Intro

De CurrentSinkDriver JGA2056 is a universal control print that converts a 4 ... 20 mA signal to a 0 … 10V* sink output.

The JGA2056 enables an easy way to convert a 4 … 20 mA signal to a signal that can be used to control external systems.

For e.g., with LED-drivers the 0 … 10V* signal is supplied by the LED-driver. This signal has to be altered and is then measured by the LED-driver. Depending on the voltage level the LED's will be dimmed.

The output of the JGA2056 is optically separated from the input.

The JGA2056 is powered by a power supply of 20 … 24 VAC or 20 … 30 VDC.

The following settings can be viewed and changed with the button, DIP-switches and potentiometer and via the USB port on the PC in conjunction with the Boutronic USB dongle:

- Acceleration and deceleration of the output signal
- Calibration of the in- and output signals

The JGA2056 sold in a DIN-rail housing.

* The 0 – 10 V outputs have a minimal voltage of 0,4 V

Liability and warranty

Every JGA2056 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 JGA2056 without permission from Boutronic.

Boutronic is in no way liable for damage caused as a direct or indirect consequence by the use of the JGA2056.

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

Manual JGA2056 Current Sink Driver
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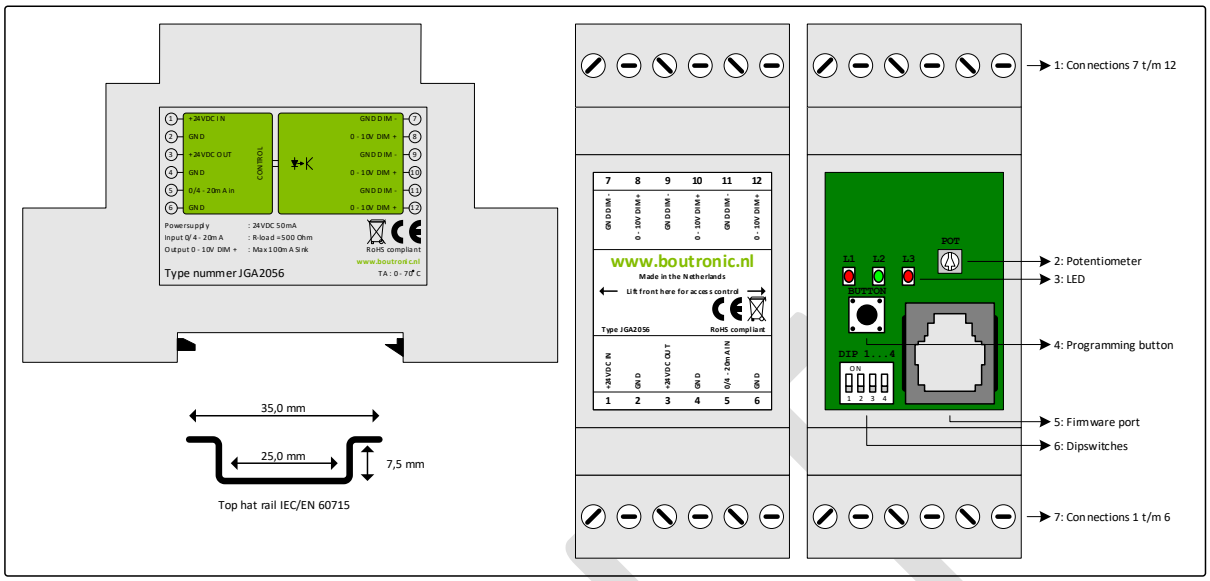
Connections

In the figure below, the JGA2056 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 JGA2056 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.

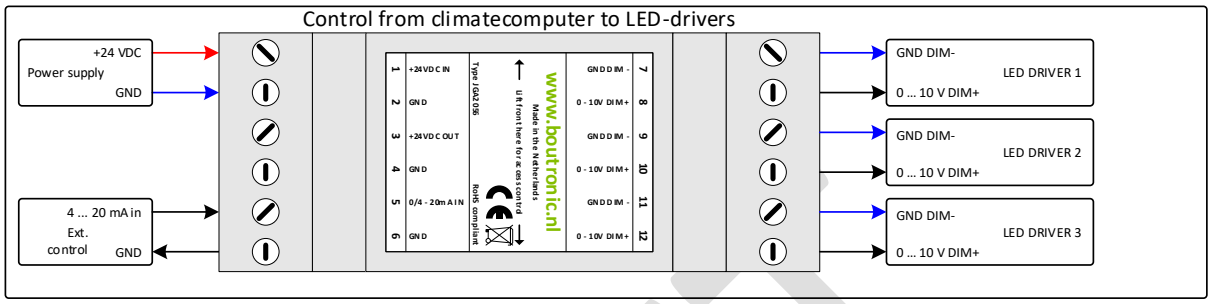
Power supply output

The power out is the same as the power input and has an internal resettable fuse.

Connection example

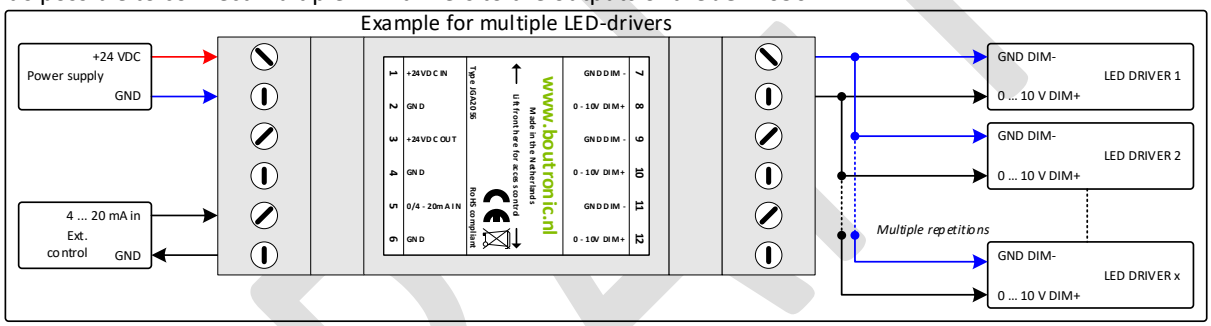
An example for the connections is given in the figure below. A more in-depth explanation of the connections can be found below.

- The climate computer sends a current of 4 … 20 mA. This current determines the amount that the LED-drivers have to be dimmed, this signal will be connected to the input of the JGA2056.
- The output will send a voltage of 0 … 5V or 0 … 10V to the LED-drivers



Connecting multiple LED-drivers per output

It's possible to connect multiple LED-drivers to the outputs of the JGA2056.

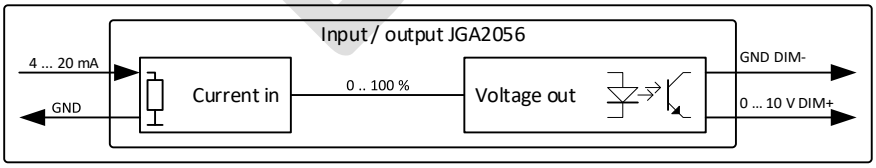


To connect multiple LED-drivers to the outputs, just connect all the DIM+ to each other and all the DIM- together. Please note that the maximum current should not exceed the maximum of the JGA2056.

Example:
When connecting 10x a LED-driver that uses 4 mA each, would lead to 40 mA in total usage.

Global overview

Below is the connection diagram with an 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 JGA2056 will limit the value to 0%, if the current input is greater or equal than 20 mA, the JGA2056 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 three outputs are connected with each other.
Note: The maximum load of the combined outputs is 100 mA.

Choose maximum voltage

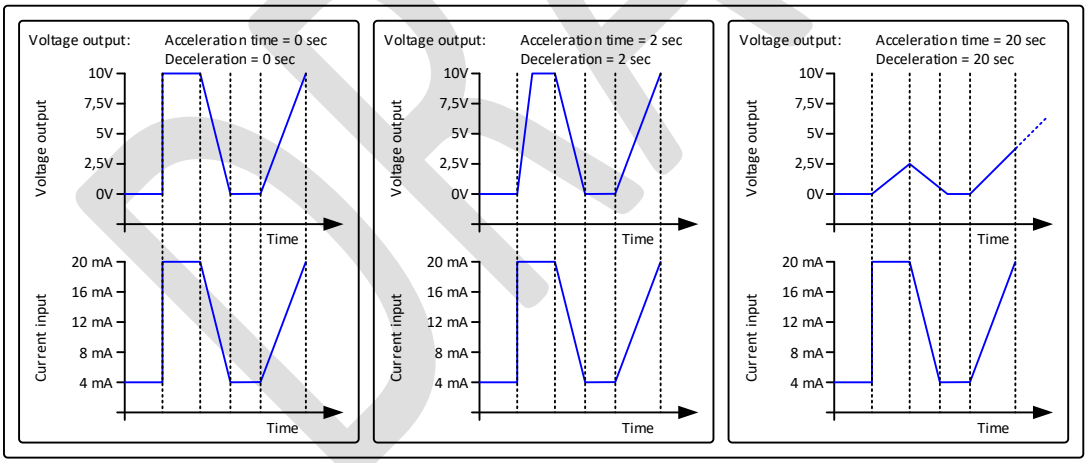
You can easily change the maximum output voltage with DIP1. By setting DIP1 to OFF the output voltage will be 0 … 5 V. When DIP1 is set to ON, the output voltage will be 0 … 10 V.

The JGA2056 will be delivered with DIP1 in the ON position (0 … 10 V output).

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 voltage output.



Change settings

The settings of the JGA2056 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 JGA2056:

	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 JGA2056 to the PC follow the next steps:

1. Connect the JGA2056 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 JGA2056 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 JGA2056 with another Terminal program the settings are:

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

Menu

--- MENU ---
1. Voltage output
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 degrease 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

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.

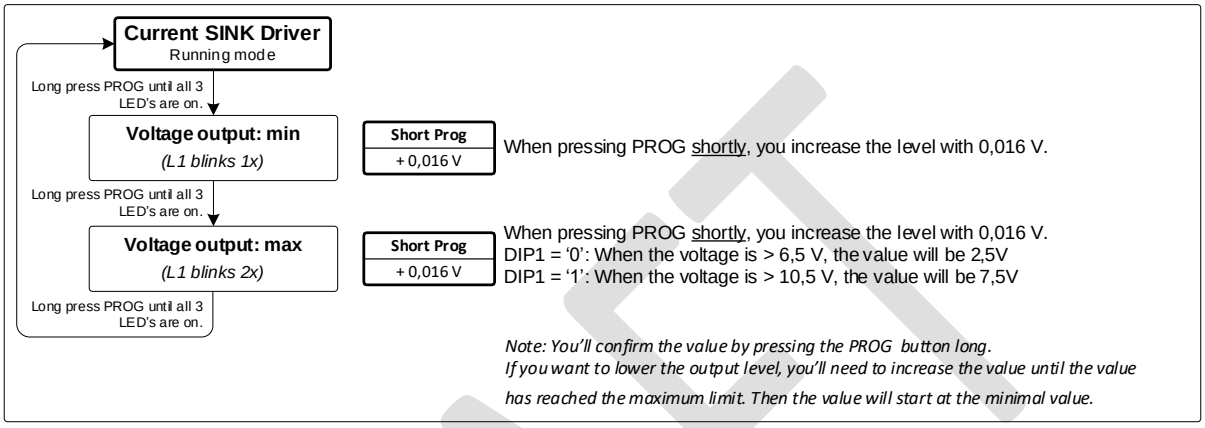
Calibrate

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.



It's only possible to increase the value when using the button on the PCB. When the maximum value has been reached, the next step will be the minimum value. When you want to confirm the value keep the button pressed until all LED's are lit up.

Voltage output

In the factory the voltage output of all JGA2056 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 JGA2056.
2. Put the JGA2056 in calibrating mode.
3. The JGA2056 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 JGA2056 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 input

In the factory the current input of all JGA2056 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:

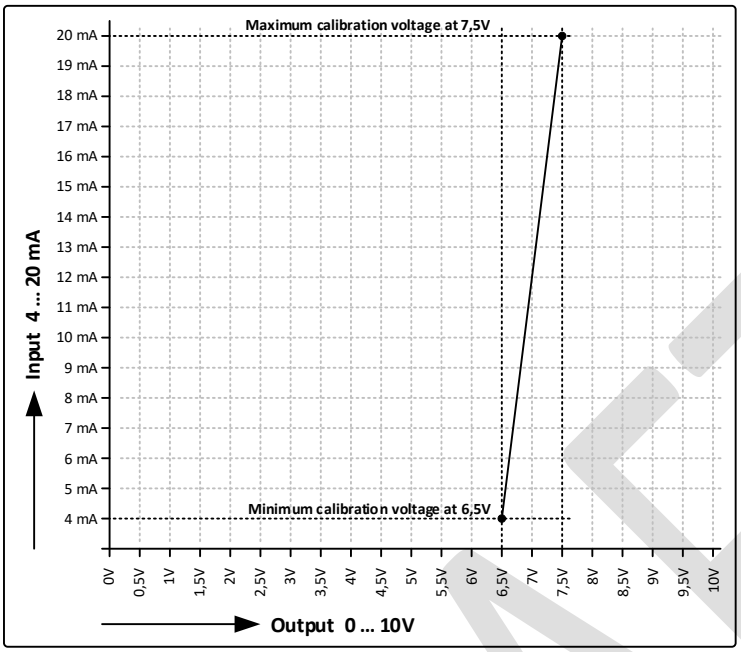
1. Go to the Terminal menu and select 4. Current in.
2. You will see MIN and the current setting.
3. Following you will see MIN with the current measured value.
4. Connect a current source to the input and apply the desired minimum current (e.g. 4 mA).
5. Wait until the value shown is stable.
6. Confirm 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 sent from the outputs. If the measured current is higher than the set maximum, the maximum value is sent 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 of the 0 … 10 V output is calibrated to 6,5 and 7,5 V. For special calibration points DIP4 must be set to ON.



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 … +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	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

Current input

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

Outputs

Voltage output

Description	Min	Typ.	Max	Unit	Remarks
Output voltage[1]	0,4	-	6,0	V	DIP1 OFF
	0,4	-	10,5	V	DIP1 ON
Resolution	-	0,016	-	V/step	
Output current	-	-	100	mA	

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

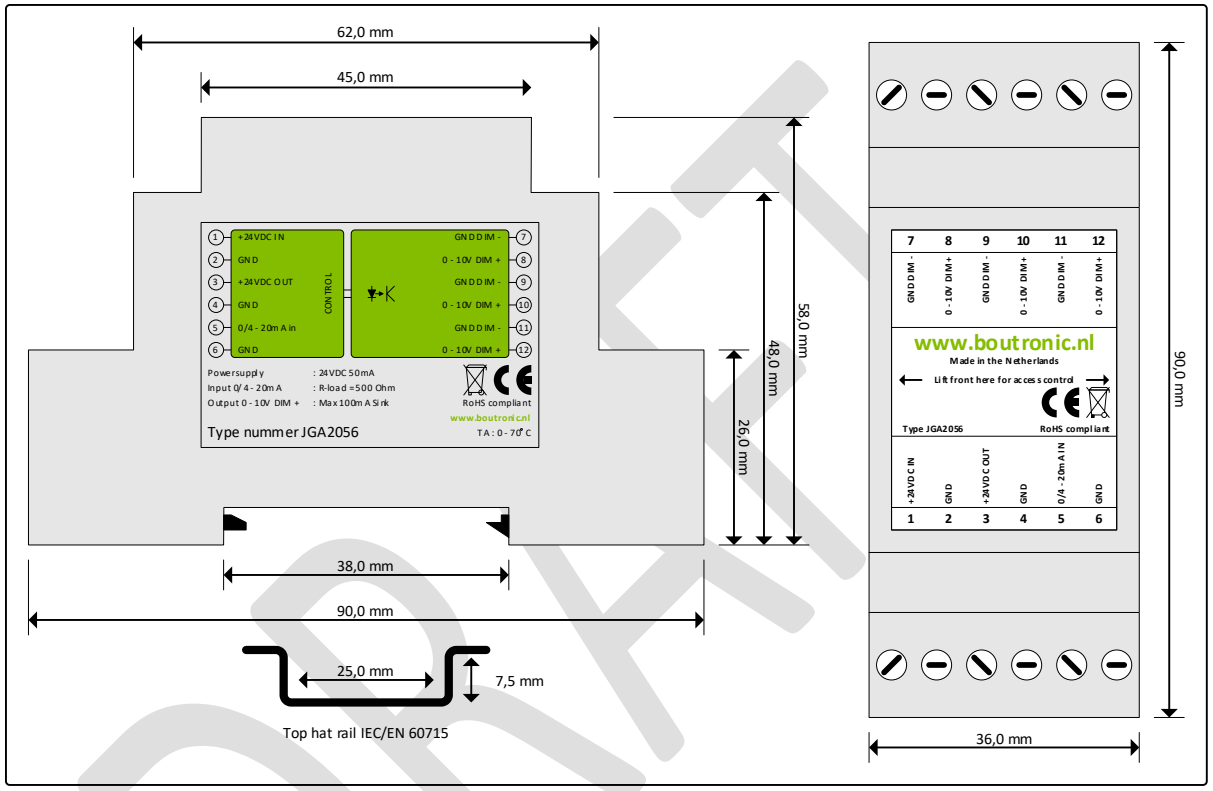
Software versions

The following software versions are there for the CurrentSinkDriver JGA2056

Version	Date	Changes
v1.0a	16-07-2019	First version

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

Measurements



Appendix A: Usage examples

In this appendix there are several usage examples explained.

0 to 20 mA --> 0 to 10 V

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 JGA2056 will now convert the 0 to 20 mA input to 0 to 10V.

See chapter 'Calibrate' for more information.

By deactivating DIP1 the output voltage can be set to 0 to 5V.