



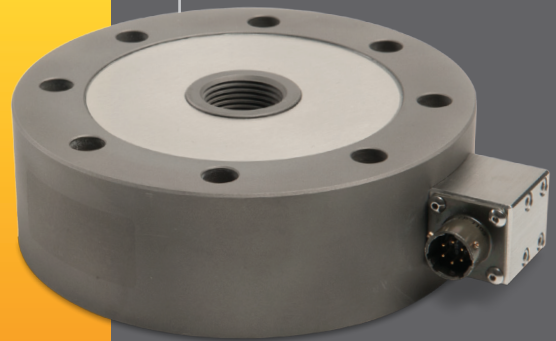
SENTRAN

Low Profile Load Cell

PH Series

The PH Series is a high performance, low profile, strain gage load cell constructed of heat-treated stainless steel. The PH Series is designed to accurately measure tension and compression forces ranging from 0-500 lbs. to 0-500,000 lbs.

The PH Series is a high performance, low profile, bonded foil strain gage load cell constructed of heat-treated stainless steel. The PH is designed to accurately measure tension and compression forces in capacities ranging from 0-500 lbs. to 0-500,000 lbs. The multiple shear web sensing design produces excellent performance, a very low profile, and reduced sensitivity to eccentric and side loading effects. The high output and low deflection of the PH Series combine to yield a high dynamic response and superior output resolution for applications in structural analysis, materials testing and process control. A fatigue rating of 10,000,000 cycles further defines the PH Series as an outstanding and versatile test and measurement solution. For universal or purely tension measurements, an optional pull plate is required to allow the forces to be directed through the center of the load cell. This load cell is Harsh Environment Sealed (IP67-Limited Immersion) by virtue of proprietary, multi-redundant barriers uniquely integrated to protect all internal components. Optional cable assemblies are available with mating connectors, including durable polyurethane or Teflon® jacketed cables that feature braided, tinned-copper shielding for mechanical protection and to minimize the effects of common industrial electrical noise, e.g. RFI and EMI. The attributes of the PH Series make it ideal for measurements in the laboratory, structures testing, materials testing, process control and for general force measurements where a compact, low profile precision tension and compression load cell solution is needed.



APPLICATIONS

- Tension/Compression Measurements
- Laboratory Test & Measurement
- Materials Testing Machines
- Dynamic Measurements
- Fatigue Rated To 10^7 Cycles
- Structural Analysis
- Actuator Control

FEATURES

- 500 to 500,000 lbs. Capacities
- Compact Low Profile Design
- High Output - 3.0 mV/V (4.0 Optional)
- 0.1 Accuracy Class
- Shear Web Design
- High Frequency Response
- IP67 Environmental Sealing
- Stainless Steel Construction
- Two Year Warranty



For more information call **1-888-545-8988**

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PH Series Specifications

Innovative Measurement Solutions



PERFORMANCE

Rated capacities ⁽¹⁾ (lbs.)	500, 1K, 2K, 3K, 4K, 5K, 7.5K, 10K, 15K, 20K, 30K, 50K, 75K, 100K, 150K, 200K, 300K, 400K, 500K
Rated Output (FSO)	3 mV/V
Output Tolerance	± 0.50 % R.O.
Combined Error Band	≤ 0.10 % FSO
Non-Linearity	≤ 0.10 % FSO
Hysteresis	≤ 0.08 % FSO
Non-Repeatability	≤ 0.03 % of load
Zero balance	± 1.0 % FSO
Creep (20 Minutes)	0.03% of Load

⁽¹⁾ ("K" = thousand)

MECHANICAL

Material	Stainless Steel
Finish	Natural
Safe overload	Compression 150 % FSO
	Tension 150 % FSO
	Side Load 30% FSO
Ultimate overload	Compression 300% FSO
	Tension 300% FSO
	Side Load: 50% FSO
Deflection	See Dimensions Page
Weight	See Dimensions Page
Mounting Bolt Torque	Torque Table

ELECTRICAL

Input Impedance*	375 ohms (nominal)
Output Impedance*	350 ohms (nominal)
Insulation Resistance	>5000 Megohms @ 50VDC
Excitation Voltage	10 V AC/DC (15 V maximum)
Connector Pin Functions	+ Excitation (A)
	- Excitation (C)
	+ Sense (B)
	- Sense (D)
	+ Signal (F)
	- Signal (E)

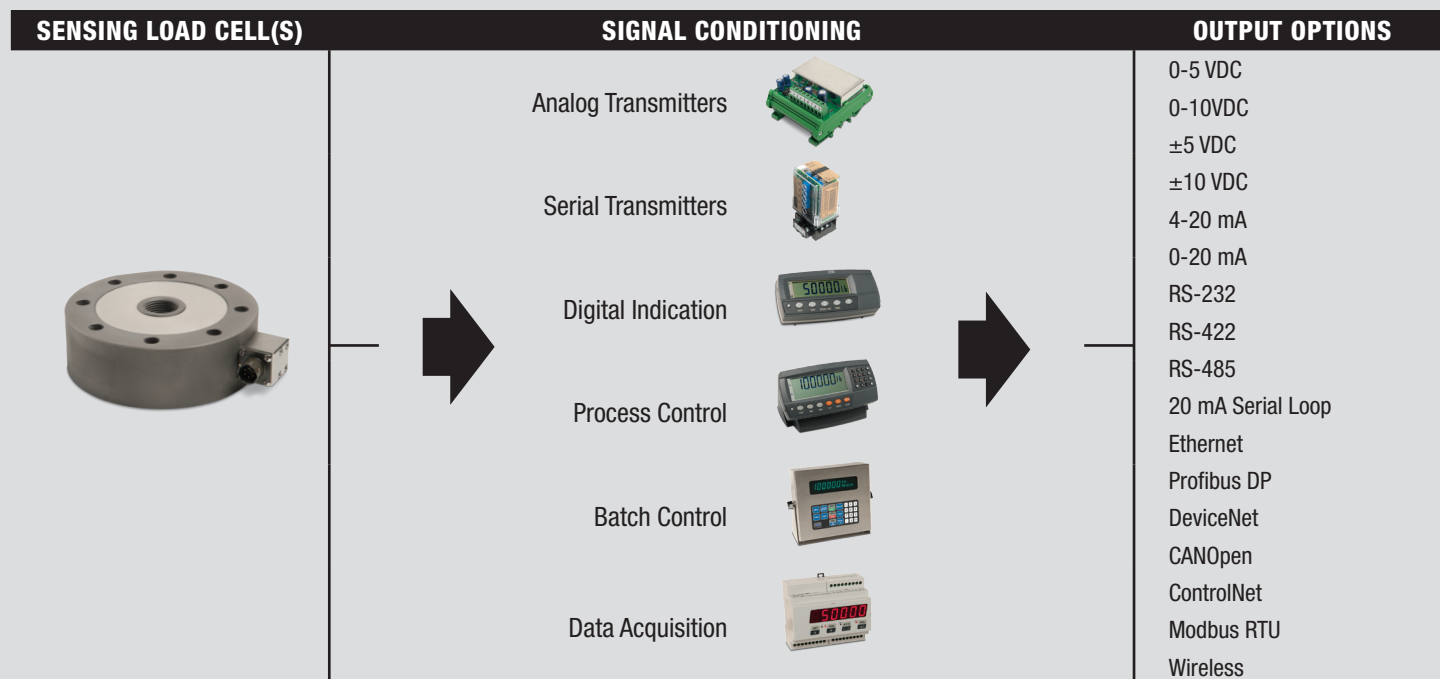
* 500 and 1K Capacity has Input Impedance of 750 ohms (nominal) and Output Impedance of 700 ohms (nominal)

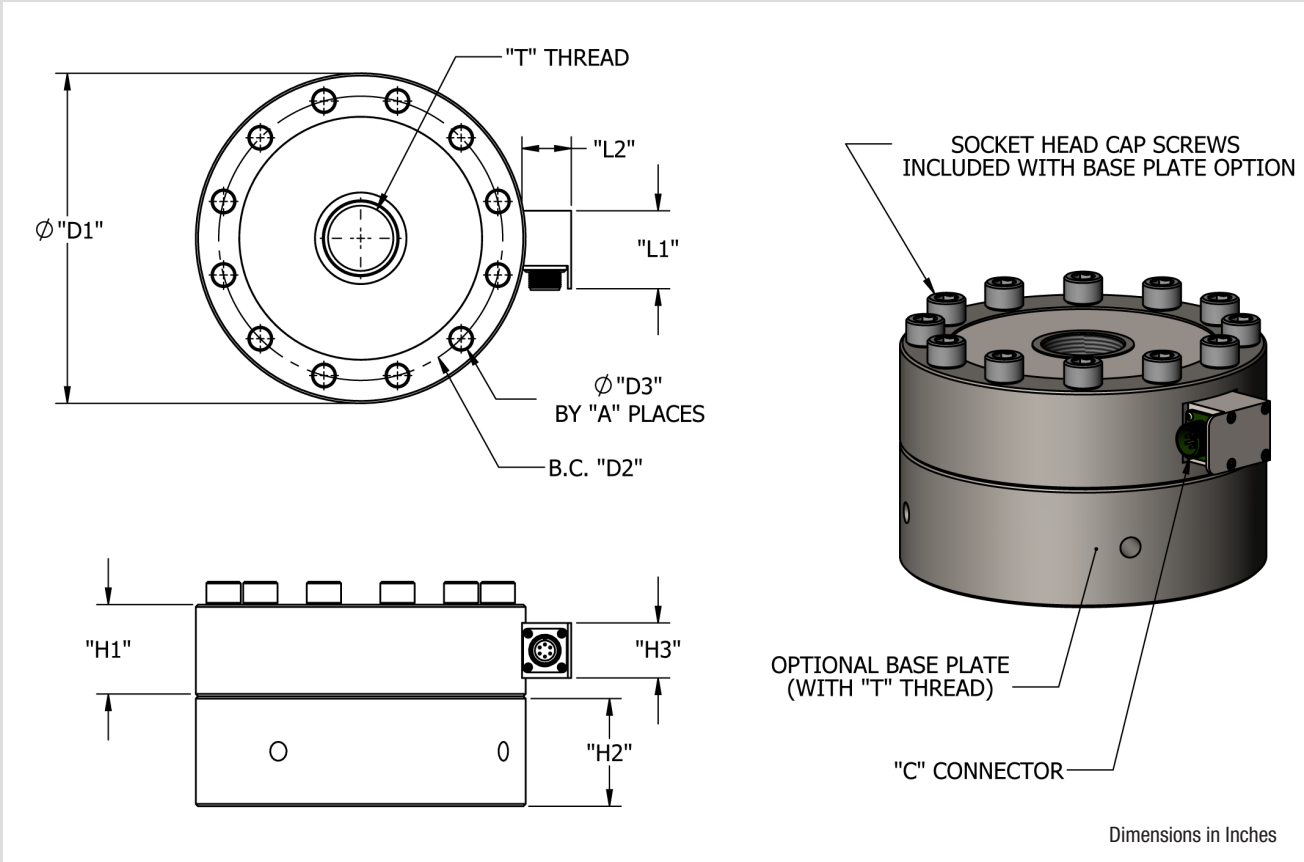
ENVIRONMENTAL

Temperature, Operating	-65 to +250 °F (-54 to +120°C)
Temperature, Compensated	15 to +115 °F (-9 to +46°C)
Temperature, Storage	-65 to +300 °F (-54 to +149°C)
Temperature Effects	Zero < 0.015% FSO/°F
	< 0.026% FSO/°C
Temperature Effects	Output < 0.0015% of Rdg./°F
	< 0.0026% Rdg./°C
Sealing	IP67; Multi-redundant; Limited Immersion Tolerance

The temperature ratings provided do not include the companion cable/connector assembly. If PUR or PVC cable is employed, the maximum operating temperature is 180°F (82°C)

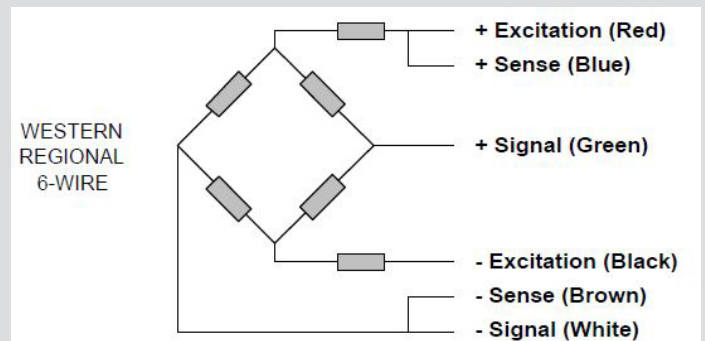
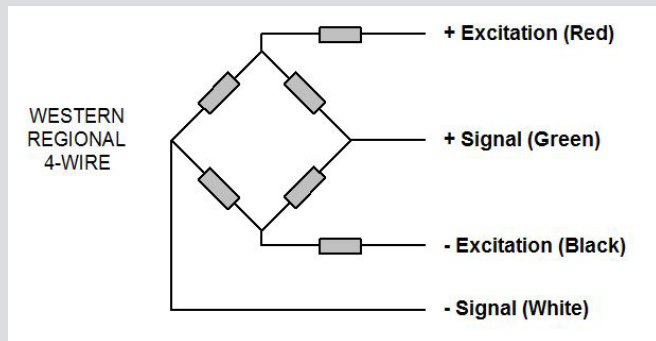
PH Typical System Configuration





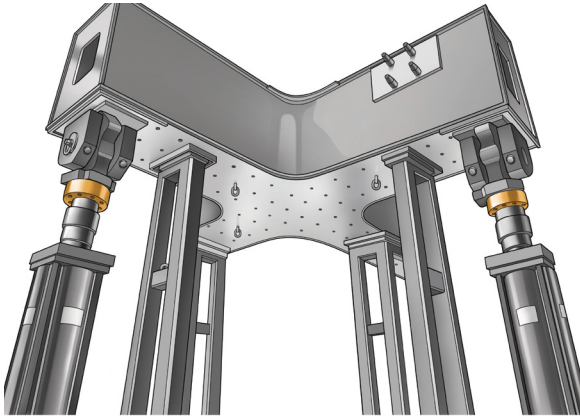
Capacity (LB)	H1	H2	H3	L1	L2	D1	D2	D3	A	T	C
DIMENSIONS (INCHES)											
500, 1K	1.00	1.00	1.00	1.375	0.82	3.00	2.250	0.28	6	3/8-24 UNF-2B	MS3112-10-6P
2K, 3K, 4K, 5K	1.00	1.00	1.00	1.375	0.82	3.50	2.625	0.34	6	1/2-20 UNF -2B	MS3112-10-6P
7.5K, 10K, 15K	1.80	1.50	1.00	1.375	1.25	5.50	4.500	0.40	8	1-14 UNS	MS3112-10-6P
20K, 30K, 50K	1.80	1.80	1.50	2.125	1.25	6.00	4.875	0.53	8	1 1/2-12 UNF-2B	MS3112-10-6P
75K, 100K	2.50	3.00	1.50	2.125	1.25	9.00	7.750	0.66	12	2-12 UN	MS3102E-14S-6P
150K, 200K	2.50	3.50	1.50	2.125	1.25	11.00	9.500	0.78	12	2 1/2-12 UN	MS3102E-14S-6P
300K, 400K, 500K	4.25	4.25	1.50	2.125	1.25	14.00	11.750	1.03	12	3 1/2-8 UN	MS3102E-14S-6P

Capacity (LB)	Deflect	Weight	Weight (B.P.)
DIMENSIONS (INCHES)			
500, 1K	0.002	1.5 LBS	1.8 LBS
2K, 3K, 4K, 5K	0.002	2.0 LBS	2.5 LBS
7.5K, 10K, 15K	0.003	7.5 LBS	9.2 LBS
20K, 30K, 50K	0.004	9.5 LBS	13.0 LBS
75K, 100K	0.006	30.0 LBS	49.2 LBS
150K, 200K	0.010	45.0 LBS	84.5 LBS
300K, 400K, 500K	0.010	62.0 LBS	115.0 LBS

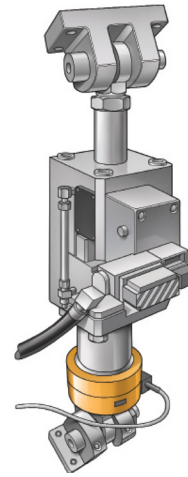




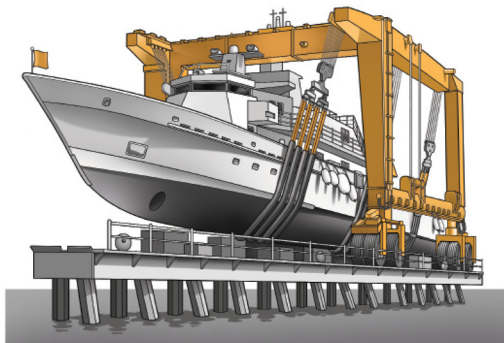
Structural Test Lab



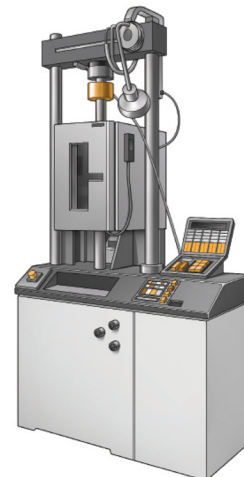
Articulating Actuator Control



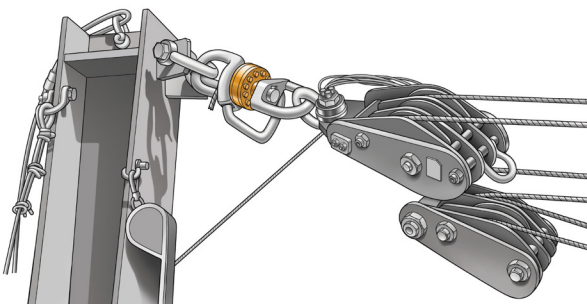
Vessel Lifting



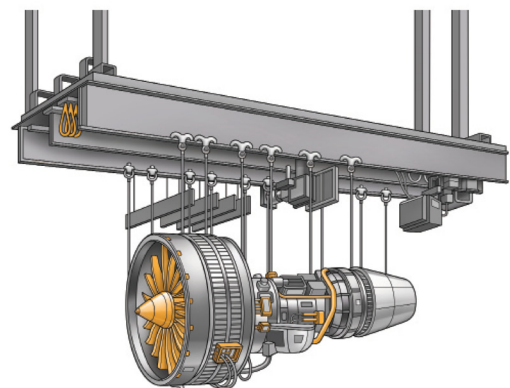
Environmental Test Load Stand



Cable Tension



Engine Hoist





- Base plates
- Load receivers
- High Temperature Operation (to 400°F)
- In-Line Analog or Serial Transmitters
- Display/Control Instrumentation
- Junction/Summing Boxes
- Wireless Operation
- MS Connectors
- Shunt Calibration
- Use and Installation Guide
- Custom and OEM Solutions

Application Recommendations / Suggestions

- The PH Series Low Profile Load Cells are considered to be “universal” in that they are designed to be loaded in compression and/or tension.
- The PH Series Load Cells are ideal for single or multiple load cell measurements typical of test and measurement, weighing, dynamic measurements, load testing systems and similar applications. When used in multiples, it is recommended that matched outputs be specified for optimum performance. Multiple load cell systems should include a Sentran summing/junction box to correctly multiplex the load cell excitation and measurement signals.
- Mating pull plates for the Load Cell must be rigid with the following characteristics:
 - At least two or three times more rigid than the load cell.
 - Possess a clean, flat and parallel surface to within 0.001in. TIR.
 - A recommended surface finish of 63 micro-in.
 - A minimum hardness of Rockwell B-100.
 - The mounting side of the Load Cell must mate intimately with the pull plate surface.
- Universal and fatigue rated load cell mounting bolts must always be preloaded to specified torque values, regardless of magnitude or type of applied load, in order to repeat and maintain original calibration performance of the load cell. Mounting bolts must be a minimum of 150,000 psi UTS, and seating torque must be applied gradually and uniformly to all bolts, in increments of no more than 1/4 of the final torque value. It is highly recommended that this procedure be conducted at the factory level and never compromised in field use.
- Load is applied to the load Cell through the threaded hole at the center of the load cell. All the threads in the load cell must be engaged by the loading member. For a through hole installation the loading rod must be torqued to the required levels.
- The most common loading method is to apply a force axially via the integral threaded load hole. Load introduction is best accomplished using devices such as a threaded rod, rod end bearing or similar loading interfaces providing an intimate connection via the load hole.
- In a compression mode, the load should be applied uniformly to center raised loading boss. In this instance, the entire surface of the boss must be engaged by the loading member.
- Off-axis loads and shock loading should be avoided as degraded performance and/or damage to the load cell could occur.
- PH Series Low Profile Load Cells are available in many capacity ranges. These load cells are designed to be used over the complete range of “no load” (0) up to the rated capacity. For example, 1,000 lbs. rated capacity PH Series are designed to be used for measurements within the range of 0 to 1,000 lbs. These load cells can be safely loaded to 150% of rated capacity without affecting the load cell performance within the capacity range.
- The reason for the variety of capacities is to allow the user to select the most ideal capacity for a given application. The most ideal capacity is one in which at least 80% of the capacity range is utilized at some point in the measurement process, without exceeding the rated capacity. This allows the load cell to deliver the highest signal to load ratio, and therefore the highest resolution and most stable measurement. There are other factors to consider, such as excitation voltage, but correct “sizing” of the load cell is the first step. Both the dead load and the live load need to be considered in determining the gross load and the load cell capacity.
- Contact Sentran’s expert Applications Specialists for additional professional guidance.

Commercial Information & Precautions

WARNING!

- Do not exceed specified Maximum Load Limits.
- The Safe Load Limit is the point to which normal loading will not cause the load cell to experience an excessive zero shift or a degradation in performance.
- Use reasonable care when applying load to any load cell. Load limits can be exceeded due to shock loading (i.e. dropping a load onto a load cell), off axis loading, side loading and similar loading conditions that are beyond design capabilities.
- The structural integrity of all load bearing components in any load cell system should be designed with safety redundant load paths. (Overload stops, overhead load arrestors, etc.)
- The surfaces to which the load cell(s) is attached and/or is reacting against must be of sufficient structural integrity to carry loads up to and exceeding the ultimate ratings of the load cell(s) being used, while also taking into account any companion hardware being used in conjunction with the load cell.
- To ensure optimum performance, all measuring system cabling should be run through dedicated conduit when available. Avoid proximity to electrical noise sources and use of "dirty" power sources.
- The load cell cable shield should be connected to a dedicated instrument ground point only.
- Force measurement and weighing applications have numerous application-specific considerations to be addressed both mechanically and electrically. Therefore, installation of all system components are the responsibility of the user and should always be approved by a qualified, professional engineer. Any information provided by Sentran, LLC is intended only as informational and does not constitute a formal recommendation for the use of any product for any application.
- Sentran offers application/installation/use guides on request for most standard products. Please contact your Sentran representative for assistance, or visit our technical library resource at www.sentranllc.com.

PERSONAL INJURY!

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

MISUSE OF DOCUMENTATION

- The information presented in this datasheet is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

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