Flowmeter SONOKIT (with FUS060 or FUS080)

Overview

SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines.

The kit includes all necessary parts and special tools to make the installation as 1- or 2-track flowmeter.

The set is made for installation on empty pipes or pipes under pressure without process shut-down (hot-tap).

Please contact Siemens for further information on hot-tap tools and instructions.

SONOKIT 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
- SONOKIT is easy to install in pipeline sizes DN 200 to DN 4000 (8" to 160") 1-track DN 100 to DN 2400 (4" to 96") – without process shut-down or flow interruption.
- 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 SONOKIT comes with transducers in IP68 enclosure
- Available in a robust version that can be buried and withstands constant flooding
- In-line transducers assure superior accuracy and performance
- Automatic calculation of the calibration factor when pipe geometry data are entered in the transmitter
- FUS060 transmitter versions with HART or PROFIBUS PA
- FUS080 transmitter, battery or mains-powered

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 SONOKIT package box contains all necessary parts to build an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- Papers to wrap around pipes for alignment of sensors
- Transducer alignment tools
- Mounting plates, transducer holders and SONO 3200 transducers
- Transducer cables
- SITRANS FUS060 transmitter for wall mounting
- 4-track version is available on request

Technical specifications

The transmitter related to this system is the SITRANS FUS080 or FUS060.

Technical specifications to the FUS060 see page 4/189 and to FUS080 see page 4/194.

Accuracy	
Typical, depending on accuracy of measurements of installation	• 2-Track: ≤ ± (0.5 … 1.5 %) • 1-Track: ≤ ± (1 … 3 %)

Note:
Accuracy depends on the accuracy of the measurements taken at location. 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 FUS060 transmitter.

Requirements for pipes

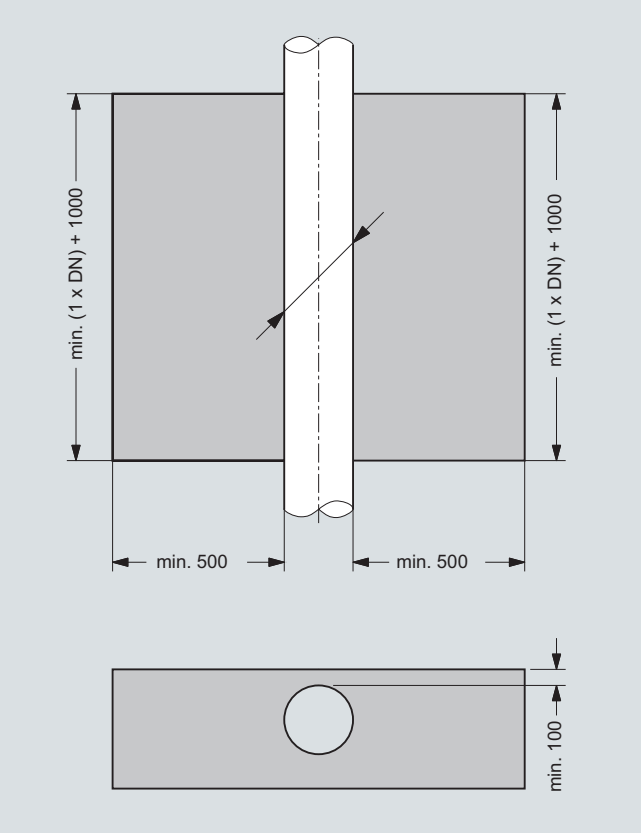
Size	FUS060: DN 100 … DN 4000 (4" … 160") FUS080: DN 100 … DN 1200 (4" … 48")
Line pressure	max. 40 bar (580 psi)
Media/surface temperature	• Standard version: -20 … +200 °C (-4 … +392 °F) • ATEX Ex-d version (FUS060): -20 ... +180 °C (-4 … +356 °F) • ATEX Ex-i version (FUS060): -10 ... +190 °C (14 ... 374 °F)
Ambient temperature sensor	-20 ... +60 °C (-4 ... +140 °F)
Transducer enclosure/ approvals/certificates	
Standard version	IP67 (NEMA 6) / IP68 (NEMA 6X)
Ex approval	System ATEX approval for SONO 3200 Ex i transducers together with transmitter FUS060-Ex: ATEX II 2G Ex dem [ia/Ib] IIC T6/T4/T3 or ATEX II 2G EEx d IIC T3-T6 with SONO 3200 Ex d transducers (for standard FUS060 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)

Flowmeter SONOKIT (with FUS060 or FUS080)

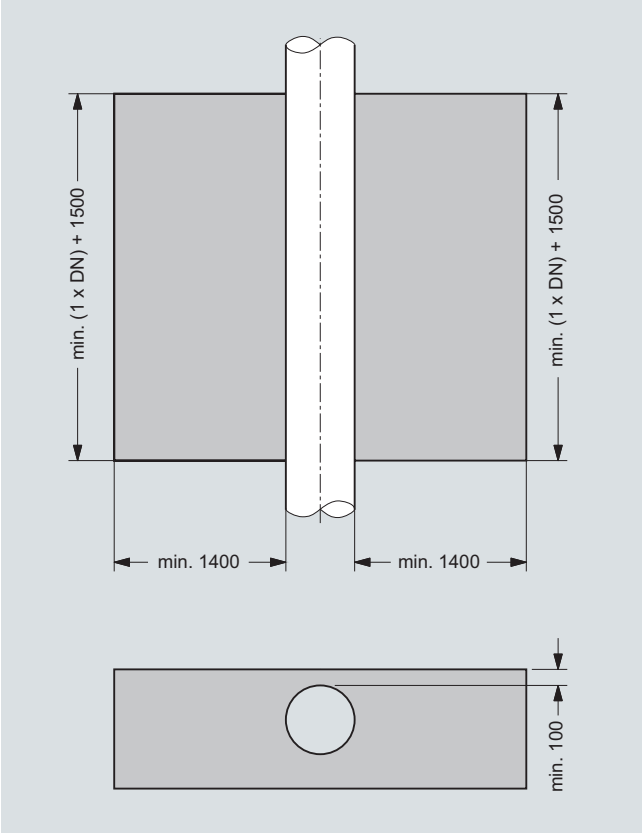
Materials of existing pipeline	
Steel	Transducer holder: EN 10273 or EN 10216 (P235GH) Mounting plates: EN 10273 or EN 10216 (P235GH)
Concrete	Transducer holder: Stainless steel AISI 316 or similar Mounting plates: (not included)
Stainless steel	Transducer holder: Stainless steel AISI 316 or similar Mounting plates: 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 x W x H, approx.)	856 x 390 x 344 mm (33.7“ x 15.4“ x 13.5“)
Weight example of a package (standard 2-track with FUS060)	approx. 53 kg (116,8 lb)
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on a CD
Material certificate	Material certificate for the transducer parts according to EN 10204-3.1 is optionally available
Approvals	No custody transfer approvals

Installation requirements

The space requirements (in mm) around the pipe for retrofitting a SITRANS F US ultrasonic flowmeter type SONOKIT are given below:



Empty pipe installation



Hot-tap installation

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data		Order No.	Ord. code
SITRANS F US SONOKIT 1-track sensor		7ME3210-	
Diameter	**Qn setting [m^3/h]**		
DN 100 (4")	100	1P	
DN 125 (5")	150	1T	
DN 150 (6")	220	2B	
DN 200 (8")	380	2F	
DN 250 (10")	600	2K	
DN 300 (12")	850	2P	
DN 350 (14")	1000	2T	
DN 400 (16")	1300	3B	
DN 450 (18")	1700	3F	
DN 500 (20")	2200	3K	
DN 550 (22")	2600	3P	
DN 600 (24")	3200	3T	
DN 650 (26")	3600	4B	
DN 700 (28")	4200	4F	
DN 750 (30")	4800	4K	
DN 800 (32")	5500	4P	
DN 900 (36")	7500	5B	
DN 1000 (40")	9000	5K	
DN 1100 (44")	10000	5P	
DN 1200 (48")	13200	5T	
Only for FUS060			
DN 1300 (52")	14000	6A	
DN 1400 (56")	16800	6C	
DN 1500 (60")	19000	6E	
DN 1600 (64")	22800	6G	
DN 1700 (68")	25000	6J	
DN 1800 (72")	27600	6L	
DN 1900 (76")	31000	6N	
DN 2000 (80")	36000	6Q	
DN 2100 (84")	37000	6S	
DN 2200 (88")	42000	6U	
DN 2300 (92")	45000	6W	
DN 2400 (96")	51000	7A	
Installation method			
Empty pipe		A	
Hot tap, mounting under pressure		B	
SONOKIT for tapping band (DN 200 ... DN 1800) (Tapping band to be ordered separately)[1]		C	
Transducer holder			
None (for tapping band)		0	
Carbon steel, length = 160 mm, mounting plates in carbon steel		1	
Stainless steel, length = 160 mm, mounting plates in stainless steel		2	
Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 2400)		3	
Transducer type and approval			
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval		1	
IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), Ex d, ATEX approval (only with standard FUS060)		2	
IP68 PA housing, Sylgard potting kit, PN 40, O-ring, 100 °C (212 °F), no approval		3	
IP68 SS housing, Sylgard potting kit, PN 40, O-ring, 200 °C (392 °F), no approval		4	
IP67 SS housing, PN 40, SS, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)		5	

Selection and Ordering data	Order No.	Ord. code
SITRANS F US SONOKIT 1-track sensor	7ME3210-	
Cable gland entries		
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)	1	
Cable glands ½" NPT in transducers and in transmitter (only with FUS060)	2	
Transmitter SITRANS FUS060 (only DN 100 ... 2400 (4" ... 96")		
IP65 (NEMA 4), 120/230 V AC	N	
IP65 (NEMA 4), 24 V AC/DC	P	
IP65 (NEMA 4), 24 V AC/DC Ex version	Q	
Transmitter SITRANS FUS080 (only DN 100 ... 1200 (4" ... 48"))		
PDM software tool and IrDA-adapter, which are needed for settings update, to be ordered separately, see FUS080 accessories		
IP67/NEMA 4X/6 115 ... 230 V AC	U	
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack	V	
IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup	W	
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)[2]	X	
Module		
No module (FUS080 only)	A	
HART, 1 pulse output, 1 relay	B	
HART Ex version, 1 pulse output, 1 relay	C	
PROFIBUS PA,1 pulse/frequency	D	
PROFIBUS PA, Ex version, 1 pulse/frequency	E	
Transducer coax cables (with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types)		
2 x 3 m, max. 70 °C (158 °F), the only option for Ex-i	0	
2 x 15 m, max. 70 °C (158 °F)	1	
2 x 30 m, high temp. max. 200 °C (392 °F)	2	
2 x 30 m, max. 70 °C (158 °F)	3	
2 x 60 m, max. 70 °C (158 °F)	4	
2 x 90 m, max. 70 °C (158 °F)	5	
2 x 120 m, max. 70 °C (158 °F)	6	
2 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex-i	7	
2 x 15 m, high temp. max. 200 °C (392 °F)	8	
Special version (add order code):		
No transducer cable, cable length 2 x 3 m, the only option for Ex-i	9	R0A
No transducer cable, cable length 2 x 15 m	9	R0B
No transducer cable, cable length 2 x 30 m	9	R0C
No transducer cable, cable length 2 x 60 m	9	R0D
No transducer cable, cable length 2 x 90 m	9	R0E
No transducer cable, cable length 2 x 120 m	9	R0F

[1] Tapping band via special request

[2] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs."

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Order No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material	**F30**
EN 10204-3.1, transducer holder material	**F31**
EN 10204-3.1, mounting plate material	**F32**
Tag name plate	
Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text)	**Y17**
Accessories	
Alignment rods-set for DN 100 ... 650 (4" ... 26") Ø = 25 mm, L = 500 mm, 3 pcs.	**S10**
Alignment rods-set for DN 700 ... 1900 (28" ... 76") Ø = 25 mm, L = 500 mm, 6 pcs.	**S11**
Alignment rods-set for DN 2000 ... 2400 (80" ... 96") Ø = 25 mm, L = 500 mm, 8 pcs.	**S12**
Spanner key for tranducer mounting type SONO 3200 O-ring type	**T11**
Tool set with various mounting/spare parts SONIOKIT installation	**T12**

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering.

Please use online Product selector to get latest updates. Product selector link:

www.pia-selector.automation.siemens.com

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data		Order No. 7ME3220-	Ord. code
SITRANS F US SONOKIT 2-track sensor			
Diameter	**Qn setting [m³/h]**		
DN 200 (8")	380	2 F	
DN 250 (10")	600	2 K	
DN 300 (12")	850	2 P	
DN 350 (14")	1000	2 T	
DN 400 (16")	1300	3 B	
DN 450 (18")	1700	3 F	
DN 500 (20")	2200	3 K	
DN 550 (22")	2600	3 P	
DN 600 (24")	3200	3 T	
DN 650 (26")	3600	4 B	
DN 700 (28")	4200	4 F	
DN 750 (30")	4800	4 K	
DN 800 (32")	5500	4 P	
DN 900 (36")	7500	5 B	
DN 1000 (40")	9000	5 K	
DN 1100 (44")	10 000	5 P	
DN 1200 (48")	13 200	5 T	
Only for FUS060			
DN 1300 (52")	14 000	6 A	
DN 1400 (56")	16 800	6 C	
DN 1500 (60")	19 000	6 E	
DN 1600 (64")	22 800	6 G	
DN 1700 (68")	25 000	6 J	
DN 1800 (72")	27 600	6 L	
DN 1900 (76")	31 000	6 N	
DN 2000 (80")	36 000	6 Q	
DN 2100 (84")	37 000	6 S	
DN 2200 (88")	42 000	6 U	
DN 2300 (92")	45 000	6 W	
DN 2400 (96")	51 000	7 A	
DN 2500 (100")	53 000	7 C	
DN 2600 (104")	60 000	7 E	
DN 2700 (108")	62 000	7 G	
DN 2800 (112")	72 000	7 J	
DN 2900 (116")	71 000	7 L	
DN 3000 (120")	78 000	7 N	
DN 3100 (124")	82 000	7 Q	
DN 3200 (128")	85 000	7 S	
DN 3300 (132")	92 000	7 U	
DN 3400 (136")	100 000	7 W	
DN 3500 (140")	100 000	8 A	
DN 3600 (144")	110 000	8 C	
DN 3700 (148")	120 000	8 E	
DN 3800 (152")	130 000	8 G	
DN 3900 (156")	130 000	8 J	
DN 4000 (160")	144 000	8 L	
Installation method			
Empty pipe		A	
Hot tap, mounting under pressure		B	
SONOKIT for tapping band (DN 200 ... DN 1800) (tapping band to be ordered separately)[1]		C	

[1] Tapping band via special request

Selection and Ordering data	Order No. 7ME3220-	Ord. code
SITRANS F US SONOKIT 2-track sensor		
Transducer holder		
None (for tapping band)	0	
Carbon steel, length = 160 mm, mounting plates in carbon steel	1	
Stainless steel, length = 160 mm, mounting plates in stainless steel	2	
Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 4000)	3	
Transducer type and approval		
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval	1	
IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), EEx-d, ATEX approval (only with standard FUS060)	2	
IP68 PA housing, Sylgard potting kit, PN 40, SS, O-ring, 100 °C (212 °F), no approval	3	
IP68 SS housing, Sylgard potting kit, PN 40, SS, O-ring, 200 °C (392 °F), no approval	4	
IP67 SS housing, PN 40, O-ring, 190 °C (374 °F), EEx-i, ATEX approval (only with FUS060 Ex)	5	
Cable gland entires		
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)	1	
Cable glands ½" NPT in transducers and in transmitter (only with FUS060)	2	
Transmitter SITRANS FUS060 (only DN 200 ... 4000 (8" ... 160")		
IP65 (NEMA 4), 120/230 V AC	N	
IP65 (NEMA 4), 24 V AC/DC	P	
IP65 (NEMA 4), 24 V AC/DC Ex version	Q	
Transmitter SITRANS FUS080 (only DN 200 ... 1200 (8" ... 48")		
PDM software tool and IrDA-adapter, which are needed for settings update, to be ordered separately, see FUS080 accessories		
IP67/NEMA 4X/6 115 ... 230 V AC	U	
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack	V	
IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup	W	
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)[4]	X	
Module		
No module (FUS080 only)	A	
HART, 1 pulse output, 1 relay	B	
HART Ex version, 1 pulse output, 1 relay	C	
PROFIBUS PA,1 pulse/frequency	D	
PROFIBUS PA, Ex version, 1 pulse/frequency	E	

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Order No.	Ord. code
SITRANS F US SONOKIT 2-track sensor	**7ME3220 -** ■■■■ - ■■■■	■■■
Transducer coax cables (with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types)		
4 x 3 m, max. 70 °C (158 °F), the only option for Ex-i	**0**	
4 x 15 m, max. 70 °C (158 °F)	**1**	
4 x 30 m, high temp. max. 200 °C (392 °F)	**2**	
4 x 30 m, max. 70 °C (158 °F)	**3**	
4 x 60 m, max. 70 °C (158 °F)	**4**	
4 x 90 m, max. 70 °C (158 °F)	**5**	
4 x 120 m, max. 70 °C (158 °F)	**6**	
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex-i	**7**	
4 x 15 m, high temp. max. 200 °C (392 °F)	**8**	
Special version (add order code):		
No transducer cable, cable length 4 x 3 m, the only option for Ex-i	**9**	**R0A**
No transducer cable, cable length 4 x 15 m	**9**	**R0B**
No transducer cable, cable length 4 x 30 m	**9**	**R0C**
No transducer cable, cable length 4 x 60 m	**9**	**R0D**
No transducer cable, cable length 4 x 90 m	**9**	**R0E**
No transducer cable, cable length 4 x 120 m	**9**	**R0F**

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Order No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material	**F30**
EN 10204-3.1, transducer holder material	**F31**
EN 10204-3.1, mounting plate material	**F32**
Tag name plate	
Stainless steel tag name plate, text length depends on font size: 8 mm up to 10 characters, 4 mm up to 20 characters, or 3 mm up to 30 characters (add plain text)	**Y17**
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 ... 4000 (88" ... 160") Ø = 25 mm, L = 500 mm, 8 or 10 pcs.	**S12**
Spanner key for tranducer mounting type SONO 3200 O-ring type	**T11**
Tool set with various mounting/spare parts SONIOKIT installation	**T12**

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www.pia-selector.automation.siemens.com

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SONOKIT accessories and spare parts

SONO 3200 spare parts, complete transducer with ½"-NPT cable glands

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

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

SONO 3200 spare parts, complete transducer with M20 cable glands

Transducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Order 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[1]	PN 40	316 SS		-20 … +200[2] (-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[1]	PN 40	316 SS	Ex-d[3]	-20 … +180 (-4 ... +356)	160 (6.3)	**FDK:085B5452**
O-ring	316 SS	O-ring	PN 40	316 SS	Ex-i[4]	-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] Chemical resistant O-ring
[2] 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.
[3] ATEX (Ex) IIC 2G EEx d IIC T3 ... T6
[4] For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

SONO 3200 spare parts, transducer terminal housing with M20 cable glands

Type	Order 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 EEx d IIC T3 ... T6
[2] For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

SONO 3200 spare parts, transducer terminal housing with ½"-NPT cable glands

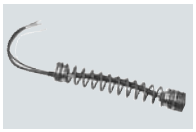
Type	Order No.
Material: PA 6.6, Temperature range: -20 … +100 °C (-4 ... +212 °F)	**A5E00839460**
Material: AISI 316, Temperature range: -20 … +200 °C (-4 ... +392 °F)	**A5E00839427**

SONO 3200 spare parts transducer body with insert

Temperature range [°C (°F)]	Gasket	Length [mm (inch)]	Order No.
-20 … +200 (-4 ... +392)	O-ring[1]	160 (6.3)	**FDK:085B1406**
-20 … +200 (-4 ... +392)	O-ring	160 (6.3)	**FDK:085B5510**
-20 … +200 (-4 ... +392)	O-ring	230 (9.41)	**FDK:085B5511**

[1] Chemical resistant O-ring
F) Subject to export regulations AL: 9I999, ECCN: N.

SONO 3200 spare parts, transducer insert

Temperature range [°C (°F)]	Length [mm (inch)]	Order No.	
-20 … +200 (-4 ... +392)	160 (6.3)	**FDK:085B1419**	
-20 … +200 (-4 ... +392)	230 (9.41)	**FDK:085B1420**	

Transducer SONO 3200 gasket

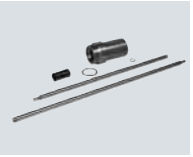
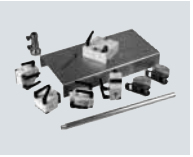
Type	Pressure rating	Material	Temperature range [°C (°F)]	Order No.	
Gasket O-ring (3 pcs. for O-ring transducers)	PN 40	FFKM[1]/FKM	-20 … +200 (-4 ... +392)	**FDK:085B1089**	

[1] Chemical resistant O-ring

Potting kit for SONO 3200 terminal housing

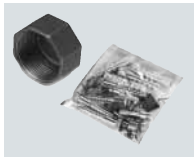
Type/description	Order No.	
Submersible kit for transducers SONO 3200, IP68 10 m (32.81 ft) w.g. rating	**FDK:085L2403**	

Tools for SONO 3200 transducers and SONOKIT

Type/description	Order No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure (hot-tap) Transducer length:		
• 160 mm (6.3“)	**FDK:085B5333**	
• 230 mm (9.1“)	**FDK:085B5335**	
Angle measurement tool for SONOKIT	**FDK:085B5330**	
Hot-tap drilling tool for SONOKIT	**FDK:085B5392**	
Alignment tool for SONOKIT For use on pipe sizes in the range DN 300 to DN 1200.	**FDK:085B5393**	

Flowmeter SONOKIT (with FUS060 or FUS080)

Alignment tools and other accessories

Type/description	Order No.	
Alignment rods-set for DN 100 ... 650 (4" ... 26"), Ø = 25 mm, L = 500 mm, 3 pcs.	**A5E02609214**	
Alignment rods-set for DN 700 ... 1900 (28" ... 76"), Ø = 25 mm, L = 500 mm, 6 pcs.	**A5E02609215**	
Alignment rods-set for DN 2000 ... 4000 (80" ... 160"), Ø = 25 mm, L = 500 mm, 10 pcs.	**A5E02609216**	
Spanner key for tranducer mounting type SONO 3200 O-ring type	**A5E02609218**	
Tool set with various mounting/spare parts SONIOKIT installation	**A5E02609219**	

Cables for SONOKIT SONO 3200 transducers with FUS060

Type/description	Length m (ft)	Order No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	**A5E00875101**	
	15 (49.21)	**A5E00861432**	
	30 (98.43)	**A5E01278662**	
	60 (196.85)	**A5E01278682**	
	90 (295.28)	**A5E01278687**	
	120 (393.70)	**A5E01278698**	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	3 (9.84)	**A5E00875105**[F)]	
	15 (49.21)	**A5E00861435**	
	30 (98.43)	**A5E01196952**[F)]	

Cables for SONOKIT SONO 3200 transducers with FUS080

Type/description	Length m (ft)	Order No.	
Coaxial cable for FUS080, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	15 (49.21)	**A5E02478541**	
	30 (98.43)	**A5E02478551**	

F) Subject to export regulations AL: 9I999, ECCN: N.

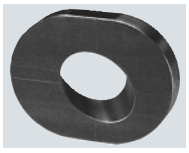
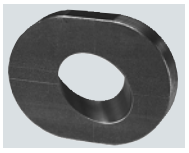
Flowmeter SONOKIT (with FUS060 or FUS080)

Transducer holder for SONOKIT SONO 3200 transducers

Type/description	Order No.	
1-track (each incl. 1 pc.)		
• 160 mm (6.3“) stainless steel 45°, DN 100 … DN 150 (4“ ... 6“)	**FDK:085L1103**	
• 160 mm (6.3“) carbon steel 45°, DN 100 … DN 150 (4“ ... 6“)	**FDK:085L1102**	
• 230 mm (9.1“) for concrete pipe 60°, DN 600 … DN 2400 (24“ ... 96“)	**FDK:085L1107**	
• 160 mm (6.3“) stainless steel 60°, DN 200 … DN 2400 (8“ ... 96“)	**FDK:085L1105**	
• 160 mm (6.3“) carbon steel 60°, DN 200 … DN 2400 (8“ ... 96“)	**FDK:085L1104**	
2-track (each incl. 1 pc.)		
• 230 mm (9.1“) for concrete pipe 60°, DN 600 … DN 4000 (24“ ... 160“)	**FDK:085L1111**	
• 160 mm (6.3“) stainless steel 60°, DN 200 … DN 4000 (8" ... 160“)	**FDK:085L1109**	
• 160 mm (6.3“) carbon steel 60°, DN 200 … DN 4000 (8“ ... 160“)	**FDK:085L1108**	

The other transducer holder parts are either completely in stainless steel for the concrete and stainless steel pipes (material no. 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 (material no. 1.4404 or similar).

Mounting plate for SONOKIT SONO 3200 transducers

Type/description	Order No.	
1-track (each incl. 1 pc.)		
• Stainless steel plate, 45°, DN 100 … DN 150 (4“ ... 6“)	**FDK:085L1113**	
• Carbon steel plate, 45°, DN 100 … DN 150 (4“ ... 6“)	**FDK:085L1112**	
• Stainless steel plate, 60°, DN 200 … DN 2400 (8“ ... 96“)	**FDK:085L1115**	
• Carbon steel plate, 60°, DN 200 … DN 2400 (8“ ... 96“)	**FDK:085L1114**	
2-track (each incl. 1 pc.)		
• Stainless steel plate, 60°, DN 200 … DN 4000 (8“ ... 160“)	**FDK:085L1119**	
• Carbon steel plate, 60°, DN 200 … DN 4000 (8“ ... 160“)	**FDK:085L1118**	

The mounting plates are either completely in stainless steel (mat. no. 1.4404 or similar) or carbon steel (St.37 or similar).

Cable connection boxes

(For the connection of individual transducer cables with the FUS060 transducer cables)

Type/description	Order No.	
Junction box for coax cable		
• IP68 metal box for 2 coaxial cables	**FDK:085B1360**	
• IP68 metal box for 4 coaxial cables	**FDK:085B1361**	
• IP68 EEx e plastic box for 2 coaxial cables, no ATEX approval	**FDK:085B1362**	
• IP68 EEx e plastic box for 4 coaxial cables, no ATEX approval	**FDK:085B1363**	

SONO 3200 cable glands

Type/description	Temperature range [°C (°F)]	Appr.	Order No.	
black PA plastic, cable Ø 5 ... 13 mm	-20 ... 100 (-4 ... +212)		**A5E02246304**	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm	-20 ... 100 (-4 ... +212)		**A5E02246309**	
½" NPT crome-plated brass, cable Ø 5 ... 9 mm	-40 ... 100 (-40 ... +212)		**A5E02246258**	
M20 stainless steel, cable Ø 4 ... 6 mm	-25 ... 200 (-13 ... +392)	Ex-i	**A5E02246194**	
M20 stainless steel, cable Ø 5 ... 8 mm	-60 ... 180 (-76 ... +356)	Ex-d	**A5E02246311**	

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