

General Specifications

Model SC42 and FF40/FS40/FD40
2/4-electrode design for Conductivity Flow fittings, Subassemblies and Immersion fittings



The sensor, model SC42 and associated fitting program is designed to meet the most common installation requirements in terms of material compatibility, process connections and flow dynamics.

Model SC42 sensor, available in various materials such as Epoxy, Stainless Steel, PTFE and PVDF, is intended to suit most process conditions. The sensor is provided either with a Amphenol connector to fit the Yokogawa WU40 cable or Variopin connector to fit with Yokogawa WU10/WE10-cable. A wide range of flow and immersion fittings makes it possible to install the sensor in a permanent or semi-permanent location. The fittings of stainless steel might be used in sanitary applications

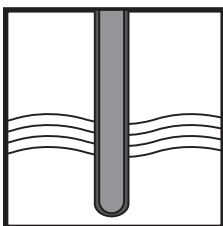
All sensors have a pre-calibrated cell constant and a built-in temperature element for automatic temperature compensation. Sensors with the Variopin connector are equipped with an ID-chip in which callibration information is stored for easy setup when connected to a SENCOM Smart Adapter model SA11-C1. For metal sensors a 3.1 material certificate is included. The sensors, except those equipped with Variopin connector, are ATEX certified for installation in zone 0 environments when connected to a certified intrinsically safe Yokogawa analyser, model SC202S or FLXA21 or a certified intrinsically safe circuit with defined output parameters (refer General Specifications of each sensor for details).



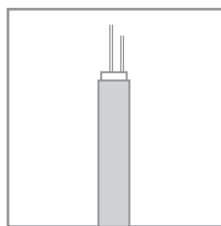
Features

- Built-in temperature resistor: Pt1000
- Fast temperature response
- Plug and cable form a water tight connection to IP67
- Selection of cell constant 0.01 cm⁻¹ to 10 cm⁻¹
- Sensor with 8 pin Variopin with ID chip for SENCOM SA11-C1 use
- ATEX/IECEx certified
- Wide range of sensors to suit most process conditions including ultra-pure water applications
- Wide range of mountings
- Standard quality inspection certificate with delivery of sensor

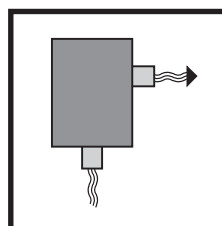
System Configuration



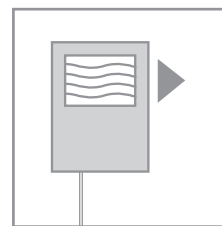
Sensors



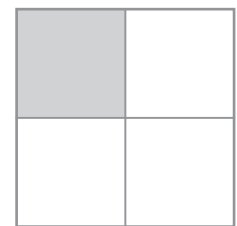
Cables



Fittings



Transmitters



Accessories

Specifications

General Specifications

Model SC42

Measuring elements

2-electrode for SC42-SP/SV series; SC42-EP04 (EP14); SC42-EP15 (EP16) series

4-electrode for SC42-EP08 (EP18); SC42-FP/FV08 (TP/TV08)

Pt1000 temperature sensor

Materials

Wetted parts sensor:

Body SC42-SP/SV : Stainless Steel AISI 316L
 SC42-EP : Glass filled epoxy resin
 SC42-FP/FV : PVDF, Glass
 SC42-TP/TV : Glass filled PTFE, Glass

Electrodes SC42-SP/SV : Stainless Steel AISI 316L
 SC42-EP : Graphite impregnated with epoxy resin
 SC42-FP/FV : Platinum
 SC42-TP/TV : Platinum

O-ring SC42-SP/SV : Viton
 SC42-FP/FV : Viton
 SC42-TP/TV : Kalrez™

For the -FP/FV and -TP/TV the supplied O-ring for sealing in the fitting is Viton.

Insulation -SP/SV : PEEK 450G, FDA migration tested

Connector:

Amphenol: Contacts : gold plated
 Plug : Polyamide

Variopin: Contacts : gold plated
 Material : Nickel-plated brass
 Insulation : PEEK, UL94-V0
 IP class : IP67

Functional specifications (at 25°C)

Temperature element SC42 : Pt1000 to IEC 751

Nominal Cell Constant

SC42-SP/SV24 : 0.1 cm^{-1}
 SC42-SP/SV34 : 0.01 cm^{-1}
 SC42 (EP08) : 10 cm^{-1}
 SC42-EP14 (EP18): 1 cm^{-1}
 SC42-EP15 (EP16): 1 cm^{-1}
 SC42-FP/FV : 10 cm^{-1}
 SC42-TP/TV : 10 cm^{-1}

Note: The SC42 temperature sensor is designed for measurement compensation and for indication. It is **NOT** designed for process temperature control.

Dynamic specifications

Response time temperature t_{90}

SC42-SP/SV24 : < 3 min.
 SC42-SP/SV34 : < 1 min.
 SC42-EP04 (EP08): < 3 min.
 SC42-EP14 (EP18): < 2 min.
 SC42-EP15 (EP16): < 3 min.
 SC42-FP/FV : < 1 min.
 SC42-TP/TV : < 1 min.

Operating range

Conductivity at actual

process temperature

: $1 \mu\text{S} * \text{C.C.} - 200 \text{ mS} * \text{C.C.}$

See Fig. 1: Measuring range of conductivity sensors

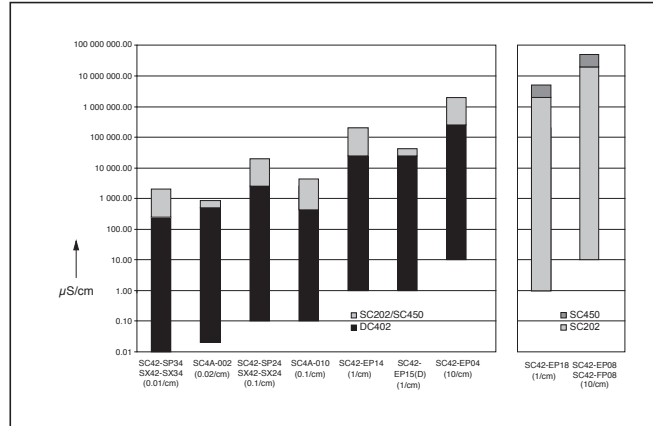


Fig. 1 Measuring range of conductivity sensors

Temperature SC42-SP/SV : 0°C to 150°C (32°F to 302°F)
 SC42-EP : 0°C to 110°C (32°F to 230°F)
 SC42-FP/FV : 0°C to 110°C (32°F to 230°F)
 SC42-TP/TV : 0°C to 110°C (32°F to 230°F)

Pressure SC42-SP/SV : 0 to 10 bar (0 to 142 PSIG)
 SC42-EP : 0 to 10 bar (0 to 142 PSIG)
 SC42-FP/FV : 0 to 10 bar (0 to 142 PSIG)
 SC42-TP/TV : 0 to 2 bar (0 to 28 PSIG)

Cable length for Sensors with Amphenol connector or Variopin connector directly connected to FLXA analyzer

: max. 60 meter with WU10 or WU10 in combination with WF10 cable and BA10 junction box

For sensors with suffix -VS combined with SA11-C1

: Optional 3 meter WE10 cable combined with SA11 Smart Adapter

SA11-C1 Smart Adapter

: Directly connected to the analyzer using a WU11 cable up to 100 meters or Connected to a BA11 connection box using WU11 cable upto 100 m. The BA11 connection box is connected to the analyzer using a WU11 cable up to 100m

Regulatory standards

(only for SC42 with Amphenol connector)

ATEX : Directive 2014/34/EU

by applying:

EN 60079-0
 EN 60079-11
 EN 60079-26

Certificate no .

: DEKRA 14ATEX0074 X

II 1 G Ex ia IIC T4... T6 Ga

ECEX

Applying standards

: IEC 60079-0
 : IEC 60079-11
 : IEC 60079-26

Certificate no.

: IECEx DEK 14.0032X
 Ex ia IIC T4...T6 Ga

Conformity

: EAC (Eurasia)
 TS (Taiwan)

Electrical data for ATEX/IECEx: For sensor input circuit connected to
 A certified intrinsically safe circuit with the following maximum values:
 $U_i = 14.4\text{ V}$; $I_i = 116.5\text{ mA}$; $P_i = 0.342\text{ W}$
 or
 Certified intrinsically safe
 Yokogawa Contact
 Conductivity transmitter Model
 FLXA21 series or
 Model SC202S series.
 The effective internal capacitance C_i and the effective internal inductance L_i of the sensor depends only upon the properties and length of the integral cable.

Special conditions (X) : T6 for Tamb. -30°C to 40°C
 T5 for Tamb. -30°C to 95°C
 T4 for Tamb. -30°C to 130°C



WARNING

Impact on the product shall be avoided.
 Electrostatic charges on the enclosure shall be avoided.
 From the safety point of view the circuits shall be assumed to be connected to earth.

Installation of SC42 sensors

To install the SC42 conductivity sensors in a permanent or semi-permanent location, Yokogawa can supply a range of flow and immersion fittings. These fittings and sub-assemblies are available in different materials to give the best solution for any process considering chemical resistance, pressure and temperature specifications. Flow fittings are available with optional flange adapters. When installing the SC42 sensor in a fitting, an O-ring is necessary. This O-ring is available in different materials to improve chemical resistance.

If the SC42 sensor is supplied with an O-ring, the O-ring in the fitting must be removed.

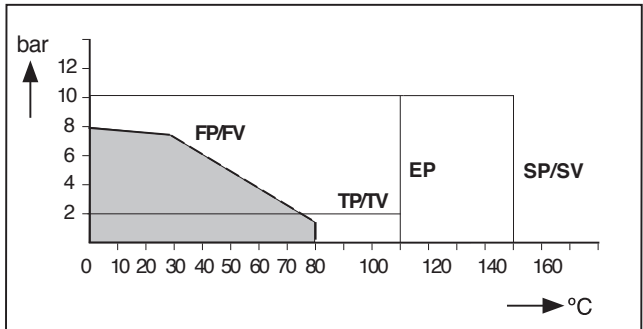


Fig. 1 Pressure vs temperature

Regulatory standards (all types)

CE : Decision 768/2008/EC

Pressure : Directive 2014/68/EU
 Applying article : 4.3 (Sound Engineering Practice)

- RoHS2 : Directive 2011/65/EU
 Applying category : 9 (Industrial monitoring and control instruments)

Typical installation of SC42 sensor in FF40 Flow fittings/ FS40 Flow fitting assemblies

From a practical point of view, the best mounting place for a conductivity sensor is in a by-pass with a sample valve. For these applications the following Flow fittings/Flow fitting subassemblies are ideal: Model FF40: Flow fitting, Model FS40: Flow fitting subassembly

When using the sensor in combination with a Flow fitting or Flow fitting subassembly, the process flow has to be taken into account when mounting the sensor. For an example see figure 2

Shipping details

Package size (LxWxH) : 300 x 95 x 73 mm (11.8 x 3.7 x 2.9 inch)
 Package weight : 0.3 to 0.8 kg (0.7 to 1.8 lbs), depends on sensor type

Environmental conditions

Storage temperature : -30°C to 50°C (-22°F to 122°F)

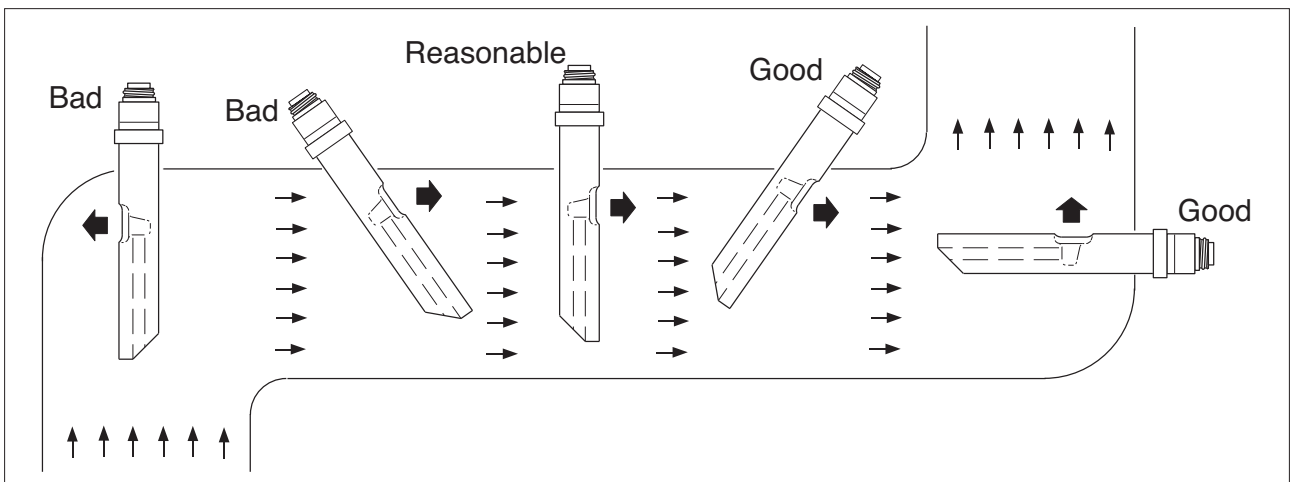


Fig. 2 Mounting position SC42 sensor

Modelcode FF40 Flowfitting:

Model code	Suffix code	Option code	Description
FF40			Flow fitting
Material	- P22 - S22 - V22		Polypropylene (PP) Stainless steel (AISI 316L) Polyvinylchloride (PVC)
Optional Flange adapters (NPT 1/2" Male lap joint)		/FP1 /FP2 /FP3 /FP4 /FS1 /FS2 /FS3 /FS4	DN15 PN10 PP DN25 PN10 PP 1/2" ANSI 150 lbs PP 1" ANSI 150 lbs PP DN15 PN10 SS AISI 316 DN25 PN10 SS AISI 316 1/2" ANSI 150 lbs SS AISI 316 1" ANSI 150 lbs SS AISI 316
Material Certificate		/M	3.1 according to EN-10024 for Stainless steel wetted parts

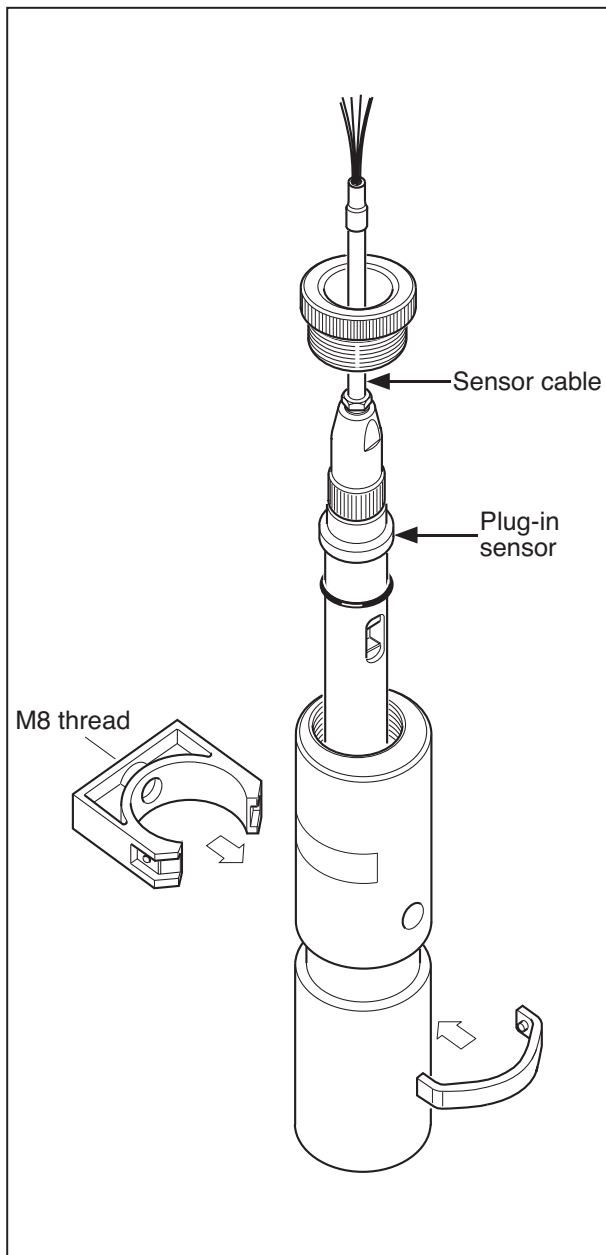


Fig. 3 Installation SC42
in FF40-P22/FF40-V22 *)

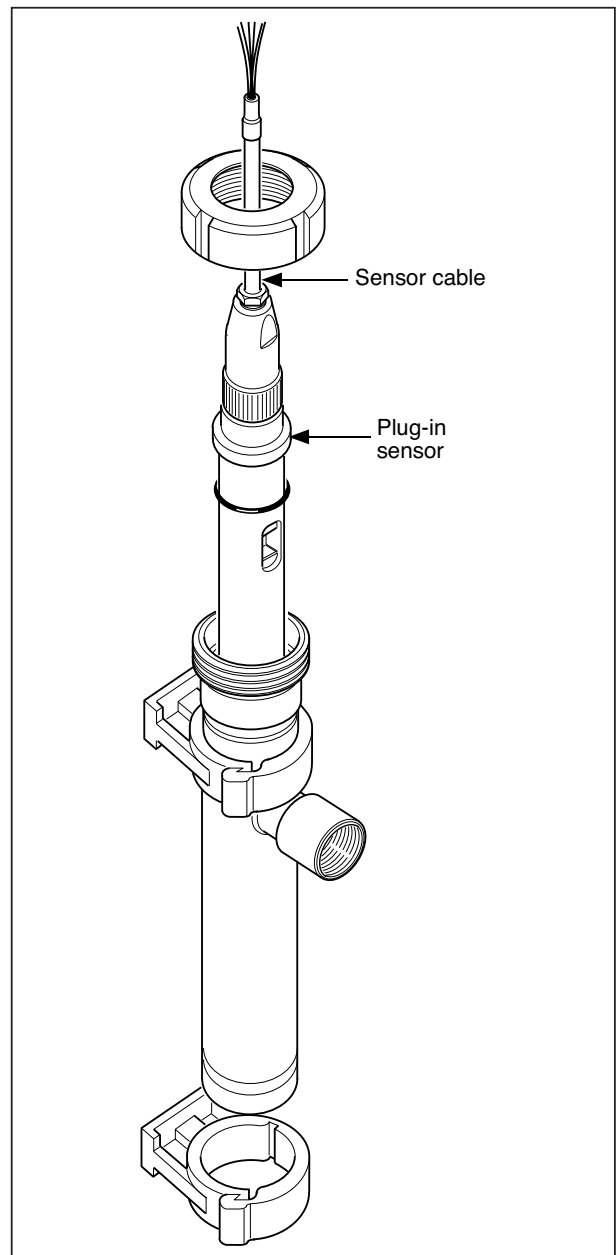


Fig. 4 Installation SC42
in FF40-S22 *)

***Note:** Not possible for sensors with suffix code -EP16

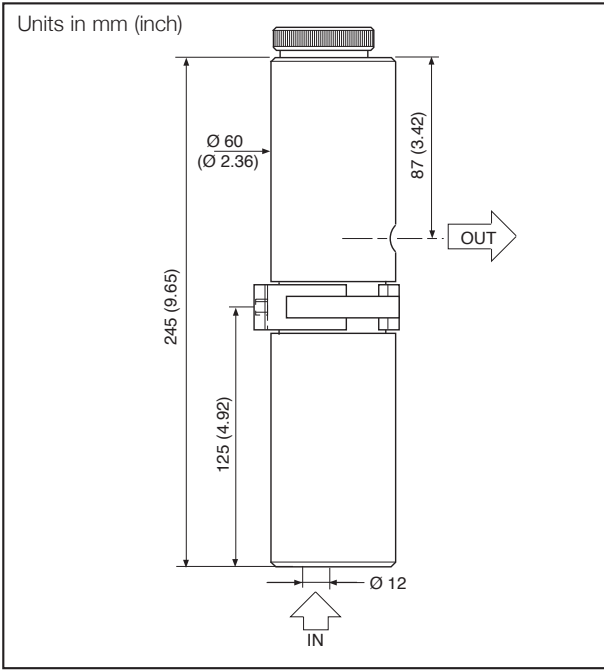


Fig. 5 Dimensions FF40-P22 (V22)

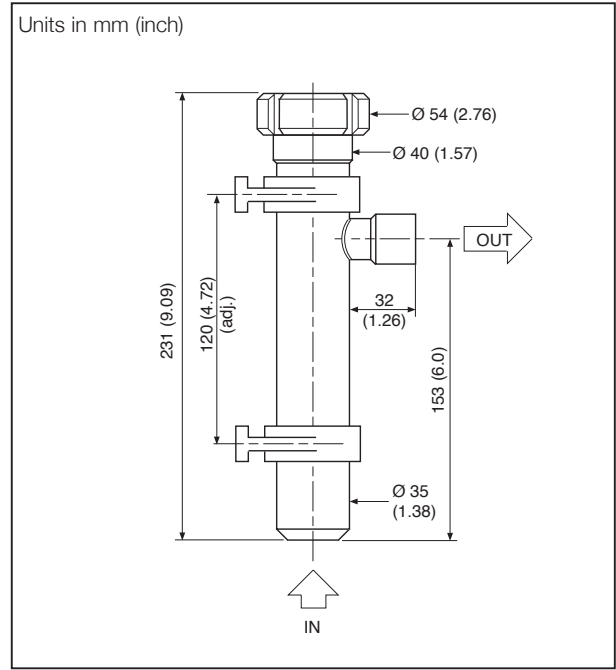


Fig. 6 Dimensions FF40-S22

Flange adapters are available for the FF40-P22 (option /FP*) and for the FF40-S22 (option /FS*)

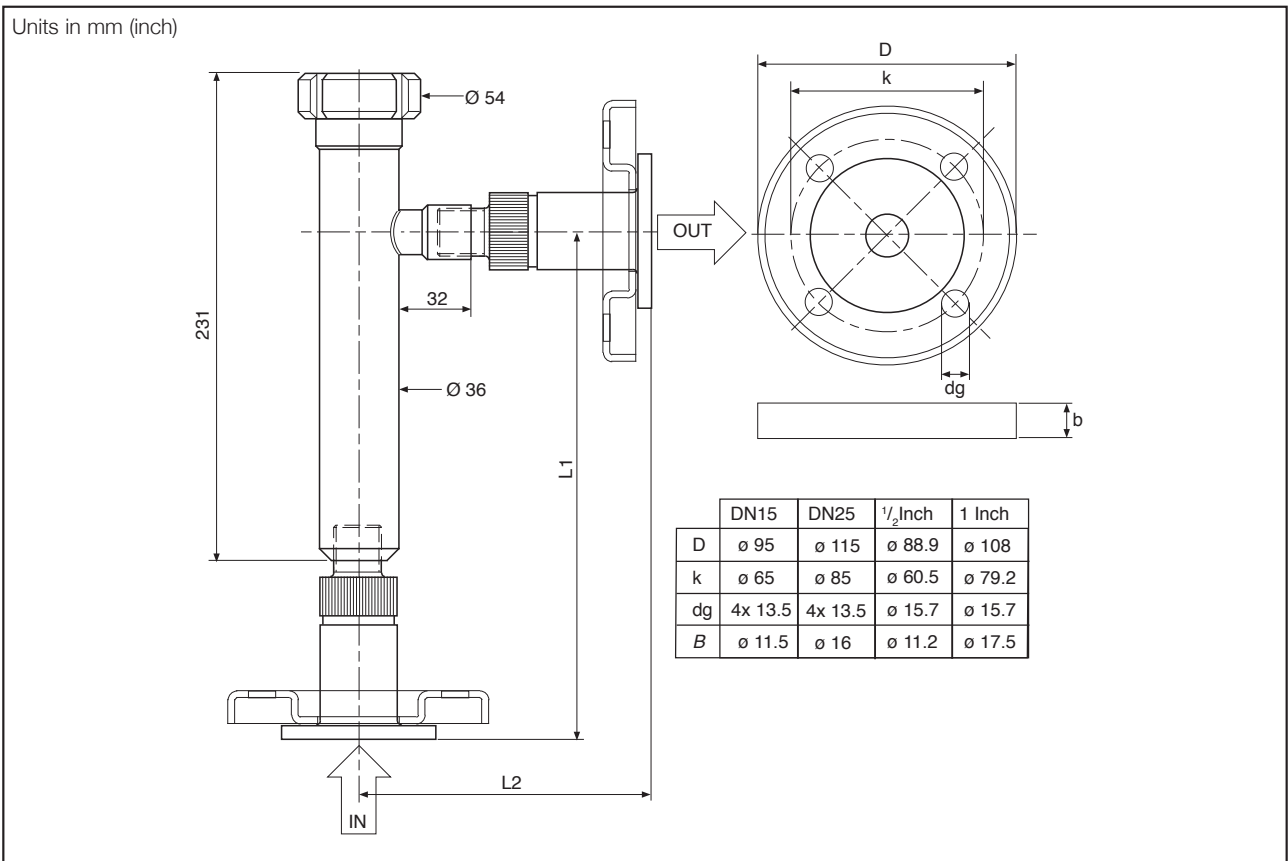
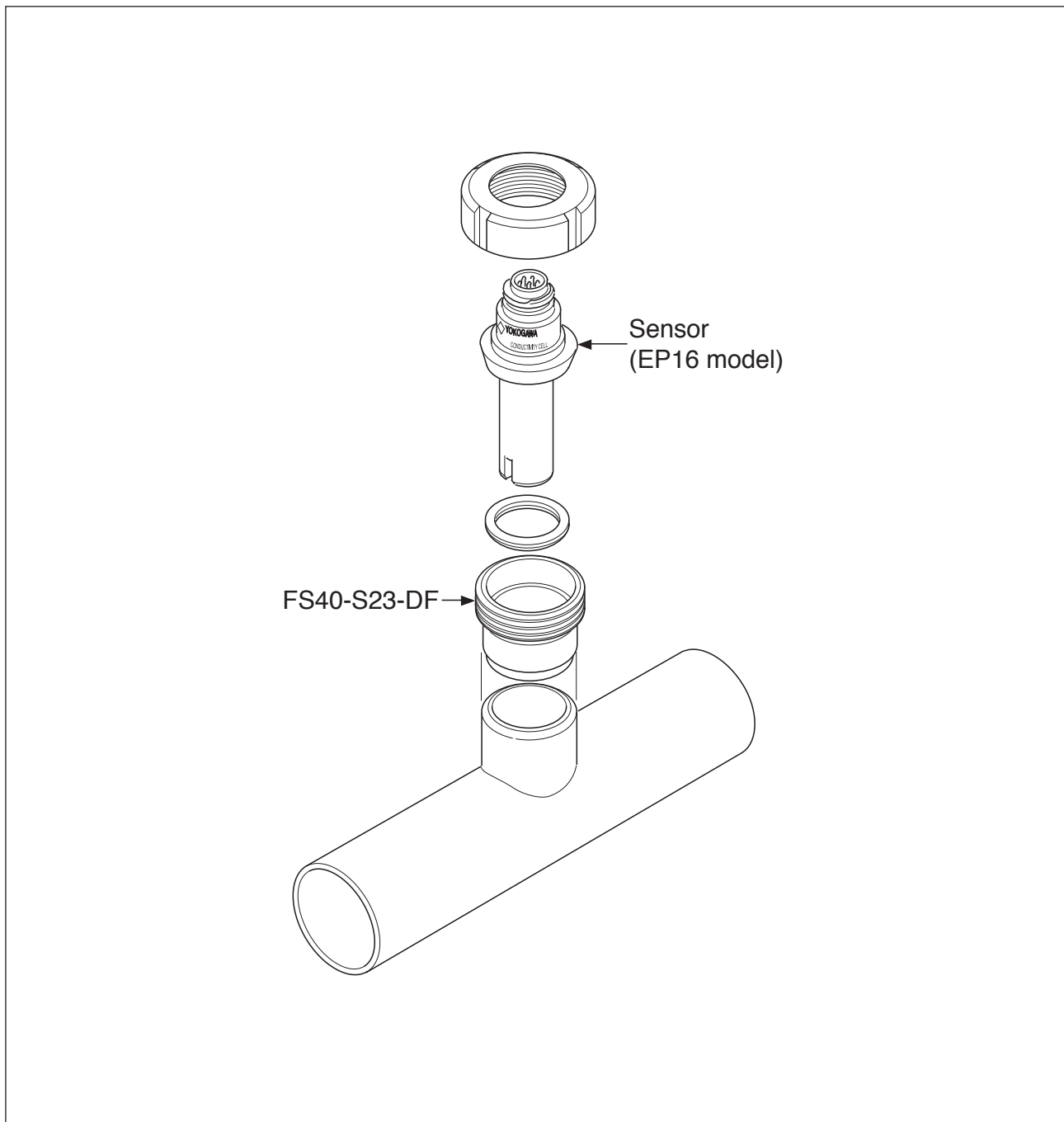


Fig. 7 Dimensions of optional Flange adapters

Type	DN15PN10		DN25-PN10		1/2" 150 lbs		1" 150 lbs	
	L1	L2	L1	L2	L1	L2	L1	L2
FF40-S22	226	123	236	133	8 7/8"	4 13/16"	9 5/16"	5 1/4"
FF40-P22	247	123	236	112	9 3/4"	4 7/8"	9 5/16"	4 7/16"

Modelcode FS40 Subassembly for Flow fitting

Model code	Suffix code	Option code	Description
FS40			Subassembly
Material	- F22 - S22 - S23 - V22		Polyvinylidene fluoride (PVDF) Stainless steel (AISI 316L) Stainless steel (AISI 316L) for EP16 model sensor Polyvinylchloride (PVC)
Mounting	- WE - PA - TP - DF		Weld-in socket for - S22 and - S23 Glue-in socket for - V22 Parallel thread, only for - F22, (ISO 228/1-G1 ¹ / ₄ "") Tapered pipe thread (1 ¹ / ₄ " NPT) For insertion type sensor with collar piece DN25 in combination with - S23
Material Certificate		/M	3.1 according to EN-10024 for Stainless steel wetted parts


Fig. 8 Installation example of the SC42-EP16 sensor with a FS40-S23-DF subassembly

Units in mm (inch)

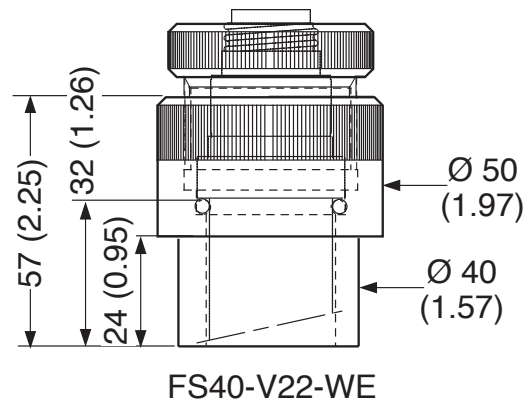
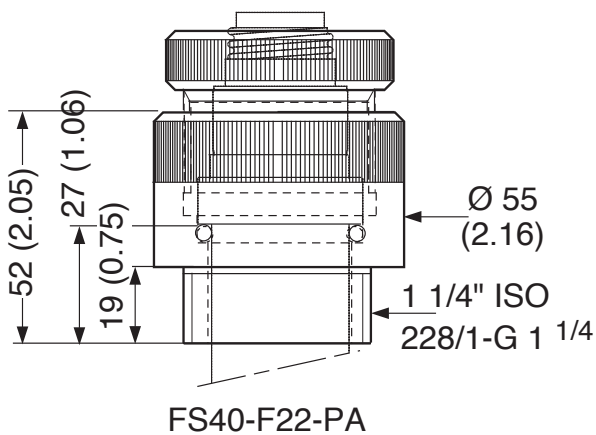
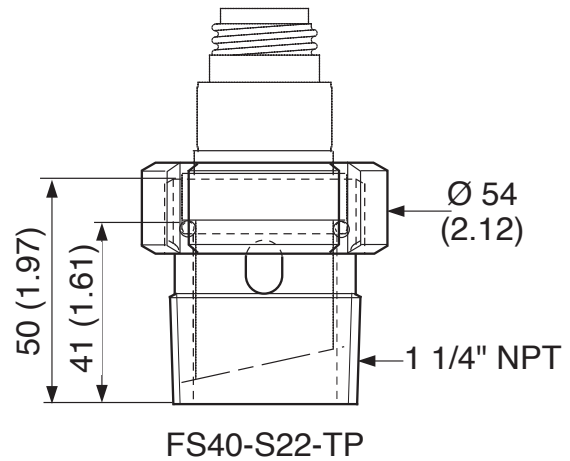
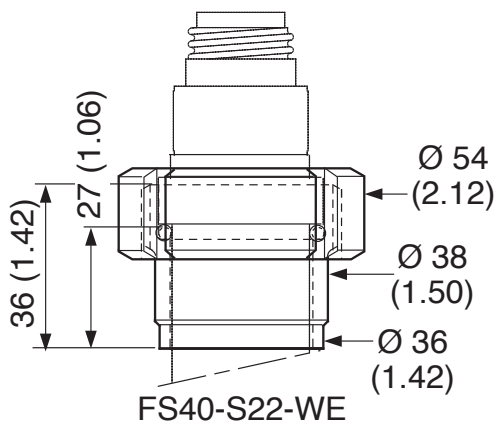
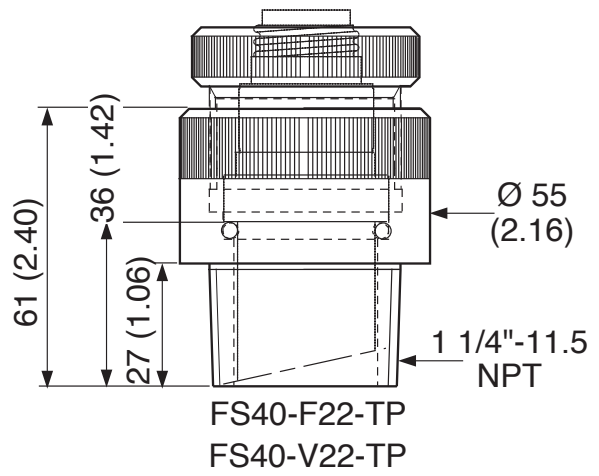
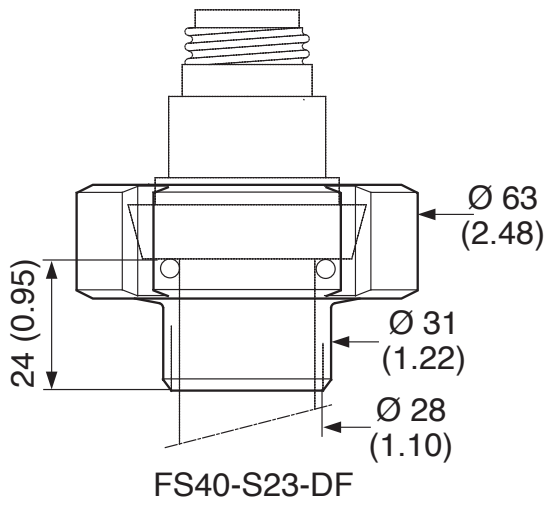


Fig. 9 Dimensions FS40 Flow fitting subassemblies

Typical installation of SC42 sensor in FD40 Immersion fitting

The immersion fittings are for installing the SC42 sensor in tanks, open vessels or drains. If the fitting is mounted in a tank with agitator or if it is placed in a fast flowing process, care must be taken that the fitting is adequately supported. For this reason several mounting flanges can be ordered.

Modelcode FD40 Immersion fitting

Model code	Suffix code	Option code	Description
FD40V28			Immersion fitting PVC
FD40S28			Immersion fitting Stainless Steel AISI 316L
Immersion depth	- □ □		Between 05 and 20 decimeter (Example 06 = 6 dm. = 0.6 m.)
	- NC		No Cable
Flange	- FN - F1 - F2 - F3 - F4		No Flange PVC flange DN50 PN10 PVC flange ANSI 2" 150 lbs Stainless Steel flange DN50 PN10 Stainless Steel flange ANSI 2" 150 lbs
Style code	* B		
Protection hose		/PH5 /PH10	For 5.5 meter mounting cable For 10 meter mounting cable
Mounting cable		/C05 /C10	Length 5,5 meter* Length 10 meter*
Material Certificate		/M	3.1 according to EN-10024 for SS wetted parts

***Note:** If it is necessary to use the fitting with another mounting cable length, this cable can be ordered separately as WU40 model (Amphenol connector) or WU10/WE10 (Variopin connector).

Model code	Suffix code	Description
WU40		Sensor cable
Cable length	- LH01 - LH02 - LH05 - LH10 - LH15 - LH20 - LH25	1 meter 2 meters 5½ meters 10 meters 15 meters 20 meters 25 meters

Model code	Suffix code	Description
WU10		Universal sensor cable
Conn. type	-V	Variopin
Cable type	-D	Dual Coax
Cable length	-02 -05 -10 -15 -20	2 meters 5 meters 10 meters 15 meters 20 meters

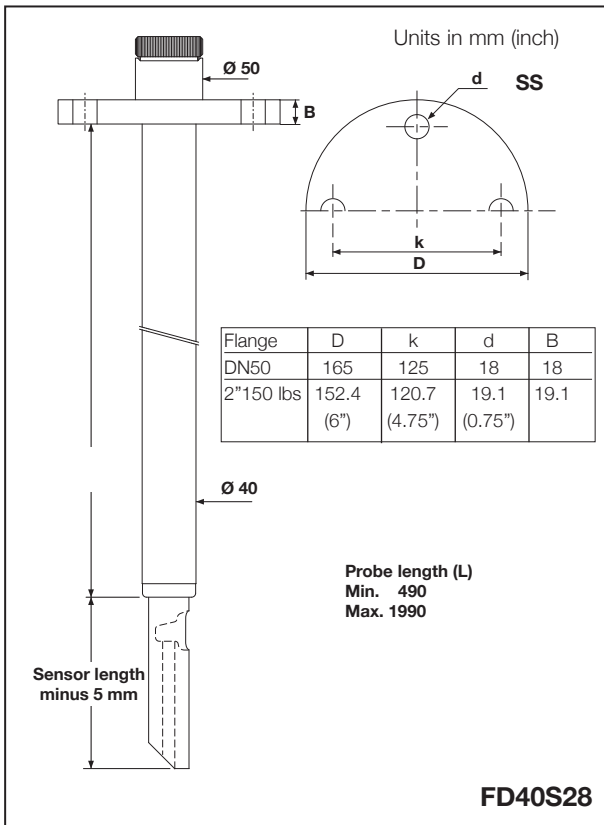


Figure 10

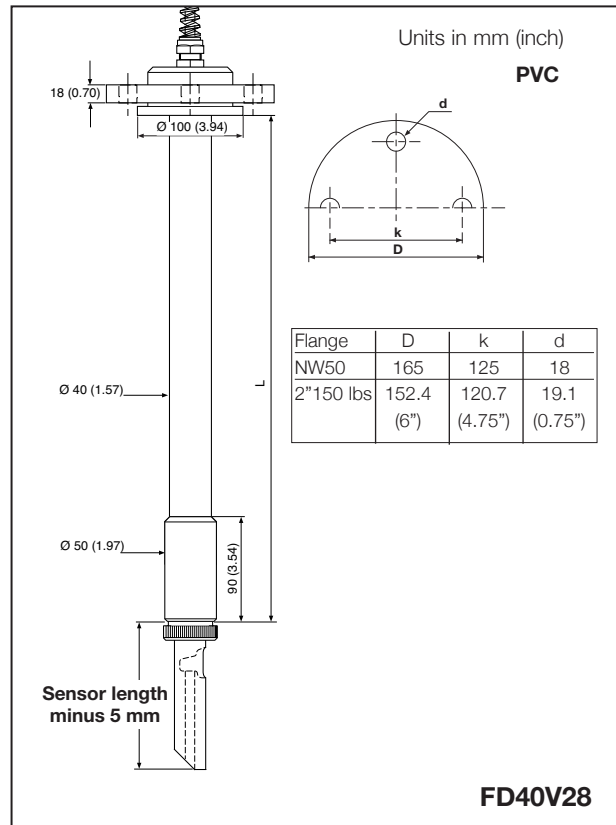


Figure 11

Dimensions SC42 sensors.

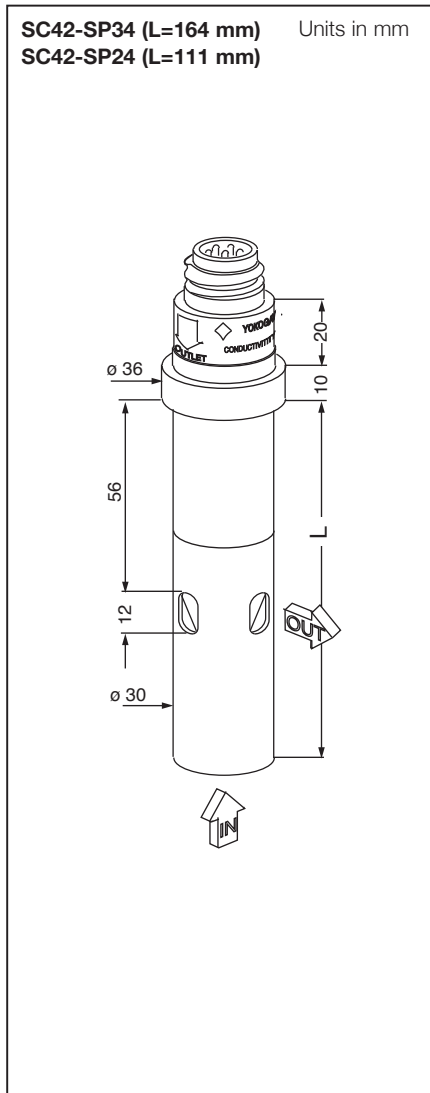


Fig. 12 Dimensions SC42-SP

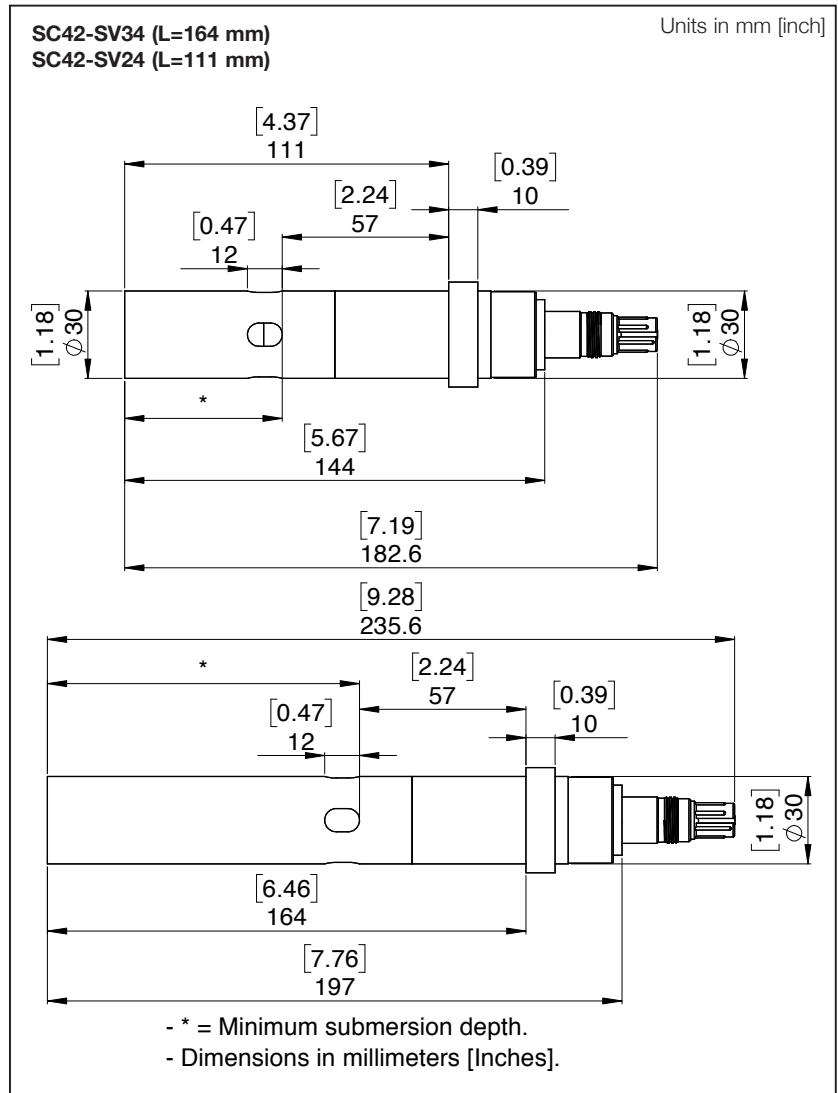


Fig. 13 Dimensions SC42-SV

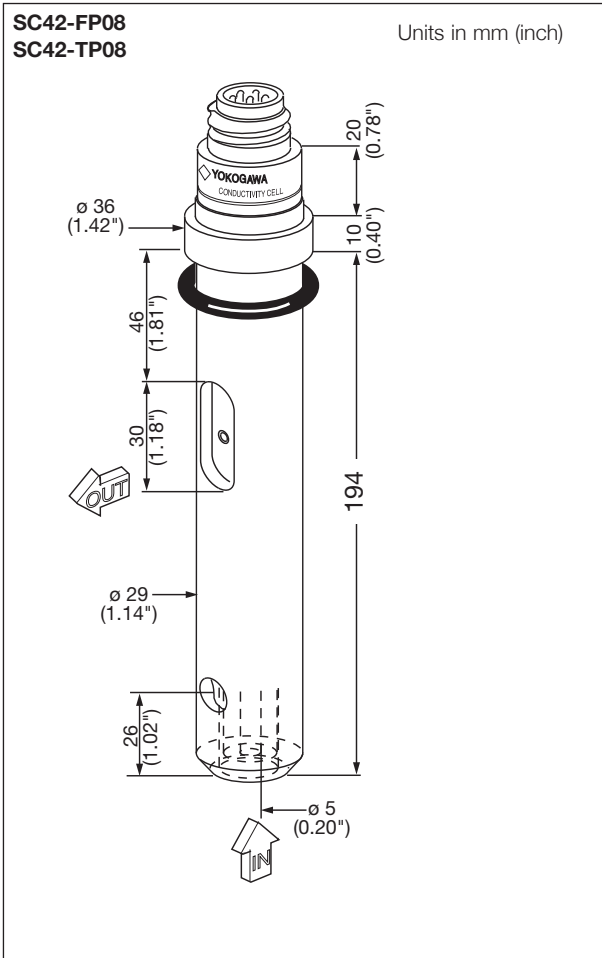


Fig. 14 Dimensions SC4 □-FP/TP

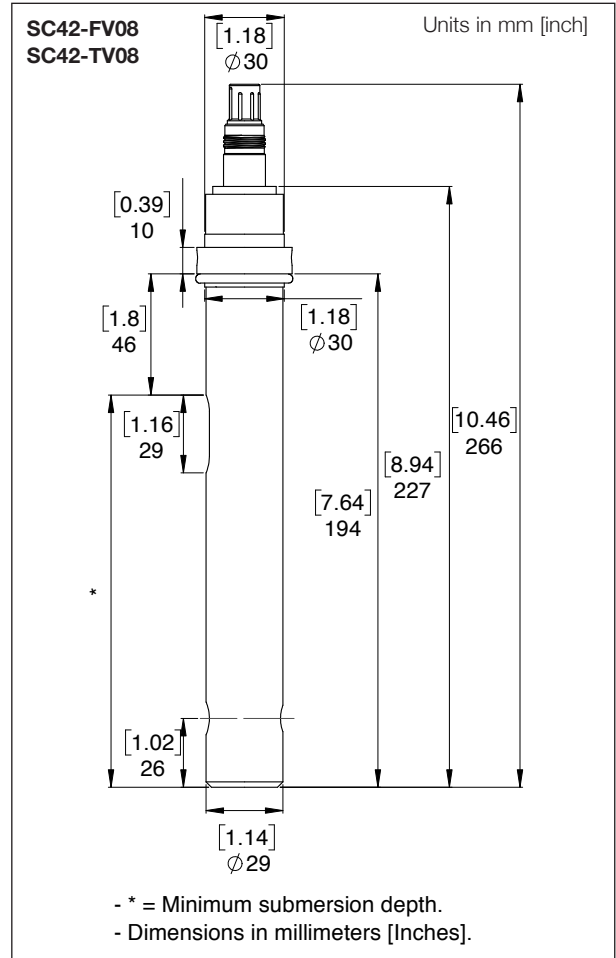


Fig. 15 Dimensions SC4 □-FV/TV

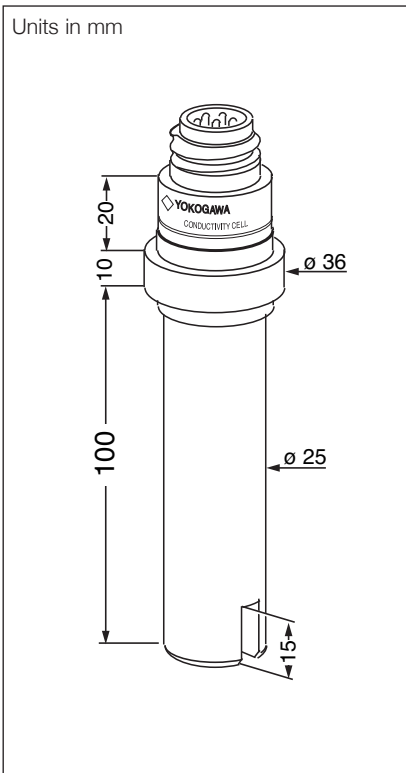


Fig. 16 SC42-EP15

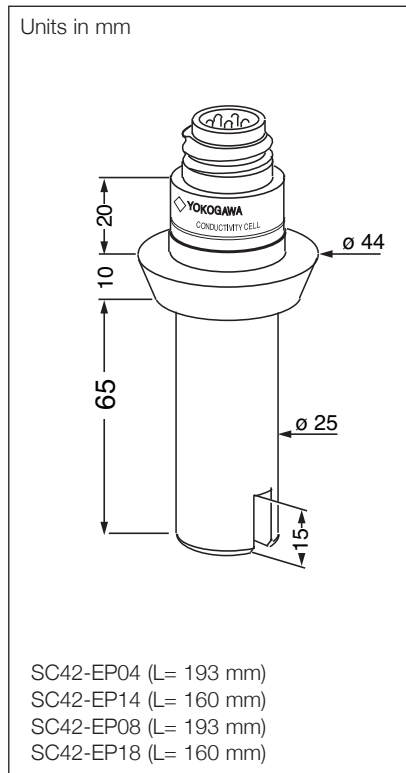


Fig. 17 SC42-EP16

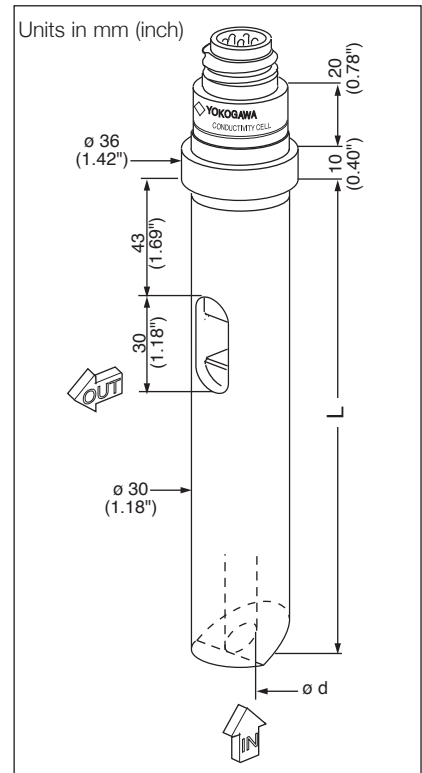


Fig. 18 SC42-EP14 (EP18),
SC42-EP04 (EP08)

Wiring SC42 sensors

The SC42 sensors are provided with a fixed connector. The standard cable used to connect the sensor with Amphenol connector to the analyser is the WU40. The standard cable used to connect the sensor with VP connector to the analyzer is the WU10. These cables are available up to 25/20 meters. When a longer cable run is necessary (maximum cable run is 60 meters), this can be done by using the WF10 extension cable in combination with the BA10 connection box.

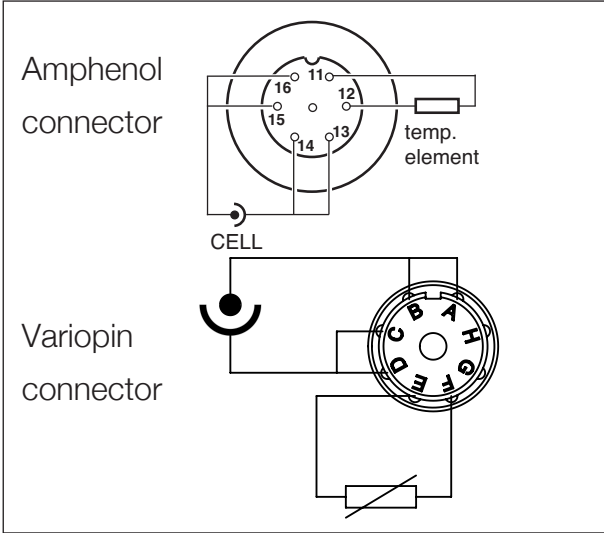


Fig. 19 Top view connector system SC42 2-electrode

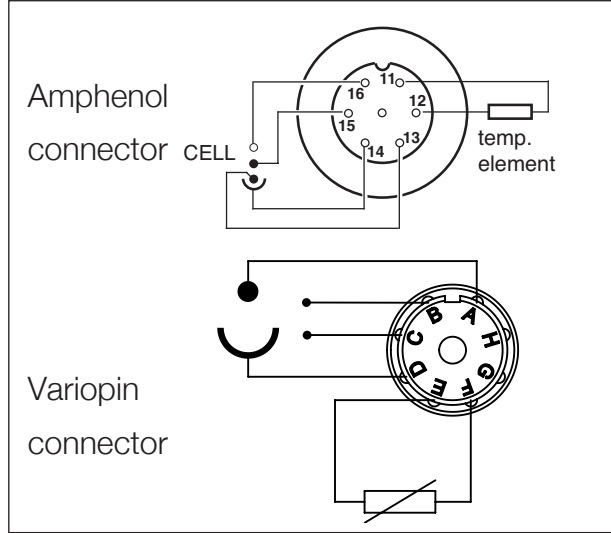


Fig. 20 Top view connector system SC42 4-electrode

3.5 Modelcode SC42

Model	Suffix Code	Option code	Description
SC42**			Conductivity Sensor 2- or 4- electrodes + Pt1000
Materials	-E -S -F -T		Epoxy / graphite Stainless steel AISI 316L / PEEK PVDF / Glass / Platinum PTFE / Glass / Platinum
Mounting	P V		Plug-in type, plug-socket connector Plug-in type, VarioPin connector with SENCOM ID-chip*
Cell constant	0 1 2 3		C = 10 cm-1 C = 1 cm-1 C = 0,1 cm-1 C = 0,01 cm-1
Type	4 5 6 8		2-electrode, flow cell 2-electrode, insertion cell 2-electrode, insertion cell with DN25 collar 4-electrode, flow cell
Options			N/A

*Note: Suffix V not ATEX/IECEx certified. Suffix V not in combination with suffix -E (Epoxy).

**Note: 3.1 Material certificate according to EN 10024 is standard delivered with this sensor.

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