Chapter 4 - Provides hardware configuration instructions, including dip switch and jumper settings.

Chapter 5 - Provides firmware/software setup procedures needed to operate and calibrate the instrument.

Chapter 6 - Provides calibration instructions.

Chapter 7 - Provides operating procedures.

Chapter 8 - Provides troubleshooting procedures.

Description

Both the HI 1756-WS and HI 1756-2WS Weigh Scale Modules are self-contained, microprocessor-based ControlLogix I/O modules with control inputs and outputs that plug into the backplane of an Allen-Bradley ControLogix® programmable controller and/or Remote Rack. The remote rack module connects to the local chassis via a ControlNet link.

NOTE:

The Allen-Bradley Control/Logix®manuals contain useful information about their products that is not provided in this manual. This manual assumes that users have a basic understanding of process control and can interpret ladder logic instructions as needed to generate the electronic signals that control their application(s).

The HI 1756-WS Weigh Scale Module Series A is configured for single-channel operation while the HI 1756-2WS Weigh Scale Module Series A is configured for dual-channel operation. Both modules can be used for a wide variety of process weighing applications such as batching, blending, filling/dispensing, check weighing, force measurement, level by weight and weight rate monitoring.

The analog-to-digital converter in the weigh module controller updates fifty times per second and is capable of 8,388,608 counts of display resolution. This is enough to provide accurate weight measurement and control and to tolerate large “dead” loads or over sizing of load cells/sensors. To calibrate the module you can simply push “The Button” to effect a C2 electronic calibration. C2, Hard (Traditional calibration with weights) is also available for those not using Hardy C2 certified load sensors.

WAVERSAVER®

During the measurement of small weight changes, the affects of mechanical vibration and noise from the operating environment 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.

WAVERSAVER® can be configured to ignore noise with frequencies as low as 0.25 Hz. One of five higher additional cut off frequencies may be selected to provide a faster instrument response time. The default factory configuration is 1.00 Hz vibration frequency immunity.

C2® Calibration

Traditional calibration uses certified test weights. C2® Electronic Calibration allows a scale to be calibrated without the need for test weights. It can be initiated by pressing "THE BUTTON®" located in the front of the module, or via ladder logic.

A C2 weighing system consists of up to eight C2 load sensors, a junction box, interconnect cable, and an instrument with C2 capabilities (e.g., the HI 1756). Each Hardy Process Solutions C2-certified load sensor outputs digital information used for the calibration. The modules reads the sensor outputs and detects the num-ber of active sensors. It then calibrates the scale based on the load sensor's output plus a user-supplied refer-ence point value (from 0 to any known weight on the scale).

IT®

INTEGRATED TECHNICIAN™ is a system diagnostics utility which, in conjunction with an HI 215IT series IT junction box, continuously monitors the excitation circuit (with up to 4 load sensors) for possible malfunctions. IT reads individual load sensor voltages and weights and isolates individual system components for quick and easy troubleshooting.

Excitation Monitor

Continuously monitors a system's excitation current to check for open or shorted load sensors or damaged or broken excitation wire(s), including the wires

between the module, Remote Terminal Assembly (RTA) and the ***IT***® Junction box. If the measured current deviates more than a ± 10% tolerance, an "Excitation Error" bit (Module Status Word bit 9) is set to 1.

Digital Volt Meter (DVM) - Optional

Requires the HI 215IT Series Junction Box to monitor both mV and mV/V readings for the system and per individual load sensor. Once a problem is detected by the operator the DVM readings help the operator to isolate the faulty component. Further, the DVM readings can be used to level a system and to make corner adjustments to platform scales. Accuracy is +/- 2% or better of full scale.

NOTE: *If you do not have the HI 215IT Junction Box connected to the module, the mV/V reading as displayed is the total for all the load cells on the system.*

Return to Zero Test - Optional

Requires the HI 215IT Series Junction Box to monitor individual load sensors. This test compares the original voltage reading (saved at calibration) against the current voltage reading of an empty vessel. The test checks for damaged load sensors due to electrical zero shift or abnormal mechanical forces that cause binding on one or all of the load sensors in the system.

Weighing System Tests - Optional

Requires the HI 215IT Series Junction Box for full utilization. This test is used to diagnose drifting or unstable weight reading problems. The Weighing System Test does the following:

1. Disconnects the controller and engages an internal reference signal to see if the problem is within the instrument.
2. Disconnects the load sensors and engages an internal (in the junction box) reference signal to see if the cable between the instrument and the Junction Box is causing the problem.
3. Reads the weight of each load sensor to see if the load sensor might be causing the problem.

CHAPTER 2 - SPECIFICATIONS

A Brief Description of Chapter 2

Chapter 2 lists the specifications for the HI 1756-WS and HI 1756-2WS Weigh Scale Modules. Specifications are listed for the standard instrument and for optional equipment. The specifications listed are designed to assist in the installation, operation and troubleshooting of the instrument. All service personnel should be familiar with this section before attempting an installation or repair of this instrument.

Specifications for a Standard HI 1756-WS (-2WS) Weigh Scale Module

Channels

2 Channels

- Single Channel HI 1756-WS
- Dual Channel HI 1756-2WS

Conversion Rate

50 updates per second

Averages

1-255 User Selectable in single increments

Resolution

Internal: 1:8,388,608

Input

Up to eight (8) 350 ohm Full Wheatstone Bridge, Strain Gauge Load Sensors/Cells (5 volt excitation) on one vessel.

Non-Linearity

0.0015% of Full Scale

WAVERSAVER®

User Selectable

- 7.50 Hz
- 3.50 Hz
- 1.00 Hz (Default)
- 0.50 Hz
- 0.25 Hz

Excitation Monitor

Current less than +/- 10% expected

Common-Mode Rejection

110dB at or below 60 Hz

Common-Mode Voltage Range	2.5VDC maximum (with respect to earth ground)
Backplane Input Voltage	5 VDC and 24 VDC
Backplane Current Load	<1 Amp at 5 VDC 0.0125 Amps at 24 VDC (with 4-350 Ohm Load Cells
Backplane Power Load	< 5W at 5 VDC < .3W at 24 VDC with 4-350 Ohm Load Cells
C2 Calibration Input	Isolation from digital section 1000 VDC minimum.
Cable lengths	1000 feet maximum of C2 authorized cable 250 feet maximum of C2 authorized cable (Maximum of 4 load sensors) with IT Junction box.
Load Cell Excitation	5 VDC +/- 1.15 W maximum. Isolation from digital section 1000 VDC minimum
C2 Calibration Output	Isolation from digital section 1000 VDC minimum

Environmental Requirements

Temperature Coefficient	Less than 0.005% of full scale per degree C for Cal-LO and Cal-HI reference points
Operating Temperature Range	0^{o} C to 60^{o} C (32^{o} F to 140^{o} F)
Storage Temperature Range	-40^{o} C to 85^{o} C (-40^{o} F to 185^{o} F)
Humidity Range	0-90% (non-condensing)
Approvals	CE Approval UL, CUL (pending)
Digital Voltmeter	Accuracy +/- 2% of full scale Resolution

- mV/V 4 digits to the right of the decimal

Optional Equipment

1756 RTA (Remote Termination Assembly

Hardy Part # -RTA (HI-1756-XX-RTA if ordered separately) Remote Termination supports two (2) separate HI 1756-WS weigh scale modules or one (1) HI 1756-2WS weigh scale module. Unit includes DIN rail mounting for 35mm x 15mm DIN rail.

RTA Cable Assemblies

Hardy Part # -C6 (HI 1756-XX-C6)

- Cable Length: 6 ft. (1.525 meters) from the single channel module to the RTA.

Hardy Part # -C6 (HI 1756-XX-DC6)

- Cable Length: 6 ft. (1.525 meters) from the dual channel module to the RTA.

HI 215IT Series Junction Box

NEMA rated waterproof enclosure which sums from one to four load sensors load sensors.

- -PS1 NEMA 4 Painted Steel
- -SS1 NEMA 4X Stainless Steel
- -FG1 NEMA 4X Fiberglass

Default Parameters

Parameter	Default	Setting
ChanActive	1	On
calyear*		
calmonth*		
calday*		
calid[2]*		
Calib Type		
tareweight	0.0 lbs	

Table 2-1: Default Parameters