Contents

4 - Analogue interfaces Zelio Analog

Selection guide . . . . . *page 4/2*

Converters for thermocouples and Pt100 probes

- Presentation . . . . . *page 4/4*
- Characteristics . . . . . *page 4/6*
- References . . . . . *page 4/8*
- Dimensions, schemes . . . . . *page 4/9*

4

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

Product types		Converters for thermocouples				
						
Input type		J (Fe-CuNi)			K (Ni-CrNi)	
Input signal	**Temperature range**	0...150 °C 32...302 °F	0...300 °C 32...572 °F	0...600 °C 32...1112 °F	0... 600 °C 32...1112 °F	0...1200 °C 32...2192 °F
	Voltage	–				
	Current	–				
Output signal	Voltage/Current	Switchable: 0...10 V /0...20 mA; 4...20 mA				
Supply voltage	Rated	⎓ 24V ± 20%, not isolated				
Built-in protection	Outputs	Reverse polarity, overvoltage and short-circuit Output safety feature, if input not wired or wire broken				
	Supply	Reverse polarity				
Signalling		Green LED (power on)				
Conformity/Approvals	Conforming to standards	IEC 60947-1, IEC 60584-1				
	Approvals	UL, CSA, GL, CE				
Type		**RMT J40BD**	**RMT J60BD**	**RMT J80BD**	**RMT K80 BD**	**RMT K90BD**
Pages		4/8				

Converters for Universal and Optimum Pt100 probes					Voltage/current converters			
								
Pt100, 2, 3 and 4-wire					–			
- 40...40 °C	-100...100 °C	0...100 °C	0...250 °C	0...500 °C	–			
- 40...104 °F	- 148...212 °F	32...212 °F	32...482 °F	32...932 °F				
–					0...10 V	0...10 V; ± 10 V	0...50 V; 0...300 V; 0...500 V ⎓ or ∿ 50/60 Hz	–
–					4...20 mA	0...20 mA; 4...20 mA	–	0...1.5 A; 0...5 A; 0...15 A ⎓ or ∿ 50/60 Hz
Switchable: 0... 10 V/0...20 mA , 4...20 mA for the Universal Pt100 range **RMP T●0BD** 0...10 V or 4...20 mA for the Optimum Pt100 range **RMP T●3BD**					0...10 V or 4...20 mA	Switchable: 0...10 V; ±10 V/ 0...20 mA; 4...20 mA	Switchable: 0...10 V/ 4...20 mA; 0...20 mA	0...10 V or 0...20 mA or 4...20 mA
⎓ 24V ± 20%, not isolated						⎓ 24V ± 20%, isolated		
Reverse polarity, overvoltage and short-circuit Output safety feature, if input not wired or wire broken								
Reverse polarity								
Green LED (power on)								
IEC 60751, DIN 43 760					IEC 60947-1			
UL, CSA, GL, CE								
RMP T1●BD	**RMP T2●BD**	**RMP T3●BD**	**RMP T5●BD**	**RMP T7●BD**	**RMC N22BD**	**RMC L55BD**	**RMC V60BD**	**RMC A61BD**
4/8								

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

The Zelio Analog range of converters is designed to convert signals emitted by sensors or electrical measurements into standard electrical signals which are compatible with automation platforms, controllers (thermal processes, speed, …). They also allow the connection distance between a sensor and the measurement acquisition device to be increased: for example between a thermocouple and a programmable controller.
Conforming to IEC standards, UL and CSA certified, these converters are suitable for universal use.

Measurement signals for thermocouples and Pt100 probes
The voltages induced by thermocouples vary between 10 and 80 µV/°C, Pt100 probes (100 ohms at 0 °C) produce about 0.5 mV/°C, with measurement currents of 1 mA. Depending on the sensor, the signal to be measured ranges from a few µV (thermocouple) to 250 and 700 mV for a Pt100 probe.
It is therefore difficult to transmit these low level signals over long electric lines without encountering problems of interference, signal reduction or errors.
Connecting Zelio Analog converters close to the sensors resolves these problems :
- 4-20 mA current loops transmitted over a long distance are less sensitive to interference than low level voltage signals from sensors,
- signal reductions during transmission (resistance) of voltages do not occur,
- the cables used to connect the converters to process equipment (programmable controllers) are standard cables, which are more cost effective than extension cables or compensation cables suitable for low level signals for Pt100 probes or thermocouples.

Presentation

The Zelio Analog range

The Zelio Analog range has been developed both to take account of the most common applications and to ensure great simplicity of installation:
- pre-set input and output scales, requiring no adjustment
- outputs protected against reverse polarity, overvoltage and short-circuits
- ⎓ 24 V power supply
- sealable protective cover
- rail mounting and screw fixing onto mounting plate
- LED indicator on the front panel
- input and output selector switches on the front panel
- output with fallback value if no input signal is present (due to failure of a sensor, for example).

The Zelio Analog converter range is divided into four families:
- Converters for J and K type thermocouples: **RMT J/K**
- Converters for Universal Pt100 probes: **RMP T●0**
- Converters for Optimum Pt100 probes: **RMP T●3**
- Universal voltage/current converters: **RMC**.

RMT J40BD

RMT K90BD

Converters for J and K type thermocouples

Thermocouples, which consist of two metals with different thermo-electric characteristics, produce a voltage that varies according to temperature. This voltage is transmitted to the Zelio Analog converter which converts it to a standard signal. Converters for thermocouples have cold junction compensation to allow detection of measurement errors induced by the connection to the device itself.

Converters for J and K type thermocouples have :
- for inputs, a pre-set temperature range, depending on the model:
  - Type J: 0...150 °C, 0...300 °C, 0...600 °C
  - Type K: 0...600 °C, 0...1200 °C.
- for outputs, a switchable signal:
  - 0...10 V, 0... 20 mA, 4... 20 mA.

Characteristics : pages 4/6 and 4/7
References : page 4/8
Dimensions : page 4/9
Schemes : page 4/9

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

RMP T70BD

Converters for Universal Pt100 probes

Pt100 probes with platinum resistor are electrical conductors whose resistance varies according to the temperature.
This ohmic resistance is transmitted to the Zelio Analog converter which converts it to a standard signal.
Converters for Universal Pt100 probes have :

- for inputs, a pre-set temperature range, depending on the model:
  - -100...100 °C,
  - - 40...40 °C,
  - 0...100 °C,
  - 0...250 °C,
  - 0...500 °C.
- for outputs, a switchable signal:
  - 0... 10 V, 0... 20 mA, 4... 20 mA.

The products in the Universal Pt100 family allow wiring of Pt100 probes in 2, 3 and 4-wire mode.

Converters for Optimum Pt100 probes

Derived from the above family, these converters have:

- for inputs, a pre-set temperature range identical to that of converters for Universal Pt100 probes.
- for outputs: 0...10V signal dedicated to Zelio Logic analogue inputs.

They allow Pt100 probes to be wired in 2, 3 and 4-wire mode.

RMC A61BD

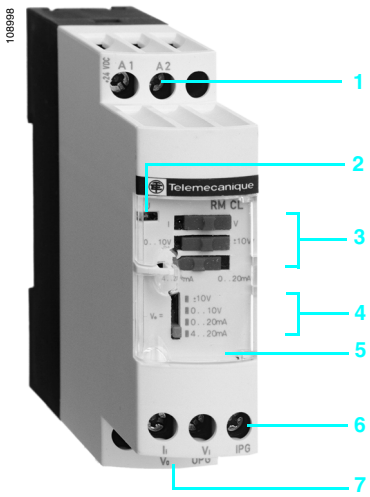
Universal voltage/current converters

This family of converters allows the adaptation of electrical values (voltage/current).
Four products are available:

- a cost effective converter which will convert a 0...10 V signal to a 4...20mA signal or vice versa.
- a Universal voltage/current converter allowing the most common signals. They have:
  - for inputs, a voltage/current range:
    - 0...10 V, ± 10 V, 0...20 mA, 4...20 mA.
  - for outputs, a switchable voltage/current range:
    - 0...10 V, ± 10 V, 0...20 mA, 4...20 mA.
- two Universal voltage/current converters which allow conversion of electrical power signals, both a.c. and d.c.

They have the following, depending on the model:

- **for voltage inputs**, a range of 0 to 500 V (∿ or ⎓)
- for outputs, a switchable voltage/current range:
  - 0...10 V, 0...20 mA, 4...20 mA.
- **for current inputs**, a range of 0 to 15 A (∿ or ⎓)
- for outputs, a voltage/current range:
  - 0...10 V, 0...20 mA, 4...20 mA.



RMC L55BD

Description

Zelio Analog converters have the following on their front panel, depending on the model:

1 Two terminals for ⎓ 24 V supply connection
2 A 'Power ON' LED
3 Three input selector switches (depending on model)
4 An output selector switch (depending on model)
5 A sealable protective cover
6 A screw terminal block for inputs
7 A screw terminal block for outputs.

Characteristics : pages 4/6 and 4/7
References : page 4/8
Dimensions : page 4/9
Schemes : page 4/9

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

Environment characteristics

Converter types			RMT J/K●●●●●, RMP ●●●●●, RMC●●●●●
Conforming to standards			IEC 60947-1, IEC 60584-1 (IEC 60751, DIN 43760 for RMP●●●●)
Product certifications			UL, CSA, GL, CE
Degree of protection			
	Housing		IP 50
	Terminal block		IP 20
Flame resistance		**°C**	850 conforming to UL, IEC 60695-2-1
Shock resistance			50 gn/11 ms conforming to IEC 68-2-27
Vibration resistance			5 gn (10...100 Hz) conforming to IEC 68-2-6
Immunity to EMC			
	Resistance to electrostatic discharge	**kV**	Level 3: 8 (air), 6 (contact) conforming to IEC 1000-4-2
	Immunity to fast transient currents	**kV**	On the power supply: 2; on the input-output: 1 conforming to IEC 1004-4
	Surge withstand	**kV**	0.5 - waves 1.2/50 µs; 0.5 J conforming to IEC 1000-4-5
Disturbance			
	Radiated/conducted		CISPR11 and CISPR22 Group 1- Class B
Insulation voltage		**kV**	2
Ambient air temperature around the device			
	Storage	**°C**	-40...85 (-40...185 °F)
	Operation	**°C**	Mounted side-by-side: 0...50 (32...122 °F); 2 cm spacing: 0...60 (32...140 °F)
Degree of pollution			2 conforming to IEC 60664-1
Mounting			35 mm DIN rail, clip-on or fixed on mounting plate
Connection		**mm²**	2 x 1.5 or 1 x 2.5 cable
Tightening torque		**Nm**	0.6...1.1

Specific characteristics

Types of converter for thermocouples			RMT J40BD	RMT J60BD	RMT J80BD	RMT K80BD	RMT K90BD
Input types	Thermocouple type to IEC 60584		J (Fe-CuNi)			K (Ni-CrNi)	
	Temperature range	**°C**	0...150	0...300	0...600	0...600	0...1200
		°F	32...302	32...572	32...1112	32...1112	32...2192
Analogue output switchable to voltage or current							
Voltage	Range	**V**	0...10				
	Minimum impedance of load	**kΩ**	100				
Current	Range	**mA**	0...20 ; 4...20				
	Maximum impedance of load	Ω	500				
Built-in protection			Reverse polarity, overvoltage (± 30 V) and short-circuit				
Safety	Output state when no inputs are wired or when input wire broken		Output predetermined according to type of output selected: voltage = - 13 V current = 0 mA				
Supply							
Voltage	Rated	⎓ **V**	24 ± 20 %, non isolated				
Maximum current consumption	For voltage output	**mA**	40				
	For current output	**mA**	60				
Built-in protection			Reverse polarity				
Signalling			Green LED (power on)				
Measurements							
Accuracy	At 20 °C	**%**	± 1 of the full scale value ± 10 of the full-scale value (in an environment subject to electromagnetic interference of 10 V/m)				
Repeat accuracy	At 20 °C	**%**	± 0.25 of the full scale value				
	At 60 °C	**%**	± 0.8 of the full scale value				
Temperature coefficient		**ppm/°C**	200 (0.02 %)				
Cold junction compensation			Built-in, cold junction measurement: 0 to 60 °C (0...140 °F)				

4

Presentation : pages 4/4 and 4/5
References : page 4/8
Dimensions : page 4/9
Schemes : page 4/9

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

Specific characteristics (continued)

Types of converter for Pt100 probes			RMP T10/13BD	RMP T20/23BD	RMP T30/33BD	RMP T50/53BD	RMP T70/73BD
Input types	Probe type		Pt100 - IEC 60751; DIN 43760 (2, 3, 4-wire)				
	Temperature range	**°C**	- 40...40	- 100...100	0...100	0...250	0...500
		°F	- 40...104	- 148...212	32...212	32...482	32...932
Analogue output							
Output selection			0...10 V/0...20 mA, 4...20 mA switchable for RMP T●0BD				
			0...10 V or 4...20 mA for RMP T●3BD				
Voltage	Minimum impedance of load	**kΩ**	100				
Current	Maximum impedance of load	**Ω**	500				
Built-in protection			Reverse polarity, overvoltage (± 30 V) and short-circuit				
Safety	Output state when no inputs are wired or when input wire broken		Output predetermined according to type of output selected: voltage = ± 13 V current = 0 mA				
Supply							
Voltage	Rated	**⎓ V**	24 ± 20 %, non isolated				
Maximum current consumption	For voltage output	**mA**	40				
	For current output	**mA**	60				
Built-in protection			Reverse polarity				
Signalling			Green LED (power on)				
Measurements							
Accuracy	At 20 °C	**%**	± 0.5 (3, 4-wire connection) of the full scale value ± 1 (2-wire connection) of the full scale value ± 10 of the full-scale value (in an environment subject to electromagnetic interference of 10 V/m)				
Repeat accuracy	At 20 °C	**%**	± 0.2 of the full scale value				
	At 60 °C	**%**	± 0.6 of the full scale value				
Temperature coefficient		**ppm/°C**	150 (0.015 %)				
Connection in 2-wire mode							
	Maximum resistance of cable	**mΩ**	200				

Specific characteristics

Types of voltage/current converters			RMC N22BD	RMC L55BD	RMC V60BD	RMC A61BD
Input types	Voltage	**V**	⎓ 0...10	⎓ 0...10, ±10	0...50; 0...300; 0...500 ⎓ or ∿ 50/60 Hz	–
	Current	**mA**	4...20	0...20 ; 4...20	–	–
		A	–	–	–	0...1.5; 0...5; 0...15 ⎓ or ∿ 50/60 Hz
Analogue output						
Output selection			By cabling	Switchable	Switchable	By cabling
Voltage	Range	**V**	0...10	0...10; ± 10	0...10	0...10
	Minimum impedance of load	**kΩ**	100			
Current	Range	**mA**	4...20	0...20; 4...20	0...20; 4...20	0...20 4...20
	Maximum impedance of load	**Ω**	500			
Built-in protection			Reverse polarity, overvoltage (± 30 V) and short-circuit			
Safety	Output state when no inputs are wired or when input wire broken		Output predetermined according to type of output selected: voltage: < 0 V current: < 4 mA	voltage: - 10…+ 10 V: -10 V 0…+ 10 V : 0 V current: 0…20 mA : 0 mA 4…20 mA : 4 mA	voltage: < 0 V current: 0…20 mA : 0 mA 4…20 mA : < 4 mA	
Supply						
Voltage	Rated	**V**	⎓ 24 ± 20 % non isolated	⎓ 24 ± 20 % isolated (1.5 kV)		
Maximum current consumption	For voltage output	**mA**	40	70		
	For current output	**mA**	60	90		
Built-in protection			Reverse polarity			
Signalling			Green LED (power on)			
Measurements						
Accuracy	At 20 °C	**%**	± 1 of the full scale value ± 10 of the full-scale value (in an environment subject to electromagnetic interference of 10 V/m)		± 5 of the full scale value ± 10 of the full-scale value (in an environment subject to electromagnetic interference of 10 V/m)	
Repeat accuracy	At 20 °C	**%**	± 0.2 of the full scale value			
	At 60 °C	**%**	± 0.6 of the full scale value			
Temperature coefficient		**ppm/°C**	200 (0.02 %)			0...1.5 A: 500 (0.05 %) 0...5 A: 1000 (0.1 %) 0...15 A: 2000 (0.2 %)

Presentation : pages 4/4 and 4/5
References : page 4/8
Dimensions : page 4/9
Schemes : page 4/9

Analogue interfaces
Zelio Analog
Converters for thermocouples and Pt100 probes
Voltage/current converters

RMT J40BD

RMT K90BD

RMP T70BD

RMP T13BD

RMC N22BD

RMC L55BD

RMC A61BD

Converters for J and K type thermocouples

Supply voltage ⎓ 24 V ± 20 %, non isolated

Type	Temperature range °C	Temperature range °F	Switchable output signal	Reference	Weight kg
Type J	0…150	32…302	0…10 V, 0…20 mA, 4…20 mA	**RMT J40BD**	0.120
	0…300	32…572	0…10 V, 0…20 mA, 4…20 mA	**RMT J60BD**	0.120
	0…600	32…1112	0…10 V, 0…20 mA, 4…20 mA	**RMT J80BD**	0.120
Type K	0…600	32…1112	0…10 V, 0…20 mA, 4…20 mA	**RMT K80BD**	0.120
	0…1200	32…2192	0…10 V, 0…20 mA, 4…20 mA	**RMT K90BD**	0.120

Converters for Universal Pt100 probes

Supply voltage ⎓ 24 V ± 20 %, non isolated

Type	Temperature range °C	Temperature range °F	Switchable output signal	Reference	Weight kg
Pt100 2-wire, 3-wire and 4-wire	- 40…40	- 40…104	0…10 V, 0…20 mA, 4…20 mA	**RMP T10BD**	0.120
	- 100…100	- 148…212	0…10 V, 0…20 mA, 4…20 mA	**RMP T20BD**	0.120
	0…100	32…212	0…10 V, 0…20 mA, 4…20 mA	**RMP T30BD**	0.120
	0…250	32…482	0…10 V, 0…20 mA, 4…20 mA	**RMP T50BD**	0.120
	0…500	32…932	0…10 V, 0…20 mA, 4…20 mA	**RMP T70BD**	0.120

Converters for Optimum Pt100 probes *(1)*

Supply voltage ⎓ 24 V ± 20 %, non isolated

Type	Temperature range °C	Temperature range °F	Output signal	Reference	Weight kg
Pt100 2-wire, 3-wire and 4-wire	- 40…40	- 40…104	0…10 V or 4…20 mA	**RMP T13BD**	0.120
	- 100…100	- 148…212	0…10 V or 4…20 mA	**RMP T23BD**	0.120
	0…100	32…212	0…10 V or 4…20 mA	**RMP T33BD**	0.120
	0…250	32…482	0…10 V or 4…20 mA	**RMP T53BD**	0.120
	0…500	32…932	0…10 V or 4…20 mA	**RMP T73BD**	0.120

Universal voltage/current converters

Supply voltage ⎓ 24 V ± 20 %, non isolated

Input signal	Output signal	Reference	Weight kg
0…10 V or 4…20 mA	0…10 V or 4…20 mA	**RMC N22BD**	0.120

Supply voltage ⎓ 24 V ± 20 %, isolated

Input signal	Output signal	Reference	Weight kg
0…10 V, ± 10 V, 0…20 mA, 4…20 mA	Switchable: 0…10 V, ± 10 V, 0…20 mA, 4…20 mA	**RMC L55BD**	0.120
0…50 V, 0…300 V, 0…500 V ⎓ or ∿ 50/60 Hz	Switchable: 0…10 V, 0...20 mA, 4…20 mA	**RMC V60BD**	0.150
0…1.5 A, 0…5 A, 0…15 A ⎓ or ∿ 50/60 Hz	0…10 V or 0...20 mA or 4…20 mA	**RMC A61BD**	0.150

Connection accessories

Description	Type	Sold in lots of	Unit reference	Weight kg
Terminal blocks for connection of protective earth conductor	Screw	100	**AB1 RRTP435U**	0.025
	Spring	100	**AB1 RRTP435U2**	0.015

(1) Converters dedicated to Zelio Logic smart relays.

Presentation : pages 4/4 and 4/5
Characteristics : pages 4/6 and 4/7
Dimensions : page 4/9
Schemes : page 4/9

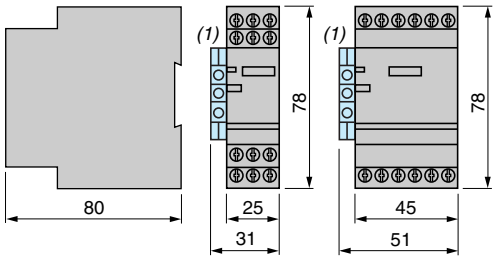
Analogue interfaces Zelio Analog

Converters for thermocouples and Pt100 probes
Voltage/current converters

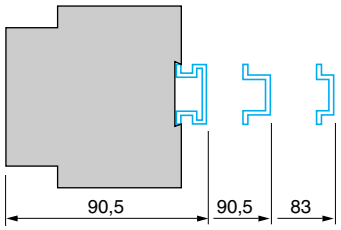
Dimensions, mounting

RMT ●●●●●/RMP ●●●●●/RMC ●●●●●

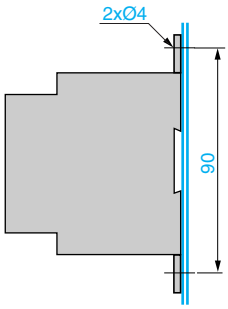
RMT ●●●●●● RMC A61BD
RMP ●●●●●●
RMC ●●●●●●



Mounting on rails **AM1 ●●●●●**



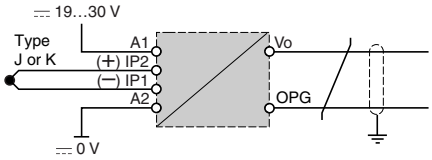
Panel mounting



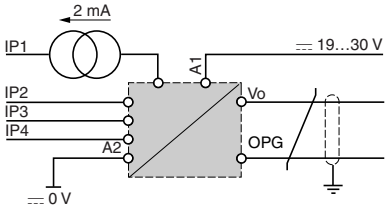
*(1) Terminal block **AB1 RRTP435U** or **AB1 RRTP435U2**.*

Schemes

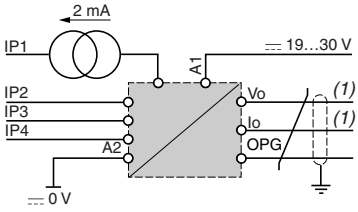
RMT J●●●●, RMT K●●●●



RMP T●0BD



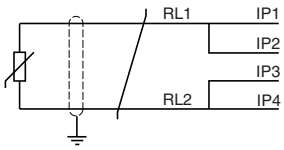
RMP T●3BD



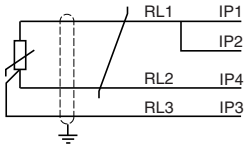
(1) Use one output only.

Input connections on RMP T●●●●●

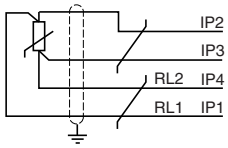
2-wire type
RL1 + RL2 ≤ 200 mΩ



3-wire type
RL1 = RL2 = RL3
RL1 + RL2 ≤ 200 Ω

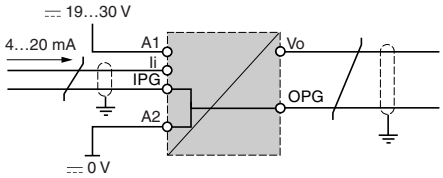


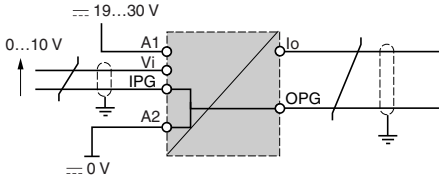
4-wire type
RL1 + RL2 ≤ 200 Ω



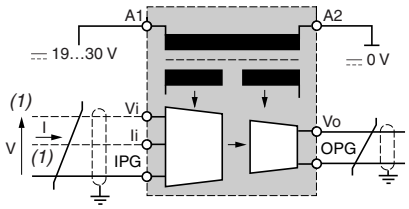
RMC ●●●●●

RMC N22BD



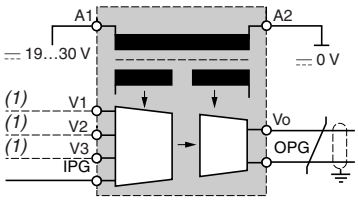


RMC L55BD



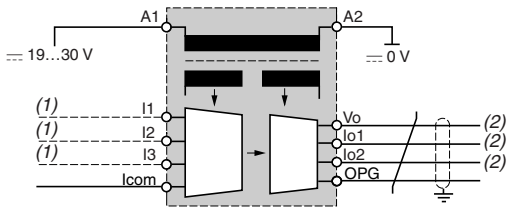
(1) Use one input only.

RMC V60BD



(1) Use one input only.

RMC A61BD



(1) Use one input only.
(2) Use one output only.

⚠ The input, output and power supply lines must be kept away from the power cables to avoid effects due to induced interference.
The input and output cables must be shielded as indicated in the schemes and must be kept away from each other.

Presentation : pages 4/4 and 4/5
Characteristics : pages 4/6 and 4/7
References : page 4/8