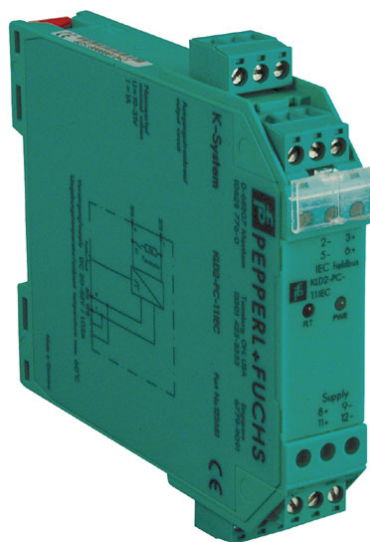


Instruction Manual

Fieldbus Power Conditioners



Connecting Fieldbus Power and Knowledge





Table of Contents

| | |
|--|-----------|
| 1. INTRODUCTION | 2 |
| 1. INTRODUCTION | 3 |
| 2. INSTALLATION..... | 3 |
| 2.1 INTENDED USE | 3 |
| 2.2 COMMISSIONING | 4 |
| 2.3 SHIELDS AND GROUNDING..... | 4 |
| 2.4 REPAIR AND MAINTENANCE | 4 |
| 2.5 DISPOSAL | 4 |
| 3. IMPLEMENTING FIELDBUS | 5 |
| 4. USING THE POWER CONDITIONER..... | 6 |
| 4.1 SINGLE MODE WITH OPTIONAL REDUNDANT POWER SUPPLY | 6 |
| 4.2 POWER CONDITIONER AND REDUNDANT POWER FEED MODULES | 7 |
| 4.3 MOTHERBOARD SOLUTION | 8 |
| 4.3 MOTHERBOARD SOLUTION | 8 |
| 4.4 USING THE POWER CONDITIONER'S FAULT OUTPUT | 9 |
| APPENDIX | 11 |



1. Introduction

The Pepperl+Fuchs power conditioning module KLD2-PC-1.1IEC conditions a standard 24 VDC supply for Fieldbus networks. It provides the necessary impedance matching circuitry for IEC 61158-2/ISA S50.02 based networks (FOUNDATION Fieldbus). The module is capable of supplying up to 1 A to the connected Fieldbus devices. The unit also features a built-in selectable terminator, two LEDs for power and fault indication (overload, short circuit, low voltage) and removable terminal blocks for easy installation.

The Power Conditioner has been designed for high reliability and availability. Due to its dedicated design the power conditioner has a MTBF of over 5000 years. Redundant power feed modules can be used in conjunction with P+F's Power Rail for an even higher availability. When used in this configuration, the fault output of each module is connected through the power rail to the power feed modules. The power feed modules then provide a normally closed contact, which can be used to monitor the status of the power conditioning system.

2. Installation

These instructions must be used in conjunction with the respective data sheets. The data sheets can be accessed at www.fieldconnex.info.

2.1 Intended Use

The Power Conditioner can be used for all fieldbus systems that use the "Manchester Bus Powered" physical layout in accordance with ISA S50.02 / IEC 61158-2. Laws and/or regulations governing the use or intended use must be observed.

The Power Conditioner is only approved for proper professional usage in accordance with the intended purposes. Improper handling will void any claim made under the warranty and any manufacturer's liability. Trained professionals in accordance with this instruction manual can only operate Power Conditioners.



2.2 Commissioning

Specialists trained specifically for this purpose must perform commissioning and installation. Recognized rules of the technology and setup requirements must be maintained during mounting and dismounting. Especially for tasks associated with electrical systems, safety requirements must be observed.

The housing of the Power Conditioner is intended for DIN-rail mounting and can be used in conjunction with P+F's Power Rail.

2.3 Shields and Grounding

Shielded cables are normally used for fieldbus applications (See Table 1). In North America, it is common practice to ground the shield at the control cabinet or junction box (segment protector) and leave the shield floating at the field device.

For detailed information concerning shielding and grounding refer to P+F's Wiring & Installation Guide or to P+F's pre-engineering documents.

2.4 Repair and Maintenance

The transmission behavior of the Power Conditioner is stable over long periods of time; therefore, there is no need for regular adjustment or configuration. Maintenance is not required; however, regular visual checks of the internal/external LED indicators should be scheduled to guarantee long-term operation. If a Power Conditioner is damaged or malfunctions in any manner, the manufacturer should be contacted and the damaged product returned for evaluation. Repair of the unit must not be attempted.

2.5 Disposal

Disposal of the packaging and Power Conditioner must only take place in accordance with the requirements of the country in which the Power Conditioner is installed.

The Power Conditioner does not contain any batteries that must be disposed of separately.



3. Implementing Fieldbus

Typically, FF wiring consists of the trunk and connected spurs. The trunk is the longest cable between any two devices on the network and all other connections are called spurs. Terminations should be done on both trunk ends. The terminator consists of a 100Ohm resistor in series with a 1uF capacitor. A shielded, twisted pair cable is recommended for fieldbus applications.

The tables below show the recommended fieldbus cable specifications and spur lengths depending on the number of connected instruments:

| | Type A |
|---|-----------------------------|
| Cable Structure | Twisted wire pair, shielded |
| Conductor cross-section (nominal) | 0.8mm ² (18 AWG) |
| Loop resistor (direct current) | 44 ohm/km |
| Wave resistance at 31.25kHz | 100 ohm +/- 20% |
| Wave attenuation at 39kHz | 3 dB/km |
| Group runtime distortion (7.9...39) kHz | 1us |
| Covering level of the shield | 90% |
| Maximum length of the network for standard applications | 1900m (6200ft) |

Table 1 – Fieldbus cable specifications (recommended Type A cable)

| Number of field devices | Max. Permissible spur length |
|-------------------------|------------------------------|
| 1-12 | 120m (400ft) |
| 13-14 | 90m (300ft) |
| 15-18 | 60m (200ft) |
| 19-24 | 30m (100ft) |
| 25-32 | 1m (3.28ft) |

Table 2 – Fieldbus spur length specifications

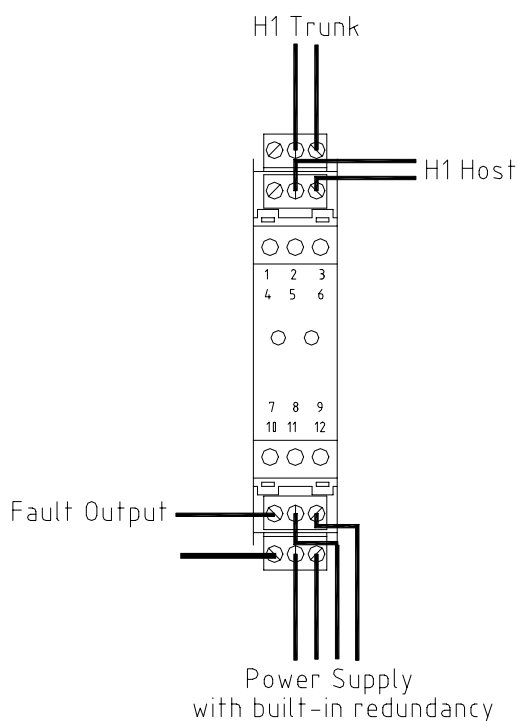
More detailed information about installing a Foundation Fieldbus segment can be found in P+F's pre-engineering documents. These can be accessed via www.fieldconnex.info.



4. Using the Power Conditioner

4.1 Single Mode with Optional Redundant Power Supply

When a single Power Conditioner without Power Rail is used to energize a Foundation Fieldbus segment all connections to it must be made via its removable terminal blocks. To supply power to the module either a regular or a power supply with built-in redundancy can be used.

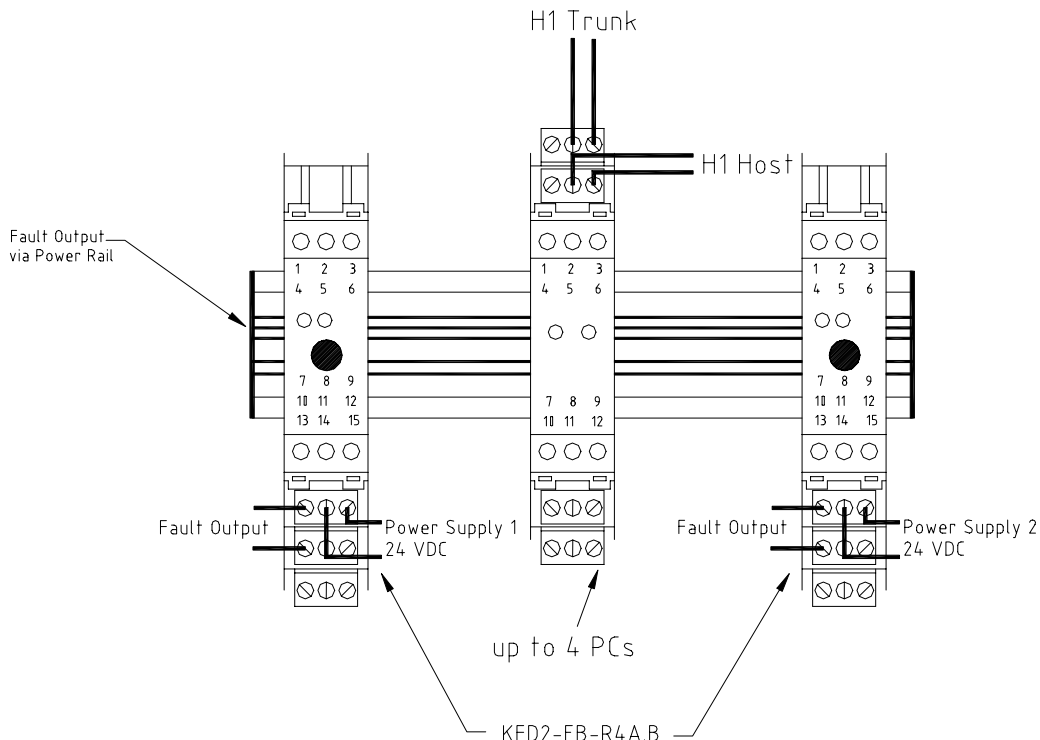


| KLD2-PC-1.1.IEC Pinout | |
|-------------------------------|--------------|
| 2 | Host(-) |
| 3 | Host(+) |
| 5 | Trunk(-) |
| 6 | Trunk(+) |
| 8/11 | Power(+) |
| 9/12 | Power(-) |
| 7/10 | Fault Output |



4.2 Power Conditioner and Redundant Power Feed Modules

Another possibility to energize a Foundation Fieldbus segment is to mount the Power Conditioner on P+F's Power Rail. Then power can be supplied via two redundant power feed modules and two 24 VDC power supplies.



| KLD2-PC-1.1.IEC Pinout | |
|------------------------|--------------|
| 2 | Host(-) |
| 3 | Host(+) |
| 5 | Trunk(-) |
| 6 | Trunk(+) |
| KFD2-EB-R4.A.B Pinout | |
| 8/11 | Power(+) |
| 9/12 | Power(-) |
| 7/10 | Fault Output |



4.3 Motherboard Solution

Pepperl+Fuchs also offers customized motherboard solutions for the Power Conditioner. All components including the design of the connectors to the host and trunk side can be designed according to customer specifications. Please contact P+F for more information.

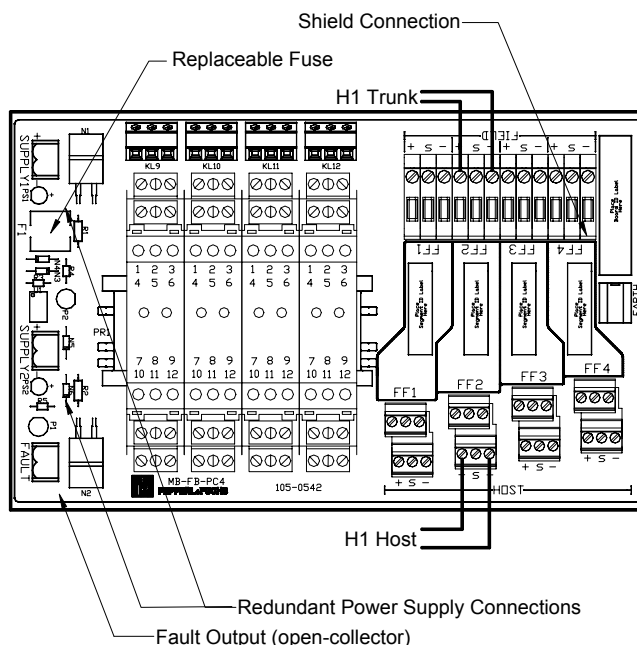


Figure 1 Universal Motherboard Solution

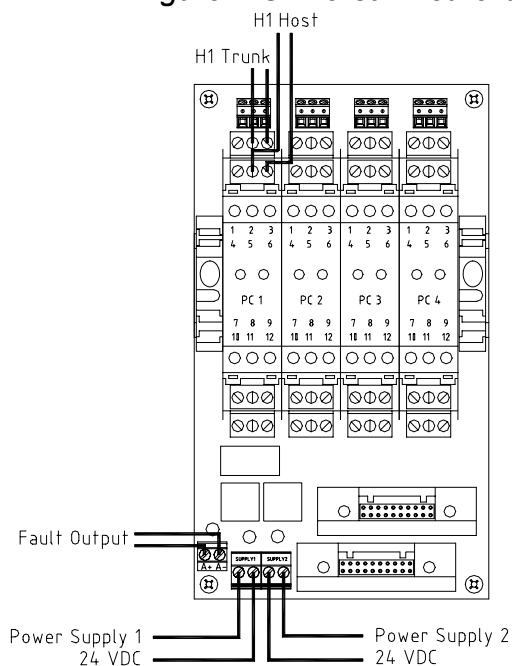


Figure 2 Customized Motherboard Solutions



4.4 Using the Power Conditioner's Fault Output

The P+F Power Conditioner features an open collector fault output. This output can be used to display an overload of the FOUNDATION Fieldbus segment. The overload is also displayed on the Power Conditioner itself via a LED. The fault output can be used to get the fault condition signal to the DCS or another error messaging system.

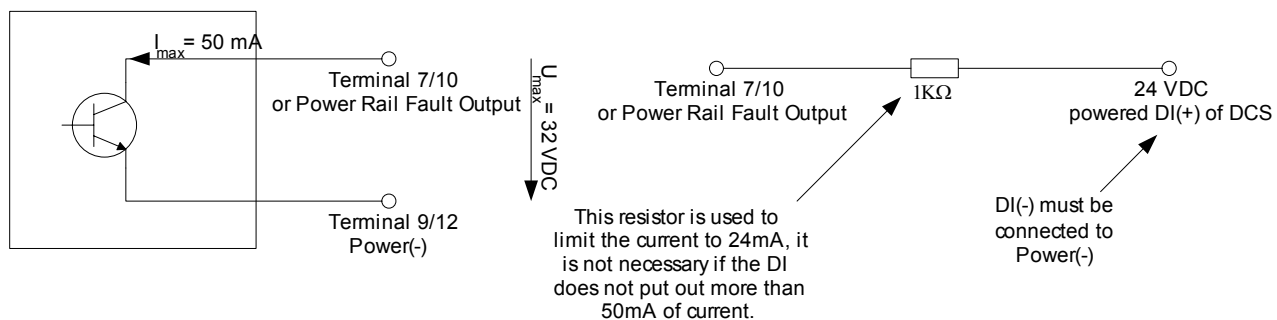
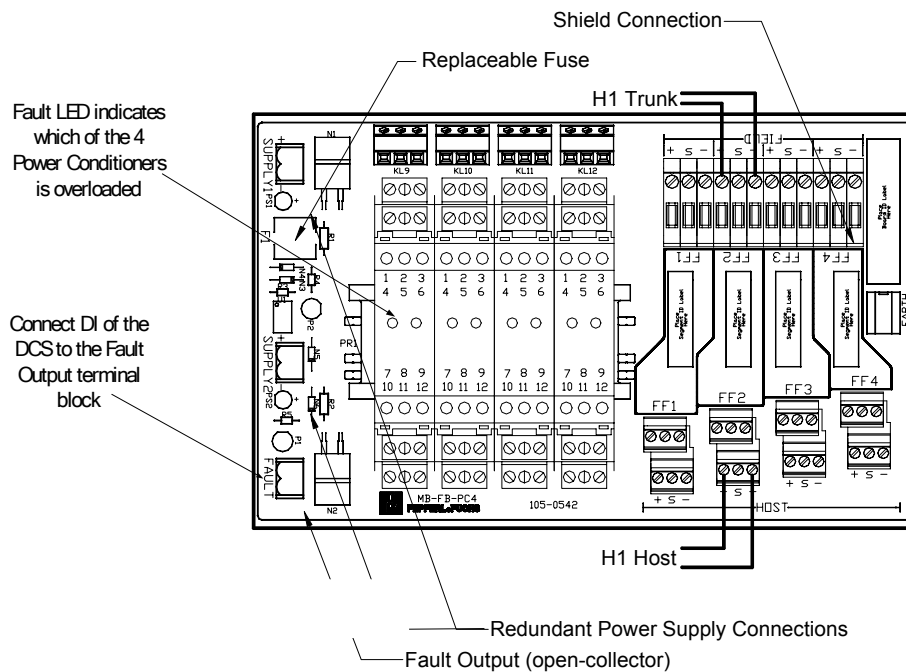
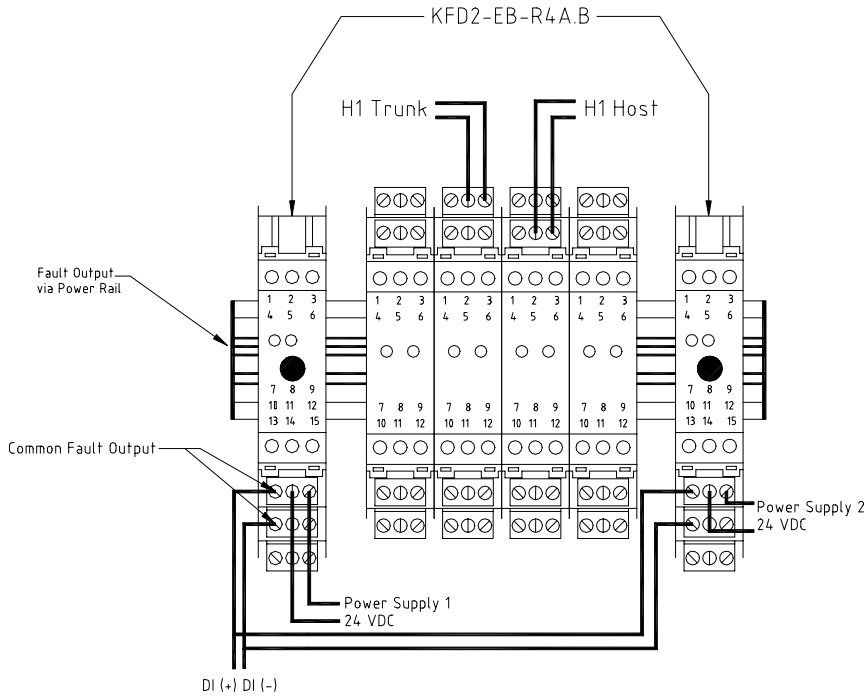


Figure 3 Connecting the Fault output to a DCS or LED



The Fault Output can be wired in parallel so a single DI port of the DCS can be used for multiple Power Conditioners.





Appendix

P+F products listed below are recommended to be used in conjunction with the Power Conditioner or other fieldbus applications.

| | |
|------------------|--|
| KLD2-PR-* | FOUNDATION fieldbus repeaters, available with intrinsically safe or non-incendive outputs. |
| PR-05/UPR-05 | Pepperl+Fuchs Power Rail, a superior DIN-Rail mounting system eliminating the need to daisy-chain the power wiring |
| F2D0-FB-Ex4.* | FieldBarrier, a short-circuit protected junction box with intrinsically safe outputs |
| F*-JBSC-*.FF.*.* | Segment Protector, a short-circuit protected junction box with non-incendive outputs |

The entire line of fieldbus products can be reviewed on our dedicated FieldConnex web site www.fieldconnex.info.