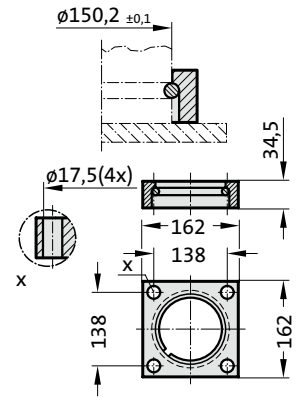
2480.044.07500²⁾



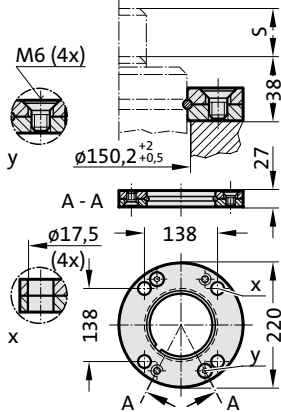
2480.044.03.07500²⁾



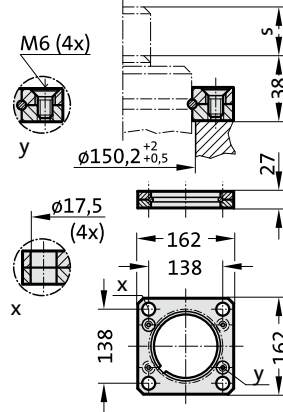
2480.052.18300



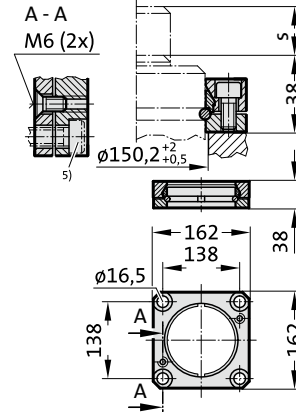
2480.055.07500



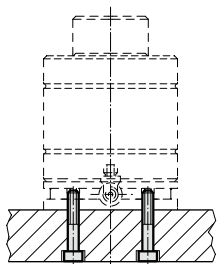
2480.057.07500



2480.064.07500⁴⁾



Mounting example:

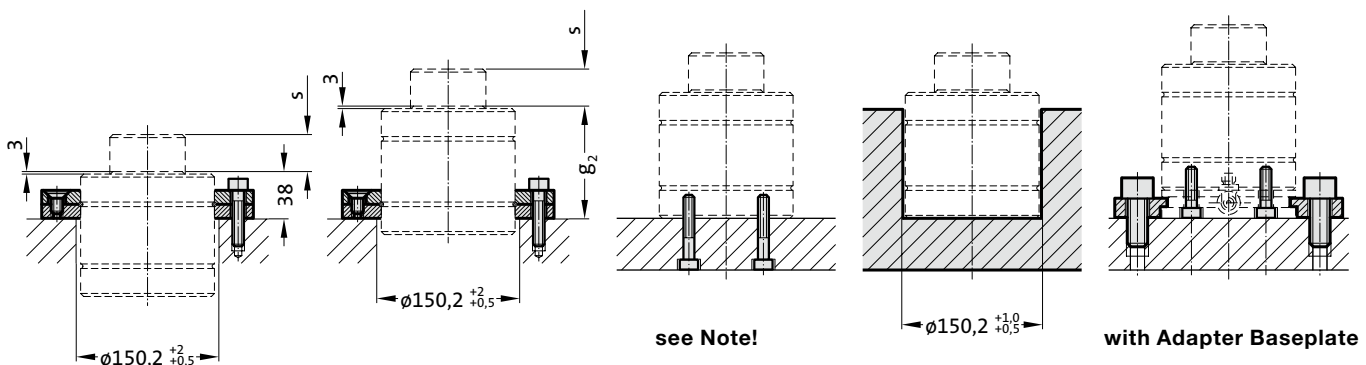


with Adapter Baseplate

Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

Mounting examples:



GAS SPRINGS LOW BUILD HEIGHT



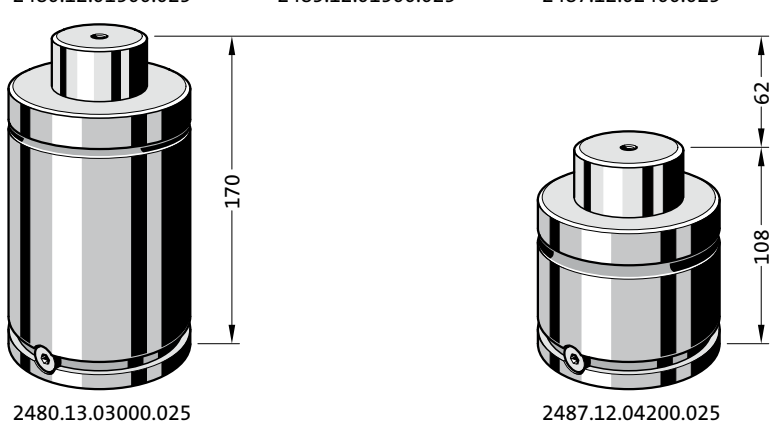
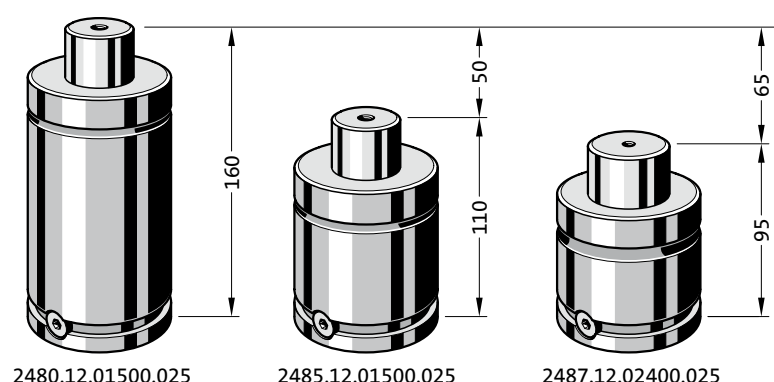
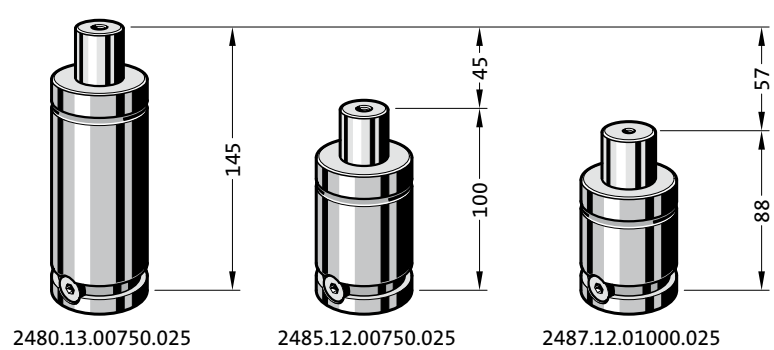
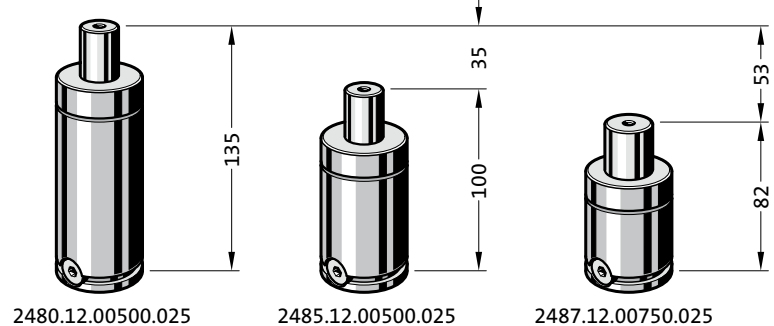
GAS SPRINGS LOW BUILD HEIGHT

Normal construction

Compact construction

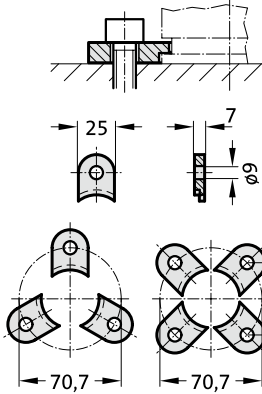
POWERLINE

Construction heights with the same stroke and the same / increased spring force

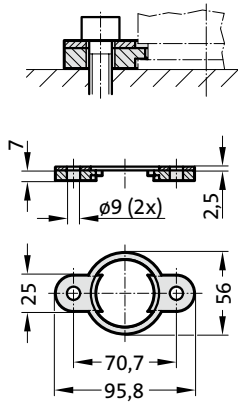


GAS SPRING, WITH LOW BUILD HEIGHT MOUNTING VARIATIONS

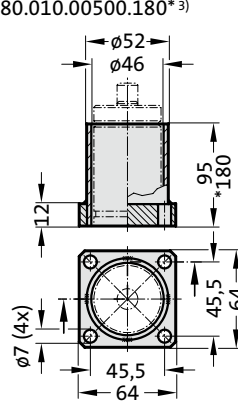
2480.007.00500



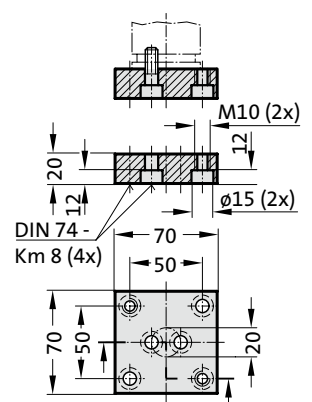
2480.008.00500³⁾



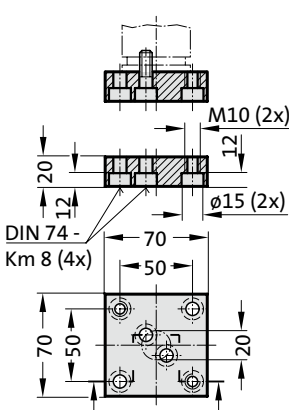
2480.010.00500.095³⁾
2480.010.00500.180*³⁾



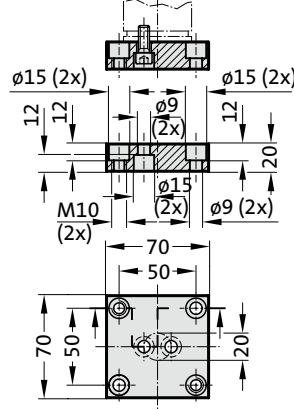
2480.011.00500



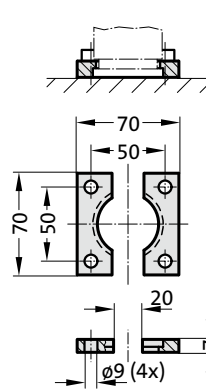
2480.011.00500.1



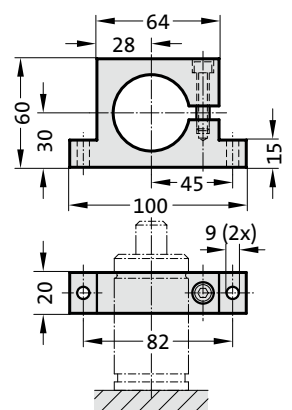
2480.011.00500.2



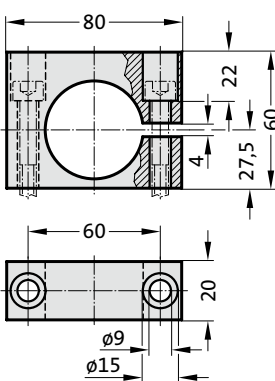
2480.022.00500



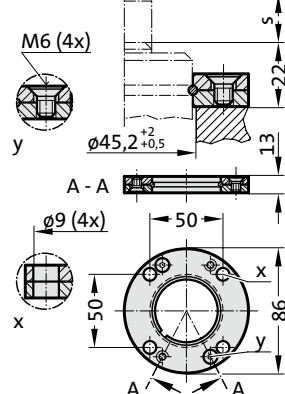
2480.044.00500²⁾



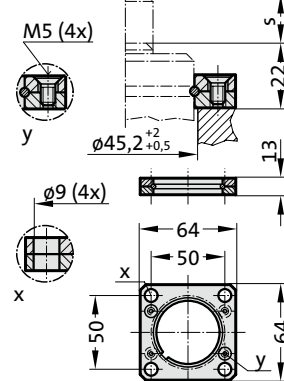
2480.044.03.00500²⁾



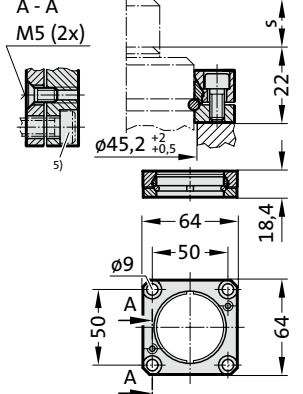
2480.055.00500



2480.057.00500



2480.064.00500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, WITH LOW BUILD HEIGHT

Note:

Initial spring force at 150 bar = 470 daN

Order No for spare parts kit: 2485.12.00500

Gas spring without valve

Order No (example): 2485.12.00500 . P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 50 bar

Working temperature: 0°C to +80°C

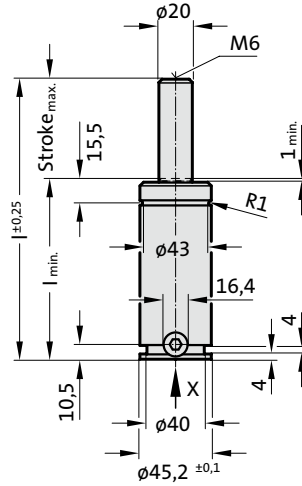
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

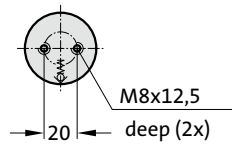
approx. 40 to 80 (at 20°C)

Max. piston speed: 1.6 m/s

2485.12.00500.



View X - Gas spring

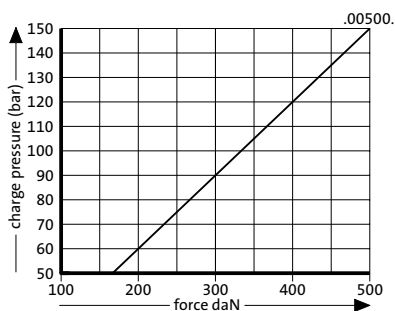


2485.12.00500.

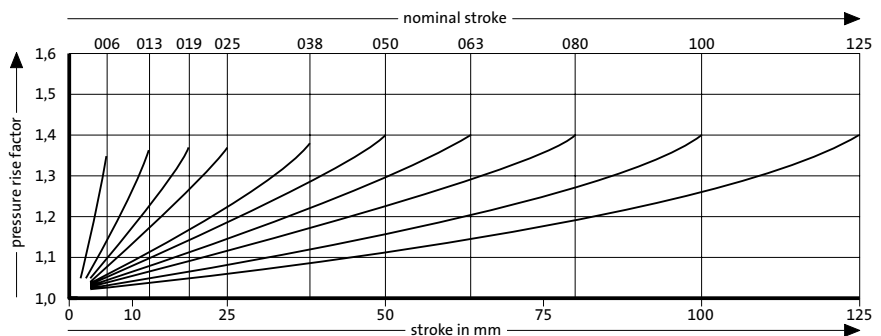
Gas spring, with low build height

Order No	Stroke _{max.} (s)	l _{min.}	l
2485.12.00500.006	6	56	62
2485.12.00500.013	12.7	62.7	75.4
2485.12.00500.019	19	69.1	88.1
2485.12.00500.025	25	75	100
2485.12.00500.038	38.1	88.1	126.2
2485.12.00500.050	50	100	150
2485.12.00500.063	63.5	113.5	177
2485.12.00500.080	80	130	210
2485.12.00500.100	100	150	250
2485.12.00500.125	125	175	300

Initial spring force versus charge pressure



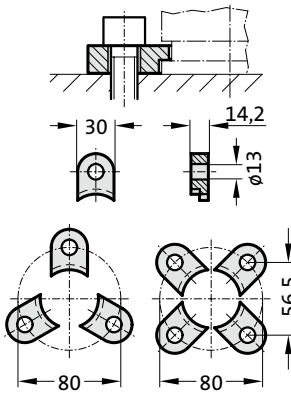
Spring force Diagram displacement versus stroke rise



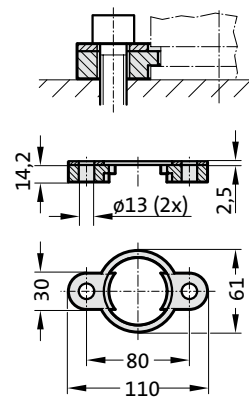
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, WITH LOW BUILD HEIGHT MOUNTING VARIATIONS

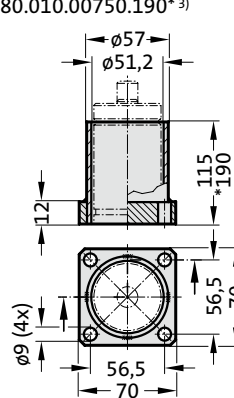
2480.007.00750



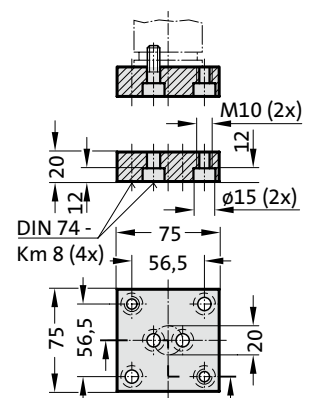
2480.008.00750³⁾



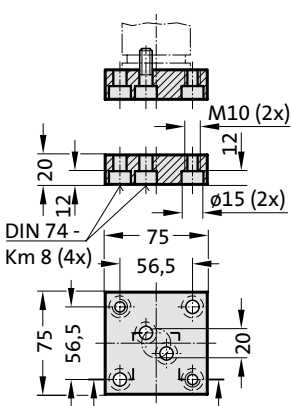
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



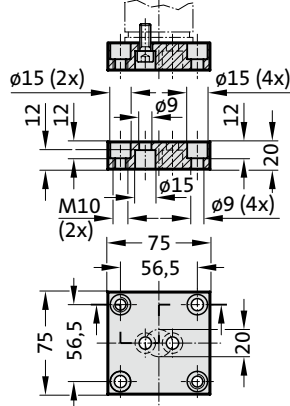
2480.011.00750



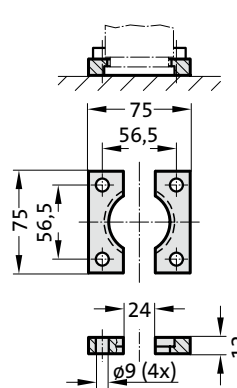
2480.011.00750.1



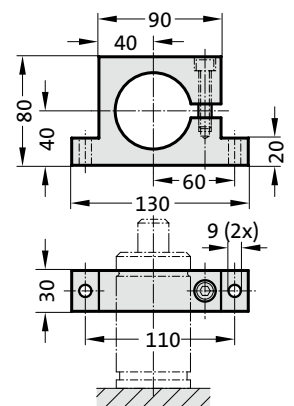
2480.011.00750.3



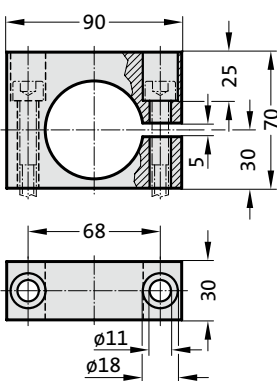
2480.022.00750



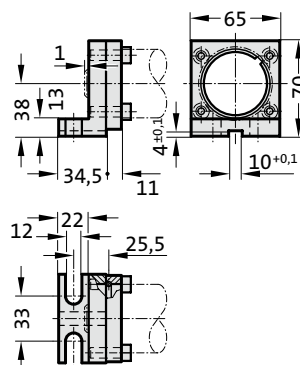
2480.044.00750²⁾



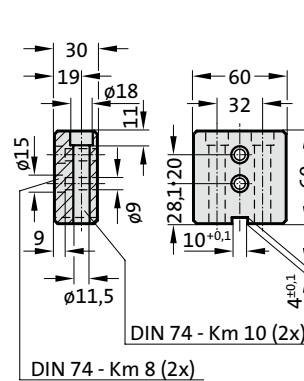
2480.044.03.00750²⁾



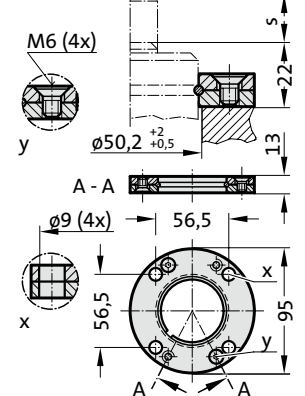
2480.045.00750²⁾



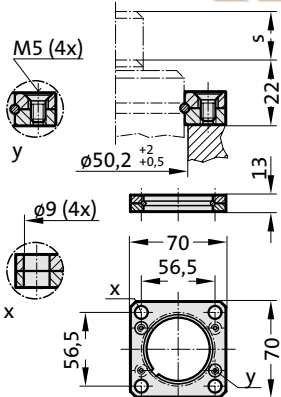
2480.047.00750²⁾



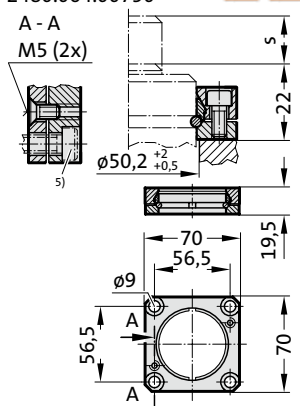
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING, WITH LOW BUILD HEIGHT

Note:

Initial spring force at 150 bar = 750 daN

Order No for spare parts kit: 2485.12.00750

Gas spring without valve

Order No (example): 2485.12.00750. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

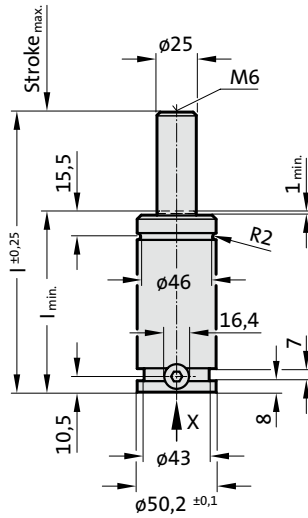
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

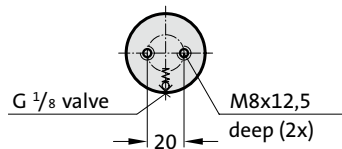
approx. 15 to 40 (at 20°C)

Max. piston speed: 1.6 m/s

2485.12.00750.



View X - Gas spring

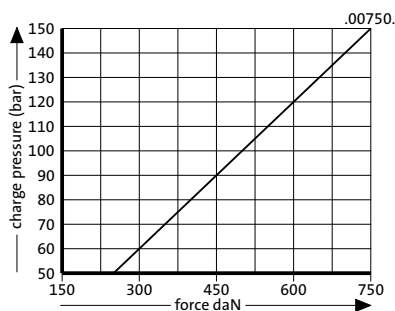


2485.12.00750.

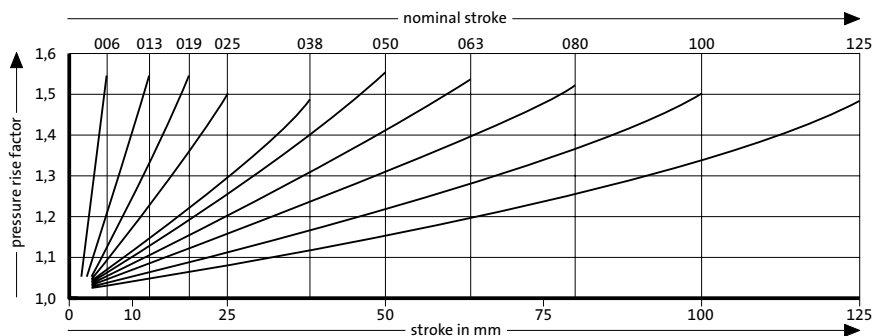
Gas spring, with low build height

Order No	Stroke _{max.} (s)	l _{min.}	l
2485.12.00750.006	6	56	62
2485.12.00750.013	12.7	62.7	75.4
2485.12.00750.019	19	69.1	88.1
2485.12.00750.025	25	75	100
2485.12.00750.038	38.1	88.1	126.2
2485.12.00750.050	50	100	150
2485.12.00750.063	63.5	113.5	177
2485.12.00750.080	80	130	210
2485.12.00750.100	100	150	250
2485.12.00750.125	125	175	300

Initial spring force versus charge pressure



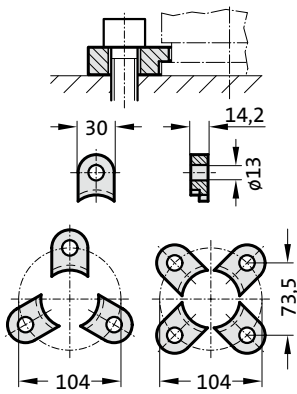
Spring force Diagram displacement versus stroke rise



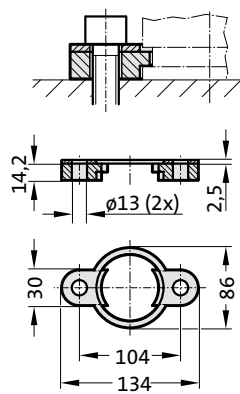
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING, WITH LOW BUILD HEIGHT MOUNTING VARIATIONS

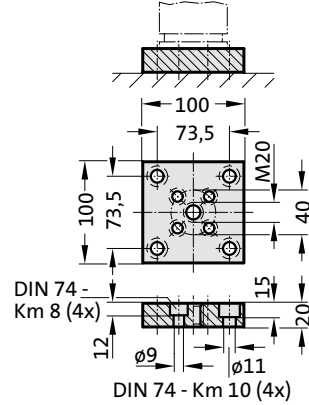
2480.007.01500



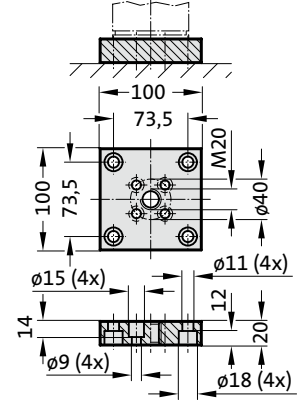
2480.008.01500³⁾



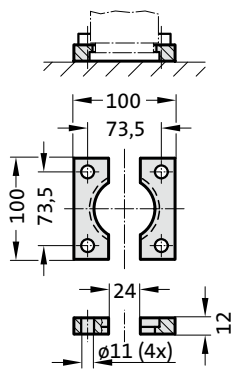
2480.011.01500



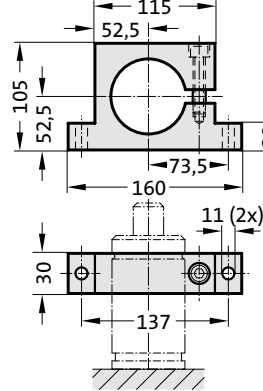
2480.011.01500.2



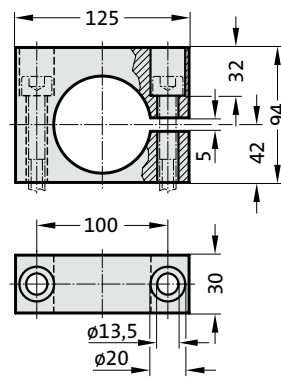
2480.022.01500



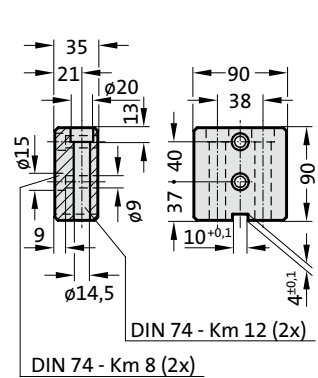
2480.044.01500²⁾



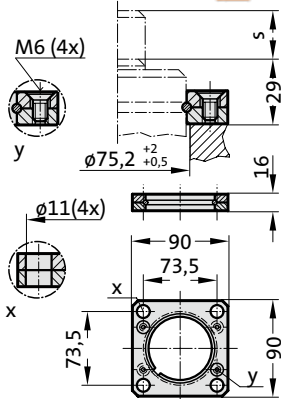
2480.044.03.01500²⁾



2480.047.01500²⁾



2480.058.01500



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.

GAS SPRING, WITH LOW BUILD HEIGHT

Note:

Initial spring force at 150 bar = 1500 daN

Order No for spare parts kit: 2485.12.01500

Gas spring without valve

Order No (example): 2485.12.01500. .P

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

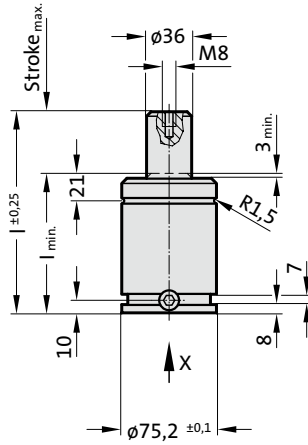
Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

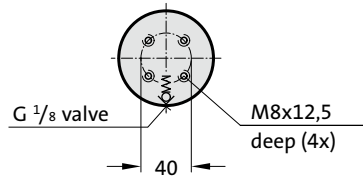
approx. 15 to 40 (at 20°C)

Max. piston speed: 1.6 m/s

2485.12.01500.



View X - Gas spring

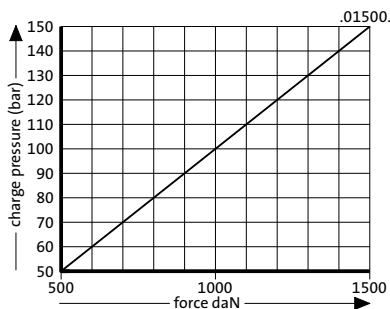


2485.12.01500.

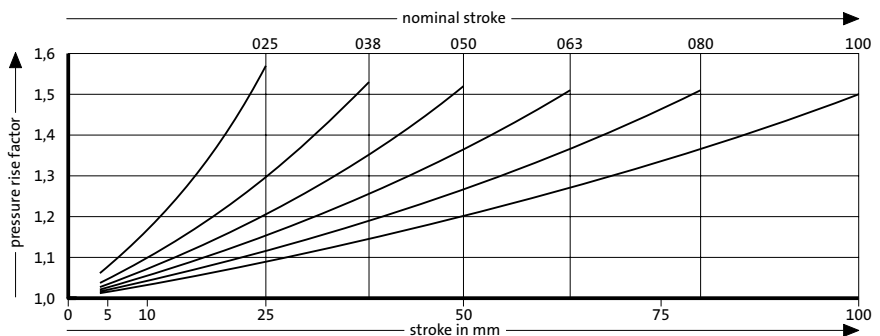
Gas spring, with low build height

Order No	Stroke _{max.} (s)	l _{min.}	l
2485.12.01500.025	25	85	110
2485.12.01500.038	38.1	98.1	136.2
2485.12.01500.050	50	110	160
2485.12.01500.063	63.5	123.5	187
2485.12.01500.080	80	140	220
2485.12.01500.100	100	160	260

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS SPC - SPEED CONTROL™



GAS SPRINGS SPC - SPEED CONTROL™

Description:

FIBRO SPC - SPEED CONTROL™ gas springs have been engineered to reduce or eliminate blank holder bounce; commonly associated with increased return stroke speeds from link drive presses.

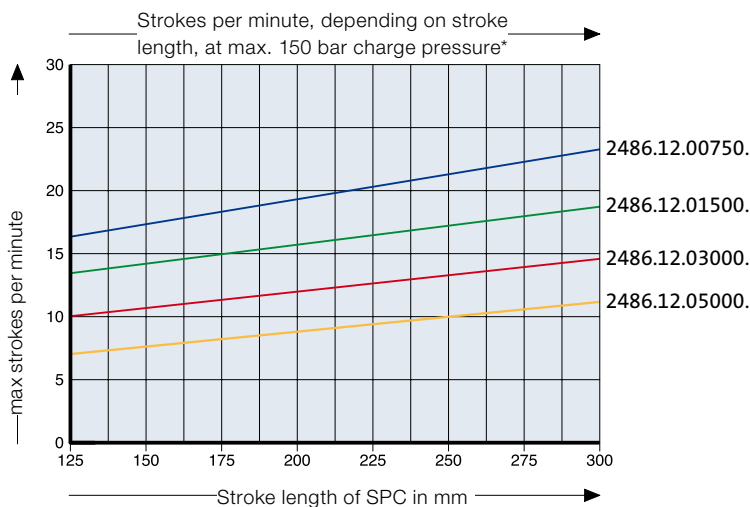
The SPC gas springs have an integrated return stroke delay, which reduces the speed of the gas spring to 0.4 m/s during the last 30 mm stroke. This gently stops the sheet holder.

Properties:

- prevents the blank holder springing back
- Productivity increase due to more efficient parts transport
- Easy to install in existing tools
- Stroke lengths of 125 to 300 mm
- can be connected to existing hose system

GAS SPRINGS SPC - SPEED CONTROL™

Performance:



The diagram shows the max. possible number of strokes per minutes [min⁻¹] of SPC gas springs with a max. filling pressure (150 bar) and max. used stroke lengths before there is a risk of excessive heating.



Note !

The number of strokes per minutes can be doubled by halving the initial filling pressure.

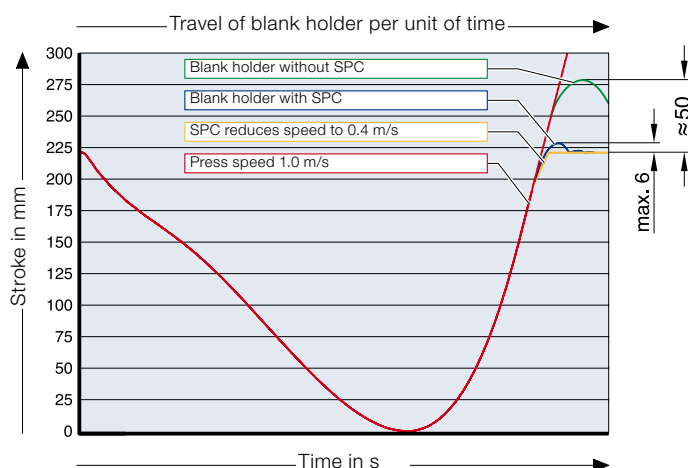


Caution !

SPC gas springs are subject to a higher heating than standard gas springs. For this reason, please ensure adequate ventilation of the SPC gas springs in the tool.

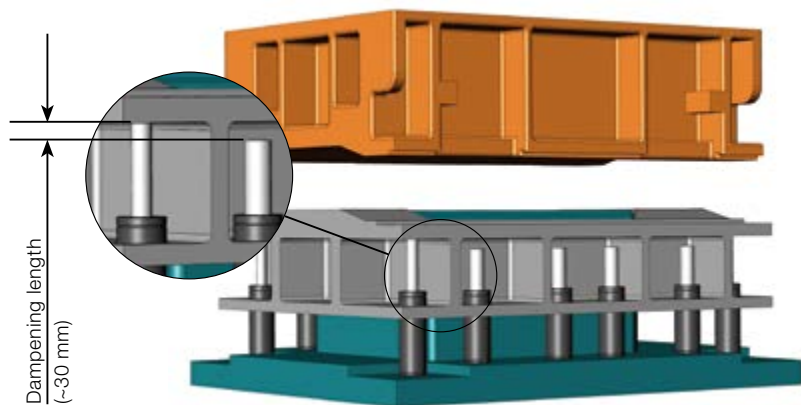
*At ambient room temperature with free air flow

Function example:



SPC - SPEED CONTROL™ gas springs gave a 90% reduction of blank holder bounce.

Installation:



It is important that approx. 25 to 30 mm before the sheet metal retainer has reached its home position, only SPC gas springs are applied. Therefore, for the retrofitting of existing tools with SPC gas springs we recommend the following two options:

Option 1:

Replace all existing gas springs holding the blank holder with SPC gas springs

Option 2:

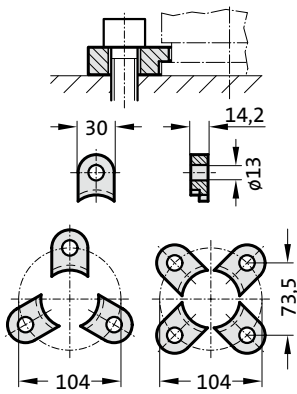
SPC gas springs with a min. 25 mm longer nominal stroke length than with the "main gas pressure springs" are positioned at the four corners of the blank holder. This lifts the blank holder from the "main gas pressure springs".

Attention:

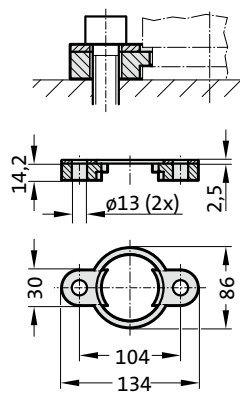
Springs must be installed with a recess of 25 mm to balance the total length difference (2 x stroke length = 50 mm). Alternatively, the contact surface of the sheet metal retainer can be recessed in order to achieve the same effect.

GAS SPRING SPEED CONTROL, CUSHIONED MOUNTING VARIATIONS

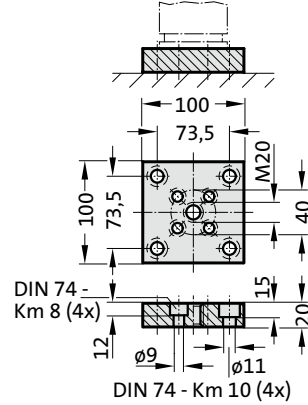
2480.007.01500



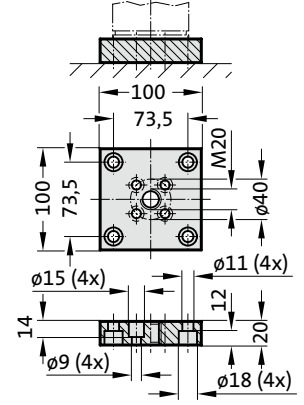
2480.008.01500³⁾



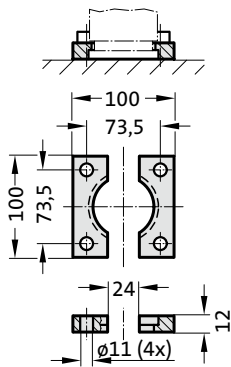
2480.011.01500



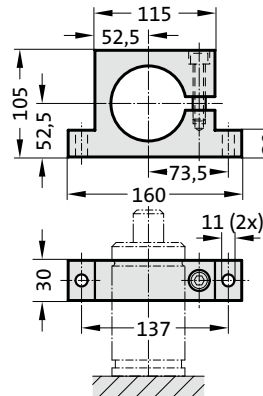
2480.011.01500.2



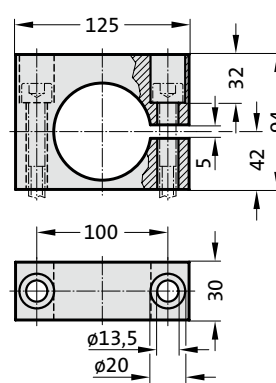
2480.022.01500



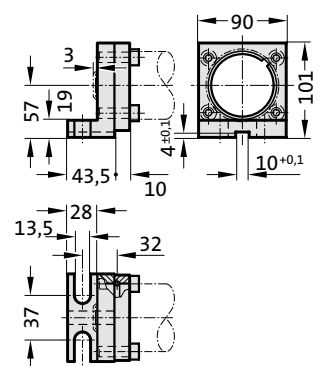
2480.044.01500²⁾



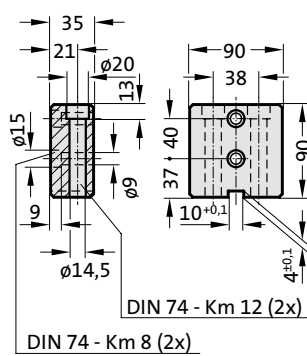
2480.044.03.01500²⁾



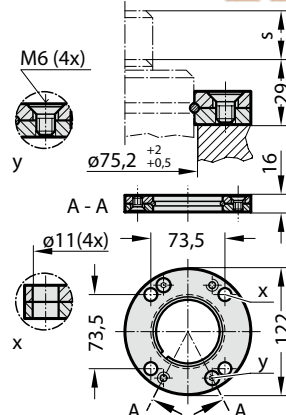
2480.045.01500²⁾



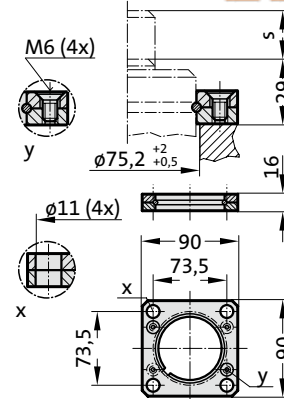
2480.047.01500²⁾



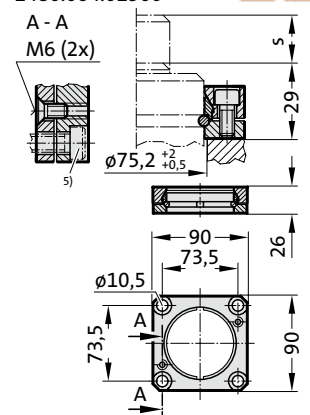
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING SPEED CONTROL, CUSHIONED

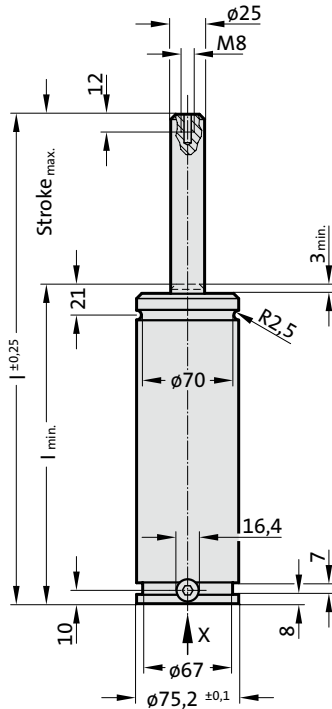
Note:

Initial spring force at 150 bar = 750 daN

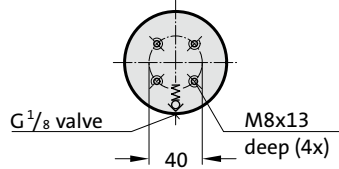
Order No for spare parts kit: 2486.12.00750

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 16 to 24 (at 20°C)
- Dampening length: ~ 30 mm
- Piston rod speed, decelerated: 0.4 m/s

2486.12.00750.



View X - Gas spring

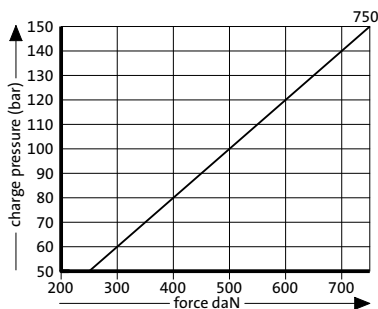


2486.12.00750.

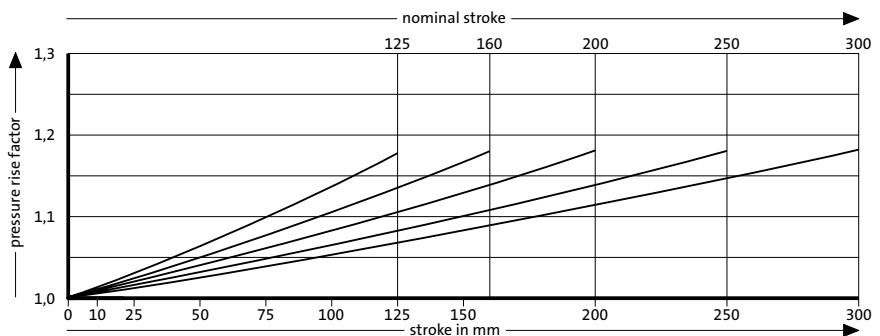
Gas spring SPEED CONTROL, cushioned

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.12.00750.125	125	235	360
2486.12.00750.160	160	270	430
2486.12.00750.200	200	310	510
2486.12.00750.250	250	360	610
2486.12.00750.300	300	410	710

Initial spring force versus charge pressure



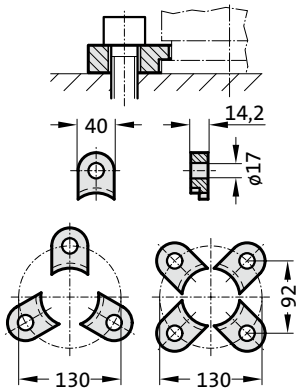
Spring force Diagram displacement versus stroke rise



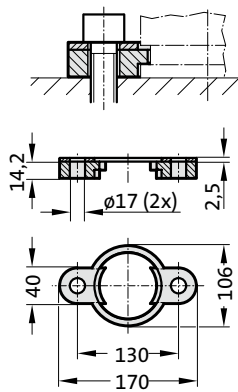
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING SPEED CONTROL, CUSHIONED MOUNTING VARIATIONS

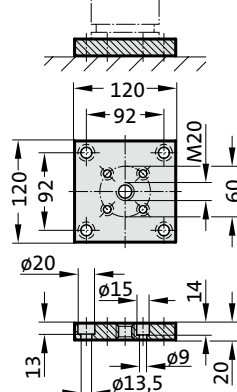
2480.007.03000



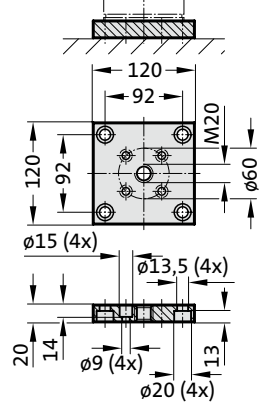
2480.008.03000³⁾



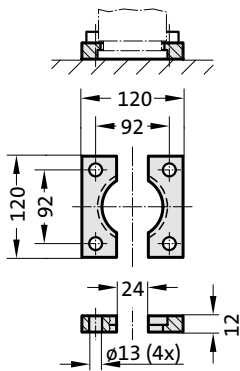
2480.011.03000



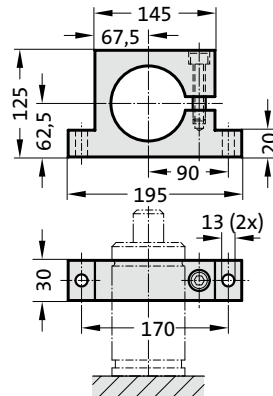
2480.011.03000.2



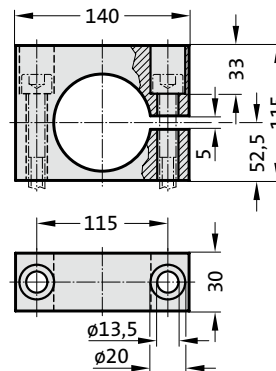
2480.022.03000



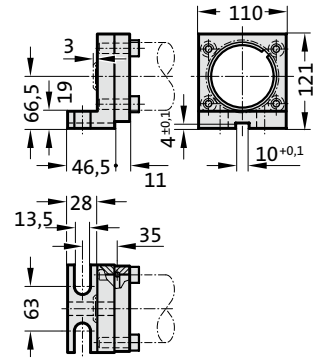
2480.044.03000²⁾



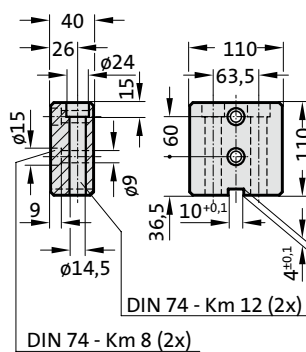
2480.044.03.03000²⁾



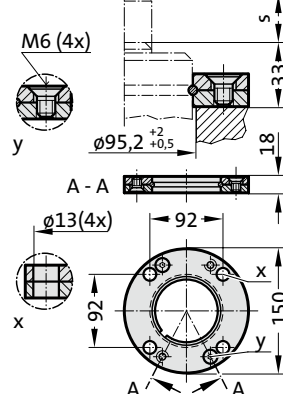
2480.045.03000²⁾



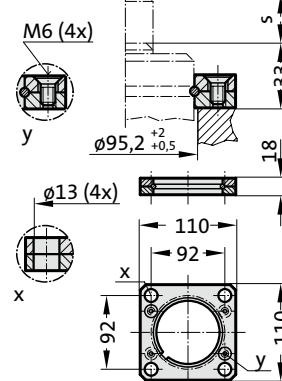
2480.047.03000²⁾



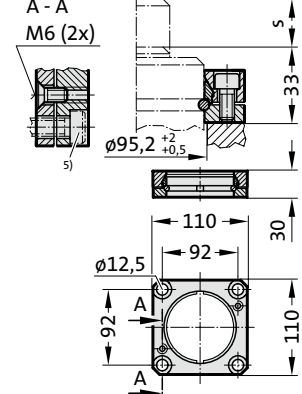
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING SPEED CONTROL, CUSHIONED

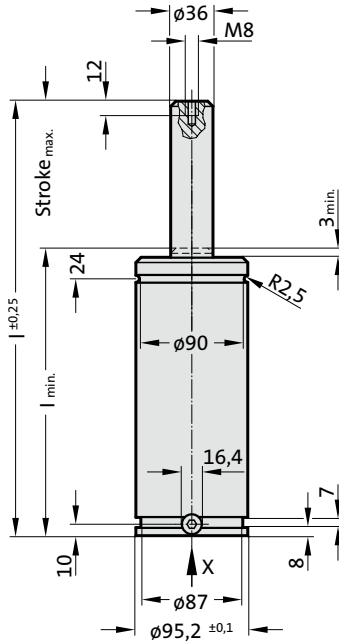
Note:

Initial spring force at 150 bar = 1500 daN

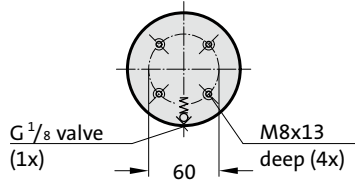
Order No for spare parts kit: 2486.12.01500

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 14 to 19 (at 20°C)
- Dampening length: ~ 30 mm
- Piston rod speed, decelerated: 0.4 m/s

2486.12.01500.



View X - Gas spring

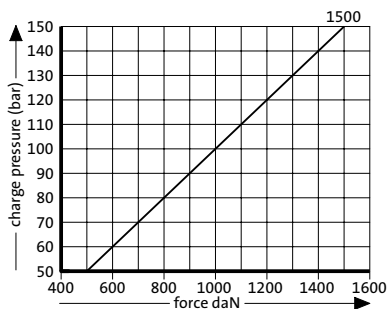


2486.12.01500.

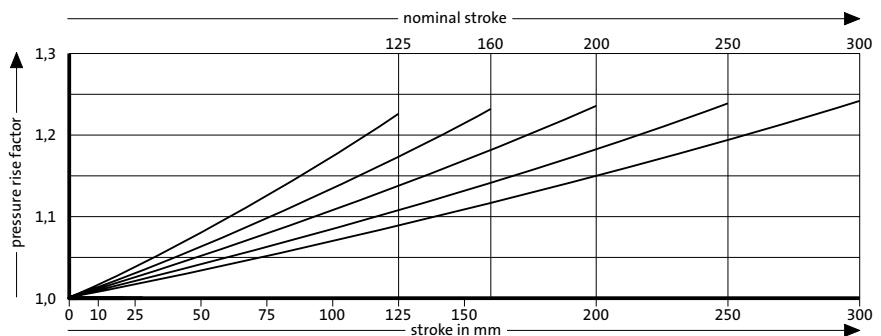
Gas spring SPEED CONTROL, cushioned

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.12.01500.125	125	245	370
2486.12.01500.160	160	280	440
2486.12.01500.200	200	320	520
2486.12.01500.250	250	370	620
2486.12.01500.300	300	420	720

Initial spring force versus charge pressure



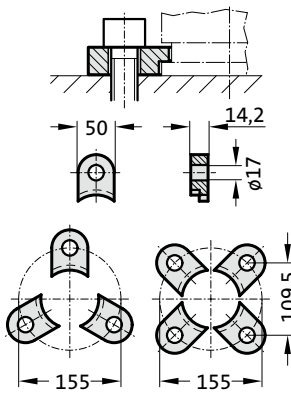
Spring force Diagram displacement versus stroke rise



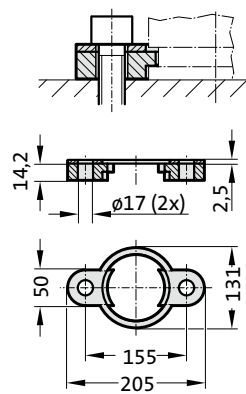
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING SPEED CONTROL, CUSHIONED MOUNTING VARIATIONS

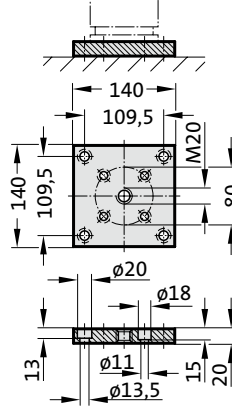
2480.007.05000



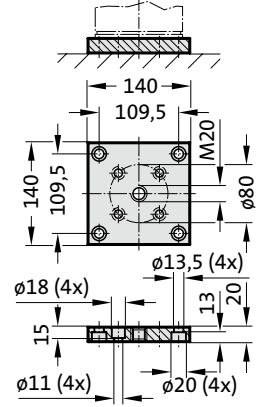
2480.008.05000³⁾



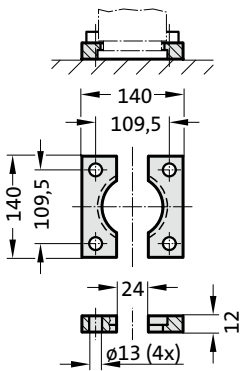
2480.011.05000



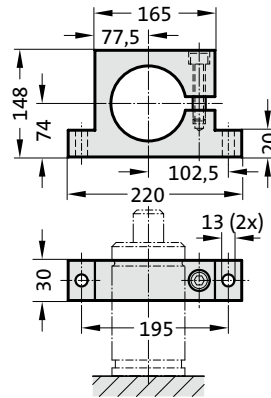
2480.011.05000.2



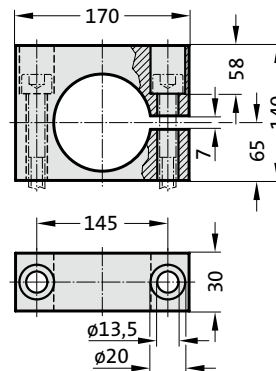
2480.022.05000



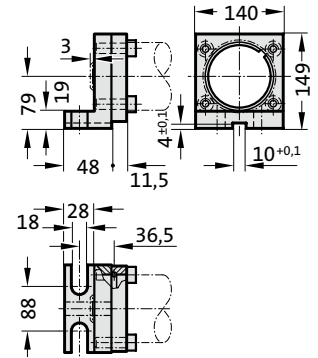
2480.044.05000²⁾



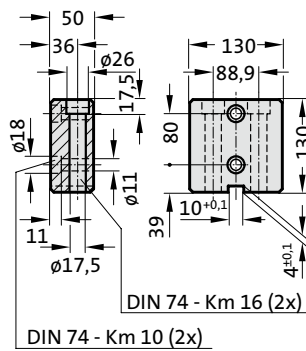
2480.044.03.05000²⁾



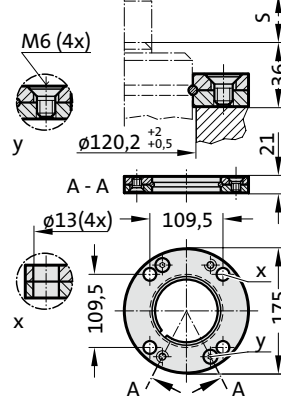
2480.045.05000²⁾



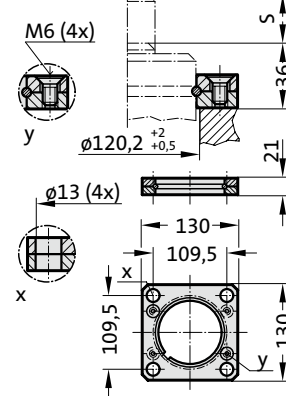
2480.047.05000²⁾



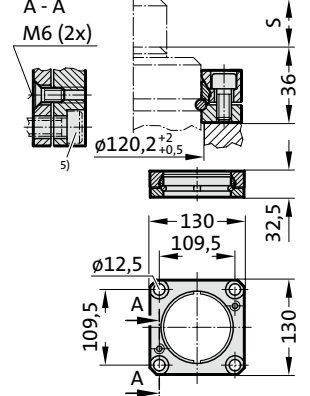
2480.055.05000



2480.057.05000



2480.064.05000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING SPEED CONTROL, CUSHIONED

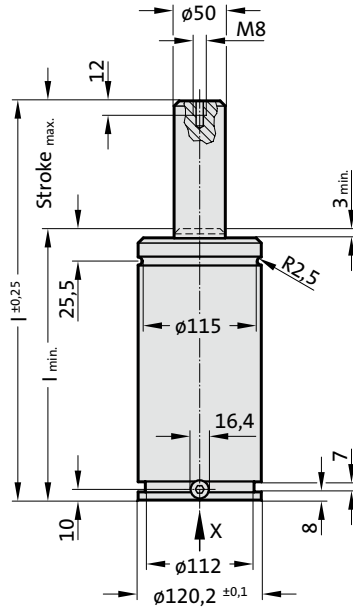
Note:

Initial spring force at 150 bar = 3000 daN

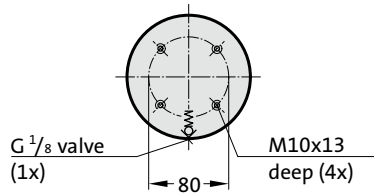
Order No for spare parts kit: 2486.12.03000

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 10 to 13 (at 20°C)
- Dampening length: ~ 30 mm
- Piston rod speed, decelerated: 0.4 m/s

2486.12.03000.



View X - Gas spring

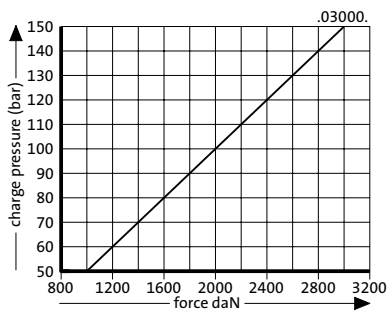


2486.12.03000.

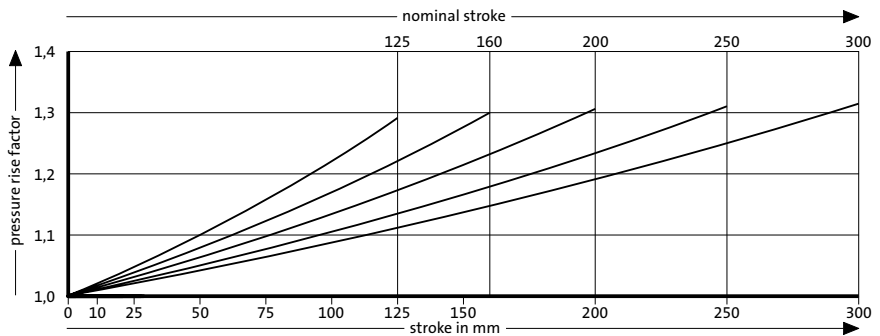
Gas spring SPEED CONTROL, cushioned

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.12.03000.125	125	265	390
2486.12.03000.160	160	300	460
2486.12.03000.200	200	340	540
2486.12.03000.250	250	390	640
2486.12.03000.300	300	440	740

Initial spring force versus charge pressure



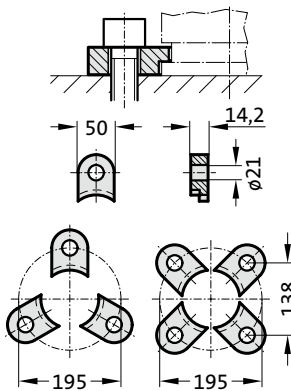
Spring force Diagram displacement versus stroke rise



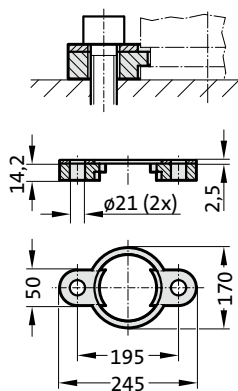
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING SPEED CONTROL, CUSHIONED MOUNTING VARIATIONS

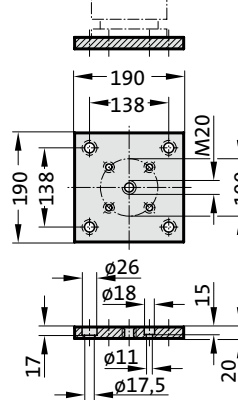
2480.007.07500



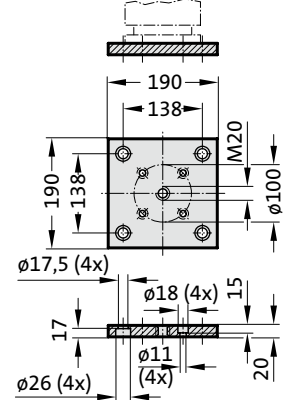
2480.008.07500³⁾



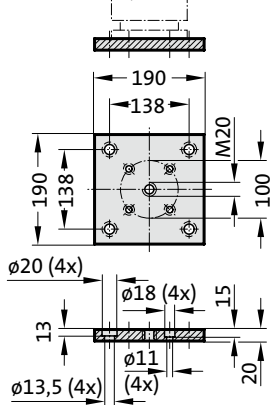
2480.011.07500



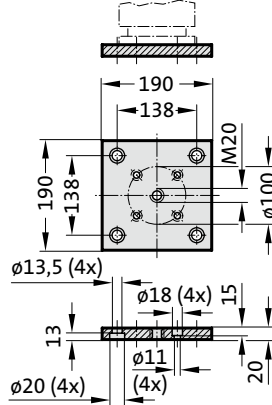
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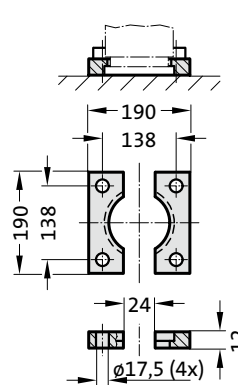
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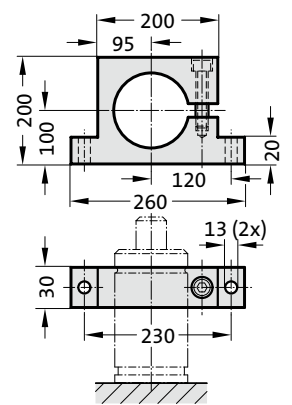
2480.011.03.07500.2



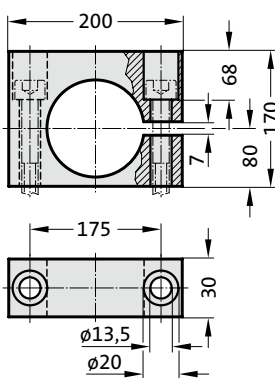
2480.022.07500



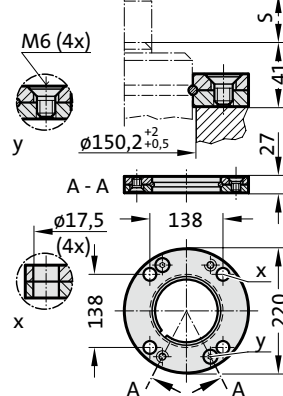
2480.044.07500²⁾



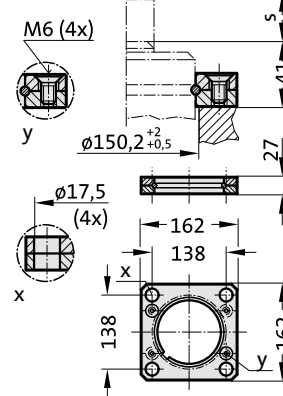
2480.044.03.07500²⁾



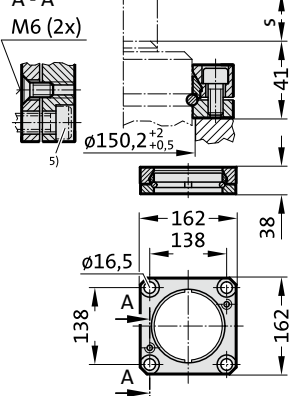
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- 2) Attention:
The spring force must be absorbed by the stop Surface!
- 3) Not for use with composite connection.
- 4) Square collar flange, non-rotating, fixing for composite connection.
- 5) Machine screws with hexagonal socket (compact head recommended)

GAS SPRING SPEED CONTROL, CUSHIONED

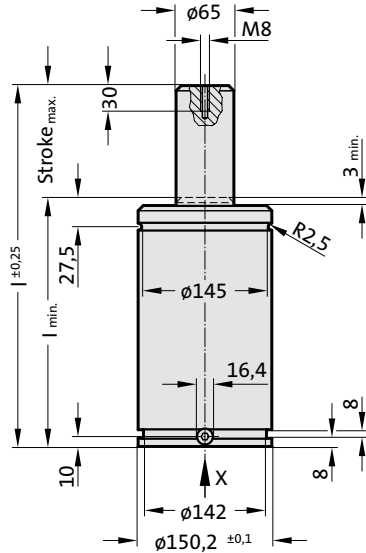
Note:

Initial spring force at 150 bar = 5000 daN

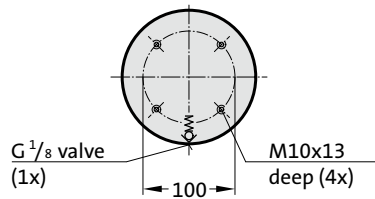
Order No for spare parts kit: 2486.12.05000

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 6 to 11 (at 20°C)
- Dampening length: ~ 30 mm
- Piston rod speed, decelerated: 0.4 m/s

2486.12.05000.



View X - Gas spring

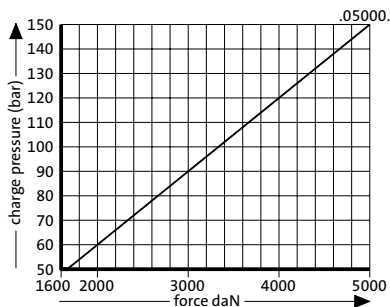


2486.12.05000.

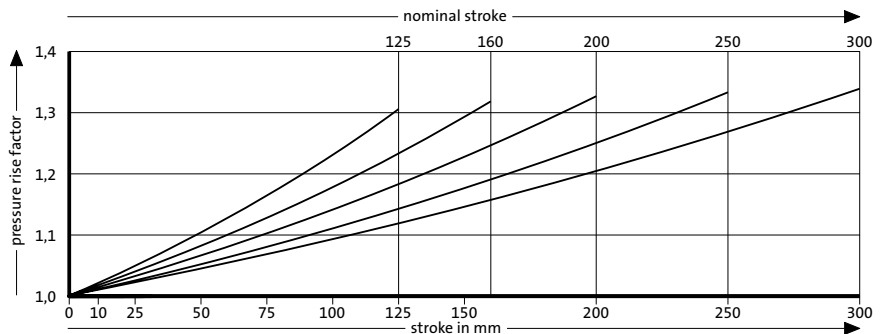
Gas spring SPEED CONTROL, cushioned

Order No	Stroke _{max.} (s)	I _{min.}	I
2486.12.05000.125	125	280	405
2486.12.05000.160	160	315	475
2486.12.05000.200	200	355	555
2486.12.05000.250	250	405	655
2486.12.05000.300	300	455	755

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS DS FOR DIE SEPARATION



GAS SPRINGS DS FOR DIE SEPARATION

Description

In line of reducing the set-up time while installing the tool in the press there are used autonomous acted gas springs for tool spacing. While using conventional gas springs they are activated with every press stroke about the whole stroke length. The new FIBRO gas spring, DS (Die Separation) have been developed especially for tool spacing. Because of the slow return stroke speed, the gas spring DS does not need the total stroke length. The FIBRO gas spring, DS minimises unwanted friction in the tool, press and in the gas spring itself. A further benefit is that they use up to 80% less energy than "conventional" standard gas springs.

Function:

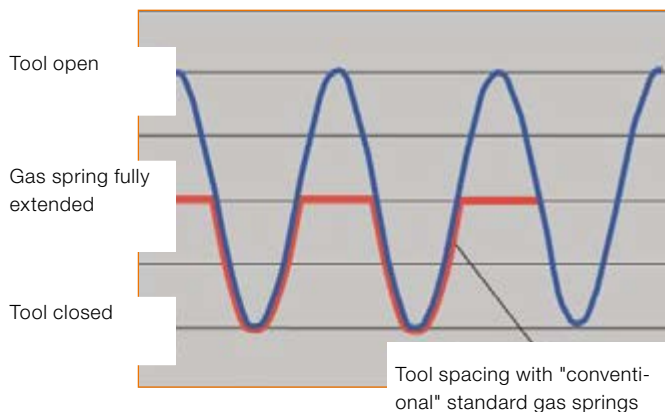
When conventional standard gas springs are used to distance the upper and lower parts of the die, additional initial forces are exerted on each stroke carried out. This force can increase further at the end of the stroke (see diagram 1). When using the "new" DS gas springs in the same application, the force is reduced to less than 10% for each stroke (diagram 2).

The return stroke speed of the gas springs DS is very slow. The duration of the complete return stroke is 1-2 minutes. However, this slow speed has no negative influence on the end position (gas springs fully extended). The piston rod is actuated oscillating up to 10% of the total stroke depending on the production rate.

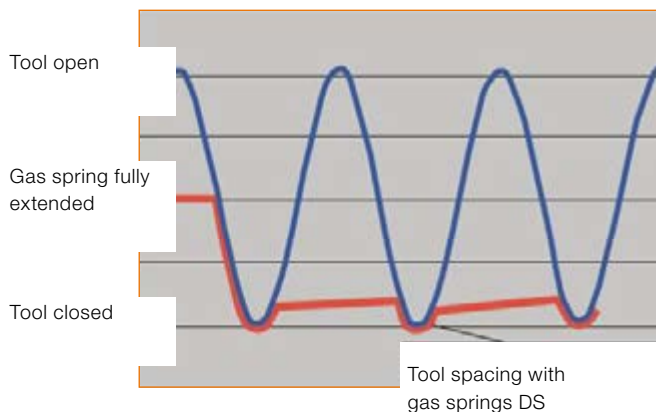
Properties:

- Initial spring forces of 3000 daN to 7500 daN
- Stroke lengths of 50 mm to 300 mm
- Standardised dimensions in accordance with ISO, VDI, CNOMO
- Very slow return stroke speed 0.2 m/min
- Standard safety features (FIBRO Safer Choice)
 - Safety piston rod
 - Excess pressure protection
 - Overtravel protection
- High flexibility during fixing from the top mounting notch and lower fixing groove, together with the tapped bores in the spring base

Diagrams 1

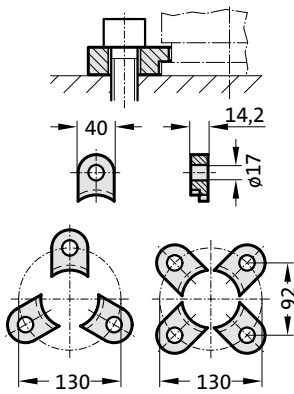


Diagrams 2

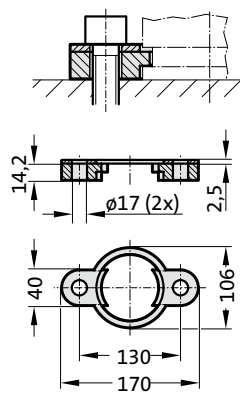


GAS SPRING DS MOUNTING VARIATIONS

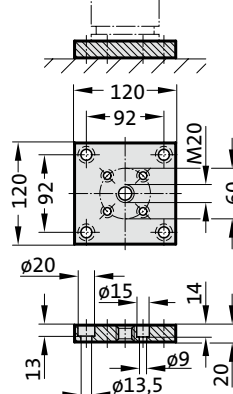
2480.007.03000



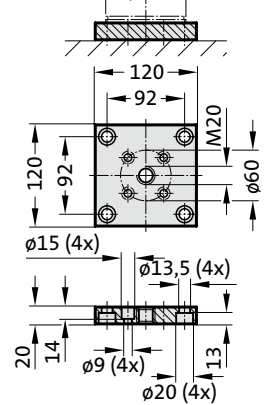
2480.008.03000³⁾



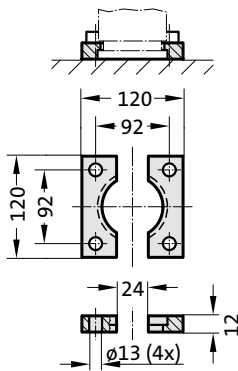
2480.011.03000



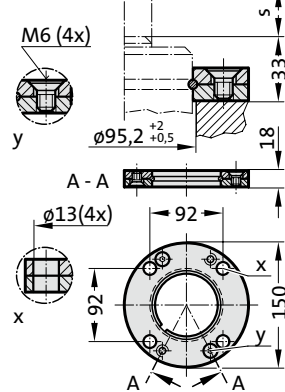
2480.011.03000.2



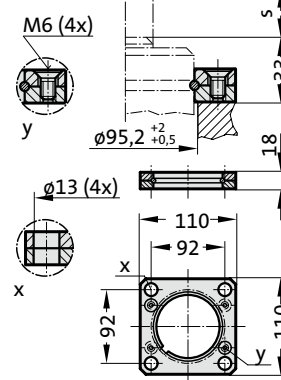
2480.022.03000



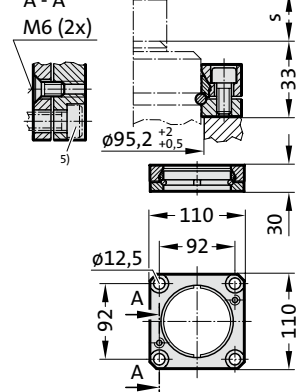
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING DS

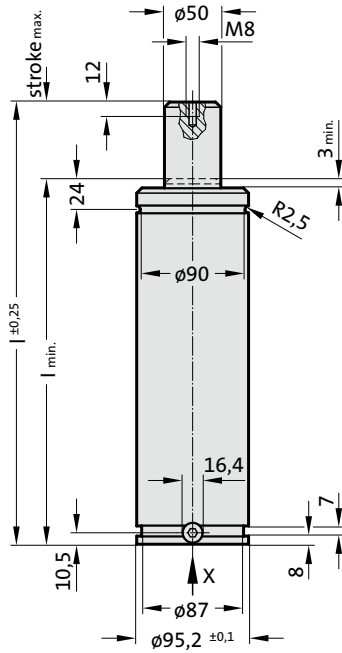
Note:

Initial spring force at 150 bar = 3000 daN

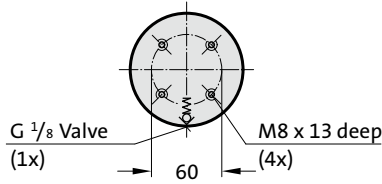
Order No. for spare parts kit: 2486.22.03000

- Pressure medium: Nitrogen - N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C bis +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 50 (at 20°C)
- Max. piston speed: 1.6 m/s
- Max. return stroke speed: 0.2 m/min

2486.22.03000.



View X - Gas spring

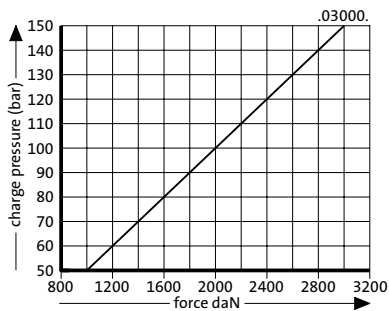


2486.22.03000.

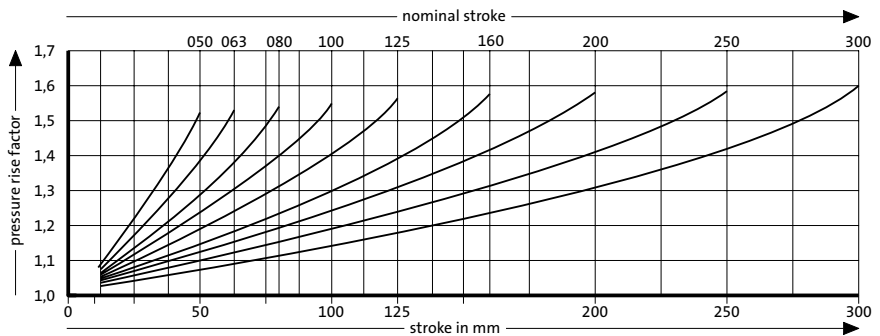
Gas spring DS

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.22.03000.050	50	170	220
2486.22.03000.063	63.5	183.5	247
2486.22.03000.080	80	200	280
2486.22.03000.100	100	220	320
2486.22.03000.125	125	245	370
2486.22.03000.160	160	280	440
2486.22.03000.200	200	320	520
2486.22.03000.250	250	370	620
2486.22.03000.300	300	420	720

Initial spring force versus charge pressure



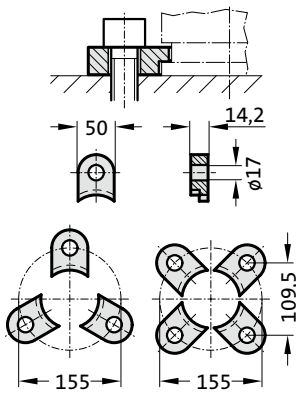
Spring force Diagram displacement versus stroke rise



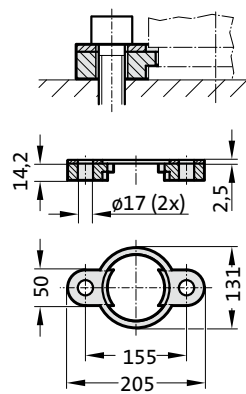
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING DS MOUNTING VARIATIONS

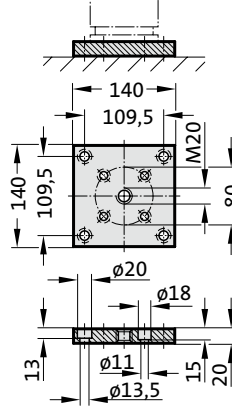
2480.007.05000



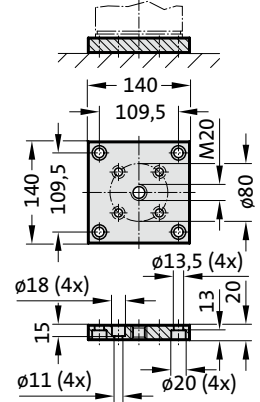
2480.008.05000³⁾



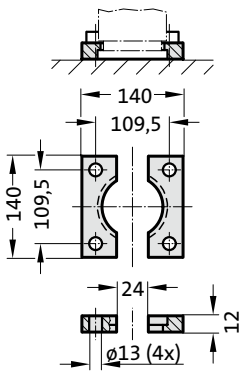
2480.011.05000



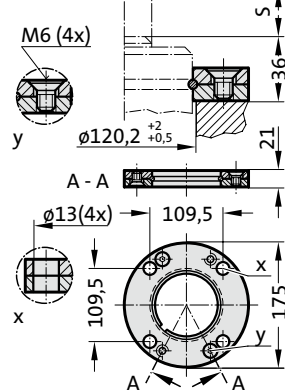
2480.011.05000.2



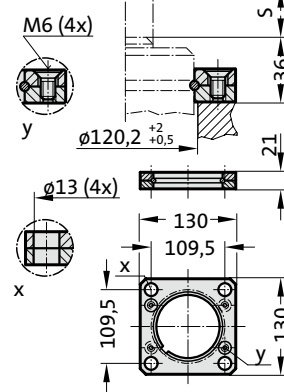
2480.022.05000



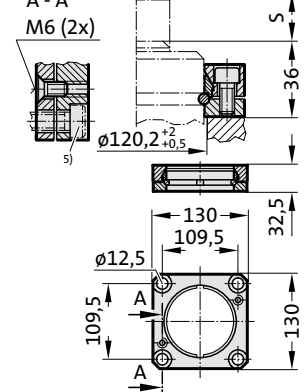
2480.055.05000



2480.057.05000



2480.064.05000⁴⁾



Note:

- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING DS

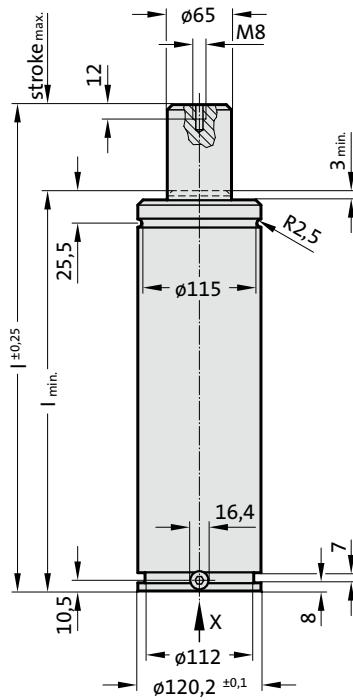
Note:

Initial spring force at 150 bar = 5000 daN

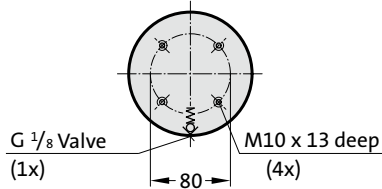
Order No. for spare parts kit: 2486.22.05000

- Pressure medium: Nitrogen - N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C bis +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 50 (at 20°C)
- Max. piston speed: 1.6 m/s
- Max. return stroke speed: 0.2 m/min

2486.22.05000.



View X - Gas spring

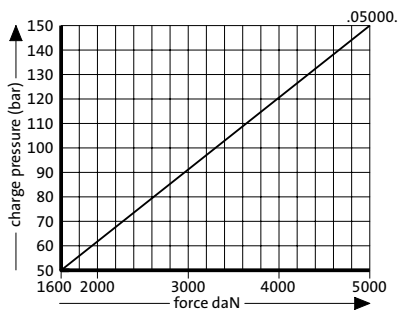


2486.22.05000.

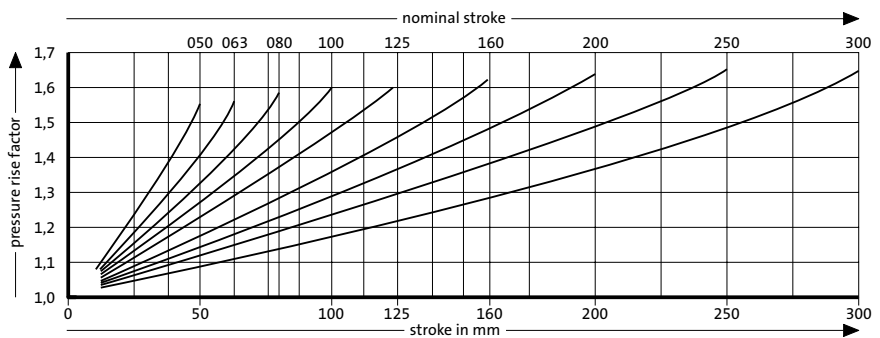
Gas spring DS

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.22.05000.050	50	190	240
2486.22.05000.063	63.5	203.5	267
2486.22.05000.080	80	220	300
2486.22.05000.100	100	240	340
2486.22.05000.125	125	265	390
2486.22.05000.160	160	300	460
2486.22.05000.200	200	340	540
2486.22.05000.250	250	390	640
2486.22.05000.300	300	440	740

Initial spring force versus charge pressure



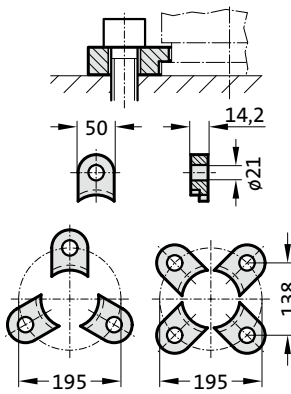
Spring force Diagram displacement versus stroke rise



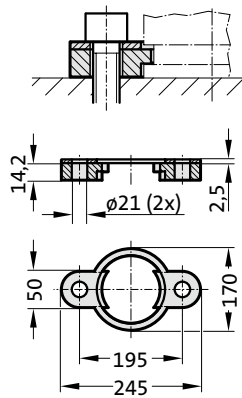
Pressure rise factor accounts for displacement but not external influences!

GAS SPRING DS MOUNTING VARIATIONS

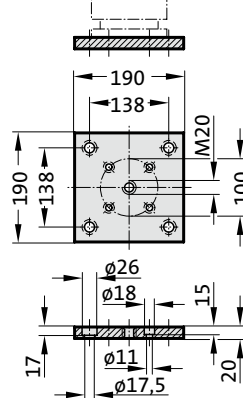
2480.007.07500



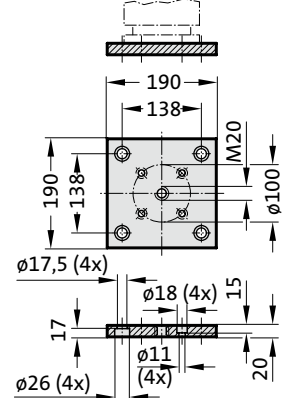
2480.008.07500³⁾



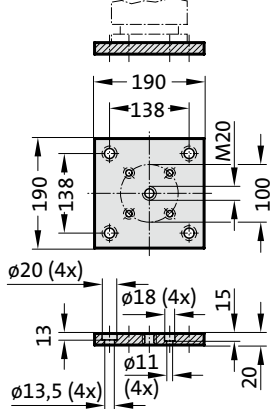
2480.011.07500



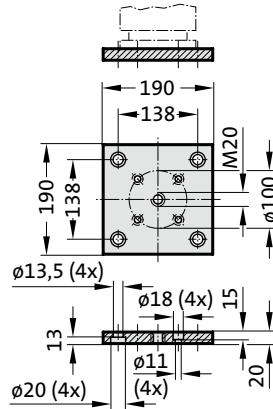
2480.011.07500.2



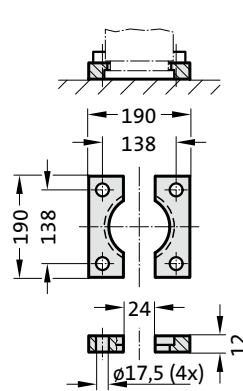
2480.011.03.07500



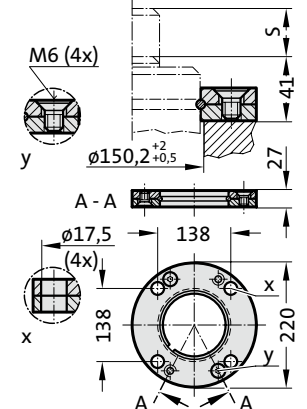
2480.011.03.07500.2



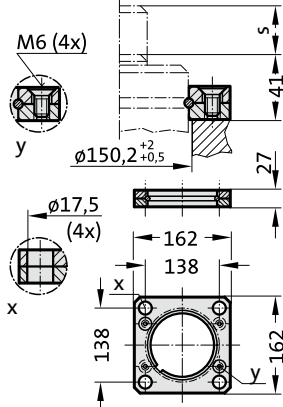
2480.022.07500



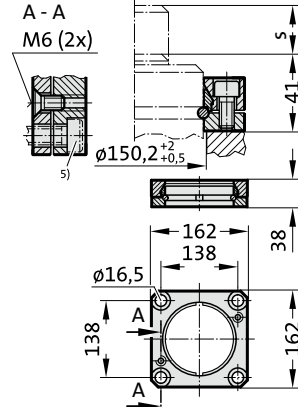
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

GAS SPRING DS

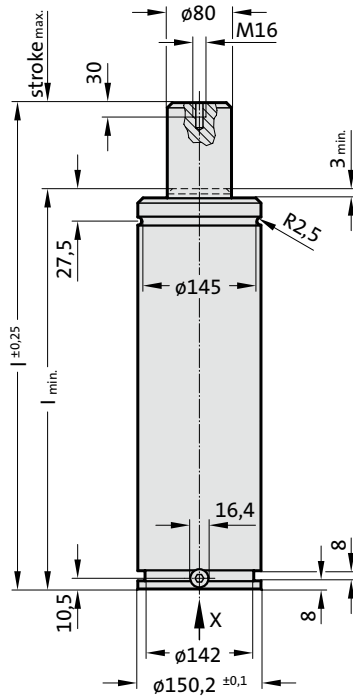
Note:

Initial spring force at 150 bar = 7500 daN

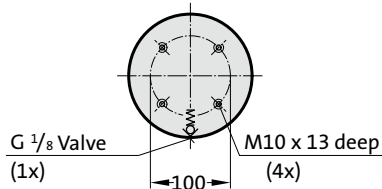
Order No. for spare parts kit: 2486.22.07500

- Pressure medium: Nitrogen - N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C bis +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 20 to 50 (at 20°C)
- Max. piston speed: 1.6 m/s
- Max. return stroke speed: 0.2 m/min

2486.22.07500.



View X - Gas spring

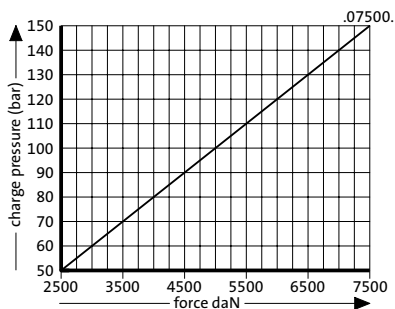


2486.22.07500.

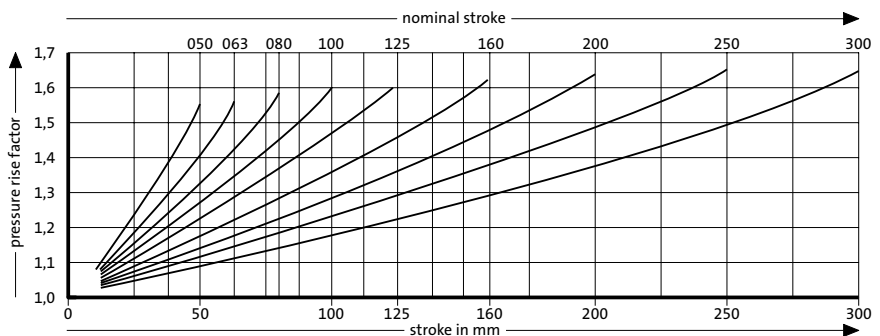
Gas spring DS

Order No	Stroke _{max.} (s)	l _{min.}	l
2486.22.07500.050	50	205	255
2486.22.07500.063	63.5	218.5	282
2486.22.07500.080	80	235	315
2486.22.07500.100	100	255	355
2486.22.07500.125	125	280	405
2486.22.07500.160	160	315	475
2486.22.07500.200	200	355	555
2486.22.07500.250	250	405	655
2486.22.07500.300	300	455	755

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRINGS WITH FASTENING TO FORD STANDARD WDX

Please request your catalogue

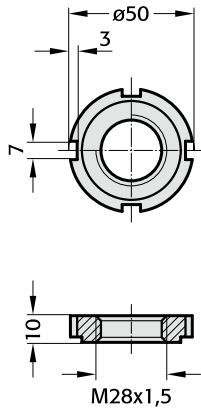


GAS SPRINGS WITH THREAD

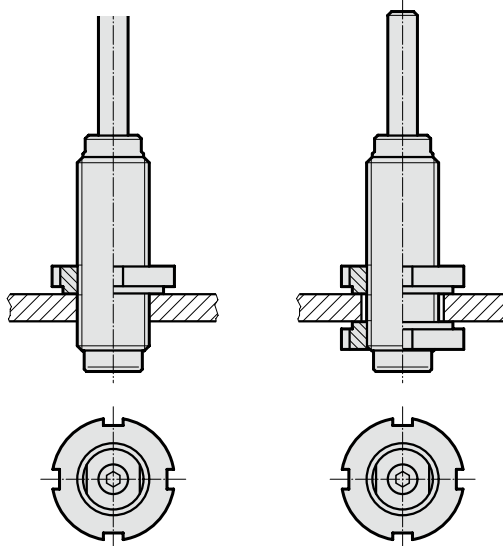


GAS SPRING WITH EXTERNAL THREAD MOUNTING VARIATIONS

2480.005.00200.
Slotted nut



Mounting examples:



GAS SPRING WITH EXTERNAL THREAD

Description:

The gas springs are colour-coded according to the spring force rating ranges 50–100–150–200 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Do take into consideration the colour-coded pressure rating during repair work and recharging.

Note:

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen N₂

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute:

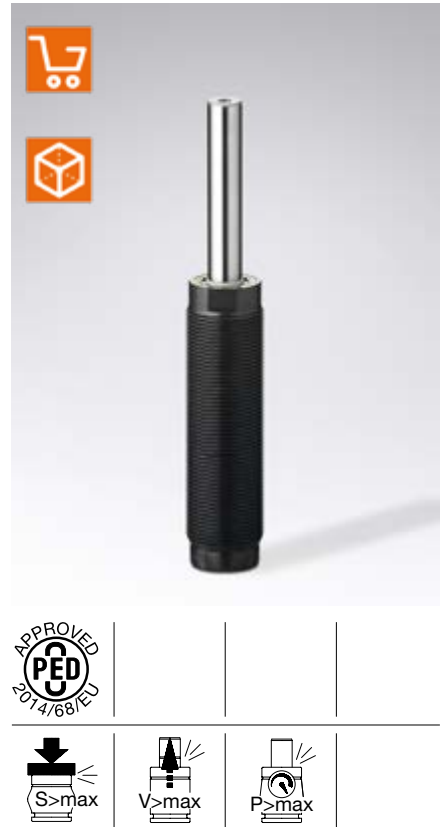
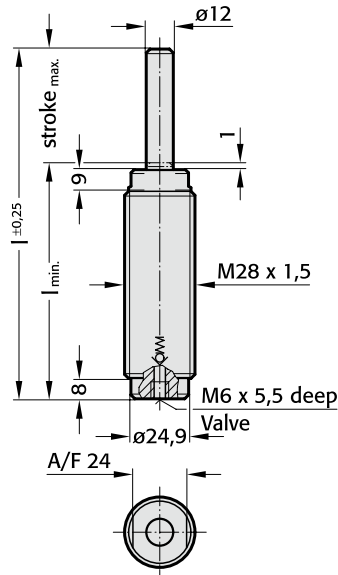
approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

Spring forces as per spring diagram.

Upon customers request, also available unfilled, Order No 2482.32.00000....., Colour: black

2480.32.



2480.32. Gas spring with external thread

Order No*	Stroke _{max.}	l	l _{min.}
2480.32.□□□□□.010	10	62	52
2480.32.□□□□□.013	12.7	67.4	54.7
2480.32.□□□□□.016	16	74	58
2480.32.□□□□□.025	25	92	67
2480.32.□□□□□.038	38.1	118.2	80.1
2480.32.□□□□□.050	50	142	92
2480.32.□□□□□.063	63.5	169	105.5
2480.32.□□□□□.080	80	202	122
2480.32.□□□□□.100	100	242	142
2480.32.□□□□□.125	125	292	167

*complete with initial spring force

Spring force marking:

Initial spring force [daN] - Pressure [bar] - Colour:

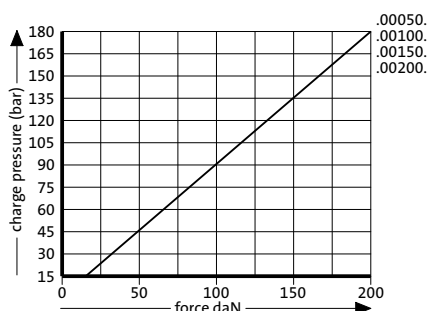
.00050. - 45 - green

.00100. - 90 - blue

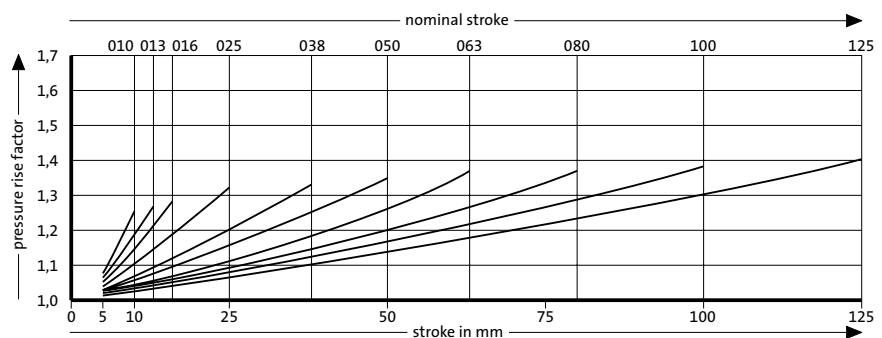
.00150. - 135 - red

.00200. - 180 - yellow

Initial spring force versus charge pressure

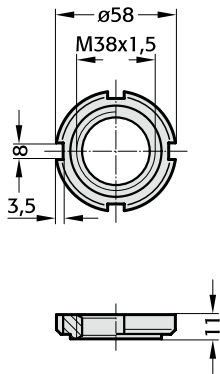


Spring force Diagram displacement versus stroke rise

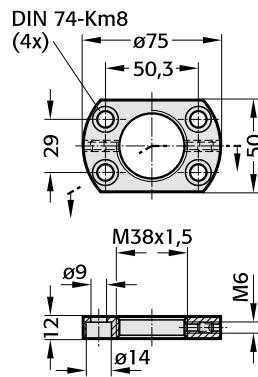


GAS SPRING WITH EXTERNAL THREAD MOUNTING VARIATIONS

2480.005.00250.
Slotted nut



2480.006.00250.
Clamped flange

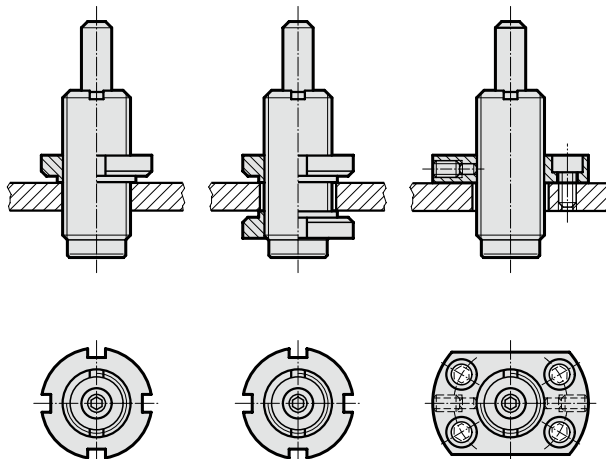


2480.00.51.01

Box spanner for assembling/disassembling
of gas springs



Mounting examples:



GAS SPRING WITH EXTERNAL THREAD

Note:

Initial spring force at 150 bar = 250 daN

Order No for spare parts kit: 2480.12.00250

Pressure medium: Nitrogen N₂

Max. filling pressure: 150 bar

Min. filling pressure: 50 bar

Working temperature: 0°C to +80°C

Temperature related force increase: ± 0.3%/°C

Max. recommended extensions per minute: approx. 80 to 100 (at 20°C)

Max. piston speed: 1.6 m/s

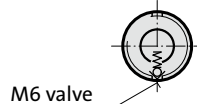
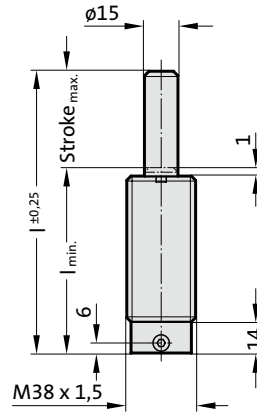
Fixing:

Installation with ring nut(s) 2480.005.00250 can be done with one or two ring nuts. If the hole in the bolster plate is not threaded, two ring nuts are needed. Holes threaded M 38 × 1,5 require one only ring nut for mounting of the gas springs.

Mounting with a threaded flange plate has the advantage of a degree of adjustability as far as the flange screws permit, moreover it is often found easier to make do with a clearance hole in the tool plate. Locking is by way of two lock screws with thrust plugs, provided in the threaded flange.

Diameter of through-hole in tool plate = 38 mm – plus four tapped holes M 8.

2480.32.00250.



M6 valve

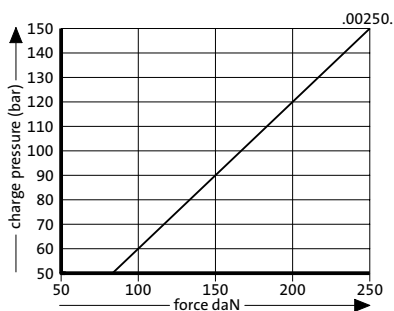


2480.32.00250.

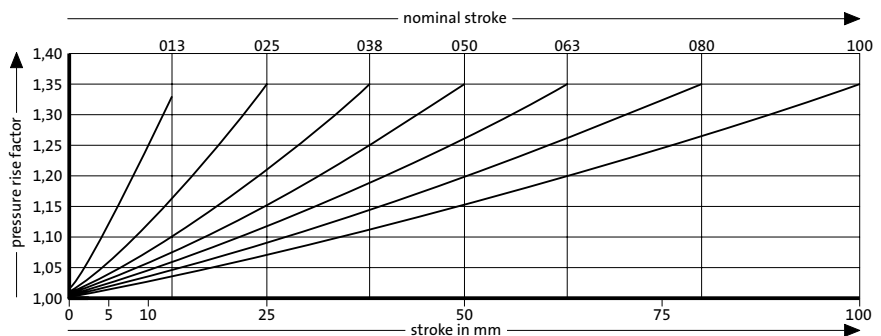
Gas spring with external thread

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.32.00250.013	12.7	62.7	75.4
2480.32.00250.025	25	75	100
2480.32.00250.038	38.1	88.1	126.2
2480.32.00250.050	50	100	150
2480.32.00250.063	63.5	113.5	177
2480.32.00250.080	80	130	210
2480.32.00250.100	100	150	250

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise

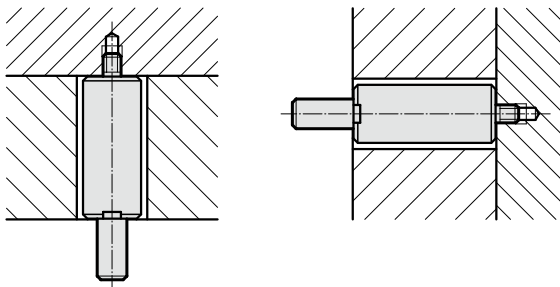


Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH MALE FIXING THREAD, SMALL MOUNTING HEIGHT MOUNTING VARIATIONS



Mounting examples:



GAS SPRING WITH MALE FIXING THREAD, SMALL MOUNTING HEIGHT

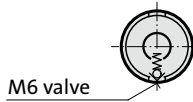
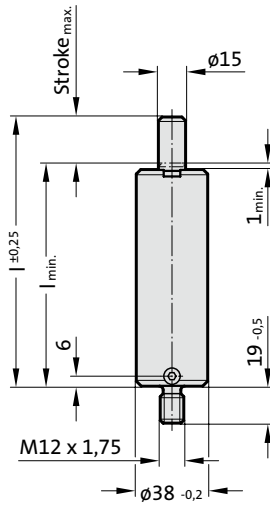
Note:

Initial spring force at 150 bar = 250 daN

Order No for spare parts kit: 2480.12.00250

Pressure medium: Nitrogen N₂
 Max. filling pressure: 150 bar
 Min. filling pressure: 50 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: ± 0.3%/°C
 Max. recommended extensions per minute:
 approx. 80 to 100 (at 20°C)
 Max. piston speed: 1.6 m/s

2480.82.00250.

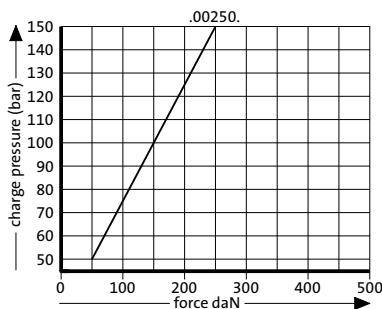


2480.82.00250.

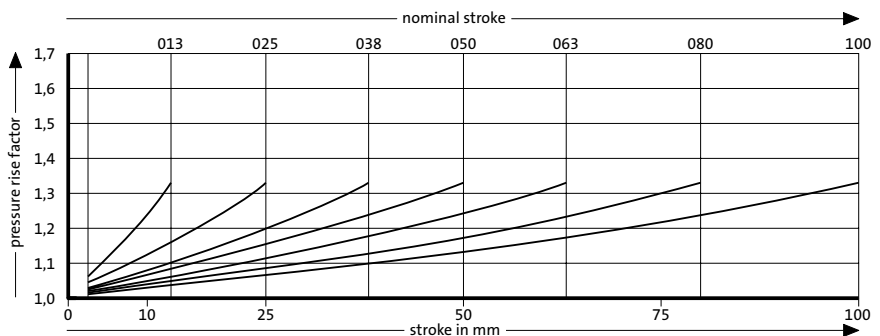
**Gas spring with male fixing thread,
small mounting height**

Order No	Stroke _{max.} (s)	l _{min.}	l
2480.82.00250.013	12.7	62.7	75.4
2480.82.00250.025	25	75	100
2480.82.00250.038	38.1	88.1	126.2
2480.82.00250.050	50	100	150
2480.82.00250.063	63.5	113.5	177
2480.82.00250.080	80	130	210
2480.82.00250.100	100	150	250

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH MALE FIXING THREAD, POWERLINE MOUNTING VARIATIONS

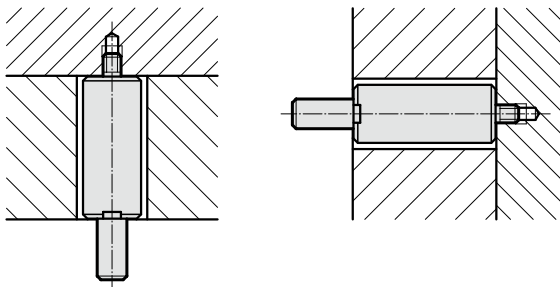
2480.00.51.05



Box spanner for assembling/disassembling of gas springs



Mounting examples:



GAS SPRING WITH MALE FIXING THREAD, POWERLINE

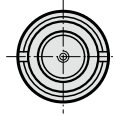
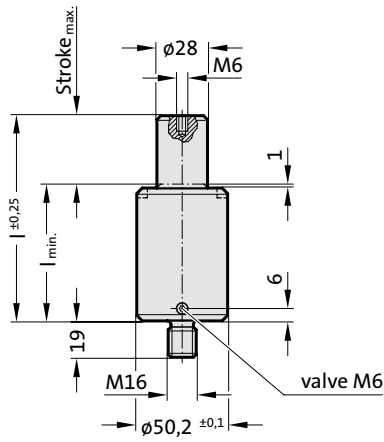
Note:

Initial spring force at 150 bar = 920 daN

Order No for spare parts kit: 2487.12.01000

- Pressure medium: Nitrogen N₂
- Max. filling pressure: 150 bar
- Min. filling pressure: 25 bar
- Working temperature: 0°C to +80°C
- Temperature related force increase: ± 0.3%/°C
- Max. recommended extensions per minute: approx. 50 to 100 (at 20°C)
- Max. piston speed: 1.6 m/s

2487.82.01000.

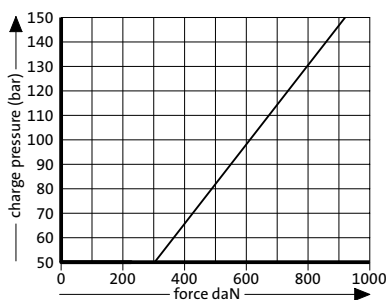


2487.82.01000.

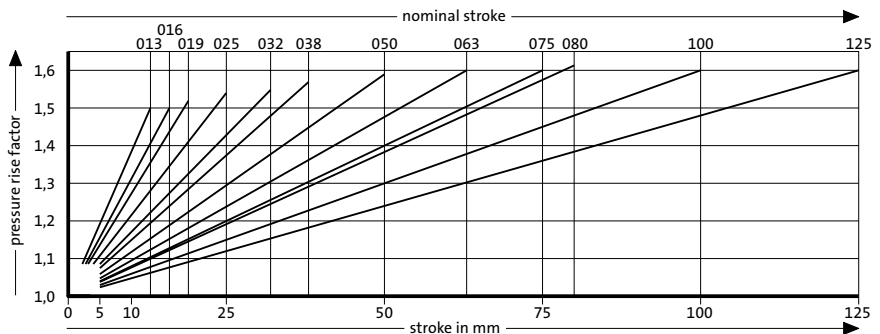
Gas spring with male fixing thread, POWERLINE

Order No	Stroke _{max.} (s)	I _{min.}	I
2487.82.01000.013	13	51	64
2487.82.01000.016	16	54	70
2487.82.01000.019	19	57	76
2487.82.01000.025	25	63	88
2487.82.01000.032	32	70	102
2487.82.01000.038	38	76	114
2487.82.01000.050	50	88	138
2487.82.01000.063	63	101	164
2487.82.01000.075	75	113	188
2487.82.01000.080	80	118	198
2487.82.01000.100	100	138	238
2487.82.01000.125	125	163	288

Initial spring force versus charge pressure

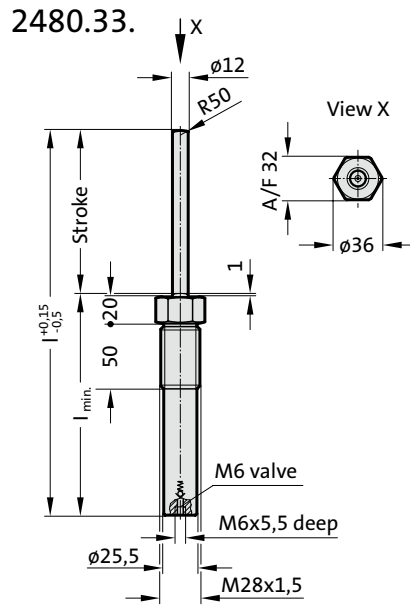


Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

GAS SPRING WITH HEXAGONAL FLANGE



Description:

The gas springs are colour-coded according to the spring force rating ranges 15–50–100–150–200 daN.

All springs, regardless of their spring force ratings, are of the same design. The differing force ratings result exclusively from the differing charge pressures.

Do take into consideration the colour-coded pressure rating during repair work and recharging.

Note:

Other stroke lengths avail on request! See gas spring 2480.32.

Order No for spare parts kit: 2480.21.00150

Pressure medium: Nitrogen N_2

Max. filling pressure: 180 bar

Min. filling pressure: 13 bar

Working temperature: 0°C to $+80^\circ\text{C}$

Temperature related force increase: $\pm 0.3\%/^\circ\text{C}$

Max. recommended extensions per minute: approx. 80 to 100 (at 20°C)

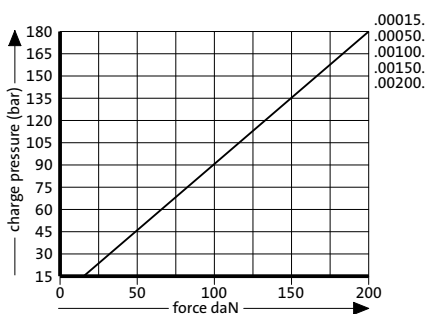
Max. piston speed: 1.6 m/s



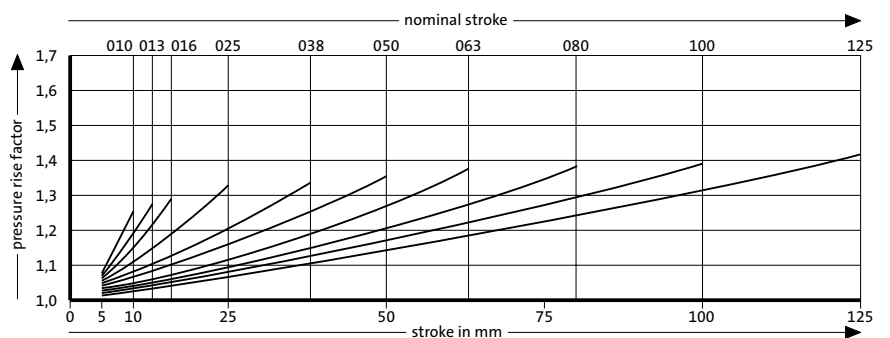
2480.33. Gas spring with hexagonal flange

Order No	Stroke _{max.} (s)	l _{min.}	l	Spring force [daN]		Colour
				initial		
2480.33.00015.125	125	167	292	15		black
2480.33.00050.125	125	167	292	50		green
2480.33.00100.125	125	167	292	100		blue
2480.33.00150.125	125	167	292	150		red
2480.33.00200.125	125	167	292	200		yellow

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



GAS SPRINGS FOR WORKING TEMPERATURES UP TO 120 ° C



GAS SPRINGS *LCF, DAMPED



* LCF Force Manager is a warning sign of Associated Spring

GAS SPRINGS *LCF, DAMPED

Description:

The LCF series represents a whole new generation of nitrogen-filled gas springs developed to meet the needs of the machine tool and press-making industries.

Negative factors such as

- high impact stresses
- excessive noise
- extreme bounce off the pad

are all minimised by LCF springs.

Characteristics such as

- dimensions
- fixing methods
- filling with gas and purging
- working in interconnected systems

are identical to those for standard ISO or type 2480.13. gas springs.

The springs from the LCF series reduce impact stresses by 50% compared to conventional gas springs.

The force builds up gradually and acceleration is uniform, reducing wear on both tool and press. As a result, less maintenance is required.

LCF springs are at least 20% quieter than standard gas springs.

The reduced noise level is due to the lower impact force, making these springs a cost-effective alternative to soundproofing panels.

They are thus more economical and environmentally-friendly.

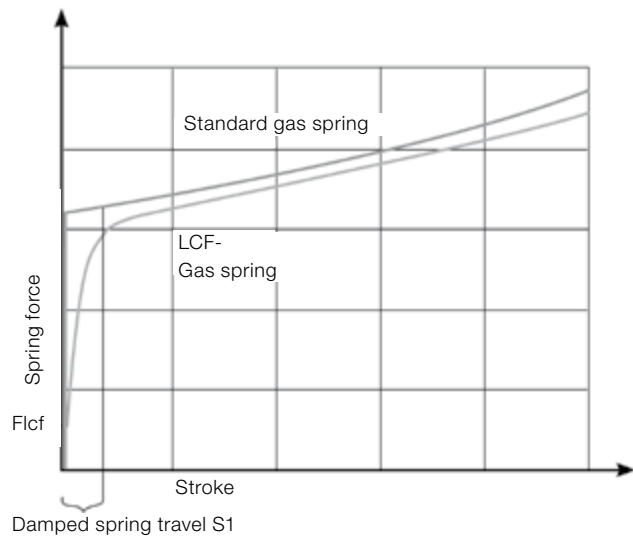
The LCF springs reduce the extreme bounce off the pad during the return stroke, thus lessening vibration on the workpiece and allowing the workpiece to be transported more effectively.

Since the spring travel is damped, the pad motion is more uniform, so in many cases the press stroke rate and thus productivity can be increased.

* LCF Force Manager is a warning sign of Associated Spring

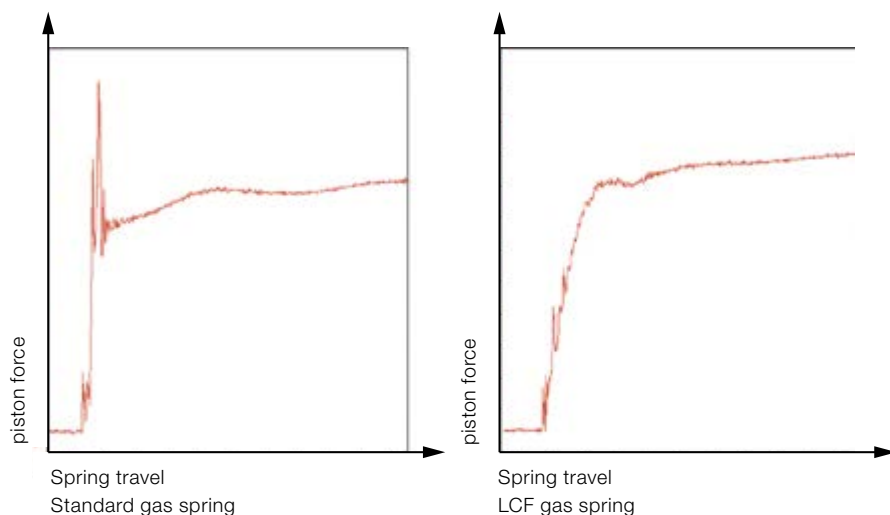
GAS SPRINGS *LCF, DAMPED

2484.13. Force diagram for gas springs LCF

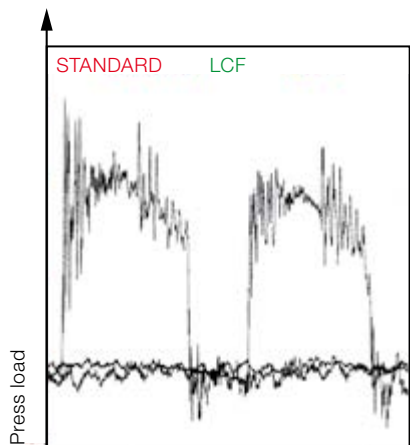


With the springs from the LCF series, the force builds up gradually and acceleration is uniform.

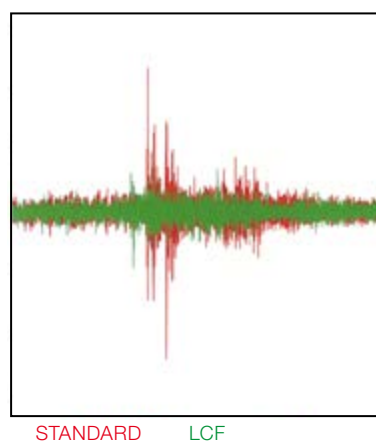
Measured dynamic piston force, Measured values for the 5000 series



Comparative press load diagram



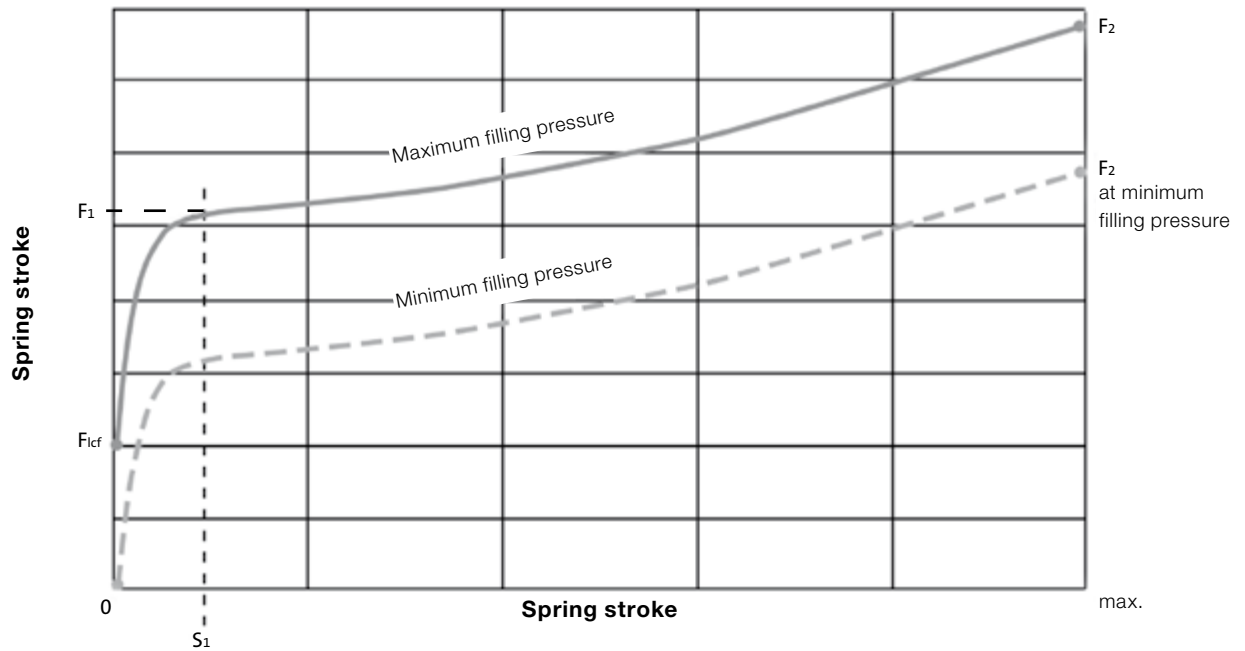
Noise reduction



The springs from the LCF series are quieter due to the reduced impact force.

GAS SPRINGS *LCF, DAMPED

2484.13. Force diagram for gas springs LCF



Note: Maximum pressure for LCF gas springs: 150 bar.
 Observe the minimum filling pressure!

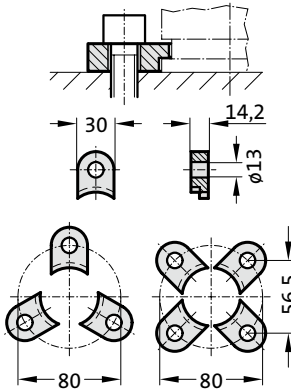
Guidelines for the use of LCF gas springs

1. After the damped spring travel (S_1) the LCF gas spring achieves the same initial spring force (F_1) and pressure build up as the standard gas spring (to ISO).
2. The spring force (F_{1cf}) should exceed the weight (e.g. the pad) by at least 15% so that it is held in the correct position (this does not apply in the case of minimum filling pressure).

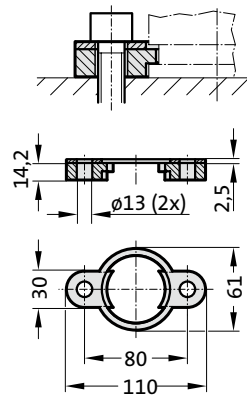
Spring size	F_{1cf} at 150 bar [daN]	Damped spring travel S_1	Minimum filling pressure [bar]
2484.13.00750.	470	3,1	70
2484.12.01500.	700	4,6	105
2484.13.03000.	1600	3,8	69
2484.13.05000.	2500	7,7	76
2484.13.07500.	3000	10,4	90

LCF GAS SPRING, DAMPED MOUNTING VARIATIONS

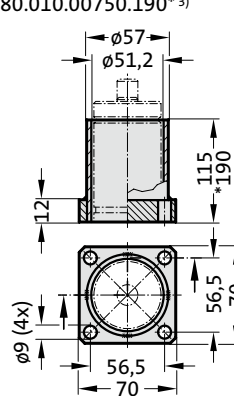
2480.007.00750



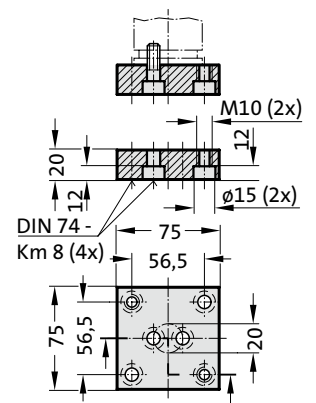
2480.008.00750³⁾



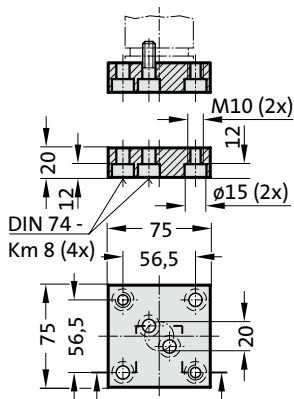
2480.010.00750.115³⁾
2480.010.00750.190*³⁾



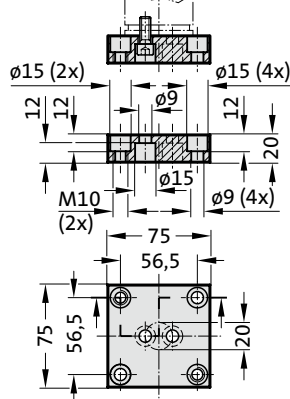
2480.011.00750



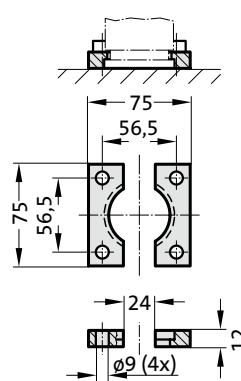
2480.011.00750.1



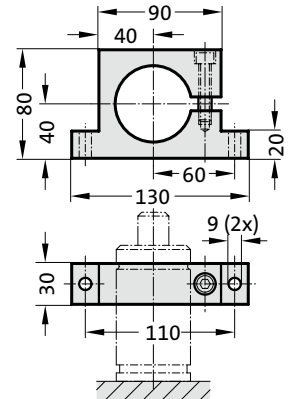
2480.011.00750.3



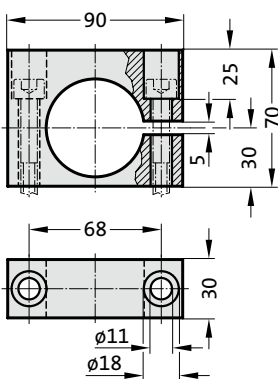
2480.022.00750



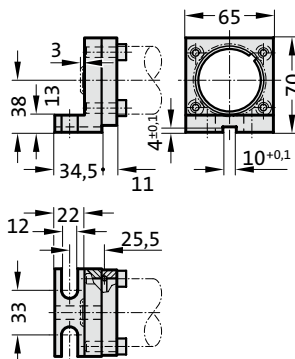
2480.044.00750²⁾



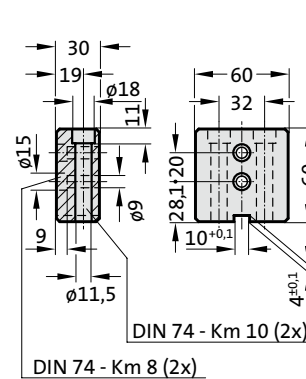
2480.044.03.00750²⁾



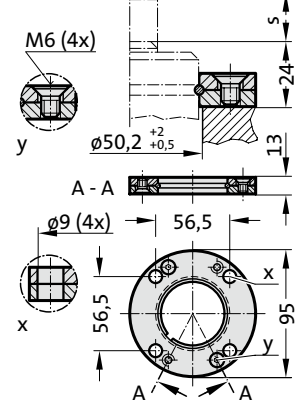
2480.045.00750²⁾



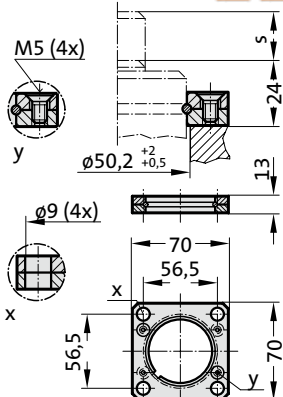
2480.047.00750²⁾



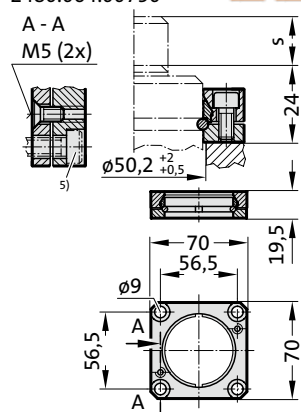
2480.055.00750



2480.057.00750



2480.064.00750⁴⁾



Note:

- 2) Attention:
The spring force must be absorbed by the stop Surface!
- 3) Not for use with composite connection.
- 4) Square collar flange, non-rotating, fixing for composite connection.
- 5) Machine screws with hexagonal socket (compact head recommended)

LCF GAS SPRING, DAMPED

Note:

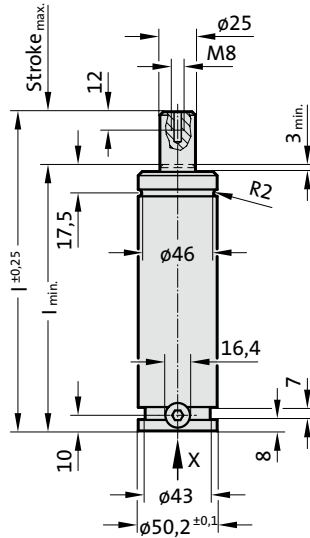
Initial spring force F_{lcf} at 150 bar = 470 daN
 Full spring force after 3.1 mm damped spring travel

Order No for spare parts kit: 2484.13.00750

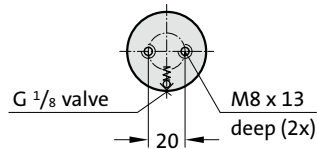
Gas spring without valve
 Order No (example): 2484.13.00750. .P

Pressure medium: Nitrogen N_2
 Max. filling pressure: 150 bar
 Min. filling pressure: 70 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: $\pm 0.3\%/^{\circ}C$
 Max. recommended extensions per minute:
 approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s

2484.13.00750.



View X - Gas spring

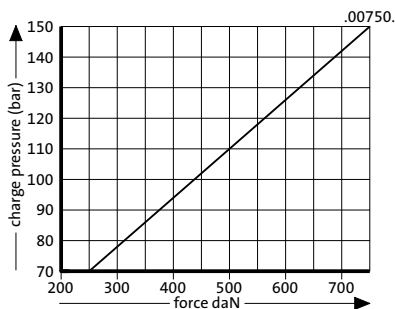


2484.13.00750.

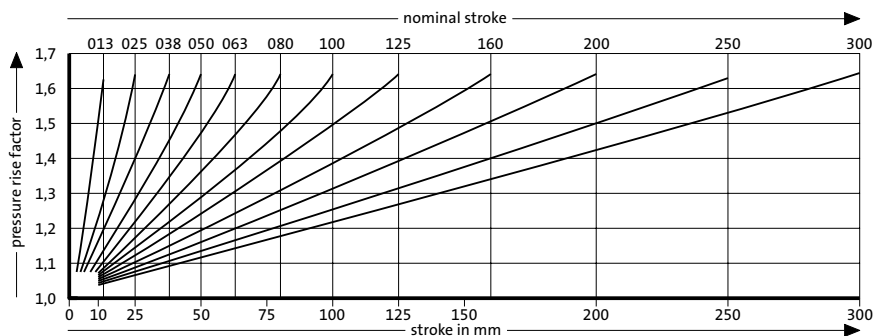
LCF Gas Spring, damped

Order No	Stroke _{max} (s)	l _{min}	l
2484.13.00750.013	12.7	107.7	120.4
2484.13.00750.025	25	120	145
2484.13.00750.038	38.1	133.1	171.2
2484.13.00750.050	50	145	195
2484.13.00750.063	63.5	158.5	222
2484.13.00750.080	80	175	255
2484.13.00750.100	100	195	295
2484.13.00750.125	125	220	345
2484.13.00750.160	160	255	415
2484.13.00750.200	200	295	495
2484.13.00750.250	250	345	595
2484.13.00750.300	300	395	695

Initial spring force versus charge pressure



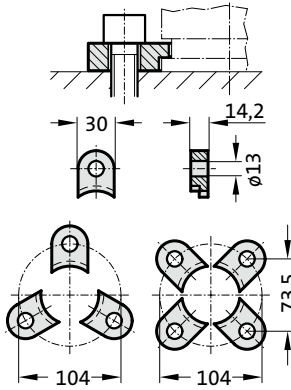
Spring force Diagram displacement versus stroke rise



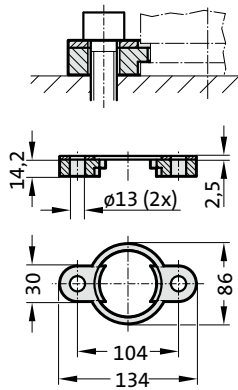
Pressure rise factor accounts for displacement but not external influences!

LCF GAS SPRING, DAMPED MOUNTING VARIATIONS

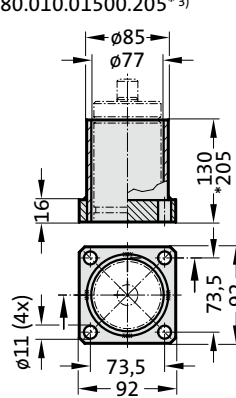
2480.007.01500



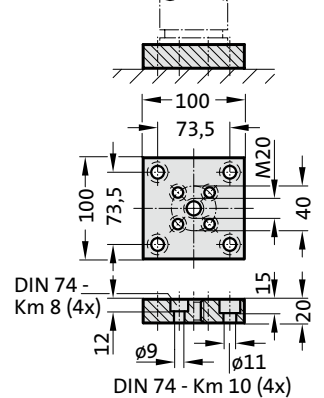
2480.008.01500³⁾



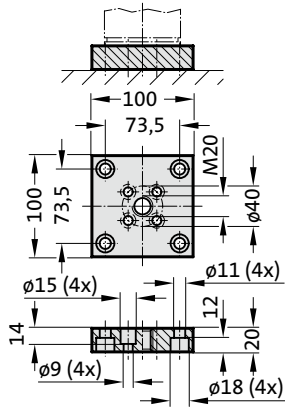
2480.010.01500.130³⁾
2480.010.01500.205^{*3)}



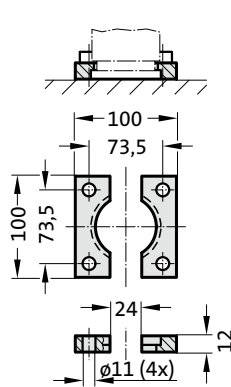
2480.011.01500



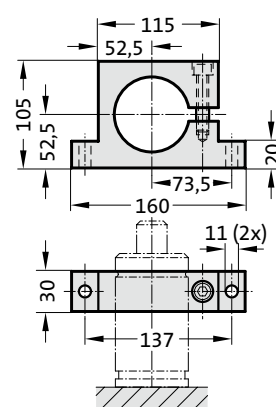
2480.011.01500.2



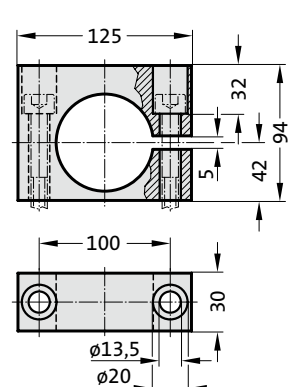
2480.022.01500



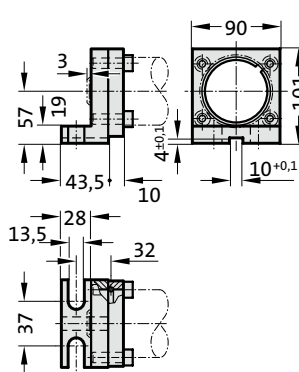
2480.044.01500²⁾



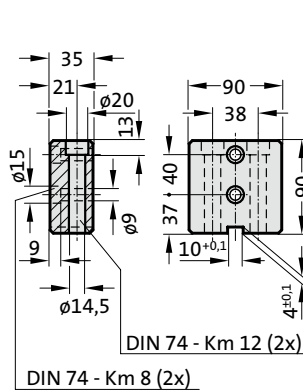
2480.044.03.01500²⁾



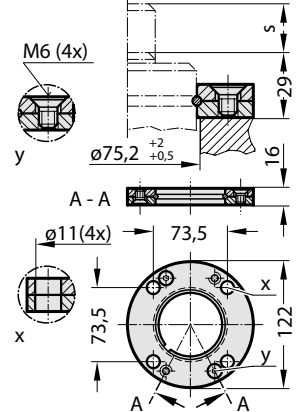
2480.045.01500²⁾



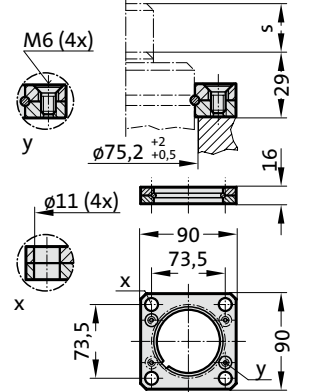
2480.047.01500²⁾



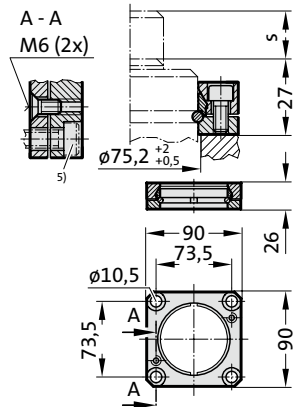
2480.055.01500



2480.057.01500



2480.064.01500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

LCF GAS SPRING, DAMPED

Note:

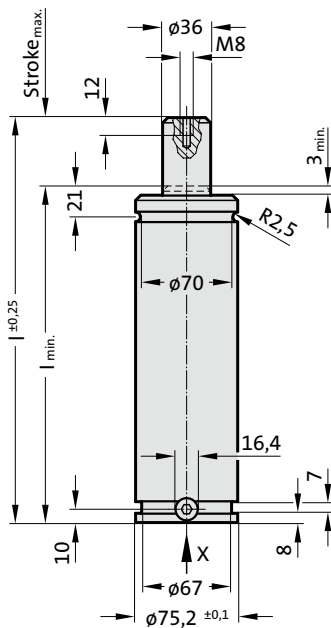
Initial spring force F_{ref} at 150 bar = 700 daN
 Full spring force after 4.6 mm damped spring travel

Order No for spare parts kit: 2484.12.01500

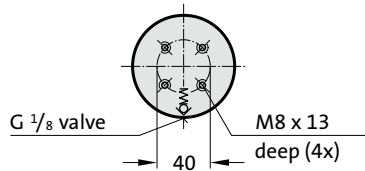
Gas spring without valve
 Order No (example): 2484.12.01500. .P

Pressure medium: Nitrogen N_2
 Max. filling pressure: 150 bar
 Min. filling pressure: 105 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: $\pm 0.3\%/^{\circ}\text{C}$
 Max. recommended extensions per minute:
 approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s

2484.12.01500.



View X - Gas spring

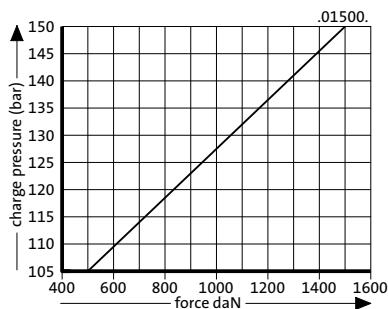


2484.12.01500.

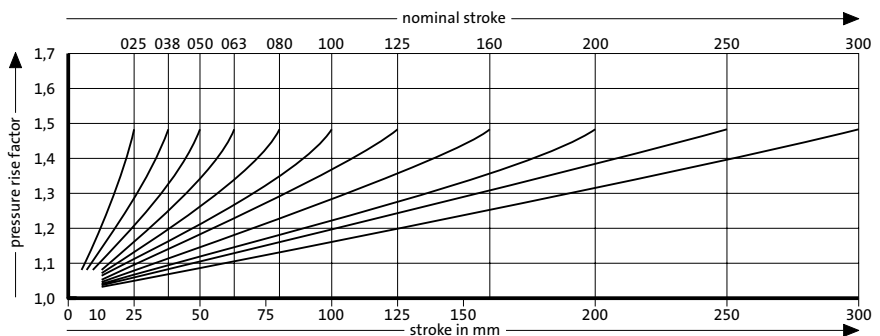
LCF Gas Spring, damped

Order No	Stroke _{max.} (s)	l _{min.}	l
2484.12.01500.025	25	135	160
2484.12.01500.038	38.1	148.1	186.2
2484.12.01500.050	50	160	210
2484.12.01500.063	63.5	173.5	237
2484.12.01500.080	80	190	270
2484.12.01500.100	100	210	310
2484.12.01500.125	125	235	360
2484.12.01500.160	160	270	430
2484.12.01500.200	200	310	510
2484.12.01500.250	250	360	610
2484.12.01500.300	300	410	710

Initial spring force versus charge pressure



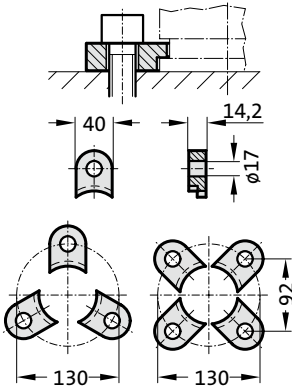
Spring force Diagram displacement versus stroke rise



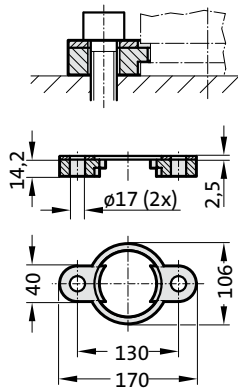
Pressure rise factor accounts for displacement but not external influences!

LCF GAS SPRING, DAMPED MOUNTING VARIATIONS

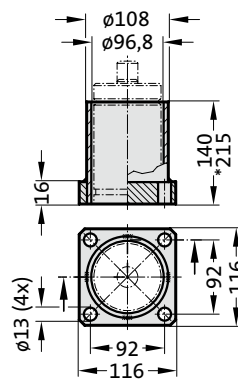
2480.007.03000



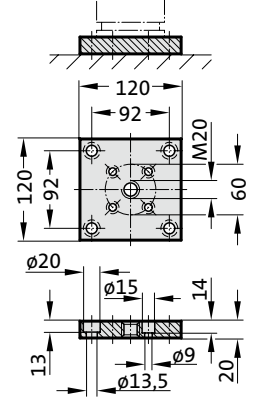
2480.008.03000³⁾



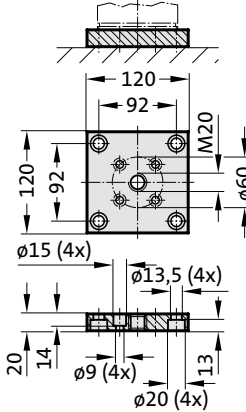
2480.010.03000.140³⁾
2480.010.03000.215*³⁾



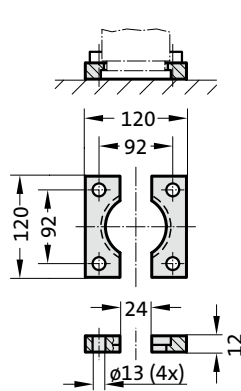
2480.011.03000



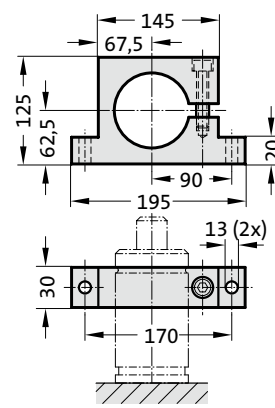
2480.011.03000.2



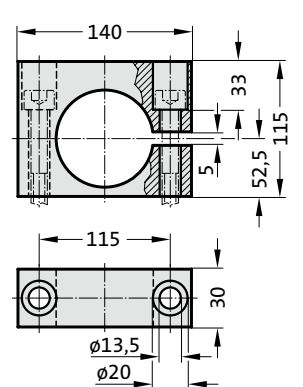
2480.022.03000



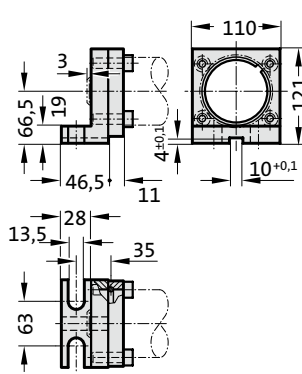
2480.044.03000²⁾



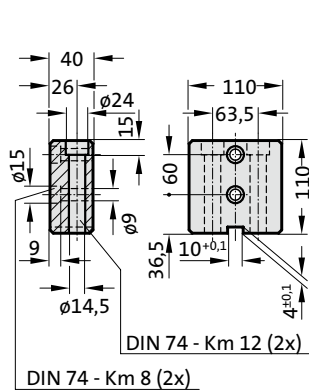
2480.044.03.03000²⁾



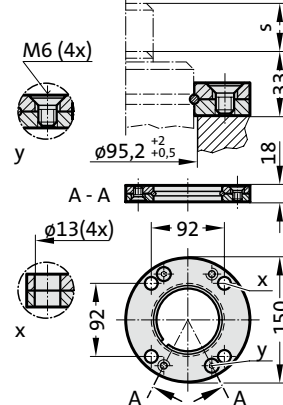
2480.045.03000²⁾



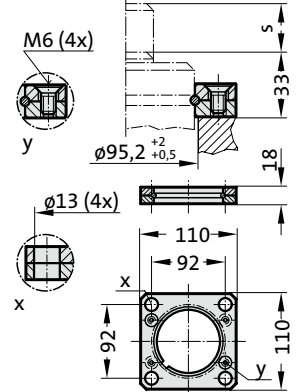
2480.047.03000²⁾



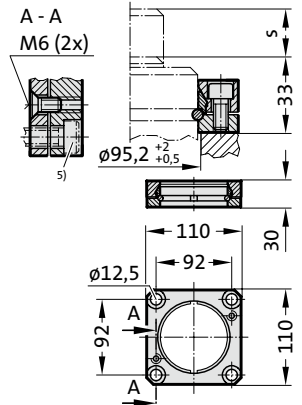
2480.055.03000



2480.057.03000



2480.064.03000⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

LCF GAS SPRING, DAMPED

Note:

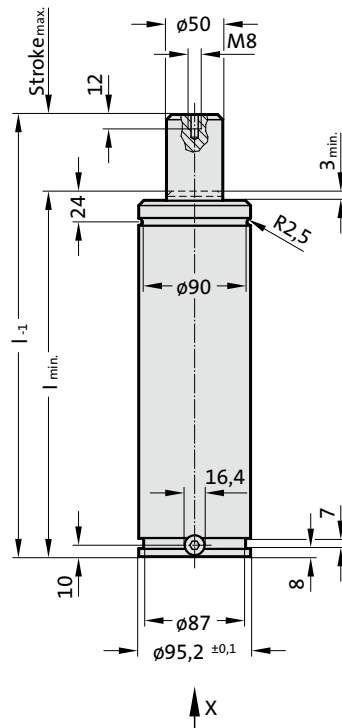
Initial spring force F_{lcf} at 150 bar = 1600 daN
 Full spring force after 3.8 mm damped spring travel

Order No for spare parts kit: 2484.13.03000

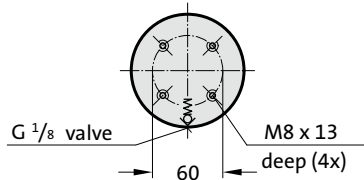
Gas spring without valve
 Order No (example): 2484.13.03000. .P

Pressure medium: Nitrogen N_2
 Max. filling pressure: 150 bar
 Min. filling pressure: 68 bar
 Working temperature: 0°C to +80°C
 Temperature related force increase: $\pm 0.3\%/^{\circ}C$
 Max. recommended extensions per minute:
 approx. 15 to 40 (at 20°C)
 Max. piston speed: 1.6 m/s

2484.13.03000.



View X - Gas spring

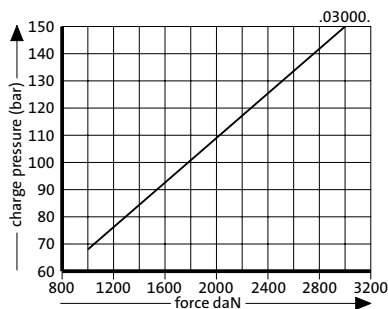


2484.13.03000.

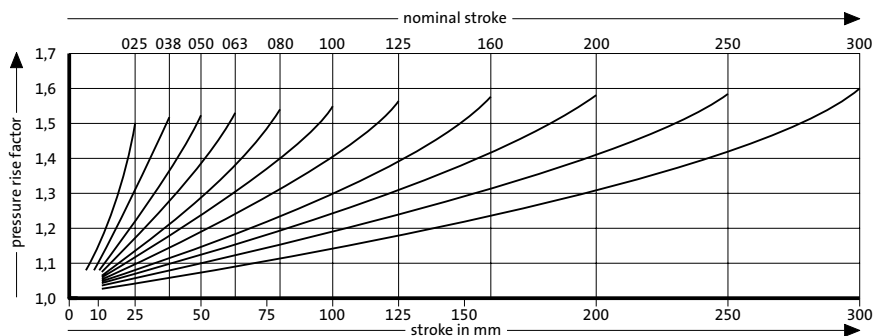
LCF Gas Spring, damped

Order No	Stroke _{max} (s)	l _{min}	l
2484.13.03000.025	25	145	170
2484.13.03000.038	38.1	158.1	196.2
2484.13.03000.050	50	170	220
2484.13.03000.063	63.5	183.5	247
2484.13.03000.080	80	200	280
2484.13.03000.100	100	220	320
2484.13.03000.125	125	245	370
2484.13.03000.160	160	280	440
2484.13.03000.200	200	320	520
2484.13.03000.250	250	370	620
2484.13.03000.300	300	420	720

Initial spring force versus charge pressure



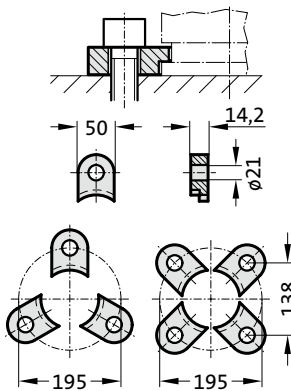
Spring force Diagram displacement versus stroke rise



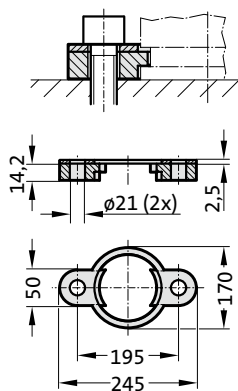
Pressure rise factor accounts for displacement but not external influences!

LCF GAS SPRING, DAMPED MOUNTING VARIATIONS

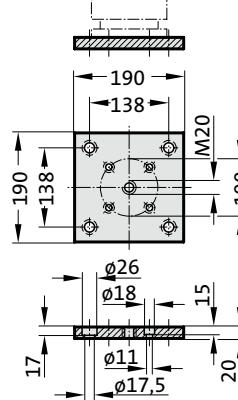
2480.007.07500



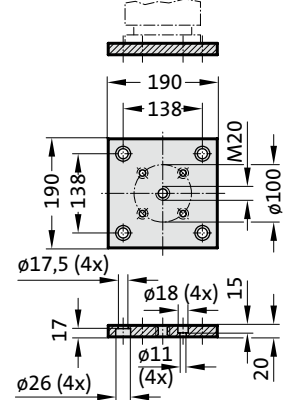
2480.008.07500³⁾



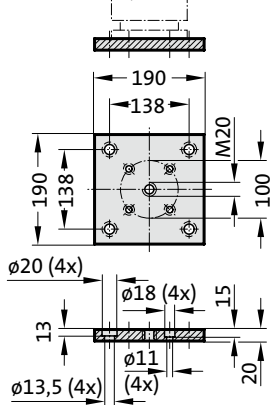
2480.011.07500



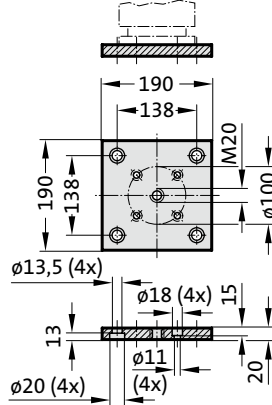
2480.011.07500.2



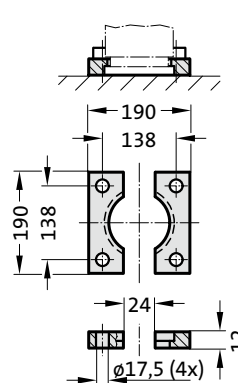
2480.011.03.07500



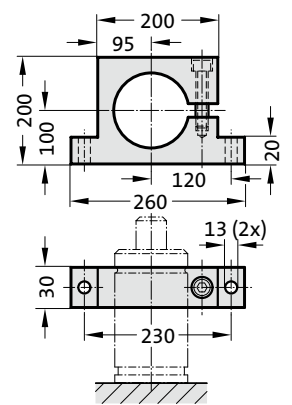
2480.011.03.07500.2



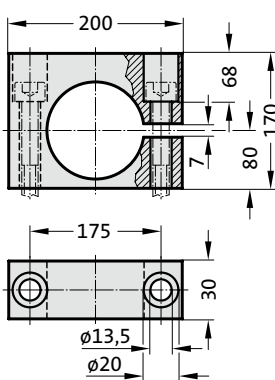
2480.022.07500



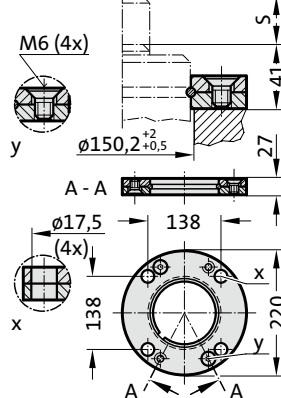
2480.044.07500²⁾



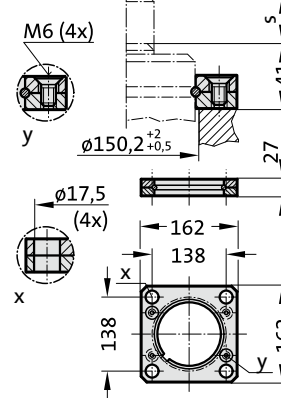
2480.044.03.07500²⁾



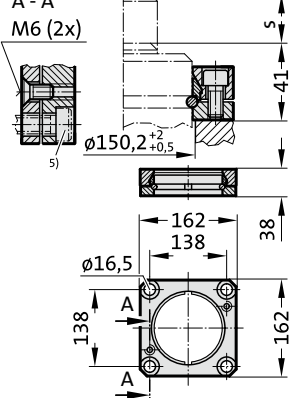
2480.055.07500



2480.057.07500



2480.064.07500⁴⁾



Note:

- ²⁾ Attention:
The spring force must be absorbed by the stop Surface!
- ³⁾ Not for use with composite connection.
- ⁴⁾ Square collar flange, non-rotating, fixing for composite connection.
- ⁵⁾ Machine screws with hexagonal socket (compact head recommended)

LCF GAS SPRING, DAMPED

Note:

Initial spring force F_{lcf} at 150 bar = 3000 daN
 Full spring force after 10.4 mm damped spring travel

Order No for spare parts kit: 2484.13.07500

Gas spring without valve

Order No (example): 2484.13.07500. .P

Pressure medium: Nitrogen N_2

Max. filling pressure: 150 bar

Min. filling pressure: 89 bar

Working temperature: 0°C to +80°C

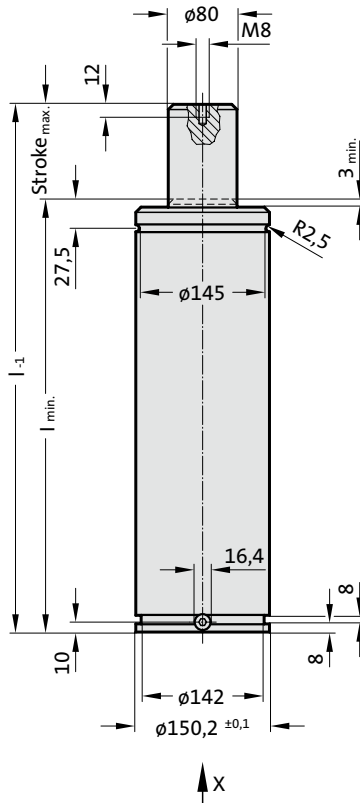
Temperature related force increase: $\pm 0.3\%/^{\circ}C$

Max. recommended extensions per minute:

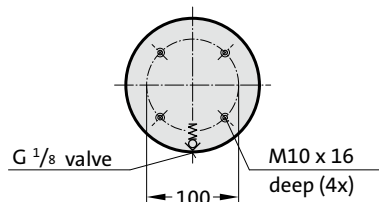
approx. 15 to 40 (at 20°C)

Max. piston speed: 1.6 m/s

2484.13.07500.



View X - Gas spring

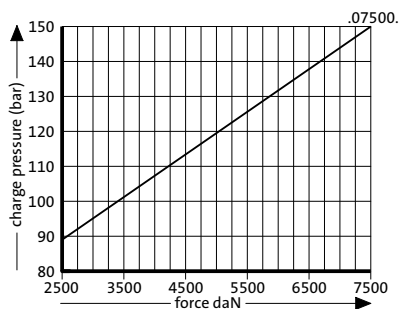


2484.13.07500.

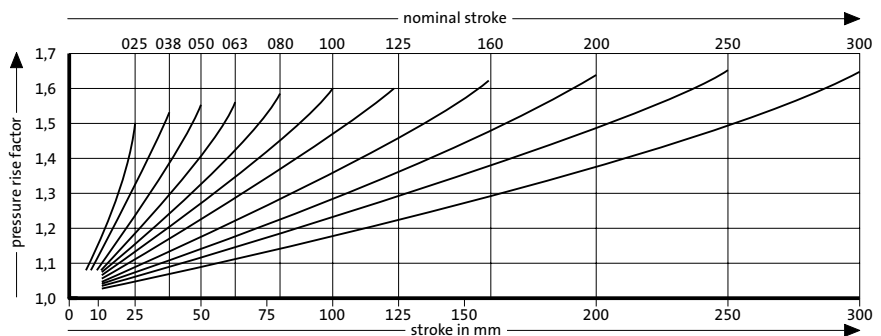
LCF Gas Spring, damped

Order No	Stroke _{max.} (s)	l _{min.}	l
2484.13.07500.025	25	180	205
2484.13.07500.038	38.1	193.1	231.2
2484.13.07500.050	50	205	255
2484.13.07500.063	63.5	218.5	282
2484.13.07500.080	80	235	315
2484.13.07500.100	100	255	355
2484.13.07500.125	125	280	405
2484.13.07500.160	160	315	475
2484.13.07500.200	200	355	555
2484.13.07500.250	250	405	655
2484.13.07500.300	300	455	755

Initial spring force versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

CONTROLLABLE GAS SPRINGS

PATENTED



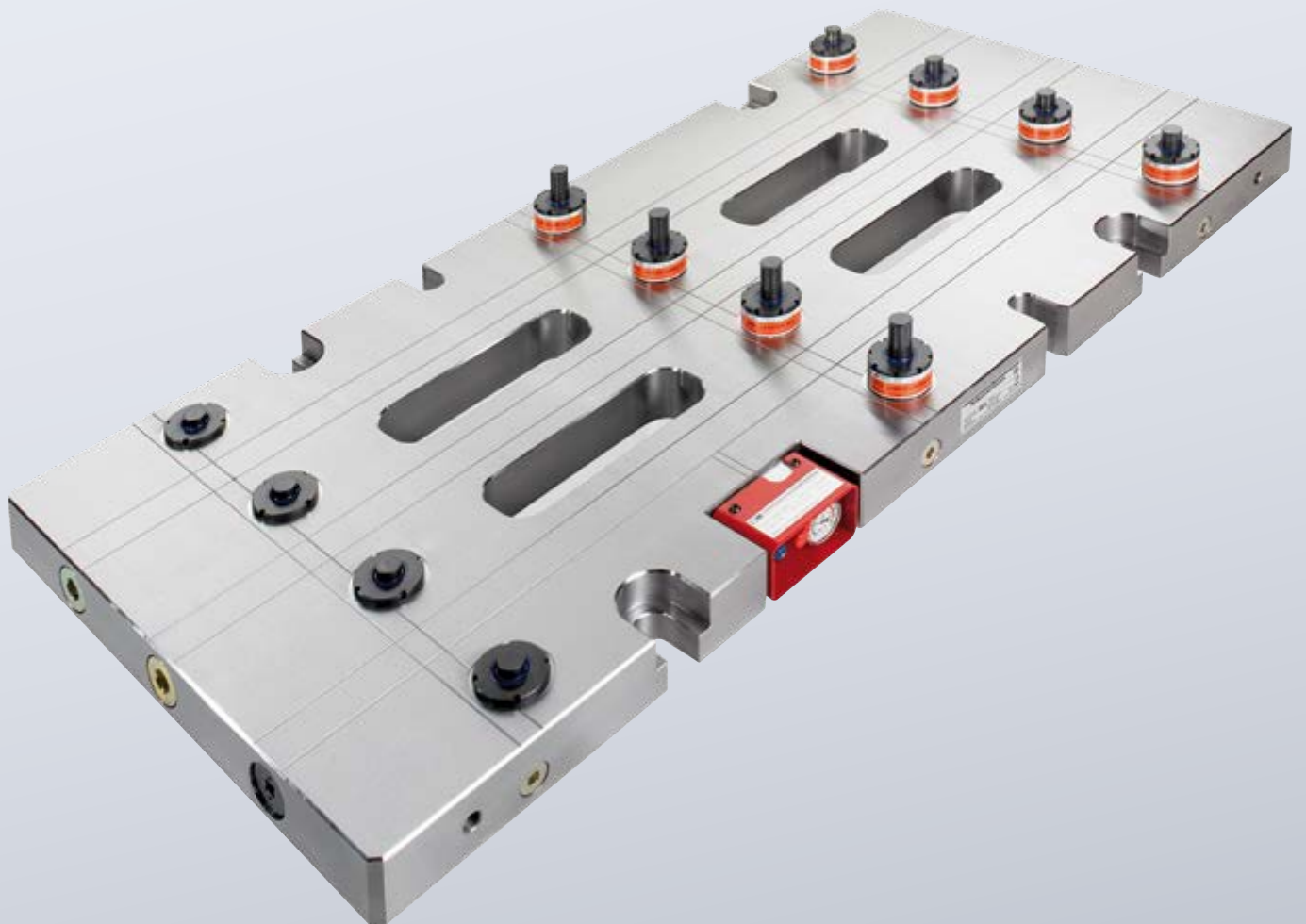
PLEASE REQUEST YOUR CATALOGUE

AIR SPRINGS TO VW STANDARD



PLEASE REQUEST YOUR CATALOGUE

MANIFOLDSYSTEMS



PLEASE REQUEST YOUR CATALOGUE

COMPOSITE PLATES



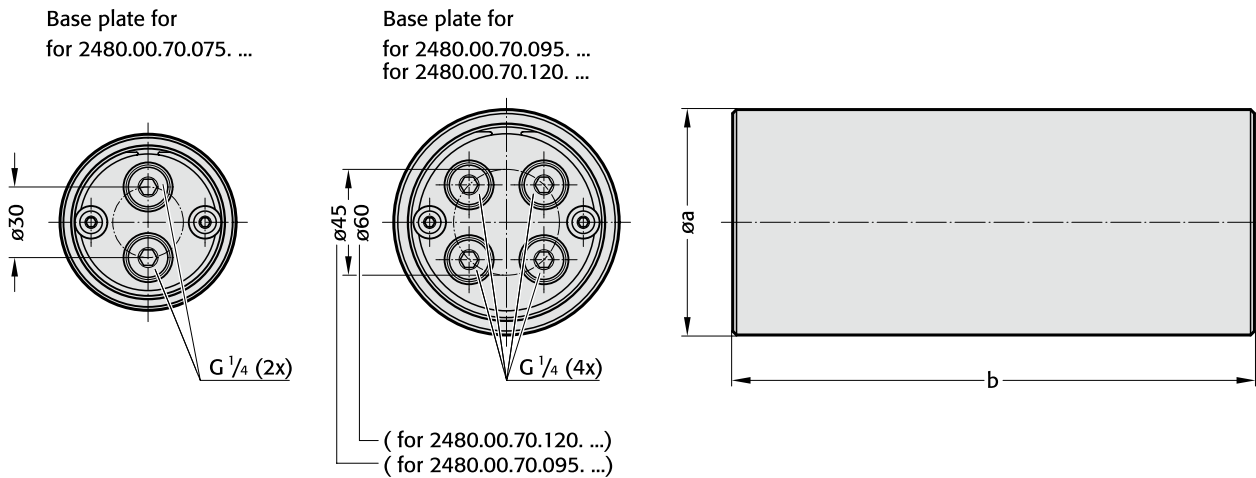
PLEASE REQUEST YOUR CATALOGUE

GAS SPRINGS - ACCESSORIES



PRESSURE RESERVOIR FOR REDUCED PRESSURE RISE

2480.00.70.



Description:

The pressure reservoir and its base plates are manufactured from the same high grade steel as FIBRO gas springs.

The advantage of including a pressure reservoir in the system is that in operation the gas pressure rises to a lesser extent. Apart from the purely technical pressure factors, a reduced pressure rise is beneficial to the service life of the system.

Function:

The pressure reservoir has two or four mounting holes with G¹/₄" at both sides, which are designed for connection to the control fitting or gas spring.

Note:

If a pressure reservoir is to be installed, we recommend the 24°-cone-system, which ensures that the gas flow is not inhibited.

Mounting clamps should be ordered separately. At least 2 are required for each pressure reservoir, see following pages.

2480.00.70. Pressure accumulator

Order No.	Volume in l [litres]	Ø a	b
2480.00.70.075.0170	0,25	75	170
2480.00.70.075.0250	0,50	75	250
2480.00.70.075.0410	1,0	75	410
2480.00.70.095.0300	1,0	95	300
2480.00.70.095.0500	2,0	95	500
2480.00.70.095.0700	3,0	95	700
2480.00.70.095.0900	4,0	95	900
2480.00.70.120.0360	2,0	120	360
2480.00.70.120.0615	4,0	120	615
2480.00.70.120.1125	8,0	120	1125

Ordering Code (example):

Pressure accumulator	=	2480.00.70.
Øa = 75 mm	=	075.
b = 170 mm	=	0170
Order No.	=	2480.00.70.075.0170

Gas spring size/daN	Piston rod surface/dm ²
.00500	0,031
.00750	0,049
.01500	0,102
.03000	0,196
.05000	0,332
.07500	0,503
.10000	0,709

Calculating the isothermic increase in pressure*

(*by approximation)

$$\text{Pressure build-up} = \frac{V_a + (n \times V_g^{1})}{V_a + (n \times (V_g^{1}) - \text{Hub} \times A)}$$

V _a	[l]	Volume of pressure reservoir, see table
V _{g¹}	[l]	Gas volume of gas springs, corresponding spring type
		1) Note: For the design, gas volume of the spring type, please contact FIBRO!
Stroke	[dm]	Stroke length of gas springs, corresponding to spring type
A	[dm ²]	Piston surface of gas springs, see table
n		Number of gas springs

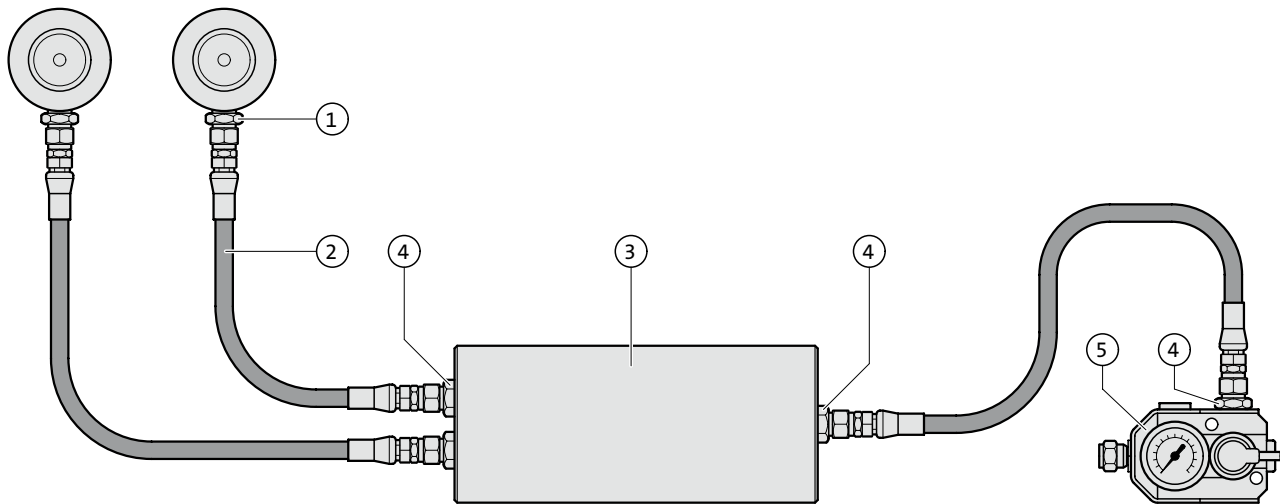
Calculation example:

10 gas springs, type 2480.13.05000.050 with a travel of 50 mm (0,5 dm) are connected to a system with an 8 litres pressure reservoir.

$$\text{Pressure build-up} = \frac{8 \text{ l} + (10 \times 0,51 \text{ l})}{8 \text{ l} + (10 \times (0,51 \text{ l} - 0,5 \text{ dm} \times 0,332 \text{ dm}^2))} = 1,145$$

PRESSURE RESERVOIR FOR REDUCED PRESSURE RISE

2480.00.70. Installation example: 24° cone hose system

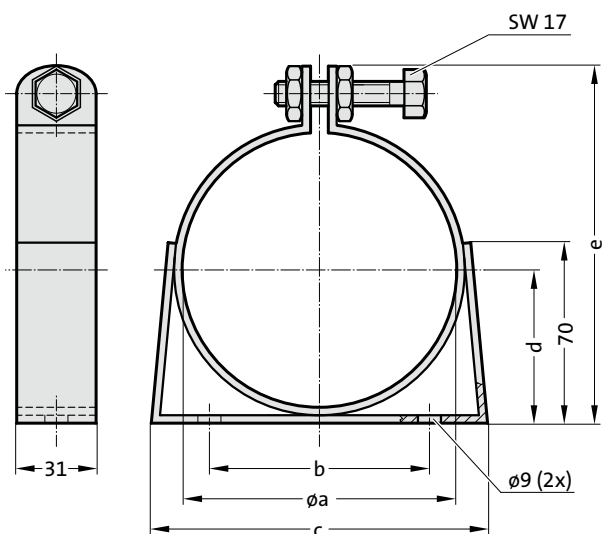


Item No.	Quantity	Description	Order No.
1	2	Screw connection G1/8 G1/8	2480.00.26.03
2	3	24°-cone-hose	2480.00.25.01.□ □ □ □
3	1	Pressure accumulator	2480.00.70. □ □ □ □ □ □ □ □
4	4	Screw connection G1/4	2480.00.26.04
5	1	Control fitting	2480.00.31.01



MOUNTING CLAMP FOR PRESSURE RESERVOIR

2480.00.70.



Description:

The mounting clamp is a rubber coated galvanised sheet steel ring and is used for mounting the FIBRO pressure reservoir.

Attention:

At least 2 fixing clamps are required per pressure reservoir.
If the pressure tank is to be mounted vertically, it should be seated on a robust base.

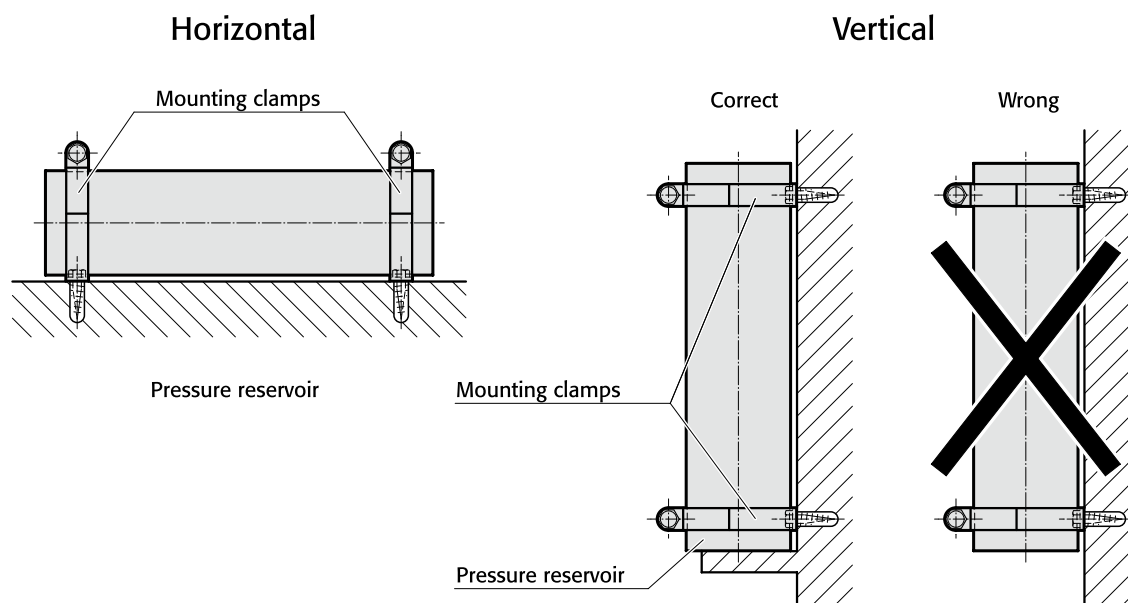
Ordering Code (example):

Mounting clamp for pressure reservoir (1 Stück)	=	2480.00.70.
$\varnothing a = 75 \text{ mm}$	=	075
Order No.	=	2480.00.70.075

2480.00.70. Mounting clamp for pressure reservoir

Order No.	$\varnothing a$	b	c	d	e
2480.00.70.075	75	80	105	41,5	102
2480.00.70.095	95	100	145	51,5	122
2480.00.70.120	120	100	145	64	147

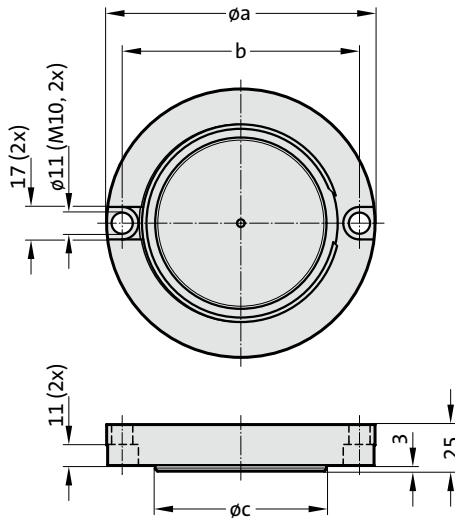
Installation options:





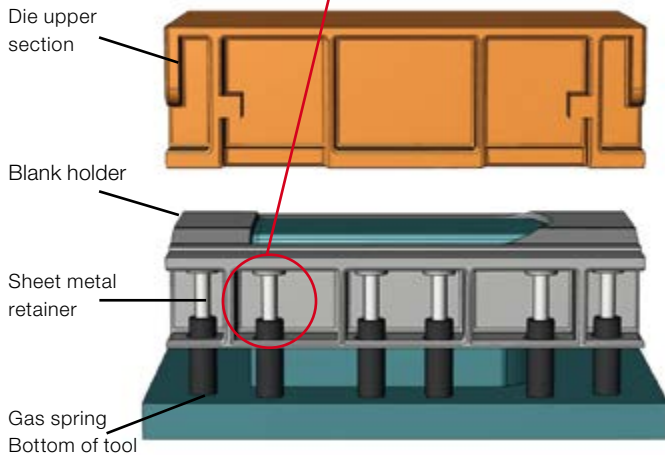
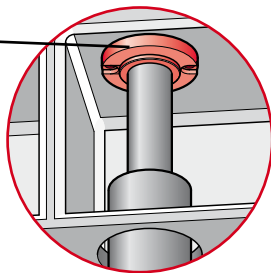
PRESSURE PLATES, SHOCK ABSORBING

2480.015.



Mounting example

Pressure plate, shock absorbing 2480.015.



2480.015. Pressure Plates, shock absorbing

Order No.	Gas spring strength	a	b	c
2480.015.01500	750 – 1500	108	91	58
2480.015.05000	> 1500 – 6600	143	126	92
2480.015.10000	> 6600 – 10600	167	150	112

Description:

The shock absorbing pressure plate is designed to minimise the main problems in the metal forming industry.

Factors such as

- extreme shock load
- this means high press maintenance costs
- high noise level
- reduced parts quality

are reduced by a specially developed damping element.

Guidelines for using shock absorbing pressure plates with gas springs:

1. After the maximum shock absorbing travel of 3 mm the gas spring will reach the same initial spring force as it would without the shock absorbing pressure plate.
2. The shock absorbing pressure plate is mounted between the tool and the piston rod of the gas spring.

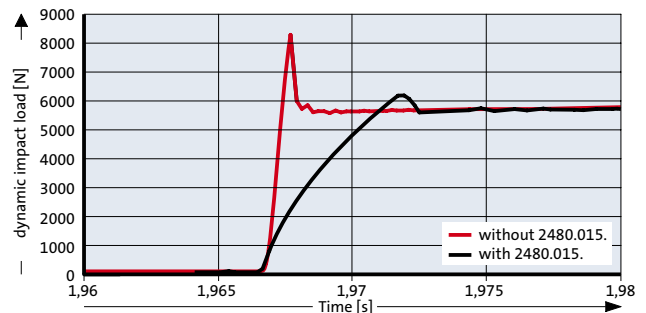
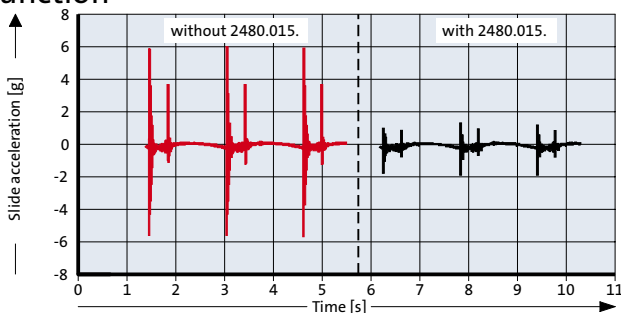
Material:

Steel, nitride
Polyurethane

Note:

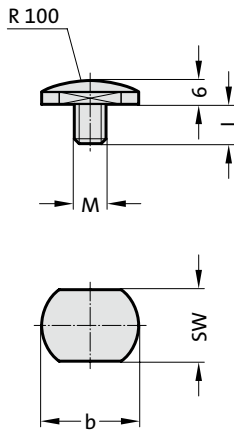
Working temperature: 0 °C to 80 °C
recommended max. strokes/min.: 20
max. pressing speed: 1.6 m/s
max. shock absorbing travel: 3 mm

Function



THRUST PAD PRESSURE PLATE

2480.004.



2480.004. Thrust Pad

Order No	Socket cap screw		b	l
	DIN EN ISO 4762	SW		
2480.004.06	6	17	20	6
2480.004.08	8	19	22.5	11

Description:

Trust pad for gas springs with M6 and M8 thread in the piston rod, not for 2480.13.00500.□□□.

Material:

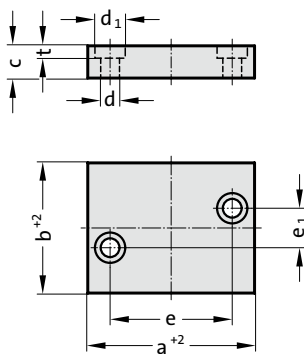
No 1.7131, case-hardened

Attention:

Can only be used for gas springs, standard 2480.12./13.!



2480.009.



2480.009. Pressure plate

Order No*	max. piston rod diameter	a	b	c	d	d ₁	e	e ₁	t
2480.009.00500	20	55	30	12	7	11	40	14	7
2480.009.00500.1	20	55	32	16	9	15	37	0	9
2480.009.00750	25	70	35	15	9	15	48	14	9
2480.009.00750.1	36	65	50	16	9	15	47	0	9
2480.009.01500	36	75	50	15	9	15	56	30	9
2480.009.03000	50	85	60	15	9	15	66	40	9
2480.009.03000.1	50	80	60	16	9	15	62	0	9
2480.009.05000	65	100	80	20	11	18	72	56	11
2480.009.05000.2	65	102	80	20	11	18	80	0	11
2480.009.07500	80	110	100	20	11	18	85	75	11
2480.009.07500.2	80	117	100	20	11	18	95	0	11
2480.009.10000.1	90	132	100	20	11	18	110	0	11

*Execution .1/.2 to Volvo standard

Material:

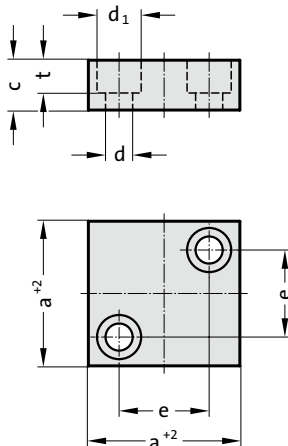
No 1.2842, hardened

or

No 1.2379, hardened



2480.018.



2480.018. Pressure plate

Order No	max. piston rod diameter	a	c	d	d ₁	e	t

Material:

No 1.2842, hardened



PRESSURE PLATE

PRESSURE PLATE TO RENAULT STANDARD

2480.019. Pressure plate

Order No*	max. piston rod diameter	a	c	d	d ₁	e	t
2480.019.00100	15	40	15	9	15	21	10
2480.019.00100.2	15	40	15	7	11	24	7
2480.019.00750	25	56	20	11	18	32	13
2480.019.03000	50	71	20	11	18	48	13
2480.019.03000.2	50	70	15	9	15	50	9
2480.019.03000.1	80	90	20	11	18	67	13
2480.019.07500.2	80	90	15	9	15	70	9
2480.019.07500	95	140	20	11	18	110	13

*Execution .2 to VDI 3003

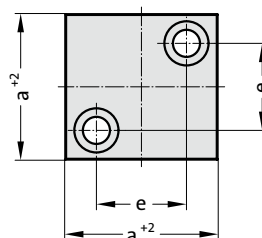
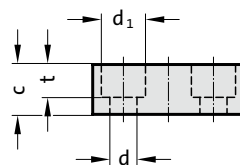
Material:

No 1.2842, hardened

or

No 1.2379, hardened

2480.019.



2480.019.45. Pressure plate to Renault standard

Order No	Shape	max. piston rod diameter	a	e	d
2480.019.45.00750	A	50	70	50	11
2480.019.45.01500	A	80	90	70	11
2480.019.45.03000	B	95	105	85	11
2480.019.45.05000	B	95	125	105	11
2480.019.45.07500	B	95	150	125	13
2480.019.45.10000	B	95	190	165	13

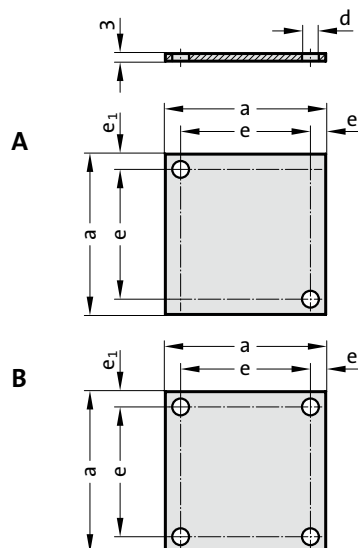
Material:

No 1.2842, hardened

or

No 1.2379, hardened

2480.019.45.



Description:

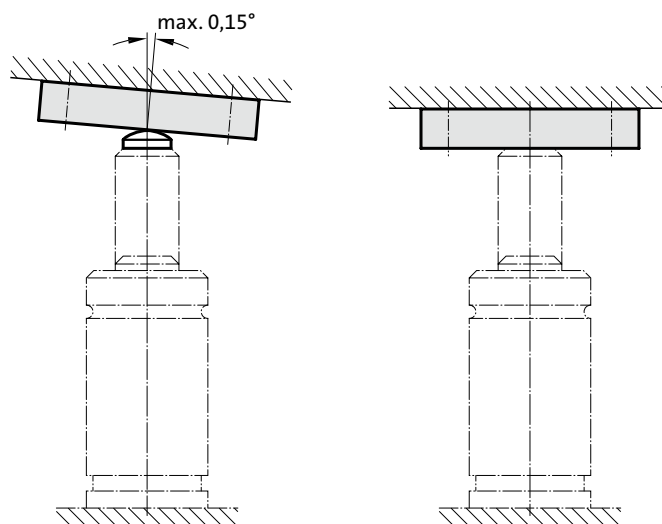
The hardened thrust pad 2480.004. reduces side forces in cases of skew thrust vaces or lateral displacement component.

In conjunction with the thrust pads, the hardened thrust plates 2480.009., 2480.018. and 2480.019. further helps to protect the gas spring from lateral forces, through reduction of friction – even when used without the thrust pad.

Note:

Especially with gas springs of large stroking capacity we recommend the use of the pad plate combination!

Mounting example





CONCERTINA SHROUD FOR GAS SPRINGS

Description:

The concertina shroud protects the piston rod of the gas spring against negative influences, such as e.g.:

- Dirt penetration
- Damage to the surface of the piston rod
- Adhesion of dirt particles
- Drawing in of oil and/or emulsion

The fastening of the folding bellows is internal (on the cylinder tube side) and does not have an interference contour, for example, due to externally attached pipe clamps. In this way, the gas spring can be attached and installed in the tool without limitations.

The concertina shroud for gas springs prolongs the lifetime of the gas springs under rough operating conditions.

Technical data

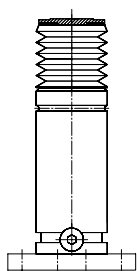
Material :	Concertina shroud:	CSM-Rubber 65 ±3 Shore A
	Washer:	Steel burnished
	Ring:	stainless Steel
Temperature range:		0-90 °C
Chemical resistance	Acids:	very good
	Alkalines:	very good
	Solvent:	adequate
Weather resistance	Sun light (UV):	good
	Ozone:	very good
	Water:	adequate
Oil resistance:	mineral:	good
	synthetic:	adequate

Delivery:

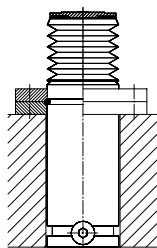
Concertina shroud incl. rotatable disk and countersunk screw.
Custom dimensions/materials available on request.



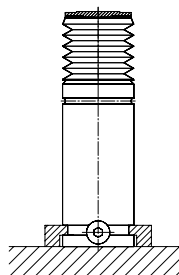
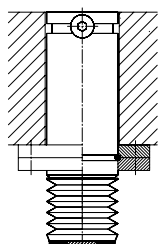
Mounting examples:



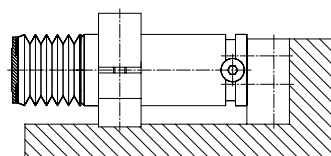
Screw mounted at the base with 2480.011.



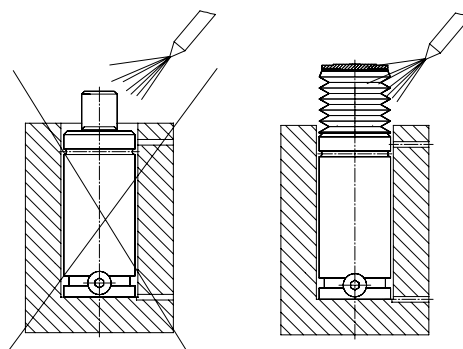
fastened with 2480.055./057./064.



fastened with 2480.007./008.



fastened with 2480.044./045./047.



installed loose in the bore

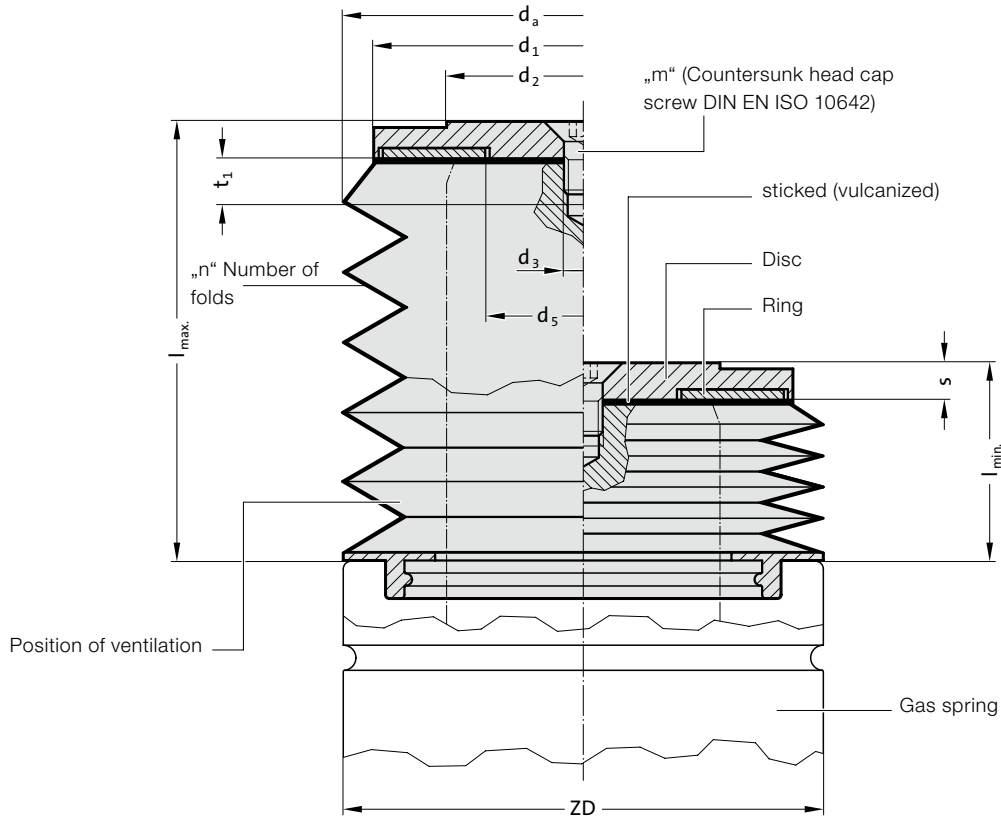


More mounting examples for gas springs see page „Mounting directions for gas springs“



CONCERTINA SHROUD FOR GAS SPRINGS

2480.080.



2480.080. Concertina shroud for gas springs

Type of gas spring	2487.12.00350.	2487.12.00350.	2487.12.00500.	2487.12.00500.	2480.13.00500.	2487.12.00750.1	2487.12.00750.	2488.13.00750.	2480.13.00750.	2487.12.01000.1	2487.12.01000.1	2488.13.01000.	2487.12.01500.	2487.12.01500.	2488.13.01500.	2480.12.01500.	2487.12.02400.	2487.12.02400.	2488.13.02400.	2480.13.03000.	2487.12.04200.	2487.12.04200.	2488.13.04200.	2480.13.05000.	2487.12.06600.	2487.12.06600.	2488.13.06600.	2480.13.07500.	2487.12.09500.	2488.13.09500.	
ZD	32	38	45	45	50	45	50	50	63	63	75	75	75	75	95	95	95	95	95	120	120	120	120	120	120	150	150	150	150	150	150
d _a	45	50	50	55	55	65	65	65	75	75	75	75	75	75	95	95	95	95	95	120	120	120	120	120	150	150	150	150	150	150	
d ₁	32	38	45	45	50	50	50	63	63	75	75	75	75	75	95	95	95	95	95	120	120	120	120	120	150	150	150	150	150	150	
d ₂ / KD	16	20	20	25	25	28	36	36	36	45	45	50	50	50	60	60	65	65	65	75	75	75	75	75	80	80	80	80	80	80	
s	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
d ₃	6,6	6,6	6,6	6,6	9	6,6	6,6	6,6	9	6,6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
d ₅	10	14	14	17	17	20	28	28	28	37	37	42	42	42	51	51	57	57	57	66	66	66	66	66	71	71	71	71	71	71	
t ₁	5	5	10	5	10	5	5	5	10	5	10	5	10	5	10	5,5	10	5,5	10	5,5	10	5,5	10	5,5	20	5,5	20	5,5	20	5,5	
m	M6×8	M6×8	M6×12	M6×8	M8×12	M6×10	M6×10	M6×10	M8×12	M6×10	M8×12	M6×10	M8×12	M6×10	M8×12	M8×12	M8×12	M8×12	M8×12	M8×12	M8×12	M8×12	M8×12	M8×12	M16×25	M8×12	M8×12	M8×12	M8×12	M8×12	
Stroke	125 (Stroke ≤ 125)																300 (Stroke > 125), not for 2487.12.*														
l _{min}	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	23	23	23	23	23	23	23	24	21	21	21	21	21	
l _{max}	133	133	133	133	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	137	134	134	134	134	134	
n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	8	6	6	6	6	6	6	6	6	5	5	5	5	5	5	
Stroke	125 (Stroke ≤ 125), not for 2487.12.*																300 (Stroke > 125), not for 2487.12.*														
l _{min}	-	-	-	-	52	--*/52	--*/52	52	--*/52	52	--*/52	54	--*/54	41	--*/41	37	--*/34	37	--*/34	37	--*/34	37	--*/34	37	--*/34	37	--*/34	37	--*/34	37	--*/34
l _{max}	-	-	-	-	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309	402	309	309	309	309	
n	-	-	-	-	22	--*/22	--*/22	22	--*/22	22	--*/22	19	--*/19	14	--*/14	11	--*/11	14	--*/14	14	--*/14	14	--*/14	14	--*/14	11	--*/11	11	--*/11	11	--*/11

Ordering Code (example):

Concertina shroud	= 2480.080.	Concertina shroud	= 2480.080.
ZD = 120 mm	= 120.	ZD = 120 mm	= 120.
d ₂ /KD = 65 mm	= 065.	d ₂ /KD = 65 mm	= 065.
Stroke = 125 (Stroke ≤ 125 mm)	= 125	Stroke = 300 (Stroke > 125 mm)	= 300
Order No.	= 2480.080.120.065.125	Order No.	= 2480.080.120.065.300



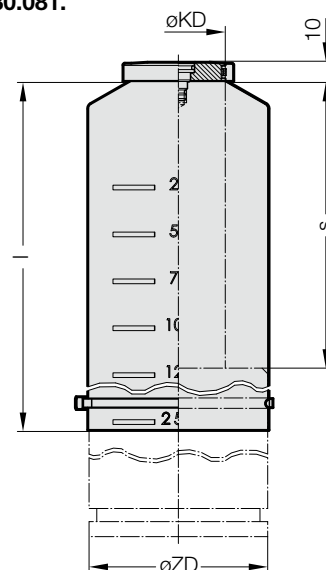
PISTON ROD PROTECTION, FIBRO-TEX®



Mounting example



2480.081.



Description:

The FIBRO-TEX® protects the piston rod of the gas spring against negative influences, such as:

- drawing in dirt
- damage to the surface of the piston rod
- adhesion of dirt particles
- drawing in oil and/or emulsion

The FIBRO-TEX® breathable material doesn't require additional ventilation.

Due to the piston rod protection, FIBRO-TEX®, increases the lifetime of the gas spring under rough operating conditions.

Note:

Included with this part number is the piston rod protection FIBRO-TEX®, with the necessary washer with screw and o-ring, preassembled with cable ties (to piston rod), cable tie (for gas spring housing) is added separately. The piston rod protection has a length of 250 mm. The length of the piston rod protection is shortened individually to the stroke length of the gas spring.

Technical data:

Material:	Piston rod protection:	Polytetrafluoroethylene (ePTFE)
	Washer:	Steel, burnished
	Cable tie (piston rod side):	Polyamide
	Cable tie (cylinder tube side):	Polyamide
Working temperature:		0°C - 80°C
Temperature resistance:		-35°C - 200°C
Chemical resistance:	Acids:	very good
	Alkalines:	very good
	Solvent:	very good
Weather-resistance:	Sunlight (UV):	very good
	Ozone:	very good
	Water:	very good
Oil resistance:	mineral:	very good
	synthetic:	very good

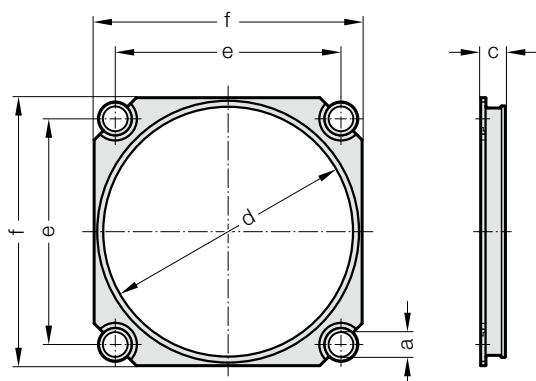
2480.081. Piston rod protection, FIBRO-TEX®

Type of gas spring	2480.13.03000.	2489.14.01500.	2484.13.03000.	2488.13.04200.	2487.12.04200.	2487.12.33.04200.	2480.13.05000.	2489.14.03000.	2484.13.05000.	2488.13.06600.	2487.12.06600.	2487.12.33.06600.	2480.13.07500.	2484.13.07500.	2488.13.09500.	2487.12.09500.	2489.14.05000.
Order No	øKD	øZD	s	l													
2480.081.095.050.250	50	95	10 - 250	250	•	•	•										
2480.081.095.060.250	60	95	10 - 250	250				•	•	•							
2480.081.120.065.250	65	120	10 - 250	250					•	•	•						
2480.081.120.075.250	75	120	10 - 250	250						•	•	•					
2480.081.150.065.250	65	150	10 - 250	250													•
2480.081.150.075.250	75	150	10 - 250	250									•	•			
2480.081.150.090.250	90	150	10 - 250	250											•	•	

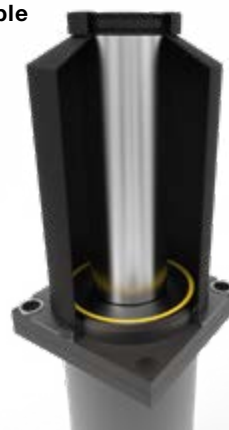
RETAINING PLATE FOR SADDLE FLANGE CABLE TIE PLIERS



2480.081.00.057.



Mounting example



2480.081.00.057. Retaining plate for saddle flange

Order No	Tube- ϕ	a	c	d	e	f
2480.081.00.057.095	95	12	12	96.2	92	110
2480.081.00.057.120	120	12	12	121.2	109.5	130
2480.081.00.057.150	150	16	11	151.2	138	162

Description:

When the gas spring is mounted with a saddle flange, an additional retainer plate can be used. The retainer plate is mounted on the upper side of the saddle flange with fastening screws.

Material:

Retainer plate: Plastic Discs: Steel

Attention:

The retainer plate is determined by the cylinder tube diameter of the gas spring.

2480.081.00.007 Cable tie pliers



Description:

We recommend to use a cable tie plier (tong) to mount the cable ties

Note:

Order Number for spare part cable ties
2480.081.00.006.1 (piston rod)
2480.081.00.006.2 (gas spring housing)

Minimum tensile strength:	220 up to 540 N
Cable tie width:	4,8 up to 7,6 mm
Stroke length:	25,4 mm

GAS SPRINGS - CONNECTOR SYSTEMS

GENERAL

Connecting gas springs in one more systems enables the user to monitor gas spring pressure from outside the tool, to adjust it if necessary, to fill it and to drain it. The connector system has many advantages including ease of maintenance, reliability and improvement in the quality of gas spring use in the tool. FIBRO offers four different systems for hose connections for gas springs: Minimes system, Compression fitting system, JIC system (24° flare) and Micro connector system.

The hoses, screwed connectors and other components are selected to meet the most stringent standards and undergo a series of tests including service life, static steel and robustness after repeated assembly and disassembly..

Minimes-system 2480.00.23./24.

- + Small external hose diameter Ø5 mm
- + Small bending radius Rmin = 20
- + High pressure resistance
- + Vibration-proof measurement couplings
- + Connector with valve
- + No tools needed for connecting hose to adapter, and disconnecting
- ± Swaged non-detachable hose fitting
- Not for use with a pressure reservoir

Technical data:

Hose:	Polyamide, black, dimpled
Hose fittings:	Free cutting steel, zinc-plated
Measuring couplings:	Free cutting steel, zinc-plated
Adapter:	Steel, burnished
Max. permi. pressure:	630 bar
Temperature range:	0–100°C

Recommended application:

Most commonly used system for all gas springs with G¹/₈ gas connection.

Not suitable for use with a pressure reservoir due to small internal diameter (reduced flow volume).

Cutting ring system 2480.00.10.

- + Assemble on-site system
- + Reusable hose fitting
- + High pressure resistance
- ± Suitable for connecting to a pressure reservoir under certain conditions
- Larger bending radius Rmin = 40
- Not suitable for gas springs with M6 connection thread
- Extra time required for preparing hose and fitting it

Technical data:

Hose:	Polyurethane/polyamide, black, dimpled
Hose fittings:	Steel, zinc-plated
Adapter:	Steel, zinc-plated
Max. permi. pressure:	380 bar
Temperature range:	0–100°C

Recommended application:

For all gas springs with G¹/₈ gas connection.

Mainly used for self-assembly in small numbers.

24°-cone-system 2480.00.25./26.

- + Suitable for connecting to a pressure reservoir
- + Wide range of connection adapters
- + Vibration-proof (O-ring seal)
- + High pressure resistance
- ± Swaged non-detachable hose fitting
- Larger bending radius Rmin = 40
- Not suitable for gas springs with M6 connection thread

Technical data:

Hose:	Polyurethane/polyamide, black, dimpled
Hose fittings:	Steel, zinc-plated
Adapter:	Steel, zinc-plated
Max. permi. pressure:	315 bar
Temperature range:	0–100°C

Recommended application:

For all gas springs with G¹/₈ gas connection.

Mainly used for connection to pressure reservoir.

Connector system, 24° conus micro 2480.00.27./28.

- + small external hose diameter Ø5 mm
- + flexible pipe: small bending radius Rmin = 20 mm
- + pipe: Min. bending radius = 12 mm (3x da)
- + high pressure resistance
- + small connection fitting
- + vibration-proof due to O-ring seal
- + swaged non-detachable hose fitting
- not for use with a pressure reservoir
- limited suitability for gas springs with thread connection G¹/₈

Technical data:

Hose:	Polyamide, black, dimpled
Hose adapter:	Free cutting steel, zinc-plated
Adapter:	Steel, zinc-plated
Max. permi. pressure:	475 bar
Temperature range:	0 to +80°C
Conduit:	Steel
External conduit diameter (da):	Ø4 mm
Internal conduit diameter (di):	Ø2 mm
max. dynamic pressure:	430 bar
Temperature range:	0 to +100°C

Recommended application:

For gas springs with M6 gas connection.

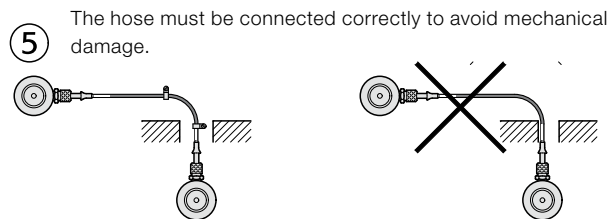
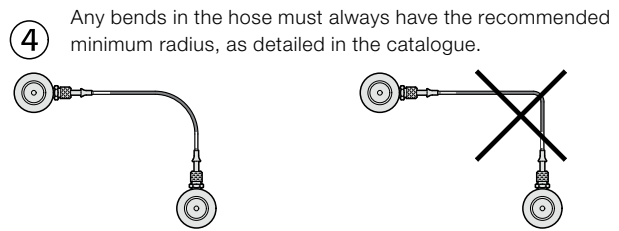
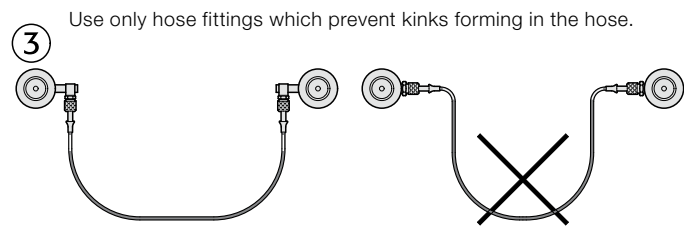
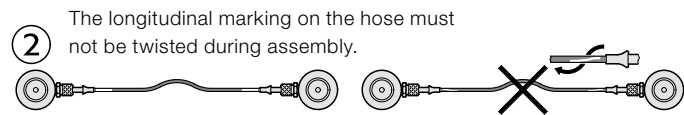
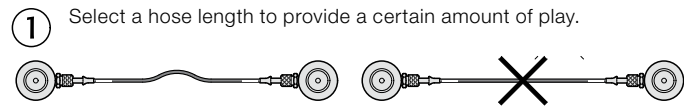
Not suitable for use with a pressure reservoir due to small internal diameter (reduced flow volume).

Note: Pipe system, 24° conus micro for higher temps on request.

INSTRUCTIONS FOR HOSE ASSEMBLY

MOUNTING ARRANGEMENT FOR GAS SPRINGS IN THE MINIMESS SYSTEM

Never exceed the maximum pressures and temperatures for the hoses. Ensure that all hoses and adaptors are perfectly clean prior to assembly. The sheathing of the hoses must be perforated so that they can be used for pressurised gas. We recommend the use of the 24° cone hose system if pressure vessels are used to avoid restricting gas flow. Follow the instructions below to ensure functionality and maximum service life for the hose connection:



Refer to DIN 20066 for further details on installing hose connections.

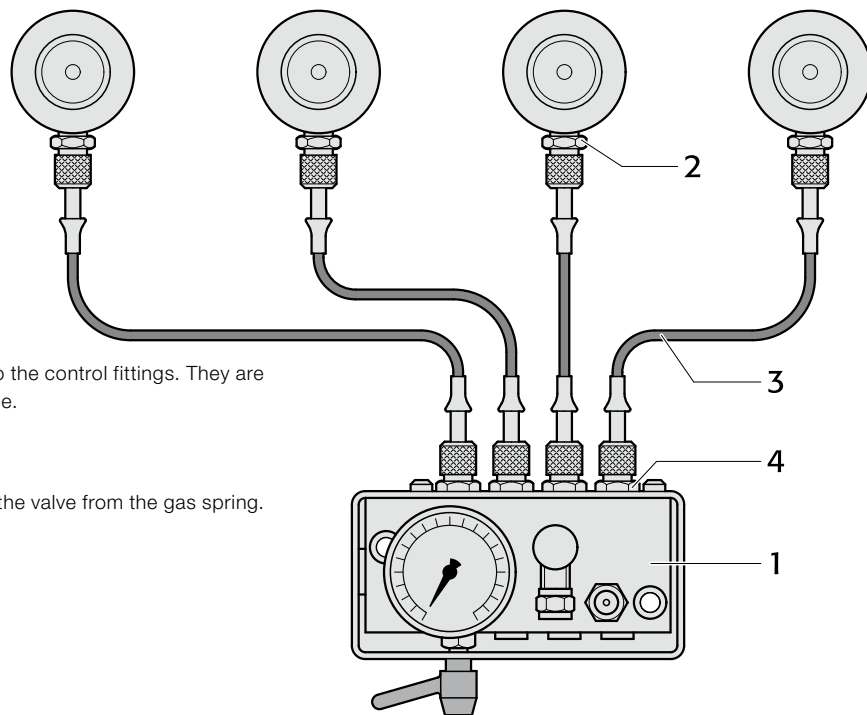
Attention!

Any modifications whatsoever to the product are prohibited.

For further information refer to the FIBRO Gas Spring Catalogue, visit www.fibro.com or contact your FIBRO agent.

2480. Connection 1:

Direct connection for group



Function:

Each spring is connected via a direct wire to the control fittings. They are not interconnected and form a pressure zone. See control fittings 2480.00.30.

Note:

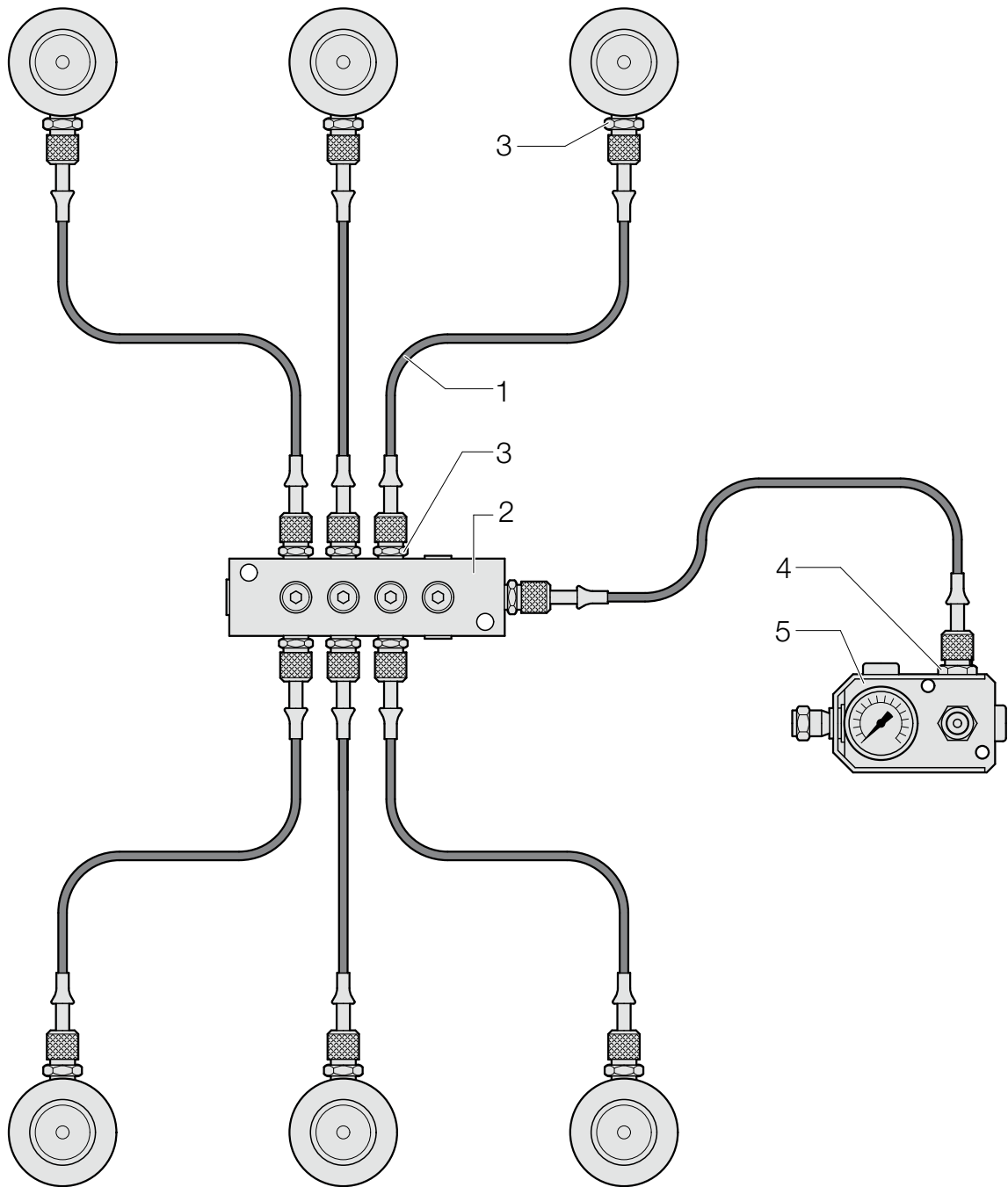
When installing gas springs always remove the valve from the gas spring.

Item No.	Term	Quantity	Order No.	Note
1	Control fitting	1	2480.00.30.01.1	Optionally with diaphragm pressure switch 2480.00.30.02
2	Gauging coupling	4	2480.00.24.01	
3	Gauging hose	4	2480.00.23.□□.□□□	Type of connection and length as required
4	Gauging coupling	4	2480.00.24.02	

MOUNTING ARRANGEMENT FOR GAS SPRINGS IN THE MINIMESS SYSTEM

2480. Connection 2:

Group series connection



Function:

The springs are interconnected and there is just one test line to the control fitting.

Note:

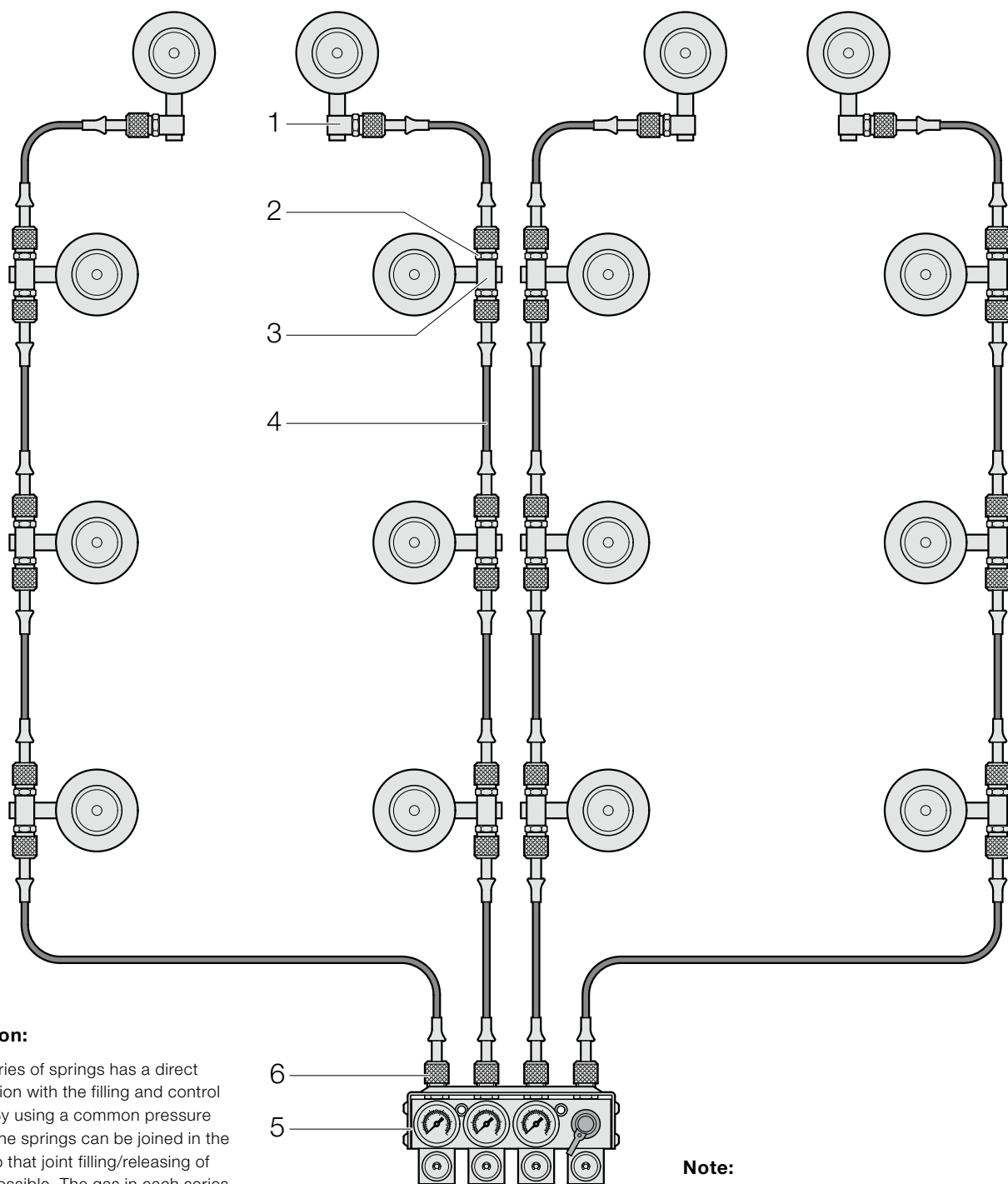
When installing gas springs always remove the valve from the gas spring.

Item No.	Term	Quantity	Order No.	Note
1	Gauging hose	7	2480.00.23.□□.□□□	Type of connection and length as required
2	Distributor	1	2480.00.24.33	
3	Gauging coupling	13	2480.00.24.01	
4	Gauging coupling	1	2480.00.24.02	
5	Control fitting	1	2480.00.31.01.1	

MOUNTING ARRANGEMENT FOR GAS SPRINGS IN THE MINIMESS SYSTEM

2480. Connection 3:

Multiple connections with independent functioning



Function:

Each series of springs has a direct connection with the filling and control fitting. By using a common pressure supply the springs can be joined in the fitting so that joint filling/releasing of gas is possible. The gas in each series of springs can also be filled/released or monitored individually.

See multi-way control fitting
2480.00.39.06.04

Note:

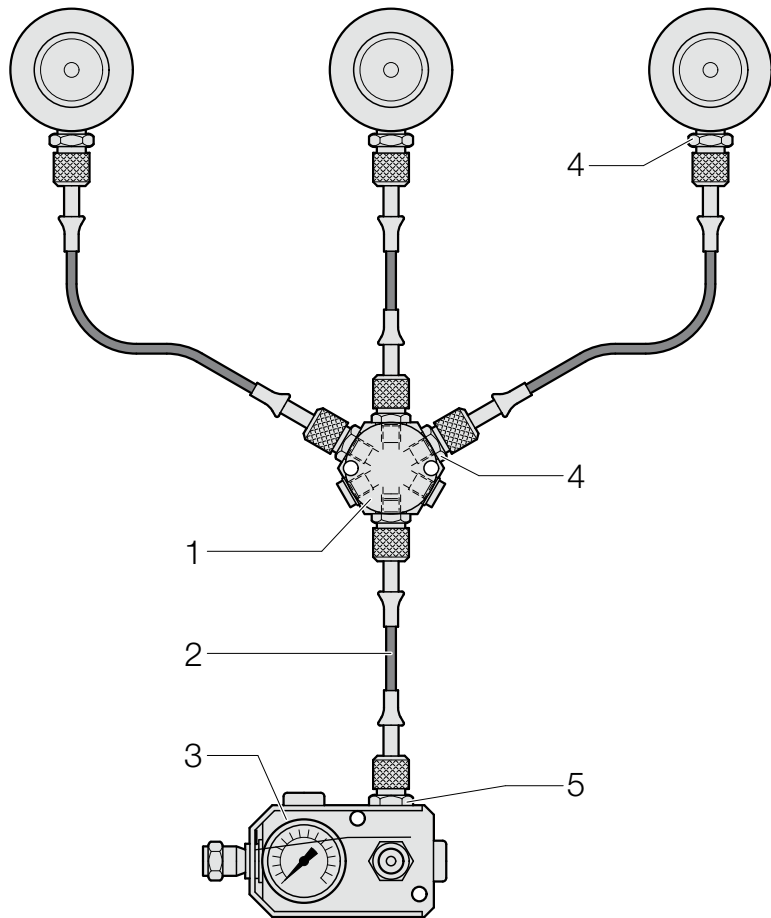
When installing gas springs always remove the valve from the gas spring.

Item No.	Term	Quantity	Order No.	Note
1	Simple adaptor, short	4	2480.00.24.17	Choice of "long" or "very long" depending on the specific mounting arrangements.
2	Gauging coupling	28	2480.00.24.01	
3	Dual adapter	12	2480.00.24.14	Choice of "long" or "very long" depending on the specific mounting arrangements.
4	Gauging hose	16	2480.00.23.□□.□□□	Type of connection and length as required
5	Multiple control fitting	1	2480.00.39.06.04	
6	Gauging coupling	4	2480.00.24.01	

MOUNTING ARRANGEMENT FOR GAS SPRINGS IN THE MINIMESS SYSTEM

2480. Connection 4.1:

Group series connection



Function:

The springs are interconnected and there is just one test line to the control fitting.

Note:

When installing gas springs always remove the valve from the gas spring.

Item No.	Term	Quantity	Order No.	Note
1	Coupling	1	2480.00.24.31	
2	Gauging hose	4	2480.00.23.□□.□□□	Type of connection and length as required
3	Control fitting	1	2480.00.31.01.1	
4	Gauging coupling	7	2480.00.24.01	
5	Gauging coupling	1	2480.00.24.02	

2480. Connection 4.2:

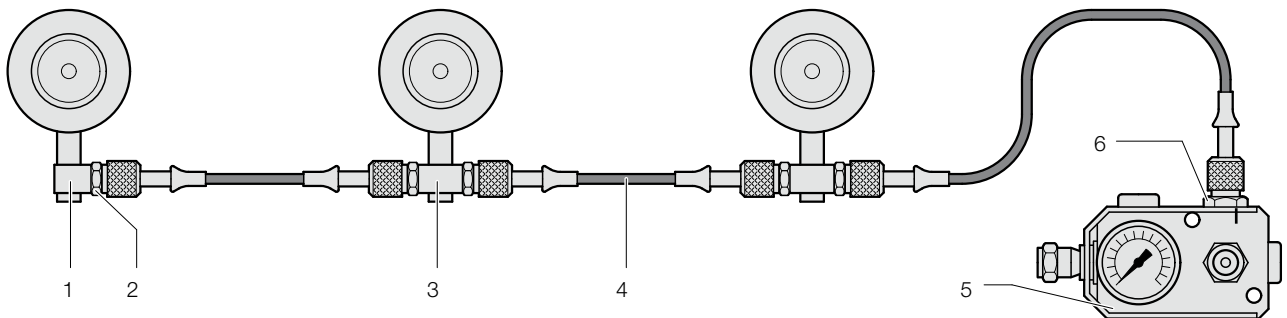
Group series connection

Function:

The springs are interconnected and there is just one test line to the control fitting.

Note:

When installing gas springs always remove the valve from the gas spring.

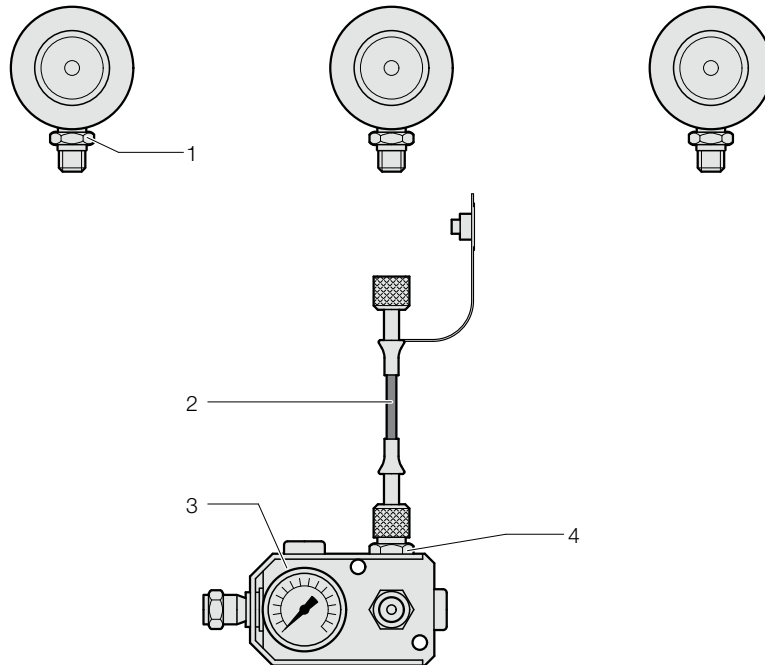


Item No.	Term	Quantity	Order No.	Note
1	Simple adaptor, short	1	2480.00.24.17	Choice of "long" or "very long" depending on the specific mounting arrangements.
2	Gauging coupling	5	2480.00.24.01	
3	Dual adaptor	2	2480.00.24.14	Choice of "long" or "very long" depending on the specific mounting arrangements.
4	Gauging hose	3	2480.00.23.□□.□□□	Type of connection and length as required
5	Control fitting	1	2480.00.31.01.1	
6	Gauging coupling	1	2480.00.24.02	

MOUNTING ARRANGEMENT FOR GAS SPRINGS IN THE MINIMESS SYSTEM

2480. Connection 5:

Independent test connection



Function:

The springs work independently and have a gauging coupling (2480.00.24.01) with valve. If required the springs can be tested and pressure adjusted individually. A control fitting (2480.00.31.01.1) is used for the purpose.

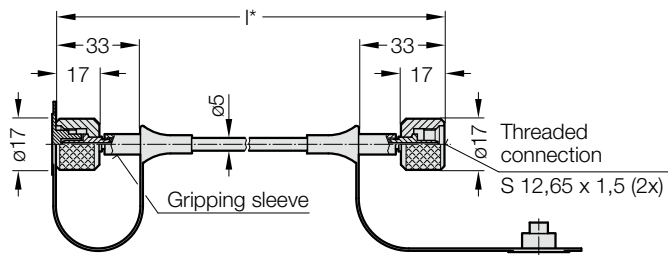
Item No.	Term	Quantity	Order No.	Note
1	Gauging coupling	3	2480.00.24.01	
2	Gauging hose	1	2480.00.23.□□□□	Type of connection and length as required
3	Control fitting	1	2480.00.31.01.1	
4	Gauging coupling	1	2480.00.24.02	

GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

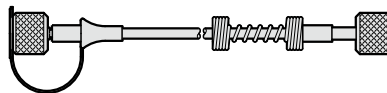
2480.00.23.01.

Gauging hose - both ends straight



2480.00.23.01.----.1

Antikink spiral, at one end



2480.00.23.01.----.2

Antikink spiral, at both ends



2480.00.23.01.

Gauging hose Mini, both ends straight

Order example:

Shortest factory length:

- 90 mm excl. bend protection
- 150 mm bend protection on one side
- 300 mm bend protection on both sides
- Minimum bending radius: R20 mm

*Measuring hose available in the following lengths:

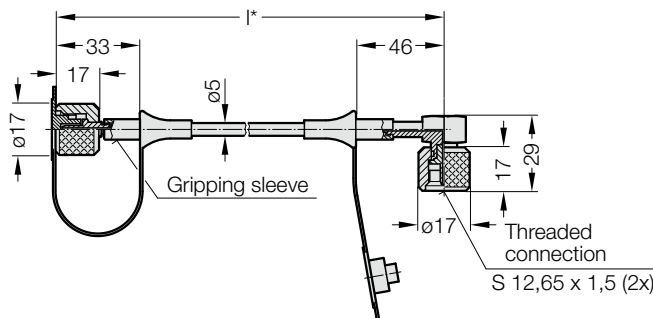
- 5 mm step range ≤ 1000 mm
- 10 mm step range > 1000 mm
- 100 mm step range > 4000 mm
- 500 mm step range > 6000 mm

Ordering Code (example):

Gauging hose Mini, both ends straight	= 2480.00.23.01.	Gauging hose Mini, both ends straight	= 2480.00.23.01.
l = 90 mm	= 0090	l = 150 mm	= 0150.
Order No	= 2480.00.23.01.0090	Bend protection on one side	= 1
		Order No	= 2480.00.23.01.0150. 1

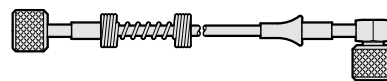
2480.00.23.02.

Gauging hose - one end straight 90°-angle



2480.00.23.02.----.1

Antikink spiral, at one end, straight



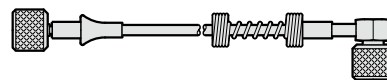
2480.00.23.02.----.2

Antikink spiral, at both ends



2480.00.23.02.----.3

Antikink spiral, at one end, 90°



2480.00.23.02.

Gauging hose Mini, one end straight / 90°-angle

Order example:

Shortest factory length:

- 90 mm excl. bend protection
- 150 mm bend protection on one side
- 300 mm bend protection on both sides
- Minimum bending radius: R20 mm

*Measuring hose available in the following lengths:

- 5 mm step range ≤ 1000 mm
- 10 mm step range > 1000 mm
- 100 mm step range > 4000 mm
- 500 mm step range > 6000 mm

Ordering Code (example):

Gauging hose Mini, one end straight / 90°-angle	= 2480.00.23.02.	Gauging hose Mini, one end straight / 90°-angle	= 2480.00.23.02.
l = 90 mm	= 0090	l = 150 mm	= 0150.
Order No	= 2480.00.23.02.0090	Bend protection on one side	= 1
		Order No	= 2480.00.23.02.0150. 1

GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

2480.00.23.03.

Gauging hose Mini, both ends
90°-angle

Order example:

Shortest factory length:

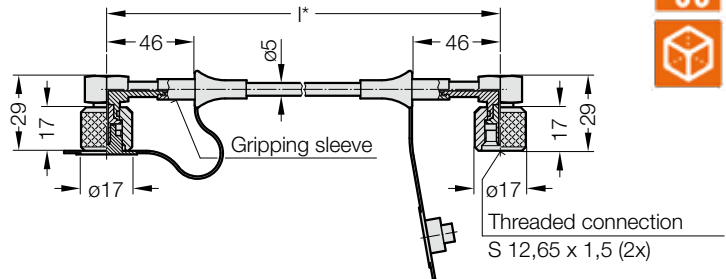
- 90 mm excl. bend protection
- 150 mm bend protection on one side
- 300 mm bend protection on both sides
- Minimum bending radius: R20 mm

*Measuring hose available in the following lengths:

- 5 mm step range ≤ 1000 mm
- 10 mm step range > 1000 mm
- 100 mm step range > 4000 mm
- 500 mm step range > 6000 mm

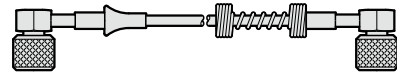
2480.00.23.03.

Gauging hose -
both ends
90°-angle



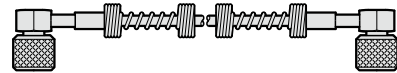
2480.00.23.03.-----3

Antikink spiral, at one end



2480.00.23.03.-----2

Antikink spiral, at both ends

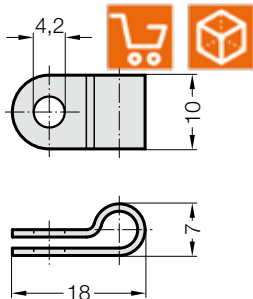


Ordering Code (example):

Gauging hose Mini, both ends 90°-angle	= 2480.00.23.03.	Gauging hose Mini, both ends 90°-angle	= 2480.00.23.03.
l = 90 mm	= 0090	l = 150 mm	= 0150.
Order No	= 2480.00.23.03.0090	Bend protection on one side	= 3
		Order No	= 2480.00.23.03.0150.3

2480.00.23.12.01

Hose clamp
for gauging hose DN2 (Ø5 mm)



Material:

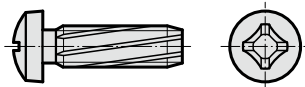
Polyamide

Note:

Supplied without screws

2192.50.04.012

Self-tapping screw DIN 7516
M4x12



Note:

self-tapping
Diameter of hole for self-tapping
screw = 3.6 mm

2480.00.23.13.

Anti-scurf spiral
for subsequent installation over hoses and tubing



Order No.	l [m]
2480.00.23.13.0001	1
2480.00.23.13.0002	2
2480.00.23.13.0005	5
2480.00.23.13.0010	10

Inner ø	7 mm
For hose external ø	max. 5-11 mm
Temperature range	-30°C up to +100°C

Description:

The anti-scurf spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

Material:

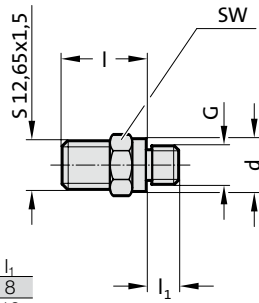
Polyamide

GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

Gauging coupling
2480.00.24.01 with valve
2480.00.24.03 without valve
for connection to gas springs

Gauging coupling
2480.00.24.02 with valve
2480.00.24.04 without valve
for connection to control fitting

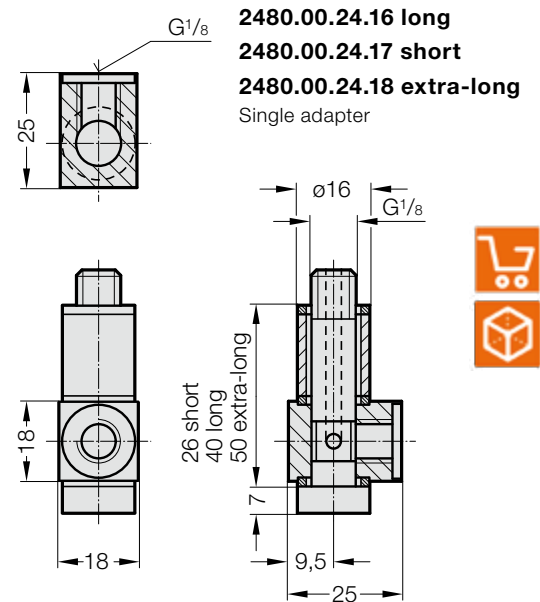


Order No.	G	d	SW	l	l ₁
2480.00.24.01	G 1/8	14	14	22	8
2480.00.24.02	G 1/4	19	19	21	10
2480.00.24.03	G 1/8	14	14	22	8
2480.00.24.04	G 1/4	19	19	21	10

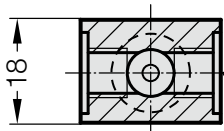
*SW = Width across flats

Note:

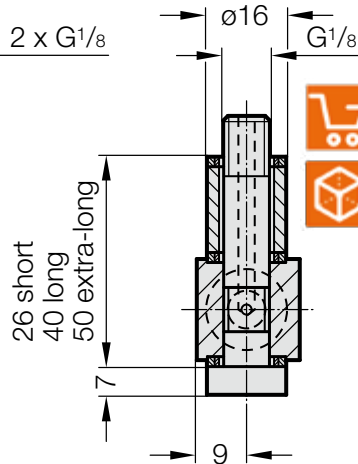
The measuring coupling with valve is used for standard assembly layouts. Where the system requires frequent filling pressure changes (e.g. die drawing cushions), the measuring coupling is used without a valve.



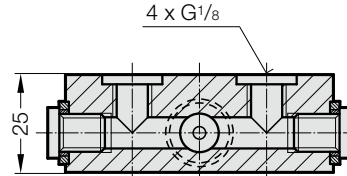
2480.00.24.13 long



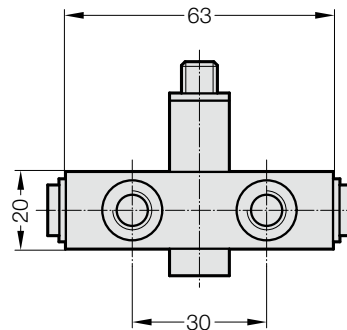
2480.00.24.14 short
2480.00.24.15 extra-long
 Double adapter



2480.00.24.10 long



2480.00.24.11 short
2480.00.24.12 extra-long
 Multiple adapter

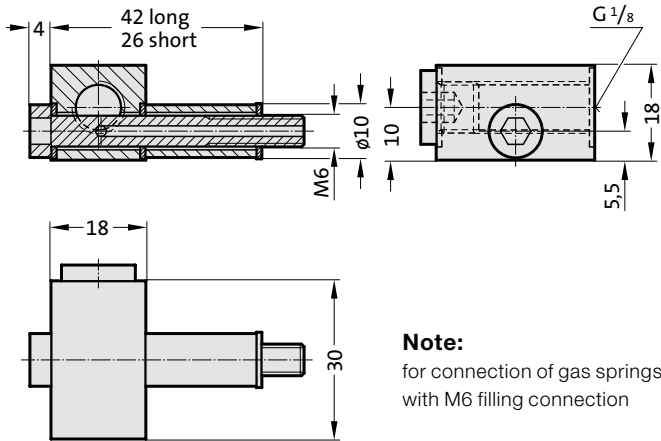


GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

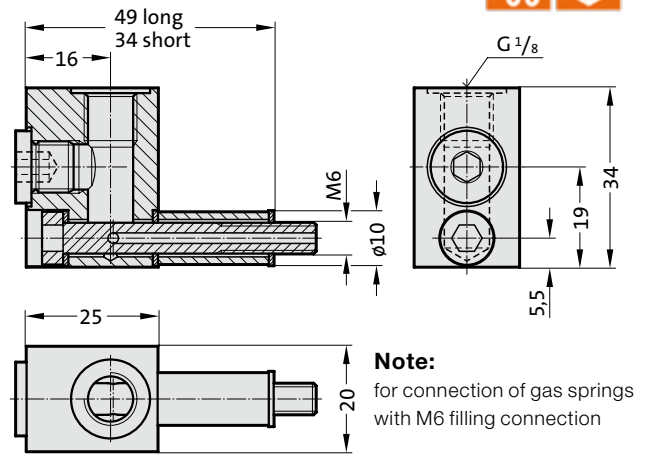
2480.00.24.53 horizontal, long
2480.00.24.54 horizontal, short

Double adapter



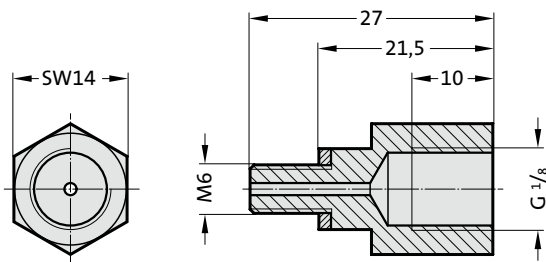
2480.00.24.56 vertical, long
2480.00.24.57 vertical, short

Double adapter

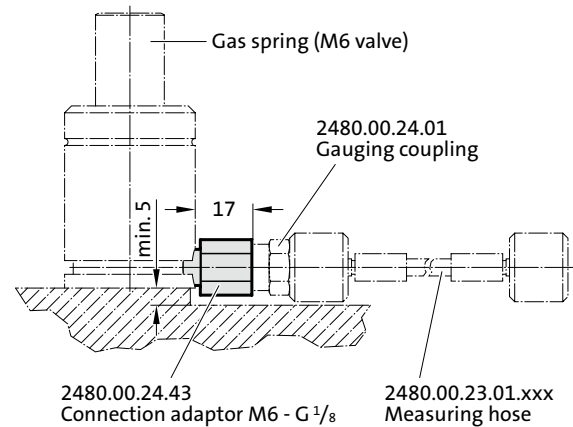


2480.00.24.43

Connection fitting M6-G1/8



Mounting example:

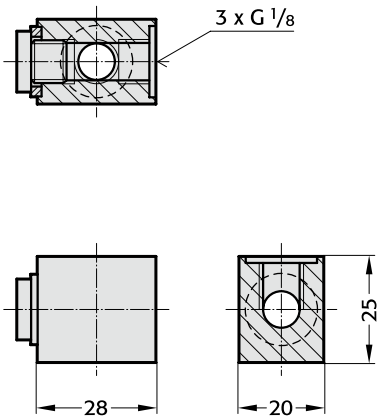


GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

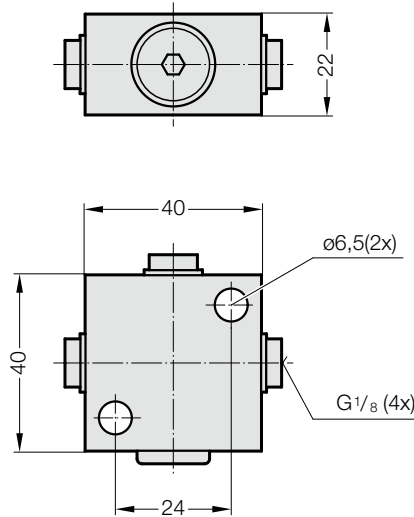
2480.00.24.30

Distributor block G1/8, 3 ports



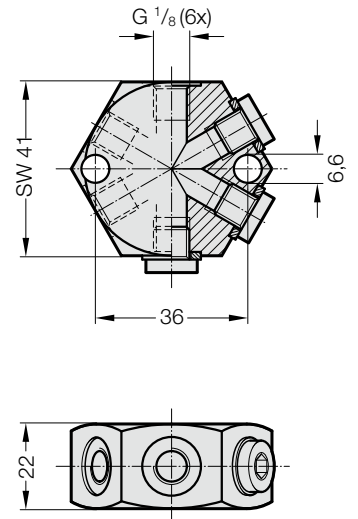
2480.00.24.34

Distributor block G1/8, 4 ports



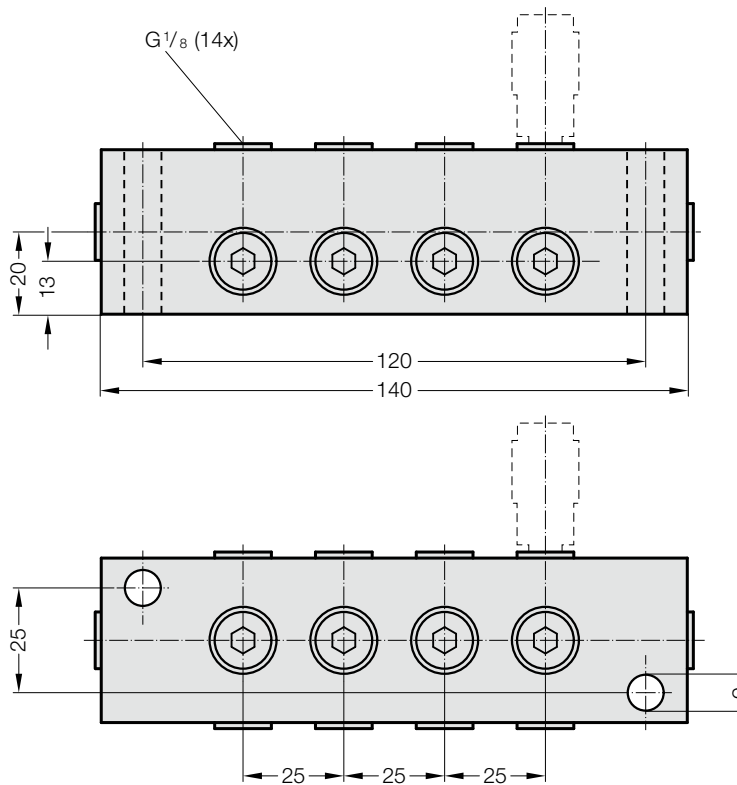
2480.00.24.31

Distributor block G1/8, 6 ports



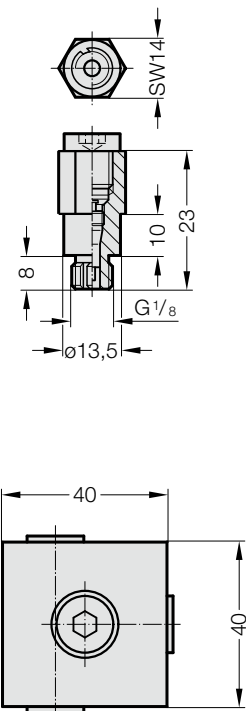
2480.00.24.33

Distributor G1/8, 14 ports



2480.00.40

Filling adapter

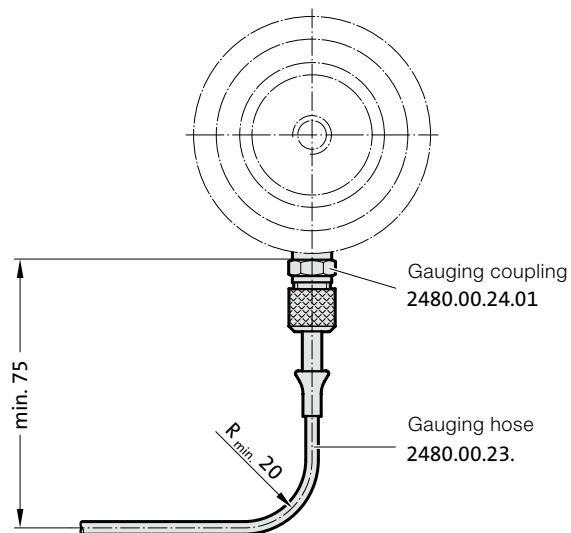
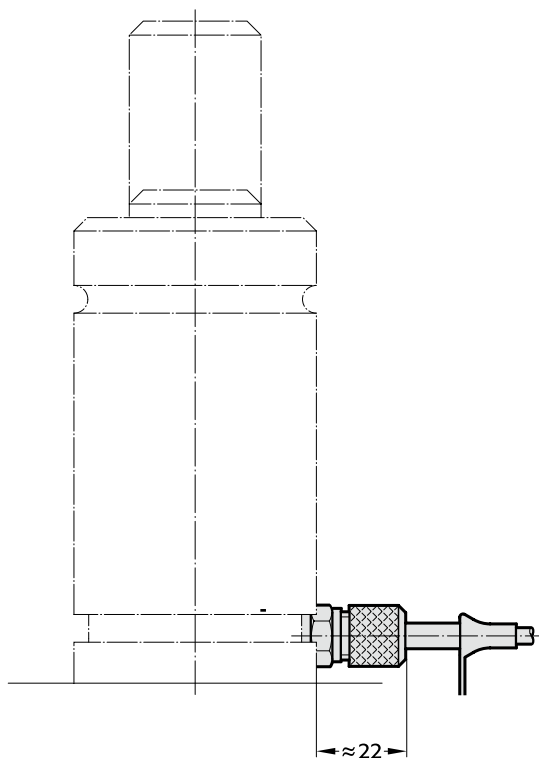


GAS SPRING ACCESSORIES

MINIMESS – COMPOUND THREADED JOINTS

2480.00.24.01

Gauging coupling with valve



2480.00.24.10 long

11 short

12 extra-long



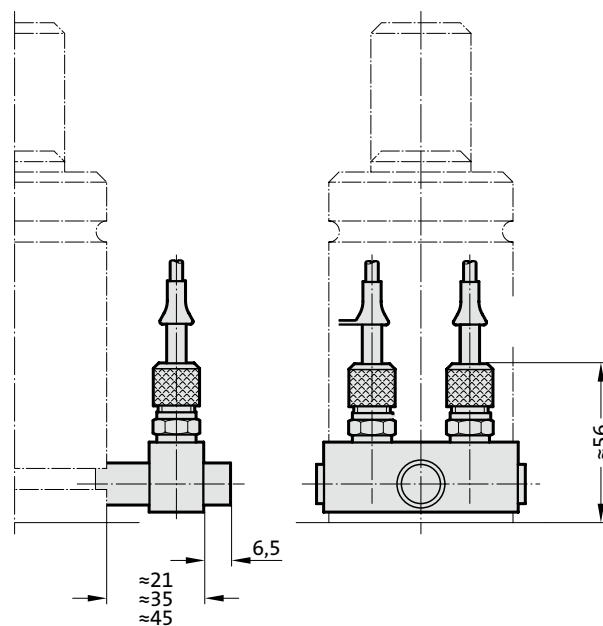
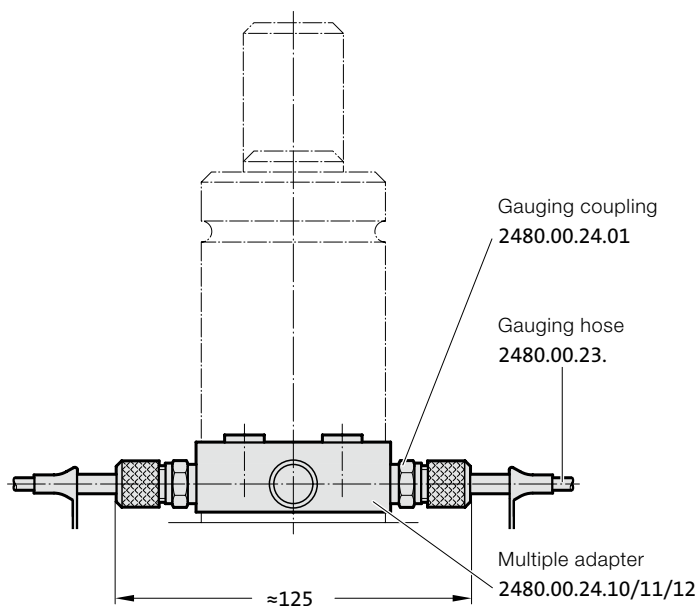
Multiple adapter with two gauging couplings

Note:

When installing or fitting a gauging coupling the valve must be removed from the gas spring.

Execution: Horizontal connection

Execution: Vertical connection

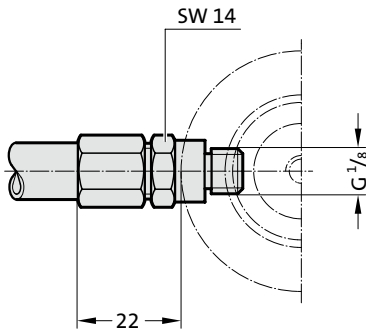


GAS SPRING ACCESSORIES

COMPRESSION FITTING – COMPOUND THREADED JOINTS

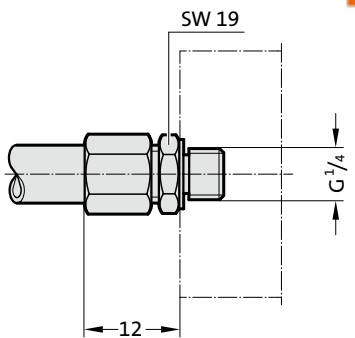
2480.00.10.01

Direct test connection to gas spring



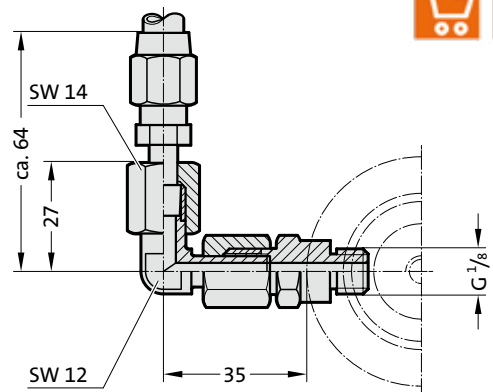
2480.00.10.03

Direct test connection to control fitting



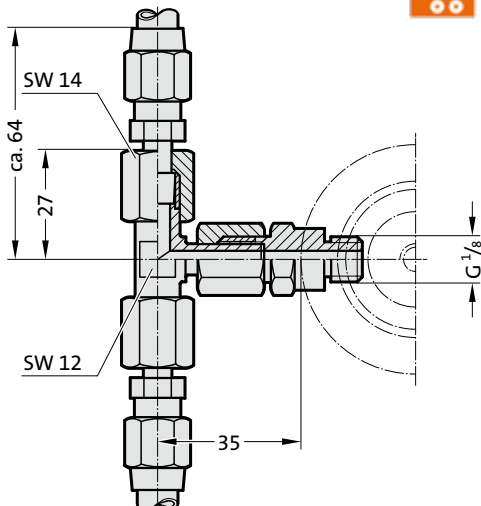
2480.00.10.10

Adjustable angular coupling



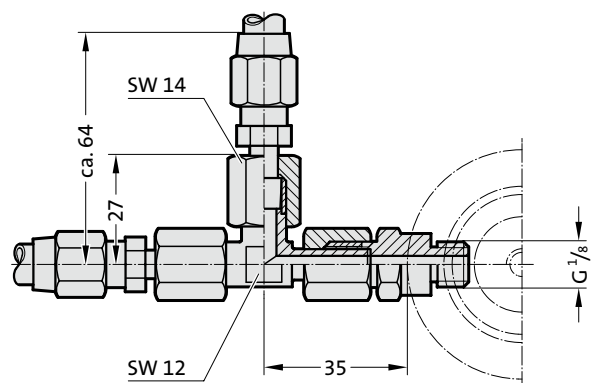
2480.00.10.11

Adjustable T-Coupling



2480.00.10.12

Adjustable L-Coupling

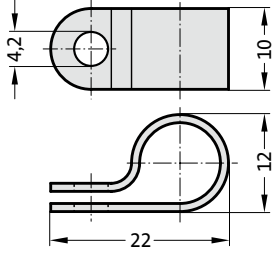


GAS SPRING ACCESSORIES

COMPRESSION FITTING – COMPOUND THREADED JOINTS

2480.00.10.20.12.01

Hose clamp
for gauging hose DN4 (Ø 9 mm)



Material:

Polyamide

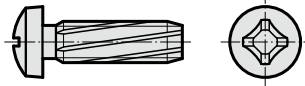
Note:

Supplied without screws



2192.50.04.012

Self-tapping screw DIN 7516
M4x12



Note:

self-tapping

Diameter of hole for self-tapping
screw = 3.6 mm



2480.00.23.13.

Anti-scuff spiral
for subsequent installation over hoses and tubing



Order No.	l [m]
2480.00.23.13.0001	1
2480.00.23.13.0002	2
2480.00.23.13.0005	5
2480.00.23.13.0010	10

Inner ø 7 mm
For hose external ø max. 5-11 mm
-30°C up to
Temperature range +100°C

Description:

The anti-scuff spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

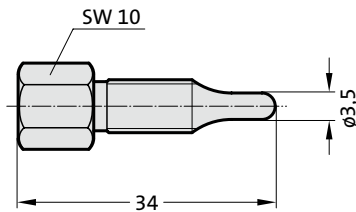
Material:

Polyamide



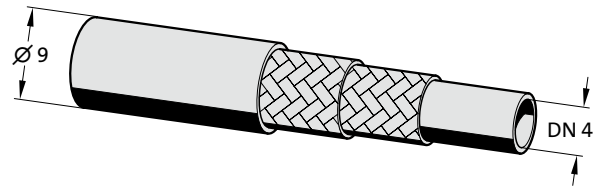
2480.00.54.01

Expansion punch for hosing



2480.00.10.20.

High-pressure hose

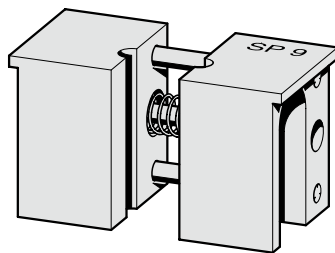


Ordering Code (example):

High-pressure hose = 2480.00.10.20.
Length 10 m = 0010
Order No. = 2480.00.10.20.0010

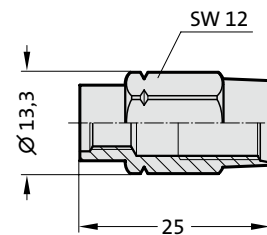
2480.00.54.02

Vice jaws
for holding high-pressure hose



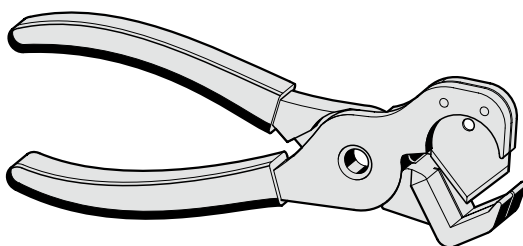
2480.00.10.21

Hose screw fitting (female)



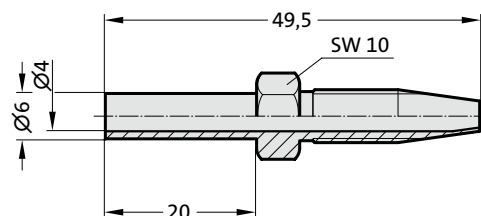
2480.00.54.03

Hose shears

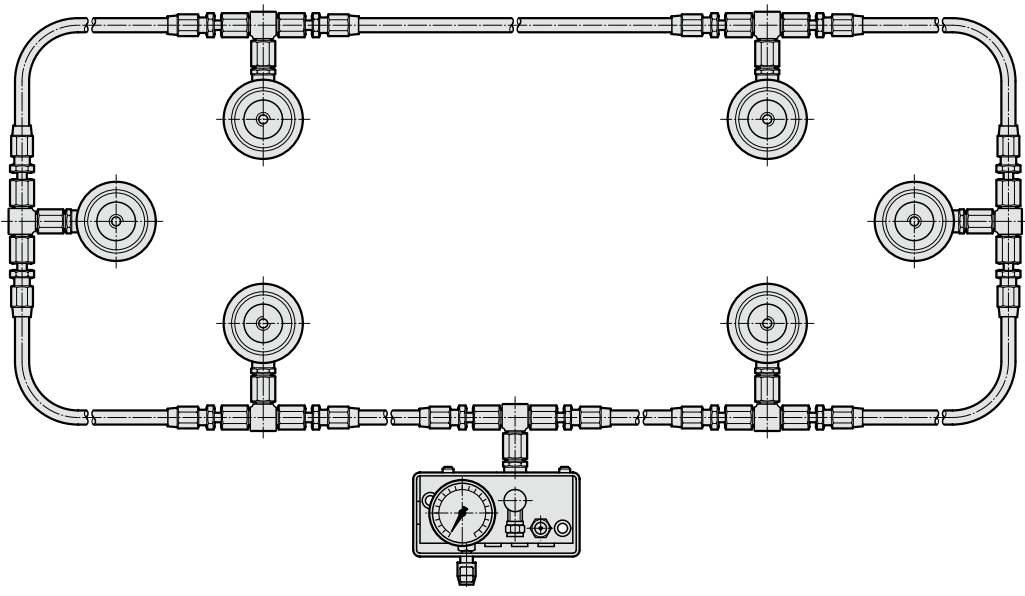
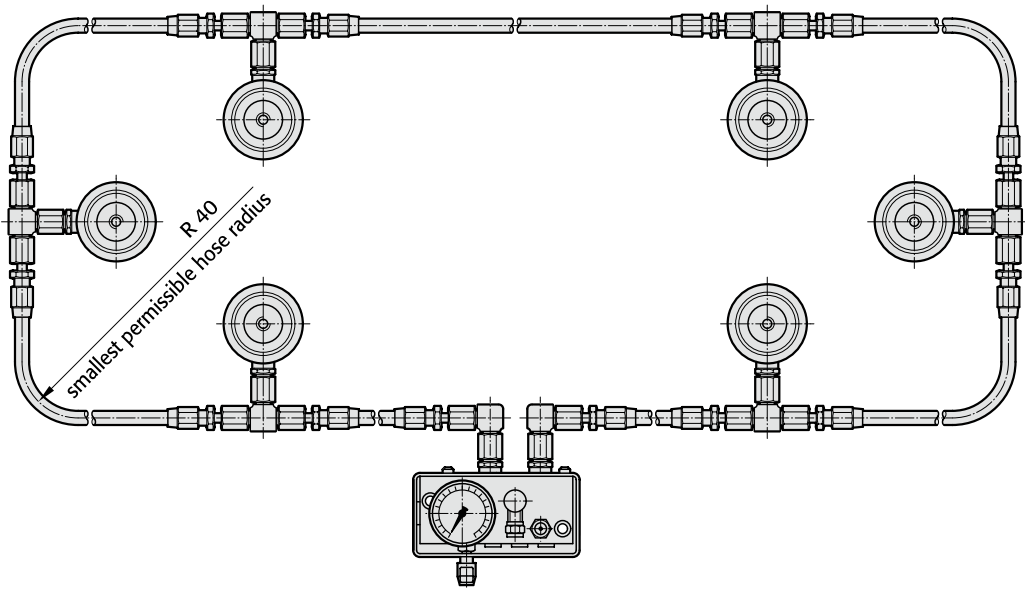
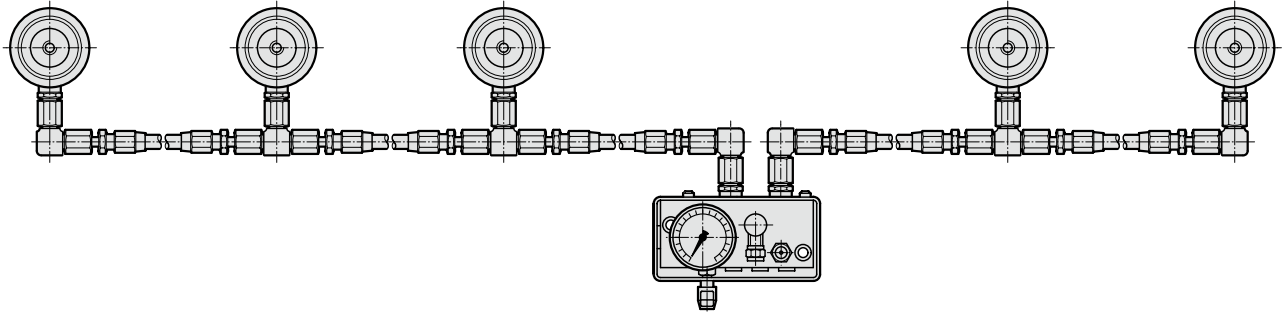


2480.00.10.22

Hose screw fitting (male)



ASSEMBLY ARRANGEMENT OF GAS SPRINGS IN SERIAL CONNECTION COMPRESSION FITTING



Note: When installing gas springs always remove the valve from the gas spring.

GAS SPRING ACCESSORIES

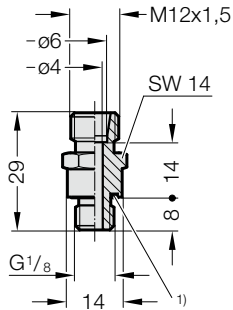
24°-CONE THREADED JOINTS

(DIN 2353 / DIN EN ISO 8434-1)

2480.00.26.03



Screw connection GE-24° conus,
DN5 - G¹/₈

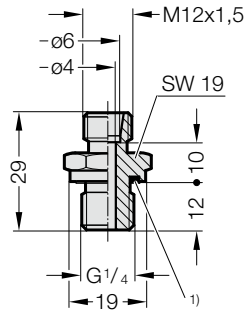


1) Eolastic-Seal ED

2480.00.26.04



Screw connection GE-24° conus,
DN5 - G¹/₄

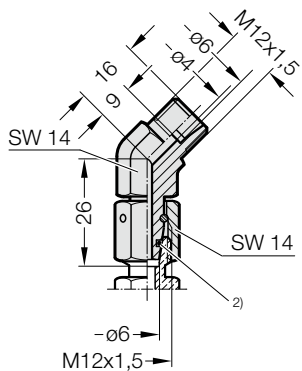


1) Eolastic-Seal ED

2480.00.26.21



Screw connection 45°-24° conus,
DN5, adjustable

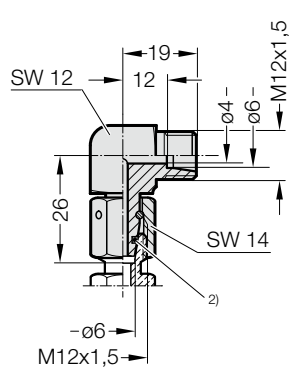


2) O-ring

2480.00.26.22



Screw connection 90°-24° conus,
DN5, adjustable

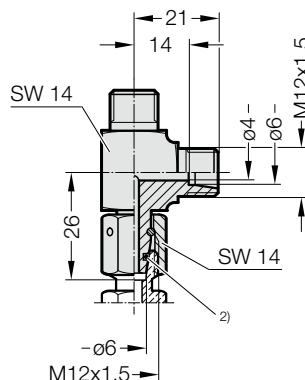


2) O-ring

2480.00.26.23



Screw connection L-24° conus,
DN5, adjustable

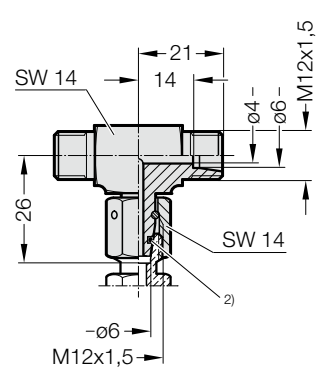


2) O-ring

2480.00.26.24



Screw connection T-24° conus,
DN5, adjustable

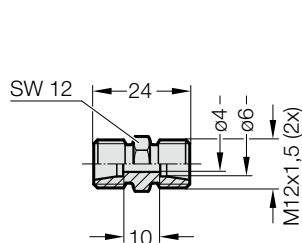


2) O-ring

2480.00.26.25



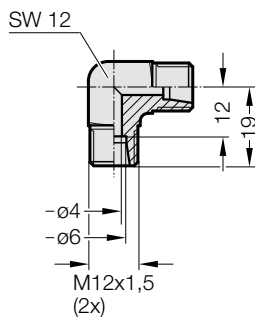
Adapter GE-24° conus,
hose - hose, DN5



2480.00.26.26



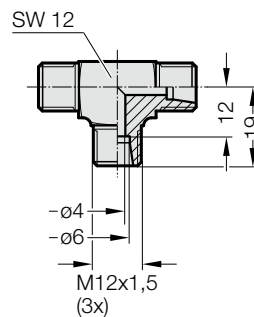
Adapter 90°-24° conus,
hose - hose, DN5



2480.00.26.27



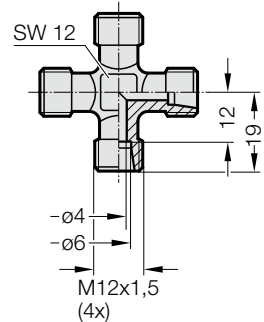
Adapter T-24° conus,
hose - hose, DN5



2480.00.26.28



Adapter K-24° conus,
hose - hose, DN5



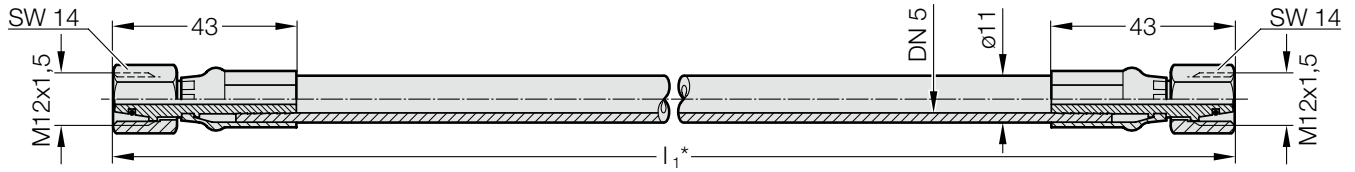
GAS SPRING ACCESSORIES

24°-CONE CONNECTION HOSES

(DIN 2353 / DIN EN ISO 8434-1)

2480.00.25.01.

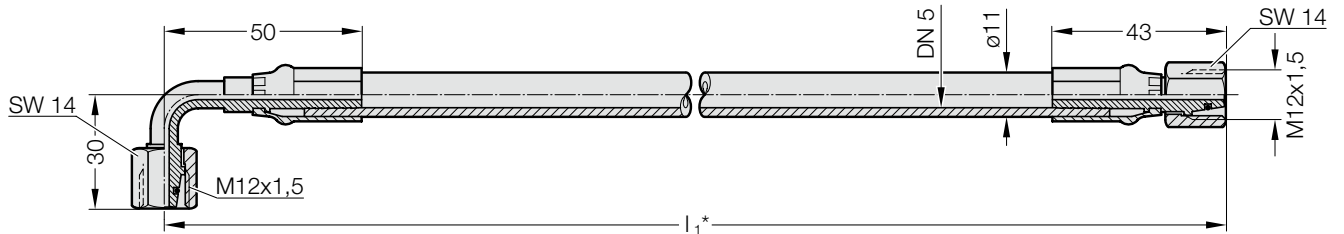
Hose – conical seals with union nuts and O-Ring (straight/straight)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.01.0765

2480.00.25.02.

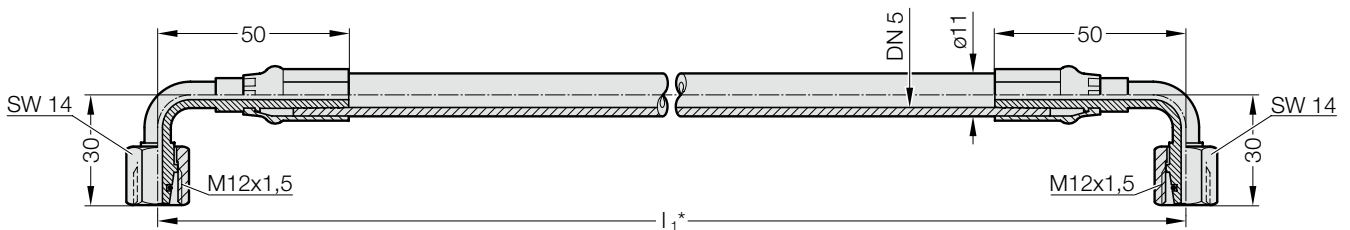
Hose – conical seals with union nuts an O-Ring (90° bend/straight)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.02.0765

2480.00.25.03.

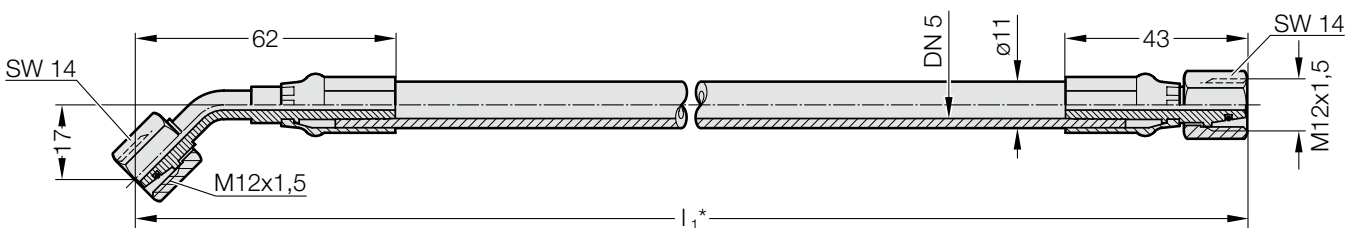
Hose – conical seals with union nuts and O-Ring (90° bend/both ends)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.03.0765

2480.00.25.04.

Hose – conical seals with union nuts and O-Ring (45° bend/straight)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.04.0765

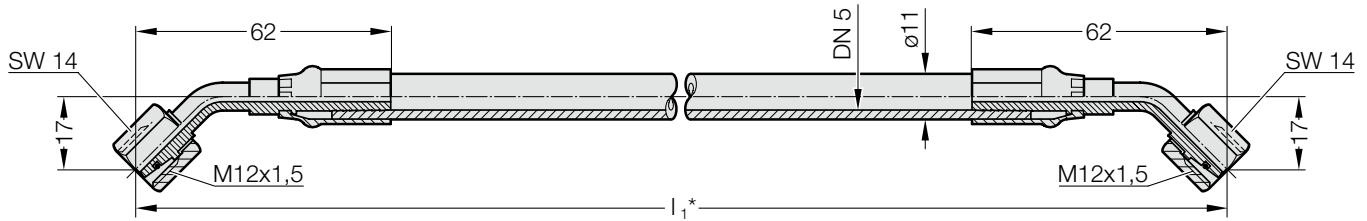
GAS SPRING ACCESSORIES

24°-CONE CONNECTION HOSES

(DIN 2353 / DIN EN ISO 8434-1)

2480.00.25.05.

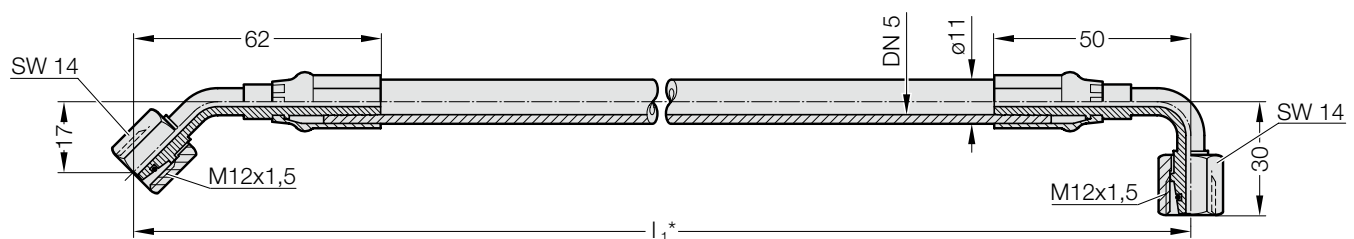
Hose – conical seals with union nuts and O-Ring (45° bend/both ends)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.05.0765

2480.00.25.06.

Hose – conical seals with union nuts and O-Ring (45° bend/ 90° bend)



Dimension l_1 specified in the order, e.g. 765 mm gives order no. 2480.00.25.06.0765

Order example:

Shortest factory length: 140 mm
Minimum bending radius: R40

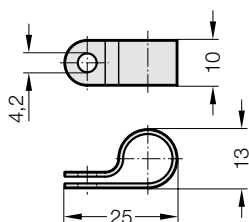
*24°-cone connection hoses available in the following lengths:

- 5 mm step range ≤ 1000 mm
- 10 mm step range > 1000 mm
- 100 mm step range > 4000 mm
- 500 mm step range > 6000 mm

2480.00.25.12.01



Hose clamp
for gauging hose DN5 (ø11 mm)



Material:

Polyamide

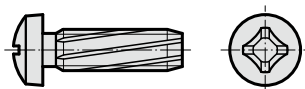
Note:

Supplied without screws

2192.50.04.012



Self-tapping screw DIN 7516
M4x12



Note:

self-tapping
Diameter of hole for self-tapping
screw = 3.6 mm

2480.00.23.13.

Anti-scuff spiral
for subsequent installation over hoses and tubing



Order No.	l [m]
2480.00.23.13.0001	1
2480.00.23.13.0002	2
2480.00.23.13.0005	5
2480.00.23.13.0010	10

Inner ø	7 mm max.
For hose external ø	5-11 mm
Temperature range	-30°C up to +100°C

Description:

The anti-scuff spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

Material:

Polyamide

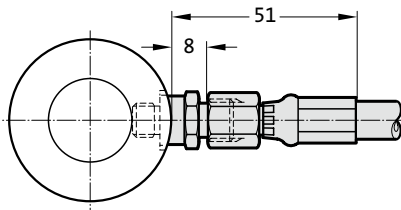
GAS SPRING ACCESSORIES

DIRECT CONNECTION DIMENSIONS

24°-CONE THREADED JOINTS (DIN 2353 / DIN EN ISO 8434-1)

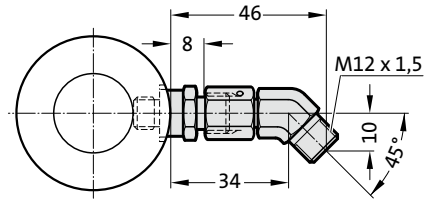
Direct connection

hose straight with adaptor 2480.00.26.03



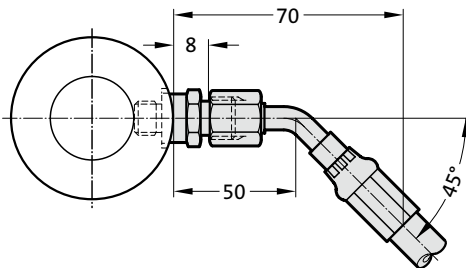
Direct connection

with elbow adaptor 45° 2480.00.26.21



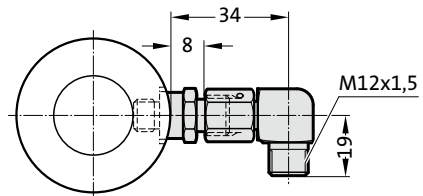
Direct connection

45° hose with adaptor 2480.00.26.03



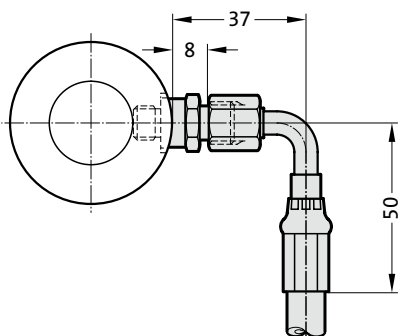
Direct connection

with elbow adaptor 90° 2480.00.26.22



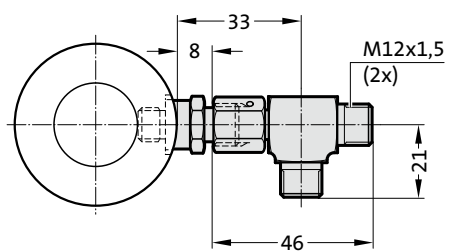
Direct connection

90° hose with adaptor 2480.00.26.03



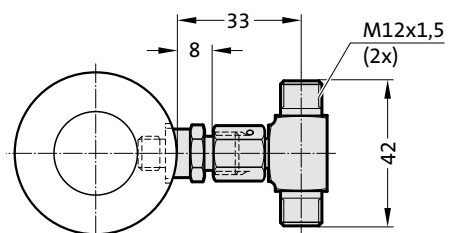
Direct connection

with L-coupling 2480.00.26.23



Direct connection

with T-coupling 2480.00.26.24



GAS SPRING ACCESSORIES

CONNECTOR SYSTEM, 24° CONUS MICRO

2480.00.27.01

M8x1 hose connector

Order example:

Shortest factory length:

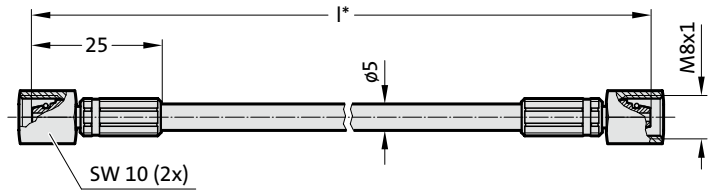
- 90 mm excl. bend protection
- 150 mm bend protection on one side
- 300 mm bend protection on both sides
- Minimum bending radius: R20 mm

*Measuring hose available in the following lengths:

- 5 mm step range ≤ 1000 mm
- 10 mm step range > 1000 mm
- 100 mm step range > 4000 mm
- 500 mm step range > 6000 mm

2480.00.27.01.

Connection hose, 24° conus micro, straight on both sides (connection hose, sealing cone with union nut and O ring)



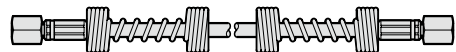
2480.00.27.01.....1

Antikink spiral, at one end



2480.00.27.01.....2

Antikink spiral, at both ends

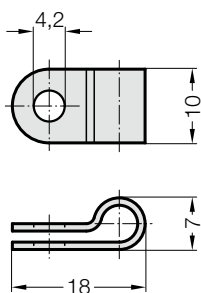


Ordering Code (example):

M8x1 hose connector	= 2480.00.27.01.	M8x1 hose connector	= 2480.00.27.01.
l = 90 mm	= 0090	l = 90 mm	= 0090.
Order No	= 2480.00.27.01. 0090	Bend protection on one side	= 1
		Order No	= 2480.00.27.01. 0090. 1

2480.00.23.12.01

Hose clamp
for gauging hose DN2 (Ø5 mm)



Material:

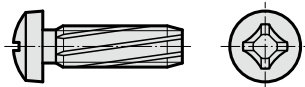
Polyamide

Note:

Supplied without screws

2192.50.04.012

Self-tapping screw DIN 7516
M4x12



Note:

self-tapping
Diameter of hole for self-tapping
screw = 3.6 mm

2480.00.23.13.

Anti-scuff spiral
for subsequent installation over hoses and tubing



Order No.	l [m]
2480.00.23.13.0001	1
2480.00.23.13.0002	2
2480.00.23.13.0005	5
2480.00.23.13.0010	10

Inner ø	7 mm
For hose external ø	max. 5-11 mm
Temperature range	-30°C up to +100°C

Description:

The anti-scuff spiral is used to protect against abrasion, is resistant to air, water, oil, hydraulic fluids petrol and other liquids.

Material:

Polyamide

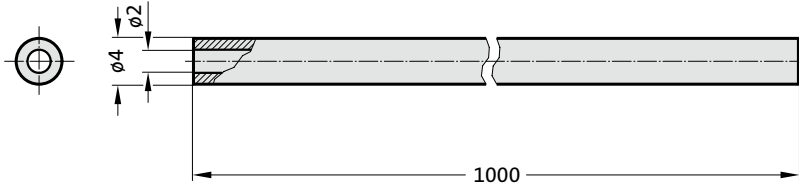
GAS SPRING ACCESSORIES

PIPE -24° CONUS MICRO

2480.00.27.11

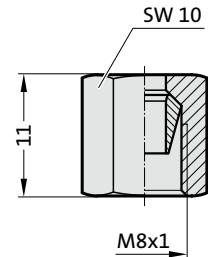
Pipe -24° conus micro
Delivered length: 1 m

Min. bending radius R12 mm (3 x external diameter)



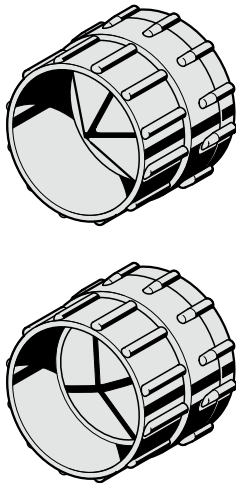
2480.00.27.11.01

Cutting ring screw connection - pipe 24° conus micro



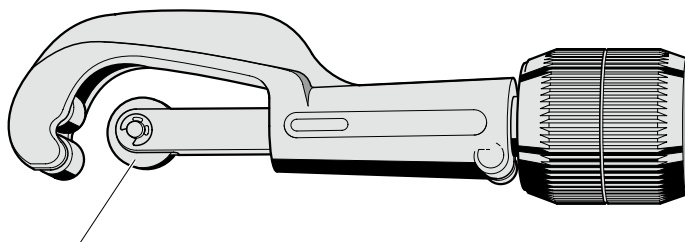
2480.00.27.00.01

Deburring tool for 24° conus micro



2480.00.27.00.02

Pipe cutter for 24° conus micro



2480.00.27.00.02.1

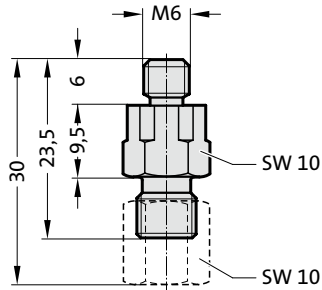
Replacement cutting wheel for pipe cutter

GAS SPRING ACCESSORIES

CONNECTOR SYSTEM, 24° CONUS MICRO

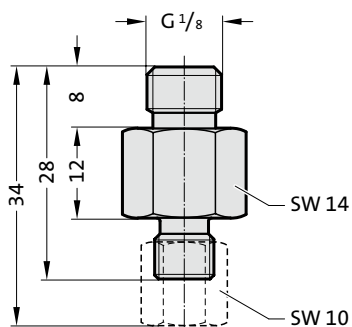
2480.00.28.01

Screw connection
GE-M6-24° cone micro



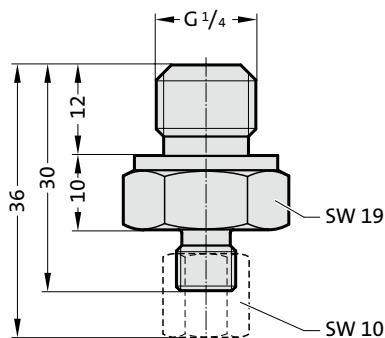
2480.00.28.02

Screw connection
GE-G¹/₈-24° cone micro



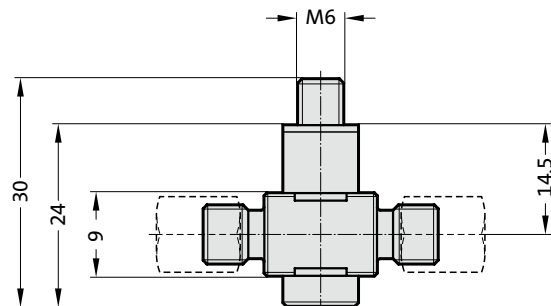
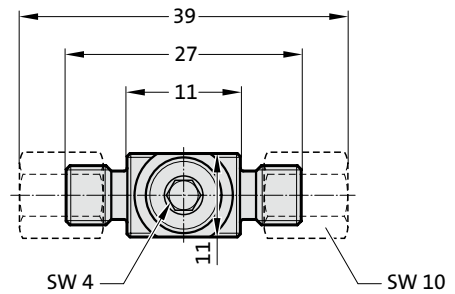
2480.00.28.03

Screw connection
GE-G¹/₄-24° cone micro



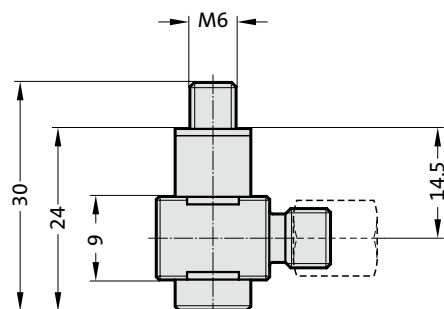
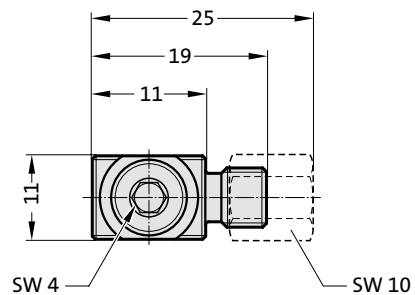
2480.00.28.14

Screw connection, T-24° conus micro



2480.00.28.17

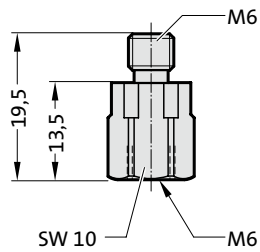
Screw connection, W-24° conus micro



GAS SPRING ACCESSORIES CONNECTOR SYSTEM, MICRO

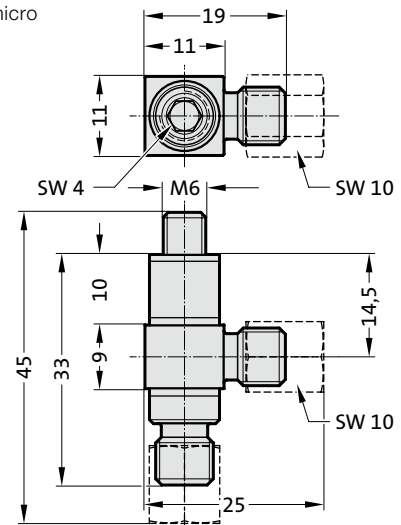
2480.00.22.06.06

Screw connection, GE-M6-M6 micro for connection to gas spring with split clamping flange 2480.022.



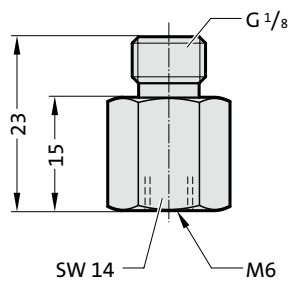
2480.00.28.15

Screw connection, L-24° conus micro



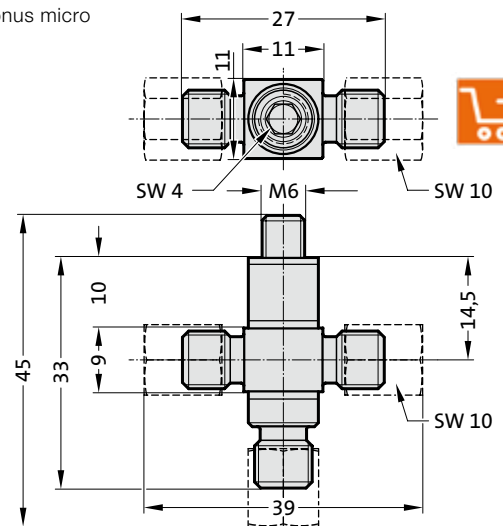
2480.00.22.18.06

Screw connection, GE-G^{1/8}-M6 micro for 2480.00.28.14 / 2480.00.28.17



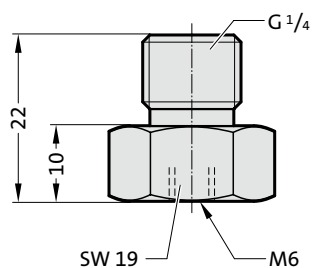
2480.00.28.16

Screw connection, K-24° conus micro



2480.00.22.14.06

Screw connection, GE-G^{1/4}-M6 micro for 2480.00.28.14 / 2480.00.28.17

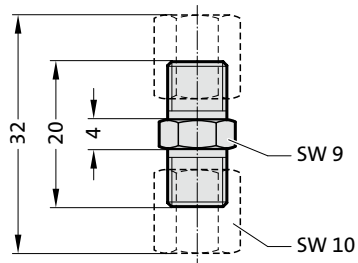


GAS SPRING ACCESSORIES

CONNECTOR SYSTEM 24° CONE MICRO

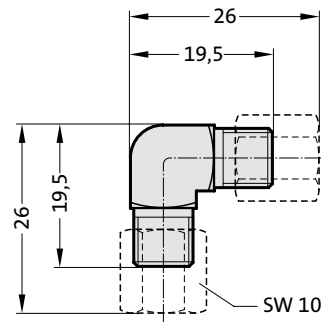
2480.00.28.25

Adapter, GE-24° cone micro
hose – hose



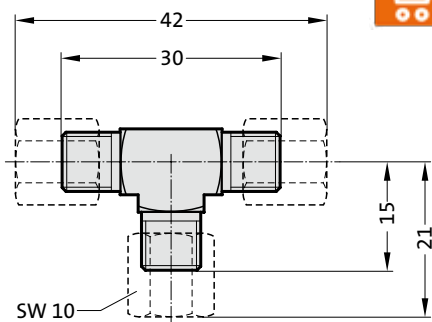
2480.00.28.26

Adapter, W-24° cone micro
hose – hose



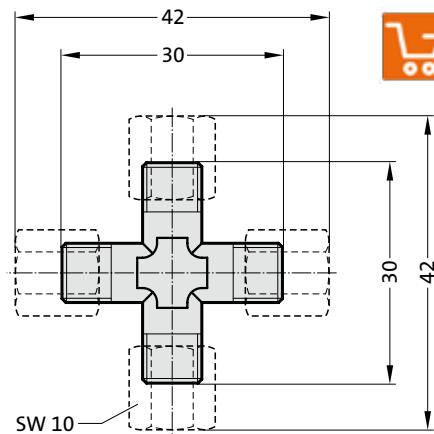
2480.00.28.27

Adapter, T-24° cone micro
hose – hose



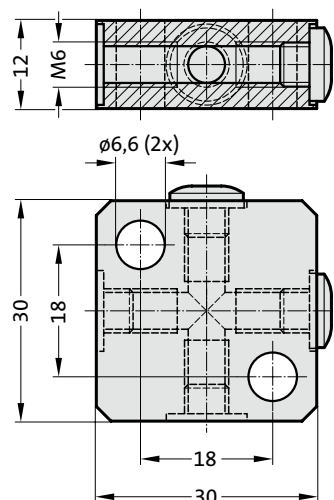
2480.00.28.28

Adapter, K-24° cone micro
hose – hose



2480.00.28.34

Distributor block M6, 4 ports



CONTROL FITTING WITHOUT PRESSURE RELIEF WITH PRESSURE RELIEF



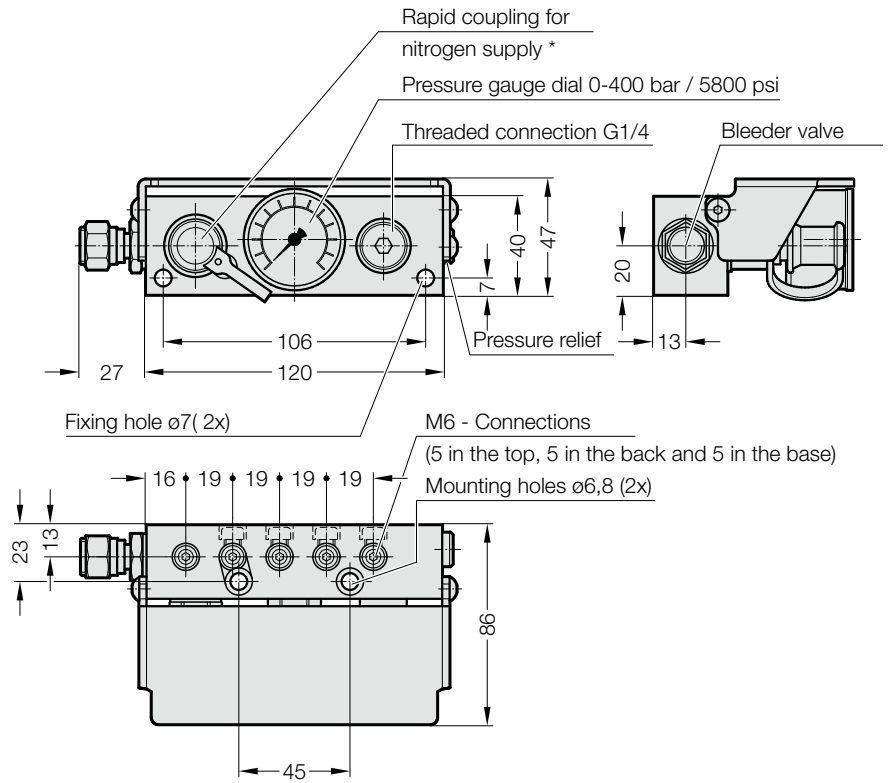
Description:

The micro control valve 2480.00.34.11.1/13.1 is used for continuous monitoring of the filling pressure of one or more gas springs (2 x 5 M6 connections, top, bottom and x 4 rear).

Note:

* 2 m long filling hose
Order no. 2480.00.31.02
order separately

2480.00.34.11.1 without pressure relief
2480.00.34.13.1 with pressure relief



CONTROL FITTING



- 2480.00.30.01.1 without pressure switch, without pressure relief
- 2480.00.30.02.1 with pressure switch, without pressure relief
- 2480.00.30.03.1 without pressure switch, with pressure relief
- 2480.00.30.04.1 with pressure switch, with pressure relief

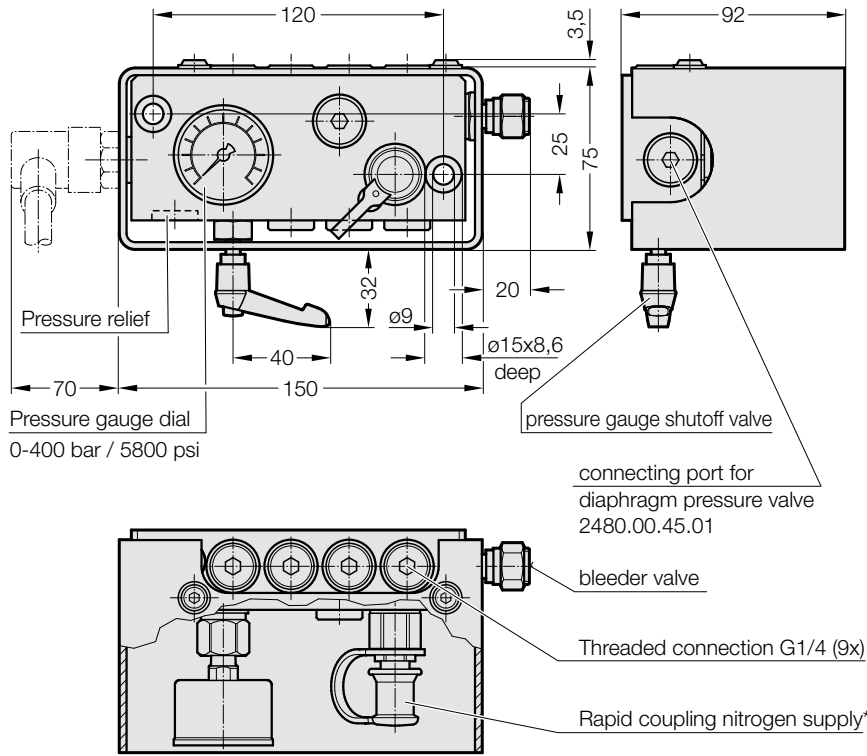
Description:

The control fitting 2480.00.30.01.1/02.1/03.1/04.1 serves to control the charge pressure of up to eight connected gas springs. Pressure checks during operation can be effected in two ways:

- a) via optical monitoring of the pressure gauge dial.
- b) via automatic monitoring with a diaphragm pressure switch. The switch will shut down the machine or trigger a signal.

Note:

The shut-off valve can be either open or closed during operation. Closing the pressure gauge shut-off valve ensures that no pressure pulsations from the gas springs act on the pressure gauge.
 * 2 m long filling hose
 Order no. 2480.00.31.02 to be ordered separately



- 2480.00.31.01.1 without pressure switch
- 2480.00.31.06.1 with pressure switch
- 2480.00.31.07.1 without pressure switch and with pressure relief
- 2480.00.31.08.1 with pressure switch, with pressure relief

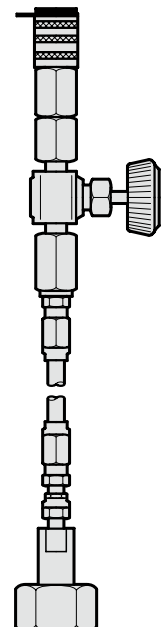
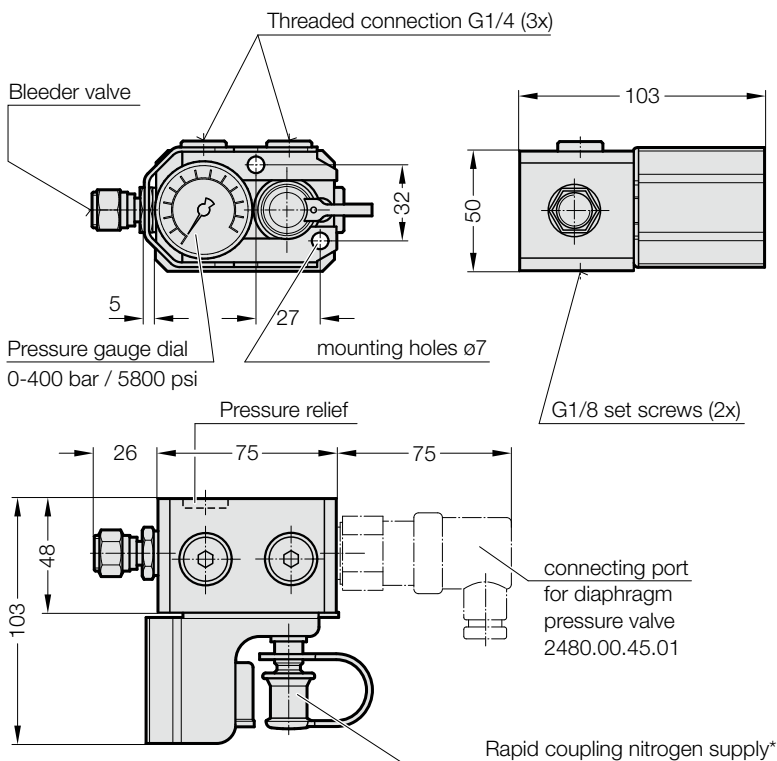


Description:

The control fitting 2480.00.31.01.1 performs the same function as the control armature 2480.00.30.01.1

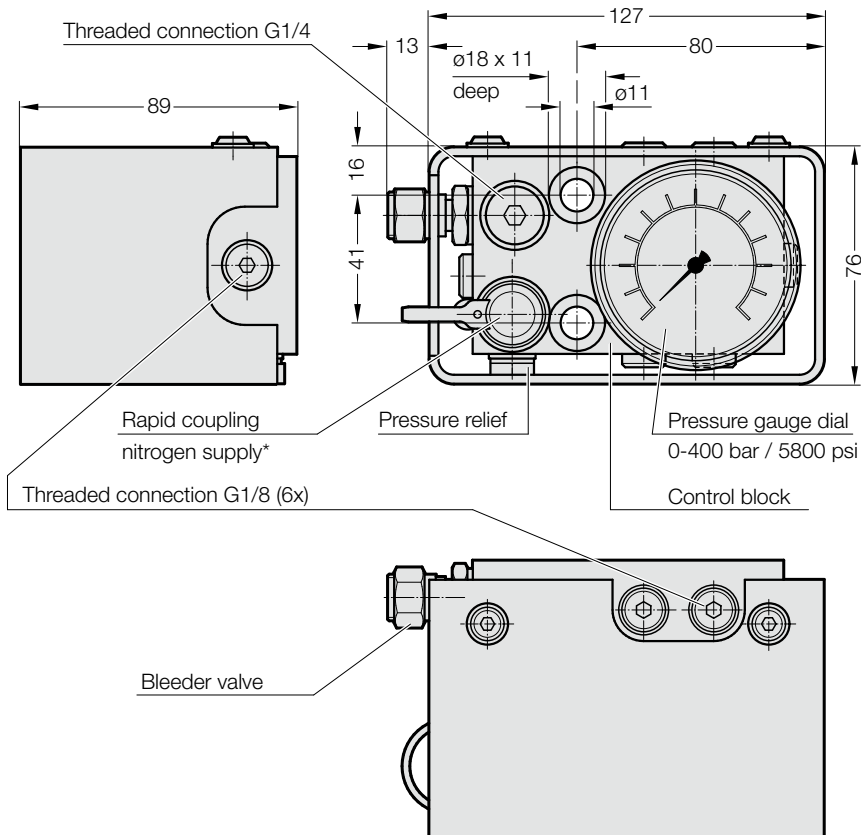
Note:

* 2 m long filling hose
 Order no. 2480.00.31.02 order separately



CONTROL FITTING

2480.00.30.13.1 without pressure switch, with pressure relief



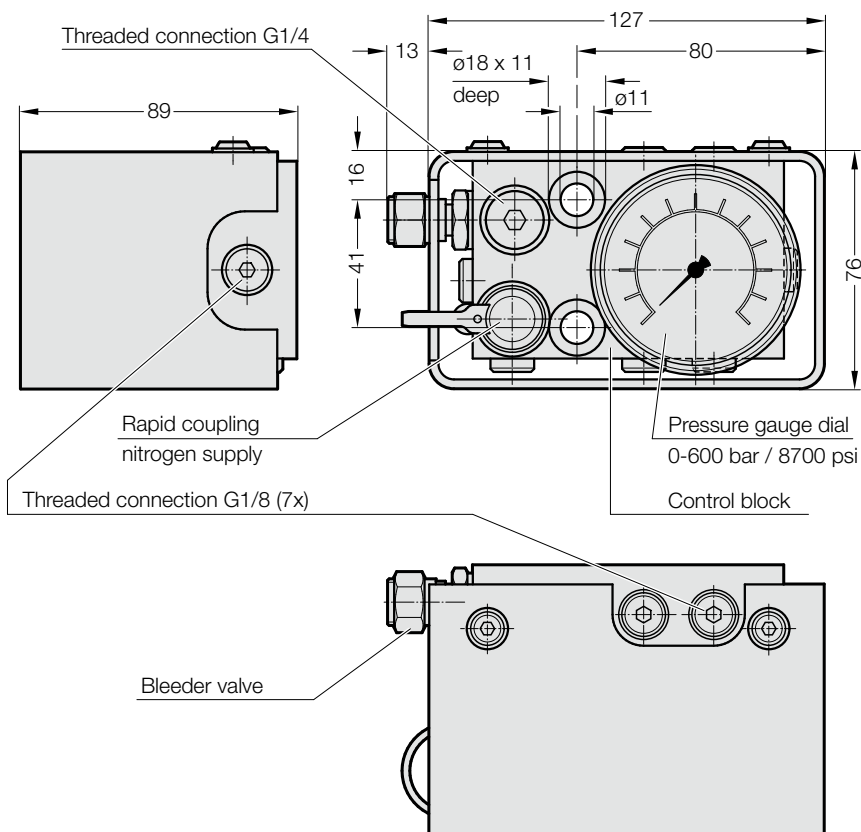
Description:

The control fitting 2480.00.30.13.1 is used to constantly monitor the filling pressure of one or more gas springs. The control fitting is equipped with rapid coupling for nitrogen supply and a bleeder valve. There are three G1/8 ports for simultaneous pressure checking at the control fitting. Measuring range from 0 - 400 bar / 5800 psi.

Note:

* 2 m long filling hose
Order no. 2480.00.31.02
order separately

2480.00.30.14.1 (600 bar) without pressure switch, without pressure relief



Description:

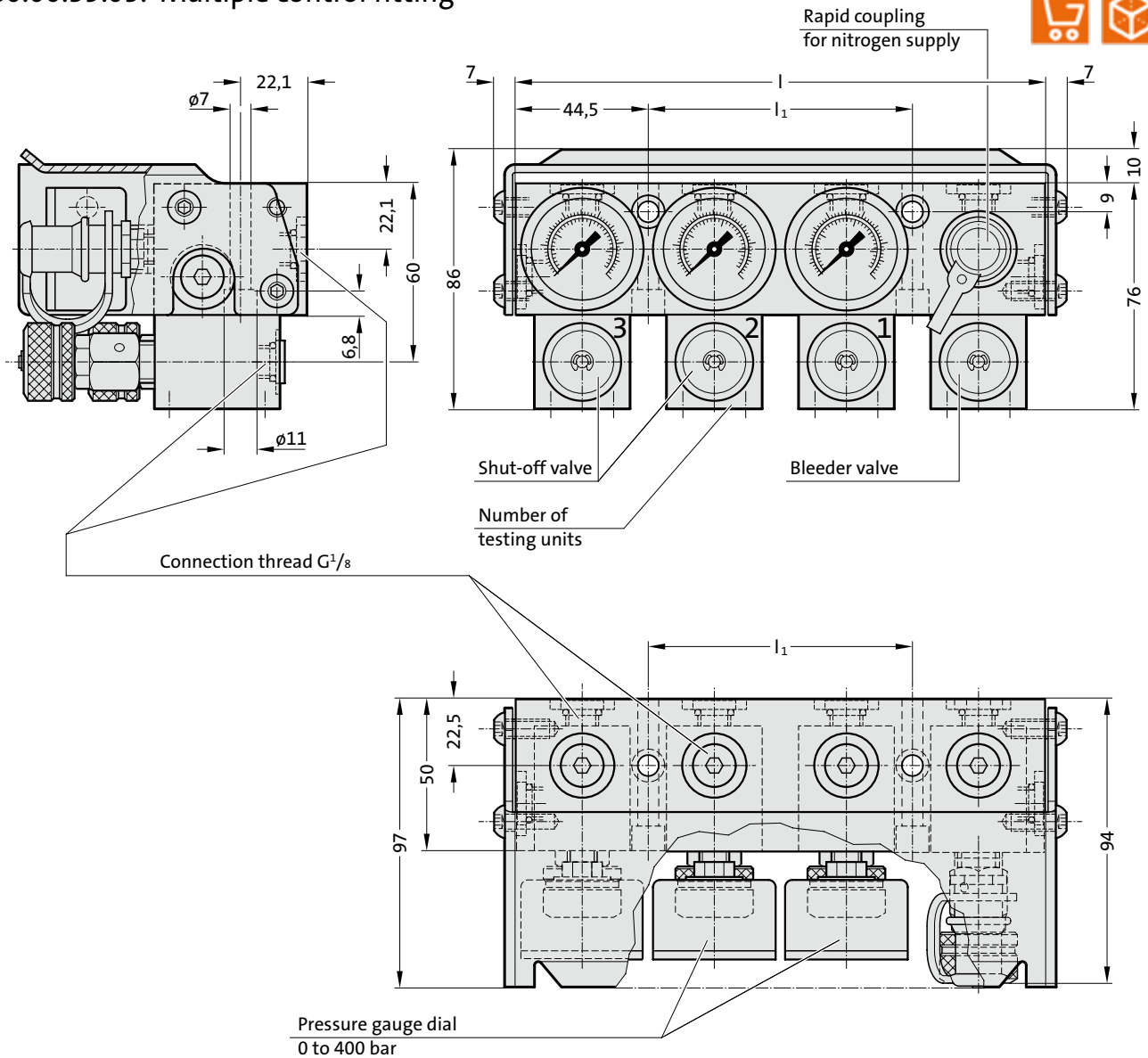
The control fitting 2480.00.30.14.1 is used for the constant monitoring of filling pressures > 150 bar of one or more gas springs. The control fitting is equipped with rapid coupling for nitrogen supply and a bleeder valve. There are three G1/8 ports for simultaneous pressure checking at the control fitting. Measuring range from 0-600 bar (8700 psi).

Note:

* 2 m long filling hose
Order no. 2480.00.31.02
order separately

MULTIPLE CONTROL FITTING

2480.00.39.05. Multiple control fitting



Description:

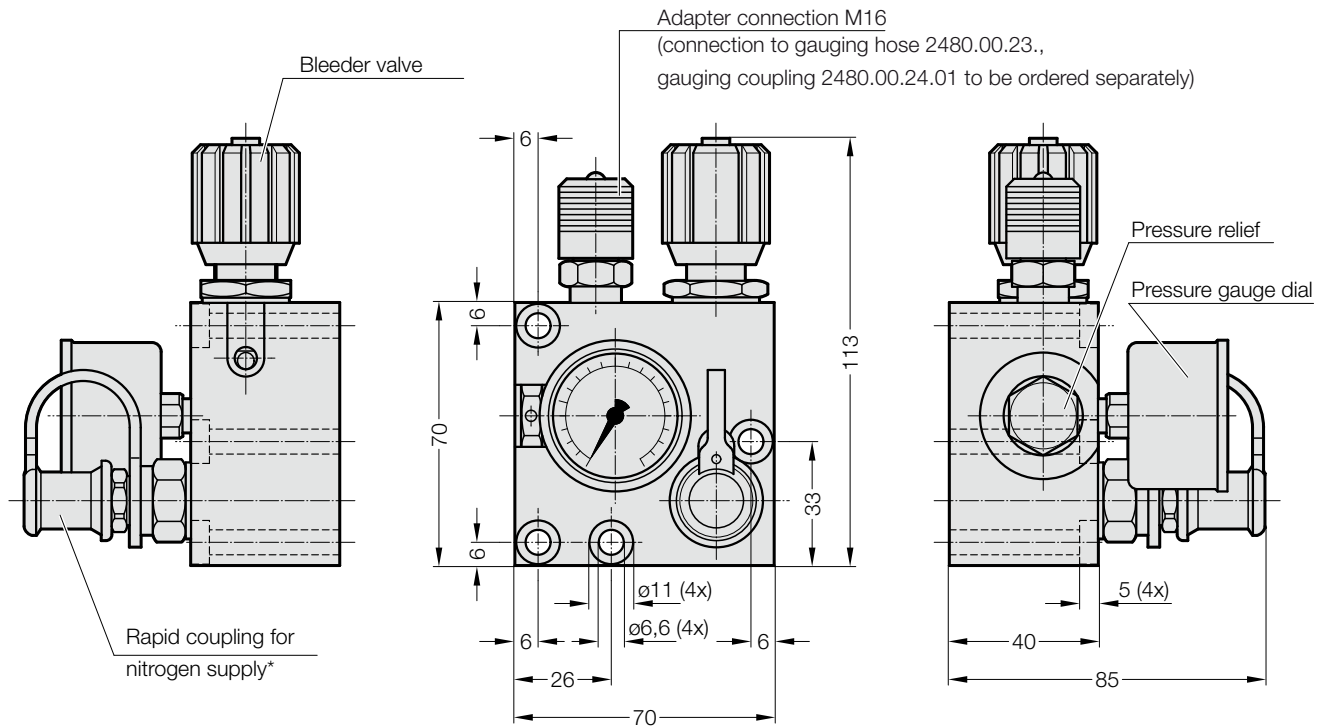
The multiple control fitting is required if it is necessary to check or set the filling pressure of each spring or spring assembly individually. The filling of the springs is done at a central position using the rapid coupling for nitrogen supply. Each testing unit is provided with three threaded connections for the optional hose connection. The cover protects against mechanical damages.

2480.00.39.05. Multiple control fitting

Order No	Number of testing units	l	l_1
2480.00.39.05.02	2	133,5	44,5
2480.00.39.05.03	3	178	89
2480.00.39.05.04	4	222,5	133,5
2480.00.39.05.05	5	267	178
2480.00.39.05.06	6	311,5	222,5
2480.00.39.05.08	8	400,5	311,5
2480.00.39.05.10	10	489,5	400,5

CONTROL FITTING

2480.00.31.11.1



Description:

The control fitting with pressure relief 2480.00.31.11.1 (Faure) is used for the continuous monitoring of the filling pressure of one or more gas pressure springs (one connection G1/8–M16). The pressure check during operation can be carried out by optical monitoring of the manometer display.

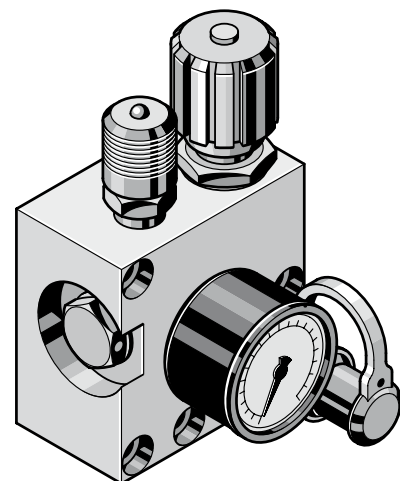
Note:

To connect measuring hose system 2480.00.23., remove M16 connection adapter and screw in the measuring coupling with valve 2480.00.24.01 (to be ordered separately).

With a composite arrangement of the gas springs, always remove the valve from the gas spring.

* 2 m long filling hose

Order no. 2480.00.31.02 to be ordered separately



DIAPHRAGM PRESSURE SWITCH ADAPTER BLOCK SCREW CONNECTION GE-G1/4-G1/8

Technical data

2480.00.45.01

Diaphragm pressure switch

2480.00.45.02

2480.00.45.01

Setting range 20-250 bar

Tolerance ± 5.0 bar

Overpressure protection 350 bar

max. voltage 250 V

2480.00.45.02

Setting range 10-80 bar

Tolerance ± 1.6 bar

Overpressure protection 350 bar

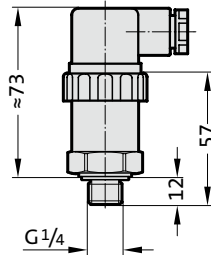
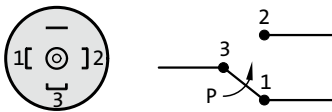
max. voltage 250 V

Note:

For individual monitoring of springs

see adapter 2480.00.45.10

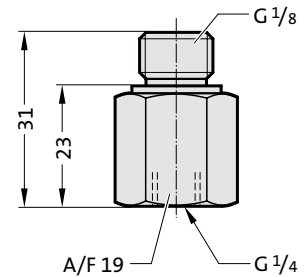
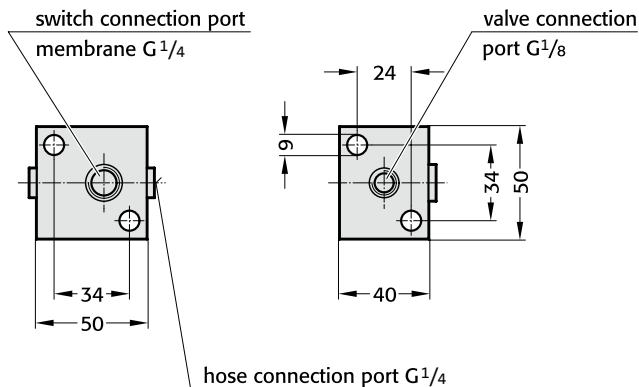
Wiring diagram for diaphragm pressure switch



2480.00.45.10

2480.00.45.00.01.18.14

Screw connection GE - G 1/8 - G 1/4 for control valve with screw connection G 1/8

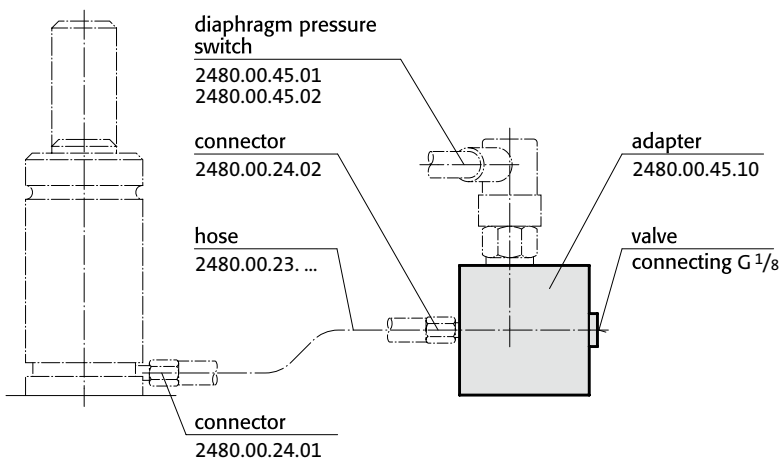


Mounting example:

Description:

The adapter 2480.00.45.10, in combination with the diaphragm pressure switch 2480.00.45.01 or 2480.00.45.02, permits filling pressure monitoring similar to the control fittings 2480.00.30.02.

When the filling pressure falls below a certain level, the diaphragm pressure switch issues a signal or switches the machine off.



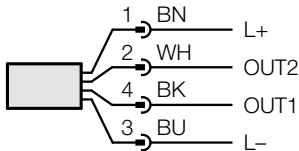
DIAPHRAGM PRESSURE SWITCH, DIGITAL



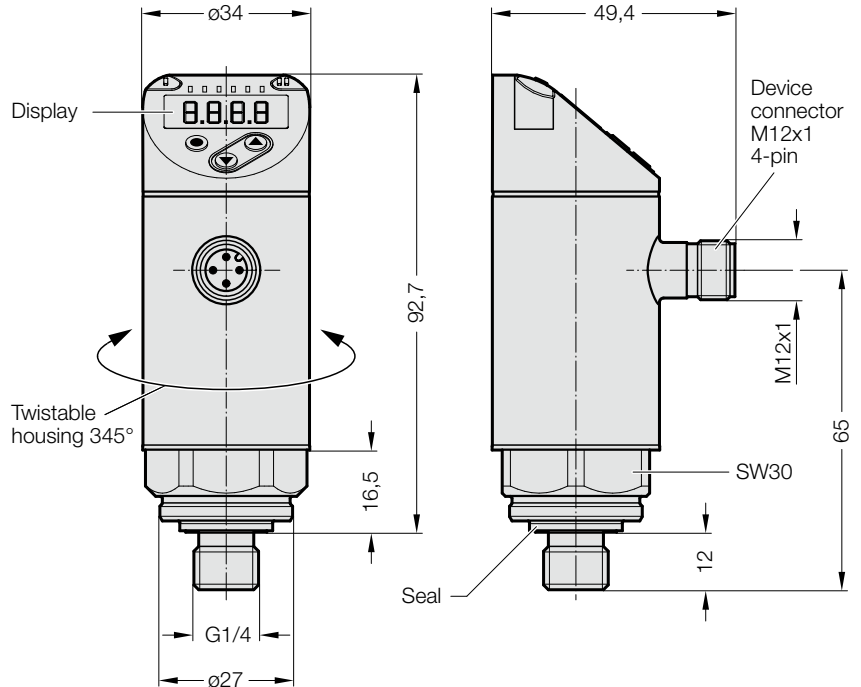
2480.00.45.04

Pin assignment:

M12x1, 4-pin



OUT1 - Switch output, IO-LINK
 OUT2 - Switch output, color coding in accordance with DIN EN 60947-5-2



Note:

2191.00.12.04.030 connecting cable, straight
 3 m long, to be ordered separately.



Description:

The membrane pressure switch, digital 2480.00.45.04, has a 4 digit alphanumeric display and two programmable switch outputs. The membrane pressure switch works in a pressure range of up to 400 bar and is impressive with a high overload resistance. With a high protection class IP65/IP67 and requiring no service, it guarantees interference-free and safe operation. The membrane pressure switch, digital with G 1/4 A nitrogen connection and M12 plug connection, is the optimal solution for hydraulic and pneumatic applications.

Advantages:

- Two switch outlets, one of which with IO link communication interface
- Red-Green alternating display for clear designation of Good ranges
- 4-digit digital display
- Optimal line up due to adjustability of the housing by 345°
- Switching direction of the switch outputs adjustable (opening or closing function)
- Value display in bar, psi or MPa or freely scalable, for example, force
- Easy handling via button programming
- Robust design for use in rough industrial environment

Technical data:

Product features:

Output signal	Switch signal; IO-LINK; (configurable)
Measuring range	400 bar
Threaded connection	G1/4

Number of digital outputs	2
output function	Closer/Opener; (parameterizable)
Max. voltage drop	
Switch output DC	2,5 V
Short circuit protection	yes

Area of application:

Media	liquid and gaseous media
Medium temperature	-25 ... 80°C
Min. burst pressure	1700 bar
Compressive strength	800 bar

Ambient conditions:

Protection type IP 65; IP 67

Electrical data:

Operating voltage	18 ... 30 V DC; (according to EN 50178 SELV/PELV)
Current consumption	< 35 mA
Protection class	III
Reverse polarity protection	yes
Readiness delay	0,3 s

Approvals/Tests:

EMW	DIN EN 61000-6-2 DIN EN 61000-6-3
-----	--------------------------------------

Outputs:

Output signal	Switch signal; IO-LINK; (configurable)
Electrical design	PNP/NPN

Mechanical data:

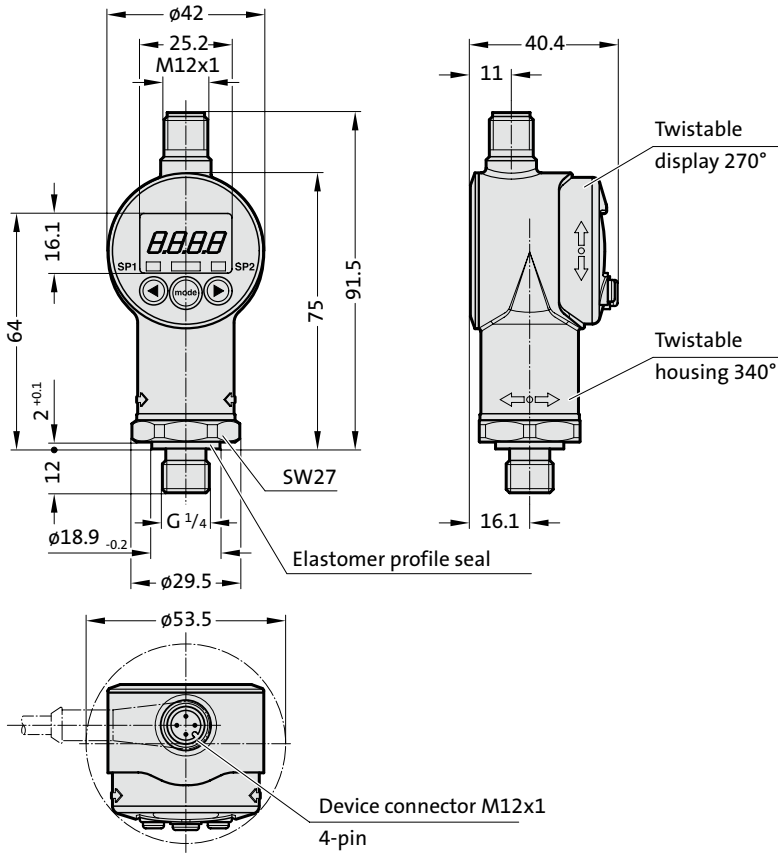
Materials	1.4542 (Stainless steel)
Tightening torque	25 ... 35 Nm

Displays/Control elements:

Display	Display unit	3x LED, green (bar, psi, MPa)
	Switch state	2x LED, yellow
	Measured values	alphanumeric display, red / green 4-digit

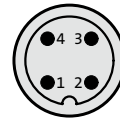
DIAPHRAGM PRESSURE SWITCH, DIGITAL

2480.00.45.05



Pin assignment:

M12x1, 4-pin



Pin

- 1 +UB
- 2 Analogue
- 3 0 V
- 4 SP1

Note:

2191.00.12.04.030 connecting cable, straight 3 m long, to be ordered separately.

Description:

The diaphragm pressure switch, digital 2480.00.45.05 is a compact, electronic pressure switch with integrated digital display for relative pressure measurement in the high pressure range.

For this purpose, it has a stainless steel measuring cell with thin film strain gauge (DMS).

The device offers a switching output and a switchable analogue output signal (4 ... 20 mA resp. 0 ... 10 V).

Advantages:

- 1 PNP transistor output, loadable up to 1.2 A
- Precision $\leq \pm 1\%$ FS
- Switchable analogue output (4 ... 20 mA / 0 ... 10 V)
- 4-digit digital display
- Optimal alignment by twisting in two axes

- Switching direction of the switch outputs adjustable (opening or closing function)
- Value display in bar, psi or MPa or freely scalable, for example, force
- Easy handling via button programming
- Switching points and reset hysteresis independently adjustable

Technical data:

Input characteristics:

Measuring range	400 bar
Overload range	800 bar
Burst pressure	2000 bar
Mechanical connection	G1/4
Tightening torque	20 Nm
Media-contacting parts	Connection piece: Stainless steel Seal: FPM (G1/4 A DIN 3852)

Output parameters:

Precision according to DIN 16086,	$\leq \pm 0,5\%$ FS typical.
Limit point adjustment (Display, Analogue output)	$\leq \pm 1\%$ FS max.
Reproducibility	$\leq \pm 0,25\%$ FS max.
Temperature drift	$\leq \pm 0,025\%$ FS / °C max. Zero point $\leq \pm 0,025\%$ FS / °C max. range

Analogue output:

Signal selectable:	4 ... 20 mA load max. 500 Ω 0 ... 10 V load min. 1 k Ω
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Switching outputs:

Execution	PNP transistor switching output
Switching current	max. 1,2 A
Operating temperature range	0° - 80°C
CE mark	EN 61000-6-1 / 2 / 3 / 4
Protection class according to DIN 40050	IP67

Setting ranges for the switching outputs:

Switching function			
Measuring range	Switching point	Hysteresis	Increment*
in bar	in bar	in bar	in bar
0 ... 400	6,0 ... 400	2,0 ... 396	1

Window function

Measuring range	Lower Switching value	Upper Switching value	Increment*
in bar	in bar	in bar	in bar
0 ... 400	6,0 ... 392	9,0 ... 396	1

* All areas specified in the table are adjustable in the grid of the step width.

WIRELESS PRESSURE MONITORING (WPM) 2.1
WIRELESS MONITORING OF GAS SPRINGS



FIBRO
2480.13.03000.160
Pressure 3000 MPa
100 MPa

Wichtige Hinweise:
- Nicht öffnen - hoher Druck!
- Keine Füllstoffe einfüllen!
- Keine Füllstoffe einfüllen!
- Keine Füllstoffe einfüllen!

Warning:
- Do not open - high pressure!
- Do not fill with filler!
- Do not fill with filler!
- Do not fill with filler!

Attention:
- Ne pas ouvrir - haute pression!
- Ne pas remplir de remplissage!
- Ne pas remplir de remplissage!
- Ne pas remplir de remplissage!

Attenzione:
- Non aprire - alta pressione!
- Non riempire con il riempimento!
- Non riempire con il riempimento!
- Non riempire con il riempimento!

PLEASE REQUEST YOUR CATALOGUE

FILLING AND CONTROL FITTING

FILLING HOSE

CYLINDER PRESSURE REGULATOR



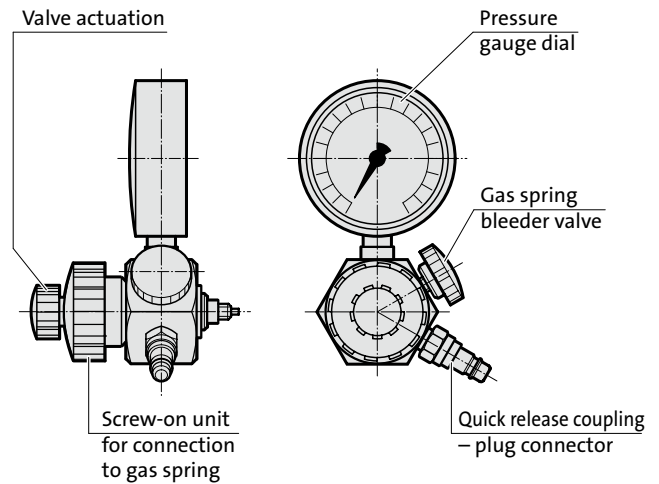
Description:

The filling and control fitting 2480.00.32.21 is used to fill, vary the pressure setting (e.g. when testing tools) and measure the gas pressure. The coupling enables the filling hose 2480.00.31.02 to be connected directly to the gas cylinder valve or the pressure regulator. If the fitting is used solely for checking purposes, a simplified arrangement without the filling hose 2480.00.31.02 is also possible. The fitting is equipped with an additional adapter 2480.00.32.10/11 for connecting to gas springs with G 1/8 valve connection as standard.

Note:

2 m long filling hose with quick release coupling, shut-off valve and gas bottle connector, order no. 2480.00.31.02 (order separately). Other filling hose lengths to order.

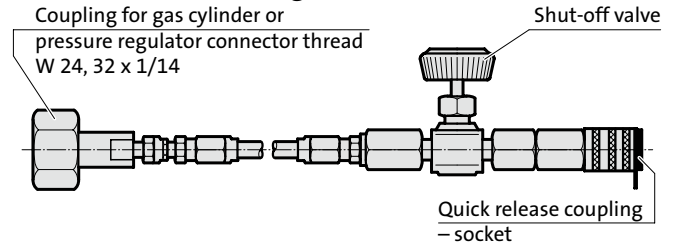
2480.00.32.21 Filling and control fitting



Connecting adapter for cylinder connector

Order No.	Country	For cylinder connector
2480.00.31.02.00.10	France	AFNOR C, W21,8x1/14
2480.00.31.02.00.11	China	G 5/8-ISO228
2480.00.31.02.00.12	Great Britain	G 5/8
2480.00.31.02.00.13	Korea	W24,32x1/4 Type 40f
2480.00.31.02.00.14	Russia	W24,32xG3/4 Type 40n
2480.00.31.02.00.15	USA	W24,32x1/4 Type 40c
2480.00.31.02.00.16	Italy	W24,32xW21,7x1/4 Type 40d

2480.00.31.02 Filling hose



Description:

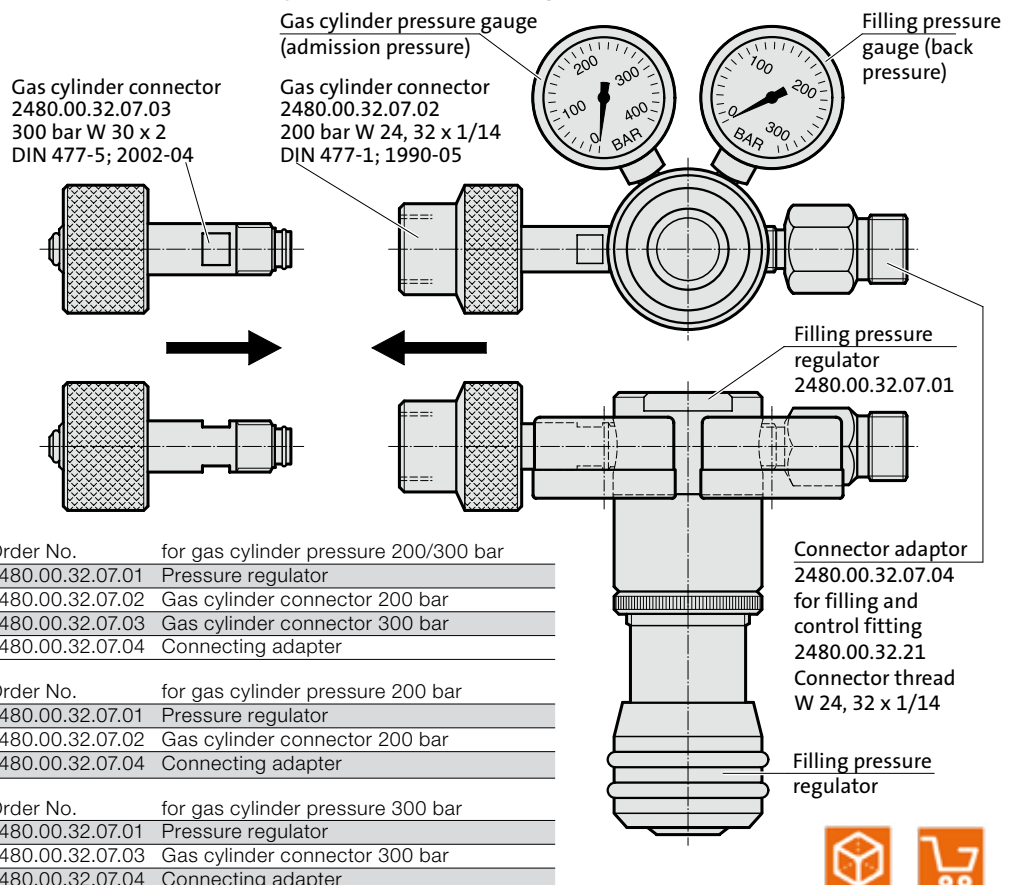
The pressure regulator 2480.00.32.07. is designed for 200 bar connections and for 300 bar gas cylinders. The filling and control fitting 2480.00.32.21 is connected to the cylinder pressure regulator for filling gas springs using filling hose 2480.00.31.02 and connector adaptor 2480.00.32.07.04. Depending on the type of gas cylinder, the gas cylinder connector used can either be the 2480.00.32.07.02 for 200 bar cylinders or the 2480.00.32.07.03 for 300 bar cylinders.

Max. admission pressure 300 bar
Back pressure range 10-200 bar

Other advantages:

- Hasty opening of the gate valve on the filling and control fitting 2480.00.32.21 cannot result in overfilling.
- It is not necessary to have the pressure display of the filling and control fitting 2480.00.32.21 in view.

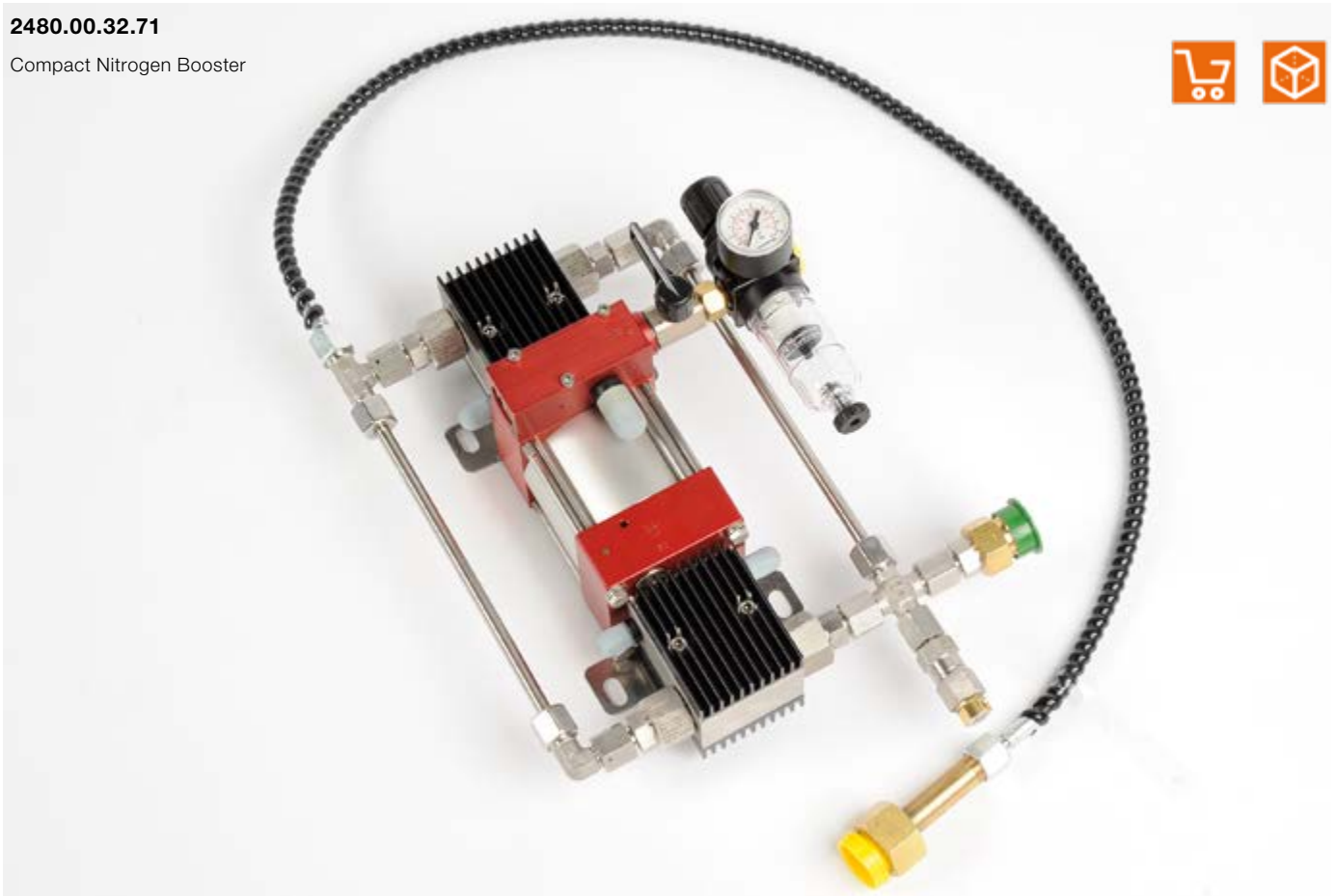
2480.00.32.07. Gas cylinder pressure regulator



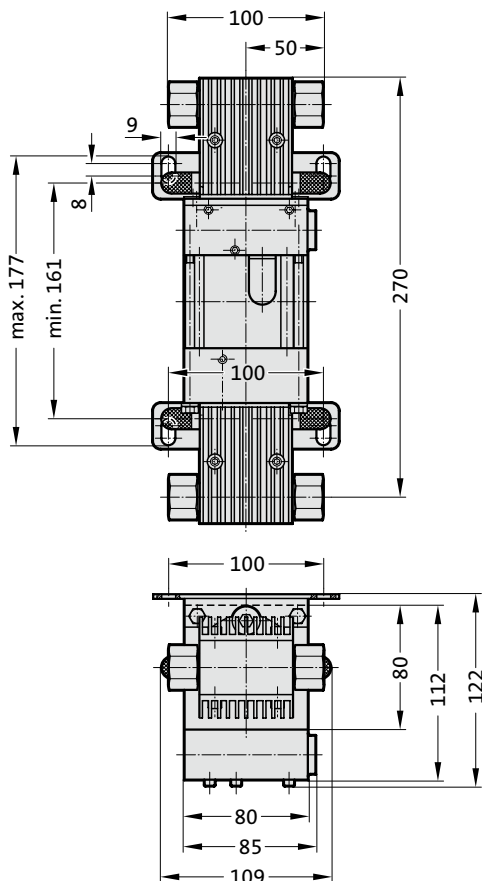
COMPACT NITROGEN BOOSTER

2480.00.32.71

Compact Nitrogen Booster



2480.00.32.71



Description:

The FIBRO compact nitrogen booster 2480.00.32.71 was developed to compress nitrogen gas. It increases the output pressure of the nitrogen cylinders considerably. For example, when filling gas springs, the N₂ cylinders can be used up to a residual pressure of 30 bar.

Advantages:

- ▶ Increase in utilisation capacity
- ▶ Reduction in cylinder replacement time
- ▶ Minimisation of the number of cylinders
- ▶ Light weight (7.2 kg)
- ▶ Compact design
- ▶ Suitable for simple installation directly on all standard nitrogen cylinders (200 bar)

Function:

The FIBRO compact nitrogen booster works according to the principle of a pressure relay valve. Low pressure is applied to a large surface, which in turns applies high pressure to a small surface.

Continuous delivery is achieved by means of an internally actuated 4/2-way valve. Compressed air is used as the drive mechanism.

A holding plate is included to secure the compact nitrogen booster to the nitrogen cylinder. The compact nitrogen booster is simply hung over the nitrogen cylinder connection.

COMPACT NITROGEN BOOSTER HOLDING PLATE

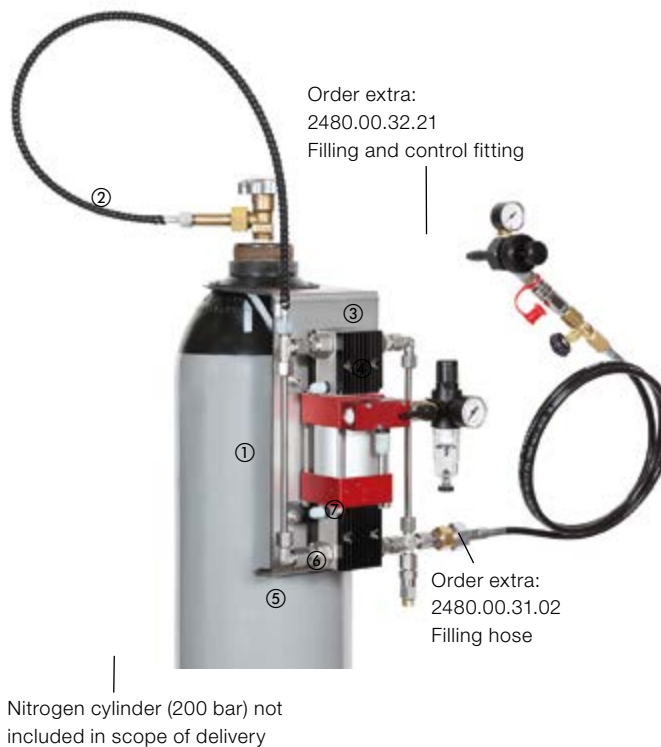
2480.00.32.71.02 Holding plate

for re-order



Connection diagram

Compact Nitrogen Booster



- ① 2480.00.32.71 Compact Nitrogen Booster
- ② Gas cylinder connection W24, 32 x 1/14 for 200 bar nitrogen cylinder
- ③ Nitrogen N₂ inlet
- ④ Compressed air inlet G1/4 max. 10 bar
- ⑤ Overpressure protection 400 bar
- ⑥ Nitrogen N₂ outlet ⑦ Connecting thread W24, 32 x 1/14

2480.00.32.71.02

Technical data:

Drive compressed air: 1 – 6 bar

Calculated operating pressure at 6 bar air drive pressure: 192 bar + remaining pressure in the nitrogen cylinder

Transmission ratio: 1:32

Displaced volume/double stroke: 11.6 cm³

Connections:

Compressed air: G1/4" thread

Nitrogen inlet: Hose DN4, 1 m long with N₂ cylinder connection 200 bar

Nitrogen outlet: N₂ cylinder connection 200 bar W24, 32 x 1/14

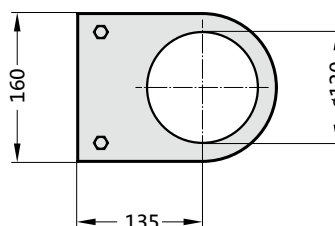
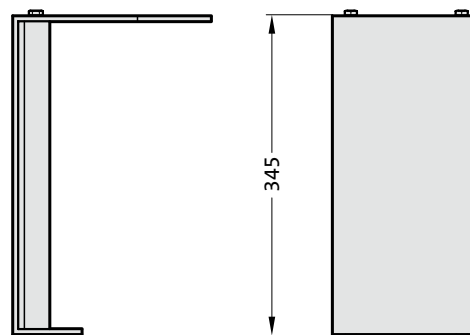
Max. operating temperature: 60 °C

Weight: approx. 7.2 kg

Inlet pressure: 30-300 bar

Average supply rate*: 280 NL/min

* The delivery rate is dependent on the air drive and inlet pressure.



DYNAMOMETER FOR GAS SPRINGS



Description:

The dynamometer with mechanical measuring device can be used to test the spring force of gas springs up to 8000 daN.

The dynamometer with digital measuring device can be used to test the spring force of gas springs up to 10000 daN.

The dynamometer 2480.00.35.021 with analogue display is supplied with three interchangeable pressure measuring nozzles different ranges of values:

up to 300 daN,

from 300 to 1750 daN

and from 1750 to 8000 daN

The dynamometer 2480.00.35.032 with digital display has a pressure measuring nozzle for forces ranging from 0 to 10000 daN.

Maximum spring installation height:

analogous = 700 mm

digital = 760 mm

DYNAMOMETER FOR GAS SPRINGS

2480.00.35.04



Description:

The dynamometer with digital measuring device can be used to test the spring force of gas springs up to 2000 daN. Max. spring installation height: 488 mm.
Max. spring diameter: 150 mm.

TOOLKIT FOR ASSEMBLING GAS SPRINGS



2480.00.50.11

Toolkit for all gas springs

The toolkit contains:

Item	Order No	Term	Type
1	2480.00.50.01.001	Assembly sleeve	Mini
2	2480.00.50.01.002	Assembly sleeve	00250
3	2480.00.50.01.003	Assembly sleeve	00500
3-1	2480.00.50.01.031	Assembly sleeve (2487.12.00500.)	X500
4	2480.00.50.01.004	Assembly sleeve	00750
5	2480.00.50.01.005	Assembly sleeve	01500
5-1	2480.00.50.01.051	Assembly sleeve (2487.12.01500.)	X1500
6	2480.00.50.01.006	Assembly sleeve	03000
7	2480.00.50.01.007	Assembly sleeve	05000
8	2480.00.50.01.008	Assembly sleeve	07500
9	2480.00.50.01.009	Assembly sleeve	10000
10-1	2480.00.50.01.101	Safety ring tool	
13	2480.00.50.01.013	T-lever	M8
14-1	2480.00.50.01.141	T-lever	M16
15	2480.00.50.01.015	T-lever	G 1/8"
16-2	2480.00.50.01.162	T-lever, Extension	M6
Spare part for 16-1			
17	2480.00.50.01.017	Valve tongs	
18	2480.00.50.01.018	Valve tool	M6
19	2480.00.50.01.019	Valve tool	G 1/8"
30	2480.00.50.01.030	Valve tool	VG 5
33	2480.00.50.01.033	Valve tool (2480.00.41.1)	M6
34	2480.00.50.01.034	Disassembly handle	M3
39-1	2480.00.50.01.391	Tool case	

Description:

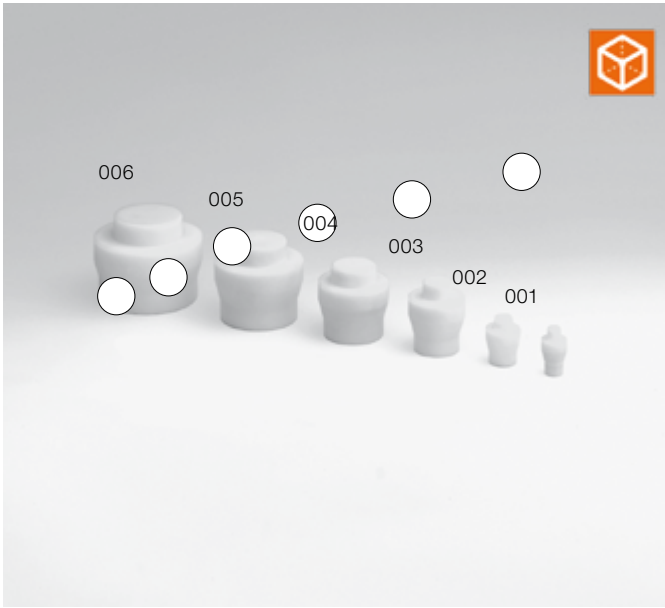
Toolkit for assembling and disassembling gas springs.

Note:

Read instructions for use before working on it.

Every tool can be ordered separately.

ASSEMBLING CONE



2480.00.50.04.

Assembling cone for gas springs with through bore passage 2496.12.

Item	Order No	Term
001	2480.00.50.04.001	Assembling cone 00270
002	2480.00.50.04.002	Assembling cone 00490
003	2480.00.50.04.003	Assembling cone 01060
004	2480.00.50.04.004	Assembling cone 01750
005	2480.00.50.04.005	Assembling cone 03300
006	2480.00.50.04.006	Assembling cone 04250

PNEUMATIC HOSE CRIMPING MACHINE HOSE SHEARS



2480.00.54.10 Pneumatic hose crimping machine

Hose crimping machine, for pneumatic hose sizes DN2 and DN5

Description:

The FIBRO pneumatic hose crimping machine, 2480.00.54.10 is suited for crimping the following hose connection systems:

- Minimes system 2480.00.23.
- 24°-cone-system 2480.00.25.
- Connector system, 24° conus micro 2480.00.27.01.

The pneumatic-hydraulic hose crimping machine drive enables simple and fast hose harnessing.

After connecting compressed air (max. 7 bar) on the G1/4" threaded fitting, the hose crimping machine is operated manually with the air-hydraulic pump (0.1 - 0.5 l/min. at 7 bar air pressure).

Lubrication-free

Plain bearing on die:

- improved performance due to reduced friction
- no press tool wear and no contamination from lubricants, 20% reduction in friction loss

Technical data:

Crimp force [kN/t]	750 / 75
Crimp range	52
Opening path	+10
Opening without pressing jaws	52
Pressing jaws nominal hose width DN2	2480.00.54.10.02
Pressing jaws nominal hose width DN5	2480.00.54.10.05
Drive	Compressed air
Oil volume [l]	1.4
Dimensions (LxWxH)	230x180x160
Weight [kg]	16

2480.00.54.03

Hose shears



The following crimping fixtures and hoses can be ordered:

for the Minimes system

2480.00.23.00.	Hose 630 bar dimpled, DN2 *
2480.00.23.01.V	Threaded connection, straight, packed, DN2 - 1215
2480.00.23.01.V.025	Threaded connection, straight, packed, DN2 - 1215/ 25 Stck
2480.00.23.01.V.050	Threaded connection, straight, packed, DN2 - 1215/ 50 Stck
2480.00.23.01.V.100	Threaded connection, straight, packed, DN2 - 1215/ 100 Stck
2480.00.23.02.V	Threaded connection, 90°, packed, DN2 - 1215
2480.00.23.02.V.025	Threaded connection, 90°, packed, DN2 - 1215/ 25 Stck
2480.00.23.02.V.050	Threaded connection, 90°, packed, DN2 - 1215/ 50 Stck
2480.00.23.02.V.100	Threaded connection, 90°, packed, DN2 - 1215/ 100 Stck

for the connector system, 24° cone micro

2480.00.23.00.	Hose 630 bar dimpled, DN2 *
2480.00.27.01.V	Threaded connection, straight, packed
2480.00.27.01.V.025	Threaded connection, straight, packed/ 25 Stck
2480.00.27.01.V.050	Threaded connection, straight, packed/ 50 Stck
2480.00.27.01.V.100	Threaded connection, straight, packed/ 100 Stck

for the 24° cone system **

2489.00.02.	High-pressure hose, dimpled, DN5 *
2480.00.25.01	Hose fitting, straight
2480.00.25.02	Hose fitting, 90°
2480.00.25.04	Hose fitting, 45°

* Hoses to be ordered in 1 m lengths, e.g.:

example order for hose DN2, 10 m long = 2480.00.23.00.0010

** not for 2480.00.54.20 manual hose press, electric

HAND HELD HOSE CRIMPING MACHINE, ELECTRIC (BATTERY POWERED) HOSE SHEARS



2480.00.54.20 Hand held hose crimping machine, electric (battery powered)

Electric hand held hose crimping machine (battery operated)

for hose size DN2

Description:

The FIBRO electric hand held hose crimping machine, 2480.00.54.20 is suited for crimping the following hose connection systems:

- Minimes system 2480.00.23.
- Connector system, 24° conus micro 2480.00.27.01

The electric/hydraulic (battery-operated) drive of the manual hose press permits quick and easy hose manufacture directly on the die. The correct crimp force is ensured by a crimp force sensor and once correct force is reached an audible signal can be heard. The electric hand held hose crimping machine, is ideal for very quick crimping.

Included: Electric hand held hose crimping machine, crimping jaws, battery, charger and case.

Technical data:

Crimp force [kN/t]	15 / 1,5
Quantity of pressings	approx. 150 at 1,5 Ah
Head for crimping jaws	approx. 350° revolving
Drive	battery operated
Voltage [V]	18
Performance [Ah]	1.5
Battery charging time	15
Dimensions (LxWxH)	377x75x116
Weight [kg]	2.3

The following crimping fixtures and hoses can be ordered:
for the Minimes system

2480.00.23.00.	Hose 630 bar dimpled, DN2 *
2480.00.23.01.V	Threaded connection, straight, packed, DN2 - 1215
2480.00.23.01.V.025	Threaded connection, straight, packed, DN2 - 1215/ 25 Stck
2480.00.23.01.V.050	Threaded connection, straight, packed, DN2 - 1215/ 50 Stck
2480.00.23.01.V.100	Threaded connection, straight, packed, DN2 - 1215/ 100 Stck
2480.00.23.02.V	Threaded connection, 90°, packed, DN2 - 1215
2480.00.23.02.V.025	Threaded connection, 90°, packed, DN2 - 1215/ 25 Stck
2480.00.23.02.V.050	Threaded connection, 90°, packed, DN2 - 1215/ 50 Stck
2480.00.23.02.V.100	Threaded connection, 90°, packed, DN2 - 1215/ 100 Stck

for the connector system, 24° cone micro

2480.00.23.00.	Hose 630 bar dimpled, DN2 *
2480.00.27.01.V	Threaded connection, straight, packed
2480.00.27.01.V.025	Threaded connection, straight, packed/ 25 Stck
2480.00.27.01.V.050	Threaded connection, straight, packed/ 50 Stck
2480.00.27.01.V.100	Threaded connection, straight, packed/ 100 Stck

* Hoses to be ordered in 1 m lengths, e.g.:
example order for hose DN2, 10 m long = 2480.00.23.00.0010

2480.00.54.03

Hose shears



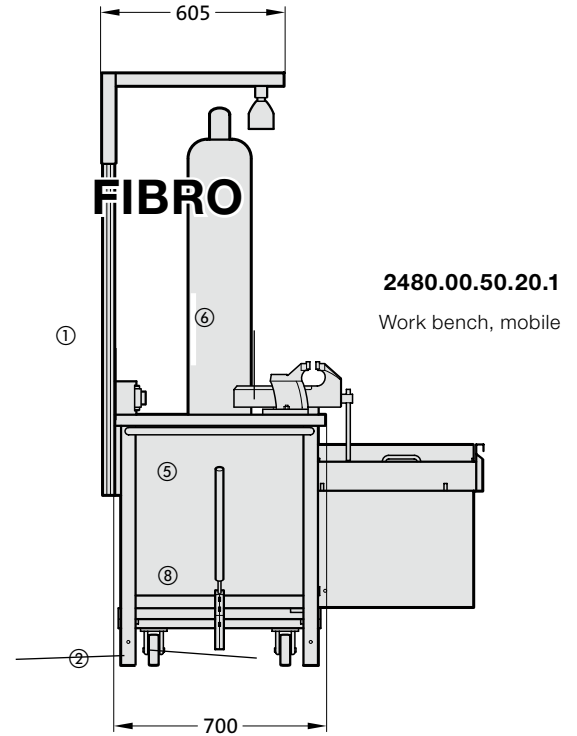
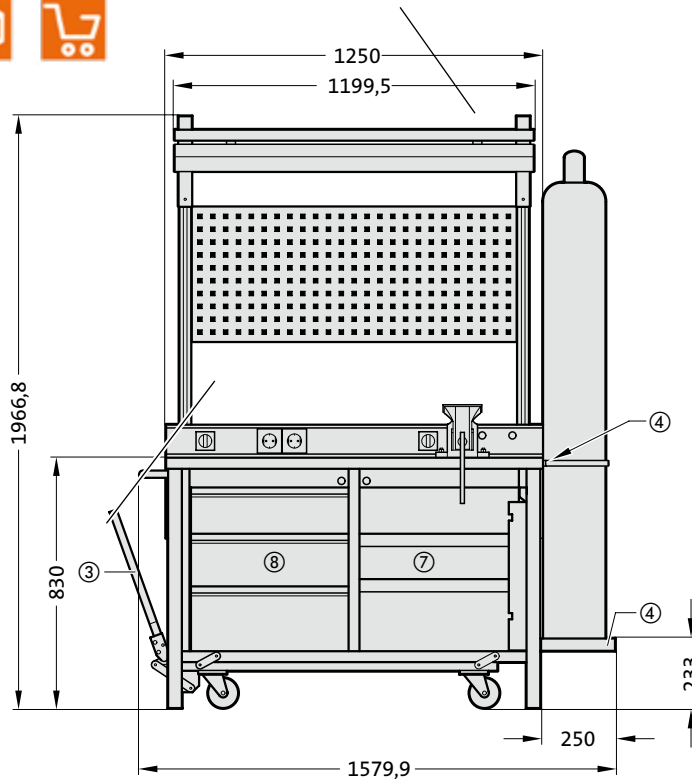
SERVICE STATION, MOBILE, FOR GAS SPRINGS

2480.00.50.20.

Service station, mobile, for gas springs

2480.00.50.20.2

Lighting unit, removable



2480.00.50.20.1

Work bench, mobile

Description:

The mobile service station for gas springs represents an optimum solution if gas springs are to be filled and/or maintained directly on the press or tool.

The service station consists of the workbench, mobile 2480.00.50.20.1 and a lighting unit, removable 2480.00.50.20.2.

Advantages:

- "All in One" solution
- High mobility coupled with secure stability
- Clean handling of the gas spring components
- High user comfort

The mobile work bench 2480.00.50.20.1 is equipped with a 40 mm thick Trovidur work surface ①. The surface is hard-wearing and very easy to keep clean.

The height adjustable chassis with 4 castors ② allows for high mobility and provides secure stability for the service station. The chassis is easily moved up and down by way of an excenter lever ③ located on the left of the unit.

At the right of the unit, a loading receptacle with a locking clip ④ is located for 200 bar bottles.

A removable oil sump with a grate in the upper drawer ⑤ will ensure clean handling of the internal gas spring components.

The energy panel ⑥ offers great user comfort because of its integrated operating elements, like the compressed air connection, light switch and 3 x 230 V electric outlet.

The removable lighting unit 2480.00.50.20.2 is height adjustable to cater to the individual requirements of the user.

Technical data:

2480.00.50.20.1 Work bench, mobile:

Work surface, Trovidur (mm) 1250 x 700 x 40

Work bench chassis made from profile steel tubing (mm) 45 x 45 x 2

Parallel vices, jaw width = 100 mm

2480.00.50.20.2 Lighting unit, removable:

Elongated light (w = 1200 mm) with connection cable and plug

2 x 45 W, strip louvre with reflector

Electronic ballast

Protection type IP20

Connections

Input:

Central supply line on the right side of the cabinet (bottom rear) with electric supply line (protected energy supply plug)

1/4" internal thread for air infeed

Power bar:

1 x 1/4" internal thread for air

1 x On/OFF switch for air supply, rotary switch for

Nitrogen Compact Booster

3 x 230 V socket (with hinged lid)

1 x ON/OFF switch for power supply, rotary switch

Accessories:

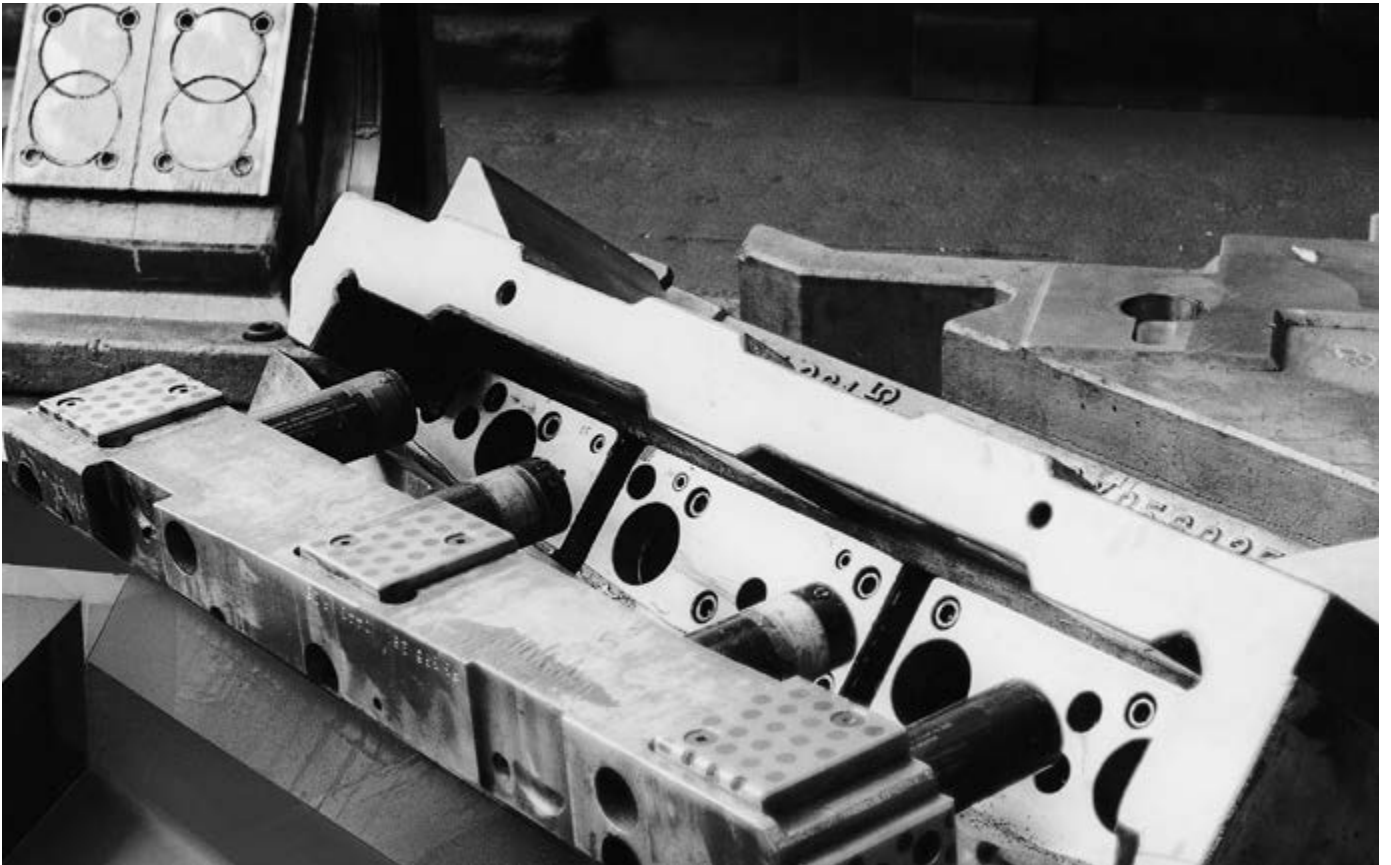
For optimised utilisation of the nitrogen bottle fill amount, a Compact Booster 2480.00.32.71 and a hose line DN4, 3 m 2480.00.32.71.05.03 can be integrated in specifically provided receiving braces in the cabinet ⑦.

The two free drawers ⑧ offer additional space for specialist tool sets 2480.00.50.11 for the repair of gas springs.

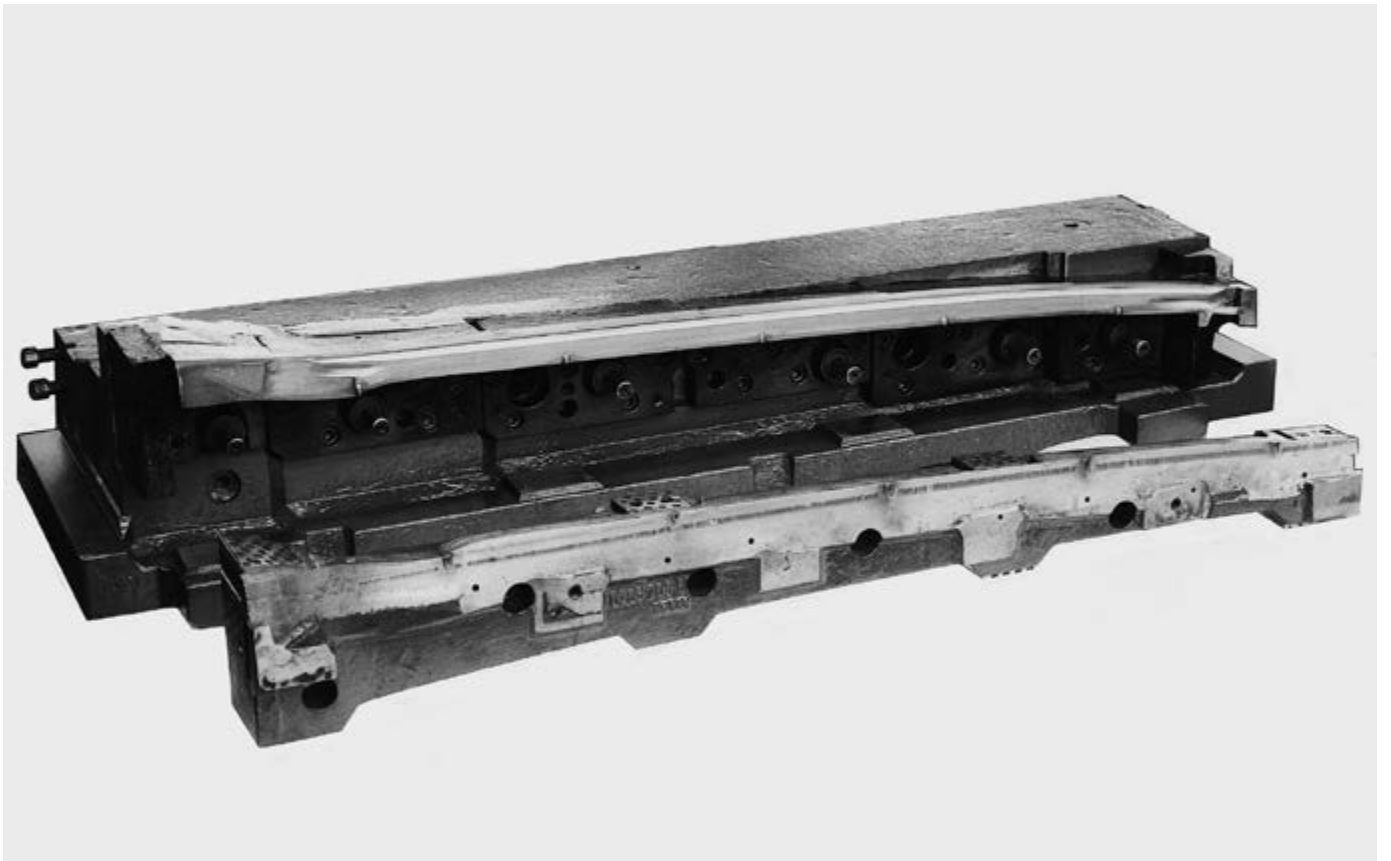
APPLICATION EXAMPLES



APPLICATION EXAMPLES



Trimming tool with inclined, Cam-Operated slide

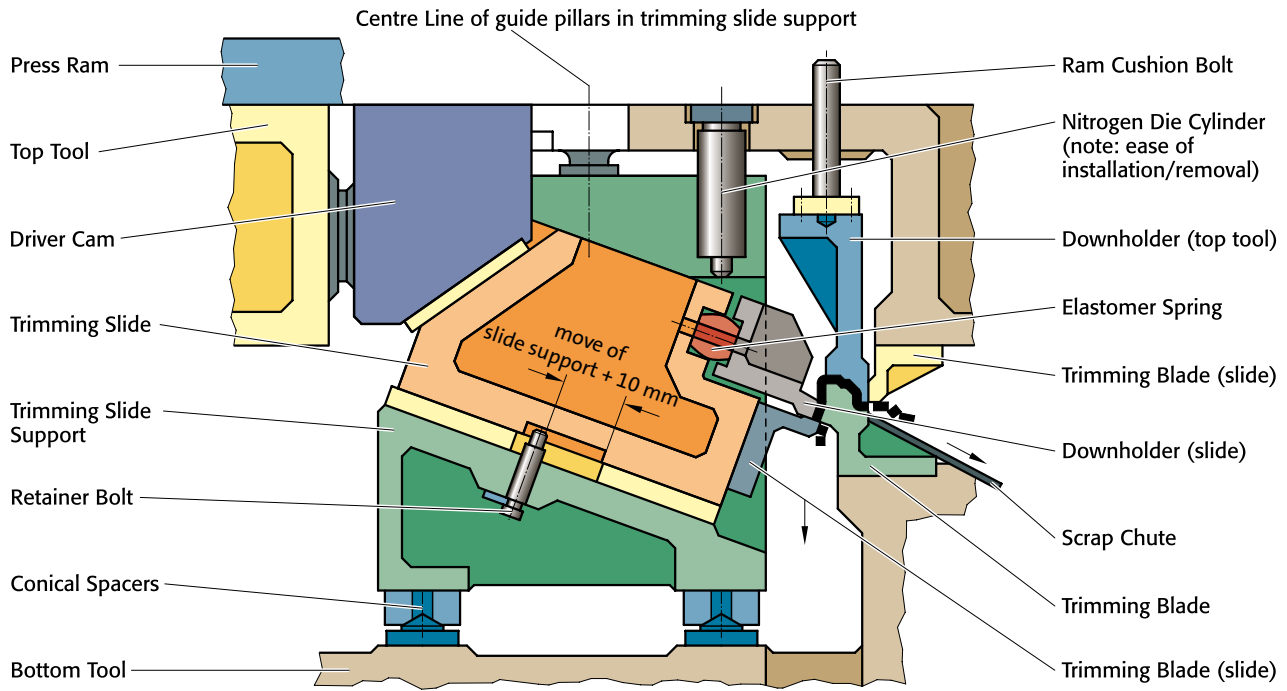


Drawing slide of large forming tool

APPLICATION EXAMPLES

Trimming tool with inclined, Cam-Operated slide

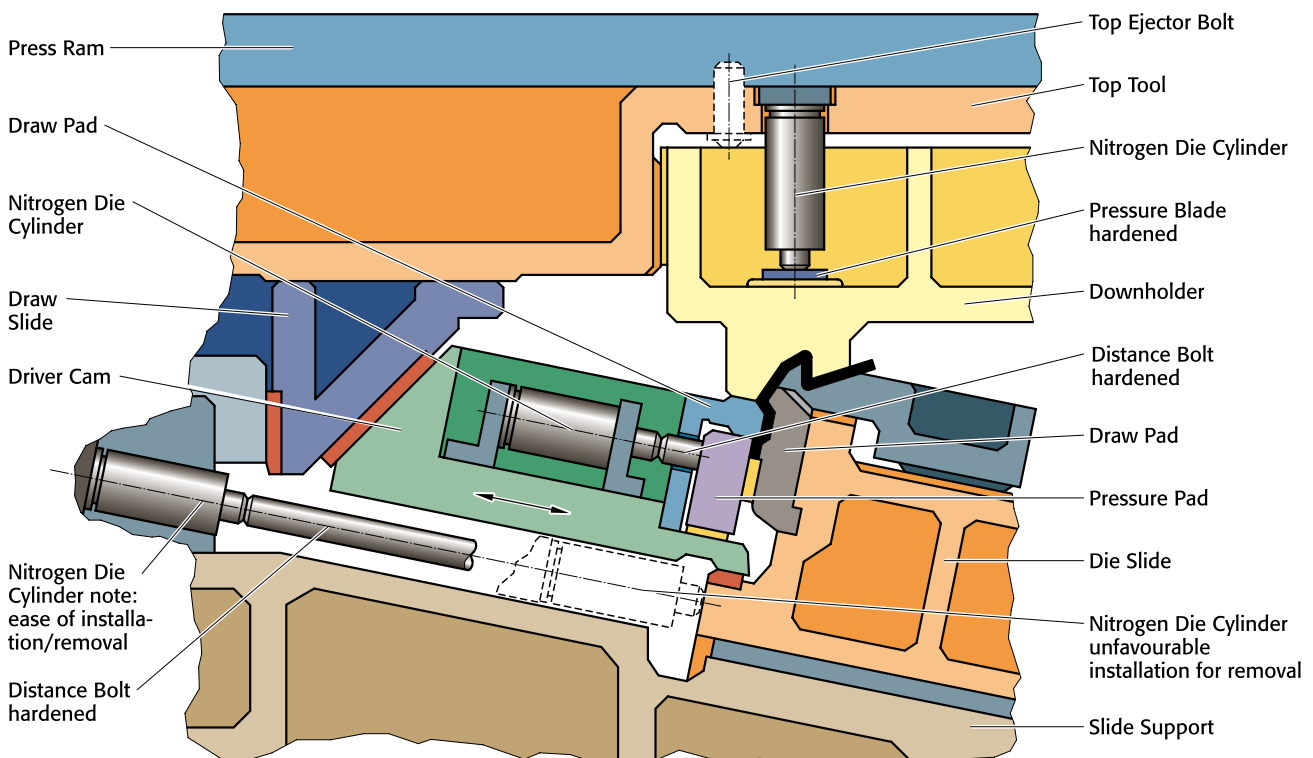
Nitrogen die cylinders in the top ensure the positive centering of the trimming slide on the centering cones in the bottom tool section.



Drawing tool

The nitrogen die cylinder for the drawing slide is easily placed into position; the safety lid secures it. Very high forces are required in this tool for the draw pad in the slide.

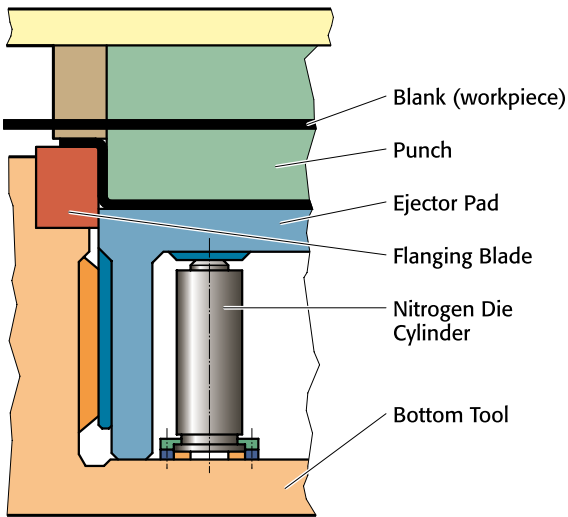
The nitrogen die cylinders in the top tool serve as boosters for the insufficient ram cushion.



APPLICATION EXAMPLES

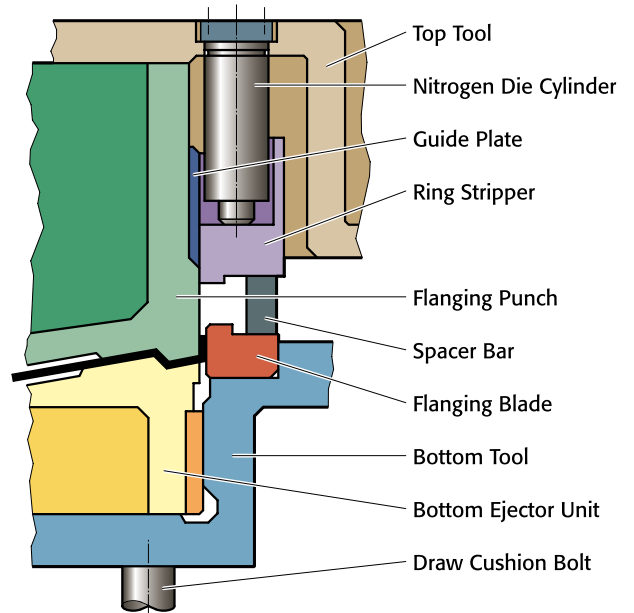
Flanging tool with nitrogen die cylinders

Where bottom ejection facilities are lacking, FIBRO Nitrogen die cylinders will provide reliable actuation of piece part ejectors.



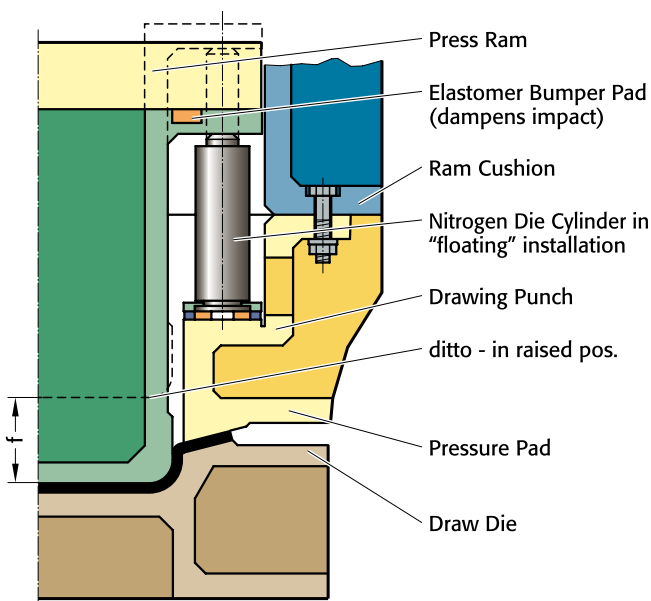
Flanging tool with ring stripper

The ring stripper is actuated by nitrogen die cylinders.



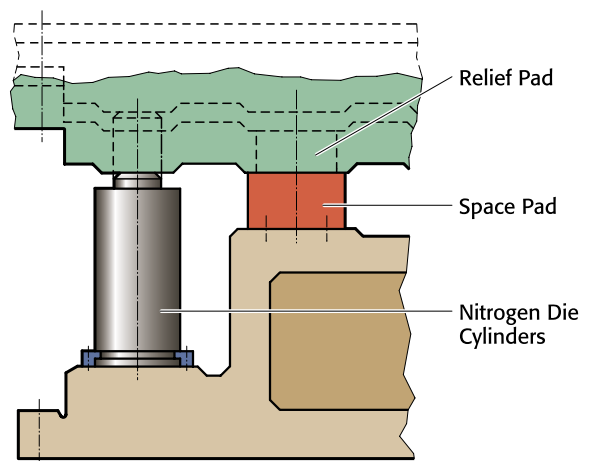
Double-Acting drawing tool

In order to obtain shorter setting times, only the downholder is bolted to the ram cushion. The drawing punch is raised through $f + 20$ mm by nitrogen die cylinders.



Blanking and piercing tool

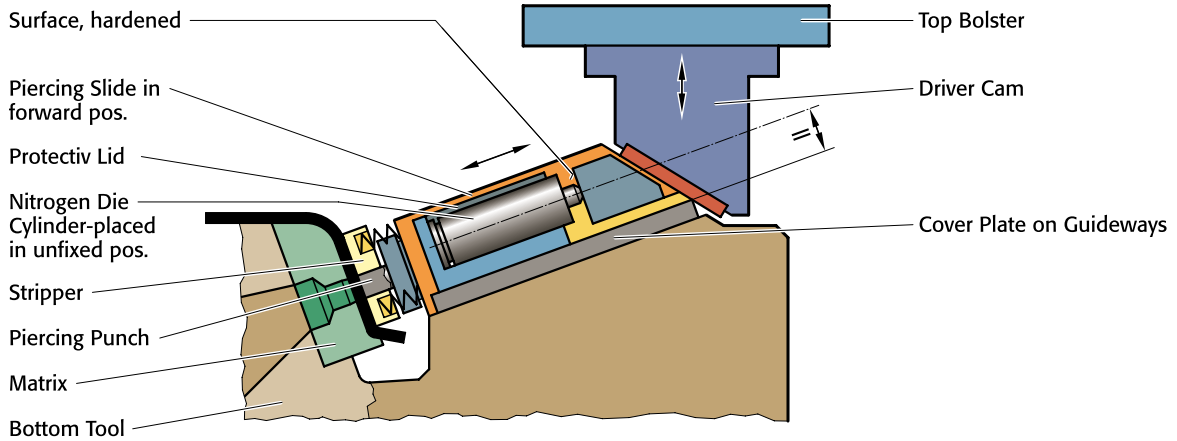
The application of nitrogen die cylinders instead of the usual elastomer bumpers results in a significant reduction of setting time. Moreover, injuries caused by "fly-out" elastomer bumpers are eliminated.



APPLICATION EXAMPLES

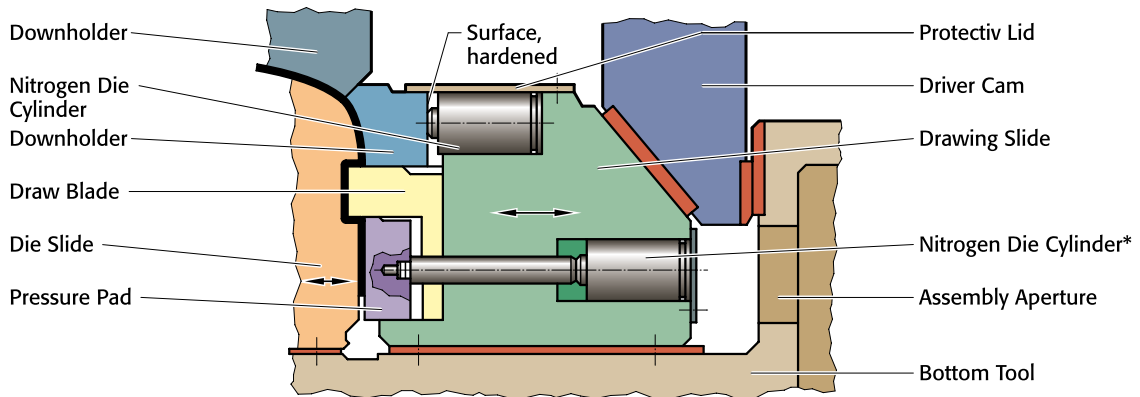
Retraction of piercing slide by nitrogen die cylinder

Die cylinder is mounted to bottom tool. It retracts the slide after completion of the piercing operation. We recommend a "soft"-start on the cam shape in order to reduce impact and acceleration on the die cylinder.



Drawing tool

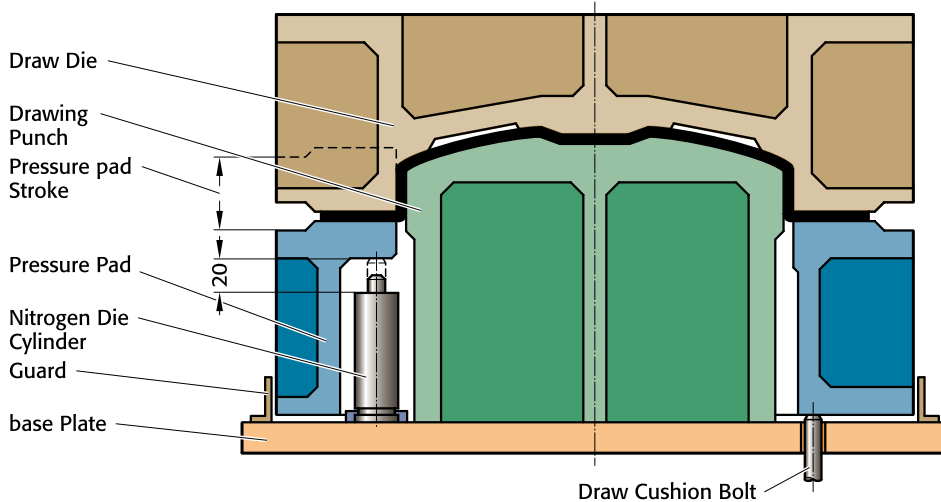
In order to prevent wrinkling, this tool requires high forces on the downholder and pressure pad. An elegant solution was achieved with nitrogen die cylinders. Ease of cylinder installation was ensured.



*Must be secured with special flange.

Drawing tool

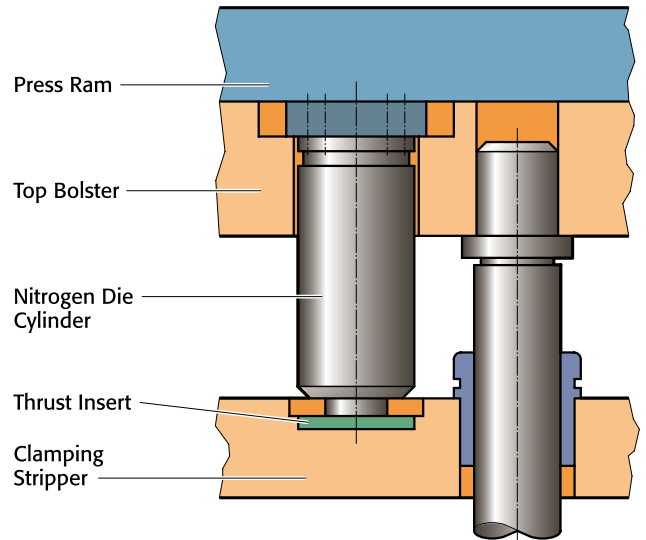
The pressure pad is actuated by nitrogen die cylinders during the final 20 mm of the draw.



APPLICATION EXAMPLES

Detail of progression compound tool

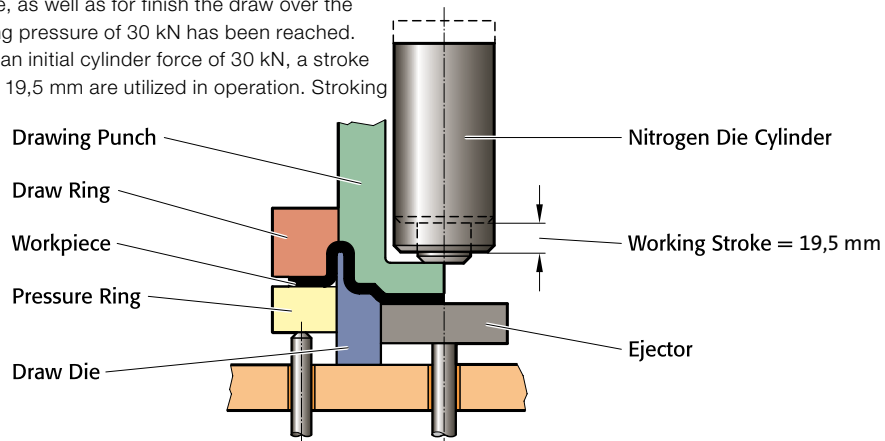
The clamping stripper is actuated by two nitrogen die cylinders 2480.12.01500.025. The units provide an initial cylinder force of 15 kN each and a stroke capacity of 25 mm – of which 20 mm are utilized.



Drawing tool

Intended for use in a 100 ton hydraulic press, with one nitrogen die cylinder 2480.12.03000.025 mounted in the drawing punch. In this application the die cylinder serves to accomplish the initial pre-draw of the internal shape, as well as for finish the draw over the draw ring – after the bottoming pressure of 30 kN has been reached. The nitrogen die cylinder has an initial cylinder force of 30 kN, a stroke capacity of 25 mm – of which 19,5 mm are utilized in operation. Stroking

speed is 4 SPM.

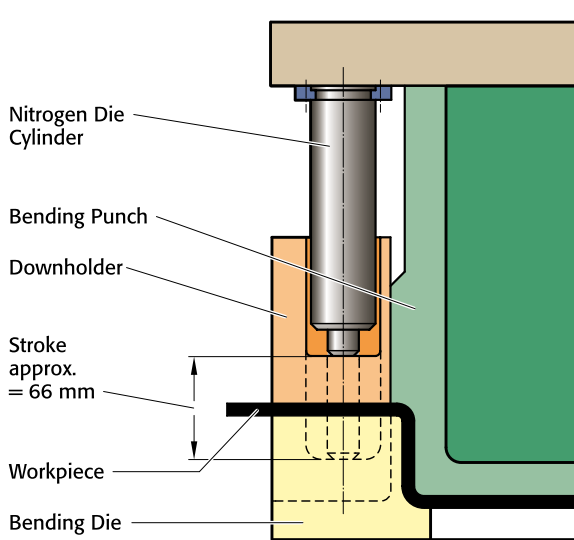


Bending tool for round bars

This tool employs two nitrogen die cylinders 2480.13.00750.080 for actuating the downholder. Press stroke is 92 mm. The stroke of the downholder is approx. 66 mm.

Because of manual loading, press strokes vary from 36 to 40 SPM. Part ejection is automatic.

The nitrogen die cylinders provide an initial force of 7,5 kN each, and a stroke capacity of 80 mm.

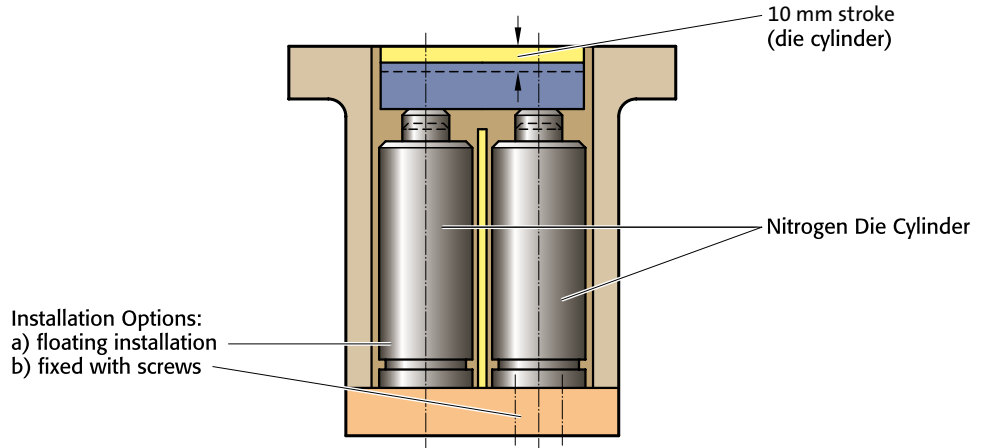


APPLICATION EXAMPLES

Bottom ejector in progression compound tool

Two nitrogen die cylinders 2480.13.00750.025 are used, providing an initial force of 7,5 kN each, and a stroke capacity of 25 mm.

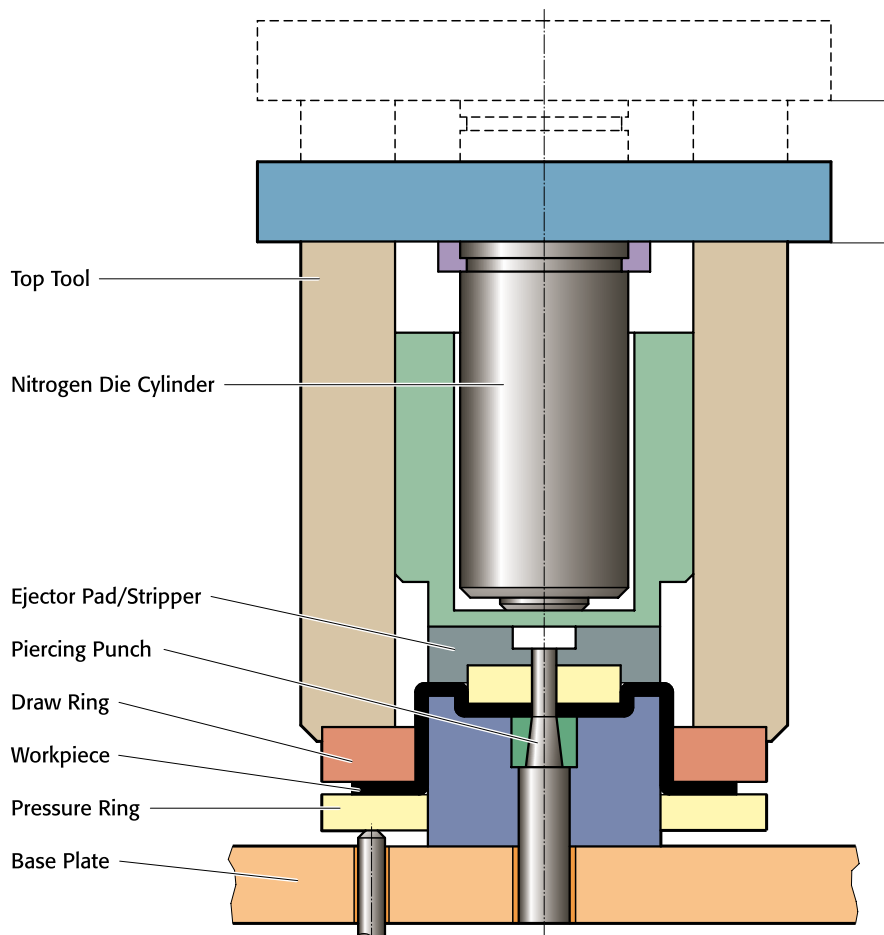
The actual working stroke is 10 mm. The tool is run at a speed of 150 SPM, with a ram stroke of 48 mm.



Drawing- and piercing tool

This tool is used in a 100 ton hydraulic press.

The nitrogen die cylinder is a 2480.13.03000.080, with a charge pressure of 130 bar – giving an initial cylinder force of 26 kN. Stroke capacity is 80 mm. The actual working stroke is 76 mm. The press is run at 14 SPM.



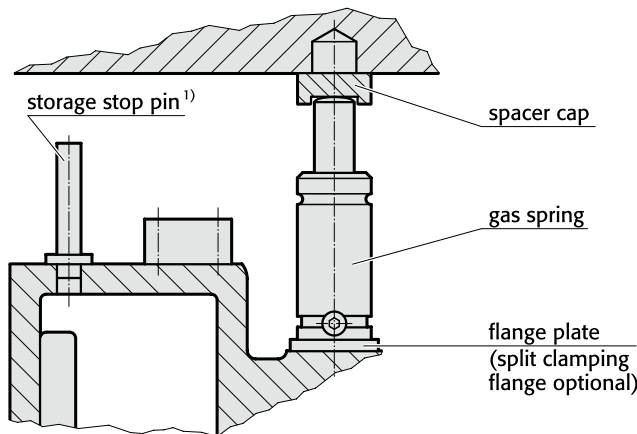
APPLICATION EXAMPLES

Gas springs facilitate tools storage and tools preparation for production

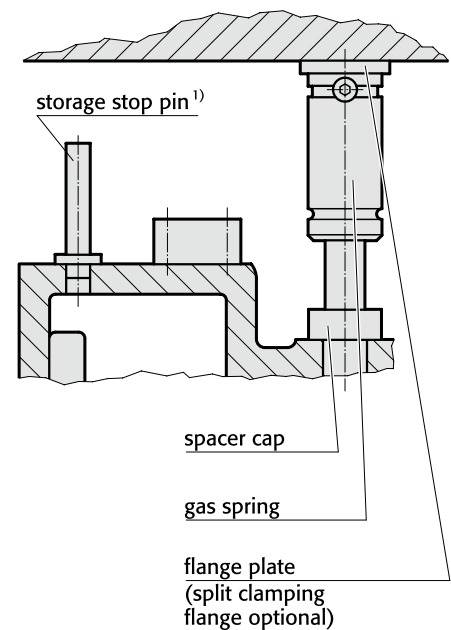
Gas springs find increasing use in large press tools - in the sole role of aiding their storage and production preparation. The springs are bolted to either the upper or lower bolsters. They are activated only when the tool is being taken out of the press. Application examples 1 and 2 show that special spacer caps are inserted prior to the tool being let down onto the gas springs – this being done whilst still in the press. During removal from the press and subsequent storage, the springs will keep the top tool elevated. Storage stop pins are provided next to the springs; when tools are stacked one on top of the other, the increasing mass will force the springs to recede – and the tops will eventually abut against the storage pins. Once the stack is removed, the springs take over again and push

the top tool up. With the usage of 4 gas springs, for example upper die parts with a weight up to 20 tons can be held high. Upon being prepared for production, the springs facilitate access to the tool. Once back in the press, the spacer caps are removed and the storage springs remain inactive during the production run. It is recommended to affix warning signs to the tools in a prominent position: the presence of gas springs in the tool often cannot be seen from the outside.

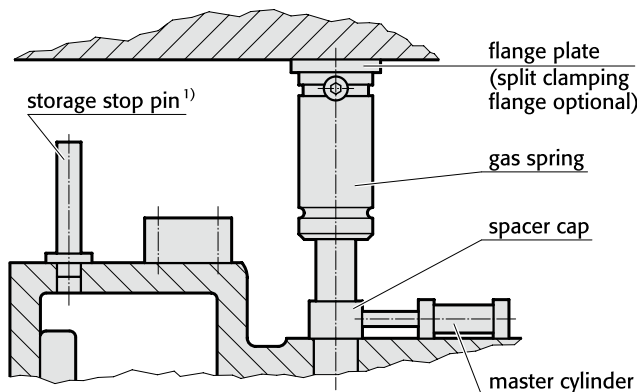
Example 1: Gas Spring fixed to bottom bolster



Example 2: Gas Spring fixed to top tool



Example 3: Gas Spring fixed to bottom bolster



1) storage stop pins are reversible - they are turned round and pushed down into their holes during getting the tool ready for production