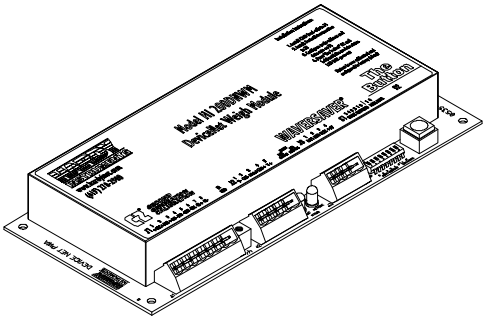
# HI 200DNWM WEIGH MODULE
## Series B

# OPERATION AND INSTALLATION MANUAL



HARDY INSTRUMENTS

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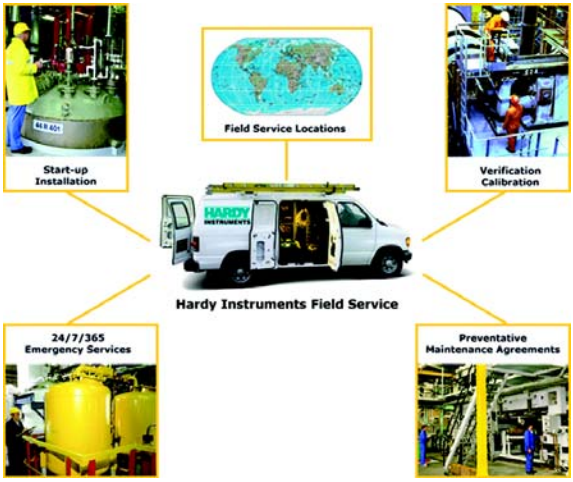


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# Table of Contents

# CHAPTER 1 - OVERVIEW

## Scope

This manual provides the user with a description of the operating procedures, specifications, installation and setup for the Hardy Instruments HI 200DNWM (**H**ardy **I**nstruments Series **200** **D**evice**Net**™ **W**eigh **M**odule). To get the maximum service life from the HI 200DNWM users should use the instrument in accordance with the recommended practices implied or contained in this manual. The user should read and understand all cautions, warnings, and safety procedures referenced or explicitly stated in the manual, to ensure the safe operation of this product. Hardy Instruments appreciates your business. Should you experience any problems, please contact our Customer Support Department at:

**Phone:** **(858) 278-2900**
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**NOTE:** *Device**Net** is a trademark of the Open Device**Net** Vendor Association, Inc.*

## About Hardy Manuals

Every Hardy Installation and Operation manual is organized into easily referenced chapters, that are almost always the same:

- **Chapter One** - Provides an introduction and an **Overview** of the instrument and its capabilities.

- **Chapter Two** - Provides a complete list of **Specifications**.
- **Chapter Three** - Contains information needed to **Insta**ll the HI 200DNWM weight module.
- **Chapter Four** - Provides complete hardware **Configuration** instructions for setting dip switches and jumpers.
- **Chapter Five** - Pertains to the firmware **Setup** and preparation procedures to calibrate and operate the module.
- **Chapter Six** - Provides **Calibration** instructions.
- **Chapter Seven** - Pertains to the **Operation** of the HI 200DNWM weight module.
- **Chapter Eight** - Pertains to the **Troubleshooting** procedures to repair the module.

## Description

The Hardy Instruments HI 200DNWM is a small weigh module that communicates Net and Gross weights to other devices connected to a Device**Net**™ Network. The weigh module supports Hardy's C2® calibration and has four levels of WAVERSAVER®. The weigh module consists of a printed circuit card with standoffs (for mounting in an enclosure) or rails for DIN rail mounting. The weigh module outputs (produces) Gross, Net and Tare weights and inputs (consumes) Zero and Tare commands via Device**Net**™. Configuration includes:

1. Metric Poll
2. Averages (1-255)
3. WAVERSAVER®
4. Calibration Type (C2® or Hard Calibration) - Not configurable, Read Only
5. Span Weight
6. Set Point Values
   a. Mode
   b. Preact
   c. Deadband

**NOTE:** *WAVERSAVER® and C2® are registered trademarks of Hardy Instruments, Inc.*

Configuration data is stored in an EEprom. I/O slave messaging is polled. The weight module supports two TTL levels out to relays for use as set points. A bit is supplied when the set point is reached.

**NOTE:** *Hardy Instruments does not supply the set point module.*

## WAVERSAVER®

Typically, mechanical noise is present in forces larger than the weight forces trying to be detected. The HI 200DNWM weigh module is fitted with WAVERSAVER® technology which eliminates the effects of vibratory forces present in all industrial weight control and measurement applications. By eliminating the factor of vibratory forces the controller is capable of identifying the actual weight data. WAVERSAVER® enables

the weigh module to distinguish between actual weight data and mechanical noise, both of which are typically transferred to the weight controller by the load cell signal. WAVERSAVER® can be configured from devicenet controller to ignore noise with frequencies as low as 0.5 Hz. One of three other additional cut off frequencies may be selected to provide a faster instrument response time. The default factory configuration is 1.0 Hz vibration frequency immunity.

**C2® Calibration**

C2® Second Generation Calibration enables a scale system to be calibrated electronically without using certified test weights which equals the systems load capacity. All Hardy Instruments C2® certified load sensors contain digital information detailing its unique performance characteristics. C2® Calibration is performed over the network or by simply pushing "**THE BUTTON"**and hold until the module status LED (DS2) goes out.

**The Button**

With one push of **"THE BUTTON"** the HI 200DNWM automatically electronically calibrates the weighing system with C2® certified load sensors, making the system ready for use. This saves system start up time costs and aggravations.

**What is DeviceNet®?**

The DeviceNet network is an open, global industry-standard communication network designed to provide an interface

through a single cable from a programmable controller directly to smart devices such as sensors, push buttons, motor starters, simple operator interfaces, drives and weigh modules. You no longer have to hard-wire each device to an I/O module or I/O block. Because you use significantly less wire, you spend far less time and money on wiring and installation time. The network also provides access to the intelligence present in the devices for superior diagnostics and troubleshooting to help increase system up time. The DeviceNet network lets you monitor your plant-floor devices from a central location and reconfigure them as your needs change or service them as required. You can, for example, configure the weigh module for different applications. The DeviceNet network's capabilities help ease integration, and reduce installation and wiring costs. (See Fig. 1-1)

**Physical Layer (Network Topology)**

- Trunk Line (thick or thin cable can be used)
- 120 ohm terminator at each end.
- Drop lines can extend to a maximum length of 20’ feet.
- Drops may be daisy chained to multiple nodes.

- Zero length drops allow direct connection of nodes to the trunk.
- Multiple power supplies can be used for load distribution and backup.

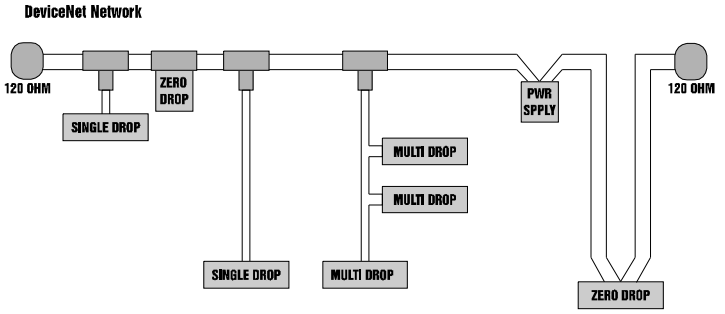


**FIG. 1-1 DEVICENET NETWORK**

# CHAPTER 2 - SPECIFICATIONS

**SCOPE**

Chapter 2 lists the specifications of the HI 200DNWM weigh module. Specifications are listed for the standard module and optional equipment. The specifications listed are designed to assist in the installation, operation and troubleshooting of the module. All service personnel should be familiar with this chapter before attempting an installation or repair of the instrument.

**Conversion Rate**

10 updates per second (When WAVER-SAVER is turned OFF or set to 1= 55 updates per second)

**Resolution**

20 bits

**Excitation Voltage**

0-5 VDC

**Averages**

1 to 255 User Selectable in Single Increments.

**Load Sensors**

Up to eight (8) 350 ohm Full Wheatstone Bridge, Strain Gauge Load Sensors/Cells (5 volt excitation) on one vessel. Using more than 4 load cells requires an external power supply.

**Non-Linearity**

0.0015% of Full Scale

**Isolation**

Non Isolated, uses external solid state relays for set points.

**Voltage**

Input power - Power from DeviceNet Cable

- 24 VDC +/- 1% Network
- 11-25 VDC Node

| | |
|---|---|
| **Temperature Coefficient** | Less than 0.0005% per degree C for zero and span. |
| **Temperature Range** | -10 degrees C to +50 degrees C |
| **Temperature Storage Range** | -20 degrees to +85 degrees C |
| **Physical Dimensions** | 3.80” W x 8.5” L x 1.0” H (96.52 mm W x 215.9 mm L x 25.4 mm H) |
| **Mounting Config** | • DIN - Rail<br>• Enclosure Mounting, pc board mounted to enclosure backplate. |
| **Approvals** | ODVA Conformance Tested |
| **Display** | None |
| **DeviceNet** | Type: Vendor Specific<br>I/O Slave Messaging: Polling<br>Profile: Refer to EDS<br>Baud Rates: 125K, 250K, 500K |
| **Inputs** | 4 bytes polled in |
| **Outputs** | 4 bytes polled out |
| **NOTE:** | *The Metric Poll parameter specifies the default format of the 4 bytes of output data from the weight scale. A zero value specifies that the default format is a 32 byte integer value containing net weight in pounds, with 3 decimal places. A one value specifies that the default format is a 32 byte integer value containing net weight in kilograms, with 3 decimal places.* |

**Connectors**

Phoenix Combicon type with unsealed screw terminal mate. PC board side-vertical pins. All connector numbering is from left to right when looking down on the board with the connector side of the board facing toward you.

**J1** Load Sensor 8 Pin

8 + EXC (Plus Excitation) + 5VDC
7 + SEN (Plus Sense)
6 + SIG (Plus Signal)
5 - SIG (Minus Signal)
4 - SEN (Minus Sense)
3 - EXC (Minus Excitation)
2 + C2
1 - C2

**J2** DeviceNet Interface 5 pin Open

1 V - (Black)
2 CAN- (Blue)
3 SHIELD (Bare)
4 CAN+ (White)
5 V+ (Red)

**J3** Set Point Out Interface 4 Pin

1 RLY 1 (Set Point Output One)
2 GND (Ground)
3 RLY 2 (Set Point Output Two)
4 +5 VDC

## Current Draw at 24VDC

**Table 1: Current Draw at 24 VDC**

| # Load Cells | Milli-Amp Reading | |
|---|---|---|
| | W/Relay TTL | W/O Relay TTL |
| 1 | 167 ma | 166 ma |
| 2 | 174 ma | 171 ma |
| 3 | 179 ma | 175 ma |
| 4 | 189 ma | 179 ma |

# CHAPTER 3 - INSTALLATION

## SCOPE

Chapter 3 covers unpacking, cabling, interconnecting and installing the HI 200DNWM weigh module. Users and service personnel should be familiar with the procedures in this chapter before installing or operating the weigh module.

## Unpacking

1. Before signing the packing slip, inspect the packing for damage of any kind.
2. Report any damage to the carrier company immediately.
3. Check to see that everything in the package matches the bill of lading. You should normally have.
4. HI 200DNWM Module
   - 1 HI 200DNWM module with mating connectors
   - 1 Installation and Operation Manual

**NOTE:** *Electronic Data Sheet Software is available on our Website www.hardyinst.com*

5. HI 200DNWM-DR Module with DIN Rail Kit
   - 1 HI 200DNWM module with mating connectors and a DIN Rail adapter.
   - 1 Installation and Operation Manual

**NOTE:** *Electronic Data Sheet Software is available on our Website www.hardyinst.com*

6. HI 200DNWM-SK1 Modules (2 complete modules pre-stacked)

2 HI 200DNWM complete weigh modules pre-stacked.

1 Installation and Operation Manual

**NOTE:** *Electronic Data Sheet Software available on our Website www.hardyinst.com*

7. HI 200DNWM Module with Stacking Kit (-SK)

   1 HI 200DNWM Module with mating connectors

   4 Standoffs

   4 Phillips Pan Head Machine Screws

   1 Installation and Operation Manual

**NOTE:** *Electronic Data Sheet Software is available on our Website www.hardyinst.com*

8. HI 200DNWM Module Junction Box (-SS - Stainless Steel) or (-PS - Painted Steel)

   1 HI 200DNWM Module with mating connectors mounted in either a stainless steel or painted steel NEMA 4/4X enclosure.

   1 Summing Card mounted in either a stainless steel or painted steel NEMA 4/4X enclosure.

   1 Installation and Operation Manual

**NOTE:** *Electronic Data Sheet Software is available on our Website www.hardyinst.com*

9. If any items are missing, damaged, or there are any questions, please contact Hardy Customer Support at:

**Hardy Instruments Inc.**
**3860 Calle Fortunada**
**San Diego, CA 92123-1825**

**Phone: (858) 278-4900**
**FAX: (858) 278-6700**
**Web Site: http//www.hardyinst.com**
**E-Mail:**
**hardysupport@hardyinst.com**

10. Record the model number and serial number of the Weigh Module. Store this information in a convenient, secure location for reference when contacting Hardy Instruments Customer Support Department or to buy parts or firmware upgrades.

## Mechanical Installation

### Installing the Bare Weigh Module in an Enclosure

Step 1. Make sure that the Weigh Module has at least 2 inches clearance around the entire weigh module. (See Fig. 3-1)

Step 2. Drill four thru holes or threaded holes for four 6-32 pan head machine screws. (See Fig. 3-2)

Step 3. Mount the four standoffs into the back panel. (See Fig. 3-3)

Step 4. Fasten the weigh module to the standoffs by installing the four (4) pan head screws. (See Fig. 3-3)

Step 5. Connect the phoenix connectors to the headers mounted on the weigh module.

**NOTE:** *Stand offs and fasteners are not included.*

**NOTE:** *Make sure that the connectors are seated properly in the headers.*

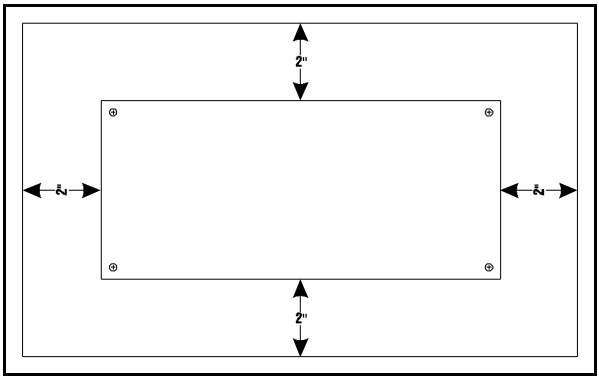


**FIG. 3-1 2" CLEARANCE AROUND THE MODULE**

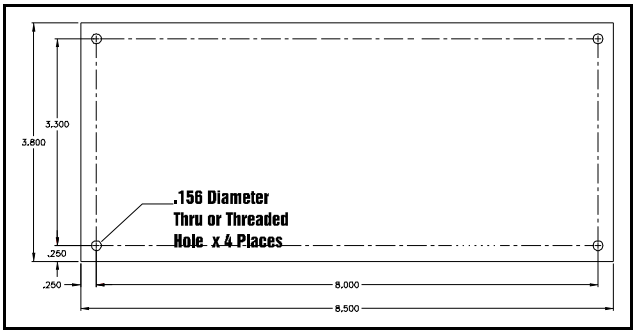


**FIG. 3-2 HOLE DIAGRAM**

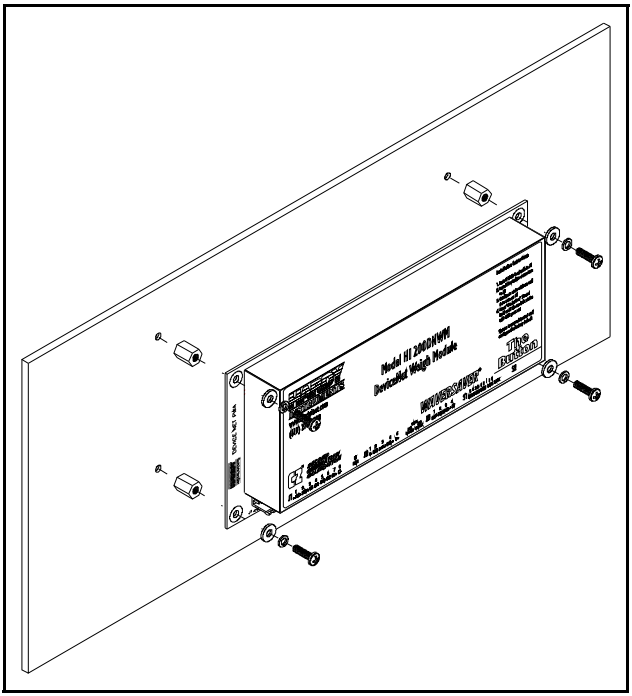

**FIG. 3-3 FASTENING MODULE TO BACK PLATE**

## Installing Weigh Module in DIN Rail

Step 1. Take one end piece and one rail insert. Snap the rail guide insert into the end piece. Take the other end piece and install the other rail guide insert (See Fig. 3-4 & 3-5)

Step 2. Take one of the small rail pieces and insert the rail pins into the end piece. (See Fig. 3-6)

Step 3. Take one of the large rail pieces and insert the rail pins into the small rail piece. Do this on both sides. (See Fig. 3-6)

Step 4. Continue installing the rail pieces until all rail pieces are installed. (See Fig. 3-7)

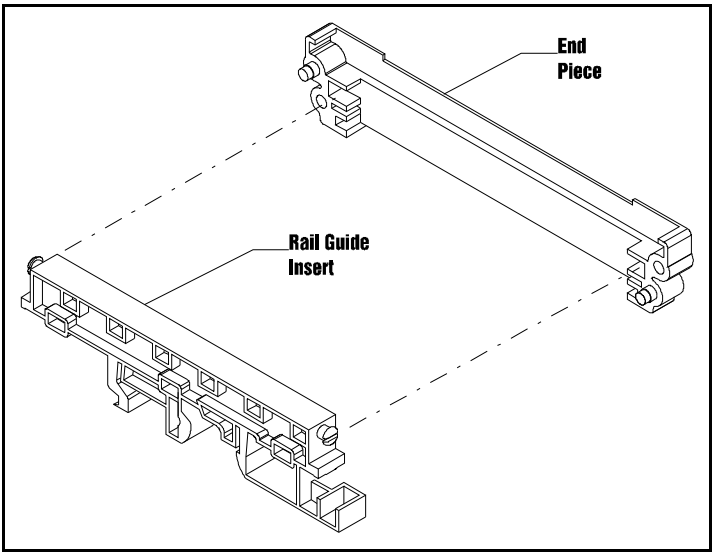


**FIG. 3-4 INSTALLING THE RAIL GUIDE INSERT INTO THE END PIECE**

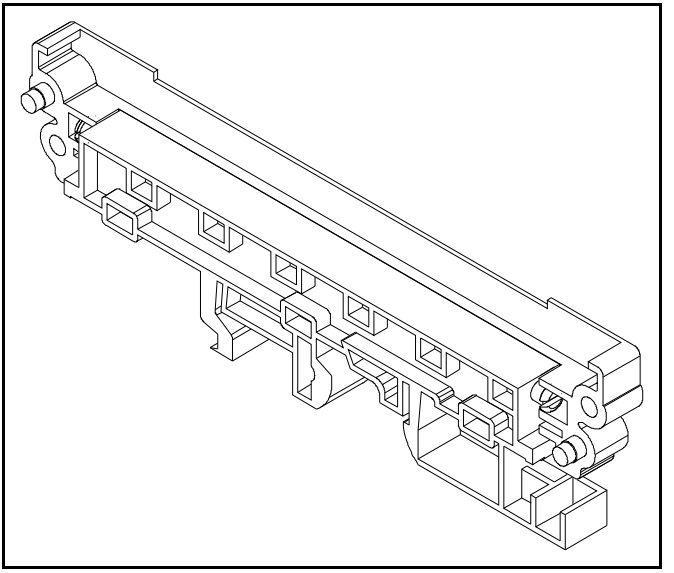

**FIG. 3-5 RAIL GUIDE INSERT IN THE END PIECE**

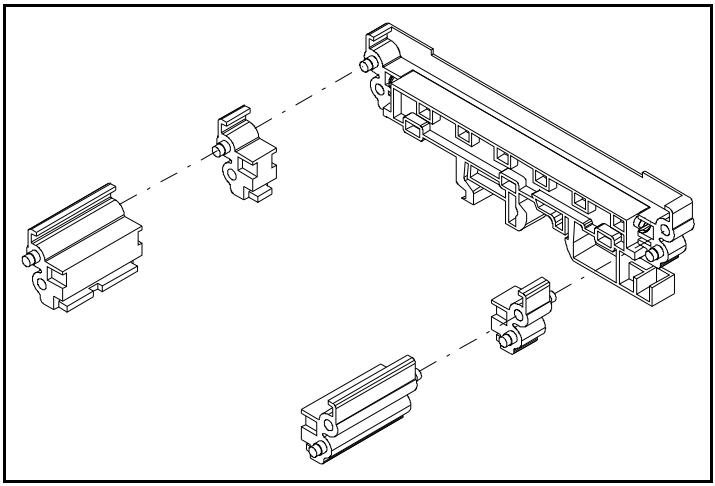

**FIG. 3-6 INSTALLATION OF THE RAIL PIECES**

Step 5. Gently slide the HI 200DNWM into the assembled DIN Rail until the board is flush against the other end piece. (See Fig. 3-7)

Step 6. Take the other assembled end piece and snap it into the rail pieces. (See Fig. 3-7)

Step 7. The HI 200DNWM is completely in the Din Rail assembly ready for installation. (See Fig. 3-8)

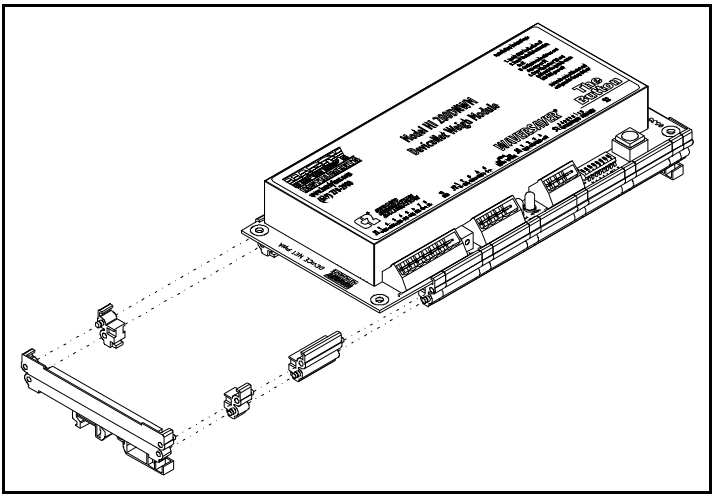

**FIG. 3-7 INSTALLING THE WEIGH MODULE INTO THE ASSEMBLED DIN RAIL**

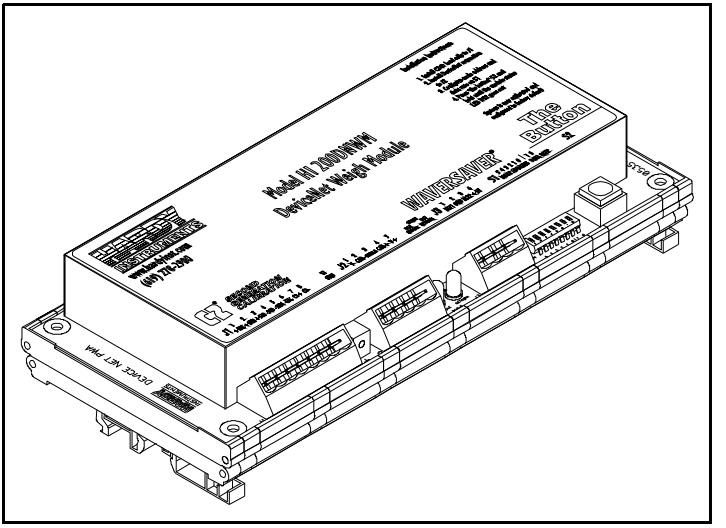


**FIG. 3-8 WEIGH MODULE INSTALLED IN THE DIN RAIL**

**NOTE:** *The Weigh Module can be installed in the DIN Rail Assembly in either direction.*

## Installing the Pre-stacked Weigh Module

Step 1. Drill four (4) thru holes or threaded holes for four (4) 6-32 threaded male 1/4" hex standoffs.

Step 2. Screw four (4) 3/8" long x 1/4" wide male standoffs into the back panel.

**NOTE:** *The four (4) 3/8" x 1/4" do not come with the stacking kit.*

**NOTE:** *Refer to Paragraph 3.1.1 for clearance and hole diameter specifications.*

Step 3. Place the bottom weigh module onto the 3/8" standoffs.

Step 4. Fasten the 1.25" x 1/4" threaded female standoffs that come in the stacking kit to the 3/8" standoffs.

Step 5. Place the second weigh module over the 1.25" standoffs aligning the holes with the threaded holes in the standoffs.

Step 6. Place the four (4) #6 flat washers over the mounting holes on the second weigh module.

Step 7. Place the four (4) #6 lock washers over the four (4) flat washers.

Step 8. Screw the four (4) pan-head machine screws into the previously mounted standoffs until the upper weigh module is fastened securely to standoffs. (See Fig. 3-9)

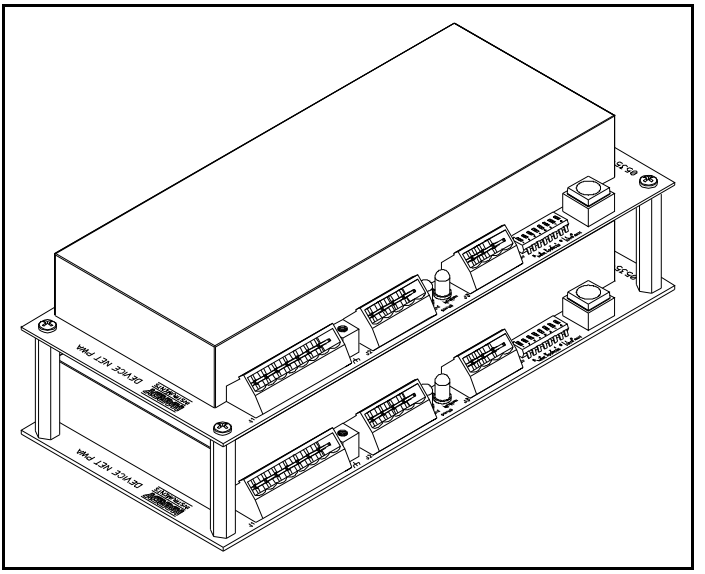

**FIG. 3-9 INSTALLING THE STACKING KIT**

## Electrical Installation

**Wiring Diagram for the J1 Load Sensor 8 Pin Connector**

| Pin | Description |
|---|---|
| 1 | -C2 |
| 2 | +C2 |
| 3 | -EXC (Minus Excitation |
| 4 | -SEN (Minus Sense) |
| 5 | -SIG (Minus Signal) |
| 6 | +SIG (Plus Signal) |
| 7 | +SEN (Plus Sense) |
| 8 | +EXC (Plus Excitation) +5VDC |

**NOTE:** *If the sense lines are not used to measure the actual excitation voltage at the junction box, an error is introduced. The error is equal to the percentage of excitation voltage lost between the instrument and the junction box. If the excitation voltage at the back of*

*the instrument is 5 volts and the excitation voltage at the junction box was 4.9 volts, 0.1 volts was lost due to cable resistance. This loss will cause a linear error of 1% of applied load in all weight readings. This error is introduced because the programmed millivolt per volt data of the load point is multiplied by the voltage between the sense lines to compute the calibrations curve of the load point. (See Chapter 7, Paragraph 7.3.2, page 7-3)*

### Wiring Diagram for the J2 DeviceNet Interface 5 Pin Open

| Pin | Description |
|---|---|
| 1 | V- (Black) |
| 2 | CAN- (Blue) |
| 3 | Shield (Bare) |
| 4 | CAN+ (White) |
| 5 | V+ (Red) |

**NOTE:** *All power for the Weigh Module is received through the DeviceNet cable. A separate power supply is not required.*

### Wiring Diagram for the J3 Set Point Out 4 Pin

| Pin | Description |
|---|---|
| 1 | RLY1 (Set Point Output One) |
| 2 | GND |
| 3 | RLY2 (Set Point Output Two) |
| 4 | +5 VDC |

### Wiring Diagram for the HI 215JB Junction Box

#### C2 Loadcell Cable Connection (J1)

When connecting the HI 215JB Junction box using C2 loadcell/point cable (6020-0001) use the following color code:

| Model | EXC + | SEN + | SIG + | SIG - | SEN - | EXC - | C2 + | C2 - |
|---|---|---|---|---|---|---|---|---|
| J-BOX | RED | BLUE | GRN | WHT | BRWN | BLK | GREY | VIO |

**Table 1: C2 CABLE COLOR CODE/HI 215JB J-BOX**

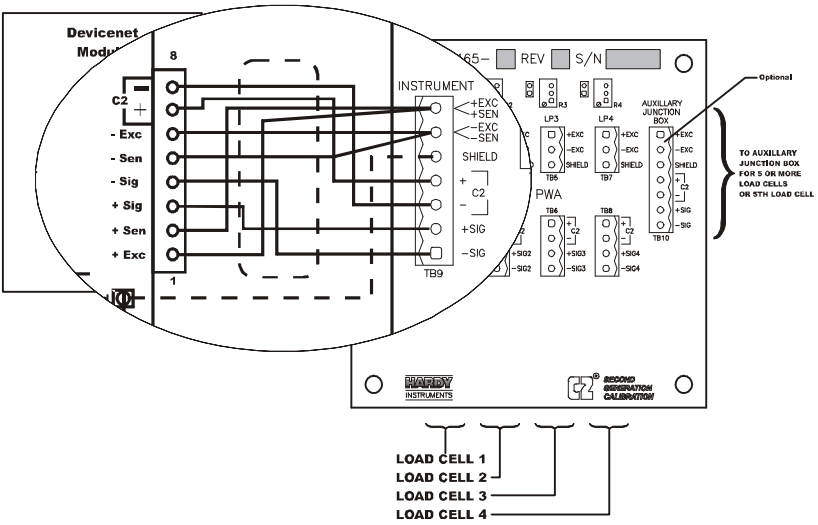


**FIG. 3-10 C2 LOAD CELL CONNECTION/HI 215JB JUNCTION BOX**

1 Recommended load cell cable, Hardy Instruments (Prt. #6020-0001)

2 Attach the load shield to the terminal block mounted next to the J1 connector on the HI 200DNWM Module.

3 Do not run load cell cable in parallel with or in the same conduit with power wiring, relay cables or any other high energy cables.

4 Remove the factory-installed jumpers for C2 wire load cell connection.

5 JB summing Card (Part. #0535-0465-05)

**Non-C2 Loadcell Cable Connection (J1)**

1 Attach the load cell cable to the terminal block mounted next to the J1 connector on the HI 200DNWM Module.

2 Factory installed jumpers to remain in place for 4 wire, non-C2 load cell connections. (See Fig. 3-11)

3 Do not run load cell cable in parallel with or in the same conduit with power wiring, relay cables or any other high energy cables.

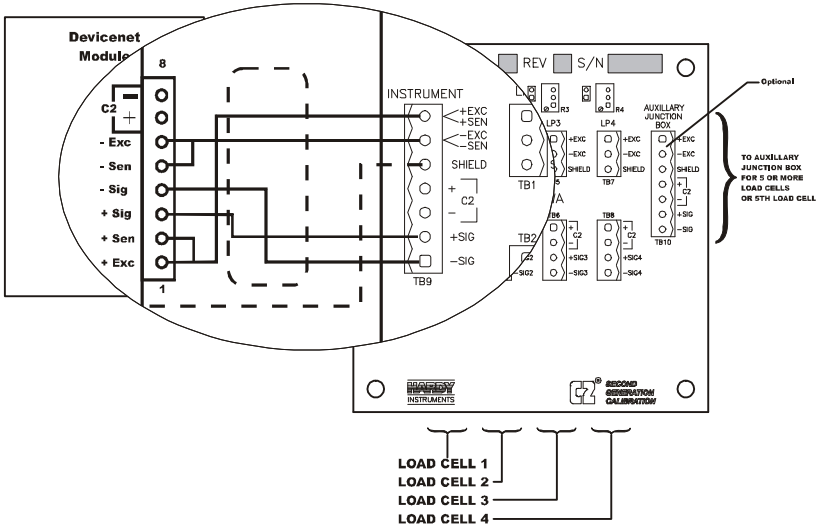


**FIG. 3-11 NON C2 LOAD CELL CONNECTION/HI 215JB JUNCTION BOX**

# CHAPTER 4 - CONFIGURATION

## SCOPE

Chapter Four consists of all the procedures for configuring the HI 200DNWM Weigh Module. System configuration includes only hardware adjustments such as Jumper and Dip Switch settings. We recommend that maintenance personnel be familiar with this chapter before configuring the Weigh Module. Alternative configuration procedures are not recommended.

## Differences in the Series A and Series B Modules

The Series B 200 DNWM module uses 4 bytes of input polled data. This requires each module to use a different .EDS file.

### Changing from the Series A to the Series B Module

Configuration when using RS NetWorx for DeviceNet require the new .EDS file. This adds the 4 bytes of input polled data. If you want to use the new features of the module, the 4 bytes of input polled data need to be mapped into the scanner's scanlist.
If you do not map the input polled data into the scanner's scanlist, the module will operate as if it were a Series A. No changes need to be made to any ladder logic written for the module.

### Changing from the Series B to the Series A Module

If you change from Series B to the older module, the configuration when using RS NetWorx for DeviceNet needs to be done using the older .EDS file. This will remove the 4 bytes of input polled data. These 4 bytes of data must then be removed from the scanner's scanlist. All

ladder logic written that refers to the 4 bytes of input polled data needs to be changed and any reference to the output data also needs to be reviewed and possible modified.

## DIP Switch (S1) Configuration

Configuring the DIP switch sets the following:

1. Baud Rate
2. Node Address

### DIP Switch Location

The DIP Switch is located between THE BUTTON and the J3 Header. (See Fig. 4-1 & 4-2)

### Configuring the Baud Rate

Refer to Table 4-1 to configure the baud rate. 0 = OFF, 1 = ON (* is the default setting)

| Baud Rate | S1-7 | S1-8 |
|---|---|---|
| 125 kbps* | OFF | OFF |
| 250 kbps | OFF | ON |
| 500 kbps | ON | OFF |
| 500 kbps | ON | ON |

**Table 4-1: Baud Rate**

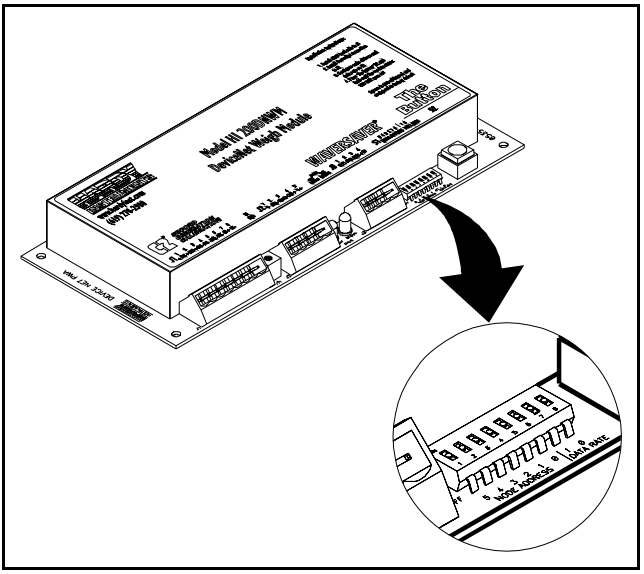

**FIG. 4-1 S1 DIP SWITCH LOCATION**

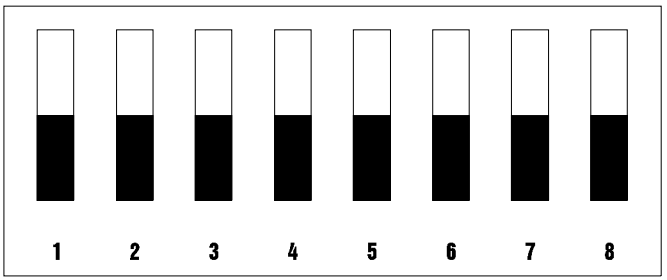


**FIG. 4-2 FACTORY DEFAULT DIP SWITCH CONFIGURATION**

## Configuring the DeviceNet Node Address

Refer to Table 4-2 to configure the DeviceNet Node Address.

| Address | S1-1 | S1-2 | S1-3 | S1-4 | S1-5 | S1-6 |
|---|---|---|---|---|---|---|
| 0 | OFF | OFF | OFF | OFF | OFF | OFF |
| 1 | OFF | OFF | OFF | OFF | OFF | ON |
| 2 | OFF | OFF | OFF | OFF | ON | OFF |
| 3 | OFF | OFF | OFF | OFF | ON | ON |
| “ | “ | “ | “ | “ | “ | “ |
| 62 | ON | ON | ON | ON | ON | OFF |
| 63 | ON | ON | ON | ON | ON | ON |

**Table 4-2: DeviceNet Node Addresses**

# CHAPTER 5 - SETUP

## SCOPE

All information contained in Chapter 5 pertains to software or firmware settings or procedures to prepare the HI 200DNWM weigh module for calibration and operation. Alternatives to these procedures either explicit or implied, contained in this section are not recommended. It is very important that the user and service personnel be familiar with the procedures contained in this chapter, before going through the setup procedures.

## Saving to Non-Volatile Ram

**NOTE:** *If you have an instrument with version 1.5, please refer to Devicenet Manual, REV B-6 or earlier for instructions about Saving to Non-Volatile Ram or contact Hardy Instruments Customer Service Department.*

In version 2.1, the HI 200DNWM does not automatically save parameters to non-volatile memory. To save parameters to non-volatile RAM, set parameter 38 (Save non-volatile command) to 1.

This request should be sent after changing any configuration parameter. It does NOT need to be sent after altering a command parameters like TARE or ZERO. It does not need to be sent after doing a calibration. The necessary calibration data values are saved automatically. However, if you change parameters used during calibration, like “number of averages”, or “WAVER-

SAVER®" for example, the SAVE request should be sent BEFORE cycling the power.

The non-volatile RAM has a maximum of 5,000,000 writes.

## Parameters

- Parameter 1 = Metric Poll
  **True = kgs net** False = lbs net
  Length in Bytes = 1

**NOTE:** *Default settings are indicated by bold type.*

- Parameter 2 = *WAVERSAVER*® Setting
  0 =OFF 1 = 4 Hz, **2 = 2Hz**, 3 = 1.0 Hz, 4 = 1/2 Hz
  Length in Bytes = 1

**NOTE:** *By selecting OFF (0) or 1 the module increases the updates per second from 10 to 55.*

- Parameter 3 = Calibration Type
  0 = Hard Cal, 1 = C2 Cal, Other = Not Cal'd (Read Only)
  Length in Bytes = 1

- Parameter 4 = Span Weight in Lbs
  1 to 2147483647 **10000.000**
  Length in Bytes = 4

- Parameter 5 = Averages
  0 to 255 **10**
  Length in Bytes = 1

- Parameter 6 = Set Point One Mode
  bit 7 = On/**Off** bit 1 = **Low**/High
  bit 0 = **Net**/Gross
  Length in Bytes = 1

- Parameter 7 = Set Point One Lbs Value
  -2147483648 to 2147483647
  **10000.000**
  Length in Bytes = 4

- Parameter 8 = Set Point One Deadband in Lbs
  0 to 2147483647 **0.100**
  Length in Bytes = 4

- Parameter 9 = Set Point One Preact in Lbs
  **0.00** to 2147483.647
  Length in Bytes = 4

- Parameter 10 = Set Point Two Type
  bit 7 = On/**Off**
  bit 1 = **Low**/High
  bit 0 = **Net**/Gross
  Length in Bytes = 1

- Parameter 11 = Set Point Two Lbs Value
  -2147483648 to 2147483647
  **100000.000**
  Length in Bytes = 4

- Parameter 12 = Set Point Two Deadband in Lbs
  0 to 2147483.647 **0.100**
  Length in Bytes = 4

- Parameter 13 = Set Point Two Preact in Lbs
  **0** to 2147483647
  Length in Bytes = 4

- Parameter 14 = Number of C2® Chips Found
  **0** to 8 (Read Only)
  Length in Bytes = 1

- Parameter 15 = Net Weight in Lbs
  Read Only
  Length in Bytes = 4

- Parameter 16 = Gross Weight in Lbs
  Read Only
  Length in Bytes = 4

- Parameter 17 = Tare Weight in Lbs
  -999999 - 999999 **0.00**
  Length in Bytes = 4

- Parameter 18 = Tare Command
  **0** to 1 (Set to True to Complete Command)
  Length in Bytes = 1

- Parameter 19 = Zero Command
  **0** to 1 (Set to True to Complete Command)
  Length in Bytes = 1

- Parameter 20 = Calibrate Low Command
  **0** to 1 (Set to True to Complete Command)
  Length in Bytes = 1

- Parameter 21 = Calibrate High Command
  **0** to 1 (Set to True to Complete Command)
  Length in Bytes = 1

- Parameter 22 = Calibrate using C2®
  **0** to 1 (Set to True to Complete Command)
  Length in Bytes = 1

- Parameter 23 = Span Weight in Kgs
  0.000 to 2147483.647 **0.045**
  Length in Bytes = 4

- Parameter 24 = Set Point One Kgs Value
  Read Only
  Length in Bytes = 4

- Parameter 25 = Set Point One Deadband in Kgs
  0.00 to 2147483.647 **0.045**
  Length in Bytes = 4

- Parameter 26 = Set Point One Preact in Kgs
  **0** to 2147483.647
  Length in Bytes = 4

- Parameter 27 = Set Point Two Kgs Value
  -2147483.648 to 2147483.647
  **4535.923**
  Length in Bytes = 4

- Parameter 28 = Set Point Two Deadband in Kgs
  0 to 2147483.647 **0.045**
  Length in Bytes = 4

- Parameters 29 = Set Point Two Preact in Kgs
  **0** to 2147483.647
  Length in Bytes = 4

- Parameter 30 = Net Weight in Kgs
  Read Only
  Length in Bytes = 4

- Parameter 31 = Gross Weight in Kgs
  Read Only
  Length in Bytes = 4

- Parameter 32 = Tare Weight in Kgs
  -999999 - 999999 **0.00**
  Length in Bytes = 4

- Parameter 33 = Relay Outputs
  Length in Bytes = 1

- Parameter 34 = A/D Counts
  Length in Bytes = 4

- Parameter 35 = Calibration Low Weight in Lbs.
  Length in Bytes = 4

- Parameter 36 = Calibration Low Weight in Kgs.
  Length in Bytes = 4

  The “Calibration Low Weight” parameter specifies the weight on the scale when the low step of a calibration is done in Traditional Calibration and is the Reference Point for C2 Calibration.

- Parameter 37 = Weight Multiplier
  Length in Bytes = 4

  This integer parameter can be set to 1, 10, 100, etc. to allow the user to select

the number of decimal places in the 32 bit integer weight outputs. The value 0 causes these weight outputs to be in floating point format.

**NOTE:** *This applies ONLY to the weights as viewed through the I/O (Command) interface. The explicit message interface continues to use 3 decimal place 32 bit integer format only.*

- Parameter 38 = Write non-volatile command.
  Length in Bytes = 1

  Setting this parameter to 1 will cause a save to non-volatile memory. Calibration data is saved to non-volatile memory automatically. Other parameters must be saved using this command.

- Parameter 39 = Parameter high word.
  Length in Bytes = 2
  This parameter is used in the command interface as described below:

## Command Interface

The Command Interface allows easy access to all parameters without using explicit messages.
The HI 200DNWM version 2.1 produces 4 bytes of polled output data and consumes 4 bytes of polled input data. The 4 bytes of input data can be used to set parameters in the module and to specify what data should be placed in the 4 bytes of output data.

## Format of Commands (4 byte input data)

| | |
|---|---|
| Byte 0 | Parameter value, least significant byte. (Used by the WRITE command only. |
| Byte 1 | Parameter value, second least significant byte. (Used by the WRITE command only.) |
| Byte 2 | Parameter number. The parameter number is the instance of the parameter object. These are listed in the HI 200DNWM manual. |
| Byte 3 | (Command byte): 0=READ command. 1 = WRITE command |

Most of the HI 200DNWM's parameters are only 1 byte long, making it possible to write them with a single command. There are also some 4 byte parameters. To write one of them:

Step 1. First write the 2 most significant bytes, using a WRITE command as described above, with 0x27 in the parameter number field.

Step 2. Write the least significant bytes using normal parameter numbers. The module will combine the value written to parameter 0x27 with the least significant bytes to produce the value written to the 4 byte parameter.

The 4 bytes written to the output table are as follows:

- If the Command byte of the input data is 0 (READ), the data is the value of the specified parameter, least significant byte first.

- If the specified parameter is an invalid number (0 for example: there is no parameter number 0), the data is net weight, with units as determined by the METRIC POLL parameter.
- If the Command byte of the input data is non-zero (WRITE), the output data echoes the input data.

### Examples Using the Command Interface

Reading Gross Weight in the polled output data.

1. First word (2 least significant bytes) of the input data is not used. Ignore.
2. Lower byte of second word is the parameter number. Gross weight in lbs is parameter #16.
3. Upper byte of second word set is “0” indicating read.

This causes the unit to output the Gross weight in lbs to the output polled data area. Resolution and data type would depend on the Weight Multiplier setting.

Writing new value to number of averages.

1. First byte of first word on the input data is the new valued wanted.
2. Upper byte of first word should be 0 and is not used.
3. Lower byte of second word is the parameter number. Averages is parameter #5.
4. Upper byte of second word is set to “1” to indicate write.

This causes the unit to write the value in the first byte of the first word to the Averages

parameter. During the execution of the command, the output polled data reflects the input polled data.

## Setpoints

### About Set-Points

The set point value is the target weight or level in either net or gross weight units

### Dead Band Limits

The dead band value can be set as a High or Low value. It is used to deactivate the set point.

For example:

If a set point value was 1000 pounds and the dead band was set to 5 pounds, the relay would close at a 1000 pounds but not open until the weight dropped to 995 pounds. This is used if a set point is a **high** trip limit. A High dead band would be used for a low trip limit. Examples are show for Low and High Trip Limits in Fig. 5-2.

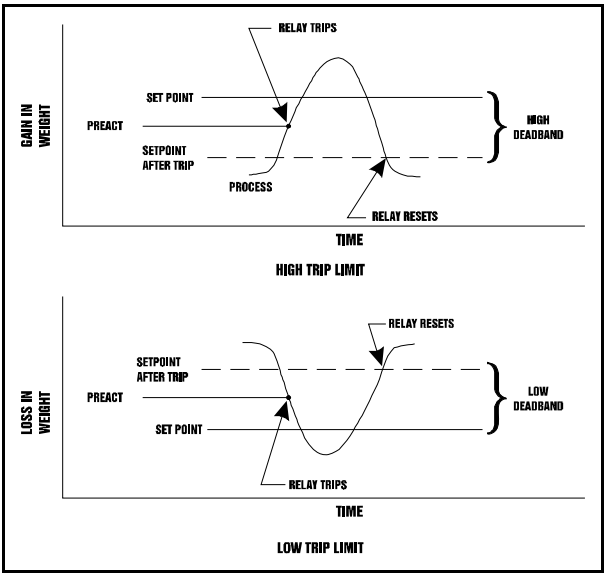


**FIG. 5-1 LOW AND HIGH PREACT TRIP LIMITS**

**Three General Rules for Set Points**

1. Set Points activate at the set point plus the preact.
2. Set Points deactivate at the set point plus the deadband.
3. The deaband should be numerically larger than the preact.

**Preact Limits**

1. The preact value is the number of units below or above the set point at which the relay will trip.
2. The preact value is used as an “in-flight” compensation value when filling a vessel. If set to zero, there will be no compensation.

**Entering Set Points**

Change the Set Point Parameters in accordance with the DeviceNet Manager you are

using. Be sure to read the DeviceNet Manager instructions first before setting.

## Setpoint Mode Parameters

### About Setpoint Mode Parameter

The Setpoint mode parameter is a bit encoded byte that affects the behavior of the setpoint.

### Entering Setpoint Mode Parameters

| Bit | Description |
|---|---|
| Bit 7 | Setpoint On/Off. Set to 1 to activate the setpoint, set to 0 to disable it. |
| Bit 6 | Set to 1 to output 0 volts (Force Relay Off) |
| Bit 5 | Set to 1 to output 5 volts (Force Relay On) |
| Bit 1 | Set to 0 for a gain in weight setpoint, set to 1 for a loss in weight setpoint. |
| Bit 0 | Set to 1 for a setpoint based on Net weight, or to 0 for a setpoint based on gross weight. |

# CHAPTER 6 - CALIBRATION

## SCOPE

Chapter 6 pertains to the calibration procedures for the HI 200DNWM weigh module. Alternatives to any procedures either implied or explicitly contained in this chapter are not recommended. In order for the weigh module to work properly, it must be calibrated prior to operation. All calibration should be re-calibrated periodically, or when not in use for extended periods of time. Be sure to follow all the procedures completely to insure that the weights read by the module are accurate. It is very important that the user and service personnel be familiar with the procedures contained in this chapter, before installing or operating the HI 200DNWM weigh module.

## Pre-Calibration Procedures

Step 1. Check to see if the load cell/ sensor/points are properly installed. Refer to your load cell I&M manual for proper installation instructions.

Step 2. Check to be sure that the connectors are installed firmly in the weigh module headers.

**NOTE:** *You need to go through the pre-calibration procedures before each calibration, regardless of the type of calibration you are performing.*

## C2® Calibration (The Button)

Step 1. The Module LED must be green in color. If it is not do not try to calibrate the instrument. Contact Hardy Instruments

Customer Support for assistance.

Step 2. Press the RED BUTTON on the weigh module printed circuit board and hold the button down until the Module Status LED goes off. (See Fig. 6-1)

**NOTE:** *This could take up to 2 seconds.*

Step 3. When the Module Status LED comes back on. Release the RED BUTTON. The weigh module system is calibrated.

Step 4. If the LED does not come back on contact Hardy Customer Support for assistance.

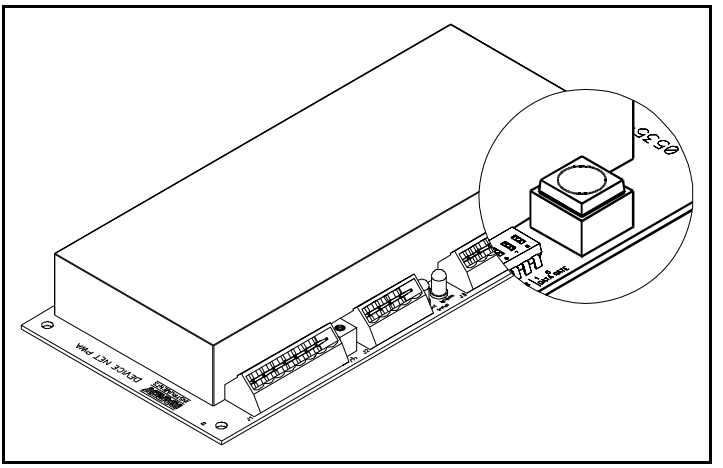

**FIG. 6-1 THE RED BUTTON**

## C2® Calibration from RS NetWorx®

Step 1. On the PC open RS NetWorx®

Step 2. Browse the Network.

Step 3. Double click on the Node Icon of the weigh module you want to calibrate. For example: Node

36. The DeviceNet Weigh Module Dialog Box appears.

Step 4. Click on the Parameter tab. The Parameter List appears with the information for the weigh module at address 36.

Step 5. Click on Cal LO.

Step 6. Enter the Cal LO value.

Step 7. Click on the Apply button.

Step 8. Click on Yes.

Step 9. Click on C2 Cal Cmd.

Step 10. Set the C2 Cal Cmd to "1".

Step 11. Click on the Apply button.

Step 12. Click on Yes.

Step 13. Click on Cmd Save non-vol.

Step 14. Set the Cmd Save non-vol to "1".

Step 15. Click on the Apply button.

Step 16. Click on Yes.

Step 17. The calibration is complete.

**NOTE:** *Requires C2® load sensors or load points.*

**NOTE:** *RS NetWorx® is a registered trademark of Rockwell Automation.*

### Test Weight Calibration from RS NetWorx®

Step 1. On the PC open RS NetWorx®

Step 2. Browse the Network.

Step 3. Double click on the Node Icon of the weigh module you want to calibrate. For example: Node 36. The DeviceNet Weigh Module Dialog Box appears.

Step 4. Click on the Parameter tab. The Parameter List appears with the information for the weigh module at address 36.

Step 5. Click on Span Weight.

Step 6. Enter the Span Weight Value.
Step 7. Click on Cal LO.
Step 8. Enter the Cal LO weight.
Step 9. Click on Cal LO command.
Step 10. Set the Cal LO to “1”.
Step 11. Click on the Apply button.
Step 12. Click on Yes.
Step 13. Place the test weight on the scale.
Step 14. Click on Cal HI command.
Step 15. Set the Cal HI command to “1”
Step 16. Click on the Apply button.
Step 17. Click on Yes.
Step 18. Click on Cmd Save non-vol.
Step 19. Set the Cmd Save non-vol to “1”.
Step 20. Click on the Apply button.
Step 21. Click on Yes.
Step 22. The calibration is complete.

# CHAPTER 7 - OPERATION

## SCOPE

All information contained in Chapter 7 pertains to the operation of the HI 200DNWM weigh module. We recommend that the processes and procedures contained in this chapter be followed to insure that the module give the user maximum quality performance. It is very important that the user be familiar with this chapter before operating the weigh module.

## Operating Capabilities

The HI 200DNWM can do the following or can be used in the following operations:

1. Monitor Weight Readings
2. Filling
3. Dispensing
4. Check Weighing
5. Batching

## Explicit Message Request Parameters

The procedures for sending the Explicit Message Requests are unique to each PLC and the user needs to refer to their PLC users guide, PLC DeviceNet Scanner section for instructions. The HI 200DNWM needs the following information to respond to an Explicit Message Request:

- SERVICE: The HI200DNWM WEIGH MODULE can process the "Get_Attribute_Single" (14) and "Set_Attribute_Single" (16).
- CLASS: The Device Net parameter Class is 15.
- INSTANCE: The HI 200DNWM WEIGH MODULE parameter number

can be found in the HI 200DNWM WEIGH MODULE I&O manual.

- ATTRIBUTE: The parameter value attribute number is 1.
- DATA: (varies)

**NOTE:** *Data length can vary, be sure to enter the correct length (size) of data or problems will occur.*

**NOTE:** *Order of bytes must be least significant first.*

## Monitoring Weight Readings from RS NetWorx

Step 1. On the PC open RS NetWorx.
Step 2. Browse the Network.
Step 3. Double click on the Node Icon of the weigh module you want to monitor. For example: Node 36. The DeviceNet Weigh Module Dialog Box appears for Node 36.
Step 4. Click on the Parameters Tab.
Step 5. All the parameters including the weights are displayed.
Step 6. The NET, GROSS, and TARE weights are now being monitored.

**NOTE:** *The HI 200DNWM can be used for Batching, Filling, Dispensing, and Check Weighing applications.*

## Network Status (DS1)

| STATE | LED | INDICATION |
|---|---|---|
| NOT POWERED/ NOT ON LINE | OFF | DEVICE IS NOT ON LINE<br>1. NO POWER APPLIED<br>2. Dup_MAC_ID TEST NOT COMPLETE |
| OPERATIONAL AND ON-LINE | GREEN | ON LINE NORMAL CONDITION WITH CONNECTIONS ESTABLISHED. |

**Table 7-1: NETWORK STATUS (DS1)**

| STATE | LED | INDICATION |
|---|---|---|
| OPERATION AND ON LINE NOT CON-NECTED | FLASHING GREEN | ON LINE NORMAL CONDITION NO CONNECTIONS Dup_MAC_ID PASSED & ON LINE, NO CONNECTIONS TO OTHER NODES. |
| CRITICAL FAULT OR LINK FAILURE | RED | UNRECOVERABLE FAULT (MAY NEED REPLACING) FAILED COMMUICATIONS (DUPLICATE Mac ID OR BUS OFF) |

**Table 7-1: NETWORK STATUS (DS1)**

## Module Status (DS2)

| STATE | LED | INDICATION |
|---|---|---|
| NOT POWERED/ NOT ON LINE | OFF | DEVICE IS NOT ON LINE<br>1. NO POWER APPLIED |
| OPERATIONAL | GREEN | NORMAL CONDITION |
| MINOR FAULT AND/OR CON-NECTION TIME-OUT | FLASHING RED | RECOVERABLE FAULT A/D ERROR, USUALLY CAUSED BY BAD CONNECTION TO LOAD CELLS LOAD CELL OUT OF RANGE. SENSE LINES MUST BE INSTALLED. (See Chapter 3, Page 3-10 for more information) |
| CRITICAL FAULT OR LINK FAILURE | RED | UNRECOVERABLE FAULT (Board MAY NEED REPLAC-ING)<br>FAILURE IN A-D. |

**Table 7-2: MODULE STATUS (DS2)**

# CHAPTER 8 - TROUBLESHOOTING

**SCOPE**

All the information in Chapter 8 pertains to the troubleshooting and resolution of operating problems that may occur. All maintenance personnel and users should be familiar with Chapter 8 before attempting to repair the HI 200DNWM.

**Module LED does not Come Back on When Performing Calibration with The Button**

If the Module LED does not come back on when performing The Button (C2 Calibration) it indicates a hardware problem. Contact Hardy Customer Support for assistance.

**Module LED is Flashing Red**

Solution: Check all the connections to be sure they are securely fastened. Reinstall if any appear to be loose.

**Mechanical Inspection**

See Fig. 8-1

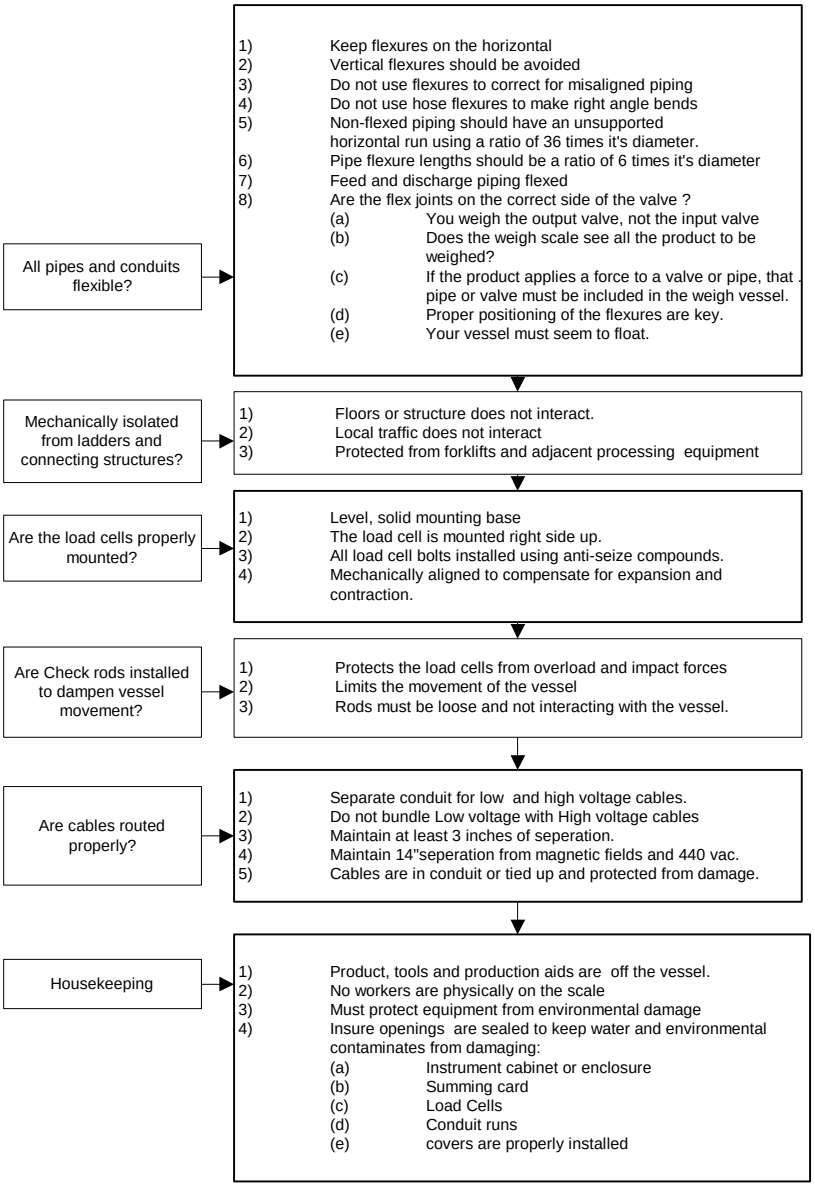


**FIG. 8-1 MECHANICAL INSPECTION**

## Load Sharing and Load Sensor Checkout

See Figure 8-2

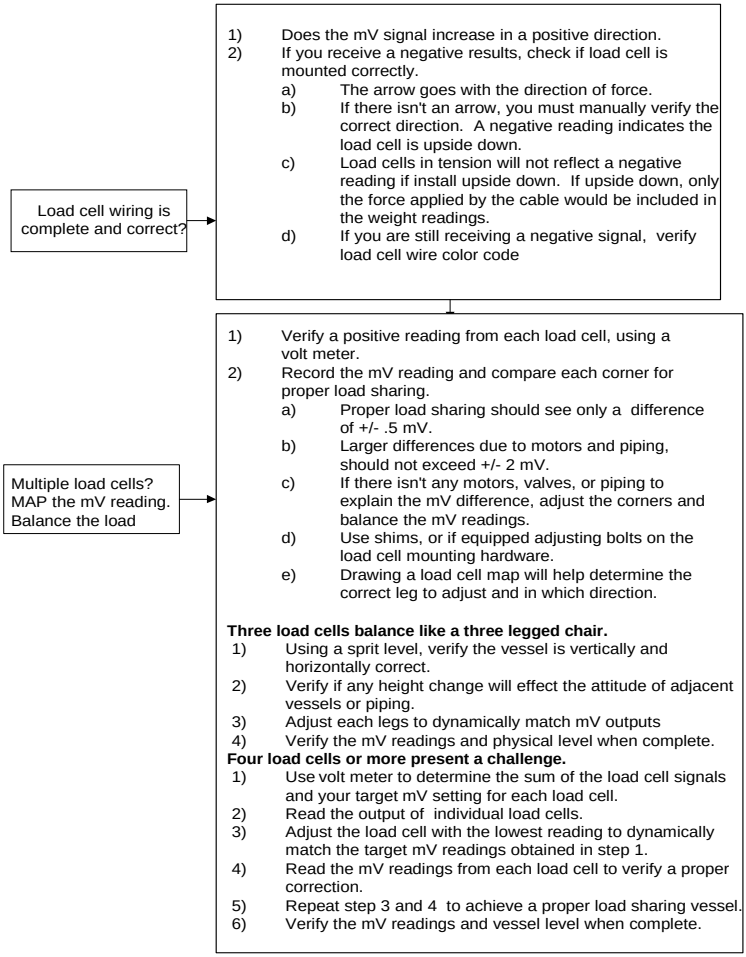


**FIG. 8-2 LOAD SHARING AND LOAD SENSOR CHECKOUT**

**Guidelines for Instabilities on Formerly Operating Systems**

See Figure 8-3

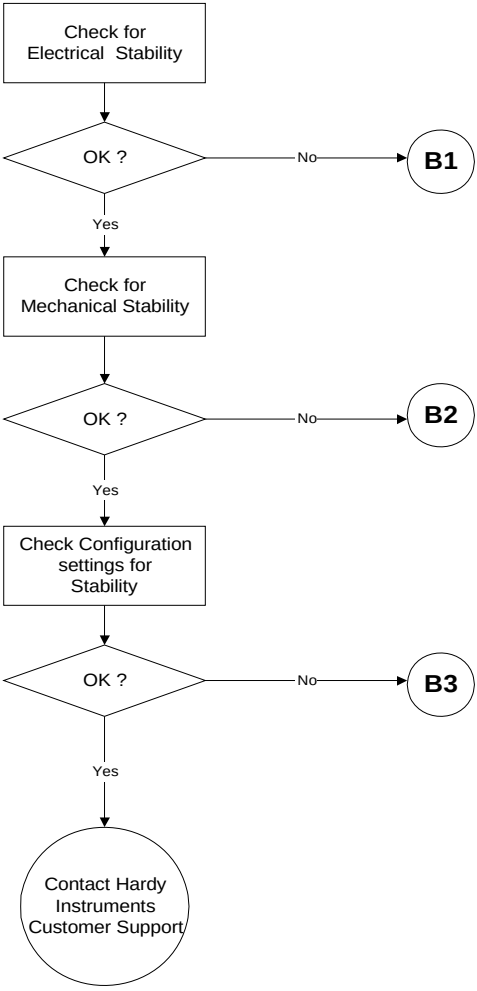


**FIG. 8-3 GUIDELINES FOR INSTABILITIES ON FORMERLY OPERATING SYSTEMS**

## Electrical

See Figure 8-4

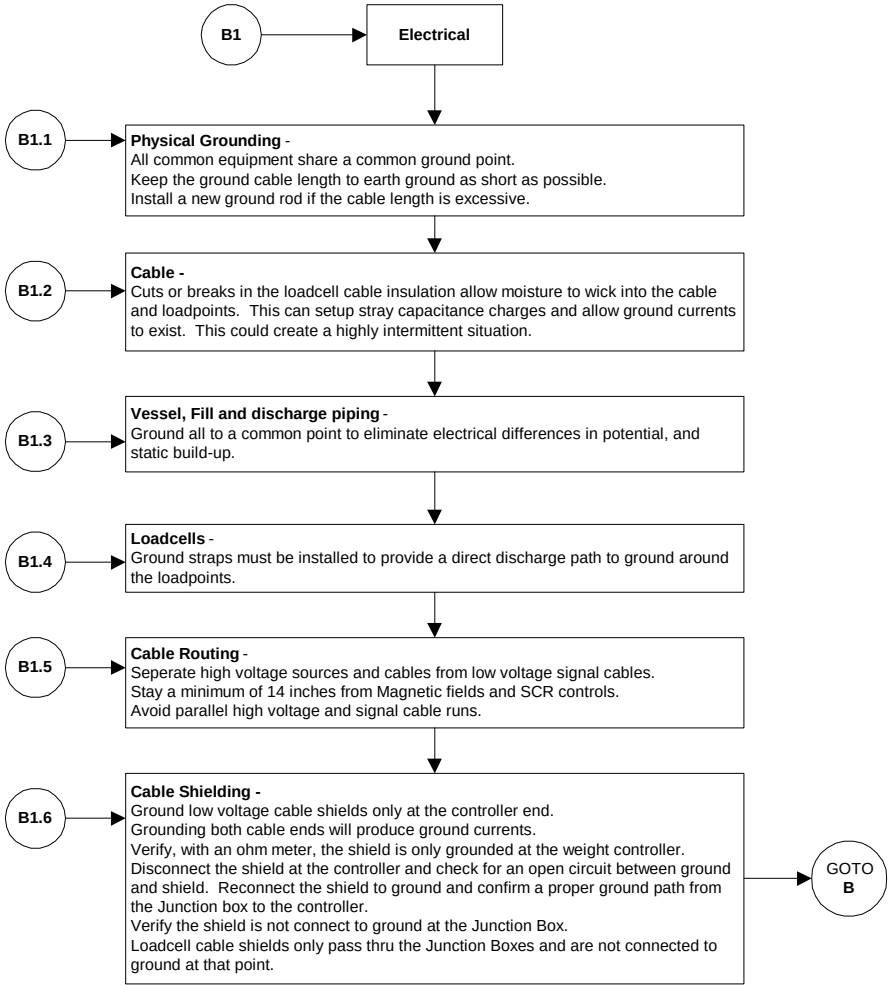


**FIG. 8-4 GUIDELINES FOR INSTABILITIES ON FORMERLY OPERATING SYSTEMS - ELECTRICAL**

## Mechanical Stability and Configuration Settings

See Figure 8-5

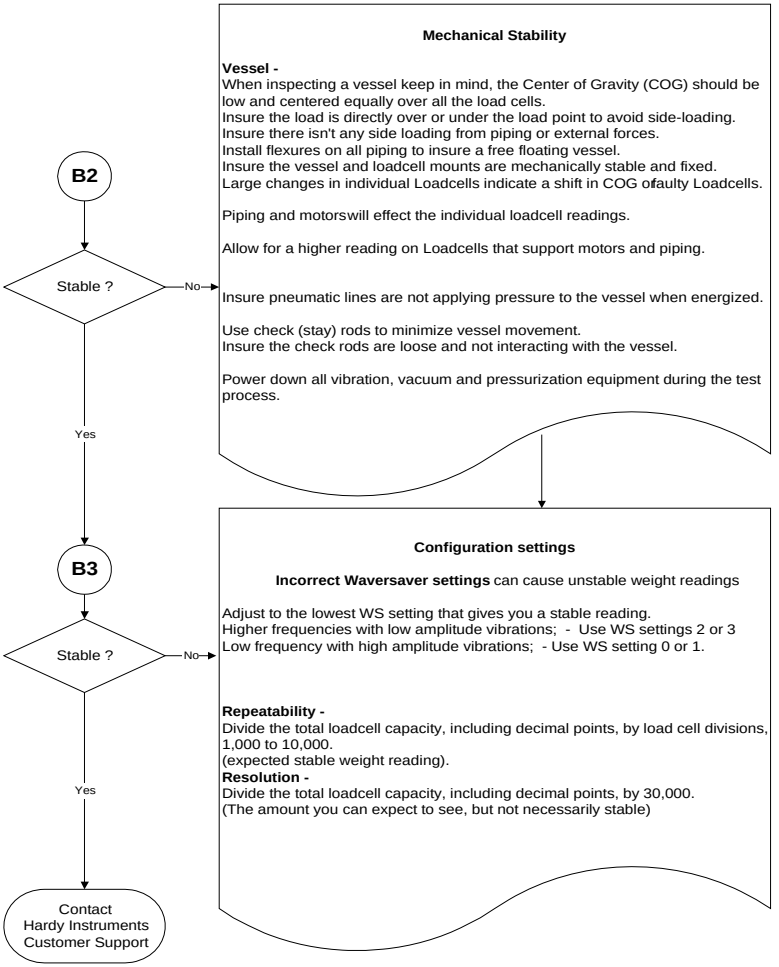


**FIG. 8-5 MECHANICAL STABILITY AND CONFIGURATION SETTINGS**

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