PRESSURECONTROLLER

TYPE 8311

Instruction Manual

 Subject to technical change without notice Ref. 438972

bürkert
Easy Fluid Control Systems

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- **Always respect the safety instructions marked by the symbol opposite as well as those included in the manual.**
- **Ensure the max. pressure the application can reach is within the chosen pressure range. It is recommended to equip the installation with a pressure relief valve.**

Pressure range (bar)	Max. admissible pressure	Destruction pressure
0-2	6	7
0-5	12	15
0-10	25	30
0-20	50	60
0-50	120	150

- **The units on the display flash when the max. pressure of the range is exceeded.**

1.1 Utilisation

- The 8311 controller has only been designed to measure the relative pressure of a liquid or a gas.
- The measuring element must be solidly screwed onto its support.

There will be no manufacturer warranty for damages caused by unexpected handling or wrong usage of the device. The warranty on the device becomes invalid if any modification or change is made on the device.

The device should only be installed and repaired by specialist staff.
The user is not allowed to work on the cables inside the housing.
If any difficulties may occur with the product during installation, please contact your nearest Bürkert sales office for assistance.

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1.2 Precautions at installation and commissioning

- When the device is powered and the cover is open, protection against electric shocks is not effective.
- Always ensure the materials in contact with the medium to measure are chemically compatible.
- To clean the device, only use chemically compatible products.
- Do not insert any object (screwdriver for instance) inside the sensor body. If the body is dirty, use compressed air to clean it.

When dismounting the controller from the pipe, take all the necessary precautions linked to the process.

1.3 Conformity to standards

EMC: EN 50 081-1, 50 082-2
Security: EN 61 010-1
Vibration: EN 60068-2-6
Shock: EN 60068-2-27

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2.1 Design

The pressure controller type 8311 is made up of an electronic module and a measuring element. It may switch a solenoid valve, activate an alarm or establish a control loop.
The switching point can be adjusted by means of the three keys located under the display. The adjustment can optionally be carried out by means of a 4-20 mA loop via an external controller.

The controller housing can be turned by 180°.

The controller type 8311 can be inserted in a Bürkert fitting type S005 or S001, before being mounted on any type of pipe.

The electrical connection is carried out via a 2508 (DIN 43 650) connector and/or an M12 multipin connector.

2.2 Measuring principle

The controller type 8311 uses a piezo-resistive ceramic cell.

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2.3 Available versions

Order number table of the controllers type 8311 for the **0-10 bar** pressure range

Supply voltage	Input	Output	Connection	Order number G 1/2	Order number NPT 1/2	Order number RC 1/2
12-30 VDC	---	NPN and PNP	M12 connector	439 932	439 940	439 936
12-30 VDC	---	Relay	M12 and DIN 43650 connectors	439 935	439 943	439 939
12-30 VDC	---	NPN	DIN 43650 connector		on request	
12-30 VDC	---	PNP	DIN 43650 connector		on request	
12-30 VDC	4...20 mA ext. setpoint	Relay	M12 and DIN 43650 connectors		on request	
ASI	---	Relay and ASI	M12 and DIN 43650 connectors		on request	

Order number table of the controllers type 8311 for the **0-2 bar, 0-5 bar, 0-20 bar and 0-50 bar** pressure ranges **: on request**

2.4 Accessories

Order number table of the accessories

	Order number
M12 female connector, 5 pins, to be wired	917 116
M12 connector, 5 pins, moulded on a shielded cable (2 m)	438 680

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General features

Pipe diameter	any type of pipe with a DN greater than 15 and a 1/2 '' threaded connection piece (G, NPT or Rc)
Medium temperature	-20 °C to +100 °C *(- 4 °F to +212 °F)*, +100 °C (*+212 °F*) with a max. ambient temperature of +40 °C *(+104 °F)*
Measuring range	0-10 bar for the standard versions 0-2, 0-5 bar, 0-20 bar and 0-50 bar on request
Accuracy	±1.5% of the full scale
Repeatability	
- typical	0.25%
- max.	1%
Measuring element	ceramic cell (Al_2O_3)

Electrical features

Installation class (overvoltage class)	2
Power supply	12-30 VDC
Max current consumption	750 mA (with load) (PNP version) 80 mA (without load) (Relay version)
Protection against polarity reversal	yes
Transistor output	NPN and/or PNP, open collector, 5-30 VDC, 700 mA max.
or	
Relay output	250 VAC, 3 A or 30 VDC, 3 A ; programmable
External setpoint input	4-20 mA (on request)

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Protection against short-circuits	yes for the transistor output
Type of cable recommended	shielded, wire section between 0.14 and 0.5 mm^2

Electrical connection

EaseOn	on request with connector type 2511
Relay connector	DIN 43650A
Multipin	M12, 5 pins
ASI connection	on request

Housing

Housing material	polycarbonate +20% of fiber glass
Front plate	polyester
Parts in contact with the medium	stainless steel 316L (DIN 1.4404), FPM in the standard versions (EPDM as an option)
Protection rating	IP 65, connectors being plugged-in and tightened

Environment

Ambient temperature	-20 to +60° C *(-4° F to +140° F),* max. +40 °C *(max +104 °F)* if the fluid temperature is near +100 °C *(+212 °F)*
Relative humidity	< 80%

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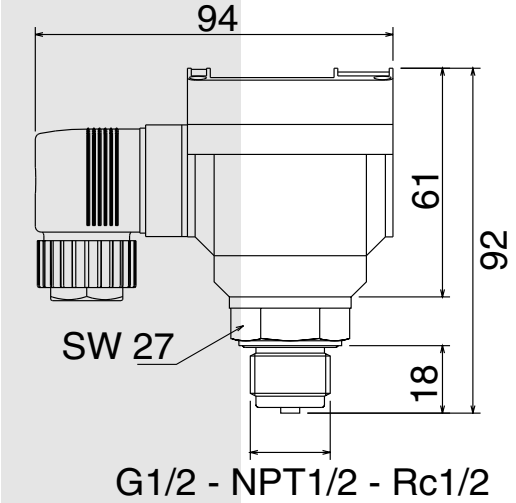
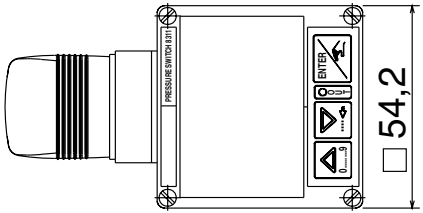
Dimensions (mm)





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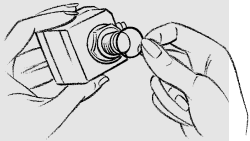
4.1 General recommendations

Avoid any contact of the device with the following products: alcohols, strong or concentrated acids, aldehydes, bases, esters, aliphatics, aromatics, ketones, aromatics or halogenated hydrocarbons, oxidizing agents and chlorinated products. For more information, please contact your Bürkert sales office.

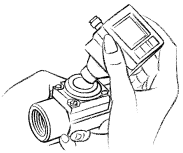
4.2 Mounting on the pipe

We recommend to insert the controller type 8311 into a Bürkert fitting type S001 (brass or stainless steel) or type S005 before mounting it on the pipe.

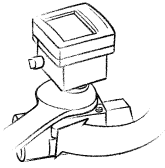
During mounting, follow the instructions given with the fitting.

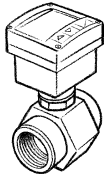


For G1/2""-version, ensure the gasket is in place



Do not tight the controller using the housing ; use a wrench size 27 instead.





Controller type 8311 mounted on a fitting type S001

4.3 Electrical connection

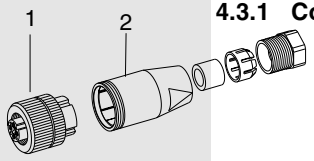
Always ensure the power supply is switched off before working on the device. All the connectors must be plugged out. Use:

- a shielded cable with an operating temperature > +80° C *(+176° F).*
- a high quality voltage supply (filtered and stable).

Install the following security devices:

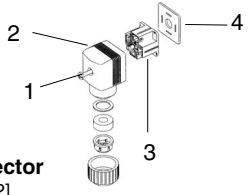
- **for the power supply: a 1-A fuse and an interrupter**
- **for the relays: a 3-A fuse and a circuit breaker (depending on the application).**

4.3.1 Connectors



Multipin M12 connector (not supplied)

- Loosen threaded ring [1]
- Remove part [2] from the connector.
- Wire according to pin assignment (see 4.3.2)



2508 (DIN 43 650) connector

- Remove part [3] from part [2].
- Wire according to pin assignment (see 4.3.2 or 4.3.3)
- Replace part [3].
- Tighten the cable gland.
- Place gasket [4] between the 2508 connector and the fixed connector of the 8311.
- Connect the 2508 connector to the 8311.
- Tighten screw [1].

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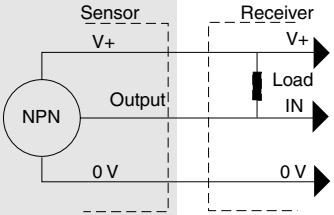
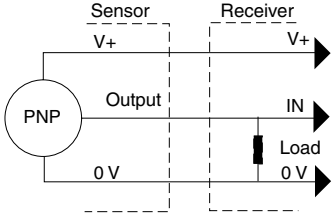
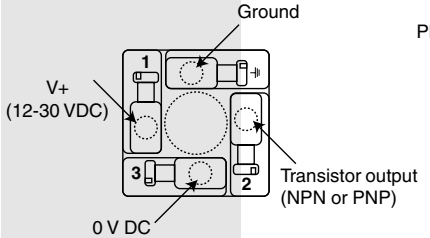
4.3.2 Version with transistor output (NPN / PNP)



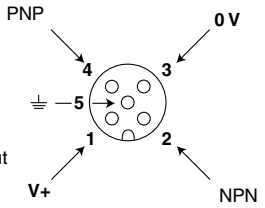
NPN output



PNP output



NPN or PNP wiring of connector type 2508



NPN / PNP wiring of M12 connector

M12 cable available as an option (reference 438 680); correspondence between the connector pin numbers and the wire colours:

Pin	Wire colour
1	brown
2	white
3	blue
4	black
5	grey

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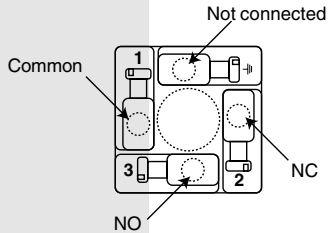
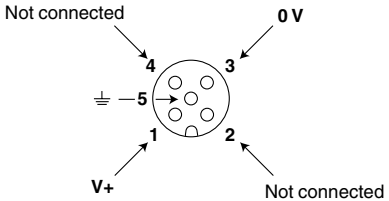
4.3.3 Version with relay output



Wiring of the 2508 connector, relay output



Wiring of the M12 connector (12-30 VDC power supply)

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Operating safety

When the voltage at the relay terminals is higher than 24 V and the connectors are not correctly plugged-in and tightened, there is a risk to electrocute yourself.

Always check all the connectors to ensure the good operating of the device.

The device should only be started if the whole installation is in good working order.

5.1 General recommendations

Keep in mind that the process may be influenced by all the parameter settings you make. Fill-in the table on page 24 with your settings of the controller type 8311.

5.2 Functionalities

The device has three operating modes :

Normal Mode

Display of the measured pressure and the switching thresholds programmed. From the Normal mode, you can access the Calibration and Simulation modes.

Calibration Mode

Access to the programming of all the parameters (unit, zero adjustment, K-factor, calibration through the „Teach-in“ feature, output, filter and, if available in your software release, bargraph, extension board parameters). From the Calibration Mode, you can go back to the Normal Mode.

Simulation Mode

Entering a theoretical pressure value to test the configuration programmed in the Calibration Mode. Depending on your software release, you may also calibrate the extension board. From the Simulation Mode, you can go back to the Normal Mode.

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5.3 Programming keys

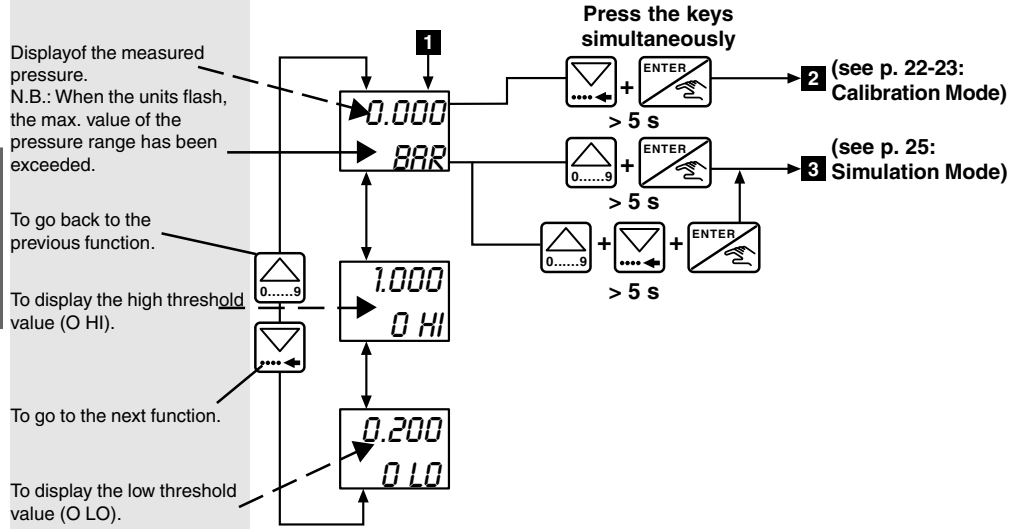
5.4 Default Configuration

At the first powering up, the configuration of the controller type 8311 is as follows:

Pressure unit:	bar
Output:	hysteresis
OLO:	0,2 bar
OHI:	1 bar
DEL:	0 s
Filter:	2
BGLO:	0 bar
BGHI:	0 bar
Extension board:	no

Available depending on the8311 release

5.5 Normal Mode



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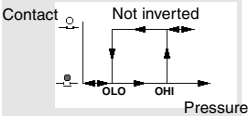
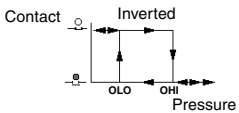
5.6 Possible switching modes of the 8311

Hysteresis Mode

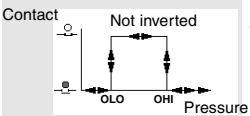
The change of state occurs when a threshold is detected (increasing pressure: high threshold (OHI) to be detected, decreasing pressure: low threshold (OLO) to be detected).

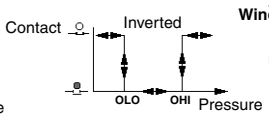




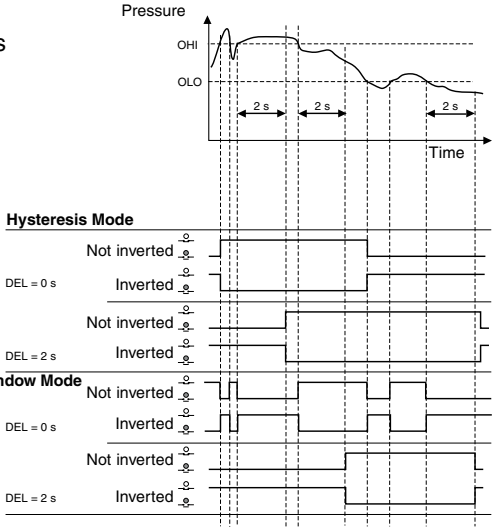
Window Mode

The change of state occurs when any threshold is detected.





The delay (DEL) is set for the both switching thresholds. The switching only occurs when either threshold value (OHI - OLO) is exceeded for a duration higher than the DEL delay.



Switching examples of the 8311 depending on the pressure and the switching mode chosen

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5.7 Calibration Mode

To change the pressure unit (bar, psi, mPa, Torr, mmHg, atm, MWS, mbar).

To go back to the previous function.

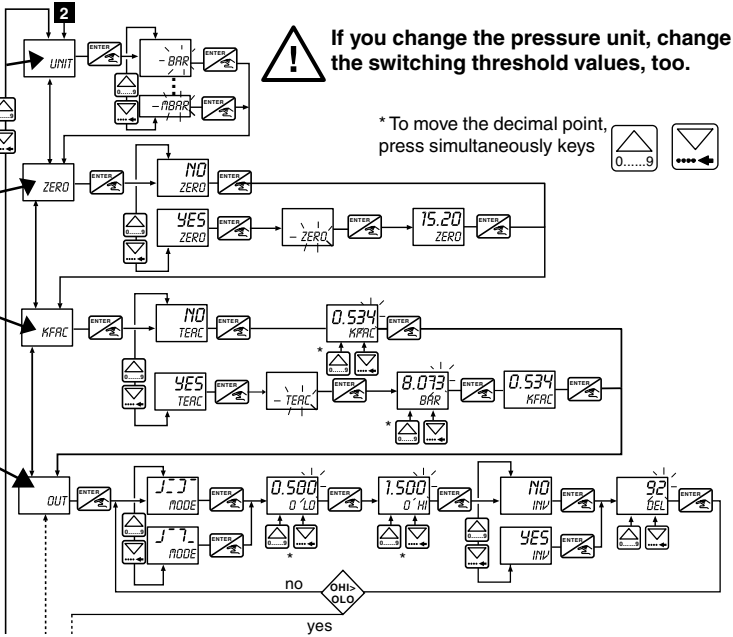
To go to the next function.

To adjust the controller zero point, at nil pressure.

To enter the K-factor or have it calculated through the Teach-in feature.The K factor corresponds to the pressure cell sensitivity (in mV/bar). The K factor value is indicated on the cell cable sticker (see Annex).

To choose :

- the switching mode of the output (Hysteresis or Window, see p. 21)
- the low (O LO) and high (O HI) switching thresholds
- whether the switching mode is inverted or not (INV, see p. 21)
- the delay before switching (DEL, in seconds).



If you change the pressure unit, change the switching threshold values, too.

* To move the decimal point, press simultaneously keys 0.....9

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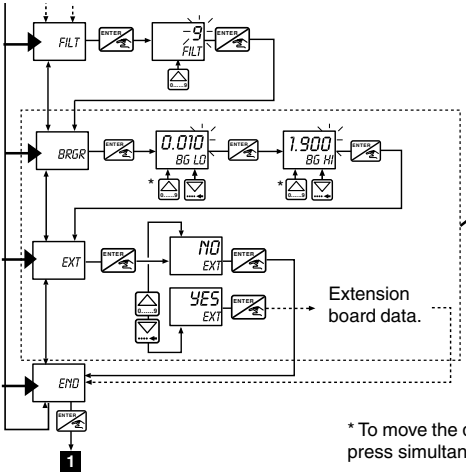
To choose the filtering level (FILT) of the pressure displayed ONLY ; «0» means «all the pressure variations are displayed», «9» smoothes the displayed pressure changes at the most.

To define the min. (BG LO) and max. (BG HI) values of the bargraph at the bottom of the display.

To calibrate the extension board (EXT) detected by the software.

To return (END) to the display of the pressure in the Normal mode.



* To move the decimal point, press simultaneously keys 0.....9 and ....

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Configuration of the 8311 : Fill-in the table with the values programmed in the Calibration mode.

Unit	K fact.	Mode		Thresh.		Inverted		Delay	Filter	Bargraph		Date	Sign.
UNIT	Fact. K	Hyst.	Wind.	O LO	O HI	Yes	No	DEL (s)	FILT	BG LO	BG HI		

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5.8 Simulation Mode

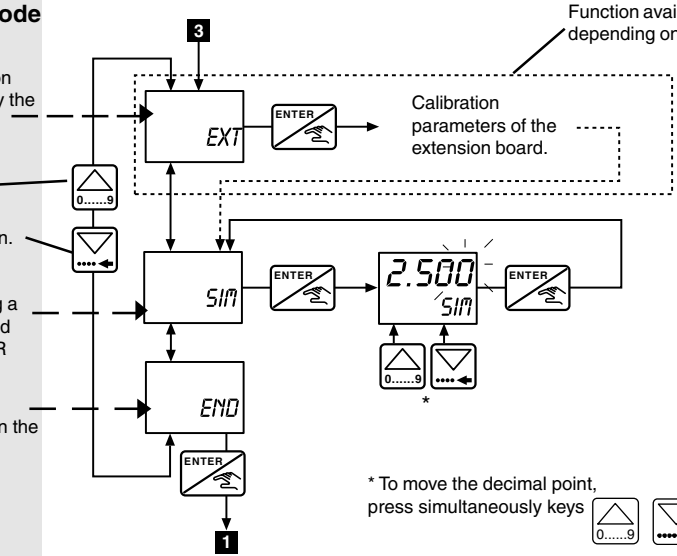
To calibrate the extension board (EXT) detected by the software.

To go back to the previous function.

To go to the next function.

To test the switching thresholds after entering a pressure value (SIM) and PRESSING THE ENTER KEY.

To return (END) to the display of the pressure in the Normal mode.



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6.1 Cleaning

The controller type 8311 can be cleaned with water or any solution compatible with the materials the device is made of.
For more information, please contact your Bürkert sales office.

6.2 Error messages

Type of message	Description	Solution
ERR 0	Calibration data are lost. Reading error: the process is stopped.	Press the ENTER key to go back to the Normal mode. The device has returned to its default configuration: the device must be calibrated again. If the message appears frequently, send the device back to your Bürkert sales office.
ERR 1	Calibration data cannot be saved. Write error: the process is stopped.	Press the ENTER key to go back to the Normal mode. The device displays the configured data; BUT this data has not been saved: the device must be calibrated again. If the message appears frequently, send the device back to your Bürkert sales office.

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Type of message	Description	Solution
ERR 2	The calibration parameters cannot be accessed. Menu reading error: the process goes on operating.	Press the UP and DOWN keys under the display to scroll through the menus. If the message appears frequently, send the device back to your Bürkert sales office.
ERR 4	The 8311 controller no more measures the pressure correctly: the process is stopped.	Perform a new Teach-In procedure (automatic calculation of the K-factor). If the message appears frequently, send the device back to your Bürkert sales office.

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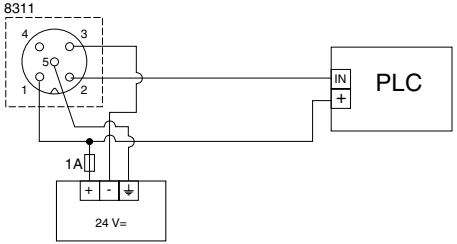
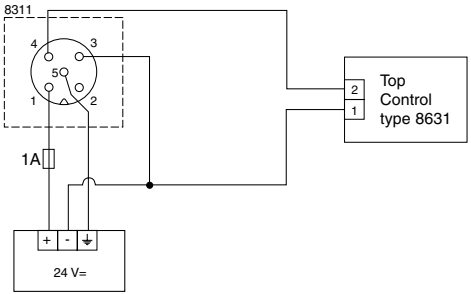
7.1 Examples of Easy Link© with the 8311

NPN connection: controller type 8311 (NPN/PNP version) and a Programmable Logic Controller.



PNP connection: controller type 8311 (NPN/PNP version) and a Top Control type 8631.



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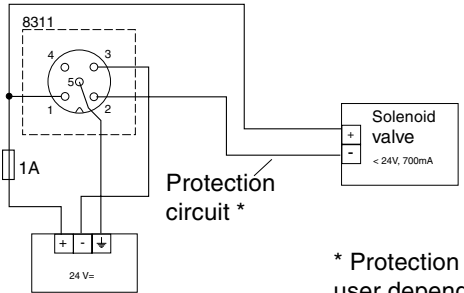
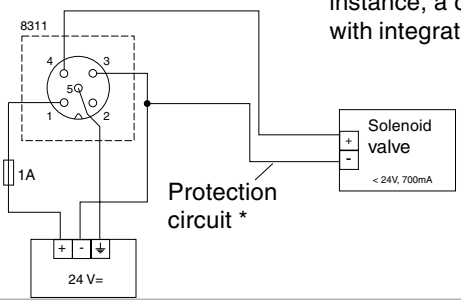
NPN connection: controller type 8311 (NPN/PNP version) and a solenoid valve type 6014.



* Protection must be installed by the user depending on the load, for instance, a connector type 2508 with integrated varistor.

PNP connection: controller type 8311 (NPN/PNP version) and a solenoid valve.



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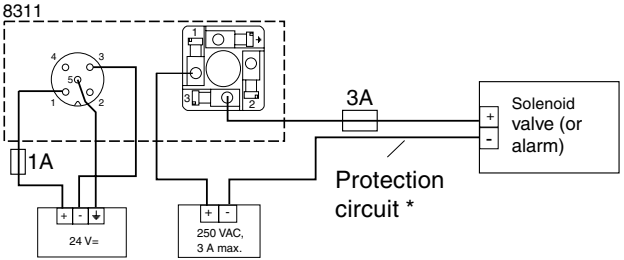
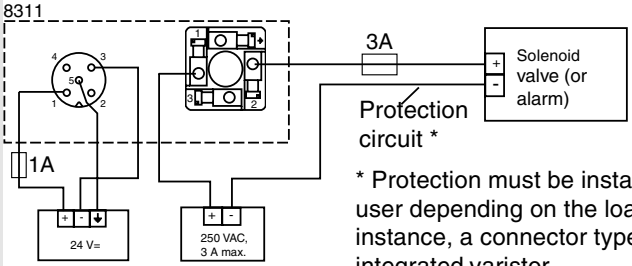
NO (Normally Open) connection: controller type 8311 (relay version) and a solenoid valve.



NC (Normally Closed) connection: controller type 8311 (relay version) and a solenoid valve.



* Protection must be installed by the user depending on the load, for instance, a connector type 2508 with integrated varistor.

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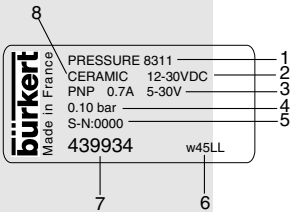
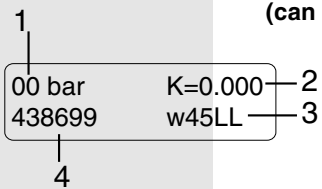
7.2 Description of the label of the controller type 8311



1. Type of sensor
2. Power supply
3. Output characteristics
4. Pressure range
5. Serial number
6. Manufacturer code
7. Order number
8. Sensor material

7.3 Description of the label of the pressure cell (can be reached by dismantling the cover)



1. Pressure range of the cell
2. K-Factor (mV/bar)
3. Order number of the cell
4. Manufacturer code

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