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Dear Customer,

Before installing or mounting this device, please take our advice and read the entire manual thoroughly.

This will enable you to fully profit from all of the advantages offered by this product.

1.1 Unpacking and Control

Please verify that the product is complete and free from any damage.

If there is any loss or damage, please contact your local Bürkert subsidiary.

1.2 About this Manual

This manual does not contain any warranty statement. Please refer to our general terms of sale and delivery.

Only properly-trained staff should install and/or repair this product. If difficulties should occur at the time of installation, please contact your nearest Bürkert sales office for assistance.

1.3 User's Responsibility for Safety

Bürkert manufactures a broad range of flow transmitters. While each of these products is designed to operate in a wide variety of applications, it is the user's responsibility to select a transmitter model that is appropriate for the application, install it properly, and maintain all components. Special attention must be paid to the chemical resistance of the transmitter against the fluids which are directly contacting the product.



This symbol appears in the manual to call special attention to instructions that affect the safe installation, function and use of the product.

1.4 Electromagnetic compatibility

This device conforms to the EMC-Directive of the European Union 89/336/EEC. In order to comply with this directive, the wiring instructions must be followed.

2.1 Transmitter type specification

A flow transmitter 8035 is consisting of a S030 fitting which houses the paddle-wheel and an electronic transmitter SE35, specially designed to be installed on the fitting. Please order the S030 Fitting separately.

For more informations about the fittings see the corresponding instruction manual.

Version	Cable Input	Order code
Transmitter 2 Totalizers, Power Supply 12-30 VDC, 4...20 mA		
Pulse Output	DIN43650	423915
Pulse Output	2 x cable glands	423916
Pulse Output, 2 relays	2 x cable glands	423918
Pulse Output on relay REED	2 x cable glands	423919
Transmitter 2 Totalizers, Power Supply 115-230 VAC, 4...20 mA		
Pulse Output	2 x cable glands	423922
Pulse Output, 2 relays	2 x cable glands	423924
Pulse Output on relay REED	2 x cable glands	423925

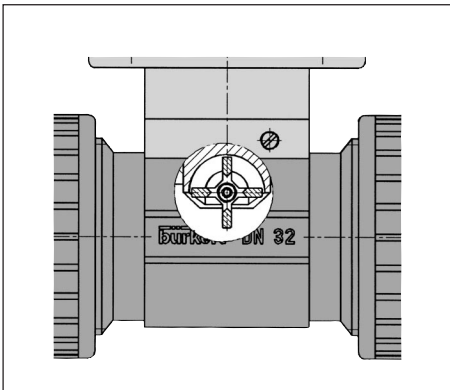
2.2 Design and Measuring Principle

Design

The flow transmitter 8035 consists of an electronic IP65 housing SE35 set by quarter turn on the fitting S030. The electronic housing integrates the electronic board with display, programming keys and also a the transducer (coil). The paddle-wheel is mounted in the fitting..

The transducer component converts the measured signal and displays the actual value.

The output signals are provided via a 4-pole plug or via two cable glands.



Measuring Principle

When liquid flows through the pipe, 4 magnets inserted in the paddle-wheel set in rotation produce a measuring signal in the 8035 transducer.

The frequency modulated induced voltage is proportional to the flow velocity of the fluid. A conversion coefficient, specific to each pipe (size and material) enables the conversion of this frequency into flowrate. This coefficient (Factor-K in pulse/liter) is available in the instruction manual of the inline fitting (S030).

The transducer without relay functions in a 2-wire circuit and requires a power supply of 12...30 VDC. A 4...20 mA standard signal is available as output signal, proportional to the flow rate. A pulse output with transistor open collector NPN/PNP or relay Reed (option) is available.

The transducer with two additional relays functions in a 3-wire circuit. Limit values are freely adjustable (not available with relay Reed option).

The flow transmitter 8035 measures a flow rate from 0.3 m/s (1.0 ft/s).

The flow transmitter electronic module SE35 can receive a power supply 230/115 VAC as an option.

2.3 Electronic module SE35: External dimensions

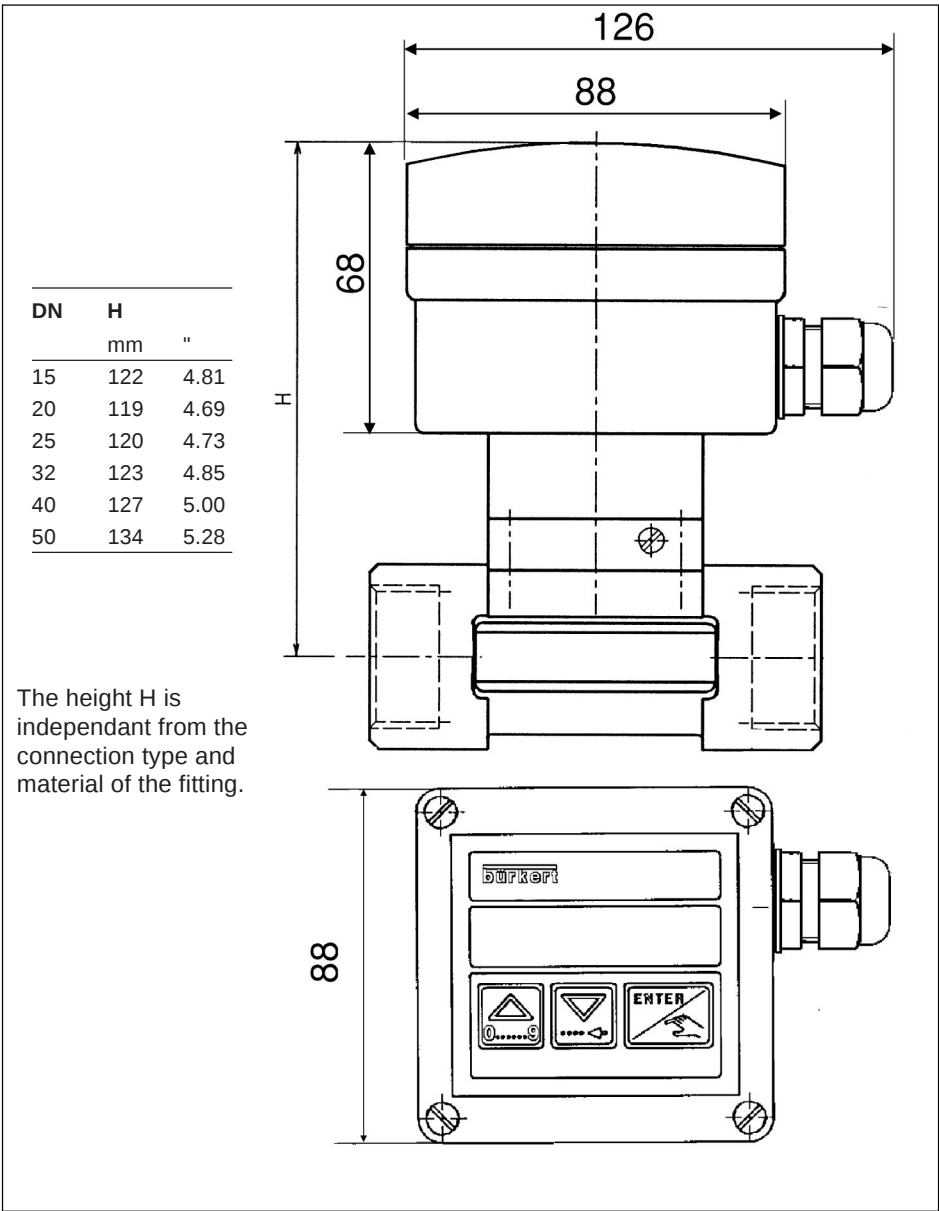


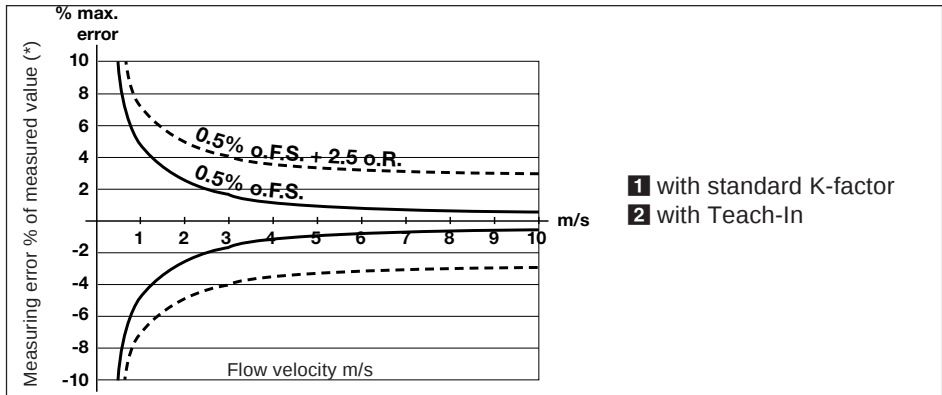
Fig. 2.1 Electronic enclosure SE35 external dimensions

2.4 Technical Data

Pipe diameter	from DN08 to DN65 (1/4" to 2"1/2)
Measuring range	0,3 to 10 m/s (1.0 to 32.8 ft/s)
flow range	as from 1 l/min (DN08 pipe, 0.3 m/s flow velocity)
flow range	as from 0.3 gpm (1/4" pipe, 1.0 ft/s flow velocity)
Plastic fitting	PVC; PP; PVDF
Pressure class	PN10
Fluid temperature max	PVC: 50 °C (132°F); PP: 80 °C (176°F); PVDF: 100 °C (212°F)
Metal fitting	Stainless-stel (316L 1.4404); brass
Pressure class	PN16
Fluid temperature max:	100 °C (212°F)
Ambiant temperature	0 to 60 °C (32 to 140 °F)
Storage temperature	0 to 60 °C (32 to 140 °F)
Relative humidity	80 %
Enclosure	IP65
Measuring error	1.With In-line calibration (Teach-In): $\leq \pm 0.5\%$ o.F.S. (at 10 m/s) * 2.With standard mean K-Factor: $\leq \pm (0.5\% \text{ o.F.S.} + 2.5\% \text{ o.R.})$ * $\leq \pm 0.5\%$ o.F.S. (at 10 m/s) *
Linearity	
Repeatability	0.4% o.R. *
Display	15 x 60 mm LCD 8 digits, alphanumeric, 15 segments, 9 mm high
Sensor holder	PVDF, PP, PVC, SS 316L (1.4404), Brass
Paddle-wheel	PVDF
Axis and bearing	ceramic; O-rings FPM
Electronics housing	PC; Front plate foil polyester
Voltage supply	12...30 VDC (115/230 V as an option)
Output signal	4...20 mA
Load	max. 900 Ω at 30V; max. 500 Ω at 24V; max. 100 Ω at 15V; max. 800 Ω at 115/230 VAC
Pulse output	Open collector NPN and PNP, 0...30 V, 100 mA, protected, freely adjustable
Pulse output relay REED	Contact relay REED, closing 0,1 s. Opening depending on flow rate (0.1 s min. U max: 34 V, 0.2 A
Relay output (optional)	2 relays, 3 A, 220 V, freely adjustable

(*) Under reference conditions i.e. measuring fluid water, ambient and water temperature 20°C, applying the minimum inlet and outlet pipe straights, matched pipe dimensions.

o.F.S. = of standard Full Scale (10 m/s) - o.R. = of Reading



Measuring error with/without Teach-In (cf § 2.4)

3.1 Installation Guidelines



The flow transmitter 8035 can only be used to measure pure, liquid and water resembling fluids (solids content $\leq 1\%$, viscosity max. 300 cSt with on-line calibration). Observe pressure-temperature dependence according to the fitting material.

Installation Guidelines

The pipe must be completely filled with the liquid, i.e. air bubbles must not be present. The flow sensor is not designed for gas flow measurement.

The device must be protected from constant heat radiation and other environmental influences, such as direct exposure to sunlight. The recommended upstream and downstream straight pipe length should respect $10 \times \text{DN}$ in and $3 \times \text{DN}$ out. According to pipe's design, necessary distances can be bigger or use a flow tranquilizer to obtain the best accuracy. For more informations please refer to EN ISO 5167-1.

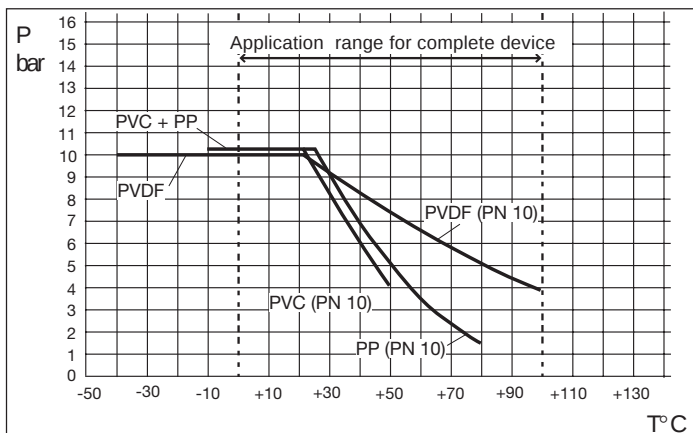


Fig. 3.1 Pressure-Temperature-Diagram

The flow sensor can be installed in either horizontal or vertical pipe.

The suitable pipe size is selected using the diagram on the end pages (G-3). Pressure and temperature ratings must be respected according to the selected fitting material. (see fig. 3.1)

3.2 Process mounting

The flow sensor electronic SE35 can be easily installed in pipes using the specially designed fitting system S030.

1. The fitting **1** must be installed into the pipe according to the installation specifications in section 3.1.

2. Fasten the electronic housing **2** to the fitting using the bayonet connection, and turn by 90 °.

3. Tighten the electronic housing with the screw **4**.

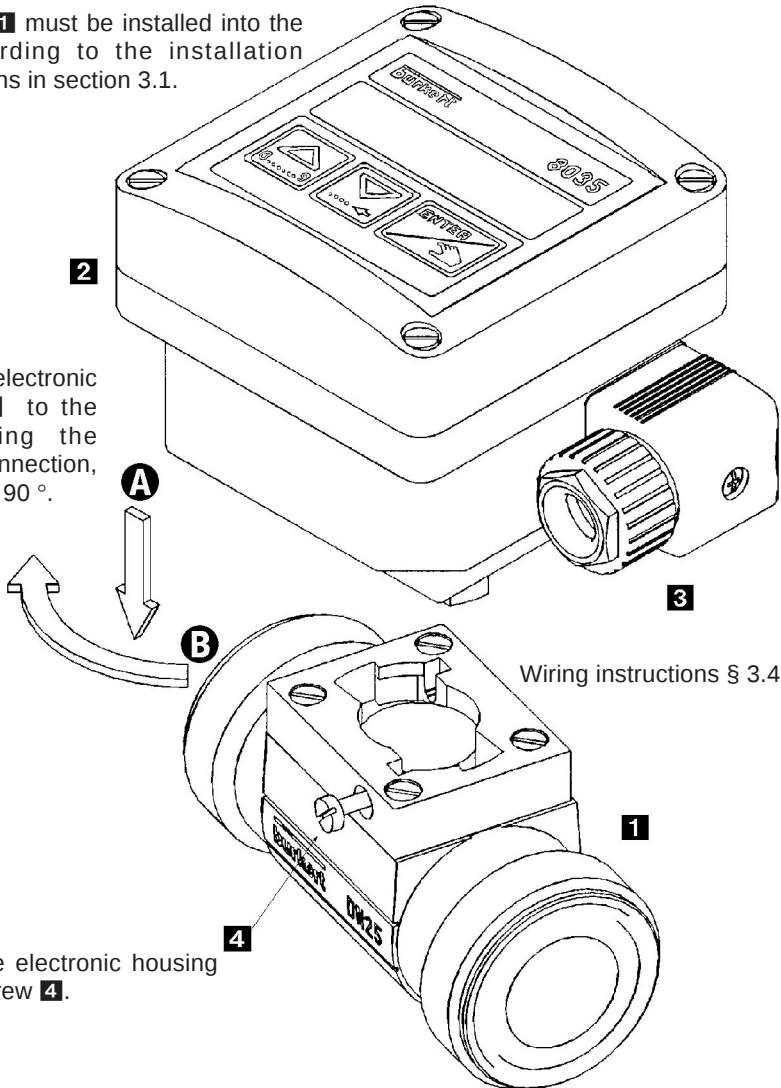


Fig. 3.2 Flow transmitter 8035 mounting diagram

3.3 General Electrical Connection

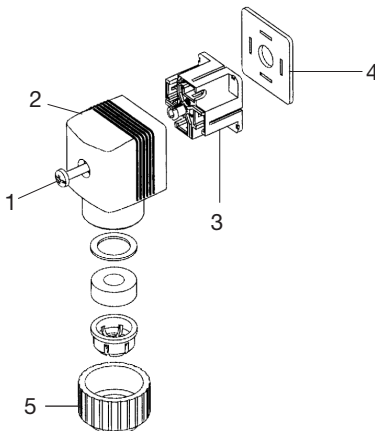
The connecting line conducts the measuring signal and must not be installed in combination with high voltage or high frequency carrying lines. If a combined installation cannot be avoided, either keep a min. space of 30 cm (approx. 1 ft) or use coax cables. When using coax cables observe faultless grounding of the shield. For normal operating conditions, the measuring signal can be transmitted by a simple cable of 0.75 mm² cross section. Always use a coax cable in case of doubt.

The power supply must be of good quality (filtrated and regulated).

Note: For EMC purposes, the earth must be connected via the earth lug on the side of the enclosure. This point must be connected locally to a good earth.

3.4. Electrical wiring

3.4.1 Connecting Transmitter SE35 without relay



Wiring via cable plug DIN 43650

Standard DIN 43650 plug connector with cable gland, pipe cross section max. 1.5 mm², IP65 rating (fig. 2). Open plug and wire according following instructions:

- 1: L+ (12...30 VDC)
- 2: Pulse output ⊕
- ⊖: Pulse output ⊖
- 3: L-

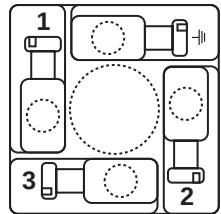


Fig. 3.3 DIN 43650 cable plug assembly

- Remove part [3] from part [2].
- Wire according to pin assignment.
- Replace part [3].
- Tighten the cable gland [5].
- Place gasket [4] between the DIN43650 connector and the fixed connector of the 8035.
- Connect the DIN 43650 connector to the 8035.
- Tighten screw [1].

Note: The pulse output of the Transmitter SE35 can easily be connected to a PLC.(fig. 3.5).

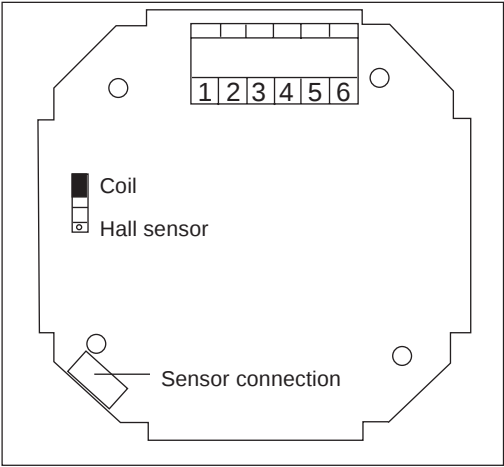


Fig. 3.4 Pin assignment SE35 without relay

Connection through cable gland

Remove cover, pull cable through cable gland and wire according to following pin assignment (fig. 3.4).

- 1: Not assigned
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)
- 5: ⊖ pulse output
- 6: ⊕ pulse output

PLC-connection:

The current output of the transmitter electronic module SE35 without relay can easily be connected to any type of PLC. (see fig. 3.5).

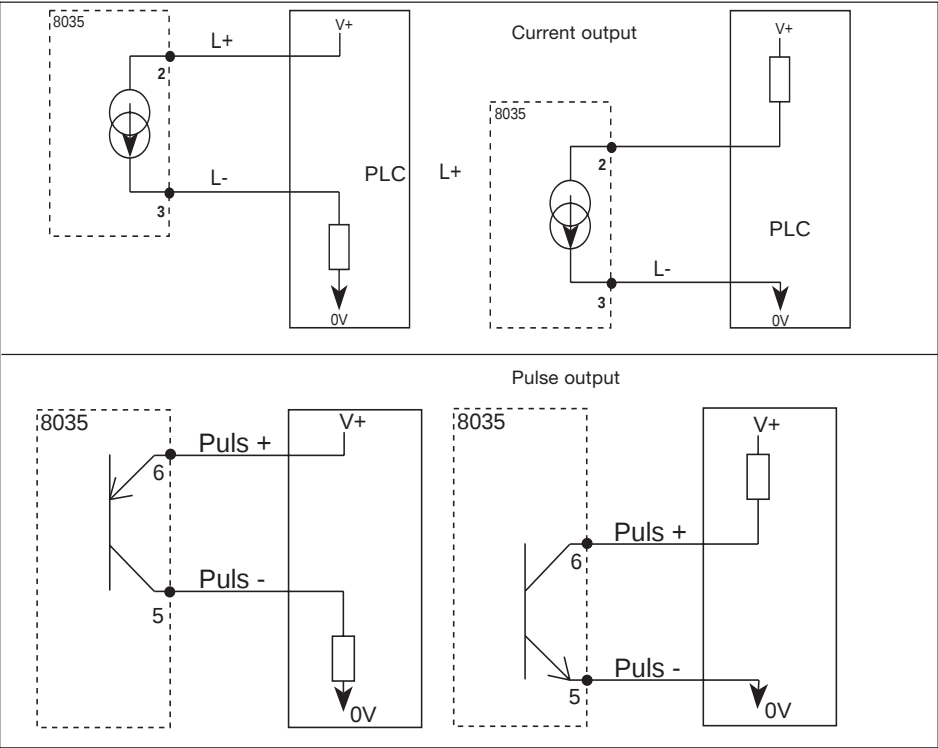


Fig. 3.5 SE35 without relay, connection to a PLC

3.4.2 Connecting SE35 with relays

Connection to cable gland

Ensure the electrical wiring via 2 cable glands. Remove cover, pull cable through cable gland and wire according to following pin assignment (fig. 3.6):

- 1: Current output 4...20 mA
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)
- 5: ⊖ pulse output
- 6: ⊕ pulse output
- 7: Relay 2 
- 8: Relay 2 
- 9: Relay 1 
- 10: Relay 1 

PLC-connection: Depending on the PLC-version, set the switch **1** on the circuit board to position A or B (fig. 3.6 and fig. 3.7).

4-20 mA Output: If the 4-20 mA current output is used, remove the strap (1-3) (see fig. 3.6).

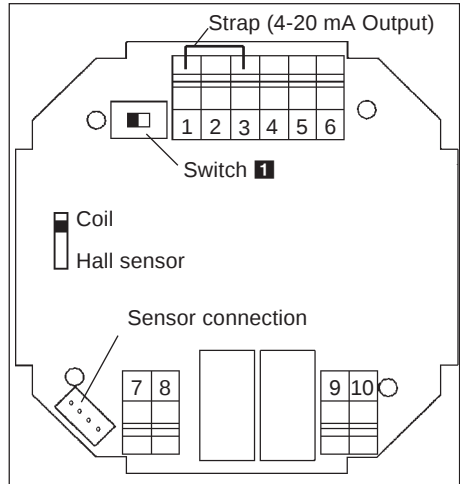


Fig. 3.6 Pin assignment SE35 with relays

Warning: If the current output 4...20 mA is not used: set the switch **1** in position A (fig. 3.7) and the strap between 1-3 (fig. 3.6).

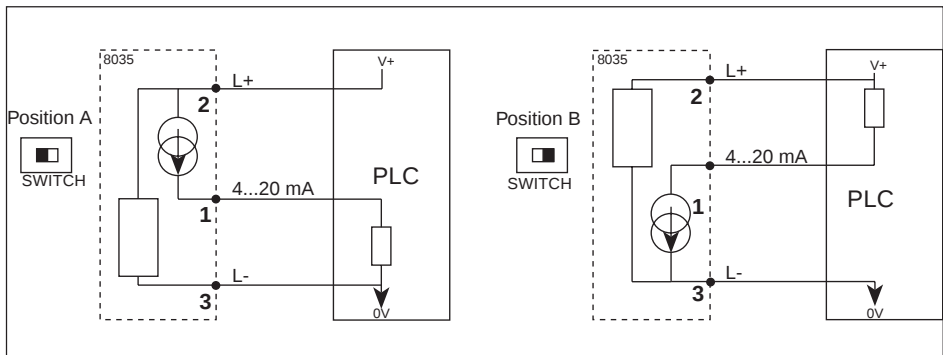


Fig. 3.7 SE35 with relays, 4-20 mA output connection to a PLC

3.4.3 Connecting the pulse output to a PLC

The pulse output of the flow transmitter SE35 (with or without relay) can easily be connected to any type of PLC (see fig. 3.5).

3.4.4 Electrical wiring with Power Supply 115/230 VAC (option)

Remove the cover of the transmitter, the power supply board is in the bottom of the housing. Pull the cable through cable gland and connect according to fig. 3.8.
The connection of the output signals (current, pulse and relays) is identical to the connection of the 12-30 VDC transmitter version.

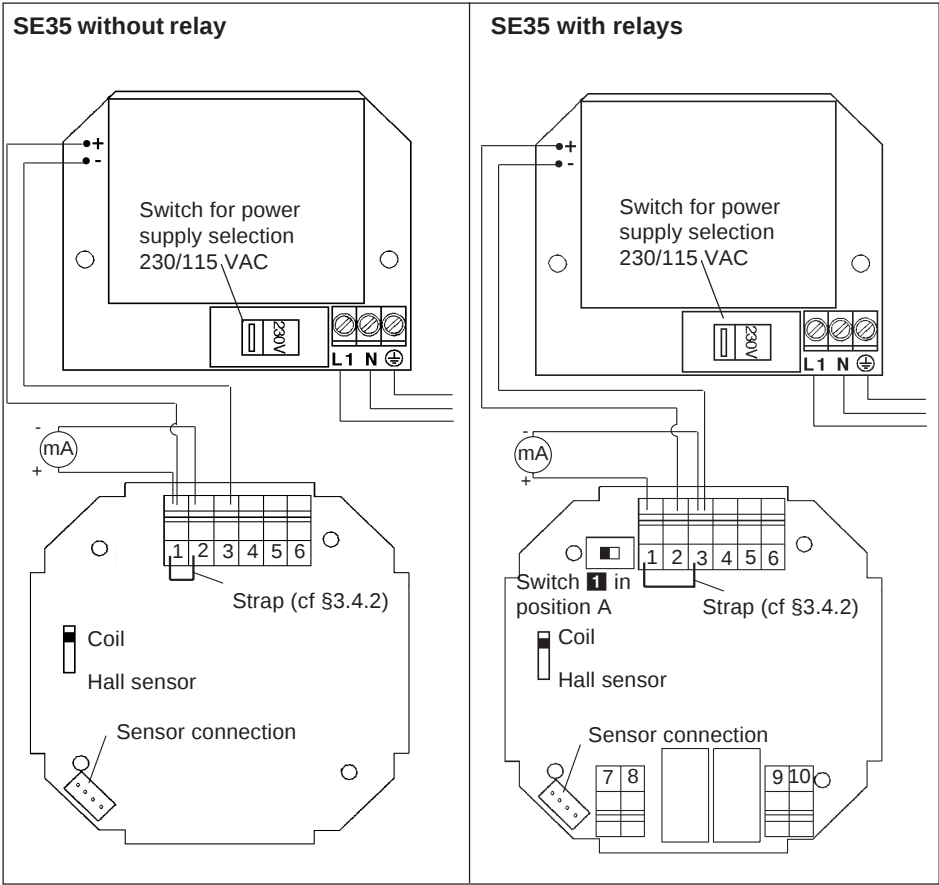


Fig. 3.8 Electrical wiring 115/230VAC power supply

Warning: If the current output 4...20 mA is not used: set the switch **1** in position A (fig. 3.7) and the strap across 1-3 (fig. 3.6).

3.4.5 Electrical connection electronic module SE35 with pulse output on relay REED

Connection to cable gland

Ensure the electrical wiring via 2 cable glands. Remove cover, pull cable through cable gland and wire according to following pin assignment (fig. 3.9):

- 1: Current output 4...20 mA
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)
- 5: Pulse (relay REED)
- 6: Pulse (relay REED)

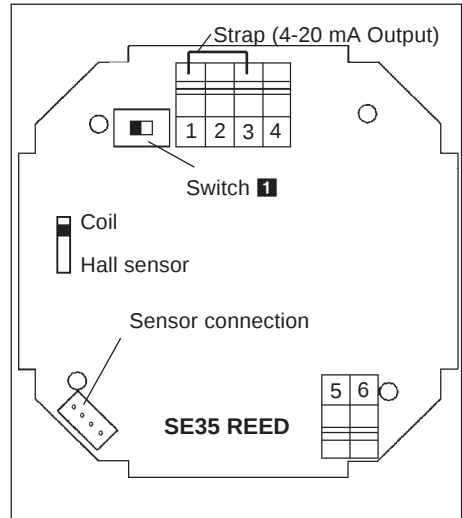


Fig. 3.9 Wiring SE35 with relay REED

PLC-connection: Depending on the PLC-version, set the switch **1** on the circuit board to position A or B (fig. 3.9 and fig. 3.10).

4-20 mA Output: If the 4-20 mA current output is used, remove the strap (1-3) (fig. 3.9).

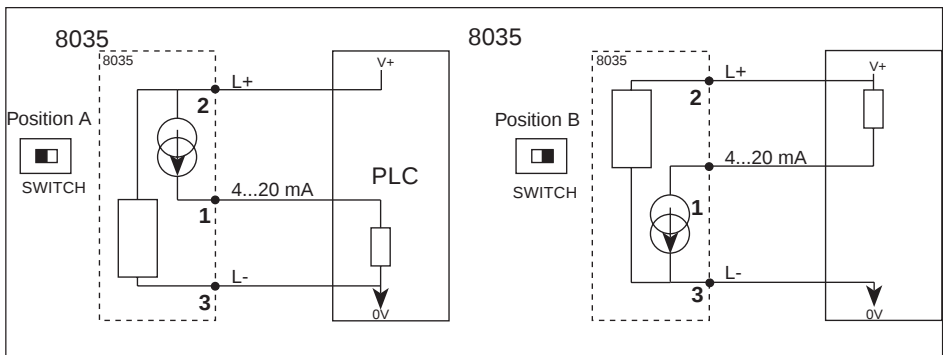


Fig. 3.10 SE35 with relay REED, 4-20 mA output connection to a PLC



Warning: If the current output 4...20 mA is not used: set the switch **1** in position A (fig. 3.10) and the strap across 1-3 (fig. 3.9).

3.4.6 SE35 with relay REED and 115/230 VAC (option)

Remove the cover of the transmitter, the power supply board is in the bottom of the housing. Pull the cable through cable gland and connect according to fig. 3.8.

The connection of the output signals (current and pulse on relay REED) is identical to the connection of the transmitter SE35 with relay REED version 12/30 VDC.

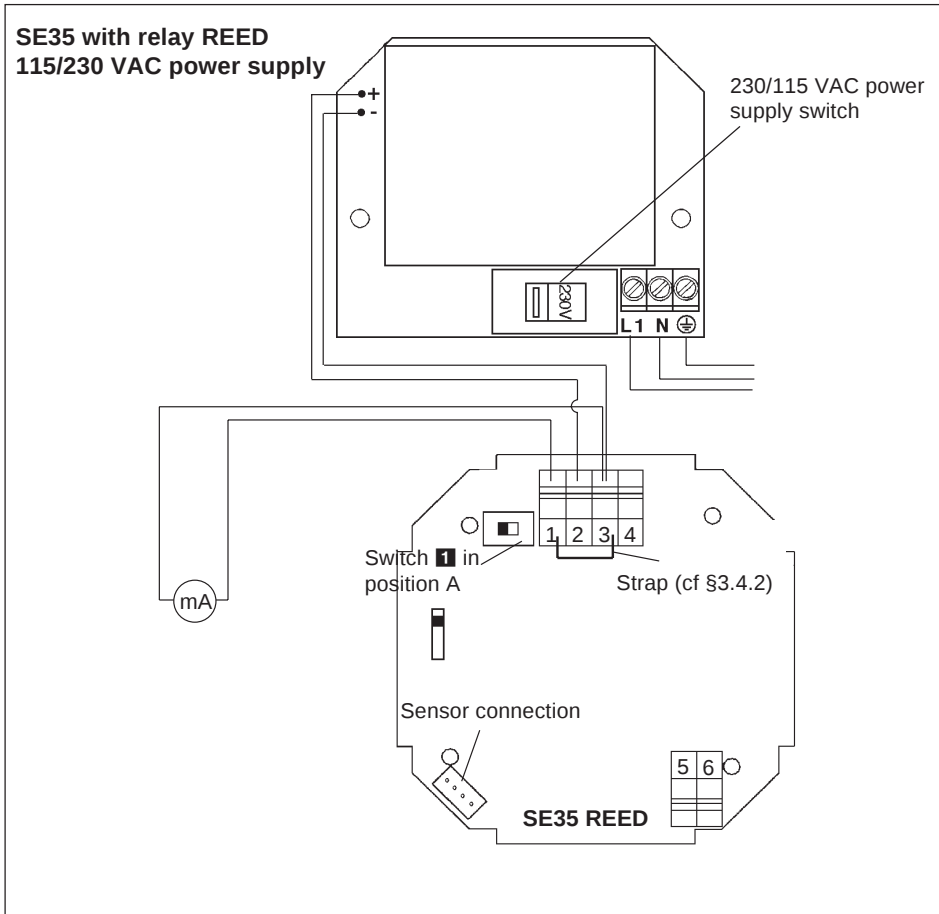


Fig. 3.11 Transmitter SE35 with relay REED and 115/230VAC power supply

⚠ If the current output 4...20 mA is not used: set the switch **1** in position A (fig. 3.10) and the strap across 1-3 (fig. 3.9).

The operation is classified according to three levels.

A) Display

This menu displays flow, output current, main totalizer and daily totalizer. The daily totalizer can also be reset in this menu.

B) Parameter Definition

All the necessary settings, such as the language, engineering units, K-factor, 4...20 mA measuring range, pulse output, relay and filter are carried through in this menu.

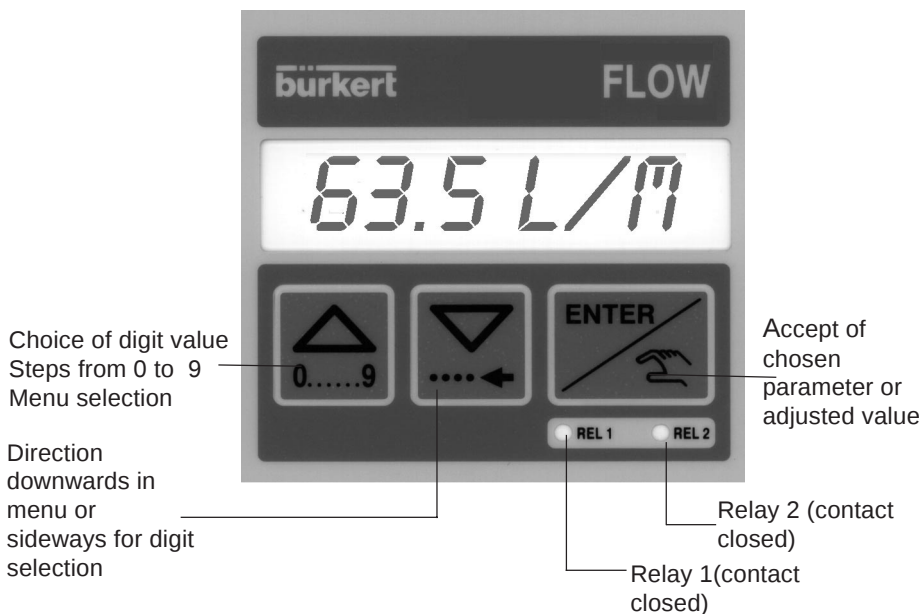
Here, the main, as well as the daily totalizer are simultaneously reset.

C) Testing

A flow can be simulated in this menu, which allows to test a process in the "dry-run condition".

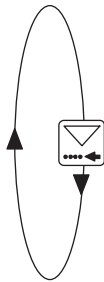
This menu also displays the sensor frequency and allows to change the basic settings (Offset, Span) of the device.

4.1 Transmitter Operating and Control Elements



4.2 Operation Mode Display

The following variables are displayed in the operation mode:

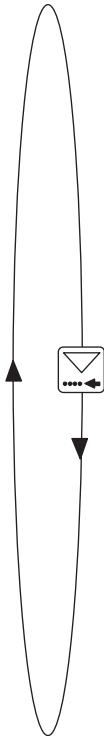


45,6 L/m	Flow rate in the required engineering unit (see calibration menu).
16,45 mA	4...20 mA output signal, proportional to the flow according to the selected measuring range
80529 L	Main totalizer in the required engineering unit (see calibration menu). Reset in the calibration menu.
6247 L	Daily totalizer in the same engineering unit as the main totalizer. A point behind the unit differentiates it from the main totalizer. Reset by simultaneously pressing the   keys for 2 seconds.

4.3 Calibration Mode

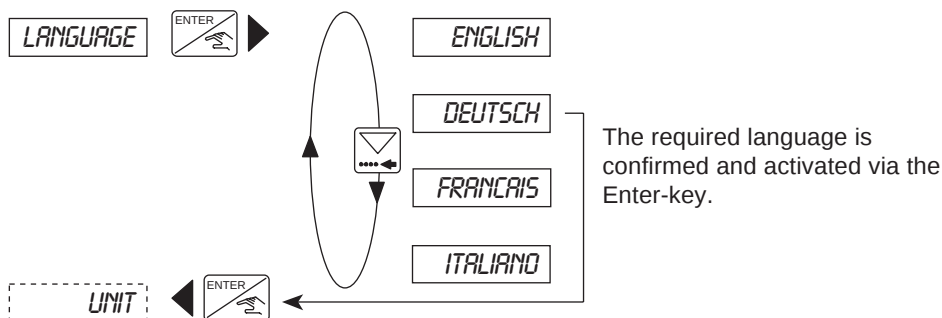
Press   simultaneously for 5 seconds

The following variables can be set in the parameter definition menu:

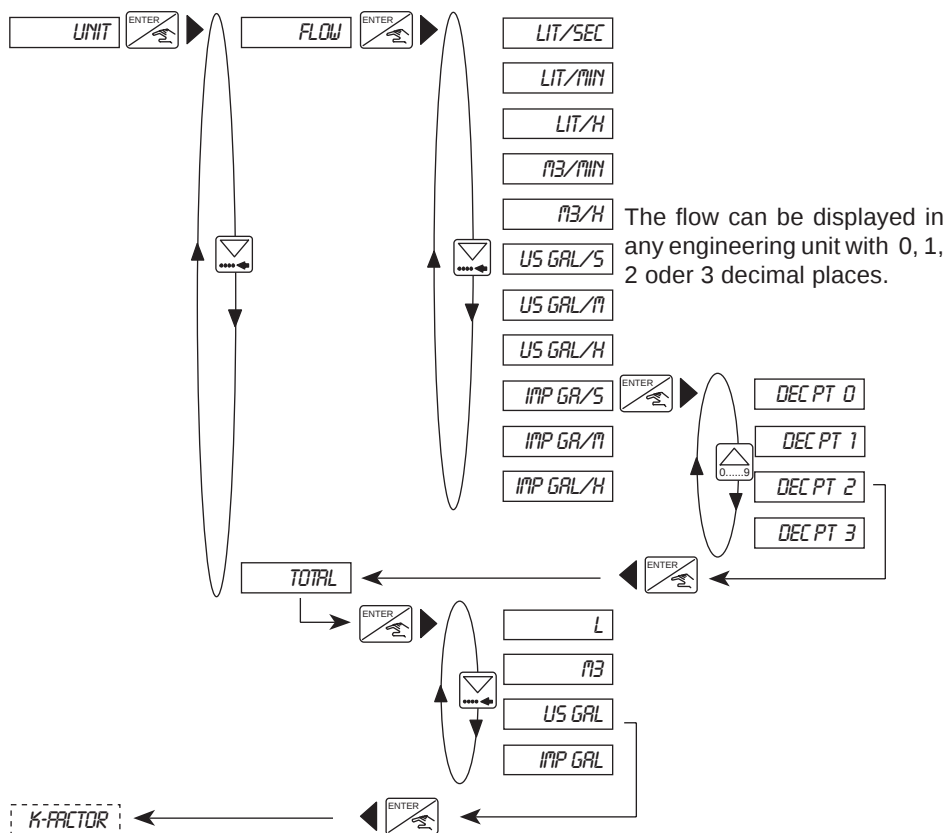


LANGUAGE	Language selection between English, German, French, Italian....
UNIT	Selection of engineering units to display flow rate and totalizer.
K-FACTOR	Input of K-factor according to chart or Teach-in function in order to determine the specific K-factor.
CURRENT	Determination of 4...20 mA measuring range.
PULSE	Parameter definition of pulse output (unit and quantity). OR definition of pulse output relay REED (unit and quantity).
RELAY	Parameter definition of relays. This message only appears if the relay option has been installed. (not for relay REED)
FILTER	Dampening selection. There are ten different steps available.
TOTAL	Totalizer resetting.
CODE	For internal Bürkert use only.
END	Return to operation mode and storage of new parameters.

4.3.1 Language



4.3.2 Engineering Units



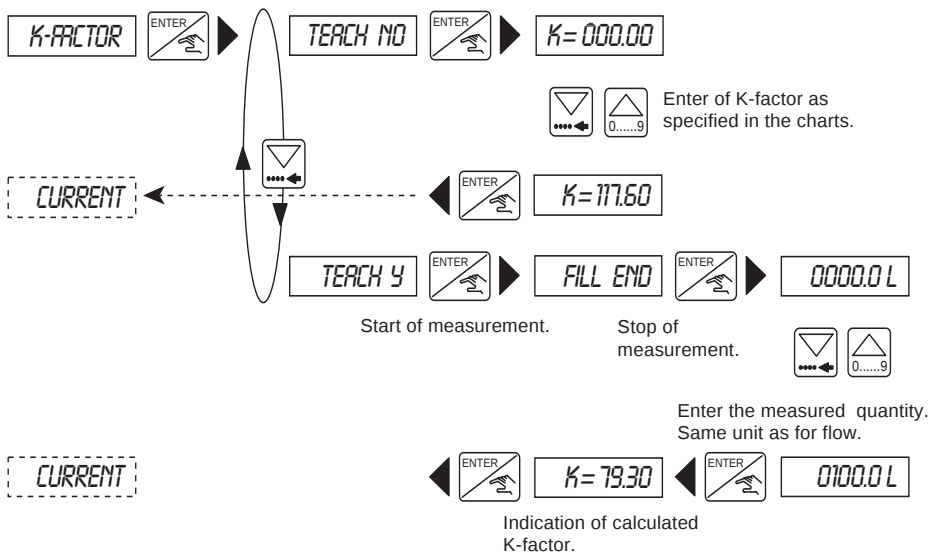
Note: Return to the main menu only via the sub-menu "TOTAL".

4.3.3 K-Factor

The K-factor of the fitting (refer to S030 reference manual) is entered in this menu .
The "Teach in" function allows to practically determine the application specific K-factor.
The user only needs to run a known quantity through his system.

Example: In order to determine a quantity the most accurately possible, the user shall fill a tank of 100 litres. When the message "TEACH YES" appears, he presses the Enter key to start the measuring procedure. The message "FILL END" (end of filling) will appear. He then switches on a pump or opens a valve. As soon as his tank is full, he switches off the pump or closes the valve. Pressing Enter stops the measurement. The user will then be asked to enter the quantity (100 litres). The calculated K-factor is displayed after validation.

Note: The device uses the K-factor entered or determined at last.

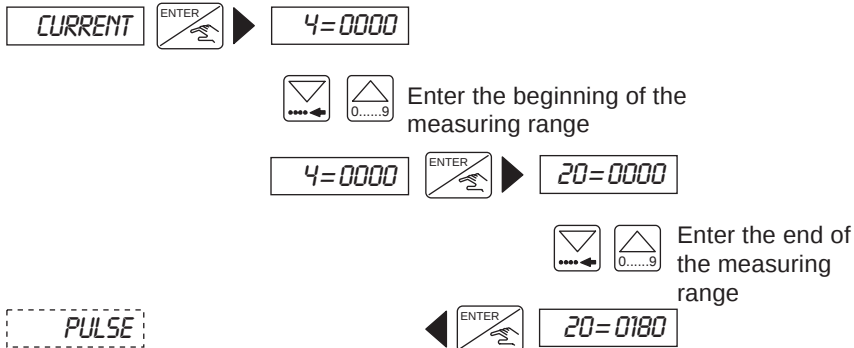


4.3.4 Output current

The measuring range of the flow, corresponding to the 4...20 mA output current is entered here. E.g. 0 to 180 l/min corresponds to 4...20 mA. The beginning of the measuring range can be larger than the end of it, i.e. 0 to 180 l/min corresponds to 20...4 mA (inverted output signal).

The settings (unit and decimal place), as selected for the flow indication will apply.

 In case of electronic internal failure, the current output is set to 22 mA.

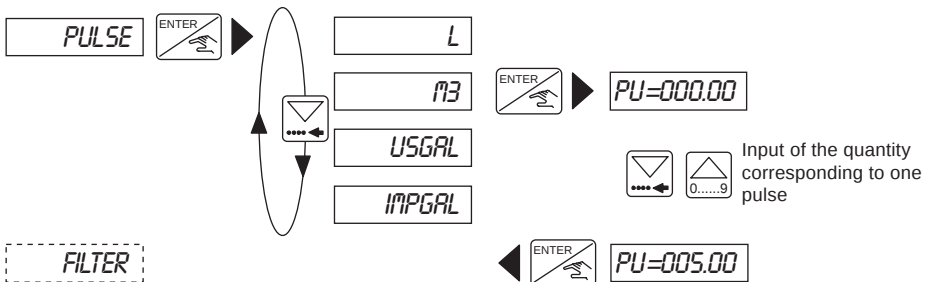


4.3.5 Pulse output

In this menu, the parameters of the pulse output are defined and the flow rate, that shall correspond to one pulse is determined. First enter the unit, then the value.

Example: 1 impulse corresponds to 5 m³.

Relay REED version: same function

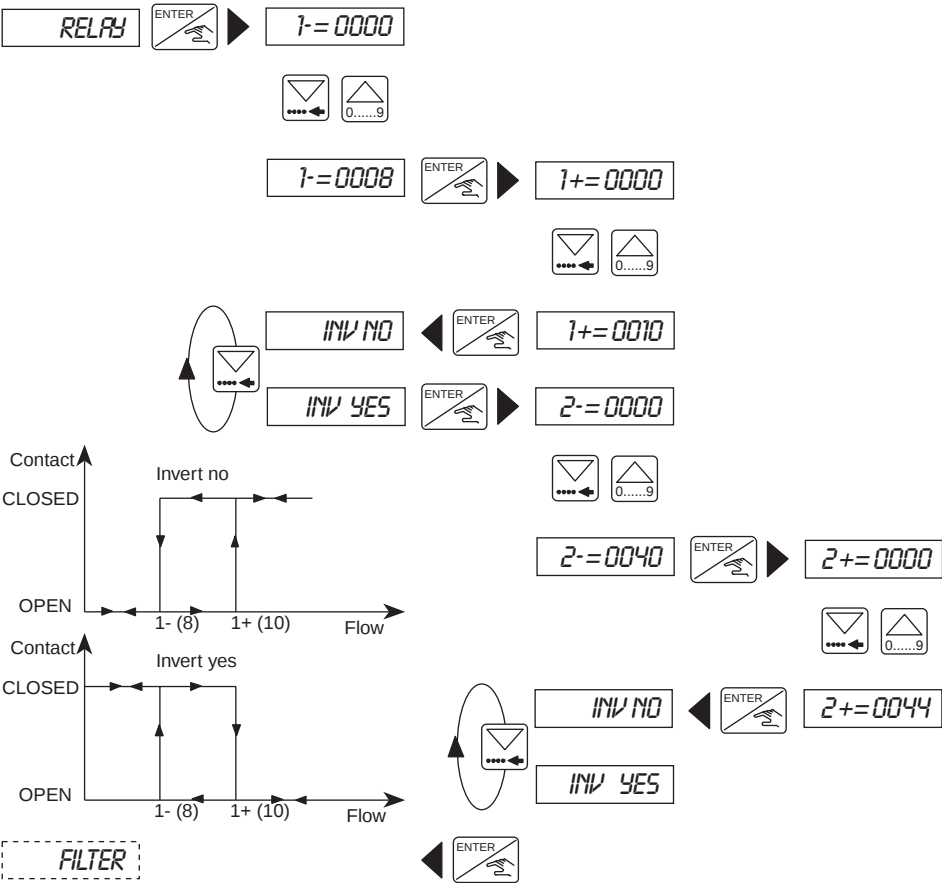


4.3.6 Relay

The parameter definition of the limit contacts is done in this menu. Two limit values are entered for each relay ; 1- and 1+ or 2- and 2+. The user also has the possibility to invert the relays. The unit and decimal place, as selected in the sub-menu "UNIT" are activated.

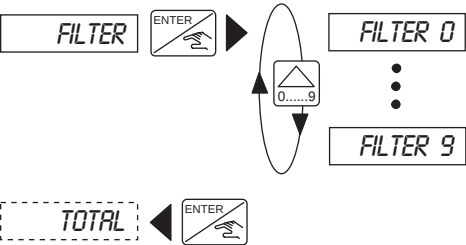


Caution! The following condition must be observed: $1- \leq 1+$, $2- \leq 2+$.
Not available on Transmitter electronic SE35 with relay REED.



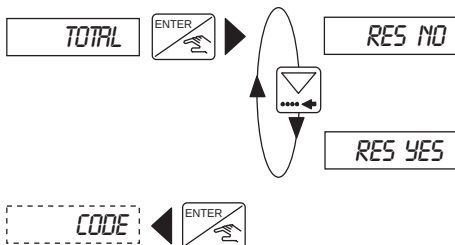
4.3.7 Filter function

The dampening is specified in this sub-menu. It prevents fluctuations of the display and output current. There are ten levels available. The first level ("FILTER 0") has no dampening effect.

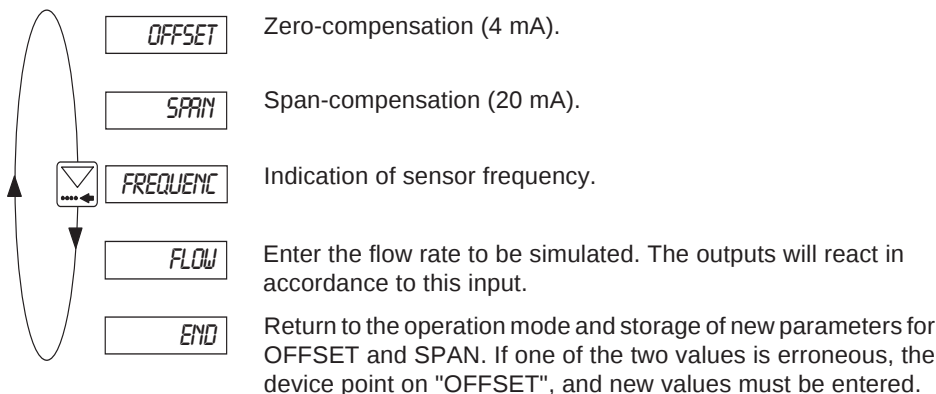


4.3.8 Totalizer

The main and daily totalizers are reset in this menu. The reset procedure only starts when Enter is pressed, at the "END" position in the parameter definition menu.

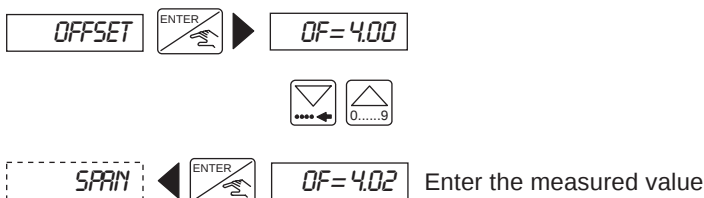
4.4 Test Menu: Press simultaneously for 5 seconds

The following compensations and tests are carried through in the test menu:



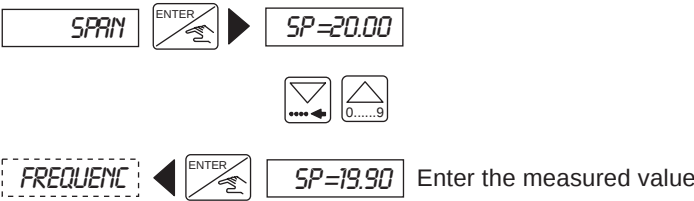
4.4.1 Offset-compensation

The option to correct the basic setting of 4 mA. A currentmeter is necessary. When Enter is pressed while "OFFSET" is displayed, the transmitter produces 4 mA. If this value is incorrect, it can be corrected (within the limit of -0,2; +1 mA) by entering the measured value.



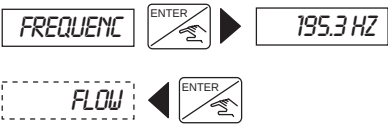
4.4.2 Span-compensation

The option to correct the basic adjustment of 20 mA. The procedure is identical to the Off-set procedure. When ENTER is pressed while "SPAN" is indicated, the transmitter produces 20 mA. If this value is incorrect (within the limit of -1/+1 mA), it can be corrected by entering the measured value.



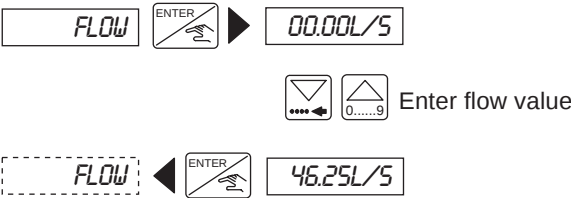
4.4.3 Frequency display

Here, the sensor frequency is displayed until the Enter key is pressed.



4.4.4 Flow simulation

A flow can be simulated in this menu. This allows the user to test his system without any liquid. Eventhough the simulated value influences the output current and the relays, it has no impact on the pulse output. Unit and decimal place, as selected in the sub-menu "UNIT" are active.



The simulation is active until the user enters into another sub-menu.

5 Maintenance

5.1 Factory setting of the transmitter electronic SE35 at delivery

Language:	English	Current:	4 mA:	00.00
Unit of flow:	L/s		20 mA:	03.00
Unit of totalizers:	L	Pulse output	unit:	L
Decimal points:	2		PU:	000.10
K-factor:	46.60	Relay:	no	
		Filter:		Filter 2

User setting of the transmitter SE35 N°:

Language:	Current:	4 mA:
Unit of flow:		20 mA:
Unit of totalizers:	Pulse output	unit:
Decimal points:		PU:
K-factor:	Relay:	
	Filter:	Filter
Fitting used:		

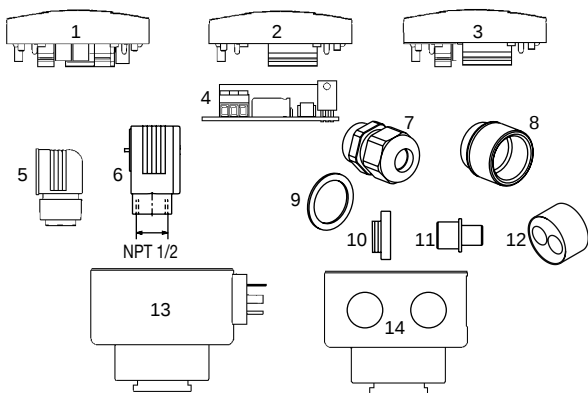
5.2 Trouble-shooting

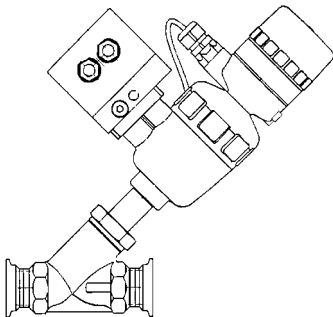
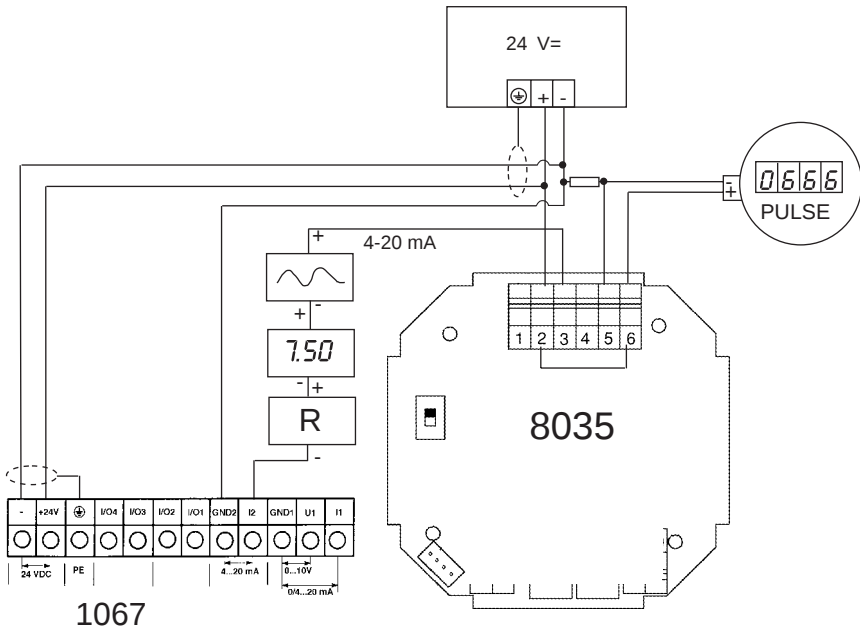
In correct installation the transmitters are maintenance-free. If contamination or clogging should occur during operation, the transmitter (paddle-wheel, bearing) can be cleaned with water or another appropriate cleaning agent.

The message "ERROR" on the display indicates that calibration data has been lost. By pressing ENTER, the user access to operation menu but the device works with the factory settings (see § 5.1). The transmitter must be re-calibrated. If this message appears more often, please return the product to the factory.

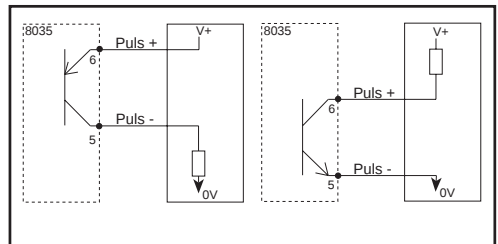
5.3 Spare Parts List

Transmitter electronic module SE35 4-20 mA ; pulse output, 2 totalizers		
Position	Specification	Order code
1	Cover with screws, front plate and PCB with relays	425250
2	Cover with screws, front plate and PCB without relay	425249
3	Cover with screws, front plate and PCB with relay REED	425251
4	Power supply board 115/230 VAC	419581
5	Cable plug DIN 43650 with cable gland (type 2508)	438811
6	Cable plug DIN 43650 with NPT 1/2" reduction (type 2509)	162673
7+9+10+12	Set incl. 2 cable glands M20x1,5 + 2 neoprene flat gaskets for cable gland or screwed plug + 2 screwed plugs M20x1,5 + 2 multiway seals 2x6 mm	449755
8+9+10	Set incl. 2 reductions M20x1,5 / NPT1/2" (mounted gasket) + 2 neoprene flat gaskets for screwed plug + 2 screwed plugs M20x1,5	551782
11+12	Set incl. 1 obturator for cable gland M20x1,5 + 1 multiway seal 2x6 mm for cable gland + 1 black EPDM gasket for the sensor + 1 mounting instruction sheet	551775
13 + 5	Sensor housing with plug connector DIN 43650 (type 2508)	425246
14	Sensor housing for 2 cable glands M20x1.5 + coil function	425247
14	Sensor housing for 2 cable glands M20x1.5 + hall function	425248
	Instruction manual Fitting S030	426107





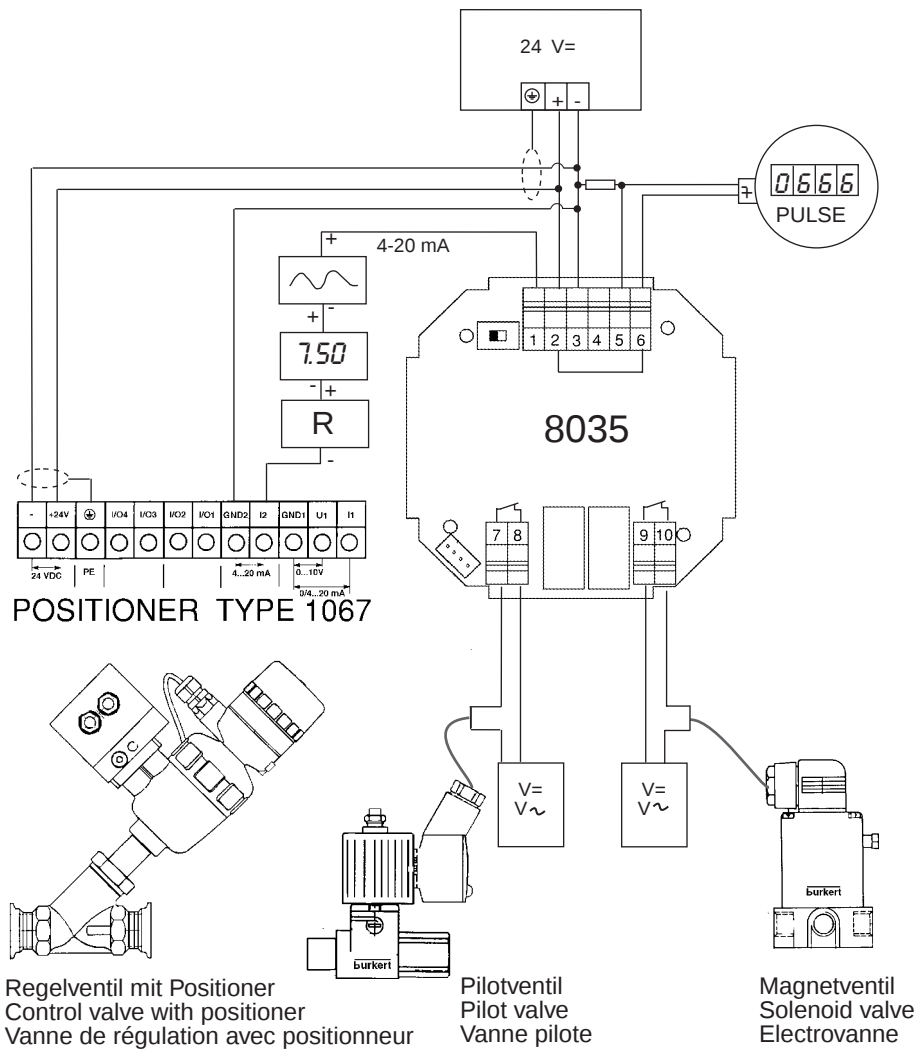
Regelventil mit Positioner
Control valve with positioner
Vanne de régulation avec positionneur



Anschluss des Pulsausgangs
Connection of the pulse output
Connexion de la sortie impulsions

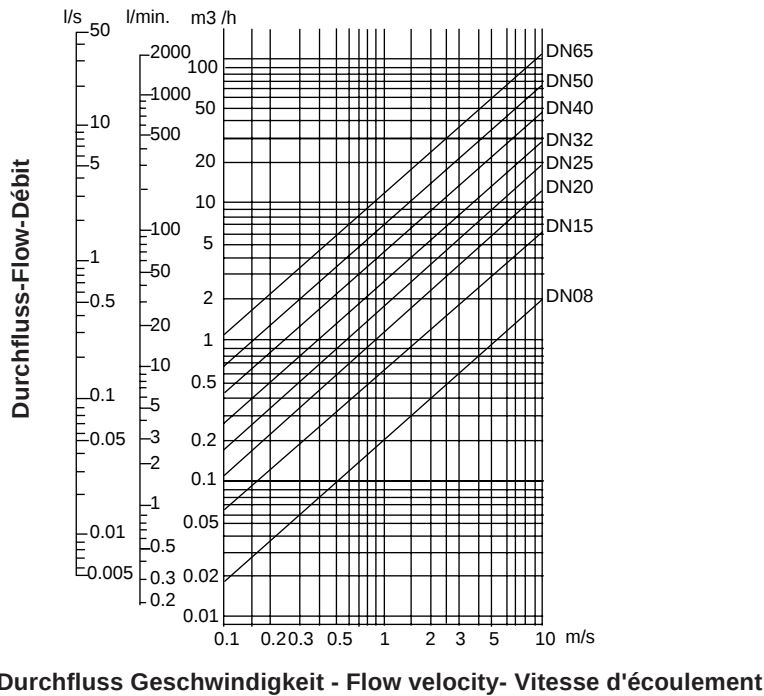
Beispiel - Example - Exemple:

Anschluss Durchfluss Transmitter 8035 Inline 12-30 VDC ohne Relais
Connection flow transmitter 8035 Inline 12-30 VDC without relay
Connexion transmetteur de débit 8035 Inline 12-30 VCC sans relais



Beispiel - Example - Exemple:
Anschluss Durchfluss Transmitter 8035 Inline 12-30 VDC mit Relais
Connection flow transmitter 8035 Inline 12-30 VDC with relays
Connexion transmetteur de débit 8035 Inline 12-30 VCC avec relais

- 1) Durchfluss-Diagramm (L/min, DN in Zoll und m/s)
- 1) Flow Chart (L/min, DN in inch and m/s)
- 1) Abaque débit/vitesse/diamètre (L/min, DN en inch et m/s)

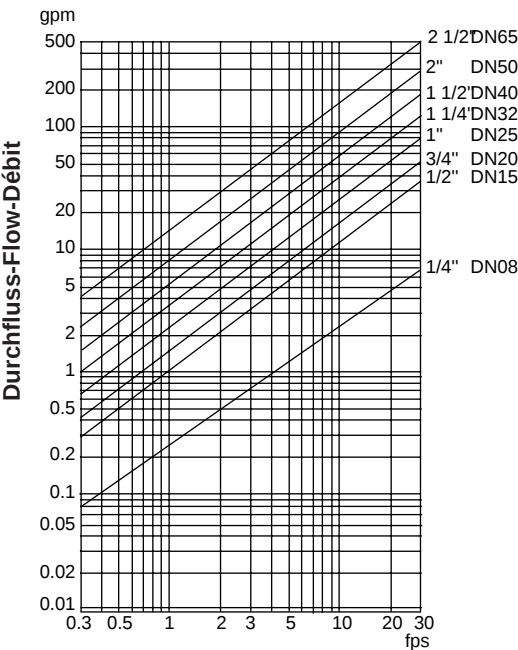


Auswahlbeispiel:
Selection example:
Exemple:

Vorgabe - Specifications - Données:
Durchfluss-Flow-Débit: 10 m³/h
Ideale Durchflussgeschwindigkeit: 2...3 m/s
Ideal flow velocity: 2...3 m/s
Vitesse optimale du fluide: 2...3 m/s

Erforderliche Nennweite - Required orifice - Dimension requise : DN 40.

- 2) Durchfluss-Diagramm (US-gallon/min, DN in Zoll und fps)
- 2) Flow Chart (US-gallon/min, DN in inch and fps)
- 2) Abaque débit/vitesse/diamètre (US-gallon/min, DN en inch et ft/s)



Durchfluss Geschwindigkeit - Flow velocity- Vitesse d'écoulement

Auswahlbeispiel:
Selection example:
Exemple:

Vorgabe -Specifications - Données:
Durchfluss-Flow-Débit: 50 gpm
Ideale Durchflussgeschwindigkeit: 8 fps
Ideal flow velocity: 8 fps
Vitesse optimale du fluide: 8 fps

Erforderliche Nennweite - Required orifice - Dimension requise : 1 1/2"

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