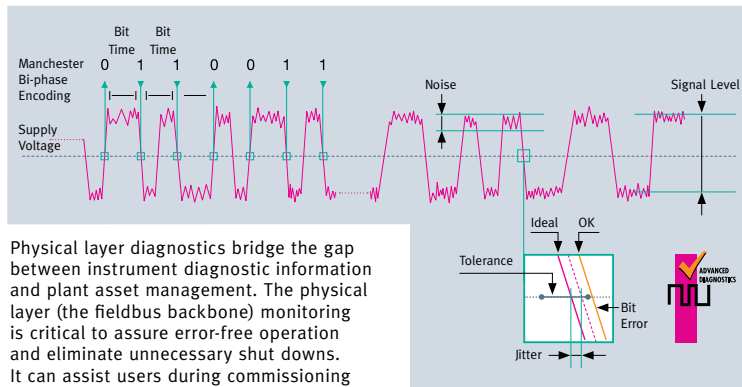


## FIELDBUS PHYSICAL LAYER

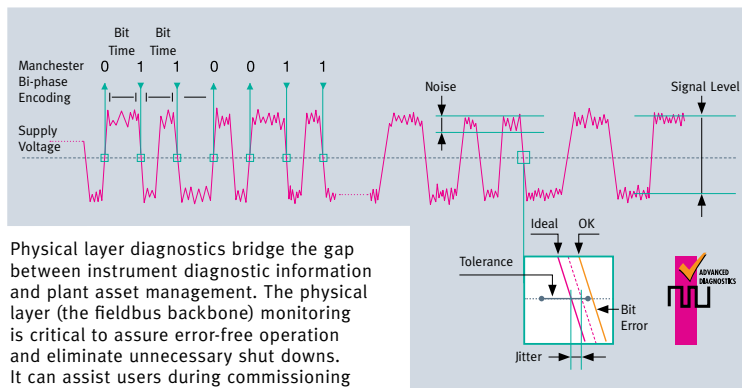


Physical layer diagnostics bridge the gap between instrument diagnostic information and plant asset management. The physical layer (the fieldbus backbone) monitoring is critical to assure error-free operation and eliminate unnecessary shut downs. It can assist users during commissioning by significantly reducing time during testing and wiring check outs. A wizard automatically tests the segment, produces documentation, and sets the system up for online monitoring. Signal degradation or other unintended changes in the fieldbus infrastructure can be managed proactively as part of the plant asset management. A detailed case study is documented in a Pepperl+Fuchs White Paper entitled "Fieldbus Testing Using Advanced Diagnostics" and can be downloaded at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

### TYPICAL PHYSICAL LAYER MEASUREMENTS

Value	Description
Signal Level	The voltage level of the data signal. Measured per device.
Noise	Unwanted disturbance. Measured per device or per segment.
Unbalance	Difference in isolation levels between each of the two leads and the shield. Ground fault.
Jitter	Deviation of the actual from the optimal zero crossing. Measured per device and per segment.
CRC Error	Cyclic Redundancy Check Error: A telegram where the checksum is invalid, i.e., one or
Framing Error	A fault or an inconsistency in the telegram structure, i.e., caused by an interruption in the

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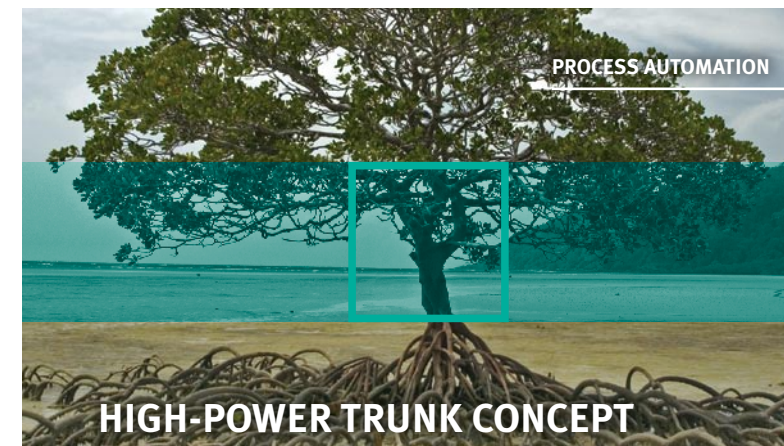
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## POCKET GUIDE



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## THE HIGH-POWER TRUNK CONCEPT

The High-Power Trunk concept (HPT) limits the energy on the trunk to 500 mA. This concept increases the amount of energy available for field instruments and facilitates a consistent installation design regardless of the area classification. By limiting the energy in the field rather than in the control room, power is more efficiently distributed to the instruments where it is required. As a result, segment protection devices are similarly installed for either hazardous or ordinary location applications. Consistency, available energy, longer cable runs, and cost savings are all increased with HPT.

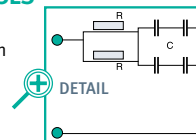
Another benefit of the HPT concept allows the user to standardize on one power conditioning system with optional redundant modules for all areas of the plant. Supplying 30 V/500 mA allows the user to achieve maximum cable lengths and maximum loading without using repeaters. If desired, live maintenance without gas clearance on the instruments is possible in combination with segment protectors (for safe area or Zone 2 applications) and FieldBarriers (for Zone 1 applications) when using instruments with the appropriate certifications (I.S. Entity or FISCO).



## BUS TERMINATION

### THE FIELDBUS TERMINATOR SERVES TWO PURPOSES

- It removes signal reflections at the end of the cable.
- It provides the impedance that translates the signal transmission as current change into a detectable voltage change.

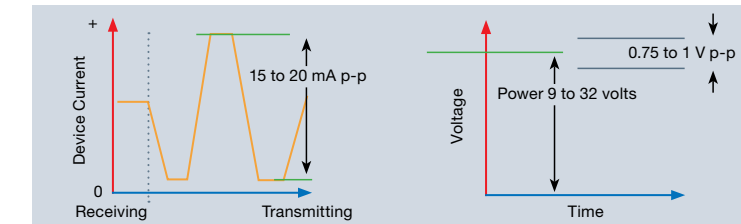


One terminator consisting of a resistor and capacitor is applied at each end of the trunk cable. High-availability design of FieldConnex terminators applies a matrix of capacitors.

The fieldbus terminator is an important component for the overall quality of the physical layer. The Advanced Diagnostic Module is capable of detecting bad or faulty termination.

## FIELDBUS SIGNALS

The transmitting device delivers 10 mA at 31.25 kbit/s into a 50 ohm equivalent load terminator to create a 1.0 V peak-to-peak voltage modulated on top of the direct current (DC) supply voltage. The DC supply voltage can range from 9 to 32 VDC.



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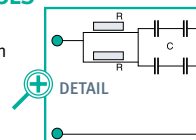
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