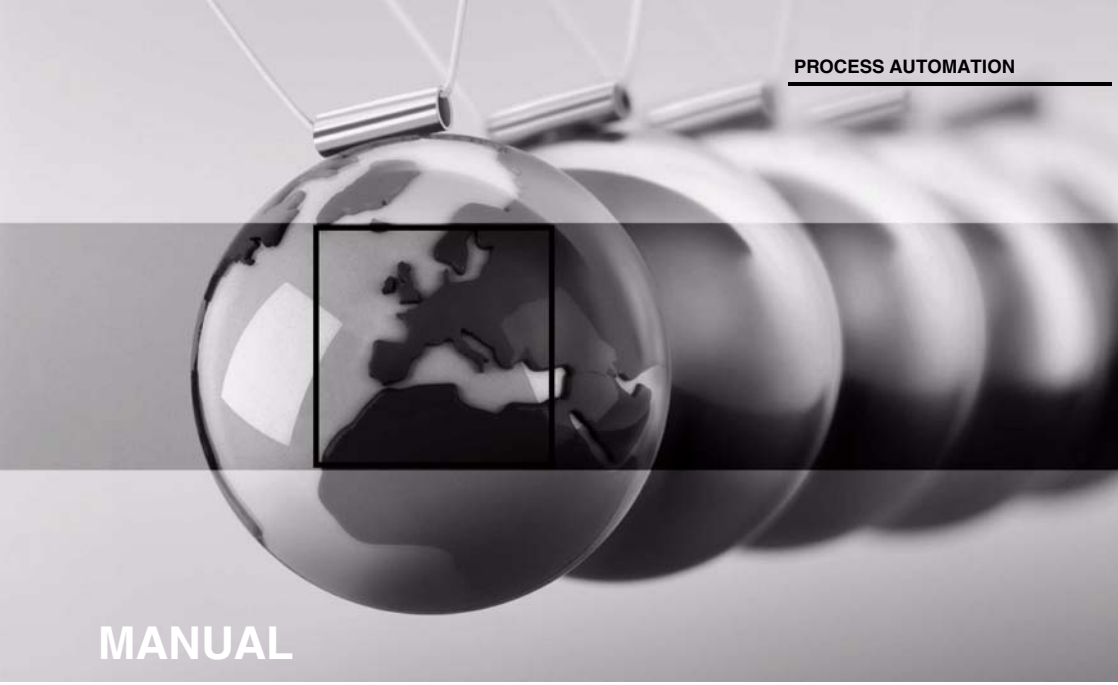


MANUAL

Temperature Multi-Input Device

F2D0-TI-Ex8.PA.*
RD0-TI-Ex8.PA.*

PROFIBUS®

PEPPERL+FUCHS
PROTECTING YOUR PROCESS

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

2013-11

2013-11

1 Safety

1.1 Validity

The chapter “Safety” is valid as instruction manual.

Specific processes and instructions in this document require special precautions to guarantee the safety of the operating personnel.

1.2 Symbols used

This document contains information that you must read for your own personal safety and to avoid property damage. Depending on the hazard category, the warning signs are displayed in descending order as follows:

Safety-relevant symbols

Danger!
This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

Warning!
This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.

Caution!
This symbol indicates a possible fault.

Non-observance could interrupt devices and any connected facilities or systems, or result in their complete failure.

Informative symbols

Note!
This symbol brings important information to your attention.

Action

This symbol indicates a paragraph with instructions.

1.3 System Operator and Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the system operator.

Mounting, installation, commissioning, operation, maintenance and disassembly of any devices may only be carried out by trained, qualified personnel. The instruction manual must be read and understood.

1.4 Pertinent Laws, Standards, Directives, and further Documentation

Laws, standards, or directives applicable to the intended use must be observed. In relation to hazardous areas, Directive 1999/92/EC must be observed.

The corresponding data sheets, declarations of conformity, EC-type-examination certificates, certificates and Control Drawings if applicable (see data sheet) are an integral part of this document. You can find this information under www.pepperl-fuchs.com.

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under www.pepperl-fuchs.com.

1.5 Marking

The Temperature Multi-Input Devices are marked with:

F2D0-TI-Ex8.PA.*:*	RD0-TI-Ex8.PA.*
Pepperl + Fuchs	Pepperl + Fuchs
68307 Mannheim, Germany	68307 Mannheim, Germany
F2D0-TI-Ex8.PA.*:*	RD0-TI-Ex8.PA.*
PTB 03 ATEX 2237 II 2 (1) G Ex ia [ia Ga] IIC T4 Gb , II (1) G [Ex ia Ga] IIC , II (1) D [Ex ia Da] IIIC , II 3 G Ex ic IIC T4 Gc	PTB 03 ATEX 2237 II 2 (1) G Ex ia [ia Ga] IIC T4 Gb , II (1) G [Ex ia Ga] IIC , II (1) D [Ex ia Da] IIIC , II 3 G Ex ic IIC T4 Gc
PTB 03 ATEX 2238 X II 3 G Ex nA IIC T4 Gc	PTB 03 ATEX 2238 X II 3 G Ex nA IIC T4 Gc

CE
0102

The stars replace a combination of characters, depending on the product.

Electrical data see EC-type-examination certificate or data sheet.

1.6 Intended Use

The 8-channel Temperature Multi-Input Device measures temperature with resistance thermometers (RTD) or thermocouples (TC) via PROFIBUS PA. Each channel can be configured independently.

The device complies with the PA profile 3.02: the device includes a physical block, an AI function block for each channel, and a transducer block belonging to each function block.

The device may be installed in Zone 1.

The device may be installed in Zone 2.

The device may be installed in the safe area.

For applications in Zone 1, the type of protection is "Intrinsic Safety".

For Zone 2 applications, the type of protection can be Ex nA or Ex i.

Independent of the type of protection of the fieldbus, the sensor inputs remain intrinsically safe.

The device must only be operated in the ambient temperature range specified.

The devices are only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

1.7 Improper Use

Protection of the operating personnel and the overall system is not ensured if the product is not being used according to its intended purpose.

1.8 Mounting and Installation

Prior to mounting, installation, and commissioning of the device you should make yourself familiar with the device and carefully read the instruction manual.

If devices have already been operated in general electrical systems, they may subsequently no longer be installed in electrical systems used in combination with hazardous areas.

The devices must be protected from electrostatic charge.

Installation Notes on Cables and Wires

If cables or wires are needed for installation, the following points must be considered/evaluated:

The dielectric strength of the insulation must be at least 500 V according to IEC/EN 60079-14.

The permissible cross section of conductors must be considered.

The insulation stripping length must be considered.

The tightening torque for the screws of the terminal must be considered.

If you use stranded wires, crimp on wire end ferrules.

The cabling must not be strained and an adequate strain relief must be provided.

Unused conductors must be either connected to terminals or securely tied down and isolated.

F2D0-Ti-Ex8.* - Installation Notes on IP Degree of Protection

To ensure the IP degree of protection:

- all seals must be undamaged and correctly fitted
- all screws of the housing and its cover must be tightened with the appropriate torque
- only cable of the appropriate size must be used in the cable glands
- all cable glands must be tightened with the appropriate torque
- all empty cable glands must be sealed with sealing plugs

F2D0-Ti-Ex8.* - Installation Notes on Cable Glands

If cable glands are needed for installation, the following points must be considered / evaluated:

- The cable glands used must be suitably certified for the application
- The temperature range of the cable glands must be chosen according to the application.
- The cable glands fitted must not reduce the IP rating.

Plastic cable glands must be protected against mechanical force.

1.8.1 Hazardous Area

Depending on the application, the device can be used as an Ex ia apparatus, an associated apparatus, or as an Ex nA apparatus. To ensure intrinsic safety, observe the following requirements.

The installation instructions in accordance with IEC/EN 60079-14 must be observed.

The installation instructions in accordance with IEC/EN 60079-25 must be observed.

The respective peak values of the field device and the associated apparatus with regard to explosion protection should be considered when connecting intrinsically safe field devices with intrinsically safe circuits of associated apparatus (verification of intrinsic safety). Make sure to observe IEC/EN 60079-14 and IEC/EN 60079-25.

Circuits of intrinsically safe apparatus can be led into hazardous areas, whereby special attention must be paid to maintaining separation distances to all non-intrinsically safe circuits according to the requirements in IEC/EN 60079-14.

Intrinsically Safe Apparatus (Ex i)

The device may be used as intrinsically safe apparatus.

Depending on where the apparatus is located, observe the following instructions:

- See chapter 1.8.2

All separation distances between two adjacent intrinsically safe circuits need to be observed in accordance with IEC/EN 60079-14.

If devices have already been operated in general electrical systems, they may subsequently no longer be installed in electrical systems used in combination with hazardous areas.

Associated Apparatus

The device may be used as associated apparatus.

Depending on where the apparatus is located, observe the following instructions:

- See chapter 1.8.2

Intrinsically safe circuits of associated apparatus (installed in safe areas) can be led into hazardous areas, whereby special attention must be paid to maintain separation distances to all non-intrinsically safe circuits according to the requirements in IEC/EN 60079-14.

If the device is supplied by a non-intrinsically safe fieldbus, the separation wall must be applied to maintain the separation distance requirements according to IEC/EN 60079-11.

Non-Arcing Apparatus (Ex nA)

The device may be used as non-sparking apparatus.

Depending on where the apparatus is located, observe the following instructions:

- See chapter 1.8.3

If the device is supplied by a non-intrinsically safe fieldbus, the separation wall must be applied to maintain the separation distance requirements according to IEC/EN 60079-11.

RD0-TI-Ex8.* with surrounding enclosure

The devices may only be installed and operated in Zone 2 if they have been mounted in a surrounding enclosure with degree of protection IP54 according to IEC/EN 60529. The surrounding enclosure must have a declaration of conformity according to 94/9/EC for at least category 3G.

1.8.2 Instructions for Zone 1

The device may be operated in Zone 1.

The installation instructions in accordance with IEC/EN 60079-14 must be observed.

The installation instructions in accordance with IEC/EN 60079-25 must be observed.

The device is designed for use in intrinsically safe fieldbus systems according to FISCO or Entity.

The respective peak values of the field device and the associated apparatus with regard to explosion protection should be considered when connecting intrinsically safe field devices with intrinsically safe circuits of associated apparatus (verification of intrinsic safety). Make sure to observe IEC/EN 60079-14 and IEC/EN 60079-25.

1.8.3 Instructions for Zone 2 and Safe Areas

The device may be installed in Zone 2.

For Zone 2 applications, the type of protection can be Ex nA or Ex i.

All separation distances between intrinsically safe and non-intrinsically safe circuits must be observed in accordance with IEC/EN 60079-14.

The respective peak values of the field device and the associated apparatus with regard to explosion protection should be considered when connecting intrinsically safe field devices with intrinsically safe circuits of associated apparatus (verification of intrinsic safety). Make sure to observe IEC/EN 60079-14 and IEC/EN 60079-25.

If the device is supplied by a non-intrinsically safe fieldbus, the separation wall must be applied to maintain the separation distance requirements according to IEC/EN 60079-11.

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a hazardous atmosphere.

1.9 Repair and Maintenance

The devices must not be repaired, changed or manipulated. If there is a defect, the product must always be replaced with an original device.

1.10 Delivery, Transport and Storage

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Always store the device in a clean and dry environment. The permitted storage temperature (see data sheet) must be considered.

1.11 Disposal

Disposing of devices, packaging material, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

2013-11

2 Product Specifications

2.1 Overview and Application

The Temperature Multi-Input Device offers universal temperature measurement, voltage, and resistance input.

This manual describes the following Temperature Multi-Input Devices:

- F2D0-TI-Ex8.*.*:* in a fieldbus housing for panel mounting
- RD0-TI-Ex8.*.* for mounting on a 35 mm DIN rail in accordance with EN 50022

Hazardous Area Installation Options

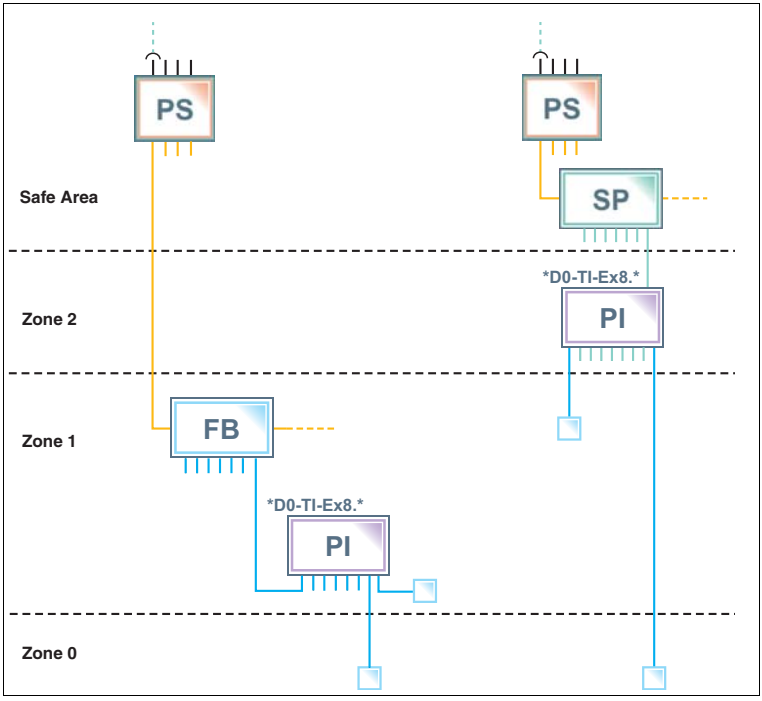


Figure 2.1 Installation options for the Temperature Multi-Input Device in the hazardous area

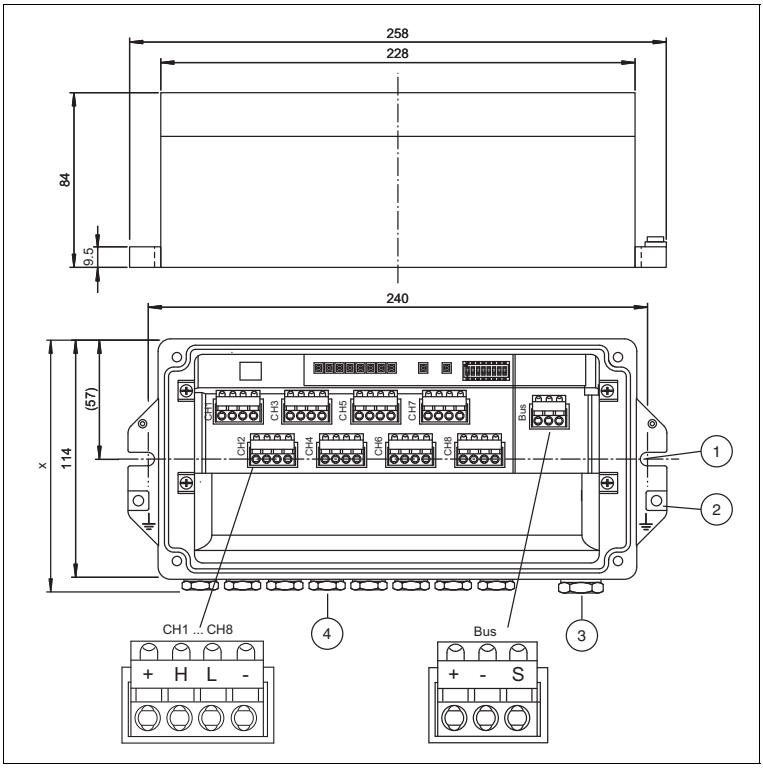
For details concerning the requirements of the different installation options, see chapter 1.8.

Observe the EC-type-examination certificate or the statement of conformity. Pay particular attention to any "special conditions" that may be indicated.

2.2 Component Identity

The following section shows the dimensions, the inside connections, and the options of the device.

F2D0-TI-Ex8.* housing and dimensions

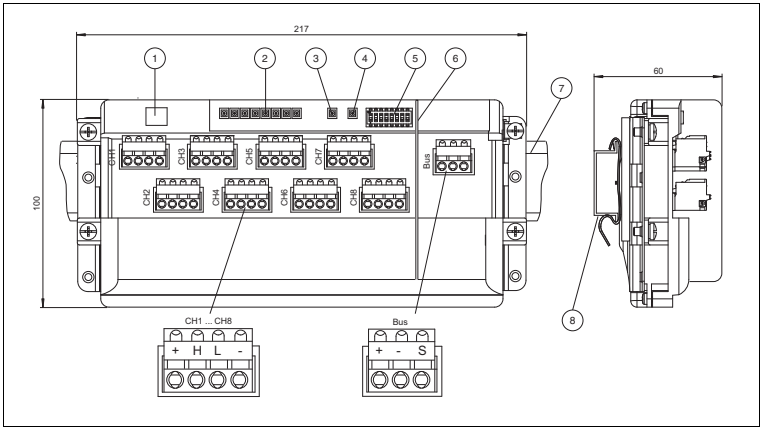


1. Notch for fixing the Temperature Multi-Input Device housing with M6 screw
2. Grounding point for connecting the Temperature Multi-Input Device to earth with M4 screw
3. Cable gland for the fieldbus IN cable. For outside dimensions, see data sheet.
4. 8 cables glands for inputs, wrench size AF 20. For outside dimensions, see data sheet.

X: Height depending on cable gland, see data sheet.

All dimensions in millimeters (mm).

RD0-TI-Ex8.* components and dimensions



1. Service interface (covered)
2. Status LEDs for channel fault indication
3. Status LED for communication
4. Status LED for power
5. Dip switches for configuration:
6. Separation wall: Used if Temperature Multi-Input Device is supplied by a non-intrinsically safe fieldbus.
7. DIN mounting rail
8. Mounting on DIN rail

All dimensions in millimeters (mm).

2.3 Technical Data

RD0-TI-Ex8.PA

Technical data	
Fieldbus interface	
Fieldbus type	PROFIBUS PA
Firmware update	via separate plug connection
FDE (Fault Disconnect Equipment)	6.7 mA
Polarity	not polarity sensitive
Rated voltage	9 ... 32 V
Rated current	max. 23 mA
PROFIBUS PA	
Profile	3.02
Indicators/operating means	
LED PWR	green: on, bus voltage existent

Technical data	
LED COM ERR	red: continuous lightning: hardware error; 2 Hz flashing: no bus activities or bus fault; off: no error
LED CHANNEL ERROR	red: 2 Hz flashing: lead breakage, overrange; off: no error
Input	
Number	8
Sensor types	see data sheet
Grounding	grounding of thermoelements possible
Error detection	lead breakage, wiring error, hardware device error
Common mode voltage	Input to Input 600 V_{peak}
Transfer characteristics	
Deviation	
Cold junction compensation	± 0.5 °C (32.9 °F)
Resolution/accuracy	see data sheet
Influence of ambient temperature	see data sheet
Linearization	T/C input 0.1°C RTD input 0.03°C
Internal measurement cycle	for all sensor types max. 1 s
Electrical isolation	
Fieldbus/inputs	safe galvanic isolation acc. to EN 60079-11, voltage peak value 375 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2011
Protection degree	IEC 60529
Fieldbus standard	IEC 61158-2
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F) hazardous area -40 ... 85 °C (-40 ... 185 °F) safe area
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	

2013-11

Technical data	
Connection type	plug-in terminals , spring terminal and screw terminal
Core cross-section	
Bus	up to 2.5 mm^2
Inputs	up to 2.5 mm^2
Housing material	Polycarbonate
Protection degree	IP20
Mass	360 g
Mounting	mounting on DIN rail in cabinet
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 03 ATEX 2237
Group, category, type of protection, temperature class	II 2 (1) G Ex ia [ia Ga] IIC T4 Gb , II (1) G [Ex ia Ga] IIC , II (1) D [Ex ia Da] IIIC , II 3 G Ex ic IIC T4 Gc
Bus	FISCO see EC-Type Examination Certificate
Voltage U_i	24 V
Inputs	see EC-Type Examination Certificate
Statement of conformity	PTB 03 ATEX 2238 X
Group, category, type of protection, temperature class	II 3 G Ex nA IIC T4 Gc
Electrical isolation	
Bus	see Statement of Conformity
Input	see EC-Type Examination Certificate
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012 , EN 60079-11:2012 , EN 60079-15:2010
International approvals	
IECEx approval	IECEx PTB 05.0001 , IECEx PTB 05.0002X
Approved for	Ex ia [ia Ga] IIC T4 Gb , [Ex ia Ga] IIC , [Ex ia Da] IIIC , Ex ic IIC T4 Gc , Ex nA IIC T4 Gc
Certificates and approvals	
Marine approval	pending

Technical data	
General information	
Supplementary information	EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com.

F2D0-TI-Ex8.PA

Technical Data	
General specifications	
Electronic component	Temperature Multi-Input Device RD0-TI-Ex8.PA* For technical data on installed electronic component see data sheet.
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2011
Protection degree	IEC 60529
Fieldbus standard	IEC 61158-2
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Ambient temperature	see data sheet
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g , 11 ms
Vibration resistance	10 g , 10 ... 150 Hz
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug-in terminals , spring terminal and screw terminal
Core cross-section	
Bus	up to 2.5 mm^2
Inputs	up to 2.5 mm^2
Cable diameter	see data sheet
Cable gland	sensor inputs M16, fieldbus M20
Housing material	ALSI12 (Cu) DIN1725 (Si 1.2%), anodized
Protection degree	IP66
Mass	1800 g
Mounting	panel mounting

2013-11

Technical Data	
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 03 ATEX 2237
Group, category, type of protection, temperature class	 II 2 (1) G Ex ia [ia Ga] IIC T4 Gb ,  II (1) G [Ex ia Ga] IIC ,  II (1) D [Ex ia Da] IIIC ,  II 3 G Ex ic IIC T4 Gc
Bus	FISCO see EC-Type Examination Certificate
Inputs	see EC-Type Examination Certificate
Statement of conformity	PTB 03 ATEX 2238 X
Group, category, type of protection, temperature class	 II 3 G Ex nA IIC T4 Gc
Electrical isolation	
Bus	see Statement of Conformity
Input	see EC-Type Examination Certificate
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012 , EN 60079-11:2012 , EN 60079-15:2010
International approvals	
IECEx approval	IECEx PTB 05.0001 , IECEx PTB 05.0002X
Approved for	Ex ia [ia Ga] IIC T4 Gb , [Ex ia Ga] IIC , [Ex ia Da] IIIC , Ex ic IIC T4 Gc , Ex nA IIC T4 Gc
Certificates and approvals	
Marine approval	pending
General information	
Supplementary information	EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com.

3 Installation and Commissioning

In the following section you find information on how to install and commission the Temperature Multi-Input Device in your fieldbus topology.

Note!

Before performing any work: Read the section on Safety, see chapter 1, especially all sections that are relevant for your application.

3.1 Mounting and Dismounting

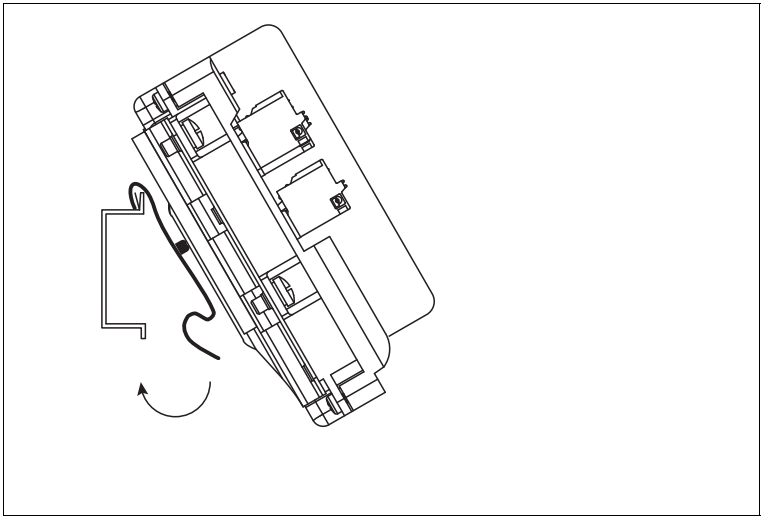
Mounting/Dismounting F2D0-TI-Ex8.*

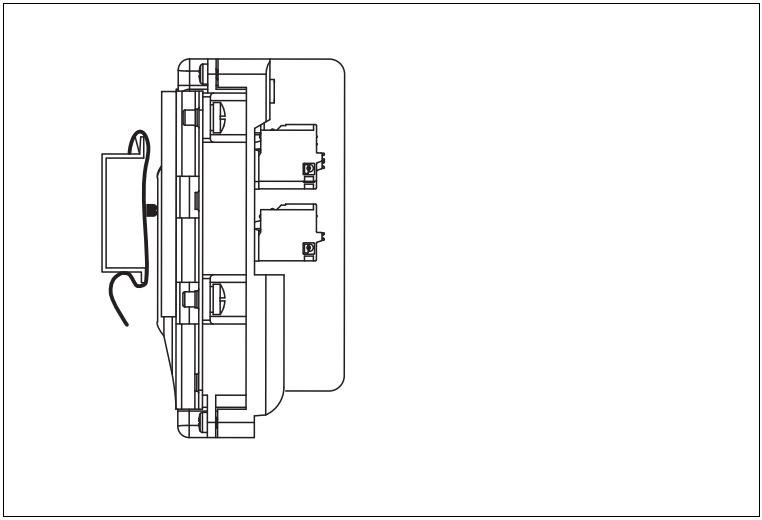
F2D0-TI-Ex8.* is designed for panel (wall) mounting.

- Select mounting material that is suitable for the sub-surface (the wall).
- Ensure that the mounting material guarantees secure fastening.
- To attach the device: use 2 fixing screws with a diameter of 6 mm.
- To dismount the device: Undo the fixing screws and take the device off the wall.

Mounting/Dismounting RD0-TI-Ex8.*

RD0-TI-Ex8.* is designed for mounting on a 35 mm DIN rail in accordance with EN 50022.





Ensure that the device is firmly fixed on the DIN rail.

To dismount the device: Take off the device in reverse order.

RD0-TI-Ex8.* Installations

Depending on the application, the RD0-TI-Ex8.* must be mounted in a suitable environment.

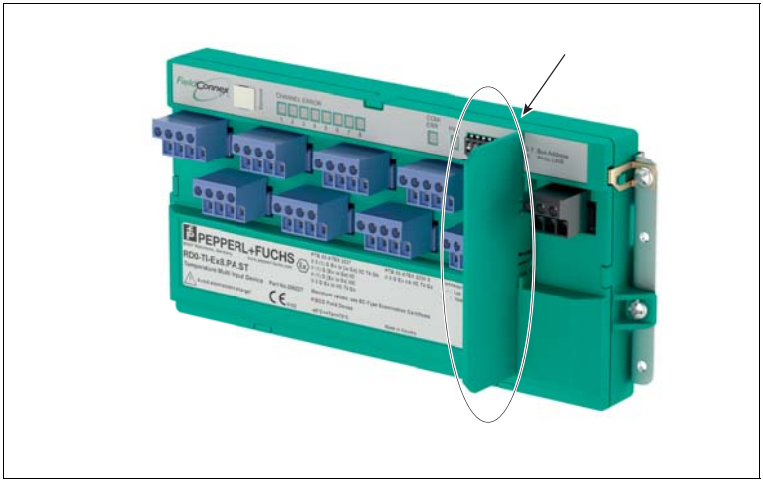
If mounted in Zone 2 for an Ex nA application, the environment must ensure the following degree of protection:

- IP54 in accordance with IEC 60529 for hazardous area Zone 2

3.1.1 Using the Separation Wall

If the device is supplied by a non-intrinsically safe fieldbus, the separation wall must be applied to maintain the separation distance requirements according to IEC/EN 60079-11.

The device is delivered with a removable separation wall. The separation wall separates the fieldbus terminals from the terminals of the sensor inputs. This way it ensures the clearance requirements of IEC/EN 60079-11 between intrinsically safe and non-intrinsically safe signals.



3.2 Hardware Installation

3.2.1 Temperature Multi-Input Device Cable and Connection Information

Sensors can be connected to either of the following 2 types of terminals as pre-engineering options:

- Spring terminals
- Screw terminals

Adhere to the following information when connecting cables to terminals:

- Insulating length of wires: 9 mm
- Wire cross-section: 0.2 mm² ... 2.5 mm² or AWG 24 ... 14
- When using a fine wire cable: Protect the ends of the leads, e.g., with core cable ends
- Screw terminals tightening torque: 0.4... 0.5 Nm
- Insulation voltage between the fieldbus line and the shield for intrinsically safe segments: ≥ 500 V

Parameterization interface: Service interface. → see image on page 13.
Parameterization tasks may be carried out via the Service interface only by trained specialists authorized by Pepperl+Fuchs.

The Service interface fulfills the type of protection EEx ia IIC/IIB, respectively EEx ib IIC/IIB with the following values:

- U_O = 7.2 V
- I_O = 29.1 mA
- P_O = 52.38 mW
- L_i = 0
- C_i = 0
- Characteristic curve: linear
- Only for connection of intrinsically safe circuits
- U_i = 5 V

3.2.2 F2D0-TI-Ex8.* Housing: Ensuring the Degree of Protection

The following section contains information concerning the installation and sealing of the cable glands and the housing cover.

Installing cable glands

When installing cable glands, observe the following:

- Only insert permanently laid cables and wires into the cable glands.
- Ensure that the cables laid do not execute any strain on the cable glands.
- For permissible cable diameters, refer to the respective data sheet.
- Use an appropriate strain-relief clamp, e.g., a suitable cable clamp.
- Seal unused cable glands with a suitable plug or replace them with appropriate screw plugs. Observe the required degree of protection IP66. For a choice of stop plugs and screw plugs, refer to the respective datasheets.
  Note that the ambient temperature range can be restricted by the stop plug.

Note!

Careful when tightening cap nuts!

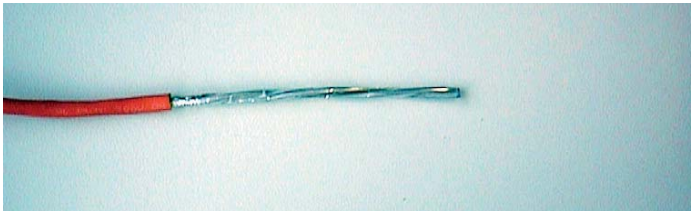
- The cap nuts must be securely tightened. Tightening the cap nuts too much or not enough both can affect the degree of protection.
- The tightening torques of cap nuts vary, depending on the cable type used. For exact details refer to the documentation of your cable manufacturer.

The following table with tightening torques offers an approximate guideline:

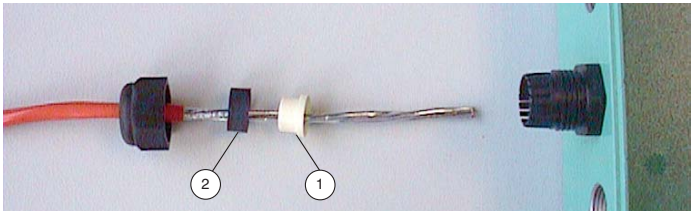
Type	Size	Cap nut	Counterpart
F2D0-TI-Ex8.*.*:*.CG	M16	2.5 Nm	3.75 Nm
	M20	2.5 Nm	3.75 Nm
F2D0-TI-Ex8.*.*:*.CGB	M16	6 Nm	6 Nm
	M20	10 Nm	10 Nm
F2D0-TI-Ex8.*.*:*.CGS	M16	6 Nm	6 Nm
	M20	10 Nm	10 Nm

To connectorize cables using F*D0-TI-Ex8.*.CG cable glands

1. Strip the insulation of the cable up to about 120 mm.



2. Loosen the cap nut and the seals from the Temperature Multi-Input Device. Depending on the application, slip Seal 1 & Seal 2 or only the obligatory Seal 2 over the cable as shown:

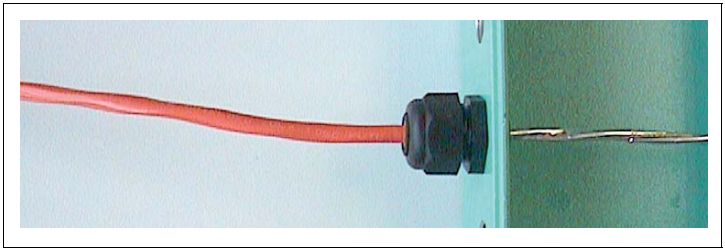


1. Seal 1, used in the following instance: Type: M20 x 1.5, Terminal area: 5-8 mm
2. Seal 2, obligatory

3. Move the required seal(s) over the cable until after the last seal about 5 mm insulation protrude before the stripped wire begins:

4. Insert the cable with the seals into the cable gland of the Temperature Multi-Input Device and tighten the cap nut.
The tightening torques of cap nuts vary depending on the cable type used.
Tightening torques (approx.):
- Cap nut 2.5 Nm
- Counterpart 3.75 Nm

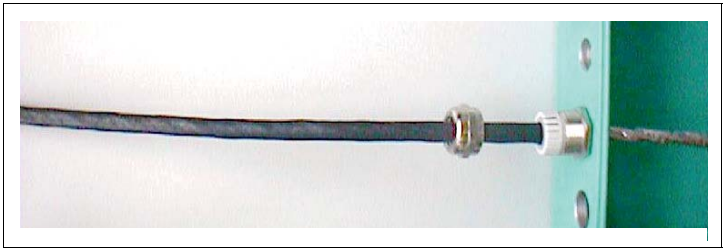
2013-11



To connectorize cables using F*D0-TI-Ex8.*.CGB and F*D0-TI-Ex8.*.CGS cable glands

1. Strip the insulation of the cable up to about 120 mm.

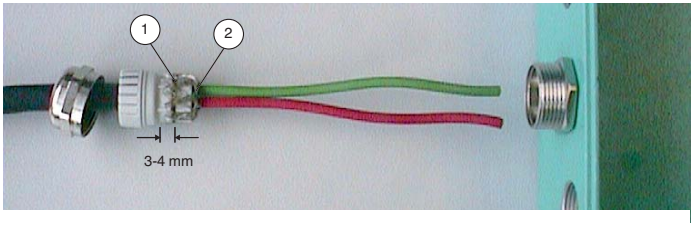
2. Loosen the cap nut from the Temperature Multi-Input Device.



3. Remove the inner plastic piece and slip it onto the cable: move it far enough over the cable, so it completely surrounds the cable insulation.
Ensure that no cable insulation protrudes behind the inner plastic piece.

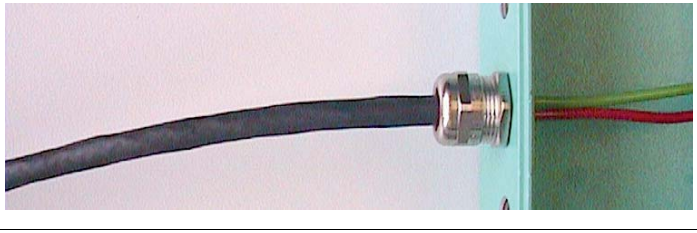
1. Inner plastic piece
2. O-ring

4. Invert the cable shield over the inside plastic piece and shorten it to a length of 3-4 mm behind the O-ring.



1. O-ring
2. Inverted cable shield

5. Insert the cable wires with the inner plastic piece into the counterpart of the cable gland.



6. Tighten the cap nut.
The tightening torques of cap nuts vary, depending on the cable type used.
Tightening torques (approx.):
- Cap nut 4.17 Nm
- Counterpart 6.25 Nm

Fixing the housing cover

Before closing the housing cover: Visually inspect the housing for any visible signs of damage on the cover seal. If damaged, replace the seal with an original seal wear part.

Tightening torque for the screws of the housing cover: 2.5 Nm

3.2.3 Grounding and Shielding

Note!

Electromagnetic Compatibility and Grounding

If the shield of the fieldbus transmission line is grounded for EMC reasons, the following guideline must always be observed:

- PROFIBUS PA User and Installation Guideline

Potential Equalization for Devices in F2 Metal Housings

For devices in metal housings in Zone 1 hazardous areas, a suitable potential equalization in accordance with IEC/EN 60079 is required. Therefore, the device is designed as follows:

- The shield (terminal S) of the intrinsically safe segment is internally connected to the F2 housing.
- The housing has a grounding point with a grounding screw. The grounding connection must be secured against loosening and corrosion, e. g., by using tinned cable plates.

Note!

Ensure potential equalization of F2 Metal Housings

Ensure that the housing is connected properly to the potential equalization.

Shielding the Electronic Component R in Intrinsically Safe Segments

The shield (terminal S) of the intrinsically safe segment is internally connected to the DIN mounting rail.

Note!

Ensure shielding of the electronic component R

Ensure that the DIN mounting rail is connected to the cabinet and the cabinet itself is connected to the potential equalization.

3.2.4 Electrical Connection

Sensor types connecting to Temperature Multi-Input Devices

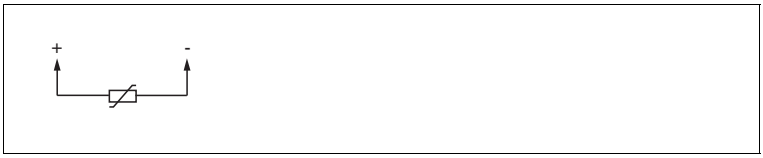


Figure 3.1 RTD, 2-wire technology

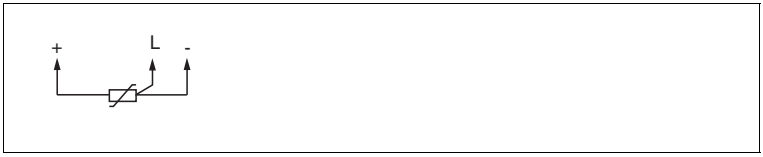


Figure 3.2 RTD, 3-wire technology

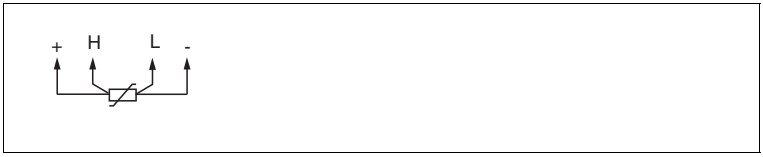


Figure 3.3 RTD, 4-wire technology

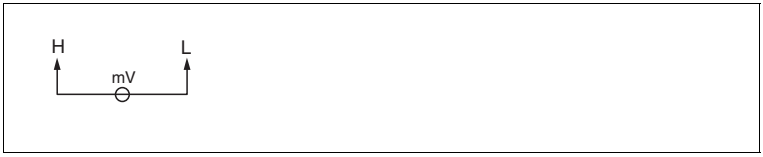


Figure 3.4 Millivolt

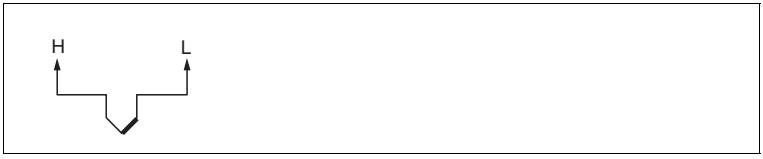
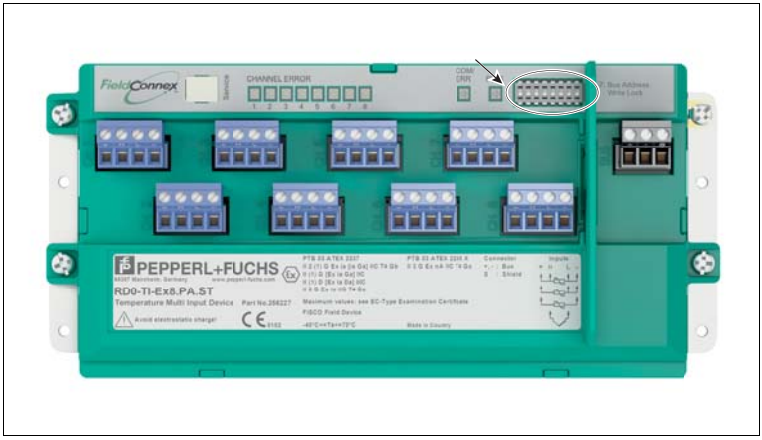


Figure 3.5 Thermocouple

3.2.5 Dip Switch Settings

The device has 8 DIP switches.



- Dip switch 1 ... 7: Bus address setting
- Dip switch 8: Write lock ON/OFF

Dip switch 1-7 "Bus Address":
In order to assign a fixed PROFIBUS address to the device use the dip switches 1 ... 7.

Dip switch 8 "Write lock ON/OFF":
In order to enable/disable parameterization of the device via the bus use dip switch 8.

3.3 Write Protection Settings

To protect the parameters from modification you can use write protection.

Write protection has the following effects:

- Acyclic write access is blocked

Activate write protection in either of the following ways:

- Hardware write protection: Use DIP switch 8 on the device (see below).
- Software write protection: Activate the respective parameter in the DTM software. See chapter 4.

Activating Write Protection via the Dip Switch

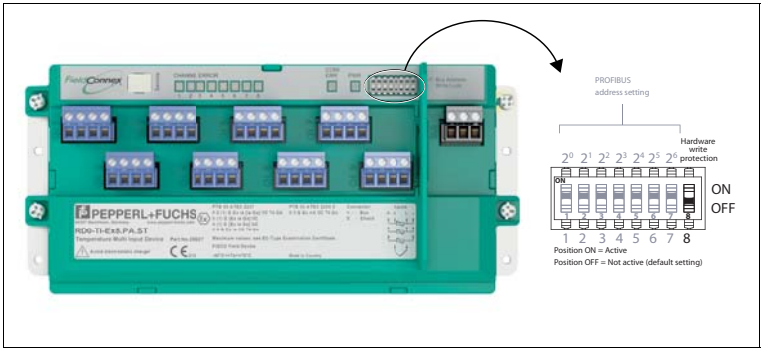


Figure 3.6 Dip switch 8 to activate the hardware write protection

Both write protection methods work the same way, regardless of which one is activated.

3.4 Address Settings

Assigning a PROFIBUS Address

In order to assign an address to the Temperature Multi-Input Device, use the DIP switches 1 ... 7.

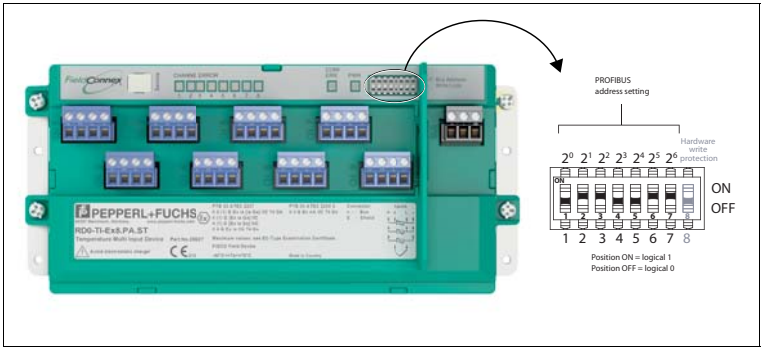


Figure 3.7 DIP switches to set the PROFIBUS address on the device

After modifying the address DIP switches, the device must be rebooted to use the new setting. Either disconnect the device from the fieldbus and then reconnect it, or restart the device via the DTM.

The address can be assigned in 2 ways:

1. **Hardware address setting:**Use the DIP switches to set the hardware address in the range of 0 ... 125 as PROFIBUS address. Any attempt to change this address via the fieldbus is automatically denied.
   To change an hardware address setting, use the DIP switches.

2. **Software address setting:** To enable software address setting, set the DIP switches either to 126 or 127. For details on how to change the address via the fieldbus, refer to the documentation of the respective COM DTM. When the address is changed, the device automatically reboots, using the new address afterwards.

Note!

- By default, the Temperature Multi-Input Device is delivered with the address set to 126. This enables the modification of the address via the bus.
- An address set via the bus remains active, even if the device has been temporarily disconnected from the bus.
- If an address in the range of 1 ... 127 is set via the dip switches, this address overrules an address previously set via the bus.

3.5 PROFIBUS Ident Number Setting

In order to select the ident number in the DTM software, use the parameter "PROFIBUS Ident Number". For details, see chapter 4.1.1.

Manufacturer-Specific PROFIBUS Ident Number

A manufacturer-specific PROFIBUS ident number is available for the Temperature Multi-Unit by Pepperl+Fuchs.

- Manufacturer-specific PROFIBUS ident number: **0E89h**

Profile-Specific PROFIBUS Ident Number

A profile-specific PROFIBUS ident number is available for the Temperature Multi-Unit by Pepperl+Fuchs.

- Profile-specific PROFIBUS ident number: **9707h**, for 8x analog input

Note!

Automatic Mode

By default, the device is set to "Automatic" mode: In the process of establishing cyclic communication, the device queries if either of the following 2 ident numbers that support the device is set. If this is the case, the device automatically uses that number.

3.6 Requirements for Commissioning

Before commissioning the Temperature Multi-Input Device (TM-I), ensure that the following requirements are met:

- For acyclic communication/parameterization: A suitable FDT frame is in place in order parameterize the TM-I via a PROFIBUS DP master. The DTM needed to run in the FDT frame can be downloaded from Internet under www.pepperl-fuchs.com. Refer to the release notes of the DTM for information on the frameworks that are supported. The release note are included in the FieldConnex® DTM package. For more information, see chapter 3.8.

- For cyclic communication/configuration: A process control system (PCS) is prepared to configure cyclic user data exchange via a PROFIBUS DP Master Class I.
- The PROFIBUS master is connected to a PROFIBUS DP segment. No DP slaves need to be available at the DP segment.
- A PROFIBUS PA segment is connected via a Segment Coupler.
- The bus terminations at both ends of the PROFIBUS PA segment are mounted or switched ON.
- The correct bus parameters for the Segment Coupler of the PROFIBUS DP are set via the DP master. See operating instructions of Segment Coupler.
- A Temperature Multi-Input Device is installed at the PROFIBUS PA segment as shown in see chapter 2.1.

3.7 Parameterization and Configuration Procedure

Use the FDT frame with the DTM to parameterize the device. Parameterization is an "acyclic" communication, i.e., read/write data is read from or stored on the device as needed. This also means that once set in the DTM, the parameters are kept even if the device is put into operation at a later point.

Use the following checklist when commissioning the device. Skip those steps you have already completed. For detailed information on how to proceed, refer to the chapters mentioned.

Parameterization (hardware and software):

1. Set a fixed valid PROFIBUS address 0 ... 125 via the DIP switch of the device or set the address 126 (default setting) for assignment of the address via the configuration or parameterization tool. See chapter 3.4.
2. Set the parameters for the devices in your project, e. g., PROFIBUS ident number, description parameters (see chapter 3.5, see chapter 4.1.1).
3. Set channel-specific parameters. See chapter 4.2. For a list of all parameters, See chapter 7.
4. If needed, activate the hardware or software write protection to protect the parameters from overwriting. See chapter 3.3.

Configuration:

1. Log on to the DP master.
2. Select the GSD file to be used (manufacturer-specific, profile-specific). See chapter 3.5.
   If necessary, install the respective GSD file.

3.8 DTM Software Installation and Commissioning

For details on the system requirements for installation, commissioning, and operation of the software, refer to the release notes of the DTM. The release notes are available on the Internet under www.pepperl-fuchs.com.

To install the DTM package with the FDT frame application PACTware™ (example)

To install the DTM package on your system, proceed as follows:

1. Install the Pepperl+Fuchs FieldConnex DTM package. For more information, refer to the Readme file in the FieldConnex® DTM Collection.
2. Start the PACTware™ program.
   Make sure that all PACTware™ projects are closed.
3. To open the Device Catalog, press **F3**.
4. To update the device catalog click on the button **Update device catalog**.

   ↳ The request Create new PACTware device catalog appears.
5. Confirm the question with **Yes**.

   ↳ The DTM is installed and ready for operation.

To create a project

To create the project, proceed as follows:

1. Start PACTware™.
   Make sure the latest DTM version is installed and that the device catalog is updated.
2. To open a project or create a new project select:
   File > Open or
   File > New.
3. Open the device catalog:
   View > Device Catalog or
   press **F3**.
4. Open the respective "Vendor" menu item.
5. Choose **Driver >** and the respective PROFIBUS COM DTM.
6. Drag and drop the PROFIBUS COM DTM driver to your project window under Host PC.
7. In the device catalog, open the "Vendor" menu item **Pepperl+Fuchs GmbH**.
8. Choose **Device > *D0-TI-Ex8.PA.***.

9. Drag and drop the DTM D0-TI-Ex8.PA.* to your project window under the PROFIBUS COM DTM driver.

   ↳ Your project should now look like this:

Figure 3.8 DTM project

3.9 DTM Dialogs

The DTM *D0-TI-Ex8.PA.* features the following dialogs to parameterize and monitor the Temperature Multi-Input Device:

- Parameterization
- Online parameterization
- Measured value
- Diagnosis
- Simulation (Force)

Parameterization Process of the DTM

The following flowchart shows how parameterization is organized, when using the DTM.

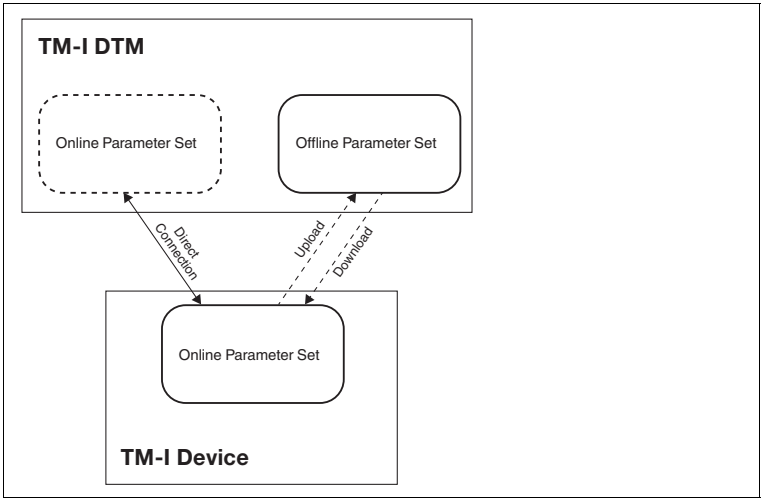


Figure 3.9 Parameterization flowchart

2013-11

Read from Device

Settings made in the online parameter set are not automatically transferred to the offline parameter set.

The function **Read from Device** is used to upload data from the device into the offline parameter set.

To read from device

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Read from Device**.

Store to Device

If a device is replaced with a new device, the parameters that where used last can be downloaded to the device.

The function **Store to Device** is used to download parameters from the DTM to the device.

To store to device

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Store to Device**.

3.9.1 Online Dialogs

Online dialogs show the currently set parameters stored on the device.

Connecting to the Device

In order to use the online dialogs, you need to connect to the device first.

To connect the *D0-TI-Ex8.PA.* DTM with the device

Make sure all settings are correct, e. g., the device address, etc.

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Connect**.

   ↳ The **Plug** icon in the menu bar indicates that device is connected, i. e., online.

Online Parameterization

Setting parameters in the online dialog directly affects device parameters. Entries or changes are immediately written to the device, as soon as affirmed with the **Return** key.

To open the online parameterization dialog

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Parameters > Online Parameterization**.

Measured Value

The dialog issues a list of the currently measured values at any time.

To open the measured value dialog

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Measured Value**.

Diagnosis

The dialog offers a current overall summary of the diagnostic state of the device and each channel.

To open the diagnosis dialog

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Diagnosis**.

Simulation (Force)

The dialog can be used to simulate parameter settings for the device in use or manually set OUT value and status for the device.

This way, you can validate settings for your application, before using them in live operation. In the course of commissioning you can check what parameters are required to achieve specific OUT values. You can also use the manual OUT value setting to force an OUT value, e. g., in case of a sensor failure.

To open the simulation dialog

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Simulation**.

3.9.2 Offline Dialogs

The offline dialogs show the parameters currently stored in the DTM parameter set of the FDT project.

Offline Parameterization

Setting parameters locally in the offline dialog does not directly affect communication or the device. Once all settings are made, data can be written to the device. Current parameters can also be read in from the device, processed, and saved.

To open the offline parameterization

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Parameters > Parameterization**.

Print

This offline dialog is a summary report that contains all offline parameter settings.

To print offline information

1. To open the context menu, right-click in the project on *D0-TI-Ex8.PA.*
2. Select **Print**.
3. In the footer of the print preview window click **Print**.

   ↳ The printer selection menu appears.
4. Select your printer and confirm the print job.

3.9.3 DTM User Interface

The DTM user interface looks like this:

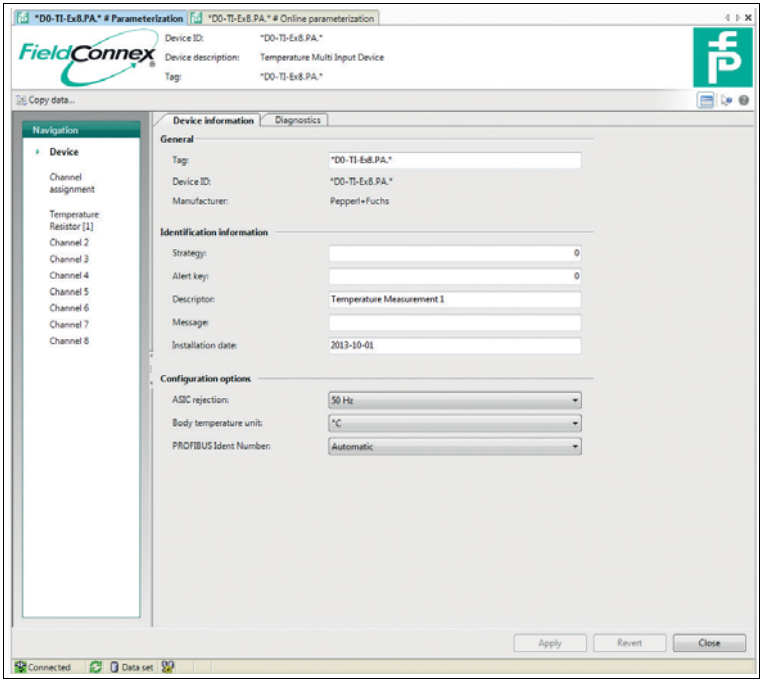


Figure 3.10 DTM user interface (online parameterization)

3.9.4 DTM Structural Diagram

The following diagrams show all device-specific and channel-specific parameters the DTM offers for parameterization.

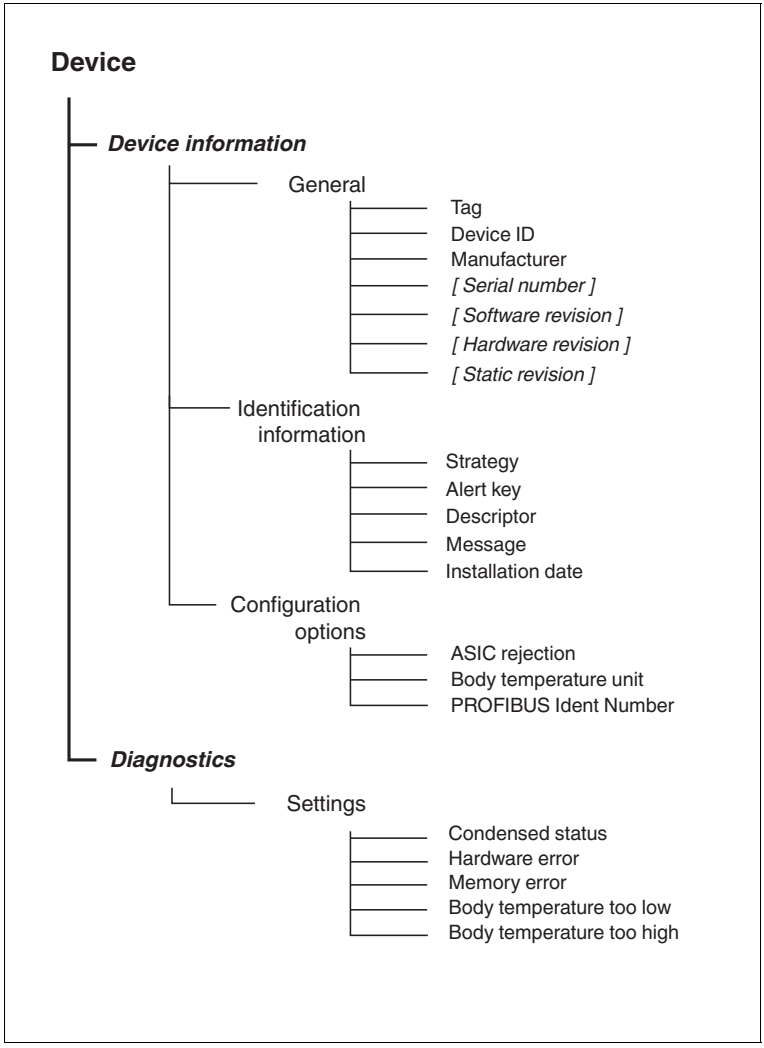


Figure 3.11 DTM menu structure: Device-specific
Parameters in square brackets [ ]: Online parameters only.

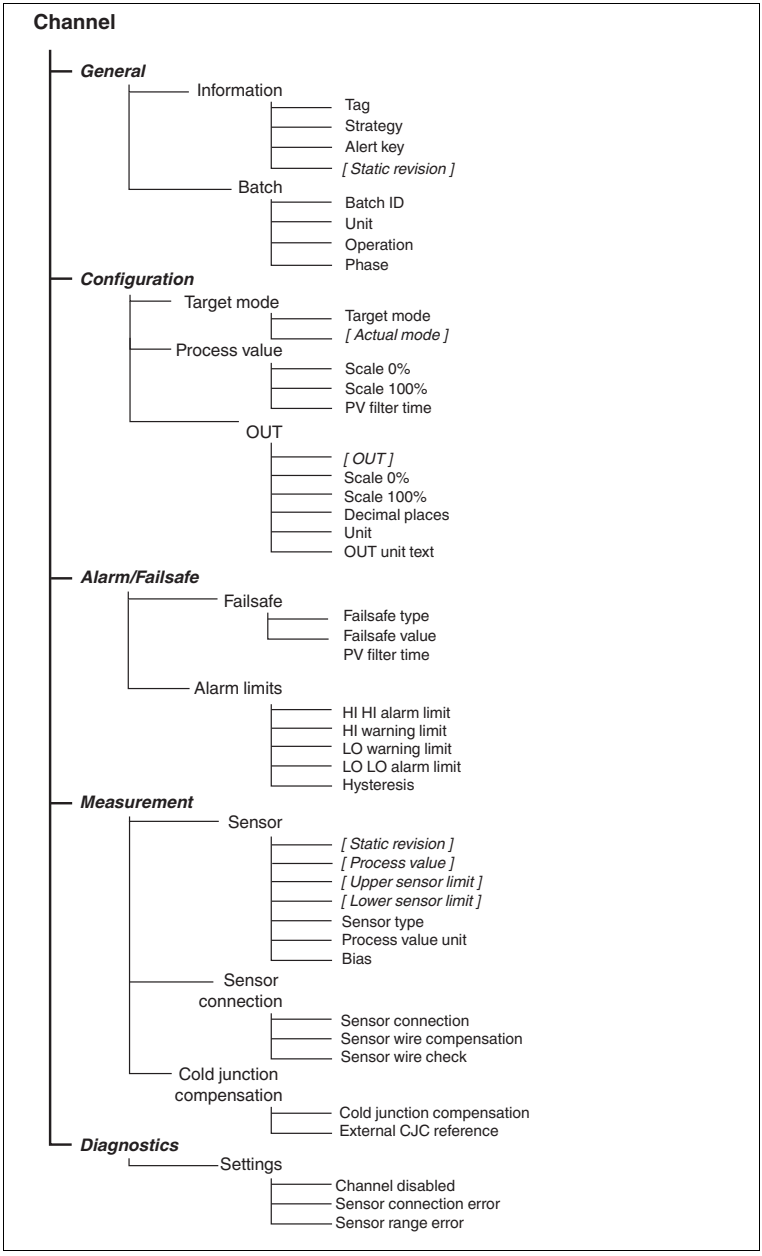


Figure 3.12 DTM menu structure: Channel-specific
Parameters in square brackets [ ]: Online parameters only.

4 Device Parameterization

During acyclic data exchange, service data is transmitted, e. g., device parameters or diagnostic information. A number of parameters of the Temperature Multi-Input Device can be adjusted acyclically, using both DIP switches and the *D0-TI-Ex8.PA.* DTM. For dip switch parameterization, see chapter 3.2.5

This chapter describes the parameterization of the device with the *D0-TI-Ex8.PA.* DTM.

The device supports both diagnosis types: “condensed diagnosis” and “classic diagnosis” according to the PA Profile 3.02. See chapter 4.3.

Note!

Diagnostic Information Display

The *D0-TI-Ex8.PA.* DTM always displays diagnostic information in condensed mode, independent of which type is used for cyclic communication.

Commands in the online mode

The following DTM menu commands can be set or are displayed additionally in the online mode.

- **Activate Write Lock:** To activate the write lock, in the DTM menu bar select **Device actions > Activate write lock**.

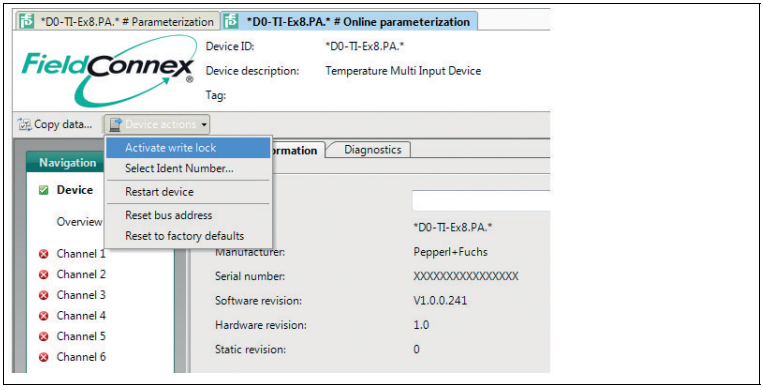


Figure 4.1 Online parameterization menu item **Activate write lock**

- **Write Lock Active:** Information banner in the DTM menu bar, signaling that the write protection is enabled. The banner includes the option **Unlock device**.

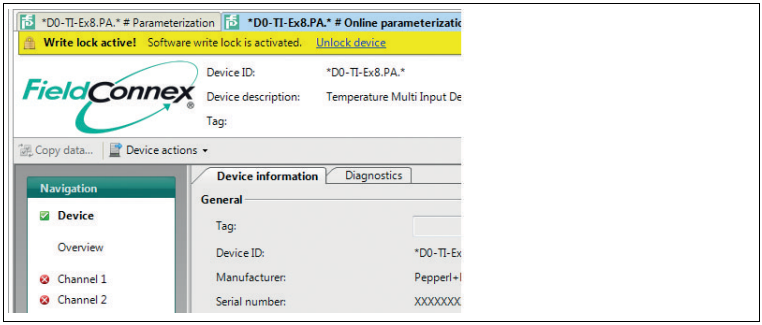


Figure 4.2 Information banner **Write lock active**

- **Select Ident Number ...**To choose between the profile-specific and the manufacturer-specific ident number, in the DTM menu bar select **Device actions > Select Ident Number ...**.
  Upon choosing the ident number, the device will be automatically restarted.
  Note: If you have changed parameters without applying the changes, PACTware™ asks you to apply/revert your changes first and repeat this command after that.

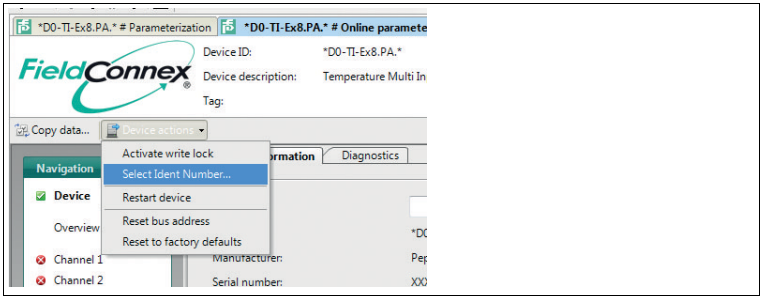


Figure 4.3 Online dialog menu item **Select ident number**

- **Restart device:** To restart the device, in the DTM menu bar select **Device actions > Restart device**.
  The device will be immediately restarted.
  Note: If you have changed parameters without applying the changes, PACTware™ asks you to apply/revert your changes first and repeat this command after that.

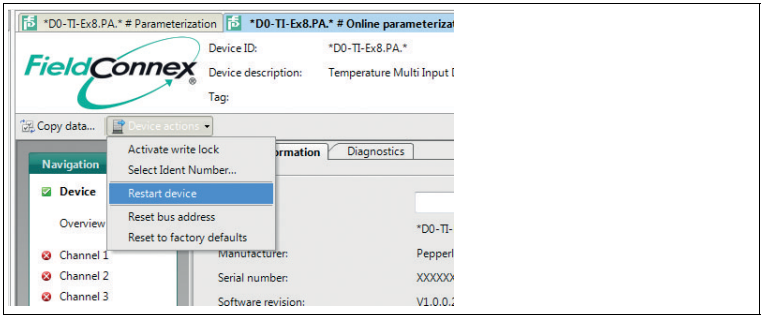


Figure 4.4 Online dialog menu item **Restart device**

- **Reset bus address:** To reset the bus address of the device to the default 126, in the DTM menu bar select **Device actions > Reset bus address**. The device will immediately return to the default address 126. The device automatically reboots and the changes become effective.
  Note: If you have changed parameters without applying the changes, PACTware™ asks you to apply/revert your changes first and repeat this command after that.

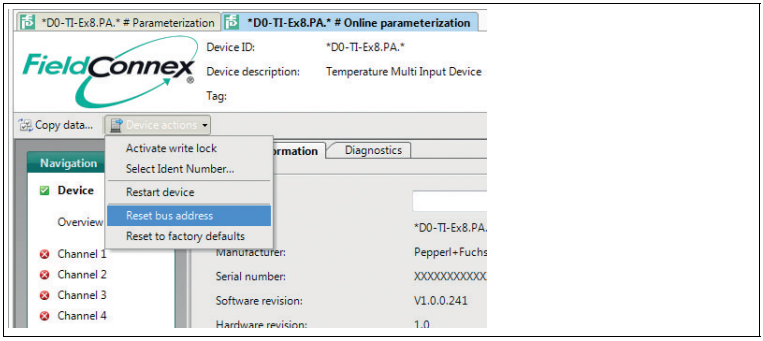


Figure 4.5 Online dialog menu item **Reset bus address**

- **Reset to factory defaults:** To reset the device information to the factory default, in the DTM menu bar select **Device actions > Reset to factory defaults**.

  The device will immediately return to the factory defaults. The device automatically reboots and the changes become effective.
  Note: If you have changed parameters without applying the changes, PACTware™ asks you to apply/revert your changes first and repeat this command after that.

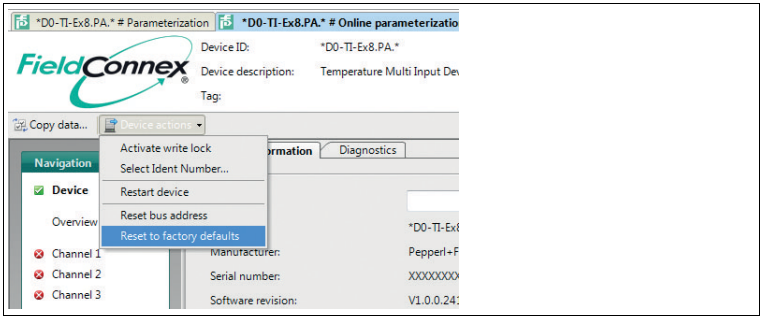


Figure 4.6 Online dialog menu item **Reset to factory defaults**

4.1 Device-Specific Parameters

In order to describe the device, several free value or text field parameters are available in the DTM software.

4.1.1 Tab "Device Information"

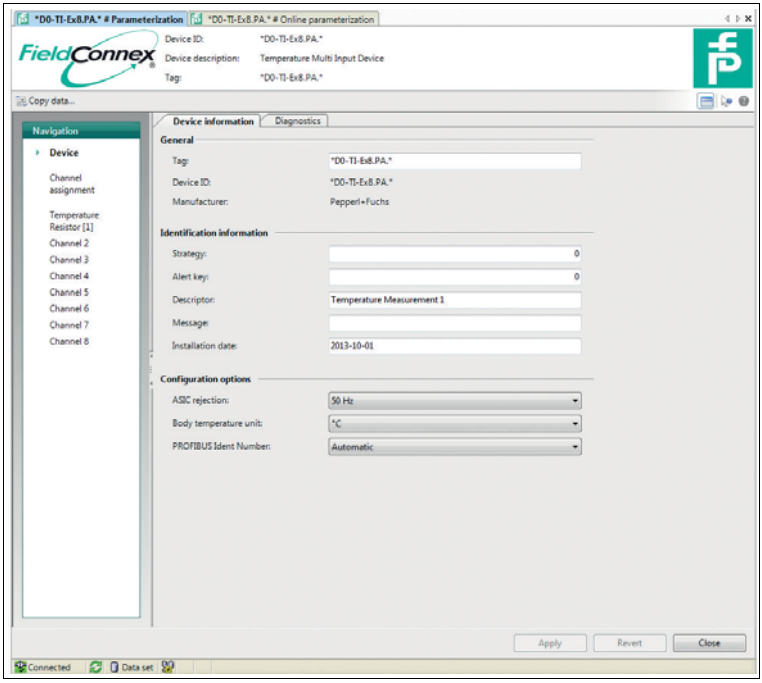


Figure 4.7 Tab device information offline

The tab "Device Information" contains the following information and parameters:

Section "General":

- **Tag:** *.D0-TI-Ex8.PA*: Free text field, enter a description of the device.
- **Device ID:** *.D0-TI-Ex8.PA*: Read-only, manufacturer-specific description of the device.
- **Manufacturer:** Pepperl+Fuchs: Read-only, identification of the manufacturer of the device.

Additional general parameters in the online mode

In the online mode, the following read-only information is displayed.
Use this data as additional diagnostic information when contacting Pepperl+Fuchs.

- **Static revision:** Incremental modification counter for counting each modification of a parameter to document the status of modification of parameterization.
  This parameter counts all changes in all device-specific online parameters.
- **Software revision:** Software revision number
- **Hardware revision:** Hardware revision number
- **Serial number:** Serial number of the device

Section "Identification information":

- **Strategy:** Free value field, enter value to use for configuration or diagnostics as a code key for sorting or summarizing diagnostic information.
- **Alert key:** Free value field, enter any value for sorting alarms or events that have been generated. The value can contain the identification number of the plant unit. It helps to identify the location (plant unit) of an event.
- **Description:** Free text field, enter any information to describe the device as a measuring point in the application.
- **Message:** Free text field, enter any information to describe the device in the application or plant.
- **Installation date:** Free text field, enter the installation date of the device in the plant.

Section "Configuration options":

- **ASIC-REJECTION:** Filter to reject the application-specific integrated circuit (ASIC) noise at 50 Hz or 60 Hz.
  Measurement values are filtered internally with a 50 Hz or 60 Hz filter to suppress EMC disturbance by that frequency. Use this parameter to set the filter in accordance to your country's power supply system frequency.
- **Body temperature unit:** Unit selector.
  Select in which unit the device temperature for the cold junction compensation is displayed.

2013-11

- **PROFIBUS Ident Number:** PROFIBUS ident number selector. Select whether the manufacturer-specific or the profile-specific ident number is used. Select the ident number setting:
  - Manufacturer-specific
  - Profile-specific
  - Automatic

  For details, see chapter 3.5

Note!

Changing the PROFIBUS Ident Number in the Online Mode

If you use the menu command in online parameterization, a change of ident number selection takes immediate effect. The device is automatically rebooted with the ident number selected.

4.1.2 Device Tab "Diagnostics"

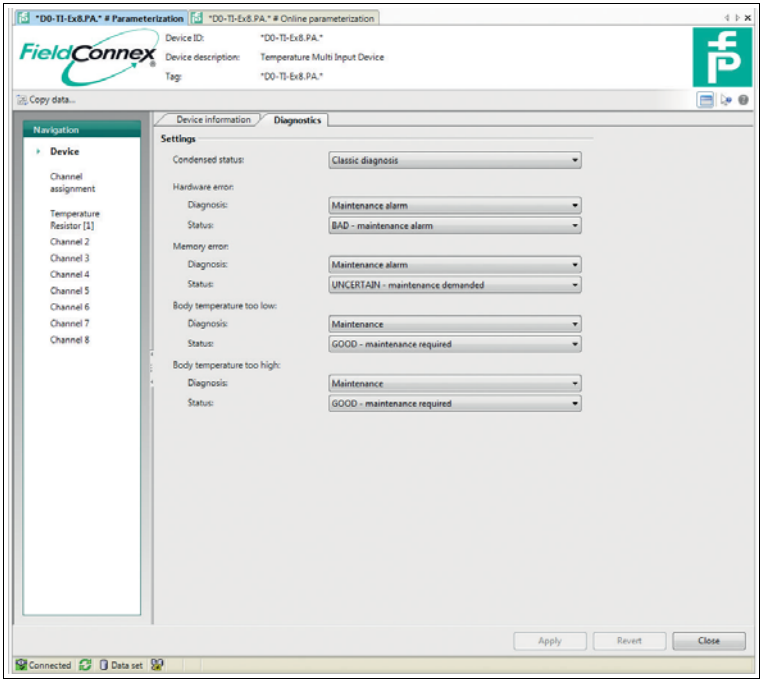


Figure 4.8 Tab device diagnostics (offline)

In the DTM, the tab "Diagnostics" enables you to configure the diagnostic behavior of the device both online and offline.

The tab "Diagnostics" contains the following parameters:

Section "Settings":

- **Condensed Status:** Mode selector to be configured for status and diagnostic behavior.
  Keep "Condensed diagnosis" or select "Classic diagnosis".

Note!

Diagnostic Type for Cyclic Communication

Setting the diagnostic type to classic or condensed status in the tab Device determines the diagnostic type of the cyclic communication between the device and the DTM.

As a part of the condensed mode in the DTM, the following settings determine the reaction of the device on manufacturer-specific diagnostic events. For each error type you can determine how to diagnose it and determine the status that the process value issues in case of the diagnosis:

Error Type	Diagnosis	Status that the process value issues if the assigned diagnosis is active:
Hardware error: **Memory error:** **Body temperature too low:** . **Body temperature too low:**	**Diagnosis:** ■ None ■ Maintenance ■ Maintenance demand ■ Maintenance alarm ■ Invalid process condition ■ Function check	**Status:** ■ GOOD - OK ■ GOOD - Maintenance required ■ GOOD - Maintenance demanded ■ UNCERTAIN - Maintenance demanded ■ BAD - Maintenance alarm ■ UNCERTAIN - Process-related, no maintenance ■ BAD - Process-related, no maintenance ■ BAD - Function check, local override ■ GOOD - Function check

Diagnostic parameters in the online mode

The following diagnostic information is displayed additionally in the online mode in order to diagnose issues or failures in real-time as they occur.

NAMUR NE107 Icon	Diagnosis information
	Good: No failure
	Maintenance required: Maintenance demanded, Maintenance
	Out of specification: Invalid process condition
	Function check: Function check
	Failure: Maintenance alarm

4.2 Channel-Specific Characteristics

The following sections describe how to configure the channel-specific characteristics.

Signal Processing

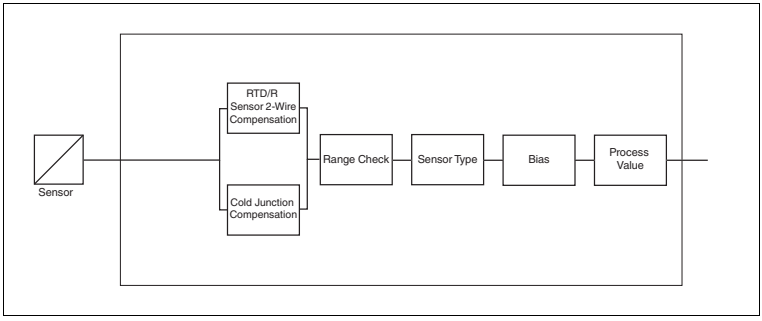


Figure 4.9 Signal measurement dataflow

Analog Input Function Block

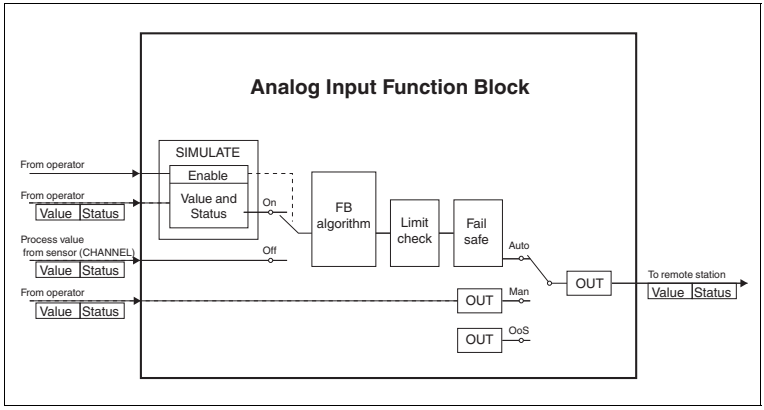


Figure 4.10 Analog input function block

4.2.1 Tab "General"

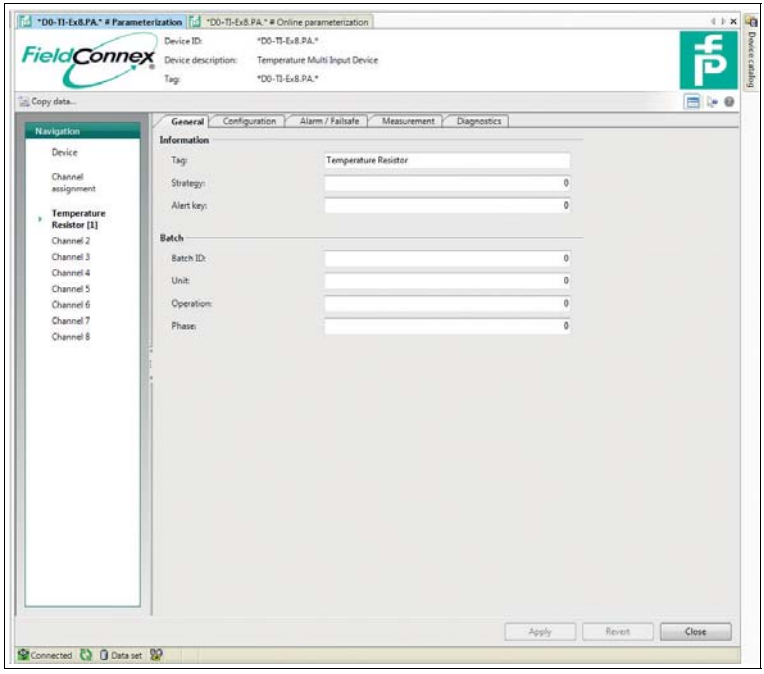


Figure 4.11 Tab channel

The tab "General" contains the following parameters:

Section "Information":

- **Tag:** Tag assignment option.
  Free text field, assign a unique tag to each of the 8 channels of the Temperature Multi-Input in the plant or process.
- **Strategy:** Code assignment option.
  Free value field, assign a user-specific code value to each of the 8 channels of the Temperature Multi-Input. This code can be used for classifying and summarizing information, e. g., for diagnosis reports.
- **Alert key:** Code assignment option.
  Free value field, assign a user-specific code value to each of the 8 channels of the Temperature Multi-Input. This code can be used for classifying and summarizing alarm messages and events, i. e., for quick localization.

Channel information parameters in the online mode

The following parameter contains read-only information displayed in the online mode.

- **Static revision:**Incremental modification counter for counting each modification of a parameter to document the status of parameterization modification.
  This parameter counts changes in the online tabs General, Configuration, Alarm/Failsafe.

Section "Batch":

- **Batch ID:** Identification assignment option.
  Free value field, assign an identifier for a batch process with distributed fieldbus systems to enhance process identification.
- **Unit**
  Free value field, assign an identifier for a batch unit with distributed fieldbus systems to enhance process identification.
- **Operation**
  Free value field, assign an identifier for a batch operation with distributed fieldbus systems to enhance process identification.
- **Phase**
  Free value field, assign an identifier for a phase with distributed fieldbus systems to enhance process identification.

4.2.2 Tab "Configuration"

The tab "Configuration" contains the following parameters:

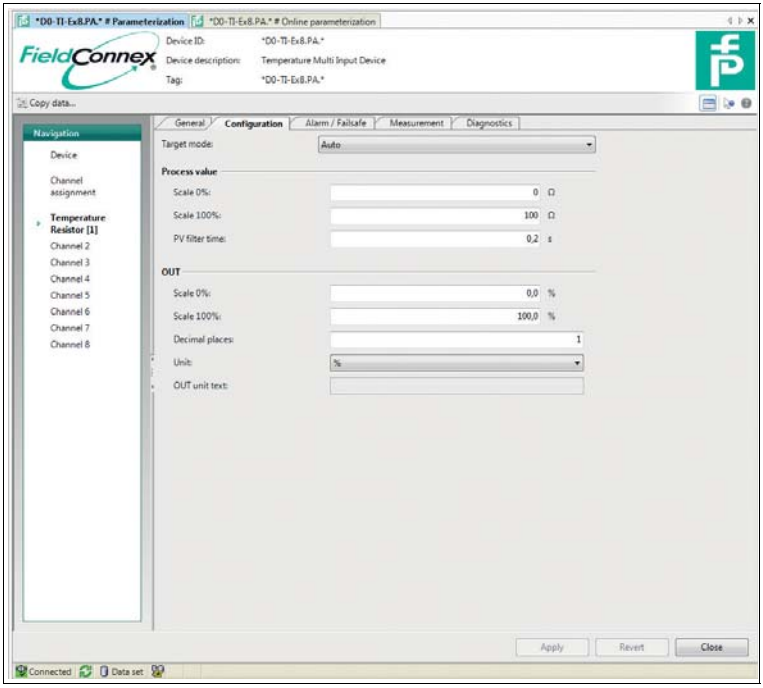


Figure 4.12 Tab configuration

- **Target mode:** Mode selection option per channel.
  Choose the target mode of the output value for each of the 8 channels. The following modes are available:
  - **Auto:** Automatic.
    The measured value of the device is used as output value.
  - **Manual**
    Option to set the output value of the device manually.
  - **Out of service**
    The channel is not in use and the output value is BAD.

Channel information parameters in the online mode

The following parameters contain read-only information displayed in the online mode.

- **Actual mode**
  Current mode of the channel. The mode can differ from the "Target mode".
  Example: Different mode is selected but the selection is not confirmed yet.

Sections "Process value" and "OUT"

Use the sections "Process value" and "OUT" to scale the input (range) process values according to the requirements of your application and scale them to the required output range.

Note!

Adapt Process Value Scales after Changing Process Value Unit

When changing the process value unit in the dialog Measurement, the device automatically changes the scale values you set to keep OUT identical.

Remember to adapt the process value scale settings according to your requirements after changing the process value unit.

To use the physically measured value as out, set both the OUT and the process value scales to "0" and to "100".

Section "Process value":

- **Scale 0 %:** Input scaling option for the minimum process value.
  Scale the input process value or value range according to your automation requirements.
- **Scale 100 %:** Input scaling option for the maximum process value.
  Scale the input process value or value range according to your automation requirements.
- **PV filter time:** Filter time setting option.
  Determine the time in seconds (s) that the filter of the 1st degree needs to filter the measured value.
  This parameter can be applied to the process value independently of the scaling options.

Section "OUT":

- **Scale 0 %:** Output scaling option for the minimum process value/value range.
  Scale the output process value or value range according to your automation requirements.
- **Scale 100 %:** Output scaling option for the maximum process value/value range.
  Scale the output process value or value range according to your automation requirements.
- **Unit:** Unit selector.
  Select the unit of the output range.
- **Decimal places:** Value field option.
  Determine the number of decimal places for the output value display.
- **OUT unit text:** Free text field option.
  If you set the parameter Unit to "Textual unit definition", you can enter a unit for the measured value in the text field.

4.2.3 Tab "Alarm and Failsafe"

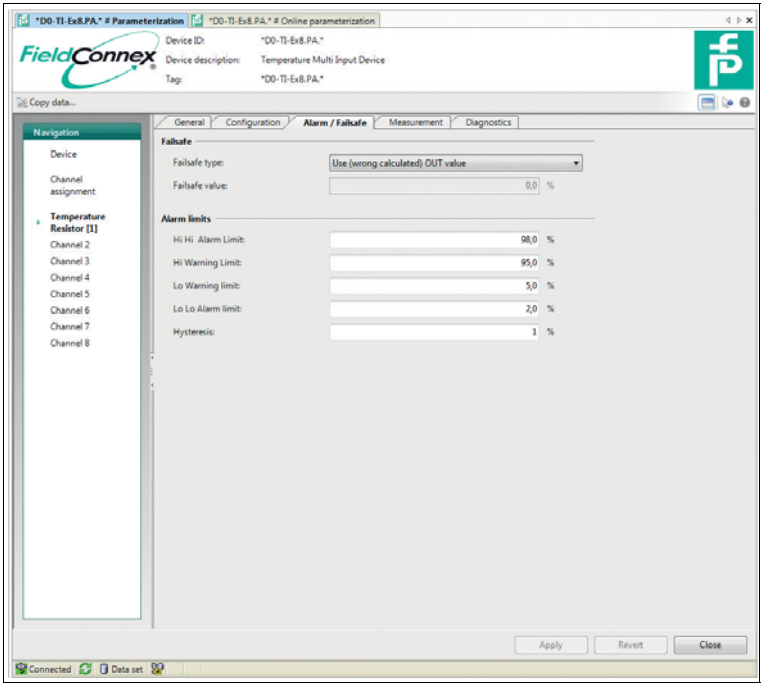


Figure 4.13 Tab alarm/failsafe

The tab "Alarm and Failsafe" contains the following parameters:

Section "Failsafe":

- **Failsafe type:** Selector for the behavior in case of faults.
  For information on the behavior of the diagnostic status information in the classic mode, See chapter 5.1. Define how the device reacts in case of faults:
  - Use failsafe value as OUT:
    The output value is substituted by the failsafe value. This value is displayed in OUT.
  - Use last valid OUT value:
    The last valid output value is used. This value is displayed in OUT.
  - Keep (wrong calculated) OUT value:
    The last wrong value is used for all subsequent calculations.
- **Failsafe value:** Free value field.
  If you selected "Use failsafe value as OUT", use this field to enter a failsafe value in case of faults.

2013-11

Section "Alarm limits":

- **HI HI Alarm Limit:** Upper value limit setting for alarms.
  Determine the upper limit of the OUT value that triggers a HI HI alarm.
- **HI Warning Limit:** Upper value limit setting for prewarning alarms.
  Determine the upper limit of the OUT value that triggers a HI warning alarm.
- **LO Warning Limit:** Lower value limit setting for prewarning alarms.
  Determine the lower limit of the OUT value that triggers a LO warning alarm.
- **LO LO Alarm Limit:** Lower value limit setting for alarms.
  Determine the lower limit of the OUT value that triggers a LO LO alarm.
- **Hysteresis:** Hysteresis value setting for all upper and lower warning and alarm limit values.
  Determine how long the measured value lies within the range of the defined alarm limit (hysteresis). The alarm remains activated until the value has left this range.

4.2.4 Tab "Measurement"

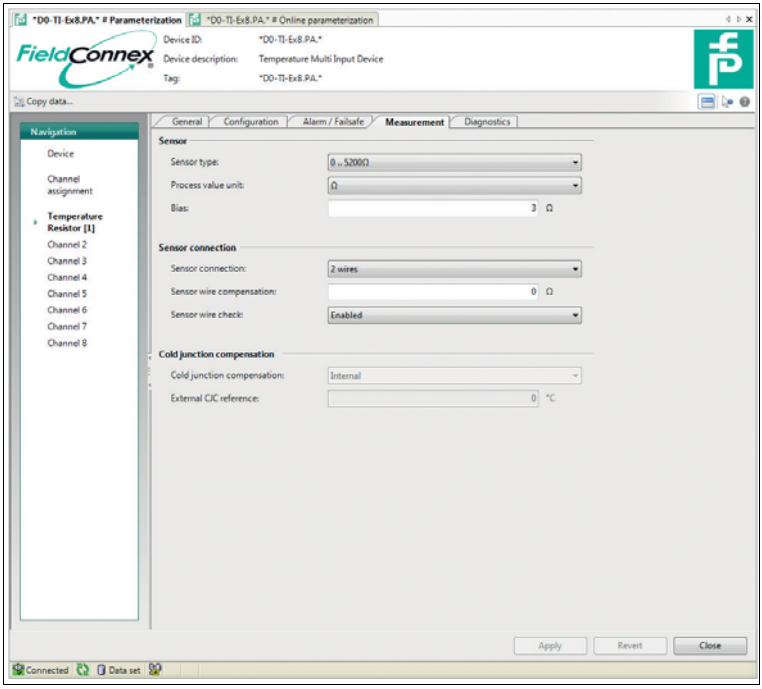


Figure 4.14 Tab measurement

The tab "Measurement" contains the following parameters:

Channel parameters in the online mode

The following parameters contain read-only information displayed in the online mode.

- **Static revision:**Incremental modification counter for counting each modification of a parameter to document the status of parameterization modification.
  This parameter counts changes in the online tab Measurement.
- **Process value:** The measured value and status of the sensor, as it is available for the function block.
- **Lower sensor limit:** Physical lower limit function of the sensor and input range.
- **Upper sensor limit:** Physical upper limit function of the sensor and input range.

Section "Sensor":

- **Sensor type:** Selector for the valid types of sensors for this device.
  Select the valid sensor type for your application.
  For more information on the sensor types, see data sheet.
- **Process value unit:** Unit selector.
  Select the unit for the value output: K, °C, °F, R°

Note!

Adapt Process Value Scales after Changing Process Value Unit

When changing the process value unit in the dialog Measurement, the device automatically changes the scale values you set to keep OUT identical.

Remember to adapt the process value scale settings according to your requirements after changing the process value unit.

To use the physically measured value as out, set both the OUT and the process value scales to "0" and to "100".

- **Bias:** Known offset setting option.
  Free value field, add a known offset value to the currently measured value.

Section "Sensor Connection":

- **Sensor connection:** Sensor connection type selector.
  If the "Sensor type" is a resistance thermometer (RTD) or resistance range (R), you can use this parameter in order to determine the type of sensor connection.
  Define if the sensor connection is 2-,3- or 4-wire.
- **Sensor wire compensation:** Compensation value option. If the "Sensor type" is a resistance thermometer (RTD) or resistance range (R) and the "Sensor Connection" is set to 2-wire, you can use this parameter in order to compensate the measured value.
  Enter a value in Ohm to be subtracted from the measured value.

2013-11

- **Sensor wire check:** Deactivation option for lead breakage and short circuit current detection.
  You can **Enable/Disable** lead breakage and short circuit current detection for the sensor connection.

Section "Cold Junction Compensation":

- **Cold junction compensation:** Selector for the type of cold junction compensation (CJC).
  If the "Sensor type" is a thermocouple (TC), you can determine if CJC is External/Internal.
  - Internal: Reference junction temperature is measured by the device itself via an internal sensor.
  - External: "External CJC reference" is used for compensation.
- **External CJC reference:** Temperature setting option for CJC.
  If the "Sensor type" is thermocouple (TC) and the "Cold junction compensation" is set to "External", you can determine a fixed temperature for CJC.
  Set a fixed temperature for the external cold junction compensation based on an external reference junction.

4.2.5 Channel Tab "Diagnostics"

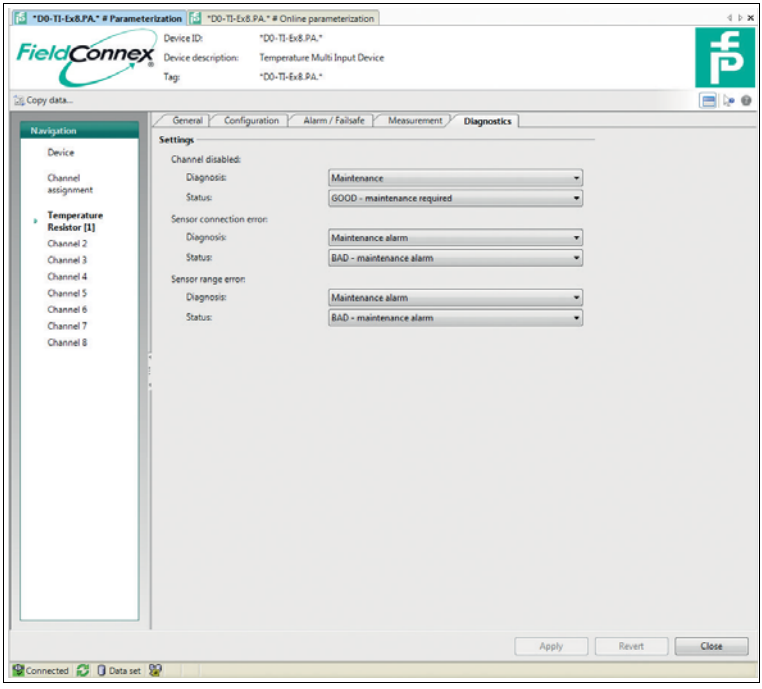


Figure 4.15 Tab channel diagnosis

In the DTM, the tab "Diagnostics" for each channel enables you to configure the diagnostic behavior of each channel.

The tab "Diagnostics" contains the following parameters:

Section "Settings":

The following settings determine the reaction of the device on channel-specific diagnostic events. For each error type you can determine how to diagnose it and determine the status that the process value issues in case of the diagnosis:

Error Type	Diagnosis:	Status that the process value issues if the assigned diagnosis is active:
Channel disabled: **Sensor connection error:** **Sensor range error:** . **Body temperature too low:** **Body temperature too high:**	**Diagnosis:** ■ None ■ Maintenance ■ Maintenance demand ■ Maintenance alarm ■ Invalid process condition ■ Function check	**Status:** ■ GOOD - OK ■ GOOD - Maintenance required ■ GOOD - Maintenance demanded ■ UNCERTAIN - Maintenance demanded ■ BAD - Maintenance alarm ■ UNCERTAIN - Process-related, no maintenance ■ BAD - Process-related, no maintenance ■ BAD - Function check, local override ■ GOOD - Function check

Diagnostic parameters in the online mode

The following diagnostic information is displayed additionally in the online mode in order to diagnose issues or failures in real-time as they occur.

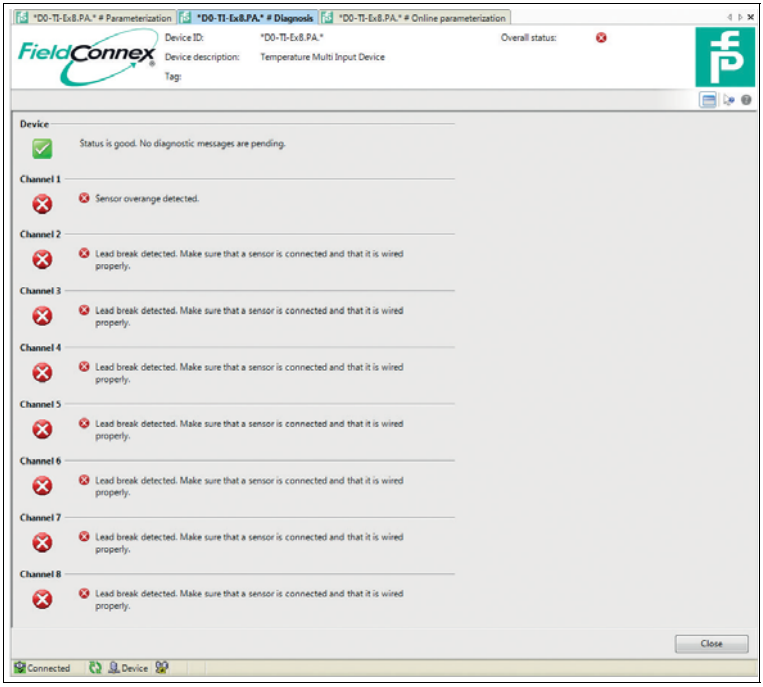
NE107 diagnostic information icons are displayed for:

- Lead breakage
- Short circuit current
- Temperature overrange
- Temperature underrange

NE107 diagnosis information icons are not displayed for sensor range errors and sensor connection errors.

NAMUR NE107 Icon	Diagnosis information
	Good: No failure
	Maintenance required: Maintenance demanded, Maintenance
	Out of specification: Invalid process condition
	Function check: Function check
	Failure: Maintenance alarm
	Passivated: Is shown if no sensor type is selected.

4.3 Diagnosis



The DTM dialog diagnosis enables you to identify errors as efficiently as possible. Diagnosis displays the NAMUR icon for the device and each channel, as well as a list of active faults. The condensed status of the device can be configured via **Device > Diagnostics**. For more information, see chapter 4.1.2 and see chapter 4.2.5.

Note!

****D0-TI-Ex8.PA.* DTM Diagnostic Information***

The *D0-TI-Ex8.PA.* DTM always displays diagnostic information in condensed mode, independent of which diagnosis type has been chosen and is used for cyclic communication.

If you use the classic mode in the DTM, the OUT status contains the classic diagnosis information. Other than that, the DTM information looks identical.

4.4 Simulation

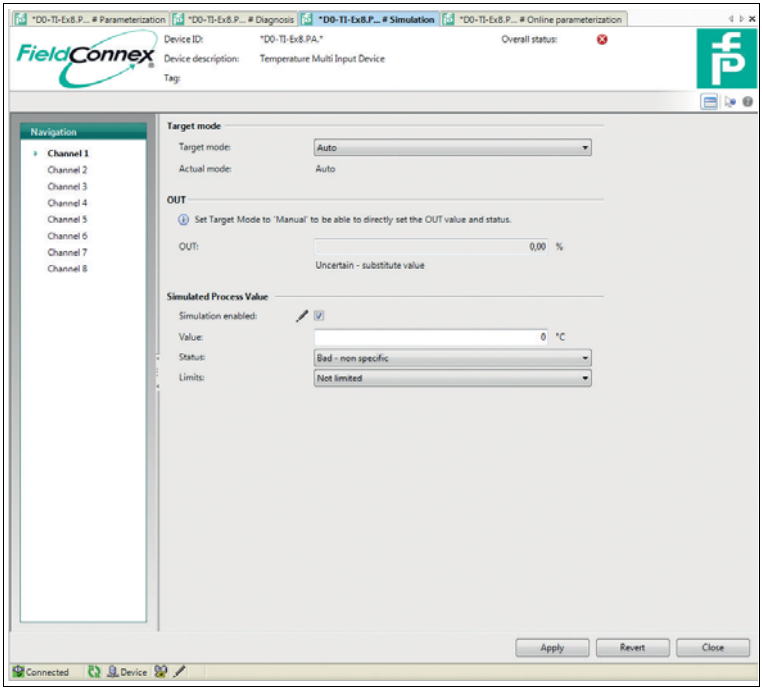


Figure 4.16 Tab simulation with target mode set to auto.

The DTM menu "Simulation" offers the option to simulate the operation of the Temperature Multi-Input Device with different simulate values, e. g., to check whether the settings work for the whole process automation setup.

Prerequisite: Enable Simulation: In the menu toolbar of PACTware™, go to **Device > Simulation**.

In the DTM, the tab "Simulation" for each channel enables you to simulate the following settings:

- Modify the target mode for each channel.
- If you set the target mode to "Manual": Edit the OUT value and simulate a variety of situations.
- If you set the target mode to "Auto": Edit a simulated process value and simulate a variety of situations. Can be used to check the failsafe and scaling behavior.

The tab "Simulation" contains the following parameters:

Section "Target Mode":

- **Target mode:** Selector for the simulation mode of the channel
  Choose either of the following modes for simulation:
  - Auto: Select this mode to simulate the process value.
  - Manual: Select this mode to set the OUT value and status.
  - Out of service: Select this mode to simulate the process with this channel as out of service.
- **Actual mode:** Current mode of the channel. The mode can differ from the "Target mode".
  Example: Different mode is selected but the selection is not confirmed yet.

Section "OUT":

Prerequisite: As target mode, select "Manual".

- **OUT:** Free value field for out value.
  Enter an OUT value to simulate the behavior of the channel with it.
- **Quality:** Selector to classify the OUT value.
  Classify the OUT value.
- **Limits:** Selector to determine the limit of the simulation OUT value.
  Select the property of the simulation value.The following options are available:
  - Not limited
  - Low limited
  - High limited
  - Constant

Section "Simulated Process Value":

Prerequisite: As target mode, select "Auto".

- **Simulation enabled:** Checkbox for activation of the process value simulation
  Activate the checkbox to enable simulation of the process value. If the checkbox is deactivated, the auto mode keeps the channel in the last used mode.
- **Value:** Free value field for process value.
  With simulation enabled, you can enter any value for simulation.
- **Status:** Selector to classify the process value.
  Assign a status to the simulation process value.

- **Limits:** Selector to determine the limit of the simulation process value. Select the property of the simulation value.The following options are available:
  - Not limited
  - Low limited
  - High limited
  - Constant

5 Bus Configuration for Cyclic Communication

Prerequisite: The GSD file is installed. If your FDT Frame supports Bus Master Configuration, you can also use the Channel Assignment dialog. For more information, see chapter 5.3.

During cyclic data exchange, "user data" is exchanged at regular intervals between the master and the slave or bus, e. g., between a PCS and a field device. User data includes measurement values, limit position feedback, and output data, etc. The bus cycle time depends on the number of nodes and the amount of data that is transmitted.

5.1 Cyclic Data Transfer

During cyclic data transfer, the device provides 8 x a measured value with status. The GSD file contains 2 module types that can be allocated to the slots 1 ... 8:

- Analog Input short: AI (short)
- Analog Input long: AI (long)

The transferred data is identical. The "long" type is written in extended format and contains the description of the data types included in the transferred data.

The transferred data is structured as follows:

Analog values consist of data blocks of 5 bytes per block.

The measured value is coded in the first 4 bytes as floating point figures in accordance with the standard IEEE 754.

The 5th byte contains the status information of the measured value according to the PA Profile 3.02 specification.

The status values of the classic mode and the condensed mode differ.

Status Values Common to Condensed and Classic Mode

Independent of the classic mode or the condensed mode, the status can have the following values if no failures or issues have occurred:

- GOOD – OK: Measured value is GOOD, no faults found
- Status is set for 10 s after a configuration parameter has been changed: GOOD – Update Event
- Status is set for 10 s after the simulation has been started: UNCERTAIN – SIMULATE_START – LIMIT_CONST

Classic Mode: Status Information in Case of Failure

In case of failure, for classic mode the following status information applies:

- **Failsafe Mode = Fail Safe Value:**
  UNCERTAIN – Substitute Value – Constant
- **Failsafe Mode = Last Usable Value:**
  UNCERTAIN – Last Usable – Constant

  If no GOOD value has ever been measured after startup:
  UNCERTAIN – Initial Value – Constant

2013-11

- **Failsafe Mode = Wrong Value:**
  Channel is deactivated, i. e., no sensor type is chosen or the device configuration is currently under change, thus temporarily disabling measurement:
  BAD – Non Specific – Constant

  Device fault:
  BAD – Device Failure – Constant

  Lead breakage, short circuit current, underrange, overrange:
  BAD – Sensor Failure – Constant

  BAD – OoS – The target mode is OoS

Condensed Mode: Status Information in Case of Failure

In case of failure, for condensed mode the following status information applies:

State triggering failsafe mechanism	Failsafe mode		
	Failsafe value	**Last usable value**	**Wrong calculated value**
BAD – maintenance alarm	UNCERTAIN – substitute set	UNCERTAIN – substitute set	BAD – maintenance alarm
BAD – process-related	UNCERTAIN – process-related	UNCERTAIN – process-related	BAD – process-related
BAD – function check	UNCERTAIN – substitute set	UNCERTAIN – substitute set	BAD – function check

All other status values of the condensed mode are issued directly.

For details, see chapter 4.1.2 and see chapter 4.2.5.

5.2 User Parameterization

With the User Parameterization the diagnostic mode can be selected.

Condensed status: Mode selector to be configured for status and diagnostic behavior.
Select "Condensed diagnosis" or keep "Classic diagnosis".

5.3 Channel Assignment

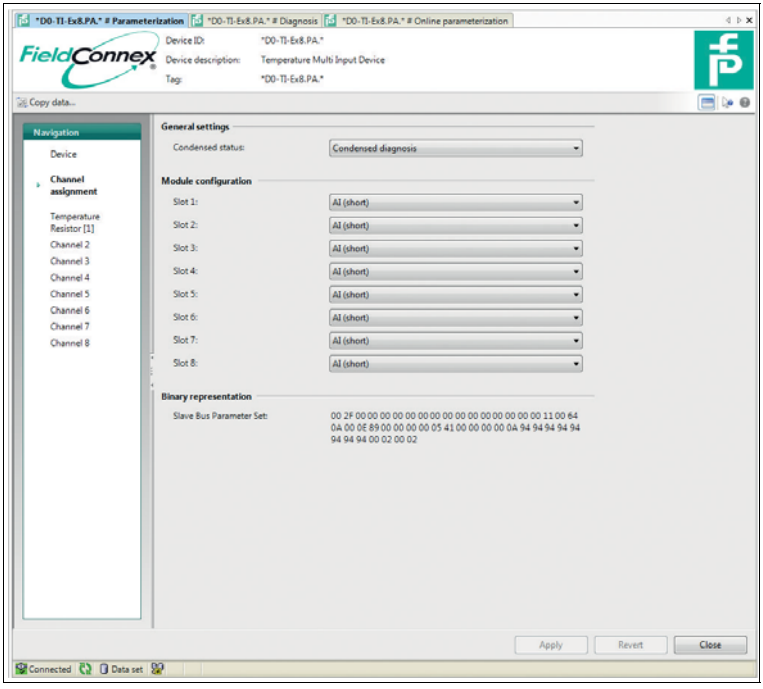


Figure 5.1 Tab channel assignment

The DTM menu "Channel Assignment" can be used to parameterize Bus Master Configuration settings for cyclic communication.

The tab "Channel Assignment" contains the following parameters:

Section "General Settings":

- **Condensed status:** Mode selector to be configured for status and diagnostic behavior.
  Select "Condensed diagnosis" or keep "Classic diagnosis".

Note!

Diagnostic Type for Cyclic Communication

Setting the diagnostic type to classic or condensed status in "Channel Assignment" determines the diagnostic type of cyclic communication between the device and the bus master.

Section "Module Configuration":

- **Slot 1 ... 8:** IO module selector for the channels 1 ... 8.
  To determine how the cyclic data transfer takes place, select either of the following options:
  - No module
  - AI (short)
  - AI (long)

Section "Binary representation":

- **Slave Bus Parameter Set:** Read-only information to check the diagnostic information that is set per byte.

5.4 Diagnosis in Cyclic Communication

The following types of diagnosis exist:

- Classic diagnosis
- Condensed diagnosis

Depending on the type of diagnosis, the following parameter lists apply for diagnosis information on the Temperature Multi-Input Device.

Extension (Valid for both Diagnostic Modes)

Byte ("Octet")	Related to	Bit	Parameter designation ("Mnemonic")	Description
1	Device/ PHY_BLK	0	DIA_EXT_HW_ERR	Is set if a device failure is detected.
		1	DIA_EXT_MEM_ERR	Is set if EEPROM checksum verification fails.
		2	DIA_EXT_BODY_ TEMP_HI	Device temperature exceeds specified temperature range.
		3	DIA_EXT_BODY_ TEMP_LO	Device temperature falls below the specified temperature range.
		4 ... 7	reserved	

Byte ("Octet")	Related to	Bit	Parameter designation ("Mnemonic")	Description
2	Channel 1	8	DIA_EXT_C1_ DISABLED	No sensor selected.
		9	reserved	
		10	DIA_EXT_C1_ SENSOR_C ONNECTION_ERR	Is set if one of the following sensor errors is detected: ■ LeadBreak ■ ShortCircuit
		11	DIA_EXT_C1_ SENSOR_ R ANGE_ERR	Is set if one of the following sensor errors is detected: ■ Underrange ■ Overrange
	Channel 2	12 ... 15	see Channel 1	see Channel 1
3	Channel 3	16 ... 19		
	Channel 4	20 ... 23		
4	Channel 5	24 ... 27		
	Channel 6	28 ... 31		
5	Channel 7	32 ... 35		
	Channel 8	36 ... 39		
6		40 ... 47	reserved	

Classic Diagnosis Parameters

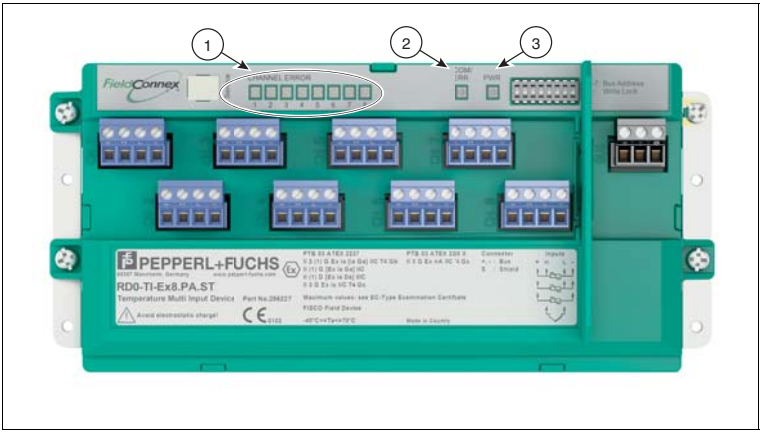
Byte ("Octet")	Bit	Parameter designation ("Mnemonic")	Set Ext_Diag bit	Description
1	0	DIA_HW_ELECTR	yes	Is set if a device failure is detected.
1	3	DIA_TEMP_ELECTR		Electronic temperature too high. See respective extension bits.
	1...3	not used		Fixed to 0.
	4	DIA_MEM_CHECKSUM	yes	Is set if a MemoryError is detected.
	5...7	not used		Fixed to 0.
2	0...1	not used		Fixed to 0.
	2	not used		Fixed to 0.
	5	DIA_MAINTENANCE	yes	Is set if any of the following bits is set: ■ DIA_EXT_Cx_SENSOR_ CO NNECTION_ERR ■ DIA_EXT_Cx_SENSOR_ RA NGE_ERR
	6	not used		Fixed to 0.
3	0...7	reserved		Fixed to 0.
4	0...6	reserved		Fixed to 0.
	7	EXTENSION_AVAILABLE	no	More diagnosis information available.

Condensed Diagnosis Parameters

Byte ("Octet")	Bit	Parameter designation ("Mnemonic")	Set Ext_Diag bit	Description
1	0...7	reserved	yes	Fixed to 0.
2	0...2	reserved		Fixed to 0.
	5	DIA_MAINTENANCE	no	Can be configured by the DTM. For more information, see chapter 4.1.2 and see chapter 4.2.5.
	6	reserved		Fixed to 0.
3	0	DIA_MAINTENANCE_ALARM	yes	Can be configured by the DTM. For more information, see chapter 4.1.2 and see chapter 4.2.5.
	1	DIA_MAINTENANCE_DEMANDED	no	an be configured by the DTM. For more information, see chapter 4.1.2 and see chapter 4.2.5.
	2	DIA_FUNCTION_CHECK	no	Can be configured by the DTM. For more information, see chapter 4.1.2 and see chapter 4.2.5.
	3	DIA_INV_PRO_COND	no	Can be configured by the DTM. For more information, see chapter 4.1.2 and see chapter 4.2.5.
	4...7	reserved		Fixed to 0.
4	0...6	reserved		Fixed to 0.
	7	EXTENSION_AVAILABLE	no	More diagnosis information available.

6 Troubleshooting and Diagnosis

LED Status and Error Indication



1. Sensor-specific red LEDs: Indicate the status of the related sensor input channels
2. Red LED COM ERR: Indicates the communication status
3. Green LED PWR: Indicates the status of the bus power

LED Indications

LED	Statuses	Cause	Remedy
PWR (green)	OFF	No power supply	■ Check power supply ■ Check fieldbus cable wiring
	Permanently ON	Power available	-
COM (red)	OFF	Cyclic communication active	-
	Permanently ON	Hardware error	Send device to Pepperl+Fuchs for repair
	Flashing ON/OFF	No communication Communication errors	■ Check DP Master ■ Check Segment Coupler ■ Check wiring
Sensor (red) Channel 1–8	OFF	No sensor errors detected	-
	Flashing ON/OFF	Sensor error (over / under range, wiring error, lead breakage)	Check sensor wiring. Check diagnostic messages in the DTM.

Common Parameters for Both Diagnosis Types

Problem			Solution	
Parameter	Message	Range of validity	Cause	Remedy
DIA_EXT_HW_ERR	Body temperature is out of spec.		Is set if a DEVICE_FAILURE is detected.	Send the device to Pepperl+Fuchs
DIA_EXT_MEM_ERR			Is set if EEPROM checksum verification fails.	Reconfigure and then restart the device. If the problem persists, send the device to Pepperl+Fuchs
DIA_EXT_BODY_TEMP_HI				Operate the device within the specification.
DIA_EXT_BODY_TEMP_LO				Operate the device within the specification.
DIA_EXT_C1_DISABLED	No sensor selected.	Channel 1 ... 8	Type: Classic diagnosis	If a sensor should be used, select the correct sensor type in the DTM.
DIA_EXT_C1_SENSOR_CONNECTION_ERR	■ LeadBreak ■ ShortCircuit	Channel 1 ... 8	Is set if one of the sensor errors is detected.	Check the wiring.
DIA_EXT_C1_SENSOR_RANGE_ERR	■ Underrange ■ Overrange	Channel 1 ... 8	Is set if one of the sensor errors is detected.	■ Check the wiring. ■ Check if the measurement range of the sensor is valid for your application.

Classic Diagnosis Parameters

Problem	Solution	
Parameter	Description	Remedy
DIA_HW_ELECTR	Is set if a DeviceError is detected. DIA_EXT_HW_ERR is set.	Send the device to Pepperl+Fuchs
DIA_MEM_CHECKSUM	Is set if a MemoryError is detected. DIA_EXT_MEM_ERR is set.	Operate the device within the specification.

2013-11

Problem	Solution	
Parameter	Description	Remedy
DIA_MAINTENANCE	Is set if either of the following bits is set: DIA_EXT_Cx_SENSOR_CONNECTION_ERR	Check the sensor wiring.
	DIA_EXT_Cx_SENSOR_RANGE_ERR	Check if the sensor supports the required measurement range. Check the wiring.

Condensed Diagnosis Parameters

Problem		Solution	
Parameter	Message	Cause	Remedy
DIA_MAINTENANCE	Maintenance	DIAG_EVENT_SWITCH is set in the DTM	Depends on the status that the process value issues. For more information, see chapter 4.1.2 and see chapter 4.2.5.
DIA_MAINTENANCE_ALARM	Maintenance alarm	DIAG_EVENT_SWITCH is set in the DTM	Depends on the status that the process value issues. For more information, see chapter 4.1.2 and see chapter 4.2.5.
DIA_MAINTENANCE_DEMANDED	Maintenance demand	DIAG_EVENT_SWITCH is set in the DTM	Depends on the status that the process value issues. For more information, see chapter 4.1.2 and see chapter 4.2.5.
DIA_FUNCTION_CHECK	Function check	DIAG_EVENT_SWITCH is set in the DTM	Depends on the status that the process value issues. For more information, see chapter 4.1.2 and see chapter 4.2.5.
DIA_INV_PRO_COND	Invalid process condition	DIAG_EVENT_SWITCH is set in the DTM	Depends on the status that the process value issues. For more information, see chapter 4.1.2 and see chapter 4.2.5.

7 Reference List of Parameters

In this section you find a list of all parameters used in the DTM. The characteristics are marked as follows:

- *F = Function parameter. Parameter is essential for operation and must be correctly set.
- I = Information parameter. Parameter is used for device description or documentation.
- D = Diagnosis parameter. Parameter is used for additional device and diagnosis functions: Essential for troubleshooting, prevention, and enquiries with Pepperl+Fuchs.
- m = Parameter can be modified.

Value Range for DIAG_EVENT_SWITCH Parameters

The DTM uses DIAG_EVENT_SWITCHES to mark the defined diagnostic states. These parameters always have the following possible values. The values are valid for all instances where the DIAG_EVENT_SWITCHES are used.

Diagnosis	Status
■ None ■ Maintenance ■ Maintenance demand ■ Maintenance alarm ■ Invalid process condition ■ Function check	■ GOOD – OK ■ GOOD – Maintenance required ■ GOOD – Maintenance demanded ■ UNCERTAIN – Maintenance demanded ■ BAD – Maintenance alarm ■ UNCERTAIN – Process-related, no maintenance ■ BAD – Process-related, no maintenance ■ BAD – Function check, local override ■ GOOD – Function check

Device-related parameters

Characteristics*	Parameter/ Mnemonic	Definition	Value range **bold** = default
F, m	Activate Write Lock WRITE_LOCKING	Activates/deactivates the read-only function by software.	not write-protected, write-protected
D	Write Lock Active HW_WRITE_ PROTECTION	Information banner signaling that the write protection is enabled. The banner includes the option **Unlock device**.	**not write-protected**, write-protected
m	Reset to factory defaults FACTORY_RESET	Resets the device information to the factory default.	0 ... 65535

2013-11

Characteristics*	Parameter/ Mnemonic	Definition	Value range **bold** = default
I, m	Tag TAG_DESC	Unique description of the device in the plant or process.	(32 characters)
D	Device ID	Manufacturer specific identification of the device.	(16 characters)
D	Manufacturer MANUFACTURER	Read-only identification of the manufacturer of the device.	0 ... 65535 **93** (Pepperl+Fuchs)
I	Static revision ST_REV	Incremental modification counter for counting each modification of a parameter. Documents the status of modification of parameterization. ST_REV counts all changes in the online tab Device Information.	**0** ... 65535
D	Software revision SOFTWARE_ REVISION	Version number of the device firmware. Required for enquiries to Pepperl+Fuchs.	(16 characters)
D	Hardware revision HARDWARE_ REVISION	Version number of the device hardware. Required for enquiries to Pepperl+Fuchs.	(16 characters)
D	Serial number DEVICE_SER_ NUM	Serial number of the device. Required for enquiries to Pepperl+Fuchs.	(16 characters)
I, m	Strategy STRATEGY	Free value field for user-specified configuration of a code key for sorting or summarizing diagnostic information.	**0** ... 65535
I, m	Alert key ALERT_KEY	User-specified value for sorting alarms or events. The value can contain the identification number of the plant unit. It helps to identify the location (plant unit) of an event.	**0** ...255
I, m	Description DESCRIPTOR	User-specified description of the device as a measuring point in the application.	(32 characters)
I, m	Message DEVICE_ MESSAGE	User-specified additional description of the device in the application or plant.	(32 characters)
I, m	Installation date DEVICE_ INSTAL_DATE	User-specified entry of the installation date of the device in the plant.	(16 characters)

Characteristics*	Parameter/ Mnemonic	Definition	Value range **bold** = default
F, m	ASIC rejection ASIC_ REJECTION	User- and country-specific filter to reject the application-specific integrated circuit (ASIC) noise. Measurement values are filtered internally with a 50 Hz or 60 Hz filter to suppress EMC disturbance by that frequency.	**50 Hz** 60 Hz
F, m	Body temperature unit BODY_TEMP_ UNIT	Unit selector for the device temperature of the cold junction compensation.	K °F **°C** °R
F, m	PROFIBUS Ident Number IDENT_ NUMBER_ SELECTOR	PROFIBUS Ident number selector. See chapter 3.5	Profile specific (0), Manufacturer specific (1) **Automatic**
D, m	Condensed Status COND_STATUS_ DIAG	Mode selector for status information and diagnostic behavior.	**Condensed diagnosis** Classic diagnosis
D, m	Hardware error DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a hardware error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **BAD - Maintenance alarm**
D, m	Memory error DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a memory error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **BAD - Maintenance alarm**

Characteristics*	Parameter/ Mnemonic	Definition	Value range **bold** = default
D, m	Body temperature too low DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a body temperature too low error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **GOOD - Maintenance required**
D, m	Body temperature too high DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a body temperature too high error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **GOOD - Maintenance required**

Channel-related parameters

Characteristics*	Parameter Mnemonic	Definition	Value range **bold** = default
I, m	Tag TAG_DESC	User-specific unique description of each of the 8 channels of the Temperature Multi-Input in the plant or process.	(32 characters)
I, m	Strategy STRATEGY	Free value field for user-specified configuration of a code key for sorting or summarizing diagnostic information.	**0** ... 65535
I, m	Alert key ALERT_KEY	User-specified value for sorting alarms or events. The value can contain the identification number of the plant unit. It helps to identify the location (plant unit) of an event.	**0** ...255

Characteristics*	Parameter Mnemonic	Definition	Value range **bold** = default
I	Static revision ST_REV	Incremental modification counter for counting each modification of a parameter. Documents the status of modification of parameterization. For channel-related parameters, 2 static revision counters are used: 1. ST_REV to count changes in the online tabs General, Configuration, Alarm/Failsafe 2. ST_REV to count changes in the online tab Measurement.	**0** ... 65535
I, m	Batch ID BATCH	Free value field for a batch process identifier with distributed fieldbus systems to enhance process identification.	**0** ... 4.294.967.295
I, m	Unit	Free value field for a unit identifier with distributed fieldbus systems to enhance process identification.	**0** ... 65535
I, m	Operation	Free value field for an identifier of the current operation with distributed fieldbus systems to enhance process identification.	**0** ... 65535
I, m	Phase	Free value field for an identifier of the current process with distributed fieldbus systems to enhance process identification.	**0** ... 65535
F, m	Target mode TARGET_MODE	Mode selector of the output value for each of the 8 channels.	**Auto** Manual Out of service
I	Actual mode MODE_BLK	Current mode of the channel. The mode can differ from the "Target mode" if operating conditions prevent the sensor to work in the "Target mode" defined.	
F, m	Process value: Scale 0 % PV_SCALE	Scaling option for minimum process value.	**0**

2013-11

Characteristics*	Parameter Mnemonic	Definition	Value range **bold** = default
F, m	Process value: Scale 100 % PV_SCALE	Scaling option for maximum process value.	**100**
F, m	PV filter time PV_FTIME	Filter time of the first degree for filtering the measured value.	**0**
F, m	Process value OUT: Scale 0 % OUT_SCALE	Scaling option for minimum process output value/range.	**0**
F, m	Process value OUT: Scale 100 % OUT_SCALE	Scaling option for maximum process output value/range.	**100**
F, m	Process value OUT: Unit OUT_SCALE_ UNIT	Unit selector for output range.	**C°**
F, m	Process value OUT: Decimal places	Free value field for determining the number of decimal places for the output range.	**2**
F, m	Process value OUT: OUT unit text OUT_UNIT_TEXT	Free-text field for a user.specified unit for the output range.	
F, m	Failsafe type FSAFE_TYPE	Selector for the behavior of the sensor in case of faults.	Use failsafe value as OUT **Use last valid OUT value** Keep (wrong calculated) OUT value
F, m	Failsafe value FSAFE_VALUE	Free value field for a user-specified value in the case of fault.	**0**
F, m	HI HI Alarm Limit HI_HI_LIM	Upper value limit setting for alarms.	**INF**
F, m	HI Warning Limit HI_LIM	Upper value limit setting for prewarning alarms.	**INF**
F, m	LO Warning Limit LO_LIM	Lower value limit setting for prewarning alarms.	**-INF**
F, m	LO LO Alarm Limit LO_LO_LIM	Lower value limit setting for alarms.	**-INF**
F, m	Hysteresis ALARM_HYS	User-specified alarm limit range for all upper and lower warning and alarm limit values.	**0,5**

Characteristics*	Parameter Mnemonic	Definition	Value range **bold** = default
I	Process value PRIMARY_VALUE	Measured value and status of the sensor.	**850°**
I	Lower sensor limit LOWER_SENSO R_LIMIT	Physical lower limit function of the sensor and input range.	**-200°**
I	Upper sensor limit UPPER_SENSOR _LIMIT	Physical upper limit function of the sensor and input range.	**850°**
F, m	Sensor type LIN_TYPE	Selector for the valid types of sensors for this device.	No Sensor PT50 (IEC) **PT100 (IEC)** PT200 (IEC) PT500 (IEC) PT1000 (IEC) PT100 (JIS) Ni100 (DIN) Cu10 TC B TC E TC J TC K TC N TC R TC S TC T NI120 MINCO NI200 DIN TC W5RE26 -150... 150 mV 0 ... 650 Ohm 0 ... 1300 Ohm 0 ... 2600 Ohm 0 ... 5200 Ohm
F, m	Process value unit PRIMARY_VALUE _UNIT	Unit selector for the value output.	K **°C** °F °R
F, m	Bias BIAS_1	Free value field for a user-specified offset setting.	**0**
F, m	Sensor connection SENSOR_CONN ECTION	Selector for sensor connection type if sensor type is resistance measurement.	**2 wires** 3 wires 4 wires
F, m	Sensor wire compensation COMP_WIRE1	Free value field for measurement compensation if sensor type is resistance measurement and sensor connection is 2-wire.	**0**
F, m	Sensor wire check SENSOR_WIRE_ CHECK_1	Deactivation option for lead breakage and short circuit current limitation.	**Enabled** Disabled

2013-11

Characteristics*	Parameter Mnemonic	Definition	Value range **bold** = default
F, m	Cold junction compensation RJ_TYPE	Selector for the type of cold junction compensation (CJC).	**Internal** External
F, m	External CJC reference EXTERNAL_ RJ_VALUE	Free value field for user-specified CJC temperature if sensor type is thermocouple and cold junction compensation is external.	**0**
D, m	Channel disabled DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a channel disabled error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **None** Status: **BAD - Maintenance alarm**
D, m	Sensor connection error DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of a sensor connection error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **BAD - Maintenance alarm**
D, m	Sensor range error DIAG_EVENT_ SWITCH	Combined diagnostic treatment and status information selector in case of sensor range error of the device.	See "Value Range for DIAG_EVENT_SWITCH Parameters" on page 70 Diagnosis: **Maintenance alarm** Status: **BAD - Maintenance alarm**

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