



CARDINAL®

**225-iCAN
SYSTEM
Installation and
Technical Manual**

TABLE OF CONTENTS

INTRODUCTION	Page 1
SPECIFICATIONS	Page 2
MODEL NUMBER DESCRIPTION	Page 3
INSTALLATION	Page 4
Mounting the Junction Boxes	Page 5
Mounting Hole Dimensions	Page 6
Connecting the Junction Boxes	Page 7
Connection of Load Cells	Page 8
Load Cell Cable Preparation	Page 9
Load Cell Cable Shield Wire Connection	Page 12
Connection of Power	Page 13
Test The Load Cell Connections	Page 14
Fiber Optic Cable Installation	Page 15
Single Junction Box System	Page 18
Multiple Junction Box System	Page 20
Final Checks	Page 23
Installation of 225 Indicator	Page 25
CALIBRATION AND SETUP	Page 30
SMARTCAL	Page 37
CELL OUTPUT	Page 39
DUAL POINT	Page 42
225 MULTI-SCALE OPERATION	Page 43
iCAN INTERFACE CARD	Page 45
INSTALLATION OF CALIBRATION SECURITY SEAL	Page 47
iCAN JUNCTION BOX CONTROLLER (JBC) BOARD	Page 48
225-iCAN ERROR MESSAGES	Page 53
Messages at Start-up	Page 53
Multi-Scale Display Errors	Page 56
225 Weight Display Status Messages	Page 57
SYSTEM DIAGNOSTICS	Page 59
Diagnostic Error Messages	Page 63
8 CELL INTERCONNECTION DIAGRAMS	Page 64
10 CELL INTERCONNECTION DIAGRAMS	Page 66
PART IDENTIFICATION	Page 68
APPENDIX A – iSITE OPTION	Page 73
APPENDIX B – Replacing the 225-iCAN Junction Box Controller Board	Page 85
APPENDIX C – Replacing the 225-iCAN Interface Card (225CANP/G)	Page 87

SERIAL NUMBER _____
DATE OF PURCHASE _____
PURCHASED FROM _____

RETAIN THIS INFORMATION FOR FUTURE USE

PRECAUTIONS

Before using this instrument, read this manual and pay special attention to all "WARNING" symbols:

	IMPORTANT		ELECTRICAL WARNING		STATIC SENSITIVE
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STATIC ELECTRICITY PRECAUTION



CAUTION! This device contains static sensitive circuit cards and components. Improper handling of these devices or printed circuit cards can result in damage to or destruction of the component or card. Such actual and/or consequential damage IS NOT covered under warranty and is the responsibility of the device owner. Electronic components must be handled only by qualified electronic technicians who follow the guidelines listed below:



ALWAYS handle printed circuit card assemblies by the outermost edges. NEVER touch the components, component leads or connectors.

ALWAYS observe warning labels on static protective bags and packaging and NEVER remove the card or component from the packaging until ready for use.

ALWAYS store and transport electronic printed circuit cards and components in anti-static protective bags or packaging.



ATTENTION! ALWAYS use a properly grounded wrist strap when handling, removing or installing electronic circuit cards or components. Make certain that the wrist strap ground lead is securely attached to an adequate ground. If you are uncertain of the quality of the ground, you should consult a licensed electrician.

FCC COMPLIANCE STATEMENT

WARNING! 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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INTRODUCTION

Thank you for purchasing the Cardinal 225-iCAN System. The 225-iCAN system is a digitally controlled weighing and diagnostic scale environment where everything from installation to maintenance is enhanced, monitored, and simplified by state-of-the-art digital electronics including state-of-the-art ISP flash microcontrollers and advanced internationally standardized CAN serial bus.



The 225-iCAN system can be configured with 2-32 load cells for 1-3 scales with Total. The 225-iCAN system consists of one to four eight-cell ICANXG/P Junction Box Controller modules connected via the CAN serial bus to a 225CAN Interface Card in the Cardinal 225 Digital Weight Indicator. The eight-cell Module performs the analog-to-digital conversion of each of eight analog strain-gage load cells, the mathematical computation of load cell and scale data, and the transmission of data to the 225CAN Interface Card in the 225 Indicator. Additional 225-iCAN Junction Boxes may be used when there are more than eight load cells in the system. The SMARTCAL® feature allows quick calibration with no manual adjustments while the diagnostic software identifies real and potential system problems.

The 225-ICAN System indicator and ICANXG/P Junction Box Controller are housed in a IP66/NEMA 4X rated junction box enclosure with plastic or glass fiber optic cable or twisted-pair copper wire interconnection.

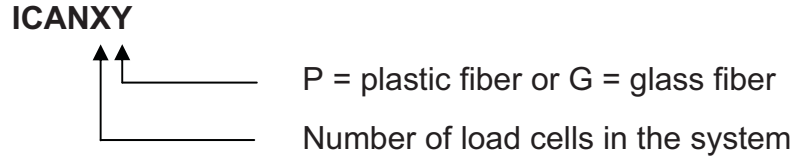
This manual describes the installation, setup, and calibration of the 225-iCAN System. Please make sure that you read this manual in its entirety before beginning the installation or attempting to operate the 225-iCAN System. Also, make certain that you pay attention to the warnings that appear in this manual. Failure to read and follow these instructions and warnings may result in damage to the scale and/or bodily injury. Please keep this manual handy for future reference.

SPECIFICATIONS

Power Requirements	115 to 230 VAC 50/60 Hz at 2 amperes per junction box
Temperature Range	-13 to 104 °F (-25 to +40 °C)
(Compensated)	
Junction Box Connections	2 AC power, 8 load cell inputs, 2 fiber optic or copper wire
Junction Box Dimensions	17" W x 9 1/2" D x 3 3/8" H (432mm x 241mm x 88mm)
Sample Rate	1 to 50 samples per second, selectable
Load Cells	Up to eight 350 ohm strain gage load cells per box
Load Cell / Scale Capacity ...	Thirty-two 350 ohm load cells with up to 8 scales per box
Excitation Voltage	12 VDC
Sensitivity:	
NON-COMMERCIAL	0.15 uV/e
NTEP	0.3uV/e (Class III/IIIL)
CANADA	0.3uV/e (Class III/IIIHD)
Scale Divisions:	
NON-COMMERCIAL	100 to 240,000
NTEP	100 to 10,000 (Class III/IIIL)
CANADA	100 to 10,000 (Class III/IIIHD)
Internal Resolution	1 part in 16,777,216
Transmission Distance	Up to 300 feet (30 foot minimum), plastic optical fiber (1 mm diameter Duplex Zipcord Plastic Optical Fiber (POF) Cable, Avago # HFBR-RUDXXX or equivalent) Up to 3,000 feet, glass optical fiber (50/125 μm, 62.5/125 μm, 100/140 μm, or 200 μm HCS® Multimode Fiber Optic Cable w/ ST connectors) Up to 1,000 feet, copper wire

MODEL NUMBER DESCRIPTION

The iCAN model number identifies the number of load cell inputs and type of optical fiber for which the system is configured. Refer to the diagram below to confirm that the junction box (es) you have received are appropriate for your specific application:



ICAN MODEL	J-BOX #1 MODEL	J-BOX #2 MODEL	J-BOX #3 MODEL	TWO 8-CELL PULL BOXES 3502-D429-0A
ICAN4P	ICAN4P	N/A	N/A	N/A
ICAN6P	ICAN6P	N/A	N/A	N/A
ICAN8P	ICAN8P	N/A	N/A	1
ICAN10P	ICAN6P	ICAN4P	N/A	N/A
ICAN12P	ICAN6P	ICAN6P	N/A	N/A
ICAN14P	ICAN6P	ICAN8P	N/A	1
ICAN16P	ICAN8P	ICAN6P	N/A	2
ICAN18P	ICAN6P	ICAN6P	ICAN6P	N/A
ICAN20P	ICAN6P	ICAN6P	ICAN8P	1
ICAN4G	ICAN4G	N/A	N/A	N/A
ICAN6G	ICAN6G	N/A	N/A	N/A
ICAN8G	ICAN8G	N/A	N/A	1
ICAN10G	ICAN6G	ICAN4G	N/A	N/A
ICAN12G	ICAN6G	ICAN6G	N/A	N/A
ICAN14G	ICAN6G	ICAN8G	N/A	1
ICAN16G	ICAN8G	ICAN8G	N/A	2
ICAN18G	ICAN6G	ICAN6G	ICAN6G	N/A
ICAN20G	ICAN6G	ICAN6G	ICAN8G	1

N/A = Not Applicable

NOTES!

- Combinations of the three POF (Plastic Optic Fiber) J-BOX versions and three GOF (Glass Optic Fiber) versions will accommodate all the above configurations.
- All POF and GOF ICANXG/P Junction Box Controller boards will be the same with only one fiber optic CAN port, to be used between the 225CAN interface board and the iCAN junction box controller, and one copper wire CAN port, to be used between iCAN junction box controllers.
- The CAN bus connection between J-Box's will be a three conductor copper wire shielded cable.

INSTALLATION

Before beginning the installation of the 225-iCAN Junction Box System, make certain that you have all of the necessary material needed to perform the installation. Verify that you have received the following items before attempting the installation:

<p>ICANXY Junction Box(es) (SEE Table on previous page)</p>	<p>Up to 8 cells, one ICANXY junction box (6 cells) and one 8 cell pull box for 7th and 8th cell. 10 to 16 cells, two ICANXY boxes are required. 18 to 24 cells, three ICANXY boxes are required. .</p> <p>Verify that all boxes are configured for the correct type of fiber (plastic or glass) and the proper number of load cells.</p>
<p>6610-2003 (for ICANXP) 6980-2004 (for ICANXP)</p> <p>SUPPLIED BY USER (for ICANXG)</p>	<p>Plastic optical fiber connector (4ea required)</p> <p>Plastic optical fiber cable (30' min – 300' max length) This is the duplex (two fibers) fiber optic cable that attaches the first junction box to the weight-indicating instrument.</p> <p>Glass optical fiber cable (greater than 300')</p> <p>Make certain that your cable matches the type of junction box interface (plastic or glass) and is of the correct length. See Fiber Optic Cable Installation section of this manual.</p>
<p>6980-0093</p>	<p>CAN Bus Interconnection Cable</p> <p>This is the 3-conductor 22GA shielded cable used to connect the 225-iCAN junction boxes together (if there's more than one box).</p>
<p>3502-C008</p>	<p>Grounding kit including ground rods, interconnecting cable and clamps.</p>
<p>225ICANG/P</p> <p>225CANP</p> <p>225CANG</p>	<p>Weight indicating instrument with CAN interface card. NOTE! Your instrument may have additional option cards depending on your specific application.</p> <p>Plastic Optic Fiber CAN Interface Card</p> <p>Glass Optic Fiber CAN Interface Card</p>
<p>6770-9009</p>	<p>Polishing kit for plastic optical fiber cable</p>
<p>6980-1029</p>	<p>Pull Box to Junction Box Interconnection Cable</p> <p>This is the 4-conductor 20GA shielded cable used to connect the pull box (for the 7th and 8th load cell) to the 225-iCAN junction box.</p>

INSTALLATION, CONT.

The following items may be required but are not provided by Cardinal Scale as a standard component of the 225-iCAN Junction Box System package:

- Wire and/or conduit needed to provide a source of AC power to the first 225-iCAN junction box (this is typically 18 to 20 AWG stranded wire, 3 conductor – refer to color code table below).
- Wire needed to feed AC power from the first 225-iCAN Junction Box to other 225-iCAN Junction Boxes, if a second, third or fourth junction box is required. (This is typically 18 to 20 AWG stranded wire, 3 conductor – refer to color code table below).
- Tools required for the installation.

AC WIRING COLOR CODE TABLE

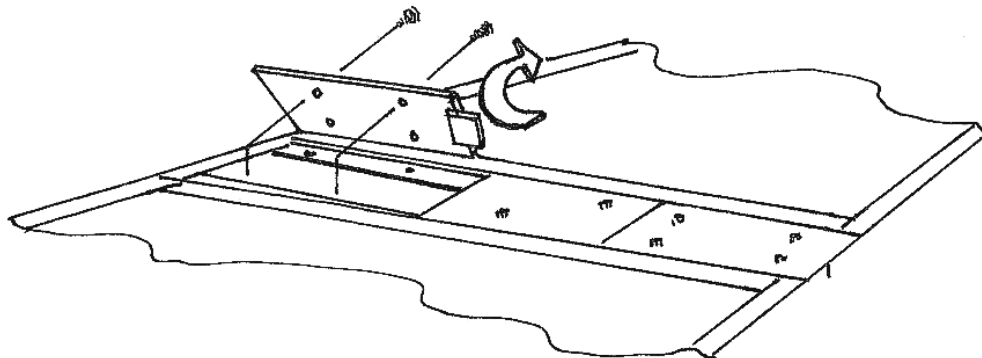
Function	U.S. Code	International Code
L1 (H) - <i>Hot</i>	Black	Brown
L2 (N) - <i>Neutral</i>	White	Blue
GND - <i>Ground</i>	Green	Green/Yellow

MOUNTING THE JUNCTION BOXES

The Cardinal 225-iCAN Junction Box System may not only be used on Cardinal vehicle scales but may also be used on other brands of scales provided that they use standard analog strain gage load cells. The following instructions describe installation on Cardinal scales and for other scales.

CARDINAL PRC AND EPR SERIES VEHICLE SCALES

When the 225-iCAN Junction Box System is used with a Cardinal PRC or EPR series vehicle scale, the junction boxes are mounted in the same locations as the standard load cell junction boxes. Access to the first junction box location is gained by removing the top cover between the first and second scale modules. The cover is composed of three separate covers. Remove the two outer covers by loosening and removing the retaining bolts, lifting upward on the cover and sliding it back from the opening. Once one or both of the outer covers have been removed, the center cover can be removed. Set the covers aside in a safe place.



**FIGURE NO. 1
REMOVAL OF COVER PLATES**

INSTALLATION, CONT.

OTHER SCALE MODELS

If you are installing the 225-iCAN Junction Box System on a scale manufactured by a company other than Cardinal Scale, the installation is essentially the same as for a Cardinal model. There are, however, a few things to consider when making such an installation. First, make certain that the scale is in good mechanical condition and that all of the load cells are working properly. The 225-iCAN Junction Box System cannot compensate for existing mechanical problems in the scale. Check to make certain that the restraint system is working and properly adjusted. Also, check the scale grounding system to ensure that it is properly installed and that the connections are clean and electrically sound.

Once you have verified that the scale is in good working condition, it is time to determine where and how the junction boxes will be attached to the scale. Note that the junction box is provided with a mounting strap with a 5/16" hole at each end, which may be used to attach the junction box to the side or bottom of the scale weighbridge. Make certain that the location selected for the junction boxes does not place it a position where it may be damaged by a vehicle tire or causes a safety hazard. When selecting a position for the box, remember that a source of AC power must be provided and that suitable protection for the load cell and fiber optic cables must be provided. After selecting the mounting location for each box, place the box near that location in preparation for making the wiring interconnections. Although you can mount the boxes before making the connections, it may be easier to make the connections first then mount the box depending on the characteristics of the installation.

MOUNTING HOLE DIMENSIONS

Carefully layout the mounting hole locations, then drill and install the bolts. Attach the junction box to the scale and securely tighten the retaining bolts.

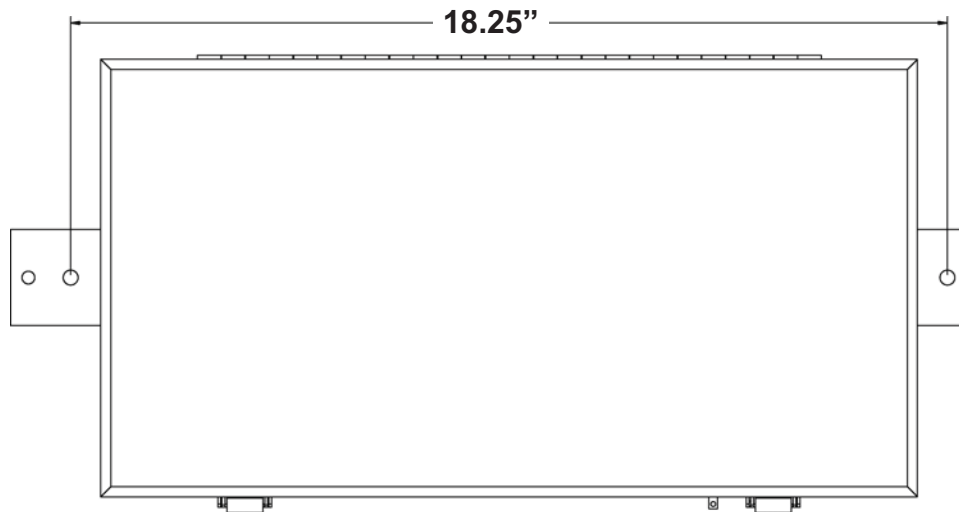


FIGURE NO. 2
MOUNTING HOLE DIMENSIONS

INSTALLATION, CONT.

CONNECTING THE JUNCTION BOXES

Although the junction boxes can be mounted to the junction box rails at this time, it will be much easier to do the wiring while the junction box is outside the scale. Determine the location for each junction box (if there's more than one) and place the junction box adjacent to the opening between the scale modules. Note that any junction box can be used in any position but that generally, the first junction box has a full complement of load cell cards.

Route the load cell cable from each load cell to the mounting location of the junction box then through the opening to the top of the scale platform. Note that the load cell cables should be routed through the protective tubing on the sides of the weighbridge. Repeat this procedure until each load cell cable has been properly routed to the junction box. Excess load cell cable should be wound up and properly secured beneath the scale platform (outside of the junction box). **NOTE!** Cardinal Scale Mfg. Co. does not recommend cutting the load cell cable.

Next, after making absolutely certain that the power has been turned off, route the power wires from the AC power source to the first junction box. If there is more than one junction box, route additional power cables between the boxes. Note that a ground fault circuit breaker (GFIC) must be installed in the AC power source.

Next, route the fiber optic cable between the first junction box and the 225 indicator. Make certain that the fiber optic cable used matches the fiber type indicated in the junction box model number. **NOTE!** You cannot use glass fiber on junction boxes configured for plastic fiber and vice versa. Refer to the following precautions for handling fiber optic cable.

- Care must be exercised when handling fiber optic cable to ensure that the cable is not damaged. Do not make sharp bends in the cable (this causes fractures in the plastic or glass core preventing the cable from transmitting data.) Do not bend the cable in anything smaller than a 1-inch radius.
- Make certain not to crush the cable. Squeezing the cable can crush the plastic or glass core also preventing the transmission of data.
- Be careful not to nick the cable jacket when pulling the cable through conduit or routing it through openings in the weighbridge.
- Keep the ends of the cable clean. Do not cut glass cored fiber optic cable. You can not re-install connectors in the field on fiber optic cables with a glass core!

INSTALLATION, CONT.

CONNECTION OF LOAD CELLS

Open the top cover on the first 225-iCAN Junction Box. Note that for each load cell a small printed circuit board is installed in the junction box. That is, if the box is configured for eight load cells, there should be a small printed circuit board in each of the junction box load cell input card guides. Refer to Figure No. 4 for the location of these cards. Verify that a card exists for each load cell to be connected to this junction box.

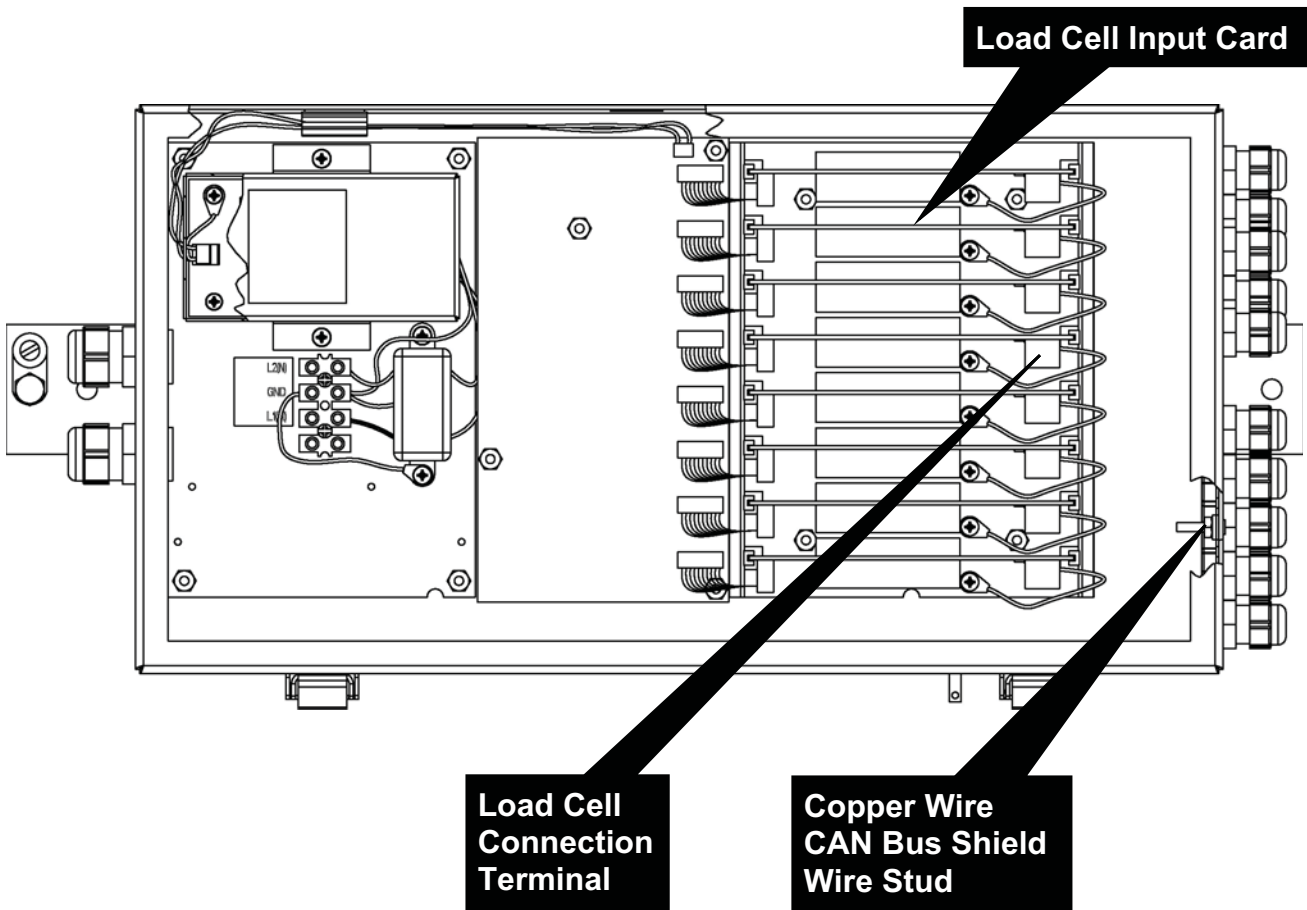


FIGURE NO. 3
LOCATION OF LOAD CELL INPUT CARDS,
CONNECTION TERMINALS, AND
COPPER WIRE CAN BUS SHIELD WIRE STUD

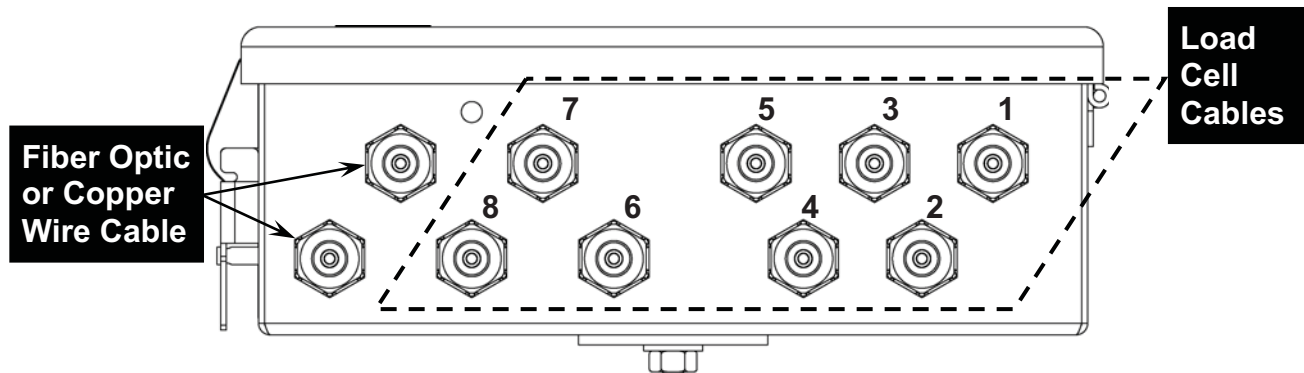


NOTE! Wiring the load cells following the layout shown in **FIGURE NO. 27 (LOAD CELL AND LOAD PLACEMENT)** will allow easy calibration with **SmartCal®**.

INSTALLATION, CONT.

CONNECTION OF LOAD CELLS, Cont.

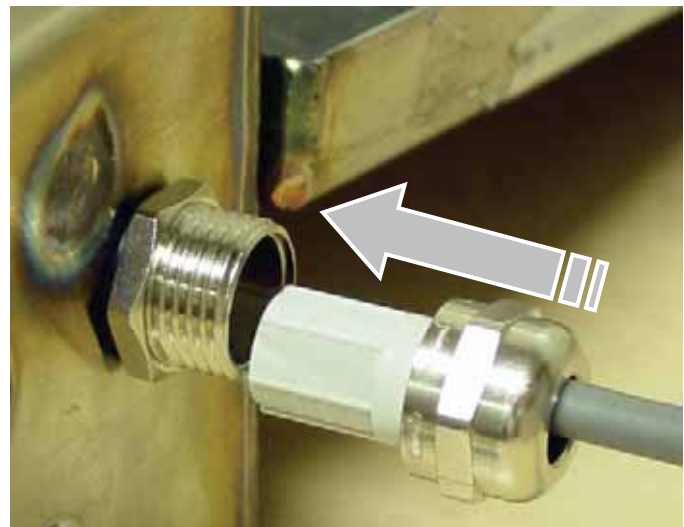
LOAD CELL CABLE PREPARATION



**FIGURE NO. 4
GLAND CONNECTOR LAYOUT**

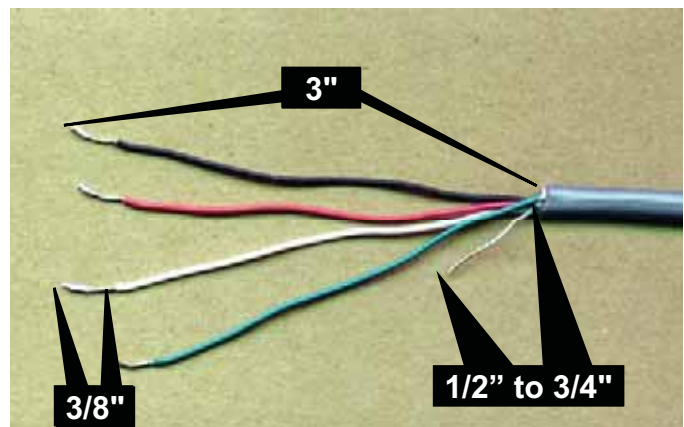
Referring to Figure No. 4 for the appropriate gland connector;

1. Loosen and remove the gland connector nut for the first load cell cable.
2. Remove the plastic insert.
3. Route the cable from the first load cell through the nut and plastic insert and into the junction box.
4. With the load cell cable routed into the junction box, remove approximately 3 inches of the outer insulating jacket from the cable exposing the internal wires, then remove approximately 3/8 inch of the insulation from the end of each wire.
5. Cut the shield wire so that it extends past the outer jacket 1/2 to 3/4 inch.



**FIGURE NO. 5
GLAND CONNECTOR**

**FIGURE NO. 6
LOAD CELL CABLE PREPARATION**



INSTALLATION, CONT.

CONNECTION OF LOAD CELLS, Cont.

REMOVABLE (SCREW) TERMINAL TYPE

1. Begin by raising the No. 1 load cell input card from the iCAN Junction Box card guide and removing the 7 connector terminal block. To remove the terminal block, hold the card in place and grasp the terminal block connector and pull straight back away from the card.
2. Loosen the screws 1, 3, 5, and 7 in the plug-in screw terminal.
3. Locate the cable from the first load cell and insert the proper wire into the first terminal then tighten the screw. Refer to the labels on the circuit board and the Load Cell Wiring Guide for terminal connections.
4. Repeat this process for each of the remaining wires until all 4 wires have been properly terminated on the plug-in screw terminals.

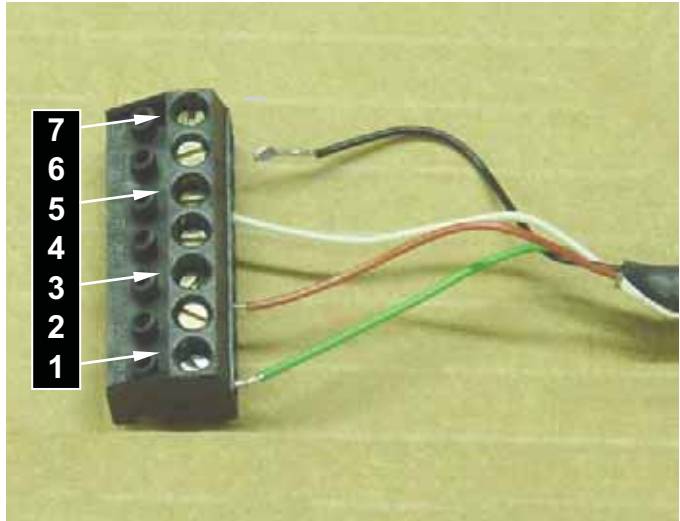


FIGURE NO. 7
TERMINATIONS OF LOAD CELL WIRES
INTO PLUG-IN SCREW TERMINALS

PUSH TERMINAL TYPE

1. Begin by raising the No. 1 load cell input card from the iCAN Junction Box card guide and place it on top of the other load cell cards.
2. Locate the cable from the first load cell and insert the proper wire into the first terminal. Refer to the labels on the circuit board and the Load Cell Wiring Guide for terminal connections.
3. To terminate a wire, first press down on the release bar for the terminal, insert the wire into the terminal opening then allow the release bar to return to its original position, locking the wire in place.
4. Repeat the procedure until all of the wires are in place.

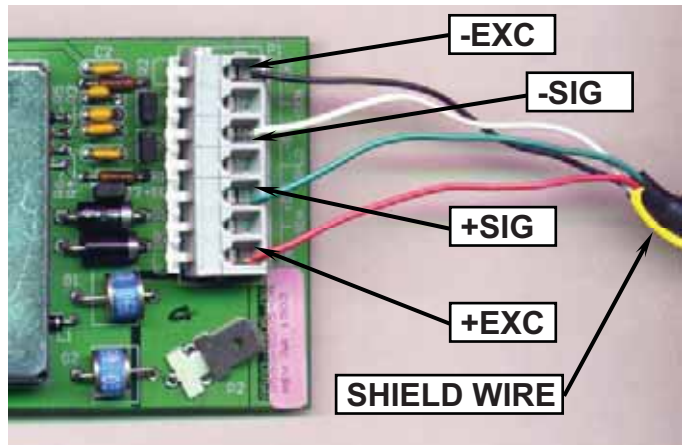


FIGURE NO. 8
TERMINATIONS OF LOAD CELL WIRES
INTO PUSH TYPE TERMINALS

INSTALLATION, CONT.

CONNECTION OF LOAD CELLS, Cont.

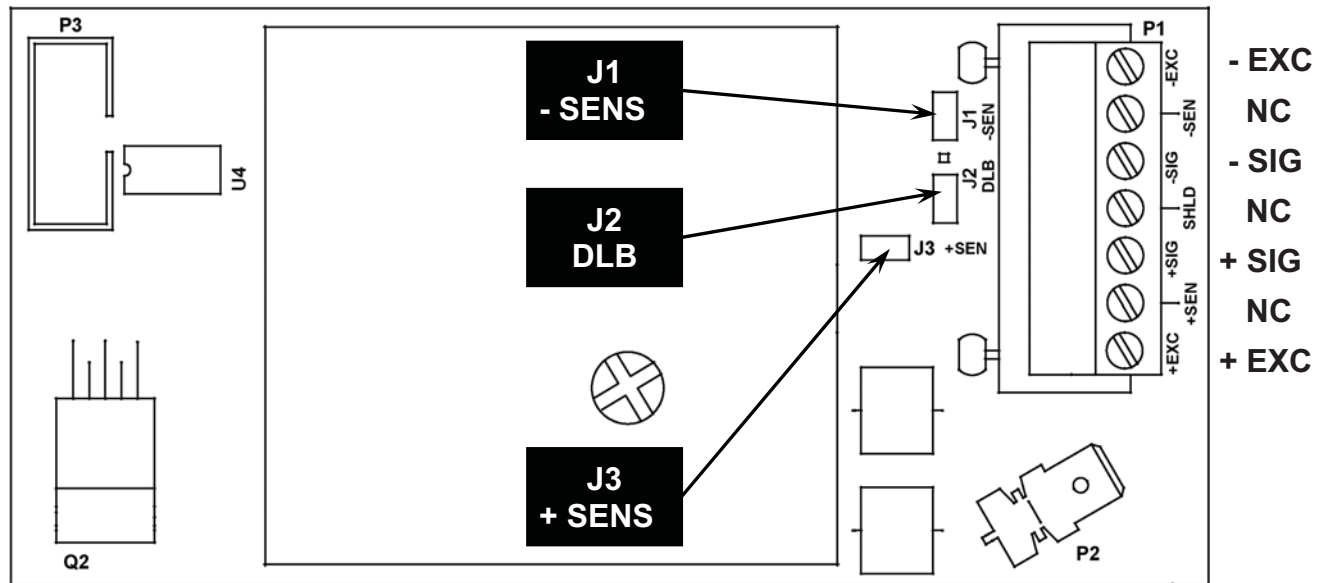
Make sure that the correct color of wire is used for each terminal. Remember that load cells have different colors for the same function and that you must make certain that the proper wires are used. The load cells used in the Cardinal PRC and EPR Series vehicle scales are of different type and color codes. Refer to the Load Cell Wiring Guide for the proper color code.

LOAD CELL WIRING GUIDE

Terminal No.	Function	PRC Series Scales (SCA cells)	EPR Series Scales (DB cells)
1 (+EXC)	+ EXCITATION	GREEN	RED
3 (+SIG)	+ SIGNAL	RED	GREEN
5 (-SIG)	- SIGNAL	WHITE	WHITE
7 (- EXC)	- EXCITATION	BLACK	BLACK



For proper operation, jumpers J1 (-SENS) and J3 (+SENS) must be installed on the load cell input card and jumper J2 (DLB) must be off or on 1 pin only. Refer to Figure No. 9.



NC = no connection

FIGURE NO. 9
LOAD CELL INPUT CARD

INSTALLATION, CONT.

LOAD CELL CABLE SHIELD WIRE CONNECTION

The load cell cable shield wires must be connected to the gland connectors of the junction box for grounding and to eliminate RFI.



**FIGURE NO. 10
LOAD CELL SHIELD
WIRE CONNECTION**

1. After all terminations have been made, remove the excess cable from the enclosure.
2. Fold the shield wire back over the plastic insert.
3. Insert the plastic insert (with the shield wire) into the gland connector.
4. The shield wire is secured when tightening the gland connector nut.
5. Do not over-tighten these connectors but make certain they are snug.
6. **DO NOT USE TOOLS!** Finger tighten only!
7. Ensure any unused gland connectors are plugged.

INSTALLATION, CONT.

CONNECTION OF POWER

The next step in the installation of the iCAN Junction Box System is to connect the junction boxes to a source of AC power. Before beginning, make certain that the power is turned off at the distribution panel. Check to make certain that the power is off before proceeding. Note that the power cable consists of three 18 to 20 AWG stranded wires and must be protected by a GFI breaker and not controlled by a switch. The power should be on continuously.

To connect each wire to the AC power terminal block, first remove approximately one half inch of insulation from each conductor. Loosen each of the three screw terminals then insert each wire into the proper terminal and securely tighten the screw. Refer to the wiring color code table below, Figure No. 11 and the labels in the junction box for the correct terminal connections.

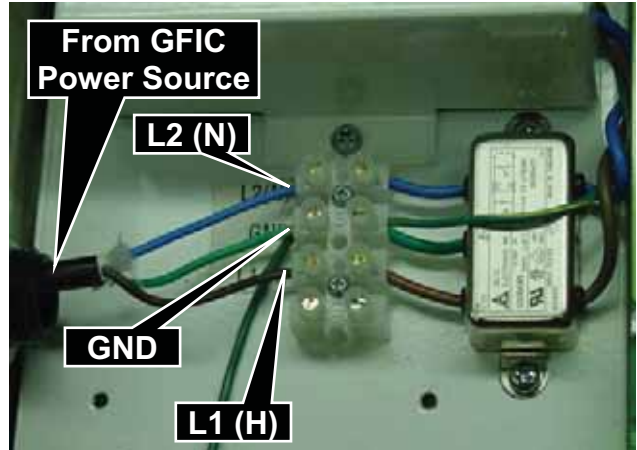


FIGURE NO. 11
AC POWER INPUT TO JUNCTION BOX

AC WIRING COLOR CODE TABLE

Function	U.S. Code	International Code
L1 (H) - <i>Hot</i>	Black	Brown
L2 (N) - <i>Neutral</i>	White	Blue
GND - <i>Ground</i>	Green	Green/Yellow

MULTIPLE JUNCTION BOXES

If your system has more than one junction box, it will be necessary to connect power to the other junction boxes. A power cable is used to connect the first junction box to the second junction box supplying it power. Another power cable is used to connect the second junction box to the third junction box board supplying it power and so on. The power cable (not supplied) consists of three 18 to 20 AWG stranded wires. Connect each wire to the AC power terminal block referring to the wiring color code table above and the labels in the junction box for the correct terminal connections.

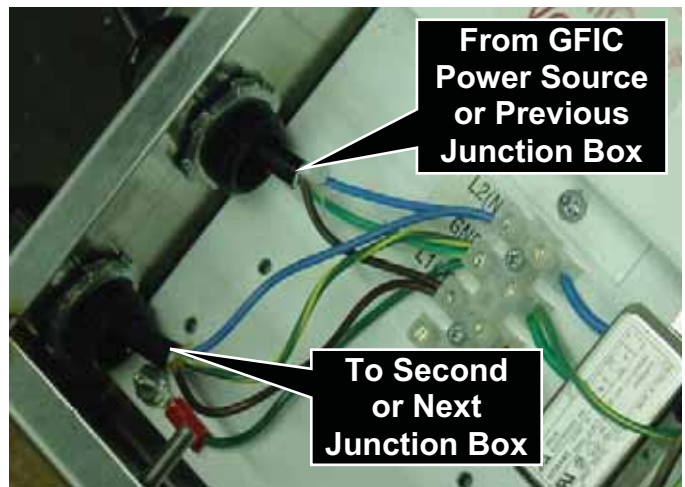


FIGURE NO. 12
POWER INPUT BETWEEN
MULTIPLE JUNCTION BOXES

INSTALLATION, CONT.

Loosen the three screws on the screw terminal in the first junction box board. Remove approximately one half inch of insulation from each wire then insert the end of each wire into the proper terminal and tighten the screws securely.

Next, loosen the three screws on the screw terminal on the second junction box. Remove approximately one half inch of insulation from each of the three wires coming from the first junction box board then insert the ends of the wires into the proper terminal and tighten the screws securely.

Use the same procedure to connect additional junction boxes (if present).

Do not turn the power on at this time. Wait until the installation has been completed before applying power to any part of it.

TEST THE LOAD CELL CONNECTIONS

1. Apply power to the iCAN junction box. After initialization*, a scrolling message will be displayed on the iCAN Controller board (see Figure No. 37 and associated description on the following pages).
2. Press S2 to enter the TEST mode. The RUN LED (D5) will turn off and the TEST LED (D4) will turn on. The millivolt output of load cell #1 should be displayed on the six digit display indicated by the number "1" on the single digit INPUT display.
3. Place a weight on the load cell #1 and observe the increase in the millivolt reading for load cell #1.
4. To check for proper wiring and function of each load cell, continue this test for all cells by pressing S3 to step through all load cells attached to the junction box.

* The following initialization messages are displayed on the "current value" LED's on the iCAN junction box controller:

$\Lambda\epsilon\Delta$ YΠ, EE YΠ, A2Δ YΠ, Σ9A YΠ

$\rho = 1.00$

Aδδρ = 1 τo 4

A2Δ = 1 τo 8

NOTE! *(These messages are displayed very quickly and may not be seen).*

} (The number displayed depends on the scale configuration).

Then a scrolling message "ιΧΑΝ βΨ ΧαρδινΑΑ" will be displayed.

The Input LED will show " - . (a dash and decimal point)".

The Run LED will be on.

The remaining LED's D2, D3, D4, D7 and D8 will be off.

INSTALLATION, CONT.

FIBER OPTIC CABLE INSTALLATION

PLASTIC FIBER

When using plastic fiber optic cable to connect the first iCAN junction box to the 225 indicator, it will be necessary to terminate the end of each cable in a special connector for attachment to the junction box and the indicator. Before installation of the connectors, however, it is first necessary to route the cable between the junction box and the indicator. Note that the cable provided is of a duplex type which means that it contains two fiber optic cores so that it can both transmit and receive data over the same cable and that one of the two conductors has a mark running the length of the cable to distinguish it from the other conductor.

PLASTIC FIBER CABLE PREPARATION

Being careful not to make sharp bends or nick the cable, route a piece of cable from the junction box to the 225 indicator. You are now ready to attach a connector to the ends of each fiber optic cable. The connectors can be easily installed on cable ends with standard tools. Polishing the ends of the cable can be accomplished using the Hewlett-Packard HFBR-4593 Polishing Kit (Cardinal p/n 6770-9009) which consists of a polishing fixture, 600 grit abrasive paper and 3 um pink lapping film. The connector may be used immediately after polishing. The following materials and tools are required to terminate the plastic fiber cable:

- Wire cutters or scissors
- 16 gage wire stripper
- Plastic optical fiber (Cardinal p/n 6980-2004)
- Crimpless connectors (HP HFBR-4532) (Cardinal p/n 6610-2003)
- Hewlett-Packard polishing kit HFBR-4593 (Cardinal p/n 6770-9009)

Step 1.

The zip cord construction of the duplex fiber optic cable makes it easy to separate the cable into two conductors. The conductors should be separated a minimum of 4 inches but no more than 6 inches back from the ends to permit installation of the connectors and polishing of the conductor ends. After cutting the cable to the desired length, strip off approximately 0.3 inch of the outer jacket using the 16-gage wire stripper. Refer to Figure No. 13.



Be careful not to nick or otherwise damage the plastic core of the fiber optic cable when removing the outer insulation jacket. Damage to the plastic core can reduce the fibers ability to transmit light, leaving the system inoperable.

INSTALLATION, CONT.

FIBER OPTIC CABLE INSTALLATION, Cont.

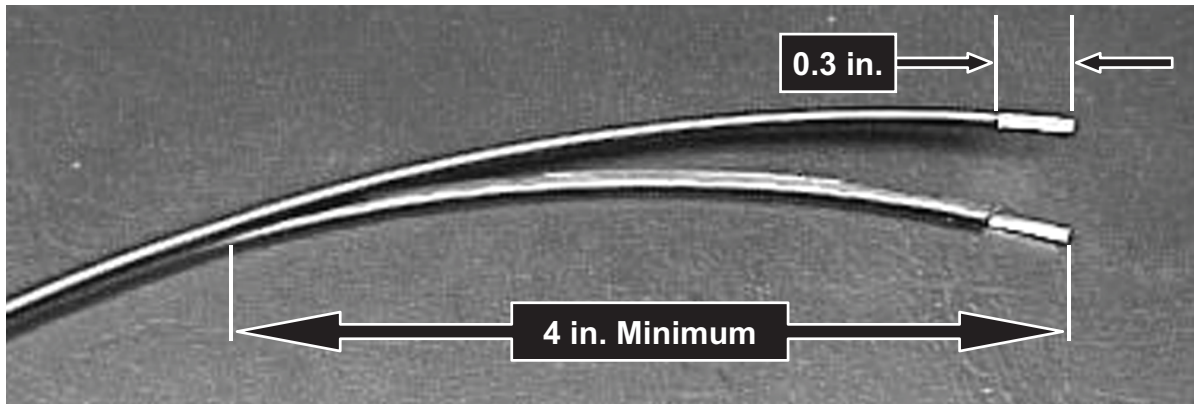


FIGURE NO. 13
PREPARATION OF PLASTIC FIBER OPTIC
CABLE FOR CONNECTOR INSTALLATION

Step 2.

Place a connector body on the end of the cable fiber as shown in Figure No. 14. Slide the connector down until the fiber jacket stops it. The fiber should protrude no less than 0.06 inch from the end of the connector. Flip the top half of the connector over and snap it into the ferrule half. Use only your fingers to do this. **Do not use pliers!** When the top half of the connector latches inside the body of the ferrule half, proper connector-to-cable attachment has been achieved. Manually press the connector halves together in the center of the assembly. The connectors are secured when the top half latches into the ferrule half.

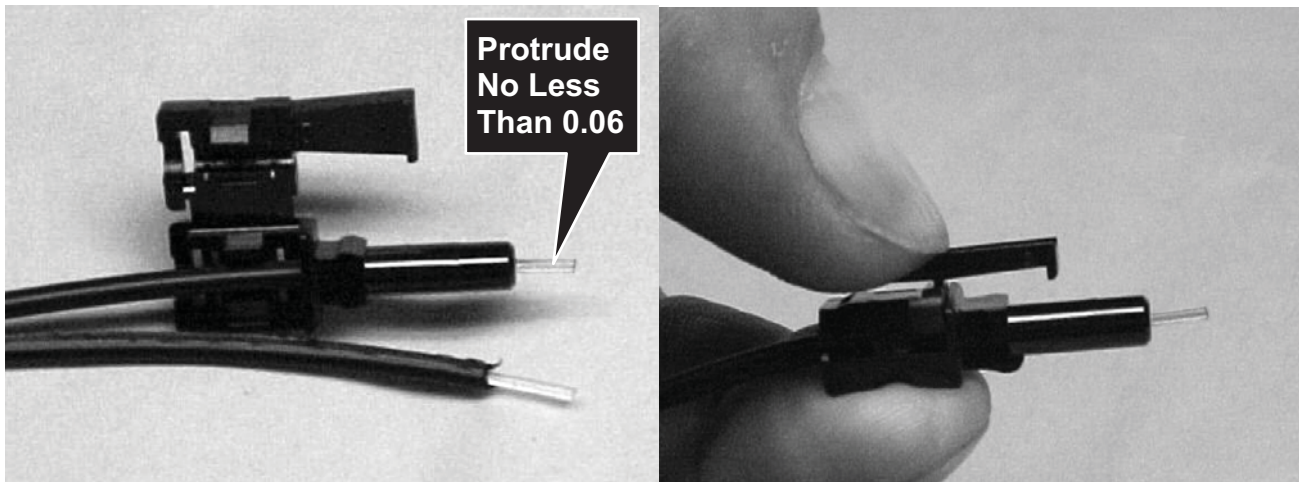


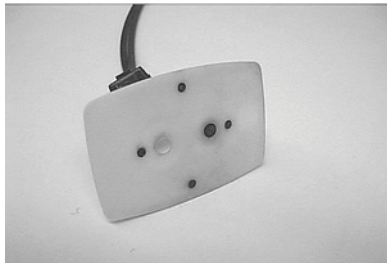
FIGURE NO. 14
CONNECTOR ATTACHMENT TO OPTICAL FIBERS

INSTALLATION, CONT.

FIBER OPTIC CABLE INSTALLATION, Cont.

Step 3.

Any fiber in excess of 0.06 inch protruding from the connector end should be cut off with the wire cutters or scissors. Insert the connector fully into the polishing fixture with the trimmed fibers protruding from the bottom of the fixture. This plastic polishing fixture can be used to polish the fibers from two connectors (*not recommended*) simultaneously, if you so choose.



NOTE: The four dots on the bottom of the polishing fixture are wear indicators. Replace the polishing fixture when any dot is no longer visible.

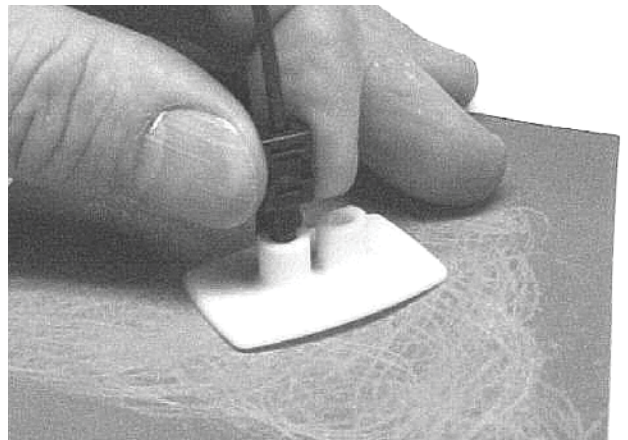
**FIGURE NO. 15
POLISHING FIXTURE WEAR INDICATORS**

Press the polishing fixture down on the 600 grit abrasive paper. Polish the fiber ends using a figure eight pattern until the connector is flush with the bottom of the polishing fixture. Wipe the connector with a clean cloth or tissue.

Step 4.

Place the fiber end of the polishing fixture on the dull side of the 3 um pink lapping film and continue to polish the fiber ends in the same figure eight pattern for approximately 25 strokes. The fiber ends should be flat, smooth and clean.

**FIGURE NO. 16
TRIMMING AND POLISHING
FIBER OPTIC CABLE END**



GLASS CORED FIBER

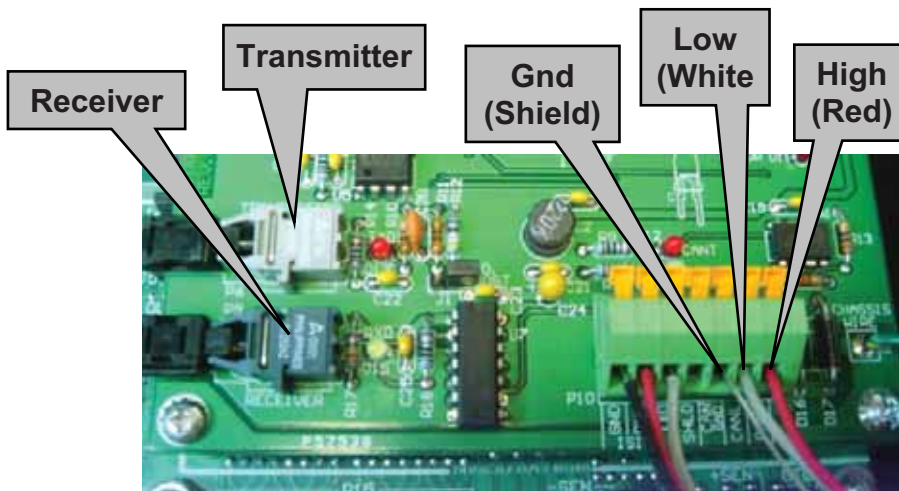


Cardinal does not recommend the field termination and preparation of glass cored fiber optic cable because of the complexity of the process and the increased risk of error. For this reason, when glass cored fiber optic cable is used, the cables will be received pre-terminated. Use the same precautions when routing glass cored fiber optic cable. That is, do not subject them to bends of less than 1-inch radius, take care not to nick the cable or its protective jacket, make sure to keep the cable ends clean and do not crush the cable. Damage to the fiber optic cable can keep the system from working.

INSTALLATION, CONT.

SINGLE JUNCTION BOX SYSTEM

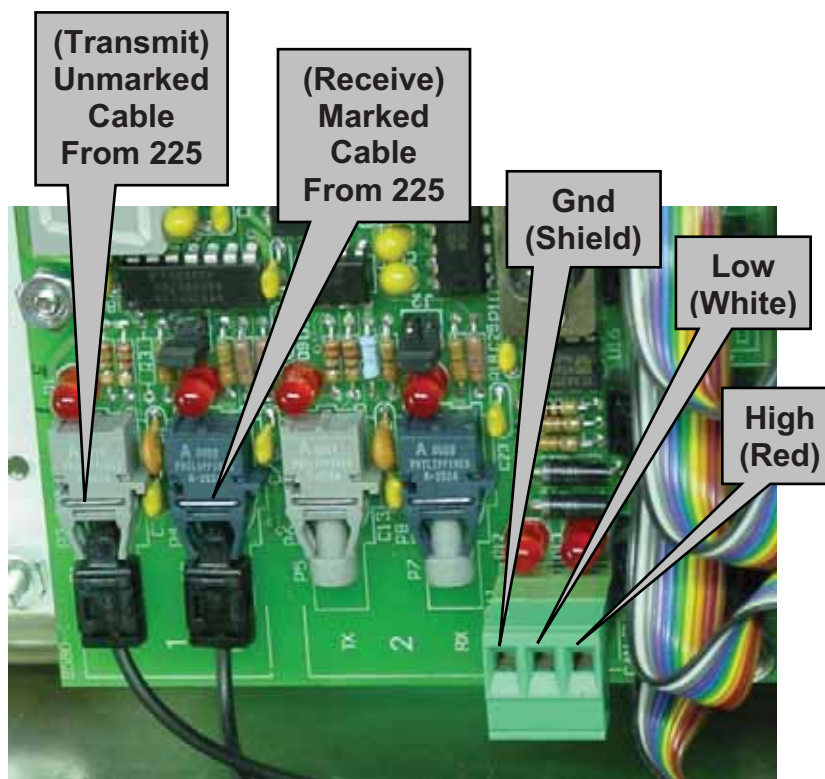
1. Remove the 14 acorn nuts securing the rear panel to the main housing (see FIGURE 27).
2. Loosen and remove the gland connector nut and remove the plastic insert.
3. Note that one of the two conductors has a mark running the length of the cable to distinguish it from the other conductor.
4. Route the fiber optic cable from the junction box through the nut and plastic insert and into the enclosure.
5. Connect the fiber that is marked to the Transmitter connector on the 225CAN Interface card located on the back of the 225 main controller board. Make the connections by fully inserting the fiber connectors into the connectors on the iCAN Interface card. See FIGURE NO. 17.
6. Connect the unmarked fiber connector to the Receive connector on the 225CAN interface board.



**FIGURE NO. 17
225CANP CABLE
CONNECTIONS**

INSTALLATION, CONT.

7. Next, at the first junction box, insert the marked (transmitter) fiber optic cable from the 225 through the gland connector then into the connector marked RX (Receive) on port 1 of the first junction box board.
8. Continue by inserting the unmarked (receiver) fiber optic from the 225 through the gland connector then into the connector marked TX (Transmit) on port 1 of the first junction box board. Make the connections by fully inserting the fiber connectors into the connectors on the board. See Figure No. 18.



**FIGURE NO. 18
JUNCTION BOX
FIBER AND COPPER WIRE
CABLE CONNECTIONS**

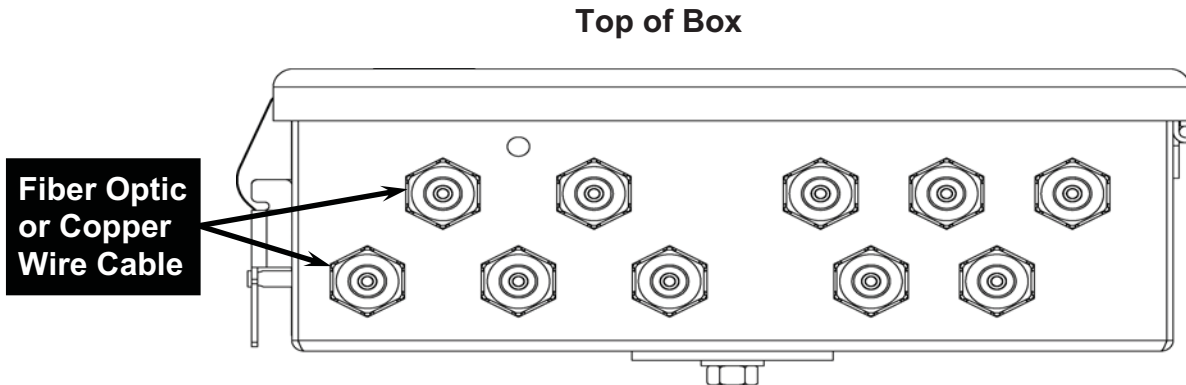
9. COPPER WIRE INTERCONNECTION

- a. If copper wire is to be used for the CAN bus interconnection between the 225 and the junction box, connect a three conductor copper wire cable to the GND, LOW, AND HIGH terminal block connectors as shown in figures 17, 18, 21, & 22.

INSTALLATION, CONT.

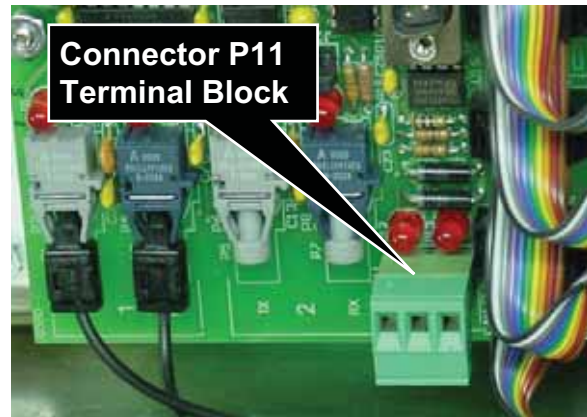
MULTIPLE JUNCTION BOX SYSTEM

Continue the installation by connecting the first and second junction boxes together. Using a three conductor copper wire cable between the junction boxes, route the cable from the second junction box to the first junction box. Insert the cable through the appropriate gland connector and into the junction box.



**FIGURE NO. 19
GLAND CONNECTOR LAYOUT**

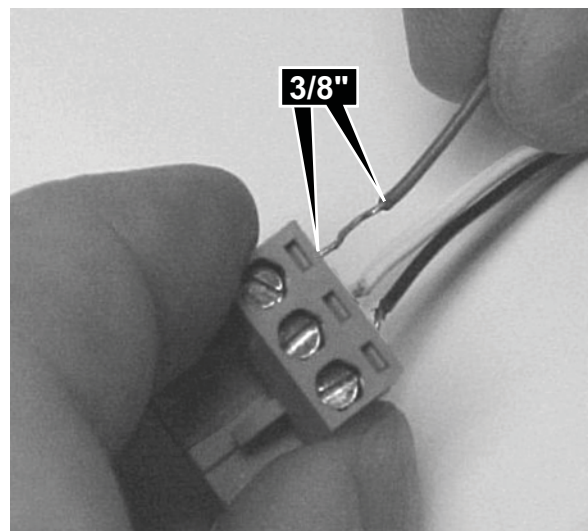
Next remove the 3 connector terminal block from the iCAN Junction Box Controller (JBC) connector P11. To remove the terminal block, hold the card in place, grasp the connector and pull straight back away from the card. Refer to Figure No. 20.



**FIGURE NO. 20
P11 TERMINAL
BLOCK LOCATION**

With the cable routed into the junction box, remove approximately 3 inches of the outer insulating jacket from the cable exposing the internal wires, then remove approximately 3/8 inch of the insulation from the end of each wire. Refer to Figure No. 21.

Loosen the 3 screws in the removed terminal block. Insert the colored wires and tighten the screws (FIGURE 22).



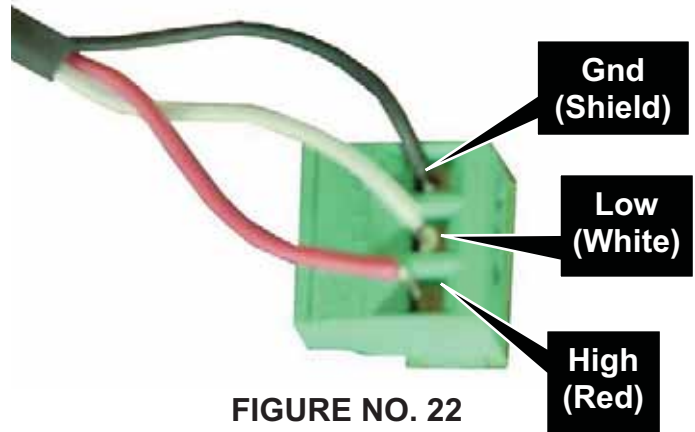
**FIGURE NO. 21
WIRE PREPARATION**

INSTALLATION, CONT.

MULTIPLE JUNCTION BOX SYSTEM, Cont.

If copper wire was used between the 225 and the first junction box, insert the wires from both cables into the terminal block.

Complete the connection by re-inserting the plug-in terminal into the connector marked P11 on the iCAN Junction Box Controller. See Figure No. 23.



**FIGURE NO. 22
P11 PLUG-IN
TERMINAL CONNECTIONS**



**FIGURE NO. 23
CONNECTIONS FROM 225
TO FIRST JUNCTION BOX
AND THEN TO SECOND
JUNCTION BOX**

INSTALLATION, CONT.

MULTIPLE JUNCTION BOX SYSTEM, Cont.

Proceed to making the following connections at the second junction box.

Referring to Figure No. 20, remove the three (3) connector terminal block the iCAN Junction Box Controller (JBC) connector P11. To remove the terminal block, hold the card in place and grasp the terminal block connector and pull straight back away from the card.

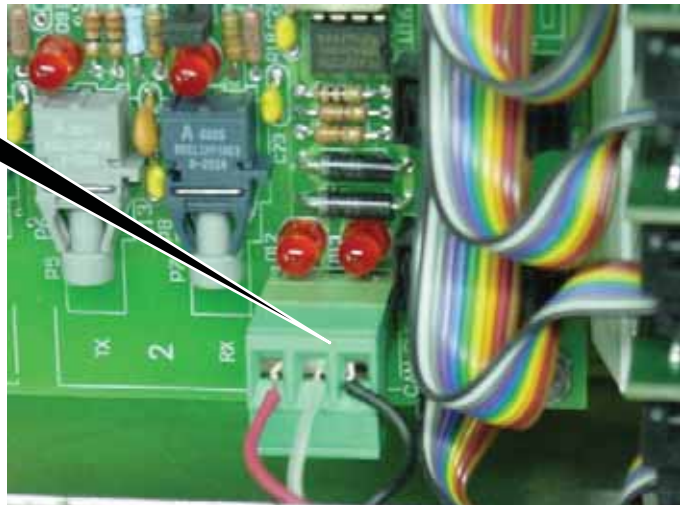
With the cable routed into the junction box, remove approximately 3 inches of the outer insulating jacket from the cable exposing the internal wires, then remove approximately 3/8 inch of the insulation from the end of each wire. Refer to Figure No. 21.

Loosen each of the 3 screws in the plug-in screw terminal. Insert the proper wire into the first terminal then tighten the screw. Refer to Figure No. 22.

Repeat this process for each of the remaining wires until all 3 wires have been properly terminated on the plug-in screw terminals.

Complete the connection by re-inserting the plug-in terminal into the connector marked P11 on the second iCAN Junction Box Controller (JBC). See Figure No. 24.

**From First
Junction Box**



**FIGURE NO. 24
TERMINAL BLOCK
LOCATION**

INSTALLATION, CONT.

FINAL CHECKS

LOADCELL CARDS

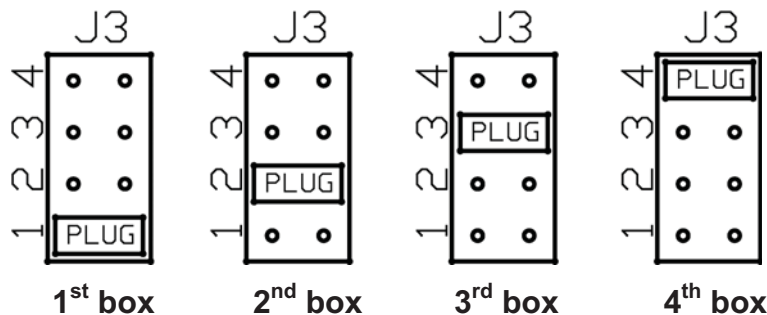
Begin by looking at the first junction box. Count the number of load cells connected to the box then verify that a load cell input card has been installed for each load cell connected (up to a maximum of 8). *Remove any cards that do not have an associated load cell connected.*

JUMPERS (see FIGURE 25)

Make certain that jumpers J3 and J4 located within each iCAN Junction Box are properly installed. These jumpers are used to correctly configure the box based on the number of junction boxes in the system.

J3 (Junction Box Address)

Jumper J3 is used to determine the junction box address (1 to 4). In multiple junction box installations, each box must have a unique address. **NOTE!** Always set the box address to 1 on a single junction box installation and in a multiple junction box installation, start with the first junction box set at 1.



J4 (END NODE)

Jumper J4 is the CAN bus END NODE jumper. **NOTE!** Without the J4 jumper installed properly, neither the fiber optic nor the copper wire bus will operate.

- In a single junction box installation using fiber optic cable or copper wire between the junction box and the 225, J4 must be installed.
- In a multiple junction box installation using fiber optic cable between the first junction box and the 225, J4 must be installed in the **first** and **last** junction box.
- In a multiple junction box installation using copper wire between the first junction box and the 225, J4 must be installed in the **last** junction box only.

Refer to Figure No. 25 and the 8 AND 10 CELL INTERCONNECTION DIAGRAMS section in this manual.

INSTALLATION, CONT.

FINAL CHECKS, Cont.

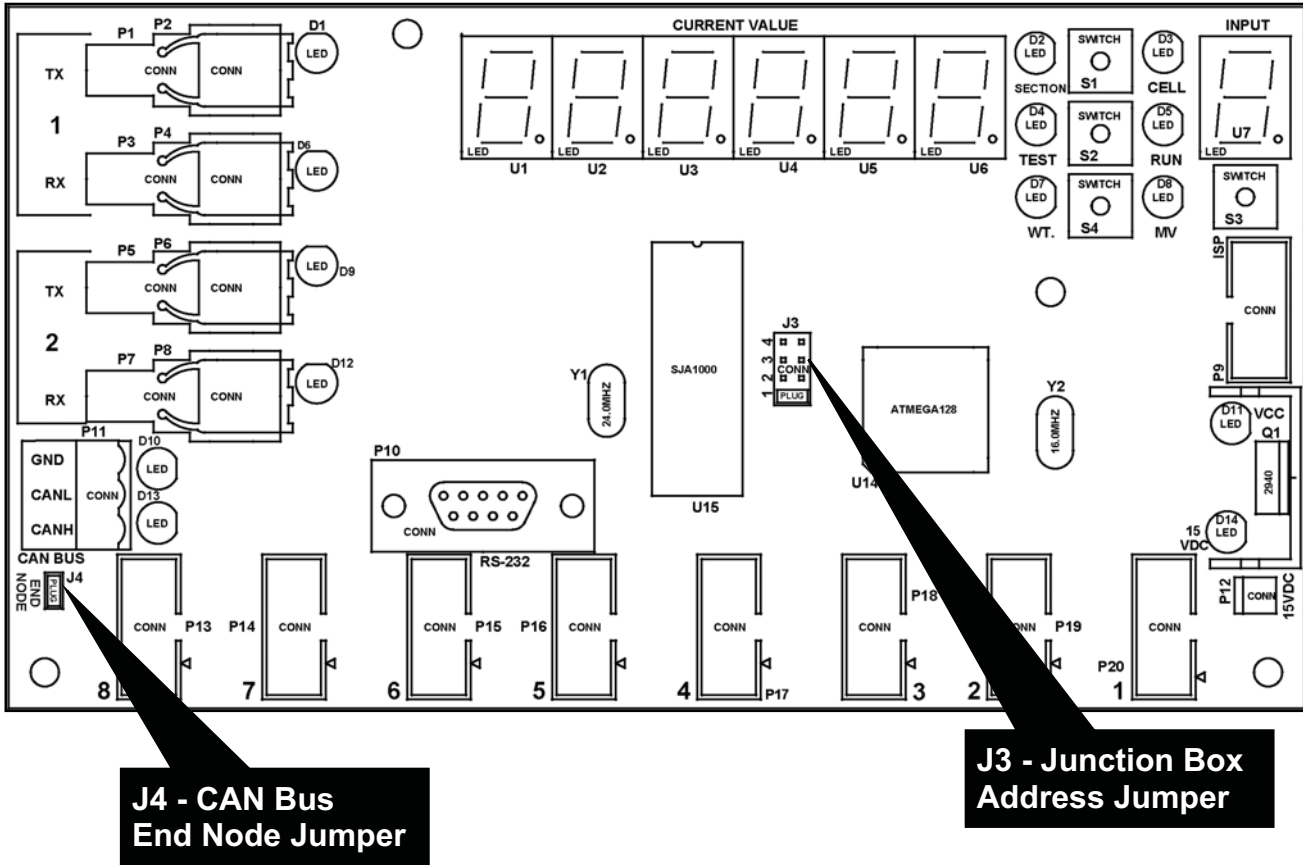


FIGURE NO. 25
JUNCTION BOX JUMPER LOCATIONS



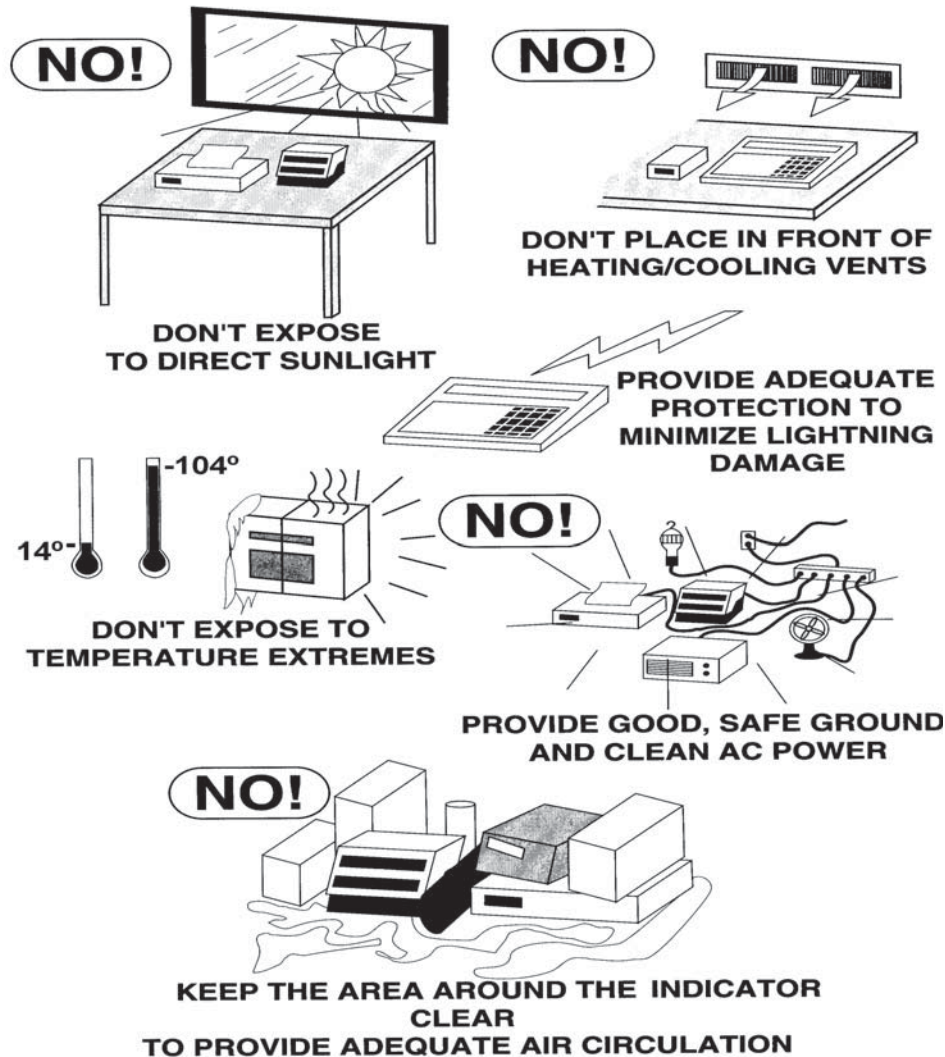
WARNING! Failure to properly configure the jumpers will disrupt the serial communication between the junction boxes and the 225 Indicator making the system inoperative. Make absolutely certain the jumpers are properly configured and a load cell card has been installed for each load cell connected to the junction box before continuing with the installation.

INSTALLATION, CONT.

INSTALLATION OF 225 INDICATOR

After completion of the termination of all fiber optic cables, completion of the weight indicator installation may take place. Refer to the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1** for additional information. In general, the weight indicator should be placed in a location that allows the operator to see the scale and is within reach of a power outlet. Connect any additional cables for peripheral devices (like a printer or remote display) to the weight indicator. Refer to the manual that accompanies the peripheral device for additional information on the proper installation connections. At this point, it is always a good idea to review the installation procedure to ensure that all proper connections have been made and that the system is ready to turn on.

The Model 225 Weight Indicator is a precision weight-measuring instrument. As with any precision instrument, it requires an acceptable environment to operate at its peak performance and reliability. This section is provided to assist you in obtaining such an environment.



INSTALLATION, CONT.

ELECTRICAL POWER

The 225 has been designed to operate from 90 to 264 VAC @ 0.4A Max. at 50/60 Hz. Note that a special order is not required for operation at 230VAC.



CAUTION! - To avoid electrical hazard and possible damage to the indicator, DO NOT, under any circumstance, cut, remove, alter, or in any way bypass the power cord grounding prong.

- The socket-outlet supplying power to the indicator should be on a separate circuit from the distribution panel and dedicated to the exclusive use of the indicator.
- The socket-outlet shall be installed near the equipment and shall be easily accessible. Note that the power cord on the 225 serves as the power disconnect.
- The wiring should conform to national and local electrical codes and ordinances and should be approved by the local inspector to assure compliance.
- On installations requiring 230 VAC power, **it is the responsibility of the customer** to have a qualified electrician install the proper power cord plug that conforms to national electrical codes and local codes and ordinances.

ELECTRICAL NOISE INTERFERENCE

To prevent electrical noise interference, make certain all other wall outlets for use with air conditioning and heating equipment, lighting or other equipment with heavily inductive loads, such as welders, motors and solenoids are on circuits separate from the indicator. Many of these disturbances originate within the building itself and can seriously affect the operation of the indicator. These sources of disturbances must be identified and steps must be taken to prevent possible adverse effects on the indicator. Examples of available alternatives include isolation transformers, power regulators, uninterruptible power supplies, or simple line filters.

TRANSIENT SUPPRESSION

The following recommendations will help to reduce transients:

- Always use shielded cables to connect signal wires to the weight indicator.
- Secure the cables in the cable clips provided inside the indicator.
- Connect the cable shield (indicator end only) to a ground point inside the indicator. Keep wires that extend beyond the shield as short as possible.
- Do not run load cell or signal cables from the weight indicator along side or parallel to wiring carrying AC power. If unavoidable, position the load cell and signal cables a minimum of 24" away from all AC wiring.
- Always use arc suppressors across all AC power relay contacts (see recommendations at http://www.paktron.com/pdf/Quencharch_QRL.pdf).
- Use zero voltage switching relays, optically isolated if possible.

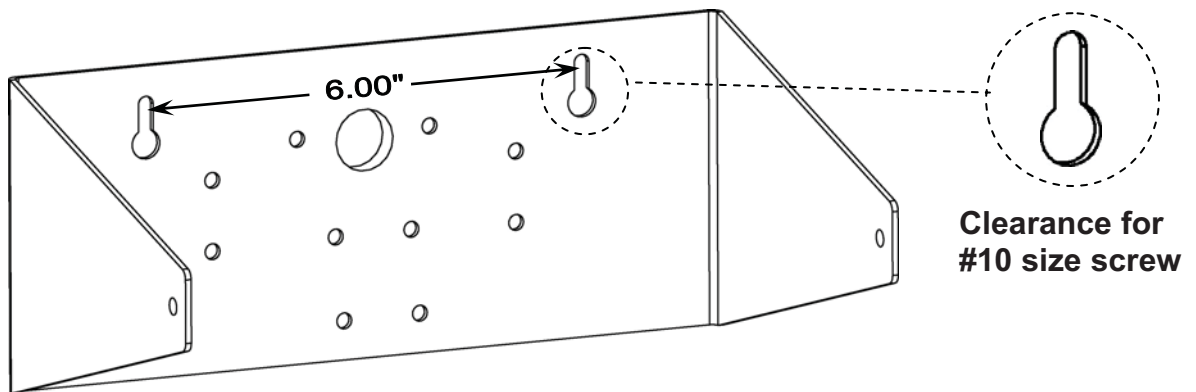
INSTALLATION, CONT.

Before beginning installation of your Model 225 Weight Indicator, make certain that it has been received in good condition. Carefully remove it from the shipping carton and inspect it for any evidence of damage (such as exterior dents or scratches) that may have taken place during shipment. Keep the carton and packing material for return shipment if it should become necessary. It is the responsibility of the purchaser to file all claims for any damages or loss incurred during transit.

Mounting the 225

The Model 225 Indicator is housed in a NEMA 4X/IP66 stainless steel wall or desk-mount enclosure. The 225 gimbal may be mounted on a desk, table or other smooth, flat, horizontal surface or may be mounted on a wall. Refer to Figure No. 1 for a layout of wall-mounting.

Figure No. 26



If wall mounted, make certain the mounting surface is strong enough to support the indicator. The mounting location should be where the display is easily viewed while being close enough to provide the operator easy access to the keypad. Carefully lay out the mounting hole locations, then drill and install the anchor bolts. Attach the gimbal to the wall and securely tighten the retaining bolts.

INSTALLATION, CONT.

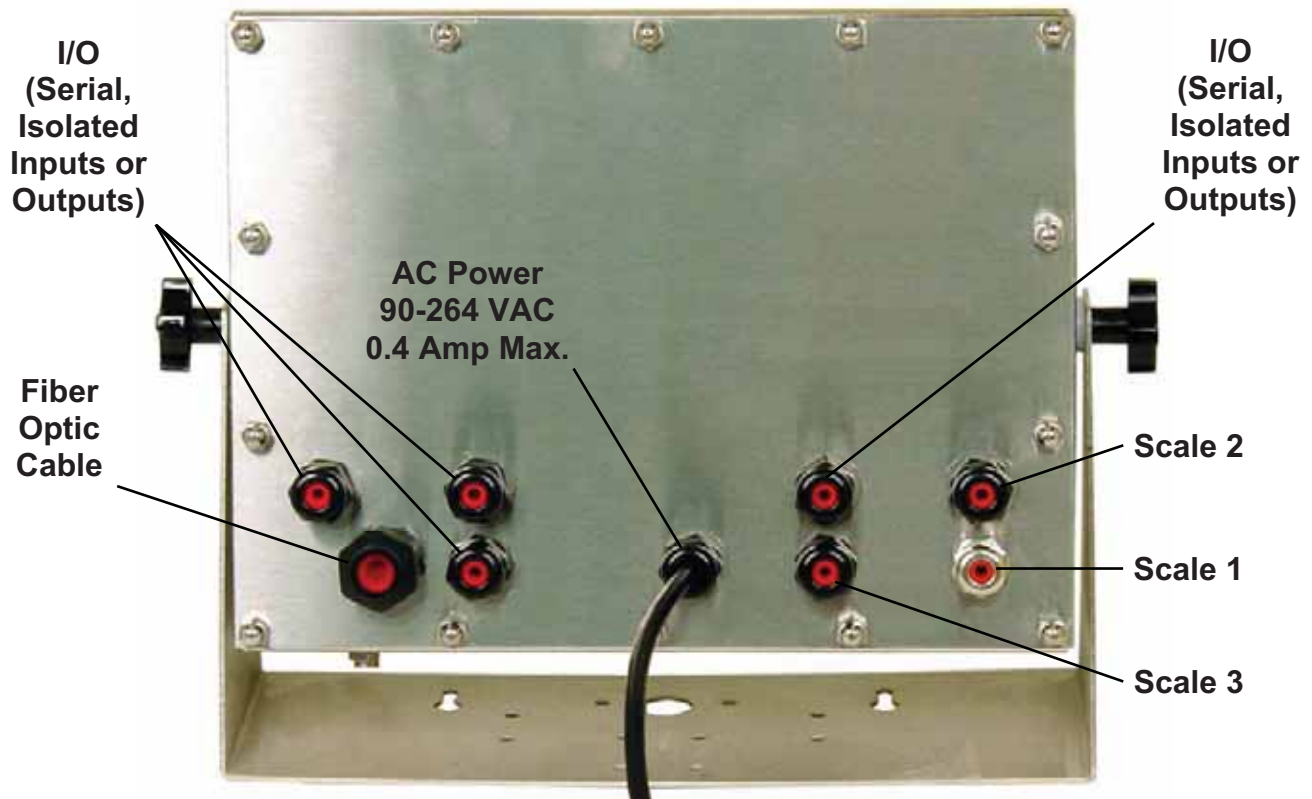


Figure No. 27

INSTALLATION, CONT.

ICAN I/O CABLE INSTALLATION

1. Remove the 14 acorn nuts securing the 225 rear panel to main housing.
2. Loosen the gland connectors for the iCAN cables. Refer to Figure No. 27 for the gland connector layout.
3. Slip the iCAN cables through the gland connector and into the enclosure.
4. Remove 2 inches of the outer insulation jacket of the copper wire cable.
5. Next, remove 1/4 inch of insulation from each of the wires.
6. Connect each of the wires to the iCAN I/O terminal block (P10) referring to Figure No. 17 for terminal block locations.
7. To terminate a wire, use a small flat blade screwdriver and press down on the release bar for the terminal. Insert the wire into the terminal opening. Remove the screwdriver, allowing the release bar to return to its original position, locking the wire in place. See Figure No. 17.
8. Repeat procedure until all of wires are in place.
9. Feed the fiber optic cables through the large gland connector provided and connect to the fiber optic connectors on the 225CANG/P option board, matching transmit and receive functions.

NOTE! Care needs to be taken to not make sharp bends in the fiber optic cable to prevent the glass or plastic core from breaking.

RE-INSTALLING THE REAR PANEL

After all terminations have been made;

1. Remove the excess cable from the indicator enclosure and securely tighten each of the cable gland connectors.
 - Do not over-tighten these connectors but make certain they are snug.
 - **DO NOT USE TOOLS!** Finger-tighten only!
2. Ensure any unused gland connectors are plugged and replace the rear panel.
3. Secure the rear panel with the 14 acorn nuts removed earlier, following a diagonal pattern when tightening the acorn nuts.

CALIBRATION AND SETUP

This section of the manual provides calibration and setup instructions relative mainly to the iCAN system operation.

For general setup information on the 225 Indicator, not included in this manual, refer to the 225 Weight Indicator Installation and Technical Manual, 8200-M538-O1.

The CALIBRATION AND SETUP of the 225-iCAN system is accomplished entirely from the keypad on the Model 225 weight indicator and does not require removing a calibration jumper or pressing a calibration switch.

Begin by turning the GFIC powering the iCAN Junction Box (es) to the ON position. Insert the 225 weight indicator power cord into a power outlet. If Auto-On has not been enabled, press the ON key on the 225 keypad to turn on the 225 indicator.

During the calibration and setup process, it is necessary to enter operational parameters and data using the indicator keypad.

- Pressing the **ENTER** key without entering a new value will retain the current setting and return the display to the menu display.
- To change a setting, enter or select a new value and then press the **ENTER** key. The new setting will be saved and the display will return to the menu display.
- Note that pressing the ← /**ESC** key on YES or NO prompts will “backup” to the previous selection. Also note that on prompts requiring a value to be entered, pressing the ← /**ESC** key will clear the value.

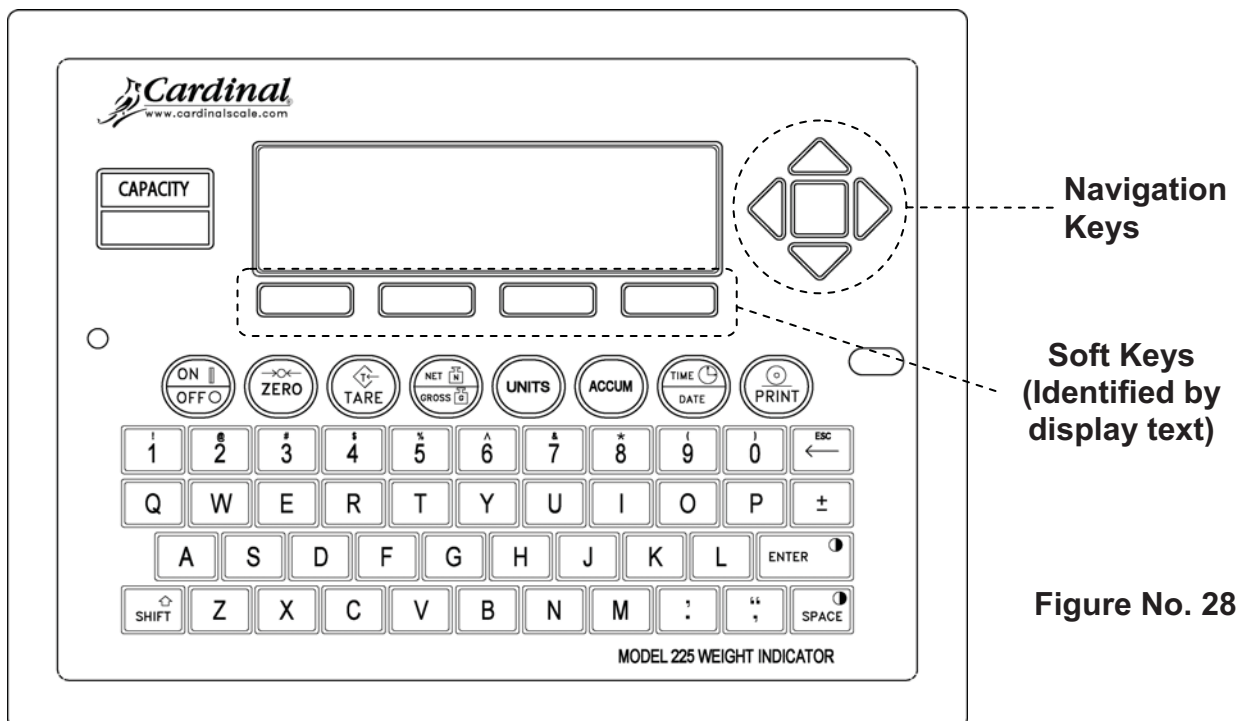


Figure No. 28

CALIBRATION AND SETUP, CONT.

ENTER CALIBRATION AND SETUP MODE

With the indicator ON, press and hold the **SHIFT** key and then press the Navigation **ENTER** key (red square key in 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

Enter Selection: 1      [ ]EXIT
```

1. ENTER CALIBRATION AND SETUP

SETUP MENU #1

With the **SETUP/REVIEW MENU** displayed, press the **1** key and then the **ENTER** key. The display will change to show **SETUP MENU #1**.

NOTE! For setup of items 1 – 7 & 10, refer to the **CALIBRATION AND SETUP** section of the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1**.

```
          SETUP MENU #1
1.  USA=XXX          6. CLR TARE=XXX
2.  NSC=XXX          7. CLEAR ID=XXX
3.  LFT=XXX          8. NO OF SCALES=X
4.  OIML=XXX         9. TOTALIZE=XXX
5.  TIME=XX         10. MODE OF OP=0  NORM
Enter Selection: 0  [ ]NEXT [ ]EXIT
```

8. NO OF SCALES=X (NUMBER OF SCALES)

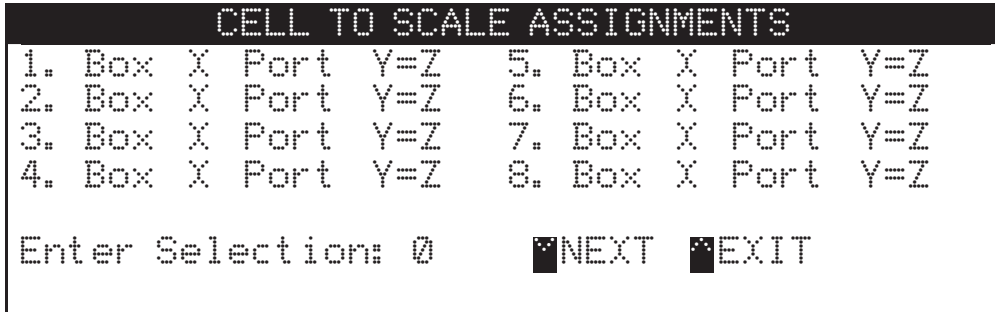
With **SETUP MENU #1** displayed the current setting for the **NO OF SCALES=X** parameter will be shown. Note that X is the current value. If the setting displayed is acceptable, proceed to the next setup parameter.

Otherwise, press the **8** key, the **ENTER** key and then using the numeric keys, enter the number of scales (1 to 3) and then press the **ENTER** key to save the new setting. If the **NO OF SCALES=X** was set to 2 or 3, the display will change to the **CELL TO SCALE ASSIGNMENTS** menu.

NOTE! For multi-scale operation, see the **225 MULTI-SCALE OPERATION** section of this manual.

CALIBRATION AND SETUP, CONT.

CELL TO SCALE ASSIGNMENTS



where BOX X is a sequential number (1 to 4) assigned to each iCAN junction box, PORT Y is the load cell connector number, and Z is the number of the scale to which the load cell is assigned. The scale assignments for up to eight load cells will be displayed on a single screen. If the system has more than eight load cells, press the NEXT (Navigation Keys ▾ Down Arrow) to display the next eight load cells. To return to the previous eight load cells, press the PREV (Navigation Keys ▲ UP Arrow).

The iCAN system determines the weight on a given scale by summing the outputs from each load cell assigned to that scale. To do this properly, the iCAN system needs to know to which scale each load cell belongs. Using the LOAD CELL LOCATION DIAGRAM (FIGURE 29) and the wiring diagrams at the back of this manual for the scales and the BOX X PORT Y=Z information displayed, determine the cells for each scale. Then, use the following procedure to assign load cells to a scale.

1. Box X Port Y=Z

With the CELL TO SCALE ASSIGNMENTS menu displayed, the current setting for the Z (SCALE NUMBER 1 to 4) parameter will be shown for each cell of each box. If the setting displayed is acceptable, proceed to the next setup parameter.

To change the SCALE number (Z) assigned to any cell, press the numeric key (1 to 8) for that menu item, then press the ENTER key. Box X Port Y=Z will be displayed at the bottom of the display. Press the numeric key 1 to 4 to assign that cell (Y) to the desired scale (1 to 4).

Repeat the procedure until all of the cells have been assigned to the proper scale.

After all of the cell assignments have been made, press EXIT (Navigation Keys ▲ UP Arrow) to return to the SETUP MENU #1.

CALIBRATION AND SETUP, CONT.

9. TOTALIZE=XXX

With SETUP MENU #1 displayed the current setting for the TOTALIZE=XXX parameter will be shown. Note that XXX is the current value. If the setting displayed is acceptable, proceed to the next setup parameter.

Otherwise, press the **9** key, the **ENTER** key, **YES** or **NO** key (soft key) and then the **ENTER** key to save the new setting and return to SETUP MENU #1.

After completion of the setup items in SETUP MENU #1 proceed to SETUP MENU #2 by pressing **NEXT** (Navigation Keys ▾ Down Arrow) to proceed to the SETUP MENU #2.

The SETUP MENU #2 will display the number of scales selected in SETUP MENU #1.

Complete the **SETUP** section of the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1** with the exception of items 5, 7, and 9 (CALIBRATE X) of SETUP MENU #2.

After completing SETUP MENU #1 and SETUP MENU #2, items 1, 2, & 3, continue to items 4, 6, & 8, SETUP SCALE X, as appropriate. Press the **4** key and then the **ENTER** key. The display will change to the SCALE 1 SETUP MENU #1.

Follow the **CALIBRATION AND SETUP** section of the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1** for SCALE X SETUP MENU #1 and SCALE X SETUP MENU #2.

After completion of the setup items in SCALE X SETUP MENU #1 and SCALE X SETUP MENU #2 proceed to SCALE X SETUP MENU #3, 1. Z SHIFT= XX. X by pressing **NEXT** (Navigation Keys ▾ Down Arrow).

SCALE X SETUP MENU #3

1. Z SHIFT= XX. X

The Z SHIFT setting is one of the ways that the 225 ICAN system monitors the scale for proper load cell operation. Every time the scale is zeroed, the system will compare the output of each cell against the calibration zero for the cell. If any individual cell output differs from the calibrated zero value by more than the Z SHIFT value, an (*) will be displayed in the lower right side of the display and a counter will be incremented. Refer to FIGURE 39 of the SYSTEM DIAGNOSTICS section of this manual for more information on this counter. The Z SHITFT value is the percentage of scale capacity. For a 120,000lb capacity scale, Z SHIFT=0.1 represents 0.1% (.001) of 120,000lbs or 120lbs.

If the displayed zero shift setting is correct, press the [**ENTER**] key. Otherwise, key in the desired zero shift value and press the [**ENTER**] key. Allowable values are 0.1-99.9% and must be greater than zero (0). **NOTE!** Factory default setting is 0.1%.

CALIBRATION AND SETUP, CONT.



At this point, a decision must be made as to what type of calibration to perform. The 225-iCAN system allows three optional methods for scale calibration: SMARTCAL® (recommended); CELL OUTPUT; or DUAL POINT as described below. DUAL POINT also has several modes within this method (see CALIBRATION METHODS in the 225 Weight Indicator Installation and Technical Manual, 8200-M538-O1).

SMARTCAL®

SmartCal is the most precise method of calibration and is unique to the 225-ican system. SmartCal requires that a calibrated load be placed over each load cell of the scale platform only once. In this method, the indicator will be able to derive calibration constants which will be used to combine information from each load cell into scale weight. To use this method, the scale must have 2 or more load cells.

From the SCALE 1 SETUP MENU #2 select 10. CALIBRATE by pressing the 1, 0 key, then the ENTER key.

From the SCALE 1 CALIBRATION MENU #2 select 10. CALIB by pressing the 1, 0 key, then the ENTER key.

At the SMART CAL= XXX prompt, YES must be selected, then proceed to the SMART CAL=YES section.

CELL OUTPUT

This method of calibration requires the operator to enter in cell output for each load cell and then apply a test load to the scale. The indicator calculates the remaining calibration constants. To use this method, the scale must have 2 or more load cells. From the SCALE 1 SETUP MENU #2 select 10. CALIBRATE by pressing the 1, 0 key, then the ENTER key. From the SCALE 1 CALIBRATION MENU #2 select 10. CALIBRATE by pressing the 1, 0 key, then the ENTER key. At the SMART CAL= XXX select NO. At the CELL OUTPUT= XXX, select YES. The display will show the CELL 1 mV/V=X.XXXXXX prompt.

Proceed to the CELL OUTPUT section.

DUAL-POINT

This is a standard calibration method requiring one weight, an empty scale and has one conversion factor. This method uses two calibration points (CAL WT 1 and CAL WT 2) to establish a zero (no load) calibration value and to span the indicator. The two points correspond to zero weight and the test load or test weight and can be applied in any order.

CALIBRATION AND SETUP, CONT.

10. CALIBRATE

With the SCALE X SETUP MENU #2 displayed, press the **1, 0**, key and then the **ENTER** key to proceed to SCALE X CALIBRATION MENU. The calibration procedure is identical for each (1, 2, and 3) scale in a multi-scale configuration.

```
SCALE X CALIBRATION MENU
1. Swt= XXXXXXXX      6. C1=XXX
2. Sct= XXXXXXXX      7. C2=XXX
3. Zct= XXXXXXXX      8. C3=XXX
4. FINE SPAN          9. C4=XXX
5. HI RES             10. CALIB      15. CELLS
Enter Selection: 0  █EXIT
```

ITEMS 1. through 9.

After calibration is complete, refer to the **CALIBRATION AND SETUP** section of the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1** for items 1 – 9.

15. CELLS (SCALE X CELL FINE SPAN ADJUST)

After calibration is complete, adjustments to the calibration coefficient for the load cells can be accomplished by following the steps below. The scale FINE SPAN can be accessed through the 4. FINE SPAN and 5. HI RES selections from the SCALE 1 CALIBRATION MENU.

To access the SCALE X CELL FINE SPAN ADJUST, from the SCALE X CALIBRATION MENU press 1, 5, ENTER. Up to eight cells are displayed at one time.

```
SCALE X CELL FINE SPAN ADJUST
1 XXXXXX XX.XXXX      5 XXXXXX XX.XXXX
2 XXXXXX XX.XXXX      6 XXXXXX XX.XXXX
3 XXXXXX XX.XXXX      7 XXXXXX XX.XXXX
4 XXXXXX XX.XXXX      8 XXXXXX XX.XXXX
ADJ=  XXXXX.X      ^FINE UP  vFINE DOWN
CELL: X  █EXIT  <CRSE UP  >CRSE DOWN
```

Single or paired load cells can be adjusted at a time. The selected load cell(s) will be highlighted.

CALIBRATION AND SETUP, CONT.

SINGLE CELL SELECTION

The cell number is followed by the cell total weight and the millivolt reading for that cell. ADJ= XXXXX. X is the total scale weight minus the dead load. CELL: X is the cell number selected for adjustment.

To select a different cell, key in the desired load cell number and press the [**ENTER**] key. The selected load cell will be highlighted.

Eight cells can be displayed on the display at one time. If the scale has more than eight load cells, the higher numbered cells will be displayed when a number greater than 8 is entered.

PAIRED CELL SELECTION

To adjust two cells simultaneously, key in the first load cell number and press the [**±**] key. Next, key in the second load cell number and press the [**ENTER**] key. The selected load cells will be highlighted. The amount of adjustment will be split evenly between the two selected load cells.

CALIBRATION COEFFICIENT ADJUSTMENT

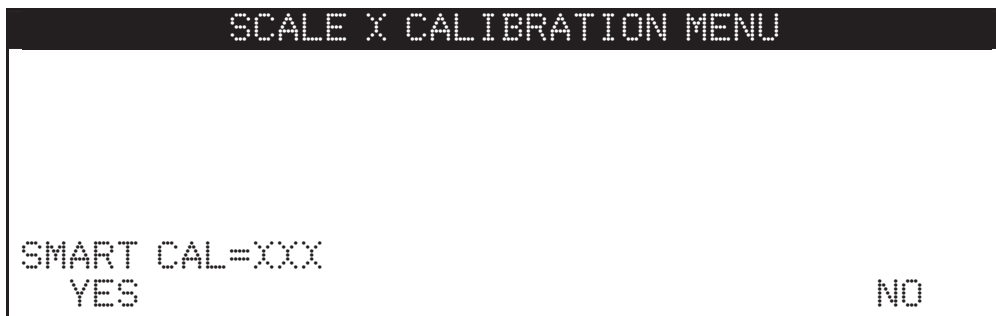
To make coarse adjustments in the calibration coefficient for the load cell, press the [**CRSE UP**] or [**CRSE DOWN**] navigation keys. To make fine adjustments in the calibration constant for the load cell, press the [**FINE UP**] or [**FINE DOWN**] navigation keys.

To zero the scale, press the [**ZERO**] key.

To return to the SCALE X CALIBRATION MENU display, press the [**SHIFT + ESC**] key.

10. CALIB

From the SCALE X CALIBRATION MENU, press **1, 0, ENTER** to proceed to the SMART CAL=YES prompt.



CALIBRATION AND SETUP, CONT.

SMART CAL=YES

SMARTCAL®

During SmartCal, the indicator will prompt for the test load to be applied over a particular load cell. If the scale has four or fewer load cells, the order will simply be cell 1, cell 2, and so forth up through cell 4. If the scale has more than four load cells, the order will be the odd numbered cells first, followed by even numbered cells, in reverse order. For example, on an eight load cell scale, the order would be cell 1, cell 3, cell 5, cell 7, cell 8, cell 6, cell 4, cell 2. This order is used so that calibration can be done using a test cart with a minimal amount of maneuvering required. Refer to Figure No. 29.

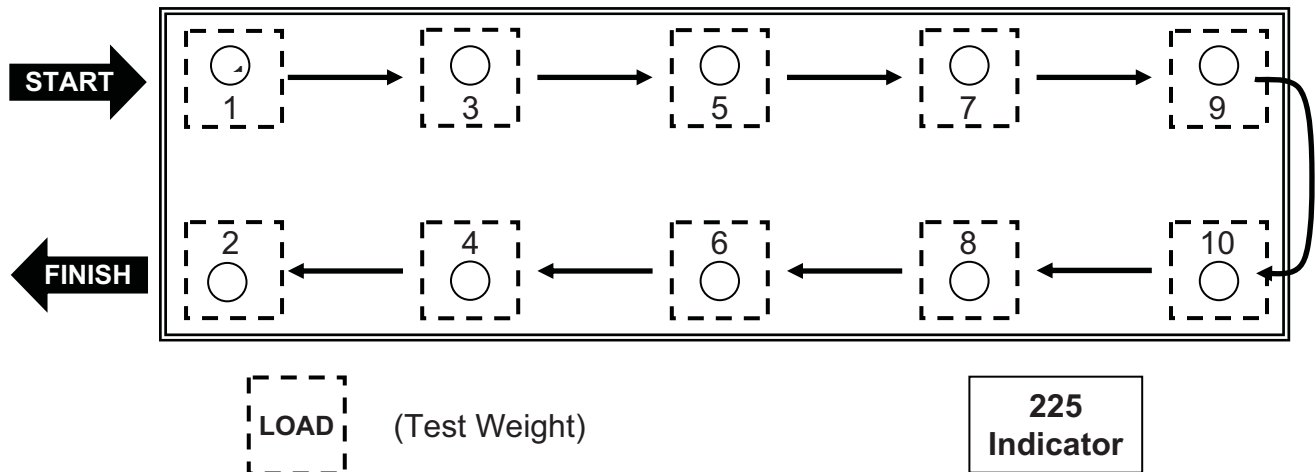
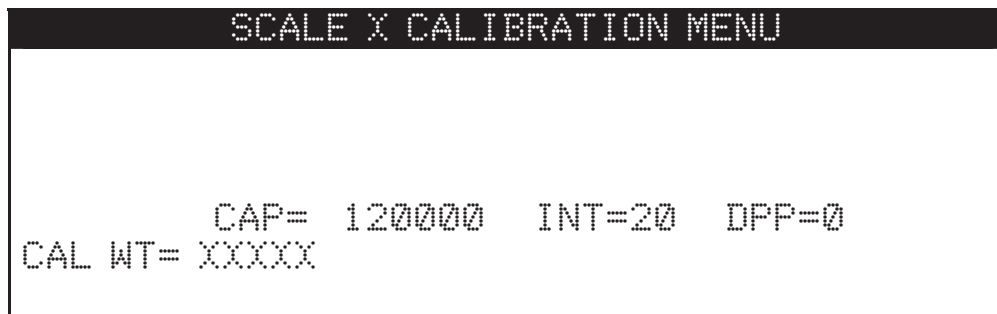


FIGURE NO. 29
LOAD CELL AND LOAD PLACEMENT



NOTE! For optimum performance, the test weights must be concentrated over the load cell as much as is safely possible.

To begin SmartCal, press the [YES] key and the [ENTER] key. The display will show:



where **XXXXX** is the test load value. Key in the value of the test load and press the [ENTER] key. The display will show:

CALIBRATION AND SETUP, CONT.

```
SCALE X CALIBRATION MENU

CAP= 120000 INT=20 DPP=0
VERIFY SCALE IS EMPTY
PRESS ENTER TO CONTINUE
```

Make certain that the scale platform is empty and press the [**ENTER**] key. CALIBRATING. . . will be displayed as the indicator gathers information from the iCAN junction box. The display will then show:

```
SCALE X CALIBRATION MENU

CAP= 120000 INT=20 DPP=0
PLACE WEIGHT ON CELL 1
PRESS ENTER TO CONTINUE
```

Concentrate the test load over cell 1 and press the [**ENTER**] key. CALIBRATING. . . will be displayed as the indicator gathers information from the iCAN junction box. Then, the display will show:

```
SCALE X CALIBRATION MENU

CAP= 120000 INT=20 DPP=0
PLACE WEIGHT ON CELL 3
PRESS ENTER TO CONTINUE
```

Repeat the above process, moving the load to the next load cell position when prompted by the indicator.

When the test load has been applied to the last load cell, information gathered from the iCAN junction box, and the **SCALE 1 CALIBRATION MENU** is displayed, the scale calibration is complete.

CALIBRATION AND SETUP, CONT.

CELL OUTPUT

With this method of calibration, the output rating for each load cell of the scale (which should be available from the documentation that came with the cell) is entered into the weight indicator. This information will be used to adjust the readings from each load cell so that the value of a given load will be independent of the position of the load on the scale platform.

From the `SCALE 1 CALIBRATION MENU #2` select `10. CALIBRATE` by pressing the `1, 0` key, then the **ENTER** key.

At the `SMART CAL= XXX` select `NO`. The display will show `CELL OUTPUT= XXX`.

At the `CELL IUTPUT= XXX` select `YES`.

The display will show the `CELL 1 mV/V=X.XXXXX` prompt.

```
SCALE X SETUP MENU #3  
  
CELL 1 mV/V=X.XXXXX
```

At the `CELL 1 mV/V=X.XXXXX` prompt, key in the cell output for cell 1 from the documentation that came with the load cell. If the cell output is not known, key in `2. 00000`. Press the [**ENTER**] key.

Repeat the for each load cell of the scale.

After all of the load cell information has been entered, the display will change to the `SCALE X CALIBRATION MENU`.

```
SCALE X CALIBRATION MENU  
  
CAP= 120000 INT=20 DFP=0  
CAL 1= 0
```

CALIBRATION AND SETUP, CONT.

STANDARD CALIBRATION MODES

The 225 indicator has seven modes that can be used to perform calibration. Four of the modes require a test load (weight), one requires the scale to be empty (and at zero) and the last two use parameter values or the calibration “C” numbers from a previous calibration. The calibration modes are as follows:

1. Dual-Point with Zero (First Zero)

This is a standard calibration method requiring one weight, an empty scale and has one conversion factor. This method uses two calibration points (CAL 1= and CAL 2=) to establish a zero (no load) calibration value and to span the indicator. The two points correspond to zero weight and test load (weight) and can be applied in any order. This method should be used for first-time calibration and complete recalibration.

2. Dual-Point without Zero (False Zero)

This calibration method requires one test weight and establishes a new conversion factor only. It is used to establish a false (temporary zero) zero without affecting the zero calibration value stored during the last calibration. This is particularly useful in tank weighing applications, where it may be impractical or impossible to completely empty the tank. This method uses two calibration points, CAL 1= and CAL 2=. The value of the test load (weight) is entered when CAL 1= is displayed and then the **NET/GROSS** key pressed when CAL 2= is displayed

3. Single-Point for Span Only (Last Zero)

This calibration method requires one test weight, the scale at zero and establishes a new conversion factor (span) without affecting the zero calibration value stored during the last calibration. This minimizes placing and removing test loads (weights) and is especially useful when checking high capacity scales. This method uses two calibration points, CAL 1= and CAL 2=. The value of the test load (weight) is entered when CAL 1= is displayed and then the **ZERO** key pressed when CAL 2= is displayed.

4. Single-Point for Zero Only (Only Zero)

This calibration method requires no test weight, an empty scale and establishes a new zero without affecting the conversion factor (span). This is useful to regain the full range of zero limit when the dead load of the scale has changed. This would occur for example, if a guard rail has been added to the scale platform. This method uses two calibration points, CAL 1= and CAL 2=. The **ENTER** key is pressed when CAL 1= is displayed and then the **ZERO** key pressed when CAL 2= is displayed.

5. Calibration Parameters (Swt, Zct and Sct)

The calibration parameters represent the test load weight Swt = (Span Weight) and the analog to digital readings at zero Zct = (Zero Count) and test load Sct = (Span Count). These values are established when the scale is calibrated. They are useful when replacing an indicator (or if the need arises to re-calibrate the scale) and a test load (weights) aren't available. By entering the previously recorded parameter values, the indicator can be returned to its present calibration setting without using test load (weights).

CALIBRATION AND SETUP, CONT.

6. Calibration “C” Numbers

The calibration “C” numbers (C1, C2, C3 and C4) are displayed on the SCALE 1 CALIBRATION MENU during the calibration and setup procedure. These numbers correspond to the calibration setting of the indicator. They can be used when replacing an indicator (or if the need arises to recalibrate the scale) and test load (weights) aren’t available. By entering the previously recorded numbers, the indicator can be returned to its present calibration settings without using test load (weights).

CALIBRATION AND SETUP, CONT.

DUAL-POINT WITH ZERO (FIRST ZERO) CALIBRATION

This method of calibration can be used if the scale has 2 or more load cells and at the **SMARTCAL** and **CELL OUTPUT** prompts, NO is selected. *NOTE! This is the only method of calibration available with a 1 load cell scale.*

For details on the other five calibration modes, refer to the **CALIBRATION MODES** section in the **225 Weight Indicator Installation and Technical Manual, 8200-M583-O1**.

CAL 1=0 (FIRST CALIBRATION WEIGHT)

With the SCALE 1 CALIBRATION MENU displayed, press the **1** and **0** keys and then the **ENTER** key. The display will change to show the settings for capacity, interval, decimal point position and CAL 1= 0. This is the first of two calibration weights. It could be ZERO (no load) or the TEST load (weight).

1. If the first calibration weight is to be ZERO (no load), press the **ENTER** key. The display will flash CALIBRATING. . . for a few seconds and then change to show CAL 2=.
2. If the first calibration weight is to be the TEST load (weight), place the weights on the scale.
3. Using the numeric keys, enter the value of the TEST load (weight) and then press the **ENTER** key.
4. The display will flash CALIBRATING. . . for a few seconds and then change to show CAL 2=. XXXXXXXX




CAL 2=XXXXXXXX (SECOND CALIBRATION WEIGHT)

The display will show CAL 2=XXXXXXXX. This is the second of two calibration weights. It could be ZERO (no load) or the TEST load (weight).

1. If the second calibration weight is to be ZERO (no load), press the **0** key and then the **ENTER** key. The display will flash CALIBRATING. . . for a few seconds and then change to show the SCALE 1 CALIBRATION MENU.

225 MULTI-SCALE OPERATION

3 SCALES WITH TOTALIZE=NO

	1 1b NET		2 1b G
	3 1b G		
ID= ID			

ARROW NAVIGATION KEYS (N/A with TOTALIZE=YES)

- | | | | |
|---|--------------------|---|--------------------|
| △ | Cycle active scale | ▽ | Cycle active scale |
| ◁ | Cycle active scale | ▷ | Cycle active scale |

The **highlighted** weight display is the active scale.
 All scale function keys act on the active scale.
 The active scale will be zeroed when the ZERO key is pressed.
 The active scale will be printed when the PRINT key is pressed.

Printer operation

1. **SETUP MENU #2**, 1. SERIAL, PORT, 7. SCALE=1, 2, 3, 4(TOTAL), CONT=YES *outputs continuous weight of the designated scale out the designated port.*
2. **SETUP MENU #2**, 1. SERIAL, PORT, 7. SCALE=1, 2, 3, 4(TOTAL), CONT=NO *outputs weight-on-demand of the designated scale out the designated port.*
3. **SETUP MENU #2**, 1. SERIAL, PORT, 7. SCALE=0, CONT=YES *outputs continuous weight of the selected (active) scale out the designated port for multi-scale operation.*

“PRINT” KEY SERIAL PORT SELECTION

The serial port used for the PRINT key is selected in the

```

PRINT TABBING MENU #1
PORT= 0 (PRINTER (TXDPRINT) 1
PORT= 1 (COM1)
PORT= 2 (COM2)
PORT= 3 (COM3)
  
```

Note: Multi-scale printing prints the selected (active) scale out the selected port.

225 MULTI-SCALE OPERATION

Example printout (TOTALIZE=NO)

Exact printout depends on the settings in **PRINT TABBING MENU #1** and **#2**

(Net weight displayed)

10:24 12/09/2008
 15000 lb G(Scale 1)
 3000 lb T
 12000 lb N

(Gross weight displayed)

10:10 12/09/2008
 100000 lb G(Scale 2)

10:10 12/09/2008
 2000 lb G(Scale 3)

3 SCALES WITH TOTALIZE=YES

12000	1 lb G	12000	2 lb G
9000	3 lb G	33000	TOT lb NET
ID=			
ID			

The **TOTAL** weight is always the **highlighted** weight display.

The **TARE** and **NET/GROSS** keys act on the **TOTAL** weight only.

The **UNITS** key acts on all weight displays.

The **ZERO** key zeroes all scales and the **TOTAL** weight when pressed.

Individual scales can be zeroed by pressing the scale number, then the **ZERO** key.

The **TOTAL** will be printed when the **PRINT** key is pressed.

Example printout WITH TOTALIZE=YES

Exact printout depends on the settings in **PRINT TABBING MENU #1** and **#2**.

(TOTAL net weight displayed)

10:21 12/09/2008
 33000 lb G (Total)
 30000 lb T
 3000 lb N

ICAN INTERFACE CARD

The 225CAN Interface Card is the communication bridge between the iCAN Controller Board and the 225 Indicator main electronics. The 225-iCAN system can handle up to three separate scales with total and up to 32 separate load cells. All CAN bus ports are configured with separate fiber optic and copper wire transceivers.

The iCAN Interface card is located in the 225 enclosure and is plugged into the internal TWO SCALE INPUT BOARD connector P2 using a 16 pin dual in-line connector. Fiber optic and copper wire connectors are provided for communications between the iCAN Junction Box and the 225 weight indicator.

SPECIFICATIONS

Temperature Range (Compensated):	14 to 104 °F (-10 to +104 °C)
Internal Connections:	1 ea Internal Bus 16 pin
External Connections:	1 ea Fiber optic input (receive) 1 ea Fiber optic output (transmit) 3 ea CAN copper wire 3 ea RS-232 serial

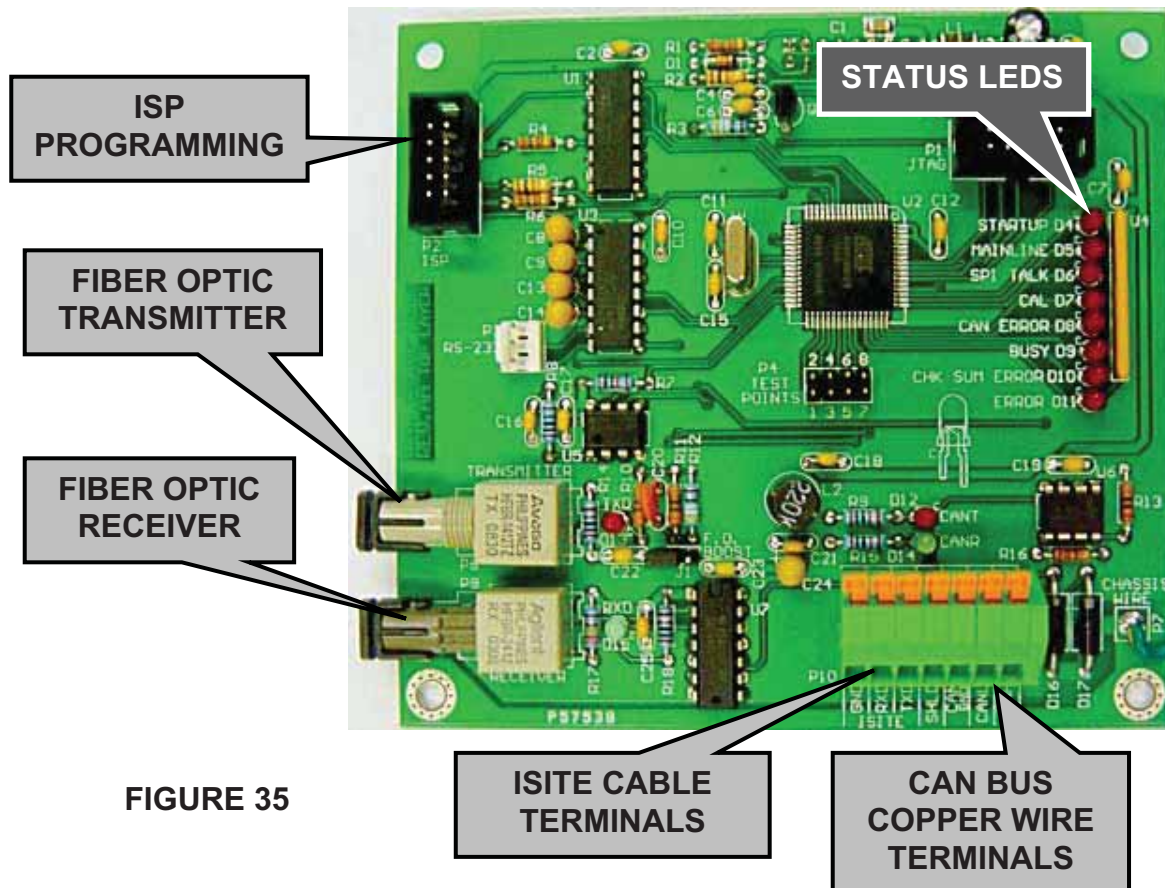


FIGURE 35

ICAN INTERFACE CARD, CONT.

DIAGNOSTIC LED FUNCTIONS

- D4** **STARTUP** - led is on during card start up after the led test
- D5** **MAINLINE** - flashes at approximately half the sample rate.
- D6** **SPI TALK** - on while SPI bus is active
- D7** **CAL** – reserved for future use
- D8** **CAN ERROR** - led is on while searching for junction boxes and checking for box differences
- D9** **BUSY** - on while card is executing a command from main board
- D10** **CHECKSUM ERROR** – reserved for future use
- D11** **ERROR** - one or more of the following errors:
 1. CAN bus error during search for junction boxes,
 2. Junction boxes with same address,
 3. No junction boxes found,
 4. Junction box address has changed,
 5. Number of cell cards in a junction box has changed,
 6. The number of scales assigned to a junction box has changed,
 7. The cell card data for a junction box has changed.

POWER-UP SEQUENCE

On power-up all eight diagnostic LED's will light simultaneously then one at a time.

D5, D6, D9, CANT, and CANR LED's, and the fiber optic TXD and RXD LED's will blink at the sample rate of the 225.

INSTALLATION OF CALIBRATION SECURITY SEAL

If your Model 225 indicator is used in a commercial application and your local metrology laws require the use of physical sealing, a lead and wire security seal can be installed to prevent the rear panel from being removed from the indicator to gain access to the calibration jumper (P6) thereby preventing unauthorized access to the calibration adjustments. Refer to the Figure No. 36 for a suggested location and details on the installation of the security seal.

NOTE! In order to install the lead and wire security seal, two (2) acorn nuts on the rear panel **MUST** be replaced with drilled acorn nuts. They are available from the Cardinal Scale Mfg. Parts Department. The part number is 8200-B026-08 (NUT HEX #10-32 ACORN SS DRILLED).

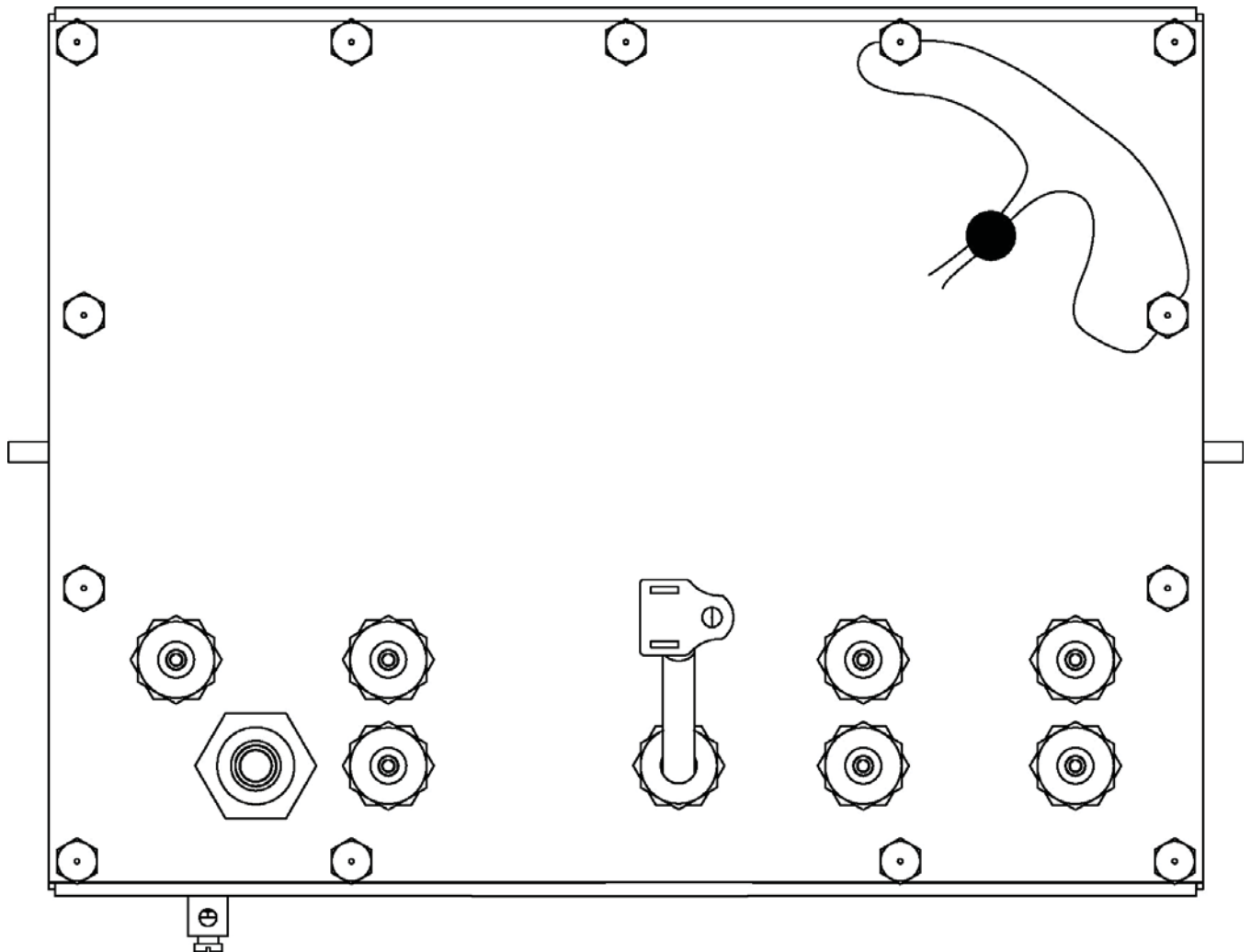


Figure No. 36

iCAN JUNCTION BOX CONTROLLER (JBC) BOARD

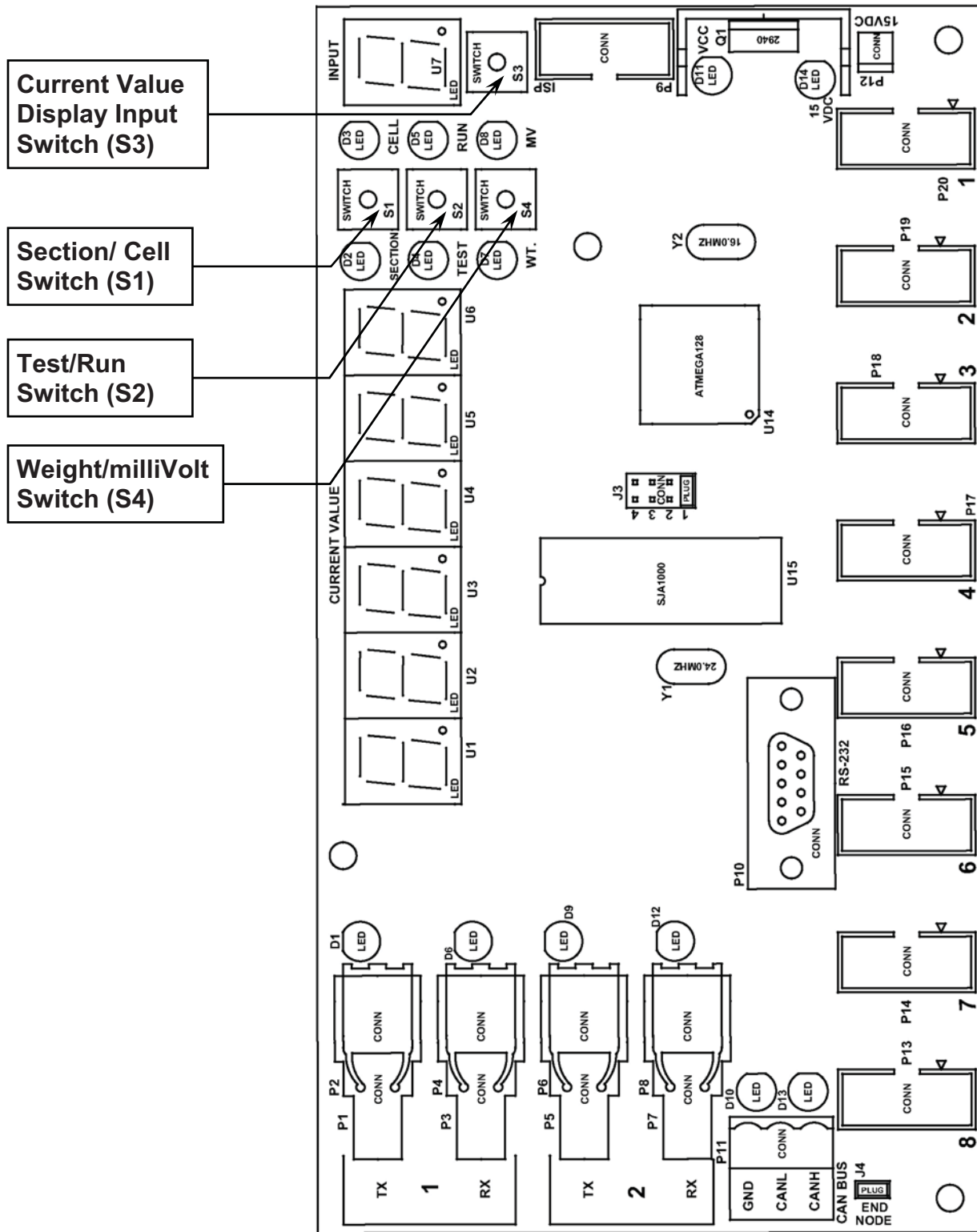


FIGURE NO. 37
iCAN JUNCTION BOX CONTROLLER (JBC)

iCAN JUNCTION BOX CONTROLLER (JBC) BOARD

STATUS LED'S AND DISPLAY (Refer to Figure No. 37)

D1 = Fiber Optic port 1 (P1) Transmit status LED.

D6 = Fiber Optic port 1 (P3) Receive status LED.

D9 = Fiber Optic port 2 (P5) Transmit status LED.

D12 = Fiber Optic port 2 (P7) Receive status LED.

Normal condition for these LED's is to blink at the sample rate.

D2 = Turned on to indicate display is showing current value of Section displayed by U7.

D3 = Turned on to indicate display is showing current value of the Cell displayed by U7.

D4 = Turned on to indicate display is showing current Test mode value of the Cell or Section displayed by U7.

D5 = Turned on to indicate display is showing current Run mode value of the Cell or Section displayed by U7.

D7 = Turned on to indicate display is showing current Weight value of the Cell or Section displayed by U7.

D8 = Turned on to indicate display is showing current milliVolt value of the Cell or Section displayed by U7.

D10 = CAN port Transmit status LED.

D13 = CAN port Receive status LED.

Normal condition for these LED's is to blink at the sample rate.

D11 = VCC status LED. Indicates 5V regulator output on JBC circuit board.

D14 = 15VDC Status LED. Indicates power to JBC circuit board.

U1 to U6 = A 6 digit LED display (labeled CURRENT VALUE on the board) used to display error messages, informative messages and values for individual cells, sections or totals.

U7 = A 1 digit LED (labeled INPUT on the board) used to indicate Section number or Cell number to be monitored. A "-" (dash) indicates running without an error.

SWITCHES

S1 (Section/Cell Switch)

Press to toggle display between Section and Cell. Section 1 consists of cells 1 and 2. Section 2 is cells 3 & 4. Section 3 is cells 5 & 6. Section 4 is cells 7 & 8.

S2 (Test/Run Switch)

Press to toggle between Test and Run modes.

S3 (Current Value Display Input Switch)

Used to select the load cell to be monitored. Press this button to advance the cell number. After reaching the last cell the total (∑ in the display) of all cells in the box will be displayed. Press again to return to cell number one.

S4 (Weight/Millivolt Switch)

Press to toggle display between Weight and milliVolt. While in the mV mode iCan becomes a 6 digit volt meter displaying the cell input in 1/10 micro volt resolution. *More resolution than most hand held multi-meters.*

iCAN JUNCTION BOX CONTROLLER (JBC) BOARD

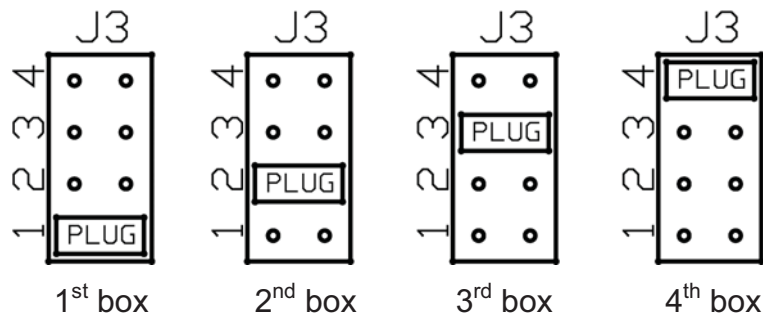
CONNECTORS (Refer To Figure No. 37)

- P1/P2 = Fiber Optic port 1 transmit connector
- P3/P4 = Fiber Optic port 1 receive connector
- P5/P6 = Fiber Optic port 2 transmit connector
- P7/P8 = Fiber Optic port 2 receive connector
- P9 = ISP (In System Programming) connector
- P10 = RS232 diagnostic port.
- P11 = CAN bus copper wire connector
- P12 = Power (15 VDC) connector
- P13 to P20 = Analog board input connectors

JUMPERS

J3 (Junction Box Address Jumper)

J3 is used to determine the junction box address (1 to 4). In multiple junction box installations, each box must have a unique address. **NOTE!** Always set the box address to 1 on a single junction box installation and in a multiple junction box installation, start with the first junction box set at 1.



J4 (END NODE)

J4 is the CAN bus END NODE jumper. **NOTE!** Without the J4 jumper installed, neither the fiber optic or the copper wire bus will operate.

- In a single junction box installation using fiber optic cable or copper wire between the junction box and the 225, J4 must be installed.
- In a multiple junction box installation using fiber optic cable between the first junction box and the 225, J4 must be installed in the **first** and **last** junction box.
- In a multiple junction box installation using copper wire between the first junction box and the 225, J4 must be installed in the **last** junction box only.

iCAN JUNCTION BOX CONTROLLER MESSAGES

The following power-up and error messages are displayed on the 6 LED's on the junction box controller, not on the 225 weight indicator display.

The following six messages occur on power-up. Messages 1 to 4 are progress indicators and will not be seen unless an error occurs. **NOTE!** The iCAN Junction Box Controller has no calibration or setup functions, it has diagnostic capabilities only.

POWER-UP MESSAGES

MESSAGE	MEANING
<i>LED UP</i>	The led driver has been initialized.
<i>EE UP</i>	The m128 novram has been tested and RAM variables loaded.
<i>A2d UP</i>	The analog boards have been initialized and interrupts enabled.
<i>SJA UP</i>	The Can Controller has been initialized.
<i>r = XX.X</i>	This message will be displayed for three seconds when power is first applied to the Junction Box Controller (JBC) board. Note that XX.X is the JBC software revision level.
<i>A2d=X</i>	The number of analog boards recognized as running. Displayed after <i>r = XX.X</i> for three seconds.
<i>Addr=X</i>	The X indicates the setting of junction box address jumper, J3.
<i>[An=50 or 60]</i>	<p>If the jbox display indicates <i>[An=50]</i> or <i>60</i> at power-up, the jbox transmitter to 225CAN receiver link is broken.</p> <p>A coarse test for an open fiber optic cable (without copper wire connected), is to pull the cable out of the receiver connector at the junction box and 225 iCAN interface card (one at a time).</p> <ul style="list-style-type: none"> • If you see a constant red light, the cable is not completely open and you should replace the 225 iCAN interface card. • If no light is present at the junction box transmitter, you should replace the junction box controller. • If you see a red light at the junction box transmitter, but not at the 225 iCAN interface card end, you should replace the cable. <p>With the copper wire connected, the red light will blink at the sample rate.</p>

iCAN JUNCTION BOX CONTROLLER MESSAGES

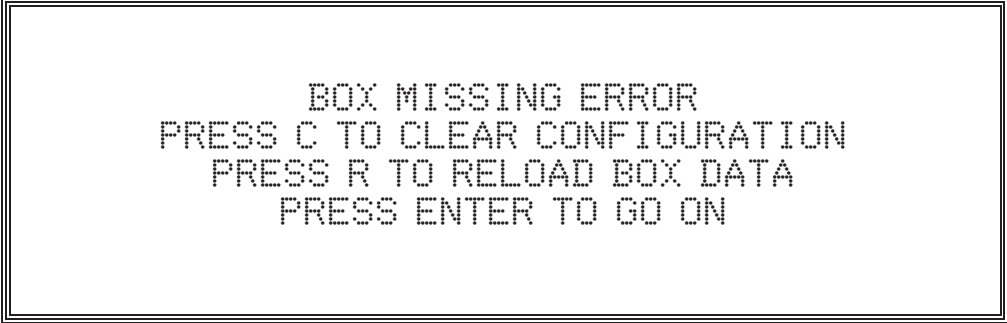
ERROR MESSAGES

CURRENT VALUE LEDS	INPUT LED	
<i>CRn=XX</i>		<p>Indicates a CAN Bus interface problem.</p> <ul style="list-style-type: none"> Faulty cable or cable connection. Faulty circuit on the 225 iCAN interface card <i>OR</i> the junction box controller board.
<i>CRlb</i>	#	<p>One or more ports have not been previously calibrated or the calibration data has been lost. The port number will be displayed on Input LED U7.</p> <ul style="list-style-type: none"> Re-calibrate the scale associated with the load cell.
<i>EE Err</i>	#	<p>One or more load cell input cards have EE RAM failure. The card number will be displayed on Input LED U7.</p> <ul style="list-style-type: none"> Replace the load cell input card indicated by the input LED U7.
<i>n0 dAt</i>	#	<p>One or more load cell input cards have reported zero for sample. The card number will be displayed on Input LED U7.</p> <ul style="list-style-type: none"> Replace the load cell input card indicated by the input LED U7
<i>n0 int</i>	#	<p>One or more load cell input cards have failed to take a sample in three seconds. The card number will be displayed on Input LED U7.</p> <ul style="list-style-type: none"> Replace the load cell input card indicated by the input LED U7
<i>n0 R2d</i>	#	<p>Either a port has an load cell input card with no scale/cell assignment or a port has a scale/cell assigned with no load cell input card. The port number will be displayed on Input LED U7.</p> <ul style="list-style-type: none"> Replace the load cell input card indicated by the input LED U7
<i>St=X</i>		<p>The board has a load cell input error not defined above.</p> <ul style="list-style-type: none"> Replace the load cell input card indicated by the input LED U7

225-ICAN ERROR MESSAGES

It sometimes happens. The installation has been completed but the system just doesn't work. Before calling for assistance, there are a few things that can be done to get the system up and running. Remember that there is a logical explanation for all problems and for troubleshooting to be successful, it must be approached in a logical and rational manner. The following error messages, displayed on the 225 weight indicator display, identify possible system problems and possible solutions to those problems.

ERROR MESSAGES AT START-UP



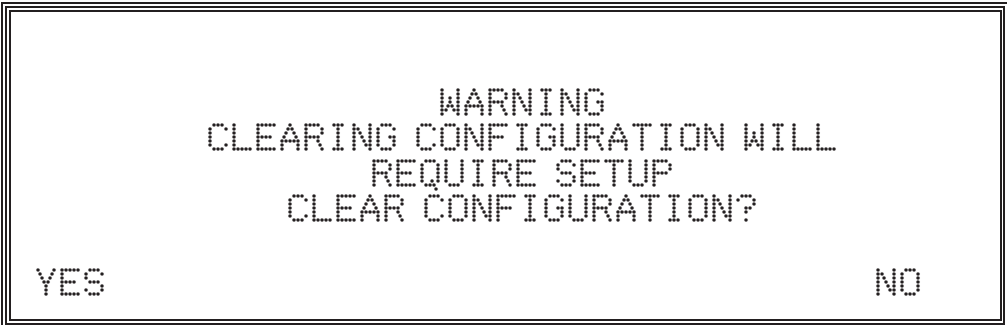
```
BOX MISSING ERROR
PRESS C TO CLEAR CONFIGURATION
PRESS R TO RELOAD BOX DATA
PRESS ENTER TO GO ON
```

The 225 configuration is stored in both the 225CANG/P and the ICAN junction box(s). A difference has been detected between the configuration in the 225CANG/P card and the configuration read from the ICAN junction box(s).

If the change was intentional (i.e., the system is a new installation or has been moved to a scale with a different configuration, calibration and setup is required.

PRESS C TO CLEAR CONFIGURATION DATA

This procedure moves the stored data from the Junction Box Controller to the iCAN Interface Card in the 225. The message below will be displayed to confirm you want to do this.



```
WARNING
CLEARING CONFIGURATION WILL
REQUIRE SETUP
CLEAR CONFIGURATION?

YES                                NO
```

Press the **YES** key to continue. After the data has been transferred, perform SETUP and CALIBRATION.

NOTE! This must be performed when changing the iCAN Interface Card in the 225.

225-ICAN ERROR MESSAGES, CONT.

PRESS R TO RELOAD BOX DATA

This procedure moves the stored data from the iCAN Interface Card in the 225 to the Junction Box Controller. A message will be displayed to confirm you want to do this.

RELOAD BOX DATA?

YES NO

Press the **YES** key. After the data has been transferred, the power-up cycle will complete.

NOTE! This must be performed when changing the Junction Box Controller. This will configure the new controller board like the one being replaced.

PRESS ENTER TO GO ON

Pressing the **ENTER** key will cause the power-up cycle to continue. A "NO WEIGHT" error will be displayed.

CELL COUNT ERROR
PRESS C TO CLEAR CONFIGURATION
PRESS R TO RELOAD BOX DATA
PRESS ENTER TO GO ON

The iCAN Interface Card in the 225 has detected a change in the number of load cell cards reported from the Junction Box Controller.

- Verify that all load cell input cards are installed and connected.
- Refer to the JUNCTION BOX CONTROLLER MESSAGES, Error Messages to determine which load cell input card to replace.

If the change was intentional (i.e., the system is just being installed or has been moved to a scale with differently configured equipment), reconfigure the system.

225-ICAN ERROR MESSAGES, CONT.

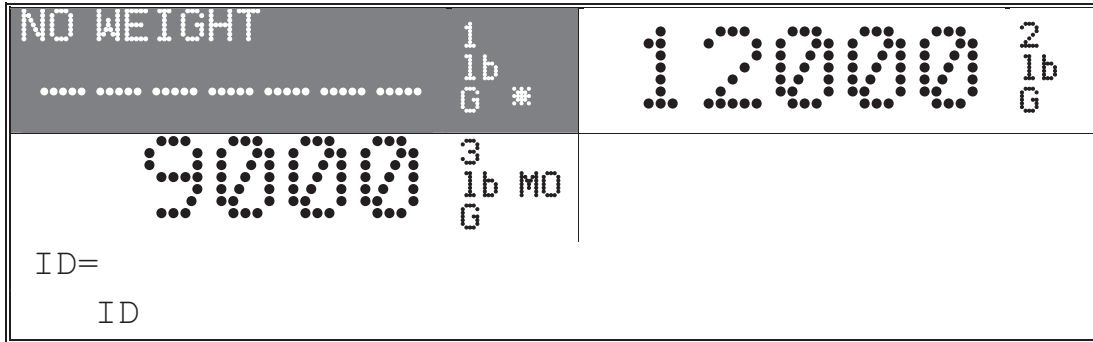
ERROR MESSAGES (At Start Up), Cont.

Other possible error messages displayed at start up.

<u>MESSAGE</u>	<u>POSSIBLE SOLUTIONS</u>
BOX ADDRESS ERROR PRESS C TO CLEAR CONFIGURATION DATA PRESS R TO RELOAD BOX DATA PRESS ENTER TO GO ON	<p>In a multiple junction box installation, this message indicates that two (or more) boxes have the J3 jumper set for the same address.</p> <p>Refer to the FINAL CHECKS section and Figure No. 25.</p>
BOX DATA ERROR PRESS C TO CLEAR CONFIGURATION DATA PRESS R TO RELOAD BOX DATA PRESS ENTER TO GO ON	<p>The system has detected a mismatch in the load cell information.</p> <p>If the change was intentional (i.e., the system has been moved), reconfigure the system.</p>
SCALE COUNT ERROR PRESS C TO CLEAR CONFIGURATION DATA PRESS R TO RELOAD BOX DATA PRESS ENTER TO GO ON	<p>The system has detected a mismatch between the number of scales the indicator is set up for and the number of scales the junction box(es) are set up for.</p> <p>If this was intentional (i.e., either the indicator or the box(es) were replaced with differently configured equipment), reconfigure the system.</p>

225-ICAN ERROR MESSAGES, CONT.

MULTI-SCALE DISPLAY ERRORS



NO WEIGHT (J-BOX DATA ERROR) – This message indicates one or more of the following errors:

NOTE: Refer to the **ICAN JUNCTION BOX CONTROLLER BOARD** section to check the status condition of the ICAN Junction Box.

1. A/D reading on at least one cell card is out of range, or
2. A/D interrupt on at least one cell card did not occur, or
3. Count of cell cards has changed, or
4. Junction box address jumper has been changed, or
5. Number of scales the junction boxes have been set up for has changed, or
6. Trim or scale assignment for at least one cell card has changed, or
7. No junction boxes were found at start up.

CAL REQ 'D - calibration required.

READ (CAN BUS) ERR - CAN bus error or loss of communication with the iCAN junction box. The error message will turn off when the problem is eliminated.

NOTE! Refer to the **ICAN JUNCTION BOX CONTROLLER BOARD** section to check the status condition of the ICAN Junction Box.

DRDY ERR – 225 main board lost communication with 225-CANG/P card.

OVER CAP - This message indicates the weight on the scale exceeds the scale capacity.

⌘ ... An asterisk to the right of the weight display indicates that the 225 has detected a load cell zero shift greater than the Z SHIFT range entered in setup. This zero shift, while not critical to the operation of the scale, is a warning that something in the scale is changing that could, if it worsens, cause operation problems. Refer to the System Diagnostic section to diagnose the change.

225-ICAN ERROR MESSAGES, CONT.

225 WEIGHT DISPLAY STATUS MESSAGES

The following table lists scale status messages displayed in the 225 indicator weight display area and their meaning.

DISPLAY	MEANING
CZ	<p>This message is shown to indicate the weight is within $\pm \frac{1}{4}$ division of the center of zero.</p> <p>This is a status message indicating that auto zero tracking is working. No corrective action is necessary.</p>
MO	<p>This message indicates that motion is present when attempting to power up, print, zero or perform a pushbutton tare operation.</p> <p>Make certain that there is no motion on the scale platform. If the problem persists, check the diagnostics display for a unstable load cell output.</p>
-- UNSTABLE --	<p>ZERO key was pressed when gross weight was outside the zero weight range, scale is in motion or overcapacity.</p> <p>Check setup parameter Z LIMIT. If YES, only 2% or 4% of scale capacity can be zeroed. Change if required.</p>
OVER CAP	<p>This message indicates the weight on the scale exceeds the scale capacity.</p> <p>Remove the weight from the scale platform. Before applying load, make certain scale is at zero. Check the load cell outputs for one that is out of range if the problem persists.</p>

For other standard 225 error and status messages refer to the **TROUBLESHOOTING** section of the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1**.

225-ICAN ERROR MESSAGES, CONT.

ERROR AND DISPLAY MESSAGES, CONT.

<u>PROBLEM</u>	<u>POSSIBLE SOLUTIONS</u>
225 display does not turn on	<p>A. 225 Auto-On not enabled or not functional. Press the ON/OFF key on the 225 keypad.</p> <p>B. Is AC power cord plugged into outlet? If not, plug AC power cord into outlet.</p> <p>C. Check power outlet for proper AC power. Try another electrical appliance in the same outlet. If it doesn't work, check circuit breaker. If off, turn breaker on.</p>
<p>225 indicator stops responding with the display showing</p> <p style="text-align: center;">CAN BUS ERROR CHECK PWR/CABLE PRESS ENTER</p>	<p>A. Insure AC power is applied to junction box (es). If not, apply power.</p> <p>B. Check circuit breaker for junction boxes. If off, turn circuit breaker on.</p> <p>C. One or more fiber optic or copper wire cables may not be properly installed or damaged.</p> <p>D. After the problem has been addressed, press the ENTER key</p>
Incorrect weight displayed, display stable	<p>A. System not calibrated yet. Perform calibration.</p> <p>B. One or more plug-in screw terminals improperly wired. Verify terminal wiring and correct if wrong.</p> <p>C. Check diagnostics display to view load cell input in either weight units or millivolts for individual cells in the box to determine if one or more load cells have outputs that are unstable. If so, open the iCAN junction box and verify that load cell cables are properly terminated. Make certain screw terminals are secure and in contact with the wire and not the insulation on the wire.</p> <p>D. Observe the millivolt reading for the load cells on the iCAN junction box main printed circuit board:</p> <ol style="list-style-type: none"> 1. Press S2 (Test/Run) until the Test LED is on. 2. Press S1 (Section/Cell) until the Cell LED is on. 3. Press S4 (WT/MV) until the MV LED is on. 4. Press the input switch (S3) until the single digit LED (U7) displays the desired cell.

SYSTEM DIAGNOSTICS

ICAN System Diagnostics provides a means to examine the performance of each load cell in the system and its associated circuitry from the 225 indicator. With the aid of the ICAN system error messages and diagnostic screens, a malfunctioning load cell or associated circuit can be identified or ruled out quickly without physically accessing the load cell or the junction box and without the use of other test equipment.

To Begin Diagnostics:

1. With the indicator in normal operations mode, while pressing and holding the **SHIFT** key ("SHIFT" will appear in the lower left corner of the display), press the red square **NAVIGATION** key (see FIGURE 28 for **NAVIGATION** keys location).
2. The display will change to show the **SETUP/REVIEW MENU**.
3. Using the numeric keys, enter **190** and then press the **ENTER** key.
4. The display will change to show the first diagnostic screen.
5. **To exit the diagnostic mode, press the ESC key.**

CELL	WGT	MAX-MIN	mV
1	1234567*	1234567	12.34567
2	1234567	1234567	12.34567
3	1234567	1234567	12.34567
4	1234567	1234567	12.34567
5	1234567	1234567	12.34567
186 G 1 (ZERO DL SHIFT) (DL SHIFT)			

**FIGURE NO. 38
CELL DRIFT DISPLAY**

where:

- CELL = the load cell number
- WGT = the weight reading for the load cell (with a resolution 10 times the normal display resolution)
- MAX-MIN = the difference between the maximum and minimum weight readings for the cell since the diagnostic screen was started.
- mV = the millivolt output from the load cell
- * = An asterisk to the right of the weight display indicates that the 225 has detected a load cell zero shift greater than the Z SHIFT range entered in setup.

Below the cell information, the gross platform weight in primary weight units (with a resolution 10 times the normal display resolution) and the scale number are displayed. Next to that, (ZERO DL SHIFT) is displayed if the zero shift on a cell is greater than the Z DRIFT setting. (ZERO DL SHIFT) (DL SHIFT) is displayed if the zero shift on a cell is greater than the Z DRIFT setting and the gross weight is less than 10 grads (normal display resolution).

SYSTEM DIAGNOSTICS, CONT.

LOAD CELL COUNT GREATER THAN 5

If the scale has more than 5 load cells, press the (Navigation Keys ∇ Down Arrow) to display readings from the next group of load cells. Press the (Navigation Keys Δ UP Arrow) key to return to the previous group of load cells. If the group of cells being displayed is the last group for the scale, pressing the SHIFT + ∇ (Navigation Keys ∇ Down Arrow) key will change the display to the next diagnostic screen. Likewise, if the group of cells is the first group for the scale, pressing the SHIFT + Δ (Navigation Keys Δ UP Arrow)] key will change the display to the previous diagnostic screen.

MULTI-SCALE

If the iCAN system has been setup for more than one scale, press the (Navigation Keys \triangleright RIGHT Arrow) key to select the next scale for display. This will zero the MAX—MIN column and also set a new reference point for the cell minimum and maximum weight readings.

DIAGNOSTICS SCREEN PRINTING

To print the displayed readings out the designated serial port, press the [PRINT] key. See the Serial Menu, CALIBRATION AND SETUP in the **225 Weight Indicator Installation and Technical Manual, 8200-M538-O1**.

MAX—MIN CELL DRIFT DISPLAY

If, after a period of time with no load on the platform, the MAX—MIN column shows a large amount of change between the minimum and maximum weight readings for the load cell, then it could indicate a problem with the load cell or a bad connection. Verify that the load cell cable is properly connected. Check the load cell cable jacket for cuts or abrasions where moisture could enter. Check the load cell itself to see if any of the seals are damaged. Replace the load cell or analog card if necessary.

To zero the MAX—MIN column, press the [ZERO] key. This will set a new reference point for the cell minimum and maximum weight readings. The MAX—MIN column will show the difference between the minimum and maximum weight readings for each cell from this point forward.

After the last group of cells has been displayed, pressing the SHIFT + ∇ (Navigation Keys ∇ Down Arrow) key will change the display screen to the next diagnostic window:

SYSTEM DIAGNOSTICS, CONT.

CELL	WGT	DL	WGT-DL	CNT
1	1234567*	1234567	-1234567	123
2	1234567	1234567	1234567	123
3	1234567	1234567	1234567	123
4	1234567	1234567	1234567	123
5	1234567	1234567	1234567	123
123 G 1 (ZERO DL SHIFT) (DL SHIFT)				

**FIGURE NO. 39
CALIBRATION DEAD-LOAD CHECK
AND
RETURN TO ZERO ERROR COUNT DISPLAY**

where:

- CELL = the load cell number
- WGT = the weight reading for the load cell (with a resolution 10 times the normal display resolution)
- DL = the calibration dead load for the cell in primary weight units
- WGT-DL = the difference between the current weight reading for the cell and the calibration dead load for the cell
- CNT = the number of times the weight on the cell differed from the calibration dead load by more than the Z SHIFT setting when the scale was zeroed (up to a maximum of 999 times)

When the scale platform is empty, the individual DL (dead load) cell weights should be close to the weights which were recorded when the scale was calibrated. Every time the scale is zeroed, the system will compare the current dead load weight for each cell against the calibration dead load for the cell. If the difference is more than the Z SHIFT setting, the CNT counter will be incremented (up to a maximum of 999). If the CNT counter for a cell has a large value, it may indicate a problem with that cell. There may also be some other problem such as the accumulation of debris in that area of the scale.

Press the [**ZERO**] key to reset the CNT counters.

SYSTEM DIAGNOSTICS, CONT.

CELL	WGT	WDL	WGT-WDL
1	1234567*	1234567	-1234567
2	1234567	1234567	1234567
3	1234567	1234567	1234567
4	1234567	1234567	1234567
5	1234567	1234567	1234567
123 G 1 (ZERO DL SHIFT) (DL SHIFT)			

**FIGURE NO. 40
RETURN TO ZERO DYNAMIC CHECK**

where:

- CELL = the load cell number
- WGT = the weight reading for the load cell (with a resolution 10 times the normal display resolution)
- WDL = cell working dead load
- WGT-WDL = the difference between the current weight reading for the cell and the cell working dead load

When the screen is first displayed, the cell working dead load will be set to zero. With the scale empty, press the **[ZERO]** to set the cell working dead load to the current weight reading for the cell. The readings in the **WGT-WDL** column should now be zero or nearly zero. To see if any cells are not returning to zero, apply a load to the scale. When the load is removed, the readings in the **WGT-WDL** column should return to zero or nearly zero.

If the scale has more than eight load cells, press the (Navigation Keys ∇ Down Arrow) to display readings from the next group of load cells. Press the (Navigation Keys Δ UP Arrow) key to return to the previous group of load cells. If the group of cells being displayed is the last group for the scale, pressing the SHIFT + ∇ (Navigation Keys ∇ Down Arrow) key will change the display to the next diagnostic screen. Likewise, if the group of cells is the first group for the scale, pressing the SHIFT + Δ (Navigation Keys Δ UP Arrow) key will change the display to the previous diagnostic screen.



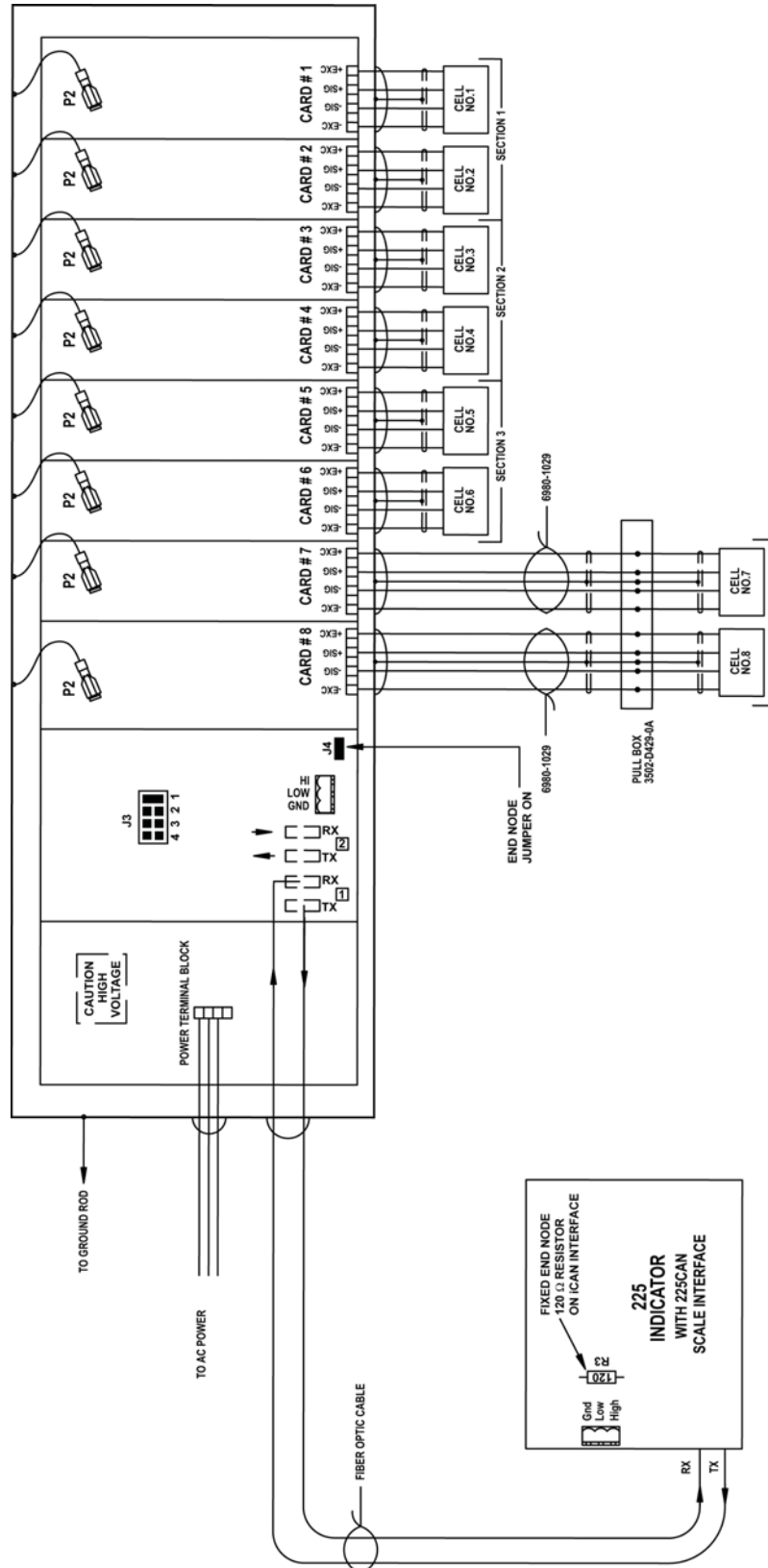
If the WGT column weight for any cell is followed by an asterisk (*), then the current no-load weight has changed from the calibrated no-load weight by more than the “Z SHIFT” percent of scale capacity. Verify that the scale platform is empty. If the asterisk (*) is still present after all weight has been removed, it could indicate a problem.

SYSTEM DIAGNOSTICS, CONT.

The following error messages can be displayed on the 225 weight indicator display (in Figures No. 38 to 40) if a problem occurs during System Diagnostics.

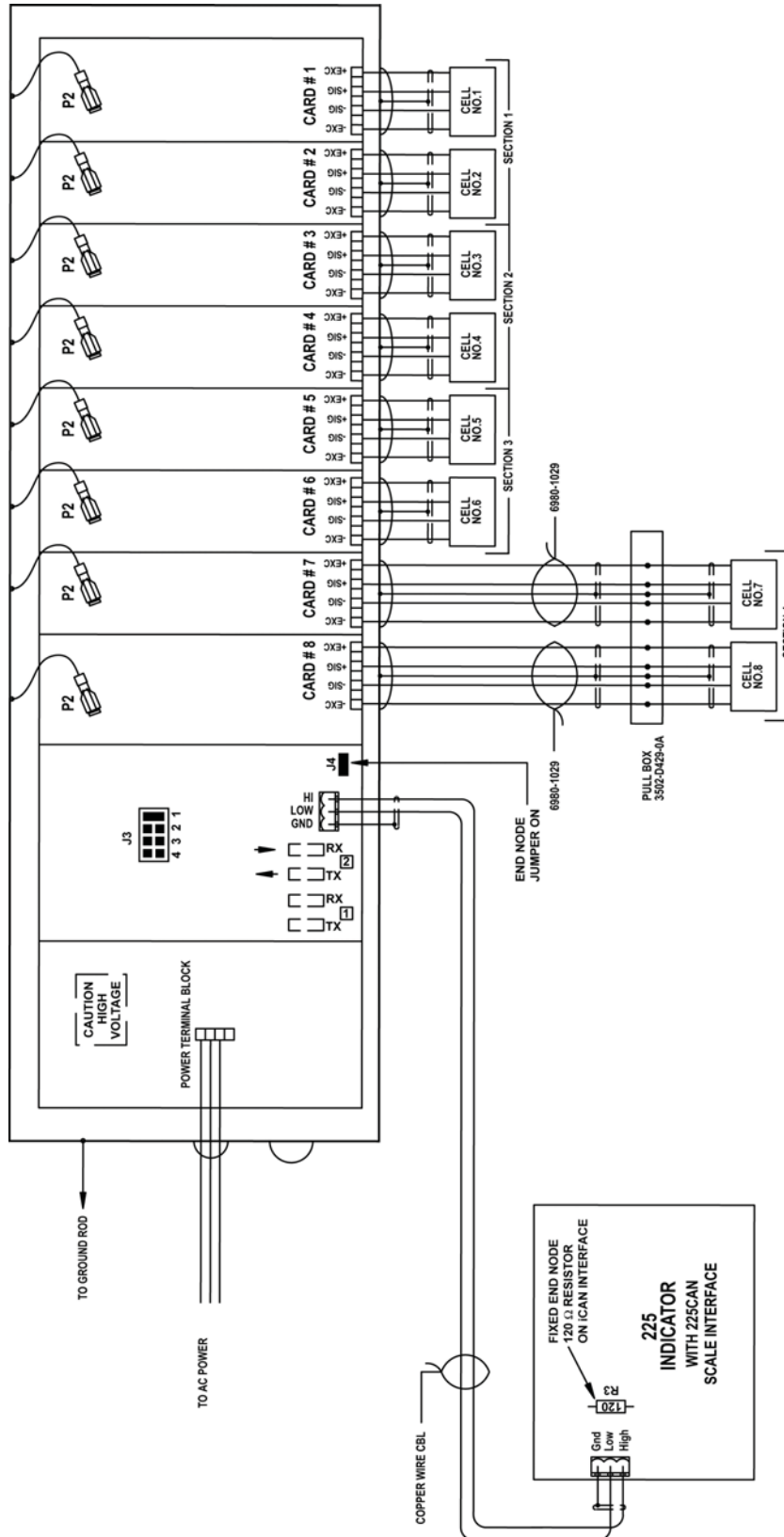
<u>MESSAGE</u>	<u>SOLUTION</u>
A2DORDR	The load cell input cards are out of order (not in sequence) in the junction box. Load cell cards must be in adjacent card guides. For example, if you have 4 load cells, the load cell input cards must be in card guides 1, 2, 3 and 4 in the junction box, not in card guides 1, 2, 3 and 5.
SCL ERR	
A2D INT	These messages indicates invalid data from the load cell input card. <ul style="list-style-type: none"> • Replace the load cell input card.
A2D EE	
A2DSMPL	This message will be displayed if the load cell output voltage is less than 0.1mv or greater than 45.2mv. <ul style="list-style-type: none"> • Using a known weight, verify that weight displayed is correct. • If weight displayed is not correct, re-calibrate the scale.
CAL RQD	This message indicates invalid data from the load cell input card. <ul style="list-style-type: none"> • Using a known weight, verify that weight displayed is correct. • If weight displayed is not correct, re-calibrate the scale.
OVRFLO	This message will be displayed as a result of the load cell output <u>not</u> changing during calibration. <ul style="list-style-type: none"> • Check load cell wiring and load cell loading.
BUS ERR	These messages indicate a CAN Bus failure. <ul style="list-style-type: none"> • Remove and re-apply power. • Check for error message at startup. • If a message is displayed, proceed to the ERROR MESSAGE AT STARTUP section of this manual.
ERROR	

8 CELL INTERCONNECTION DIAGRAM (USING FIBER OPTIC CABLE FROM 225 TO JUNCTION BOX)



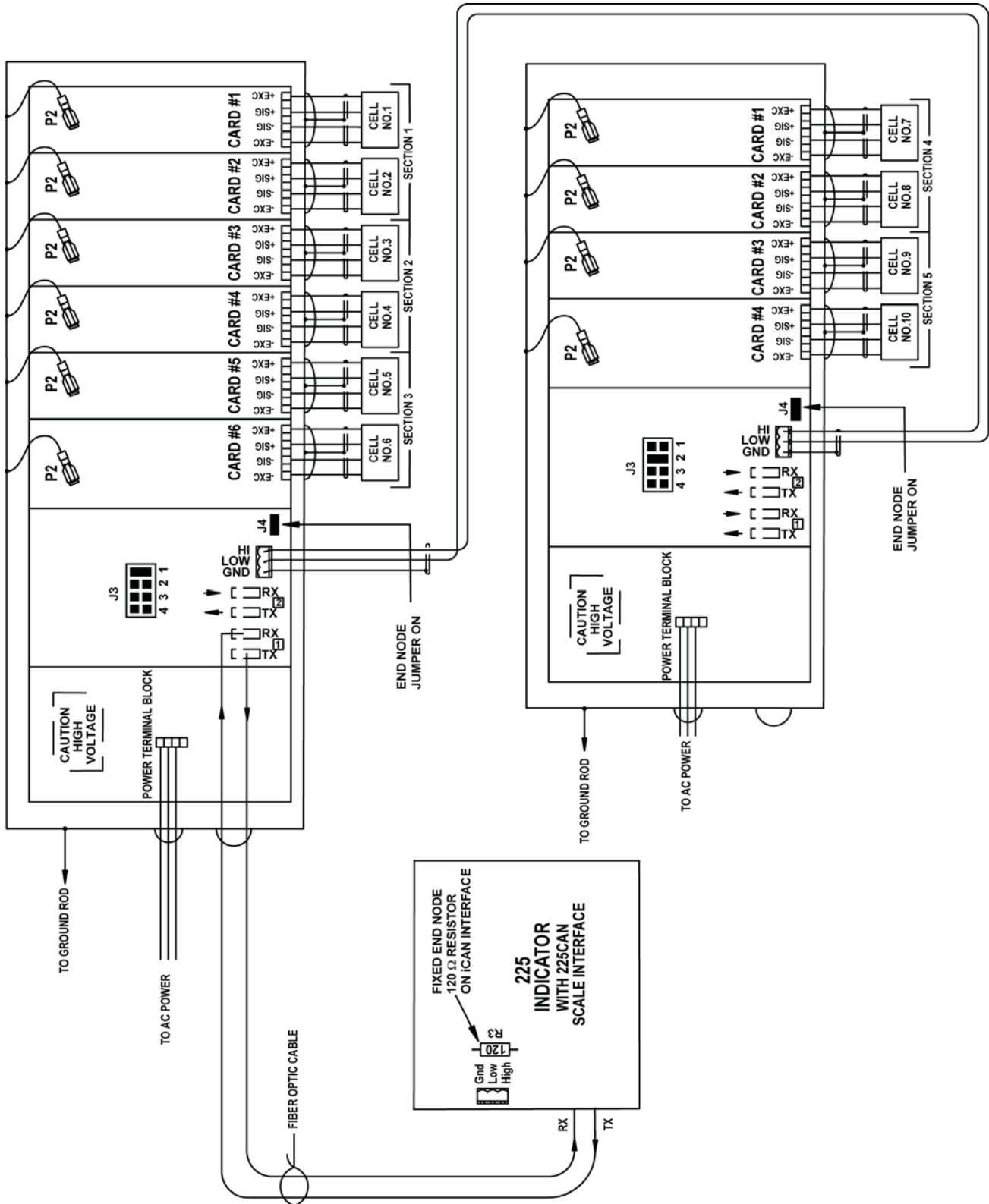
8 CELL INTERCONNECTION DIAGRAM

(USING COPPER WIRE CABLE FROM 225 TO JUNCTION BOX)



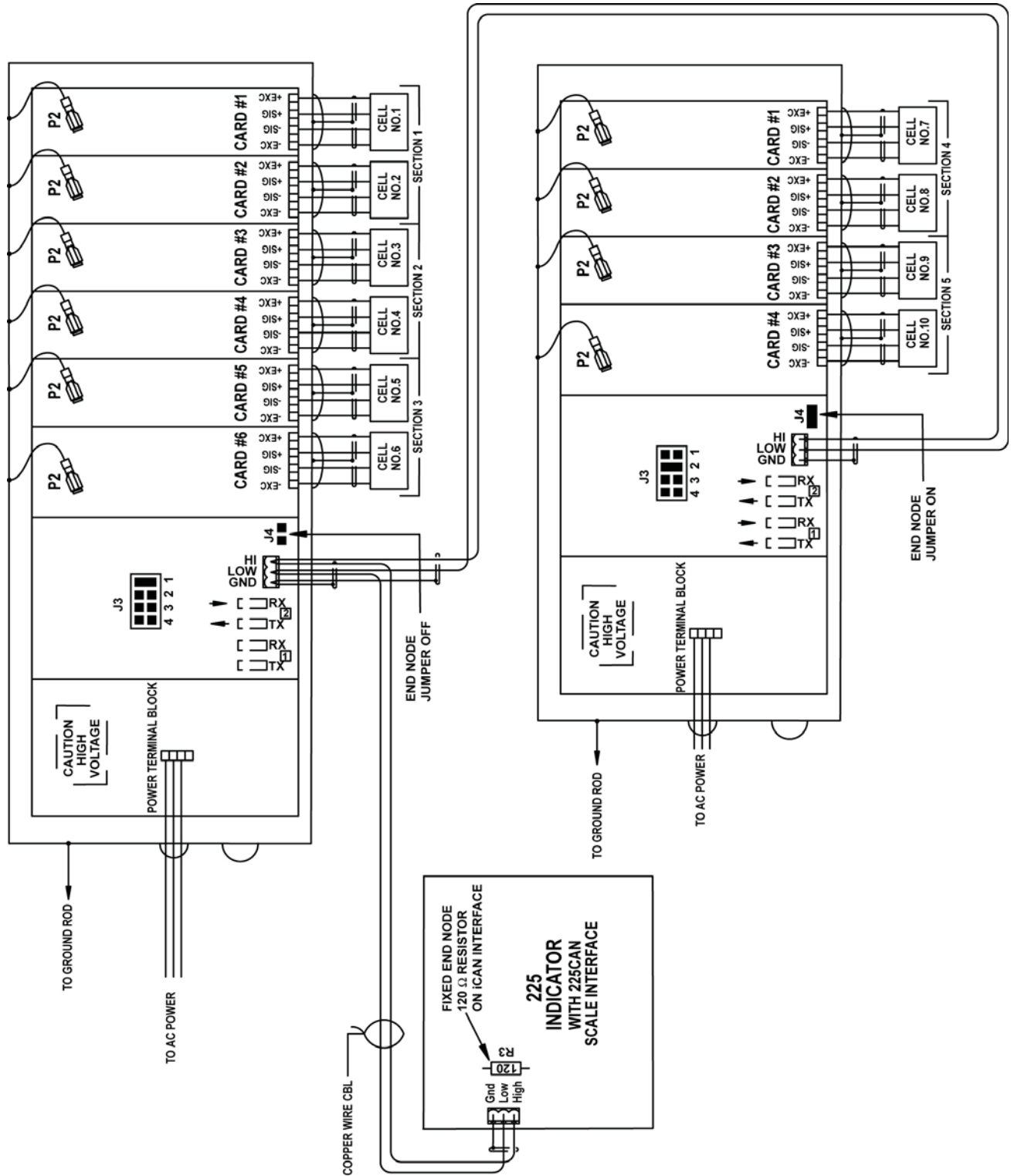
10 CELL INTERCONNECTION DIAGRAM

(USING FIBER OPTIC CABLE FROM 225 TO FIRST JUNCTION BOX)

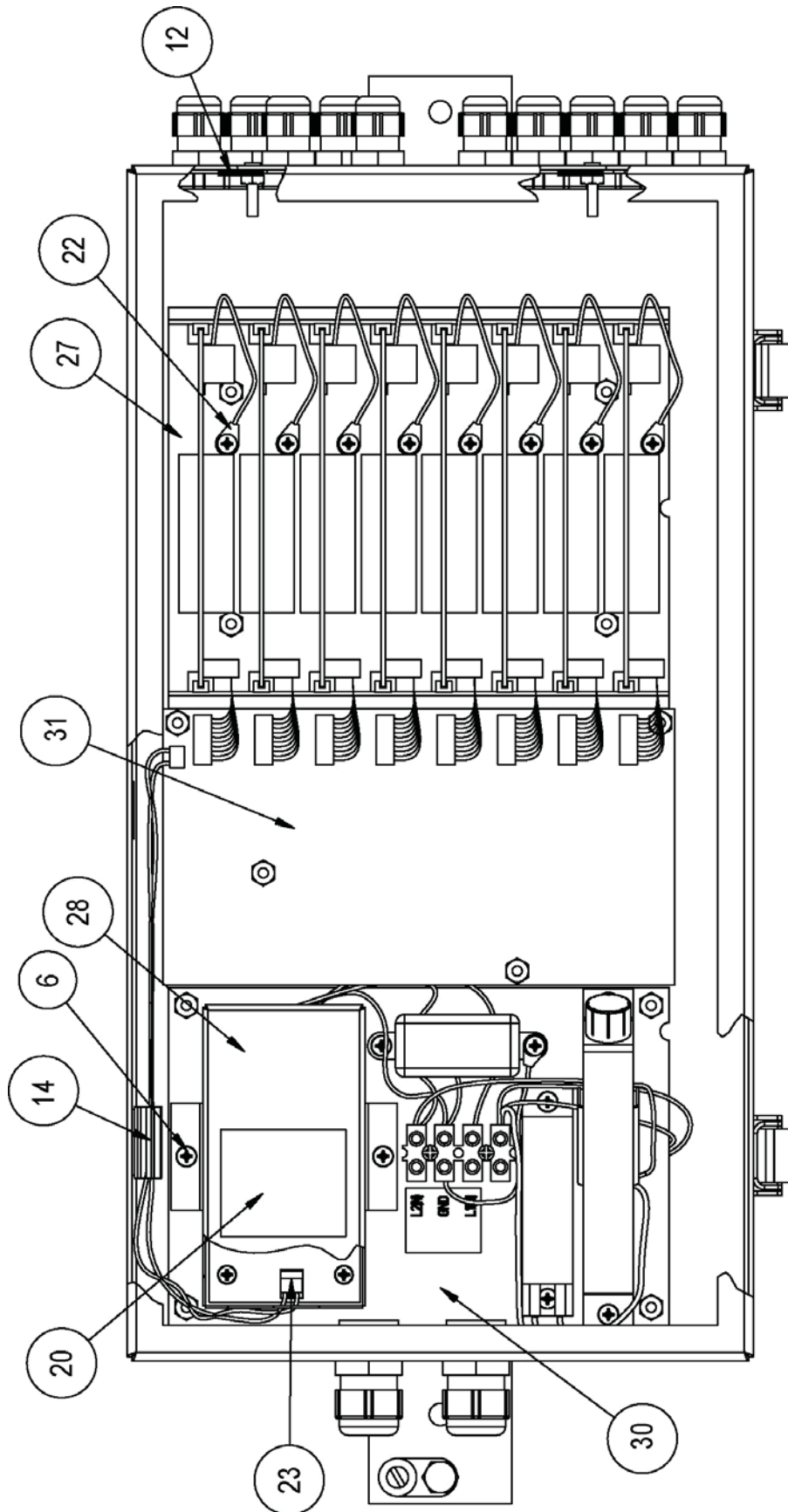


10 CELL INTERCONNECTION DIAGRAM

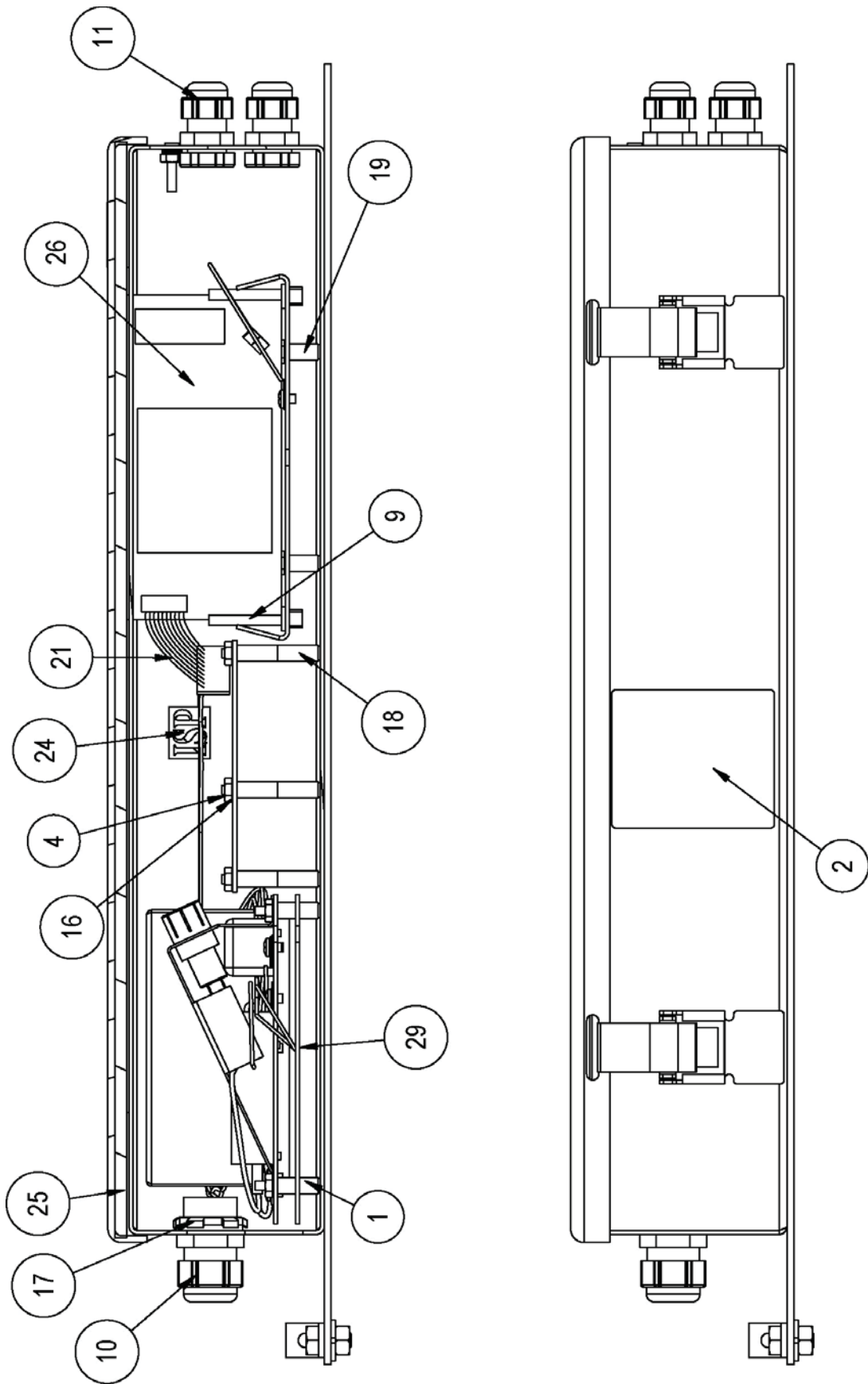
(USING COPPER WIRE CABLE FROM 225 TO FIRST JUNCTION BOX)



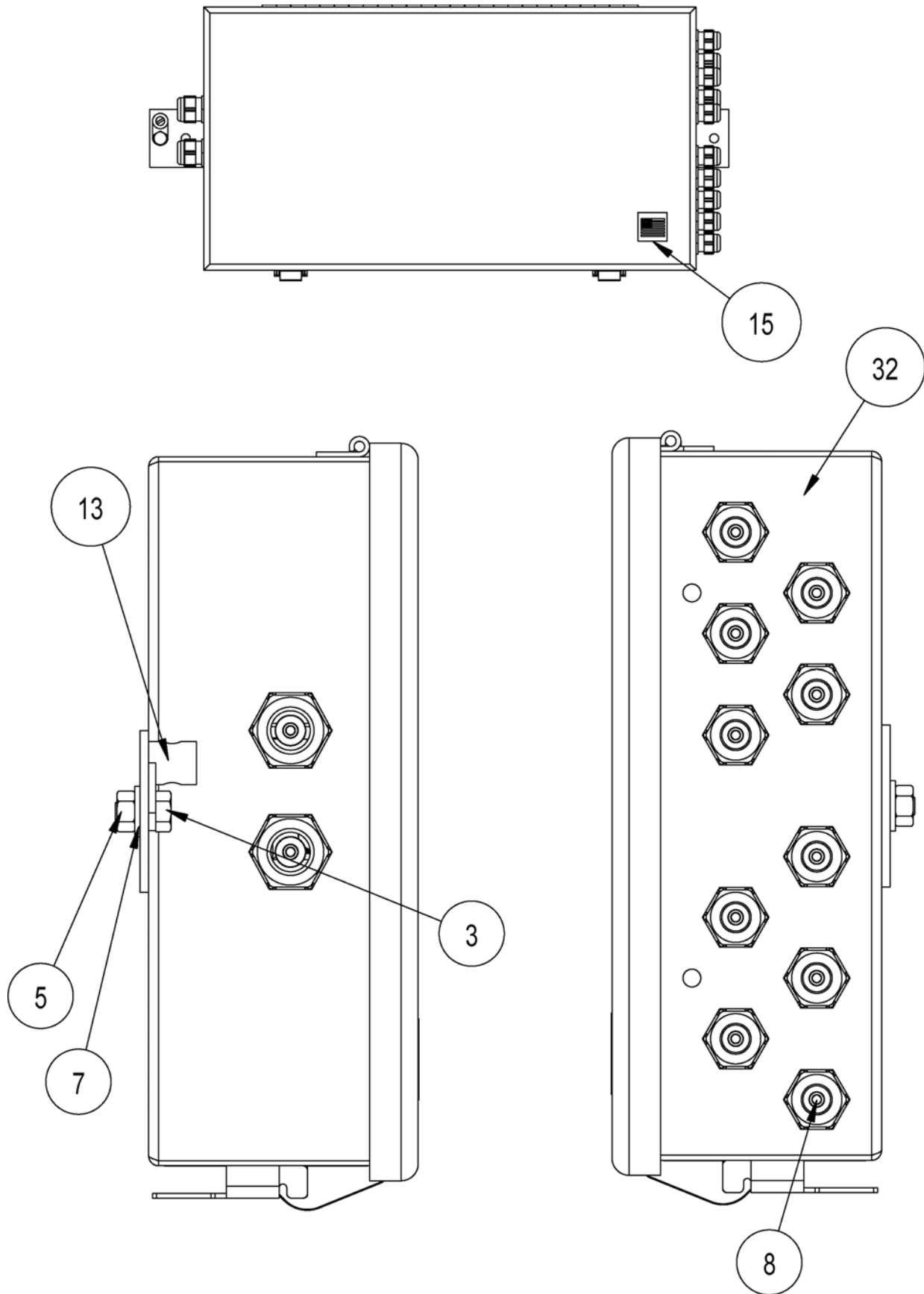
PART IDENTIFICATION



PART IDENTIFICATION, CONT.



PART IDENTIFICATION, CONT



PART IDENTIFICATION, CONT.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	8	0031-B014-08	SPACER
2	1	593GR986	SERIAL TAG
3	1	6007-0016	BLT HEX HD 1/4-20 x 1/2 Z/P
4	14	6013-0039	NUT HEX #6-32
5	1	6013-0047	NUT 1/4-20 HEX SS
6	10	6021-0663	#6-32 x 3/16 PHMS
7	1	6024-0040	WASHER – LOCK 1/4 HEL SPLIT
8	12	6540-1104	PLUG, HOLE 0.173 to .240 RED POLYETH
9	16	6610-1460	CARD GUIDE 1.2 VERT. PRESS IN NYLON
10	2	6610-2081	CONN GLAND .170 to .470 GRIP .875 MTG BLK
11	10	6610-2248	CONN GLAND .187 to .312 GRIP .599 MTG BLK
12	8	6610-5005	LUG SOLDER #6 x 0.625 FLAT LOCKING
13	1	6610-5006	GROUND LUG L-70
14	1	6610-5007	CABLE CLIP
15	1	6650-0087	LABEL: MADE IN THE USA
16	14	6680-0004	WASHER LOCK INT. TOOTH #6 Z/P
17	2	6680-0015	NUT CONDUIT 1/2 SEAL
18	8	6680-0080	SPACER #6 x .625 NYLON
19	4	6680-0121	SPACER (PCB) #6 x .438
20	1	8510-C346-01	LABEL – HIGH VOLTAGE
21	8	8580-B202-0A	CABLE A/D
22	8	8580-B210-0A	WIRE: 18GA, GRN, 5.0 #8RT/TINNED
23	1	8580-B211-0A	POWER CABLE
24	1	8580-B219-08	LABEL: "ISP"
25	1	8580-B223-08	GASKET
26	8	8580-C205-0A	PCB ASSEMBLY A/D
27	1	8580-C204-08	SUB PANEL – ANALOG/ DIGITAL
28	1	8580-C208-08	POWER SUPPLY COVER
29	1	8580-C222-0A	ASSEMBLY: SUB PANEL, HEATER
30	1	8580-C224-0A	ASSEMBLY: SUB PANEL, POWER SUPPLY
31	1	8580-D200-0A	PCB ASSEMBLY: iCAN CONTROLLER
32	1	8580-D207-0A	JBOX WELDMENT

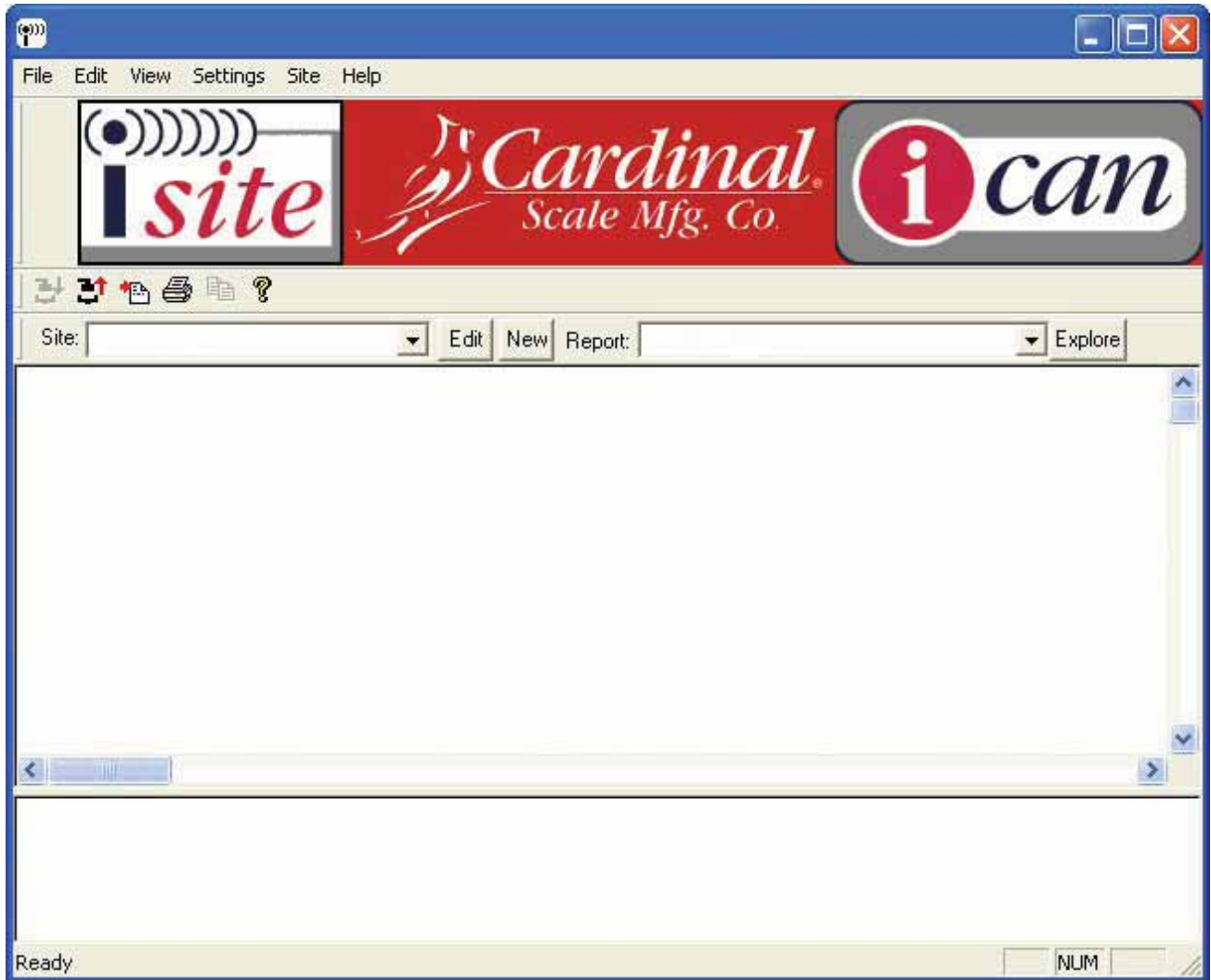
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APPENDIX A

ISITE OPTION

INTRODUCTION

The iSite software and hardware facilitates electronic communications from dealer or support personnel locations to iCan scale sites. The communications can be performed via network TCP/IP connections, direct serial port connections, or dial-up modem connections.



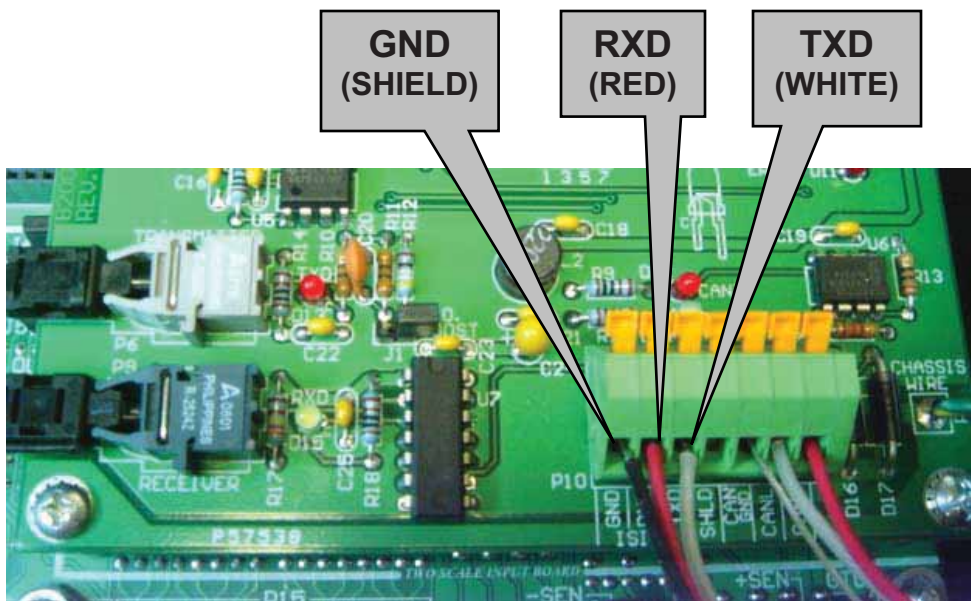
Status reports can be electronically requested from each iCan site at any time. These reports include weight information and millivolt readings for each load cell of each scale. An automatic request feature may be used to obtain new status reports from a site automatically at a specified interval, such as 40 seconds, or 20 minutes.

The iSite software automatically updates a summary report for each site as individual reports are requested. The summary report for a site provides quick comparison of load cell readings over the history of the site. The summary report may be opened with Excel to allow further analysis or graphing of the data.

APPENDIX A

ISITE SERIAL CABLE INSTALLATION

1. Remove the 14 acorn nuts securing the rear panel to the main housing (see FIGURE 27).
2. Loosen and remove one of the unused gland connector nuts and remove the plastic insert.
3. Using the serial cable provided with the iSITE kit, insert the bare wire end through the gland connector on the back of the 225 indicator.
4. Insert the cable wires into the terminal block on the 225CANG/P board as shown in the picture below.
5. Replace the rear panel and acorn nuts. Tighten the gland connector nut.



**225CANG/P BOARD
iSITE
SERIAL CABLE CONNECTIONS**

APPENDIX A

INSTALLATION

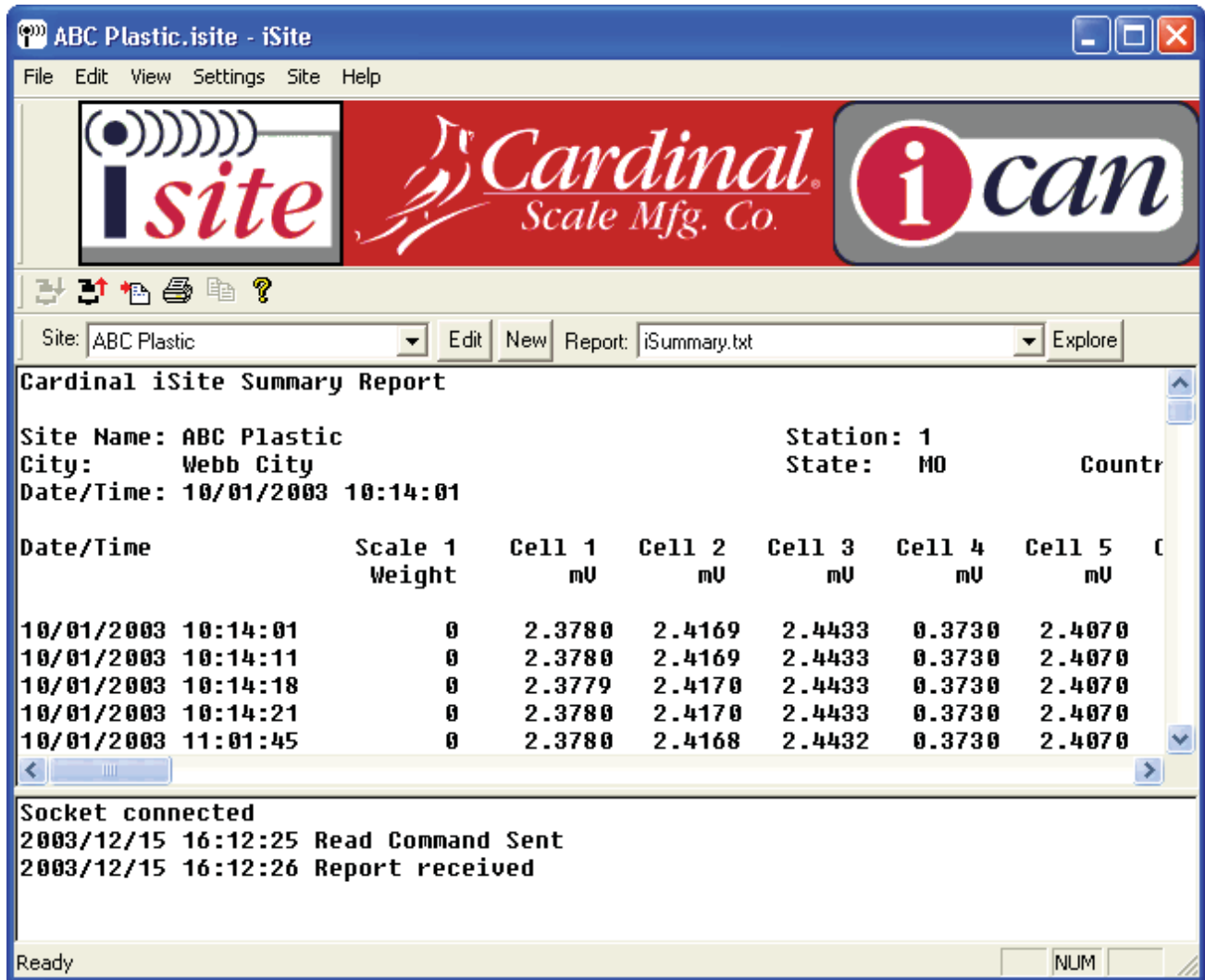
Insert the CD. For most systems the installation will begin automatically. Follow the onscreen prompts to perform the installation.

STARTUP

Double-click the “iSite” icon on the desktop, or click “Start” “Programs” and “iSite”.



The main iSite program window will appear.



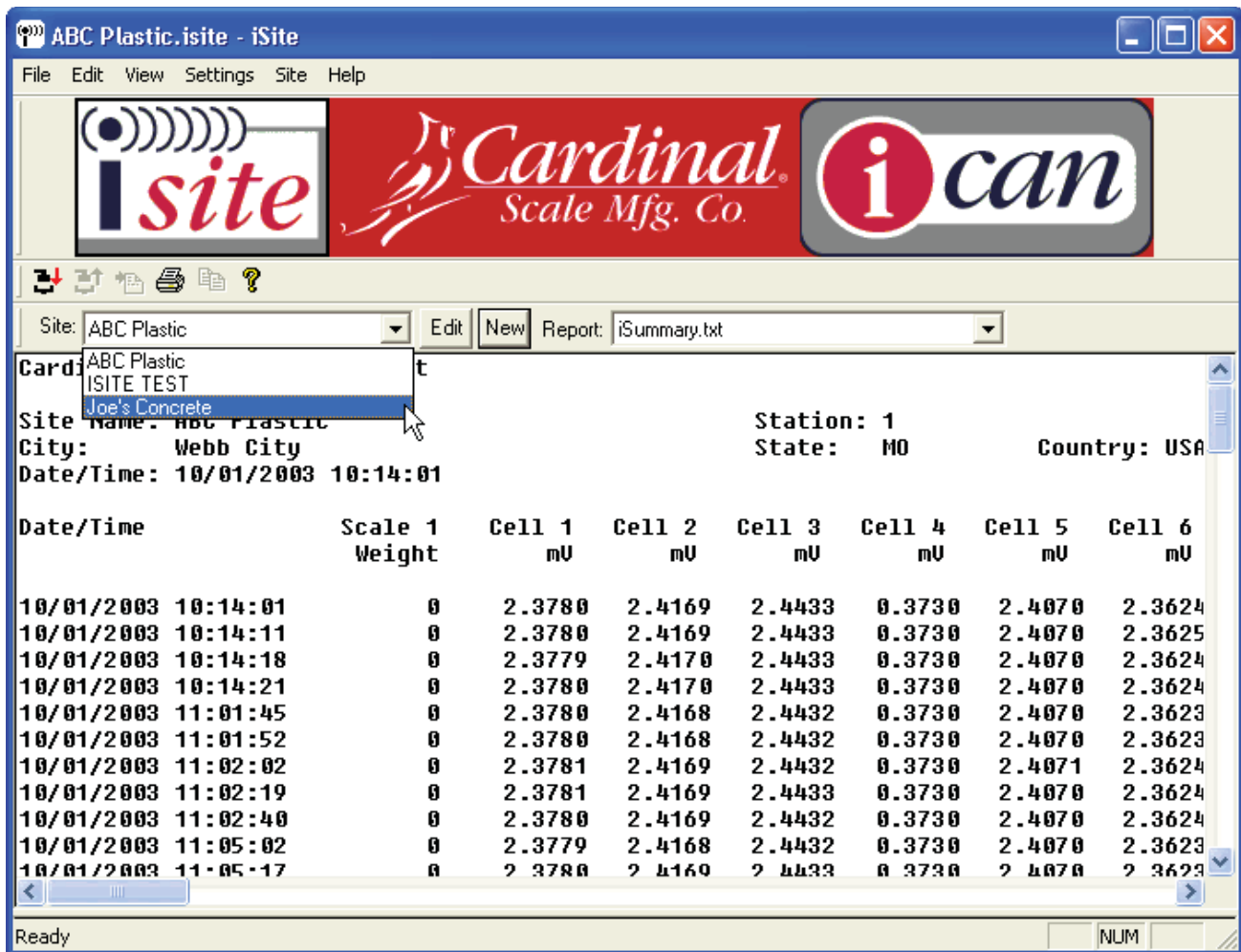
APPENDIX A

SELECTION BAR

The selection bar is used to select the desired site and report files quickly.



The iSite screen will initially show the most recently selected site. Click the downward arrow to the right of the “Site” prompt to show the list of sites available.



Click the desired site from the list.

Click “Edit” to edit the settings for the current site, or “New” to create a new site.

APPENDIX A

Registration | Connection

Site Name: ABC Plastic

Station ID: 1

City: Webb City

State: MO

Country: USA

Sales Order: B12345

Registration: 189020114

OK Cancel Apply

If a registration is used the site registration must be entered exactly as provided by Cardinal. For a non-registered site the “Registration” prompt should be left blank.

Registration | Connection

Device: TCP/IP

IP Address: 90.1.2.145

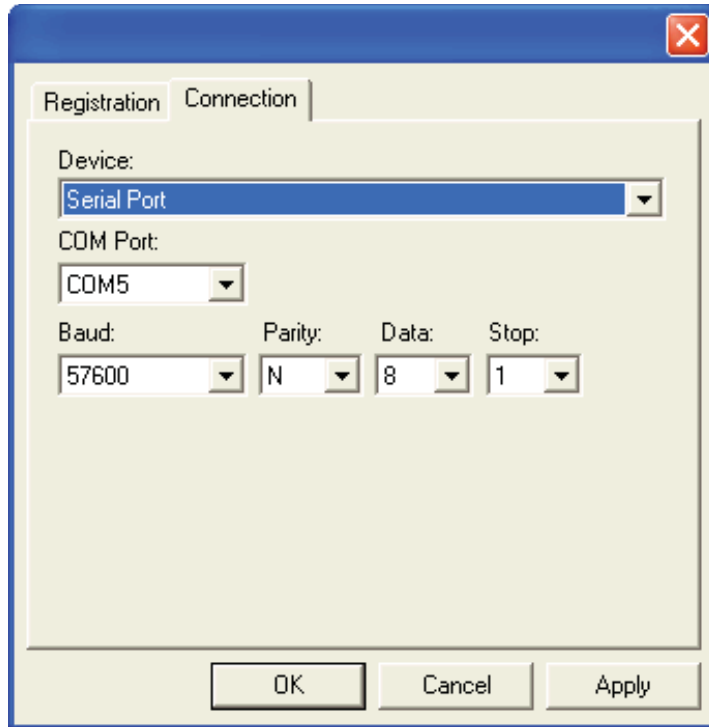
Port: 3001

OK Cancel Apply

Click the “Connection” tab for the connection settings to the site. Set the “Device” to “TCP/IP” for a TCP/IP network connection. Provide the appropriate “IP Address” and “Port”.

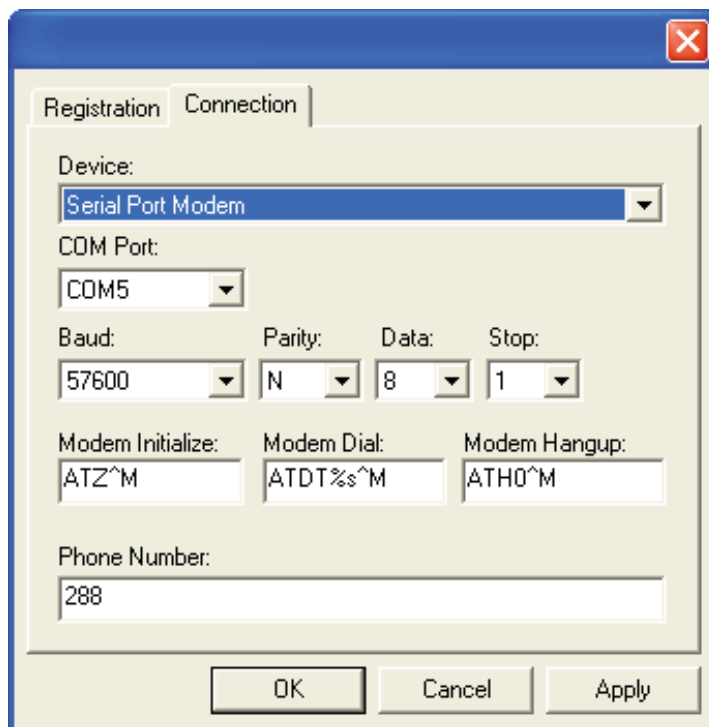
APPENDIX A

Set the “Device” to “Serial Port” for a direct serial connection.



Specify the appropriate “COM Port” “Baud”, “Parity”, “Data”, and “Stop” bits for the device.

Set the “Device” to “Serial Port Modem” to connect to the site by modem.



APPENDIX A

Specify the “COM Port”, “Baud”, “Parity”, “Data”, and “Stop” bits. The COM port for an internal modem can usually be determined by checking “Control Panel” “Modems”, or “Control Panel”, “System”, “Hardware/Device Manager”.

Specify the “Modem Initialize”, “Modem Dial”, “Modem Hangup” and “Phone Number” for the site. The “%s” in the “Modem Dial” command will be substituted with the phone number specified.

REPORT

When a site is selected the default summary report “iSummary.txt” will appear. To view other reports click the down arrow to the right of the “Report” prompt. A list of the available reports is displayed. The report file names are based on the date and time that the report was created. Click the desired report to view.

The screenshot shows the iSite software interface for 'ABC Plastic'. The main window displays a 'Cardinal iSite Detail Report' with the following information:

- Site Name: ABC Plastic
- City: Webb City
- Date/Time: 12/15/2003 14:59:54

Below this, it shows 'Cardinal iSite for iCan' with a table of data:

Scale	Weight	CalZero	WrkZero	Z diff
1	100	2265	2374	109

At the bottom, there is another table with columns: Cell, mVolts, Weight, Scale, CalZ, and Count.

Cell	mVolts	Weight	Scale	CalZ	Count
1	2.9424	6089	1	7431*	1 ok
2	3.7189	7696	1	7667	0 ok

A dropdown menu is open, showing a list of report files with timestamps, such as '2003-12-15 14-59-54 Report.txt' through '2003-12-15 15-55-11 Report.txt'. The status bar at the bottom indicates 'Socket connected' and '2003/12/15 16:12:25 Read Command Sent'.

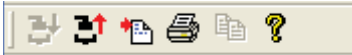
APPENDIX A

EXPLORE

As the reports are read they are created as text files in a folder “My Documents\iSite\sitename” (where *sitename* is the name of the site). To delete reports from a site or copy the reports to another location click the “Explore” button to open Windows explorer to the folder that corresponds to the current site.

TOOL BAR

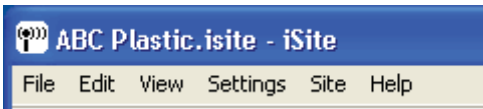
The tool bar is used to perform common operations quickly.



The first icon is used to connect to the currently selected site. The second icon is used to disconnect from the site. The third icon is used to read the report from the site. The fourth icon is used to print the current report. The fifth icon is used to copy any selected text to the clipboard. The final icon is used to display the “About” box.

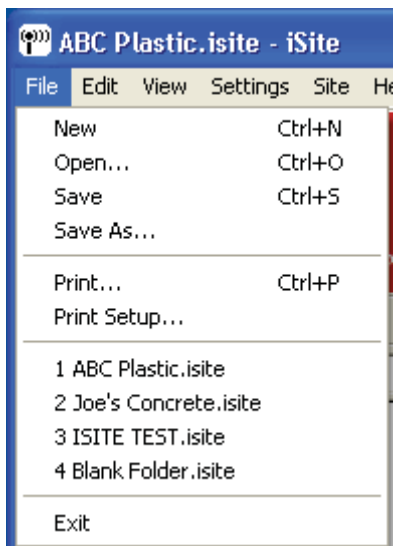
MENU BAR

The menu bar at the top of the program is used for various functions.



FILE

The “File” menu is used for file related activities.



- New** Create a new site
- Open...** Open a site
- Save** Save the site information
- Save As...** Save the site information as a new filename.
- Print...** Print the currently shown display
- Print Setup...** Specify printer options
- Recent files** Recently opened site files may be selected
- Exit** Quit the iSite program

APPENDIX A

EDIT

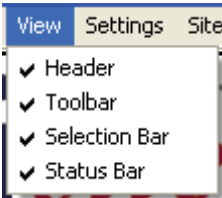
The “Edit” menu is used to copy text.



Copy When text is selected copy may be used to copy the text to the clipboard for use with other programs.

VIEW

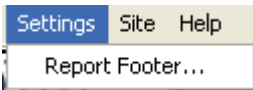
The “View” menu is used to modify the appearance of the program.



The **Header**, **Toolbar**, **Selection Bar**, and **Status Bar** may be displayed or hidden.

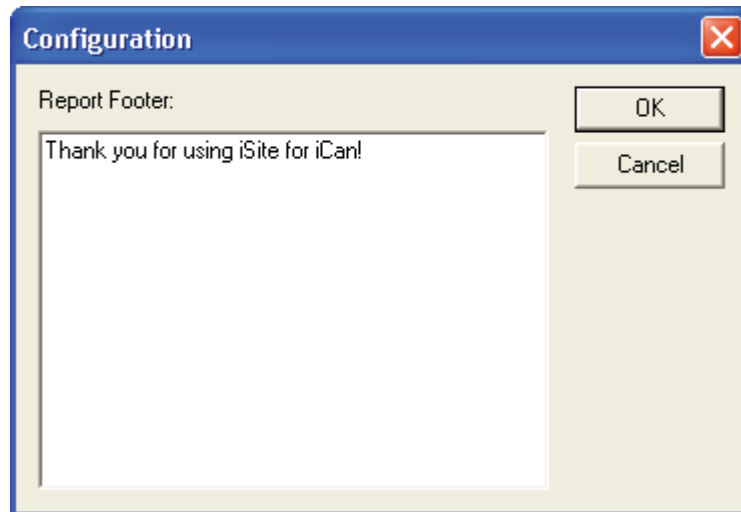
SETTINGS

The “Settings” menu is used to specify footer text to appear at the bottom of the reports.



Report Footer...

Footer text may be specified to appear at the bottom of each report.

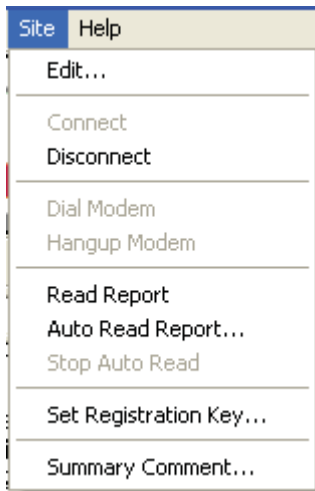


Click “OK” to save any changes to the text. Click “Cancel” to return to the main program without saving changes.

APPENDIX A

SITE

The “Site” menu is used to perform functions relating to the current site.



Edit... Edit the site information as shown above.

Connect Connect to the current site.

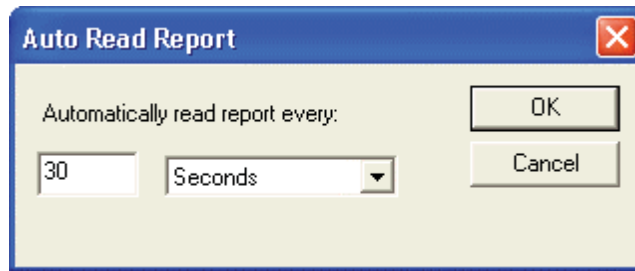
Disconnect Disconnect from the current site.

Dial Modem Dial the modem to connect to a dial-up site.

Hangup Modem Hangup the modem to a dial-up site.

Read Report Read the report from the site.

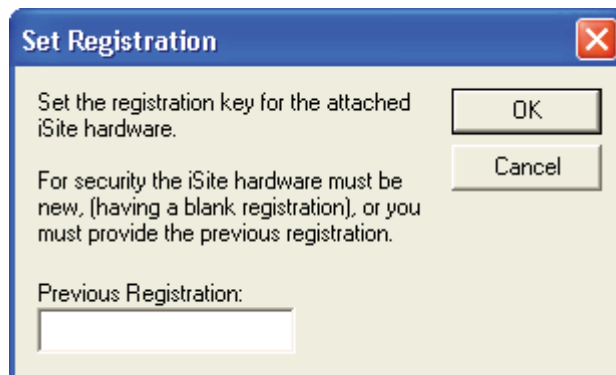
Auto Read Report... Automatically read the report at a specified interval.



Specify the time interval for auto read and click “OK” to start reading reports. Click “Cancel” to return to the main screen without starting autoread. iSite must be left open and connected for the auto read operation.

Stop Auto Read Stop the auto read operation.

Set Registration Key... Set the registration key for the first time use of the iSite hardware.



If the iSite hardware was previously programmed with a registration key the previous key must be provided. Click “OK” to set the registration key. Click “Cancel” to return to the main screen without setting the key.

APPENDIX A

Summary Comment As reports are read from each site iSite creates a summary report showing the history of the site. Summary comments may be entered to add to this report information such as maintenance actions or calibrations performed.



Click “OK” to add the comment to the summary report, or click “Cancel” to return to the main screen without adding a comment.

HELP

The “Help” menu is used show the about box.



About iSite... Display the about box showing program version.



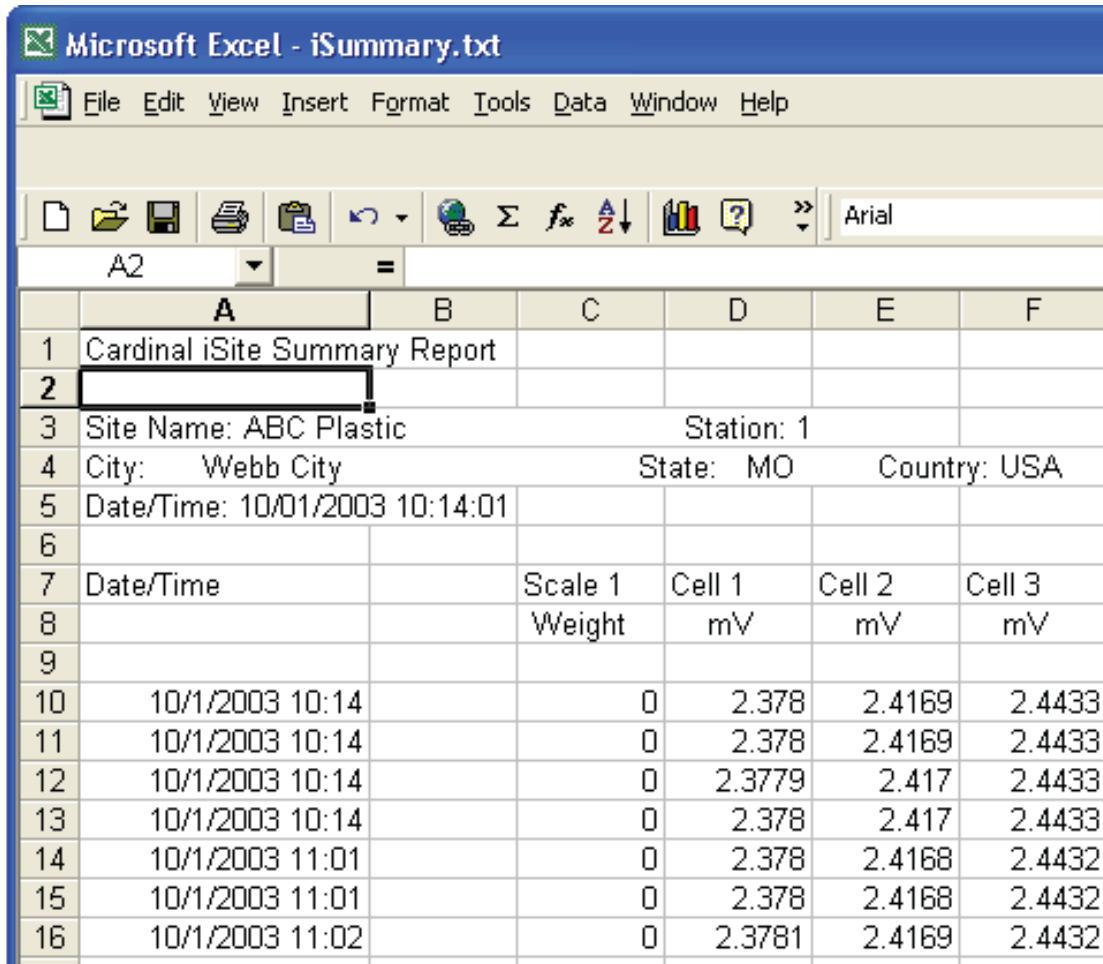
Click “OK” to return to the main program window.

APPENDIX A

EXCEL COMPATIBILITY

The site summary reports are in a tab delimited format. These reports may be opened with Excel to allow for more detailed review of the data or graphing.

In Excel click “File”, “Open” to display the file open dialog box. At the “Files of Type:” prompt select “*.txt”. Browse to the “My Documents\iSite\Your site” folder. Select the “iSummary.txt” file and click open. Specify “Tab Delimited”. This will insure that each load cell of each scale is given its own column in the spreadsheet.



The screenshot shows a Microsoft Excel window titled "iSummary.txt". The spreadsheet contains the following data:

	A	B	C	D	E	F
1	Cardinal iSite Summary Report					
2						
3	Site Name: ABC Plastic			Station: 1		
4	City: Webb City		State: MO		Country: USA	
5	Date/Time: 10/01/2003 10:14:01					
6						
7	Date/Time		Scale 1	Cell 1	Cell 2	Cell 3
8			Weight	mV	mV	mV
9						
10	10/1/2003 10:14		0	2.378	2.4169	2.4433
11	10/1/2003 10:14		0	2.378	2.4169	2.4433
12	10/1/2003 10:14		0	2.3779	2.417	2.4433
13	10/1/2003 10:14		0	2.378	2.417	2.4433
14	10/1/2003 11:01		0	2.378	2.4168	2.4432
15	10/1/2003 11:01		0	2.378	2.4168	2.4432
16	10/1/2003 11:02		0	2.3781	2.4169	2.4432

COMMAND LINE OPTION FOR TASK SCHEDULING

The iSite main program file iSite.exe supports a command line option “/AUTO” (without the quotes). This allows iSite to be specified as a scheduled task to run every week or month and automatically connect to each site, retrieve the report, and disconnect. Any sites that cannot be connected to, or the report cannot be read from, are automatically retried after all sites have been tried. When the reports from all sites have been read iSite will close automatically.

APPENDIX B

Replacing the iCAN Junction Box Controller Board (8580-D200-XA)



NOTE! By following this procedure, the iCAN junction box controller board can be replaced without the need to re-calibrate the scale. The 225 will reload the calibration data into the controller board.



CAUTION! OBSERVE THE PRECAUTIONS FOR HANDLING STATIC SENSITIVE DEVICES

1. Remove power from the junction box.
2. Disconnect the load cell input card ribbon cables, CAN bus connector, fiber optic cables, and 2-pin power cable from the controller board. Be careful to mark the fiber optic cables. Reversing them will disable the CAN bus.
3. Remove the four controller board mounting nuts and washers.
4. Replace the controller board.
5. Replace the nuts and washers.
6. Reconnect the ribbon cables, CAN bus connector, fiber optic cables, and the power connector.
7. Apply power to the junction box and observe the display for correct *Addr =* (address) and *Rad =* (number of load cell input cards, load cells) values.
8. Apply power to the 225.
9. Observe error message display with the statement:

PRESS RELOAD TO RELOAD BOX DATA

10. Press the [**RELOAD**] button.
11. Observe display with the statement:

RELOAD BOX DATA?

12. Press the [**YES**] key.
13. The box data should be reloaded into the controller board in the junction box.
14. When the process has finished, turn the power to the 225 off then back on.
15. Normal operation should return.



If the **SCALE 1 REQUIRES SETUP** or **CAN BUS BUSY** message appears on the 225, cycle power on the 225. Normal operation should return. For other errors call Cardinal Technical Support before proceeding (to avoid having to recalibrate the scale).

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APPENDIX C

Replacing the iCAN Interface Card (225CANP/G)



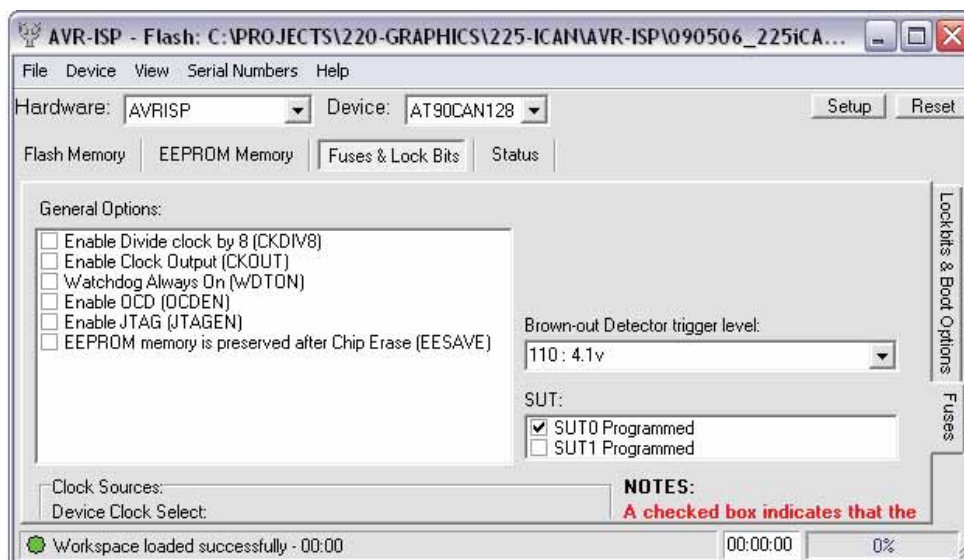
NOTE! By following this procedure, with the aid of a computer and the AVR ISP computer program, the iCAN interface card (225CANP/G) can be replaced without the need to re-calibrate the scale. In order to accomplish this, the flash and EEPROM data must be read from the card to be replaced and programmed into the new card.

First, assuming that the microcontroller on the existing iCAN interface card can be powered and the program can be read, the AVR ISP program will be used to read the flash and EEPROM data from the card to be replaced. Then, the AVR ISP program will be used to program the new card with the data read from the old card.



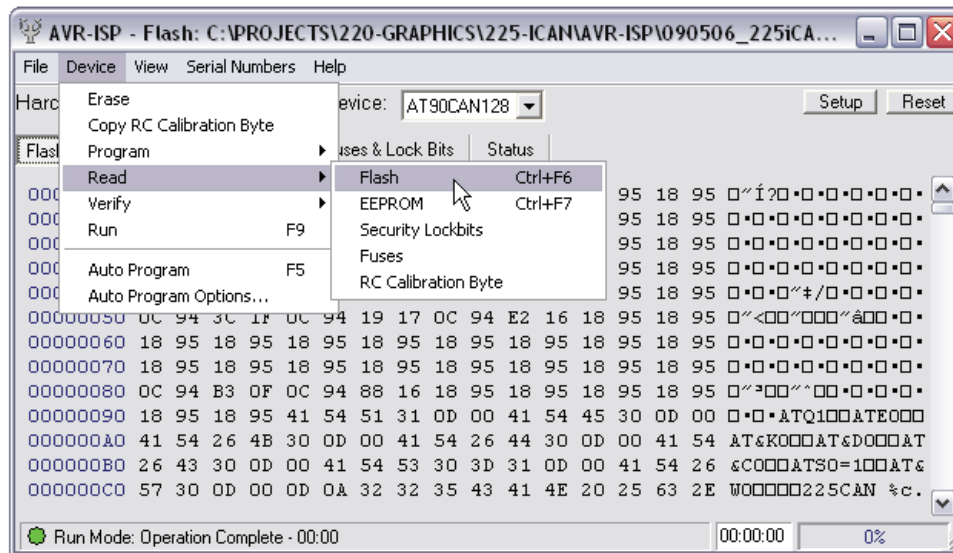
CAUTION! OBSERVE THE PRECAUTIONS FOR HANDLING STATIC SENSITIVE DEVICES

1. Remove the 225 power cord from the wall outlet.
2. Remove the fourteen acorn nuts securing the rear panel to the main housing.
3. Lift the back panel from the main housing, taking care not to stretch the cable and wires between the panel and main housing. Lay the back panel on the work bench/table next to the indicator. **NOTE!** You may need to loosen the gland connectors to allow enough slack in the cable and wires to avoid stretching them.
4. Connect the ISP programmer ribbon cable to the iCAN interface card ISP connector P2.
5. Re-insert the 225 power cord into the wall outlet.
6. Press the **ON/OFF** key on the 225 keypad to turn on the 225 indicator.
7. Start the AVR ISP program and select Device: **AT90CAN128**.
8. Click “Fuses and Lock Bits” and check boxes as shown below.



APPENDIX C

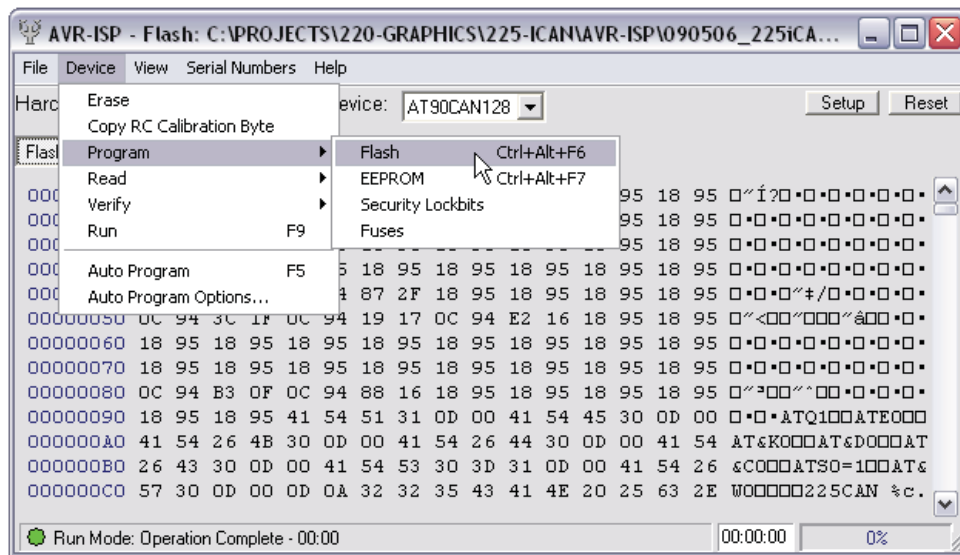
9. Read the flash from the iCAN interface card by clicking the Device/Read/Flash menu as shown below.
10. Wait for the “Flash: Read Complete” message to appear in the bottom of the AVR ISP window.
 - a. If the message “Your target device is not responding, check power, connections, & clock settings” appears in the bottom of the AVR ISP window, attempt to resolve the problem and retry. If the problem cannot be resolved, a failure of the card microcontroller circuit is indicated and the flash and EEPROM data cannot be retrieved. Follow steps 11 – 18 to replace the iCAN interface card. Setup and calibration will have to be performed on the system. See the Setup and Calibration section of this manual for instructions.
11. Read the EEPROM from the iCAN interface card by clicking the Device/Read/EEPROM menu as shown below.



12. Wait for the “EEPROM: Read Complete” message to appear in the bottom of the AVR ISP window.
13. Remove the ISP programmer ribbon cable from the iCAN interface card ISP connector P2.
14. Remove the 225 power cord from the wall outlet.
15. Disconnect the CAN bus wire and fiber optic cables from the iCAN interface card. Be careful to mark the fiber optic cables. Reversing them will disable the CAN bus.
16. Remove the four screws and washers securing the iCAN interface card to the 225 main board and then remove the ground wire from the interface card to the 6-32 threaded stud in the main housing.
17. Replace the iCAN interface card.
18. Attach the ground wire first and then secure the iCAN interface card to the main board with the four screws and washers.
19. Reconnect the CAN bus wire and the fiber optic cables.

APPENDIX C

20. Connect the ISP programmer ribbon cable to the iCAN interface card ISP connector P2.
21. Re-insert the 225 power cord into the wall outlet.
22. Press the **ON/OFF** key on the 225 keypad to turn on the 225 indicator.
23. On the AVR ISP program window, select Device/Program/Flash.
24. Wait for the “Flash: Programming Complete” message to appear in the bottom of the AVR ISP window.
25. On the AVR ISP program window, select Device/Program/EEPROM.
26. Wait for the “EEPROM: Programming Complete” message to appear in the bottom of the AVR ISP window.



27. Remove the 225 power cord from the wall outlet.
28. Remove the ISP programmer ribbon cable from the iCAN interface card ISP connector P2.
29. Ensure that no cables or wires are exposed between the main housing and the rear panel, then place the rear panel onto the main housing and secure it using the fourteen acorn nuts removed in step 2.
30. Re-insert the 225 power cord into the wall outlet.
31. Press the **ON/OFF** key on the 225 keypad to turn on the 225 indicator. Normal operation should return.

If the **SCALE 1 REQUIRES SETUP, CAN BUS BUSY, ICAN CARD TIMEOUT** or **CALIBRATION REQUIRED** message appears on the 225, cycle power on the 225. Normal operation should return. For other errors call Cardinal Technical Support before proceeding (to avoid having to recalibrate the scale).



If the **BOX MISSING ERROR** appears, the process has failed. Repeat the process following each step exactly. If the **BOX MISSING ERROR** appears again, there is a problem in communications between the iCAN interface card and the junction box. Verify that the fiber optic or copper wire CAN Bus cables are properly installed and not damaged.

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)	LIFETIME	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
LSC SCALE (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
SWIM AND 760 SERIES 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
CONVEYOR BELT SCALES (including Belt-Way)	1 YEAR	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D, E, F



CARDINAL

Ph. (800) 441-4237
E-mail: cardinal@cardet.com
102 E. Daugherty
Webb City, MO 64870

04/24
Printed in USA
315-WARRANTY-CAR-M

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 / Belt-Way 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.



Ph. (800) 441-4237
E-mail: cardinal@cardet.com
102 E. Daugherty
Webb City, MO 64870

04/24
Printed in USA
315-WARRANTY-CAR-M

Cardinal Scale Mfg. Co.

102 E. Daugherty, Webb City, MO 64870 USA

Ph: 417-673-4631 or 1-800-641-2008

Fax: 417-673-2153

www.cardinalscale.com

Technical Support: 1-866-254-8261

E-mail: tech@cardet.com

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