

## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3100/FUS060 flowmeter

#### Overview



SONO3100/FUS060

The combination of the SONO 3100 sensor and the FUS060 transmitter is ideal for applications where process shut-down is impossible during service and where there is a need for extreme high/low temperatures and pressures.

Transducers can be changed without interrupting operation. SONO 3100 can optionally be delivered as a 1-path or 2-path solution.

#### Benefits

- Transducers can be replaced under pressure
- Measurement of all liquids less than 350 Cst, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- On request as special versions:
  - Special sensor material, e.g. Duplex, stainless steel
  - High/low temperature sensor version: +250 °C (+482 °F)/-200 °C (-328 °F) sensors
  - Pressure rating 430 bar (6235 psi)
  - Special sensor sizes down to DN 25
  - 1-path or 2-path sensor technology

#### Application

The main application for SONO 3100 in combination with transmitter type FUS060 is to measure volume flow within:

- Water and waste water

#### Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, SONO 3200 transducers with O-rings or flanges depending on selection - and a FUS060 transmitter.

SONO 3100 is basically supplied in a 2-path solution with flanges in sizes from DN 100 to DN 500 and without flanges in sizes from DN 100 to DN 300.

2-path standard, 1-path special versions available on request, depending on size (DN 25 to DN 500).

SONO 3100 is as standard available in carbon steel from DN 100 to DN 500.

FUS060 is designed for remote wall mounting only.

#### Technical specifications

The transmitter related to this system is the SITRANS FUS060. The technical specifications to the FUS060 see page 3/254.

##### 2-paths sensor fitted with four SONO 3200 transducers

##### Error in measurement

Error in measurement at reference conditions	$V > 0.5 \dots 10 \text{ m/s}$ , $< \pm 0.5 \%$ of rate ( $v$ = flow velocity)
Max. flow velocity	10 m/s (32 ft)
Nominal size	DN 100 ... 500 (4 ... 20")
Media temperature	
• Standard	-10 ... +200 °C (14 ... 392 °F)
• ATEX Ex d version	-20 ... +180 °C (-4 ... +356 °F)
• ATEX Ex i version	-10 ... +190 °C (14 ... 374 °F)
• Specials	-200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature	
• Standard and Ex-i version	-20 ... +60 °C (-4 ... +140 °F)
• Ex d version	-20 ... +180 °C (-4 ... +356 °F)
Enclosure	IP67 (NEMA 4X/6)/IP68 (NEMA 6P) and ATEX (see below)

##### Process connections

PN designated EN 1092-1, type 11 (B)

Pipe material carbon steel

- DN 200 ... DN 500 (8" ... 20"), PN 10
- DN 100 ... DN 500 (4" ... 20"), PN 16
- DN 200 ... DN 500 (8" ... 20"), PN 25
- DN 100 ... DN 500 (4" ... 20"), PN 40

Class designated EN 1759-1

Pipe material carbon steel

- DN 100 ... DN 500 (4" ... 20") Class 150
- DN 100 ... DN 300 (4" ... 12") Class 300
- DN 350 ... DN 500 (14" ... 20"), PN 10
- DN 100 ... DN 500 (4" ... 20"), PN 16
- DN 200 ... DN 500 (8" ... 20"), PN 25
- DN 100 ... DN 500 (4" ... 20"), PN 40

Without flanges (EN 10217), weld-in version only in carbon steel

Transducer SONO 3200

O-ring or flange versions

##### Materials

Pipe	Steel EN 1.0345-P235GH
Flange	
PN	EN 10025-S235JRG2, 1E1
Class	ASTM A105, 1, 1
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6

**Certificates and approvals**

System ATEX approval for SONO 3100 together with transmitter FUS060-Ex

ATEX II 2  
G Ex dem [ia/ib] IIC T6/T4/T3 Gb or  
ATEX II 2G Ex d IIC T3-T6 Gb with  
SONO 3200 Ex d transducers (for  
standard FUS060 transmitter,  
installed outside of Ex zone)

For FUS060 Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements for electrical immunity.

Conformity certificate CE

The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.

Material certificates

Material certificate according to EN 10204-3.1 is optionally available.

NDT examination report

Extended material certificate is optionally available.

Pressure certificate

Pressure test according to EN 1024-2.3 optionally available

Calibration report

A standard calibration report is shipped with each flowmeter.

Optionally available:

Extended accredited ISO/IEC 17025 calibration certificates

Approvals

No custody transfer approvals

The sensor SONO 3100 with transmitter FUS060 conforms to Product Family Standard EN 61326/A3 appendix A (Title: Electrical Equipment for Measurement control and laboratory use – EMC requirements).

The sensors are approved according to EU directive 2014/68/EU regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

The SONO 3100 as weld-in version does not include the flanges. Thus, it can neither be tested nor approved according to PED. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

**Selection and ordering data****Article No.****SITRANS F US SONO 3100 sensor 2-path****7ME3100-**

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Diameter	Qn setting [m <sup>3</sup> /h]	
DN 100 (4")	28	1 N
DN 100 (4")	100	1 P
DN 100 (4")	220	1 R
DN 125 (5")	44	1 S
DN 125 (5")	150	1 T
DN 125 (5")	360	1 V
DN 150 (6")	64	2 A
DN 150 (6")	220	2 B
DN 150 (6")	500	2 D
DN 200 (8")	110	2 E
DN 200 (8")	380	2 F
DN 200 (8")	900	2 H
DN 250 (10")	180	2 J
DN 250 (10")	600	2 K
DN 250 (10")	1300	2 M
DN 300 (12")	300	2 N
DN 300 (12")	850	2 P
DN 300 (12")	2200	2 R
DN 350 (14")	350	2 S
DN 350 (14")	1000	2 T
DN 350 (14")	2800 <sup>1)</sup>	2 V
DN 400 (16")	450	3 A
DN 400 (16")	1300	3 B
DN 400 (16")	3600	3 D
DN 500 (20")	1300	3 J
DN 500 (20")	2200	3 K
DN 500 (20")	4200 <sup>1)</sup>	3 M

**Flange norm and pressure rating**

(All sizes are not available in all pressure ratings)

EN 1092-1

- PN 10 (DN 200 ... 600)
- PN 16 (DN 100 ... 600)
- PN 25 (DN 200 ... 600)
- PN 40 (DN 100 ... 500)

ANSI B16.5

- Class 150 (DN 100 ... 300)
- Class 300 (DN 100 ... 300)

Pipe without flanges (EN 10217) (weld-in version)<sup>2)</sup>

- PN 10 (DN 200 ... 600)
- PN 16 (DN 100 ... 600)
- PN 25 (DN 200 ... 600)
- PN 40 (DN 100 ... 500)

B  
C  
D  
E  
  
H  
J  
  
P  
Q  
R  
S

## Flow Measurement

### SITRANS FS (ultrasonic)

#### Inline ultrasonic flowmeters

#### SONO 3100/FUS060 flowmeter

#### Selection and ordering data (continued)

SITRANS F US SONO 3100 sensor 2-path	7ME3100-
<b>Pipe and flange material</b>	
Carbon steel (DN 100 ... 1200)	1
<b>Transducer type and approval</b>	
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 ... 600)	1
IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 ... 600)	2
IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 600)	3
IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 ... 300)	4
IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) (DN 100 ... 300)	5
IP68 SS housing, PN 40, flange, 88 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 300)	6
IP67 SS housing, PN 40, O-ring, 50 mm, 90 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 600)	7
IP67 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 300)	8
<b>Cable gland entries</b>	
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5	1
Cable glands ½" NPT in transducers and in transmitter	2
<b>Transmitter version of SITRANS FUS060</b>	
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 (ATEX)	Q
<b>FUS060 output module</b>	
HART, 1 pulse output, 1 relay	B
HART Ex, 1 pulse output, 1 relay	C
PROFIBUS PA, 1 pulse/frequency	D
<b>Transducer coaxial cable</b>	
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

#### Additional information

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

#### Calibration

Production calibration DN 100 ... DN 600 (with certificate)

Included

Accredited Siemens ISO/IEC 17025 calibration for DN 100 to DN 200 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m<sup>3</sup>/h).

D20

Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2800 m<sup>3</sup>/h).

D21

Accredited Siemens ISO/IEC 17025 calibration for DN 400 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 8000 m<sup>3</sup>/h).

D22

#### Material certificate

EN 10204-3.1

F10

EN 10204-3.1 and 100 % NDT on weldings, DN 100 ... DN 400

F11

EN 10204-3.1 and 100 % NDT on weldings, DN 500 ... DN 600

F12

#### Pressure certificate

EN 10204-2.3

#### Tag name plate

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).

Y17

Please use online Product selector to get latest updates:

<https://www.pia-portal.automation.siemens.com>

<sup>1)</sup> Reduced Q value during calibration (Qn setting unchanged).

<sup>2)</sup> For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of Du / Wxx > 100).

#### Selection and ordering data (continued)

#### Flowmeter SONO 3100 operating instructions, accessories and spare parts

##### Operating instructions

Description	Article No.
SITRANS FUS060	
• English	<b>A5E01204521</b>
• German	<b>A5E02123845</b>
SITRANS F US SONO 3100	
• English	<b>A5E00814513</b>

This device is shipped with Safety Notes and a DVD containing further SITRANS F US literature.

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

##### Accessories

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 transducer SONO 3200

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)), 50 mm (1.97") transducers	<b>FDK:085B5331</b>



##### Spare parts

##### Transducer SONO 3200 spare parts, complete units

Type	Material	Gasket	Pressure rating	Terminal housing	Approv.	Temp. range [°C (°F)]	Length mm (inch)	Article No.
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	50 (1.97)	<b>FDK:085B5453</b>
O-ring	316 SS	O-ring	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	50 (1.97)	<b>FDK:085B5450</b>
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex d <sup>1)</sup>	-20 ... +180 (-4 ... +356)	50 (1.97)	<b>FDK:085B5451</b>
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex-i <sup>2)</sup>	-10 ... +190 (14 ... 374)	50 (1.97)	<b>A5E00836448</b>
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	50 (1.97)	<b>A5E00839472</b>
O-ring	316 SS	O-ring	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	50 (1.97)	<b>A5E00839431</b>
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	88 (3.47)	<b>FDK:085B5461</b>
Flange	316 SS	Graphite	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	88 (3.47)	<b>FDK:085B5462</b>
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex d <sup>1)</sup>	-20 ... +180 (-4 ... +356)	88 (3.47)	<b>FDK:085B5463</b>
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex-i <sup>2)</sup>	-10 ... +190 (14 ... 374)	88 (3.47)	<b>A5E00836465</b>
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	88 (3.47)	<b>A5E00839479</b>
Flange	316 SS	Graphite	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	88 (3.47)	<b>A5E00839440</b>
Flange	316 SS	Copper ring	PN 40	316 SS PG 13.5 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	<b>FDK:085B5416</b>
Flat flange	316 SS	Flat gasket	PN 40	316 SS M20 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	<b>A5E02593524</b>

<sup>1)</sup> ATEX (Ex) IIC 2G Ex d IIC T3- T6 Gb

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

##### Terminal housing for SONO 3200 sensor

Type	Pressure rating	Material	Temp. range [°C (°F)]	Article No.
Terminal housing (M20 cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	<b>FDK:085B5501</b>
Terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	<b>FDK:085B5504</b>
Terminal housing (½" NPT cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	<b>A5E00839460</b>
Terminal housing (½" NPT cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	<b>A5E00839427</b>
Ex d <sup>1)</sup> terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +180 (-4 ... +356)	<b>FDK:085B5505</b>
Ex-i <sup>2)</sup> terminal housing (M20 cable gland)	N/A	ASTM 316	-10 ... +190 (14 ... 374)	<b>A5E00835255</b>



## Flow Measurement



SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters






### SONO 3100/FUS060 flowmeter

#### Selection and ordering data (continued)

SONO 3200 spare parts, transducer body without terminal housing, including insert

Type	Material	Gasket	Pressure rating	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	-20 ... +200 (-4 ... +392)	50 (1.97)	<b>FDK:085B1405</b>	
Flange	316 SS	Graphite	PN 40	-20 ... +200 (-4 ... +392)	88 (3.47)	<b>FDK:085B1464</b>	

Transducer SONO 3200 gaskets


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>	
Gasket flange	PN 40/160	Graphite	-20 ... +200 (-4 ... +392)	<b>FDK:085B1080</b>	
Gasket and 12 mm (0.47") bolts and nuts for flange transducers (4 pcs.)	PN 40	AISI 316 or equal	-20 ... +200 (-4 ... +392)	<b>FDK:085B1083</b>	
Gasket and 16 mm (0.63") bolts and nuts for flange transducers (4 pcs.)	PN 160	Graphite, 316 SS	-20 ... +200 (-4 ... +392)	<b>FDK:085B1084</b>	
Gasket for cryogenics transducer with flat flange (2 pcs.)	PN 40	Graphite/metal composite	-200 ... +100 (-328 ... +212)	<b>A5E02593522</b>	

#### Selection and ordering data (continued)

##### 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 gray 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>	

##### Cables for SONO 3100 with FUS060

Description	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC), (2 pcs.)		
• 3 m (9.84ft)	<b>A5E00875101</b>	
• 15 m (49.21ft)	<b>A5E00861432</b>	
• 30 m (98.43ft)	<b>A5E01278662</b>	
• 60 m (196.85ft)	<b>A5E01278682</b>	
• 90 m (295.28ft)	<b>A5E01278687</b>	
• 120 m (393.70ft)	<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 for remaining transmitter part with SMB plug, max. 70 °C (158 °F); impedance 75 Ω, (2 pcs.)		
• 3 m (9.84ft)	<b>A5E00875105</b>	
• 15 m (49.21ft)	<b>A5E00861435</b>	
• 30 m (98.43ft)	<b>A5E01196952</b>	
SITRANS F US special coaxial cable sets for low temperature cryogenic systems, with SMB-plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... +392 °F), impedance 75 Ω, (2 pcs.)		
• 10 m (32.84ft)	<b>A5E02085593</b>	
• 15 m (49.21ft)	<b>A5E03262088</b>	
• 30 m (98.43ft)	<b>A5E02085644</b>	
• 40 m (131.23ft)	<b>A5E02085649</b>	

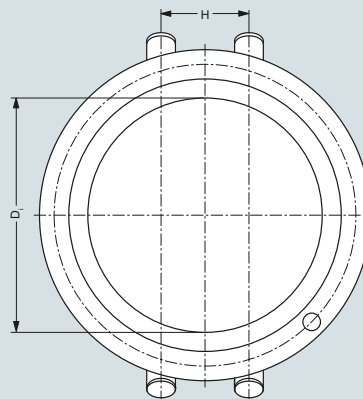
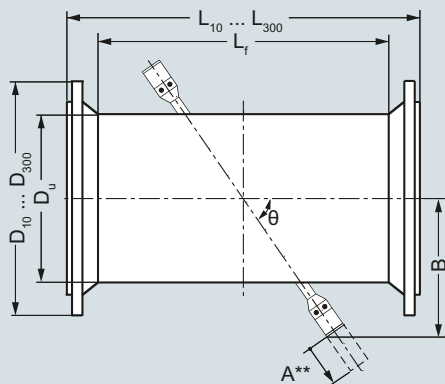
## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3100/FUS060 flowmeter

#### Dimensional drawings



Sensor SONO 3100 with EN norm

DN	PN 10 ... 40		PN 16		PN 25		PN 40		
	$\theta$ [°]	$L_{10}^{2)}$ mm (inch)	$L_{f 10}^{3)4)}$ mm (inch)	$L_{16}^{2)}$ mm (inch)	$L_{f 16}^{3)4)}$ mm (inch)	$L_{25}^{2)}$ mm (inch)	$L_{f 25}^{3)4)}$ mm (inch)	$L_{40}^{2)}$ mm (inch)	$L_{f 40}^{3)4)}$ mm (inch)
100	45 <sup>1)</sup>	-	-	960 (37.80)	856 (33.70)	-	-	990 (38.98)	860 (33.86)
125	45 <sup>1)</sup>	-	-	970 (38.19)	860 (33.86)	-	-	990 (38.98)	854 (33.62)
150	45 <sup>1)</sup>	-	-	970 (38.19)	860 (33.86)	-	-	1010 (39.76)	860 (33.86)
200	45 <sup>1)</sup>	790 (31.10)	-	790 (31.10)	666 (26.22)	820 (32.28)	660 (25.98)	840 (33.07)	664 (26.14)
250	45 <sup>1)</sup>	850 (33.46)	-	850 (33.46)	710 (27.95)	890 (35.04)	714 (28.11)	920 (36.22)	710 (27.95)
300	45 <sup>1)</sup>	740 (29.13)	-	760 (29.92)	604 (23.78)	790 (31.10)	606 (23.86)	830 (32.68)	600 (23.62)
350	45 <sup>1)</sup>	770 (30.32)	634 (24.96)	800 (31.50)	636 (25.04)	840 (33.07)	640 (25.20)	880 (34.65)	630 (24.80)
400	45 <sup>1)</sup>	850 (33.46)	706 (27.80)	875 (34.45)	705 (27.76)	925 (36.42)	705 (27.76)	975 (38.39)	705 (27.76)
500	45 <sup>1)</sup>	950 (37.40)	800 (31.50)	980 (38.59)	812 (31.97)	1050 (41.34)	800 (31.50)	1080 (42.52)	800 (31.50)
600	60	1075 (42.32)	911 (35.87)	1105 (43.50)	915 (36.02)	1165 (45.87)	915 (36.02)	-	-

Sensor SONO 3100 with EN norm

DN	PN 10			PN 16			PN 25			PN 40		
	$D_{10}$ mm (inch)	$D_{u 10}$ mm (inch)	$D_{i 10}$ mm (inch)	$D_{16}$ mm (inch)	$D_{u 16}$ mm (inch)	$D_{i 16}$ mm (inch)	$D_{25}$ mm (inch)	$D_{u 25}$ mm (inch)	$D_{i 25}$ mm (inch)	$D_{40}$ mm (inch)	$D_{u 40}$ mm (inch)	$D_{i 40}$ mm (inch)
100	-	-	-	220 (8.66)	114.3 (4.50)	107.1 (4.22)	-	-	-	235 (9.25)	114.3 (4.50)	106.3 (4.19)
125	-	-	-	250 (9.84)	139.7 (5.50)	131.7 (5.19)	-	-	-	270 (10.63)	139.7 (5.50)	129.7 (5.11)
150	-	-	-	285 (11.22)	168.3 (6.23)	159.3 (6.27)	-	-	-	300 (11.81)	168.3 (6.23)	157.1 (6.19)
200	340 (13.39)	219.1 (8.63)	206.5 (8.13)	340 (13.39)	219.1 (8.63)	206.5 (8.13)	360 (14.17)	219.1 (8.63)	206.5 (8.13)	375 (14.76)	219.1 (8.63)	204.9 (8.07)
250	395 (15.55)	273 (10.75)	260.4 (10.25)	405 (15.94)	273 (10.75)	260.4 (10.25)	425 (16.73)	273 (10.75)	258.8 (10.19)	450 (17.72)	273 (10.75)	255.4 (10.06)
300	445 (17.52)	323.9 (12.75)	309.7 (12.19)	460 (18.11)	323.9 (12.75)	309.7 (12.19)	485 (19.09)	323.9 (12.75)	307.9 (12.12)	515 (20.28)	323.9 (12.75)	303.9 (11.96)
350	505 (19.88)	355.6 (14.00)	341.4 (13.44)	520 (20.47)	355.6 (14.00)	339.6 (13.37)	555 (21.85)	355.6 (14.00)	339.6 (13.37)	580 (22.83)	355.6 (14.00)	333.6 (13.13)
400	565 (22.24)	406.4 (16.00)	392.2 (15.44)	580 (22.83)	406.4 (16.00)	390.4 (15.37)	620 (24.41)	406.4 (16.00)	388.8 (15.31)	660 (25.98)	406.4 (16.00)	381.4 (15.02)
500	670 (26.38)	508 (20.00)	492 (19.37)	715 (28.15)	508 (20.00)	488 (19.21)	730 (28.74)	508 (20.00)	488 (19.21)	755 (29.72)	508 (20.00)	478 (18.82)
600	780 (30.71)	610 (24.02)	594 (23.39)	840 (33.07)	610 (24.02)	586 (23.07)	845 (33.27)	610 (24.02)	580 (22.83)	-	-	-

<sup>1)</sup> For all sensors with flange transducers path angle are 60°.

<sup>2)</sup> Length tolerance for L in mm (inch): DN 100 +6/-7 (+0.24/-0.28), DN 125 ... 200 +7/-8 (+0.28/-0.31), DN 250 +8/-9 (+0.31/-0.35), DN 300 ... 400 +10/-11 (+0.39/-0.43), DN 500 ... 600 +11/-12 (+0.43/-0.47).

<sup>3)</sup> Length tolerance for  $L_f$  in mm (inch): DN 100 +2/-3 (+0.08/-0.12), DN 125 ... 200 +3/-4 (+0.12/-0.16), DN 250 ... 400 +4/-5 (+0.16/-0.20), DN 500 ... 600 +5/-6 (+0.20/-0.24).

<sup>4)</sup>  $L_f$  is the length of sensor versions without flanges (weld-in version). For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of  $D_u/W_{xx} > 100$ ).

A\*\*) Space required for replacement of transducer min. 230 mm (9.1 inch).

## Dimensional drawings (continued)

Sensor SONO 3100 with EN norm												
DN	PN 10			PN 16			PN 25			PN 40		
	H <sub>10</sub>	B <sub>10</sub> <sup>1)</sup>	W <sub>min</sub> <sup>2)</sup>	H <sub>16</sub>	B <sub>16</sub> <sup>1)</sup>	W <sub>min</sub> <sup>2)</sup>	H <sub>25</sub>	B <sub>25</sub> <sup>1)</sup>	W <sub>min</sub> <sup>2)</sup>	H <sub>40</sub>	B <sub>40</sub> <sup>1)</sup>	W <sub>min</sub> <sup>2)</sup>
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
100	-	-	-	42.8 (1.69)	278 (10.94)	3.6 (0.14)	-	-	-	42.5 (1.67)	285.5 (11.24)	3.6 (0.14)
125	-	-	-	64.5 (2.54)	301 (11.85)	4.0 (0.16)	-	-	-	63.6 (2.50)	311 (12.24)	4.0 (0.16)
150	-	-	-	78.1 (3.07)	330.5 (13.01)	4.5 (0.18)	-	-	-	77 (3.03)	337 (13.27)	4.5 (0.18)
200	101.2 (3.98)	379 (14.92)	6.3 (0.25)	101.2 (3.98)	379 (14.92)	6.3 (0.25)	101.2 (3.98)	389 (15.32)	6.3 (0.25)	100.4 (3.95)	395.5 (15.57)	6.3 (0.25)
250	127.6 (5.02)	429.5 (16.91)	6.3 (0.25)	127.6 (5.02)	434.5 (17.11)	6.3 (0.25)	126.8 (4.99)	444.5 (17.50)	7.1 (0.28)	125.1 (4.93)	455 (17.91)	7.1 (0.28)
300	151.8 (5.98)	476.5 (18.76)	7.1 (0.28)	151.8 (5.98)	484 (19.06)	7.1 (0.28)	150.9 (5.94)	495.5 (19.51)	8.0 (0.31)	148.9 (5.86)	508.5 (20.02)	8.0 (0.31)
350	167.3 (6.59)	520.5 (20.49)	8.0 (0.31)	166.4 (6.55)	527 (20.75)	8.0 (0.31)	166.4 (6.55)	544.5 (21.44)	8.0 (0.31)	163.5 (6.44)	554 (21.81)	8.8 (0.35)
400	192.2 (7.57)	572.5 (22.54)	8.0 (0.31)	191.3 (7.53)	579 (22.80)	8.0 (0.31)	190.5 (7.50)	598 (23.54)	8.8 (0.35)	186.9 (7.36)	615 (24.21)	11.1 (0.44)
500	241.1 (9.49)	668 (26.30)	7.1 (0.28)	239.1 (9.41)	689.5 (27.15)	8.0 (0.31)	239.1 (9.41)	697 (27.44)	10.0 (0.39)	234.2 (9.22)	704.5 (27.74)	14.2 (0.56)
600	291.1 (11.46)	783 (30.83)	7.1 (0.28)	287.1 (11.30)	809 (31.85)	8.8 (0.35)	284.2 (11.19)	809.5 (31.87)	11.0 (0.43)	-	-	-

<sup>1)</sup> B dimension value is an approximate information and may differ a little by flange pressure rate.

<sup>2)</sup> Wall thickness for pressure rates PN 10 ... 40. For weld-in sensor versions according EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y=P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of Du/Wxx > 100). W<sub>min</sub> wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness must be ordered as PVR.

## Sensor SONO 3100 with EN norm, 2-path

DN	Weight with flange <sup>1)</sup>				Weight flangeless			
	PN 10	PN 16	PN 25	PN 40	PN 10	PN 16	PN 25	PN 40
	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)	kg (lbs)
100	-	20 (44.1)	24 (52.9)	-	-	10 (22.0)	-	11 (24.3)
125	-	26 (57.3)	34 (74.0)	-	-	14 (30.9)	-	16 (35.3)
150	-	33 (72.8)	45 (99.2)	-	-	18 (39.7)	-	21 (46.3)
200	47 (103.6)	47 (103.6)	58 (127.9)	69 (152.1)	-	24 (52.9)	24 (52.9)	27 (59.5)
250	63 (138.9)	65 (143.3)	84 (185.2)	111 (244.7)	-	31 (68.3)	35 (77.2)	43 (94.8)
300	72 (158.7)	80 (176.4)	103 (227.1)	144 (317.5)	-	36 (79.4)	40 (88.2)	48 (105.8)
350	91 (200.6)	111 (244.7)	143 (315.3)	199 (438.7)	41 (90.4)	46 (101.4)	46 (101.4)	61 (134.5)
400	113 (249.1)	140 (308.6)	189 (416.7)	284 (626.1)	51 (112.4)	57 (125.7)	63 (138.9)	88 (194.0)
500	162 (357.1)	229 (504.9)	294 (648.2)	408 (899.5)	81 (178.6)	102 (224.9)	100 (220.5)	148 (326.3)
600	216 (476.2)	356 (784.8)	445 (981.1)	-	110 (242.5)	164 (361.6)	203 (447.5)	-

<sup>1)</sup> Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lbs).



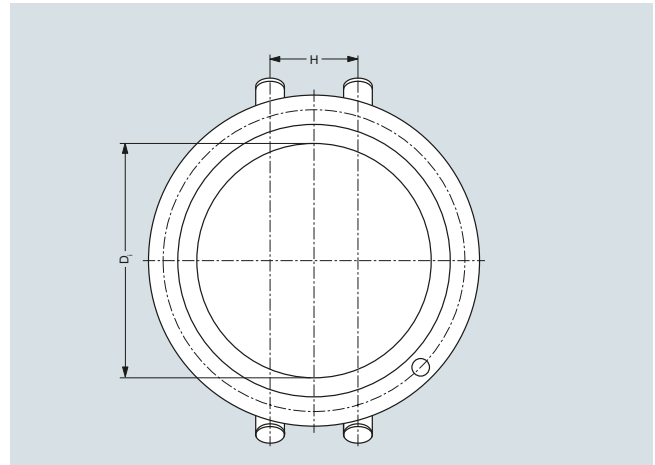
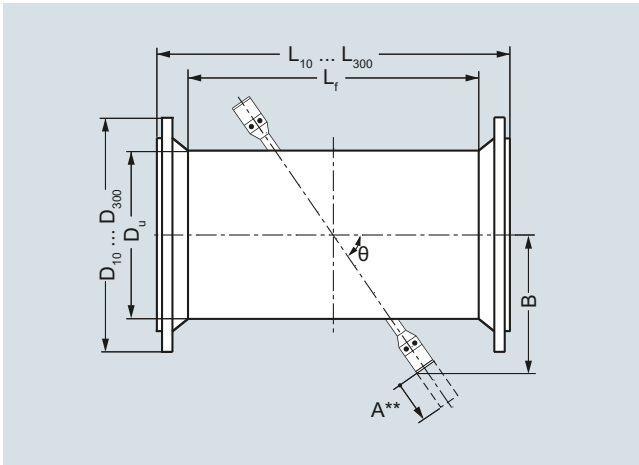
## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3100/FUS060 flowmeter

#### Dimensional drawings (continued)



#### Sensor SONO 3100 with ANSI norm

DN	Class 150							
	$\theta$ [°]	$L_{150}^{2)}$ inch (mm)	$D_{150}$ inch (mm)	$D_{u\ 150}$ inch (mm)	$D_{i\ 150}$ inch (mm)	$H_{150}$ inch (mm)	$B_{150}^{3)}$ inch (mm)	$W_{min}^{4)}$ inch (mm)
100	45 <sup>1)</sup>	39.86 (1012)	9.06 (230)	4.50 (114.3)	4.00 (101.7)	1.60 (40.7)	11.06 (281)	0.14 (3.6)
125	45 <sup>1)</sup>	40.94 (1040)	10.04 (255)	5.56 (141.3)	5.05 (128.2)	2.47 (62.8)	11.91 (302.5)	0.15 (3.8)
150	45 <sup>1)</sup>	40.94 (1040)	11.02 (280)	6.63 (168.3)	6.07 (154.1)	2.97 (75.5)	12.83 (326)	0.16 (4.1)
200	45 <sup>1)</sup>	34.30 (871)	13.58 (345)	8.63 (219.1)	7.93 (201.5)	3.89 (98.7)	14.94 (379.5)	0.16 (4.1)
250	45 <sup>1)</sup>	36.11 (917)	16.00 (405)	10.75 (273)	9.96 (253)	4.88 (124)	16.99 (431.5)	0.18 (4.6)
300	45 <sup>1)</sup>	32.90 (836)	19.09 (485)	12.75 (323.8)	11.96 (303.8)	5.86 (148.9)	19.43 (493.5)	0.20 (5.1)
350	45 <sup>1)</sup>	35.16 (893)	21.06 (535)	14.00 (355.6)	13.21 (335.6)	6.47 (164.4)	20.96 (532.5)	0.21 (5.3)
400	45 <sup>1)</sup>	33.74 (857)	23.43 (595)	16.00 (406.4)	15.21 (386.4)	7.45 (189.3)	23.01 (584.5)	0.22 (5.6)
500	45 <sup>1)</sup>	42.76 (1086)	27.56 (700)	20.00 (508)	19.21 (488)	9.41 (239.1)	26.85 (682)	0.26 (6.6)
600	60	47.91 (1217)	32.09 (815)	24.00 (610)	23.23 (590)	11.38 (289.1)	31.44 (798.5)	0.30 (7.6)

#### Sensor SONO 3100 with ANSI norm

DN	Class 300							
	$\theta$ [°]	$L_{300}^{2)}$ inch (mm)	$D_{300}$ inch (mm)	$D_{u\ 300}$ inch (mm)	$D_{i\ 300}$ inch (mm)	$H_{300}$ inch (mm)	$B_{300}^{3)}$ inch (mm)	$W_{min}^{4)}$ inch (mm)
100	45 <sup>1)</sup>	40.62 (1032)	10.04 (255)	4.50 (114.3)	4.00 (101.7)	1.60 (40.7)	11.56 (293.5)	0.25 (6.4)
125	45 <sup>1)</sup>	41.70 (1059)	11.02 (280)	5.56 (141.3)	5.05 (128.2)	2.47 (62.8)	12.40 (315)	0.27 (6.9)
150	45 <sup>1)</sup>	41.70 (1059)	12.60 (320)	6.63 (168.3)	6.00 (152.3)	2.94 (74.6)	13.58 (345)	0.30 (7.6)
200	45 <sup>1)</sup>	35.06 (891)	14.96 (380)	8.63 (219.1)	7.93 (201.5)	3.89 (98.7)	15.63 (397)	0.29 (7.4)
250	45 <sup>1)</sup>	37.35 (949)	445 (17.52)	10.75 (273)	9.96 (253)	4.88 (124)	17.78 (451.5)	0.34 (8.6)
300	45 <sup>1)</sup>	34.14 (867)	520 (20.47)	12.75 (323.8)	11.76 (298.8)	5.76 (146.4)	20.04 (509)	0.39 (9.9)
350	45 <sup>1)</sup>	-	-	-	-	-	-	-
400	45 <sup>1)</sup>	-	-	-	-	-	-	-
500	45 <sup>1)</sup>	-	-	-	-	-	-	-
600	60	-	-	-	-	-	-	-

<sup>1)</sup> For all sensors with flange transducers path angle are 60°.

<sup>2)</sup> Length tolerance in inch (mm): DN 100 +0.12/-0.24 (+5/-6), DN 125 ... 200 +0.24/-0.39 (+6/-10), DN 250 +0.28/-0.43 (+7/-11), DN 300 ... 400 +0.39/-0.59 (+10/-15), DN 500 ... 600 +0.43/-0.63 (+11/-16).

<sup>3)</sup> B dimension value is an approximate information and may differ a little by flange pressure rate.

<sup>4)</sup> Minimum wall thickness for pressure rates Class 150 or Class 300. For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of  $D_u/W_{xx} > 100$ ).  $W_{min}$  wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness to be ordered as PVR..

A\*\*) Space required for replacement of transducer min. 9.1 inch (230 mm).

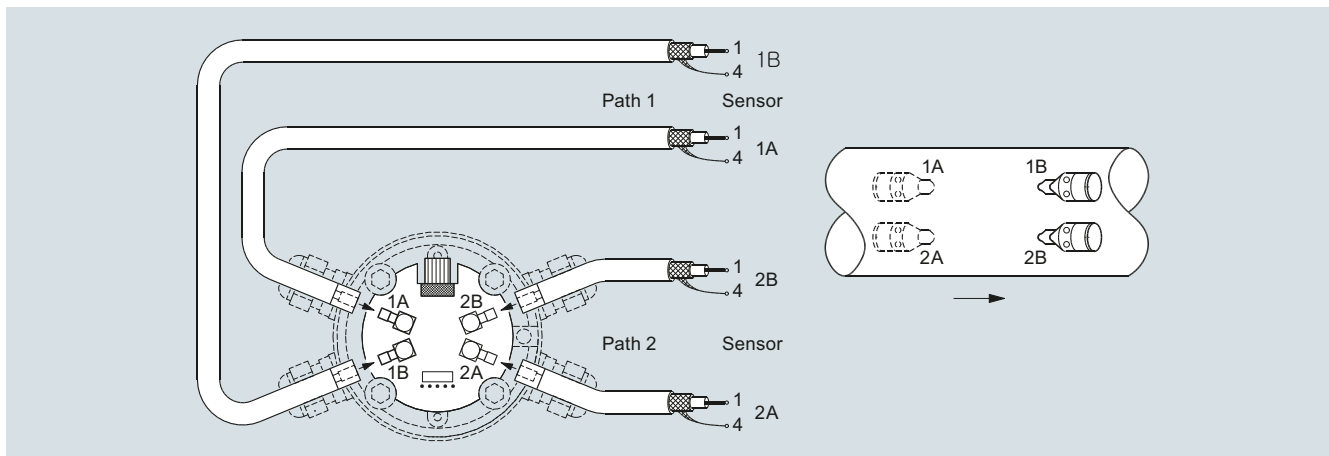
**Dimensional drawings** (continued)

Approximate weights for SONO 3100 sensor with ANSI B16.5 flanges

Sensor SONO 3100 with ANSI norm		Weight with flange <sup>1)</sup>		
DN	mm	inch	Class 150	Class 300
			kg (lbs)	kg (lbs)
100	4		31 (68.3)	40 (88.2)
125	5		41 (90.4)	54 (119.1)
150	6		48 (105.8)	70 (154.3)
200	8		69 (152.1)	95 (209.4)
250	10		99 (218.3)	137 (302.0)
300	12		123 (271.2)	187 (412.3)
350	14		158 (348.3)	-
400	16		184 (405.7)	-
500	20		270 (595.2)	-
600	24		375 (826.7)	-

<sup>1)</sup> Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lbs). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

**Circuit diagrams**



Electrical connection of SITRANS FUS060 and SONO 3100