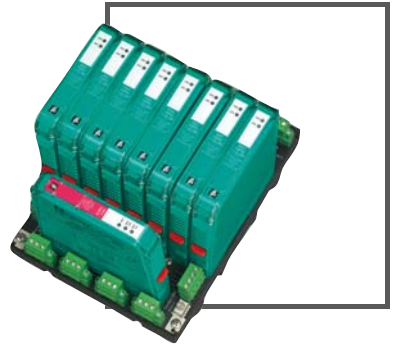


MANUAL

Fieldbus Generic Power Hub High Density



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	Safety	4
1.1	Validity	4
1.2	Symbols used	4
1.3	System Operator and Personnel	4
1.4	Pertinent Laws, Standards, Directives, and further Documentation	4
1.5	Delivery, Transport and Storage	5
1.6	Marking	5
1.7	Intended Use	6
1.8	Mounting and Installation	6
1.8.1	Mounting Instructions for HD2* Modules	7
1.8.2	Zone 2 and Div. 2	7
1.8.3	Ex ic	7
1.9	Housing	8
1.10	Repair and Maintenance	8
1.11	Disposal	8
2	Specification	9
2.1	Overview	9
2.2	System Components	10
2.2.1	Motherboard	10
2.2.2	Power Supply Modules HD2-FBPS-*	10
2.2.3	Diagnostic Modules	11
2.3	Component Identity	12
2.4	Technical Data	13
2.5	Dimensional Drawings	16
3	Installation and Commissioning	17
3.1	Mounting and Dismounting	17
3.2	Shielding and Grounding	18
3.3	Connection Layout	19
3.3.1	Connections	22
3.4	Segment Termination	24
4	Thermal Dissipation	25
5	Appendix	29
5.1	Ordering Information	29
5.2	Electromagnetic Compatibility Verification in Accordance with EC Council Legislation Directive 2004/108/EC29	
5.3	Referenced Documents	30

1 Safety

1.1 Validity

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 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.

1.6 Marking

Motherboards

MBHD-FB1-4R*

Pepperl+Fuchs GmbH

Fieldbus Power Hub
Motherboard

TÜV 06 ATEX 553229 X

 II 3 G Ex nA IIC T4 Gc

IECEX TUN 11.0003X


Ex nA IIC T4 Gc

HD2-FBPS-*.500

Pepperl+Fuchs GmbH

Fieldbus Power Hub
Galvanically Isolated Fieldbus Power Supply

TÜV 04 ATEX 2500 X

 II 3 G Ex nA IIC T4 Gc

IECEX TUN 13.0038X

Ex nA IIC T4 Gc

HD2-FBPS-1.25.360

Pepperl+Fuchs GmbH

Fieldbus Power Hub
Galvanically Isolated Fieldbus Power Supply

TÜV 06 ATEX 553229 X



II 3 G Ex nA IIC T4 Gc

IECEX TUN 13.0003X

Ex nA IIC T4 Gc

Diagnostic Modules

For marking information of the diagnostic modules refer to the instructions or manuals of the respective diagnostic module used.

1.7

Intended Use

The fieldbus power hub high density (HD) product range is intended to power up to 4 FOUNDATION Fieldbus H1 segments in redundant mode according to IEC 61158-2.

The fieldbus power hub high density (HD) product range may be installed in Zone 2 hazardous areas. Types of protection are Ex nA (non-arcing) for Zone 2, gas groups IIC, IIB, IIA.

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.

For further information about hazardous area installation refer to referenced documents see chapter 5.3.

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

The device must only be operated in the ambient temperature range and at the relative humidity (non-condensing) specified.

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.

Trunk and spur connectors are only allowed to be manipulated at ambient temperatures between -5 °C and +70 °C.

The devices may be installed in a corrosive location acc. to ISA-S71.04-1985, severity level G3.

1.8.1 Mounting Instructions for HD2* Modules

The modules are intended for mounting on an appropriate fieldbus power hub motherboard.

The power hub motherboard features a special connection slot for HD2-DM-* diagnostic modules labeled "Diagnostic Module only". Do not try to plug any other modules into this connection slot. Other modules may be damaged.

Instruction for Redundant Systems

Each segment on a redundant motherboard must only be fitted with 2 power modules of the same type.

1.8.2 Zone 2 and Div. 2

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

It is necessary to pay particular attention to the type of fieldbus power supply selected for use on the power hub. This determines the type of Zone 2/Div. 2 installations and certified field instruments that can be connected in Zone 2 or Div. 2 area.

Take special care when using power supply modules with Pepperl+Fuchs segment protectors for intrinsically safe Ex ic and non-incendive field wiring. Double-check to ensure that the correct type of power supply module is used in relation to its output values. For example, the output voltage must be equal or less than the maximum voltage of the connected field devices.

Requirements for all used fieldbus products in Zone 2 installations are summarized in the manual: "Using Pepperl+Fuchs fieldbus equipment in Zone 2 hazardous area environment". You will find this document on the product page of the device at www.pepperl-fuchs.com.

The devices must be installed and operated only in surrounding enclosures that

- comply with the requirements for surrounding enclosures according to IEC/EN 60079-0
- are rated with the degree of protection IP54 according to IEC/EN 60529

Prevent any electrostatic charge that could result in electrostatic discharge while installing or operating the device.

In Zone 2, only such devices are allowed to be connected to circuits that are suitable for the operation in explosion hazardous areas of Zone 2 and for the conditions available at the place of operation (declaration of conformity or certificate of a testing department).

1.8.3 Ex ic

The intrinsically safe circuits of the associated apparatus may lead into hazardous areas. Make sure to observe all relevant distances (creepage distances, clearances) to all non-intrinsically safe circuits in accordance with IEC/EN 60079-14.

If "Ex ic" protected circuits are operated with non-intrinsically safe circuits, they must no longer be used as "Ex ic" protected circuits.

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.

When using the Fieldbus Power Hub with Pepperl+Fuchs Segment Protectors to generate Ex ic rated outputs, connector covers (ACC-MB-CC) have to be plugged on the bulk power supply connectors. This is to guarantee the clearance distance of 50 mm between host terminal and power supply connectors.

The devices must be installed and operated only in an environment that ensures a pollution degree 2 (or better) according to IEC/EN 60664-1.

Ensure that single conductors do not protrude more than 30 mm from the cable jackets of the trunk and diagnostic bus cables. If this cannot be avoided, single conductors that protrude more than 30 mm of the trunk and diagnostic bus cable jackets must be tied together with a tie-wrap or a shrink hose, see chapter 3.

1.9 Housing

If additional housings are needed for installation in hazardous areas, the following points must be considered / evaluated:

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 unused cable glands must be sealed or plugged with corresponding plugs

1.10 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.

1.11 Disposal

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

2 Specification

2.1 Overview

The FieldConnex[®] high-density power hub is a high-performance power supply for FOUNDATION Fieldbus with redundant configuration as standard for 4 segments. It consists of a motherboard with sockets for plug-in modules: 2 power supply modules per segment and a diagnostic module. 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 one shielded twisted-pair cable. Communication between field devices and a host system is established by modulating the data signal onto the power stream utilizing Manchester Bus Powered (MBP) transmission.

All FieldConnex[®] power hubs feature superior design elements. The main design points are redundancy, passive impedance generation, well balanced circuitry and low heat dissipation.

All active electronic components are located in the plug-in modules. Each module holds the electronic components for 1 segment, and 2 modules operate in redundant configuration. When an exchange becomes necessary, only few electronic components need to be exchanged when compared to block configurations for power supplies. Modules can be exchanged while the system is energized without tools, thus ensuring high system availability.

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 EMI impacts both leads of the shielded twisted-pair cable symmetrically. The data signal is thus undisturbed. Low heat dissipation allows highest packing density inside the cabinet and a very long service life.

The power hub feeds segments following the high-power trunk concept for explosion protection. High energy level on the trunk line is fed to the field instrument via couplers such as FieldBarriers or segment protectors.

Using segment protectors allows enable live maintenance at the field device level in Zone 2, as outputs are either classified for Ex ic, Entity, FNICO, or FISCO ic. Using FieldBarriers allows to do live maintenance in Zone 1, as outputs are classified Ex ia. Thus limitations for explosion protection are overcome enabling maximum cable lengths and highest number of devices in any explosive 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 thus bringing visibility to the fieldbus physical layer, which can now be treated as active component in plant asset management systems. Operators are enabled to decide on proactive measures to avoid unwanted situations and while the plant is running smoothly.

The following table summarizes the main features and benefits of the power hub:

Features	User benefit
Low heat dissipation of less than 2 W per segment under full load condition.	Long service life. Very high packing density and reduced cooling requirements.
Exchange of modules while the system is energized and load share between power modules.	Increased segment availability.
Full balance of electric circuitry with high isolation against RF and in-band interference.	High resistance to external disturbance such as EMI.
High-integrity passive power conditioners.	Long service life.
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...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 supervision for preventive and pro-active maintenance. Professional Tools for easy fieldbus troubleshooting.

2.2 System Components

2.2.1 Motherboard

MBHD-FB1-4R

The motherboard MBHD-FB1-4R enables the redundant supply of 4 segments and the connection of the FOUNDATION Fieldbus H1 host system. The 8 sockets hold the power supply modules, 2 each supply 1 of the 4 segments redundantly. The extra socket holds a diagnostic module.



Note!

If the motherboard is intended to be used with dedicated power supply modules and segment protectors to generate Ex ic rated outputs, a connector cover has to be mounted on each power supply terminal. 2 connector covers and special connectors come with each motherboard.

2.2.2 Power Supply Modules HD2-FBPS-*

Modules providing full galvanic isolation between bulk power supply and fieldbus segments are called power supply modules. They provide optimal system reliability for applications where cabling and wiring are routed through critical or harsh electrical environments, i.e. where superior protection from electromagnetic interference (EMI) is mandatory.

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

For different application requirements special power supply modules are available:

Designation	Application
HD2-FBPS-1.500	Ex ic
HD2-FBPS-1.23.500	Ex ic
HD2-FBPS-1.17.500	FISCO ic, FNICO
HD2-FBPS-1.25.360	general purpose

2.2.3 Diagnostic Modules

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. Status and faults are indicated by LEDs and can be transmitted via dry 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.

The Diagnostic Manager – Professional Edition offers additional functionality: the commissioning wizard generates automated reports; the software displays clear text messages for troubleshooting of out-of-spec behavior. The OPC server transmits user-selectable summary alarms to the DCS.

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

Advanced Diagnostic Module Relay Output

The ADM relay 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

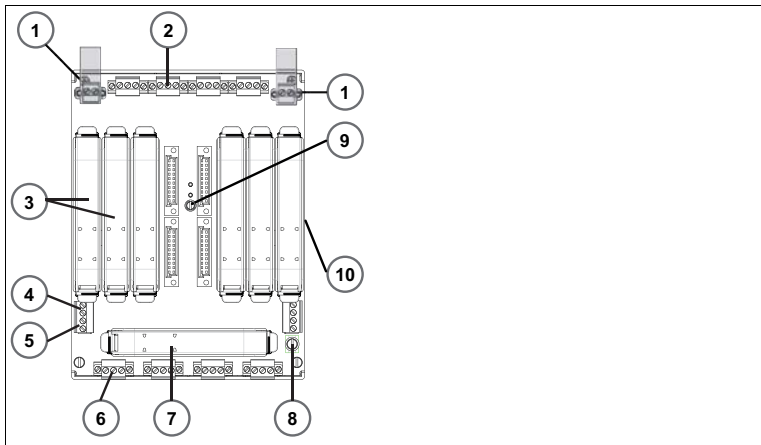
The "Maintenance required" alarm enables proactive diagnosis. If a value exceeds the limit, a relay contact opens and the respective segment LED starts to flash yellow. With this proactive diagnosis, changes within the fieldbus installation can be detected early and fault sources can be found before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

If an "Out of specification" alarm occurs (LED flashing red), 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.

To set up appropriate limit values for your fieldbus installation, a comprehensive diagnostic solution such as the mobile advanced diagnostic module is required during commissioning to determine the DIP switch positions.

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

2.3 Component Identity



- 1 Connections for bulk power supply, redundant. With mounted connector covers (optional, see accessories) for Ex ic installations
- 2 Host connection (segment 1)
- 3 Power modules (segment 1)
- 4 Common alarm voltage-free contact
- 5 Diagnostic bus connection
- 6 Trunk connection (segment 1)
- 7 Diagnostic module
- 8 Screen/ground connection clamp
- 9 Mother board fastening screw
- 10 DIN rail slot

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	15 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 with screw flange
Core cross-section	2.5 mm ²
Degree of protection	IP20

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
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3

Motherboard Types MBHD-FB1-4R

Supply

Connection	redundant
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	16 A
Power loss	typ. 0.39 W per segment
Terminating resistor	100 Ω integrated

Indicators/operating means

Fault signal	VFC alarm output via connectors
--------------	---------------------------------

HD2-FBPS-1.500, Isolated Power Supply Module

Supply

Rated voltage	19.2 ... 35 V DC
Power loss	typ. 1.8 W

HD2-FBPS-1.500, Isolated Power Supply Module

Fieldbus interface

Rated voltage	28 ... 30 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	32 V

HD2-FBPS-1.23.500, Isolated Power Supply Module

Supply

Rated voltage	19.2 ... 35 V DC
Power loss	typ. 1.5 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

HD2-FBPS-1.17.500, Isolated Power Supply Module

Supply

Rated voltage	19.2 ... 35 V DC
Power loss	typ. 1.3 W

Fieldbus interface

Rated voltage	15 ... 17 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA

Indicators/operating means

HD2-FBPS-1.17.500, Isolated Power Supply Module

LED ERR	red flashing: short-circuit or undervoltage at output
LED PWR	green if $U_{out} > 15\text{ V}$

Data for application in connection with Ex-areas

Outputs	
Voltage	17.5 V

HD2-FBPS-1.25.360, Isolated Power Supply Module

Supply

Rated voltage	19.2 ... 35 V DC
Power loss	typ. 2 W

Fieldbus interface

Rated voltage	25 ... 28 V
Rated current	360 ... 10 mA
Short-circuit current	typ. 400 mA

Indicators/operating means

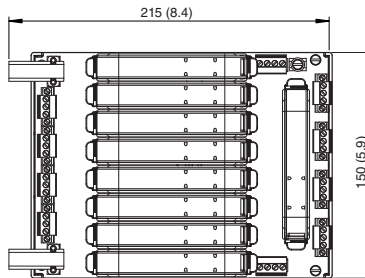
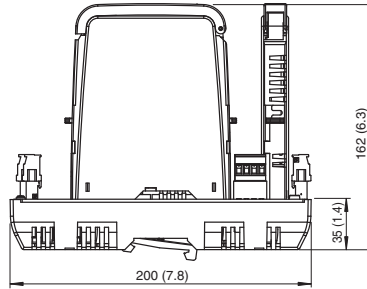
LED ERR	red flashing: short-circuit or undervoltage at output
LED PWR	Power LED: green, if $U_{out} > 25\text{ V}$

Technical Data of Diagnostic Modules

For information on the technical data of the respective diagnostic modules, refer to the respective data sheets, manuals or instructions of the diagnostic module used.

Accessories	
ACC-MB-HDC	Diagnostic link cable Coupling the diagnostic bus between 2 motherboards, length 6 cm.
ACC-MB-CC	Connector cover Set of 2 covers with special connectors to keep clearance distance between power and host terminals.

2.5 Dimensional Drawings



All dimensions in millimeters (inches) and without tolerance indication.

3 Installation and Commissioning

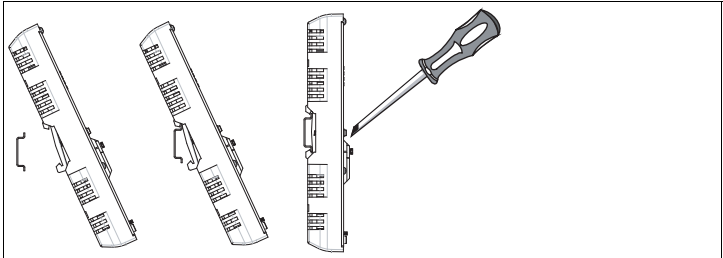
3.1 Mounting and Dismounting



Mounting of Fieldbus Motherboards on DIN Mounting Rail

To mount a motherboard on a DIN mounting rail, proceed as follows:

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



↳ The motherboard has been mounted.



Mounting Modules on the Motherboard



Caution!

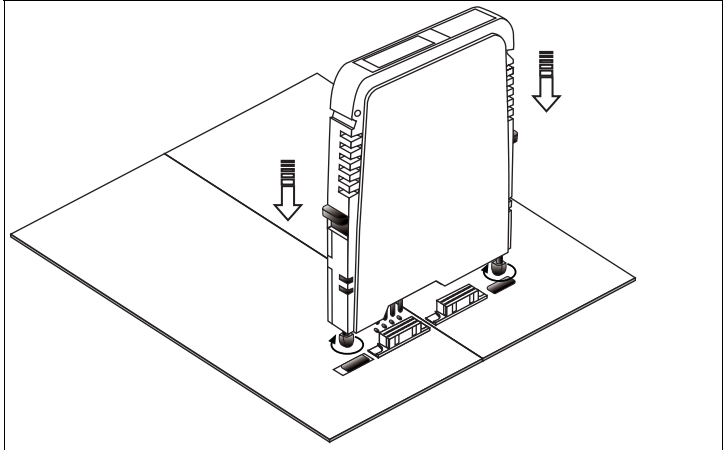
Hardware Damage

The Power Hub motherboard includes a dedicated connection slot for the HD2-DM* diagnostic modules labeled "Diagnostic Module only".

Do not try to plug other modules into this connection slot. Other modules may be damaged.

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

1. Carefully center the polarisation holes and mate the two 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).



↳ The new module has been installed.

Dismounting Modules from the Motherboard

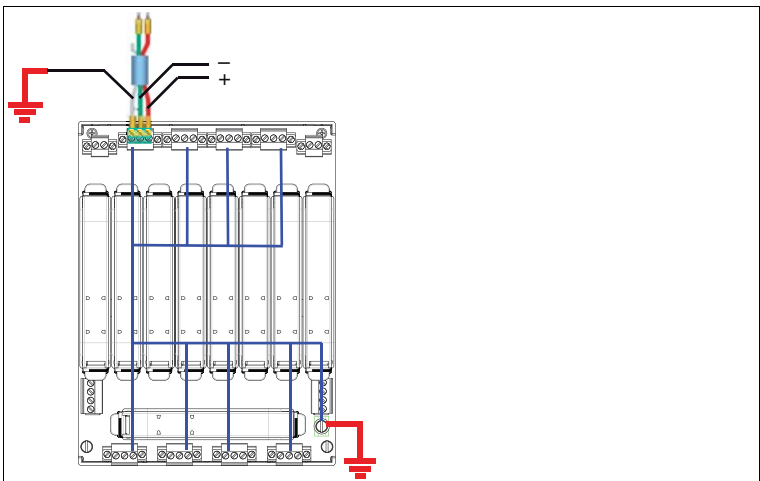
To dismount a module from the motherboard, proceed as follows:

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

Shielding and Grounding



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Prevent Grounding Loops

Depending on the chosen grounding method, you can leave the shield earthing at the host connection open.

If the grounding points of the host and the field devices do not have the same potential, the shield of the motherboard must be left open to prevent a grounding loop.



Caution!

Risk of electric shock and property damage through 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.

3.3 Connection Layout

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.

Cable and Connection Information

- Permissible cross core section: 0.2-2.5 mm²
- Insulation stripping length: 7 mm
- If stranded conductors are used: Protect strand ends with end splices.
- 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

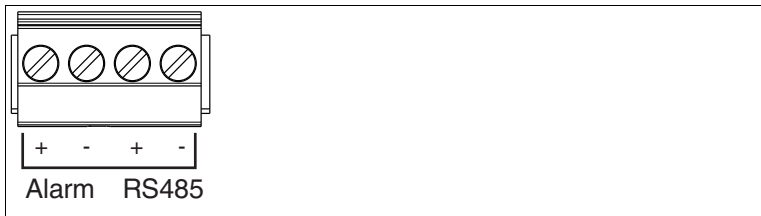
The motherboard is connected to the trunk line via designated screw terminals. See "Cable and Connection Information" on page 19.



- + Segment +
- Segment -
- S Shield connection

Connecting the Diagnostic Bus

The motherboard is connected to the diagnostic bus via plug-in terminals on fixed circuit board connectors. See "Cable and Connection Information" on page 19.



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

Connecting the Power Supply

The motherboard is connected to the bulk power supply via designated screw terminals. See "Cable and Connection Information" on page 19.

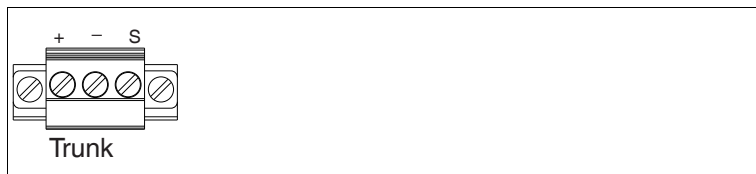
Connector PWR Module A or B:



- + PWR
- PWR

Connecting the Host

The motherboard is connected to the host system via designated screw terminals.



- + Host +
- Host -
- S Shield

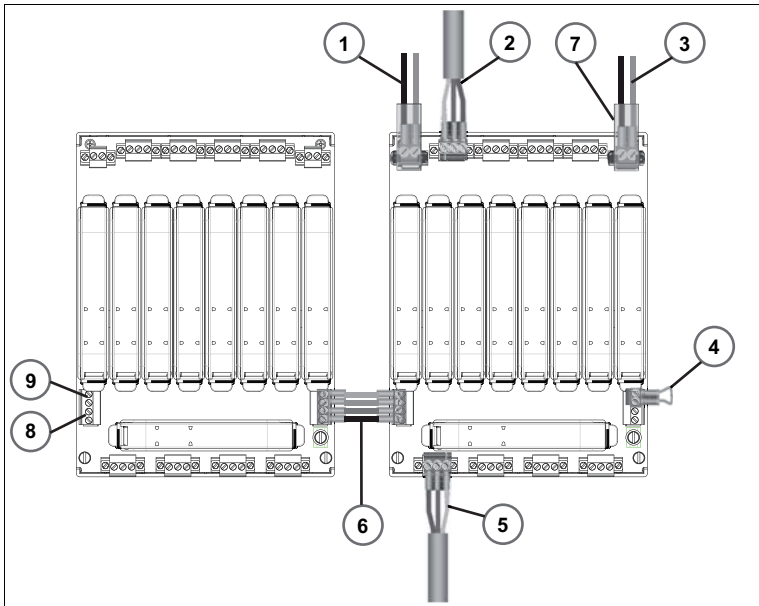
Grounding

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

3.3.1 Connections



- 1 Primary connection to bulk power supply
- 2 Host connection
- 3 Secondary connection to bulk power supply
- 4 Final motherboard link; the alarm contact must be looped at the last motherboard
- 5 Connections for the fieldbus trunk
- 6 Diagnostic link cable ACC-MB-HDC for series connection of motherboards
- 7 Connector cover ACC-MB-CC needed for Ex ic installations
- 8 Diagnostic bus connection
- 9 Common alarm volt-free contact

Installation Requirements for Ex ic Installations

If the fieldbus power hub is used in an intrinsically safe installation (Ex ic), the following installation requirements must be fulfilled:

- Mount connector cover on each power terminal.
- Prepare trunk, alarm volt-free contact and diagnostic bus cable as described below.



Mounting the Connector Cover ACC-MB-CC for Ex ic Installations



Warning!

Wrong wiring

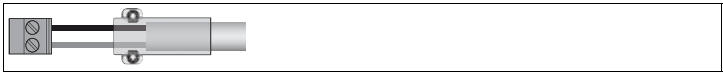
Use the delivered connector without fastening screws only:

- in combination with the connector cover
- on primary and secondary bulk power terminals

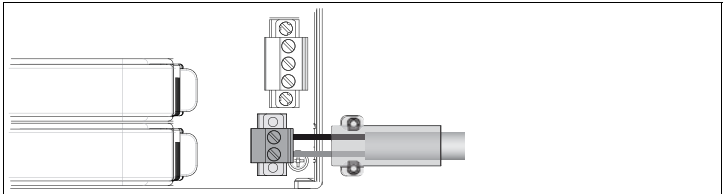
1. Slide the connector cover over the stripped power supply cable.



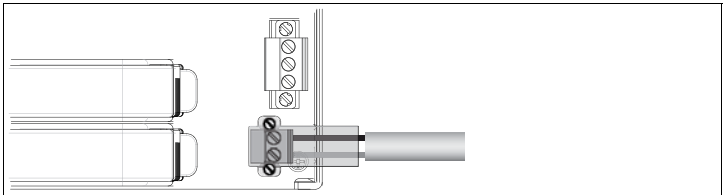
2. Screw the leads into the delivered connector.



3. Mount the connector onto the power terminal.



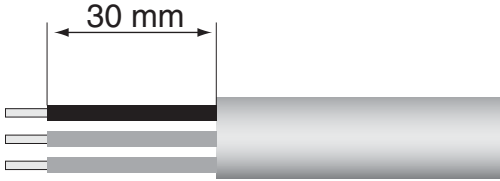
4. Put the connector cover over the power supply connector and tighten the fastening screws



Preparing Trunk, Alarm, and Diagnostic Bus Cable for Ex ic Installations

In order to guarantee the prescribed clearance distance, the trunk, the alarm volt-free contact, and diagnostic bus cable have to be prepared as follows.

This measure is not necessary if the ACC-MB-HDC diagnostic cable is used.



Ensure that single conductors do not protrude more than 30 mm from the cable jackets of the trunk and diagnostic bus cables. If this cannot be avoided, single conductors that protrude more than 30 mm of the trunk and diagnostic bus cable jackets must be tied together with a tie-wrap or a shrink hose, see chapter 3.

3.4 Segment Termination

Motherboards have integrated terminators for each segment.



Caution!

Communication Problems

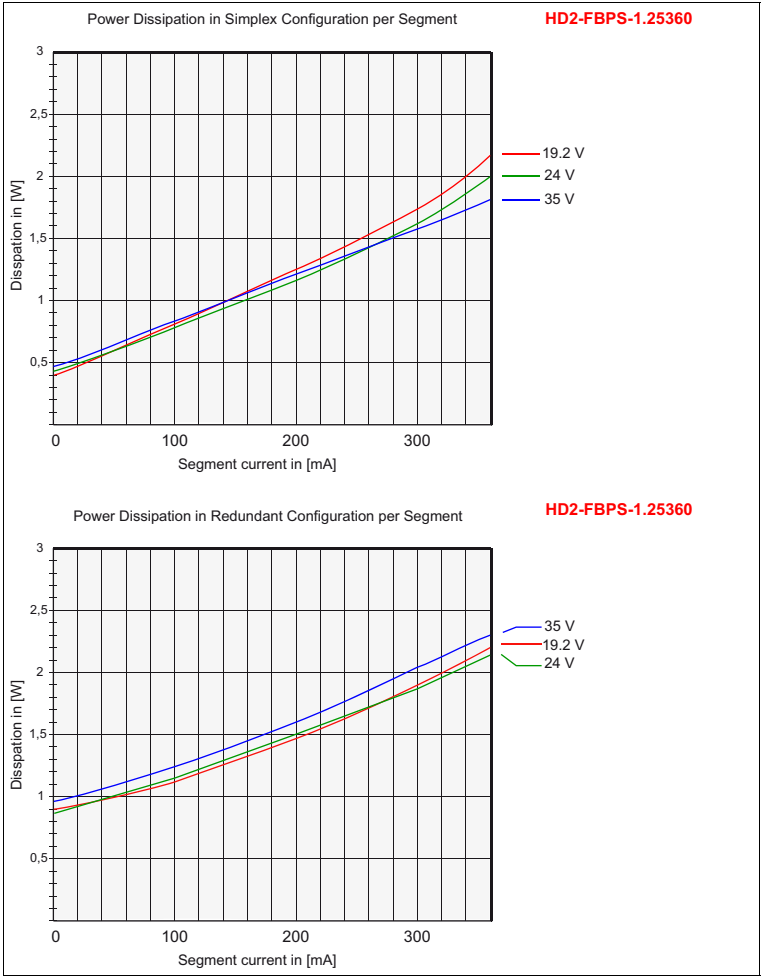
Wrong termination may cause communication problems or a total communication loss.

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

4 Thermal Dissipation

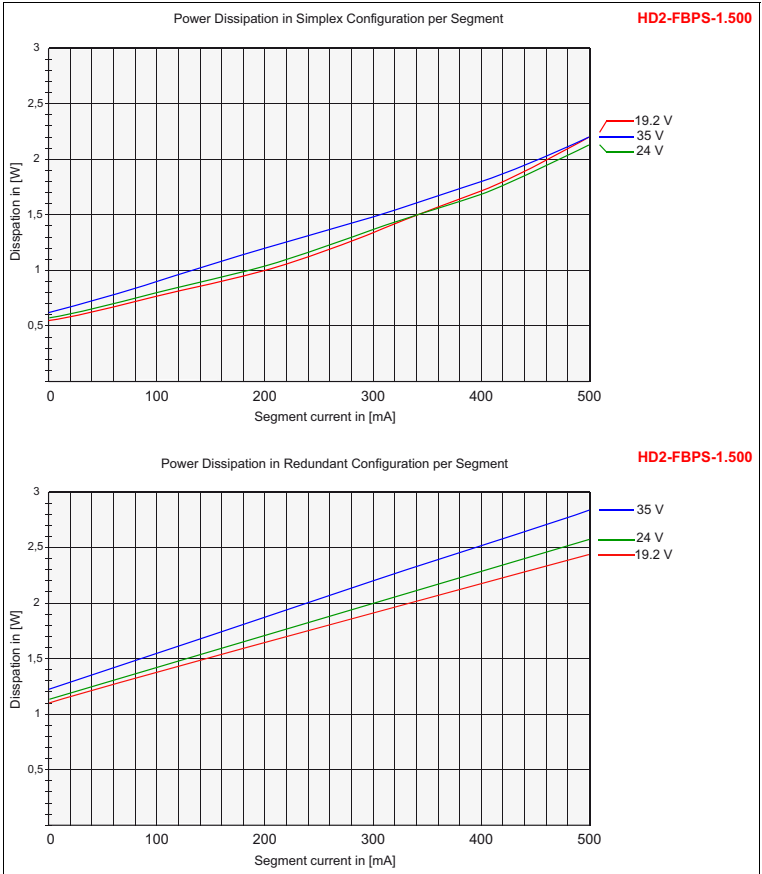
Each power supply dissipates, i.e., loses energy in form of heat. The graphs below illustrate typical power dissipation values in watt (W) for one segment including motherboard power losses, for given output currents and supply voltages.

Thermal Dissipation of HD2-FBPS-1.25.360, including Motherboard

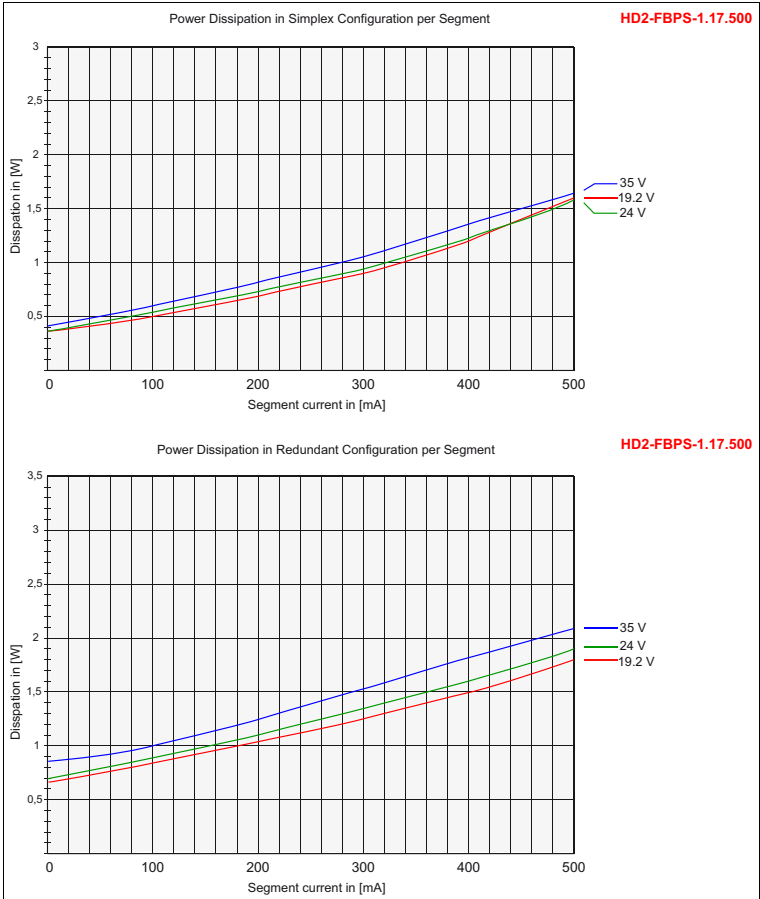


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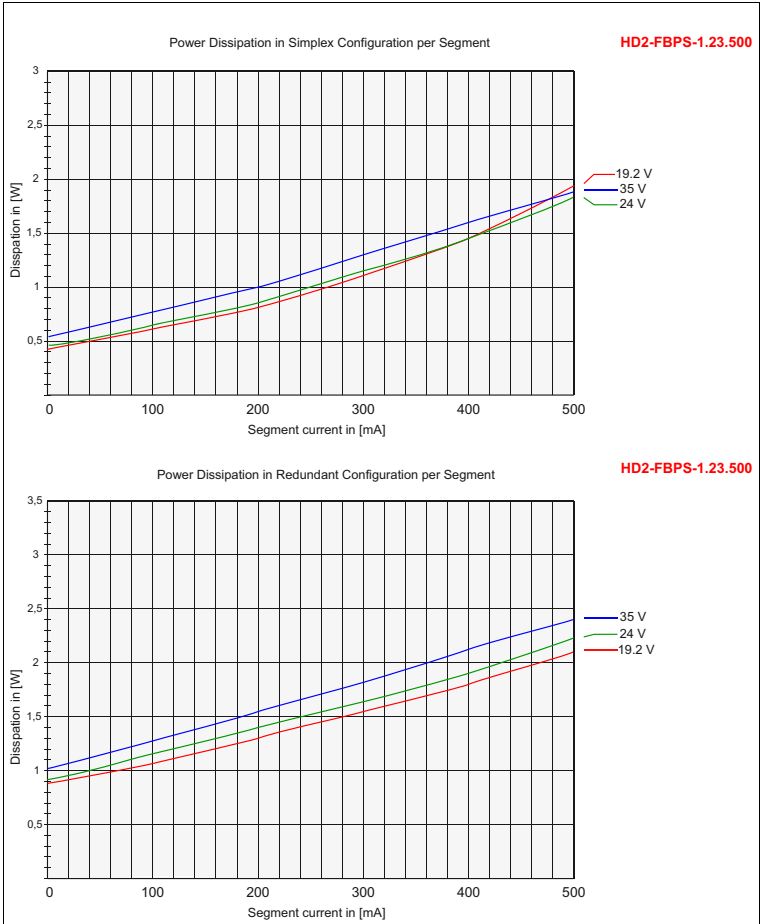
Thermal Dissipation of HD2-FBPS-1.500, including Motherboard



Thermal Dissipation of HD2-FBPS-1.17.500, including Motherboard



Thermal Dissipation of HD2-FBPS-1.23.500, including Motherboard



5

Appendix

5.1

Ordering Information

Designation	Description
HD2-FBPS-1.500	Ex ic isolated fieldbus power supply module with 28 ... 28 V DC and 500 mA output.
HD2-FBPS-1.23.500	Ex ic isolated fieldbus power supply module with 21 ... 23 V DC and 500 mA output.
HD2-FBPS-1.17.500	FNICO, FISCO ic isolated fieldbus power supply module with 15 ... 17 V DC and 500 mA output.
HD2-FBPS-1.25.360	General purpose isolated fieldbus power supply module with 25 ... 28 V DC and 360 mA output.
HD2-DM-B	Basic diagnostic module with LED indication and common relay fault output.
HD2-DM-A	In combination with the FDT/DTM-based diagnostic manager, the advanced diagnostic module (ADM) allows for the analysis of signal and segment parameters as well as for the measurement of specific physical layer values concerning the system and node.
HD2-DM-A.RO	The advanced diagnostic module (ADM) relay output permanently monitors the physical layer. If a predefined threshold is exceeded, a built-in contact opens to alarm the operator via a system alarm input.
MBHD-FB1-4R	General purpose 4 x redundant segment motherboard with redundant bulk power feed and diagnostic interface, all connectors plug with screw flange terminal connections.

Accessories	
ACC-MB-HDC	Diagnostic link cable Coupling the diagnostic bus between 2 motherboards, length 6 cm.
ACC-MB-CC	Connector cover Set of 2 covers with special connectors to keep clearance distance between power and host terminals.

5.2

Electromagnetic Compatibility Verification in Accordance with EC Council Legislation Directive 2004/108/EC

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 European Standard EN 61326. 3 different performance criteria are distinguished in this standard:

A category **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 category **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 category **C** device has loss of function, 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, failure criteria and test levels have been selected, always representing 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	RF conducted emission	Class A	–
	RF radiated emission	Class A	–

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

PROCESS AUTOMATION – PROTECTING YOUR PROCESS



Worldwide Headquarters

Pepperl+Fuchs GmbH
68307 Mannheim · Germany
Tel. +49 621 776-0
E-mail: info@de.pepperl-fuchs.com

For the Pepperl+Fuchs representative
closest to you check www.pepperl-fuchs.com/contact

www.pepperl-fuchs.com

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