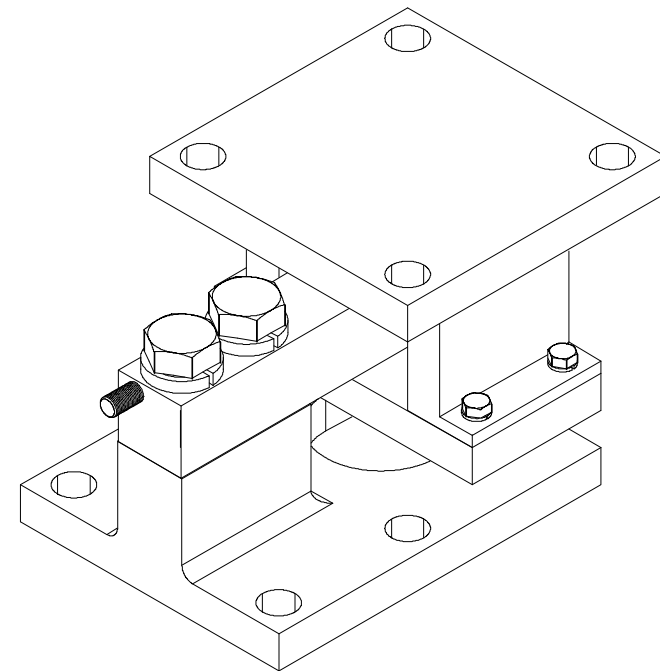




A Subsidiary of Dynamic Instruments

## INSTALLATION & MAINTENANCE MANUAL



### HI LPS SERIES LOAD POINT ASSEMBLY



A Subsidiary of Dynamic Instruments

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3860 Calle Fortunada

San Diego, CA 92123-1825

Phone: 1-(800) 821-5831

(858) 278-2900

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# **NOTICE**

## **UNPACK WITH CARE**

WHEN UNPACKING, DO NOT DISCARD THE PACKING CASE OR ANY PACKING MATERIAL, UNTIL THE CONTENTS OF THE PACKING CASE ARE INSPECTED AND CAREFULLY COMPARED WITH THE SHIPPING DOCUMENTS.

IF ANYTHING IS UNSATISFACTORY, PLEASE NOTIFY HARDY INSTRUMENTS IMMEDIATELY BY CALLING OR FAXING:

Customer Support Manager  
HARDY INSTRUMENTS  
3860 Calle Fortunada  
San Diego, California 92123-1825

Phone: (800) 821-5831  
(858) 278-2900

FAX: (858) 278-6700

A RETURN AUTHORIZATION NUMBER IS REQUIRED BEFORE RETURNING ANY DAMAGED PRODUCT. CALL THE CUSTOMER SUPPORT DEPARTMENT TO GET THE NUMBER. YOUR COMPANY NAME, ADDRESS, TELEPHONE NUMBER, SERIAL NUMBER OF THE UNIT AND A BRIEF DESCRIPTION OF THE PROBLEM SHOULD BE READY WHEN CALLING.

IN CASE OF DAMAGE DUE TO SHIPPING, NOTIFY THE DELIVERING CARRIER IMMEDIATELY FOR AN INSPECTION.

Please print the unit serial number and model number for reference when ordering parts for the HI LPS Load Point Assembly.

Serial Number:

Model Number:

# INSTALLATION & MAINTENANCE MANUAL

SERIES HI LPS

LOAD POINT ASSEMBLY

SINGLE ENDED SHEAR BEAM  
500 TO 10,000 LB. CAPACITY

## TABLE OF CONTENTS

GENERAL INFORMATION .....	PG 1
UNPACKING .....	PG 1
SITE PREPARATION .....	PG 2
PRECAUTIONS .....	PG 2
WARNINGS .....	PG 3
ASSEMBLY PROCEDURES .....	PG 3
TYPICAL MOUNTING ARRANGEMENTS .....	PG 4
ASSEMBLY DRAWING .....	PG 5
PARTS LIST .....	PG 6
TROUBLESHOOTING .....	PG 7
ELECTRICAL TERMINATION	
CABLE COLOR CODES .....	PG 9
MODEL NUMBERS .....	PG 9
SPECIFICATIONS .....	PG 10

## GENERAL INFORMATION

The Hardy Instruments HI LPS Series Load Point Assembly is designed to provide accurate output in the most demanding applications. The load sensor performance exceeds IP67 and NEMA 6 Standards for Wash down Resistance.

The HI LPS load point assembly is a self-centering, end-loaded, single ended shear beam. The LPS is supported at one end. The shear beam is sealed and completely waterproof and supplied with a minimum of twenty (20) feet of cable. The load point assembly is designed to resist angular effects and reduce moment sensitivity. The HI LPS comes standard with C2<sup>®</sup> Second Generation Calibration. This feature allows the load point, to be electronically calibrated without the use of test weights.

The mounting hardware is center pivoted and combines spherical washers that reduce the possibility of error producing side loads. The LPS is designed to compensate for thermally induced expansion and contraction of the scale and support structure. The use of conventional check rods for static loads is virtually eliminated. The HI LPS Series mounting hardware is available either in stainless steel or mild steel, covered with a chip resistant dual epoxy paint.

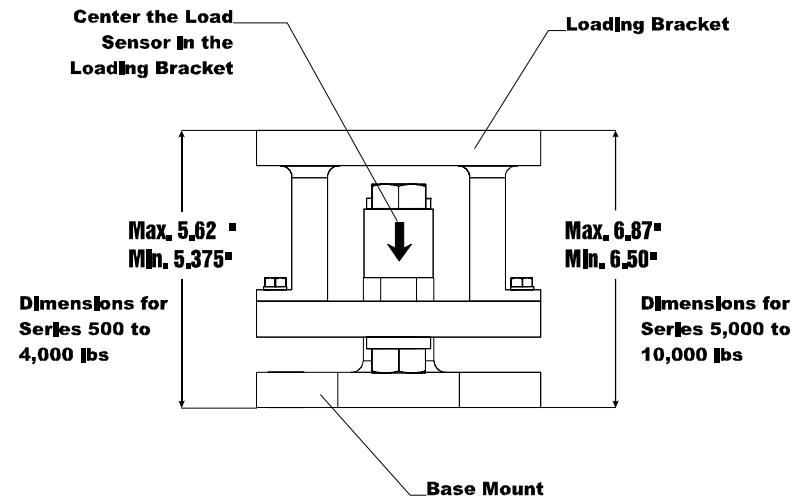
## UNPACKING

Do not remove the load sensor from it's packaging until it is time for installation. Although the load sensor is designed for harsh environments, it is a precision instrument and should be treated as such. Often the load sensor will be shipped separately so be sure that all the parts are received before trying to install the load point assembly.

The load point assembly comes disassembled, be sure that all the parts are contained in the shipment. Check to be sure that all parts of

## SPECIFICATIONS

Excitation (VDC) .....	10 Nom., Max. 15
Rated Output (mV/V) .....	3 ± .003
Zero Balance (Max.) .....	1% of Full Scale
Combined Error .....	0.03% of Full Scale
Non-Repeatability .....	0.02% of Full Scale
Creep (Max.) .....	0.03% of Load in 20 Minutes
Temperature Sensitivity (Max.)	
Output .....	.0002% of load /°F or .00018%/°C
Zero .....	.005% of Full Scale/°F or .045%/°C
Resistance	
EXC .....	350 ohms ± 3.5
SIG .....	350 ohms ± 3.5
Operating Temperature .....	-65°F to +200°F or -54°C to +93°C
Compensated Temperature .....	0°F to 150°F or -18°C to +65°C
Safe Overload .....	150% of Full Scale
Safe Side Load .....	100% of Full Scale



## INSTALLATION SPECIFICATIONS

- ▶ If the sensor fails this test remove the ground wire and test with only the four live leads.
  - ▶ If the sensor now passes the test an insulation problem in the cable is most likely.
- Replace the load sensor.

## **ELECTRICAL TERMINATION CABLE COLOR CODES**

EXC+	Red
EXC-	Black
SHIELD	Orange
C2+	Gray
C2-	Violet
SIG+	Green
Sig-	White

## **MODEL NUMBERS**

Painted Mount Model #	Stainless Mount Mount #	Replacement Sensor	Capacity		Ship Wght.	
			lbs	kgs	lbs	kgs
HI LPS500-31C	HI LPS 500-33C	HI SB01-500	500	227	17	7.7
HI LPS01K-31C	HI LPS01K-33C	HI SB01-1K	1,000	454	17	7.7
HI LPS1.5K-31C	HI LPS01.5K-33C	HI SB01-1.5K	1,500	680	17	7.7
HI LPS2.5K-31C	HI LPS02.5K-33C	HI SB01-2.5K	2,500	1134	17	7.7
HI LPS04K-31C	HI LPS04K-33C	HI SB01-4k	4,000	1814	17	7.7
HI LPS05K-31C	HI LPS05K-33C	HI SB01-5K	5,000	2268	17	7.7
HI LPS10K-31C	HI LPS10K-33C	HI SB01-10K	10,000	4536	17	7.7


the mounting hardware have been received before installing.

Inspect the box and the load point assembly for any signs of damage that might occur during shipment. Since almost all of the load point assemblies are shipped F.O.B. our factory, such damage is normally the responsibility of the carrier and should be reported to them.

## **SITE PREPARATION**

- All mounting surfaces for the base and loading plate must be level. The distance between the mounting surface of the loading plate and base must be within 1/32" of the nominal height, "H". The Load Point Assemblies must be level to within  $\pm 0.5^\circ$ .
- When mounting the base plate on concrete, use grout to level the plate.
- Any welding should be done prior to installation of the load points.
- Proper drainage must be provided to prevent the load point assembly from standing in water.

## **PRECAUTIONS**

- If the installation is frequently steam cleaned, place a protective cover over the weighing assembly.
- Never cut the load cell cable coming from the load point assembly. Coil excess cable and tie with a cable strap.
- Never bolt structures directly to a load sensor if the sensor is fixed to the ground. Expansion and contraction inaccuracies will be introduced.
- All piping to and from the vessel should be flexibly connected and be horizontal to the vessel.
- Be extremely careful when pulling sensor cable through conduit. Electronic components are present at the end of the cable under the yellow C2 label. 

- When installing the load point with a recurring force such as a conveyor belt or roller platform, make sure that the long axis of the load point is in line with the recurring force.

## WARNINGS

- Always treat the sensor as a precision instrument. Leave the load sensor in its packaging until it is time for installation.
- NEVER CARRY OR SWING THE LOAD SENSORS BY THEIR CABLE.
- Never allow moisture to get into any interconnections.

## ASSEMBLY PROCEDURES

**NOTE:** *Make sure that the bolts are threading into the threaded holes smoothly and easily before final assembly.*

The type of installation will govern the method of locating, attaching and assembling the parts of a load point. The following is a typical installation:

1. Check to be sure you have all the parts.
2. Weld or bolt the base mount to the mounting surface.
  - Use a level and check to see if the base mount is completely level and level with other base plates on the vessel pad.
  - If the base mount is not level, use shims or spacers between the base mount and mounting surface.
3. Bolt or weld the upper loading bracket to the weighing vessel leg.
4. Use the four 5/16" or 1/4" (10) cap screws and bolt the bottom loading bracket to the upper loading bracket.
5. Check the load sensor and make sure the arrow on the front surface is pointing down before installing.



**NOTE:** *In the event the arrow is missing, look for a groove cut into the bottom surface of the Load Sensor. For proper installation make sure that the groove is facing down.*

## 2. Bridge Resistance Test

Problem: Changes in Bridge Resistance

Cause: Failure of a compensating element, or by a broken or burned bridge wire. Often caused by an electrical transient like such as lightning.

Remedy:

- Use an Ohmmeter and measure the resistance between each pair of excitation and signal leads.
  - ▶ The excitation value should be 350 ohms  $\pm$  3.5 ohms.
  - ▶ The whole signal value should be 350 ohms  $\pm$  3.5 ohms.
  - ▶ Readings beyond those limits indicated above suggest damage and the load cell should be thoroughly inspected.

## 3. Resistance to Ground

Problem: Electrical Leakage creating an unstable output from the instrument.

Cause: Water contamination in the load sensor or cables.

Remedy:

- Tie together the load sensor excitation (2), signal (2) and ground (1) Wires.

*NOTE: Be careful NOT to include the two C2 wires.*

- Use a megohmmeter and measure the resistance between all five wires tied together and the load cell metal body.

- ▶ The reading should be 5000 megohms or more.

**WARNING**

**WHEN USING A MEGGER DO NOT EXCEED 50 VOLT RANGE.**

## TROUBLESHOOTING

1. Visually inspect each load point for physical damage. Look for distortion or cracks in all metal parts of the load point.
2. Check all welds to be sure they are not cracked or have deep pot marks.
3. Check all cables to be sure that they have no cracks, cuts or frimps. Check for any abrasion on the cables.
4. Look for structural changes in the scale or supporting structures.
5. Look for the presence of moisture at all interconnects.

### Electrical Tests for Load Point Problems

#### 1. Zero Balance Test

Problem: Changes in the Zero Balance

Cause: Load Cell has been overloaded.

Remedy:

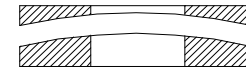
- Use a millivolt meter and measure the LPS output under “no load” conditions.
  - ▶ The reading should be less than 1% of the full scale output.

**NOTE:** *Sensors can shift up to about 10% of their full scale and still function correctly.*

- ▶ If the output has shifted more than 10%, replace the sensor.

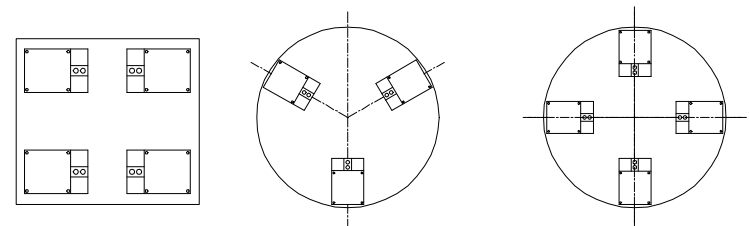
Assumption: A 10VDC excitation on a sensor with a 3mV/V output sensitivity, a 1% shift in zero balance will yield a 0.3mV change from the specification.

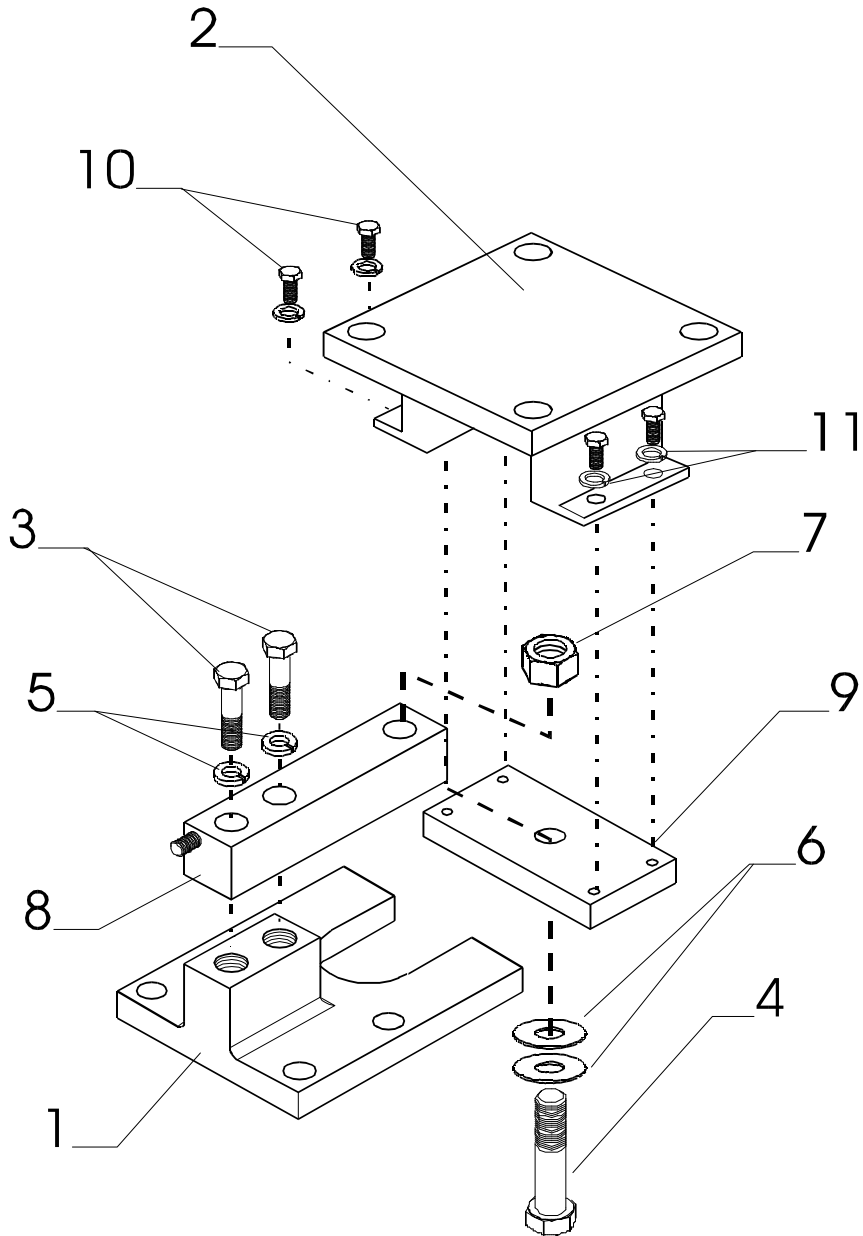
6. Use the two hex bolts (3) and lock washers (5) and fasten the load sensor (8) to the base mount (1). Make sure the bolts are tight and the lock washers are fully compressed.
7. Slide the spherical washer set (6) onto the hex bolt (4). Make sure that the washers are facing each other. (See Illustration Below)



8. Slide the hex bolt (4) through the Lower Loading Bracket (9) and thread it up through the Load Sensor (8) with at least a 1/4" of threads through the top of the sensor.
9. Attach the Nylon Jam Nut to the hex bolt (4) until it is against the top of the load cell.
10. Install the other load points by repeating steps 1-9.
11. The distance between the base mount (1) and the Top of the upper loading bracket (2) must be within 1/32" of the nominal height of each load point. Final height adjustments can be made with shim stock or spacers inserted between the top of the upper loading bracket (2) and the weighing vessel, or by tightening the Jam nut (4). Tightening or loosening the jam nut (4) will allow for approximately 3/8" of height adjustment.
12. Check that all mounting bolts are tight. Do not over tighten.

## TYPICAL MOUNTING ARRANGEMENTS





**HI LPS ASSEMBLY DRAWING**

**HI LPS PARTS LIST**

**SERIES FROM 500 LBS. TO 4,000 LBS**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	BASE MOUNT .....	1
2	LOADING BRACKET (UPPR) .....	1
3	1/2-20 X 2 1/2" HEX BOLT, GRDE 5 ...	2
4	1/2-20 X 3 1/2" HEX BOLT, GRDE 5 ...	1
5	1/2" LOCK WASHER .....	2
6	1/2" SPHERICAL WASHER SET .....	1
7	1/2" JAM NUT .....	1
8	LOAD SENSOR .....	1
9	LOADING BRACKET (LWR) .....	1
10	1/4-28 X 3/4" CAP SCREW, GRDE 5	4
11	1/4 LOCK WASHER .....	4

**SERIES FROM 5000 LBS. TO 10,000 LBS**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	BASE MOUNT .....	1
2	LOADING BRACKET (UPPR) .....	2
3	3/4-16 X 3" HEX BOLT, GRDE 5 ...	2
4	3/4-16 X 3 1/2" HEX BOLT, GRDE 5 ..	1
5	3/4 LOCK WASHER .....	2
6	3/4 SPHERICAL WASHER SET .....	1
7	3/4 JAM NUT .....	1
8	LOAD SENSOR .....	1
9	LOADING BRACKET (LWR) .....	1
10	5/16-24 X 1.0" CAP SCREW, GRDE 5	4
11	5/16 LOCK WASHER .....	4