RTD and mA Input / Output Modules

REL52811 / REL52812 (VIO 12AA/AB)
REL52813 / REL52814 (VIO 12AC/AD)

User Manual

VVIO12A/EN M/D002
04/2020

www.schneider-electric.com

Table of Contents

Legal information

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

Safety information

Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it.

The following special messages may appear throughout this publication or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please note

Electrical equipment must only be installed, operated, serviced, and maintained by qualified personnel. A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Protective grounding

The user is responsible for compliance with all the existing international and national electrical codes concerning protective grounding of any device.

EU directive compliance

EMC compliance

CE 2014/30/EU

Compliance with the European Commission's EMC Directive. Product Specific Standard was used to establish conformity:

- EN 60255-26 2013

Product safety

CE 2014/35/EU

Compliance with the European Commission's Low Voltage Directive. Product Specific Safety Standard was used to establish conformity:

- EN 60255-27 2014

1 Features

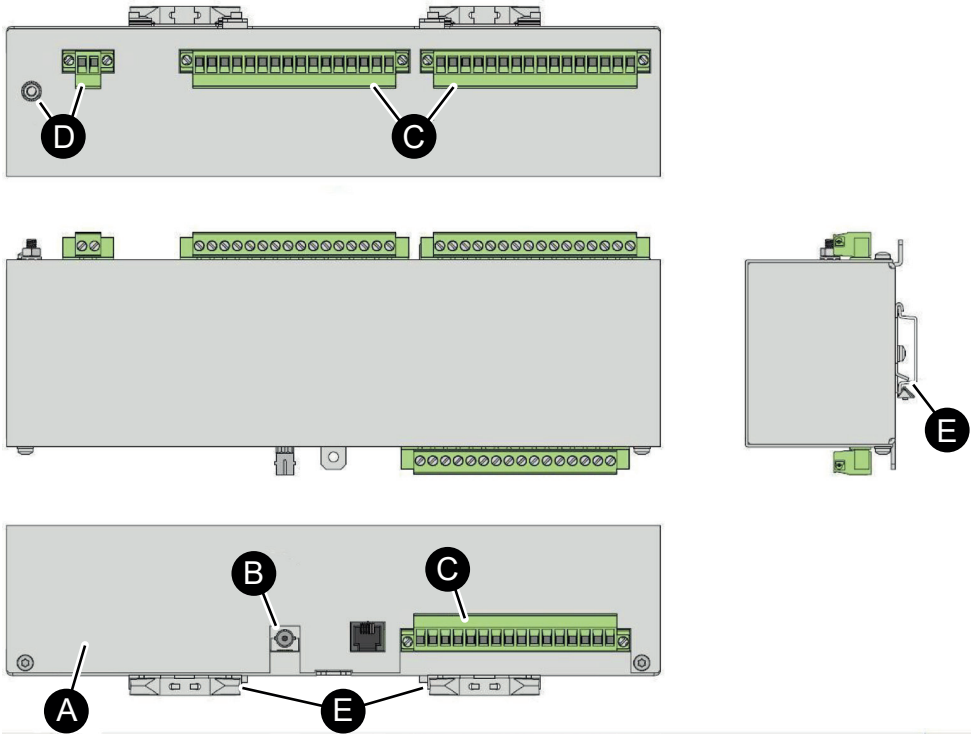
- Measures up to 12 RTD resistances
- Measuring accuracy: ± 0.3 Ω
- Supported RTD types:
  - Pt100
  - Ni100
  - Ni120
  - Cu10
- Communication:
  - REL52811 (VIO 12AA):
    - ST-type glass fiber (only TX)
    - RS-232
  - REL52812 (VIO 12AB):
    - RS-485
  - REL52813 (VIO 12AC) and REL52814 (VIO 12AD):
    - ST-type glass fiber (TX and RX)
    - RS-232
    - RS-485
- Supported external I/O protocols:[1]
  - RTD input (special protocol designed for VIO 12AA)
  - Modbus RTU
- Steel plate case
- Assembly options:
  - 35-mm DIN rail
  - Wall-mounted
  - Easergy P3 back panel
- Power supply:
  - REL52811 (VIO 12AA)and REL52812 (VIO 12AB): 24...230 Vac/dc, 50/60 Hz
  - REL52813 (VIO 12AC): 24 Vdc
  - REL52814 (VIO 12AD): 48...230 Vac/dc, 50/60 Hz
- Operating temperature: 0...+55 °C

[1] In Easergy P3 devices, the Modbus RTU and RTD input communications to VIO 12AA (or other external I/O modules) are called external I/O protocols.

2 Layout

2.1 REL52811 (VIO 12AA) RTD input module

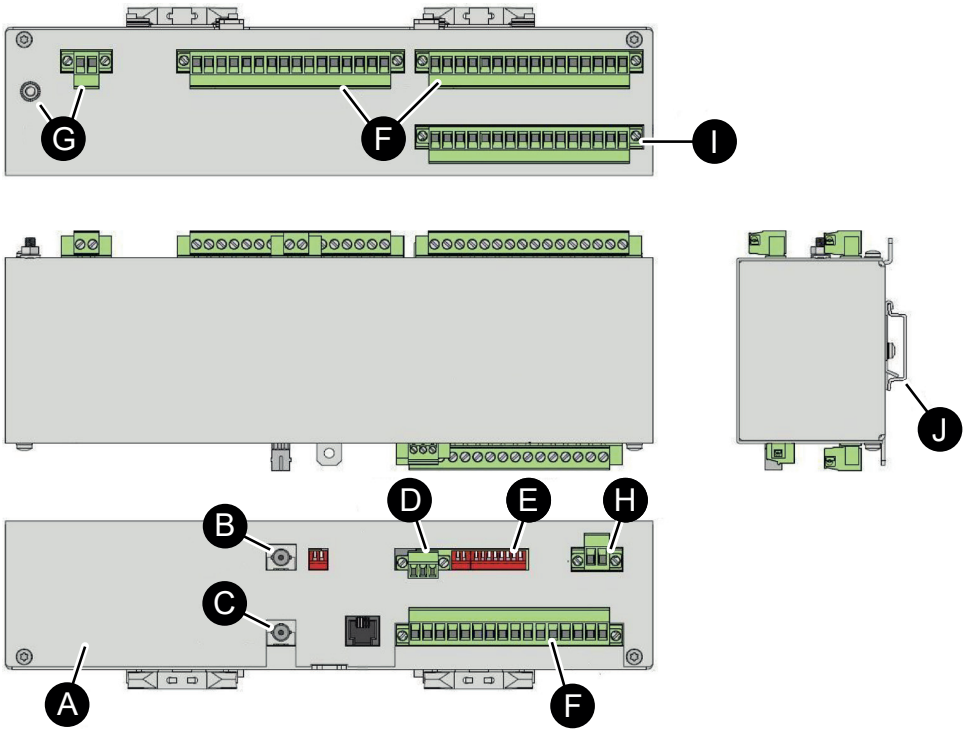
Figure 1 - REL52811 (VIO 12AA) RTD input module layout



A. Metal enclosure
B. Glass-fiber Tx communication
C. RTD inputs (12 channels, 3-wire connection + shield/channel)
D. Power connector and PE connection
E. DIN rail mounting

2.2 REL52812 (VIO 12AB) RTD input module

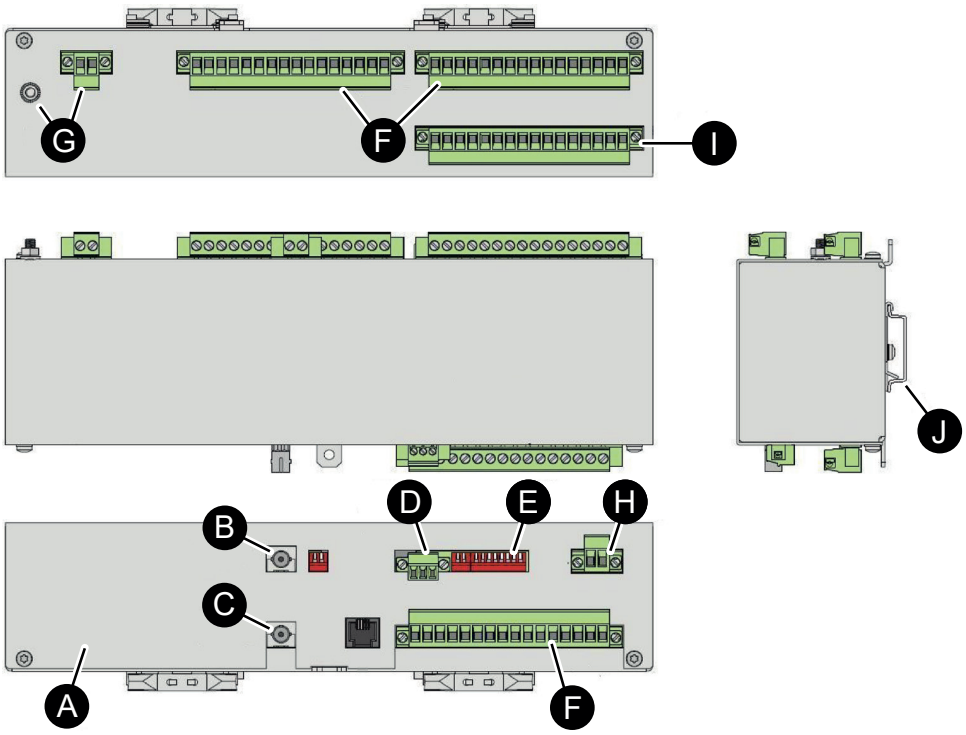
Figure 2 - REL52812 (VIO 12AB) RTD input module layout



A. Metal enclosure
B. Glass-fiber Rx communication
C. Glass-fiber Tx communication
D. RS-485 communication (including the termination switch)
E. Address DIP switch
F. RTD inputs (12 channels, 3-wire connection + shield/channel)
G. Power connector and PE connection
H. PTC input (2-wire connection)
I. Four mA inputs/four mA outputs (2-wire connection/channel)
J. DIN rail mounting

2.3 REL52813 and REL52814 (VIO 12AC/AD) RTD input and mA I/O modules

Figure 3 - REL52813/REL52814 (VIO 12AC/AD) RTD input and mA I/O module layout



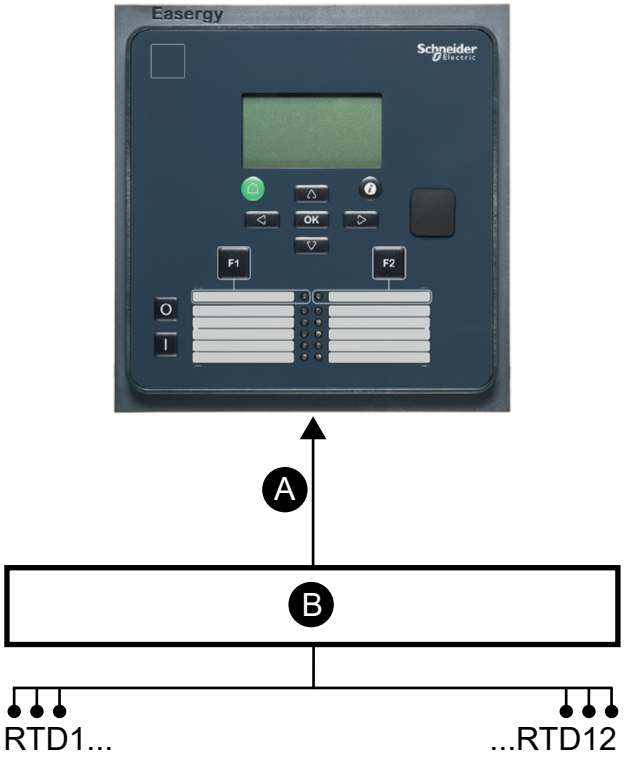
A. Metal enclosure
B. Glass-fiber Rx communication
C. Glass-fiber Tx communication
D. RS-485 communication (including the termination switch)
E. Address DIP switch
F. RTD inputs (12 channels, 3-wire connection + shield/channel)
G. Power connector and PE connection
H. PTC input (2-wire connection)
I. Four mA inputs/four mA outputs (2-wire connection/channel)
J. DIN rail mounting

3 Operation

The RTD modules support two external I/O protocols:

- RTD input
- Modbus RTU

Figure 4 - Operation principle of the RTD input protocol

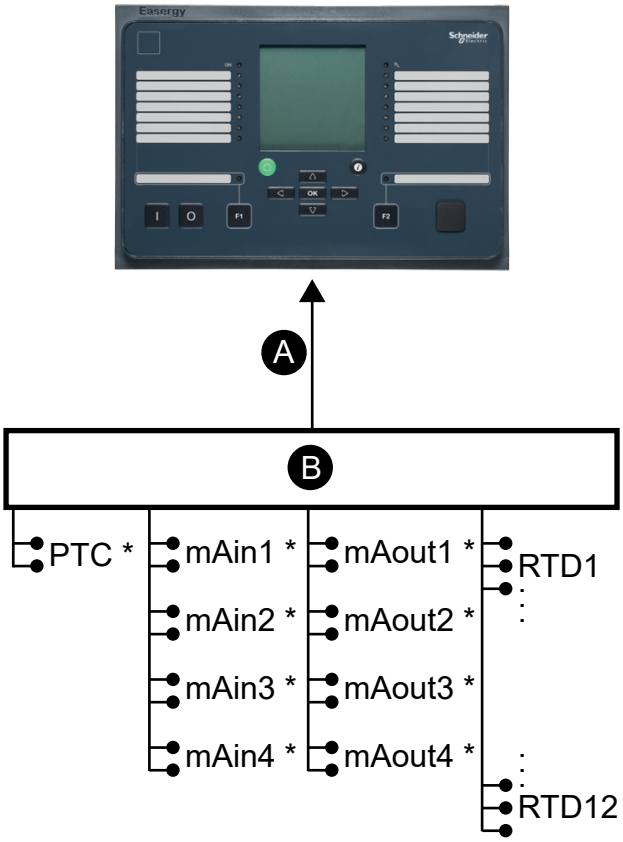


A. Single fiber for RTD input protocol (one-way communication)
B. RTD input module

Function

The RTD input module measures the resistances of RTD sensors and sends the results via the RTD input protocol.

Figure 5 - Operation principle of the Modbus RTU protocol



A. Two fibers (or RS-485 interface) for Modbus RTU (two-way communication)
B. RTD input module
* Only REL52813 and REL52814 (VIO 12AC/AD)

Function

- The RTD input module measures the resistances of RTD sensors and sends the results via Modbus RTU.
- It measures analog inputs (mA and PTC) and sends the results via Modbus RTU (only REL52813 and REL52814 / VIO 12AC/AD).
- It provides analog outputs (mA) (only REL52813 and REL52814 / VIO 12AC/AD).

Table 1 - Resistances of supported RTDs in various temperatures

Temperature (°C)	**RTD type**			
	Pt100	**Ni100**	**Ni120**	**Cu10**
300	212.02	–	439.44	–
200	175.84	223.20	303.46	16.78
100	138.50	161.80	200.64	12.90
90	134.70	154.90	191.64	12.51
80	130.89	148.30	182.84	12.12
70	127.07	141.70	174.25	11.74
60	123.24	135.30	165.90	11.35

Temperature (°C)	RTD type			
	Pt100	**Ni100**	**Ni120**	**Cu10**
50	119.40	129.10	157.74	10.97
40	115.54	123.00	149.79	10.58
30	111.67	117.10	142.06	10.19
20	107.79	111.20	134.52	9.81
10	103.90	105.60	127.17	9.42
0	100.00	100.00	120.00	9.04
-10	96.09	94.60	113.00	8.65
-20	92.16	89.30	106.15	8.26
-30	88.22	84.10	99.41	7.88
-40	84.27	79.10	92.76	7.49
-50	80.31	–	86.17	7.10

4 Application

Table 2 - Communication interfaces from the Easergy P3 device to VIO 12xx

Product	Device interface	Cable	Communications adapter	VIO 12 type	Note
P3 Standard (P3Ux)	RS-232	REL52825 (VX082 or VX083)	REL52816 (VSE001 GG) for fiber-optic interface	VIO 12AA VIO 12AC VIO 12AD (fiber interface)	Use an optical cable with ST connector 62.5/125 µm between VSE 001 and VIO,
		REL52826 (VX082 or VX083)	REL52820 (VSE 002) for RS-485 interface	VIO 12AB VIO 12AC VIO 12AD (RS-485 interface)	Use twisted pair between VSE 002 and VIO.
P3 Advanced (P3x3x)	Fiber GG (slots 6 and 9)	Fiber optical with ST connector, 62.5/125 µm	–	VIO 12AA VIO 12AC VIO 12AD (fiber interface)	Fiber connected to P3 directly
	RS-232 (slot 6 or 9)	REL52823 (VX067)	REL52816 (VSE001-GG)	VIO 12AA VIO 12AC VIO 12AD (fiber interface)	Use optical cable with ST connector 62.5/125 µm between VSE 001 and VIO.
			REL52820 (VSE 002)	VIO 12AB VIO 12AC VIO 12AD (RS-485)	Use twisted pair between VSE 001 and VIO.

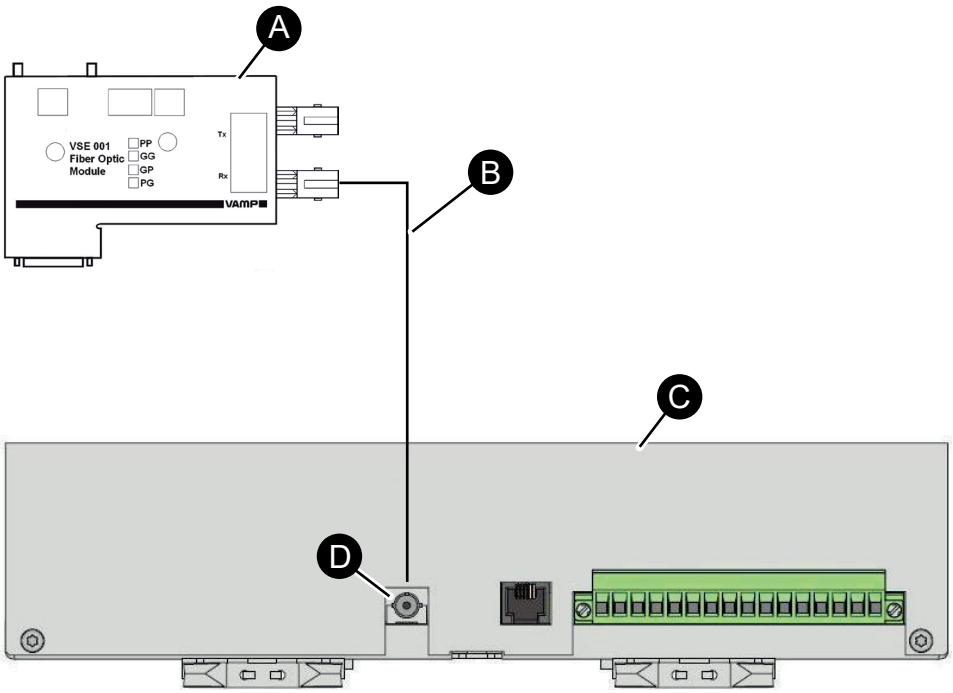
Table 3 - Accessories for Easergy P3 devices

Accessory	Code	P3 Standard (P3Ux)	P3 Advanced (P3x3x)
Fiber-optic module	REL52816 (VSE001-GGSE)	X	X
Fiber-optic module	REL52819 (VSE001-PPSE)	X	X
RS-485 module	REL52820 (VSE002)	X	X
Cable	REL52825 (VX082)	X	–

4.1 REL52811 (VIO 12AA)

Glass-fiber application with Easergy P3 Standard

Figure 6 - Glass-fiber application, REL52811 (VIO12AA)



A. Fiber-optic module mounted to the protection device's serial port or communications cable

B. Multimode fiber-optic cable: Diameter is 62.5/125 µm and the connector type is ST.

C. REL52811 (VIO 12AA) assembled on the wall or DIN rail

D. Fiber Tx

See *Table 2 - Communication interfaces from the Easergy P3 device to VIO 12xx on page 16* for compatible Easergy P3 devices and fiber-optic modules. For mounting instructions, see the user manual of the fiber-optic module.

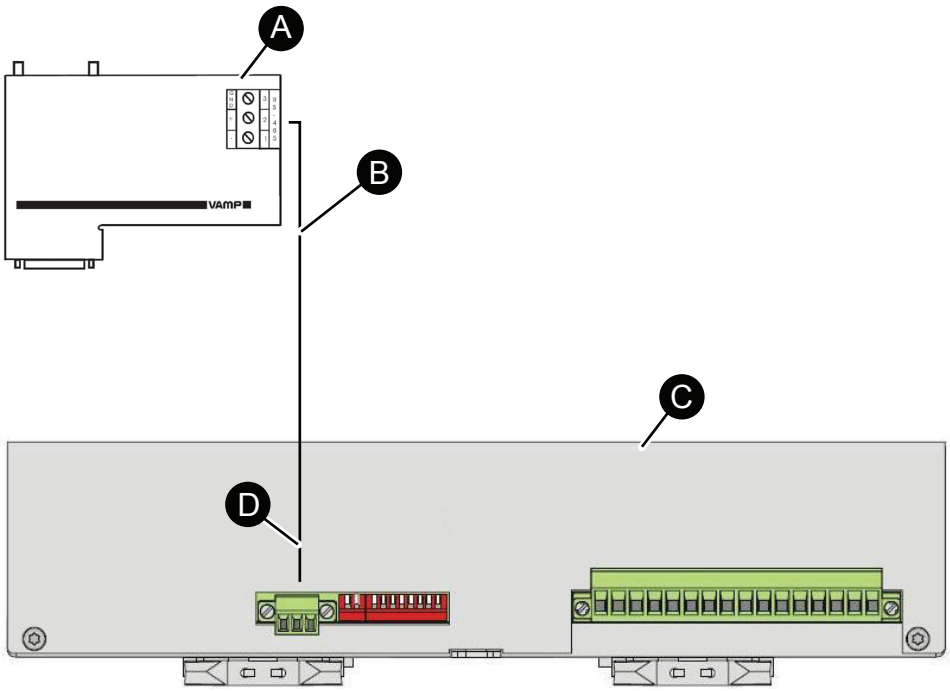
Communication over glass fiber

REL52811 (VIO 12AA) transmits RTD measurements to the protection device using the RTD input protocol.

4.2 REL52812 (VIO 12AB)

RS-485 application

Figure 7 - RS-485 application



A. RS-485 communication module mounted to the protection device's serial port or communications cable

B. Shielded twisted pair RS-485 copper cable (for example, Belden 3079E)

C. REL52812 (VIO 12AB) assembled on the wall or DIN rail

D. RS-485: 1: –, 2: +, 3: GND

For detailed mounting instructions, see the user manual of the particular RS-485 communication module.

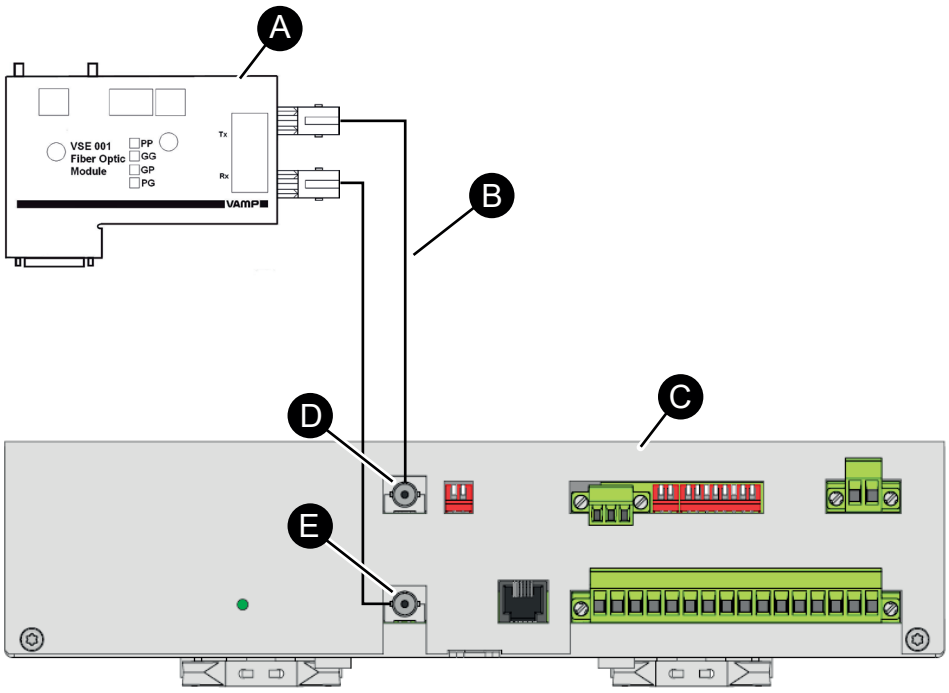
Communication over RS-485

- The device reads RTD measurements from REL52812 using the Modbus RTU protocol.
- REL52812 transmits RTD measurements to the device using the RTD input protocol.

4.3 REL52813 and REL52814 (VIO 12AC/AD)

Glass-fiber application with Easergy P3 protection devices

Figure 8 - Glass-fiber application



A. Fiber-optic module mounted to the device's serial port or communications cable

B. Multimode fiber-optic cable: The diameter is 62.5/125 µm and the connector type is ST.

C. REL52813 or REL52814 (VIO 12AC/AD) assembled on the wall or DIN rail

D. Fiber Rx

E. Fiber Tx

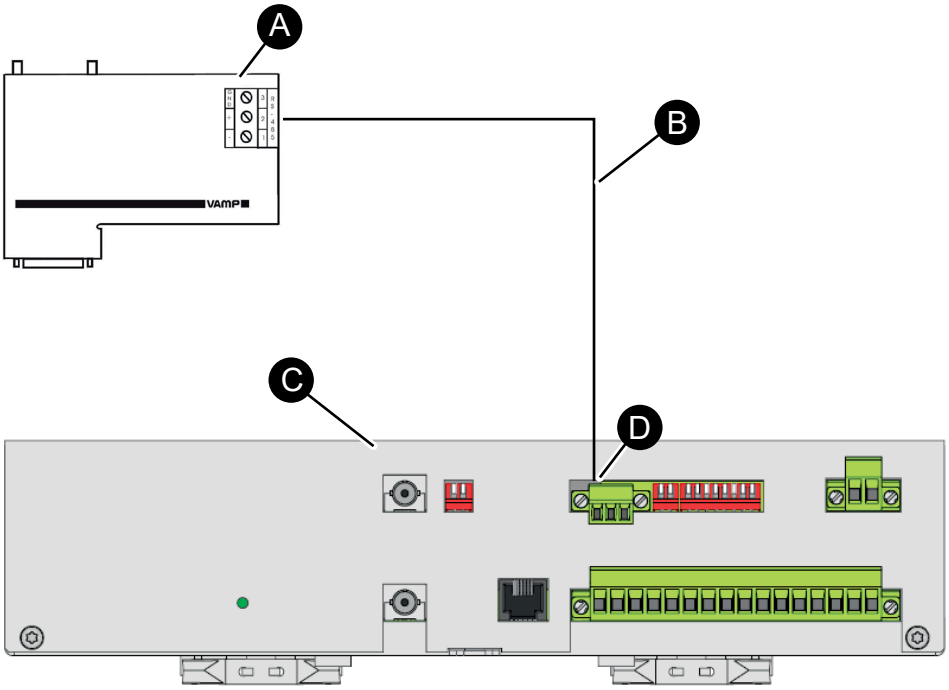
See *Table 2 - Communication interfaces from the Easergy P3 device to VIO 12xx on page 16* for compatible devices and fiber-optic modules. For mounting instructions, see the user manual of the fiber-optic module.

Communication over glass fiber

- The device reads RTD measurements from REL52813/REL52814 (VIO 12AC/AD) using the Modbus RTU protocol.
- REL52813/REL52814 (VIO 12AC/AD) transmits RTD measurements to the device using the RTD input protocol.

RS-485 application

Figure 9 - RS-485 application



A. RS-485 communication module mounted to the device's serial port or communications cable

B. Shielded twisted pair RS-485 copper cable (for example, Belden 3079E)

C. REL52813 or REL52814 (VIO 12AC/AD) assembled on the wall or DIN rail

D. RS-485: 1: –, 2: +, 3: GND

For connecting instructions, see the user manual of the RS-485 communication module.

Communication over RS-485

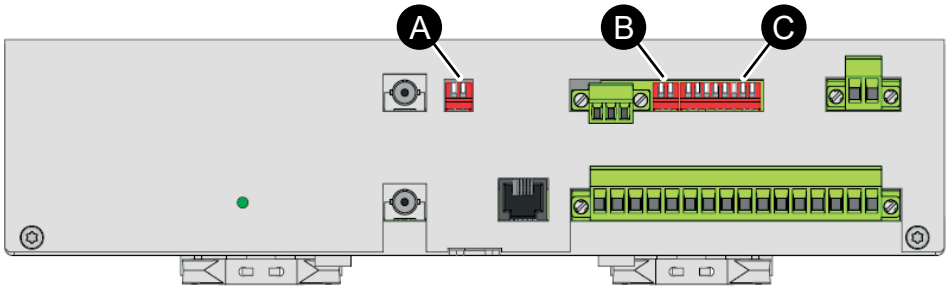
- The device reads RTD measurements from REL52813/REL52814 (VIO 12AC/AD) using the Modbus RTU protocol.
- REL52813 / REL52814 (VIO 12AC/AD) transmits RTD measurements to the device using the RTD input protocol.

4.4 Communication settings

DIP switches functionality

The DIP switches on the RTD input modules allow the user to set the communication settings required by the application.

Figure 10 - DIP switches



A. LE switch
B. T switch
C. A switch

Table 4 - DIP switches in RTD input modules

Switch	RTD input module		
	REL52811 (VIO 12AA)	**REL52812 (VIO 12AB)**	**REL52813/14 (VIO 12AC/AD)**
LE[2]			X
T		X	X
A		X	X
X = available in the RTD input module The switch position is ON when the switch is turned downwards.			

[2] LE switch is divided into two parts, LE:1 and LE:2

LE (light and echo) switches

The LE:1 light switch is used in the RTD module's optical fiber communication setup.

Table 5 - LE:1 light switch positions

Position	Description
ON	Light is on when data is sent.
OFF	Light is off when there is no data being sent.

The LE:2 echo switch is used in the RTD module's optical fiber communication in a multi-slave chain or ring topology setup.

Table 6 - LE:2 echo switch positions

Position	Description
ON	The RTD module echoes the data received to the next device in the chain.
OFF	The RTD module does not echo to the next device in the chain.

T. Term. switch (termination switch)

The termination switch is related only to the RS-485 interface. The switch selects the 120-ohm termination resistor for the RS-485 interface.

Table 7 - Termination switch positions

Position	Description
ON	Resistor is selected.
OFF	Resistor is not selected.

NOTE: The switch must be either ON or OFF at both ends of the communication line.

Address switch

The address switch selects the slave address for the RTD module.

Table 8 - Address switch positions

Position	Description
ON	Selected single address bit is set to 1.
OFF	Selected single address bit is set to 0.

The address switch has 8 single switches. Their combination provides the user with an address space of 256 addresses (0–255). However, Modbus protocol's requirements restrict the use of addresses 0 and those higher than 247 (decimal base).

Example:

The address switch represents the RTD module's address in its binary notation.

	Address switch							
	1	2	3	4	5	6	7	8
OFF		X		X	X	X	X	X
ON	X		X					

5 (decimal) = (Switch 8–>1) 00000101 (binary)

NOTE: By setting the RTD module's address to "0", the RTD input protocol can be used to send RTD measurements to the device.

When implementing the connection between the RTD module and the device with RS-485 via the RTD input protocol, no other modules can be connected to the RS-485 bus.

NOTE: The mA outputs and inputs cannot be used via the RTD input protocol.

5 Connections

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Only qualified personnel should operate this equipment. Read this entire set of instructions and check the technical characteristics of the device before performing such work.

Before connecting the devices, disconnect the supply voltage to the unit.

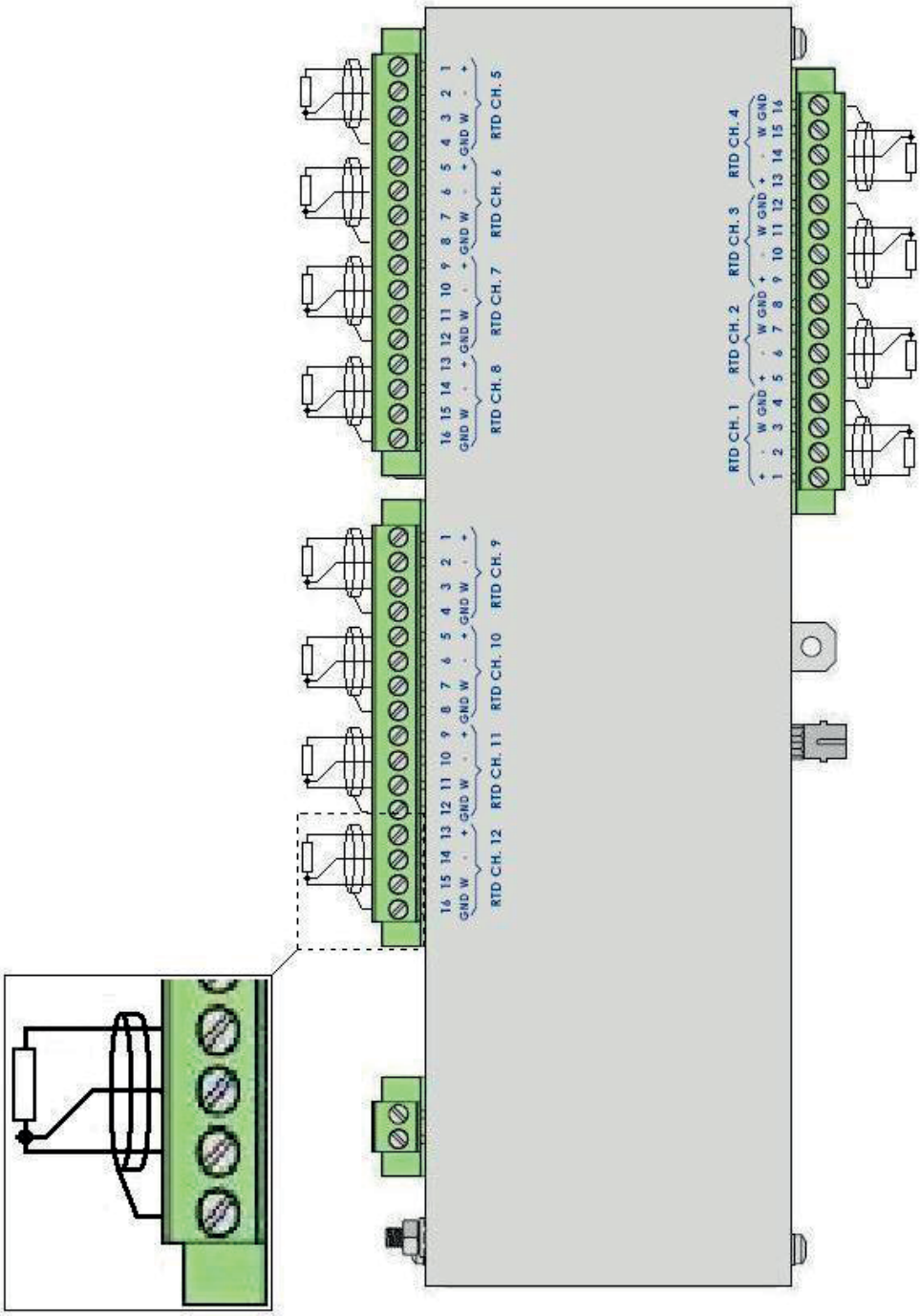
Connect the device's protective ground to functional earth according to the connection diagrams presented in this document.

Failure to follow these instructions will result in death or serious injury.

5.1 RTDs

RTD connections are the same in all RTD module versions.

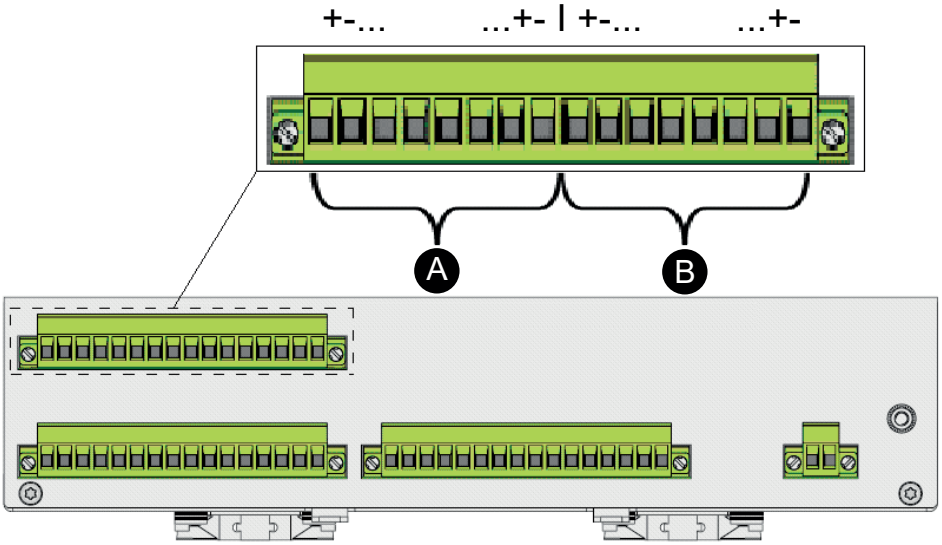
Figure 11 - RTD connections



Use a shielded non-paired control and instrumentation cable (for example, Belden 8771).

5.2 mA input and output connections

Figure 12 - REL52813/REL52814 (VIO 12AC/AD) mA input/output connection cables



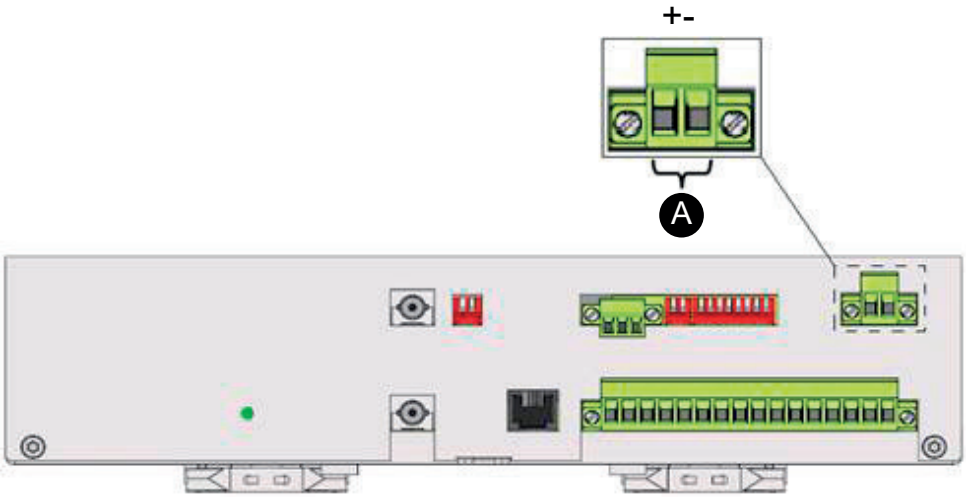
A. mA inputs

B. mA outputs

Use a shielded non-paired control and instrumentation cable (for example, Belden 8771).

PTC connections

Figure 13 - REL52813/REL52814 (VIO 12AC/AD) PTC connection cables



A. PTC input

Use a shielded non-paired control and instrumentation cable (for example, Belden 8771).

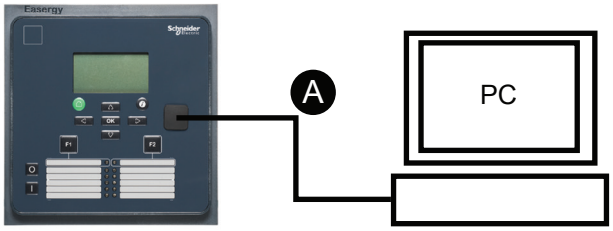
6 Configurations

This chapter describes the configurations required to correctly set up the protection device and the RTD module using Easergy Pro.

6.1 Connecting the device to Easergy Pro

1. Connect the USB cable (A) between the PC running Easergy Pro and the local port of the protection device.

   Figure 14 - Connecting cable REL52822 to the device's front port



   A. USB cable REL52822 (VX052-3)

2. On the Easergy Pro toolbar, click the **ON** connection button.
3. On the **Login**dialog box, select the right USB serial port and the connection speed.
4. Click **Connect**.

   A new window showing the device information opens.

5. Select the desired operating level: **User**, **Operator** or **Configurator**.

   The Easergy Pro main view opens.

For more information on the communication between the device and the PC, see the device's user manual and the Easergy Pro user manual.

6.2 Defining the device settings

All RTD module versions include support for both external I/O protocols (RTD input and Modbus RTU). RTD input is a special protocol designed for REL52811 (VIO 12AA). Define the device settings according to the used protocol.

1. In the **Protocol Configuration** setting view in Easergy Pro, select **External I/O** as the remote port protocol for one of the available serial ports.

   The same port must be equipped with a suitable hardware interface module to receive data from the module.

2. In the **External I/O Configuration** setting view, select the protocol to be used according to the connection method of the RTD module.

Table 9 - External I/O configuration when the device type is ”Other”

Parameter	Values
External I/O configuration	
External I/O Device Type	Other…
External I/O Protocol	ModBus
External I/O bit rate	9600 bps
Parity	Even

Table 10 - External analog input settings when one-fiber cable is used for the RTD module connection

Parameter	Values
External I/O Device Type	REL52811
External I/O Protocol[3]	RTD input
External I/O bit rate	9600
Parity	Even

[3] After changing this parameter, restart the device.

Table 11 - External analog input settings when RS-232, RS-485 or two-fiber cables are used for the RTD module connection

Parameter	Values
External I/O Device Type	REL52811, REL52812, REL52813
External I/O Protocol[4]	Modbus
External I/O bit rate	9600
Parity	Even

[4] After changing this parameter, restart the device.

3. In the **RTD Inputs - Quick Setup** setting view, define the device’s most common RTD settings.

Table 12 - RTD Inputs - Quick Setup parameters

Parameter	Values
AI Enabled	On / Off
RTD Ch	Not editable
RTD Sensor Type	Other.., Pt100, Ni100, Ni120, Cu10
RTD Sensor Function	Off, WindingG, BearingG, Ambient, Other..
Alarm Limit[5]	User defined
Trip Limit[5]	User defined

[5] Unit: Celsius

4. In the **External Analog Inputs** setting view, set the parameter values.

Table 13 - External analog input settings

Parameter	Values
AI Enabled	On
AI Unit	C
AI Slave Address	1–247
AI Modbus Address	See *Table 8 - Address switch positions on page 22*
AI Register Type	HoldingR
AI Signed	Off

NOTE: When the external I/O protocol selection is RTD input, AI Slave Address, AI Modbus Address, AI Register Type and AI Signed can be left to their default values.

5. On the external analog inputs menu, give proper values to parameters AI Offset, x1, x2, y1 and y2.

Table 14 - Scaling values for each supported RTD type

Parameter	Scaling values			
	Pt100	**Ni100**	**Ni120**	**Cu10**
AI Offset	0	0	0	0
X1	10000	10000	12000	904
Y1	0	0	0	0
X2	13850	16180	20064	1290
Y2	100	100	100	100

6. Set the Modbus register address and properties.

Table 15 - RTD module external I/O registers

	Modbus register	Properties
RTD1's resistance	301	Read
RTD2's resistance	302	Read
RTD3's resistance	303	Read
RTD4's resistance	304	Read
RTD5's resistance	305	Read
RTD6's resistance	306	Read
RTD7's resistance	307	Read
RTD8's resistance	308	Read
RTD9's resistance	309	Read
RTD10's resistance	310	Read
RTD11's resistance	311	Read
RTD12's resistance	312	Read

	Modbus register	Properties
mA-input 1[6]	313	Read
mA-input 2[6]	314	Read
mA-input 3[6]	315	Read
mA-input 4[6]	316	Read
PTC-resistance[6]	317	Read
mA-output 1[6]	318	Read / Write
mA-output 2[6]	319	Read / Write
mA-output 3[6]	320	Read / Write
mA-output 4[6]	321	Read / Write

[6] Only in REL52813 and REL52814 (VIO 12AC/AD)

7. In the **External Analog Output** setting view, set the parameter values.

Table 16 - External Analog Outputs parameters

Parameter	Value	Explanation	Note
AO Enabled	ON	Analog output enabled	–
	OFF	Analog output not enabled	–
mA Output	Typically 0...20 mA	Analog output current	Depends on the values set for the parameters mA Min, mA Max, Linked Val. Min/Max and Modbus Min/Max
mA Min	Typically 0 mA	Minimum output current	Value: user defined. Depends on the values set for the parameters Linked Val. Min and Min Modbus. Value set is related to ModBus Min by a ratio of 1:1000.
mA Max	Typically 20 mA or 25 mA (maximum)	Maximum output current	Value: user defined. Depends on the values set for the parameters Linked Val. Max and Max Modbus. Value set is related to ModBus Max by a ratio of 1:1000.
AO Link	See note	Device’s or RTD module’s analog input measurement	This parameter is directly linked to the mA output parameter.

Parameter	Value	Explanation	Note
Linked Val. Min	See note	AO Links minimum value	Value: User defined Allows scaling of the mA Output parameter
Linked Val. Max	See note	AO Links maximum value	Value: User defined Allows scaling of the mA Output parameter
Ao Slave address	1–247	RTD module's Modbus slave address	Value is restricted according to the address switch in *4.4 Communication settings on page 20*
Ao Modbus address	See note		Although there are 16 locations available, only four can be assigned (REL52814). Addresses are by default numbered from 1 to 16. However the address value must be set according the values in table *Table 15 - RTD module external I/O registers on page 28* meaning that: mA Output <—>Ao ModBus A <—> 318 <—> 319 <—> 320 <—> 321
Ao Register type	HoldingR	Holding register	Only available option
ModBus Min	See note	Minimum value which is sent to the RTD module's Modbus register	Typical value: mA Min = 0 -> ModBus Min = 0
Modbus Max	See note	Maximum value which is sent to the RTD module's Modbus register	Typical value: mA Max = 20 -> ModBus Max = 20000
AO Counter	0 …	Error counter for analog outputs	It increments itself if either Ao Slave Address or Ao Register Address is not set correctly.

6.2.1 Troubleshooting

Table 17 - Error indications

If...	Then...
an RTD sensor is disconnected	Easergy Pro displays a value of -200 ºC for the sensor channel in the **External Analog Inputs** setting view.
an RTD sensor is short-circuited	Easergy Pro displays a value of -250 ºC for the sensor channel in the **External Analog Inputs** setting view.
there is a power failure or connection loss to the RTD module when using the RTD input protocol	• Each sensor channel displays a value of -250 ºC. • The Timeout counter increases on the Protocol menu.[7]
there is a power failure or connection loss to the RTD module when using the Modbus RTU protocol	• Each sensor channel value freezes. • The AI error counter increases in the **External Analog Inputs** setting view. • The Timeout counter increases on the Protocol menu.[7]

[7] If the application uses the remote or extension communication port, an alarm can be generated using the device logic because, for example, an inverted Remote.comm signal can be used to drive a LED.

6.3 REL52811 (VIO 12AA) settings

RTD input protocol

If the module is connected to the protection device with the fiber-optic cable, the RTD input protocol is automatically used and no additional settings are needed for REL52811 (VIO 12AA).

Modbus RTU protocol

The RTD module uses the Modbus RTU protocol in communication with the device if the RTD module is connected to the device with an RS-232 cable. By using the RS-232 cable, the module’s address is automatically fixed to 1, the baud rate is 9600 b/s and the parity is Even.

6.4 REL52812 (VIO 12AB) settings

Modbus RTU protocol

The REL52812 (VIO 12AB) module's address is set with DIP switches. The available address range is 1–247. If multiple REL52812 (VIO 12AB) modules (or other External I/O modules) are connected to the same RS-485 bus, each module must have a unique address. The termination must be on in the last module of the RS-485 bus structure. The baud rate is fixed to 9600 b/s, and the parity is Even.

RTD input protocol

By setting the REL52812 (VIO 12AB) module's address to "0", it is possible to send RTD measurements to the device via the RTD input protocol.

NOTE: When implementing the connection between REL52812 and a device with RS-485 via the RTD input protocol, no other modules can be connected to the RS-485 bus.

6.5 REL52813 and REL52814 (VIO 12AC/AD) settings

Modbus RTU protocol

The REL52813 / REL52814 (VIO 12AC/AD) module's address is set with DIP switches. The available address range is 1–247. If the RS-485 interface is used and there are multiple REL52813 / REL52814 modules (or other external I/O modules) connected to the same RS-485 bus, each module must have a unique address. The termination must be on in the last module of the RS-485 bus structure. The baud rate is fixed to 9600 b/s, and the parity is Even.

RTD input protocol

By setting the REL52813 / REL52814 (VIO 12AC/AD) module's address to "0", it is possible to send RTD measurements to the device via the RTD input protocol.

NOTE: When implementing the connection between REL52813 / REL52814 and the Easergy P3 device with RS-485 via the RTD input protocol, no other modules can be connected to the RS-485 bus. The mA outputs and inputs cannot be used via the RTD input protocol.

7 Technical data

7.1 General

7.1.1 RTD inputs

Table 18 - Technical data

Description	REL52811 (VIO 12AA)	REL52812 (VIO 12AB)	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
RTD inputs	12			
RTD types	Pt100, Ni100, Ni120, Cu10			
Measuring range	1...400 Ω			
Measuring accuracy	±0.3 Ω			
Measuring resolution	0.10 Ω			
Measuring time	1 s/all channels (1 s mean value)			
RTD open-circuit detection	>450 Ω			
RTD short-circuit detection	<1 Ω			

7.1.2 mA inputs

Table 19 - Technical data

Description	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
mA inputs	4	
Input range	0...25 mA	
Input accuracy	±1%	
Input resolution	6 µA (12 bits)	
Input impedance	100 Ω	

7.1.3 mA outputs

Table 20 - Technical data

Description	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
mA outputs	4	
Output range	0...25 mA	
Output accuracy	±1%	
Output resolution	6 µA (12 bits)	
Galvanic isolation	1000 V	
Max. Load / output	750 Ω	

7.1.4 PTC input

Table 21 - Technical data

Description	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
PTC inputs	1	
Measuring accuracy	±10% (<10 kΩ)	

7.2 Connections

7.2.1 Measuring circuitry

Table 22 - Technical data

Description	All RTD modules
Cable type	Shielded non-paired control and instrumentation cable (for example, Belden 8771)
RTD measuring current	~1 mA
Maximum wire resistance	50 Ω per lead (corresponds to 2000 m at 0.75 mm^2 copper wire)
Terminal block Maximum wire dimensions	Phoenix MSTB or equivalent 2.5 mm^2 (13...14 AWG)

7.2.2 Auxiliary voltage

Table 23 - Technical data

Description	REL52811 (VIO 12AA)	REL52812 (VIO 12AB)	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
Rated voltage	24...230 Vac/dc		24 Vdc	48...230 Vac/dc
Power consumption	<1 W (normal conditions)			
Terminal block	Phoenix MSTB or equivalent			
Maximum wire dimensions	2.5 mm^2 (13...14 AWG)			
Power LED	In normal conditions, the LED is continuously lit. If the LED is blinking, contact Schneider Electric support.			

7.2.3 Glass fiber connection

Table 24 - Technical data

Description	REL52811 (VIO 12AA)	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
Fiber type	Multimode fiber-optic cable Ø 62.5/125 µm		
Connector type	ST		
Maximum fiber length	2000 m		

7.2.4 RS-232 connection

Table 25 - Technical data

Cable type	REL52811 (VIO 12AA)	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
Easergy P3 Standard	No cable available		
Easergy P3 Advanced	No cable available		

7.2.5 RS-485 connection

Table 26 - Technical data

Description	REL52812 (VIO 12AB)	REL52813 (VIO 12AC)	REL52814 (VIO 12AD)
Cable type	Shielded twisted pair RS-485 copper cable (for example, Belden 3079E)		
Terminal block	Phoenix MC or equivalent		
Maximum cable length	1200 m		

7.3 Tests and environmental conditions

7.3.1 Disturbance tests

Table 27 - Technical data

Description	Value	Standard & Test class / level
Emission (IEC/EN 61000-6-4) • Conducted (EN 55011/ CISPR 11) • Emitted (EN 55011/ CISPR 11)	0.15...30 MHz 30...1 000 MHz	
Immunity (IEC/EN 61000-6-2) • Static discharge (ESD)	6 kV contact discharge 8 kV air discharge	EN 61000-4-2, class III
• Fast transients (EFT)	2 kV, 5/50 ns	EN 61000-4-4, class III
• Surge	1 kV differential mode 2 kV common mode	EN 61000-4-5, class III
• Conducted RF	0.15...80 MHz, 10 V/ m	IEC/EN 61000-4-6, Class III
• Radiated RF	80...2000 MHz, 10 V/m	IEC/EN 61000-4-3, Class III
• Power frequency magnetic field	100 A/m, 50/60Hz	IEC/EN 61000-4-8
• Pulse magnetic field	1000 A/m, 1.2/50 µs	IEC/EN 61000-4-9
• Voltage dips 7 interruptions	–	IEC/EN 61000-4-11

7.3.2 Test voltage

Table 28 - Technical data

Description	All RTD modules
Voltage tests	IEC 61810-1
Dielectric voltage	2 kV 1 min
Impulse voltage	5 kV 1.2/50 µs

7.3.3 Environmental conditions

Table 29 - Technical data

Description	All RTD modules
Operating temperature	0...+55 °C

7.3.4 Casing

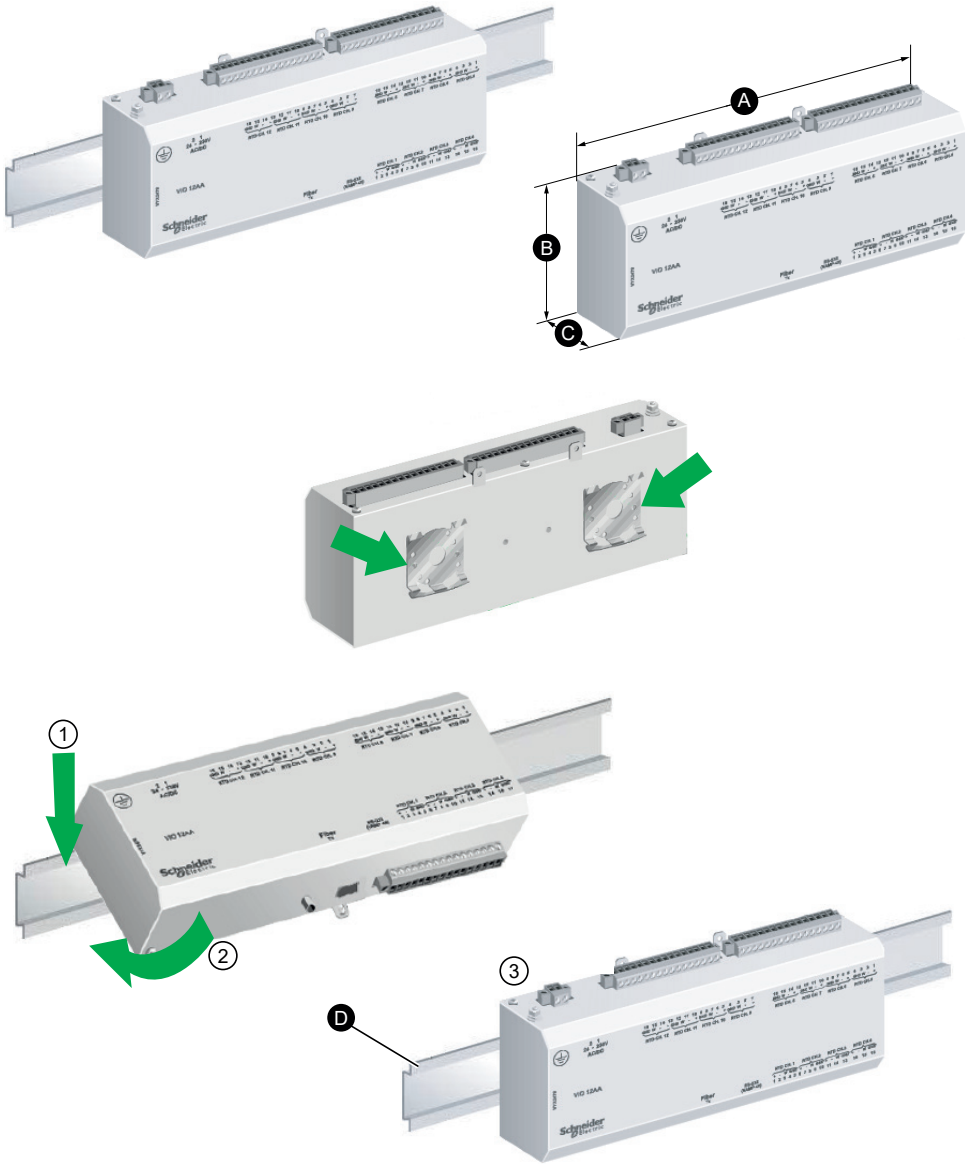
Table 30 - Technical data

Description	All RTD modules
Degree of protection (IEC 60529)	IP20
Dimensions (W x H x D)	262.0 x 97.8 x 66.7 mm
Material	1-mm steel plate
Weight	About 1 kg

8 Construction and mounting

8.1 DIN rail mounting

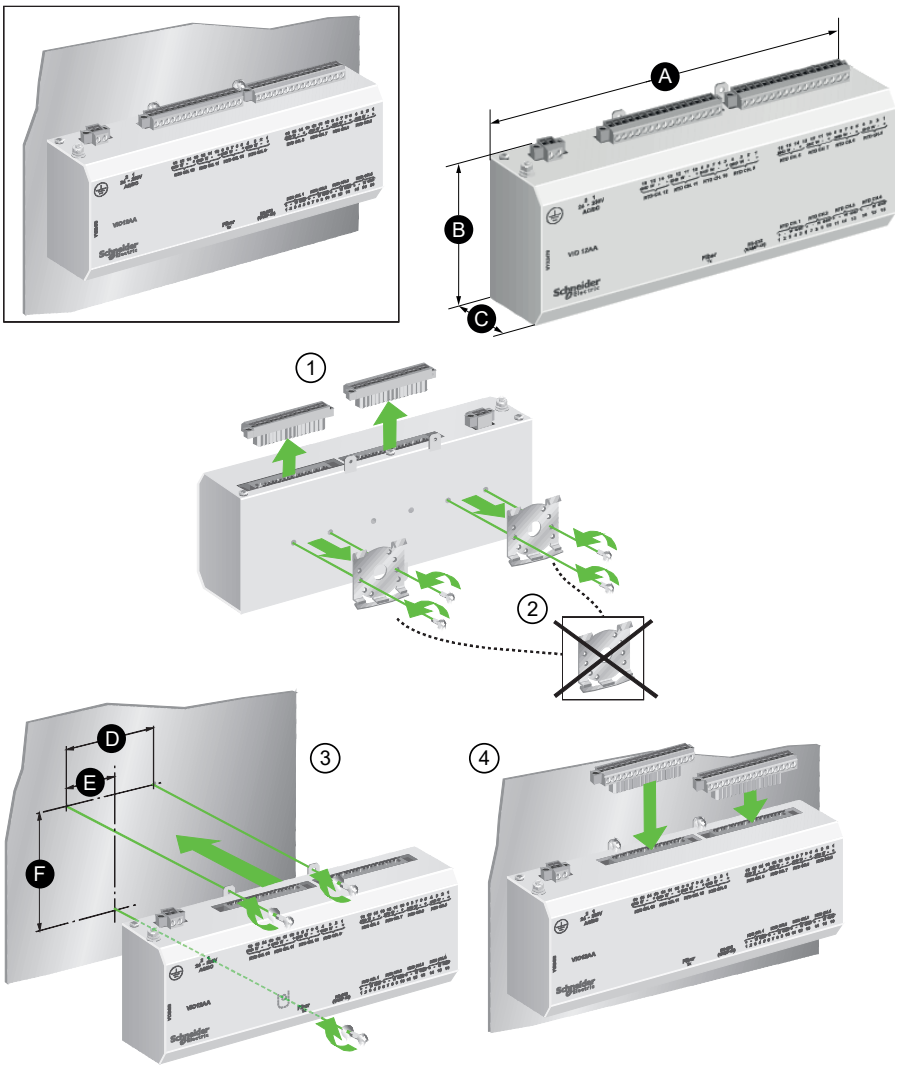
Figure 15 - DIN rail mounting



A. 262 mm (10.31 in.)
B. 97.8 mm (3.85 in.)
C. 66.7 mm (2.62 in.)
D. 35 mm (1.37 in.); EN 50022

8.2 Wall mounting

Figure 16 - Wall mounting



A. 262 mm (10.31 in.)
B. 97.8 mm (3.85 in.)
C. 66.7 mm (2.62 in.)
D. 79 mm (3.11 in.)
E. 39.5 mm (1.58 in.)
F. 90.5 mm (3.56 in.)

9 Order information

The following information is required when ordering:

- Order code and type designation:
  - REL52811 (VIO 12AA)
  - REL52812 (VIO 12AB)
  - REL52813 (VIO 12AC)
  - REL52814 (VIO 12AD)
- Quantity

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