MANUAL

Temperature Converter
HiC2081, HiD2081, HiD2082

PEPPERL+FUCHS

PROTECTING YOUR PROCESS

PEPPERL+FUCHS

🔁 **PEPPERL+FUCHS**

PEPPERL+FUCHS

1 Introduction

1.1 General

This manual describes the installation, initial operation and handling of the device. It renders information on the safe operation of the device, fault elimination, maintenance and disposal.

The corresponding data sheets, declarations of conformity and/or EC-Type Examination Certificates are part of this instruction manual. The instruction manual shall be valid only if all applicable documents are taken into consideration. These documents can be downloaded at www.pepperl-fuchs.com. For additional information, please refer to the contact addresses on the last page of this instruction manual.

This instruction manual requires technical know-how and experience with plant installations and explosion protection.

The devices are intended only for correct and intended use (see section 2). In case of any violation, all guarantee and manufacturer's liability shall become void. Please observe the applicable laws and guidelines for the use and intended purpose.

The device has been developed and manufactured under observation of all applicable European standards and directives.

1. 2 Symbols used in this document

In order to highlight safety-related and informative notes, we have defined the following categories.
Every note is marked by a symbol.

Danger!

This symbol indicates a warning about a possible danger.
In the event the warning is ignored, the consequences may range from personal injury to death.

Warning!

This symbol indicates a warning about a possible fault or danger.
In case of non-observation injuries or severe material damage may result.

Caution!

This symbol warns of a possible fault.
In the event the warning is ignored, the consequences may course personal injury or heaviest property damage.

This symbol brings important information to your attention.

This symbol marks an acting paragraph.

PEPPERL+FUCHS

2   Intended use

The temperature converters HiC2081, HiD2081 and HiD2082 are used for intrinsic safety applications. The devices HiC2081 and HiD2081 are 1-channel devices; the device HiD2082 is a 2-channel device.

The devices accept thermocouples (TC), millivolts, potentiometers, or resistance temperature detectors (RTD) from a hazardous area and convert them to an isolated, linearized analog output in the safe area.
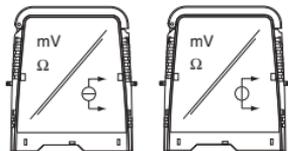
The outputs can be selected as a current source, current sink, or voltage source via DIP switches.

The devices can also be configured as a signal splitter (only HiD2082).

Line fault detection of the field circuit is indicated by a red LED and an output on the fault bus. The fault conditions are monitored via a Fault Indication Board.

The devices are easily configured by the use of the **PACT**_ware_**™** configuration software.

This devices mount on HiC or HiD Termination Boards.

For more information (on certificates, data sheets and the instruction manual), please refer to our website at www.pepperl-fuchs.com (entry in product search: HiC2081, HiD2081 or HiD2082).

3 Safety

### 3. 1 General safety instructions

The device may be mounted, connected and operated only **outside of the hazardous area**. Have the work carried out only by a trained expert in electric engineering.

Use the device for its intended use only (see section 2). Please observe the information rendered in the instruction manual on installation, initial operation and handling of the device.

If faults can not be remedied, shut down the device. Secure the device against accidental operation. Return the device to Pepperl+Fuchs for repair. Own interventions and modifications are potentially hazardous, and any guarantee and manufacturer's liability shall become void.

Responsibility for adhering to local safety regulations and directives is held by the operator

3.2 Explosion Protection
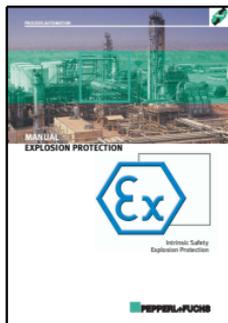
For matters concerning primary explosion protection, i.e. measures to prevent or restrict formation of a potentially explosive atmosphere, please refer to Directive 94/9/EG (ATEX) and the corresponding national regulations.

For matters concerning secondary explosion protection, i.e. measures to prevent ignition by electrical apparatus of a potentially explosive atmosphere, Pepperl+Fuchs are happy to provide their "Explosion protection manual" for a nominal fee.

In particular, please observe EN 60079-0, EN 60079-11, EN 60079-26, EN 61241-11 as well as the corresponding national regulations.

Pepperl+Fuchs also offer a seminar on the subject of explosion protection.

PEPPERL+FUCHS

4 Delivery, transport and storage

4. 1 Scope of delivery

The scope of delivery comprises:
- The device
- The instruction manual (this document)

4. 2 Acceptance

Please check the packaging and contents for any damage. Please check the delivery in order to ensure that all parts are available and the delivery conforms to your order. Compare the data on the nameplate with the ordering data.

Data on the nameplate:
- Order designation and part number
- Supply voltage
- Input and/or output data
- Data on explosion protection and intrinsic safety (if applicable)

4. 3 Transport

Pack the device for transport to protect it against damage. The original packaging offers perfect protection for the device.

4. 4 Storage

Pack the device for storage to protect it against impact and soiling. The original packaging offers perfect protection for the device. Store the device in a dry environment protecting it against humidity and aggressive media. The permissible storage temperature ranges from -40 °C to 90 °C (-40 °F to 194 °F).

PEPPERL+FUCHS

5 Installation and mounting

5.1 Mounting

> ⚠️ **Warning!**
> **Fault or damage of the device caused by wrong mounting location.**
> In case of non-observation, the safety and function of the device as well as other devices or plants are not ensured.
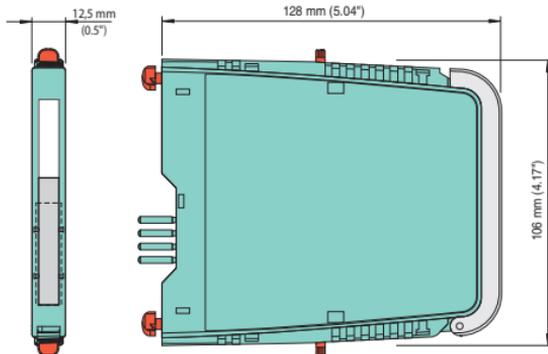> - Select the mounting location according to the type of protection of the device (IP30).
> - Protect the device against foreign bodies of 2.5 mm or larger and against spraying water.
> - Please observe the notes on the types of housing protection (IEC 60529).

This devices mount on HiC or HiD Termination Boards. All devices can be connected to every mounting station and can be mixed on the termination board.

> For additional information on the termination boards, please refer to system description on our website at www.pepperl-fuchs.com (entry in product search: HiC2081, HiD2081 or HiD2082).
> If you want to use a customized Termination Board, please contact your Pepperl+Fuchs assistant.

PEPPERL+FUCHS

Dimensions HiC device

12,5 mm (0.5")
128 mm (5.04")
106 mm (4.17")

Dimesnions HiD device

18 mm (0.71")
128 mm (5.04")
106 mm (4.17")

09/2014

193263

PEPPERL+FUCHS
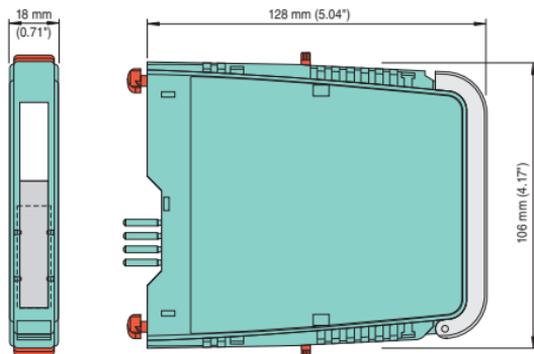
▶ **Mounting the device on the Termination Board:**
- Push the Quick Lok bar (1) into the upper position.
- Center the pins (2) above the contact elements of the Termination Board. Note the connection direction of the device.
- Center the locking pins (3) above the locking elements of the Termination Board.
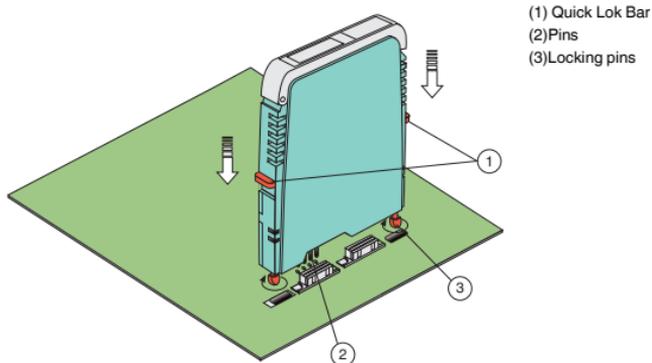- Carefully push the device into the contacts and locking elements.
- Push the red Quick Lok bar (1) down on either side of the device.

The device is mounted now.

(1) Quick Lok Bar
(2) Pins
(3) Locking pins

5. 2   Connecting the device

The device is connected by means of the terminals of the Termination Board, which permits a fast and faultfree exchange in case of failure.

The terminals are self-opening and have a spacious connecting area for a core cross-section of up to 2.5 mm^2.

09/2014

193263

PEPPERL+FUCHS

Intrinsically safe field circuits are connected to the **blue** Termnation Board terminals 1, 2, 5, 4 (channel I) and 7, 3, 6, 8 (channel II only HiD2082), which in keeping with DIN EN 60079-14 by means of connecting cables can be passed into the potentially explosive area. The following sensors can be connected (see figure):

- Potentiometer (800 Ω ... 20 kΩ) in 3-wire technology
- RTD (**R**esistance **T**emperature **D**etector) in 2-wire, 3-wire or 4-wire technology
  - Pt10, Pt50, Pt100, Pt500, Pt1000 according to EN 60751: 1995 or GOST6651-94
  - Ni 100 according to DIN 43760
  - Cu10, Cu50, Cu100 according to GOSTP50353-92
- Internal cold junction compensation
  - HiC2081: resistance thermometer for cold junction compensation H-CJC-Pt100
  - HiD2081, HiD2082: esistance thermometer for cold junction compensation H-CJC-SC-8, H-CJC-SP-8
- Thermocouples
  - Type B, E, J, K, N, R, S, T according to IEC584-1: 1995
  - Type L according to DIN 43710
  - Type TXA, TXK, TXKH according to GOSTP8.585-2001
- Sources for voltage signals between -100 mV and +100 mV

Termination Board

Zone 0, 1, 2
Div. 1, 2

09/2014

193263
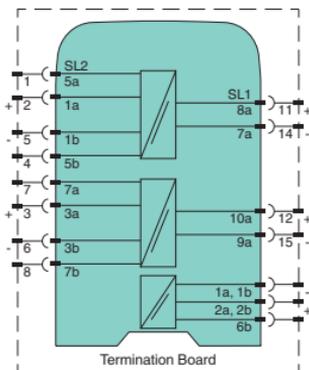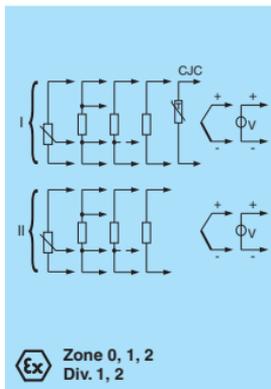
Non-intrinsically safe current circuit can be connected to the **black** Termination Board terminals, which have the following function:

- Terminals 11, 14 (channel I) and 12, 15 (channel II only HiD2082): as current source, current sink or voltage source
- Fault bus
- Power supply
- Programming socket (RS 232) for parameterisation and diagnosis using **PACT**ware**™**

Termination Board

09/2014

193263

PEPPERL+FUCHS
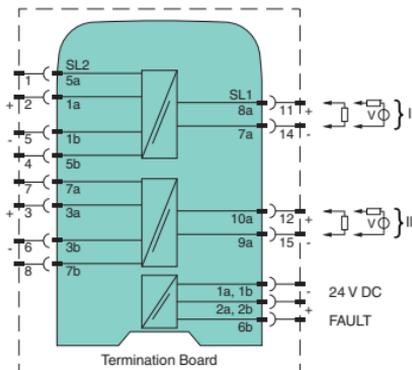
If a **current output** is operated **as a sink**, the voltage of the terminals has to be between 5 V and 30 V. An additional resistance is required only, if the voltage is over 16.5 V. The resistance has to be between (U - 16.5 V)/0.0215 A and (U - 5 V) / 0.0215 A (see diagram).

Example: U = 24 V

(24 V - 16.5 V) / 0.0215 A = 350 Ω

(24 V - 5 V) / 0.0215 A = 880 Ω

Resistor range
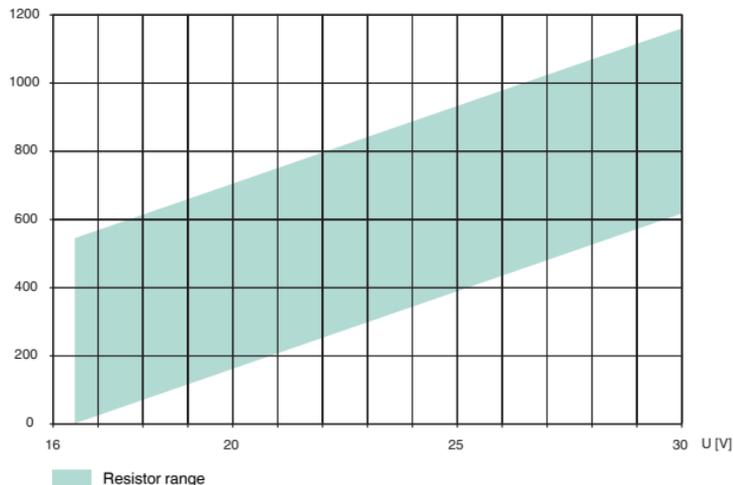
If a **current output** operated **as a source**, the load resistance has to be between 0 Ω and 550 Ω.

For more information on connections (on terminal assignment and current supply, for example), please refer to our website at www.pepperl-fuchs.com (entry in product search: HiC2081, HiD2081 or HiD2082).

PEPPERL+FUCHS

5.3 Operating and display elements

The following operating and display elements are located on the front side of the device:

- Red LED CH1 FAULT (channel I) to display
  - a lead fault on input 1
    (terminals 1, 2, 4, 5, flashing red)
  - of the simulation mode (flashing red)
  - a device failure (continuously red)
- Red LED CH2 FAULT (channel II only HiD2082) to display
  - a lead fault on input 2
    (terminals 3, 6, 7, 8, flashing red)
  - of the simulation mode (flashing red)
  - a device failure (continuously red)
- green LED PWR ON, to indicate the presence of the supply voltage
- serial RS 232 interface for connection to a PC for programming and diagnosis of the device using **PACT**_ware_**™**

09/2014

193263
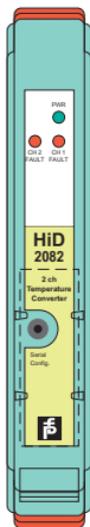
PEPPERL+FUCHS

5.4 Marking

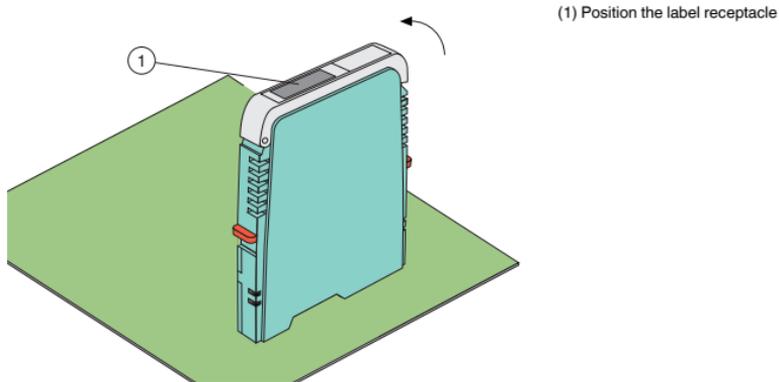It is possible to mark the device, the signals and the device function of each individual device. For this purpose, please use the labels offered by Pepperl+Fuchs.

▶ **Marking the device:**
- Open the transparent housing cover.
- Push the label into the receptacle (1).
- Close the housing cover.

(1) Position the label receptacle

6   Operation

6.1   Configuration on the device

The DIP switches on the side of the device are used to set the output type for output 1 and output 2. The two outputs can be configured differently. The output type can be selected as

- current source 4 ... 20 mA,
- current sink 4 ... 20 mA,
- or voltage source 1 V ... 5 V.

Configuring the device:
- Dismount the device (see section 9.1).
- Select the output type for output 1 and 2 (only HiD2082) from the table (1).
- Use the DIP switches (2) to set the output type for output 1 and output 2 (only HiD2082).
- Mount the device (see section 5.1).

The device is configured.

OUTPUT CONFIGURATION	CH 1				CH 2			
	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
SOURCE 4-20 mA	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
SOURCE 1-5 Volt	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SINK 4-20 mA	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF

SW
ON
1 2 3 4 5 6 7 8
Ch.1 Ch.2

CAUTION
Refer to the Instruction Manual to install and operate the unit

09/2014

193263

PEPPERL+FUCHS
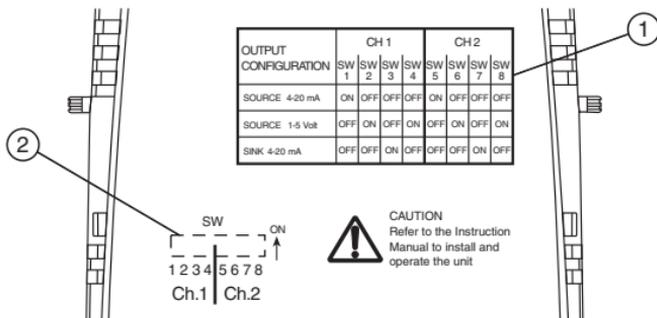
6.2 Configuration using a PC operating program

6.2.1 Installing the software components

In order to be able to configure the device by means of a PC operating program, the following software components are required:

1. **Microsoft® .NET Framework 1.1** or later

2. **PACT*ware*™ 2.4** (**P**rocess **A**utomation **C**onfiguration **T**ool) or later.
   PACT*ware*™ is used according to FDT Specification 1.2 (**F**ield **D**evice **T**ool Specification) as a framework program for the DTM (**D**evice **T**ype **M**anager), which is supplied by manufacturers of field devices as configuration software.

3. **DTM Collection** Conventional Interface Technology. The DTM Collection comprises all device and communication DTM required to parameterise devices of conventional interface technique.
   The DTM are used to establish the communication with field devices using protocols, such as the HART or PROFIBUS protocol.

The software components are rendered available on CD or on the Internet at www.pepperl-fuchs.com in the product selector under **Software > PACTware**.

> For the **latest** software component, please access the product selector for
> **Software > PACTware**.

> **Installing the software components:**
> The installation of the software components is described in the "**PACT*ware*™** Installation Instructions" manual. Please observe the sequence of the installation steps and the instructions in the installation instructions.
>
> - Install **Microsoft® .NET Framework**.
> - Install **PACT*ware*™**.
> - Use the **DTM Collection** Conventional Interface Technology to install the communication DTM of your device.

F PEPPERL+FUCHS

The cross-device properties of the software are described in the "**PACT**_ware_**™** Process Automation Configuration Tool" manual. For the free manual written in several languages, please access our website at www.pepperl-fuchs.com under **Software > PACTware**.

Below please find the device-specific settings for temperature converter only.

6.2.2 Connecting the device

▶ **Connect the PC to the device**
- Mount the device on the termination board (see section 5.1).
- Connect the device to the power supply.
- Use the adapter cable K-ADP-USB to connect the PC to the device. This cable can be ordered as an accessory.

- Insert the cable jack into the RS 232 interface on the front of the device and to a free USB interface on the PC.
- Start the **PACT**_ware_**™** as described in the "**PACT**_ware_**™** Process Automation Configuration Tool" manual.

PEPPERL+FUCHS

6.2.3 Adjustment of the communication DTM

In a **PACT**_ware_**™** project the temperature converter can be addressed by communication DTM P2P RS232 FDT only. Please refer to the "**PACT**_ware_**™** Process Automation Configuration Tool" manual to read how to create and edit a project.

If such a driver is not available in your project yet, use the device catalog to add it to the project (see "**PACT**_ware_**™** Process Automation Configuration Tool" manual).

The only parameters of the communication DTM are the PC interfaces used and the number of repeat attempts.

➤ **Setting the parameters**

- Use the mouse to double-click on communication DTM **P2P RS232 FDT** in the project window.

The **Parameter** window is opened.

- Select the requested communication port from the list of **communication ports**.
- Select the number of attempts from the list of repeat attempts.
  Here the number of attempts is selected which the communication DTM carries out to establish a connection to the connected device.
- Close the **Parameter** window using the button ⊠.

PEPPERL+FUCHS
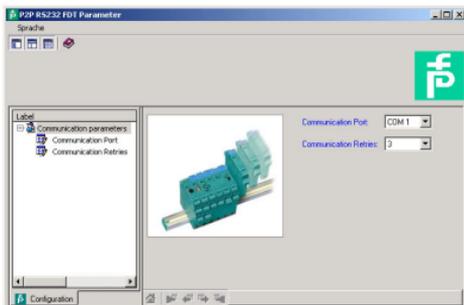
In order to add a device to a project, please chose communication DTM P2P RS232 FDT of the project. Add the device to the device catalog. For more details on these working steps, please refer to the "**PACT**_ware_**™** Process Automation Configuration Tool" manual.

The description in the following chapters proceeds on the assumption that a device has been chosen in the project.

The following submenus can be run in the **Device Menu**:

Device	**>**	**Connect**		
	>	**Disconnect**		
	>	**Load from device**		
	>	**Store to device**		
	>	**Parameter (section 6.3)**		
	>	**Measured value (section 6.2.4)**		
	>	**Simulation (section 6.2.5)**		
	>	**Diagnostics (section 6.2.6)**		
	>	**Additional functions**	**>**	**Service (section 6.2.7)**

> **Starting and stopping communication**
> - Start the communication between **PACT**_ware_**™** and the device by running **Device > Connect**.
> - Stop the communication between **PACT**_ware_**™** and the device by running **Device > Disconnect**.

PEPPERL+FUCHS

6.2.4 Measured value

The **Measured value** window displays the current values measured for the inputs and the current output values.

▶ **Call the Measured value window.**
- Call the **Measured value** window in **Device > Measured value**.
- Close the **Measured value** window using the button ⊠.

The **Measured value** window displays the following information on the outputs of the device:
- Measured values at the inputs in the selected unit as a bar diagram and numerically.
- Values of the analog outputs in the selected unit as a bar diagram and numerically.

PEPPERL+FUCHS
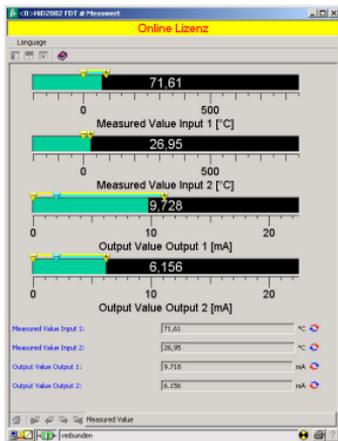
6.2.5 Simulation

Simulation operation is activated or deactivated in the **Simulation** window.

▶ **Call the Simulation window.**
   • Call the **Simulation** window in **Device > Simulation**.

Warning!

The simulation operation may disturb or damage the device and the plant.
The simulation interrupts the normal function of the device! In case of non-observation, the safety and function of the device as well as other devices or plants are not ensured.
   • Start the simulation only, if you are sure that no hazardous condition will occur in the plant.

09/2014

193263

PEPPERL+FUCHS

➤ **Activating and deactivating simulation:**
- Activate simulation with ☑ **Active**.
- Change the output current and/or output voltage data for test purposes.
- Press the **Enter** button to permit the numerical input to become effective.
- Deactivate simulation with ☐ **Active**. The device will resume its normal function immediately again.
- An interruption of the power supply will also shutdown the simulation.
- Close the **Simulation** window by clicking on the button ☒. The device will operate in simulation mode until simulation is deactivated by ☐ **Active**.

PEPPERL+FUCHS

6.2.6 Diagnostics

The **Diagnostics** window displays the device status as well as the status of input 1 and 2 (only HiD2082).

▶ **Call the Diagnostics window.**
- Call the **Diagnostics** window in **Device > Diagnostics**.
- Close the **Diagnostics** window using the button ☒.

If a diagnosis is available, it will be marked in red. The **Diagnostics** window contains the following information:

09/2014

193263

PEPPERL+FUCHS

Explanation:

- **Memory Error:** Error in the memory of the device. If this error has been caused by a wrong data transmission, it can be remedied by accessing **Device > Additional functions > Service** (see section 6.2.7). Otherwise please contact Pepperl+Fuchs.
- **Internal Error:** Please contact Pepperl+Fuchs.
- **Redundancy error (only HiD2082):** Only if **Redundancy ☑ Active** has been selected (page 35) in case of a lead fault on **both** inputs (see above).
- **Device In Simulation:** see section 6.2.5
- **Under Voltage Lockout:** The supply voltage is too low for a correct function of the outputs. The output render 0 mA or 0 V, irrespective of which parasitic current/which interference voltage has been selected.
- **Redundancy Deviation Error (only HiD2082):** This error will be displayed only, if **Redundancy ☑ Active** has been selected (page 35) for the case that the maximum deviation set is exceeded.
- **Sensor Breakage:** see page 32
- **Sensor Short Circuit:** only for sensor type RTD, see page 32
- **Overrange, Underrange:** The measured value is outside of the maximum measuring range of the selected sensor (see section 6.3.4 and section 7.1 or 7.2).
- **CJC Error:** This error will be displayed, if the cold junction compensation has been selected (see page 33) and a breakage or short-circuit has occurred with the H-CJC-* resistance thermometer.
- **Input 1:** terminals 1, 2, 4, 5
 **Input 2 (only HiD2082):** terminals 3, 6, 7, 8

6.2.7 Service

The device can be reset to the factory settings in the **Service** window. In section 10 lists all preset parameters.

▶ **Call the Service window.**
- Call the Service window by accessing the **Device > Additional functions > Service.**
- Set the device to **Factory Reset** and load.
- Close the **Service** window using the button ⊠.

PEPPERL+FUCHS

193263   09/2014
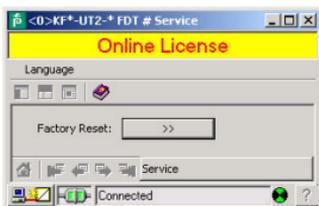
6.3 Defining the device data

Define all device parameters in the **Parameter** window.

⚠️ **Warning!**

Faults or damage may occur due to modifications of the device functions.

In case of non-observation, the safety and function of the device as well as other devices or plants are not ensured.

- Before transmitting new data, please make sure that no danger is caused for the device and the plant by these new data.

➤ **Call the Parameter window.**
- Call the **Parameter** window by accessing **Device > Parameter** open (see "**PACT*ware*™** Process Automation Configuration Tool" manual).

The **Parameter** window contains dialog windows, which can be called via the structure in the left part of the window. These dialog windows are described in the following chapters.

| Parameter	>	Information (section 6.3.1)		
	>	Description (section 6.3.2)		
	>	Input (section 6.3.3)	>	Input 1
			>	Input 2 (only HiD2082)
			>	Input Extra
	>	Output (section 6.3.4)	>	Analog Output 1
			>	Analog Output 2 (only HiD2082)

F PEPPERL+FUCHS

6.3.1 Information

The device information is rendered in the **Information** dialog window.

➤ **Call the information dialog window.**
- Call the **Parameter** window in **Device > Parameter**.
- In the directory tree select the **Information** dialog window.
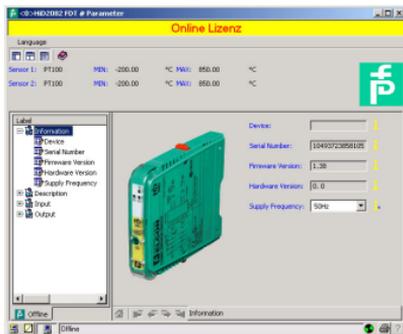
The data on the **device**, the **serial number**, the **firmware version** as well as the **hardware version** are displayed only and can not be modified. The device data can be read out from the device.

➤ **Reading out the device data.**
- Read the device data out by accessing **Device > Load from device**.

➤ **Setting the supply frequency**
- Use **Supply Frequency** to set the frequency of your network (50 Hz or 60 Hz).
In this way the best possible suppression of influences of this supply frequency on the device is achieved.
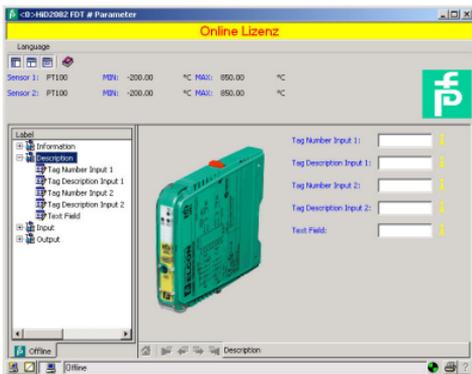
6.3.2 Description

Use the **Description** dialog window to enter free descriptions of the inputs.

> ▶ **Call the Description dialog window.**
> • Call the **Parameter** window in **Device > Parameter**.
> • In the directory tree select the **Description** dialog window.

> ▶ **Enter the description.**
> • Enter the data in the description fields.
> These data can be defined and edited as you require.

PEPPERL+FUCHS

6.3.3 Input

Use the **Input** dialog window to enter the input parameter.
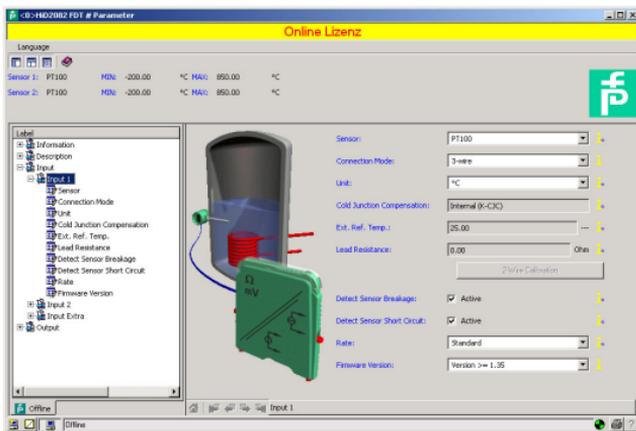
> **Call the Input dialog window.**
> • Call the **Parameter** window **in Device > Parameter**.
> • In the directory tree select the **Input** dialog window.

Three additional dialog windows are available in the **Input** dialog window: **Input 1**, **Input 2 (only HiD2082)** and **Input Extra (only HiD2082)**.

Input 1 and Input 2

Use the **Input 1** dialog window to set the parameters for the input on the terminals 1, 2, 4, 5. Use the **Input 2 (only HiD2082)** dialog window to set the parameters for the input on the terminals 3, 6, 7, 8 (see section 5. 2).

The **Input 1** and **Input 2 (only HiD2082)** dialog windows are identical and a described together here.

09/2014

193263

PEPPERL+FUCHS

➤ **Enter parameters.**
- Use the **Input** dialog window to select **Input 1** or **Input 2 (only HiD2082)** dialog window.
- Set the parameters for the selected input.

The following parameters can be set:
- **Sensor** (see section 5. 2)*:*
  - RTD (**R**esistance **T**emperature **D**etector): **Pt100** etc.
  - Thermocouple: **TXK** etc.
  - **Potentiometer**
  - **Voltage**
- **Connection Mode** (for RTD only, see section 5. 2):
  - **2-wire**
  - **3-wire**
  - **4-wire**
- **Unit**:
  - for resistance temperature detectors and thermocouples: °**F, K** or °**C**
  - for potentiometers: fixed **ratio**
  - for voltage (sources): fixed **mV**

> The unit selected at this point is used for **all** corresponding settings and displays in **PACT**_ware_**™**.

- **Cold Junction Compensation** (for thermocouples only):
  - **Ext. Ref. Temp.** (external reference temperature)
  - **Internal (resistance thermometer H-CJC-*)**

If **Ext. Ref. Temp.** has been selected, the external reference temperature can be entered (value range: **-100 °C to 320 °C**)

> The devices use a specific resistance thermometer for internal cold junction compensation (see page 13).

PEPPERL+FUCHS

- **Lead Resistance**: In case of 2-wire connection of an RTD, the lead resistor of the feed to the sensor can be entered.
- **2-Wire Calibration**: In case of 2-wire connection of an RTD, the lead resistor can be synchronised here. For this purpose, the sensor has to be short-circuited.
- **Detect Sensor Breakage** (for all types of sensors)
- **Detect Sensor Short Circuit** (for resistance temperature detector only)

  ▶ **Activating and deactivating the sensor monitoring.**
  - Activate the monitoring system with ☑ **Active.**
  - Deactivate the monitoring system with ☐ **Active**.

- **Rate** (for resistance temperature detectors only)
  - **Slow**
  - **Standard**

  In case of the **Standard** measuring rate, the accuracy values are retained which are rendered in the data sheet. In case of the **Slow** measuring rate, the suppression of 50 Hz and 60 Hz is improved.

- **Firmware Version**: The firmware version of the device can be selected here. Depending on the firmware version, some options and functions may differ. If the firmware version is not known, the firmware version may be read out from the device and can then be entered in this field.

  ▶ **Reading out the device data.**
  - Read the device data out by accessing **Device > Load from device**.

PEPPERL+FUCHS

Input Extra (only HiD2082)

The **Input Extra** dialog window is used to activate or deactivate the redundancy.

> **Activating and deactivating redundancy, entering the maximum deviation.**
> * Use the **Input** dialog window to select the **Input Extra** dialog window.
> * Activate redundancy with ☑ **Active**.
> * Deactivate redundancy with ☐ **Active**.
> * Enter a value for Maximum Deviation (see page 36).
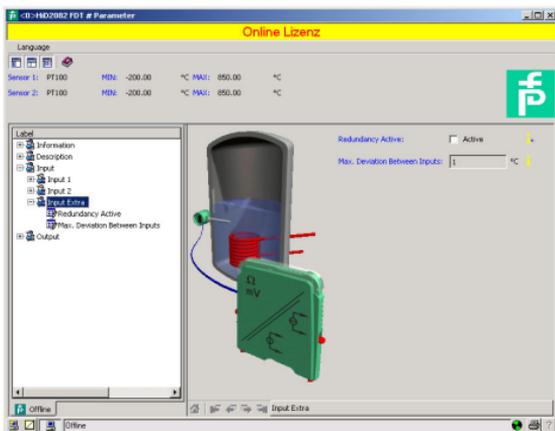
The device will react as follows:

- If the **Maximum Deviation** between the measured values on input 1 (terminals 1, 2, 4, 5) and input 2 (terminals 3, 6, 7, 8, only HiD2082) is exceeded,
    - the **Diagnostics** window (see section 6.2.6) displays the error message for **Redundancy Deviation Error**.
    - an error is released by the fault bus.
    - both outputs process the measured value on input 1 (terminals 1, 2, 4, 5, see section 5. 2).
    - the output does not show any failure information (fault current/fault voltage).
- If a lead fault (page 32) is recognised on **one** of the two inputs,
    - the corresponding error message is displayed in the **Diagnostics** window (see section 6.2.6).
    - an error is released by the fault bus.
    - the two output process the measured value of the input which is not disturbed.
    - the output do not release any parasitic current/no interference voltage.
- If a lead fault (page 32) is recognised on **both** inputs,
    - the **Redundancy Error** is displayed in the **Diagnostics** window (see section 6.2.6) in addition to the corresponding error message.
    - an error is released by the fault bus.
    - the outputs display the selected behaviour for faults (see section 6.3.4 and section 7.1 or section 7.2).

PEPPERL+FUCHS

6.3.4 Output

Use the **Output** dialog window to enter the output parameter.

➤ **Call the output dialog window.**
- Call the **Parameter** window in **Device > Parameter**.
- In the directory tree select the **Output** dialog window.

Two additional dialog windows are available in the **Output** dialog window: **Analog Output 1** and **Analog Output 2 (only HiD2082)**.

Analog Output 1 and Analog Output 2 (only HiD2082)

Use the **Analog Output 1** dialog window to set the parameters for the output on the terminals 11 and 14. Use the **Analog Output 2** dialog window to set the parameters for the output on the terminals 12 and 15 (see section 5. 2).

The **Analog Output 1** and **Analog Output 2** dialog windows are identical and a described together here.

PEPPERL+FUCHS

➤ **Enter parameters.**
- Use the **Output** dialog window to **Analog Output 1** or **Analog Output 2 (only HiD2082)** dialog window.
- Set the parameters for the selected output.

The following parameters can be set:

- **Assigned Input**:
  – **Input 1**: Input at terminals 1, 2, 4, 5
  – **Input 2 (only HiD2082)**: Input at terminals 3, 6, 7, 8, see section 5. 2
- **Characteristic**, if the **Current Output** has been selected for the output type.
  – **4 mA ... 20 mA unlimited**
  – **4 mA ... 20 mA (NE 43)**
  – **4 mA ... 20 mA limited**
  – **0 mA ... 20 mA**

  For the behaviour of the current output in various settings, please refer to see section 6.4.
- **Characteristic**, if the **Voltage Output** has been selected for the output type.
  – **1 V ... 5 V unlimited**
  – **1 V ... 5 V (NE 43)**
  – **1 V ... 5 V limited**
  – **0 V ... 5 V**

  For the behaviour of the voltage output in various settings, please refer to see section 6.5.

The actual selection as to whether a current or voltage signal is released, is determined by the DIP switches on the device itself (see section 6.1). In communication DTM, the setting has to be made manual so that the display corresponds to the real device setting.

PEPPERL+FUCHS

- **Start Value** of the measuring range

  The minimum value possible is displayed corresponding to the selected sensor. The start value can also be accepted by means of the **Online Adjustment Start Value** button.

- **End Value** of the measuring range

  The maximum value possible is displayed corresponding to the selected sensor. The end value can also be accepted by means of the **Online Adjustment End Value** button.

- **Error Indication:** (section 7.1 or 7.2)
  - **Upscale**
  - **Downscale**
  - **Hold**
  - **Upscale/downscale** (to be used for resistance temperature detectors only)

- **Output Invert**: see section 6.4 and section 6.5

  ➤ **Activating and deactivating the characteristic.**
  - Activate the inverted output with ☑ **Active**.
  - Deactivate the inverted output with ☐ **Active**.

6.4 Behaviour of the current output

The linear behaviour outside of the measuring range described in the following chapter occurs only, if the current values correspond to the temperature values which are between the minimum and the maximum value of the sensor selected. If this is not the case, the output current skips to the minimum or maximum value rendered. The **Diagnostics** window (see section 6.2.6) is used to show the message on the **Overrange** or **Underrange**.

If **Output Invert** is selected, the start value and the end value are replaced by each other.
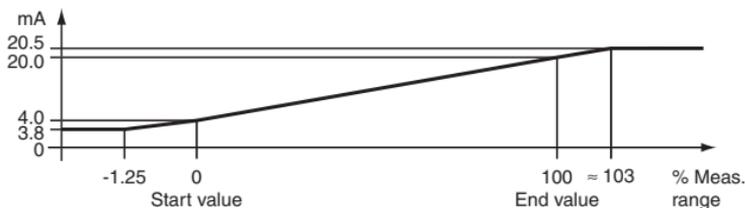
6.4.1 Setting 4 mA ... 20 mA unlimited
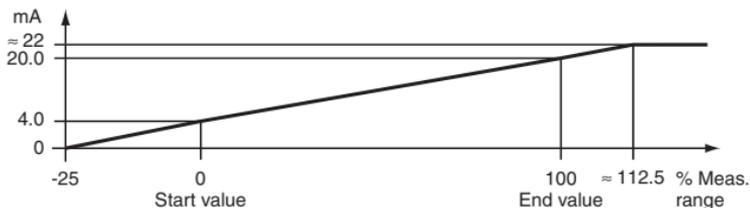
At this setting, the start value of the measurement range is converted to 4 mA and the end value to 20 mA. Intermediate values are converted proportionally.

If the value falls below the start value, the output current decreases linearly to a minimum of 0 mA (-25 % of the measurement range). Further decreases cannot be evaluated (output 0 mA). If the value exceeds the end value, the output current increases linearly to a maximum of 22 mA (approx. 112.5 % of the measurement range). Further increases cannot be evaluated (output approx. 22 mA).
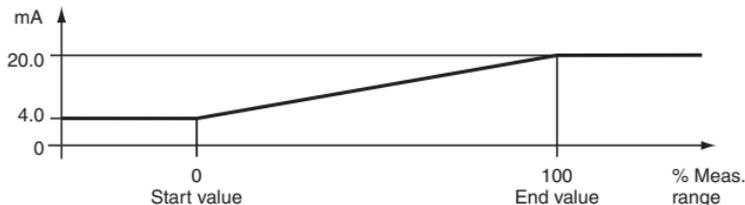
09/2014

193263

PEPPERL+FUCHS

6.4.2 Setting 4 mA ... 20 mA (NE 43)

At this setting, the start value of the measurement range is converted to 4 mA and the end value to 20 mA. Intermediate values are converted proportionately.

If the value falls below the start value, the output current decreases linearly to a minimum of 3.8 mA (-1.25 % of the measurement range). Further decreases cannot be evaluated (output 3.8 mA). If the value exceeds the end value, the output current increases linearly to a maximum of 20.5 mA (approx. 103 % of the measurement range). Further increases cannot be evaluated (output 20.5 mA).
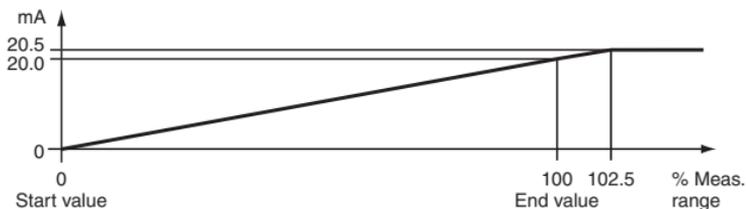
6.4.3 Setting 4 mA ... 20 mA limited

At this setting, the start value of the measurement range is converted to 4 mA and the end value to 20 mA. Intermediate values are converted proportionately.

Values below the start value cannot be evaluated (output 4 mA). Values above the end value cannot be evaluated either (output 20 mA).

6.4.4 Setting 0 mA ... 20 mA

At this setting, the start value of the measurement range is converted to 0 mA and the end value to 20 mA. Intermediate values are converted proportionately.
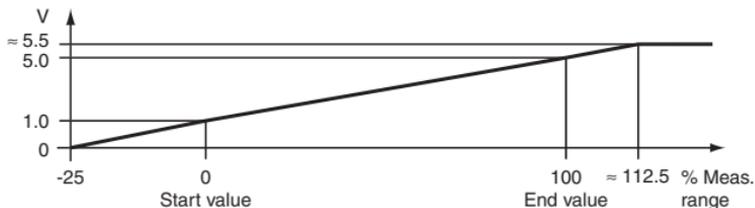
Values less than the start value cannot be evaluated (output 0 mA). If the value exceeds the end value, the output current increases linearly to a maximum of 20.5 mA (102.5 % of the measuring range). Further increases cannot be evaluated (output 20.5 mA).

PEPPERL+FUCHS

6.5 Behaviour of the voltage output

The linear behaviour outside of the measuring range described in the following chapter occurs only, if the voltage values correspond to the temperature values which are between the minimum and the maximum value of the sensor selected. If this is not the case, the output voltage skips to the minimum or maximum value rendered. The **Diagnostics** window (see section 6.2.6) is used to show the message on the **Overrange** or **Underrange**.

If **Output Invert** is selected, the start value and the end value are replaced by each other.
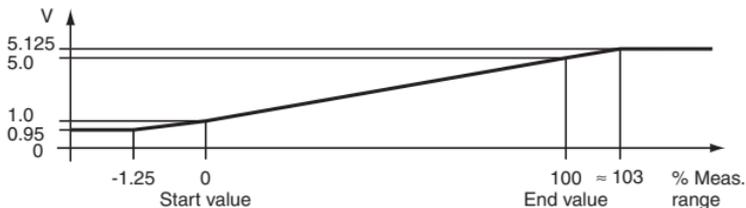
6.5.1 Setting 1 V ... 5 V unlimited

At this setting, the start value of the measurement range is converted to 1 V and the end value to 5 V. Intermediate values are converted proportionately.

If the value falls below the start value, the output voltage decreases linearly to a minimum of 0 V (-25 % of the measurement range). Further decreases cannot be evaluated (output 0 V). If the value exceeds the end value, the output voltage increases linearly to a maximum of 5.5 V (approx. 112.5 % of the measurement range). Further increases cannot be evaluated (output approx. 5.5 V).
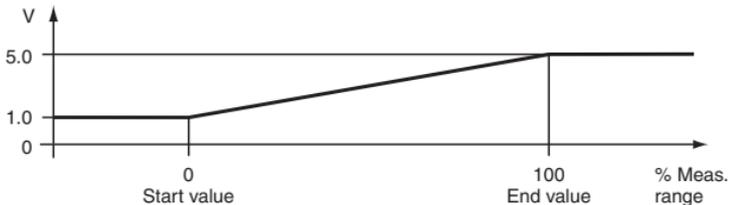
PEPPERL+FUCHS

6.5.2 Setting 1 V ... 5 V (NE 43)

At this setting, the start value of the measurement range is converted to 1 V and the end value to 5 V. Intermediate values are converted proportionately.

If the value falls below the start value, the output voltage decreases linearly to a minimum of 0.95 V (-1.25 % of the measurement range). Further decreases cannot be evaluated (output 0.95 V). If the value exceeds the end value, the output voltage increases linearly to a maximum of 5.125 V (approx. 103 % of the measurement range). Further increases cannot be evaluated (output 5.125 V).

6.5.3 Setting 1 V ... 5 V limited

At this setting, the start value of the measurement range is converted to 1 V and end value to 5 V. Intermediate values are converted proportionately.

Values below the start value cannot be evaluated (output 1 V). Values above the end value cannot be evaluated either (output 5 V).

P+F PEPPERL+FUCHS

6.5.4 Setting 0 V ... 5 V

At this setting, the start value of the measurement range is converted to 0 V and the end value to 5 V. Intermediate values are converted proportionately.

Values below the start value cannot be evaluated (output 0 V). If the value exceeds the end value, the output voltage increases linearly to a maximum of 5.125 V (approx. 102.5 % of the measurement range). Further increases cannot be evaluated (output 5.125 V).
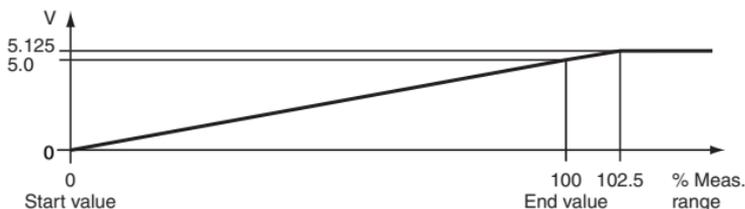
7 Trouble shooting

7.1 Fault current

The following table shows the values of the current output during a fault, depending on the settings. For information on the behaviour of the current output if **Redundancy Active** has been selected, refer to page 36.

Setting	Characteristic 4 mA ... 20 mA unlimited	Characteristics 4 mA ... 20 mA (NE 43) 4 mA ... 20 mA limited	Characteristic 0 mA ... 20 mA
Upscale	approx. 22 mA (cannot be distinguished from value exceeding end value)	approx. 21.5 mA	approx. 21.5 mA
Downscale	0 mA (cannot be distinguished from value below start value)	2.0 mA	0 mA (cannot be distinguished from measurement of the start value)
Hold	last measured value before the fault		
Upscale/ downscale sensible only for RTD	approx. 22 mA in the case of lead short-circuit (cannot be distinguished from value exceeding end value)	approx. 21.5 mA in the case of lead short-circuit	approx. 21.5 mA in the case of lead short-circuit
	0 mA in the case of lead breakage (cannot be distinguished from value below start value)	2.0 mA in the case of lead breakage	0 mA in the case of lead breakage (cannot be distinguished from measurement of the start value)

09/2014

193263

PEPPERL+FUCHS

7.2 Fault voltage

The following table shows the values of the voltage output during a fault, depending on the settings. For information on the behaviour of the voltage output if **Redundancy Active** has been selected, refer to page 36.

Setting	Characteristic 1 V ... 5 V unlimited	Characteristics 1 V ... 5 V (NE 43) 1 V ... 5 V limited	Characteristic 0 V ... 5 V
Upscale	approx. 5.5 V (cannot be distinguished from value exceeding end value)	approx. 5.375 V	approx. 5.375 V
Downscale	0 V (cannot be distinguished from value below start value)	0.5 V	0 V (cannot be distinguished from measurement of the start value)
Hold	last measured value before the fault		
Upscale/ downscale sensible only for RTD	approx. 5.5 V in the case of lead short-circuit (cannot be distinguished from value exceeding end value)	approx. 5.375 V in the case of lead short-circuit	approx. 5.375 V in the case of lead short-circuit
	0 V in the case of lead breakage (cannot be distinguished from value below start value)	0.5 V in the case of lead breakage	0 V in the case of lead breakage (cannot be distinguished from measurement of the start value)

PEPPERL+FUCHS

8   Maintenance and repair

The device is maintenance-free. If the device is defective,

- dismount the device (see section 9.1), and
- return it to Pepperl+Fuchs for repair or
- replace the device.

Own interventions and modifications are potentially hazardous, and any guarantee and manufacturer's liability shall become void.

9   Dismounting, storage and disposal

9.1   Dismounting

- Pull the red Quick Lok Bar (1) up on either side of the device (see figure).
- Carefully pull the device out of the contact receptacle.

(1) Quick Lok Bar

09/2014

193263

PEPPERL+FUCHS
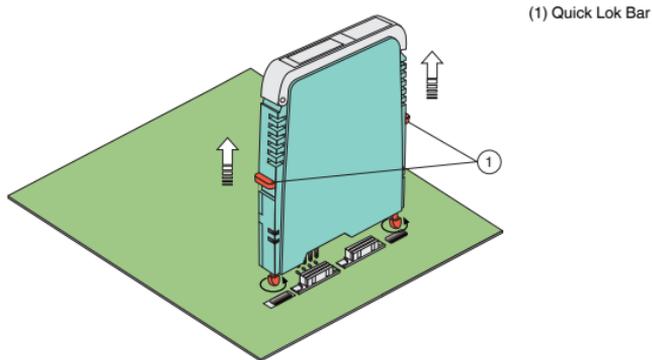
9.2 Storage

Pack the device for storage to protect it against impact and soiling. The original packaging offers perfect protection for the device. Store the device in a dry environment protecting it against humidity and aggressive media. The permissible storage temperature ranges from -40 °C to 90 °C (-40 °F to 194 °F).

9.3 Disposal

Separate the device components according to their materials. Recycle any recyclable components.

<table>
<tr><td>

⚠️ **Caution!**

</td></tr>
</table>

Caution!

The material of the device components may be a hazard to the environment.
Electronic waste is hazardous waste.

• Please observe the legal and local regulations applicable at the point of disposal of clapped-out devices.

PEPPERL+FUCHS

10   Factory settings

The device is supplied with preset factory parameters. The following table lists all parameters.

Parameter	Factory settings		Own settings	
Supply Frequency	50 Hz			
Input	1	2 (only HiD2082)	1	2 (only HiD2082)
Sensor	Pt100	Pt100		
Connection Mode	3-wire	3-wire		
Unit	°C	°C		
Cold Junction Compensation	Internal (H-CJC-*)	Internal (H-CJC-*)		
Ext. Ref. Temp.	25 °C	25 °C		
Lead Resistance	0.00	0.00		
Sensor Breakage	Active	Active		
Sensor Short Circuit	Active	Active		
Rate	Standard	Standard		
Firmware Version	Version ≥ 1.35	Version ≥ 1.35		
Input Extra				
Redundancy	Deactivated			
Maximum Deviation	1 °C			
Output	1	2 (only HiD2082)	1	2 (only HiD2082)
Assigned Input	1	2 (only HiD2082)		
Characteristic	4 ... 20 mA, NE 43	4 ... 20 mA, NE 43		
Start Value	0 °C	0 °C		
End Value	200 °C	200 °C		
Error Indication	Downscale	Downscale		
Output Invert	Deactivated	Deactivated		
Output Type	Current Output	Current Output		

09/2014

193263

PEPPERL+FUCHS

PEPPERL+FUCHS

PROCESS AUTOMATION –
PROTECTING YOUR PROCESS
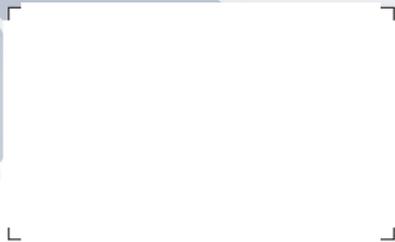
PEPPERL+FUCHS
PROTECTING YOUR PROCESS

193263   DOCT-0963B
                                          09/2014