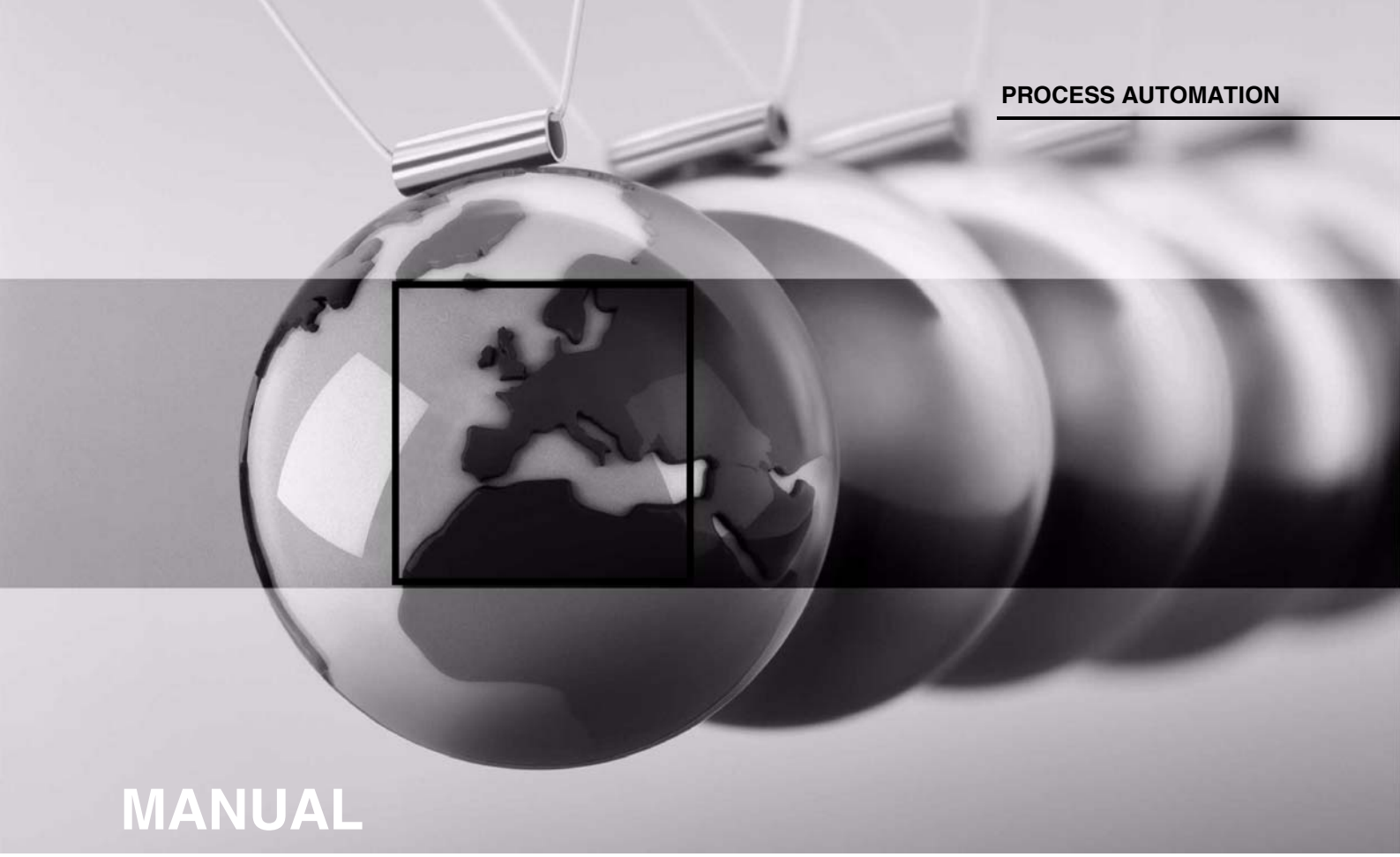
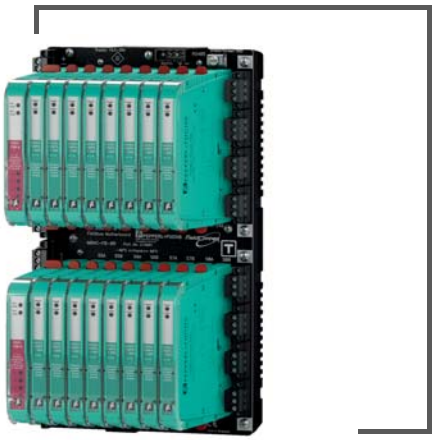


MANUAL

COMPACT FIELDBUS POWER HUB YOKOGAWA



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 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 a warning about an immediate possible danger.

In case of ignoring the consequences may range from personal injury to death.

Warning!

This symbol indicates a warning about a possible fault or danger.

In case of ignoring the consequences may cause personal injury or heaviest property damage.

Caution!

This symbol indicates a warning about a possible fault.

In case of ignoring the devices and any connected facilities or systems may be interrupted or fail completely.

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

The plant owner is responsible for its planning, installation, commissioning, operation, maintenance and disassembly.

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.

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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

MBHC-FB-8R*

Pepperl+Fuchs GmbH

Fieldbus Power Hub

TÜV 10 ATEX 555761X

II 3G Ex nA IIC T4 Gc

HCD2-FBPS-1.500

Pepperl+Fuchs GmbH

Fieldbus Power Hub

TÜV 10 ATEX 555761X

II 3G Ex nA IIC T4 Gc

HCD2-FBPS-1.23.500

Pepperl+Fuchs GmbH

Fieldbus Power Hub

TÜV 10 ATEX 555761X

II 3G Ex nA IIC T4 Gc

Diagnostic Modules

HD2-DM-A

Pepperl+Fuchs GmbH

Fieldbus Power Hub

TÜV 04 ATEX 2500 X

II 3G EEx nA IIC T4

HD2-DM-A.RO

Pepperl+Fuchs GmbH

Fieldbus Power Hub

TÜV 04 ATEX 2500 X

II 3G EEx nA II T4

HD2-DM-B
Pepperl+Fuchs GmbH
Fieldbus Power Hub
TÜV 04 ATEX 2500 X
Ex II 3G EEx nA C IIC T4

1.7 Intended Use

The Compact Power Hub is intended to power eight FOUNDATION Fieldbus H1 segments in redundant mode according to IEC 61158-2.

The Compact Power Hub may be installed in Zone 2 or Class I, Division 2 hazardous areas. Types of protection are Ex nA (non-arcing) 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 acc. to IEC 60079-11. In combination with Pepperl+Fuchs Segment Protectors the outputs are specified Ex nl or 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 6.3.

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 two 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 if Power Supply Modules are to be used with Pepperl+Fuchs Segment Protectors for energy limited Ex nL, intrinsically safe Ex ic and non-incendive field wiring. Doublecheck 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 enclosures that

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

Avoid electrostatic discharges while operating the installed device. Avoid electrostatic charge.

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.

The devices must be installed and operated only in an environment that ensures a pollution degree 2.

1.8.4 Ex nL

"Ex nL" protected circuits (limited energy) must no longer be used as "Ex nL" protected circuits,

- if these circuits were operated with non-intrinsically safe circuits or
- if these circuits were operated with circuits that do not comply with the type of protection "Ex nL".

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 / housing cover must be tightened with the appropriate torque
- only cable of the appropriate size must be used in the cable glands
- all cable glands must be tightened with the appropriate torque
- all empty cable glands must be sealed with sealing plugs

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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® Compact Power Hub is a high-performance power supply for FOUNDATION Fieldbus H1 with redundant configuration as standard for eight segments. It consists of a motherboard with sockets for plug-in modules: Two power supply modules per segment and two diagnostic modules. 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® Compact Power Hubs feature superior design elements. The main design features 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 only one segment, and two modules operate in redundant configuration. When an exchange becomes necessary, only the smallest amount of electronic components is exchanged compared to block configurations for power supplies. Modules can be exchanged while the system is energized without the use of tools, thus ensuring very high system availability.

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

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 instrument via couplers such as FieldBarriers or Segment Protectors. The Power Hub powers segment installed as non-arcing (Ex nA).

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.

Two plug-in Advanced Diagnostic Modules for fieldbus are available. These modules monitor 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. They bring visibility to the fieldbus physical layer, so it can be treated as an active component in Plant Asset Management systems. Operators are enabled to decide on proactive measures to avoid unwanted situations while the plant is running smoothly.

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

Features	User benefit
Lowest 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

MBHC-FB-8R.YO

The MBHC-FB-8R.YO motherboard enables the redundant supply of eight segments. 16 sockets hold the power supply modules, with two each supplying one of the eight segments redundantly. Two extra sockets hold diagnostic modules. The host side is adapted for direct, redundant connection to the Yokogawa ALF111 controller.

2.2.2 Power Supply Modules HCD2-FBPS-*

Power Supply Modules are modules providing 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, i.e., where superior 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 two power modules.

For different application requirements special Power Supply Modules are available:

Designation	Application
HCD2-FBPS-1.500	General purpose
HCD2-FBPS-1.23.500	Ex ic, Ex nL

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.

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 please 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 two 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 Pepperl+Fuchs Mobile Advanced Diagnostic Module is required during commissioning to determine the DIP switch positions.

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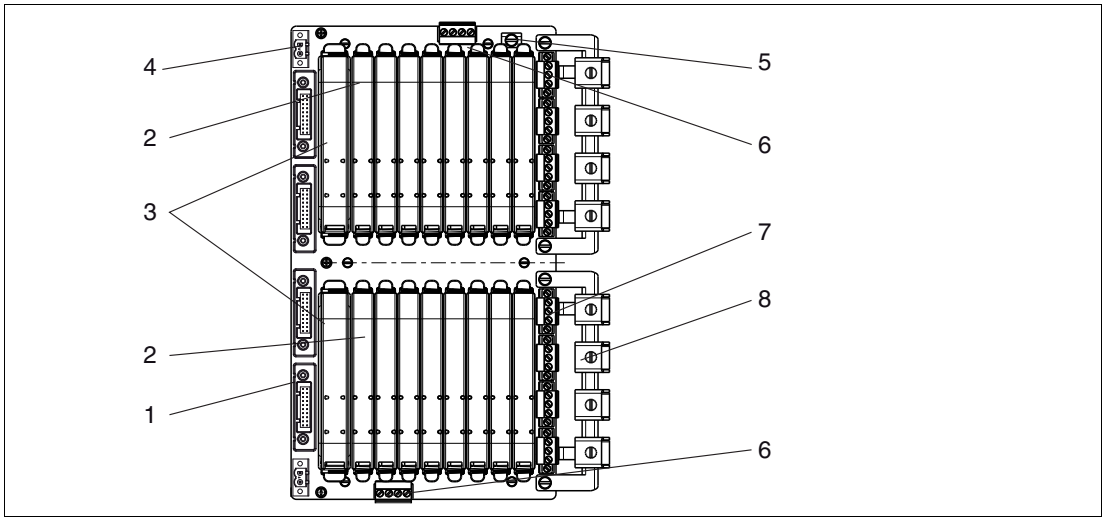
2.3 Component Identity



1 Host connectors ALF111, redundant for Yokogawa AKB336 system cables
2 Power modules
3 Diagnostic modules
4 Bulk power connection
5 Shield/earth connection clamp
6 Common alarm voltage-free contact and diagnostic bus connection
7 Trunk connection
8 Screening/earthing kit ACC-MB-HSK

2.4 Technical Data

System Specification

Ambient conditions	
Ambient temperature	-40 ... 60 °C
Storage temperature	-40 ... 85 °C
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
Mechanical specifications	
Connection type	plug with retaining screws
Core cross-section	2.5 mm^2
Protection degree	IP20
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	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 Type MBHC-FB-8R.YO

Supply	
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	16 A
Power loss	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

Isolated Power Supply Module Type HCD2-FBPS-1.500

Supply	
Rated voltage	19.2 ... 35 V DC
Power loss	typ. 1.6 W
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

Isolated Power Supply Module Type HCD2-FBPS-1.23.500

Supply	
Rated voltage	19.2 ... 35 V DC
Power loss	typ. 1.6 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

Basic Diagnostic Module Type HD2-DM-B

Supply	
Rated voltage Rated current	19.2 ... 35 V
Rated current	20 mA
Power loss	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

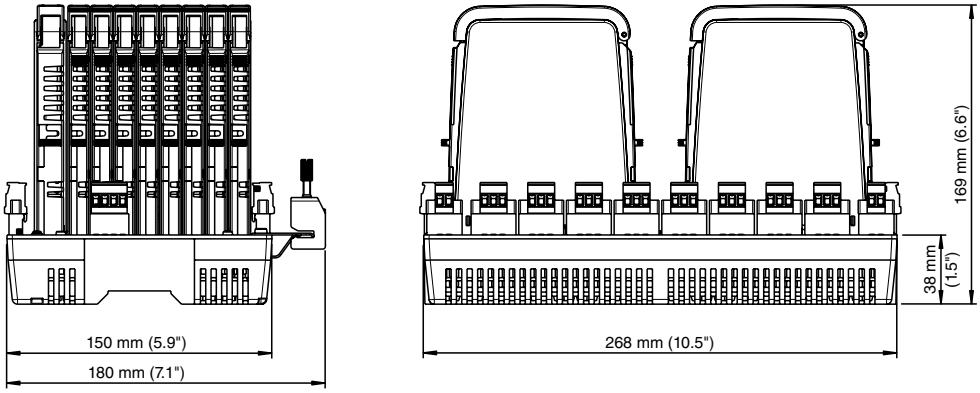
Supply	
Rated voltage	19.2 ... 35 V
Rated current	110 ... 30 mA
Power loss	max. 2 W
Fieldbus interface	
Number of segments	4
Rated voltage	9 ... 32 V
Indicators/operating means	
LED PRI PWR	green: on, primary bulk power supply connected
LED SEC PWR	green: on, secondary bulk power supply connected
LED 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

Accessories	
ACC-MB-HDC	Diagnostic link cable Coupling of diagnostic bus between two motherboards, length 6 cm
ACC-MB-HSK	Earth bar and 4 cable clamps used to simplifiy shield connection on the trunk cable

2.5 Dimensional Drawings



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

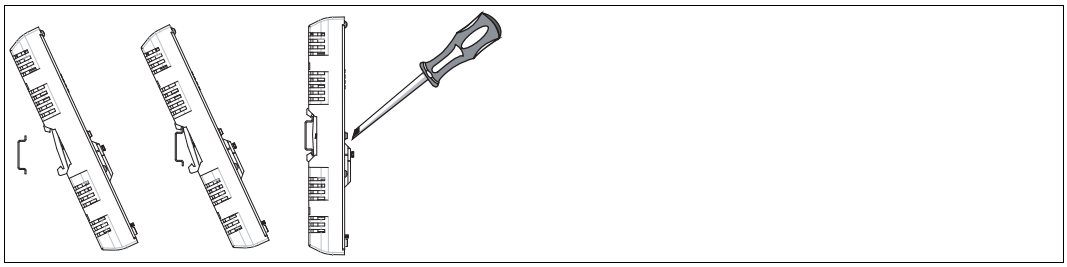
3 Installation and Commissioning

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!

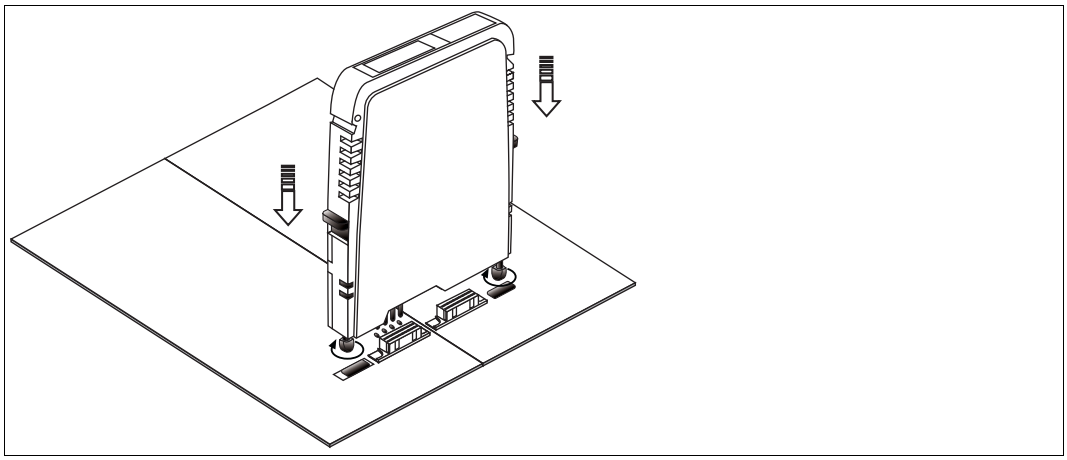
Hardware Damage

The Power Hub motherboard includes is 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.

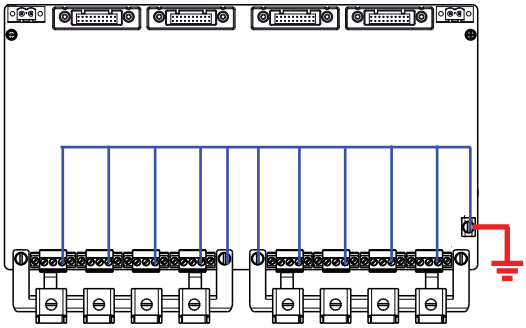
Dismounting Modules from the Motherboard

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



Caution!

This is not a safety earth.

Under certain conditions, it may be necessary to ground any exposed metal parts to ground.

Note that a correct grounding must be 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

Doublecheck 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 18.

+ Segment +

- Segment -

S Shield connection

Connecting the Yokogawa PLS

The motherboard is redundantly connected to the host system via Yokogawa ALF111 connectors. See "Cable and Connection Information" on page 18.

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 18.

Alarm Alarm signal lines

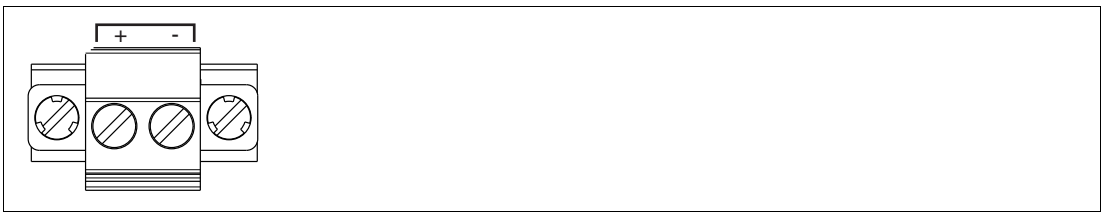
+ Diagnostic bus +

- 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 18.

Connector PWR Module A or B:



+ PWR

- PWR

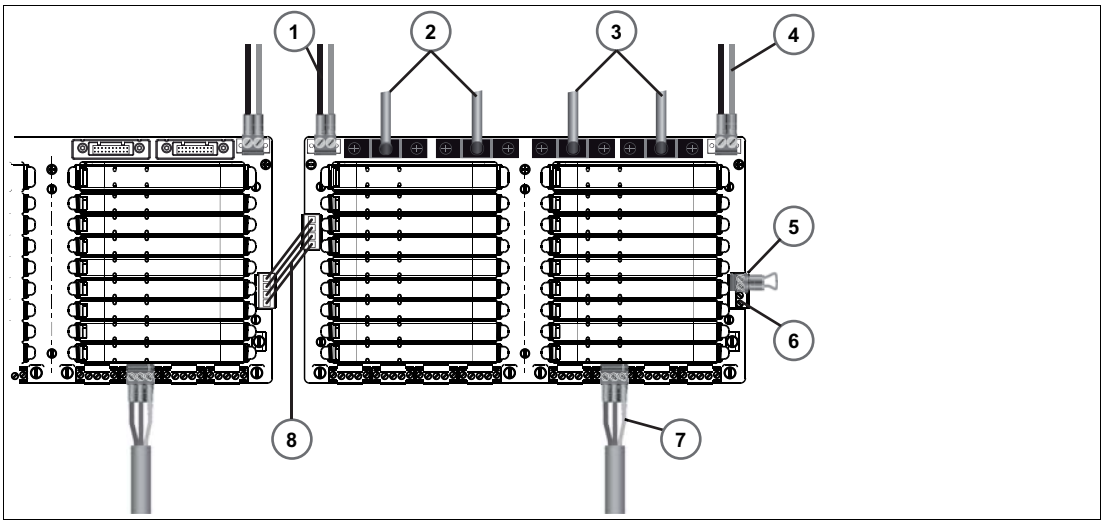
Grounding

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

3.3.1 Connections



1 Secondary bulk power connection

2 Redundant connection to Yokogawa ALF111 segments 5 to 8

3 Redundant connection to Yokogawa ALF111 segments 1 to 4

4 Primary bulk power connection

5 Common alarm voltage-free contact with final motherboard link.
The alarm contact must be looped at the last motherboard.

6 Diagnostic bus connection

7 Connections for fieldbus trunk

8 Diagnostic link cable ACC-MB-HDC

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.

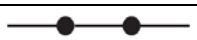
- Make sure that two terminators are activated on each trunk line.
- Verify that a terminator is located at each end of the trunk line.

4 Fieldbus Power Hub Basic Diagnostics

The FieldConnex® Power Hub system provides integrated self-supervision functionality located within the Power Modules and the Motherboards. Additionally, a Basic Diagnostic Module is available to monitor the bulk power supply status and compatibility of the mounted Power Modules in redundant systems. The following conditions are monitored:

- Availability of the bulk power supply
- Output voltage per segment
- Overload or short circuit per segment
- Power Module failure

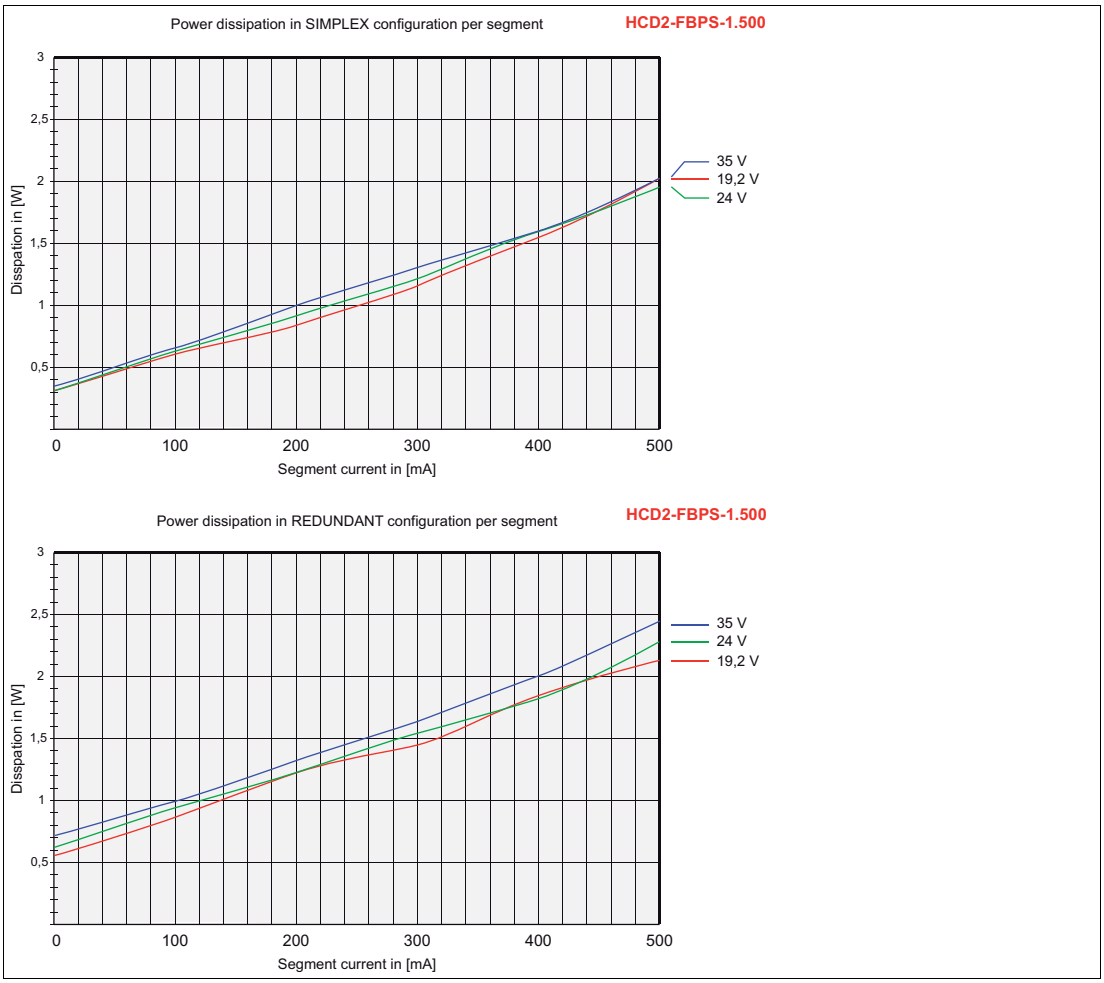
The status of the Power Hub is shown by LED indication and by a normally closed, voltage-free contact. Normal operating conditions are shown by green LEDs, the voltage-free contact is closed. See table below for detail diagnostic information.

Fault	Relay Contact	Diagnostic Module	Power Module
A: Supply Under/Over Voltage Detection			
> 18.5 V DC +/- 4 % < 35.8 V DC +/- 4 %		PRI PWR SEC PWR ERR	PWR ERR
< 17.5 V DC +/- 4 % > 36.8 V DC +/- 4 %*		PRI PWR SEC PWR ERR	PWR ERR
B: Power Module compatibility redundant system only			
All modules have intact redundancy partner		PRI PWR SEC PWR ERR	PWR ERR
Only one Power Module is fitted to a segment		PRI PWR SEC PWR ERR	PWR ERR
C: Power Module or load status			
Power Module failure		PRI PWR SEC PWR ERR	PWR ERR
Output overload or trunk short circuit		PRI PWR SEC PWR ERR	PWR ERR
All Power Modules fixed and healthy		PRI PWR SEC PWR ERR	PWR ERR

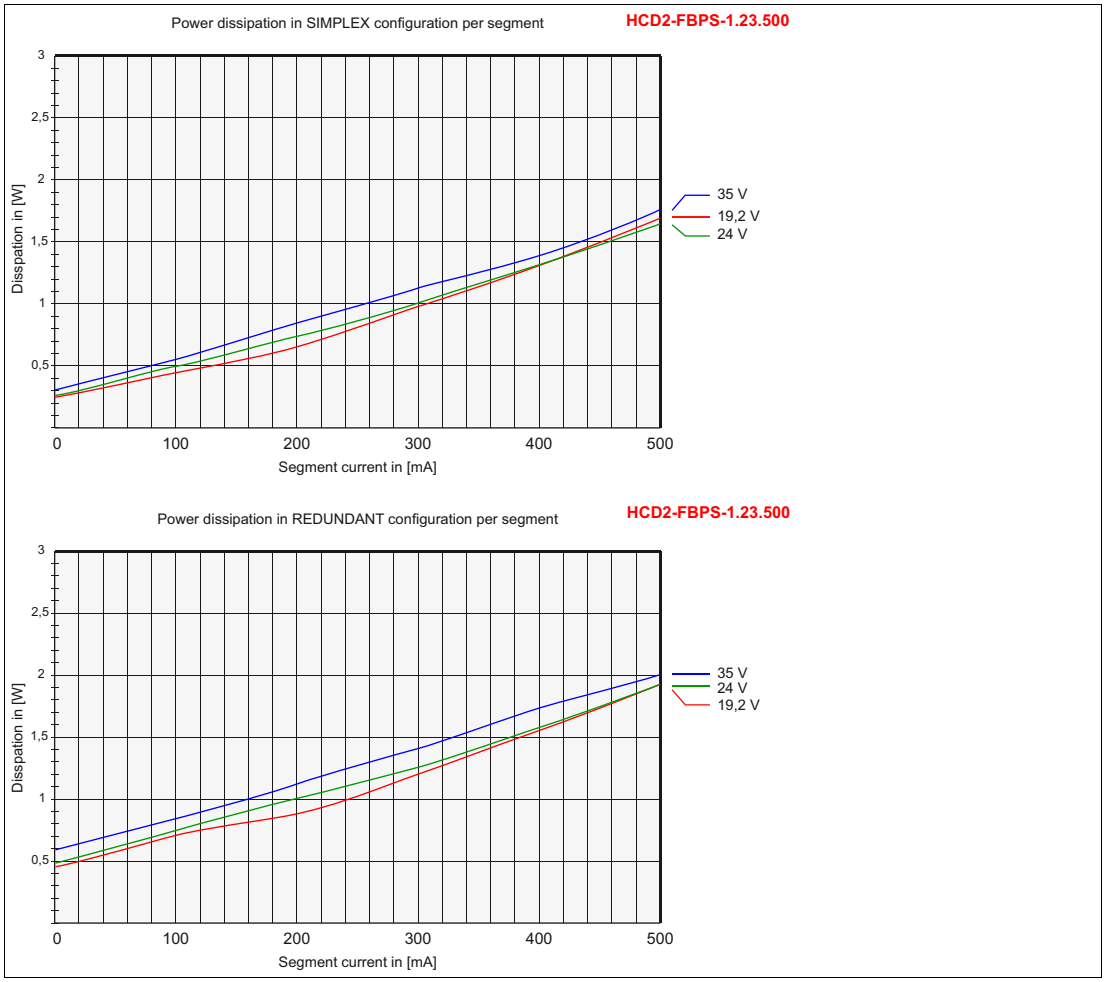
5 Thermal Dissipation

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 HCD2-FBPS-1.500, including motherboard



Thermal Dissipation of HCD2-FBPS-1.23.500, including motherboard



6 Appendix

6.1 Ordering Information

Designation	Description
HCD2-FBPS-1.500	General purpose isolated FieldConnex® Power Supply Module with 28 ... 28 V DC and 500 mA output.
HCD2-FBPS-1.23.500	Ex ic, Ex nL isolated FieldConnex®Power Supply Module with 21 ... 23 V DC and 500 mA output.
HD2-DM-B	Basic Diagnostic Module with LED indication and common relay fault output.
HD2-DM-A	Together with the FDT/DTM based Diagnostic Manager, the Advanced Diagnostic Module enables the analysis of signal and segment parameters, as well as the measurement of specific system and node physical layer values.
HD2-DM-A.RO	The Advanced Diagnostic Module relay output permanently monitors the physical layer. If a predefined threshold is exceeded, a built-in contact opens to alarm the operator by means of a system alarm input.
MBHC-FB-8R.YO	Redundant segment FieldConnex®Motherboard for eight segments with redundant bulk power feed and diagnostic interface, and with screw terminal connectors. Host side adapted for direct connection with the Yokogawa ALF111 controller.

Accessories	
ACC-MB-HDC	Diagnostic link cable Coupling of diagnostic bus between two motherboards, length 6 cm
ACC-MB-HSK	Earth bar and 4 cable clamps used to simplifiy shield connection on the trunk cable

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

Compatibility in accordance with EN61326-1:2006 and Namur NE21:2006 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. Three 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 NE21 recommendation, are partly higher compared to the test levels and failure criteria defined in EN61326-1. For the product qualification, failure criteria and test levels have been selected, representing always the worst case conditions.

EN61000-4, as a generic standard, defines the test setups for the specific required test for EN61326-1 and NE21.

2013-01

Applied standards:

- CE-Conformity 2004/108/EC
- EN61000-4, July 2007
- EN61326-1, October 2006
- EN55011, March 2007
- NE21, Mai 2006

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	_

6.3 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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