FIBRO

WIRELESS PRESSURE MONITORING (WPM)
OPERATION WITH ETHERCAT
OR PROFINET FIELDBUS

- Box 1 (Fibro Gateway)
  - TxPDO1 Info
    - Tool State
    - Number Of Tools
    - Number Of Sensors
    - Active Tool
    - Active Sensor
    - Monitored Tool
    - Command
  - TxPDO2 Tool Data
    - State
    - Battery
    - Serial Number
    - RSSI
    - Name
    - Sensors
  - TxPDO3 Sensor Data
    - State
    - Pressure
    - Temperature
    - Battery
    - Serial Number
    - RSSI
  - RxPDO1 Activate

WIRELESS PRESSURE MONITORING (WPM)
OPERATION WITH ETHERCAT OR PROFINET FIELDBUS

■ 1. OPERATION WITH ETHERCAT/PROFINET FIELDBUS

The operation with EtherCAT/Profinet fieldbus requires a higher-ranking EtherCAT master, such as a PLC.

An XML appliance description file for the WPM Gateway is available for the configuration of the EtherCAT master or Profinet PLC.

The configuration of a PLC and the fieldbus is not described in these instructions. It is part of the respective PLC or fieldbus master description. Every PLC has its own approach.

■ 1.1 ETHERCAT XML FILE, PROFINET XML FILE, APPLIANCES DESCRIPTION FILE

The XML file describes which inputs, outputs and data formats are available on the EtherCAT, Profinet fieldbus.

WIRELESS PRESSURE MONITORING (WPM)
TXPDO1
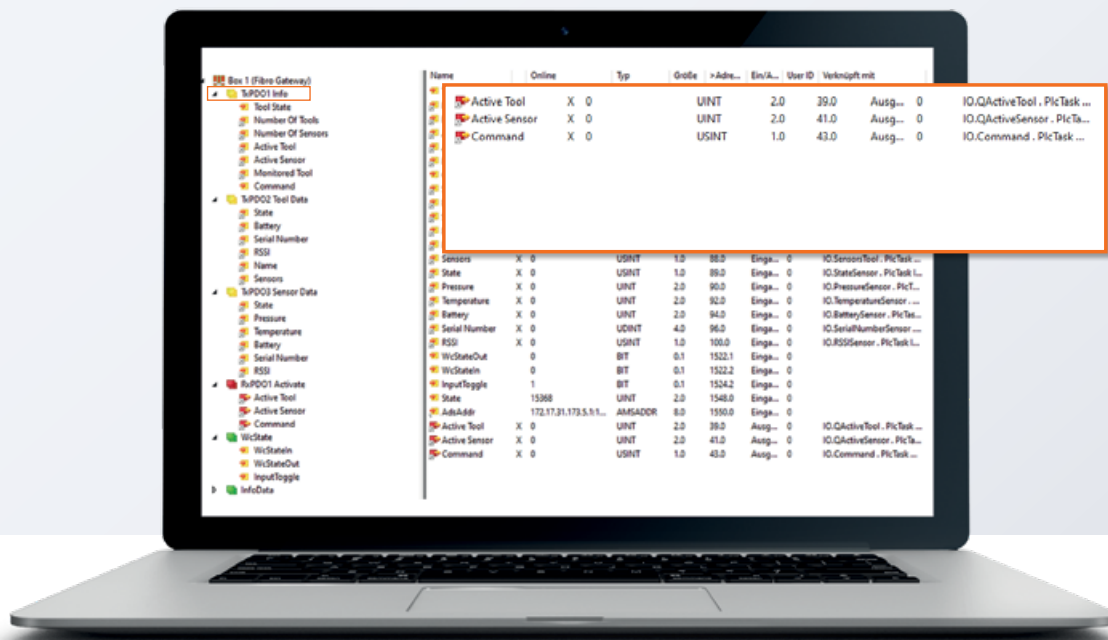
TOOL STATE

Bit	Meaning
0 (0x01)	Warning message
1 (0x02)	Alarm message
2 (0x04)	At least one sensor failed during tool monitoring (no Bluetooth messages received for 120 seconds)
4 (0x10)	Active pairing procedure
5 (0x20)	Pairing completed (tool monitoring active)
All others	--

NUMBER OF TOOLS
Number of WPM data holders received via Bluetooth

NUMBER OF SENSORS
Number of WPM pressure sensors received via Bluetooth

ACTIVE TOOL
Feedback from which WPM data holder the data is transmitted in 'TXPDO2 Tool Data'. If 'Active Tool' = 0, the data of all WPM pressure sensors received via Bluetooth can be read.

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ACTIVE SENSOR
Feedback from which WPM pressure sensor the data is transmitted in 'TXPDO3 Sensor Data'.

MONITORED TOOL
Index of the WPM data holder used to carry out a pairing or which WPM data holder is currently being monitored.
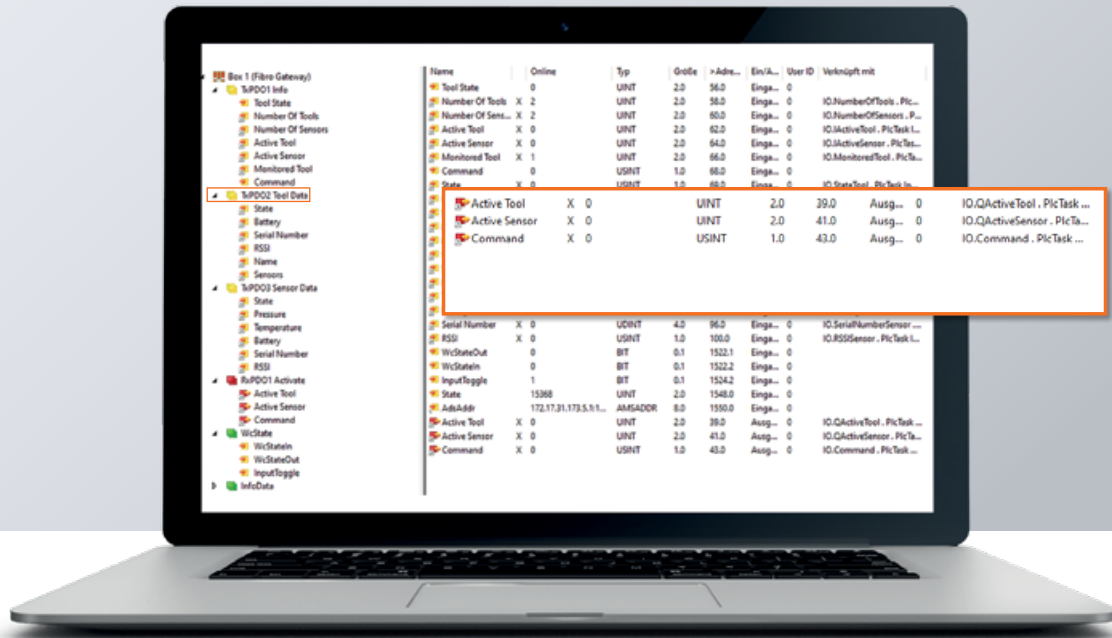
COMMAND
Feedback of the executed command

TOOL DATA
Actual values of the currently selected WPM data holder. These values pertain to the index of the selected WPM data holder shown in 'Active Tool' TxPDO1. If 'Active Tool' is in TxPDO1 0, the data is invalid.

WIRELESS PRESSURE MONITORING (WPM)
TXPDO2

▮ STATE

Gerätestatus

Bit	Meaning
0 (0x01)	--
1 (0x02)	--
2 (0x04)	Warning Battery
3 (0x08)	--
4 (0x10)	--
5 (0x20)	Bit for PC-Measurement, PC has switched ACTIVE
6 (0x40)	Bit ACTIVE mode
7 (0x60)	Bit for LOCK

▮ BATTERY

Voltage of the battery in mV

▮ SERIAL NUMBER

Serial number of the WPM data holder

▮ RSSI

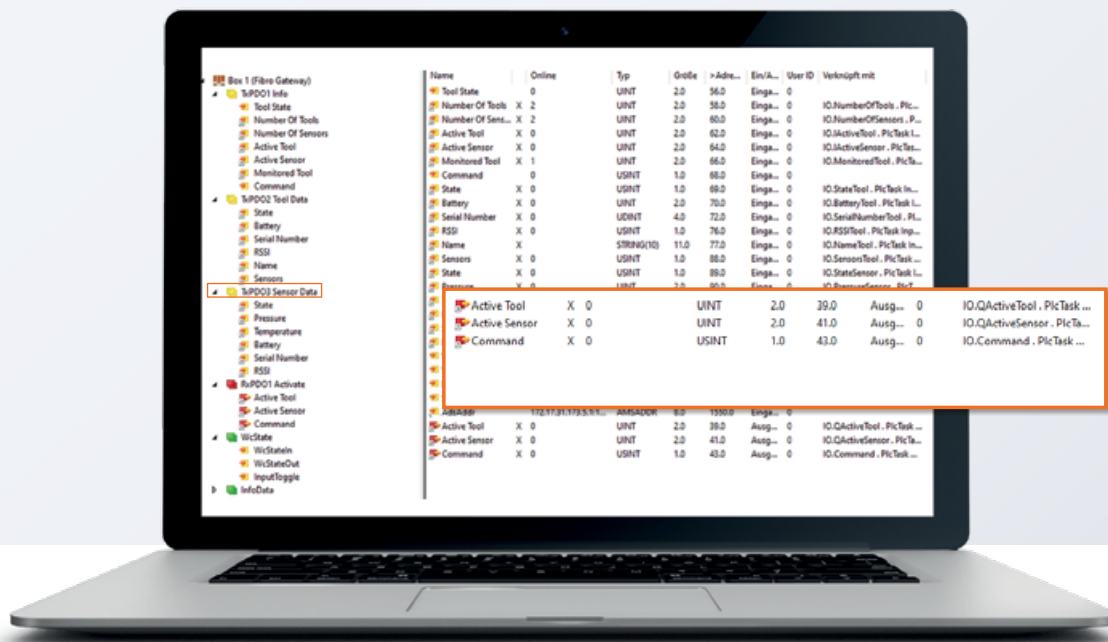Signal strength of the Bluetooth signal in percent

▮ NAME

Abbreviated name of the WPM data holder

▮ SENSORS

Number of WPM pressure sensors assigned to the WPM data holder.

WIRELESS PRESSURE MONITORING (WPM)
TXPDO3

SENSOR DATA

Actual values of the currently selected WPM pressure sensor. These values pertain to the index of the selected WPM pressure sensor shown 'Active Sensor' TxPDO1. If 'Active Sensor' in TxPDO1 0, the data is invalid.

STATE

Appliance state

Bit	Bedeutung
0 (0x01)	Warning Print
1 (0x02)	Warning Temperature
2 (0x04)	Warning Battery
3 (0x08)	Alarm Print
4 (0x10)	Alarm Temperature
5 (0x20)	WPMconfig-Measurement
6 (0x40)	ACTIVE mode (non-sleep)
7 (0x60)	LOCK

PRESSURE

Last measured pressure value of the WPM pressure sensor in bar

TEMPERATUR

Last measured temperature of the WPM pressure sensor in °C

BATTERY

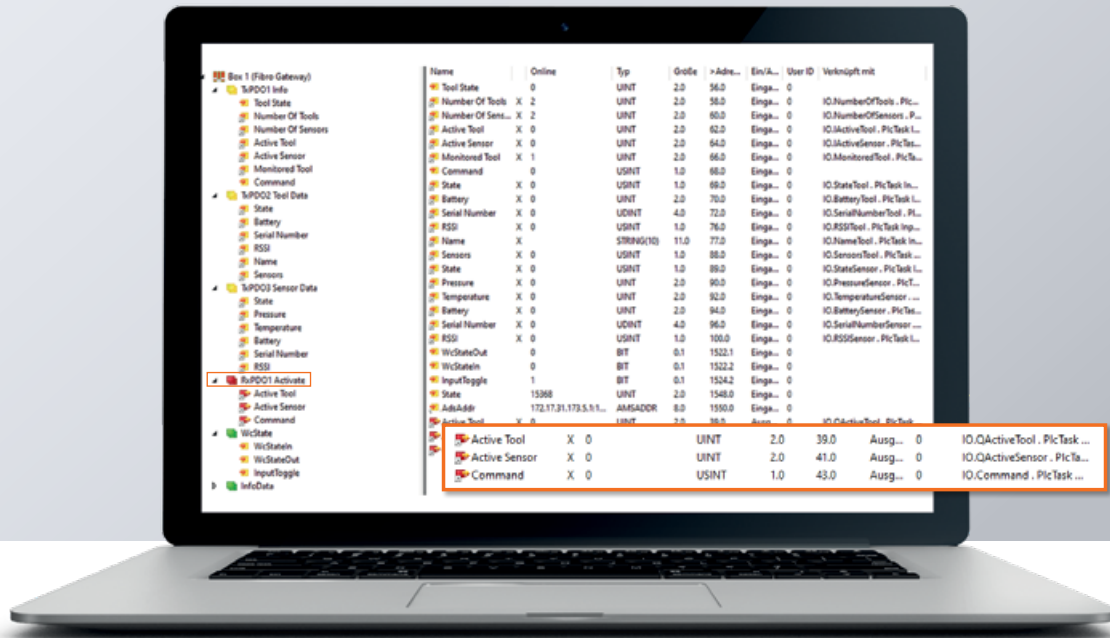Last measured battery voltage of the WPM pressure sensor in mV

SERIAL NUMBER

Serial number of the WPM pressure sensor

RSSI

Signal strength of the Bluetooth signal in percent

subject to alterations

WIRELESS PRESSURE MONITORING (WPM)
RXPDO1 ACTIVATE

ACTIVE TOOL

Index of the WPM data holder for which data must be displayed in TxPDO2 or index of the WPM data holder to be monitored (pairing).

ACTIVE SENSOR

Index of the WPM pressure sensor for which data must be displayed in TxPDO3. By setting the index in 'Active Sensor', the data of the WPM pressure sensors that are assigned to the WPM data holder can be read. If 'Active Tool' is in TxPDO1 0, the data of all WPM pressure sensors received via Bluetooth can be read via 'Active Sensor'.

COMMAND

Sending a command to the WPM Gateway.
The following commands are defined:

Command	Meaning
0	Ending the last command
1	Run pairing (activation of tool monitoring)
74	Activate Test mode
75	End Test mode

WIRELESS PRESSURE MONITORING (WPM)
SELECTION OF WPM DATA HOLDER AND WPM PRESSURE SENSOR

■ 1.2
ETHERCAT/PROFINET MULTIPLEXING SELECTION WPM DATA HOLDER AND WPM PRESSURE SENSOR

A fieldbus is used for the fast transmission of dynamic process data.

To maintain the real-time capability with short transmission cycles, only the absolutely necessary real-time data should be transmitted.

In the WPM system, the information of the selected die to be monitored will be treated as "necessary data".
In case of multiple dies in the reception area, they are locally provided in a list in the WPM Gateway.
The number of tools in the list is relayed in the EtherCAT/Profinet process image. The EtherCAT Master/Profinet PLC uses a type of addressing procedure (multiplexing) to communicate the next desired element (number) from the list to the WPM Gateway.

The same multiplex procedure is also used for the selection of WPM pressure sensors in the tool that is being monitored.
If the PLC program is supposed to monitor a WPM pressure sensor that is different from the current one, its desired number is transferred from the list to the WPM Gateway. The WPM Gateway answers by sending the desired information on the EtherCAT Master/Profinet SPS.

With this method, the EtherCAT Master/Profinet PLC cyclically picks up all data and creates its own local list in the PLC, which can then be visualized easily as needed. If dies drop out of the list in the WPM Gateway (no reception), the list will be created new by the WPM Gateway. The cyclical addressing and reading out of the list by the PLC adapts the local copy. Filtering and sorting in the PLC is applied to the local list.

■ 1.3
READING THE DATA OF A WPM PRESSURE SENSOR

The number of the WPM pressure sensors assigned to the data holder shown in 'Sensors' (TxPDO2).
For reading the data of one of these WPM pressure sensors, the index of the WPM pressure sensor is written in 'Active Tool' (RxPDO1). If a valid index was specified, the Gateway acknowledges the index in 'Active Sensor' (TxPDO1). The data of the selected sensor can now be read in 'Sensor Data' (TxPDO3).
If the number of sensors is 5, a value between 1 – 5 can be specified as index.

■ 1.4
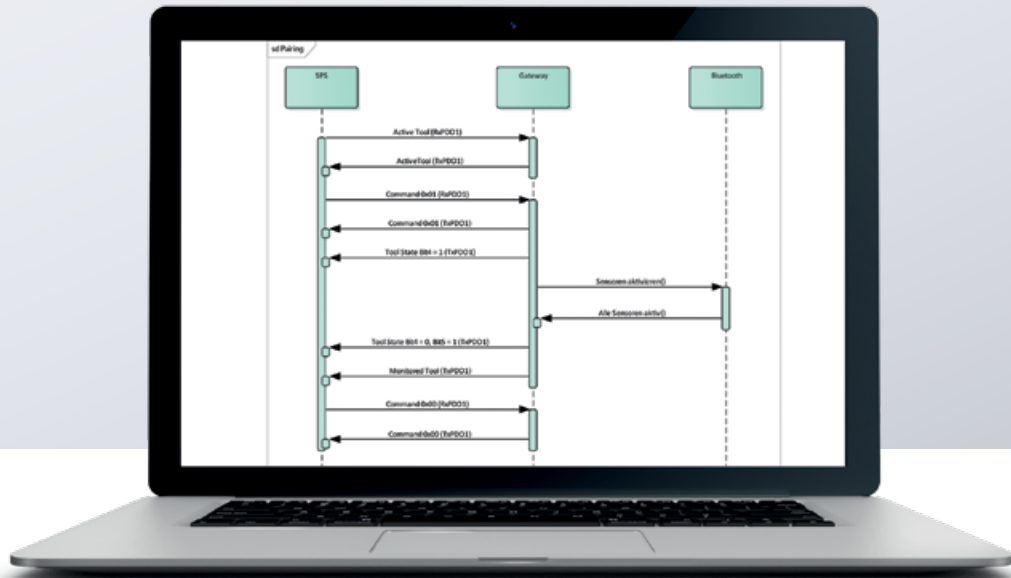### READING THE DATA OF A WPM DATA HOLDER

The number of detected WPM data holders is shown in 'Number of Tools' (TXPDO1).
For reading the data of one of these WPM data holders, the index of the data holder is written in 'Active Tool' (RXPDO1). If a valid index was specified, the WPM Gateway acknowledges the index in 'Active Tool' (TXPD01). The data of the selected WPM data holder can now be read in 'Tool Data' (TXPDO2).
If the number of detected data holders is 5, a value between 1 – 5 can be specified as index.

WIRELESS PRESSURE MONITORING (WPM)
PAIRING AND TOOL MONITORING

◼ **1.5**

PAIRING OF A WPM DATA HOLDER, ACTIVATING TOOL MONITORING

If a WPM data holder is to be monitored automatically by the WPM Gateway, pairing with the desired WPM data holder must be carried out.
Carry out the following steps accordingly:

- Selection of the WPM data holder by sending the index of the WPM data holder in 'Active Tool' (RxPDO1)
- WPM Gateway acknowledges index in TxPDO1
- Sending '1' in command (RxPDO1) to the WPM Gateway
- WPM Gateway acknowledges command in TxPDO1
- WPM Gateway sets Bit 4 in 'Tool State' (TxPDO1) (active pairing procedure)
- The WPM Gateway activates all WPM pressure sensors assigned to the WPM data holder via Bluetooth (end of Sleep Mode). The time for the activation depends, among other things, on the number of assigned WPM pressure sensors, programming of the WPM data holder and reception strength of the Bluetooth signal and can take from a few seconds to several minutes.

Following the successful activation, Bit4 in 'Tool State' (TxPD01) is deleted by the Gateway, Bit 5 is set in 'Tool State' (TxPDO1) (pairing procedure completed, tool monitoring active).

- The WPM Gateway acknowledges the index of the monitored WPM data holder in 'Monitored Tool (TxPDO1)
- Sending '0' in 'Command' (RxPDO1) to the WPM Gateway at the end of the pairing procedure
- WPM Gateway acknowledges command in TxPDO1
- The WPM Gateway now monitors the selected tool independently. If one of the WPM sensors returns a warning or alarm, the respective bit will be set in 'Tool State' (TxPDO1).
- If the pairing procedure could not be completed successfully by the WPM Gateway, Bit 1 (Alarm) is set in 'Tool State' TxPDO1. Pairing must be completed by sending '0' in 'Command' (RxPDO1) in this case as well.

WIRELESS PRESSURE MONITORING (WPM)
END TOOL MONITORING
AND PAIRING

KEEPING THE PAIRING OF A WPM DATA HOLDER,

DEACTIVATING TOOL MONITORING

If the pairing with a WPM data holder and the automatic monitoring must be ended by the Gateway, carry out the following steps:

- Sending Index '0' in 'Active Tool' (RxPDO1)
- Gateway acknowledges index in TxPDO1
- Sending '1' in command (RxPDO1) to the Gateway
- Gateway acknowledges command in TxPDO1
- Gateway sets Bit 4 in TxPDO1 (active pairing procedure)
- The Gateway deactivates all WPM pressure sensors assigned to the WPM data holder via Bluetooth (reset to sleep mode)
- Following successful deactivation, the Gateway Bit4 in TxPD01 will be deleted (pairing completed Tool monitoring deactivated)
- The Gateway sets the index of the monitored WPM data holder in 'Monitored Tool (TxPDO1) to 0
- Sending '0' in command (RxPDO1) to the Gateway at the end of the pairing procedure
- Gateway acknowledges command in TxPDO1
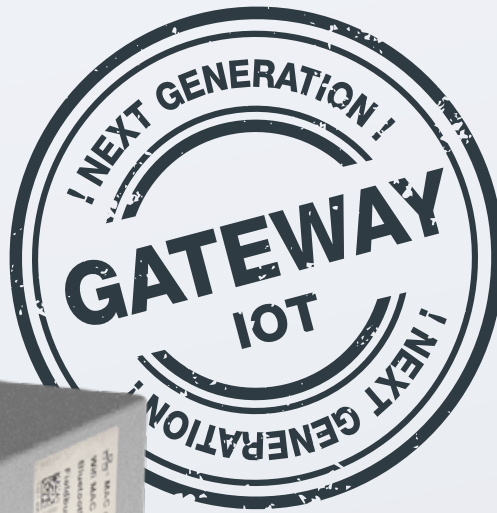
further information at

www.fibro.de/wpm/

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