

## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3300/FUS060 flowmeter

#### Overview



The combination of SONO 3300 sensor and FUS060 transmitter is ideal for applications within the general industry. Measurements are independent of liquid temperature, density, pressure and conductivity. Transducers cannot be replaced.

#### Benefits

- Robust remote transmitter FUS060
- Robust design for industrial applications
- Measures all liquids less than 350 cSt, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- ATEX approval

#### Application

The main application for SONO 3300/FUS060 ultrasonic flowmeter is measurement of volume.

SONO 3300/FUS060 can be used for water and treated waste water.

#### Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 80 (2" to 3")), welded pipes (DN 100 to 300 (4" to 12")) and a transmitter FUS060.

The transmitter can only be mounted separately.

The internal signal cables from transducers to sensor connection box are protected from an aggressive environment by stainless steel pipes.

#### Sensor installation

See system information.

### Technical specifications

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

#### 2-path sensor with flanges and inline transducers

##### Error in measurement

Error in measurement at reference conditions	$V > 0.5 \dots 10 \text{ m/s}$ , $\pm 0.5 \%$ of rate ( $v = \text{flow speed}$ )
Max. flow velocity	10 m/s (32 ft/s)
Nominal size	DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300 (2" ... 12")
Media temperature	Separate version: $-10 \dots +160 \text{ }^\circ\text{C}$ (14 ... 320 $^\circ\text{F}$ )
Ambient temperature (sensor)	Separate version: $-20 \dots +60 \text{ }^\circ\text{C}$ (-4 ... +140 $^\circ\text{F}$ )
Enclosure	Storage: $-40 \dots +85 \text{ }^\circ\text{C}$ (-40 ... +185 $^\circ\text{F}$ ) Standard version: IP67 (NEMA 4X/NEMA 6) ATEX version: As standard, but with ATEX approval (see below)

##### Process connections

PN designated EN 1092-1 type 11 (B)	<ul style="list-style-type: none"> <li>• DN 50 ... 300 (2" ... 12"), PN 40</li> <li>• DN 100 ... 300 (4" ... 12"), PN 16</li> <li>• DN 200 ... 300 (8" ... 12"), PN 10</li> </ul>
Class designated EN 1759-1	<ul style="list-style-type: none"> <li>• DN 50 ... 300 (2" ... 12"), class 150</li> <li>• DN 50 ... 300 (2" ... 12"), class 300</li> </ul>
Transducer	Inline version welded into pipe

##### Materials


Pipe	<ul style="list-style-type: none"> <li>• DN 50 ... DN 80 (2" ... 3"): Cast steel EN 1.1131-GS-15Mn5</li> <li>• DN 100 ... DN 300 (4" ... 12"): Carbon steel EN 1.0345-P235GH</li> </ul>
Flange	<ul style="list-style-type: none"> <li>• DN 50 ... DN 300 (2" ... 12"): EN 1.0025-S235JRG2</li> </ul>
Class	ASTM A105
Transducer	Stainless steel AISI 316 or similar

##### Certificates and approvals

Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD.
Material certificate	Material certificate according to EN 10204-3.1 available
NDT examination report	Extended material certificate is optionally available on special request (PVR)
Calibration report	A standard calibration report is shipped with each flowmeter.
Extended accredited ISO/IEC 17025 calibration certificates	Optionally available
Approvals	No custody transfer approvals
Ex approval	System ATEX approval for SONO 3300 with remote transmitter FUS060-Ex (ATEX II 2 G Ex dem [ia/ib] IIC T6/T4/T3 Gb)  For Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet 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).

#### Coax cable between sensor SONO 3300 and transmitter FUS060

Standard Coax cable (75 $\Omega$ )	Coax cable with SMB straight plug on one end for the FUS060 connector	
Outside diameter	$\varnothing 5.8 \text{ mm}$	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter	
Material (outside jacket)	black PE	
Ambient temperature	$-10 \dots +70 \text{ }^\circ\text{C}$ (14 ... 158 $^\circ\text{F}$ )	
High temperature Coax cable (75 $\Omega$ )	Coax cable with SMB straight plug on one end for the FUS060 connector	
Outside diameter	$\varnothing 5.13 \text{ mm}$ (first 0.3 m (9.84 ft) part to the transducer), $\varnothing 5.8 \text{ mm}$ (for remaining cable to the transmitter – with SMB plug at the end) and between these is a black hot melt junction $\varnothing 16 \text{ mm}$ (length 70 mm)	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max. 3 m (9.84 ft)) transducer cable length for Ex area mounted transmitters	
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)	
Ambient temperature	$-200 \dots +200 \text{ }^\circ\text{C}$ (-328 ... +392 $^\circ\text{F}$ ) (brown PTFE transducer part) and $-10 \dots +70 \text{ }^\circ\text{C}$ (14 ... 158 $^\circ\text{F}$ ) (black PE for remaining transmitter cable part)	

## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3300/FUS060 flowmeter

#### Selection and ordering data

Sensor SONO 3300 with transmitter FUS060		Article No.
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		7ME3300-0 -
Diameter	Qn setting [m <sup>3</sup> /h]	
DN 50 (2")	10	1 A
DN 50 (2")	26	1 B
DN 50 (2")	60	1 D
DN 65 (2½")	15	1 E
DN 65 (2½")	42	1 F
DN 65 (2½")	100	1 H
DN 80 (3")	20	1 J
DN 80 (3")	60	1 K
DN 80 (3")	150	1 M
DN 100 (4")	36	1 N
DN 100 (4")	100	1 P
DN 100 (4")	230	1 R
DN 125 (5")	50	1 S
DN 125 (5")	150	1 T
DN 125 (5")	360	1 V
DN 150 (6")	80	2 A
DN 150 (6")	220	2 B
DN 150 (6")	500	2 D
DN 200 (8")	120	2 E
DN 200 (8")	380	2 F
DN 200 (8")	900	2 H
DN 250 (10")	200	2 J
DN 250 (10")	600	2 K
DN 250 (10")	1400	2 M
DN 300 (12")	300	2 N
DN 300 (12")	850	2 P
DN 300 (12")	2200	2 R
Flange norm and pressure rating		
(All sizes are not available in all pressure ratings)		
EN 1092-1		
<ul style="list-style-type: none"> <li>• PN 10 (DN 200 ... 300)</li> <li>• PN 16 (DN 80 ... 300)</li> <li>• PN 40 (DN 50 ... 300)</li> </ul>		B C E
ANSI B16.5		
<ul style="list-style-type: none"> <li>• Class 150 (DN 50 ... 300)</li> <li>• Class 300 (DN 50 ... 300)</li> </ul>		H J
Sensor type (approval) and transmitter mounting		
IP67 standard, remote transmitter		1
IP67 Ex-version (ATEX), remote transmitter (Ex-version)		3
Cable gland entries in FUS060 and SONO 3300		
Cable glands M20 in sensor and in transmitter M25/20/16 x 1.5		1
Transmitter version of SITRANS FUS060		
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

#### Article No.

Sensor SONO 3300 with transmitter FUS060		Article No.
7ME3300-0 -		
FUS060 output module		
HART, 4 ... 20 mA, 1 pulse output, 1 relay		B
HART, Ex version, 4 ... 20 mA, 1 pulse output, 1 relay		C
PROFIBUS PA, 1 pulse/frequency		D
Transducer coaxial cable		
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		Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.		
Calibration		
Production calibration DN 50 ... DN 300 (with certificate, 2 x 3 points in 10 %, 25 % and 100 % Qn)		Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 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 300 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2000 m <sup>3</sup> /h).		D21
Material certificate		
EN 10204-3.1		F10
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>

#### Selection and ordering data (continued)

#### Flowmeter SONO 3300 with FUS060 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 3300	
• English	<b>A5E01365400</b>
• German	<b>A5E02690975</b>

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

##### Accessories

##### Potting kit

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




##### Spare parts

##### Cables for SONO 3300 with FUS060

(only as spare parts)


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




##### Cable glands (for the SONO 3300 terminal box)

(only as spare parts)


Description	Article No.
Type M20, material nickel plated brass, 2x cables Ø 5 ... 6 mm, temperature range -25 ... +200 °C (-13 ... +392 °F) (2 pcs.)	<b>A5E02246329</b>




Description	Article No.
SONO 3300 terminal box lid, in stainless steel painted black (1 pc.)	<b>FDK:085U1505</b>




Description	Article No.
Gasket for SONO 3300 terminal lid in EPDM (1 pc.)	<b>FDK:085U1820</b>



Description	Article No.
SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version, incl. lid in stainless steel (painted black) and gasket in EPDM	<b>A5E00836867</b>



Description	Article No.
Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060	<b>A5E02593568</b>



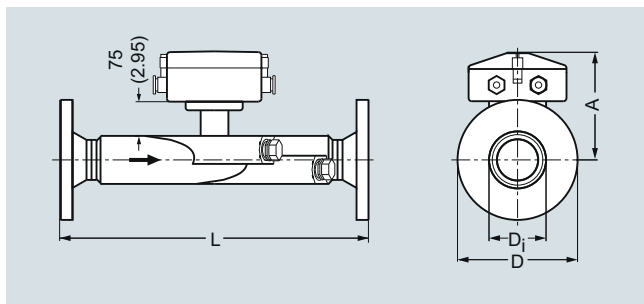
## Flow Measurement

SITRANS FS (ultrasonic)

Inline ultrasonic flowmeters

### SONO 3300/FUS060 flowmeter

#### Dimensional drawings



Sensor SONO 3300, dimensions in mm (inch)

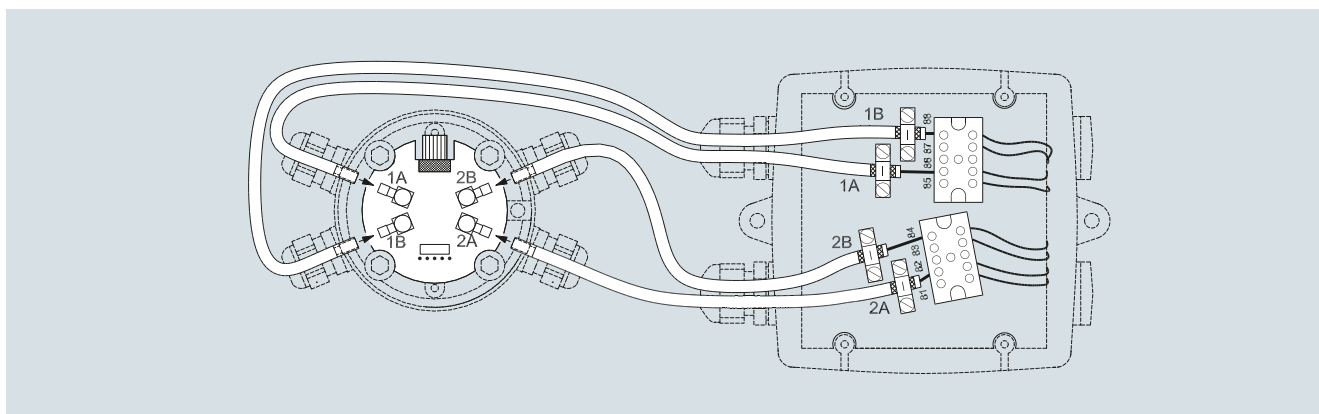
DN	EN 1092-1						PN 16						PN 40					
	PN 10 L <sup>1)</sup>		D		Di		L <sup>1)</sup>		D		Di		L <sup>1)</sup>		D		Di	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50													475	18.70	165	6.50	52.60	2.07
65													475	18.70	185	7.28	62.70	2.47
80							380	14.96	200	7.87	78.00	3.07	400	15.75	200	7.87	78.00	3.07
100							375	14.76	220	8.66	102.40	4.00	400	15.75	235	9.25	102.40	4.00
125							375	14.76	250	9.84	128.30	5.05	400	15.75	270	10.63	128.30	5.05
150							360	14.17	285	11.22	154.20	6.07	400	15.75	300	11.81	154.20	6.07
200	400	15.75	340	13.39	207.30	8.16	400	15.75	340	13.39	207.30	8.16	450	17.72	375	14.76	206.50	8.13
250	400	15.75	395	15.55	260.40	10.25	400	15.75	405	15.94	260.40	10.25	500	19.69	450	17.72	258.80	10.19
300	400	15.75	445	17.52	309.70	12.19	420	16.54	460	18.11	309.70	12.19	500	19.69	515	20.28	307.90	12.12

DN	ANSI 150 lb L <sup>1)</sup>						300 lb L <sup>1)</sup>						EN and ANSI A		Weight <sup>2)</sup>			
	L <sup>1)</sup>		D		Di		L <sup>1)</sup>		D		Di		A		EN		ANSI	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	kg	lbs
50 mm/2"	510	20.08	152	5.98	52.6	2.07	520	20.47	165	6.50	52.6	2.07	180	7.09	14	30.9	17	37.5
65 mm/2½"	510	20.08	178	7.01	62.7	2.47	520	20.47	190	7.48	62.7	2.47	186	7.32	16	35.3	20	44
80 mm/3"	420	16.54	191	7.52	78.0	3.07	440	17.32	210	8.27	78.0	3.07	193	7.60	19	42	23	51
100 mm/4"	420	16.54	229	9.01	102.4	4.03	440	17.32	254	10	102.4	4.03	205	8.07	25	55	35	78
125 mm/5"	440	17.32	254	10.00	128.3	5.05	460	18.11	279	10.98	128.3	5.05	218	8.58	29	64	40	89
150 mm/6"	430	16.93	279	10.98	154.2	6.07	450	17.71	318	12.52	154.2	6.07	232	9.13	35	78	50	111
200 mm/8"	480	18.90	343	13.50	202.7	7.98	500	19.69	381	15	202.7	7.98	256	10.08	54	119	72	160
250 mm/10"	490	19.29	406	15.98	254.5	10.02	520	20.47	444	17.48	254.5	10.03	283	11.14	85	189	98	217
300 mm/12"	550	21.65	483	19.02	306.3	12.06	580	22.83	521	20.51	306.3	12.06	309	12.17	115	256	142	322

<sup>1)</sup> Length tolerance (mm): DN 50 ... 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 300 +4/-5

<sup>2)</sup> Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb)

#### Circuit diagrams



Electrical connection of SITRANS FUS060 and SONO 3300