
Instruction Manual Model SC4A, SC41 SC42,
SC49, SX42
Specific Conductivity
sensors



(BG)

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(D)

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(DK)

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(EST)

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(E)

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(F)

Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

(GB)

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(GR)

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(H)

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(I)

Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

(LV)

Visas ATEX Ex kategorijas izstrādājumu Lietošanas instrukcijas tiek piegādātas angļu valodās. Ja vēlaties saņemt Ex ierīšu dokumentāciju citā valodā, Jums ir jāsazinās ar firmas Yokogawa (Yokogawa) tuvāko ofisu vai pārstāvi.

(LT)

Visos gaminio ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglo kalbomis. Norėdami gauti priestaiso Ex dokumentaciją kitomis kalbomis susisiekite su artimiausiu bendrovės Yokogawa biuru arba atstovu.

(M)

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(NL)

Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

(P)

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(PL)

Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym języku, prosimy o kontakt z najbliższym biurem Yokogawy.

(RO)

Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

(S)

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(SF)

Kaikkien ATEX Ex-tyyppisten tuotteiden käyttöohjeet ovat saatavilla englannin-. Mikäli tarvitsette Ex-tyyppisten tuotteiden ohjeita omalla paikallisella kielellänne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

(SK)

Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

(SLO)

Vsi predpisi in navodila za AEX Ex sorodni pridelki so pri roki v anglišèini. Èe so Ex sorodna navodila potrebna v vašem tukejnem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

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1. PREFACE

1.1 Introduction

The sensor, model SC4A, SC41, SC42, SC49 and SX42, and associated fitting program is designed to meet the most common installation requirements in terms of material compatibility, process connections and flow dynamics. The various installation possibilities are described and illustrated in this Instruction Manual.

Model SC4A sensors, available in a Stainless Steel or Titanium version with fixed cable or Variopin connector, in combination with WU10/WE10-cable are intended for the low conductivity applications. These sensors are designed in a convenient compact style, and can be inserted directly in process pipework using available fittings or adapters.

Model SC41, SC42 and SC49 sensors, available in various materials such as Epoxy, Stainless Steel, PTFE and PVDF, are intended to suit most process conditions. The sensors are 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 sensors in a permanent or semi-permanent location.

Model SX42 sensors have a Stainless Steel body and ceramic insulation, especially designed to withstand high temperatures and high pressures. The flanged model has an integral connection box, the threaded models are provided with a Amphenol connector to fit the Yokogawa WU40 cable or Variopin connector to fit with Yokogawa WU10/WE10-cable.

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 calibration 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 (see General Specifications of each sensor for details).

1.2 Unpacking and Checking

Upon delivery, unpack the sensor carefully and inspect it to ensure that it is not damaged during shipment. If damage is found, retain the original packing material and immediately notify the carrier and the relevant local Yokogawa Sales office. Make sure the Model Code and Serial Number on the sensor are the same as on the packing list. Also check if option(s) that were ordered, are included and correct.

1.3 Warranty and Service

Yokogawa products are guaranteed free from defects in workmanship and materials under normal use and service for a period of (typically) 12 months from the date of shipment from the manufacturer. Individual Sales organizations can deviate from the typical warranty period, and the

conditions of sale relating to the original purchase order should be consulted. Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes is excluded from this warranty coverage. In the event of a warranty claim, the defective goods should be sent (freight paid) to the Service Department of the relevant Yokogawa Sales office for repair or replacement (at Yokogawa's discretion).

The following information must be included in the letter accompanying the returned goods:

- Model Code and Serial Number.
- Original Purchase Order and Date.
- Length of time in service and description of the process.
- Description of the fault and circumstances of the failure.
- Process/environmental conditions that may be related to the failure of the sensor.
- Statement as to whether warranty or nonwarranty service is requested.
- Complete shipping and billing instructions for return of material, plus the name and phone number of a contact person that can be reached for further information.
- Clean Statement Returned goods that have been in contact with process fluids must be decontaminated and disinfected prior to shipment. Goods should carry a certificate to this effect, for the health and safety of our employees. Material Safety Data sheets must be included for all components of the process to which the sensor (options) have been exposed.

1.4 Serial Number definition

The serial number is defined by nine (9) alphanumeric characters:

X_1X_2	Production location, N3 for Yokogawa Process Analyzers Europe B.V.
X_3X_4	Year/Month code
$X_5X_6X_7X_8X_9$	Tracking number
Example:	N3P600028

Method used for year/month numbering

Table 1: Production Year code

Year	Year code	Year	Year code
2014	P	2026	3
2015	R	2027	4
2016	S	2028	5
2017	T	2029	6
2018	U	2030	7
2019	V	2031	8
2020	W	2032	9
2021	X	2033	A
2022	Y	2034	B
2023	Z	2035	C
2024	1	2036	D
2025	2	2037	E

Table 2: Production Month code

Month	Month code
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	A
November	B
December	C

2. MODEL SC4A

2.1. General Specifications

2.1.1. Measuring elements

2-electrode measuring system

Pt1000 temperature sensor

2.1.2. Materials

Wetted parts sensor:

Body & electrodes	SC4A-T-AD	: Titanium grade 2 or 3
	SC4A-S-AD	: Stainless Steel AISI 316L
	SC4A-E-SA (SB, SC)	: Stainless Steel AISI 316L
	SC4A-T-PR	: Titanium grade 2 or 3
	SC4A-S-PR	: Stainless Steel AISI 316L
O-ring	SC4A*-AD	: Viton
	SC4A-E-SA (SB, SC)	: EPDM FDA approved
	SC4A*-PR	: Viton

Insulation : PEEK 450G, FDA migration tested

Wetted parts adapters/fitting:

/PS, /FF	SC4A*-AD	: Stainless Steel AISI 316L
/PF	SC4A*-AD	: PVDF
/SA1(2), /SB1(2), /SC1	SC4A-E-SA (SB, SC)	: Stainless Steel AISI 316L

Cable:

Versions with integrated cable only:

Conductors	: tinned copper 0.6 mm ²
Outside shield	: braid, tinned copper, 85% coverage
Insulator	: Polyester for conductors, for colors see Section 2.4 TPE-O for outer jacket, color black

Variopin connector:

Contacts	: Gold plated
Material	: Nickel plated brass
Insulation	: Peek, UL94-VO
IP class	: IP67

2.1.3. Functional specifications (at 25°C)

Temperature element : Pt1000 to IEC 751
 Nominal Cell Constant (C.C.) : 0.02 cm⁻¹ or 0.1 cm⁻¹

Note: The SC4A temperature sensor is designed for measurement compensation and for indication. It is **NOT** designed for process temperature control.

2.1.4. Dynamic specifications

Response time temperature t₉₀ : < 1 min.

2.1.5. Operating range

Conductivity at actual process temperature : 1 μS * C.C. – 50 mS * C.C.

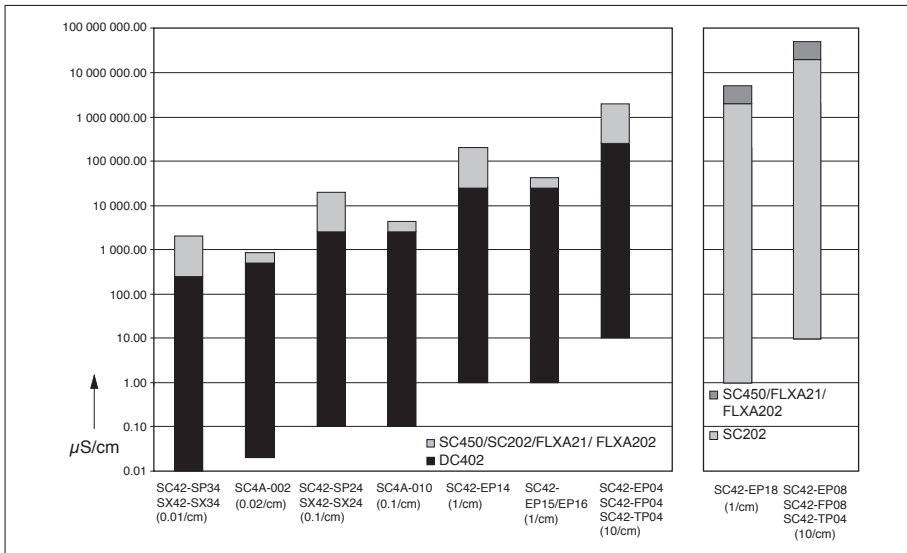


Fig. 1 Measuring range of conductivity sensors

Process temperature Stainless Steel : 0°C to 110°C (32°F to 230°F)
 & Titanium type : 135°C (275°F) for a short period of time during sterilization.

Process temperature in combination with PVDF fitting : 0°C to 80°C (32°F to 176°F)

Process pressure Stainless Steel & Titanium type: 0 to 10 bar (0 to 142 PSIG)

Process Pressure in combination with PVDF fitting: See Fig. 2

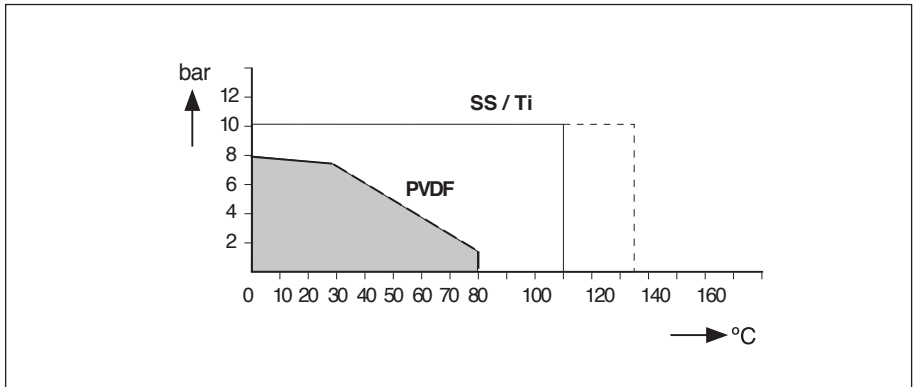


Fig. 2 Pressure vs temperature

Cable length for

- SC4A with fixed cable or SC4A with Variopin directly connected to Flexa analyzer : max. 60 meter with WU10/WE10 (possibly in combination with WF10 cable and BA10 junction box)
- For suffix -VS combined with SA11 : 3 meter WE10 cable (as option) combined with SA11 Smart Adapter
 - SA11 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.

2.1.6. Regulatory standards (only for SC4A with fixed cable)

- 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

- IECEx
 - 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



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.

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)

2.1.7. Shipping details

Package size (LxWxH)	: 220 x 220 x 90 mm (8.7 x 8.7 x 3.6 inch)
Package weight	: 0.5 to 1.7 kg (1.1 to 3.8 lbs), depends on sensor type and cable length

2.1.8. Environmental conditions

Storage temperature	: -30°C to 50°C (-22°F to 122°F)
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2.1.9. Mechanical specifications

Surface roughness SC4A-*-AD	: 0.8 μ m
SC4A-E-SA (SB, SC)	: 0.5 μ m
SC4A-*-PR	: 0.8 μ m

2.2. Installation of SC4A sensors

For optimum measurement results, the SC4A sensor should be installed in a location that offers an acceptable representation of the process composition and DOES NOT exceed the specifications of the sensor.

2.2.1. Typical installation SC4A-*-AD with standard options

The SC4A-*-AD sensor can be installed in the process using optional 3/4" NPT adapters. These adapters are available in Stainless Steel (/PS) and in PVDF (/PF); see figure 3 for the mounting sequence. The sensor can also be installed in an optional Stainless Steel flow fitting (/FF) using option /PS, see figure 4 for details.

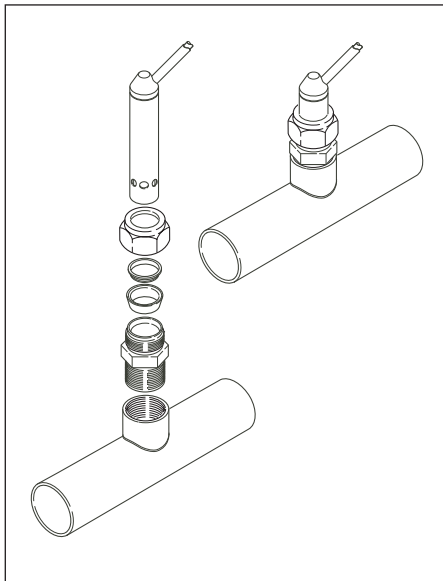


Fig. 3 Mounted sensor with the option /PF and /PS

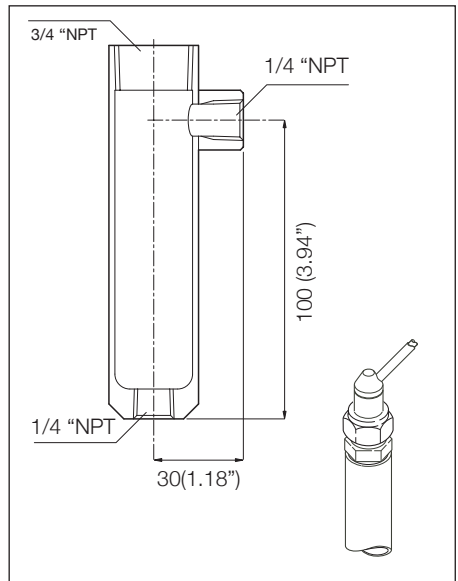


Fig. 4 Dimensional drawing /FF with the option /PS

2.2.2. Typical installation SC4A-E-SA (SB, SC) with standard options / spare parts

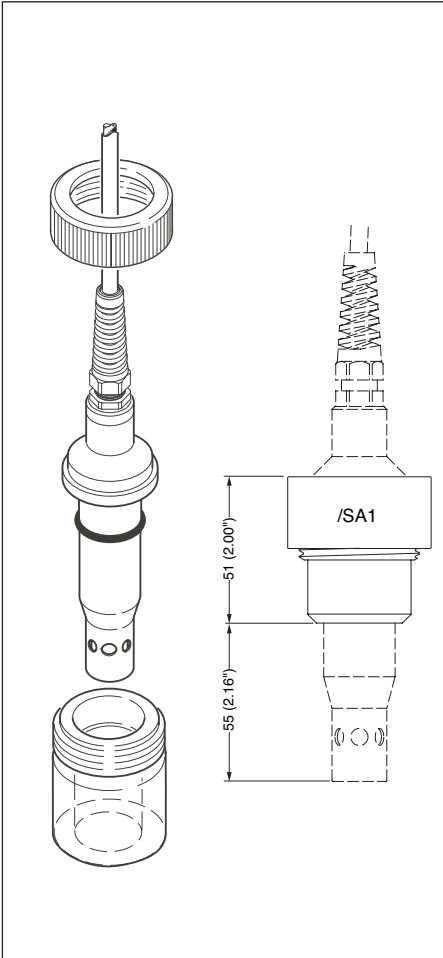
The typical installation of the SC4A-E-SA sensor is done by using a standardized 25 mm port. Stainless Steel welding sockets are available as straight version (spare part /SA1) or 15° angled version (spare part /SA2). Both versions are delivered with mounting nut.

In figure 5 an example is shown how to install the sensor using spare part /SA1.

Sensors SC4A-E-SB and SC4A-E-SC are installed by tri-clamp method.

For the SB version two Stainless Steel tri-clamps are available, in a 1" size (spare part /SB1) or in a 1½" size (spare part /SB2).

The SC version has just one Stainless Steel tri-clamp in a 2" size (spare part /SC1).



**Fig 5. Mounted SC4A-E-SA sensor
with sparepart/ SA1**

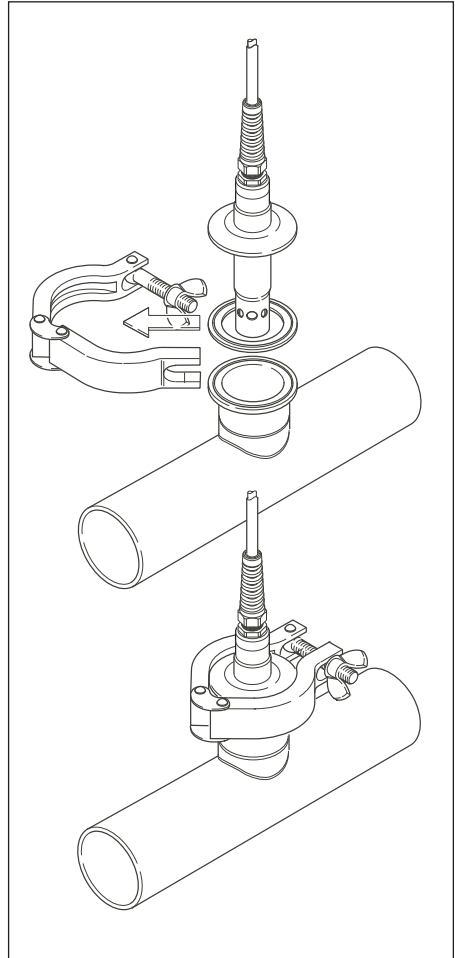


Fig 6 Mounted SC4A-E-SB sensor

2.2.3. Typical installation SC4A-* -PR

The installation of the SC4A-* -PR sensor is done using the Model PR10 retractable fitting. The mounting procedure of the sensor is explained in the Instruction Manual of this fitting.

2.3. Dimensions SC4A sensors

units in mm (inch)

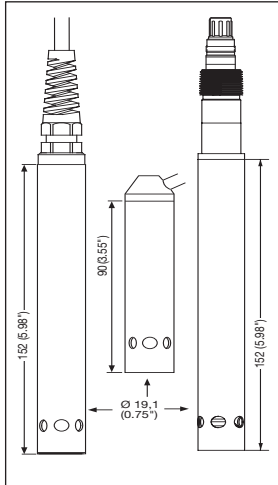


Fig 7. SC4A-AD

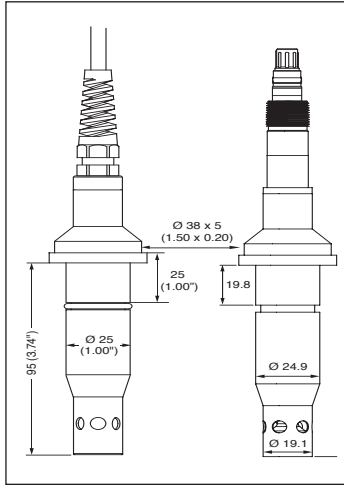


Fig. 8. SC4A-SA

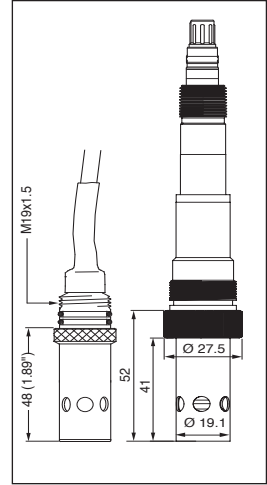


Fig. 9. SC4A-PR

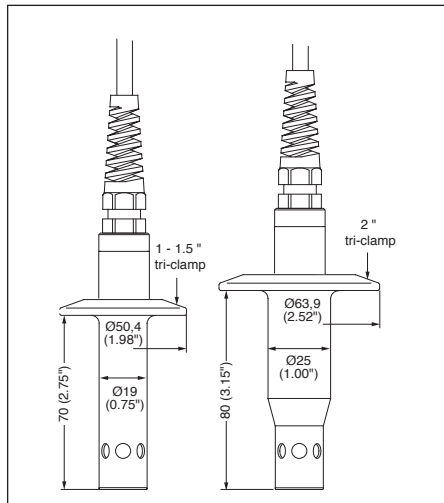
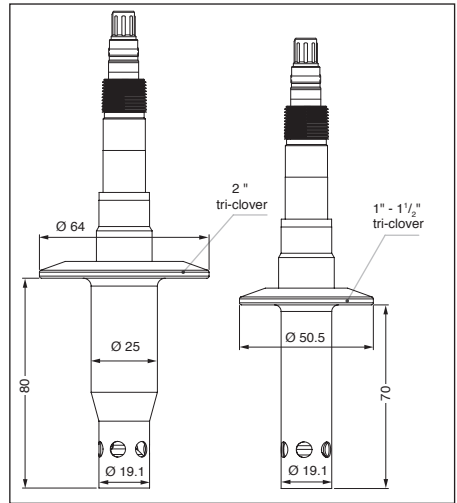


Fig. 10 : Dimensions of SC4A-SB/SC sensor



2.4. Wiring SC4A sensors

The SC4A sensors are provided with a fixed sensor cable or Variopin connector to fit the WU10/WE10 cable up to 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. The connection of the integral cable and WF10 cable to the Yokogawa Contact Conductivity analyser are given in table 3.

Table 3. Definition fixed sensor cable, WF10 cable and analyser

Cable wire color	Cable wire color WF10	SC terminal #	Signal description
White	Red	11	Temperature
Brown	Blue	12	Temperature
Green	Clear (Core of Brown coax)	13	Inner electrode
Yellow	Yellow	14	Outer electrode
Black	Clear (Core of White coax)	15	Inner electrode
Pink	White (Shield of White coax)	16	Outer electrode

Table 4. Definition VP sensor cable, WU10/WE10 cable and analyser

WU10/WE10	Color	SC
A	Core brown	Ui
B	Shield brown	li
C	Core white	Uo
D	Shield white	lo
E	Red	T1
F	Blue	T2
G	Yellow	VCC ID chip
H	Green	Data ID chip
Drain wire	Black	Shield

Note: Sensors with Variopin contain an embedded ID chip which is recognized to work with SA11 Smart Adapter model SA11-C1

Note: WU10-V-D type

2.5. Modelcode SC4A sensors

Model	Suffix Code	Option code	Description
SC4A			19 mm conductivity sensor
material	-T -S -E		Titanium Grade 2 or 3 Stainless steel AISI 316L (SS) EPDM FDA
fitting-type	-AD -PR -SA -SB -SC		For adapter mounting For retractable mounting For sanitary purposes 1-1½" tri-clamp 2" tri-clamp
sensor-length	-09 -15 -NN		9 cm ¹⁾ 15 cm Fixed length
cellconstant	-002 -010		0.02/cm 0.1/cm
connection type	-03 -05 -10 -15 -20 -VS		Fixed cable with wirepins, 3 m Fixed cable with wirepins, 5 m Fixed cable with wirepins, 10 m Fixed cable with wirepins, 15 m Fixed cable with wirepins, 20 m No Cable; Variopin connector with SENCOM ID-chip ²⁾
	-T1		Pt1000
		/PS /PF /FF	3/4" stainless steel adapter 3/4" PVDF adapter Flow fitting stainless steel AISI 316L ³⁾

Note 1: Suffix -AD-09 not available with -VS.

Note 2: Suffix -VS not ATEX/IECEX certified.

Note 3: With option /FF: option /PS is mandatory.

2.6. Spare parts SC4A

Adapters SC4A-*-AD sensor				
Part no.	Description	Process connection	Material	Quantity
K1542DF	/PS	3/4" NPT adapter	Stainless Steel	1
K1542CW	/PF	3/4" NPT adapter	PVDF	1
K1598AC	/FF	Flow fitting	Stainless Steel	1
Adapters SC4A-E-SA sensor				
Part no.	Description	Process connection	Material	Quantity
K1542FA	/SA1	Straight welding socket	Stainless steel	1
K1542FB	/SA2	Angled welding socket	Stainless steel	1
Spare parts for adapters SC4A-E-SA sensor				
Part no.	Description			Quantity
K1520EJ	Straight weld-in adapter without mounting nut, Stainless Steel			1
K1520EK	Angled weld-in adapter without mounting nut, Stainless Steel			1
Spare parts for SC4A-E-SA sensor				
Part no.	Description			Quantity
K1542DL	O-ring set, EPDM FDA, 20.3 x 2.62			3
K1542DK	O-ring set, Viton, 20.3 x 2.62			3
Adapters SC4A-E-SB sensor				
Part no.	Description	Process connection	Material	Quantity
K1542FC	/SB1	Tri-clamp 1"	Stainless Steel	1
K1542FF	/SB2	Tri-clamp 1½"	Stainless Steel	1
Spare parts for adapters SC4A-E-SB sensor				
Part no.	Description			Quantity
K1500BN	Clamp seal ring, EPDM FDA, 1" ~ 1½"			1
K1542DG	Clamp seal ring, Viton, 1"			3
K1542DH	Clamp seal ring, Viton, 1½"			3
Adapters SC4A-E-SC sensor				
Part no.	Description	Process connection	Material	Quantity
K1542FE	/SC1	Tri-clamp 2"	Stainless Steel	1
Spare parts for adapters SC4A-E-SC sensor				
Part no.	Description			Quantity
K1500BP	Clamp seal ring, EPDM FDA, 2"			1
K1542DJ	Clamp seal ring, Viton, 2"			3
Spare parts for SC4A-*-PR sensor				
Part no.	Description			Quantity
K1500BE	O-ring set, Viton, 15.6 x 1.78			10
K1500ED	O-ring set, Kalrez, 15.6 x 1.78			1

3. MODEL SC41, SC42 AND SC49

3.1. General Specifications

3.1.1. Measuring elements

2-electrode for SC41/SC42-SP series; SC41/SC42-EP04 (EP14); SC41/SC42-EP15 (EP16) series

4-electrode for SC42/SC49-EP08 (EP18); SC42/SC49-FP08 (TP08)

Pt1000 temperature sensor

3.1.2. Materials

Wetted parts sensor:

Body	SC41/SC42/SC49-SP/SV	: Stainless Steel AISI 316L
	SC41/SC42/SC49-EP	: Glass filled epoxy resin
	SC41/SC42/SC49-FP/FV	: PVDF, Glass
	SC41/SC42/SC49-TP/TV	: Glass filled PTFE, Glass
Electrodes	SC41/SC42/SC49-SP/SV	: Stainless Steel AISI 316L
	SC41/SC42/SC49-EP	: Graphite impregnated with epoxy resin
	SC41/SC42/SC49-FP/FV	: Platinum
	SC41/SC42/SC49-TP/TV	: Platinum
O-ring	SC41/SC42/SC49-SP/SV	: Viton
	SC41/SC42/SC49-FP/FV	: Viton
	SC41/SC42/SC49-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
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Connector:

Amphenol:	Contacts	: gold plated
	Plug	: Polyamide

Variopin:

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

3.1.3. Functional specifications (at 25°C)

Temperature element SC41, SC49		: Ni100
Temperature element SC42		: Pt1000 to IEC 751
Nominal Cell Constant	SC41/SC42/SC49-SP/SV24	: 0.1 cm ⁻¹
	SC41/SC42/SC49-SP/SV34	: 0.01 cm ⁻¹
	SC41/SC42/SC49 (EP08)	: 10 cm ⁻¹
	SC41/SC42/SC49-EP14 (EP18)	: 1 cm ⁻¹
	SC41/SC42/SC49-EP15 (EP16)	: 1 cm ⁻¹
	SC41/SC42/SC49-FP/FV	: 10 cm ⁻¹
	SC41/SC42/SC49-TP/TV	: 10 cm ⁻¹

Note: The SC41/SC42/SC49 temperature sensor is designed for measurement compensation and for indication. It is **NOT** designed for process temperature control.

3.1.4. Dynamic specifications

Response time temperature t_{90}		
	SC41/SC42/SC49-SP/SV24	: < 3 min.
	SC41/SC42/SC49-SP/SV34	: < 1 min.
	SC41/SC42/SC49-EP04 (EP08)	: < 3 min.
	SC41/SC42/SC49-EP14 (EP18)	: < 2 min.
	SC41/SC42/SC49-EP15 (EP16)	: < 3 min.
	SC41/SC42/SC49-FP/FV	: < 1 min.
	SC41/SC42/SC49-TP/TV	: < 1 min.

3.1.5. Operating range

Conductivity at actual process temperature : 1 $\mu\text{S} \cdot \text{C.C.}$ – 200 $\text{mS} \cdot \text{C.C.}$

See Fig. 2: Measuring range of conductivity sensors section 2.1.5

Temperature	SC41/SC42/SC49-SP/SV	: 0°C to 150°C (32°F to 302°F)
	SC41/SC42/SC49-EP	: 0°C to 110°C (32°F to 230°F)
	SC41/SC42/SC49-FP/FV	: 0°C to 110°C (32°F to 230°F)
	SC41/SC42/SC49-TP/TV	: 0°C to 110°C (32°F to 230°F)
	Pressure	SC41/SC42/SC49-SP/SV
	SC41/SC42/SC49-EP	: 0 to 10 bar (0 to 142 PSIG)
	SC41/SC42/SC49-FP/FV	: 0 to 10 bar (0 to 142 PSIG)
	SC41/SC42/SC49-TP/TV	: 0 to 2 bar (0 to 28 PSIG)

Cable length for

Sensors with Amphenol connector or

Variopin connector directly connected

to Flexa 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 : Optional 3 meter WE10 cable combined with SA11 Smart Adapter

SA11 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

3.1.6. 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

- IECEx
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



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.

Regulatory standards (all types)

CE	: Decision 768/2008/EC	CE
- 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)	

3.1.7. 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

3.1.8. Environmental conditions

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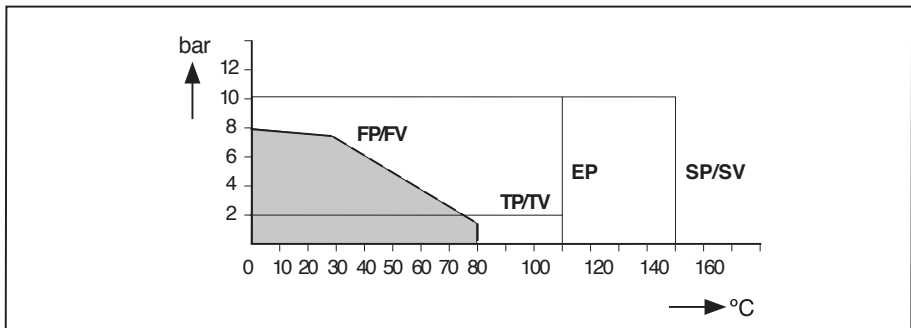


Fig. 11 Pressure vs temperature

3.2. Installation of SC41/SC42/SC49 sensors

To install the SC41/SC42/SC49 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 (see figure 11). Flow fittings are available with optional flange adapters. When installing the SC41/SC42/SC49 sensor in a fitting, an O-ring is necessary. This O-ring is available in different materials to improve chemical resistance (see Section 3.6 for ordering information).

If the SC41/SC42/SC49 sensor is supplied with an O-ring, the O-ring in the fitting must be removed.

3.2.1. Typical installation of SC41/SC42/SC49 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 12

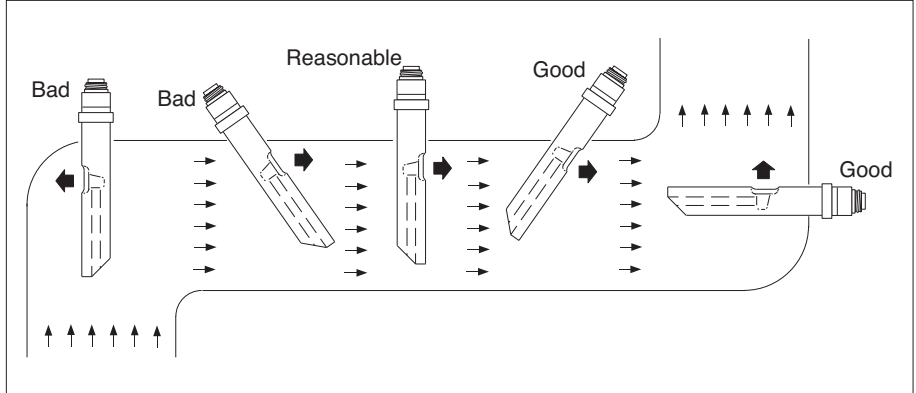
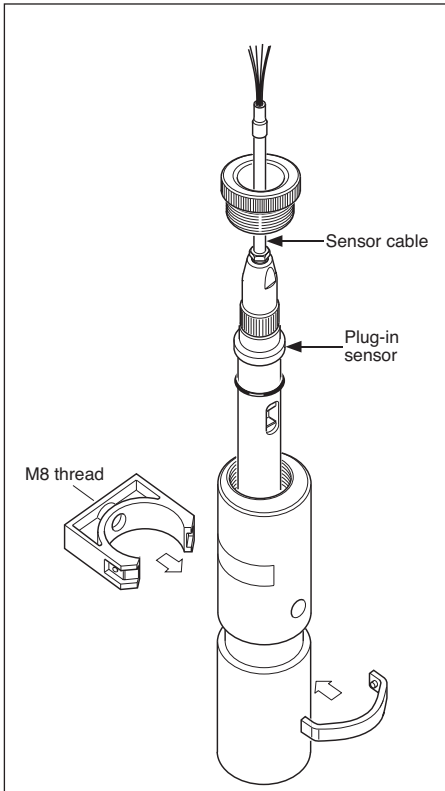


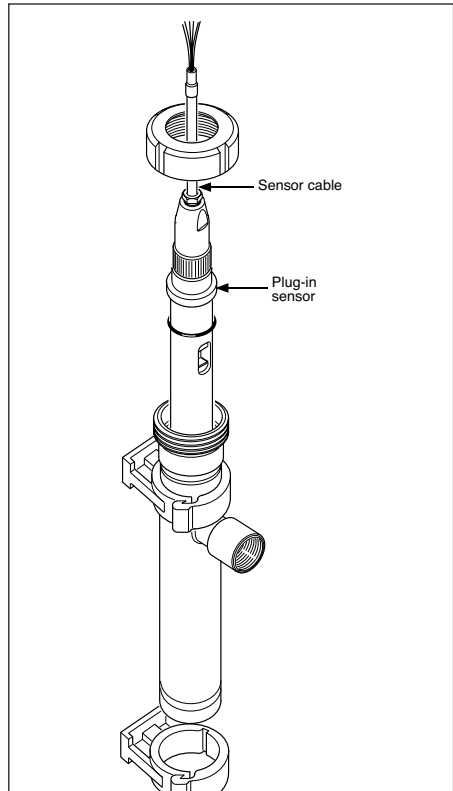
Fig. 12 Mounting position SC41/SC42/SC49 sensor

Modelcode FF40 Flowfitting:

Model code	Suffix code	Option code	Description
FF40			Flow fitting
Material	- P22 - S22 - V22		Polypropylene (PP) Stainless steel (AISI 316) Polyvinylchloride (PVC)
Optional Flange adapters (NPT ½" Male lap joint)	/FP1 /FP2 /FP3 /FP4 /FS1 /FS2 /FS3 /FS4		DN15 PN10 PP DN25 PN10 PP ½" ANSI 150 lbs PP 1" ANSI 150 lbs PP DN15 PN10 SS AISI 316 DN25 PN10 SS AISI 316 ½" ANSI 150 lbs SS AISI 316 1" ANSI 150 lbs AISI 316
Material Certificate	/M		3.1 according to EN-10024 on wetted parts



**Fig. 13 Installation SC41/SC42/SC49
in FF40-P22/FF40-V22 *)**



**Fig. 14 Installation SC41/SC42/SC49
in FF40-S22 *)**

Note: Not possible for sensors with suffix code -EP16

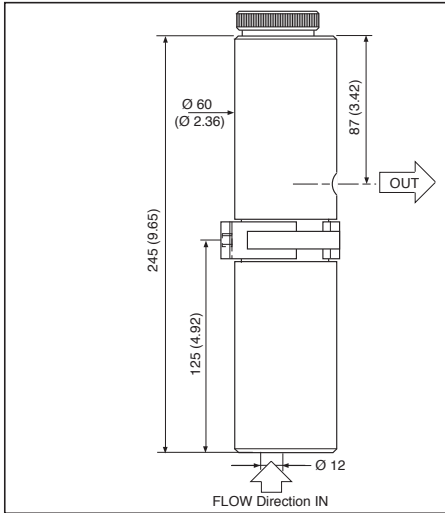


Fig. 15 Dimensions FF40-P22 (V22)

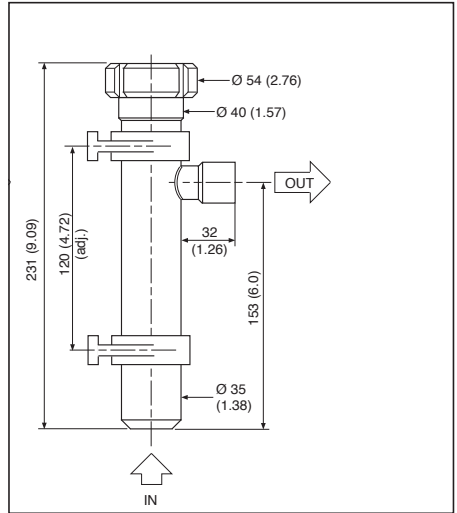
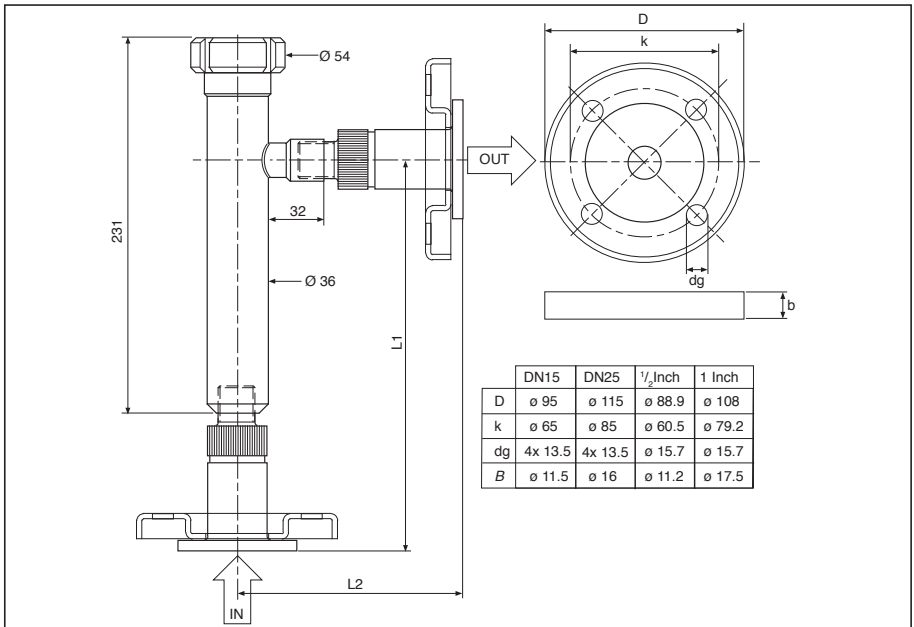


Fig. 16 Dimensions FF40-S22

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

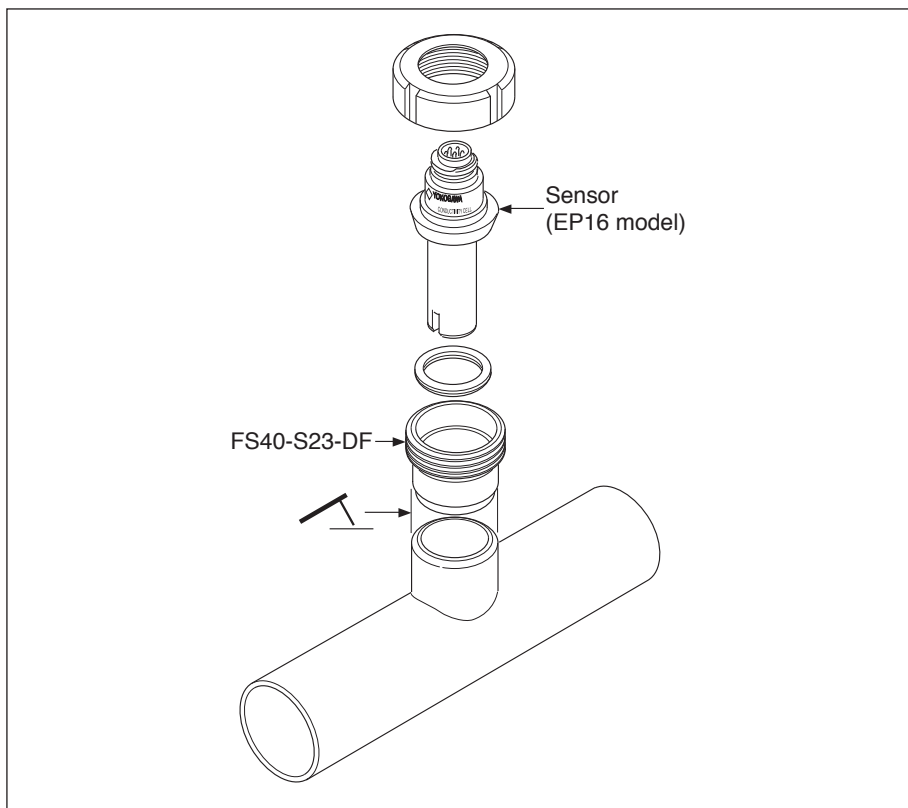


Type	DN15PN10		DN25-PN10		1/2" 150 lbs		1" 150 lbs	
	L1	L2	L1	L2	L1	L2	L1	L2
FF40-S22	226	123	236	133	8 7/8"	4 13/16"	9 5/16"	5 1/4"
FF40-P22	247	123	236	112	9 3/4"	4 7/8"	9 5/16"	4 7/16"

Fig. 17 Dimensions of optional Flange adapters

Modelcode FS40 Subassembly for Flow fitting

Model code	Suffix code	Option code	Description
FS40			Subassembly for Flow fitting
Material	- F22 - S22 - S23 - V22		Polyvinylidenefluoride (PVDF) Stainless steel (AISI 316) Stainless steel (AISI 316) 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 $\frac{1}{4}$ "") Tapered pipe thread (1 $\frac{1}{4}$ " NPT) For insertion type sensor with collar piece DN25 in combination with - S23
Material Certificate		/M	3.1 according to EN-10024 on wetted parts



**Fig. 18 Installation example of the SC41/SC42-EP16 sensor
with a FS40-S23-DF subassembly**

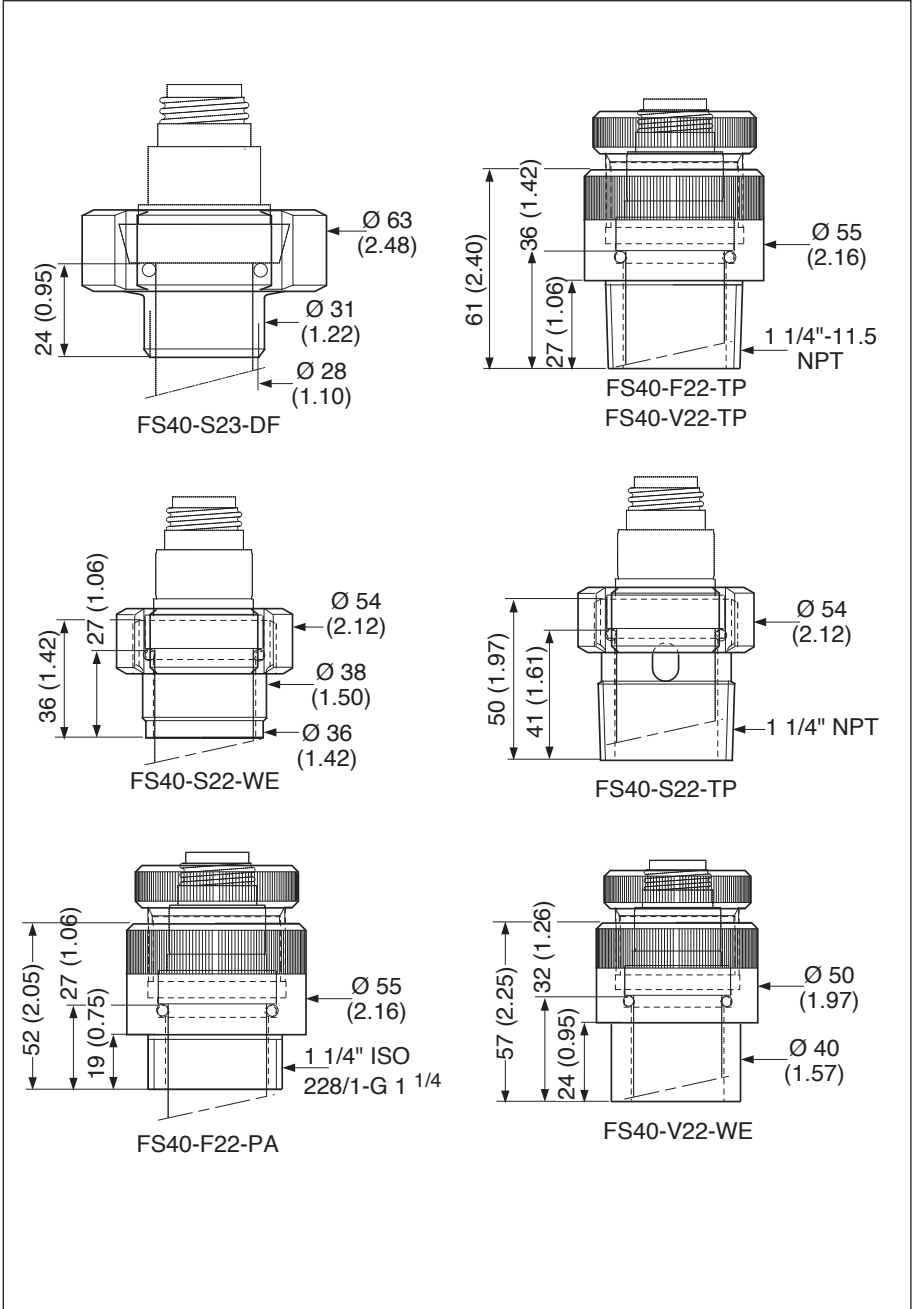


Fig. 19 Dimensions FS40 Flow fitting subassemblies

3.2.2. Typical installation of SC41/SC42/SC49 sensor in FD40 Immersion fitting

The immersion fittings are for installing the SC41/SC42/SC49 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 mounting several flanges can be ordered.

Modelcode FD40 FD40 Immersion fitting

Model code	Suffix code	Option code	Description
FD40V28			Immersion fitting PVC
FD40S28			Immersion fitting Stainless Steel AISI 316
Immersion depth	- □ □		Between 05 and 20 decimeter (Example 06 = 6 dm. = 0.6 m.)
	- NC		
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 on 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). This is not applicable for sensors with suffix V (Variopin model).

Model code	Suffix code	Description	Model code	Suffix code	Description
WU40		Sensor cable	WU10		Universal 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	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

3.3 Dimensions SC41/SC42/SC49 sensors.

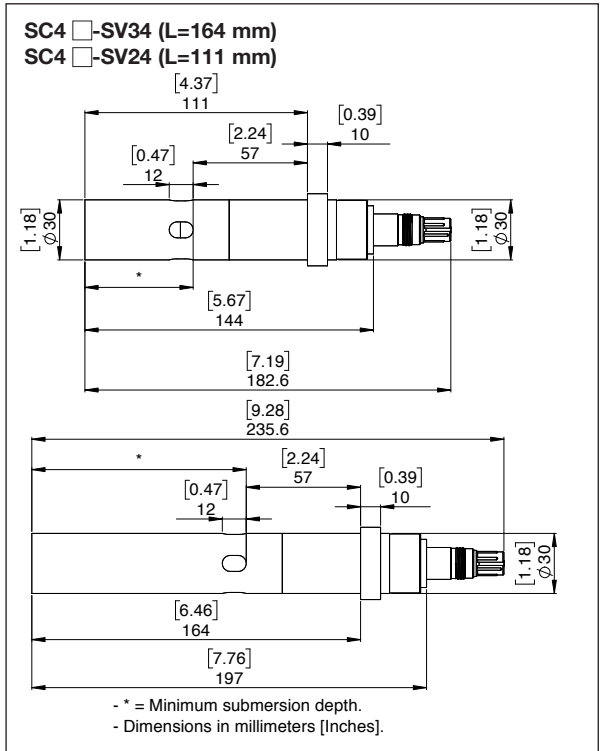
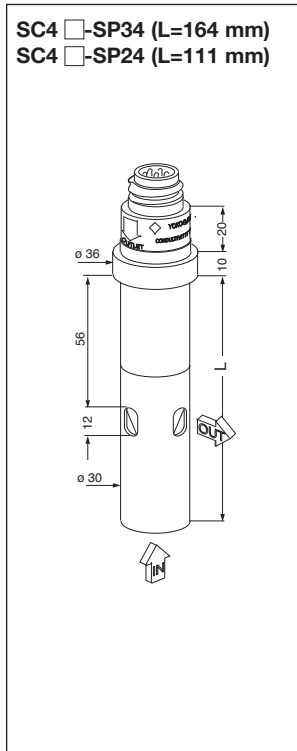


Fig. 20 Dimensions SC4 □-SP Fig. 21 Dimensions SC4 □-SV

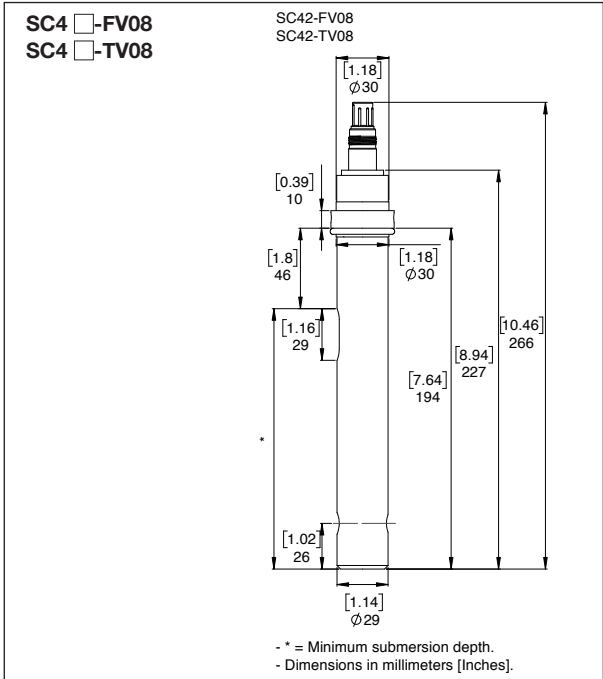
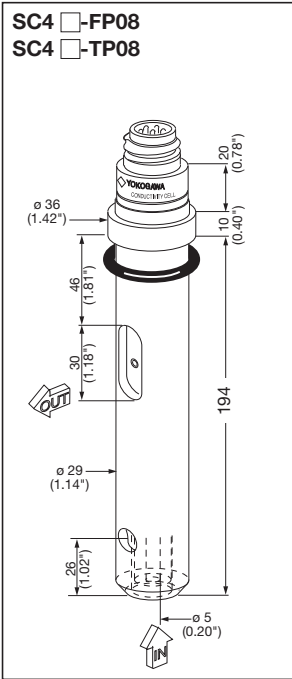


Fig. 22 Dimensions SC4 □-FP/TP Fig. 23 Dimensions SC4 □-FV/TV

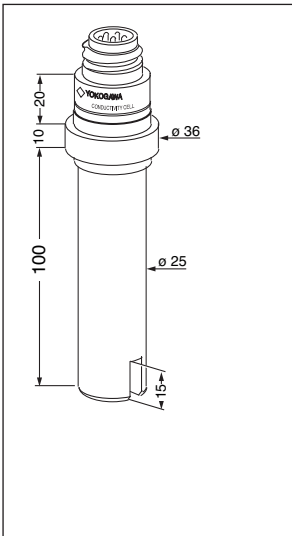


Fig. 24 SC41/SC42-EP15

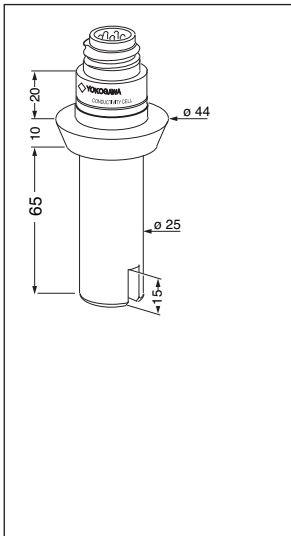


Fig. 25 SC41/SC42-EP16

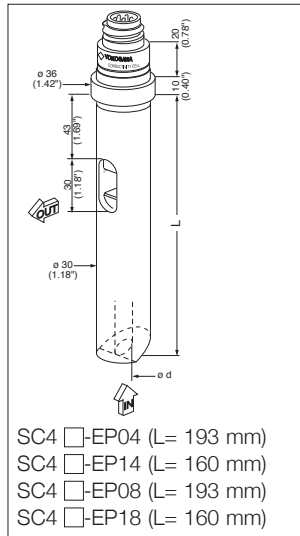


Fig. 26 SC4 □-EP14 (EP18),
SC4 □-EP04 (EP08)

3.4. Wiring SC41/SC42/SC49 sensors

The SC41, SC42 and SC49 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 analyser 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. The connection of the WU40 cable, WU10 cable and WF10 cable to the Yokogawa Contact Conductivity analyser are given in table 4.

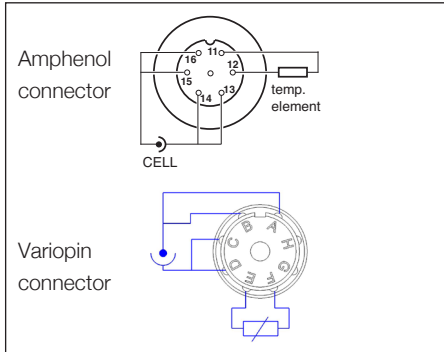


Fig. 27 Top view connector system SC41/ SC42 2-electrode

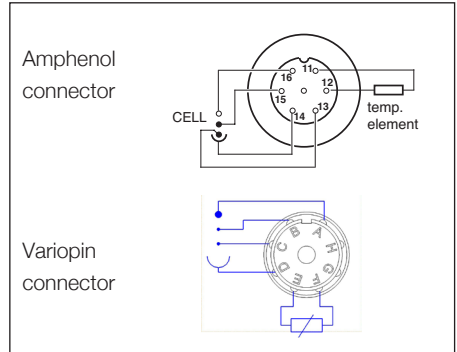


Fig. 28 Top view connector system SC42/ SC49 4-electrode

3.5 Modelcode SC41/SC42/SC49

Model	Suffix Code	Option code	Description
SC41 (SC49)			Conductivity Sensor 2- or 4- electrodes + Ni100
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 ⁽¹⁾		Plug-in type, plug-socket connector Plug-in type, VarioPin connector with SENCOM ID-chip 1)
Cell constant	0 1 2 3		Cell constant 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).

4. MODEL SX42

4.1. General Specifications

4.1.1. Measuring elements

2-electrode measuring system

Pt1000 temperature sensor

4.1.2. Materials

Wetted parts sensor:

Body	:	Stainless Steel AISI 316L
Electrodes	:	Stainless Steel AISI 316L
Insulation	:	Ceramic (aluminium oxide)

Connector:

Amphenol:	Contacts	:	gold plated
	Plug	:	Polyamide

Variopin:

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

Terminal box flanged models:

Housing	:	Aluminium
Insulation	:	Ceramic

4.1.3. Functional specifications (at 25°C)

Temperature element : Pt1000 to IEC 751

Nominal Cell Constant (C.C.) SX42-SX24 : 0.1 cm⁻¹

SX42-SX34 : 0.01 cm⁻¹

Note: The SX42 temperature sensor is designed for cell compensation and for indication.

It is **NOT** designed for process temperature control.

4.1.4. Operating range

Conductivity at actual process temperature : 1 µS * C.C. – 200 mS * C.C.
See Fig. 2: Measuring range of conductivity sensors section 2.1.5

Temperature Threaded models (-BS,-NS) : 0°C to 200°C (32°F to 392°F)

Threaded models (-BV,-NV) : 0°C to 125°C (32°F to 257°F)

Flanged models : 0°C to 250°C (32°F to 482°F)

Pressure Threaded models : 0 to 40 bar (0 to 363 PSIG)

Flanged model PN63 : 0 to 40 bar (0 to 580 PSIG)

Flanged model PN40 : 0 to 30 bar (0 to 435 PSIG)

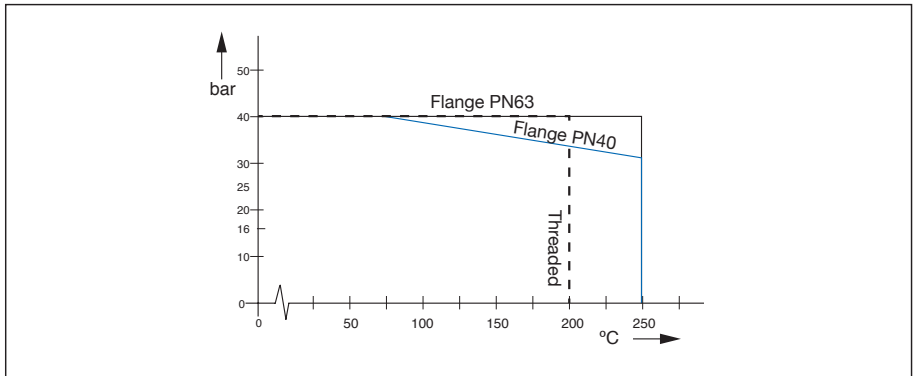


Fig. 29 Pressure vs. process temperature flanged / threaded models SX42

Cable length:

Threaded models (-BS,-NS) : max. 60 meter with WU40 cable in combination with WF10 cable and BA10 junction box

Threaded models (-BV,-NV)

Variopin connector directly connected

: max. 60 meter with WU10/WE10 (possibly in combination with WF10 cable and BA10 junction box)

For sensors with suffix -BV/NV

: 3 meter WE10 cable (as option) combined with SA11 Smart Adapter



combined with SA11 Smart Adapter

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


Flanged models

: max. 60 meter with customer specified high temperature cable

4.1.5. Regulatory standards (not applicable for sensors with suffix code -BV or -NV)

- 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
- IECEx	
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.

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).

4.1.6. Shipping details

Package size (LxWxH) Threaded models : 300 x 95 x 73 mm (11.8 x 3.7 x 2.9 inch)
 Flanged models : 480 x 275 x 235 mm (18.9 x 10.8 x 9.3 inch)
 Package weight Threaded models : 0.5 to 0.7 kg (1.1 to 1.5 lbs)
 Flanged models : 5.7 to 6.0 kg (12.6 to 13.2 lbs)

4.1.7. Environmental conditions

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

4.2. Installation of SX42 sensors

SX42 threaded models are installed by screw-in (ISO 7/1-R 1" or 1" NPT), and the SX42 flanged models by using the pre-mounted flange (DN50 PN63, DN50 PN40 or ANSI 2" 600 lbs). Flange dimensions of DN50 PN40 (in red) to be included

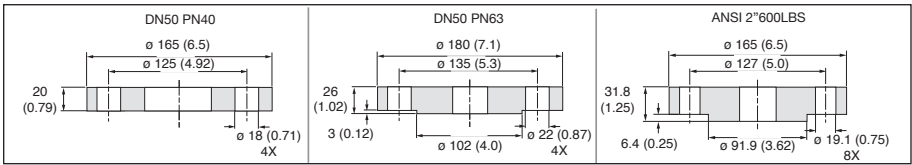


Fig. 30 Flange dimensions SX42 flanged model according EN 1092-1

4.3. Dimensions SX42 sensors

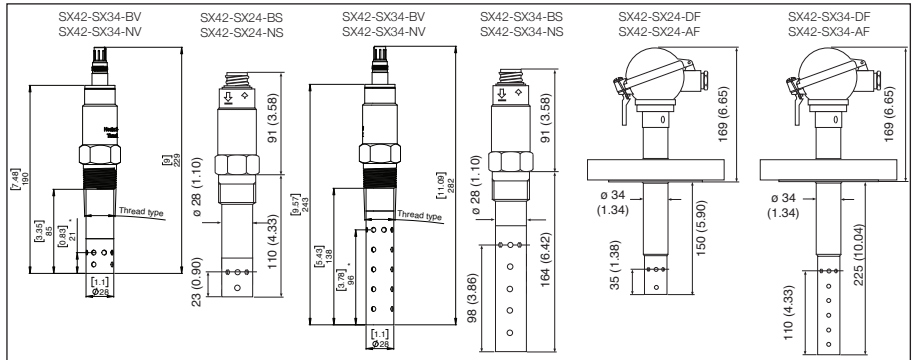


Fig. 31 Dimensions SX42 threaded models and flanged models

4.4. Wiring SX42 sensors

The SX42 threaded models are provided with a fixed connector. The standard cable used to connect the sensors 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/WE10. 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. The connection of the WU40 cable, WU10 cable and WF10 cable to the Yokogawa Contact Conductivity analyser are given in table 5.

The sensors with VP connector contain an embedded ID chip allowing direct connection to our SA11 Smart Adapter. The SA11 Smart Adapter can be applied in processes with ambient temperature upto 125°C.

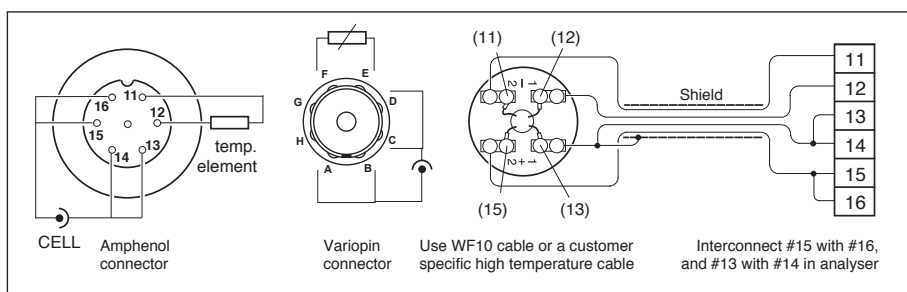
If ambient temperature is higher than 125°C the connection to Smart Adapter should be made using the WE10 extension cable in between the Smart Adapter and the sensor.

Table 5: Defintion of WU10 cable, WE10 cable, WU40 cable and WF10 cable

VP connector	Cable wire color WU10-V-D-** / WE10-H-D-**	SC analyser Terminal #	Signal description
A	Core brown coax	15	Ui (inner electrode)
B	Shield brown coax	16	li (inner electrode)
C	Core white coax	13	Uo (outer electrode)
D	Shield white coax	14	lO (outer electrode)
E	Red	11	Temperature
F	Blue	12	Temperature
G	Yellow		N/A
H	Green		N/A

Note: For the WU40 and WF10 cable the labelled wires must be connected to the corresponding terminal # of the SC analyser.

The SX42 flanged models are provided with a connection box. The cable used to connect these sensors to the analyser has to be a high temperature shielded cable. This cable is not supplied by Yokogawa. The wiring diagram of the flanged models is given in fig.32.

**Fig. 32 SX42 threaded models connector (top view)**

Model	Suffix Code	Option code	Description
SX42			High temp. conductivity sensor with Pt1000 sensor
	-SX24		Cell constant 0.1/cm
	-SX34		Cell constant 0.01/cm
	-BS		ISO 7/1-R1 screw thread, plug-socket conn.
	-BV ¹⁾		ISO 7/1-R1 screw thread, VarioPin conn. with SENCOM ID-chip 1)
	-NS		1-11½ NPT screw thread, plug-socket conn.
	-NV ¹⁾		1-11½ NPT screw thread, VarioPin conn. with SENCOM ID-chip 1)
	-DF		DN50-PN63 EN flange
	-EF		DN50-PN40 EN flange
	-AF		2" 600 LBS ANSI flange
Style	*A		Always *A style
Option			N/A

Note: Suffix -BV and -NV not ATEX/IECEx certified.

5. GENERAL CALIBRATION AND MAINTENANCE PROCEDURE

5.1. Calibration of the sensor

The conductivity sensors are factory calibrated traceable to NIST standards. The cell constant values are indicated on the sensor or on the integral cable of the sensor. The cell constant value can be entered directly in the Yokogawa analyser. The procedure is explained in the Instruction Manual of the analyser. If the sensor has been subject to abrasion (erosion or coating) in the process, re-calibration of the sensor may be necessary. Refer to the Instruction Manual of the analyser for a detailed description.

Note: During calibration the temperature compensation is still active. This means that the display reading refer to the default reference temperature (25 °C).

Calibration is normally carried out by measuring a solution with a known conductivity value at a known temperature. These solutions are commercially available. You can make your own solution by dissolving an amount of salt in water. Table 6 and 7 show some typical conductivity values for Sodium Chloride (NaCl) and Potassium Chloride (KCl) solutions which can be made, preferably in a laboratory. The tables are derived from the standards laid down in 'International Recommendation No. 56 of the Organisation Internationale de Métrologie Legale'.

Table 6. KCl values at 25 °C (OIML)

Weight %	molar (m)	mg of KCl / kg of solution	Conductivity
0.3	0.001	74.66	0.1469 mS/cm
0.5	0.002	149.32	0.2916 mS/cm
1	0.005	373.29	0.7182 mS/cm
3	0.01	745.263	1.4083 mS/cm
5	0.1	7419.13	12.852 mS/cm
10	1.0	71135.2	111.31 mS/cm

Table 7. NaCl values at 25 °C (IEC 746-1)

Weight %	mg/kg	Conductivity
0.001	10	21.4 µS/cm
0.003	30	64.0 µS/cm
0.005	50	106 µS/cm
0.01	100	210 µS/cm
0.03	300	617 µS/cm
0.05	500	1.03 mS/cm
0.1	1000	1.99 mS/cm
0.3	3000	5.69 mS/cm
0.5	5000	9.48 mS/cm
1	10000	17.6 mS/cm
3	30000	48.6 mS/cm
5	50000	81.0 mS/cm
10	100000	40 mS/cm

5.2. Periodic maintenance of the sensor

In general conductivity sensors do not need much periodic maintenance. In case the sensor has become fouled, an insulating layer may be formed on the surface of the electrodes, and consequently giving a measuring error. Cleaning the sensor will solve this problem. Effective cleaning methods are given below:

1. Normal applications: hot water with some commercially available washing-up liquid.
2. Lime, hydroxides or similar applications: 5 % solution of hydrochloride acid.
3. Organic (e.g. oils, fats) applications: alcohol or iso-propanol.
4. Algae, bacteria or fungus: solution of commercially available bleach (hypochlorite).

Note: Read the instructions on the package of the cleaning agents for safe use.

6. PROTECTION OF ENVIRONMENT (USE IN CHINA)

Instruction Manual

SB20, SC24V, SC25V, SC25F, SM60, SR20
FC20, BA10, BA11, SM29, SA11,
WE10, WF10, WF20, WP20, WU10, WU11, WU40
SC41, SC42, SC49, SC4A, SX41, SX42
ISC40

Protection of Environment (Use in China)

This manual is valid only in China.
中華人民共和国国内でのみ有効です。



这个标志是基于SJ/T11364，在中国（不包括台湾，香港，澳门）贩售的电子电器产品所适用的环境保护期限，6种有害物质的含有量都低于GB/T26572所规定的限量要求以下。

Production date

关于生产日期

生产日期在产品铭牌上9位数的序列号中，用以下形式表示生产日期。

从左数第3位数：生产年份

R:2015, S:2016, T:2017, U:2018, V:2019, W:2020, X:2021, Y:2022, Z:2023,

1:2024, 2:2025, 3:2026, ...

从左数第4位数：生产月份

1: 1月, 2: 2月, 3: 3月, ..., 9: 9月, A: 10月, B: 11月, C: 12月

(示例) N3S700001: 2016年7月

Subject to change without notice

7. CHEMICAL COMPATABILITY CHART

Chemical Compatibility Chart

			Material																		
			Viton			Kalrez			EPDM			Silicon Rubber			Ti		SS 316(l)				
			Conc. %	Temp. °C		20	60	100	20	60	100	20	60	100	20	60	100	20	60	100	
Inorganic acid	Sulfuric acid	10	O	O	O	O	O	O	O	O	O	O	O	O	-	-	-	X	X	X	
		50	O	O	O	O	O	O	X	-	-	-	-	-	-	-	-	X	X	X	
		95	O	O	O	O	O	O	X	-	-	-	-	-	-	-	-	X	X	X	
		fuming	O	O	O	O	O	O	-	-	-	-	-	-	-	-	-	-	-	-	
	Hydrochloric acid	10	O	O	O	O	O	X	O	O	O	X	-	-	-	-	-	-	-	-	
		sat.	O	O	O	O	O	X	X	X	X	X	-	-	-	-	-	-	-	-	
	Nitric acid	25	O	O	X	O	O	O	X	-	O	O	X	O	O	O	X	X	X		
		50	-	-	-	O	O	O	-	-	-	X	-	-	O	O	O	X	X	X	
		95	-	-	-	O	O	X	-	-	-	-	-	-	O	O	O	O	O	O	
		fuming	-	-	-	O	O	X	-	-	-	-	-	-	-	-	-	O	O	O	
	Phosphoric acid	25	O	O	O	O	O	O	O	O	O	O	O	X	X	X	-	-	-	-	
		50	O	O	O	O	O	O	O	O	O	O	O	X	X	-	-	X	X	X	
		95	X	X	-	O	O	O	O	O	O	O	X	X	X	-	-	O	O	O	
	Hydrofluoric acid	40	O	O	O	O	O	X	-	-	-	-	-	-	-	-	-	-	-	-	
		75	O	O	X	O	O	X	-	-	-	-	-	-	-	-	-	-	-	-	
	Organic acid	Acetic acid	10	-	-	-	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X
			glacial	-	-	-	O	O	O	X	X	X	O	O	O	O	O	O	O	O	X
		Formic acid	80	-	-	-	O	O	X	O	O	X	O	O	X	X	X	-	X	X	X
Alkali	Citric acid	50	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O	
	Calcium hydroxide	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Potassium hydroxide	50	O	O	O	O	O	O	X	-	O	O	O	O	X	-	O	O	O		
	Sodium hydroxide	40	X	X	X	O	O	O	O	X	-	O	O	O	X	X	-	O	O	O	
	Ammonia in water	30	X	X	X	O	O	O	O	O	O	O	O	O	X	X	-	O	O	O	
	Acid salt	Ammonium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X
		Zinc chloride	50	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X
Iron(III) chloride		50	O	O	O	O	O	O	O	O	O	O	O	O	-	-	-	-	-	-	
Sodium sulfite		sat.	-	-	-	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
Basic salt	Sodium carbonate	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Potassium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X	
	Sodium sulfate	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Calcium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	
Neutral salt	Sodium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	
	Sodium nitrate	50	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	
	Aluminium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	-	-	-	
	Hydrogen peroxide	30	O	O	O	O	O	O	O	O	X	X	X	X	O	O	O	O	O	O	
Oxidizing agent	Sodium Hypochloride	50	O	O	X	O	O	O	O	O	O	O	O	O	X	-	-	X	X	X	
	Potassium dichromate	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Chlorinated lime					X	-	-				O	O	O				X	X	X	
Organic solvent	Ethanol	80	X	-	-	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Cyclohexane		O	O	O	O	O	O	-	-	-	-	-	-	O	O	O	O	O	O	
	Toluene		-	-	-	O	O	O	-	-	-	-	-	-	O	O	O	O	O	O	
	Trichloroethane		X	X	X	X	-	-	-	-	-	-	-	-	O	O	O	O	O	X	
Water		O	O	O	O	O	X	O	O	O	O	O	O	O	O	O	O	O	O		

O = can be used; X = shortens useful life; - = cannot be used; Blank = no data available

Note: Information in this list is based on our general experience and literature data and given in good faith. However, Yokogawa is unable to accept responsibility for claims related to this information.

Chemical Compatibility Chart

		Conc. %	Temp. °C	PTFE (teflon)			PEEK			PVDF (Kynar)			PP		Epoxy			Glass		
				20	60	100	20	60	100	20	60	100	20	60	20	60	100	20	60	100
Inorganic acid	Sulfuric acid	10	O	O	O	O	O	O	O	O	O	O	O	O	X	X	O	O	O	
		50	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O	
		95	O	O	O	-	-	-	O	X	-	X	-	-	-	-	O	O	O	
		fuming	O	O	O	-	-	-	-	-	-	-	-	-	-	-	O	O	O	
	Hydrochloric acid	10	O	O	O	O	O	X	O	O	O	O	O	O	X	-	O	O	O	
		sat.	O	O	O	O	O	X	O	O	O	O	O	O	X	-	O	O	O	
	Nitric acid	25	O	O	O	O	O	O	O	O	X	O	O	O	X	-	O	O	O	
		50	O	O	O	X	X	X	O	O	X	X	-	X	-	-	O	O	O	
		95	O	O	O	-	-	-	O	X	-	-	-	-	-	-	O	O	O	
	fuming	O	O	O	-	-	-	-	-	-	-	-	-	-	-	O	O	O		
	Phosphoric acid	25	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	
		50	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	
95		O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O		
Hydrofluoric acid	40	O	O	O	-	-	-	O	O	O	O	O	X	X	-	X	X	X		
	75	O	O	O	-	-	-	O	O	O	O	X	X	-	-	-	-	-		
Organic acid	Acetic acid	10	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	
		glacial	O	O	O	O	O	X	O	X	-	O	X	X	-	-	O	O	O	
	Formic acid	80	O	O	O	X	X	X	O	O	O	O	X	-	-	O	O	O		
Citric acid	50	O	O	O	O	O	O	O	O	O	O	O	X	-	-	O	O	O		
Alkali	Calcium hydroxide	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
	Potassium hydroxide	50	O	O	O	O	O	O	O	O	X	O	O	O	X	O	O	X		
	Sodium hydroxide	40	O	O	O	O	O	O	O	O	X	O	O	O	X	O	O	X		
	Ammonia in water	30	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	
Acid salt	Ammonium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	X	X	O	O	O		
	Zinc chloride	50	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O		
	Iron(III) chloride	50	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O		
	Sodium sulfite	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
Basic salt	Sodium carbonate	sat.	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O		
	Potassium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
	Sodium sulfate	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
	Calcium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
Neutral salt	Sodium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
	Sodium nitrate	50	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
	Aluminium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		
	Hydrogen peroxide	30	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O		
Oxidizing agent	Sodium Hypochloride	50	O	O	O	O	O	O	O	O	O	X	X	O	X	X	O	O	O	
	Potassium dichromate	sat.	O	O	O	O	O	O	O	X	-	O	O	O	X	X	O	O	O	
	Chlorinated lime		O	O	O	X	X	X	O	O	O	-	-	O	X	X	O	O	O	
	Ethanol	80	O	O	O	O	O	O	O	O	X	O	O	O	O	X	O	O	O	
Organic solvent	Cyclohexane		O	O	O	O	O	O	O	O	X	-	-	O	O	X	O	O	O	
	Toluene		O	O	O	O	O	O	O	O	O	X	-	O	O	X	O	O	O	
	Trichloroethane		O	O	O	O	O	O	X	X	X	-	-	X	-	-	O	O	O	
	Water		O	O	X	O	O	O	O	O	O	O	O	O	O	X	O	O	O	

O = can be used; X = shortens useful life; - = cannot be used; Blank = no data available

Note: Information in this list is based on our general experience and literature data and given in good faith. However, Yokogawa is unable to accept responsibility for claims related to this information.

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