CARDINAL®

ARMOR® TRUCK SCALES

GUARDIAN® HYDRAULIC LOAD CELLS

Hydraulic Truck Scale

Installation Manual

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FCC Compliance Statement

This equipment generates uses, 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 designed within the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules 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. Request stock No. 001-000-00315-4.

Serial Number_____

Date of Purchase _____

Purchased Form_____

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RETAIN THIS INFORMATION FOR FUTURE USE

PRECAUTIONS

Before using this product, read this manual and pay special attention to all "NOTIFICATION" symbols:

DANGER!
WARNING!
CAUTION!

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INTRODUCTION

Cardinal's ARMOR® Truck Scales with Guardian hydraulic load cells are the ideal choice for the solid waste, aggregate, chemical, grain, and construction industries because they offer a high level of protection against many of the conditions that can adversely affect truck scale installations.

The NTEP legal-for-trade ARMOR® Guardian has no electronic components at the scale making it highly resistant to damage from water, lightning and voltage surges, corrosion, rodents, shock loading, and extreme climatic conditions that can dramatically increase the cost of ownership of your scale. The ARMOR® Guardian hydraulic load cells are covered under a true lifetime warranty against all of these-protecting your investment. Every ARMOR® Guardian is 100% assembled, pre-calibrated, and tested before shipping.

This manual must be used in conjunction with certified drawings of the particular truck scale model being installed. *In case of conflict, the certified drawings will govern.*

This manual should be studied thoroughly before attempting to install the ARMOR® Truck Scale with Guardian hydraulic load cells. Safety should always be the prime consideration during all phases of the installation. Failure to comply with the instructions in this manual will void all warranty implied or stated.

SITE PREPARATION REQUIREMENTS

Site preparation is consistent with any other truck scale installation. The foundation will have conduit stubbed up at each load cell and run to a central pull box at the center of the scale. Any deviation from this should be noted since extra tubing may be required. Tubing length may not exceed 125 feet from the load cell to the totalizer, and no splices are allowed. Consideration should be given to avoid tight radius bends in the conduit that would make it difficult to pull the tubes to the totalizer enclosure.

The totalizer enclosure should be located in a protected area close to the scale, and the indicator cable ran in conduit to the scale house if long tubing runs need to be avoided.

Soil bearing capacity and pier depth must be verified for local conditions and regulations before foundation construction.

INSTALLATION

At this point, the foundation should be in place as specified on the certified foundation drawing.

Foundation Verification

Begin the installation procedure by verifying that the following items have been cast in the concrete foundation and have been properly located per the certified foundation drawing:

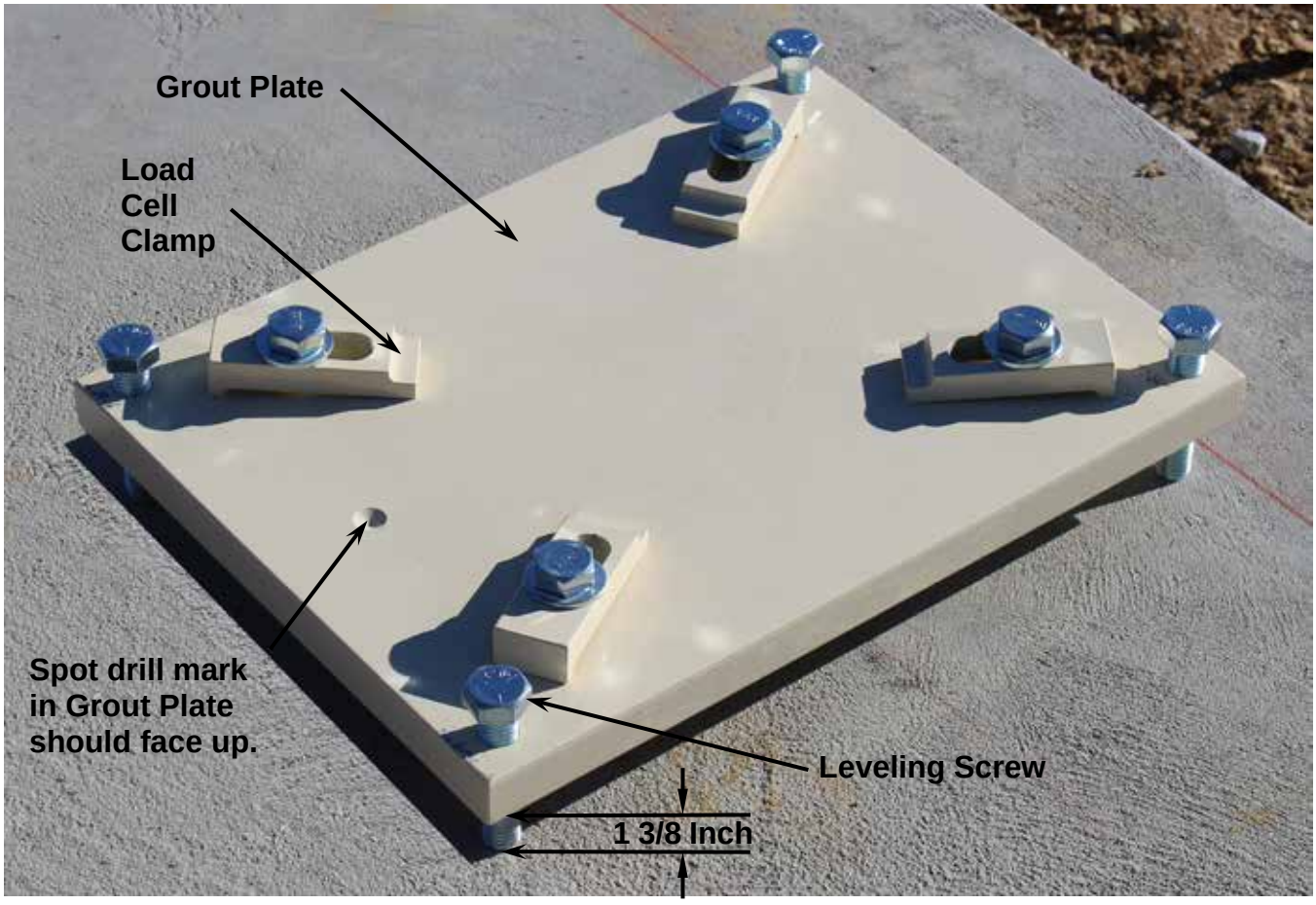
- Conduit for hydraulic tubing from load cells to pull box (1” minimum)
- Conduit from pull box to totalizer (2” minimum)
- Coping angle assembly

NOTE: Top of piers are to be smooth and level within ± 1/8" (all piers are to be within 1/4"). Ensure concrete piers are clear of debris and rough spots before setting grout plates in place.

Installing the Grout Plates and Load Cells

In most installations, it is advisable to locate and install the cells before the bridges are set in place. Grouting of the grout plates is done after the bridges have been set, everything has been positioned, and all load cells within each section are taking an equal load.

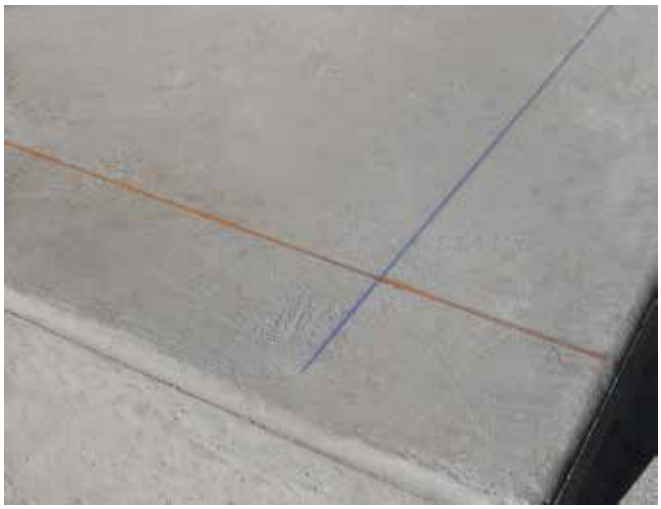
1. Begin by installing the leveling screws in each of the grout plates and adjusting them so that 1 3/8 inch of the bolt is protruding from the bottom of the grout plate.



Adjust Leveling Screws to protrude 1 3/8 inch below the bottom of the grout plate.

2. Establish the placement of the grout plates on the piers, per the foundation drawing. Snap a longitudinal chalk line off the centerline and a lateral chalk line from the edge of the end piers.

Snap a longitudinal chalk line on edge of piers per foundation drawing.



Per foundation drawing, snap a lateral chalk line for aligning grout plates.

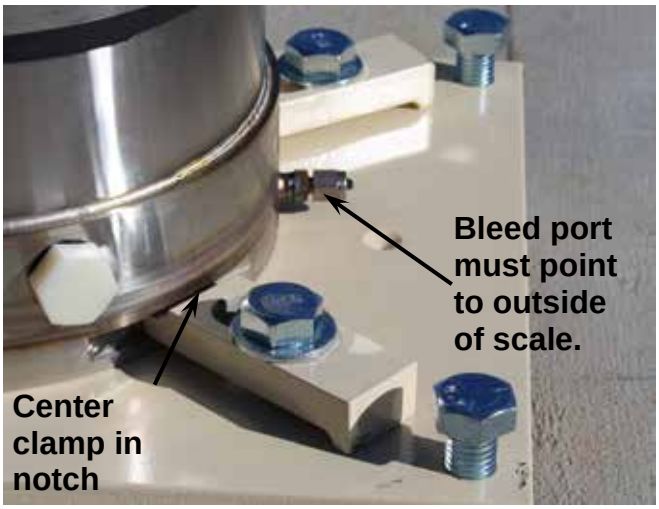
3. Place the grout plate on the pier and verify it is level in both directions. Adjust the leveling screws up or down to ensure the grout plate is level on the pier.

Place grout plate on the pier and ensure it is level in both directions.

Adjust leveling screws up or down to level.

4. Place the load cell (evenly between the clamps) on the grout plate, so that the bleed port is pointing to the outside of the scale. Center the four load cell clamps in the notches on the load cell and then tighten the bolts down securing the load cell to the grout plate.

Place load cell on grout plate with bleed port pointing to outside of the scale.



Center clamps in notches and tighten bolts to secure load cell to grout plate.

5. After securing the load cell to the grout plate, make sure the grout plate/load cell assembly is still level, and correctly aligned on the pier.

After securing the load cell to the grout plate, check to make sure it is still level.

Check to make sure the grout plate is still correctly aligned on the pier.

6. With the grout plate and load cell assembly verified level and aligned on the foundation piers, the grout forms can now be installed around the grout plate. Note that it is usually helpful to use caulk on the bottom of the forms to keep the grout from leaking from underneath the forms.

Use caulk on the form bottom to prevent grout from leaking underneath the form.

Grout forms in place around grout plate and load cell assembly.

Installing the Totalizer Enclosure and Load Cell Tubing

1. After the grout plate/load cell assemblies have been located, mount the totalizer enclosure as close to the digital weight indicator as possible. The totalizer enclosure should be mounted at least 24 inches off the ground to allow room to connect the hydraulic tubes running from the load cells to the bulkhead fittings. The 2-inch conduit from the scale should be stubbed up directly under the left side of the totalizer enclosure for the easiest installation.
2. After the load cells and the totalizer enclosure have been located, the hydraulic tubes must be cut to length and installed. Always start with the longest runs first, and be aware that the drops from some of the longer runs may be used for shorter runs.

   NOTE: At the bulkhead plate, loop the tube for each load cell, so that the tube can be moved if necessary, and to allow a tube to be cut off and a new ferrule set installed if necessary.

Mount Totalizer Enclosure at least 24 inches off ground to allow room to connect tubing to bulkhead fittings.

Loop tube at bulkhead plate so the tube can be moved and repaired if necessary. (Cut and a new ferrule set installed.)

Leave a loop of tube at each load cell, so the cell can be moved if necessary and to allow a tube to be cut off and a new ferrule set installed if necessary. **NEVER** attach the tube to the scale weighbridge, as the vibration will lead to fatigue and failure of the tube to load cell connection.

3. Using a sharp tube cutter, cut about one inch off the end of each tube.
4. Cut only halfway through the tube then, gently bend the tube back and forth to finish the cut. This keeps the inside diameter of the tube from collapsing when the cutter breaks through the tube wall. Use a jeweler's file to remove any burrs from the end of the tube.
5. Place the nut and inner and outer ferrule over the tube, and then assemble it finger tight onto the load cell or totalizer fitting.
6. Mark the nut so that you can tell where you began tightening the fitting, and tighten 3/4 to 1 turn.
7. Swagelok makes a simple gauge to check the connection so that if it will slide in between the fitting and nut, it needs tightened more.

Swagelok Gap Inspection Gauge

8. If you must remove a fitting, mark the nut and fitting so that when you reassemble the connection, you go back to the same place. When this is complete, make an additional 1/8 to 1/4 turn.
9. Connect the load cell tubes to the totalizer enclosure bulkhead fittings. The tubes are normally installed with section #1 (tubes for cells one and two) being installed toward the front of the enclosure with the odd cells on the left and even cells on the right. The tube caps should be installed finger tight then tightened an additional 1/8 to 1/4 of a turn to lock the fitting in place.
10. All of the cell tubes should be installed at this time.

Install load cell tubes with load cells 1 and 2 to the front of bulkhead with odd cells on left and even on right. Note that load cell tubes shown, have protective conduit supplied by the installer.

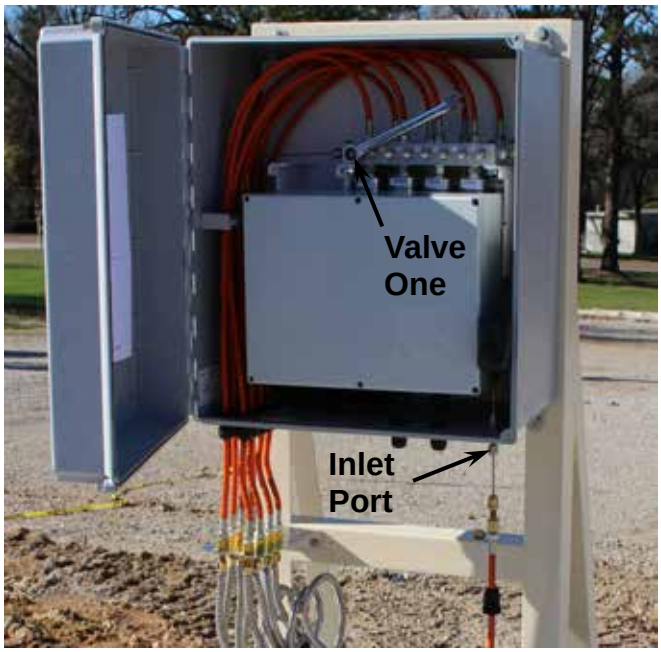
Gauging SST Hydraulic Load Cells

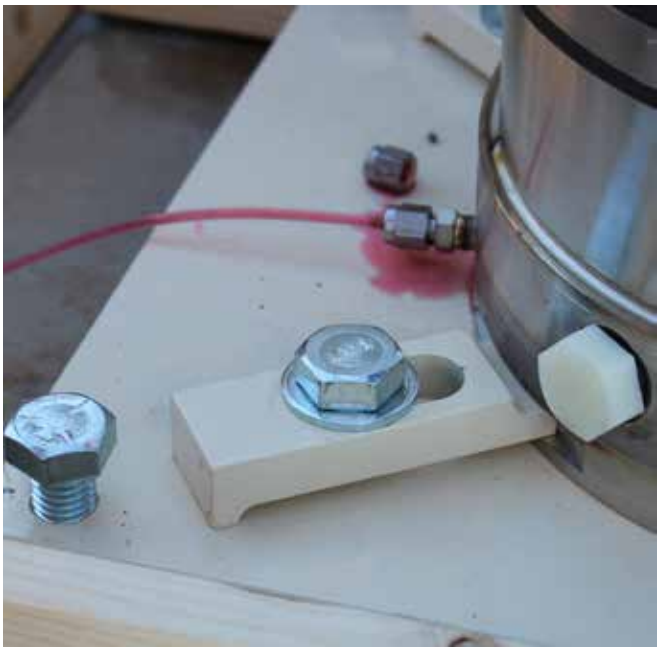
Filling and bleeding the system is a very simple procedure. Begin by filling the pressure pump with oil and attaching it to the inlet port located on the outside, the bottom right side of the totalizer enclosure. This pump is used to push oil through the system for bleeding purposes.

1. First, jack up the weighbridge at load cell number one to remove the deadload from it before bleeding and purging the line.
2. Next, remove the plastic gauge port plugs from load cell number one and place a .026 inch thick shim in each of the three gauge ports.
3. Place a container under the tube at the load cell to catch oil as air is purged from the line.

> **CAUTION!** It should be noted that load should **NEVER** be applied to a load cell unless the circuit for that cell is sealed and the cell has the correct amount of oil in it. Placing a load on a load cell with no oil, or the incorrect level of oil in it, can damage the pressure diaphragm in the cell.

4. Open Manifold valve number one and pump oil through circuit number one until no air bubbles are seen coming out of the load cell end of the line.
5. Now remove the plug at the load cell inlet fitting, and install the tube.
6. Tighten the tube nut finger tight, then an additional 1/8 to 1/4 turn.
7. Next, remove the cap from the bleed port on the cell and attach a plastic bleed hose, placing the end in a clean glass container.
8. Now pump 10-12 strokes of oil through the cell to ensure the cell has no trapped air inside it. If air bubbles are still visible coming from the plastic line, continue pumping oil through the system until no further air remains.





Attach pressure pump to the inlet port and then open manifold valve one.

9. Lower the weighbridge onto the load cell and then proceed with gauging the load cell.

NOTE: Always bleed the load cell with the weighbridge and deadload off the load cell, and then gauge the load cell with the weighbridge in place, and the deadload applied.

10. Remove the plastic bleed tube, replace, and snug the bleed port cap. After the cap is installed, stroke the pump one more time and close the manifold valve for load cell number one.
11. See if the three gauge shims are tight in the load cell. If not, open the bleed valve and pump another stroke of oil into the load cell.
12. Continue this procedure until the shims in the cell are snug.

SST75 Hydraulic Load Cell with .026 Shims in Gauge Ports

13. At this point, tighten the bleed screw in the manifold.
14. Now carefully open the bleed cap and let a few drops of oil out of the load cell until the shims can be pulled free. Once complete, tighten the bleed cap.
15. At this point, the cell's gauge gap should be very close to the .027 +/- .001 gap that is necessary for operation.
16. Repeat this procedure on all cells in the system until all cells are bled and filled to the correct level.
17. After the weighbridges are installed on the deck, double-check the gap.
18. Replace the gauge port caps on the cells.

WEIGHBRIDGE INSTALLATION

After the load cells are in place and full of fluid, position the bolt-down check stands near the check plate's areas as shown on the final assembly drawing.

With the load cells in place and full of fluid, and the bolt down check stands in position on the piers per the final assembly drawing, the weighbridges can be set in place.

1. Run a string down the side of the foundation to aid in aligning the bridges.
2. Place wood blocks on the piers as safety blocks by each load cell to set the bridges on.

NEVER place the bridge modules directly on the load cells with a crane as damage to the pressure diaphragm may result.

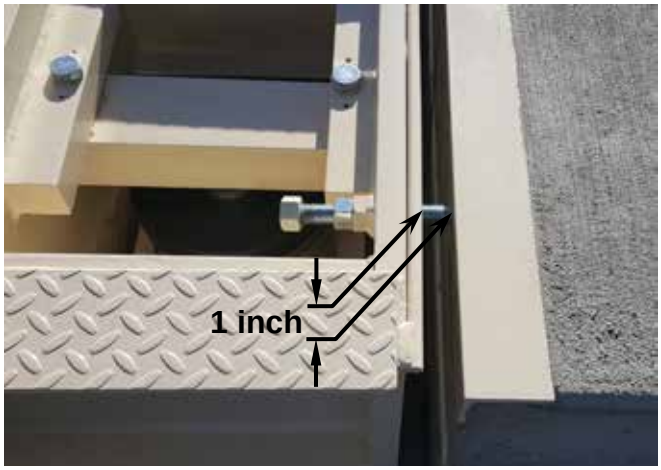
3. Set the first weighbridge module on the wood blocks so the module ends are on the wood blocks and the edge of the module lines up with the string down the side of the foundation.

Set weighbridge on wood blocks aligning with string ran down the side of foundation.

4. After the weighbridge module is on blocks and aligned, use a hydraulic jack to lift up the weighbridge module and remove the wood blocks.
5. Carefully lower the weighbridge module onto the load cell.
6. Repeat this procedure at all load cells on the weighbridge module.
7. Use the alignment bolts to position the first module so that there is (1) inch clearance from the edge of the module to the coping angle assembly.

NOTE: The alignment bolts are used to adjust for squareness and to help hold the scale in position while installing the check stands. They must be removed before scale calibration and operation.

Use a hydraulic jack to lift weighbridge and remove wood blocks, and then lower weighbridge down on the load cell.



Use alignment bolts to position the first module for (1) inch clearance from coping angle assembly.

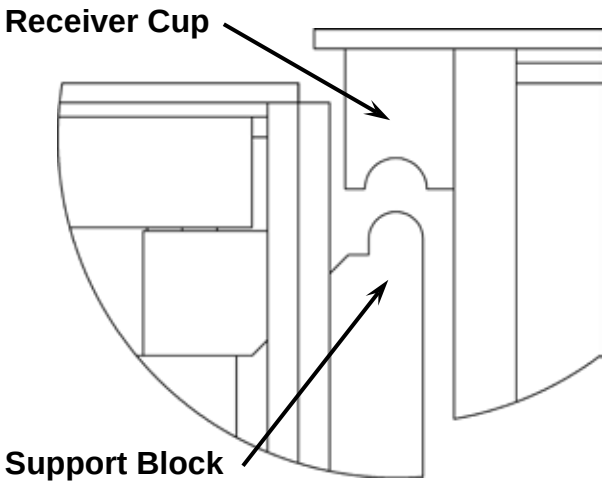
8. Remove lifting lugs from first bridge module and install them on the second bridge module.
9. Lower the second bridge module onto the wood blocks on the load cell end. When in position, align the receiver cup on it with the support block on the first bridge module.

Remove lifting lugs from the first bridge module and install them on the second.

Align second bridge receiver cup with first bridge support block.

NOTE: The modules use the simple EPR receiver cup/support block connection that greatly simplifies the installation of the bridge modules.

Bridge receiver cup aligned with bridge support block.



Bridge Connection Detail

10. For each additional bridge module, remove the liftings lugs from the previous module and install them on the next module.
11. Lower the additional bridge module onto the wood blocks on the load cell end. When into position, align the receiver cup on it with the support block on the previous bridge module.
12. After the weighbridge module is aligned and connected to the previous module, use the hydraulic jack to lift up the weighbridge and remove the wood blocks.
13. Carefully lower the weighbridge on the load cell.
14. Repeat this procedure for the remaining load cells on the weighbridge module.

Lower bridge module receiver cup onto previous bridge module support block.

Lift bridge with a hydraulic jack, remove wood blocks, then lower onto load cell.

Complete the installation of the hydraulic load cell assemblies and grout them in place permanently, before loading the scale.

1. Begin by adjusting the hydraulic cell assemblies to the proper elevation on the four end load cells to get the scale deck even with the approach. Be very careful to keep the grout plates level and the load cell-centered between the legs of the head channels. After the ends are set at the correct elevation, use a transit to shoot the center sections of the scale to get them at the same elevation.
2. The grout plates should now be ready to grout in place. Use an approved non-shrinking epoxy type only. Five Star Epoxy Grout or equal is recommended. Follow carefully the manufacturer's recommendations for mixing and cure time of the grout.
3. Pour the grout into the grout forms, allowing it to flow completely under the grout plate. Care should be exercised to ensure that no voids occur under the grout plates.

Pour grout into grout forms, allowing it to flow completely under the grout plate.

Make sure there are no voids under the grout plates.

WARNING: Do not load the scale until grout is installed under the grout plates, the grout has been allowed to dry overnight, and is completely cured. The leveling bolts will not support any load beyond the dead weight of the scale.

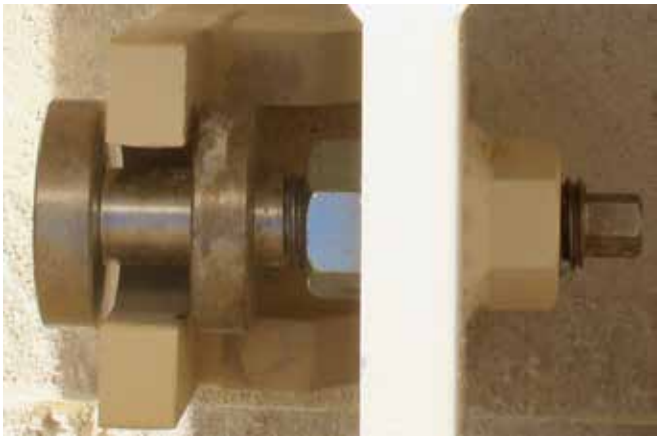
Allow grout to dry overnight before removing forms and loading scale.

INSTALLING THE CHECKING STANDS

After the weighbridges have been set in place, the position of the bolt-down check stands should be verified before they are permanently installed.

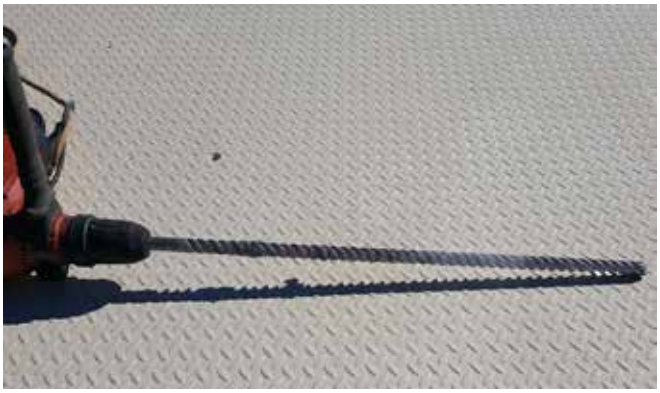
1. Ensure the check bolt is in the open slot of the bolt-down check stands, then move them together toward the check plate, and begin engaging the threaded check bolt in the check plate. Be sure the check plate bolt has full engagement with the welded-on nut on the check plate. Make sure the bolt-down check stands are centered on the check bolt and square to the shoulders of check bolt and that all anchor hole locations are visible and accessible from the top of the scale before drilling anchor holes.

Ensure check bolt is in open slot of bolt down check stand. Move them together toward check plate, and begin engaging the threaded check bolt in the check plate.



Check stand must be centered on check bolt and square to shoulders of check bolt. Ensure anchor hole locations are accessible from the top of the scale.

2. Drill suitable holes for the anchors. Note, that in order to allow the drill to clear the weighbridge, a drill bit of a minimum of 24 inches in length is required.

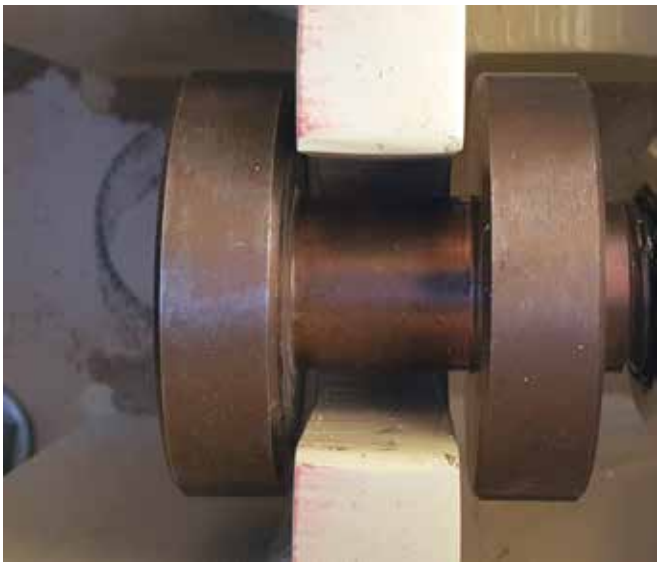


A minimum 24-inch drill bit is required to clear the weighbridge when drilling holes.

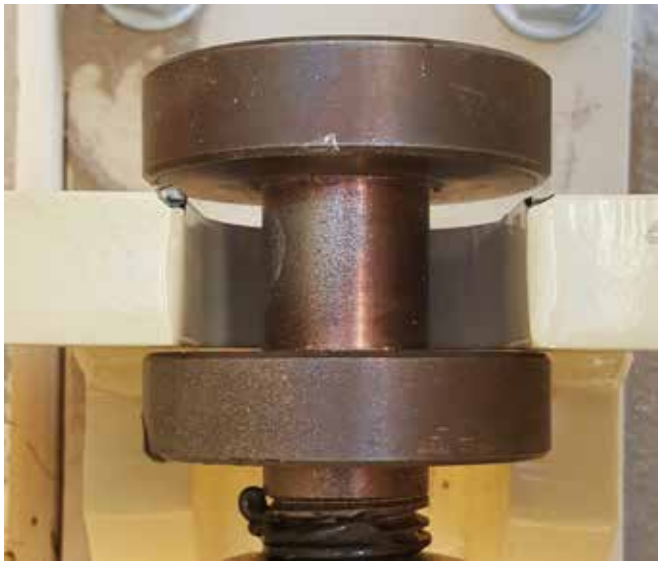
Drill suitable holes for the anchors.

IMPORTANT! To ensure the anchor holes are at the correct depth, remove the dust from the holes after drilling is complete. Use a vacuum (with a long nozzle) to remove the dust out of the holes.

3. Once the bolt-down check stands have been installed, the bumper bolts should be checked for the correct positioning in the check stand and adjusted to the proper clearance.



Check bumper bolts for proper clearance on both sides of the check stand plate.

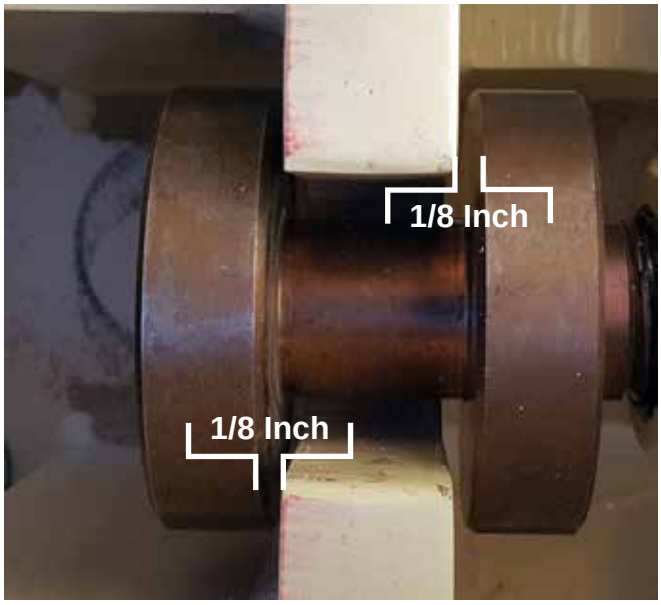


The clearance shown here is incorrect and requires adjustment.

4. The bumper bolts should be adjusted so that there is 1/8-inch clearance on both sides of the check stand plate.

5. After clearance is set, use a 1 1/4” wrench to tighten the jam nut against the check stand plate.

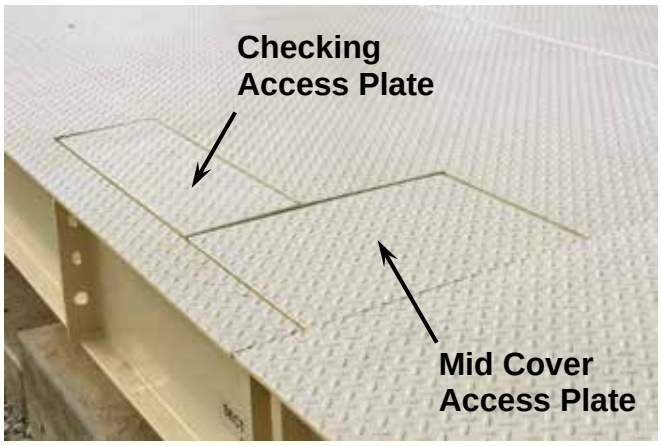
IMPORTANT! The bumper bolt adjustment should be checked periodically.



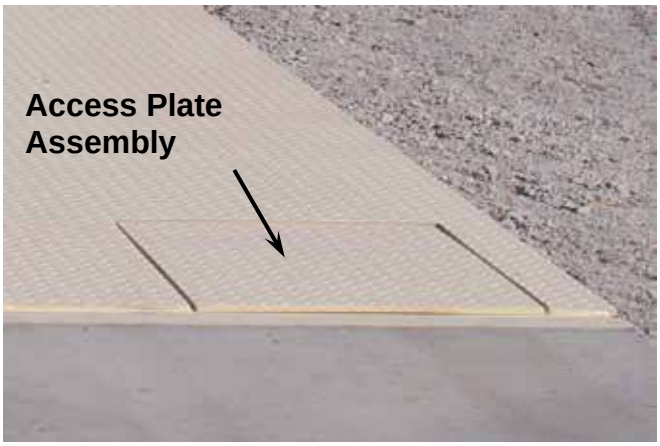
Adjust bumper bolts to 1/8-inch clearance on both sides of the check stand plate.

ACCESS PLATE INSTALLATION

Install the mid cover access and checking access cover plates on the hook-on weighbridge module of the scale. The remaining access plate assemblies are installed on the weighbridge end and hook-end weighbridge modules of the scale. All access plates should have a 1/4-inch to 1/2-inch gap on either side of the access plate.



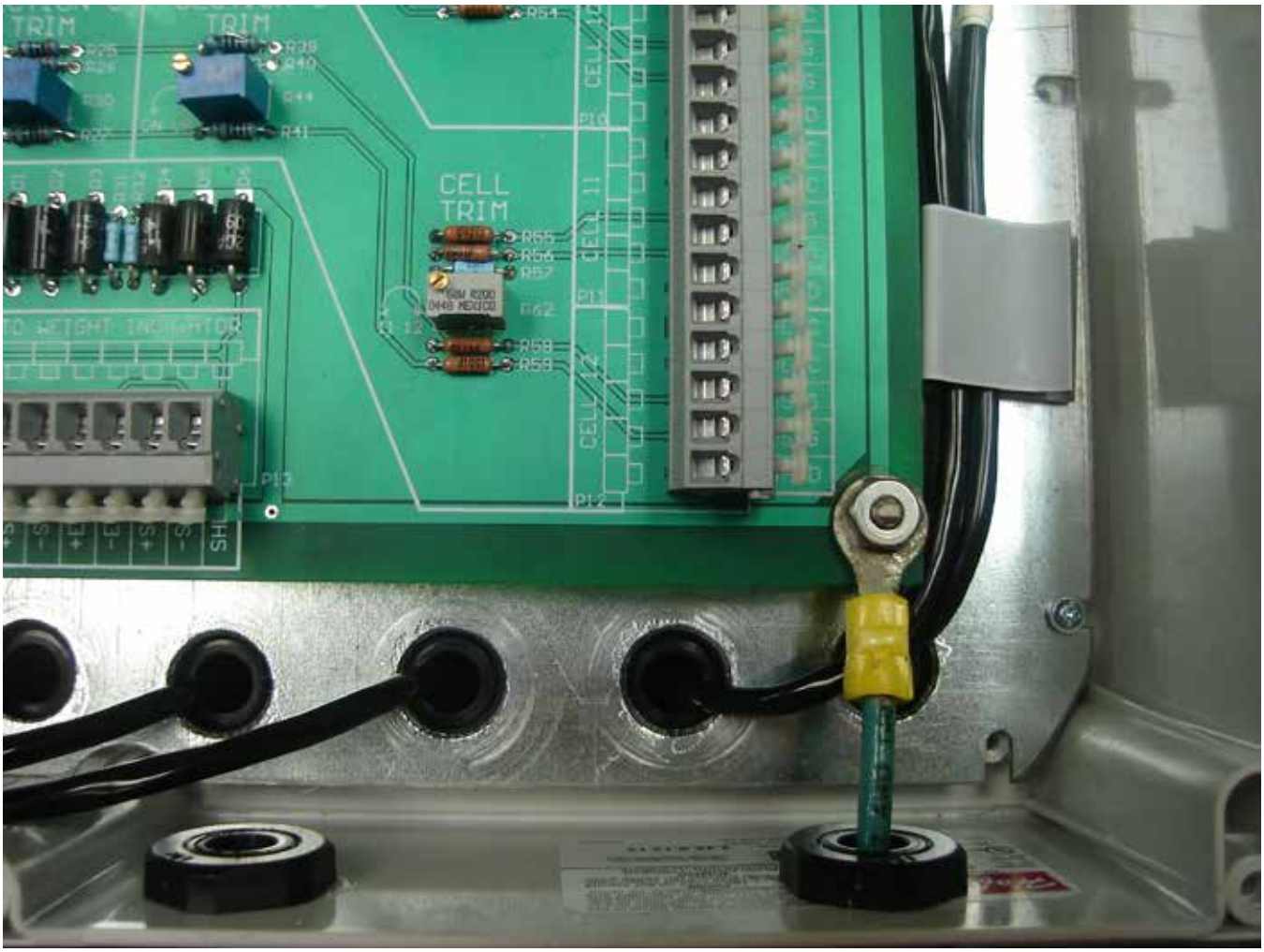
Mid cover and checking access plates installed on hook-on weighbridge module.



Access plate assembly installed on weighbridge end module.

INDICATOR INSTALLATION

1. Install the digital indicator.
2. The indicator cable is terminated in the Totalizer enclosure. Make sure the Totalizer enclosure is grounded back to the indicator and the AC power ground.



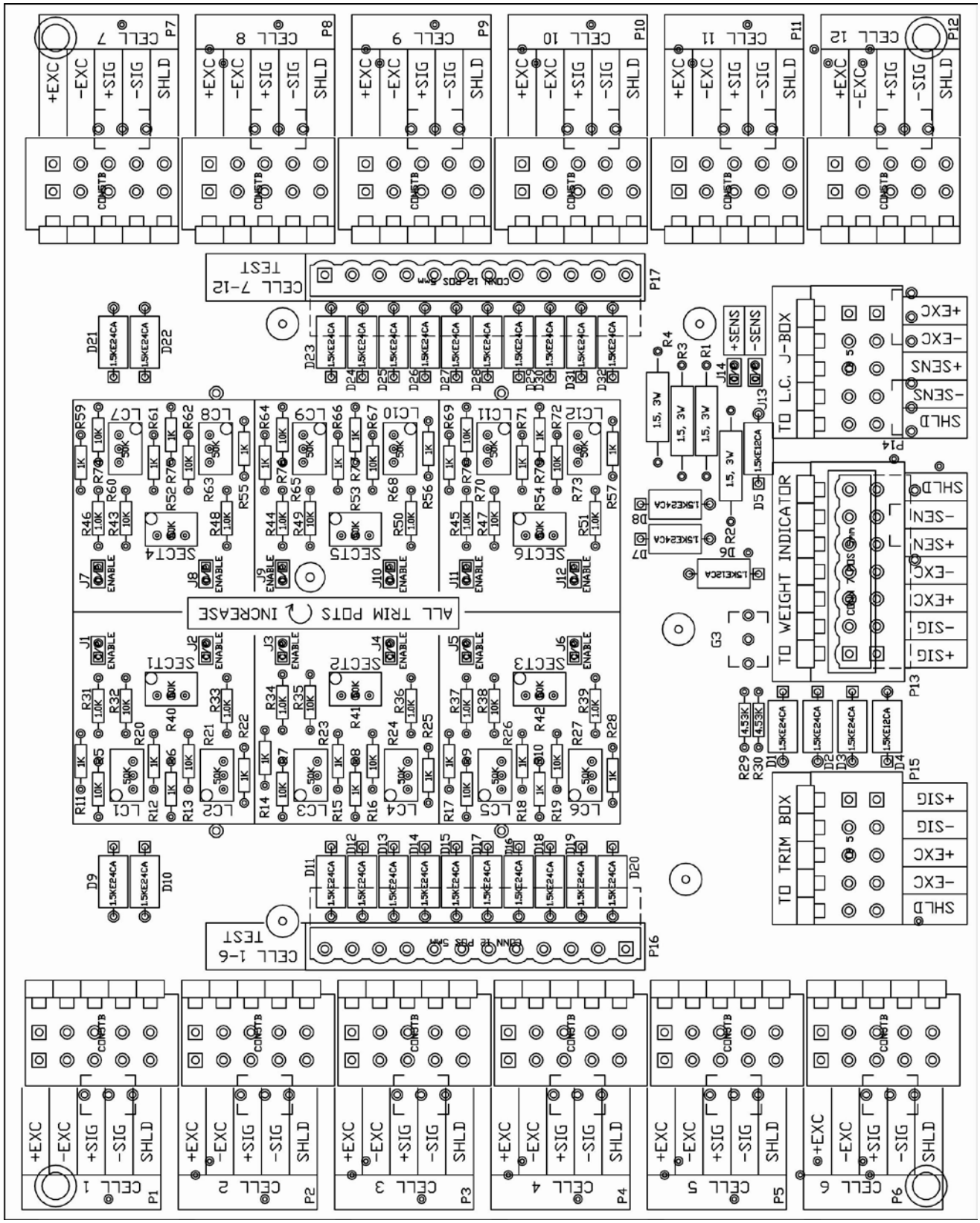
Attach the ground wire to the circuit board mounting post.

The *ground* wire must be attached to the circuit board mounting post, run with the indicator cable, and terminated to the ground lug on the weight indicator.

CALIBRATION

If, after test loading the scale, it is determined that adjustments are required, follow the procedure below. This section describes the procedure necessary to calibrate a Cardinal Armor Truck Scale with Hydraulic load cells.

1. Before any adjustments are made, turn on the power to the digital weight indicator.
2. Drive a test truck across the scale *at least three times* in each direction before calibrating the scale.
3. Before any sealing can be done, the weight indicator must be calibrated to the scale. A division size of 5 pounds should be selected and the auto-zero function turned off. Refer to the Weight Indicator Installation and Technical Manual.
4. The scale is calibrated for side-to-side balance and section errors at the summing card using trimming potentiometers. Span is set and adjusted at the weight indicator.
5. The first step in calibration is to do a simple span of the indicator so the scale may be adjusted. In the setup mode, first set the division size to 5 pounds and the filter level to 1. Now proceed to the prompt “2nd Order Linearization” and answer “YES”. You can now do up to a five-point calibration.
6. Begin with scale zero and one load point around 20,000 pounds. Other calibration points may be used later if necessary.
7. After the scale is spanned, apply loads to each section 4 to 5 times to make sure the scale repeats and will return to zero (you cannot adjust the scale unless it does).
8. Begin by adjusting the side-to-side balance in each section. On each section of the scale, you want the two load cells to weigh the same within 10-20 pounds. At this point, you do not care what they read, as long as they read the same. To adjust the side-to-side balance, use the “Cell Trim” pot on the summing card. Turn the pot toward the lightest of the cells in the section. Repeat until their output is the same. If a test cart is not available, a small forklift weighing 3000 to 4000 pounds will make a good concentrated weight to place over each cell.
9. Next, adjust the section readings on the scale. Again, you do not care exactly what the sections read, as long as they are all the same and within 10 to 20 pounds of each other. Use the “Section” Trim Pots to adjust the sections until they all read the same. Turning the Pot Clockwise increases the output, going counterclockwise decreases the output.
10. After all of the sections of the scale are adjusted, the indicator should be spanned to the scale deck. There are several unique features of the iCAN card that allow the indicator’s span to be adjusted to compensate for any minor errors in the output of the scale.
11. Begin by removing the sealing screw on the rear of the indicator (refer to the appropriate indicator manual) and entering the “Setup” mode. Go through setup as you would on any Cardinal weight indicator. To begin Calibration at the prompt “2nd Order linearization”, answer “YES”. At the prompt C1, press “ENTER”. Enter “0” for your first calibration weight and press “ENTER”. You may now enter up to four different weights that you wish to span the scale at. It is usually best to span at about #4000, #8000, #16,000, and #24,000. If you want to do less than four weight spans, simply do not enter a value and press “ENTER”, and the indicator will proceed to the next step.



Totalizer Summing Card

12. The indicator will now display the “Fine Span Adjustment Screen”. From this screen, you can adjust the span of the indicator in three different ways. From the initial display, you can use the “UP” and “DOWN” keys to raise the span of the entire scale up or down.
13. By selecting the “COEFF” menu selection, you can manipulate the output of the indicator if necessary. The first two screens are to enter the two coefficients for a quadratic formula to linearize an error curve in the output of the scale. Normally this feature will not need to be used. Until you get to the point that you are loading the cells to around 70% of their output, the output will be linear. If you ever have an application that you are using the cells from 70% to 100% of their capacity, and you encounter a linearization problem at elevated weights, we can take that data from you and calculate a set of values to enter for the “Linear Coefficient” and “2nd Order Coefficient”. These values will be used by the indicator to linearize the output of the system.
14. Normally, if you are going to use the Second Order Linearization feature to calibrate the scale, you will only want to calibrate at “0” and one weight (for example, 20,000 pounds). The software will take the two coefficients and apply them to the output of the indicator to make it linear.
15. The third feature is very useful to fine-tune the output of the scale. The Range Specific Span Adjustment or “Tweak” feature lets you select a low tweak weight and a high tweak weight that defines the range of the output of the scale that you wish to adjust. You then enter a tweak value, either positive or negative, that tells the indicator how much to adjust the output of the system within that specific range.
16. Example: You have installed an Armor Guardian Truck Scale and the scale weighs with no error up to 27,000 pounds. At 27,000 pounds, the scale picks up +10 pounds, at 33,000 pounds, it adds +20 pounds, and at 45,000 pounds, it is high by +30 pounds. The scale is in acceptance tolerance but still has some errors. We can go into the “Tweak” mode, and tell the indicator from 27,000 pounds to 100,000 pounds to lower all the readings by 20 pounds. This would make the scale read –10 at 27,000 pounds, no error at 33,000 pounds, and +10 at 45,000 pounds, getting rid of the worst error in that range.
17. There is also a “High Res” feature that will put the indicator in a high-resolution mode if needed (a 20-pound division-size will become 2 pounds). This is very useful for adjusting the trim pots of the scale without having to span the indicator again.

CONFORMAL COATING

After installation and testing have been completed, the last step is to conformally coat the summing card using Cardinal Part number 6560-0017, CONFORMAL COATING, SILICONE.

Apply the coating by spraying from top to bottom, holding the can 6 to 8 inches from the summing card. It is best to apply 2 to 3 coats, changing the angle a little each time, for the best coverage.

The coating dries to the touch in 1 hour and cures in approximately 72 hours. The wiring should not be disturbed until after the curing time.

MAINTENANCE

Like any other truck scale, the Armor Guardian system needs routine maintenance to keep it working to its potential. Since there are no electronic components in the scale itself, this is simplified on the Guardian.

After initial installation, it is recommended that gauge gaps on the load cells be checked after the scale has been in use one week, again after one month of use, and then every six months. If there is a very small leak in one of the cell circuits, it may not be apparent during the initial setup and calibration of the scale.

Check Stand Bolts and Check Bolts should be inspected and adjusted every three months.

The scale should be inspected for dirt and debris under the platform and cleaned every three months or more often depending on the application.

TROUBLESHOOTING

If you are having a problem with a cell losing fluid (it will always be weighing light), remove the gauge port and see if the gauge will go into the cell. If not, we need to determine for sure that the cell has lost oil.

1. On the initial inspection, make sure the .028 feeler gauge will not enter the cell gauge gap. It is very important, that if on inspection, you find the gap at .035 inches, that you find the source of the leak and eliminate it.
2. There is a rubber wear pad inside the cell that may compress slightly with use. A gap that has increased to .029 may just be because of the rubber pad compressing. Any increase in the gap above .029 means that fluid has left that circuit either at a cell, tube, or fitting or inside the totalizer enclosure in a hose or manifold.
3. If the cell has lost fluid, you must find the source of the leak and fix it. Simply pumping more oil in the cell may get it going again, but it will soon fail.
4. Clean <u>all</u> fittings and the area around the cell (spray brake or carb cleaner works well), then wrap the fittings with an absorbent tissue, and apply a heavy load to the cell that appears to be leaking.
5. After some time, remove the tissue and inspect it for signs of oil. If no external leaks can be found, the cell should be considered suspect.
6. If you are unsure of the level of oil in the cell, ALWAYS open the bleed port, let oil out of the cell, and add it back until the .028 feeler gauge will not enter the cell gauge gap.
7. After the problem has been found and fixed, remove all load from that cell, bleed, and gap it to .027 inch. Then apply load and verify the gauge gap.

PTG-3K Transducer

The Cardinal PTG-3K pressure transducer is a simple device to convert hydraulic pressure into a voltage output that can be easily summed and trimmed. It can be checked much the same as a standard strain gauge-based load cell.

PTG-3K Pressure Transducer

The PTG-3K is rated at 1mV/V. Because of this, you will see exactly half of the output from the transducer that you would normally see out of a 2mV/V load cell. The Transducer uses a modified Wheatstone bridge circuit and Balco resistors for span temperature compensation, as well as, copper alloy for zero temperature compensation.

To troubleshoot the PTG-3K, you will first measure the resistance between the red and white signal leads. This value should be from 340 ohms to 360 ohms. The resistance between the black and green excitation leads will be from 402 ohms to 422 ohms.

Resistance from the circuit wires to the transducer body should be 5K Megohms (5 billion ohms). Normally a standard VOM meter is not capable of measuring this resistance. A megohmmeter is required.

Since the PTG-3K will always have some amount of pressure on the gauged surfaces, it is impossible to check the absolute zero balance condition of the transducer without removing the transducer from the hydraulic circuit. This is something you normally will not want to do. When the scale is first set up, you should record the output of the transducer with the deck jacked up off the load cell. This value should be recorded and left inside the transducer cabinet so that in the future, you can compare the no-load output from the transducer to see if there has been a significant shift in zero. A change of .2mV from the initial reading may indicate a change in the sensor output.

If a sensor must be changed in the scale, first jack up the weighbridge at the corresponding load cell to eliminate pressure from that circuit. Apply two wraps of Teflon tape to the new transducer threads and force them into the bottom of the threads. Remove the transducer to be replaced, clean the manifold threads, check for loose Teflon in the manifold, and install the new PTG-3K. The sensor should be very tight in the manifold to avoid leaks. Bleed the circuit and set the gauge gap in the cell. Once completed, the scale should be ready to be calibrated.

IMPORTANT: Add oil to the new transducer before installing. Otherwise, it will not fill up properly when bleeding the circuit.

CELL OUTPUT CALIBRATION WORKSHEET

Cell #	Dead Load Output	–	Zero Balance Output	=	Circuit Gain
Cell #1		–		=	
Cell #2		–		=	
Cell #3		–		=	
Cell #4		–		=	
Cell #5		–		=	
Cell #6		–		=	
Cell #7		–		=	
Cell #8		–		=	
Cell #9		–		=	
Cell #10		–		=	
Cell #11		–		=	
Cell #12		–		=	

RECOMMENDED SEALING PROCEDURE

If your Armor Guardian Truck Scale 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 access to the interior components of the Totalizer Enclosure.

To prevent access to the interior components, refer to the illustrations below and seal the enclosure as follows:

1. Install the sealing tab before the “O” ring.
2. Tighten the screw.
3. Bend the tab as shown.
4. Install sealing wire.
5. Pull the wire tight and install the lead seal.
6. The screw cannot be removed without damaging the seal.

Note that the sealing tab and screw are available from the Cardinal Scale Mfg. Parts Department.

PARTS LIST

8530-B159-08 - - - - - - - - SEALING TAB

6021-1708 - - - - - - - - - - - #10-32 X 3/4” FILLISTER HEAD DRILLED

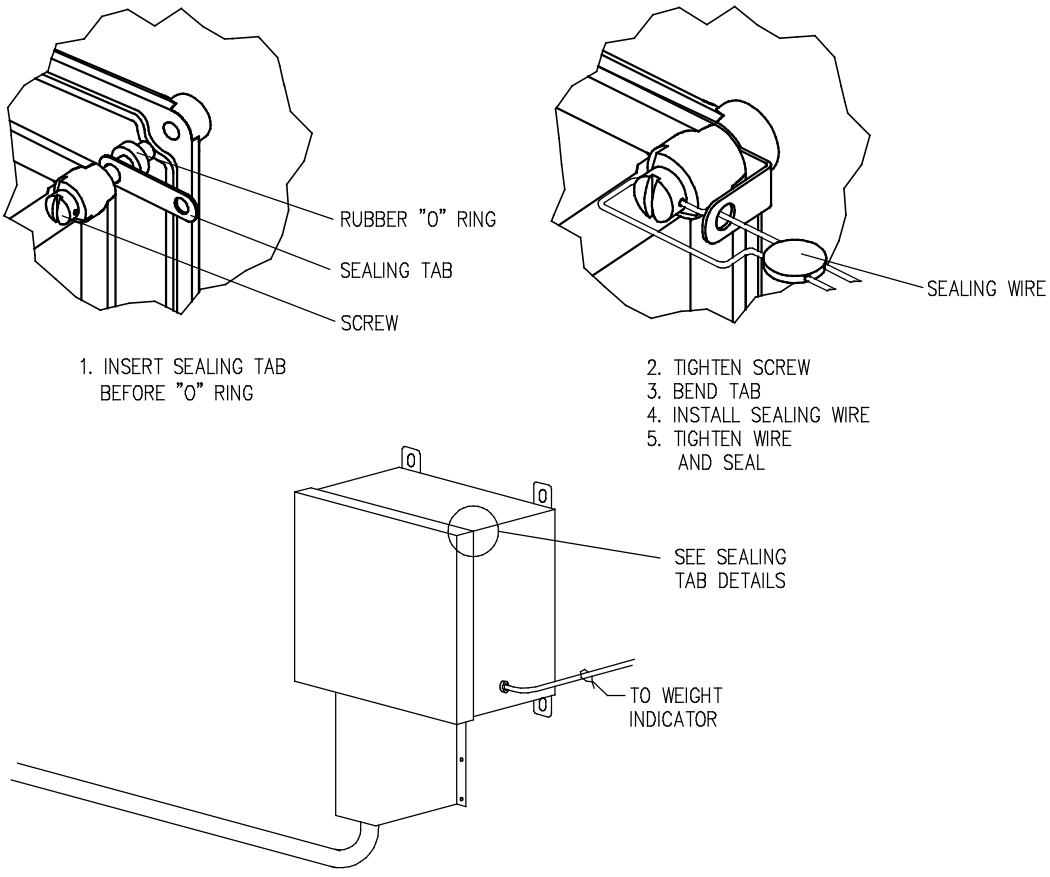
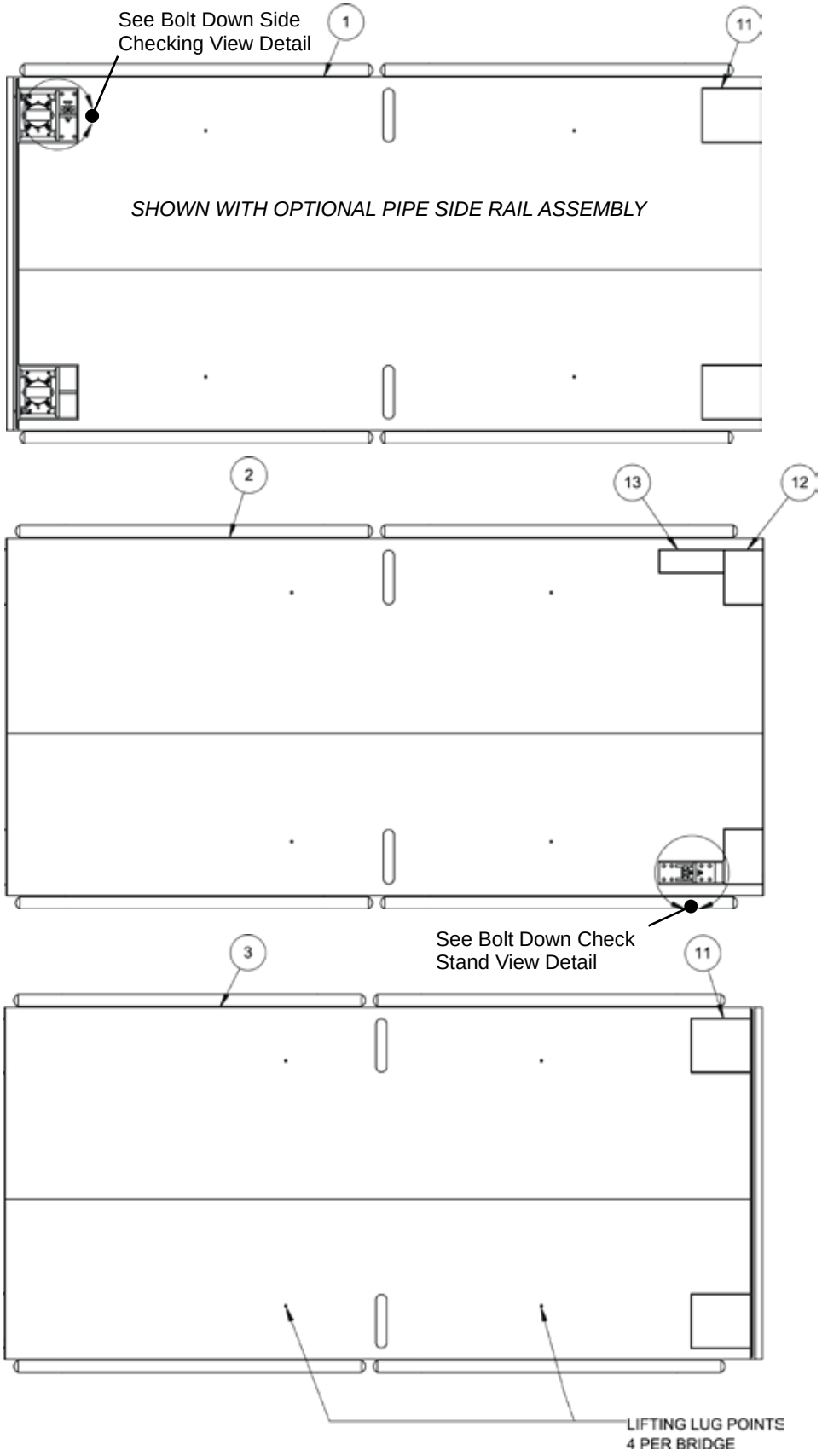


Figure No. 14 – (Sealing Tab Detail)

PARTS IDENTIFICATION

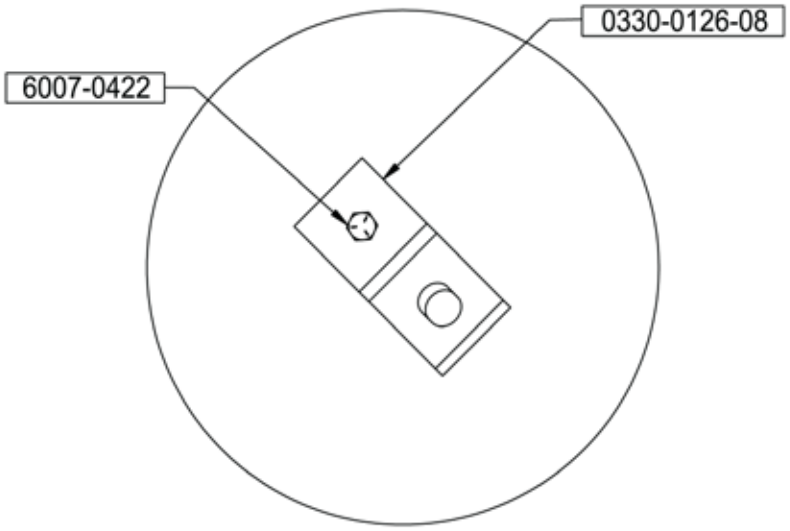
Weighbridge Assembly (Quantity shown for 70’ x 11’ Steel Deck Scale)



Weighbridge Assembly, Cont. (Quantity shown for 70’ x 11’ Steel Deck Scale)

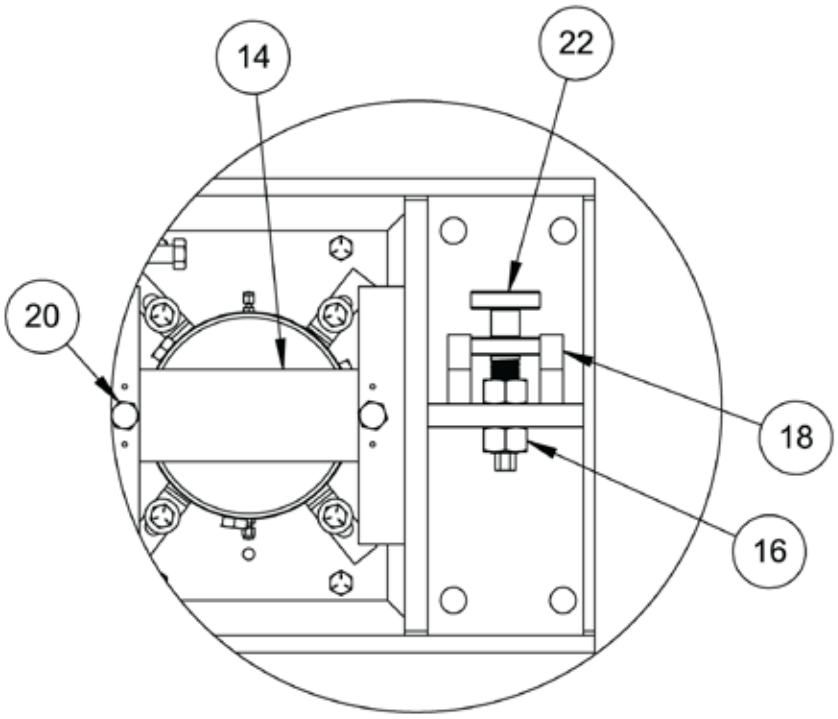
NO.	QTY.	ITEM	DESCRIPTION
1	1	0330-1732-0A	END BRIDGE HYDRAULIC MODULE
2	1	0330-1736-0A	HOOK-ON BRIDGE HYDRAULIC MODULE
3	1	0330-1739-0A	HOOK-END BRIDGE HYDRAULIC MODULE
11	6	0331-0039-0A	ACCESS PLATE ASSEMBLY
12	2	0331-0041-0A	MID COVER ACCESS PLATE ASSEMBLY
13	2	0331-0043-0A	CHECKING ACCESS COVER PLATE ASSEMBLY

Lifting Lug Detail



ITEM	QTY.	DESCRIPTION
6007-0422	4	HEX HEAD BOLT, 3/4”-10 X 3” GRADE 8 Z/P
0330-0126-08	4	LIFTING LUG, HR PL 3/4” X 4” X 8 11/16”

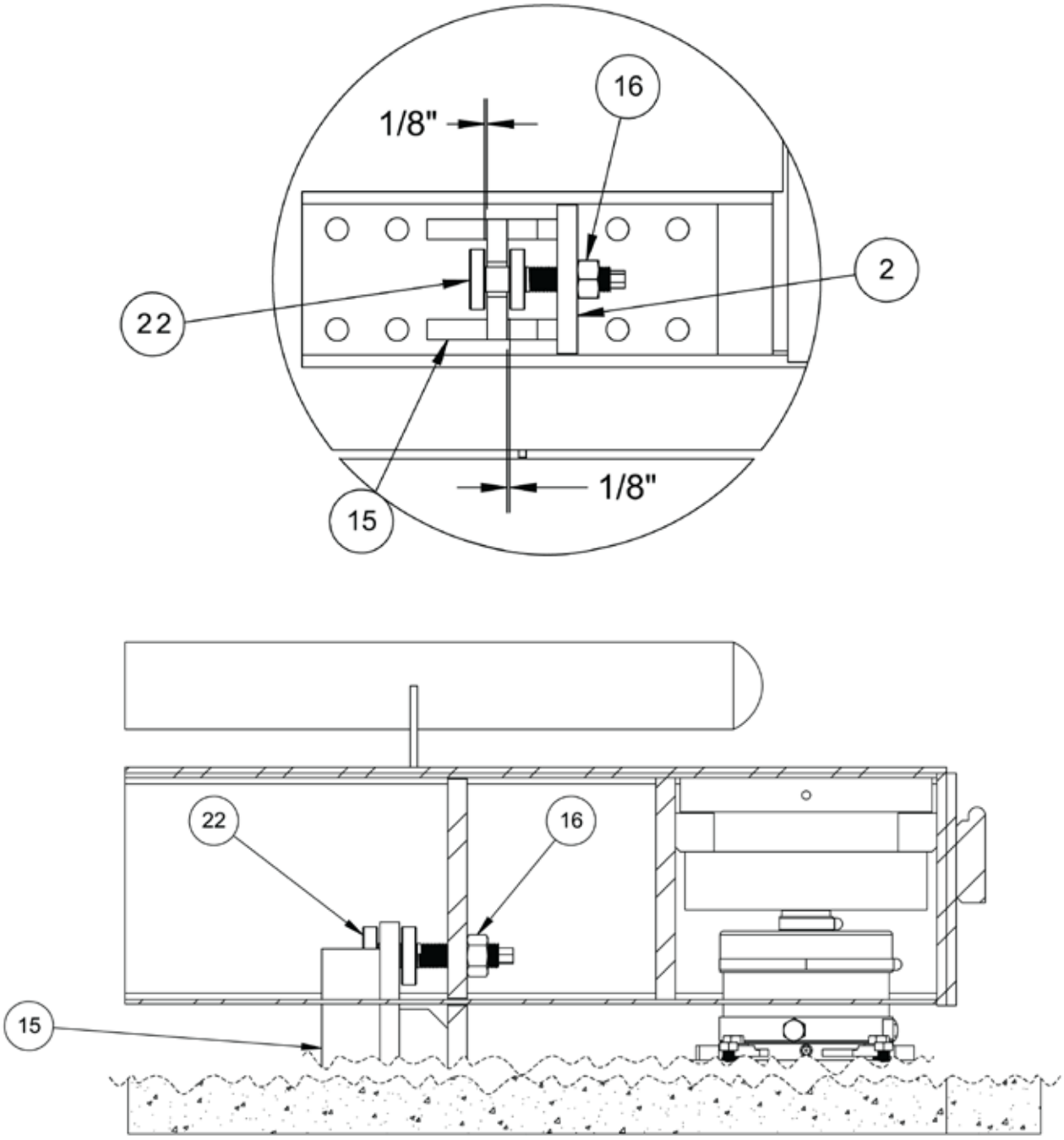
Bolt Down Side Checking View Detail



(Quantity shown for 70’ x 11’ Steel Deck Scale)

NO.	QTY.	ITEM	DESCRIPTION
14	8	0331-0044-08	LOAD CELL BLOCK
16	4	6013-0176	HEX NUT, 1 1/4”-7 Z/P
18	2	0331-0056-0A	BOLT-DOWN SIDE CHECKING ASSEMBLY
20	16	6007-0300	HEX BOLT, 3/4”-10 UNC 2A X 2 3/4”
22	4	0331-0052-08	CHECK PLATE BOLT, 203/4” ROD X 7” 17-4

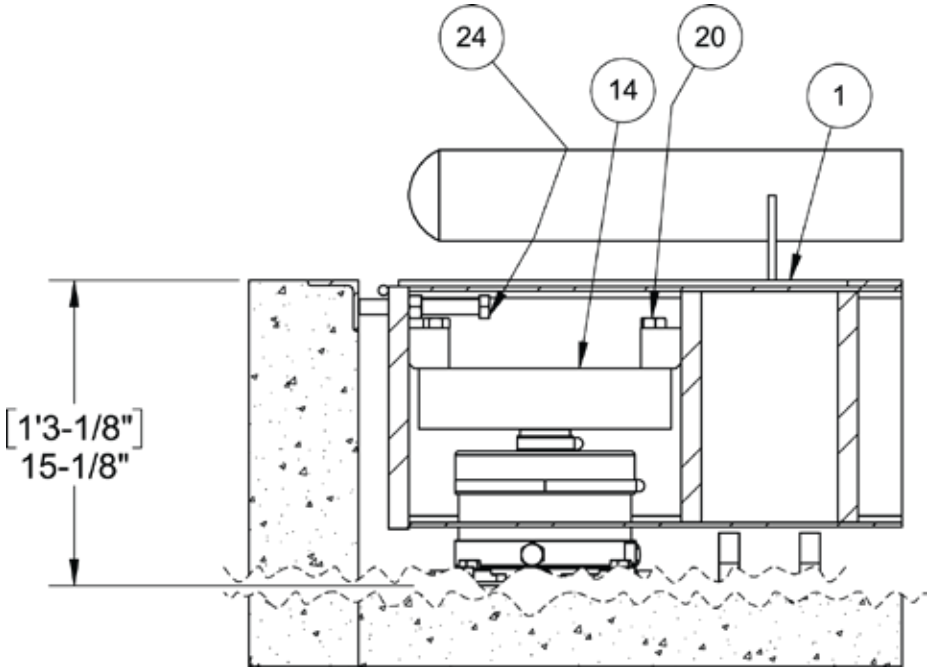
Bolt Down Check Stand View Detail



(Quantity shown for 70’ x 11’ Steel Deck Scale)

NO.	QTY.	ITEM	DESCRIPTION
2	REF	0330-1736-0A	HOOK-ON BRIDGE HYDRAULIC MODULE
15	2	0331-0053-0A	BOLT DOWN CHECK STAND
16	4	6013-0176	HEX NUT, 1 1/4”-7 Z/P
22	4	0331-0052-08	CHECK PLATE BOLT, 203/4” ROD X 7” 17-4

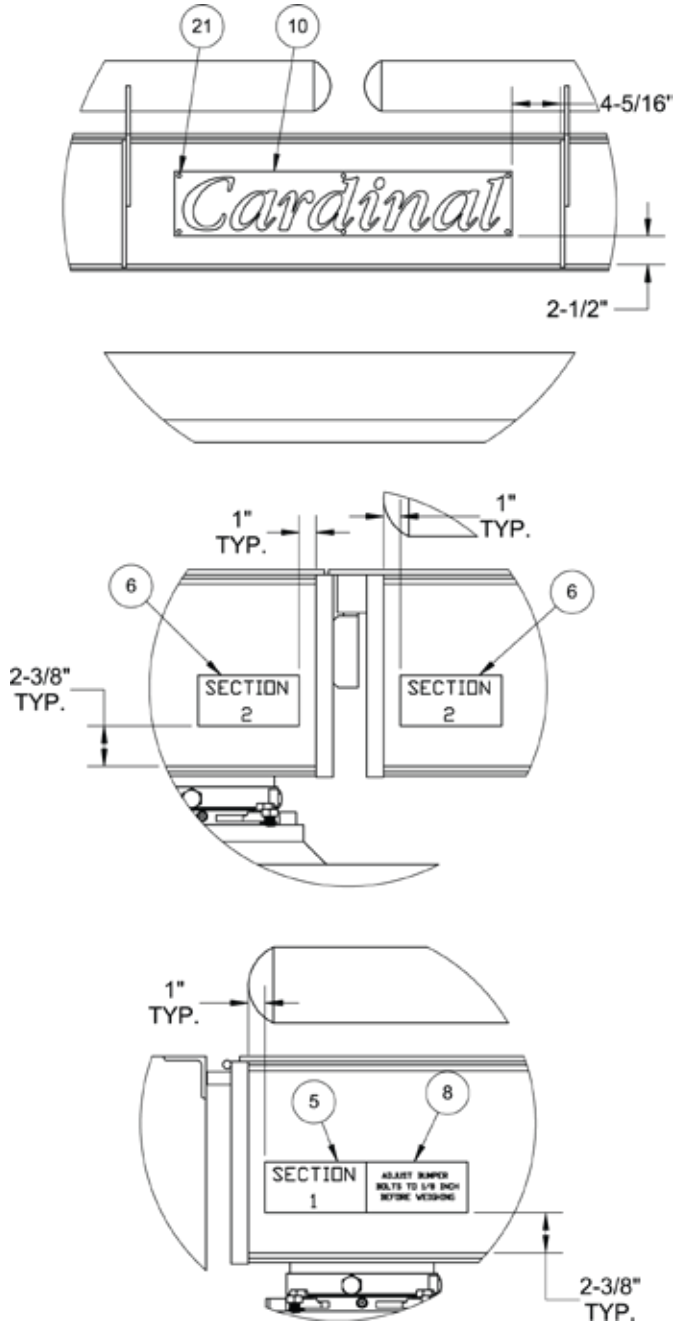
Load Cell Mounting View Detail



(Quantity shown for 70’ x 11’ Steel Deck Scale)

NO.	QTY.	ITEM	DESCRIPTION
1	REF	0330-1732-0A	END BRIDGE HYDRAULIC MODULE
14	8	0331-0044-08	LOAD CELL BLOCK
20	16	6007-0300	HEX BOLT, 3/4”-10 UNC 2A X 2 3/4”
24	2	6007-4514	ALIGNMENT BOLT, 3/4”-10 X 6” UNC 2A

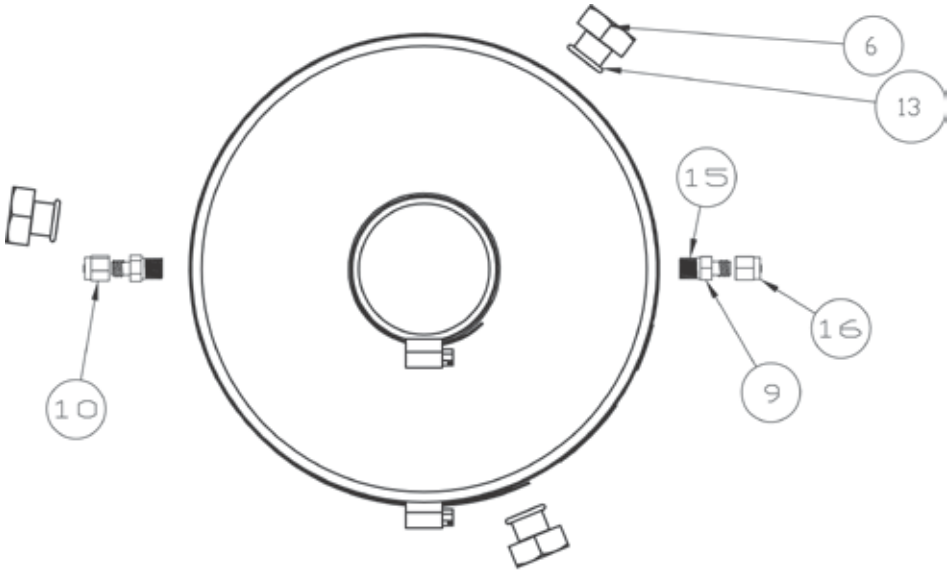
Decal and Name Plate Mounting View Detail



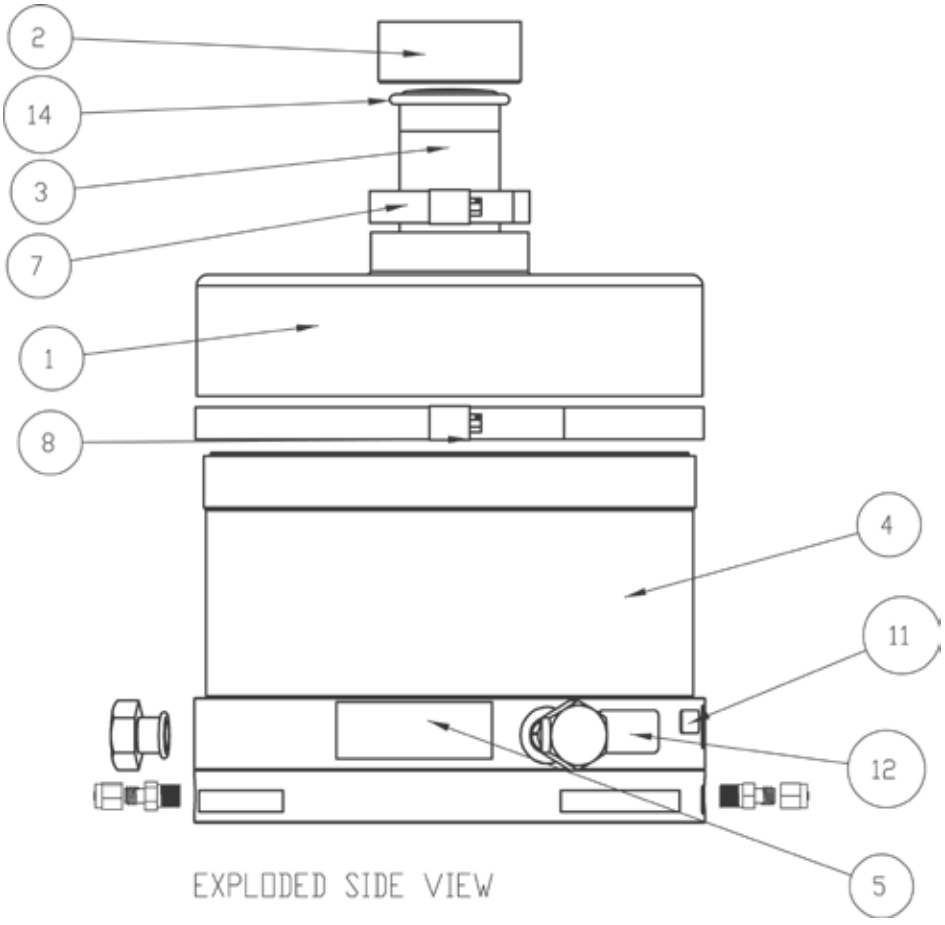
(Quantity shown for 70’ x 11’ Steel Deck Scale)

NO.	QTY.	ITEM	DESCRIPTION
5	1	0145-B392-18	DECAL, SECTION 1
6	2	0145-B392-28	DECAL, SECTION 2
8	2	0142-B196-08	ADJUST BUMPER BOLTS
10	2	5930-D091-08	NAME PLATE
21	12	6680-0210	POP RIVET

SST75 Load Cell Assembly



EXPLODED TOP VIEW

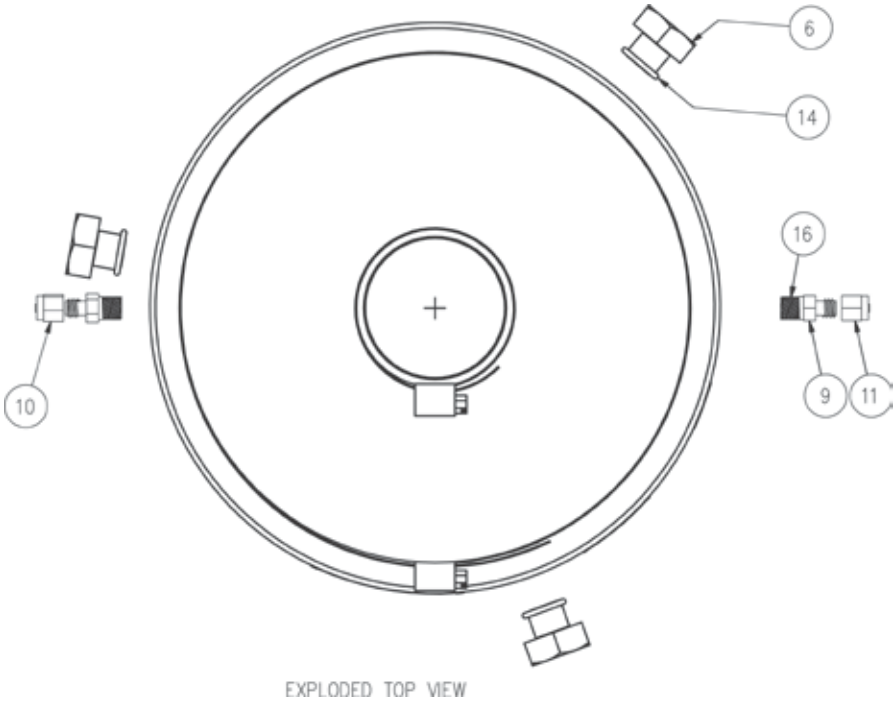


EXPLODED SIDE VIEW

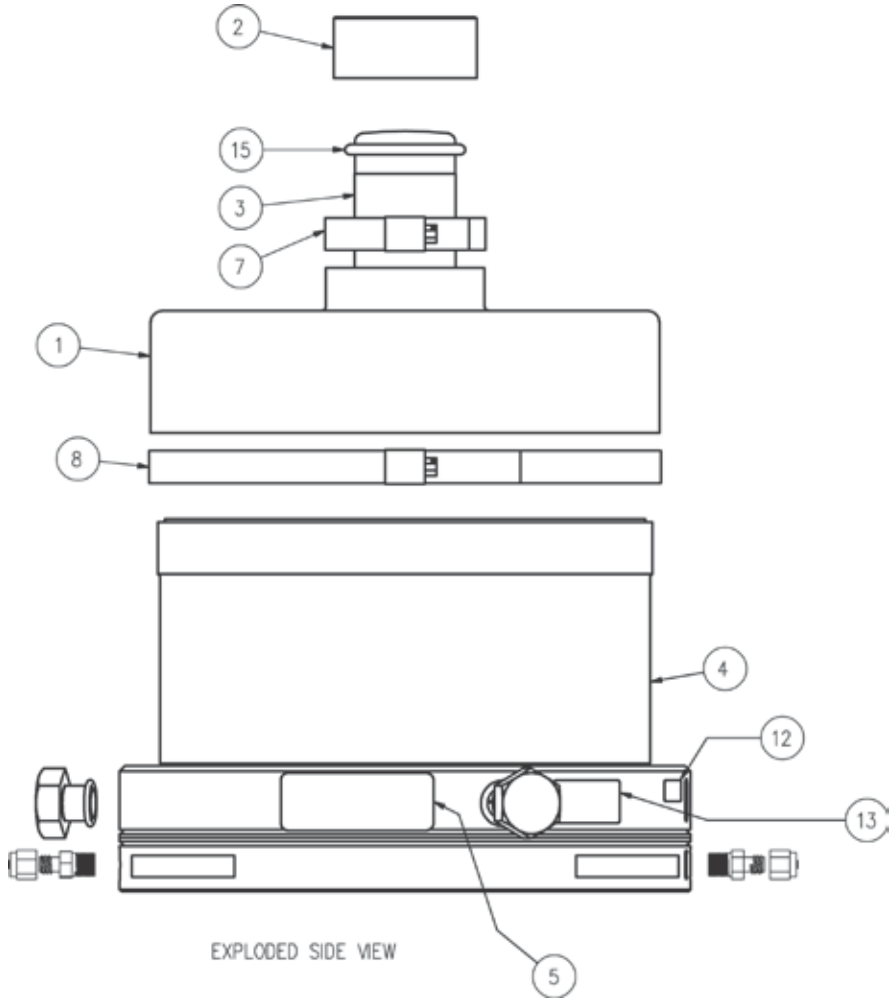
SST75 Load Cell Assembly, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1771-B106-18	RUBBER BOOT FOR SST75/100
2	2	1771-B109-08	LOAD CUP
3	1	1771-C110-08	LOAD POST
4	1	1771-D040-0A	LOAD CELL WELDMENT FOR SST75
5	1	5930-B106-08	CARDINAL LOGO
6	3	6007-0115	BOLT HEX HD 5/8-11 X 0.5 NYLON
7	1	6082-0072	HOSE CLAMP, 1 13/16” – 2 3/4”
8	1	6028-0074	HOSE CLAMP, 7 1/8” – 10”
9	2	6031-0500	CONNECTOR, MALE
10	2	6031-0502	PLUG FITTING 1/8” BRASS
11	1	6600-0650	LABEL HIGH TEMP INVENTORY TRACKING .37 X .90
12	1	6600-0653	SER. TAG 3/4 X 1 1/2” SILVER MYLAR
13	3	6650-0114	O-RING 5/8 ID X 13/16 OD X 3/32 THK VITON
14	2	6650-1055	O-RING 1.75 ID X 2.125 OD X .187 DIA BUNA-
15	.01	6560-1127	ADHESIVE LOCTITE 545 THREAD SEALANT
16	1	6031-0521	FITTING, STAINLESS 1/8” PLUG

SST100 Load Cell Assembly



EXPLODED TOP VIEW

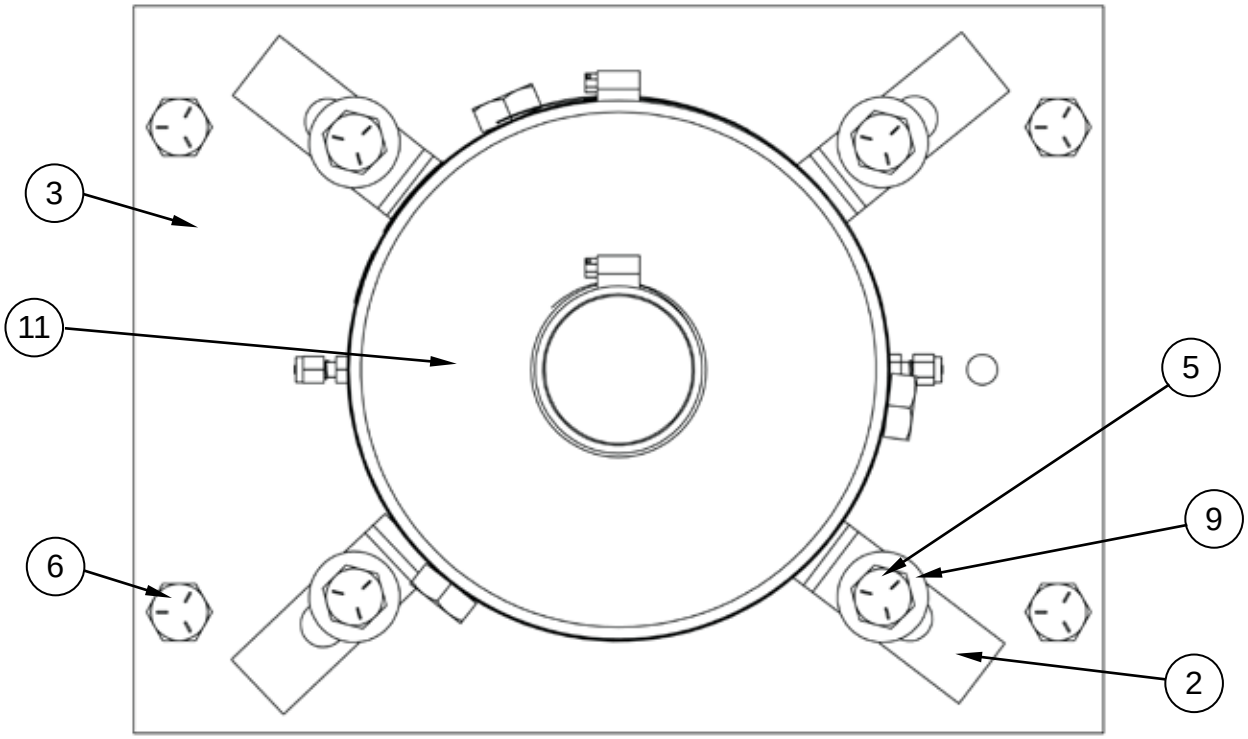


EXPLODED SIDE VIEW

SST100 Load Cell Assembly, Cont.

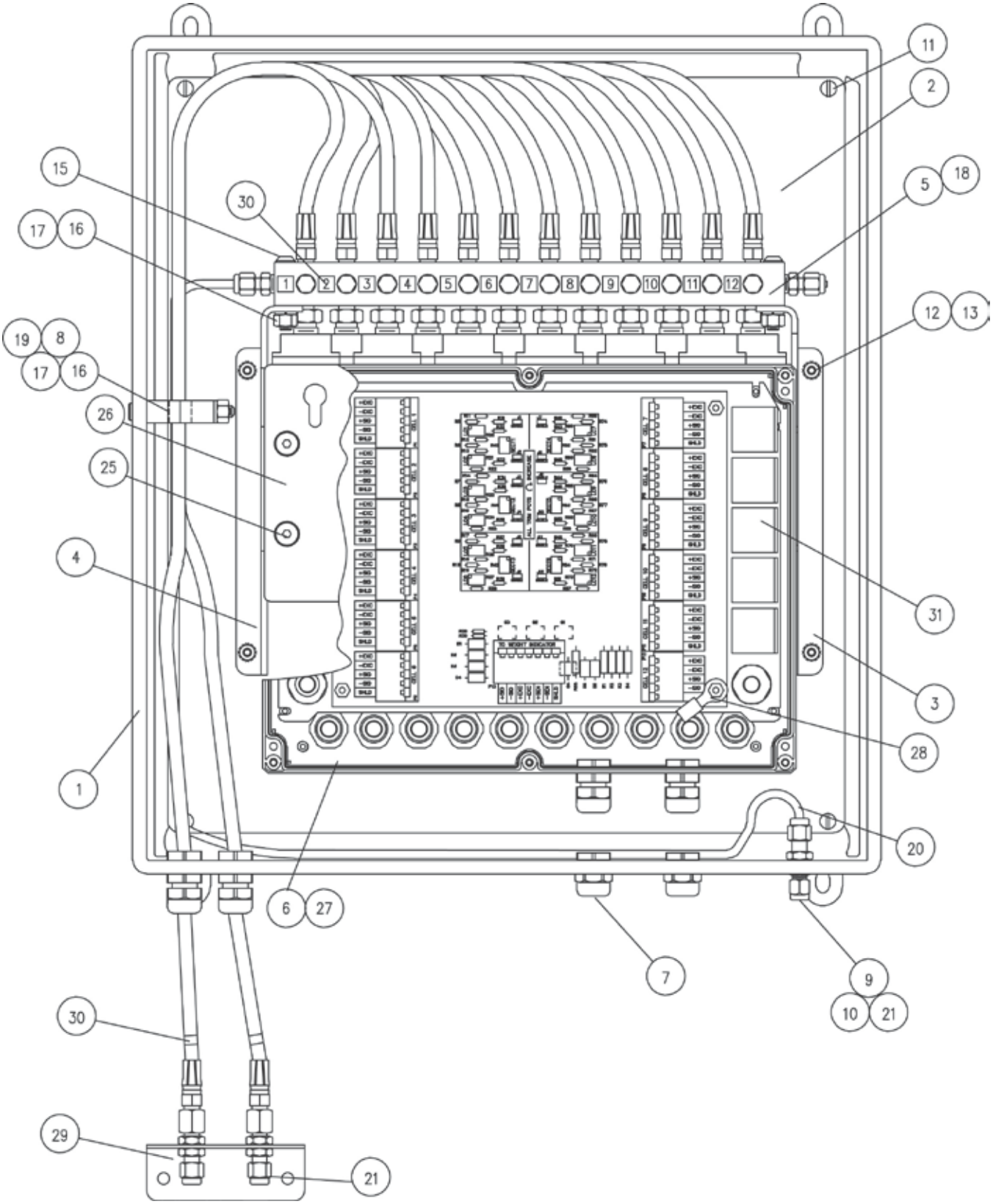
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1771-B106-18	RUBBER BOOT NEOPRENE 0.131 THICK DURO.
2	2	1771-B109-08	LOAD CUP
3	1	1771-C110-08	LOAD POST
4	1	1771-D330-0A	LOAD CELL WELDMENT FOR SST100
5	1	5930-B106-08	LABEL: CARDINAL LOGO W/WEB ADDRESS
6	3	6007-0115	BOLT HEX HD 5/8-11 X 0.5 NYLON
7	1	6082-0072	HOSE CLAMP, 1 13/16” – 2 3/4”
8	1	6028-0074	HOSE CLAMP, 7 1/8” – 10”
9	2	6031-0500	CONNECTOR, MALE
10	1	6031-0502	PLUG FITTING 1/8” BRASS
11	1	6031-0521	FITTING, STAINLESS 1/8” PLUG
12	1	6600-0650	LABEL HIGH TEMP INVENTORY TRACKING .37 X .90
13	1	6600-0653	SERIAL TAG 3/4 X 1 1/2” SILVER MYLAR
14	3	6650-0114	O-RING
15	2	6650-1055	O-RING
16	.01	6560-1127	ADHESIVE LOCTITE 545 THREAD SEALANT

Load Cell Support Assembly



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
2	4	1771-B043-08	CLAMP
3	1	1771-C042-08	GROUT PLATE
5	4	6007-0159	BLT HEX HD 5/8-11 X 1 1/2” UNC-2A G2 Z/P
6	4	6007-0230	BLT HEX HD 5/8-11 X 3” TAP BOLT GRADE 5
9	4	6024-0015	5/8 FLAT WASHER
11	REF	SST75	HYDRAULIC LOAD CELL, 75K LB CAPACITY
		SST100	HYDRAULIC LOAD CELL, 100K LB CAPACITY

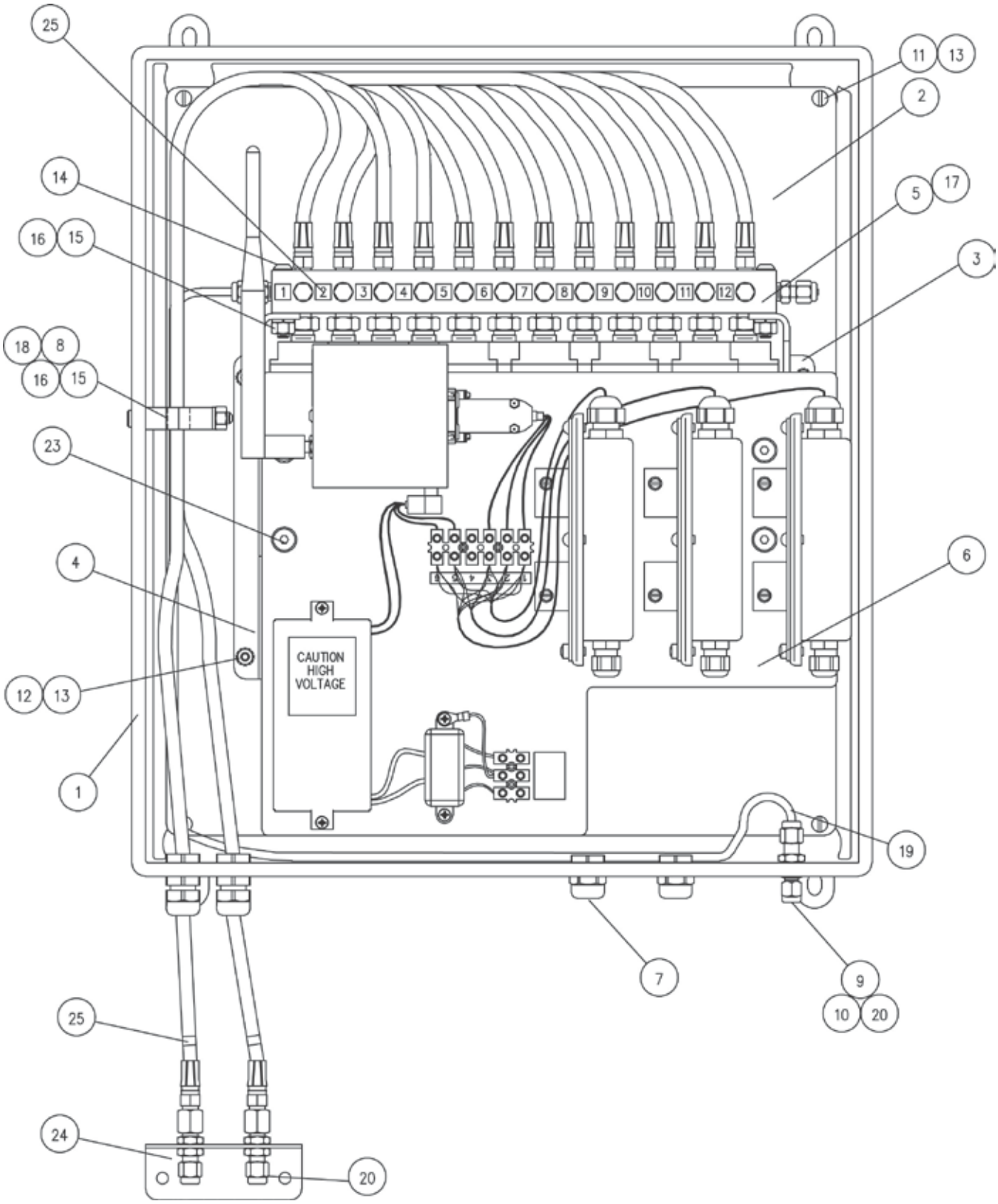
10 & 12 Cell Totalizer Enclosure



10 & 12 Cell Totalizer Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1780-D012-08	ENCLOSURE
2	1	1780-D043-08	SUBPANEL - TOTALIZER
3	1	1780-D018-08	BRACKET
4	1	1780-D018-18	BRACKET
5	1	1772-D004-1A	VALVE BLOCK ASSY 12 CELL SYSTEM
6	1	1780-C014-0A	J-BOX ASSY
7	2	6610-2248	GLAND CONNECTOR
8	2	1780-B027-08	BRACKET HYD. HOSE
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
11	4	6021-1024	RHMS #10-32UNF-2A X 1/2” W/NYLON PATCH
12	4	6021-1004	BHCS #10-32 x 1/2”
13	4	6024-0049	WASHER LOCK EXT TOOTH #10 TYPE A Z-PL
15	4	6021-1533	BHCS 1/4-20UNC-2A x 1 1/2”
16	6	6024-0039	WASHER LOCK HELICAL 1/4” DIA
17	6	6013-0045	HEX NUT 1/4-20UNC-2B
18	1	1772-D004-0A	VALVE BLOCK ASSY 10 CELL SYSTEM
19	2	6021-1417	SHCS 1/4-20 x 2”
20	3	6031-0506	COPPER TUBING
21	11	6031-0502	PLUG, BRASS (10 cell system)
21	13	6031-0502	PLUG, BRASS (12 cell system)
23	2	3502-B217-0A	HOLE PLUG (not shown, used on 10 cell system)
24	1	1780-B028-08	LABEL: LOGO & GUARDIAN
25	4	6021-1707	FHSCS 1/4-28 x 1/2”
26	1	1780-B039-08	SUPPORT PLATE, JUNCTION BOX
27	1	1780-C014-1A	J-BOX ASSY 10 CELL SYSTEM
28	1	6610-2449	RING TERMINAL 1/4 STUD 12-10 AWG
29	1	1780-C042-08	BULKHEAD BRACKET
30	.2	6980-0139	WIRE MARKER #1-45 10 SHEETS/BOOKLET
31	10	6610-5007	CABLE CLIP, GRAY(10 cell system)
31	12	6610-5007	CABLE CLIP, GRAY(12 cell system)

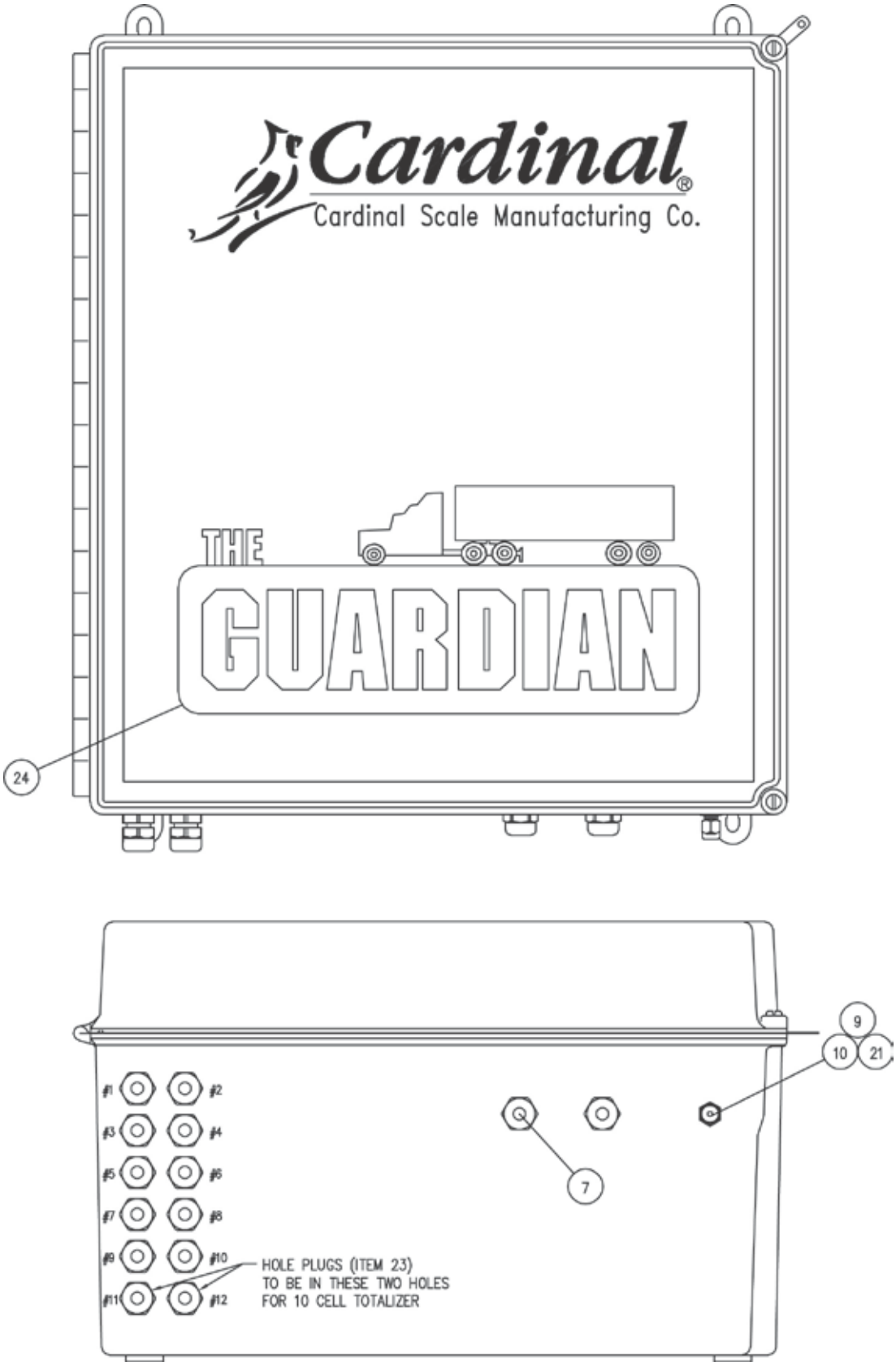
10 & 12 Cell SnapStream Series Totalizer Enclosure



10 & 12 Cell SnapStream Series Totalizer Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1780-D012-08	ENCLOSURE
2	1	1780-D043-08	SUBPANEL - TOTALIZER
3	1	1780-D018-08	BRACKET
4	1	1780-D018-18	BRACKET
5	1	1772-D004-1A	VALVE BLOCK ASSY 12 CELL SYSTEM
6	1	1780-D074-1A	SUB-ASSY: SNAP TOTALIZER PANEL, 12LC
7	2	6610-2248	GLAND CONNECTOR
8	2	1780-B027-08	BRACKET HYD. HOSE
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
11	4	6021-1024	RHMS #10-32UNF-2A X 1/2” W/NYLON PATCH
12	4	6021-1004	BHCS #10-32 x 1/2”
13	4	6024-0049	WASHER LOCK EXT TOOTH #10 TYPE A Z-PL
14	4	6021-1533	BHCS 1/4-20UNC-2A x 1 1/2”
15	6	6024-0039	WASHER LOCK HELICAL 1/4” DIA
16	6	6013-0045	HEX NUT 1/4-20UNC-2B
17	1	1772-D004-0A	VALVE BLOCK ASSY 10 CELL SYSTEM
18	2	6021-1417	SHCS 1/4-20 x 2”
19	3	6031-0506	COPPER TUBING
20	11	6031-0502	PLUG, BRASS (10 cell system)
20	13	6031-0502	PLUG, BRASS (12 cell system)
21	3	3502-B217-0A	HOLE PLUG (not shown, used on 10 cell system)
21	1	3502-B217-0A	HOLE PLUG (not shown, used on 12 cell system)
22	1	1780-B028-08	LABEL: LOGO & GUARDIAN
23	4	6021-1707	FHSCS 1/4-28 x 1/2”
24	1	1780-C042-08	BULKHEAD BRACKET
25	.2	6980-0139	WIRE MARKER #1-45 10 SHEETS/BOOKLET

10 & 12 Cell System Enclosure

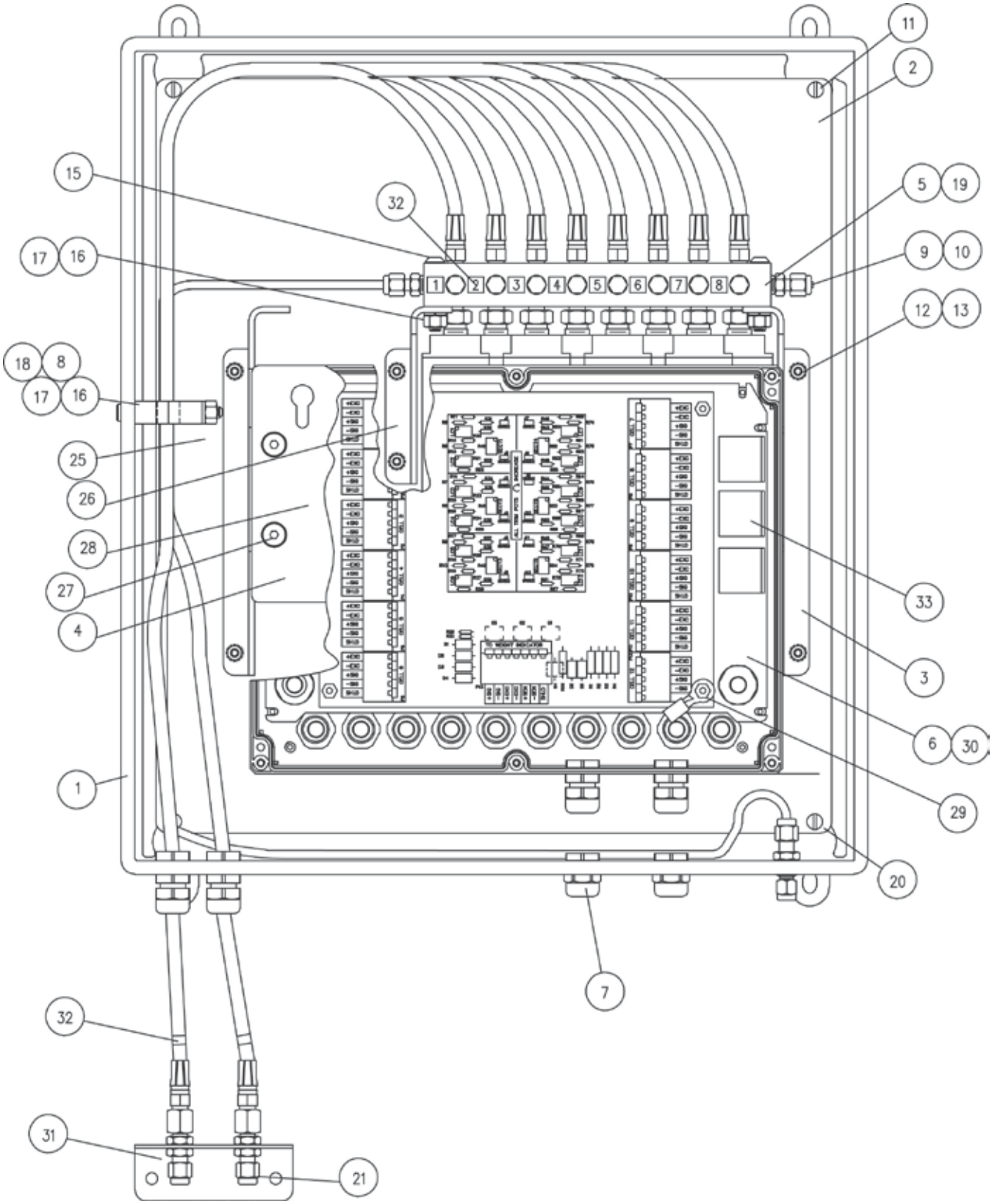


10 & 12 Cell System Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
7	2	6610-2248	GLAND CONNECTOR
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
21	11	6031-0502	PLUG, BRASS (10 cell system)
21	13	6031-0502	PLUG, BRASS (12 cell system)
23	2	3502-B217-0A	HOLE PLUG (used on 10 cell system)
24	1	1780-B028-08	LABEL: LOGO & GUARDIAN
ÜÜ	1	6560-0017	CONFORMAL COATING, SILICONE

ÜÜ Not Shown

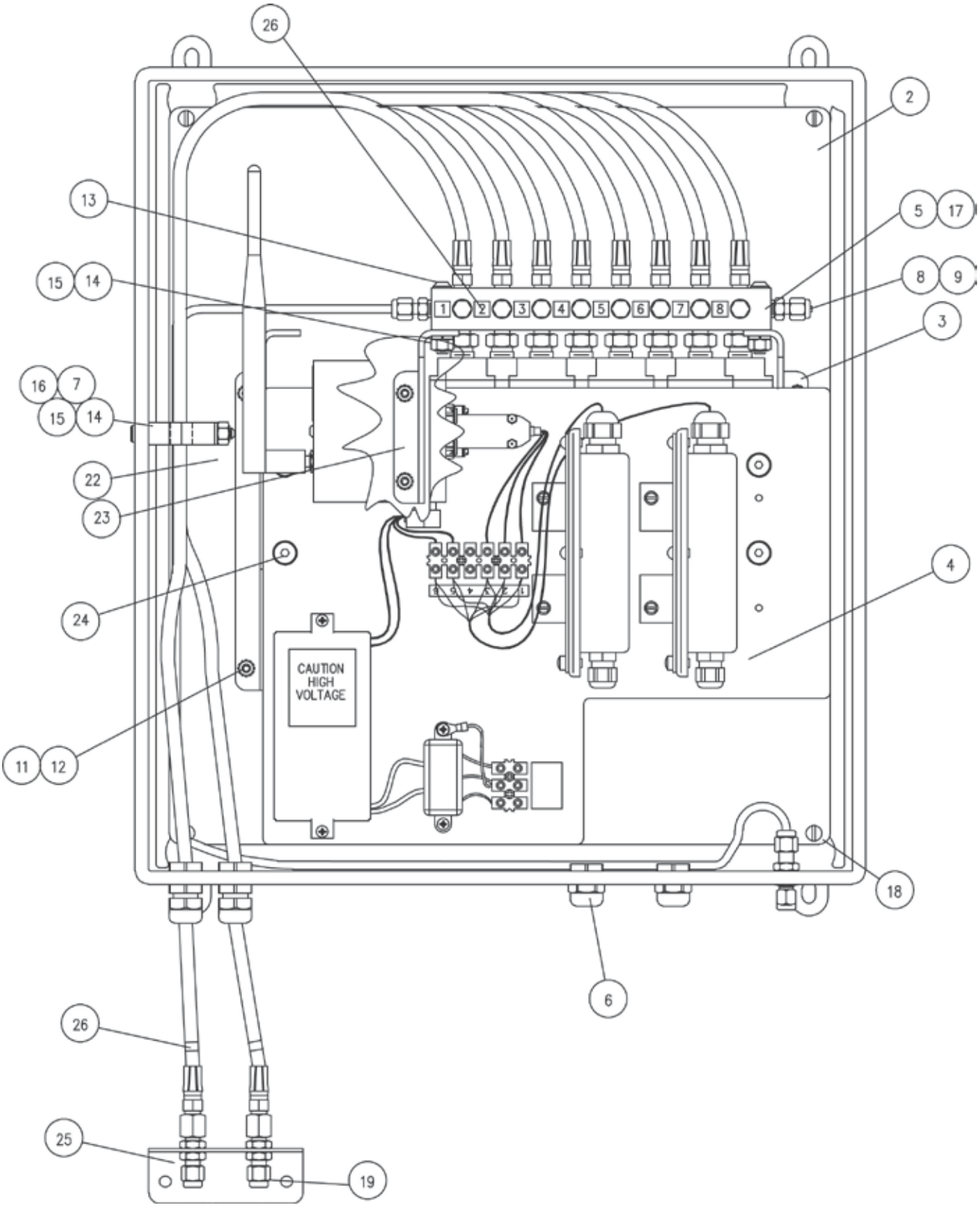
6 & 8 Cell Totalizer Enclosure



6 & 8 Cell Totalizer Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1780-D012-28	ENCLOSURE
2	1	1780-D043-08	SUBPANEL - TOTALIZER
3	1	1780-D018-08	BRACKET
5	1	1772-D007-0A	VALVE BLOCK ASSY 8 CELL SYSTEM
6	1	1780-C014-2A	J-BOX ASSY 8 CELL SYSTEM
7	2	6610-2248	GLAND CONNECTOR
8	2	1780-B027-08	BRACKET HYD. HOSE
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
11	4	6021-1024	RHMS #10-32UNF-2A X 1/2” W/NYLON PATCH
12	6	6021-1004	BHCS #10-32 x 1/2”
13	6	6024-0049	WASHER LOCK EXT TOOTH #10 TYPE A Z-PL
15	4	6021-1533	BHCS 1/4-20UNC-2A x 1 1/2”
16	6	6024-0039	LOCK WASHER 1/4” DIA
17	6	6013-0045	HEX NUT 1/4-20UNC-2B
18	2	6021-1417	SHCS 1/4-20 x 2”
19	1	1772-D007-1A	VALVE BLOCK ASSY 6 CELL SYSTEM
20	3	6031-0506	COPPER TUBING
21	7	6031-0502	PLUG, BRASS (6 cell system)
21	9	6031-0502	PLUG, BRASS (8 cell system)
23	2	3502-B217-0A	HOLE PLUG (not shown, used on 6 cell system)
24	1	1780-B028-08	LABEL: LOGO & GUARDIAN
25	1	1780-D018-18	BRACKET
26	1	1780-D020-08	BRACKET
27	4	6021-1707	FHSCS 1/4-28 x 1/2”
28	1	1780-B039-08	SUPPORT PLATE, JUNCTION BOX
29	1	6610-2449	RING TERMINAL 1/4 STUD 12-10 AWG
30	1	1780-C014-3A	J-BOX ASSY 6 CELL SYSTEM
31	1	1780-C042-08	BULKHEAD BRACKET
32	.2	6980-0139	WIRE MARKER #1-45 10 SHEETS/BOOKLET
33	6	6610-5007	CABLE CLIP, GRAY (6 cell system)
33	8	6610-5007	CABLE CLIP, GRAY (8 cell system)

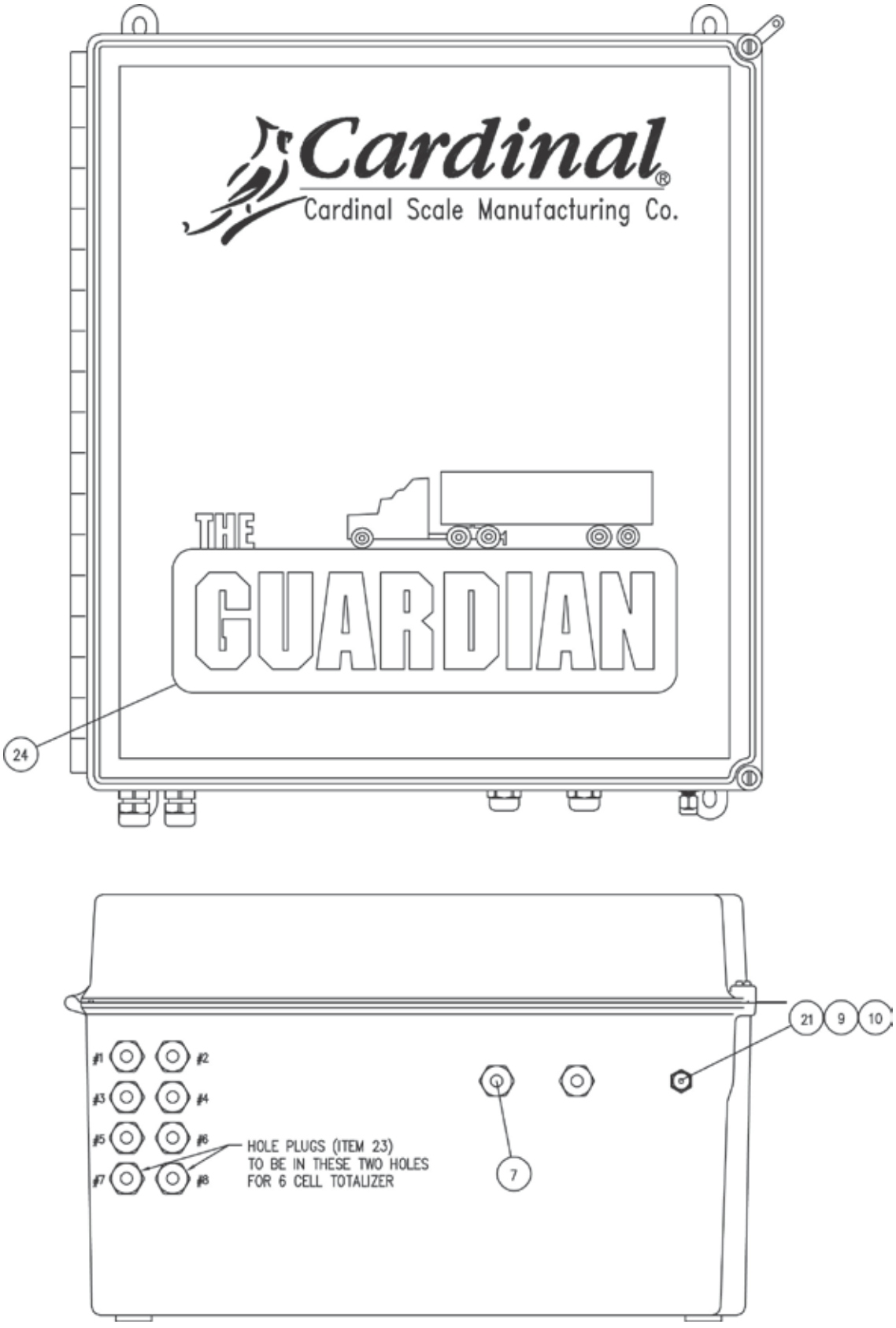
6 & 8 Cell SnapStream Series Totalizer Enclosure



6 & 8 Cell SnapStream Series Totalizer Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1780-D012-28	ENCLOSURE
2	1	1780-D043-08	SUBPANEL - TOTALIZER
3	1	1780-D018-08	BRACKET
4	1	1780-D074-0A	SUB-ASSY: SNAP TOTALIZER PANEL, 8LC
5	1	1772-D007-0A	VALVE BLOCK ASSY 8 CELL SYSTEM
6	2	6610-2248	GLAND CONNECTOR
7	2	1780-B027-08	BRACKET HYD. HOSE
8	1	6031-0515	FITTING, BRASS
9	1	6031-0507	JAM NUT, BRASS
10	4	6021-1024	RHMS #10-32UNF-2A X 1/2” W/NYLON PATCH
11	4	6021-1004	BHCS #10-32 x 1/2”
12	4	6024-0049	WASHER LOCK EXT TOOTH #10 TYPE A Z-PL
13	4	6021-1533	BHCS 1/4-20UNC-2A x 1 1/2”
14	6	6024-0039	WASHER LOCK HELICAL 1/4” DIA
15	6	6013-0045	HEX NUT 1/4-20UNC-2B
16	2	6021-1417	SHCS 1/4-20 x 2”
17	1	1772-D007-1A	VALVE BLOCK ASSY 6 CELL SYSTEM
18	3	6031-0506	COPPER TUBING
19	7	6031-0502	PLUG, BRASS (6 cell system)
19	9	6031-0502	PLUG, BRASS (8 cell system)
20	3	3502-B217-0A	HOLE PLUG (not shown, used on 6 cell system)
20	1	3502-B217-0A	HOLE PLUG (not shown, used on 8 cell system)
21	1	1780-B028-08	LABEL: LOGO & GUARDIAN
22	1	1780-D018-18	BRACKET
23	1	1780-D020-08	BRACKET
24	4	6021-1707	FHSCS 1/4-28 x 1/2”
25	1	1780-C042-08	BULKHEAD BRACKET
26	.2	6980-0139	WIRE MARKER #1-45 10 SHEETS/BOOKLET

6 & 8 Cell System Enclosure

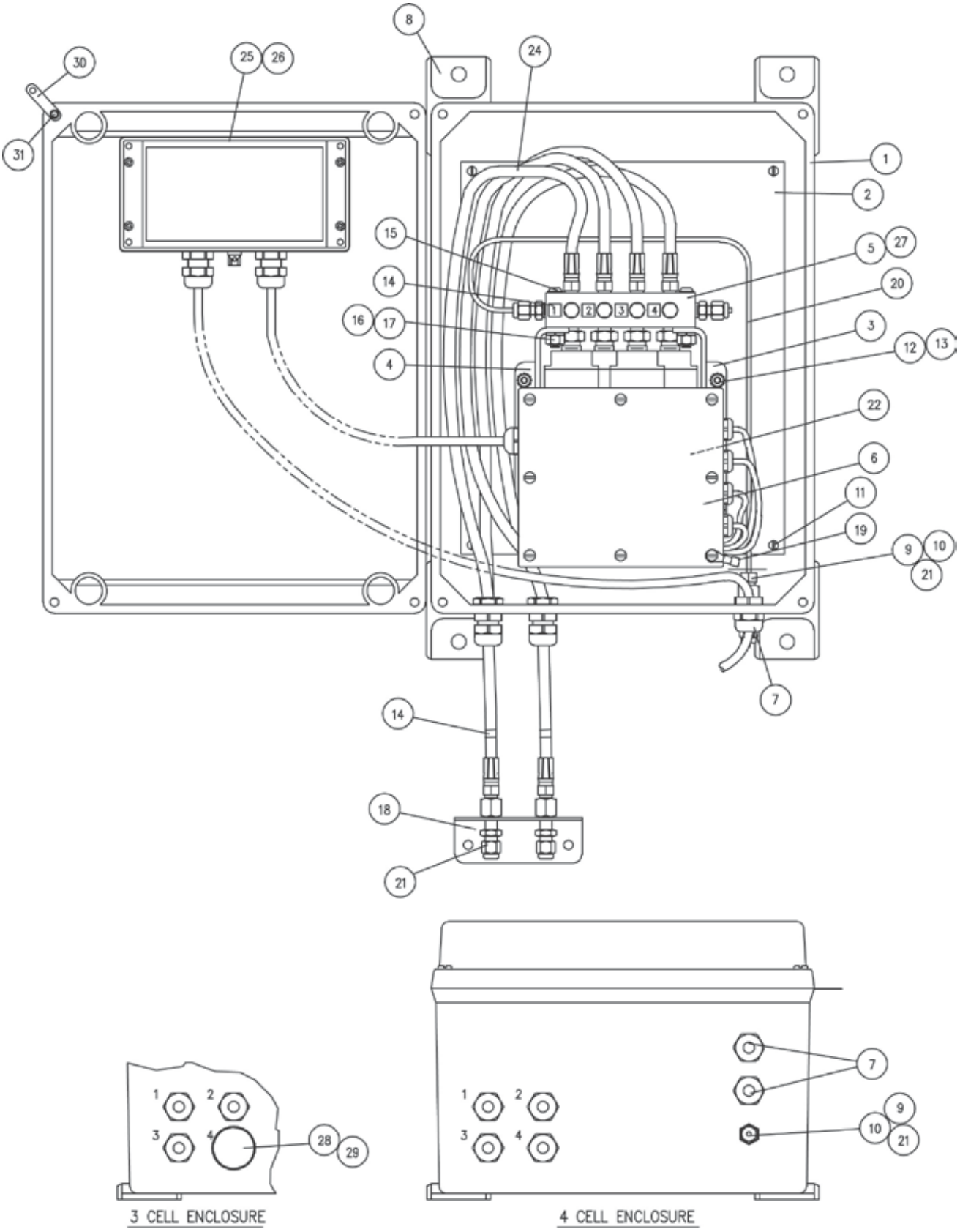


6 & 8 Cell System Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
7	2	6610-2248	GLAND CONNECTOR
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
21	7	6031-0502	PLUG, BRASS (6 cell system)
21	9	6031-0502	PLUG, BRASS (8 cell system)
23	2	3502-B217-0A	HOLE PLUG (used on 6 cell system)
24	1	1780-B028-08	LABEL: LOGO & GUARDIAN
ÜÜ	1	6560-0017	CONFORMAL COATING, SILICONE

ÜÜ Not Shown

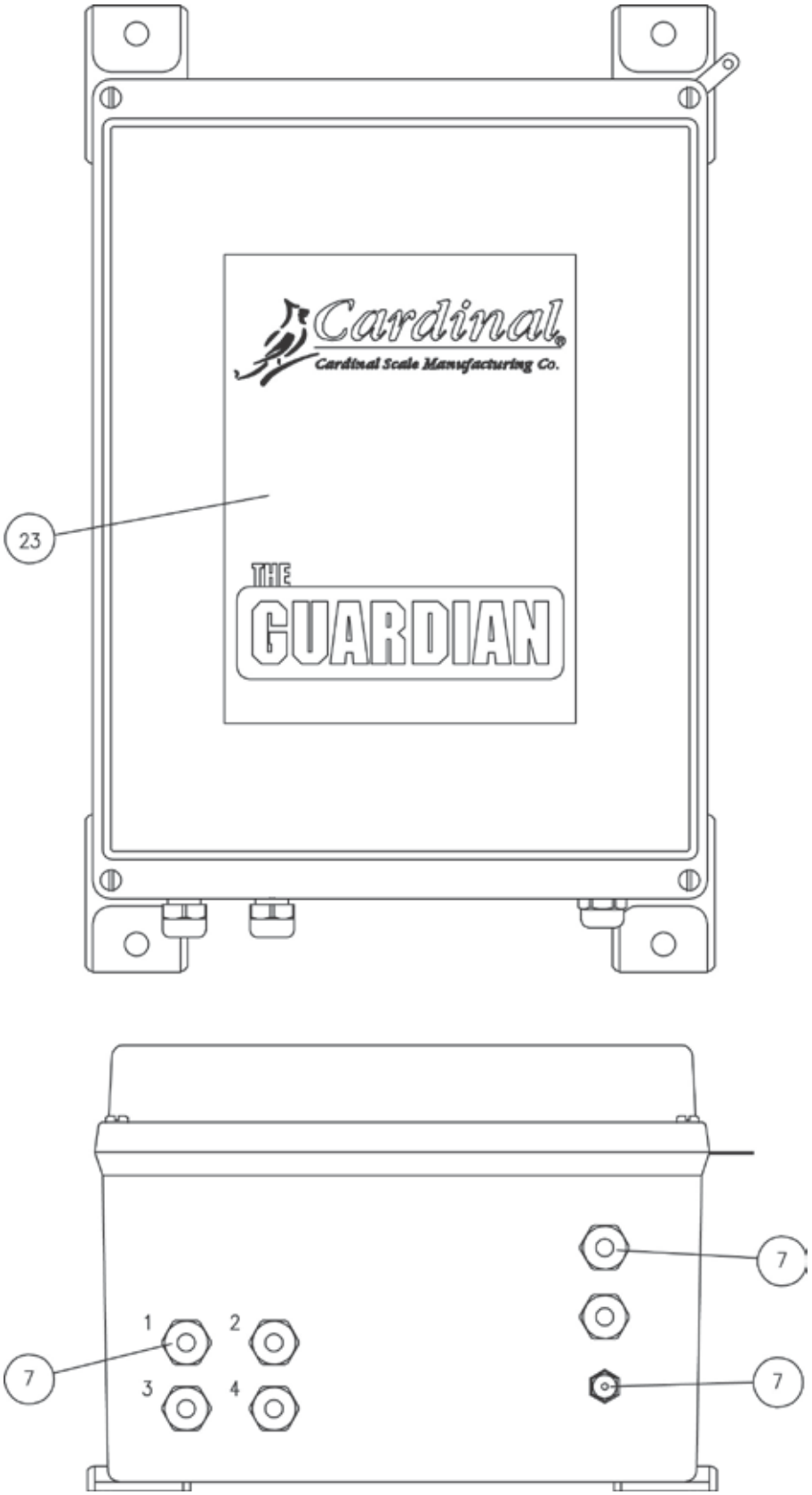
3 & 4 Cell Totalizer Enclosure



3 & 4 Cell Totalizer Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1780-D049-08	ENCLOSURE
2	1	1780-C051-08	SUBPANEL - TOTALIZER
3	1	1780-D050-08	BRACKET
4	1	1780-D050-18	BRACKET
5	1	1772-C014-0A	VALVE BLOCK ASSY, 4 CELL SYSTEM
6	1	1780-C052-0A	J-BOX TRIM ASSY
7	2	6610-2248	GLAND CONNECTOR
8	1	6540-0331	MOUNTING FEET
9	1	6031-0515	FITTING, BRASS
10	1	6031-0507	JAM NUT, BRASS
11	4	6021-1020	RHMS, #10-32UNF-2A X 3/8”
12	4	6021-1004	BHCS, #10-32 X 1/2”
13	4	6024-0049	WASHER LOCK, EXT TOOTH #10 TYPE A Z-PL
14	.2	6980-0139	WIRE MARKER #1-45 (10 SHEETS/BOOKLET)
15	4	6021-1533	BHCS, 1/4-20UNC-2A X 1 1/2”
16	4	6024-0039	WASHER LOCK, HELICAL 1/4”
17	4	6013-0045	HEX NUT, 1/4-20UNC-2B
18	1	1780-C042-18	BULKHEAD BRACKET (4 CELL)
19	1	6610-2449	RING TERMINAL, 1/4 STUD 12-10 AWG
20	3’	6031-0506	COPPER TUBING
21	5	6031-0502	PLUG, BRASS
22	4	6021-1707	FHSCS, 1/4-28 X 1/2”
24	4	1780-B053-0A	SHORTER HYD. HOSE (4 CELL SYSTEM)
24	3	1780-B053-0A	SHORTER HYD. HOSE (3 CELL SYSTEM)
25	1	3502-C520-0A	TRANS SUPP. BOX
26	A/R	6710-1017	TAPE (AS REQUIRED)
27	1	1772-C014-1A	VALVE BLOCK ASSY, 3 CELL SYSTEM
28	1	3502-B217-0A	HOLE PLUG
29	A/R	6560-0041	SILICON SEALER (AS REQUIRED)
30	1	8530-B159-08	SEALING TAB
31	1	6021-1708	#10-32 X 3/4” FILISTER HEAD, DRILLED

3 & 4 Cell System Enclosure



3 & 4 Cell System Enclosure, Cont.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
7	2	6610-2248	GLAND CONNECTOR
23	1	1780-B028-18	LABEL: LOGO & GUARDIAN
ÜÜ	1	6560-0017	CONFORMAL COATING, SILICONE

ÜÜ Not Shown

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 WORKMAN-SHIP	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®

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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.

CARDINAL®

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