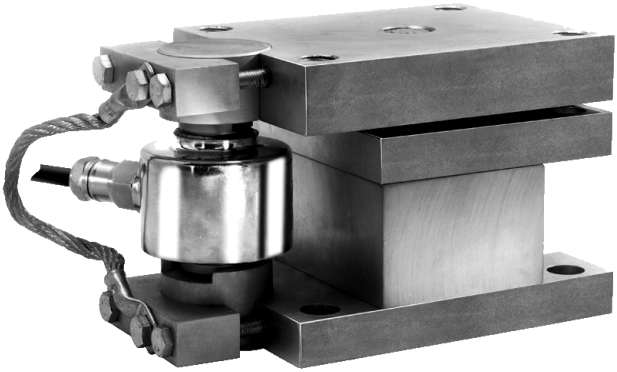
HI LPRC03 ADVANTAGE® SERIES ROCKER LOAD POINT ASSEMBLIES

OPERATION AND INSTALLATION MANUAL



HARDY PROCESS SOLUTIONS
Measurement ▪ Automation ▪ Productivity

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Hardy Process Solutions Document Number: 0596-0309-01 Rev D

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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 PROCESS SOLUTIONS IMMEDIATELY BY CALLING, FAXING OR E-MAILING TO:

Customer Support Department
Hardy Process Solutions
9440 Carroll Park Drive
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E-mail: hardysupport@hardysolutions.com
Web Address: www.hardysolutions.com

TO RETURN DEFECTIVE OR DAMAGED PRODUCT(S) CALL HARDY TECHNICAL SUPPORT FOR A HARDY SERVICE TICKET NUMBER (HST#). YOUR COMPANY NAME, ADDRESS, TELEPHONE NUMBER, SERIAL NUMBER OF THE UNIT AND A BRIEF DESCRIPTION OF THE PROBLEM SHOULD BE READY WHEN CALLING. FOR ALL NON-WARRANTY REPAIRS, A VALID PURCHASE ORDER OR CREDIT CARD IS ALSO REQUIRED. OR USE OUR ON-LINE HST # REQUEST FORM AT WWW.HARDYSOLUTIONS.COM UNDER CUSTOMER SUPPORT AND THEN REPAIR FORM. FOLLOW THE DIRECTIONS AND THEN SUBMIT THE REQUEST FORM. AN HST# WILL BE ISSUED AND EMAILED

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

General Information

The Hardy Process Solutions HI LPRC03 Advantage® Low-Profile Rocker self-aligning load point, is designed for applications in hoppers, tanks and silos. The HI LPRC03 load point consists of a mount and hermetically sealed, stainless steel load sensor (gauge area and cable entry), with C2® Electronic Calibration, and a 1/4 inch conduit adapter. Load sensors are matched by mV/V and mV/V/Ohm and mount.

The HI LPRC03 mount eliminates the effects of unwanted forces, which makes it well suited for high capacity vessels. Its performance exceeds IP68 and NEMA 6 Standards for Wash Down Resistance, ensuring accurate output even for the most demanding applications.

The mount comes preassembled, with the top plate centered to the bottom of the unit using two heavy bolts to hold the parts together. Each load point is fitted with a grounding strap. The mounting hardware is available in stainless, zinc plated or painted steel.

Unpacking

The load sensor is shipped in a separate container. Do not remove it 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.

Precautions

- Always treat the Load Sensor as a precision instrument. Leave the assembly in its packaging until it is time for installation.
- NEVER CARRY OR SWING THE LOAD SENSORS BY THEIR CABLE.
- DO NOT CUT THE C2 CABLE. DOING SO MAY VOID YOUR WARRANTY.
- Never let moisture get into any interconnections.
- Inspect the box, packing, and load point assembly for any signs of damage. Since most 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.

LOAD SENSOR CERTIFICATION SHEETS ARE AVAILABLE 24 HOURS A DAY AT OUR WEBSITE: http://www.hardsolutions.com. Go to Customer Support," click Self Service and then "C2 Online Cert Lookup", and then enter the sensor serial number to pull up the data.

NOTE: *Write down the serial number(s) for reference when accessing the C2 Online Cert Lookup or when contacting Hardy Technical Support. Store this information in a safe location for future reference.*

Site Preparation

As foundations for the load point assemblies, use a metal base plate that will not be deformed when you weld it to the bottom plate of the load point.

- Check the I/I diagrams that come with this document for the assembly's dimensions. (They are also available on the Hardy Process Solutions Web Site (http://www.hardysolutions.com).
- All mounting surfaces for the base and loading plate must be level. Load Point Assemblies must be level to within 0.4/100 for legal or trade applications or 0.8/100 for general applications.
- Complete all welding before installing the load sensor.

Basic Engineering Principles for Positioning Load Point Assemblies

Note the following requirements when positioning the Load Point.

- Position the Load Point Assemblies to distribute the load (weight) as evenly as possible between each load point assembly in the scale.
- When the installation does not allow even load distribution, select higher capacity load point assemblies.
- All load point assemblies must have the same capacity when used in one scale.

Typical Mounting Arrangements

Round Vessel - 3 Load Point Assemblies

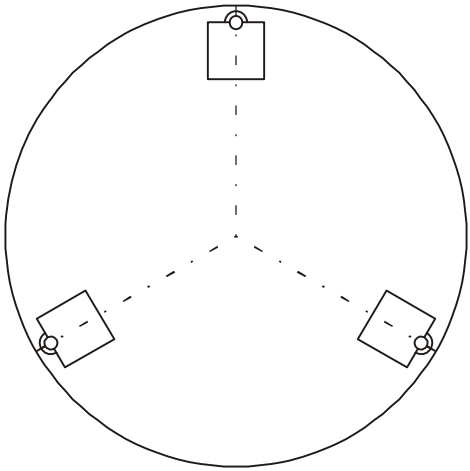


FIG. 1: ROUND VESSEL TANK - 3 LOAD CELLS

Round Vessel - 4 Load Point Assemblies

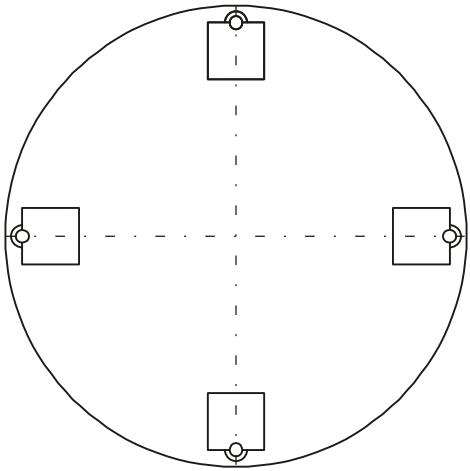


FIG. 2: ROUND VESSEL TANK - 4 LOAD POINT ASSEMBLIES

Installing a Mount Assembly

Step 1. Read the Operation and Installation Manual first to familiarize yourself with the installation process.

Step 2. Unpack the mount.

Step 3. The load sensor is in a separate box. Set it aside in a safe location to be installed after all the welding has been completed.

Step 4. Place the mount on the foundation plates.

Step 5. Level each mount top plate. Note that all load points should be within +/- 0.5^{o} of each other. Use shim stock and place it under the bottom plate to adjust the height for each mount.

Step 6. When the assemblies are within tolerance of each other. Position the preassembled mount on to a foundation plate, and either weld or bolt the unit into place.

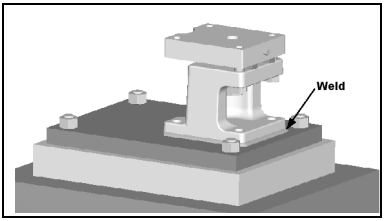


FIG. 3: WELDING ON MOUNTING PLATE

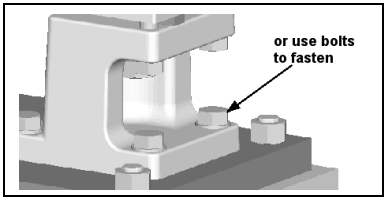


FIG. 4: BOLTING ONTO MOUNTING PLATE

Step 7. Weld or bolt the top plate to the load carrier.

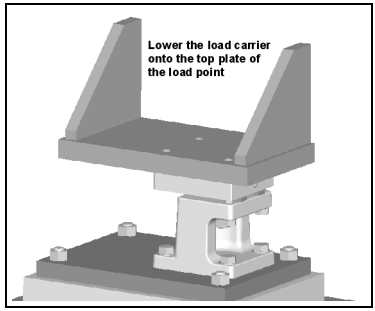


FIG. 5: WELD OR BOLT THE TOP PLATE

Step 8. If you bolt the plate, fasten the left two bolts snugly, but the right two bolts loosly.

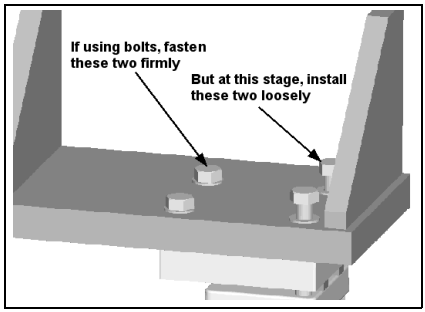


FIG. 6: BOLTING ADVICE

NOTE: *The basic mount serves as a construction block. Do not install the load sensor until all welding has been completed.*

Step 9. Unpackage the load sensor and place the Top and Bottom Load Sensor Housings on the Load Sensor.

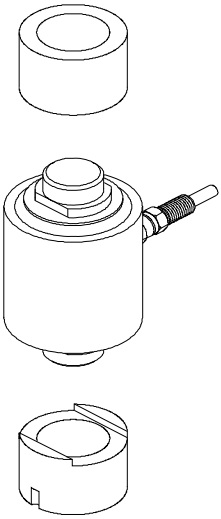


FIG. 7: LOAD SENSOR

Step 10. Apply a layer of grease to the O-rings inside the loading cups and assemble cups with the load sensor.

Step 11. Slide the load sensor assembly with cups between the bottom and top plate into position with the loading cups facing as shown.

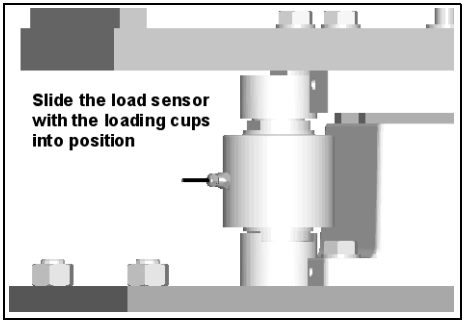


FIG. 8: LOAD SENSOR

Step 12. Be sure to line up the horizontal anti-rotation notch.

Step 13. Mount the lower clamp and tighten the screws. When you mount the upper clamp, tighten screws loosely for now.

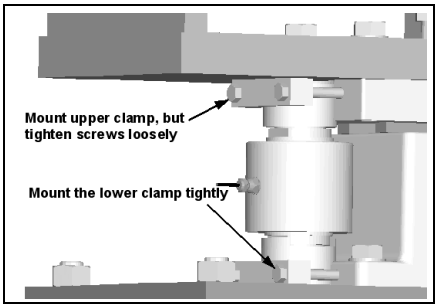


FIG. 9: FASTEN CLAMPS

Step 14. Remove the bolts holding the parts together, then tighten the two bolts that were left loose in step eight.

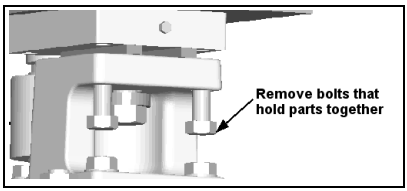


FIG. 10: REMOVE BOLTS

Step 15. Place a hydraulic jack between the top and bottom plates. Apply just enough lift to remove the spacers.

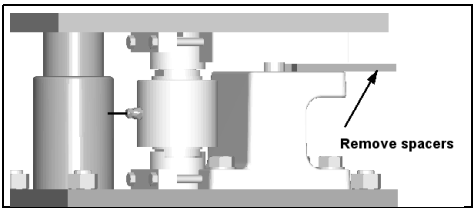


FIG. 11: REMOVE SPACERS

Installing the Load Sensor

Step 16. Use the jack to lower the load carrier onto the load sensor

Step 17. Remove the jack, then tighten the upper clamp bolts that were left loose in Step 13.

Step 18. Set lift off gap to about 1.5-3 mm and secure it with the locking screw.

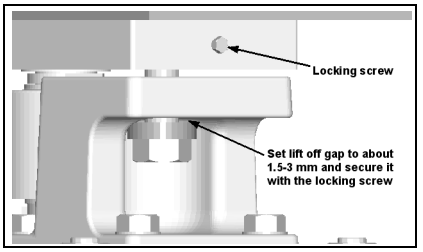


FIG. 12: SET GAP

CAUTION: **DO NOT REINSTALL THE SHIPPING BOLT WHICH IS USED FOR ALIGNMENT ONLY. IF REINSTALLED, IT WILL YIELD IMPROPER WEIGHT READINGS.**

Step 19. Use primer paint on the zinc-plated load point assemblies and then a finish coat on and around the welds to protect them from iron oxide formation.

Step 20. Repeat the installation process for each of the load point assemblies in the system.

Step 21. When finished the load point assembly should look like the figure below.

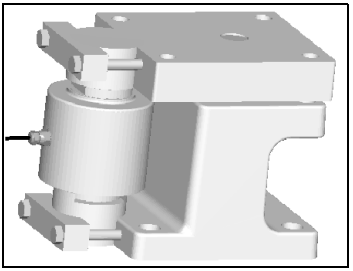


FIG. 13: FINISHED LOAD POINT ASSEMBLY WITH STANDARD LOAD SENSOR

NOTE: *For additional help with the load point installation, contact your local Hardy Process Solutions Representative or either Technical Support or the Hardy Service Center.*

Troubleshooting

Physical Checks

Follow these steps before running any electrical tests:

Step 1. Visually inspect each load point assembly for physical damage. If you find any problems, replace the part that is damaged.

- Look for distortions or cracks in all metal parts. Make sure that any welds are not cracked and do not have deep pot marks.
- Check all cables for cracks, cuts or crimping. Check for any abrasions on the cables.
- Look for structural changes in the scale or supporting structures.
- Look for binding of any kind on the load point assembly.

Step 2. In the Troubleshooting section of the Hardy Manual for the weighing instrument, look for information on how to troubleshoot using Integrated Technician. (See also the support page of the Hardy Web site at: http://www.hardysolutions.com.)

Step 3. Get the Load Sensor certification sheets for referencing while troubleshooting. They are also available 24 hours a day at our Web Site: http://www.hardysolutions.com.

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 weighing instrument and measure the signal output under "no load" conditions. The reading should be less than 1% of the full scale output.

NOTE: *Output sensitivity 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 caused by an electrical transient such as lightning or welding.

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 +/- 50 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 +/- 10 ohm.

Step 3. Readings that exceed the ranges indicated suggest damage, and the load cell should be throroughly 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.*

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.

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

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.

Replace the load cell if the cell fails both tests.

If the sensor passes the test, an insulation problem in the cable is most likely.

Electrical Termination Cable Color Codes

The cable is 6 conductor, shielded (floating) and 30 feet in length.

EXC+Red	EXC -Black
SIG +Green	SIG -White
C2+Gray	C2-Violet
SHIELDYellow	

NOTE: *DO NOT CUT C2 CABLE. DOING SO MAY RUIN YOUR SENSOR AND MAY VOID YOUR WARRANTY.*

HI HLPRC03 SERIES LOAD POINT ASSEMBLY

Model Numbers

NOTE: *The -43C indicates a stainless steel Load Sensor with stainless steel mounting hardware. For zinc plated mounting hardware, use -45C. For painted steel mounting hardware, use -41C (Painted Steel is the only option for the 330Klbs and the 660Klbs mounts.*

Specifications

Capacity		Model #	Model #
KLBS	MT	Fixed Assembly	Spare Load Sensor
16.5	7.5	HILPRC03-16.5K-4_C	HIRCH04-16.5K
33	15	HILPRC03-33K-4_C	HIRCH04-33K
50	23	HILPRC03-50K-4_C	HIRCH04-50K
66	30	HILPRC03-66K-45C	HIRCH03-66K
88	40	HILPRC03-88K-4_C	HIRCH03-88K
110	50	HILPRC03-110K-4_C	HIRCH03-110K
220	100	HILPRBC03-200K-4_C	HIRCH03-200K
330	150	HILPRC03-330K-41C	HIRCH03-330K
660	300	HILPRC03-660K-41C	HIRCH03-660K

TABLE 1: MODEL NUMBERS & CAPACITIES

CAPACITY IN Klbs:

16.5K / 33K / 50K / 66K / 88K / 110K

- Maximum number verification intervals (nmax): 3,000
- Minimum load cell vertifcation inteval (vmin): Emax/15,000
- Combined Error (%RO): ± 0.0200
- Non-Linearity(%RO): ± 0.01666
- Hysteresis (%RO): ± 0.01666
- Creep Error (30 minutes) /DR (%RO): ± 0.01666

- Temperature effect on min dead load ouput (%RO) /10°C: ± 0.0093
- Temperature effect on sensitivity %RO/10°C: ± 0.0100
- Rated Output (%RO) mV/V: 2 ± 0.1
- Calibration in mV/VΩ : Matched
- Zero Balance (%RO): <± 5
- Excitation Voltage (V): 5-15
- Input Resistance (Ω): 1150 ± 50
- Output Resistance (Ω): 1000 ± 2
- Insulation Resistance (100VDC) (MΩ): ≥ 5000
- Excitation 5-15VDC
- Load Cell Safe Load Limit (% Emax): 200
- Load Cell Ultimate Load Limit (% Emax): 300
- Load Cell Safe Load Limit (% Emax): N/A

Environmental Specifications

- Compensated Temperature Range: 14^{o} F to 104^{o} F (Minus 10^{o} C to Plus 40^{o} C)
- Operating Temperature Range Minus 40^{o} F to Plus176^{o} F (-40^{o} C to +80^{o} C)
- Load Sensor Material: Stainless Steel 17-4 PH (1.4548)
- Sealing: Complete Hermetic Sealing -- Glass to Metal Header
- Protection According to EN 60529: IP68 (up to 2m water deph/IP69K
- Cable Length: 30 ft
- Hazardous Certification: IS Class 1,2,3 Div 1, NI Class 1,2,3 Div 2
- Legal for Trade: N/A

CAPACITY IN Klbs: 220K/330K/660K

- Maximum number verification intervals (nmax): N/A

- Minimum load cell vertifcation inteval (vmin): N/A
- Combined Error (%RO): ± 0.0500
- Non-Linearity(%RO): ± 0.0400
- Hysteresis (%RO): ± 0.0400
- Creep Error (30 minutes) /DR (%RO): ± 0.0600
- Temperature effect on min dead load ouput (%RO) /10°C: ± 0.0400
- Temperature effect on sensitivity %RO/10°C: ± 0.0200
- Rated Output (%RO) mV/V: 2 ± 0.1
- Calibration in mV/VΩ : Matched
- Zero Balance (%RO): <± 5
- Excitation Voltage (V): 5-15
- Input Resistance (Ω): 1150 ± 50
- Output Resistance (Ω): 1100 ± 2
- Insulation Resistance (100VDC) (MΩ): ≥ 5000
- Excitation 5-15VDC
- Load Cell Safe Load Limit (% Emax): 200
- Load Cell Ultimate Load Limit (% Emax): 300
- Load Cell Safe Load Limit (% Emax): N/A

Environmental Specifications

- Compensated Temperature Range: 14^{o} F to 104^{o} F (Minus 10^{o} C to Plus 40^{o} C)
- Operating Temperature Range Minus 40^{o} F to Plus176^{o} F (-40^{o} C to +80^{o} C)
- Load Sensor Material: Stainless Steel 17-4 PH (1.4548)
- Sealing: Complete Hermetic Sealing -- Glass to Metal Header
- Protection According to EN 60529: IP68 (up to 2m water deph/IP69K

- Cable Length: 50 ft
- Hazardous Certification: IS Class 1,2,3 Div 1, NI Class 1,2,3 Div 2
- Legal for Trade: N/A

Drawings

See the section *Installing Load Point Assembly* for installation procedures.

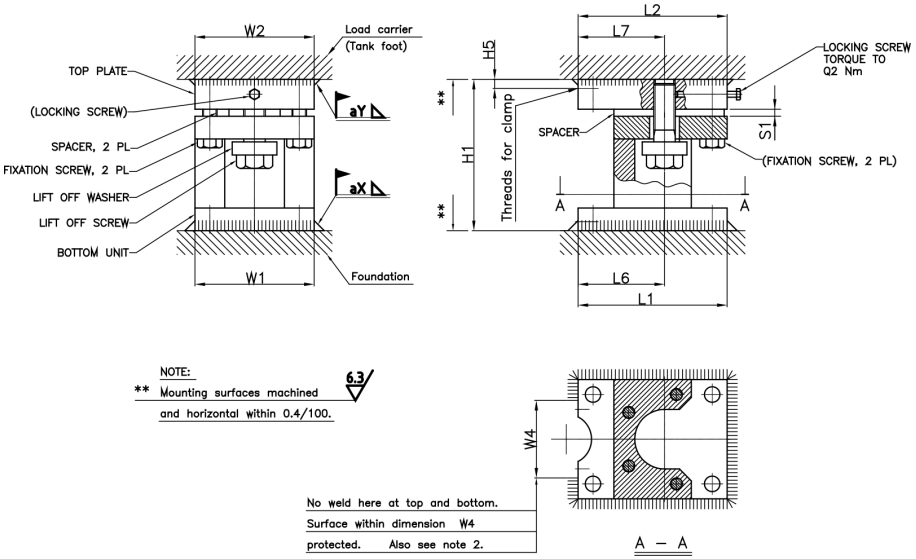
All data and information contained in or disclosed by these drawings is confidential and proprietary information of Hardy Process Solutions Inc. and all rights therein are expressly reserved.

NOTE:

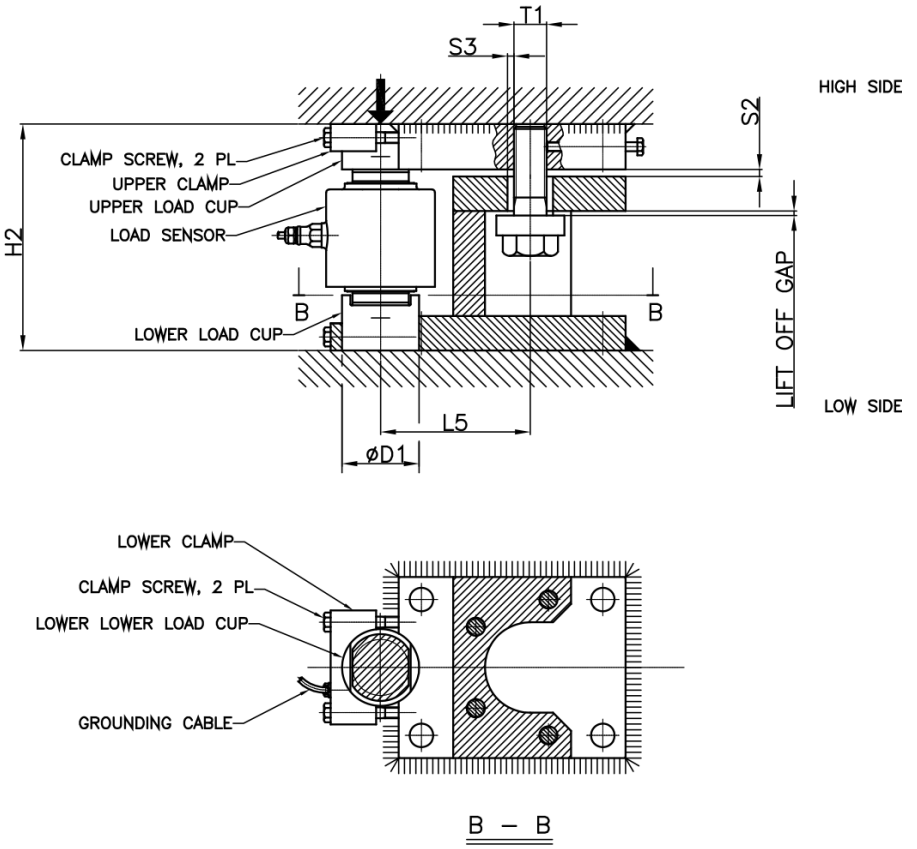
Drawings shown in this section are for the 16.5Klb to 50Klb mounts. I/I Drawings for all other capacities are available for download on the Hardy Website

www.hardysolutions.com >Products> Load Cells and Platform Scales> Compression > Advantage HI LPRC03 Load Point. Select the Docs & Program Tab and download the drawings you require. Drawings are available in three different formats.

Drawing 1: Module assembly for shipment, positioned on site, and showing the welding alternatives

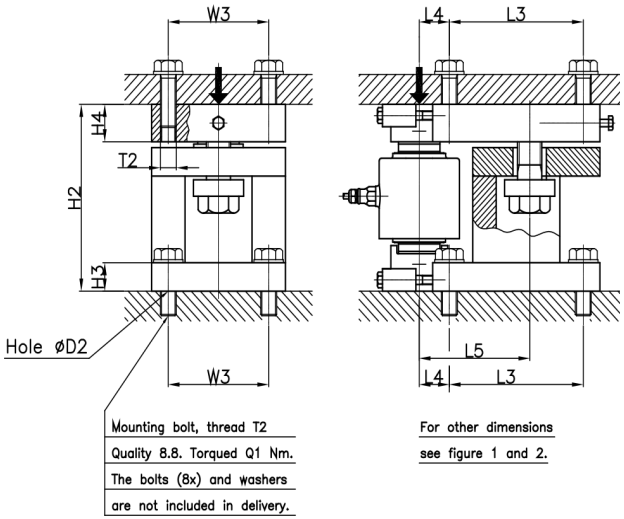


Drawing 2: Welded module installed



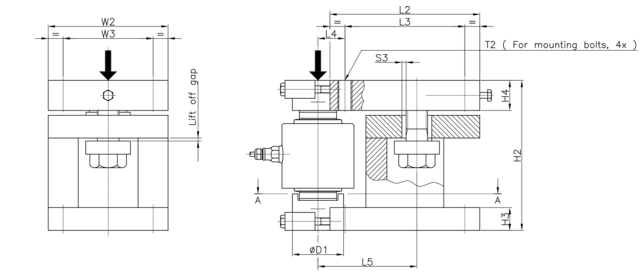
B – B

Drawing 3: Bolted module installed



Arrow marks indicate the center of the load, which coincides with the center of the tank leg, etc.

Drawing 4: Dimensional drawing

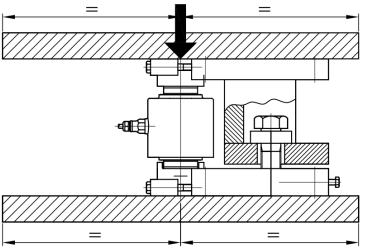


MODEL NUMBER LOAD SENSOR

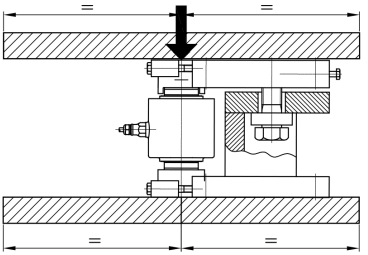
CAPACITY LBS [T]	MODEL NUMBER STAINLESS STEEL	PLATED STEEL	MODEL NUMBER	LOAD SENSOR CABLE LENGTH	MAXIMUM LIFT-OFF FORCE KLB [KN] *	MAXIMUM SIDE FORCE KLB [KN] *	WEIGHT – EXCLUDING LOAD SENSOR
16.5KLB [7.5T]	HI LPRC03–16.5K–43C	HI LPRC03–16.5K–45C	HI RCHC04–16.5K	30FT [9.1M]	22.5 [100]	11.2 [50]	33LB [15KG]
33KLB [15T]	HI LPRC03–33K–43C	HI LPRC03–33K–45C	HI RCHC04–33K				
50KLB [22.5T]	HI LPRC03–50K–43C	HI LPRC03–50K–45C	HI RCHC04–50K				

DIMENSIONS IN [MM]													BOLT THREAD
D1	D2	H2	H3	H4	L1	L2	L3	L4	L5	S3	W1	W2	W3	T2
1.96 [50]	.69 [17.5]	5.12 [130]	.79 [20]	1.18 [30]	6.54 [166]	6.30 [160]	5.12 [130]	.98 [25]	3.94 [100]	.20 [5]	5.12 [130]	5.12 [130]	3.94 [100]	M16

Drawing 5: Bolted module installed



WEIGH MODULE CAN ALSO BE INSTALLED INVERTED



WEIGH MODULE AS NORMALLY INSTALLED

CENTER POINT – THIS CENTER POINT OF THE UPPER LOAD CUP SHOULD BE CENTERED ON THE LOAD CARRIER FOOT PLATE.

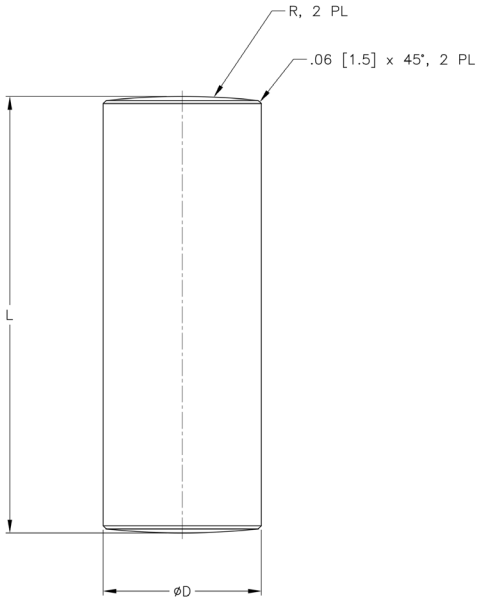
Dummy Load Cells

Hardy has two sizes of dummy load cells available for the HI LPRC03. One version replaces the HIRCH04 load sensor during welding and mount installation for the 16.5 Klbs to 50 Klbs capacities. The second replaces the HIRCH03 load cell from 66 Klbs to 660 Klbs.

NOTE:

I/I Drawings for Dummy Load Cells are available for download on the Hardy Website:

www.hardysolutions.com >Products> Load Cells and Platform Scales> Compression > Advantage HI LPRC03 Load Point. Select the Docs & Program Tab and download the drawings you require. Drawings are available in three different formats.



DIMENSIONS – INCHES & [mm]

MODEL NUMBER DUMMY LOAD CELL	ASSOCIATED LOAD SENSOR	CAPACITY LBS [T]	øD	L	R
HI DLC-RCH03-66KLB-43	HI RCH03-66K	66 KLB [30T]	1.54 [39.0]	5.51 [140.0]	7.87 [200.0]
HI DLC-RCH03-88KLB-43	HI RCH03-88K	88 KLB [40T]	1.54 [39.0]	5.91 [150.0]	7.09 [180.0]
HI DLC-RCH03-110KLB-43	HI RCH03-110K	110 KLB [50T]	1.73 [44.0]	7.01 [178.0]	11.02 [280.0]
HI DLC-RCH03-220KLB-43	HI RCH03-220K	220 KLB [100T]	2.44 [62.0]	7.01 [178.0]	11.81 [300.0]
HI DLC-RCH03-330KLB-43	HI RCH03-330K	330 KLB [150T]	3.00 [76.2]	8.27 [210.0]	13.78 [350.0]
HI DLC-RCH03-660KLB-43	HI RCH03-660K	660 KLB [300T]	3.94 [100.0]	11.02 [280.0]	21.65 [550.0]

Record Model Information

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

The serial number can be found on the side of the load sensor, or by entering the SelfTest Mode of a few Hardy Plug-In Weight Modules and Controllers (not all instruments have this function).

Scale Name/Location:

Model Number:

Serial Number 1:

Serial Number 2:

Serial Number 3:

Serial Number 4:

Serial Number 5:

Serial Number 6: