

# General Specifications

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

The measurement of specific conductivity in aqueous solutions is becoming increasingly important for the determination of impurities in water or the concentration measurement of dissolved chemicals. The accuracy of the measurement is strongly influenced by temperature variations, polarisation effects at the surface of the contacting electrodes, cable capacitances, etc.

Yokogawa provides sensors for pure water systems, general applications with a 2-electrode design and applications involving high concentrations of chemicals with a 4-electrode design.

To install conductivity sensors in a permanent or semi-permanent location, Yokogawa offers wide a range of flow and immersion fittings. A high degree of standardisation simplifies mounting, servicing and removal or replacement of the sensors.

Included are flow fittings and subassemblies for in-line or direct mounting of conductivity sensors in piping systems.

The immersion fittings are designed for tanks, open vessels or drains. PVC and stainless steel construction materials suit most process conditions, regarding chemical resistance, pressure and temperature specifications.

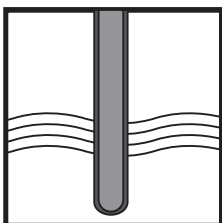
The fittings of stainless steel might be used in sanitary applications.



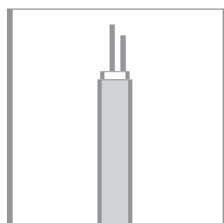
## Features

- Wide range of sensors to suit most process conditions.
- High precision of the cell constant (Field calibration not necessary).
- Sensors for ultra-pure water applications.
- Built-in resistance thermometers Pt 1000 for automatic temperature compensation.
- Optional material certificate 3.1 according to EN 10024 for stainless steel sensors.
- Optional quality inspection certificate.

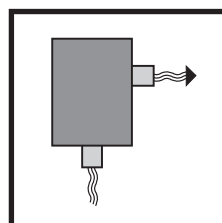
## System Configuration



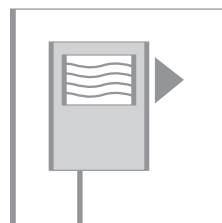
Sensors



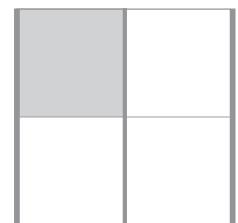
Cables



Fittings



Transmitters



Accessories

## Plug-in flow sensors (SS)

### Stainless steel cells for 2-electrode type with cell constants 0.01 and 0.1 cm<sup>-1</sup>.

These conductivity sensors have a stainless steel body and PEEK (Poly Ether Ether Ketone) inner insulation for high pressure/temperature applications. A special treatment of the electrodes ensures optimal resistance against polarisation. The sensor includes a built-in resistance thermometer Pt1000 for automatic temperature compensation.

The combination sensor plug and cable socket is watertight and temperature resistant up to 100°C (212 °F). It meets the requirements of IP65.

The dimensions of the sensor are standardised for mounting in the standard fitting program of Yokogawa.

### Features

- High precision of the cell constant (individually calibrated).
- Fast temperature response.
- High pressure/temperature specifications.
- Built-in resistance thermometer, Pt1000 RTD
- Plug-socket cable connection for easy installation and maintenance, meeting IP 65.
- Standardised dimensions for mounting in flow- and immersion fittings.

### Typical Applications

#### 1. Cell constant = 0.01 cm<sup>-1</sup>

For measurement in very low conductive solutions like pure water, condensate, demineralised water, distilled water, etc.

#### 2. Cell constant = 0.1 cm<sup>-1</sup>

For measurement of low conductive solutions like boiler feed water, surface water, etc.

## General Specifications

### Materials

Wetted parts

- |                        |                                       |
|------------------------|---------------------------------------|
| a. Body                | : Stainless steel AISI 316            |
| b. Insulation          | : PEEK (Poly Ether Ether Ketone)      |
| c. Electrode           | : Stainless steel AISI 316            |
| d. Quad-rings, O-rings | : Viton                               |
| e. Connector           | : Polyamide with gold plated contacts |

### Weight and immersion length (L in figure)

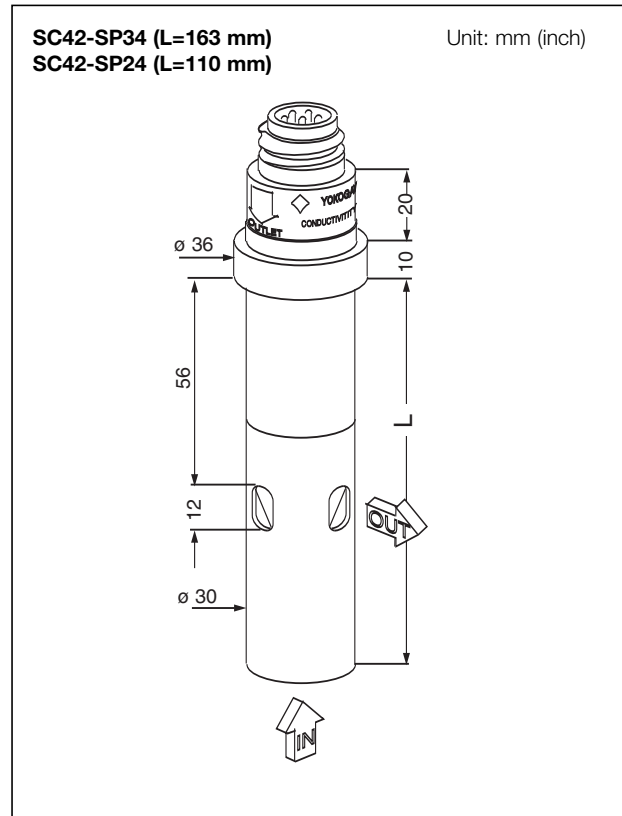
- |                 |                        |
|-----------------|------------------------|
| Model SC42-SP24 | : 440 gram; 110 mm (L) |
| Model SC42-SP34 | : 600 gram; 163 mm (L) |

## Functional Specifications

Model	Temp. element	Cell-constant	Pressure rating	Max. temperature	90% Temp. response	Measurement system
SC42-SP34	Platinum resistor (Pt1000 to DIN)	0.01 cm <sup>-1</sup>	10 bar/142 PSIG	150°C/302 °F	< 1 min.	2-electrode system
SC42-SP24	Platinum resistor (Pt1000 to DIN)	0.1 cm <sup>-1</sup>	10 bar/142 PSIG	150°C/302 °F	< 3 min.	2-electrode system

The maximum pressure and temperature rating also depend on the actual process conditions. Under certain circumstances it is necessary to test the cell in situ. Additional data is available from Yokogawa.

**Note:** Stainless steel cells for 2-electrode systems with cell-constants 0.01 and 0.1 cm<sup>-1</sup> designed for pressure and temperature ratings of up to 40 bar (PSIG) at 250°C (°F) are available upon request.



### Flow type

### Options

- |             |   |
|-------------|---|
| Certificate | /M : Material certificate 3.1 according to EN 10024 (only wetted metal parts) |
|             | /Q : Quality inspection certificate   |

**Plug-in flow sensors (EPOXY)**

**Epoxy cells for 2- and 4-electrode type with cell-constants 1 and 10 cm<sup>-1</sup>.**

These conductivity sensors have a body of glass-filled epoxy resin. The electrodes are made from graphite impregnated with epoxy resin. This gives the sensors a good chemical resistance and a good reduction of polarisation effects.

**Features**

- Good chemical resistance.
- Choice in 2- and 4-electrode types.
- Easy installation

**General Specifications**

**Materials**

Wetted parts

- a. Body : Glass filled epoxy resin
- b. Electrodes : Graphite impregnated with epoxy resin

Connector plug : Polyamide with gold plated contacts

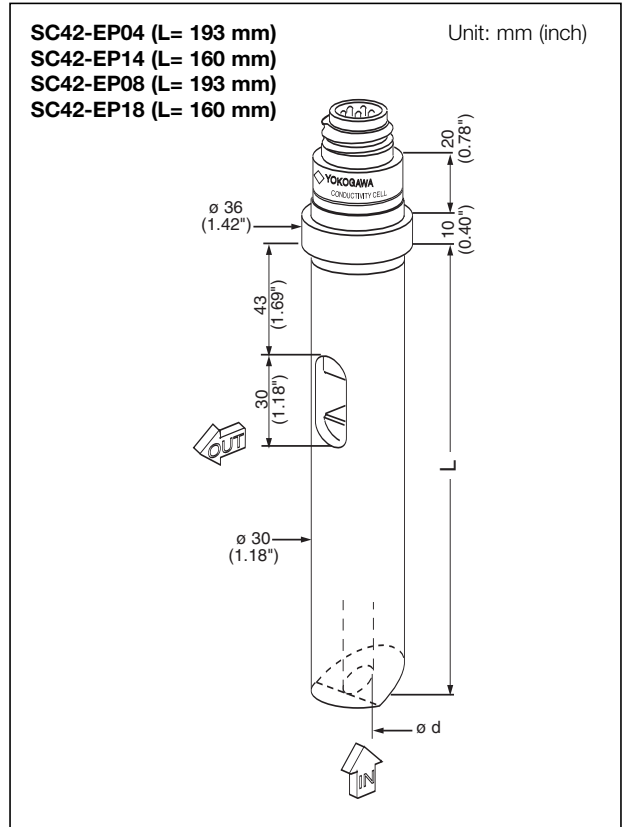
**Weight and immersion length (L in figure)**

Model SC42-EP0. : 270 gram; 193 mm (L)

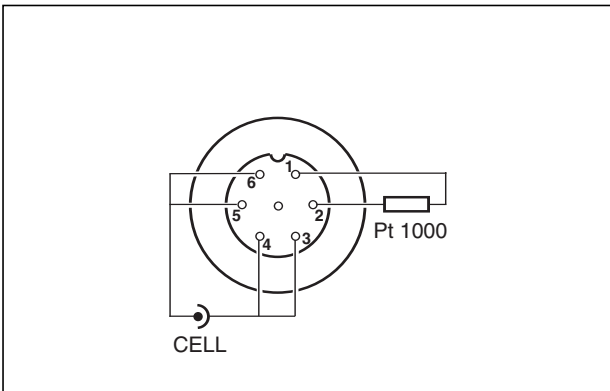
Model SC42-EP1. : 220 gram; 160 mm (L)

**Options**

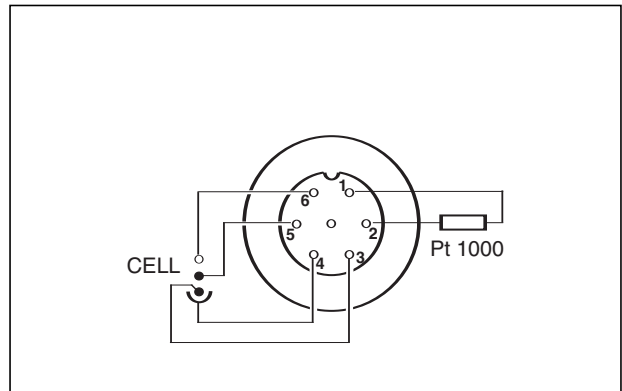
Certificate /Q : Quality inspection certificate



**Flow type**



**Connector 2-electrode system**



**Connector 4-electrode system**

**Functional Specifications**

temperature	90% Temp. response	inlet d $\phi$	Meas. system	Model	Temp. element	Cell constant	Pressure rating	Max.
SC42-EP04	Pt1000	10 cm <sup>-1</sup>	10 bar/142 PSIG		110°C/230 °F	< 3 min.	5 mm	2-el.ectrode
SC42-EP14	Pt1000	1 cm <sup>-1</sup>	10 bar/142 PSIG		110°C/230 °F	< 2 min.	10 mm	2-el.ectrode
SC42-EP08	Pt1000	10 cm <sup>-1</sup>	10 bar/142 PSIG		110°C/230 °F	< 3 min.	5 mm	4-el.ectrode

The maximum pressure and temperature rating also depend on the actual process conditions. Under certain circumstances it is necessary to test the cell in situ. Additional data is available from Yokogawa.

## Plug-in flow sensors (PTFE and PVDF)

### PTFE or PVDF shielded glass-platinum cells for 2- and 4-electrode type with cell constant 10 cm<sup>-1</sup>.

These conductivity sensors are excellent suited for measurement in aggressive media. The (protection) body consists of PVDF (Kynar) or PTFE (Teflon with 25% glass filling).

The cell itself is made from highly resistant glass with platinum electrodes. The electrodes surfaces of the 2-electrode cells (SC42-P04) are further enhanced by gold plating to minimize the polarisation effects.

The internal sealing between the glass measuring cell and the PTFE/PVDF body (not visible in drawing) is by a KALREZ O-ring (high quality with excellent chemical resistance). A VITON O-ring is supplied with the sensors for sealing the cell in the fitting (visible in drawing). For measurements in strongly oxidizing acids an optional KALREZ O-ring is recommended.

### Features

- Excellent chemical resistance for applications in aggressive media like oleum, concentrated mineral acids, etc.
- Suitable for measurement of highly conductive, strongly polluted solutions.
- Optimum results by gold plating (of 2-electrode version) against polarisation effects.

### Typical applications

- PTFE-cell : Concentrated mineral acids such as: oleum, nitric acid, hydrochloric acid, etc.
- PVDF-cell : All aggressive media with the exception of strongly oxidizing agents.

**Note:** See the chemical resistance list in table 1.

## General specifications

### Materials

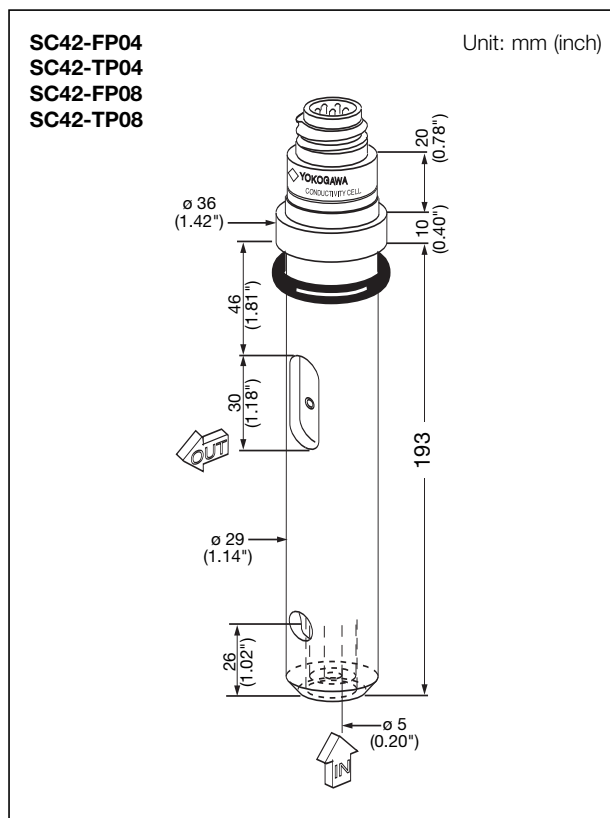
Wetted parts

- Body (shield) : - PVDF (Kynar®) for model SC42-FP04/FP08.  
- PTFE (Teflon® with 25% glass) for model SC42-TP04/TP08
- O-ring : - KALREZ™ for cell-body sealing  
- VITON™ for sealing in het fitting
- Electrodes system : Platinum, Gold plated for 2-electrode
- Inside cell : Glass tube
- Connector plug : Polyamide with gold plated contacts

## Functional Specifications

Model	Temp. element	Cell-constant	Pressure rating	Max. temperature	90% Temp. response	Measurement system
SC42-FP04	PT1000	10 cm <sup>-1</sup>	10 bar/142 PSIG	110°C/230 °F	< 1 min.	2-electrode system
SC42-TP04	PT1000	10 cm <sup>-1</sup>	2 bar/28,5 PSIG	110°C/230 °F	< 1 min.	2-electrode system
SC42-FP08	PT1000	10 cm <sup>-1</sup>	10 bar/142 PSIG	110°C/230 °F	< 1 min.	4-electrode system
SC42-TP08	PT1000	10 cm <sup>-1</sup>	2 bar/28,5 PSIG	110°C/230 °F	< 1 min.	4-electrode system

The maximum pressure and temperature rating also depend on the actual process conditions. Under certain circumstances it is necessary to test the cell in situ. Additional data is available from Yokogawa.



### Flow type

### Weight and immersion length

- Model SC42-FP0 : ca. 270 gram; 193 mm  
Model SC42-TP0 : ca. 320 gram; 193 mm

### WARNING:

Temperature shocks should be avoided

### Options

Certificate /Q : Quality inspection certificate

**Insertion Sensors**

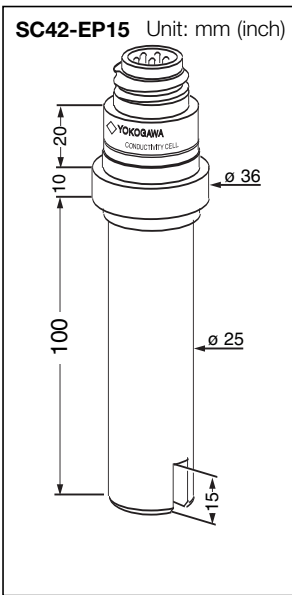
**Insertion sensors for 2-electrode type with cell constant 1 cm<sup>-1</sup>.**

The insertion sensors are especially useful in applications where a representative sample flow through the sensor cannot be achieved easily (e.g. in liquids containing solids, direct measurement in pipe-lines). The electrode surfaces are easily accessed for cleaning or maintenance. The model SC4.-EP15D is especially designed for direct mounting in sanitary piping systems. It has a collar piece suitable for mounting with DN 25.

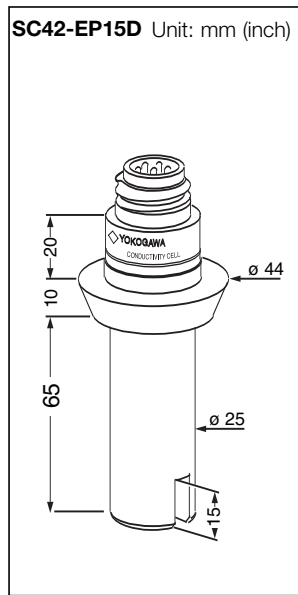
**Features**

- No obstacles in the flow-line by short immersion length.
- Easy cleaning.
- Good chemical resistance.
- Low polarisation distortion.

In addition to that the model SC42-EP15D can be directly fitted with a DN25 swivel.



**Insertion type**



**Insertion type (sanitary)**

**Applications**

For measurement of moderate conductive solutions like surface water, waste water, salt solutions, etc.

**General Specifications**

**Materials**

Wetted parts

- Body : Glass-filled epoxy resin
- Electrodes : Graphite impregnated with epoxy
- Connector plug : Polyamide with gold plated contacts

**Weight and immersion length (L in figure)**

- Model SC42-EP15 : 150 gram; 100 mm
- Model SC42-EP15D : 150 gram; 65 mm

**Options**

Certificate /Q : Quality inspection certificate

**Functional Specifications**

Model	Temp. element	Cell-constant	Pressure rating	Max. temperature	90% Temp. response	Measurement system
SC42-EP15	Pt1000	1 cm <sup>-1</sup>	10 bar/142 PSIG	110°C/230 °F	< 3 min.	2-electrode system
SC42-EP15D	Pt1000	1 cm <sup>-1</sup>	10 bar/142 PSIG	110°C/230 °F	< 3 min.	2-electrode system

The maximum pressure and temperature rating also depend on the actual process conditions. Under certain circumstances it is necessary to test the cell in situ. Additional data is available from Yokogawa.

**Parts and Accessories**

To connect the conductivity sensors to a transmitter or converter Yokogawa supplies special cables already pretreated and equipped with numbers for easy connection to Yokogawa instruments.

Model	Description	Length
WU40-LH01	Conductivity cable	1.0 m
WU40-LH02	Conductivity cable	2.0 m
WU40-LH05	Conductivity cable	5.5 m
WU40-LH10	Conductivity cable	10 m
WU40-LH15	Conductivity cable	15m
WU40-LH20	Conductivity cable	20 m
WU40-LH25	Conductivity cable	25 m

- K1500FX Set of 5 O-rings for sealing the cell in the fitting material: silicone rubber.
- K1500AG Set of 5 O-rings for sealing the cell in the fitting material: VITON™.
- K1500AH One (1) KALREZ™ O-ring for sealing the cell in the fitting.

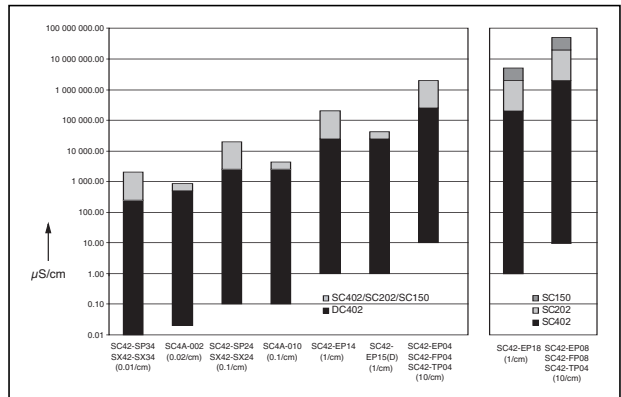
**Selection Criteria**

A good indication of construction materials can be taken from the piping material used in the process equipment. If this material of better is used no problems by corrosion will occur.



In considering the required sensor, please check all four points listed hereafter:

- The pressure and temperature requirements are within the limits of the cell.
- The selected materials (wetted parts) have a good resistance to corrosion according to practice or table 2.
- The conductivity value at the process temperature is within the application range of the cell (see figure 1).
- A selection is made between 2- or 4-electrode measuring system (see figure 1).



**Range ability of conductivity sensors**

## Model FF40/FS40 flow fittings and subassemblies for conductivity measuring loops

To install conductivity sensors in a permanent or semi-permanent location, the program of Yokogawa includes a range of flow and immersion fittings.

A high degree of standardisation simplifies mounting, servicing and removal or replacement of the sensors.

The program includes flow fittings and their subassemblies for in-line or direct mounting of conductivity sensors in piping systems.

A wide choice of construction materials gives the user the best solution for any process considering chemical resistance, pressure and temperature specifications.

### Features

- Wide choice of construction materials.
- High degree of standardisation for all cells.
- Easy mounting, service and removal of sensors.
- Electrolytically polished stainless steel designs for optimal corrosion resistance.
- Available with flange adapters.

### A. Flow Fittings

From a practical plant aspect, the best mounting place of a conductivity sensor is in a by-pass with a sample valve. For these applications the flow fittings are ideal.

### Features

- Easy mounting and maintenance of the sensors.
- Changeable liquid outlet position (right or left).
- Wall mounting bracket.
- Blanking plug for mounting and test applications.

### General Specifications

#### Materials

#### Wetted parts

- Body
    - Model FF40-V22 : Polyvinylchloride (PVC)
    - Model FF40-S22 : Stainless steel AISI 316 (SS)
    - Model FF40-P22 : Polypropylene (PP)
  - O-rings : Silicone rubber
- Mounting brackets for
- Model FF40-V22 : Polypropylene (PP)
  - Model FF40-S22 : Polamide (PA)
  - Model FF40-P22 : Polypropylene (PP)
- Retaining nut for
- Model FF40-V22 : Polyvinylchloride (PVC)
  - Model FF40-S22 : Stainless steel AISI 304 (SS)
  - Model FF40-P22 : Polypropylene (PP)

#### Volume measuring vessel

- Plastic fittings : Approx. 150 ml
- Stainless steel fitting : Approx. 150 ml

#### Mounting connections

- Plastic fittings : For screw M6
- Stainless steel fitting : 2x M8 (female)

### Process connections

- PVC fitting : PVC tube  $\varnothing$  12 O.D.
- PP fitting :  $\frac{1}{2}$ "- NPT (female)
- SS fitting :  $\frac{1}{2}$ "- NPT (female)
- Flange (option) :  $\frac{1}{2}$ " ANSI 150 lbs or DN 15 PN10

### Weight

- Model FF40-V22 : 770 gram
- Model FF40-S22 : 550 gram
- Model FF40-P22 : 530 gram

### Functional Specifications

#### Temperature

- Min. :  $-10^{\circ}\text{C}$
- Max. : Depending on material and application (see fig. 2)

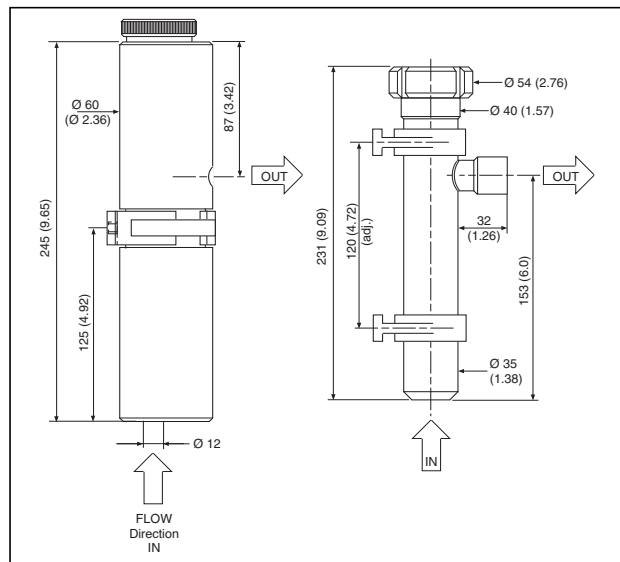
#### Flow rate

- : 0,1 - 10 l/min (depending on application)

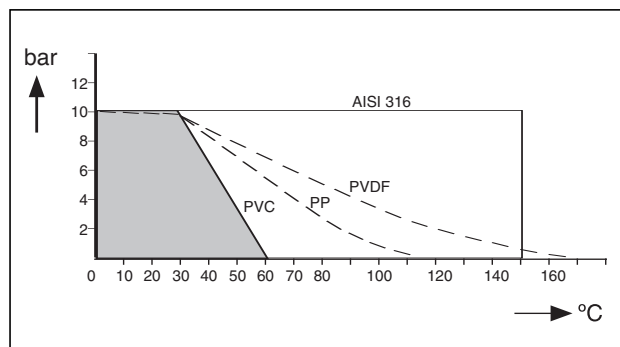
#### Pressure

- : See fig. 2

### Dimensions



### Flow Fittings



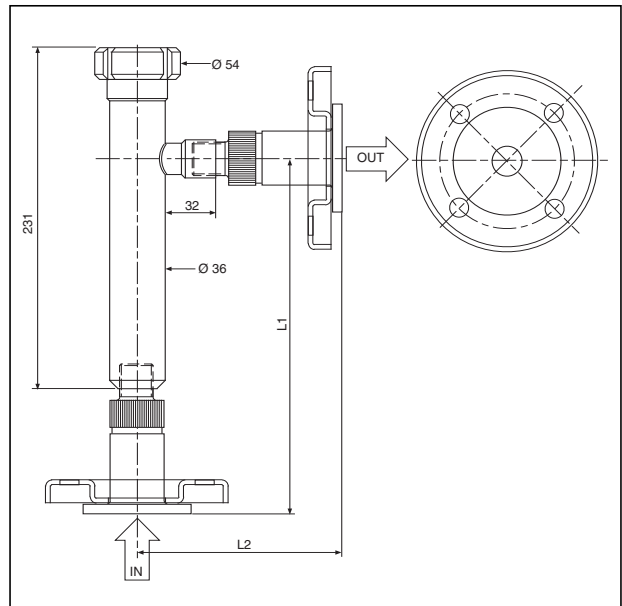
### Pressure/temperature class

**Model and Suffix Codes**

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

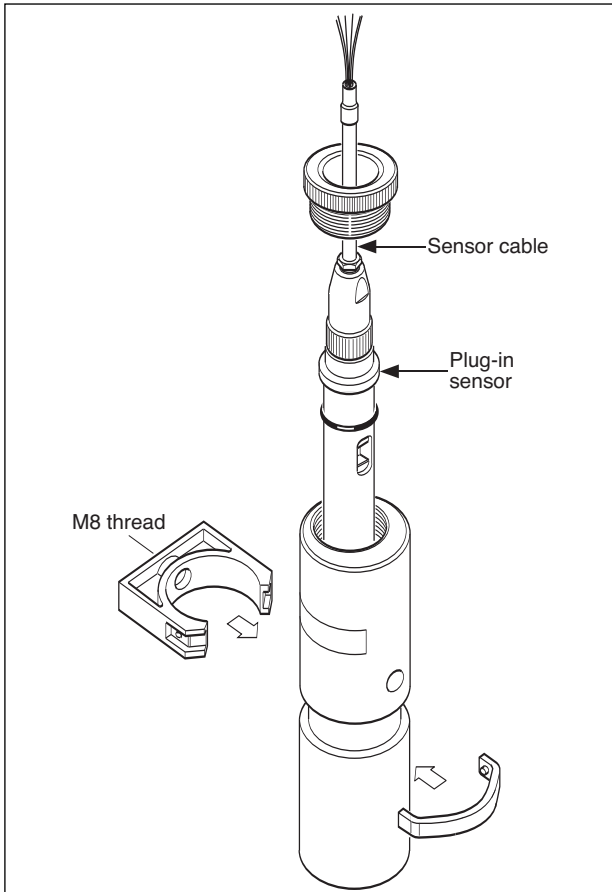
**Spare Parts**

Part no.	Description
K1500AK	O-rings EPDM 29.74x3.53 (5)
K1500EG	Mounting clampset for FF40-S22
K1500EH	Mounting clamp for FF40-P/V22
K1500FX	O-rings Sil 70 29.74x3.53 (5)
K1521AD	Flange adapter /FS3
K1521AF	Flange adapter /FP3
K1521AG	Flange adapter /FS4
K1521AJ	Flange adapter /FP4
K1521AK	Flange adapter /FS1
K1521AM	Flange adapter /FP1
K1521AN	Flange adapter /FS2
K1521AQ	Flange adapter /FP2

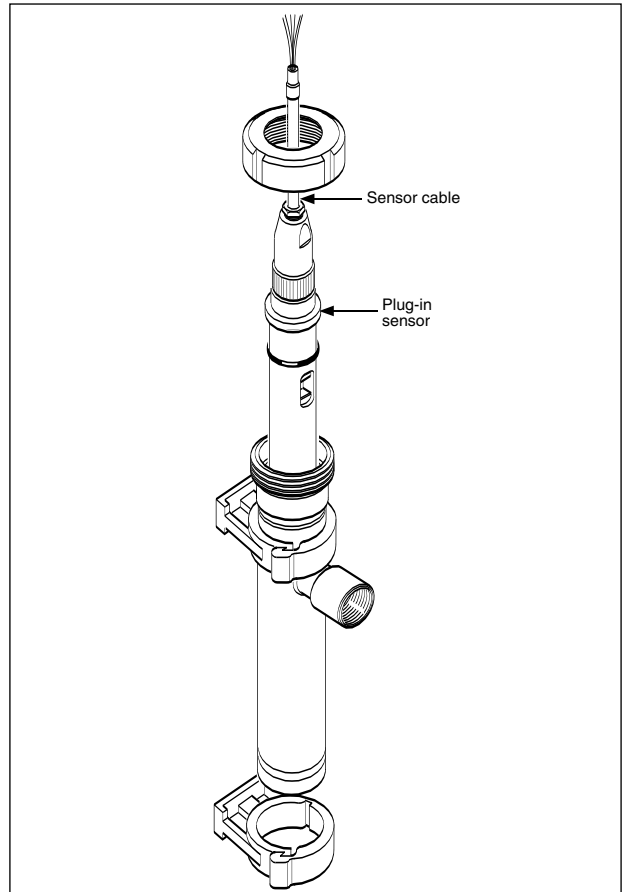


**Dimensions of Flange options**

Type	NW15ND10		NW25-ND10		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"



**PVC/PP flow fitting**



**Stainless steel flow fitting**

## B. Subassemblies

The subassemblies are designed for mounting conductivity sensors in a tank wall or directly into a piping system. They can be easily mounted in the process piping by welding, cementing or screwing.

The stainless steel subassemblies meet the requirements of DIN 11850 and DIN 11851 for sanitary constructions.

### Features

- Suitable for mounting in a T-piece or directly in the piping system.
- Designs for mounting the plug-in type sensor and the insertion type sensor with collar piece DN 25 (D-model).

## General Specifications

### Materials

#### Wetted parts

- a. Body
- Model FS40-S22-WE : Stainless steel AISI 316 (SS)
  - Model FS40-S22-TP : Stainless steel AISI 316 (SS)
  - Model FS40-S23-DF : Stainless steel AISI 316(SS)
  - Model FS40-F22-PA : Polyvinylidene fluoride (PVDF)
  - Model FS40-F22-TP : Polyvinylidene fluoride (PVDF)
  - Model FS40-V22-WE : Polyvinylchloride (PVC)
  - Model FS40-V22-TP : Polyvinylchloride (PVC)

- b. Sealing ring
- Silicone rubber : DIN/ISO 1629 code VMQ
  - Buna N : DIN/ISO 1629 code NBR
  - Perfluorelastomer : DIN/ISO 1629 code PFFPM

### Process connections

- Model FS40-S22-WE : DN32
- Model FS40-S22-TP : 1<sup>1</sup>/<sub>4</sub>"- 11,5 NPT
- Model FS40-S23-DF : DN25
- Model FS40-F22-PA : ISO 228/1 - G 1<sup>1</sup>/<sub>4</sub>" (BSPP)
- Model FS40-F22-TP : 1<sup>1</sup>/<sub>4</sub>"- 11,5 NPT
- Model FS40-V22-WE : DN32
- Model FS40-V22-TP : 1<sup>1</sup>/<sub>4</sub>"- 11,5 NPT

### Weight

- Model FS40-S22-WE : 0.21 kg
- Model FS40-S22-TP : 0.30 kg
- Model FS40-S23-DF : 0.13 kg
- Model FS40-F22-PA : 0.10 kg
- Model FS40-V22-WE : 0.45 kg
- Model FS40-V22-TP : 0.12 kg
- Model FS40-F22-PA : 0.13 kg

## Functional Specifications

### Temperature

- Min. : -10°C (14 °F)
- Max. : Depending on material (see fig. 2)

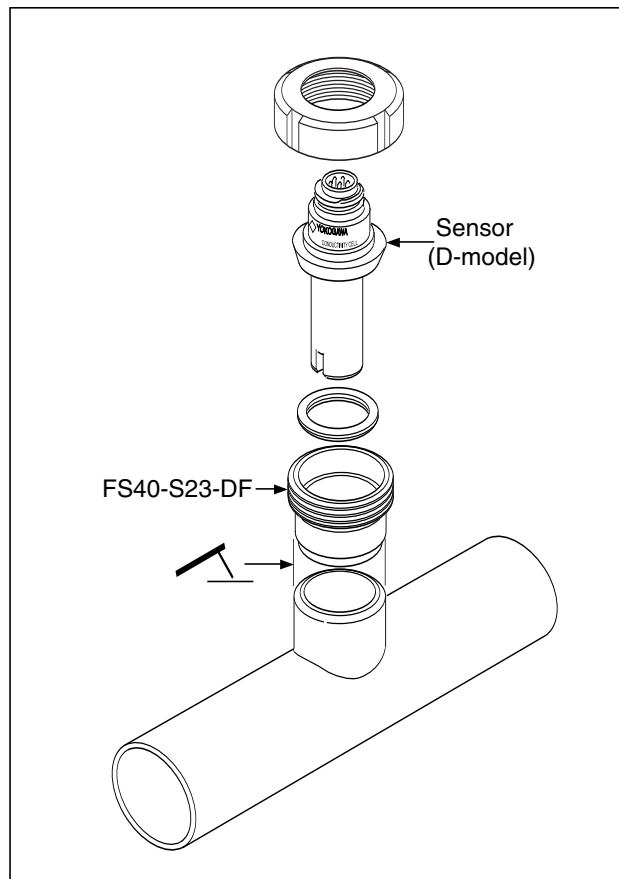
- Pressure : See fig. 2

## Model and Suffix Codes

Model	Suffix code	Option code	Description
FS40			Flow fitting subassembly
Material	-F22 -S22 -V22 -S23		Polyvinylidene fluoride (PVDF) Stainless steel (SS) Polyvinylchloride (PVC) Stainless steel D-Model (SS)
Mounting	-WE -PA -TP -DF		Weld-in socket for S version Glue-in socket for V version. Parallel thread, only for PVDF version (ISO 2281- G1 <sup>1</sup> / <sub>4</sub> " ) Tapered pipe thread (1 <sup>1</sup> / <sub>4</sub> " NPT) For insertion type sensor with collar piece DN25 only (only for S23)
Certificate	/M		Material certificate 3.1 according to EN 10024 (only wetted metal parts)

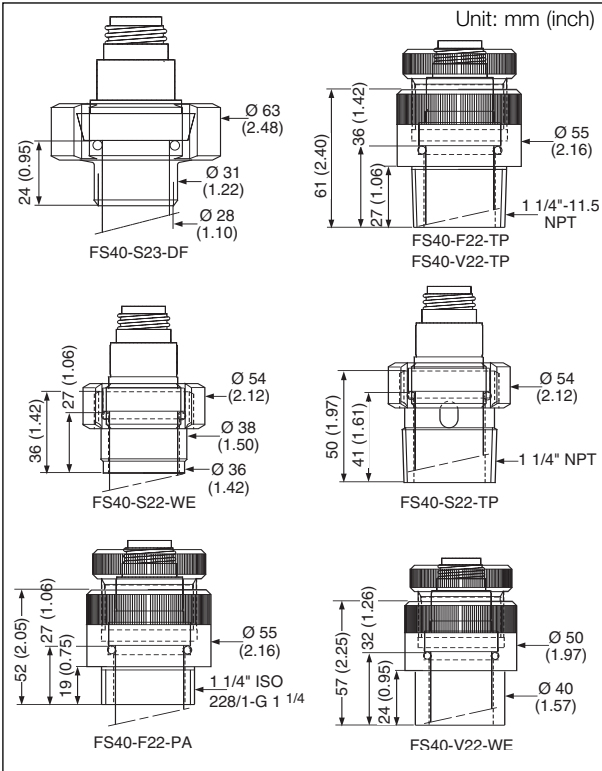
## Spare Parts

Part no.	Description
K1500AH	O-ring Kalrez 29.74x3.53
K1500AR	O-rings Sil 70, FS40-F22-PA (5x)
K1500FX	O-rings Sil 70 29.74x3.53 (5)
K1500HE	O-ring set silicon, FS40-S23

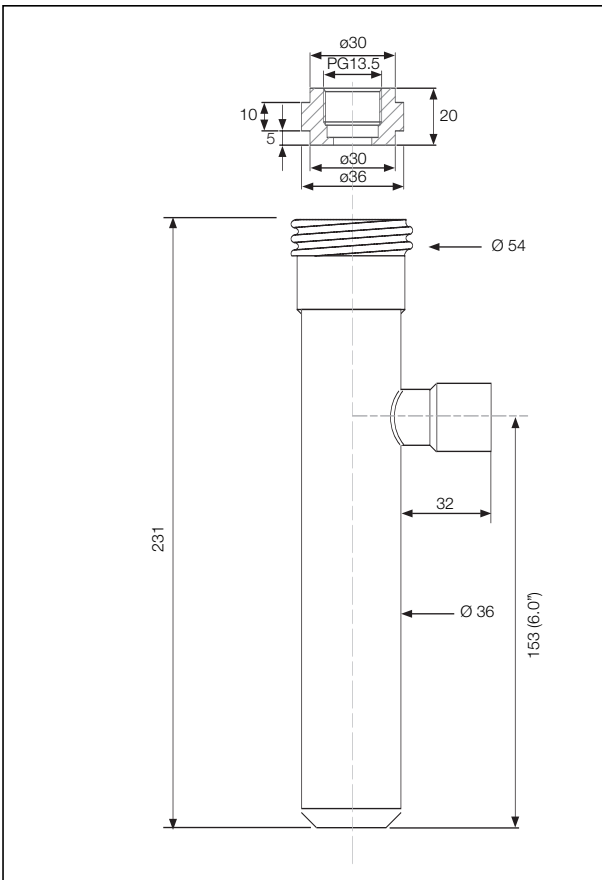


## Installation example

**Dimensions**

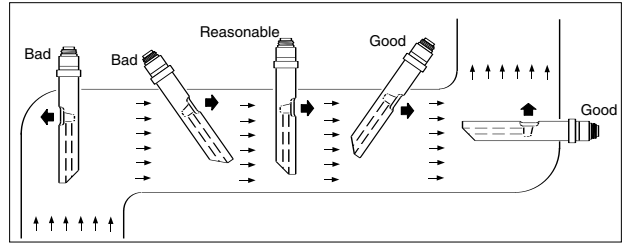


**Flow Fittings subassembly**



**Description K1523JA**

Description: Adapter to fit sensors with a PG13,5 process connection in FF40/FS40 and FD40 fittings. Material: Polypropylene



**Mounting position sensors**

**Accessories and Options**

Type	Description
WF10	Connecting cable (between connecting box and transmitter)
WU40-LH01	Sensor cable (1 m)
WU40-LH02	Sensor cable (2 m)
WU40-LH05	Sensor cable (5,5 m)
WU40-LH10	Sensor cable (10 m)
WU40-LH15	Sensor cable (15 m)
WU40-LH20	Sensor cable (20 m)
WU40-LH25	Sensor cable (25 m)

**Service Parts**

Type	Description
K1500AR	Silicone O-rings (42.52 x 2.62) for PVDF subassembly (qty. 5)
K1500HE	Sealing rings (29.74 x 3.53) for SS subassembly (D-model)
K1500FX	Silicone O-rings (29.74 x 3.53) for other fittings and subassemblies (qty. 5)
K1500AH	Perfluorelastomer O-ring (Kalrez) (29.74 x 3.53) for fittings and subassemblies (optional), except for the DF style (qty. 1)
K1500AK	EPDM O-rings (29.74 x 3.53) for fittings and subassemblies (optional), except for the DF model (qty. 5)

**Ordering Instructions**

When ordering, specify model and code, item name and part no.:

- Flow fitting : FF40-P22, FF40-S22 or FF40-V22
- Subassembly : FS40-F22-..., FS40-S22-..., FS40-V22-... (flow fitting) or FS40-S23-DF
- Sensor cable, : WU40-LH01, WU40-LH02, WU40-LH05, WU40-LH10 if relevant WU40-LH15, WU40-LH20 and WU40-LH25.
- Connecting box/connecting cable (only when converter is installed a distance from the fitting) : BA10/WF10 or BP10/WF10 (IS Design)
- Accessories : Part name and part number (quantity)
- Service parts : Part name and part number (quantity)

### Model FD40 Immersion Fittings for conductivity measuring loops

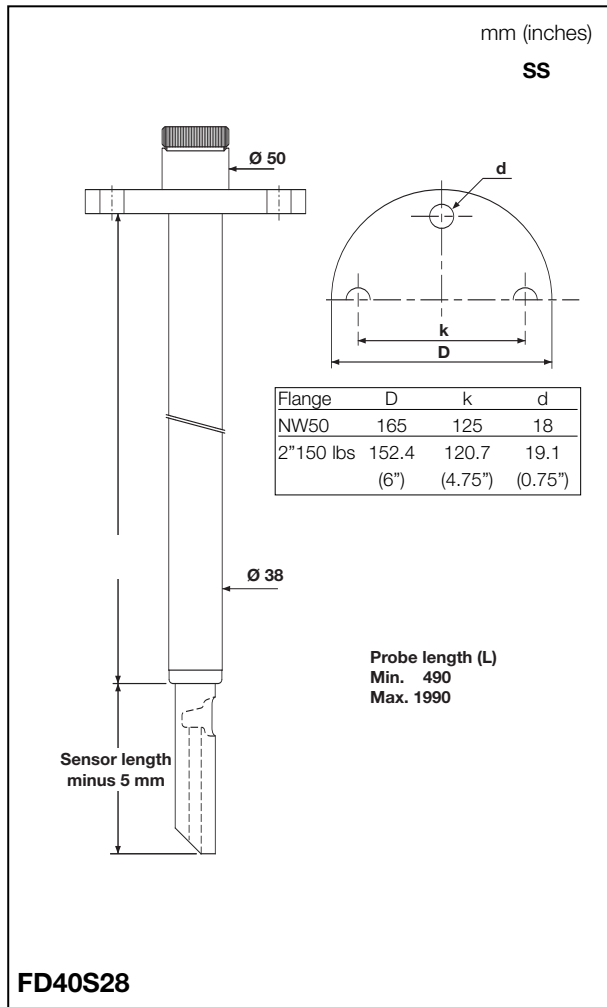
For installing conductivity sensors in a permanent or semi-permanent location, the program of Yokogawa includes a range of flow and immersion fittings.

The immersion fittings are for installing conductivity sensors in tanks, open vessels or drains. The constructions of PVC and stainless steel suit most process conditions, considering chemical resistance, pressure and temperature specifications. The fittings of stainless steel might be used in sanitary applications. A mounting flange can be ordered.

#### Features

- Designed for mounting conductivity sensors in tanks, open vessels and drains.
- Easy mounting, service and removal or replacement of sensors.
- High pressure and temperature specifications.
- With or without flanged connection.
- Stainless steel construction for sanitary applications.
- Several lengths available.

From a practical plant aspect, the immersion fittings should be installed in a site, where the point of measurement truly represents the entire solution. Avoid areas where the measurement varies significantly. 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. Select a mounting place where the sensor is always immersed in the process liquid.



#### General Specifications

- |                                |   |
|--------------------------------|---|
| <b>Wetted parts</b>            | <b>Materials</b>  |
| <b>a. Body</b>                 | : Stainless steel AISI 316 (SS)<br>Polyvinylchloride (PVC)<br>(refer to model code) |
| <b>b. O-rings</b>              | : Silicone rubber (other materials see accessories)                                 |
| <b>Sensor cable</b>            | : Six wire multicore, covered with thermoplastic PVC<br>length: 5.5 m or 10 m       |
| <b>Blanking plug*</b>          | : Ryton R4  |
| <b>Weight (without flange)</b> | : a. PVC fitting 1.7 kg<br>b. SS fitting 4.5 kg                                     |

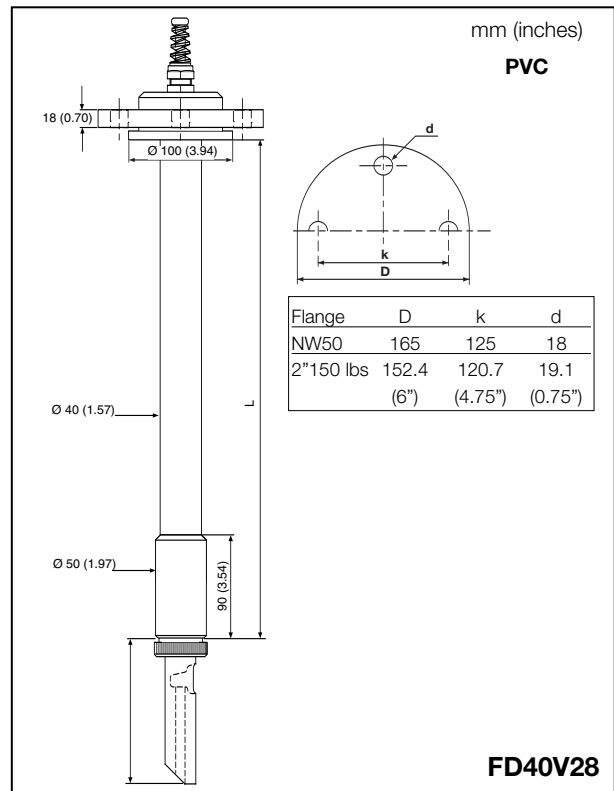
\* This plug is for test applications only and must be removed before mounting the sensor.

#### Functional Specifications

- |                                 |  |
|---------------------------------|--|
| <b>Temperature</b>              |  |
| Min.                            | : -10°C (14 °F)                                      |
| Max.                            | : Depending on material and application (see fig. 3) |
| <b>Pressure</b>                 | : See fig. 3   |
| <b>Immersion length fitting</b> | : 0.5 to 2.0 m (in steps of 0.1 m)                   |

#### Spare Parts

Part no.	Description
K1500AB	Cable gland 1/2 inch NPT (10)
K1500AK	O-rings EPDM 29.74x3.53 (5)
K1500AW	Flexible conduit, 5 meter
K1500AX	Flexible conduit, 10 meter
K1500AY	Connection parts for conduit
K1500EM	/PH25 for immersion holders
K1500DN	/PH03 protection hose, 3 meter
K1500DN	/PH05 protection hose, 5 meter
K1500DN	/PH10 protection hose, 10 meter
K1500DN	/PH15 protection hose, 15 meter
K1500DN	/PH20 protection hose, 20 meter



**Model and Suffix Codes**

Model	Suffix	option	Description
FD40V28			Immersion fitting PVC
FD40S28			Immersion fitting Stainless steel
Immersion	-NN		Between 0.5 and 2.0 m length (in dm) example:= <b>06</b> m
	-NC		No cable
	-FN		No flange
	-F1		PVC flange DIN DN50 PN10
	-F2		PVC flange ANSI 2" 150 lbs
	-F3		SS flange DIN DN50 PN10 (AISI 316)
	-F4		SS flange ANSI 2" 150 lbs (AISI 316)
		*B	Style code B
Protection hose	/PH5		For 5,5 m cable
Mounting kit	/PH10		For 10 m cable
Cable	/C05		(Length 5.5 m)
	/C10		(Length 10 m)
Certificate	/M		Material certificate 3.1 according to EN 10024 (on wetted metal parts only)

**Ordering Instructions**

When ordering, specify model and code, item name and part numbers:

1. Immersion fitting : FD40V28 or FD40S28
2. Sensor cable, if relevant : WU40-LH05 or WU40-LH10
3. Connecting box/connecting cable (only when converter is installed a distance from the fitting) : BA10/WF10
4. Accesories : Part name and part number (quantity)
5. Service parts : Part name and part number (quantity)

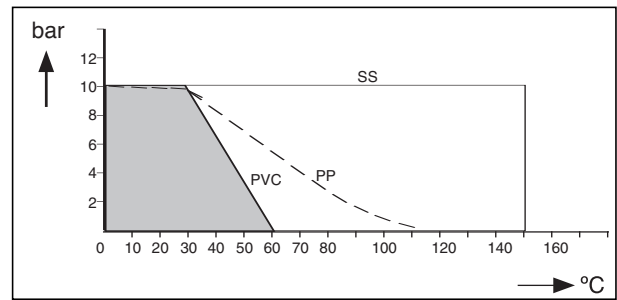
**Accessories and Options**

Type	Description
BA10	Connection box (between fitting and transmitter)
WF10	Connecting cable (between connecting box and transmitter)
WU40-LH05	Sensor cable (5,5 m)
WU40-LH10	Sensor cable (10 m)
K1500CJ	/PH05 cable protection
K1500CK	/PH10 cable protection
K1500DN	/PH03 protection hose, 3 meter
K1500DN	/PH05 protection hose, 5 meter
K1500DN	/PH10 protection hose, 10 meter
K1500DN	/PH15 protection hose, 15 meter
K1500DN	/PH20 protection hose, 20 meter

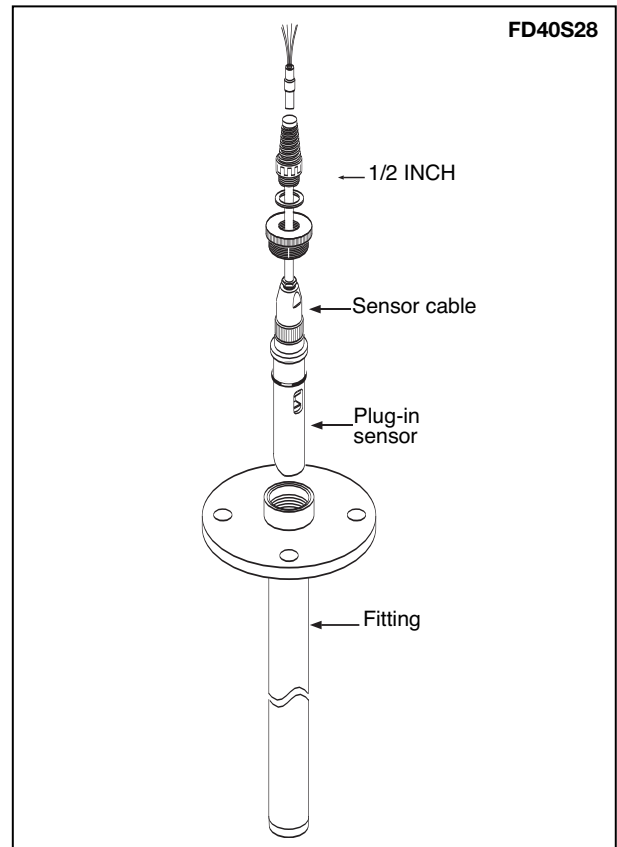
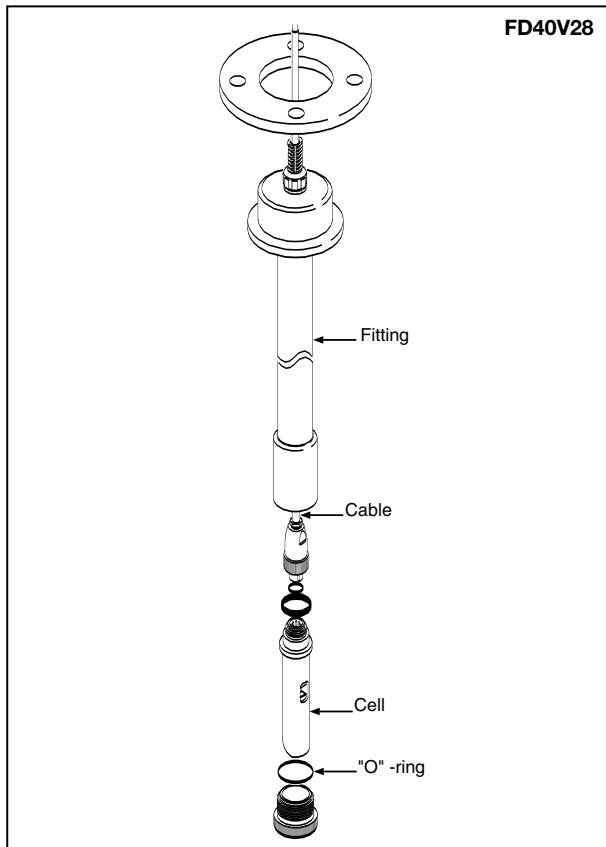
**Service Parts**

Type	Description
K1500FX	5x O-rings for mounting the sensor in a fitting
K1500FY	5x O-rings (Silicone) for sealing the cell
K1500AH	1x O-rings (KALREZ)
K1541ZY	/MS1 for FD30 / ISC40FD and FD40

\* Special material for use in aggressive mediums.



**Pressure/temperature class**



**Table 1**

		Material																														
		PTFE (teflon)	PVDF (Kynar)	S.S. 316	EPOXY	VITON	GLASS	PEEK	KALREZ	SILICONE RUBBER																						
		Temp. °C		Temp. °C		Temp. °C		Temp. °C		Temp. °C		Temp. °C																				
% Conc.		20	60	100	20	60	100	20	60	100	20	60	100	20	60	100	20	60	100													
Inorganic acid	Sulfuric acid	10	0	0	0	X	X	X	O	X	X	0	0	0	0	0	0	0	0	0	0											
		50	0	0	0	X	X	X	X	X	X	0	0	0	0	0	0	0	0	-	-	-										
		95	0	0	0	O	X	-	X	X	X	-	-	-	0	0	0	0	0	-	-	-										
		fuming	0	0	0	-	-	-	-	-	-	-	0	0	0	0	0	0	0	-	-	-										
	Hydrochloric acid	10	0	0	0	0	0	0	-	-	-	O	X	-	0	0	0	0	0	O	X											
		sat.	0	0	0	0	0	0	-	-	-	O	X	-	0	0	0	0	0	O	X											
	Nitric acid	25	0	0	0	0	X	X	X	X	-	-	-	O	X	-	0	0	X	0	0	O	X									
		50	0	0	0	0	X	X	X	X	-	-	-	-	-	-	0	0	0	X	X	0	0	X	-	-						
		95	0	0	0	0	O	X	-	0	0	0	-	-	-	-	0	0	0	-	-	-	0	O	X	-	-	-				
	fuming	0	0	0	0	-	-	-	0	0	0	-	-	-	-	0	0	0	-	-	-	0	O	X	-	-	-					
	Phosphoric acid	25	0	0	0	0	0	-	-	-	O	X	-	0	0	0	0	0	0	0	0	0	0	0	0	0	X					
		50	0	0	0	0	0	X	X	X	X	-	-	-	O	X	-	0	0	0	0	0	0	0	0	0	0	X				
95		0	0	0	0	0	0	0	0	0	O	X	-	X	X	-	0	0	0	0	0	0	0	0	0	O	X	X				
Hydrofluoric acid	40	0	0	0	0	0	-	-	-	X	X	-	0	0	0	X	X	X	-	-	-	0	O	X	-	-	-					
	75	0	0	0	0	0	-	-	-	X	X	-	0	0	0	-	-	-	-	-	-	0	O	X	-	-	-					
Organic acid	Acetic acid	10	0	0	0	0	0	O	X	-	O	X	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0				
		glacial	0	0	0	0	O	X	-	O	X	-	X	-	-	-	0	0	0	0	O	X	0	0	0	0	0	0	0			
	Formic acid	80	0	0	0	0	0	0	X	X	X	X	-	-	-	0	0	0	0	X	X	X	O	X	0	0	0	0				
	Citric acid	50	0	0	0	0	0	0	0	0	0	X	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Alkali	Calcium hydroxide	sat.	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	Sodium hydroxide	40	0	0	0	0	0	0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0				
	Ammonia in water	30	0	0	0	0	0	0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0				
Acid salt	Ammonium chloride	sat.	0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	Zinc chloride	50	0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	Iron (III) chloride	50	0	0	0	0	0	0	-	-	-	O	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Basic salt	Sodium sulfite	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	Sodium carbonate	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Neutral salt	Potassium chloride	sat.	0	0	0	0	0	0	X	X	X	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	0	0	0	0	0	0	0	0	0				
	Calcium chloride	sat.	0	0	0	0	0	0	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	Sodium chloride	sat.	0	0	0	0	0	0	X	X	X	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	X	X	X	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	0	0	0	0	0	0				
Oxidizing agent	Hydrogen peroxide	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X			
	Sodium hypochloride	50	0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Potassium dichromate	sat.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Chlorinated lime		0	0	0	0	0	0	X	X	X	O	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X	-	-	0	0	0
Organic solvent	Ethanol	80	0	0	0	0	0	0	0	0	0	0	X	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Cyclohexane		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Toluene		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Trichloroethane		0	0	0	0	0	0	X	X	X	O	X	X	-	-	X	X	X	0	0	0	0	0	0	0	X	-	-	-	-	-
	Water		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

O = can be used                      X = shortens useful life                      - = cannot be used

**Note:** There are many variables affecting corrosion, making it virtually impossible to compile a conclusive corrosion table applicable under all possible process conditions. The indications in table 2 cannot be used as a recommendation by Yokogawa for the choice of materials. The selection of a suitable material is the sole responsibility of the user. Yokogawa disclaims any reference to this leaflet on that basis.

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