

Retractable Assemblies for pH/Redox Measurement *CleanStar OPA 933 and OPA 939*

Compact Retractable Assemblies for Installation of pH/Redox Electrodes in Tanks or Pipelines



Features and benefits

- Compact design
- Electrode can be cleaned and calibrated without interrupting the process; electrode life is extended
- Reliable separation from process by stop bolt and O-ring seals
- Simple removal and installation of electrode during ongoing process
- Adaptation to process requirements by great variety of materials and designs available
- Can be automated with a pneumatic or electric control system

Areas of application

- Chemical industry
- Food industry
- Biotechnology
- Effluent treatment
- Plant design
- Tanks and process vats
- Pipelines or pipes

This compact retractable assembly permits automatic cleaning, calibration and replacement of the electrode while the tank is full or under process conditions with pressures of up to 6 bar. The material in contact with the medium is stainless steel or Hastelloy C4.

Area of application

Area of application

The retractable assemblies CleanStar OPA 933 and OPA 939 are intended for reliable in-process measurement of pH value and Redox. This assemblies have been designed as compact retractable assemblies for the chemical industry, for plant design, food industry and for industrial effluent treatment. Without having to interrupt the process, the electrode can be

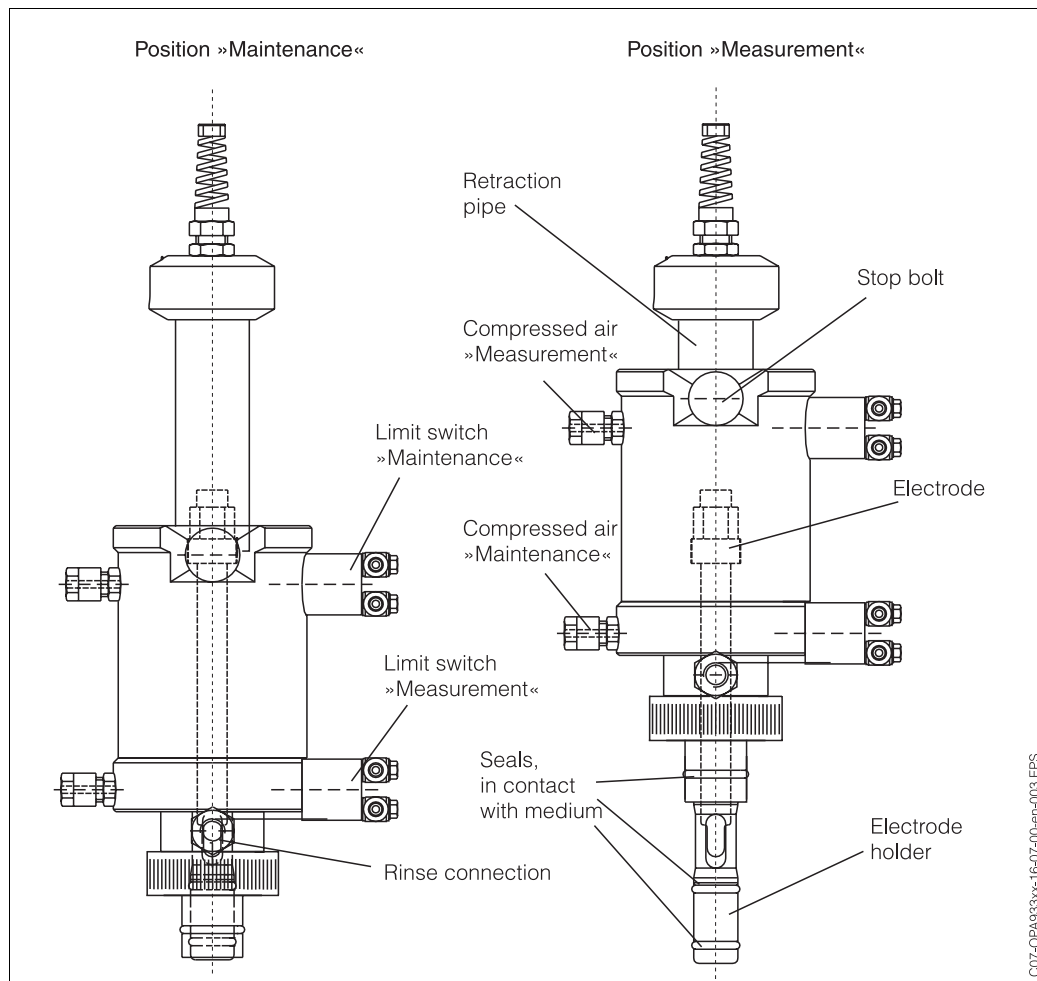
- separated from the process and moved to a rinse chamber manually or pneumatically;
- rinsed with water or cleaning solution;
- kept moist during interruptions in operation;
- removed;
- sterilised; or
- calibrated.

The CleanStar OPA 933 / OPA 939 assemblies are available with stainless steel 1.4404 (AISI 316L), 1.4571 (AISI 316Ti) or Hastelloy C4 as the material in contact with the medium, and in a housing made of stainless steel or polyamide (PA). Depending on the application, you can choose the short assembly (OPA 933; for use with 120 mm gel electrodes or 225 mm liquid KCl electrodes, immersion depth up to 101 mm) or the long assembly (OPA 939; for use with 225 mm gel electrodes, electrode immersion depth up to 208 mm). The most commonly used process connections are available (see section Process connections).

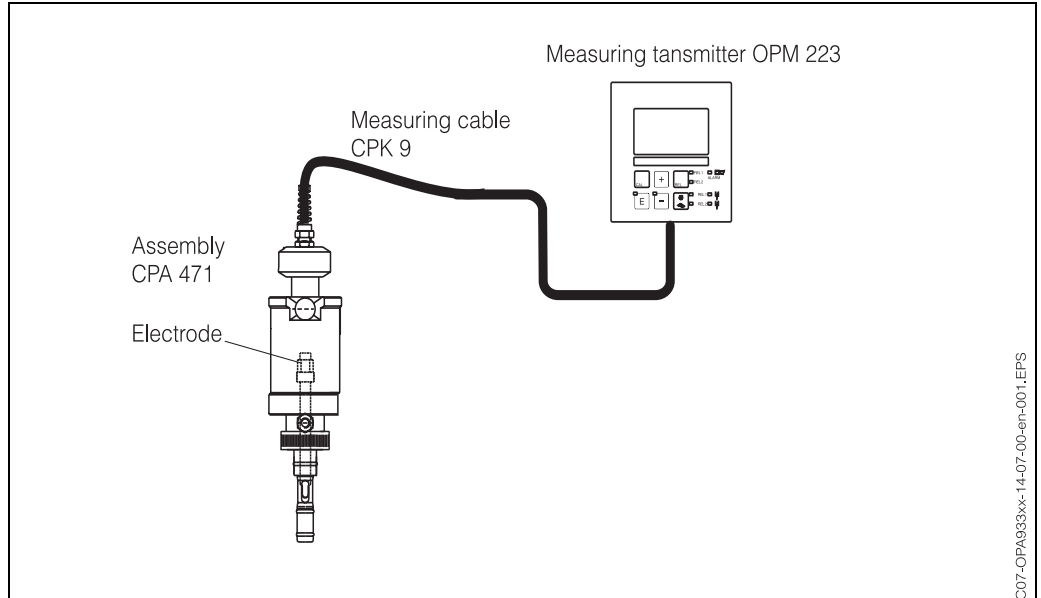
The sterilisable version »S« of the electrode holder (electrolytic polished, $R_a = 0.5 \mu\text{m}$) is used to monitor processes which demand a high degree of purity, e.g. in the foodstuffs industry and in biotechnology.

Function and construction

Function



Measuring sytem without control

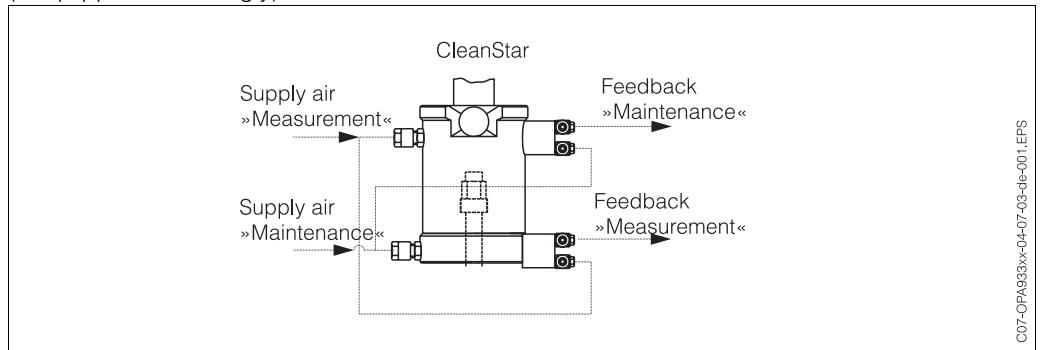


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Auxiliary energy / connections

Pneumatic connections for automatic assembly actuation

(if equipped accordingly)



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The CleanStar OPA 933 and OPA 939 assemblers are operated with an air pressure of 4 to 6bar. The air must be filtered (40 µm) and free from water and oil. There is no continuous pressure demand.

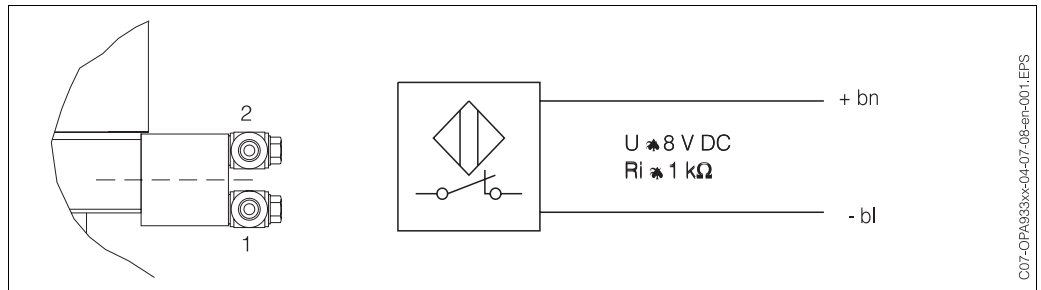
The air lines must have a minimum nominal diameter of 4 mm.



Note:

If pressure increases to above 6 bar are likely (including short peak pressures), a pressure reducer must be installed.

Connections for limit position detection



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Pneumatic limit switch (1: compressed air inlet, 2: compressed air outlet)

The lower limit switches are always used for the »Measurement« function, the upper switches for the »Maintenance« function.

Operating conditions (installation)

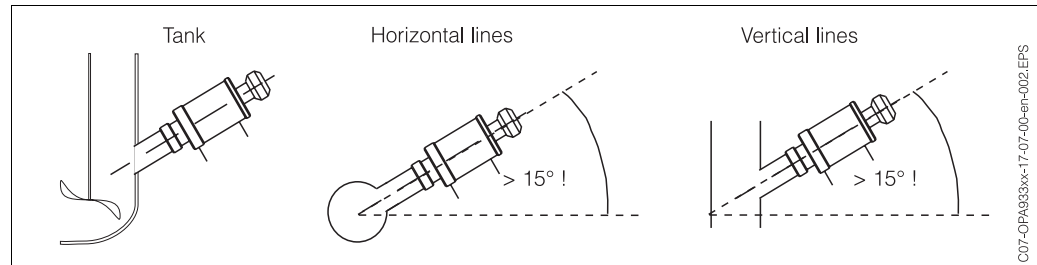
Place of installation

The CleanStar OPA 933/ OPA 939 assemblies are suitable for mounting on tanks or pipelines. Appropriate sockets are to be provided.



Note:

An installation angle of at least 15° from the horizontal is mandatory.



Examples for installation; Installation angle at least 15° from the horizontal



Note:

- Pipe installation of the assembly with a welding socket requires a nominal diameter of at least DN 80.
- A flow chamber is to be used for smaller pipe diameters. The flow chamber is available as an accessory (DN 25, stainless steel 316L or DN 50, cast iron chamber lined with PFA; order no. see section Accessories).

Operating conditions (environment)

Ambient temperature

The ambient temperature must not drop below 0 °C.



Caution:

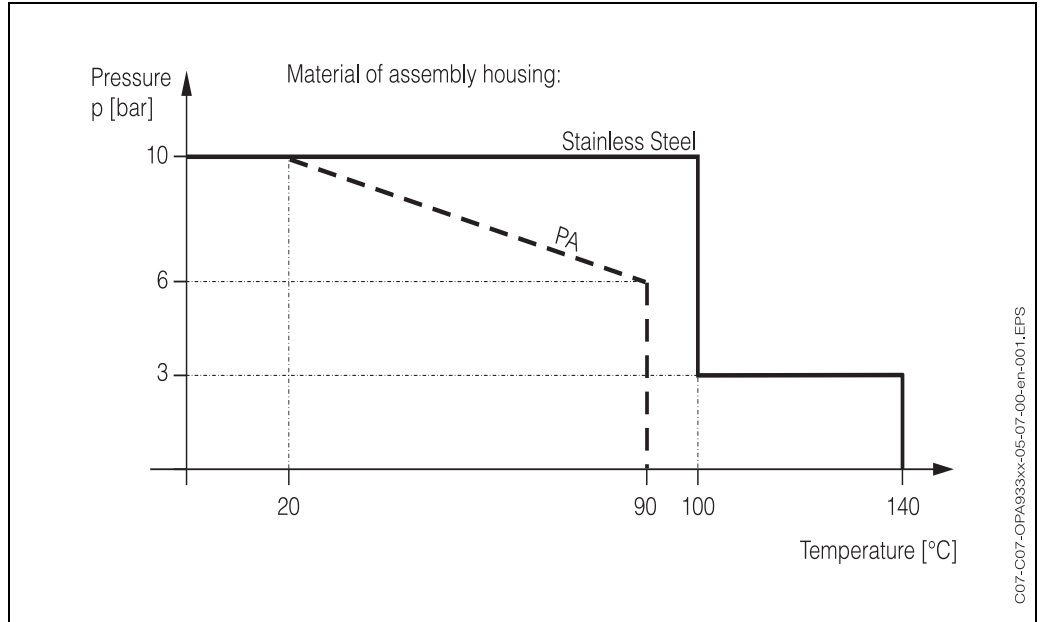
Danger of frost damage!

If temperatures below 0 °C are possible, the assembly, air and water lines are to be heated.

Operating conditions (process)

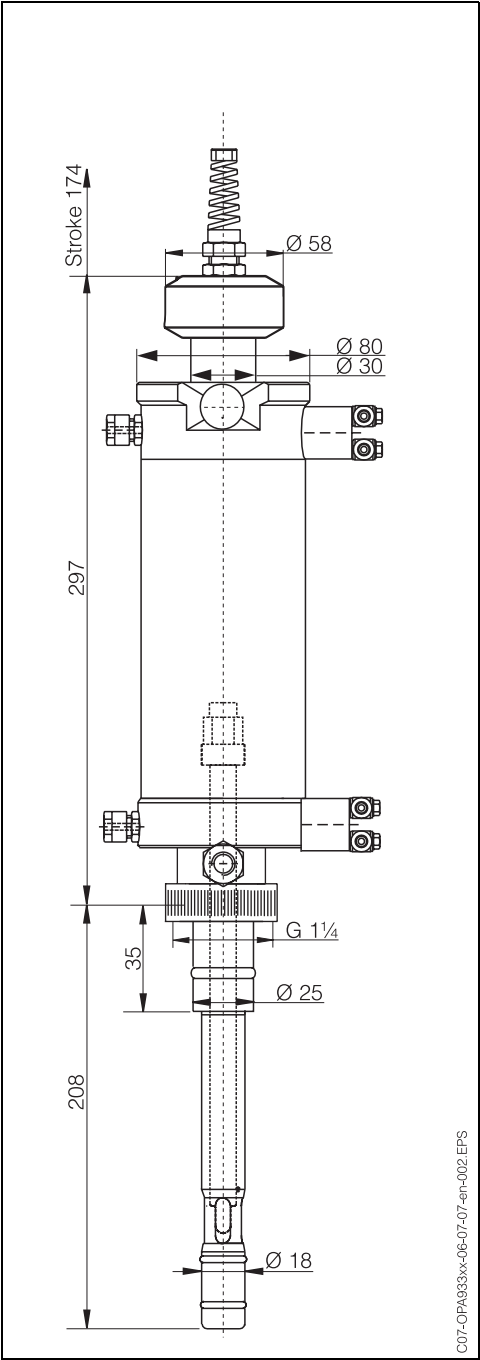
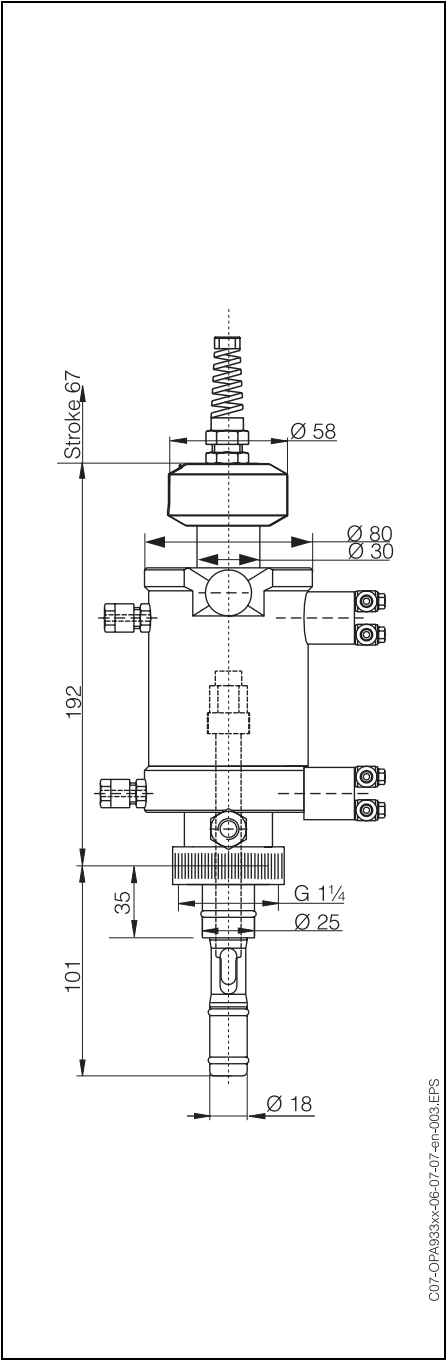
Process temperature range 0 ... 90 °C (depending on material selected and process pressure)
up to 140 °C for version with stainless steel housing

Process pressure range 0 ... 4 bar overpressure for manual actuation
0 ... 6 abr overpressure for pneumatic actuation and PA housing
0 ... 10 bar overpressure for pneumatic actuation and stainless steel housing

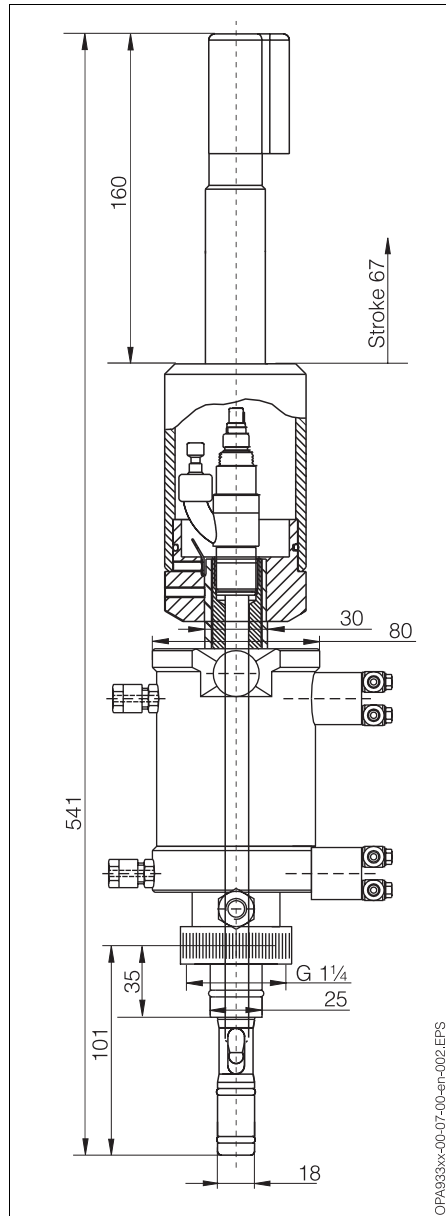


Design

Design, dimensions



Left: CleanStar OPA 933 (for electrode length of 120 mm, gel electrodes OPS 11/12)
Right: CleanStar OPA 939 (for electrode length of 225, gel electrodes OPS 11)



CleanStar OPA 933 with 225 mm liquid KCl electrode OPS 41
(with hose connection for refilling with KCl)

Materials in contact with medium	Electrode holder:	stainless steel 1.4404 (316L), 1.4571 (AISI 316Ti)
	Electrode holder of process connections Tri-Clamp 2" and dairy fitting:	stainless steel 1.4404 (AISI 316L), electrolytic polished, $R_a = 0.5 \mu\text{m}$
	Electrode holder of assembly version »S«:	stainless steel 1.4404 (AISI 316L)
	Seals:	EPDM, VITON [®] , KALREZ [®] , PTFE
Materials not in contact with medium	Housing: PA »Extra order -A«:stainless steel 1.4404 (AISI 316L)	
Rinse connections	2 x G 1/4 (inside), 2 x NPT 1/4" (inside)	
Pneumatic requirements	Pressure 4 ... 6 bar overpressure Filtered air (40 μm), water-free, oil-free The air hoses must have a minimum nominal diameter of 4 mm.	
Limit switches	Pneumatic 3/2-way valve Electric limit switches	

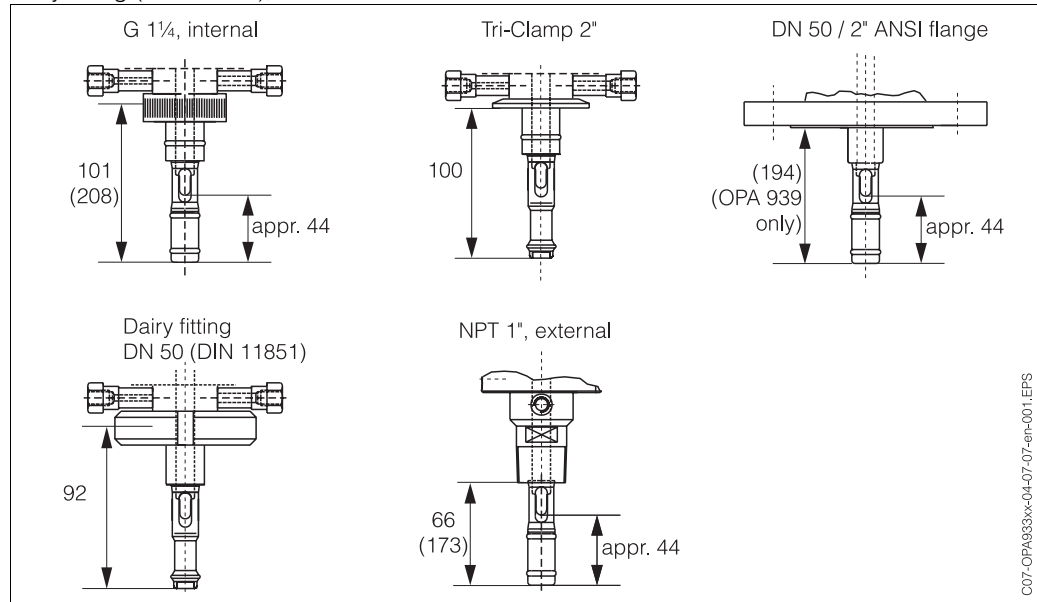
Weight OPA 933 approx. 2.5 kg
OPA 939 approx. 9 kg

Electrodes OPA 933: gel electrodes: 120 mm
KCl electrode with KCl refilling: 225 mm
OPA 939: gel electrodes: 225 mm

Process connection

Assembly versions OPA 933 and OPA 939

G 1¼ internal thread, Tri-Clamp 2", DN 50 flange, 2" ANSI flange, dairy fitting (DIN 11851), NPT 1" external thread

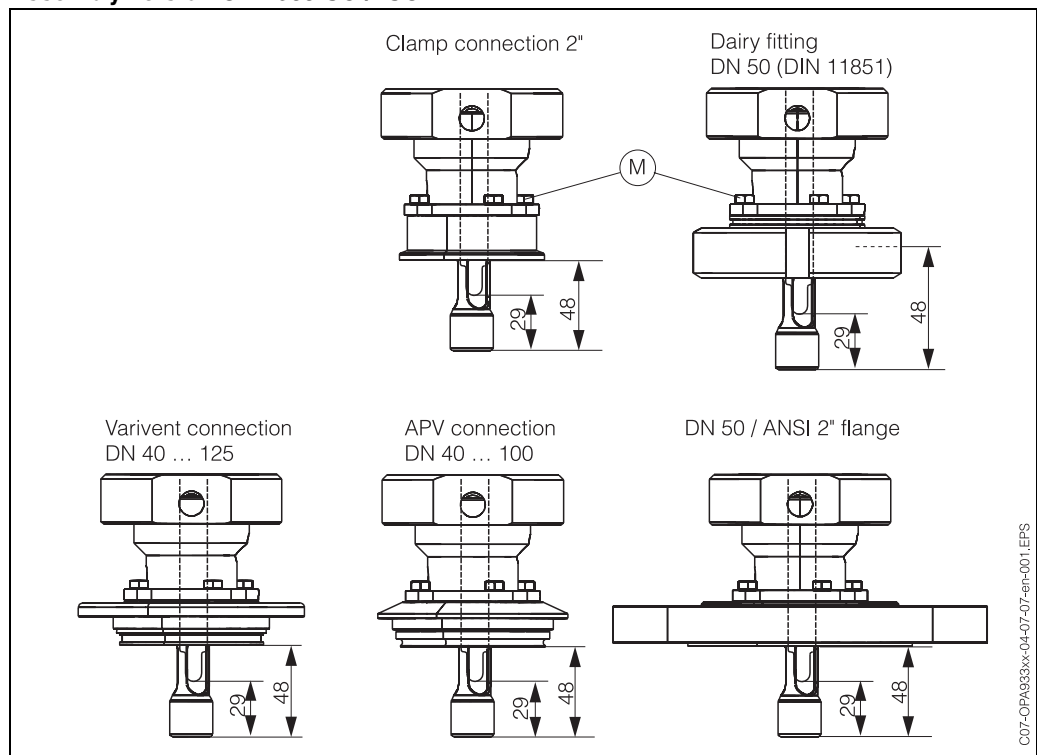


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Process connections and electrode holders.

The immersion depth in mm is specified for each connection type (values in brackets are for OPA 939)

Assembly version OPA 933-SG / -SC



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Process connections and electrode holders for version »S« (sterilizable)

The immersion depth in mm is specified for each connection type. The process connections are simply exchangeable by removing the nuts »M« (see above).

Product overview

Product overview for CleanStar OPA 933

		Drive type and limit switches	
	0	Manual (cannot be converted to pneumatic)	
	1	Pneumatic without limit switches (suitable for retrofitting)	
	2	Pneumatic with 1 pneumatic limit switch	
	3	Pneumatic with 2 pneumatic limit switches	
	4	Pneumatic with 1 electric limit switch	
	5	Pneumatic with 2 electric limit switches	
	6	Pneumatic with 1 electric limit switches, ex version	
	7	Pneumatic with 2 electric limit switches, ex version	
	9	Special version acc. to customers specification	
		Sealing of electrode holder / electrode length	
	C	Standard version (for KCl electrodes, length 225 mm, with Pg 13.5 hose connection head)	
	G	Standard version (for gel electrodes with Pg 13.5, length 120 mm)	
	Y	Special version acc. to customers specification	
		Assembly material (in contact with medium)	
	71	Stainless steel 1.4404 (AISI 316L), with PA housing	
	72	Stainless steel 1.4404 (AISI 316L), with stainless steel 1.4571 (AISI 316Ti) housing	
	81	Stainless steel 1.4571 (AISI 316Ti), with PA housing	
	82	Stainless steel 1.4571 (AISI 316Ti), with stainless steel 1.4571 (AISI 316Ti) housing	
	99	Special version acc. to customers specification	
		Seal material (in contact with medium)	
	E	EPDM	
	F	VITON®	
	K	KALREZ®	
	Y	Special version acc. to customers specification	
		Process connection	
	1	NPT 1 external thread	
	2	G 1¼ internal thread (union)	
	4	Dairy pipe NW 50	
	5	DN 50 flange	
	6	Tri-Clamp 2"	
	7	APV DN 40 ... 100	
	9	Special version acc. to customers specification	
		Optional equipment	
	N	With rinse fitting 2 x NPT ¼" internal thread	
	O	Without rinse connection (retrofitting not possible)	
	R	With rinse fitting 2 x G ¼ internal thread	
	Y	Special version acc. to customers specification	
		Customer specification	
	NND	German	
	NNE	English	
	NNN	No Name	
	YYY	Special version acc. to customers specification	
OPA 933-			complete order code

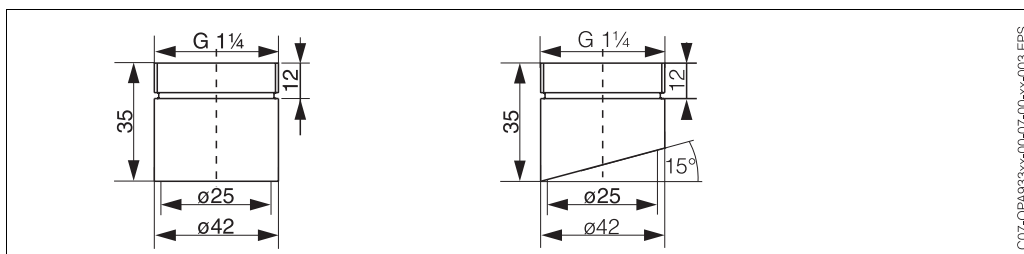
Product overview for CleanStar OPA 939

		Drive type and limit switches	
	0	Manual (cannot be converted to pneumatic)	
	1	Pneumatic without limit switches (suitable for retrofitting)	
	2	Pneumatic with 1 pneumatic limit switch	
	3	Pneumatic with 2 pneumatic limit switches	
	4	Pneumatic with 1 electric limit switch	
	5	Pneumatic with 2 electric limit switches	
	6	Pneumatic with 1 electric limit switches, ex version	
	7	Pneumatic with 2 electric limit switches, ex version	
	9	Special version acc. to customers specification	
		Sealing of electrode holder / electrode length	
	D	For gel electrodes 225 mm, immersion depth 150 mm	
	H	For gel electrodes 225 mm, immersion depth 212 mm	
	I	For gel electrodes 360 mm, immersion depth 150 mm	
	L	For gel electrodes 360 mm, immersion depth 290 mm	
	Y	Special version acc. to customers specification	
		Assembly material (in contact with medium)	
	71	Stainless steel 1.4404 (AISI 316L), with PA housing	
	72	Stainless steel 1.4404 (AISI 316L), with stainless steel 1.4571 (AISI 316Ti) housing	
	81	Stainless steel 1.4571 (AISI 316Ti), with PA housing	
	82	Stainless steel 1.4571 (AISI 316Ti), with stainless steel 1.4571 (AISI 316Ti) housing	
	99	Special version acc. to customers specification	
		Seal material (in contact with medium)	
	F	VITON [®]	
	K	KALREZ [®]	
	Y	Special version acc. to customers specification	
		Process connection	
	1	NPT 1 external thread	
	2	G 1¼ internal thread (union)	
	3	ANSI 2" flange	
	6	Tri-Clamp 2"	
	7	APV DN 40 ... 100	
	8	DN 50 flange	
	9	Special version acc. to customers specification	
		Optional equipment	
	N	With rinse fitting 2 x NPT ¼" internal thread	
	O	Without rinse connection (retrofitting not possible)	
	R	With rinse fitting 2 x G ¼ internal thread	
	Y	Special version acc. to customers specification	
		Customer specification	
	NND	German	
	NNE	English	
	NNN	No Name	
	YYY	Special version acc. to customers specification	
OPA 939-			complete order code

Accessories

Welding socket

G 1¼, straight, stainless steel 316Ti; order no.: A933Z-ES35G
 G 1¼ inclined 15°, stainless steel 316Ti; order no.: A933Z-ES35S



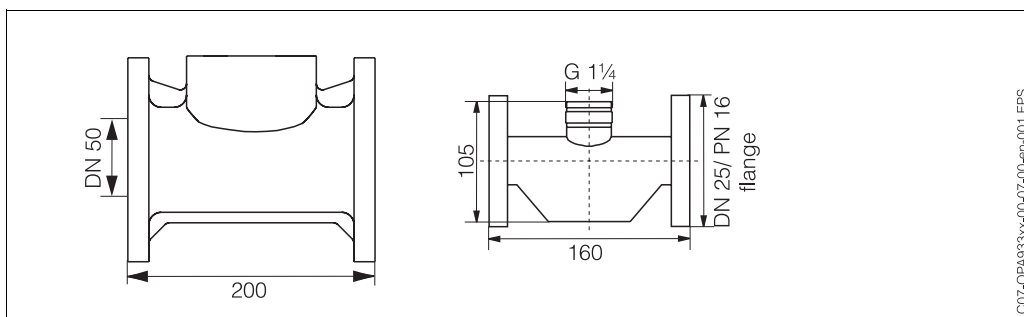
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Blind plug for G 1¼ process connection

Stainless steel 316Ti with VITON® seal
 G 1¼ connection, internal thread; order no.: A933Z-BV35

Flow chamber

DN 25, G 1¼ external thread, stainless steel 316Ti; order no.: A933Z-DF25VA
 DN 50, cast iron chamber lined with PFA, order no.: A933Z-DN50PFA



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Electrolyte vessel

The electrolyte vessel OPY 7 is used to supply electrodes filled with liquid electrolyte in unpressurized or pressurized applications. If a reference electrode is installed, then the electrolyte vessel can be used as an electrolyte bridge.

Set of seals for contact with medium

Electrode holder standard version: EPDM; order no.: A933DISA-EPDM
 VITON®; order no.: A933DISA-FPM
 KALREZ®; order no.: A933DISA-KAL
 (not for flange connection)
 Electrode holder sterilisable version: EPDM; order no.: A933-SDISA-EPDM
 VITON®; order no.: A933-SDISA-FPM

pH/Redox combination electrodes, length 120 mm

Gel electrodes OPS 11/12

pH/Redox combination electrodes, length 225 mm

Gel electrodes OPS 11/12
 KCl liquid electrode OPS 41 (with SSA or ESS head)

Hose nozzles for rinse connections

G ¼, DN 12, stainless steel 316L (2 pcs.); order no.: A933Z-ST12

Retrofit Kit limit switches

pneumatic limit switches (2 pcs.); order no.: A933Z-PS

Supplementary documentation

Supplementary documentation

- Technical Information OPS 11 TI 028C/07 (order no. 51503148)
OPS 12 TI 028C/07 (order no. 51503202)
- Technical Information OPS 41 TI 079C/07 (order no. 51503200)