

Intro

The Ramp generator JGA2003 is a universal control print with two digital inputs and two analogue outputs:

- Open input
- Close input
- Current output (4 ... 20 mA)
- Voltage output (0...5 V or 0...10 V max 100 mA).



Liability and warranty

Every JGA2003 is checked before sending for correct operation. Therefore Boutronic has a warranty period of 1 year.

The warranty expires if:

- The defect is caused by gross negligence or by improper installation
- Repairs and/or modifications to the JGA2003 without permission from Boutronic.

Boutronic is in no way liable for damage caused as a direct or indirect consequence by the use of the JGA2003.



For more information see: <http://www.boutronic.nl/producten>

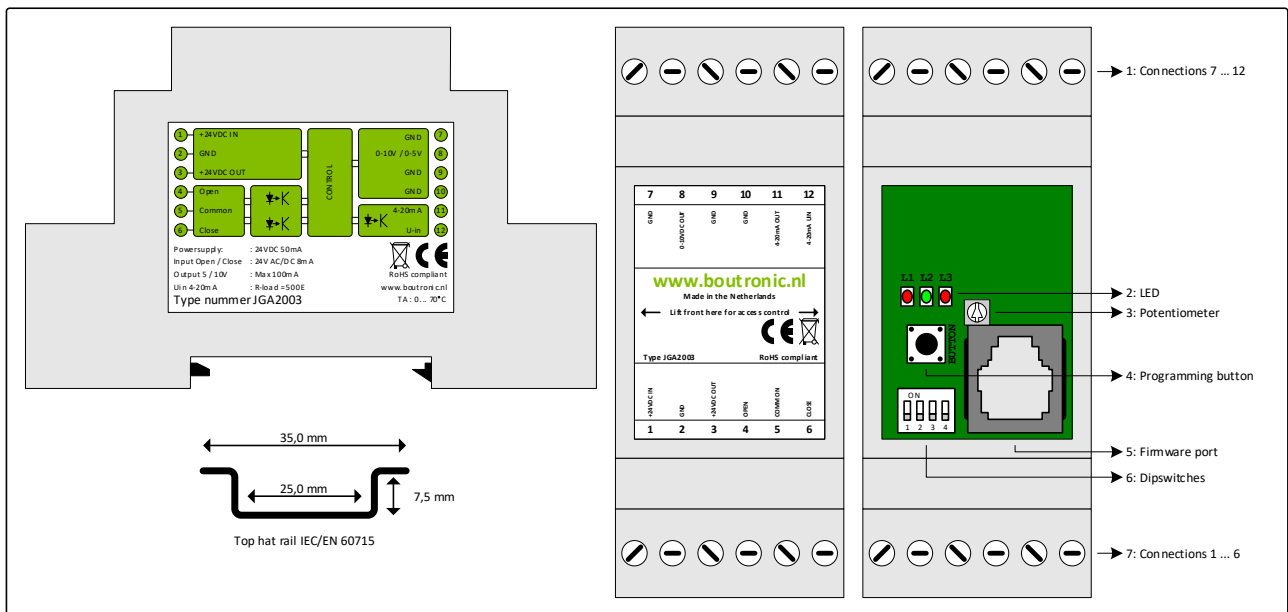
Manual JGA2003
March 2023
From software version 2.0a
www.boutronic.nl

Menu

INTRO	1
LIABILITY AND WARRANTY	1
MENU	2
CONNECTIONS	3
EXPLANATION	3
POWER SUPPLY INPUT	4
POWER SUPPLY OUTPUT	4
INPUTS: OPEN AND CLOSE	4
4 ... 20 MA OUTPUT	4
0 ... 5 OR 0 ... 10 V OUTPUT	4
CONNECTION EXAMPLE WITH INTERNAL OR EXTERNAL POWER SUPPLY	5
CHANGE SETTINGS	6
DRIVE TIME	6
CHANGE SETTINGS VIA BOUTRONICSTUDIO	6
SETTINGS	6
OPTIONS	7
DIP-SWITCH 1: MAXIMUM OUTPUT VOLTAGE	7
DIP-SWITCH 2: START-UP CURRENT AND VOLTAGE OUTPUT	7
DIP-SWITCH 3: FAST TO MINIMUM OUTPUT LEVELS	7
DIP-SWITCH 4: MINIMUM AND MAXIMUM CALIBRATE LEVELS	7
CALIBRATING OUTPUT LEVELS	8
CALIBRATING VIA PROGRAMMING BUTTON	8
CALIBRATING VIA FIRMWARE PORT	9
TECHNICAL SPECIFICATIONS	10
GENERAL	10
POWER	10
INPUTS	10
OUTPUTS	11
ADDITIONAL FILTERING	11
MEASUREMENTS	12
SOFTWARE VERSIONS	12
CHECKING THE SOFTWARE VERSION	12

Connections

In the figure below, the JGA2003 is shown schematically:



Explanation

Nr	Unit	Description
1	Connection 7 ... 12	Connections for the current and voltage outputs.
2	LED's	L1: When this LED is on, the analog outputs are increased L2: When this LED is on, the analog outputs are decreased. L3: This LED is on when the button is pressed
3	Potentiometer	With this potentiometer you can set the total drive time for the outputs going from minimum to maximum output level (30 ... 240 sec)
4	Programming button	Programming button to change program settings.
5	Firmware port	Connection to PCB (with a Boutronic dongle) for firmware update or programming settings
6	Dipswitches	DIP 1: Maximum output voltage DIP 2: Start-up voltage and current output DIP 3: Fast to minimum output levels DIP 4: Minimum and maximum calibrate levels See chapter ' Options '
7	Connection 1 ... 6	Connection for supply and open/close inputs

Power supply input

The power supply for the JGA2003 is 20 ... 30VDC or 20 ... 24 VAC, internally single-sided rectified and feeds the internal controller and the voltage output. Taking into account that one of the AC is connected to the GND and that the voltage output functions with respect to the GND.

Power supply output

The power out is the same as the power input (single-sided rectified and with capacitor buffered) and has an internal resettable fuse. This power supply can be used to power the 4... 20 mA output.

Inputs: Open and Close

Inputs for driving the output signals are optically separated. They have a separate COMMON connection. They can be driven by 10 ... 30 VAC/DC (5 ... 20 mA).

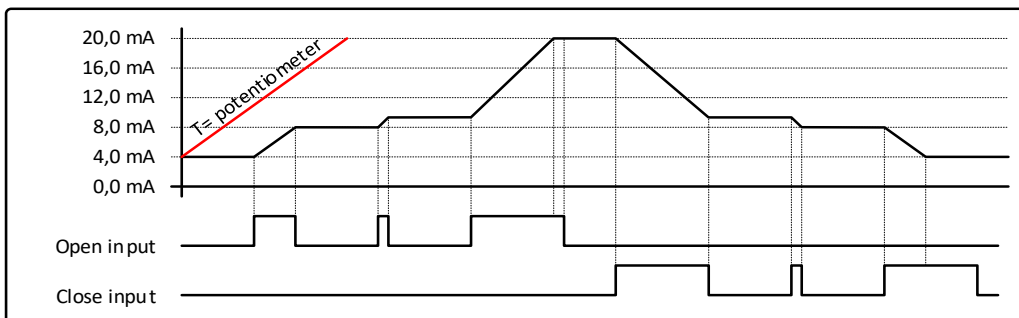
OPEN: Increase output signal(s)

CLOSE: Decrease output signal(s)

When the inputs are driven by a triac, the input current can be too low for correct functioning. In this case use a relay to drive the inputs.

4 ... 20 mA output

The 4 ... 20 mA output is optically isolated. In this way, a connection can easily be made with a system that has a different supply potential than the JGA2003. The 4 ... 20 mA output is increased or decreased through the open and close inputs. The total run time from 4 ... 20 mA can be set from 30 to 240 seconds with the potentiometer. The potentiometer is set to 135 seconds by default.

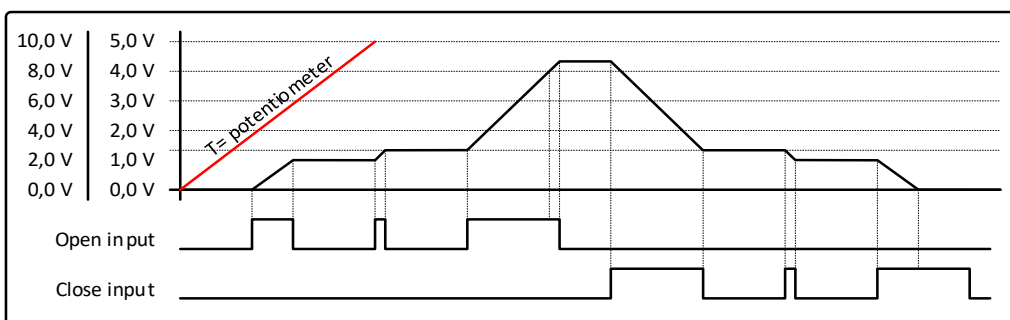


0 ... 5 or 0 ... 10 V output

The voltage output can be set through DIP-switch 1 whether the output voltage is 0 ... 5 V or 0 ... 10 V.

The voltage output is increased or decreased through the open and close input.

The total run time from 0 ... 5 or 0 ... 10 V can be set from 30 to 240 seconds with the potentiometer. The potentiometer is set to 135 seconds by default.



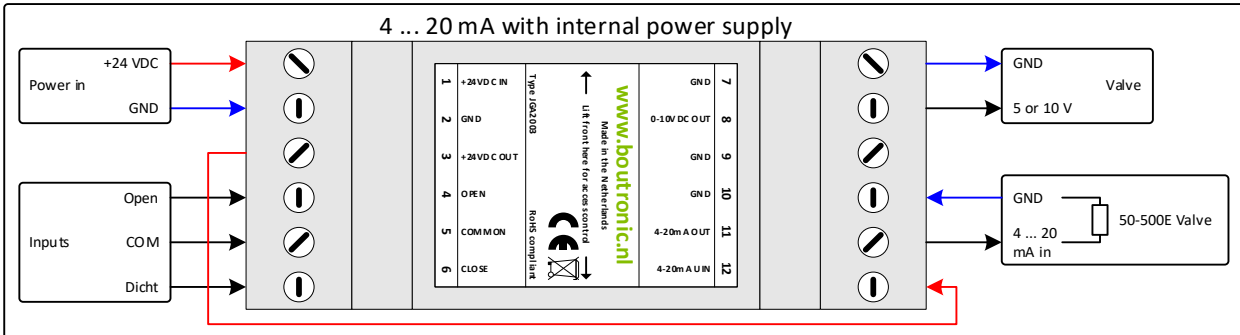
Connection example with internal or external power supply

In the following chapter you can see several examples of connecting the JGA2003.

Internal power supply

Below is the connection diagram using the internal power supply. Due to this method, there is no optical separation between the JGA2003 and the external system to which the 4 ... 20 mA is connected.

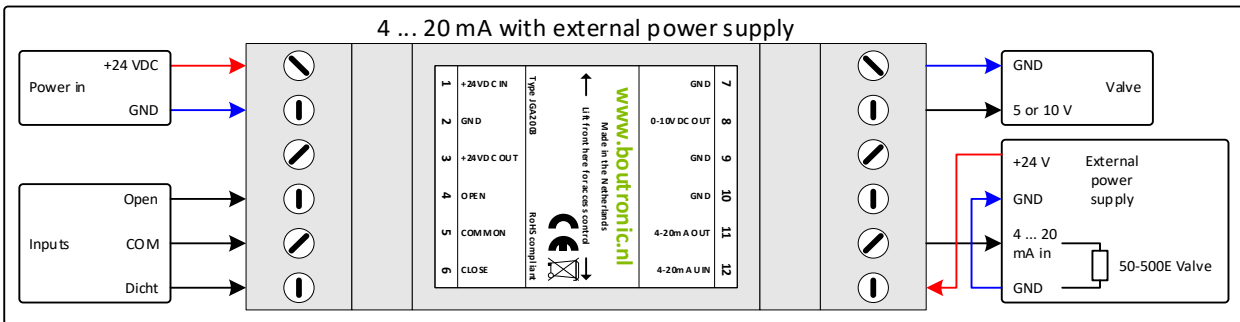
The 0 ... 5 V or 0 ... 10 V has no optical isolation.



External power supply

Below is the connection diagram using the external power supply. Due to this method, there is an optical separation between the JGA2003 and the external system to which the 4 ... 20 mA is connected.

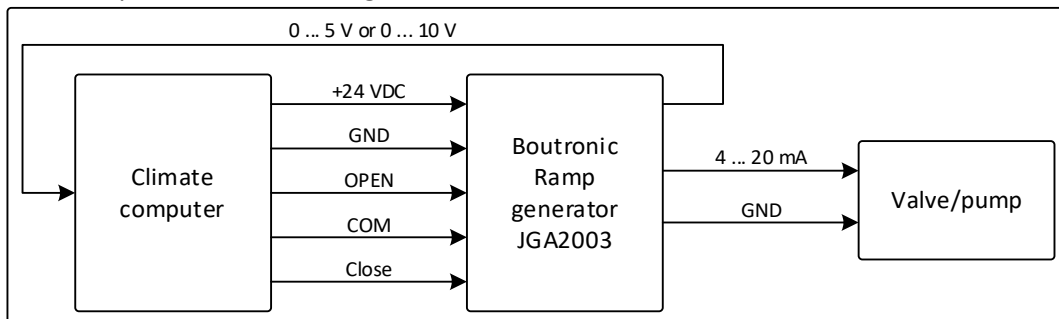
The 0 ... 5 or 0 ... 10 V has no optical isolation.



Control with climate computer with feedback

The JGA2003 can be used to convert the OPEN and CLOSE control from a climate computer to a 4 ... 20 mA signal. For a feedback signal the JGA2003 can send a voltage back to the climate computer (0 ... 5 V or 0 ... 10 V max 100 mA).

This example is shown in the figure below:



Change settings

This chapter describes how you can change the settings.

Drive time

You can set the total drive time of the outputs (0 ... 100%) with the potentiometer. When you turn the potentiometer CCW you set the minimum time (30 sec), when you turn the potentiometer CW you set the maximum time (240 sec).

As of version 2.0a (from March 2023) you can set the drivetime via the software.

See chapter 'Change settings via BoutronicStudio' for more information.

Change settings via BoutronicStudio

As of version 2.0a it is possible to connect the JGA2003 to the computer and access the settings with the BoutronicStudio.

For this you'll need BoutronicStudio version 3.0e or higher. You can download this from the website of Boutronic. (<https://www.boutronic.nl>)

To use this, you'll connect the JGA2003 to the computer with the Boutronic USB dongle. Next you'll go to the BoutronicStudio and setup this to connect to the JGA2003. When detected, you'll see several tab pages with the settings.



For more information about connecting a device to the BoutronicStudio see the manual of the BoutronicStudio.

When the BoutronicStudio doesn't detect the JGA2003, check the following points:

- Software version JGA2003 lower than v2.0a
(See chapter softwareversions for more information)
- Software version BoutronicStudio lower than v3.0e.
(See the title of the BoutronicStudio for the version number)

Settings

The following settings are available in the JGA2003:

Setting	Description	Min	Max	Default
Drivetime current output ¹	Drivetime used by the current output to drive from 0% to 100%.	0 sec	240 sec	0 sec ¹
Drivetime voltage output ¹	Drivetime used by the voltage output to drive from 0% to 100%.	0 sec	240 sec	0 sec ¹
Start-up value current output ²	This value is set by the current output when the JGA2003 starts up.	0,0 %	100,0 %	0,0 %
Start-up value voltage output ²	This value is set by the voltage output when the JGA2003 starts up.	0,0 %	100,0 %	0,0 %

1. When the drivetime is set to 0 sec, the potentiometer drivetime is used.
2. This settings only applies when DIP-switch 2 is set.

Options

Via the DIP-switches you can enable or disable several options.

DIP-switch 1: Maximum output voltage

The maximum output voltage can be set with DIP-switch 1:

- Set to off, the maximum output voltage is 5 V.
- Set to on, the maximum output voltage is 10 V.

DIP-switch 2: start-up current and voltage output

When the JGA2003 starts up the output value is set standard to 4mA and 0V.

This can be changed as followed:

- Set DIP-switch 2 to on. (activate memory)
- As soon as the outputs have the desired output levels you must activate the OPEN and CLOSE inputs simultaneous (the Open and Close LED both turn on).
- As soon as the LED's Open and Close turn off the value is being stored.
- When the JGA2003 starts up the outputs are as stored.

DIP-switch 3: fast to minimum output levels

When DIP-switch 3 is on, the outputs will drop from maximum to minimum in 1 second.

This function can be set as followed:

- Set DIP-switch 3 to on and leave it in this position. (activate)
- Activate both Open and Close inputs to set to minimum levels. As soon as the LED's Open and Close turn off and on, the value is at the minimum level.

*Note: When DIP-switch 2 is **also** activated, the saved level is set on start-up. (The value of the output cannot be saved anymore)*

DIP-switch 4: Minimum and maximum calibrate levels

When you set DIP-switch 4 to on you can (by the menu of the USB port with a special Boutronic Dongle) set the maximum output level for calibrating

- Current: Normally the calibrate level for min (4 mA) are between 2 mA and 6 mA and the calibrate level max (20 mA) are between 18 mA and 21 mA. When DIP-switch 4 is activated the calibrate levels can be set between 1 mA and 21 mA.
- Voltage: Normally the calibrate level for min (0 V) are between 0 V and 1 V and the calibrate level max (5/10 V) are between 4 ... 6 or 9 ... 11 V. When DIP-switch 4 is activated the calibrate levels can be set between 0 and 5/10 V.

Calibrating output levels

By default the output levels are calibrated to 4 and 20 mA and 0 and 10V.

You can calibrate the output levels again. This can be done by the programming button or via de firmware port.

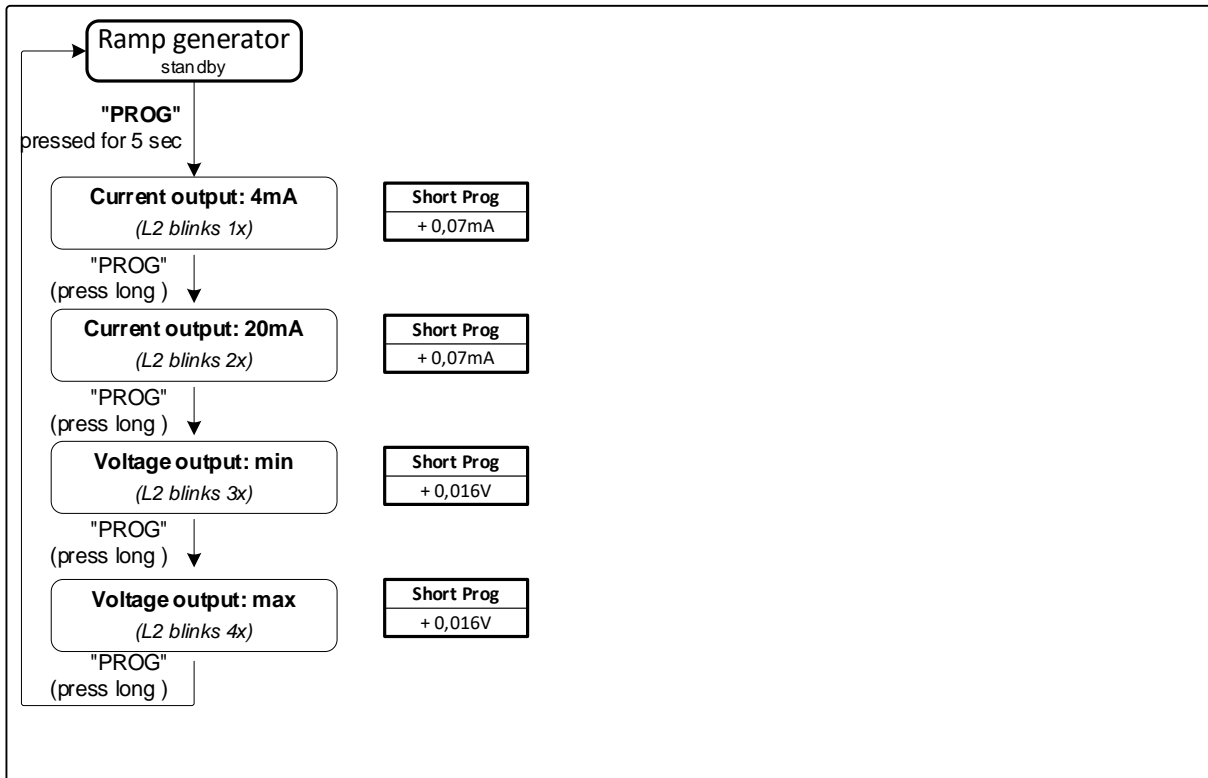
Calibrating via programming button

Press the Programming button switch and keep this for 5 seconds until all LED's turn on. Then release the switch and L2 will start blinking. The output will be driven with the current setting.

- By pressing shortly the Programming button you'll increase the value.
(When the value exceeds the maximum value, the value will be set the minimum value)
- By pressing the Programming button long (until all LED's turn on) you'll store the current value in the memory. (This setting will be remembered after power loss).

Note: If you don't press the Programming button for more than 1 minute, you will leave the menu automatically.

Menu structure



Calibrating via Firmware port

You can change the settings with the USB port and the Boutronic Studio. The Boutronic Studio can be downloaded from the website www.boutronic.nl

1. Connect the JGA2003 to your PC by a Boutronic USB dongle.
2. Open the Boutronic Studio 2 with the tab 'Terminal', set the baud rate to 9600 and connect.
3. Click on the black screen with the mouse and press three times the + (+++)

The following text is given on the screen:

```
*** CONFIGMENU ***
```

```
I OUT 4mA
```

The current output will be set to 4 mA.

With the '+' key the output level will be increased

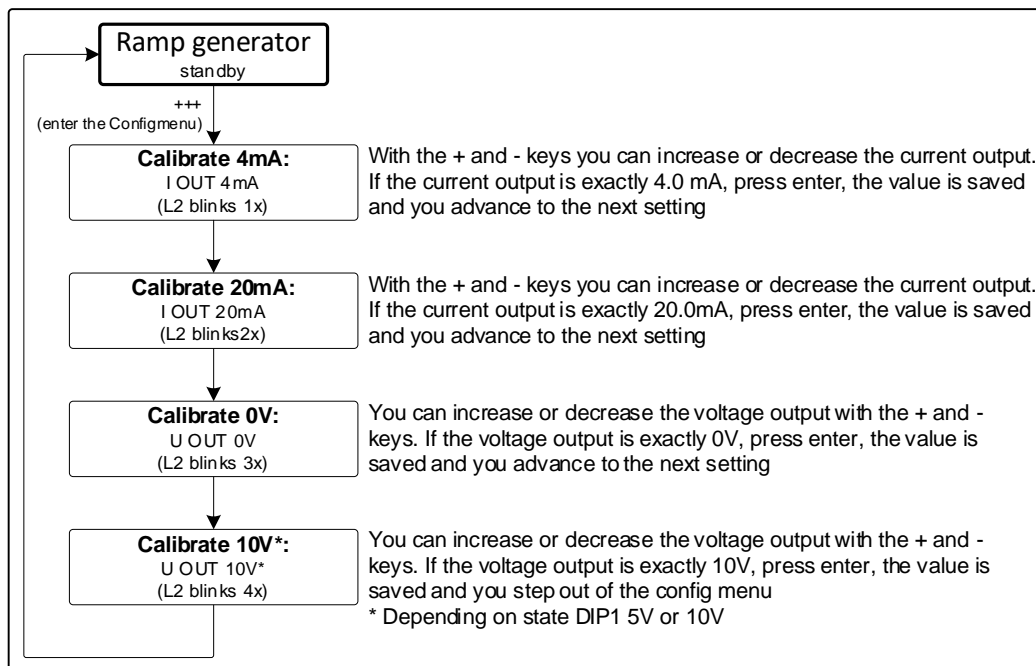
With the '-' key the output level will be decreased

With the 'enter' key the value will be stored.

With the 'esc' key the programming will be stopped

With the 'F' key you will set all setting to factory levels

With the 'T' key you will start the test mode (Only for factory use)



4. When you press the 'enter' switch you confirm the set value and it will be stored:
SAVED
5. You can change the next settings
6. After the last setting you'll leave the menu. When there isn't a key pressed for over a minute you'll leave automatically the menu, you'll see:
RUN

Technical specifications

General

Description	Value	Unit	Remarks
Measurement	90 x 36 x 58	mm	L x B x H
Mounting	DIN-rail (Top hat rail)		IEC/EN 60715
Material	Plastic ABS		
Weight	80	gram	
Temperature storage	-20 ... +60	°C	
Temperature operational	0 ... +55	°C	
Relative humidity	10 ~ 95% RH @ 40°C, non-condensing		
Protecting range	IP20		

Power

Description	Min	Typ.	Max	Unit	Remarks
Power in	20	24	30	VDC	
	20	24	24	VAC	1
	-	50	-	mA	
Power out	20	-	30	VDC	2
	-	-	150	mA	3

1. Note: one of the phases is directly connected to the GND.
2. This voltage is equal to the power supply in (single-sided rectified and with capacitor buffered)
3. With a resettable fuse

Inputs

Open and close inputs

Description	Min	Typ.	Max	Unit	Remarks
Separation	-	-	3750	Vrms	Optical
Input voltage	10	24	30	VAC/DC	
Input current	5	15	20	mA	

Outputs

Description	Min	Typ.	Max	Unit	Remarks
Increase and decrease time with potentiometer	30	135	240	sec	
Increase and decrease time with BoutronicStudio	10		240	sec	1

- By default the JGA2003 uses the potentiometer.

Current output

Description	Min	Typ.	Max	Unit	Remarks
Separation	-	-	2500	Vrms	Optical
Output current	4	-	20	mA	
Input voltage	20	24	30	VDC	
Resolution		0,07		mA/step	
Impedance	50	-	500	Ω	

Voltage output

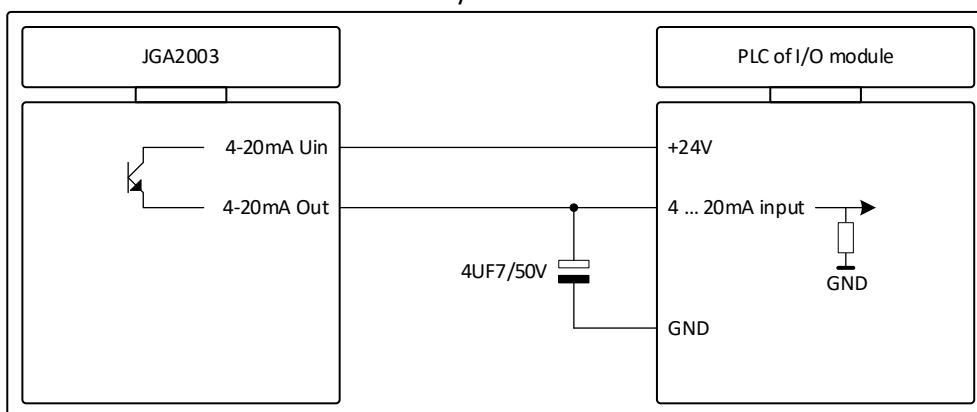
Description	Min	Typ.	Max	Unit	Opmerkingen
Output voltage	0,1	-	6,0	V	DIP-switch 1 off
	0,1	-	10,5	V	DIP-switch 1 on
Resolution	-	0,016	-	V/stap	
Output current	-	-	100	mA	1

- When the 5V option, the output level can be briefly higher than 5V.
(During start-up or calibration)

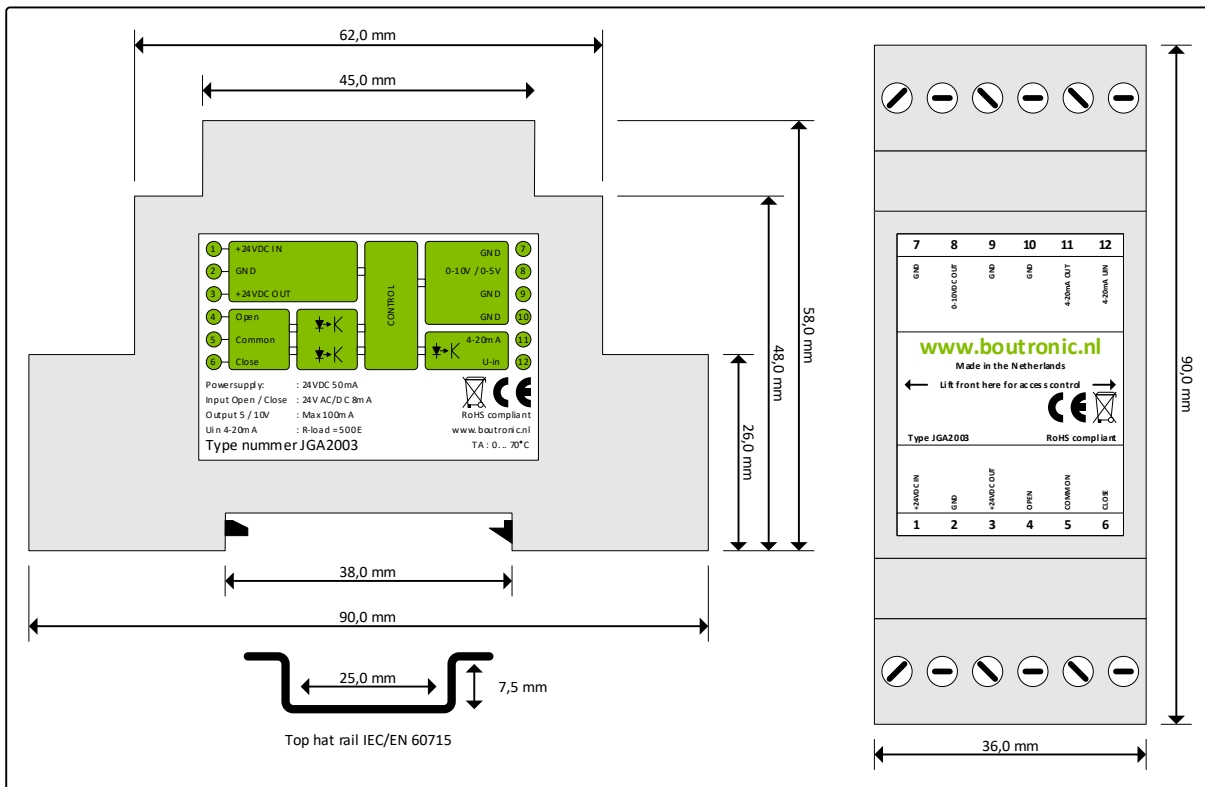
Additional filtering

If additional filtering is required, an extra capacitor (ELKO) of +/- 4UF7/50V can be placed between the input signal and the GND (minus) of the PLC or the I/O module.

This connection is shown schematically below.



Measurements



Software versions

Software version	Date	Changes
v1.0a	15-07-2019	First version
v1.0b	02-08-2019	Changing for fabric test
v1.0c	16-11-2020	Optimising handling of AC inputs
v1.0d	30-07-2021	When calibrating with push button, driving the output optimized
v2.0a	06-03-2023	New hardware with new type microprocessor and EMI filtering

Checking the software version

You can check the software version by looking at the LED's when powering the JGA2003. When the JGA2003 is energized, all 3 LED's will light up. Then the LED's go out 1 by 1.

Software version	Order
v1.0a	L1, L2, L3
v1.0b	
v1.0c	L3, L2, L1
v1.0d	
v2.0a and higher	L2, L1, L3