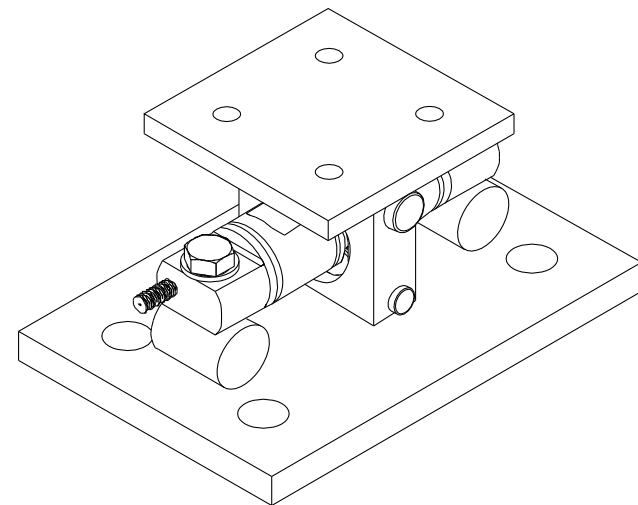


HARDY **INSTRUMENTS**

A Subsidiary of Dynamic Instruments

INSTALLATION & MAINTENANCE MANUAL



HARDY **INSTRUMENTS**

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**HI LPD SERIES
LOAD POINT ASSEMBLY**

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 LPD Load Point Assembly.

Serial Number:

Model Number:

INSTALLATION & MAINTENANCE MANUAL

SERIES HI LPD

LOAD POINT ASSEMBLY

DOUBLE ENDED SHEAR BEAM
5,000 TO 250,000 LB. CAPACITY

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GENERAL INFORMATION

The Hardy Instruments HI LPD Series Load Point Assembly is designed to provide accurate output in the most demanding applications. The load point assembly consists of heavy duty mounting hardware and a load sensor.

The HI LPD load point assembly is a self-centering, center-loaded, double ended shear beam rigidly supported at both ends. The shear beam is sealed with a waterproofing compound and supplied with a minimum of thirty (30) feet of cable. The HI LPD is designed to resist angular effects and reduce moment sensitivity. The load point assembly comes standard with C2[®] Second Generation Calibration. This feature allows the load point, to be electronically calibrated without the use of test weights.

The mounting hardware uses a sliding pin design that reduces the possibility of error producing side loads, and compensates for thermally induced expansion and contraction of the scale and associated support structure. The need for conventional check rods when used for static loads is virtually eliminated. The HI LPD 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 its 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.

SPECIFICATIONS

Excitation (VDC)	10 Nom., Max. 15
Rated Output (mV/V)	3 ± .003 (0.03 for Stainless Steel)
Zero Balance (Max.)	1% of Full Scale (2% for Stainless Steel)
Combined Error	0.03% of Full Scale (0.1 f% or Stainless Steel)
Non-Repeatability	0.01% of Full Scale (.02% for Stainless Steel)
Creep (Max.)	0.03% of Load in 20 Minutes
Temperature Sensitivity (Max.)	
Output	0.0008% of load /°F (.002% for Stainless Steel)
Zero	0.0015% of Full Scale/°F (.005% for Stainless Steel)
Resistance	
EXC	700 ohms ± 1% (860 ohms ± 80 for Stainless Steel)
SIG	700 ohms ± 1%
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

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/Clear
C2+	Gray
C2-	Violet
SIG+	Green
Sig-	White

MODEL NUMBERS

Stainless Load Cell

Plated Load Sensor	Stainless Load Sensor	Stainless Load Sensor	Capacity		Ship Wght.	
Painted Mount Model #	Painted Mount Mount #	Stainless Mount Model #	lbs	kgs	lbs	kgs
HI LPD05K-21C	HI LPD05K-31C	HI LPD05K-33C	5K	2272	22	10
HI LPD10K-21C	HI LPD10K-31C	HI LPD10K-33C	10K	4536	22	10
HI LPD15K-21C	HI LPD15K-31C	HI LPD15K-33C	15K	6804	22	10
HI LPD20K-21C	HI LPD20K-31C	HI LPD20K-33C	20K	9,072	22	10
HI LPD30K-21C	HI LPD30K-31C	HI LPD30K-33C	30K	13,608	80	37
HI LPD40K-21C	HI LPD40K-31C	HI LPD40K-33C	40K	18,144	80	37
HI LPD50K-21C	HI LPD50K-31C	HI LPD50K-33C	50K	22,680	80	37
HI LPD60K-21C	HI LPD60K-31C	HI LPD60K-33C	60K	27,216	80	37
HI LPD100K-21C	HI LPD100K-31C	HI LPD100K-33C	100K	45,360	170	78
HI LPD150K-21C	HI LPD150K-31C	HI LPD150K-33C	150K	68,040	170	78
HI LPD200K-21C	*	*	200K	90,720	350	159
HI LPD250K-21C	*	*	250K	113,400	350	159

* CONTACT FACTORY FOR MORE INFORMATION

The load point assembly comes disassembled. Be sure that all the

parts are contained in the shipment. Check to be sure all parts of 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 Double Assemblies (LPD) must be level to within ± 0.5°. 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.



WARNINGS

Always treat the load sensor as a precision instrument. Leave the load sensor in their packaging until it is time for their 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.
Weld or bolt the base plate (2) to the mounting surface. Use a level and check to see if the base plate 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.
2. Bolt or weld the loading bracket (1) to the weighing vessel.
3. Insert and center the Load Sensor (9) through the large hole in the loading bracket (1). Make sure the arrow on the front surface is pointing down.
4. Put a flat washer on each hex bolt first and then pass the bolts through the ends of the load sensor (9) and load bars (6) and thread both into the base plate (2) and hand tighten.
5. Check to be sure the center line of the load bars (6) are perpendicular to the centerline of the load sensor.
6. Slide the bearing pin (7) and the locating pin (8) through the loading bracket (1). Don't force the pins, they should go in easily.



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 860 ohms \pm 80 ohms.
The whole signal values should be 700 ohms \pm 7.0 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.

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 that they are not cracked or have deep pot marks.
3. Check all cables to be sure that they have no cracks, cuts or frays. 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 LPD 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.

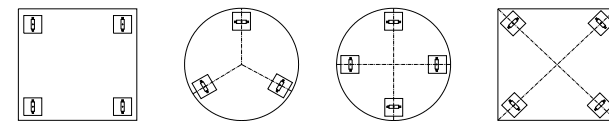
Assumption: A 10VDC excitation on a sensor with a 3mV/V output sensitivity, a 1% shift in zero balance will yield a 0.3mV change from the specification.

7. Insert cotter pins (4) into the bearing pin (7) and the locator

8. Check to be sure the load sensor is centered in the loading bracket. Adjust if necessary.
9. Install the other load points by repeating steps 1-7 above.
10. 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 loading bracket (2) and the weighing vessel
10. Torque both hex head mounting bolts (3) to a minimum twenty foot-pounds.

TYPICAL MOUNTING ARRANGEMENTS

The HI-LPD Series, double ended shear beam load sensor is designed to permit thermal expansion and movement of the vessel being weighed. (See Fig. 1) The following diagrams show load point placement for horizontal and vertical tanks.



Horizontal Tank

Vertical Tanks

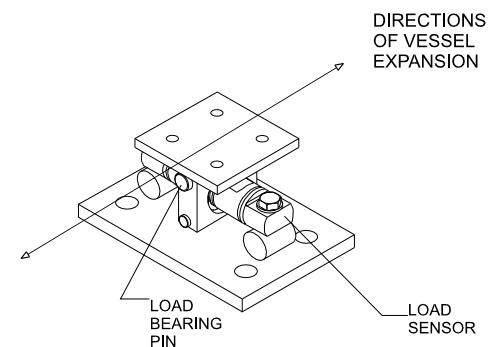


FIG. 1 VESSEL THERMAL EXPANSION & MOVEMENT ILLUSTRATION

HI LPD PARTS LIST

SERIES FROM 5,000 LBS. TO 20,000 LBS

ITEM	DESCRIPTION	QTY
1	LOADING BRACKET (5.5 INCH ²)	1
2	BASE PLATE (8" X 11" X .75")	1
3	5/8 -18 X 3 1/2" HEXBOLT	2
4	COTTER PIN (3/16" X 1.75")	2
5	1/2" FLAT WASHER (5/8" ID, NOM.)	2
6	LOAD BARS (2" X 1.5")	2
7	BEARING PIN	1
8	LOCATING PIN	1
9	LOAD SENSOR (HI DSB0X-XXXX)	1

SERIES FROM 30,000 LBS. TO 50,000 LBS

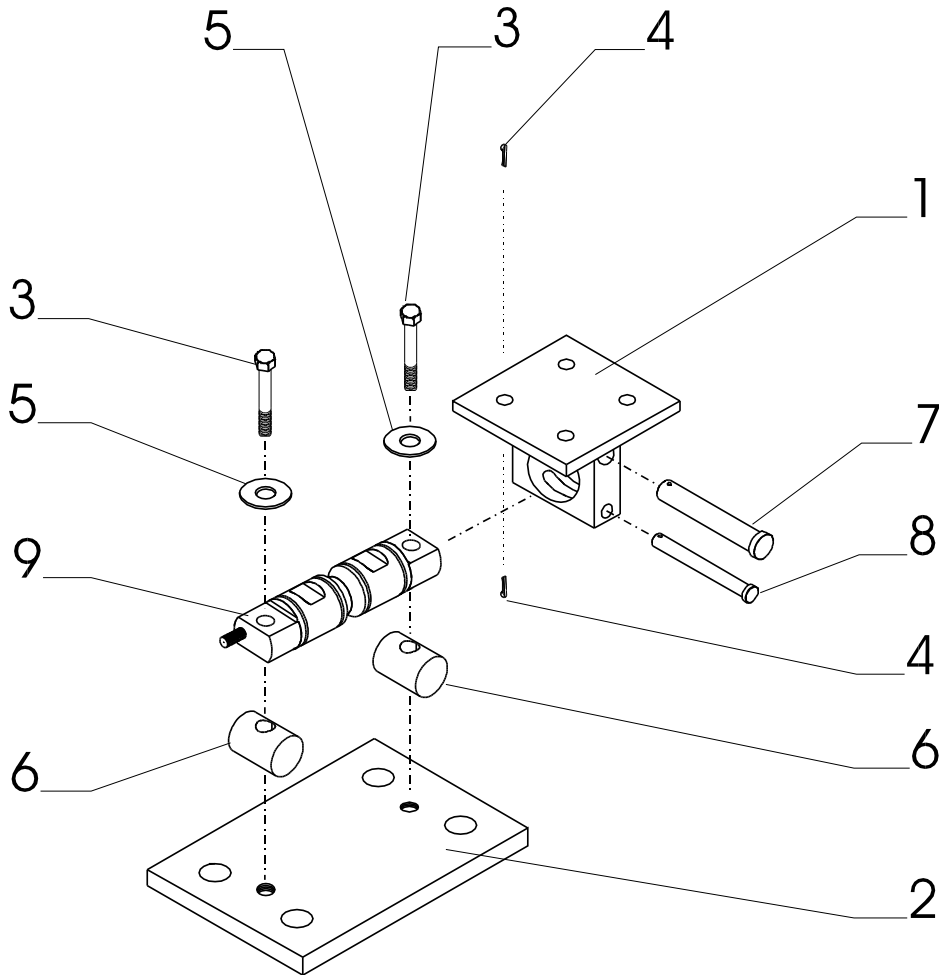
ITEM	DESCRIPTION	QTY
1	LOADING BRACKET (8 INCH ²)	1
2	BASE PLATE (10" X 15" X 1.0")	1
3	1.0 -14 X 5 1/2" HEXBOLT	2
4	COTTER PIN (3/16" X 3.0")	2
5	1/2" FLAT WASHER (1.0" ID, NOM.)	2
6	LOAD BARS (3" X 2")	2
7	BEARING PIN	1
8	LOCATING PIN	1
9	LOAD SENSOR (HI DSB0X-XXXX)	1

SERIES FROM 100,000 LBS. TO 150,000 LBS

ITEM	DESCRIPTION	QTY
1	LOADING BRACKET (10 INCH ²)	1
2	BASE PLATE (12" X 18" X 1.25")	1
3	1.0 -14 X 6" HEX BOLT	2
4	COTTER PIN (3/16" X 3.5")	2
5	1/2" FLAT WASHER (1.0" ID, NOM.)	2
6	LOAD BARS (6" X 2")	2
7	BEARING PIN	1
8	LOCATING PIN	1
9	LOAD SENSOR (HI DSB0X-XXXX)	1

SERIES FROM 200,000 LBS. TO 250,000 LBS

ITEM	DESCRIPTION	QTY
1	LOADING BRACKET (12 INCH ²)	1
2	BASE PLATE (12" X 26" X 2.0")	1
3	1.5 -12 X 9" HEX BOLT	2
4	COTTER PIN (1/4" X 5.5")	2
5	1/2" FLAT WASHER (1.5" ID, NOM.)	2
6	LOAD BARS (7" X 3.25")	2
7	BEARING PIN	1
8	LOCATING PIN	1
9	LOAD SENSOR (HI DSB0X-XXXX)	1



HI LPD ASSEMBLY DRAWING