



## Weight Processor

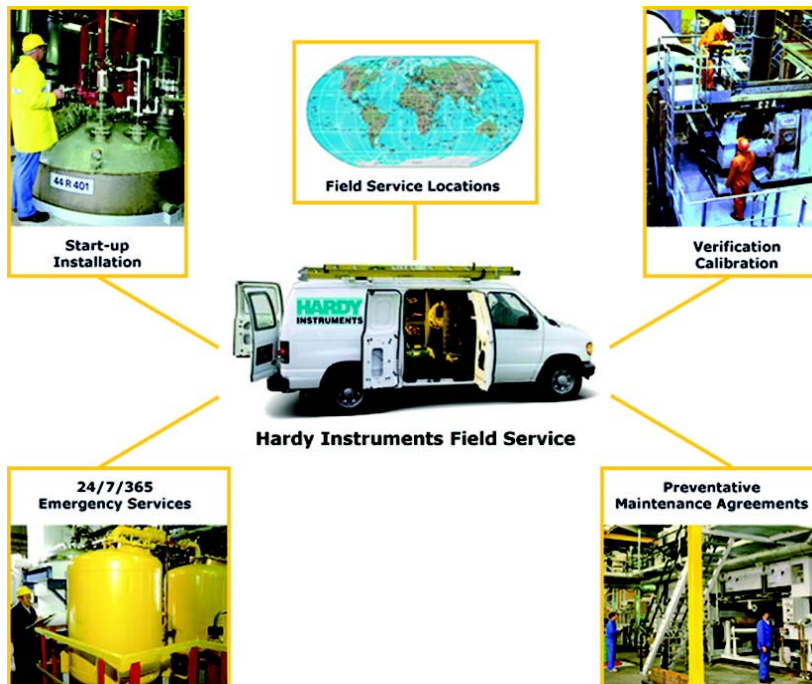
### HI 6300 Series

#### User's Guide

Hardy Process Solutions Document Number: 0596-0328-01 REV B



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# Contents



<b>Chapter 1</b>	<b>Overview- . . . . .</b>	<b>1</b>
	General Introduction to the HI 6300 Series Weight Processor - - - - -	1
	HI 6300 Series Weight Processor Description- - - - -	1
	Typical Applications - - - - -	2
	Features and Capabilities - - - - -	2
	Hardy Process Toolbox- - - - -	2
	C2® and eCal™ Calibration - - - - -	2
	WAVERSAVER®- - - - -	2
	INTEGRATED TECHNICIAN®- - - - -	3
	Weighing System Tests- - - - -	3
<b>Chapter 2</b>	<b>Specifications- . . . . .</b>	<b>5</b>
	Basic Specifications - - - - -	5
	General - - - - -	5
	Number of Channels - - - - -	5
	Update Rate - - - - -	5
	Resolution - - - - -	5
	WAVERSAVER- - - - -	5
	Averages - - - - -	5
	Input - - - - -	5
	Non-linearity - - - - -	5
	Common Mode Rejection - - - - -	5
	Common Mode Voltage Range - - - - -	5
	Front Panel (optional) - - - - -	6
	Load Cell Excitation - - - - -	6
	C2 Calibration Input - - - - -	6
	Cable Lengths - - - - -	6
	Network Connectivity - - - - -	6
	Environmental Requirements - - - - -	6
	Operating Temperature Range - - - - -	6
	Temperature Coefficient - - - - -	6
	Storage Temperature Range - - - - -	6
	-40 to 85° C (-40° to 185° F) - - - - -	6
	Humidity Range - - - - -	6
	Maximum Altitude for Installation - - - - -	6
	Pending Approvals- - - - -	6

<b>Chapter 3</b>	<b>HI 6300 Installation</b>	<b>7</b>
	Unpacking	7
	Spare Parts List	8
	Tool List	8
	Installing the HI 6300 Series Instrument	8
	Installation options for the HI 6300 series instrument	9
	Mounting the Front Panel Display-	9
	Panel Mount Option 1	11
	Panel Mount Option 2	12
	Making Longer Display Interface Cables	13
	DIN Rail Mount	15
	Wall Mount	16
	Remote Display Mount-	18
	Blind Unit (No display)	19
	Disassembly and Reassembly Notes and Cautions	21
	Load Cell Wiring Diagrams	22
	Connecting to the Hardy HI 215IT or HI 6010/6020IT Summing Box-	23
<b>Chapter 4</b>	<b>Network Configuration-</b>	<b>25</b>
	Ethernet TCP/IP Network Configuration	25
	LAN Connection	26
	DHCP Configuration Using the Front Panel	26
	Direct Connect Hardware-	28
	Windows PC Configuration-	28
	Windows 2000-	28
	Windows XP-	29
	Windows 7	29
	Direct Connect Configuration - HI 6300 Series Instrument	30
	Ethernet-UDP	30
	Modbus-RTU (over RS-485)	31
	Wiring Pinout	31
	Modbus Setup	31
	Modbus Functions	32
	Modbus Registers	32
	Network Command Interface	32
	Communications Parameters for the HI 6310 Only	35
	Printer (over RS-232)	35
	USB Memory Stick	36
	Analog 4-20mA	36
<b>Chapter 5</b>	<b>Instrument Configuration</b>	<b>39</b>
	Using the Home Page to set Parameters	39

Using the Front Panel Display Menus to Set Parameters- - - - -	40
Front Panel Display - - - - -	40
The Five Button Command Cluster - - - - -	40
Using the Mode, Zero, and Tare buttons- - - - -	41
Entering Numeric and Alphanumeric Values - - - - -	42
Commands and Parameters - - - - -	44
Calibration Menu - - - - -	45
C2 (eCal) Commands and Parameters - - - - -	45
Ref Weight Parameter - - - - -	47
Sensitivity Parameter- - - - -	47
Hard Cal Commands and Parameters - - - - -	48
Cal Lo Weight Parameter - - - - -	48
Cal Tolerance Parameter - - - - -	49
Span Weight Parameter- - - - -	50
Cal Date Parameter- - - - -	51
Communication Menu - - - - -	51
HI 6310 Only - - - - -	52
Ethernet TCP/IP Commands and Parameters- - - - -	52
Enable DHCP Parameter - - - - -	52
Fixed IP Parameter - - - - -	53
Mask Address Parameter - - - - -	54
Gateway Address Parameter - - - - -	54
DNS Server Parameter - - - - -	54
Ethernet UDP Parameters- - - - -	54
Hardy Port Parameter - - - - -	54
Modbus-RTU Commands and Parameters - - - - -	55
Slave Address Parameter - - - - -	55
Printer Command Parameters - - - - -	57
USB Memory Stick Parameters - - - - -	58
4-20 mA Communications Commands and Parameters - - - - -	60
Weight Source Parameter- - - - -	60
Diagnostics Parameter Menu - - - - -	61
See the Chapter 9 for further information on Diagnostics. - - - - -	62
Display Parameter Menu - - - - -	62
Backlight Parameter - - - - -	62
Power Saving Parameters- - - - -	62
Auto Enable Parameter - - - - -	62
Wait Time Parameter- - - - -	63
Set Background Parameter - - - - -	63
Set Foreground Parameter - - - - -	63
Split Screen Parameters and Commands- - - - -	64
Filter Parameter Menu - - - - -	66
NumAverages Parameter - - - - -	66
WAVERSAVER® Parameter- - - - -	67

Information Page-	68
Language Parameter Menu	68
Operations Parameter Menu	69
Tare Operations Commands and Parameters-	69
Tare Amount Parameter	69
Tare Offset Parameter	70
Tare Command	71
Zero Operations Commands and Parameters-	71
Zero Tolerance Parameter	71
Zero Amount Parameter	71
Zero Command	72
Auto Mode	72
Count Operations Parameters and Commands	72
Security Parameter Menu	74
The Calibration Lock Parameters	75
Calibration Lock Parameter-	75
Calibration Password Parameter	75
The Configuration Lock Parameters-	76
Configuration Lock Parameter	76
Configuration Password Parameter	76
The Display Lock Parameters-	76
Display Lock Parameter	76
Display Password Parameter	77
The Keypad Lock Parameters-	77
Keypad Lock Parameter	77
Keypad Password Parameter	78
The Read Only Lock Parameters	78
Read Only Lock Parameter	78
Read Only Password Parameter	78
Setup Parameter Menu	79
Capacity Parameter-	79
Decimal Point Parameter	79
Graduation Size Parameter	80
Instrument ID Parameter	81
Motion Tolerance Parameter	81
Operator ID Parameter	82
Unit (of Measure) Parameter	82

**Chapter 6 Calibration- . . . . . 85**

Pre-Calibration Procedures	85
Electrical Check Procedures	86
Load Cell/Point Input/Output Measurements	86
Load Check	87

C2 & eCAL Electronic Calibration- - - - -	87
Gravitation Correction - - - - -	87
C2 and eCAL Calibration from the Web Page - - - - -	89
C2 Calibration from the Front Panel- - - - -	90
Hard Calibration - - - - -	91
Hard Calibration from the Web page - - - - -	91
Hard Calibration from the Front Panel- - - - -	92
<b>Chapter 7 Operation - - - - -</b>	<b>95</b>
Getting Started - - - - -	95
Mode Button- - - - -	95
Zero Operation- - - - -	95
Tare Operation - - - - -	97
Auto Mode Tracking – Disabled (Default) - - - - -	98
Auto Mode Tracking – Enabled - - - - -	98
Split Screen Mode - - - - -	101
Making Longer Display Interface Cables - - - - -	101
<b>Chapter 8 Security - - - - -</b>	<b>105</b>
Display Security Options - - - - -	105
The Display Lock - - - - -	106
The Keypad Lock - - - - -	108
The Configuration Lock - - - - -	110
The Read Only, Security & Calibration Locks - - - - -	111
Modifying the Security Parameters- - - - -	112
Modifying the Calibration Parameters - - - - -	112
Modifying the Read Only Parameters - - - - -	113
<b>Chapter 9 Troubleshooting - - - - -</b>	<b>115</b>
Error Messages - - - - -	116
Trouble Shooting Using Integrated Technician (IT®) - - - - -	117
Stability Test ALL - - - - -	117
PASS/FAIL and Stability Test - - - - -	118
WAVERSAVER TEST - - - - -	118
Weight and Voltage ALL - - - - -	118
Weight - - - - -	118
RTZ (Return to Zero) Test - - - - -	119
IT Test - - - - -	119
Sensor Number - - - - -	119
General Troubleshooting Flow Chart Index- - - - -	121

A - Guideline Instability: Electrical and Mechanical review.	122
A1. Checking for Unstable Components in a Weighing System	123
B. Guidelines for Electrical, Mechanical or Configuration Issues	124
B1 - Guidelines to Verify Electrical Installation-	125
B2 - Guidelines to Verify Mechanical Installation	126
B3 - Guidelines to Verify Configuration/Filter Settings to Improve Stability	127
C - Integrated Technician and Stability Test Overview	128
E Testing for Non-Return to Zero (System with IT Summing Card.)	129
F. Verify Individual Load Sensor Millivolt Output readings	130
G- Calibration Errors When Performing the Calibration	131
H. Mechanical Installation-	132
J- Electrical Inspection	133
K - Installation Check Points	134
M. Weight Processor's Front Display is Blank or Locked	135
N. Analog Out (HI 6310 Only)-	136
Tests and Diagnostics	137
Parameters-	138
System and Load Cell Tests	139
Overview of Typical Load Cell System	139
INTEGRATED TECHNICIAN-	140
Stability Test-	140
Weight and Voltage Tests	142



# Chapter 1

## Overview



### General Introduction to the HI 6300 Series Weight Processor

This Manual describes installation, setup and troubleshooting procedures for the HI 6300 Series Weight Processor. Be sure to read and understand all cautions, warnings, and safety procedures in this manual to ensure safe operation and repair of this instrument.

Hardy Process Solutions sincerely appreciates your business. We encourage input about the performance and operation of our products from our customers. Should you not understand any information in this manual or experience any problems with this product, please contact our Technical Support Department at:

**Phone:** (858) 278-2900

**Toll Free:** 1-800-821-5831

**FAX:** (858) 278-6700

**E-Mail:** [hardysupport@hardysolutions.com](mailto:hardysupport@hardysolutions.com) or [hardyinfo@hardysolutions.com](mailto:hardyinfo@hardysolutions.com)

Or visit our web site at:

<http://www.hardysolutions.com>

Our web site provides information about our products and process weighing applications. You can also update the HI 6300 User Guide. The latest revised manuals are available FREE in the product selection pull down menu on our Web Site. Other pages on the site provide answers to questions about weighing instruments, PLC plug in modules, load points, summing boxes, process weighing or other Hardy Process Solutions products. Be sure to sign up for the Hardy Newsletter to get the latest information on all Hardy products and services. For answers to technical issues and service problems, check the Hardy WebTech on our Hardy Web Site. Most problems can be resolved by the Hardy WebTech, 365 days a year, 24 hours a day 7 days a week. You can still contact a technician by phone during our normal operating hours (6:30 AM to 5:30 PM Pacific Time) if necessary.

### HI 6300 Series Weight Processor Description

The HI 6300 series of single-channel weight processing instruments is suitable for PLC-based or stand-alone weighing applications. The primary function of the HI 6300 series is to provide stable gross or net weight in a variety of units such as oz, lb, ton, gm, kg and mt.



The HI 6300 series can be used with or without a display. The display is a bright 4.3” high-contrast LCD capable of high-resolution graphics and discrete messaging. The unit can be panel mounted, DIN mounted, and remote display mounted. The thin enclosure and ultra-low power consumption allows for high density control cabinet design.

### **Typical Applications**

The HI 6300 series serves a variety of industrial weighing applications found in batching, blending, filling, dispensing, inventory management, level by weight and check by weight verification.

## **Features and Capabilities**

### **Hardy Process Toolbox**

The Hardy Process Toolbox is a set of productivity tools that support process weighing functions. Each tool in the Hardy Process Toolbox saves time, increases accuracy, improves efficiency or reduces risk in process weighing applications. The HI 6300 includes the following Toolbox functions.

### **C2<sup>®</sup> and eCal<sup>™</sup> Calibration**

Traditional calibration uses certified test weights. C2<sup>®</sup> (or eCAL<sup>™</sup> as it is called in China) Electronic Calibration allows a scale to be calibrated without the need for test weights. A C2 or eCAL weighing system consists of up to four load cell sensors per channel, a junction box, interconnect cable, and an instrument with C2 capabilities (e.g., the HI 6300 series instrument). Each Hardy Process Solutions C2-certified load sensor outputs digital information used for calculating the calibration. When the HI 6300 series instrument reads the signals from the load sensors, it calibrates the scale based on the load sensor’s output plus a user-supplied reference point value (from 0 to any known weight on the scale).

### **WAVERSAVER<sup>®</sup>**

When measuring small weight changes, the effects of mechanical vibration and noise from feeders and other plant environmental conditions can introduce substantial interference. WAVERSAVER factors out vibration, noise, and other interference-related signals from the load cell so the rate controller can better decipher the actual weight data.

While WAVERSAVER can factor out noise with frequencies as low as 1.00 Hz, three cut-off frequencies can be selected, with higher frequencies providing a faster response time. The default factory setting is 1.00 Hz vibration frequency immunity.

## INTEGRATED TECHNICIAN®

In conjunction with an IT junction box, the HI 6300 features INTEGRATED TECHNICIAN® (IT), a system diagnostics program that makes it possible to diagnose weighing system problems from the instrument's front panel or over the available networks. IT reads individual load sensor voltages and weights and isolates individual system components for quick and easy troubleshooting

### NOTE

*If you do not have a Hardy IT Junction Box connected to the HI 6300, the weight reading is the total for all load cells on the system.*

## Weighing System Tests

These tests are used to diagnose drifting or unstable weight reading problems. It requires a Hardy IT Junction Box for full utilization, for example the HI 215IT or the HI 6010IT. The ability to read the weight seen by the individual load sensors allows you to use this test for making cornering, leveling and load sharing adjustments to the weighing system.

INTEGRATED TECHNICIAN provides the following problem detection support:

1. **Integrated Technician Weight and Voltage Test:** Reads the weight of each load sensor in the system to see if the load sensor might be causing the problem.
2. **Integrated Technician Stability Test:** Disconnects the load sensors and engages an internal (in the junction box) reference signal to see if the Junction box, the cable between the instrument and the Junction Box, or the instrument is causing the problem.
3. **Integrated Technician Return to Zero Test:** Measures and stores the mV out of each Hardy load cell during a C2 calibration when zero is used as the reference. Later when the test is run it measures and compares the voltage with zero weight out from each load cell to the stored value and indicates either a pass or fail. This test insures the integrity of the weighing system.

### NOTE

*WAVERSAVER, C2, and INTEGRATED TECHNICIAN are registered trademarks of Hardy Process Solutions.*



# Chapter 2

## Specifications



Chapter 2 provides specifications for HI 6300 series instruments. The specifications listed are designed to assist in the installation, operation and troubleshooting of your instrument. All service personnel should be familiar with this section before installing or repairing the instrument.

### Basic Specifications

#### General

##### Number of Channels

- 1 Channel

##### Update Rate

- 55 Updates per Second

##### Resolution

- Internal 1:262,144

##### WAVERSAVER

- User Selectable
  - OFF
  - 7.50 Hz
  - 3.50 Hz
  - 1.00 Hz (default)

##### Averages

- 1 to 250 User-selectable in Single Increments

##### Power

- 12-27 VDC

##### Input

- Up to four 350-ohm full Wheatstone bridge, strain gauge load sensor/cells (5 volt excitation) can be connected to the weigh scale input

##### Non-linearity

- 0.0015% of full scale

##### Common Mode Rejection

- 110dB at or below 60 Hz

##### Common Mode Voltage Range

- 2.5 VDC maximum (with respect to earth ground)

### **Front Panel (optional)**

- Monochrome 480 x 272 LCD display with backlight
- Five tactile keys for menu item selection

### **Load Cell Excitation**

- 5 VDC +/- 1.15 VDC maximum
- Isolation from digital section 1000 VDC minimum

### **C2 Calibration Input**

- Isolation from digital section 1000 VDC minimum

### **Cable Lengths**

- 250 feet maximum of C2 authorized cable (Maximum of 4 load sensors) with IT Junction box

## **Network Connectivity**

Ethernet TCP/IP

Ethernet UDP

Modbus-RTU over RS485

### **HI 6310 Only**

Analog 4-20 mA

Printer port

USB port

## **Environmental Requirements**

### **Operating Temperature Range**

- 0 to 60° C (32° to 140° F)

### **Temperature Coefficient**

- Less than 0.005% of full scale per degree C for Cal-LO and Cal-HI reference points

### **Storage Temperature Range**

-40 to 85° C (-40° to 185° F)

### **Humidity Range**

- 0-90% (non-condensing)

### **Maximum Altitude for Installation**

- 2000 Meters (6,562 Feet)

## **Pending Approvals**

- UL, CUL and CE
- Hazardous Class I, Division 2, Groups A,B,C,D, T4A and Class I, II, III, Division 2, Groups F, G, T4A

# Chapter 3

## HI 6300 Installation



Chapter 3 covers unpacking, cabling, interconnecting, configuring, and installing the HI 6300 series of instruments. User and service personnel should read this chapter before installing or operating the weighing functions of the instrument.

**WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2.**

**AVERTISSEMENT – Risque d’explosion – La substitution de composants peut diminuer la conformité pour la Division 2**

**WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS**

**AVERTISSEMENT – Risque d’explosion – Ne pas débrancher l’équipement à moins que l’alimentation soit coupée ou que la zone ne présente pas de risques**

## Unpacking

- Step 1. Before signing the packing slip, inspect the packing for damage, and report damage of any kind to the carrier company.
- Step 2. Check to see that everything in the package matches the bill of lading.
- Step 3. If items are missing or you have any questions, contact Customer Service at:

**Hardy Process Solutions**

9440 Carroll Park Drive

San Diego, CA 92121

**Phone: (800) 821-5831**

**International: (858) 292-2710**

**FAX: (858) 278-6700**

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

**E-Mail: [hardysupport@hardysolutions.com](mailto:hardysupport@hardysolutions.com)**

- Step 4. Record the model number and serial number of the HI 6300 series instrument. Store them in a convenient, secure location for reference when contacting Hardy Customer Service Department or to buy parts or firmware upgrades

Step 5. Be sure to complete the warranty registration on the Hardy Process Solutions web site.

## Spare Parts List

Part Reference	Description	Quantity
HI 6110	HI 6300 Series Instrument Display (Optional)	1
0551-0653-01-0	HI 6300 Series Alt. Panel and Wall Mount Kit (optional)	1
0578-0072-01	Paper Mounting Template	1
0524-0034-01-0	Mounting Gasket	1
2140-0092-0	J1, 3-pin Power Connector	1
2140-0139-09-0	J2, 9-pin Load Cell Connector	1
2140-0139-06-0	J3, 6-pin Serial Port Connector	1
2140-0139-03-0	J4, 3-pin 4-20mA Connector	1

## Tool List

To install the HI 6300 series the following tools will be required.

- Drill with 5mm drill bit
- Jewelers screw driver (if cable assemble needs to be modified)
- 4mm nut driver with a maximum outside dimension of 8mm
- 10-50 mm Unibit (for optional display installation)

## Installing the HI 6300 Series Instrument

Before getting started, take the following precautions:

**WARNING - Electrostatic discharge may damage semiconductor components in the module. DO NOT TOUCH THE CONNECTOR PINS.**

**WARNING AVERTISSEMENT – Les décharges électrostatiques peuvent endommager les composants semi-conducteurs dans le module. NE TOUCHEZ PAS les broches du connecteur.**

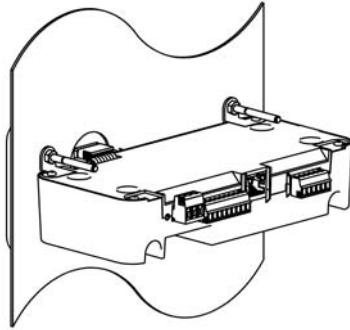
- Wear an approved wrist-strap grounding device when handling the module.
- Touch a grounded object or surface to rid yourself of any electrostatic discharged prior to handling the module.
- Handle the module from the bezel in front away from the connector. Do not touch the connector pins.
- Do not install the module right next to an AC or high voltage DC module.
- Route all the low voltage cables away from high voltage cables.



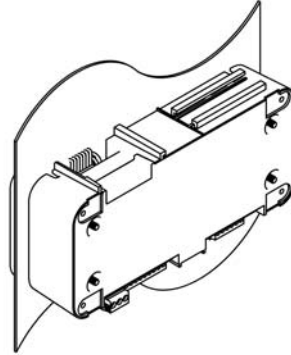
## Installation options for the HI 6300 series instrument

The HI 6300 series instrument can be mounted in four different configurations. There are two panel mount options, one DIN rail mount option, and a wall mount option.

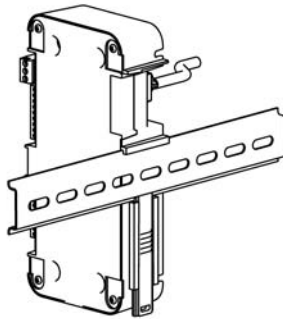
Panel Mount Option 1 with mounting kit



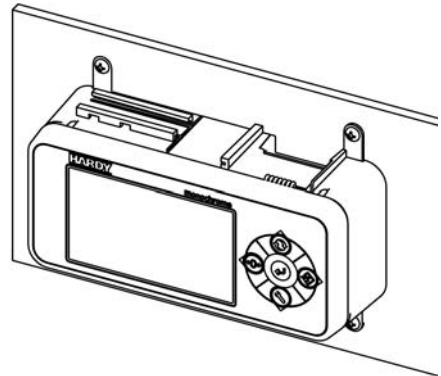
Panel Mount Option 2



DIN Rail Mount



Wall Mount with mounting kit



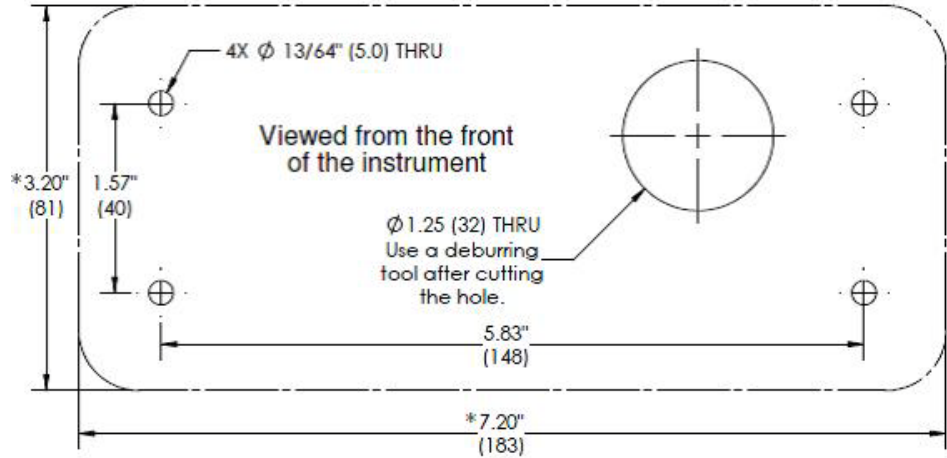
**Panel Mount Option 1 and Wall Mounts require additional hardware, which is available in the Panel Mount Option 1 and Wall Mount kit sold separately (Part# 0551-0653-01-0).**

The following sections provide details on how to mount the front panel display on a panel door or cover and how to install and connect the front panel to the HI 6300 series instrument for each of these four configurations.

### Mounting the Front Panel Display

Step 1. Make sure that all Electrostatic Discharge (ESD) precautions are taken before and during installation.

Step 2. A thin plastic template comes with the product. Make the hole pattern in the panel door or cover using the dimensions provided on the diagrams below.



**Panel Hole Dimensions (not displayed to scale)**

A printable template is available on the Hardy website. Printers and copy machines can distort or reduce the template measurements shown above. If you are not using the plastic template included with the product, verify the dimensional accuracy of any paper template before use.

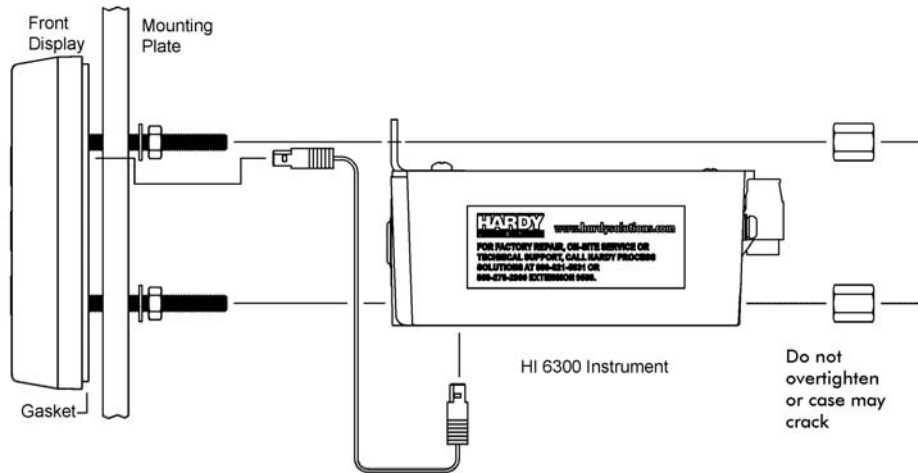
**CAUTION:**

*We recommend installing the HI 6300 in a NEMA 4, 4X or IP 55 rated enclosure or better.*

**ATTENTION**

*Nous vous recommandons d'installer le HI 6300 dans un boîtier NEMA 4, 4X ou IP 55 ou mieux.*

## Panel Mount Option 1



**FIG. 1 Exploded View of the Panel Mount Assembly – Option 1 with optional mounting kit**

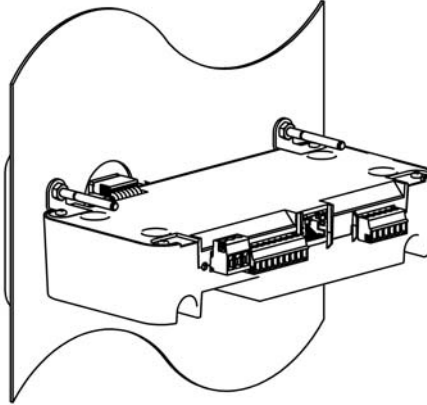
- Step 1. Screw the Panel Mounting Brackets to the top of the enclosure
- Step 2. Connect and hand tighten the four screw rods into the front panel display
- Step 3. Push the screw rods and cable assembly through the holes in the panel.
- Step 4. Connect the front panel display cable assembly
- Step 5. Tighten the four 4mm nuts enough to completely compress the gasket for IP65
- Step 6. Position the enclosure with the connectors at the back
- Step 7. Align the screw rods with the holes in the brackets and the enclosure
- Step 8. Connect the cable assembly
- Step 9. Slide the enclosure onto the screw rods until flush with the panel
- Step 10. Install and tighten keeper nuts.

**CAUTION:**

*Do not over tighten the bracket screws or the mounting nuts as this may damage the enclosure.*

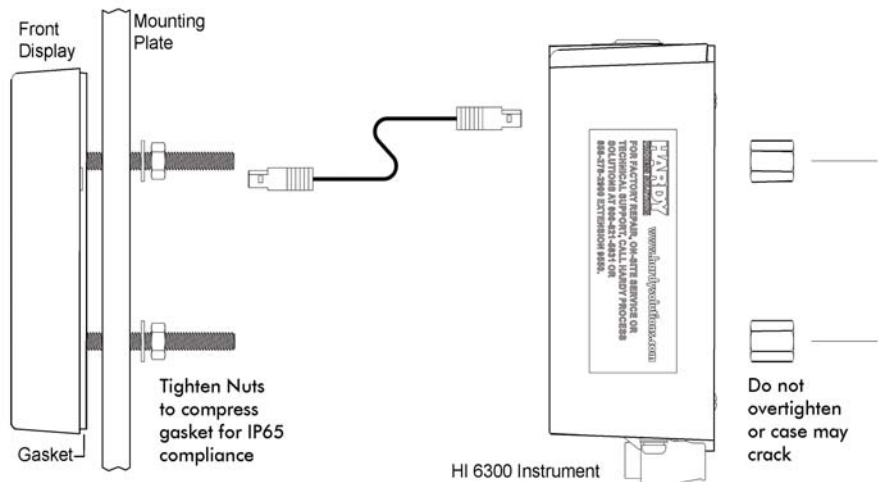
**ATTENTION**

*Ne pas trop serrer les écrous de montage car cela pourrait endommager l'enceinte.*



**Finished Panel Mount Assembly – Option 1**

## **Panel Mount Option 2**



***Exploded View of the Panel Mount Assembly – Option 2***

**NOTE**

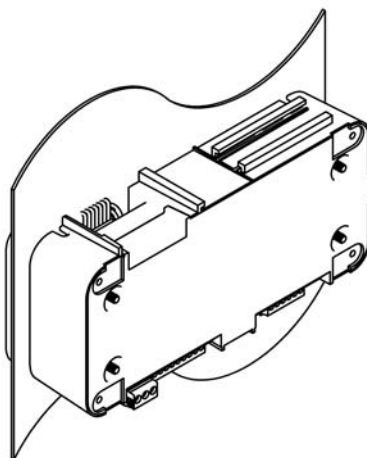
*No brackets are needed for this installation.*

- Step 1. Connect and hand tighten the four screw rods into the front panel display
- Step 2. Connect the front panel display cable assembly
- Step 3. Push the screw rods and cable assembly through the holes in the panel.

- Step 4. Secure display to panel using four 4mm nuts and washers on the screw rods.
- Step 5. Tighten the four 4mm nuts enough to completely compress the gasket for IP65 compliance.
- Step 6. Position the enclosure with the connectors pointing downwards
- Step 7. Align the screw rods with the holes in the enclosure
- Step 8. Connect the cable assembly
- Step 9. Slide the enclosure onto the screw rods until flush with the panel
- Step 10. Using the 4 mm x 12 mm keeper nuts supplied, secure the enclosure screw rods

*CAUTION:* *Do not over tighten the bracket screws or the mounting nuts as this may damage the enclosure.*

*ATTENTION* *Ne pas trop serrer les écrous de montage car cela pourrait endommager l'enceinte.*



***Finished Panel Mount Assembly – Option 2***

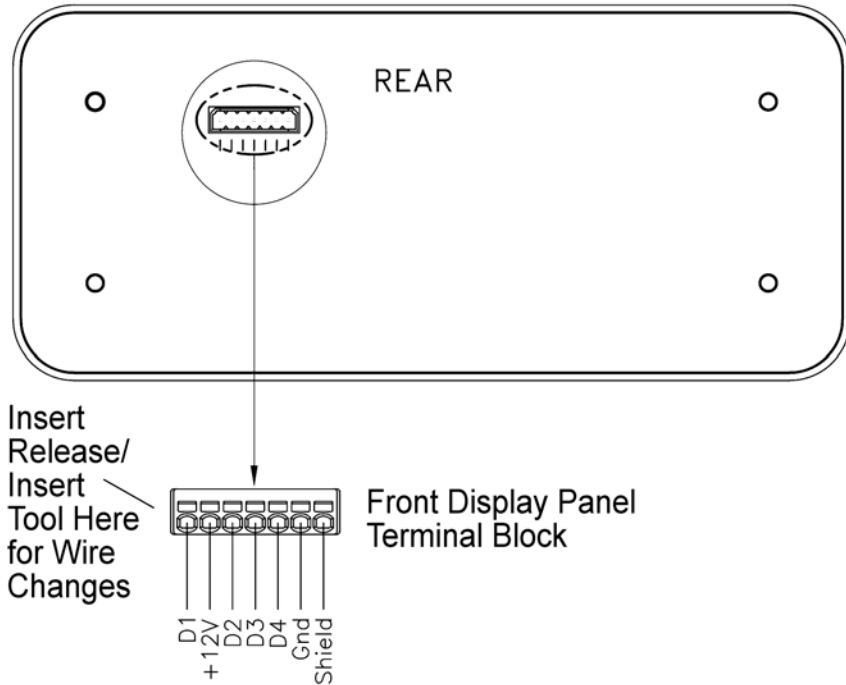
### **Making Longer Display Interface Cables**

If you need to install the front panel further away from the HI 6300 series than is possible with the supplied cable then, you will need to make a display cable between the panel and the instrument.

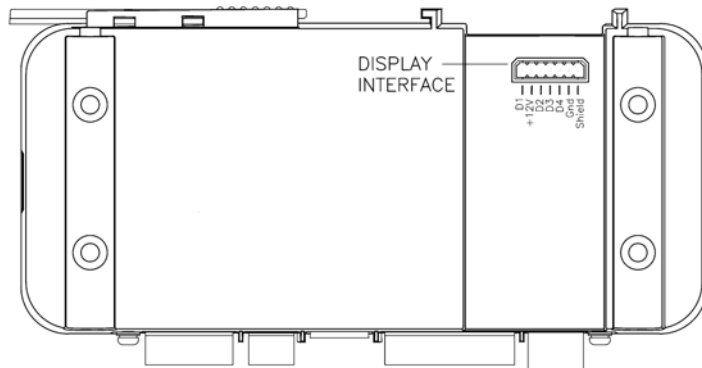
#### Wiring Specifications

- Wire size: 20 AVG maximum / 26 AWG minimum
- Maximum cable length: 100 ft. (30.48 meters)
- Use three twisted pairs with a drain wires
- Pair wires +12 and GND, D1 and D2, D3, and D4

*View from the rear of the front display panel*

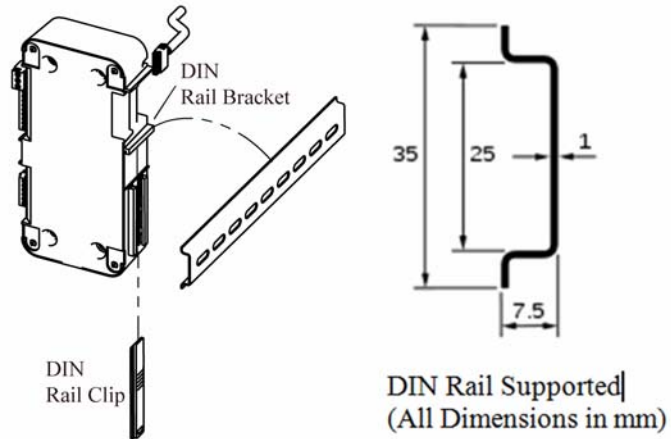


The terminal type is a spring cage type contact. There is a slot provided to use an insert/release tool. The tool is a 2.0 mm x 0.4 mm wide flat blade screw driver. Inserting the tool opens the cage contact and allows one or two bare wires to be inserted. Removing the insertion tool with bare conductor inserted will lock the connection.



*View from the front of the instrument showing the display connector.*

## DIN Rail Mount

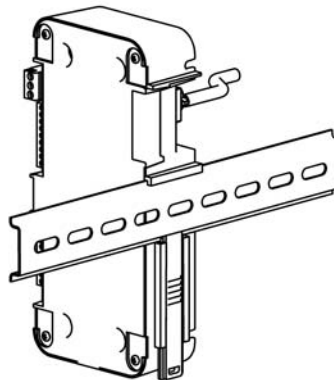


### Exploded View of the DIN Rail Mount Assembly

#### NOTE

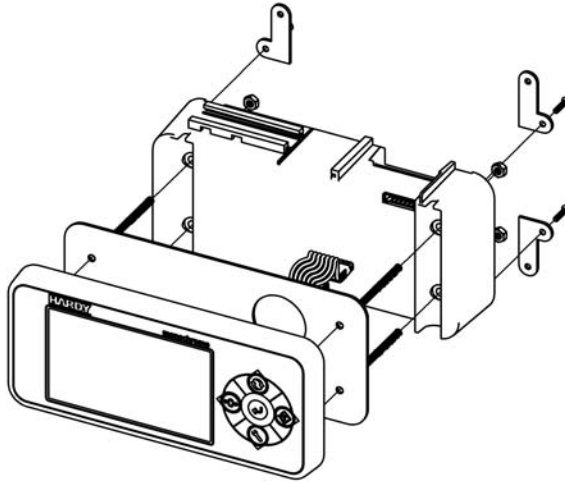
*The DIN Rail mount can be used with a remote display or operated as a Blind unit*

- Step 1. Pull down the DIN rail clip to expose the DIN Rail bracket. Do not fully remove the clip from the housing.
- Step 2. Hook DIN rail bracket onto the DIN rail using the groove at the top of the bracket
- Step 3. Push the DIN rail clip up until it locks in place.
- Step 4. While holding the HI 6300 series instrument, gently pull the bottom of the HI 6300 away from the DIN rail to verify that it is mounted correctly.



*Completed DIN Rail Mount Assembly*

## Wall Mount



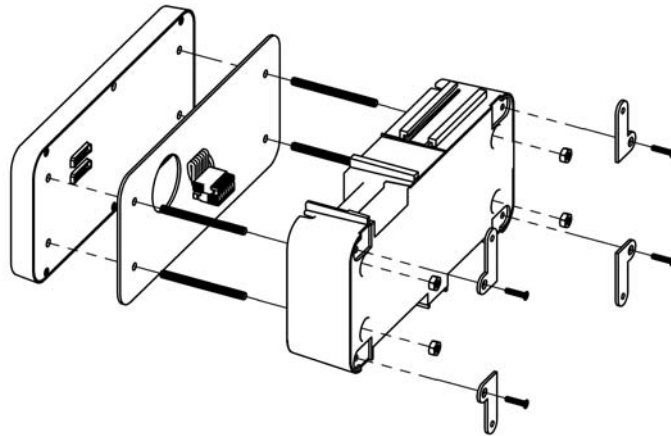
### *Wall Mount Assembly exploded from the front with optional mounting kit*

To wall mount the HI 6300 series instrument, the display and weight processor need to be assembled; then the assembled instrument can be mounted onto the wall.

- Step 1. Connect and hand tighten the four screw rods into the front panel display
- Step 2. Connect the front panel display cable assembly
- Step 3. Push the screw rods and cable assembly through the holes in the gasket.
- Step 4. Position the enclosure with the connectors pointing downwards
- Step 5. Align the screw rods with the holes in the enclosure
- Step 6. Connect the cable assembly
- Step 7. Slide the enclosure onto the screw rods until flush with the gasket
- Step 8. Using the washers and nuts supplied, tightened the nuts onto the screw rods

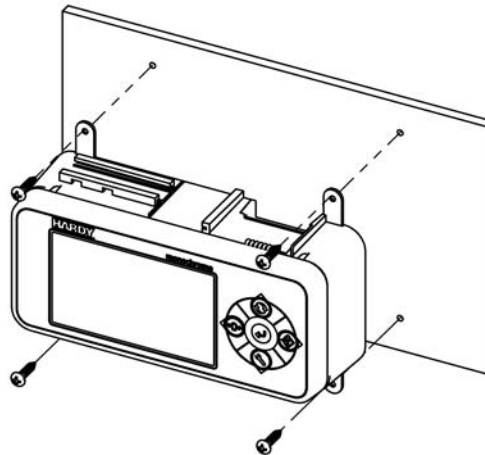


Step 1. Attach the mounting brackets using the supplied brackets and screws



*Exploded View of the Wall Mount Assembly – Rear View*

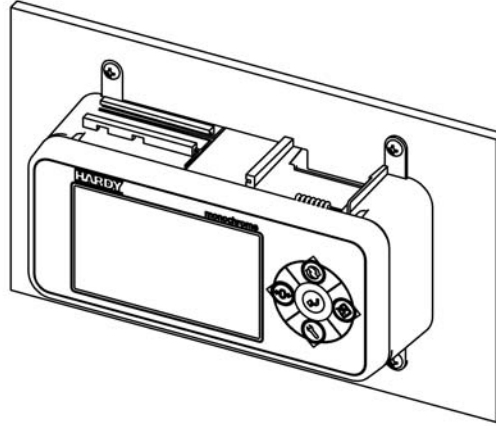
Step 2. Place the assembled wall mounted unit against the wall



Step 3. Mark the centers of the wall mounting brackets

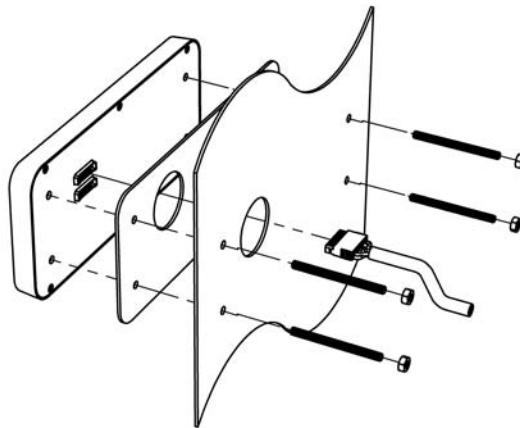
Step 4. Drill and insert the required wall plugs if attaching to brick, concrete, or plaster board. If attaching to wood use a pilot drill to ensure alignment.

Step 5. Position the assembled wall unit over the holes and using the appropriate screw fasten to the wall.



*Completed Wall Mount Assembly*

### **Remote Display Mount**

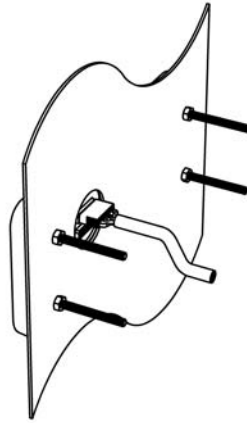


#### **Exploded View of the Remote Display Mount Assembly**

The display for the HI 6300 series instrument can be mounted in a remote location and the supplied cable can be modified to support the desired length of cable (not supplied).

Step 1. Connect and hand tighten the four screw rods into the front panel display

- Step 2. Disable the cable assembly provided, and replace the original cable with the desired cable length (not provided--up to 100 ft (30.48 meters)). Build the cable assembly using the instructions above for **Making Longer Display Interface Cables** on page 13.
- Step 3. Connect the front panel to the newly assembled display cable
- Step 4. Push the screw rods and cable assembly through the holes in the gasket.
- Step 5. Slide the screw rods through the panel until flush with the surface
- Step 6. Using the washers and nuts supplied, tightened the nuts onto the screw rods. Tighten the nuts enough to completely compress the gasket for IP65 compliance
- Step 7. Connect the cable assembly to the HI 6300 series instrument



*Finished Remote Display Mount Assembly*

### **Blind Unit (No display)**

The front display is not necessary for the HI 6300 series instrument to operate as a scale controller. Blind units can be fully configured using the Web browser communication.

## DC Power Input

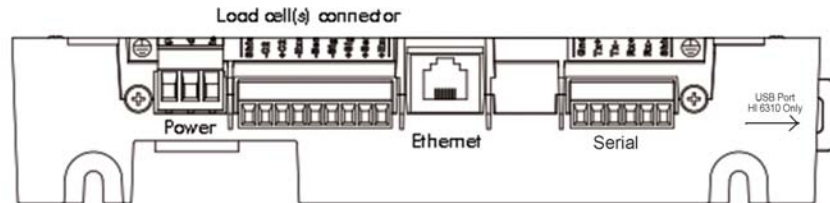
**WARNING - Do not operate with incorrect line voltage. To do so will result in property damage and/or personal injury. Make sure that the power source does not exceed 24 VDC.**

**AVERTISSEMENT – Assurez-vous que la source d’alimentation ne dépasse pas 240 V. L’utilisation d’un mauvais voltage peut résulter en dégâts matériels et/ou des risques de blessures.**

**WARNING - Be careful not to reverse the ground and hot wires, which can result in damage to the equipment.**

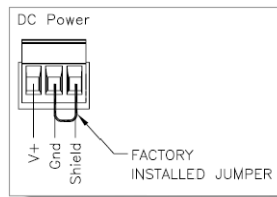
**AVERTISSEMENT – Attention à ne pas inverser le sol et fils chauds, ce qui peut entraîner des dommages à l’équipement.**

The illustration below shows the connections on the HI 6300 unit.



You must use a power-limited DC power supply (Class 2) on the DC input wiring. DC power should be supplied by a clean primary line, directly from the DC power source.

- Step 1. Make sure the VDC power is shut off before installing the wires to the connector.
- Step 2. Connect the 24 VDC voltage wire, ground wire and shield wire to the connector that plugs into the DC voltage header at the rear panel.



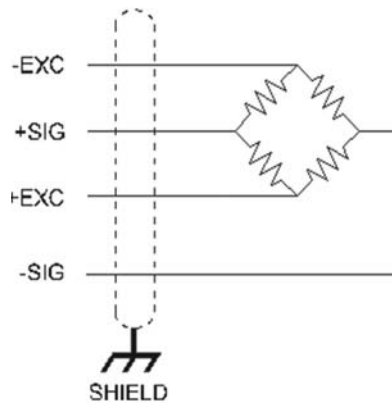
- Step 3. Plug the connector into the header at the rear panel.
- Step 4. Apply VDC power to the unit.

## Disassembly and Reassembly Notes and Cautions

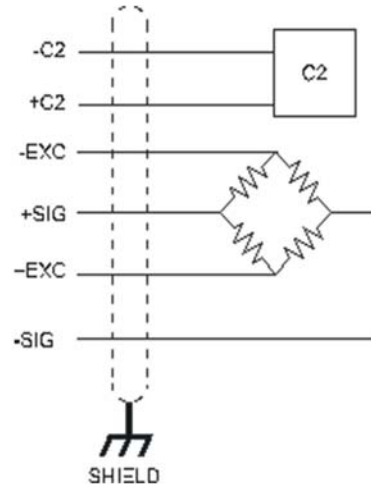
- Installation of this equipment must comply with International, National and Local Electrical and Mechanical codes.
- Make sure that any disassembly is done in a clean, well ventilated, properly controlled static-free environment.
- Always make sure that the assemblies and sub-assemblies are well supported and insulated when working on the instrument.
- Place small fasteners, connectors and electrical parts in closed containers so as not to lose parts during reassembly.
- Read the disassembly instructions before disassembly. If you find the instructions for disassembly unclear, contact the Hardy Process Solutions Technical Support Department for additional information and assistance.
- Do not disconnect any electrical plug, connector or terminal unless an identification tag is present or one is attached. Always note where the connector or plug was attached to the electrical component or wiring harness.
- Install complete hardware groups (screws, washers, lock washers, spacers, etc.) back to the original point of removal.
- Replace broken or damaged hardware immediately!
- Verify that no loose parts are sitting on printed circuit boards or electrical connectors or wires when disassembling or reassembling.
- Always protect printed circuit boards from electrostatic discharge (ESD). Always use approved ESD wrist straps and anti-static pads.

## Load Cell Wiring Diagrams

The diagrams below show how Hardy Load Sensor with C2 wiring differs from standard Load Cell wiring. C2 wiring is required when using an Integrated Technician summing junction box. The C2 wires are used for communicating IT and C2 commands.



Industry standard load cells wiring



Hardy load sensor C2 wiring

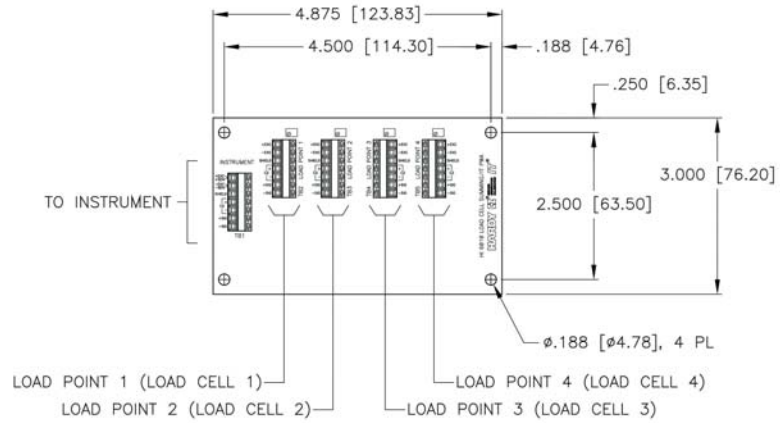
The simple wiring diagram above shows how to connect a single load cell to the HI 6300 series instrument. Note: when connecting the HI 6300 series instrument to a junction box, the sense lines would be connected between the +Sen and -Sen Connections for the junction box and the instrument.

**WARNING - Instrument power should be routed away from all other signal cables to avoid electrical interference.**

**AVERTISSEMENT – Tension de l'appareil doivent être acheminés à l'écart de tous les autres câbles de signaux pour éviter toute interférence électrique.**



### HI 6010IT SERIES LOAD CELL SUMMING CARD



### HI 6010 Summing Box Diagram

**NOTE**

*When connecting a Hardy Summing Box to the HI 6300, you must remove the two factory installed jumpers on pins 1 & 2 and on pins 5 & 6 on the module and install C2 and sense wires. C2 wires carry the commands for Integrated Technician and the C2 calibration information.*



# Chapter 4

## Network Configuration



Chapter Four contains step-by-step instructions for configuring Hardy HI 6300 series instruments and related communication networks. We recommend reading these procedures because having a correct configuration is necessary to ensure trouble-free operation.

This chapter explains how to either configure the HI 6300 series instrument from its own front panel or with a PC-based Web interface connected to the HI 6300 series instrument over a standard Ethernet network. The features of the HI 6300 series instrument operate the same way in either case. You must use the Web interface to configure units that do not have a display.

Before operating the HI 6300 Weight Processor, make sure that:

- Power and load point cables are properly installed and in working order.
- Communication cables are properly installed and in working order.

### Ethernet TCP/IP Network Configuration

#### NOTE

*Do not confuse the on-board Ethernet TCP/IP communication with EtherNet/IP®. EtherNet/IP is an industrial protocol that does not transmit Web traffic.*

An embedded Web server in the HI 6300 series instrument allows you to easily configure every parameter of the instrument via a standard Web browser. A standard Ethernet network is required to provide the connectivity between the HI 6300 series instrument and your desktop / laptop computer.

The HI 6300 series instrument is designed with a standard 10/100 BASE-T Ethernet connection for linking to any Windows PC. Once connected, you can monitor, download Hardy software from the Internet, or configure the HI 6300 series instrument from that PC. A Help function can assist you in setup or trouble-shooting. The browser also links to the Hardy Web Site where the user can find additional services and support.

There are two primary ways to connect the HI 6300 series instrument to your computer:

**LAN Connection:** Connect the HI 6300 series instrument to an existing Ethernet-based Local Area Network (LAN) that has connectivity to your desktop or laptop computer. See the *LAN Connection* section below.

**Direct Connection:** A direct point-to-point connection between the HI-6300 and your desktop or laptop computer using any standard Ethernet cable. See the *Direct Connection* section below.

## LAN Connection

To connect the HI 6300 series instrument to a LAN, you simply connect a standard Ethernet cable between the instrument and the common network hub. You will then need to determine which scheme is used on the network to assign IP addresses. Every node on the network must have a unique IP address or conflicts will result.

Contact your Network Administrator for the IP address to use for the instrument.

The IP address can be set manually (Fixed IP), or it can be set automatically by a network service called DHCP.

### NOTE

*If the DHCP service fails, the instrument will default to the Fixed IP address after a power cycle. If the DHCP service is repaired, the instrument will revert back to using the DHCP IP address.*

If you are required to use Fixed IP addresses, refer to the section *Fixed IP Configuration Using the Front Panel* below. For automatic IP assignment (DHCP), use the following steps:

### DHCP Configuration Using the Front Panel

DHCP works only if a DHCP server is installed on your network.

- Step 1. From the Configuration menu, Use the UP or DOWN button to select the communication menu, then select the Ethernet TCP/IP menu item.
- Step 2. Select the DHCP menu item and use the ENTER key to enable/disable this feature.
- Step 3. Select the DHCP IP address menu item and verify that a correct IP address has been assigned to the instrument by the network server. If an incorrect IP address has been assigned contact your system administrator; or use a Fixed IP address.
- Step 4. This is the IP address to use in your web browser to access the Web Interface. From here you can jump to the section

### NOTE

*You cannot change the values of the DHCP IP address. The LEFT button returns the operator to the Ethernet TCP/IP Menu.*

## Fixed IP Configuration Using the Front Panel

The HI 6300 series instrument can be configured to use any Fixed IP address. The Fixed IP addresses must be carefully selected to avoid accidentally configuring two devices to the same address with unpredictable results. Since ‘guessing’ a value could lead to personal or property damage and/or interrupted network services, your network administrator should provide this address.

Read-only screens can display a limited number of characters per line. To see the complete IP address in DHCP, you need to do the following:

- Step 1. Press the CONFIG button to enter the Configuration menu; and use the UP or DOWN buttons to select the Communication menu, then use the UP or DOWN buttons to select the Ethernet TCP/IP menu item and press the RIGHT or ENTER button to access the Ethernet TCP/IP menu.
- Step 2. Select the Fixed IP menu item.
- Step 3. Starting at the right-most digit, enter the IP number using the standard format. Use the UP or DOWN buttons to select each number, and press the LEFT or RIGHT button to move between numbers.

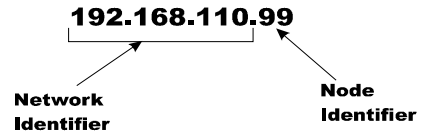
192.168.0.100  
└───┬───┘ └──┘  
Network Node  
Identifier Identifier

- Step 4. Press the ENTER button to save the entry.
- Step 5. Use the LEFT button to exit the menu structure.
- Step 6. The IP address is now saved and the instrument’s embedded Web browser is now available at the entered IP address. From here you can jump to the Network Options Configuration section.
- Step 7. Cycle power to establish the fixed IP address as the current operating address.

This method of interconnect between an HI 6300 series instrument and a standard Windows PC allows you to configure the instrument using the embedded web browser, even if an Ethernet network is not part of the normal installation. A desktop or laptop may be used on location as necessary.

- Step 1. Both sides of the link require configuration of their IP addresses to establish a working connection. The following steps will walk you through the process of connecting the hardware and configuring the HI 6300 series instrument and PC with compatible IP addresses. From the Summary display, press Enter to activate the Configuration menu. Use the down arrow to select Communications and press Enter.
- Step 2. Use the down arrow again to select Ethernet, and select IP to display the IP screen.

Step 3. Starting at the right-most digit, enter the IP number using the standard format. Use the up/down arrows to select each character, and press the left arrow to move to the next digit.



Step 4. Press Enter to save the entry.

Step 5. Press the Exit key four times to exit the IP, Ethernet, communications and configuration menus.

The IP address is now saved and the instrument's embedded Web browser is now available at the entered IP address. From here you can jump to the *Network Options Configuration* section.

Both sides of the link require configuration of their IP addresses to establish a working connection. The following steps will walk you through the process of connecting the hardware and configuring the HI-6300 and PC with compatible IP addresses.

### **Direct Connect Hardware**

Any standard Ethernet cable with RJ-45 connectors at each end can be used to connect the HI 6300 series instrument to your PC. A 'crossover' cable is not required. Simply plug the cable into each instrument.

### **Windows PC Configuration**

#### **Windows 2000**

Step 1. After starting your computer, click the Start button.

Step 2. Click on Settings > Control Panel to display the Windows Control Panel.

Step 3. Click the Network icon to display the Network dialog.

Step 4. Click on TCP/IP; then click the Properties button to open the TCP/IP Properties dialog. Click the IP Address tab.

Step 5. If the 'Use the Following IP Address' box is already checked, write down the displayed IP Address and jump to the *Direct Connect Configuration – HI 6300* section below.

Step 6. Click the 'Specify an IP Address' check box; then enter the following into the TCP/IP Properties dialog.

IP Address = 192.168.0.100

Subnet Mask = 255.255.255.000

Step 7. Select OK on the TCP/IP Properties dialog. The computer is now fully configured.

Step 8. To return the PC to the original network settings, return to the 'Internet Properties (TCP/IP) dialog, select 'Obtain an IP address automatically,' and click OK.

## Windows XP

- Step 1. After starting your computer, click Start and then Control Panel.
- Step 2. Click on Settings > Network Connections.
- Step 3. Right click on 'Local Area Connection' and select Properties.
- Step 4. Click on Internet Protocol (TCP/IP) and click on the Properties button to open the Internet Properties (TCP/IP) Properties dialog.
- Step 5. If the 'Use the Following IP Address' box is already checked, write down the displayed IP Address and jump to the *Direct Connect Configuration – HI 6300* section below.
- Step 6. Click the 'Use the Following IP Address' check box; then enter the following into the TCP/IP Properties dialog.  
IP Address = 192.168.0.100  
Subnet Mask = 255.255.255.000
- Step 7. Select OK on the TCP/IP Properties dialog box. The computer is now fully configured.
- Step 8. To return the computer to the original network settings, return to the 'Internet Properties (TCP/IP)' dialog, select 'Obtain an IP address automatically,' and click OK.

## Windows 7

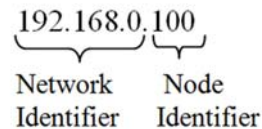
- Step 1. After starting your computer, click the Start button.
- Step 2. Click on Control Panel to display the Windows Control Panel.
- Step 3. Click on Network; then click Internet
- Step 4. Click on Network Sharing Center.
- Step 5. Click on Change Adapter Settings in the left-hand column.
- Step 6. Right click on Local Area Connection and select Properties.
- Step 7. Click on Internet Protocol Version 4 (TCP/IPV4)
- Step 8. Click the Properties button to open the Internet Properties (TCP/IP) Properties dialog.
- Step 9. If the 'Use the Following IP Address' box is already checked, then write down the displayed IP Address and jump to the *Direct Connect Configuration – HI 6300* section below.
- Step 10. Click in the 'Use the Following IP Address' checkbox; then enter the following into the TCP/IP Properties dialog.  
IP Address = 192.168.0.100  
Subnet Mask = 255.255.255.000

- Step 11. Select OK in the TCP/IP Properties dialog box. The computer is now fully configured.
- Step 12. To return the computer to the original network settings, return to the Internet Properties (TCP/IP) dialog , select ‘Obtain an IP address automatically,’ and click OK.

## Direct Connect Configuration - HI 6300 Series Instrument

The HI 6300 must now be assigned a unique IP address that will connect to the Windows PC. There are two simple rules for the IP Address:

- It must have the same network identifier as the computer
- It must have a different node identifier than the computer.


  
 192.168.0.100
   
 Network Identifier    Node Identifier

If your Windows PC already had an IP address assigned, simply increment by one the Node Identifier field of the IP Address you wrote down in the Windows PC configuration steps above. If your Windows PC was originally set to automatically obtain an IP address (DHCP), use 192.168.100.50 for the HI 6300 IP address.

## Ethernet-UDP

**HardyPort** is the Ethernet port number that one can use to connect to this instrument via UDP or TCP/IP. You send commands to the instrument to read or set parameters. The commands are text strings of the form

PARAMETERNUMBER

or

PARAMETERNUMBER=PARAMETERVALUE

For example, send the command 00000090 to read the gross weight value. The response will be something like:

Gross = 10.3

To set a parameter, send a command like 0000000D = 0.5 - this command sets the Motion Tolerance parameter to 0.5

See the Operation/Diagnostics/Parameters web page for a list of parameter numbers.

The HI 6300 series instrument has only 1 TCP/IP socket available for this command interface, so only 1 master can connect, say using HYPERTERMINAL Telnet. There is no such limit with UDP – any number of masters can send UDP commands.



## Modbus Functions

The Modbus functions allowed in the HI 6300 are:

Function 3: Modbus Read Holding Registers

Function 4: Modbus Read Input Registers

Function 6: Modbus Write Single Register

Function 16 (0x10): Modbus Write Multiple Registers.

## Modbus Registers

This instrument has 64 16-bit MODBUS input registers and 64 16-bit output registers. The data in these registers is in "big endian" format, meaning that the most significant byte comes first.

- The first 6 registers (0 – 5) are used for the “command interface” in the unit.
- Registers 6 & 7 will contain the Net weight in 32 bit floating point format.
- Registers 8 & 9 will contain the Gross weight in 32 bit floating point format.
- Registers 10 and 11 will contain the statusword
- Registers 12 and 13 (HI 6310 only) are for the count function.

## Network Command Interface

The "network command interface" uses 6 registers (0 – 5) in and 6 registers out.

- Register 0: command (shown below)
- Register 1: status
- Registers 2, 3: Parameter number. See the diagnostics/parameters web page for a list of parameter numbers.
- Registers 4, 5: parameter value

The Modbus master sends a 'command' by writing a value to register 0. **Any non-zero return value is an error.**

Here is a list of Hardy command numbers:

- **0: READ PARAM CMD.** To read a parameter, write a #0 to the command register (register #0), and write the parameter number in the parameter ID number in registers 2 and 3, most significant word first. The parameter value may then be read from registers 4 and 5, again most significant word first. This value may be in integer or floating point format, depending on the parameter. The status register in the reply will contain the lower 16 bits of the system status word.
  - Status word bit 0: A/D error.
  - Status word bit 6 (0x40): Motion status.
  - Status word bit 15 (0x8000): Not Found - the requested parameter number does not exist
- **1: ZERO CMD.** Write a #1 to the command register to ZERO the gross weight. The status register will read 0 if this command succeeds.
  - Status Error code 1 (motion)
  - Status Error code 2 (A/D error)



- Status Error code 3 (out of tolerance)
- **2: TARE CMD.** Write a #2 to the command register to ZERO the net weight. The status register will read 0 if this command succeeds:
  - Status Error code 1 (motion)
  - Status Error code 2 (A/D error)
- **4: WRITE NONVOL CMD.** Write a #4 to the command register to save parameters in non-volatile memory.
  - No Error Codes
- **0x64 (100 decimal): CAL LOW CMD.** Write a 0x64 hex to the command register to perform the low step of a traditional calibration. The status register will read 0 if this command succeeds:
  - Calibration\_Fail 1
  - Calibration\_Fail\_Motion 3
  - Calibration\_Fail\_Adc\_Error 4
- **0x65 (101 decimal): CAL HIGH CMD.** Write a 0x65 hex to the command register to perform the high step of a traditional calibration.
  - Calibration\_Fail 1
  - Calibration\_Fail\_Motion 3
  - Calibration\_Fail\_Adc\_Error 4
  - HardcalFailCounts 8: not enough counts between hard cal hi and hard cal lo
- **0x66 (102 decimal): C2 CAL CMD.** Write a 0x66 hex to the command register to perform a C2 calibration.
  - Calibration\_Fail 1
  - Calibration\_Fail\_Motion 3
  - Calibration\_Fail\_Adc\_Error 4
  - Calibration\_Fail\_Noc2 5
  - Calibration\_Fail\_C2capeq 6
  - Calibration\_Fail\_C2clones 7
- **0x1000 (4096 decimal): WRITE INTEGER CMD.** Set the value of an integer parameter. Write 0x1000 in the command register 0, the parameter ID number in registers 2, 3 and the desired value in registers 4, 5.
  - No Error Codes
- **0x1001 (4097 decimal): WRITE FLOAT CMD.** Set the value of a floating point parameter. Write 0x1001 in the command register 0, the parameter ID number in registers 2, 3 and the desired float value in registers 4, 5.
  - Failure 1

- TooHigh -1 : value is above legal limit
- TooLow -2 : value is below legal limit
- ErrorNotFound 0x8000 : parameter id not found

All communications will be controlled by the Modbus functions. The Modbus protocol will determine the function, address, size, and offset register for the message. The command interface data will be within the data portion of the message and will define the command to our unit.

Example 1: If you wish to read the span weight value you would:

1. Enter the Span parameter ID into registers 2 & 3. The Span ID is 0x0000 0201.
  - a. Place 0x0000 into data register #2.
  - b. Place 0x0201 into data register #3.
2. Enter the command #0 into data register #0.
3. Run the Modbus Function code #16 (write multiple registers).
4. Run the Modbus Function code #4 (read multiple registers).
5. Read the value for the span parameter in data registers #4 & 5. This value will be in floating point format.

Example 2: If you wish to write a new span value of 100.55:

1. Enter the Span parameter ID into data registers 2 & 3. The Span ID is 0x0000 0201.
  - a. Place 0x0000 into data register #2.
  - b. Place 0x0201 into data register #3.
2. Enter the new value into data registers 4 & 5. The float value 100.55 in hex is 0x42C9 1999.
  - a. Place 0x42C9 into data register #4.
  - b. Place 0x1999 into data register #5.
3. Enter the write float command into data register #0. The write float command is 0x1001.
  - a. Place 0x1001 into data register #0.

4. Run the Modbus Function code #16 (write multiple registers).
5. Run the Modbus Function code #4 (read multiple registers). This will allow the user to read the status of the command in data register #1.

If you wish to then read back the value you have written:

6. Enter the command #0 into data register #0.
7. Run the Modbus Function code #16 (write multiple registers), or Function code #6 (write single register) insuring the correct data location is being set.
8. Run the Modbus Function code #4 (read multiple registers).

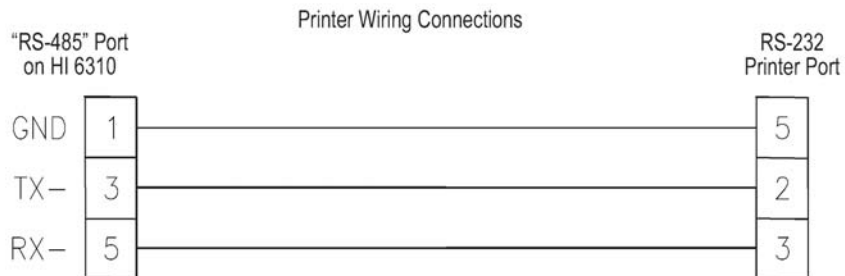
Read the value for the span parameter in data registers #4 & 5. This value will be in floating point format.

## Communications Parameters for the HI 6310 Only

### Printer (over RS-232)

**Available on the HI 6310 only.**

The HI 6310 can transmit Gross, Net, Count, Tare values to a serial printer over RS-232. The printer Baud rate is user selectable at 600, 1200, 2400, 4800, 9600, or 19200 (default is 9600).



A sample wiring connection from the HI 6310 to the printer port is shown above. The printer parameters can be configured through the web interface or the display panel.

- Step 1. Set the baud rate for the RS232 printer, default is 9600.
- Step 2. Set the parity bit, default is EVEN
- Step 3. Select what values to transmit over the serial interface to the printer using the printer mode, default is disabled.

- a. Gross Weight
- b. Net Weight
- c. Tare Weight
- d. Unit Count
- e. All – Gross, Net, Tare, and Count (if Count enabled) values
- f. OFF, Printer disabled.

## USB Memory Stick

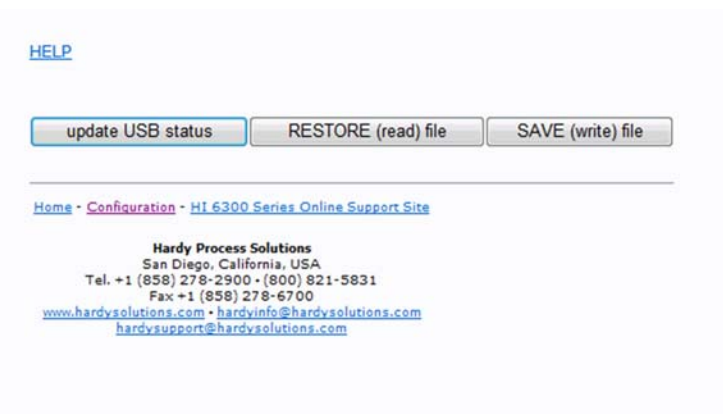
**Available on the HI 6310 only.**

The HI 6310 provides an interface to an external USB memory stick that allows HI 6310 parameters to be saved, restored, or copied to another instrument.

The USB memory stick commands can be activated through the web interface or the display panel.

To access the USB Menu, from the front keypad, select Configuration > Enter, Communications > Enter, USB > Enter, UP or DOWN arrow to Save or Restore > Enter.

On the **Web page**: Configuration; communications; USB; save/restore.



Step 1. Insert the USB stick into the HI6310

Step 2. Using the web interface or display panel, save or restore system parameters.

## Analog 4-20mA

**Available on the HI6310 only**

The analog 4-20mA output is directly proportional to the programmed gross, net, or count range; by setting the low value equal to 4mA and the high value equal to 20mA. These values can be set from either the front panel or the web interface.

The 4-20mA parameters can be configured through the web interface or the display panel.

From the front display: select the configuration menu then UP or DOWN to communications, enter; UP or DOWN to 4-20mA, enter; UP or DOWN to setting you want for Source; enter the value for 4mA; enter the value for 20mA or mA output (read only). Press enter to select and UP or DOWN arrows to enter value. From the Website, select the Communications Menu and then

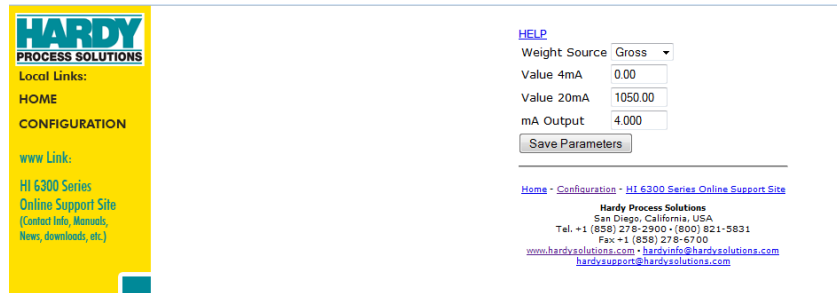
Step 1. Select the source for the 4 to 20mA output, default is gross

- a. Gross.
- b. Net
- c. Count
- d. Manual

Step 2. Set the 4mA value

Step 3. Set the 20mA value

Step 4. Save Parameters



**NOTE**

Setting the weigh source to manual allows the mA output setting to be set to a fixed output. This is used to test the circuit level to the host.



# Chapter 5

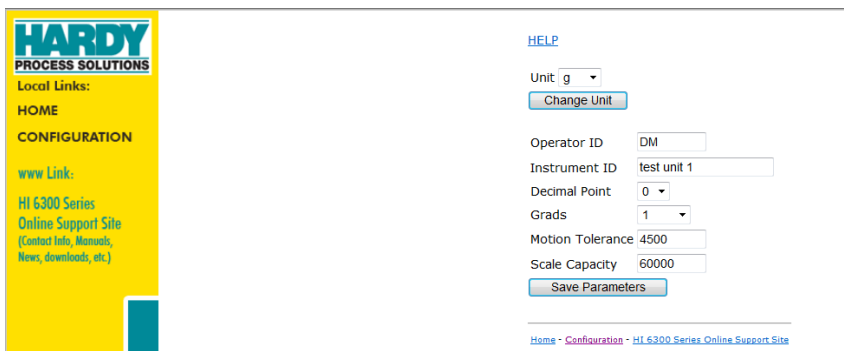
## Instrument Configuration



### Using the Home Page to set Parameters

Enter your HI 6300 series home page by typing the IP Address you used to set up the instrument (see Chapter 4 for information on setting the IP Address) accessing the instrument via a direct connection on a PC.

From the Home Page, click Configuration to open the Configuration page. Select Instrument Setup to open the Instrument Setup page.



The HI 6300 series instrument Configuration process sets up the instrument to operate as a scale. This includes configuring, units of measure, WEVERSAVER®, motion tolerance and other instrument parameters required for your process.

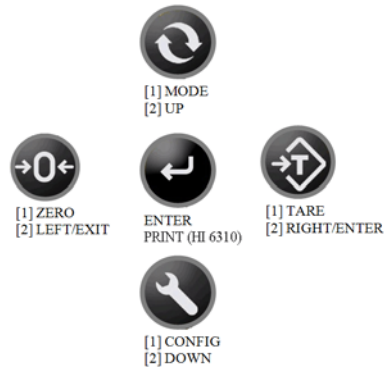
## Using the Front Panel Display Menus to Set Parameters



### Front Panel Display

The Front Panel Display is a 480 x 272 LCD graphical display. The Summary screen displays the current weight in the selected mode (Gross, Net or Count (HI 6310 only)) and the selected engineering units (oz, lb, t (ton), g, kg, mt (Metric Ton)).

### The Five Button Command Cluster



### TARE Command Button

When the TARE button is pressed the NET weight value is set to zero.





## The CONFIG Menu Structure



To configure and setup the HI 6300 series instrument press the CONFIG button. To enable the user to continue to monitor the process the display the weight, mode, and zero symbol are reduced and placed in the top right hand corner.

A submenu list is provided on the left hand side, with the item that would be selected by highlighted and identified by the ◆ symbol.

The numeric or alphanumeric value for the selected item is display in the area shown as --- **Value** ---- in the above illustration, along with help text for the item selected.

If more than five item are in the submenu list, use the UP/DOWN button to scroll through the submenu list. To select the item from the submenu list press the RIGHT or ENTER key.

### Entering Numeric and Alphanumeric Values

At the lowest level of the menu hierarchy the user may need to enter a numeric or which could represent a tolerance or an Ethernet IP address or an alphanumeric value for entering a user ID or security password.

When a parameter value is selected, either the current value is displayed or a 0. In either case a flashing underscore is generated under the least significant digital or character.

The LEFT and RIGHT buttons move the cursor left and right within the numeric value or character set. In the following three number examples the cursor starts under the 300 value, the LEFT button moves the cursor under the 2000 value in example 2, and in example 3 the RIGHT button moves the cursor under the 40 value.

Example 1:      12345.01

Example 2:      12345.01

Example 3:      12345.01

The UP and DOWN arrows are used to change the displayed digit.

0→1→2→3→4→5→6→7→8→9→.→ →0

The UP button increments from 0 through 9, then the decimal point, space, and back to 0, while the DOWN button decrements from 9 through 0, then the space, decimal point and back to 9.

Example 4:     12345.01

Example 5:     02345.01

Example 6:     \_2345.01

In example 4, the LEFT button is used to select the 10000 value, in example 5 the DOWN button is used to decrement the value to 0, and in example 6 the value is removed to change the original value from 12345.10 to the new value of 2345.01

Once the correct value has been entered, the ENTER button is pressed to accept the value and the left button will return the user to the next higher level in the menu hierarchy.

When a menu item, such as user ID or password enables the use of alphanumeric characters, the process is similar to entering a numeric value with additional characters available when you use the UP/DOWN buttons as shown below.

0→1→.....→9→a→b→.....→z→0

In this example a 4 character security code is entered, and in place of the value being display, four entry boxes are displayed as in example 7.

Example 7:     □ □ □ □

Example 8:     a 0 z 9

As in the numeric example, the UP button increments from 0 through 9, then the alphabet letters a through z, then back to 0, while the DOWN button decrements from 9 through 0, then the alphabet letters z through a, and back to 9.

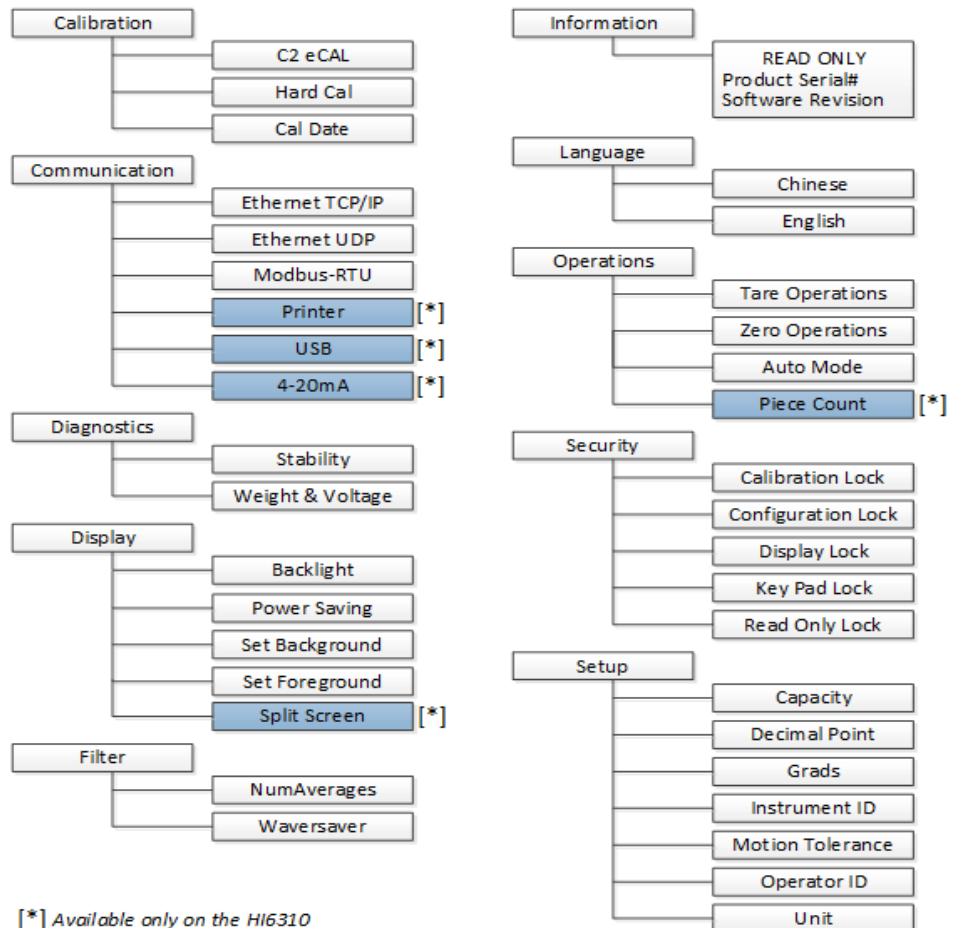
Once the last alphanumeric digit has been entered as shown in example 8, pressing the ENTER button will unlock the keypad if the code entered matches the code in memory.

## Commands and Parameters

The instrument commands and parameters are grouped into 10 categories:

- Calibration = Cal
- Communication = Comm
- Diagnostics = Diag
- Display (only active for units with a front panel display) = Display
- Filter = Filter
- Information = Info
- Language = Language
- Operations = Op
- Security = Security
- Setup = Setup

These 10 categories are further broken down into sets of commands and parameters as shown in the following figure.



## Calibration Menu

- C2 eCAL
  - o Sensitivity
  - o Gravity
  - o Ref Wt
  - o Do C2 Calibration
  - o Cal Tol
  - o Num Dev
  
- Hard Cal
  - o Cal Tol
  - o Sensitivity
  - o Cal Lo Wt
  - o Do Cal Lo
  - o Span Wt
  - o Do Cal Hi
  
- Cal Date

## C2 (eCal) Commands and Parameters

### Cal Tolerance Parameter

The value you enter for Calibration Tolerance sets the amount of deviation to allow during the calibration process. This value must be greater than or equal to the base motion value and/or the Graduation Sizes.

The base motion value can be calculated by using the following formula:

$$\text{Base Motion value} = (\text{Total Load Cell Capacity} \times 0.0003)$$

We recommend three graduation sizes.

RANGE: .000001 - 999999 (default 10)

On the **Web page**, enter the value in the text box provided.

[HELP](#)

Last Calibration:Jan 22,2013 Cal Type:TRAD

Loadcell Sensitivity

Cal Motion Tolerance

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the C2 (eCAL) submenu, then select the Cal Tolerance (Calibration Tolerance) menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Do C2 (eCAL) Command

When this command is selected the C2 eCAL calibration process is run using the Cal Tolerance, Gravity Correction, Ref Weight, and Sensitivity parameter settings.

#### NOTE

*Ensure the Sensitivity, Gravity and Reference weight are all set prior to running C2 cal command.*

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the C2 (eCAL) submenu, then select C2 Cal. The instrument will perform the calculation.

On the **Web page**, left click on the Do C2 eCAL button

### Method 1: C2 eCal

cal date	Jan ▾	22	2013
Num Devices	1		
Ref Weight	0.00		
Gravity Correction	1.001500		
<input type="button" value="Do C2 Calibration"/>			

### Gravity Parameter

Gravity Correction compensates for an object weighing less at the equator than at the North or South Pole.

Before modifying this value, please read the C2 calibration procedure described in Chapter 6.

On the **Web page**, select the calibration menu and left click inside the Gravity text field and enter the desired Gravity value (see table in Chapter 6).

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the DO C2 eCAL submenu, then select the Gravity menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

## NumDevices Parameter

The NumDevices is a read only parameter that indicates the number of C2 eCAL load cells that are connected to the HI 6300. This value is automatically calculated when Hardy C2 eCAL load cell(s) are detected during a C2 eCAL Calibration.

On the **Web page**, select the calibration menu and the number of C2 eCAL load cells detected will be shown in the NumDevices text field.

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the C2 eCAL submenu, use the IP or DOWN button the select the NumDevices menu item and the number of C2 eCAL load cells detected will be shown on the display.

### Method 1: C2 eCal

cal date	Jan ▾	22	2013
Num Devices	<input type="text" value="1"/>		
Ref Weight	<input type="text" value="0.00"/>		
Gravity Correction	<input type="text" value="1.001500"/>		
<input type="button" value="Do C2 Calibration"/>			

## Ref Weight Parameter

Reference Weight is the total live load that is currently on the scale. The calibration process uses a reference weight, which is normally zero (no weight on the scale), but can be any known weight on the scale. With nothing on the scale, the Reference Weight is 0.00. With 5 lbs on the scale, the Reference Weight is 5.00 lbs.

On the **Web page**, select the calibration menu and left click inside the Ref Weight text field and enter the desired reference weight value.

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the C2 eCAL submenu, then select the Ref Weight menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

## Sensitivity Parameter

The load cell sensitivity, defined in mV/V, sets the expected change in analog signal over the full scale range of an analog strain gage load cell. For example if a 5 Volt excitation is applied to a load cell with a sensitivity of 2 mV/V then the full scale signal will be 10mV. To ensure that the HI 6300 optimizes the processing of the analog signal from the load cell, the load sensitivity parameter should be set to match that of the load cell.

On the **Web page**, select the calibration menu and using the Sensitivity drop down list select the required sensitivity value.

[HELP](#)

Last Calibration:Jan 22,2013 Cal Type:TRAD

Loadcell Sensitivity  ▾

Cal Motion Tolerance

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the C2 eCAL submenu, then select the Sensitivity menu item. The list of sensitivity values supported will be displayed and the current value will be highlighted, if the sensitivity needs to be modified use the UP and DOWN buttons to select a new value and press the ENTER button.

## Hard Cal Commands and Parameters

These commands and parameters are used when doing a Hard Cal or traditional calibration of the instrument.

### Cal Lo Weight Parameter

The value you enter for Cal Lo Weight sets the lower weight value to be used when calibrating the system. The Cal Lo weight value, is normally zero (no weight on the scale), but can be set to any known weight on the scale. With nothing (zero) on the scale, the Cal Lo Weight is 0.00. With 5 lbs on the scale, the Cal Lo Weight is 5.00 lbs.

On the **Web page**, enter the value in the text box provided.

### Method 2:Calibration - Zero Cal

cal date  ▾

Ref Weight

### Method 2:Calibration - Span

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Hard Cal submenu, then select the Cal Lo Weight menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.





## Method 2:Calibration - Zero Cal

cal date    Jan ▾    22    2013

Ref Weight    0.00

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Hard Cal submenu, then select the Do Cal Lo menu item then press the ENTER button.

### Do Cal Hi Command

Before executing this Do Cal Hi command verify that the Span Weight value is correct. After setting/verifying the Span Weight value executing this command will run the Hard Calibration process using the Cal Tolerance, Span Weight, and Sensitivity parameter settings.

On the **Web page**, left click on the Do Cal High button as shown.

## Method 2:Calibration - Span

Span Weight    10000.00

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Hard Cal submenu, then select the Do Cal Hi menu item then press the ENTER button.

### Span Weight Parameter

The Span Weight value is the weight of the object that is being placed on the scale to set the “High” calibration point with respect to the “Low” calibration point set using the Cal Lo Weight parameter.

On the **Web page**, select the calibration menu and left click inside the Span Weight text field and enter the load cell sensitivity value.

## Method 2: Calibration - Span

Span Weight

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Hard Cal submenu, then select the Span weight menu item. The current Span Weight value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Cal Date Parameter

The Cal Date parameter is used to record the date when the last calibration was completed on the HI 6300 series instrument. The format is

mm/dd/yyyy

On the **Web page**, select the calibration menu and left click inside the Cal Date text field and enter the date the calibration was completed.

cal date

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Cal Date submenu. The last Cal Date value will be displayed, press the ENTER or the RIGHT button if this date needs to be modified.

## Communication Menu

The following parameters are used to setup instrument communication

- Ethernet TCP/IP
  - o DHCP
  - o Fixed IP
  - o Dynamic IP
  - o Mask Address
  - o Gateway Address
  - o DNS Server
- Ethernet UDP
  - o Hardy Port
- Modbus-RTU

- o Slave Address
- o Baud Rate
- o Parity

### **HI 6310 Only**

- Printer
  - o Printer Mode
  - o Baud Rate
  - o Parity
- USB
  - o Restore
  - o Save
- Analog 4-20mA
  - o Weight Source
  - o Value 4mA
  - o Value 20mA
  - o mA Output

## **Ethernet TCP/IP Commands and Parameters**

### **Enable DHCP Parameter**

The **Enable DHCP** parameter enables the network to automatically assign an IP address when DHCP is enabled in the HI 6300. When DHCP is disabled or the network is unable to assign an IP address the Fixed IP address is used. Please note that DHCP works only if there is a DHCP server installed on your network.

On the **Web page**, select the communication menu. Then select Ethernet TCP/IP, UDP and select either Enable or Disable from the list next to the DHCP parameter.

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Ethernet TCP/IP submenu, then select the DHCP menu item. The current state of the DHCP value will be displayed, press the ENTER if this value needs to be modified. When modifying this parameter, the ENTER button toggles the parameter between two states Enabled and Disabled, and pressing the LEFT button sets the state for the Enable DHCP parameter.

[HELP](#)

DHCP	OFF ▾
fixed IP	010.153.018.145
Dynamic IP	010.153.018.145
Mask	255.255.255.000
Gate	010.153.018.001
DNS	010.153.008.104
Ethernet UDP	
HardyPort	1024
<input type="button" value="Save Parameters"/>	

### Fixed IP Parameter

The HI 6300 can be configured to use any fixed IP address. The Fixed IP addresses must be carefully selected to avoid accidentally configuring two devices to the same address with unpredictable results. Since 'guessing' a value could lead to personal injury, property damage and/or interrupted network services, your network administrator should provide this address.

192.168.0.99  
└──────────┬────────┘  
Network    Node  
Identifier   Identifier

On the **Web page**, select the communication menu and the Ethernet TCP/IP submenu and left click inside the Fixed IP text field and enter the IP address.

On the **HI 6300 series instrument** display, select the communication menu and use the UP or DOWN button to select the Ethernet TCP/IP submenu, then select the Fixed IP menu item. The current IP address for the Fixed IP value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### **Mask Address Parameter**

The Mask Address parameter, or subnet address, is used by the TCP/IP network to determine if the host is on a local subnet or on a remote network.

On the **Web page**, select the communication menu and the Ethernet TCP/IP submenu, and left click inside the Mask Address text field and enter the mask address.

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Ethernet TCP/IP submenu, then select the Mask Address menu item. The current Mask Address value will be displayed, press the ENTER or the RIGHT button if the Mask Address needs to be modified.

### **Gateway Address Parameter**

The Gateway Address parameter, is required when the HI 6300 series instrument needs to communicate to a remote host.

On the **Web page**, select the communication menu and the Ethernet TCP/IP submenu, and left click inside the Gateway Address text field and enter the Gateway address.

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Ethernet TCP/IP submenu, then select the Gateway Address menu item. The current Gateway Address value will be displayed, press the ENTER or the RIGHT button if the Gateway Address needs to be modified.

### **DNS Server Parameter**

The DNS Server parameter provides the host name when the HI 6300 series instrument is communicating with a remote host.

On the **Web page**, select the communication menu and the Ethernet TCP/IP submenu, and left click inside the DNS Server text field and enter the domain name of the DNS Server.

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Ethernet TCP/IP submenu, then select the DNS Server menu item. The current DNS server domain name will be displayed, press the ENTER or the RIGHT button if the DNS Server domain name needs to be modified.

### **Ethernet UDP Parameters**

Ethernet UDP enables the HI 6300 series instrument to send messages, datagrams, to other hosts on the IP network.

#### **Hardy Port Parameter**

The Hardy Port parameter provides the service port which is combined with the IP address to provide a unique application socket.

The Hardy Port value can be any 16-bit value between 0 and 65,535.

On the **Web page**, select the communication menu and the Ethernet TCP/IP submenu, and left click inside the Hardy Port text field and enter the Hardy Port value.

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Ethernet UDP submenu, then select the Hardy Port menu item. The current Hardy Port value will be displayed, press the ENTER or the RIGHT button if the value needs to be modified.

## Modbus-RTU Commands and Parameters

### Slave Address Parameter

The Slave Address parameter is a unique network address between 1 and 247 assigned to the HI 6300 series instrument.

On the **Web page**, select the communication menu and then select the Modbus RTU submenu, and left click inside the Slave Address text field and enter the Slave Address assigned to the HI 6300 series instrument.

[HELP](#)

Slave Address	<input type="text" value="3"/>
Baud Rate	<input type="text" value="9600"/>
Parity	<input type="text" value="even"/>
<input type="button" value="Save Parameters"/>	
Valid Frames	<input type="text" value="0"/>
Error Frames	<input type="text" value="0"/>
Received Frames	<input type="text" value="0"/>

[Home](#) - [Configuration](#) - [HI 6300 Series Online Support Site](#)

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Modbus-RTU submenu, then select the Slave Address menu item. The current Slave Address value will be displayed, press the ENTER or the RIGHT button if the Slave Address needs to be modified.

### Baud Rate Parameter

No specific baud rate is specified for Modbus-RTU, the Baud Rate parameter is used to match the baud rate set by the master device, typically 9,600 or 19,200.

On the **Web page**, select the communication menu and then select the Modbus RTU submenu and left click inside the Baud Rate text field and enter the Baud Rate.

[HELP](#)

Slave Address	<input type="text" value="3"/>
Baud Rate	<input type="text" value="9600"/>
Parity	<input type="text" value="even"/>
<input type="button" value="Save Parameters"/>	
Valid Frames	<input type="text" value="0"/>
Error Frames	<input type="text" value="0"/>
Received Frames	<input type="text" value="0"/>

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On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Modbus-RTU submenu, then select the Baud Rate menu item. The current Baud Rate value will be displayed, press the ENTER or the RIGHT button if the value needs to be modified.

### Parity Parameter

The Parity parameter has three options, EVEN, ODD, or OFF.

On the **Web page**, select the communication menu and then select the Modbus RTU submenu, and left click inside the Parity field and select even, odd or off using the drop down menu.

[HELP](#)

Slave Address	<input type="text" value="3"/>
Baud Rate	<input type="text" value="9600"/>
Parity	<input type="text" value="even"/>
<input type="button" value="Save Parameters"/>	
Valid Frames	<input type="text" value="0"/>
Error Frames	<input type="text" value="0"/>
Received Frames	<input type="text" value="0"/>

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On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Modbus-RTU submenu, then select the Slave Address menu item. The current Parity value will be displayed, press the ENTER or the RIGHT button if the Parity needs to be modified.



## Printer Command Parameters

Available on the HI6310 only

### RS-232 printer configuration.

The Printer Mode selects what will be transmitted to the serial printer over the RS-232 interface

- Gross Weight (default)
- Net Weight
- Tare Weight
- Unit Count
- All – Gross, Net, Tare, and Count
- (if Count enabled) values
- OFF, Printer disabled.

If the Count Mode is not enabled, the option to select count is disabled, and if the “All” option is selected, the Unit Count value is not printed.

Selecting the “OFF”, Printer Mode option disables the print function.

If any other option is selected when the display is at the summary page level, pressing the ENTER key is sending the selected weight values over the serial interface to the printer.

#### NOTE

*When in the split screen mode (HI 6310 only), to initiate a print the user needs to:*

- 1. Use the left/right, up/down arrows to select the unit to print from.*
- 2. Press Enter to go to the units summary page level.*
- 3. Press the configuration key to select*
  - a. Exit to go back to split screen display*
  - b. Configuration to enter the configuration menu*
  - c. Print to send the data to the printer.*

**On the Web page**, select the communication menu and using the Printer Mode down list select the required weight value(s) to send to the printer.

**On the HI6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the Printer submenu, then select the Printer Mode menu item. The list of options available will be displayed and the current printer Mode will be highlighted, if the printer Mode needs to be modified use the UP and DOWN buttons to select a new option and press the ENTER button.

### Baud Rate Parameter

No specific baud rate is specified for printer, the Baud Rate parameter is used to set the baud rate for the printer connected to the HI6310, typically 9,600 or 19,200.

**On the Web page**, select the communication menu, and left click inside the Baud Rate text field and enter the Baud Rate.

**On the HI6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the Printer submenu, then select the Baud Rate menu item. The current Baud Rate value will be displayed, press the ENTER or the RIGHT button if the value needs to be modified.

### Parity Bit Parameter

The Parity Bit parameter has three options, EVEN, ODD, or OFF.

**On the Web page**, select the communication menu, and then select the Printer submenu, and left click inside the Parity field and select between EVEN, ODD, or OFF using the drop down menu..

**On the HI6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the Printer submenu, then select the Parity menu item. The current Parity value will be displayed, press the ENTER or the RIGHT button if the Parity needs to be modified.

### USB Memory Stick Parameters

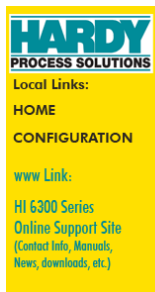
**Available on the HI6310 only**

The HI6310 provides an interface to an external USB memory stick that allows HI 6310 parameters to be saved, restored or transferred to another instrument.

### Restore Command

This command replaces the existing HI6310 parameters by the parameters stored on a USB memory stick.

**On the Web page**, go the communication menu and left click on the Restore button.



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**Hardy Process Solutions**  
San Diego, California, USA  
Tel. +1 (858) 278-2900 • (800) 821-5831  
Fax +1 (858) 278-6700  
[www.hardysolutions.com](http://www.hardysolutions.com) • [hardyinfo@hardysolutions.com](mailto:hardyinfo@hardysolutions.com)  
[hardysupport@hardysolutions.com](mailto:hardysupport@hardysolutions.com)

**On the HI6310 series instrument display**, select the Communication menu and use the UP or DOWN button to select the USB submenu, then select the Restore menu item then press the ENTER button.

### Save Command

This command saves the current HI6310 parameters to a USB memory stick.

**On the Web page**, go the communication menu and left click on the Save button.

**On the HI6310 series instrument display**, select the Communication menu and use the UP or DOWN button to select the USB submenu, then select the Save menu item then press the ENTER button.

## 4-20 mA Communications Commands and Parameters

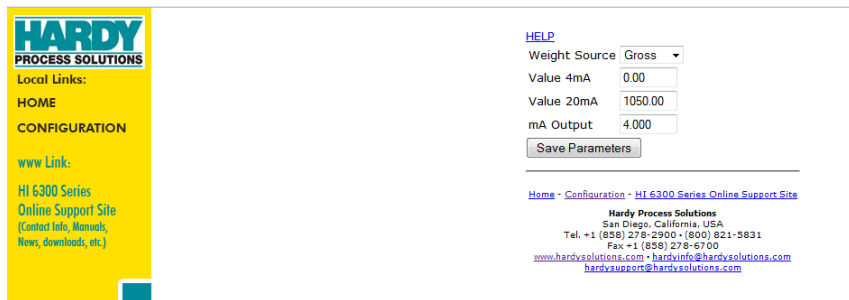
### Available on the HI6310 only

The analog 4-20mA output is directly proportional to the programmed gross, net, or count range; by setting the low value equal to 4mA and the high value equal to 20mA. These values can be set from either the front panel or the web interface.

### Weight Source Parameter

The weight source allows the 4-20mA output to be proportional to the gross weight, the net weight, a count, or can be set to a known mA value

**On the Web page**, select the communication menu and using the weight source down list select the required source for the 4 to 20mA output.



The screenshot displays the Hardy Process Solutions web interface. On the left is a yellow sidebar with the company logo and navigation links. The main content area shows the 'Weight Source' dropdown menu set to 'Gross'. Below this are three input fields: 'Value 4mA' (0.00), 'Value 20mA' (1050.00), and 'mA Output' (4.000). A 'Save Parameters' button is located below the input fields. At the bottom right, there is contact information for Hardy Process Solutions, including their address in San Diego, California, USA, telephone and fax numbers, and website and email addresses.

**HARDY**  
PROCESS SOLUTIONS

Local Links:  
HOME  
CONFIGURATION

www Link:  
HI 6300 Series  
Online Support Site  
(Contact Info, Manuals,  
News, downloads, etc.)

HELP  
Weight Source Gross ▾  
Value 4mA 0.00  
Value 20mA 1050.00  
mA Output 4.000  
Save Parameters

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**Hardy Process Solutions**  
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**On the HI 6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the 4-20mA submenu, then select the weight source menu item. The list of sources available will be displayed and the current value will be highlighted, if the source needs to be modified use the UP and DOWN buttons to select a new value and press the ENTER button.

### Value 4mA Parameter

Sets the minimum value that will produce a 4mA output value

**On the Web page**, select the communication menu and left click inside the Value 4mA text field and enter the value.

**On the HI 6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the 4-20mA submenu, then select the Value 4mA menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

## Value 20mA Parameter

Sets the high value that will produce a 20mA output.

**On the Web page**, select the communication menu and left click inside the Value 20mA text field and enter the value.

**On the HI 6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the 4-20mA submenu, then select the Value 20mA menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

## mA Output Parameter

Sets a fixed mA output level when the weight source selected is manual. If any weight source other than manual is selected, this is a read only value showing what the current output level is in real time for the weight source selected.

**On the Web page**, select the communication menu and left click inside the mA Output text field and enter the desired mA value.

**On the HI6310 series instrument display**, select the communication menu and use the UP or DOWN button to select the 4-20mA submenu, then select the Value 20mA menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### NOTE

*The analog output is not isolated. A 4-20mA isolator may be required for stable readings depending on ground conditions.*

**WARNING - THE HI 6310 ANALOG 4 TO 20mA IS AN OUTPUT SOURCE. DO NOT CONNECT THE 4 TO 20mA OUTPUT TO ANOTHER INTERNAL OR EXTERNAL ANALOG SOURCE. TO DO SO MAY RESULT IN PROPERTY DAMAGE AND/OR PERSONAL INJURY.**

**AVERTISSEMENT – Le HI 6310 analogiques 4 à 20 mA est une source de sortie. Ne pas brancher la sortie 4 à 20 mA à l'autre Source analogique interne ou externe. Pour ce faire peut entraîner des dommages matériels et / ou corporels.**

## Diagnostics Parameter Menu

Diagnostics is covered extensively in Troubleshooting (Chapter 9).

The available parameters on the Web page are:

- Parameters (which shows all parameters on the instrument)
- Integrated Technician (when connected to an IT Junction Box)
- C2
- Stability test

The available parameters on the device are:

- Stability test
- Weight and Voltage

See the Chapter 9 for further information on Diagnostics.

## Display Parameter Menu

The following sets of parameters are only active from the display panel when the display panel is attached to the instrument. They are not enabled on the Web Page.

- Backlight
- Power Saving
- Set Background
- Set Foreground
- Split Screen (HI 6310 only)
  - o Display Mode
  - o Discover (Command)
  - o Num Display
  - o Display Order

### Backlight Parameter

The Backlight parameter sets the display panel brightness level in 16 equal steps shown as a progress bar on the instrument.

On the **HI 6300 series instrument display**, select the display menu and use the UP or DOWN button to select the Backlight submenu. The current Backlight level will be displayed, press the ENTER button if the value needs to be modified, and use the LEFT or RIGHT buttons to set the required backlight level. Press the ENTER button to set and save the backlight value.

### Power Saving Parameters

To conserve power the display can be automatically dimmed towards a blank screen. While the weight value is not in motion for the programmed Wait Time, the text is dimmed in 2 steps towards the blank level for the display. If the weight value is in motion, or the ENTER button is pressed on the display, the value returns immediately to the preset background and foreground levels.

### Auto Enable Parameter

The Auto Enable parameter is used to turn ON or OFF the power saving mode.

On the **HI 6300 series instrument display**, select the display menu and use the UP or DOWN button to select the Power Saving submenu, then select the Auto Enable menu item. The current state, ON or OFF, will be displayed. Press the ENTER button if the state needs to be modified. When modifying this parameter, ENTER toggles the parameter between the two states ON and OFF, and pressing the ENTER button sets the state for the Auto Enable parameter.



### **Wait Time Parameter**

The Wait Time parameter is the amount of time the instrument waits before entering power saving mode. The time unit for the Wait Time parameter is in integer multiples of minutes. The Wait Time can be set between 0 and 480 minutes (8 hours).

On the **HI 6300 series instrument display**, select the communication menu and use the UP or DOWN button to select the Power Saving submenu, then select the Wait Time submenu. The current Wait Time value will be displayed, press the ENTER or the RIGHT button if the value needs to be modified.

### **Set Background Parameter**

The Set Background parameter sets the monochrome level of the display background, the non-text areas of the display, in 32 equal steps, shown as a progress bar.

The Set Background value can be any value between 0 (Black) and 31 (White) as shown in the parameter dump.

On the **HI 6300 series instrument display**, select the display menu and use the UP or DOWN button to select the Set Background submenu. The current background level will be displayed, press the ENTER button if the level needs to be modified, and use the LEFT or RIGHT buttons to set the required background level. Press the ENTER button to set and save the background value.

### **Set Foreground Parameter**

The Set Foreground parameter sets the monochrome level of the display foreground, in other words the text areas of the display, in 32 equal steps shown as a progress bar.

The Set Foreground value can be any value between 0 (Black) and 31 (White) as shown in the parameter dump.

On the **HI 6300 series instrument display**, select the display menu and use the UP or DOWN button to select the Set Foreground submenu. The current foreground value will be displayed, press the ENTER button if the value needs to be modified, and use the LEFT or RIGHT buttons to set the required foreground level. Press the ENTER button to set and save the foreground value.

## Split Screen Parameters and Commands

### Available on the HI 6310 Only

The HI 6310 supports a split screen summary page mode in addition to the single screen summary page mode available on the HI 6300.

The split screen modes provides up to four summary pages on the display at the same time.



When the split screen mode is enabled the HI 6310 automatically detects up to four HI 6310 instruments connected to the same display. To avoid confusion the instrument 15 character instrument ID is display in each screen segment, and the sequence the instruments are displayed can be modified under user control.

### Display Order Parameter

The display order provides the user the ability to set the sequence the instruments are displayed on the screen.

Instrument A	Instrument B
Instrument C	Instrument D

**On the Web page**, this option not configurable via the web interface

**On the HI 6310 instrument display**, select the display menu and use the UP or DOWN button to select the Split Screen submenu, then select the Display Order menu item. The current instrument sequence is displayed:

**Instrument A**

**Instrument B**

**Instrument C**

**Instrument D**

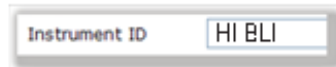
Use the UP or DOWN buttons to select the instrument to change and press ENTER to “pick up” the instrument, then use the UP or DOWN buttons to move the instrument UP or DOWN in the sequence list. Once the instrument is in the correct position in the instrument sequence then press ENTER to “set down” the instrument and establish the new instrument sequence. This process can be repeated until the instruments are in the required order.

### **Instrument ID Parameter**

The Instrument ID parameter provides unique identification for the HI 6310 instrument.

RANGE: 19 Characters (default BLINST)

**On the Web page**, enter a name to identify the instrument in the Instrument ID text field. We used “HI BLI.” In this example.



**On the HI 6310 instrument display**, select the Setup menu and use the UP or DOWN button to select the Instrument ID menu item. The current Instrument ID will be displayed, press the ENTER or the RIGHT button if this identifier needs to be modified and use the UP, DOWN, LEFT, and RIGHT buttons to input a new identifier, then press the ENTER button to save and exit this menu.

### **Mode Parameter**

The mode parameter selects between the single unit mode and multiple unit mode. If you have multiple units hooked up to the display and disable split screen mode, you will get data from only one of the units.

**On the Web page**, this parameter is not configurable via the web interface.

**On the HI 6310 instrument display**, select the display menu and use the UP or DOWN button to select the Split Screen submenu, then select the Mode menu. The current mode will be displayed, press the ENTER or the RIGHT button if the mode needs to be modified.





WAVERSAVER® 1.0 Hz ▾  
 Num Averages 10  
 Save Parameters

[Home](#) - [Configuration](#) - [HI 6300 Series Online Support Site](#)

On the **HI 6300 series instrument display**, select the Filter menu and use the UP or DOWN button to select the NumAverages menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### WAVERSAVER® Parameter

Typically, mechanical noise (from other machinery in a plant environment) is present in forces larger than the weight variations you want to detect. WAVERSAVER® reduces the effects of the vibratory forces that exist in all industrial weight control and measurement applications so the device can better calculate the actual weight. WAVERSAVER enables the Weight Controller to distinguish between actual weight data and mechanical noise, both of which are typically conveyed in the load cell signal. WAVERSAVER can be configured to ignore noise with frequencies as low as 1.0 Hz. One of three higher additional cut off frequencies may be selected to provide a faster instrument response time. The function is user selectable and can be turned off.

RANGE: 1.0 Hz, 3.50 Hz, 7.50 Hz, OFF (default 1.0 Hz)

Chapter 1 describes the benefits of using the WAVERSAVER feature.

On the **Web page**, from the pull-down list, select the FILTER menu and then select the value for WAVERSAVER.

WAVERSAVER® 1.0 Hz ▾  
 Num Averages OFF  
 Save Parameters 7.0 Hz  
 3.5 Hz  
 1.0 Hz

On the **HI 6300 series instrument display**, select the FILTER menu and use the UP or DOWN button to select WaverSaver menu item. The current value will be displayed. If the WaverSaver selection needs to be modified, press the ENTER key, then use the UP and DOWN buttons to select a new value and press the ENTER button to set and save the new WaverSaver setting.



## Operations Parameter Menu

The following parameters are used to setup the instrument operations:

- Tare Operations
  - o Tare Amount
  - o Tare Offset
  - oTare
- Zero Operations
  - o Zero Tolerance
  - o Zero Amount
  - o Zero
- Auto Mode
  - o Auto Mode Enabled
  - o Auto Mode Disabled
- Count Operations (HI 6310 only)
  - o Count Enable
  - o Unit Weight
  - o Enable
  - o Weigh Sample

### Tare Operations Commands and Parameters

#### Tare Amount Parameter

The Tare Amount parameter displays the total amount that has been "Tared" from the scale minus the Tare Offset.

This value is reset to zero when net and gross are the same weight, and totalizes the differences each time the Tare command is run. This value excludes the initial Tare Offset value, which is a constant value subtracted from the Net weight value without the operator running the Tare command.

Note that on the **Web page**, the value will appear on the Operations web page under Tare Operations.

**Operation**  
[HELP](#)

### Weight Input

Item	Value
Gross	51863.0 g
Net	51847.0 g
Piece Count	12962
StatusWordA/D Conversion Error*	00000001
Periodic	<input checked="" type="checkbox"/>

---

Count Enable: Enabled

Unit Weight: 4.00000

[Save Parameters](#)

Sample Size: 2

[Weigh Sample](#)

---

Zero Tolerance: 464.0

Zeroed Amount: 0.0

Tare offset: 0.0

Tare amount: 16.0

[Save Parameters](#)

---

Auto mode: Enabled

display mode: Count

[Save Parameters](#)

---

[Tare](#)

[Zero](#)

\*

[Reload Page](#)

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On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to select the Tare Operations submenu, then select the Tare Amount menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Tare Offset Parameter

The value you enter for Tare Offset allows the user to avoid pushing the Tare button each time he/she places an empty container on the scale.

RANGE: .000001 - 999999. (default 0.0)

On the **Web page**, under the Operation menu enter the value in the editable text box provided next to Tare Offset.

On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to select the Tare Operations submenu, then select the Tare Offset menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

## Tare Command

When the Tare command is selected the Net weight value is set equal to 0 (zero), and the displayed weight goes to 0.00 if the Net weight is being displayed. If the Gross weight is being displayed the displayed value does not change.

On the **Web page**, left click on the Tare button located in the Operations page.

### NOTE

*The Tare operation will fail if the scale is in motion.*

On the **HI 6300 series instrument display**, select the calibration menu and use the UP or DOWN button to select the Tare Operations submenu, then select the Tare menu item and press the ENTER button to execute this command.

## Zero Operations Commands and Parameters

### Zero Tolerance Parameter

The value you enter for Zero Tolerance sets the weight unit limit from zero the instrument will accept as gross zero during the zeroing function (when you push the Zero button).

### NOTE

*The amount of weight zeroed off is cumulative. The zero command will fail if the current gross weight plus any previously zeroed amount exceeds the zero tolerance.*

RANGE: .000001 - 999999 . (default 10.0)

On the **Web page**, select the Operations menu and enter the value in the text box provided. Our example, for illustration only, sets the Zero Tolerance to 10.0

Zero Tolerance	<input type="text" value="10.0"/>
Zeroed Amount	<input type="text" value="0.00"/>
Tare offset	<input type="text" value="0.00"/>
Tare amount	<input type="text" value="2.00"/>
<input type="button" value="Save Parameters"/>	
<input type="button" value="Tare"/>	
<input type="button" value="Zero"/>	

On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to select the Zero Operations submenu, then select the Zero Tolerance menu item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Zero Amount Parameter

The Zero Amount parameter is READ ONLY and displays the amount that has been "zeroed" from the scale.

On the **Web page**, the value will appear on the Operations web page.

Zeroed Amount

On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to select the Zero Operations submenu, then select the Zero Amount menu item. The current value will be displayed.

### Zero Command

When the Zero command is selected the Gross weight value is set equal to 0 (zero) if the Gross weight is within the Zero tolerance, and the displayed weight goes to 0.00 if the Gross weight is being displayed.

On the **Web page**, select the Operations menu and left click on the Zero button

On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to select the Zero Operations submenu, then select the Zero menu item and press the ENTER button to execute this command.

### NOTE

*The Zero Command will fail if the scale is in motion*

### Auto Mode

Auto Mode enables one-button functionality when performing Zero and Tare operations, automatically switching to Net mode when Tare is pressed. The default is Disabled.

On the **Web page**, select the Operations menu and left click to pull down the

Auto mode    
display mode

Enabled/Disabled command to select Auto mode. Next select display mode Gross or Net. Then click on the Save Parameters button.

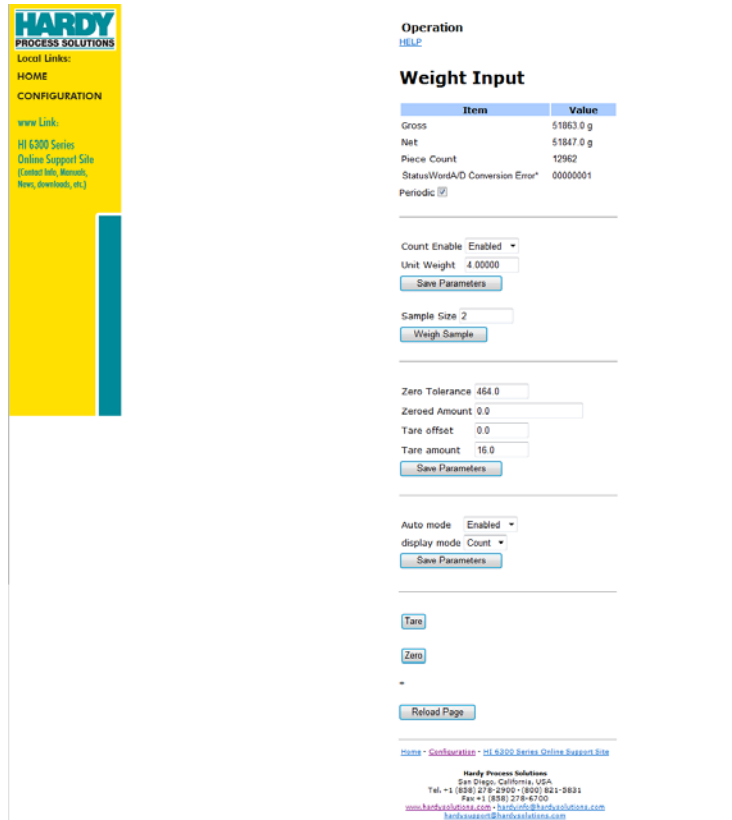
On the **HI 6300 series instrument display**, select the Operations menu and use the UP or DOWN button to Enable or Disable Automode. For display mode, select Gross or Net. Press the ENTER button to execute this command.

### Count Operations Parameters and Commands

**Available on the HI 6310 Only.** The count mode allows the unit to be calibrated and used as a counter. This mode allows the user to "count" the number of pieces placed on the scale.

**On the HI 6310 instrument display**, select the Operations menu and use the UP or DOWN button to select the Piece Count submenu. Select Count Enable to allow the option of running the instrument in count mode.

Piece Count can be displayed on the main screen by pressing the MODE button and cycling through to the count mode: GROSS > NET > COUNT >



### Determining Piece Count:

#### If the weight of an individual piece is known:

Select Unit Weigh by pressing ENTER and input the single unit weight value using the UP, DOWN, RIGHT and LEFT arrows.

#### If the weight of an individual piece (or pieces) is unknown:

Place a sample or samples onto the scale and enter the number of pieces being used for the "sample size".

**To weigh the items:** Place the items to be counted onto the scale and then press enter while Weigh Sample is selected. The instrument will then count the items on the scale.



## NOTE

*All the samples must be the same weight, type and size.*

*Be sure the scale has been Zero'd before determining piece count.*

***Hint: When the weight of individual pieces varies, it is better to take the Weight Sample of a larger number of pieces when the weight of individual pieces varies.***

On the **Web page**: first select Count Enabled, and then either enter the weight of a unit in the unit weight field, or use the weigh sample field entering the correct number of pieces in the Sample size field as shown above. Then click on the weigh sample field.

## Security Parameter Menu

A detailed description of the security features is provided in Chapter 8.

- Calibration Lock
  - Calibration Lock
  - Calibration Password
- Configuration Lock
  - Configuration Lock
  - Password
- Display Lock
  - Display Lock
  - Display Password
- Keypad Lock
  - Keypad Lock
  - Keypad Password
- Read Only Lock
  - Read Only Lock
  - Read Only Password

## NOTE

***The security parameters can be accessed via the front panel display by entering a preset password, or directly through the network connection. There is no way to bypass the security password. We recommend you keep your passwords in a secure location.***

The security menu allows the user to lock out different levels of the menu hierarchy. The user-configurable security settings only limit access through the front panel to ensure the consistency of the instrument setup and weighing process. Parameter configuration through the network is unaffected by these security settings.

The factory default for the security menu is to disable all lock modes and to preset each of the security passwords to 1234. Below is another example where each password in the security menu is different.

cal lock enabled	OFF ▾	password	<input type="text" value="1111"/>
config lock enabled	OFF ▾	password	<input type="text" value="2222"/>
display lock enabled	OFF ▾	password	<input type="text" value="3333"/>
keypad lock enabled	OFF ▾	password	<input type="text" value="4444"/>
read only lock enabled	OFF ▾	password	<input type="text" value="5555"/>
<input type="button" value="Save Parameters"/>			

[Home](#) - [Configuration](#) - [HI 6300 Series Online Support Site](#)

## The Calibration Lock Parameters

### Calibration Lock Parameter

When the Calibration Lock is enabled, the ability to run calibration through the front panel is disabled unless the correct calibration password is entered by the operator. If the Calibration lock is disabled, then calibration through the front panel is enabled.

On the **Web page**, on the security web page, select the Calibration Lock parameter, change the password or leave it at the default password and then select either Enable or Disable from the drop down list.

On the **HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the Calibration Lock submenu, select the Calibration Lock submenu, press enter. You will be prompted for the current password. Enter the correct password to access the menu. Select the Lock menu selection, then select the Calibration Lock parameter. The current state, Enabled or Disabled, will be displayed. To change the state of this parameter, press the ENTER button.

### Calibration Password Parameter

The Calibration Password is a four digit alphanumeric character sequence. If the sequence is not entered correctly through the front panel display the menu leaves the Calibration Lock submenu unchanged.

On the **Web page**, select the security menu. The Calibration Password will be displayed on the security web page. To change the Calibration Password, left click inside the text field and enter a new 4 character alphanumeric password or leave it at the default password. The current state, Enabled or Disabled, will be displayed. To change the state of this parameter, change the value on the drop down menu.

On the **HI 6300 series instrument display**, select the Security menu and use the UP or DOWN button to select the Calibration Lock submenu. To change the current password, arrow down to the password menu item and press enter. Now using the arrow keys to enter the new password. Press enter to accept. Press left arrow key to exit the menu. To

change the current password press the ENTER or RIGHT button and enter the current password, then simply enter the new password and press the ENTER button to save and exit this submenu; and return to the top level security menu.

## The Configuration Lock Parameters

### Configuration Lock Parameter

When the Configuration Lock is enabled, the ability to enter the configuration menu structure is disabled. If the Configuration Lock is disabled, all parameters except the security parameters can be read through the front panel. The ability to modify these parameters however is controlled by the calibration, read only, and keypad lock parameters. This will stop the use of the keypad, but will not stop the ability to change a parameter if the correct password is used.

On the **Web page**, on the security web page, select the Configuration Lock parameter, then select either Enable or Disable from the drop down list.

On the **HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the Configuration Lock submenu enter the 4 character alphanumeric configuration password, then select the Configuration Lock parameter. To ENABLE the Configuration Lock parameter, press the ENTER button.

### Configuration Password Parameter

The Configuration Password is a four alphanumeric character sequence. If the password sequence is not entered correctly through the front panel display the menu leaves the Configuration Lock submenu.

On the **Web page**, select the security menu, the Configuration Password will be displayed on the security web page. To change the Configuration Password, left click inside the text field and enter the new 4 character alphanumeric password.

On the **HI 6300 series instrument display**, select the Security menu and use the UP or DOWN button to select the Configuration Lock submenu. Enter the current password to enter the submenu. To change the current password, arrow to "password" menu selection, enter and use the arrow keys to enter a new password, To change the current password press the ENTER or RIGHT button and enter the current password, then simply use the arrow keys to enter the new password and press the ENTER button to save and exit this submenu; and return to the top level security menu.

## The Display Lock Parameters

### Display Lock Parameter

The Display Lock disables and blanks the front panel display and disables the keypad. If the ENTER button is pressed, a password dialog box is shown on the screen. If the correct password is entered the display is unlocked and operator can view the weight data and use the MODE button to change the weight between Gross and Net. If the ENTER button is pressed again the Display Lock parameter is reset to ENABLED and the display blanked.

## NOTE

*If the keypad is locked, then the tare, zero, mode, and configuration buttons are disabled*

On the **Web page**, on the security web page, select the Display Lock parameter, then select either Enable or Disable from the drop down list.

**On the HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the Display Lock submenu, enter the password and then select the Display Lock parameter. To ENABLE the Display Lock parameter, press the ENTER button.

### Display Password Parameter

The Display Password is a four alphanumeric character sequence. If the sequence is not entered correctly through the front panel display the menu leaves the Display Lock submenu.

On the **Web page**, select the security menu, the Display Password will be shown on the security web page. To change the Display Password, left click inside the text field and enter the new four character alphanumeric password.

On the **HI 6300 series instrument display**, select the Security menu and use the UP or DOWN button to select the Display Lock submenu. To change the current password press the ENTER or RIGHT button and enter the current password, then simply enter the new password and press the ENTER button. Press the ENTER button to save and exit this submenu and return to the top level security menu.

## The Keypad Lock Parameters

### Keypad Lock Parameter

The Keypad Lock disables the front panel keypad. If the ENTER button is pressed, a password dialog box is shown on the screen. If the correct password is entered the Keypad is unlocked. If the ENTER button is pressed again the Keypad Lock parameter is reset to its original locked state.

On the **Web page**, on the security web page, select the Keypad Lock parameter, then select either Enable or Disable from the drop down list.

On the **HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the keypad lock submenu. Enter the password and then press the ENTER button. Select ENABLE and press the ENTER button to save and exit this submenu.

## Keypad Password Parameter

The Keypad Password is a four alphanumeric character sequence. If the sequence is not entered correctly the menu leaves the Keypad Lock submenu.

On the **Web page**, select the security menu, the Keypad Password will be displayed on the security web page, to change the Keypad Password left click inside the text field and enter a new 4 character alphanumeric password and press enter.

On the **HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the keypad Password submenu. Enter the password and then press the ENTER button. Select ENABLE and press the ENTER button to save and exit this submenu.

## The Read Only Lock Parameters

### Read Only Lock Parameter

The Read Only Lock enables the operator to view all the parameters but not modify their values or state. There are two exceptions to this;

- 1** It is possible to enter the calibration submenu, but the operator must enter the Calibration Password if the Calibration Lock is ENABLED.
- 2** The security parameters can only be changed if the operator knows the required security password.

On the **Web page**, on the security web page, select the Read Only Lock parameter, then select either Enable or Disable from the drop down list.

On the **HI 6300 series instrument display**, select the security menu and use the UP or DOWN button to select the read only submenu. Select Read Only and then press the ENTER button. Select ENABLE and press the ENTER button to save and exit this submenu.

To change the state of this parameter, press the ENTER button. Pressing the ENTER button selects the new state for the Read Only Lock parameter.

### Read Only Password Parameter

The Read Only Password is a four alphanumeric character sequence. If the sequence is not entered correctly the menu leaves the Read Only Lock submenu.

On the **Web page**, select the security menu, the Read Only Password will be displayed on the security web page, to change the Read Only Password left click inside the text field and enter the new 4 character alphanumeric password.

On the **HI 6300 series instrument display**, select the Security menu and use the UP or DOWN button to select the Read Only submenu. Enter the password and then change the current password press the UP or DOWN button and enter the current password then arrow to "password" and enter and use the arrow keys to enter new password and press the ENTER button to save and exit this submenu; and return to the top level security menu.

## Setup Parameter Menu

The Setup Menu consists of the following parameters:

- Capacity
- Decimal Point
- Grads
- Instrument ID
- Motion Tolerance
- Operator ID
- Units

### Capacity Parameter

Scale Capacity is the scale's nominal operating capacity (the total weight capacity of the scale system). If this value is exceeded by six graduations, dashes appear on the front display. Communications to and from optional devices are not affected.

If a Capacity value is entered which conflicts with either the decimal point value or the graduation value, the decimal point and/or graduation values are automatically modified to match the programmed capacity. It is therefore recommended that the Capacity parameter is entered first before setting the Decimal Point and Grad parameters.

RANGE: .000001 - 999999 (Default 999999).

On the **Web page**, enter the capacity in the text box provided

Scale Capacity

On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Capacity item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Decimal Point Parameter

Use the Decimal Point Parameter to set the resolution you want for the instrument. Here you set the location of the decimal point for the weight resolution. The higher the number, the farther to the left the decimal point moves and the higher the resolution of the scale. Note that setting more decimal points does affect the overall accuracy of the instrument.

RANGE: 0-5 (default 2) Not to exceed 1 part in 100,000

On the **Web page**, from the Decimal Point pull-down list, select the decimal position for this instrument.

[HELP](#)

The screenshot shows a configuration interface with the following elements:

- Unit: kg (dropdown menu)
- Change Unit button
- Operator ID: DM (text input)
- Instrument ID: test unit 1 (text input)
- Decimal Point: 3 (dropdown menu, currently open)
- Grads: 0 (dropdown menu)
- Motion Tolerance: 2 (text input)
- Scale Capacity: 4 (text input) 10 (text input)
- Save Parameters button

On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Decimal Point menu item. The list of decimal point values supported will be displayed and the current value will be highlighted, if the decimal point needs to be modified use the UP and DOWN buttons to select a new value and press the ENTER button.

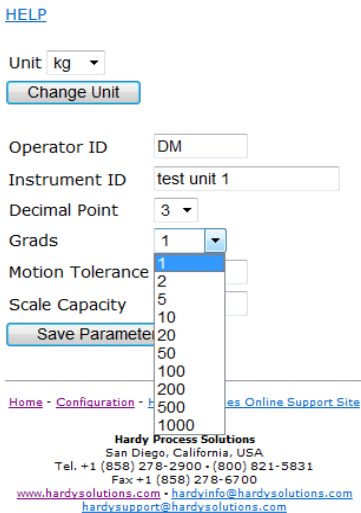
### Graduation Size Parameter

The Graduation Size is the Minimum increment displayed by the instrument. The Base Graduation Number can be calculated by dividing the Total Load Cell Capacity by 10,000.

For example, with two decimal points selected, a graduation size of 10 will display increments of .10 units and the graduation size .50 will display increments of .50 units. For a scale with 10,000 capacity, graduation size = 1

RANGE: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 (default 1)

On the **Web page**, from the Grads pull-down menu, select a Graduation Size Parameter for this instrument.



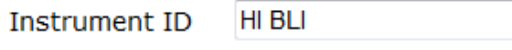
On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Grads menu item. The list of graduation sizes supported will be displayed and the current value will be highlighted. If the graduation size needs to be modified, use the UP and DOWN buttons to select a new value and then press ENTER.

### Instrument ID Parameter

The Instrument ID parameter provides unique identification for the HI 6300 series instrument.

RANGE: 19 Characters (default BLINST)

On the **Web page**, enter a name to identify the instrument in the Instrument ID text field. We used “HI BLI.” In this example.



**On the HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Instrument ID menu item. The current Instrument ID will be displayed, press the ENTER or the RIGHT button if this identifier needs to be modified and use the UP, DOWN, LEFT, and RIGHT buttons to input a new identifier, then press the ENTER button to save and exit this menu.

### Motion Tolerance Parameter

The value you enter for Motion Tolerance sets the amount of deviation to allow for your process. This value must be greater than or equal to the Graduation Sizes. We recommend 3 times the graduation size.



The base motion number can be calculated by using the following formula:

Base Motion Number = (Total Load Cell Capacity x 0.0003)

RANGE: .000001 - 999999 (default 10)

On the **Web page**, enter the value in the text box provided.

Motion Tolerance

On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Motion Tolerance item. The current value will be displayed, press the ENTER or the RIGHT button if this value needs to be modified.

### Operator ID Parameter

The Operator ID is the ID of the user who is going to operate the Weight Controller or service the instrument. Select three letters or numbers or any combination of letters and numbers that adequately identifies the user.

On the **Web page**, type a name that identifies the operator of this instrument in Operator ID text field.

Operator ID

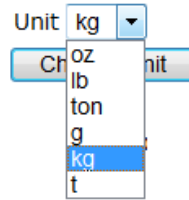
On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Operator ID menu item. The current Operator ID will be displayed, press the ENTER or the RIGHT button if this identifier needs to be modified and use the UP, DOWN, LEFT, and RIGHT buttons to input a new identifier, then press the ENTER button to save and exit this menu.

### Unit (of Measure) Parameter

The Unit (of measure) parameter sets the scale to either English or Metric units. The Selections are:

- Ounces
- Pounds
- Ton
- Gram
- Kilogram
- Metric Ton

On the **Web form**, from the Units pull-down list, select the desired weight units to use; then click Change Unit to set the units value. Our example shows pounds (kg).



On the **HI 6300 series instrument display**, select the Setup menu and use the UP or DOWN button to select the Units menu item. The list of weight measurement units supported will be displayed and the current unit will be highlighted, if the unit needs to be modified use the UP and DOWN buttons to select a new value and press the ENTER button.

# Chapter 6

## Calibration



Chapter 6 describes C2, eCAL and traditional calibration procedures. For the Weight Controller to give precise readings, it must be routinely calibrated both during operation or when it has not used for an extended period of time. It is important that users and service personnel be familiar with the procedures in this chapter before installing or operating the HI 6300 series instrument.

All calibration is done in the Gross mode. Be sure to follow all the procedures completely to insure that the weights read by the controller are accurate.

In some incidents it is better to verify a calibration than just re-do the calibration. If during the scale verification, it is found to be out of calibration, check for damage and a mechanical problem. When all checks OK, then recalibrate. Perform a calibration and perform a scale verification. No calibration process ensures the load cells are functioning or installed correctly.

Always verify your scale after any calibration and maintenance routine.

*NOTE*

*Do not perform a calibration while an application is in operation.*

### Pre-Calibration Procedures

Verify that the load cells have been properly installed.

- Refer to your load cell operations and installation manual for proper installation instructions.
- On some sensors and cells an arrow indicates the direction of the applied load. If the arrow is pointing in the wrong direction, change the position of the load cell so that it is mounted in the direction of the applied load.

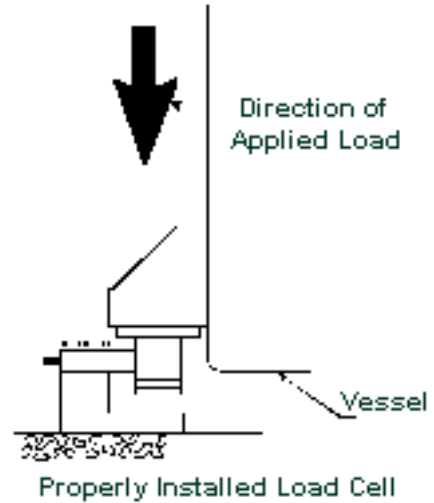
Check for binding on the Load Cell or other parts of the weighing system.

**WARNING** - Binding on a scale/vessel or load cell does not allow the load cell free vertical movement and may prevent the instrument from returning to the original zero reference point.

**AVERTISSEMENT** – Lier sur une échelle / récipient ou cellule de charge ne permet pas la cellule de charge libre circulation verticale et peut empêcher l'appareil de revenir au point de référence zéro d'origine.

A load cell must be mounted so that 100% of the load (Vessel w/Contents) passes vertically through the load cell.

Verify that nothing is binding the load cell. This means that nothing is draped across the scale/vessel or the load cell, such as a hose, electrical cord, tubes, or other objects. Verify that nothing is in contact with the scale/vessel other than service wires and piping that have been properly mounted with flexible connections. Flexible pipes are not to be used in any other than the horizontal plane and are not to be used to correct pipe alignment problems. Vertical or at angles other than vertical will have an affect on the scales ability to repeat and provide accurate weight readings.



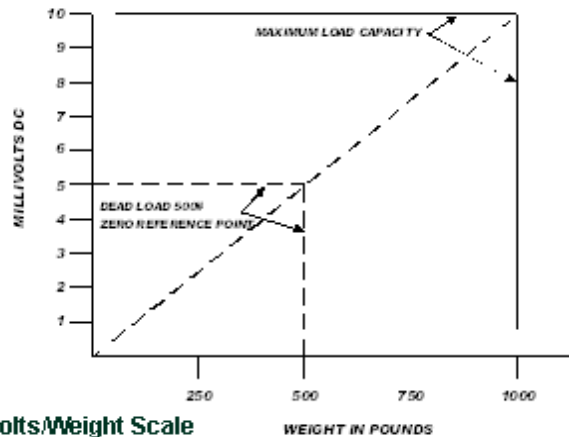
## Electrical Check Procedures

### Load Cell/Point Input/Output Measurements

The HI 6300 series instrument is designed to supply 5 VDC excitation to as many as four 350-Ohm load cells/points per channel. The expected output from each load cell/point will depend on the mV/V rating of the load cell/point and the weight.

For example, a 2mV/V load cell/point will respond with a

maximum of 10 mVDC at the load sensor's full weight capacity, which includes the weight of the vessel and the weight of the product as measured by the load cell/point. Thus, if the load cell/point weight capacity is rated at 1000 pounds, the load cell/point will be 10 mVDC at 1000 pounds, 7.5 mVDC at 750 pounds, 5 mVDC at 500 pounds and so on.



A zero reference point will vary from system to system depending on the “Dead Load” of the vessel. “Dead Load” is the weight of the vessel and appurtenances only, with no product loaded. In our example we will assume the dead load to be 500 pounds.

The operating range for the scale in this example is 5-10 mVDC with a 500 pound weight range. Note that after zeroing the instrument, the 0 reading refers to the zero reference point and not absolute 0 mVDC or absolute 0 weight.

**NOTE**

*Load cell/point measurements are checked with a digital voltmeter at the load cell connector on the front of the module or by using INTEGRATED TECHNICIAN with a Hardy IT Junction Box. The scale calibration must be completed to enable IT to function correctly.*

### **Load Check**

Place a load (weight) on the scale or vessel, and check to see if the weight reading on the input table changes in the proper direction.

For example, if the display reads 100 pounds and a 20-pound weight is placed on the vessel or scale, the display should read 120 or some value over 100. With the display reading 100 pounds, if a 20-pound load is placed on the vessel or scale and the reading is 80 pounds, the reading is going in the wrong direction and indicates some problem with the system.

If the display reads improperly or shows no change, something is wrong with the setup. If the display changes weight in the proper direction, remove the weight and proceed to calibrate the instrument. Refer to Chapter 9 on troubleshooting for additional help to determine the cause of the poor weight reading.

## **C2 & eCAL Electronic Calibration**

C2 or eCAL, Electronic Calibration, calibrates a scale system electronically without using certified test weights. It can use up to 2 junction boxes with up to 4 load cells per junction box, interconnect cable and an instrument with C2 capabilities, such as the HI 6300 series instrument. Digital information within a Hardy C2 or eCAL-certified load sensor details its unique performance characteristics. The HI 6300 series instrument reads the performance characteristics of each load sensor and detects the number of load sensors in the system.

Before running C2 eCAL calibration, run all of the pre-calibration procedures. Make sure you have configured the HI 6300 series instrument. This includes setting the units, decimal point, NumAverages etc. For instructions please see the Chapter on Instrument Configuration.

### **Gravitation Correction**

Objects weigh about 0.5% less at the equator than they weigh at each pole because the force of gravity is less at the equator than at the poles. For example an object weighing 100 pounds at the North Pole on a spring scale would weigh 99.65 pounds at the equator.

Depending on the latitude of your location, your scales would measure somewhere in between. The table below shows the gravitation correction factor for a few cities around the world.

**NOTE**

*Ensure that the scale system is clean and ready to receive product. This step establishes the gross zero reference. You must perform a C2 Calibration after setting the Gravity Correction or the correction factor won't work.*

In general if your location is between the 45th parallel and the equator, gravity correction is greater than 1.0. For example, at these latitudes, because the gravity is less, you are adding, 1.0006 for an error that is .06%). For locations between the 45th parallel and the North or South Pole your correction factor will be less than 1.0. For example .9994 for an error that is -.06%.

City	Grav. Accel	City	Grav. Accel	City	Grav. Accel
Amsterdam	0.999369	Istanbul	1.000406	Paris	0.999048
Athens	1.000684	Havana	1.001872	Rio de Janeiro	1.001884
Auckland NZ	1.000782	Helsinki	1.001405	Rome	1.000326
Bangkok	1.002392	Kuwait	1.001405	San Francisco	1.000702
Brussels	0.999503	Lisbon	1.000615	Singapore	1.00269
Buenos Aires	1.001004	London	0.999445	Stockholm	0.99877
Calcutta	1.00191	Los Angeles	1.001028	Sydney	1.00104
Cape Town	1.00104	Madrid	1.000461	Taipei	1.001741
Chicago	0.99922	Manila	1.000461	Tokyo	1.000886
Copenhagen	0.999075	Mexico City	1.002102	Vancouver BC	0.999653
Nicosia	1.00093	New York	1.000433	Washington DC	1.000601
Jakarta	1.002631	Oslo	0.998726	Wellington NZ	0.999399
Frankfurt	0.999579	Ottawa	1.000007	Zurich	0.999821

## C2 and eCAL Calibration from the Web Page

From the Home Page, click Configuration to display the Configuration menu; then click Calibration to open the Calibration page.

### Method 1: C2 eCal

cal date	Jan ▾	22	2013
Num Devices	<input type="text" value="1"/>		
Ref Weight	<input type="text" value="0.00"/>		
Gravity Correction	<input type="text" value="1.001500"/>		
<input type="button" value="Do C2 Calibration"/>			

- Step 1. Check to make sure the number of load cells displayed on the webpage corresponds correctly to the inputs on the instrument.
- Step 2. In the “Ref Weight” text field, enter the reference weight for your application.
- Step 3. An empty scale will use a 0.00 reference weight setting.
- Step 4. (Optional) If you want to enter the Gravity Correction Factor, see the table above, then enter the Correction Factor number you selected from the table in the Gravity Correction field
- Step 5. Click the “Do C2 Calibration” button
- Step 6. Wait a few seconds and the results will appear. If the Calibration was successful a Cal completed OK appears and gross weight will read your reference value.

Cal completed OK  
[Return to calibration page](#)

However, if no load points are connected to the HI 6300 series the following message appears. Check the cable and connectors of the load point(s) and re-calibrate.

- Step 7. This message appears if no load points are connected to the HI 6300. Check the cable and connectors of the load point(s) and re-calibrate.

Cal failed: A to D converter error

- Step 8. This message appears if no C2 load points are connected to the HI 6300. Either do a traditional calibration or connect C2 load sensors to the instrument.

### C2 Cal Failed: no C2 sensors found

- Step 9. Click Back to return to the Calibration page.

### **C2 Calibration from the Front Panel**

The example settings below are for illustrations only. Your setting requirements may vary significantly.

- Step 1. From the Configuration menu, use the UP or DOWN button to select Calibration, and press the ENTER button to display the Calibration menu. Select C2 (eCal), and press the ENTER button to display the C2 Calibration Menu items.
- Step 2. Use the UP or DOWN arrow to select the NumDevices menu item. The read-only NumDevices value provides the number of C2 (or eCal) load cells on the system detected by the HI 6300 series instrument. Verify that the displayed number matches the actual number installed. If not, check to ensure that each load cell/point cable connection is securely fastened and that each load cell/point cable is not broken. Only Hardy Process Solutions load sensors are C2 (or eCal) calibration capable
- Step 3. When you finish updating the value press Enter to save the Reference Weight and return to the C2 eCal menu. Use the UP or DOWN button to select the Reference Weight. The current reference weight will show. Press the ENTER or RIGHT button if modifications to this value need to be made.
- Step 4. Select Gravity Correction to display the value and press the ENTER button if the value needs to be modified.
- Step 5. Use the UP or DOWN button to select Do C2 eCAL and press the ENTER button to perform the C2 eCAL calibration..
- Step 6. A "Cal Completed OK" briefly appears on the screen indicating the C2 calibration was successful.
- A "Cal Failed" message briefly appears with the error number if the C2 Calibration was not successful. Chapter 9, Troubleshooting lists corrective actions.





- Step 4. Click the Do Cal Lo button to do the hard Cal Zero operation. A “Cal Completed OK” message appears briefly if the calibration was successful. An Error number appears if the calibration was not successful. See the Error list in the troubleshooting chapter for help in correcting the error.
- Step 5. To set the Span Weight, place certified test weights on the scale.
- Step 6. In the Span Weight text field, enter the amount of test weight that was placed on the scale.

### Method 2: Calibration - Span

Span Weight

- Step 7. Click the Do Cal Hi button. A “Cal Completed OK” message appears briefly if the calibration was successful.
- Step 8. An Error message appears if the calibration was not successful. See the error list in the Troubleshooting chapter, for help in correcting errors.
- Step 9. The scale is now calibrated.

### Hard Calibration from the Front Panel

- Step 1. From the Configuration menu, use the down arrow to select Calibration, and then press Enter to display the Calibration menu. Select the Hard Cal menu item and press the ENTER button to open the menu.
- Step 2. Use the UP or DOWN button to select the Ref Weight value then press the ENTER to set the reference weight equal to the weight on the scale. Normally, you would remove all weight "live load" from the scale to obtain a Ref Weight of 0.0. Wait 12 seconds or more for the reading to stabilize. Press the ENTER button to save the value and return to calibration menu.
- Step 3. Use the DOWN button to select " Do Cal Lo, and press the ENTER button to set the low calibration point. A "Cal Completed OK" message appears briefly if the calibration was successful.
- Step 4. An Error appears if the calibration was not successful. See the Troubleshooting chapter, for help with errors.

- Step 5. Press the DOWN button to select Span Weight, the current span weight will be displayed. Press the ENTER button to modify the Span Weight value.
- Step 6. To set the Span Weight, place a certified test weight, equal to the span weight entered in step 5, on the scale. This value is the amount of test weight that you will apply, typically 80-100% of the expected maximum product loading on the load cells.
- Step 7. Use the DOWN button to select Do Cal Hi, then press the ENTER button to set the Cal High point and complete the calibration sequence. A "Cal Completed OK" message appears briefly if the calibration is successful. An Error number appears if the calibration fails. See the Error list in the Troubleshooting chapter for help with error correction



# Chapter 7

## Operation



Chapter 7 contains step-by-step instructions for operating the Hardy HI 6300 series instrument. The procedures include complete instructions for operating the instrument from the front panel and from the Web page. Operating procedures primarily include Taring and/or Zeroing the instrument. We highly recommend reading the set-up and operating procedures before operating the instrument. Being familiar with the operating procedures insures that the instrument will provide trouble free service.

### Getting Started

Before operating a Hardy HI 6300 series Weight Processor, check to make sure the following procedures have been performed:

- Power and Load Point cables properly installed.
- Communication cables properly installed.
- Setting of instrument parameters is complete.
- Calibration performed.

### Mode Button

- Press the Mode Button to switch between different weighing modes of:



[1] MODE  
[2] UP

- GROSS: Displays the GROSS weight of the system.
- NET: Displays the NET weight of the system. The NET weight displayed is the GROSS weight minus the TARE value.
- COUNT: If Enabled (HI 6310 only).

The displayed mode on the instrument can also be changed by selecting DISPLAY MODE on the Operations webpage and choosing Gross, Net or Count (if enabled) from the drop-down menu or by sending the DISPLAY MODE command over communications.

### Zero Operation

In GROSS mode, remove all weight from the scale and wait until the scale has settled.



[1] ZERO  
[2] LEFT/EXIT

A scale in motion will show the symbol “ ~ ” in the lower right hand corner of the screen to indicate the scale has not settled. A scale that will not settle may have the Motion Tolerance parameter established during SETUP adjusted too small for the environment.

Press the ZERO button, a message “ZERO OK” will briefly be displayed and the scale will show **000.00**, indicating the ZERO command was successful.

If “ZERO FAILED” is displayed, the Zero command was unsuccessful. Check the Zero Tolerance parameter established in Set Up to determine if the zero amount has exceeded the maximum cumulative value that can be zero'd off the scale.

#### NOTE

*The amount of weight zeroed off each time is cumulative. The zero command will fail if the current gross weight plus any previously zeroed amount exceeds the zero tolerance established in the SET UP parameters.*

The ZERO command can also be initiated from the Operations webpage by left clicking the ZERO button as shown in the screen shot from an HI 6300 below.

#### Weight Input

Item	Value
Gross	2.24 lb
Net	-0.02 lb
StatusWord	00000000
Periodic <input checked="" type="checkbox"/>	

Zero Tolerance

Zeroed Amount

Tare offset

Tare amount

Auto mode

display mode

\*



**HARDY**  
PROCESS SOLUTIONS

Local Links:  
HOME  
CONFIGURATION

www Link:

HI 6300 Series  
Online Support Site  
(Contact Info, Manuals,  
News, download, etc.)

**Operation**  
[HELP](#)

**Weight Input**

Item	Value
Gross	51863.0 g
Net	51847.0 g
Piece Count	12962
StatusWordA/D Conversion Error*	00000001

Periodic

---

Count Enable: Enabled ▾  
Unit Weight: 4.00000  
[Save Parameters](#)

Sample Size: 2  
[Weigh Sample](#)

---

Zero Tolerance: 464.0  
Zeroed Amount: 0.0  
Tare offset: 0.0  
Tare amount: 16.0  
[Save Parameters](#)

---

Auto mode: Enabled ▾  
display mode: Count ▾  
[Save Parameters](#)

---

[Tare](#)

[Zero](#)

=

[Reload Page](#)

### Auto Mode Tracking – Disabled (Default)

1. The displayed weight mode will remain unchanged when TARE or ZERO is pressed.
2. To change the displayed weight mode, press the MODE button from the front panel display
3. or send the DISPLAY MODE command over communications.
4. The ZERO command functions in both NET or GROSS mode at any time.

### Auto Mode Tracking – Enabled

1. The displayed weight mode will automatically change to NET when TARE is pressed on the front panel display or when a TARE command is sent over communications.





**HARDY**  
PROCESS SOLUTIONS

Local Links:  
HOME  
CONFIGURATION

www Link:  
HI 6300 Series  
Online Support Site  
(Contact info, Manuals,  
News, downloads, etc.)

**Operation**  
[HELP](#)

**Weight Input**

Item	Value
Gross	51863.0 g
Net	51847.0 g
Piece Count	12962
Status/Word/AD Conversion Error*	00000001

Periodic

Count Enable: Enabled ▾  
Unit Weight: 4.00000  
[Save Parameters](#)

Sample Size: 2  
[Weigh Sample](#)

Zero Tolerance: 464.0  
Zeroed Amount: 0.0  
Tare offset: 0.0  
Tare amount: 16.0  
[Save Parameters](#)

Auto mode: Enabled ▾  
display mode: Count ▾  
[Save Parameters](#)

[Tare](#)

[Zero](#)

=

[Reload Page](#)

[Home](#) • [Configuration](#) • [HI 6300 Series Online Support Site](#)

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### Determining Piece Count:

If the weight of an individual piece is known:

Select Unit Weigh by pressing ENTER and input the unit weight value using the up, down, right and left arrows.

If the weight of an individual piece (or pieces) is unknown:

Place the sample or samples onto the scale and then press enter while Weigh Sample is selected. The instrument will record that weigh value of the sample size. If more than one piece was used during Weigh Sample, input the Sample Size using the arrow keys.

### NOTE:

*Be sure the scale has been Zero'd before determining piece count.*

*Hint: It is better to take the Weight Sample of a larger number of pieces when the weight of individual pieces varies.*

On the **Web page**: first select Count Enabled, and then either enter the weight of a unit in the unit weight field, or use the weigh sample field entering the correct number of pieces in the Sample size field as shown above. Then click on the weigh sample field.

## Split Screen Mode

*Available on HI 6310 Only*

### **Before wiring and mounting instruments to be displayed on split screen**

Be sure to update the firmware in the Display and each instrument to the latest version to ensure all menus are up to date. The display must only be connected to a single instrument to upload new firmware.

### **Wiring the Units to the Display Panel**

Wire the instruments together and connect them to the display panel connector wire.



*A sample wiring diagram for wiring four HI 6310 instruments to one HI 6110 Panel*

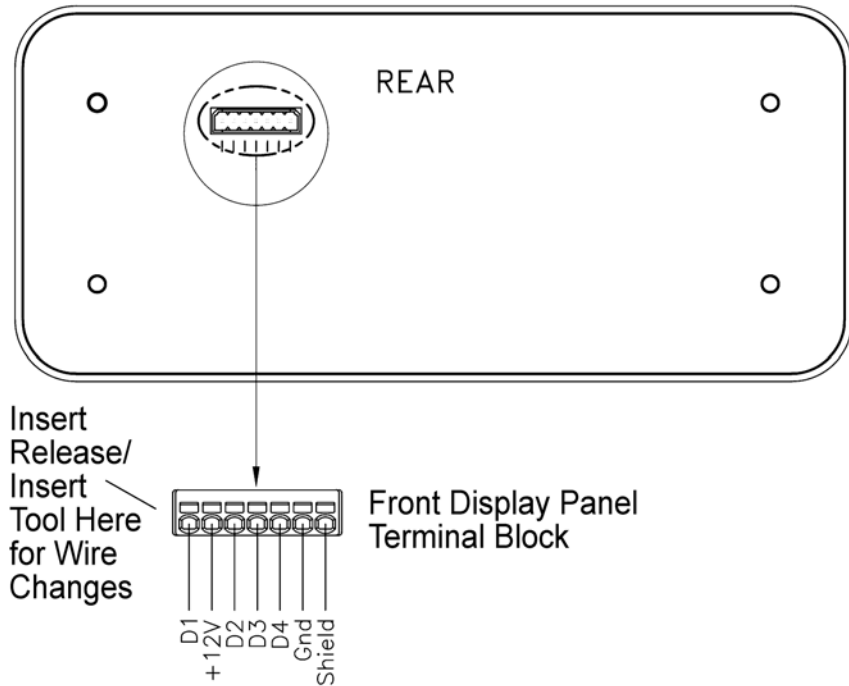
### **Making Longer Display Interface Cables**

If you need to install the front panel further away from the HI 6300 series instruments than is possible with the supplied cable then, you will need to make a display cable between the panel and the first instrument. in the series of up to four connected units.

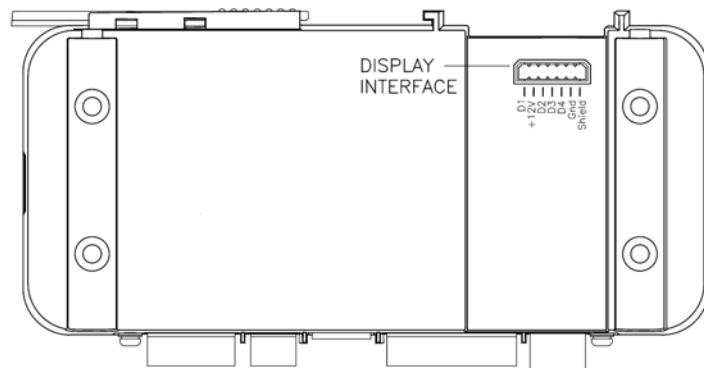
#### Wiring Specifications

- Wire size: 20 AVG maximum / 26 AWG minimum
- Maximum cable length: 100 ft. (30.48 meters)
- Use three twisted pairs with a drain wires
- Pair wires +12 and GND, D1 and D2, D3 and D4

*View from the rear of the front display panel*



The terminal type is a spring cage type contact. There is a slot provided to use an insert/release tool. The tool is a 2.0 mm x 0.4 mm wide flat blade screw driver. Inserting the tool opens the cage contact and allows one or two bare wires to be inserted. Removing the insertion tool with bare conductor inserted will lock the connection.



*View from the front of the instrument showing the display connector.*

### **Once Instruments are Wired and In Place**

Connect the display to the port on the instrument. If the Split Screen Display Mode is not enabled, the user will be connected to a single unit.

Enter the Display->Split Screen menu to enable the Split Screen Display Mode. Here you can send a Discover command and the display will find all compatible instruments on the RS-485 Display Network. The product serial codes for each instrument will be listed as they are found. Once the discovery process has completed the menu will switch to the Display Order interface and attempt to connect to each discovered instrument. As instruments connect their Instrument IDs will be displayed next to their product serial codes.

### **Reordering Units**

When a Discovery completes or when Display Order is selected in the Display->Split Screen menu, the Display Order interface will open. The order which instruments are listed determines their locations on the Split Screen Summary Page. Instruments are displayed left to right, top to bottom.

From the front panel display, use the UP and DOWN buttons to select unit to move to another location. Press enter to select the unit. Use UP and DOWN button to move it to the desired location. Once in the desired position, press Enter do complete the move. Repeat with any other unit you wish to move in the display.

1	2
3	4

### **Hiding Units by Changing the Number of Units to Display**

The Num Display parameter sets the number of instruments to display on the Split Screen Summary Page. Sections higher than the number of instruments to display are left blank and cannot be selected from the Split Screen Summary Page.



# Chapter 8

## Security



Chapter 8 covers the security menu, which allows the user to lock out different levels of the menu hierarchy. The user configurable security settings only limit access through the front panel to ensure the consistency of the instrument setup and weighing process. Parameter configuration through the network is unaffected by these security settings.

### Display Security Options

Lock Enabled	Operation
Display	Display is blank; and the Mode, Tare, Zero, and Configuration buttons are disabled. Pressing ENTER jumps to the password prompt.
Keypad	Display is active; and the Mode, Tare, Zero, and Configuration buttons are disabled. Pressing ENTER jumps to the password prompt.
Configuration	Display is active, and the Mode, Tare, and Zero buttons are active; but the configuration button is disabled. Pressing CONFIG jumps to the configuration password prompt.
Read Only	Display is active, and the Mode, Tare, and Zero buttons are active, the configuration button is active but no parameters can be modified.
Calibration	Display is active, all buttons are active, and all the parameters except the calibration parameters can be modified.
No Locks Enabled	When no locks are selected, the display is active, all buttons are active, and all the parameters can be modified.

The current status and password for each level of security can be read and changed through the web browser if using an Ethernet connection, or through the serial interface.

To access or modify the security parameters through the front panel display, a password always needs to be entered before a lock can be enabled or disabled or the password modified. Note, that as the password can be read over the network, any security password can always be over written if the local operator enters an incorrect password.

The changes to the calibration and read only security features are updated when you exit the security submenu and return to the configuration menu; while changes to the display, keypad, or configuration security settings are updated when the operator exits the configuration menu.

The factory default for the security menu is to disable all lock modes and to preset each of the security passwords to 1234.

## The Display Lock

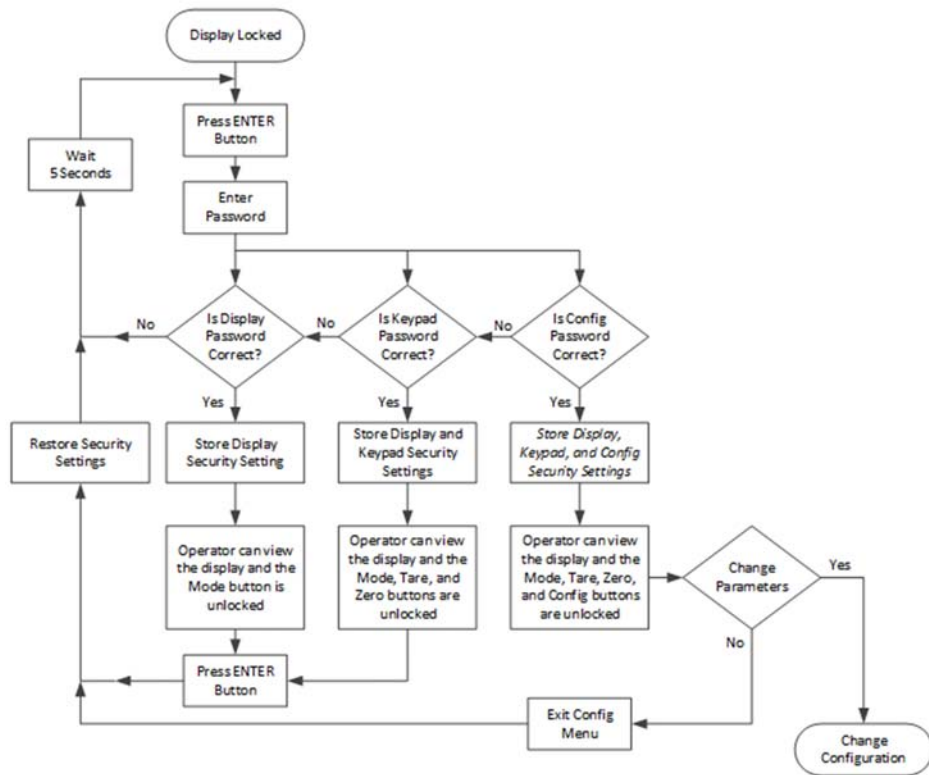
This security setting blanks the front screen so the current weight reading on the scale cannot be observed; and while the display is locked the Mode, Zero, Tare, and Configuration buttons are disabled regardless of the keypad lock or configuration lock settings; as enabling these buttons without the operator being able to read the front panel display would lead to process errors.

If the ENTER button is pressed the “Enter Password” page will appear on the display. At this level of security the operator can enter one of three possible passwords for the display lock, the keypad lock, or the configuration lock.

The display lock flowchart below shows the options and features when the display lock is enabled.



**Figure 1: Display Lock Flowchart**



The following list explains the operation and features available if the correct 4 alphanumeric character password is entered by the operator.

**1 Display Password:**

- The current display lock setting is saved.
- The display lock is set to disabled and the MODE button is unlocked, enabling the operator to view the current Gross or Net weight on the front panel display.
- Pressing the ENTER button a second time returns the display lock to its original setting.

**2 Keypad Password:**

- The current display lock and keypad lock settings are saved.
- The display lock is set to disabled and the MODE, TARE, and ZERO buttons are unlocked, enabling the operator to view the current Gross or Net weight on the front panel display, and to tare or zero the scale.
- Pressing the ENTER button a second time returns the display lock and keypad lock to their original settings.

### 3 Configuration Password:

- The current display lock, keypad lock, and configuration lock setting are saved.
- The display lock is set to disabled and the MODE, TARE, and ZERO buttons are unlocked, enabling the operator to view the current Gross or Net weight on the front panel display, and to tare or zero the scale.
- The CONFIG button is also enabled allowing the operator to open the configuration menus.

When the operator exits the configuration menu, the display lock and keypad lock are set to their original settings. If no changes to the configuration lock or password parameters were made the configuration lock is also set to its original lock settings; otherwise the latest configuration security settings are used.

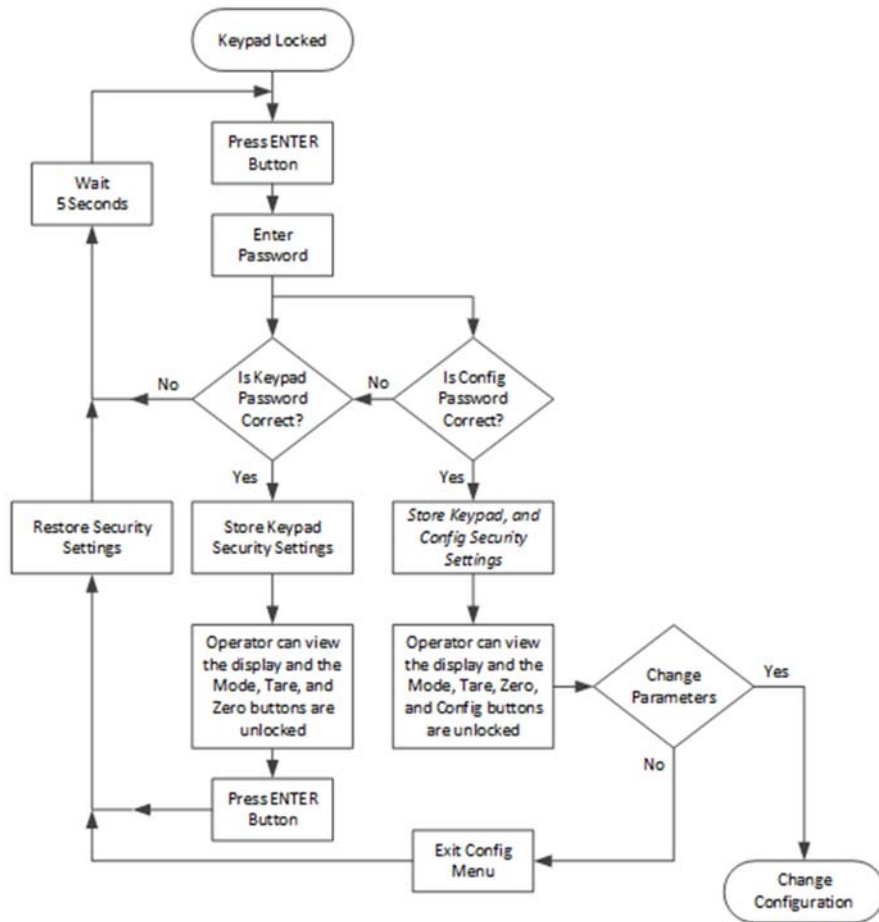
## The Keypad Lock

While the keypad lock is enabled the Mode, Zero, Tare, and Configuration buttons are disabled regardless of the configuration lock setting.

If the ENTER button is pressed the “Enter Password” page will appear on the display. At this level of security the operator can enter one of two possible passwords for the keypad lock or the configuration lock.

The keypad lock flowchart below shows the options and features when the keypad lock is enabled.

**Figure 2: Keypad Lock Flowchart**



The following list explains the operation and features available if the correct 4 alphanumeric character password is entered by the operator.

**1 Keypad Password:**

- The current keypad lock setting is saved.
- The MODE, TARE, and ZERO buttons are unlocked, enabling the operator to tare or zero the scale.
- Pressing the ENTER button a second time returns the keypad lock to its original setting.

**2 Configuration Password:**

- The current keypad lock and configuration lock setting are saved.

- The TARE and ZERO buttons are unlocked, enabling the operator to tare or zero the scale.
- The CONFIG button is also enabled allowing the operator to open the configuration menus.
- When the operator exits the configuration menu, the display lock and keypad lock are set to their original settings. If no changes to the configuration lock or password parameters were made the configuration lock is also set to its original lock settings; otherwise the latest configuration security settings are used.

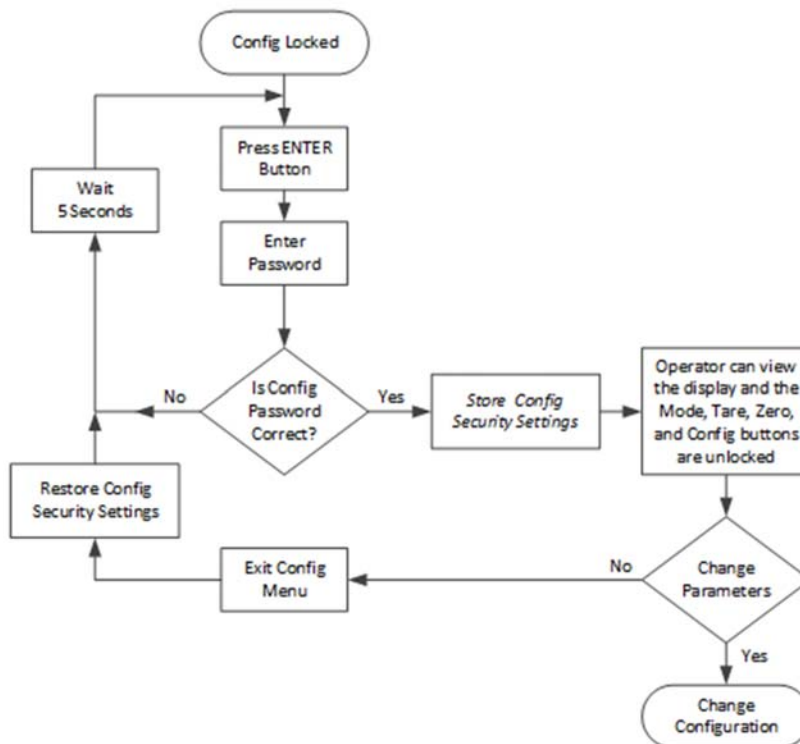
## The Configuration Lock

While the configuration lock is enabled the Configuration button is disabled, preventing the operator from viewing or modifying any instrument parameters.

If the CONFIG button is pressed the “Enter Password” page will appear on the display. At this level of security the operator can enter only one possible password for the configuration lock.

The configuration lock flowchart shows the options and features when the configuration lock is enabled.

**Figure 3: Configuration Lock Flowchart**



The following list explains the operation and features available if the correct 4 alphanumeric character password is entered by the operator.

### 1 Configuration Password:

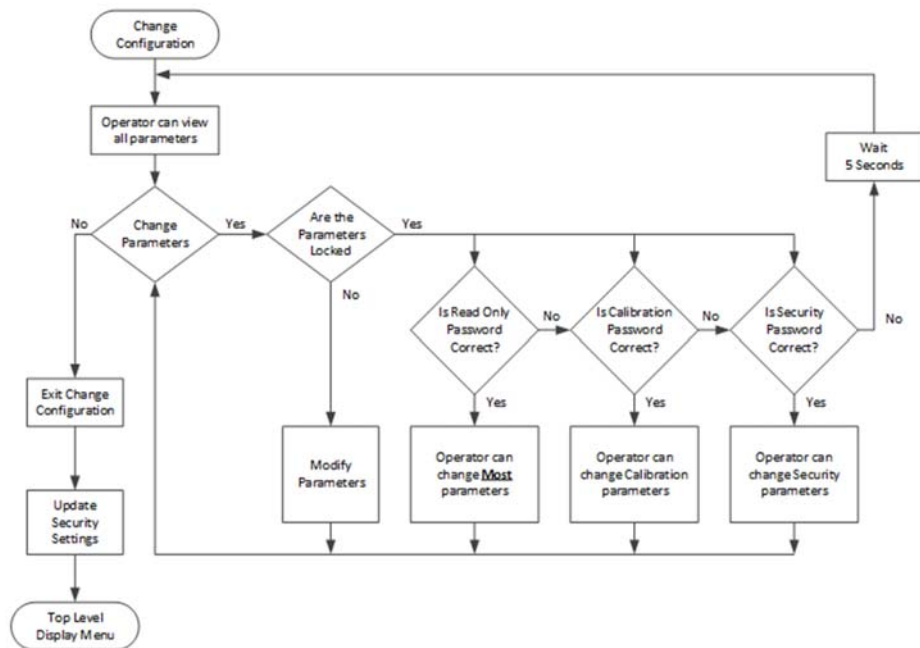
- The current configuration lock setting is saved.
- The CONFIG button is also enabled allowing the operator to open the configuration menus.
- When the operator exits the configuration menu, if no changes to the configuration lock or password parameters were made the configuration lock is set to its original lock settings; otherwise the latest configuration security settings is used.

## The Read Only, Security & Calibration Locks

There are three additional levels of security once the operator is within the configuration menu. These limit access to sensitive parameter settings such as calibration, security settings, and network settings.

If the operator has been given permission to access the configuration menu, the operator will at a minimum be able to view all the parameters except the security parameters.

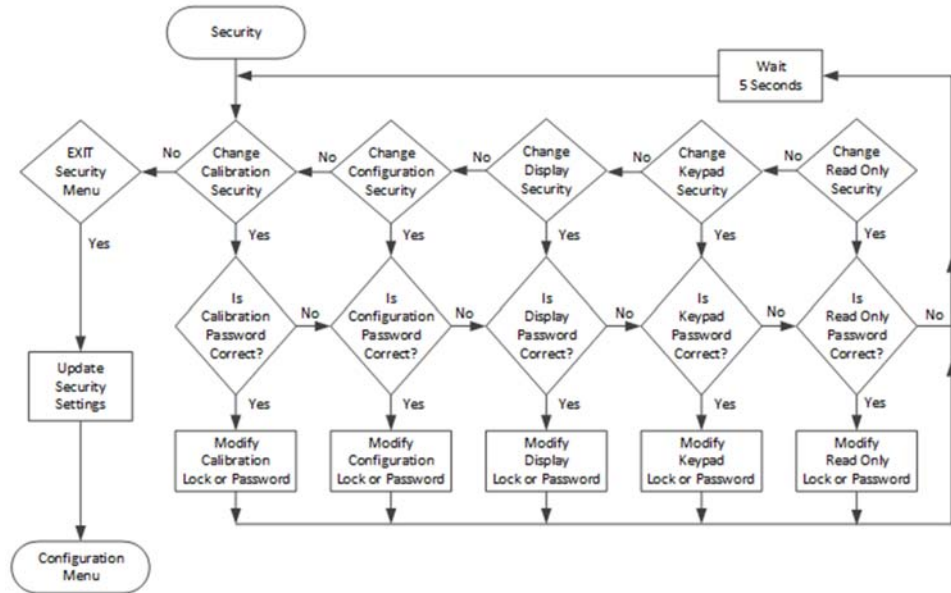
Figure 4: Parameters Lock Flow Chart



## Modifying the Security Parameters

To view or modify the security parameters use the UP or DOWN button to select the security menu then press ENTER.

Figure 5: Parameters Lock Flow Chart



To modify the security feature use the UP or DOWN button to select the security feature then press the ENTER button. The password dialog box will appear; if the correct 4 alphanumeric character sequence is entered the operator will be able to either enable or disable the security feature or change the password. Note a password must consist of a 4 alphanumeric character sequence to be accepted as a valid password.

If an incorrect password is entered the menu will be returned to the security submenu.

The updated security features for the Read Only Lock and Calibration Lock will not be active until the operator leaves the security menu, any changes for the Configuration Lock, Keypad Lock, or Display Lock will not be active until the operator exits the configuration menu and returns to the top level display.

## Modifying the Calibration Parameters

The calibration security locks out users from seeing any calibration parameters until you enter the correct calibration password.

To modify the calibration parameters use the UP or DOWN button to select the calibration menu and press the ENTER button. The password dialog box will appear; if the correct 4 digit alphanumeric character sequence is entered the calibration lock will be disabled until you exit the calibration menu; at which time the calibration lock will be automatically reset to the original setting.

If an incorrect password is entered the menu will return to the configuration menu.

## **Modifying the Read Only Parameters**

The security and calibration parameters have their own password protection. The parameters discussed in this section are those listed under communication, diagnostics, display, filter, language, operation, and setup.

With the exception of the security and calibration parameters, all parameters can be read by the operator once the operator is navigating inside the configuration menu; however the ability to change these parameters can be password protected.

If the read only password is enabled and a parameter is selected, the password dialog box will appear. If the 4 alphanumeric character sequence is entered the read only lock will be disabled until you exit the configuration menu; at which time the configuration lock will be automatically reset to the original setting.

If an incorrect password is entered the menu will return to the configuration menu.





# Chapter 9

## Troubleshooting



Chapter 9 provides procedures for troubleshooting the electrical, mechanical and firmware elements of the HI 6300 series instrument and for using Hardy's Integrated Technician (IT®) software utility to isolate problems. Flow charts provide troubleshooting procedures for the onroller, load cells, and cabling.

### NOTE

Never run Hardy's Integrated Technician testing while in a production mode. The reported weight readings will not be correct and can cause equipment to start or stop unpredictably.

## Disassembly and Reassembly Notes, Warnings & Cautions

**WARNING - EXPLOSION HAZARD - DO NOT REPLACE COMPONENTS UNLESS POWER HAS BEEN SWITCHED OFF OR AREA IS KNOWN TO BE NON-HAZARDOUS.**

**AVERTISSEMENT – Risque d'explosion- Ne pas remplacer les composants à moins que la source d'alimentation soit éteinte ou que la zone est classifiée non dangereuse.**

**WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS**

**AVERTISSEMENT – Risque d'explosion – Ne pas déconnecter l'équipement à moins que la source d'alimentation ait été mise en position « éteint » ou que la zone soit classifiée non dangereuse.**

Always disconnect the power cord before disassembling.

- Always replace broken or damaged modules or hardware immediately.
- Always check to be sure that no loose parts are sitting on printed circuit boards or electrical connectors or wires when disassembling or reassembling.
- Always protect printed circuit boards from electrostatic discharge (ESD). Always use approved ESD wrist straps and anti-static pads.

This chapter describes several tests that can shorten the time for troubleshooting. Most problems require the use of two or more tests to determine the cause.

If a problem is isolated to a load cell, it may not mean the load cell is the damaged component. Mechanical imbalances and system piping stress (lack of piping flexures, pressure hoses draped over, pipes etc.) can make a load cell or weight controller seem to be the problem.

If you are in doubt as to how to resolve a problem or if you need assistance, review Hardy Process Solutions Web-tech at <http://www.hardysolutions.com>. Web-tech is updated often and is available 365 days a year 24/7. It contains frequently asked questions to aid you in troubleshooting, and it provides a form for requesting additional information and answers to questions, with no waiting on hold. Located under the Support menu, select the WebTech Knowledge base. Customer Service is also available from 6:30AM to 5:30 PM Pacific Standard Time. For direct factory support call Hardy Process Solutions Customer Service at:

- 1** Factory Technical Support in the US and Canada:1-800-821-5831
- 2** Technical Support outside the US and Canada:1-858-278-2900

## Error Messages

- A/D Convert Error! - Load Cells input out of range.
- Motion Error! - Check Motion Tolerance Settings and Retry
- Too Lo Error! - Verify that the load cell signal level is 0-25 mV. Verify that there is enough weight on the scale.
- Too Hi Error! - Verify that the load cell signal level is 0-25mV. Verify that there is too much weight on the scale.
- No C2 Sensor! - Instrument did not detect a C2 Load Sensor
- CAL Failed! - Too few counts between Zero and Span.
- C2 Caps Unequal! - Different load cell capacities (For example 50 lbs capacity load cell and 100 lbs capacity load cell on one system. Make the load cells equal by removing the odd load cell and replacing it with a load cell that is equal to the other's capacity.
- HI/LO Too Close! - Zero and Span are not more than 1,000 counts from each other or there is no change or negative change. Reset either so the counts are more than 1,000 counts of each other.
- Not Allowed! - Value entered is outside the range allowed. Try another value.
- Need Cal with ITJBOX - IT summing card is not installed. Install an IT summing card then do a Calibration with the card installed to access the IT information.

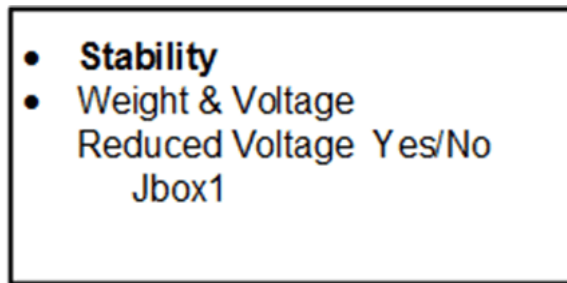
## Trouble Shooting Using Integrated Technician (IT<sup>®</sup>)

The front panel display for the HI 6300 instrument's Stability test is shown below. To navigate this screen, select a test on the right using the right and left arrows with exit using the left arrow when you are at the first out of the five positions.

The test displays are live readings and only available if you have an IT summing junction card, maximum one J-boxes and 4 channels.

The test for pass or fail may take 30 seconds to settle. It will always show the load cells as fail when the test is started.

The reduced voltage is a Yes or No selection. Then run the J-box test 1 as appropriate.



A more detailed explanation of each section of the test follows below:

### Stability Test ALL

Stability:	Gross = 0.9lb	
	RAW	Waversaver
Mean	32918	32993
Variation	0.17	0.00
Results	OK	OK
mV/V	0.0184	
RTZ	Pass	

## PASS/FAIL and Stability Test

This test computes the variation of the A/D counts. The results show the variance and indicate pass or fail. The test is valid to help break down the problem into smaller divisions. Unstable test results can be caused by an internal A/D processor fault, grounding, power connection, EMI/RFI above specified CE limits, or noisy load cell input.

These numbers reflect a weight change at the smallest measurement of the filter setting, the internal analog-to-digital converter computer register.

## WAVERSAVER TEST

These numbers also reflect weight change at the smallest measurement, the internal analog-to-digital converter computer register. The internal RAW A to D counts and filtered A to D counts are displayed for a comparison. A FAIL on the RAW counts and pass on the filtered counts indicates the WAVERSAVER filtering is necessary and functioning properly.- except that this reading is averaged using the WAVERSAVER and AVERAGES setting parameter from the controller's configuration. Using the maximum number of internal averages and the 10ms update speed equals a maximum delay of 2.55 seconds

## Weight and Voltage ALL

This test section looks at the readings from ALL the load cells to test overall system performance and signal voltage readings. This test works for most load cell types.

Further investigation to isolate system problems requires the use of hand tools and multi-meters or the INTEGRATED TECHNICIAN Junction or Summing Box and using the IT<sup>©</sup> Test section.

- **Stability**
- **Weight & Voltage**  
Reduced Voltage Yes/No  
Jbox1

### NOTE

*INTEGRATED TECHNICIAN<sup>®</sup> (IT) is a registered trademark of Hardy Process Solutions.*

**Weight** This displays the amount of force seen by all load cells installed in the summing junction box. Further investigation to isolate system problems will require the use of hand tools and Multi-meters or the Integrated Summing Junction box and using the IT test section.

Millivolt/Volt equals the output from a load cell per each volt of excitation. The HI 6300 series reads the load cell output in mV/V which is a higher resolution (4 decimal places) reading than a mV reading, thereby providing more sensitivity to enable you to troubleshoot the condition of the load cell in question under certain conditions. . Load Cells are rated in Millivolts/Volts. **mV/V** are DC voltage signals between 0-5.0000 mV/V.



**HARDY**  
PROCESS SOLUTIONS

Local Links:

HOME

CONFIGURATION

www Link:

HI 6300 Series  
Online Support Site  
(Contact Info, Manuals,  
News, downloads, etc.)

Integrated technician requires a Hardy IT JBOX

Jbox1Sensors 4 ▾

Sensor	weight	RTZ	mV/V	raw variation	raw result	waversaver variation	waversaver result
1	0.0 lb	Pass	0.0204	6.49	Pass	9.43	Pass
2	0.0 lb	Pass	0.0323	1.22	Pass	283.37	Fail
3	0.0 lb	Pass	0.0347	3.01	Pass	12.29	Pass
4	0.0 lb	Pass	0.0351	5.14	Pass	4.01	Pass
REF			0.4982	0.22	Pass	443161.84	Fail

Do IT test

Sensor	weight	RTZ	mV/V	raw variation	raw result	waversaver variation	waversaver result
1							
2							
3							
4							
REF							

Do IT test, reduced voltage

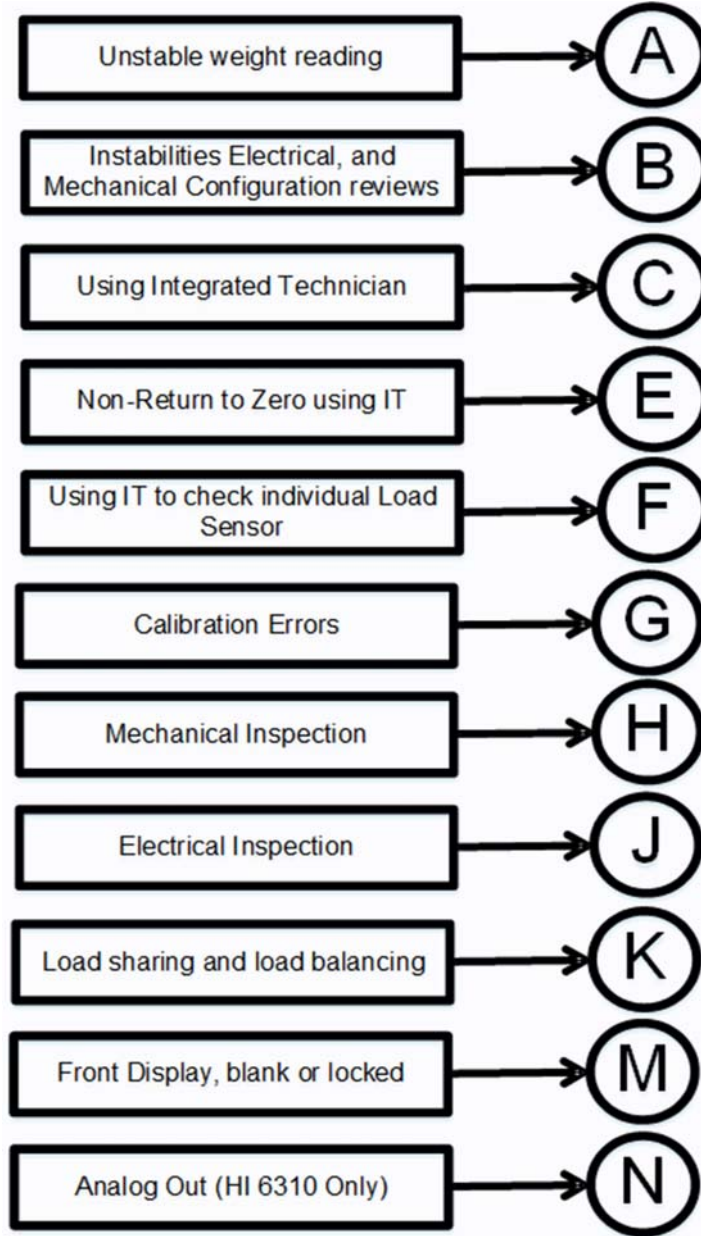
[Home](#) - [Configuration](#) - [HI 6300 Series Online Support Site](#)

Hardy Process Solutions  
San Diego, California, USA  
Tel: +1 (858) 278-2900 - (800) 821-5831  
Fax: +1 (858) 278-6700  
[www.hardysolutions.com](http://www.hardysolutions.com) - [hardyinfo@hardysolutions.com](mailto:hardyinfo@hardysolutions.com)  
[hardysupport@hardysolutions.com](mailto:hardysupport@hardysolutions.com)

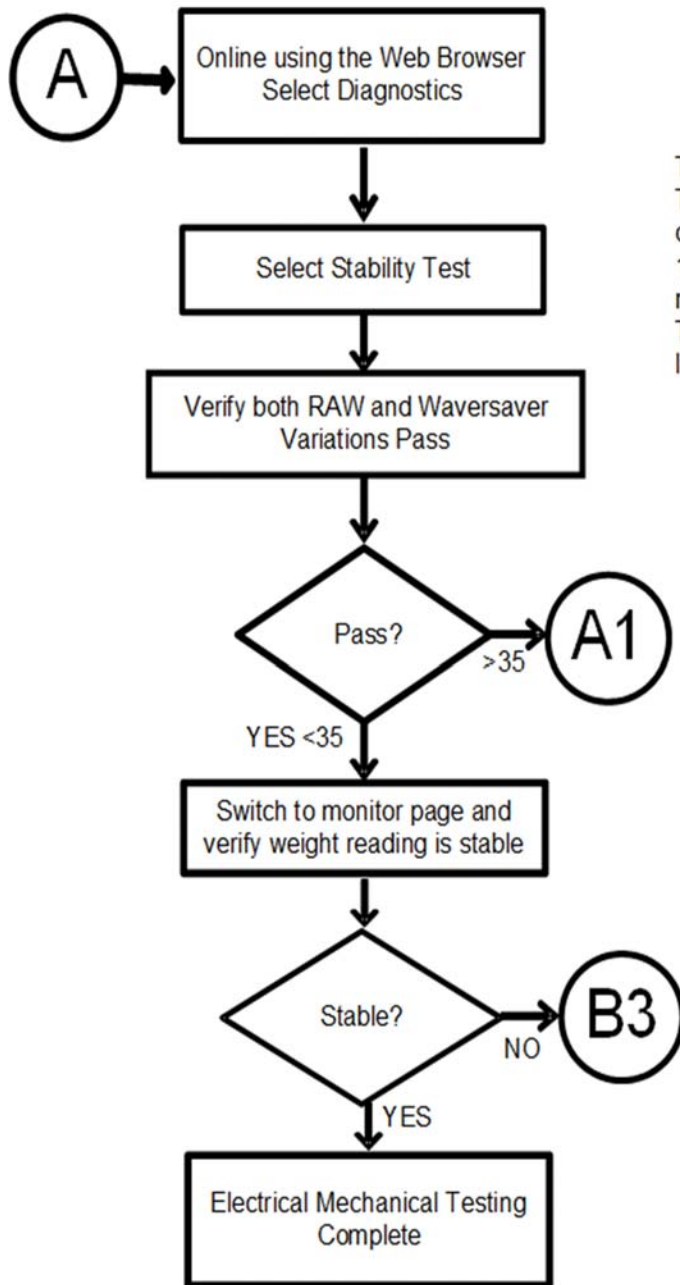
**NOTE**

*Warning: Do not install your summing board in areas susceptible to high vibrations. The relays on the board can chatter and affect your weight readings.*

## General Troubleshooting Flow Chart Index



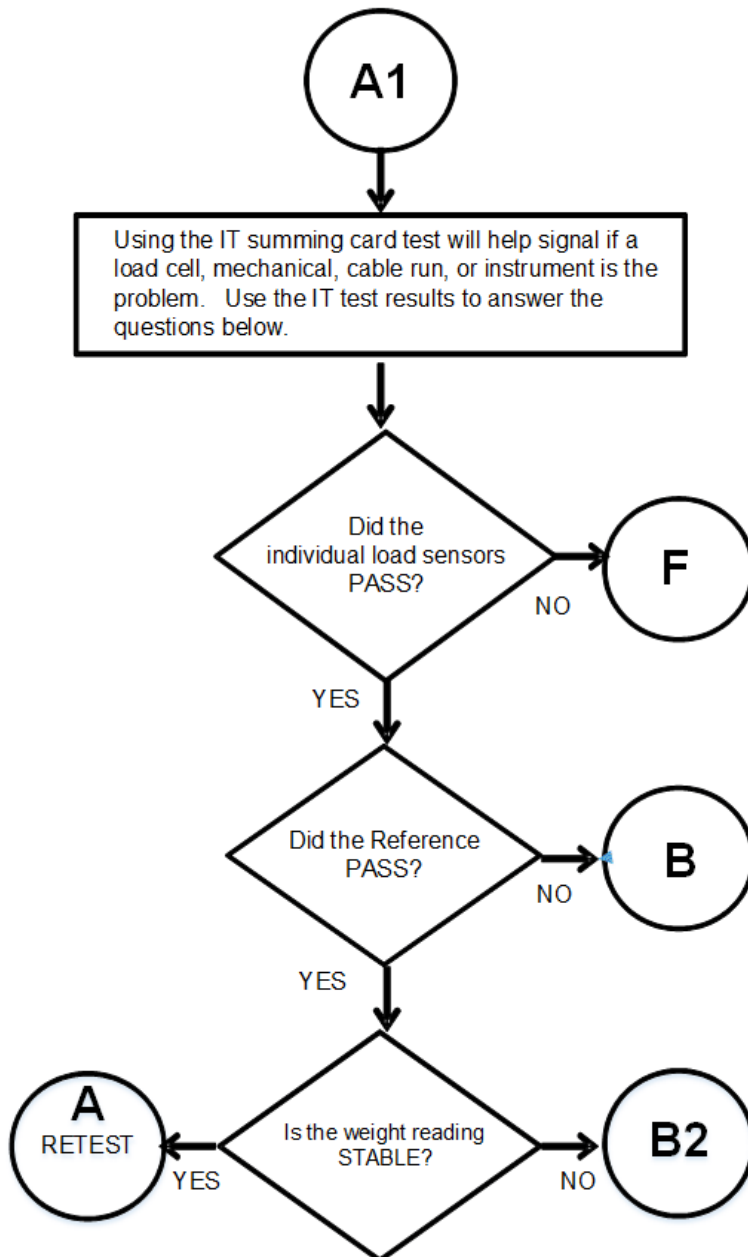
## A - Guideline Instability: Electrical and Mechanical review.



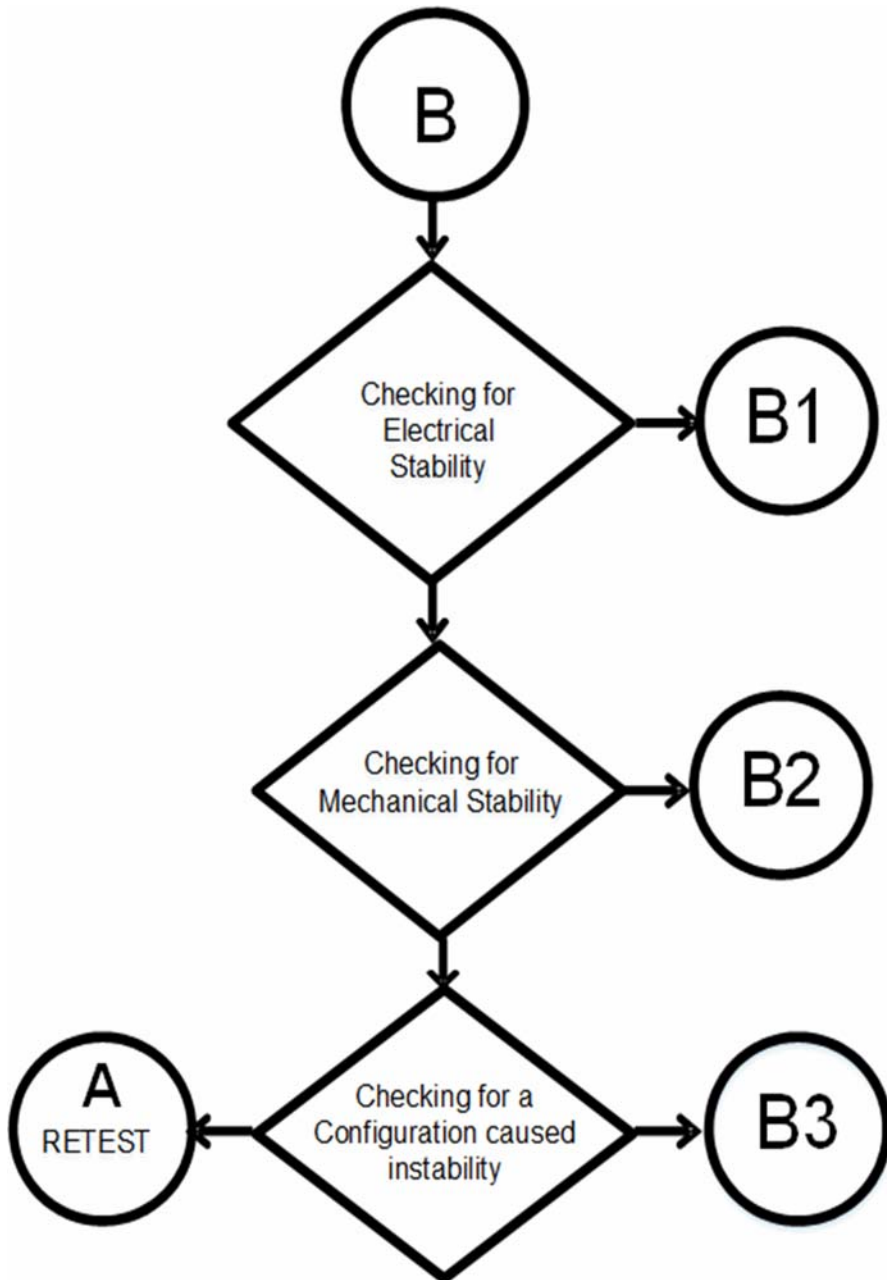
This test is Pass or Fail.  
The raw and filtered signal standard deviation is compared over the last 100 updates. The mean deviation must be less than 35 counts to pass. Tests internal and external signal levels for excessive signal variations.



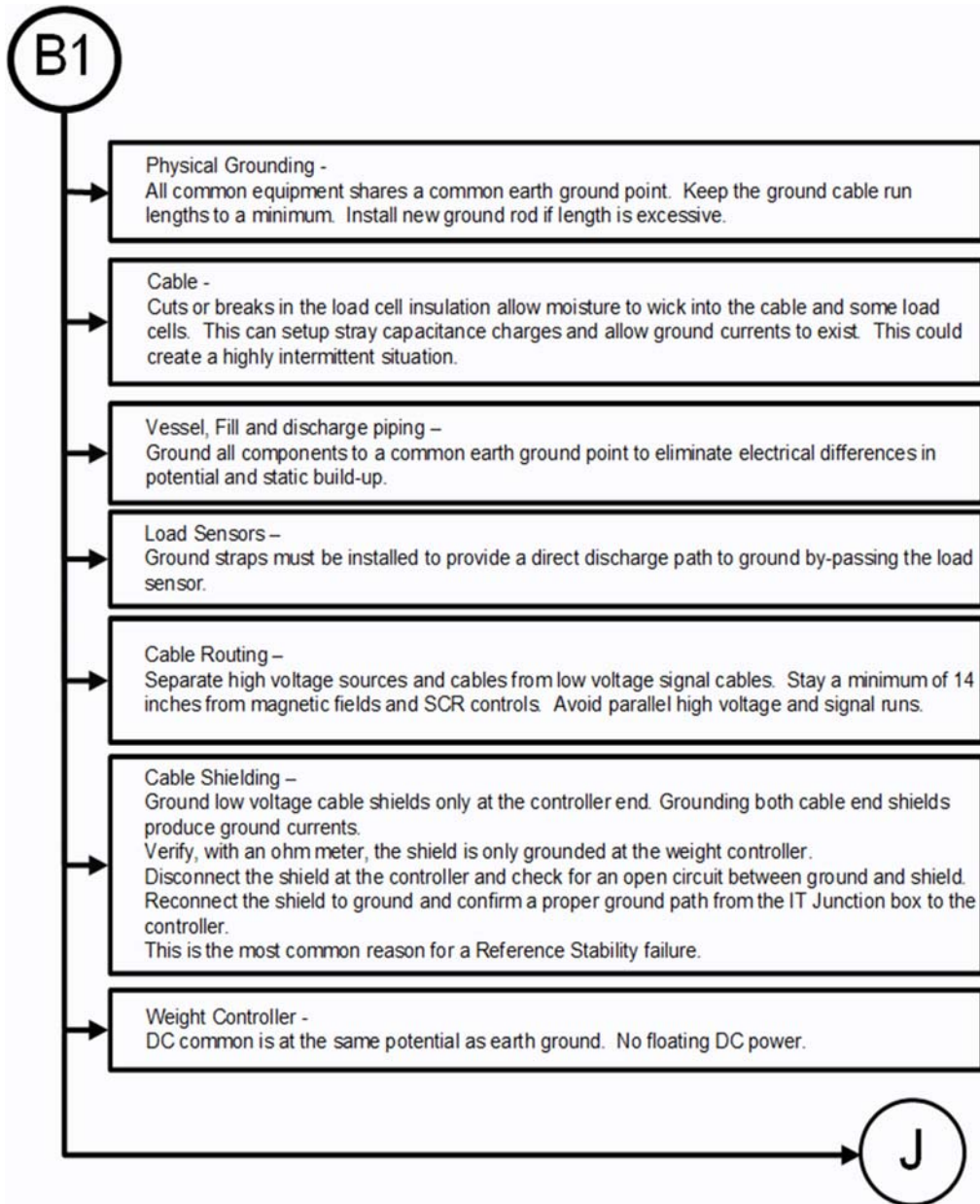
## A1. Checking for Unstable Components in a Weighing System



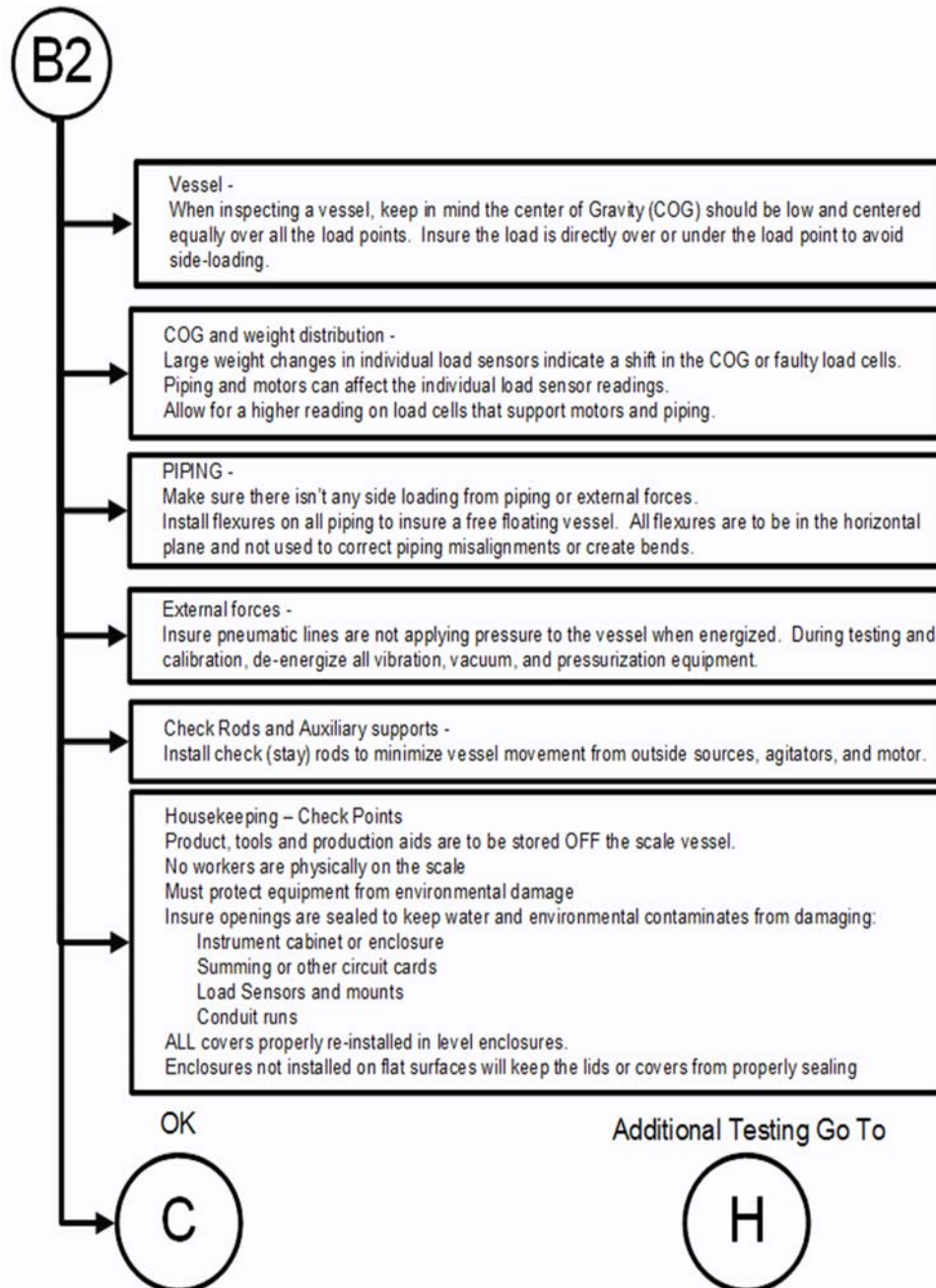
## B. Guidelines for Electrical, Mechanical or Configuration Issues



## B1 - Guidelines to Verify Electrical Installation



## B2 - Guidelines to Verify Mechanical Installation



## B3 - Guidelines to Verify Configuration/Filter Settings to Improve Stability

B3

### Filter Settings –

Incorrect WAVERSAVER settings can cause unstable weight readings.  
Adjust to the lowest WS setting that gives you a stable weight reading.  
Selections from the least to the highest is: OFF, 7 Hz, 3.5 Hz, 1 Hz  
Higher frequencies with low amplitude - select 7 Hz or OFF  
Low frequencies with high amplitude – select settings 3.5 Hz or 1 Hz

Averages are used to counter bumps and intermittent events.  
Start with 2-5 and increase as required.  
Excessive Averages will delay the final weight reading.

### Decimal Point selection –

Incorrect number of decimal points beyond the ability of the load cells will provide an unstable and unusable weight reading.

The number of decimal points should not exceed a 1:10,000 resolution. This is a level of stability described as a stable scale system. Your scale's performance will vary with filter settings.  
1:10,000 is a good starting point.

#### Example:

A 10,000 lbs scale would not have any decimal points. Adding a decimal point and a Grad size of 5 would expand the resolution to 1:20,000

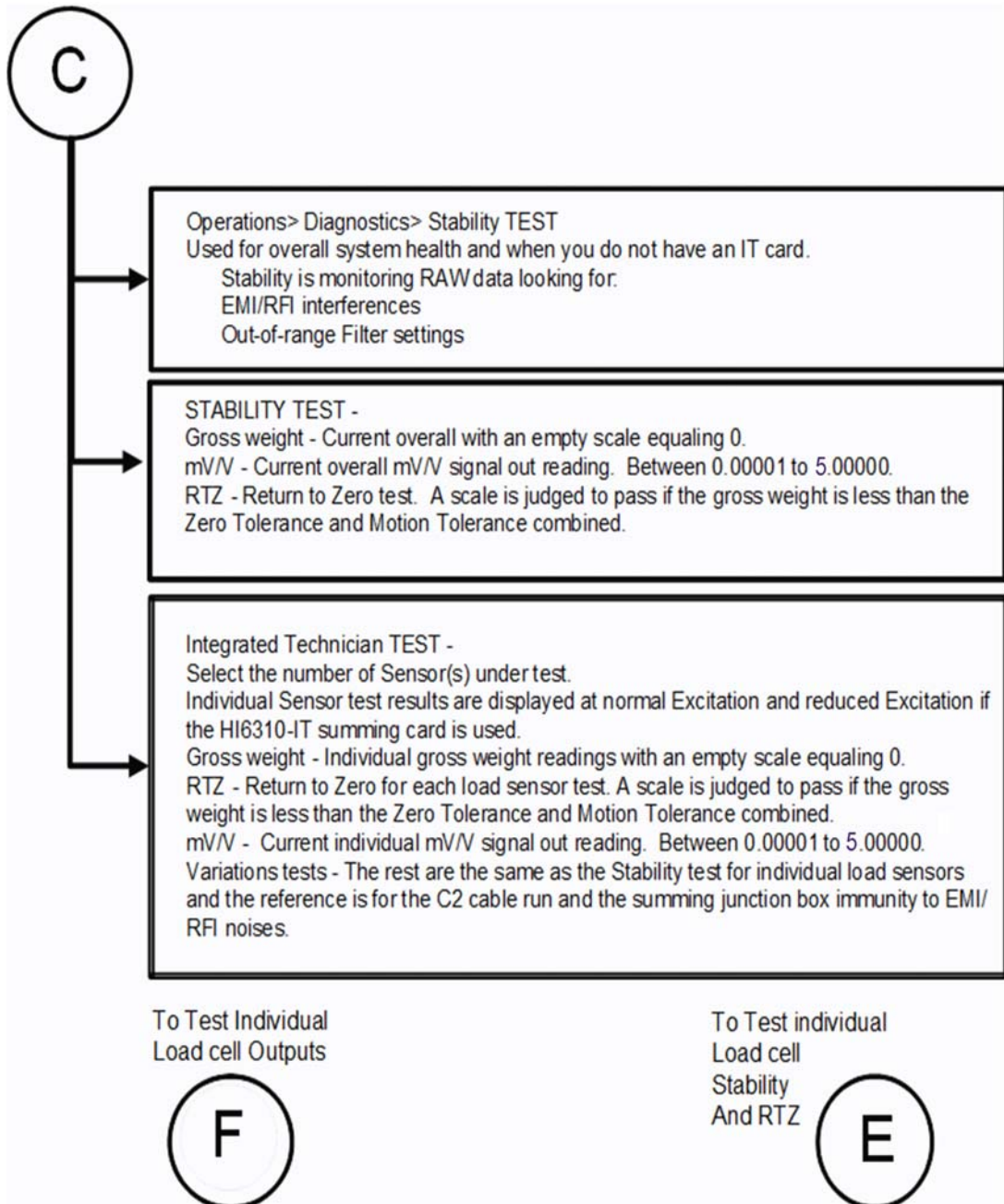
Graduation selections help select a more applicable weight reading setting.  
Use the Grad sizes as steps in between decimal point selections.

### Resolution –

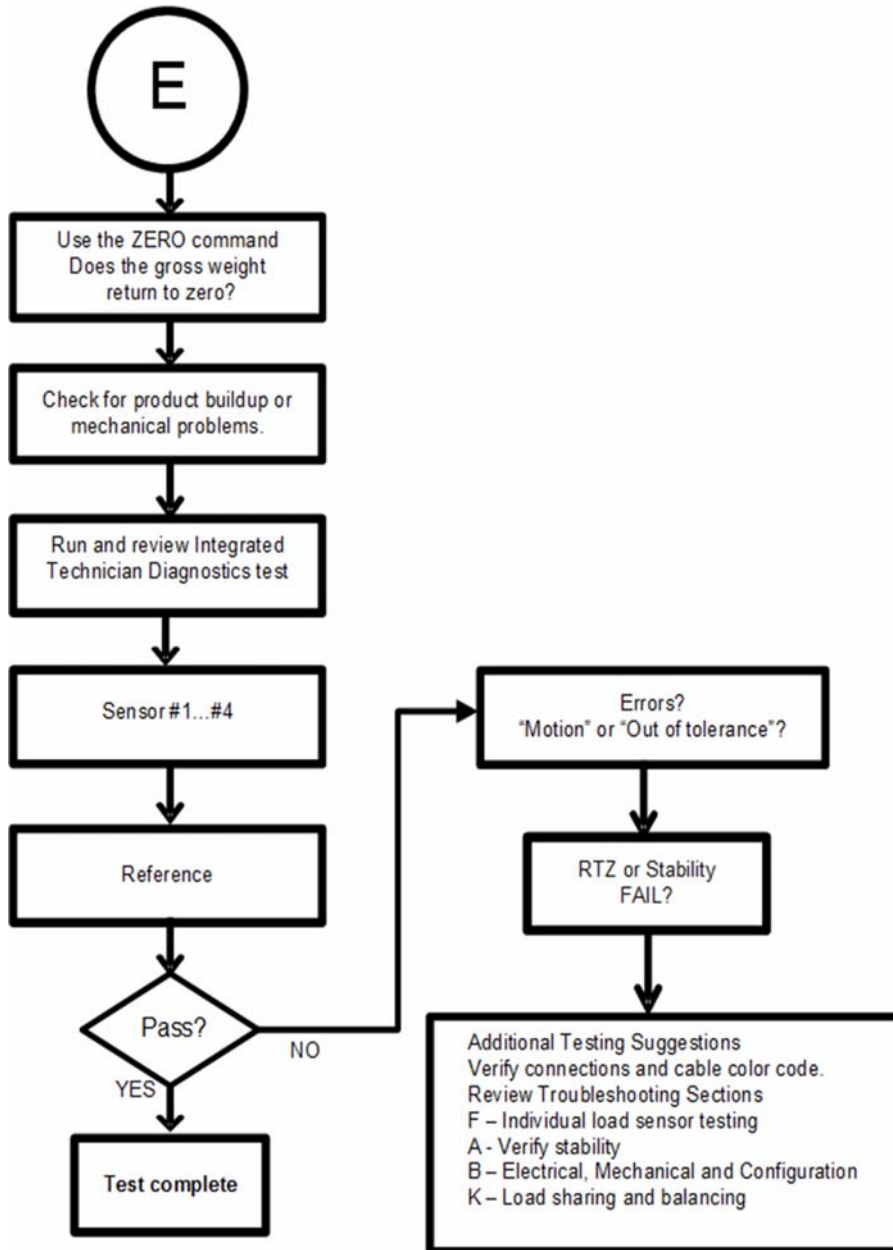
Resolution is the smallest expected scale increment or weigh reading step.  
1:30,000 is considered a very usable weight resolution, but may not be stable, and is considered the outside limits for decimal points and grad sizes.

C

## C - Integrated Technician and Stability Test Overview



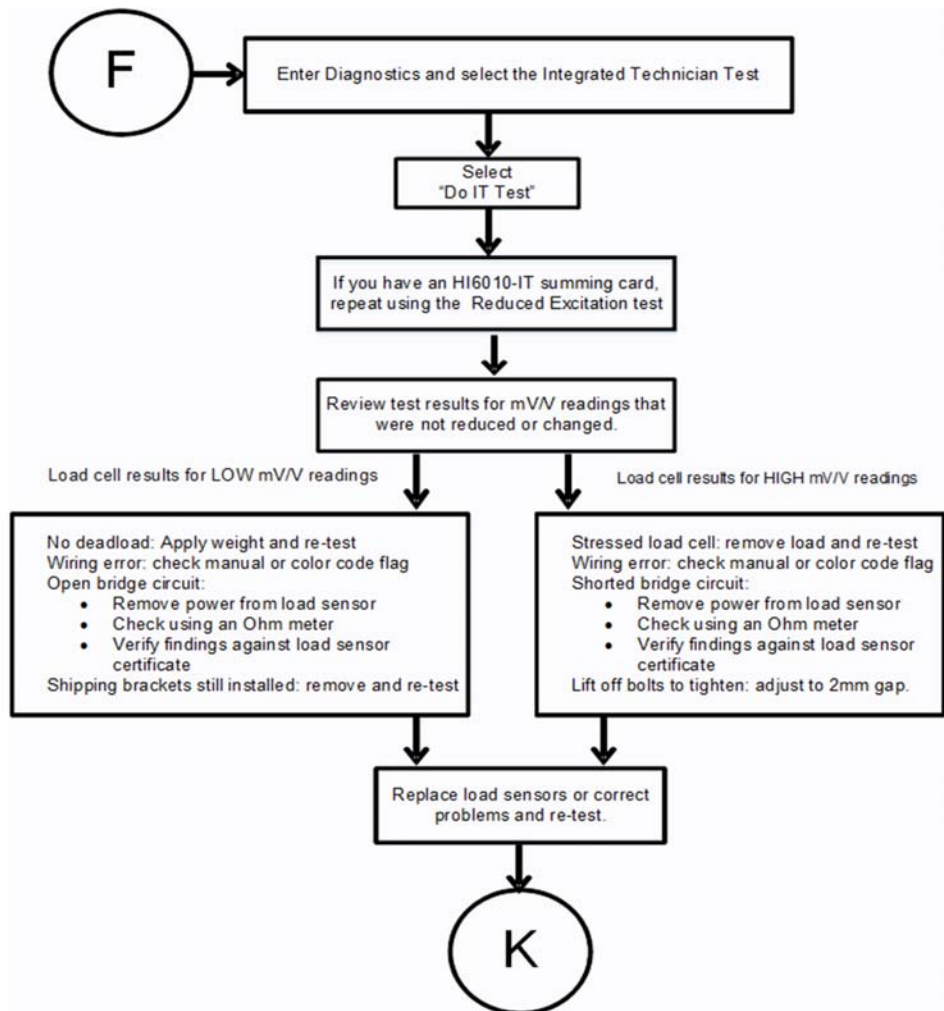
## E Testing for Non-Return to Zero (System with IT Summing Card.)



## F. Verify Individual Load Sensor Millivolt Output readings

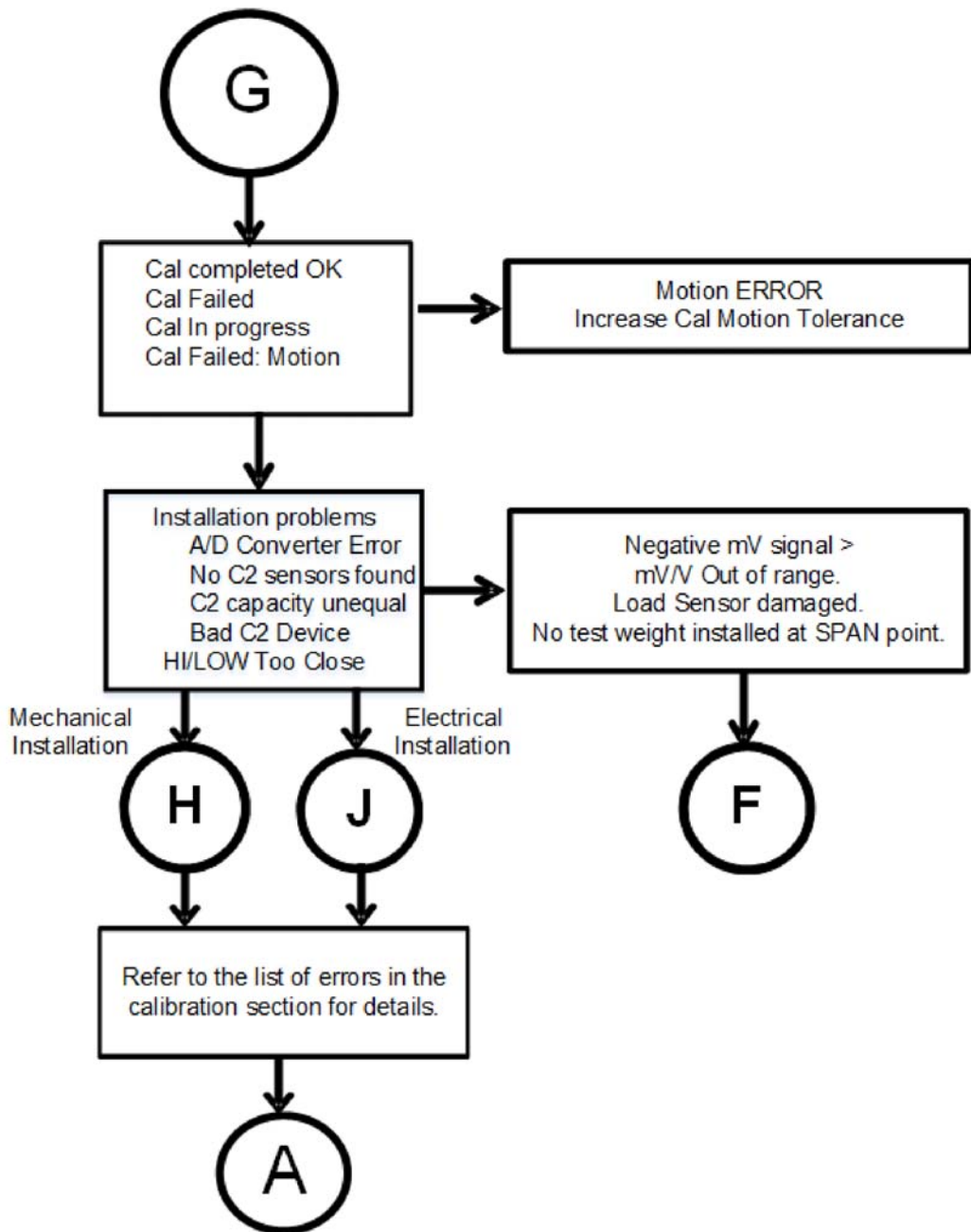
Testing an individual load sensor output requires an IT summing card or Millivolt meter with two decimal place resolution. To determine the sensitivity and parameters for your load sensor, use the load sensor certificate or read the C2 chip with the utility found under the Diagnostic menu.

Example: A 3mV/V Load sensor produces approximately 3.0000 mV/V at rated load. If the scale capacity is 1,000 lbs with 100 lbs of deadload, when empty the load point mV/V reading should measure 0.3000 mV/V. This number can be converted to mV by multiplying the mV/V results by 5. (5V excitation)

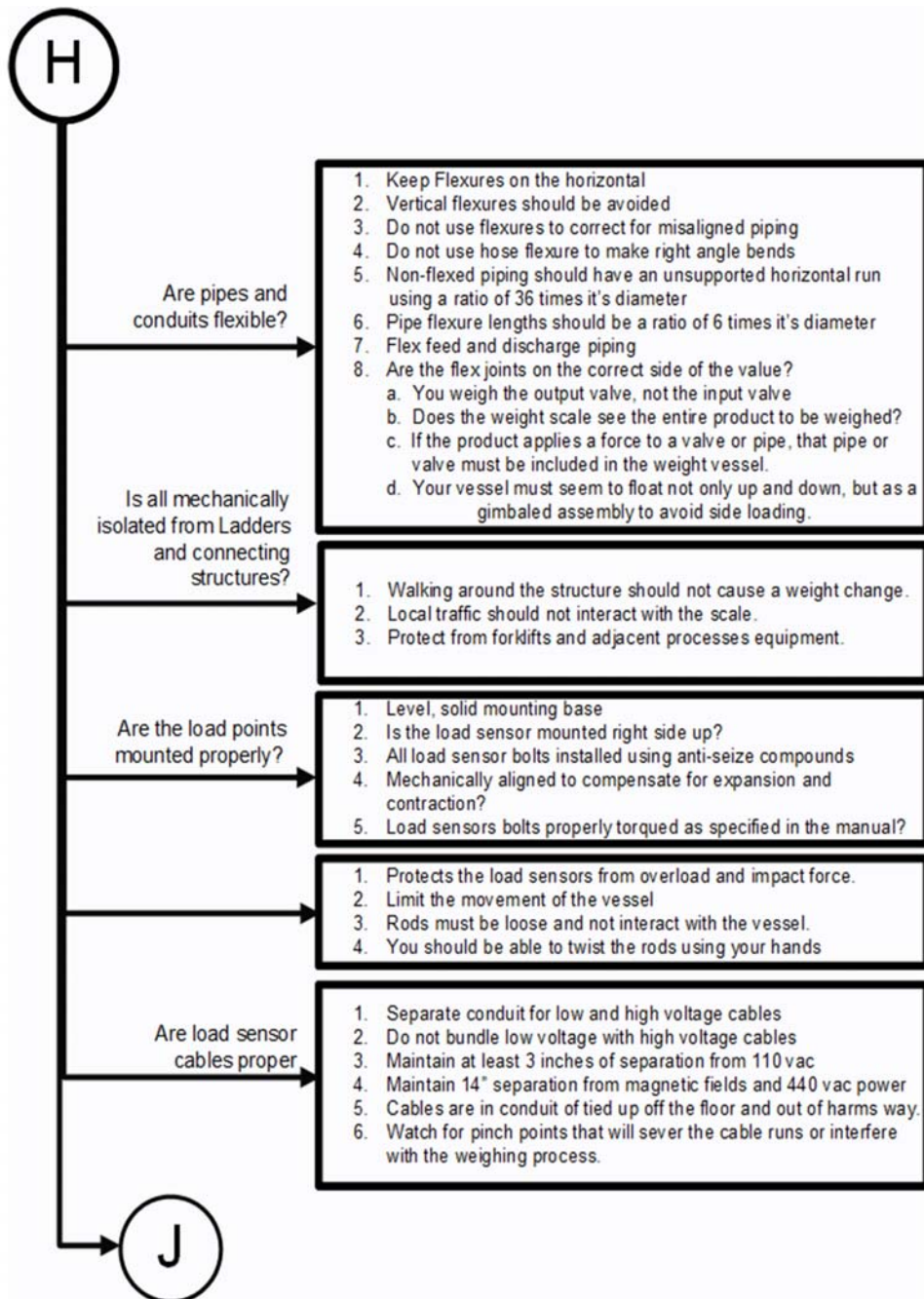




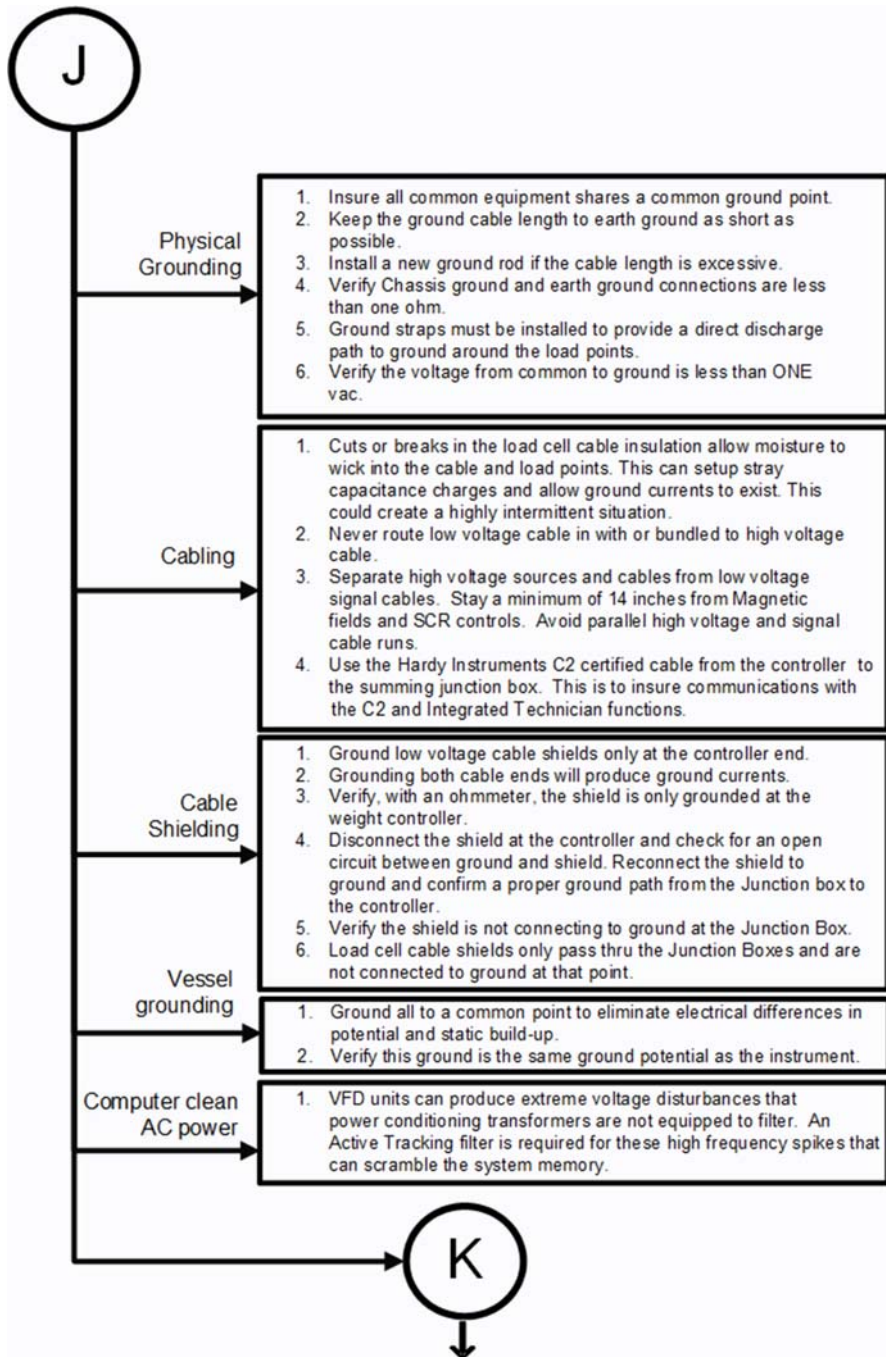
## G- Calibration Errors When Performing the Calibration



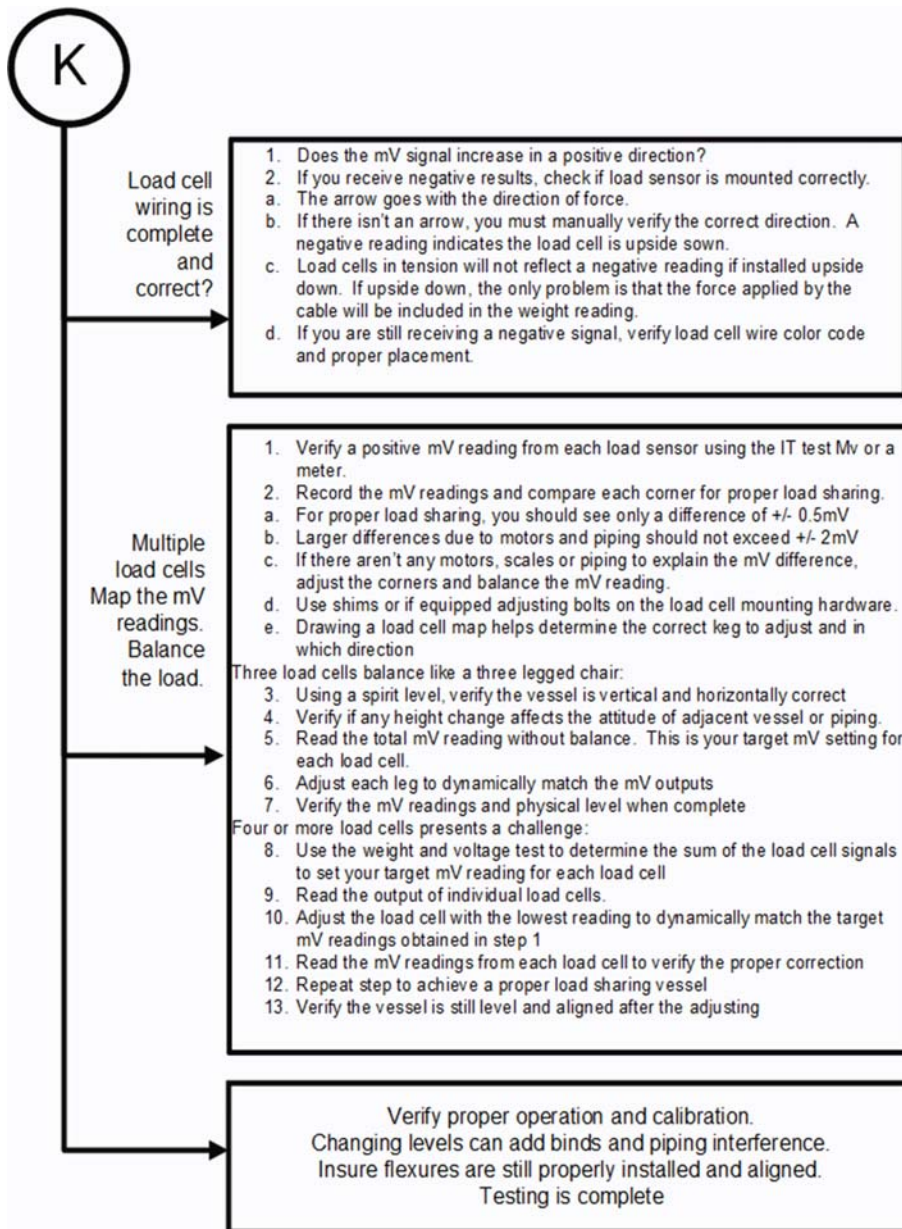
## H. Mechanical Installation



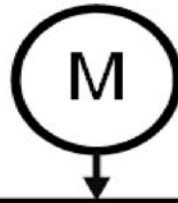
## J- Electrical Inspection



## K - Installation Check Points



## M. Weight Processor's Front Display is Blank or Locked

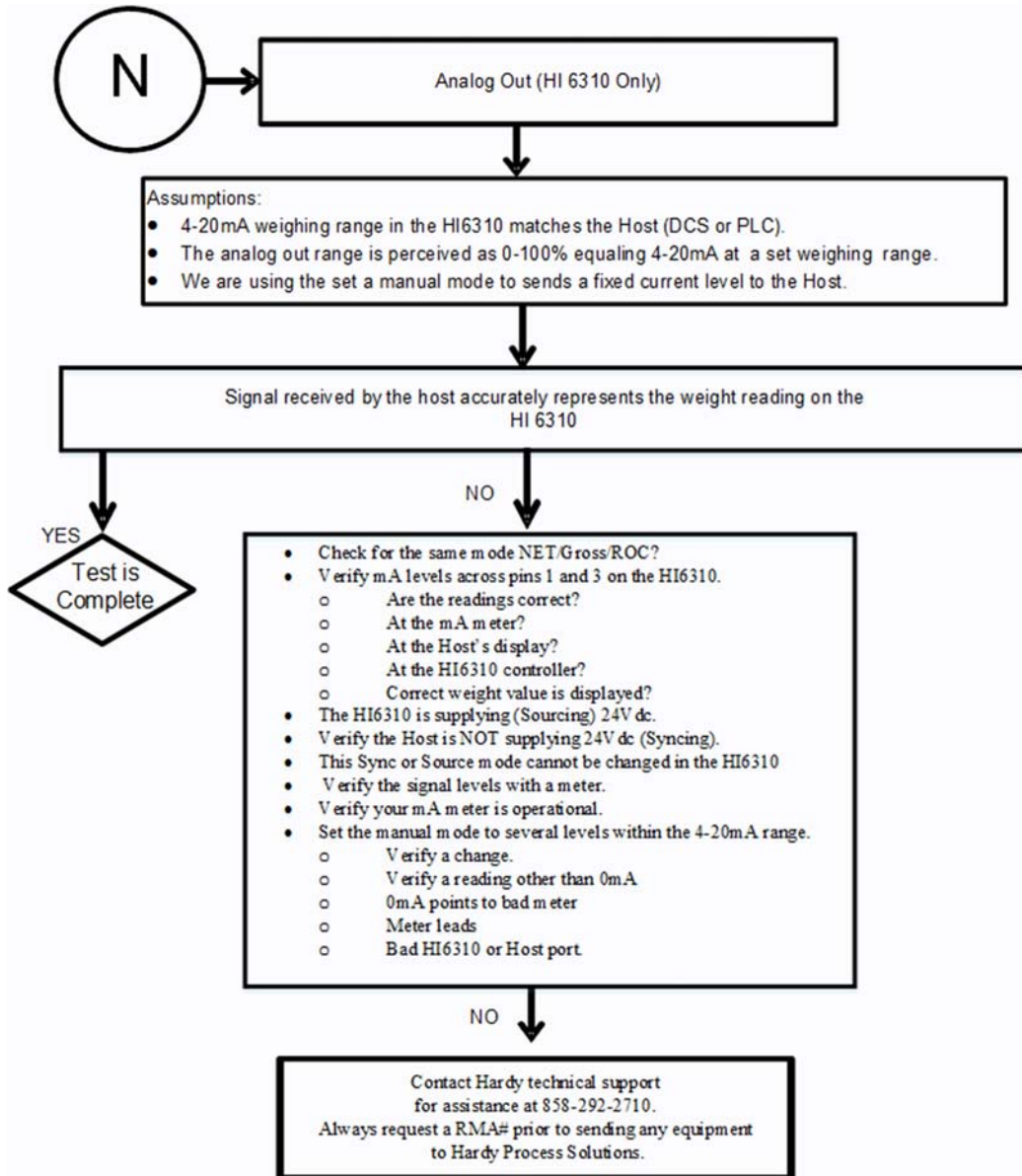


Verify input and output voltages

Display adjustments and Power saver mode

1. Is the voltage proper?
  - a. Check for broken connections and power switches.
  - b. Is there 5Vdc excitation voltage?
  - c. Is there 5Vdc C2 voltage?
2. Disconnect all connectors from the back panel except power.
  - a. Is the voltage correct?
3. If yes reconnect one at a time and re-check for proper voltage after each cable addition.
4. Is the system set for Power Saver mode?
  - a. Press on the scale enough to invoke Motion
  - b. Did the display restore?
5. Is the front display secured?
  - a. Press the enter button and look for any request for a password.
6. If the screen illumination is incorrect the display menu selection is not affected by the screen settings.
  - a. Enter the configuration/tools section and select the display settings.
  - b. Adjust as required observing the weight readings in the upper right hand corner.

## N. Analog Out (HI 6310 Only)



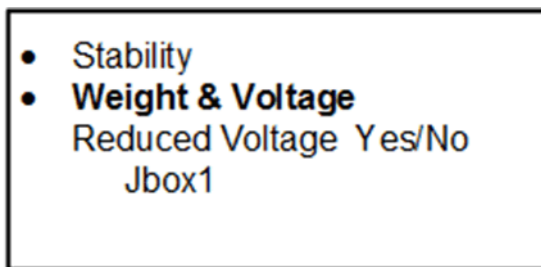
## Tests and Diagnostics

The Test and Diagnostics menus provide an expanded view of how the weight controller and scale are working. You can run several tests from either the test links on the Web Diagnostic page or the front panel Test menu. Each test is described in its own subsection below.

You can also obtain information that a Hardy representative may ask for if you make a request to Technical Support. For example, for the last calibration, you can see the type of calibration and when it was done. You can also check the graduation size, operator ID, and other configuration information, and you can learn the serial number, model number, firmware revision number.

### Diagnostic testing from the front panel

From the Configuration menu, use the down arrow to select Diagnostics and press Enter to open the Menu. This menu lists the tests you can run.



Use the down arrow to select the option.

#### NOTES

*The values entered in the Diagnostics Menu are for illustration purposes only. Your values will vary.*

*To download the latest firmware version, see the HI 6300/Downloads page at: <http://www.hardysolutions.com/products/weighing-instruments/weight-processors/product/461/hi-6300-series>*

## Parameters

Parameters is the first listed hyper-link at the base of the Diagnostics page. Click that link to display the Parameters page. Note the scroll bar on the right of the list.

The steps below explain how you can duplicate the configuration of one HI 6300 to use in configuring another HI 6300 for sending a copy of your parameters to [hardysupport@hardysolutions.com](mailto:hardysupport@hardysolutions.com)

To copy the parameters:

- Step 1. Right click in the parameter list.
- Step 2. Click Select All.
- Step 3. Right click again.
- Step 4. Click Copy.

To paste the parameter

configuration into the instrument you want to configure, or into a text file for storage:

- Step 1. Enter the IP address of that instrument into a Web browser to display its Home page.
- Step 2. Select Operation, then Diagnostics, then Parameters, as described above.
- Step 3. Right click in the Parameter list.
- Step 4. Click Select All.
- Step 5. Right click again in the Parameter List.
- Step 6. Click on Paste to replace the existing or default parameter settings with the parameters settings of the instrument you copied. Only the past setting from a text file will work---you can not paste from a word processing program.
- Step 7. Click the Save button. You now have an exact duplicate of the pre-configured instrument.

If you need to make any modifications to the parameter settings go to Chapter 5, Configuration, for more instructions.

### Operation - Diagnostics Parameter Dump

[Other Parameters](#)

```
00000283 Firmware Revision=HI6300 1.0.0.32
00000001 Unit=4 [kg]
00000003 Grads=0 [1]
00000002 Decimal Point=2 [2]
0000000F Scale Capacity=1.00
00000004 Operator ID=DM
00000005 Instrument ID=Hardy1
00000006 WAVERSAVER=3 [1.0 Hz]
00000007 Num Averages=50
00000008 Zero Tolerance=0.40
00000009 Loadcell Sensitivity=0 [1.0 mV/V]
0000000D Motion Tolerance=0.05
0001000D Cal Motion Tolerance=0.03
00000201 Span Weight=10000.00
00000202 Ref Weight=0.00
00000203 Cal low counts=8618425
00000204 Cal high counts=8999232
00000205 Cal Span Factor=5.294424681779E-06
00000206 Zero counts=8618425
00000207 Cal Zero counts=8618425
```



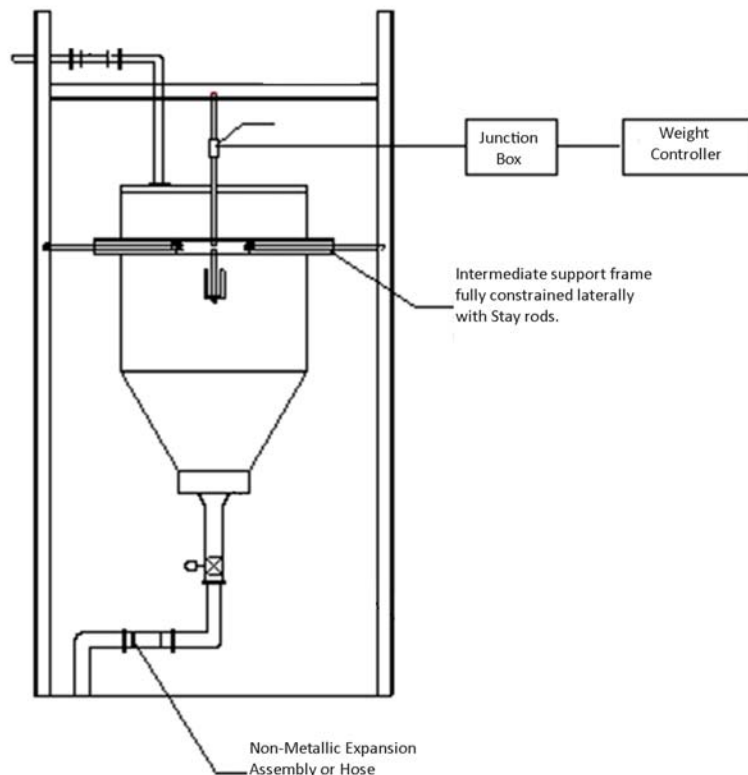
# System and Load Cell Tests

## Overview of Typical Load Cell System

The typical system consists of one or more load cells/points, a summing junction box, and an HI 6300 Weight Processor.

**Load sensor** - Used to measure pressure, weight, or torque, the sensor is a strain gauge-based force transducer that generates an electrical signal proportional to the load applied. This can be done using either tension or compression type load sensors. When the HI 6300 sends the load cell a 5-volt DC excitation signal that powers the load cell, the force transducer generates a millivolt output proportional to the load (0-10mv DC for 2mv/V load cells/ points or 0-15mv DC for 3mv/V load sensor).

**Weight Processor** - This is part of the HI 6300 that, among other functions, powers the load cell(s)/point(s), receives the millivolt signal output from the load cell(s)/point(s), and digitizes, interprets, communicates and displays the results.



## INTEGRATED TECHNICIAN

INTEGRATED TECHNICIAN<sup>®</sup> (IT) is an optional diagnostics utility that enables the operator to rapidly troubleshoot individual load cells. The option requires an HI 215IT or HI 6010IT Summing Box (shown above) that provides distinct inputs for each load cell.

Without the HI 215IT or HI 6010 Summing Box, it is difficult to isolate the signals from different load cells. If any load cell fails, the test will output a FAIL response without identifying the problem load cell. For numerical values, the system will return an average of all the load cell responses and, in some cases, will return values that cannot be used.

The HI 215IT or HI 6010 Summing Box with the IT firmware can provide the HI 6300 both average numerical values and values specific to each load cell, including PASS/FAIL values for each load cell, as shown below.

Integrated technician requires a Hardy IT JBOX

Jbox1Sensors: 4 ▾

Sensor	weight	RTZ	mV/V	raw variation	raw result	waversaver variation	waversaver result
1	0.0 lb	Pass	0.0204	6.49	Pass	9.43	Pass
2	0.0 lb	Pass	0.0323	1.22	Pass	283.37	Fail
3	0.0 lb	Pass	0.0347	3.01	Pass	12.29	Pass
4	0.0 lb	Pass	0.0351	5.14	Pass	4.01	Pass
REF			0.4982	0.22	Pass	443161.84	Fail

Do IT test

To view this screen on your system, see *Diagnostics*. The number of load sensor(s) is based on the connections in the IT junction box. Check the installation sequence in the box to determine which load sensor is number 1, 2 and so on. You can use the IT functions from either the front panel or Web interface. If you do not have the optional IT junction box, some of the options described below will not appear on either interface.

### Stability Test

The Stability test lets you check the A/D Raw count and filtered. With the IT option, it tests and reports for each load cell. The test sends the load cell data to the analog-to-digital converter and calculates the mean squared variation from the average reading, using 100 samples. The test passes if the mean squared variation is less than 5.0.

If the weighing system passes the stability test, the results show OK and the variation and mean results are posted. FAIL indicates that the Mean Squared Variation is greater than 5.0 so the system is considered unstable. In that case, see the Troubleshooting Flow Charts Section.

### CAUTION

**Do not perform the Stability Test during production. The test activities can cause incorrect readings.**

## ATTENTION

**Ne pas effectuer le test de stabilité lors de la production. Ces tests peuvent résulter à des lectures incorrectes.**

### Running the Stability Test from the Web Interface

The Stability tests calculate the mean squared variations from the raw mean and filtered (WAVERSAVER®) mean readings. A test passes if the variation is less than 35.0.

The RTZ (return to zero) test passes if the gross weight is less than the sum of the Zero Tolerance and the Motion Tolerance parameters.

raw mean	raw variation	raw result	waversaver mean	waversaver variation	waversaver result
32930	0.03	OK	33010	0.00	OK
Gross	mV/V	RTZ			
-0.2 lb	0.0197	Pass			

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A Stability Test column on the IT test results display (see picture above) shows PASS or FAIL for each load sensor. We obtained the data by running the IT test, as described above.

Stability test is in the Diagnostics menu. Select the Stability Test hyperlink and wait a few seconds.

The results will not be specific to each load sensor, as in the IT test. They will display an average reading and PASS/FAIL for the system as a whole. If equipped with an IT summing junction box there will be a selection to run the Weight and voltage test. That test will display the individual load cell and loop back test results.

### Running the Stability Test from the front panel

- Step 1. From the Diagnostic menu, select Stability Test with use the down arrow and press Enter. The HI 6300 runs the test and shows the results.
- Step 2. To see the AD/Raw Count and the A/D Filtered select them from the menu.
- Step 3. Press Exit to return to the Test Menu.

Stability:	Gross = 0.9lb	
	RAW	Waversaver
Mean	32918	32993
Variation	0.17	0.00
Results	OK	OK
mV/V	0.0184	
RTZ	Pass	

## Weight and Voltage Tests

The Weight and Voltage tests are used to diagnose a weighing system and, if certain types of problems are indicated, determine their source. It provides the total scale input to the instrument such as mV, mV/V and Weight in the units selected (i.e. lbs, kg, oz, g).

### Weight and Voltage Test from the Web interface

Since the IT Web page shows all the weight and voltage values at once, it is the preferred method for troubleshooting. Click Integrated Technician to open the Diagnostics - Integrated Technician page.

To view individual load sensor data, click Do IT Test.

Integrated technician requires a Hardy IT JBOX

Jbox1Sensors 4 ▾

Sensor	weight	RTZ	mV/V	raw variation	raw result	waversaver variation	waversaver result
1	0.0 lb	Pass	0.0204	6.49	Pass	9.43	Pass
2	0.0 lb	Pass	0.0323	1.22	Pass	283.37	Fail
3	0.0 lb	Pass	0.0347	3.01	Pass	12.29	Pass
4	0.0 lb	Pass	0.0351	5.14	Pass	4.01	Pass
REF			0.4982	0.22	Pass	443161.84	Fail

Do IT test

These readings are snapshots and allow you to determine if the problem is in the instrument (internal) or in a load sensor(s) (external).

The specification range for the Weight Controller is 0-25 mV, so a reading between 0-25 mV is within the normal range. A reading outside this range would normally indicate that the problem is external to the system (most likely improper wiring).

If all the load sensor readings are 0.00, something is wrong between the HI 6300 and the junction or summing box box or with the summing or junction box itself. Either the cable is disconnected, or something is causing the junction box to not transmit the readings to the HI 6300.

If you do not get a reading for one or possibly two or more load sensors (Sensor 3 for example reads 0.00 or the reading is either larger or smaller than it should be) and you know that the Load Sensors are connected to the junction box, the individual load sensor cable is disconnected from the junction box or the load sensor is malfunctioning.

### Running the IT test from the front panel

The same information can be obtained from the Diagnostics menu. Select Enter to show the menu. Then select Jbox1 to run the test. To read the rest of the results, press the down arrow.

The screen shows the individual load sensors in dwell mode. Using the right+ left button, move from Sensor to Sensor. The pass/fail test requires 15-30 seconds to complete testing.

IT Dwell – Jbox1	Channel x (x/5)
	RAW      Waversaver
Results	OK      OK
Variation	0.45      0.00
mV/V	0.0219
Weight	-0.378605
RTZ	PASS





## **I**

Installation Options 9  
Instrument Configuration 39  
INTEGRATED TECHNICIAN 136  
IT Test 117  
IT Web page 141

## **K**

K - Load Sharing and Load Sensor  
Checkout 132

## **L**

load (weight) 91  
Load Point cables 95  
Lock Washers 21

## **M**

Making Longer Cables 13, 14, 101  
Making Cables for Split Screen Mode 101  
Mean squared variation 139  
Mode Button 41  
Motion Error 114  
Motion Tolerance 81  
Mv/V and MV 116

## **N**

N - Weight Controller's Front Display is  
Blank 136  
No C2 Sensor 114  
Number of Channels 5  
NumDevices 90

## **O**

Operation/Diagnostics - Weight & Voltage  
page 141  
Operation-Diagnostics Page 137  
Operator ID 82  
Overview Typical Load Cell System 138

## **P**

P - SD Card Diagnostics and Losing  
Memory at Power Cycles 136  
Parity Bit 56, 58  
PASS/FAIL and Variance Test 116

Physical Characteristics 6  
PP# = Program Part Number 136  
Pre-Calibration Procedures 39  
printed circuit boards 21  
Printer 35  
process weighing 1

## **R**

Raw A/D Average Counts 116  
Reassembly 21  
Ref Weight text field 89, 91  
Resolution 5  
RTZ (Return to Zero) Tests 117

## **S**

Screws 21  
Security 74  
Sensor Number 117  
Set Background 66  
Setup 79  
Shield wire 20  
Slave Address 55  
small fasteners 21  
Spacers 21  
Span Weight 50  
Span Weight text field 92  
Split Screen Mode 101, 102, 103  
Stability Test 139, 140, 141  
Stability Test ALL 115  
Support Section 1  
System Integrity Check and Fault  
Determination From the Front Panel 136

## **T**

Tare Button 41  
Tare Failed 41  
Tare OK 41  
Tare Operations 97  
Technical Support Department 1  
Temperature Coefficient 6  
Tension or Compression type load cells  
138  
Test Menu 136  
Too Hi Error 114  
Too Lo Error 114



Trad Cal Error 114  
Traditional Calibration 91

## **U**

Unit of Measure 82  
Units 83  
Update Rate 5  
USB Memory Stick 36

## **W**

Washers 21  
Waversaver 2  
Weight 116  
Weight and Voltage ALL 116

## **Z**

Zero Button 41  
Zero Failed 41  
Zero OK 41







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