## 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 … 10 m/s, < ± 0.5 % of rate (v = 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 … +160 °C (14 … 320 °F) |
| Ambient temperature (sensor) | Separate version: -20 … +60 °C (-4 … +140 °F) |
| | Storage: -40 … +85 °C (-40 … +185 °F) |
| Enclosure | 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) | • DN 50 … 300 (2" … 12"), PN 40 |
| | • DN 100 … 300 (4" … 12"), PN 16 |
| | • DN 200 ... 300 (8" … 12"), PN 10 |
| Class designated EN 1759-1 | • DN 50 ... 300 (2" … 12"), class 150 |
| | • DN 50 ... 300 (2" … 12"), class 300 |
| Transducer | Inline version welded into pipe |
| **Materials** | |
| Pipe | • DN 50 ... DN 80 (2" … 3"): Cast steel EN 1.1131-GS-15Mn5 |
| | • DN 100 ... DN 300 (4" … 12"): Carbon steel EN 1.0345-P235GH |
| Flange | • DN 50 ... DN 300 (2" … 12"): EN 1.0025-S235JRG2 |
| 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 Ω)** | **Coax cable with SMB straight plug on one end for the FUS060 connector** |
|---|---|
| Outside diameter | Ø 5.8 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 … +70 °C (14 … 158 °F) |
| **High temperature Coax cable (75 Ω)** | Coax cable with SMB straight plug on one end for the FUS060 connector |
| Outside diameter | Ø 5.13 mm (first 0.3 m (9.84 ft) part to the transducer), Ø 5,8 mm (for remaining cable to the transmitter – with SMB plug at the end) and between these is a black hot melt junction Ø 16 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 … +200 °C (-328 … +392 °F) (brown PTFE transducer part) and -10 … +70 °C (14 … 158 °F) (black PE for remaining transmitter cable part) |

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## Selection and ordering data

| Sensor SONO 3300 with transmitter FUS060 ↗ | | Article No. 7ME3300-0- |
|---|---|---|
| ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Diameter** | **Qn setting [$m^3$/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 | | |
| • PN 10 (DN 200 ... 300) | | B |
| • PN 16 (DN 80 ... 300) | | C |
| • PN 40 (DN 50 ... 300) | | E |
| ANSI B16.5 | | |
| • Class 150 (DN 50 ... 300) | | H |
| • Class 300 (DN 50 ... 300) | | 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 |

| 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 $m^3$/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 $m^3$/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 | **A5E01204521** |
| • German | **A5E02123845** |
| SITRANS F US SONO 3300 | |
| • English | **A5E01365400** |
| • German | **A5E02690975** |

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) | **FDK:085L2403** |  |

### *Spare parts*

Cables for SONO 3300 with FUS060

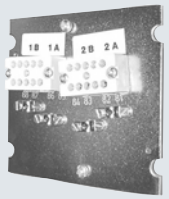
(only as spare parts)

| Description | Article No. | |
|---|---|---|
| Coax cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.) | |  |
| • 3 (9.84) | **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** | |
| • 15 (49.21) | **A5E00861435** | |
| • 30 (98.43) | **A5E01196952** | |

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.) | **A5E02246329** |  |

| Description | Article No. | |
|---|---|---|
| SONO 3300 terminal box lid, in stainless steel painted black (1 pc.) | **FDK:085U1505** |  |
| Gasket for SONO 3300 terminal lid in EPDM (1 pc.) | **FDK:085U1820** |  |
| SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version, incl. lid in stainless steel (painted black) and gasket in EPDM | **A5E00836867** |  |
| Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060 | **A5E02593568** |  |

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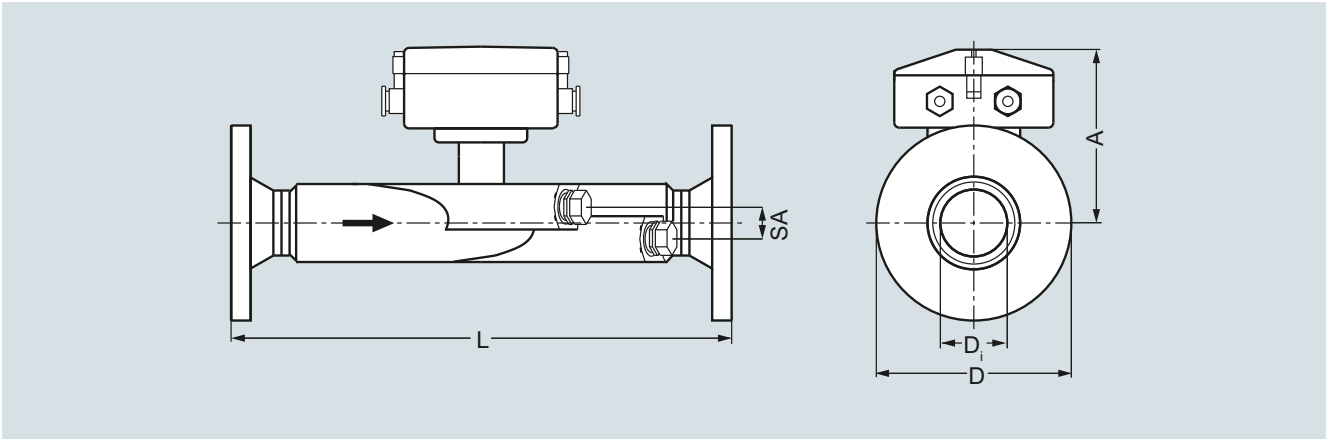
## Dimensional drawings




Sensor SONO 3300, dimensions in mm (inch)

**Sensor SONO 3300 with EN 1092-1 norm**

| DN | PN 10 | | | | | PN 16 | | | | | PN 40 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L[1] | D | $D_i$ | A | SA | L[1] | D | $D_i$ | A | SA | L[1] | D | $D_i$ | A | SA |
| | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | 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) | 54.5 (2.15) | 185.3 (7.30) | 12.9 (0.51) |
| **65** | - | - | - | - | - | - | - | - | - | - | 475 (18.70) | 185 (7.28) | 70.3 (2.77) | 191 (7.52) | 15.4 (0.61) |
| **80** | - | - | - | - | - | 380 (14.96) | 200 (7.87) | 82.5 (3.25) | 198 (7.80) | 19.1 (0.75) | 400 (15.75) | 200 (7.87) | 82.5 (3.25) | 198 (7.80) | 19.1 (0.75) |
| **100** | - | - | - | - | - | 375 (14.76) | 220 (8.66) | 107.1 (4.22) | 217.2 (8.55) | 52.5 (2.07) | 400 (15.75) | 235 (9.25) | 106.3 (4.19) | 217.2 (8.55) | 52.1 (2.05) |
| **125** | - | - | - | - | - | 375 (14.76) | 250 (9.84) | 131.7 (5.19) | 229.9 (9.05) | 64.5 (2.54) | 400 (15.75) | 270 (10.63) | 129.7 (5.11) | 229.9 (9.05) | 63.6 (2.50) |
| **150** | - | - | - | - | - | 360 (14.17) | 285 (11.22) | 159.3 (6.27) | 244.2 (9.61) | 78.1 (3.07) | 400 (15.75) | 300 (11.81) | 157.1 (6.19) | 244.2 (9.61) | 77 (3.03) |
| **200** | 400 (15.75) | 340 (13.39) | 206.5 (8.13) | 259.6 (10.22) | 101.2 (3.98) | 400 (15.75) | 340 (13.39) | 206.5 (8.13) | 259.6 (10.22) | 101.2 (3.98) | 450 (17.72) | 375 (14.76) | 204.9 (8.07) | 259.6 (10.22) | 100.4 (3.95) |
| **250** | 400 (15.75) | 395 (15.55) | 260.4 (10.25) | 286.5 (11.28) | 127.6 (5.02) | 400 (15.75) | 405 (15.94) | 260.4 (10.25) | 286.5 (11.28) | 127.6 (5.02) | 500 (19.69) | 450 (17.72) | 255.4 (10.06) | 286.5 (11.28) | 125.1 (4.93) |
| **300** | 400 (15.75) | 445 (17.52) | 309.7 (12.19) | 311.9 (12.28) | 151.8 (5.98) | 420 (16.54) | 460 (18.11) | 309.7 (12.19) | 311.9 (12.28) | 151.8 (5.98) | 510 (20.08) | 515 (20.28) | 303.9 (11.96) | 311.9 (12.28) | 148.9 (5.86) |

**Sensor SONO 3300 with ANSI norm**

| DN | | Class 150 | | | | | Class 300 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | L[2] | D | $D_i$ | A | SA | L[2] | D | $D_i$ | A | SA |
| mm | inch | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) |
| **50** | **2** | 510 (20.08) | 150 (5.91) | 52.3 (2.06) | 185.3 (7.30) | 12.9 (0.51) | 520 (20.47) | 165 (6.50) | 52.3 (2.06) | 185.3 (7.30) | 12.9 (0.51) |
| **65** | **2½** | 510 (20.08) | 180 (7.09) | 62.2 (2.45) | 191 (7.52) | 15.4 (0.61) | 520 (20.47) | 190 (7.48) | 62.2 (2.45) | 191 (7.52) | 15.4 (0.61) |
| **80** | **3** | 420 (16.54) | 190 (7.48) | 77.7 (3.06) | 198 (7.80) | 19.1 (0.75) | 440 (17.32) | 210 (8.27) | 77.7 (3.06) | 198 (7.80) | 19.1 (0.75) |
| **100** | **4** | 420 (16.54) | 230 (9.06) | 101.7 (4.00) | 217.2 (8.55) | 49.8 (1.96) | 440 (17.32) | 255 (10.04) | 101.7 (4.00) | 217.2 (8.55) | 49.8 (1.96) |
| **125** | **5** | 440 (17.32) | 255 (10.04) | 128.2 (5.05) | 230.7 (9.08) | 62.8 (2.47) | 460 (18.11) | 280 (11.02) | 128.2 (5.05) | 230.7 (9.08) | 62.8 (2.47) |
| **150** | **6** | 430 (16.93) | 280 (11.02) | 154.1 (6.07) | 244.2 (9.61) | 75.5 (2.97) | 450 (17.71) | 320 (12.60) | 152.3 (6.00) | 244.2 (9.61) | 74.6 (2.94) |
| **200** | **8** | 480 (18.90) | 345 (13.58) | 201.5 (7.93) | 259.6 (10.22) | 98.7 (3.89) | 500 (19.69) | 380 (14.96) | 201.5 (7.93) | 259.6 (10.22) | 98.7 (3.89) |
| **250** | **10** | 490 (19.29) | 405 (15.94) | 253 (9.96) | 286.5 (11.28) | 124 (4.88) | 520 (20.47) | 445 (17.52) | 253 (9.96) | 286.5 (11.28) | 124 (4.88) |
| **300** | **12** | 550 (21.65) | 485 (19.09) | 303.8 (11.96) | 311.9 (12.28) | 148.9 (5.86) | 580 (22.83) | 520 (20.47) | 298.8 (11.76) | 311.9 (12.28) | 146.4 (5.76) |

[1] Length tolerance in mm (inch): DN 50 ... 80 +4/-4 (+0.16/-0.16), 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 +10/-11 (+0.39/-0.43).

[2] Length tolerance in mm (inch): DN 50 ... 80 +4/-4 (+0.16/-0.16), DN 100 +5/-6 (+0.20/-0.24), DN 125 ... 200 +6/-10 (+0.24/-0.39), DN 250 +7/-11 (+0.28/-0.43), DN 300 +10/-15 (+0.39/-0.59).

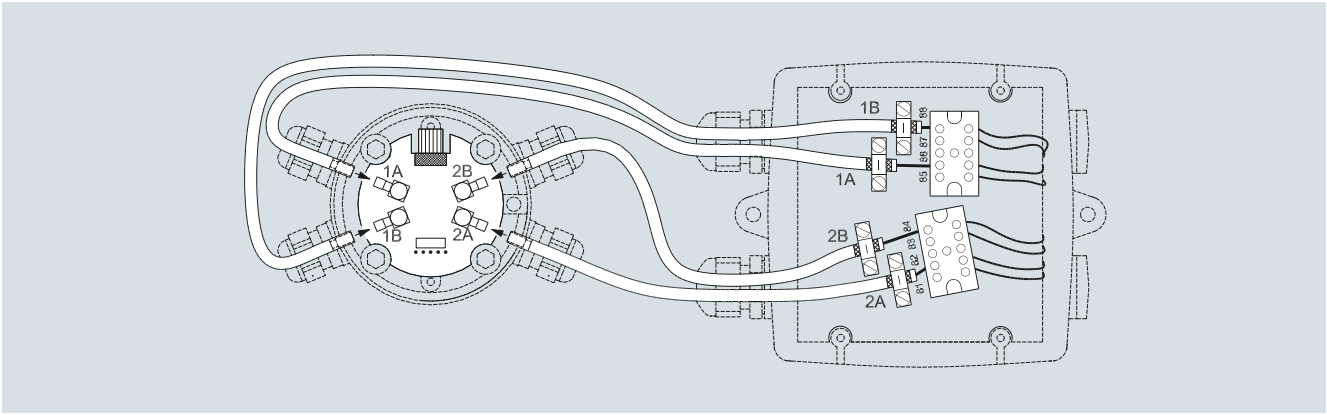
## Dimensional drawings (continued)

Weights for SONO 3300 sensor with EN 1092-1 and ANSI norm

| Weight[1)] | | | | | | |
|---|---|---|---|---|---|---|
| | | EN | | | ANSI | |
| DN | | PN 10 | PN 16 | PN 40 | Class 150 | Class 300 |
| mm | inch | kg (lbs) | kg (lbs) | kg (lbs) | kg (lbs) | kg (lbs) |
| **50** | **2** | - | - | 12 (26.5) | 11 (24.3) | 13 (28.7) |
| **65** | **2½** | - | - | 13 (28.7) | 15 (33.1) | 17 (37.5) |
| **80** | **3** | - | 14 (30.9) | 16 (35.3) | 17 (37.5) | 21 (43.3) |
| **100** | **4** | | 13 (28.7) | 17 (37.5) | 20 (44.1) | 29 (63.9) |
| **125** | **5** | | 17 (37.5) | 23 (50.7) | 26 (57.3) | 39 (86.0) |
| **150** | **6** | - | 21 (43.3) | 30 (66.1) | 30 (66.1) | 49 (108.0) |
| **200** | **8** | 33 (72.8) | 33 (72.8) | 53 (116.8) | 50 (116.8) | 76 (167.6) |
| **250** | **10** | 44 (97.0) | 45 (99.2) | 86 (189.6) | 71 (156.5) | 108 (238.1) |
| **300** | **12** | 52 (114.6) | 60 (132.3) | 117 (257.9) | 100 (220.4) | 159 (350.5) |

1) Approximate weigths without transmitter FUS060 - weigth of FUS060 is 4.4 kg (9.7 lb).

## Circuit diagrams




Electrical connection of SITRANS FUS060 and SONO 3300