

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

YOKOGAWA

SC4A-S-PR-NN-002-05-T1

CONTACTING CONDUCTIVITY SENSOR

Used with the applicable SC4A configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: SC4A manufacturer technical reference

1. SPECIFICATIONS

General Specifications

- **1.1 Measuring method** : 2-electrode
- **1.2 Measuring element** : Pt1000 temperature sensor
- **1.3 Wetted parts**

Sensor Body and electrodes	: SC4A-T-AD SC4A-S-AD SC4A-E-SA (SB, SC) SC4A-T-PR SC4A-S-PR	: Titanium grade 2 or 3 Stainless Steel AISI 316L Stainless Steel AISI 316L Titanium grade 2 or 3 Stainless Steel AISI 316L
O-ring	: SC4A-*AD SC4A-E-SA (SB, SC) SC4A-*PR	: Viton EPDM FDA approved Viton
Insulation	: All models	: PEEK 450G, FDA migration tested
Connector Variopin	: Contacts Material Insulation	: gold plated Nickel-plated brass PEEK, UL94-V0
Wetted parts adapters/fitting	: /PS, /FF for SC4A-*AD /PF for SC4A-*AD /SA1(2), /SB1(2), /SC1 for SC4A-E-SA (SB, SC)	: Stainless Steel AISI 316L PVDF Stainless Steel AISI 316L
Cable ¹	: Conductors Outside shield Insulator	: tinned copper 0.6 mm2 braid, tinned copper, 85% coverage Polyester for conductor*

* for colors see Section 5.1, TPE-O for outer jacket, color black

Note 1 : Cable is not considered as wetted part

- **1.4 Functional specifications (at 25 °C)**

Temperature element ²	: Pt1000 to IEC 751
Nominal Cell Constant	: 0.02 cm-1 or 0.01 cm-1

Note 2 : The temperature sensor included in the sensor is designed for process compensation and for indication.
It is NOT designed for process temperature control.

- **1.5 Dynamic specifications**

Response time temperature (t_{90})	: < 1 min.
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- **1.6 Operating range**

Conductivity range* at actual process temperature	: 1 μ S x C.C. – 200 mS x C.C. (See Fig. 1)
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* measurement range dependent on input range analyzer.

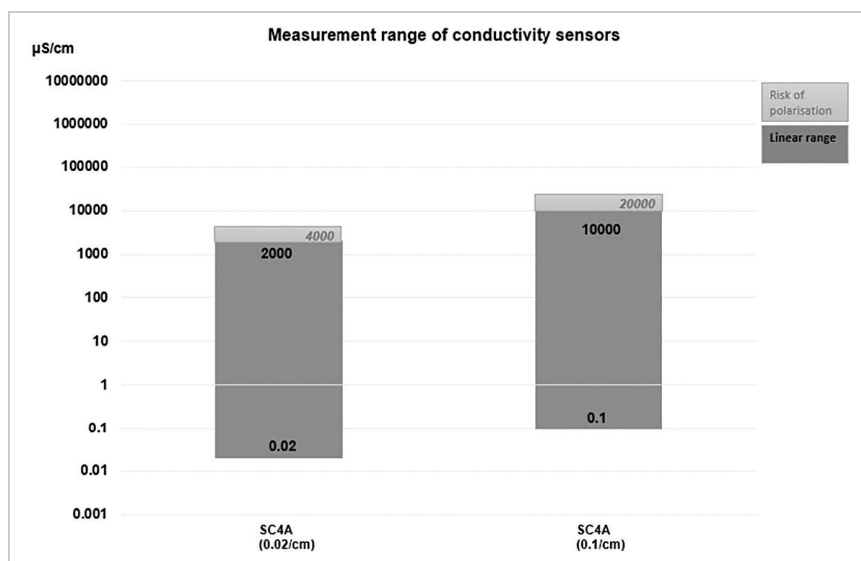


Figure 1. Measuring range of conductivity sensors section

Temperature @ 100 KPa : 0 °C ... 125 °C (32 °F to 257 °F) - For VarioPin type sensors
(1 Bar, 14.5 PSI) 0 °C ... 100 °C (32 °F to 212 °F) - For fixed cable type sensors

Remark:

For all types 135°C (275 °F) max. for a short period of time during sterilization.
In combination with a fitting or option, the specification of the most critical part is leading.

Pressure @ 25 °C : Stainless Steel & Titanium type
Over pressure 0 to 10 barg (7 to 142 PSIG)*
Under pressure 0 to 0.5 barg (0 to 7 PSIG)*

* Unit definition: barg = bar gauge, over pressure against atmosphere.
barg = under pressure against atmosphere

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

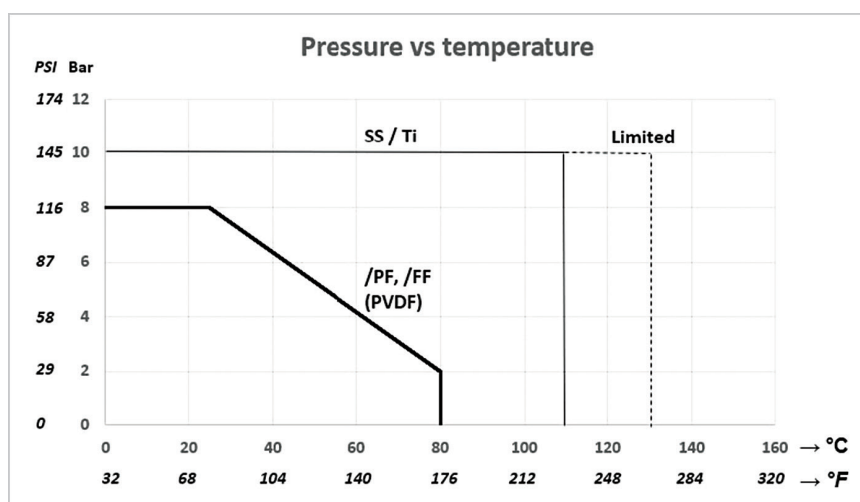


Figure 2. Process pressure in combination with fitting

4. SPECIFICATIONS SC4A-PR

General Specifications

4.1 Materials Wetted Parts

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

4.2 Operating Specifications (Sensor)

See paragraph 1.6

4.3 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.

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

4.4 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
	-T1		Pt1000

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

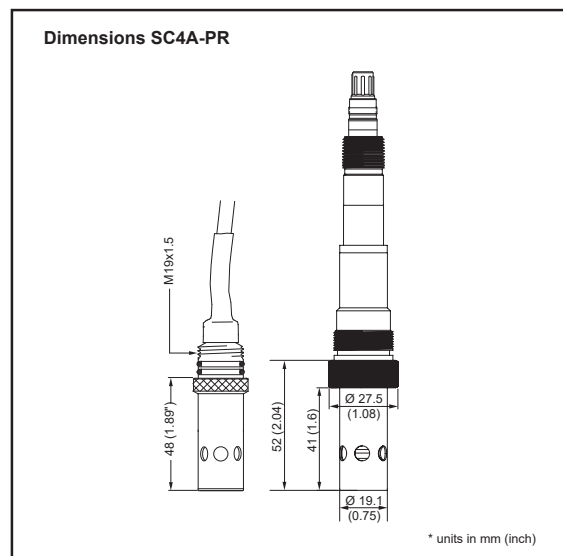


Figure 11. SC4A -PR

■ 5. ADDENDUM 1: Typical Installations

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.

● 5.1 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 12** for the mounting sequence. The sensor can also be installed in an optional Stainless-Steel flow fitting (/FF) using option /PS, **see Figure 13** for details.

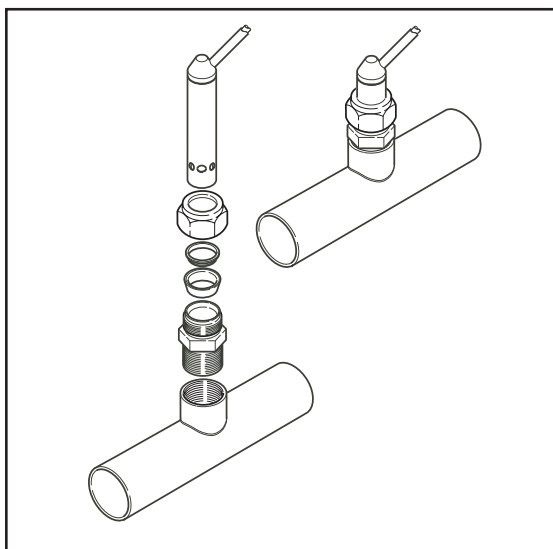


Figure 12. Mounted sensor with option /PF and /PS

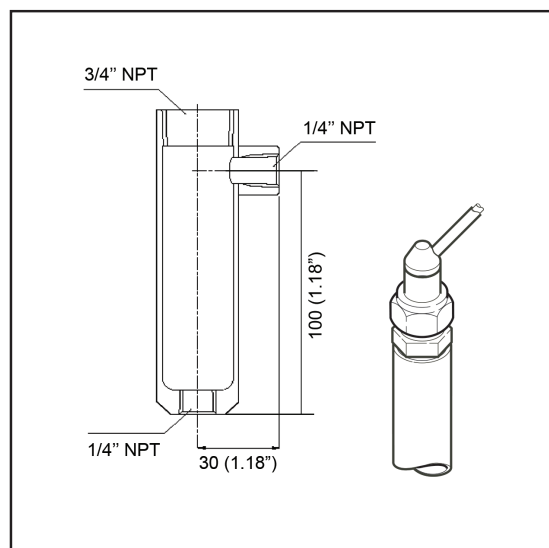


Figure 13. Dimensional drawing /FF with option /PS

● 5.2 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 14 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, **see Figure 15**. 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).

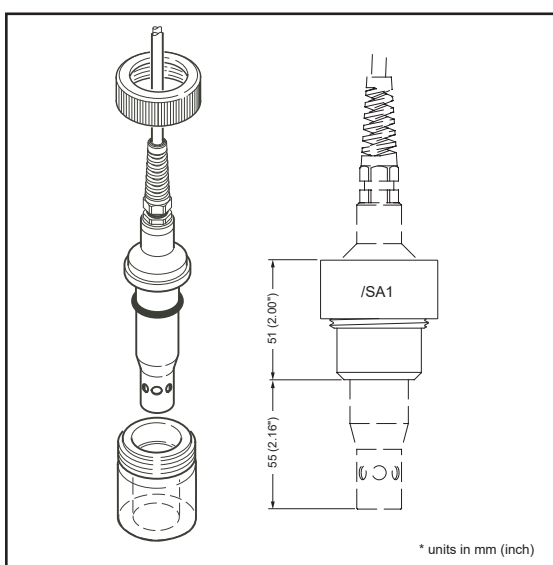


Figure 14. Mounted SC4A-E-SA sensor with spare part /SA1

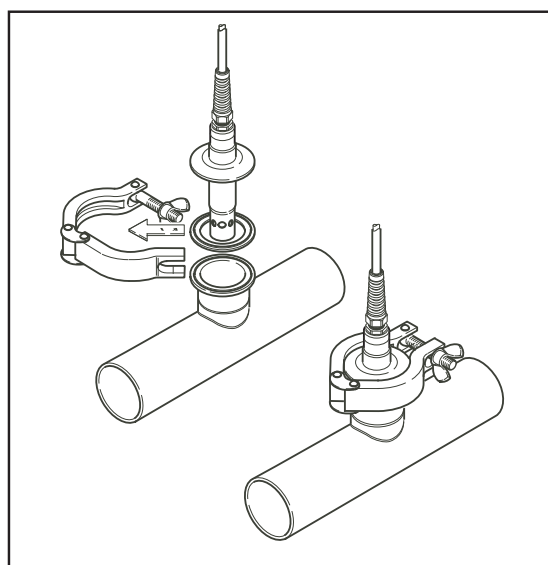


Figure 15. Mounted SC4A-E-SB(-SC) sensor

■ 6. ADDENDUM 2: Available model codes

SC4A-S-AD-09-002-03-T1	SC4A-T-AD-09-002-03-T1	SC4A-E-SB-NN-002-03-T1	SC4A-T-AD-15-002-VS-T1
SC4A-S-AD-09-002-05-T1	SC4A-T-AD-09-002-05-T1	SC4A-E-SB-NN-002-05-T1	SC4A-T-AD-15-010-VS-T1
SC4A-S-AD-09-002-10-T1	SC4A-T-AD-09-002-10-T1	SC4A-E-SB-NN-002-10-T1	
SC4A-S-AD-09-002-15-T1	SC4A-T-AD-09-002-15-T1	SC4A-E-SB-NN-002-15-T1	SC4A-S-AD-15-002-VS-T1
SC4A-S-AD-09-002-20-T1	SC4A-T-AD-09-002-20-T1	SC4A-E-SB-NN-002-20-T1	SC4A-S-AD-15-010-VS-T1
SC4A-S-AD-09-010-03-T1	SC4A-T-AD-09-010-03-T1	SC4A-E-SB-NN-010-03-T1	
SC4A-S-AD-09-010-05-T1	SC4A-T-AD-09-010-05-T1	SC4A-E-SB-NN-010-05-T1	SC4A-E-SC-NN-002-VS-T1
SC4A-S-AD-09-010-10-T1	SC4A-T-AD-09-010-10-T1	SC4A-E-SB-NN-010-10-T1	SC4A-E-SC-NN-010-VS-T1
SC4A-S-AD-09-010-15-T1	SC4A-T-AD-09-010-15-T1	SC4A-E-SB-NN-010-15-T1	
SC4A-S-AD-09-010-20-T1	SC4A-T-AD-09-010-20-T1	SC4A-E-SB-NN-010-20-T1	SC4A-E-SB-NN-002-VS-T1
			SC4A-E-SB-NN-010-VS-T1
SC4A-S-AD-15-002-03-T1	SC4A-S-PR-NN-002-03-T1	SC4A-E-SC-NN-002-03-T1	
SC4A-S-AD-15-002-05-T1	SC4A-S-PR-NN-002-05-T1	SC4A-E-SC-NN-002-05-T1	SC4A-E-SA-NN-002-VS-T1
SC4A-S-AD-15-002-10-T1	SC4A-S-PR-NN-002-10-T1	SC4A-E-SC-NN-002-10-T1	SC4A-E-SA-NN-010-VS-T1
SC4A-S-AD-15-002-15-T1	SC4A-S-PR-NN-002-15-T1	SC4A-E-SC-NN-002-15-T1	
SC4A-S-AD-15-002-20-T1	SC4A-S-PR-NN-002-20-T1	SC4A-E-SC-NN-002-20-T1	SC4A-T-PR-NN-002-VS-T1
SC4A-S-AD-15-010-03-T1	SC4A-S-PR-NN-010-03-T1	SC4A-E-SC-NN-010-03-T1	SC4A-T-PR-NN-010-VS-T1
SC4A-S-AD-15-010-05-T1	SC4A-S-PR-NN-010-05-T1	SC4A-E-SC-NN-010-05-T1	
SC4A-S-AD-15-010-10-T1	SC4A-S-PR-NN-010-10-T1	SC4A-E-SC-NN-010-10-T1	SC4A-S-PR-NN-002-VS-T1
SC4A-S-AD-15-010-15-T1	SC4A-S-PR-NN-010-15-T1	SC4A-E-SC-NN-010-15-T1	SC4A-S-PR-NN-010-VS-T1
SC4A-S-AD-15-010-20-T1	SC4A-S-PR-NN-010-20-T1	SC4A-E-SC-NN-010-20-T1	
SC4A-T-AD-15-002-03-T1	SC4A-E-SA-NN-002-03-T1	SC4A-T-PR-NN-002-03-T1	
SC4A-T-AD-15-002-05-T1	SC4A-E-SA-NN-002-05-T1	SC4A-T-PR-NN-002-05-T1	
SC4A-T-AD-15-002-10-T1	SC4A-E-SA-NN-002-10-T1	SC4A-T-PR-NN-002-10-T1	
SC4A-T-AD-15-002-15-T1	SC4A-E-SA-NN-002-15-T1	SC4A-T-PR-NN-002-15-T1	
SC4A-T-AD-15-002-20-T1	SC4A-E-SA-NN-002-20-T1	SC4A-T-PR-NN-002-20-T1	
SC4A-T-AD-15-010-03-T1	SC4A-E-SA-NN-010-03-T1	SC4A-T-PR-NN-010-03-T1	
SC4A-T-AD-15-010-05-T1	SC4A-E-SA-NN-010-05-T1	SC4A-T-PR-NN-010-05-T1	
SC4A-T-AD-15-010-10-T1	SC4A-E-SA-NN-010-10-T1	SC4A-T-PR-NN-010-10-T1	
SC4A-T-AD-15-010-15-T1	SC4A-E-SA-NN-010-15-T1	SC4A-T-PR-NN-010-15-T1	
SC4A-T-AD-15-010-20-T1	SC4A-E-SA-NN-010-20-T1	SC4A-T-PR-NN-010-20-T1	

■ 7. ADDENDUM 3:Control drawings

● 7.10 FM-United States

Applying standards	: FM Class 3600 FM Class 3610 FM Class 3810 ANSI/ISA 60079-0 ANSI/ISA 60079-11
Certificate no.*	: FM20US0123X IS CL I, DIV 1, GP ABCD, T4...T6 CL I, ZN 0, AEx ia IIC, T4...T6 Ga Control Drawing: D&E 2020-024-A50
Electrical data	: (See Note)
Specific conditions of use	: See Control Drawing D&E 2020-024-A50. Temperature classes for SC4A models are defined T4...T6 (See Note) .

Note: Intrinsically safe, entity, for Class I, Division 1, Groups A, B, C and D; Class I, Zone 0, AEx ia IIC, Ga (entity) for hazardous (classified) locations when installed per control drawing D&E 2020-024-A50.

Maximum sensor input parameters:

Ui= 14.4 V; li= 116.5 mA; Pi= 0.3424 W
Li= 0.1 mH (models with fixed cable) or Li= 0 mH (VS type)
Ci= 150 nF (models with fixed cable) or Ci= 0.4 nF (VS type)

Ambient temperature:

-30°C to +40°C for temperature class T6,
-30°C to +95°C for temperature class T5,
-30°C to +125°C for temperature class T4 (VS type),
-30°C to +130°C for temperature class T4 (models with fixed cable).



When the sensor has been connected to non intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuits, the sensor is not suitable anymore for intrinsically safe use.

* Certification is subject to change, due to new regulations or changes in the product itself. When a certificate is updated the certificate is released under the same number with a new date. (FM-United States: FM20US0123X, effective from 03-2021)