

General Specifications

Model FD20
Immersion Fittings for pH/ORP (Redox) measuring loops

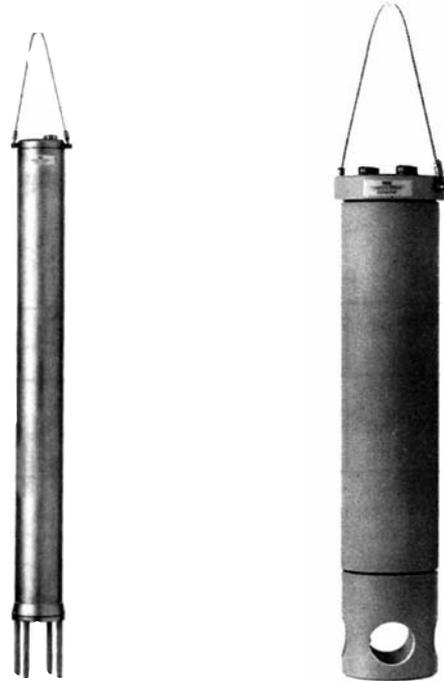
pH/ORP

For liquid analysis, the sensors are usually mounted in either a flow or an immersion fitting. Therefore Yokogawa has invested considerable design and development time in producing a full range of fittings with particular emphasis on designs that reduce installation and maintenance time and consequently save operation costs.

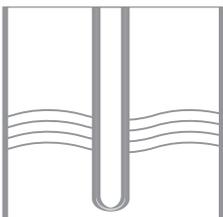
A high degree of standardisation makes it possible to mount electrodes with DIN dimensions direct in a fitting. For most other types a mounting kit (accessory) is available. A wide choice of construction materials gives the user the optimal solution for any process considering chemical resistance, pressure and temperature specifications. The immersion fittings are designed for either pH or ORP (Redox) measurements in tanks, open vessels and drains. They have a "hoisting cable" for easy maintenance. The program includes fittings for mounting of 1 electrode, 3 electrodes, 4 electrodes or alternatively 3 electrodes and a cleaning system. As standard, the immersion length can be between 0.5 and 2 m. A flange for fixing in tanks, etc. is available on request.

Features

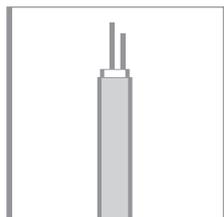
- Designed for either pH or ORP measurements in tanks open vessels and drains.
- "Hoisting cable" for easy maintenance.
- Pre-selected immersion length.
- Wide choice of construction materials.
- Flange mounting.
- High degree of standardisation reduces spare holding requirements.
- Liquid earth pin for stable measurements.
- Chemical or brush cleaning systems as an option.



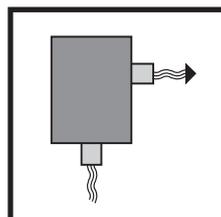
System Configuration



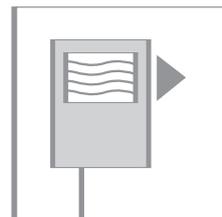
Sensors



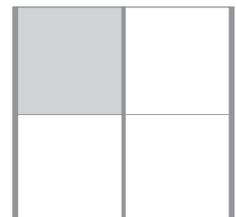
Cables



Fittings



Transmitters



Accessories

General Specifications

Materials

- Wetted parts
 - A. Body (refer to model code): Polypropylene (PP)
Stainless steel AISI 316 (SS)
Polyvinylchloride (PVC)
Polyvinylidene fluoride (PVDF)
 - B. "O" rings : Silicone rubber
 - C. Liquid earth sensor : Titanium (PP and PVDF design)
Stainless steel AISI 316 (SS design)
- Electrode mounting sets : Ryton R 4
- "Hoisting eye" : Stainless steel cable (twisted)

Weight* : See tabel 1

Table 1

Material	PVC	PP	SS	PVDF
Fitting				
1-hole fitting	0.4 kg			
3-hole fitting		2 kg	5.3 kg	2.5 kg
4-hole fitting		4.5 kg	5.4 kg	5.5 kg

* The accessories are not included.
The noted weights are at an immersion length of 1 m.

Mounting : by means of the "hoisting eye" or flange mounting

Functional Specifications

Temperature

- min. : -10°C
- max. : depending on material and application (see figure 1)

Immersion length (in dm) : between 0.5 and 2.0 m

Pressure : see figure 1

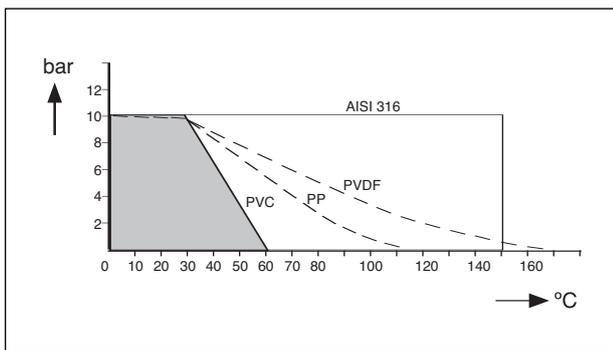
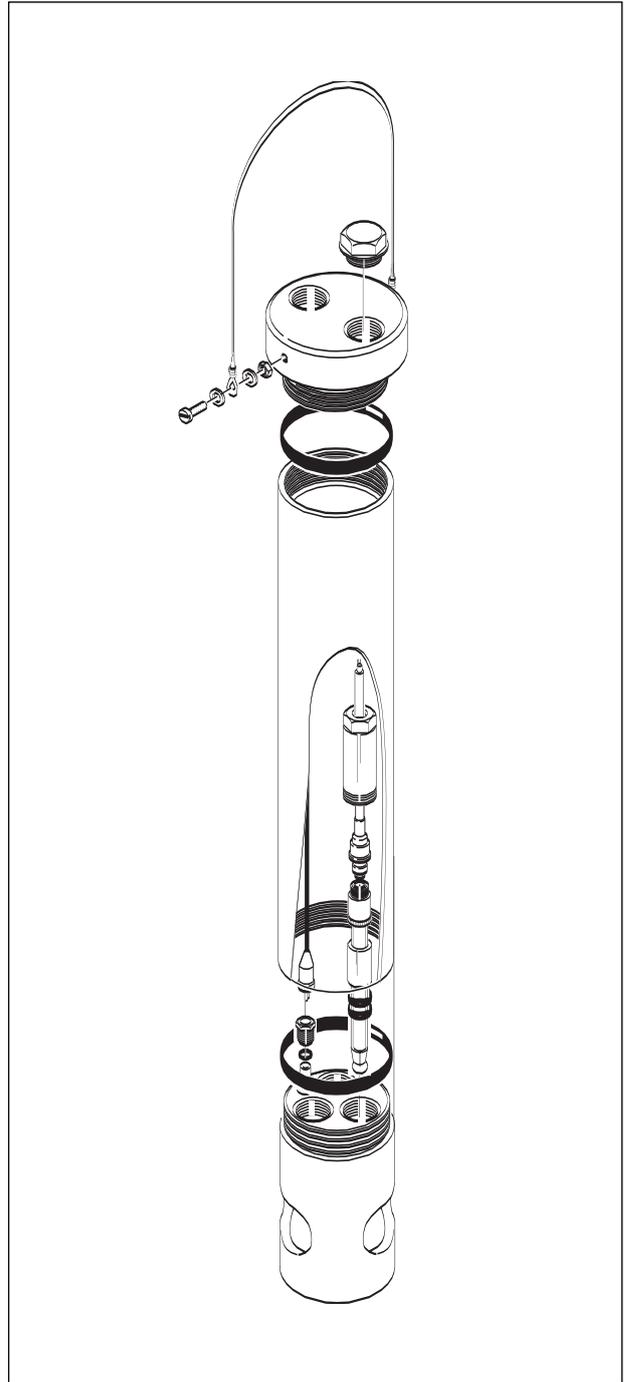


Fig. 1. Pressure/temperature class



FD20-P37-10-NF*A

Model and Suffix codes

Model	Suffix Code	Option Code	Description
FD20F37			Immersion fitting, PVDF, 3 electrode mounting holes
FD20F47			Immersion fitting, PVDF, 4 electrode mounting holes
FD20P37			Immersion fitting, PP, 3 electrode mounting holes
FD20P47			Immersion fitting, PP, 4 electrode mounting holes
FD20S37			Immersion fitting, SS, 3 electrode mounting holes
FD20S47			Immersion fitting, SS, 4 electrode mounting holes
FD20V18 ¹			Immersion fitting, PVC, 1 electrode mounting hole
Immersion length ²	-NN		Between 5 and 20 (in dm) example 06=0.6 mtr.
Flange ³ (Working pressure not more than 3 bar)	-NF -F1 -F2 -F3 -F4 -F5 -F6 -F7 -S1 -S2 -S3 -S4 -S7		No flange Flange DN32 for 1 hole fitting Flange DN80 for 3 hole fitting PP Flange DN80 for 3 hole fitting PVDF Flange DN80 for 3 hole fitting SS Flange DN125 for 4 hole fitting PP Flange DN125 for 4 hole fitting PVDF Flange DN100 for 4 hole fitting SS Flange ANSI 1 1/4" 150Lbs for 1 hole fitting PVC Flange ANSI 3" 150Lbs for 3 hole fitting PP Flange ANSI 3" 150Lbs for 3 hole fitting PVDF Flange ANSI 4" 150Lbs for 3 hole fitting SS Flange ANSI 4" 150Lbs for 4 hole fitting SS
		*A	Style A
Options			
Cleaning system		/HCN2 /HCN3 /HCN4	FD20- .27 FD20- .37 FD20- .47
Protectionhose installation kit		/PH5 /PH10	For 5.5 m cable For 10 m cable
Mounting kit		/R /B	For mounting (top) refillable electrodes with along glass shaft For mounting Bellomatic reference and combined electrodes
KCL reservoir ⁴		/K	Electrolyte tubing is included (2.5 m) (only in combination with /R)
Salt bridge		/S	For liquid which cannot stand contamination with KCL
Certificate		/M	3.1 according EN 10024 for wetted metal parts

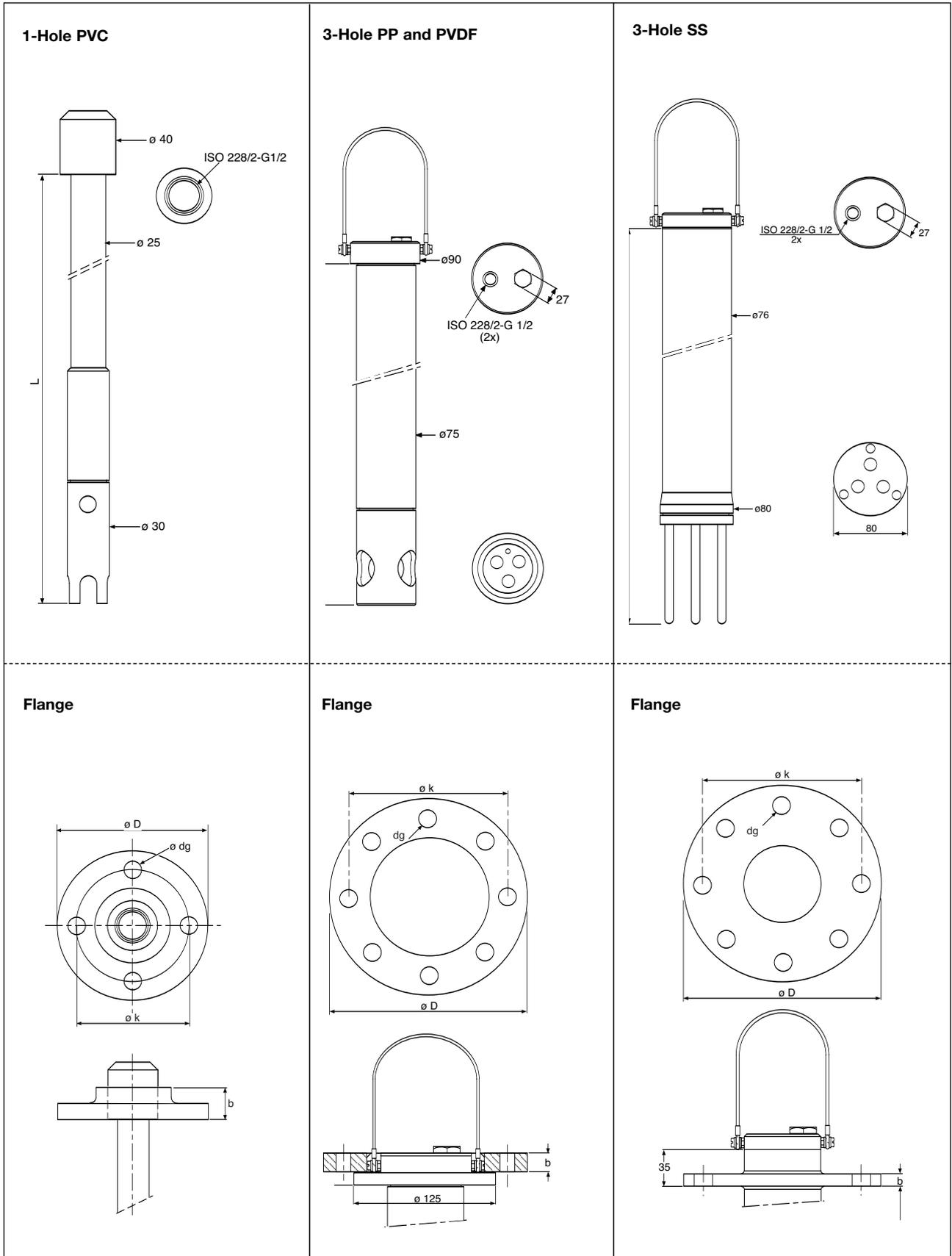
- PVC is available in a 1-hole design only.
- The immersion length of stainless steel fittings with a flange will be shortened by 35 mm (refer to dimensional drawings).
- Configuration of hole (see dimensional drawings).
Working pressure not more than 3 bar.
For higher pressure ratings please contact your local Sales Department of Yokogawa.
- In combination with /R option only.

Notes:

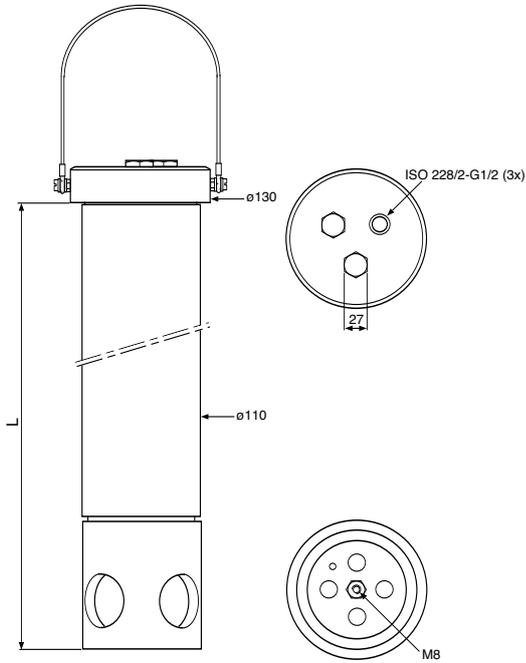
- Options are supplied with the fitting.
- The available length of the electrode cables between fitting and converter or connection box is cable length minus immersion length (L).
- It is possible to order the fittings assembled (complete with cables, cleaning system, options, etc.). Please contact your local Yokogawa sales organisation for more information.

Dimensions

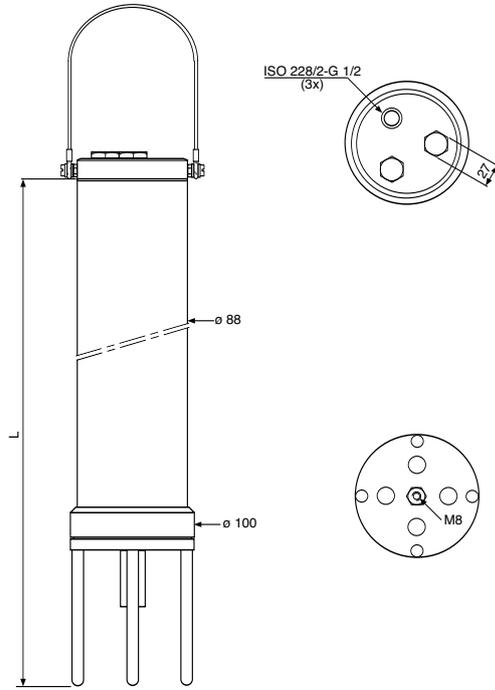
Unit: mm



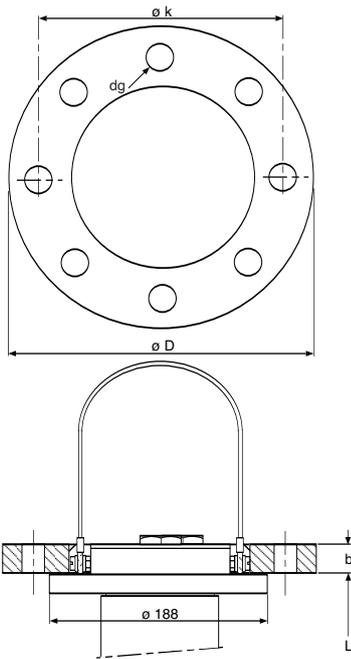
4-Hole PP and PVDF



4-Hole SS



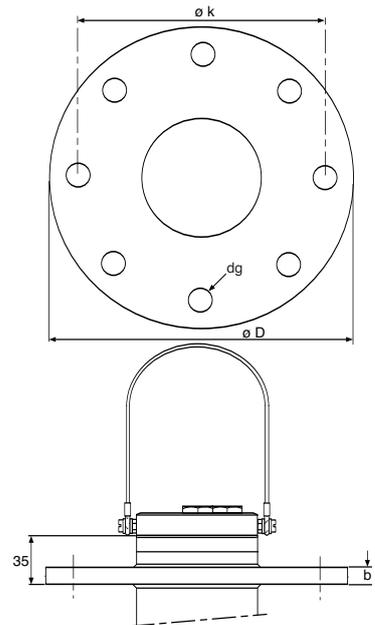
Flange



unit in mm

	L	D	k	dg	b
FD20-V18...-FN	5-20dm				
FD20-V18...-F1	5-20dm	120	90	14	26
FD20-V18...-S1	5-20dm	120	90	16	26
FD20-P37...-FN	5-20dm				
FD20-F37...-FN	5-20dm				
FD20-P37...-F2	5-20dm	200	160	18	20
FD20-F37...-F3	5-20dm	200	160	18	20
FD20-P37...-S2	5-20dm	190	152.4	20	18
FD20-F37...-S3	5-20dm	190	152.4	20	18
FD20-S37...-FN	5-20dm				
FD20-S37...-F4	5-20dm	200	160	18	10
FD20-S37...-S4	5-20dm	228.6	190.5	19	23.8
FD20-P47...-FN	5-20dm				
FD20-F47...-FN	5-20dm				
FD20-P47...-F5	5-20dm	250	210	18	25
FD20-F47...-F6	5-20dm	250	210	18	25
FD20-P47...-S5	5-20dm	285	241	22	30
FD20-F47...-S6	5-20dm	285	241	22	30
FD20-S47...-FN	5-20dm				
FD20-S47...-F7	5-20dm	220	180	18	10
FD20-S47...-S7	5-20dm	228.6	190.5	19	

Flange



Accessories

Type no.	Description
K1500FU	KCl-reservoir + tubing (2.5 mtr) (option /K)
K1500GA	Electrolyte tubing (5 mtr) for connection between KCl-reservoir and electrode
SB20-VC	Salt bridge (option /S)
FC20-VE*	Brush cleaning system (electric driven)
BC10*	Supply unit (220 V/24 V) for motor-drive of electric driven brush cleaning
FC20-VP*	Brush cleaning system (pneumatic driven)
BA10	Connection box (between electrodes and transmitter)
WF10	Connection cable (per mtr) between connection box and transmitter input
K1500BX	Grommet for watertight cable input in PG 16 gland (3 electrodes cables and liquid earth cable)
K1500BY	Mounting kit for (top) refillable electrodes (option /R)
FP20-S13	Mounting kit for BELLOMATIC reference electrode and combined electrodes (option /B)
WU20-PC01	COAX-cable (1 mtr) for single electrode
WU20-PC02	COAX-cable (2 mtr) for single electrode
WU20-PC05	COAX-cable (5.5 mtr) for single electrode
WU20-PC10	COAX-cable (10 mtr) for single electrode
WU20-PC15	COAX-cable (15 mtr) for single electrode
WU20-PC20	COAX-cable (20 mtr) for single electrode
WU20-PC25	COAX-cable (25 mtr) for single electrode
WU20-LT01	TRIAX-cable (1 mtr) for combined electrode
WU20-LT02	TRIAX-cable (2 mtr) for combined electrode
WU20-LT05	TRIAX-cable (5.5 mtr) for combined electrode
WU20-LT10	TRIAX-cable (10 mtr) for combined electrode
WU20-LT15	TRIAX-cable (15 mtr) for combined electrode
WU20-LT20	TRIAX-cable (20 mtr) for combined electrode
WU20-LT25	TRIAX-cable (25 mtr) for combined electrode
K1500FV	Liquid earth cable (10 mtr)
K1500DU	Liquid earth cable (25 mtr)

* For details see GS 12B6V1-E-E

Service Parts

Type no.	Description
K1500BW	Diaphragm tube for SB20-VC
K1500EE	Diaphragm tube for SB20-VP
K1500EF	Diaphragm tube for SB20-VS
K1500DX	Nylon tubing for salt bridge
K1520NA	Tubing (ø 4x6) for brush cleaning (pneumatic driven)
K1520FJ	Tubing (ø 1/4") for chemical cleaning (5 m)
K1520FK	Tubing (ø 1/4") for chemical cleaning (10 m)
K1500GR	O-ring (11x3) for electrode mounting (8 pieces)
K1500GH	Set O-rings for 1-hole fitting (PVC)
K1500GU	Set O-rings for 3-hole fitting (PP and PVDF)
K1500GV	Set O-rings for 4-hole fitting (PP and PVDF)
K1500GW	Set O-rings for 3-hole fitting (SS)
K1500GX	Set O-rings for 4-hole fitting (SS)
FP20-R12	Electrode mounting set (Ryton R4)
FP20-S12	Electrode mounting set (SS)
K1500HC	Sealing rings for BELLOMATIC electrode holder (10 pieces)
K1500GE	5 Sets O-rings for BELLOMATIC electrode
K1500FZ	O-ring for mounting the (top) refillable electrodes with a long glass shaft
K1520NB	Brush for mechanical cleaning
K1500DQ	/PH3 protection hose (3 m)
K1500DN	/PH3 protection hose (10 m)
K1500DR	/PH15 protection hose (15 m)
K1500DS	/PH20 protection hose (20 m)
K1500DM	/PH25 protection hose (25 m)

GS 12B6K2-01E-E

Consumable Parts

Type no.	Description
6C231	Buffer powder pH 1.68 (at 25°C)
6C232	Buffer powder pH 4.01 (at 25°C)
6C237	Buffer powder pH 6.87 (at 25°C)
6C236	Buffer powder pH 9.18 (at 25°C)
K1500GF	250 ml. KCl-solution (1 M)
K1500GG	250 ml. KCl-solution (1 M), thickened
K1520VA	250 ml. KCl-solution (3.3 M)
K1520VN	250 ml. KCl-solution (3.3 M), thickened

Spare Parts FD20F47

Part no.	Description
K1500FE	O-ring set EPDM FD20P&F47
K1500FF	O-ring set Viton FD20P&F47
K1500GV	O-ring set FD20P&F47

Spare Parts FD20S37

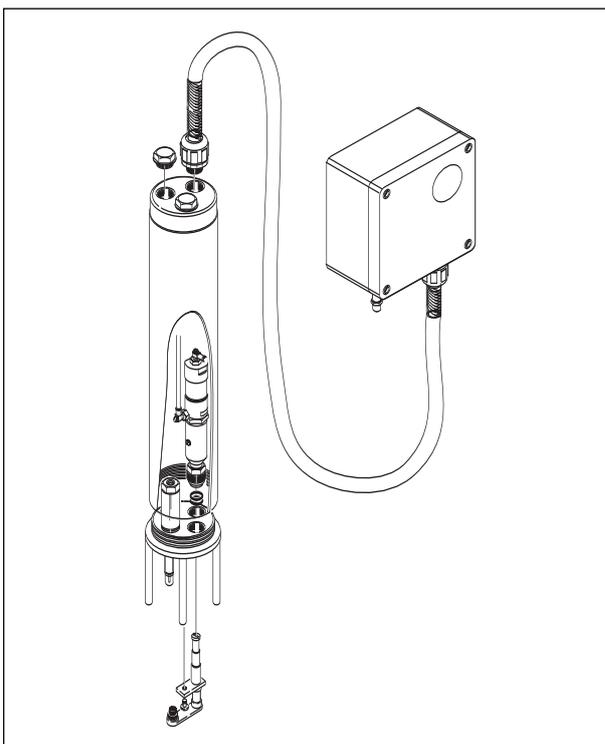
Part no.	Description
K1500AN	Hauling parts kit for FD20-SS
K1500FC	O-ring set EPDM FD20-S37
K1500FD	O-ring set Viton FD20-S37
K1500GW	O-ring set FD20S37

Spare Parts FD20S47

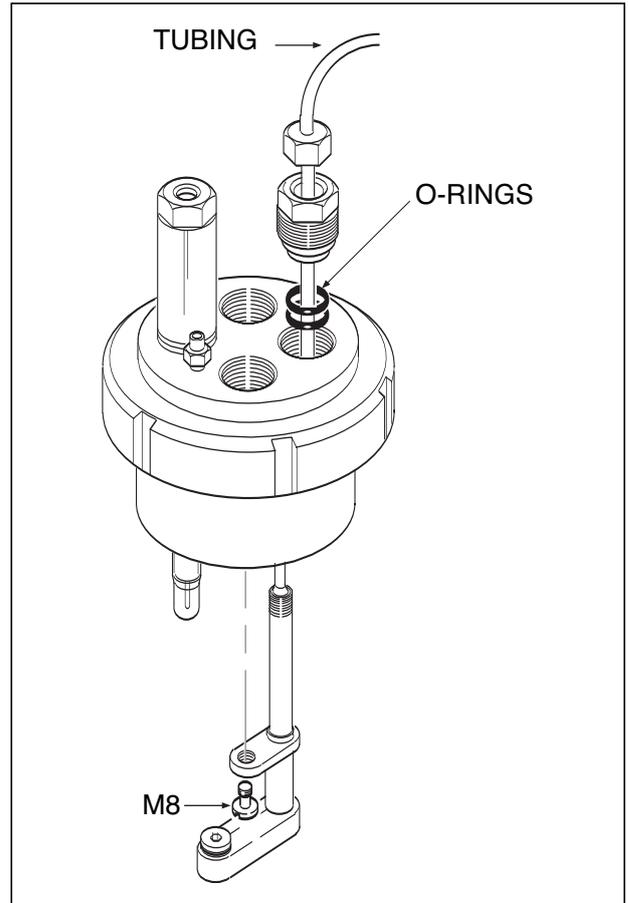
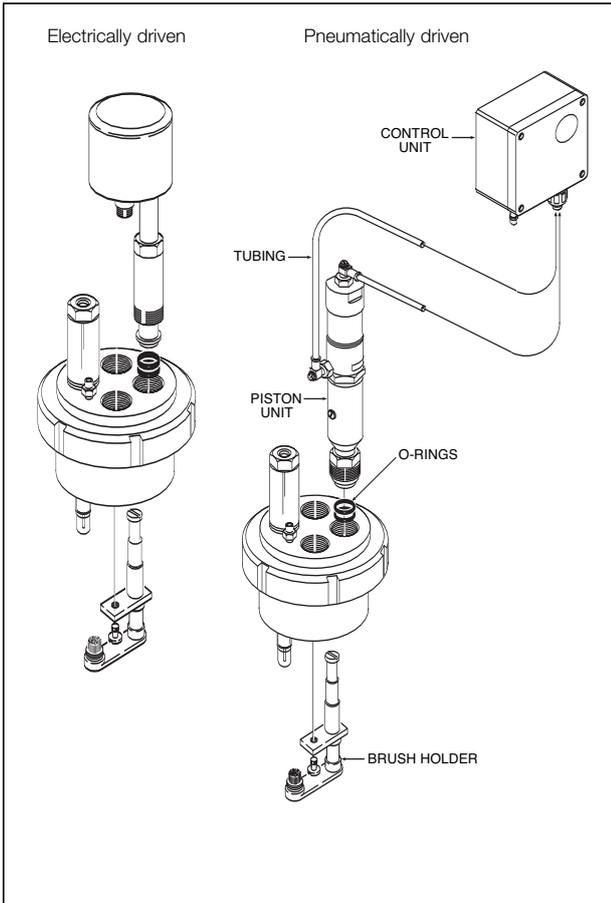
Part no.	Description
K1500FG	O-ring set EPDM FD20-S47
K1500FH	O-ring set Viton FD20-S47
K1500GT	O-ring set silicon. FF20-.4.
K1500GX	O-ring set FD20S47

Spare Parts FD20V18

Part no.	Description
K1500GH	O-ring set 1-hole imm. PVC



FD20-S47-10-NF*A with FC20-VP fitted



Ordering Instructions

When ordering, specify model and codes, item name and part numbers.

Items to be specified:

- | | |
|---|--|
| 1. Immersion fitting | : FD20-V18, FD20-P37, FD20-P47, FD20-S37, FD20-S47, FD20-F37 or FD20-F47 |
| 2. Suffix codes, if relevant | : |
| 3. Electrode cables | : WU20-PC01, WU20-LT01
WU20-PC02, WU20-LT02
WU20-PC05, WU20-LT05
WU20-PC10, WU20-LT10
WU20-PC15, WU20-LT15
WU20-PC20, WU20-LT20
WU20-PC25, WU20-LT25 |
| 4. Liquid earth cable | : K1500FV (10 m) |
| 5. Connecting box/extension cable
(up to 30 mtr. cable length) | : BA10/WF10 |
| 6. Cleaning system | : FC20-VP, FC20-VE, HCN2/3, HCN4 or HCNF |
| 7. Consumable parts | : Part name and part number (quantity) |
| 8. Service parts | : Part name and part number (quantity) |

Selection Criteria

Chemical		Concentration and pH		Material			
		W/V (%)	pH (25°C)	PVC	PVDF	PP	SS 316
Inorganic acid	Sulfuric acid	0.5	1.0	O	O	O	X
		0.05	2.0	O	O	O	X
	Hydrochloric acid	0.4	1.0	O	O	O	X
		0.04	2.0	O	O	O	X
	Nitric acid	0.6	1.0	O	O	O	O
		0.06	2.0	O	O	O	O
	Phosphoric acid	1.0	1.5	O	O	O	O
	Boric acid	0.6	5.0	*	O	O	*
Organic acid	Carbonic acid	0.6	3.6	O	O	O	*
	Chromic acid	1.2	0.8	O	O	O	O
	Sulfurous acid	0.8	1.4	O	O	O	*
	Acetic acid	0.6	2.8	*	O	O	*
	Formic acid	0.5	2.3	*	O	O	O
	Oxalic acid	0.9	1.0	*	O	*	*
	Lactic acid	0.9	2.4	*	X	O	O
	Phenol acid	0.9	5.4	*	O	*	O
Alkali	Monochloroacetic acid	0.9	1.8	X	O	O	O
	Calcium hydroxide	0.2	12.4	O	O	O	O
	Potassium hydroxide	0.5	12.7	O	O	O	*
	Sodium hydroxide	0.4	12.9	O	O	O	O
Acid salt	Ammonium hydroxide	0.5	10.4	O	O	O	O
	Ammonium chloride	5		O	O	O	X
	Aluminous water	5		O	O	O	*
	Zinc chloride	5		O	O	O	X
	Iron (III) chloride	5		O	O	O	X
Basic salt	Iron (III) nitrate	5	1.3	O	O	O	O
	Sodium sulfite	5		O	O	O	*
	Sodium carbonate	5	11.8	O	O	O	O
Neutral salt	Sodium phosphate	5		O	O	O	*
	Potassium chloride	5		O	O	O	X
	Sodium sulfate	5		O	O	O	*
	Calcium chloride	5		O	O	O	X
	Sodium nitrate	5	8.2	O	O	O	*
Oxidizing agent	Aluminium chloride	5		O	O	O	X
	Hydrogen peroxide	1		O	O	O	*
	Sodium hypochlorite solution	1	12.5	O	O	*	X
	Chlorinated lime	1		*	O	O	*
Organic solvent	Potassium dichromate	5	4.5	O	O	O	*
	Alcohol	10		O	O	O	O
	Organic solvent or oil (excluding alcohol)			*	O	*	O
	Chlorinated solvent			X	O	X	*

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

Note:

- pH in table was calculated with dissociated constant (related to measurement)
- When any of the two conditions listed below are applicable, please consult our sales department.
 - Strong, oxidizing solutions such as aqua regia, chromic acid, hypochloric acid, perchloric acid, etc.
 - The organic solvent is contained in the order of a few percent.

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GS 12B6K2-01E-E

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