

Intro

The Currentsplitter JGA2006 is a universal control unit for splitting a 4 ... 20 mA signal to 2 optical isolated 4 ... 20 mA signals and a voltage output 0 ... 5 V or 0 ... 10 V.

With the JGA2006 you can easily split a 4 to 20 mA signal to 2 different systems.

The supply for the JGA2006 can be 20 to 24 VAC or 20 to 30 VDC.

The following settings can be viewed and changed with the switch, DIP-switches and potentiometer. They also can be viewed and changed with the PC and the Boutronic Studio via the Boutronic USB dongle:

- Voltage output 5 or 10V
- Acceleration and deceleration of the outputs
- Calibrating of the in- and outputs

The JGA2006 is for DIN-rail mounting.



Liability and warranty

Every JGA2006 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 JGA2006 without permission from Boutronic.

Boutronic is in no way liable for damage caused as a direct or indirect consequence by the use of the JGA2006.

Manual JGA2006 Current Splitter
May 2023
From software version 1.0d

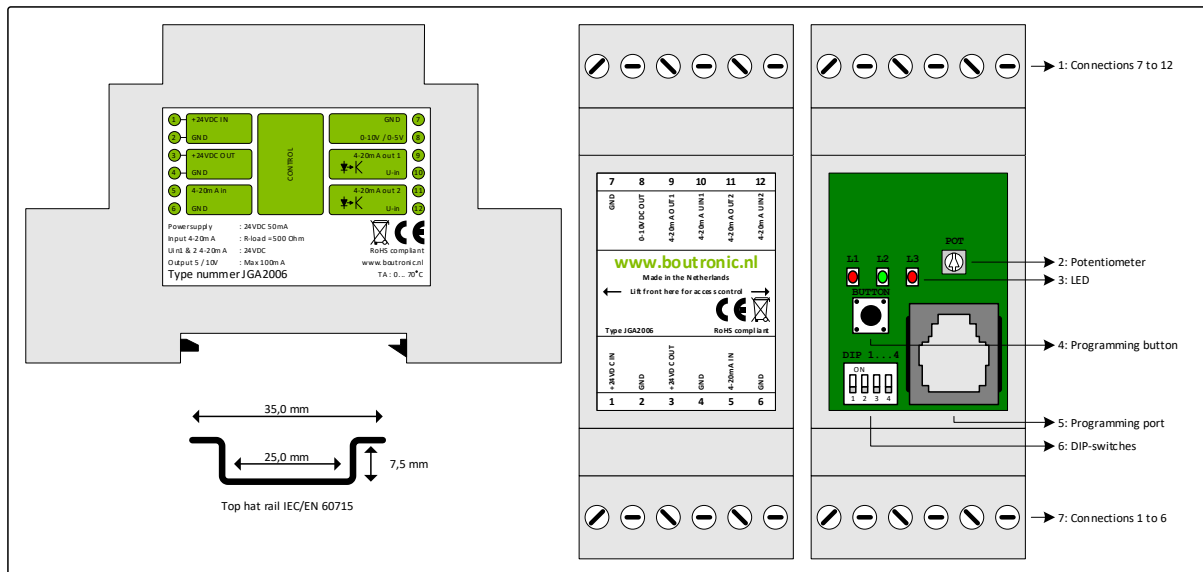
Boutronic B.V.
Edisonstraat 24
2691GT 's-Gravzande
www.boutronic.nl

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Connections

In the figure below, the JGA2006 is shown schematically:



Nr	Unit	Description
1	Connection 7 ... 12	Connection 7 ... 12, see front for type of connections
2	Potentiometer	With this potentiometer you can set the total drive time for the outputs going from minimum to maximum output level (0 ... 25 sec)
3	LED's	L1: Calibrating outputs L2: When this LED is on, the analog outputs are increasing or decreasing. L3: This LED is on when the button is pressed
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	DIP-switches	DIP-switch 1: Output voltage 0 ... 5 or 0 ... 10 V DIP-switch 2: reserved DIP-switch 3: Time with potentiometer or software DIP-switch 4: Minimum and maximum calibrate levels See chapter change settings
7	Connection 1 ... 6	Connection 1 ... 6, see front for type of connections

Power supply input

The power supply for the JGA2006 is internally single-sided rectified and feeds the internal controller and the voltage output. The power supply can be 24VDC or 24VAC, taking into account that one of the 24VAC is connected to the GND and that the voltage output functions with respect to the GND.

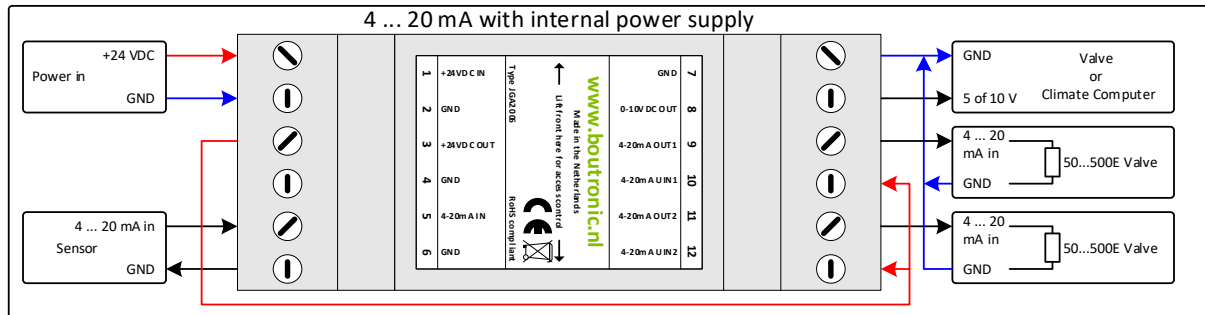
Power supply output

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 outputs.

Connection example

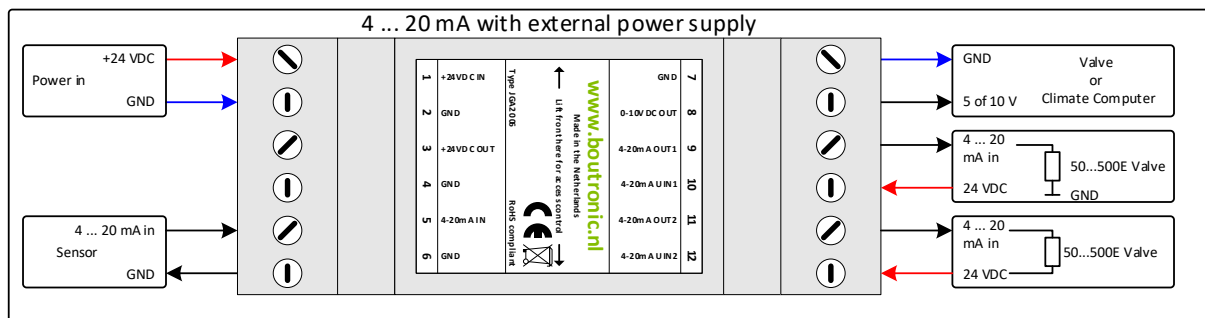
Internal power supply

Below is the connection diagram using the internal power supply for powering the 4 ... 20 mA outputs. Due to this method, there is no optical separation between the JGA2006 and the external systems to which the 4 ... 20 mA is connected. The 0 ... 5 V or 0 ... 10 V has no optical isolation.



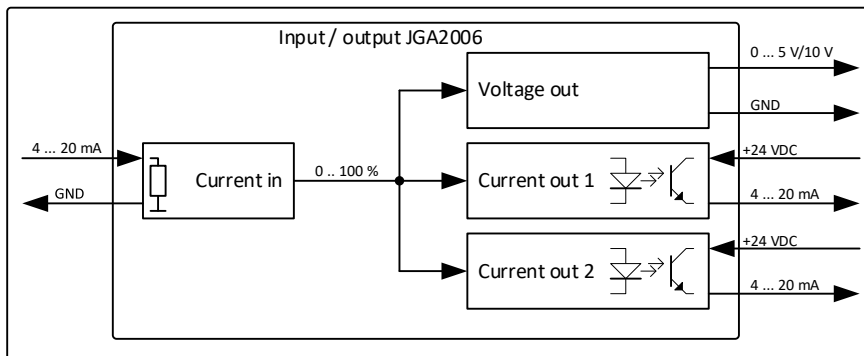
External power supply

Below is the connection diagram using an external power supply for powering the 4 ... 20 mA outputs. Due to this method, there is an optical separation between the JGA2006 and the external system to which the 4 ... 20 mA is connected. The 0 ... 5 or 0 ... 10 V has no optical isolation.



Global overview

Below is the connection diagram with a explanation overview.



Current input

A signal of 4 ... 20 mA is applied to the current input. This signal is read and converted to a 0 ... 100% value. If the current input is less than or equal to 4 mA, the JGA2006 will limit the value to 0%, if the current input is greater or equal than 20 mA, the JGA2006 will limit the value to 100%.

Note: the maximum current that may be applied to the current input is 30 mA.

It's possible to calibrate the input to different levels. See chapter 'Calibrate' for more information

Voltage output

The voltage output will control the output in response to the measured input signal.

The output voltage is scaled between 0 ... 5 V or 0 ... 10 V

DIP-switch 1 to off: the output voltage is 0 ... 5 V

DIP-switch 1 to on: the output voltage is 0 ... 10 V

Example: If the current input measures a signal of 8 mA, this is converted to a value of 25%.

The voltage output will also go to 25%. If DIP-switch 1 is set to off, the voltage output will become 1.25 V. If DIP-switch 1 is on, the output voltage will be 2.5 V.

Note: The maximum load of the voltage output is 100 mA.

Choose maximum voltage

You can easily change the maximum output voltage with DIP1. By setting DIP1 to OFF the output voltage will be 0 ... 5 V. When DIP1 is set to ON, the output voltage will be 0 ... 10 V.

Current outputs

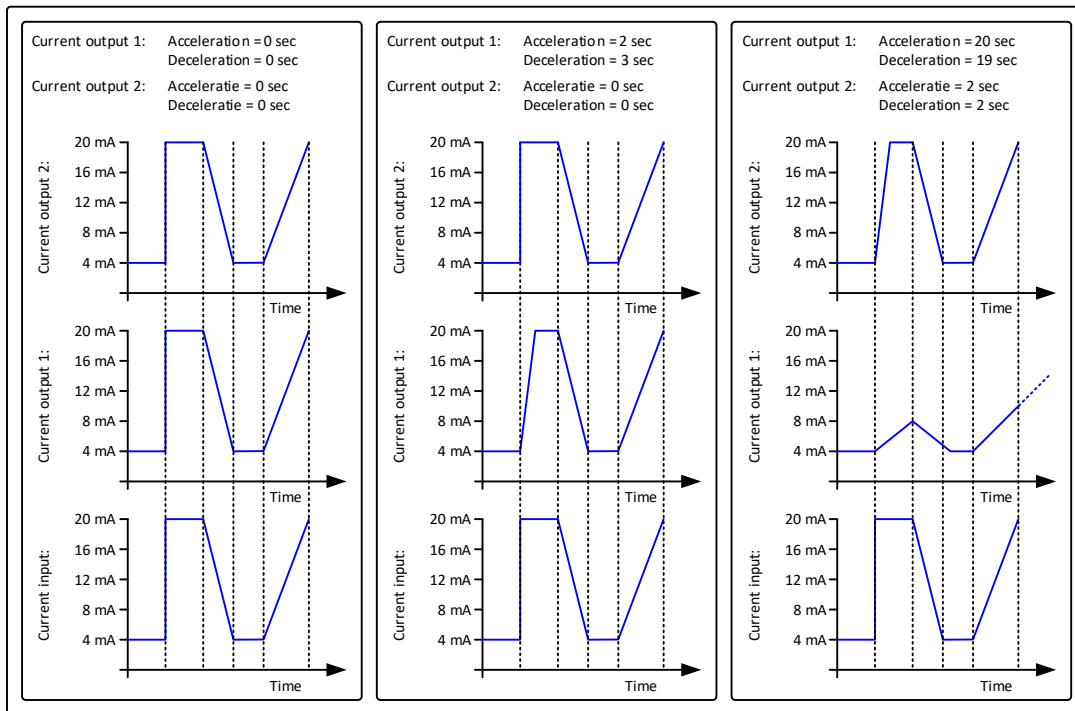
The current outputs will adjust according to the measured input signal. The value is scaled between the minimal (4 mA) and the maximal value (20 mA). The minimal and maximal value can be calibrated (See chapter Calibrate).

The current outputs will follow the measured input signal exactly with the set delays.

Output delay

The delay with which the current outputs and voltage output run to the desired value can be determined by the potentiometer (DIP-switch 3 on off) or by software setting (DIP-switch 3 to on). The speed is defined by the time from the minimum value to the maximum value. This can be set from 0 to 25 seconds through the potentiometer or from 0 to 6000 seconds with the software settings.

Below is a schematic example for the current outputs, the same can be set for the voltage output.



Change settings

The settings of the JGA2006 can be changed in two ways:

1. With the potentiometer, the DIP-switches and the programming button
2. With the USB port of the PC in combination with the Boutronic USB dongle.

In the next chapters the changing of the settings is explained.

Potentiometer

You can set the total drive time of the outputs (0 ... 100%) with the potentiometer. When turning the potentiometer CCW you set the minimum time to 0 sec, when turning the potentiometer CW you set the maximum time to 25 sec.

(With software programming the time is between 0 and 6000 seconds)

DIP-switches

4 DIP-switches are available on the JGA2006:

	OFF	ON
DIP-switch 1	Voltage output from 0 ... 5 V	Voltage output from 0 ... 10 V
DIP-switch 2	Reserved	Reserved
DIP-switch 3	Use potentiometer for drive time	Use software setting for drive time
DIP-switch 4	Minimum and maximum calibration values are limited	Minimum and maximum calibration values are not limited

Programming button

With the programming button on the PCB you can calibrate the output signals. See chapter Calibrate for more information.

Terminal or BoutronicStudio

You can change the settings with the USB port and the Boutronic Studio. The BoutronicStudio can be downloaded from our website:

www.boutronic.nl/producten/boutronic_studio_instellen_via_windows

Setup

To connect the JGA2006 to the PC follow the next steps:

1. Connect the JGA2006 to your PC by a Boutronic USB dongle
2. Open the Boutronic Studio and click on the COM-port on the left of the screen on which the JGA2006 is connected.
After the tabs are loaded, click on the tab Terminal.
3. Set the baud rate to 9600 and press **Connect**. (When the baud rate is not changeable, click on **Disconnect**, then select 9600 and press **Connect**).
4. Click on the black screen with the mouse and press three times the + (+++)

When connecting to the JGA2006 with another Terminal program the settings are:

- Baudrate: 9600 BAUD
- Databits: 8
- Stopbits: 1
- Parity: None

Menu

--- MENU ---

1. Voltage output
2. Current output 1
3. Current output 2
4. Current in
- D. Debuglevel
9. Factory defaults
- T. Factory test

Navigation

By pressing the first character on the row, you can select the menu.

With the **ESC** button you can go back one level.

By pressing the **Enter** you confirm the value.

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

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

If a value must be given, you can use the number 0 to 9.

When there is no activity longer than 25 seconds, the menu will automatically close.

1. Voltage output

In this menu the calibration and the in- and decrease speed for the voltage output is set.

Value	Description	Range
U OUT 0 V ...	When 5V (DIP1 OFF) calibration value for minimum voltage output	0 ... 2 V (DIP4 OFF) 0 ... 5V (DIP 4 ON)
U OUT 5 V ...	When 5V (DIP 1 ON) calibration value for maximum voltage output	4 ... 6 V (DIP4 OFF) 0 ... 5 V (DIP4 ON)
U OUT 0 V ...	When 10V (DIP1 ON) calibration value for minimum voltage output	0 ... 4 V (DIP4 OFF) 0 ... 10V (DIP 4 ON)
U OUT 10V ...	When 10V (DIP 1 ON) calibration value for maximum voltage output	8 ... 11 V (DIP4 OFF) 0 ... 11 V (DIP4 ON)
Increase ... seconds	Time for voltage output to go from minimum to maximum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds
Decrease ... seconds	Time for voltage output to go from maximum to minimum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds

2. Current output 1

In this menu the calibration and the increase and decrease speed for the current output 1 is set.

Value	Description	Range
I OUT 4 mA ...	Calibration value for minimum current output 1	2 ... 6 mA (DIP4 OFF) 2 ... 21mA (DIP4 ON)
I OUT 20 mA ...	Calibration value for maximum current output 1	18 ... 21 mA (DIP4 OFF) 2 ... 21 mA (DIP4 ON)
Increase ... seconds	Time for current output 1 to go from minimum to maximum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds
Decrease ... seconds	Time for current output 1 to go from maximum to minimum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds

3. Current output 2

In this menu the calibration and the increase and decrease speed for the current output 2 is set.

Value	Description	Range
I OUT 4 mA ...	Calibration value for minimum current output 2	2 ... 6 mA (DIP4 OFF) 2 ... 21mA (DIP4 ON)
I OUT 20 mA ...	Calibration value for maximum current output 2	18 ... 21 mA (DIP4 OFF) 2 ... 21 mA (DIP4 ON)
Increase ... seconds	Time for current output 2 to go from minimum to maximum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds
Decrease ... seconds	Time for current output 2 to go from maximum to minimum (this time will only be used if DIP-switch 3 is on)	0 ... 6000 seconds

4. Current in

In this menu you can calibrate the input current.

	Description	Range
MIN	Calibration value for the minimal value of the current input. (Apply the desired current to the input)	0 .. 21 mA
MAX	Calibration value for the maximal value of the current input. (Apply the desired current to the input)	0 .. 21 mA

D. Debug level

This option is for factory use only.

9. Factory defaults

This option can set all programming values to factory values.

Value	Description
N. No	No values will be set to factory values
Y. Yes, without cal.	All values will be set to factory except the calibration values
A, Yes with cal.	All values and the calibration values will be set to factory

T. Factory test

This option is for factory test only.

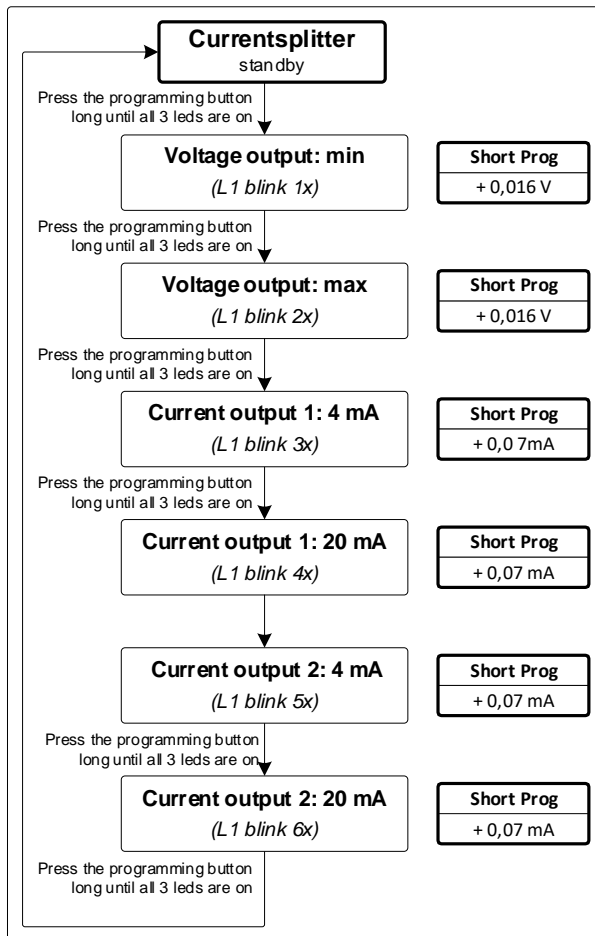
Calibrate

Calibrating the outputs can be done by Terminal menu or the BoutronicStudio and with the programming button on the PCB.

For calibrating via the Terminal or BoutronicStudio see chapter 'Terminal or BoutronicStudio'

Calibrating with the programming button

The outputs can be calibrated with the programming button. The diagram below describes how this is done.



If the Programming button is pressed short the calibration value can only be increased. When the value becomes to high the value return at the lowest level.

When using the programming button on the PCB you can only increase the value. When the value has reached the maximum value, the next step will be the minimal value. If you want to confirm the setting, press the button until all LED's are on.

Voltage output

In the factory the voltage output of all JGA2006 are calibrated on 0V, 5V and 10V. If you want to change the minimum or maximum value you can calibrate the output.

Calibrating the outputs can be done by following these steps:

1. Connect a voltage meter to the voltage output of the JGA2006.
2. Put the JGA2006 in calibrating mode.
3. The JGA2006 will start with the minimal value (0V).
4. Increase or decrease the value until you reached the desired value.
5. Confirm the value
6. The JGA2006 will send the maximal value.
(5V when DIP1 is OFF or 10V when DIP1 is ON).
7. Increase or decrease the value until you reached the desired value.
8. Confirm the value
9. Calibrating the voltage output is done.

Current output

In the factory the current outputs of all JGA2006 are calibrated on 4 mA and 20 mA. If you want to change the minimum or maximum value you can calibrate the output.

Calibrating the outputs can be done by following these steps:

1. Connect a current meter to the current output of the JGA2006.
2. Put the JGA2006 in calibrating mode.
3. The JGA2006 will start with the minimal value (4 mA).
4. Increase or decrease the value until you reached the desired value.
5. Confirm the value
6. The JGA2006 will send the maximal value (20 mA).
7. Increase or decrease the value until you reached the desired value.
8. Confirm the value
9. Calibrating the current output is done.

Current input

In the factory the current input of all JGA2006 are calibrated on 4 mA and 20 mA. If you want to change the minimum or maximum value you can calibrate the input.

Calibrating the input can be done by following these steps:

1. Go to the Terminal menu and select 4. Current in.
2. You will see MIN and the current setting.
3. Following you will see MIN with the current measured value.
4. Connect a current source to the input and apply the desired minimum current (e.g. 4 mA).
5. Wait until the value shown is stable.
6. Confirm by pressing Enter to save the value.
(If you want to skip this step, press 's')
7. Next you will see MAX and the current setting.
8. Following you will see MAX with the current measured value.
9. Connect a current source to the input and apply the desired maximum current (e.g. 20 mA).
10. Confirm by pressing Enter to save the value.
(If you want to skip this step, press 's')
11. Now the current input is calibrated.

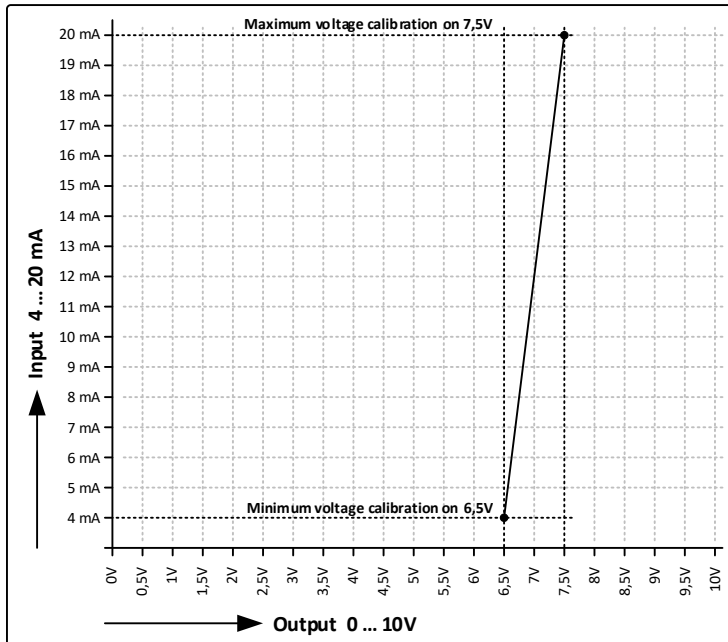
Please note:

When a lower current is measured than the set minimum, the minimal value will be send from the outputs. If the measured current is higher than the set maximum, the maximum value is send from the outputs.

Example window

In the example below the input 4 .. 20 mA is converted to an output from 6,5 to 7,5 V.

To realise this the minimum and maximum output voltage is calibrated to 6,5 and 7,5V.
For special calibration points DIP4 must be set to ON.



Technical specifications

General

Description	Value	Unit	Remarks
Measurement	90 x 36 x 57	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 ... +70	°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
	-	35	-	mA	
Power out	20	-	30	VDC	2
	-	-	150	mA	3

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

Inputs

Current input

Description	Min	Typ.	Max	Unit	Remarks
Input voltage	-	-	30	VDC	
Input current	0	4..20	30	mA	
Input impedance		500		Ω	

Outputs

Current outputs 1 and 2

Description	Min	Typ.	Max	Unit	Remarks
Separation	-	-	2500	V rms	Optical
Output current	2	-	22	mA	
Input voltage	20	24	30	VDC	
Resolution		0,07		mA/step	230 steps
Impedance	50	-	500	Ω	

Voltage output

Description	Min	Typ.	Max	Unit	Remarks
Output voltage	0,1	-	6,0	V	DIP1 OFF
	0,1	-	10,5	V	DIP1 ON
Resolution	-	0,019	-	V/step	
Output current	-	-	100	mA	1

1. With the 5V setting the voltage output can be higher than 5V for a very short period (when calibrating or on start-up)

Software versions

The following software versions are there for the CurrentSplitter JGA2006

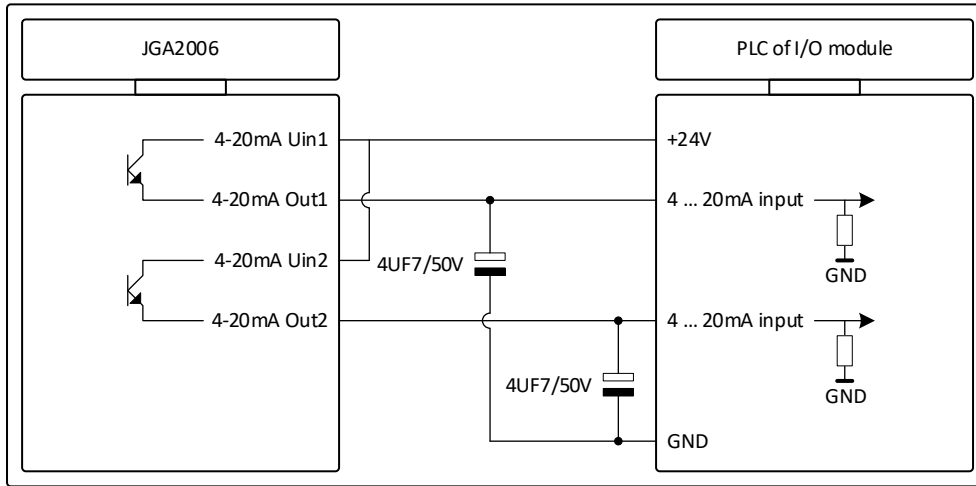
Versie	Datum	Wijzigingen
v1.0a	16-07-2019	First version
v1.0b	06-10-2022	I OUT 1 and I OUT 2 where switched in the software
v1.0c	30-11-2022	Calibrating the current input. When booting all LED's will go on then the LED's will go off in the following order: L1, L2 and L3.
v1.0d	03-05-2023	Current values higher & lower than the calibrated values are proportionally sent to the current output (up to the minimum and maximum values). At power up, the LEDs will turn on and off in the following order: L3, L2, and L1

Product shipped after the release date contain the according software version.

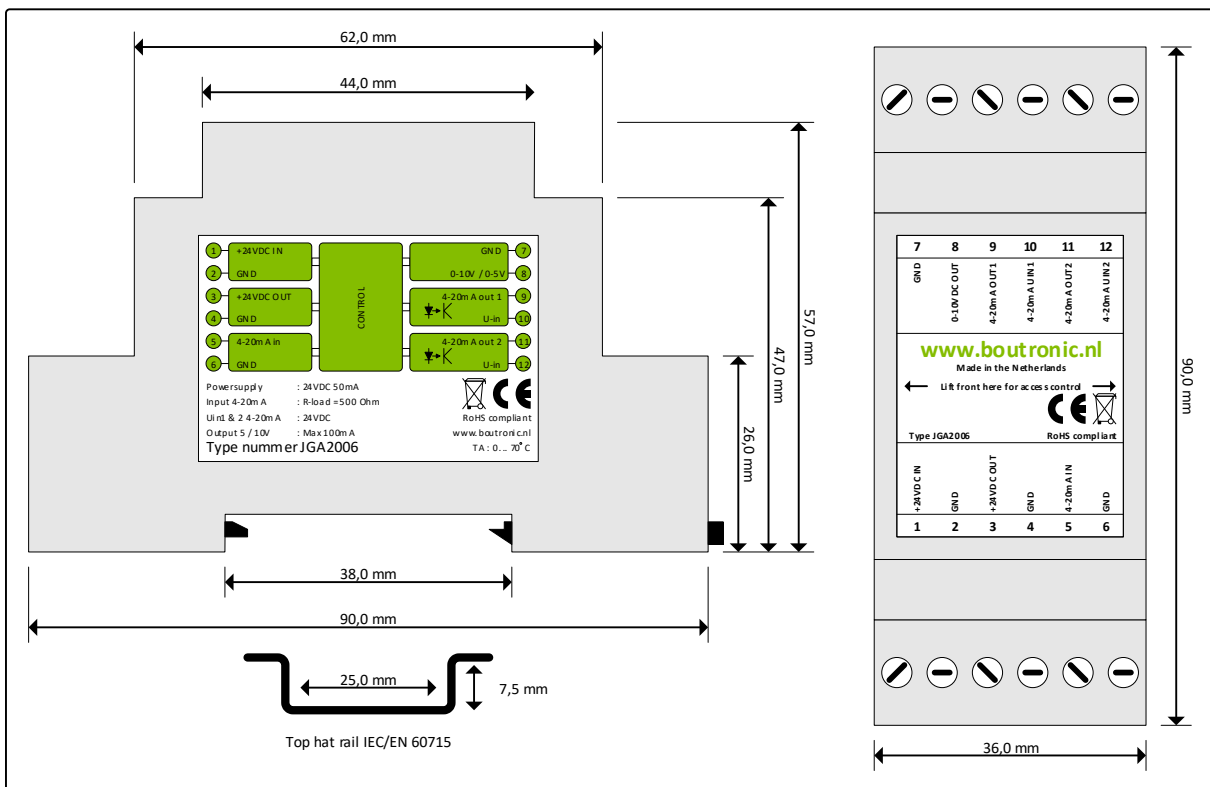
Additional filtering

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



Appendix A: Usage examples

In this appendix there are several usage examples explained.

0 to 20 mA --> 0 to 5V and 2x 4 to 20 mA

It's possible to adjust the input current by calibrating the input current. With this you can set the minimum input current to 0 mA and the maximum input current to 20 mA. The JGA2006 will now convert the 0 to 20 mA input to 0 to 5V and 2x 4 to 20 mA.

See chapter 'Calibrate' for more information.

By activating DIP1 the output voltage can be set to 0 to 10V.