

SAFETY INSTRUCTIONS

1. Do not exceed maximum temperature/pressure specifications.
2. Wear safety goggles or faceshield during installation/service.
3. Do not alter product construction.

1. Technical Data

1.1 General

Compatibility: +GF+ SIGNET 2750 pH/ORP sensor
 Electrical contacts: gold-plated DryLoc™ connector

Pipe Size Range:

- 1/2" and up. Use +GF+ SIGNET installation fittings to 4 in.
- Use pipe adapters in pipes over 4 in.
- Submersion with 2750 sensor requires 3/4 in. NPT or ISO 7-1/R 3/4 male threaded extensions

Efficiency: >97% @ 25°C (77° F)
 Response Time: pH: < 5 s for 95% of signal change
 ORP: Application dependent

Primary Functions: 2754, 2755: Flat surface resists fouling
 2756, 2757: Bulb surface for general use
 2754-HF: Extended use in applications with trace hydrofluoric acid (<2%)
 2756-DI: Extended use in pure waters (<100 µS)

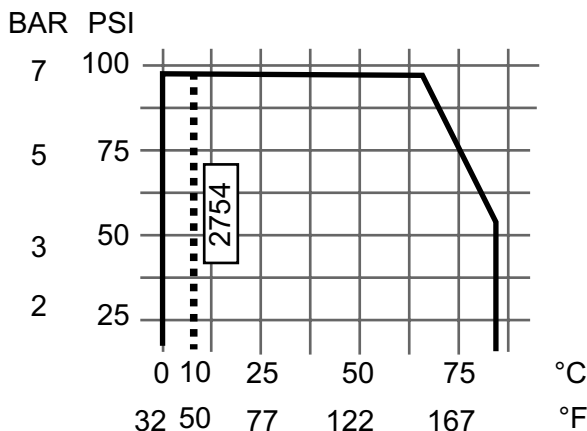
1.2 2754 and 2756 pH Electrodes

Operating Range: 0 to 14 pH
 Wetted Materials: CPVC Body
 Glass
 FPM O-rings
 Porous UHMW Polyethylene reference junctions
 pH Reference: Electrolyte: Solidified Acrylamide Gel
 3.5M KCl (2754, 2754-HF, 2756)
 0.1 M KCl (2756-DI)

Element: Ag/AgCl
 Temperature Sensor: PT-1000 (1096.8Ω @ 25°C)
 Response Time, τ: 140 secs. (2754), 196 secs. (2756)

1.3 2755/2757 ORP Electrodes

Operating Range: -2000 to +2000 mV
 Wetted Materials: CPVC Body
 Glass
 FPM O-rings
 Porous UHMW Polyethylene reference junctions
 Platinum sensing surface
 ORP Reference: Solidified Acrylamide Gel:3.5M KCL saturated with AgCl
 Element: Ag/AgCl



1.4 Temperature and pressure specifications

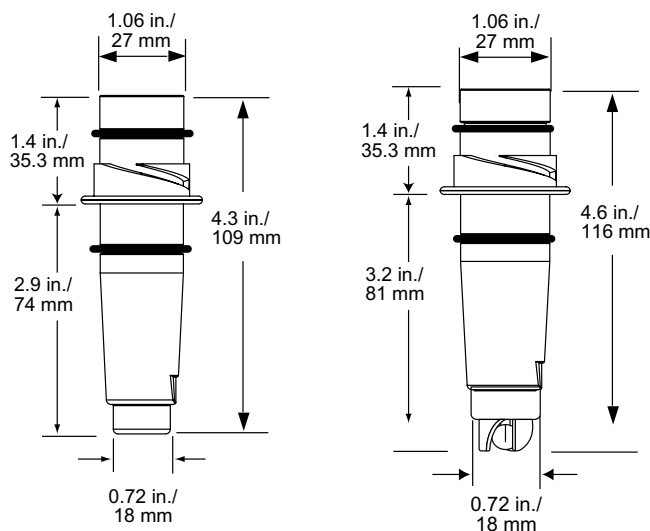
- ORP electrode operating Temperature/Pressure
- 6.89 bar @ 0°C to 65°C (100 psi @ 32° to 149° F)
 - 4.00 bar @ 66°C to 85°C (58 psi @ 150° to 185° F)

- 2756 and 2756-DI pH electrode operating Temperature/Pressure
- 6.89 bar @ 0°C to 65°C (100 psi @ 32° to 149° F)
 - 4.00 bar @ 66°C to 85°C (58 psi @ 150° to 185° F)

- 2754 and 2754-HF pH electrode operating Temperature/Pressure
- 6.89 bar @ 10°C to 65°C (100 psi @ 50° to 149° F)
 - 4.00 bar @ 66°C to 85°C (58 psi @ 150° to 185° F)

Storage Temperature: > -12° C (11° F)

1.5 Dimensions



Flat electrode

Bulb electrode

4. ORP Electrode Calibration

All ORP electrodes are designed to ensure linearity during their lifespan. The following sections define proper electrode operation.

4.1 Offset (STD)

Electrode offsets occur due to:

- Clogged reference junction
- Aged or contaminated reference solution/wire

Offsets are easily checked in pH 7 buffer saturated with quinhydrone @ 25 °C; since the theoretical output is +87 mV. Any deviation from +87 mV is the ORP electrode offset (i.e. +90 mV). Quinhydrone is the oxidizer measured by the ORP electrode and is required for calibration. To guarantee buffer saturation, mix 1/8g quinhydrone per 50 mL of pH buffer.

ORP Electrode Offset:

Solution: pH 7 or pH 4 buffer saturated with Quinhydrone @ 25 °C

	<u>pH 7 + Quinhydrone</u>	<u>pH 4 + Quinhydrone</u>
Theoretical mV:	+ 87 mV	+ 264 mV
New:	87 ± 15 mV	+264 ± 15 mV
Reliable:	87 ± 50 mV	+264 ± 50 mV

Electrode offsets greater than ±50 mV indicate the electrode requires cleaning or replacement, see section 5.2.

4.2 Slope (SLP)

ORP slope errors are generally caused by contamination of the platinum electrode surface. Cleaning the electrode surface will usually restore proper values, response time, and stability.

<u>Reaction</u>	<u>Common ORP Values</u>	<u>mV</u>
Cr → Cr ²⁺ + 2e ⁻		- 913
Fe → Fe ²⁺ + 2e ⁻		- 440
Cr ²⁺ → Cr ³⁺ + e ⁻		- 407
4OH ⁻ → O ₂ + 2H ₂ O + 4e ⁻		- 401
2I ⁻ → I ₂ + 2e ⁻		- 400
Ti ²⁺ → Ti ³⁺ + e ⁻		- 370
Ni → Ni ²⁺ + 2e ⁻		- 250
Pb → Pb ²⁺ + 2e ⁻		- 126
Fe → Fe ³⁺ + 3e ⁻		- 37
H ₂ → 2H ⁺ + 2e ⁻		0
Fe ²⁺ → Fe ³⁺ + e ⁻		+ 771
Ag → Ag ⁺ + e ⁻		+ 799
Pb → Pb ⁴⁺ + 4e ⁻		+ 800
3Br ⁻ → Br ₃ ⁻ + e ⁻		+ 1060
2Br ⁻ → Br ₂ + 2e ⁻		+ 1066
ClO ₂ ⁻ → ClO ₂ + e ⁻		+ 1160
Pt → Pt ²⁺ + 2e ⁻		+ 1188
Ag → Ag ²⁺ + 2e ⁻		+ 1369

Many systems require both pH and ORP calibration. To conserve calibration reference solutions, use pH 7 and 4 buffers for pH calibration first. ORP calibration can be performed with the same buffers by adding quinhydrone.

5. Maintenance and Cleaning

5.1 Maintenance

Variables can affect long term pH or ORP electrode life. For this reason, a maintenance log is recommended for trend analysis. When storing boxed sensors, lay the sensor flat to maximize hydration of the glass surface. Keep the glass surface wet at all times. Soak the sensor tip in pH 4.0 buffer during system maintenance intervals. In-line applications should be plumbed with a depression (trap) so liquid is maintained around the sensor tip. If the sensor dehydrates, soak the sensor tip in pH 4 buffer for 24 to 48 hours, then visually inspect the electrode for surface cracks, swelling, or discoloration. Severely dehydrated electrodes cannot be restored to normal operation.

5.2 Cleaning

Cleaning techniques vary depending on the type of coating present on the glass electrode surface or reference junction.

- Soft coatings can be removed by vigorous stirring, or with directed spray of an applicable detergent or solvent onto the glass electrode surface. Chlorine bleach or mild detergent may be used to remove soft coatings. Always rinse electrode tip in clean water after cleaning.
- Hard coatings can be chemically removed. Use the least harsh chemical which will remove the contaminant within two (2) minutes without attacking the materials of construction. e.g. calcium carbonate may be removed with a 5% HCL (muriatic acid) solution.
- Oily or organic coatings can be removed with detergents or an appropriate solvent that does not attack the materials of construction e.g. isopropyl alcohol may be used but acetone must be avoided to prevent damage to the CPVC sensor body.
- ORP electrode surface (platinum rod) can be gently sanded with 600 grit wet and dry silicone or carbide sandpaper, jewelers rouge, crocus cloth, or very fine steel wool.



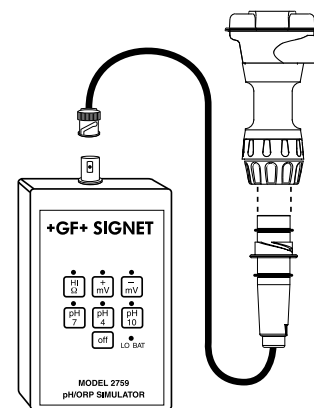
WARNING!

Wear appropriate eye, face, hand, body, and respiratory protection when using chemicals or solvents.

6. Replacement parts and accessories

Mfr. Part No.	Code	Description
3-2754	159 000 747	Flat pH Electrode
3-2754-HF	159 000 748	Flat pH Electrode, HF Resistant
3-2755	159 000 749	Flat ORP Electrode
3-2756	159 000 750	Bulb pH Electrode
3-2756-DI	159 000 751	Bulb pH Electrode, DI Resistant
3-2757	159 000 752	Bulb ORP Electrode
3-2759	159 000 762	pH/ORP Simulator/System Tester
3-2759.391	159 000 764	Adapter Cable for use with 2750
3-2750-1	159 000 744	In-line Sensor Electronics w/Junction Box
3-2750-2	159 000 745	In-line Sensor Electronics w/Junction Box & Local EasyCal
3-2750-3	159 000 746	Submersible Sensor Electronics (NPT)
3-2750-4	159 000 842	Submersible Sensor Electronics (ISO)
P31515-0P200	159 000 630	PVC Pipe Adapter
P31515-0C200	159 000 631	CPVC Pipe Adapter
P31515-0V200	159 000 459	PVDF Pipe Adapter
3-0700.390	198 864 403	pH Buffer Kit
1220-0021	198 801 186	O-ring, FPM (standard)
1224-0021	198 820 006	O-ring, EPR
1228-0021	198 820 007	O-ring, Kalrez

3-2759 pH/ORP Simulator/System Tester

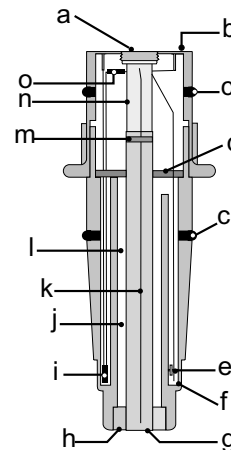


CAUTION!

Apply O-ring lubricant to sensor O-rings prior to assembly.
Unlubricated O-rings may score the sealing surface in the 2750.

Technical Features

- | | |
|--|--|
| a) Foul-proof connector with gold-plated contacts | i) PT-1000 RTD for pH electrode |
| b) Keyed for a simple sure fit | j) Solidified acrylamide reference electrolyte |
| c) Viton® O-rings | k) Ag/AgCl measuring element |
| d) Silicone-bushing seal | l) Large reference volume |
| e) Double junction | m) Epoxy seal |
| f) Ag/AgCl reference element | n) Shielding |
| g) Platinum sensing surface (ORP) or flat pH glass | o) 10KΩ I.D. resistor for ORP sensor |
| h) Porous UHMW polyethylene reference junction | |



+GF+ SIGNET

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