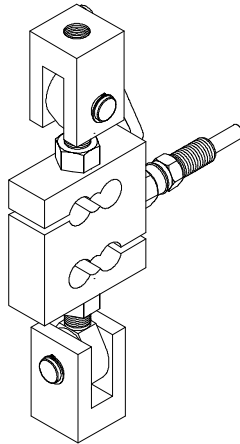


# HI HLPT SERIES LOAD POINT ASSEMBLIES

## OPERATION AND INSTALLATION MANUAL



### Corporate Headquarters

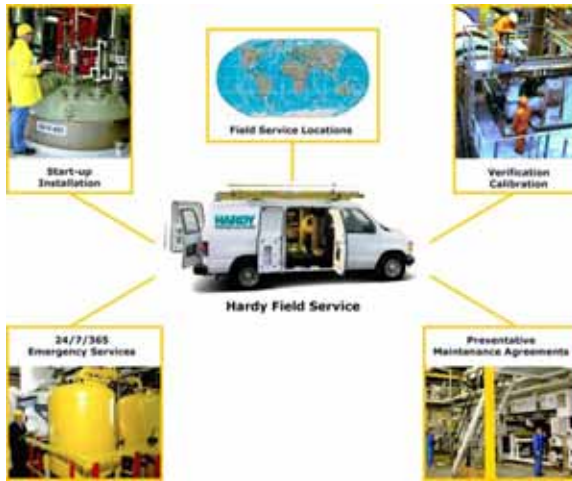
9440 Carroll Park Drive, Ste. 150

San Diego, CA 92121

Phone: (858) 278-2900

FAX: (858) 278-6700

Web-Site: <http://www.hardysolutions.com>



## Local Field Service

Hardy has over 200 field technicians in the U.S., and more positioned throughout the world to assist you in your support needs. We also have factory engineers who will travel to your facility anywhere in the world to help you solve challenging applications. We're ready to support you with:

- **Installation and start-up**
- **Routine maintenance and certification**
- **Plant audits and performance measurement**
- **Emergency troubleshooting and repair**

To request Emergency Service and Troubleshooting, Start-up, Installation, Calibration, Verification or to discuss a Maintenance Agreement please call **800-821-5831 Option 3** or Emergency Service after hours (Standard Hours 6:00 AM to 6:00 PM Pacific Standard Time) and weekends Ext. 1111.

## Outside the U.S

Hardy Instruments has built a network of support throughout the globe. For specific field service options available in your area please contact your local sales agent or our U.S. factory at **+1 858-292-2710**.



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**CAUTION:**

**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 IMMEDIATELY BY CALLING, FAXING OR E-MAILING TO:**

Customer Support Department  
HARDY PROCESS SOLUTIONS, INC.  
9440 Carroll Park Drive, Ste. 150  
San Diego, California 92121

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

FAX: (858) 278-6700

E-mail: [support@hardysolutions.com](mailto:support@hardysolutions.com)  
Web Address: [www.hardysolutions.com](http://www.hardysolutions.com)

**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.**

***Congratulations, on your purchase of the Hardy Advantage Load Point Assembly. This product, is engineered to set a new standard in load point assemblies. Hardy combined new innovations with previously extra cost features and just plain common sense features and provided you with optimum performance unequalled anywhere.***

**General Information**

The Hardy HI HLPT Hermetic Load Point System is designed to provide accurate output in the most demanding applications. The load sensor performance exceeds IP68 and NEMA 6 Standards for Wash Down Resistance.

The HI HLPT Advantage, Tension Load Point Systems are designed for use on low to medium capacity vessels. The pre assembled Tension Load Point System is specifically designed to eliminate the effects of unwanted forces resulting in exceptional load measuring accuracy.

Each load point consists of a stainless steel load sensor which is truly hermetically sealed (gauge area and cable entry), Enhanced C2<sup>®</sup> Second Generation Calibration, matched mV/V and mV/V/Ohm and a 1/4 inch conduit adapter. The load points are pre assembled at our factory eliminating any assembly in the field. Each load point is fitted with a grounding strap. The load points mounting hardware is available in either stainless or galvanized steel and consist of two (2) clevises, two (2) Clevis Pins with four (4) external retaining rings and two (2) rod end assemblies.

**Unpacking**

- Do not remove the load point assembly from it's packaging until just before installation. Although the load sensor is designed for harsh environments, it is a precision instrument and should be treated as such.
- Inspect the box, packing 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 fac-

## HI HLPT SERIES LOAD POINT ASSEMBLY

tory, such damage is normally the responsibility of the carrier and should be reported to them.

- **LOAD SENSOR CERTIFICATION SHEETS ARE AVAILABLE 24 HOURS A DAY AT OUR WEBSITE: <http://www.hardysolutions.com>**
- Write down the serial number(s) on the inside of the back cover for reference when talking to Hardy Customer Service. Store this information in a secure dry location for future reference.

### Site Preparation

- All mounting surfaces for the base and loading plate must be level. The Load Point Assemblies in a system must be level to within  $\pm 0.5^\circ$ .
- Any welding should be done prior to installation of the load points.

### Precautions

- Always treat the Load Sensor as a precision instrument. Leave the load point assembly 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.

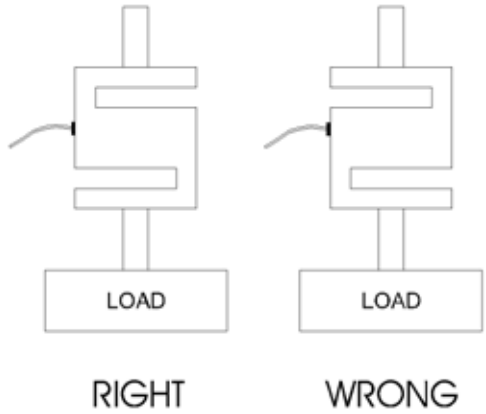
### Basic Engineering Principles for Positioning Load Point Assemblies

- Load Points Assemblies should be positioned such that the load (weight) is distributed as evenly as possible between each load point assembly in the scale.
- When the installation does not allow even distribution of the load, select higher capacity load point assemblies. This does not effect the weighing accuracy of the scale.
- All load point assemblies must have the same capacity when used in one scale.



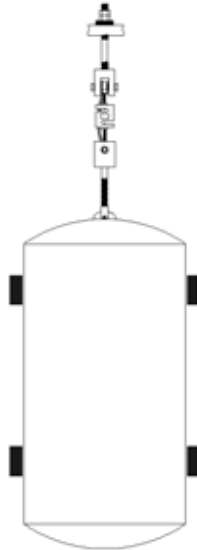
**Typical Mounting Arrangements**

**Load Sensor Orientation**



**FIG. 1: LOAD SENSOR ORIENTATION**

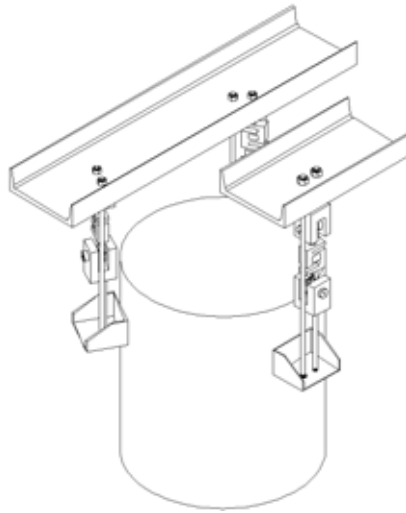
**Round Vessel with 1 Load Point**



**FIG. 2: ROUND VESSEL WITH 1 LOAD POINT ASSEMBLY**

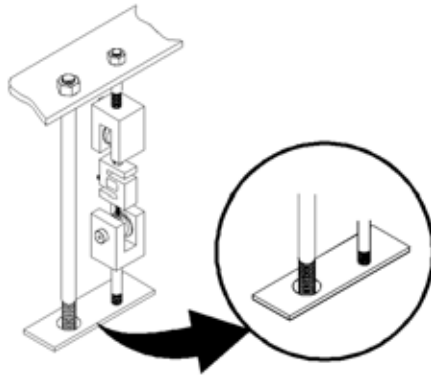
## HI HLPT SERIES LOAD POINT ASSEMBLY

### Round Vessel with 3 Load Point Assemblies



**FIG. 3: VERTICAL TANK - 3 LOAD CELLS**

### Safety Rods



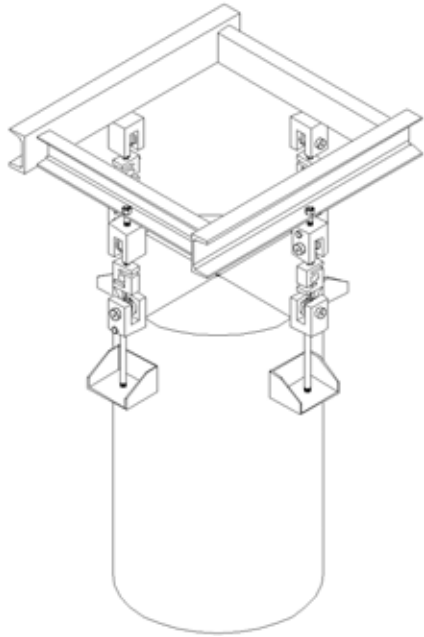
**FIG. 4: SPACE REQUIRED FOR SAFETY  
RODS**

### CAUTION:

**THE ORIENTATION OF THE TOP AND BOT-  
TOM CLEVIS ASSEMBLY MUST BE AT 90° AS  
SHOWN IN FIG. 4. IMPROPER ORIENTA-  
TION CAUSES THE CLEVISES TO MISALIGN.  
THIS CAN LEAD TO BINDING WHICH CAN**

**CAUSE THE EYE END OF THE EYE BOLTS TO SHEAR AND/OR PRODUCE AN INACCURATE WEIGHT READING.**

**Round Vessel with  
4 Load Point  
Assemblies**



**FIG. 5: 4 LOAD POINT ASSEMBLY**

**NOTE:**

*In case there is some doubt concerning load point assembly installation, contact your local Hardy Representative, Hardy Process Solutions, Application Engineering or Customer Support Department for assistance.*

**Replacing the Load  
Sensor**

**NOTE:**

*Make sure that the rod ends are threading into the threaded holes smoothly and easily before final assembly.*

## HI HLPT SERIES LOAD POINT ASSEMBLY

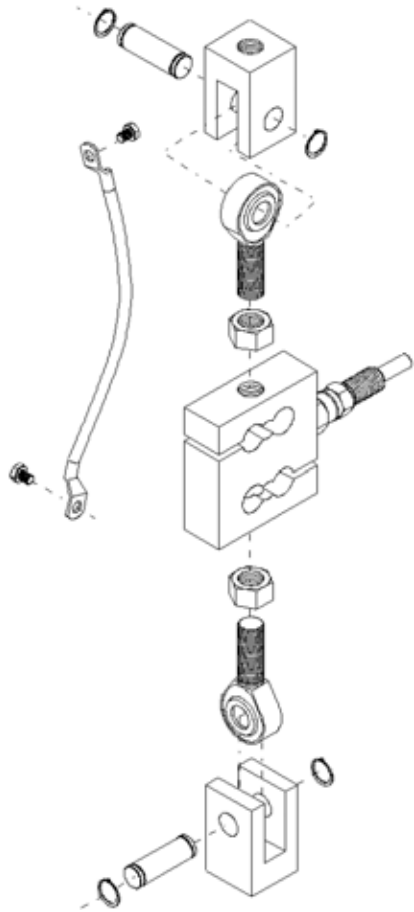
The type of installation will govern the method of locating, attaching and assembling the parts of a load point. The following is a typical installation:

### **Removing the Load Sensor**

- Step 1. Check to be sure you have all the parts.
- Step 2. Take the load off the load cell.
- Step 3. Use a flat screw driver and push the retaining rings off the clevis pin on both clevis mounts. (See Fig. 6)
- Step 4. Pull the two clevis pins out of the clevises and ball joints. (See Fig. 6)
- Step 5. Slide the load sensor with the rod ends out of the clevis mounts.
- Step 6. Use a box end or crescent wrench and loosen the lock nuts on both rod ends that are fastened to the load sensor. (See Fig. 6)
- Step 7. Use a small piece of masking tape or chalk to mark the location of the lock nuts for re-assembly.
- Step 8. Use channel locks to loosen the rod ends.
- Step 9. Remove both rod ends from the load cell.

### **Installing a New Load Sensor**

- Step 1. Get a new load sensor.
- Step 2. Replace the rod ends and tighten with channel locks to the mark made by the masking tape or the chalk.
- Step 3. Remove the masking tape or wipe off the chalk.
- Step 4. Tighten the lock nut.
- Step 5. Insert the ball joint of one of the rod ends between the jaws of the clevis mounting block. (See Fig. 6)
- Step 6. Align the holes in the ball joint with the holes in the clevis.
- Step 7. Slide the clevis pin through the clevis and the ball joint holes.
- Step 8. Insert the retaining rings in the grooves on both sides of the clevis pin until the ring snaps onto the pin.
- Step 9. Repeat Step 5 through Step 8 for the other clevis mounting block.
- Step 10. Put the load back on the load point assembly.



**FIG. 6: ISO ASSEMBLY DRAWING**

## **Troubleshooting**

### **Physical Checks**

Before doing any electrical tests do the following:

- Step 1. Visually inspect each load point assembly for physical damage. Look for distortions or cracks in all metal parts.
- Step 2. Check all welds to be sure they are not cracked or have deep pot marks.

## HI HLPT SERIES LOAD POINT ASSEMBLY

- Step 3. Check all cables for cracks, cuts or crimping. Check for any abrasions on the cables.
- Step 4. Look for structural changes in the scale or supporting structures.
- Step 5. Look for binding of any kind on the load point assembly.
- Step 6. Refer to your Hardy Manual for information on how to troubleshoot using Integrated Technician. For your convenience this manual is available on the Hardy Web site at: <http://www.hardyinst.com> on the support page. If you do not have access to the internet, contact your local Hardy Representative for information as to where to get this and other manuals for Hardy products.
- Step 7. Get the Load Sensor certification sheets for referencing while troubleshooting. The certifications are available to you 24 hours a day at our Web Site: <http://www.hardyinst.com>

If you find any of the problems stated above, replace the part that is damaged.

### **Electrical Tests for Load Point Assembly Problems**

#### **Zero Balance Test**

Problem: Changes in the Zero Balance.  
Cause: Load Cell has been overloaded.  
Remedy:

- Step 1. Use a millivolt meter or the Integrated Technician feature of the HI 2151/30WC (See Physical Checks, Step 6) 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.*

- Step 2. If the output has shifted more than 10%, replace the sensor.

Assumption: A 5VDC excitation on a sensor with a 3mV/V output sensitivity, a 1% shift in zero balance will yield a .1mV/V change from the specification.

**Bridge  
Resistance  
Test**

Problem: Changes in Bridge Resistance

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

Remedy:

- Step 1. Use an Ohmmeter and measure the resistance between the EXC + and EXC- leads.

- The value for the EXC leads should be 1106 ohms + - 5 ohms.

- Step 2. Use an Ohmmeter and measure the resistance between the SIG + and SIG - leads.

- The value for the SIG leads should be 1,000 ohms + - 1 ohm.

- Step 3. Readings that exceed the ranges indicated suggest damage and the load cell should be thoroughly inspected or replaced.

**Resistance to  
Ground Test**

Problem:Electrical leakage is creating an unstable output from the instrument.

Cause: Water contamination in the load sensors or cables.

Remedy:

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

**NOTE:**

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

## HI HLPT SERIES LOAD POINT ASSEMBLY

Step 2. Use a megohmmeter and measure the resistance between all five wires tied together and the load cell metal body.

- The measured value should be 5,000 megohms or more.

### WARNING

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

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

Step 3. Replace the load cell if the cell fails both tests.

### Electrical Termination Cable Color Codes

The cable is 6 conductor, shielded (floating) and 20 feet in length.

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

### WARNING

**LOAD CELL CABLE LENGTH HAS BEEN CALCULATED INTO C2 CALIBRATION DATA. HARDY PROCESS SOLUTIONS RECOMMENDS THAT YOU DO NOT CUT YOUR ADVANTAGE OR ADVANTAGE LITE LOAD SENSOR CABLE, AS YOUR C2 ACCURACY WILL BE AFFECTED AND THE WARRANTY WILL BE VOIDED.**



**Model Numbers**

**NOTE:**

*The -43C indicates a stainless steel load sensor with stainless steel mounting hardware. For galvanized mounting hardware use -45 C*

Capacity		Model #	Model #
LBS	Kn	Fixed Assembly	Spare Load Sensor
225	1	HI HLPT225-43C	HI STH06-225
450	2	HI HLPT450-43C	HI STH06-450
1,125	5	HI HLPT1125-43C	HI STH06-112K
2.25K	10	HI HLPT2.25K-43C	HI STH01-2.25K
4.5K	20	HI HLPT4.5K-43C	HI STH01-4.5K
11.25	50	HI HLPT11.25K-45C	HI STH01-11.25K

**TABLE 1: MODEL NUMBERS & CAPACITIES**

**Three Leg Systems**

Total Capacity		
Model #	Pounds	Kn
HI 3T675-43	675	3
HI 3T1.35K-43	1.35K	6
HI 3T3375-43	3.375K	15
HI 3T6.75K-43	6.75KK	30
HI 3T13.3K-43	13.5K	60
HI 3T33.75K-45	33.75K	150

**TABLE 2: THREE LEG SYSTEMS**

# HI HLPT SERIES LOAD POINT ASSEMBLY

## Four Leg Systems

Total Capacity		
Model #	Pounds	Kn
HI 4T900-43	900	4
HI 4T1.8K-43	1.8K	8
HI 4T4.5K-43	4.5K	20
HI 4T9K-43	9K	40
HI 4T18K-43	18K	80
HI 4T45K-45	45K	200

**TABLE 3: FOUR LEG SYSTEMS**

## Specifications

### Operating Specifications

Rated Output (F.S.) - - - - -	2+-0.002mV
Non-Linearity - - - - -	+0.018% R.O.
Hysteresis - - - - -	<+-0.025% R.O.
Zero Balance - - - - -	<+-1.0% R.O.
Creep @ 5 Min. - - - - -	<+-0.01% R.O.
Temp Effect Output - - - - -	<+-0.0014% R.O./C
Temp Effect Sensitivity - - - - -	<+-0.0007% R.O./C
Input Resistance - - - - -	1050 to 1200 Ohms
Output Resistance - - - - -	1000 +- 1 ohm
Insulation Resistance - - - - -	>5000 megohms
Excitation - - - - -	5-15VDC
Safe Load Limit - - - - -	200% Emax
Ultimate Load - - - - -	300% Emax
Safe Side Load - - - - -	100% Emax

Environmental Specifications

Operating Temperature	-----	Minus 40° F to Plus 176° F (-40° C to +80° C)
Compensated Temperature	-----	14° F to 104° F (Minus 10° C to Plus 40° C)
Load Sensor Material	-----	17-4PH Martensitic (Magnetic) Stainless Steel
Load Sensor Fittings	-----	Coated Tool Steel
Top Plate & Base Plate Material	---	316 Stainless Steel or Galvanized Steel
Conduit Adapter	-----	.250-18 NPT
Hermetic Sealing		
Gauging Area	-----	Welded Cylindrical Sleeve
Cable Entry	-----	Glass to Metal Header

**HI HLPT SERIES LOAD POINT ASSEMBLY**

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

**The serial number can be found on the side of the load sensor, or by entering the SelfTest Mode of the HI 2151/30WC.**

**Scale Name/Location:**

**Model Number:**

**Serial Number 1:**

**Serial Number 2:**

**Serial Number 3:**

**Serial Number 4:**

**Serial Number 5:**

**Serial Number 6:**