

General Specifications

Model ISC40G (S) Inductive Conductivity sensor and fittings

The model ISC40 sensors are designed for use with the EXA: ISC40G(S) 2-wire transmitters and the EXA: ISC450G 4-wire analyzers. This combination exceeds all expectations for conductivity measurement in terms of: reliability, accuracy, rangeability and price performance.

The accuracy is 0.5% of reading plus 0.5 $\mu\text{S}/\text{cm}$ for any conductivity value: whether measured in rinse water or in concentrated acids. The materials of construction guarantee a long life under harsh industrial conditions:

- The erosion/abrasion resistant PEEK (Poly Ether Ether Ketone), which also features excellent chemical resistance in all solutions except fluoric acid or oxidizing concentrated acids.
- The ultimate material in terms of chemical resistance: PFA for applications in hydrofluoric acid and oxidizing concentrated acids (nitric, sulfuric, oleum).

The PEEK sensor is provided with a rugged Stainless Steel mounting thread, nut and gasket combination for ultimate flexibility in installation using bulk head installation technique. There is also a wide range of holders and options available for reliable in-line or off-line installation with double O-ring seals for long service life of the sensor. Additional models are available for use in Ball-Valve Insertion applications and in Sanitary Flange installations.

The ISC40G and ISC40s are available in PEEK (sensor type GG) for general use. In applications where sample is aggressive to PEEK we offer the sensor in Teflon (Sensor type TG).

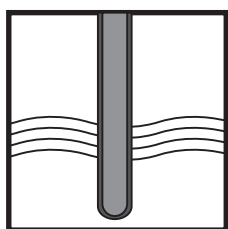
Both sensors have a large bore for optimal resistance to fouling processes and when properly installed, the flow will keep the sensor clean preventing measuring errors.



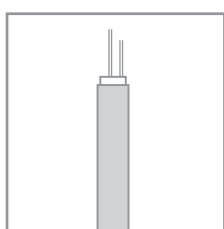
Features and Applications

- Inductive Conductivity technique for elimination of fouling and polarization errors.
- Wide bore sensors for long term stability.
- Installation flexibility by wide range of holders and by the use of universal bulkhead construction.
- Wide rangeability in terms of conductivity (1 $\mu\text{S}/\text{cm}$ to 2 S/cm) and temperature (-20 to 130°C).
- All applications where severe electrode fouling prevents the use of contacting electrodes.
- All ranges except the (ultra) pure water applications.
- All slurry applications where conventional systems suffer from plugging or erosion.
- All applications where the 6 decade rangeability is necessary for accurate process control.

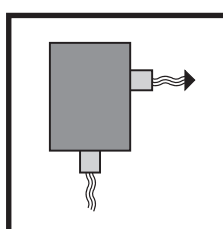
System Configuration



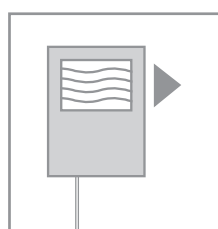
Sensors



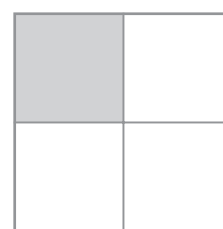
Cables



Fittings



Transmitters

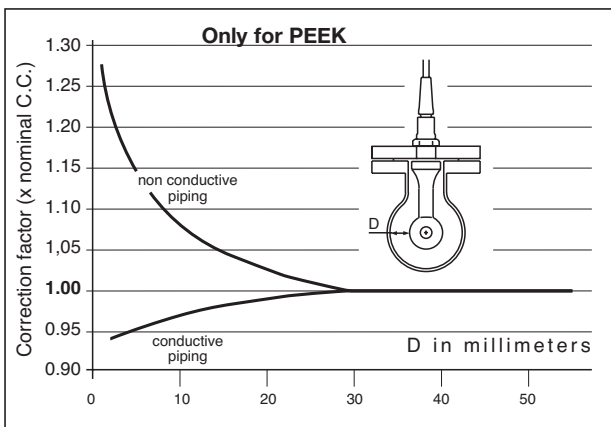


Accessories

General Specifications

Model ISC40 Inductive conductivity sensor

- A. Compatibility** : ISC40G is suitable for use with both ISC450G and I(S)C202G(S) inductive conductivity transmitter.
- B. Hazardous area** : ISC40S is suitable for use with the I(S)C202S conform to ATEX, FM and CSA intrinsic safety standards
- ATEX intrinsic safety : II 1 G EEx ib [ia] IIC T6 for ambient temp. -10 to 40°C
: II 1 G EEx ib [ia] IIC T4 for ambient temp. -10 to 55°C
 - ATEX certificate no. : KEMA 00 ATEX 1067 X
 - FM intrinsic safety : IS CL1, DIV1, GP ABCD T3B for ambient temp. (ta)
-10°C to 55°C and T4 for ambient temp. (ta) -10°C to 40°C.
 - FM approval report : J.L. 1Y1A7.AX
 - CSA intrinsic safety : Ex [ia] Class I, Division 1, Groups C and D, T4a
 - CSA approval file : LR 102851-1
- C. Measuring range** : 0- 2000 mS/cm at actual process temperatures. The sensor has an error of 0.5 µS/cm (PEEK sensors) or 1 µS/cm (PFA sensor) that must be considered when application range is chosen.
- D. Installation factor** : Cellconstant: The nominal cell constant of the sensor is 1.88/cm for the PEEK sensor types and 3.00/cm for the PFA sensor. The calibrated values are indicated on the cable markers and the actual installation can change this factor. If there is less than 25 mm spacing between sensor and holder, in-situ calibration is necessary to meet the specified accuracies. An indication is given in figure.



Actual installed cell-constant as function of spacing around the sensor.

E. Process temperature range

- Peek : -20 to 130°C (0 to 270 °F) for Response time 5 min. (90%)
- PFA : -20 to 100°C (0 to 212 °F) Response time 10 min. (90%)

F. Process pressure

- Peek : Maximum 20 bar (300 psi) dependant on installation.

	°C	°F	°C	°F
Temperature	100	212	20	36
Pressure BAR	5	-	10	-
Pressure PSI	-	71	-	142

G. Materials

- Sensor wetted parts : Victrex PEEK (Poly-Ether-Ether-Ketone)
: Complies with the FDA regulations for plastic for food contact of the FDA.21 CFR 177.2415
- PFA (High purity Perfluoro alkoxy alkane)
- Sealing gasket : Viton for PEEK
: Gore tex for PFA
- Process adapters : AISI 316 SS, PVC or PVDF (only for PEEK)

- H. Process connection** : Process connection are made in combination with a variety of adapters and fittings. See relevant sections in this document.

I Cables

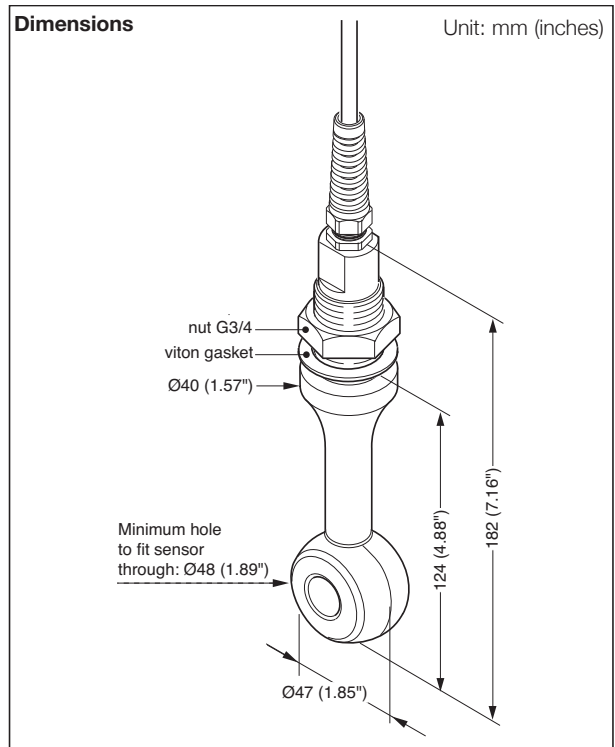
- Connection cable : Integral connection cable in a variety of lengths up to 20 meter.
- Extension cable : Extension cable with WF10 junction box BA10 can be used to a total of 50 meters (fixed cable and extension cable).

J. Shipping details

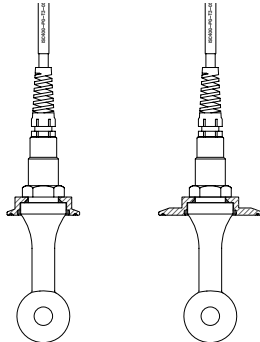
- Package
 - 3-5 meters : WxHxD = 350x270x50 mm
 - 10-20 meters : WxHxD = 320x240x110 mm
- Packed weight approx.
 - 03 m : 1.0 kg
 - 05 m : 1.3 kg
 - 10 m : 1.6 kg
 - 15 m : 2.1 kg
 - 20 m : 2.5 kg
 - protection hose : 0.8 kg (approx.)

ISC40G(S)-GG Model

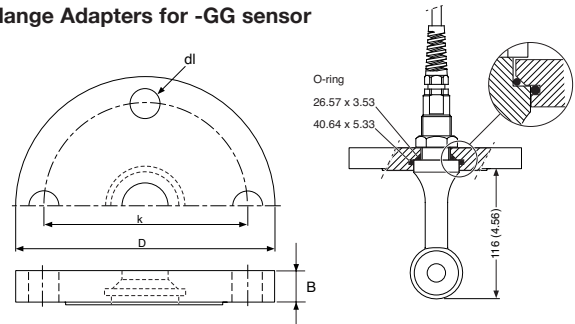
Model	Suffix	Option	Description
ISC40G			General purpose inductive conductivity sensor
Sensor type	-GG		Glass filled PEEK, general model
	-GR		Glass filled PEEK, retractable model
	-GS		Glass filled PEEK, shaft model
	-TG		PFA, general model
	-TF		PFA, flange model
Temperature sensor	-T1		Pt1000
	-T3		30k thermistor, for IC200 select only T3
Cable length	-03		03 meter
	-05		05 mete
	-10		10 meter
	-15		15 meter
	-20		20 meter
Options for Sensor		Material	Proc.Connection
Flange adapters -GG, -TG	/SFA	AISI 316 SS	2" ANSI 150 lbs
	/SFD	AISI 316 SS	NW50-PN16
	/STW	AISI 316 SS	3" tri-clamp
	/S2W	AISI 316 SS	2" tri-clamp
	/TFD	TFM, AISI 316 SS	NW65-PN10
	/TFN	TFM	For NW65-PN10
Flange adapters for -GS	/SFT	AISI 316 SS	Sanitary Tuchenhausen
	/STC1	AISI 316 SS	Sanitary 2" tri clamp
	/STC2	AISI 316 SS	Tri-clamp complete
Protection Hose for -TF	/PH□	03m /05m /10m /15m /20m	Same length as the cable
Certificates	/M	Material certificate	Not for -GR
	/Q	Quality certificate	



Adapters for ISC40G(S)-GG



Flange Adapters for -GG sensor



Flange adapter for -GG sensor

Partno.	Description
K1541KB	3" Triclover (STW) (ISO 2852)
K1541KC	2" Triclover (S2W) (ISO 2852)
K1542FE	Weld-in 2" Triclover (incl. clamp)
K1542FH	Weld-in 3" Triclover (incl. clamp)

Note: clamp not included

DIMENSIONS mm (inches)

d	D1	D2	Material	
/SFA	Ø 19 (0.75)	121 (4.75)	152 (6.0)	SS
/SFD	Ø 18 (0.71)	125 (5.00)	165 (6.5)	SS

O-rings spare parts for ISC40 sensor & Options as spare parts

Dimensions	O-ring material				
	EPDM	Viton	Silicon	KALREZ	Quantity
O-rings for option /SFA /SFD 40.64 x 5.33 / 26.57 x 3.53	K1500CA	K1500CB	K1500CC	K1500CD K1500CH	5 sets of 2 O-rings
O-rings for K1541KC (/S2W) 40.87 x 3.53 / 26.57 x 2.62 2" seal-clamp	K1541ZH	K1500DJ	K1500DK		2 sets of 3 O-rings
O-rings for K1541KB (/STW)° 40.87 x 3.53 / 26.57 x 2.62 3" seal-clamp	K1541ZK	K1500DL	K1500DM		2 sets of 3 O-rings
O-rings for old models Viton gasket		K1500AM			5 O-rings

GS 12D8J2-E-E

Fittings for ISC40G(S)-GG Inductive Conductivity Sensors

For liquid analysis, the sensors are frequently mounted in either a flow or an immersion fitting. Yokogawa supplies for the model ISC40 inductive conductivity sensors a full range of fittings with particular emphasis on designs that reduce installation and maintenance time and consequently save operation costs.

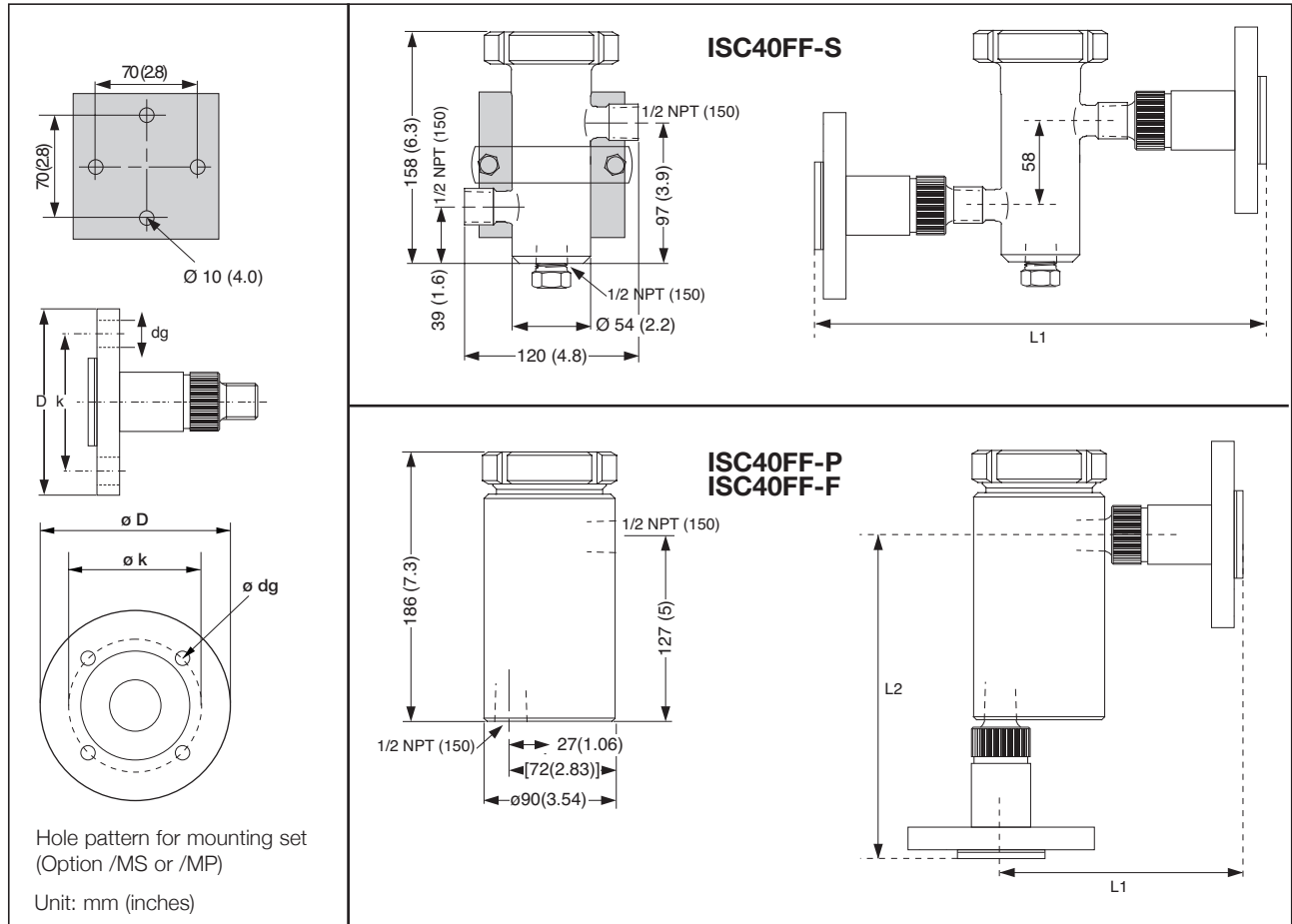
A wide choice of construction materials gives the user the optimal solution for any process considering chemical resistance, pressure and temperature specifications.

The flow fittings are used for installation of the sensors in sample by-pass lines. This makes maintenance easy without having to interrupt the main process stream. The subassemblies simplifies mounting of the sensors direct into process lines or vessels. This is particularly important where sample lines give problems, for instance with settling slurries.

Features

- Wide choice of construction materials.
- Built in drain on stainless steel flow fitting.
- Quick disconnect direct insertion sub assemblies.
- High temperature PVC immersion fitting with optional flanged process connection for adjustable insertion depth.
- High pressure and temperature specifications.
- Electrolytically polished stainless steel fittings for optimal corrosion resistance.

Dimensions in mm (inches)



Model ISC40FF Flow fitting

A. Process temperature

- Model ISC40FF-S : Maximum 150°C (300°F)
- Model ISC40FF-P : Maximum 100°C (210°F)
- Model ISC40FF-F : Maximum 130°C (270°F)

B. Process pressure

- Model ISC40FF-S : Max. 1.0 MPa (150 psi) at 150°C (300 °F)
- Model ISC40FF-P : Max. 0.6 MPa (90 psi) at 20°C (70°F)
Max. 0.1 MPa (15 psi) at 100°C (210°F)
- Model ISC40 FF-F : Max. 1.0 MPa (150 psi) at 20°C (70°F)
Max. 0.1 MPa (15 psi) at 120°C (250°F)

C. Wetted materials

- Model ISC40FF-S : AISI 316 Stainless Steel
- Model ISC40FF-P : Polypropylene
- Model ISC40FF-F : PVDF (KYNAR®)

Non-wetted materials

- Nut : AISI 304 stainless steel.
- Mounting set : AISI 304 Stainless Steel (optional)
- Flange adapters : AISI 304 Stainless Steel (optional)

Adapter dimensions

L1	L2	L3	
FP1 - FF1	161	216	
FP2 - FF2	151	206	
FP3 - FF3	163	218	
FP4 - FF4	149	204	
FS1	278		112
FS2	298		122
FS3	274		110
FS4	298		122

Flange dimensions

	D	k	dg
DN25	ø115	ø85	ø13.5
1 Inch	ø108	ø79.2	ø15.7
1/2 Inch	ø88.7	ø66.6	ø15.7
DN15	ø95	ø65	ø13.5

Panel dimensions

100x100, holes 70x70 ø10mm

Model and Suffix Codes

Model	Suffix	Option	Description
ISC40FF			flow fitting
Material	-S -P -F		AISI 316 stainless steel Polypropylene (PP) PVDF (KYNAR®)
Process connection	-A		NPT
1/2"NPT Flange adapters	/FF1 /FF2 /FF3 /FF4 /FP1 /FP2 /FP3 /FP4 /FS1 /FS2 /FS3 /FS4		PVDF, DN15 PN10 PVDF, DN25 PN10 PVDF, ANSI 1/2"-150lbs PVDF, ANSI 1"-150lbs PP, DN15 PN10 PP, DN25 PN10 PP, ANSI 1/2"-150lbs PP, ANSI 1"-150lbs AISI 316 SS, DN15 PN10 AISI 316 SS, DN25 PN10 AISI 316 SS, ANSI 1/2"- 150lbs AISI 316 SS, ANSI 1"- 150lbs
Mounting set	/MS /MP		Wall/pipe for SS flow fitting Wall/pipe for PP or PVDF flow fitting
Material certificate	/M		3.1. according EN 10024 for wetted metal parts only

Model ISC40FS Direct insertion subassemblies

A. Process temperature

- Model ISC40FS/SCS: Maximum 150°C (300 °F)
- Model ISC40FS-PCS: Maximum 100°C (210 °F)
- Model ISC40FS-FCS: Maximum 130°C (270 °F)

B. Process pressure

- Model ISC40FS/SCS : Max. 1.0 MPa (150 psi) at 150°C (300°F)
- Model ISC40FS-PCS : Max. 0.6 MPa (90 psi) at 20°C (70°F)
Max. 0.1 MPa (15 psi) at 100°C (210°F)
- Model ISC40FS-FCS : Max. 1.0 MPa (150 psi) at 20°C (70°F)
Max. 0.1 MPa (15 psi) at 120°C (250°F)

C. Wetted materials

- Model ISC40FS/SCS: AISI 316 Stainless steel
- Model ISC40FS-PCS: Polypropylene
- Model ISC40FS-FCS: PVDF (KYNAR®)
- All models : Viton O-ring, EPDM (only S2WN and STWN)

Non wetted materials

- Nut : AISI 304 Stainless steel

D. Process connection

- Model ISC40FS-SCS/PCS/FCS
- : 2" screw-in coupling

E. Shipping details

- Dimensions : Refer to section Dimensions
- Package : Normally packed with sensor
- Weight : 500 g. (1 lbs)

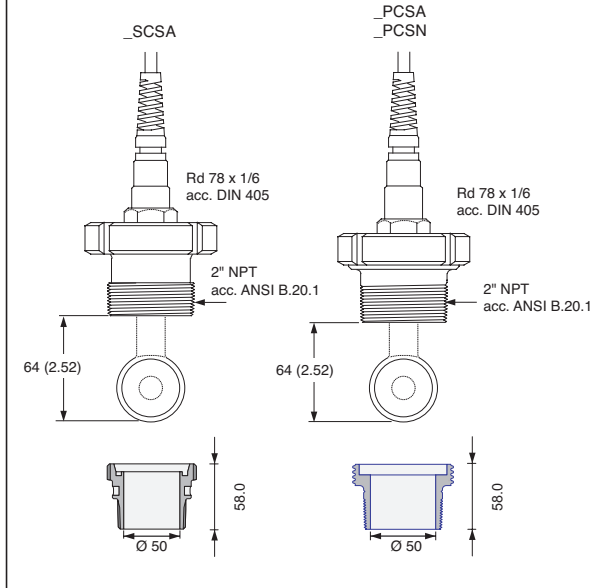
Model and Suffix Codes

Model	Suffix	Option	Description
ISC40FS			Flow fitting subassembly
Material	-F -P -S		PVDF Polypropylene Stainless Steel
Process connection	-CS -CW		Dairy Coupling screw-in* Dairy Coupling welded*
Thread type NPT or R	-A -N		NPT No thread (for weld-in couplings)
Options	/M		Material certificate 3.1. EN 10024 (for wetted metal parts only)

* **Note:** according to Din 11851

Dimensions

Unit: mm (inches)



Model ISC40FD Immersion fitting

- A. Process temperature**

 - : Max. 80°C (180 °F) PVC
 - : Max. 150°C (300 °F)
 - AISI 316 Stainless steel
- B. Process pressure**

 - PVC : Max. 0.2 MPa (30 PSI) at 20°C (70°F)
 - Max. 0.1 MPa (15 PSI) at 80°C (180°F)
 - AISI316 Stainless steel : 10 bar
- C. Wetted materials**

 - Probe tube : C-PVC
 - Process sealing O-ring : Viton
 - Flange : PVC (Optional)

Non wetted materials

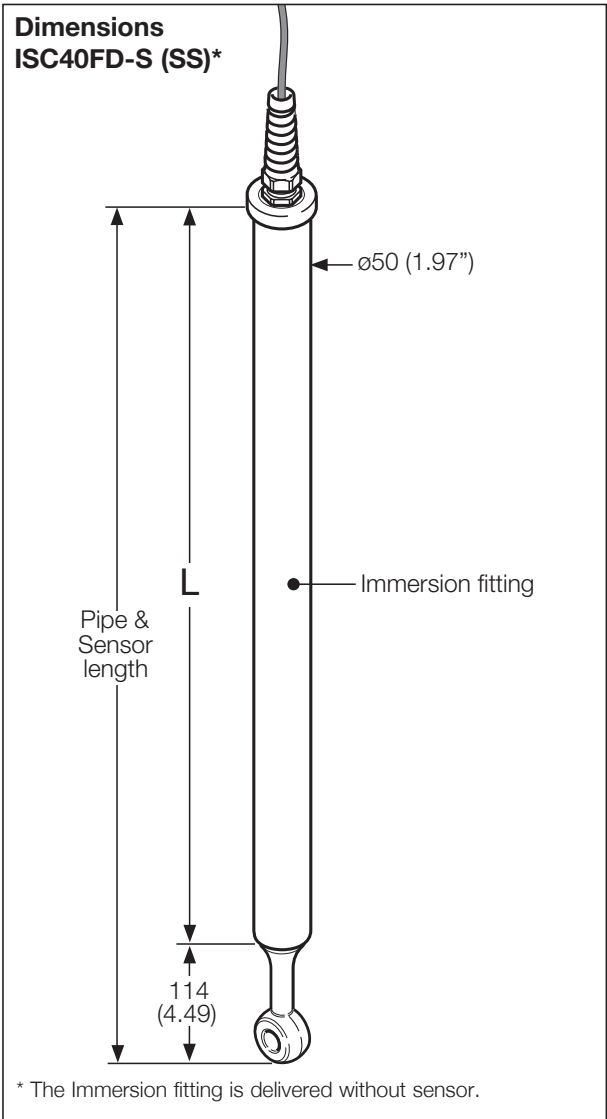
 - Cable insulation : Thermoplastic rubber
- D. Process connection**

 - Adjustable flange : Hole pattern according to DIN DN50-PN10 and ANSI 2" 150 lbs. Only for the PVC (Optional).
 - Mounting set : Galvanized steel (Optional).

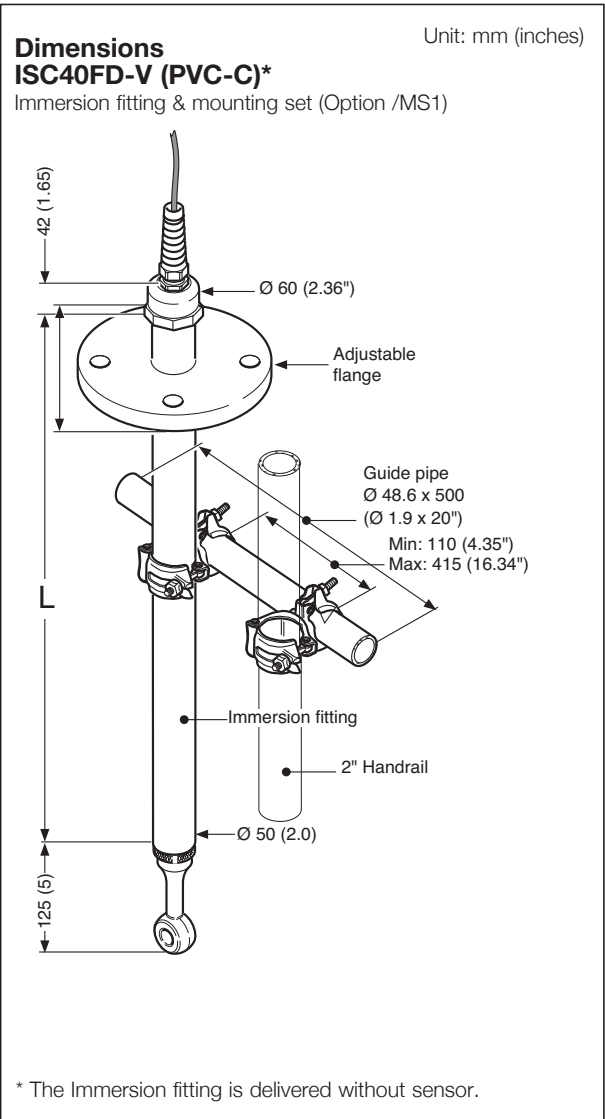
Note: Adjustable flange (/FA) is only for the PVC fitting

Model and Suffix Codes

Model code	Suffix code	Option code	Description
ISC40FD			Immersion fitting
Material	-S -V		AISI 316 Stainless steel PVC-C
Pipe length	- □ □		Between 05 to 20 meter Example: 05 = 0.5 m
Flange	-NFL -SFA -SFD		No flange AISI316 SS 2" AISI316 SS DN50
Options		/MS1 /FA /PH5 /PH10	Pipe mounting set (Carbon steel) Adjustable flange with DIN DN50-PN10 and ANSI 2" 150 lbs hole pattern (only for PVC) Protection hose for 5 m cable Protection hose for 10 m cable
Material certificate		/M	3.1. according EN 10204 (for wetted metal parts only)



GS 12D8J2-E-E

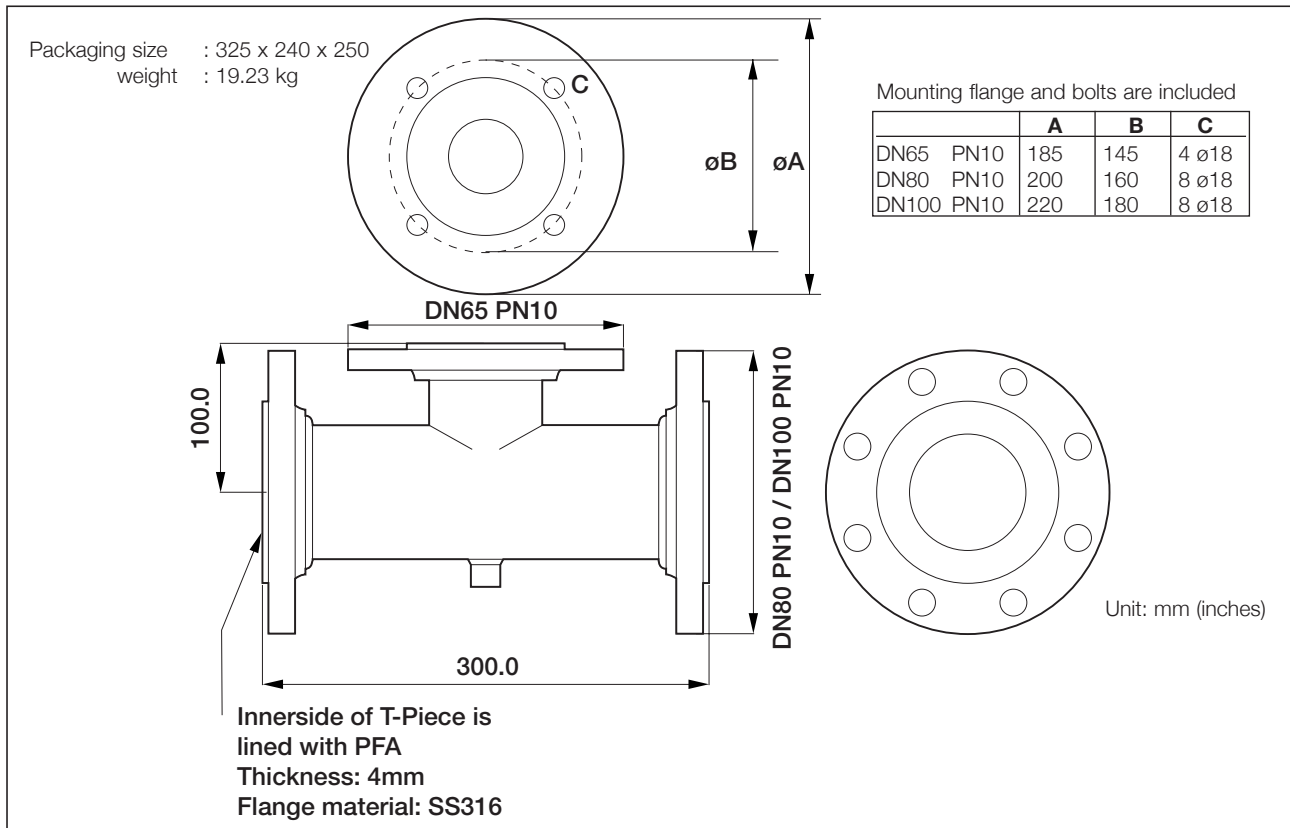


ISC40G(S)-TG Model

Part no.	Option	Description
K1500CJ	/PH05	05 meter protection hose
K1500CK	/PH10	10 meter protection hose
K1500EM	/PH25	25 meter protection hose

T-Piece ISC40-TG

Partno.	Flanges	Description
K1500HG	DN80 PN10	T-Piece, DN80 Flange
K1500HF	DN100 PN10	T-Piece, DN100 Flange
K1500HP	DN65	Gore-Tex seal for ISC40-TF (DN50)
K1541GX	DN65	DN65, DN10 Flange



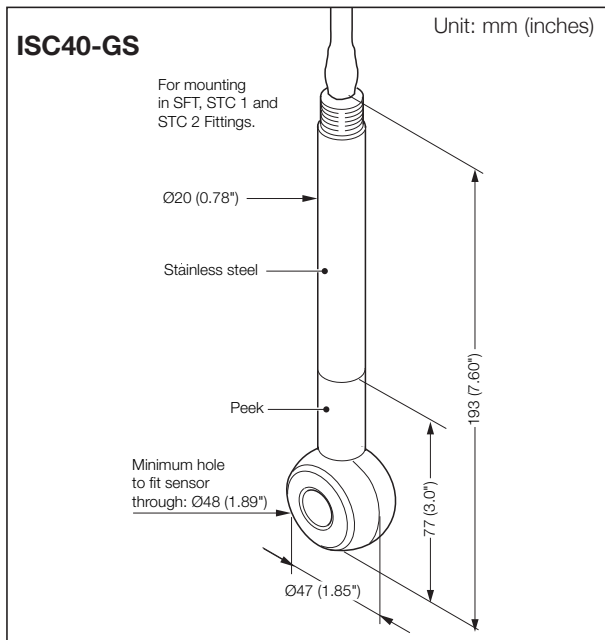
T-Piece for ISC40-TF Inductive Conductivity sensor

ISC40G(S)-GS Model

Model and Suffix Codes

Model	Suffix	Option	Description
ISC40G-GS			General purpose, glass filled PEEK, shaft model
ISC40S-GS			Intrinsically safe, glass filled PEEK, shaft model
Temp. sensor	-T1 -T3		Pt1000 30kNTC
Cable length	-03 -05 -10 -15 -20		03 mtr 05 mtr 10 mtr 15 mtr 20 mtr
Flange adapters for -GS sensor	/SFT1 /STC1 /STC2		AIS316 SS Sanitary Tuchenhagen AIS316 SS Sanitary 2" Tri-clamp* AIS316 SS Tri-clamp*
Certificates	/M /Q		Material certificate (only applies to SS316 wetted part) Quality certificate

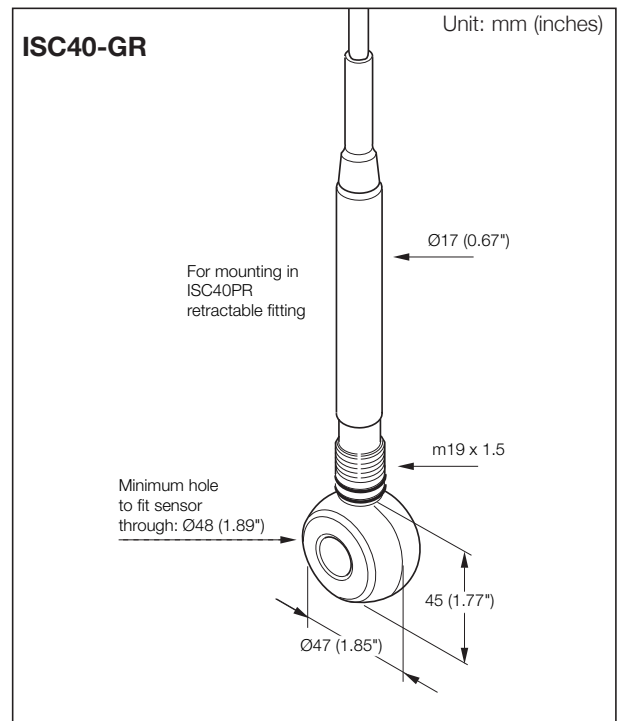
* according to ISO 2852



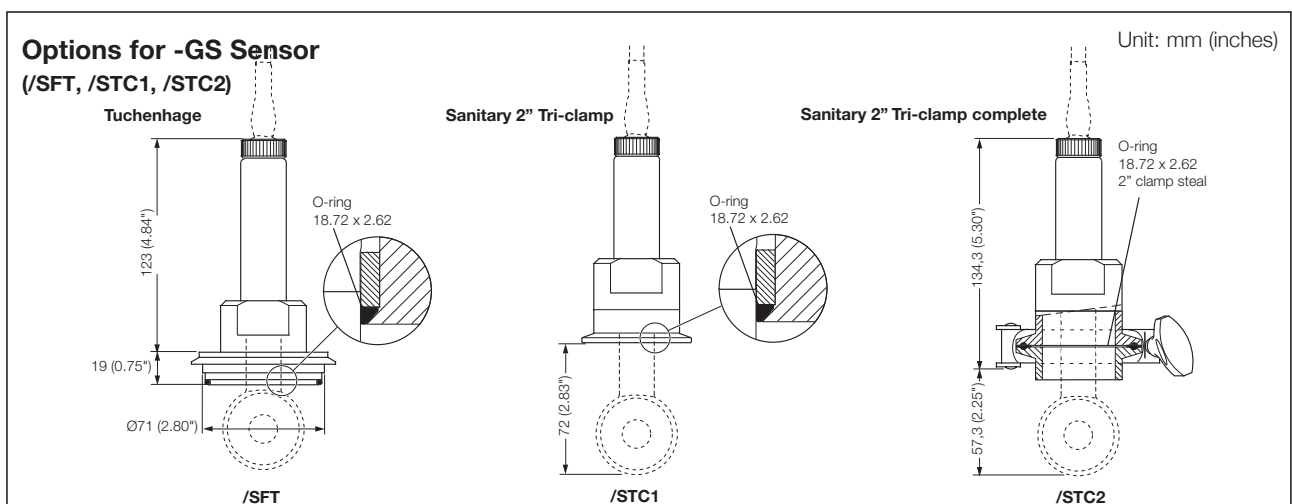
ISC40G(S)-GR Model

Model and Suffix Codes

Model	Suffix	Option	Description
ISC40G-GR			General purpose, glass filled PEEK, retractable model
ISC40S-GR			Intrinsically safe, glass filled PEEK, retractable model
Temp. sensor	-T1 -T3		Pt1000 30kNTC
Cable length	-03 -05 -10 -15 -20		03 mtr 05 mtr 10 mtr 15 mtr 20 mtr
Certificates	/M /Q		Material certificate (only applies to SS316 wetted part) Quality certificate



Note: for retractable fitting PR10 please check GS12D8J2-01E-E



GS 12D8J2-E-E

Chemical Compatibility Chart

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