General Specifications

Model SC4A
Conductivity Sensors and Fittings
for 2-electrode Systems

CE

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. There are several mounting possibilities, including a compression gland, giving a simple effective method of direct insertion in process pipework. The sensors are made from a combination of wetted materials approved by FDA. This makes them ideally suited for the monitoring of pure water systems used in the preparation of injectable solutions. For this kind of application, sanitary clamp mountings are most often used.
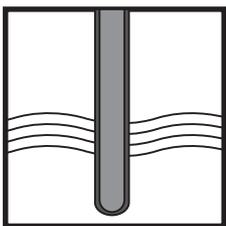
All sensors have a pre-calibrated cell constant and a built-in temperature element for automatic temperature compensation. Sensors with the Variopin connector are equipped with an ID-chip in which callibration information is stored for easy setup when connected to a SENCOM Smart Adapter model SA11-C1. For metal sensors a 3.1 material certificate is included. The sensors, except those equipped with Variopin connector, are ATEX certified for installation in zone 0 environments when connected to a certified intrinsically safe Yokogawa analyser, model SC202S or FLXA21 or a certified intrinsically safe circuit with defined output parameters.
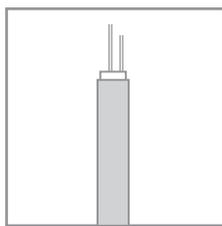
Features
- Compact style sensor
- Built-in temperature resistor: Pt1000
- Fast temperature response
- Plug and cable form a water tight connection to IP67
- Selection of two cell constant 0.02 cm^{-1} or 0.10 cm^{-1}
- Sensor with 8 pin Variopin with ID chip for SENCOM SA11-C1 use
- ATEX/IECEx certified
- Direct process insertion
- Wide range of mountings
- Compatible with PR10 retractable assembly
- The sensor is polished to meet pharmaceutical requirements
- Standard quality inspection certificate with delivery of sensor
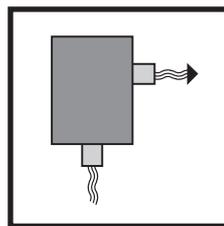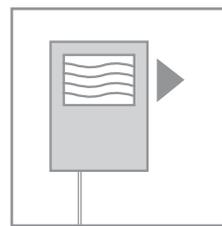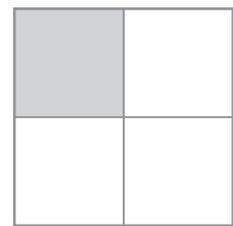- Peek and O-rings according to FDA standard

System Configuration

Sensors	Cables	Fittings	Transmitters	Accessories

YOKOGAWA ◆

Specifications
General Specifications

Measuring elements
2-electrode measuring system
Pt1000 temperature sensor

Materials
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

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.

Dynamic specifications
Response time temp. t_{90} : < 1 min.

Operating range
Conductivity at actual process
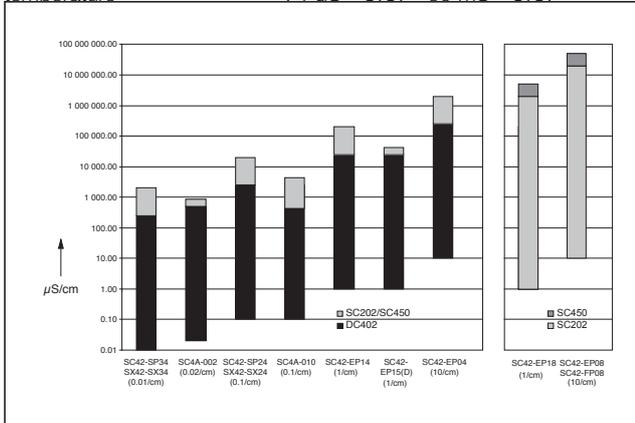temperature : 1 uS * C.C. – 50 mS * C.C.

Fig. 1 Measuring range of conductivity sensors

Process temperature SS & Titanium type	: 0°C to 110°C (32°F to 230°F) : 135°C (275°F) for a short period of time during sterilization.
Process temperature in combination with PVDF fitting (option /PF)	: 0°C to 80°C (32°F to 176°F)
Process pressure Stainless Steel & Titanium type	: 0 to 10 bar (0 to 142 PSIG)

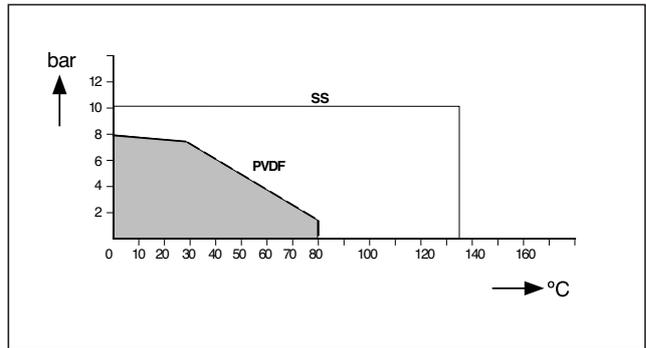Process Pressure in combination with PVDF fitting: See Fig. 2

Fig. 2 Pressure versus temperature

Process/temperature relationship

Cable length for
SC4A with fixed cable or
SC4A with Variopin directly
conn. 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-C1	: 3 meter WE10 cable (as option) combined with SA11-C1 Smart Adapter
SA11-C1 Smart Adapter	: Directly connected to the analyzer using a WU11 cable up to 100 meters or Connected to a BA11 connetion box using WU11 cable upto 100 m. The BA11 connection box is connected to the analyzer using a WU11 cable up to 100m.

Regulatory standards (only for 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
	⟨Ex⟩ 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: Ui = 14.4 V; Ii = 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)   : 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 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)

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

Environmental conditions

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

Specifications SC4A-AD

General Specifications

Materials Wetted Parts

Body & electrodes	: Stainless steel AISI 316L or Titanium grade 2 or 3
O-ring	: EPDM FDA
Mounting adapter	: PVDF or Stainless steel AISI 316L
Insulation	: PEEK (Polyether Ether Ketone)
Surface Roughness	: 0.8µm (R432)

Operating Specifications (Sensor)

Measuring system	: 2-electrode (4-wire)
Maximum pressure	: 10 bar (142 PSIG)
Maximum temperature	: 110ºC (230 °F)
Sterilize	: At 135°C (275 °F)

Model and Suffix codes

Model	Suffix	Option	Description
SC4A*			19 mm conductivity sensor
	-T		Titanium
	-S		Stainless steel 316L (Sterilizable acc. EHEDG test)
Fitting-type	-AD		For adapter mounting
Sensor length	-09		9 cm (note 1)
	-15		15 cm
Cellconstant	-002		0.02/cm
	-010		0.1/cm
Cable length	-03		3 mtr
	-05		5 mtr
	-10		10 mtr
	-15		15 mtr
	-20		20 mtr
	-VS		No Cable; Variopin connector with SENCOM ID-chip (note 2)
		-T1	Pt1000
AD only		/PS	3/4"NPT Stainless Steel adapter
		/PF	3/4"NPT PVDF adapter
(option /PS required)		/FF	Stainless Steel flow fitting

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

Note 1: Suffix -AD-09 not available with VS
Note 2: Suffix -VS not ATEX/ IECEx certified

Spare parts SC4A-AD

Adapters SC4A-*-AD sensor

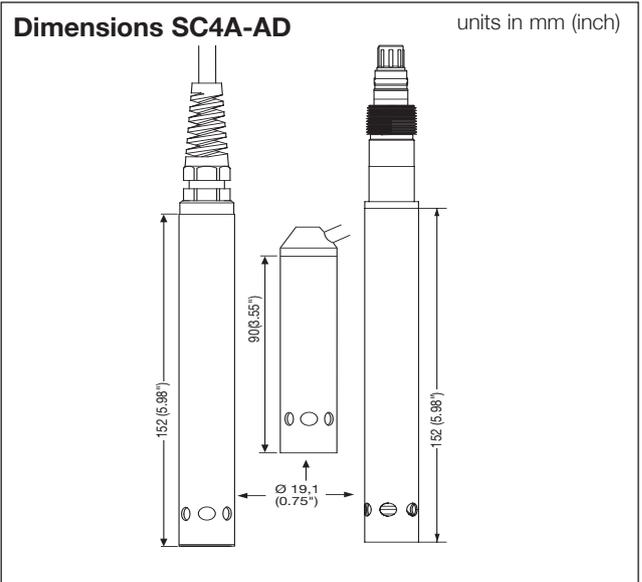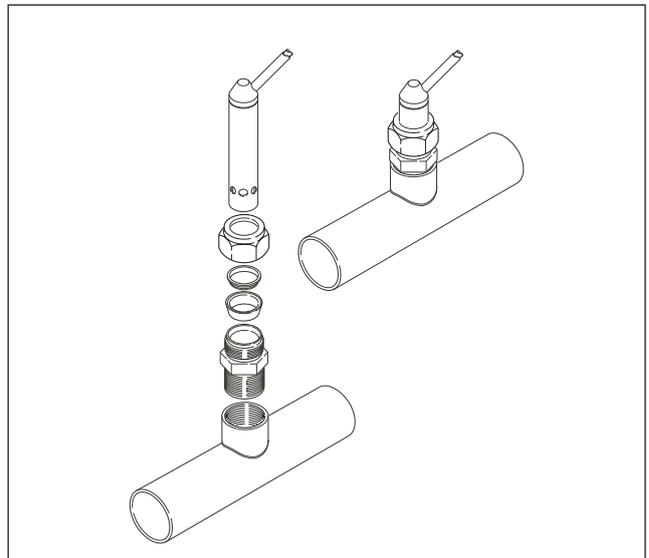| Part no.	Description	Process conn.	Material	Quantity
K1542DF	/PS	3/4" NPT adapter	Stainless Steel	1
K1542CW	/PF	3/4" NPT adapter	PVDF	1
K1598AC	/FF	Flow fitting	Stainless Steel	1

Dimensions SC4A-AD

units in mm (inch)

Fig. 3 SC4A-AD-15 / SC4A-AD-09

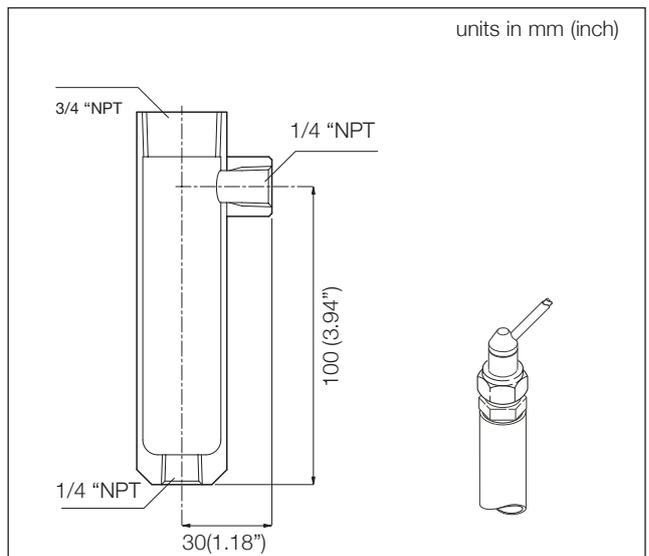Fig. 4 Mounted sensor with the option /PF and /PS

units in mm (inch)

Fig. 5 Dimensional drawing /FF with the option /PS

Specifications SC4A-SA/SB/SC

General Specifications

The SC4A-E is a conductivity sensor made of below materials with full traceability and supporting documents.

• EPDM O-ring (21 CFR 177.2600)
• SS is 1.4435
• Double O-ring construction (EPDM 21 CFR 177.2450)
• Virgin PEEK isolator (21 CFR 177.2415)
• Surface roughness Ra < 0.5μm (R416)
• Tested for sterilizability against EHEDG procedure
• 5% accuracy for the Cell constant

Materials Wetted Parts

Body & electrodes	: Stainless steel AISI 316L (1.4435)
O-ring	: EPDM, FDA migration tested 21 CFR 177.2600
Mounting adapter	: Stainless steel AISI 316L Tri-clamp according to ISO 2852-1993
Insulation	: PEEK (Polyether Ether Ketone) FDA migration tested 21 CFR 177.2415
Surface Roughness	: 0.5μm

Operating Specifications (Sensor)

Measuring system	: 2-electrode, 4-wire
Maximum pressure	: 10 bar (142 PSIG)
Maximum temperature	: 110ºC (230 °F)
Sterilize	: At 135°C (275 °F)

Operating Specifications options /SB1, /SB2, /SA1, /SA2, /SC1

Stainless Steel

Maximum pressure	: 10 bar (142 gpsi)
Maximum temperature	: 135ºC (275°F)

Model and Suffix codes

Model Code	Suffix Code	Option Code	Description
SC4A			19 mm conductivity sensor
	-E		with EPDM FDA O-ring
fitting-type	-SA		25 mm port
	-SB		1-1½" tri-clamp
	-SC		2" tri-clamp
cellconstant	-002		0.02/cm
	-010		0.1/cm
connection type	-03		Fixed cable with wirepins, 3 m
	-05		Fixed cable with wirepins, 5 m
	-10		Fixed cable with wirepins, 10 m
	-15		Fixed cable with wirepins, 15 m
	-20		Fixed cable with wirepins, 20 m
	-VS		No Cable; Variopin connector with SENCOM ID-chip
		-T1	Pt1000

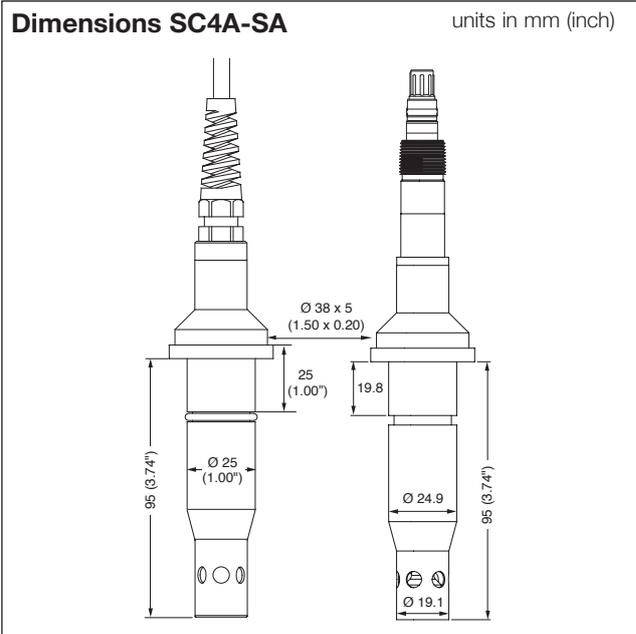* 3.1 Material certificate according to EN 10024 is standard delivered with this sensor.
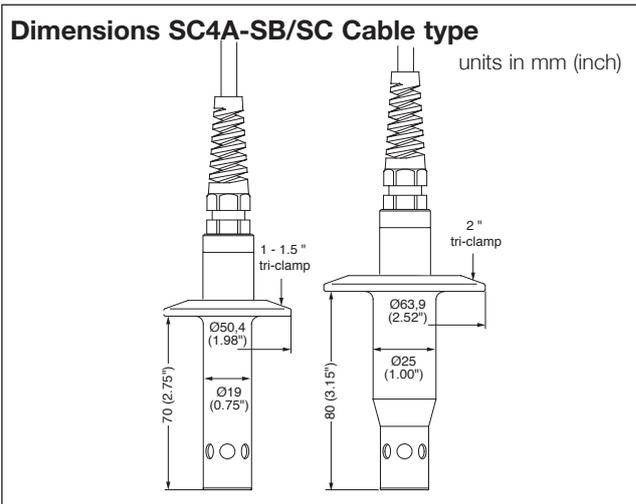
Dimensions SC4A-SA

units in mm (inch)

Figure 6. Sensor SC4A-SA

Dimensions SC4A-SB/SC Cable type

units in mm (inch)

Figure 7. Sensor SC4A-SB/SC

Dimensions SC4A-SB/SC Variopin type

units in mm (inch)

Figure 8. Sensor SC4A-SB/SC -VS type

GS 12D07J04-01E-E
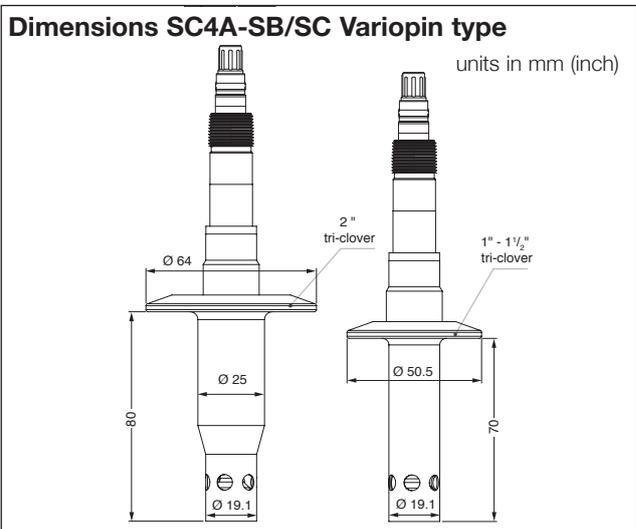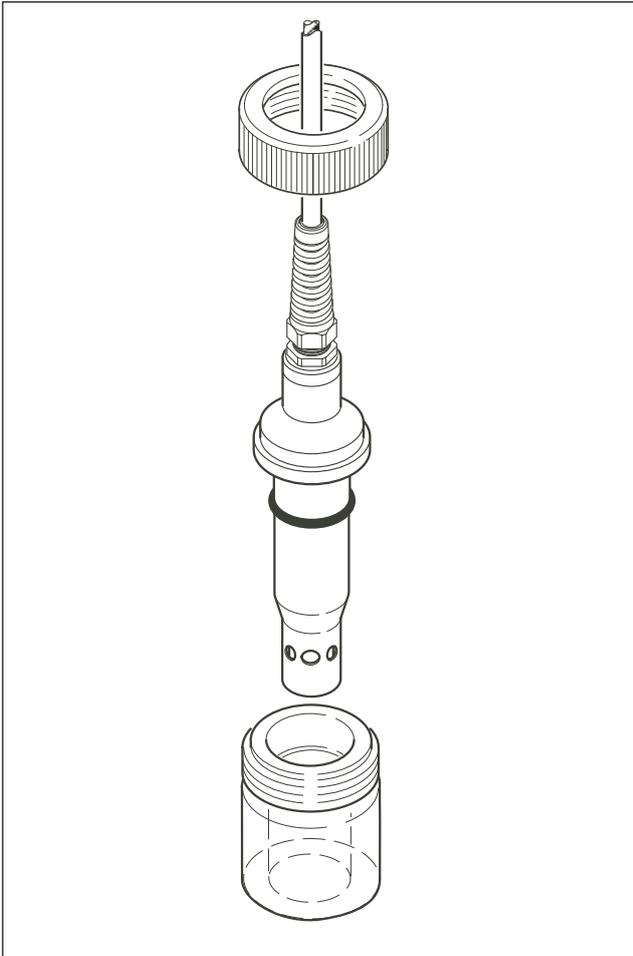
Installation SC4A-SA/SB/SC
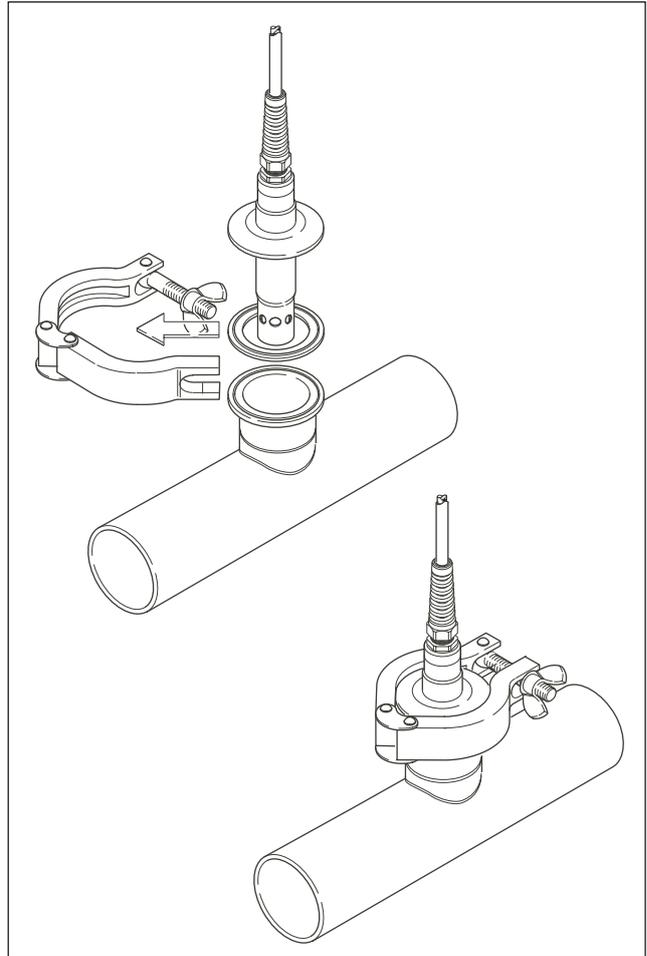

Figure 9. Mounted Sensor SC4A -SA

Figure 10. Mounting example

Adapters SC4A-E-SA sensor

Part number	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 number	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 number	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 number	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 number	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 number	Description	Process connection	Material	Quantity
K1542FE	/SC1	Tri-clamp 2"	Stainless Steel	1

Spare parts for adapters SC4A-E-SC sensor

Part number	Description			Quantity
K1500BP	Clamp seal ring, EPDM FDA, 2"			1
K1542DJ	Clamp seal ring, Viton, 2"			3

Specifications SC4A-PR

General Specifications

Materials Wetted Parts

Body & electrodes : Stainless steel AISI 316L
or Titanium grade 2 or 3
O-ring : Viton
Mounting adapter : Retractable fitting
Insulations : PEEK (Polyether Ether Ketone)

Operating Specifications (Sensor)

Measuring system : 2-electrode
Maximum pressure : 10 bar (142 PSIg)
Maximum temperature : 110ºC (230 °F)
Sterilize : At 135°C (275 °F)
Surface Roughness : 0.8µm (R432)

Model and Suffix codes

Model Code	Suffix code	Option	Description
SC4A*			19 mm conductivity sensor
	-T		Titanium
	-S		Stainless steel
Fitting-type	-PR		For retractable mounting
Always	-NN		fixed length
Cellconstant	-002		0.02/cm
	-010		0.1/cm
Cable length		-03	3 meter
		-05	5 meter
		-10	10 meter
		-15	15 meter
		-20	20 meter
		-VS	No cable; Variopin with Sencom ID-chip
		-T1	Pt1000

* 3.1 Material certificate according to EN 10024 is standard
  delivered with this sensor.
Note: -VS not ATEX /IECEx certified

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.

Spare parts for SC4A-*-PR sensor

Part number	Description	Quantity
K1500BE	O-ring set, Viton, 15.6 x 1.78	10
K1500ED	O-ring set, Kalrez, 15.6 x 1.78	1

units in mm (inch)

Dimensions SC4A-PR
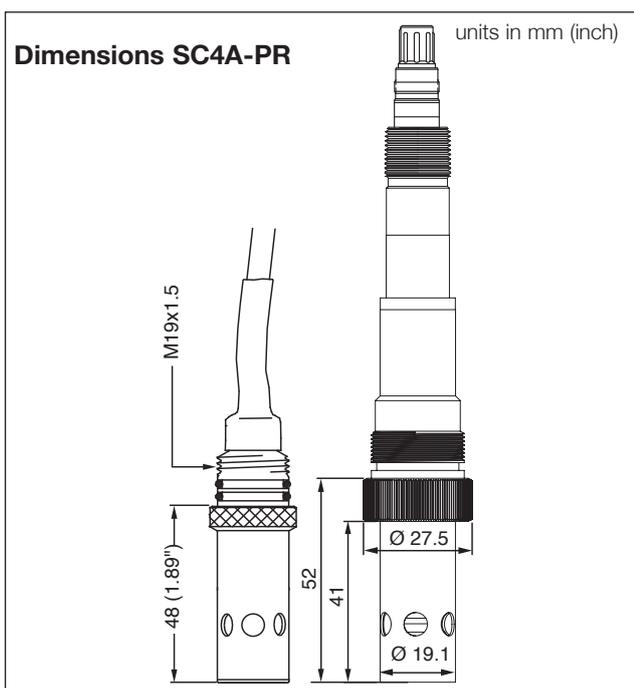
M19x1.5
48 (1.89")
52
41
Ø 27.5
Ø 19.1

Figure 11. SC4A -PR

GS 12D07J04-01E-E

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distribution network.
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nearest representative.

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