Sitron's Pressure Sensors & Hydrostatic Continuous Level Probes

Pressure Sensors

Models:

- SP96
- SPC98

Introduction

Sitron's Pressure Sensors SP96 and SPC98 provide cost effective, reliable and accurate level and pressure measurement. These sensors are suitable for absolute pressure as well as for positive and negative gauge pressure. Like all of Sitron's products, the Pressure Sensors can be made in a wide variety of process connections. They feature easy installation (mounted at the bottom of a vessel), within a compact design. They also feature excellent repeatability, high accuracy, and maintenance-free reliability under varying environmental conditions.

Technology

As the volume of the medium increases within a tank or well, the process pressure is applied to a 316 S.S. piezoresistive diaphragm cell (SP96) or a ceramic cell (SPC98). The external force of the process pressure creates a displaced electrical charge, which accumulates on opposing surface of the cell. In both cases this generate an output signal, which is converted to a standardized 4-20-mA (2 wire) signal that is directly proportional to the pressure applied.

Features

- **Low Cost**
- **Rugged and compact design- Body entirely 316 S.S.**
- **Loop powered**
- **Absolute and gauge pressure ranges**
- **Temperature compensation**
- **Ceramic sensors for SPC98 models**
- **High accuracy**
- **Excellent repeatability**
- **3A approved**

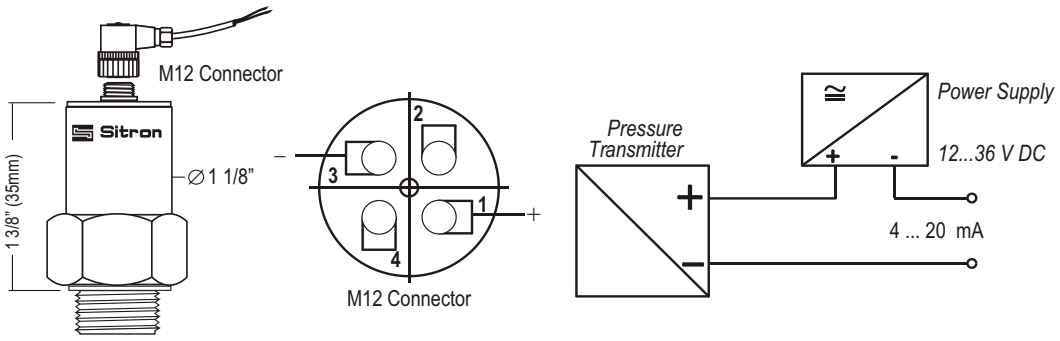
SP96 Pressure Sensor

The **SP96** pressure sensor is made with 316S.S. piezoresistive cells filled with silicone or oil. It is design to be installed at the bottom of the tank.
The SP96 pressure sensor is offered in 316 S.S. with a 4-20mA output signal, as well as a great variety of pressure ranges and connections. The SP96 pressure sensor can also be offered with a Zero and Span adjustment. The SP96 models can be easily customized to handle a wide range of applications for different types of liquids, a variety of food industry applications, as well as for gases.

There are advantages (such as wide frequency and amplitude range) to use piezoelectric sensors. Fast response, rugged and compact 316S.S. housing and temperature compensation are standard features of the SP96.
For applications with aggressive medium, a Hastelloy-C options is offered with ceramic sensor.

Pressure ranges from 14.50 to 2900-PSI (-1 to 200 bar) gauge/absolute.

DIMENSIONS	WIRING DIAGRAM



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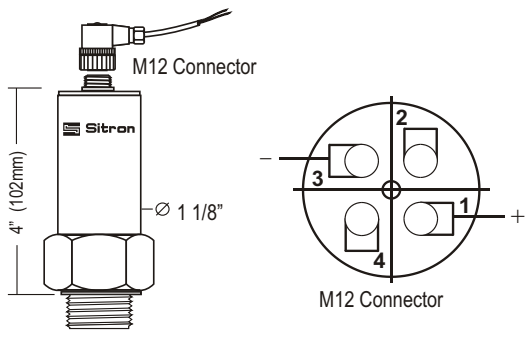
SPC98 Ceramic Pressure

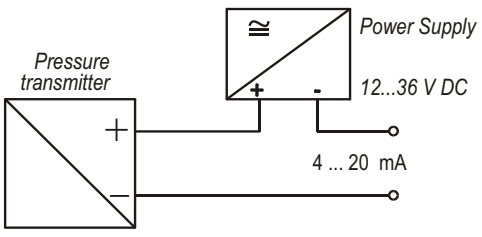
The **SPC98** dry and flush mounted ceramic pressure sensor uses an aluminum oxide ceramic sensor as a "dry cell" that is extremely resistant to overload, aggressive mediums, extreme min/max temperature, applications with solid particles and low pressure ranges. It is designed to be installed at the bottom of the tank. As opposed to the 316S.S. piezoresistive cells filled with oil, the process pressure acts directly on the ceramic diaphragm. The actual measuring range of the sensor is determined by the thickness of the ceramic diaphragm, which if overloaded, stops on the ceramic substrate without sustaining damage. Ceramic cells do not expand and contract nearly as much as metal, ensuring good temperature stability.

Common features of the SPC98 are low hysteresis, high repeatability, immunity to the effects of process builds up and outstanding resistance to chemical attack. The SPC98 is often specified for sanitary applications because if the ceramic cell breaks it will not contaminate the process medium. The SPC 98 provides a 4-20mA output and its body is made of 316S.S.

Pressure ranges from -1 to 580PSI (-1 to 40 bar) gauge /absolute.

DIMENSIONS	WIRING DIAGRAM





Hydrostatic Measurement (Depth & Level)

Models:

- **HLF 842 (Piezo cell) or HLF 842-C (ceramic)**
- **HLC 842 (Piezo cell) or HLC 842-C (ceramic)**
- **HL 840 (Piezo cell) or HL 840-C (ceramic)**

Introduction

Sitron's Hydrostatic Level Probes have identical features as the Pressure Sensors with one main difference: They are submersible. Hydrostatic Level Probes are specifically designed for depth/level measurements in groundwater, deep wells, water towers, rivers, sewage treatment plants and other similar applications. The Hydrostatic Level Probes are fully encapsulated and are housed in a weatherproof cylindrical enclosure. Offering a great degree of flexibility, they can be constructed with 316S.S. rigid rods or with special cables for depth measurements.

These probes can be made with either 316 S.S. piezoresistive or ceramic cells. Their compact design enables the probes to work within pipe diameters as little as 3/4". The 842 models are available with an electronic module within the enclosure providing a Zero/Span adjustment. All of Sitron's Hydrostatic Level Probes have a 4-20mA (2 wire) output signal and are fully temperature compensated. Like all of Sitron's products, the Hydrostatic Measurement Level Probes can be made in a wide variety of process connections.

Technology

Hydrostatic Level Probes utilize the same pressure sensing technology as the pressure sensors; as hydrostatic pressure increases with the height of the water column a displaced electrical charge accumulates on the opposing surface of the cell (316 S.S. piezoresistive or ceramic). This generates an output signal, which is converted to a standardized 4-20-mA (2 wire) signal that is directly proportional to the pressure applied.

Mounting

While the Hydrostatic Level Probes are similar to the pressure sensors in terms of their technical specifications, all of the mechanical mounting procedures are different. The HL Series of Hydrostatic Level Probes must be installed at the top of the tank or well, along with a special polyurethane cable or rigid rods that transmit the signals from the sensor to the head of the probe where an electronic module is located. Precision mounting of Hydrostatic Level Probes is essential for accurate pressure measurements.

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Features

- Simple Installation
- Fully Submersible NEMA 6P (IP68)
- Special polyurethane cable for long lengths
- Ceramic or 316 S.S. Piezoresistive cells
- Analog output 4-20mA Zero and Span adjustment
- Long term stability
- Sanitary connections available for food processing and pharmaceutical industries

Hydrostatic Level Probe with Fixed Rod

HLF842

The **HL842** is designed for short measurements with a fixed 316S.S. rigid rod. There is no pre-set limit for rigid rod lengths, but the longer the rod gets, the more difficult it is to transport and install. Sitron recommends lengths no greater than 8 feet (2.43 m); for lengths greater than 8 feet (2.43 m) the HLC842, having no pre-set limit on cable lengths, is the ideal solution. The HLF842 has an electronic module in the probe's enclosure with a Zero/Span adjustment.

The HLF842 submersible pressure sensor uses a 316S.S. piezoresistive diaphragm filled with silicon to interface between the water and the sensing element. This silicone diaphragm is highly flexible and touches the sensing element, producing a sensor with exceptional linearity and very low hysteresis.

Pressure ranges from 0 to 4.5-PSI (0 to 0.3bar) gauge.

Hydrostatic Level Probe with Cable

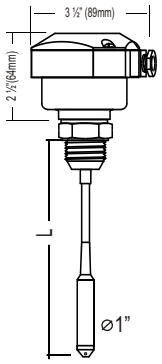
HLC842

The **HLC842** is the ideal solution for depth measurements, but it works as well for short measurement applications. Like the HLF842, the HLC842 also has a 316S.S. piezoresistive diaphragm filled with silicon. The advantage of the HLC842 is that the special polyurethane waterproof cable, which connects the sensor to the monitoring device, permits unlimited length for depth measurements.

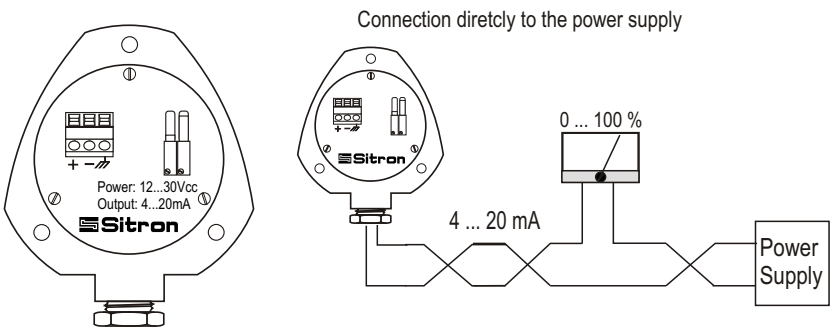
The HLC842 has an electronic module in the probe's enclosure with a Zero/Span adjustment.

Pressure ranges from 0 to 29PSI (0 to 2bar) gauge.

DIMENSIONS



WIRING DIAGRAM



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Hydrostatic Level Probe

HL840

The **HL840** is exactly the same as the HLC842, with only one difference: The electronic module is located inside the capsule along with the sensing element. The HL840 does not have an enclosed housing or process connection. It is only the sensor located at the bottom of the cable.

Pressure ranges from 0 to 2900-PSI (0to 200 bar) gauge. Sitron's HL840 has been successfully applied in the field to depths of 2000 ft. (610 m).

Hydrostatic Level Probe with Fixed Rod - Ceramic

HLF842C

The **HLF842C** is designed for short measurements with a ceramic cell and rigid rod. It has the same features as the HLF842, but this one is made with a ceramic cell. Sitron recommends lengths no greater than 8 feet (2.43 m); for lengths greater than 8 feet (2.43 m) the HLC842C, having no pre-set limit on cable lengths, is the ideal solution.

Pressure ranges from 0 to 4.5-PSI (0 to 0.3bar) gauge.

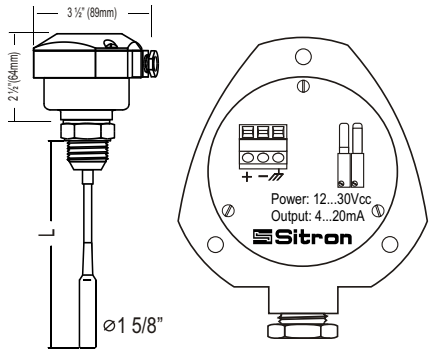
Hydrostatic Level Probe with Cable - Ceramic

HLC842C

The **HLC842C** comes with a polyurethane waterproof cable and is the ideal solution for depth measurements, but it works as well for short measurement applications. It has the same features as the HLC842, but this one is made with a ceramic cell.

Pressure ranges from 0 to 29PSI (0 to 2bar) gauge.

DIMENSIONS



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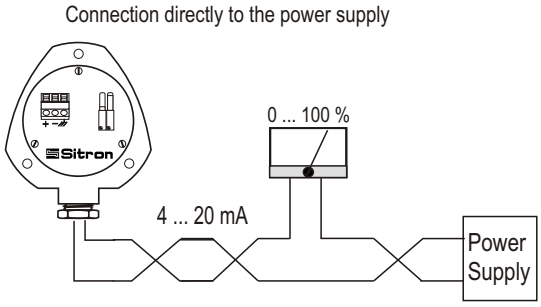

Hydrostatic Level Probe - Ceramic

HL840C

The **HL840** electronic module is located inside the capsule along with the sensing element. The HL840 does not have an enclosed housing or process connection. It is only the sensor located at the bottom of the cable. It is made with a ceramic cell.

Pressure ranges from 0 to 580 PSI (0 to 40 bar) gauge

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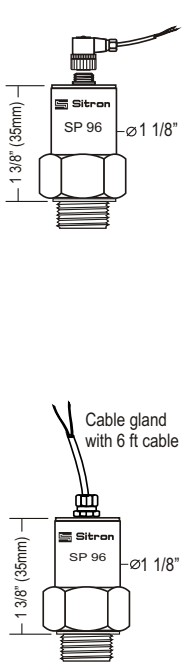
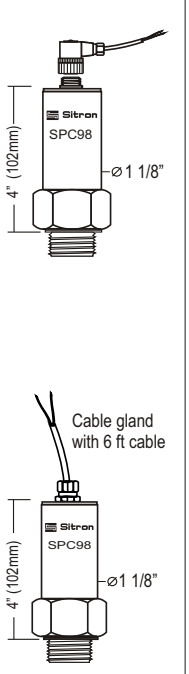
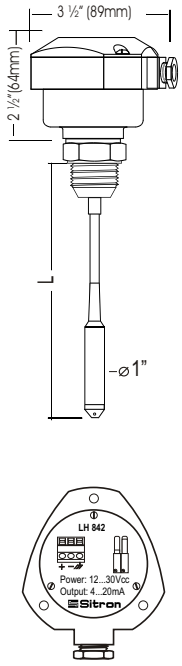
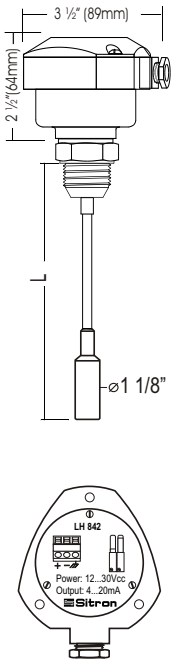
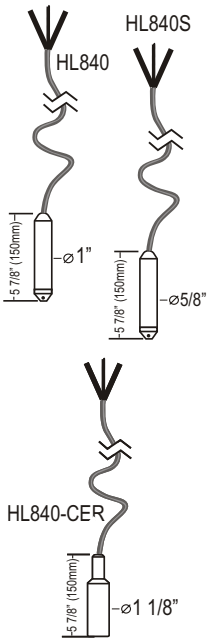
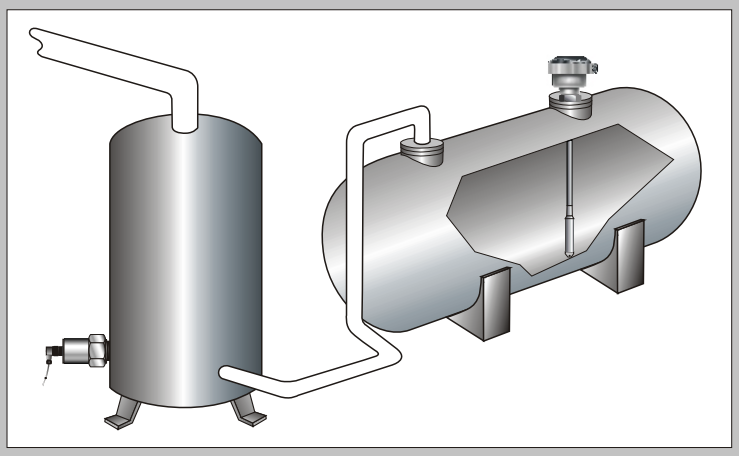
SPECIFICATIONS

MODELS	SP 96	SPC 98	HLF 842- (rod) HLC 842 - (cable)	HLF842-CER HLC842-CER	HL840 (316 S.S.) HL840S (316S.S.) HL 840-CER- (Ceramic)
					
Application	Pressure and level measurement for liquids and gas	Pressure and level measurement for liquids and gas	Pressure and level measurement for liquids and gas	Pressure and level measurement for liquids and gas	Pressure and level measurement for liquids and gas
Operating Voltage	12 .. 30 Vdc	12 .. 30 Vdc	12 .. 30 Vdc	12 .. 30 Vdc	12 .. 30 Vdc
Current consumption	Máx.: 22mA	Máx.: 22mA	Máx.: 22mA	Máx.: 22mA	Máx.: 22mA
Electrical connection	Cable gland with 6.57ft (2000mm) cable or M12 connector	Cable gland with 6.57ft (2000mm) cable or M12 connector	Cable gland with 6.57ft (2000mm) cable or M12 connector	Cable gland with 6.57ft (2000mm) cable or M12 connector	--
Adjustment	--	--	Potentiometer Zero and Span	Potentiometer Zero and Span	--
Output	4...20mA (2 wire)	4...20mA (2 wire)	4...20mA (2 wire)	4...20mA (2 wire)	4...20mA (2 wire)
Accuracy/ Stability	0,5%	0,5%	0,5%	0,5%	0,5%
Type of Sensor	Piezoresistive 316 S.S.	Capacitive Ceramic Sensor	Piezoresistive 316 S.S.	Capacitive Ceramic Sensor	Capacitve Ceramic Sensor Piezoresistive 316 S.S.
Process connection	1/4" to 1 1/2" BSP or NPT, sanitary or flanged connections	1/4" to 1 1/2" BSP or NPT, sanitary or flanged connections	1/4" to 1 1/2" BSP or NPT, sanitary or flanged connections	1/4" to 1 1/2" BSP or NPT, sanitary or flanged connections	--
Wetted material	316 Stainless Steel	316 Stainless Steel or Hastelloy-C	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
Housing	316 Stainless Steel	316 Stainless Steel or Hastelloy-C	Glass filled nylon	Glass filled nylon	--
Measuring ranges	-14.5 to 2,900PSI (-1 to 200Bar)	-14.5 to 580PSI (-1 to 40Bar)	0 to 29PSI (0 to 2Bar)	0 to 29PSI (0 to 2Bar)	Ceramic: 0 to 580PSI (0 to 40Bar) Piezo: 0 to 2,900PSI (0 to 200Bar)
Over ranging limit	3 x F.S	3 x F.S	3 x F.S	3 x F.S	3 x F.S
Operating Temperature	14 to 176° F (-10 to 80°C)	14 to 176° F (-10 to 80°C)	14 to 176° F (-10 to 80°C)- rod 14 to 140° F (-10 to 60°C)- cable	14 to 176° F (-10 to 80°C)- rod 14 to 140° F (-10 to 60°C)- cable	14 to 140° F (-10 to 60°C)
Class Protection	NEMA 4 (IP 65)	NEMA 4 (IP 65)	NEMA 6 (IP 67)	NEMA 6 (IP 67)	NEMA 6P (IP 68)

Pressure Transmitter installed at the bottom of the tank
Hydrostatic Transmitter installed at the top of the tank



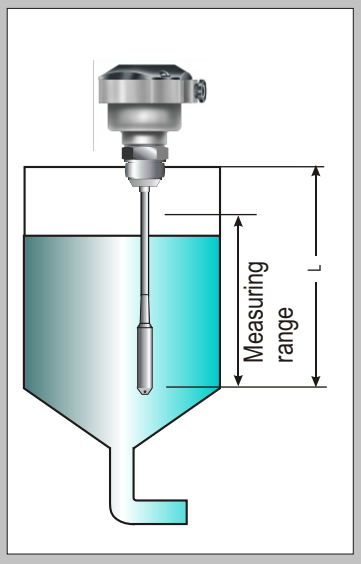


Fig. 3
Hydrostatic Probe installed in a tank
showing measuring range

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PRESSURE

ORDERING INFORMATION

Code	Specifications
SP 96	Pressure transmitter - PIEZORESISTIVE
SPC 98	Pressure transmitter - CERAMIC
SP96FA	Pressure transmitter - PIEZORESISTIVE with Zero and Span adjustment - nylon enclosure
SPC98FA	Pressure transmitter - CERAMIC with Zero and Span adjustment - nylon enclosure

Code	Process Connection
A	1/4" Thread
B	1/2" Thread
C	1"Tri-Clamp
D	Other - Specify

Code	Type of Thread
B	BSP
N	NPT
0	Not a thread

Code	Material
S	316 S.S.
H	Hastelloy - C (ceramic sensors only) **(See Note 1)**

Code	Pressure Range
G	Gauge
A	Absolute

Code	Electrical Connection
C	Cable gland with 6ft. Cable
M	M12 connector

Code	Pressure Range
R	

Code for this item should be the pressure range for ex. 0-30 PSI

[ ] - [ ] - [ ] - [ ] - [ ] - [ ]

HYDROSTATIC

Code	Specifications
HLF 842	Hydrostatic Level Probe with rigid rod, process connection and enclosure
HLC 842	Hydrostatic Level Probe with cable, process connection and enclosure
HL840	Hydrostatic Level Probe with cable only
HL840S	Hydrostatic Level Probe with cable only with small sensor
HLF842-CER	Hydrostatic Level Probe with rigid rod, process connection and enclosure - CERAMIC
HLC842-CER	Hydrostatic Level Probe with cable, process connection and enclosure - CERAMIC
HL840-CER	Hydrostatic Level Probe with cable only - CERAMIC

Code	Process Connection
1	1" Thread
2	1 1/2" Thread
3	1 1/2" Tri-Clamp
4	Other Specify
5	No process connection

Code	Type of Thread
B	BSP
N	NPT
0	Not a thread

Code	Rod's or Cable Length
L	Specify Length

Code	Water Column range
R	

Code for this item should pressure WC - for ex.: 0-2ft. WC

[ ] - [ ] - [ ] - [ ] - [ ]

NOTE1: Sensors made with hastelloy-C are available only for ceramic models.
WC=Water column