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MANUAL

INPUTS AND OUTPUTS SPECIFICATIONS



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1 Introduction

1.1 About this manual

This hardware manual describes the different types of inputs and outputs that are available in Regin's controllers and regulators, e.g. Regio Ardo, EXOcompact Eedo and Add:io.

Connection diagrams and other technical details can be found in each product's manual.

2 Inputs

2.1 Analog inputs

2.1.1 Ala

AI type *a* can be configured according to the following modes :

- ✓ 0...10 V
- ✓ 0...200 mV
0(4)...20 mA (with external 10 Ω shunt)
- ✓ 800 - 1600 Ω
PT1000 (-50...+150 °C)
Ni1000 LG (-40...+120 °C)
Ni1000 DIN (-40...+105 °C)
Digital open/close (slow)
- ✓ 0 - 4000 Ω
PT1000 extended (-60...+600 °C)
Ni1000 LG extended (-50...+250 °C)
Ni1000 DIN extended (-40...+250 °C)

The technical data are as follows:

Measurement current (resistance modes)	770 μ A
Input resistance (voltage modes)	10 M Ω
ADC resolution	12 bit
PT1000/Ni1000 accuracy (excluding sensor)	$\pm$ 0.4 K
Voltage 0...10 V accuracy (% of full scale)	$\pm$ 0.15 %
Voltage 0...200 mV accuracy (% of full scale)	$\pm$ 0.15 %

2.1.2 Alb

AI type *b* can be configured according to the following mode:

- ✓ 0...10 V

The technical data are as follows:

Input resistance	98 k Ω
ADC resolution	12 bit
Voltage 0...10 V accuracy (% of full scale)	$\pm$ 0.15 %

2.1.3 Alc

AI type *c* can be configured according to the following modes

- ✓ Pt1000 (-50...+150 °C)
- ✓ Digital open/close (slow)

The following modes might be available through the software configuration:

- ✓ 800 - 1600 Ω
- ✓ Ni1000 LG (-40...+120 °C)

✓ Ni1000 DIN (-40...+105 °C)

The technical data are as follows:

Measurement current (resistance modes)	~400 uA
ADC resolution	12 bit
PT1000/Ni1000 accuracy (excluding sensor)	± 0.4 K

2.2 Digital inputs

2.2.1 DIa

DI type *a* is of sinking input type and is designed for 0/24 V signals where 24 V normally is supplied from the controllers' +C terminal.

The technical data are as follows:

Input type	Sinking (+C, Rail)
Pulse length	>4 ms (fast)

2.2.2 DIb

DI type *b* is of sourcing input type and is designed with an internal supply of the DI. The reference is the controllers' GND or G0/- terminal.

The technical data are as follows:

Input type	Sourcing (-GND)
Shortest detectable pulse length	>4 ms (fast)
Max permitted cable capacitance with pulse length 4 ms (sets the cable length)	10 nF
Open input voltage	6,25 V
Shorted input current	0,7 mA
Guaranteed high level signal¹	4,45 V
Guaranteed low level signal	<1,9 V
24V AC / DC tolerant	Yes

¹ Configurable in SW if DI high/low shall result in a logic '1/10'

2.3 Condensation inputs

CI type *a* is used for all products.

2.4 Universal inputs

Universal inputs on the controller can be individually configured as either analogue inputs or as digital inputs

The default configuration of a UI is as a DI.

UIb and UIc are 24 V AC/DC tolerant.

1.

2.4.1 UIa as AI

UI type *a* in AI mode can be configured according to the following modes:

- ✓ 0...10 V
- ✓ 0...200 mV (0(4)...20 mA with external 10 Ω shunt)
- ✓ 800...1600 Ω (Pt1000, Ni1000 LG, Ni1000 DIN)
- ✓ 0...4000 Ω (Pt1000 ext, Ni1000 LG ext, Ni1000 DIN ext)

The technical data are as follows:

Measurement current (resistance modes)	medium, 500-1000 μ A
Input resistance	medium, ~1 M Ω
ADC resolution	12 bit

2.4.2 UIa as DI

This type of DI can be used together with transceivers of PNP type and relays with dry contact. The reference is the external current source (+C) and sensors and transmitters shall therefore be connected to +C.

The technical data are as follows:

DI input type	Sinking
Response time	Fast
Voltage	24 V (+C)
Input resistance	✓ signal < 12V: medium, ~1MΩ ✓ signal > 12V: low, < 20 kΩ
Guaranteed detect levels	✓ High ('1'): > 12 V ✓ Low ('0') < 5 V
Smallest detectable pulse width	4 ms

2.4.3 UIb as AI

UI type *b* in AI mode can be configured according to the following modes:

- ✓ Pt1000 (0...+100 $^{\circ}$ C)

The technical data are as follows:

Measurement current (resistance modes)	low, < 500 μ A
Input resistance	✓ signal < 12V: high, > 10 MΩ ✓ signal > 12V: low, < 15kΩ
ADC resolution	10-12 bit

2.4.4 UIb as DI

This type of DI can be used together with transceivers of PNP type and relays with dry contact. The reference is the external current source (+C) and sensors and transmitters shall therefore be connected to +C. The smallest detectable pulse is 20 ms.

The technical data are as follows:

DI input type	Sinking
Response time	Slow
Voltage	24 V (+C)
Input resistance	✓ signal < 2V: high, >10 MΩ ✓ signal > 2V: low, < 20 kΩ

2.4.5 UIc as AI

UI type *c* in AI mode can be configured according to the following modes:

- ✓ 0...10 V
- ✓ 800..1600 Ω (Pt1000, Ni1000 LG, Ni1000 DIN)
- ✓ 0..4000 Ω (Pt1000 ext, Ni1000 LG ext, Ni1000 DIN ext)

The technical data are as follows:

Measurement current (resistance modes)	low, < 500 μA
Input resistance	1 MΩ
ADC resolution	12 bit

2.4.6 UIc as DI

This type of DI can be used together with transceivers of NPN type and relays with dry contact. It is of sourcing input type and is designed with an internal supply of the DI. The reference is the controllers' GND.

The technical data are as follows:

DI input type	Sourcing (-GND)
Response time	Fast
Voltage, open input	6.5 V
Guaranteed detect levels	✓ Open ('0') ✓ > 4V ✓ Closed ('1') ✓ < 2 V
Smallest detectable pulse width	4 ms

2.4.7 UId as AI

UI type *d* in AI mode can be configured according to the following modes:

- ✓ 0...10 V
- ✓ 0...20 mA
- ✓ 800..1600 Ω (Pt1000, Ni1000 LG, Ni1000 DIN)
- ✓ 0..4000 Ω (Pt1000 ext, Ni1000 LG ext, Ni1000 DIN ext)

The technical data are as follows:

Measurement current (resistance modes)	low, < 500 μA
Input resistance	1 MΩ
ADC resolution	12 bit

2.4.8 UId as DI

UI type d as DI has the same specifications as UI type c as DI.

3 Outputs

3.1 Analogue outputs

3.1.1 AOa

AO type *a* can be configured according to the following mode:

- ✓ 0...10 V

The technical data are as follows:

Output resistance	< 0.5 Ω
Resolution	12 bit
D/A generation type	PWM
Output short tolerant	Yes
24 V tolerant	No
Max load	5mA

3.1.2 AOb

AO type *b* can be configured according to the following modes:

- ✓ 0...10 V

- ✓ 0...20 mA

The technical data are as follows:

Output resistance	3 Ω
Resolution	12 bit
D/A generation type	DAC
Output short tolerant	Yes
24 V tolerant	No
Max load	1mA

3.1.3 AOC

AO type *c* can be configured according to the following mode:

- ✓ PWM (0...100 %)

The technical data are as follows:

Output resistance	< 6 Ω
Resolution	$\geq$ 10 bit
D/A generation type	PWM
Output short tolerant	Yes
24 V tolerant	No
Max load	10mA

3.2 Digital outputs

3.2.1 DOa

DO type *a* is a 24V DC sourcing type.

The technical data are as follows:

Output type	Sourcing
Voltage	24 V DC
Max current load	See the product manual



Note! DO as type *a* is only used in older products at Regin.

3.2.2 DOb

DO type *b* is a 24V AC/DC sinking MOSFET type.

The technical data are as follows:

Output type	Sinking MOSFET
Voltage	24 V AC/DC
Max current load	See the product manual

3.2.3 DOc

The technical data are as follows:

Output type	Relay
Voltage	230 V AC
Max current load	See the product manual

3.2.4 DOd

The technical data are as follows:

Output type	Triac
Voltage	230 V AC
Max current load	See the product manual

3.3 Universal outputs

Universal outputs on the controller can be individually configured as either analogue outputs, using any of the analogue outputs, or digital outputs.

The default configuration of a UO is as a DO.

3.3.1 UOa as AO

UO as type *a* configured as AO can be configured according to the following mode:

✓ 0...10 V

The technical data are as follows:

Output resistance	Max 1 Ω
Resolution	≥ 10 bit
D/A generation type	PWM
Output short tolerant	Yes
24 V tolerant	Yes
Sinking capacity	No

3.3.2 UOa as DO

The technical data are as follows:

Output type	Sinking MOSFET
Voltage	24 V AC/DC
Output resistance	100 m Ω
Over-current protected	No
Over-temperature protected	No

3.3.3 UOb as AO

UO as type *b* configured as AO can be configured according to the following mode:

✓ 0...10 V

The technical data are as follows:

Output resistance	Max 3 Ω
Resolution	12 bit
D/A generation type	PWM
Output short tolerant	Yes
24 V tolerant	Yes
Sinking capacity	Yes
Maximum output current	3 mA

3.3.4 UOb as DO

The technical data are as follows:

Output type	Sinking MOSFET
Voltage	24 V AC/DC
Maximum output current	2 A
Output resistance	Max 200 m Ω
Over-current protected	Yes
Over-temperature protected	Yes



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