



Flex Cam

Hydraulic cylinders and tool slides
for tool and mould-making
and machinery construction

发送器-接收器 系统

液压缸和模具滑阀
适用于 模具、成型和机械制造



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General

System safety, reliability and functionality can be ensured by supplying FIBRO with the application data and drawings of the installation arrangements for checking.

Please note that the number of the threaded connections and the hose lengths for installation in the system must be determined.



Assembly, commissioning, maintenance and servicing of the Flex Cam system require special knowledge and may only be carried out by FIBRO trained, specialist personnel.

You can order the work to be carried out by a FIBRO customer service engineer, to be invoiced in accordance with our installation tariff.

Just contact us to schedule it for you.

We shall be pleased to answer any technical queries you may have, now or at any time in the future.



As the Flex Cam system which are specially made, we recommend that you keep reserve systems in stock to avoid the risk of delay when the need arises.

一般提示

为了确保系统功能安全，必须将使用数据和安装尺寸图表提交 FIBRO 检查。

我方特此提示：将系统装入模具时应确定螺栓连接的件数，以及软管长度。



安装、调试、保养和维修发送器-接收器系统均需要特种知识，因此，仅限经过 FIBRO 培训的专业人员执行前述工作。

为此，您可根据安装套件要求 FIBRO 委派装配工，但需另行收费。

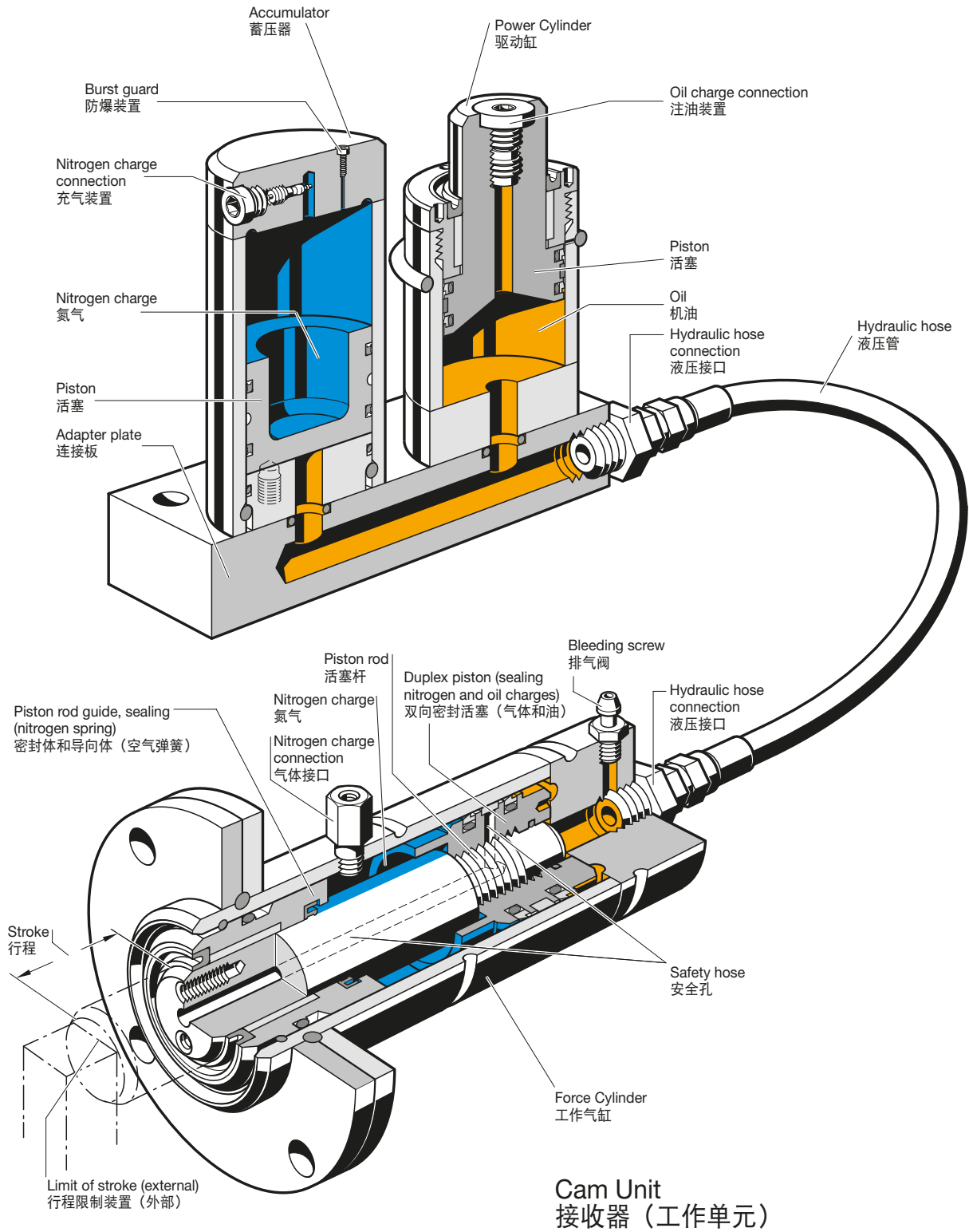
请与我们联系以便约定日期。

如需技术咨询，请随时联系我们。



由于发送器-接收器系统需要特殊制造，因此，我方建议您保留一套备用系统，以便在发生故障时为新货交付留出必要的时间。

Power Unit 发送器 (传动装置)



Introduction

The hydraulic cam system is the ideal component for executing linear motions at any point in the available space.

The system is increasingly being used in tool making, in particular, to drive drawing, moulding, cutting and drilling operations where conventional slides cannot be used due to lack of space or inconvenient position.

The working motion is generated by the cam unit (e.g. the working cylinder), which can be installed in any position in the available space.

The cam unit is controlled by a driving cylinder which, in turn, is activated by the stroke motion of a press, for example.

The link between the two is provided by a hydraulic hose in which the volume of oil in the power unit is displaced to the cam unit.

Description

Power Unit

The Power Unit consists of the following components:

- Power Cylinder
- Accumulator
- Adapter plate

The Power Cylinder is filled with oil at one end, while the machine that executes the stroke is at the opposite end.

The accumulator is charged with nitrogen gas at one end. In the idle state, the base of the piston rests on the Accumulator, relieving the pressure on the system.

The adapter plate connects the Power Cylinder to the Accumulator and Force Cylinder.

In the standard version, the capacity of the accumulator is matched to the total displacement volume of the Power Cylinder. It is thus of the same height as the piston rod. The integral rupture protection device opens at 517 bar.

The Power Unit is also available with a separate Power Cylinder and Accumulator.

Cam Units

There are 3 types of Cam Units:

- Force Cylinder 2018.30./40./50./60.
- Compact Cam 2018.11.
- Flange Cam 2018.12.

Force Cylinder 2018.30./40./50./60.

Design

The accumulator is charged with nitrogen gas at one end (20 – 40 bar). The volume of oil displaced from the Power Unit acts on the other end when the Power Unit is pressurised. The Force Cylinder then extends. The retraction motion is generated by the nitrogen gas when the pressure is relieved on the stroke side of the Power Cylinder.

The displacement length of the Force Cylinder is twice as long as the permissible nominal displacement length. The unused displacement capacity is needed as a compartment for the pressurised nitrogen gas in order to return the stroke.

引言

发送器-接收器系统是一款能够在腔室内实现自由线性移动的理想组件。

尤其在模具制造时，可将该系统用于增强拉伸、成型、切削和打孔操作时的传动情况。如果由于空间或位置原因而无法安装传统滑阀时，也可使用该系统。

作功运动由所谓的接收器（例如，工作气缸）完成，而接收器可安装在腔室内的任意位置。

发送器（驱动缸）则负责驱动上述接收器，其通过行程带动的移动（例如，压力机）被激活。

液压管作为连接装置使用，发送器的油量通过该管被挤压至接收器。

说明

发送器（传动装置）

发送器由下列组件构成：

- 驱动缸
- 蓄压器
- 适配板

驱动缸通过连接室以无压方式向蓄压器和接收器注油。

蓄压器单侧加注氮气。静止状态时，其通过放置活塞底部以无压方式作用于系统。

适配板通过液压管将驱动缸和接收器连接在一起。

标准规格中，蓄压器贮存容量的设计依据驱动缸的整体挤压容量进行。由此产生含活塞杆的共同结构高度。517 bar 时，内置式防爆装置打开。

也供应带单独驱动缸和蓄压器的发送器规格。

接收器（工作单元）

接收器分为 3 种类型：

- 工作气缸 2018.30./40./50./60.
- 紧凑型模具滑阀 2018.11.
- 卷边滑阀 2018.12.

工作气缸 2018.30./40./50./60.

结构

蓄压器单侧加注氮气（20–40 bar）。向驱动缸施压时，缸内受挤压的油量将作用于背面。接着，工作气缸驶出。一旦驱动缸行程侧的负载下降，则通过氮气完成复位。

工作气缸行程室长度为允许额定行程长度的一倍。未经使用的行程室可作为气体室供用于复位行程的预紧氮气使用。

Flex Cam

Applications

The Force Cylinder is designed to drive an individual tool component (e.g. a slide).

The nominal stroke of the Force Cylinder may be limited by external stops. As a standard the stroke's end position is limited by an internal stop according to stroke length. The Force Cylinder is not guided and therefore cannot absorb any side loads. The tool components themselves must be guided.

⚠ Side loads acting on the Force Cylinder lead to system failure.

When attaching accessories, be careful to ensure that the axes are lined up correctly to avoid transverse forces during the stroke. Coupling pins or similar accessories must be used for the connection as there must be no rigid connection between the piston of the Force Cylinder and the tool components.

Compact Cam 2018.11.

Design

The Power Cylinder starts the piston rod of the Compact Cam moving when pressurised.

The slide is returned by external gas springs. Two pillars with guideways prevent the tool holder plate rotating. The clearance in the guides is 0.01 - 0.03 mm.

Applications

The Compact Cam is suitable for hole punching operations involving no transverse forces. The Compact Cam is guided and has an internal stop. Punches can be mounted directly on the tool holder plate.

⚠ Side loads on the Compact Cam will lead to system failure.

In cutting operations with a small cutting clearance and asymmetrical cutting forces a guide bolster should be provided, with an external guide to absorb the lateral forces. As with the Force Cylinder, coupling pins must be used for the connection between the slide and the external guide (uncoupling). The Compact Cam is attached by 4 fixing screws. A feather key groove absorbs the cutting forces. It is positioned by means of two pilot holes.

Flange Cam 2018.12.

Design

The Flange Cam construction is the same as the construction of the Compact Cam. The Power Cylinder starts the piston rod of the Flange Cam moving when pressurised. The slide is returned by external gas springs. Two pillars with guideways prevent the tool holder plate rotating. The clearance in the guides is 0.01 - 0.03 mm. The tool holder plate is supported by a roller and a support plate to absorb lateral forces.

Applications

The Flange Cam is suitable for work operations with lateral forces (e.g. bend up, sliding). The Compact Cam is guided with an integrated stop. Punches can be mounted directly on the tool holder plate.

发送器-接收器系统

特性

工作气缸设计用于驱动单独的模具组件（例如，滑阀）。

可通过外部挡块限制工作气缸的额定行程。通常，通过内部挡板即可根据额定行程长度限制行程位置。工作气缸未经导向，因此不会吸收侧面力。必须单独导向模具组件。

⚠ 作用于工作气缸侧面的力会导致系统停止运转。

固定附加装置时，必须注意仔细对齐各个轴，以便避免行程过程中所产生的横向力。必须通过接头榫或类似装置完成连接（切勿使用刚性连接连接工作气缸活塞和模具组件）。

紧凑型模具滑阀 2018.11.

结构

加压时，驱动缸推动紧凑型模具滑阀的活塞杆。

通过安装于外部的空气弹簧完成复位。通过两根导向式立柱实现模具接收板的扭转止动。导向间隙为 0.01 - 0.03 mm。

特性

紧凑型模具滑阀适用于侧面无负载的打孔操作。紧凑型模具滑阀具备导向功能并配有一个内部终端挡块。可将打孔冲头直接安装于模具接收板。

⚠ 作用于紧凑型模具滑阀侧面的力会导致系统停止运转。

使用偏心切削力以较小切削间隙执行切削操作时，必须配备可吸收侧向力的额外外部导向装置。此时，与工作气缸一样，还必须通过接头榫将滑阀与额外导向装置相连（断开）。通过四个固定螺栓固定紧凑型模具滑阀。安装一个滑键槽以支撑所产生的切削力。借助两个导套孔实现定位。

卷边滑阀 2018.12.

结构

卷边滑阀的结构与紧凑型模具滑阀相同一致。加压时，驱动缸推动卷边滑阀的活塞杆。通过安装于外部的空气弹簧完成复位。通过两根导向式立柱实现模具接收板的扭转止动。导向间隙为 0.01 - 0.03 mm。为了吸收侧向力，可借助一个滚轮和支撑板实现对模具接收板的支撑。

特性

卷边滑阀设计用于含侧向力的工作操作（例如，提升、卷边）。卷边滑阀具备导向功能并配有一个内部终端挡块。可将冲头直接安装于模具接收板。



A guide bolster with external guide should be provided for bending operations with asymmetrical forces.

The Flange Cam is attached by 4 fixing screws. A feather key groove absorbs the bending forces. It is positioned by means of two pilot holes.

Alternative drive

For operating the Cam Unit electrically powered Hydraulic pump units can be used (see page 56). The max. working pressure must not exceed 150 bar. The max. speeds listed on page 8 must not be exceeded.

Charging fittings

Nitrogen gas: The Accumulator and Cam Unit can be charged with the gas spring filling charge 2480.00.32.21.

Hydraulic system: The system is filled and vented using the oil filling unit 2018.00.30.

Filling and venting of the system is described in detail in the user manual supplied with the system.

Hydraulic connection

See also pages 57-64

User-friendly, flexible high-pressure hoses are ideal for the hydraulic connections (see page 56).

A space-saving alternative is to use system hydraulic pipes.

The same screwed couplings are used for both hoses and pipes.

The hose length should not exceed 2000 mm. This is important to ensure a constant build-up of pressure and – even more importantly – to minimise impact during cutting without a significant pressure build-up.

The couplings should be designed for at least 300 bar nominal pressure and 1000 bar rupture pressure.

This is essential if the connection is to be sufficiently rigid and for the rupture protection device to operate at 517 bar.

Quick-release couplings for hydraulic hoses

We recommend that you use quick-release couplings to join the hydraulic hoses.

Benefits:

- The system can be filled and vented under optimum conditions when off the tool, either at FIBRO or on site.
- If the tool has to be assembled or dismantled, the hydraulic hose connecting the Power Unit and the Cam Unit is disconnected using the quick-release coupling. It is thus not necessary to dismantle the hoses, drain and refill the oil and vent the system, which keeps costs down.

For layout purposes, the dimensions of the commonly used threaded couplings and hoses are shown on pages 57, 60-64.



使用偏心作用力执行卷边操作时，必须配备可收侧向力的额外外部导向装置。

通过四个固定螺栓固定卷边滑阀。安装一个滑键槽以支撑所产生的弯曲力。借助两个导套孔实现定位。

传动装置选件

也可使用液压机组（参见第 56 页）驱动接收器。驱动压力不得超过 150 bar 的允许值。必须注意最大允许速度（参见第 8 页）。

加注配件

氮气：可使用空气弹簧加注配件 2480.00.32.21 加注蓄压器和接收器。

液压：使用注油装置 2018.00.30 加注和排空系统。

随附的用户手册中详细说明了加注和排空系统的方法。

液压连接

另请参见第 57-64 页

液压连接主要采用用户友好的弹性高压软管制成（参见第 56 页）。

作为一款可节省空间的选件，其也可用于连接系统液压管。

供软管或管道使用的螺栓连接均一样。

软管长度不得超过 2000 mm，以便将软管的呼吸作用保持在容许界限内。这一点不仅是持续形成压力的重点，而且在无显著压力形成的切削操作时保持切削冲击较低方面显得更为重要。

连接依据最低 300 bar 的额定压力和 1000 bar 的破裂压力设计。

这是 517 bar 时确保连接刚性和防爆装置功能的前提条件。

液压软管快速接头

建议为液压软管配备一个快速锁闭接头。

优点:

- 系统已由 FIBRO 或在现场模具外部以最佳前提条件完成加注和排空。
- 需要安装或拆卸模具时，可通过快速锁闭接头断开发送器到接收器之间的液压软管连接。无需执行软管拆除、油料排空、重新加注和排空系统的工作，从而降低了成本。

第 57, 60-64 页以图示形式介绍了与结构布局相关的常用螺栓连接和软管的尺寸。

FIBRO 可根据说明批量生产软管连接。

Flex Cam

Leaks and oil level display

The experience we have gained in manufacturing gas springs enables us to select the most suitable seals.

The result is an effective and long-lasting seal.

The connecting line can be assembled with no leaks, using available materials and with careful installation.


If an oil leak does occur, it will be compensated short term by the overtravel volume in the Accumulator.

The Accumulator and Power Cylinder are of the same height, so any loss of oil from the system will be manifested by a difference in height.

Stroke rate

The stroke rate is dependent on the minimum flow opening, the volume of oil and the working and return pressures. The connecting openings allow a working stroke rate of up to 0.8 m/s. Although this is limited by the extent to which the system heats up due to the high stroke rates. The system temperature should not exceed 60 °C.

As the volume of the hydraulic oil increases when the system temperature rises, the cam unit no longer returns completely to its stroke starting position due to the oil expansion. For this reason, a stroke reserve must be complied with at the start of the stroke (idle stroke).

 **The minimum idle stroke should be between 3 mm and 6 mm, depending on the number of strokes.**

Safety instructions

If the layout of the system gives the Force Cylinder an excessive displacement volume due to excess overtravel and/or seizing of the cylinder, the pressure in the system can exceed the admissible value of 280 bar. In critical situations, this effect will be counteracted by the opening of a rupture valve at 517 bar.

The couplings are designed for a nominal pressure of 300 bar and 1000 bar rupture pressure.

On the gas side, the Accumulator is pressurised at 150 bar and is subject to Pressure Equipment Directive 97/23/EC.

To monitor safety during the process, we recommend installing a control fitting as an additional check on the gas side – see range of accessories.

发送器-接收器系统

泄露和油位指示器

从空气弹簧制造方面积累的经验改善了对于密封件的选择。

其结果是实现了长久的密封性。

连接管道采用可用材料制造并通过仔细安装确保其不会泄露。


如果出现漏油，其可通过蓄压器中的超行程容量暂时得到补偿。

蓄压器与驱动缸的结构高度相同。因此，可以通过高度差别判断系统内是否出现漏油。

行程次数和油膨胀

行程次数取决于最小流量开孔、油量和工作及复位压力。接口开孔允许的最大工作行程速度为 0.8 m/s。但该速度也可能受到因高行程次数导致的系统自身加热的限制。系统温度不得超过 60 °C。

因为系统温度升高时液压油体积将增大，接收器因受到油膨胀的影响而无法完全驶回其初始位置。出于上述原因，必须在行程起始位置（空行程）保留备用行程。

 **根据行程次数，最小空行程在 3 mm 至 6 mm 之间。**

安全提示

如果工作气缸的挤压容量因超行程过大和/或工作气缸堵塞而远远超出设计限制，则系统内的压力可能超越 280 bar 的允许值。情况严重时，将在 517 bar 时打开防爆阀予以应对。

连接管依据 300 bar 的额定压力和 1000 bar 的破裂压力设计。

蓄压器气体侧可承受 150 bar 压力并符合压力设备指令 DGRL 97/23/EG 的规定

为了监控进程安全，我方建议通过链接一个控制配件对气体侧进行检查 – 详见附件方案。

Capacity and output

The forces listed in table 1 below are applicable for the following nitrogen gas pressures:

Accumulator	150 bar
Force Cylinder	20 bar
Compact Cam	
2018.11.01500. [] [] and 2018.11.04000. [] []	
Gas spring 2480.21. and .23.00000. [] []	180 bar
2018.11.06000. [] []	
Gas spring 2487.12.00350. [] []	180 bar
Compact Cam	
2018.11.09000. [] []	
Gas spring 2480.12.00500. [] []	150 bar
2018.11.15000. [] []	
Gas spring 2487.12.00750. [] []	150 bar
Flange Cam	
2018.12.04000.049	
Gas spring 2480.21. bzw. .23.00000. [] []	180 bar

容量和性能

下文表 1 中的各项力所承受的氮气压力如下:

蓄压器	150 bar
工作气缸	20 bar
紧凑型模具滑阀	
2018.11.01500. [] [] 和 2018.11.04000. [] []	
空气弹簧 2480.21. 或 .23.00000. [] []	180 bar
2018.11.06000. [] []	
空气弹簧 2487.12.00350. [] []	180 bar
紧凑型模具滑阀	
2018.11.09000. [] []	
空气弹簧 2480.12.00500. [] []	150 bar
2018.11.15000. [] []	
空气弹簧 2487.12.00750. [] []	150 bar
卷边滑阀	
2018.12.04000.049	
空气弹簧 2480.21. 或 .23.00000. [] []	180 bar

Comments

The Accumulator and the Force Cylinder are pressure vessels and as such are subject to the Pressure Equipment Directive 97/23/EC.

During cutting and hole punching operations the nominal force of the Compact Cam should only be utilised up to 75% to minimise impact during cutting which is reinforced by the Accumulator. Impact during cutting can be reduced by polished tool edges (e.g. roof shape) and so downtime can be reduced.

备注

蓄压器和工作气缸均为压力容器并符合压力设备指令 DGRL 97/23/EG 的规定。

执行切削或打孔操作时, 仅限使用紧凑型模具滑阀 75 % 的额定力, 以便将通过蓄压器增强的切削冲击保持在较低水平。切削冲击可通过抛光模具的边缘 (例如, 篷形) 予以缓解并由此提高利用率。

Description 说明		Force Cylinders 工作气缸					Compact Cams 模具滑阀 紧凑型					Flange Cams 卷边 滑阀		Power Unit 接收器				
		2018.30.					2018.11					2018.12.		2018.20				
Force (magnitude) 力 (尺寸)	kN	15	40	60	90	150	15	40	60	90	150	40		15	40	60	90	150
Initial restoring force 初始反冲力	kN	2	5	8	13	21	2	4	7	10	15	4		-	-	-	-	-
Minimum gas pressure 最低气体压力	bar	10					125					105		125				
Maximum gas pressure 最高气体压力	bar	40					180					150		180				
Stroke length 行程长度	mm	25, 50, 100					24, 49, 99*					49		35**, 60**, 110**, 160** ⁽¹⁾				
Maximum speed 最大速度	m/s	0,8					0,8					0,8		0,8				
Maximum restoring speed 最大反冲速度	m/s	0,8					0,8					0,8		0,8				
Maximum frequency 最大频率	Strokes/min	30					60					30		60				
Ambient temperature 环境温度	°C	10-40					10-40					10-40		10-40				

* not for 2018.11.01500.

** including +10 mm overtravel

⁽¹⁾ not for 2018.20.01500. and 2018.20.15000.

Table 1: Technical data

* 不适用于 2018.11.01500.

** 包括 +10 mm 超行程

⁽¹⁾ 不适用于 2018.20.01500. 和 2018.20.15000.

表 1: 技术参数

Values other than those specified in the above table may be accepted under certain circumstances or if different stroke lengths, speeds and frequencies are combined.

可在特定情况下或在组合行程长度、速度和频率时接受与表 1 中规定值存在偏差的数值。

Flex Cam

发送器-接收器系统

Function

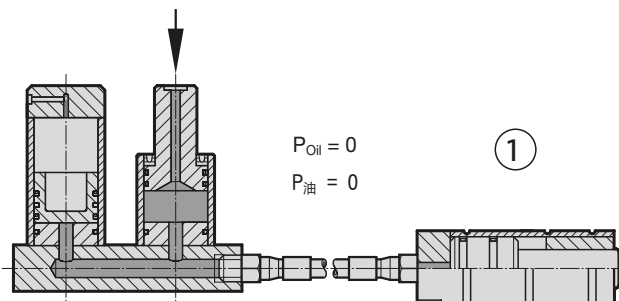
The individual components of the Flex Cam System described above interact as follows:

① The Power Cylinder is actuated by the stroke of the press.

功能

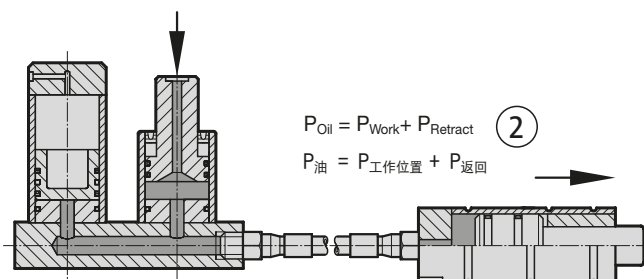
发送器-接收器系统的各个前述组件协作方式如下:

① 通过行程移动（压力机）操作驱动缸。



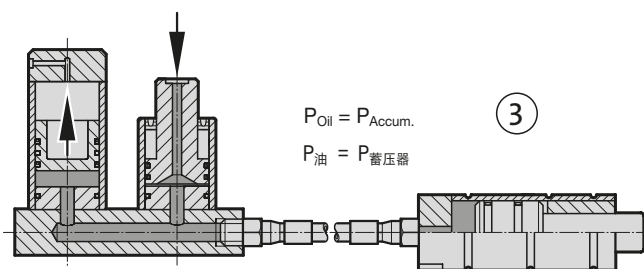
② Once the pressure build-up in the Flex Cam exceeds the preset pressure in the Force Cylinder, the Force Cylinder extends.

② 一旦液压系统中形成的压力超过接收器中预先设定的压力，则接收器驶出。



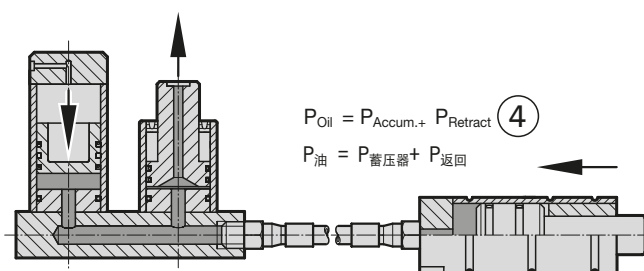
③ When the Force Cylinder reaches its working position, the pressure in the system rises to match the pressure in the Accumulator. The rest of the displaced volume of oil is then held in the Accumulator (Power Cylinder overtravels by approx. 3 - 10 mm).

③ 工作气缸驶向其工作位置后，系统中的压力升高至蓄压器中的现有压力。此时，蓄压器将吸收剩余的受挤压油量（驱动缸超行程约 3-10 mm）。



④ This overtravel is essential since it ensures that a constant contact pressure is built up during each stroke.

④ 须强制执行该超行程，从而确保每次行程时形成恒定的压力。



At the same time the pressure on the Power Cylinder is relieved (return travel of the press), the Force Cylinder is reset by the nitrogen gas.

卸除驱动缸负载（压力机返回）的同时将通过氮气复位接收器。

Pressure ratios in the system

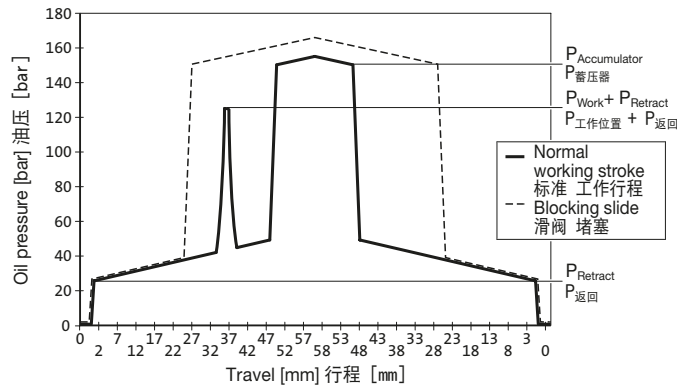
系统中的压力情况

The above diagram shows the oil pressure build-up during the work cycle. Before the working motion, the oil-system is pressureless. When the Power Cylinder is actuated, the oil pressure rises to the preset gas pressure in the Cam Unit. As the Force Cylinder continues to travel, the volume of gas is further compressed until the work operation is executed.

At the same time, the back-pressure in the system rises due to the punching operation, for example. Once the operation has ended, the Power Cylinder continues as far as the end position of the Force Cylinder. This ensures that the excess volume of oil is fully absorbed by the Accumulator. At the same time, the oil pressure rises to match the charging pressure in the Accumulator.

If a malfunction occurs in the tool part during system travel and blocks the travel of the Cam Unit, all the displaced oil is held in the Accumulator. The oil pressure increases until it equals that of the compressed nitrogen in the Accumulator.

The system is protected by an integral rupture protection device in the Accumulator which opens at 517 bar to vent the nitrogen. The resulting system security protects the tool from damage by the Flex Cam.



上图展示工作循环中形成的油压。作功运动前，系统处于无压状态。如果驱动驱动缸，则油压上设置接收器中预紧的气体压力。工作气缸的行程向前移动时，在工作操作前气体体积将被继续压缩。此时，系统将承受因诸如冲压操作而上升的反作用力。如果工作操作结束后驱动缸继续执行行程移动直至抵达接收器终端位置，则剩余油量将完全被蓄压器吸收且油压上升至蓄压器中的加注压力。

如果模具部件中的系统在执行作功运动的过程中出现堵塞接收器行程移动的故障，则受挤压的油量将完全被蓄压器吸收。油压将一直上升直至达到蓄压器内被压缩的氮气的压力。

为了确保系统安全，应在蓄压器内集成一个可在 517 bar 时打开的防爆装置，以便将氮气排放至外界。从而实现系统安全并防止模具因发送器-接收器系统而受到损坏。

Possible combinations

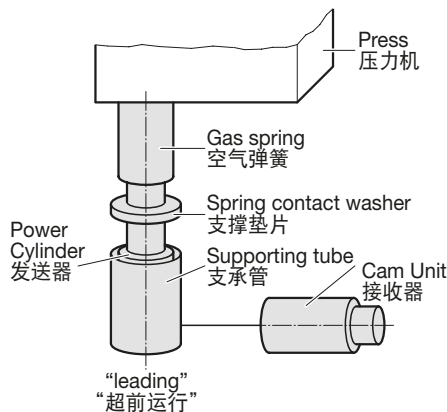
Power Unit with Cam Unit

Cam Unit leading

If a stroke of the Cam Unit is required before the tool actually reaches its working position, this can be achieved by incorporating a gas spring. The press stroke actuates a gas spring which, in turn, actuates the Power Unit, since its prestressing force is higher than the nominal force of the Power Unit. When the Cam Unit reaches its end position, the drive (press) overtravel is compensated by the retracting piston rod of the gas spring. A spring contact washer transmits the pressure of the gas spring to the supporting tube when the Power Unit reaches its end position.

发送器和接收器的 组合方式
接收器超前运行

如果在地道实际模具工作位置前就需要接收器开始行程移动，则可通过与空气弹簧合作实现这一要求。下压行程驱动空气弹簧，由于弹簧的预紧力高于发送器的额定力，因此其将再次驱动发送器。达到接收器的终端位置后，通过驶入空气弹簧的活塞杆补偿传动装置（压力机）的超行程。空气弹簧的压力将在发送器终端位置通过支撑垫片传输至支承管。

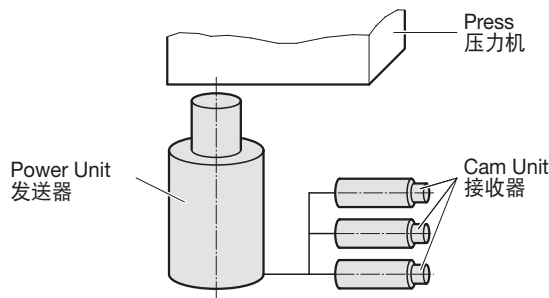


Several Cam Units driven asynchronously

Several Cam Units can be driven by a common Power Unit. The individual Cam Units should not, however, be mechanically connected to one another since the feedrates cannot be totally synchronised due to the different connection lengths (system losses) and restoring forces.

异步驱动多个接收器

可通过同一个发送器驱动多个接收器。但是，由于不同的连接长度（流动损失）和复位力无法保证绝对同步的进给速度，因此，各个接收器之间不得采用机械式连接。

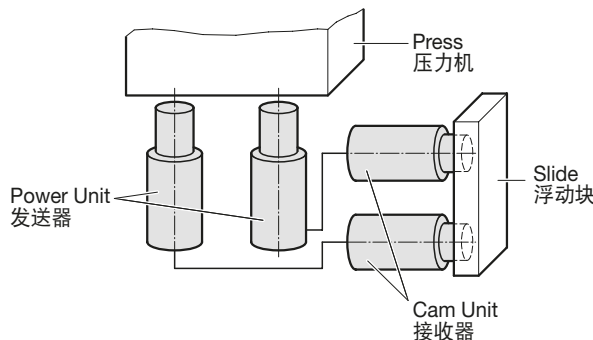


Several Cam Units driven synchronously

Synchronous operation can be achieved by using two systems of the same dimensions, although this application requires the restoring force of the individual Cam Units to be equal, as well.

同步驱动多个接收器

通过使用两个尺寸相同的系统的可实现同步驱动。但该使用情况的前提是接收器的复位力一样大。

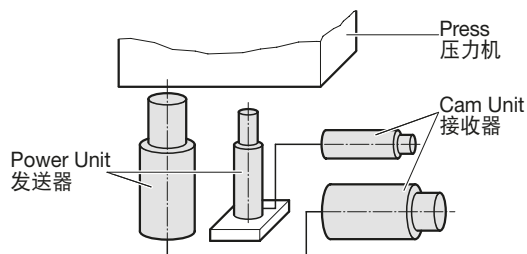


One or more Cam Units driven with delay

A time delay, and thus a variable working sequence for the Cam Units, can be achieved by combining two different strokes. The first Power Unit to be actuated executes the first step. As the Cam Unit moves beyond its end position, the excess oil is displaced into the Accumulator (not shown in the diagram). The second Power Unit can then enter the working sequence as required.

交错驱动一个或多个接收器

通过组合两个不同的行程可实现交错驱动，从而改变接收器工序的时间。首先被驱动的发送器执行第一项工作步骤。接收器超过终端位置时，剩余的油将被挤压至蓄压器（图中未注明）。由此，第二个发送器可在任意时间进入加入工序。

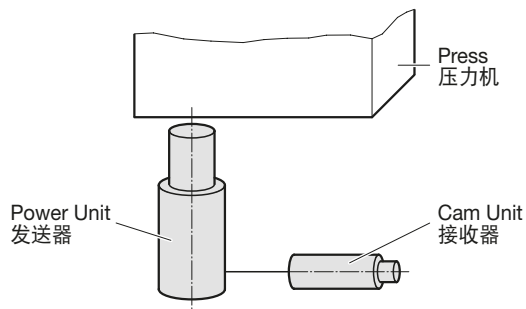
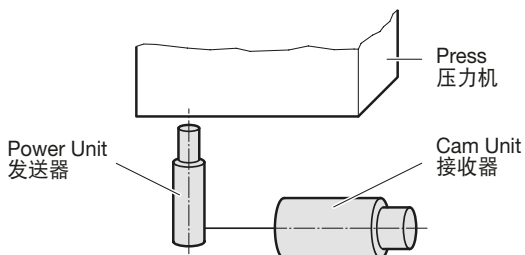


Variable speed / force drive

The forces or travel speeds can be combined as required by varying the ratio between Power Unit sizes and Cam Unit sizes. The maximum travelling speed should not exceed 0.8 m/s, however.

非恒定速度/力驱动

通过改变发送器尺寸而改变接收器尺寸可根据需要组合各种力或各种行程速度。最大行程速度不得超过 0.8 m/s。



Flex Cam

发送器-接收器系统

Transmission ratios in use

Transmission or reduction ratios can be expressed in four different ways:

- a) Force
- b) Speeds of the individual Cam Units
- c) Press travel speed to Cam Unit travel speed
- d) Stroke lengths

Transmission ratios

The nominal transmission ratio of 1:1 is normally used throughout the system.

The ratio can vary, however, according to the combination (and number) of Power Units and Cam Units used (see table on page 16).

Selecting the components

The component sizes are explained step by step below with regard to the forces required, stroke length and the number of operations.

Step 1: Size of the Cam Unit

Calculate the force required for the operation to be carried out. The Cam Unit used should provide sufficient force to execute the operation. If the force required cannot be precisely calculated, we recommend that you use a larger Cam Unit.

Force required (kN) / 所需力 (kN)	Cam Unit / 接收器
0 - 15	2018. <input type="text"/> .01500. <input type="text"/>
15 - 40	2018. <input type="text"/> .04000. <input type="text"/>
40 - 60	2018. <input type="text"/> .06000. <input type="text"/>
60 - 90	2018. <input type="text"/> .09000. <input type="text"/>
90 - 150	2018. <input type="text"/> .15000. <input type="text"/>

Force required: _____ kN Cam Unit size: _____

Example: If the force required is 22 kN, then a 40 kN Cam Unit should be used. Cam Unit 2018. .04000.

Step 2: Cam Unit stroke length

Determine the Cam Unit stroke required to execute the operation in the tool. Use the Cam Unit with the shortest possible stroke, but remember that the tool must have sufficient space for the workpiece.

Required stroke length (mm) 所需 行程长度(mm)	Max. stroke length of Cam Unit (mm) 接收器 最大行程长度 (mm)	Part number 商品编号
0 - 25	25 (24)***	2018. <input type="text"/> . <input type="text"/> .025*
25 - 50	50 (49)***	2018. <input type="text"/> . <input type="text"/> .050*
50 - 100	100 (99)**/***	2018. <input type="text"/> . <input type="text"/> .100*

*) 2018.11. .024/049/099

***) This stroke length does not apply to Compact Cam
2018.11.01500.

***) Compact cam

Stroke length of Cam Unit: _____ mm

Example: If the stroke length required is 35 mm, use a Cam Unit with a stroke length of 50 mm.

Step 3: Order number of the Cam Unit

Select the Cam Unit according to the type of operation to be performed. See also pages 6, 7, 16-18

Compact Cam: 2018.11. .

Flange Cam: 2018.12.04000.049

Force Cylinder: 2018.30. .

Example: The order number for the Compact Cam is 2018.11.04000.049

传动

可通过四种方式进行传动或减速:

- a) 力
- b) 接收器之间的速度
- c) 下压行程速度转变为 接收器行程速度
- d) 行程长度

传动比

通常, 常用标称尺寸中的传动为 1:1。

组合不同型号/数量的发送器和接收器会导致传动比随之变化(参见第16页的表格)。

选择组件

下文将围绕所需力、行程长度和工序数量逐步阐明组件的尺寸。

步骤 1: 接收器单元的尺寸

根据模具中工序所需的力计算得出。选择接收器时, 应确保有充足的力执行工序。如果无法准确算出所需的力, 则建议使用尺寸较大的接收器。

所需力: _____ kN 接收器尺寸: _____

示例: 如果所需力为 22 kN, 则选用 40 kN 的接收器。
接收器 2018. .04000.

步骤 2: 接收器的行程长度

根据模具中执行工序所需的接收器行程计算得出。尽可能选用行程最短的接收器, 但在选择时应注意: 必须在模具中为工件预留足够的空间。

*) 2018.11. .024/049/099

***) 该行程长度不适用于紧凑型模具滑阀
2018.11.01500.

***) 紧凑型模具滑阀

接收器单元行程长度: _____ mm

示例: 如果所需行程长度为 35 mm, 则应选用行程长度为 50 mm 的接收器。

步骤 3: 接收器单元订货编号

根据工作操作的类型选择接收器。

另请参见第 6、7、16-18 页

紧凑型模具滑阀: 2018.11. .

卷边滑阀: 2018.12.04000.049

工作气缸: 2018.30. .

示例: 紧凑型模具滑阀的订货编号为 2018.11.04000.049

Power unit selection table 发送器选择表

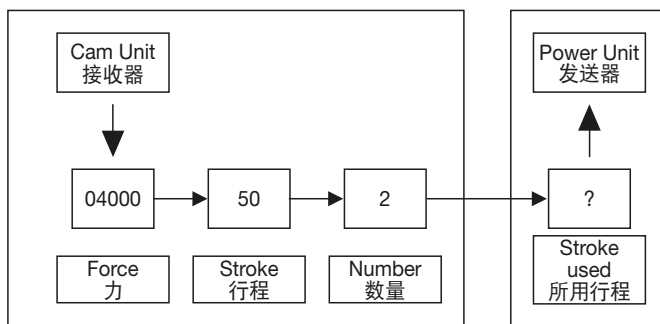
Cam Unit force 接收器 力 [kN]	Nom. stroke 标称行程 [mm]	No. 数量	Power Unit 发送器			Power Unit 发送器			Power Unit 发送器			Power Unit 发送器			Power Unit 发送器		
			15 kN	SU	TR	40 kN	SU	TR	60 kN	SU	TR	90 kN	SU	TR	150 kN	SU	TR
15	25	1	035	35	1,0	035	20	2,5	035	16	4,0	035	14	6,3	035	13	9,8
	25	2	060	60	0,5	035	30	1,5	035	23	2,0	035	18	3,1	035	15	4,9
	25	3	110	85	0,3	060	40	0,8	035	29	1,3	035	22	2,1	035	18	3,3
50	50	1	060	60	1,0	035	30	2,5	035	23	4,0	035	18	6,3	035	15	9,8
	50	2	110	110	0,5	060	50	1,2	035	35	2,0	035	26	3,1	035	20	4,9
	50	3				110	70	0,8	060	48	1,3	035	34	2,1	035	25	3,3
100	100	1	110	110	1,0	060	50	2,5	035	35	4,0	035	26	6,3	035	20	9,8
	100	2				110	91	1,2	060	60	2,0	060	42	3,1	035	30	4,9
	100	3				160	131	0,8	110	85	1,3	060	58	2,1	060	41	3,3
150	150	1	160	160	1,0	110	70	2,5	060	48	4,0	060	34	6,3	035	25	9,8
	150	2				160	131	1,2	110	85	2,0	060	58	3,1	060	41	4,9
	150	3							160	123	1,3	110	82	2,1	060	56	3,3
40	25	1	110	72	0,4	035	35	1,0	035	26	1,6	035	20	2,5	035	16	3,9
	25	2				060	60	0,5	060	41	0,8	035	30	1,3	035	23	2,0
	25	3				110	85	0,3	060	57	0,5	060	40	0,8	035	29	1,3
50	50	1				060	60	1,0	060	41	1,6	035	30	2,5	035	23	3,9
	50	2				110	110	0,5	110	72	0,8	060	50	1,3	035	35	2,0
	50	3				160	160	0,3	110	103	0,5	110	70	0,8	060	48	1,3
100	100	1				110	110	1,0	110	72	1,6	060	50	2,5	035	35	3,9
	100	2							160	134	0,8	110	89	1,3	060	61	2,0
	100	3										160	129	0,8	110	86	1,3
150	150	1							160	103	1,6	110	70	2,5	060	48	3,9
	150	2										160	129	1,3	110	86	2,0
	150	3												160	124	1,3	
60	25	1	110	110	0,3	60	50	0,6	035	35	1,0	035	26	1,6	035	20	2,4
	25	2				110	91	0,3	060	60	0,5	060	42	0,8	035	30	1,2
	25	3				160	131	0,2	110	85	0,3	060	58	0,5	060	41	0,8
50	50	1				110	91	0,6	060	60	1,0	060	42	1,6	035	30	2,4
	50	2							110	110	0,5	110	74	0,8	060	51	1,2
	50	3							160	160	0,3	110	106	0,5	110	71	0,8
100	100	1							110	110	1,0	110	74	1,6	060	51	2,4
	100	2										160	138	0,8	110	92	1,2
	100	3												160	133	0,8	
150	150	1							160	160	1,6	110	106	1,6	110	71	2,4
	150	2												160	133	1,2	
90	25	1				110	73	0,4	060	49	0,6	035	35	1,0	035	26	1,6
	25	2				160	136	0,2	110	88	0,3	060	60	0,5	060	42	0,8
	25	3							160	127	0,2	110	85	0,3	060	58	0,5
50	50	1				160	136	0,4	110	88	0,6	060	60	1,0	060	42	1,6
	50	2										110	110	0,5	110	74	0,8
	50	3										160	160	0,3	110	106	0,5
100	100	1										110	110	1,0	110	74	1,6
	100	2												160	138	0,8	
150	150	1										160	160	1,0	110	106	1,6
150	25	1				110	108	0,3	110	71	0,4	060	49	0,6	035	35	1,0
	25	2							160	132	0,2	110	88	0,3	060	60	0,5
	25	3										160	127	0,2	110	85	0,3
50	50	1							160	132	0,4	110	88	0,6	060	60	1,0
	50	2												110	110	0,5	
	50	3												160	160	0,3	
100	100	1													110	110	1,0
150	150	1													160	160	1,0

Step 4a Size and stroke of the Power Unit

Follow **step 4a** if one to three **Cam Units of the same size** are connected to a given Power Unit. If **different Cam Units** are connected to a Power Unit, then **step 4b** should be used.

Select the Power Unit from the following table. The table should be read in the following order: Cam Unit – force – stroke – number – Power Unit – stroke length. We recommend that no more than three Cam Units be connected to a single Power Unit.

Make sure that you do not exceed the maximum Cam Unit stroke speed (0.8 m/s).



Selection flowchart 选择流程图

Power Unit = Nominal working force / nominal stroke + 10 mm overtravel
 发送器 = 标称工作力/标称行程 + 10 mm 超行程
 SU = Working stroke (stroke actually used) + 10 mm
 = 工作行程 (实际所用行程) + 10 mm 超行程 (用于形成压力)
 TR = Transmission ratio
 = 传动比 (发送器: 接收器)

步骤 4a 发送器的尺寸和行程

步骤 4a 可在一至三个相同大小的接收器与一个发送器相连时使用。如果不同尺寸的接收器与一个发送器相连, 则应使用步骤 4b。

根据下文表格选择发送器。表格的阅读顺序如下: 接收器 力 行程 数量 发送器 行程长度: 建议连接至同一发送器的接收器不超过三个。不得超过接收器行程的最大速度 (0.8 m/s)。

See also the following examples:

Example 1 (Fig. 1): A Power Unit 2018.20.04000.060 is provided as standard for a Compact Cam 2018.11.04000.049. The nominal stroke of the Power Unit is 60 mm. The transmission ratio is 1:1. The stroke of the Compact Cam is thus performed at the same speed as the press.

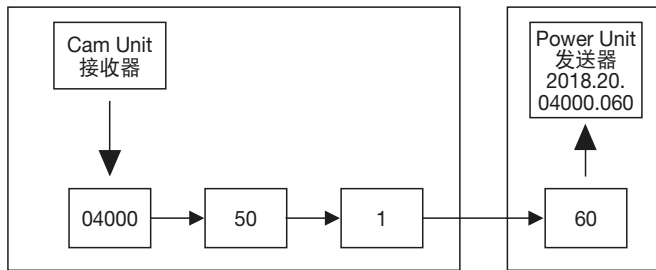


Fig. 1: Selection for example 1 图 1: 选择示例 1

另请参见下列示例:

示例 1 (图 1): 使用紧凑型模具滑阀 2018.11.04000.049 时, 通常配备一个发送器 2018.20.04000.060。发送器的标称行程为 60 mm。传动比为 1.0。紧凑型模具滑阀的行程按照与压力机相同的速度移动。

Example 2 (Fig. 2): If a press stroke of just 30 mm can be used to execute the operation, then a larger Power Unit 2018.20.09000.035 should be used for the Cam Unit 2018.11.04000.049. The Power Unit stroke used is 30 mm, the transmission ratio is 2.5. If the press speed is 0.3 m/s, then the Cam Unit stroke speed obtained is $2.5 \times 0.3 \text{ m/s} = 0.75 \text{ m/s}$.

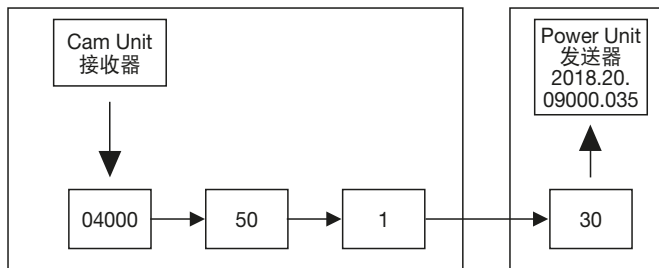


Fig. 2: Selection for example 2 图 2: 选择示例 2

示例 2 (图 2): 如果执行工作操作时仅需要 30 mm 的下压行程, 则可为接收器 2018.11.04000.049 选择尺寸较大的发送器单元 2018.20.09000.035。发送器所用行程为 30 mm, 传动比 2.5。如果下压速度为 0.3 m/s, 则得出接收器行程速度为 $2.5 \times 0.3 \text{ m/s} = 0.75 \text{ m/s}$ 。

发送器和接收器所用的行程可根据模具内的特殊需求优化调整。

某些应用时, 需要将接收器调至比压力机更高的速度。

The stroke used by Power Unit and Cam Unit can be perfectly matched to any special constraints associated with the tool.

For some applications, the speed of the Cam Unit must be increased in proportion to the press speed.

! If several Cam Units are connected to a Power Unit, then the individual Cam Units will not have the same stroke speed.

! 如果将多个接收器与一个发送器相连, 则接收器的行程速度互不相同。

Example 3 (Fig. 3): A Power Unit 2018.20.04000.110 can be used with two Compact Cams 2018.11.04000.049 and a useful press stroke of 110 mm. The Power Unit stroke used is 110 mm and the transmission ratio is 0.5.

If the press speed is 0.3 m/s, then the mean Cam Unit stroke speed obtained is $0.5 \times 0.3 = 0.15 \text{ m/s}$.

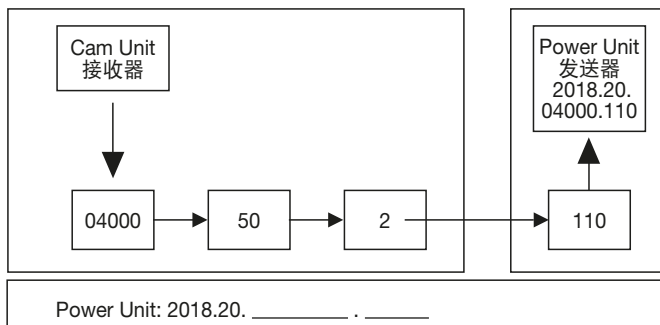


Fig. 3: Selection for example 3 图 3: 选择示例 3

示例 3 (图 3): 使用两个紧凑型模具滑阀 2018.11.04000.049 和一个 110 mm 可用下压行程时, 则可使用 2018.20.04000.110。发送器所用行程为 110 mm, 传动比 0.5。

如果下压速度为 0.3 m/s, 则得出平均接收器行程速度为 $0.5 \times 0.3 = 0.15 \text{ m/s}$ 。

Step 5

Select appropriate hoses and screwed couplings. The maximum admissible hose length between Power Unit and the Cam Unit is 2000 mm. The nominal hose diameter is determined on the basis of the size of the Power Unit. The hose size is matched to the flow of oil (see page 50).

Depending on the press speed a nominal hose width smaller than the standard nominal width may be used (see table 4).

步骤 5

相应选择软管和接口螺栓连接。发送器和接收器之间允许的软管最大程度为 2000 mm。根据发送器尺寸确定软管的额定宽度。根据油的流动情况调整软管尺寸（参见第 50 页）。

可根据下压速度使用小于标称标准额定宽度的软管额定宽度（参见表 4）。

Power Unit / 发送器单元	Nominal hose size, Standard nominal width, max. speed			Press speed / 下压速度	
	软管尺寸	标准额定宽度	最大速度	0,6 m/s	0,2 m/s
2018.20.01500	DN 12	DN 12	0,8 m/s	DN 12	DN 12
2018.20.04000	DN 20	DN 20	DN 20	DN 12	DN 12
2018.20.06000	DN 25	DN 20	DN 20	DN 20	DN 12
2018.20.09000	DN 25	DN 25	DN 25	DN 20	DN 12
2018.20.15000	DN 32	DN 32	DN 32	DN 25	DN 20

Table 4: Press speed/nominal hose size 表4: 下压速度/软管尺寸



It is easiest to determine the correct hose length if both Power Unit and Cam Unit are installed inside the tool.

Remember to protect the hose against sharp edges etc. The hose moves slightly during operation due to the pulsating oil pressure. Observe the minimum bending radius.



将发送器和接收器装入模具可大大减轻确定合适软管长度时的工作量。

必须防止锐缘和外界作用对软管造成损坏。运行过程中，软管会由于油压脉动而发生少量移动。必须遵守最小弯曲度。

**Dimensions and
Order No:**

Cam Units

Force Cylinders

Compact Cam

Flange Cam

Power Units

尺寸及订货编号

接收器（工作单元）

工作气缸

紧凑型模具滑阀

卷边滑阀

发送器（传动装置）

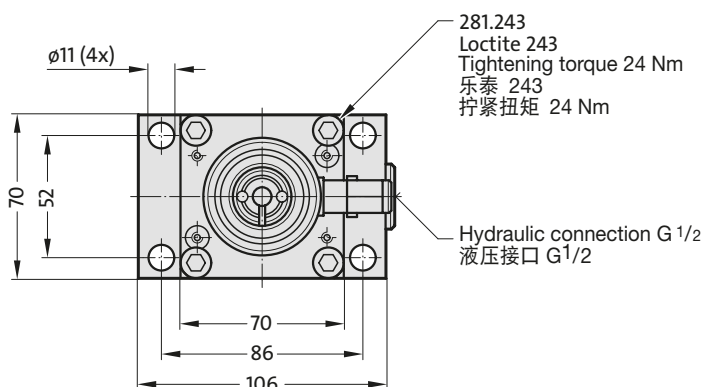
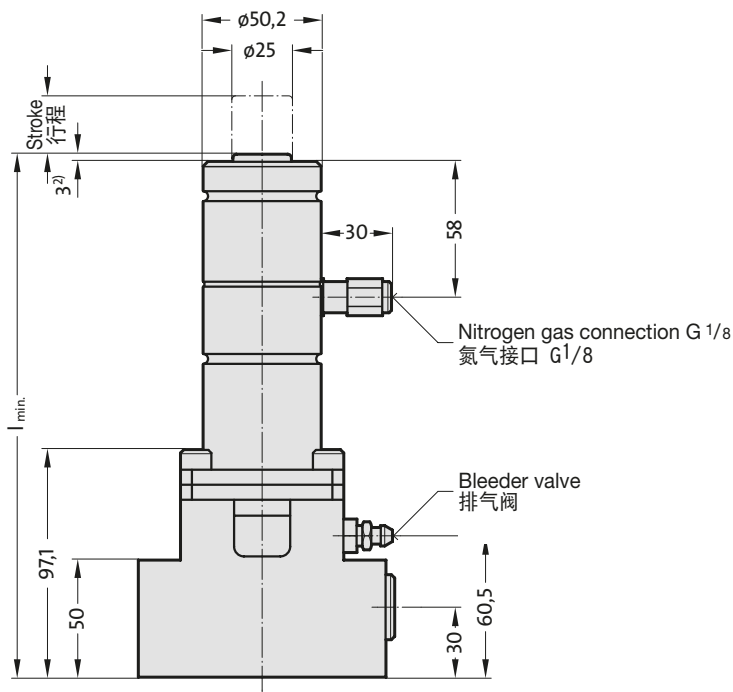
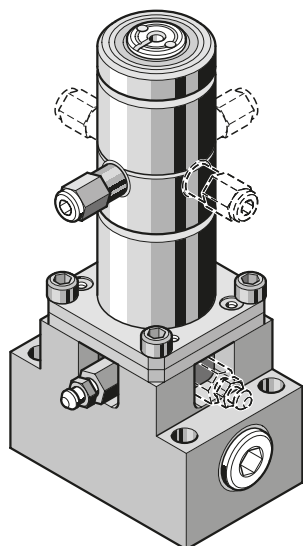
Cam Unit
Force Cylinder 15 kN with base plate

接收器
工作气缸 15 kN 带底架



FIBRO

2018.45.01500.



²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. Allow for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018.45.01500. Force Cylinder with base plate – 工作气缸 15 kN 带底架

Restoring force in kN* at 20 bar (max. 40 bar)
复位力 20 bar 时 (最大 40 bar)

Order no 订货编号	Stroke 行程	l_{min}	Stroke _{start} 行程 _{初始}	Stroke _{end} 行程 _{结束}
2018.45.01500.025	25	273	1,5	3,1
2018.45.01500.050	50	273	1,5	3,1
2018.45.01500.100	100	373	1,5	3,1
2018.45.01500.150	150	473	1,5	3,1

* isothermic 等温

Cam Unit Compact Cam 15 kN with gas monitoring connection

接收器 紧凑型模具滑阀 15 kN 带气体监控接口



FIBRO

2018.11.01500. _ _ _ .1

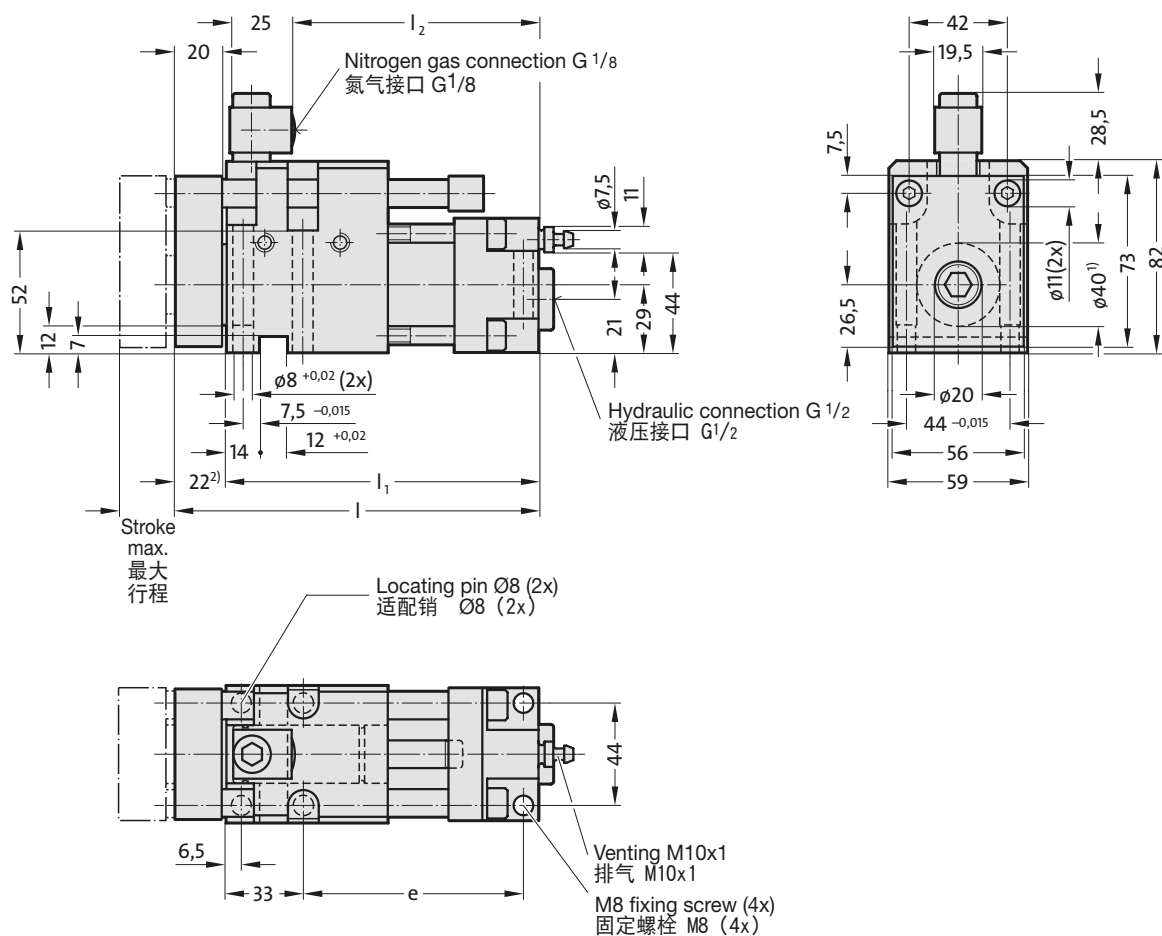
Install together with measuring hose and control fitting (gas spring and nitrogen connection are valveless).
配合测量软管和控制配件使用（空气弹簧和氮气接口均无阀门）。

Note:

- 1) Preferably apply the stamp in the middle of the piston rod. Where necessary, the stamp can be placed in the marked area. During disengaging and trimming operations, an external guide must be provided in order to absorb the lateral forces which occur.
- 2) The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

提示:

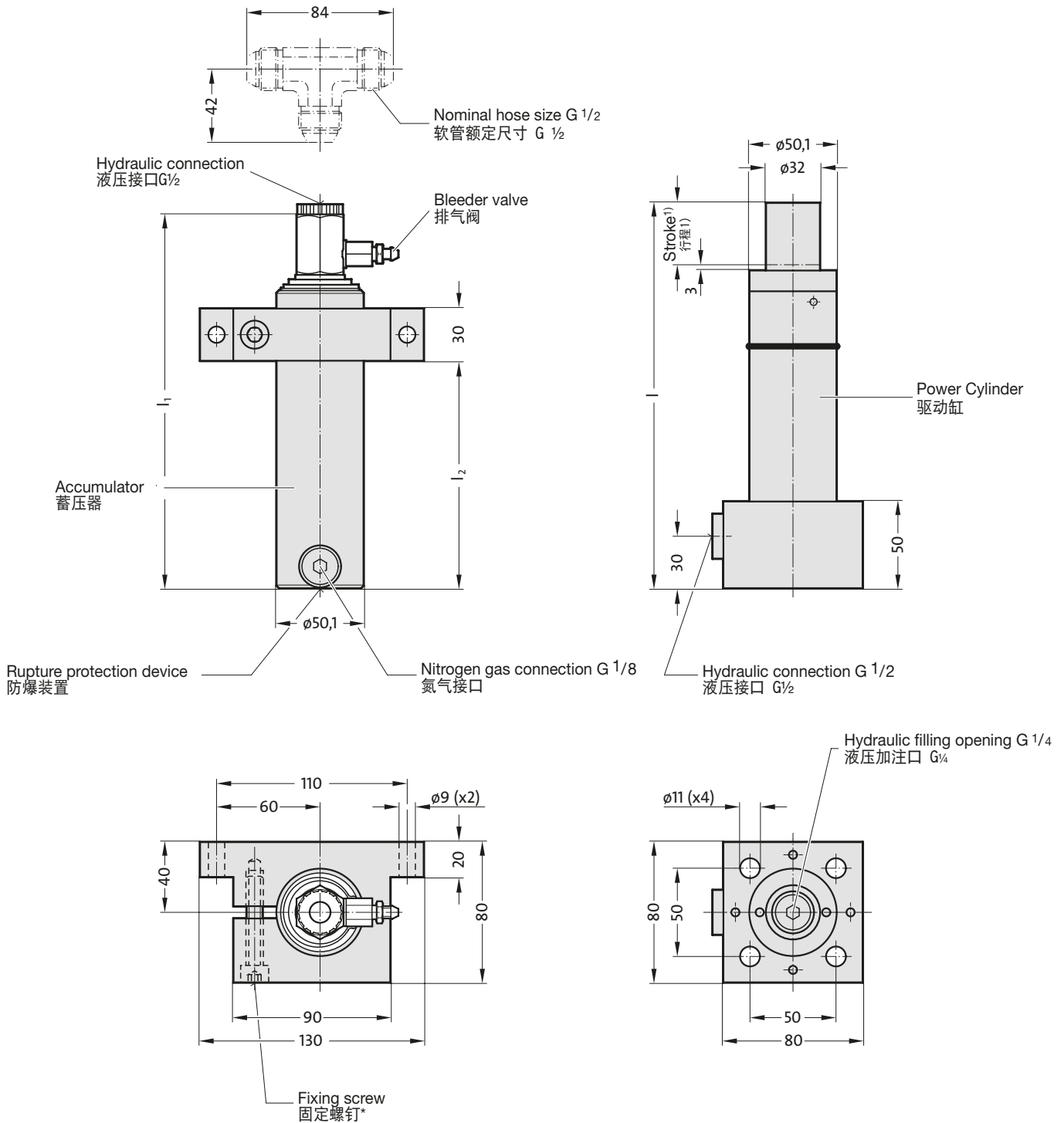
- 1) 首先将冲头放置于活塞杆的中间。必要时，可将冲头置于标记范围内。执行剪切和切削操作时，必须配备一个外部导向装置，以便吸收产生的侧向力。
- 2) 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。



2018. 11.01500. _ _ _ .1 Compact Cam 15 kN with gas monitoring connection 紧凑型模具滑阀 15 kN 带气体监控接口

Order no 订货编号	Stroke max. 行程 最大	e	l	l ₁	l ₂	Restoring force in kN at 180 bar 复位力 kN 180 bar	
						Stroke start 行程 初始	Stroke end 行程 结束
2018.11.01500.010.1	10	80	141,5	119,5	93	2	2,6
2018.11.01500.024.1	24	94	155,5	133,5	107	2	2,6
2018.11.01500.049.1	49	119	180,5	158,5	132	2	2,6

2018.25.01500.



* Tighten M8 fixing screw to 25 Nm
* 使用 25 Nm 拧紧固定螺栓 (M8)

1) The overtravel compensation is the nominal stroke + 10 mm additional stroke.
1) 额定行程 + 10 mm 额外行程为超行程补偿。

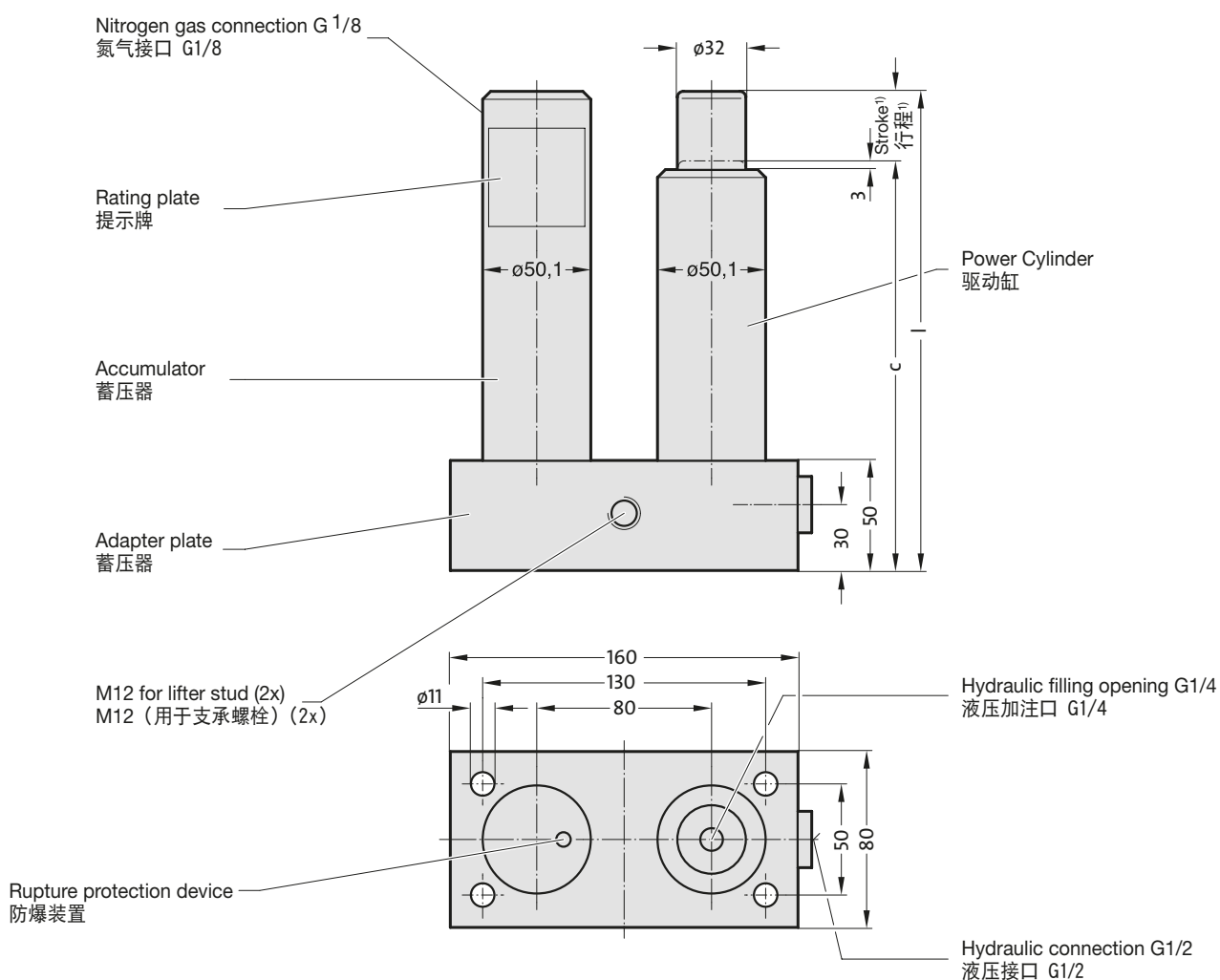
2018. 25.01500. Power Unit 15 kN with separate Accumulator
发送器 工作气缸 15 kN 带单独蓄压器

Order no 订货编号	Stroke +10 ¹⁾ 行程+10 ¹⁾	l	l ₁	l ₂
2018.25.01500.035	35	220	213	130
2018.25.01500.060	60	270	264	180
2018.25.01500.110	110	370	364	280
2018.25.01500.160	160	470	464	380

Power Unit 15 kN

发送器 驱动装置 15 kN

2018.20.01500.



¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.

¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.20.01500. Power Unit 15 kN – 发送器 驱动装置 15 kN

Order no 订货编号	c	l	Stroke +10 ¹⁾ 行程+10 ¹⁾
2018.20.01500.035	185	220	35
2018.20.01500.060	210	270	60
2018.20.01500.110	260	370	110
2018.20.01500.160	310	470	160

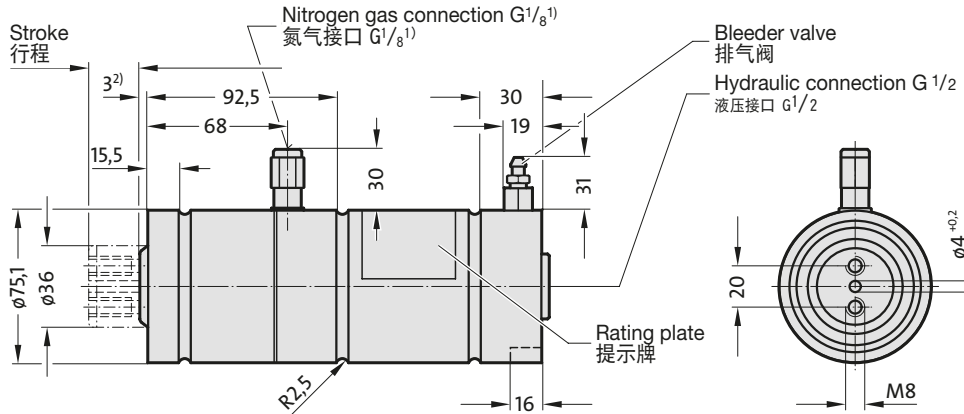
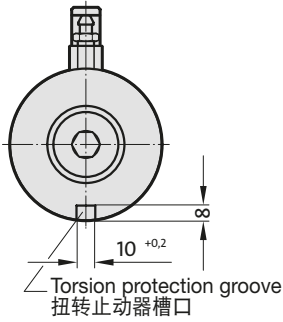
Cam Unit
Force Cylinder 40 kN

接收器
工作气缸 40 kN



2018. __ .04000.

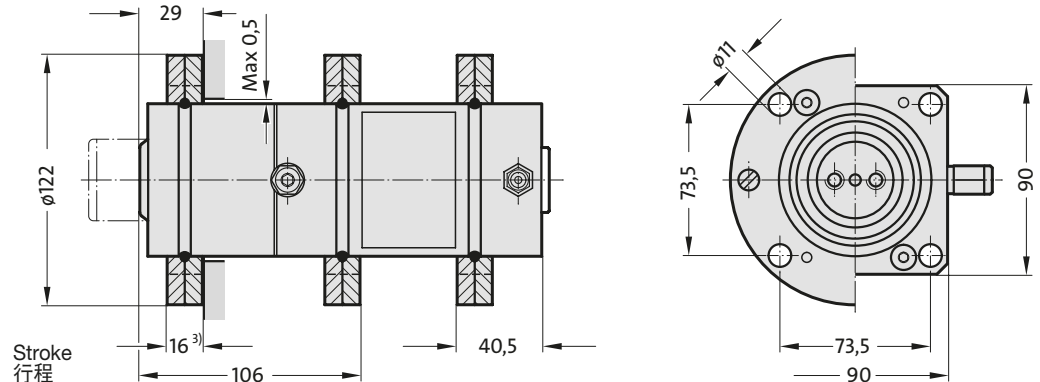
Stroke/行程
2018.30.04000.



Stroke/行程
2018.50.04000.

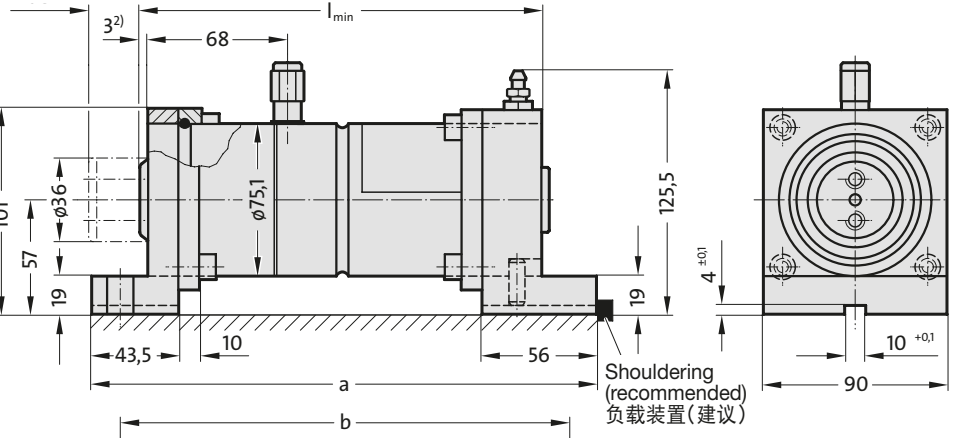
Stroke/行程
2018.60.04000.

Spare parts
备件
Mounting flanges
张紧法兰
© 2480.055.01500
□ 2480.057.01500



Stroke/行程
2018.40.04000.

Spare parts
Mounting flanges
备件
张紧法兰
On the piston rod
活塞杆双侧
2480.045.01500
On the hydraulic connector
液压接口侧
2480.046.01500



¹⁾ Nitrogen gas connector: caution – before removing the connector check that the cylinder has no gas pressure.
²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.
³⁾ This fastening may only be subjected to pressure (by support).

¹⁾ 氮气接口: 小心, 拆除接口前应检查气缸内是否无任何气体压力。
²⁾ 由于油膨胀受到温度限制, 因此, 接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。
³⁾ 仅限通过压力 (朝向底座) 拉紧该固定装置。

2018. __ .04000. Force Cylinder 40 kN – 工作气缸 40 kN

Order no 订货编号	Stroke 行程	l _{min}	a	b	Restoring force in kN* at 20 bar (max. 40 bar) 复位力 kN* 20 bar 时 (最大 40 bar)	
					Stroke _{start} 行程 _{初始}	Stroke _{end} 行程 _{结束}
2018. __ .04000.025	25	195	246	219	4,2	8,4
2018. __ .04000.050	50	245	296	269	4,2	8,4
2018. __ .04000.100	100	345	396	369	4,2	8,4
2018. __ .04000.150	150	445	496	469	4,2	8,4

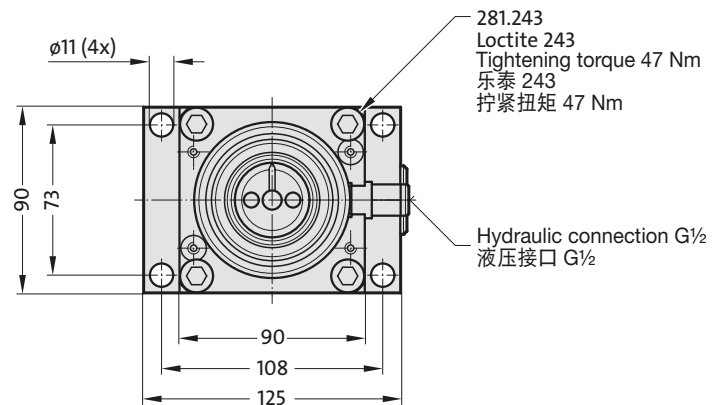
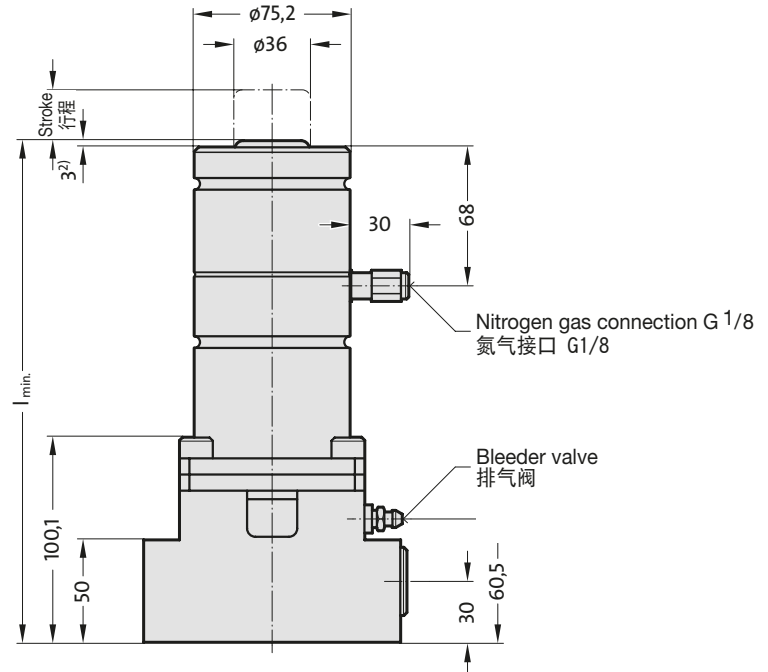
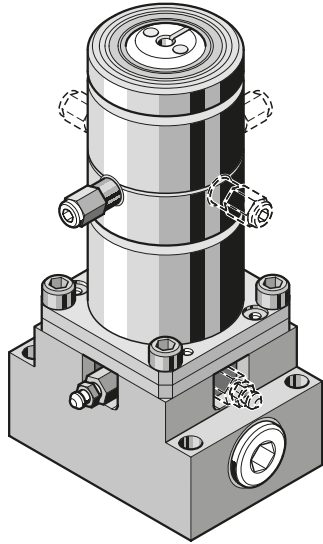
* isothermic 等温

Cam Unit
Force Cylinder 40 kN
with base plate

接收器
工作气缸 40 kN
带底架



2018.45.04000.



²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018.45.04000. Force Cylinder 40 kN with base plate – 工作气缸 40 kN 带底架

Order no 订货编号	Stroke 行程	l_{min}	Restoring force in kN* at 20 bar (max. 40 bar) 复位力 kN* 20 bar 时 (最大 40 bar)	
			Stroke _{start} 行程 _{初始}	Stroke _{end} 行程 _{结束}
2018.45.04000.025	25	245	4,2	8,4
2018.45.04000.050	50	295	4,2	8,4
2018.45.04000.100	100	395	4,2	8,4
2018.45.04000.150	150	495	4,2	8,4

* isothermic 等温

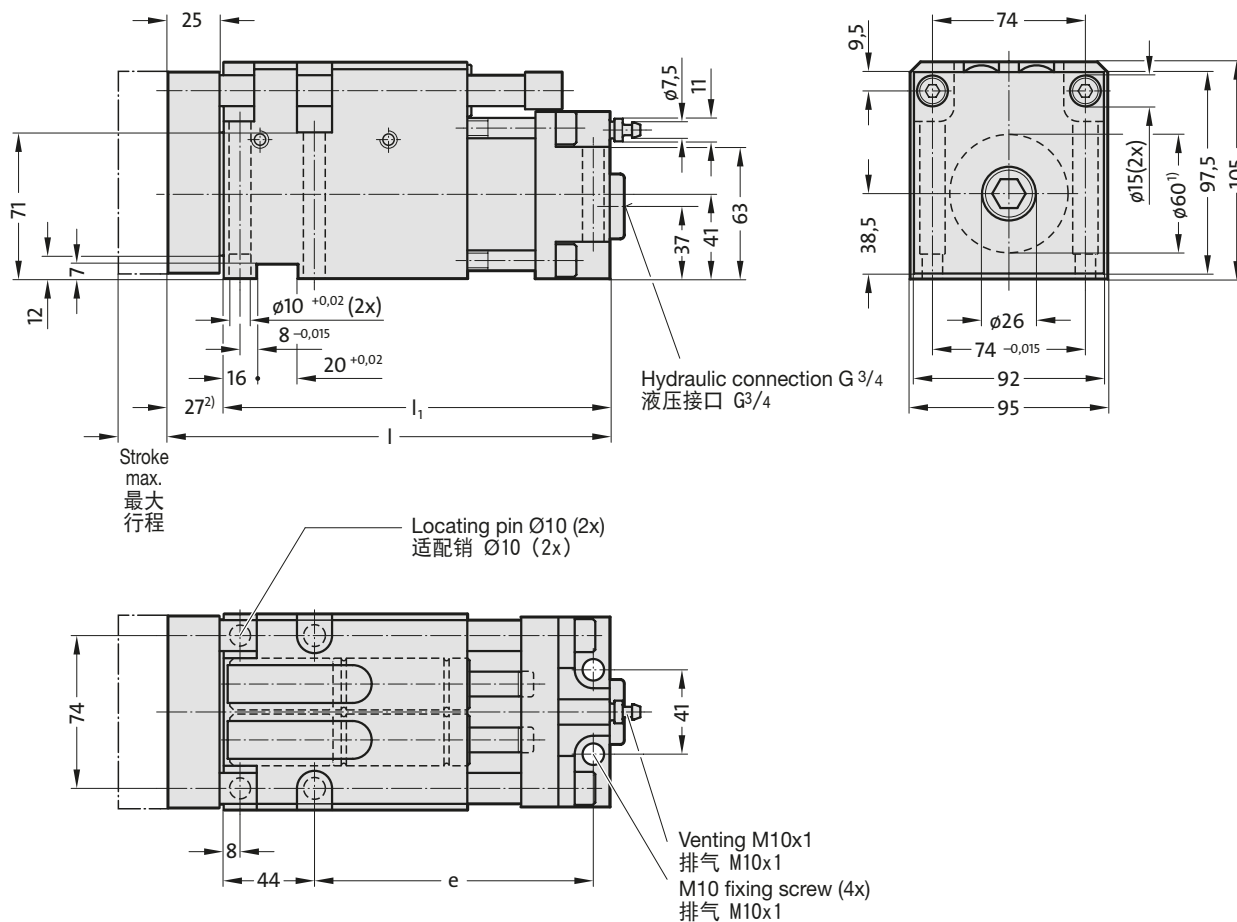
2018.11.04000.

Note:

- 1) Preferably apply the stamp in the middle of the piston rod. Where necessary, the stamp can be placed in the marked area. During disengaging and trimming operations, an external guide must be provided in order to absorb the lateral forces which occur.
- 2) The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

提示:

- 1) 首先将冲头放置于活塞杆的中间。必要时，可将冲头置于标记范围内。执行剪切和切削操作时，必须配备一个外部导向装置，以便吸收产生的侧向力。
- 2) 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。



2018.11.04000. Compact Cam 40 kN – 模具滑阀 40 kN 紧凑型

Order no 订货编号	Stroke max. 行程 最大	e	l	l ₁	Restoring force in kN at 180 bar 复位力 kN 180 bar 时	
					Stroke start 行程 初始	Stroke end 行程 结束
2018.11.04000.024	24	135	214	187	4	5,2
2018.11.04000.049	49	160	239	212	4	5,4
2018.11.04000.099	99	210	289	262	4	5,6

Cam Unit Compact Cam 40 kN with gas monitoring connection

接收器 紧凑型模具滑阀 40 kN 带气体监控接口

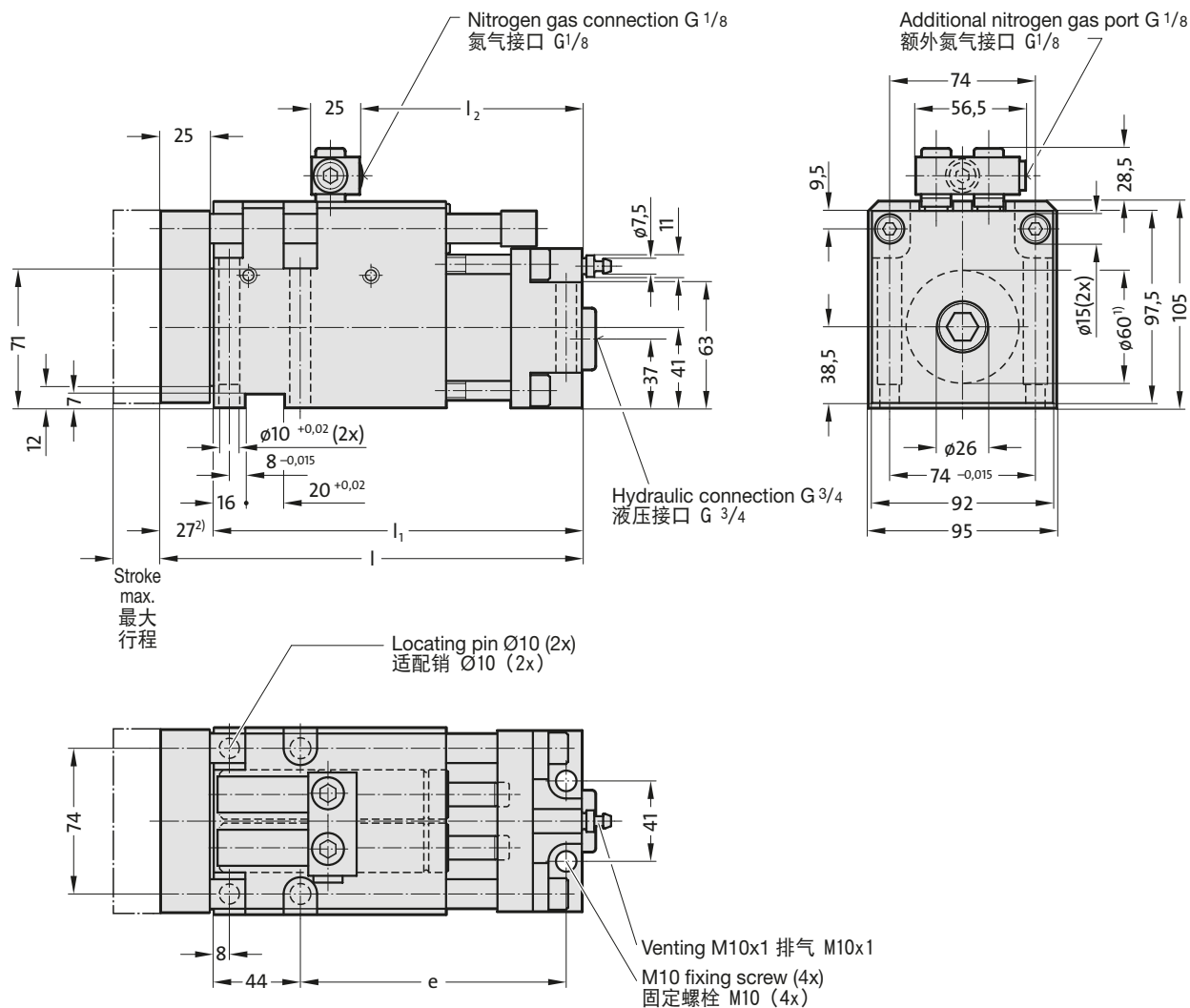


FIBRO

2018.11.04000. _ _ .1

Install together with measuring hose and control fitting (gas spring and nitrogen connection are valveless). Duplicate nitrogen gas ports for connecting the measuring hose. Use only one port whilst keeping the other one closed.

配合测量软管和控制配件使用（空气弹簧和氮气接口均无阀门）。有两个氮气接口可用于连接测量软管。仅使用其中一个接口（另一个保持封闭）。



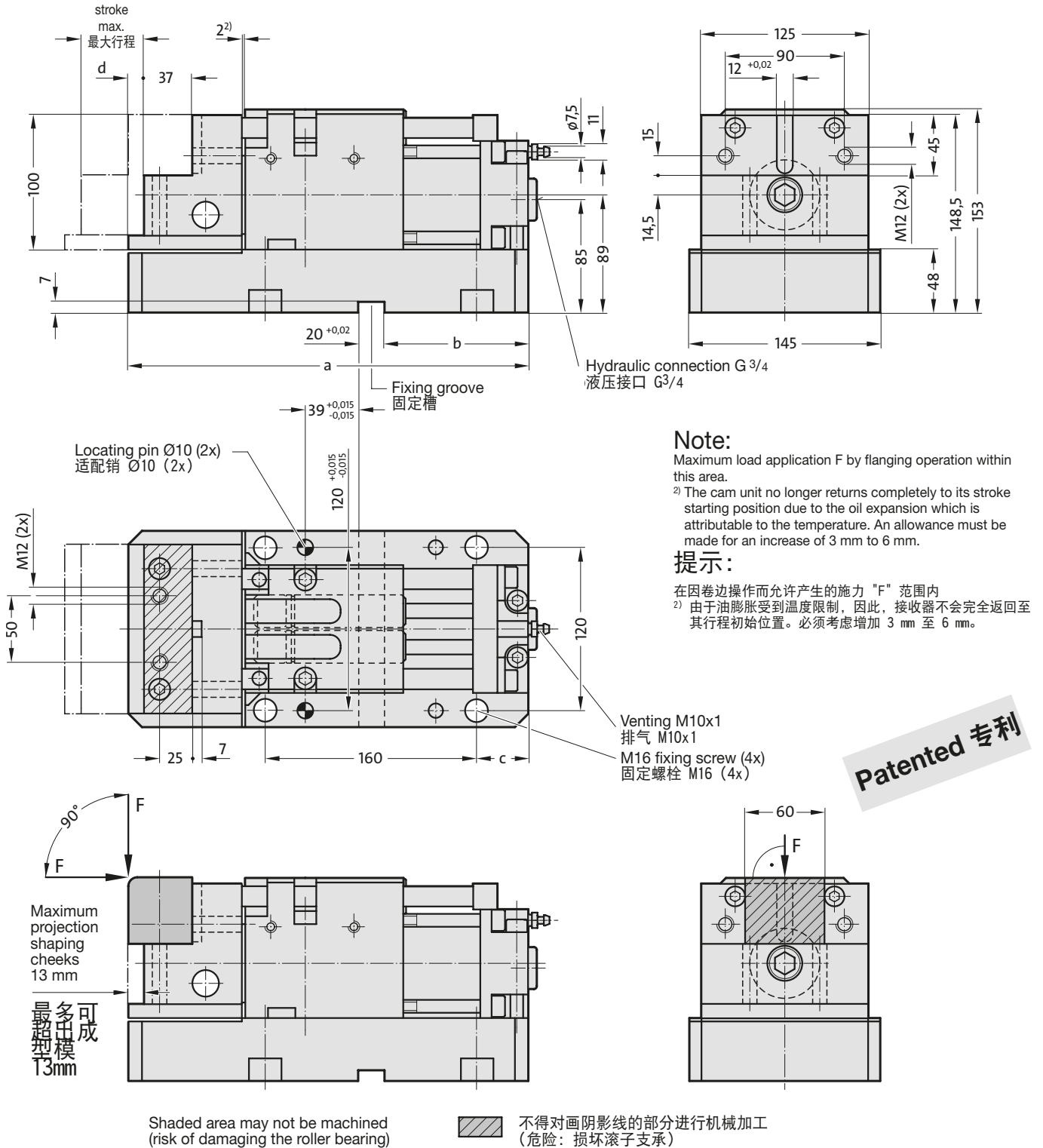
²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018. 11.04000. _ _ _ .1 Compact Cam 40 kN with gas monitoring connection 紧凑型模具滑阀 40 kN带气体监控接口

Order no 订货编号	Stroke max. 行程 最大	e	l	l ₁	l ₂	Restoring force in kN at 180 bar 复位力 kN 180 bar 时	
						Stroke start 行程 初始	Stroke end 行程 结束
2018.11.04000.024.1	24	135	214	187	112	4	5,2
2018.11.04000.049.1	49	160	239	212	162	4	5,2
2018.11.04000.099.1	99	210	289	262	237	4	5,2

2018.12.04000.



2018.12.04000. Flange Cam 40 kN – 卷边滑阀 40 kN

Order no 订货编号	Restoring force in kN at 180 bar 复位力 kN 180 bar 时			a	b	c	d
	Stroke max. 行程最大	Stroke start 行程初始	Stroke end 行程结束				
2018.12.04000.049	49	4	5,2	304	109	39	13
2018.12.04000.099	99	4	5,2	404	159	89	63

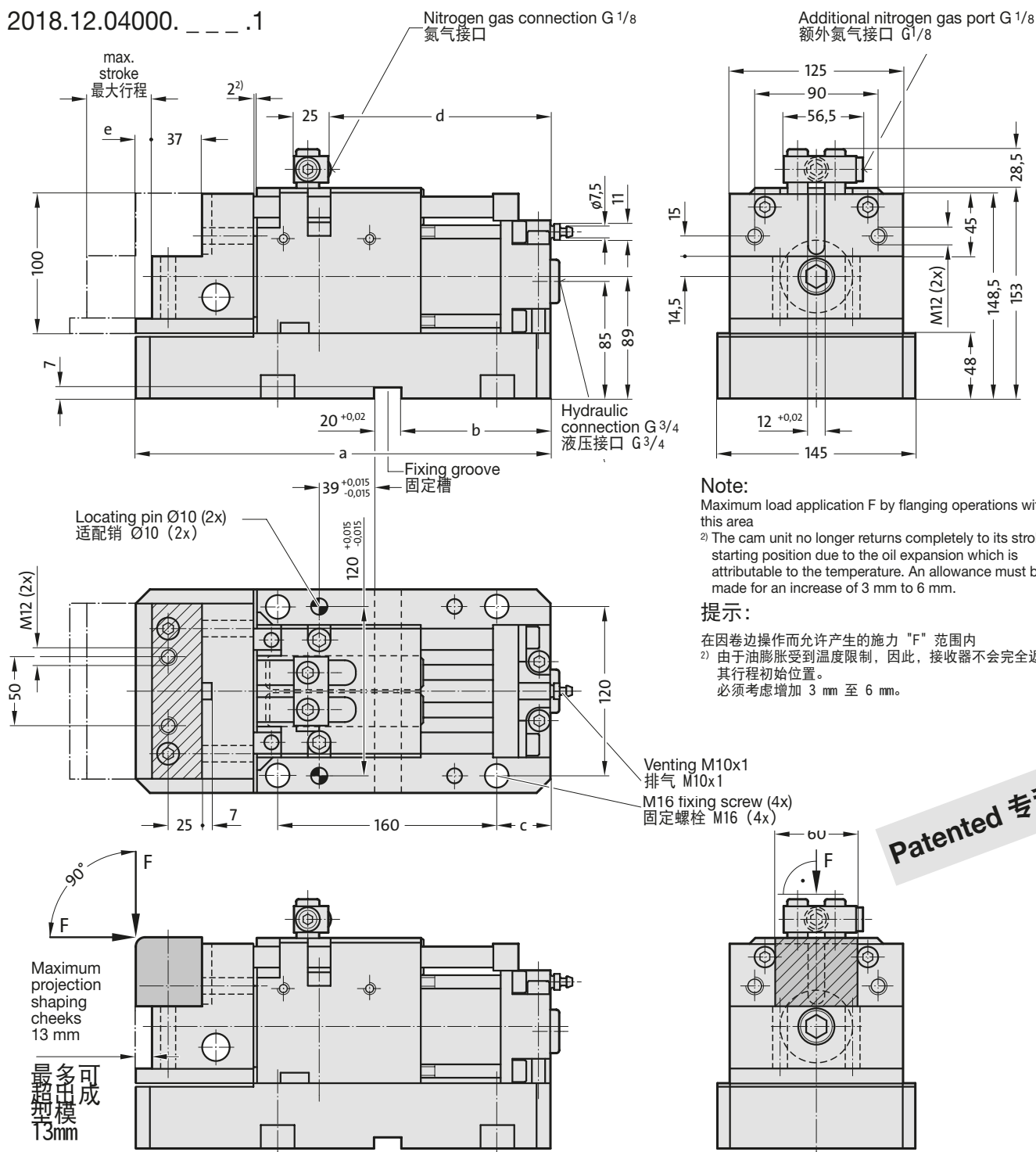
Cam Unit Flange Cam 40 kN with gas monitoring connection

接收器 卷边滑阀 40 kN 带气体监控接口



FIBRO

2018.12.04000. ____ .1



Note:
Maximum load application F by flanging operations within this area
2) The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

提示:
在因卷边操作而允许产生的施力 "F" 范围内
2) 由于油膨胀受到温度限制, 因此, 接收器不会完全返回至其行程初始位置。
必须考虑增加 3 mm 至 6 mm。

Patented 专利

Shaded area may not be machined (risk of damaging the roller bearing) 不得对画阴影线的部分进行机械加工 (危险: 损坏滚子支承)

Two nitrogen gas ports for connecting the measuring hose.
Use only one port, whilst keeping the other one closed.
Install together with measuring hose and control fitting
(gas spring and nitrogen connection are valveless).

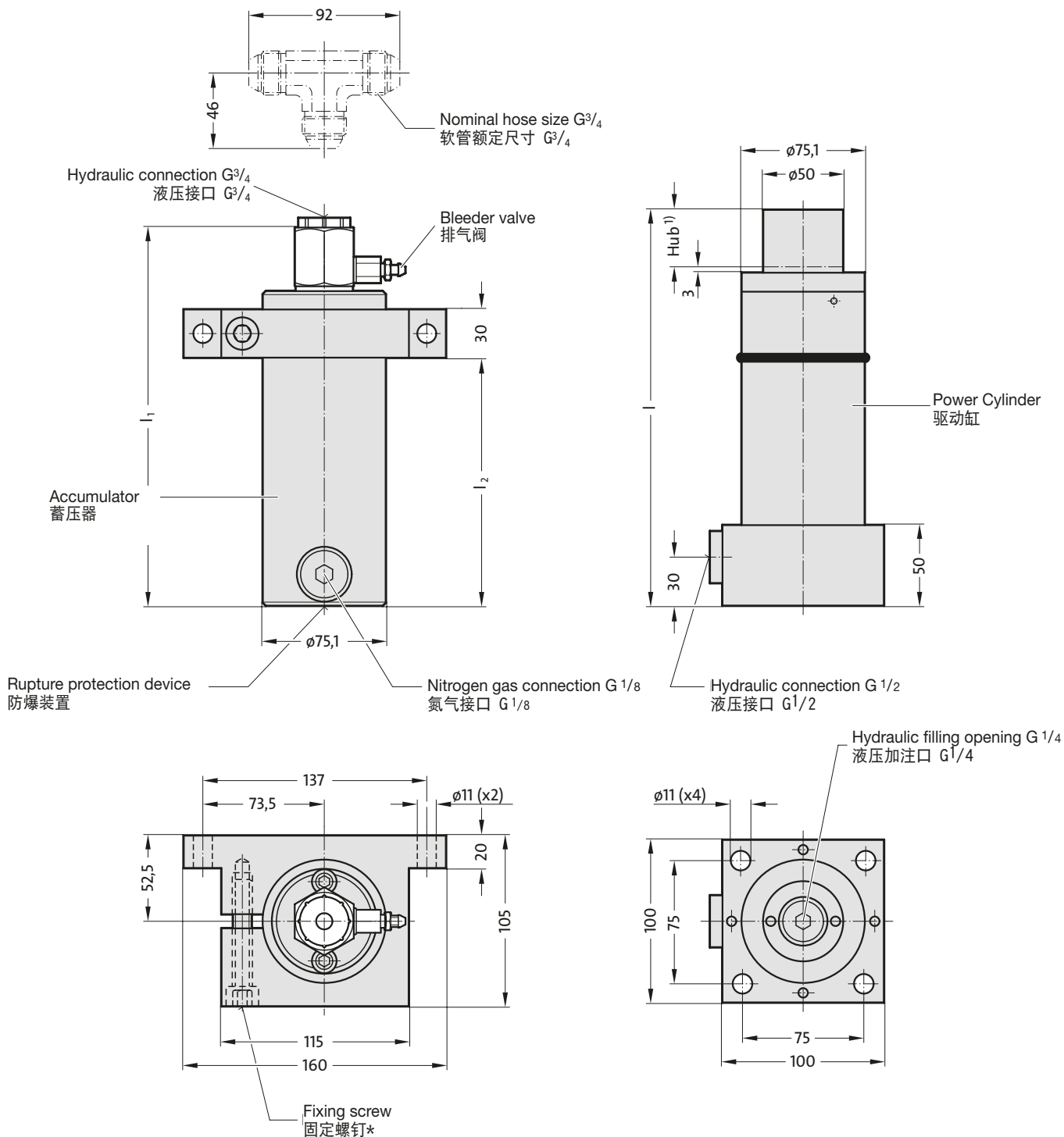
有两个氮气接口可用于连接测量软管。
仅使用其中一个接口 (另一个保持封闭)。
配合测量软管和控制配件使用 (空气弹簧和氮气接口均无阀门)。

2018.12.04000. ____ .1 Flange Cam 40 kN with gas monitoring connection 卷边滑阀 40 kN 带气体监控接口

Restoring force in kN at 180 bar
复位力 kN 180 bar 时

Order no 订货编号	Stroke max. 行程最大	Stroke start 行程初始	Stroke end 行程结束	a	b	c	d	e
2018.12.04000.049.1	49	4	5,2	304	109	39	162	13
2018.12.04000.099.1	99	4	5,2	404	159	89	237	63

2018.25.04000.



* Tighten M10 fixing screw to 52 Nm
* 使用 52 Nm 拧紧固定螺栓 (M10)

¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

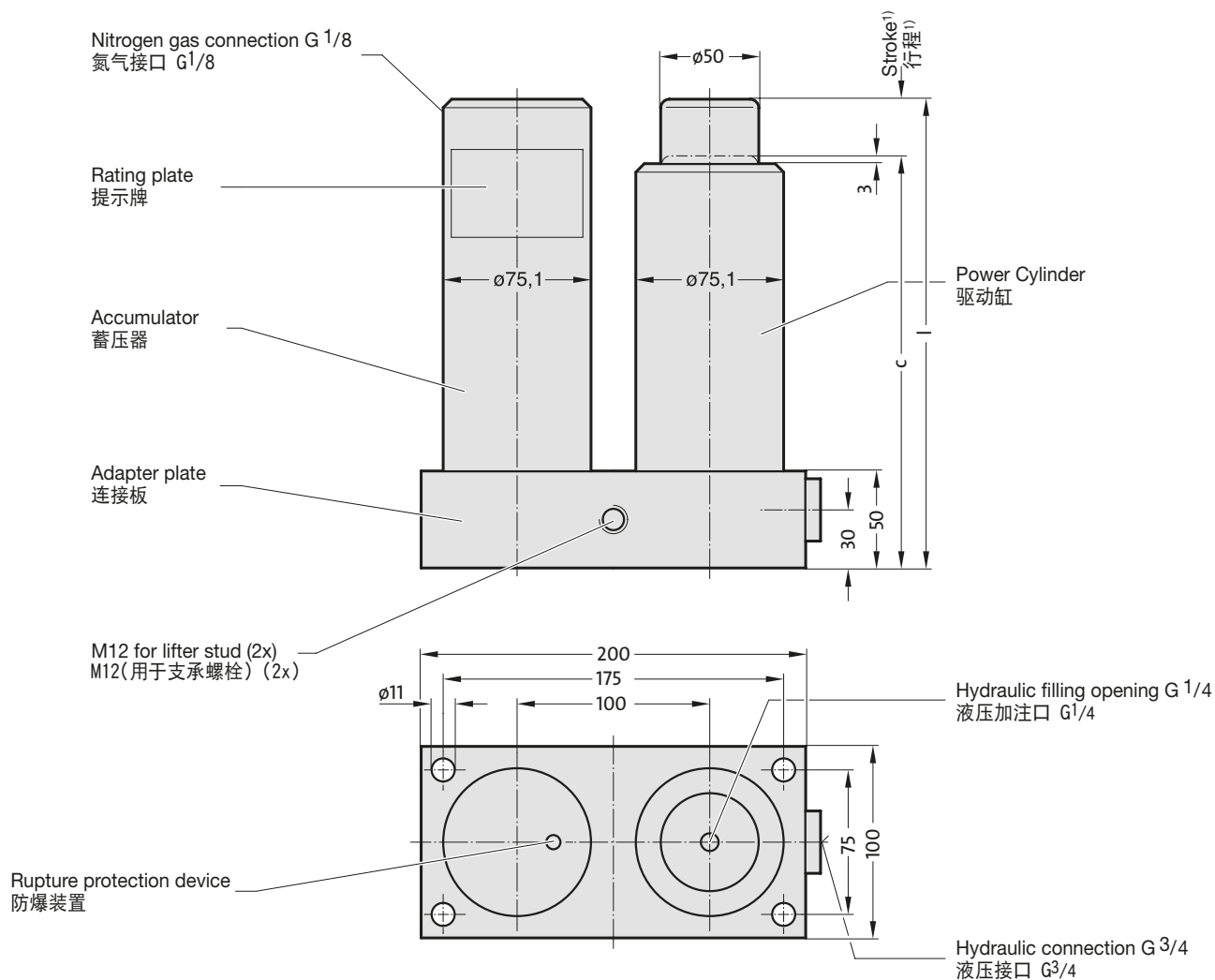
2018.25.04000. Power Unit 40 kN with separate Accumulator
工作气缸 40 kN 带单独蓄压器

Order no 订货编号	Stroke +10 ¹⁾ 行程 +10 ¹⁾	l	l ₁	l ₂
2018.25.04000.035	35	242	231	152
2018.25.04000.060	60	292	281	202
2018.25.04000.110	110	392	381	302
2018.25.04000.160	160	492	481	402

Power Unit 40 kN

发送器 驱动装置 40 kN

2018.20.04000.



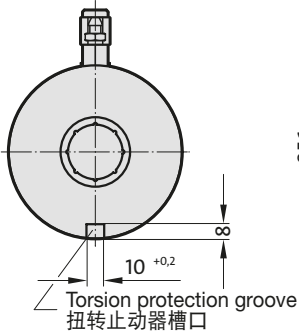
¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.20.04000. Power Unit 40 kN – 发送器 驱动装置 40 kN

Order no 订货编号	c	l	Stroke +10 ¹⁾ 行程 +10 ¹⁾
2018.20.04000.035	207	242	35
2018.20.04000.060	232	292	60
2018.20.04000.110	282	392	110
2018.20.04000.160	332	492	160

2018. __ .06000.

Stroke/行程
2018.30.06000.



Stroke/行程
2018.50.06000.

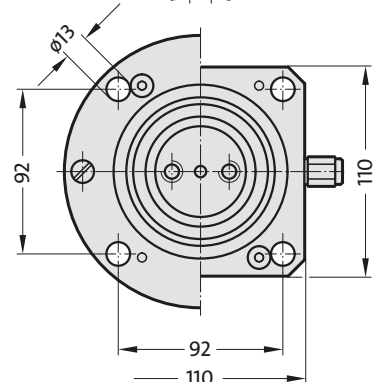
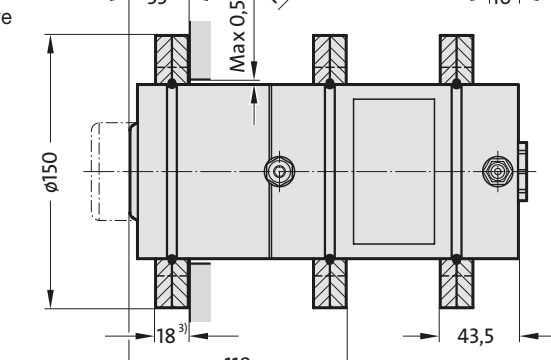
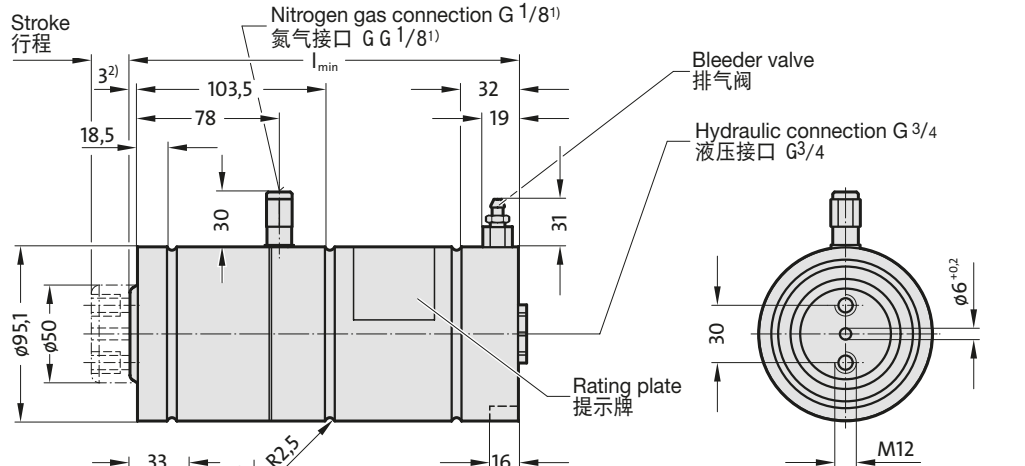
Stroke/行程
2018.60.06000.

Spare parts

Mounting flanges
张紧法兰

⊙ 2480.055.03000

□ 2480.057.03000



Stroke/行程
2018.40.06000.

Spare parts
Mounting flanges

张紧法兰

On the piston rod

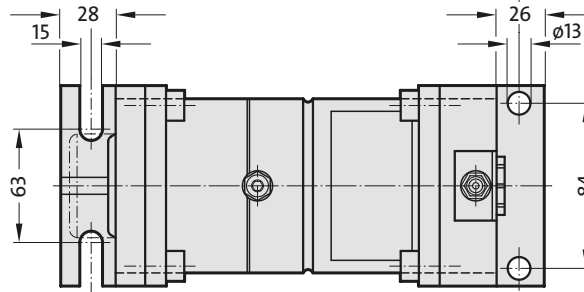
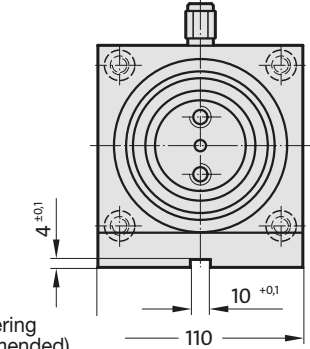
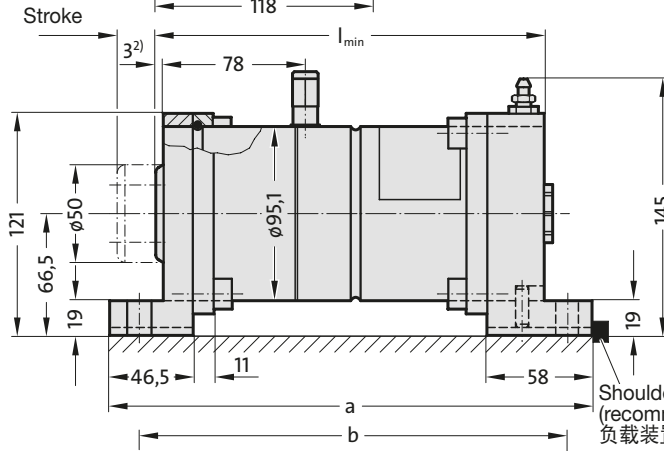
活塞杆双侧

2480.045.03000

On the hydraulic connector

液压接口侧

2480.046.03000



¹⁾ Nitrogen gas connector: caution – before removing the connector check that the cylinder has no gas pressure.

²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

³⁾ This fastening may only be subjected to pressure (by support).

¹⁾ 氮气接口：小心，拆除接口前应检查气缸内是否无任何气体压力。

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

³⁾ 仅限通过压力（朝向底座）拉紧该固定装置。

2018. __ .06000. Force Cylinder 60 kN – 工作气缸 60 kN

Restoring force in kN* at 20 bar (max. 40 bar)
复位力 kN* 20bar 时(最大 40bar)

Order no 订货编号	Stroke 行程	l_{min}	a	b	Stroke _{start} 行程 _{初始}	Stroke _{end} 行程 _{结束}
2018. __ .06000.025	25	211	262	235	6,1	12,3
2018. __ .06000.050	50	261	312	285	6,1	12,3
2018. __ .06000.100	100	361	412	385	6,1	12,3
2018. __ .06000.150	150	461	512	485	6,1	12,3

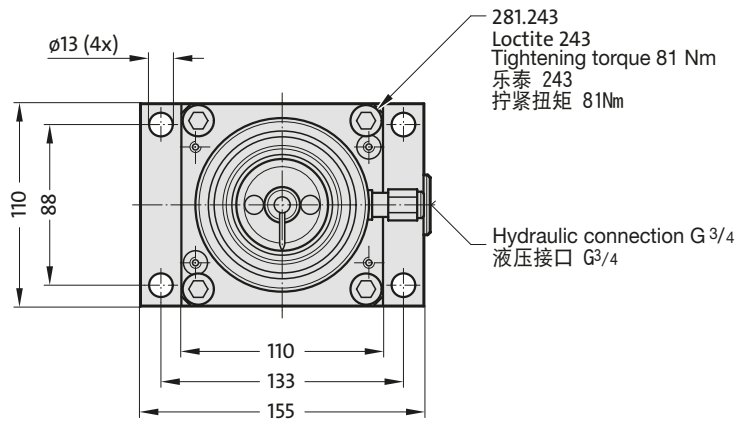
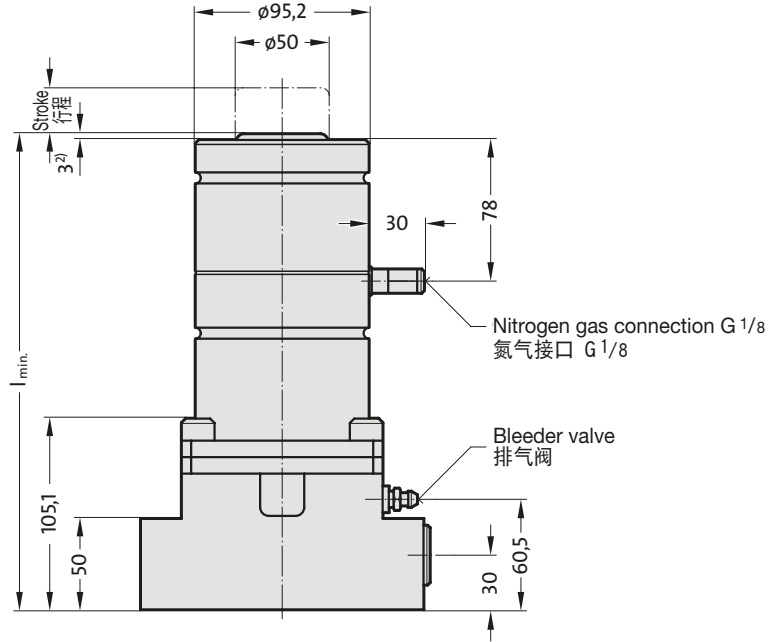
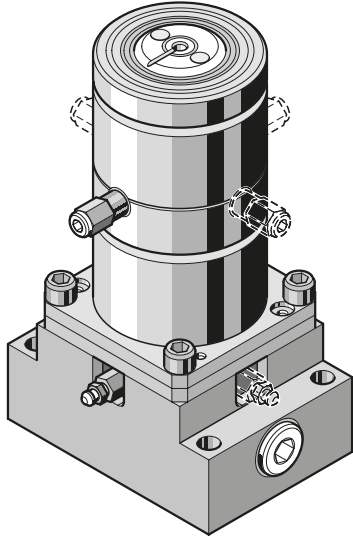
* isothermic 等温

Cam Unit
Force Cylinder 60 kN with base plate

接收器
工作气缸 60 kN 带底架



2018.45.06000.



²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

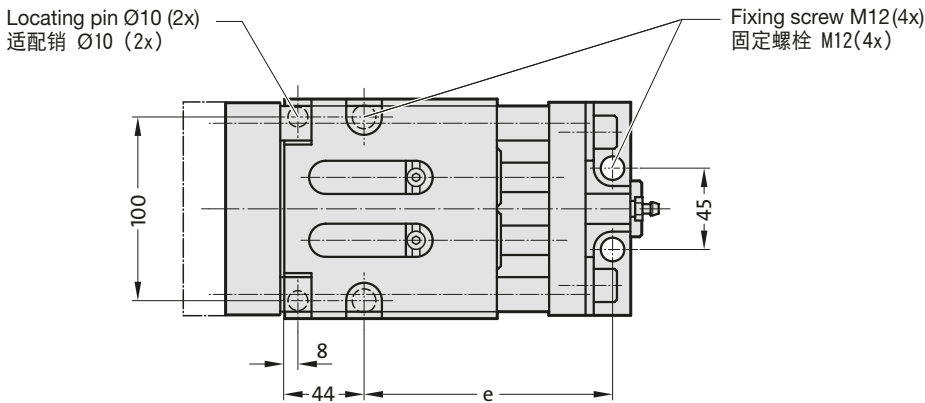
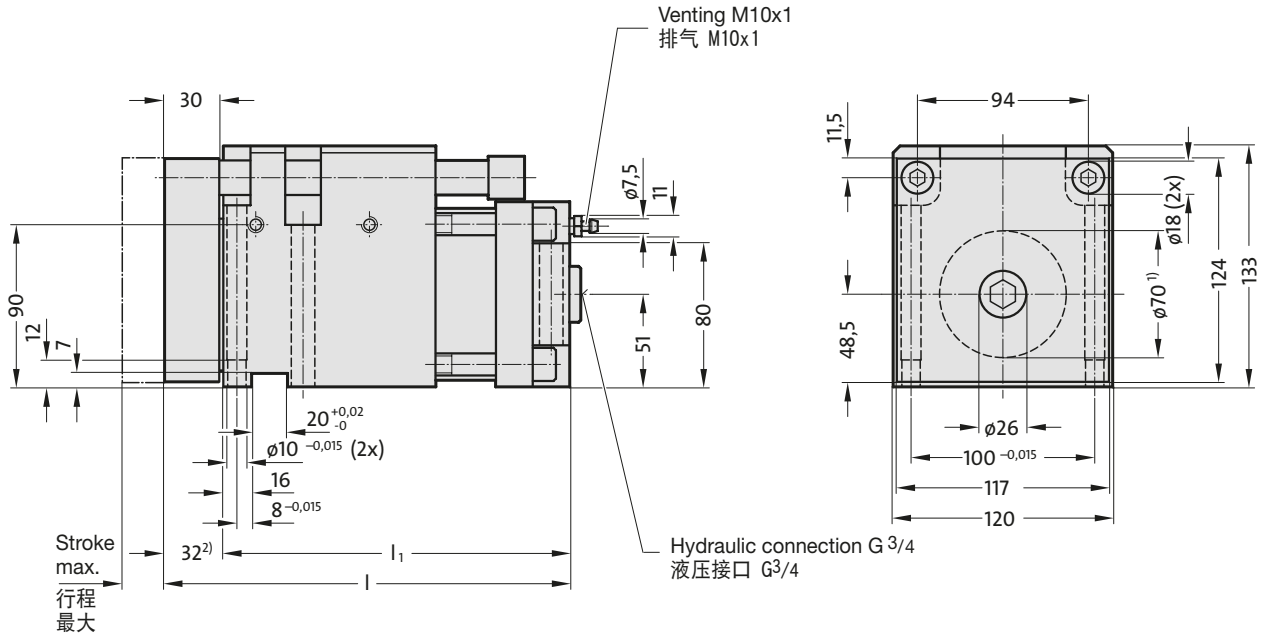
2018.45.06000. Force Cylinder 60 kN with base plate – 工作气缸 60 kN 带底架

Restoring force in kN* at 20 bar (max. 40 bar)
复位力 kN* 20bar 时(最大 40bar)

Order no 订货编号	Stroke 行程	l_{min}	Stroke _{start} 行程 _{初始}	Stroke _{end} 行程 _{结束}
2018.45.06000.025	25	261	6,1	12,3
2018.45.06000.050	50	311	6,1	12,3
2018.45.06000.100	100	411	6,1	12,3
2018.45.06000.150	150	511	6,1	12,3

* isothermic 等温

2018.11.06000.



Note:

- ¹⁾ The punch should preferably be mounted in the middle of the piston rod. It can also be located in the shaded area if necessary. A guide bolster with external guide to absorb the lateral forces should be provided for coping and cutting operations.
- ²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

提示:

- ¹⁾ 首先将冲头放置于活塞杆的中间。必要时，可将冲头置于标记范围内。执行剪切和切削操作时，必须配备一个外部导向装置，使吸收产生的侧向力。
- ²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018.11.06000. Compact Cam 60 kN – 模具滑阀 60 kN 紧凑型

Order no 订货编号	Stroke max. 行程最大	e	l	l ₁	Restoring force in kN at 180 bar 复位力 kN 180 bar 时	
					Stroke start 行程初始	Stroke end 行程结束
2018.11.06000.024	24	137	223	191	7	10,6
2018.11.06000.049	49	162	248	216	7	10,6
2018.11.06000.099	99	212	298	266	7	10,6

Cam Unit Compact Cam 60 kN with gas monitoring connection

接收器 紧凑型模具滑阀 60 kN 带气体监控接口

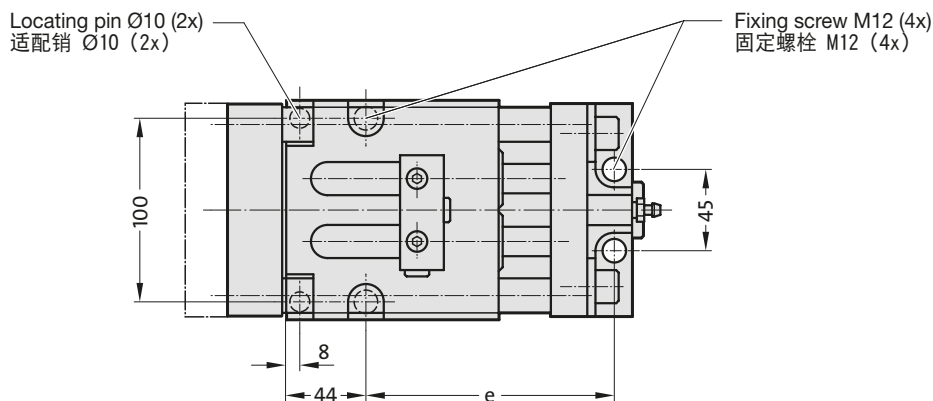
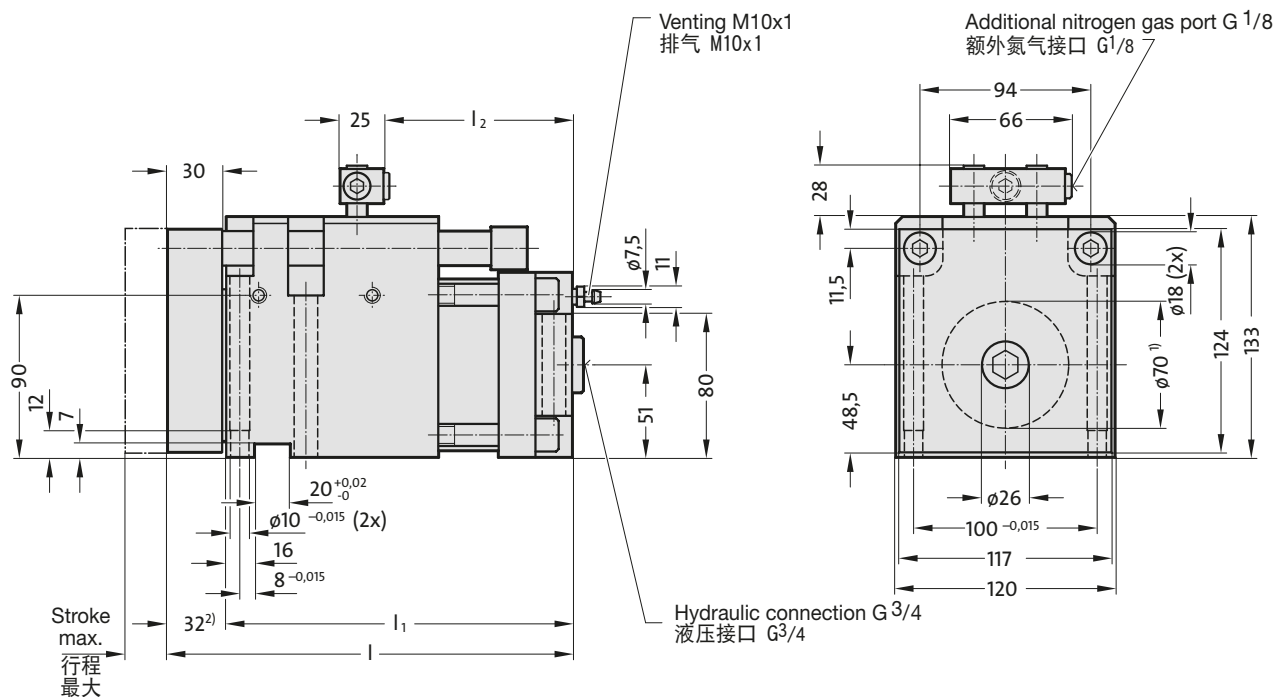


FIBRO

2018.11.06000. _ _ _ .1

Install together with measuring hose and control fitting (gas spring and nitrogen connection are valveless).
Duplicate nitrogen gas ports for connecting the measuring hose.
Use only one port whilst keeping the other one closed.

配合测量软管和控制配件使用（空气弹簧和氮气接口均无阀门）。
有两个氮气接口可用于连接测量软管。
仅使用其中一个接口（另一个保持封闭）。



Note:

- ¹⁾ The punch should preferably be mounted in the middle of the piston rod. It can also be located in the shaded area if necessary. A guide bolster with external guide to absorb the lateral forces should be provided for coping and cutting operations.
- ²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

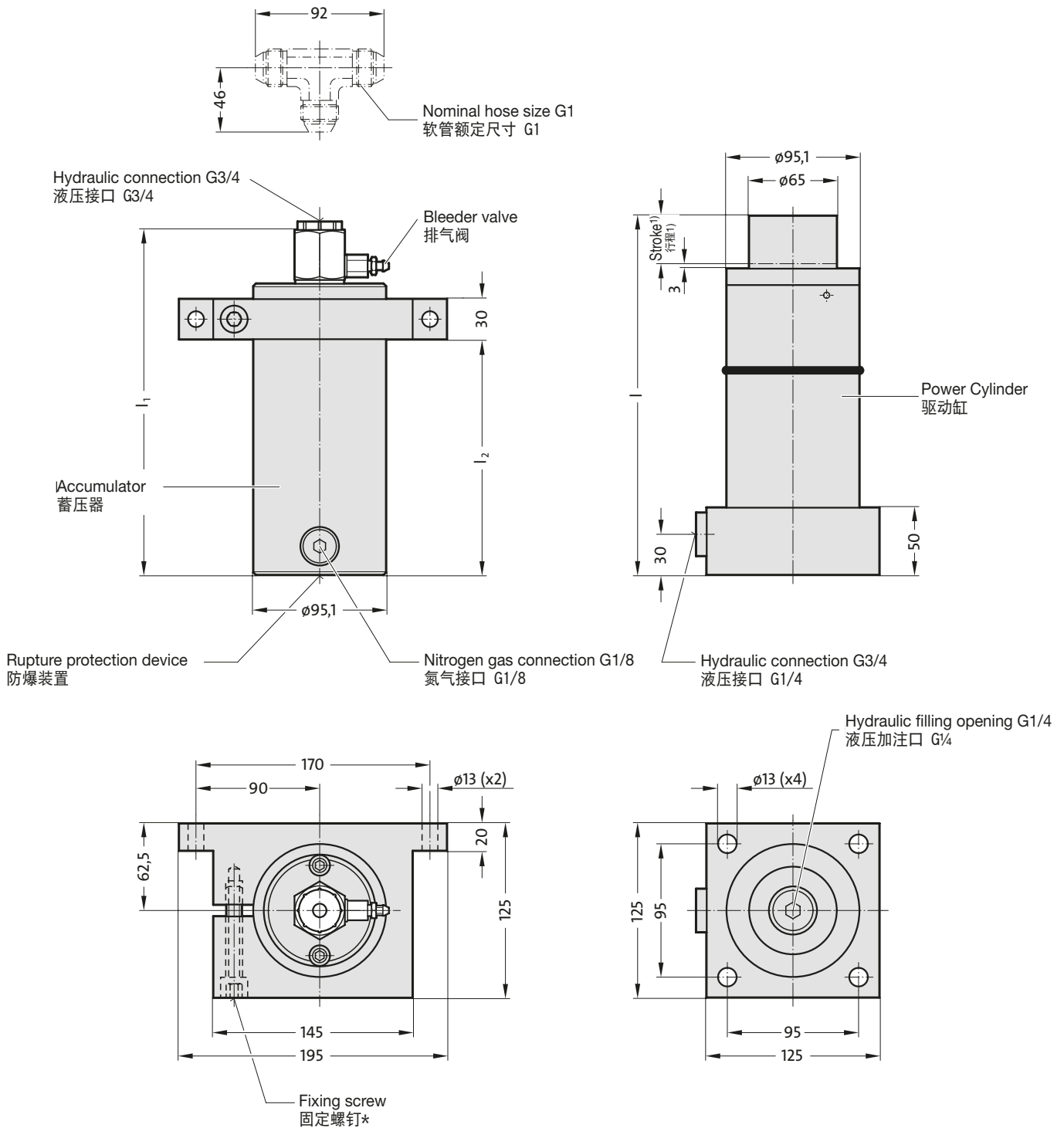
提示:

- ¹⁾ 首先将冲头放置于活塞杆的中间。必要时，可将冲头置于标记范围内。执行剪切和切削操作时，必须配备一个外部导向装置，以便吸收产生的侧向力。
- ²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018.11.06000. _ _ _ .1 Compact Cam 60 kN with gas monitoring connection 紧凑型模具滑阀 60 kN 带气体监控接口

Order no 订货编号	Stroke max. 行程最大	e	l	l_1	l_2	Restoring force in kN at 180 bar 复位力 kN 180 bar 时	
						Stroke start 行程初始	Stroke end 行程结束
2018.11.06000.024.1	24	137	223	191	103	7	10,6
2018.11.06000.049.1	49	162	248	216	153	7	10,6
2018.11.06000.099.1	99	212	298	266	228	7	10,6

2018.25.06000.



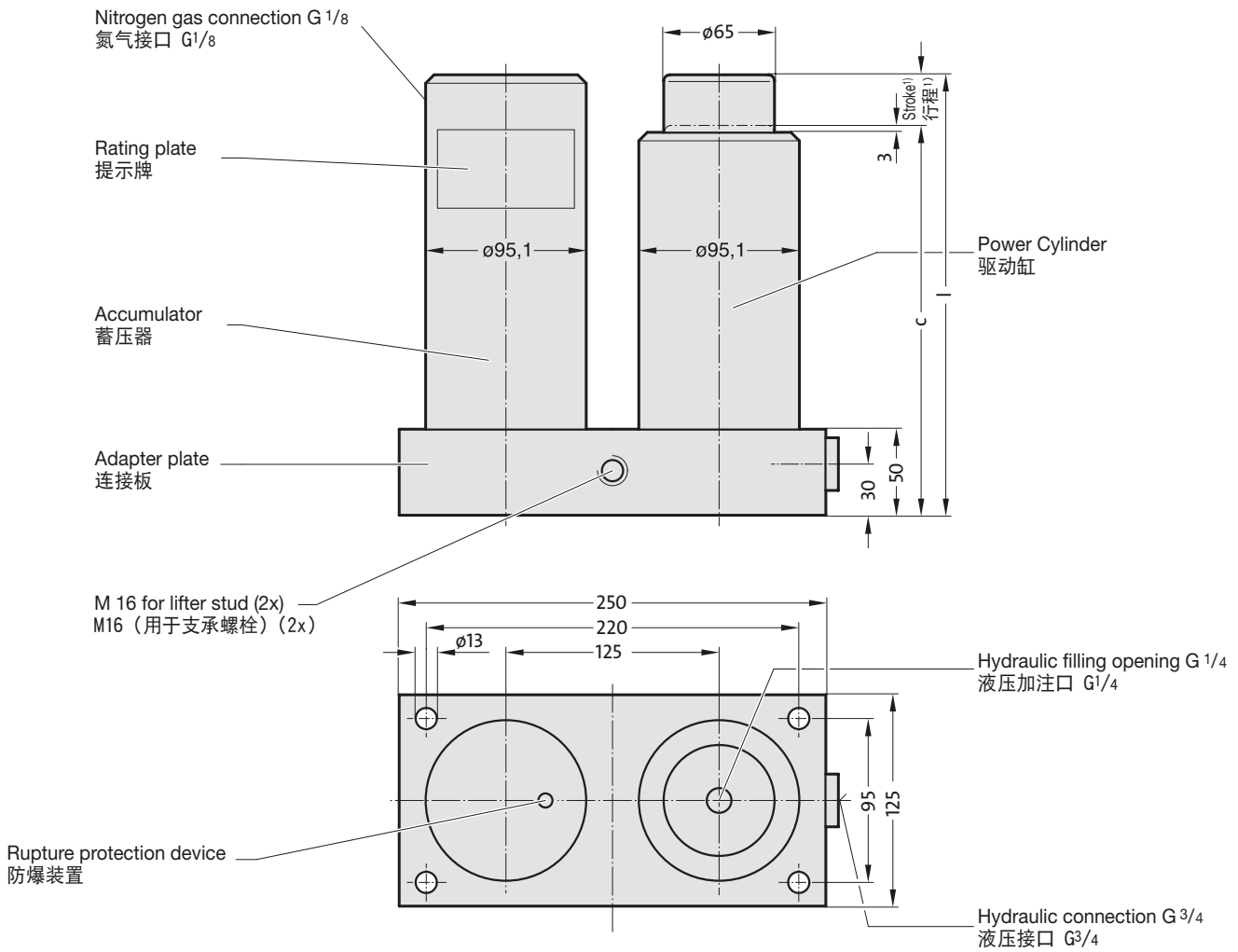
* Tighten M12 fixing screw to 91 Nm
* 使用 91 Nm 拧紧固定螺栓 (M12)

¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.25.06000. Power Unit 60 kN with separate Accumulator
工作气缸 60 kN 带单独蓄压器

Order no 订货编号	Stroke +10 ¹⁾ 行程 +10 ¹⁾	l	l ₁	l ₂
2018.25.06000.035	35	258	247	168
2018.25.06000.060	60	308	296	218
2018.25.06000.110	110	408	396	318
2018.25.06000.160	160	508	496	418

2018.20.06000.

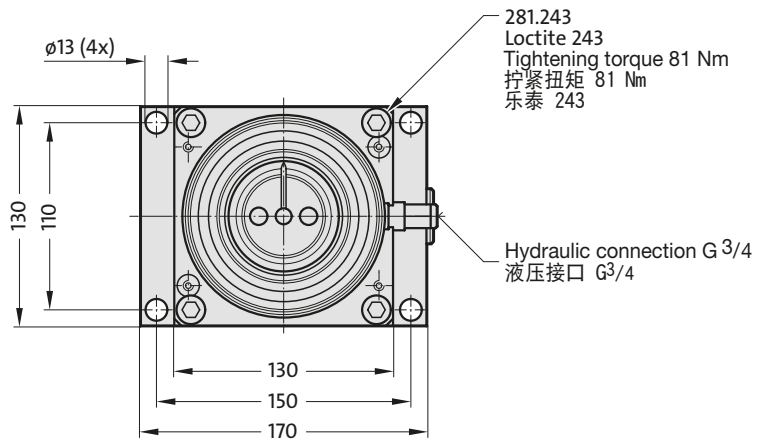
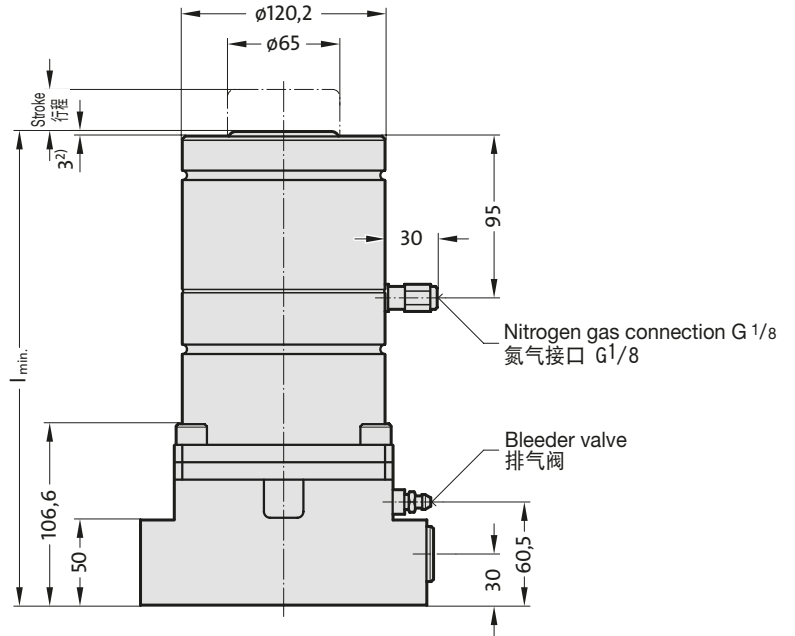
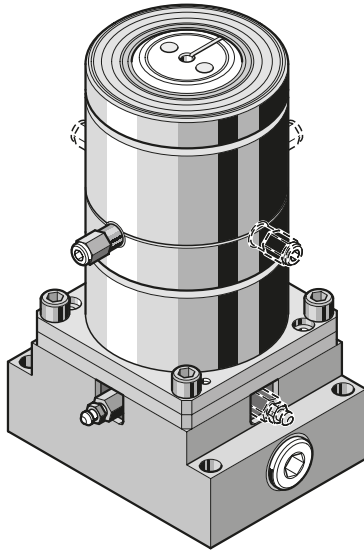


¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.20.06000. Power Unit 60 kN – 驱动装置 60 kN

Order no 订货编号	c	l	Stroke +10 ¹⁾ 行程 +10 ¹⁾
2018.20.06000.035	223	258	35
2018.20.06000.060	248	308	60
2018.20.06000.110	298	408	110
2018.20.06000.160	348	508	160

2018.45.09000.



²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

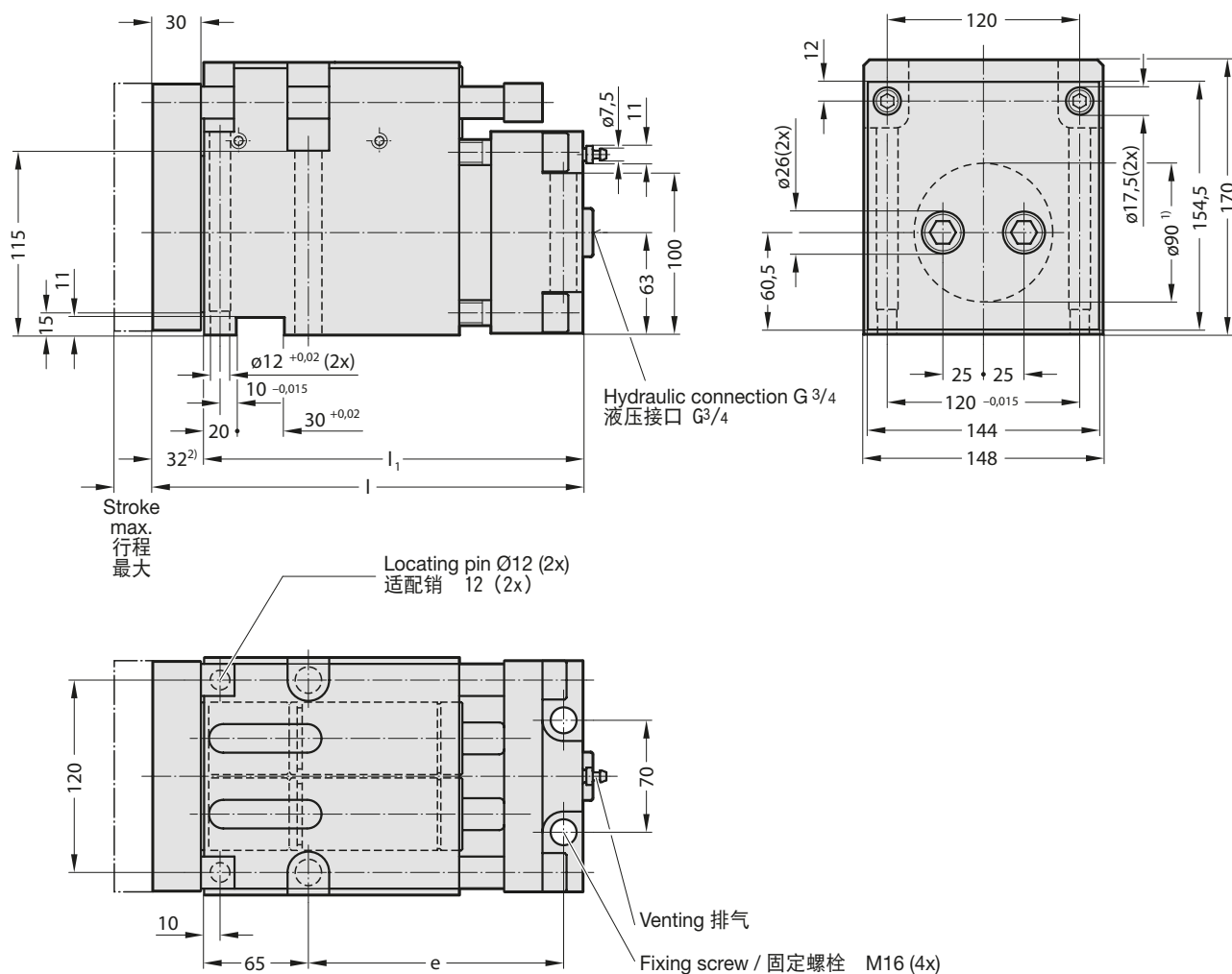
2018.45.09000. Force Cylinder 90 kN with base plate – 90 kN 带底架

Restoring force in kN* at 20 bar (max. 40 bar)
20 bar 时 (最大 40 bar) 的复位力 kN*

Order no 订货编号	Stroke 行程	l_{min}	行程 初始	行程 结束
2018.45.09000.025	25	279	9,1	18,1
2018.45.09000.050	50	329	9,1	18,1
2018.45.09000.100	100	429	9,1	18,1
2018.45.09000.150	150	529	9,1	18,1

* isothermic 等温

2018.11.09000.



Note:

- The punch should preferably be mounted in the middle of the piston rod. It can also be located in the shaded area if necessary. A guide bolster with external guide to absorb the lateral forces should be provided for coping and cutting operations.
- The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

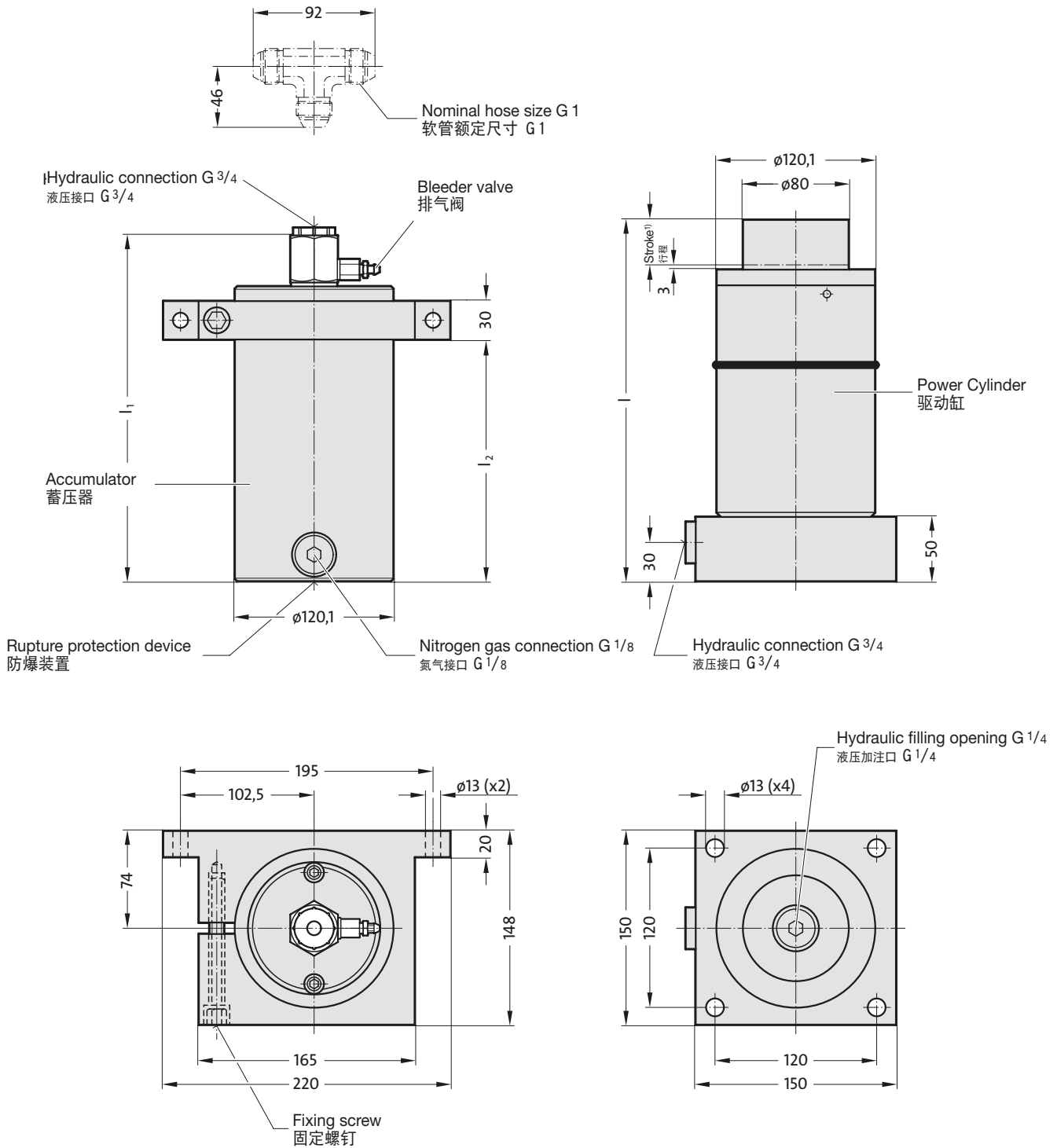
提示:

- 首先将冲头放置于活塞杆的中间。必要时，可将冲头置于标记范围内。执行剪切和切削操作时，必须配备一个外部导向装置，以便吸收产生的侧向力。
- 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

2018.11.09000. Compact Cam 90 kN – 模具滑阀 90 kN 紧凑型

Order no 订货编号	Stroke max. 行程 最大	e	l	l ₁	Restoring force in kN at 150 bar 复位力 kN150 bar 时	
					Stroke start 行程 初始	Stroke end 行程 结束
2018.11.09000.024	24	159	268	236	10	14,6
2018.11.09000.049	49	184	293	261	10	14,4
2018.11.09000.099	99	234	343	311	10	14,2

2018.25.09000.



* Tighten M12 fixing screw to 91 Nm
* 使用 91 Nm 拧紧 固定螺栓 (M12)

¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.25.09000. Power Unit 90 kN with separate Accumulator – 工作气缸 90 kN带单独蓄压器

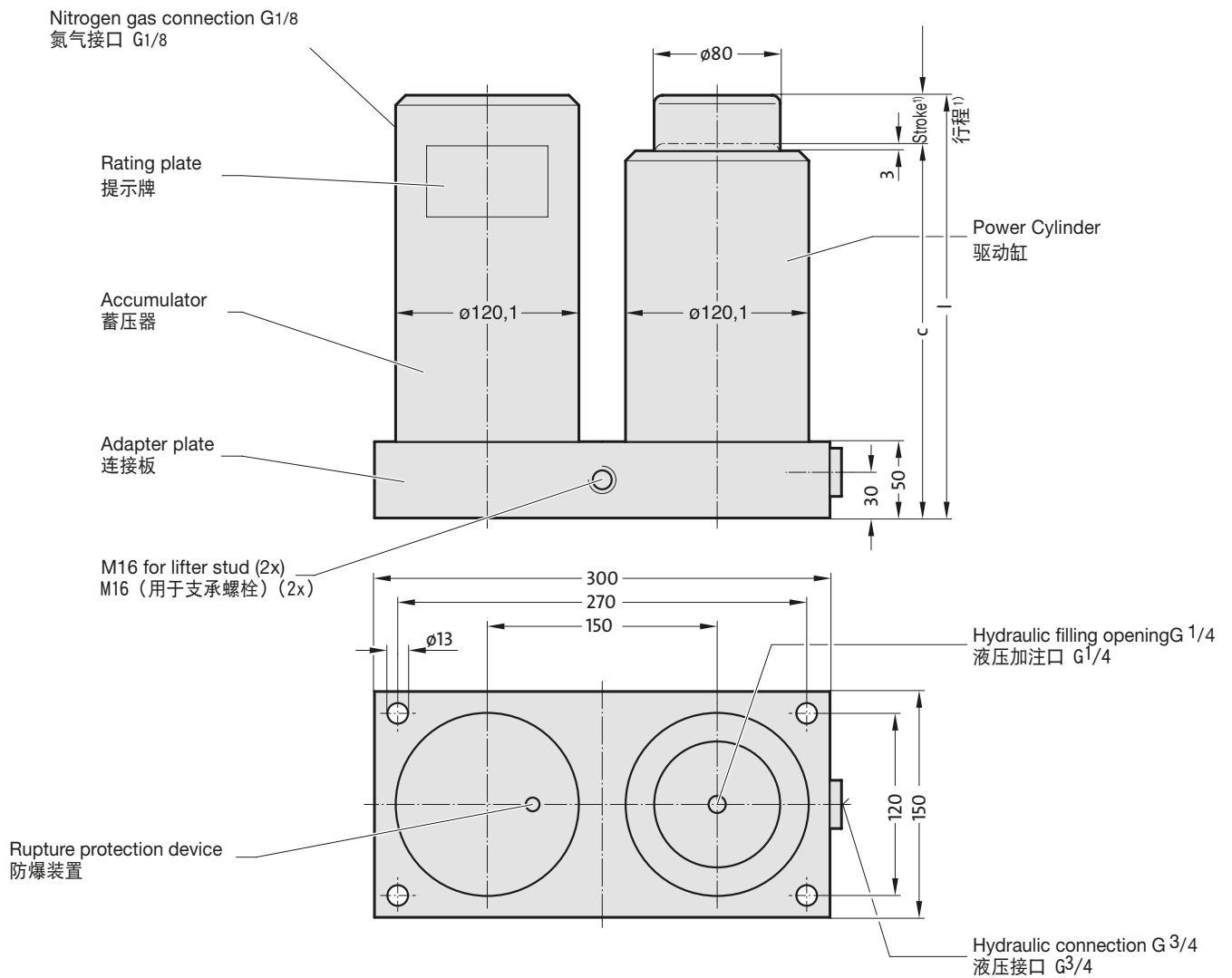
Order no 订货编号	Stroke +10 ¹⁾ 行程+10 ¹⁾	l	l ₁	l ₂
2018.25.09000.035	35	276	265	186
2018.25.09000.060	60	326	315	236
2018.25.09000.110	110	426	415	336
2018.25.09000.160	160	526	514	436

Power Unit 90 kN

发送器 驱动装置 90 kN



2018.20.09000.



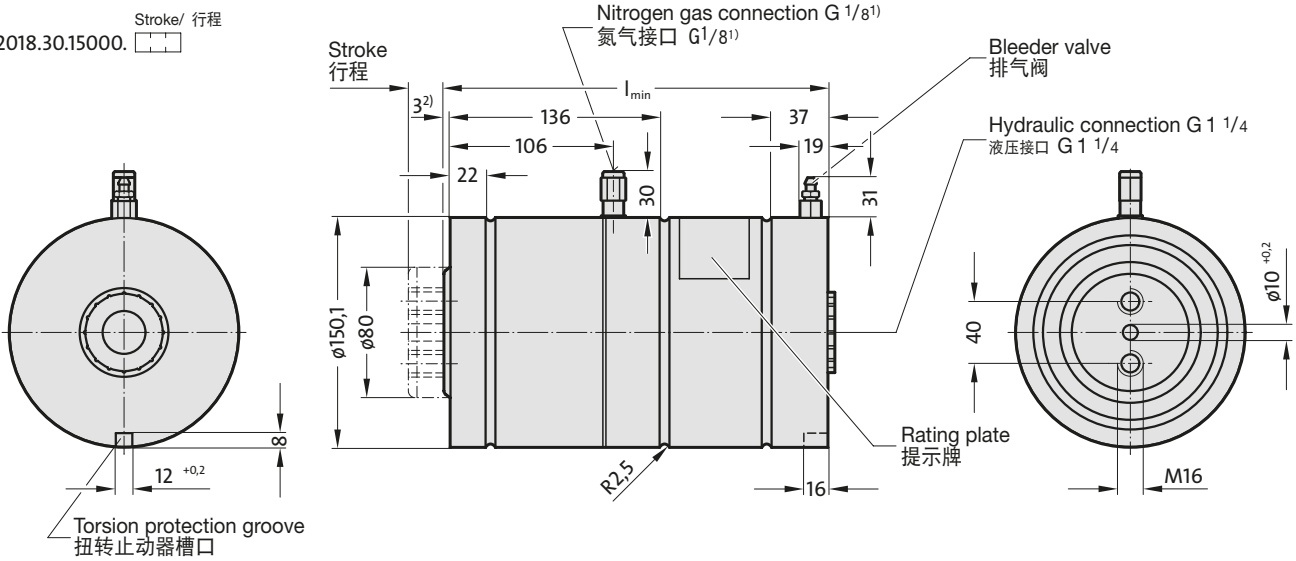
¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.
¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.20.09000. Power Unit 90 kN – 驱动装置 90 kN

Order no 订货编号	c	l	Stroke +10 ¹⁾ 行程 +10 ¹⁾
2018.20.09000.035	241	276	35
2018.20.09000.060	266	326	60
2018.20.09000.110	316	426	110
2018.20.09000.160	366	526	160

2018. __ .15000.

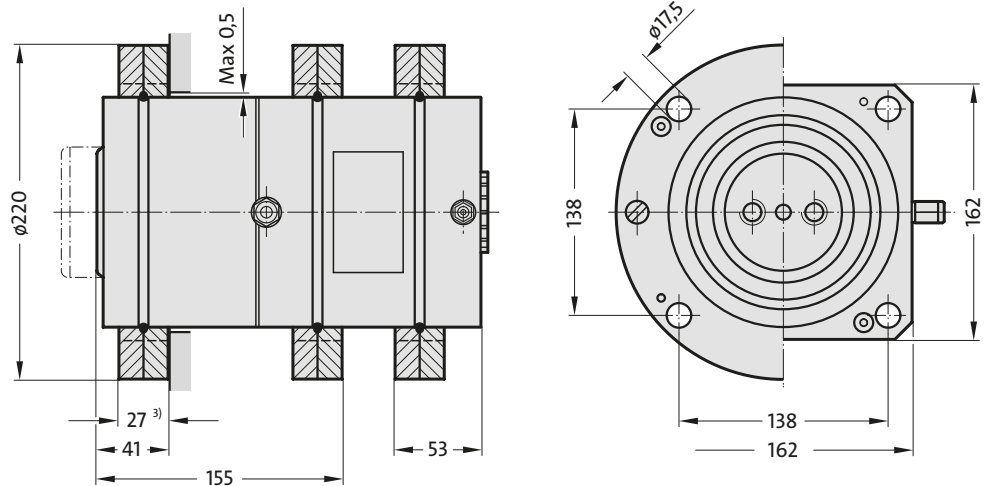
2018.30.15000.



2018.50.15000.

2018.60.15000.

- Spare parts
备件
Mounting flanges
张紧法兰
⊙ 2480.055.07500
□ 2480.057.07500



¹⁾ Nitrogen gas connector: caution – before removing the connector check that the cylinder has no gas pressure.

²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

³⁾ This fastening may only be subjected to pressure (by support).

¹⁾ 氮气接口：小心，拆除接口前应检查气缸内是否无任何气体压力。

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

³⁾ 仅限通过压力（朝向底座）拉紧该固定装置。

2018. __ .15000. Force Cylinder 150 kN – 工作气缸 150 kN

Restoring force in kN* at 20 bar (max. 40 bar)
20 bar 时（最大 40 bar）的复位力 kN*

Order no 订货编号	Stroke max. 行程 最大	l_{min}	Stroke start 行程 初始	Stroke end 行程 结束
2018. __ .15000.025	25	250	14,5	29,0
2018. __ .15000.050	50	300	14,5	29,0
2018. __ .15000.100	100	400	14,5	29,0
2018. __ .15000.150	150	500	14,5	29,0

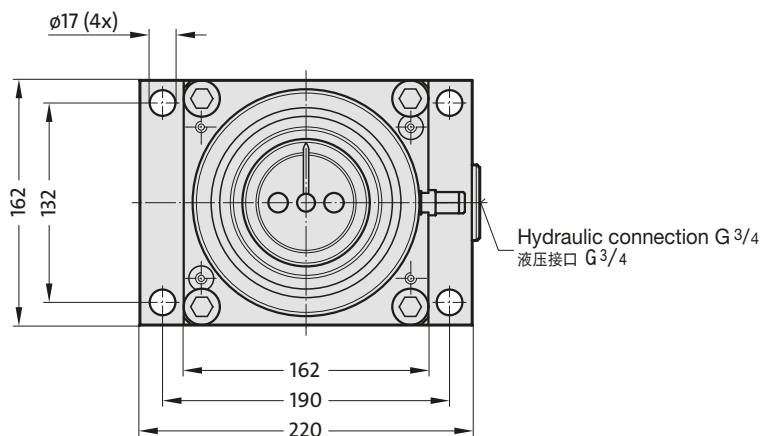
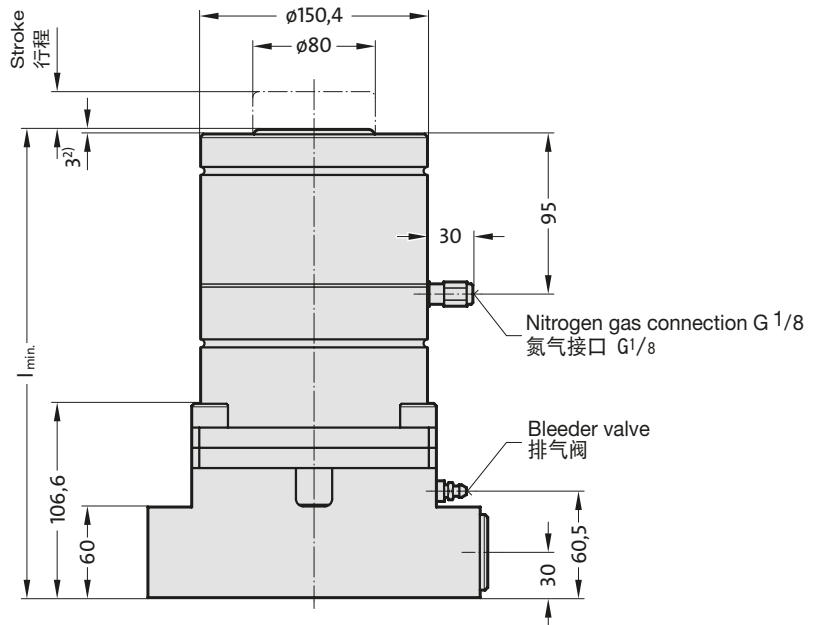
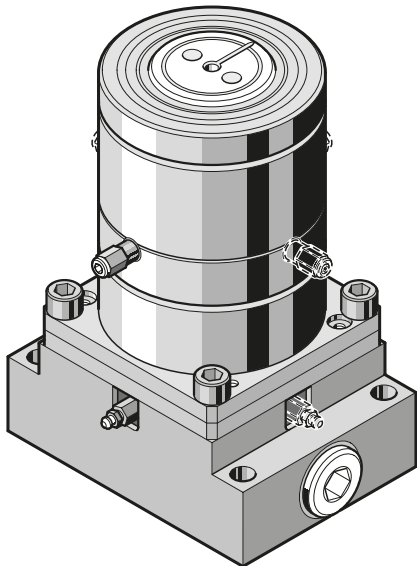
* isothermic 等温

Cam Unit
Force Cylinder 150 kN
with base plate

接收器
工作气缸 150 kN
带底架



2018.45.15000.



²⁾ The cam unit no longer returns completely to its stroke starting position due to the oil expansion which is attributable to the temperature. An allowance must be made for an increase of 3 mm to 6 mm.

²⁾ 由于油膨胀受到温度限制，因此，接收器不会完全返回至其行程初始位置。必须考虑增加 3 mm 至 6 mm。

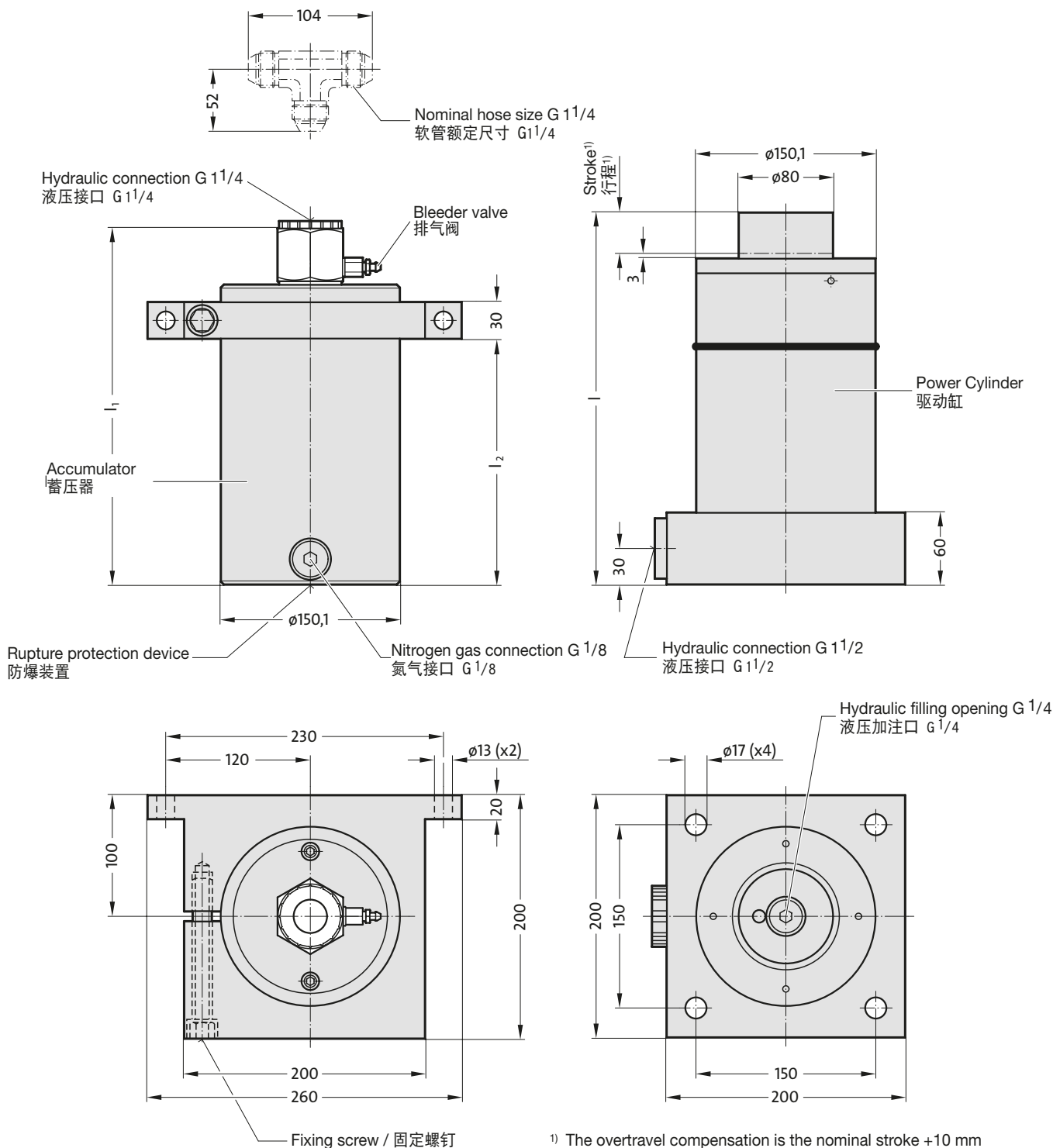
2018.45.15000. Force Cylinder 150 kN with base plate – 工作气缸 150 kN 带底架

Restoring force in kN* at 20 bar (max. 40 bar)
20 bar 时 (最大 40 bar) 的复位力 kN*

Order no 订货编号	Stroke 行程	l_{min}	Stroke _{start} 行程 初始	Stroke _{end} 行程 结束
2018.45.15000.025	25	310	14,5	29,0
2018.45.15000.050	50	360	14,5	29,0
2018.45.15000.100	100	460	14,5	29,0

* isothermic

2018.25.15000.



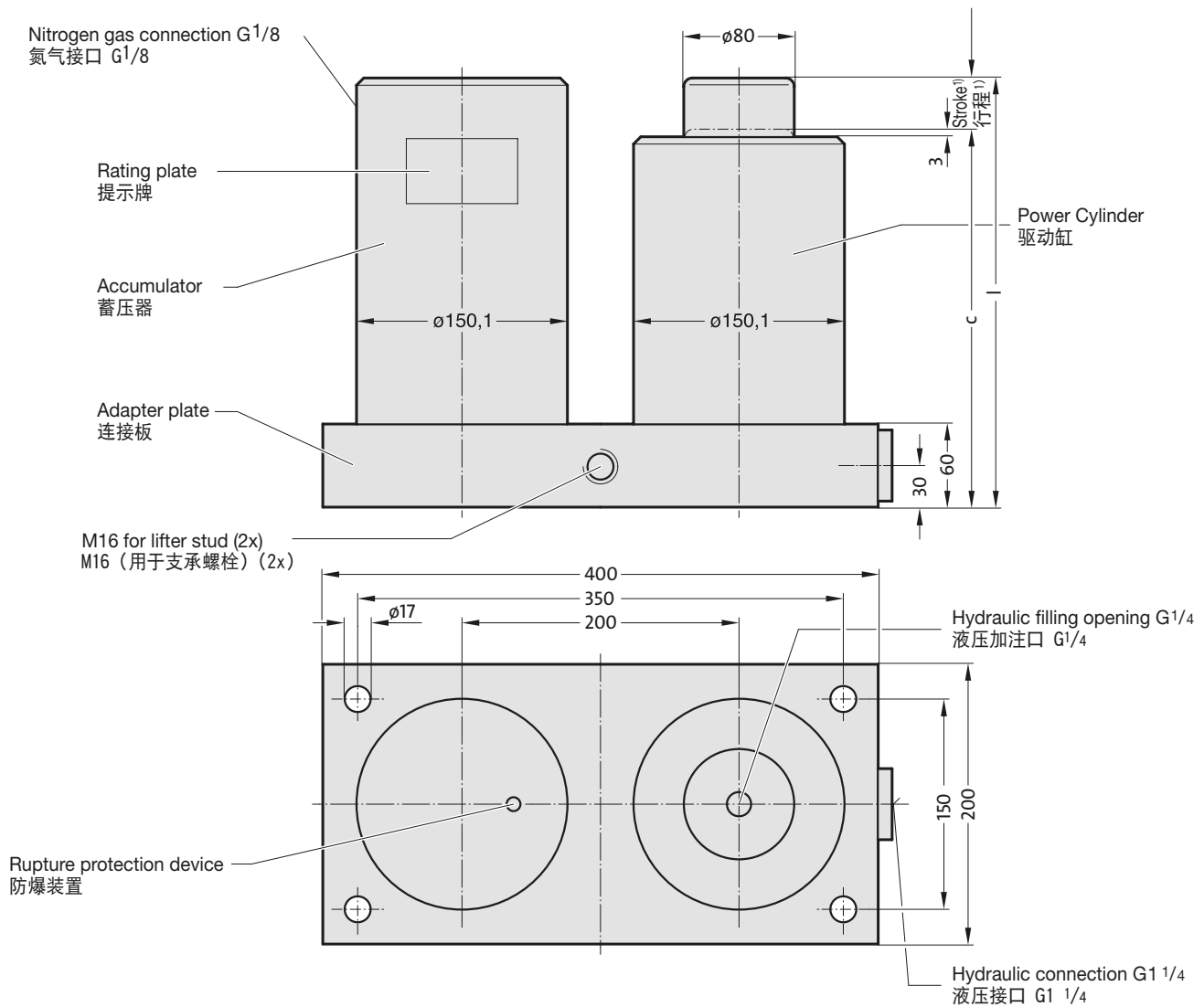
* Tighten M12 fixing screw to 91 Nm
* 使用 91 Nm 拧紧固定螺栓 (M12)

1) The overtravel compensation is the nominal stroke +10 mm additional stroke.
1) 额定行程 + 10 mm 额外行程为超行程补偿。

2018.25.15000. Power Unit 150 kN with separate Accumulator
发送器 工作气缸 150 kN 带单独蓄压器

Order no 订货编号	Stroke +10 ¹⁾ 行程+10 ¹⁾	l	l ₁	l ₂
2018.25.15000.035	35	307	294	207
2018.25.15000.060	60	357	344	257
2018.25.15000.110	110	457	444	357
2018.25.15000.160	160	557	544	457

2018.20.15000.



¹⁾ The overtravel compensation is the nominal stroke + 10 mm additional stroke.

¹⁾ 额定行程 + 10 mm 额外行程为超行程补偿。

2018.20.15000. Power Unit 150 kN
发送器 驱动装置 150 kN

Order no 订货编号	c	l	Stroke +10 ¹⁾ 行程+10 ¹⁾
2018.20.15000.035	272	307	35
2018.20.15000.060	297	357	60
2018.20.15000.110	347	457	110

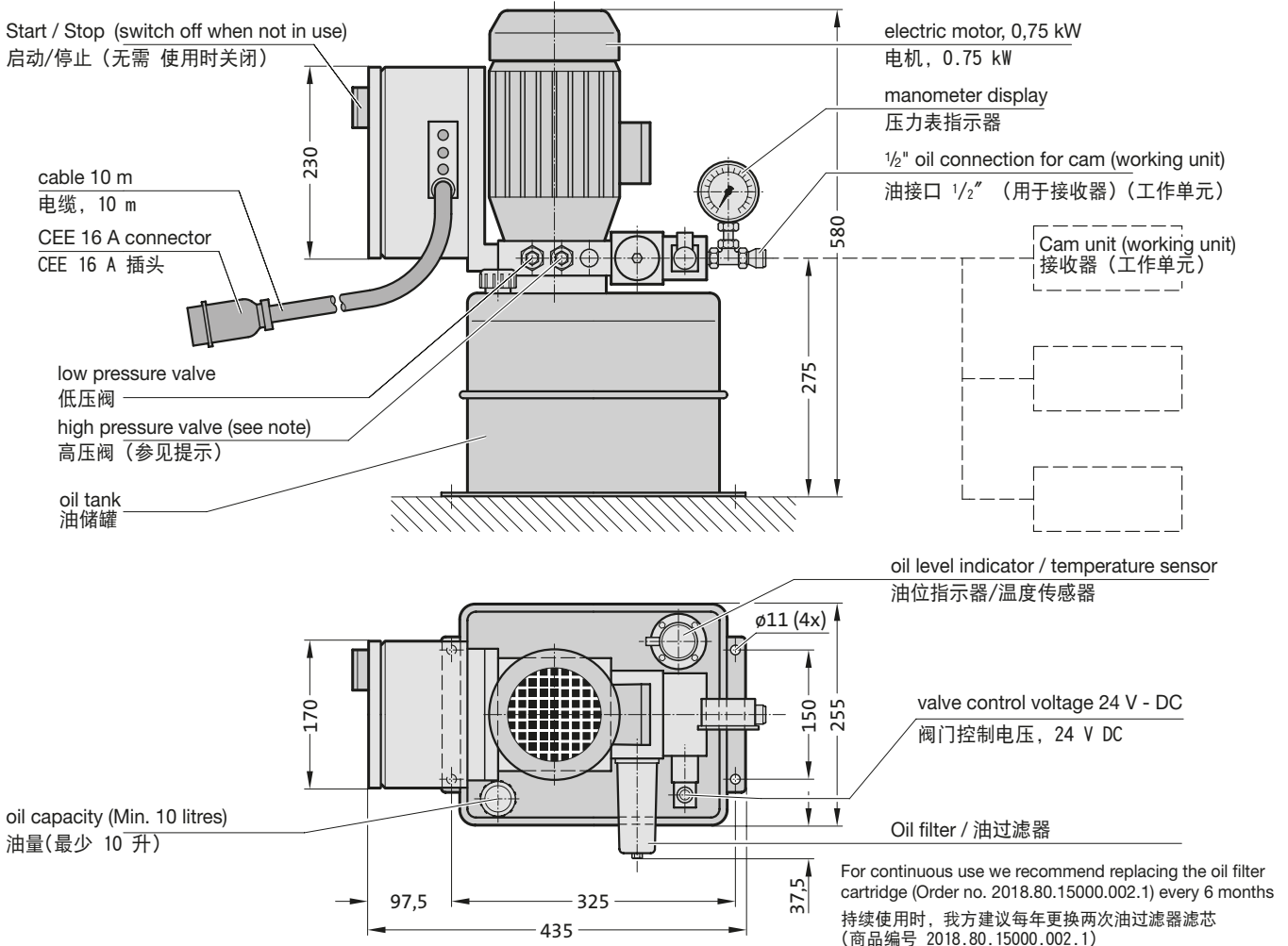
**Electric
hydraulic pump
电子液压泵**

Electric hydraulic pump

电子液压泵

2018.80.15000

Start / Stop (switch off when not in use)
启动/停止 (无需 使用时关闭)



Note!
The pressure can be set at both valves. We recommend setting the low pressure valve to 25 bar. The high pressure valve can be set to a maximum of 180 bar. The value to be set depends on the operational requirements.

提示!
可在两个阀门上调节压力。我方建议将低压阀设置为 25 bar。高压阀可最高设置为 180 bar。设置值取决于所执行操作的需求。

Technical specifications – hydraulic system
技术参数 – 液压系统

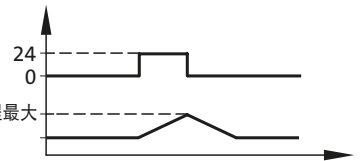
Oil tank volume / 油储罐容量	15 l
Hydraulic oil ISO VG 32 液压油 ISO VG 32	DIN 51524 HVL P (or similar) DIN 51524 HVL P (或同类产品)
Min. flow at 180 bar 180 bar 时的最小容积流量	1,6 l/min.
Max. flow at 25 bar 25 bar 时的最大容积流量	8,7 l/min.
Oil pressure when extending and retracting 驶入和驶出时的油压	10-20 bar
Oil pressure during operation 操作过程中的油压	max. 180 bar 最大 180 bar
Low and high pressure valves 低压和高压阀	(see note) (参见提示)

Technical specifications – electrical system
技术参数 – 电子系统

Power supply electrical pump 电子泵主电压	3x220-440 V-AC 50-60 Hz
Control voltage & control valve 控制阀上的控制电压	24 V-DC
max. oil temperature / 最大油温	70+/-5°C
Reset switch-on temperature after overheating 过热后的重启温度	50°

Control signal 24 V - DC
控制信号 24 V - DC

Cam unit (working unit)**
接收器 (工作单元)**



Cam speeds* 接收器速度*

Size of cam 接收器尺寸	When extending and retracting (Low pressure phase) 驶入和驶出时 (低压阶段)	during operation (high pressure phase) 操作过程中 (高压阶段)
2018.11.01500.	115 mm/s	21 mm/s
2018.11.04000.	47 mm/s	9 mm/s
2018.11.06000.	29 mm/s	5 mm/s
2018.11.09000.	18 mm/s	3 mm/s
2018.11.15000.	12 mm/s	2 mm/s

* The table shows the approximate speeds of one cam unit connected to an electric hydraulic pump. If several cam units are connected to an electric hydraulic pump to obtain the speed of each, divide by the number of cam units.
Example: 3 x 2018.11.01500.024 : 115 mm/s = 38 mm/s

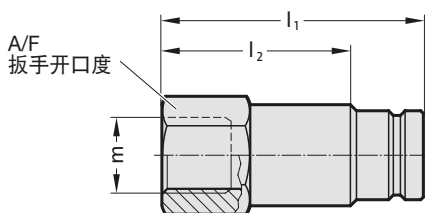
** The control signal (24 V DC) triggers extension of the piston rod and the gas overpressure in the cam unit causes retraction.

* 表中所示为连接至电子液压泵的单个接收器的安全速度。如果将多个接收器与一个电子液压泵相连, 则必须将速度除以接收器的数量。

示例: 3 x 2018.11.01500.024 : 115 mm/s = 38 mm/s

** 通过控制信号 (24 V DC) 激活活塞杆 驶出, 通过接收器 (工作单元) 内产生的气体超压驶出。

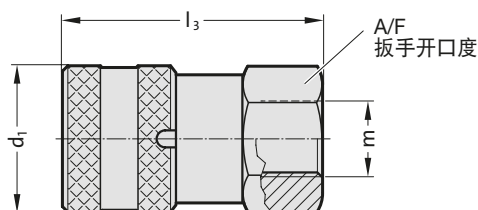
2018.00.10.00.02.1 Quick-release coupling, male section / 插头快速接头



Order no 订货编号	Nominal hose size 软管 标称尺寸	m	Max pressure / Cam Unit speed 最大下压/ 接收器速度				
				l ₁	l ₂	A/F	*1
2018.00.10.00.02.1	DN 20	3/4	0,8 m/s	86	63	1 1/2	152

A/F = 扳手开口度

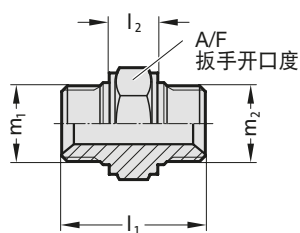
2018.00.10.00.02.2 Quick-release coupling, female section / 套筒快速接头



Order no 订货编号	Nominal hose size 软管 标称尺寸	m	Max pressure / Cam Unit speed 最大下压/ 接收器速度				
				l ₃	A/F	d ₁	*1
2018.00.10.00.02.2	DN 20	3/4	0,8 m/s	89	1 3/4	49	152

A/F = 扳手开口度

2018.00.26.02. Quick-release coupling, screw-in adapter (SK) / 快速接头旋入式螺栓连接 (SK)



Order no 订货编号	Nominal hose size 软管 标称尺寸					A/F 扳手开口度
		m ₁	m ₂	l ₁	l ₂	
2018.00.26.02.01	DN20	3/4	1/2	44,5	15	32
2018.00.26.02.02	DN20	3/4	3/4	46	15	32

- m₁ = Coupling thread for Power Unit / Cam Unit
- m₂ = Coupling thread for quick-release coupling male/female section
- m₁ = 接口螺纹发送器/接收器
- m₂ = 接口螺纹插头/套筒

Check the press or Cam Unit speed before using the quick-release coupling.

Turn the ring to secure the coupling.

Do not open while the oil is still warm or under pressure.

Note:

Only for use with 2018.80.15000 electric hydraulic pump.

使用快速接头前，检查下压或接收器速度。

通过旋拧圆环固定接头。

当油热或处于压力时，切勿打开！

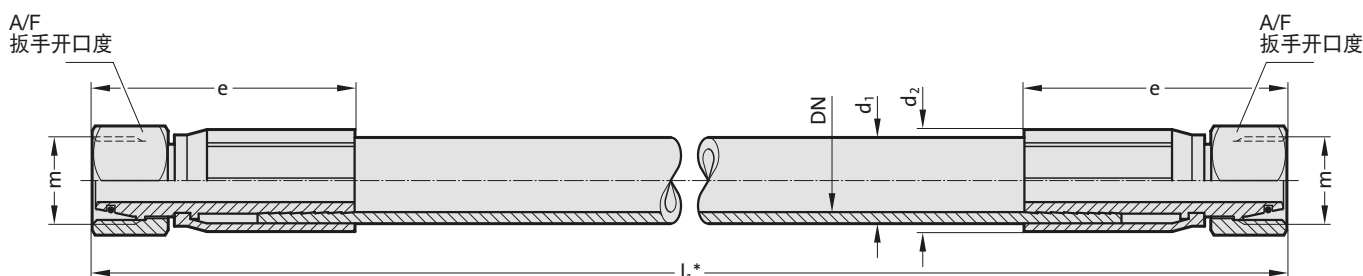
注意：

仅用于2018.80.15000电动液泵

Accessories

附件

2018.00.25.01. Hose with conical seals, union nut and O ring (straight/straight)
软管 - 带锁紧螺母和 O 形环的密封锥 (直/直)



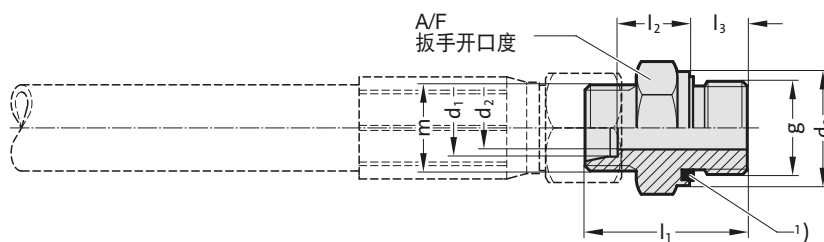
Dimension l_1 specified in the order, e. g. 765 mm, gives order no. 2018.00.25.01.XX.0765
由订购方确定尺寸 l_1 , 例如, 订货编号 2018.00.25.XX.0765 表示 765 mm

Note: 45° and 90° elbow hoses are not available. Instead use 2018.00.26.21./22. adapters.
提示: 不提供 45° 或 90° 的弯角软管。为此, 应使用相应的适配器 2018.00.26.21./22.。

2018.00.25.01. Hose with conical seals, union nut and O ring (straight/straight)
软管 - 带锁紧螺母和 O 形环的密封锥 (直/直)

Order no 订货编号	l_1	DN	Recommended for Power Unit size 2018.20. 建议用于 发送器尺寸 2018.20.	Hose connector thread M with (24° cone) 软管螺纹 M m (24° 圆锥)	d_1	d_2	e	A/F	Minimum bend radius 最小 弯曲半径	Shortest factory length 最短 生产长度
2018.00.25.01.01.	12	12	01500.	M24x1,5	24	28,5	63	30	90	150
2018.00.25.01.02.	20	20	04000.	M30x2	31	35	72	36	120	165
2018.00.25.01.03.	25	25	06000.	M36x2	38	44	88	46	150	200
			09000.	M36x2	38	44	88	46	150	200
2018.00.25.01.04.	32	32	15000.	M42x2	50	55	114	50	250	250

2018.00.26.03. Threaded connector, straight – G / 接口螺栓连接 – G, 直



1) Eolastic seal ED
1) Eolastic 密封件 ED

2018.00.26.03. Threaded connector, straight – G / 接口螺栓连接 – G, 直

Order no 订货编号	Nominal hose size 软管 标称尺寸	Hose connector thread m 软管接口 螺纹 m	Standard unit thread g 单元接口 螺纹 g	d_1	d_2	d_3	l_1	l_2	l_3	A/F 扳手开口度
2018.00.26.03.01.01	DN 12	M24x1,5	G 1/2	16	12	27	41	18,5	14	27
2018.00.26.03.01.02	DN 12	M24x1,5	G 3/4	16	12	32	45	20,5	16	32
2018.00.26.03.02.01	DN 20	M30x2	G 1/2	20	12	27	45	20,5	14	32
2018.00.26.03.02.02	DN 20	M30x2	G 3/4	20	16	32	47	20,5	16	32
2018.00.26.03.02.04	DN 20	M30x2	G 1 1/4	20	16	50	53	22,5	20	50
2018.00.26.03.03.01	DN 25	M36x2	G 1/2	25	12	27	49	23	14	41
2018.00.26.03.03.02	DN 25	M36x2	G 3/4	25	16	32	51	23	16	41
2018.00.26.03.03.03	DN 25	M36x2	G 1	25	20	40	53	23	18	41
2018.00.26.03.03.04	DN 25	M36x2	G 1 1/4	25	20	50	55	23	20	50
2018.00.26.03.04.03	DN 32	M42x2	G 1	30	20	40	55	23,5	18	46
2018.00.26.03.04.04	DN 32	M42x2	G 1 1/4	30	25	50	57	23,5	20	50

Ordering Code (example):

订货示例:

Threaded connector, straight 接口螺栓连接, 直 = 2018.00.26.03.

Nominal size DN 25 标称尺寸 DN 25 = 03.

Male thread G 1/2 旋入螺纹 G 1/2 = 01

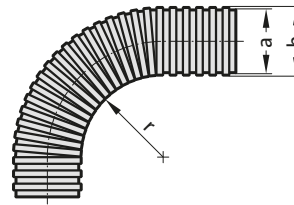
Order no 订货编号 = 2018.00.26.03.01

2018.00.25.00.01. Anti-scuff hose /
螺旋形保护软管

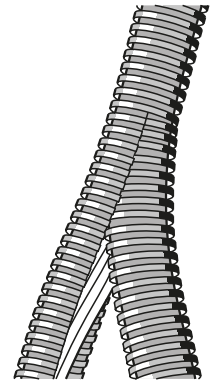
Order no 订货编号	l [m] l [单位:m]	DN	a	b	r
2018.00.25.00.01.01.01	1	12	26,6	34,5	180
2018.00.25.00.01.01.02	2	12	26,6	34,5	180
2018.00.25.00.01.01.03	3	12	26,6	34,5	180
2018.00.25.00.01.01.05	5	12	26,6	34,5	180
2018.00.25.00.01.02.01	1	20	33,9	42,6	200
2018.00.25.00.01.02.02	2	20	33,9	42,6	200
2018.00.25.00.01.02.03	3	20	33,9	42,6	200
2018.00.25.00.01.02.05	5	20	33,9	42,6	200
2018.00.25.00.01.03.01	1	25	45,1	54,5	240
2018.00.25.00.01.03.02	2	25	45,1	54,5	240
2018.00.25.00.01.03.03	3	25	45,1	54,5	240
2018.00.25.00.01.03.05	5	25	45,1	54,5	240
2018.00.25.00.01.04.01	1	32	64,3	80,3	235
2018.00.25.00.01.04.02	2	32	64,3	80,3	235
2018.00.25.00.01.04.03	3	32	64,3	80,3	235
2018.00.25.00.01.04.05	5	32	64,3	80,3	235

2018.00.25.00.01.
Anti-scuff hose for subsequent
installation over hose

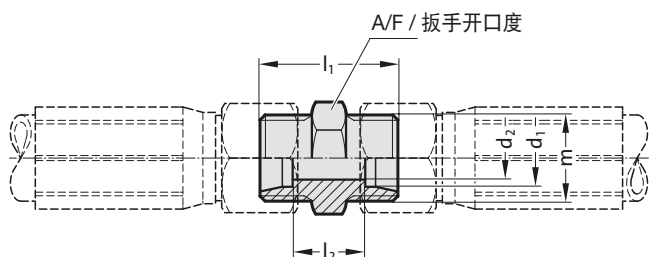
螺旋形保护软管
用于事后安装于软管上



Material: polyamide black
材料: 黑色聚酰胺



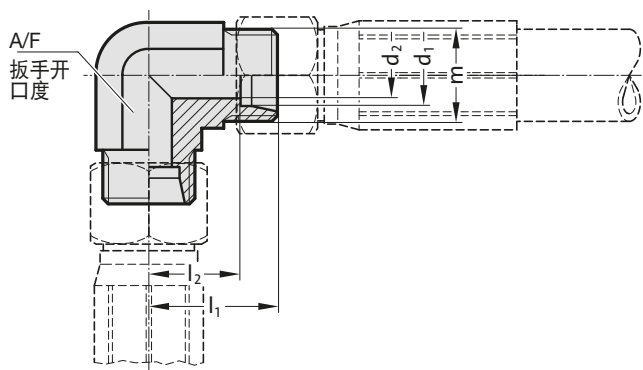
2018.00.26.25. Adapter straight, hose – hose / 适配器，直，软管-软管



Order no 订货编号	DN*	Hose connector 软管接口 螺纹 Mm	d ₁	d ₂	l ₁	l ₂	A/F 扳手开口度
2018.00.26.25.01	DN 12	M24x1,5	16	12	38	21	27
2018.00.26.25.02	DN 20	M30x2	20	16	44	23	31
2018.00.26.25.03	DN 25	M36x2	25	20	50	26	41
2018.00.26.25.04	DN 32	M42x2	30	25	54	27	46

* DN = clear width of hose
* DN = 软管的净宽度

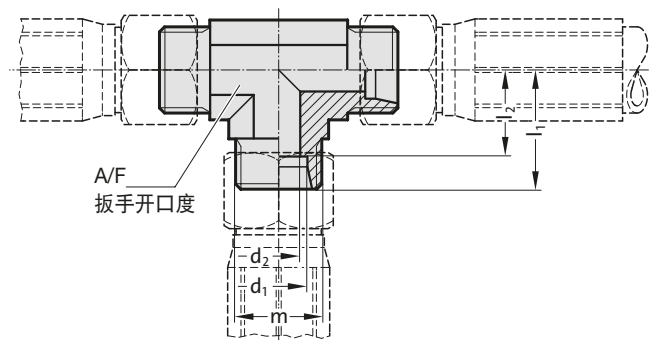
2018.00.26.26. 90° adapter, hose – hose / 适配器，90°，软管-软管



Order no 订货编号	DN*	Hose connector 软管接口 螺纹 Mm	d ₁	d ₂	l ₁	l ₂	A/F 扳手开口度
2018.00.26.26.01	DN 12	M24x1,5	16	12	33	24,5	24
2018.00.26.26.02	DN 20	M30x2	20	16	37	26,5	27
2018.00.26.26.03	DN 25	M36x2	25	20	42	30	36
2018.00.26.26.04	DN 32	M42x2	30	25	49	35,5	41

* DN = clear width of hose
* DN = 软管的净宽度

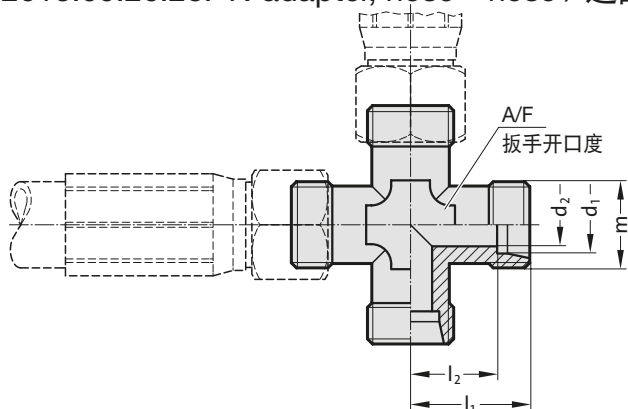
2018.00.26.27. T-adapter, hose – hose / 适配器，T形，软管-软管



Order no 订货编号	DN*	Hose connector 软管接口 螺纹 Mm	d ₁	d ₂	l ₁	l ₂	A/F 扳手开口度
2018.00.26.27.01	DN 12	M24x1,5	16	12	33	24,5	24
2018.00.26.27.02	DN 20	M30x2	20	16	37	26,5	27
2018.00.26.27.03	DN 25	M36x2	25	20	42	30	36
2018.00.26.27.04	DN 32	M42x2	30	25	49	35,5	41

* DN = clear width of hose
* DN = 软管的净宽度

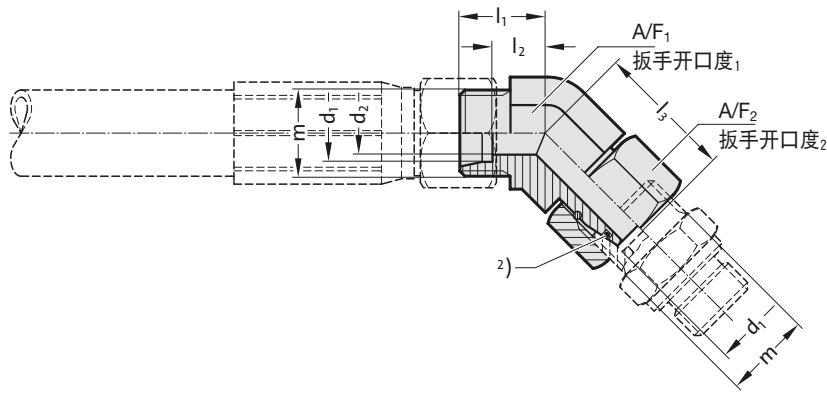
2018.00.26.28. K-adapter, hose – hose / 适配器，K形，软管-软管



Order no 订货编号	DN*	Hose connector 软管接口 螺纹 Mm	d ₁	d ₂	l ₁	l ₂	A/F 扳手开口度
2018.00.26.28.01	DN 12	M24x1,5	16	12	33	24,5	24
2018.00.26.28.02	DN 20	M30x2	20	16	37	26,5	27
2018.00.26.28.03	DN 25	M36x2	25	20	42	30	36
2018.00.26.28.04	DN 32	M42x2	30	25	49	35,5	41

* DN = clear width of hose
* DN = 软管的净宽度

2018.00.26.21.



2) = O-Ring
2) = O 形环

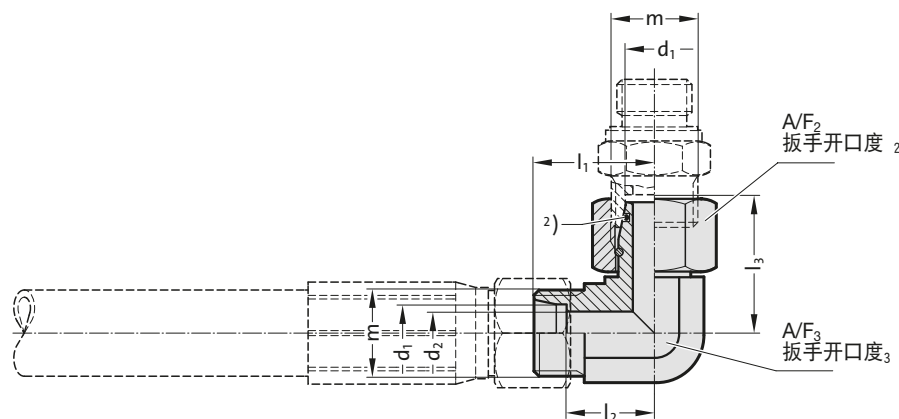
2018.00.26.21. 45° swivel coupling, complete / 可旋转 45° 螺栓连接, 套件

Order no 订货编号	Nominal hose size 软管 标称尺寸	Hose connector thread m 软管接口 螺纹 m	d ₁	d ₂	l ₁	l ₂	l ₃	A/F ₁ 扳手开口度 ₁	A/F ₂ 扳手开口度 ₂
2018.00.26.21.01	DN 12	M24x1,5	16	12	24	15,5	36,5	27	30
2018.00.26.21.02	DN 20	M30x2	20	16	26,5	16	44,5	30	36
2018.00.26.21.03	DN 25	M36x2	25	20	30,5	18,5	50	36	46
2018.00.26.21.04	DN 32	M42x2	30	25	37	23,5	55	50	50

Ordering Code (example):

45° swivel coupling 可旋转 45° 螺栓连接 = 2018.00.26.21.
Nominal size DN 25 标称尺寸 DN 25 = 03
Order no 订货编号 = 2018.00.26.21.03

2018.00.26.22.



2) = O-Ring
2) = O 形环

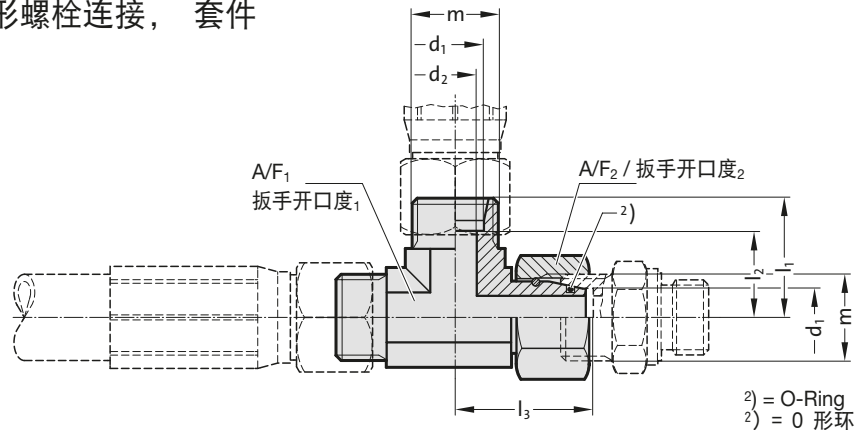
2018.00.26.22. 90° swivel coupling, complete / 可旋转 90° 螺栓连接, 套件

Order no 订货编号	Nominal hose size 软管 标称尺寸	Hose connector thread m 软管接口 螺纹 m	d ₁	d ₂	l ₁	l ₂	l ₃	A/F ₁ 扳手开口度 ₁	A/F ₂ 扳手开口度 ₂
2018.00.26.22.01	DN 12	M24x1,5	16	12	33	24,5	36,5	24	30
2018.00.26.22.02	DN 20	M30x2	20	16	37	26,5	44,5	27	36
2018.00.26.22.03	DN 25	M36x2	25	20	42	30	50	36	46
2018.00.26.22.04	DN 32	M42x2	30	25	49	35,5	55	41	50

Ordering Code (example):

90° swivel coupling 可旋转 90° 螺栓连接 = 2018.00.26.22.
Nominal size DN 25 标称尺寸 DN 25 = 03
Order no 订货编号 = 2018.00.26.22.03

2018.00.26.23. L swivel coupling, complete
2018.00.26.23.可旋转 L 形螺栓连接, 套件



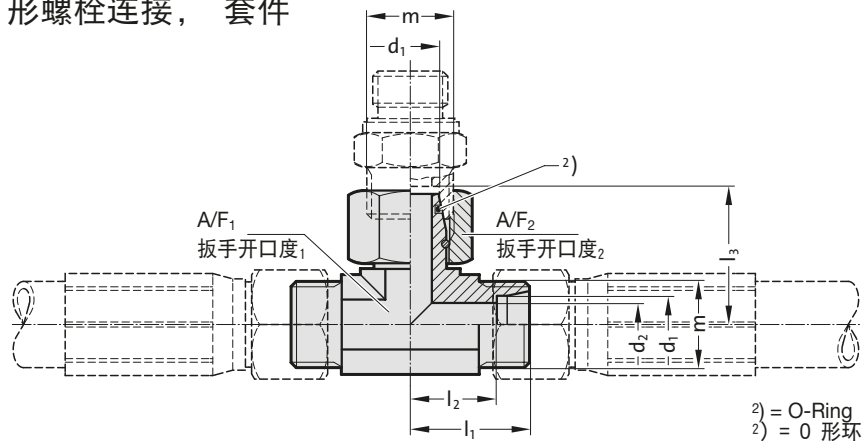
2018.00.26.23. L swivel coupling, complete / 可旋转 L 形螺栓连接, 套件

Order no 订货编号	Nominal hose size 软管 标称尺寸	Hose coupling thread m 软管接口 螺纹 m	d ₁	d ₂	l ₁	l ₂	l ₃	A/F ₁ 扳手开口度 ₁	A/F ₂ 扳手开口度 ₂
2018.00.26.23.01	DN 12	M24x1,5	16	12	33	24,5	36,5	24	30
2018.00.26.23.02	DN 20	M30x2	20	16	37	26,6	44,5	27	36
2018.00.26.23.03	DN 25	M36x2	25	20	42	30	50	36	46
2018.00.26.23.04	DN 32	M42x2	30	25	49	35,5	55	41	50

Ordering Code (example): 订货示例:

L swivel coupling 可旋转 L 形螺栓连接 = 2018.00.26.23.
Nominal size DN 25 标称尺寸 DN 25 = 03
Order no 订货编号 = 2018.00.26.23.03

2018.00.26.24. T swivel coupling, complete
2018.00.26.24.可旋转 T 形螺栓连接, 套件



2018.00.26.24. T swivel coupling, complete / 可旋转 T 形螺栓连接, 套件

Order no 订货编号	Nominal hose size 软管 标称尺寸	Hose coupling thread m 软管接口 螺纹 m	d ₁	d ₂	l ₁	l ₂	l ₃	A/F ₁ 扳手开口度 ₁	A/F ₂ 扳手开口度 ₂
2018.00.26.24.01	DN 12	M24x1,5	16	12	33	24,5	36,5	24	30
2018.00.26.24.02	DN 20	M30x2	20	16	37	26,6	44,5	27	36
2018.00.26.24.03	DN 25	M36x2	25	20	42	30	50	36	46
2018.00.26.24.04	DN 32	M42x2	30	25	49	35,5	55	41	50

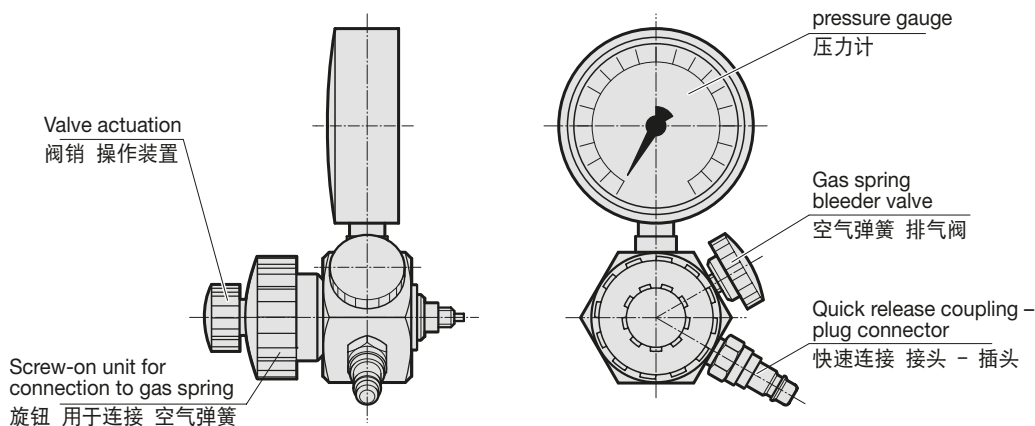
Ordering Code (example): 订货示例:

T swivel coupling 可旋转 T 形螺栓连接 = 2018.00.26.24.
Nominal size DN 25 标称尺寸 DN 25 = 03
Order no 订货编号 = 2018.00.26.24.03

Flex Cam – Accessories
Filling and Control Fitting,
Filling hose Charging Adapter

发送器-接收器系统-附件
加注和控制配件,
加注软管加注适配器

2480.00.32.21 Filling and control fitting / 加注和控制配件



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 to be connected directly to the gas cylinder valve or the pressure regulator.

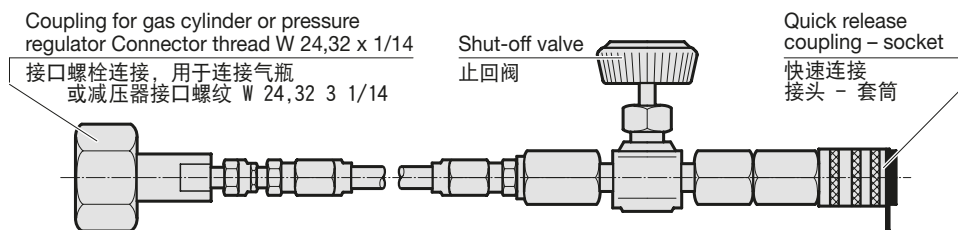
If the fitting is used solely for checking purposes, a simplified arrangement not connected to the gas cylinder is also possible.

Closing the shut-off valve of the filling hose enables the filling to be used to measure the charging pressure in the accumulator / Cam Unit, without detaching the hose.

For constant gas monitoring, we recommend connecting a control fitting 2480.00.30. or 2480.00.31.

The adapter which is required for filling the power/cam units (2480.00.32.11) comes as standard with the filling and control fitting (2480.00.32.21).

2480.00.31.02 Filling hose / 加注软管

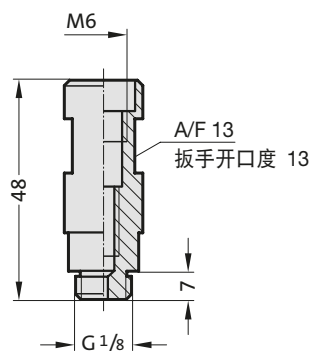


Note:

2480.00.31.02 Filling hose 2 m long with quick release coupling, shut-off valve and gas bottle connector (order separately).

Other filling hose lengths to order.

2480.00.32.11 Charging adapter / 加注适配器



说明:

加注和控制配件 2480.00.32.21 可用于加注、用于调整压力设置 (例如, 测试模具时) 及用于测量气体压力。

使用加注软管的接口螺栓连接可将其直接连接至气瓶开关阀或减压器。

如果仅将配件用于检查, 则可采用无需气瓶接口的简化排列方式。

通过关闭加注软管的止回阀, 可在不安装软管的情况下使用配件测量蓄压器/接收器中的加注压力。

建议连接控制配件 2480.00.30. 或 2480.00.31. 以便永久监控气体情况。

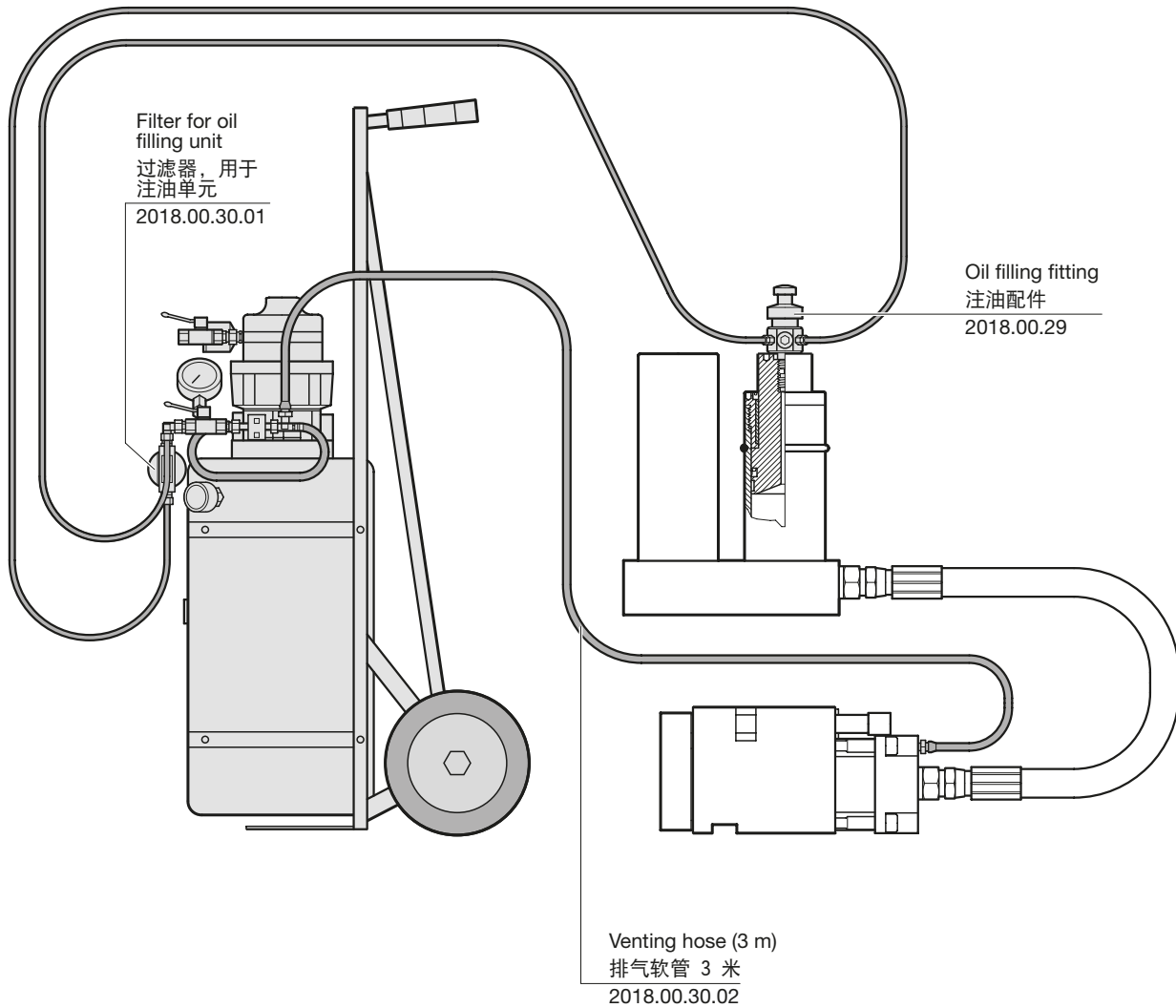
供应加注和控制配件 (2480.00.32.21) 时将搭配加注发送器和接收器时需要的适配器 (2480.00.32.11)。

提示:

2480.00.31.02 加注软管 (2 m 长, 带快速连接接头、止回阀和气瓶接口) 需另行订购。

可根据要求供应其他长度的加注软管。

2018.00.30 Oil filling unit / 注油单元



Scope of supply: 供货范围:

Filter 过滤器	2018.00.30.01
Venting hose 排气软管	2018.00.30.02
Oil filling fitting 注油配件	2018.00.29

Description: 说明:

The oil filling unit 2018.00.30 is used to fill the system with hydraulic oil DIN 51524 HVLP ISO VG32.
 注油单元 2018.00.30 用于为系统加注液压油 DIN 51524 HVLP ISO VG32。

Order no 订货编号

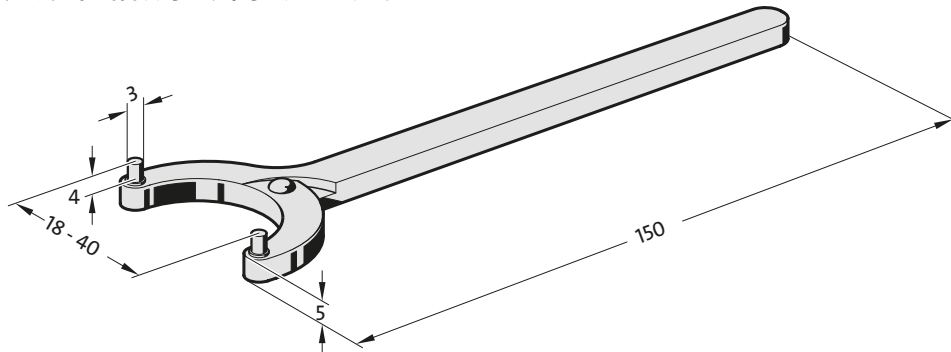
280.37.032.01	(1 Liter / 升)	Hydraulic oil UNIVIS N 32 液压油 UNIVIS N 32
280.37.032.05	(5 Liters / 升)	Hydraulic oil UNIVIS N 32 液压油 UNIVIS N 32

Precise instructions on filling the system with oil and gas are given in the user manual supplied with the system.

随附的用户手册中将详细说明为系统加注油和气体的方法。

2018.00.20.1840.03

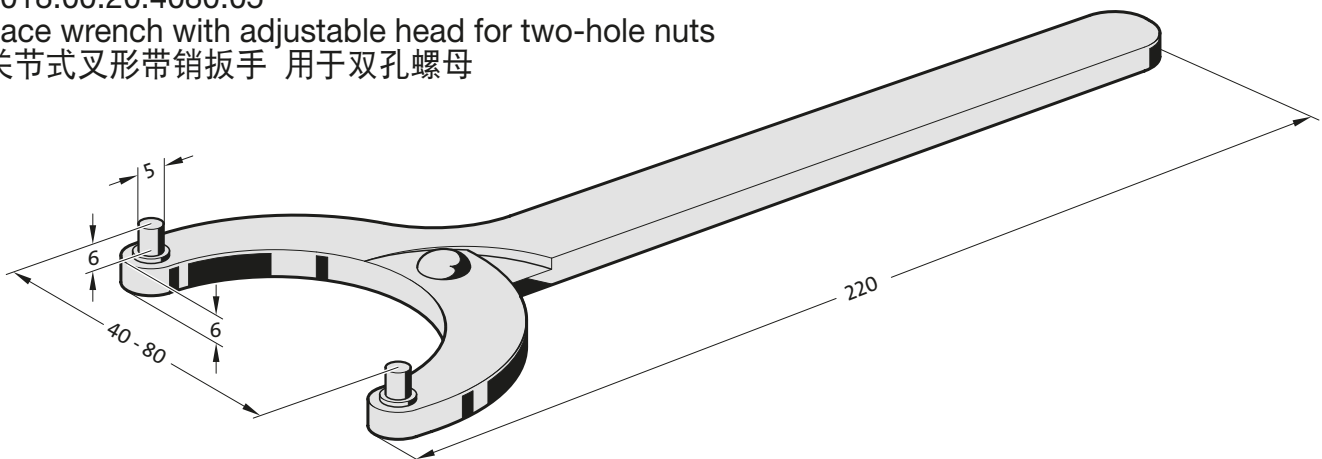
Face wrench with adjustable head for two-hole nuts
关节式叉形带销扳手 用于双孔螺母



Used by Power Unit 用于发送器型号	Number 订货编号
	2018.20.01500.
	2018.20.04000.

2018.00.20.4080.05

Face wrench with adjustable head for two-hole nuts
关节式叉形带销扳手 用于双孔螺母



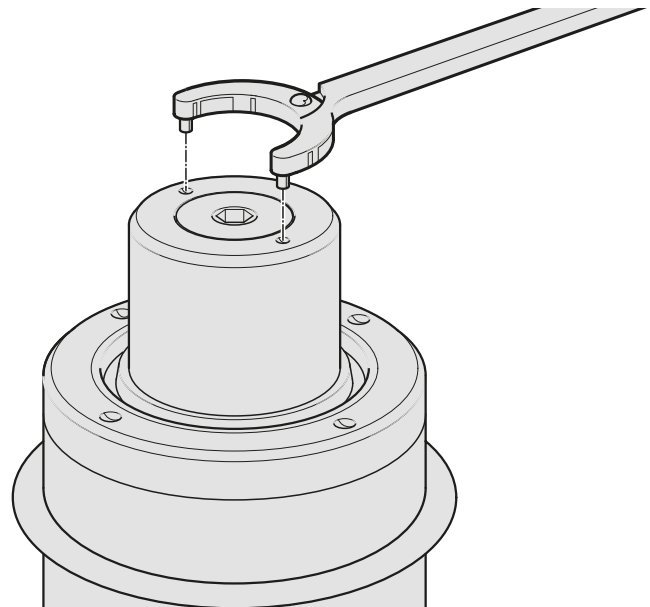
Used by Power Unit 用于发送器型号	Number 订货编号
	2018.20.06000.
	2018.20.09000.
	2018.20.15000.

Material:

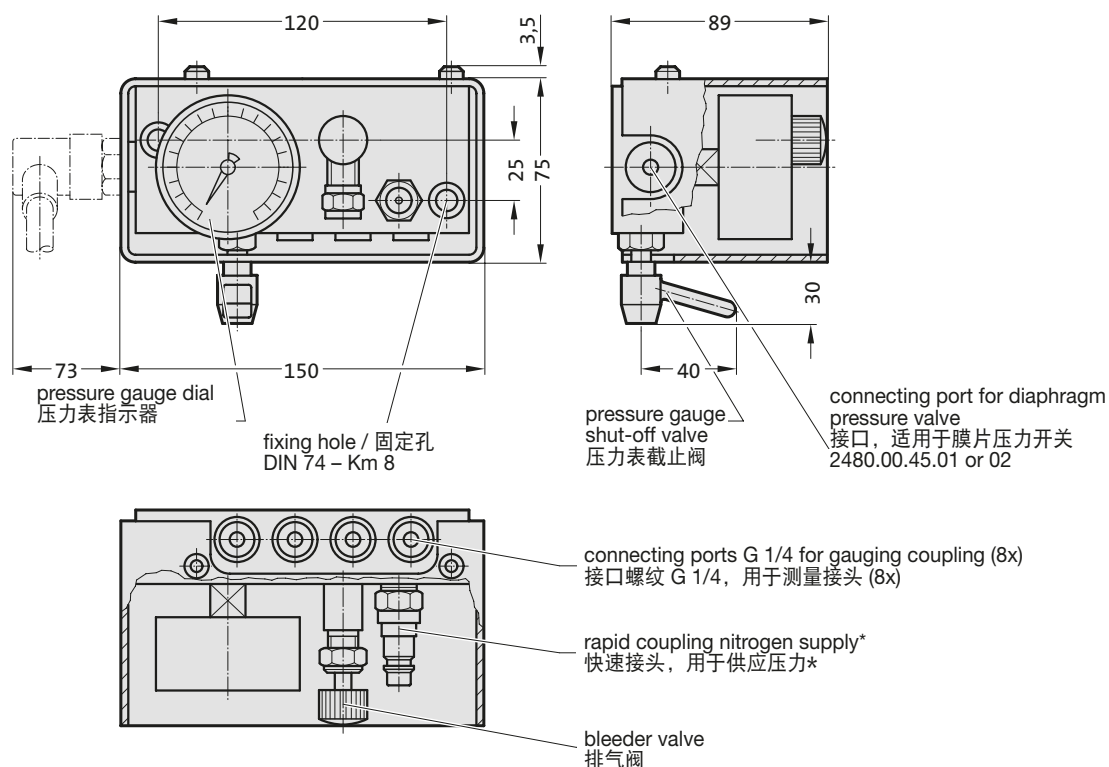
Special steel, burnished.

材料:

特种钢, 发蓝处理



- 2480.00.30.01 without pressure switch, without pressure relief / 无压力开关且无防爆装置
- 2480.00.30.02 with pressure switch, without pressure relief / 带压力开关但无防爆装置
- 2480.00.30.03 without pressure switch, with pressure relief / 无压力开关但带防爆装置
- 2480.00.30.04 with pressure switch, with pressure relief / 带压力开关和防爆装置



Description:

The control armature 2480.00.30.01/03 serves to control the charge pressure of up to eight connected gas springs. Pressure checks during operation can be effected in two ways:

- a) by visual monitoring of the gauge dials
- b) automatically, by means of diaphragm pressure switch 248.00.15. The switch will stop the associated machine as soon as the charge pressure drops below the value set.

Note:

The shut-off valve may be open or closed during operation. The closing of the pressure gauge shut-off valve ensures that no pressure peaks from the gas spring act on the pressure gauge.

* 2-m filler hose with rapid coupling and connector for gas bottle Order No. 2480.00.31.02 (to be ordered separately)

说明:

控制配件 2480.00.30.01/03 用于尺寸监控一个或多个蓄压器/接收器 (可配 8 个接口) 的加注压力。使用过程中, 可采用双重方式执行压力检查。

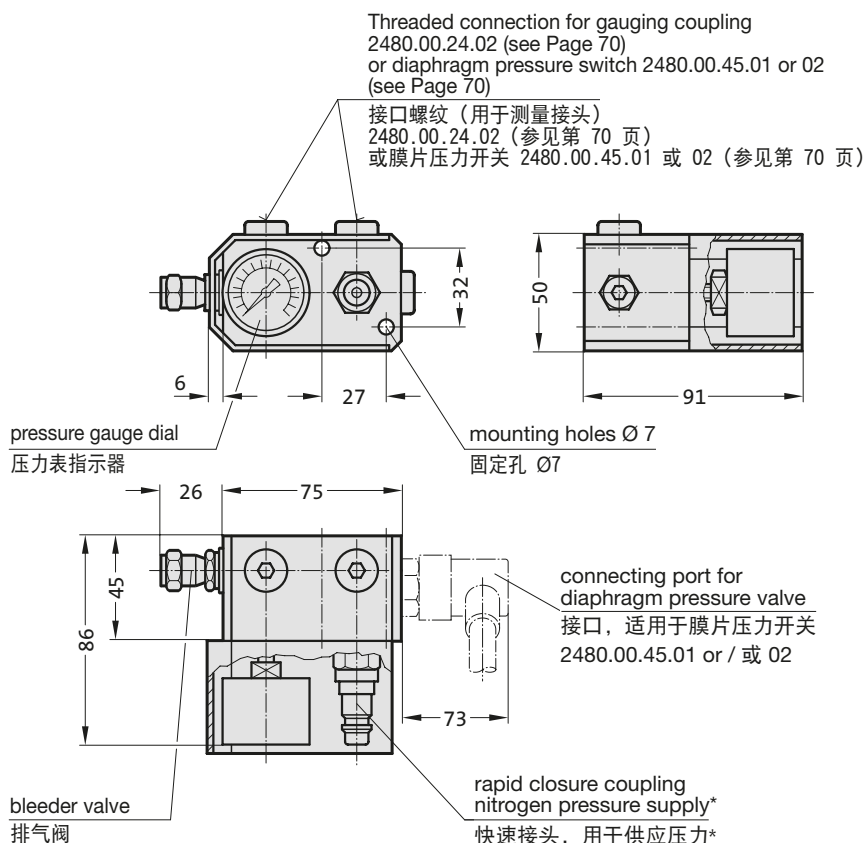
- a) 通过目视监控压力指示器。
- b) 通过膜片压力开关自动监控。该开关会在压力下降时关闭机器或触发信号。

提示:

可在运转过程中关闭或打开止回阀。通过关闭压力表止回阀可排除气体压力的动态压力脉动作用于压力表

* 带快速锁闭接头和 贮气瓶接口的 2 m 长 加注软管 订货编号: 2480.00.31.02 (另行订购)

- 2480.00.31.01 without pressure switch / 无压力开关
- 2480.00.31.06 with pressure switch / 带压力开关
- 2480.00.31.07 without pressure switch, with pressure relief / 无压力开关但带防爆装置



Description:

The control armature 2480.00.31.01 performs the same function as the control armature 2480.00.30.01.

Note:

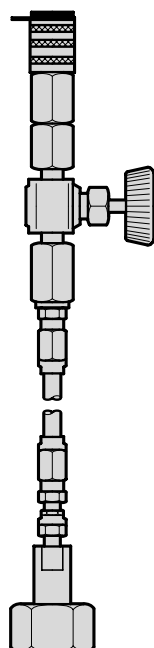
* 2-m filler hose with rapid coupling and connector for gas bottle
2480.00.31.02 (to be ordered separately)

说明:

控制配件 2480.00.31.01 的功能与控制配件 2480.00.30.01 相同。

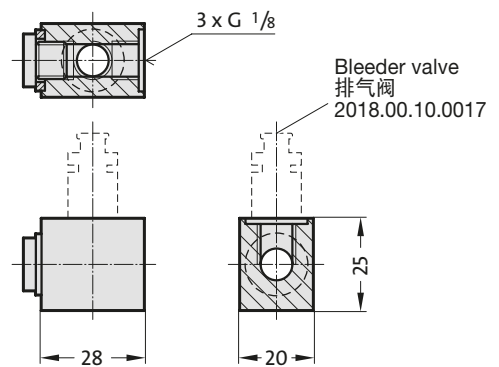
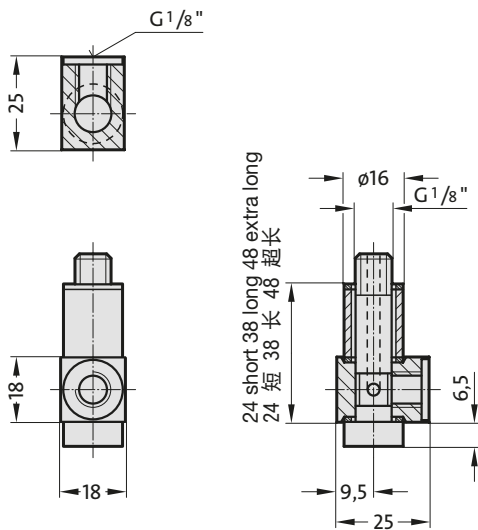
提示:

* 带快速锁闭接头和 贮气瓶接口的 2 m 长 加注软管 订货编号: 2480.00.31.02 (另行订购)

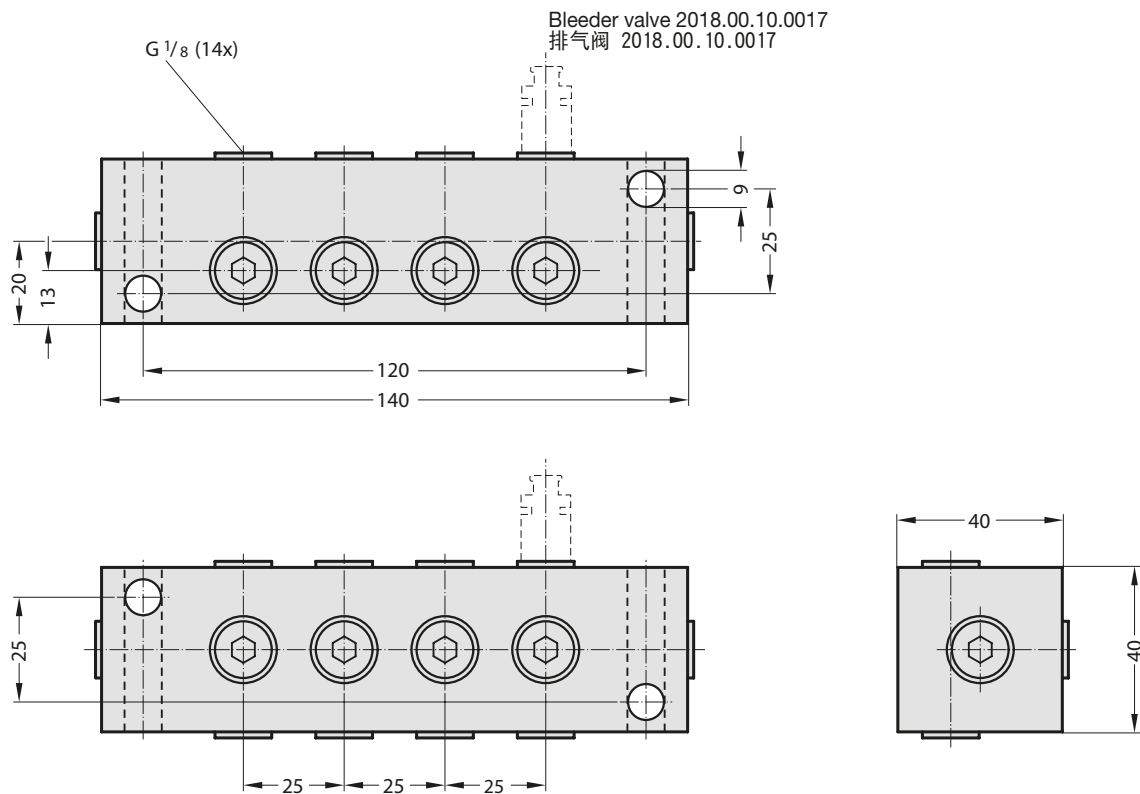


2480.00.24.16 long / 长
 2480.00.24.17 short / 短
 2480.00.24.18 extra-long / 超长
 Simple adapters for connecting
 Hydraulic Cams
 用于连接工作气缸的简易适配器

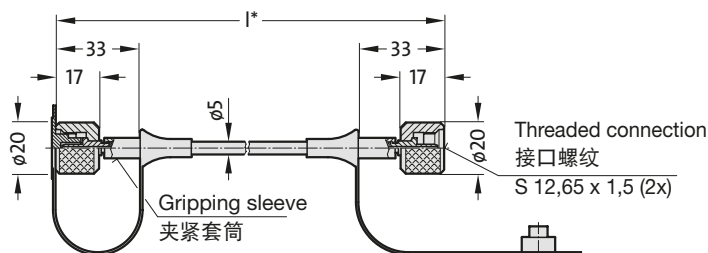
2480.00.24.30
 Coupling / 离合器



2480.00.24.33
 Distributor / 分配器导向板



2480.00.23.01.
Gauging hose – both ends straight
测量软管 - 两侧直



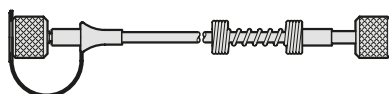
Order no 订货编号		l*
2480.00.23.01.	0200	0200
2480.00.23.01.	0300	0300
2480.00.23.01.	0400	0400
2480.00.23.01.	0500	0500
2480.00.23.01.	0630	0630
2480.00.23.01.	0800	0800
2480.00.23.01.	1000	1000
2480.00.23.01.	1200	1200
2480.00.23.01.	1500	1500
2480.00.23.01.	2000	2000
2480.00.23.01.	2500	2500
2480.00.23.01.	3000	3000

* other lengths available from 90 mm upwards, in 5 mm steps.

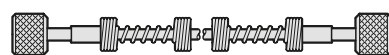
* 可按 5 mm 增量供应其他长度！最短生产长度

without antikink protection:	90 mm
antikink protection at one end:	150 mm
antikink protection at both ends:	300 mm

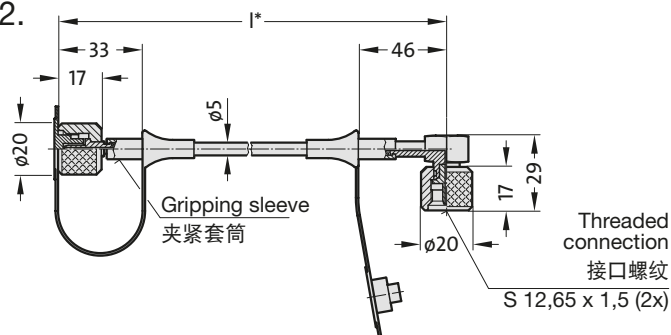
2480.00.23.01. --- .1
Antikink coil, at one end
抗扭结线圈, 单侧



2480.00.23.01. --- .2
Antikink coil, at both ends
抗扭结线圈, 双侧



2480.00.23.02.
Gauging hose – one end straight, 90°-angle
测量软管 - 单侧直带 90° 角



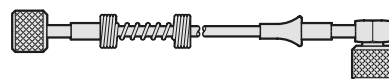
Order no 订货编号		l*
2480.00.23.02.	0200	0200
2480.00.23.02.	0300	0300
2480.00.23.02.	0400	0400
2480.00.23.02.	0500	0500
2480.00.23.02.	0630	0630
2480.00.23.02.	0800	0800
2480.00.23.02.	1000	1000
2480.00.23.02.	1200	1200
2480.00.23.02.	1500	1500
2480.00.23.02.	2000	2000
2480.00.23.02.	2500	2500
2480.00.23.02.	3000	3000

* other lengths available from 90 mm upwards, in 5 mm steps.

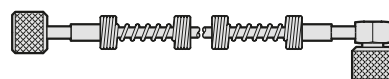
* 可按 5 mm 增量供应其他长度！最短生产长度

without antikink protection:	90 mm
antikink protection at one end:	150 mm
antikink protection at both ends:	300 mm

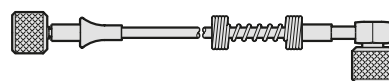
2480.00.23.02. --- .1
Antikink coil, at one end, straight
抗扭结线圈, 单侧直



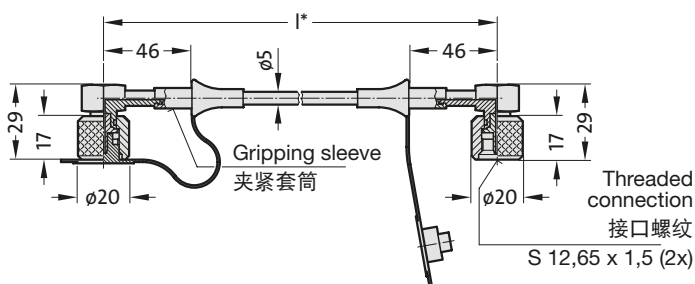
2480.00.23.02. --- .2
Antikink coil, at both ends
抗扭结线圈, 双侧



2480.00.23.02. --- .3
Antikink coil at one end 90°
抗扭结线圈, 单侧 90°



2480.00.23.03.
Gauging hose – both ends 90°-angle
测量软管 - 双侧带 90° 角



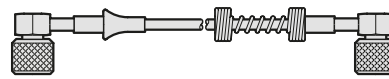
Order no 订货编号		l*
2480.00.23.03.	0200	0200
2480.00.23.03.	0300	0300
2480.00.23.03.	0400	0400
2480.00.23.03.	0500	0500
2480.00.23.03.	0630	0630
2480.00.23.03.	0800	0800
2480.00.23.03.	1000	1000
2480.00.23.03.	1200	1200
2480.00.23.03.	1500	1500
2480.00.23.03.	2000	2000
2480.00.23.03.	2500	2500
2480.00.23.03.	3000	3000

* other lengths available from 105 mm upwards, in 5 mm steps.

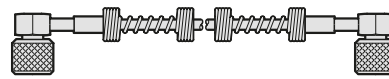
* 可按 5 mm 增量供应其他长度！最短生产长度

without antikink protection:	105 mm
antikink protection at one end:	150 mm
antikink protection at both ends:	300 mm

2480.00.23.03. --- .3
Antikink coil, at one end
抗扭结线圈, 单侧

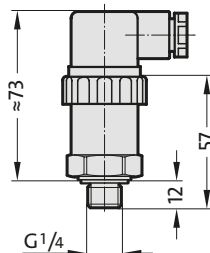


2480.00.23.03. --- .2
Antikink coil, at both ends
抗扭结线圈, 双侧





2480.00.45.01 50-250 bar
for accumulator /
Compact Cams
用于蓄压器/紧凑型模具滑阀
2480.00.45.02 10-80 bar
for cam unit
用于工作气缸



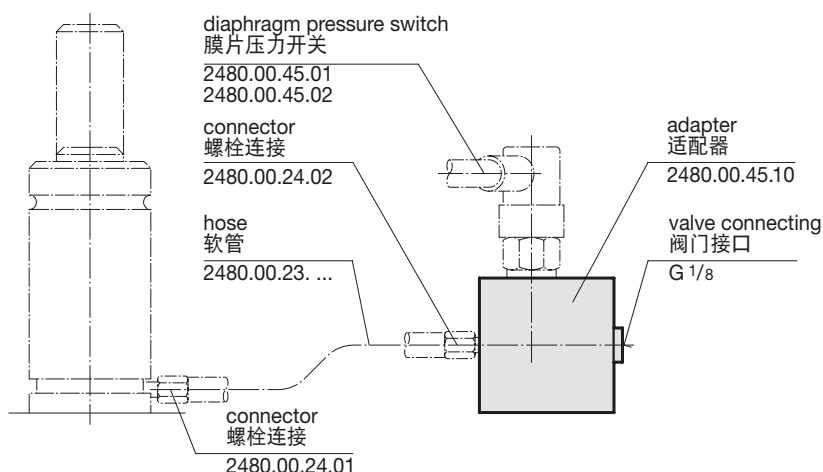
Technical Data of Diaphragm Pressure switch

技术参数 膜片压力开关

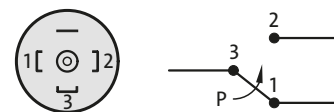
2480.00.45.01	
switching range, adjustable 调整范围	50–250 bar
switching tolerance 公差	±5 bar
overpressure protection 超压保护	350 bar
voltage (max.) 最大电压	250 V

2480.00.45.02	
switching range, adjustable 调整范围	10–80 bar
switching tolerance 公差	±1,6 bar
overpressure protection 超压保护	350 bar
voltage (max.) 最大电压	250 V

Installation Example:
安装示例:



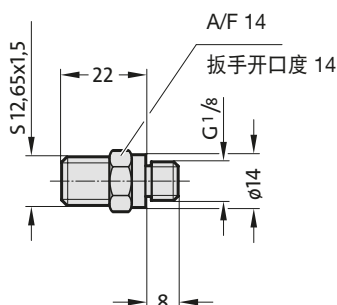
Circuit diagram for diaphragm pressure switch
膜片压力开关电路图



2480.00.24.01

Gauging coupling with valve for connection to accumulator/cam unit

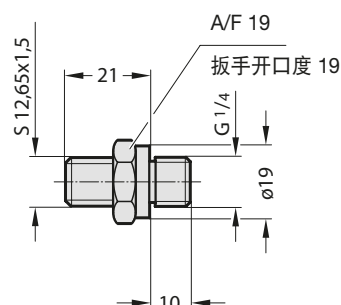
测量接头（带阀门） 用于连接至蓄压器/接收器



2480.00.24.02

Gauging coupling with valve for connection to control armature

测量接头（带阀门） 用于连接至控制配件



2018.00.60.

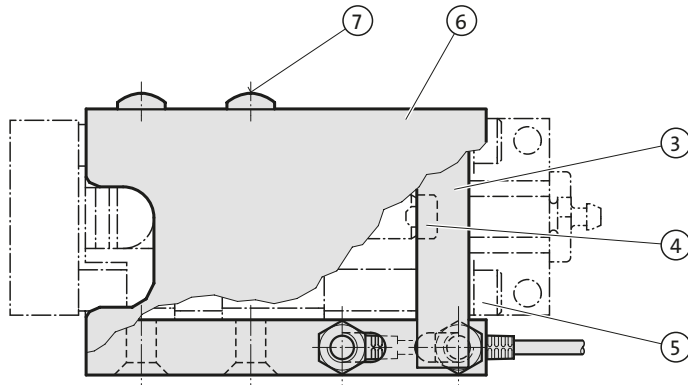
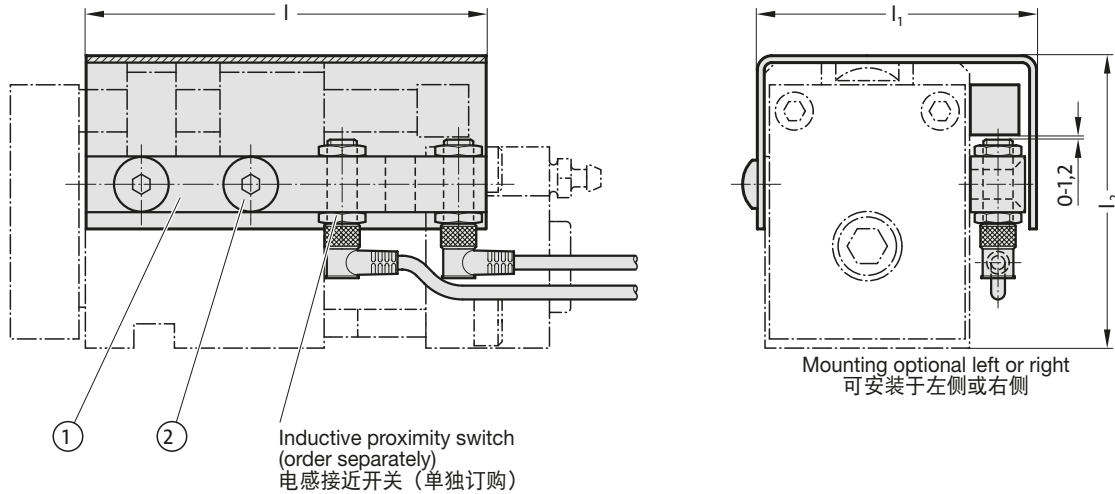
Sensor mounting kit for Compact Cam 2018.11.
传感器固定套件，用于紧凑型模具滑阀 2018.11.

Description:

The sensor mounting kit with inductive proximity switch (order separately) is used to monitor the end travel positions of the Compact Cam. Both hub positions full extension and full retraction can be monitored. The accuracy of adjustment is ± 1 mm.

说明:

带电感接近开关(单独订购)的传感器固定套件用于监控紧凑型模具滑阀的行程位置。其可监控行程的“驶出”和“驶入”位置。调整精度为 ± 1 mm。



Item 位置	Designation 名称	Number 数量
1	Mounting bracket 固定梁	1
2	Screw 螺栓	2
3	Activator flag 开关标记	1
4	Centering washer* 定心垫片*	1 or 2
5	Screw 螺栓	2
6	Cover plate 盖板	1
7	Screw 螺栓	2

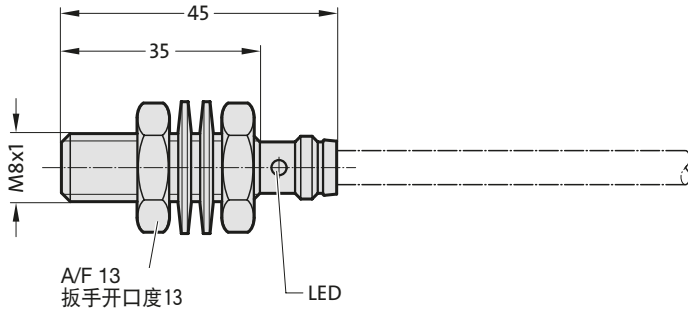
* not for * 不适用于 2018.11.09000.
* 不适用于 2018.11.09000.

2480.00.60. Sensor mounting kit for Compact Cam 2018.11.
传感器固定套件，用于紧凑型模具滑阀 2018.11.

Order no / 订货编号	l	l ₁	l ₂	for Compact Cam / 用于紧凑型模具滑阀
2018.00.60.01500.024	115	81	84	2018.11.01500.024
2018.00.60.01500.049	165	81	84	2018.11.01500.049
2018.00.60.04000.024	168	117	107	2018.11.04000.024
2018.00.60.04000.049	193	117	107	2018.11.04000.049
2018.00.60.04000.099	271	117	107	2018.11.04000.099
2018.00.60.06000.024	171	142	135	2018.11.06000.024
2018.00.60.06000.049	196	142	135	2018.11.06000.049
2018.00.60.06000.099	271	142	135	2018.11.06000.099
2018.00.60.09000.024	216	170	172	2018.11.09000.024
2018.00.60.09000.049	241	170	172	2018.11.09000.049
2018.00.60.09000.099	316	170	172	2018.11.09000.099
2018.00.60.15000.024	216	182	207	2018.11.15000.024
2018.00.60.15000.049	241	182	207	2018.11.15000.049
2018.00.60.15000.099	316	182	207	2018.11.15000.099

2018.00.60.08.045

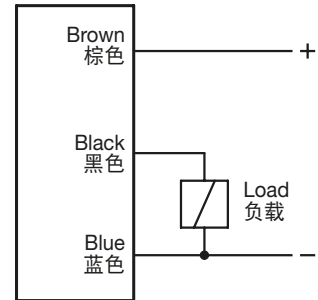
Inductive proximity switch
电感接近开关



Technical data

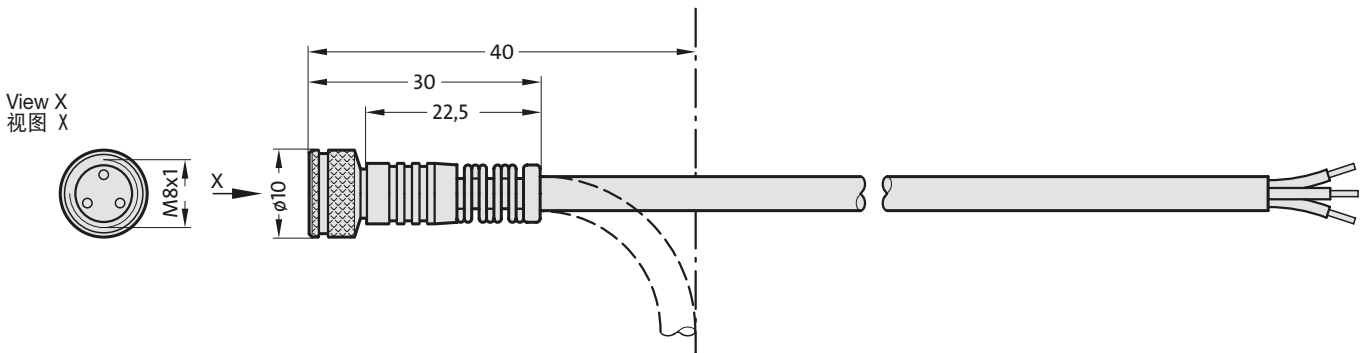
技术参数

Item 测量工作	
Rated operating voltage U_e 电压 U_e	24 V DC
Operating voltage U_s 工作电压 U_s	10-30 V DC
Idle current I_0 Damped 空载电流 I_0 衰减	9 mA
Repeat accuracy R 重复精度 R	$\leq 5\%$
Ambient temperature T_a 环境温度 T_a C	-25 bis +70°C -25 至 +70
switching frequency f 开关频率 f	1500 Hz
Protection to IEC 529 保护等级符合 IEC 529	IP 68
Casing material 外壳材料	Steel stainless 不锈钢
Connection 接口类型	connector 插头连接器
Approval 许可	UL



2018.00.60.23.01.5

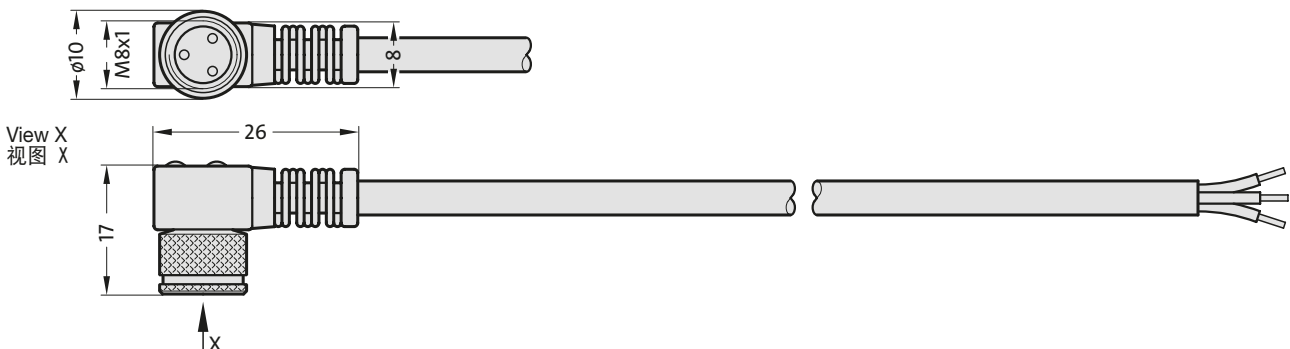
Connection cable – straight. Cable type: 3 pole M8, oil resistant – 连接电缆 – 直. 电缆类型: 3 芯 M8, 耐油



Standard length 5 m. Other lengths upon request. 标准长度为 5 m. 可根据需要供应其他长度。

2018.00.60.23.02.5

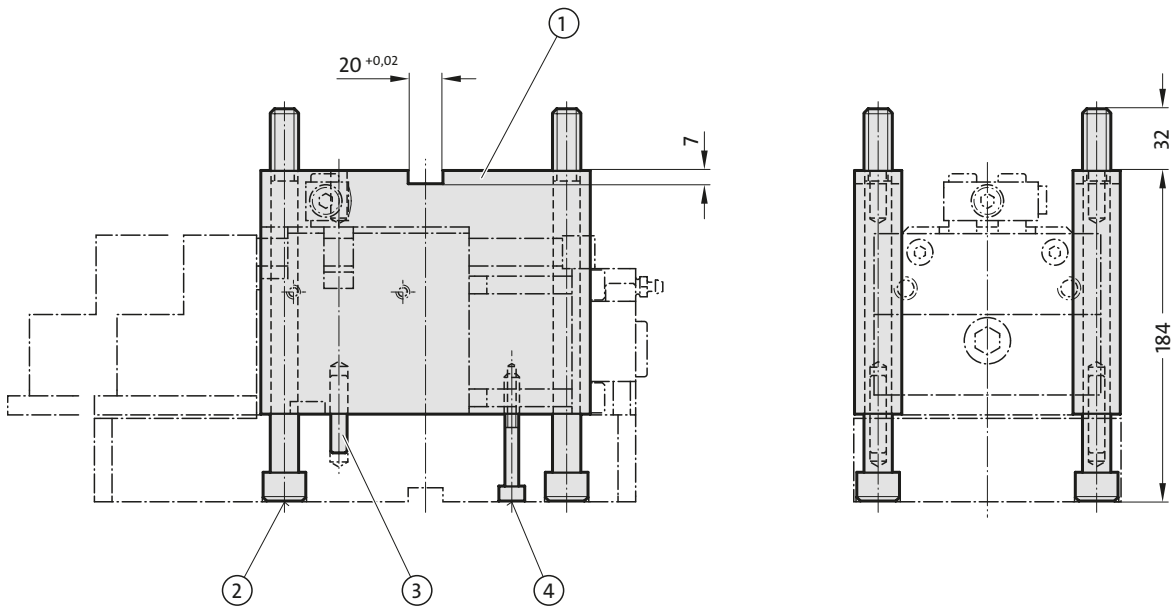
Connection cable 90°. Cable type: 3 pole M8, oil resistant – 连接电缆 90° 电缆类型: 3 芯 M8, 耐油



Standard length 5 m. Other lengths upon request. 标准长度为 5 m. 可根据需要供应其他长度。

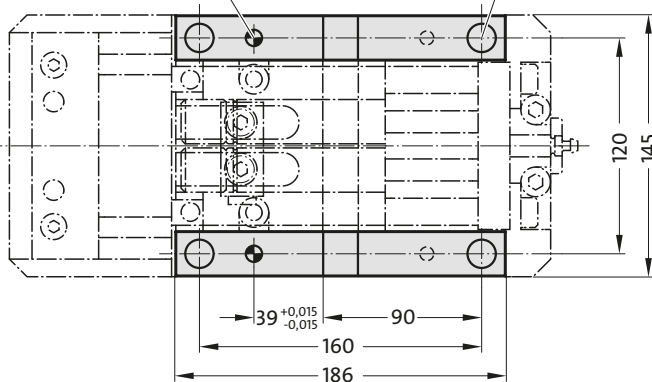
2018.12.01.04000.049

Top mounting for Flange Cam 2018.12. – 固定套件，用于卷边滑阀 2018.12



dowel pin Ø 10 (2x)
适配销 Ø10 (2x)

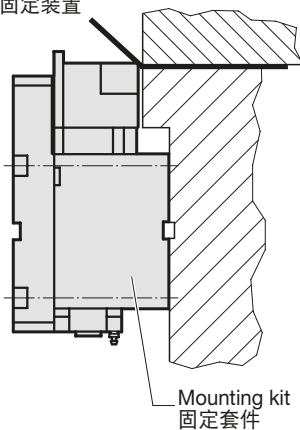
fixing screw M16 (4x)
固定螺栓 M16 (4x)



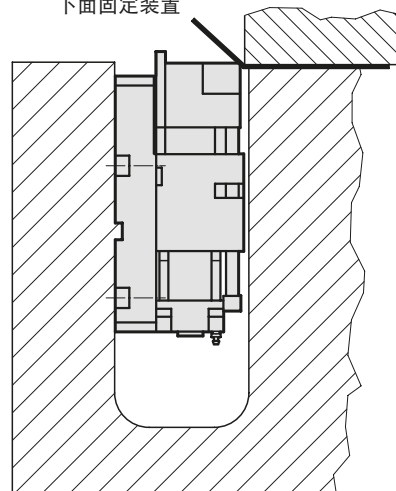
Item 位置	Designation 名称	Number 数量
1	Spacer 间隔板	2
2	M16x200 Screw 螺栓 M163200	4
3	Ø10x40 Dowel pin 定位销 Ø10x40	2
4	Screw M8x60 螺栓 M8360	2

Installation example for Flange Cam
卷边滑阀安装示例

Top mounting
上面固定装置



Bottom mounting
下面固定装置



2018.27.01. Safety module 安全块

If a malfunction occurs in the primary unit, the system pressure can be released manually on the oil side via the discharge valve in the safety module 2018.27.01. A pressure limitation valve releases the oil pressure if the limit set is exceeded.

安全块 2018.27.01. 用于在发送器内发生故障时通过排放阀手动排放油侧的系统压力。超过所设置的极限值时，限压阀将予以响应并排放油压。

Order no 订货编号	For Power Unit size 2018.25 用于发送器尺寸 2018.25	A*	recommended nominal hose size 建议软管标称尺寸
2018.27.01.01500	01500.	10	DN 12
2018.27.01.04000	04000.	22,5	DN 20
2018.27.01.06000	06000.	32,5	DN 25
2018.27.01.09000	09000.	40	DN 25
2018.27.01.15000	15000.	70	DN 32

* allow distance for assembly with accumulator
* 在蓄压器上安装时应注意间距尺寸

Installation example for safety module 安全块安装示例

Power Cylinder 驱动缸
Control fitting 2480.00.31.01 控制配件 2480.00.31.01
Compact Cam 紧凑型 模具滑阀 2018.11.1
Accumulator 蓄压器
Drainage hose 排液 软管
Safety module 2018.27.01. fitted with manual discharge valve and pressure limitation valve. 安全块2018.27.01. 使用 手动排放阀和限压阀
Control fitting 2480.00.31.01 控制配件 2480.00.31.01

Control fitting 2480.00.31.01 控制配件 2480.00.31.01
Power Unit 发送器
Compact Cam 紧凑型 模具滑阀 2018.11.1
Drainage hose 排液 软管
Safety module 2018.27.01. fitted with manual discharge valve and pressure limitation valve. 安全块2018.27.01. 使用 手动排放阀和限压阀

Use part number 2018.25. to order Power Cylinder and Accumulator together
使用同一商品编号 2018.25. 订购驱动缸和蓄压器！

We recommend that the safety warning should be located in a clearly visible position on the tool when hydraulic cam systems are fitted.

在模具上安装所安装发送器-接收器系统的提示牌时，建议确保其清晰可见。

<div style="display: flex; justify-content: space-between; align-items: center;"> ⊕ <div style="background-color: #cccccc; padding: 5px;">FIBRO</div> ⊕ </div>				
Geber-Nehmer-System / Flex Cam / Système maître-cylindre / cylindre récepteur				
Werkzeugbauer / Tool maker / Fabricant d'outillage				
Tag der Erstinstallation / Date of first installation / Jour de la première installation				
Werkzeugnummer / Tool number / Numéro d'outil				
max. Hübe / strokes / Nombre de courses / min.				
	Type	genutzter Hub (mm) / Stroke used (mm) / Course utile (mm)	Anzahl der Einheiten / Number of units / Nombre d'unités	Fülldruck (bar) / Pressure (bar) / Pression de remplissage (bars)
Gebereinheit / Primär unit / Unité maître cylindre				
Nehmereinheit / Secondär unit / Unité cylindre récepteur				
	Type	Länge / Length / Longueur (mm)	Anzahl / Number / Nombre	
Schlauchverbindungen / Hose connections / Liaisons par tuyaux flexibles				
Achtung! Hoher Druck / Warning! High pressure / Attention! Haute pression	Vor Wartung und Arbeiten an dem Geber-Nehmer-System unbedingt Benutzerhandbuch lesen! / ALWAYS read the User Manual before working on or with this flex cam system. / Avant de procéder à l'entretien et d'effectuer des travaux sur le système maître cylindre/cylindre récepteur, lire absolument le manuel à l'usage de l'utilisateur !			
⊕ FIBRO GmbH · DE-74851 Hassmersheim · Postfach 1120 · Made in Germany · Telefon ++49(0)6266-73-0* · Telefon ++49(0)6266-73-237 ⊕				

Order no 订货编号

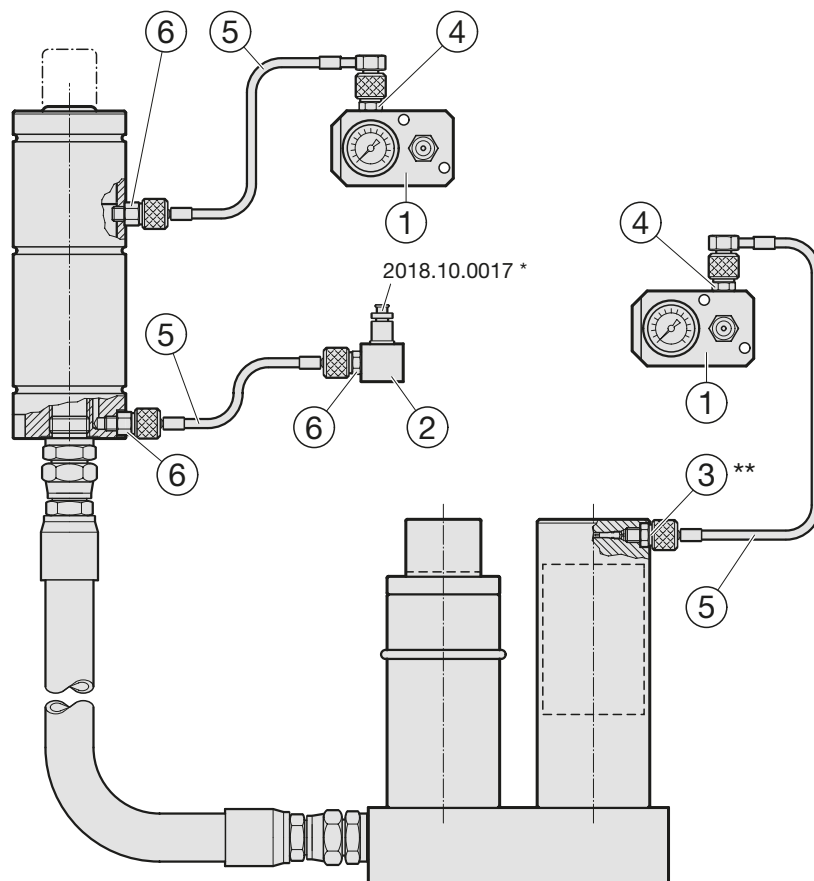
Safety label 提示牌 = 2018.00.105.210.11100

To be applied to machines in which hydraulic cam systems are fitted. 安装在装有发送器-接收器系统的机器上。

**Typical
installations for
monitoring
process safety**

**进程安全
监控装置
安装示例**

Monitoring a Power Unit and a Cam Unit on the gas side
with external venting
发送器和接收器气体侧监控装置 带外部排气装置



* Screw the Cam Unit's bleeder valve 2018.10.0017 into the coupling 2480.00.24.30.

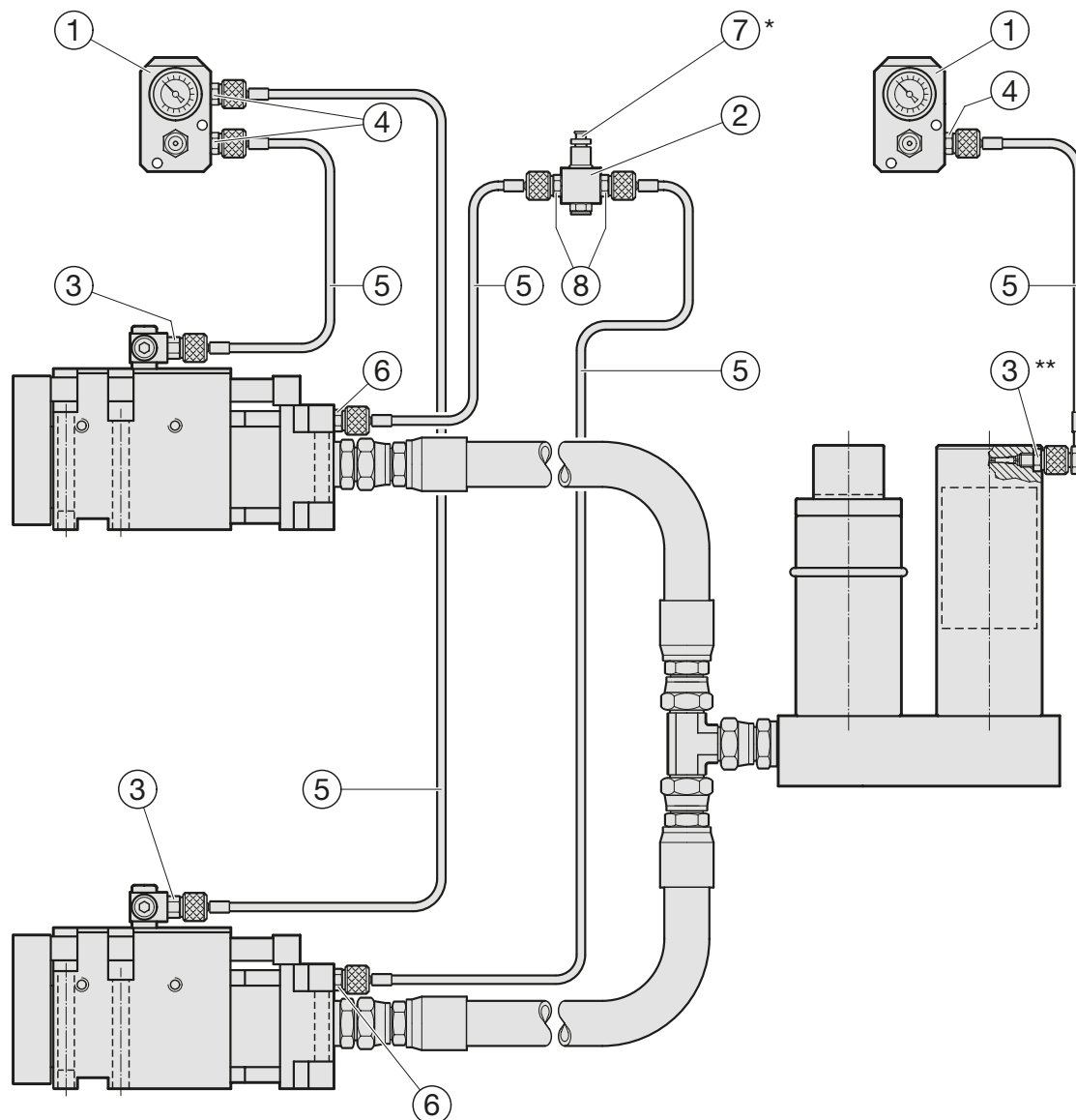
** Before mounting the gauging coupling remove the valve from the pressure reservoir

* 将接收器的排气阀 2018.10.0017 旋入接头 2480.00.24.30。

** 在安装测量接头前先卸下蓄压缸上的阀芯

Designation 名称	Number 数量	Order no 订货编号	Comment 备注
1 Control fitting 控制配件	2	2480.00.31.01	Optionally with diaphragm-type pressure switch 2480.00.45.01 or 02 可选择膜片压力开关 2480.00.45.01 或 .02
2 Coupling 接头	1	2480.00.24.30	
3 Gauging coupling with valve 带阀门的测量接头	1	2480.00.24.01	
4 Gauging coupling with valve 带阀门的测量接头	2	2480.00.24.02	
5 Gauging hose 测量软管	3	2480.00.23. _ _ _ _ _	Type of connection and length as required 根据需要选用接口类型和长度
6 Gauging coupling without valve 测量接头(无阀芯)	3	2480.00.24.03	

Monitoring a Power Unit and two Cam Units on the gas side
with external venting Asynchronous drive
发送器和两个接收器的气体侧监控装置 带外部排气装置 异步驱动



*For Force Cylinder 2018.30 screw the bleeder valve 2018.100.0017 into the coupling 2480.00.24.30.

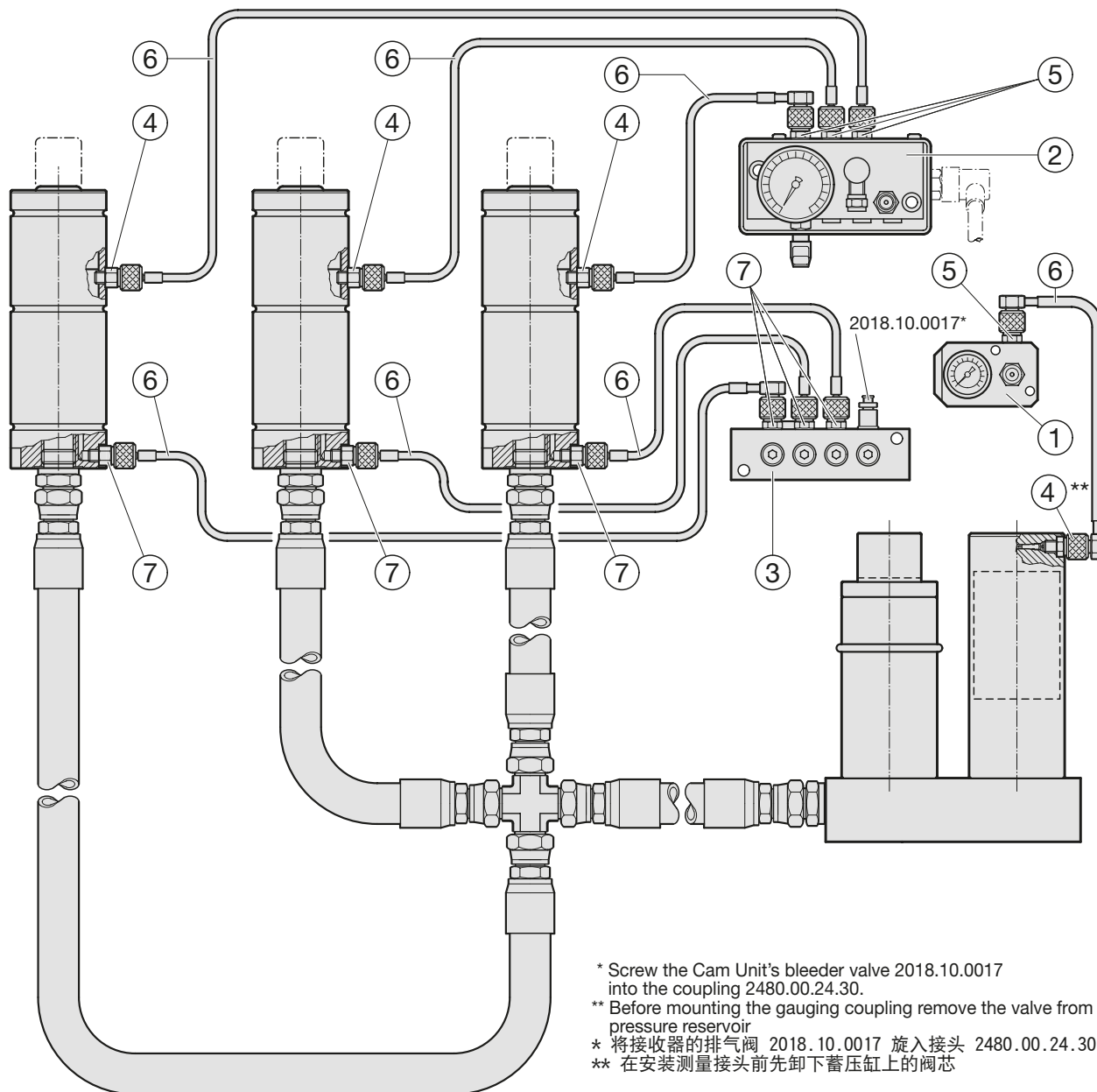
** Before mounting the gauging coupling remove the valve from the pressure reservoir

* 使用工作气缸 2018.30. 时, 将接收器的排气阀 2018.10.0017 旋入接头 2480.00.24.30。

** 在安装测量接头前先卸下蓄压缸上的阀芯

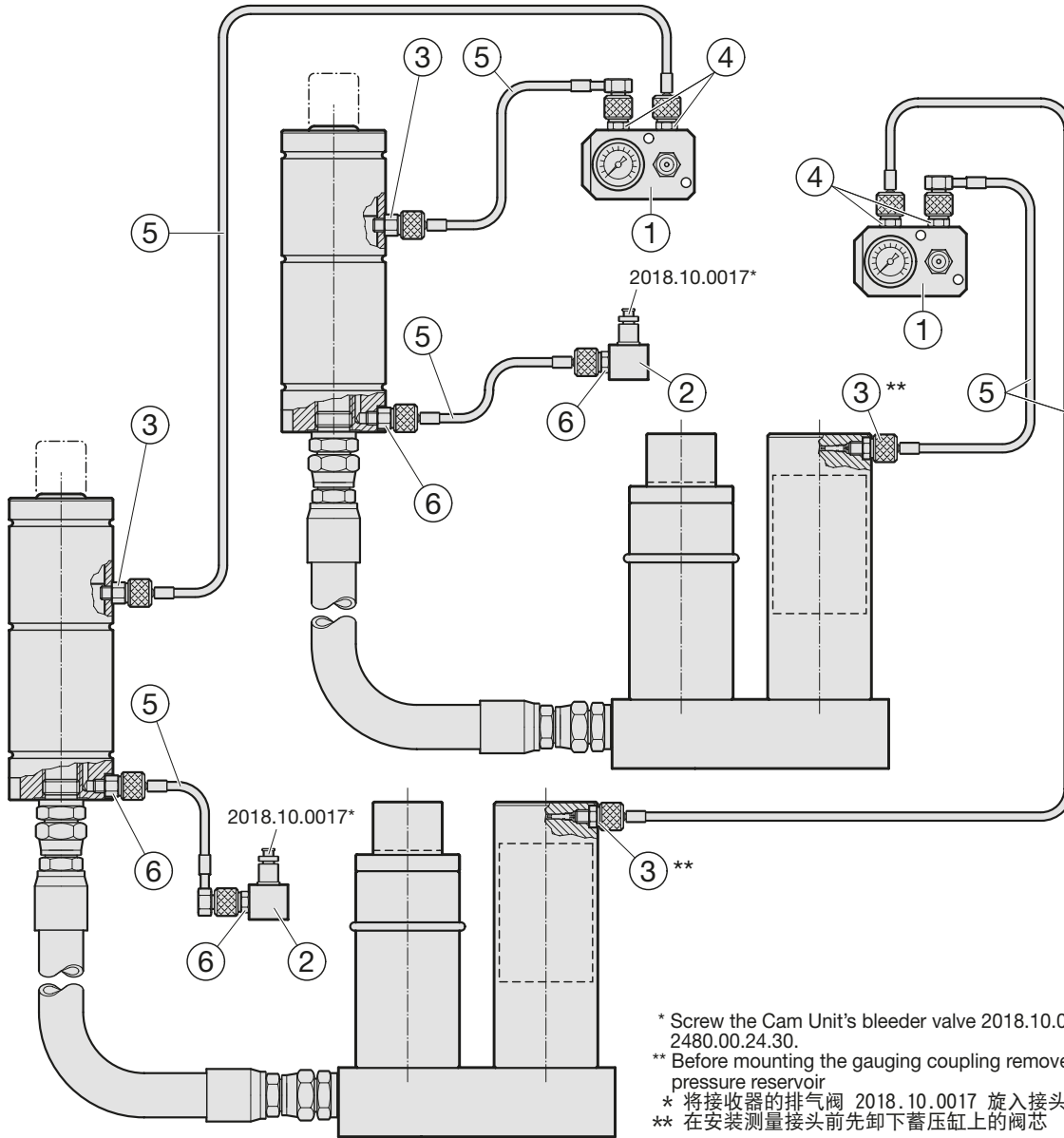
Designation 名称	Number 数量	Order no 订货编号	Comment 备注
1 Control fitting 控制配件	2	2480.00.31.01	Optionally with diaphragm-type pressure switch 2480.00.45.01 or 02 可选择膜片压力开关 2480.00.45.01 或 .02
2 Coupling 接头	1	2480.00.24.30	
3 Gauging coupling with valve 带阀门的测量接头	3	2480.00.24.01	
4 Gauging coupling with valve 带阀门的测量接头	3	2480.00.24.02	
5 Gauging hose 测量软管	3	2480.00.23.	Type of connection and length as required 根据需要选用接口类型和长度
6 Gauging coupling without valve 测量接头(无阀芯)	2	2018.00.24.05	
7 Bleeder valve 排气阀	1	2018.10.0017	
8 Gauging coupling without valve 测量接头(无阀芯)	2	2018.00.24.03	

Monitoring a Power Unit and three Cam Units on the gas side with external venting
Asynchronous drive
发送器和三个接收器的气体侧监控装置 带外部排气装置 异步驱动



Designation 名称	Number 数量	Order no 名称	Comment 备注
1 Control fitting 控制配件	1	2480.00.31.01	Optionally with diaphragm-type pressure switch 2480.00.45.01 可选择膜片压力开关 2480.00.45.01
2 Control fitting 控制配件	1	2480.00.30.01	Optionally with diaphragm-type pressure switch 2480.00.45.02 可选择膜片压力开关 2480.00.45.02
3 Distributor box 分配器导向板	1	2480.00.24.33	
4 Gauging coupling with valve 带阀门的测量接头	4	2480.00.24.01	
5 Gauging coupling with valve 带阀门的测量接头	4	2480.00.24.02	
6 Gauging hose 测量软管	7	2480.00.23.	Type of connection and length as required 根据需要选用接口类型和长度
7 Gauging coupling without valve 测量接头(无阀芯)	6	2480.00.24.03	

Monitoring two Power Units and two Cam Units on the gas side
with external venting Synchronous drive
两个发送器和两个接收器的气体侧监控装置 带外部排气装置 同步驱动

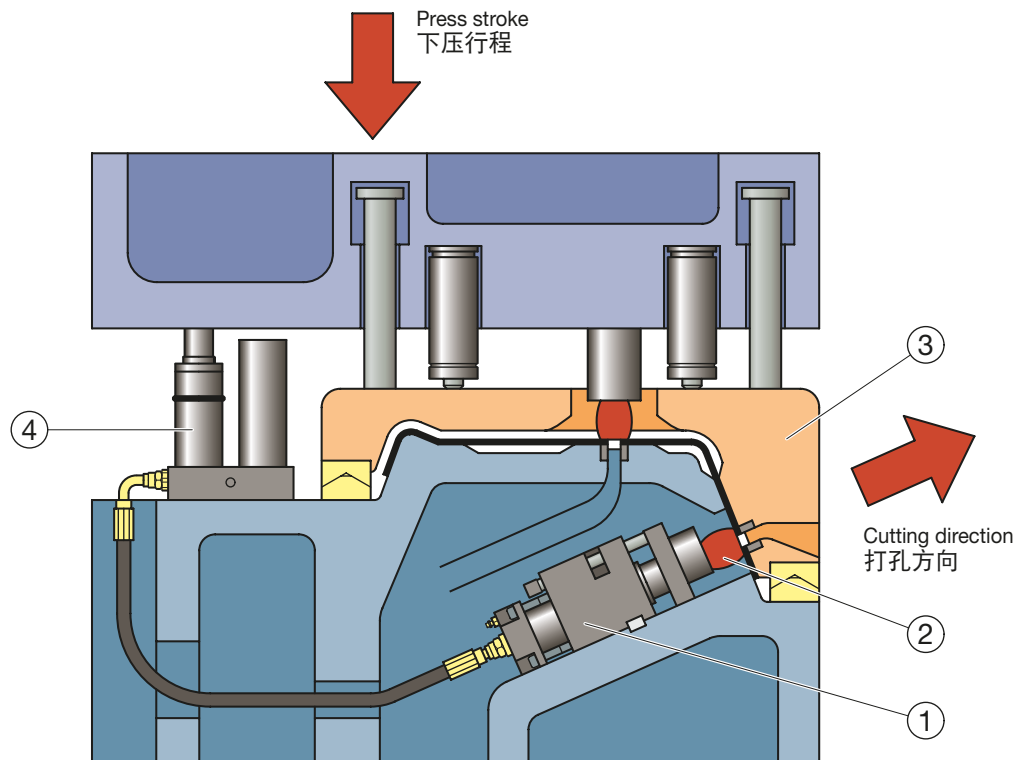


* Screw the Cam Unit's bleeder valve 2018.10.0017 into the coupling 2480.00.24.30.
** Before mounting the gauging coupling remove the valve from the pressure reservoir
* 将接收器的排气阀 2018.10.0017 旋入接头 2480.00.24.30。
** 在安装测量接头前先卸下蓄压缸上的阀芯

Designation 名称	Number 数量	Order no 订货编号	Comment 备注
1 Control fitting 控制配件	2	2480.00.31.01	Optionally with diaphragm-type pressure switch 2480.00.45.01 or 02 可选择膜片压力开关 2480.00.45.01 或 .02
2 Coupling 接头	2	2480.00.24.30	
3 Gauging coupling with valve 带阀门的测量接头	4	2480.00.24.01	
4 Gauging coupling with valve 带阀门的测量接头	4	2480.00.24.02	
5 Gauging hose 测量软管	6	2480.00.23. _ _ _ _ _	Type of connection and length as required 根据需要选用接口类型和长度
6 Gauging coupling without valve 测量接头(无阀芯)	4	2480.00.24.03	

**Typical
Applications
应用示例**

Application: Cutting with Compact Cam 使用紧凑型模具滑阀打孔的应用情况



This example shows how a compact cam (1) can be used for punching holes. The punch can be mounted directly to the Compact Cam, which means that no additional guides are required in the tool. The diagram shows that the Power Unit does not have to be installed in the vicinity of the Cam Unit, making it much more flexible compared to conventional mechanical systems. We recommend fitting a stripping unit (2) to the punch.

Working sequence

When the top part of the tool moves down, it actuates the clamping pad (3) that holds the workpiece in position. The clamping pad is centred with respect to the bottom part of the tool by conical spacers. Once the clamping pad reaches its position, the Power Unit is actuated (4) and the Cam Unit executes its operation.

本示例介绍将紧凑型模具滑阀（1）用于打孔的方法。可将冲头直接安装于紧凑型模具滑阀，因而无需在模具中安装额外的导向装置。图示表明无须将发送器安装在接收器附近。因此，其灵活性比传动的机械式解决方案更高。建议在冲头上安装清扫器（2）。

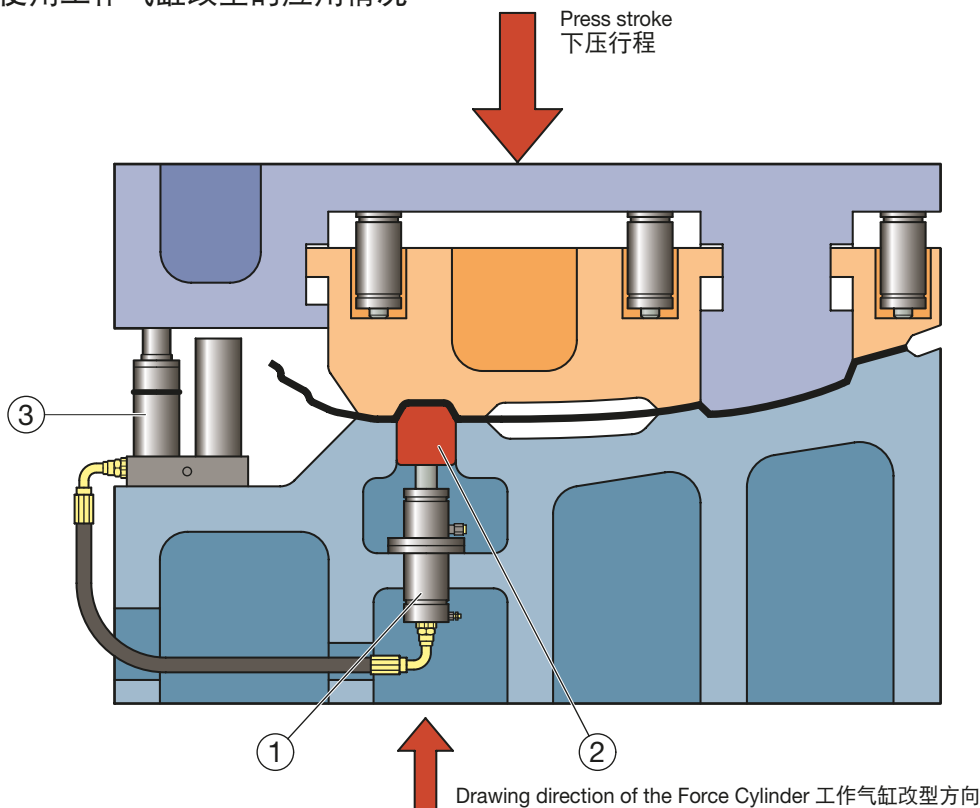
工作流程

当模具上部向下移动时，将激活压紧装置（3）并将工件保持在其位置。借助圆锥形隔片将压紧装置对准模具底部的中心。如果压紧装置达到其位置，则将激活发送器（4）且接收器执行其工作操作。

Flex Cam
Typical Applications

发送器-接收器系统
应用示例

Application: Metal forming
使用工作气缸改型的应用情况



This example shows how one or more Cam Units (1) can be used to drive embossing punches (2) (or tool slides) in a machine tool. The punch (or slide) is guided in the tool. This method of driving tool components allows considerable flexibility in the machine tool layout. The Cam Unit only generates the motion and force. Only shearing and tensile forces are permitted.

Working sequence

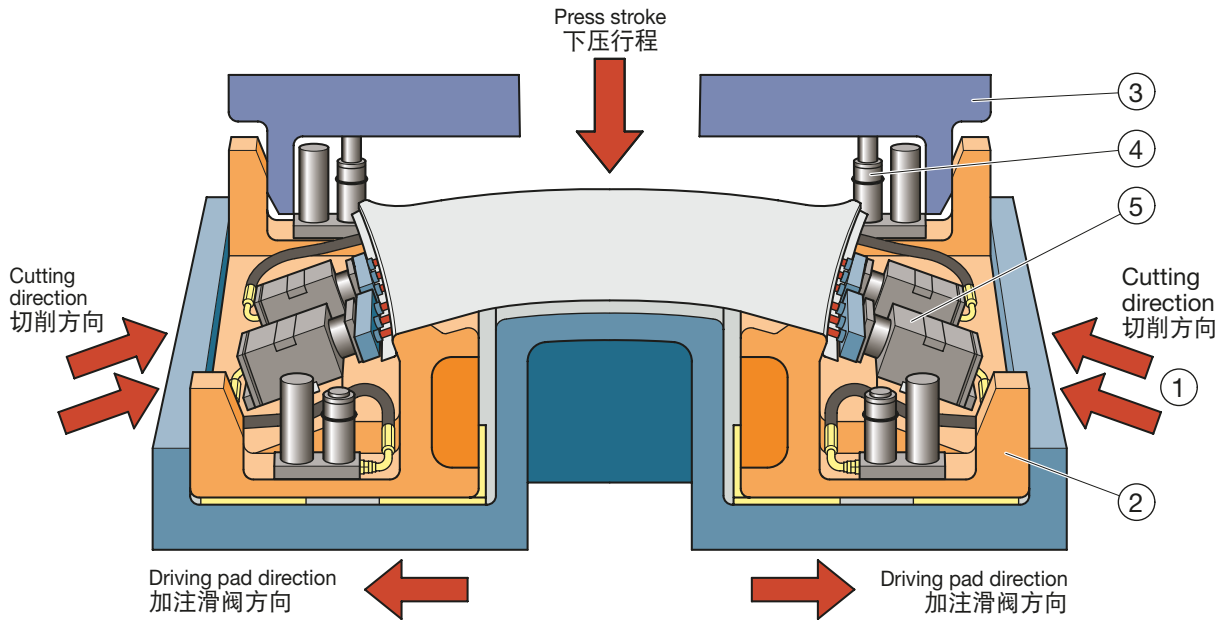
As the top part of the tool moves down, it actuates the clamping pad that holds the workpiece in position. When the clamping pad reaches its position, the Power Unit is actuated (3) and the Cam Unit executes its operation. The embossing force can be adjusted, if necessary, by varying the pressure in the Accumulator.

本示例介绍如何使用一个或多个接收器 (1) 驱动模具中的压印冲头 (2) (或模具滑阀)。在模具中导向冲头 (或滑阀)。该模具组件驱动方式实现了模具结构的高灵活性。接收器仅提供移动和力。仅允许推力和拉力。

工作流程

模具上部的向下移动激活压紧装置，而压紧装置则将工件保持在其位置。如果压紧装置达到其位置，则将激活发送器 (3) 且接收器执行其工作操作。如需要，可通过改变蓄压器中的压力调整印压力。

Application: Cutting with positioning of the overflow wedge
使用超程楔定位装置打孔的应用情况



12 holes are punched at a negative angle (1). In this tool, the Flex Cam is equipped with mechanically-driven filling slides (2).

Working sequence:

The filling slide (2) is first moved into position, controlled by the overflow wedge (3). As the press descends further, the four Power Units (4) are pressurised, causing the Cam Units (5) to punch the holes.

In this arrangement, the hole punching operation requires no other drivers, which means that it can easily be performed at an angle of 90° to the workpiece.

按照负角 (1) 打出 12 个孔。在该模具中为发送器-接收器系统配备了机械驱动的加注滑阀 (2)。

工作流程:

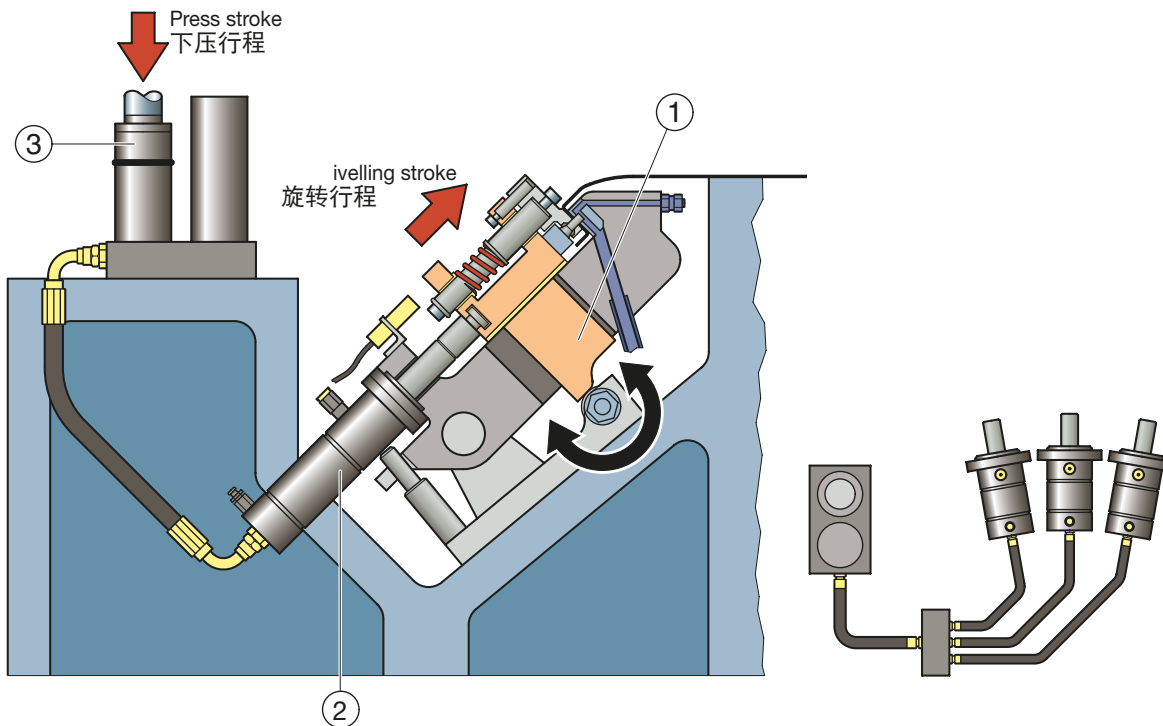
首先, 通过超程楔控制装置 (3) 将加注滑阀 (2) 送入位置。继续下压过程时将向四个发送器 (4) 施压, 从而激活接收器 (5) 开始打孔。

如果使用该解决方案, 则在打孔操作时无需任何传动齿轮, 进而能够按与工件成 90° 角的方式顺利完成打孔操作。

Flex Cam Typical Applications

发送器-接收器系统 应用示例

Application: Punching holes with a swivelling die
使用可旋转底模打孔的应用情况



6 holes are punched at a negative angle using working cylinders that drive a shearing punch unit (1).

使用可驱动旋转式冲裁凸模单元 (1) 的工作气缸按负角打出 6 孔。

Working sequence:

The diagram shows the Flex Cam in its end position (press at bottom dead centre). As the working cylinder (2) starts to move back, the punch moves out of the punching area. The entire shearing punch then swivels down so that the workpiece can be removed. The operation is reversed when the top part of the press down descends once more.

The tool contains two systems: one on the left and the other on the right. Each system consists of a Power Unit (3) that drives three Cam Units.

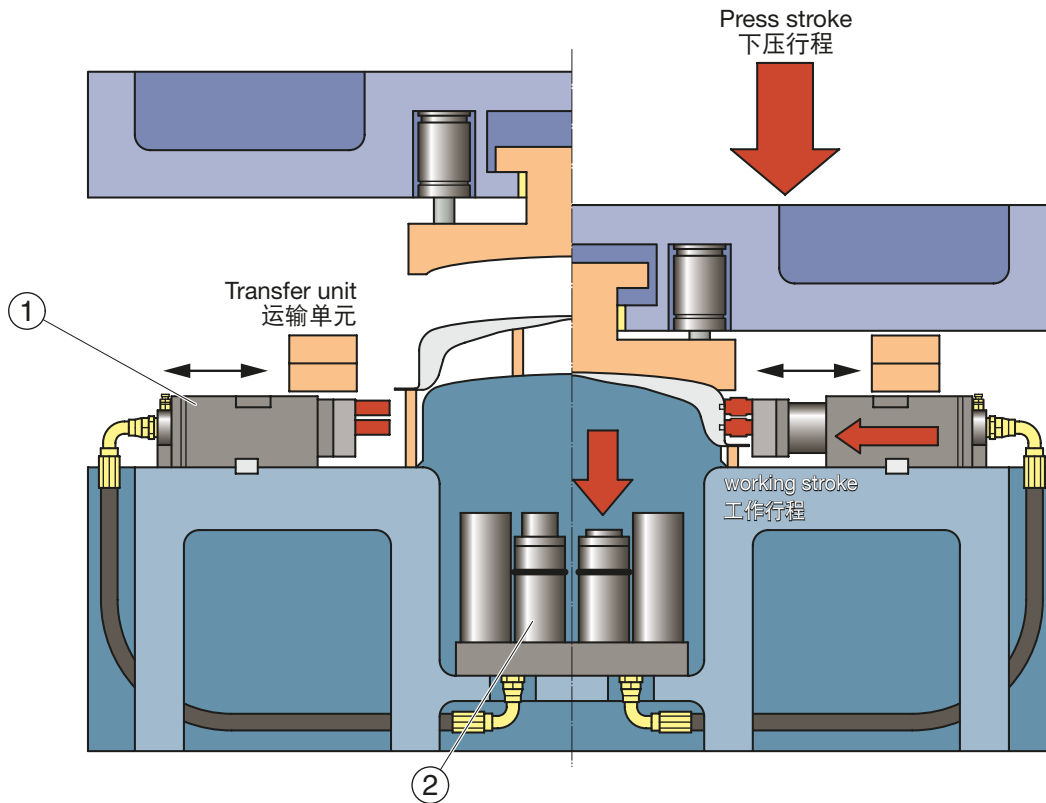
工作流程:

图中所示为位于终端位置的发送器-接收器系统（压力机位于底部顶点）。

如果工作气缸 (2) 开始返回，则冲头从打孔部位驶出，随后，整个冲裁凸模单元向下旋转，从而可取出工件。但压力机上部再次下降时，即开始相反的工序。

模具中配有两套系统，一套位于左侧，一套位于右侧。每套系统均由一个可驱动三个接收器的发送器 (3) 构成。

Application: Punching holes with a Flex Cam Stroke ratio 1:2.5
使用发送器-接收器行程比打孔的应用情况 (1:2.5)



This tool produces two workpieces at the same time: one on the right and the other on the left. On the left-hand side of the diagram, the press is at the top dead centre position. On the right-hand side, the press is at the bottom dead centre. The transport grippers can be seen above the Cam Units.

The workpiece must be shaped before the holes are punched in the sides.

The machining contour requires a relatively large distance between the blank and the punching unit.

Working sequence:

A small Cam Unit (1) is connected to a larger Power Unit (2) in order to guarantee the necessary time/traverse sequence. This results in a stroke ratio of 1 to 2.5.

Example: If the Power Unit stroke is 10 mm, then the Cam Unit stroke will be 25 mm.

在模具中同时制造两个部件（一个在左，一个在右）。图中左侧为顶部顶点中的压力机。右侧所示为底部顶点中的压力机。

接收器单元的上方可见运输抓斗。

侧面打孔前，必须执行工件成型。由于模具成型轮廓的原因，钣金零件与打孔单元之间需要留出相当大的间距。

工作流程：

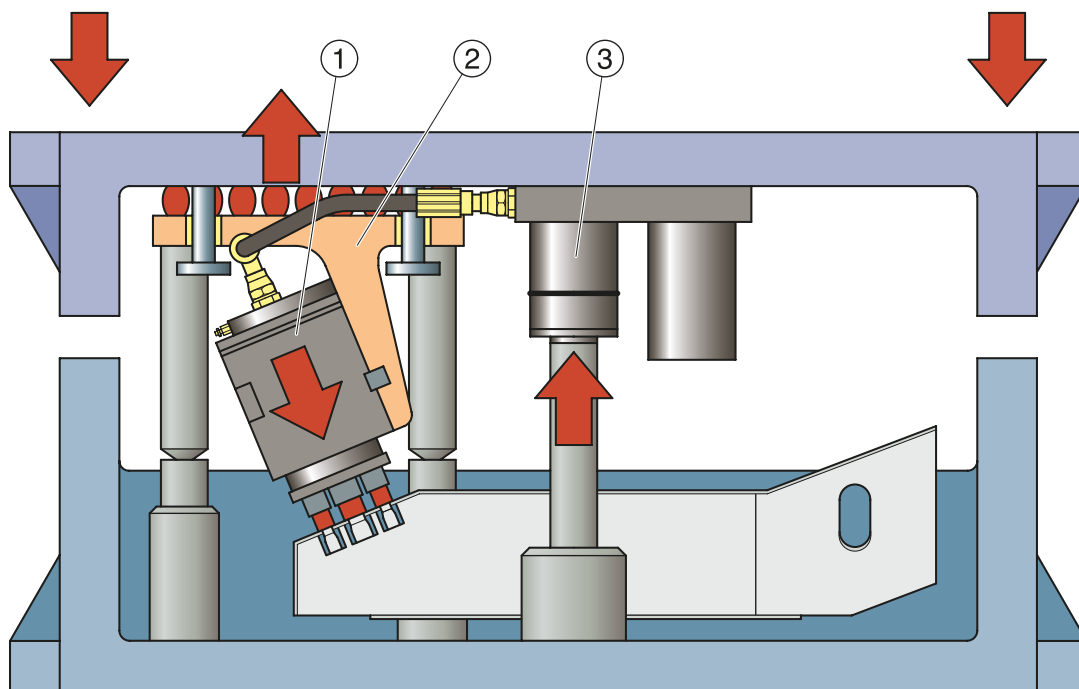
为了保障所需的时间-距离过程，应将尺寸较小的接收器（1）与尺寸较大的发送器（2）相连。由此产生系数为 2.5 的行程比。

例如：如果发送器行程为 10 mm，则接收器行程 = 25 mm。

Flex Cam Typical Applications

发送器-接收器系统 应用示例

Application: Cutting with floating suspension and conical spacers
使用浮动悬挂装置和楔形隔片打孔的应用情况



This application uses a Flex Cam that is suspended from above (in the top part of the tool).

该应用时，将使用悬挂在上方（安装在模具上部）的发送器-接收器系统。

Working sequence:

The Cam Unit (1) is mounted on a floating die (2). The floating die is spring-mounted and is centred with respect to the bottom part of the tool by conical spacers. As the press moves down and the floating die is centred, the Power Unit (3) is activated and the holes are punched.

Before the Flex Cam was installed, the holes were punched vertically using oval forming punches.

Due to the improved production output and quality that resulted from installing the Flex Cam, the system paid for itself (including installation) within just three months.

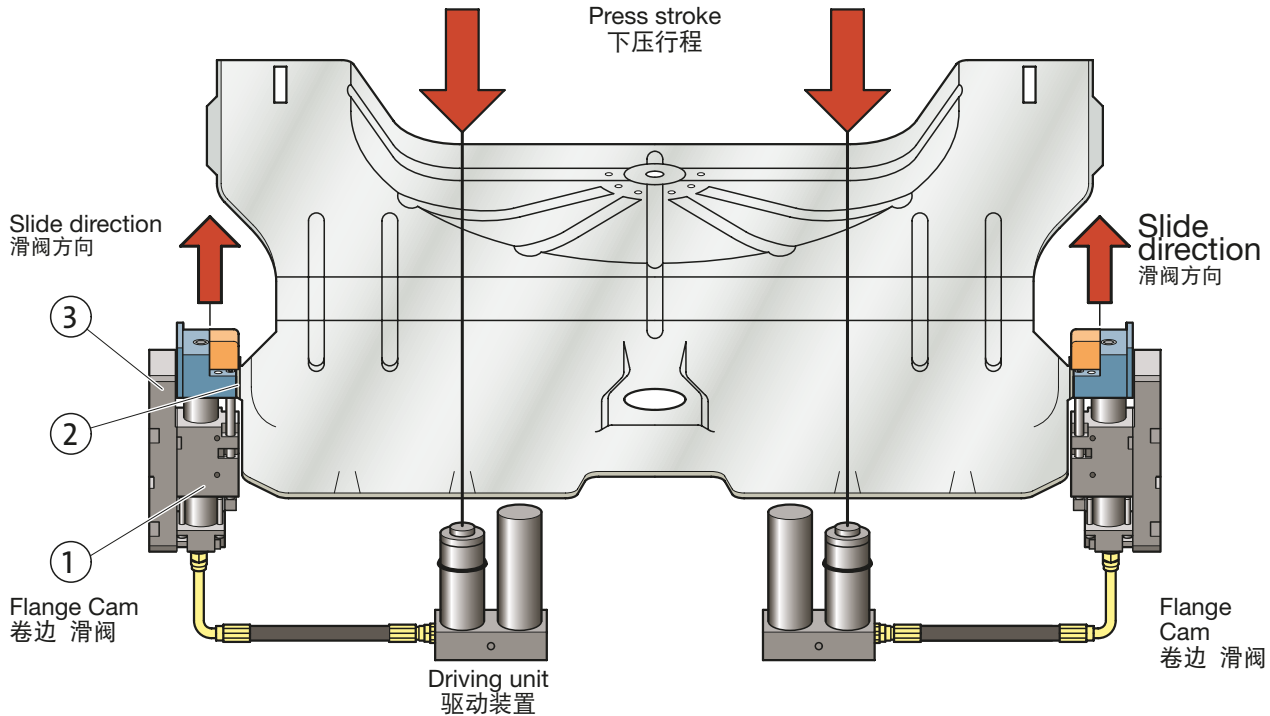
工作流程：

将接收器（1）安装在浮沉模（2）上。浮沉模采用弹性安置并使用楔形隔片将其对准模具底部的中心。当压力机向下移动并对准浮沉模时，将激活发送器（3）并带动打孔器。

安装发送器-接收器系统前，打孔器使用椭圆形成型冲头垂直打孔。

由于安装发送器-接收器系统可明显改善生产情况和质量，因此，在安装后的三个月内即可回收系统的全部成本。

Application: Bending
使用卷边滑阀竖起的应用情况



The diagram shows a base plate which is used in the Flex Cam (1) to cant (bend up) lateral tabs (2).

图中所示为底板，此时的发送器-接收器系统（1）被用于为侧面连接板（2）卷边（竖起）。

Working sequence:

The bending punches fixed to the Cam Units (in this case Flange Cams) are supported at the sides (3). These supports absorb the severe lateral forces resulting from the bending operation.

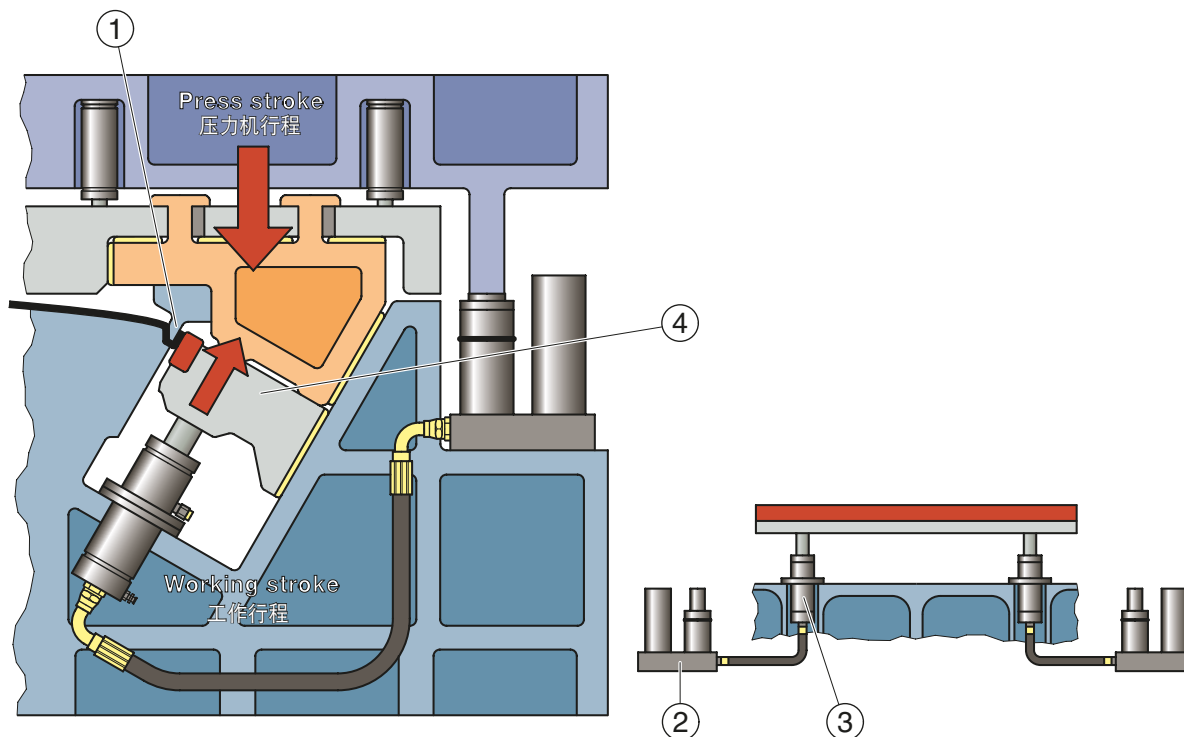
工作流程：

固定在接收器（此处为卷边滑阀）上的卷边或竖起模具收到侧面（3）支承，以便吸收因弯曲过程产生的强大侧向力。

Without this system, it would have been necessary to produce an entire new tool with a floating die or to introduce a second operation.

否则，必须使用浮沉模制造全新模具或设置第二项工作过程。

Application: Bending – slide driven synchronously
竖起应用情况 - 同步驱动滑阀



This tool has two Force Cylinders for driving an 800 mm wide bending punch.

Working sequence:

As can be seen from the diagram, the blank is bent (1) at an angle, against the motion of the press.

Two separate Flex Cam to synchronise the motion of the bending punch. Each system consists of a Power Unit (2) and a Force Cylinder (3).

The bending punch (4) is guided in the tool. As a result, the Force Cylinders only absorb axial forces.

Use of the Flex Cam simplified the structure of this tool, thus reducing the machinery costs.

该模具使用两个工作气缸驱动 800 mm 宽的弯曲冲头。

工作流程:

如图所示, 将按照与下压移动相反的角度执行竖起 (1) 工序。

为了确保竖起导向板同步移动, 应使用两套独立的发送器-接收器系统。每套系统均由一个发送器 (2) 和一个工作气缸 (3) 构成。

在模具中导向导向板 (4), 以便工作气缸仅会吸收轴向力。

通过使用发送器-接收器系统可简化模具结构, 进而降低制造成本。

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Hassmersheim plant / Hassmersheim 工厂

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They include steel die sets, guide elements, oilless guide elements and precision components such as punches and matrixes, special steel compression springs, gas springs, forming materials, metal bonding agents, moulding resins, peripheral equipment for pressing and tool making, tool slides with cam or roller slides and hydraulic cam systems.

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产品范围适用于模具、成型、机械及设备制造方面的客户。

其中包括：

钢制冲压模座、导向元件、免维护滑动元件、精密部件（如冲裁凸模和切削衬套）、钢制特种压力弹簧、空气弹簧、成型材料、金属粘合剂和铸模树脂、压力机和模具制造的外围设备，以及带楔子、滚轮或液压传动装置的模具滑阀。

FIBRO 凭借其种类繁多的仓储及迅速快捷的供货能力成为了全球同行业中的标杆。

FIBRO - your production partner

FIBRO is customer-focused – world-wide. A well-developed network of sales and service points and strategic partners ensure that help is always at hand. This ensures technical advance, world-wide experience in applications and rapid availability of products.

Facts and figures on FIBRO:

- founded 1958
- approximately 770 staff
- more than 70 representatives and service stations world-wide
- branches in France, USA, India, Switzerland, Singapore and China
- ISO 9001:2000 Quality Assurance and VDA 6.4 certification



Precision parts manufacturing / 精密零件制造

因此，FIBRO 在全球范围内推广以客户为中心的服务。稠密的销售及售后服务网络，以及战略合作伙伴则不断地提供贴近市场的服务。从而确保了技术上的进步、国际化的应用经验和产品的迅速可用性。

FIBRO GmbH 的数据与实际情况：

- 成立于 1958 年
- 约 770 名员工
- 在全球设立了超过 70 家代表处和售后服务合作伙伴
- 在法国、美国、印度、瑞士、新加坡、和中国设有分公司
- 经过 DIN EN ISO 9001:2000 和 VDA 6.4 认证



Rotary Tables

FIBRO – The worldwide pioneer in the field of rotary tables

A comprehensive range of types:

FIBROTAKT® – Rotary indexing table with Hirth face gear

FIBROPLAN® – NC rotary table with worm drive

FIBRODYN® – NC rotary table with direct torque drive

FIBROMAX® – Heavy-duty NC rotary table with Twin Drive

FIBROTOR® – Electromechanical rotary indexing table for applications that do not involve machining

Rotary tables for all applications – from flexible workpiece positioning through rotary and multiple-axis machining to assembly automation

Used in all branches of industry – from the automobile industry through solar energy to machine tools

A wide range of sizes – from micro-machining to processing of very large parts

Customer-oriented design – from the standard modular table to customer-specific special solutions

旋转台

Weinsberg 工厂自 1962 年起就开始生产旋转台, 从而使 FIBRO 成为该方面备受亲睐的先行者。

丰富的型号:

FIBROTAKT® – 带端面齿 (Hirth) 平面啮合的圆形回转台

FIBROPLAN® – 带螺杆传动的 NC 旋转台

FIBRODYN® – 带力矩直接传动的 NC 旋转台

FIBROMAX® – 带双传动的重型负载 NC 旋转台

FIBROTOR® – 用于非切削应用的电子机械式旋转台

适用于各类应用的旋转台 – 从灵活的工件定位, 到倒圆加工和多轴加工, 乃至安装自动化

投身于各个行业 – 从汽车工业, 到太阳能技术, 乃至机床行业

各类尺寸应有尽有 – 从微加工到大型部件制造

以客户为导向的规格 – 从模块化标准到客户特定的特殊解决方案

VERTRETUNGEN · REPRESENTATIVES · REPRESENTATIONS · RAPPRESENTANTES ·

DEUTSCHLAND

Außendienst Andreas Otto

Immenweg 3
16356 Ahrensfelde OT Eiche
T +49 30 423 97 15
M +49 170 739 00 64
a.otto@fibro.de

PLZ 10000-19000

Walter Ruff GmbH

Heerenholz 9 28307 · Bremen
T +49 421 438 78-0
F +49 421 438 78-22
mail@praeziruff.de · www.praeziruff.de

PLZ 20000-29000, 49000

Außendienst Stephan Hoffmann

Unter den Linden 22
38667 Bad Harzburg
M +49 171 971 90 05
s.hoffmann@fibro.de

PLZ 30000-31000, 37000-39000

Außendienst Daniel Kolakowski

Auf der Strotheide 50 · 32051 Herford
M +49 170 576 00 09
d.kolakowski@fibro.de

PLZ 32000-34000, 48000-49000

Außendienst Ralf Feldmann

Wiesenstraße 23b · 58339 Breckerfeld
M +49 151 12 59 01 59
r.feldmann@fibro.de

**PLZ 35000-36000, 57000, 60000-61000,
65000**

Außendienst Lars Jahncke

Locher Straße 44 · 42719 Solingen
T +49 212 25 43-462 · F -390
M +49 170 7637125
l.jahncke@fibro.de

PLZ 42000, 44000-46000, 58000-59000

Außendienst Hartwig Hennemann

Staubenthaler Höhe 79
42369 Wuppertal
T +49 202 283 17 56
F +49 202 759 55 80
M +49 175 29 659 30
h.hennemann@fibro.de

PLZ 40000-42000, 47000, 50000-53000,

Außendienst Oliver Koop

Burgstraße 14
66780 Rehlingen-Siersburg
T +49 6835 923 28 10
F +49 6835 608 59 09
M +49 175 438 53 81
o.koop@fibro.de

PLZ 54000-56000, 66000

Außendienst Markus Rössl

Johann-Strauß-Straße 16/1
74906 Bad Rappenau
T +49 7264 20 64-17 · F -18
M +49 160 97 25 23 93
m.roessler@fibro.de

**PLZ 63000-64000, 67000-69000,
76000-77000**

Außendienst Manfred Wagner

Breslauer Straße 57 · 74372 Sersheim
T +49 7042 3-50 86 · F -748 20
M +49 170 563 52 30
m.wagner@fibro.de

PLZ 70000-73000, 88000-89000

Außendienst Matthias Ehrenfried

Steigerwaldstraße 25
74172 Neckarsulm
T +49 7132 34 56 90
F +49 7132 98 94 82
M +49 171 864 95 52
m.ehrenfried@fibro.de

PLZ 71000, 74000-75000, 97000

Außendienst Matthias Jörg

In der Krautbündt 44
77656 Offenburg-Zunsweile
M +49 151 21 28 25 00
m.joerg@fibro.de

PLZ 72000, 77000-79000, 88000

Jugard + Künstler GmbH

Landsberger Straße 289
80687 München
T +49 89 546 15 60
F +49 89 580 27 96
muc@jugard-kuenstner.de
www.jugard-kuenstner.de

PLZ 80000-89000

Jugard + Künstler GmbH

Weidentalstraße 45
90518 Altdorf bei Nürnberg
T +49 9187 936 69-0
F +49 9187 936 69-90
nbg@jugard-kuenstner.de
www.jugard-kuenstner.de

PLZ 90000-97000

HELD Werkzeugmaschinen Präzisionswerkzeuge GmbH

Sorge 34 · 07545 Gera
T +49 365 824 91 0
F +49 365 824 91 11
info@held-wzm.de
www.held-wzm.de

PLZ 01000-09000, 98000-99000

REPRESENTACIONES · PRZEDSTAWICIELSTWA · ZASTOUPENÍ · MÜMESSILLER · 代表处

INTERNATIONAL

AR ARCINCO Industrial Ltda.

Rua Oneda, 935 - Planalto
CEP 09895-280 - São Bernardo do Campo
- SP
T +55-11-3463.8855
F +55-11-4390.9155
arcinco@arcinco.com.br
www.arcinco.com.br

AT Rath & Co. Ges. m.b.H.

Teiritzstrasse 3 · 2100 Korneuburg
T +43 2262 608 0 · F +43 2262 608 60
office@rath-co.at · www.rath-co.at

AU Bruderer Presses Australia Pty. Ltd.

92 Trafalgar Street
Annandale, NSW 2038
T +61 419 400 995
F +61 296 864 809
Brudsyd@tpgi.com.au

BA Oro-Tech trgovina d.o.o.

Ulica borcev 1/b · SI-2000 Maribor
T +386 2 426 08 43
F +386 2 426 08 44
oro-tech.trgovina@siol.net

BE Schiltz s.a.

Rue Nestor Martin 315 · 1082 Bruxelles
T +32 2 464 4830 · F +32 2 464 4839
info@schiltz.be · www.schiltz-norms.be

BG Bavaria 2002 EOOD

Patriarh Evtimii 10
5100 Gorna Orjachoviza
T +359 618 64158 · F +359 618 64960
bavaria2002@gorna.net
www.bavaria2002.hit.bg

BR ARCINCO Industrial Ltda.

Rua Oneda, 935 - Planalto
CEP 09895-280 - São Bernardo do Campo
- SP
T +55-11-3463.8855
F +55-11-4390.9155
arcinco@arcinco.com.br
www.arcinco.com.br

CA FIBRO Inc.

139 Harrison Ave. · Rockford, IL 61104
T +1 815 229 1300
F +1 815 229 1303
info@fibroinc.com · www.fibro.com

CH FIBRO GmbH · 74855 Hassmersheim

Angebote: ac5.normalien@fibro.de
T +49 6266 73 439
F +49 6266 9205 670
Bestellungen: vc5.normalien@fibro.de
T +49 6266 73 468
F +49 6266 9205 671

CL Bermat S.A.

Coyancura 2283, Of. 601
Casilla 9781 · Santiago
T +56 2 231 88 77 · F +56 2 231 42 94
bermat@bermat.cl · www.bermat.cl

CN FIBRO (Shanghai)

Precision Products Co., Ltd.

1st Floor, Building 3, No. 253, Ai Du Road
Pilot Free Trade Zone, Shanghai 200131
T +86 21 6083 1596
F +86 21 6083 1599
info@fibro.cn · www.fibro.com

Jilin Province Feibo Tooling

Standard Parts Co., Ltd.

Add: Room303, No. 5470, Xi'an Avenue,
Luyuan District, Changchun City,
Jilin Province
T +86 431 8120 3792
F +86 431 8120 3792
feibomuju@sina.cn · www.fibro.com

Shenzhen Poleda Investment Co., Ltd.

Add: 4/F, SED Technology Tower,
No.1 Keji Road, Hi-tech Industrial Park,
Nanshan District, Shenzhen
T +86 755 2398 5026/2398 5029
F +86 755 2398 5596
anson@poleda.cn · www.fibro.com

CY Militos Trading Ltd.

P.O.B. 27297 · 1643 Nicosia
T +357 22 75 12 56
F +357 22 75 22 11
militos@cytanet.com.cy

CZ Gore, s.r.o.

Košínova 3090/29a
61200 Brno - Kralovo Pole
T +42 541 219 607
F +42 541 219 606
obchod@gore.cz · www.gore.cz

DK EBI A/S

Naverland 29 St. Th · 2600 Glostrup
T +45 4497 8111 · F +45 4468 0626
ebi@ebi.dk · www.ebi.dk

DZ Pneumacoupe Blida Boufarik

86 Bld. Menad Mohamed
Boufarik, 09400 Blida
T +213 347 5655 · F +213 347 5655
pneumacoupe@yahoo.fr

EE CLE Baltic Oü

Sära street 10 · Peetri village
Rae county · 75312 Estonia
T +372 780 3530 · F +372 668 8679
roland.rebane@clegroup.com ·
www.clebaltic.com

EG Smeco

68, Abdel Rahman El Raffei St.
11351-Heliopolis West, Cairo
T +20 2 620 06 71 · F +20 2 620 06 74
r.metwally@tedata.net.eg

ES Daunert Máquinas-Herramientas, S. A.

c/. Tirso de Molina s/n Esquina
c/. Albert Einstein
Polígono Industrial Almeda
08940 Cornellá de Llobregat · Barcelona
T +34 93 475 1480
F +34 93 377 6464
info@daunert.com · www.daunert.com

FI CLE

Trollbergintie 10 · 10650 Tammisaari
T +358 2075 19-600
F +358 2075 19-619
info@cle.fi · www.cle.fi

VERTRETUNGEN · REPRESENTATIVES · REPRESENTATIONS · RAPPRESENTANTES ·

INTERNATIONAL

FR FIBRO France Sarl

26, avenue de l'Europe
67300 Schiltigheim
T +33 3 90 20 40 40
F +33 3 88 81 08 29
info@fibro.fr · www.fibro.com

GB Bruderer UK Ltd.

Unit H, Cradock Road
Luton · Bedfordshire LU4 0JF
T +44 1582 563 400
F +44 1582 493 993
mail@bruderer.co.uk
www.bruderer-presses.com

GR Konstantinos Koutseris & Co. - MEK

Pyloy 100 · 10441 Athen
T +30 210 5220557
F +30 210 5221208
info@mek.com.gr · www.mek.com.gr

HK FIBRO (Shanghai)

Precision Products Co., Ltd.

1st Floor, Building 3, No. 253, Ai Du Road
Pilot Free Trade Zone, Shanghai 200131
T +86 21 6083 1596
F +86 21 6083 1599
info@fibro.cn · www.fibro.com

HR WML Robert Bednjanec

Vlaska 76 · 10000 Zagreb
T +385 984 16005
robert.bednjanec@net.hr

HU Rath & Co. Ges. m.b.H.

Teiritzstraße 3 · AT-2100 Korneuburg
T +43 2 262 608 0
F +43 2 262 608 60
office@rath-co.at · www.rath-co.at

ID FIBRO Asia Pte. Ltd.

9, Changi South Street 3, #07-04
Singapore 486361
T +65 65 43 99 63 · F +65 65 43 99 62
info@fibro-asia.com · www.fibro.com

IE Bruderer UK Ltd.

Unit H, Cradock Road
Luton · Bedfordshire LU4 0JF
T +44 1582 563 400
F +44 1582 493 993
mail@bruderer.co.uk
www.bruderer-presses.com

IL A. J. Englander 1980 Ltd.

13 Harechev Street · Tel Aviv 67771
T +972 3 537 36 36
F +972 3 537 33 25
info@englander.co.il · www.englander.co.il

IN FIBRO INDIA

PRECISION PRODUCTS PVT. LTD.

Plot No: A-55, Phase II, Chakan MIDC
Taluka Khed, Pune - 410 501
T +91-2135 67 09 03
M +91-98810 00273
info@fibro-india.com · www.fibro.com

IR Eximrad Co.

268 Dr. Mofatah Ave. · Tehran 15848
T +98 21 8882 12 3
F +98 21 8830 9778
eximrad@yahoo.com

IT Millutensil S.R.L.

Corso Buenos Aires, 92 · 20124 Milano
T +39 02 2940 4390
F +39 02 204 6677
info@millutensil.com
www.millutensil.com

KR FIBRO Korea Co. Ltd.

203-603, Bucheon Technopark
Ssangyong 3 · 397, Seokcheon-ro, Ojeong-
gu, Bucheon-si, Gyeonggi-do
T +82 32 624 0630
F +82 32 624 0631
fibro_korea@fibro.kr · www.fibro.com

LI FIBRO GmbH · 74855 Hassmersheim

Angebote: ac5.normalien@fibro.de
T +49 6266 73-439
F +49 6266 9205 670
Bestellungen: vc5.normalien@fibro.de
T +49 6266 73-468
F +49 6266 9205 671

LT Cle Baltic Oü

Pramones gatve 94-7
11115 Vilnius, Lithuania
T +370 663 56309 · F +370 520 40914
info@clebaltic.com · www.clebaltic.com

LV Cle Baltic Oü

Starta iela 6b · 1026 Riga, Latvia
T +371 671 39991 · F +371 671 39992
info@clebaltic.com · www.clebaltic.com

MA Chiba Industrie

Lot 59 Zone Industrielle · Mohammedia
T +212 523 31 40 16/17/19
F +212 523 30 39 85
h.hind@chibaindustrie.com

MX FIBRO Inc.

139 Harrison Ave. · Rockford, IL 61104
T +1 815 229 1300
F +1 815 229 1303
info@fibroinc.com · www.fibro.com

MY FIBRO Asia Pte. Ltd.

9, Changi South Street 3, #07-04
Singapore 486361
T +65 65 43 99 63 · F +65 65 43 99 62
info@fibro-asia.com · www.fibro.com

NL Jeveka B.V.

Platinaweg 4 · 1362 JL Almere Poort
T +31 36 303 2000
info@jeveka.com · www.jeveka.com

NZ APS Tooling Ltd.

17A Spring Street
Onehunga, Auckland, 1061
T +64 9 579 2208 · F +64 9 579 2207
info@apstools.co.nz

PE Ing. E. Brammertz S.c.r.l.

Av. José Pardo 182 · OF. 905
Apartado 0173 · Miraflores, Lima 18
T +51 1 445 81 78 · F +51 1 445 19 31
braming@terra.com.pe

PL Doradca Techniczny Marcin Pietka

Roczynny, ul. Bielska 8 · 34-120 Andrychów
T +48 33 813 72 13
M +48 605 987 284
m.pietka@fibro.de · www.fibro.com

REPRESENTACIONES · PRZEDSTAWICIELSTWA · ZASTOUPENÍ · MÜMESSILLER · 代表处

INTERNATIONAL

Doradca Techniczny Piotr Kaszuba

ul. Chopina 12/1 · 56-400 Oleśnica
T +48 71 398 53 08
F +48 71 398 53 08
M +48 609 987 285
p.kaszuba@fibro.de · www.fibro.com

PT Ferrometal Lda.

Estrada Manuel Correia Lopes
Parque Industrial Progresso, Armazém 1
Polima
2785-001 S. Domingos de Rana
T +351 214 447 160
F +351 214 447 169
ferrometal@ferrometal.pt

RO Reprezentant Vanzari

Daniel Andrei Sibisan

Str. Zizinului nr. 8, ap. 21
Brasov, 500414
T +40 744 44 05 83
F +40 368 78 00 08
d.sibisan@fibro.de · www.fibro.com

RS Andrija Tesic, Dipl. Ing.

Partisanska 12/a-II · 11090 Beograd
T +381 11 2338 362
F +381 11 2338 362
atesic@verat.net

RU CL Engineering & Co. Ltd.

ul. Sofyiskaya 66 · 192289 S. Petersburg
T +7 812 575 1592
F +7 812 324 7388
info@cleru.ru · www.cleru.ru

RU 000 VTF Instrumsnab

ul. Topolinaya 9A · 445047 Togliatti
T +7 8482681424 · F +7 8482681452
office@instrumsnab.ru
www.instrumsnab.ru

SA Abdul Rahman I. Fallatah Br. Est.

Old Makkah Road - Kilo 3
Dar Al Oloum Street
P. O. Box 31403 · Jeddah 21497
T +966 12 681 13 91
F +966 12 645 85 39
fibro.sa@gmail.com · www.al-rasha.com

SE Lideco AB

Verkstadsvägen 4 · 51463 Dalstorp
T +46 321 53 03 50 · F +46 321 603 77
info@lideco.se · www.lideco.se

SG FIBRO Asia Pte. Ltd.

9, Changi South Street 3, #07-04
Singapore 486361
T +65 65 43 99 63 · F +65 65 43 99 62
info@fibro-asia.com · www.fibro.com

SI Oro-Tech trgovina d.o.o.

Ulica borceev 1/b · SI-2000 Maribor
T +386 2 426 08 43
F +386 2 426 08 44
oro-tech.trgovina@siol.net

SK Technicky konzultant

Vladimir Tanecká

CSA 89/8 · 96223 Ocova
M +421 905 32 94 56
v.tanecka@fibro.de · www.fibro.com

TH FIBRO Asia Pte. Ltd.

9, Changi South Street 3, #07-04
Singapore 486361
T +65 65 43 99 63
F +65 65 43 99 62
info@fibro-asia.com · www.fibro.com

TR Ender Kesici ve Teknik Takımlar

Sanayi Ticaret A.S.

Tersane Caddesi No. 105
34420 Karaköy/Istanbul
T +90 212 253 2600
F +90 212 254 5791
info@enderltd.com · www.enderltd.com

TW SunNan Enterprises Co. Ltd.

2F, No. 7, Alley 6, Lane 235
Pao-Chiao Road
Hsin-Tien City · Taipei
T +886 22917 6454
F +886 22911 0398
sun-ss@umail.hinet.net

US FIBRO Inc.

139 Harrison Ave. · Rockford, IL 61104
T +1 (815) 229-1300
F +1 (815) 229-1303
info@fibroinc.com · www.fibro.com

ZA Herrmann & Herrmann Pty. Ltd.

9, Mpande Street · Sebenza
Edenvale 1609
T +27 11 828 01 00
F +27 11 828 60 21
hermstools@mweb.co.za
www.hermstools.com

Standard Parts / 业务部: 标准件

FIBRO GmbH
August-Läpple-Weg
74855 Hassmersheim
T +49 6266 73-0
F +49 6266 73 237
info@fibro.de

DE

FIBRO France Sarl
26, avenue de l'Europe
67300 Schiltigheim
T +33 3 90 20 40 40
F +33 3 88 81 08 29
info@fibro.fr

FR

FIBRO Inc.
139 Harrison Avenue
Rockford, IL 61104
T +1 815 2 29 13 00
F +1 815 2 29 13 03
info@fibroinc.com

US

FIBRO Asia Pte. Ltd.
9, Changi South Street 3, #07-04
Singapore 486361
T +65 65 43 99 63
F +65 65 43 99 62
info@fibro-asia.com

SG

FIBRO INDIA
PRECISION PRODUCTS PVT. LTD.
Plot No: A-55, Phase II, Chakan Midc,
Taluka Khed, Pune - 410 501
T +91 21 35 33 88 00
F +91 21 35 33 88 88
info@fibro-india.com

IN

FIBRO (SHANGHAI)
PRECISION PRODUCTS CO., LTD.
1st Floor, Building 3, No. 253, Ai Du Road
Pilot Free Trade Zone, Shanghai 200131
T +86 21 60 83 15 96
F +86 21 60 83 15 99
info@fibro.cn

CN

菲薄若 (上海) 标准件有限公司
中国(上海)自由贸易试验区荷丹路188号30号厂房2楼
邮编:200131
电话: 0086 21 60831589
传真: 0086 21 60831599
电子邮件: INFO@FIBRO-CHINA.COM

中

FIBRO KOREA CO., LTD.
203-603, Bucheon Technopark
Ssangyong 3
397, Seokcheon-ro, Ojeong-gu,
Bucheon-si, Gyeonggi-do
T +82 032 624 0630
F +82 032 624 0631
fibro_korea@fibro.kr

KR