

RNX-2000

REMOTE CONTROL
UNIT | RTU

Communication Solutions

Primary & Secondary Distribution



- RNX2000 is a flexible, compact and modular (depending on model) remote-terminal unit (RTU) for primary and secondary distribution suitable for low and medium voltage switchgears, being an optimal solution for Ring Main Units monitoring and control thanks to its compact size.
- RNX2000 is provided with 24-48 Vdc power supply.
- If measurements are selected, the following options are available depending on model:
 - » Current:
 - 9 current channels for current sensors (LPCT or Rogowski).
 - » Voltage:
 - 3 voltage channels for resistive or capacitive low voltage sensors (LEAs)
- RNX2000 includes the following communication ports:
 - » Serial Ports:
 - 1x RS485 Port.
 - 1x RS232/RS485 Port selectable by switch.
 - » Ethernet ports:
 - 2x WAN (10/100/1000 Base Tx) Ports (RJ45 connectors).
 - 1x LAN (10/100/1000 Base Tx) Port (RJ45 connector).
 - 1x Service LAN (10/100/1000 Base Tx) Port (RJ45 connector).
- RNX2000 will support all the standard protocols enhancing cyber security requirements to fulfil IEC62351:
 - » Slave/Server: IEC60870-5-104
 - » Master/Client: Modbus RTU, NTP/SNTP.
Master/Client: IEC60870-5-101/104, IEC60870-5-103, Modbus (TCP/IP), DNP3 (TCP/IP and Serial), IEC61850 (Upcoming).
Slave/Server: IEC60870-5-101, IEC60870-5-103, Modbus (TCP/IP and RTU), DNP3 (TCP/IP and Serial), IEC61850 (Upcoming).
- RNX2000 includes different modules of I/O available to support:
 - » 32, 48 or 64 inputs.
 - » 8, 16, 24, 32 or 40 outputs with associated LED indicators.
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Protection functions available depending on model.
- Advanced logic configuration and automation capability thanks to the programmable logic.
- Sequential Events Recording (SER) in non-volatile RAM memory maintaining the date & time thanks to its internal RTC (Real Time Clock).
- Integrated Web server for configuration and diagnostics.

The diagram illustrates the communication architecture for the FANUC RNX 2000 system, organized into three main levels:

- Station level:**
 - SCADA CENTER:** Connected to the RNX 2000 via DNP 3 (IEC60870-5-1-04, IEC60870-5-1-01).
 - REMOTE CONTROL:** Connected to the RNX 2000 via DNP 3 (IEC60870-5-1-04, IEC60870-5-1-01, IEC61850 CLIENT/SERVER).
 - HMI:** Connected to the RNX 2000 via a cloud icon.
 - SIC-A:** Connected to the RNX 2000 via a RED BOX.
 - RNX 2000:** The central processing unit, connected to the SCADA center, remote control, HMI, and SIC-A.
- Bay level:**
 - LAN-A and LAN-B:** Connected to the RNX 2000 via a cloud icon.
 - IEC 61850:** A central bus connecting LAN-A and LAN-B.
 - BUS RS-485:** A bus connecting the IEC 61850 bus to the SIC-A and various FANUC modules.
 - FANUC Modules:**
 - SIL-G, SIR-A, SIR-A/C, SIC-A:** Connected to the IEC 61850 bus.
 - SIL-S, SIL-A, SIR-C, SIL-C, SIU-C:** Connected to the SIC-A via TCP-IP.
 - SIA-C, SIA-B:** Connected to the SIC-A via SELF-POWER PROTECTION.

TECHNICAL PARAMETERS RNX2000

Communication interfaces	Serial ports: 1x RS485 Port. 1x RS232/RS485 Port (selectable by switch). Ethernet ports: 2x WAN Ports (10/100/1000 Base Tx) (RJ45 connectors). 1x LAN Port (10/100/1000 Base Tx) (RJ45 connector). 1x Service LAN Port (10/100/1000 Base Tx) (RJ45 connector).
Protocol Support	Slave/Server: IEC60870-5-104 Master/Client: Modbus RTU, NTP/SNTP. <i>Master/Client: IEC60870-5-101/104, IEC60870-5-103, Modbus (TCP/IP), DNP3 (TCP/IP and Serial), IEC61850 (Upcoming).</i> <i>Slave/Server: IEC60870-5-101, IEC60870-5-103, Modbus (TCP/IP and RTU), DNP3 (TCP/IP and Serial), IEC61850 (Upcoming).</i>
Function 50-1 (*)	Function enable: No/Yes
Function 50-2 (*)	Current tap: 0.004 - 8x nominal (step 0.001xIn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Reset Time: 0.000 to 300.000 s (step 0.001 s)
	Block Signal: 0 to 512 (step 1)
Function 50N-1 (*)	Function enable: No/Yes
Function 50N-2 (*)	Current tap: 0.004 - 8x nominal (step 0.001xIn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Reset Time: 0.000 to 300.000 s (step 0.001 s)
	Block Signal: 0 to 512 (step 1)
Function 50INC (*)	Function enable: No/Yes
	Current Set: 1 to 4 (Step 1)
	Phase Current tap: 0.004 - 8x nominal (step 0.001xIn)
	Pickup Peaks number: 1 to 20 (step 1)
	Trip Peak number: 1 to 20 (step 1)
	Block Signal: 0 to 512 (step 1)
	Reset Signal: 0 to 512 (step 1)
Function 21FL (*)	Function enable: No/Yes
	Current Set: 1 to 4 (Step 1)
	Line length 0.1 to 100.0 km (step 0.1 km)
	Z1 line magnitude: 0.001 to 5.000 (step 0.001 Ω/km)
	Z1 line angle: 0 to 90° (step 0.1°)
	Z0 line magnitude: 0.001 to 5.000 (step 0.001 Ω/km)
	Z0 line angle: 0 to 90° (step 0.1°)

Other Functionality	Advanced logic configuration and automation capability thanks to the programmable logic. Cyber Security, according to IEC62351-3, IEC62351-4 and IEC62351-8. Integrated Web Server for configuration and diagnostics.
Current measurements (*)	OUTGOING-1: I-A, I-B, I-C, I-N (Calculated) INCOMING-2: I-A, I-B, I-C, I-N (Calculated) OUTGOING-2: I-A, I-B, I-C, I-N (Calculated) Current measurement: /225 mV Current range: 0.004 - 8x nominal Secondary range: 0.004x225-8x225 → 0.9 mV - 1.8V Accuracy: ±1% in a band of ± 20% the nominal current and ±2% or ±5 mA (greater of both) in the rest of the range
Voltage measurements (*)	OUTGOING-2: V-A, V-B, V-C, V-N (Calculated), UAB, UBC, UCA Voltage measurement: /3.25: Voltage range: Vn : /3.25:=1.88 V Range: 0.04-2xVn Secondary range: 0.04x1.88-2x1.88→75 mV - 3.8V Accuracy: ±1% in a band of ± 20% the nominal current and ±2% or ±5 mA (greater of both) in the rest of the range
Angle measurements (*)	OUTGOING-1: Ang I-A, Ang I-B, Ang I-C, Ang I-N INCOMING-2: Ang I-A, Ang I-B, Ang I-C, Ang I-N OUTGOING-2: Ang I-A, Ang I-B, Ang I-C, Ang I-N Ang V-A, Ang V-B, Ang V-C, Ang V-N Ang UAB, Ang UBC, Ang UCA Accuracy: ±2°
Power measurements (*)	OUTGOING-1: Total active power, reactive power, apparent power, power factor INCOMING-2: Total active power, reactive power, apparent power, power factor OUTGOING-2: Total active power, reactive power, apparent power, power factor
Power supply	24-48 Vdc ±20%

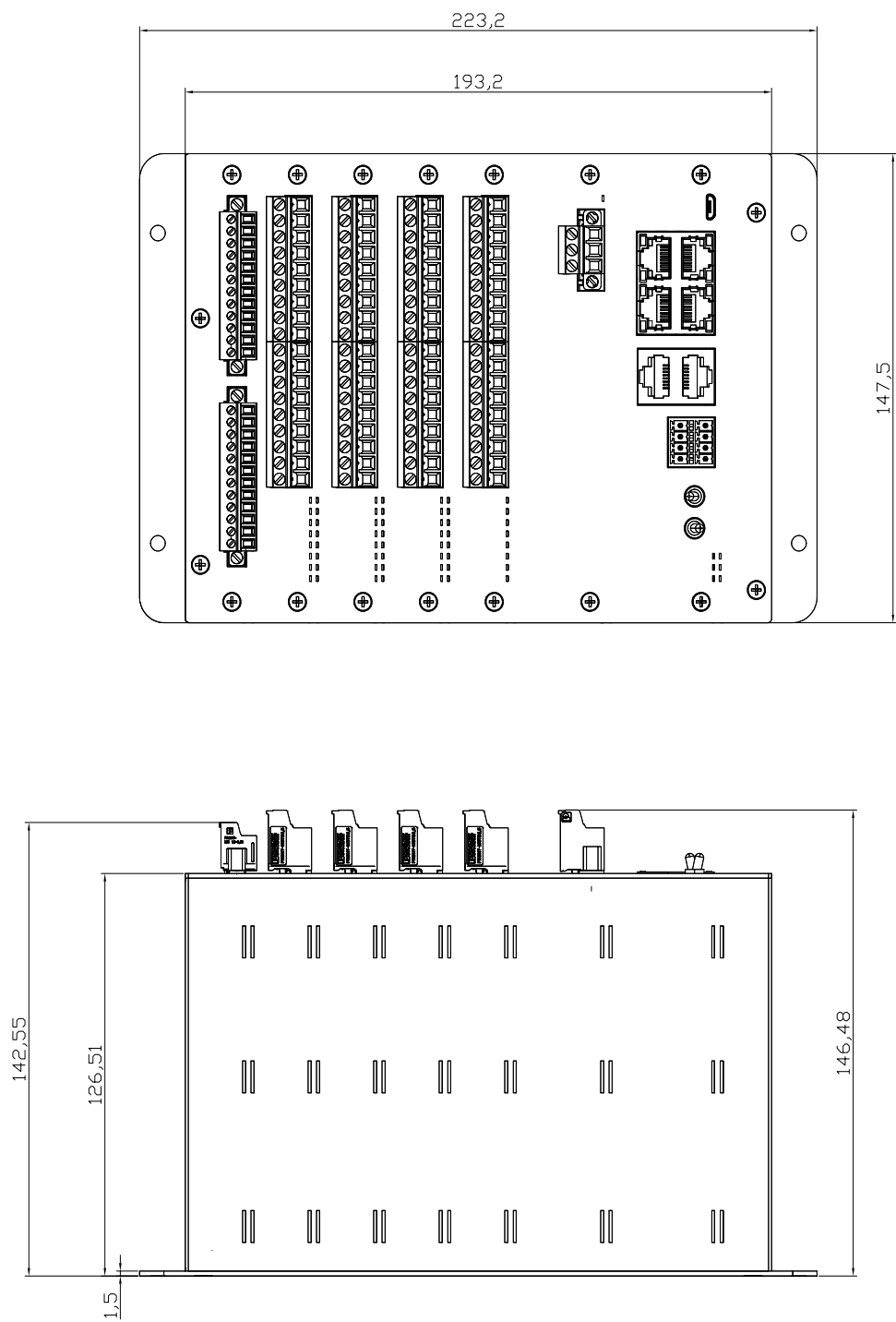
TECHNICAL PARAMETERS RNX2000

Digital Outputs Module (*)	Depending on the model: 8, 16, 24, 32 or 40 outputs (1 module of 16 outputs or 1, 2, 3, 4 or 5 modules of 8 outputs): Each 8-outputs module (separated common per output): • 2 NO-NC output + 6 NO outputs. • Switching capacity: 24-48 Vdc/1A • Withstand voltage across open contacts: 300 V Each 16-outputs module (separated common by every 8 outputs): • 1 NC output + 15 NO outputs. • Switching capacity: 24-48 Vdc/1A • Withstand voltage across open contacts: 300 V
Digital Inputs Module (*)	Depending on model: 16 inputs, 32 inputs, 48 inputs or 64 inputs (16 Inputs per module): The voltage of the inputs is the same as the auxiliary power supply (Minimum threshold: 15 V).
Analog Measurements Modules (*)	» Current: ▪ 9 current channels for current sensors (LPCT/Rogowski) » Voltage: ▪ 3 voltage channels for resistive or capacitive low voltage sensors (LEAs) Upcoming different combinations of current and voltage channels.
Energizing Quantities	Burden of current inputs: <50 μVA Burden of voltage inputs: <10 μVA Burden of power supply unit: 24-48 Vdc ($\pm$20%): < 10 W Burden for binary inputs: 24-48 Vdc ($\pm$20%): < 100 mW
Environmental conditions	Operating temperature: -40 to 70°C Storage temperature: -40 to 80°C Relative humidity: 95%
Mechanical characteristics	Metallic box 7-modules (fixed structure): Horizontal assembly HxWxD: 147.5 x 223.2 x 146.48 mm Vertical assembly HxWxD: 223.2 x 147.5 x 146.48 mm 7-modules (modular structure): Horizontal assembly HxWxD: 167.5 x 233.2 x 146.48 mm Vertical assembly HxWxD: 233.2 x 167.5 x 146.48 mm 10-module (modular structure): Horizontal assembly HxWxD: 167.5 x 298.5 x 146.48 mm Vertical assembly HxWxD: 298.5 x 167.5 x 146.48 mm

(*) Optional depending on model

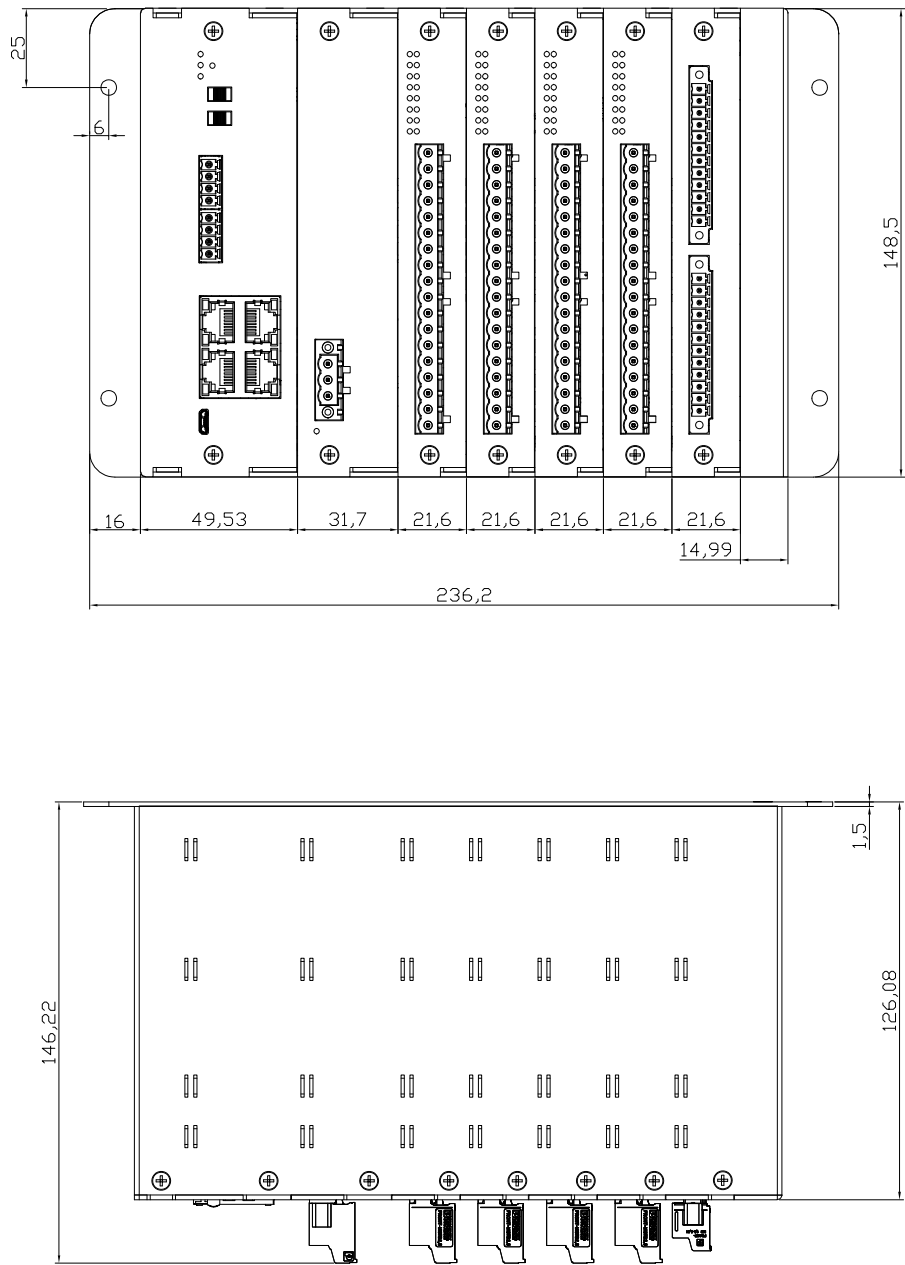
DIMENSIONS RNX2000

7- Slot (Fixed structure)



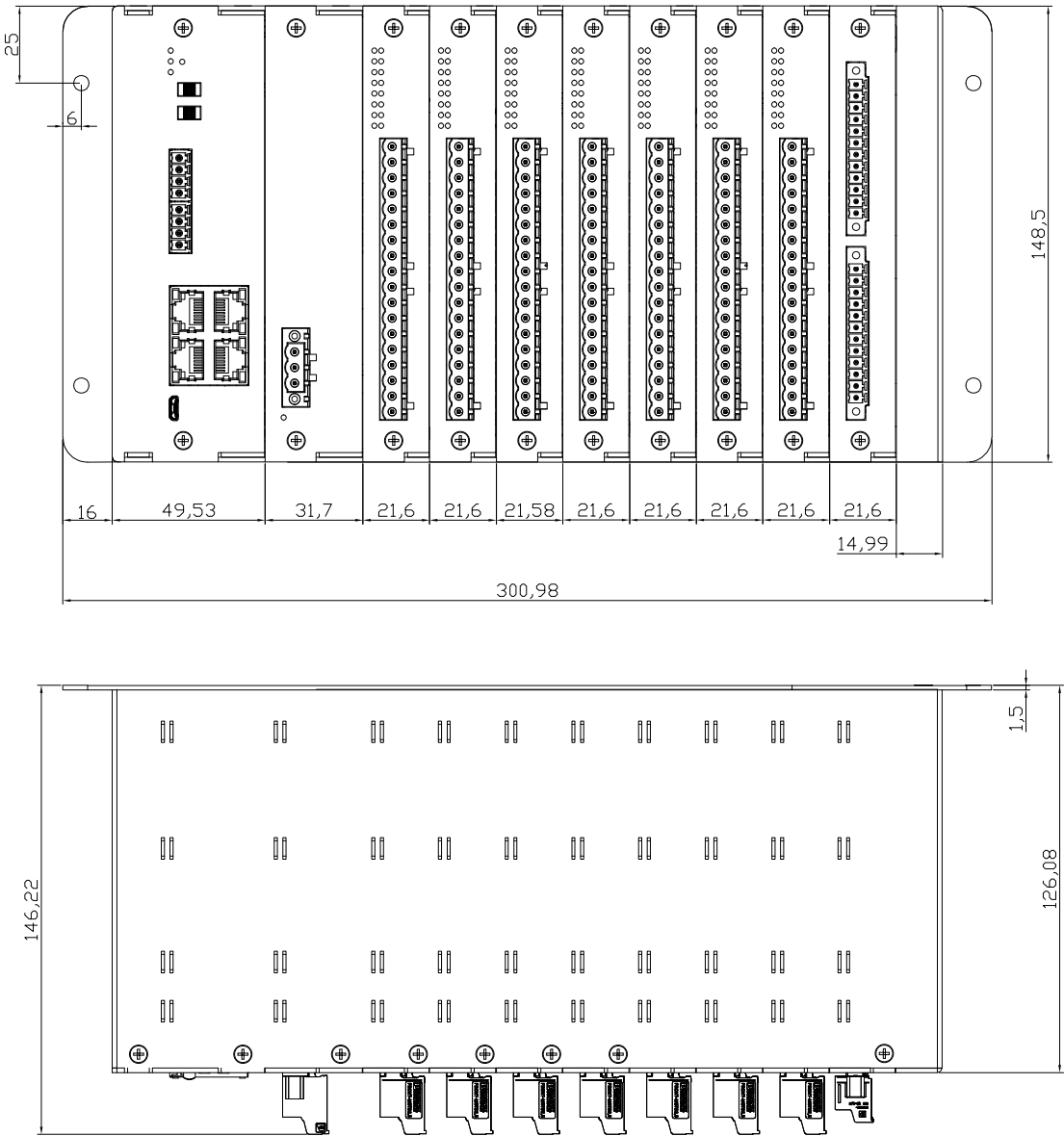
DIMENSIONS RNX2000

7- Slot (Modular structure)



DIMENSIONS RNX2000

10- Slot (Modular structure)



SELECTION & ORDERING DATA RNX2000

RNX 2000

Ring Terminal Unit									
00 9P									PHASE CURRENT MEASUREMENT Without measurement 9xLPCT (xxA/225 mV)
	00 3L								VOLTAGE MEASUREMENT Without measurement 3xLEA: 3.25/ $\sqrt{3}$ Vrms
		A							POWER SUPPLY 24-48 Vdc
			A						COMMUNICATION PORTS RS485 + RS232/RS485 + 4 x Ethernet (10/100/1000 Base Tx)
				E 1 2 3 4					INPUTS Without inputs 1 x 16 Inputs 2 x 16 Inputs 3 x 16 Inputs 4 x 16 inputs
					E 0 1 2 3 4 5				OUTPUTS Without Outputs 1 x 8 Outputs 1 x 16 Outputs 2 x 8 Outputs 3 x 8 Outputs 4 x 8 Outputs 5 x 8 Outputs
						5 7 8			MECHANICS 7 Slots modular assembly (2 fixed + 5 modular) 7 Slots (compact structure only) 10 Slots modular assembly (2 fixed + 8 modular)
							A B C D		ADAPTATION - + (2) 50 + (2) 50N + (2) 21FL + (2) 50INC + (2) 50 + (2) 50N + (2) 50 + (2) 50N+ SZM + 52

NOTE: When the part number is selected, the admissible maximum number of inputs and outputs are:

Maximum 64 inputs.

Maximum 40 outputs.

Example of ordering code:

9P	3L	A	A	3	0	7	A	RNX 2000 9P3LAA307A
RNX 2000								

SELECTION & ORDERING DATA FOR ACCESSORIES

RNX Modules

Module Type	Ref	Description
MEASUREMENT MODULES	RNX-AIM-0309	Analogue Input Module : 3xLEA + 9xLPCT
COMMUNICATION MODULES	RNX-COM-1140	Communication Module : 1xRS485 + 1xRS232/RS485 + 4RJ45
POWER SUPPLY MODULES	RNX-PSM-24	Power Supply Module: 24-48 Vdc
INPUTS MODULES	RNX-DIM-16	Digital Inputs Module: 16 Inputs
OUTPUTS MODULES	RNX-DOM-08	Digital Outputs Module: 8 Outputs
	RNX-DOM-16	Digital Outputs Module: 16 Outputs
BLANK COVER	RNX-BCM-00	Blank Cover