SITRANS FSS100 flowmeter (SONOKIT)

Overview

SITRANS FSS100 is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines. Together with the transmitters SITRANS FST030 or FST020, a high-precision inline flow meter is set up directly on site.

The kit offers all parts and special tools to make the installation as 1- up to 4-path flowmeter. The set is made for installation on empty pipes.

SITRANS FSS100 has in-line transducers (in contact with media) which assure superior accuracy and performance.

Benefits

- Cost-effective solution – contains all the necessary components for retrofitting.
- SITRANS FSS100 is easy to install in pipeline sizes DN 100 to DN 3000 (4" to 120"): 1-path from DN 100 (4"), 2-path from DN 200 (8"), 3- and 4-path from DN 400 (16")
- No bypass installation necessary – withstands pressures up to 40 bar (580 psi) and media temperatures between -20 °C and +200 °C (-4 °F and +392 °F).
- High accuracy – the bigger the pipe, the more accurate the result.
- Solid construction and no moving parts for a 100% maintenance and obstruction-free flowmeter.
- The FSS100 comes with transducers in IP68 enclosure.
- In-line transducers assure superior accuracy and performance.
- Transmitter SITRANS FST030 for 1- up to 4-path or SITRANS FST020 for water application with 1-path measuring. Please select the transmitter separate.

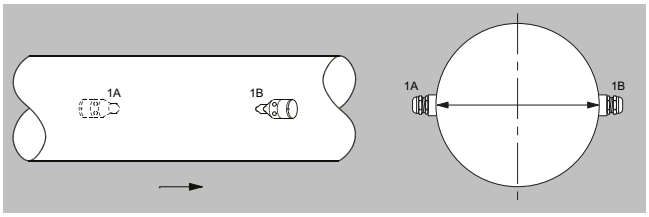
Naming convention	
FSS100	Sensor
FS130	FST030 + FSS100
FS120	FST020 + FSS100
Sensor pair	Consists of two sensors (two transducers)
System	Transmitter + sensor
One sensor pair	Forms a single-path flow meter
Two sensor pairs	Form a dual-path flowmeter
Three sensor pairs	Form a three-path flowmeter
Four sensor pairs	Form a four-path flowmeter

Application

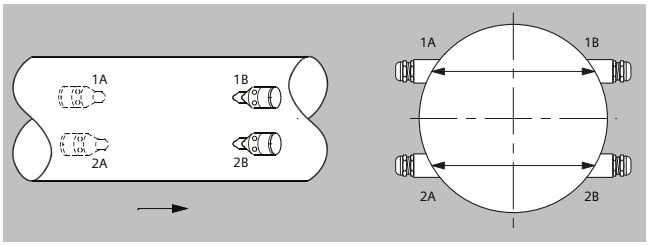
- Raw water intake for water treatment plants
- Water distribution systems
- Irrigation systems
- Power generation (energy and water)
- District heating plants
- Cooling water plants within the industry and in power stations
- Systems within the oil and refinery business
- Sewage treatment plants
- Plants transporting non-conductive liquids

Design

The FSS100 sensors can be installed into existing pipelines, regardless of the pipe material and without cutting out sections of the pipe. Installation is done by drilling holes for the sensors in the pipe, thus providing a low cost and low effort solution compared to installing an inline sensor. Up to four measurement paths can be installed to improve the measuring accuracy.



1-track-ultrasonic flowmeter with 2 transducers (1A and 1B)



2-track-ultrasonic flowmeter with 4 transducers (1A and 1B, 2A and 2B)

The FSS100 package box contains all necessary parts to build an ultrasonic flowmeter on existing pipes.

The sensor pair consists of two transducers, which represent a measurement path. One transducer is installed on top of the pipe and the other one on the bottom of the pipe.

Variants	
1-path	The transducers are installed in the center of the pipe
2-path	The transducers are installed on the right and left at the same distance from the center of the pipe
3-path	Combination of a 1-path and 2-path installation
4-path	Combination of two 2-path installations, these are installed crosswise

- Papers to wrap around pipes for alignment of the transducers.
- Alignment tools for the transducers.
- Mounting plates, transducer holders and the FSS100 transducers.

The FSS100 sensors can be directly connected to the transmitter SITRANS FST030 or SITRANS FST020. The transmitter must be ordered separately.

The transmitter related to this system is the SITRANS FST020 or FST030 (see Technical specifications for SITRANS FST020 or FST030). SITRANS FST020 for 1-path and water application. SITRANS FST030 for 1- up to 4-path, Ex-application, industrial liquids, water and wastewater.

Information on PED approval

The FSS100 system includes the pipe mounting parts only and therefore it cannot be delivered as PED-approved. After the installation, all installation-related activities (welding, pressure test, etc.) are the responsibility of the customer.

[1] Mounting plates are only included for empty pipe installation types (refer to selection "A"). For hot tap mounting the mounting plates are not included (refer to selection "B").

Selection and ordering data

SITRANS FSS100		Article No. 7ME3810-									
		●	●	●	●	●	-	0	0	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Installation method [1] (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.											
Installation	**Size**										
Empty pipe	DN < 200 (8")	1									
Empty pipe	DN ≥ 200 (8")	2									
Empty pipe concrete	DN ≥ 600 (24")	4									
Transducer holder											
Transducer carbon steel, mounting plates in carbon steel			B								
Transducer stainless steel, mounting plates in stainless steel			C								
Sensor cable											
Standard cable, 3 m for FST030 or FST020				B							
Standard cable, 15 m for FST030 or FST020				C							
Standard cable, 30 m – only for FST020				D							
Standard cable, 60 m – only for FST020				E							
Standard cable, 90 m – only for FST020				F							
High-temp cable, 3 m for FST030 or FST020				J							
High-temp cable, 15 m for FST030 or FST020				K							
High-temp cable, 30 m for FST020				L							
Transducer type and approval											
IP68 (NEMA 4X/6) PA polyamide housing, PN 40, O-ring, 100 °C (212 °F)					1						
IP68 SS stainless steel housing, PN 40, O-ring, 190 °C (374 °F), EX d type, ATEX approval (only with SITRANS FST030 Ex version)					4						
IP68 SS stainless steel housing, PN 40, O-ring, 190 °C (374 °F), EX i type, ATEX approval (only with SITRANS FST030 Ex version)					5						
Number of tracks											
1 track (path) with FST030, FST030 and FS DSL or FST020						1					
2 tracks (path) with FST030, FST030 and FS DSL or FST020						2					
3 tracks (path) require FST030 and FS DSL						3					
4 tracks (path) require FST030 and FS DSL						4					
Ex approvals											
Non Ex										A	
ATEX zone 1 ...										C	
IECEx zone 1 ...										F	
NEPSI										N	
INMETRO										P	
KCs										Q	

	Order code
Additional information Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Certificate	
Material certificate acc. to EN 10204 3.1	**C12**
Factory certificate acc. to EN 10204 2.1	**C15**
Transducers accessories	
Alignment rods-set for DN 100 ... 750 (4" ... 30") Ø = 25 mm, l = 500 mm, 3 pcs	**S10**
Alignment rods-set for DN 800 ... 2100 (32" ... 84") Ø = 25 mm, l = 500 mm, 6 pcs	**S11**
Alignment rods-set for DN 2200 ... 3000 (88" ... 120") Ø = 25 mm, l = 500 mm, 8 pcs	**S12**
Alignment rods-set for DN 100 ... 750 (4" ... 30") Ø = 25 mm, l = 500 mm, 3 pcs	**S13**

	Order code
Tranducers toolkits	
Spanner key for transducer mounting FSS100 O-ring type	**T11**
Toolbox set with various mounting/spare parts for FSS100	**T12**
Tag name	
Stainless steel TAG plate (1 × 24 × 80 mm), wire fixed. Font size depends on length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**

Operating instructions

Description	Article No.
SITRANS FSS100	
• English	
• German	

All literature is available to download for free, in a range of languages, at
www.siemens.com/processinstrumentation/documentation

Selection and ordering data (continued)

Please use online Product selector to get latest updates. Product selector link: www.pia-portal.automation.siemens.com

Technical specifications

SITRANS FSS100	
Accuracy [2]	± (0.5 ... 1.5%) of flow
Typical, depending on accuracy of measurements of installation.	Flow speed of 0.5 ms/s up to 10 m/s
Repeatability	± 0.25% according to ISO 11631
Requirements for pipes	
Size	• SITRANS FS130 (1- ... 4-path): DN 100 ... 3000 (4" ... 120") • SITRANS FS120: DN 100 ... 3000 (4" ... 120")
Line pressure	Max. 40 bar (580 psi)
Media temperature:	
• Standard version	• -10 ... +200 °C (14 ... 392 °F)
• ATEX Ex d version (FST030)	• -20 ... +180 °C (-4 ... +356 °F)
• ATEX Ex i version (FST030)	• -10 ... +190 °C (14 ... 374 °F)
Ambient temperature sensor:	
• Standard and Ex i version	• -20 ... +60 °C (-4 ... +140 °F)
• Ex d version	• -20 ... +180 °C (-4 ... +356 °F)
Transducer enclosure/approvals/certificates	
Standard version	IP67 (NEMA 6)/IP68 (NEMA 6P)
Ex approval	System ATEX approval for FSS100 Ex i transducers together with transmitter SITRANS FST030-Ex: • ATEX WII 2G Ex dem [ia/Ib] IIC T6/T4/T3 Gb • ATEX II 2G Ex d T3-T6 Gb with SONO 3200 Ex d transducers (for standard SITRANS FST030 transmitter, installed outside of Ex zone)
Material certificates	EN 10204-3.1 material certificate on transducer mounting parts
Transducer materials	
Terminal housing	Standard version: • PA 6.6, 100 °C (212 °F) or stainless steel • AISI 316, 200 °C (392 °F)
Transducer body	Standard version: • Stainless steel AISI 316, 200 °C (392 °F)
Materials of existing pipeline	
Steel	• Transducer holder: EN 10273 or EN 10216 (P235GH) • Mounting plates [1]: EN 10273 or EN 10216 (P235GH)
Concrete	• Transducer holder: Stainless steel AISI 316 or similar • Mounting plates [1]: (not included)
Stainless steel	• Transducer holder: Stainless steel AISI 316 or similar • Mounting plates [1]: Stainless steel AISI 316 or similar
Pipe wall thickness	
Steel pipe (AISI 316 and St. 37.2 or corresponding material)	Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79")
Concrete pipe	Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9") and pipe sizes ≥ DN 600
Dimension of the package box	
(L × W × H)	856 × 390 × 344 mm (33.7" × 15.4" × 13.5")
Weight example of a package	
(Standard 1-path)	Approx. 53 kg (116.8 lb)

Technical specifications (continued)

SITRANS FSS100	
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on a DVD
Material certificate	Material certificate for the transducer parts according to EN 10204-3.1 is optionally available

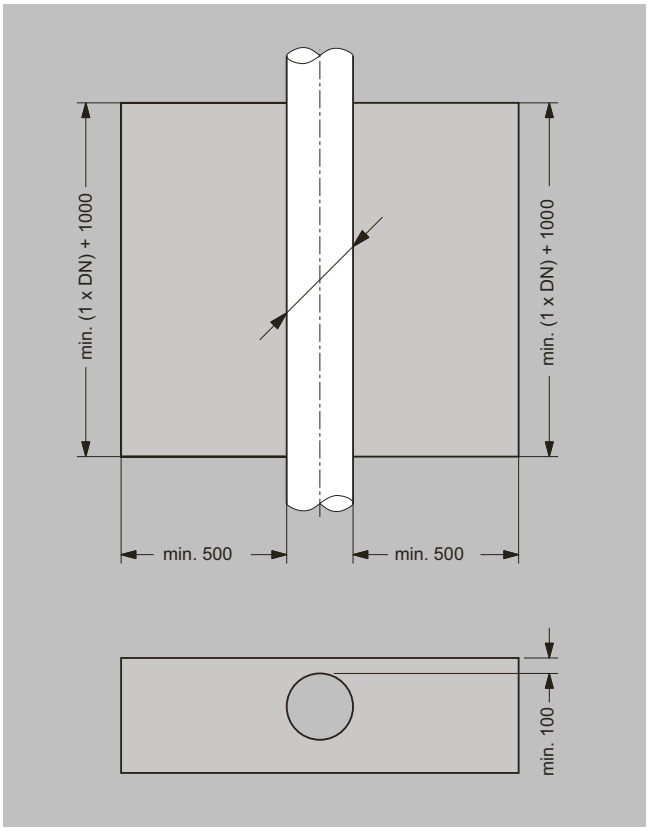
1) Mounting plates are only included for empty pipe installation types (refer to selection "A"). For hot tap mounting the mounting plates are not included (refer to selection "B").

2) Accuracy depends on the accuracy of the measurements taken at location during installation. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter have a direct effect on the accuracy. Values measured are entered into the memory of the SITRANS FST030 or FST020 transmitter. Multiple path systems provide a better flow profile compensation, this can lead to better measurement accuracy.

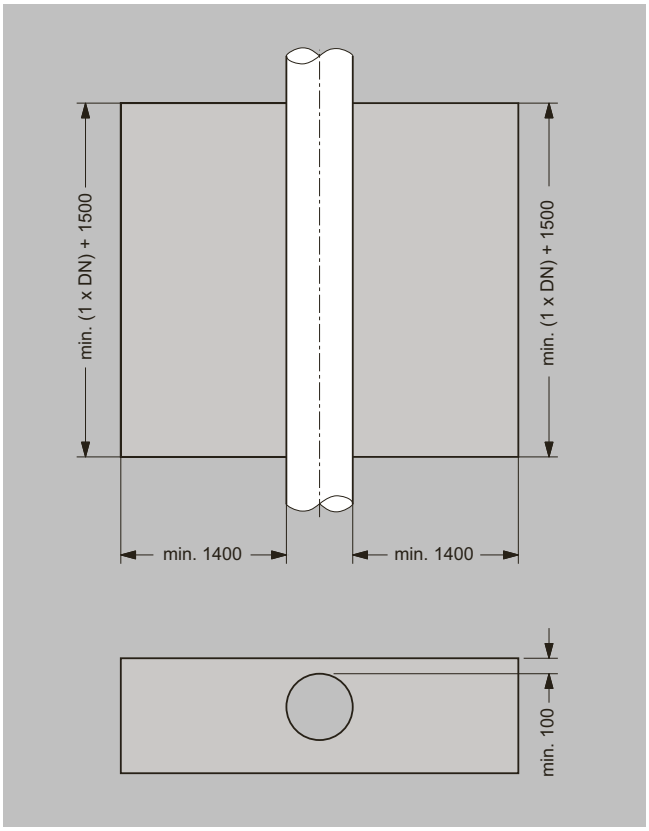
Dimensional drawings

Installation requirements

The space requirements (in mm) around the pipe for retrofitting a SITRANS FS100 ultrasonic flowmeter type SITRANS 120 or FS130 are given below:



Dimensional drawings (continued)



Selection and ordering data

FSS100 couplant grease

Description	Article No.
FSS100 couplant grease lubrication for high temperature based on PFPE/PTFE	A5E02904544

Tools for FSS100 transducers

Description	Article No.	
Extraction tool for replacement of FSS100 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F)) For transducer length:		
• Up to 160 mm (6.3")	FDK:085B5333	
• Up to 230 mm (9.1")	FDK:085B5335	
Angle measurement tool for FSS100	FDK:085B5330	
Hot-tap drilling tool for FSS100, the extraction tool is required, max. pressure 40 bar (580 psi)	FDK:085B5392	
Alignment tool for FSS100 (typically for hot-tapping). For use on pipe sizes in the range DN 300 ... 1200	FDK:085B5393	
Alignment rods-set		
• for DN 100 ... 650 (4" ... 26"), Ø = 25 mm, L = 500 mm, 3 pcs	A5E02609214	
• for DN 700 ... 1900 (28" ... 76"), Ø = 25 mm, L = 500 mm, 6 pcs	A5E02609215	
• for DN 2000 ... 3000 (80" ... 120"), Ø = 25 mm, L = 500 mm, 10 pcs	A5E02609216	
Spanner key for transducer mounting type FSS100	A5E02609218	
Tool set with various mounting/spare parts for FSS100 transducer installation	A5E02609219	 

Selection and ordering data (continued)

Transducer SITRANS FSS100 spare parts, complete transducer with ½"-NPT cable glands

Type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-420 ... +212)	160 (6.3)	**A5E00839476**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 [1] (-4 ... +392)	160 (6.3)	**A5E00839435**	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	**A5E00839477**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 [1] (-4 ... +392)	230 (9.41)	**A5E00839437**	

[1] 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temperature but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temperature

Transducer SITRANS FSS100 spare parts, complete transducer with M20 cable glands

Type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	160 (6.3)	**FDK:085B5454**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 [1] (-4- ... +392)	160 (6.3)	**FDK:085B5455**	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	**FDK:085B5458**	
O-ring	316 SS	O-ring	PN 40	316 SS	Ex d [2]	-20 ... +180 (-4 ... +356)	160 (6.3)	**FDK:085B5452**	
O-ring	316 SS	O-ring	PN 40	316 SS	Ex I [3]	-10 ... +190 (14 ... 374)	160 (6.3)	**A5E00836462**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 [2] (-4 ... +392)	230 (9.41)	**FDK:085B5459**	

[1] 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temperature but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temperature
[2] ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb
[3] For systems with FST030 ATEX IIC 2G Ex dem [ia/ib] T6/T4/ T3

Transducer SITRANS FSS100 spare parts, transducer terminal housing with ½"-NPT cable glands

Description	Article No.	
Material PA 6.6 Temperature range-20 ... +100 °C (-4 ... +212 °F)	**A5E00839460**	
Material AISI 316 Temperature range -20 ... +200 °C (-4 ... +392 °F)	**A5E00839427**	

Transducer FSS100 spare parts, transducer terminal housing with M20 cable glands

Description	Article No.	
Material PA 6.6 Temperature range -20 ... +100 °C (-4 ... +212 °F)	**FDK:085B5501**	
Material AISI 316 Temperature range -20 ... +200 °C (-4 ... +392 °F)	**FDK:085B5504**	
Material AISI 316, Ex d [1] Temperature range -20 ... +180 °C (-4 ... +356 °F)	**FDK:085B5505**	
Material AISI 316, Ex i [2] Temperature range -10 ... +190 °C (14 ... 374 °F)	**A5E00835255**	

[1] ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb
[2] For systems with FST030 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Selection and ordering data (continued)

Transducer SITRANS FSS100 spare parts transducer body with insert as well as insert only

Type	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring (FFKM O-ring material) [1]	-20 ... +200 (-4 ... +392)	160 (6.3)	**FDK:085B1406**	
O-ring (FKM 602 O-ring material) [2]	-20 ... +200 (-4 ... +392)	160 (6.3)	**FDK:085B5510**	
O-ring	-20 ... +200 (-4 ... +392)	230 (9.41)	**FDK:085B5511**	

[1] Chemical resistant O-ring material. Body specially for Ex-approved transducers
[2] Body specially for standard transducers

Transducer SITRANS FSS100 gasket

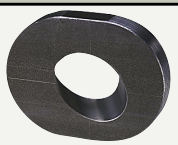
Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
O-ring 3 pcs for O-ring transducers	PN 40	FKM	-20 ... +200 (-4 ... +392)	**FDK:085B1089**	

Transducer holder for1- up to 4-path SITRANS FSS100

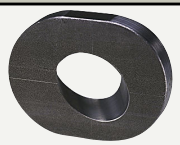
Description	Article No.	
Holders used for 1-path or 3-path for the center transducer mounting (each incl. 1 pc)		
• 160 mm (6.3") stainless steel 45°, DN 100 ... 150 (4" ... 6")	**FDK:085L1103**	
• 160 mm (6.3") carbon steel 45°, DN 100 ... 150 (4" ... 6")	**FDK:085L1102**	
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... 2400 (24" ... 96")	**FDK:085L1107**	
• 160 mm (6.3") stainless steel 60°, DN 200 ... 2400 (8" ... 96")	**FDK:085L1105**	
• 160 mm (6.3") carbon steel 60°, DN 200 ... 2400 (8" ... 96")	**FDK:085L1104**	
Holders used for 2-path, 3-path and 4-path for the non-central transducer mounting (each incl. 1 pc)		
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... 3000 (24" ... 120")	**FDK:085L1111**	
• 160 mm (6.3") stainless steel 60°, DN 200 ... 3000 (8" ... 120")	**FDK:085L1109**	
• 160 mm (6.3") carbon steel 60°, DN 200 ... 3000 (8" ... 120")	**FDK:085L1108**	

The other transducer holder parts are either completely in stainless steel for the concrete and stainless steel pipes (AISI 316L/1.4404 or similar). For carbon pipes the part welded onto the pipe is in carbon steel (St.37 or similar). Thread part is stainless steel (AISI 316L/1.4404 or similar).

Mounting plate for SITRANS FSS100 transducers

Description	Article No.	
Mounting plates used for 1-path or 3-path for the center transducer mounting (each incl. 1 pc)		
• Stainless steel plate, 45°, DN 100 ... 150 (4" ... 6")	**FDK:085L1113**	
• Carbon steel plate, 45°, DN 100 ... 150 (4" ... 6")	**FDK:085L1112**	
• Stainless steel plate, 60°, DN 200 ... 2400 (8" ... 96")	**FDK:085L1115**	
• Carbon steel plate, 60°, DN 200 ... 2400 (8" ... 96")	**FDK:085L1114**	
Mounting plates used for 2-path, 3-path and 4-path for the non-central transducer mounting (each incl. 1 pc)		
• Stainless steel plate, 60°, DN 200 ... 3000 (8" ... 120")	**FDK:085L1119**	

Selection and ordering data (continued)

Description	Article No.	
• Carbon steel plate, 60°, DN 200 ... 3000 (8" ... 120")	FDK:085L1118	

The mounting plates are either completely in stainless steel (AISI 316L/1.4404 or similar) or carbon steel (St.37 or similar).

Cable glands

Description	Temperature range [°C (°F)]	Approvals	Article No.	
Black PA plastic cable Ø 5 ... 13 mm (1 pc)	-20 ... 100 (-4 ... +212)		A5E02246304	
½" NPT grey PA plastic cable Ø 5 ... 9 mm (1 pc)	-20 ... 100 (-4 ... +212)		A5E02246309	
½" NPT crome-plated brass cable Ø 5 ... 9 mm (1 pc)	-40 ... 100 (-40 ... +212)		A5E02246258	
M20 stainless steel cable Ø 4 ... 6 mm (1 pc)	-25 ... 200 (-13 ... +392)	Ex i	A5E02246194	
M20 stainless steel cable Ø 5 ... 8 mm (1 pc)	-60 ... 180 (-76 ... +356)	Ex d	A5E02246311	
PG 13.5 brass cable gland	-20 ... 100 (-4 ... +212)		A5E02247692	