

SR2 B121BD



- 1 Modular smart relay  
(10 or 26 I/O)
- 2 I/O extension module  
(6,10 or 14 I/O)

### Presentation

Zelio Logic smart relays are designed for use in small automated systems. They are used in both industrial and commercial applications.

#### ■ For industry:

- automation of small finishing, production, assembly or packaging machines.
- decentralised automation of ancillary equipment of large and medium-sized machines in the textile, plastics and materials processing sectors,
- automated systems for agricultural machinery (irrigation, pumping, greenhouses, ...).

#### ■ For the commercial/building sectors:

- automation of barriers, roller shutters, access control,
- automation of lighting installations,
- automation of compressors and air conditioning systems.

Their compact size and ease of setting-up make them a competitive alternative to solutions based on cabled logic or specific cards.

Simple programming, ensured by the universal nature of LADDER and function block diagram FBD (1) languages, meets all automation requirements and also the needs of the electrician.

Compact smart relays are suitable for simple automated systems, up to 20 I/O.

If required, modular smart relays can be fitted with I/O extensions and a module for communication on the Modbus network, for greater performance and flexibility, from 10 to 40 I/O.

### Programming

Programming can be carried out:

- independently, using the buttons on the smart relay (ladder language),
- on a PC, using "Zelio Soft" software.

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

### LCD display backlighting (2)

Backlighting of the display is programmable using "Zelio Soft" software and by direct action on the smart relay's 6 programming buttons.

### Memory

The Zelio Logic smart relay has a backup memory which allows programs to be copied into another smart relay (examples: for building identical equipment, remote transmission of updates).

The memory also allows a backup copy of the program to be saved prior to exchanging the product.

When used with a smart relay without display or buttons, the copy of the program contained in the cartridge is automatically transferred into the smart relay at power-up.

### Autonomy and backup

Autonomous operating time of the clock, ensured by a lithium battery, is 10 years. Data backup (preset values and current values) is provided by an EEPROM Flash memory (10 years).

### I/O extensions

Zelio Logic smart relays can, if necessary, take the following I/O extensions:

- 6, 10 or 14 I/O, supplied with  $\text{---}$  24 V via the smart relay,
- 6, 10 or 14 I/O, supplied with  $\sim$  24 V via the smart relay,
- 6, 10 or 14 I/O, supplied with  $\sim$  100... 240 V via the smart relay.

### Communication module ▲

A module for communication on the Modbus network will be available for Zelio Logic modular smart relays. It is supplied with  $\text{---}$  24 V via the smart relay.

### Communication interface ▲▲

The "communication" products in the Zelio Logic range include:

- a communication interface connected between a smart relay and a modem,
- analogue or GSM modems,
- "Zelio Soft Com" software.

They are designed for monitoring or remote control of machines or installations which operate without personnel.

The communication interface, supplied with  $\text{---}$  12/24 V, allows messages, telephone numbers and call conditions to be stored.

(1) FBD: Functional Block Diagram.

(2) LCD: Liquid Crystal Display

▲ Available 1<sup>st</sup> quarter 2004.

▲▲ Available 1<sup>st</sup> half 2004.

# Zelio Logic smart relays

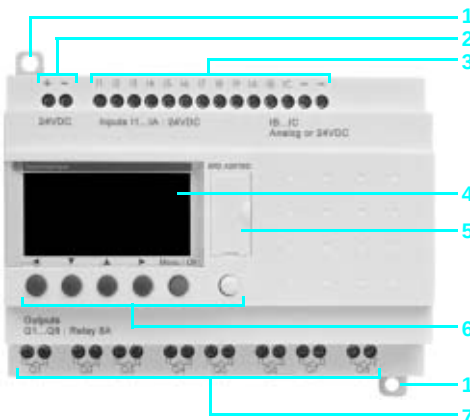
## Compact and modular smart relays

### Compact smart relays

Without display - 10, 12 and 20 I/O



With display - 10, 12 and 20 I/O

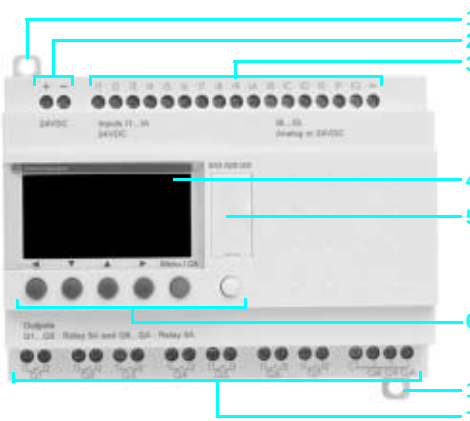


Compact smart relays have the following on the front panel:

- 1 Two retractable fixing lugs
- 2 Two power supply terminals
- 3 Terminals for connection of the inputs
- 4 Backlit LCD display with 4 lines of 18 characters
- 5 Slot for a memory cartridge and connection to a PC
- 6 6 buttons for programming and parameter entry
- 7 Terminals for connection of the outputs

### Modular smart relays

10 and 26 I/O

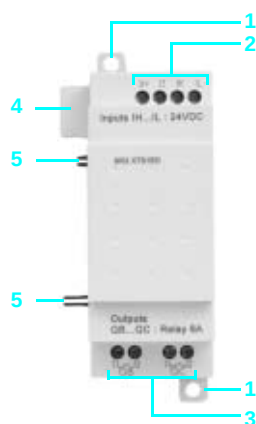


Modular smart relays have the following on the front panel:

- 1 Two retractable fixing lugs
- 2 Two power supply terminals
- 3 Terminals for connection of the inputs
- 4 Backlit LCD display with 4 lines of 18 characters
- 5 Slot for a memory cartridge and connection to a PC
- 6 6 buttons for programming and parameter entry
- 7 Terminals for connection of the outputs

### I/O extension modules

6 I/O



10 and 14 I/O



I/O extension modules have the following on the front panel:

- 1 Two retractable fixing lugs
- 2 Terminals for connection of the inputs
- 3 Terminals for connection of the outputs
- 4 A connector for connection to the smart relay (powered by the smart relay)
- 5 Locating pegs

## Zelio Logic smart relays

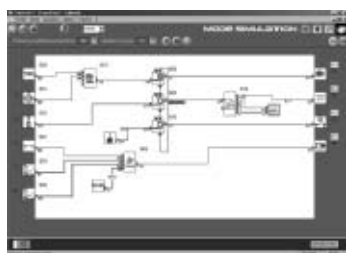
### Compact and modular smart relays

### "Zelio Soft for PC" programming software



Programming in LADDER language

Programming in FBD language



"Simulation" mode



"Monitoring" mode

#### "Zelio Soft for PC" (version 2.0)

"Zelio Soft" software allows:

- programming in LADDER language or in function block diagram language (FBD),
- simulation, monitoring and supervision,
- uploading and downloading of programs,
- output of personalised files,
- automatic compiling of programs,
- on-line help.

#### Coherence test and application languages

"Zelio Soft" software monitors applications by means of its coherence test function. An indicator turns red at the slightest input error. The problem can be located by simply clicking the mouse.

"Zelio Soft" software allows switching, at any time, to any of the 6 application languages (English, French, German, Spanish, Italian, Portuguese), and editing of the application file in the selected language.

#### Inputting messages for display on Zelio Logic

"Zelio Soft" software allows Text function blocks to be configured, which can then be displayed on all smart relays which have a display.

#### Program testing

2 test modes are provided: simulation and monitoring.

"Zelio Soft" **simulation** mode allows all the programs to be tested, without the smart relay, i.e.:

- enable discrete inputs,
- display the status of outputs,
- vary the voltage of the analogue inputs,
- enable the programming buttons,
- simulate the application in real time or in accelerated time,
- dynamically display (in red) the various active elements of the program.

"Zelio Soft" **monitoring** mode makes it possible to test the program executed by the smart relay, i.e.:

- display the program "on line",
- force inputs, outputs, control relays and current values of the function blocks,
- adjust the time,
- change from STOP mode to RUN mode and vice versa.

In simulation or monitoring mode, the monitoring window allows the status of the smart relay I/O to be displayed within your application environment (diagram or image).

# Zelio Logic smart relays

## Compact and modular smart relays

### "Zelio Soft" programming software

#### LADDER language

##### Definition



Text function block



Timer



Up/down counter



Fast counter



Analogue comparator



Clock



Control relay



Counter comparator



LCD backlighting



Summer/Winter time switching



Output coil

LADDER language allows a LADDER program to be written with elementary functions, elementary function blocks and derived function blocks, as well as with contacts, coils and variables.

The contacts, coils and variables can be annotated. Text can be placed freely within the graphic.

##### ■ Control scheme input modes

"Zelio input" mode enables users who have directly programmed the Zelio smart relay to find the same user interface, even when using the software for the first time. "Free input" mode, which is more intuitive, is very user-friendly and incorporates many additional features.

With LADDER programming language, two alternative types of symbol can be used :

- LADDER symbols,
- electrical symbols.

"Free input" mode also allows the creation of mnemonics and notes associated with with each line of the program.

Instant switching from one input mode to the other is possible at any time, by clicking the mouse.

Up to 120 control scheme lines can be programmed, with 5 contacts and 1 coil per program line.

##### ■ Functions:

- 16 time delay function blocks; parameters of 11 different types can be set for each of these (1/10<sup>th</sup> second to 9999 hours),
- 16 up/down counter function blocks from 0 to 32767,
- 1 fast counter (1 kHz),
- 16 text function blocks,
- 16 analogue comparator function blocks,
- 8 clock function blocks, each with 4 channels,
- 28 control relays,
- 8 counter comparators,
- automatic Summer/Winter time switching,
- variety of coil functions, latching (Set/Reset), impulse relay, contactor
- LCD screen with programmable backlighting.

#### Functions

| Function             | Electrical scheme | LADDER language | Notes                                                                                                                                                                                                |
|----------------------|-------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact              |                   |                 | <p>I corresponds to the real state of the contact connected to the input of the smart relay.</p> <p>i corresponds to the inverse state of the contact connected to the input of the smart relay.</p> |
| Standard coil        |                   |                 | The coil is energised when the contacts to which it is connected are closed.                                                                                                                         |
| Latch coil (Set)     |                   |                 | The coil is energised when the contacts to which it is connected are closed. It remains tripped when the contacts re-open.                                                                           |
| Unlatch coil (Reset) |                   |                 | The coil is de-energised when the contacts to which it is connected are closed. It remains inactive when the contacts re-open.                                                                       |

# Zelio Logic smart relays

## Compact and modular smart relays

### “Zelio Soft” programming software

#### Function block diagram language (FBD) (1)

##### Definition

FBD language allows graphical programming based on the use of predefined function blocks.

This language provides the use of 23 pre-programmed functions for counting, time delay, timing, definition of switching threshold (temperature regulation for example), generation of impulses, time programming, multiplexing, display, etc.

##### Pre-programmed functions

Zelio Logic smart relays provide a high processing capacity, up to 200 function blocks, including 23 pre-programmed functions:

|                                                                                                                                                                                                                 |                                                                                                                                                                                           |                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>TIMER AC</b><br><b>TIMER A/C</b><br>Timer. Function A/C<br>ON-delay and OFF delay                                          |  <b>TIMER BH</b><br><b>TIMER B/H</b><br>Timer. Function BH.<br>(Adjustable pulsed signal)                |  <b>TIMER BW</b><br><b>TIMER B/W</b><br>Timer - Function BW<br>(pulse on rising/falling edge)                         |
|  <b>TIMER Li</b><br><b>TIMER L/i</b><br>Pulse generator<br>ON-delay, OFF delay                                                 |  <b>BISTABLE</b><br><b>BISTABLE</b><br>Impulse relay function                                            |  <b>SET- RESET</b><br><b>SET &amp; RESET</b><br>Bistable latching - Priority assigned either to SET or RESET function |
|  <b>BOOLEAN</b><br><b>BOOLEAN</b><br>Allows logic equations to be created between connected inputs                             |  <b>CAM</b><br><b>CAM</b><br>Cam programmer                                                              |  <b>PRESET COUNT</b><br><b>PRESET COUNT</b><br>Up/down counter                                                        |
|  <b>UP DOWN COUNT</b><br><b>UP DOWN COUNT</b><br>Up/down counter with external preset                                          |  <b>PRESET H-METER</b><br><b>PRESET H-METER</b><br>Hour counter<br>(hour, minute preset)                 |  <b>TIME PROG</b><br><b>TIME PROG</b><br>Time programmer,<br>weekly and annual                                        |
|  <b>GAIN</b><br><b>GAIN</b><br>Allows conversion of an analogue value by change of scale and offset.                         |  <b>TRIGGER</b><br><b>TRIGGER</b><br>Defines an activation zone with hysteresis.                       |  <b>MUX</b><br><b>MUX</b><br>Multiplexing functions on 2 analogue values                                            |
|  <b>COMP IN ZONE</b><br><b>MAX VAL MIN</b><br>Zone comparison<br>(Min. ≤ Value ≤ Max.)                                       |  <b>ADD/SUB</b><br><b>+</b><br>Add and/or subtract function                                            |  <b>MUL/DIV</b><br><b>×</b><br>Multiply and/or divide function                                                      |
|  <b>DISPLAY</b><br><b>DISPLAY</b><br>Display of digital and analogue data, date, time, messages for Human-Machine interface. |  <b>COMPARE</b><br><b>COMPARE</b><br>Comparison of 2 analogue values using the operands =, >, <, ≤, ≥. |  <b>STATUS</b><br><b>STATUS</b><br>Access to smart relay status                                                     |
|  <b>ARCHIVE</b><br><b>ARCHIVE</b><br>Storage of 2 values simultaneously                                                      |  <b>SPEED COUNT</b><br><b>SPEED COUNT</b><br>Fast counting up to 1 kHz                                 |                                                                                                                                                                                                          |

##### SFC functions (2) (GRAFCET)

|                                                                                                                                                    |                                                                                                                                               |                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>RESET-INIT</b><br><b>RESET-INIT</b><br>Reinitialisable step |  <b>INIT STEP</b><br><b>INIT STEP</b><br>Initial step      |  <b>STEP</b><br><b>STEP</b><br>SFC step                    |
|  <b>DIV-OR 2</b><br><b>DIV-OR 2</b><br>Divergence to OR         |  <b>CONV-OR 2</b><br><b>CONV-OR 2</b><br>Convergence to OR |  <b>DIV-AND 2</b><br><b>DIV-AND 2</b><br>Divergence to AND |
|  <b>CONV-AND 2</b><br><b>CONV-AND 2</b><br>Convergence to AND   |                                                                                                                                               |                                                                                                                                                 |

##### Logic functions

|                                                                                                                                 |                                                                                                                                       |                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|  <b>AND</b><br><b>AND</b><br>AND function    |  <b>OR</b><br><b>OR</b><br>OR function             |  <b>NAND</b><br><b>NAND</b><br>NOT AND function |
|  <b>NOR</b><br><b>NOR</b><br>NOT OR function |  <b>XOR</b><br><b>XOR</b><br>Exclusive OR function |  <b>NOT</b><br><b>NOT</b><br>NOT function       |

(1) Functional Block Diagram.

(2) Sequential Function Chart.

| Environment characteristics               |                                             |                 |                                                                                                      |  |
|-------------------------------------------|---------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------|--|
| Product certifications                    |                                             |                 | UL, CSA, GL, C-TICK                                                                                  |  |
| Conformity with the low voltage directive | Conforming to 73/23/EEC                     |                 | EN 61131-2                                                                                           |  |
| Conformity with the EMC directive         | Conforming to 89/336/EEC                    |                 | EN 61131-2 (Zone B)<br>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              |                                                                                                      |  |
| Maximum relative humidity                 |                                             |                 | 95 % without condensation or dripping water                                                          |  |
| Maximum operating altitude                | Operation                                   | m               | 2000                                                                                                 |  |
|                                           | Transport                                   | m               | 3048                                                                                                 |  |
| Mechanical resistance                     | Immunity to vibrations                      |                 | IEC 60068-2-6, test Fc                                                                               |  |
|                                           | Immunity to mechanical shock                |                 | IEC 60068-2-27, test Ea                                                                              |  |
| Resistance to electrostatic discharge     | Immunity to electrostatic discharge         |                 | IEC 61000-4-2, level 3                                                                               |  |
| Resistance to HF interference (Immunity)  | Immunity to electromagnetic radiated fields |                 | IEC 61000-4-3, level 3                                                                               |  |
|                                           | Immunity to fast transients in bursts       |                 | IEC 61000-4-4, level 3                                                                               |  |
|                                           | Immunity to shock waves                     |                 | IEC 61000-4-5                                                                                        |  |
|                                           | Radio frequency in common mode              |                 | IEC 61000-4-6, level 3                                                                               |  |
|                                           | Voltage dips and breaks (~)                 |                 | IEC 61000-4-11                                                                                       |  |
|                                           | Immunity to damped oscillation wave         |                 | IEC 61000-4-12                                                                                       |  |
|                                           | Conforming to EN 55022/11 (Group 1)         |                 | Class B                                                                                              |  |
| Conducted and radiated emissions          | Flexible cable with cable end               | mm <sup>2</sup> | 1 conductor: 0.25...2.5, cable: AWG 24... AWG14<br>2 conductors: 0.25...0.75, cable: AWG 24... AWG18 |  |
|                                           | Semi-solid cable                            | mm <sup>2</sup> | 1 conductor: 0.2...2.5, cable: AWG 25... AWG14                                                       |  |
|                                           | Solid cable                                 | mm <sup>2</sup> | 1 conductor: 0.2...2.5, cable: AWG 25... AWG14<br>2 conductors: 0.2...1.5, cable: AWG 24... AWG16    |  |
|                                           | Tightening torque                           | N.m             | 0.5                                                                                                  |  |

| 12 V supply characteristics                   |                      |    |                            |             |
|-----------------------------------------------|----------------------|----|----------------------------|-------------|
| Smart relay type                              |                      |    | SR2 B121JD                 | SR2 B201JD  |
| Primary                                       | Nominal voltage      | V  | 12                         | 12          |
| Voltage limits                                | Including ripple     | V  | 10.4...14.4                | 10.4...14.4 |
| Nominal input current                         |                      | mA | 120                        | 200         |
| Maximum nominal input current with extensions |                      | mA | 144                        | 250         |
| Power dissipated                              |                      | WA | 1.5                        | 2.5         |
| Micro-breaks                                  | Permissible duration | ms | ≤ 1 (repeated 20 times)    |             |
| Protection                                    |                      |    | Against polarity inversion |             |

| 24 V supply characteristics                   |                      |    |                            |           |           |           |            |            |            |            |
|-----------------------------------------------|----------------------|----|----------------------------|-----------|-----------|-----------|------------|------------|------------|------------|
| Smart relay type                              |                      |    | SR2 11BD                   | SR2 12BD  | SR2 13BD  | SR2 14BD  | SR3 B101BD | SR3 B102BD | SR3 B261BD | SR3 B262BD |
| Primary                                       | Nominal voltage      | V  | 24                         | 24        | 24        | 24        | 24         | 24         | 24         | 24         |
| Voltage limits                                | Including ripple     | V  | 19.2...30                  | 19.2...30 | 19.2...30 | 19.2...30 | 19.2...30  | 19.2...30  | 19.2...30  | 19.2...30  |
| Nominal input current                         |                      | mA | 100                        | 100       | 100       | 100       | 100        | 50         | 190        | 70         |
| Maximum nominal input current with extensions |                      | mA | —                          | —         | —         | —         | 100        | 160        | 300        | 180        |
| Power dissipated                              |                      | WA | 3                          | 3         | 6         | 3         | 3          | 4          | 6          | 5          |
| Maximum power dissipated with extensions      |                      | W  | —                          | —         | —         | —         | 8          | 8          | 10         | 10         |
| Micro-breaks                                  | Permissible duration | ms | ≤ 1 (repeated 20 times)    |           |           |           |            |            |            |            |
| Protection                                    |                      |    | Against polarity inversion |           |           |           |            |            |            |            |

| 24 V supply characteristics |                      |    |                          |             |             |
|-----------------------------|----------------------|----|--------------------------|-------------|-------------|
| Smart relay type            |                      |    | SR2 11B                  | SR2 12B     | SR3 B101B   |
| Primary                     | Nominal voltage      | V  | 24                       | 24          | 24          |
| Voltage limits              | Including ripple     | V  | 20.4...28.8              | 20.4...28.8 | 20.4...28.8 |
| Nominal frequency           |                      | Hz | 50-60                    | 50-60       | 50-60       |
| Nominal input current       |                      | mA | 145                      | 233         | 140         |
| Power dissipated            |                      | VA | 4                        | 6           | 4           |
| Micro-breaks                | Permissible duration | ms | ≤ 10 (repeated 20 times) |             |             |
| rms insulation voltage      |                      | V  | 1780 (50-60 Hz)          |             |             |

## ~ 100...240 V supply characteristics

| Smart relay type                              |                  |   | SR2 ●101FU | SR2 ●121FU | SR2 ●201FU | SR3 B101FU | SR3 B261FU |
|-----------------------------------------------|------------------|---|------------|------------|------------|------------|------------|
| Primary                                       | Nominal voltage  | V | 100...240  | 100...240  | 100...240  | 100...240  | 100...240  |
|                                               | Including ripple | V | 85...264   | 85...264   | 85...264   | 85...264   | 85...264   |
| Nominal input current                         |                  |   | mA         | 80/30      | 80/30      | 100/50     | 100/50     |
| Maximum nominal input current with extensions |                  |   | mA         | –          | –          | –          | 80/40      |
| Power dissipated                              |                  |   | VA         | 7          | 7          | 11         | 7          |
| Maximum power dissipated with extensions      |                  |   | VA         | –          | –          | –          | 12         |
| Micro-breaks                                  |                  |   | ms         | 10         | 10         | 10         | 10         |
| Permissible duration                          |                  |   | ms         | 10         | 10         | 10         | 10         |
| rms insulation voltage                        |                  |   | V          | 1780       | 1780       | 1780       | 1780       |

## Processing characteristics

| Smart relay type               |                         |  | SR2/SR3                                                            |
|--------------------------------|-------------------------|--|--------------------------------------------------------------------|
| Number of control scheme lines | With LADDER programming |  | 120                                                                |
|                                | With FBD programming    |  | Up to 200                                                          |
| Cycle time                     |                         |  | ms                                                                 |
| Response time                  |                         |  | ms                                                                 |
| Back-up time                   | Day/time                |  | 10 years (lithium battery) at 25 °C                                |
|                                | Program and settings    |  | 10 years (EEPROM memory)                                           |
| Program memory checking        |                         |  | At each power-up                                                   |
| Clock drift                    |                         |  | 12 min/year (0 to 55 °C)<br>6 sec/month (at 25 °C and calibration) |
| Timer block accuracy           |                         |  | 1 % ± 2 of the cycle time                                          |

## Discrete ≡ 24 V input characteristics

| Smart relay type             |                           |         | SR2/SR3                           |
|------------------------------|---------------------------|---------|-----------------------------------|
| Connection                   |                           |         | Screw terminal block              |
| Nominal value of inputs      | Voltage                   | V       | 24                                |
|                              | Current                   | mA      | 4                                 |
| Input switching limit values | At state 1                | Voltage | V                                 |
|                              |                           | Current | mA                                |
|                              | At state 0                | Voltage | V                                 |
|                              |                           | Current | mA                                |
| Input impedance at state 1   |                           |         | KΩ                                |
| Configurable response time   | State 0 to 1              | ms      | 0.2                               |
|                              | State 1 to 0              | ms      | 0.3                               |
| Conformity to IEC 61131-2    |                           |         | Type 1                            |
| Sensor compatibility         | 3-wire                    |         | Yes PNP                           |
|                              | 2-wire                    |         | No                                |
| Input type                   |                           |         | Resistive                         |
| Isolation                    | Between supply and inputs |         | None                              |
|                              | Between inputs            |         | None                              |
| Maximum counting frequency   |                           |         | kHz                               |
| Protection                   |                           |         | Control instructions not executed |

## Discrete ~ 100...240 V input characteristics

| Smart relay type             |                           |         | SR2/SR3                           |
|------------------------------|---------------------------|---------|-----------------------------------|
| Connection                   |                           |         | Screw terminal block              |
| Nominal value of inputs      | Voltage                   | V       | 100... 240                        |
|                              | Current                   | mA      | 0.6                               |
|                              | Frequency                 | Hz      | 47... 63                          |
| Input switching limit values | At state 1                | Voltage | V                                 |
|                              |                           | Current | mA                                |
|                              | At state 0                | Voltage | V                                 |
|                              |                           | Current | mA                                |
| Input impedance at state 1   |                           |         | KΩ                                |
| Configurable response time   | State 0 to 1 (50/60 Hz)   | ms      | 50                                |
|                              | State 1 to 0 (50/60 Hz)   | ms      | 50                                |
| Isolation                    | Between supply and inputs |         | None                              |
|                              | Between inputs            |         | None                              |
| Protection                   |                           |         | Control instructions not executed |

| Integral analogue input characteristics |                                     |          |         |                                                       |
|-----------------------------------------|-------------------------------------|----------|---------|-------------------------------------------------------|
| Smart relay type                        |                                     |          | SR2/SR3 |                                                       |
| Analogue inputs                         | Input range                         |          | V       | 0...10 or 0...24                                      |
|                                         | Input impedance                     |          | KΩ      | 12                                                    |
|                                         | Maximum non destructive voltage     |          | V       | 30                                                    |
|                                         | Value of LSB                        |          |         | 39 mV, 4 mA                                           |
|                                         | Input type                          |          |         | Common mode                                           |
| Conversion                              | Resolution                          |          |         | 8 bit                                                 |
|                                         | Conversion time                     |          |         | Smart relay cycle time                                |
|                                         | Precision                           | at 25 °C |         | ± 5 %                                                 |
|                                         |                                     | at 55 °C |         | ± 6.2 %                                               |
|                                         | Repeat accuracy                     | at 55 °C |         | ± 2 %                                                 |
| Isolation                               | Between analogue channel and supply |          |         | None                                                  |
| Cabling distance                        |                                     |          | m       | 10 maximum, with screened cable (sensor not isolated) |
| Protection                              | Against inversion of terminals      |          |         | Control instructions not executed                     |

| Relay output characteristics                       |                                            |       |                            |                          |              |
|----------------------------------------------------|--------------------------------------------|-------|----------------------------|--------------------------|--------------|
| Smart relay type                                   |                                            |       | SR2●●●/ SR3 B101●●         | SR3 B261●●, SR3 XT141●●  |              |
| Operating limit values                             |                                            |       | V                          | ≡ 5...150.<br>~ 24...250 |              |
| Contact type                                       |                                            |       |                            | N/O                      |              |
| Thermal current                                    |                                            |       | A                          | 8                        |              |
| Electrical durability for 500 000 operating cycles | Utilisation category                       | DC-12 | V                          | 24                       |              |
|                                                    |                                            |       | A                          | 1.5                      |              |
|                                                    |                                            | DC-13 | V                          | 24 (L/R = 10 ms)         |              |
|                                                    |                                            |       | A                          | 0.6                      |              |
|                                                    |                                            | AC-12 | V                          | 230                      |              |
|                                                    |                                            |       | A                          | 1.5                      |              |
|                                                    |                                            | AC-15 | V                          | 230                      |              |
|                                                    |                                            |       | A                          | 0.9                      |              |
|                                                    | Minimum switching capacity                 |       | At minimum voltage of 12 V | mA                       | 10           |
|                                                    | Low power switching reliability of contact |       |                            |                          | 12 V - 10 mA |
| Maximum operating rate                             | No-load                                    |       | Hz                         | 10                       |              |
|                                                    | At Ie (operational current)                |       | Hz                         | 0.1                      |              |
| Mechanical life                                    | In millions of operating cycles            |       |                            | 10                       |              |
| Rated impulse withstand voltage                    | Conforming to IEC 60947-1 and 60664-1      |       | kV                         | 4                        |              |
| Response time                                      | Trip                                       |       | ms                         | 10                       |              |
|                                                    | Reset                                      |       | ms                         | 5                        |              |
| Built-in protection                                | Short-circuit                              |       |                            | None                     |              |
|                                                    | Against overvoltage and overload           |       |                            | None                     |              |

| Transistor output characteristics |                                     |  |         |                 |
|-----------------------------------|-------------------------------------|--|---------|-----------------|
| Smart relay type                  |                                     |  | SR2/SR3 |                 |
| Operating limit values            |                                     |  | V       | 19.2...30       |
| Load                              | Nominal voltage                     |  | V       | ≡ 24            |
|                                   | Nominal current                     |  | A       | 0.5             |
|                                   | Maximum current                     |  | A       | 0.625 at 30 V   |
| Drop out voltage                  | At state 1                          |  | V       | ≤ 2 for I=0.5 A |
| Response time                     | Trip                                |  | ms      | ≤ 1             |
|                                   | Reset                               |  | ms      | ≤ 1             |
| Built-in protection               | Against overload and short-circuits |  |         | Yes             |
|                                   | Against overvoltage (1)             |  |         | Yes             |
|                                   | Against inversions of power supply  |  |         | Yes             |

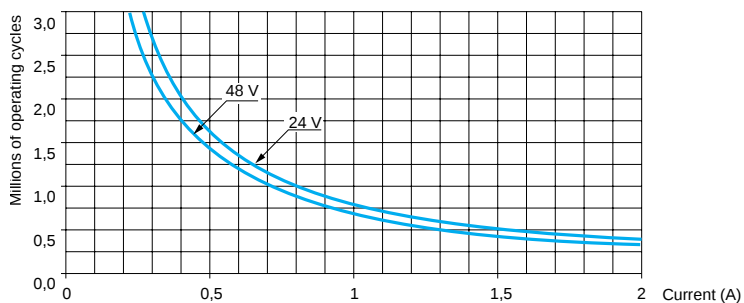
(1) If there is no volt-free contact between the relay output and the load.

## Electrical durability of relay outputs

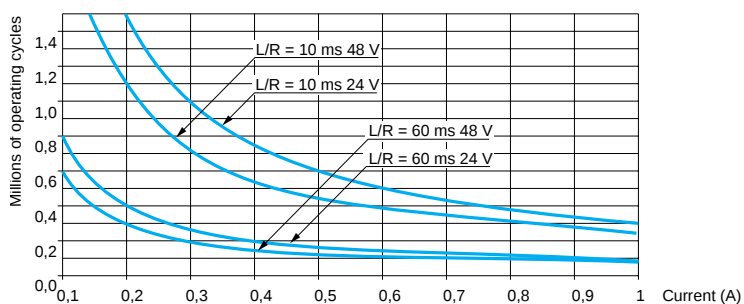
(in millions of operating cycles, conforming to IEC 60947-5-1)

### d.c. loads

#### DC-12 (1)



#### DC-13 (2)



(1) DC-12: switching resistive loads and photo-coupler isolated solid state loads,  $L/R \leq 1\text{ ms}$ .

(2) DC-13: switching electromagnets,  $L/R \leq 2 \times (U_e \times I_e)$  in ms,  $U_e$ : Rated operational voltage,  $I_e$ : rated operational current (with protection diode on load, use the DC-12 curves and apply a coefficient of 0.9 to the millions of operating cycles value)

# Zelio Logic smart relays

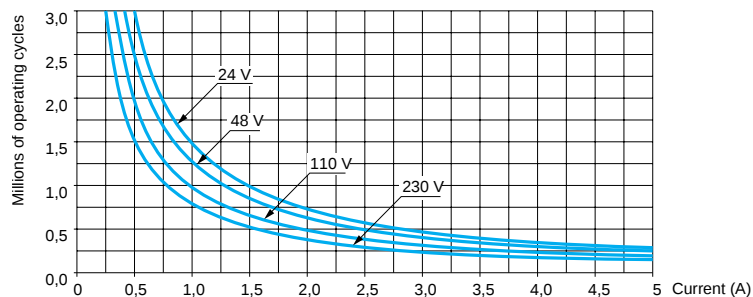
## Compact and modular smart relays

### Electrical durability of relay outputs (continued)

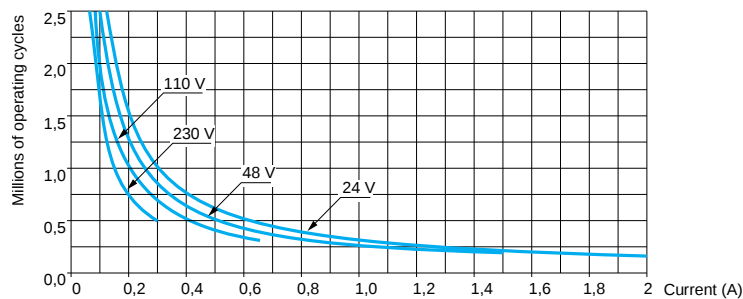
(in millions of operating cycles, conforming to IEC 60947-5-1)

#### a.c. loads

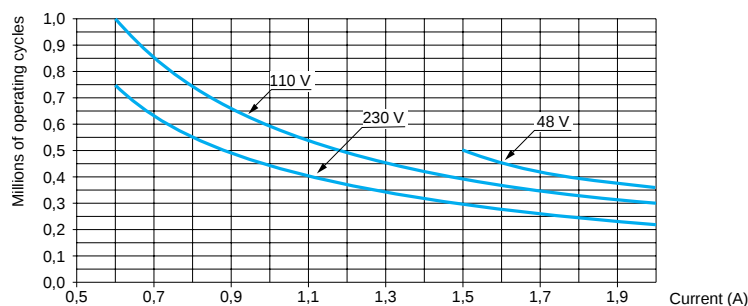
##### AC-12 (1)



##### AC-14 (2)



##### AC-15 (3)



(1) AC-12: switching resistive loads and photo-coupler isolated solid state loads,  $\cos \geq 0.9$ .

(2) AC-14: switching small electromagnetic loads whose power drawn with the electromagnet closed is  $\leq 72$  VA, making:  $\cos = 0.3$ , breaking:  $\cos = 0.3$ .

(3) AC-15: switching electromagnetic loads whose power drawn with the electromagnet closed is  $> 72$  VA, making:  $\cos = 0.7$ , breaking:  $\cos = 0.4$ .

# Zelio Logic smart relays

## Compact smart relays



SR2 A201BD



SR2 E121BD



SR2 PACK●●●

### Compact smart relays with display

| Number of I/O | Discrete inputs | Of which 0-10 V analogue inputs | Relay outputs | Transistor outputs | Clock | Reference | Weight kg |
|---------------|-----------------|---------------------------------|---------------|--------------------|-------|-----------|-----------|
|---------------|-----------------|---------------------------------|---------------|--------------------|-------|-----------|-----------|

#### Supply $\equiv$ 12 V

|    |    |   |   |   |     |            |       |
|----|----|---|---|---|-----|------------|-------|
| 12 | 8  | 4 | 4 | 0 | Yes | SR2 B121JD | 0.250 |
| 20 | 12 | 6 | 8 | 0 | Yes | SR2 B201JD | 0.250 |

#### Supply $\equiv$ 24 V

|    |    |   |   |   |     |                |       |
|----|----|---|---|---|-----|----------------|-------|
| 10 | 6  | 0 | 4 | 0 | No  | SR2 A101BD (1) | 0.250 |
| 12 | 8  | 4 | 4 | 0 | Yes | SR2 B121BD     | 0.250 |
|    | 8  | 4 | 0 | 4 | Yes | SR2 B122BD     | 0.220 |
| 20 | 12 | 2 | 8 | 0 | No  | SR2 A201BD (1) | 0.380 |
|    | 12 | 6 | 8 | 0 | Yes | SR2 B201BD     | 0.380 |
|    | 12 | 6 | 0 | 8 | Yes | SR2 B202BD     | 0.280 |

#### Supply $\sim$ 24 V

|    |    |   |   |   |     |           |       |
|----|----|---|---|---|-----|-----------|-------|
| 12 | 8  | 0 | 4 | 0 | Yes | SR2 B121B | 0.250 |
| 20 | 12 | 0 | 8 | 0 | Yes | SR2 B201B | 0.380 |

#### Supply $\sim$ 100...240 V

|    |    |   |   |   |     |                |       |
|----|----|---|---|---|-----|----------------|-------|
| 10 | 6  | 0 | 4 | 0 | No  | SR2 A101FU (1) | 0.250 |
| 12 | 8  | 0 | 4 | 0 | Yes | SR2 B121FU     | 0.250 |
| 20 | 12 | 0 | 8 | 0 | No  | SR2 A201FU (1) | 0.380 |
|    | 12 | 0 | 8 | 0 | Yes | SR2 B201FU     | 0.380 |

### Compact smart relays without display

| Number of I/O | Discrete inputs | Of which 0-10 V analogue inputs | Relay outputs | Transistor outputs | Clock | Reference | Weight kg |
|---------------|-----------------|---------------------------------|---------------|--------------------|-------|-----------|-----------|
|---------------|-----------------|---------------------------------|---------------|--------------------|-------|-----------|-----------|

#### Supply $\equiv$ 24 V

|    |    |   |   |   |     |                |       |
|----|----|---|---|---|-----|----------------|-------|
| 10 | 6  | 0 | 4 | 0 | No  | SR2 D101BD (1) | 0.220 |
| 12 | 8  | 4 | 4 | 0 | Yes | SR2 E121BD     | 0.220 |
| 20 | 12 | 2 | 8 | 0 | No  | SR2 D201BD (1) | 0.350 |
|    | 12 | 6 | 8 | 0 | Yes | SR2 E201BD     | 0.350 |

#### Supply $\sim$ 24 V

|    |    |   |   |   |     |           |       |
|----|----|---|---|---|-----|-----------|-------|
| 12 | 8  | 0 | 4 | 0 | Yes | SR2 E121B | 0.220 |
| 20 | 12 | 0 | 8 | 0 | Yes | SR2 E201B | 0.350 |

#### Supply $\sim$ 100...240 V

|    |    |   |   |   |     |                |       |
|----|----|---|---|---|-----|----------------|-------|
| 10 | 6  | 0 | 4 | 0 | No  | SR2 D101FU (1) | 0.220 |
| 12 | 8  | 0 | 4 | 0 | Yes | SR2 E121FU     | 0.220 |
| 20 | 12 | 0 | 8 | 0 | No  | SR2 D201FU (1) | 0.350 |
|    | 12 | 0 | 8 | 0 | Yes | SR2 E201FU     | 0.350 |

### Compact "discovery" packs

| Number of I/O | Pack contents | Reference | Weight kg |
|---------------|---------------|-----------|-----------|
|---------------|---------------|-----------|-----------|

#### Supply $\equiv$ 24 V

|    |                                                                                                                               |             |       |
|----|-------------------------------------------------------------------------------------------------------------------------------|-------------|-------|
| 12 | An SR2 B121BD compact smart relay with display, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom.  | SR2 PACKBD  | 0.700 |
| 20 | An SR2 B201BD, compact smart relay with display, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom. | SR2 PACK2BD | 0.850 |

#### Supply $\sim$ 100...240 V

|    |                                                                                                                               |             |       |
|----|-------------------------------------------------------------------------------------------------------------------------------|-------------|-------|
| 12 | An SR2 B121FU, compact smart relay with display, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom. | SR2 PACKFU  | 0.700 |
| 20 | An SR2 B201FU, compact smart relay with display, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom. | SR2 PACK2FU | 0.850 |

(1) Programming on smart relay in LADDER language only.

# Zelio Logic smart relays

## Modular smart relays



SR3 B101BD



SR3 XT61BD



SR3 XT141BD

### Modular smart relays with display

| Number of I/O                              | Discrete inputs | Of which 0-10 V analogue inputs | Relay outputs | Transistor outputs | Clock | Reference  | Weight kg |
|--------------------------------------------|-----------------|---------------------------------|---------------|--------------------|-------|------------|-----------|
| <b>Supply <math>\text{---}</math> 24 V</b> |                 |                                 |               |                    |       |            |           |
| 10                                         | 6               | 4                               | 4             | 0                  | Yes   | SR3 B101BD | 0.250     |
|                                            | 6               | 4                               | 0             | 4                  | Yes   | SR3 B102BD | 0.220     |
| 26                                         | 16              | 6                               | 10 (1)        | 0                  | Yes   | SR3 B261BD | 0.400     |
|                                            | 16              | 6                               | 0             | 10                 | Yes   | SR3 B262BD | 0.300     |

### Supply $\sim$ 24 V

|    |    |   |        |   |     |           |       |
|----|----|---|--------|---|-----|-----------|-------|
| 10 | 6  | 0 | 4      | 0 | Yes | SR3 B101B | 0.250 |
| 26 | 16 | 0 | 10 (1) | 0 | Yes | SR3 B261B | 0.400 |

### Supply $\sim$ 100-240 V

|    |    |   |        |   |     |            |       |
|----|----|---|--------|---|-----|------------|-------|
| 10 | 6  | 0 | 4      | 0 | Yes | SR3 B101FU | 0.250 |
| 26 | 16 | 0 | 10 (1) | 0 | Yes | SR3 B261FU | 0.400 |

### I/O extension modules (2)

| Number of I/O                                                            | Discrete inputs | Relay outputs | Reference   | Weight kg |
|--------------------------------------------------------------------------|-----------------|---------------|-------------|-----------|
| <b>Supply <math>\text{---}</math> 24 V (for smart relays SR3 B●●●BD)</b> |                 |               |             |           |
| 6                                                                        | 4               | 2             | SR3 XT61BD  | 0.125     |
| 10                                                                       | 6               | 4             | SR3 XT101BD | 0.200     |
| 14                                                                       | 8               | 6             | SR3 XT141BD | 0.220     |

### Supply $\sim$ 24 V (for smart relays SR3 B●●●B)

|    |   |   |            |       |
|----|---|---|------------|-------|
| 6  | 4 | 2 | SR3 XT61B  | 0.125 |
| 10 | 6 | 4 | SR3 XT101B | 0.200 |
| 14 | 8 | 6 | SR3 XT141B | 0.220 |

### Supply $\sim$ 100-240 V (for smart relays SR3 B●●●FU)

|    |   |   |             |       |
|----|---|---|-------------|-------|
| 6  | 4 | 2 | SR3 XT61FU  | 0.125 |
| 10 | 6 | 4 | SR3 XT101FU | 0.200 |
| 14 | 8 | 6 | SR3 XT141FU | 0.220 |

### Communication module (2)

| For use on     | Supply voltage    | Reference     | Weight kg |
|----------------|-------------------|---------------|-----------|
| Modbus network | $\text{---}$ 24 V | SR3 MBU01BD ▲ | 0.300     |

### Modular "discovery" packs

| Number of I/O                               | Pack contents                                                                                                                | Reference   | Weight kg |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| <b>Supply <math>\text{---}</math> 24 V</b>  |                                                                                                                              |             |           |
| 10                                          | An SR3 B101BD, modular smart relay, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom.             | SR3 PACKBD  | 0.700     |
| 26                                          | An SR3 B261BD modular smart relay, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom.              | SR3 PACK2BD | 0.850     |
| <b>Supply <math>\sim</math> 100...240 V</b> |                                                                                                                              |             |           |
| 10                                          | An SR3 B101FU modular smart relay, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom.              | SR3 PACKFU  | 0.700     |
| 26                                          | An SR3 B261FU modular smart relay with display, a connecting cable and "Zelio Soft" programming software supplied on CD-Rom. | SR3 PACK2FU | 0.850     |

(1) Including 8 outputs at maximum current of 8 A and 2 outputs at maximum current of 5 A.

(2) Power supply to the I/O extension and communication modules is via the modular smart relays

**Note:** The smart relay and its associated extensions must have an identical voltage.

▲ Available: 1<sup>st</sup> quarter of 2004.

# Zelio Logic smart relays

## Compact and modular smart relays

### Separate components



SR2 SFT01



SR2 MEM01



SR2 COM01



ABL7 RM1202

#### "Zelio Soft" software for PC

| Description                                                                                                                          | Reference | Weight<br>kg |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------|
| "Zelio Soft" for PC multi-language programming software supplied on CD-Rom (1), compatible with Windows 95, 98, NT, 2000, XP and ME. | SR2 SFT01 | 0.200        |
| Connecting cable between smart relay and PC (length: 3 m)                                                                            | SR2 CBL01 | 0.150        |

#### Back-up memory

| Description           | Reference | Weight<br>kg |
|-----------------------|-----------|--------------|
| EEPROM back-up memory | SR2 MEM01 | 0.010        |

#### Communication interface (2)

| Description             | Supply    | Reference   | Weight<br>kg |
|-------------------------|-----------|-------------|--------------|
| Communication interface | ≡ 12/24 V | SR2 COM01 ▲ | 0.140        |

#### Converters for Optimum Pt100 probes (3)

Supply voltage ≡ 24 V (20 %, not isolated)

| Type                      | Temperature range |             | Output signal         | Reference | Weight<br>kg |
|---------------------------|-------------------|-------------|-----------------------|-----------|--------------|
|                           | °C                | °F          |                       |           |              |
| Pt100                     | - 40...40         | - 40...104  | 0...10 V or 4...20 mA | RMP T13BD | 0.116        |
| 2-wire, 3-wire and 4-wire | - 100...100       | - 148...212 | 0...10 V or 4...20 mA | RMP T23BD | 0.116        |
|                           | 0... 100          | 32... 212   | 0...10 V or 4...20 mA | RMP T33BD | 0.116        |
|                           | 0... 250          | 32... 482   | 0...10 V or 4...20 mA | RMP T53BD | 0.116        |
|                           | 0... 500          | 32...932    | 0...10 V or 4...20 mA | RMP T73BD | 0.116        |

#### Power supplies (3)

| Input voltage                 | Nominal output voltage | Nominal output current | Reference   | Weight<br>kg |
|-------------------------------|------------------------|------------------------|-------------|--------------|
| ~ 100...240 V<br>(47...63 Hz) | ≡ 12 V                 | 1.9 A                  | ABL 7RM1202 | 0.180        |
|                               | ≡ 24 V                 | 1.4 A                  | ABL 7RM2401 | 0.182        |

#### Documentation

| Description                                             | Language   | Reference   | Weight<br>kg |
|---------------------------------------------------------|------------|-------------|--------------|
| User's manual for direct programming on the smart relay | English    | SR2 MAN01EN | 0.100        |
|                                                         | French     | SR2 MAN01FR | 0.100        |
|                                                         | German     | SR2 MAN01DE | 0.100        |
|                                                         | Spanish    | SR2 MAN01ES | 0.100        |
|                                                         | Italian    | SR2 MAN01IT | 0.100        |
|                                                         | Portuguese | SR2 MAN01PO | 0.100        |

(1) CD-Rom containing "Zelio Soft" software, an application library, a self-training manual, installation instructions and a user's manual.

(2) See pages 14011/2 to 14011/7

(3) See pages 14060/2 to 14060/5

▲ Available: 1<sup>st</sup> half of 2004.

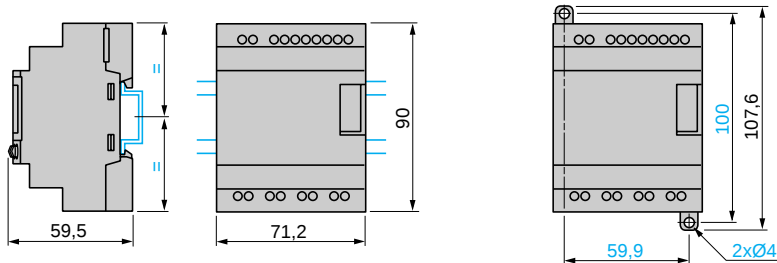
### Compact and modular smart relays

SR2 A101BD, SR2 D101FU, SR3 B101BD and SR3 B101FU (10 I/O)

SR2 B121JD, SR2 B120BD, SR2 B121B, SR2 A101FU, SR2 B121FU, SR2 D101BD, SR2 E121BD, SR2 E121B, SR2 E121FU (12 I/O)

Mounting on 35 mm rail

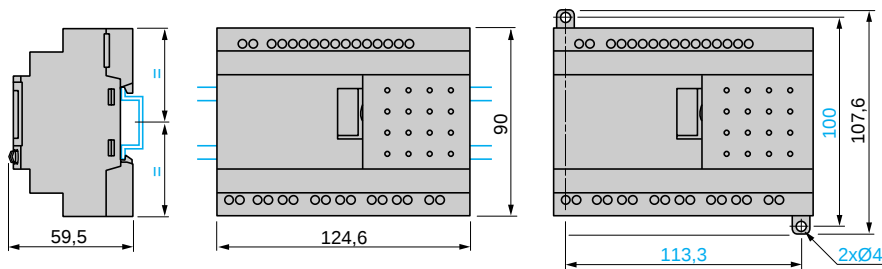
Screw fixing (retractable lugs)



SR2 B201JD, SR2 A201BD, SR2 B200BD, SR2 B201B, SR2 A201FU, SR2 B201FU, SR2 D201BD, SR2 E201BD, SR2 E201B, SR2 D201FU and SR2 E201FU (20 I/O)  
SR3 B260BD and SR3 B261FU (26 I/O)

Mounting on 35 mm rail

Screw fixing (retractable lugs)

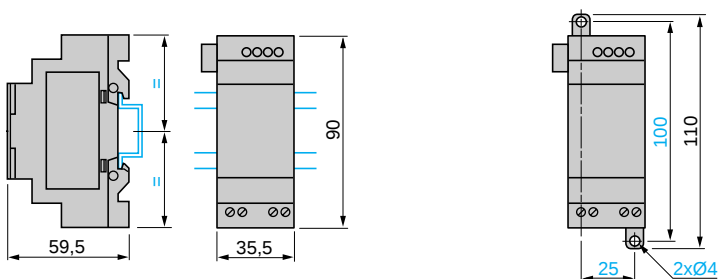


### I/O extension modules

SR3 XT6100 (6 I/O)

Mounting on 35 mm rail

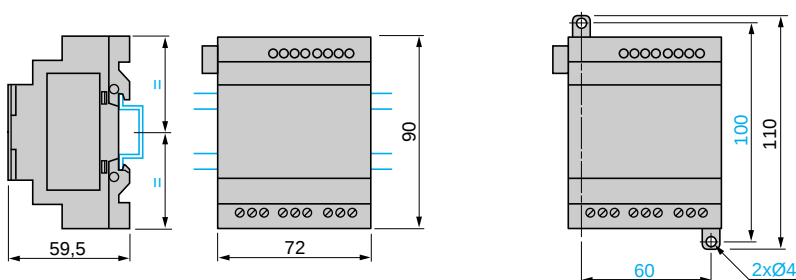
Screw fixing (retractable lugs)



SR3 XT10100 and SR3 XT14100 (10 and 14 I/O)

Mounting on 35 mm rail

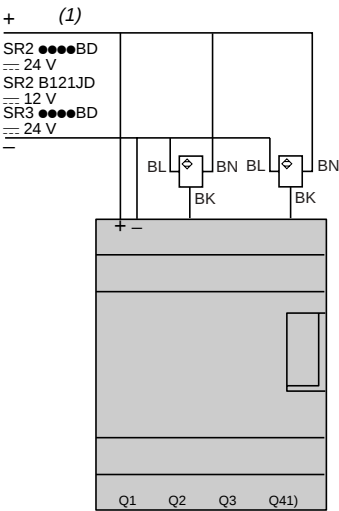
Screw fixing (retractable lugs)



Input connections

3-wire sensors

SR2 ●●●●BD, SR2 B121JD and SR3 ●●●●BD



(1) 1 A quick-blow fuse or circuit-breaker.

Analogue inputs

SR2 B12●BD, SR2 B121JD and SR3 B10●BD

SR2 B201BD, SR3 B26●BD and SR2 B201JD

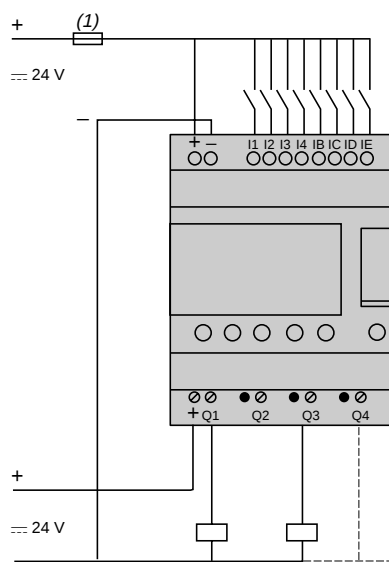
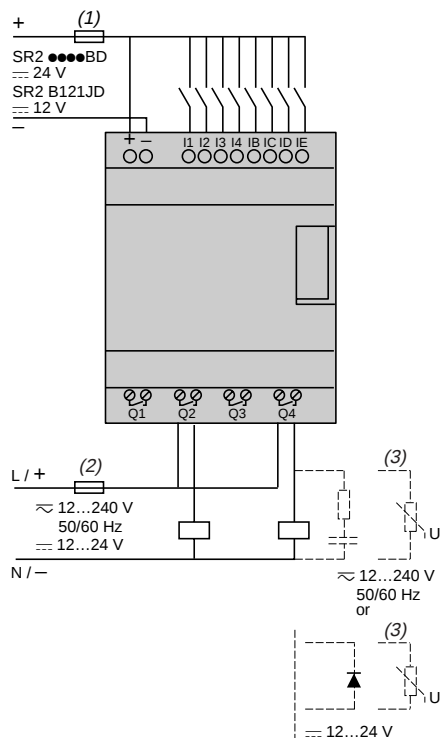
(1) 1 A quick-blow fuse or circuit-breaker.

(1) 1 A quick-blow fuse or circuit-breaker.

## Connection of smart relays on $\text{---}$ supply

SR2 ●●●BD, SR2 B121JD, SR2 ●201BD and SR3 B10●●●

SR2 B122BD and SR2 B202BD, SR3 B102BD and SR3 B262BD

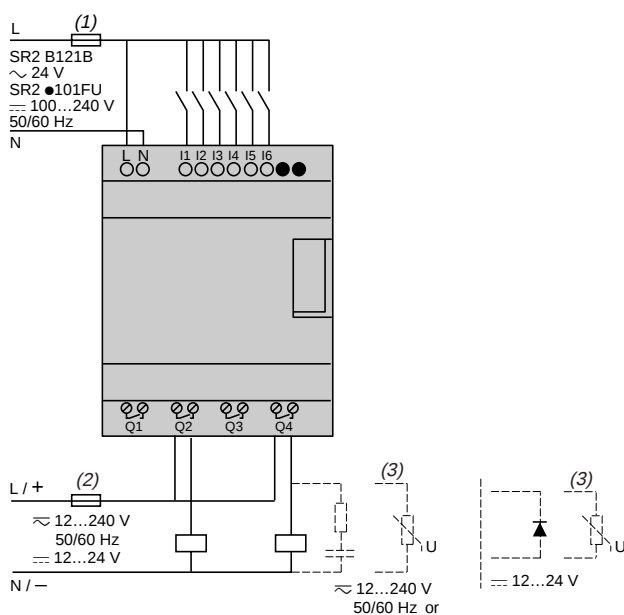


- (1) 1 A quick-blow fuse or circuit-breaker.  
 (2) Fuse or circuit-breaker.  
 (3) Inductive load.

- (1) 1 A quick-blow fuse or circuit-breaker.

## Connection of smart relays on $\sim$ supply

SR2 B●●●B, SR2 A1●1FU, SR2 ●201FU, SR3 B●●B and SR3 B●●●FU



- (1) 1 A quick-blow fuse or circuit-breaker.  
 (2) Fuse or circuit-breaker.  
 (3) Inductive load.