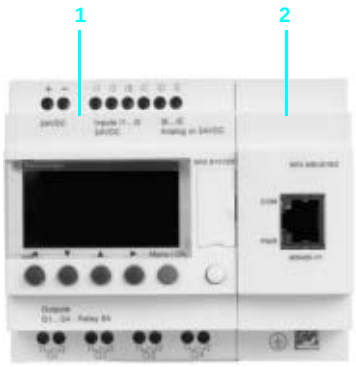
Zelio Logic smart relays
Modbus slave communication module

000005

SR3 MBU01BD

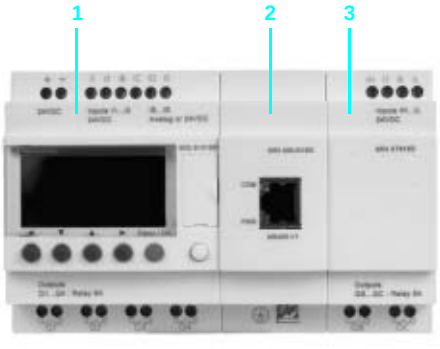
Examples of combinations:

000001



1 Modular smart relay (10 or 26 I/O)
2 Modbus slave communication module

000003



1 Modular smart relay (10 or 26 I/O)
2 Modbus slave communication module
3 I/O extension module (6, 10 or 14 I/O)

Presentation

The Modbus protocol is a master/slave protocol.

Two exchange methods are possible:
■ Question/answer:
Questions from the master are addressed to a specific Modbus slave. The master waits for the answer to be returned by the slave polled.
■ Distribution:
The master distributes a message to all the slave stations on the bus. These stations execute the instruction without sending an answer.

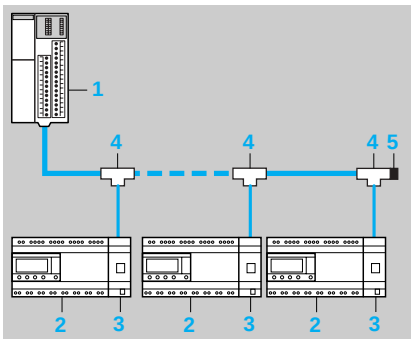
Zelio Logic modular smart relays are connected to the Modbus network via the Modbus slave communication module. This module is a slave that is not electrically isolated.
The Modbus slave communication module must be connected to an SR3 B●●●BD modular smart relay, with a ⎓ 24 V supply.

Configuration

The Modbus slave communication module can be configured:
■ Independently, using the buttons on the smart relay (ladder language).
■ On a PC, using "Zelio Soft" software *(1)*.

When using a PC, programming can be carried out either in LADDER language, or in function block diagram language (FBD) *(2)*.

Connection example



1 Modbus Master programmable controller (for example Twido).
2 Zelio Logic smart relay.
3 Modbus slave communication module.
4 T-junction.
5 Line terminator.

Description

■ The Modbus slave communication module is connected to a 2-wire or 4-wire Modbus network.
■ The maximum length of the network is 1000 m (9600 bauds max., AWG 26).
■ A maximum of 32 slaves may be connected to the Modbus network, or a maximum of 247 slaves with repeaters.
■ Line end adaptors must be fitted to both ends of the line (10 nF/10 V, 120 Ω / 0.25 W in series).
■ The line must be polarised (470 Ω /0.25 W resistors) *(3)*.
■ The connection cable and its RJ45 male connectors must be shielded.
■ The "COMMON" signal must be connected directly to the protective earth at one point on the bus.

(1) See page 14102/14.
(2) FBD: Function Block Diagram.
(3) The polarisation resistors must be managed by the master.

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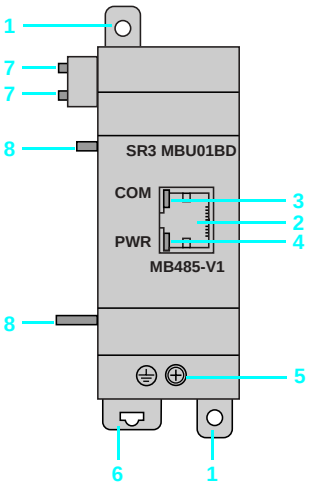
Modbus slave communication module

Description



Modbus slave communication module **SR3 MBU01BD** comprises:

1 Two retractable fixing lugs.
2 A Modbus network connection (RJ45 shielded female connector).
3 A communication LED (COM)
4 A Power ON LED (PWR)
5 A screw terminal block for the protective earth connection.
6 A spring clip for mounting on a 35 mm mounting rail.
7 Two locating pegs.
8 Two pins for clip-on fixing.

Environment characteristics

Product certifications			Pending: UL, CSA, GL, C-TICK
Conformity with the low voltage directive	Conforming to 73/23/EEC		EN 61131-2 (open equipment)
Conformity with the EMC directive	Conforming to 89/336/EEC		EN 61131-2 (Zone B) EN 61000-6-2, EN 61000-6-3 and EN 61000-6-4
Degree of protection	Conforming to IEC 60529		IP 20
Overvoltage category	Conforming to IEC 60664-1		3
Degree of pollution	Conforming to IEC/EN 61131-2		2
Ambient air temperature around the device	Operation	**°C**	-20... +55 (+40 in enclosure), conforming to IEC 60068-2-1 and IEC 60068-2-2
	Storage	**°C**	-40... +70
Maximum relative humidity			95 % without condensation or dripping water
Maximum operating altitude	Operation	**m**	2000
	Transport	**m**	3048
Mechanical resistance	Immunity to vibrations		Conforming to IEC 60068-2-6, test Fc
	Immunity to mechanical shock		Conforming to IEC 60068-2-27, test Ea
Resistance to electrostatic discharge	Immunity to electrostatic discharge		Conforming to IEC 61000-4-2, level 3
Resistance to HF interference (immunity)	Immunity to electromagnetic radiated fields		Conforming to IEC 61000-4-3, level 3
	Immunity to fast transients in bursts		Conforming to IEC 61000-4-4, level 3
	Immunity to shock waves		Conforming to IEC 61000-4-5
	Radio frequency in common mode		Conforming to IEC 61000-4-6, level 3
	Voltage dips and breaks (⁓)		Conforming to IEC 61000-4-11
	Immunity to damped oscillation waves		Conforming to IEC 61000-4-12
Conducted and radiated emissions	Conforming to EN 55022/11 (Group 1)		Class B

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Parameter entry

Software workshop parameter entry window

Parameters can be entered either using Zelio Soft software, or directly using the buttons on the Zelio Logic smart relay.
When the "RUN" instruction is given, the Zelio Logic smart relay initialises the Modbus slave communication module in a configuration previously defined in the basic program.
The Modbus slave communication module has 4 parameters:
- number of UART wires and format of the frames on the Modubs network,
- transmission speed,
- parity,
- network address of the Modbus module.

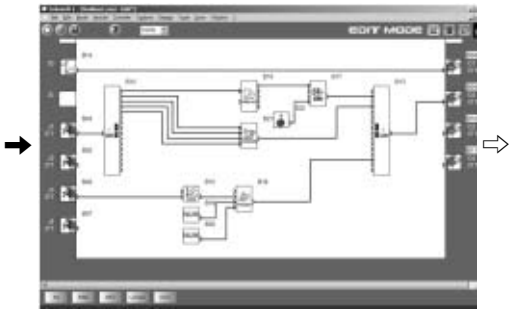
The default parameter settings are as follows: 2-wire, RTU, 19 200 bauds, even parity, address n°1.

Parameter entry	Options
Number of wires	2 or 4
Frame format	RTU or ASCII
Transmission speed in bauds	1200, 2400, 4800, 9600, 19 200, 28 800, 38 400, 57 600
Parity	None, even, odd
Network address	1 to 247

Addressing of Modbus exchanges

Function block diagram (FBD) programming *(1)*

In FBD mode, the 4 input data words (16 bits) (J1XT1 to J4XT1) and the 4 output data words (O1XT1 to O4XT1) can be accessed by the application. Dedicated function blocks make it possible to:
- break down a 'complete' type input (16 bits) into 16 separate 'bit' type outputs.
  - Example: break down a Modbus type input (J1XT1 to J4XT1) and copy these status values to discrete outputs.
- make up a 'complete' type output (16 bits) from 16 separate 'bit' type inputs.
  - Example: transfer the status value of the discrete inputs or the status of a function to a Modbus type output (O1XT1 to O4XT1).



Modbus exchanges	Code	Number of words
➜	Read/Write 16, 06 or 03	4
⇨	Read 03	4
 ⇨ ➜	Read/Write 16, 06 or 03	4
Status ⇨	Read 03	1

(1) FBD: Function Block Diagram.

LADDER programming

In LADDER mode, the 4 data words (16 bits) to be exchanged cannot be accessed by the application. Transfers with the master are implicit and are effected in a way that is totally transparent.

Modbus exchanges	Code	Number of words
Image of smart relay I/O	Read 03	4
 ⇨ ➜	Read/Write 16, 06 or 03	4
Status ⇨	Read 03	1

Zelio Logic smart relays
Modbus slave communication module

References

SR3 MBU01BD

Modbus slave communication module

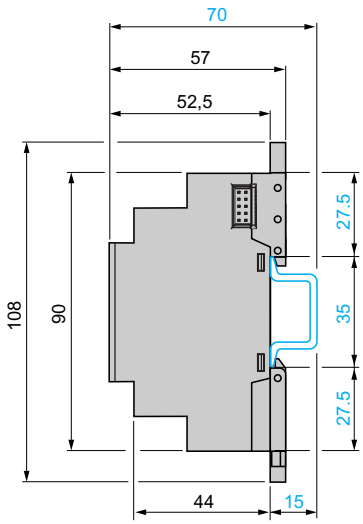
For use with	Reference	Weight kg
Modular smart relays SR3 B●●●BD	**SR3 MBU01BD**	0.300

Connection accessories

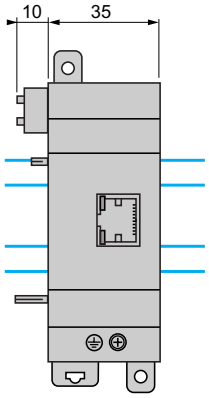
Description	Reference	Weight kg
T-junction complete with 0.3 m cable	**VW3 A8 306TF03**	–
T-junction complete with 1 m cable	**VW3 A8 306TF10**	–
T-junction without cable	**170 XTS 04100**	–

Dimensions and mounting

Side view



Rail mounting



Screw fixing