



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



YOKOGAWA ◆

IM 12D07J01-11E-E
9th edition



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(BG)

Всички улътвания за продукти от серията ATEX Ex се предлагат на английски език. Ако се нуждаете от улътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

(CZ)

Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

(D)

Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichem Yokogawa-Vertreter in Verbindung.

(DK)

Alle brugervejledninger for produkter relateret til CE er tilgængelige på engelsk. Skulle De ønske yderligere oplysninger om håndtering af CE produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

(EST)

Kõik ATEX Ex toodete kasutamishandid on esitatud inglise keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

(E)

Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

(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)

All instruction manuals for ATEX Ex related products are available in English. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

(GR)

Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπροσωπο τηξ.

(H)

Az ATEX Ex műszerek gépkönyveit angol nyelven adjuk ki. Amennyiben helyi nyelven kéri az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviselőt.

(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 Jokogava (Yokogawa) tuvāko ofisu vai pārstāvi.

(LT)

Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës Yokogawa biuru arba atstovu.

(M)

Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż. Jekk tkun tehtiëg struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentant jew ufficiċċju ta' Yokogawa.

(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)

Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

(PL)

Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym 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)

Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska. Om Ni behöver instruktioner för dessa explosionsssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

(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 predstavnika.

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1. PREFACE

1.1. Introduction

The sensor and fitting program for specific conductivity measurement (model SC4A, SC41, SC42, SC49 and SX42) 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 integral 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 with a connector to fit the Yokogawa WU40 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 connector to fit the Yokogawa WU40 cable.

All sensors have a pre-calibrated cell constant and a built-in temperature element for automatic temperature compensation. For metal sensors a 3.1 material certificate is included. The sensors 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:

Conductors	: tinned copper 0.6 mm2
Outside shield	: braid, tinned copper, 85% coverage
Insulator	: Polyester for conductors, for colors see Section 2.4
	TPE-O for outer jacket, color black

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 cell compensation and for indication. It is **NOT** designed for process temperature control.

2.1.4. Dynamic specifications

Response time temperature t_{90} : < 1 min.





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2.1.5. Operating range

Conductivity at actual process temperature	: 1 $\mu\text{S} \cdot \text{C.C.}$ – 50 $\text{mS} \cdot \text{C.C.}$
Temperature Stainless Steel & Titanium type	: 0°C to 110°C (32°F to 230°F) : 135°C (275°F) for a short period of time during sterilization.
Temperature in combination with PVDF fitting	: 0°C to 80°C (32°F to 176°F)
Pressure Stainless Steel & Titanium type	: 0 to 10 bar (0 to 142 PSIG)
Pressure in combination with PVDF fitting	: See Fig. 1
Cable length	: max. 60 meter with WU40 cable in combination with WF10 cable and BA10 junction box

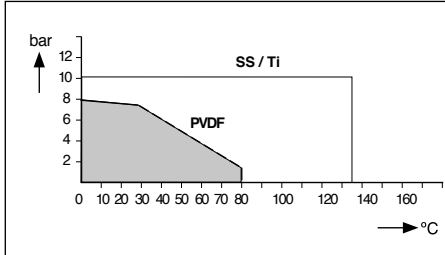


Fig. 1 pressure vs. process temperature

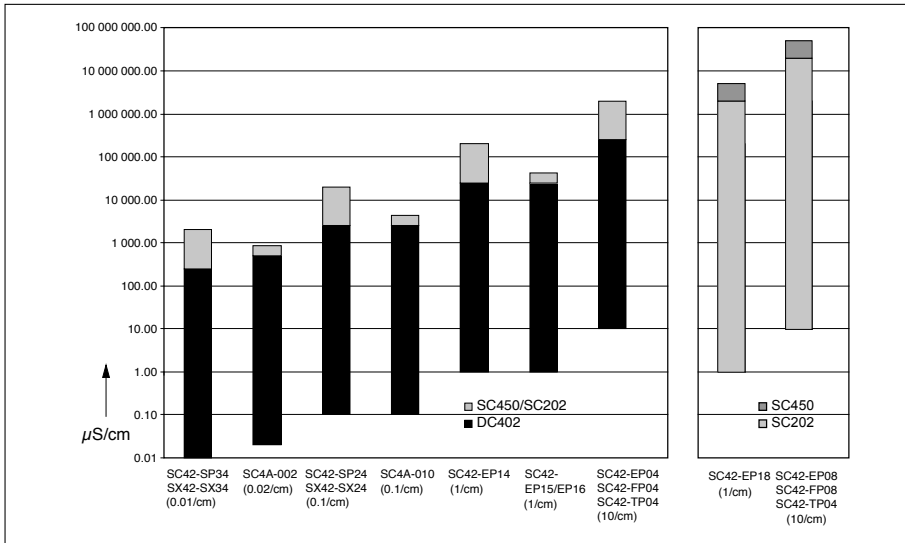


Fig. 2 Measuring range of conductivity sensors

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**2.1.6. Regulatory standards****CE**

- ATEX

Certificate no.

Electrical data

: Decision 768/2008/EC **CE** **N200**

: Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003

: DEKRA 14ATEX0074 X

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

: For sensor input circuit connected to
A certified intrinsically safe circuit with the following maximum values:
Ui = 14.4 V; li = 116.5 mA; Pi = 0.342 W
or
Certified intrinsically safe Yokogawa Contact Conductivity transmitter Model FLXA21 series
or
Model SC202S series.

The effective internal capacitance Ci and the effective internal inductance Li of the sensor depends only upon the properties and length of the integral cable.

Special conditions (X)

**WARNING**

: 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.

- Pressure

Applying article

: Directive 97/23/EC, as amended by Regulation (EC) no. 1882/2003

: 3.3 (Sound Engineering Practice)

- RoHS

Applying category

: Directive 2011/65/EU

: 9 (Industrial monitoring and control instruments)

IECEX

Applying standards

: IEC 60079-0: 2011
IEC 60079-11: 2011
IEC 60079-26: 2006

Certificate no.

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

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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 μm
	SC4A-E-SA (SB, SC)	: 0.5 μm
	SC4A*-PR	: 0.8 μm

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.

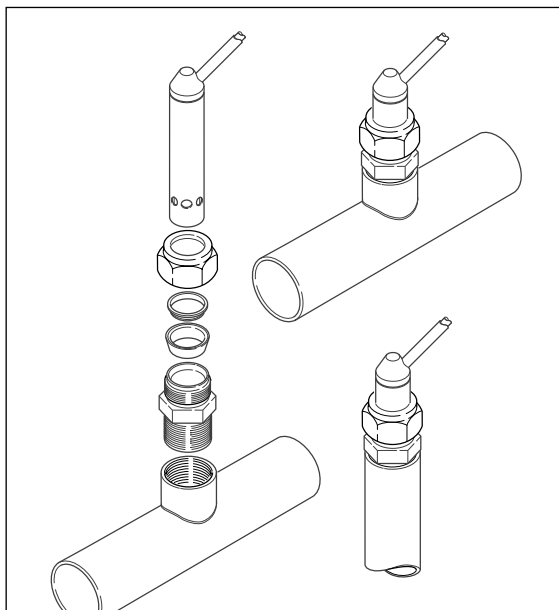


Fig. 3 Mounted sensor with the option /PS and /PF

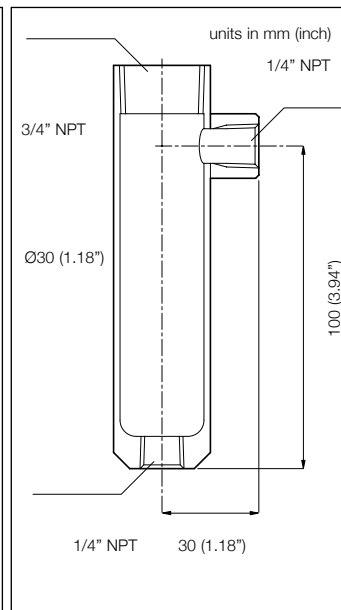


Fig. 4 Dimensional drawing /FF

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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).

In figure 6 an example is shown how to install the sensor using one of these tri-clamps.

Ordering information for spare parts can be found in Section 2.6.

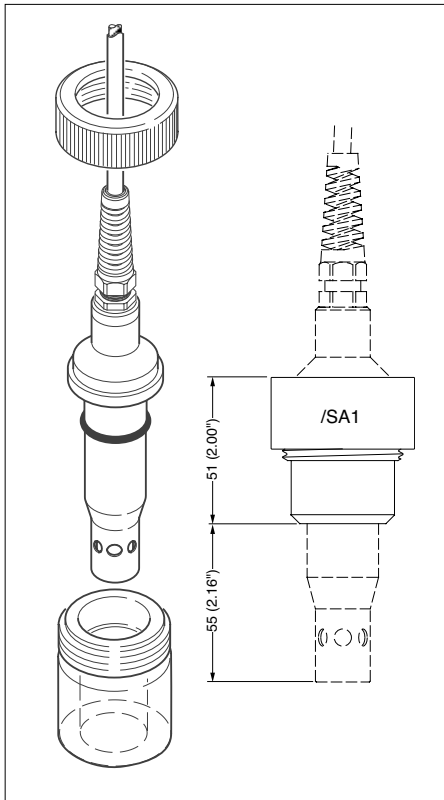


Fig. 5 Mounted SC4A-E-SA sensor with spare part /SA1 (K1542FA)

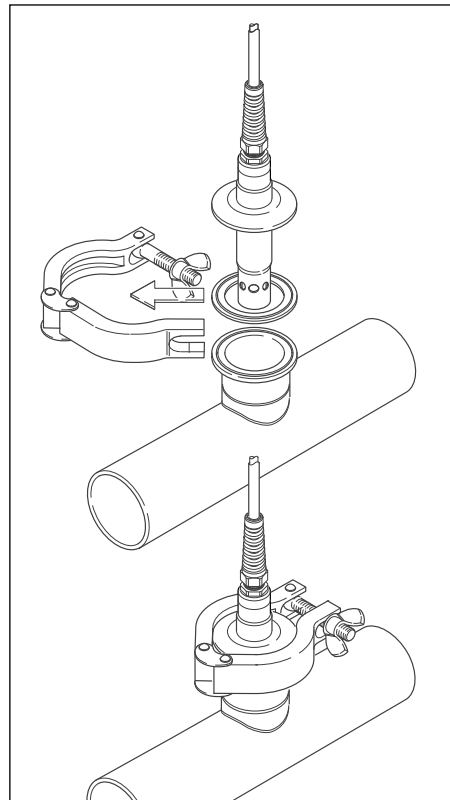


Fig. 6 Mounted SC4A-E-SB (SC) sensor with tri-clamp





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

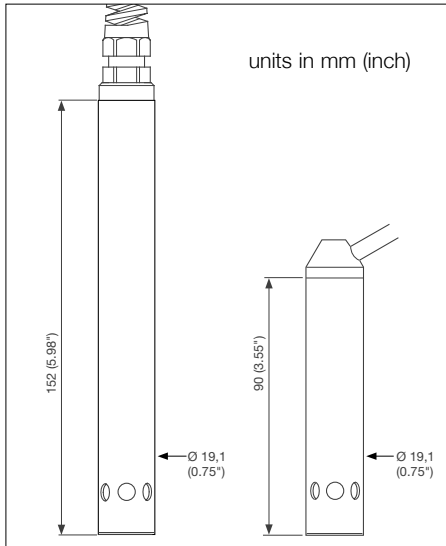


Fig. 7 SC4A-*-AD-15** SC4A-***-AD-09****

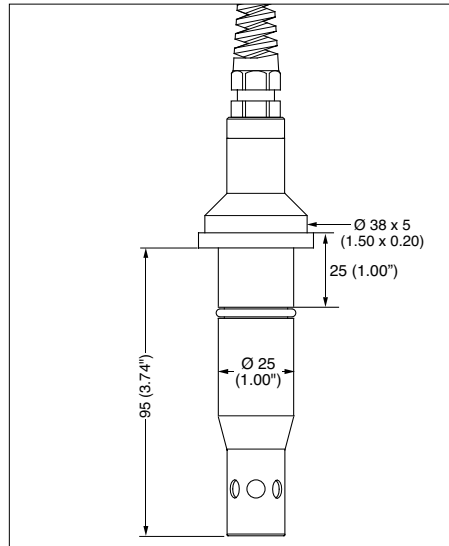


Fig. 8 SC4A-E-SA

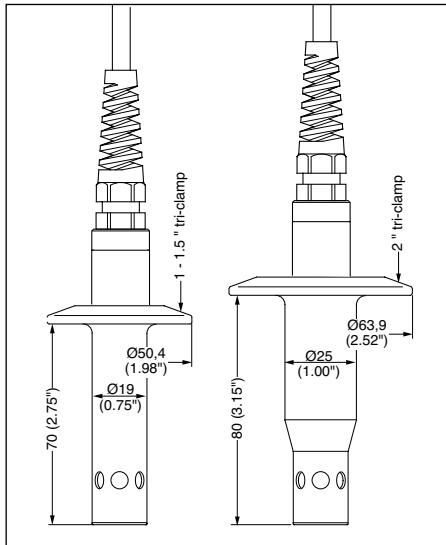


Fig. 9 SC4A-E-SB SC4A-E-SC

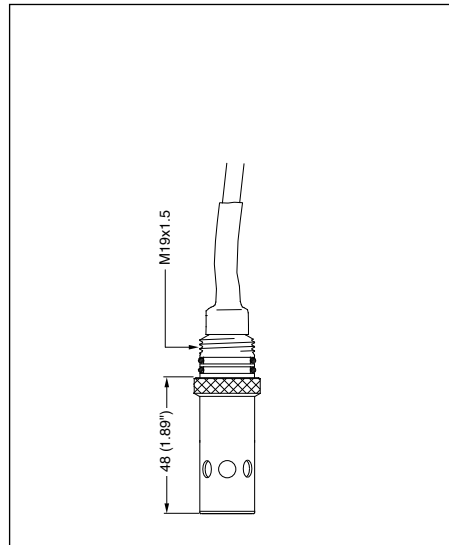


Fig. 10 SC4A-*-PR****





2.4. Wiring SC4A sensors

The SC4A sensors are provided with an integral sensor 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 integral 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	Outer electrode
Yellow	Yellow	14	Outer electrode
Black	Clear (Core of White coax)	15	Inner electrode
Pink	White (Shield of White coax)	16	Inner electrode

2.5. Modelcode SC4A sensors

Model Code	Suffix Code	Option Code	Description
SC4A			19 mm conductivity sensor
Material	- T - S - E		Titanium Grade 2 or 3 Stainless Steel AISI 316L 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 15 cm Fixed length
Cell Constant	- 002 - 010		0.02 cm ⁻¹ 0.1 cm ⁻¹
Cable length	- 03 - 05 - 10 - 15 - 20		3 meter 5 meter 10 meter 15 meter 20 meter
Temperature element	- T1		Pt1000
Options - AD		/PS /PF /FF	3/4" NPT adapter, Stainless Steel 3/4" NPT adapter, PVDF Flow fitting, Stainless Steel
Test Certificate *		/Q	Quality Inspection Certificate

* 3.1 Material Certificate according to EN 10204 is supplied as standard



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
Spare parts for adapters SC4A-*-AD sensor				
Part no.	Description			Quantity
K1500DY	Clamp ring set for /PS			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



2.7. Declaration of Conformity SC4A

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We: **Yokogawa Process Analyzers Europe B.V.**
Euroweg 2
3825 HD Amersfoort
The Netherlands

herewith declare under our sole responsibility that the product, model: **SC4A**
further specified with model suffix- and option codes: **As listed in Section 2.5**
is manufactured in accordance with the requirements for CE-marking of products as stated in EC
Decision:

768/2008/EC on a common framework for the marketing of products

by applying the following standards:

EN-ISO 9001: 2008 Quality management systems - Requirements

Subject product is:

- In compliance with the essential requirements of the specific product legislation:

- **Pressure Equipment Directive 97/23/EC (PED)**

As amended by Regulation (EC) no. 1882/2003, by applying:

Article 3.3: Sound Engineering Practice

- **RoHS Directive 2011/65/EU**

by applying:

Category 9: Industrial monitoring and control instruments

- **Explosive atmospheres Directive 94/9/EC (ATEX)**

As amended by Regulation (EC) no. 1882/2003, by applying the following standards:

EN 60079-0: 2012 Explosive atmospheres –

Part 0: Equipment – General requirements

EN 60079-11: 2012 Explosive atmospheres –

Part 11: Equipment protection by intrinsic safety “i”

EN 60079-26: 2007 Explosive atmospheres –

Part 26: Equipment with equipment protection level (EPL) Ga

The provisions fulfilled are:  II 1 G Ex ia IIC T4...T6 Ga

Number of the EC-type Examination Certificate: DEKRA 14ATEX0074 X

Name of the notified body: DEKRA Certification B.V.

Identification number of the notified body: 0344

Address of the notified body: Meander 1051, 6825 MJ Arnhem, The Netherlands

- Produced according to appropriate quality control procedures.

The CE-mark has been affixed on the product in 2014 for the first time.

If applicable, the product is checked against the latest official released revision of the standards mentioned above; differences do not affect the certified product identified on this declaration.

Amersfoort, 1 July 2014

H. Leijten, General Manager

Yokogawa Process Analyzers Europe B.V. IM 12D07J01-11E-E





3. MODEL SC41, SC42 AND SC49

3.1. General Specifications

3.1.1. Measuring elements

measuring system:

2-electrode for SC41/SC42-SP series; SC41/SC42-EP04 (EP14); SC41/SC42-FP04 (TP04);

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 series	: Stainless Steel AISI 316L
	SC41/SC42/SC49-EP series	: Glass filled epoxy resin
	SC41/SC42/SC49-FP series	: PVDF, Glass
	SC41/SC42/SC49-TP series	: Glass filled PTFE, Glass
Electrodes	SC41/SC42/SC49-SP series	: Stainless Steel AISI 316L
	SC41/SC42/SC49-EP series	: Graphite impregnated with epoxy resin
	SC41/SC42/SC49-FP series	: Platinum
	SC41/SC42/SC49-TP series	: Platinum
O-ring	SC41/SC42/SC49-SP series	: Viton
	SC41/SC42/SC49-FP series	: Viton
	SC41/SC42/SC49-TP series	: Kalrez™
	For the -FP series and -TP series the supplied O-ring for sealing in the fitting is Viton.	
Insulation	-SP series	: PEEK 450G, FDA migration tested

Connector:

Contacts : gold plated

Plug : Polyamide

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-SP24	: 0.1 cm ⁻¹
	SC41/SC42/SC49-SP34	: 0.01 cm ⁻¹
	SC41/SC42/SC49-EP04 (EP08)	: 10 cm ⁻¹
	SC41/SC42/SC49-EP14 (EP18)	: 1 cm ⁻¹
	SC41/SC42/SC49-EP15 (EP16)	: 1 cm ⁻¹
	SC41/SC42/SC49-FP series	: 10 cm ⁻¹
SC41/SC42/SC49-TP series	: 10 cm ⁻¹	

Note: The SC41/SC42/SC49 temperature sensor is designed for cell 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-SP24	: < 3 min.
SC41/SC42/SC49-SP34	: < 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 series	: < 1 min.
SC41/SC42/SC49-TP series	: < 1 min.

3.1.5. Operating range

Conductivity at actual process temperature : 1 μ S * C.C. – 200 mS * C.C.

See Fig. 2: Range ability of conductivity sensors on page 8

Temperature	SC41/SC42/SC49-SP series	: 0°C to 150°C (32°F to 302°F)
	SC41/SC42/SC49-EP series	: 0°C to 110°C (32°F to 230°F)
	SC41/SC42/SC49-FP series	: 0°C to 110°C (32°F to 230°F)
	SC41/SC42/SC49-TP series	: 0°C to 110°C (32°F to 230°F)
Pressure	SC41/SC42/SC49-SP series	: 0 to 10 bar (0 to 142 PSIG)
	SC41/SC42/SC49-EP series	: 0 to 10 bar (0 to 142 PSIG)
	SC41/SC42/SC49-FP series	: 0 to 10 bar (0 to 142 PSIG)
	SC41/SC42/SC49-TP series	: 0 to 2 bar (0 to 28 PSIG)
Cable length		: max. 60 meter with WU40 cable in combination with WF10 cable and BA10 junction box

3.1.6. Regulatory standards (only for SC42)

CE	: Decision 768/2008/EC
- ATEX	: Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003
Certificate no.	: DEKRA 14ATEX0074 X II 1 G Ex ia IIC T3...T6 Ga
Electrical data	: For sensor input circuit connected to A certified intrinsically safe circuit with the following maximum values: U _i = 14.4 V; I _i = 116.5 mA; P _i = 0.342 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 connected cable.

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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
T3 for Tamb. -30°C to 165°C



Electrostatic charges on the enclosure shall be avoided.

From the safety point of view the circuits shall be assumed to be connected to earth.

- Pressure

: Directive 97/23/EC,
as amended by Regulation (EC) no.
1882/2003

Applying article

: 3.3 (Sound Engineering Practice)

- RoHS

: Directive 2011/65/EU

Applying category

: 9 (Industrial monitoring and control
instruments)

IECEX

Applying standards

: IEC 60079-0: 2011
IEC 60079-11: 2011
IEC 60079-26: 2006

Certificate no.

: IECEX DEK 14.0032X
Ex ia IIC T3...T6 Ga

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)

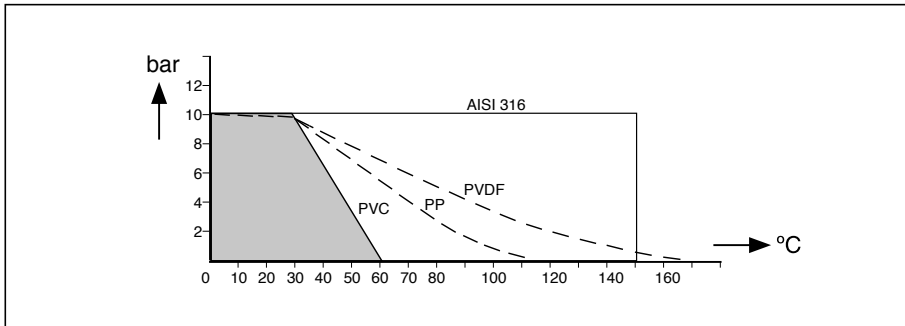


Fig. 11 Material vs. temperature/pressure


IM 12D07J01-11E-E





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).

WARNING  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.

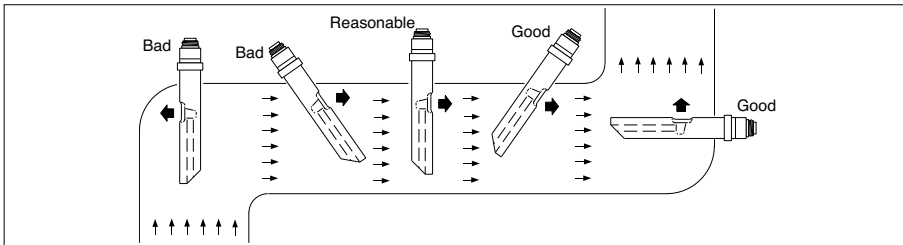


Fig. 12 Mounting position SC41/SC42/SC49 sensor Model FF40 Flowfitting Modelcode:

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 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 AISI 316
Material Certificate		/M	3.1 according to EN-10024 on wetted parts





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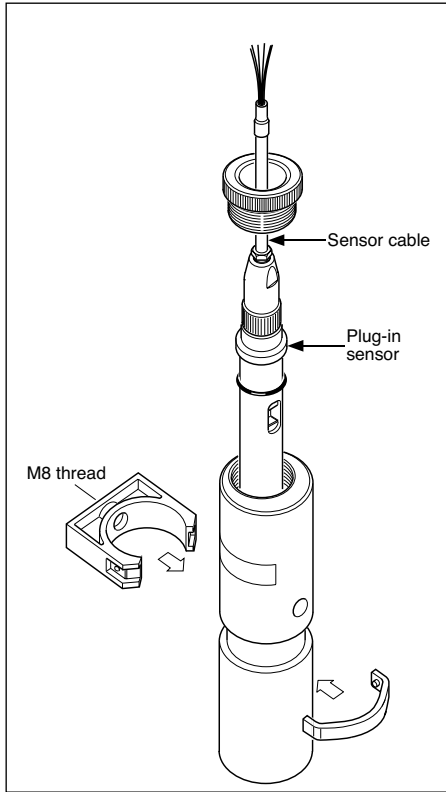


Fig. 13 Installation SC41/SC42/SC49 in FF40-P22/FF40-V22

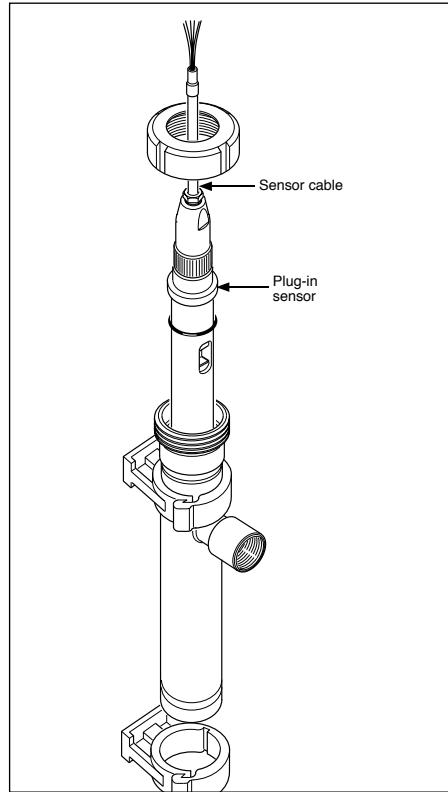


Fig. 14 Installation SC41/SC42/SC49 in FF40-S22

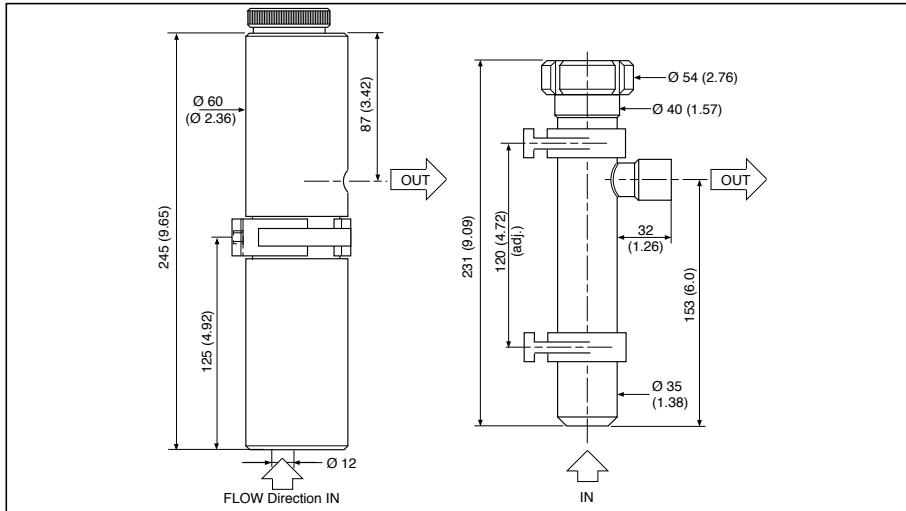


Fig. 15 Dimensions FF40-P22 (V22)

Fig. 16 Dimensions FF40-S22

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Optional flange adapters are available for the FF40-P22: option /FP* and for the FF40-S22: option /FS*

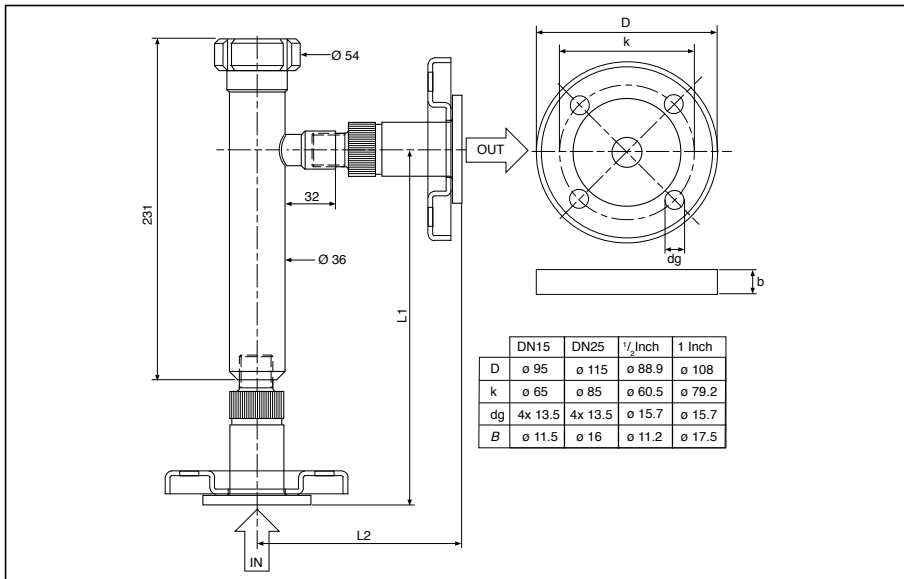


Fig. 17 Dimensions of Flange options

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"

Model FS40 Subassembly for Flow fitting Modelcode:

Model code	Suffix code	Option code	Description
FS40			Subassembly for Flow fitting
Material	- F22 - S22 - S23 - V22		Polyvinylidene fluoride (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 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 on wetted parts



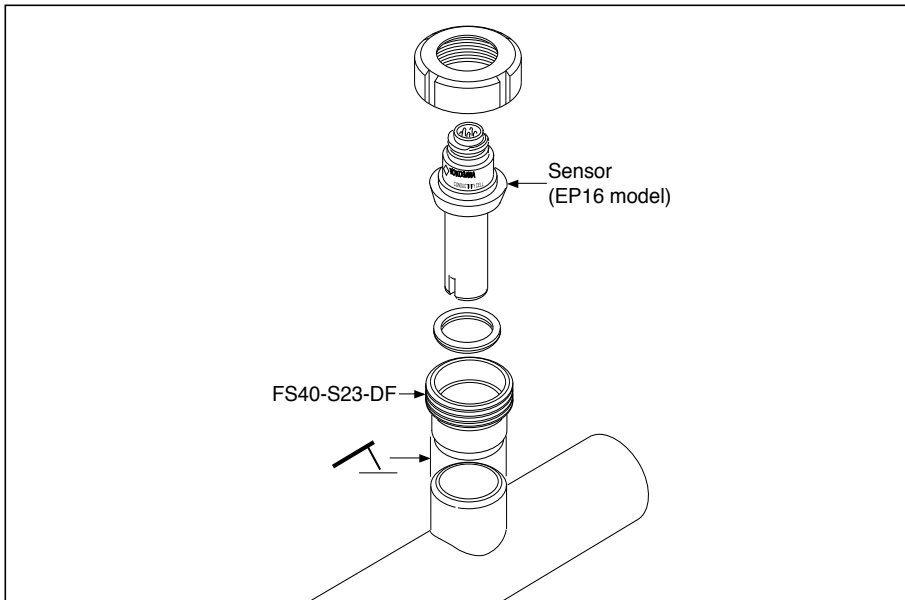


Fig. 18 Installation example of the SC41/SC42/SC49-EP16 sensor with a FS40-S23-DF subassembly

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.

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.)
Cable length	- 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 on SS wetted parts

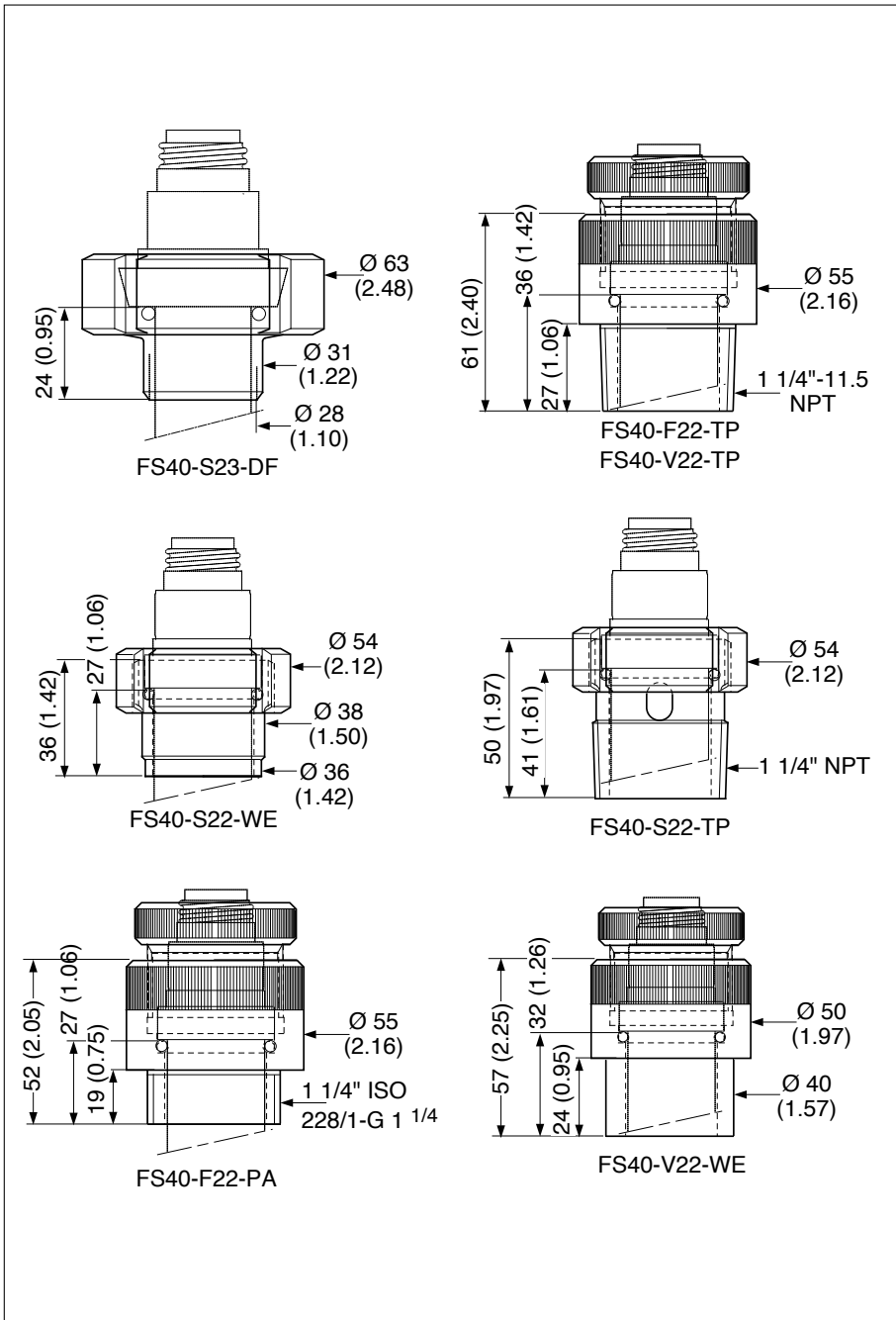


Fig. 19 Dimensions FS40 Flow fitting subassemblies





If it is necessary to use the fitting with another mounting cable length, this cable can be ordered separately as WU40 model:

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

3.3 Dimensions SC41/SC42/SC49 sensors.

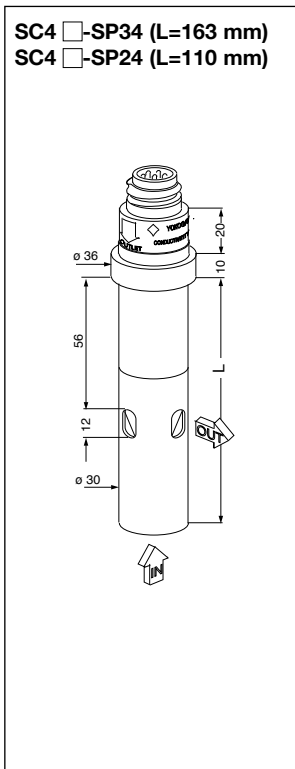


Fig. 20 Dimensions SC4 □-SP,

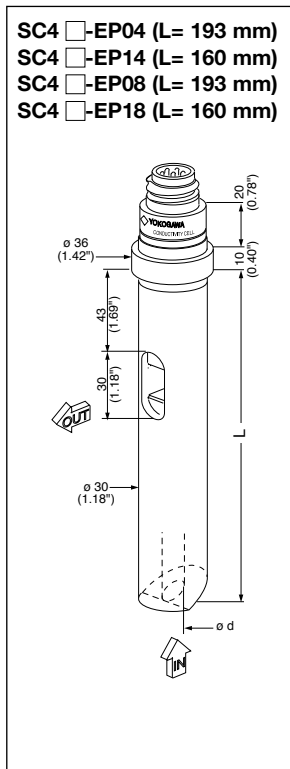


Fig. 21 SC4 □-EP14 (EP18),
SC4 □-EP04 (EP08)

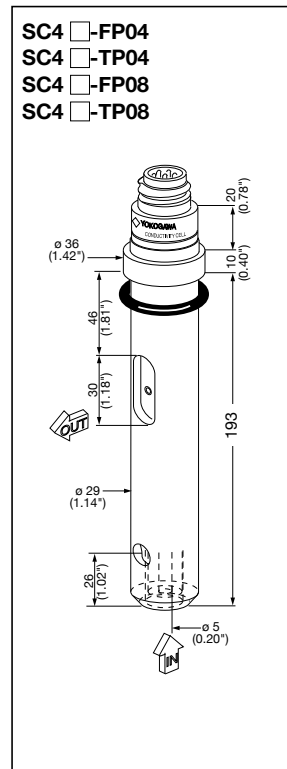


Fig. 22 SC4 □-FP04 (FP08) and
SC4 □-TP04 (TP08)



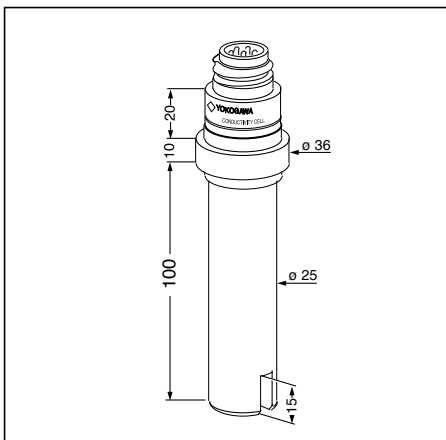


Fig. 23 SC41/SC42-EP15

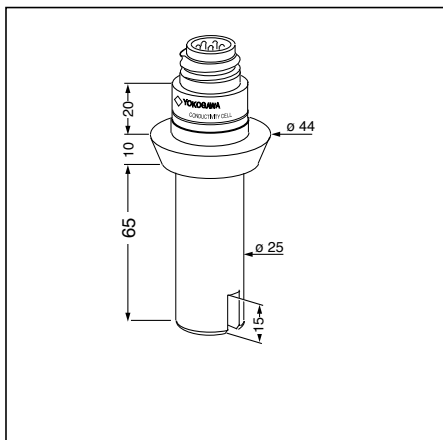


Fig. 24 SC41/SC42-EP16

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 to the analyser is the WU40. This cable is available up to 25 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 and WF10 cable to the Yokogawa Contact Conductivity analyser are given in table 4.

Table 4. Definition WU40 cable, WF10 cable and analyser

Cable wire color WU40	Cable wire color WF10	SC analyser terminal #	Signal description
White	Red	11	Temperature
Brown	Blue	12	Temperature
Green	Clear (Core of Brown coax)	13	Outer electrode
Yellow	Yellow	14	Outer electrode
Grey	Clear (Core of White coax)	15	Inner electrode
Pink	White (Shield of White coax)	16	Inner electrode

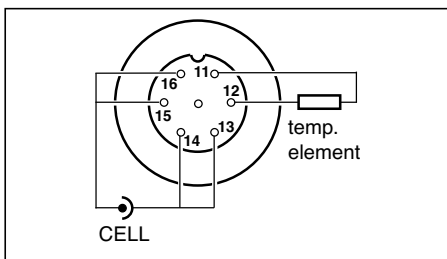


Fig. 24 SC41/SC42 2-electrode connector (top view)

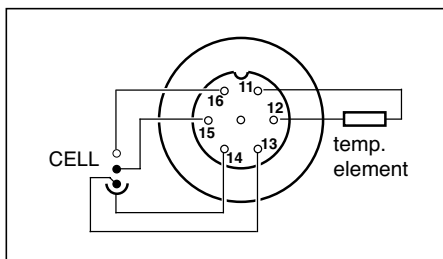


Fig. 25 SC42/SC49 4-electrode connector (top view)



3.5. Modelcode SC41/SC42/SC49 sensors

Model code	Suffix code	Option code	Description
SC41, SC49			Conductivity sensor 2- or 4 electrode with Ni100 temperature element
SC42			Conductivity sensor 2- or 4 electrode with Pt1000 temperature element
Material	- E - S - F - T		Epoxy / graphite Stainless Steel AISI 316L / PEEK PVDF / Glass / Platinum PTFE / Glass / Platinum
Mounting	P		Plug-in
Cell Constant	0 1 2 3		10 cm ⁻¹ 1 cm ⁻¹ 0.1 cm ⁻¹ 0.01 cm ⁻¹
Type	4 5 6 8		2-electrode, flow 2-electrode, insertion 2-electrode, insertion with DN 25 collar 4-electrode, flow
Test Certificate Material Certificate*		/Q /M	Quality Inspection Certificate Material Certificate

* 3.1 Material Certificate according to EN 10204 is supplied as standard for Stainless Steel version.

3.6. Spare parts SC41/SC42/SC49

Part no.	Description	Quantity
K1500AG	O-ring set for sealing in fitting, Viton, 29.74 x 3.53	5
K1500AH	O-ring set for sealing in fitting, Kalrez, 29.74 x 3.53	1
K1500AK	O-ring set for sealing in fitting, EPDM, 29.74 x 3.53	5
K1500FX	O-ring set for sealing in fitting, Silicone, 29.74 x 3.53	5
K1500HE	Sealing ring for SC41/SC42-EP16	5



3.7. Declaration of Conformity SC42

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We: **Yokogawa Process Analyzers Europe B.V.**
Euroweg 2
3825 HD Amersfoort
The Netherlands

herewith declare under our sole responsibility that the product, model: **SC42**
further specified with model suffix- and option codes: **As listed in Section 3.5**
is manufactured in accordance with the requirements for CE-marking of products as stated in EC
Decision:

768/2008/EC on a common framework for the marketing of products

by applying the following standards:

EN-ISO 9001: 2008 Quality management systems - Requirements

Subject product is:

- In compliance with the essential requirements of the specific product legislation:

- **Pressure Equipment Directive 97/23/EC (PED)**

As amended by Regulation (EC) no. 1882/2003, by applying:

Article 3.3: Sound Engineering Practice

- **RoHS Directive 2011/65/EU**

by applying:

Category 9: Industrial monitoring and control instruments

- **Explosive atmospheres Directive 94/9/EC (ATEX)**

As amended by Regulation (EC) no. 1882/2003, by applying the following standards:

EN 60079-0: 2012 Explosive atmospheres –

Part 0: Equipment – General requirements

EN 60079-11: 2012 Explosive atmospheres –

Part 11: Equipment protection by intrinsic safety “i”

EN 60079-26: 2007 Explosive atmospheres –

Part 26: Equipment with equipment protection level (EPL) Ga

The provisions fulfilled are:  II 1 G Ex ia IIC T3...T6 Ga

Number of the EC-type Examination Certificate: DEKRA 14ATEX0074 X

Name of the notified body: DEKRA Certification B.V.

Identification number of the notified body: 0344

Address of the notified body: Meander 1051, 6825 MJ Arnhem, The Netherlands

- Produced according to appropriate quality control procedures.

The CE-mark has been affixed on the product in 2014 for the first time.

If applicable, the product is checked against the latest official released revision of the standards mentioned above; differences do not affect the certified product identified on this declaration.

Amersfoort, 1 July 2014

H. Leijten, General Manager

Yokogawa Process Analyzers Europe B.V. IM 12D07J01-11E-E





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 threaded models:	Contacts	: gold plated
	Plug	: Polyamide
Terminal box flanged models:	Housing	: Aluminium

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 on page 8	
Temperature	Threaded models	: 0°C to 200°C (32°F to 392°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)
Cable length	Threaded models	: max. 60 meter with WJ40 cable in combination with WF10 cable and BA10 junction box
	Flanged models	: max. 60 meter with customer specified high temperature cable

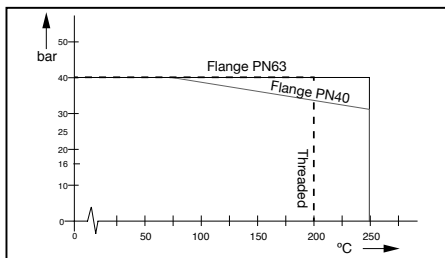


Fig. 26 Pressure vs. process temperature flanged / threaded models SX42

IM 12D7J1-11E-E





4.1.5. Regulatory standards

CE

- ATEX

Certificate no.

Electrical data

Special conditions (X)



- Pressure

Applying article

- RoHS : Directive 2011/65/EU

Applying category

IECEX

Applying standards

Certificate no.

4.1.6. Shipping details

Package size (LxWxH) Threaded models
Flanged models

Package weight Threaded models

Flanged models

: Decision 768/2008/EC **CE**

: Directive 94/9/EC,

as amended by Regulation (EC) no. 1882/2003

: DEKRA 14ATEX0074 X



II 1 G Ex ia IIC T2...T6 Ga

: 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 connected cable.

: T6 for Tamb. -30°C to 40°C

T5 for Tamb. -30°C to 95°C

T4 for Tamb. -30°C to 130°C

T3 for Tamb. -30°C to 165°C

T2 for Tamb. -30°C to 275°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.

: Directive 97/23/EC,

as amended by Regulation (EC) no. 1882/2003

: 3.3 (Sound Engineering Practice)

: 9 (Industrial monitoring and control instruments)

: IEC 60079-0: 2011

IEC 60079-11: 2011

IEC 60079-26: 2006

: IECEx DEK 14.0032X

Ex ia IIC T2...T6 Ga

: 300 x 95 x 73 mm (11.8 x 3.7 x 2.9 inch)

: 480 x 275 x 235 mm (18.9 x 10.8 x 9.3 inch)

: 0.5 to 0.7 kg (1.1 to 1.5 lbs)

: 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

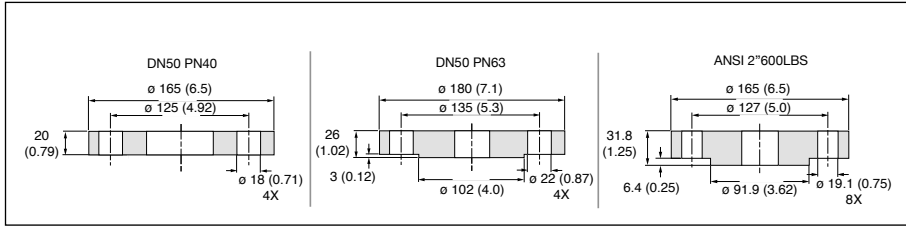


Fig. 27 Flange dimensions SX42 flanged model according EN 1092-1

4.3. Dimensions SX42 sensors

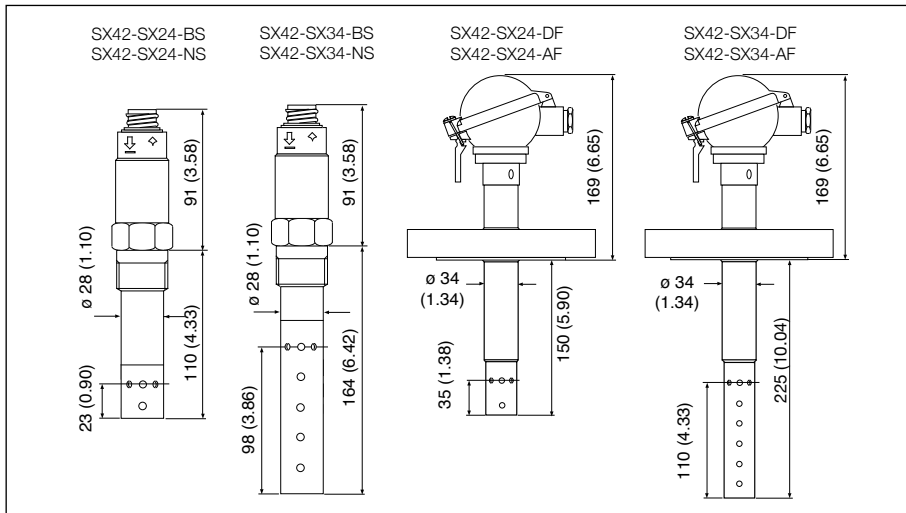


Fig. 28 Dimensions SX42 threaded models and flanged models

4.4. Wiring SX42 sensors

The SX42 threaded models are provided with a fixed connector. The standard cable used to connect these sensors to the analyser is the WU40. This cable is available up to 25 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 and WF10 cable to the Yokogawa Contact Conductivity analyser are given in table 5.



Table 5. Definition WU40 cable, WF10 cable and analyser

Cable wire color WU40	Cable wire color WF10	SC analyser terminal #	Signal description
White	Red	11	Temperature
Brown	Blue	12	Temperature
Green	Clear (Core of Brown coax)	13	Outer electrode
Yellow	Yellow	14	Outer electrode
Grey	Clear (Core of White coax)	15	Inner electrode
Pink	White (Shield of White coax)	16	Inner electrode

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 figure 29.

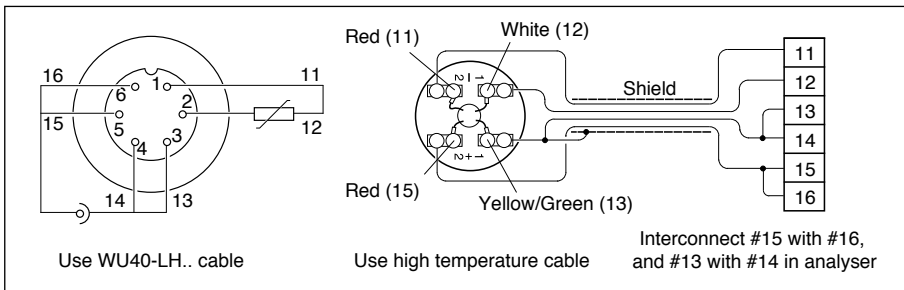


Fig. 29 SX42 threaded models connector (top view) SX42 flanged models wiring diagram

4.5. Modelcode SX42 sensors

Model code	Suffix code	Option code	Description
SX42			Conductivity sensor 2- electrode for high temperature/high pressure with Pt1000 temperature element
Cell Constant	- SX24 - SX34		0.1 /cm 0.01 /cm
Process connection	- BS - NS - DF - EF - AF		Threaded, ISO 7/1-R 1" Threaded, 1" NPT male Flange, DIN DN50 PN63 Flange, DIN DN50 PN40 Flange, ANSI 2" 600 lbs
Style code	*A		Style A
Test Certificate		/Q	Quality Inspection Certificate
Material Certificate*		/M	Material Certificate

* 3.1 Material Certificate according to EN 10204 is supplied as standard.

4.6. Spare parts SX42

None.





4.7. Declaration of Conformity SX42

We: **Yokogawa Process Analyzers Europe B.V.**
Euroweg 2
3825 HD Amersfoort
The Netherlands

herewith declare under our sole responsibility that the product, model: **SX42**
further specified with model suffix- and option codes: **As listed in Section 4.5**
is manufactured in accordance with the requirements for CE-marking of products as stated in EC
Decision:

768/2008/EC on a common framework for the marketing of products

by applying the following standards:

EN-ISO 9001: 2008 Quality management systems - Requirements

Subject product is:

- In compliance with the essential requirements of the specific product legislation:

- **Pressure Equipment Directive 97/23/EC (PED)**

As amended by Regulation (EC) no. 1882/2003, by applying:

Article 3.3: Sound Engineering Practice

- **RoHS Directive 2011/65/EU**

by applying:

Category 9: Industrial monitoring and control instruments

- **Explosive atmospheres Directive 94/9/EC (ATEX)**

As amended by Regulation (EC) no. 1882/2003, by applying the following standards:

EN 60079-0: 2012 Explosive atmospheres –

Part 0: Equipment – General requirements

EN 60079-11: 2012 Explosive atmospheres –

Part 11: Equipment protection by intrinsic safety “i”

EN 60079-26: 2007 Explosive atmospheres –

Part 26: Equipment with equipment protection level (EPL) Ga

The provisions fulfilled are:  II 1 G Ex ia IIC T2...T6 Ga

Number of the EC-type Examination Certificate: DEKRA 14ATEX0074 X

Name of the notified body: DEKRA Certification B.V.

Identification number of the notified body: 0344

Address of the notified body: Meander 1051, 6825 MJ Arnhem, The Netherlands

- Produced according to appropriate quality control procedures.

The CE-mark has been affixed on the product in 2014 for the first time.

If applicable, the product is checked against the latest official released revision of the standards mentioned above; differences do not affect the certified product identified on this declaration.

Amersfoort, 1 July 2014

H. Leijten, General Manager

Yokogawa Process Analyzers Europe B.V.

IM 12D7J1-11E-E





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)

Weigth %	molal (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)

Weigth %	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. 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	20	60	100
Inorganic acid	Sulfuric acid	10	O	O	O	O	O	O	O	O	O	O	O	O	-	-	-	X	X	X	O	O	O
		50	O	O	O	O	O	O	O	X	-	-	-	-	-	-	-	X	X	X	O	O	O
		95	O	O	O	O	O	O	X	-	-	-	-	-	-	-	-	X	X	X	O	O	O
		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	O	X	-	O	O	X	O	O	O	X	X	X	O	O	O
		50	-	-	-	O	O	O	-	-	-	X	-	-	O	O	O	X	X	X	O	O	O
		95	-	-	-	O	O	X	-	-	-	-	-	-	O	O	O	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	O	O	X
		95	X	X	-	O	O	O	O	O	O	O	X	X	X	-	-	O	O	O	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	O	O	O	X
		glacial	-	-	-	O	O	O	X	X	X	O	O	O	O	O	O	O	O	O	O	O	X
	Formic acid	80	-	-	-	O	O	X	O	O	X	O	O	O	X	X	-	X	X	X	O	O	O
Citric acid	50	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O	O	O	O	
Alkali	Calcium hydroxide	sat.	O	O	O	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	X	X	-	O	O	O	O	O	O	
	Sodium hydroxide	40	X	X	X	O	O	O	O	X	-	O	O	O	X	X	-	O	O	O	O	O	O
	Ammonia in water	30	X	X	X	O	O	O	O	O	O	O	O	O	X	X	-	O	O	O	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	O	O	O
	Zinc chloride	50	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O
	Iron(III) chloride	50	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	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	O	O	O
	Potassium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X	O	O	O
	Sodium sulfate	sat.	O	O	O	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	O	O	O
Neutral salt	Sodium chloride	sat.	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O
	Sodium nitrate	50	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	O	O
	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	X	-	X	X	X	O	O	O	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	O	O	O
	Potassium dichromate	sat.	O	O	O	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	O	O	O
	Cyclohexane		O	O	O	O	O	O	-	-	-	-	-	-	O	O	O	O	O	O	O	O	O
	Toluene		-	-	-	O	O	O	-	-	-	-	-	-	O	O	O	O	O	O	O	O	O
	Trichloroethane		X	X	X	X	-	-	-	-	-	-	-	-	O	O	O	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	O	O	

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																
Inorganic acid	Sulfuric acid	10	0	0	0	0	0	0	0	0	0	0	0	0	X	X	0	0	0
		50	0	0	0	0	0	0	0	0	0	0	0	X	X	X	0	0	0
		95	0	0	0	-	-	-	0	X	-	X	-	-	-	-	0	0	0
		fuming	0	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	Hydrochloric acid	10	0	0	0	0	0	X	0	0	0	0	0	0	X	-	0	0	0
		sat.	0	0	0	0	0	X	0	0	0	0	0	0	X	-	0	0	0
	Nitric acid	25	0	0	0	0	0	0	0	0	X	0	0	0	X	-	0	0	0
		50	0	0	0	X	X	X	0	0	X	X	-	X	-	-	0	0	0
		95	0	0	0	-	-	-	0	X	-	-	-	-	-	-	0	0	0
	fuming	0	0	0	-	-	-	-	-	-	-	-	-	-	-	0	0	0	
	Phosphoric acid	25	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
		50	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
95		0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	
Hydrofluoric acid	40	0	0	0	-	-	-	0	0	0	0	0	X	X	-	X	X	X	
	75	0	0	0	-	-	-	0	0	0	0	0	X	X	-	-	-	-	
Organic acid	Acetic acid	10	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
		glacial	0	0	0	0	X	-	0	X	-	0	X	-	-	-	0	0	0
	Formic acid	80	0	0	0	X	X	X	0	0	0	0	0	X	-	-	0	0	0
Citric acid	50	0	0	0	0	0	0	0	0	0	0	0	X	-	-	0	0	0	
Alkali	Calcium hydroxide	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Potassium hydroxide	50	0	0	0	0	0	0	0	0	X	0	0	0	0	X	0	0	X
	Sodium hydroxide	40	0	0	0	0	0	0	0	0	X	0	0	0	0	X	0	0	X
	Ammonia in water	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X
Acid salt	Ammonium chloride	sat.	0	0	0	0	0	0	0	0	0	0	0	0	X	X	0	0	0
	Zinc chloride	50	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
	Iron(III) chloride	50	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
	Sodium sulfite	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Basic salt	Sodium carbonate	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
	Potassium chloride	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sodium sulfate	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Calcium chloride	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neutral salt	Sodium chloride	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sodium nitrate	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aluminium chloride	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrogen peroxide	30	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	
Oxidizing agent	Sodium Hypochloride	50	0	0	0	0	0	0	0	0	0	X	X	0	X	X	0	0	0
	Potassium dichromate	sat.	0	0	0	0	0	0	0	X	-	0	0	0	X	X	0	0	0
	Chlorinated lime		0	0	0	X	X	X	0	0	0	-	-	0	X	X	0	0	0
	Ethanol	80	0	0	0	0	0	0	0	0	X	0	0	0	0	X	0	0	0
Organic solvent	Cyclohexane		0	0	0	0	0	0	0	X	-	-	-	0	0	X	0	0	0
	Toluene		0	0	0	0	0	0	0	0	0	X	-	0	0	X	0	0	0
	Trichloroethane		0	0	0	0	0	0	X	X	X	-	-	X	-	-	0	0	0
	Water		0	0	X	0	0	0	0	0	0	0	0	0	0	X	0	0	0

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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