MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

PEPPERL+FUCHS

HD2-DM-B

BASIC DIAGNOSTIC MODULE

Used with the applicable FieldConnex Advanced Diagnostics system configuration.

REFERENCE PACKAGE

Selected official pages follow this cover with source pagination retained.

OFFICIAL DOCUMENT

Pepperl+Fuchs product record 14633; PDS 131001; TDOCT-3979

Basic Diagnostic Module
FieldConnex® Fieldbus
HD2-DM-B

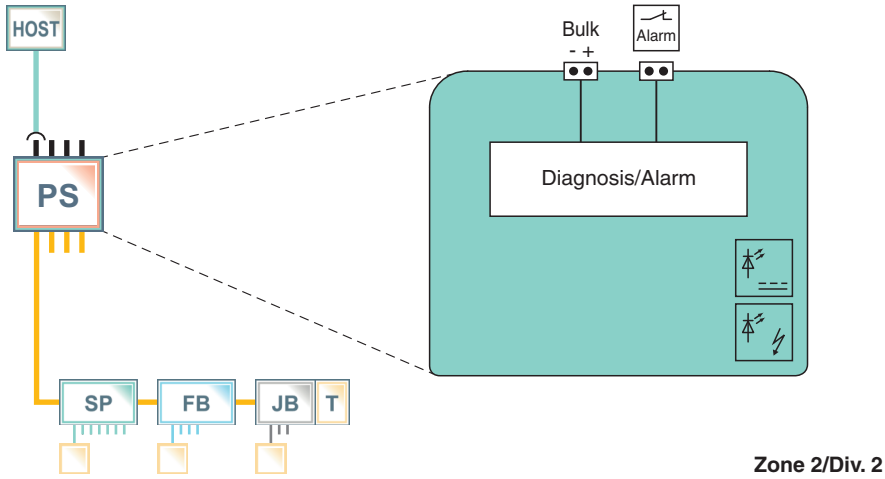
- Basic monitoring for power supply output and health
- Plug-in Module for the FieldConnex Power Hub
- Plug and play - no engineering required
- For online monitoring
- For FOUNDATION Fieldbus H1 and PROFIBUS PA
- Installation in Zone 2/Class I, Div. 2
- System state and fault indication via LEDs

Basic diagnostic module, base module for fieldbus power hub physical layer diagnostics

Function

Designed as a plug-in module for the FieldConnex® Power Hub, the Basic Diagnostic Module HD2-DM-B provides basic system diagnostics. It checks for proper operation of bulk power supplies and monitors the connected trunks for overload or short-circuit conditions. All Power Hub modules are checked for proper function. On redundant power modules it indicates missmatching pairs.
The module indicates a fault condition via voltage-free contact. It provides monitoring "plug-and-play" without additional engineering. LED signals indicate a fault for easy detection.

Connection



Technical Data

General specifications		
Design / Mounting		Motherboard based
Installation in hazardous area		Zone 2 / Div. 2
Supply		
Rated voltage	U_r	19.2 ... 35 V
Rated current	I_r	20 mA
Power dissipation		max. 0.5 W
Fieldbus connection		
Number of segments		4
Indicators/operating means		
LED PRI PWR		green: on, primary bulk power supply connected

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Technical Data

LED SEC PWR	green: on, secondary bulk power supply connected
LED ERR	red: 2 Hz flashing, power supply fault (short-circuit, undervoltage), redundancy fault
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Galvanic isolation	
Fieldbus segment/Fieldbus segment	functional insulation acc. to IEC 62103, rated insulation voltage 50 V_{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013
Standard conformity	
Electromagnetic compatibility	NE 21:2011
Degree of protection	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
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	
Core cross section	motherboard specific
Housing material	Polycarbonate
Degree of protection	IP20
Mass	approx. 70 g
Dimensions	
Height	106 mm
Width	18 mm
Depth	128 mm
Mounting	motherboard mounting
Data for application in connection with hazardous areas	
Certificate	TÜV 04 ATEX 2500 X
Marking	⟨Ex⟩ II 3 G Ex nA nC IIC T4 Gc
Directive conformity	
Directive 2014/34/EU	EN IEC 60079-0:2018+AC:2020 , EN 60079-11:2012 , EN 60079-15:2010
International approvals	
FM approval	
FM certificate	FM 19 US 0015 X and FM 19 CA 0011 X
FM marking	Class I, Division 2, Groups A, B, C, D, T4 / Class I, Zone 2, AEx/Ex nA nC IIC T4
IECEx approval	
IECEx certificate	IECEx TUN 13.0038X
IECEx marking	Ex nA IIC T4 Gc
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

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Product Photo

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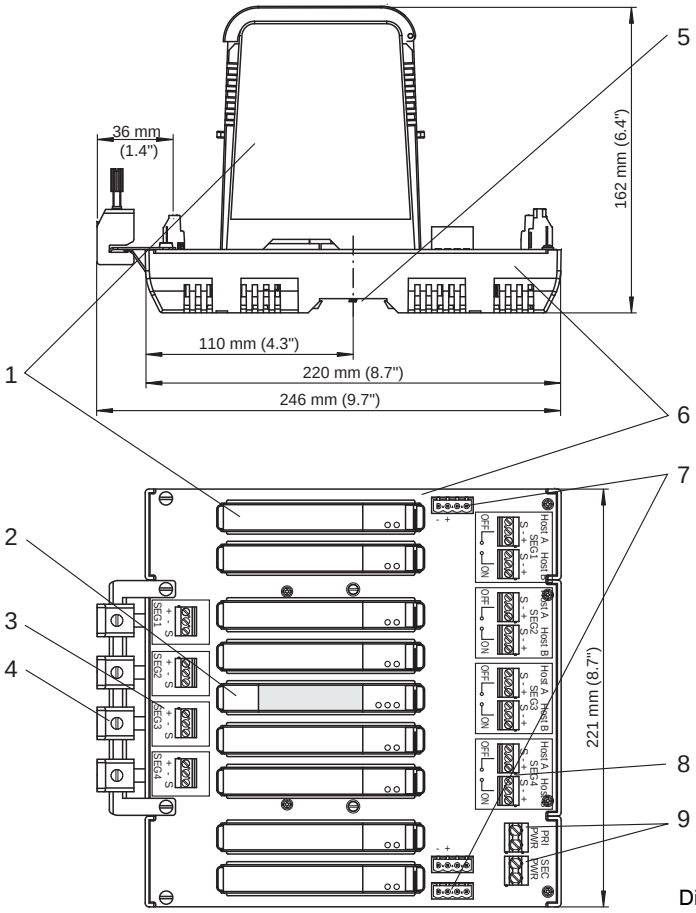
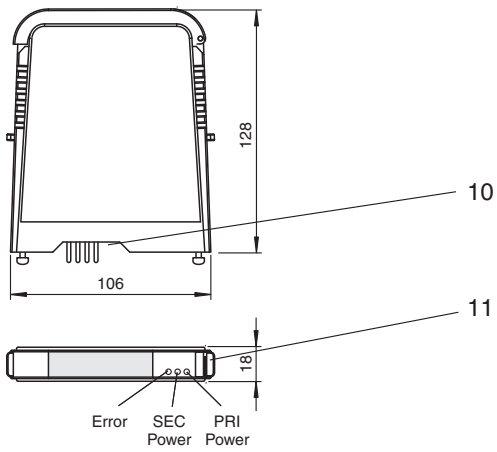
Additional Information

Dimensions



Dimensions complete redundant system



Dimensions Diagnostics Module

Description:
1 Power Supply Modules, see separate data sheets
2 Diagnostics Module
3 Connections for fieldbus trunk, terminator switch
4 Screening/earthing kit for trunk cables shield, optional accessory
5 Mounting slot for DIN rail
6 Motherboard, see separate data sheets
7 Connections for alarm, voltage free contact and diagnostics bus
8 Connections for redundant host
9 Connections for redundant bulk power supply
10 Plug connections to Motherboard
11 State and fault indication LEDs

Installation

see manual

Accessories

see system datasheet

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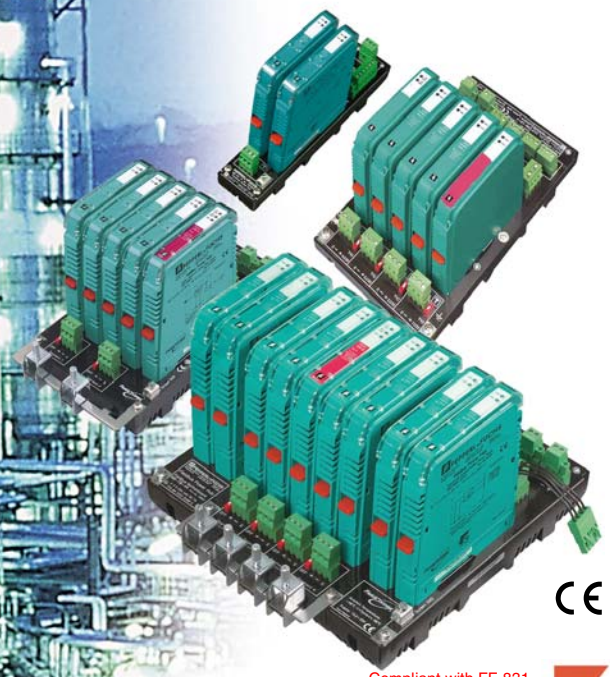
PROCESS AUTOMATION

System Manual

Fieldbus Power Hub

A family of advanced high performance simplex or redundant balanced Fieldbus Power Supplies and Power Conditioners:

SAFE AREA
ZONE 2 / Div. 2



CE

Compliant with FF-831
The latest FF power supply test specification

FF-831

Crosstalk & Resonance suppression technology **CREST**

PEPPERL+FUCHS
FieldConnex™

- Supply of field devices: POWER + communication signal
- Redundant supply for high availability
- Basic diagnostics via LEDs
- Advanced Physical Layer Diagnostics using the Advanced Diagnostic Module HD2-DM-A and the FDT/DTM software packet

5.3 System components

5.3.1 Motherboards

Motherboards are available for one, two or four fieldbus segments. Motherboards are typically mounted on DIN rails inside a wiring or marshalling cabinet. Wiring connectors exist on board for two independent bulk power supplies, fieldbus segments, fault and diagnostics signalling.

MB-FB-1R

The motherboard MB-FB-1R is a system component of the FieldConnex Power Hub. It allows redundant supply for one fieldbus segment as well as the connection of the FOUNDATION Fieldbus H1 host system. Two sockets will hold the power supply modules which operate in redundancy. The modules are available for different explosion protection concepts and with various isolation levels. Basic system diagnostic features are integrated and visualized by LED. All modules are checked for proper function and integrity. The bulk power supplies are checked for working in the proper voltage range and the connected trunk is monitored for overload and short-circuit.

MB-FB-2R

The motherboard MB-FB-2R is a system component of the FieldConnex Power Hub. It allows the redundant supply of two fieldbus segments and a redundant connection of the FOUNDATION Fieldbus H1 Host system, switchable with one or two connection cables. Four sockets will hold the power supply modules, two each are in redundancy per segment. The modules are available for different explosion protection concepts and with various isolation levels. The extra socket will hold a diagnostics module.

MB-FB-4

The motherboard MB-FB-4 is a system component of the FieldConnex Power Hub. It allows the supply of four fieldbus segments and the connection of the FOUNDATION Fieldbus H1 host system. The four sockets will hold the power supply modules. The power modules are available for different explosion protection concepts and with various isolation levels. The extra socket will hold a diagnostics module.

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MB-FB-4R

The motherboard MB-FB-4R is a system component of the FieldConnex Power Hub. It allows the redundant supply of four fieldbus segments and the redundant connection of the FOUNDATION Fieldbus H1 Host system, switchable with one or two connection cables. The eight sockets will hold the power supply modules, two each are in redundancy per segment. The extra socket will hold a diagnostics module.

5.3.2 Modules

Power Modules are connected to the motherboard via sockets. Replacement under live conditions (hot-swap) and load sharing capability in redundant configuration enable interruption-free communication. The modules are available in different explosion protection concepts and with various isolation levels.

Power Modules

- Power Supply Modules
  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.
  Different Power Supply Modules exist with voltage regulated and limited energy levels according to the specifications of FNICO, Entity and FISCO standards. A maximum output current of 500 mA is available to power field devices.
- Power Conditioner Modules
  Modules with current limiting circuits between bulk power supply and fieldbus segment and without galvanic isolation are called “Power Conditioner Modules“. Power Conditioner Modules carry passive components only and can be used where ’good wiring practice’ is followed and reduced safety requirements exist such as protection type n or increased safety. Power Conditioner Modules utilize CREST technology thereby creating high impedance for common mode noise and network resonance effects.

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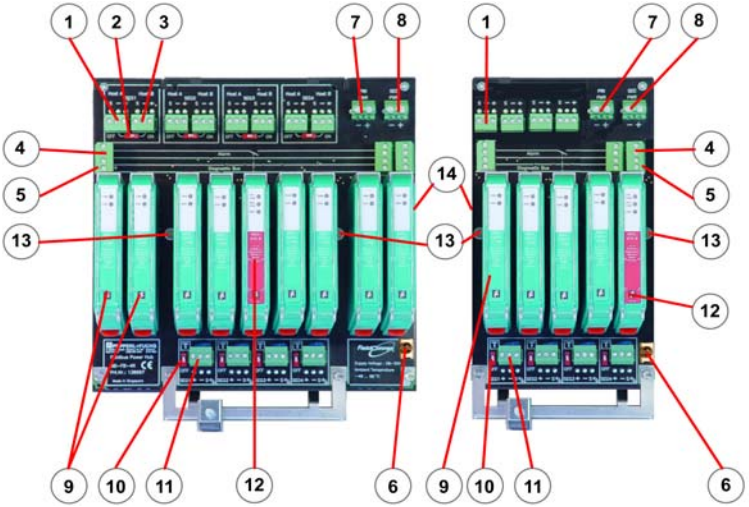
5.9 Component Identity

MB-FB-4R	MB-FB-2R, MB-FB-4



1	Host connection A (segment 1)	8	Secondary power connection
2	Host connection Link switch (segment 1)	9	Power module(s) (segment 1)
3	Host connection B (segment 1)	10	Terminator switch (segment 1)
4	Common alarm voltage free contact	11	Trunk connection (segment 1)
5	Diagnostic bus connection	12	Diagnostic module
6	Screen/ground connection clamp	13	Motherboard fastening screw
7	Primary power connection	14	DIN rail slot

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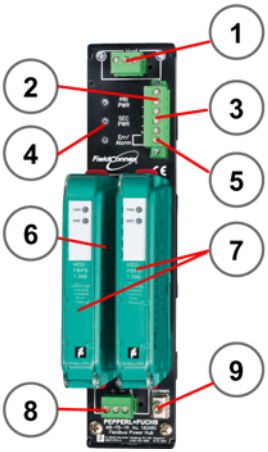
5.10 Component identity MB-FB-1R



1 Host connection
2 Primary power connection
3 Secondary power connection
4 LED indication from integrated Diagnostic module
5 Alarm output
6 Motherboard fastening screw
7 Power modules
8 Segment trunk connection
9 Screen/ground connection clamp

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5.12 System engineering

5.12.1 Redundant Power Supply for one Fieldbus Segment

For one redundant Fieldbus segment, use the following components:

- Motherboard MB-FB-1R
- 2 x Power Modules (Power Supply Modules or Power Conditioner Modules)
- Diagnostic Module (Basic or Advanced)

5.12.2 Redundant Power Supply for two Fieldbus Segments

For two redundant Fieldbus segments, use the following components:

- Motherboard MB-FB-2R
- 4 x Power Modules (Power Supply Modules or Power Conditioner Modules)
- Diagnostic Module (Basic or Advanced)

5.12.3 Simplex Power Supply for four Fieldbus Segments

For four simplex Fieldbus segments, use the following components:

- Motherboard MB-FB-4
- 4 x Power Modules (Power Supply Modules or Power Conditioner Modules)
- Diagnostic Module (Basic or Advanced)

5.12.4 Redundant Power Supply for four Fieldbus Segments

For four redundant Fieldbus segments, use the following components:

- Motherboard MB-FB-4R
- 8 x Power Modules (Power Supply Modules or Power Conditioner Modules)
- Diagnostic Module (Basic or Advanced)

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Instruction Manual

1. Marking

Advanced diagnostic module, type HD2-DM-A*
ATEX certificate: TÜV 04 ATEX 2500 X ATEX marking: Ex II 3 G Ex nA IIC T4 Gc
IECEx certificate: IECEx TUN 13.0038X IECEx marking: Ex nA IIC T4 Gc

Basic diagnostic module, type HD2-DM-B*
ATEX certificate: TÜV 04 ATEX 2500 X ATEX marking: Ex II 3 G Ex nA nC IIC T4 Gc
IECEx certificate: IECEx TUN 13.0038X IECEx marking: Ex nA nC IIC T4 Gc

The *-marked letters of the type code are placeholders for versions of the device.

Pepperl+Fuchs Group Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

2. Target Group, Personnel

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

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the device. The trained and qualified personnel must have read and understood the instruction manual.

3. Reference to Further Documentation

Observe directives, standards, and national laws applicable to the intended use and the operating location.
Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable supplement this document. You can find this information under www.pepperl-fuchs.com.

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com/device-information.

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.

4. Intended Use

The device is designed to analyze signals for monitoring and measuring specific system and field device values.

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.

The device must only be operated in the specified ambient temperature range and at the specified relative humidity without condensation.

5. Improper Use

Protection of personnel and the plant is not ensured if the device is not used according to its intended use.

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

The device is not suitable for isolating signals in power installations unless this is noted separately in the corresponding datasheet.

6. 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.

Observe the installation instructions according to IEC/EN 60079-14.

Do not mount a damaged or polluted device.

The device 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.

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

6.1. Hazardous Area

If the device has already been operated in general electrical installations, the device may subsequently no longer be installed in electrical installations used in combination with hazardous areas.

6.1.1. Gas

6.1.1.1. Zone 2

The device may be installed in gas groups IIC, IIB, and IIA.

The device may be installed in Zone 2.

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

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

7. Operation, Maintenance, Repair

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

Only use operating elements in the absence of a potentially explosive atmosphere.

Only plug and pull the energized module in the absence of a potentially explosive atmosphere.

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

Do not remove the warning marking "Warning – Do not separate when energized!".

Observe IEC/EN 60079-17 for maintenance and inspection of associated apparatus.

Do not connect or disconnect increased safety circuits when the circuits are energized and a potentially explosive atmosphere is present.

If there is a defect, always replace the device with an original device.

8. Delivery, Transport, Disposal

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.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.