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Point I/O Strain Gage Input Module Model HM-1734-WM



Instruction Manual

Rev. 4.18

March, 2022

Force Measurement and Control Solutions

This Series C product can be used with DeviceNet and PROFIBUS adapters. It can be used with Ethernet/IP and Ethernet adapters using RSLogix 5000, version 11 (or higher) software.

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meet all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Allen-Bradley be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication is intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard.

WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION**Environment and Enclosure**

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

ATTENTION

POINT I/O is grounded through the 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.

WARNING**EXPLOSION HAZARD**

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this 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.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

ATTENTION**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.

ATTENTION

Check label on the module for the Firmware Revision (4.17 or 4.18)

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.

- The module can power (2) load cells @ 350Ω
- LCP module is needed for more than (2) load cells
- (1) LCP module can support up to (4) load cells at 350Ω
- for summing applications, the mV/V to enter is the average of the mV/V for each load cell
- the scale set on summing applications is equal to the capacity of the cells multiplied by the total number of cells

WARNING



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.

1. Using a bladed screwdriver, rotate the key switch (2) on the mounting base clockwise until the number required for the type of module being installed aligns with the notch in the base.
2. Make certain the DIN rail locking screw is in the horizontal position. (You cannot insert the module if the locking mechanism is unlocked.)

ATTENTION



Check label on the module for the Firmware Revision (4.17 or 4.18)

3. Local: 2.0. Data [2].0 (Rev 418 Enable Bit)

- A) This module with Rev 418 has dual function, it can run as Rev 417 or Rev 418
- B) For existing customers with SP417 ladder logic make sure Bit is cleared for existing ladder logic in project.
- C) Make sure sample set is set to 1 or higher (SP417 Ladder Logic)

HM1734WM:1:O.Data[3]	SINT	Sample Bits
HM1734WM_A[8]	DINT	Set Average Sample Count (0-255)

- D) For new installations set this Bit and run with Rev 418 ladder logic, or, clear Bit to run with existing ladder logic projects (SP417).
- E) This function has been maintained for systems using SP417 ladder so that modules can be replaced without changing ladder logic.

4. Insert the module straight down into the mounting base and press to secure. The module will lock into place.

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.

WARNING

When you connect or disconnect the Removable Terminal Block (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.

WARNING

Some non-Helm load cell summing devices may be incompatible due to signal trimming. Please contact Helm support for verification at 704-942-4710.

Removing a Mounting Base

To remove a mounting base, you must remove any 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 Removable Terminal Block (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 the 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 and 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.

OUTPUT TAG DESCRIPTIONS

CALMODE

Used for initial installation. All math is disabled, weigh value is not scaled, leaving raw A/D value.
Value = 2,090,000 to 2,100,000 at normal zero (at rest state).

RUNMODE

Factory Cal setting **100,000** counts = 2MV/V

CLEAR TARE CH1/CH2 Bit

Clears internal tare value for “zero state”.
Useful when troubleshooting load cell wiring or other failures.

TARE CH1/CH2

Sets A/D value to zero.

READ ADTRIM BIT

(HELM Factory setting only).

SET-TO-CH1 Bit

Used for one channel operation where a faster sample speed is required.
1 = 2msec (max speed)
0 = 4msec (max speed-default)

FREQUENCY BITS

Used to set sample rate and filter options.
With no bits set: Sample = 100msec.

Set one bit only.

Note: For one channel operation, sample rate is at bit selected.
For two channel operation, sample rate is 2 times bit time selected.

ZERO-DEAD-BAND Bits

Useful for Auto-Tare functions with production runs.
Set only one bit.

ZEROBAND_025 = .025% full scale

ZEROBAND_05 = .05% full scale

ZEROBAND_075 = .075% full scale

Auto tare occurs when load cell weight is at bit level or lower.

REQUIRED CONTROLLER TAGS

CH1/CH2 SCALE SET / REFERENCE WEIGH VALUE

LOCAL : 2 : C, DATA[0]

LOCAL : 2 : C, DATA[3]

Full scale setting for CH1, CH2

Value is determined by capacity of load cell and by resolution required.

Example: 10KG = 10,000

GET WEIGH VALUE CH1, CH2

GET_WEIGH_CH1

GET_WEIGH_CH2

Reports measured weigh value in RUN mode.

Reports raw A/D count value in CAL mode.

SET AUTOCAL CH1, CH2 Enable Bit

CH1 AUTO TUNE

CH2 AUTO TUNE

With ladder logic provided, an auto-cal method for calibrating is available.

Set to (1) to initiate Auto-Cal for the channel.

SET AVERAGE SAMPLE COUNT

(SAMPLE BITS) Only set to 1 Bit

Set number of samples to take for average type filter.

(Sample=10) set to 1

(Sample =20) set to 1

(Sample=50) set to 1

All Bits clear Sample=1

SET mV/V CH1, CH2

LOCAL : 2 : C, DATA[2]

LOCAL : 2 : C, DATA[5]

CH1/CH2 MV_V Settings

Enter (2000) for 2.0MV/V for nominal load cell.

Actual value is from load cell specification.

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

PLEASE NOTE:

- The module excitation voltage is 5VDC.
- Most load cells are rated for 10VDC to 15VDC.
- Even though the module voltage is lower than the load cell rated voltages it will perform with 5VDC for all load cells.

Follow Steps 1 and 2 for each channel.

Step 1. Balance Sensor Input Check

1. Set to CAL mode.
2. Set Clear Tare bit momentarily.
3. Check Raw A/D value. (Range 2,090,000 to 2,100,000)

CH1 = Controller Tag GET_WEIGHT_CH1

CH2 = Controller Tag GET_WEIGHT_CH2

4. Set Zero Tare bit momentarily.

Step 2. Set Calibration Numbers

1. Set Scale to capacity of load cell.
2. Set mV/V to load cell specification.

Example:

100 ton load cell, 2.025 mV/V

For scale set, enter 100

For mV/V set, enter 2025

3. Set to RUN mode.

Specifications - HM1734-WM Strain Gage Input Module

Module Location	1734-TOP (screw terminal) or 1734-TOPS (spring loaded terminal)
Type of input	Strain Gage (350 ohm, 700 ohm)
Gage Excitation Voltage	5 Volt
Input Impedance	5.11 meg. ohm
Display Resolution	Up to .0025% of full scale
Module Accuracy	Dependent on Load Cell Specification
Module Update Time	Software selectable from 2ms to 100ms
Number of Channels	2 (isolated)
A/D Conversion Method	Successive Approximation - 24 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 LEDs 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)
Emissions	CISPR 11 Group 1, Class A
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)

WARNING

Note: Excitation above 5V is acceptable.



SETTING UP HM1734WM MODULE USING 1734-AENT/A on Ethernet/IP

Step #1

Add module to project as following:

HM1734WM MODULE PROPERTIES

General Tab Settings

Module Properties Report: HM1734WM:1 (1734-MODULE 1.1)

General | Connection | Module Info

Type: 1734-MODULE Generic 1734 Module
Parent: HM1734WM

Name:

Description:

Comm Format:

Slot:

Connection Parameters

	Assembly Instance:	Size:	
Input:	<input type="text" value="43"/>	<input type="text" value="12"/>	(8-bit)
Output:	<input type="text" value="33"/>	<input type="text" value="4"/>	(8-bit)
Configuration:	<input type="text" value="123"/>	<input type="text" value="12"/>	(8-bit)
Status Input:	<input type="text"/>	<input type="text"/>	
Status Output:	<input type="text"/>	<input type="text"/>	

Status: Offline

OK Cancel Apply Help

Connection Tab Settings

Module Properties Report: Local:2 (1734-MODULE 1.1)

General | Connection | Module Info

Requested Packet Interval (RPI): ms (2.0 - 750.0 ms)

Inhibit Module

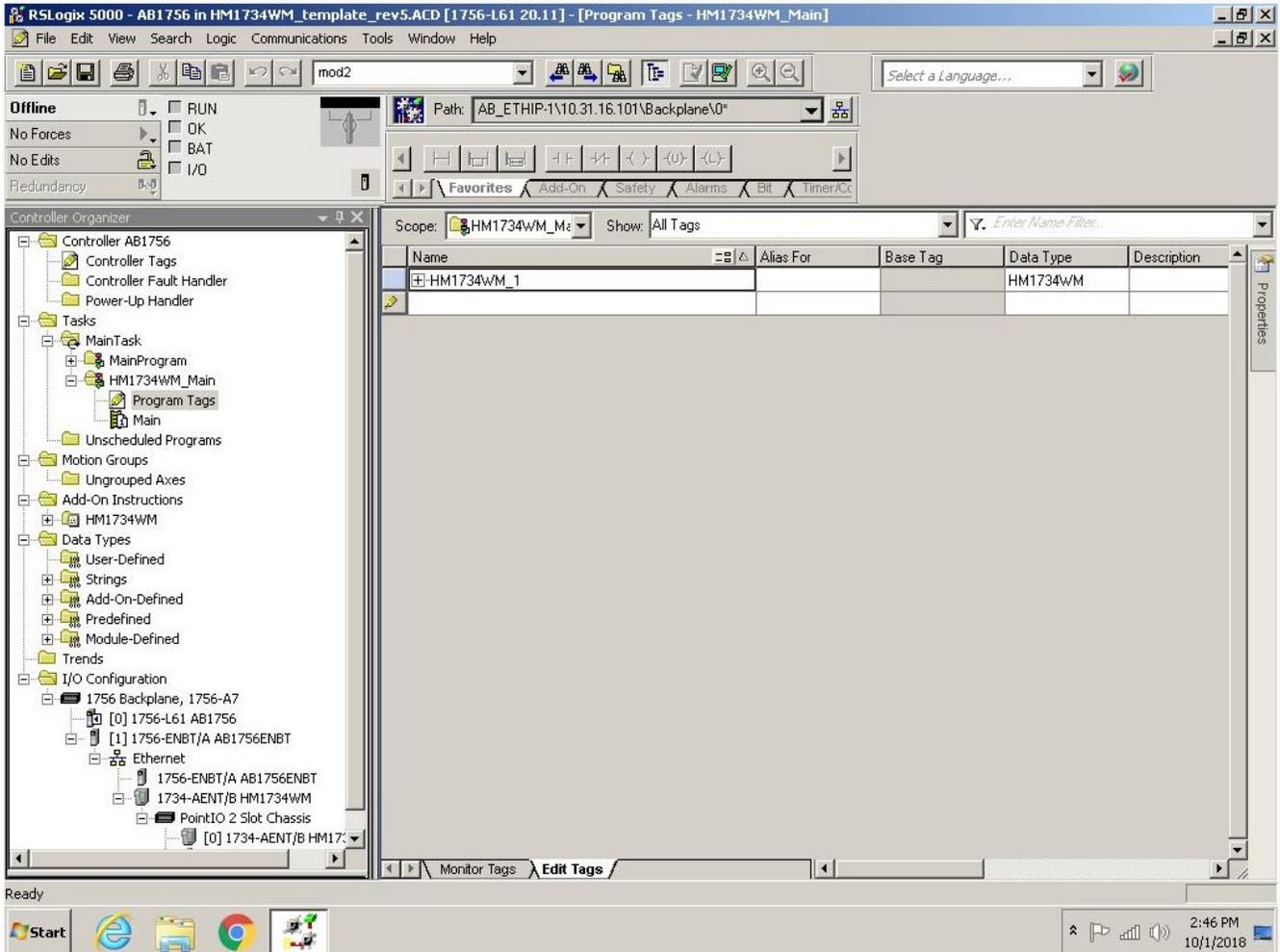
Major Fault On Controller If Connection Fails While in Run Mode

Module Fault

Status: Offline

OK Cancel Apply Help

*RPI rate cannot be faster than 4ms.



Step #2

Open "HM1734_WM_AOP_REV418. ACD"

Copy HM1734WM_main routine

Open project

Paste HM1734WM_main routine

Check program tag here should be as

Example

Data Map for HM1734-WM on Ethernet/IP

OUTPUT BITS

Local:2:O.Data[0].0	1	cal mode
Local:2:O.Data[0].1	0	run mode
Local:2:O.Data[0].2	0	ch1 clear tare
Local:2:O.Data[0].3	0	ch1 tare
Local:2:O.Data[0].4	0	ch1 set adtrim
Local:2:O.Data[0].5	0	read adtrim
Local:2:O.Data[0].6	0	ch2 clear tare
Local:2:O.Data[0].7	0	ch2 tare
Local:2:O.Data[1]		
Local:2:O.Data[1].0	0	ch2 set adtrim
Local:2:O.Data[1].1	0	ch1 only
Local:2:O.Data[1].2	0	4msec
Local:2:O.Data[1].3	0	8msec
Local:2:O.Data[1].4	0	16msec
Local:2:O.Data[1].5	0	32msec
Local:2:O.Data[1].6	0	40msec
Local:2:O.Data[1].7	0	48msec
Local:2:O.Data[2]	5	
Local:2:O.Data[2].0	1	rev418 enable
Local:2:O.Data[2].1	0	10x scale
Local:2:O.Data[2].2	0	samples = 10
Local:2:O.Data[2].3	0	samples = 20
Local:2:O.Data[2].4	0	samples = 50
Local:2:O.Data[2].5	0	zero band .025
Local:2:O.Data[2].6	0	zero band .050
Local:2:O.Data[2].7	0	zero band .075
Local:2:O.Data[3]		
Local:2:O.Data[3].0	0	read scale sets
Local:2:O.Data[3].1	0	auto cal mode
Local:2:O.Data[3].2	0	ch1 auto tune
Local:2:O.Data[3].3	0	ch2 auto tune
Local:2:O.Data[3].4	0	read autocal values
Local:2:O.Data[3].5	0	read sample set
Local:2:O.Data[3].6	0	read mv_v sets
Local:2:O.Data[3].7	0	extra test

Data Map for HM1734-WM on Ethernet/IP

CONTROLLER TAGS

get_weight_ch1	2792725	Decimal	DINT	
get_weight_ch2	2794308	Decimal	DINT	

Local:2:C.Data[0]	5000	Decimal	INT	ch1 scale
Local:2:C.Data[1]	2000	Decimal	INT	ch1mv_v
Local:2:C.Data[2]	5000	Decimal	INT	ch2 scale
Local:2:C.Data[3]	2000	Decimal	INT	ch2 mv_v

Set or Change Configuration Data:

- Must be “On-Line”
- Must be in “Program Mode”
- Enter new configuration data
- Power Down/ then Power Up
(MODULE LOADS IN CONFIG DATA ON POWER UP)

Scale Settings:

FOR SCALE = 10,000

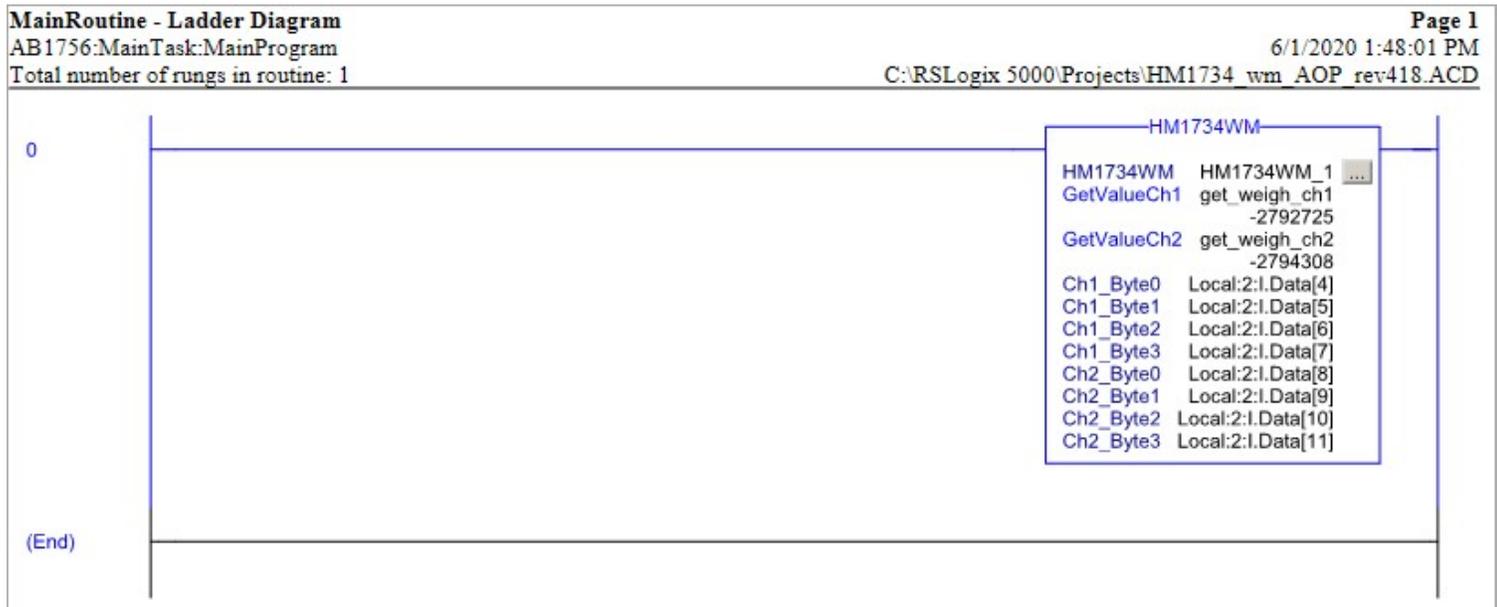
- Enter 10,000 at SCALE SET
- Set 10X scale = 0

FOR SCALE = 100,000

- Enter 10,000 at SCALE SET
- Set 10X scale = 1

USE “READ BITS” TO CHECK FOR MODULE CURRENT CONFIG DATA

HM1734-WM AOP rev418. ACD



CALIBRATING WITH KNOWN LOAD (AUTO-CAL) Ver. 4.18

- 1) Set known weight for channel at scale parameter.
- 2) Tare-0 (with no weight on cell/scale).
- 3) Set module to AUTOCAL mode (BIT).
- 4) Apply known load (test weight) to load cells/ scale.
- 5) Set AUTO TUNE BIT on for CH1 (CH2 if applicable).
- 6) To ensure accuracy repeat the steps above.
- 7) MAKE SURE AUTOCAL MODE BIT STAYS ON.

HM1734-WM ADDON rev3. ACD

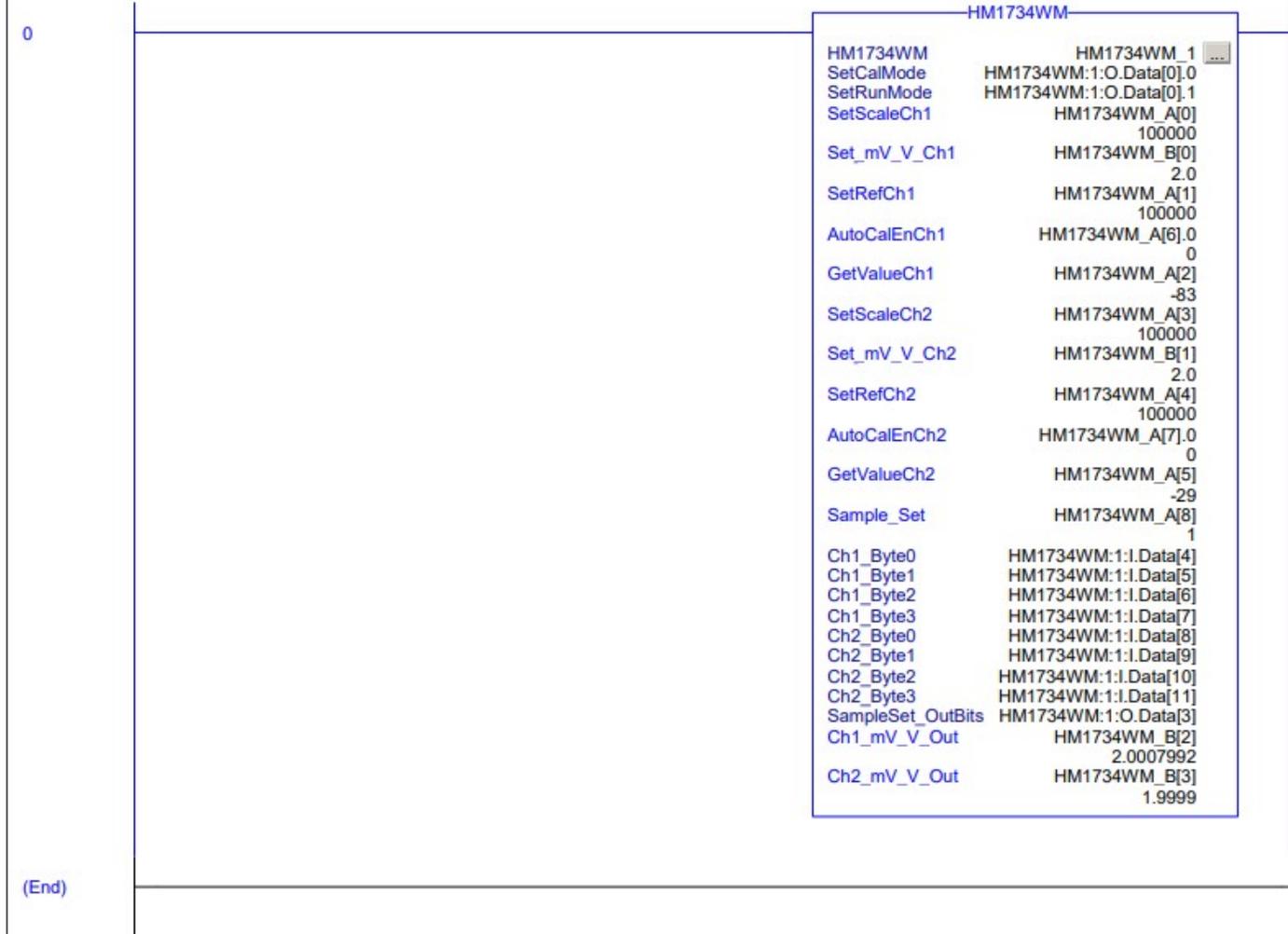
Main - Ladder Diagram

AB1756:MainTask:HM1734WM Main

6/26/2017 3:26:02 PM

Total number of rungs in routine: 1

C:\RSLogix 5000\Projects\HM1734WM ADDON rev3.ACD



HM1734-WM ADDON rev3. ACD

HM1734WM:1:O.Data[0].0	0		BOOL		cal mode
HM1734WM:1:O.Data[0].1	0		BOOL		run mode
HM1734WM:1:O.Data[0].2	0		BOOL		ch1 clear tare
HM1734WM:1:O.Data[0].3	0		BOOL		ch1 tare
HM1734WM:1:O.Data[0].4	0		BOOL		ch1 adtrim
HM1734WM:1:O.Data[0].5	0		BOOL		read adtrim
HM1734WM:1:O.Data[0].6	0		BOOL		ch2 clear tare
HM1734WM:1:O.Data[0].7	0		BOOL		ch2 tare

HM1734WM:1:O.Data[1].0	0		BOOL		ch2 adtrim
HM1734WM:1:O.Data[1].1	0		BOOL		ch1 only
HM1734WM:1:O.Data[1].2	0		BOOL		4msec
HM1734WM:1:O.Data[1].3	0		BOOL		8msec
HM1734WM:1:O.Data[1].4	0		BOOL		16msec
HM1734WM:1:O.Data[1].5	0		BOOL		32msec
HM1734WM:1:O.Data[1].6	0		BOOL		40msec
HM1734WM:1:O.Data[1].7	0		BOOL		48msec

HM1734WM:1:O.Data[2].0	0		BOOL		set to zero
HM1734WM:1:O.Data[2].1	0		BOOL		msf .002 to .001
HM1734WM:1:O.Data[2].2	0		BOOL		msf .004 to .002
HM1734WM:1:O.Data[2].3	0		BOOL		msf .008 to .004
HM1734WM:1:O.Data[2].4	0		BOOL		msf .01 to .005
HM1734WM:1:O.Data[2].5	0		BOOL		zero band .025
HM1734WM:1:O.Data[2].6	0		BOOL		zeroband .05
HM1734WM:1:O.Data[2].7	0		BOOL		zeroband .075
HM1734WM:1:O.Data[3]	0		SINT		sample bits

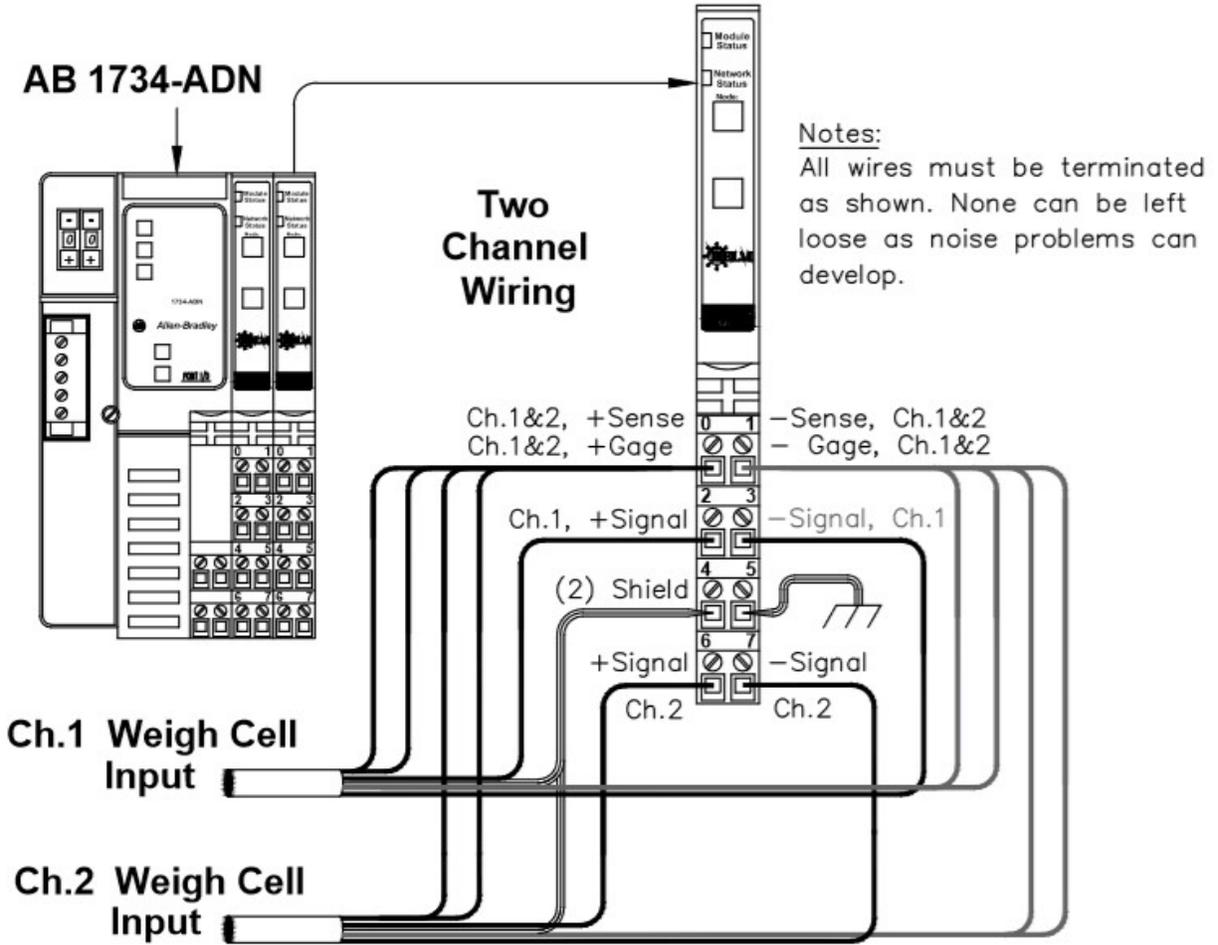
HM1734WM_A[0]		100000		DINT	Standard	Set Scale Value Ch1
HM1734WM_A[1]		100000		DINT	Standard	Set Autocal Ref Weigh Value Ch1
HM1734WM_A[2]		-83		DINT	Standard	Get Weigh Value Ch1
HM1734WM_A[3]		100000		DINT	Standard	Set Scale Value Ch2
HM1734WM_A[4]		100000		DINT	Standard	Set Autocal Ref eigh Value Ch2
HM1734WM_A[5]		-29		DINT	Standard	Get Weigh Value Ch2
HM1734WM_A[6]		0		DINT	Standard	Set Autocal Enable Bit Ch1
HM1734WM_A[7]		0		DINT	Standard	Set Autocal Enable Bit Ch2
HM1734WM_A[8]		1		DINT	Standard	Set Average Sample Count (0-255)

HM1734WM_B[0]		2		REAL	Standard	Set mV/V Ch1
HM1734WM_B[1]		2		REAL	Standard	Set mV/V Ch2
HM1734WM_B[2]		2.000799		REAL	Standard	Ch1_Autocal_mV/V
HM1734WM_B[3]		1.9999		REAL	Standard	Ch2_Autocal_mV/V

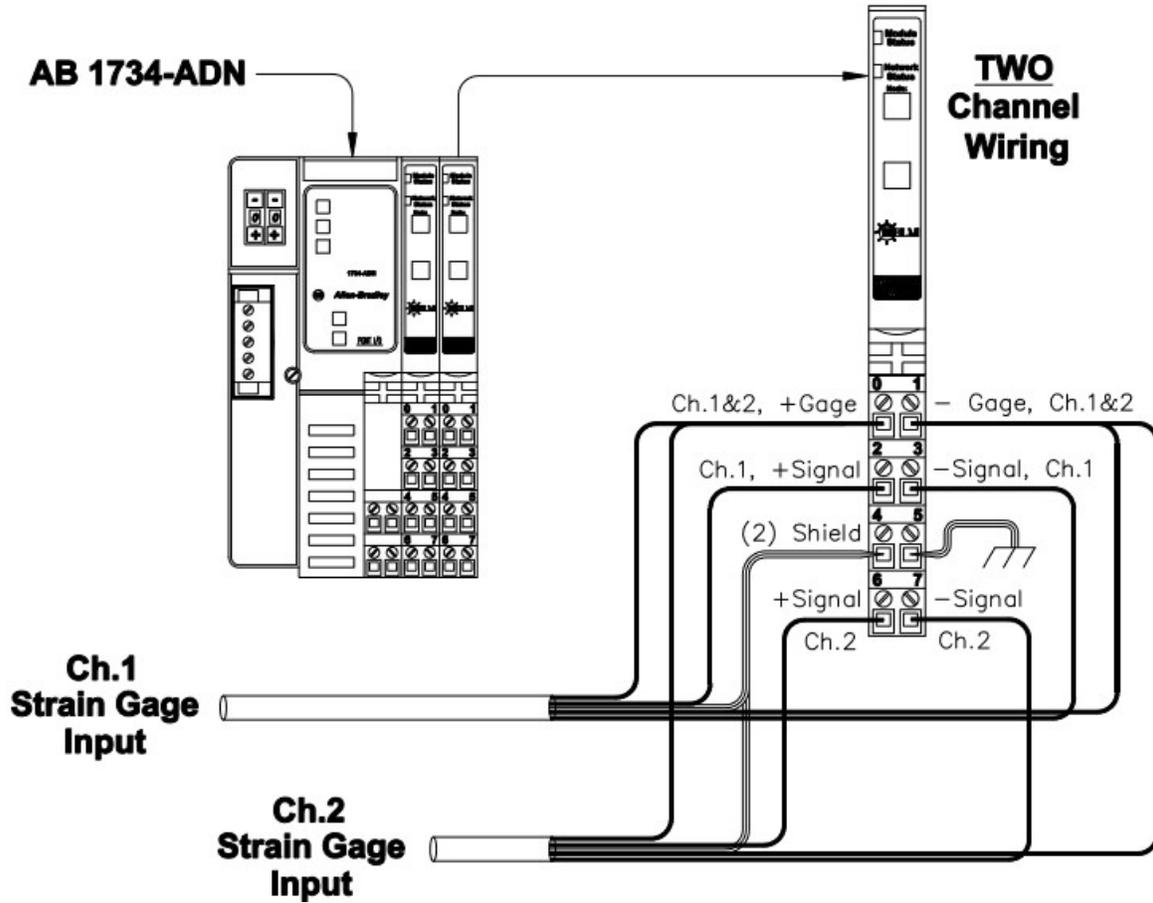
CALIBRATING WITH KNOWN LOAD (AUTO-CAL) Ver. 4.17

- 1) Set known weight for channel at REF WEIGH VALUE.
- 2) Tare-0 (with no weight on cell/scale).
- 3) Apply known load (test weight) to load cells/ scale.
- 4) Set AUTO CAL ENABLE BIT on for CH1 (CH2 if applicable).
- 5) To ensure accuracy repeat the steps above.
- 6) mV/V values at Ch1_Autocal_mV/V
Ch2_Autocal_mV/V

Helm HM-1734-WM 6-Wire Weigh Cell Connection



Helm HM-1734-WM 4-Wire Weigh Cell Connection



Load Module Inputs - Minimum Ohms

* SEE ENG. DEPT. FOR
SPECIAL SENSOR SPEC'S.

Model	Min. Ohms - Ea. Ch.	Gage Supply Mod.	Max # & Type Sensors/ Ea. Ch.*
HM-1756-PLM	175	not needed	(2) HT-400
HM-1756-WM	350	not available	(3) 1100 ohm cells
HM-1520-PLM	350 std / 175 option	see LCP below	(1) Ht-400 Std./ (2) Ht-400 Opt.
HM-1520-LCP	this add'l P.S. for the HM-1520 allows:		(2) 350 or (6) 1100 ohm / ch.
HM-1525-WM	350	not available	(3) 1100 ohm cells
HM-604-PLM	350 std / 175 option	opt - 2V gage	(1) Ht-400 Std./ (2) Ht-400 Opt.
HM-604-WM	350 std / 175 option	opt - 2V gage	(3) 1100 ohm Std./ (6) 1100 ohm Opt.
HM2-SSI-PLM	350	cannot change	(1) HT-400
HM-1734-WM	350 std / 88 option	see LCP below	(3) 1100 ohm weigh cells
HM-1734-LCP	this add'l P.S. for the HM-1734-WM allows:		(4) 350 or (12) 1100 ohm / ch.
PTM-1	175 as of 10-4-13	not needed	(2) Ht-400 or (6) 1100 ohm cells
CLM-1	175 as of 10-4-13	not needed	(2) Ht-400 or (6) 1100 ohm cells

REV. A	1.) POWER SUPPLY UPDATE ON PTM-1/CLM-1. 2.) ADD HM-1520-LCP. 3.) ADD HM-1734-LCP.	03/30/15 N.F.N.	REV. B	1.) NEW 10V POWER SUPPLY ON 1756-WM & 1525-WM.	05/30/15 N.F.N.
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SCALE: NONE	DESIGNED BY: M.H.L.	DRAWN BY: M.H.L.
DATE: 03/12/09	CHECKED BY: N.F.N.	APPROVED BY: R.J.G.
TITLE: LOAD MODULE INPUTS - MINIMUM OHMS (HELM)		
DRAWER:	DRAWING NUMBER: E1145Z01B	

Common Techniques Used in this Manual

The following conventions are used throughout this manual:

- Bulleted lists such as this one provides information, not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.

Product Support

Contact your Helm representative or call Helm direct at 419-893-4356:

- sales and order support
- product technical training
- warranty support
- support service agreements

Download up to date manuals and ladder logic files at
<http://www.helminstrument.com/manuals-and-downloads/>

Your Questions or Comments on this Manual

If you have any suggestions for how this manual could be made more useful to you, please send us your ideas.