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Installation Instructions
HM1734-PLM
Revision 2.0
POINT I/O™ Strain Gage Input Module

May 20, 2015

Process Control Systems, Instruments and Transducers

Visit our Web Site at http://www.helminstrument.com or email us at sales@helminstrument.com

Helm HM1734-PLM Installation Instructions

HELM INSTRUMENT COMPANY, INC. manufactures a complete line of load monitoring control solutions for use on metal stamping, forging, compaction and assembly presses, thermoforming and tablet presses.

Standard or custom transducers and load cells are available for in-die monitoring of transfer or progressive tooling.

At HELM, quality is inherent not only in the design of our products but in the attitudes of our employees as well. We're working together to give you the best. After all, that's what our business is all about - providing innovative instrumentation to help make your manufacturing process more productive and your operation more effective.

The Helm HM1734-PLM is a single channel strain gage input module designed on the POINT I/O platform. The module is compatible with Allen-Bradley 1734-AENT Ethernet I/P and 1734-ACNR ControlNet adapters. The module can be directly connected to the 1769-L1x CompactLogix controllers.

The Helm HM173-PLM module features programmable high and low limits to protect the machine, the tooling and to ensure part quality.

A cam enable bit is available for high speed operations.

Strain Gage Transducers

The primary part of the load monitoring system centers around the measurement. The basic function of the Helm HT-400 Strain Gain sensor is to detect the amount of deflection imposed on the press or die as parts are being formed. All Strain Gain sensors are matched to within 1% and therefore can be replaced without recalibration of the machine.

The Helm Strain Gain sensors can be mounted to strategic high stress areas of the machine frame or strategically located in tooling or applied to stop blocks. Signals from these sensors are routed to the module for processing. The module is capable of measuring either a tension or compression signal.

Explosion Hazard

Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. Substitution of components may impair suitability for Class I, Division 2.

Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment.
Touch a grounded object to discharge potential static.

- Wear an approved grounding wrist strap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation. When not in use, store the equipment in appropriate static-safe packaging.

Grounding

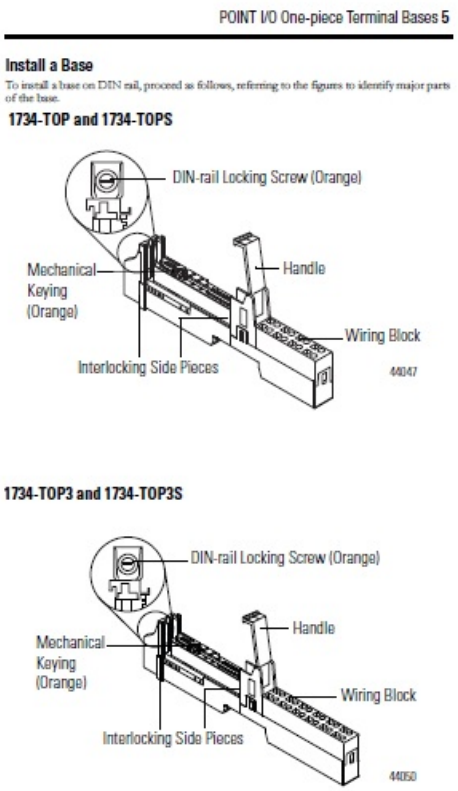
POINT I/O is grounded through DIN rail to chassis ground. Use zinc plated, yellow chromated steel DIN rail to assure proper grounding. Using other DIN rail materials (e.g. aluminum, plastic,etc.) which can corrode, oxidize or are poor conductors can result in improper or intermittent platform grounding.

Helm HM1734-PLM Installation Instructions

Installing the Mounting Base

To install the mounting base on the DIN rail, proceed as follows.

1. Position the mounting base vertically above the installed units adapter, power supply or existing module.
2. Slide the mounting base down allowing the interlocking side pieces to engage the adjacent module or adapter.
3. Press firmly to seat the mounting base on the DIN rail. The mounting base will snap into place.
4. To remove the mounting base from the DIN rail, remove the module, and use a small bladed screwdriver to rotate the base locking screw to a vertical position. This releases the locking mechanism. Then lift straight up to remove.



Installing the I/O module

The module can be installed before, or after base installation. Make sure that the mounting base is correctly keyed before installing the module into the mounting base. In addition, make sure the mounting base locking screw is positioned horizontal referenced to the base.

When you insert or remove the module while backplane power is on, an electrical arc can occur.

Installing the Removable Terminal Block (RTB)

A removable terminal block is supplied with your wiring base assembly. To remove, pull up on the RTB handle. This allows the mounting base to be removed and replaced as necessary without removing any of the wiring. To reinsert the removable terminal block, proceed as follows.

1. Insert the end opposite the handle into the base unit. This end has a curved section that engages with the wiring base.
2. Rotate the terminal block into the wiring base until it locks itself in place
3. If an I/O module is installed, snap the RTB handle into place on the module.

When you connect or disconnect the RTB with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is nonhazardous before proceeding.

Removing a Mounting Base

To remove a mounting base, you must remove and installed module, and the module installed in the base to the right. Remove the removable terminal block (if wired).

1. Unlatch the RTB handle on the I/O module.
2. Pull on the RTB handle to remove the removable terminal block.

   When you connect or disconnect the RTB with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations.
   Be sure that power is removed or the area is nonhazardous before proceeding.

3. Press on the module lock on the top of the module.
4. Pull on the I/O module to remove from that base.

   When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.
   Be sure that power is removed or the area is nonhazardous before proceeding.

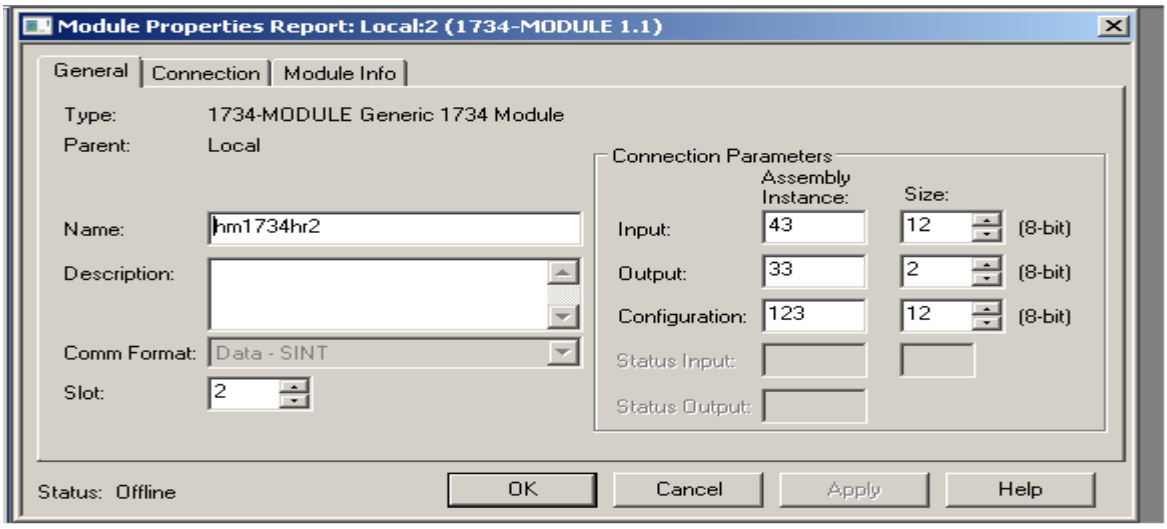
5. Repeat steps 1, 2, 3, 4 for the module to the right.
6. Use a small bladed screwdriver to rotate the orange base locking screw to a vertical position. This releases the locking mechanism.
7. Then lift straight up to remove.

COMMUNICATION WITH THE MODULE

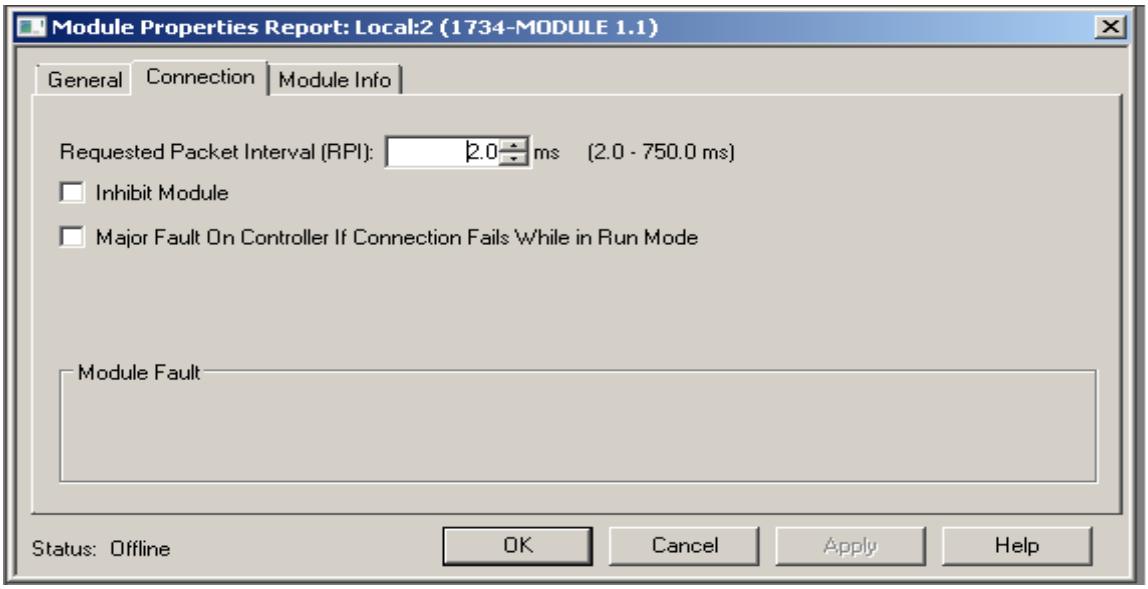
I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's memory. This POINT I/O input module produces 2 bytes of input data (scanner Rx) and 2 bytes of output data (scanner Tx).

SETTING UP HM1734-PLM MODULE USING 1734-AENT/A on Ethernet/IP

General Tab Settings



Connection Tab Settings



Data Map for HM1734-PLM on Ethernet/IP

INPUT DATA TAGS

Data Tags name:x.I	Data Type	Bit	Description
.Data[4]	SINT	-	CH1 Value LSByte
.Data[5]	SINT	-	CH1 Value MSByte
			lowcapalarm LOCAL:2:1.DATA[7],0
			hicapalarm LOCAL:2:1.DATA[6],0
			cam LOCAL:2:1.DATA[8],0

x: Point I/O slot position of HM1734-PLM.

OUTPUT TAGS

[n] = slot number for module		
LOCAL:[n]:O.Data	**SINT[2]**	**Description**
LOCAL:1:O.Data[0]	SINT	
LOCAL:1:O.Data[0].0	bit	Track Mode
LOCAL:1:O.Data[0].1	bit	Peak Mode
LOCAL:1:O.Data[0].2	bit	Ch1 Clear Tare Bit (momentary)
LOCAL:1:O.Data[0].3	bit	Ch1 Tare Bit (momentary)
LOCAL:1:O.Data[0].4	bit	Alarm Reset
LOCAL:1:O.Data[0].5	bit	Set Cal Factor
LOCAL:1:O.Data[0].6	bit	Read Cal Factor
LOCAL:1:O.Data[0].7	bit	Record Mode
LOCAL:1:O.Data[1]	SINT	
LOCAL:1:O.Data[1].0	bit	External Cam Enable
LOCAL:1:O.Data[1].1	bit	Bypass Scaling
LOCAL:1:O.Data[1].2	bit	Save to EEprom
LOCAL:1:O.Data[1].3	bit	Cam Bit

Data Map for HM1734-PLM on Ethernet/IP

Required Controller Tags

Data Tags Name	Data Type	
	INT[9]	
checkhighcap	INT	Check High Capacity Alarm Setting
checklowcap	INT	Check Low Capacity Setting
	INT	Check Reference Tons
hicapset	INT	High Capacity Alarm Setting
lowcapset	INT	Low Capacity Setting
	INT	Set Reference Tons
value	INT	Peak Tonnage / Coarse Zero
	BOOL[2]	
hicapalarm	BOOL	High Capacity Alarm Bit
locapalarm	BOOL	Low Capacity Alarm Bit

OUTPUT TAG DESCRIPTIONS

TRACK MODE
Ethernet/IP (Data[0]): Bit 0
Used for initial installation

PEAK MODE
Ethernet/IP (Data[0]): Bit 1
A/D values scaled with math in ladder logic

CLEAR TARE BIT
Ethernet/IP (Data[0]): Bit 2
Clears internal tare value for “zero state”.
Useful when troubleshooting load cell wiring or other failures.

TARE
Ethernet/IP (Data[0]): Bit 3
Sets A/D value to zero.

ALARM RESET
Ethernet/IP (Data[0]): Bit 4

SET CAL FACTOR (IN PEAK MODE ONLY)
Ethernet/IP (Data[0]): Bit 5

READ CAL FACTOR (IN PEAK MODE ONLY)
Ethernet/IP (Data[0]): Bit 6

RECORD MODE
Ethernet/IP (Data[0]): Bit 7
Used for troubleshooting, check signal strength and waveform storage.
This feature allows the module to update a block of memory at real time data using “Grab Data” ladder logic to create data block.

- Set module to record mode
- Run “Grab Data” routine to get real time data

EXTERNAL CAM ENABLE
Ethernet/IP (Data[1]): Bit 0
Set bit to use external cam input.

BYPASS SCALIMG
Ethernet/IP (Data[1]): Bit 1

SAVE TO EEPROM
Ethernet/IP (Data[1]): Bit 2
Use to save all settings to module

CAM BIT
Ethernet/IP (Data[1]): Bit 3
PLC cam bit used when external cam is disabled.

REQUIRED CONTROLLER TAGS

SET REFERENCE TONS
Full scale setting for CH1
Value is determined by capacity of load cell and by resolution required.
Actual value is from load cell specification or rated capacity on column or side of press.

LOW CAPACITYALARM SET
Enter desired value to set low alarm limit.

VALUE
Reports measured peak tonnage value in RUN mode.
Reports raw A/D count value in CAL mode.

HIGH CAPACITY SETTING
Enter desired value to set high alarm limit.

HIGH CAPACITY ALARM BIT
Bit is set when high limit is reached

LOW CAPACITY ALARM BIT
Bit is set when low limit is reached.

CHECK REFERENCE TONS
Used to verify that the module has the correct value.

CHECK LOW CAPACITY SET
Used to verify that the module has the correct value.

CHECK HIGH CAPACITY SET
Used to verify that the module has the correct value.

Troubleshooting with the Indicators

Module Status:

Off	No power applied to device.
Green	Device operating normally.
Flashing Green	Device needs commissioning due to configuration missing, incomplete or incorrect.
Flashing Red	Recoverable fault.
Red	Unrecoverable fault. May require device replacement.
Flashing Red/Green	Device is in self-test.

Network Status:

Off	Device is not on-line. Device has not completed dup_MAC_id test. Device not powered. Check module status indicator.
Green	Device on-line and has connections to the established state.
Flashing Green	Device is on-line but has no connections in the established state.
Flashing Red	One or more I/O connections is in timed-out state.
Red	Critical link failure – failed communications device.
Flashing Red/Green	Network access error and is in communication faulted state. Device has received and accepted an Identity Communication Faulted Request – long protocol message.

Setup Procedure

A complete listing of a sample ladder logic program is included at the back of this manual. Examples shown here are for reference.

All values are 0 (default) on initial start-up.
This means that all alarms are disabled.
You must make the following adjustments for proper operation:

- **Balance sensor input(s)**
- **Set Calibration numbers**

Step 1. Balance Sensor Input

1. Set to TRACK mode.
2. Set Clear Tare bit momentarily and set check coarse zero bit.
3. Check Raw A/D value. 32,000

   CH1 = Controller Tag “value”.

4. Set Zero Tare bit momentarily.

Step 2. Set Calibration Factor

1. Set to PEAK Mode.
2. Set Reference Tons to Actual Load/Tons.
3. Run Machine.
4. Toggle Set Cal Factor Bit.
5. Value should Equal Load/Tons.
6. Toggle Save to EEprom Bit.
7. Set Read Cal Factor Bit to Record Cal Factor on Calibration Sheet.

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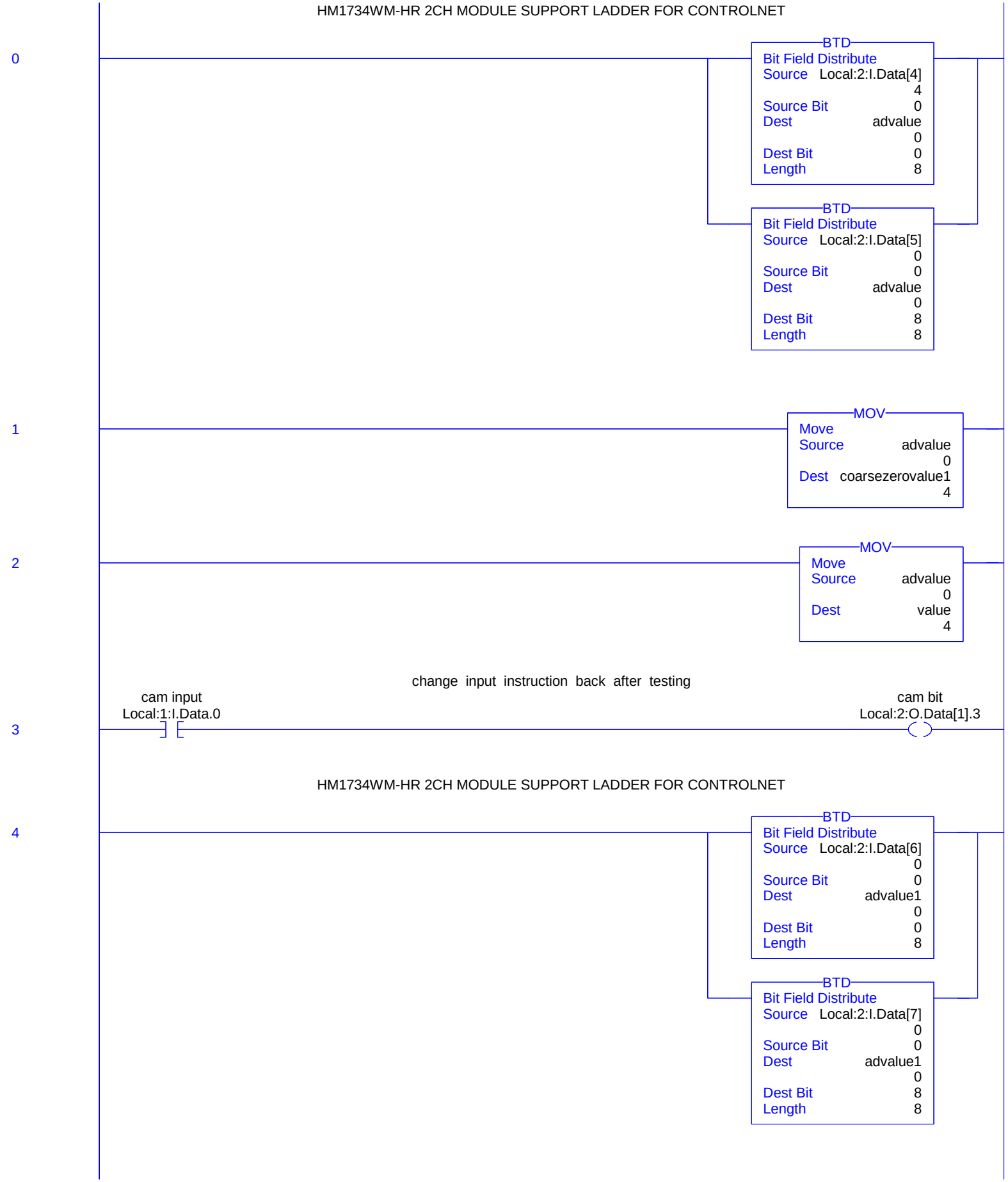
HM1734-PLM SPECIFICATIONS

Module Location	**1734-TOP (screw terminal) or 1734-TOPS (spring loaded terminal)**
Voltage Range	**10-28.8V dc**
Type of input	**Strain Gage (350 ohm, 700 ohm)**
Gage Excitation Voltage	**5V**
Input Impedance	**1 meg. ohm**
Display Resolution	**.1% of full scale**
Module Accuracy	**Dependent on Load Cell Specification**
Module Update Time	**Software selectable from 2ms to 100ms**
Number of Channels	**1**
A/D Conversion Method	**Successive Approximation - 12 bit**
Normal Mode Rejection (between +/- input)	**116DB CMRR**
Amplifier Bandwidth	**200 kHz**
Calibration	**Software Selectable**
Isolation:	**500 VDC continuous between inputs and chassis ground, and between input and backplane**
LED indicators	**2 LED's for Power and Alarm**
Recommended Cable	**Strain Gage Cable (Helm part number 6117)**
Operating Temperatures	**0°C to 60°C (32°F to 140°F)**
Hazardous Environment Classification	**Class 1 Division 2 Hazardous Environment**
Pointbus Current	**5V @ 72ma**
External Power	**24V @ 19.5ma**
Dimensions	**2.21H x 0.47W x 2.97L (Millimeters 56H x 12W x 75.5L)**


HM1734WM-HR 2CH MODULE SUPPORT LADDER FOR CONTROLNET
0
BTD
Bit Field Distribute
Source Local:2:I.Data[4]
4
Source Bit 0
Dest advalue
0
Dest Bit 0
Length 8
BTD
Bit Field Distribute
Source Local:2:I.Data[5]
0
Source Bit 0
Dest advalue
0
Dest Bit 8
Length 8
1
MOV
Move
Source advalue
0
Dest coarsezerovalue1
4
2
MOV
Move
Source advalue
0
Dest value
4
change input instruction back after testing
cam input
Local:1:I.Data.0
cam bit
Local:2:O.Data[1].3
3
HM1734WM-HR 2CH MODULE SUPPORT LADDER FOR CONTROLNET
4
BTD
Bit Field Distribute
Source Local:2:I.Data[6]
0
Source Bit 0
Dest advalue1
0
Dest Bit 0
Length 8
BTD
Bit Field Distribute
Source Local:2:I.Data[7]
0
Source Bit 0
Dest advalue1
0
Dest Bit 8
Length 8

5

MOV
Move
Source advalue1
0
Dest coarsezerovalue2
0

HM1734WM-HR 2CH MODULE SUPPORT LADDER FOR CONTROLNET

6

BTD
Bit Field Distribute
Source Local:2:I.Data[8]
0
Source Bit 0
Dest advalue2
0
Dest Bit 0
Length 8

BTD
Bit Field Distribute
Source Local:2:I.Data[9]
0
Source Bit 0
Dest advalue2
0
Dest Bit 8
Length 8

7

MOV
Move
Source advalue2
0
Dest coarsezerovalue3
0

HM1734WM-HR 2CH MODULE SUPPORT LADDER FOR CONTROLNET

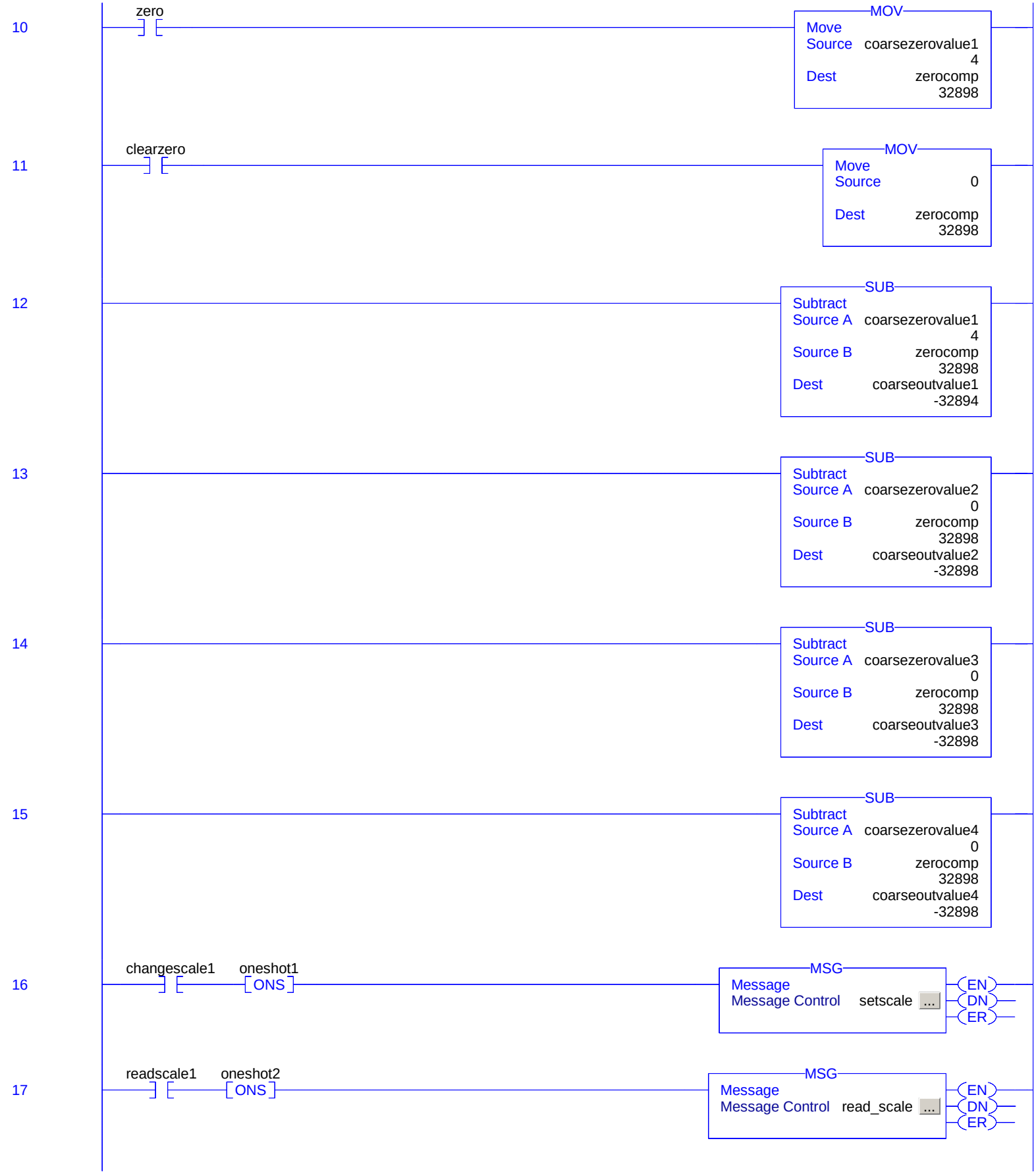
8

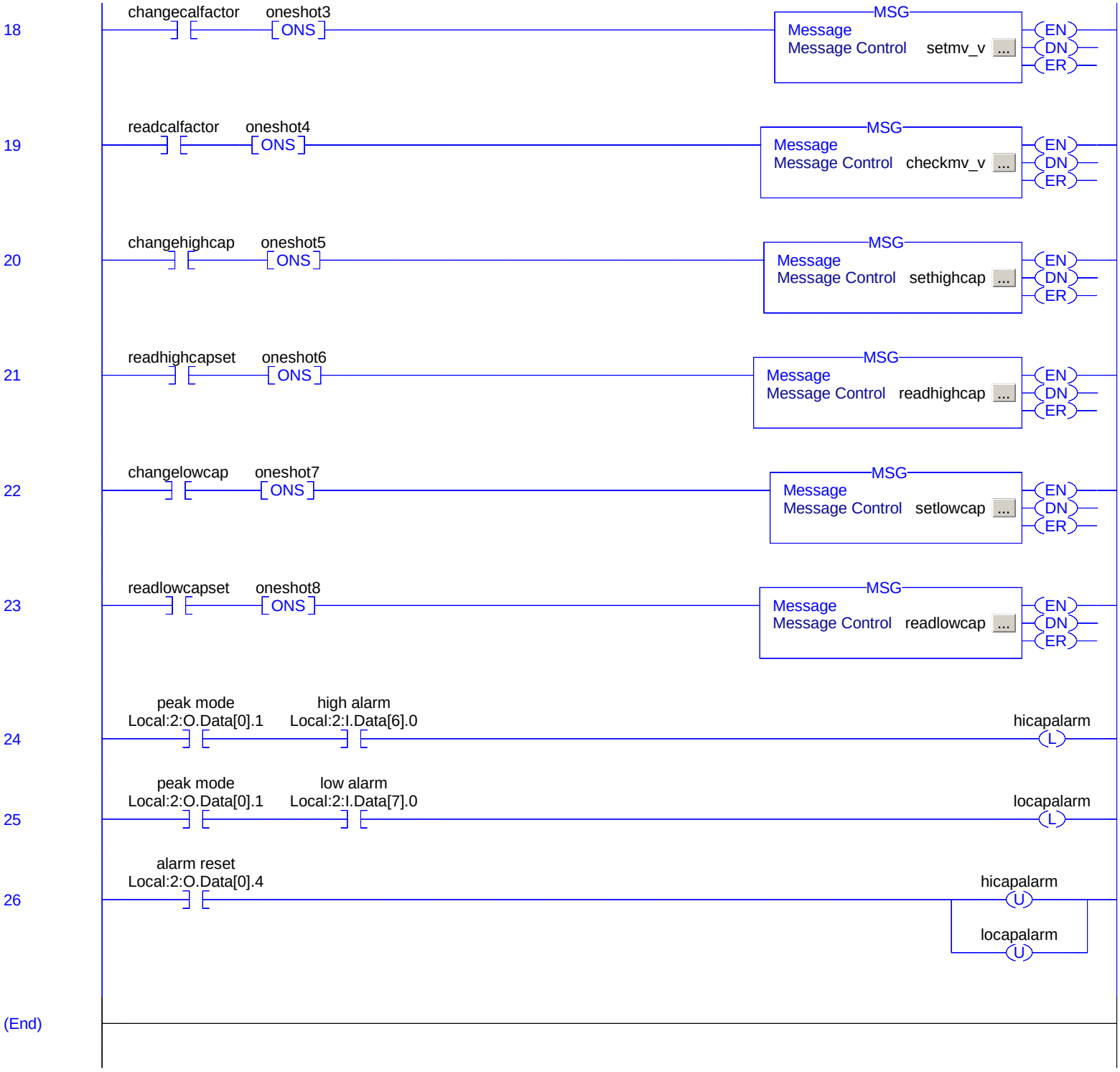
BTD
Bit Field Distribute
Source Local:2:I.Data[10]
0
Source Bit 0
Dest advalue3
0
Dest Bit 0
Length 8

BTD
Bit Field Distribute
Source Local:2:I.Data[11]
0
Source Bit 0
Dest advalue3
0
Dest Bit 8
Length 8

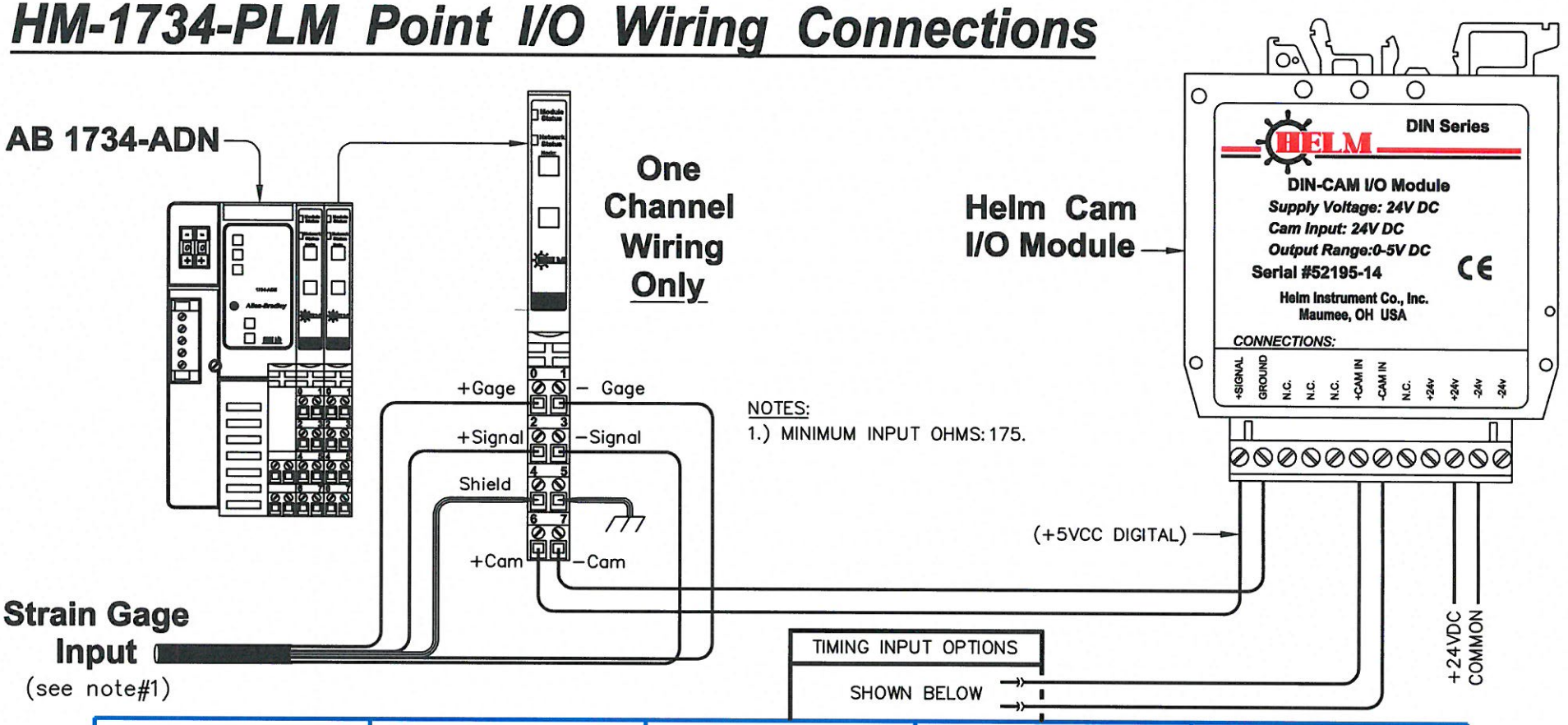
9

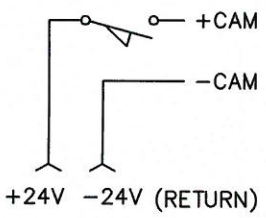
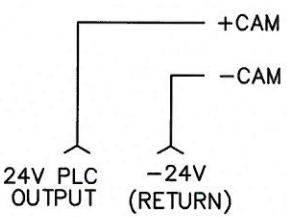
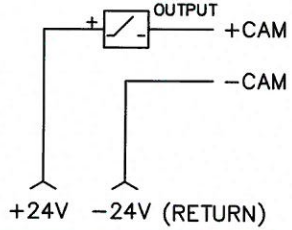
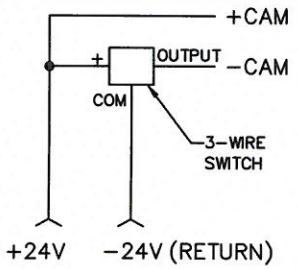
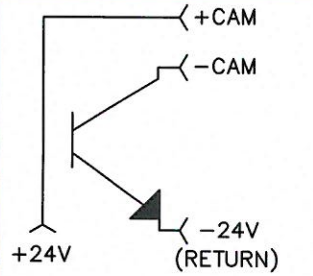
MOV
Move
Source advalue3
0
Dest coarsezerovalue4
0


10
zero
MOV
Move
Source coarsezerovalue14
Dest zerocomp32898
11
clearzero
MOV
Move
Source 0
Dest zerocomp32898
12
SUB
Subtract
Source A coarsezerovalue14
Source B zerocomp32898
Dest coarseoutvalue1-32894
13
SUB
Subtract
Source A coarsezerovalue20
Source B zerocomp32898
Dest coarseoutvalue2-32898
14
SUB
Subtract
Source A coarsezerovalue30
Source B zerocomp32898
Dest coarseoutvalue3-32898
15
SUB
Subtract
Source A coarsezerovalue40
Source B zerocomp32898
Dest coarseoutvalue4-32898
16
changescale1
oneshot1
ONS
MSG
Message
Message Control setscale ...
EN
DN
ER
17
readscale1
oneshot2
ONS
MSG
Message
Message Control read_scale ...
EN
DN
ER


18
changecalfactor
oneshot3
ONS
MSG
Message
Message Control setmv_v
EN
DN
ER
19
readcalfactor
oneshot4
ONS
MSG
Message
Message Control checkmv_v
EN
DN
ER
20
changehighcap
oneshot5
ONS
MSG
Message
Message Control sethighcap
EN
DN
ER
21
readhighcapset
oneshot6
ONS
MSG
Message
Message Control readhighcap
EN
DN
ER
22
changelowcap
oneshot7
ONS
MSG
Message
Message Control setlowcap
EN
DN
ER
23
readlowcapset
oneshot8
ONS
MSG
Message
Message Control readlowcap
EN
DN
ER
24
peak mode
Local:2:O.Data[0].1
high alarm
Local:2:I.Data[6].0
hicapalarm
L
25
peak mode
Local:2:O.Data[0].1
low alarm
Local:2:I.Data[7].0
locapalarm
L
26
alarm reset
Local:2:O.Data[0].4
hicapalarm
U
locapalarm
U
(End)

HM-1734-PLM Point I/O Wiring Connections



EXTERNAL DRY–CONTACT CAM SWITCH	24 VDC PLC OUTPUT	EXTERNAL 2–WIRE PROX PROBE	EXTERNAL 3–WIRE PROX PROBE	TRANSISTOR–TYPE OUTPUT
				

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SCALE: 3/4	DESIGNED BY: N.F.N.	DRAWN BY: M.H.L.
DATE: 04/01/14	CHECKED BY: N.F.N.	APPROVED BY: R.J.G.
TITLE: SENSOR CONNECTIONS, HM–1734–PLM (HELM)		
DRAWER:	DRAWING NUMBER: E1133W07	