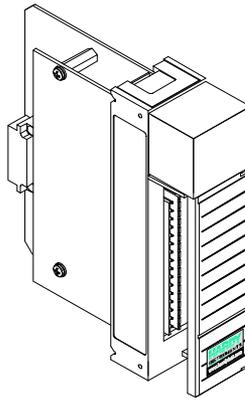# HI 1746-WS
WEIGH SCALE MODULE

OPERATION AND INSTALLATION MANUAL

Series C

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10075 Mesa Rim Road
San Diego, CA 92121
Phone: (858) 278-2900
Web-Site: https://www.hardysolutions.com

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HI 1746-WS WEIGH SCALE MODULE

CHAPTER 1 - OVERVIEW

A BRIEF DESCRIPTION OF CHAPTER 1

This manual provides the user and service personnel with a description of the specifications, installation, setup, configuration, operation, communication, maintenance, and troubleshooting procedures for the Hardy Process Solutions HI 1746-WS Weigh Scale Module, designed for use in Allen-Bradley's SLC 5/02, 5/03, 5/04, 5/05 programmable controllers. The HI 1746-WS is equipped with WAVERSAVER®, C2® Calibration, The Button, and INTEGRATED TECHNICIAN (***IT***) diagnostics. The module is configurable via Windows® 95/98/NT HI WS 100 Configuration Software or RS Logix 500© Industrial Programming Software. To get the maximum service life from this product, users should operate this module in accordance with recommended practices either implied or expressed in this manual. Before using the Weigh Scale Module, all users and maintenance personnel should read and understand all cautions, warnings, and safety procedures, referenced or explicitly stated in this manual, to ensure the safe operation of the module. Hardy Process Solutions appreciates your business. Should you not understand any information in this manual or experience any problems with the product, please contact our Customer Support Department at:

Phone: (858) 278-2900
FAX: (858) 278-6700
e-mail: hardysupport@hardysolutions.com
Web Address: http://www.hardysolutions.com

NOTE:

WAVERSAVER®, C2®, INTEGRATED TECHNICIAN® are registered trademarks of Hardy Process Solutions Inc. Windows® is a registered trademark of the Microsoft Corporation. RS Logix 500© is a Copyright of Rockwell Software Inc.

NOTE:

Hardy bases all procedures with the assumption that the user has an adequate understanding of all Allen-Bradley SLC 500 products. In addition the user

should understand process control and be able to interpret ladder logic instructions necessary to generate the electronic signals that control your application(s).

About Hardy Manuals

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

- **Chapter 1** - Provides an introduction to the instrument and an **Overview** of the equipment and its capabilities.
- **Chapter 2** - Provides a complete list of **Specifications**.
- **Chapter 3** - Contains information needed to install the HI 1746-WS (both standard and optional equipment) and the HI 215IT series Junction Box.
- **Chapter 4** - Provides complete hardware **Configuration** instructions for setting dip switches and jumpers.
- **Chapter 5** - Pertains to the firmware/software **Setup** and preparation procedures to calibrate and operate the instrument.
- **Chapter 6** - Provides all **Calibration** instructions.
- **Chapter 7** - Pertains to the **Operating Procedures** of the HI 1746-WS.
- **Chapter 8** - Pertains to the **Troubleshooting** procedures for repair of the instrument.

Hardy Process Solutions hopes that this manual meets your needs for information and operation. All corrections or suggestions for improvements of this manual are welcome and can be sent to the Technical Publications Department or Customer Support Department at Hardy Process Solutions Inc.

Description

The HI 1746-WS Weigh Scale Module is a self contained microprocessor based I/O module with control inputs and outputs, that is designed to be easily plugged into the back plane of an Allen-Bradley SLC 5/02, 5/03, 5/04 or 5/05 programmable controller and/or Remote Rack. The HI 1746-WS Weigh Scale Module can be configured to operate as either a local or

remote module. The HI 1746-WS module 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 module can control two (2) relays via two (2) TTL level outputs and transmits data via the back plane to the SLC. The 20 bit analog to digital converter in the weigh module controller updates twenty (20) times per second and is capable of 985,000 counts of display resolution. This gives the instrument the ability to tolerate large "dead" loads, over sizing of load cells/sensors and still have sufficient resolution to provide accurate weight measurement and control. The HI 1746-WS module is set up by using the SLC 500 AI Series, RS Logix500$^{©}$ Industrial Programming Software for Windows$^{®}$ 95/98/NT or the optional Hardy Windows$^{®}$ 95/98/NT HI WS100 Configuration Software. The software configuration applications must be installed in a PC with either Ethernet, DH+, DH-485, or RS-232-C that can initiate communications with the SLC 5/02, 5/03, 5/04 or 5/05. To calibrate the module you can simply push "The Button" to effect a C2 calibration. C2, Hard (Traditional calibration with weights), and Soft calibration can be implemented from the SLC 500 AI Series DOS software, RS Logix500$^{©}$ Industrial Programming Software for Windows$^{®}$ 95/98/NT or from the optional Hardy WS 100 Configuration Software for Windows. The HI 1746-WS is IT (Integrated Technician) enabled which means the module has a built in IT excitation monitor to detect some load cell problems and with the addition of the optional HI 215IT Junction Box and the HI WS100 software, the operator can use the other IT functions for fault isolation troubleshooting of the weighing system.

WAVERSAVER$^{®}$

Typically, mechanical noise (from other machinery in a plant environment) is present in forces larger than the weight forces trying to be detected by the module. The HI 1746-WS 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 module is capable of identifying the actual weight data. WAVERSAVER® can be configured from the Configuration Software 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

C2 Second Generation Calibration enables a scale system to be calibrated electronically without using certified test weights which equals the systems load capacity. A C2 weighing system consists of up to eight (8) C2 load sensors, a junction box, interconnect cable and an instrument with C2 capabilities such as the HI 1746-WS Weight Scale Module. All Hardy C2 certified load sensors contain digital information detailing its unique performance characteristics. The HI 1746-WS reads the performance characteristics of each individual load sensor and detects the quantity of load sensors in the system. C2 Calibration can be performed by pressing "The Button" located in the front of the module, or via Hardy's Configuration Software or Allen-Bradley's RS Logix 500 software.

IT®

INTEGRATED TECHNICIAN™ is a system diagnostics utility which continuously monitors the weighing system (with up to 4 load sensors) for possible malfunctions. For full functionality the HI 215IT junction box and Hardy's Configuration Software for Windows should be used. Full *IT* functionality allows the operator to rapidly troubleshoot a weighing system from the Configuration Software, INTEGRATED TECHNICIAN Display.

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 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 Junction Box and Hardy Configuration Software to monitor both mV and mV/V readings 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 balanced 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 in the Configuration Software, Test display is the total for all the load cells on the system.

Return to Zero Test - Optional

Requires the HI 215IT Junction Box to monitor individual load sensors. The Hardy configuration Software is required when using this option. This test compares the original voltage reading (saved at calibration) against the current voltage reading of an empty vessel. The test displays a "Passed Return to Zero Test" or a "Failed Return to Zero Test" statement when running the System Test from the Configuration Software, Test Display, depending on the outcome of the test. 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 Junction Box. 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.
1. 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.
2. Reads the weight of each load sensor to see if the load sensor might be causing the problem.

The ability to read the weight seen by each individual load sensor allows use of this test to make cornering,

leveling and load sharing adjustments to the weighing system. The Hardy Configuration Software is highly recommended for use with this option.

Auto Zero

Auto Zero Tracking will indicate zero weight, as long as any "live weight" on the scale is below the set Auto Zero Tolerance and the scale is not motion. This capability allows the module to ignore material build-up in the weighing system within a pre-set auto zero tolerance.

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.

Set Point TTL Outputs

The HI 1746-WS is equipped with two (2) standard Digital TTL (Transistor - Transistor Logic) Level Outputs which can be connected to external solid state relays. Both outputs have individual set point, preact and deadband parameters. Both outputs are rated at 10 milliamps per line. Each can be programmed to respond to the standard Net, Gross, Rate of Change (ROC), Excitation Monitor, Force On or Force Off mode of operation.

CHAPTER 2 - SPECIFICATIONS

A Brief Description of Chapter 2

Chapter 2 lists the specifications for the HI 1746-WS Weigh Scale Module. 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 1746-WS Weigh Scale Module

Modes of Operation	Local and Remote
Conversion Rate	20 updates per second
Averages	1-255 User Selectable in single increments
Resolution	Displayed: 1:985,000 (@ 3 mV/V) 1:656,000 (@ 2 mV/V) Internal: 1:1,048,576
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
Maximum Zero Tolerance	32766
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

HI 1746-WS WEIGH SCALE MODULE

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 maximum (with respect to earth ground)
Backplane Current Load	0.250 Amps at 5 VDC
Power	+5 VDC +/- 5%
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
Set Point (1 & 2) Out	Discrete outputs (TTL) step function of 0 or +5 VDC to drive an SSR
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° C to 60° C (32° F to 140° F)
Storage Temperature Range	-20° C to 85° C (-4° F to 185° F)
Humidity Range	0-90% (non-condensing)

Approvals	UL Certification cUL Certification CE Approval
Digital Voltmeter	Accuracy +/- 2% of full scale Resolution

- mV/V 4 digits to the right of the decimal
- mV 1 digit to the right of the decimal

Optional Equipment HI 215IT Junction Box

IT Junction Box HI 215IT-SS or PS Series

Case Dimensions	6.25"H x 6.25"W x 4.50D (158.75mmH x 158.75mmW x 114.3mmD)
Weight	5 pounds (2.27 Kilograms)

Enclosure Ratings	-SS	Stainless Steel	NEMA 4 & 4X
	-PS	Painted Carbon Steel	NEMA 4

IT Junction Box HI 215IT-FG Series

Case Dimensions	6.50"H x 8.0"W x 4.46"D (165.1mmH x 203.2mmW x 113.28mmD)
Weight	5 pounds (2.27 Kilograms)

Enclosure Rating	-FG	Fiberglass	NEMA 4 & $X

Configuration Software for Windows	Hardy's Configuration Software for Windows allows the user to configure, monitor, and troubleshoot an HI 1746-WS module and load points from any PC with an installed Windows® 95/98 or NT operating system.

Default Parameters

Table 2-1:

Parameter	Default	Setting
Tare Weight	0.0 lbs	
WAVERSAVER®	1 Hz	2
Weight Units	lbs	0
Span Weight	10,000.0 lbs	
Averages	10	
Auto Zero Tracking Enabled	False	0
Tare Enabled	True	1
Zero Enabled	True	1
Calibration Type	No Calibration	-1
Setpoint Mode 1&2	Force Low, Gross	0x12
Setpoint Value 1&2	10000.0 lbs	
Setpoint Deadband 1&2	0.1 lbs	
Setpoint Preact 1&2	0.0 lbs	
Auto-zero Tolerance	10.0 lbs	
Motion Tolerance	5.0 lbs	
Zero Tolerance	10	
Rate of Change Time Base	10	
Cal Year	0	
Cal Month	0	
Cal Day	0	
Cal ID	0	

CHAPTER 3 - INSTALLATION

A Brief Description of Chapter 3

All information contained in Chapter 3 pertains to unpacking, cabling, interconnecting, configuration and installing the HI 1746-WS Weigh Scale Module. Alternatives to any procedures contained or implied in this chapter are not recommended. 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 1746-WS module. Hardy Process Solutions appreciates your business. Should you experience any problems installing this equipment, contact Hardy Customer Support for assistance.

Unpacking

Step 1.   Before signing the packing slip, inspect the packing for damage of any kind.

Step 2.   Report any damage to the carrier company immediately.

Step 3.   Check to see that everything in the package matches the bill of lading. You should normally have:

- HI 1746-WS Weigh Scale Module
- Operation and Installation Manual

Step 4.   Write down the Model and Serial number of the module. Store this information in a convenient location for reference when contacting The Customer Support Department for parts or service.

Installing the HI 1746-WS into an Allen-Bradley SLC 500 Processor or Allen-Bradley Remote Rack

WARNING

ELECTROSTATIC DISCHARGE MAY DAMAGE SEMICONDUCTOR COMPONENTS IN THE MODULE. DO NOT TOUCH THE CONNECTOR PINS. PLEASE OBSERVE THE FOLLOWING HANDLING PRECAUTIONS:

- 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. Never, **NEVER** touch the connector pins.
- Never install, remove, or wire any module while the power is on. Always disconnect the power from the SLC when working on the module.
- Do not install the module right next to an AC or high voltage DC module.

Setting the Jumper for Local or Remote Mode of Operation

Step 1.   Remove the module from its package by grasping the front cover. (See Fig. 3-1)
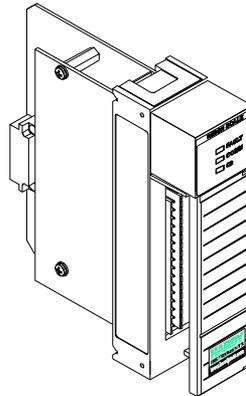
FIG. 3-1 HI 1746-WS WEIGH MODULE IN PROPER ORIENTATION

Step 2.   Place the jumper either on OFF (Default) for Local or ON for Remote operation. (See Fig. 3-2)
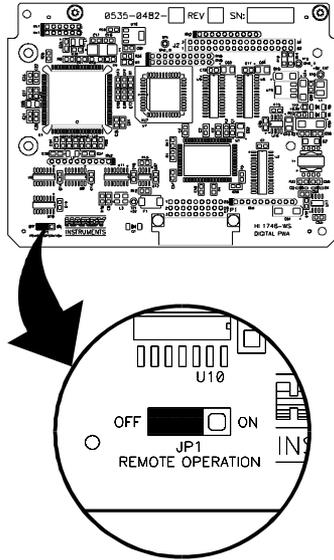
FIG. 3-2 JUMPER LOCATION/JUMPER SET IN THE DEFAULT OFF (LOCAL MODE) POSITION

Installing the HI 1746-WS into the SLC 500 or Remote Chassis

Step 1.   Make sure that the module is oriented correctly for installation. (See Fig. 3-3)

PCB
Guide
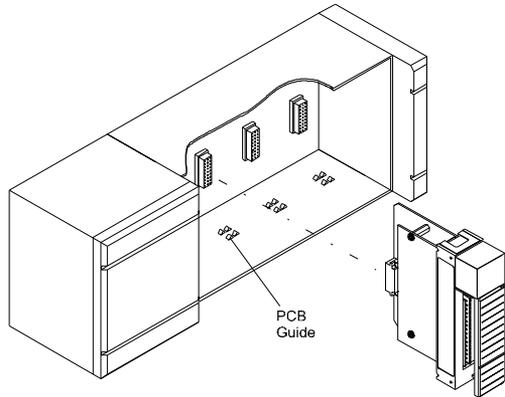
FIG. 3-3 POSITIONING THE MODULE FOR INSTALLATION

Step 2.   Gently slide the module into the SLC or Remote Chassis.

Step 3.   Slide the digital board between the PCB Guides on the top plate and bottom plate of the chassis to line up the module connector with the backplane connector.

Step 4.   When the module connector is touching the backplane connector, firmly but carefully push toward the chassis until the pins are plugged in and the Processor Releases (both top and bottom) are snapped into place. (See Fig. 3-4 & 3-5)

Step 5.   The installation is complete.

Top and Bottom
Module Release(s)

PCB
Guide
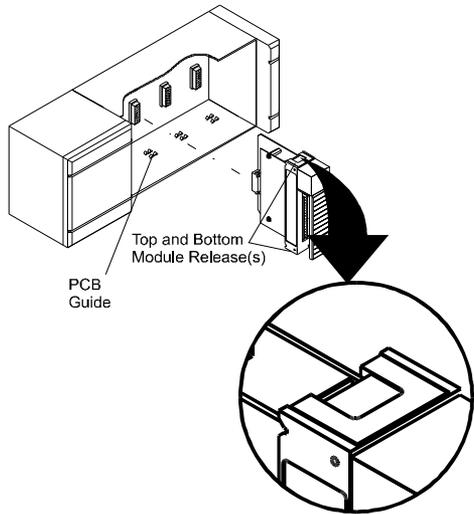
FIG. 3-4 MODULE RELEASE(S)
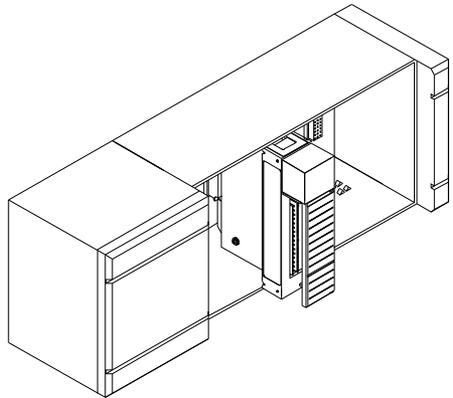
FIG. 3-5 MODULE INSTALLED IN SLC CHASSIS

Removing the Module from the SLC 500 or Remote Chassis

Step 1.   Press down on the top and bottom Processor Releases simultaneously until the module can be pulled away from the chassis. (See Fig. 3-4)

Step 2.   Pull the module out of the Chassis.

Step 3.   Store in a safe, secure location in an anti-static bag or the original enclosure.

Installing the Module I/O Connector

About the Module I/O Connector

The I/O Connector at the front of the module connects the module to the load sensors and relays, or the HI 215IT Junction Box depending on how many load sensors are installed in the weighing system. See below for the pin-out diagram. The pin-out diagram is located on the inside of the module door. (See Fig. 3-5)

Pin 16   Aux In
Pin 15   N.C
Pin 14   GND
Pin 13   +V
Pin 12   Relay 2
Pin 11   +V
Pin 10   Relay 1
Pin 9   C2-
Pin 8   C2+
Pin 7   -Exc
Pin 6   -Sen
Pin 5   -Sig
Pin 4   +Sig
Pin 3   +Sen
Pin 2   +Exc
Pin 1   Shield

Step 1.   Open the Module door to gain access to the I/O connector. (See Fig. 3-5)
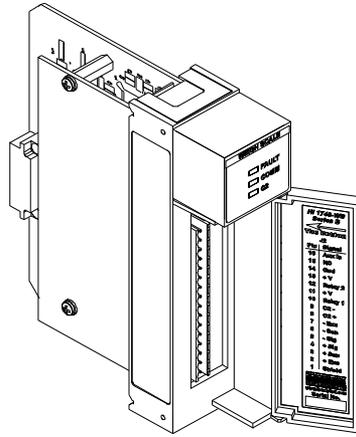
FIG. 3-6 MODULE WITH DOOR OPEN

Step 2. Install the cable and connector so it allows the module door to be shut.

Step 3. There is a bracket (not shown) that allows you to use a tie wrap to secure the cable to the module.

Step 4. With the plug oriented correctly (See the pin-out diagram above), plug the I/O male connector into the I/O connector at the front of the module.

Step 5. Check to be sure that the connector is completely plugged in before operating the module.

NOTE: *Most of the problems with modules are due to loose connections. Be sure to check the I/O connection first in the event you have a problem receiving information from the load cells or if the relays do not operate correctly.*

Load Cell Wiring Diagrams

NOTE: *The HI 1746 has two factory installed jumpers. If your application is not using C2 load cells do not remove the factory installed jumpers . If your appli-*

cation requires load cells cables that are less than 50 ft. you must leave the jumpers installed or connect the sense lines, one or the other. If your application calls for load cell cables over 50 ft. or you are using C2 load cells, remove the jumpers and connect the sense lines. The jumpers or sense lines must be installed at all times.

WARNING: Load cell cable length has been calculated into C2 calibration data. Hardy recommends that you DO NOT CUT your Advantage or Advantage Lite load sensor cable, as your C2 accuracy will be affected and the warranty will be voided.

Industry Standard Load Cells
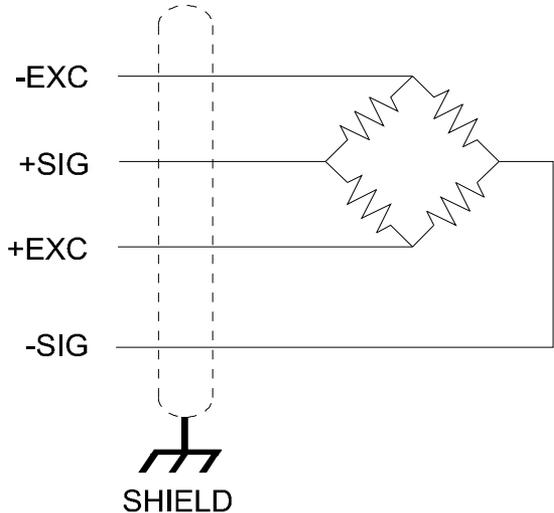
FIG. 3-7 INDUSTRY STANDARD LOAD CELLS WIRING DIAGRAM

**Hardy Load
Sensor with C2**
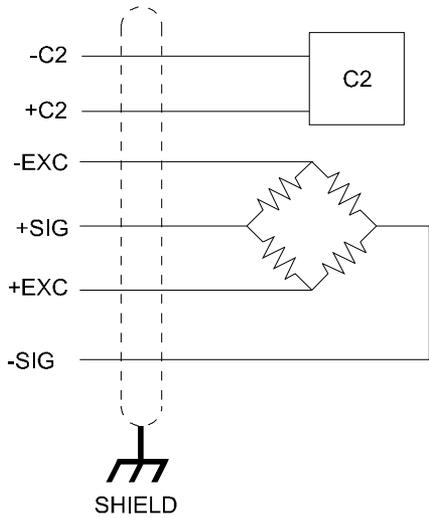
**FIG. 3-8 HARDY LOAD SENSOR/C2 WIRING
DIAGRAM**

**Hardy HI 215IT
Junction Box**
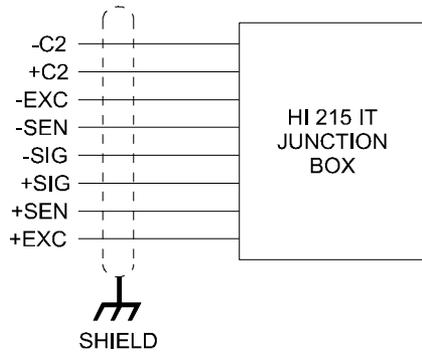
**FIG. 3-9 HARDY HI 215IT JUNCTION BOX
WIRING DIAGRAM**

NOTE: *When connecting the Hardy HI 215IT Junction Box
you must remove the two factory installed jumpers
that are connected to contacts 2&3 and 6&7 on the
module and install sense lines.*

Installing the Hardy Configuration Software (Optional)

Contact your local Hardy Representative or Hardy Sales Department for information about how to purchase the Hardy WS 100 Configuration Software for Windows.

Step 1.   The SETUP program copies the required files to your hard disk.

Step 2.   Run Windows NT/95/98 and insert the Configuration Installation System Disk into the 3.5" floppy drive.

Step 3.   Click on START.

Step 4.   Click on Run.

Step 5.   In the Run field type the command: a:setup. If your floppy drive is drive b enter: b:setup.

Step 6.   Press the Enter key.

Step 7.   You can also use the Add/Remove Function in the Control Panel dialogue box.

　　a.   Click on Start
　　b.   Move the cursor to Settings.
　　c.   Select Control Panel.
　　d.   Double click on the Add/Remove Programs icon.
　　e.   Click on the Install button.

Step 8.   The SETUP program will lead you through the installation process.

NOTE: *HI WS100 Configuration Software is an option. For Pricing and Information for this product contact your local Hardy Representative.*

CHAPTER 4 - SETUP

A Brief Description of Chapter 4

All information contained in Chapter 4 pertains to firmware and software settings (Local and Remote modes of operation) to prepare the module controller for calibration and operation. Alternatives to these procedures 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. The Setup procedures require either Allen-Bradley DOS PLC 500 AI Series Ladder Logic Editor, Allen-Bradley RS Logix 500, Allen-Bradley RSLinx™ or RSLinx™ Lite. The Local Mode of Operation means the Module is installed in a SLC Chassis and Remote Mode of Operation means the Module is installed in a Remote Chassis.

Power Check

Step 1.   Check to see that there is power to the SLC and the module.

Step 2.   If there is power to the module, the LEDS should be lit. (See Fig. 4-1)

Step 3.   To make any settings the LED's should be lit as follows:

a.   Run/Fault - Steady Green
b.   Communication - Flashing Green
c.   C2 - Steady Green if system has C2 load cells or off if there are no C2 load cells.
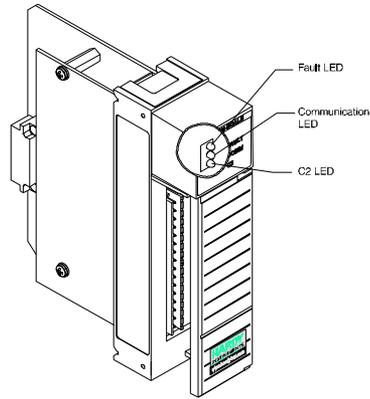
FIG. 4-1 MODULE LEDS

LEDS

Run/Fault LED	Flashing Green	Self-Test is running.
	Flashing Green	(5Hz Flash Speed) - Self-Test Failed, or no calibration.
	Steady Green	Self-Test Passed
	Flashing Red	Weigh Scale Module has a fault.
	Steady Red	Module has a major problem.*

NOTE: ** Contact Hardy Customer Support for assistance.*

Comm. LED	Steady Green	Normal Operation
	Flashing Green	Block transfer is being performed.
	LED is Off	No Communication

C2 LED	Steady Green	A C2 load cell(s) has been found.
	LED is Off	No C2 load cells have been found.
	Steady Red	Unable to read loadcell data or the loadcell data is in error.

Setting Up Communications Between the SLC and the HI 1746-WS Weigh Scale Module

To set up communication between the SLC 5XX and the HI 1746-WS Weigh Scale Module you will need to select or enter the following information into the I/O Configuration section of your software:

Local Mode of Operation

Type of Device Category: Other

I/O Card ID Code: 13635

M Files

M0 = 128 Words
M1 = 128 Words

There are no G files.

Remote Mode of Operation

Type of Device Category: Other

I/O Card ID Code: 3535

Input Words: 8
Output Words: 8

About M Files

The M File Interface consists of two files, M0 and M1. M0 and M1 files are data files that reside in the HI 1746-WS Weigh Scale Module. There is no image for these files in the processor memory. With respect to the SLC processor (SLC 5/02, 5/03, 5/04, 5/05) the M0 file is a module output file (a write only file) and the M1 file is a module input file (a read only file). With respect to the HI 1746-WS weigh module the M1 file is for output from the module to the processor and M0 file is for input from the processor to the module. The module writes replies in the M1file to commands that the processor writes into the M0 file. The M files are used to control and monitor block transfer operations.

Direct M File Mapping

Local Mode of Operation

For the 1746 modules used in the local chassis, Hardy has available direct mapping of the parameters to the M files. This means that you can write to a specific location in the M0 file and the1746 will pick up the change and apply it and reflect the change in the M1 file.

NOTE: *After making the change, you need to save the change to non-volatile memory.*

Changes can be made one word at a time or up to 37 words (all parameters) at a time.

NOTE: *If multiple words written to the module at the same time, data must be in the same order and have the correct length for each parameter.*

The mapping is as follows for all the parameters:

Parameter	Word
Tare Weight (float)	28
Span Weight (float)	30
CalLO Weight (float)	32
Set Point 1 (float)	34
Dead Band 1 (float)	36
Preact 1 (float)	38
Set Point 2 (float)	40
Dead Band 2 (float)	42
Preact 2 (float)	44
Zero Tolerance (float)	46
Auto Zero Tolerance (float)	48
Motion Tolerance (float)	50

Parameter	Word
Metric (int)	52
Waversaver (int)	53
Averages (int)	54
Zero Track Enable (int)	55
Tare Enable (int)	56
Zero Enable (int)	57
ROC Time Base (int)	58
Setpoint 1 Type (int)	59
Setpoint 2 Type (int)	60
Cal Year (int)	61
Cal Month (int)	62
Cal Day (int)	63
Cal ID (int)	64

Remote Mode of Operation

For 1746 modules used in the remote chassis, direct mapping of the parameters to the M files is also available. You can write to a specific location in the M0 file, do a single Executable command, such as command 4 to write non-volatile, and the 1746 will pick up the change and apply it to the weigh module and reflect the change in the M1 file.

NOTE:

After making the change you need to save it to non-volatile memory.

The 1746 module is limited to 8 words total for any read or write at any time, so you are limited to changing a maximum of 7 words at a time. The mapping is the same as listed above for the local chassis.

M File Interface to Set Up for Local Mode of Operation

CAUTION:

THIS SETUP INFORMATION IS FOR THE LOCAL MODE OF OPERATION ONLY. BEFORE SETTING UP FOR LOCAL MODE OF OPERATION CHECK TO BE SURE THE JUMPER IS SET FOR LOCAL MODE AND THAT THE MODULE IS INSTALLED IN A LOCAL SLC CHASSIS. (SEE CHAPTER 3, PG 3-2 FOR MORE INFORMATION)

M File Data Structure (Words 0 to 5)

0   Sequence Number (sequenceNum) is used to control the flow of commands to the HI 1746-WS module in order to prevent duplicate or invalid commands. To write a command to the module, the processor must copy the current sequence number from the M1 file to the M0 file. When the module performs the requested command, it writes the response into the M1 file, incrementing the sequence number by 1. To get the sequence number from the module, a read command should be used before a write command to retrieve the next number from the module.

1   Command is used to select the command to be performed.   Enter the command from the Command List.

2   Command Status indicates if the command succeeded or not. The module writes a value of zero (0) if the command succeeded. If the command failed, the module writes an error code value which indicates the reason for the command failure. (See the Error Code List.) The Error Code table also lists the commands where the error code is the sum of possible error bits.

3   Offset specifies which parameter will be read or written.

4   Length is the number of bytes in a data string field (32 bytes maximum or 16 words)

5   Datastring field is where the actual data is entered you want to send to the module, or to receive from the module. Example: To set the value of one of the module's parameters, the value of the parameter is written in the Datastring field.

Logical File Interface to Set Up for Remote Mode of Operation (8 Word)

CAUTION:

THIS SETUP INFORMATION IS FOR THE REMOTE MODE OF OPERATION ONLY. BEFORE SETTING UP FOR REMOTE MODE OF OPERATION, CHECK TO BE SURE THE JUMPER IS SET FOR REMOTE MODE AND THAT THE MODULE IS INSTALLED IN A REMOTE CHASSIS. (SEE CHAPTER 3, PG 3-2 FOR MORE INFORMATION)

About Logical Files

For the remote mode of operation, the HI 1746-WS has no M files. Instead, the module contains files that correspond to the 32 word I and O files used when the module is in the local mode of operation. These files are referred to as "Logical MFiles". Logical MFiles perform the function of the I, O, and M files used in the local mode of operation but are not directly accessible through the SLC backplane. (See Fig. 4-2)

- O = Output
- I = Input referenced to the CPU.
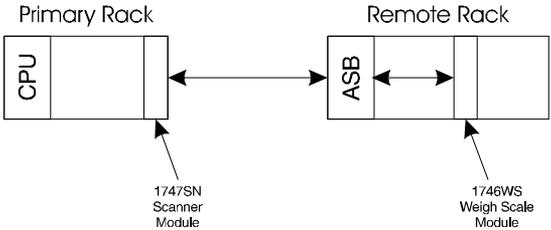
**FIG. 4-2 PRIMARY AND REMOTE
COMMUNICATION DIAGRAM**

**Command Word
Encoding**

You may write up to 7 words at a time to either the Logical O file or the Logical M0 file. Word #0 of the 8 word output file is used to specify where words 1-7 go in either the logical O or M0 file, is called the "Command Word". Word #0 of the I file will always be a copy of the "Command Word".

Bits 15 & 14

11 = write 0 to 7 words to the logical M0 file, Read 7 words from the M1 file.

NOTE:

You need to run any command through M files before previous writes take effect.

01 = write 0 to 7 words to the logical O file, Read (configured) I

10 = configure 0 to 7 words for the I file return, configure 7 words to read from Logical I file.
00 = the configured I file returned.

Bits 8-13

Number of words to write to the logical M0 or logical O file.

Bits 0-7

Offset (in words) in the logical M0 or logical O file where the write begins.

Command Word - 16 bits		
Bits 15-14	Bits 13-8	Bits 7-0

Command Word - 16 bits		
Configure the Read and Write	Binary value indicating number of words to write	Binary value indicating starting offset for write/read to begin.

Writing to the 32 Word Logical O and logical M0 files

You must Decide whether you are going to write to the M0 or O file.

Command Word

Writing to the M0 file

- Bits 15-14 set to "11", will specify a write to the logical M0 file.
- Bits 13-8 set as a binary value indicating number of words to write (e.g. 2 would be "000010".
- Bits 7-0 set as a binary value indicating offset word to start writer at (e.g. 28 would be "00011100".

For Example

A command word set to binary value "1100 0010 0001 1100" would indicate a write of 2 words to the logical M0 file starting at offset word 28.

Writing to the O file

- Bits 15-14 set to "01", will specify a write to the logical O file.
- Bits 13-8 set as a binary value indicating number of words to write (e.g. 2 would be "000010").
- Bits 7-0 set as a binary value indicating offset word to start write at (e.g. 7 would be "00000111").

For Example

A command word set to binary value "0100 0010 0000 0111" would indicate a write of 2 words to the logical O file starting at offset word 7.

Words 1-7

Data to be written to the M0 or O files. Number of words determined by setup of "Command Word

Reading from the 32 Word Logical I and logical M1 files

Reads are all done in the I file (not to be confused with the "logical I file"). Word #0 will always be a copy of the "Command Word". Words 1-7 of the I file can be configured to read up to 7 words from either the Logical M1 or the Logical I file (you cannot read from both at the same time).

Command Word

Bits 15-14 set to "10"

Allows the user to specify what words (up to 7) from the logical I file to appear in words 1-7 in the I file.

For Example

If bits 15-14 are set to 10 in "Command Word" and words 1-7 of the O file are: 18,19, 20, 21, 16, 15, 24. The return in the I file words 0-7 would be (in order): "Command Word", gross weight (MSW), gross weight (LSW), net weight (MSW), net weight (LSW), relay status, module status, and ROC evaluation period.

Bits 15-14 set to "11"

When written to the logical M0 file, will cause the I file to reflect the words at the same starting offset in the logical M1 file as specified in bits 7-0.

For Example

If 2 words are written to the logical M0 file starting at offset word 28, then offset words 28 and 29 of the logical M1 file would appear in words 1 and 2 of the I file.

Bits 15-14 set to "01"

For a write will cause the I file to reflect the words previously selected to read using the "10" setting.

NOTE:

The selected words to read are not necessarily the ones being written to using the "01" setting.

Bits 15-14 set to "00"

Returns the configuration set up with the "10" command.

NOTE:

After an input byte is configured, the 1746 will remember the configuration as long as it has power. The Configuration is lost after you power down.

**Executable Command
List**

CAUTION: **ALWAYS PERFORM A READ COMMAND
FIRST BEFORE THE WRITE COMMAND
EVERYTIME, TO GET THE CORRECT
SEQUENCE NUMBER. (SEE THE SET-
PARAMS EXAMPLE, RUNG 0 FOR THE LAD-
DER LOGIC)**

**Zero Command
(ZEROCMD)**   The Zero Command requests that the current gross
weight be set to zero.
Error Return Values:

- NOTALLOWED - the ZeroEnable parameter is
not set to TRUE (1),

- OUTOFTOLERANCE - the current weight value
is beyond the limits set by the zero tolerance
parameter.

- "STATUSWORD" - the command failed because
the weight was not stable (in motion), or that
there was an A/D error of some kind.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	1				

**Tare Command
(TARECMD)**   The Tare Command requests the current net weight be
set to zero.

Error Return Values:

- NOTALLOWED - the TareEnable parameter is not set to true

- "STATUSWORD" - means the command failed because the weight was not stable (in motion) or there was an A./D error.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	2				

Write Non-Volatile Command (WRITENONVOLATILE)

The Write Non-Volatile Command - causes all parameters (including calibration constants) to be saved to the non-volatile memory.

Error Return Values: None

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	4				

Reload Non-Volatile (RELOADNONVOLATILE)

The Reload Non-Volatile Command - causes the weigh module to re-read the values stored in its non-volatile memory. Any parameters changed since the last write non-volatile command are overwritten. this command can be used to abort a calibration or parameter entry session.

Error Return Values: None

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x10				

Float Integer to Integer Conversion Command (FLOAT2INT)

The Float Integer Conversion Command - converts a floating point number into an integer format. (For use with the SLC 5/02)

Data Input Values: 6 bytes (a four byte float, and a two byte integer)
Return Value: 4 byte long integer, equal to the float multiplied by the integer.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x96				

Integer to Float Integer Conversion Command (INT2FLOAT)

The Integer to Float Integer Conversion Command - Converts a Float integer to an integer. (For use with the SLC 5/02)

Data Input Value: A four byte long integer, and a two byte integer.
Return Value: A four byte float, equal to the long divided by the two byte integer.
Error Return Value:

• NOTALLOWED - returned if the two byte integer is zero.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5
From M1 File	0x97				Integer Dividend

DATA 6	DATA 7	DATA 8-16
Integer Dividend	int2 Divisor	

**Cal Low Command
(CALLOWCMD)**

The Cal Low Command - sets the "calLowCount" parameter to the current A/D average counts when doing a hard calibration.

Error Return Values:

- STATUSWORD - there was a conversion error, weight in motion or an A/D error or all three.

- HARDCALFAILCOUNTS - there is less than 100 counts between the zero and the span weights.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x64				

**Cal High
Command
(CALHIGHCMD)**

The Cal High Command - Sets the Span Weight parameter to the current A/D average counts when doing Hard CAL.
Error Return Values:

- STATUSWORD - there was a conversion error, weight in motion or an A/D error or all three.

- HARDCALFAILCOUNTS - there is less than 100 counts between the zero and the span weights.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x65				

**C2 Cal Command
(C2CALCMD)**

The C2 Cal Command - Performs a C2 Calibration.

Error Return Values:

- STATUSWORD - there was a conversion error, weight in motion or an A/D error or all three.

- C2FAILNODEVS - did not detect any C2 load cells.

- C2FAILCAPEQ - detected two load cells with different capacities.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x66				

Read C2 Serial Number Command (READC2SERIALN UM)

The Read C2 Serial Number Command - Reads the 9 byte serial number from a C2 chip located on every C2 load cell. Specify the index of the C2 chip to read in commandData.offset of the Mfile. The index should be a number of 0 to C2RomX-1 (-1 is a minus one not a dash one), where C2RomX is the number of C2 chips. The "serial number" will be 8 bytes of ASCII text, followed by a 0 terminator.

Error Return Values:

- OUTOFTOLERANCE - specified chip is not found.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x70				

Set Parameters Command (SETPARAM)

Sets a parameter in the module. (See Setting the Process Weighing Parameters below for more detailed information.)

Error Return Values:

- OUTOFTOLERANCE - is returned if an incorrect value is entered to a parameter.
- INDEXOUTOFRANGE - is returned if no parameter corresponds to the offset specified.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x100		Use Parameter Offset Value from Table 4-1		See Weight Multiplier Section Below

Get Parameters Command (GETPARAM)

Reads a parameter, from the module. (See Setting the Process Weighing Parameters below for more detailed information.)

Error Return Values:

- OUTOFTOLERANCE - is returned if an incorrect value is entered to a parameter.
- INDEXOUTOFRANGE - is returned if no parameter corresponds to the offset specified.

SEQ NUMBER 0	COMMAND# (Hex) 1	STATUS 2	OFFSET 3	LENGTH 4	DATA 5-16
From M1 File	0x101		Use Parameter Offset Value from Table 4-1		

I/O Setup Ladder
Logic for Remote
Mode Operation

This file reads the logical I file and writes it back to the logical O file. All B16 bits are control to insure sequencing of rungs. Bit N9:0/0 initiates the transfer.

This rung sets up the weight multiplier for integer values. This sets up for a write to the logical O file of one word to location word 15.

```
         B16:0
0000  ──┤ OSR ├──                        ┌─── MOV ──────────┐
           1                             │ Move             │
                                         │ Source    -16655 │
                                         │          -16655< │
                                         │ Dest        N9:1 │
                                         │          -16384< │
                                         └──────────────────┘

                                         ┌─── COP ──────────┐
                                         │ Copy File        │
                                         │ Source    #N15:55│
                                         │ Dest        #N9:2│
                                         │ Length         1 │
                                         └──────────────────┘

                                              N9:0
                                            ─< L >─
                                               0
                                             B16:0
                                            ─< L >─
                                               2
```

This rung sets up a read of the first 7 words of the logical I file to transfer to the logical O file data locations. Data locations N15:60 through N15:73 are being used as constant values (0-13 respectively) for setting up words to read. The first MOV is setting up the command word for bit 15-14 = 10. N9:2 to N9:8 will be values 0 to 7, for the first 7 words of the logical I file.

```
         B16:0      ┌─── EQU ──────┐      ┌─── MOV ──────────┐
0001  ──┤    ├──────│ Equal        │──────│ Move             │
           2        │ Source A N9:9│      │ Source    -32768 │
                    │       18183< │      │          -32768< │
                    │ Source B N9:1│      │ Dest        N9:1 │
                    │      -16384< │      │          -16384< │
                    └──────────────┘      └──────────────────┘

                                         ┌─── COP ──────────┐
                                         │ Copy File        │
                                         │ Source    #N15:60│
                                         │ Dest        #N9:2│
                                         │ Length         7 │
                                         └──────────────────┘

                                              N9:0
                                            ─< L >─
                                               0
                                             B16:0
                                            ─< L >─
                                               3
```
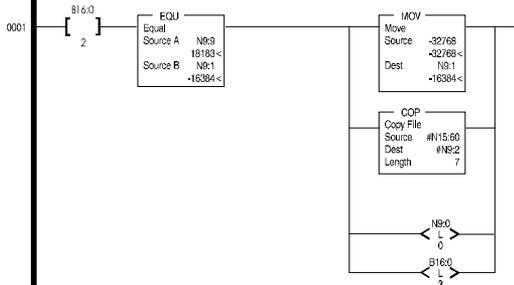
This rung copies the data from the read to the logical O data table location. These are words 0-6. Command word set up: bits 15-14 = 01, bits 13-8 = 7, bits 7-0 = 0. This will write 7 words to logical O file starting at word 0.
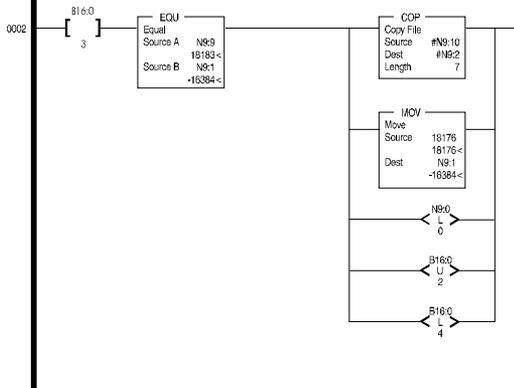
```
         B16:0      ┌─── EQU ──────┐      ┌─── COP ──────────┐
0002  ──┤    ├──────│ Equal        │──────│ Copy File        │
           3        │ Source A N9:9│      │ Source    #N9:10 │
                    │       18183< │      │ Dest        #N9:2│
                    │ Source B N9:1│      │ Length         7 │
                    │      -16384< │      └──────────────────┘
                    └──────────────┘
                                         ┌─── MOV ──────────┐
                                         │ Move             │
                                         │ Source     18176 │
                                         │           18176< │
                                         │ Dest        N9:1 │
                                         │          -16384< │
                                         └──────────────────┘

                                              N9:0
                                            ─< L >─
                                               0
                                             B16:0
                                            ─< U >─
                                               2
                                             B16:0
                                            ─< L >─
                                               4
```

This rung sets up the weight multiplier for integer values. This sets up for a write to the logical O file
of one word to location word 15.

This rung sets up a read of the second 7 words of the logical I file to transfer to the logical O file
data locations. Data locations N15:60 through N15:73 are being used as constant values (0-13 respectively)
for setting up words to read. The first MOV is setting up the command word for bits 15-14 = 10. N9:2 to N9:8
will be values 8 to 13, for the second 7 words of the logical I file.

```
         B16:0              ┌─── EQU ───┐              ┌──── COP ─────┐
0003    ─┤ ┤──────────────  │  Equal     │ ───────────  │  Copy File    │
            4                │ Source A   N9:9│           │ Source  #N15:67│
                             │          18183<│           │ Dest      #N9:2│
                             │ Source B   N9:1│           │ Length        7│
                             │         -16384<│           └───────────────┘
                             └────────────────┘
                                                          ┌──── MOV ─────┐
                                                          │  Move         │
                                                          │ Source  -32768│
                                                          │        -32768<│
                                                          │ Dest      N9:1│
                                                          │       -16384<│
                                                          └───────────────┘

                                                               N9:0
                                                              ─< L >─
                                                                0

                                                               B16:0
                                                              ─< U >─
                                                                3

                                                               B16:0
                                                              ─< L >─
                                                                5
```
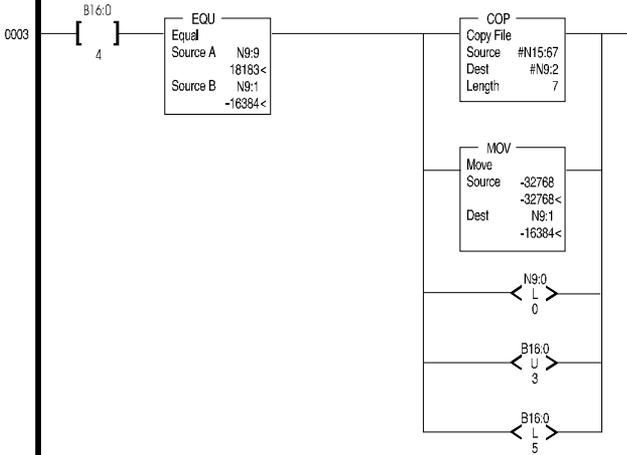
This rung copies the data from the read to the logical O data table location. This are words 7-13.
Command word set up: bits 15-14 = 01, bits 13-8 = 7, bits 7-0 = 7. This will write 7 words to the logical O file
starting at word 7.

```
         B16:0              ┌─── EQU ───┐              ┌──── COP ─────┐
0004    ─┤ ┤──────────────  │  Equal     │ ───────────  │  Copy File    │
            5                │ Source A   N9:9│           │ Source   #N9:10│
                             │          18183<│           │ Dest      #N9:2│
                             │ Source B   N9:1│           │ Length        7│
                             │         -16384<│           └───────────────┘
                             └────────────────┘
                                                          ┌──── MOV ─────┐
                                                          │  Move         │
                                                          │ Source   18183│
                                                          │        -32768<│
                                                          │ Dest      N9:1│
                                                          │       -16384<│
                                                          └───────────────┘

                                                               N9:0
                                                              ─< L >─
                                                                0

                                                               B16:0
                                                              ─< U >─
                                                                4

                                                               B16:0
                                                              ─< L >─
                                                                6
```

4-17
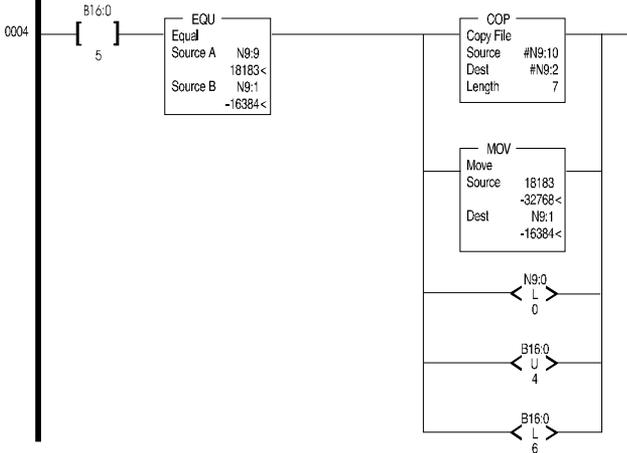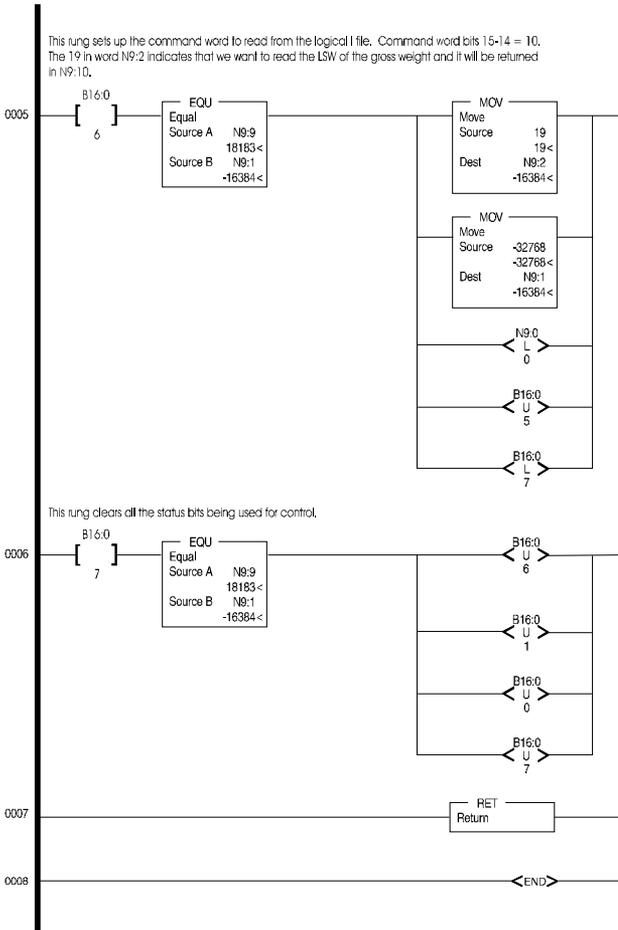
FIG. 4-3 SETUP I/O FOR REMOTE MODE OF OPERATION

HI WS100 Configuration Software Interface (Remote Mode of Operation)

The HI WS100 program communicates with the remote HI 1746-WS module via an integer (N7, N8, etc.) file, as specified in the "Comm Setup Section of the HI WS100 Configuration Software Manual Prt. #0596-0241-01) HI WS100 and requires 17 contiguous words.

A version of the ladder logic is contained in the HI WS 100 Configuration Software Manual. All addresses are arbitrary in the ladder logic example and may need to be changed to match the hardware configuration of your system and to prevent conflicts in addressing.

In the Ladder Logic example provided in the HI WS100 manual note the following:

- N9 is the data file for the data written to and read from the module and the trigger bit.
- The ladder logic program needs 17 contiguous words in the data file, which are:

  1. N9:0 is the write trigger
  2. N9:1 to N9:8 are write data locations.
  3. N9:9 to N9:17 are read data locations.

NOTE: *These can be from an integer file with 17 contiguous words available.*

  4. N10 is the data file for setting up sections of the M files.
  5. N10:0 sets a section of the M file as read.
  6. N10:1 sets the length
  7. N10:2 sets the address.
  8. N10:5 sets a section of the M file as write
  9. N10:6 sets the length
  10. N10:7 sets the address
  11. N10:10 to N10:19 are locations used for checking status

NOTE: *Refer to Allen-Bradley 1747 Scanner module manual for more information on the setup of M files.*

12. M0:x.yy and M1:x.yyy (where x = slot scanner module is in and yyy = location within the M file) are the M files being written to or read from.
13. M0 is from the processor to the scanner
14. M1 is from the scanner to the processor
15. B11:0 is used for program control bits.

- Insure the following:

  1. Data file (i.e. N9) has 17 contiguous words and the file number and first word are listed in the appropriate fields in the "COMM SETUP" screen in WS100 and the "Remote" box is checked.
  2. Proper driver is selected. This should be the same driver that RS Logix 500 would use.
  3. Station number of the processor is correct which can be found in the driver configuration.
  4. M file setup data (i.e. N10:0 to N10:2) is correct for your setup.
  5. Slot location is correct in the M file references.

Setting The Process Weighing Parameters

About the Ladder Logic Example

We have provided a Ladder Logic example explaining how to set the weigh process parameters. The Ladder Logic example is meant to provide a ladder logic model only. Your application may vary and the example may or may not meet your requirements.

Weight Multiplier

To use one of the commands, place the offset of a parameter, from Table 4-1, into the command-Data.offset of the M0file. If you are setting a parame-

ter, place the 4 bytes for a float, or two bytes for an integer into the dataString.

If you have set the WEIGHTMULTIPLIER in the output data file to a non-zero value, and you are setting a parameter of type float, the parameter will be set to the 4 byte integer value you place in the dataString, divided by the WEIGHTMULTIPLIER. The parameter will be interpreted as pounds or kilograms, depending on the value of the Metric parameter.

If you are reading a type float parameter, and the WEIGHTMULTIPLIER is non-zero, the value of the parameter returned in dataString will be a 4 byte integer, equal to the parameter multiplied by the WEIGHTMULTIPLIER. The value returned will be pounds or kilograms, depending on the value of the Metric Parameter.

If the WEIGHTMULTIPLIER is zero, the dataString value returned will be a floating point integer.

NOTE: *If using a multiplier, setpoint data to and from the I/O tables is limited to three (3) decimal places.*

SETPARAM - GETPARAM Command and Non Volatile Memory

The parameters set using the SETPARAM command are not automatically saved to non-volatile memory. A separate command is required (WRITENONVOLATILE 4).

Some parameters are not automatically used by the weigh module, because they are normally used only at start up. The command to save parameters to non-volatile memory does cause a re-initialization, so that the parameters will then be active.
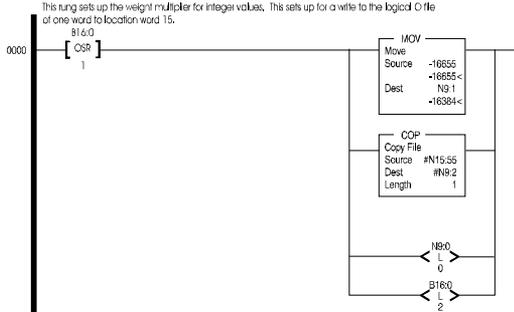
Possible Error Returns

OUTOFTOLERANCE - is returned if an incorrect value is entered to a parameter.

INDEXOUTOFRANGE - is returned if no parameter corresponds to the offset specified.

**Setting
Parameters
Ladder Logic
Explanation**

Rung #0   Does an initial read of the M1 file. This is necessary to get the sequence number for future writes.

Rung #1   Loads data into the write location ready to write. The data required is:

    a.   Sequence Number
    b.   Command Number
    c.   Parameter Offset
    d.   Parameter Value

Rung #2   Checks to see if the data was loaded from the previous rung, then writes to the M0 file.

Rung #3   Reads the M1 file for the response.

Rung #4   Checks the results of the read to make sure that the sequence number was incremented (write complete) and that the status is zero (no error). If the check is good, it latches a bit for the next parameter.

Rung #5   Checks the results of the read and if the status is not zero (error occurred) restarts the process of writing this parameter.

Rungs #6-30   Duplicate the same process as rungs #1 to #5 for the remaining parameters.

    a.   Rungs #1-5 - Units
    b.   Rungs #6-10 - Number of Averages
    c.   Rungs #11-15 - WAVERSAVER Setting
    d.   Rungs #16-20 - Zero Tolerance
    e.   Rungs #21-25 - Auto Zero Tolerance
    f.   Rungs #26-30 - Motion Tolerance

**SETPARAMS
Local Mode of
Operation**
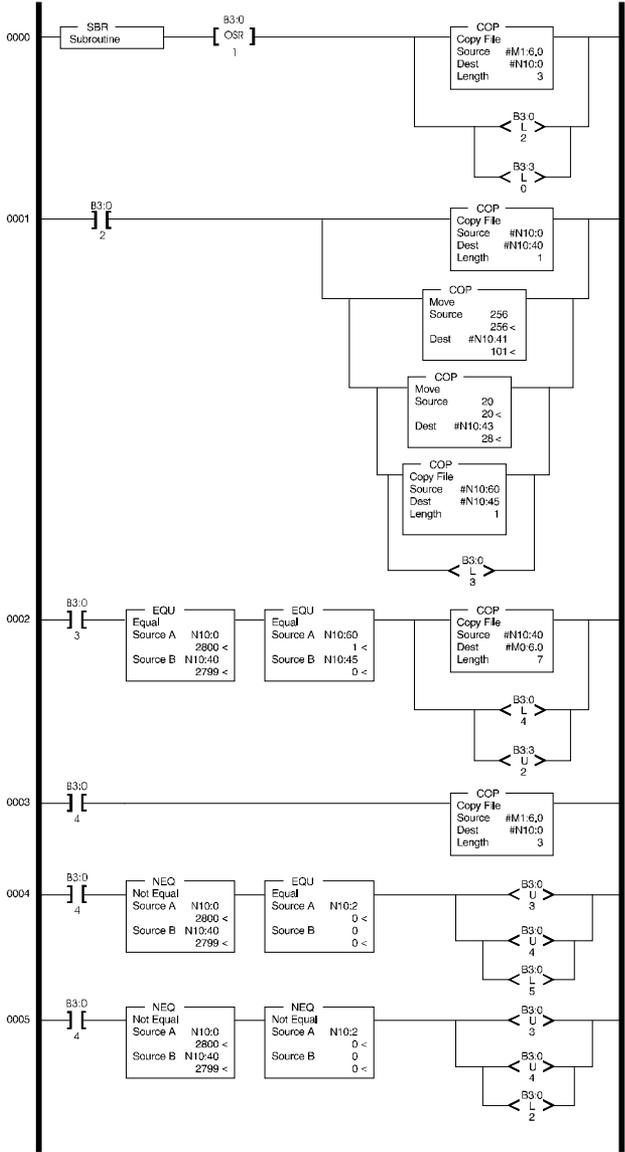
FIG. 4-4 SETPARAMS LADDER LOGIC EXAMPLE/LOCAL MODE

**SETPARAMS
Remote Mode
of Operation**

This file downloads single as well as multiple parameters to the logical M0 file. It does a save at the end that causes the unit to utilize the new parameters. For all writes to the logical M file, bits 15-14 of command word will be 11. Bits 13-8 will indicate the number of words, bits 7-0 will indicate the offset location in the M file for that parameter.

This rung sets up and copies the metric setting to the logical M0 file.

```
0000   B18:0
       ┤ OSR ├                                          ┌─ COP ──────────┐
          1                                             │ Copy File      │
                                                        │ Source  #N17:24 │
                                                        │ Dest    #N9:2   │
                                                        │ Length       1  │
                                                        └────────────────┘

                                                        ┌─ MOV ──────────┐
                                                        │ Move           │
                                                        │ Source  -16076 │
                                                        │         -16076< │
                                                        │ Dest     N9:1  │
                                                        │         -16384< │
                                                        └────────────────┘

                                                             N9:0
                                                            < L >
                                                              0
                                                             B18:0
                                                            < L >
                                                              2
```

This rung copies the WAVERSAVER value into logical M0 file.

```
0001   B18:0    ┌─ EQU ──────────┐                      ┌─ COP ──────────┐
       ┤   ├    │ Equal          │                      │ Copy File      │
          2     │ Source A  N9:9  │                      │ Source  #N17:25 │
                │          18183< │                      │ Dest    #N9:2   │
                │ Source B  N9:1  │                      │ Length       1  │
                │         -16384< │                      └────────────────┘
                └────────────────┘
                                                        ┌─ MOV ──────────┐
                                                        │ Move           │
                                                        │ Source  -16075 │
                                                        │         -16075< │
                                                        │ Dest     N9:1  │
                                                        │         -16384< │
                                                        └────────────────┘

                                                             N9:0
                                                            < L >
                                                              0
                                                             B18:0
                                                            < L >
                                                              3
```

This rung loads a New Zero Tolerance.

```
0002   B18:0   ┌─ EQU ──────────┐                       ┌─ COP ──────────┐
       ┤/├┤ ├  │ Equal          │                       │ Copy File      │
          3     │ Source A  N9:9  │                      │ Source  #N17:18 │
                │          18183< │                      │ Dest    #N9:2   │
                │ Source B  N9:1  │                      │ Length       2  │
                │         -16384< │                      └────────────────┘
                └────────────────┘
                                                        ┌─ MOV ──────────┐
                                                        │ Move           │
                                                        │ Source  -15826 │
                                                        │         -15826< │
                                                        │ Dest    #N9:1  │
                                                        │         -16384< │
                                                        └────────────────┘

                                                             N9:0
                                                            < L >
                                                              0
                                                            N18:0
                                                            < U >
                                                              13
                                                             B18:0
                                                            < L >
                                                              4
```

This rung loads the New Motion Tolerance

```
B18:0
0003  ┤ ├         EQU                          COP
  4              Equal                        Copy File
               Source A    N9:9              Source    #N17:22
                          18183 <            Dest        #N9:2
               Source B    N9:1              Length          2
                         -16384 <
                                              MOV
                                             Move
                                             Source  -15822
                                                     -15822 <
                                             Dest      #N9:1
                                                     -16384 <

                                              B9:0
                                             < L >
                                               0

                                              B18:0
                                             < U >
                                               3

                                              B18:0
                                             < L >
                                               5
```

This rung loads New Number of Averages

```
B18:0
0004  ┤ ├         EQU                          COP
  5              Equal                        Copy File
               Source A    N9:9              Source    #N17:26
                          18183 <            Dest        #N9:2
               Source B    N9:1              Length          1
                         -16384 <
                                              MOV
                                             Move
                                             Source  -16074
                                                     -16074 <
                                             Dest      #N9:1
                                                     -16384 <

                                              B9:0
                                             < L >
                                               0

                                              B18:0
                                             < U >
                                               4

                                              B18:0
                                             < L >
                                               6
```

This rung loads Multiple parameters at once. This rung loads Setpoint 1, Deadband 1, and Preact 1.
(NOTE: Parameters must be consecutive in the M File Mapping.)

```
B18:0
0005  ┤ ├         EQU                          COP
  6              Equal                        Copy File
               Source A    N9:9              Source    #N17:6
                          18183 <            Dest        #N9:2
               Source B    N9:1              Length          6
                         -16384 <
                                              MOV
                                             Move
                                             Source  -14814
                                                     -14814 <
                                             Dest      #N9:1
                                                     -16384 <

                                              B9:0
                                             < L >
                                               0

                                              B18:0
                                             < U >
                                               5

                                              B18:0
                                             < L >
                                               7
```

This rung Reads the logical M1 file to get the sequence number. Command word is set up for zero words at location 0 and bits 15-14 = 11. This will cause the unit to read logical M1 file starting at location 0.

```
        B18:0
0006  ─┤ ├─              ┌─── EQU ───┐                              ┌─── MOV ───┐
         7               │ Equal     │                              │ Move      │
                         │ Source A  N9:9│                          │ Source  -16384│
                         │       18183 < │                          │       -16384 <│
                         │ Source B  N9:1│                          │ Dest    #N9:1 │
                         │      -16384 < │                          │       -16384 <│
                         └───────────┘                              └───────────┘
                                                                        B9:0
                                                                       ─( L )─
                                                                         0
                                                                        B18:0
                                                                       ─( U )─
                                                                         6
                                                                        B18:0
                                                                       ─( L )─
                                                                         8
```

This rung does a save to non-volatile memory. Writes two words starting at word 0.
Data is the sequence number in N9:2 and command #4 (write non-volatile) in N9:3. This command causes the unit to save the new parameters as well as start to use them.

```
        B18:0
0007  ─┤ ├─              ┌─── EQU ───┐                              ┌─── COP ───┐
         8               │ Equal     │                              │ Copy File │
                         │ Source A  N9:9│                          │ Source  #N9:10│
                         │       18183 < │                          │ Dest    #N9:2 │
                         │ Source B  N9:1│                          │ Length      1 │
                         │      -16384 < │                          └───────────┘
                         └───────────┘                              ┌─── MOV ───┐
                                                                    │ Move      │
                                                                    │ Source      4 │
                                                                    │         4 <   │
                                                                    │ Dest    #N9:3 │
                                                                    │        52 <   │
                                                                    └───────────┘
                                                                    ┌─── MOV ───┐
                                                                    │ Move      │
                                                                    │ Source  -15872│
                                                                    │       -15872 <│
                                                                    │ Dest    #N9:1 │
                                                                    │       -16384 <│
                                                                    └───────────┘
                                                                        B9:0
                                                                       ─( L )─
                                                                         0
                                                                        B18:0
                                                                       ─( U )─
                                                                         7
                                                                        B18:0
                                                                       ─( L )─
                                                                         9
```

This rung sets up the command word to read from the logical I file. Command word bits 15-14 = 10.
The 19 in word N9:2 indicates that we want to read the LSW of the gross weight and it will be returned in N9:10.

```
        B18:0
0008  ─┤ ├─              ┌─── EQU ───┐                              ┌─── MOV ───┐
         9               │ Equal     │                              │ Move      │
                         │ Source A  N9:9│                          │ Source     19 │
                         │       18183 < │                          │        19 <   │
                         │ Source B  N9:1│                          │ Dest    #N9:2 │
                         │      -16384 < │                          │         0 <   │
                         └───────────┘                              └───────────┘
                                                                    ┌─── MOV ───┐
                                                                    │ Move      │
                                                                    │ Source  -32768│
                                                                    │       -32768 <│
                                                                    │ Dest    #N9:1 │
                                                                    │       -16384 <│
                                                                    └───────────┘
                                                                        B9:0
                                                                       ─( L )─
                                                                         0
                                                                        B18:0
                                                                       ─( U )─
                                                                         8
                                                                        B18:0
                                                                       ─( L )─
                                                                         10
```
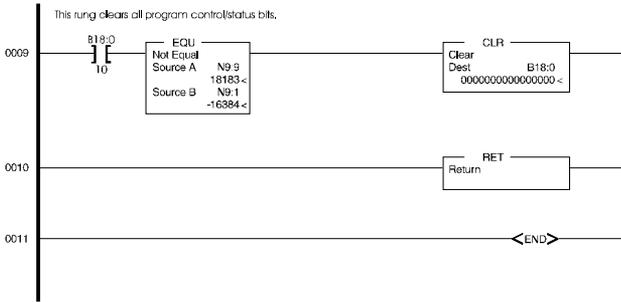
FIG. 4-5 SETPARAMS LADDER LOGIC EXAMPLE/REMOTE MODE

Parameter (type)	Offset (Hex)
SpanWeight (float)	0x1C
CalLoWeight (float)	0x20
ZeroTolerance (float)	0x4C
AutoZeroTolerance (float)	0x50
MotionTolerance (float)	0x54
Metric (int) 0=LBS	0x14
WAVERSAVER (int) limits = 0 - 4	0x16
NumAverages (int) limits = 1 - 255	0x24
ZeroTrackEnable (int)	0x26
TareEnable (int)	0x28
ZeroEnable (int)	0x2A
RoctimeBase (int) limits = 1 - 1800	0x2E
Tareweight (float)	0x10
Calyear (int)	0x9C
Calmonth (int)	0x9E
Calday (int)	0xA0

Table 4-1: Parameters and Offsets

Parameter (type)	Offset (Hex)
Calid (int)	0xA2

Table 4-1: Parameters and Offsets

Error Code List

SUCCESS	0
NOTALLOWED	-1
OUTOFTOLERANCE	-3
INDEXOUTOFRANGE	-4
NOSUCHCMD	-5
C2FAILNODEVS	-6
C2FAILCAPEQ	-7 (failure, capacities not equal)
HARCALFAILCOUNTS	-8 (failure, not enough ADC counts between high, low)

NOTE: *For a complete ladder logic example for downloading all the parameters please go to the Hardy Process Solutions Web Site at: https://www.hardysolutions.com/hi1746-ws. The tab Docs and Programs will take you to all the available Documents and Sample Programs for the HI 1746.*

Calibration Setup Procedures

Setting the Unit of Measure

The Unit of measure (Metric - See Table 4-1) can be set to either kilograms or pounds. Any weight value input to the module (e.g. CAL-LO, CAL-HI setpoints) are in the currently selected units. The unit of measure can be set at any time, not just at calibration. Setting the unit of measure before calibrating reminds the user what unit of measure is being displayed. It is important to note that the weigh scale module does not need to be calibrated again after changing the unit of measure.

Setting the Motion Tolerance Value

The motion tolerance is the tolerance value used to determine if the scale is in motion.

Setting the Zero Tolerance Value   Sets the range of weights so that the Zero Command works, as an offset of the calibrated Zero.

Setting the Auto Zero Tolerance Value   When the Auto Zero Tolerance is entered, and Auto Zero Tracking is enabled, any weight within the entered tolerance of zero and within the Auto Zero Tolerance of the calibrated zero point, with the scale not in motion, will cause the display to automatically read zero.

NOTE: *There is a short time delay (at least 1 second) before the Auto Zero Triggers.*
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.

Setting the Number of Readings Averages   The Number of Averages sets the number of weight readings which will be used to compute the displayed weight. The average is a sliding average so that a new average reading is available for display at every reading.

Setting the Span Weight Value   The Span Weight is a reference point derived from an actual measured weight. This should not be confused with the Scale Capacity. If you have a 100 pound weight and you place it on the scale, the Span Weight would be 100 pounds.

Setting the WAVERSAVER Value   There are 5 selectable levels. 0 provides the least vibration immunity with the fastest response time. 4 provides the most vibration immunity with the slowest response time. Default setting is 2.

Immunity	Setting
7.5 Hz	0
3.5 Hz	1
1.0 Hz	2
0.5 Hz	3
0.25 Hz	4

CHAPTER 5 - CALIBRATION

A Brief Description of Chapter 5

Chapter 5 pertains to the calibration procedures for the HI 1746-WS Weigh Scale 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. Calibration procedures require an understanding of the M File interface. It is recommended that the module 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 1746-WS Weigh Module.

Pre-Calibration Procedures

Step 1.   Check to determine if the load cells have been properly installed.

    a.   Refer to your load cell I&M manual for proper installation instructions.

    b.   On some single and double ended shear beam load cells there is an arrow that 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.

Step 2.   Check for Binding on the Load Cell or other parts of the weighing system.

<u>CAUTION:</u>   **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.**

    a.   A load cell must be mounted in such a way that 100% of the load (Vessel w/

Contents) is vertically passed through a load cell. (See Fig. 5-1)

b. Check to see 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.

c. Check to see that nothing is coming in contact with the scale/vessel other than service wires and piping that have been properly mounted with flexible connectors.

Direction of the applied load

Vessel
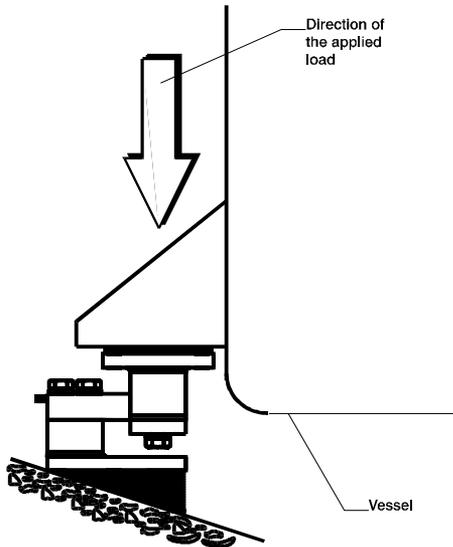
FIG. 5-1 PROPERLY INSTALLED LOAD CELL W/NO BINDING

Electrical Check Procedures

Load Cell/Point Input/Output Measurements

Step 3.   Typical Load Cell/Point Input/Output Measurements (EXC & SIG Outputs)

a. The HI 1746-WS is designed to supply 5 VDC excitation to as many as eight 350 Ohm load cells/points.

b. The expected output from each load cell/point depends on the mV/V rating of the load cell/point and the weight.

c. For example, a 2mV/V load cell/point will respond with a maximum of 10 mVDC at full weight capacity of the system which includes the weight of the vessel and the weight of the product as measured by the load cell/point.

d. 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.

e. 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. (See Fig. 5-2)
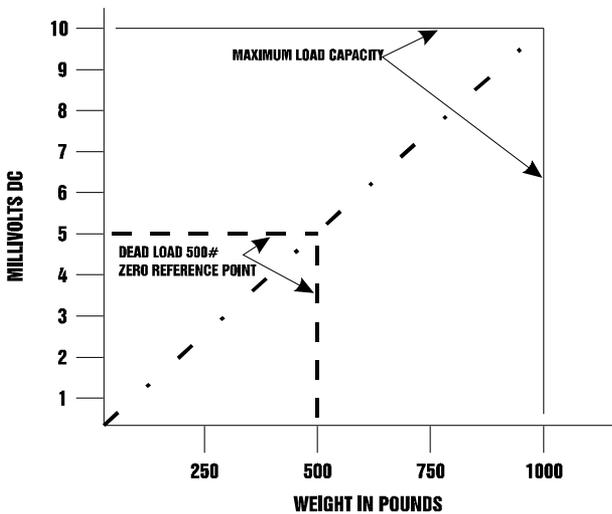
FIG. 5-2 MILLIVOLTS/WEIGHT SCALE

f. Based on the example, the operating range for this scale is 5-10 mVDC with a 500 pound weight range. Understand 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 volt meter at the J2 connector on the front of the module or by using INTEGRATED TECHNICIAN with the HI 215IT Junction Box.*

Load Check

Step 1. Place a load (weight) on the scale or vessel.

Step 2. Check to see if the weight reading changes on the ladder logic display in the proper direction.

- For example: If the ladder logic display reads 100 pounds and a 20 pound weight is placed on the vessel or scale, the ladder logic display should read 120 or some value over 100.
- If the ladder logic display reads 100 pounds and 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 ladder logic display is reading improperly or shows no change there is something wrong with the setup.

Step 3. If the ladder logic display changed weight in the proper direction, remove the weight and proceed to calibrate the module.

C2 Calibration

About C2 Calibration

C2 calibration requires C2 load sensors. If you do not have C2 load sensors you must perform a Hard Calibration. The HI 1746-WS reads the performance characteristics of each individual load cell and detects the

quantity of load cell in the system. C2 Calibration can be performed by pressing "The Button" located in the front of the module, or via Allen-Bradley DOS PLC 500 AI Series Ladder Logic Editor, Allen-Bradley RS Logix 500 or clicking the C2 selection in Hardy's Configuration Software.

"THE BUTTON" C2 Calibration

Step 1.   Check to be sure that the parameters have been setup for your weighing process. (See Chapter 4, Setup)

Step 2.   Open the front door of the HI 1746-WS module. (See Fig. 5-3)
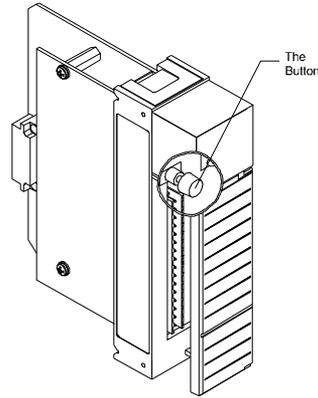
FIG. 5-3 "THE BUTTON" C2 CALIBRATION

NOTE:

If the module is being calibrated for the first time and your not sure what parameters to set, use the default parameters which are set by the module at power up. Once the calibration is successful, feel free to change the parameters to meet the requirements of your weighing process. (See Chapter 4 - Setup) "The Button" can be used for calibration at any time after the weighing process parameters have been set.

Step 3.   Press and hold "The Button" until the C2 LED goes off. (See Fig. 5-4)
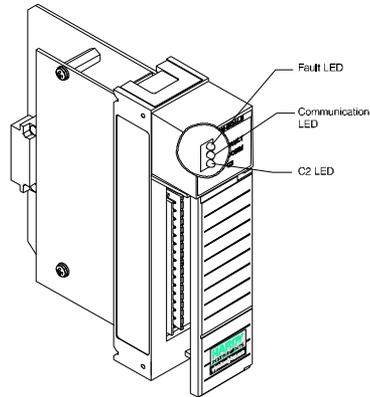
FIG. 5-4 C2 LED

C2 LED	Green Off/On	Button Calibration was successful
	Red then Green	C2 Cal failed, scale in motion.

C2 Calibration Using Ladder Logic

Step 1. Check to be sure that the parameters have been setup for your weighing process. (See Chapter 4, Setup)

Step 2. We have provided a Ladder Logic (for both the local and remote mode of operation) example explaining how to perform the C2 Calibration.

Data Locations Used for Ladder Logic Examples (For Local Mode of Operation Only)

B3 - All the B3 locations are used as status bits for program control.

N9:0 - 24 Input Data (READWEIGHT Example)

N9:50 Weight Multiplier

N9:51 ROC Multiplier

N10:0 - 2 Input Read from M1 File. (Sequence number, command number and status)

N10:40 - 46	Location of data being written to M0 File.
N10:60 - 72	Locations of Parameters Values
N10:60	Units
N10:61	Number of Averages
N10:62	WAVERSAVER Setting
N10:63-64	0 Tolerance
N10:65-66	A0 Tolerance
N10:67-68	Motion
N10:69-70	CalLo
N10:71-72	Span

C2 Calibration Ladder Logic Explanation

This file will download and set a reference point for C2 calibration and then save data to non-volatile memory.

Rung #0	Does an initial read of the M1 file. this is necessary to get the sequence number for future writes.
Rungs #1-5	Downloads a reference point value. These rungs follow the same pattern as the SETPARAMS example in Chapter 4.
Rungs #6-12	Writes the C2CALCMD to set the reference point. These rungs follow the same pattern as setting a parameter in the SETPARAMS example in Chapter 4.
Rungs #13-17	Writes the WRITENONVOLATILE command. This will save the new calibration to the non-volatile memory. These rungs follow the same pattern as setting a parameter in the SETPARMS example in Chapter 4.

**C2 Calibration
Ladder Logic
Example (For
Local Mode of
Operation
Only)**
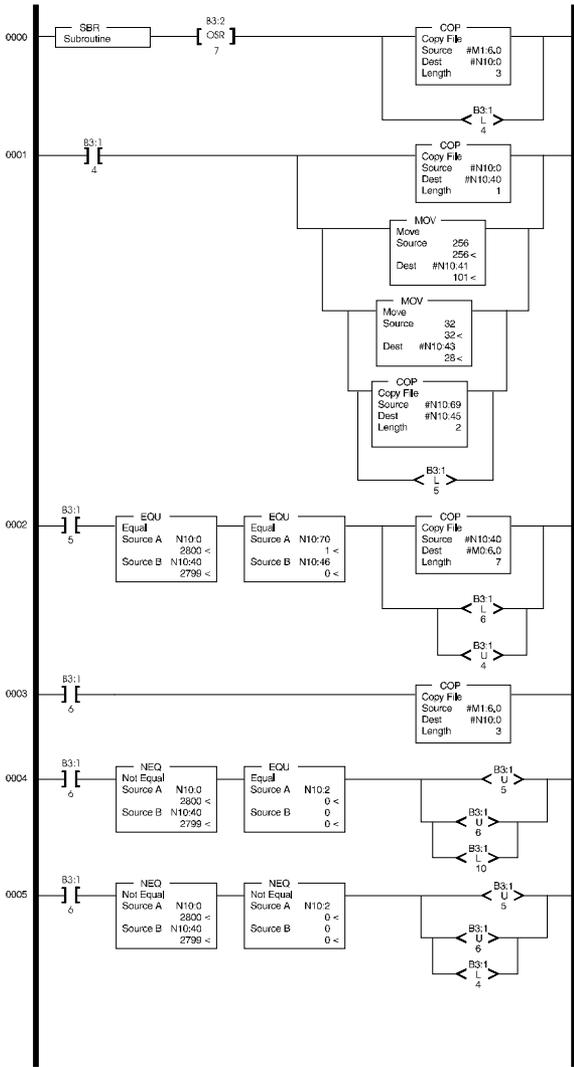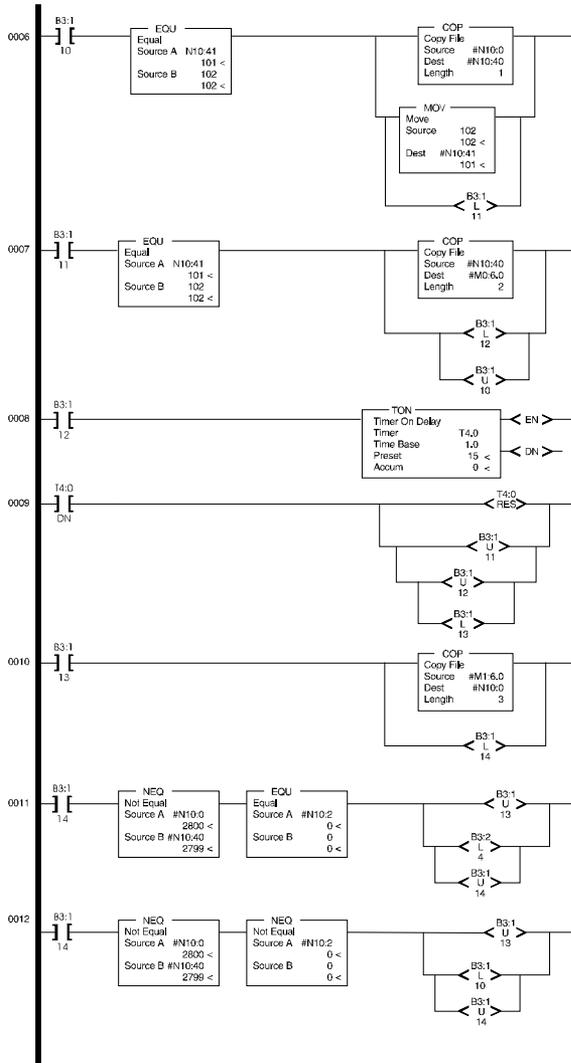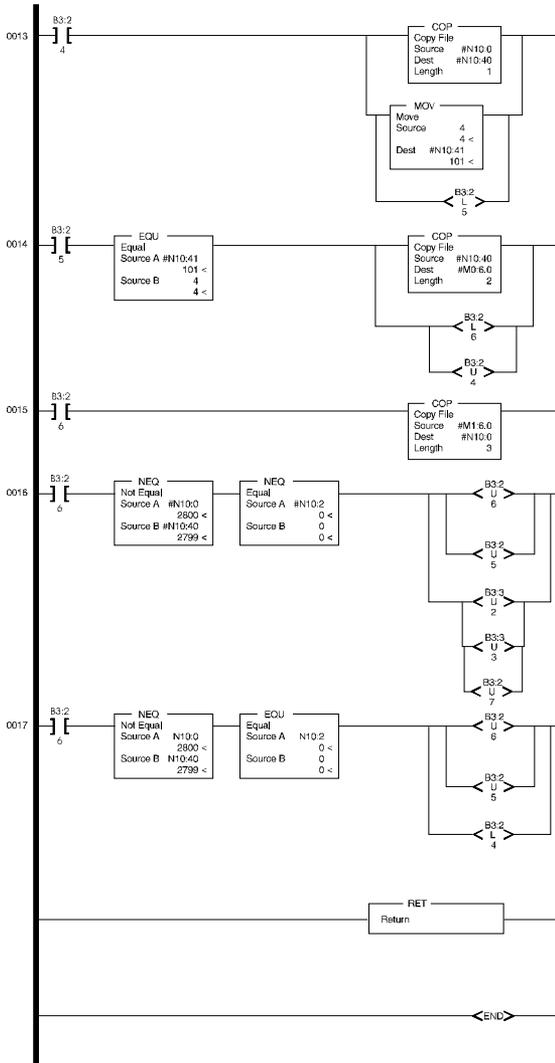
FIG. 5-5 C2 LADDER LOGIC EXAMPLE/LOCAL MODE OF OPERATION

C2 Calibration Ladder Logic Example (For Remote Mode of Operation Only)

This file will do a C2 Calibration of the module and Save CAL. Bit N9:0\0 initiates the transfer.

This rung sets up read of the logical M1 file to get the sequence number.

```
            B18:0                                                    MOV
0000       ] OSR [                                                   Move
             12                                                      Source      -16384
                                                                                 -16384 <
                                                                     Dest         N9:1
                                                                                 -16384 <

                                                                                 N9:0
                                                                              <    L   >
                                                                                  0

                                                                                 B18:0
                                                                              <    L   >
                                                                                  13
```

This rung copies the SEQ# to N9:2, command #102 (C2 CAL Command) to N9:3 and sets the command word to: bits 15-14 = 11, 13-8 = 2, 7-0 = 0. This says write 2 words to logical M0 file starting at location 0.

```
            B18:0     EQU                                            COP
0001       ] [       Equal                                          Copy File
             13      Source A    N9:9                               Source    #N9:10
                               18183 <                              Dest      #N9:2
                     Source B    N9:1                               Length         1
                              -16384 <
                                                                    MOV
                                                                    Move
                                                                    Source       102
                                                                                 102 <
                                                                    Dest       #N9:3
                                                                                 52 <

                                                                    MOV
                                                                    Move
                                                                    Source    -15872
                                                                              -15872 <
                                                                    Dest       #N9:1
                                                                              -16384 <

                                                                                 N9:0
                                                                              <    L   >
                                                                                  0

                                                                                 B18:0
                                                                              <    L   >
                                                                                  14
```

This will do command #4 (write non-volatile) to save the new CAL.

```
            B18:0     EQU                        B18:1              COP
0002       ] [       Equal                      ] OSR [            Copy File
             14      Source A    N9:9              1               Source    #N9:10
                               18183 <                             Dest      #N9:2
                     Source B    N9:1                              Length         1
                              -16384 <
                                                                    MOV
                                                                    Move
                                                                    Source         4
                                                                                   4 <
                                                                    Dest       #N9:3
                                                                                 52 <

                                                                                 N9:0
                                                                              <    L   >
                                                                                  0

                                                                                 N18:0
                                                                              <    U   >
                                                                                  13

                                                                                 B18:0
                                                                              <    L   >
                                                                                  15
```

FIG. 5-6 C2 LADDER LOGIC EXAMPLE/REMOTE MODE OF OPERATION

Hard Calibration

Hard Calibration is the traditional method of calibration that uses test weights. Hardy recommends that the test weights total 80 to 100% of the scale capacity.

Hard Calibration Ladder Logic Example

Step 1. Check to be sure that the parameters have been setup for your weighing process. (See Chapter 4, Setup)

Step 2. We have provided a Ladder Logic example explaining how to set the weigh process parameters. The Ladder Logic example is meant to provide a ladder logic model only. Your application may vary and the example may or may not meet your requirements.

Step 3. The Hard Calibration Ladder Logic Example is located at the Hardy Web Site. If you have access to the Internet:

a. Type the following URL: www.hardysolutions.com

b. Click on the Support button.

c. Click on Sample Programs.

    d.   Click on the pull down menu for the product you are calibrating.

    e.   Click on the Ladder Logic Example for the HI 1746-WS Weigh Module, Hard Calibration.

Step 4.

    For sample programs visit https://www.hardysolutions.com/hi1746-ws Use the Docs and Programs tab to download the sample programs.

CHAPTER 6 - OPERATING PROCEDURES

A Brief Description of Chapter 6

All information contained in Chapter 6 pertains to the operation of the HI 1746-WS Weigh Scale Module. The Operating Procedures include Writing and Reading data transferred between the ControlLogix PLC and the weigh scale module. The data is defined as either Read Data (including Module Status words indicating the current state of the module) from the weigh scale module or Write Data sent to the module. It is very important that the user be familiar with this chapter before operating the weight scale module.

CAUTION:

THE OPERATING PARAMETERS ARE DIFFERENT FOR THE LOCAL MODE AND THE REMOTE MODE. BE SURE YOU LOOK IN THE CORRECT SECTION FOR THE CORRECT PARAMETERS

Block Transfer, Read

WORD	PARAMETER	
0	Setpoint 1 Value (32 bit float, or integer)	MSW
1	Setpoint 1 Value (32 bit float, or integer)	LSW
2	Setpoint 1 Deadband (32 bit float, or integer)	MSW
3	Setpoint 1 Deadband (32 bit float, or integer)	LSW
4	Setpoint 1 Preact (32 bit float, or integer)	MSW
5	Setpoint 1 Preact (32 bit float, or integer)	LSW

TABLE 6-1: BLOCK TRANSFER, READ

WORD	PARAMETER	
6	Setpoint 1 Mode Bit Setpoint Mode 0 ROC (Rate of Change) 1 Gross 2 Net 3 Gain Mode (0 = gain in wght) (1 = loss in wght) 4 force low 5 force high 6 Excitation Error 7 No Excitation Error 8-15 Currently Not Used	
7	Setpoint 2 Value (32 bit float, or integer)	MSW
8	Setpoint 2 Value (32 bit float, or integer)	LSW
9	Setpoint 2 Deadband (32 bit float, or integer)	MSW
10	Setpoint 2 Deadband (32 bit float, or integer)	LSW
11	Setpoint 2 Preact (32 bit float, or integer)	MSW
12	Setpoint 2 Preact (32 bit float, or integer)	LSW

TABLE 6-1: BLOCK TRANSFER, READ

WORD	PARAMETER	
13	Setpoint 2 Mode Bit Setpoint Mode 0 ROC (Rate of Change) 1 Gross 2 Net 3 Gain Mode (0 = gain in wght) (1 = loss in wght) 4 Force low 5 Force high 6 Excitation Error 7 No Excitation Error 8-15 Currently Not Used	
14	Weight Functions Bit Weight Functions 0 Zero 1 Tare 2 Write Non-Volatile 3 Apply Settings 4 Reload Non-Volatile 5 Cal Low Cmd 6 Cal High Cmd 7 C2 Cal Cmd 8 - 15 Currently Not Used	

TABLE 6-1: BLOCK TRANSFER, READ

WORD	PARAMETER	
15	Module Status Word Bit Module Status Bit 0 A/D Conversion Error 1 A/D Failure 2 Weight in lbs (0 = kgs) 3 Zero Tracking Enabled 4 Tare Enabled 5 Zero Enabled 6 Weight in Motion 7 No Calibration 8 Non-Volatile RAM Failure 9 Excitation Monitor 10 Communication Timeout Error 11-13 Currently Not Used 14 Command Error 14 & 15 Currently Not Used	
16	Relay Status	
17	Firmware Revision	
18	Gross Weight (32 bit float, or integer)	MSW
19	Gross Weight (32 bit float, or integer)	LSW
20	Net Weight (32 bit float, or integer)	MSW
21	Net Weight (32 bit float, or integer)	LSW
22	RoC (Rate of Change) (32 bit float, or integer)	MSW
23	RoC (Rate of Change) (32 bit float, or integer)	LSW
24	RoC Evaluation Period	

TABLE 6-1: BLOCK TRANSFER, READ

WORD	PARAMETER	
25	Increments on each weight update (about 110 times a second)	
26-31	Currently Not Used	

TABLE 6-1: BLOCK TRANSFER, READ

Block Transfer, Read Example (For Local Mode Only) (READWEIGHT)

Explanation of the READWEIGHT Example

Rung #0   Downloads the weight and rate multipliers one time.

Rung #1   Setpoint, Status, Weight and Rate of Change are copied from the input file for access.

**READWEIGHT
Ladder Logic
Example**
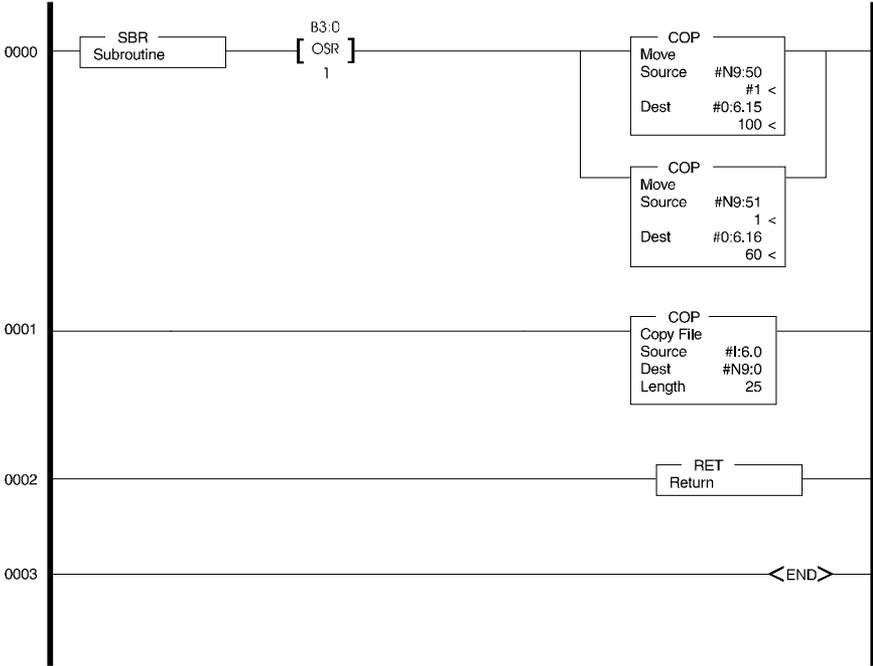
FIG. 6-1 READWEIGHT LADDER LOGIC EXAMPLE/LOCAL MODE OF OPERATION

Block Transfer, Read Ladder Logic Example for Remote Mode Operation

For Remote Mode Operation Block Transfer, Read Examples go to the Hardy Website (http://www.hardysolutions.com) and Click on Support.

Block Transfer, Write

WORD	PARAMETER	
0	Setpoint 1 Value (32 bit float, or integer)	MSW
1	Setpoint 1 Value (32 bit float, or integer)	LSW
2	Setpoint 1 Deadband (32 bit float, or integer)	MSW
3	Setpoint 1 Deadband (32 bit float, or integer)	LSW
4	Setpoint 1 Preact (32 bit float, or integer)	MSW
5	Setpoint 1 Preact (32 bit float, or integer)	LSW
6	Setpoint 1 Mode Bit Setpoint Mode 0 ROC (Rate of Change) 1 Gross 2 Net 3 Gain Mode (0 = gain in wght) (1 = loss in wght) 4 Force Low 5 Force High 6 Excitation Error 7 No Excitation Error 8-15 Currently Not Used	
7	Setpoint 2 Value (32 bit float, or integer)	MSW
8	Setpoint 2 Value (32 bit float, or integer)	LSW

TABLE 6-2: BLOCK TRANSFER, WRITE

WORD	PARAMETER	
9	Setpoint 2 Deadband (32 bit float, or integer)	MSW
10	Setpoint 2 Deadband (32 bit float, or integer)	LSW
11	Setpoint 2 Preact (32 bit float, or integer)	MSW
12	Setpoint 2 Preact (32 bit float, or integer)	LSW
13	Setpoint 2 Mode Bit Setpoint Mode 0 ROC (Rate of Change) 1 Gross 2 Net 3 Gain Mode (0 = gain in wght) (1 = loss in wght) 4 force low 5 force high 6 - 15 Currently Not Used	
14	Weight Functions Bit Weight Functions 0 Zero 1 Tare 2 Write Non-Volatile 3 Apply Settings 4 Reload Non-Volatile 5 Cal Low Cmd 6 Cal High Cmd 7 C2 Cal Cmd 8- 15 Currently Not Used	
15	Weight Multiplier	
16	ROC Multiplier	
17-31	Currently Not Used	

TABLE 6-2: BLOCK TRANSFER, WRITE

Block Transfer, Write Ladder Logic Example for Remote Mode Operation

For Remote Mode Operation Block Transfer, Write Examples go to the Hardy Website (http://www.hardysolutions.com) and Click on Support.

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