Type SE30
Ex

Flow transmitter to use on Inline sensor-fitting for hazardous areas II 1 G/D - II 3 GD

- Flowmeter with NAMUR or NPN/PNP output signal
- Mounting, dismounting of electronics by a Quarter-Turn
- Protection-Ex:
  - Intrinsically safe (ignition protection type i) certified NAMUR version for use in Zone 0, 1, 2 - Gas (G) or 20, 21, 22 - Dust (D)
  - non-sparking (ignition protection type nA) certified NPN/PNP version for use in Zone 2 - Gas (G) or 22 - Dust (D)3

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 8619
multiCELL - transmitter/controller

Type 8611
eCONTROL - Universal controller

Type 8025
Flow transmitter or remote batch controller

Intrinsic safety barrier
with NAMUR input

PLC

Type description

The flow transmitter SE30 Ex for continuous flow measurement is especially designed for use in neutral, slightly aggressive, solid-free liquids, in hazardous environments.

The complete flowmeter is made up of an electronic module and a measuring element, either a Inline sensor-fitting S030 with PVDF paddle-wheel or a Inline sensor-fitting S077, quickly and easily connected together by a Quarter-Turn.

The electronic module detects the paddle-wheel (S030) or oval gear (S077) rotation, modulates the current of the power supply line according to NAMUR standard or produces an NPN/PNP output signal (depends on model). To operate the NAMUR signal, an intrinsic safety barrier should be connected to the flowmeter SE30 Ex.
The connection to another device in the safe area depends on the used flowmeter model.

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1. General technical data

1.1. About the device

A complete flowmeter for hazardous areas is available

- either with a Namur output signal (version NAMUR)
- or with an NPN/PNP output signal (version NPN/PNP)

and with a wide variety of process connection according to the sensor-fitting Type S030 or S077 on which the transmitter Type SE30 Ex is mounted.

See **data sheet Type S030** or **data sheet Type S077** for more information. Detailed information on the restrictions on the use of sensors can be found in chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9**.

1.2. All versions

The following data applies to all versions mentioned above.

Product properties	
Dimensions	Detailed information can be found in chapter **"3. Dimensions" on page 6**.
Compatibility	• Any pipe from DN 06…DN 65 which are fitted with Bürkert S030 Inline sensor-fitting. For the selection of the nominal diameter and materials of the Inline sensor-fittings, see **data sheet Type S030**. • Any pipe from DN 15…DN 50 which is fitted with Bürkert S077 Inline sensor-fitting. For the selection of the nominal diameter and materials of the Inline sensor-fittings, see **data sheet Type S077**. Detailed information on the restrictions on the use of sensors can be found in chapter **"5.3. Safe-ty instructions - Notice of ATEX instructions" on page 9**.
Measuring range	• Used with S030 sensor-fitting Flow rate: 0.5…1200 l/min (0.13…317 gpm) with flow velocity: 0.3…10 m/s • Used with S077 sensor-fitting Flow rate: 2…350 l/min (0.53…92.46 gpm) with viscosity >5 cps or 3…300 l/min (0.79…79.25 gpm) with viscosity <5 cps
Performance data	
Measurement deviation	• Used with S030 sensor-fitting: – Teach-In (via a connected remote transmitter, e.g. Type 8025): ±1 % of the measured value[1.)] (at Teach-In flow rate value) – Standard K-factor: ±2.5 % of the measured value[1.)] • Used with S077 sensor-fitting: ±0.5 % of the measured value
Linearity	±0.5 % of full scale[1.)]
Repeatability	• Used with S030 sensor-fitting: ±0.4 % of the measured value[1.)] • Used with S077 sensor-fitting: ±0.3 % of the measured value
Electrical data	
Protection against DC polarity reversal	Yes
Voltage supply cable	• Cable with maximum operating temperature greater than 80 °C • Max. 50 m length, shielded • External diameter of wire: 5…8 mm • Cross section of wires: 0.5…1.5 mm^2 • Cross section the local ground wire: max. 0.75 mm^2 • Line impedance of the conductors:<50 Ω
Medium data	
Fluid temperature	Max. +80 °C (+176 °F)

Approvals and certificates	
Standards	
Protection class according to IEC/EN 60529	IP67 with connector plugged-in and tightened
Directives	
CE directives	The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of conformity (if applicable)
Certification	
ATEX	Detailed information on the ATEX certification can be found in chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9**.
NAMUR	EN 60947-5-6
Environment and installation	
Ambient temperature	-15…+60 °C (+32…+140 °F) (operation and storage)
Relative air humidity	≤80 %, without condensation
Height above sea level	Max. 2000 m
Operating condition	Continuous
Equipment mobility	Fixed
Use	Indoor and outdoor (Protect the device against electromagnetic interference, ultraviolet rays and the effects of climatic conditions)
Installation category	Category I according to UL/EN 61010-1
Pollution degree	Degree 2 according to UL/EN 61010-1

1.) Under reference conditions i.e. measuring fluid = water, ambient and water temperature =20 °C (68 °F), while maintaining the minimum inlet and outlet distances and the appropriate internal diameters of the pipes.

1.3. Transmitter with a Namur output signal

Product properties	
Materials	
Non wetted parts	
Housing, cover (male fixed plug)	PPS glass fibre reinforced
Female cable plug	PA
Seal	Silicone
Wetted parts	
Sensor-fitting	Depend on the selected sensor-fitting Type. Detailed information on sensor-fitting can be found in the data sheet of the used Inline sensor-fittings, see **data sheet Type S030** or **data sheet Type S077** and restrictions on the use of the sensors can be found in chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9**.
Electrical data	
Operating voltage[1.)]	8…15 V DC (from connected intrinsic safety barrier)
Current consumption	With sensor: ≤7 mA
Outputs	2-wire current modulation according to NAMUR (0.5 or 2.5 mA)
Connections & communication	
Electrical connection	Cable plug Form A acc. to EN 175301-803 (supplied)

1.) See chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9** to choose the supply adapted to the area of application.

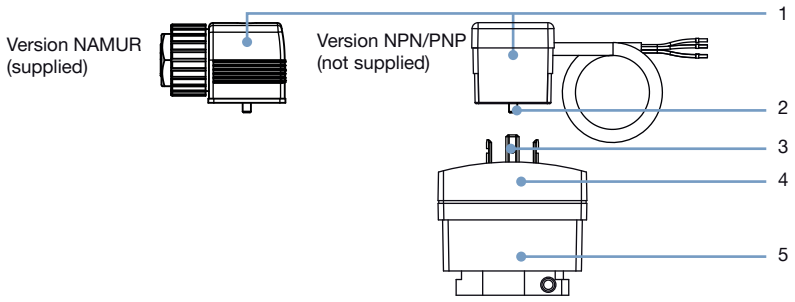
1.4. Transmitter with an NPN/PNP output signal

Product properties	
Materials	
Non wetted parts	
Housing, cover (male fixed plug)	PC
Female cable plug	PA
Seal	NBR
Wetted parts	
Sensor-fitting	Depend on the selected sensor-fitting Type. Detailed information on sensor-fitting can be found in the data sheet of the used Inline sensor-fit-tings, see **data sheet Type S030** or **data sheet Type S077** for more information and using restriction can be found in chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9**.
Electrical data	
Operating voltage[1.)]	12…36 V DC
Current consumption	30 mA
Outputs	NPN/PNP
Connections & communication	
Process connection	Cable plug Form A acc. to EN 175301-803 with 5 or 12 m cable (not supplied)

1.) See chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9** to choose the supply adapted to the area of application

2. Materials

2.2. Material specifications



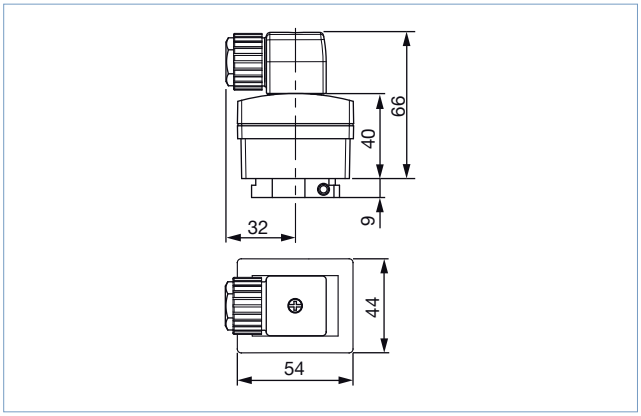
No.	Description	Material
1	Female cable plug	• Version Namur: PA with silicone seal • Version PNP/NPN: PA with NBR seal
2	Screws	Stainless steel
3	Electrical contact	Sn
4	Cover (male fixed plug)	PC
5	Housing	• Version Namur: PPS, glass fibre reinforced • Version PNP/NPN: PC

3. Dimensions

3.1. Transmitter SE30 Ex, version NAMUR

Note:

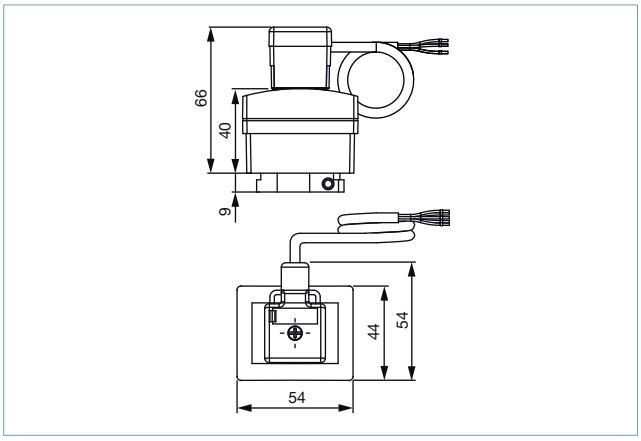
- Specifications in mm
- Cable plug (EN 175301-803) is supplied in the delivery



3.2. Transmitter SE30 Ex, version PNP/NPN

Note:

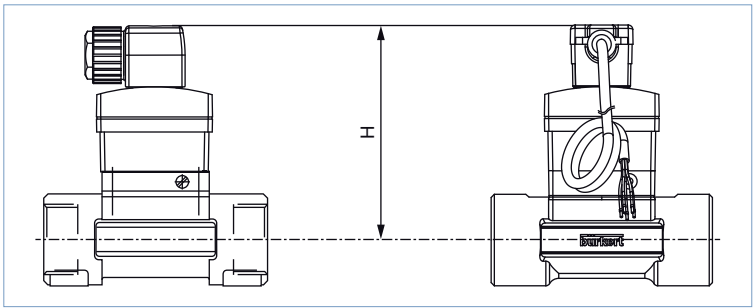
- Specifications in mm
- Cable plug Type 2513 with 5 or 12 m cable is not supplied in the delivery. It has to be ordered separately.
  The cable output is **always oriented perpendicularly** to the pipe.
  See **data sheet Type 2513**



3.3. Transmitter SE30 Ex mounted on an S030 sensor-fitting

Note:

- Specifications in mm
- Cable plug (EN 175301-803) is supplied in the delivery
- Cable plug Type 2513 with 5 or 12 m cable is not supplied in the delivery. It has to be ordered separately.
  The cable output is **always oriented perpendicularly** to the pipe.
  See **data sheet Type 2513**

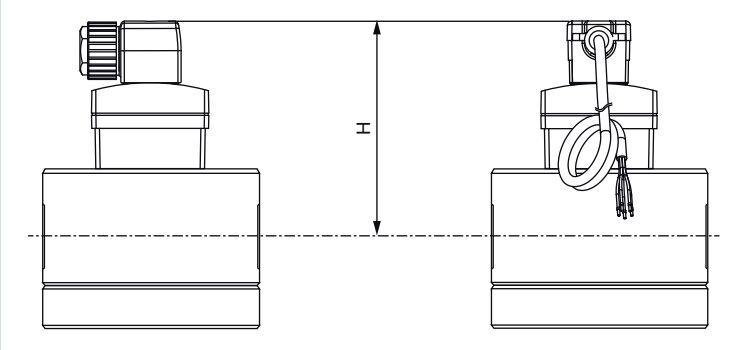


DN	H
06	95.5
08	95.5
15	100.5
20	98.0
25	98.0
32	102.0
40	105.5
50	112.0
65	112.0

3.4. Transmitter SE30 Ex mounted on an S077 sensor-fitting

Note:

- Specifications in mm
- Cable plug (EN 175301-803) is supplied in the delivery
- Cable plug Type 2513 with 5 or 12 m cable is not supplied in the delivery. It has to be ordered separately.
  The cable output is **always oriented perpendicularly** to the pipe.
  See **data sheet Type 2513**

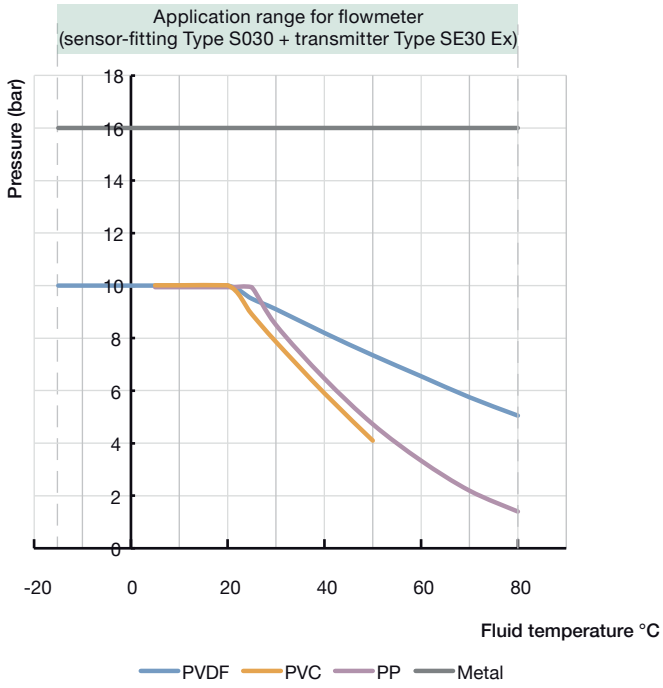


DN	H
15	87
25	96
40	108
50	118
80	168

DN15 DN25 DN40 DN50 DN80
Threaded connection
DN15 DN25 DN40 DN50 DN80
Flanged connection

4. Performance specifications

4.1. Pressure temperature diagram



5. Product installation

5.1. Installation notes

Installation into S030 sensor fitting

Note:
The device is not designed for gas and steam flow measurement.

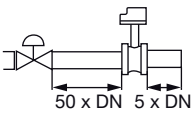
Minimum straight upstream and downstream distances must be observed. According to the pipe's design, necessary distances can be bigger or use a flow conditioner to obtain the best accuracy.

Fore more information, please refer to EN ISO 5167-1.
EN ISO 5167-1 prescribes the straight inlet and outlet distances that must be complied with when installing fittings in pipe lines in order to achieve calm flow conditions. The most important layouts that could lead to turbulence in the flow are shown below, together with the associated prescribed minimum inlet and outlet distances.

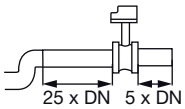
Make sure that the measuring conditions at the point of measurement are calm and problem-free.

DN = Orifice **Fluid direction ⇨**

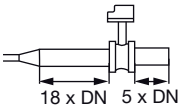
Regulating valve[1.)]



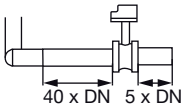
2 x 90° elbow joint



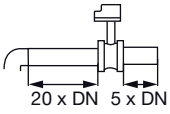
Expansion[2.)]



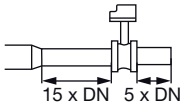
2 x 90° elbow joint
3 dimensional



90° elbow joint
or T-piece

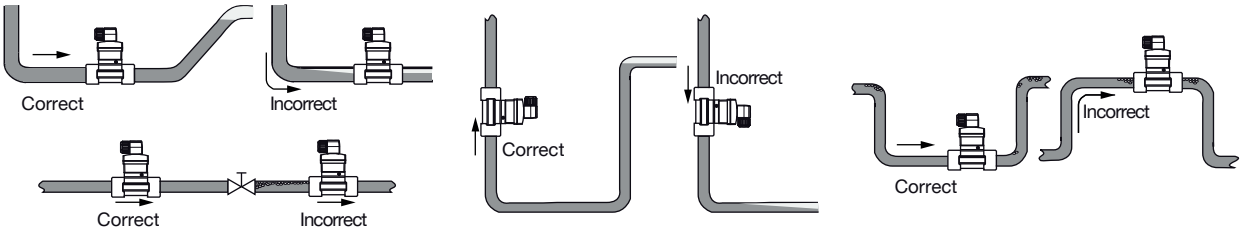


Reduction



1.) If the valve cannot be mounted after the measuring device, the minimal distances have to be respected.
2.) If an expansion cannot be avoided, the minimal distances have to be respected.
Please note minimum flow velocity

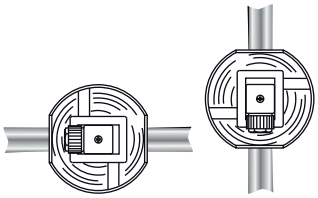
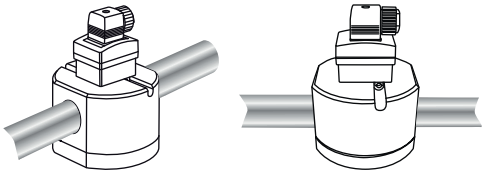
The device can be installed into either horizontal or vertical pipes.
Important criteria for this are; ensure that the measurement pipe is fully filled and that the measurement pipe is air bubble free.



Pressure and temperature ratings must be respected according to the selected sensor-fitting material. The suitable pipe size is selected using the diagram for selecting the nominal diameter of the sensor-fitting, see **data sheet Type S030** for more information and using restriction can be found in chapter **"5.3. Safety instructions - Notice of ATEX instructions" on page 9**.

Installation into S077 sensor fitting

The sensor fitting can be installed in any orientation as long as t**he rotor shafts are always in a horizontal plane** (see following figures).
The pipe must be filled with liquid and free from air bubbles. Avoid air purge of the system which would cause damages and to prevent damage from dirt or foreign matter, we strongly recommend the installation of a 250 µm strainer as close as possible to the inlet side of the meter.

Correct installation	Incorrect installation
	

5.2. Overview of hazardous areas depending on SE30 Ex flow transmitter models (according to ATEX)

This equipment can be installed in some potentially explosive atmospheres (surface industries) and is in compliance with the 2014/34/EU ATEX directives.

Equipment for explosive atmospheres (surface industries) - GROUP II						
Level of protection	**Very high**		**High**		**Normal**	
Zone	**Gas, Zone 0**	**Dust, Zone 20**	**Gas, Zone 1**	**Dust, Zone 21**	**Gas, Zone 2**	**Dust, Zone 22**
Explosive atmospheres	Present continuously, long periods or frequently	Present continuously, long periods or frequently	Are likely to occur	Are likely to occur	Are unlikely to occur or present only infrequently and for a short period only	Are unlikely to occur or present only infrequently and for a short period only
CATEGORY 1 **SE30 Ex -** **NAMUR II 1 G/D** **(Article no. 552901)** EEx ia IIC T6 - IP6X T80 °C associated with PVDF, brass, stainless steel or aluminium sensor fittings	To use with intrinsic safety barrier with NAMUR input (The open circuit voltage for the NAMUR input must be included between 8 and 15 V). 					
CATEGORY 3 **SE30 Ex -** **II 3 GD - NPN/PNP** **(Article no. 552353)** Ex nA IIC T4 Gc Ex tc IIIC T135 °C Dc IP6X associated with PVDF, brass, stainless steel or aluminium sensor fittings	Not to be used		Not to be used		to use with a 12…36 V supply source	

5.3. Safety instructions - Notice of ATEX instructions

Note:
The appropriate SE30 Ex model is dependent of the installation environment.

Model SE30 Ex NAMUR (Article no. 552901) Group II - Category 1 for potentially explosive zones of gas (0, 1 and 2) and dust (20, 21 and 22)

- **ATEX marking identification and ATEX installation zones**

CE 0102 ⟨Ex⟩ II 1 GD Ex ia IIC T6
Ex iaD 2O IP6X T80 °C
ambient T: 0 °C ≤ Ta ≤ 60 °C
LCIE 04 ATEX 6070 X

- **Special conditions for a safe use**

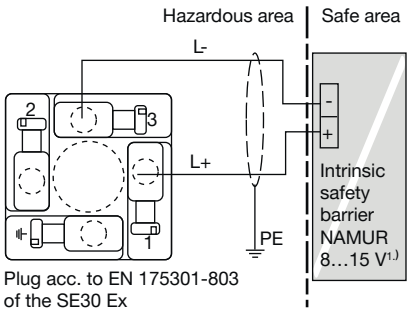
The device is intrinsic safety certified and may be installed in potentially explosive atmospheres: zones 0, 1 or 2 and zones 20, 21 or 22.

The connector can only be connected to certified intrinsic safety equipment.
This combination must be compatible with intrinsic safety rules (see electrical safety data in the table under the adjacent connection diagram).

The ambient temperature of use must always be between these limits: from 0…+60 °C.

- Compatible mechanical assembly and fluid connections:

⚠ **Use PVDF, brass, stainless steel or aluminium sensor fitting only.**
Any other connection is prohibited.



Plug acc. to EN 175301-803 of the SE30 Ex

1.) Use an appropriate power supply which complies with the following electrical specifications

Earth the shielding of the cable on side of the measuring exploitation

Electrical safety data	
Ui	≤15 V
Ii	≤50 mA
Pi	≤188 mW
Ci	≤1.2 nF
Li	≈0

Model SE30 Ex NPN/PNP (Article no. 552353) Group II - Category 3 for potentially explosive zones of gas (2) and dust (22)

- **ATEX marking identification and ATEX installation zones**

CE 0102 Ⓔx II 3 GD
Ex nA IIC T4 Gc
Ex tc IIIC T135 °C Dc IP6X
ambient T: 0 °C ≤ Ta ≤ 50 °C
INERIS 04 ATEX 3015X

- **Special conditions for a safe use**

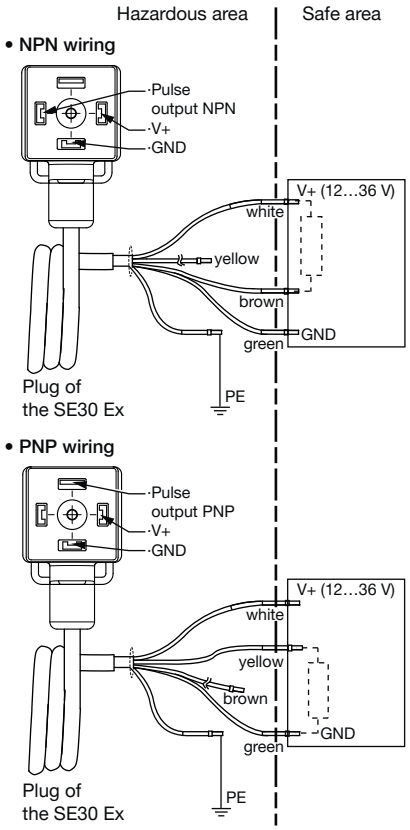
The device is ATEX certified and may be installed in potentially explosive atmospheres: zones 2 or 22.

The connector may be connected to a 12…36 V supply source.

The ambient temperature of use must always be between these limits: from 0…+50 °C.

- Compatible mechanical assembly and fluid connections:

⚠ **PVDF, brass, stainless steel, aluminium sensor fittings can be used. Any other connection is prohibited.**



Electrical safety data on power supply line (L+/L-)	
U max.	36 V
I max.	30 mA
P max.	108 mW

6. Product operation

6.1. Measuring principle

When liquid flows through the pipe, the paddle wheel with 4 inserted magnets or of the oval gear of the sensor-fitting S030 or S077 respectively is set in rotation, producing a measuring signal in the transmitter SE30 Ex.

- For the NAMUR version, the electronic module modulates the current of the 2-wire supply line according to NAMUR standard. The modulated frequency of this signal is proportional to the flow rate. This signal is converted, by the connected type NAMUR intrinsic safety barrier, into a frequency signal on its open collector output.
  The electrical connection of the flowmeter is made via a cable plug (Type 2508 supplied, see **data sheet Type 2508**.
- For the NPN/PNP version, the generating signal, which frequency is proportional to the flow rate, can be displayed or processed directly.
  The electrical connection of the flowmeter is made via a cable plug with 5 or 12 m cable (Type 2513 not supplied, has to be ordered separately, see **data sheet Type 2513**).

A K-factor (available in the **instruction manual of the S030 fitting** or **instruction manual of the S077 fitting**) specific to each pipe (size and material) enables the conversion of this frequency into a flow rate/volume.

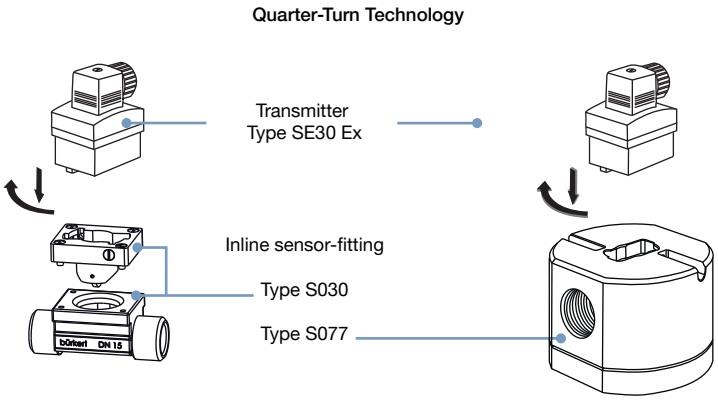
7. Product design and assembly

7.1. Product assembly

Note:

- A complete flowmeter is built up with an electronic module SE30 Ex associated to a sensor fitting S030 or S077 respectively with integrated measurement paddle-wheel or oval gear. This connection is made by means of a Quarter-Turn.
- The S030 Inline sensor-fitting ensures simple installation into pipes from DN 06…DN 65.
- The S077 Inline sensor-fitting ensures simple installation into pipes from DN 15…DN 80.

See **data sheet Type S030** or **data sheet Type S077** for more information.



8. Product accessories

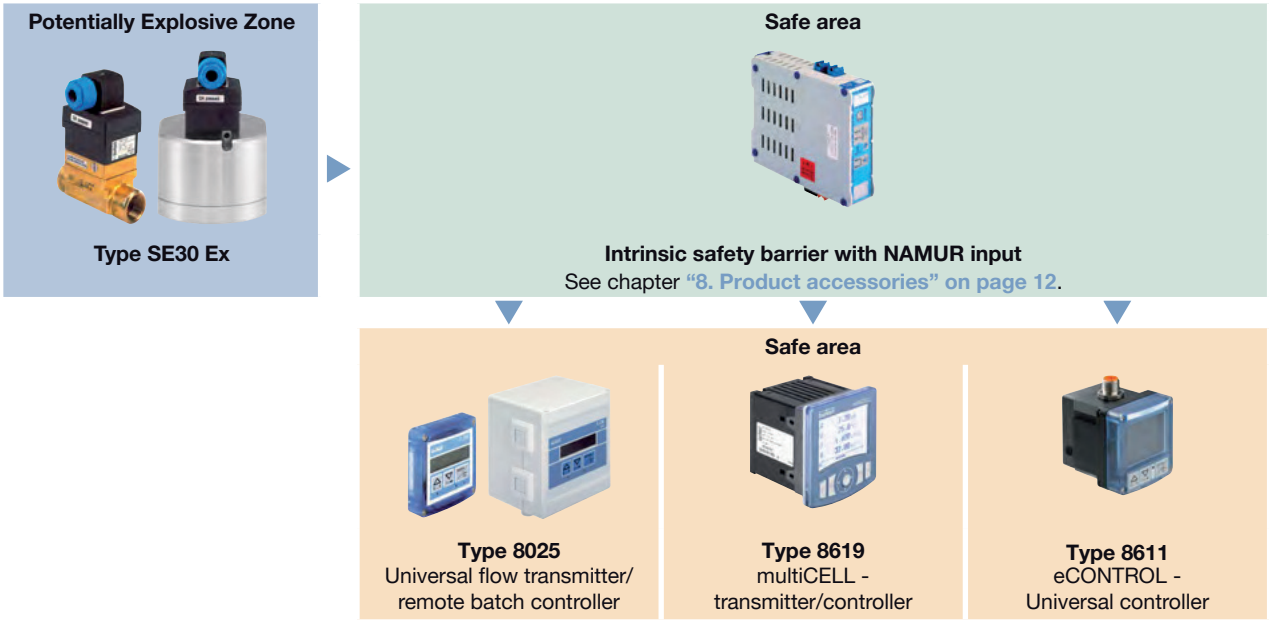
Note:
To operate the NAMUR signal, an intrinsic safety barrier should be connected to the flowmeter SE30 Ex.

Description	
	• 2 or 4 channels, intrinsic safety digital inputs: proximity detectors NAMUR, contacts… • Rail mount on hat profile 35 mm • All connections by removable screw terminals
Product features	
Dimensions	• Housing for symmetrical DIN rail (hat profile 35 mm as per standard NFC63015 / EN50022) • Depth:120 mm • Height: 90…145 mm overall including space for cables • Width on rail: 29.5 mm • Minimal distance between rails: 180 mm
Selection of the sensor type	Inductive or capacitive intrinsic safety certified NAMUR proximity detector or free-potential contacts
Selection of the logic	By a mini-DIP choice of active proximity switches or when contact is NO (Normally Open) or NC (Normally Closed)
Fault detector	• For all inputs configured as NAMUR, all models are provided with fault detector (broken line or short-circuit) • In faulty case, the green front LED switches off, the contact of the defective channel opens and the red LED corresponding to the defective channel switches on • Other channels are not affected
Electrical data	
Operating voltage	• 24 V DC ±10 % • 230 V AC ±10 % • 1 front panel yellow LED is “ON” when supply is active
Power consumption	5 VA
Digital inputs	Each of the 4 x intrinsic safety inputs can be configured independently for a contact or a proximity detector NAMUR as per DIN 19234
Intrinsic safety inputs	Proximity detector NAMUR as per DIN 19234 or free potential contacts, relays, pressure or temperature switches or push buttons in hazardous area.
Non intrinsic safety recopy outputs	• According to the type of sensor and the chosen logic: a green LED on the front panel displays a free-potential contact for each channel without common wire. • Collector cut-off power: 15 V, 60 mA, 0.9 VA, 350 Hz
Connections & communication	
Electrical connection	All connections by removable screw terminals and supply distribution by means of a flat cable from one unit to the next one
Approvals and certificates	
Classification for explosive areas	• Intrinsic safety associated apparatus must be installed in safe area and connected to materials installed in zone 0, 1 or 2 - Gas (G) or in zone 20, 21 or 22 - Dust (D) • Classification according to 2014/34/EU ATEX directives: –  I/II (M1)/(1) G/D [EEx ia] IIC – Safety parameters see EC-type certificate LCIE 00ATEX 6034X
Environment and installation	
Ambient temperature	• Operating: -20…+60 °C, -20…+50 °C (recommended) • Storage: -40…+80 °C
Installations conditions	• Mounting on DIN rail: Must take into account thermal dissipation and risk of overheating generated by housings installed side by side. In case of a high concentration inherent safety barrier, we recommend to leave a free space of 10 mm between each group of 8 units (horizontal rail) and between each group of 4 units (vertical rail). • Mounting inside a cabinet: It is recommended to close the electrical cabinet and to ensure a circulation of fresh air even by means of an air conditioner to keep the inside temperature at the level compatible with the recommended operating temperature among the units.

9. Networking and combination with other Bürkert products

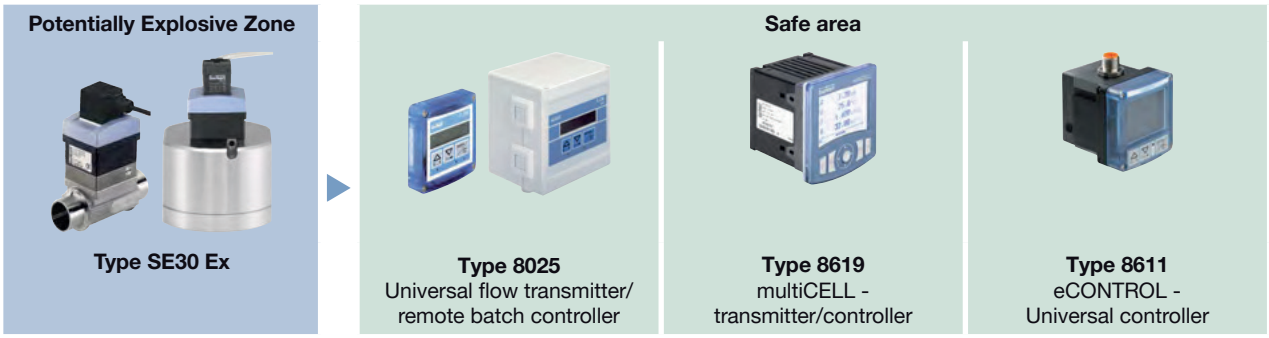
9.1. SE30 Ex with marking II 1 G/D (NAMUR version)

Example:



9.2. SE30 Ex with marking II 3 GD (NPN/PNP version)

Example:



10. Ordering information

10.1. Recommendation regarding product selection

A complete flowmeter for hazardous areas II 1 G/D - II 3 GD consists of a compact SE30 Ex flow transmitter and a Bürkert S030 or S077 Inline sensor-fitting.

Two different components must be ordered in order to select a complete device. The following information is required:

- **Article no.** of the desired compact SE30 Ex flow transmitter (see chapter **"1.1. About the device" on page 2**.
- **Article no.** of the selected S030 or S077 Inline sensor-fitting (see **data sheet Type S030** or **data sheet Type S077**)

10.2. Ordering chart of the SE30 Ex flow transmitter

Description	Operating voltage	Output	Electrical connection	Article no.
SE30 Ex - NAMUR II 1 G/D for explosive gas and dust environments: zones 0, 1 or 2 and 20, 21 or 22	8…15 V DC, via an intrinsic safety barrier with NAMUR input[1.)]	NAMUR current modulation, 2-wire	Cable plug EN 175301-803	552901
SE30 Ex - II 3 GD for explosive gas and dust environments: zones 2 or 22	12…36 V DC	NPN/PNP		552353

1.) The open circuit voltage for the NAMUR input must be included between 8 and 15 V.

10.3. Ordering chart accessories

Cable plug

Description	Article no.
Cable plug Form A acc. to EN 175301-803 with blue cable gland and silicone seal for NAMUR version, see **Type 2508**	167526
Cable plug Form A acc. to EN 175301-803 with 5 m cable and NBR seal for NPN/PNP version, see **Type 2513**. The cable output is always oriented perpendicularly to the pipe.	565558
Cable plug Form A acc. to EN 175301-803 with 12 m cable and NBR sea for NPN/PNP version, see **Type 2513**. The cable output is always oriented perpendicularly to the pipe.	565559

Intrinsic safety barrier

Classifications for explosive areas	Operating voltage	Outputs	Number of channels	Article no.
2014/34/EU ATEX directives ⟨Ex⟩ I/II (M1)/(1) G/D [EEx ia] IIC	24 V DC	Open collector, 15 V, 60 mA	2, with NAMUR input	553456
			4, with NAMUR input	553457
	230 V AC	Open collector, 15 V, 60 mA	2, with NAMUR input	553458
			4, with NAMUR input	553459