

## **The RS-232 and Analog Converter**

With the BoltSafe RS-232 and Analog converter, it is easy to connect a BoltSafe CMS sensor (Continuous Monitoring System) directly to any Data Acquisition System, computer, or PLC.

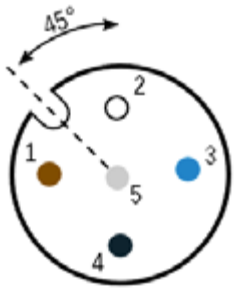
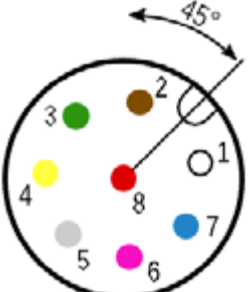
The RS-232 and Analog converter is available in two types of enclosures: a plastic DIN rail enclosure for inside a control box and an aluminum enclosure that is watertight and dustproof. The aluminum enclosure is fitted with connectors, which makes it a plug-and-play system, suitable for rough conditions.

The converter automatically scales the analog output to the attached sensor. By default, the maximum clamping load as mentioned on the sensor equals 100% of the analog output (5Vdc, 10Vdc or 20mA). If a small measuring range of the sensor is needed, the minimum and maximum clamping load of the sensor can be changed on request. That way, the preferred bandwidth of the output can be utilized.

The free Windows-based software allows users to easily read out the load that is applied to the sensor. The software can also be used to adjust the moment when the BoltSafe RS-232 and Analog converter has to switch on or off (in kN or as a percentage of full scale). This makes it possible to use the converter independently; to activate an alarm or warning light.

The RS-232 and Analog converter can also be used to switch off a remote control or even a complete pump or (electric) torque tool. The complete serial communication protocol will be provided, which also enables users to use their own software and adjust settings via their computer or PLC.



Electrical Connections				
<b>Sensor side</b>	Plug-in screw-clamp	M12x1, 5P, Female connector		
	1 = 5Vdc Sensor		1 = Brown	5Vdc Sensor
	2 = Data		2 = White	Data
	3 = 5Vdc Probe		3 = Blue	5Vdc Probe
	4 = GND		4 = Black	GND
			5 = Grey	NC
<b>Outputs and supply</b>	Plug-in screw-clamp	M12x1, 8P, Male connector		
	1 = 5Vdc		1 = White	5Vdc
	2 = 12-30Vdc		2 = Brown	12-30Vdc
	3 = GND		3 = Green	GND
	4 = Analog Output		4 = Yellow	Analog Output
	5 = RX (RS-232)		5 = Grey	RX (RS-232)
	6 = TX (RS-232)		6 = Pink	TX (RS-232)
	7 = Relay C1		7 = Blue	Relay C1
	8 = Relay C2		8 = Red	Relay C2

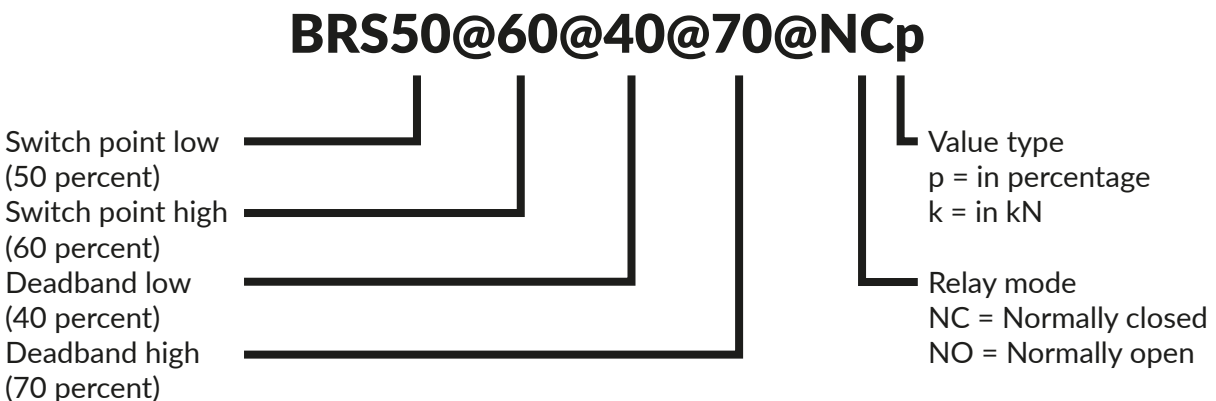


The M12 thread from the sensor connector or the shield of the sensor cable must be connected to the ground (GND) of the converter. The sensor connector in the aluminum housing has already been grounded. If you use the plastic DIN rail housing, you must connect it in such a way that the shield is grounded.

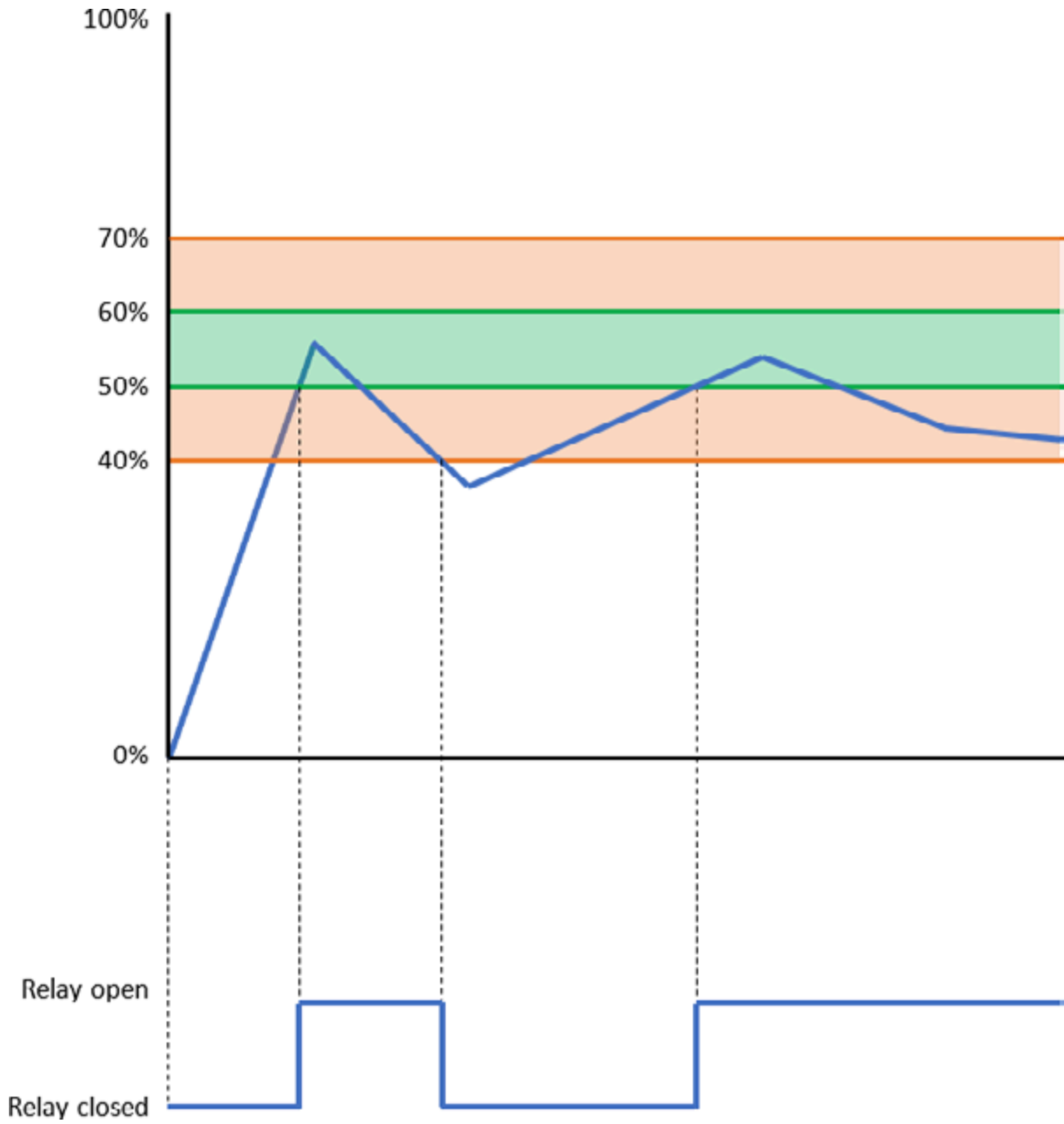
RS-232 commands	
BSl#	Load, rounded to the standard step of the connected sensor
BSlr#	Load, rounded to whole numbers
BSsn#	Serial number of the connected sensor
BSsize#	Size of the connected sensor
BSrmin#	Lower limit of the sensor load range
BSrmax#	Upper limit of the sensor load range
BSks#	The steps in kN used to round the measuring value
BSscal#	Calibration date of the sensor
BSsv#	Software version of the print
BSavg@<value>@# e.g.: BSavg@3@#	Value for moving average (min. value is 3), a low number ensures a quick response, a high number ensures a constant output
BSint@<value>@# e.g.: BSavg@10@#	Value for serial output interval (minimum value is 1, meaning every measurement is written to output)

## Relay settings

The relay of the BoltSafe RS-232 and Analog converter can be used for a wide range of applications, the most common of which will be switching on a warning system if the bolt load drops below a set value or switching off a bolt tightening system. The relay setting can be set with the software or with one command line:



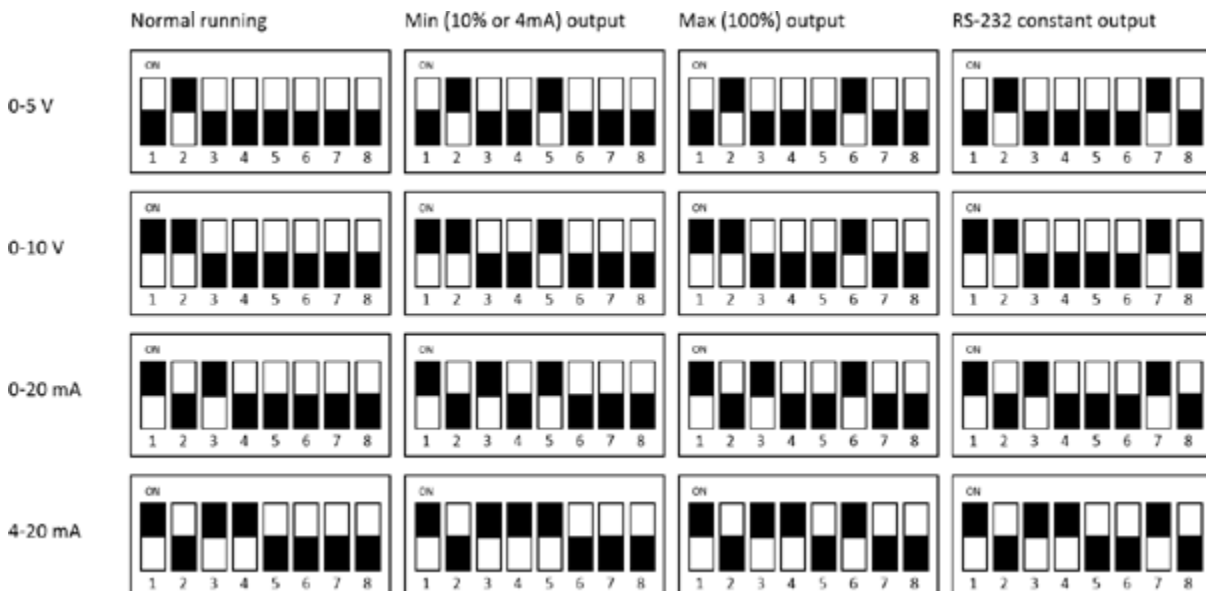
## Relay functionality



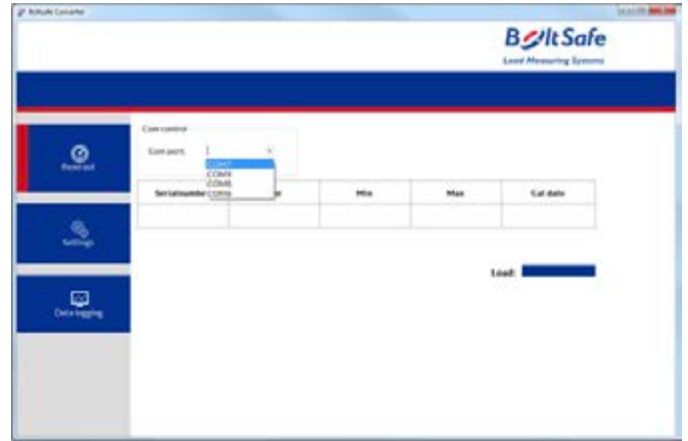
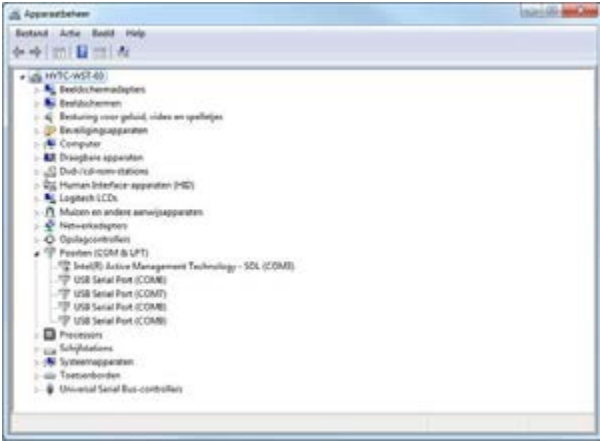
## DIP Switch settings

The DIP Switch can be found behind the right top cap of the DIN rail enclosure or behind the cover on the sensor side of the aluminum enclosure. The analog outputs can be forced to the minimum or maximum with the DIP switches. This allows for testing and calibrating reading equipment.

Analog mode	Below minimum	Proportionate scaling between:	
0 - 5 V	< 10% of FS = 0 V	10% of FSC = 0.5 V	≥ 100% of FSC = 5 V
0 - 10 V	< 10% of FS = 0 V	10% of FSC = 1 V	≥ 100% of FSC = 10 V
0 - 20 mA	< 10% of FS = 0 mA	10% of FSC = 0.2 mA	≥ 100% of FSC = 20 mA
4 - 20 mA	< min. of sensor = 0 mA	min. of sensor = 4 mA	≥ 100% of FSC = 20 mA

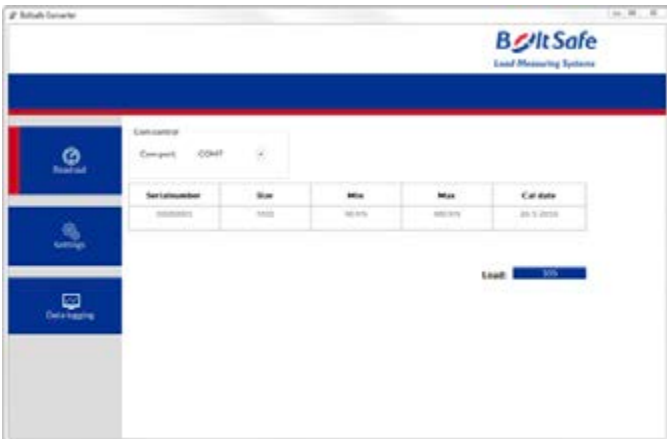


## Software

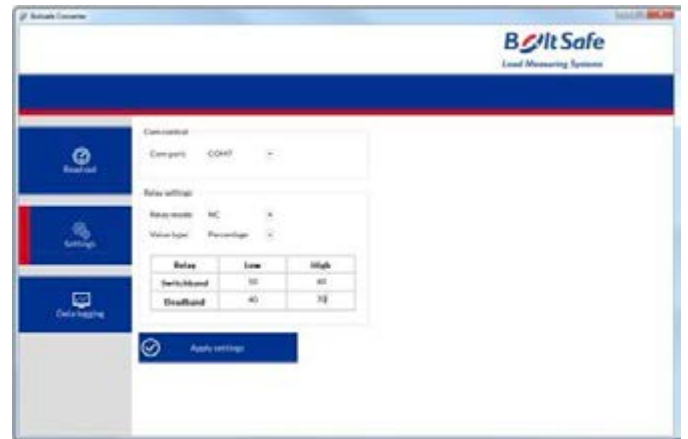


1. When the converter is connected via USB, a USB Serial Port will be created. Check the COM port number in the device manager.

2. Select the COM port of the converter that the sensor is connected to.



3. On the readout screen, you can see the properties of the connected sensor and the current load.



4. On the settings screen, you can set the relay function. See chapter "Relay Settings".

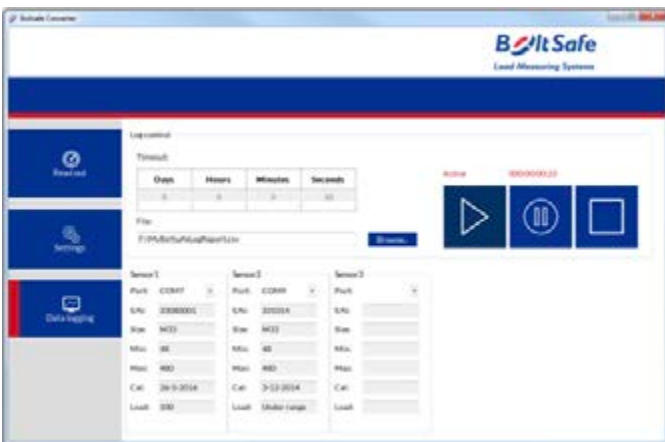


## Software



5. The “Data logging” tab makes it possible to monitor multiple sensors at the same time.

6. Select the sensors/converter one by one by selecting the COM ports.



7. Create an export file location and name, and set the timeout between each measurement.

	A	B	C
1	BOLTSAFE	Sensor 1	Sensor 2
2	S/N:	33080001	331014
3	Size:	M33	M33
4	Min [kN]:	48	48
5	Max [kN]:	480	480
6	Cal date:	26-5-2016	3-12-2014
7			
8	4-7-2019 13:44:08	105	Under range
9	4-7-2019 13:44:18	100	Under range
10	4-7-2019 13:44:28	100	Under range
11	4-7-2019 13:44:38	100	Under range

8. Example of the export file in Excel.

