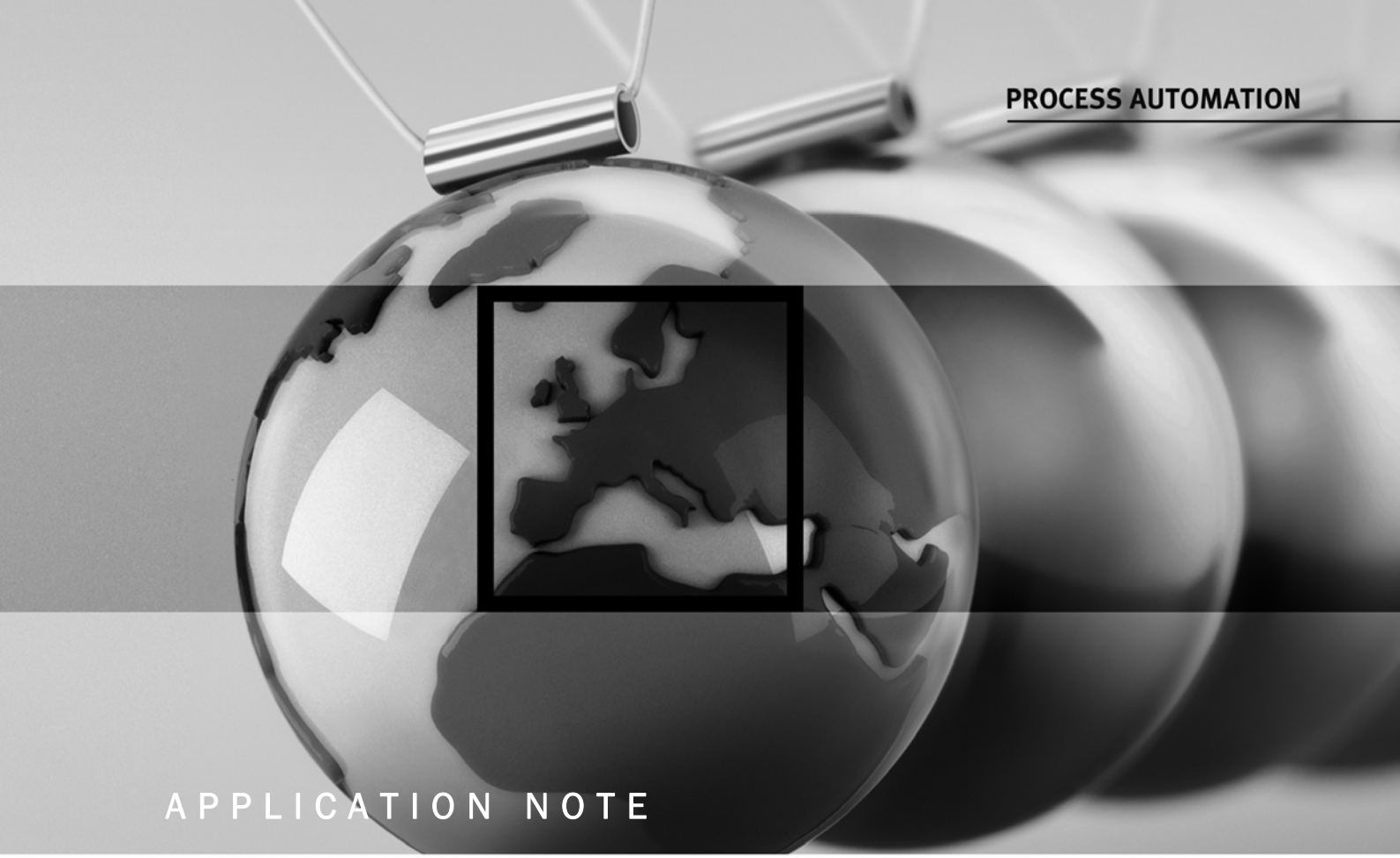

PROCESS AUTOMATION

APPLICATION NOTE

Fieldbus Solutions with Physical Layer Diagnostics

This note is directed to users of Pepperl+Fuchs Fieldbus Technology in conjunction with the Foxboro® I/A Series® System and the Fieldbus Interface Modules for FOUNDATION Fieldbus, FBM228. This document provides possible solutions for enhanced physical layer diagnostics using the Pepperl+Fuchs FieldConnex® Power Hub family of power supplies.

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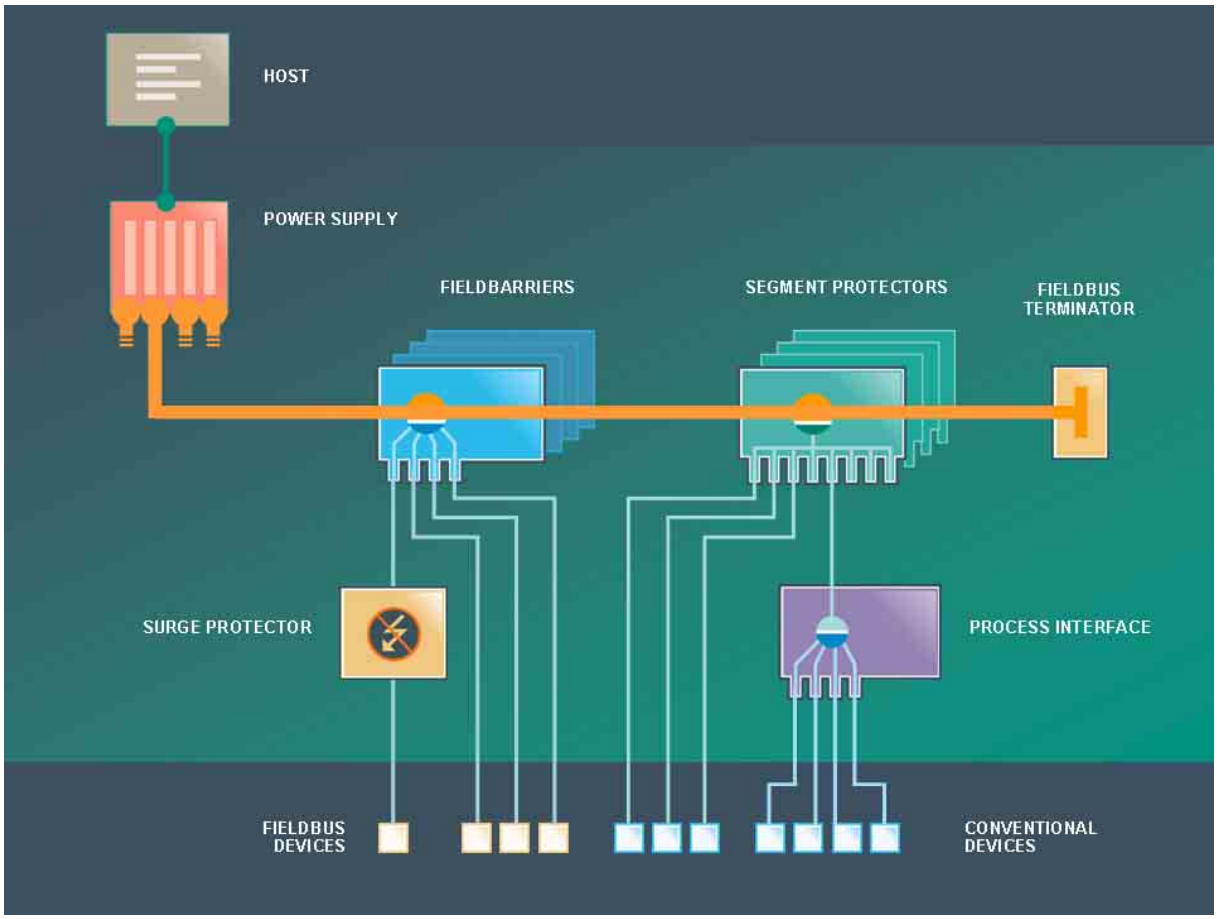

Fieldbus devices are installed and operate at the heart of the process and in most cases under harsh conditions. Exposed to aggressive process media causing corrosion and in some cases even signal degradation. Due to the environmental demands operational reliability and proven quality is vital.

FieldConnex® is the combination of latest fieldbus technology, expert know how and superior design. Fieldbus benefits are illustrated through cost reductions, simplified planning effort, fast commissioning and a long service life. Advancements in fieldbus communications have allowed solutions such as Advanced Diagnostics to enable permanent and powerful online monitoring of the fieldbus physical layer. Critical situations can now be recognized and proactively repaired, before they negatively influence process signal quality and plant availability.

Pepperl+Fuchs is the leading company for fieldbus connectivity - for the safe as well as hazardous area. Our reputation earned our active roll in participation governing bodies and contributions to the development of standards and technologies. Our cutting edge products find worldwide recognition through the name FieldConnex. Periodic seminars and events in conjunction with the governing bodies achieve continuous knowledge transfer to planners and end users.

Pepperl+Fuchs offers expert know how for fieldbus and explosion protection. A superior product portfolio of award winning technologies allows complete solutions from a single source. Our global support network offers assistance worldwide. With Pepperl+Fuchs you can rely on our comprehensive industry knowledge - from Chemical to pharmaceutical and Oil and Gas to power generation to water and waste water. All backed by a company with years of unparalleled commitment to innovation.

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Fieldbus Solutions with Physical Layer Diagnostics

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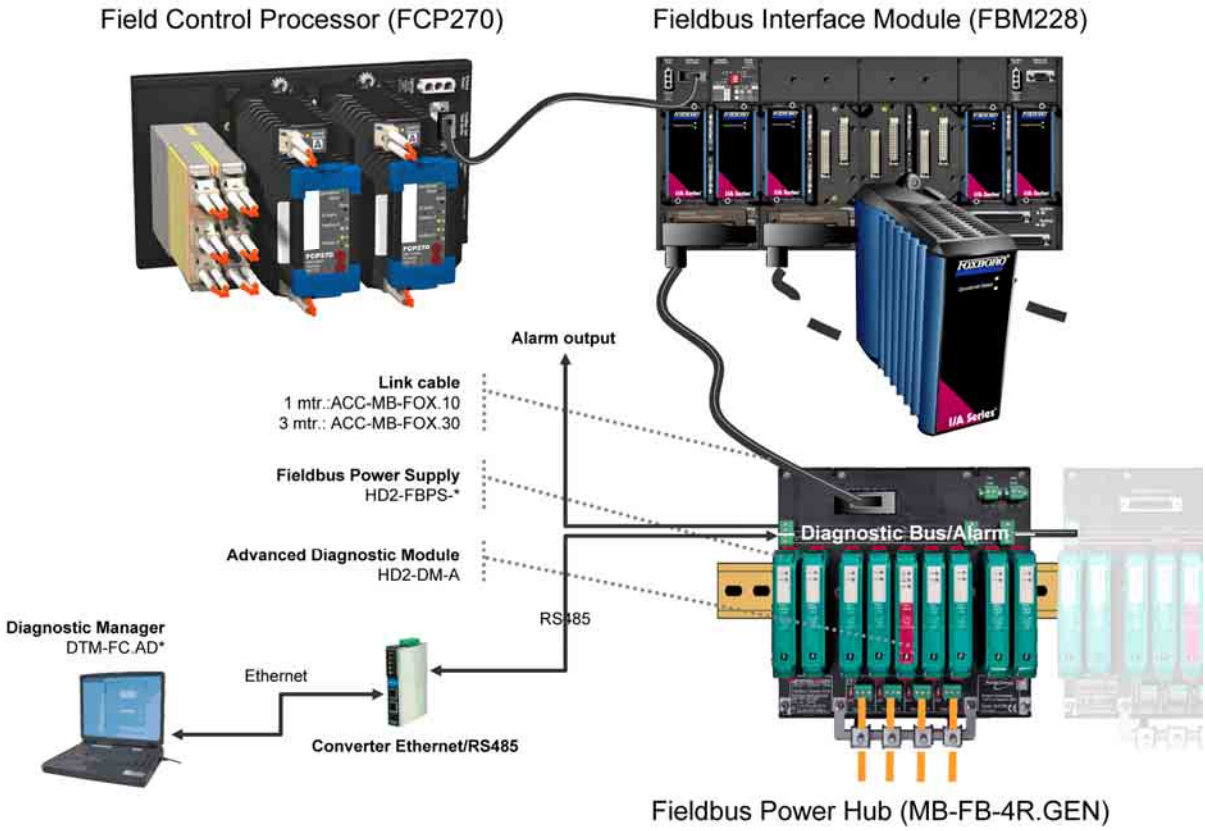
1 Application: New Fieldbus Installations

The following assembly shall be the preferred solution for new Fieldbus installations.



The baseplate of the Foxboro Fieldbus Interface Modules and the Pepperl+Fuchs Fieldbus Power Hub are connected to each other by a customized link cable. It is available in two different lengths. *ACC-MB-FOX.10* has a length of 1 meter and *ACC-MB-FOX.30* a length of 3 meters. The cable connects to one 37-pin Sub-D Fieldbus Interface Module system connector and to the 25-pin system connector of the Fieldbus Power Hub. It offers the link for up to 4 independent operating Fieldbus signal pairs. In a redundant FBM 228 Field Controller configuration a Foxboro Redundant Adapter (P0922RK) needs to be assembled prior to the connection of the link cable. It combines two baseplate system connectors to one common. The control processor FCP270 was chosen just for illustration purposes, the solution fits for the control processor ZCP270 as well.

The Power Hub is available in two different versions. The version *MB-FB-4R.GEN* as shown allows the redundant assembly of 2 Fieldbus Power Supplies per segments and delivers 4 segment outputs in total. The version *MB-FB-4.GEN* is the simplex variant and provides just one slot for a single Fieldbus Power Supply per segment. Different versions of Fieldbus Power Supplies of the type *HD2-FBPS-** are available with different voltage and current outputs.

The Power hub hosts the Advanced Diagnostic Module *HD2-DM-A* which connects to the RS485 diagnostic bus. Malfunctions are indicated by LEDs and can be transmitted as summary alarm by a voltage-free dry contact to any binary input signal. Via the RS485 diagnostic bus which allows the daisy-chaining of up to 31 Power Hubs the diagnostic data is retrievable and being transmitted.

The user interface is called Diagnostic Manager which runs on a common Windows® based platform. The license *DTM-FC.AD** lets the Diagnostic Manager run remotely in the control room or a special maintenance workstation that connects for instance to a local Ethernet network. An Ethernet/RS485 converter mounted close to the control cabinet routes the data from the user interface to the diagnostic module and vice versa.

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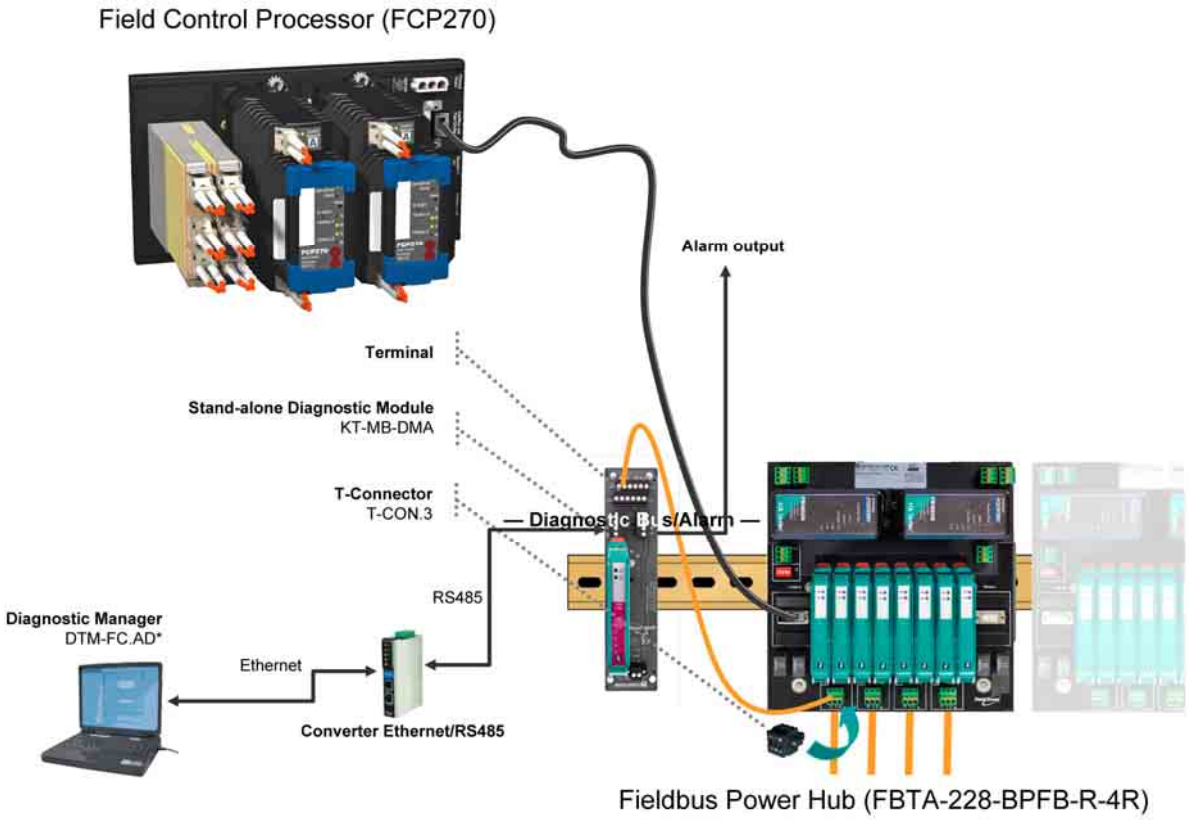
2 Application: Upgrading Fieldbus Installations

The following assembly shall be the preferred solution for upgrading existing Fieldbus installations.



Two Fieldbus Interface Modules FBM228 are directly mounted onto the customized Fieldbus Power Hub motherboard. The Field Control Processor connection to the Power Hub is established by using a standard Sub-D connector provided by Foxboro. Two versions of Power Hub motherboards are available at Pepperl+Fuchs. Version *FBTA-228-BPFB-R-4R* provides 4 segment outputs in redundant configuration while version *FBTA-228-BPFB-8* supplies 8 simplex segment outputs. Both boards are able to host any type of Fieldbus Power Supplies *HD2-FBPS-** available with different voltage and current outputs. The control processor FCP270 was chosen just for illustration purposes, the solution fits for the control processor ZCP270 as well.

The customized Fieldbus Power Hub offers no option for a Fieldbus Advanced Diagnostic Module. In order to enable physical layer diagnostics for any existing or new installation, Pepperl+Fuchs offers a Power Hub independent operating version of the Advanced Diagnostic Module named *KT-MB-DMA* for retrofitting and permanent aside installation. The Stand-alone Diagnostic Module is able to measure 4 segments at a time. Connectors to the front allow easy branching to the Power Hub segment outputs. An optional T-Connector-Kit *T-CON.3 (consisting of four connectors)* offers a safe and secure connection of the Trunk and the branching cable at the Power Hub. Except of measuring the segment current the module monitors all physical parameters as a Power Hub integrated version. Malfunctions are indicated by LEDs and can be transmitted as summary alarm by a voltage-free dry contact to any binary input signal. Via the RS485 diagnostic bus which allows the daisy-chaining of up to 31 Stand-alone Diagnostic modules the diagnostic data is retrievable and transmitted.

The user interface is called Diagnostic Manager which runs on a common Windows® based platform. The license *DTM-FC.AD** lets the Diagnostic Manager run remotely in the control room or a special maintenance workstation that connects for instance to a local Ethernet network. A close to the control cabinet mounted Ethernet/RS485 converter routes the data from the user interface to the diagnostic module and vice versa.

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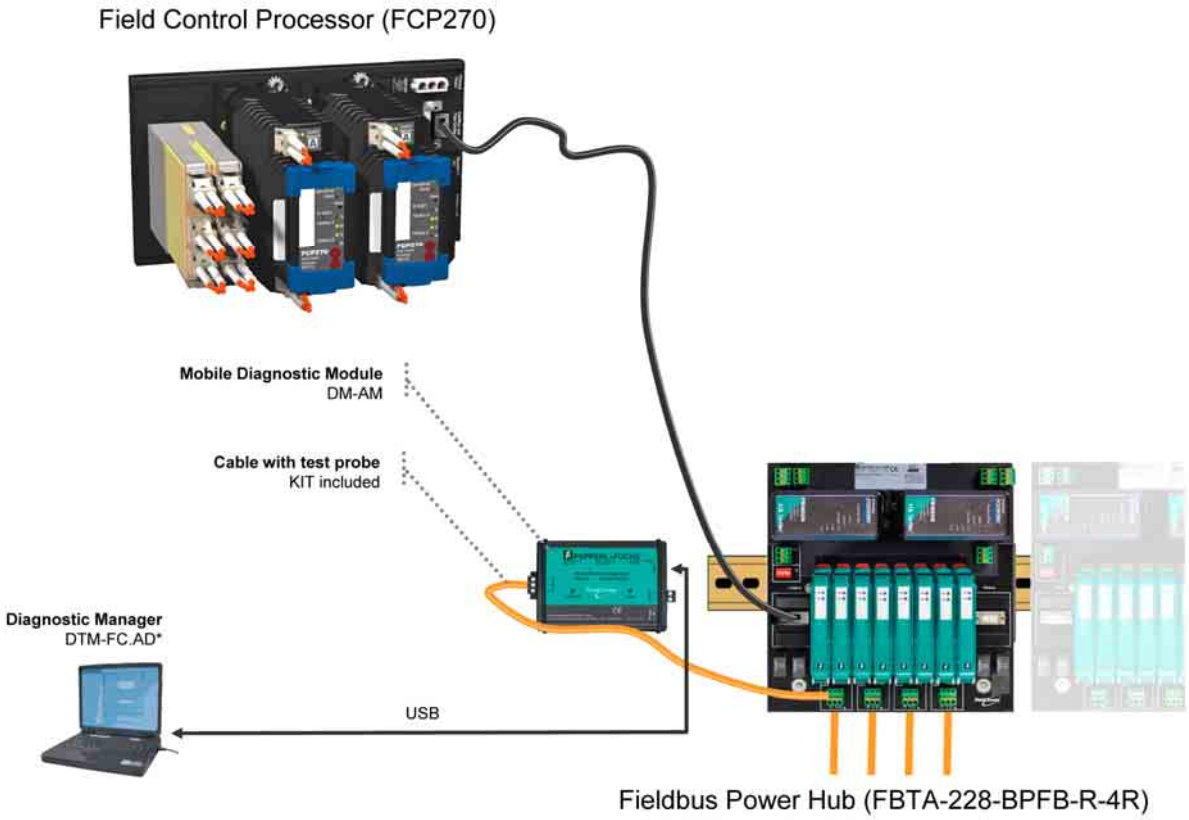
3 Application: Troubleshooting and Commissioning of new/existing installations

The following assembly is the solution for troubleshooting and commissioning new and existing installations.



The customized Fieldbus power hub solution *FBTA-228-BPFB-R-4R* with slots for two Foxboro Fieldbus Interface Modules FBM228 supports 4 redundant Fieldbus segments. The system-side connection to the control processor is established by means of a standard Sub-D connector provided by Foxboro. The alternatively available version *FBTA-228-BPFB-8* of the Power Hub supplies 8 simplex segment outputs instead. Both boards are able to host any type of Fieldbus Power Supplies *HD2-FBPS-** available with different voltage and current outputs. The control processor FCP270 was chosen just for illustration purposes, the solution fits for the control processor ZCP270 as well.

The USB or externally powered Mobile Advanced Diagnostic Module DM-AM available as Diagnostic Kit *DM-AM-KIT* is designed for commissioning, proactive maintenance and troubleshooting of a single segment at a time. The connection to a Fieldbus Power Hub segment is established by using the 3-pin cable set included in the kit, designed to directly connect to the test plug sockets on each segment connector.

The user interface is called Diagnostic Manager which runs on a common Windows® based platform. The license *DTM-FC.ADM* lets the Diagnostic Manager run with the Mobile Diagnostic Module which makes use of the USB port of the workstation or notebook in order to establish a connection to the module.

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