

General Specifications

Combined Electrodes for biotech and pharmaceutical industry Model SC22

pH

Yokogawa combined pH sensors are designed to include the latest technology in compact convenient design. Whether you are looking for sanitary and sterilisable systems or those for highly contaminated effluent, Yokogawa can offer a solution.

New electrochemical sensors released by Yokogawa have been specifically designed for the biotech and pharmaceutical industry. They address applications which are mounted directly in the bio-reactor.

The majority of biotechnological processes can be divided into the following categories:

- Biomass; cultivation of bacteria, fung, "Single Cell Protein" fermentations
- Specialty chemicals; using the bioprocess as an alternative to classical chemistry
- Hightech chemicals; antibacterial, antibiotics, anti HIV
- Biotransformations; micro-organisms are used to perform a specific, often complicated chemical reaction.

In biotechnology the continuous measurement and control of temperature, dissolved oxygen and pH is vital for an optimal product cultivation. The process medium must be sterile before inoculation with the desired micro-organisms, otherwise undesired organisms will grow. The treatment of the medium with hot steam is the most common practice for sterilisation. Small bio-reactors up to 10 liters are usually sterilised in an autoclave. Larger vessels are heated with steam (double wall fermentors). The sensor must also withstand steam of up to 130°C and pressures up to 3.5 bar. and designed to analyse only the liquid phase.

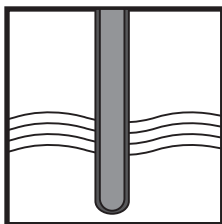
C.I.P (Cleaning In Place) techniques are used for both cleaning and sterilization. The sensor must be resistant to this severe treatment both with hot caustic and hot acid solutions.



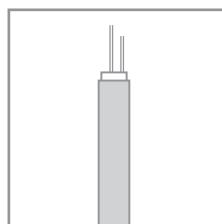
FEATURES

- Long-term stability of calibration values
- Special membrane and high stability internal buffer
- Easy installation
- Low maintenance
- Compatible with PG 13.5 process connection
- Compatible with "Schott" line electrical connector.
- Coated reference junction technology

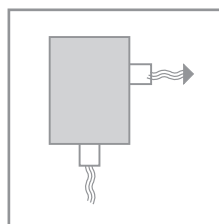
SYSTEM CONFIGURATION



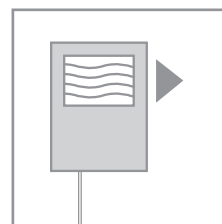
Sensors



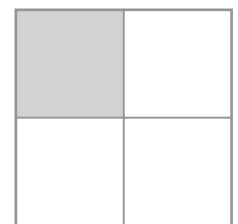
Cables



Fittings



Transmitters



Accessories

A. Combination pH sensors for biotechnology SC22-AAC24/27/29

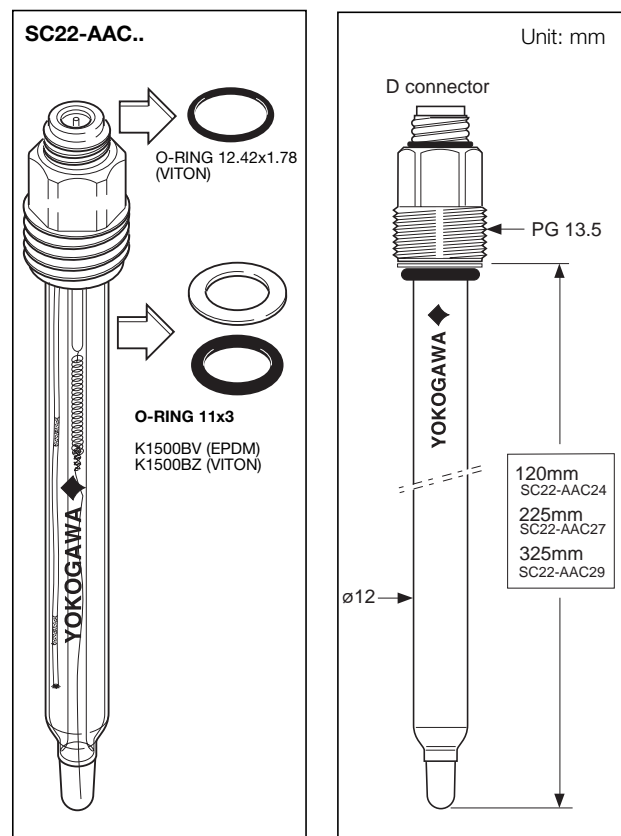
The SC22-AAC24/27/29 is designed for biotechnology applications, offering superior life, and stable calibration values with virtually no signal drift even after multiple sterilisations. The SC22-AAC24/27/29 also shows excellent performance in chemical processing.

- Special glass formulation for low measuring impedance combined with rugged construction and high resistance to sterilization.
- Specially designed coated junctions and thickened electrolyte solution to combine ultra low diffusion rate with excellent stability of the reference potential.

GENERAL SPECIFICATIONS

Type SC22-AAC24/27/29

- Measuring membrane	: "H"
- Impedance in MOhm/25 °C	: 250 - 500 MOhm
- pH range	: 0 - 14
- Temperature range	: 0 °C to 130 °C
- Reference system	: Ag/AgCl
- Pressure range @ 25 °C	: ≤ 6 bars
- Zero Point	: 0 ± 20 mV
- Diaphragm Type	: coated ceramic
- Number of Diaphragms	: 3
- Isothermal point	: 7 pH ± 0 mV
- Available lengths	: 120 mm 225 mm 325 mm
- Fittings	: FF22-S24



B. Industrial applications

SC22-AAH24/27

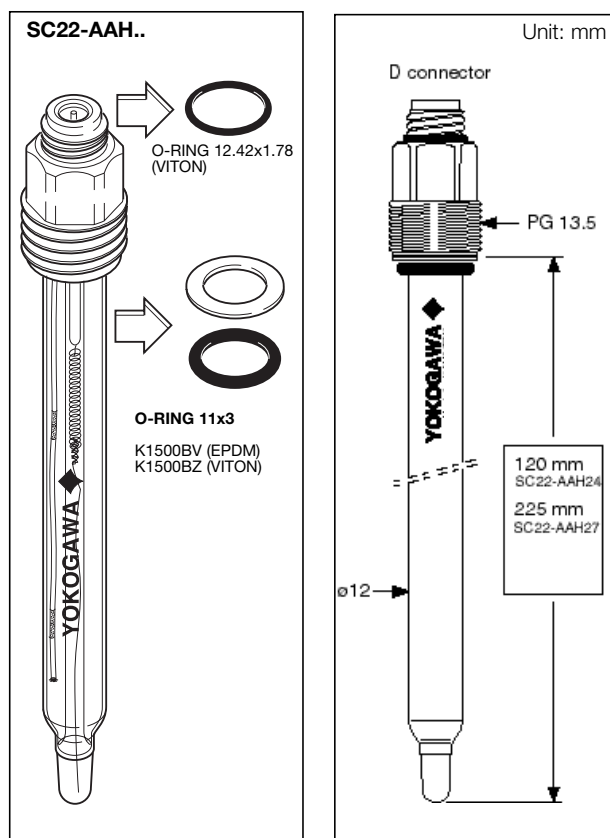
The SC22-AAH24 and 27 sensors are designed for use in applications with a high potential for coating. The polymerized electrolyte gives a low diffusion rate even without the use of the diffusion-limiting junction. The junction is replaced by simple hole in the sensor. The sensor can be used successfully in water and waste waters as well as in process applications where steam sterilization is not required.

It fits into FF22-S24 and other armatures which have a PG 13.5 thread.

GENERAL SPECIFICATIONS

Type SC22-AAH24/27

- Measuring membrane	: "H" glass
- Resistance in MOhm/25 °C	: 250 - 500 MOhm
- pH range	: 2 - 14
- Temperature range	: 0 to 90 °C
- Reference system	: Ag/AgCl
- Pressure range @ 25 °C	: ≤ 6 bars
- Reference electrolyte	: Polymer
- Zero Point	: 0 ± 20 mV
- Diaphragm Type	: single pore
- Number of Diaphragms	: 2
- Isothermal point	: 7 pH ± 0 mV
- Available lengths	: 120 mm 225 mm
- Fittings	: FF22-S24



C. Flowing type combination sensors SC22-AAC54/55

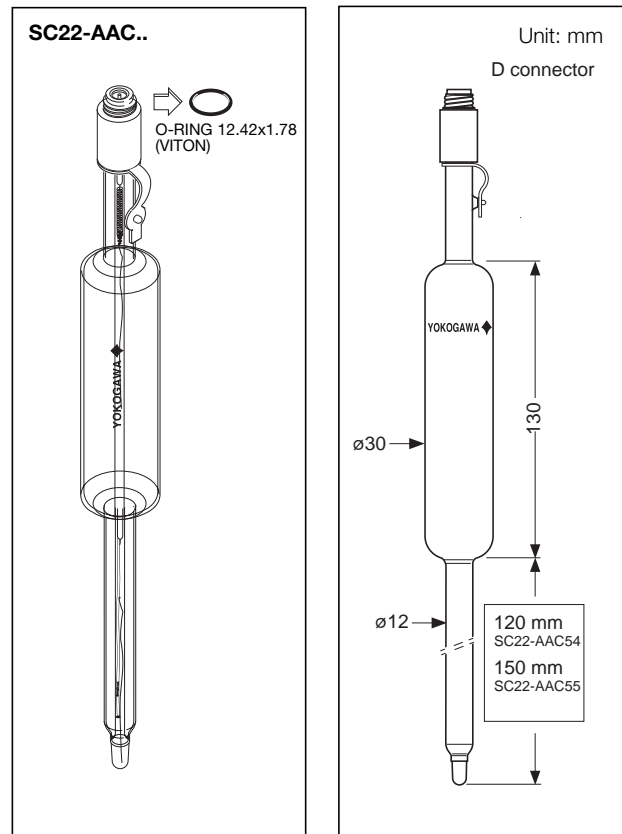
The most stable pH readings are obtained with flowing junction type sensors if they are well maintained. In return for the regular refilling and the necessary pressurization of the sensor you get the best possible stability of measurement because of the absence of diffusion potential.

The presserisable fitting FP22-S54(5) must be used with these sensors.

GENERAL SPECIFICATIONS

Type SC22-AAC54/55

- Measuring membrane	: "H" glass
- Resistance in MOhm/25 °C	: 250 - 500 MOhm
- pH range	: 0 - 14
- Temperature range	: -10 to 130 °C
- Reference system	: Ag/AgCl
- Pressure range @ 25 °C	: ≤ 6 bars
- Reference electrolyte	: 3M KCl LR
- Zero Point	: 0 ± 20 mV
- Diaphragm Type	: zirconia
- Number of Diaphragms	: 3
- Isothermal points	: 7 pH ± 0 mV
- Available length	: 120 mm 150 mm
- Fittings	: FP22-S54/S55



D. Direct insertion fitting FF22-S24

The FF22-S24 armature is the best selection for standard fermentation applications. It is designed for installation of the PG13.5 120mm length type sensors. Redox or oxygen or pH sensors fit into the 25mm port connection commonly used in the Biotechnical Industry. It is easily mounted and the VITON O-rings can be exchanged without a special tool.

The revolutionary cable cap features:

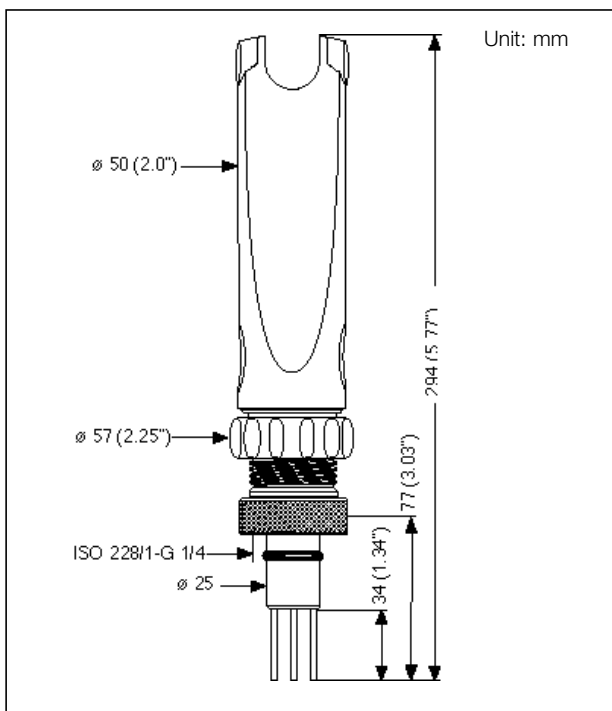
- Strain relief for the sensor cable
- Full protection against, dust, dirt, moisture and water.

GENERAL SPECIFICATIONS

- Connection : G 1³/₄" - 25 mm port size
- Total length : 294 mm
- Max. Diameter : 57 mm
- Wetted materials : Stainless Steel 1.4571; AISI 316Ti, VITON
- Temperature range : -10 °C to 130 °C/14 °F to 266 °F
- Max. pressure : 6 bar/87 psi
- Electrodes : All 120 mm length with PG13.5 thread, except the SC22-AAC54/55

MODEL AND SUFFIX CODES

Model code	Suffix code	Option	Description
FF22			Adapter
	-S24		For 25 mm Port, 120 mm sensor



FF22-S24

**E. Presserisable insertion fitting
FP22-S54/S55**

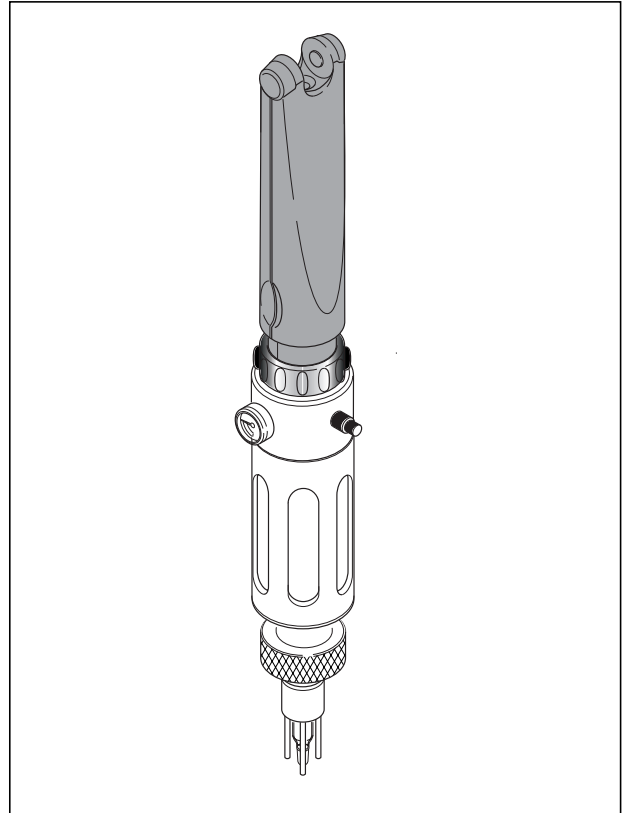
Critical processes or applications where high accuracy or long term stability is required need electrodes with liquid electrolytes. Such electrodes need to be pressurised above the process pressure to enable the electrolyte to flow out the electrode. The FP22-... armature enables easy installation of these types of sensors into a process tank or pipe. The armature has no flat seals which ensures that the probe seals perfectly tight. Large windows permit the electrolyte level of the electrode to be checked in situ. The integrated manometer indicates the pressure applied and is also protected against damage. The armature head is equipped with a lever to make opening quick and simple. Moving the lever releases the armature pressure to avoid opening of the armature under pressure. Three stainless steel pins protect the electrode membrane against breakage from solid process components. The FP22-... armature is available in various immersion lengths for installation into tanks or fermentors with different wall thickness (e.g. isolation or double walled types).

GENERAL SPECIFICATIONS

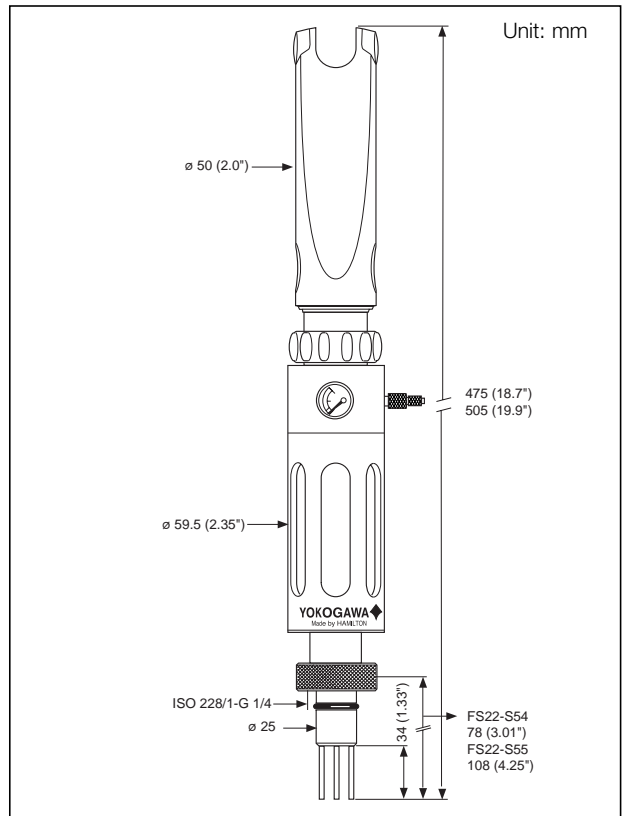
- Connection : G 1³/₄" - 25 mm port size
- Total length : 475 mm (S54) and 505 (S55)
- Max. Diameter : 60 mm (except valve & manometer)
- Wetted materials : Stainless Steel 1.4571; AISI 316Ti, VITON
- Temperature range : -10 °C to 130 °C/14 °F to 266 °F
- Max. pressure : 6 bar/87 psi
- Standard immersion length : 70 mm, 100 mm
- Compatibility : SC22-AAC54/55

MODEL AND SUFFIX CODES

Model	Suffix code	Option code	Description
FP22			Pressure Adapter
	-S54		120 mm Electrodes
	-S55		150 mm Electrodes



FP22-S54/S55



FP22-S54/S55

F. Direct insertion adapter FS22-S11

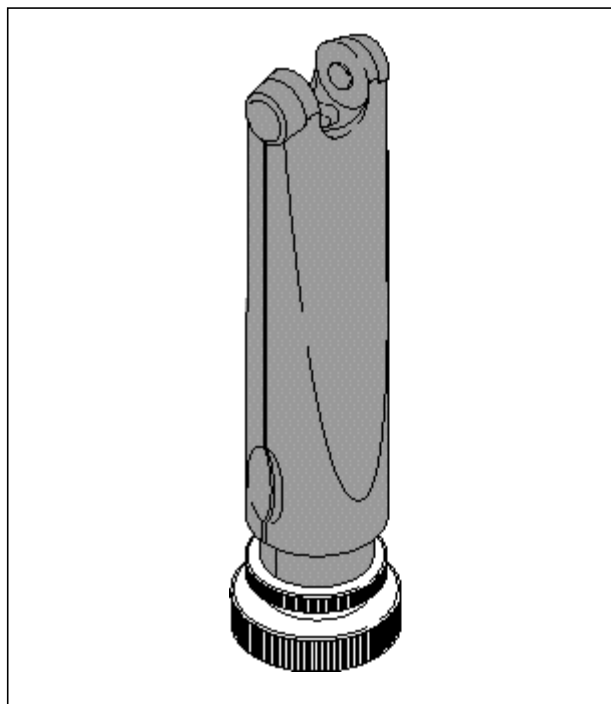
The FS22-S11 is designed to install diffusion type sensors (SC22-AAC24 /AAH24) in INGOLD compatible holders made originally for flowing junction sensors.

GENERAL SPECIFICATIONS

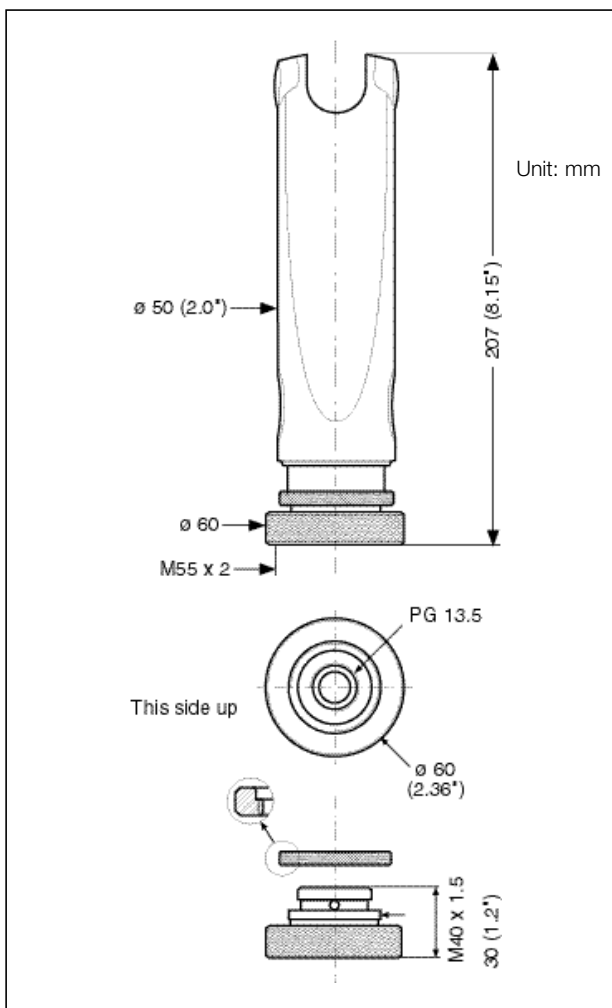
- Connection : M55x2"
- Max. Diameter : 60 mm
- Wetted materials : Stainless steel AISI 316
- Temperature range : -10 °C to 130 °C/14 °F to 266 °F
- Max. pressure : 6 bar/87 psi
- Compatibility : INGOLD model Infit and compatibles

MODEL AND SUFFIX CODES

Model	Suffix code	Option code	Description
FS22			Adapter
	-S11		Adapter M55 to 2"



FS22-S11



FS22-S11

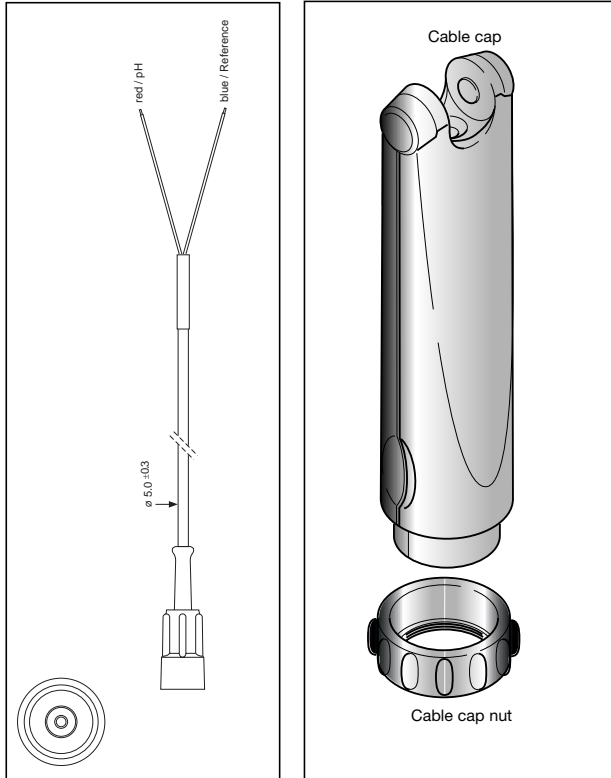
G. Cable WU20

GENERAL SPECIFICATIONS

Bending radius : min. 50mm
 Max. Temperature : 90 °C (continuously)
 Cable length : 2, 5 or 10 mtr

Ordering instructions for the cable

WU20D-PC02 2 mtr
 WU20D-PC05 5 mtr
 WU20D-PC10 10 mtr



Coax cable WU20D-PC..

Cable cap with nut

G. Model and suffix codes

Model	Suffix code	Option code	Description
SC22			Electrode
	-AAC24		Biotech. PG13.5 D D connection 120 mm
	-AAC27		Biotech. PG13.5 D D connection 225 mm
	-AAC29		Biotech. PG13.5 D D connection 325 mm
	-AAC54		Universal pressurised D connector 120 mm
	-AAC55		Universal pressurised D connector 150 mm
	-AAH24		Universal. Non flow D connect. 120mm
	-AAH27		Universal. Non flow D connect. 225mm

H. Spare parts

Description	Spare part number	Quantity
Service kit for FF22	K1523DP	1
O-ring 20.24 x 2.62 VITON		
O-ring 12.42 x 1.78 VITON		
Service kit for FP22	K1523DQ	1
O-ring 36.14 x 2.62 VITON		
O-ring 16 x 4 VITON		
O-ring 47.63 x 3 NBR		
O-ring 20.24 x 2.62 VITON		
O-ring 12.42 x 1.78 VITON		
Glass cylinder for FP22	K1523DR	1
Cable cap for all armatures	K1523DS	1
Cable cap nut for all armatures	K1523DX	1
O-ring VITON 11x3	K1500BZ	6 pcs.
O-ring EPDM 11x3	K1500BV	6 pcs.
O-ring EPDM (FDA) 42x3, 11x3	K1500HL	2x1

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