



**Diagnostic module for commissioning, online monitoring and troubleshooting of fieldbus segments**

- Comprehensive diagnostics for fieldbus physical layer and power supply
- For FOUNDATION Fieldbus H1 and PROFIBUS PA
- Display of data in the control room
- Alarm integration into DCS
- Fault indication transmission by voltage free contact and diagnostic bus
- Installation in Zone 2/Class I, Div. 2

**Function**

The Advanced Diagnostic Module is a comprehensive measurement tool for the fieldbus physical layer and plugs into the FieldConnex motherboards.

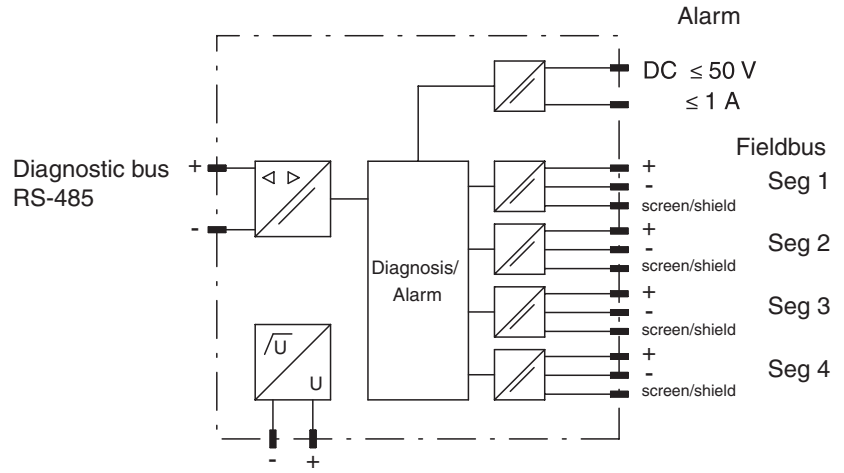
It is well suited for commissioning, online monitoring and maintenance. Passive input circuits leave the physical layer untouched, avoiding alteration of the signal.

The module provides the exact segment and individual device data needed for detection of gradual or sudden changes in the fieldbus physical layer. Intermittent segment malfunctions can be traced.

The FDT/DTM-based Diagnostic Manager - Basic Edition is downloadable free of charge. It displays all measurement values with fast screen updates in the control room.

The optional 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 behaviour. The OPC server transmits user-selectable summary alarms to the DCS. Operations and maintenance personnel proactively schedule repair work before communications or plant failure.

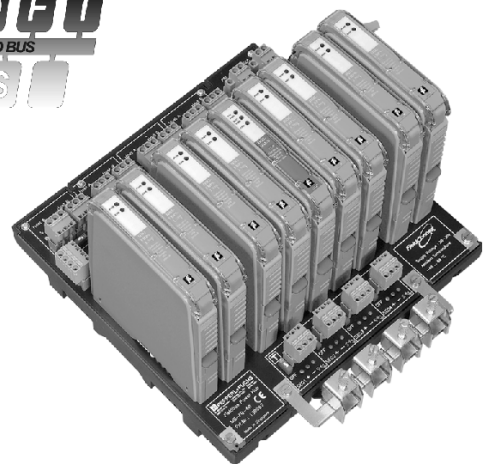
**Connection**



**Composition**



Fieldbus Power Hub, Advanced Diagnostic Module



Fieldbus Power Hub, Motherboard fully equipped with Diagnostic Module and redundant Power Supply Modules

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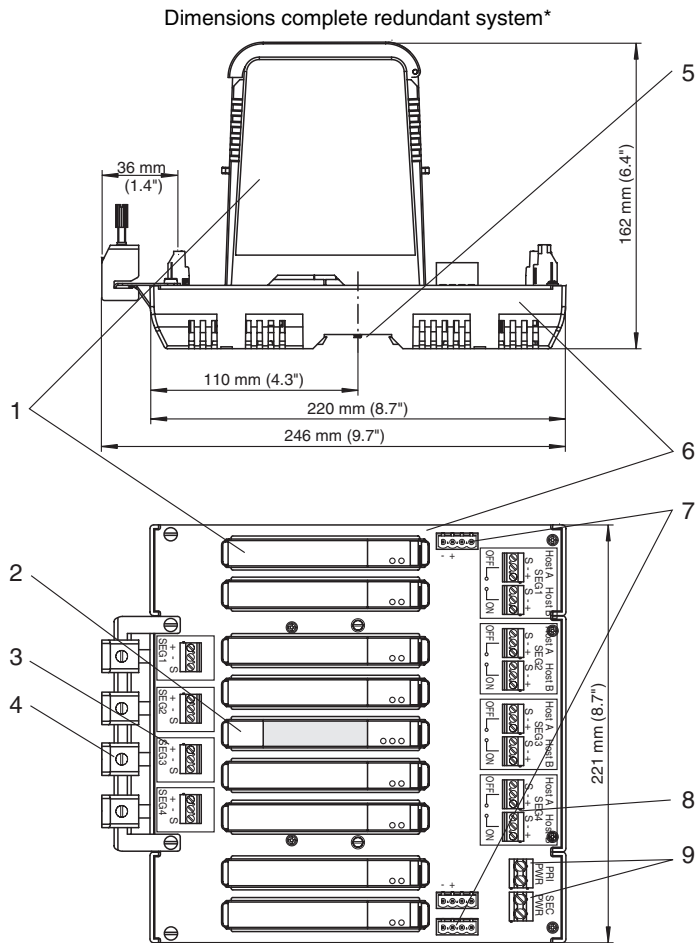
<b>Supply</b>	
Rated voltage	19.2 ... 35 V
Rated current	110 ... 30 mA
Power loss	max. 2 W
<b>Fieldbus interface</b>	
Number of segments	4
Fieldbus type	FOUNDATION Fieldbus/PROFIBUS PA
Rated voltage	9 ... 32 V
<b>Indicators/operating means</b>	
LED PRI PWR	green: on, primary bulk power supply connected
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
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
DIP-switch	diagnostic address 1...247, binary coded
<b>Interface</b>	
Interface type	Diagnostic bus: RS 485
<b>Electrical isolation</b>	
Fieldbus segment/Fieldbus segment	functional insulation acc. to IEC 62103, rated insulation voltage 50 V <sub>rms</sub>
Fieldbus segment/Supply	functional insulation acc. to IEC 62103, rated insulation voltage 50 V <sub>rms</sub>
<b>Directive conformity</b>	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
<b>Standard conformity</b>	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
<b>Ambient conditions</b>	
Ambient temperature	-40 ... 60 °C (233 ... 333 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)
Relative humidity	< 95 % non-condensing
Shock resistance	15 g 11 ms
Vibration resistance	1 g , 10 ... 150 Hz
<b>Mechanical specifications</b>	
Connection type	motherboard specific
Core cross-section	motherboard specific
Housing material	Polycarbonate
Housing width	18 mm
Height of housing	106 mm
Housing depth	128 mm
Protection degree	IP20
Mass	approx. 100 g
Mounting	motherboard mounting
Mating cycles	100
<b>Data for application in conjunction with hazardous areas</b>	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature classification	⊕ II 3G EEx nA IIC T4
Directive conformity	
Directive 94/9 EC	EN 60079-15:2003
<b>International approvals</b>	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Div 2, ABCD, T4 / Class I, Zone 2, AEx/Ex nA IIC T4
<b>Certificates and approvals</b>	
Marine approval	DNV A-10798

**Supplementary information**

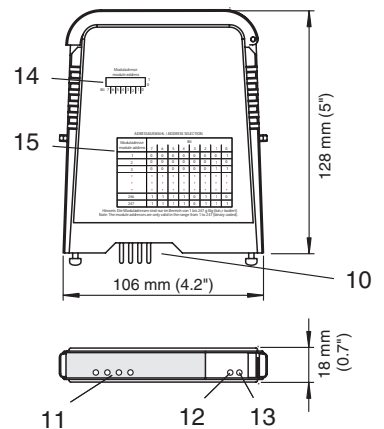
Statement of Conformity, Declaration of Conformity and instructions have to be observed. For information see [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

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Dimensions



Dimensions Advanced Diagnostic Module\*



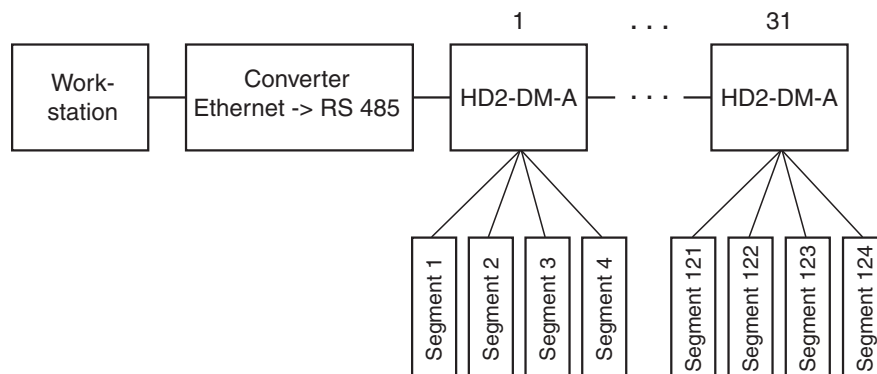
\*all dimensions without tolerance indication

Description:

- 1 Power Supply Modules, see separate data sheets
- 2 Advanced Diagnostic 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 LED Seg 1 ... Seg 4
- 12 LED green SEC Power
- 13 LED green PRI Power
- 14 Dip-Switch-Array for diagnostic address or address on the diagnostics bus
- 15 Address selection overview

Installation note

System topology



Installation notes see manual.

Accessories

- Software User Interface for monitoring up to or including 100 fieldbus segments: Diagnostic Manager, Professional Edition DTM-FC.AD
- Software User Interface for monitoring more than 100 fieldbus segments: Diagnostic Manager, Professional Edition DTM-FC.AD.1
- COM Port Converter, Digi One<sup>R</sup> IA

Functional overview

<b>Supply input voltage</b>	The supply voltage of the primary and secondary input is measured in a range of 0 V ... 40 V.
<b>Segment power redundancy integrity</b>	The health of the primary and backup fieldbus power supply is monitored.
<b>Fieldbus voltage</b>	The segment voltage is measured in a range of 0 V ... 35 V.
<b>Fieldbus current</b>	The current feed into a fieldbus segment is measured in a range of 0 A ... 1 A depending on the used power supply.
<b>Unbalance detection</b>	A capacitive or resistive short between any fieldbus wire and shield is measured and given in a range between -100 % ... +100 %. (-100% = short against - wire, +100% = short against +wire)
<b>Termination</b>	Over- and Undertermination are detected and reported .
<b>Communication level</b>	Node specific communication levels are measured in a range of 0 V ... 2.5 V.
<b>Jitter</b>	The jitter of the frames of a fieldbus segment is directly related to the quality of the communication of that segment. The quality of the power supply, field devices and other equipment as well as cable length and types may influence the jitter. The jitter is either segment- or device-specifically measured in a range of 0 µsec ... 8 µsec.
<b>Signal polarity</b>	For each node the polarity of the signal modulation is given.
<b>Noise measurement</b>	Noise is measured in a frequency range between 100 Hz ... 140 kHz. Noise measurement can be performed node-address-specific in order to detect device-specific noise.
<b>Communication errors statistics</b>	Segment-specific error counters, e. g. for CRC errors, framing errors.
<b>Oscilloscope function</b>	The built-in oscilloscope is a powerful tool for signal voltage behavior analysis. It allows for analysis of specific frames and occurring communication errors. Trigger conditions, as e. g. different frame types, CRC errors, framing errors are either node-address-specific or unspecific. The frame contents detected in the sampled period are analyzed and shown.  Possible trigger conditions for FOUNDATION Fieldbus segments are: <ul style="list-style-type: none"> <li>• Passtoken to node address</li> <li>• Probenode to address</li> <li>• Passtoken response to address</li> <li>• Missing Passtoken response to address</li> <li>• Probe response to address</li> <li>• Missing probe response to address</li> <li>• Claim LAS from address</li> <li>• Transfer LAS to address</li> </ul> Possible trigger conditions for PROFIBUS PA segments are: <ul style="list-style-type: none"> <li>• Request from address</li> <li>• Response from address</li> <li>• Missing response from address</li> <li>• Passtoken to address</li> <li>• Missing passtoken response from address</li> </ul> Other possible trigger events : <ul style="list-style-type: none"> <li>• CRC error</li> <li>• Framing error</li> <li>• Signal level</li> </ul>
<b>Live list generation</b>	A list of all connected devices and additional status information is generated.
<b>Alarm management</b>	For all measured values, either segment- or node-specific, alarm limits exist. In addition, warning limits can be defined. When these limits are violated, alarms are generated.
<b>History/trending function</b>	For up to 2 years, segment- and node-specific physical layer values can be stored and time stamped in the Diagnostic Module, so trending analyses are possible over longer periods of time.

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