FOXBORO®

PSS 21H-8F1 B4

I/A Series® Remote Terminal Unit (RTU)
RTU 20 – Hardware Configurations

OVERVIEW

The I/A Series RTU 20 is designed to match data acquisition and remote control requirements in the several industrial application fields in which SCADA systems are typically used.

The RTU 20 has enhanced modular functionality allowing it to operate like a powerful remote SCADA terminal and, at the same time, to support programmable local control sequence logic through advanced programmable logic controller functionality.

Within the RTU 20 family, six different basic architectures are available to meet all possible plant and customer needs, from simple, cost-effective configurations to complex, highly reliable configurations.

There are two I/O module sizes, with different I/O density per board:

- half-size
- full-size.

As symbolized by the **CE** logo, the RTU 20 is in compliance with the applicable European Union directives.

Invensys™

Product Specifications

I/A Series RTU 20 HALF-SIZE MODULES

The I/A Series RTU 20 with half-size modules are very compact, modular I/O process terminals designed for small to medium applications.

The RTU 20 equipped with half-size I/O boards can be configured using two different racks:

- SHS – Small half-size cabinet housing a single CPU and up to five I/O modules
- RHS – Medium half-size cabinet housing a single or redundant CPU and nine I/O modules.

The half-size I/O modules (100 mm size in depth) allow the insertion of field connections (I/O cables) on the same electronic board through removable screw-terminal blocks located on the module's front edge.

Packaged for industrial environments, RTU 20 half-size modules provide high electrical isolation and high immunity to electromagnetic fields and environmental conditions.

Cabinets are waterproof and dustproof (protection level of IP 65/NEMA 4) and can be wall-, panel- or pole-mounted.

RTU 20 SHS: Half-Size Modules – 5 I/O Slot Cabinet, Small Configuration

The RTU 20 SHS small cabinet is designed to house up to five half-size I/O modules, plus the RTUs CPU and power supply units (located in dedicated card slots on the left side of the RTUs rack) in a single configuration.

It is the smallest RTU 20 configuration, with a very compact chassis, installed within an IP 65/NEMA 4 certified enclosure, suitable for outdoor field mounting (on wall or pole).

Inside the SHS small cabinet, additional space is available to hold:

- Lead, sealed, maintenance-free, backup battery (24 V dc, 2.5 A)
- Modem, radio equipment, optical fiber interfaces
- A sealed (IP 65) alphanumeric LCD display with flat membrane keypad, embedded on the RTUs door (with external access without opening the cabinet).

Main ac or dc voltage input is connected through a plug-in connector (ac) or terminal block (dc) located on the power supply module's front panel.

Field I/O cables are connected to the RTU 20 half-size I/O modules through removable screw-terminal blocks located on each I/O module's front edge. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 SHS half-size small cabinet features:

- Dimensions (h x w x d): 500 x 400 x 250 mm (19.7 x 15.7 x 9.8 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Field cables that enter from the cabinet bottom.

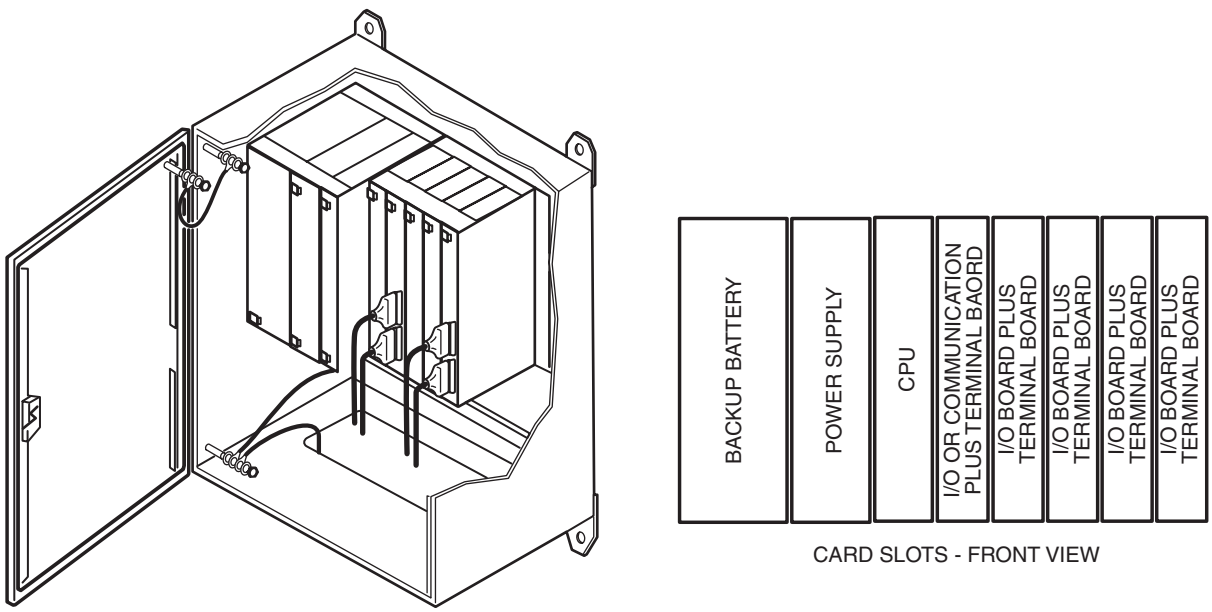


Figure 1. Hardware Configuration Schematic for RTU 20 SHS – Half-Size Modules, Small Cabinet

RTU 20 RHS: Half-Size Modules – 9 I/O Slot Cabinet, Medium/Redundant Configuration

The RTU 20 RHS medium cabinet is designed to house up to nine half-size I/O modules, plus the RTUs CPU and power supply units (located in dedicated card slots on the left side of the RTUs rack) in single or redundant configuration.

It is a medium RTU 20 configuration, with a 19-inch wide compact chassis, installed within an IP 65/NEMA 4 certified enclosure, suitable for outdoor field mounting (on wall or pole).

Inside the RHS medium cabinet, additional space is available to hold:

- Lead, sealed, maintenance free, backup battery (24 V dc, up to 5 A) housed in the cabinet door
- Modem, radio equipment, optical fiber interfaces
- A sealed (IP 65) alphanumeric LCD display with flat membrane keypad, embedded on the RTUs door (with external access without opening the cabinet)
- Additional filters, intrinsically safe barriers, terminal boards, interposing relays, and so forth to interface/isolate the I/O field signals (typically mounted in external marshalling cabinets).

Main ac or dc voltage input is connected through a plug-in connector (ac) or terminal block (dc) located on the power supply module's front panel.

Field I/O cables are connected to the RTU 20 half-size I/O modules through removable screw-terminal blocks located on each I/O module's front edge. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 RHS medium half-size cabinet features:

- Dimensions (h x w x d): 800 x 600 x 320 mm (31.5 x 23.6 x 12.6 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Field cables that enter from the cabinet bottom.

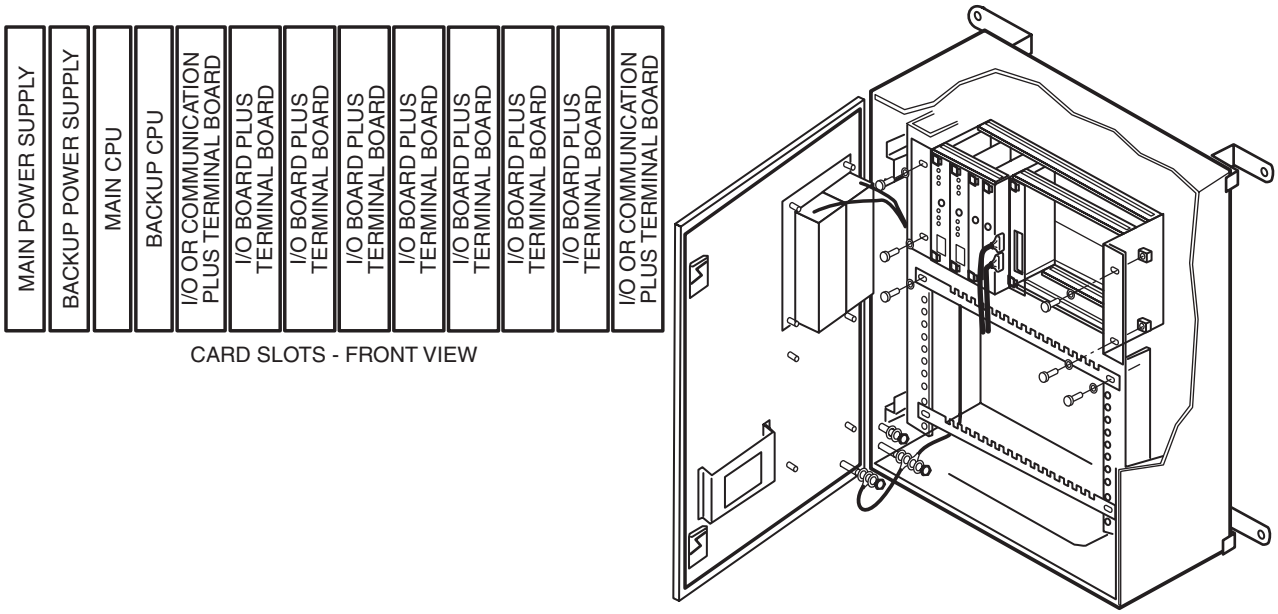


Figure 2. Hardware Configuration Schematic for RTU 20 RHS – Half-Size Modules, Medium Cabinet

I/A Series RTU 20 FULL-SIZE MODULES

The I/A Series RTU 20 with full-size modules are compact, modular I/O process terminals designed for medium to large applications.

The I/A Series RTU 20 with full-size modules is available in four rack/cabinet sizes:

- SFS: Small full-size configuration housed on a single rack with five slots for full-size electronic I/O boards including the relevant terminal boards
- RFS: Medium full-size configuration housed on a double rack with nine slots for full-size electronic I/O boards, on the first, and the relevant terminal boards on the second
- LFR: Large front/back cabinet configuration housed on four full-size 19-inch double racks (nine slots each for full-size electronic I/O modules and relevant terminal boards), two on the front side of the cabinet and two on its rear side
- LRP: Large rotating panel cabinet configuration housed on four full-size 19-inch racks for electronic boards (nine slots each for full-size electronic I/O modules) mounted on the front rotating panel of the cabinet and four 19-inch racks for the relevant terminal boards mounted on the fixed back panel within the cabinet.

The full-size electronic I/O modules (EURO size in depth) acquire the field signals through independent terminal boards (equipped with removable screw-terminal blocks) connected to each I/O module rack backplane.

Packaged for industrial environments, RTU 20 with full-size modules provide a high electrical isolation and a high immunity to electromagnetic field and environmental conditions.

Cabinets are waterproof and dustproof (protection level of IP 65/NEMA 4) for small and medium full-size models (wall-, panel- or pole-mounted for outdoor installations) and meet IP 55/NEMA 12 requirements for large front/back and large rotating panel models (floor-mounted for indoor installations).

RTU 20 SFS: Full-Size Modules – 5 I/O Slot Cabinet, Small Configuration

The RTU 20 SFS small configuration is designed to house up to five full-size I/O modules, plus the RTUs CPU and power supply units (located in dedicated card slots on the left side of the RTU rack) in single configuration.

It is a medium RTU 20 configuration, with a 19-inch wide compact chassis, installed within an IP 65/NEMA 4 certified enclosure, suitable for outdoor field mounting (on wall or pole).

Inside the small full-size cabinet, additional space is available to hold:

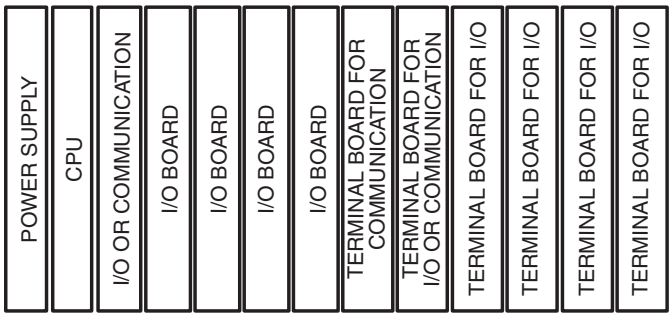
- Lead, sealed, maintenance-free, backup battery (24 V dc, up to 5 A) housed in the cabinet door
- Modem, radio equipment, optical fiber interfaces
- A sealed (IP 65) alphanumeric LCD display with flat membrane keypad, embedded on the RTUs door (with external access without opening the cabinet)
- Additional filters, intrinsically safe barriers, terminal boards, interposing relays, etc. to interface/isolate the I/O field signals (typically mounted in external marshalling cabinets).

Main ac or dc voltage input is connected through a plug-in connector (ac) or terminal block (dc) located on the power supply module's front panel.

Field I/O cables are connected to the RTU 20 full-size I/O modules through removable screw-terminal blocks on dedicated terminal boards connected to the I/O modules backplane. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 SFS small full-size cabinet features:

- Dimensions (h x w x d): 800 x 600 x 320 mm (31.5 x 23.6 x 12.6 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Field cables that enter from the cabinet bottom.



CARD AND TERMINAL BOARD SLOTS - FRONT VIEW

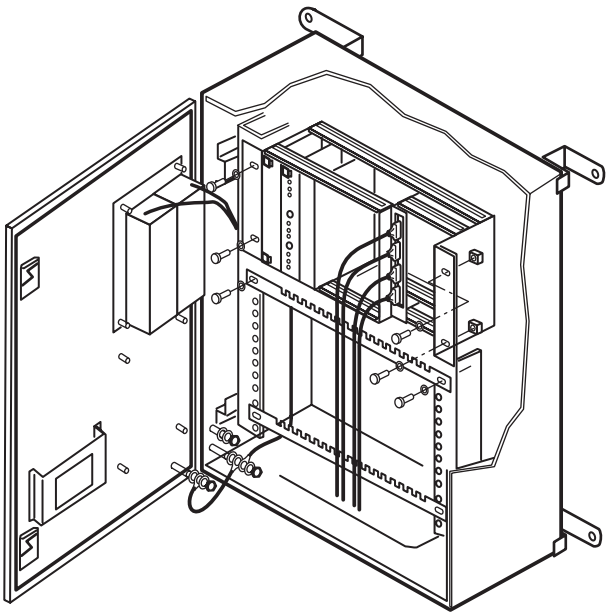


Figure 3. Hardware Configuration Schematic for RTU 20 SFS – Full-Size Modules, Small Configuration

RTU 20 RFS: Full-Size Modules – 9 I/O Slot Cabinet, Medium/Redundant Configuration

The RTU 20 RFS medium configuration is designed to house up to nine full-size I/O modules, plus the RTUs CPU and power supply units (located in dedicated card slots in the RTU rack) in single or redundant configuration.

It is a medium to large RTU 20 configuration, with a double 19-inch wide board and a terminal barrier chassis, installed within an IP 65 /NEMA 4 certified enclosure, suitable for outdoor field mounting (on wall or pole).

Inside the medium full-size cabinet, additional space is available to hold:

- Lead, sealed, maintenance-free, backup battery (24 V dc, up to 5 A) housed in the cabinet door
- Modem, radio equipment, optical fiber interfaces
- A sealed (IP 65) alphanumeric LCD display with flat membrane keypad, embedded on the RTUs door (with external access without opening the cabinet).

Main ac or dc voltage input is connected through a plug-in connector (ac) or terminal-block (dc) located on the power supply module's front panel.

Field I/O cables are connected to the RTU 20 full-size I/O modules through removable screw-terminal blocks on dedicated terminal boards connected to the I/O modules backplane. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 RFS medium full-size cabinet features:

- Dimensions (h x w x d): 800 x 600 x 320 mm (31.5 x 23.6 x 12.6 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Field cables that enter from the cabinet bottom.

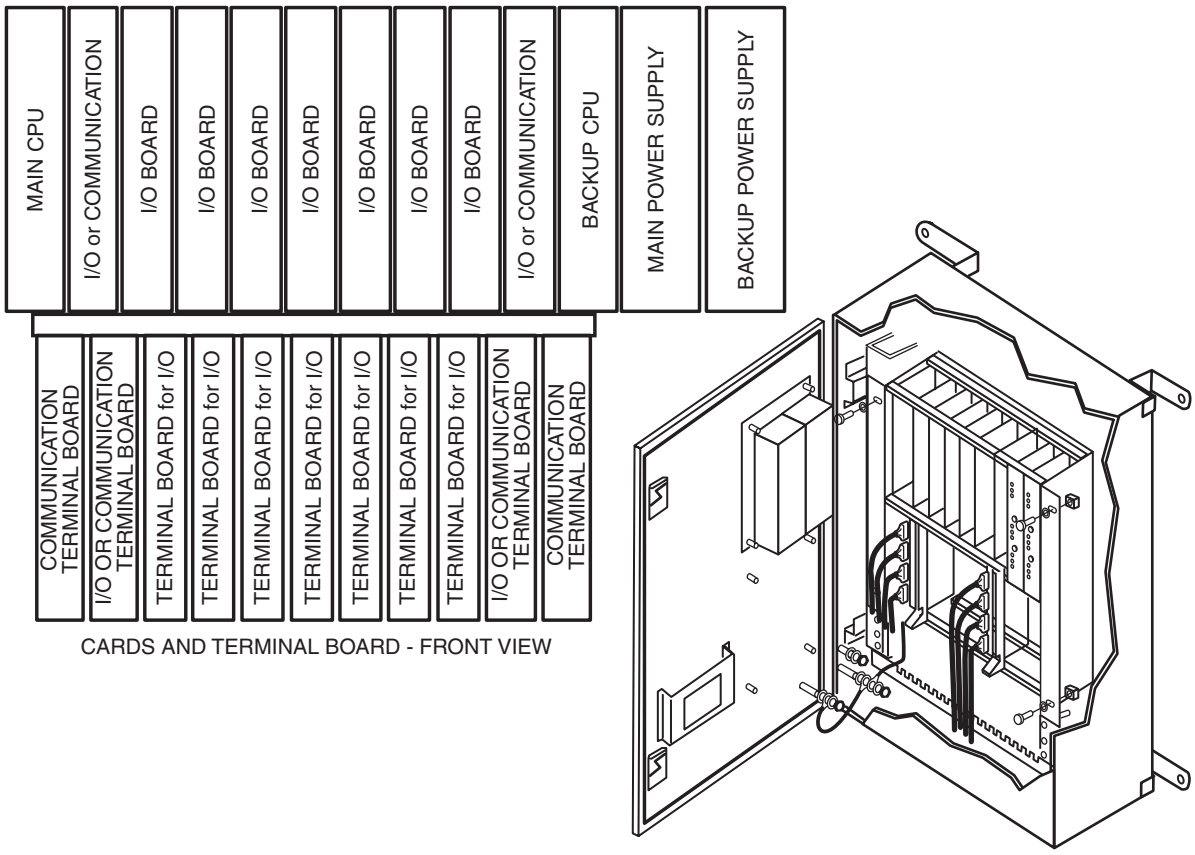


Figure 4.
Hardware Configuration Schematic for RTU 20 RFS – Full-Size Modules, Medium/Redundant Configuration

RTU 20 LFR: Full Size Modules – 36 I/O Slot Front/Back Cabinet, Large/Redundant Configuration

The RTU 20 LFR large front/back cabinet is designed to house up to 36 full-size I/O modules (shared in four 9-slot chassis), plus the RTUs CPU (located in dedicated card slots on the RTUs main rack) and power supply units in single or redundant configuration.

It is the largest RTU 20 configuration, with up to four double 19-inch wide boards and terminal barrier chassis, installed within an IP 55/NEMA 12 certified enclosure, suitable for indoor floor mounting.

In its maximum expansion, two I/O modules and terminal barrier chassis are installed on each accessible cabinet side (two on front and two on the back).

Inside the LFR front/back cabinet, additional space is available to hold:

- Lead, sealed, maintenance-free, backup battery (24 V dc, up to 5 A)
- Modem, radio equipment, optical fiber interfaces.

Main ac or dc voltage input is connected through a single (at cabinet level) power entry panel. For 110/220 V ac input (inside the cabinet) there is a main ac/dc converter that supplies 24 V dc to the power supply modules installed in each RTU chassis.

Field I/O cables are connected to the RTU 20 front/back full-size I/O modules through removable screw-terminal blocks on dedicated terminal boards connected to the I/O modules backplane. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 LFR large front/back cabinet features:

- Dimensions (h x w x d): 2000 x 800 x 800 mm (78.8 x 31.5 x 31.5 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Cabinet internal access: front and back
- Field cables that enter from the cabinet bottom.

RTU 20 LRP: Full Size Modules – 36 I/O Slot Rotating Panel Cabinet, Large/Redundant Configuration

The RTU 20 LRP large rotating panel cabinet is designed to house up to 36 full-size I/O modules (shared in four 9-slot chassis), plus the RTUs CPU (located in dedicated card slots on the RTUs main rack) and power supply units in single or redundant configuration.

It is the largest RTU 20 configuration, with up to four double 19-inch wide boards and a terminal barrier chassis, installed within an IP 55/NEMA 12 certified enclosure, suitable for indoor floor mounting.

In its maximum expansion, four I/O modules chassis are installed on the cabinet's rotating internal frame, while their four terminal barrier chassis are mounted on the cabinet's fixed back. All chassis (holding I/O modules and terminal barriers) are accessible only from the cabinet's front.

Inside the LRP rotating panel cabinet, additional space is available to hold:

- Lead, sealed, maintenance-free, backup battery (24 V dc, up to 5 A)
- Modem, radio equipment, optical fiber interfaces.

Main ac or dc voltage input is connected through a single (at cabinet level) power entry panel. For 110/220 V ac input (inside the cabinet); there is a main ac/dc converter that supplies 24 V dc to the power supply modules installed in each RTU chassis.

Field I/O cables are connected to the RTU 20 rotating panel full-size I/O modules through removable screw-terminal blocks on dedicated terminal boards connected to the I/O modules backplane. The field cable's single wire core section can range from 12 to 24 AWG (up to 2.5 square mm).

The RTU 20 LRP large rotating panel cabinet features:

- Dimensions (h x w x d): 2000 x 800 x 800 mm (78.8 x 31.5 x 31.5 in)
- Material: carbon steel
- Paint: RAL 7032, fine pebbled
- Cabinet internal access: front only
- Field cables that enter from the cabinet bottom.

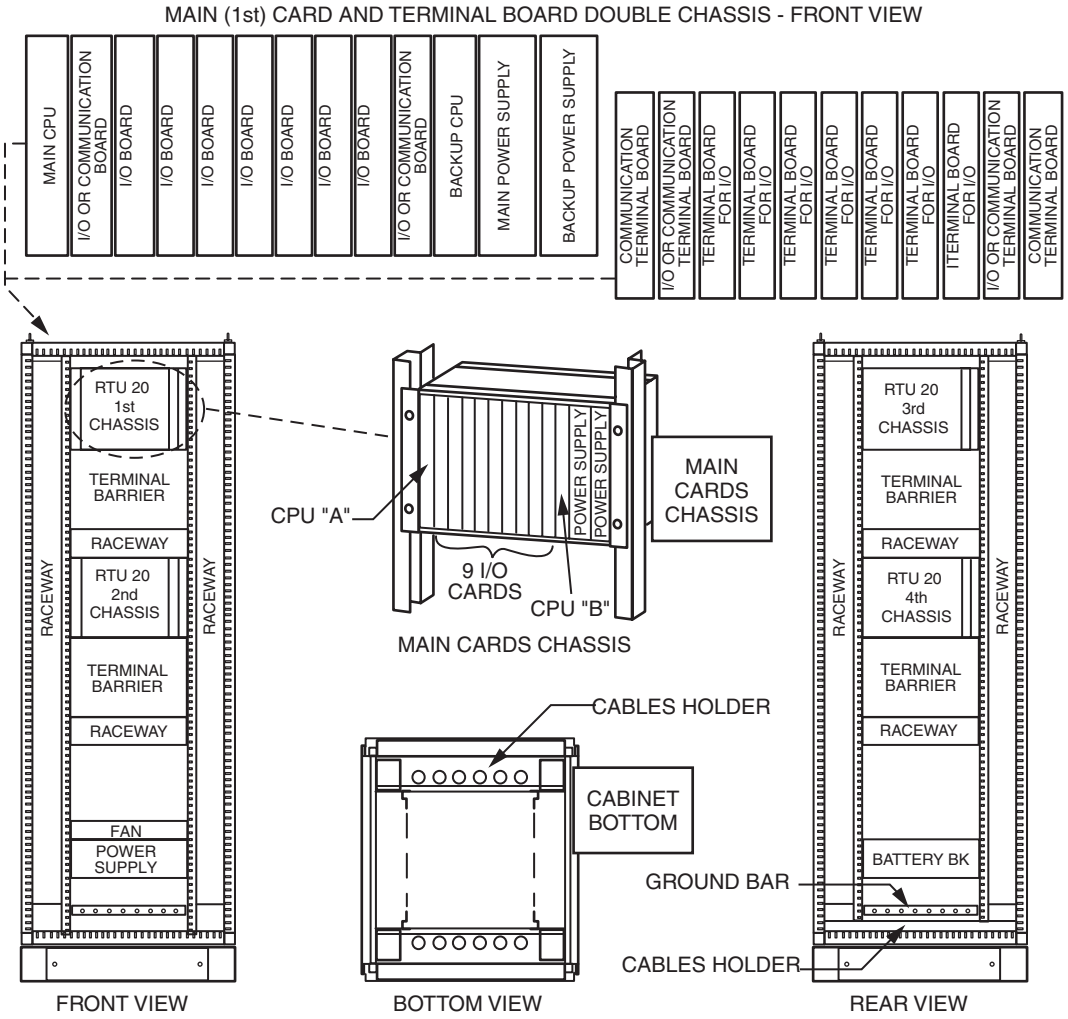


Figure 5. Hardware Configuration Schematic for RTU 20 LFR – Full-Size Modules in Large Front/Back Cabinet

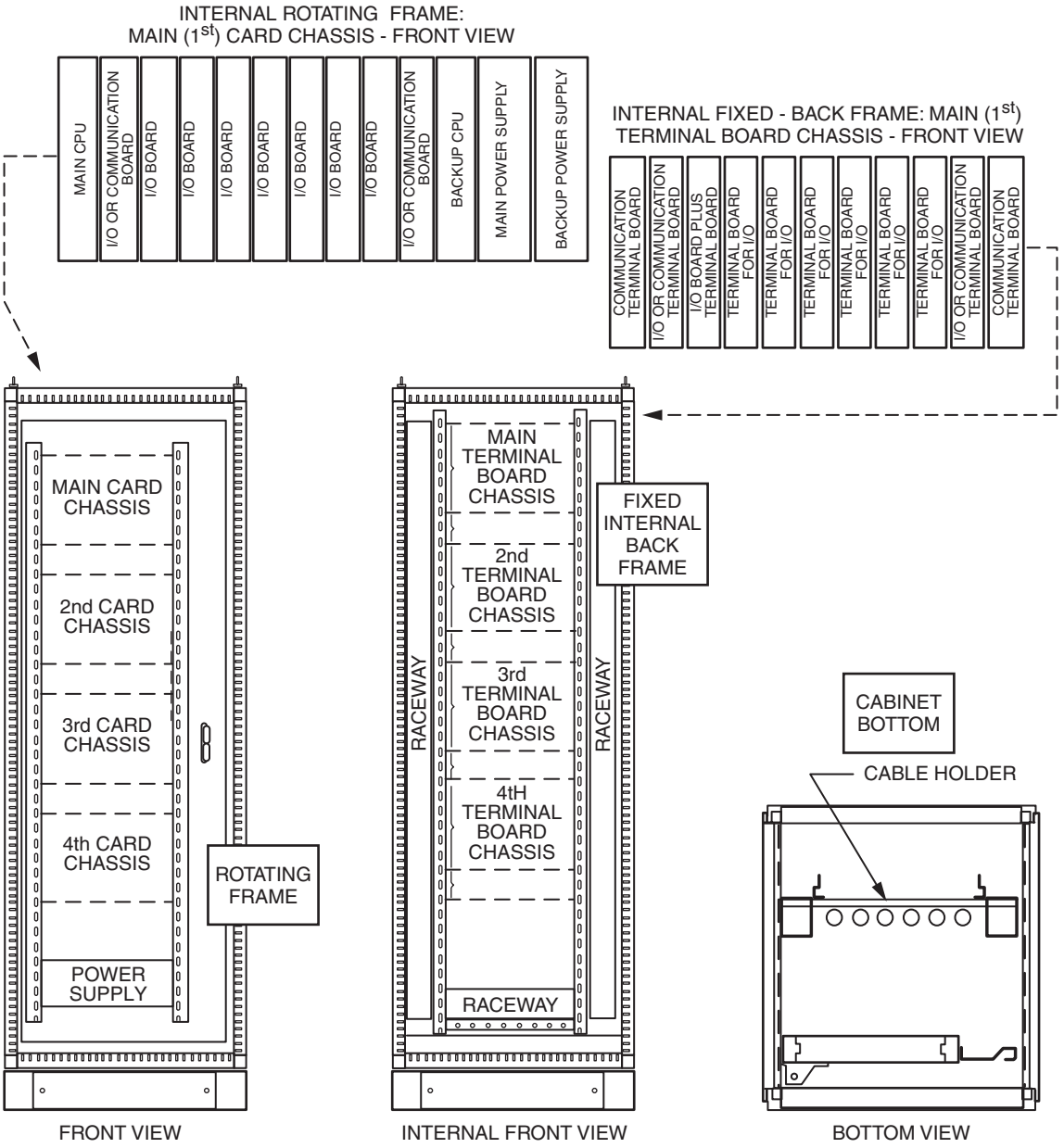


Figure 6.
Hardware Configuration Schematic for RTU 20 LRP – Full-Size Modules in Large Rotating Panel Cabinet

SPECIFICATIONS

RTU 20 half- or full-size models can operate in a temperature range from –25°C to +70°C, with maximum relative humidity of 95% (noncondensing), complying with IEC 870-2-1 Class C1 and D1 standards.

According to the available power voltage, the RTU 20 can be provided with one of the following power supplies:

- 110/220 V ac, 48 to 62 Hz, 50 W (with or without battery backup charger)
- 24 V dc, 24 W (without battery charger)
- 28 V dc, 41 W (with battery charger).

All power supply modules provide electric power for all internal electronic components, field instrumentation and 24 V dc for external devices as modem or radio links.

Power supplies, if provided with a battery charger circuit, can feed two sealed, lead type, maintenance-free, 60 W backup batteries (optional), housed in a dedicated card slot of the RTU I/O boards rack. If backup batteries are installed, the operative temperature range cannot exceed +55°C (to avoid battery damage).

All RTU 20 modules use large integration HCMOS technology, and components designed to operate in industrial temperatures ranging from –40°C to +85°C. They are field isolated up to 1500 Vrms.

All models of the I/A Series RTU 20 family consume a small amount of power (models for outdoor installations can be powered by small photo voltaic solar cells) and provide high reliability.

The RTU 20 can support up to four communication lines to SCADA Master Stations and local or remote slave RTUs.

Communication is implemented using:

- Local connections through RS-232-C or RS-485 serial asynchronous ports
- Connections to dedicated channels through integrated or external modems
- Radio links, optic fibers and other communication media interfaces.

To allow interfacing towards the most common devices and instrumentation distributed on plants, the following I/O modules are available:

- current or voltage analog input (including thermocouple and resistance temperature detector adapters)
- digital and counter input
- analog output (0 to 20 mA)
- momentary or permanent digital output.

The Foxboro Company
33 Commercial Street
Foxboro, Massachusetts 02035-2099
United States of America
http://www.foxboro.com
Inside U.S.: 1-508-543-8750 or 1-888-FOXBORO (1-888-369-2676)
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