8045

MAGNETIC INDUCTIVE FLOW TRANSMITTER

INSTRUCTION MANUAL

bürkert
Fluid Control Systems

1.1 SYMBOLS USED

Indicates information which must be followed. Failure to follow the information could endanger the user and affect the function of the device.

Indicates that the page contains general information.

Indicates a quickstart guide for quickly commissioning the transmitter.

Indicates that the page contains information about installation.

Indicates that the page contains information about configuration, programming and operation.

Indicates important information, tips and recommendations.

Indicates a worked example.

Indicates an action which has to be continued or reference to a relevant section.

Indicates information about repairs, service, maintenance and spare parts.

1.2 GENERAL SAFETY INSTRUCTIONS

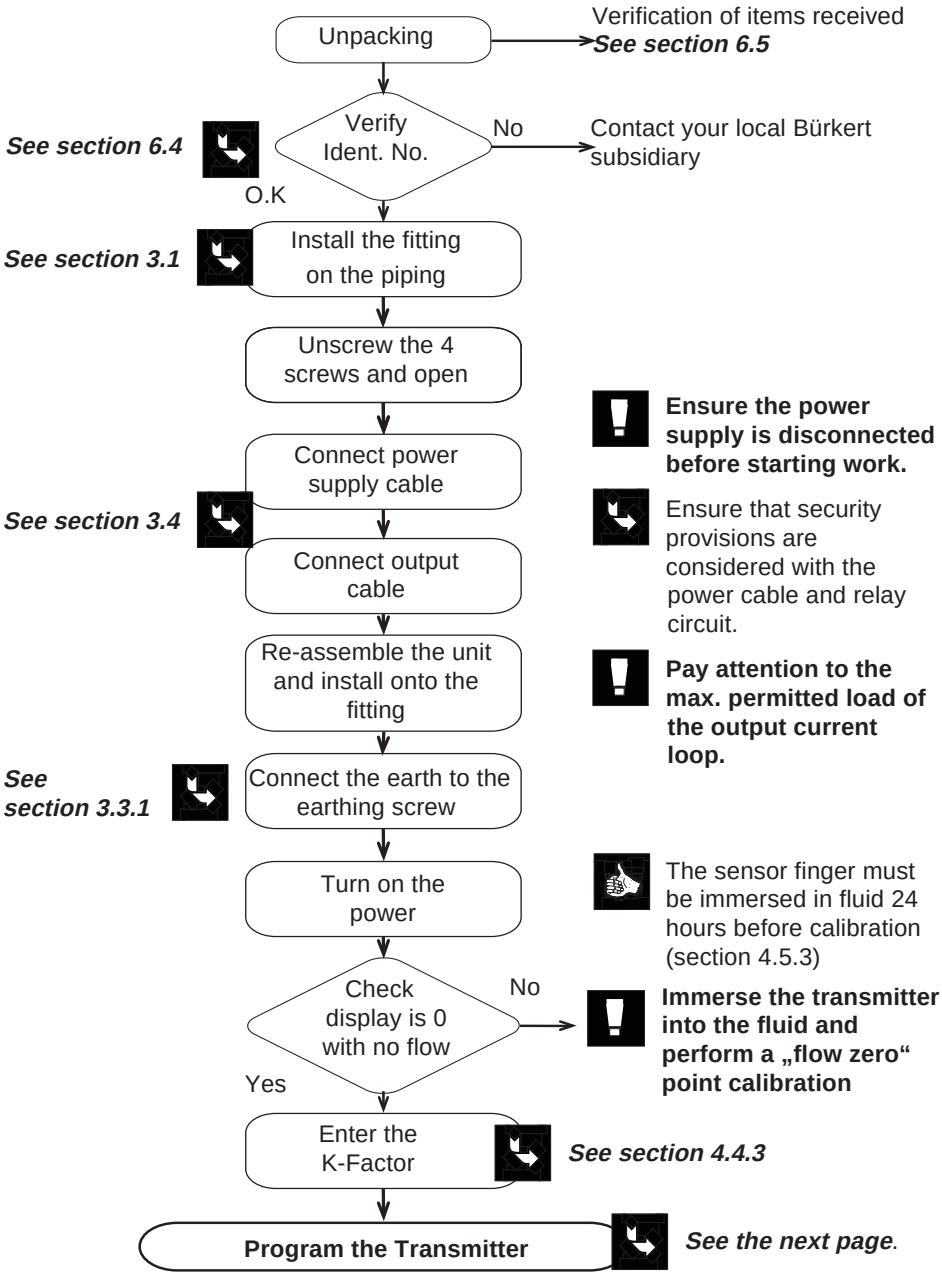
Congratulations on purchasing our 8045 Electromagnetic Flow Transmitter.

Before installing or using this product, please read this manual and any other relevant documentation to ensure you fully benefit from all the advantages the product can offer.

- Please verify that the product is complete and free from any damage. (see reference table section 6.5).
- It is the customer's responsibility to select an appropriate transmitter for the application, ensure the unit is installed correctly, and maintain all components.
- This product should only be installed or repaired by specialist staff using the correct tools.
- Please observe the relevant safety regulations throughout the operation, maintenance and repair of the product.
- Always ensure that the power supply is switched off before working on the device / system.
- If these instructions are ignored, no liability will be accepted and the guarantee on the device and accessories will become invalid.

This section provides a comprehensive installation and operation guide which will assist with the commissioning of the 8045 Flow Transmitter.

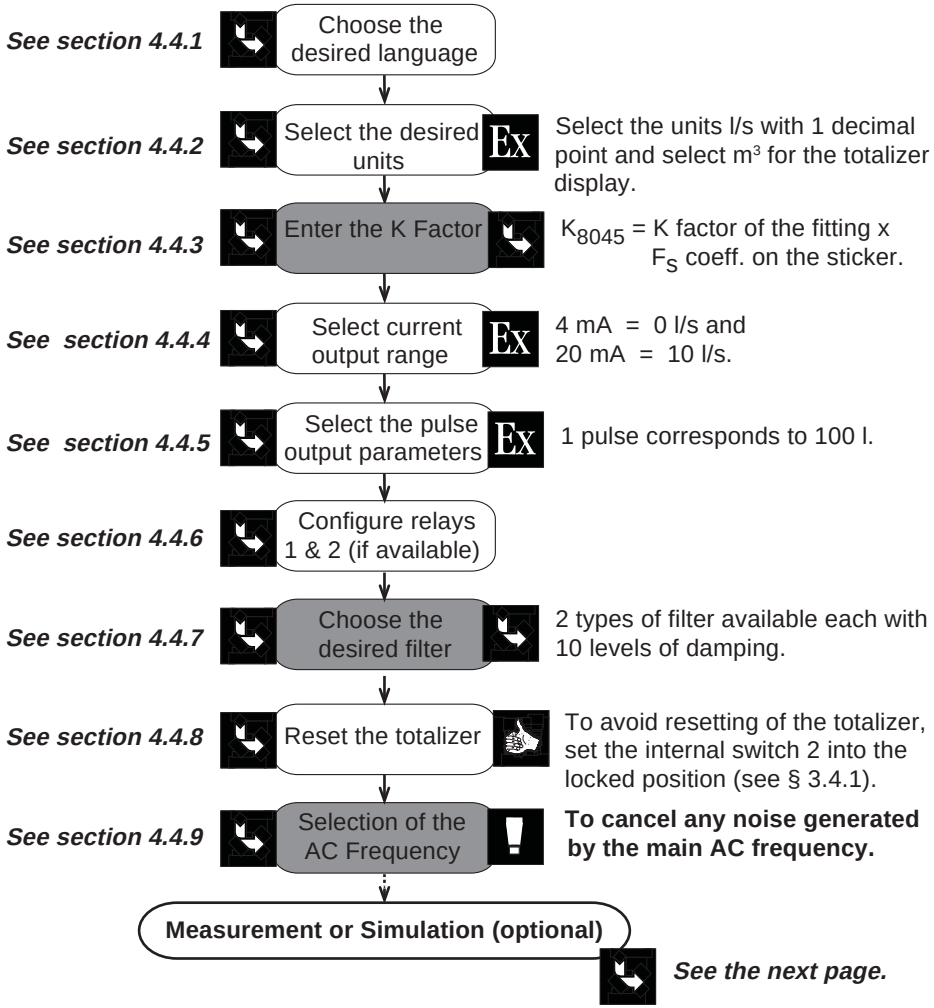
2.1 INSTALLATION



To access the **CALIBRATION MENU** simultaneously press ▽ and ENTER for 5 seconds.

- Ensure that the enter key is unlocked - section 3.4.1
- Reference can additionally be made to the menu guide - section 4.2.

2.2 PROGRAMMING

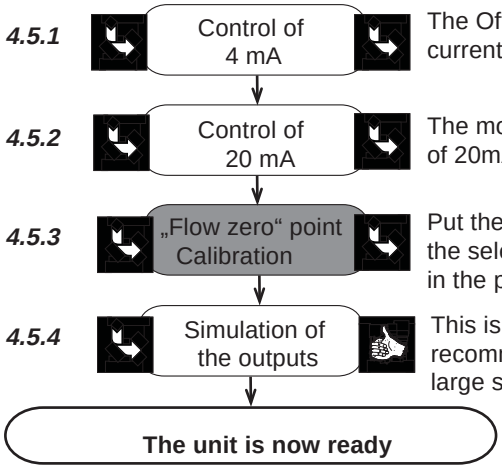


The actions which are highlighted in grey must be fully completed for accurate measurement.

To access the **TEST MENU** simultaneously press 

for 5 seconds.

2.3 TESTING



See Section 4.5.1

The Offset mode fixes the output current of 4mA.

See Section 4.5.2

The mode Span fixes the output of 20mA.

See Section 4.5.3

Put the displayed value at 0.00 in the selected unit when the liquid in the pipe is not moving.

See Section 4.5.4

This is optional although it is recommended for commissioning large systems.

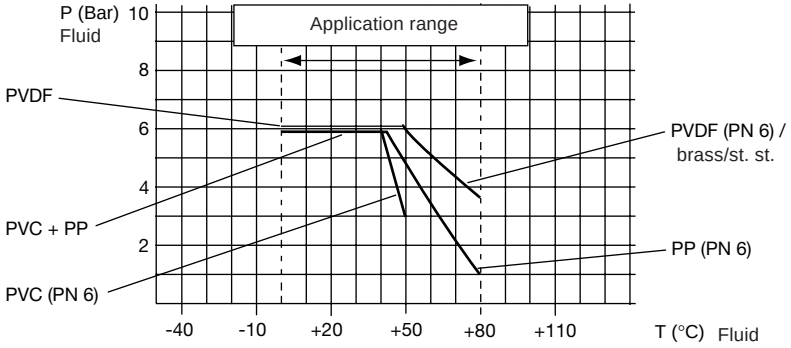
The actions which are highlighted in grey must be fully completed for accurate measurement.

3.1 INSTALLATION GUIDELINES

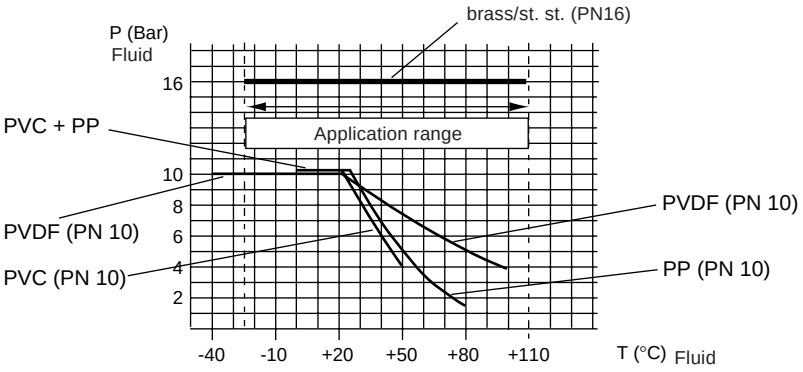
- **Pressure - Temperature Diagram for plastic fittings**

Please be aware of the fluid pressure-temperature dependence according to the respective fitting+sensor material as shown in the diagram below.

8045 with a PVDF sensor



8045 with a stainless steel sensor



- The device must be protected against the rain, constant heat radiation and other environmental influences such as magnetic fields or direct exposure to sunlight.

- Ensure that the device is not located near any large machinery which may interfere with the transmitter as this can have an effect on the measurement readings.

In order to ensure a high precision of the measure and good stability of the „flow zero“ point, the transmitter must be installed into the processed medium at least 24 H before calibration (electrode passivation).

Dismounting precautions:

All precautions must be taken before removing the transmitter depending on the process used as the pipe may contain dangerous / agressive hot fluids or fluids with high temperatures or pressures.

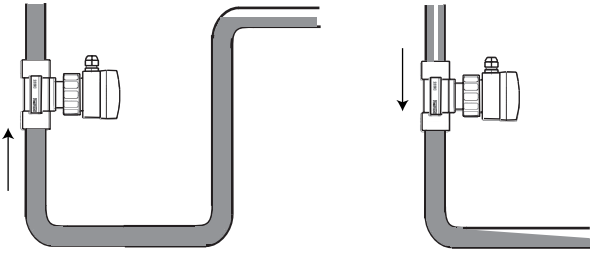
3.1.1 MOUNTING POSITIONS

The 8045 electromagnetic flow transmitter can be mounted in the following ways to obtain an accurate flow measurement although the piping should be designed to ensure that the pipe is maintained full at all times to avoid inaccurate measurement.

Mounting horizontally

Correct **Incorrect**

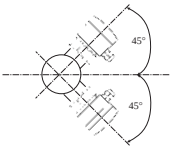
Mounting vertically



Correct **Incorrect**

- **When mounting vertically ensure that the flow direction is in an upward direction as indicated by the arrow.**
- **Always mount the transmitter upstream a possible injection point in the pipe of a high-conductivity product (acid, base, saline,...).**

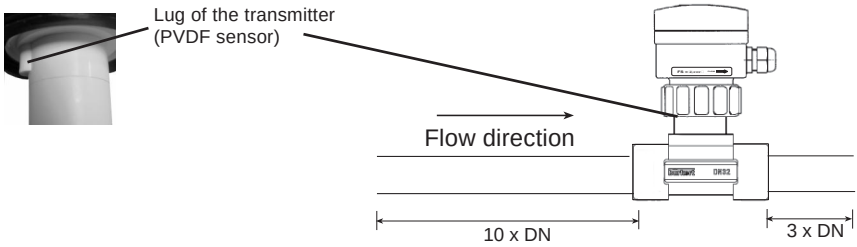
It is advisable to mount the transmitter at a 45° angle to the horizontal centre of the pipe as shown in the diagram to avoid having deposits on the electrodes and false measurements due to air bubbles.



Mounting direction and flow measuring:

The flow value displayed by the transmitter is positive whatever the mounting direction of the device, but the totalizer increases or decreases depending on several parameters,i.e.:

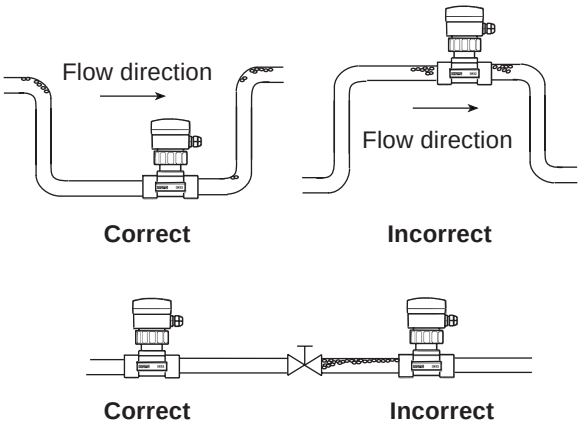
- **8045 with a PVDF sensor:**
  The totalizer increases when the arrow on the side of the housing indicates the flow direction, the lug shows the upstream direction and the marked coax cable is connected according to fig. 3.3 or 3.4.



- **8045 with a stainless steel sensor:**
  The totalizer increases when the arrow on the side of the housing indicates the flow direction, the cable glands show the downstream direction and the marked coax cable is connected according to fig. 3.3 or 3.4.

The minimum straight upstream (10 x DN) and downstream (3 x DN) distances must be observed.

Please ensure that the pipe design does not allow the build up of air bubbles or cavities within the medium as this will cause measuring errors.



3.2 INSTALLATION

The 8045 flow transmitter can be installed into pipes using our specially designed fitting system S020.

The fitting 4 must be installed into the pipe according to the installation specifications within section 3.1.

- Insert the plastic nut 3 onto the fitting 4 and snap the plastic ring 2 into the guide-bush 5.
- Insert the sensor into the fitting ensuring the arrow on the side of the housing indicates the flow direction, and:
  Version with a PVDF sensor: ensuring the sensor is sitting correctly, making sure that the lug 6 is aligned correctly onto the fitting.
  Version with a stainless steel sensor: ensuring the cable glands show the downstream direction and the alignment of the electrodes is perpendicular to the flow direction.

  If the mounting is correct, the sensor housing 1 cannot be rotated.

The plastic nut must only be tightened by hand!

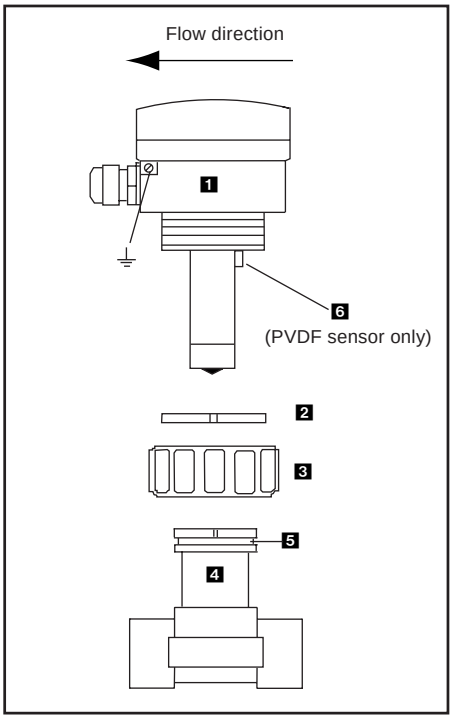


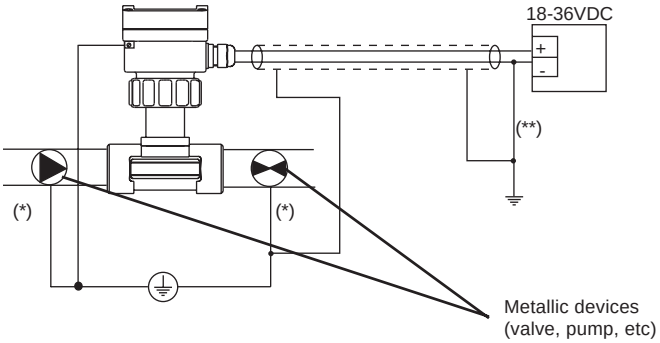
Fig. 3.1 Installation of flow transmitter

3.3 GENERAL ELECTRICAL CONNECTION

- Use cables with a temperature limit of 80°C minimum.
- For normal operating conditions the measuring signal can be transmitted by a shielded cable of 0.75 mm^2 cross section.
- The line must not be installed in combination with carrying lines with a higher voltage or frequency.
- If a combined installation cannot be avoided, a minimum space of 30 cm (1 ft) should be respected.
- The cable diameter must be between 6 and 12 mm;
  If 2 cables are needed, use the supplied multiway seal and 4-mm diameter cables.
- The power supply must be regulated - section 6.1

- Ensure the equipotentiality of the installation (power supply - transmitter - fluid):
  - The various earth spots in the installation have to be connected together to eliminate the potential differences that may occur between different earthes.
  - Observe faultless grounding of the shield at both ends of teh cable.
  - Earth the negative terminal of the power supply to suppress the common mode currents. If direct earthing is not possible insert a 100 nF-condensator between the negative terminal and the earth.
    Special attention has to be paid if the transmitter is installed on plastic pipes because there is no direct earthing possible.

Proper earthing is performed by earthing together the metallic devices such as pumps or valves, that are as close as possible to the magmeter. If no such devices are present, insert metallic piping parts (earthing rings, not supplied) into the plastic pipes before and after the magmeter and earth them together. The earthing rings shown in the diagram below must be in contact with the fluid.



For plastic pipe applications

(*) or metallic parts, not supplied, inserted inside the pipe.
(**) If direct earthing is impossible, connect a 100 nF-condensator between the negative terminal and the earth.

- **Do not open and wire the transmitter with the power supply connected.**
- **It is advisable to put security devices on :**
  Power supply: Fuse (300 mA) and an interrupter
  Relay: 3A max. fuse and circuit breaker (depending on application).
- **Do not apply both a dangerous voltage and a very low safety voltage to the relays.**

3.4 ELECTRICAL WIRING FOR THE 8045 FLOW TRANSMITTER

3.4.1 18-36 VDC without relays

Remove the cover via the screws on the front display and pull the cable through the cable gland and wire according to one of the pin assignment diagrams below.
The electronics within the 8045 allows a PLC with a sourcing or sinking 4-20 mA entry to be connected. Position A (Fig 3.3) provides a sourcing configuration and Position B (Fig 3.4) a sinking configuration.

On a version with a stainless steel sensor, seal the unused cable gland using the supplied obstructor to ensure the tightness of the transmitter. Unscrew the cable gland nut, insert the obstructor and screw the nut back on the cable gland.

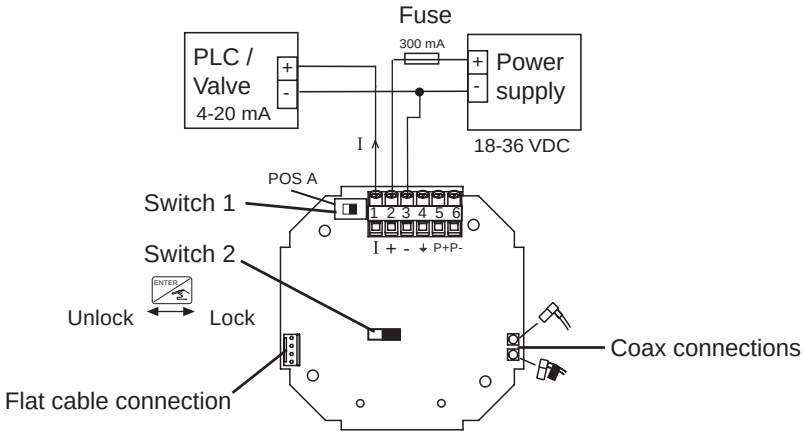


Fig. 3.3 Sourcing configuration - Position A

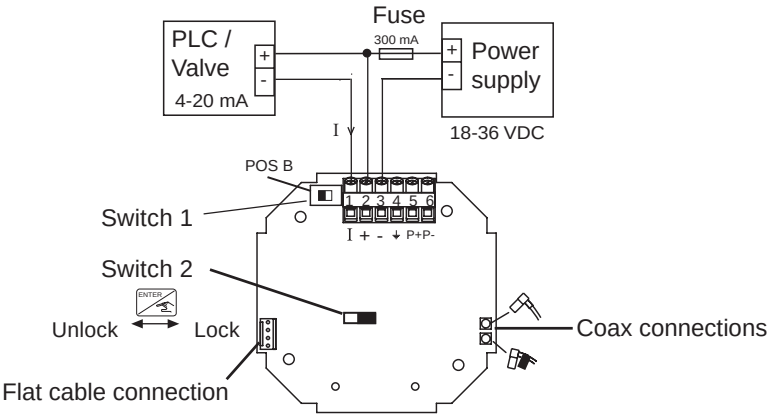


Fig. 3.4 Sinking configuration - Position B

3.4.2 18-36 VDC with relays

The electrical wiring of this model is possible via the use of 2 cable glands. Remove the cover via the screws on the front display and pull the cables through the cable glands and wire according to pin assignment diagram below (Fig. 3.5).

Use the supplied cable clip to fasten the wires originating from the relay module.

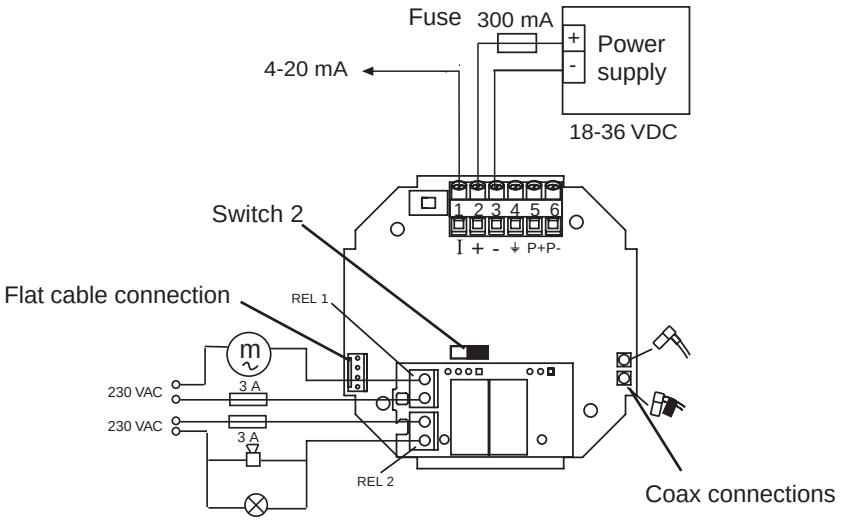


Fig. 3.5 Pin assignment for relays

The device can be easily connected to a PLC independently of the respective version.

3.4.3 Switch Settings

Switch1: This switch allows a sinking or sourcing PLC to be connected (output current). For further information see section 3.4.1.

Switch2 :

- This switch allows the 'Enter' key to be locked to avoid accidental or unauthorized access to the Programmation and Test menus.
- The Switch2 when set in the unlocked position allows the parameter values to be changed (K-Factor, relays, current, ...) and when in the locked position access to the programmation and test menus is restricted.

3.4.4 CONNECTION OF THE PULSE OUTPUT

The pulse output can be easily connected to a PLC or counter independently of the power supply or version.

3.4.4.1 Connection of a PLC

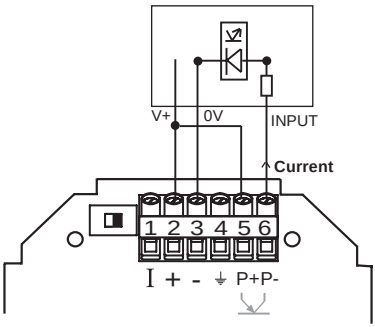


Fig. 3.6 PLC with common -

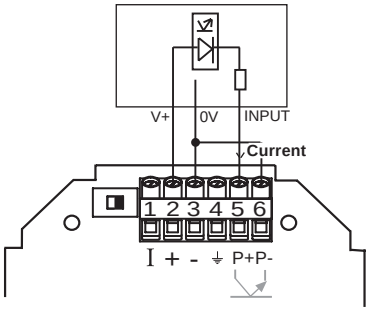


Fig. 3.7 PLC with common +

3.4.4.2 Connection of a load

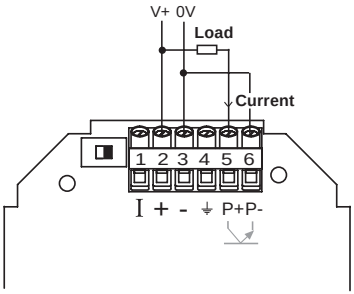


Fig. 3.8 Electromechanical counter or relay

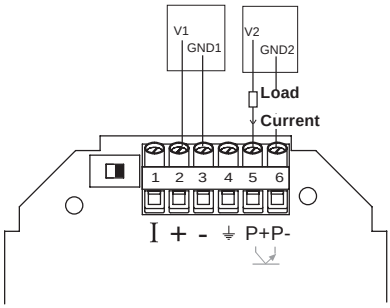


Fig. 3.9 Electronic counter with powered input

In the figures above ensure that the current does not exceed 100 mA.

For calculation of the load the following equation can be used;

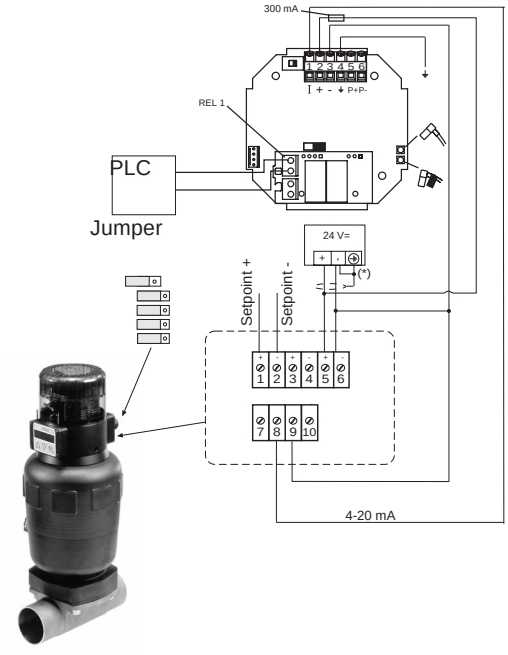
$$\text{Load} = \frac{V}{I}$$

Example:

V = 30V
I = 20mA
Load = 1500 Ω

3.5 CONNECTION EXAMPLES

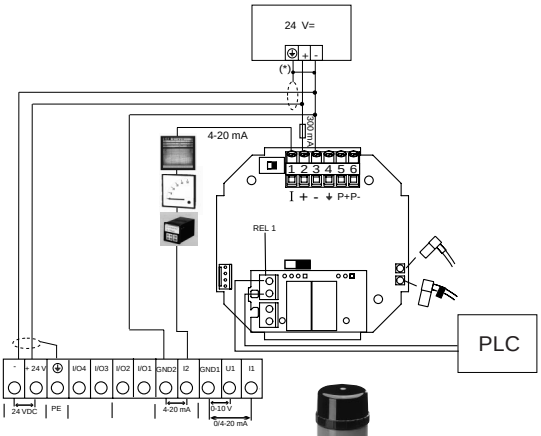
CONTINUOUS PNEUMATIC FLOW CONTROL



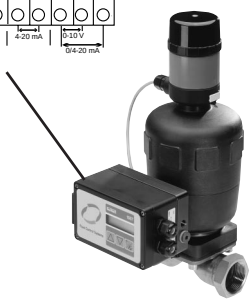
Connection between the 8045 flow transmitter 18-36VDC and the 8630 Top Control mounted on a diaphragm valve 2031.

(*) If direct earthing is impossible, connect a 100 nF-condensator between the negative terminal and the earth.

Connection between the 8045 flow transmitter 18-36VDC and the 1067 positioner mounted on a diaphragm valve 2031.



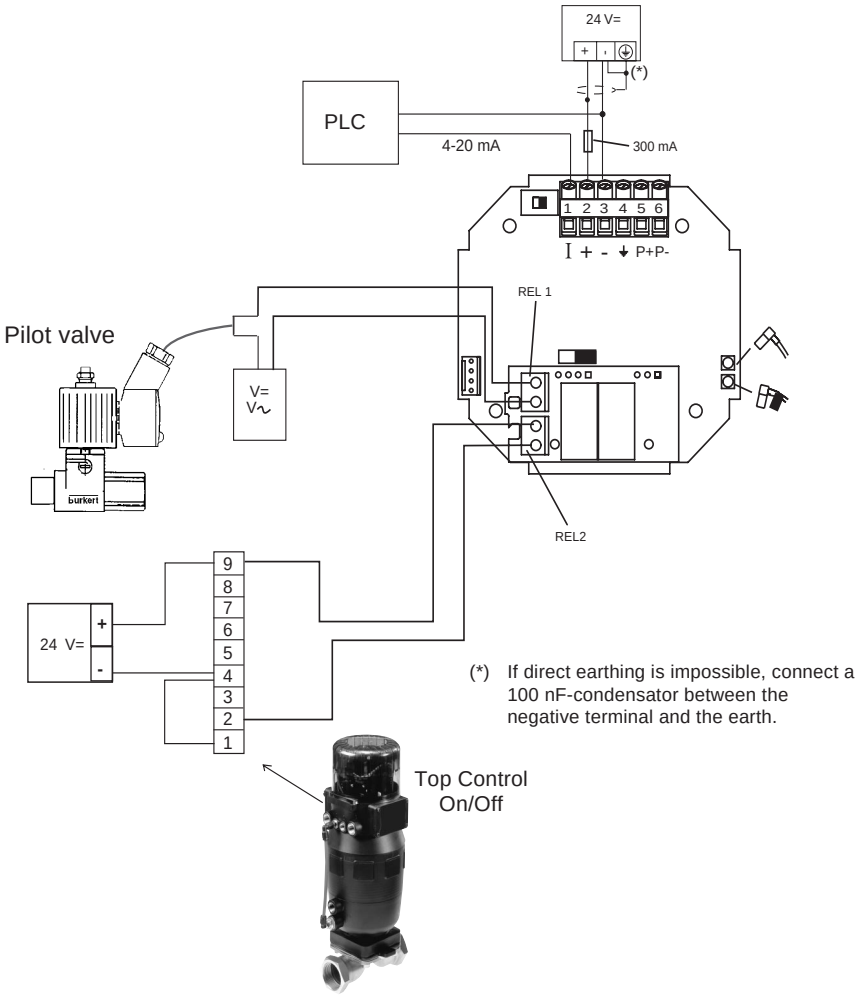
POSITIONER 1067



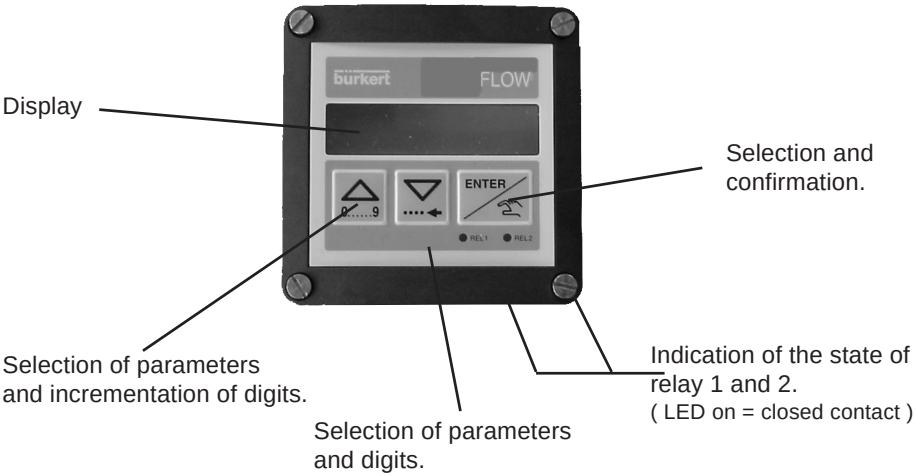
(*) If direct earthing is impossible, connect a 100 nF-condensator between the negative terminal and the earth.

ON/OFF FLOW CONTROL

Connection between the 8045 flow transmitter 18-36VDC and the 8631Top Control mounted on a diaphragm valve 2031 and a pilot valve 6012.



4.1 OPERATING AND CONTROL GUIDE



Keys	Menu Mode	Finding a value
0.....9	Previous Menu	Increase from the blinking digit
	Next Menu	Advance to the next digit
ENTER	Activate the menu displayed (If “END“ is displayed, save the modified parameters and return to the main menu	Validate the displayed value
0.....9 + 2 Seconds	Resetting of the daily totalizer*. (only available within daily totalizer option § - 4.3)	Modification of the decimal point: Know the K-Factor and impulse volume
+ ENTER 5 Seconds	Access or return to the CALIBRATION MENU*	
0.....9 + + ENTER 5 Seconds	Access or return to the TEST MENU*	

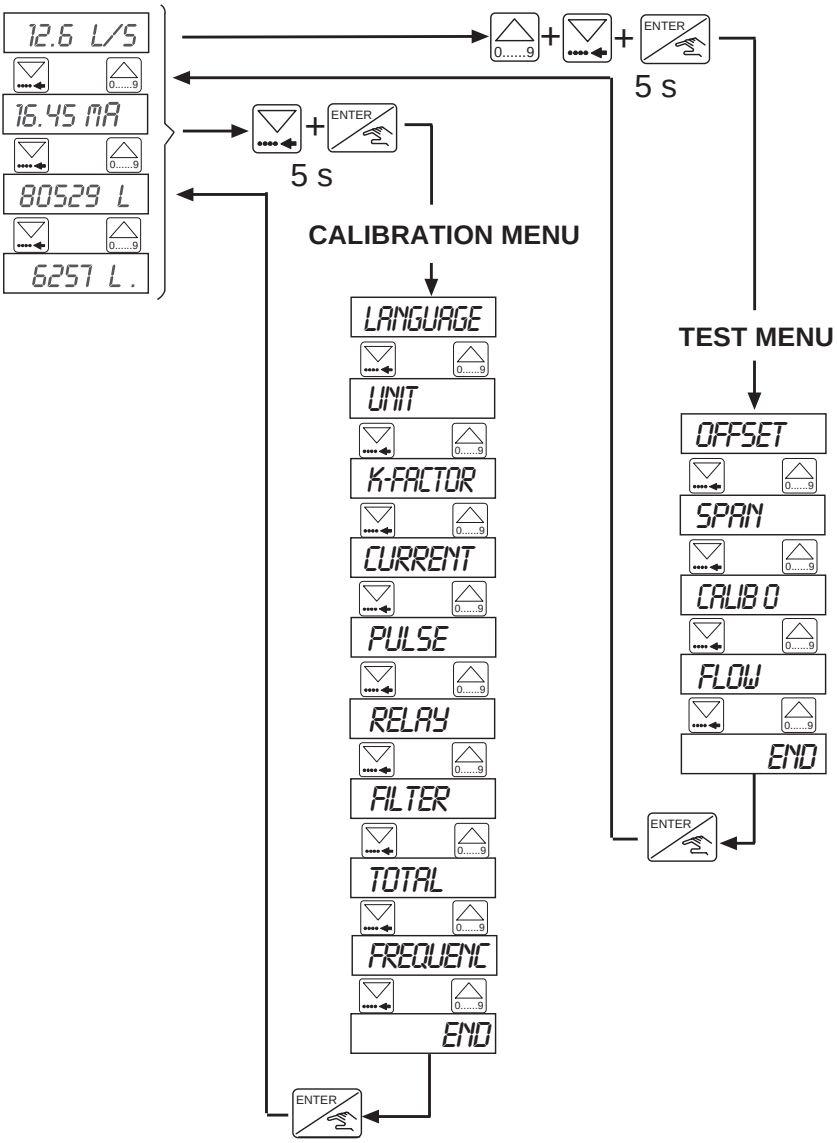
* Only available within the main menu.

The ENTER Key can be locked to avoid accidental or unauthorized access.

For further information see sections 3.4.1 & 3.4.3.

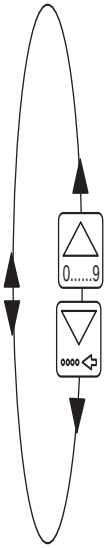
4.2 MENU GUIDE

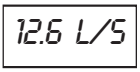
The menu guide below will assist in quickly and easily finding a desired parameter and programming the 8045 flow transmitter.



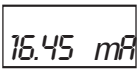
4.3 MAIN MENU

The following information is displayed within the Main Menu:

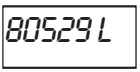




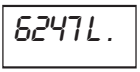
Flowrate : This is displayed in the selected engineering units (see calibration menu).



Output Signal : The output signal is 4-20mA and is proportional to the flow according to the selected measuring range.



Main Totalizer : This is displayed in the required engineering units (see calibration menu). To reset this totalizer see section 4.4.8 in the next menu.



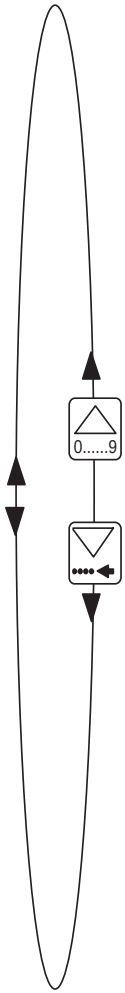
Daily Totalizer : This is displayed with the same engineering units as the main totalizer. A point behind the unit differentiates this totalizer from the main totalizer. To reset this value, simultaneously press the  keys for 2 seconds within this menu.

4.4 CALIBRATION MENU

PRESS   **SIMULTANEOUSLY FOR 5 SECONDS**

The internal Switch2 must be set in the unlocked position to enter parmeters within this menu. (§ 3.4.1)

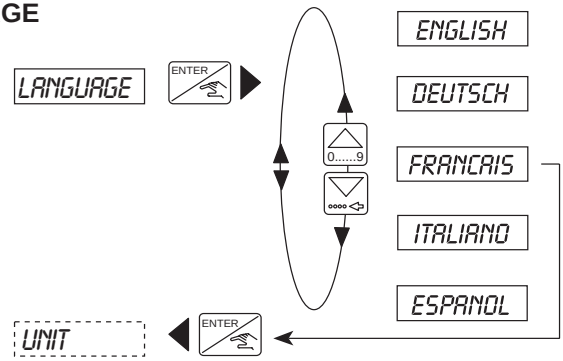
The following parameters can be set within this menu:



		SECTIONS
LANGUAGE	Selection between English, German, French, Italian and Spanish.	4.4.1
UNIT	Selection of engineering units to display flowrate and totalizer.	4.4.2
K-FACTOR	Input of K-factor according to chart or Teach-in function in order to determine the specific K-factor.	4.4.3
CURRENT	Determination of 4-20 mA measuring range.	4.4.4
PULSE	Parameter definition of pulse output (unit and volume).	4.4.5
RELAY	Parameter definition of relays. This message only appears if the relay option has been installed.	4.4.6
FILTER	Damping selection. There are 10 steps available and 2 filtering modes.	4.4.7
TOTAL	Totalizer resetting.	4.4.8
FREQUENC	Selection of the mains AC frequency (50 or 60 Hz).	4.4.9
END	Return to operation mode and storage of new parameters.	

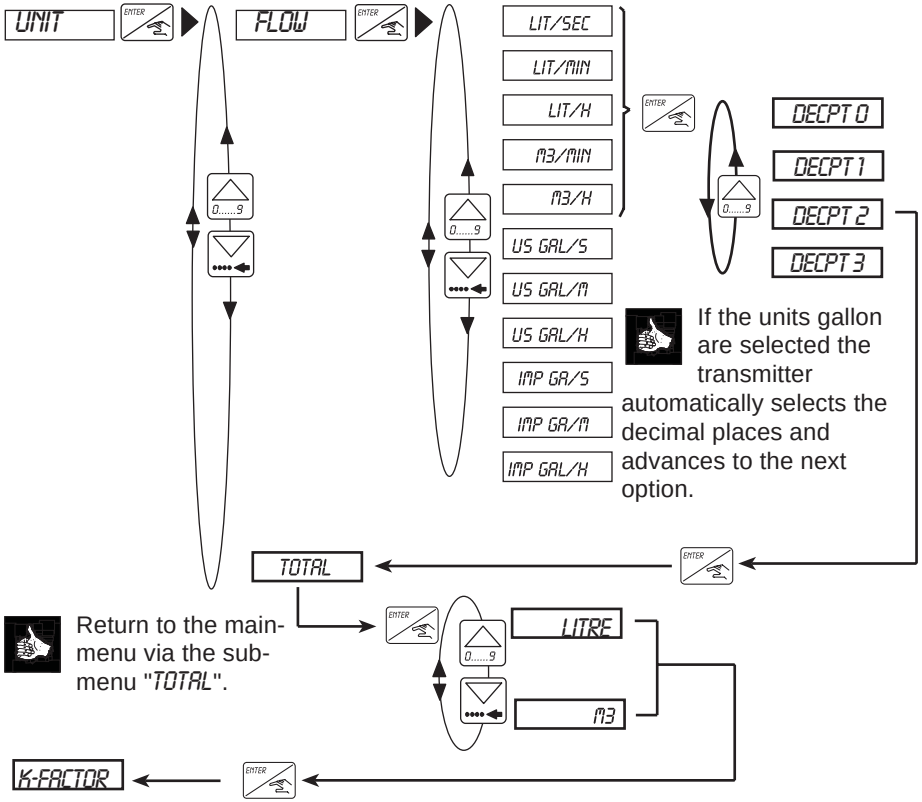
The following sections explain how to change the parameter values within the calibration menu above.

4.4.1 LANGUAGE



The required language is confirmed and activated via the ENTER-key.

4.4.2 ENGINEERING UNITS



If the units gallon are selected the transmitter automatically selects the decimal places and advances to the next option.

Return to the main-menu via the sub-menu "*TOTAL*".

The flow can be displayed in any engineering units with 0, 1, 2 or 3 decimal digits. (except m^3/min)

4.4.3 K-FACTOR

Within this menu the K-factor of the fitting can be entered manually according to the DN and material of the used fitting (see Type S020/1500/1501 Fitting reference manual) or a Teach-In procedure can be completed.
The teach-in procedure consists either of a volume measurement or a comparison measurement with another flow meter.

The transmitter uses the last K-factor entered or determined.
The max. authorized value for the K-factor is 999.99.

4.4.3.1 Manual Calculation of the K-Factor

For manual calculation and entry of the K-factor, the following equation can be used to determine the value. After the value has been determined select "*TEACH IN*" within the *K-FACTOR* option and enter the determined value.

8045 with a PVDF-sensor:

$$K_{8045} = K_{fitting} \times F_S \times K_W$$

8045 with a stainless steel sensor:

$$K_{8045} = K_{fitting} \times F_S$$

Where :

K fitting is the specific K-Factor of the fitting

F s is the specific cell constant of the sensor. This value is written on a sticker on the side of the sensor housing or on the cell cable.

K w is the temperature correction coefficient. This only needs to be used if the temperature > 40°C.

The correction coefficient depends on the pipe dimensions. Use the correct coefficient from the values below.

DN15 =+ 0.2 %/°C Kw= 1-(0,2 x (Tw °C- 20 °C)/100)
DN20/25 =+ 0.1 %/°C Kw= 1-(0,1 x (Tw °C- 20 °C)/100)
> DN25 = + 0.05 %/°C Kw= 1-(0,05 x (Tw °C- 20 °C)/100

Ex To assist with the manual determination of the K-Factor a worked example is displayed below; for a 8045 with a PVDF-sensor:

K fitting = 1.69 (DN15 in Brass)
F s = 1.01
Temp. of the fluid = 70°C
K w = 1 - (0.2 x (70°C - 20°C) / 100) = 0.9

K 8045 = 1.69 x 1.01 x 0.9 = 1.54

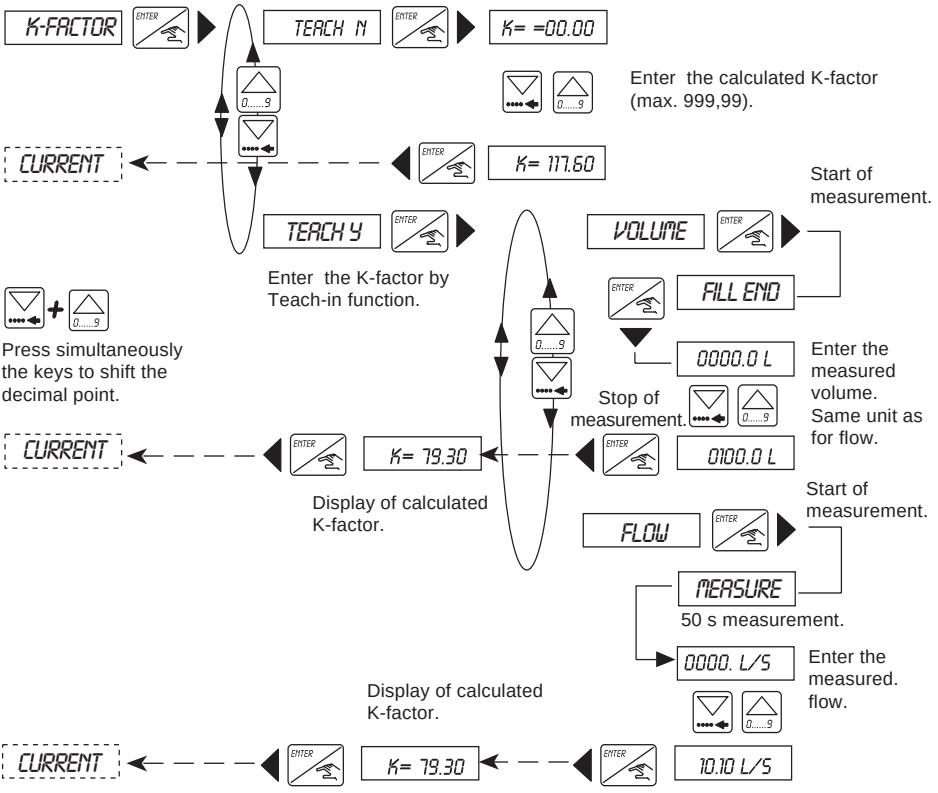
4.4.3.2 Determination of the K-Factor via Teach-In Procedure

The K-Factor can be practically determined via volume or flow measurement depending on the application.

Steps for successful measurement (Teach-In)

- In order to determine an accurate volume, fill a tank to 100 litres of the liquid to be measured.
- When the message "*TEACH Y*" appears, press the ENTER key and select the "*VOLUME*" option to start the measuring procedure.
- The message "*FILL END*" (end of filling) will then appear.
- After switch on a pump or open a valve.
- When the tank is full, switch off the pump or close the valve. If ENTER is pressed it will end the measurement.
- The user will then be asked to enter the volume (100 litres).
- The calculated K-factor is displayed after validation.

The Teach-In is also available with reference to a flow meter. In this case select the "*FLOW*" option on entry to the Teach-In function.

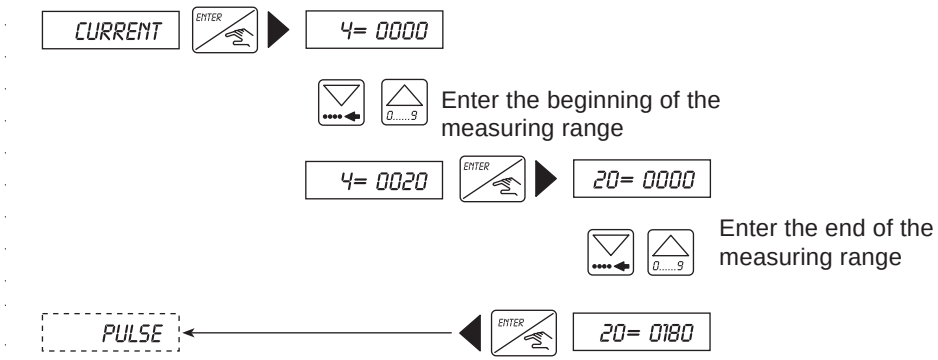


4.4.4 OUTPUT CURRENT

Within this option the measuring range can be defined corresponding to the output current of 4-20 mA.

- The beginning of the measuring range might be higher than the end (inverted signal), eg/ 20 to 180 l/min corresponds to 20-4 mA.
- The adjustments (engineering unit and decimal point) selected for the flow will be valid within this option.
- The minimal difference between the flow rate at 4 mA and 20mA is dependent on the position of the decimal point.

Number of decimals	0	1	2	3
Minimal flow difference	2	0,2	0,11	0,101



In case of electronic failure the device will emit an error signal of 22 mA.

The figure below shows an example of relationship between the 4-20mA output and the associated measuring range

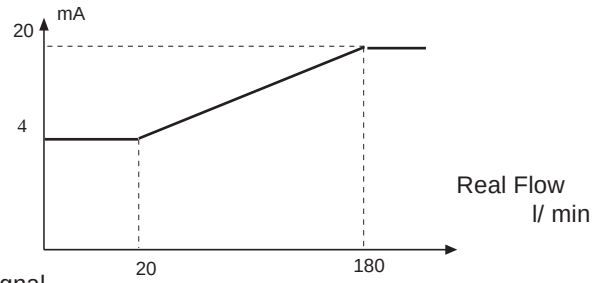
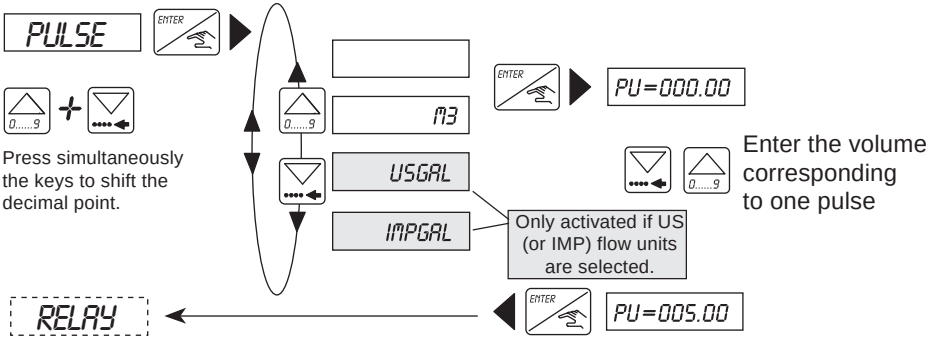


Figure 4.1 - Output Signal

4.4.5 PULSE OUTPUT



The parameters of the pulse output are defined. The volume inducing one pulse is determined. First enter the unit, then the value.

Ex 1 pulse corresponds to 100 l; Unit = litres and Pu = 100,00.

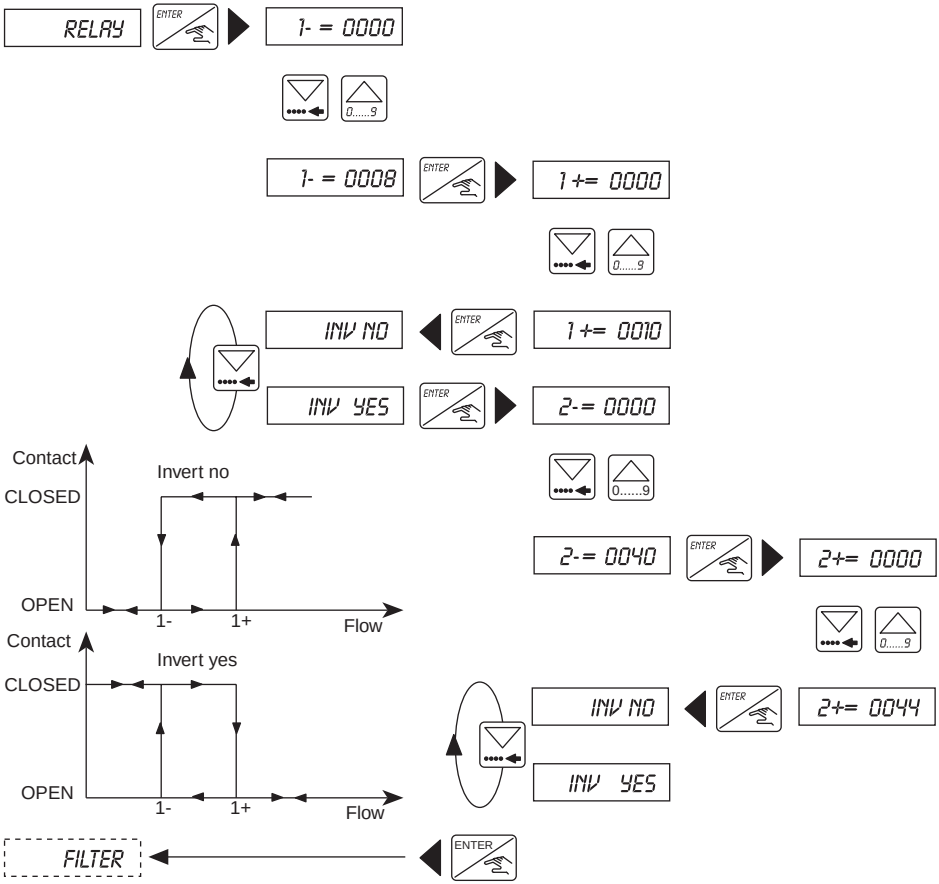
- **The pulse frequency is given by f = Q / Pu; frequency must never exceed 250 Hz. Select the Pulse value in order to obtain a maximum frequency ≈ 200 Hz.**
- **If the pulse frequency is smaller than 2Hz, the pulse width will equal 250ms.**
- **For pulse frequencies higher than 2Hz the duty cyclic is of 50%.**
- **If $\frac{Q}{Pu}$ is greater than 250Hz the frequency pulse will equal 0.00Hz.**

4.4.6 RELAY *(OPTION)*

The parameter definition of the limit contacts is completed within this mode. Two limit values are entered for each relay : 1 -, 1 + and 2 -, 2 +. The user also has the option to invert the relays.

- **The following conditions must be observed: 1- ≤ 1+, 2- ≤ 2+.**
- **Ensure that security provisions are taken for the relay circuits (3A max).**

Ex 1- and 2- = the low settings for both relays
1+ and 2+ = the high settings for both relays

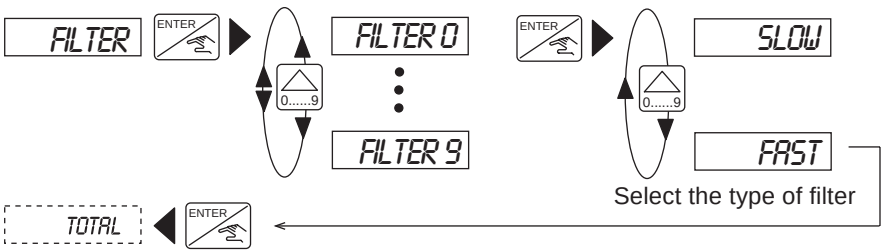


4.4.7 FILTER FUNCTION

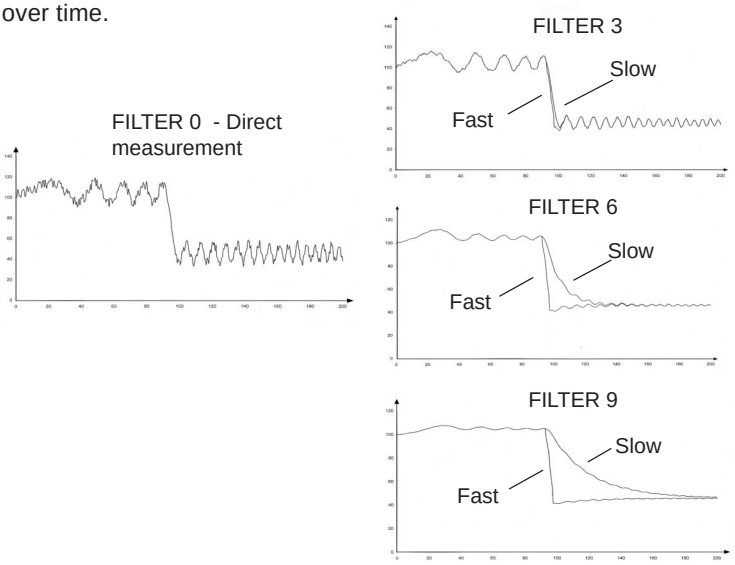
The filter function provides a damping effect to prevent fluctuation within the output current and display. There are 2 types of filter (fast and slow) each with 10 levels of damping available from 0 to 9 with 0 having no damping effect.

The “Fast“ filter is used when rapid changes within the varying flow can occur. (In cases of quick valve shut off the slow filter will take a few seconds to reach zero, while the fast filter will react immediately).

The “Slow“ filter may be used in bad measuring conditions (e.g. in case of electrical or magnetical interference, earthing problems, air bubbles in the fluid, hard fluctuating flow, ...).



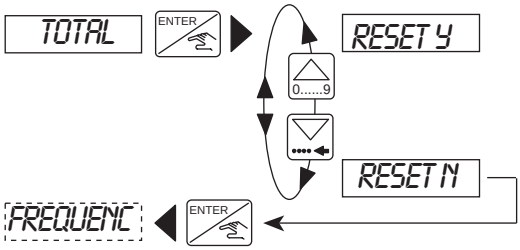
From the diagram below it is possible to see how the different filters influence the flow output over time.



4.4.8 TOTALIZER

The main and daily totalizers are simultaneously reset within this menu. The reset procedure only starts when ENTER is pressed at the "*END*" position in the menu.

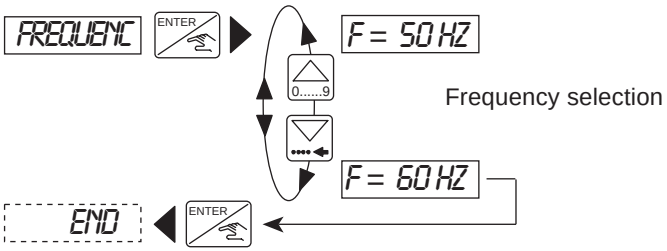
The transmitter totally resets both totalizers when the K-factor, or the units for flow and total are changed. The daily totalizer reset remains available in the main menu. (§ - 4.3)



To avoid any accidental or unauthorised reset of the totalizer, set the internal Switch2 to the locked position (section 3.4.3).

4.4.9 50/60 HZ NOISE REJECTION

This function will filter any spurious signals carried by the power supply, although ensure that the device is not located near any large machinery as this can affect the measurement readings. To filter the spurious signals enter the frequency of the main power source.



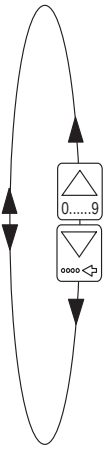
This function which cancels noises generated by the mains must be properly selected even if the transmitter is connected to a DC power supply.

4.5 TEST MENU

PRESS  **SIMULTANEOUSLY FOR 5 SECONDS**

The internal Switch2 must be set in the unlocked position to enter parameters within this menu. (§ - 3.4.1)

The following parameters can be set within this menu:



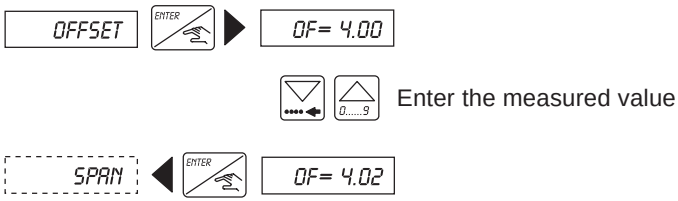
		SECTIONS
OFFSET	Offset adjustment (4 mA).	4.5.1
SPAN	Span adjustment (20 mA).	4.5.2
CALIB 0	Flow zero-point adjustment.	4.5.3
FLOW	Entering the flowrate to be simulated. The outputs will react in accordance to this input.	4.5.4
END	Return to the operation mode and storage of the new parameters for CALIB 0, OFFSET and SPAN. If the OFFSET/SPAN values are inappropriate the device will revert to "OFFSET" and new values must be entered.	

4.5.1 OFFSET ADJUSTMENT

Within this option the user has the possibility of correcting the basic setting of 4 mA generated by the transmitter. The transmitter generates a value of 4mA by pressing ENTER when"*OFFSET*" is displayed within the main test menu.

Measure the generated current with an ammeter. If the displayed value is incorrect it can be corrected by entering the measured value on the ammeter.

Adjustment range: + / - 0.5mA



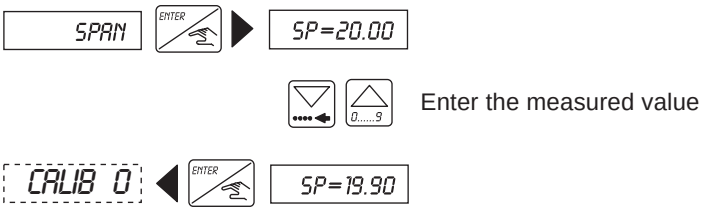
The corrected value of 4mA is calculated when ENTER is pressed when at the '*END*' position within the test menu.

4.5.2 SPAN ADJUSTMENT

Span compensation provides the option of changing the basic setting of 20 mA. The procedure is identical to that of the offset compensation above. The transmitter generates 20mA if the ENTER key is pressed when "*SPAN* " is displayed within the main test menu.

Measure the generated current with an ammeter. If the displayed value is incorrect it can be corrected by entering the measured value on the ammeter.

Adjustment range: + / - 0.5mA



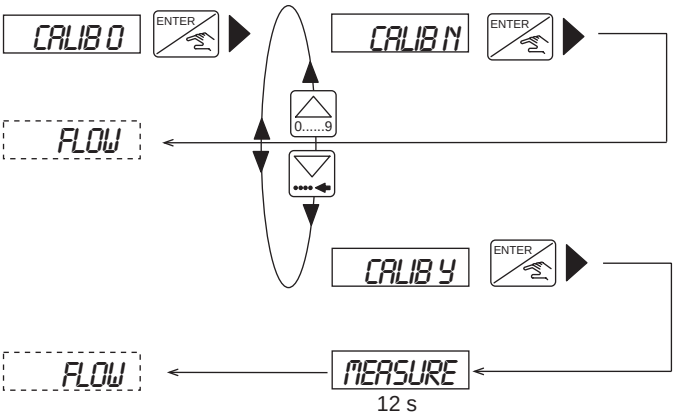
The corrected value of 20mA is calculated when ENTER is pressed when at the '*END*' position within the test menu.

4.5.3 CALIBRATION OF THE FLOW ZERO POINT

Fill the pipe with the measured fluid and stop the flow. To calibrate the flow zero point, press 'enter' when *CALIB 0* is diplayed within the test menu and select *CALIB Y*. After selection the transmitter will automatically set the flow zero-point after 12 seconds.

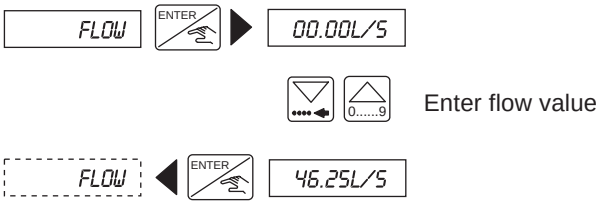
The sensor must be immersed in fluid 24hrs before calibration. Ensure there are no air bubbles in the pipe and the fluid is not moving before commencing the calibration.

This calibration is only valid for the actual parameters (pipe, fitting and fluid characteristics) and must be completed before the determination of the K-Factor via the Teach-In method.



4.5.4 FLOW SIMULATION

A flow value can be simulated within this menu, allowing the user to test the system without any liquid being present. The simulated value influences all the outputs including the relays and pulse output.



Press 0.....9 or to stop the flow simulation.

4.6 8045 SETTINGS

4.6.1 TYPE 8045 FLOW TRANSMITTER ON DELIVERY

Language		English	Relay	1-:	00.00
Unit of flow		L/s		1+:	00.00
Unit of totalizers		L		Inverted:	No
Decimal Points		2		2-:	00.00
K factor		1		2+:	00.00
Current	4mA	00.00		Inverted:	No
	20mA	00.00	Filter	Filter 2 Slow	
Pulse output unit		L	Frequency	50 Hz	
	PU:	00.00			

4.6.2 TYPE 8045 FLOW TRANSMITTER USER CONFIGURATION

IDENT NUMBER: **SERIAL NUMBER:**

Language		.....	Relay	1-:	.....
Unit of flow		.....		1+:	.....
Unit of totalizers		.....		Inverted:	.....
Decimal Points		.....		2-:	.....
K factor		.....		2+:	.....
Current	4mA	.....		Inverted:	.....
	20mA	.....	Filter	.....	
Pulse output unit		.....	Frequency	.....Hz	
	PU:	.....			

Fluid temperature value at calibration:

5.1 STORING AND CLEANING OF THE SENSOR

In correct installation conditions the 8045 flow transmitter is maintenance-free. If contamination or clogging should occur during operation the sensor can be cleaned with water or another cleaning agent compatible with the PVDF and SS316L.

It is highly recommended to perform a calibration of the zero point 24 hours after the cleaning of the electrodes, or in cases of changes of the fluid.

The current output is set to 22 mA in case of an electronic failure and at the start-up of the device all parameters are set to factory setting values (§ 4.6). The reasons for failure can be seen within “Display ‘ERROR‘ - output current 22mA“ in the trouble shooting guide below.

5.2 TROUBLE SHOOTING GUIDE

If any problems persist, please contact your local Bürkert subsidiary or return the product with a full explanation of the problem.

This section is designed to assist with problems which may occur during installation or operation. If in doubt please do not hesitate to contact you local Bürkert subsidiary.

Faults	Status	Actions	
The transmitter does not work			
Transmitter connected	No	Connect the device	3.3
Power supply on terminal + and - ok?	No	Check the connection	3.3
Power supply between 18-36VDC?	No	Change power supply	----
Power supply regulated (oscillations rate ≠ ±5%?)	No	Change power supply	----
Fuse OK	No	Change the fuses	----
Switch on	No	Set the switch ON	----
Transmitter programming/testing unavailable			
Internal switch 2 ‘Locked‘?	Yes	Set switch 2 to „unlock“.	3.4.1
Display ‘ERROR‘ - output current 22mA			
Display at the start-up (EEPROM failure)?	Yes	Restart the device	----
Error at each start-up?	Yes	Return the device	----
Display after validation of the menu (EEPROM failure)	Yes	Configure the device again	4.4
Failure at each validation of the menu?	Yes	Return the device	----
Fluctuating display			
Inappropriate filter ?	Yes	Increase the filter or select slow mode filtering.	4.4.7
Air bubbles in the fluid	Yes	Set slow mode filtering	4.4.7
The electrodes are dirty	Yes	Clean the electrodes	5.1
Are the electrodes passivated	No	Install the transmitter into the fluid 24hr before use	3.1

Faults	Status	Actions	
Is the conductivity rapidly fluctuating	Yes	Transmitter not suited for the application	----
Earth connection			
Is the earth connection good (No noise on the earth line)?	No	Use a non disturbed earth	----
Are metal pipes connected to the earth?	No	Connect the pipes to earth	----
Flow measurement incorrect			
Correct K-Factor?	No	Enter the correct coefficient or determine via Teach-In	4.4.3
The flow has stopped and the display does not equal zero	Yes	Perform a flow zero point calibration	4.5.3
Electrodes in contact with the fluid?	No	Plunge them into the fluid	
Arrow on the side of the housing indicates flow direction?	No	Turn the transmitter	3.1.1
Cable glands show downstream direction? (8045 with stainless steel sensor)	No	Turn the transmitter	3.1.1
Alignment of electrodes perpendicular to flow direction?	No	Turn the sensor	3.2
Current output value			
Switch 1 correctly set? (Sinking or Sourcing)	No	Select appropriate position	3.4.3
Connection of the current output OK?	No	Reconnect the current output	3.3
Fixed current output value			
Parameters for current output OK?	No	Program the current output	4.4.4
The relays do not work			
Parameters OK?	No	Program the relay outputs	4.4.6
Relays correctly connected?	No	Connect relays	3.3
Connection of relays 1 and 2 inverted?	Yes	Connect relays accordingly	3.3
Protection fuses for the relays OK?	No	Change the fuses	----
Relay switches ON?	No	Switch ON	----

6.1 SPECIFICATIONS

Specification in relation to the process

Flow measurement

Measurement type	Electromagnetical measurement
Measuring range	0,1 to 10 m/s (0.3 to 32.8 fps)
Measuring error	1) with individual works calibration (on request) or Teach-In: +/- 2 % o. R. (1-10 m/s) (*) 2) with standard mean K-Factor: +/- 4 % o. R. (1-10 m/s) (*)
Linearity	+/- (1 % o. R. + 0,1% o. F.S.) (*)
Repeatability	0.25 % of measured value

(*) Under reference conditions i.e measuring fluid = water, ambient and water temperatures of 20 °C, applying the minimum inlet and outlet pipes straights, matched inside pipe dimensions
o. R. = of Reading
o. F.S. = of Full Scale (10 m/s)

Piping installation

Fittings	Stainless steel, brass or plastic (PVDF, PP, PVC) Solvent/fusion spigots, threaded ports (G, NPT, Rc), buttwelding ends, flange, Tri-clamp - see instruction manual S020 - Ident. No.- 429633
Pressure rating	
with a PVDF sensor	PN 6
with a st. steel sensor	PN 16
Fluid temperature	
with a PVDF sensor	0 to 80 °C (32 to 176°F)
with a st. steel sensor	-25 to +110 °C (-13 to +230 °F)
Conductivity of the fluid	min. 20 µS/cm
Materials contacting the fluid	
Sensor armature	PVDF or Stainless-steel 316L (DIN 1.4404)
Electrodes	Stainless-steel 316L (DIN 1.4404)
Earth ring (version with PVDF sensor)	Stainless-steel 316L (DIN 1.4404)
Seals	EPDM (standard on versions with a stainless steel sensor) FPM (standard on versions with a PVDF sensor)
Electrode armature (version with st. steel sensor)	PEEK

Specificaton in relation to the control outputs

Electrical connection

Power supply	18-36 VDC regulated (oscillation rate ≤+/- 5%)
Consumption	300 mA max.

Proportional output

Output type	Current output from 4-20 mA (error signal 22mA)
Accuracy	Dependent on the measuring error - Maximum of 4%
Wiring	Sinking or sourcing mode

Proportional output (continued)

Response time	0,5 s to 150 s depending on the filter to reach 95% of a variation
Maximum Load (current loop)	1300 Ω at 30 VDC 1000 Ω at 24 VDC 700 Ω at 18 VDC

Pulse output

Output type	Isolated NPN / PNP open collector, galvanic insulation, max. 250 Hz
Specifications	36VDC max / 100mA max (protected against short-circuits and polarity reversals)

Relay output

Output type	Normally open relays
Relay output	2 relays, freely adjustable AC : 250V / 3A DC : 30V / 3A (resistive load) Max. cutting power : 750 VA (resistive load)
Life expectancy	100 000 cycles (minimum)
Thresholds	Hysteresis programmable according to the flow

Specification in relation to the user

User's interface

Display	15 x 60 mm LCD 8 digits, alphanumeric 15 segments, 9 mm high
Flow units	l, m^3, US gal, Imp gal / Per / sec (except m^3/sec.), min, hr
Display :	
Current output	Generated current indication : xx.xx mA
Relay state	Red LED's on when contact is closed
Programming	Menus with 3 programming keys
Protection	Lockable switch for the 'Enter' key

Processing

Filtering of the flow	10 levels of filtering (from 0 to 9, fast or slow mode)
Temperature coefficient	(cf § 4.4.3.1)

Specification in relation to the environment

Ambient conditions

Operating temperature	-10 to +60 °C (14 to 140 °F)
Storing temperature	-20 to +60 °C (-4 to 140 °F)
Relative humidity	max. 80 %, non condensated
Enclosure rating	IP65

Specification in relation to the environment (continued)

Construction

Dimensions maximum	166 x 88 x 116
Weight	
with a PVDF sensor	550 g (maximum)
with a st. steel sensor	650 g (maximum)

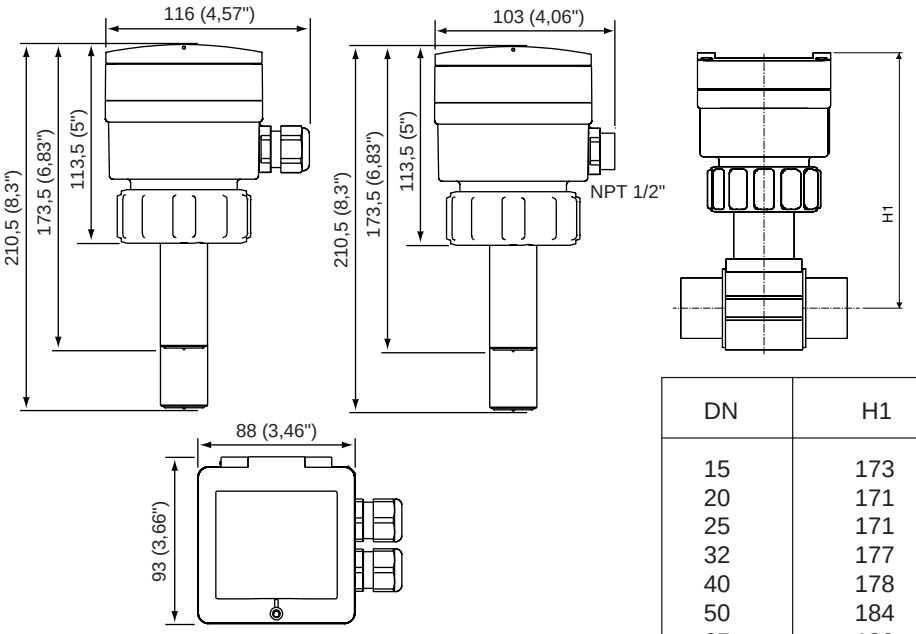
Materials in contact with the environment

Electronic housing	
with a PVDF sensor	PC, glass reinforced fibre (BUT cover in PC, not reinforced)
with a st. steel sensor	PPA, glass reinforced fibre
Protection cap	Topas COC (version with a stainless steel sensor)
Front plate	Polyester

Conformity to standards

Emission	According to generic norm EN 50081.1
Immunity	According to generic norm EN 50082.2
Security	According to generic norm EN 61010-1
Vibration	According to generic norm EN 60068-2-6
Shock	According to generic norm EN 60068-2-27

6.2 DIMENSIONS



DN	H1
15	173
20	171
25	171
32	177
40	178
50	184
65	190

6.3 DESIGN AND MEASURING PRINCIPLE

Design

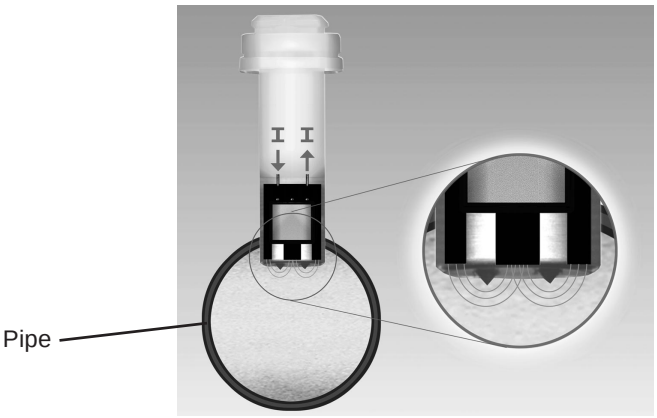
The 8045 compact flow transmitter combines a flow sensor and a transducer with display within a splash-proof IP65 plastic enclosure.

- The base of the sensor finger contains a solenoid and 2 electrodes which are in contact with the fluid to detect the induced voltage.
- The electronic module converts the induced voltage into a flow value which can be displayed.
- The transducer uses a 3-wire circuit and requires a power supply of 18-36 VDC. The output signals are provided via one or two cable glands.
- For additional control adjustable relays can be used (optional).

Measuring Principle

According to the induction law, a voltage is induced when a conductor is present within a magnetic field. The space between the 2 electrodes is filled with the conductive fluid creating a conductor.

- Through movement of the conductive fluid (min 20µS/cm) perpendicular to the magnetic field which is provided by the solenoid produces a proportional voltage to the flow velocity.
- This voltage is detected between the electrodes and is then converted and filtered according to the K-factor selected.
- The flow direction generates a positive or a negative value of the flow. The magnetic flow transmitter 8045 measures a flow velocity from 0.1 m/s (0.3 ft/s).
- A 4-20 mA standard signal, proportional to the flowrate is available as an output signal.
- In case of electronic failure a 22 mA signal is provided.



6.4 TYPE SPECIFICATION

8045 Electromagnetic Flow Transmitter
4-20 mA output; pulse output; 2 totalizers

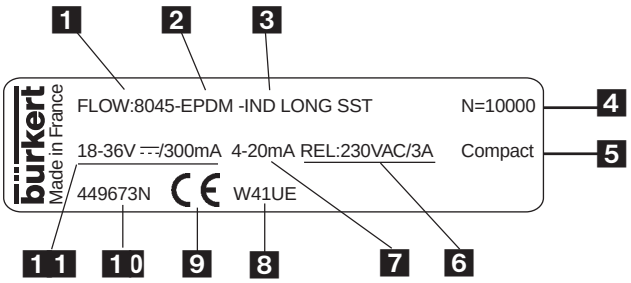
Power supply	Relays	Housing	Gasket	Sensor	Cable gland	Order code
18-36 VDC	No	PC	FPM	Short, PVDF	2	**426498**
18-36 VDC	No	PC	FPM	Long, PVDF	2	**426499**
18-36 VDC	2	PC	FPM	Short, PVDF	2	**426506**
18-36 VDC	2	PC	FPM	Long, PVDF	2	**426507**
18-36 VDC	No	PPA	EPDM	Short, st. steel	2	**449670**
18-36 VDC	No	PPA	EPDM	Long, st. steel	2	**449672**
18-36 VDC	2	PPA	EPDM	Short, st. steel	2	**449671**
18-36 VDC	2	PPA	EPDM	Long, st. steel	2	**449673**

6.5 STANDARD DELIVERY

From a standard delivery you should have received the following:

- 1 8045 Electromagnetic Flow Transmitter
- 1 Instruction manual (3 languages)
- 1 Instruction manual for fitting S020/1500/1501
- 1 set including 1 black EPDM-gasket for the sensor, 1 cable gland obturator, 1 multiway seal, 1 mounting instruction sheet.

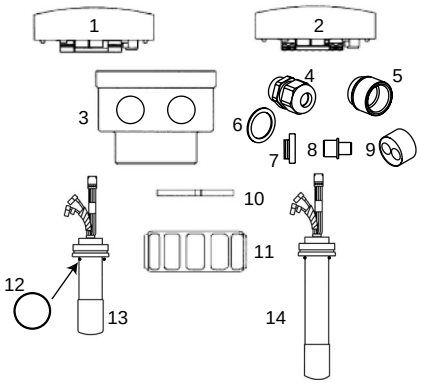
6.6 LABEL TYPE 8045

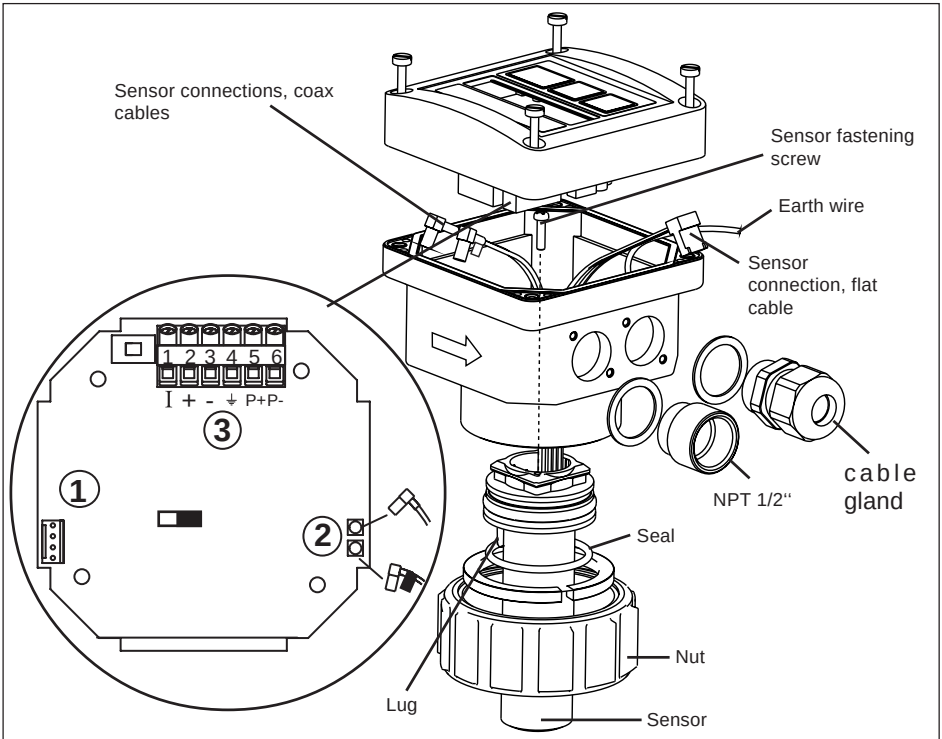


1. Transmitter type
2. Seal material
3. Sensor data
4. Serial number
5. Transmitter version
6. Relay characteristics
7. Current output
8. (Factory internal No.)
9. CE Mark
10. Order code
11. Power supply/Max. consumption

6.7 SPARE PARTS LIST

Position	Designation	Order code
1	PC cover with screws, front plate and PCB without relay	426530
	PPA cover with screws, front plate and PCB without relay	449757
2	PC cover with screws, front plate and PCB with 2 relays	426531
	PPA cover with screws, front plate and PCB with 2 relays	449758
3+11	PC housing for 2 cable glands + nut	425526
	PPA housing for 2 cable glands + nut	449754
4+6+7+9	Set with 2 cable glands M20x1,5 + 2 neoprene flat seals for cable gland or plug + 2 screw-plugs M20x1.5 + 2 multiway seals 2x6 mm	449755
5+6+7	Set with 2 reductions M20x1,5 / NPT1/2'' + 2 neoprene flat seals for cable gland or plug + 2 screw-plugs M20x1.5	551782
8+9+12	Set with 1 cable gland obturator M20x1,5 + 1 multiway seal 2x6 mm for cable gland or plug + 1 black EPDM gasket for the sensor + 1 mounting instruction sheet	551775
10	Ring	619205
11	PC nut for PC housing	619204
	PPA nut for PPA housing	440229
12	Set with 1 green FPM gasket + 1 black EPDM gasket	552111
13	PVDF sensor, short, for DN15 up to 100 (1/2" - 4")	444780
	Stainless steel sensor, short, for DN15 up to 100 (1/2" - 4")	449759
14	PVDF sensor, long, for DN >100 (> 4")	444781
	Stainless steel sensor, long, for DN >100 (> 4")	449760
	Instruction manual Fitting S020/1500/1501	429633





When mounting the transmitter, respect the following instructions:

Version with a PVDF sensor:

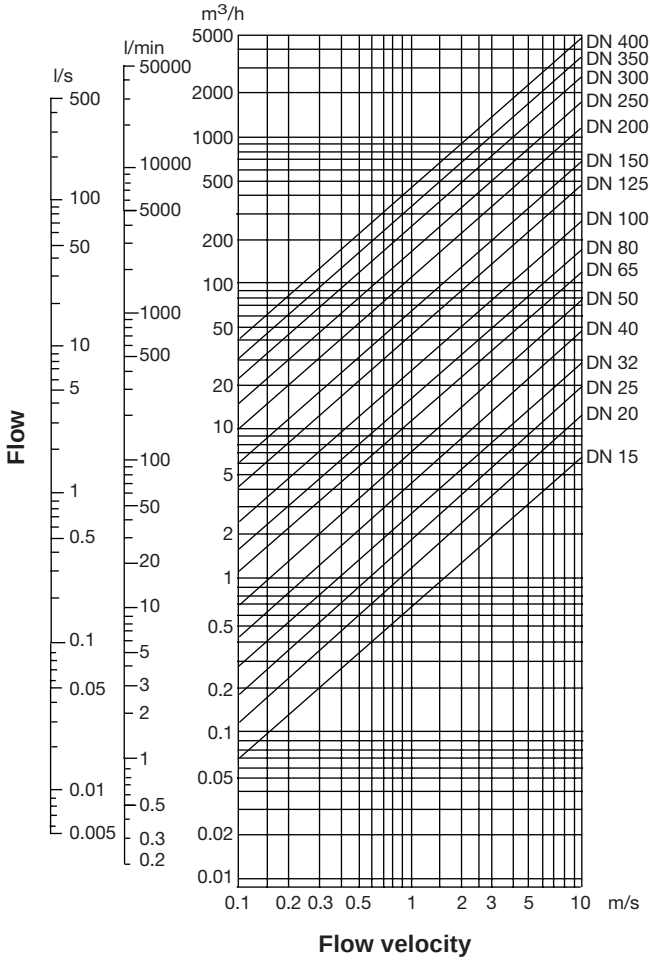
- connect the earth wire to the terminal N°4 of the terminal strip 3
- connect the flat cable to the connector 1
- connect the coax cables to the connectors 2 by respecting the connecting order
- replace all the seals
- orient the lug properly (see 3.1.1)
- fasten the sensor fastening screw

Version with a stainless steel sensor:

- connect the earth wire to the terminal N°4 of the terminal strip 3
- connect the flat cable to the connector 1
- connect the coax cables to the connectors 2 by respecting the connecting order
- replace all the seals
- orient the sensor so that the alignment of the electrodes is perpendicular to the arrow on the side of the housing (see 3.2)
- fasten the sensor fastening screw

Fig. 6.1 Spare parts exploded view of the 8045 electromagnetic flow transmitter

FLOW CHART (L/MIN, DN IN MM AND M/S)



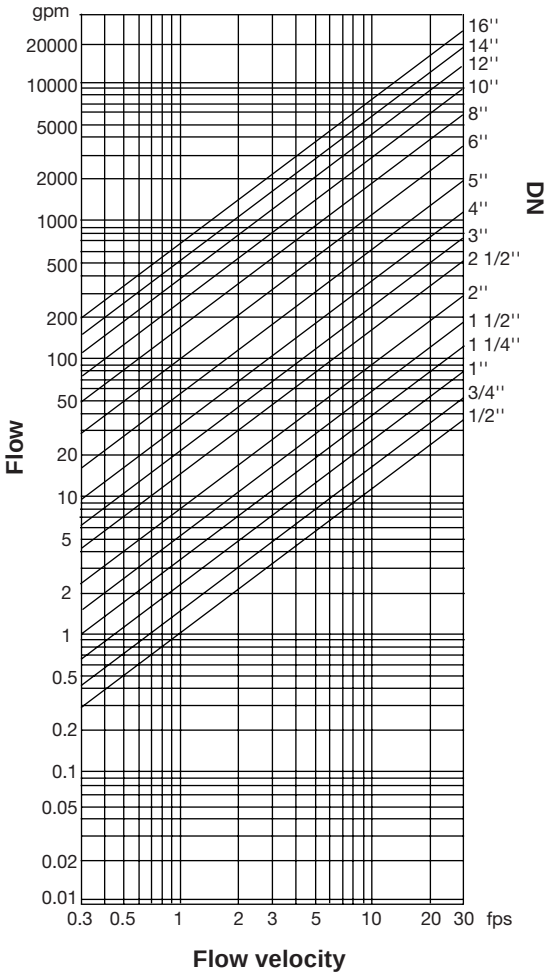
SELECTION EXAMPLE:

Specifications:
Nominal flow: 10 m³/h
Determination with ideal flow velocity: 2-3 m/s

With these specifications, the required fitting diameter, as defined by the flow chart is DN 40.

ENGLISH

FLOW CHART (GPM, DN IN INCH AND FPS)



SELECTION EXAMPLE:

Specifications:

Nominal flow:	50gpm
Determination with ideal flow velocity:	8 fps

With these specifications, the required fitting diameter, as defined by the flow chart is 1 1/2“.