

## Flow Measurement

### SITRANS FS (ultrasonic)

#### Inline ultrasonic flowmeters

#### SONOKIT flowmeter (with FUS060 or FUS080)

#### Overview



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

The kit offers all necessary parts and special tools to make the installation as 1-path or 2-path 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 inline 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 3000 (8" to 120") 1-path DN 100 to DN 2400 (4" to 96").
- 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.
- Inline transducers assure superior accuracy and performance.
- Automatic calculation of the calibration factor when pipe geometry data are entered in the transmitter.
- FST030 transmitter, modified for inline HART or Modbus
- 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 or FUS080 transmitter for wall mounting
- For pipes bigger DN500 (20") please order FST030 transmitter separately (FDK-085X6329)

#### Technical specifications

The transmitter related to this system is the SITRANS FUS080 or FST030.

Technical specifications on pages 3/260 and 3/331.

#### Accuracy

Typical, depending on accuracy of measurements of installation

- 2-path:  $\leq \pm (0.5 \dots 1.5 \%)$
- 1-path:  $\leq \pm (1 \dots 3 \%)$

#### 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 or FUS080 transmitter.

#### Requirements for pipes

<b>Size</b>	FUS060: DN 100 ... DN 3000 (4" ... 120") FUS080: DN 100 ... DN 1200 (4" ... 48")
Line pressure	max. 40 bar (580 psi)
Media temperature	
• Standard version	-10 ... +200 °C (14 ... 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	
• Standard and Ex-i version	-20 ... +60 °C (-4 ... +140 °F)
• Ex d version	-20 ... +180 °C (-4 ... +356 °F)
<b>Transducer enclosure/ approvals/certificates</b>	
Standard version	IP67 (NEMA 6)/IP68 (NEMA 6P)
Ex approval	System ATEX approval for SONO 3200 Ex i transducers together with transmitter FUS060-Ex: ATEX II 2 G Ex dem [ia/lb] IIC T6/T4/T3 Gb or ATEX II 2G Ex d T3-T6 Gb 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
<b>Transducer materials</b>	
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)

#### Technical specifications (continued)

Materials of existing pipeline	
Steel	Transducer holder: EN 10273 or EN 10216 (P235GH) Mounting plates <sup>1)</sup> : EN 10273 or EN 10216 (P235GH)
Concrete	Transducer holder: Stainless steel AISI 316 or similar Mounting plates <sup>1)</sup> : (not included)
Stainless steel	Transducer holder: Stainless steel AISI 316 or similar Mounting plates <sup>1)</sup> : 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.

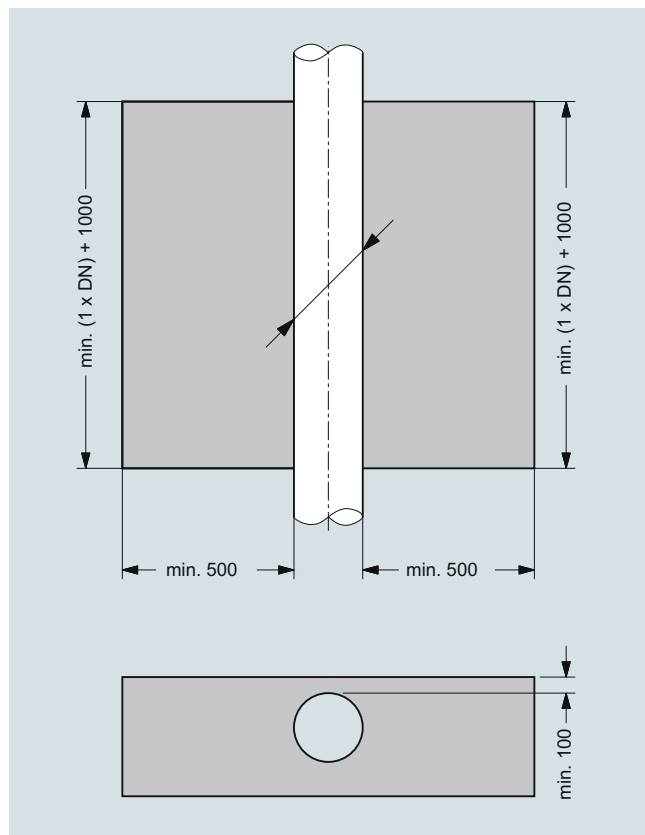
<b>Dimension of the package box</b> (L x W x H)	856 x 390 x 344 mm (33.7" x 15.4" x 13.5")
<b>Weight example of a package</b> (standard 2-path with FUS060)	approx. 53 kg (116.8 lb)
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on a DVD.
Material certificate	Material certificate for the transducer parts according to EN 10204-3.1 is optionally available.
Approvals	No custody transfer approvals

**Information on PED approval:**  
The SONOKIT includes the pipe mounting parts only and therefore it cannot be PED-approved. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

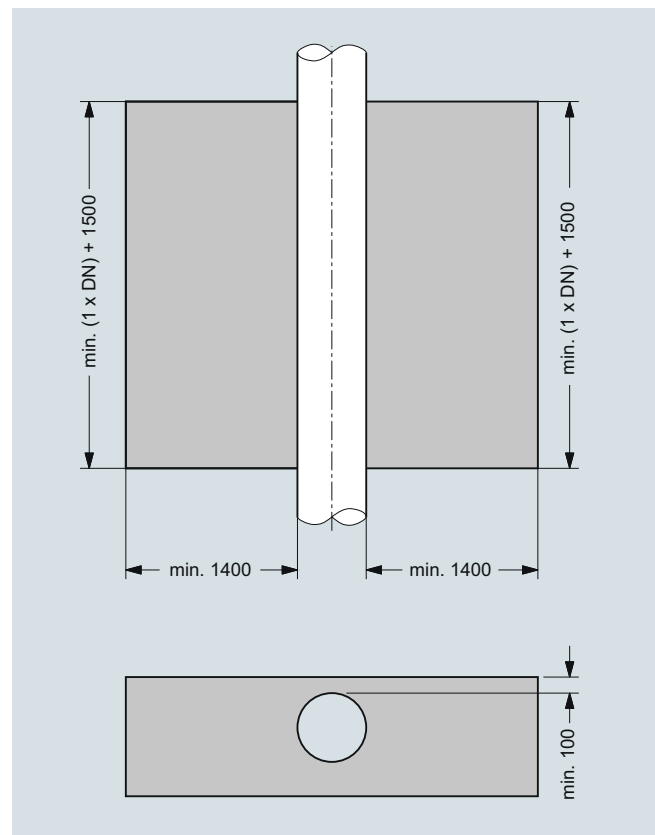
<sup>1)</sup> Mounting plates are only included for empty pipe installation types (refer to selection "A"). For hot tap mounting the mounting plates are not included (refer to selection "B").

#### 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

## Flow Measurement

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#### Selection and ordering data

#### Article No.

SITRANS F US SONOKIT 1-path sensor		7ME3210-	Ord. Code
<a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>			
Diameter	Qn setting [m <sup>3</sup> /h]		
DN 100 (4")	100	1 P	
DN 125 (5")	150	1 T	
DN 150 (6")	220	2 B	
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")	10000	5 P	
DN 1200 (48")	13200	5 T	
Installation method <sup>1)</sup>			
Empty pipe (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.		A	
Hot tap, mounting under pressure (mounting plates <b>not</b> incl.). Special mounting tools to be ordered separately.		B	
Transducer holder			
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 ... 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, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)		5	

#### Article No.

SITRANS F US SONOKIT 1-path sensor		7ME3210-	Ord. Code
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 version of SITRANS FUS060 (only DN 100 ... 2400)			
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 version of SITRANS FUS080 (only DN 100 ... 1200)			
PDM software tool and IrDA-adaptor, 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) <sup>2)</sup>		X	
Transmitter output module			
Transmitter SITRANS FUS080			
Pulse and/or alarm output (standard for FUS080)		A	
Transmitter SITRANS FUS060			
HART, 1 pulse output, 1 relay		B	
HART Ex version, 1 pulse output, 1 relay		C	
PROFIBUS PA, 1 pulse/frequency		D	
Transducer coaxial 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	R O A
No transducer cable, cable length 2 x 15 m		9	R O B
No transducer cable, cable length 2 x 30 m		9	R O C
No transducer cable, cable length 2 x 60 m		9	R O D
No transducer cable, cable length 2 x 90 m		9	R O E
No transducer cable, cable length 2 x 120 m		9	R O F

<sup>1)</sup> Mounting tools must be ordered separately as "-Z"-options.

<sup>2)</sup> 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		Article No.	Article No.	
<b>Additional information</b>			<b>SITRANS F US SONOKIT</b>	7ME3220-
Please add <b>"-Z"</b> to Article No. and specify Order code(s) and plain text.			<b>2-path sensor</b>	Ord. Code
<b>Material certificate</b>				
EN 10204-3.1, transducer body material		<b>F30</b>	↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
EN 10204-3.1, transducer body material		<b>F31</b>	<b>Diameter</b>	<b>Qn setting [m<sup>3</sup>/h]</b>
EN 10204-3.1, mounting plate material		<b>F32</b>	DN 200 (8")	380
<b>Regional specific approval</b>			DN 250 (10")	600
KCC marking for Korea		<b>W28</b>	DN 300 (12")	850
<b>Tag name plate</b>			DN 350 (14")	1000
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).		<b>Y17</b>	DN 400 (16")	1300
<b>Accessories</b>			DN 450 (18")	1700
Alignment rods-set for DN 100 ... 650 (4" ... 26") Ø = 25 mm, L = 500 mm, 3 pcs.		<b>S10</b>	DN 500 (20")	2200
Alignment rods-set for DN 700 ... 1900 (28" ... 76") Ø = 25 mm, L = 500 mm, 6 pcs.		<b>S11</b>	DN 550 (22")	2600
Alignment rods-set for DN 2000 ... 2400 (80" ... 96") Ø = 25 mm, L = 500 mm, 8 pcs.		<b>S12</b>	DN 600 (24")	3200
Spanner key for transducer mounting type SONO 3200 O-ring type		<b>T11</b>	DN 650 (26")	3600
Tool set with various mounting/spare parts for SONOKIT installation		<b>T12</b>	DN 700 (28")	4200
<b>Operating instructions</b>			DN 750 (30")	4800
<b>Description</b>		<b>Article No.</b>	DN 800 (32")	5500
SITRANS FUS060			DN 900 (36")	7500
• English		<b>A5E01204521</b>	DN 1000 (40")	9000
• German		<b>A5E02123845</b>	DN 1100 (44")	10000
SITRANS FUS080			DN 1200 (48")	13200
• English		<b>A5E03059912</b>	<b>Installation method<sup>1)</sup></b>	
• German		<b>A5E31628428</b>	Empty pipe (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.	<b>A</b>
SITRANS F US SONOKIT 1-path			Hot tap, mounting under pressure (mounting plates <b>not</b> incl.). Special mounting tools to be ordered separately.	<b>B</b>
• English		<b>A5E00814557</b>	<b>Transducer holder</b>	
• German		<b>A5E02610428</b>	Carbon steel, length = 160 mm, mounting plates in carbon steel	<b>1</b>
			Stainless steel, length = 160 mm, mounting plates in stainless steel	<b>2</b>
			Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... 3000)	<b>3</b>

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## Flow Measurement

### SITRANS FS (ultrasonic)

#### Inline ultrasonic flowmeters

#### SONOKIT flowmeter (with FUS060 or FUS080)

#### Selection and ordering data

#### Article No.

#### Article No.

#### SITRANS F US SONOKIT 2-path sensor

7ME3220-

Ord.  
Code

#### 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, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)

5

#### 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 version of SITRANS FUS060 (only DN 200 ... 500)

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 version of SITRANS FUS080 (only DN 200 ... 1200)

PDM software tool and IrDA-adaptor, which are needed for settings update, to be ordered separately, see FUS080 accessories

U

IP67/NEMA 4X/6 115 ... 230 V AC

V

IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack

W

IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup

X

IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)<sup>2)</sup>

#### Transmitter output module

Transmitter SITRANS FUS080

Pulse and/or alarm output (standard for FUS080)

A

Transmitter SITRANS FUS060

HART, 1 pulse output, 1 relay

B

HART Ex version, 1 pulse output, 1 relay

C

PROFIBUS PA, 1 pulse/frequency

D

#### SITRANS F US SONOKIT 2-path sensor

7ME3220-

Ord.  
Code

#### Transducer coaxial 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) (up to DN 3000)

4

4 x 90 m, max. 70 °C (158 °F) (up to DN 3000)

5

4 x 120 m, max. 70 °C (158 °F) (up to DN 3000)

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

R O A

No transducer cable, cable length 4 x 15 m

9

R O B

No transducer cable, cable length 4 x 30 m

9

R O C

No transducer cable, cable length 4 x 60 m (up to DN 3000)

9

R O D

No transducer cable, cable length 4 x 90 m (up to DN 3000)

9

R O E

No transducer cable, cable length 4 x 120 m (up to DN 3000)

9

R O F

<sup>1)</sup> Mounting tools must be ordered separately as "-Z"-options.

<sup>2)</sup> 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."

#### Additional information

Please add "-Z" to Article No. and specify Order code(s) and plain text.

#### Material certificate

EN 10204-3.1, transducer body material

F30

EN 10204-3.1, transducer body material

F31

EN 10204-3.1, mounting plate material

F32

#### Regional specific approval

KCC marking for Korea

W28

#### Tag name plate

Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed.

Y17

Font size depends on text length:

8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).

#### 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

Spanner key for transducer mounting type SONO 3200 O-ring type

T11

Tool set with various mounting/spare parts for SONOKIT installation

T12

#### Selection and ordering data (continued)

##### Operating instructions

Description	Article No.
SITRANS FUS060	
• English	<b>A5E01204521</b>
• German	<b>A5E02123845</b>
SITRANS FUS080	
• English	<b>A5E03059912</b>
• German	<b>A5E31628428</b>
SITRANS F US SONOKIT 2-path	
• English	<b>A5E02445496</b>
• German	<b>A5E02554972</b>

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##### Flowmeter SONOKIT accessories and spare parts

##### Accessories

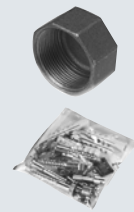
##### Potting kit for SONO 3200 terminal housing

Description	Article No.
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	<b>FDK:085L2403</b>



##### Tools for SONO 3200 transducers and SONOKIT

Description	Article No.
Extraction tool for replacement of SONO 3200 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")	<b>FDK:085B5333</b>
• Up to 230 mm (9.1")	<b>FDK:085B5335</b>
Angle measurement tool for SONOKIT	<b>FDK:085B5330</b>
Hot-tap drilling tool for SONOKIT, the extraction tool is required, max. pressure 40 bar (580 psi)	<b>FDK:085B5392</b>
Alignment tool for SONOKIT (typically for hot-tapping) For use on pipe sizes in the range DN 300 ... DN 1200	<b>FDK:085B5393</b>
Alignment rods-set for DN 100 ... 650 (4" ... 26"), Ø = 25 mm, L = 500 mm, 3 pcs.	<b>A5E02609214</b>
Alignment rods-set for DN 700 ... 1900 (28" ... 76"), Ø = 25 mm, L = 500 mm, 6 pcs.	<b>A5E02609215</b>
Alignment rods-set for DN 2000 ... 3000 (80" ... 120"), Ø = 25 mm, L = 500 mm, 10 pcs.	<b>A5E02609216</b>
Spanner key for transducer mounting type SONO 3200 O-ring type	<b>A5E02609218</b>
Tool set with various mounting/spare parts for SONOKIT installation	<b>A5E02609219</b>



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#### Selection and ordering data (continued)

##### Spare parts

Transducer SONO 3200 spare parts, complete transducer with 1/2"-NPT cable glands

Transducer 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)	<b>A5E00839476</b>
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 <sup>1)</sup> (-4 ... +392)	160 (6.3)	<b>A5E00839435</b>
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	<b>A5E00839477</b>
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 <sup>1)</sup> (-4 ... +392)	230 (9.41)	<b>A5E00839437</b>

1) <sup>1)</sup> 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.

Transducer 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)]	Article No.
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	160 (6.3)	<b>FDK:085B5454</b>
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 <sup>1)</sup> (-4 ... +392)	160 (6.3)	<b>FDK:085B5455</b>
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	<b>FDK:085B5458</b>
O-ring	316 SS	O-ring	PN 40	316 SS	Ex d <sup>2)</sup>	-20 ... +180 (-4 ... +356)	160 (6.3)	<b>FDK:085B5452</b>
O-ring	316 SS	O-ring	PN 40	316 SS	Ex i <sup>3)</sup>	-10 ... +190 (14 ... 374)	160 (6.3)	<b>A5E00836462</b>
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 <sup>2)</sup> (-4 ... +392)	230 (9.41)	<b>FDK:085B5459</b>

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.

2) ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

3) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

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

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

1) ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Transducer SONO 3200 spare parts, transducer terminal housing with 1/2"-NPT cable glands

Type	Article No.
Material: PA 6.6, Temperature range: -20 ... +100 °C (-4 ... +212 °F)	<b>A5E00839460</b>
Material: AISI 316, Temperature range: -20 ... +200 °C (-4 ... +392 °F)	<b>A5E00839427</b>

#### Selection and ordering data (continued)

Transducer SONO 3200 spare parts transducer body with insert as well as insert only

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

<sup>1)</sup> Chemical resistant O-ring material. Body specially for Ex-approved transducers.

<sup>2)</sup> Body specially for standard transducers.

Transducer SONO 3200 gasket

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

Cables for SONOKIT SONO 3200 transducers with FUS060

Description	Article No.
Coax cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC), (2 pcs.)	
• 3 m (9.84 ft)	<b>A5E00875101</b>
• 15 m (49.21 ft)	<b>A5E00861432</b>
• 30 m (98.43 ft)	<b>A5E01278662</b>
• 60 m (196.85 ft)	<b>A5E01278682</b>
• 90 m (295.28 ft)	<b>A5E01278687</b>
• 120 m (393.70 ft)	<b>A5E01278698</b>
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)	<b>A5E00875105</b>
• 15 (49.21)	<b>A5E00861435</b>
• 30 (98.43)	<b>A5E01196952</b>

Cables for SONOKIT SONO 3200 transducers with FUS080

Description	Article No.
Coax cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC), (2 pcs.)	
• 15 m (49.21 ft)	<b>A5E02478541</b>
• 30 m (98.43 ft)	<b>A5E02478551</b>

Transducer holder for SONOKIT SONO 3200 transducers

Description	Article No.
1-path (each incl. 1 pc.)	
• 160 mm (6.3") stainless steel 45°, DN 100 ... DN 150 (4" ... 6")	<b>FDK:085L1103</b>
• 160 mm (6.3") carbon steel 45°, DN 100 ... DN 150 (4" ... 6")	<b>FDK:085L1102</b>
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... DN 2400 (24" ... 96")	<b>FDK:085L1107</b>
• 160 mm (6.3") stainless steel 60°, DN 200 ... DN 2400 (8" ... 96")	<b>FDK:085L1105</b>
• 160 mm (6.3") carbon steel 60°, DN 200 ... DN 2400 (8" ... 96")	<b>FDK:085L1104</b>
2-path (each incl. 1 pc.)	
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... DN 3000 (24" ... 120")	<b>FDK:085L1111</b>
• 160 mm (6.3") stainless steel 60°, DN 200 ... DN 3000 (8" ... 120")	<b>FDK:085L1109</b>
• 160 mm (6.3") carbon steel 60°, DN 200 ... DN 3000 (8" ... 120")	<b>FDK:085L1108</b>

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).



## Flow Measurement

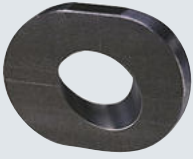
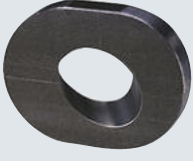
SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONOKIT flowmeter (with FUS060 or FUS080)






#### Selection and ordering data (continued)

##### Mounting plate for SONOKIT SONO 3200 transducers

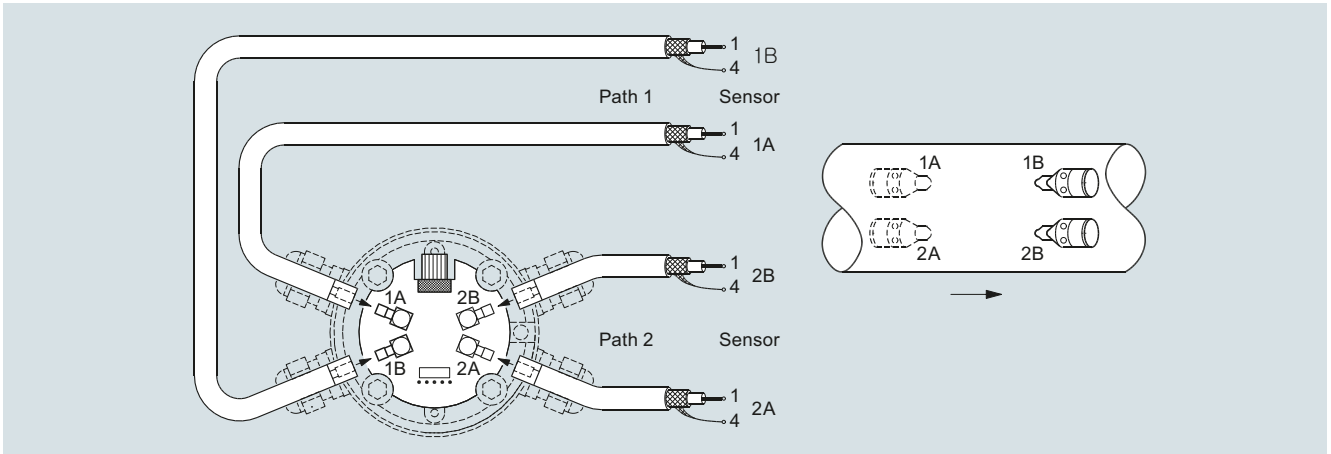
Description	Article No.	
1-path (each incl. 1 pc.)		
• Stainless steel plate, 45°, DN 100 ... DN 150 (4" ... 6")	<b>FDK:085L1113</b>	
• Carbon steel plate, 45°, DN 100 ... DN 150 (4" ... 6")	<b>FDK:085L1112</b>	
• Stainless steel plate, 60°, DN 200 ... DN 2400 (8" ... 96")	<b>FDK:085L1115</b>	
• Carbon steel plate, 60°, DN 200 ... DN 2400 (8" ... 96")	<b>FDK:085L1114</b>	
2-path (each incl. 1 pc.)		
• Stainless steel plate, 60°, DN 200 ... DN 3000 (8" ... 120")	<b>FDK:085L1119</b>	
• Carbon steel plate, 60°, DN 200 ... DN 3000 (8" ... 120")	<b>FDK:085L1118</b>	

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

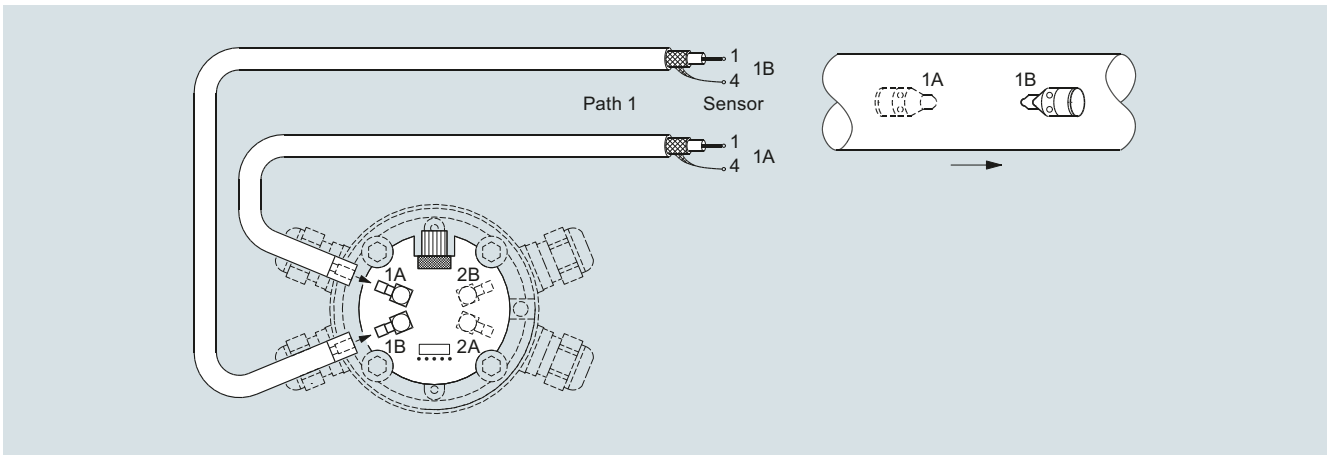
##### SONO 3200 cable glands

Description	Article No.	
Black PA plastic, cable Ø 5 ... 13 mm (1 pc.), temperature range -20 ... 100 °C (-4 ... +212 °F)	<b>A5E02246304</b>	
½" NPT grey PA plastic, cable Ø 5 ... 9 mm (1 pc.), temperature range -20 ... 100 °C (-4 ... +212 °F)	<b>A5E02246309</b>	
½" NPT chrome-plated brass, cable Ø 5 ... 9 mm (1 pc.), temperature range -40 ... 100 °C (-40 ... +212 °F)	<b>A5E02246258</b>	
M20 stainless steel, cable Ø 4 ... 6 mm (1 pc.), temperature range -25 ... 200 °C (-13 ... +392 °F), Ex i approval	<b>A5E02246194</b>	
M20 stainless steel, cable Ø 5 ... 8 mm (1 pc.), temperature range -60 ... 180 °C (-76 ... +356 °F), Ex d approval	<b>A5E02246311</b>	

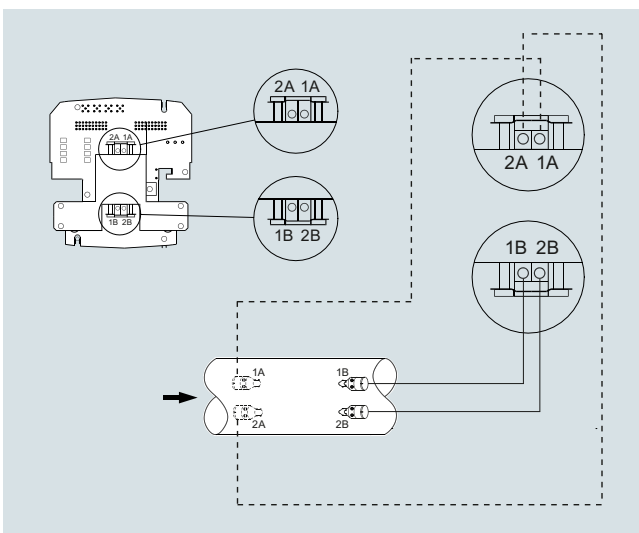
**Circuit diagrams**



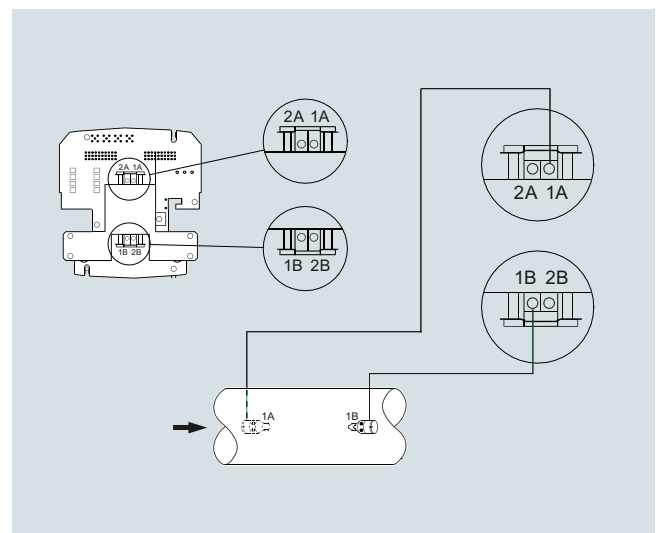
Electrical connection of SITRANS FUS060 and SONOKIT 2-path



Electrical connection of SITRANS FUS060 and SONOKIT 1-path



Electrical connection of SITRANS FUS080 and SONOKIT 2-path



Electrical connection of SITRANS FUS080 and SONOKIT 1-path