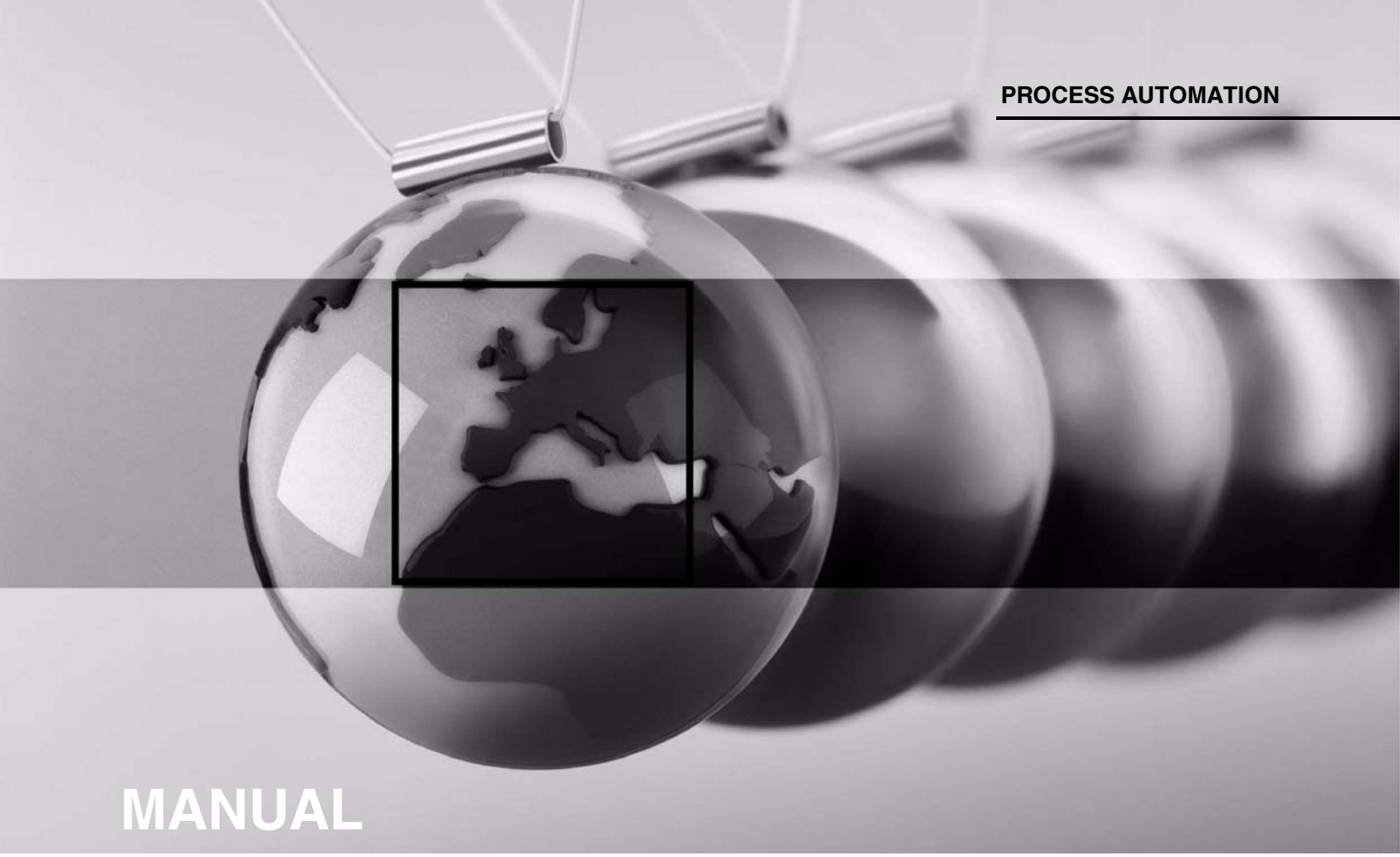

MANUAL

Fieldbus Power Hub, Motherboard for Gateway and Power Supply Modules

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"

1 Introduction

1.1 Contents

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

Note!

This document does not substitute the instruction manual.

Note!

For full information on the product, refer to the instruction manual and further documentation on the Internet at www.pepperl-fuchs.com.

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

1.2 Target Group, Personnel

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

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

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Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:

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 the device and any connected systems and plants, 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. You are prompted to perform an action or a sequence of actions.

2 Product Specifications

2.1 Overview and Application

The motherboard is a system component of the FieldConnex®Power Hub, a modular fieldbus power supply for 4 segments. It is the wiring interface for one gateway, one advanced diagnostic module, and 4 power supply modules. The power supply supports explosion protection, e. g., the high–power trunk for long cable lengths and high device counts. The Power Hub supports advanced diagnostics for fast fieldbus commissioning and online monitoring.

The Power Hub may be installed in Zone 2 or Class I, Division 2 hazardous areas.

Types of protection are Ex ec (increased safety) for Zone 2, gas groups IIC, IIB, IIA, and non-incendive for use in Class I, Division 2, gas groups A, B, C, and D.

Dedicated power supply modules limit the output voltage safely according to IEC 60079–11. In combination with Pepperl+Fuchs Segment Protectors, the outputs are specified Ex ic. Thus, live maintenance at the field device level is permitted.

The Power Hub is designed for use with fieldbus systems in accordance with IEC 61158–2. This standard specifies how power and communication are transmitted sharing a shielded twisted pair cable. Communication between field devices and a host system is established by modulating the data signal onto the power stream. For this, Manchester Bus Powered (MBP) data transfer technology is used.

The main FieldConnex® Power Hub design features are passive impedance generation, well-balanced circuitry, and low power dissipation. All active electronic components are located in the plug-in modules. Each module holds the electronic components for 1 segment. When an exchange becomes necessary, only few electronic components need to be exchanged when compared to block configurations for power supplies.

Impedance generation prevents the data signal from being short-circuited by the low internal resistance of the power supply. This impedance generation is designed with passive components such as inductances and resistors with long durability.

A fully balanced circuit and segment design is important for undisturbed fieldbus operation. An external disturbance through electromagnetic interference (EMI) impacts both leads of the shielded twisted pair cable symmetrically. The data signal is thus undisturbed. Low power dissipation allows highest packing density inside the cabinet and a long useful lifetime.

When applied to fieldbus in hazardous areas, the Power Hub feeds segments following the high-power trunk concept for explosion protection. High power level on the trunk line is fed to the field device via couplers such as FieldBarriers or Segment Protectors. The Power Hub powers segments installed as increased safety (Ex ec) for Zone 2.

FieldBarriers enable live maintenance in Zone 0/1 as outputs are classified Ex ia. Thus, power limitations of intrinsically safe explosion protection are overcome, enabling maximum cable lengths and highest number of devices in any hazardous area.

A plug-in advanced diagnostic module for fieldbus is available. This module monitors the physical layer online and in real time, enabling detection of degradation and faults during operation. Measurement data and alarms are transmitted to the control room. This brings visibility to the fieldbus physical layer, so it can be treated as an active component in plant asset management systems. On this basis, operating personnel can decide on proactive measures to avoid unwanted situations while the plant is running smoothly.

The following table summarizes the main features and benefits of the Power Hub:

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Features	User benefit
Lowest power dissipation of less than 2 W per segment under full load condition.	Long useful lifetime. High packing density and reduced cooling requirements.
Full balance of electric circuitry with high isolation against radio frequency and in-band interference.	High resistance to external disturbance such as EMI.
High-integrity passive power conditioner modules.	Long useful lifetime.
Local and remote alarm annunciation.	Easy maintenance and troubleshooting.
Tolerance against inrush currents during segment start.	Long-term, robust operation with tolerance towards field device misbehavior.
Full current span operation from 10 mA … 500 mA.	Flexible segment design and tolerance against live working on field devices.
Advanced diagnostic module for physical layer fieldbus diagnostics.	Improved and known quality of fieldbus installation. Live real-time monitoring for preventive and predictive maintenance. Professional tools for easy fieldbus troubleshooting.

2.2 System Components

2.2.1 Motherboard

MBHC-FB-4.GT*

The motherboard MBHC-FB-4.GT enables the supply of PROFIBUS PA 4 segments and the connection to a fieldbus host system. 4 sockets hold the power supply modules, each supplying 1 of the 4 segments. 1 dedicated socket holds the diagnostic module and another dedicated socket holds the gateway from PROFIBUS PA to a host system.

- MBHC-FB-4.GT: Simplex motherboard equipped with screw terminals
- MBHC-FB-4.GT.1: Simplex motherboard equipped with spring terminals

2.2.2 Gateway Modules HD2-GTR-4PA*

Gateway HD2-GTR-4PA (Segment Coupler SK3)

The gateway is a FieldConnex® system component for transparently coupling PROFIBUS DP to PROFIBUS PA segments. The Segment Coupler makes each PA device appear as if it was related to DP with regard to addressing, cyclic/acyclic data exchange, and transfer rate. The gateway operates with power supply modules connected to the same or a separate motherboard. The gateway provides a PA master for each segment and thus enables short bus cycle times.

For details on the gateway, go to www.pepperl-fuchs.com and look up the corresponding product information.

Gateway HD2-GTR-4PA.PN

The gateway is a FieldConnex® system component for coupling PROFINET to PROFIBUS PA and integrates communication of 4 PA segments into PROFINET IO systems. The gateway operates with power supply modules connected to the same or a separate motherboard. The gateway provides a PA master for each segment and thus enables short bus cycle times.

For details on the gateway, go to www.pepperl-fuchs.com and look up the corresponding product information.

2.2.3 Power Supply Modules HCD2-FBPS-*

Danger!

Explosion hazard from invalidation of type of protection

When using Power Hubs with suitable Segment Protectors in order to generate an intrinsically safe field wiring, exceeding the limits of the output values can overload connected field devices. In consequence, the field devices or the circuits themselves can produce sparks that can ignite the surrounding potentially explosive atmosphere.

Ensure that the power supply modules used are within the limits of the required output values.

Power supply modules provide full galvanic isolation between the bulk power supply and the segments. They provide optimum system reliability for applications where cabling and wiring are routed through critical or harsh electrical environments. Power supply modules are the best choice in situations, where full protection from electromagnetic interference (EMI) is mandatory.

Power modules are connected to the motherboard via sockets. They can be exchanged while the system is in operation. In redundant configuration, load is shared between 2 power modules.

For different application requirements, special power supply modules are available:

Designation	Application
HCD2-FBPS-1.500	Ex ic, output voltage 28 V ... 30 V, U_o = 30 V
HCD2-FBPS-1.23.500	Ex ic, output voltage 21 V ... 23 V, U_o = 24 V

2.2.4 Diagnostic Modules

Caution!

Property damage from plugging the wrong type of module

Plugging the wrong type of module into the connection slot labeled "Diagnostic Module only" can damage the connection slot or the module.

Only plug HD2-DM diagnostic modules in the connection slot labeled "Diagnostic Module only".

Basic Diagnostic Module

The basic diagnostic module provides basic system diagnostics. It monitors the input voltage of the bulk power supply and each segment for overload and short circuit conditions. Each power supply module is checked for proper function. Power modules operating in redundant configuration are checked for compatibility. LEDs indicate both status and fault information. This information can be transmitted via volt-free contact.

For further information refer to the instructions "Basic Diagnostic Module HD2-DM-B".

Advanced Diagnostic Module

The advanced diagnostic module is a comprehensive measurement tool for the fieldbus physical layer. It is well suited for commissioning, online monitoring and maintenance. The module provides the exact segment and individual device data needed for detection of changes in the fieldbus physical layer. Segment measurements include fieldbus voltage and load current; device-specific measurements are: signal level, noise, and jitter. All data is transmitted to the control room via Ethernet. The Diagnostic Manager – Basic Edition shows all data on easy-to-use displays.

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The Diagnostic Manager – Professional Edition offers extra functionality: the commissioning wizard generates automated reports; the software displays clear text messages for troubleshooting of out-of-specification behavior. The OPC server transmits user-selectable common alarms to the process control system.

For further information refer to the manual "Advanced Diagnostic Module HD2-DM-A".

Advanced Diagnostic Module Relay Contact Output

The advanced diagnostic module relay contact output is a tool for permanently monitoring the fieldbus physical layer. Using DIP switches, limit ranges can be configured for each physical layer parameter monitored.

The module distinguishes between 2 alarm types:

- Maintenance required alarm
- Out of specification alarm

The "Maintenance required" alarm enables proactive diagnostics. If a value exceeds the limit, a relay contact opens and the respective segment LED starts to flash yellow. With this proactive diagnostics, changes within the fieldbus installation can be detected early and fault sources can be found before communication fails.

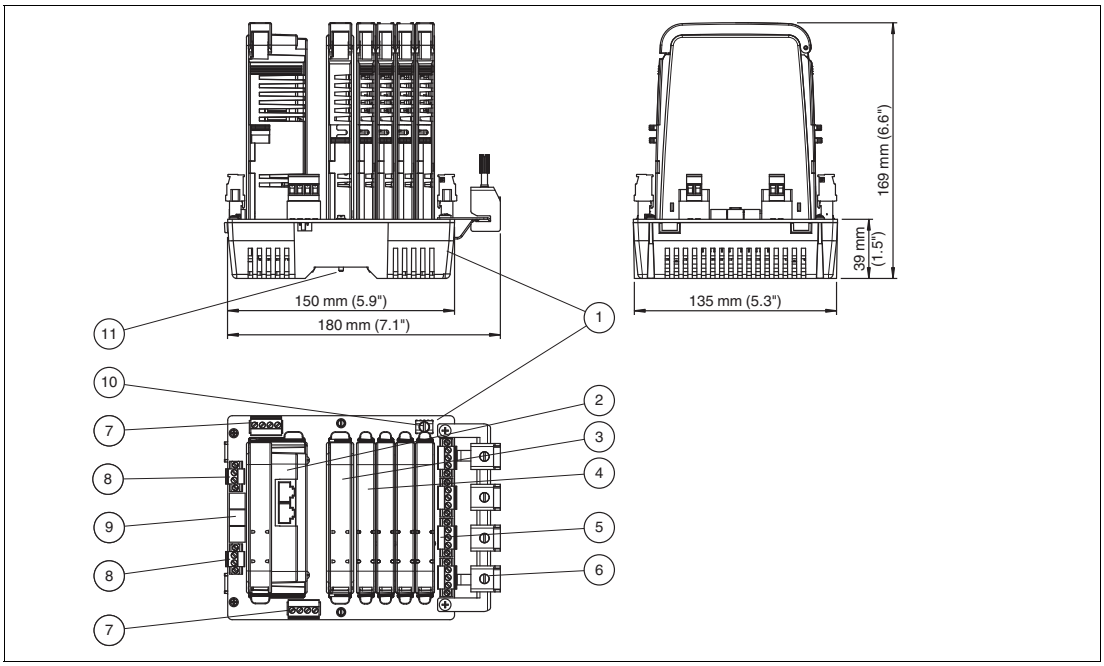
If an "Out of specification" alarm occurs (LED flashing red) that means: One of the monitored physical layer parameters has rapidly declined and moved out of range of "Maintenance required". A fast examination of the affected segment is crucial to prevent a total dropout of this segment in the near future.

In order to set the appropriate limit values for your fieldbus installation during commissioning, a comprehensive diagnostic solution is required. For DIP switch configuration, you can use the mobile advanced diagnostic module.

For further information refer to the manual "Advanced Diagnostic Module HD2-DM-A.RO".

2.3 Component Identity and Dimensions

MBHC-FB-4.GT*



1 Motherboard MBHC-FB-4.GT
2 Gateway module
3 Diagnostic module
4 Power supply modules (x 4)
5 Trunk connection
6 Shielding/grounding kit for trunk shields, optional accessory
7 Connections for alarm volt-free contact and diagnostic bus (x 2)
8 Connections for bulk power supply (x 2)
9 Rotary switches for gateway addressing x1, x10, x100
10 Shield connection
11 Mounting slot for DIN mounting rail

2.4 Technical Data

System Specification

Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	< 95 % non-condensing
Shock resistance	10 g , 11 ms
Vibration resistance	1 g , 10 ... 150 Hz
Pollution degree	max. 2, according to IEC 60664
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug-in terminals , spring terminal and screw terminal
Degree of protection	IP20

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Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013
Standard conformity	
Electromagnetic compatibility	NE 21:2011
Degree of protection	IEC 60529
Fieldbus standard	IEC 61158-2
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6

Motherboard Type MBHC-FB-4.GT

Supply	
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	12 A
Power dissipation	typ. 0.4 W per segment
Terminating resistor	100 Ω integrated
Indicators/operating means	
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Rotary switch	bus addressing, gateway-specific
Data for application in connection with Ex-areas	
Statement of conformity	
Group, category, type of protection, temperature class	Ⓔx II 3G Ex ec IIC T4 Gc
Directive conformity	
Directive 2014/34/EU	EN 60079-0:2012 , EN 60079-7:2015 , EN 60079-11:2012
International approvals	
IECEx approval	IECEx TUR 16.0007X
Approved for	Ex ec IIC T4 Gc
Certificates and approvals	
Marine approval	pending

Isolated Power Supply Module Type HCD2-FBPS-1.500

Supply	
Rated voltage	19.2 ... 35 V DC
Power dissipation	typ. 1.6 W
Fieldbus interface	
Rated voltage	28 ... 29.5 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA
Indicators/operating means	
LED ERR	red flashing: short-circuit or undervoltage at output
LED PWR	green if U_{out} > 28 V
Data for application in connection with Ex-areas	
Outputs	
Voltage	30 V

Isolated Power Supply Module Type HCD2-FBPS-1.23.500

Supply	
Rated voltage	19.2 ... 35 V DC
Power dissipation	typ. 1.2 W
Fieldbus interface	
Rated voltage	21 ... 23 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA
Indicators/operating means	
LED ERR	red flashing: short-circuit or undervoltage at output
LED PWR	green if U_{out} > 21 V
Data for application in connection with Ex-areas	
Outputs	
Voltage	24 V

Basic Diagnostic Module Type HD2-DM-B

Supply	
Rated voltagesRated current	19.2 ... 35 V
Rated current	20 mA
Power dissipation	Max. 0.5 W
Indicators/operating means	
LED PRI PWR	green: on, primary bulk power supply connected
LED SEC PWR	green: on, secondary bulk power supply connected
LED ERR	red: 2 Hz flashing, power supply fault (short-circuit, undervoltage), redundancy fault

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Advanced Diagnostic Module Type HD2-DM-A

Supply	
Rated voltage	19.2 ... 35 V
Rated current	110 ... 30 mA
Power loss	max. 2 W
Fieldbus interface	
Number of segments	4
Rated voltage	9 ... 32 V
Indicators/operating means	
LED PRI PWR	green: on, primary bulk power supply connected
LED SEC PWR	green: on, secondary bulk power supply connected
LED Seg 1...4	yellow: bus activity; red 2 Hz flashing: alarm; red: hardware error
DIP-switch	diagnostic address 1...247, binary coded

Advanced Diagnostic Module Type HD2-DM-A.RO

Supply	
Rated voltage	19.2 ... 35 V
Rated current	40 ... 25 mA
Power loss	max. 1 W
Fieldbus interface	
Number of segments	4
Rated voltage	9 ... 32 V
Indicators/operating means	
LED PRI PWR	green: on, primary bulk power supply connected
LED SEC PWR	green: on, secondary bulk power supply connected
LED Seg 1...4	yellow: bus activity; yellow 2 Hz flashing: Maintenance required; red 2 Hz flashing: specification limit violated; red: hardware error
DIP-switch	fieldbus type , redundant supply , Signal level , Noise level , Jitter

3 Installation and Commissioning

3.1 Mounting and Dismounting

Danger!

Danger to life from wrong mounting and installation

Incorrect mounting and installation of the device can compromise its function and its electrical safety.

- Observe the safety instruction in the instruction manual.
- Observe the information in the manual.

Danger!

Explosion hazard from damaged electronic components

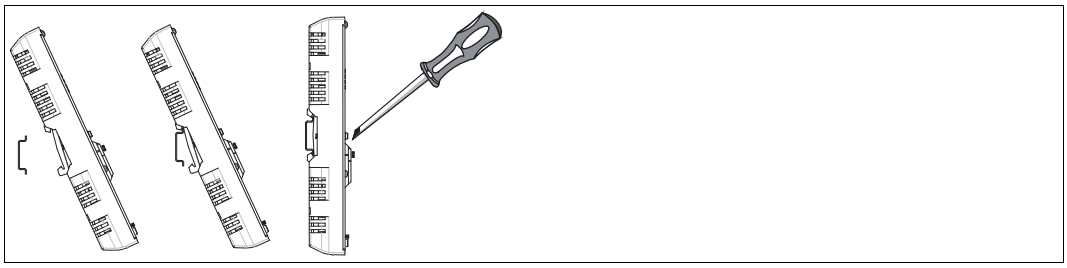
Premature wear of electronic components in a device that was previously used in a general electrical installation can cause sparks that can ignite the surrounding potentially explosive atmosphere.

Never install devices that have already been operated in general electrical installations in electrical installations used in combination with hazardous areas!

Mounting of Fieldbus Motherboards on DIN Mounting Rail

In order to mount a motherboard on a DIN mounting rail, proceed as follows:

1. Place the motherboard on the DIN mounting rail.
2. Tighten the two fastening screws to attach the motherboard on the DIN mounting rail.



↳ The motherboard has been mounted.

Mounting Plug-In Modules on the Motherboard

Caution!

Property damage from wrong mounting

The Power Hub motherboard includes is a dedicated connection slot for the HD2-DM* diagnostic modules labeled “Diagnostic Module only“. Using this slot for mounting the wrong type of module can cause property damage on the module or the motherboard.

Do not try to plug other modules into this connection slot.

To install a new plug-in module on the motherboard, proceed as follows:

1. Carefully center the polarization holes and mate the 2 connectors, then gently press down the module.
2. Push down the red Quick Lok bars on each side of the module to fix it to the panel. No tools required.

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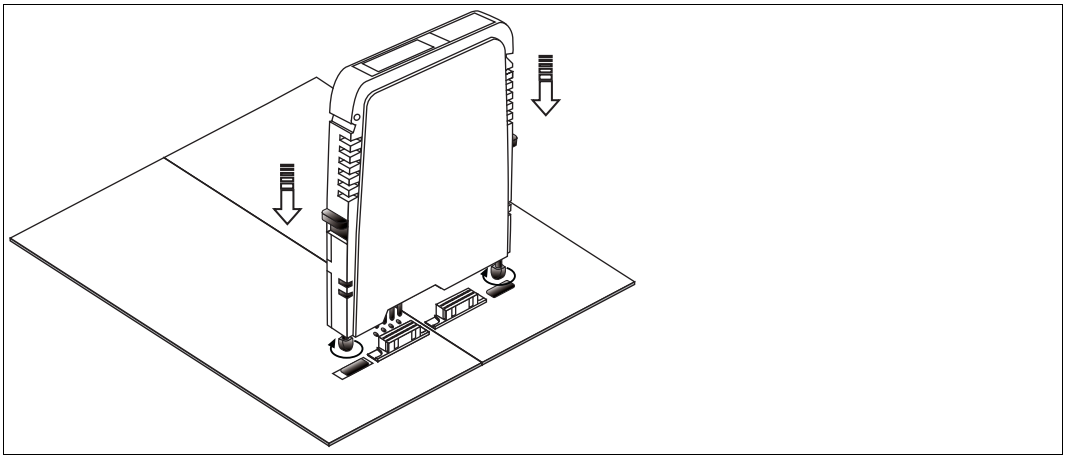


↳ The new module has been installed.

Dismounting Modules from the Motherboard

To dismount a module from the motherboard, proceed as follows:

Pull up the red Quick Lok Bars on each side of the module and carefully lift off the entire module.

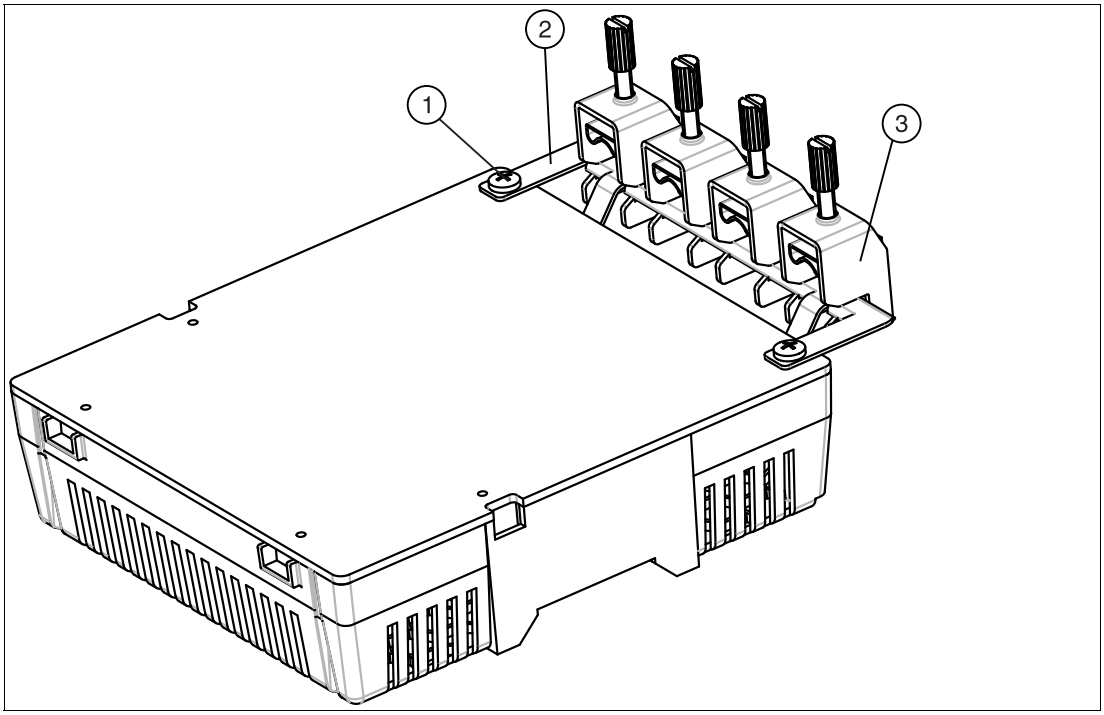
↳ The module has been removed from the motherboard.

3.2 Mounting the Grounding Rail (ACC-MB-HSK)

Easy Shield Connection

If required, you can attach a grounding rail to the motherboard in order to connect the shield at the trunk cable more easily. The grounding rail is available as accessory ACC-MB-HSK.

Mounting the Grounding Rail (ACC-MB-HSK)

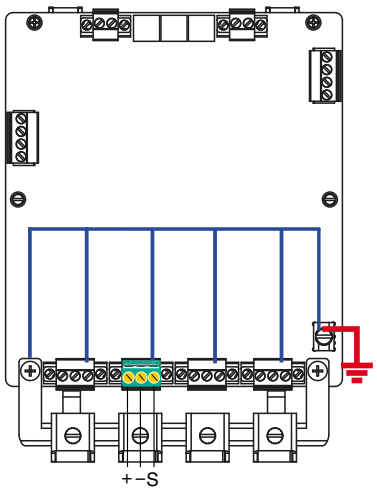


1 Connection screws DIN 7985 M4 x 10 (2x): Use to fix the grounding rail to the motherboard

2 Grounding rail

3 Shield clamps (4x): Use to connect the shield lines with the grounding rail

3.3 Shielding and Grounding



Connect the trunk cable shields to the corresponding terminals in order to directly ground the cable shields to the grounding terminal.

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3.3.1 Connection to Equipotential Bonding System

Caution!

Risk of electric shock or property damage from inadequate grounding

If you fail to connect all metal parts of the device to protective local earth correctly, this could result in potential equalization currents. These currents could hurt operating personnel or cause property damage.

The grounding terminal is not a safety earth: Do not use the grounding terminal to ground exposed metal parts.
Ground exposed metal parts of the device separately. Ensure that a correct grounding is guaranteed at all times.

All shield connections are internally connected to the "Shield/Screen GND" grounding terminal.

Connecting the Ground Connection Cable

Note!

Use a cable with a minimum cross core section of 4 mm².

1. Connect the ground cable to a cable lug.
2. Position the cable lug over the ground connection clamp with the cable pointing downwards.
3. Screw the cable lug to the ground connection clamp with 2 toothed lock washers inserted between screw, lug, and clamp as illustrated:

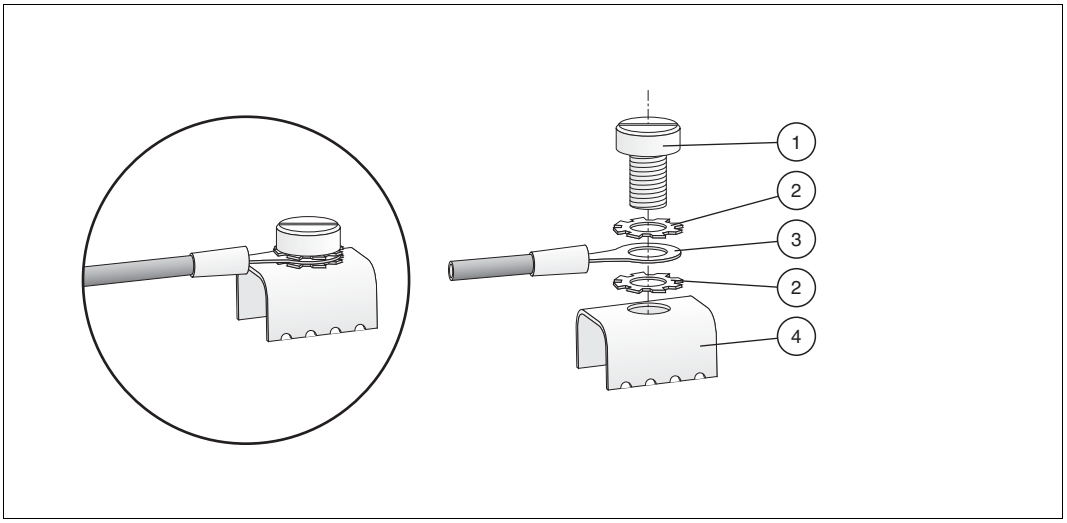


Figure 3.1 Connecting the ground connection cable

1 Screw
2 Toothed lock washer
3 Cable lug
4 Ground connection clamp on motherboard

4. Tighten the screw with a torque of 1.5 Nm.

   ↳ The cable lug is properly attached and cannot come loose.

Connect the "Shield/Screen GND" grounding terminal to an equipotential bonding system.

3.4 Connection Layout

Danger!

Explosion hazard from connection damage

Manipulating connections outside of the specified ambient temperature range can lead to material damage, resulting in an unwanted failure of the connection. This could result in an increased explosion hazard in potentially explosive atmospheres.

Only manipulate connections in the specified ambient temperature range.
Temperature range: -5 C° ... +70 C°

Danger!

Danger to life from incorrect installation

Incorrect installation of cables and connection lines can compromise the function and the electrical safety of the device.

- Observe the permissible core cross-section of the conductor.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use only one conductor per terminal.
- When installing the conductors the insulation must reach up to the terminal.
- Observe the tightening torque of the terminal screws.

The following section describes the different connection details of the motherboard with particular reference to the torques required for a safe installation.

For any terminal connections, observe the following cable and connection information.

Screw Terminals: Cable and Connection Information

- Permissible wire core section:
  - Screw terminals with flexible or rigid wires: 0.2-2.5 mm²
- Insulation stripping length: 7 mm
- If you use stranded connectors: Crimp on wire end ferrules
- Ensure that connectors are mechanically locked
- Torque required for tightening terminal screws: 0.4-0.5 Nm

Spring Terminals: Cable and Connection Information

- Permissible wire core section:
  - Spring terminals with flexible or rigid wires: 0.5-2.5 mm²
- Insulation stripping length: 10 mm
- Ensure that connectors are mechanically locked
- Torque required for tightening terminal screws: 0.4-0.5 Nm

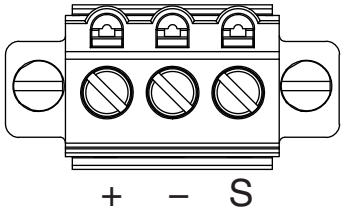
Tip

Double-check that the correct torques are used when un- and reinstalling the terminal during wiring activities!

Connecting the Trunk

The motherboard is connected to the trunk line via designated screw or spring terminals.

Trunk Connection with Screw Terminal

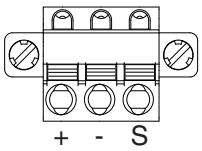


+ Segment +

- Segment -

S Shield connection

Trunk Connection with Spring Terminal



+ Segment +

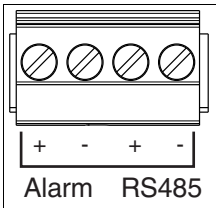
- Segment -

S Shield connection

Connecting the Diagnostic Bus

The motherboard is connected to the diagnostic bus via plug-in screw or spring terminals on fixed circuit board connectors.

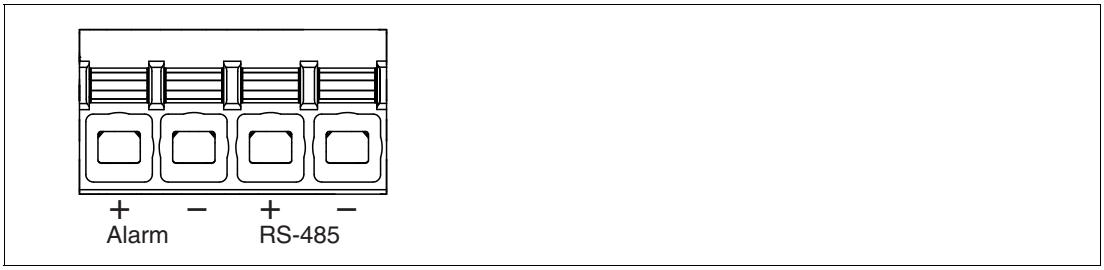
Diagnostic Bus Connection with Screw Terminal



Each motherboard has 2 identical diagnostic bus terminals facing each other with inverted connections.

Alarm	Alarm signal lines
+	Diagnostic bus +
-	Diagnostic bus -

Diagnostic Bus Connection with Spring Terminal



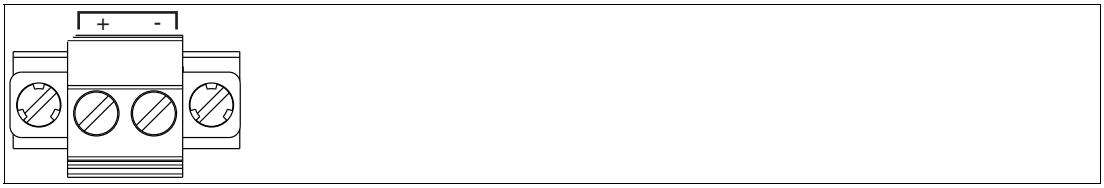
Each motherboard has 2 identical diagnostic bus terminals facing each other with inverted connections.

Alarm	Alarm signal lines
+	Diagnostic bus +
-	Diagnostic bus -

Connecting the Power Supply

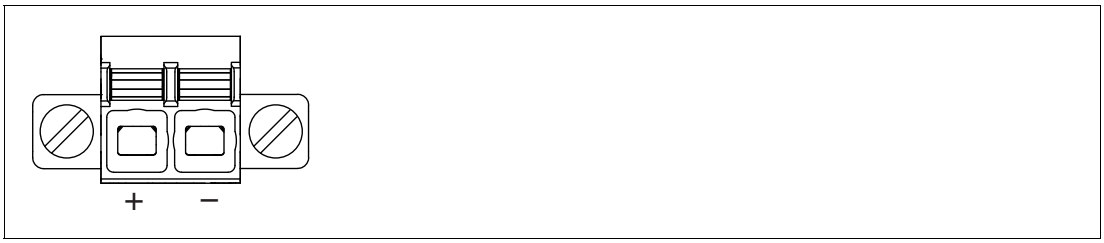
The motherboard is connected to the bulk power supply via designated screw or spring terminals.

Power Supply with Screw Terminal



+	PWR
-	PWR

Power Supply with Spring Terminal



+	PWR
-	PWR

Grounding

The motherboard is connected to the earth via designated screws.

If needed, an optional grounding rail can be applied.

The torque required for tightening the grounding screws: 1.5 Nm

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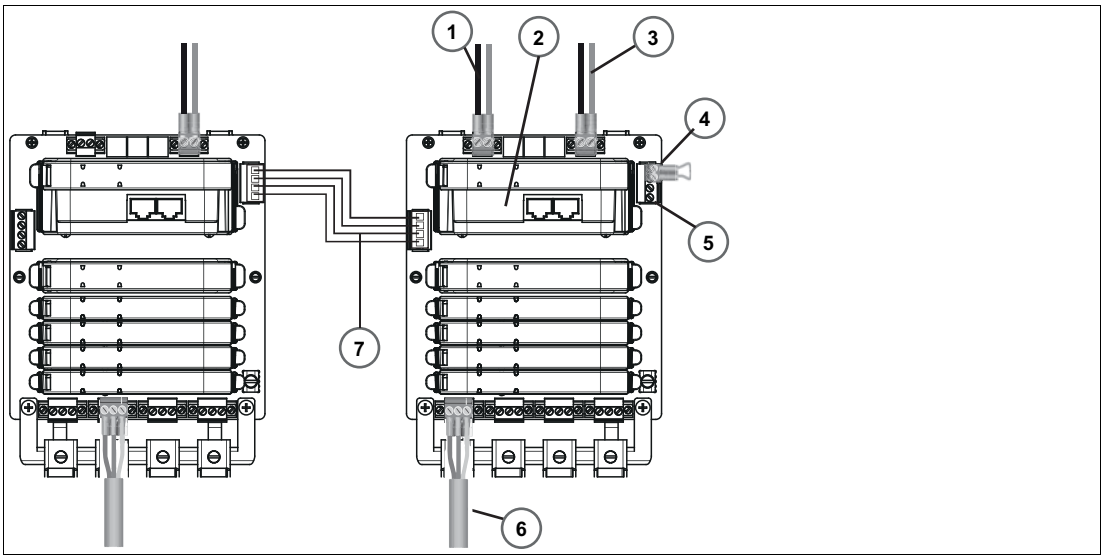
3.4.1 Connections



1 Primary bulk power connection

2 Gateway host

3 Secondary bulk power connection

4 Common alarm volt-free contact with final motherboard link. Loop the alarm contact at the last motherboard.

5 Diagnostic bus connection

6 Connections for fieldbus trunk

7 Diagnostic link cable ACC-MB-HDC

3.5 Segment Termination

Motherboards have integrated terminators for each segment.

Note!

Communication Problems

Wrong termination may cause communication problems or a total communication loss.

- Make sure that 2 terminators are activated on each trunk line.
- Verify that 1 terminator is located at each end of the trunk line.

3.6 Host Connection

Host connection is provided by specific gateways such as the Segment Coupler SK3 (HD2–GTR–4PA) for coupling PROFIBUS PA to PROFIBUS DP.

For details on the gateway required for your application, go to www.pepperl-fuchs.com and look up the corresponding documentation of the gateway you installed.

3.7 Gateway Addressing

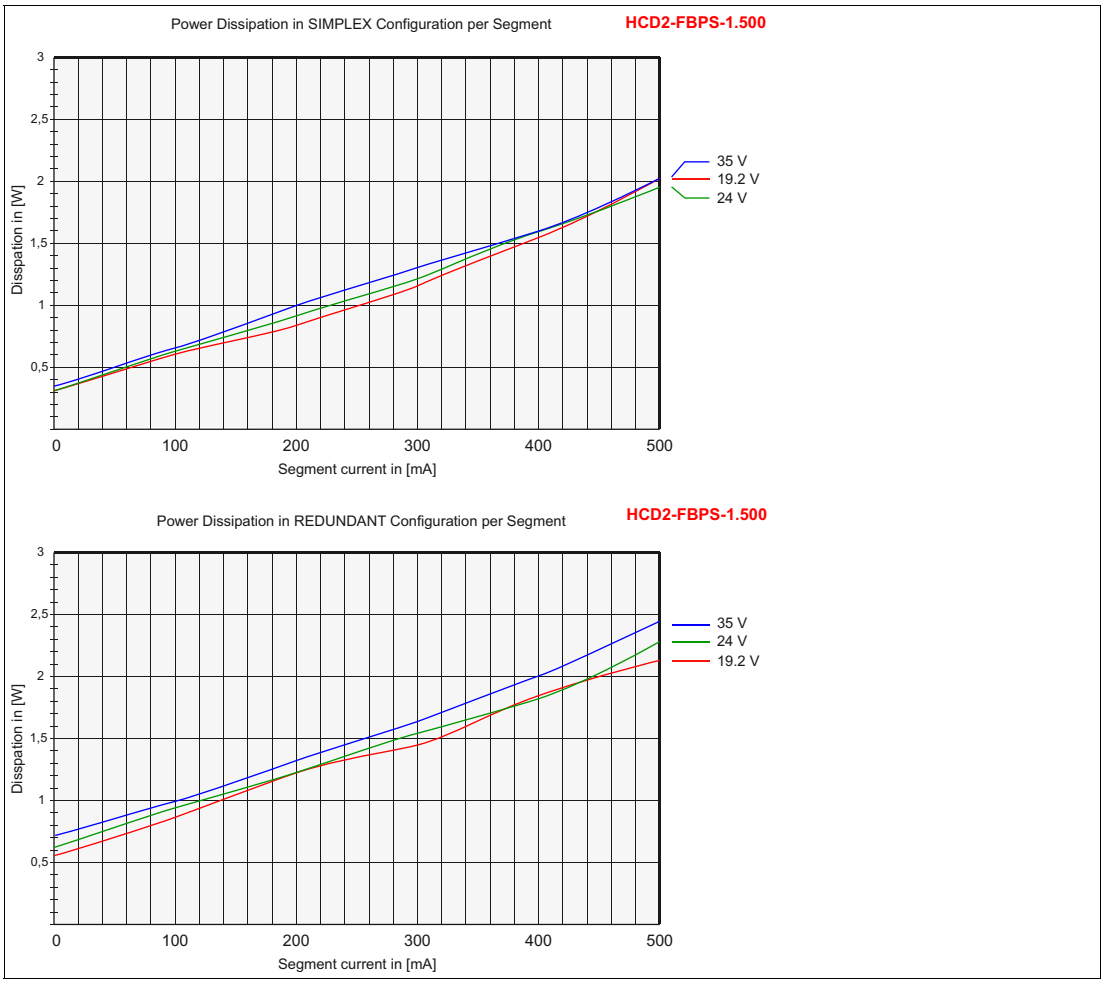
The motherboard features 3 rotary switches for addressing the gateway according to the host protocol used.

For details on the configuration of the gateway required for your application, go to www.pepperl-fuchs.com and look up the corresponding documentation of the gateway you installed.

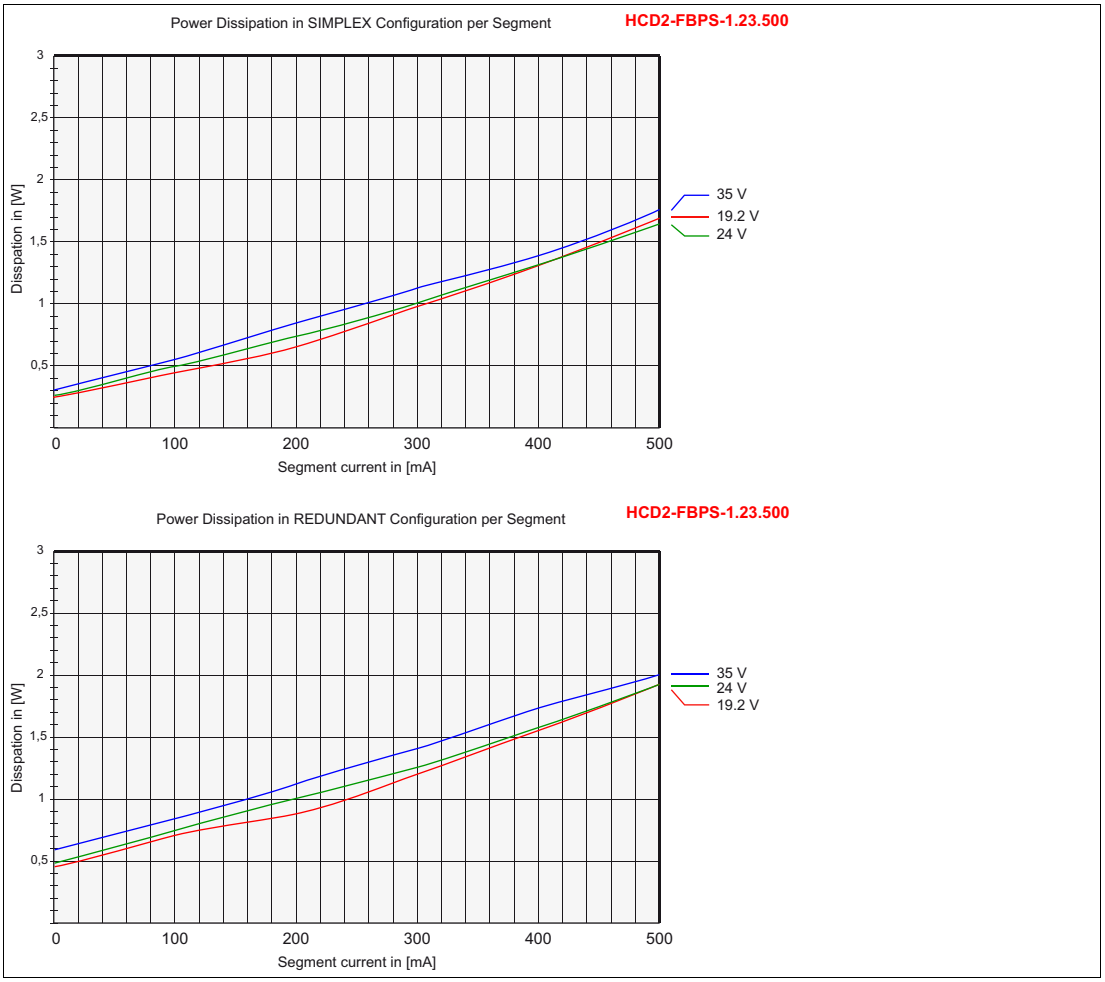
4 Thermal Dissipation

Each power supply dissipates, i.e., loses energy in form of heat. The graphs below illustrate typical power dissipation values in watt (W) for one segment for given output currents and supply voltages. These include the power dissipation of the motherboard.

Thermal Dissipation of HCD2-FBPS-1.500 Including Motherboard



Thermal Dissipation of HCD2-FBPS-1.23.500, Including Motherboard



5 Appendix

5.1 Ordering Information

For details on all available system components and accessories, go to www.pepperl-fuchs.com and look up the corresponding online information for this product.

5.2 Electromagnetic Compatibility Verification

Verification in Accordance with EC Council Legislation Directive 2004/108/EC and 2014/30/EU

Compatibility in Accordance with EN 61326-1 and NAMUR NE 21 Recommendation

The electromagnetic compatibility (EMC) requirements, applicable for electrical equipment for measurement, control, and laboratory use in general are anchored in the international standard EN 61326. 3 different performance criteria are distinguished in this standard:

A class **A** device operates as intended during the test. This device can withstand the immunity tests without any noticeable performance degradations within the specification limits of the manufacturer.

A class **B** device operates as intended after the test. The device shows temporary degradation or loss of function of performance during the test but self-recovers from that state when the exposures are ceased.

A class **C** device has loss of function. The device may need manual restoration. During the test a temporary loss of function is allowed, as long as an operator can restore the device back to operation.

The requirements of the association for standard and control and regulations of the German chemical industries, defined in the NE 21 recommendation, are partly higher compared to the test levels and failure criteria defined in EN 61326-1. For the product qualification, the failure criteria and test levels selected always represent the worst case conditions.

EN 61000-4, as a generic standard, defines the test setups for the specific required test for EN 61326-1 and NE 21.

See declaration of conformity for standards and editions applied.

Conducted EMC Tests

Immunity

Standard	Type	Test Level	Category
EN 61000-4-2	Electrostatic discharge, direct contact	6 kV	A
	Electrostatic discharge, indirect, air	8 kV	A
EN 61000-4-3	Electromagnetic field radiated, radio frequency	10 V/m	A
EN 61000-4-4	Fast transients burst on signal lines	1 kV	A
	Fast transients burst on power lines	2 kV	A
EN 61000-4-5	Slow transient surge on signal lines	1 kV	B
	Slow transient surge on shielded lines	2 kV	B
EN 61000-4-6	Conducted immunity, radio frequency	10 V	A
EN 55011	Reduction factor conducted emission	Class A	_
	Reduction factor radiated emission	Class A	_

2016-06

5.3 Referenced Documents

- Manual: "Using Pepperl+Fuchs fieldbus equipment in Zone 2 hazardous area environment"
- Selection table: Conformity of FieldConnex® Power Hub modules and motherboards to Ex ic

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