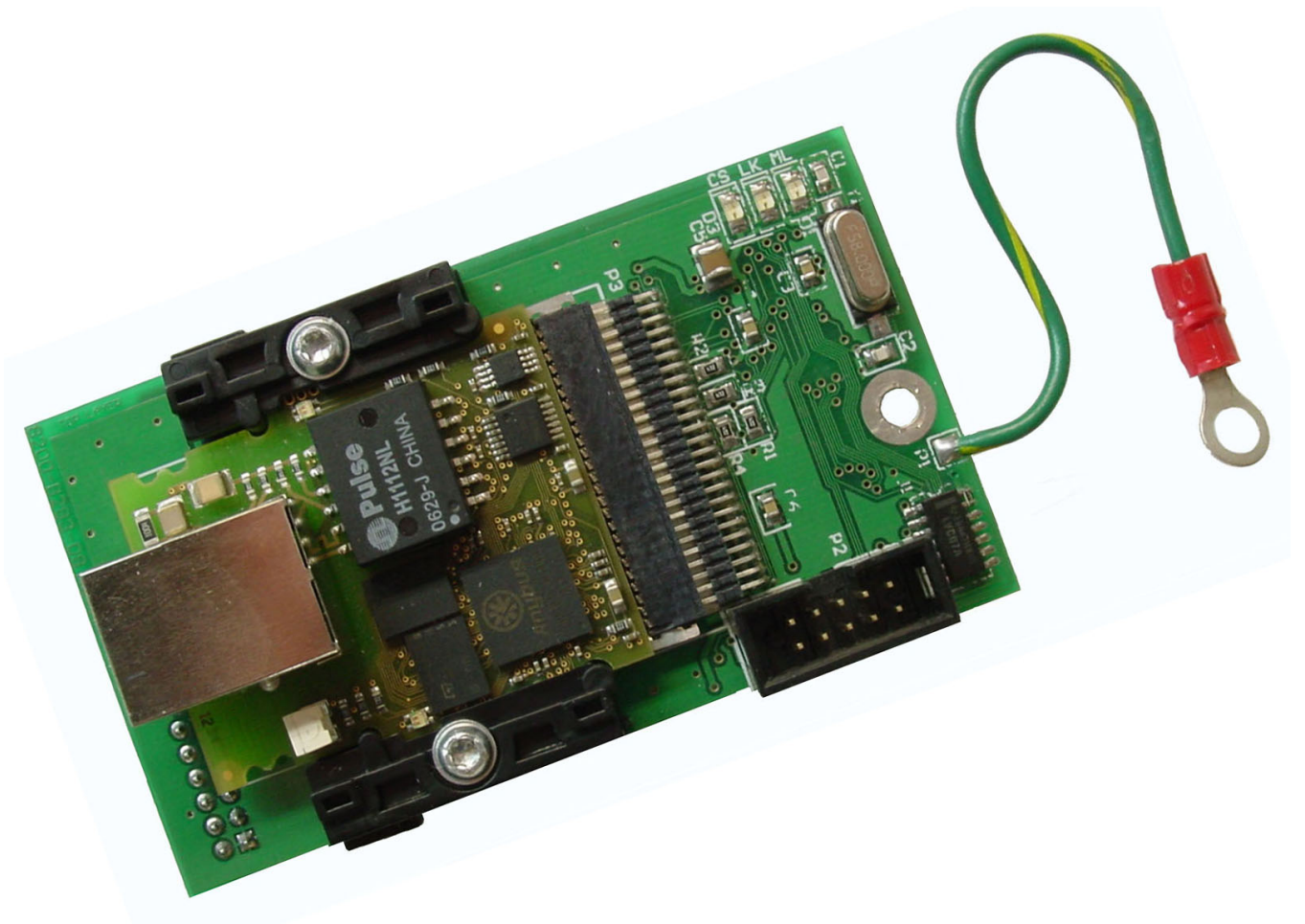




2XX-EIP
EtherNet/IP Interface Card
Installation and Setup Manual
For 205, 210, and 225 Weight Indicators



INTRODUCTION

The 2XX-EIP has been designed for the industrial environment where interfacing through an EtherNet IP network is desired. When coupled with a 205, 210, or 225 digital weight indicator, it can provide the weight reading and control of multiple scale commands. The interface card resides in the main enclosure of the indicator and has a 16-pin dual in-line connector to provide an easy connection to the indicator's internal hardware. A single RJ-45 connector is provided to connect to the EtherNet IP network. The 2XX-EIP supports 10/100 Mbit, full or half-duplex operation.

The purpose of this manual is to provide you with a guide through the installation and setup of the 2XX-EIP EtherNet/IP interface card. Please read it thoroughly before attempting to install it in your indicator and keep it available for future reference.

SPECIFICATIONS

- Temperature Range: 14° to 104° F (-10° to +40° C)
- Network Connections: (1) RJ-45 connector
- Diagnostics: Onboard LEDs CS (Chip Select), LK (Link), and ML (Main Line)




FCC COMPLIANCE STATEMENT

This equipment generates uses and can radiate radio frequency and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the user will be responsible to take whatever measures necessary to correct the interference.

You may find the booklet "How to Identify and Resolve Radio-TV Interference Problems" prepared by the Federal Communications Commission helpful. It is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 001-000-00315-4.

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While every precaution has been taken in the preparation of this manual, the Seller assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein. All instructions and diagrams have been checked for accuracy and ease of application; however, success and safety in working with tools depend to a great extent upon individual accuracy, skill, and caution. For this reason, the Seller is not able to guarantee the result of any procedure contained herein. Nor can they assume responsibility for any damage to property or injury to persons occasioned from the procedures. Persons engaging in the procedures do so entirely at their own risk.

PRECAUTIONS					
Before beginning installation of this option card, read this manual and pay special attention to all "WARNING" symbols:					
	IMPORTANT		ELECTRICAL WARNING		STATIC SENSITIVE

INSTALLATION

Mounting the 2XX-EIP Option Card

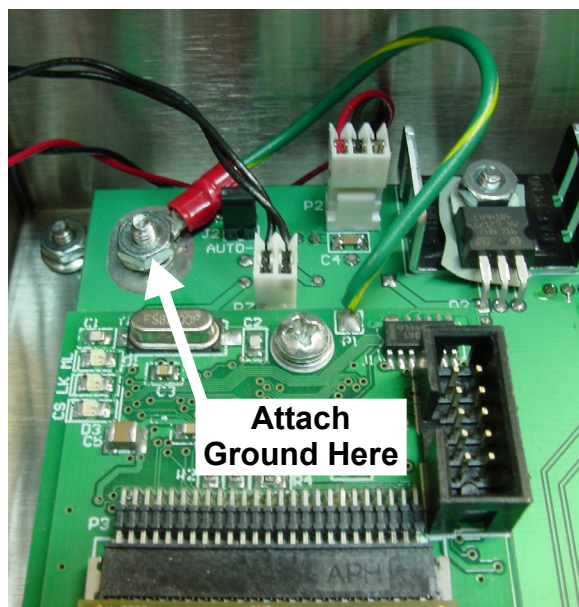
NOTE: Should your indicator come with the 2XX-EIP option card already installed, the following section describing mounting does not apply. Proceed to the **Node Address Setup** section.



CAUTION! This board contains static sensitive components. Improper handling can result in damage to or destruction of the components or board. Such actual and/or consequential damage IS NOT covered under warranty.

1. Make sure the power to the indicator is OFF. Unplug the AC power cord.
2. Loosen the gland connectors where the AC power cord and any other cables enter the indicator.
3. Remove the rear panel on the indicator.
 - On the 205/210, remove the 12 acorn nuts securing the rear panel to the front housing.
 - On the 225, remove the 14 acorn nuts securing the rear panel to the front housing.
4. Separate the rear panel from the front housing on the indicator.
5. Lift the panel from the main housing, taking care not to stretch the cable and wires between the panel and main housing. Lay the panel on the workbench next to the indicator.
6. Referring to the illustrations on page 3, locate the threaded stand-off and the OPTION BOARD connector on the indicator mainboard.
 - 205/210 – The threaded stand-off is below P3 and the OPTION BOARD connector is P10.
 - 225 – The threaded stand-off is near P9 and the OPTION BOARD connector is P15.
7. To install the option 2XX-EIP card, carefully align the connector P4 (pins on the bottom side of the 2XX-EIP board) with connector P10 on the 205/210 or P15 on the 225 mainboard and then apply even downward pressure to the end of the 2XX-EIP board (with P4 pins on the bottom side).
8. Align the hole in the 2XX-EIP board with the threaded stand-off on the indicator main board and using the lock washer and screw supplied with the 2XX-EIP board, secure the 2XX-EIP to the indicator mainboard.
9. To attach the ground wire:
 - On the 205/210, remove a 6-32 nut and washer from the threaded stud at the corner of the indicator mainboard.
 - On the 225, remove a 6-32 nut and washer from the threaded stud at the center of the indicator mainboard.
10. Connect the ground wire from the option card by placing the ring terminal over the 6-32 threaded stud.
11. Reinstall the washer and 6-32 nut and tighten.

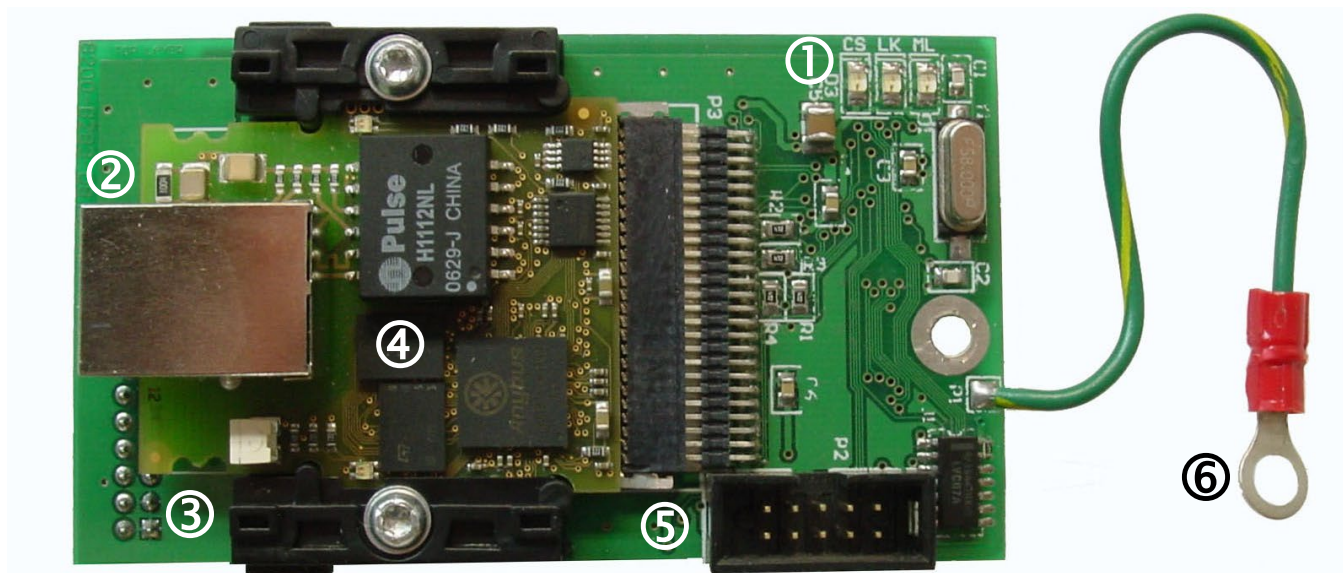
NOTE: The ground wire attachment example shown is on the 205/210 mainboard. The attachment for the 225 is similar.



INSTALLATION, CONT.

Ethernet Cable Installation

1. Loosen an unused cable gland connector for the cable.
2. Insert the Ethernet cable (CAT 5 or equivalent) through the gland connector and into the enclosure.
3. Consult your network administrator for the proper procedure to terminate the cable.
4. After the cable has been terminated, plug the cable into the RJ-45 jack on the 2XX-EIP.



Item #	Description	Item #	Description
1	Status LED's	4	EtherNet/IP Module
2	Ethernet Connector	5	P2 Expansion Connector
3	P4 Connector (pins on trace side of board)	6	Ground Wire

2XX-EIP Status LED'S

The 2XX-EIP EtherNet/IP Interface Card contains three LEDs to indicate the communication status with the indicator mainboard.

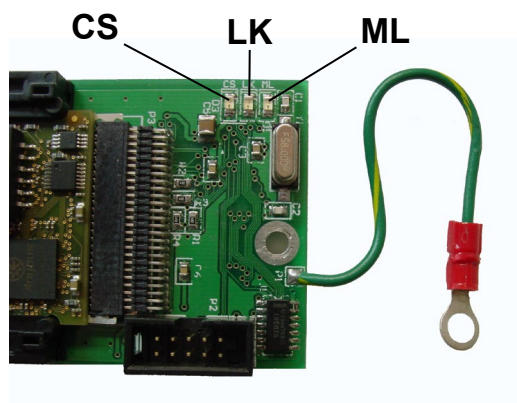
- CS, Chip Select
- LK, Link
- ML, Main Line

If the CS (Chip Select) LED is off, communications may have been lost between the EtherNet IP module and the indicator mainboard. Cycle power (press **ON/OFF** key twice) to re-establish communications.

The LK (Link) LED displays the communication status.

It will be on or flashing rapidly when communications between the 2XX-EIP and the EtherNet IP network are established.

The ML (Main Line) LED will be on to indicate the 2XX-EIP is powered up and running.



IMPORTANT: A load cell connection is required when testing the indicator. An ERR AL or ERR AH condition will cause the communications from the mainboard and the module to be very slow and will inhibit communications with the EtherNet/IP module.

RE-INSTALLING THE REAR PANEL

When the installation is complete:

1. Remove the excess cable from the indicator enclosure.
2. Make certain no cables or wires are exposed between the main housing and rear panel and then place the rear panel onto the main housing.
3. Secure the panel to the main housing with the acorn nuts (12 on the 205/210, 14 on the 225) removed earlier.
4. Tighten the gland connector nut to seal the cable.
 - Do not over-tighten the connector but make certain they are snug.
 - **DO NOT USE TOOLS!** Finger-tighten only!
 - Make sure any unused gland connectors are plugged.
5. If required, install the lead and wire calibration seal.

205/210 INDICATOR SETUP

With the 2XX-EIP option card installed, a sub-menu *Opt ion* (Option) has been placed after *LockOut* (Key Lock Out Function). The *Opt ion* sub-menu contains the setup selection to change the output weight byte order.

NOTE: The prompt will display as *Opt ion* when using the CAL switch and *Opt?* when using the **ENTER** key to advance through the setup prompts.

ord: (Output Weight Byte Order)

Press the **ENTER** key to show the current setting. If the setting displayed is acceptable, press the **ENTER** key again to save it. Otherwise, using the numeric keys (or the arrow keys on the 205) enter the new setting, then press the **ENTER** key to save it. Allowable values are:

1234* 4321 3412 2143

*Default setting.

225 INDICATOR SETUP

With the indicator ON, press the **SHIFT** key and then press the Navigation **ENTER** key (red square key in the center of the Navigation arrows). The display will change to show the SETUP/REVIEW MENU.

```
          SETUP/REVIEW MENU
1. ENTER CALIBRATION AND SETUP
2. VIEW AUDIT TRAIL COUNTERS
3. CALIBRATE SCALE 1   8. SCALE ID=00
                       9. DEL CUSTOM TICKET
                       10. PRINT SETUP
Enter Selection: 1  █EXIT
```

Press the **ENTER** key, and then press the **NEXT** Navigation arrow until SETUP MENU #3 is displayed.

225 INDICATOR SETUP, CONT.

```

          SETUP MENU #3
1. G/N ACCUMS=XXX      6. KEY LOCKOUT
2. BACK LITE= X        7. LRPort=COM3
3. PASSWORD
4. 2XX-EIP/MODBUSTCP
5. BADGE RDR          10. Send Grs En=XXX
Enter Selection: 0  ▣PREV ▣EXIT

```

With SETUP MENU #3 displayed, press the **4** key and then the **ENTER** key. The display will change to show the 2XX-EIP/MODBUSTCP SETUP MENU.

```

          2XX-EIP/MODBUSTCP SETUP MENU
5. BYTEORDER = XXXX
Enter Selection: 0  ▣EXIT

```

With 2XX-EIP/MODBUSTCP SETUP MENU displayed, the current setting for the **BYTEORDER =** parameter will be shown. Note that XXXX is the current setting for the byte order. If the setting displayed is acceptable, press the Navigation **EXIT** arrow until the indicator goes into the weight display mode.

Otherwise, press the **5** key, the **ENTER** key, and then using the numeric keys, enter the setting for the byte order. Press the **ENTER** key to save the new setting and return to the 2XX-EIP/MODBUSTCP SETUP MENU. Allowable values are:

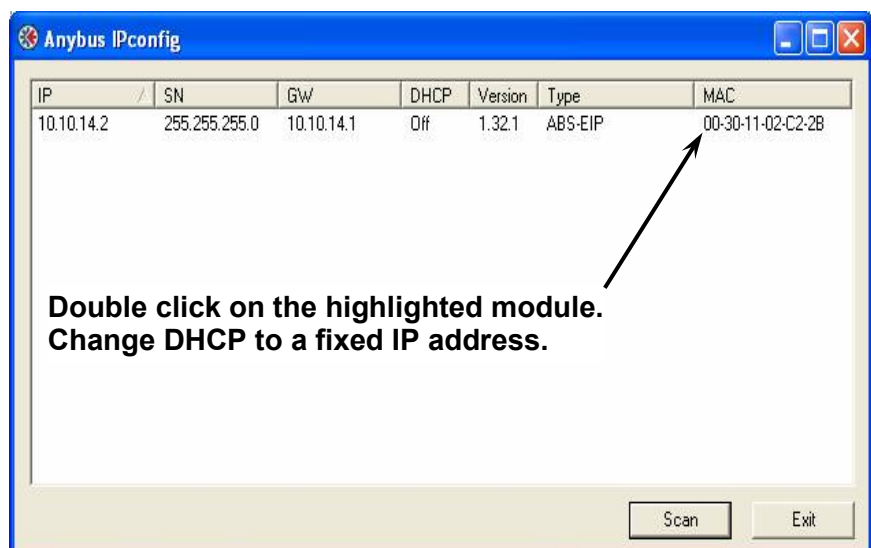
1234* 4321 3412 2143

*Default setting.

Press the Navigation **EXIT** arrow until the indicator goes into the weight display mode.

NODE ADDRESS SETUP

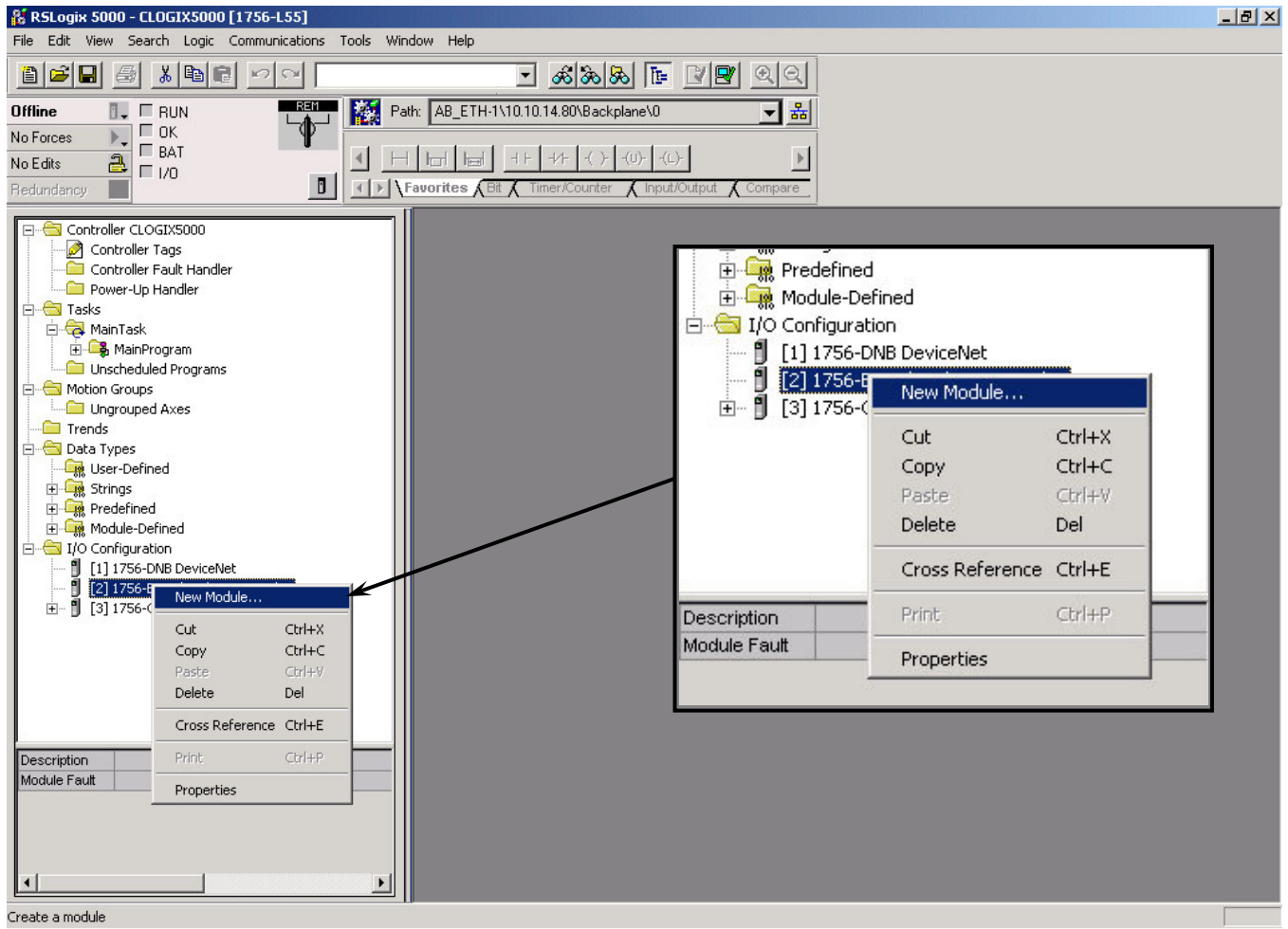
On an EtherNet/IP network, each node must be assigned its own unique TCP/IP address. The 2XX-EIP EtherNet IP interface card IP address is set using the Anybus IPconfig Tool Utility, available when logged into the dealer-protected software section of CardinalScale.com. Download the file from CardinalScale.com by navigating to 225 Navigator > Resource Type > Software > 2XX-EIP Anybus IPconfig Tool Utility.



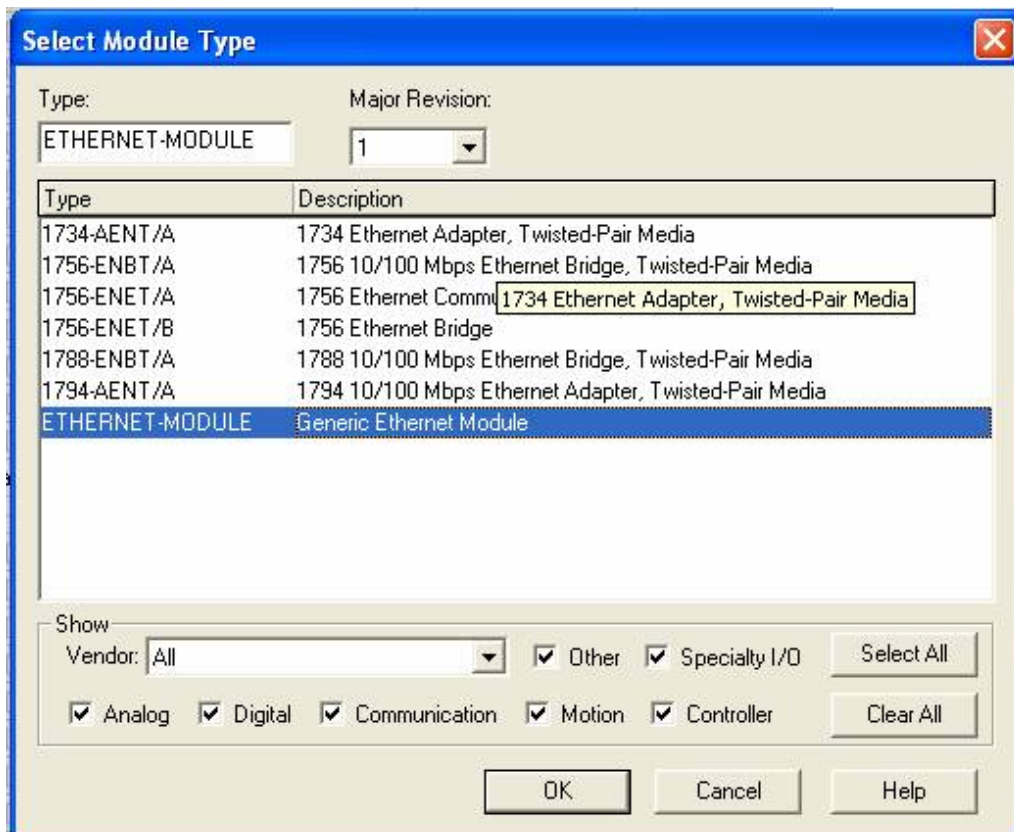
NOTE: EtherNet/IP makes use of TCP port number 44818 for explicit messaging and UDP port number 2222 for implicit messaging.

CONFIGURE THE PLC USING RSLogix5000

Either create a new project or use an existing one, set the program in “Offline” mode. Add the module to the configuration in the PLC. Start by right click the EtherNet/IP module/bridge in the I/O configuration, and select “New Module”.



Now a dialogue window will appear. In this dialogue window, select “Generic Ethernet module” and press OK.



CONFIGURE THE PLC USING RSLogix5000, CONT.

In the next dialogue window, RSLogix 5000 will ask for information regarding the communication to the module. First, enter a name for the module. This name will create a tag in RSLogix5000, which can be used to access the memory location in the PLCs memory where the data for the module will be stored. With the name entered, press Next.

Module Properties - Cardinal_Ethernet_Bridge (ETHERNET-MODULE 1.1)

Type: ETHERNET-MODULE Generic Ethernet Module
Vendor: Allen-Bradley
Parent: Cardinal_Ethernet_Bridge
Name: Cardinal_220
Description:
Comm Format: Data - SINT
Address / Host Name
 IP Address: 10 . 10 . 14 . 2
 Host Name:
Connection Parameters
Input: 100 8 (8-bit)
Output: 150 8 (8-bit)
Configuration: 1 0 (8-bit)
Status Input:
Status Output:
Cancel < Back Next > Finish >> Help

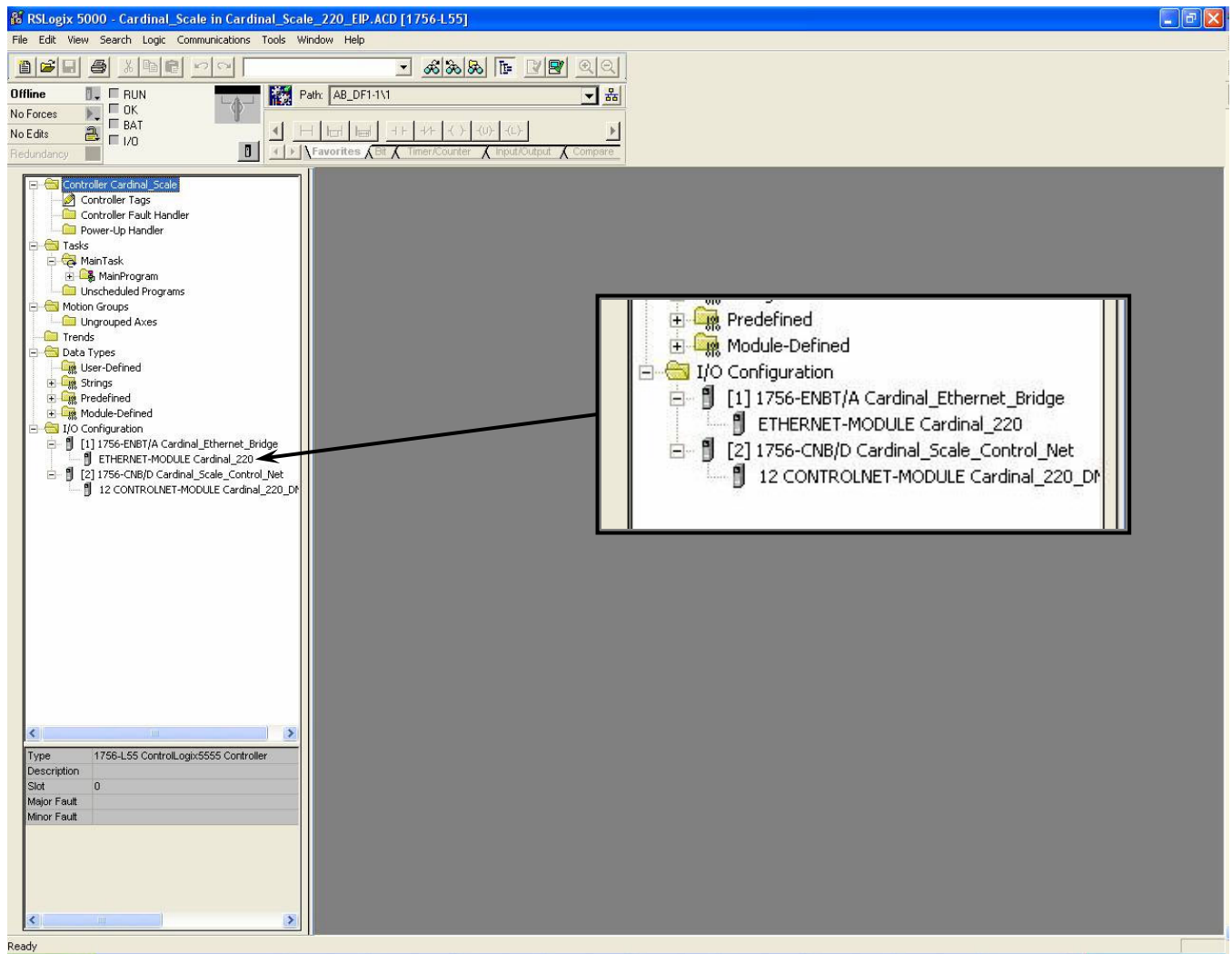
In the next dialogue box enter a value for the time between each scan of the module, called Request Packet Interval (RPI). Make sure that "Inhibit Module" isn't checked. After this, press Finish.

Module Properties - Cardinal_Ethernet_Bridge (ETHERNET-MODULE 1.1)

Requested Packet Interval (RPI): 50.0 ms (1.0 - 3200.0 ms)
 Inhibit Module
 Major Fault On Controller If Connection Fails While in Run Mode
Module Fault
Cancel < Back Next > Finish >> Help

CONFIGURE THE PLC USING RSLogix5000, CONT.

Now the module has been added to the I/O configuration in RSLogix5000. The main screen will look as follows.



Now go online and download the configuration to the PLC.

1. Select Go Online in the communication menu.
2. A new window will open.
3. Select download.
4. A new window will pop up with the question if you want to download the configuration.
5. Select "Download". The configuration will now be downloaded to the PLC.

Now it's possible to access the data exchanged by ControlLogix5000 and the module. To do this, open the "Controller Tags" window and go to monitor tags. Three tags named "Cardinal_2XX:C", "Cardinal_2XX:I", and "Cardinal_2XX:O" should be visible, representing the three instances configuration, input, and output. The configuration instance will be created even if we selected zero as its size. The Cardinal_2XX:I tag is data coming from the module and the Cardinal_2XX:O tag holds data going to the module.

CONFIGURE THE PLC USING RSLogix5000, CONT.

Tag Name	Value	Force Mask	Style	Type	Description
+ Cardinal_220:C	{...}	{...}		AB:ETHERNET_...	Weight
- Cardinal_220:I	{...}	{...}		AB:ETHERNET_...	
- Cardinal_220:I.Data	{...}	{...}	Decimal	SINT[8]	Weight Status
+ Cardinal_220:I.Data[0]	16#44		Hex	SINT	PWC Status
+ Cardinal_220:I.Data[1]	16#95		Hex	SINT	
+ Cardinal_220:I.Data[2]	16#a0		Hex	SINT	
+ Cardinal_220:I.Data[3]	16#00		Hex	SINT	
+ Cardinal_220:I.Data[4]	2#0000_0000		Binary	SINT	CMD 0 return when complete
+ Cardinal_220:I.Data[5]	2#0000_0000		Binary	SINT	CMD 1 return when complete
+ Cardinal_220:I.Data[6]	0		Decimal	SINT	
+ Cardinal_220:I.Data[7]	0		Decimal	SINT	
- Cardinal_220:O	{...}	{...}		AB:ETHERNET_...	
- Cardinal_220:O.Data	{...}	{...}	Decimal	SINT[8]	CMD 0
+ Cardinal_220:O.Data[0]	2#0000_0000		Binary	SINT	CMD 1
+ Cardinal_220:O.Data[1]	2#0000_0000		Binary	SINT	
+ Cardinal_220:O.Data[2]	0		Decimal	SINT	N/A
+ Cardinal_220:O.Data[3]	0		Decimal	SINT	
+ Cardinal_220:O.Data[4]	16#46		Hex	SINT	Float Byte 0
+ Cardinal_220:O.Data[5]	16#ea		Hex	SINT	Float Byte 1
+ Cardinal_220:O.Data[6]	16#60		Hex	SINT	Float Byte 2
+ Cardinal_220:O.Data[7]	16#00		Hex	SINT	Float Byte 3

Input

The weight data begins at Data[0] and uses the next four bytes to produce a floating-point program tag.

Float = (Data[0], Data[1], Data[2], Data[3])

WEIGHT_220	2000.0	Float	REAL
------------	--------	-------	------

205/210 COMMUNICATIONS

Data Sent from the 205/210 Indicator to the PLC

Byte0	Float point weight. Byte 0	Float point weight. Byte 1	Byte1
Byte2	Float point weight. Byte 2	Float point weight. Byte 3	Byte3
Byte4	Weight status. See bit definitions below	PWC status. Bit0 = PWC1... 1=on	Byte5
Byte6	Cmd0. Returned by the 205/210 indicator when complete	Cmd1. Returned by the 205/210 indicator when complete	Byte7

Data Sent from the PLC to the 205/210 Indicator

Byte0	Cmd0. See definition below	Cmd1. See definition below	Byte1
Byte2	N/A	N/A	Byte3
Byte4	Float point value for Cmd. Byte 0	Float point value for Cmd. Byte 1	Byte5
Byte6	Float point value for Cmd. Byte 2	Float point value for Cmd. Byte 3	Byte7

205/210 WEIGHT STATUS (Data[4])

- Bit0 MOTION
- Bit1 BELOW ZERO
- Bit2 CENTER OF ZERO
- Bit3 OVER CAPACITY
- Bit4 WEIGH UNITS 0=unit1 (lb)/1=unit2 (kg)
- Bit5 WEIGH MODE 0=Gross/1=Net
- Bit6 Not defined
- Bit7 Scale Error. The indicator has failed to communicate for at least 3 seconds, data is invalid.

205/210 PWC STATUS (Data[5])

NOTE: The following status section applies only if the PWC has been enabled. Refer to the Technical and Installation manual of your indicator for instructions on enabling and using the PWC feature.

- Bit0 PWC1 – 0=off/1=on
- Bit1 PWC2 – 0=off/1=on
- Bit2 PWC3 – 0=off/1=on
- Bit3 PWC4 – 0=off/1=on
- Bit4 PWC5 – 0=off/1=on
- Bit5 PWC6 – 0=off/1=on
- Bit6 PWC7 – 0=off/1=on
- Bit7 PWC8 – 0=off/1=on

205/210 COMMANDS

CMD0 and CMD1 combined to make the command word. Command words are broken into command bits for PLC ease of programming. To invoke a command set the bit to one. The PLC should continue to send a command until the command is returned by the indicator. If the indicator cannot perform a command the returned command will include Bit7.

Bit00 GROSS/NET

Bit01 PRINT

Bit02 ZERO

Bit03 PB TARE

Bit04 KB TARE requires float point value be sent in Bytes 4, 5, 6, and 7

Bit05 not defined

Bit06 not defined

Bit07 This bit is the error bit from the 2XX when a command fails.

Bit08 PWC1 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit09 PWC2 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit10 PWC3 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit11 PWC4 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit12 PWC5 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit13 PWC6 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit14 PWC7 requires float point value be sent in Bytes 4, 5, 6, and 7

Bit15 PWC8 requires float point value be sent in Bytes 4, 5, 6, and 7

225 COMMUNICATIONS

Data Sent from the 225 Indicator to the PLC

Byte0	Float point weight. Byte 0	Float point weight. Byte 1	Byte1
Byte2	Float point weight. Byte 2	Float point weight. Byte 3	Byte3
Byte4	Weight status. See bit definitions below	Scale Number (Bits 4-7)	Byte5
Byte6	Cmd0. Returned by 225 Indicator when complete	Cmd1. Returned by 225 Indicator when complete	Byte7

Data Sent from the PLC to the 225 Indicator:

Byte0	Cmd0. See definition below	Cmd1. See definition below	Byte1
Byte2	N/A	N/A	Byte3
Byte4	Float point value for Cmd. Byte 0	Float point value for Cmd. Byte 1	Byte5
Byte6	Float point value for Cmd. Byte 2	Float point value for Cmd. Byte 3	Byte7

225 COMMANDS

CMD0 and CMD1 are combined to make the command word. Command words are broken into command bits for PLC ease of programming. To invoke a command, set the bit to one. The PLC should continue to send a command until the command is returned by the indicator. If the indicator cannot perform a command, the returned command will include bit 7. The scale number is encoded as a four-bit binary number, 1 through the number of scales available.



NOTE: ALL COMMAND BITS SHOULD BE RELEASED AFTER THEY ARE PROCESSED BY THE INDICATOR.

- Bit0 Gross/Net
- Bit1 Print
- Bit2 Zero
- Bit3 PB Tare
- Bit4 KB Tare, requires float point value be sent in bytes 4, 5, 6, and 7
- Bit5-6 not defined
- Bit7 This bit is the error bit from the 225 when a command fails.
- Bit8-11 not defined
- Bit12 Select scale number, bit 0 (least significant)
- Bit13 Select scale number, bit 1
- Bit14 Select scale number, bit 2
- Bit15 Select scale number, bit 3 (most significant)

225 SCALE NUMBER

The scale number is encoded as a four-bit binary number, 1 through the number of scales available. For example, Scale #1 (00010000), Scale #2 (00100000), Scale #3 (00110000), and Total scale (01000000).

- Bit0 (not used)
- Bit1 (not used)
- Bit2 (not used)
- Bit3 (not used)
- Bit4 Select scale number, bit 0 (least significant)
- Bit5 Select scale number, bit 1
- Bit6 Select scale number, bit 2
- Bit7 Select scale number, bit 3 (most significant)

225 WEIGHT STATUS

- Bit0 Motion
- Bit1 Below Zero
- Bit2 Center of Zero
- Bit3 Over Capacity
- Bit4 Weigh Units 0=unit 1 (PRIMARY UNITS), 1=unit 2 (ALTERNATE UNITS)
- Bit5 Weigh Mode 0=Gross, 1=Net
- Bit6 Not Defined
- Bit7 Error. Data is invalid.

225 FLOATING POINT WEIGHT DATA

Example for weight data 5000 = Floating-point 459C4000h

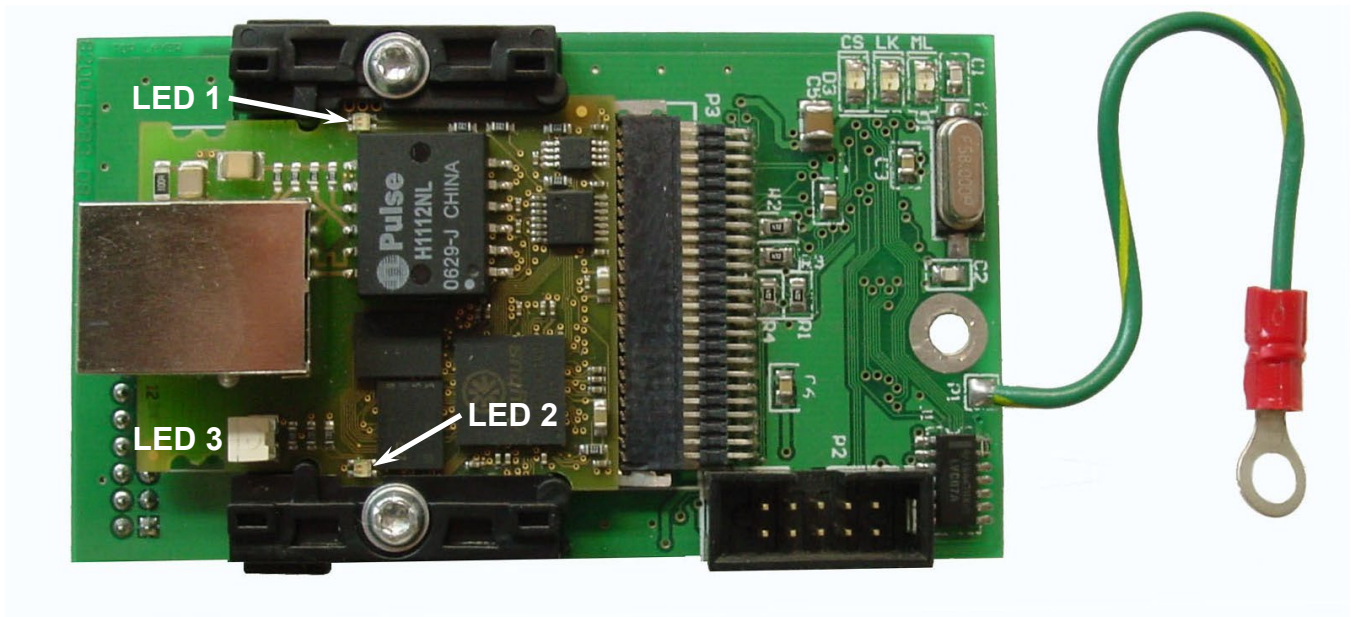
- Byte0 45h
- Byte1 9Ch
- Byte2 40h
- Byte3 00h

Some PLCs may require Byte 1 and Byte 0 to be swapped to be compatible with the Allen-Bradley floating-point data format.

TROUBLESHOOTING

EtherNet/IP Module Status LEDs

The EtherNet/IP Module has three LEDs to indicate run time status and errors to the user. During power up, a LED test sequence is performed according to the EtherNet/IP specification.



Keep the enclosure back panel off during the configuration of the device so you can see the EtherNet IP module status LEDs.

LED #	INDICATION	STATE	DESCRIPTION
1	Network Status	Off	No power or no IP address
		Green	On-line, one or more connections established (CIP Class 1 or 3)
		Green, Flashing	On-line, no connections established
		Red	Duplicate IP address, FATAL error
		Red, Flashing	One or more connections timed out (CIP Class 1 or 3)
2	Module Status	Off	No power
		Green	Controlled by a Scanner in Run state
		Green, Flashing	Not configured, or Scanner in Idle state
		Red	Major fault (EXCEPTION-state, FATAL error, etc.)
		Red, Flashing	Recoverable fault(s)
3	Link/Activity	Off	No link, no activity
		Green	Link established
		Green, flickering	Activity

STATEMENT OF LIMITED WARRANTY

WARRANTY TERMS

Cardinal Scale Manufacturing Company warrants the equipment we manufacture against defects in material and workmanship. The length and terms and conditions of these warranties vary with the type of product and are summarized below:

PRODUCT TYPE	TERM	MATERIAL AND WORKMANSHIP	LIGHTNING DAMAGE See note 9	WATER DAMAGE See note 7	CORROSION See note 4	ON-SITE LABOR	LIMITATIONS AND REQUIREMENTS
WEIGHT INDICATORS	90 DAY REPLACEMENT ----- 1 YEAR PARTS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
LOAD CELLS (Excluding Hydraulic)	1 YEAR	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
HYDRAULIC LOAD CELLS (When purchased with Guardian Vehicle Scale)	LIFE	YES	YES	YES	YES	90 DAYS	1, 5, 6, 8 A, B, C, D
HYDRAULIC LOAD CELLS (When purchased separately)	10 YEARS	YES	YES	YES	YES	NO	1, 5, 6, 8, 9 A, B, C, D
VEHICLE SCALE (Deck and Below Excl. PSC Series)	5 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6 A, B, C, D, E
PSC and LSC SCALE STRUCTURES (Deck and Below)	3 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6, 11 A, B, C, D
GUARDIAN FLOOR SCALES	10 YEARS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6, 9, 10 A, B, C, D
ALL OTHER CARDINAL PRODUCTS	1 YEAR	YES	YES	YES	YES	NO	1, 2, 5, 6 A, B, C, D, E
REPLACEMENT PARTS	90 DAYS	YES	YES	YES	YES	NO	1, 2, 4, 5, 6 A, B, C, D
IN-MOTION VEHICLE SCALES	1 YEAR	YES	YES	YES	YES	90 DAYS	1, 2, 5, 6 A, B, C, D
SOFTWARE	90 DAYS	YES	N/A	N/A	N/A	NO	1, 6 B, C, D



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Webb City, MO 64870

06/13
Printed in USA
315-WARRANTY-CAR-K

APPLICABLE LIMITATIONS AND REQUIREMENTS

1. This warranty applies only to the original purchaser. The warranty does not apply to equipment that has been tampered with, defaced, damaged, or had repairs or modifications not authorized by Cardinal or has had the serial number altered, defaced or removed.
2. This warranty is not applicable to equipment that has not been grounded in accordance with Cardinal's recommendations.
3. This equipment must be installed and continuously maintained by an authorized Cardinal dealer.
4. Applies only to components constructed from stainless steel.
5. This warranty does not apply to equipment damaged in transit. Claims for such damage must be made with the responsible freight carrier in accordance with freight carrier regulations.
6. Warranty term begins with date of shipment from Cardinal.
7. Only if device is rated NEMA 4 or better or IP equivalent.
8. Lifetime warranty applies to damages resulting from water, lightning, and voltage transients and applies only to the hydraulic load cell structure itself (does not include pressure transducers, rubber seals, o-rings, and associated wiring).
9. 10 Year prorated warranty on hydraulic load cells.
10. 1 Year warranty for scale structure.
11. PSC models' warranty coverage applies only to agricultural installations on farms up to 3,000 acres (LSC models not limited in this manner).
12. Load cell kits MUST be installed in accordance with Cardinal Scale instructions. Failure to follow these instructions will void the warranty.

EXCLUSIONS

- A.) This warranty does not include replacement of consumable or expendable parts. The warranty does not apply to any item that has been damaged due to unusual wear, abuse, improper line voltage, overloading, theft, fire, water, prolonged storage or exposure while in purchaser's possession or acts of God unless otherwise stated herein.
- B.) This warranty does not apply to peripheral equipment not manufactured by Cardinal. This equipment will normally be covered by the equipment manufacturer's warranty.
- C.) This warranty sets forth the extent of our liability for breach of any warranty or deficiency in connection with the sale or use of our product. Cardinal will not be liable for consequential damages of any nature, including but not limited to loss of profit, delays or expenses, whether based on tort or contract. Cardinal reserves the right to incorporate improvements in material and design without notice and is not obligated to incorporate said improvements in equipment previously manufactured.
- D.) This warranty is in lieu of all other warranties expressed or implied including any warranty that extends beyond the description of the product including any warranty of merchantability or fitness for a particular purpose. This warranty covers only those Cardinal products installed in the forty-eight contiguous United States and Canada.
- E.) This warranty does not cover paint coatings due to the variety of environmental conditions.
- F.) Do not cut load cell cables on load cells returned for credit or warranty replacement. Cutting the cable will void the warranty.
- G.) Software is warranted only for performance of the functions listed in the software manual and/or the Cardinal proposal.
- H.) The software warranty does not cover hardware. Warranties on hardware are provided from the hardware vendor only.
- I.) The software warranty does not cover interfacing issues to non-Cardinal supplied hardware.
- J.) The software warranty does not include automatic software upgrades unless purchased separately.



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