

SITRANS F flowmeters

SITRANS F US

SONOFLO SONO 3100/FUS060 Industry

Overview



The SONO 3100 sensor and the FUS060 transmitter is an ideal combination 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 easily be changed without interrupting operation. SONO 3100 can be delivered in 4-track solution for absolute best performance and accuracy.

Benefits

- Replaceable transducers under pressure
- Measure on all liquids less than 350 Cst, conductive or non conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long time stability
- On request:
 - Special sensor material, e.g. Duplex
 - High/low temperature sensor version: +250 °C (+482 °F) / -200 °C (-382 °F) sensors
 - Pressure rating 430 bar (6235 psi)
 - 4 track sensor technology

Application

The main application for SONO 3100 in combination with FUS060 ultrasonic flowmeter is to measure volume within.

- Petrochemical industry
- Power engineering
- Water and waste water
- Oil and liquid gases

SITRANS FUS060 holds ATEX for hazardous areas, HART and PROFIBUS PA. SONO 3100 holds ATEX Ex approval.

Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, transducers with O-rings or flanges depending on selection - and a FUS060 transmitter. SONO 3100 is basically supplied in a 2-track solution with and without flanges in sizes from DN 100 to DN 1200.

4 track version is available on request.

SONO 3100 is as standard available in carbon/stainless steel from DN 100 to DN 1200.

FUS060 is designed for wall mounting only.

Technical specifications

2-track sensor fitted with four SONO 3200 transducers

Error in measurement

Error in measurement at reference conditions; % of measured value	$v > 0.5 \dots 10 \text{ m/s}$, $\pm 0.5\%$ of rate ($v = \text{flow speed}$)
Max flow velocity	10 m/s (32 ft)
Nominal size	DN 100 ... DN 1200 (4" ... 48")
Liquid temperature	-10 °C ... +200 °C (14 ... 392 °F)
Ambient temperature	-20 °C ... +200 °C (-4 ... +392 °F)
Enclosure	IP68 (NEMA 6)

Process connections

PN designated, EN 1092-1-type II, B

Pipe material carbon steel	• DN 200 ... DN 1200 (8" ... 48") PN 10 • DN 100 ... DN 1200 (4" ... 48") PN 16 • DN 200 ... DN 1000 (8" ... 40") PN 25 • DN 100 ... DN 500 (4" ... 20") PN 40
Pipe material stainless steel	• DN 200 ... DN 300 (8" ... 12") PN 10 and PN 25 • DN 100 ... DN 300 (4" ... 12") PN 16 and PN 40

Class designated, EN 1759-1-type II, B

Pipe material carbon steel	• DN 100 ... DN 600 (4" ... 24") Class 150 • DN 100 ... DN 300 (4" ... 12") Class 300
Pipe material stainless steel	• DN 100 ... DN 300 (4" ... 12") Class 150 and Class 300
<u>Without flanges,</u> only in carbon steel	• DN 100 ... DN 1200 (4" ... 48") PN 16 • DN 200 ... DN 1000 (8" ... 40") PN 25 • DN 100 ... DN 500 (4" ... 20") PN 40
Transducer SONO 3200	O-ring or flange versions

2-track sensor fitted with four SONO 3200 transducers

Materials

Pipe	Steel EN 1.0345-P235GH or stainless steel EN 1.4404 - AISI 316L
Flange	
PN	EN 10025-S235JRG2, 1E1 or stainless steel EN 10222-5-1.4404, 13E0
Class	ASTM A105, 1,1 or stainless steel ASTM F316L, 2,3
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6

Certificates and approvals

Ex approval sensor	ATEX EEx i IIC T3
Material certificates	The sensor is supplied as standard with a Siemens Certificate of Conformity. Material certificate on wetted parts on request.
NDT examination report	Available on request
The sensors are approved according to EU directive 97/23/EF, dated 29 May 1997, regarding fluid group 1, classified in category III. Design EN 13480 (PED directive)	

Selection and Ordering data		Order-No.	Order code
SITRANS F US SONO 3100 sensor 2-track		7 ME 3 1 0 0 -	
Diameter	Qn [m³/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"	350	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"	250	2 N	
DN 300 / 12"	850	2 P	
DN 300 / 12"	2000	2 R	
DN 350 / 14"	350	2 S	
DN 350 / 14"	1000	2 T	
DN 350 / 14"	2800	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	3 M	
DN 600 / 24"	1300	3 S	
DN 600 / 24"	3200	3 T	
DN 600 / 24"	4200	3 V	
DN 700 / 28"	2000	4 E	
DN 700 / 28"	4200	4 F	
DN 800 / 32"	4200	4 N	
DN 800 / 32"	5500	4 P	
DN 900 / 36"	4200	5 A	
DN 900 / 36"	7500	5 B	
DN 1000 / 40"	4200	5 J	
DN 1000 / 40"	9000	5 K	
DN 1200 / 48"	4200	5 S	
DN 1200 / 48"	13200	5 T	
Flange norm and pressure rating (All sizes are not available in all pressure ratings)			
<u>EN 1092-1</u>			
PN 10		B	
PN 16		C	
PN 25		D	
PN 40		E	
<u>ANSI B16.5</u>			
class 150		H	
class 300		J	
<u>pipe without flanges</u>			
PN 10		P	
PN 16		Q	
PN 25		R	
PN 40		S	

Selection and Ordering data		Order-No.	Order code
SITRANS F US SONO 3100 sensor 2-track		7 ME 3 1 0 0 -	
Pipe and flange material			
Carbon steel		1	
Stainless steel		2	
Transducer type and approval			
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F)		1	
IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F)		2	
IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F)		4	
IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F)		5	
IP68 SS housing, PN 40, O-ring, 50 mm, 190 °C (374 °F), EEx i IIC T3, M20 gland, ATEX approval		7	
IP68 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), EEx i IIC T3, M20 gland, ATEX approval		8	
Cable gland entires			
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	
Transmitter 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 ATEX Ex-d		Q	
Module			
HART, 1 pulse output, 1 relay			B
HART EEx e, 1 pulse output, 1 relay			C
PROFIBUS PA, 1 pulse/frequency			D
PROFIBUS PA, EEx [ia], 1 pulse/frequency			E
Transducer coax cable			
4 x 3 meter, max. 70 °C (158 °F)			0
4 x 15 meter, max. 70 °C (158 °F)			1
Teflon cable 4 x 3 meter, max. 200 °C (392 °F)			7
Teflon cable 4 x 15 meter, max. 200 °C (392 °F)			8

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

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Selection and Ordering data

Order code

Additional information

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

Calibration

Production calibration DN 100 ... DN 1200

Theoretical calibration DN 500 ... DN 1200

Match pair calibration 2 x 3 points

Max. flow 250 ... 1300 m³/h depending on dimension (DN 100 ... DN 500)

Match pair calibration 2 x 3 points

Max. flow 1400 ... 4200 m³/h depending on dimension (DN 300 ... DN 700)

Match pair calibration 2 x 3 points

Max. flow 4200 m³/h depending on dimension (DN 800 ... DN 1200)

Accredited Siemens ISO/IEC 17025 calibration

Max. flow 250 ... 1300 m³/h depending on dimension (DN 100 ... DN 500)

Accredited Siemens ISO/IEC 17025 calibration

Max. flow 1400 ... 4200 m³/h depending on dimension (DN 300 ... DN 700)

Accredited Siemens ISO/IEC 17025 calibration

Max. flow 4200 m³/h depending on dimension (DN 800 ... DN 1200)

Accredited - Third party ISO/IEC 17025 calibration

Max. flow 250...1300 m³/h depending on dimension (DN 100 ... DN 500)

Accredited - Third party ISO/IEC 17025 calibration

Max. flow 1400...4200 m³/h depending on dimension (DN 300 ... DN 700)

Accredited - Third party ISO/IEC 17025 calibration

Max. flow 4300...7000 m³/h depending on dimension (DN 800 ... DN 1200)

EN 10204-3.1.B

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

EN 10204-3.1.B and 100% NDT on weldings, DN 500 ... DN 700

EN 10204-3.1.B and 100% NDT on weldings, DN 800 ... DN 1200

Pressure certificate

EN 10204-2.3

Tag name plate

Stainless steel tag with 12 mm characters, max. 15 characters (add plain text)

Self-adhesive plastic tag with 8 mm characters, max. 15 characters (add plain text)

Included

D03

D06

D07

D08

D21

D22

D23

D31

D32

D33

F10

F11

F12

F13

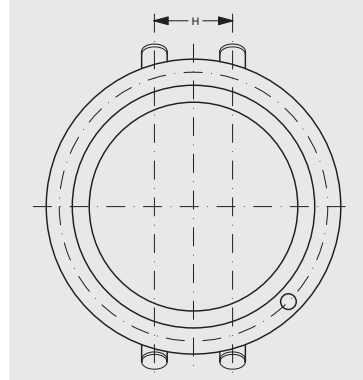
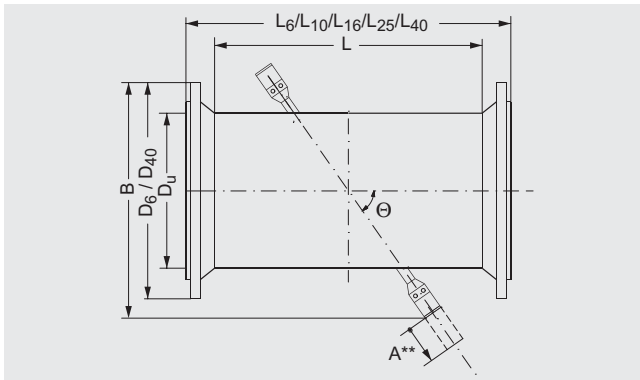
F21

Y17

Y18

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

Dimensional drawings



EN 1092-1

DN	Du	L	B	q	H	PN10			PN16			PN25			PN40		
						W ₁₀ ¹⁾	D ₁₀ Flange dia.	L ₁₀	W ₁₆ ¹⁾	D ₁₆ Flange dia.	L ₁₆	W ₂₅ ¹⁾	D ₂₅ Flange dia.	L ₂₅	W ₄₀ ¹⁾	D ₄₀ Flange dia.	L ₄₀
	[mm]	[mm]	[mm]	[°]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
100	114.3	860	305	30	48.2	3.6	220	960	3.6	220	960	3.6	235	990	3.6	235	990
125	139.7	862	325	30	59.3	4.0	250	970	4.0	250	970	4.0	270	990	4.0	270	990
150	168.3	862	350	30	71.7	4.5	285	970	4.5	285	970	4.5	300	1010	4.5	300	1010
200	219.1	668	430	45	92.9	6.3	340	790	6.3	340	790	6.3	360	820	6.3	375	840
250	273.0	714	480	45	117.2	6.3	395	850	6.3	405	850	7.1	425	890	7.1	450	920
300	323.9	607	525	45	139.4	7.1	445	740	7.1	460	760	8.0	485	790	8.0	515	830
350	355.6	639	550	45	152.8	8.0	405	770	8.0	520	800	8.0	555	840	8.8	580	880
400	406.4	703	600	45	175.7	8.0	565	850	8.0	580	875	8.8	620	925	11.1	660	975
500	508.0	797	690	45	222.2	7.1	670	950	8.0	715	980	10.0	730	1050	14.2	755	1080
600	610.0	912	705	60	268.1	7.1	780	1075	8.8	840	1105	11.0	845	1165	-	-	-
700	711.0	937	895	60	312.8	8.0	895	1100	8.8	910	1140	12.5	960	1190	-	-	-
800	813.0	967	985	60	358.7	8.0	1015	1150	10.0	1025	1180	14.2	1085	1240	-	-	-
900	914.0	1007	1070	60	402.3	10.0	1115	1200	10.0	1125	1230	16.0	1185	1300	-	-	-
1000	1016.0	1060	1160	60	448.2	10.0	1230	1250	10.0	1255	1300	17.5	1320	1370	-	-	-
1200	1220.0	1100	1350	60	539.1	11.0	1455	1330	12.5	1485	1360	-	-	-	-	-	-

¹⁾ Wall thickness

SONO 3100, 2-track

Nominal diam.	Weight [kg] ([lbs])			
DN	PN 10	PN 16	PN 25	PN 40
100	32 (70.5)	32 (70.5)	35 (77.2)	35 (77.2)
125	38 (83.8)	38 (83.8)	44 (97.0)	44 (97.0)
150	45 (99.2)	45 (99.2)	52 (114.6)	52 (114.6)
200	59 (130.0)	58 (127.9)	70 (154.3)	79 (174.2)
250	73 (161.0)	75 (163.3)	96 (211.6)	117 (257.9)
300	83 (183.0)	92 (202.8)	114 (251.3)	151 (332.9)
350	98 (216.0)	113 (249.1)	145 (322.9)	191 (421.1)
400	119 (262.4)	141 (310.9)	191 (421.1)	275 (606.3)
500	153 (337.3)	207 (456.4)	284 (626.0)	379 (836.0)
600	193 (425.5)	276 (608.5)	363 (800.3)	-
700	262 (577.6)	303 (668.0)	480 (1058)	-
800	329 (725.3)	400 (881.8)	650 (1433)	-
900	428 (943.6)	475 (1047)	835 (1841)	-
1000	500 (1002)	594 (1010)	1078 (2377)	-
1200	732 (1614)	902 (1989)	-	-