

PERFORMANCE  
MADE  
SMARTER

# Product manual

## 7908 / 7916

### System 9000 Backplane



TEMPERATURE | I.S. INTERFACES | COMMUNICATION INTERFACES | MULTIFUNCTIONAL | ISOLATION | DISPLAY

No. 7900V102-UK  
From serial no.: 139425001



# 6 Product Pillars

## *to meet your every need*

### Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.



Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.



We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.



We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our PR Process Supervisor (PPS) application, available for iOS and Android.



Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.



Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.



Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

# System 9000 Backplane 7908 / 7916

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## Warning



To avoid the risk of electric shock and fire, the safety instructions of this guide must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following. Prior to the commissioning of the device, this installation guide must be examined carefully. Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Until the device is fixed, do not connect hazardous voltages to the device.

**Repair of the device must be done by PR electronics A/S only.**

## Warning



Potential electrostatic charging hazard. To avoid the risk of explosion due to electrostatic charging of the enclosure, do not handle the units unless the area is known to be safe, or appropriate safety measures are taken to avoid electrostatic discharge.

## Symbol identification



**Triangle with an exclamation mark:** Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.



**The CE mark** proves the compliance of the device with the essential requirements of the EU directives.



**Ex devices** have been approved according to the ATEX directive / UKEX regulations for use in connection with installations in explosive areas.

# Safety instructions

## Receipt and unpacking

Unpack the device without damaging it and check whether the device type corresponds to the one ordered. The packing should always follow the device until this has been permanently mounted.

## Environment

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.

The device must be installed in pollution degree 2 or better.

The device is designed to be safe at least under an altitude up to 2 000 m.

The device is designed for indoor use.

## Mounting

Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location.

Descriptions of input / output and supply connections are shown in this installation guide and on the side label.

The device is provided with field wiring terminals and shall be supplied from a Power Supply having double / reinforced insulation. A power switch should be easily accessible and close to the device. The power switch shall be marked as the disconnecting unit for the device.

The 79xx Backplane can be mounted on a 35 x 15 mm DIN rail according to EN 60715.

## Calibration and adjustment

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

## Normal operation

Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.

## Cleaning

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

## Liability

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics A/S that would otherwise exist according to the concluded sales agreement.

## System 9000 backplane 7908 / 7916

- Provides safe, easy wiring between the backplane and non I.S. automation systems using standard prefabricated I/O cables
- Uses PR system 9000 units to make AI, AO, DI and DO process signals intrinsically safe
- Direct, redundant and duplicate signalling - including HART I/O
- Robust, compact high-end design solution that holds 8 or 16 system 9000 units
- Digital output and LEDs indicate backplane system status

### Applications

- The 7908 / 7916 backplane is a compact and robust solution that enables a safe and easy connection of PR system 9000 IS device signals into standard automation systems.
- Standard automation system cables and connectors are used to link the backplane to the I/O cards.
- The 7908 / 7916 backplane can be used for Direct, Redundant, Duplicate signalling including HART I/O System connectivity (HART MUX).
- The system 9000 devices isolate and convert AI, AO, DI and DO signals coming from, or going to the I.S. classified area, and routes those signals to a system automation I/O card.
- The system 9000 units maintain a SIL 2 / SIL 3 level of functional safety, even when mounted in the backplane solution.

### Technical characteristics

- Robust, compact high-end design that holds 8 or 16 system 9000 units.
- Digital output indicates status of the 9000 devices and primary / back-up power supplies.
- Flexible 24 VDC supply voltage and redundant power supply connection solution.

### Mounting / installation

- Flexible horizontal / vertical panel or wall mounting in the safe area or Zone 2 / Div. 2 areas.
- System 9000 devices easily snap ON and OFF using piano keys, and devices can be hot-swapped if mounting is in safe area.
- Tag number and ID labels are easily mounted and read by using the dedicated piano key spacer.
- Wide temperature operation range: -20...+60°C.

## Order

Type	Specification	Supported DCS systems and I/O cards
7908	8 module backplane	Check separate selection guide for supported DCS systems and I/O cards.
7916	16 module backplane	A wiring list is available on the individual supported DCS system I/O cards.

## Electrical specifications

### Environmental conditions

Specifications range . . . . .	-20°C to +60°C
Storage temperature . . . . .	-40°C to +85°C
Relative humidity . . . . .	< 95% RH (non-cond.)
Installation in pollution degree 2 / overvoltage category II.	

### Mechanical specifications

Dimensions (HxWxD), 7908 . . . . .	144 x 247 x 141 mm
Dimensions (HxWxD), 7916 . . . . .	144 x 443 x 141 mm
Weight approx., (7908 / 7916) . . . . .	1050 / 1850 g
Wire gauge, max . . . . .	2.5 mm <sup>2</sup> / AWG 12
	(Supply 1 / 2 and status relay connectors)
Mounting . . . . .	35 x 15 mm DIN rail (EN 60715), Panel plate or wall mounting

### Common electrical specifications

Supply voltage, 24 DC nom. . . . .	20...31.2 VDC
Power consumption, 7908 - 8 unit bp. . . . .	≤ 30 W
(Fuse F 1 & F 2: 1.6 A SB, 250 V, Type TR5)	
Power consumption, 7916 - 16 unit bp. . . . .	≤ 60 W
(Fuse F 1 & F 2: 3.15 A SB, 250 V, Type TR5)	
Isolation voltage - test / working . . . . .	500 VAC / 50 VAC
(Basic isolation between supply 1 & 2 and status relay)	

### Status relay output terminal 1 and 2

Max. voltage and current, Zone 2 / Div. 2 area . . . . .	32 V / 100 mA
Max. voltage and current, Safe area . . . . .	42 V / 100 mA

### Observed authority requirements:

EMC . . . . .	2014/30/EU
ATEX . . . . .	2014/34/EU
RoHS . . . . .	2011/65/EU
EAC . . . . .	TR-CU 020/2011

### Approvals:

c UL us, UL 508. . . . .	E231911
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### Ex:

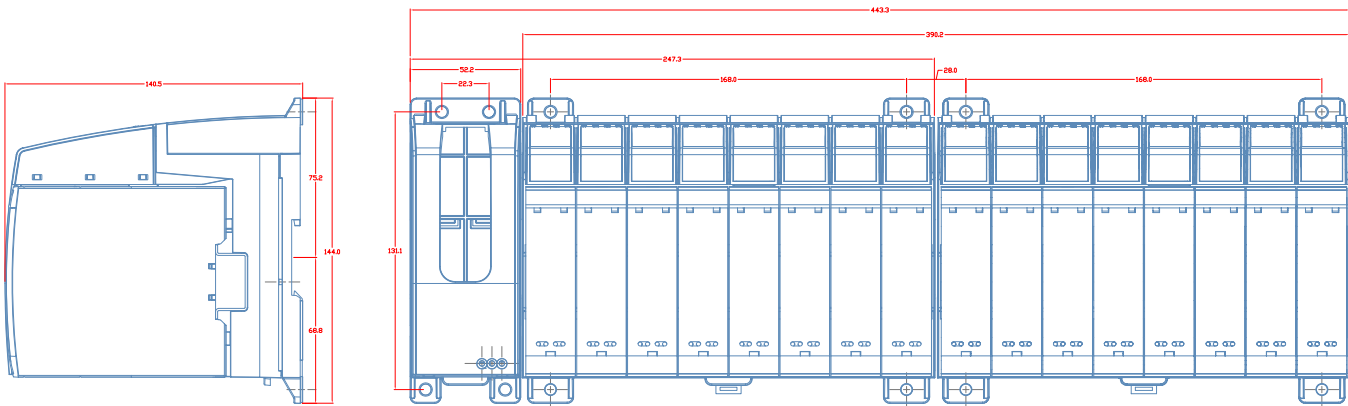
ATEX . . . . .	DEKRA 13ATEX0136X
IECEx . . . . .	DEK 13.0044X
FM, C / US . . . . .	0003049918-C

# 7908 Backplane - 8 module setup

Connectors have built-in test probe access for easy HART programming



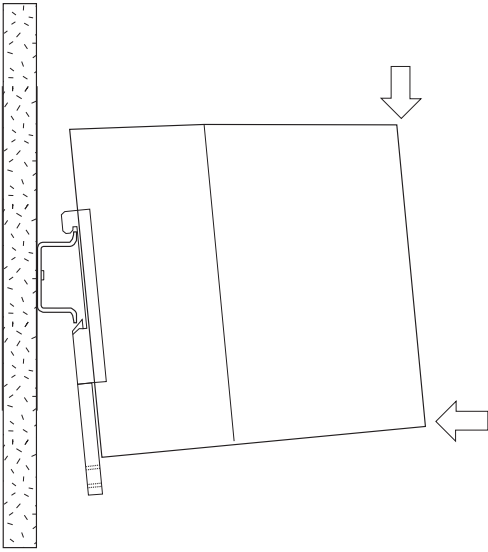
## Mechanical dimensions



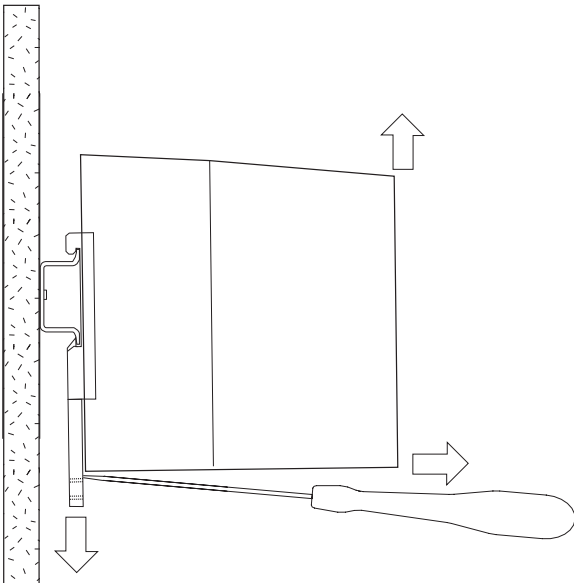


## Mounting on DIN rail

The backplane can easily be mounted on a standard 35 mm DIN rail:  
A 15 mm high DIN rail type must be used.

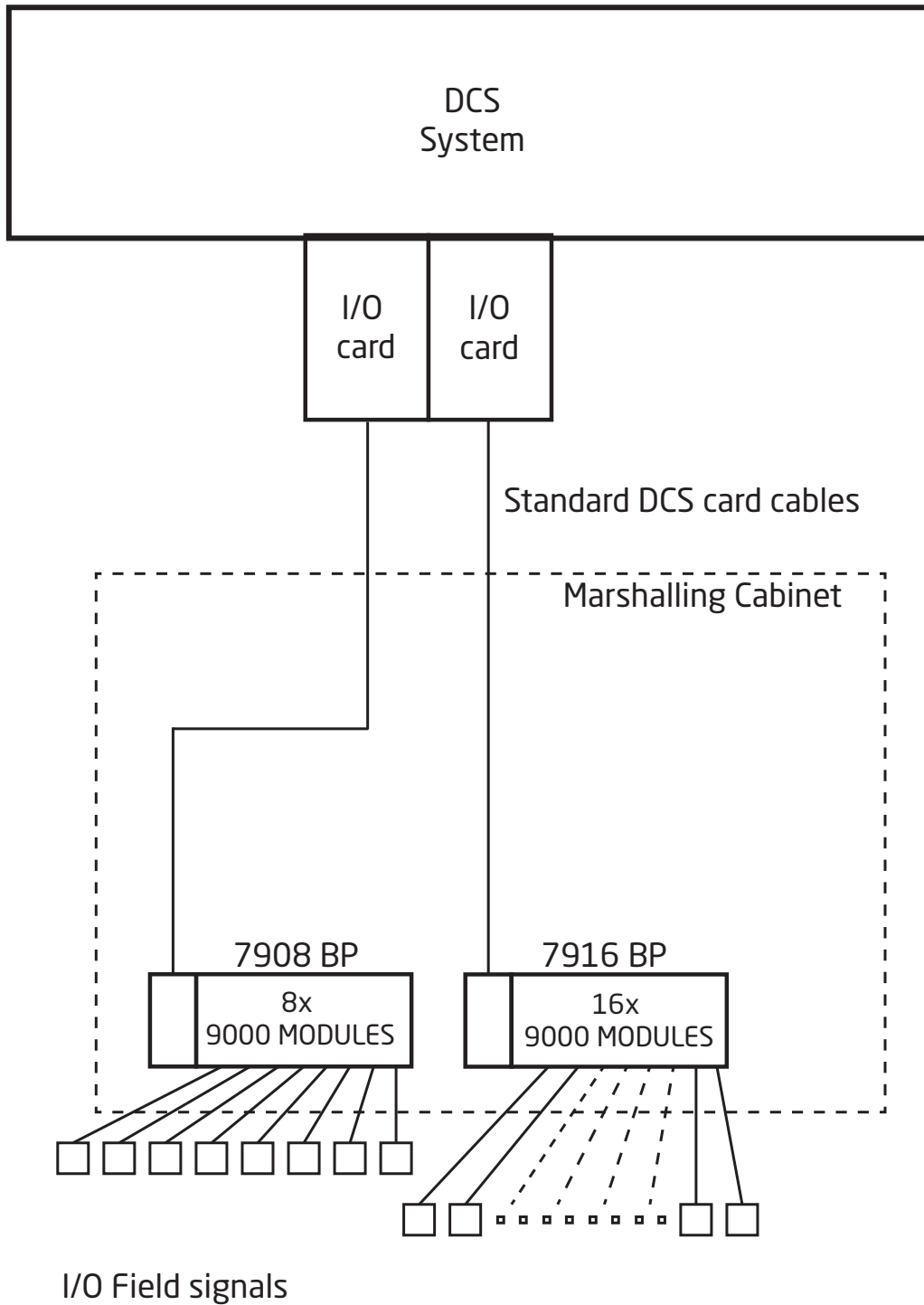


Remove the backplane from the rail by lifting the DIN rail mounting clips:



To allow for easy product change the DIN rail mounting clips can be set in the down/release position.

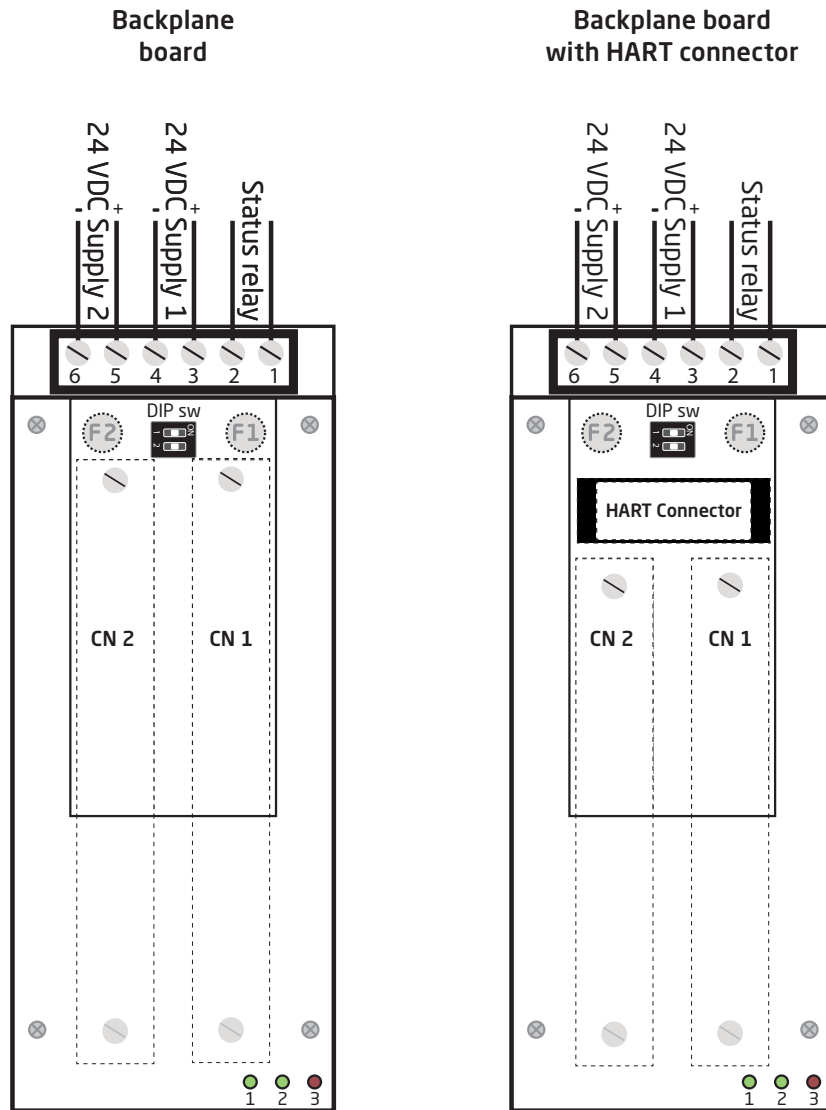
# 7908 / 7916 installation



# Connections

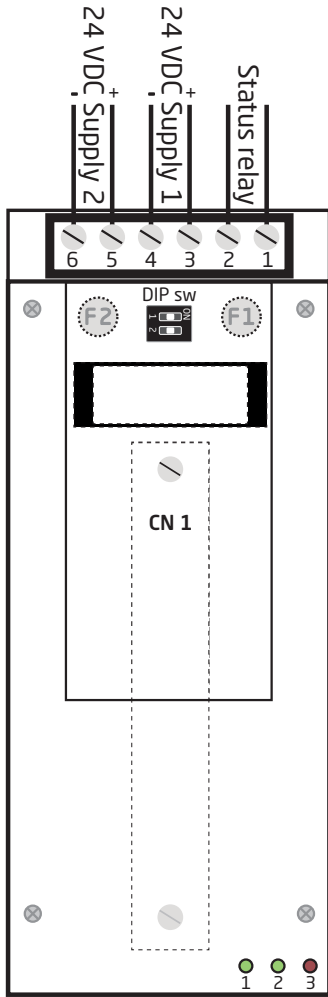
## CN1 and CN2 connectors

The connectors provide Direct, Redundant and Duplicate\*, including HART signal connection wiring, between the Backplane and the DCS system. This by using standard automation system cables.

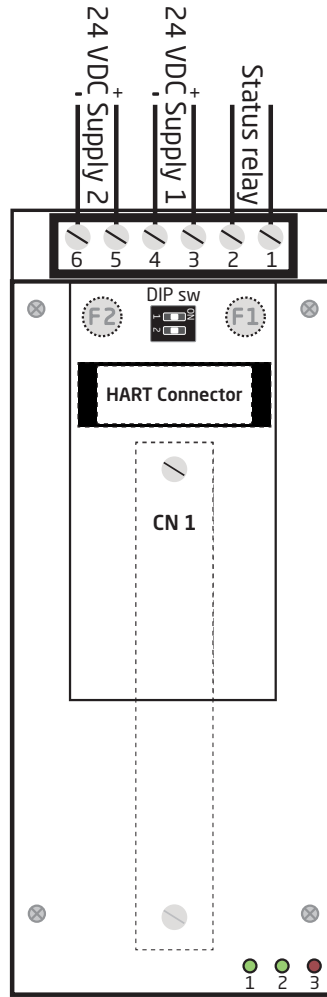


\* Depending on product version

Backplane board  
single connector,  
universal



Backplane board  
single connector,  
universal with HART



## LED indications, fuses and DIP-switches

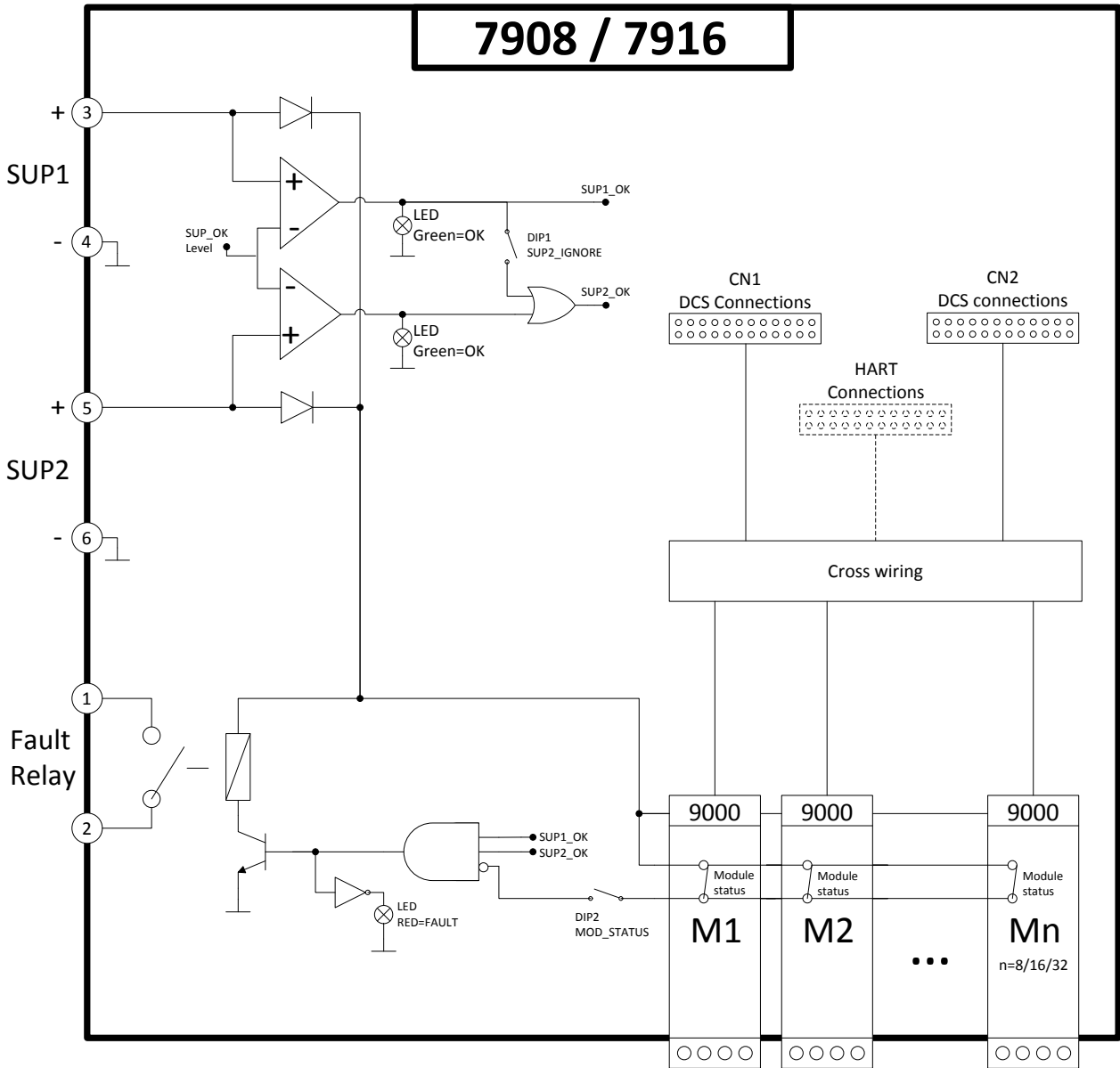
LED 1	Green: Power Supply 1 OK Off: Power Supply 1 Error
LED 2	Green: Power Supply 2 OK Off: Power Supply 2 Error
LED 3	Off: Status signal OK Red: Status signal Error

DIP-switch	Function
1	ON = Ignore Power Supply 2 error
2	ON = Enable module Status signal

### Replacing the F1 & F2 fuses

1. Remove power from the Backplane and open the connector module cover.  
Remove the 4 holding screws located on each PCB corner.
2. Pull out the adaptor board by using the mounted DCS cable or a plier tool and locate the F1 and F2 fuses mounted in sockets.
3. Insert a new fuse to same type. Check page 7 for specific fuse type.
4. Remount all mechanical parts and repower the Backplane system.

# Block diagram



Fault Relay status terminal 1 & 2	Condition	Action required
Contact Closed	OK	-
Contact Open	Error	Check Power Supply 1 or 2 condition or an individual Module Status Error Signal is activated

# Installation instructions

## UL installation

Use 60/75°C copper conductors only.

Wire size . . . . . AWG 26-12

UL file number . . . . . E231911

The device is an Open Type Listed Process Control Equipment. To prevent injury resulting from accessibility to live parts the equipment must be installed in an enclosure. The power Supply unit must comply with NEC Class 2, as described by the National Electrical Code® (ANSI / NFPA 70).

## cFMus installation in division 2 or zone 2

Class I, Div. 2, Group A, B, C, D T4 or I, Zone 2, AEx nA IIC T4 or Ex nA IIC T4.

In class I, Division 2 or Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI / NFPA 70) or in Canada in the Canadian Electrical Code (C22.1).

The 79xx Backplane must be connected to limited output NEC Class 2 circuits, as outlined in the National Electrical Code® (ANSI / NFPA 70), only. If the devices are connected to a redundant power supply (two separate power supplies), both must meet this requirement.

Where installed in outdoor or potentially wet locations the enclosure shall at a minimum meet the requirements of IP54.

Warning: Substitution of components may impair suitability for zone 2 / division 2.

Warning: To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors when energised and an explosive gas mixture is present.

Warning: Do not mount or remove devices from the backplane when an explosive gas mixture is present.

## IECEX, ATEX installation in zone 2

IECEX, Ex ec nC IIC T4 Gc . . . . . DEK 13.0044X

ATEX, II 3 G Ex ec nC IIC T4 Gc . . . . . DEKRA 13ATEX0136X

For safe installation the following must be observed. The device shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.

The equipment shall only be used in an area of not more than pollution degree 2, as defined in EN 60664-1.

The device shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN IEC 60079-0, taking into account the environmental conditions under which the equipment will be used.

To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors when energised and an explosive gas mixture is present. Do not mount or remove devices from the backplane when an explosive gas mixture is present.

## Document history

The following list provides notes concerning revisions of this document.

<b>Rev. ID</b>	<b>Date</b>	<b>Notes</b>
102	2423	ATEX and IECEx approvals updated - Ex na changed to Ex ec.



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PR electronics is the leading technology company specialized in making industrial process control safer, more reliable and more efficient. Since 1974, we have been dedicated to perfecting our core competence of innovating high precision technology with low power consumption. This dedication continues to set new standards for products communicating, monitoring and connecting our customers' process measurement points to their process control systems.

Our innovative, patented technologies are derived from our extensive R&D facilities and from having a great understanding of our customers' needs and processes. We are guided by principles of simplicity, focus, courage and excellence, enabling some of the world's greatest companies to achieve PERFORMANCE MADE SMARTER.