

F880-RT

**8 Segment Redundant Fieldbus Power Supply
for use with the Yokogawa
CENTUM 3000 R3 Control System
Ring Terminal Terminations**



F880-RT

Installation Instructions

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Figure 1: F880-RT

1 OVERVIEW

The F880-RT redundant fieldbus power supply is designed to provide redundant power for eight (8) Foundation fieldbus™ H1 segments. Connections are provided on the F880-CA-RT Carrier for two redundant pairs of Yokogawa ALF111 fieldbus cards using Yokogawa AKB336 cables. Power for the eight fieldbus segments is provided by two F801 or F802 Power Modules mounted to the carrier and operating in a redundant configuration. Failure alarms, galvanic isolation, power conditioning and segment termination are incorporated into each Power Module. A single Power Module may be used where redundancy is not required.

2 DESCRIPTION

For maximum reliability, the module carrier contains no components and only provides interconnections between the

Power Modules and the external connections. The carrier circuit board is supported in a rigid metal frame that protects it from mechanical damage. Secure DIN-rail mounting is provided by integrated fixings. The Power Module provides galvanic isolation between the 24V DC input power and the fieldbus segments, as required by the IEC61158-2 fieldbus standard and the Fieldbus Foundation™ FF-831 validation test for fieldbus power supplies. There is also galvanic isolation between the fieldbus segments, thereby preventing cross-talk between segments in the event of ground faults in the field wiring. Each segment has its own current limitation and passive fieldbus power conditioner. Termination of the fieldbus segment is automatically maintained when single or redundant Power Modules are fitted. The F880-CA-RT carrier is equipped with connectors that will accept an F809F diagnostic module. The module continuously monitors the performance of each of the eight fieldbus segments, providing information on the network health.

Each Power Module has indicator LEDs to show both its status and that of the eight segments under power. In normal operation, each green 'Segment' LED is lit, showing

that the segment is powered. If a segment is shorted, or its voltage is below the rated output, its LED is extinguished, and the red 'Alarm' LED is lit. Redundant 24V DC (nom.) input power is connected to the F880-CA-RT carrier using Ring Terminal connectors.

3 COMPONENTS AND ACCESSORIES

Product part numbers and their descriptions are given to the right.

PART No.	DESCRIPTION
F801	8 Segment Power Module: 21.5V, 350mA
F802	8 Segment Power Module: 28V, 500mA
F809F	8 Segment Fieldbus Diagnostic Module
F880-CA-RT	F880 Ring Terminal Carrier
F880-RT	F880-CA-RT and two F801 modules
F880-2-RT	F880-CA-RT and two F802 modules
F880-RT-NR	F880-CA-RT and one F801 module
F880-2-RT-NR	F880-CA-RT and one F802 module
F800-BLK	Blanking Module included with -NR systems

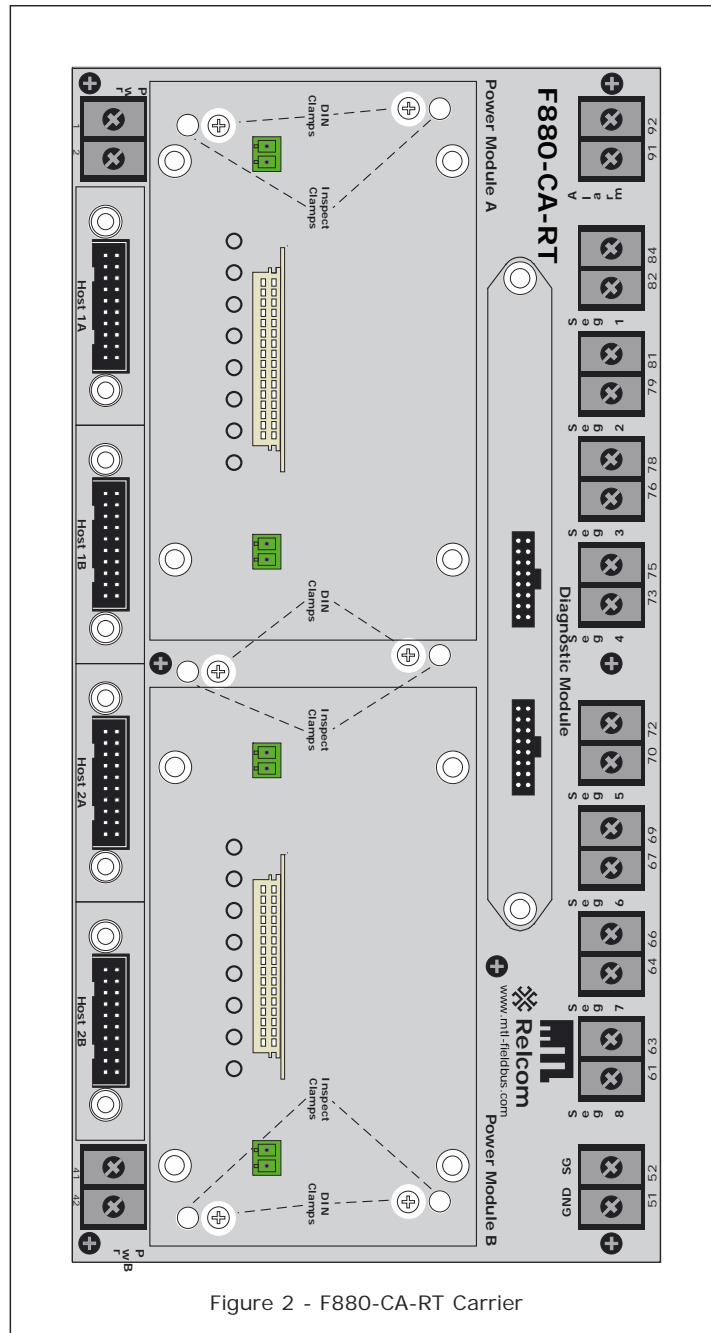


Figure 2 - F880-CA-RT Carrier

4 MECHANICAL

4.1 Mounting Orientation

The F880-CA-RT carriers are designed for mounting on a vertically aligned DIN-rail on a vertical surface. This method of mounting ensures optimum heat dissipation from the Power Modules.

4.2 Enclosure Requirements

4.2.1 General Requirements

The assembly may be mounted in hazardous (classified) areas – see Sections 8 and 9. The following conditions must also be satisfied to ensure safe and reliable operation.

- Prevent any form of pollution that could compromise the operation of the unit. For example, choose an unpolluted location or a suitable enclosure to protect the assembly.
- Provide an adequate level of mechanical protection. This can be achieved by selecting a protected location, a suitable enclosure, or a combination of both.
- Ensure that all cable entries and connections are secure by making provision for the careful routing and securing of all cables.
- Provide adequate security against unauthorized interference.
- Ensure that the permitted ambient temperature range of -40°C to $+65^{\circ}\text{C}$ (derate to $+50^{\circ}\text{C}$ for the F802 when loaded above 60% of its full load rating) is not exceeded. Allow for power dissipation within the enclosure and consider the use of shading against direct sunlight.

4.2.2 Outdoor Mounting

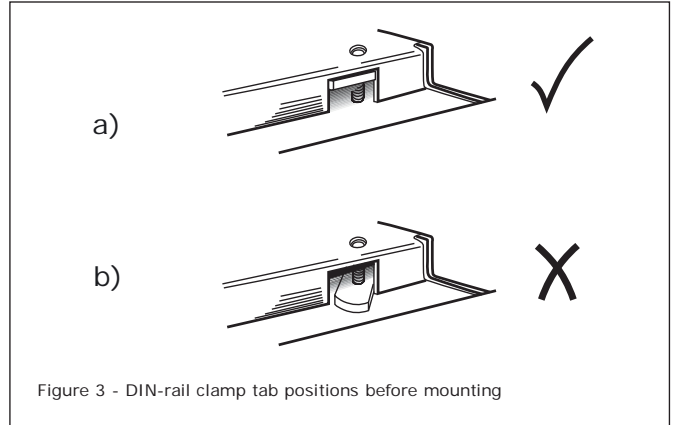
If the power system is mounted in an outdoor location, use a suitable enclosure with a minimum of IP54 ingress protection. A higher level of ingress protection rating will be necessary if the working atmosphere is or can be corrosive or if the enclosure is subject to wet or dusty environments.

4.3 DIN-rail Mounting

The carrier is designed for mounting on 35mm x 7.5mm T-section "top hat" DIN rail to EN50022 and uses six built-in DIN clamp tabs to hold it on the rail. The Power Modules must be removed from the carrier to obtain access to the DIN-rail clamp screws.

4.3.1 Mounting Procedure

Before starting to mount the carrier on the DIN rail, rotate all six of the **DIN clamp** screws counterclockwise (i.e. unscrew) until the clamping tabs reach the position shown in Figure 3a and none of the tabs extend into the channel for the DIN rail.



Press the carrier onto the DIN-rail and rotate each of the **DIN clamp** screws clockwise until the tab tightens against the DIN-rail. The clamping tabs can be seen through the **Inspect clamps** holes when they are in the correct position.

4.4 Removal from DIN-rail

The Power Modules must be removed from the carrier to obtain access to the DIN-rail clamp screws. Support the carrier by pressing it to the DIN-rail and unscrew (counterclockwise) the six DIN-rail clamp screws. Turn each screw approximately two full turns when releasing its clamping tab from the rail. Remove carrier.

4.5 Mounting and Removal of the Power Modules

The Power Modules are secured to the carrier with four screw mountings. There are four locating connectors (two for each module) on the module carrier along with mating connectors in the F801 or F802 module. Align the module with the retaining screws and press onto the connector. Hold it in place while tightening the four retaining screws. To remove a Power Module, support the module while unscrewing the four retaining screws at its base. Lift the module off the carrier connector.

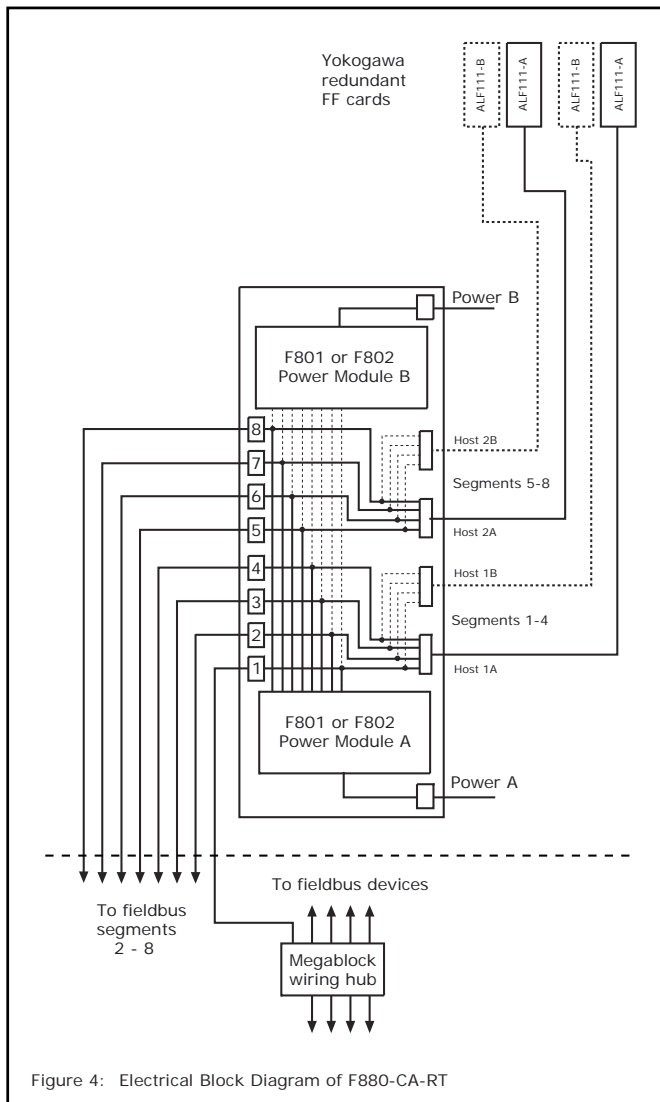


Figure 4: Electrical Block Diagram of F880-CA-RT

5 ELECTRICAL CONNECTIONS

The DC power, Alarm, and Field Segment connections are all made using Ring terminals on the barrier strip. The barrier strip will accommodate up to 8mm diameter Ring terminals with hole sizes from 3.5mm to 5.0mm.

The Field Segment connections do not include a terminal for the cable shield. Figure 5 illustrates how the segment cable should be terminated on the barrier strip. The shield (screen or drain) wire should be cut off in a manner that will not allow it to short out to any metal or terminals. Alternatively, if the shield wire must be grounded in the same cabinet as the F880-CA-RT, the user must supply a method to accomplish this.

Note: All fieldbus segments must have the shield grounded at only one place. Because different users want to accomplish this in different ways, we did not provide a terminal for landing the shield wires.



Figure 5: Ring Terminal Attachment

5.1 DC Power Requirements

Dual redundant power terminals requiring a nominal input voltage of 24VDC are provided allowing the use of bulk power supplies with a supply range of 19.2–30VDC. Input power cabling and over-current protection devices must be chosen to match the current consumption.

An F880 system, operating with redundant F801 modules at 24VDC, will require 3.5A in total if all eight segments draw the maximum of 350mA. With redundant F802 modules the system will draw 6A when all segments are loaded to 500mA. Note that the total current could be drawn from either the Power A or Power B connection if one power module is removed.

It is also important to size the Bulk Power Supply to handle the inrush current required by the F801 or F802. Inrush is less than 2 times the maximum rated current for the F801 with a duration lasting less than 1ms. For the F802, the inrush is less than 4 times the maximum rated current with a duration less than 10ms.

5.2 Power A and Power B

Power A supplies Power Module A and Power B supplies Power Module B. Each module provides DC power to all eight segments - see Figure 4. DC supply connections are as follows:

Power A	
Pin No.	Connection
1	+ve
2	-ve

Power B	
Pin No.	Connection
41	+ve
42	-ve

Cable lengths on the Power connectors should not exceed 30m.

5.2.1 Redundancy

For **redundant operation**, Power Modules must be fitted in Power Module A and Power Module B locations. For **non-redundant operation** fit an F801 or F802 in the Power Module A location and apply power to Power A terminals. The F800-BLK would then be placed on the Power Module B connector to allow the alarm circuit to function. Power must be connected to Power B terminals if live replacement of Power Module A is necessary since Power B terminals feed the Power Module B connector.

5.2.2 Terminator

A single terminator is provided automatically on each segment whether one or two Power Modules are used.

5.3 Alarm Connection

In an alarm condition a normally closed, galvanically-isolated relay contact in each Power Module goes to an open-circuit condition. These relays are connected in series on the F880-CA-RT carrier and are presented at terminals as follows:

Alarm	
Pin No.	Connection
91	+ve
92	-ve

In non-redundant applications using a single Power Module, the alarm connections on the carrier will be open-circuit, indicating a permanent alarm condition unless the F800-BLK module is fitted in place of the missing Power Module.

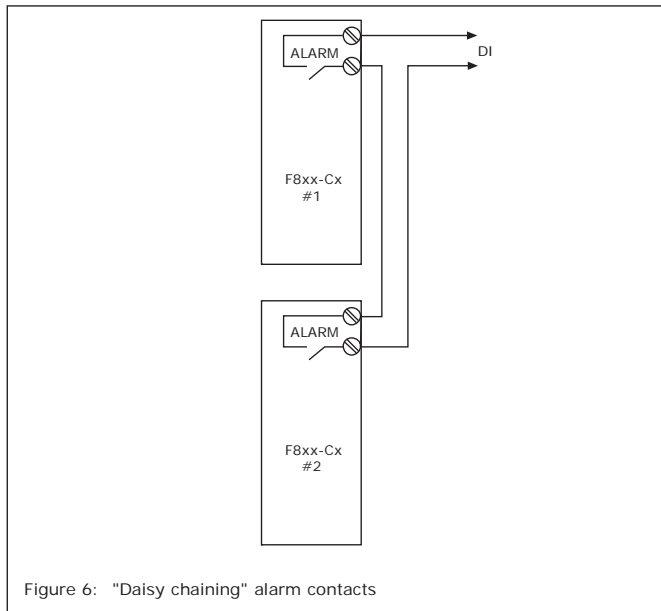


Figure 6: "Daisy chaining" alarm contacts

If multiple F880 units are used, a common alarm circuit can be achieved by 'daisy-chaining' the alarm circuits (see Figure 6).

5.4 Host Connections

Connectors are provided to permit direct connection via AKB336 cables to Yokogawa ALF111 cards. Four connectors are fitted to provide the following connections. The host cable length should not exceed 30 meters.

Connector	Function	Segments
Host 1A	Main	1 – 4
Host 1B	Redundant	1 – 4
Host 2A	Main	5 – 8
Host 2B	Redundant	5 – 8

5.5 Field Segment Connections

There are eight field segment connectors. Each connector provides (+) and (-) connections. No cable screen connections are provided on the F880-CA-RT carrier.

Pin No.	Connection
82	Segment 1 +
84	Segment 1 -
79	Segment 2 +
81	Segment 2 -
76	Segment 3 +
78	Segment 3 -
73	Segment 4 +
75	Segment 4 -

Pin No.	Connection
70	Segment 5 +
72	Segment 5 -
67	Segment 6 +
69	Segment 6 -
64	Segment 7 +
66	Segment 7 -
61	Segment 8 +
63	Segment 8 -

5.6 Cable Screen / Ground Connections

If the screens of the fieldbus cables are required to be earthed in the equipment cabinet housing the F880 system, a separate earth bar, connected to local instrumentation earth, should be used. Note that the Yokogawa AKB336 cables do not carry segment screens. Screen grounding as recommended by the standards must be done downstream of the F880 field connectors – either in the F880 equipment cabinet or a marshalling cabinet.

5.7 Ground Connections

There are two Ground connections on the carrier. Terminal 51 is internally connected to the chassis of the carrier and should be wired to a Safety or Instrumentation Ground. This ground is needed for the F880 system to meet Electromagnetic Compatibility and Electrical Safety requirements. Terminal 52 must be grounded to the same potential as the Fieldbus screens if the F809F diagnostic module is used. This Signal Ground connection is used by the F809F to detect screen shorts to the Fieldbus wiring.

6 TESTING

6.1 F801 / F802 Status and Alarm LEDs

Each Power Module is fitted with nine LEDs, eight to indicate segment status and one to signify an Alarm condition.

Fault Condition	Segment LED	Fault LED	Alarm contact status
No Fault	Green	Off	Closed
Segment shorted	Off	Red	Open
Output <20V	Off	Red	Open
Input <16V	Off (All)	Red	Open

7 ROUTINE MAINTENANCE

Check the general condition of the installation occasionally to make sure that no deterioration has occurred. At least every two years (and more frequently for particularly harsh environments) check:

- the condition of wire connections, terminations, and screens.
- the dc output voltage on each of the eight fieldbus segments is >21.5V for the F801 or >28V for the F802. This can be performed using a multi-meter or a Relcom FBT-3/FBT-6 Fieldbus Monitor.
- the segment LEDs on the Power Module(s) are functioning and the Alarm LED is not lit .
- the Power Module retaining screws are tight.
- there are no signs of damage or corrosion.

8 ATEX CATEGORY 3 INSTRUCTIONS

Safety instructions for installation and operating personnel

This manual contains basic safety instructions for installation, operation and maintenance and servicing. Failure to comply with these instructions can endanger personnel, the plant and the environment.

Before installation/commissioning:

- Read the operating instructions.
- Give adequate training to the installation and operating personnel.
- Ensure that the contents of the operating instructions are fully understood by responsible personnel.
- The national installation and mounting regulations (e.g. EN 60079-14, National Electrical Code) apply.

When operating the apparatus:

- Make the operating instructions available at the installation area (at all times).
- Observe safety instructions.
- Observe national safety and accident prevention regulations.
- Operate the equipment within its published specification.

Servicing/maintenance work or repairs which are not described in the operating instructions must not be performed without prior agreement with the manufacturer.

Any damage may render explosion protection null and void.

No changes to the devices or components impairing their explosion protection are permitted.

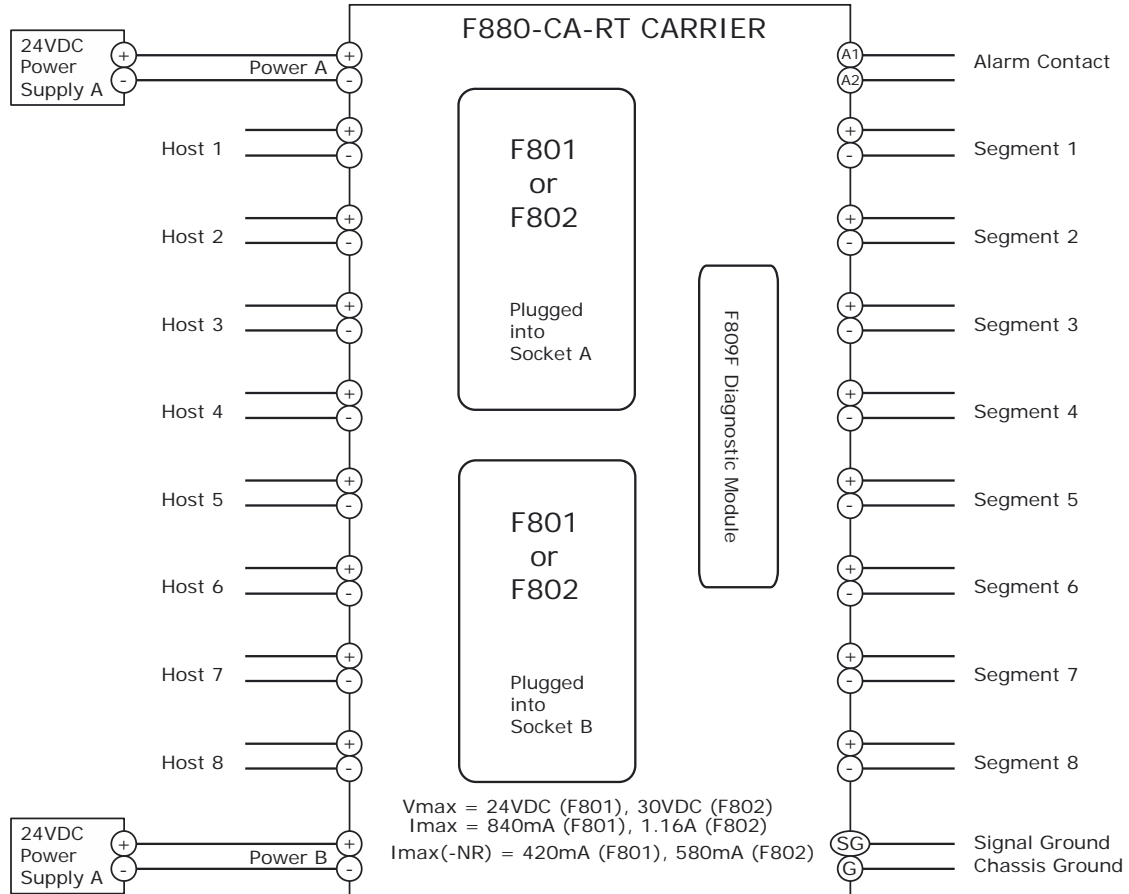
The device may only be fitted and used if it is in an undamaged, dry and clean state.

9 CONTROL DRAWING

HAZARDOUS (CLASSIFIED) LOCATION

Class I, Division 2, Groups A, B, C, D, T4
 Class I, Zone 2, IIC T4
 -40C <= Tamb <= 65C
 -40C <= Tamb <= 50C (F802 total load > 60% of rated maximum)
 To be installed in an IP54 or better enclosure

WARNING:
 EXPLOSION HAZARD - DO NOT DISCONNECT
 EQUIPMENT UNLESS POWER HAS BEEN SWITCHED
 OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.



24VDC Power Supplies may be installed in the Non-hazardous area.

Signal Ground is for F809F Shield Short Measurements.
 Chassis Ground is for EMC Compliance and electrical safety.

Each of the 8 Segments (Hostx, Segmentx) are isolated from one another and from the Power Supplies. Host Terminals connect to the Host Control system which may be in a non-hazardous area.

Carrier May Contain a Single F801 or F802 module where redundancy is not needed ("-NR" option). In such cases, only one Power Supply connection is needed. Also for the Alarm Contact to work, an F800-BLK module must be installed in place of the missing F801 or F802 module.

Power Supplied to the Carrier must be fused for 8A circuitry.

Do not mix an F801 and F802 on the same Carrier.

Part Numbers:	Carriers	Kits w/ F801	Kits w/ F802
	F880-CA-RT	F880-RT[-NR]	F880-2-RT[-NR]

Kits contain 1 or 2 F801 or F802 modules along with the Carrier and Ring Terminal Connectors.

Installation must be in accordance with local Electrical Codes.

 Relcom Inc. <small>INDUSTRIAL LAN WIRING COMPONENTS AND TESTERS</small> 2221 Yew Street, Forest Grove, Oregon 97116 USA	
Title: CONTROL DRAWING FOR F880-RT CLASS I, DIV 2 (ZONE 2) HAZARDOUS LOCATIONS	
Approved By: Mike Strauser	Date: 12/28/09
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