



# CARDINAL®



# LSM Series Mobile Livestock Scales Owner's 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 for taking 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.

<b>Serial Number</b> _____
<b>Date of Purchase</b> _____
<b>Purchased Form</b> _____
_____
_____
RETAIN THIS INFORMATION FOR FUTURE USE

<h2>PRECAUTIONS</h2> <p>Before using this scale, read this manual and pay special attention to all "NOTIFICATION" symbols:</p>  <p><b>DANGER!</b> <b>WARNING!</b> <b>CAUTION!</b></p>
--

# INTRODUCTION

Thank you for selecting and purchasing Cardinal Scale's Weight Wrangler Livestock Scale. Your scale was built with quality and reliability and incorporates the latest technology and innovative features for the weighing industry to meet your weighing needs for years to come.

The purpose of this manual is to provide you with a guide through the setup and operation of your Weight Wrangler Livestock Scale. Please read it thoroughly before attempting to use your scale and keep it available for future reference.

## Overview

The Weight Wrangler Mobile Livestock Scales provide a self-contained NTEP legal-for-trade weighing system that can be used on any firm surface with up to a 5% grade. The livestock scales include an integral air pump to easily lift and lower the scale's airbag suspension. Models come in an 18-ft-long tandem axle or 13-ft-long single axle. The X-lug rubberized component deck and steel cattle pen enclosure with dual gates are all suspended at four points within a mobile base frame. The Weight Wrangler can weigh groups of cattle up to 15-20 head at a time (20,000 lb capacity). The scale includes a weight indicator, ticket printer, USB port, battery, self-adjusting electric brakes, and adjustable hitch height. Solar panels are optional.



# Specifications

## LSM2018-MWC225P

- Type: Tandem axle
- Capacity: 20,000 lb x 5 lb
- Overall Dimensions: 18 ft. 5 in. L x 7 ft. 4 in. W x 8 ft. 2 in. H (not including tongue)



## LSM1513-MWC225P

- Type: Single axle
- Capacity: 15,000 lb x 5 lb
- Overall Dimensions: 13 ft. L x 7 ft. 4 in. W x 8 ft. 2 in. H (not including tongue)



Includes:	Cardinal Scale's 225 Digital Weight indicator, ticket printer, 12-volt battery, taillights, reflectors, and adjustable height hitch
Indicator Display:	240 x 64 pixel (5 in W x 1.33 in H / 127 mm W x 34 mm H) monochrome graphics LCD with white LED backlight and visible in direct sunlight
Keypad:	60-key color-coded keypad with QWERTY keys plus four soft keys and 13 function keys
Printer:	Cardinal Scale model CTP-1 dot matrix ticket printer included in mobile weigh center for NTEP legal-for-trade ticket printing of transactions. <b>NOTE:</b> The printer's Operating Temperature Range is 41°F to 104°F
Inclinometer:	Included with scale and detects scale angle to determine if the angle is out of acceptable tolerance for weighing (blanks out if out of NTEP tolerance – up to 5% tilt angle)
Paint:	UV-protected, baked-on tan powder paint
Flooring:	X-lug high-quality rubberized non-slip composite flooring with predefined floor plank seams in the scale deck to help prevent debris from piling up inside and help with cleaning
Country of Origin:	USA
NTEP Certificate of Conformance:	Certificate number 16-042 (legal for trade)
Accuracy Class:	III / IIIL
Power Requirements:	12V automotive type battery (battery included), charged by towing vehicle
Deck Height:	6 inches when in weigh mode for easy step-in
Air Pump:	Integral air pump to lift and lower scale airbag suspension. <b>NOTE:</b> The required air pressure that is needed for the suspension airbags is 100 psi and can be adjusted with the air pressure regulator that is located in the battery box above and to the right of the battery. Refer to the image on page 21.
Load Cells:	NTEP stainless steel model ZX-10000 tension load cells
Gates:	Dual swing gates included with a heavy-duty single gate latch
Brakes:	Self-adjusting electric brakes (4)
Shipping Weights:	LSM2018-MWC225P: 6,000 lb; LSM1513-MWC225P: 4,200 lb

## Standard Features

### Weight Wrangler

- Durable steel cattle pens with UV-protected, baked-on tan powder paint.
- The scale includes two standard gates with a choice of gate opening hinge pin locations.
- 12-volt battery pack included (recharged by towing vehicle).
- Taillights, reflectors, and adjustable height scale hitch are standard.
- A weatherproof mobile weighing center (indicator and printer) is mounted to the exterior of the livestock pen.
- Cattle blind so the operator does not upset livestock while operating the scale during the weight transaction.
- Extra storage shelf in indicator/printer cabinet for spare ticket rolls or EDI reader wand.
- The battery box and weight indicator cabinet feature toolbox latches to properly secure the lids and doors.
- Predefined floor plank seams in the scale deck help prevent debris from piling up inside the scale and allow the debris to fall through to the underside to help with cleaning.
- High under-frame clearance (helpful in maneuvering through bumpy field terrain).
- USA-made stainless-steel load cells are easily accessible via a side access panel.

### Mobile Weighing Center

Cardinal Scale's USA-made legal-for-trade 225 digital weight indicator, USB port, and CTP-1 ticket printer combine in the weatherproof, outdoor enclosure of the Weight Wrangler's mobile weighing center. Livestock weighing transaction results are all displayed on the easy-to-read, Transflective LCD screen that remains highly visible, even in direct sunlight.

Cardinal Scale's USA-made 225 digital weight indicator features StableSENSE® digital filtering that filters the weight signal to produce a stable weight display despite motion on the scale platform due to animal movement.

- Calculates shrink loss for livestock groups.
- Displays current headcount, gross weight, and average weight.
- Also displays previous and total headcount, gross weight, and average weight.
- Display transaction number and transaction shrinkage.
- A printable report summarizing the above information per transaction.
- Inclinator detects scale angle to determine if the angle is out of tolerance for weighing.
- Weight indicator displays current tilt angle (blanks out if out of NTEP tolerance).
- Comes with a USB port to store transactions on a portable USB flash drive.
- Transactions stored on the USB drive may be summarized for printing.

### Options/Accessories

- Collector Panel Mount Bow (qty. 1)
- Horse Risers
- Dual Latch Gate
- Solar Panel

# SAFETY

## Safety Symbol Definitions



**DANGER!** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



**WARNING!** Indicates a potentially hazardous situation that, if not avoided could result in serious injury or death and includes hazards that are exposed when guards are removed.



**CAUTION!** Indicates a potentially hazardous situation that, if not avoided may result in minor or moderate injury.

**IMPORTANT!** Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

## GENERAL SAFETY

Do not operate or work on this equipment unless you have read and understood the instructions and warnings in this manual. Failure to follow the instructions or observe the warnings could result in injury or death. Contact Cardinal Scale Tech Support for replacement manuals. Proper care is your responsibility.



**WARNING!** Failure to follow instructions or observe warnings may result in serious injury or death.

- Do not allow children or inexperienced persons to operate this scale.
- Do not operate without all shields and guards in place.
- Do not use it for purposes other than weighing.
- Do not place fingers into slots or possible pinch points.
- Do not place hands, feet, or any body part underneath the scale at any time. The scale could be lowered, crushing body parts.
- Do not use this product if any of the components are cracked.
- Do not exceed the rated load limit of the unit.
- Do not make alterations or modifications to the unit.
- Do not remove or obscure warning labels.
- Keep hands, feet, and loose clothing away from moving parts.
- Always be certain when lowering scale, that everyone is clear of scale and any moving parts.
- Use two hands when gripping the lift handle to raise or lower the scale.
- Be sure the gates are latched before transporting the scale.
- Ensure the hitch lock pin is installed and all suspension stops are in the transport position before moving the scale.
- The mobile livestock scale is not a trailer. The weighing platform **must be empty** when the scale is being towed.





**WARNING! The Cardinal Mobile Livestock Scale is not a trailer and is not intended for the transportation of livestock or any other goods.**

**The weighing platform must be empty when the scale is towed.**



**Failure to observe this warning may result in serious injury to livestock and/or premature component failure and will void the warranty.**

### **Animal Safety**

Animal safety is a serious issue and must be observed when handling any type of animal. The scale surface may become slippery during use; a build-up of manure on the scale may reduce traction. It is recommended that you take any necessary precautions to maintain an acceptable level of animal footing.

### **Calibration**

This scale has been designed to be calibrated with single block weights spread evenly throughout the floor of the scale. Shift tests should not be done with more than 4,000 lb or 1,815 kg in a 4' x 4' area. Failure to comply with this warning will result in damage to the scale and void the warranty.

# UNLOADING

## Slinging the Scale

The Cardinal Mobile Livestock Scale can be slung using four straps connected from the lifting lugs to a single point in the center. To obtain a lifting point closer to the center of gravity, straps should be one to two 2 feet longer on the rear of the scale.

- Strap length 8 x 13 = 6 ft. minimum
- Strap length 8 x 18 = 9 ft. minimum

## Lifting the Scale

1. Lift the scale only in designated locations. The scale may be lifted by four straps and a crane or loader.



**IMPORTANT! Ensure the scale is in the transport mode when loading and transporting.**

2. The scale can now be placed on a relatively flat location.



**Only lift the scale with the installed lugs.**



**Lifting lugs are spaced to allow balanced lifting of scale.**

## Removing the Lifting Fixture

After the scale has been placed in position, remove the lifting fixture from the inside of the scale cage to prevent injury to livestock.

1. On the outside of the scale cage frame, remove the locknut from the bolt installed for shipping.
2. Remove the lifting fixture and bolt from inside the scale cage.
3. Using the holes that run parallel to the scale cage frame (90 degrees from where the bolt was just removed), install the lifting fixture on the outside of the frame securing it with the bolt and locknut.

# TOWING



**WARNING!** The Cardinal Mobile Livestock Scale is not a trailer and is not intended for the transportation of livestock or any other goods.

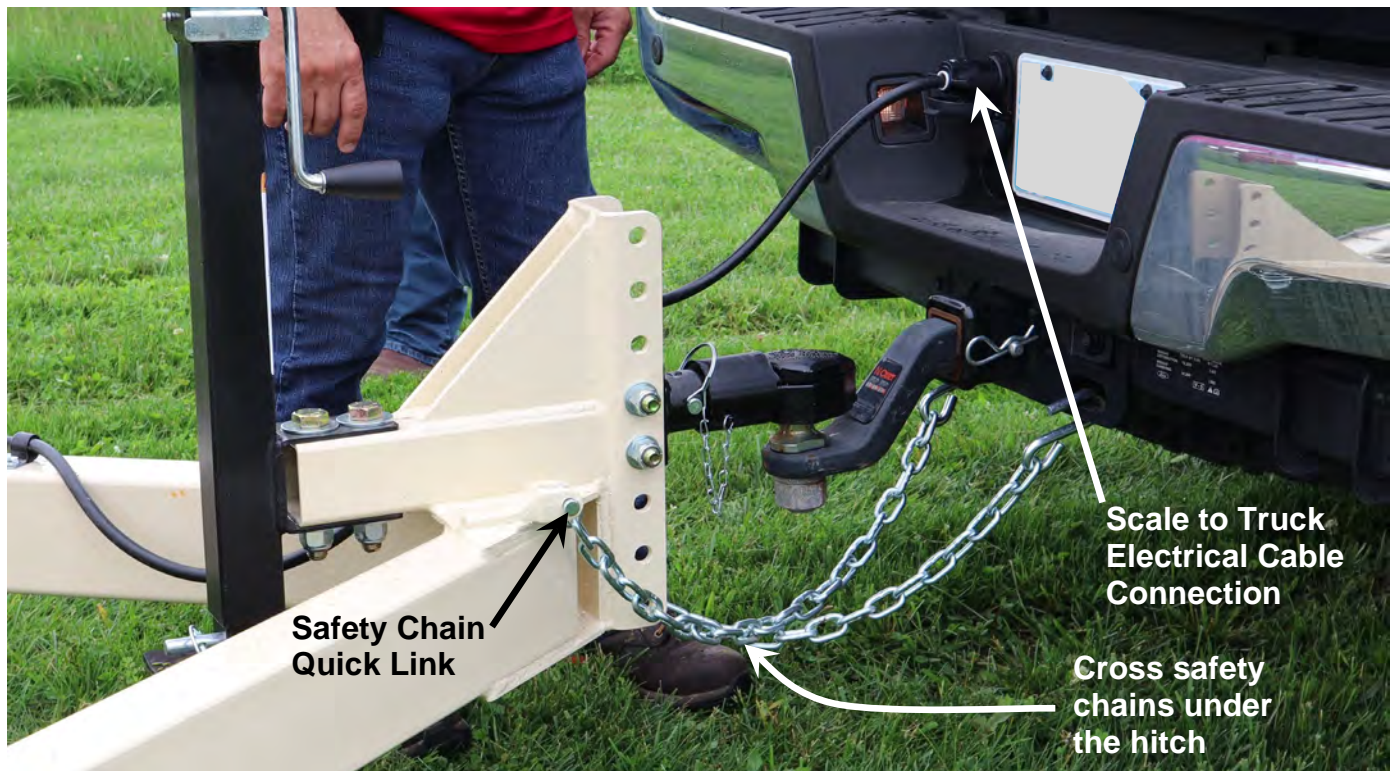


The weighing platform must be empty when the scale is towed.

The scale is classified as a farm implement and therefore should be limited to a *maximum speed of 35 MPH* when towing. Failure to observe this warning may result in serious injury to livestock and/or premature component failure and will void the warranty.

## IMPORTANT! THE SCALE MUST BE IN TRANSPORT MODE BEFORE TOWING.

The scale is designed to be towed level (frame parallel to the ground) using a 2 5/16-inch ball behind a standard 3/4-ton truck. To achieve the level towing condition, the required hitch height of the towing vehicle must be approximately 16 inches. If the hitch of the towing vehicle is not in this range, an adjustable height hitch comes standard on the scale, allowing the correct height to be achieved. Note that the hitch weight of the scale is approximately 700 lb. An equalizer hitch may be used for towing if desired.

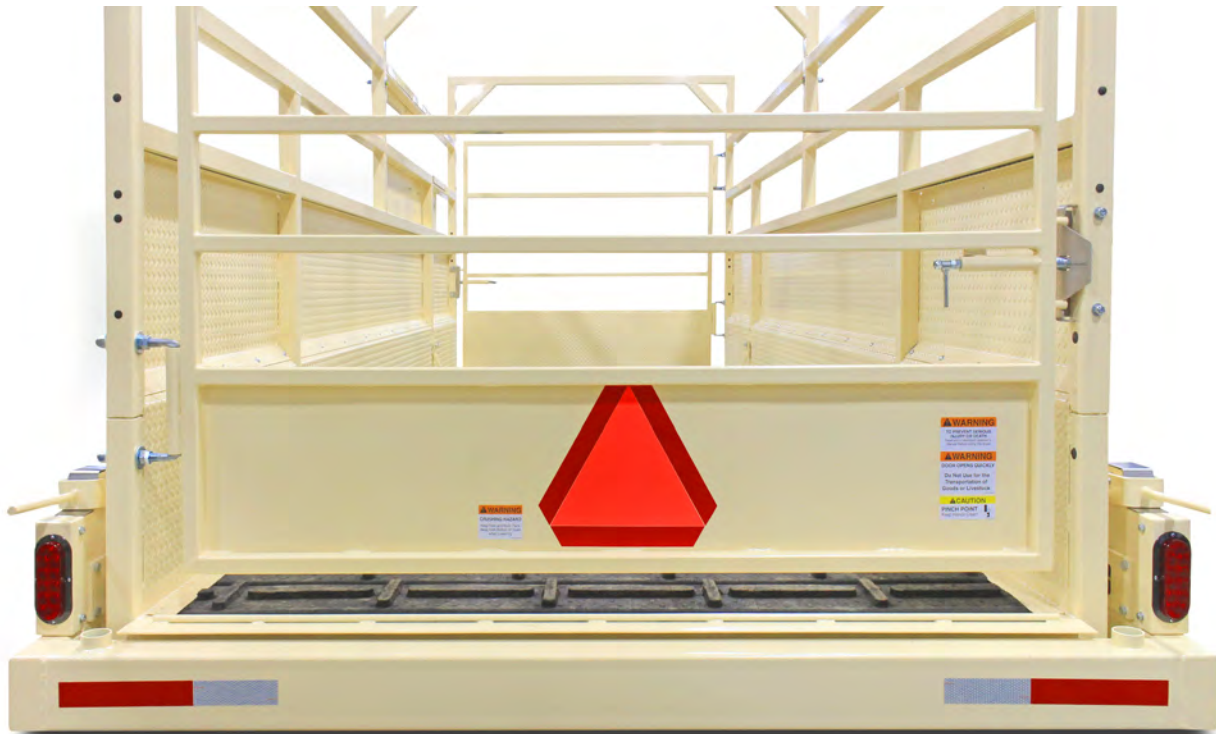


**Scale hitch shown correctly installed on the tow vehicle.**

The safety chains must be connected during towing. Cross the safety chains under the hitch for proper protection. Note that the length of the safety chain can be easily adjusted by inserting the quick link through any of the chain links.

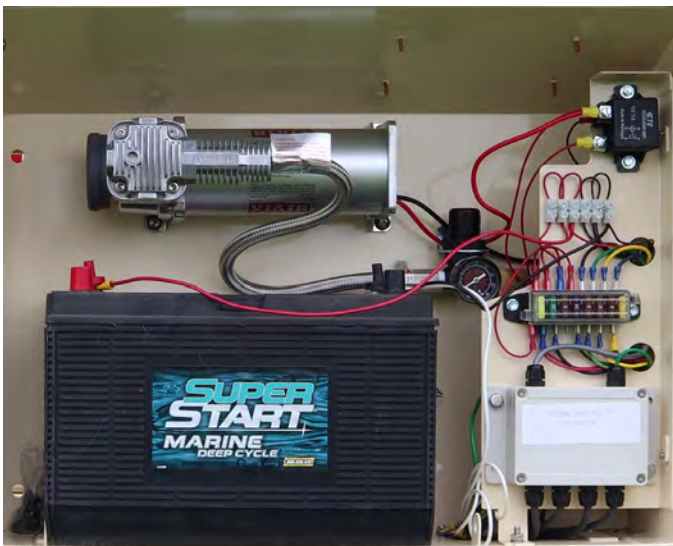
The scale must be connected electrically to the tow vehicle. Ensure the wiring of the towing vehicle is compatible with the scale wiring before connecting the scale to the tow vehicle.

Taillights and reflectors are standard on the scale to allow it to be towed at night, or if the lights on the tow vehicle are obstructed by the scale.

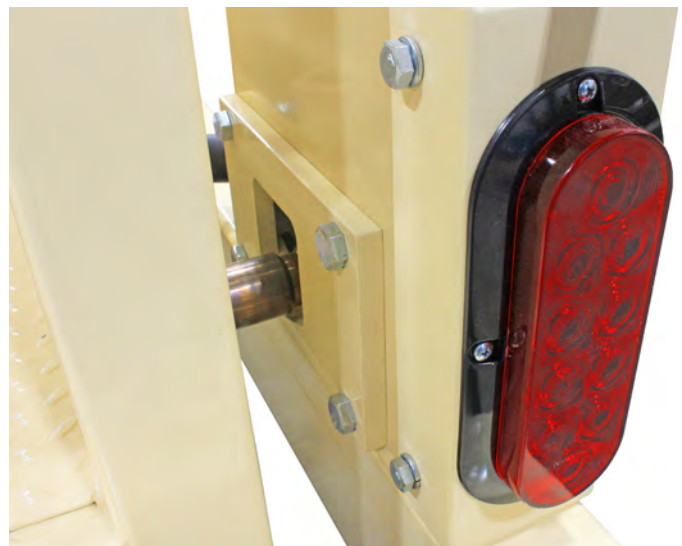


**Taillights and reflectors are standard and do not require removal to use the scale.**

The taillights are hard-wired inside the battery box, so there is no plug to work loose and there is no exposed wiring. The taillight wiring is run inside the lower frame, eliminating exposed wiring and removal of the taillights before using the scale, making for a faster setup.



**Taillights are hard-wired inside battery box, so there is no plug to work loose.**



**Taillight wiring runs inside the lower frame eliminating exposed wiring.**

## WEIGH MODE SETUP

Use the following instructions to convert the scale from Transport Mode to Weigh Mode.

1. Park the scale on a level location as possible. Ensure no obstructions or debris are under the scale would affect weighing accuracy.

**NOTE:** The scale will weigh properly on up to a 5% tilt angle.

2. Disconnect the scale from the tow vehicle's electrical cable.
3. Disconnect the scale hitch from the tow vehicle hitch and extend the jack until it lifts the scale hitch from the truck hitch.
4. Move the tow vehicle clear of the scale.
5. Remove the retaining clip securing the safety pin holding the tongue arms together and store the retaining clip as shown.



**Remove retaining clip securing safety pin.**



**Store retaining clip as shown above.**

6. Using the scale hitch jack, lower the scale tongue arms until they are on the ground.



**Lower scale tongue arms until they are on the ground using the scale hitch jack.**

7. Ensure the dump valve located on the battery box is closed and then open all the airbag valves located directly above the airbags.



Ensure dump valve is closed

Dump valve on battery box must be closed.



Open all airbag valves

Open all airbag valves located directly above the airbags.

8. Slowly open the dump valve to empty the air from the scale suspension.  
9. The scale will slowly lower to the ground.



Open dump valve slowly

Slowly open the dump valve on the battery box to empty air from scale suspension.



Scale completely lowered to the ground.

10. To open the Mobile Weigh Center, raise and secure the cover using the two pins (one on each side), then lower the shelf, and press the power switch to the ON position.

Secure cover with attached pins, one on each side

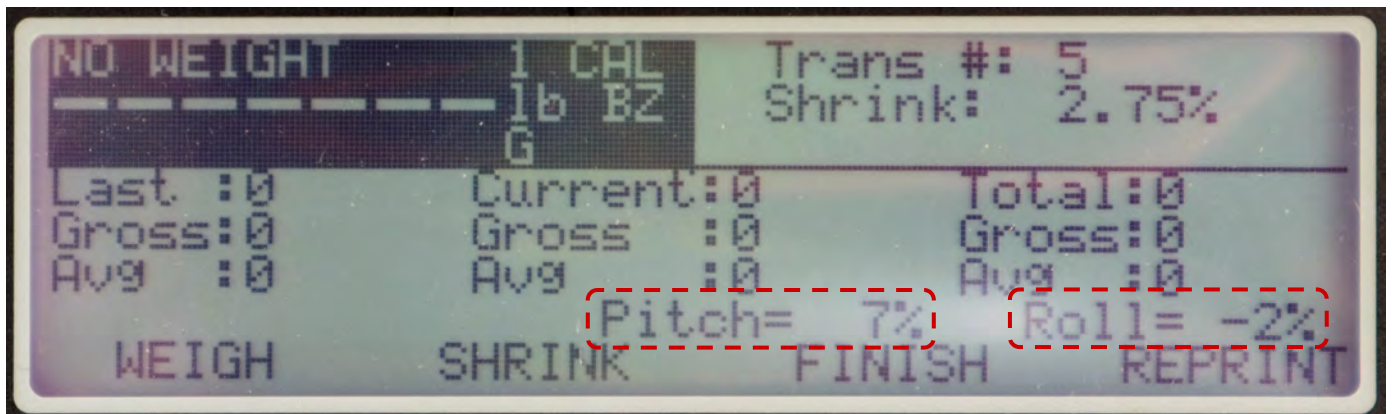


Secure cover with attached pins. One on each side of Mobile Weigh Center cover.



After lowering the shelf, press the power switch to the ON position.

11. If the scale is not level, the indicator will display dashes and NO WEIGHT along with the out-of-tolerance angle measurements (Pitch and Roll) as a percentage. Pitch refers to the scale's rotation from front to back and Roll refers to the scale's motion from side to side (front to back from the indicator's perspective).



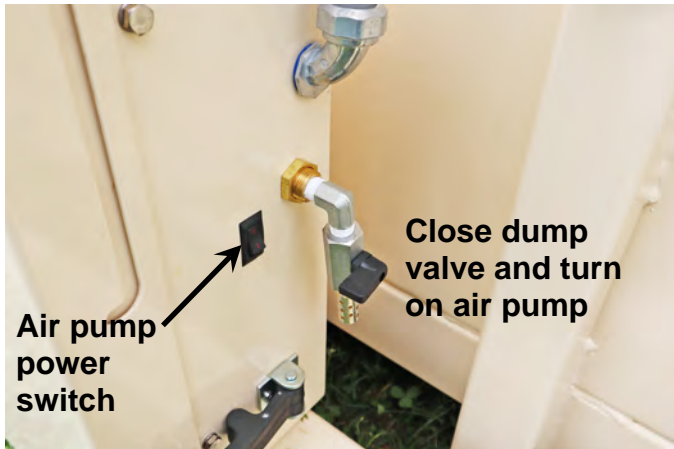
Indicator display when the scale is not level. Note the outlined Pitch and Roll out-of-tolerance percentage values.



**IMPORTANT!** Using shims may level the scale. If the out-of-tolerance angle is too great, the scale will need to be moved to a more level location.

12. Inspect all four corners of the scale. Although the scale will weigh properly up to five (5) degrees off level, individual corners of the scale should not be allowed to teeter. If any of the corners are not contacting the ground, either move the scale to a more level location or complete steps 13 through 15 to install shims.

13. Close the dump valve and turn on the air pump to slightly raise the scale. Once the scale frame has lifted sufficiently, turn off the pump.



Close the dump valve and turn on the air pump to raise scale enough to add shims.



Close airbag valves on one side of the scale to only raise that side to add shims.



**NOTE:** If only one side of the scale requires shims to level it, you can close both airbag valves on that side of the scale and then turn on the air pump to raise that side and not the other side.

14. Place shims directly *under the base frame* and *under the load cell stands* to level the scale.



Brick under base frame

Brick used as a shim and placed under the base frame.



Brick under load cell stand

Brick used as a shim and placed under load cell stands.

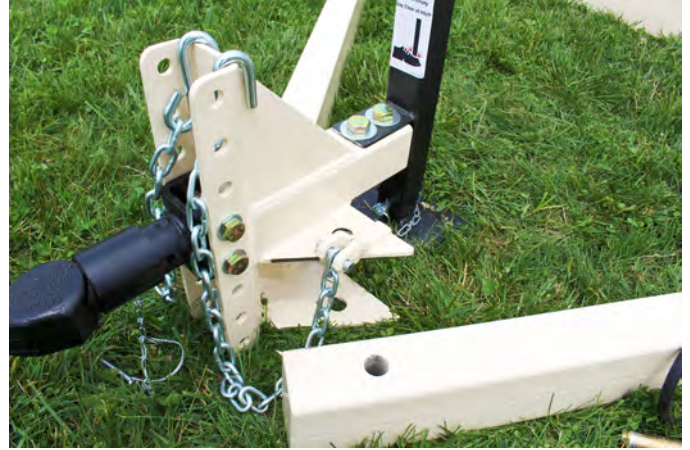
15. Open the dump valves to lower the scale onto the ground and shims.



16. Remove the safety pin holding the tongue arms together.

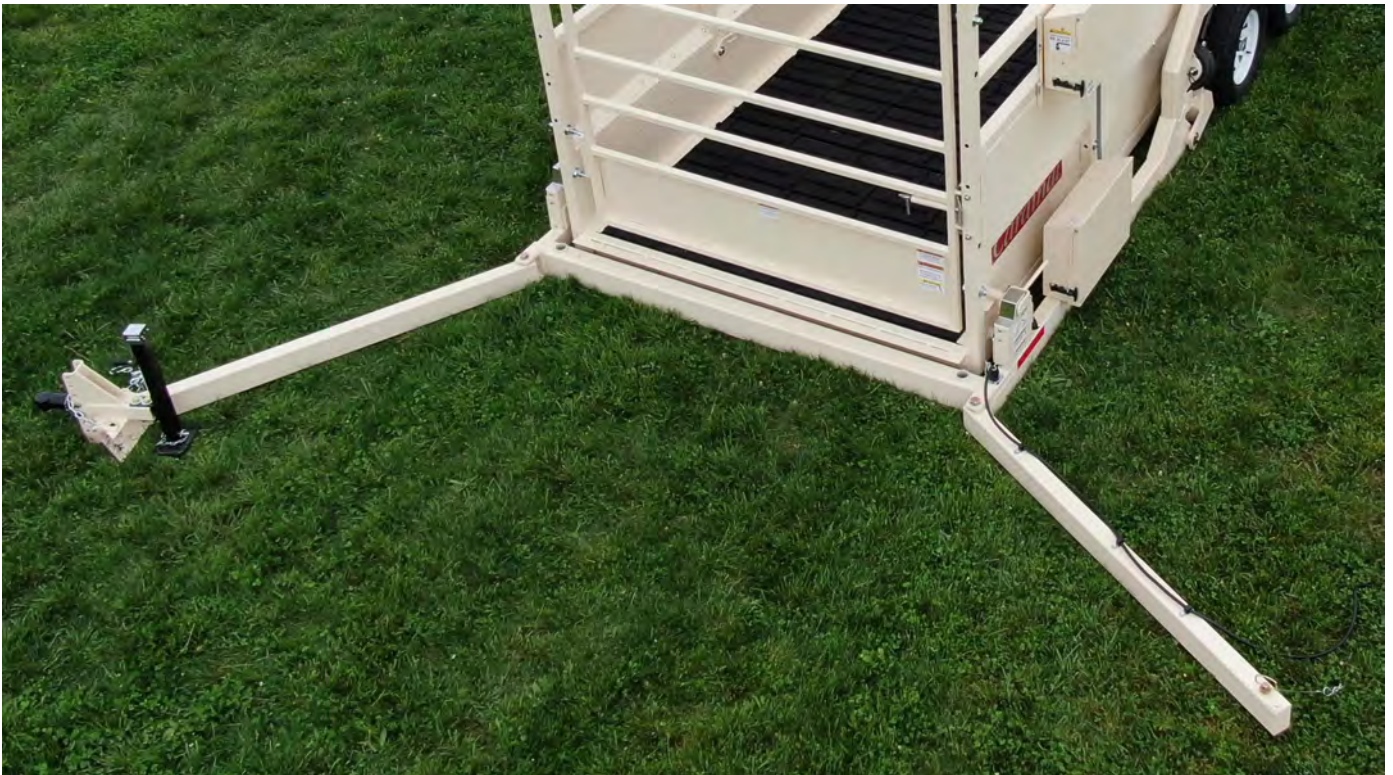


**Safety pin removed.**



**Tongue arms separated.**

17. Swing both tongue arms so they are clear of the scale (at approximately 90° from the scale or as much as the location will allow) to prevent injuries to the animals when exiting the scale.



**Separate tongue arms to approximately 90° from the scale or as much as the location allows to prevent injuries to animals when exiting the scale.**

18. Using both hands, securely grip the cam handle and rotate it towards the center of the scale to raise the platform and enable the scale. Repeat for each corner of the scale.

**NOTE:** The Cam levers point OUT away from the center of scale (and each other) in the Transport mode and IN towards the center of scale (and each other) in the Weigh mode. Refer to the decals on each load cell tower cover for the direction of levers in each mode.



**WARNING!** The lift mechanism is an over-center cam-style lift and lock. Always grip the lift handle with two hands *securely* when raising and lowering the scale.



Front Cam lever in Transport position.



Front Cam lever in Weigh position.



Rear Cam lever in Transport position.



Rear Cam lever in Weigh position.

19. Ensure the MWC225P indicator is showing zero weight.



## INSTALLING GATHERING PANELS

1. On the corner of the scale frame, locate the opening for the gathering panel.
2. Insert the tube from the gathering panel into the frame opening.
3. Position the gathering panel at the desired angle away from the scale.



Frame opening for Gathering Panel tube.



Insert Gathering Panel tube into frame opening.



Lower stops on Gathering Panel tube.



Upper stop on Gathering Panel tube.

**IMPORTANT!** When installing the gathering panels, make sure the gathering panels **DO NOT** touch the scale cage. Touching the scale cage will cause inaccurate weight readings.



**Install the Gathering Panels so they DO NOT touch the scale cage, otherwise inaccurate weight readings will occur.**

**NOTE:** The gate will only open slightly past 90 degrees from the cage. Position the gathering panel on the gate side so that it is close but not touching the gate to avoid a gap large enough for livestock to get trapped between the gathering panel and the gate.



**CAUTION! Gathering panels must be removed from the scale during transport.**

**The LSM Series scale is not a trailer and is not intended for the transportation of livestock or any other goods. The weighing platform must be empty when the scale is towed. Failure to observe this warning may result in serious injury to livestock and/or premature component failure and will void the warranty.**

# MWC225P MOBILE WEIGH CENTER

This section is a guide to the setup and operation of the MWC225P Mobile Weigh Center special application for the LSM Series scales. It should be used in addition to the 225 WEIGHT INDICATOR Installation and Technical Manual, 8200-M698-O1. The standard manual should be consulted for information concerning the installation, operation, and service of the indicator.

The MWC225P is for use with the LSM Series mobile livestock scale. It collects headcount, total weight, the average weight per head, and shrinkage, and stores transactions to a thumb drive. An inclinometer measures scale tilt to ensure it is within the appropriate range and, if not, stops weighing until tilt is brought back within tolerance. This is to ensure all weighments are accurate.

## Setup

Hold down the **SHIFT** key and then press the Navigation **ENTER** key (red square key in the center of Navigation arrows, to the right of the weight display).

If a password has been entered (Refer to the *225 WEIGHT INDICATOR Installation and Technical Manual*), then at the `PASSWORD=` prompt, enter the password and press the **ENTER** key.

## Calibrating the Inclinometer

**IMPORTANT! Perform on a level surface, using a mechanical level on the scale frame.**

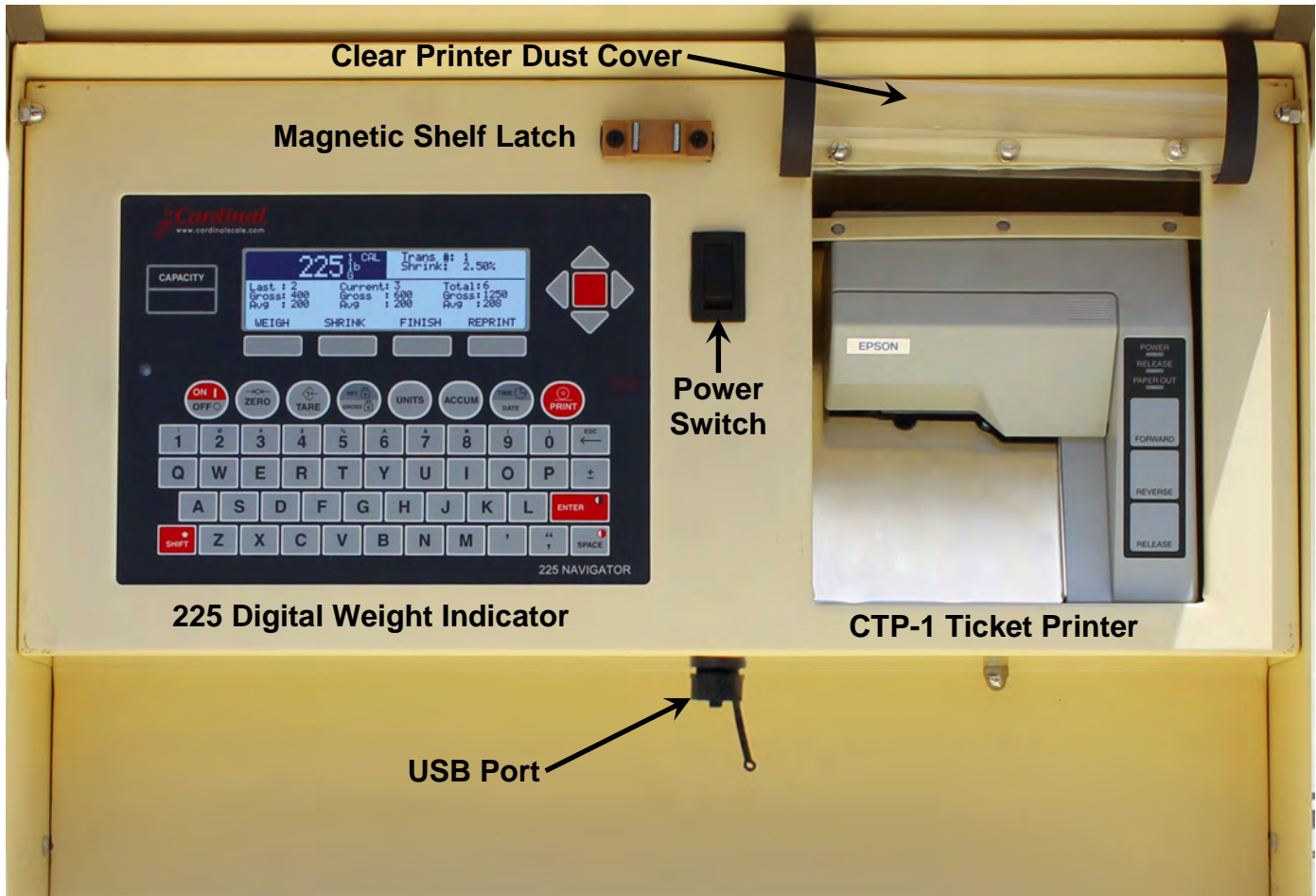
1. Navigate to SETUP MENU #3.
2. Press **8** – **ENTER** to enter the `CAL ANGLE` menu.
3. Press **1** – **ENTER** to modify the pitch angle (front to back of the scale, left to right of the 225).
  - a. The 225 will display `Enter current angle (in degrees) = 0.0`.
  - b. To set the current angle to 0 simply press **ENTER**.
  - c. To set the current angle to some externally measured angle, enter the new angle and press **ENTER**.
  - d. Calibration takes several seconds. If the calibration was successful, the 225 will display `-SUCCESS-`. If the calibration fails, the 225 will display `ERROR`.
4. Press **2** – **ENTER** to modify the roll angle (sideways roll of scale, front to the back of the 225).
  - a. The 225 will display `Enter current angle (in degrees) = 0.0`.
  - b. To set the current angle to 0 simply press **ENTER**.
  - c. To set the current angle to some externally measured angle, enter the new angle and press **ENTER**.
  - d. Calibration takes several seconds. If the calibration was successful, the 225 will display `-SUCCESS-`. If the calibration fails, the 225 will display `ERROR`.

**NOTE:** To DEFAULT the angle calibration, press **3** – **ENTER** to select `Default Angle Cal`.

## MWC225P Indicator



The MWC225P will only display weight when the scale is on a level plane within tolerance. If the scale is tilted out of tolerance the indicator will display dashes and **NO WEIGHT** along with the out-of-tolerance angle measurements (Pitch and Roll) as a percentage. Pitch refers to the scale's rotation from front to back and Roll refers to the scale's motion from side to side (front to back from the indicator's perspective).



**Mobile Weigh Center Components**

## Soft Keys

<b>WEIGH</b>	Press to begin weighing animals. The display will prompt <b>ENTER HEAD COUNT</b> and then will start printing a ticket with current animals on the scale. The Head Count, Current Count with Gross Weight, and Average Weight per Head will be displayed and added to running transaction totals.
<b>SHRINK</b>	Press to view and/or modify the Shrink Value when weighing animals. This value can be modified at any time before the <b>FINISH</b> soft key is pressed. This is the percentage removed from the total Gross Weight as shrinkage.
<b>FINISH</b>	Press to complete the current batch of animals and print the transaction totals.
<b>REPRINT</b>	Press to reprint the last ticket any time <i>before</i> starting the next batch.

## MWC225P Indicator Operations

### Power the Scale

Press the power switch to turn the indicator ON.

### Enter the Shrink Value

The shrink value is the percentage removed from the total gross weight as shrinkage. It is limited to a range from 0.00 to 100.00 percent.

Press the **SHRINK** soft key at any time to view and/or modify the shrink percentage.

### Enter the Number of Animals

1. Insert a ticket into the printer. Press **FORWARD** on the printer to secure the ticket.
2. Verify the scale is level and within tolerance. If the scale is tilted out of tolerance the indicator will display dashes and **NO WEIGHT** along with the out-of-tolerance angle measurements (Pitch and Roll) as a percentage.
3. Press the **ZERO** key to re-zero scale if needed.
4. Load the animals onto the scale.
5. Press the **WEIGH** soft key.

6. The indicator will prompt **ENTER HEAD COUNT**. Using the keypad, enter the number of animals and press the **ENTER** key. The Head Count, Current Count with Gross Weight, and Average Weight per head will be displayed and a ticket will begin to print and advance.

Each time the **WEIGH** soft key is pressed, the weighment will display the Head Count in the center column (as Current Count), along with the Gross Weight and Avg (average) Weight per Head. The left column is the previous weighment. The right column is the running total.

7. Unload the animals from the scale.
8. Follow steps 4 through 7 until all animals from the current batch have been weighed.
9. Press the **FINISH** soft key to complete the current batch of animals.

The shrinkage percentage will be applied, and the transaction totals will be printed (before they are reset). Pressing the **FINISH** soft key terminates the transaction, resets all the counts to zero, and increments the transaction number.

10. Press the **REPRINT** soft key at any time *before* starting the next batch to reprint the last ticket.



The transaction number can be modified (before a transaction) by pressing the **TIME/DATE** key. Press the **ENTER** key twice to skip the Time and Date prompts and then the 225 indicator will prompt **Trans Num: XXXXX**. Using the numeric keys, enter the new transaction number and then press the **ENTER** key.

## Printing a Ticket

The following is an example ticket:

10:15 05/24/2021		
Trans #: 3		
Head	Weight	Avg Wt
-----		
8	6515 lb	814
10	7245 lb	724
7	5745 lb	820
-----		
25	19505 lb	780 Gross
	19114 lb	764 Net
		2.00% shrink

On the first animal/group weighment, Time, Date, Transaction Number, and Column Headers are printed along with the first weighment.

Each subsequent weighment prints only the Head Count, Weight, and Avg Wt.

Terminating a transaction by pressing the **FINISH** soft key totals all the numbers, applies Shrinkage, and prints the Total Gross, Total Net, and Shrink Percentage where:

**Note that Net = Gross x (1-shrink\_percentage).**



**IMPORTANT!** The printer's Operating Temperature Range is 41°F to 104°F.

## USB Flash Drive

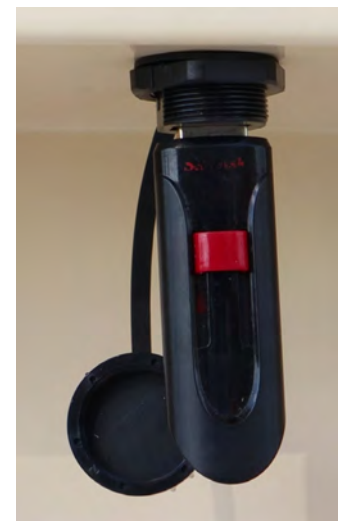
The USB port allows transactions to be exported to a spreadsheet for more extensive reporting and data collection. When a USB flash drive is installed in the USB port, a transaction will be stored upon pressing the **FINISH** soft key.

Summary information from all transactions is stored on the USB flash drive and can be printed by simply pressing the **SHIFT** key and the **TOT\_PRINT** soft key.

**USB flash  
drive installed  
in USB port.**

**NOTE:** The data is stored on the USB flash drive in a comma-delimited format as follows:

TRANS #, DATE, TIME, TOTAL HEAD CNT, TOTAL GROSS, SHRINK<CR><LF>





## TRANSPORT MODE SETUP

Use the following instructions to convert the scale from Weigh Mode to Transport Mode.

1. Turn off the power switch located in the weigh center. Close the shelf, remove the two securing the cover in the upright position, then close and latch the weigh center cover.
2. On each corner of the scale, using both hands, securely grip the cam handle and rotate it away from the center of the scale to lower the platform and disengage the scale.

**NOTE:** The Cam levers point OUT away from the center of scale (and each other) in the Transport mode and IN towards the center of scale (and each other) in the Weigh mode. Refer to the decals on each load cell tower cover for the direction of levers in each mode.

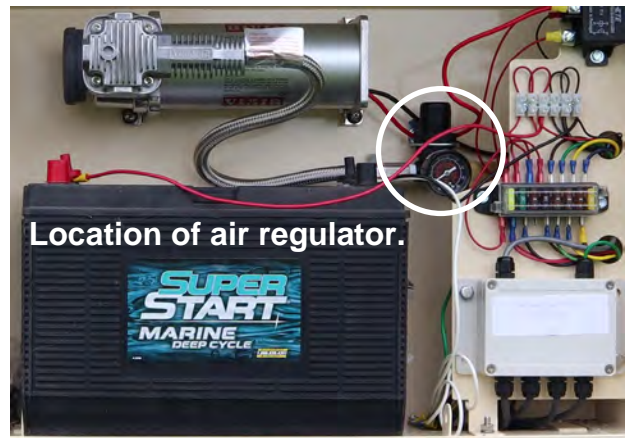


**WARNING!** The lift mechanism is an over-center cam-style lift and lock. Always grip the lift handle with two hands *securely* when raising and lowering the scale.

3. Swing both tongue arms together and insert the safety pin.
4. Ensure the dump valve located on the battery box is closed.
5. Turn on the air pump to add air to the scale suspension to raise the scale frame off the ground. If shims were used, they should be removed at this time.

**NOTE:** The required air pressure that is needed for the suspension airbags is 100 psi and can be adjusted with the air pressure regulator that is located in the battery box above and to the right of the battery. Refer to the image to the right.

6. Close all air valves located directly above the airbags.



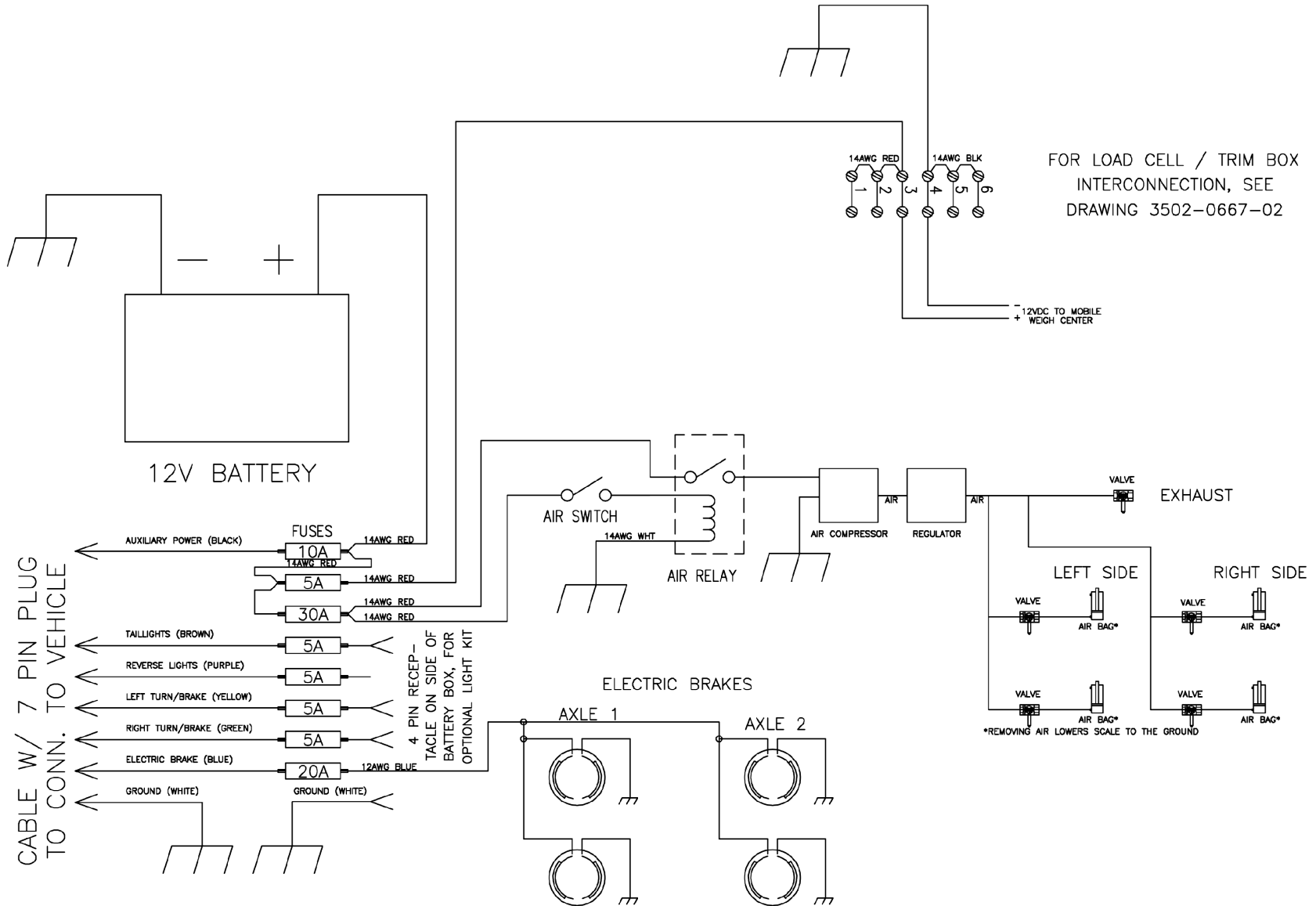
**IMPORTANT!** During scale towing, all valves **MUST** be closed.

7. Extend the scale hitch jack to raise the scale hitch off the ground and be approximately high enough to clear the tow vehicle hitch.
8. Install the retaining clip in the tongue arms safety pin to secure it.
9. Position the tow vehicle near the scale hitch.
10. Retract the scale hitch jack to lower the scale hitch onto the tow vehicle hitch.
11. Connect the scale hitch to the tow vehicle and connect all wiring between the scale and the tow vehicle.
12. Connect the safety chains to the tow vehicle, crossing them under the scale hitch.
13. If not performed in step 10, completely retract the scale hitch jack.

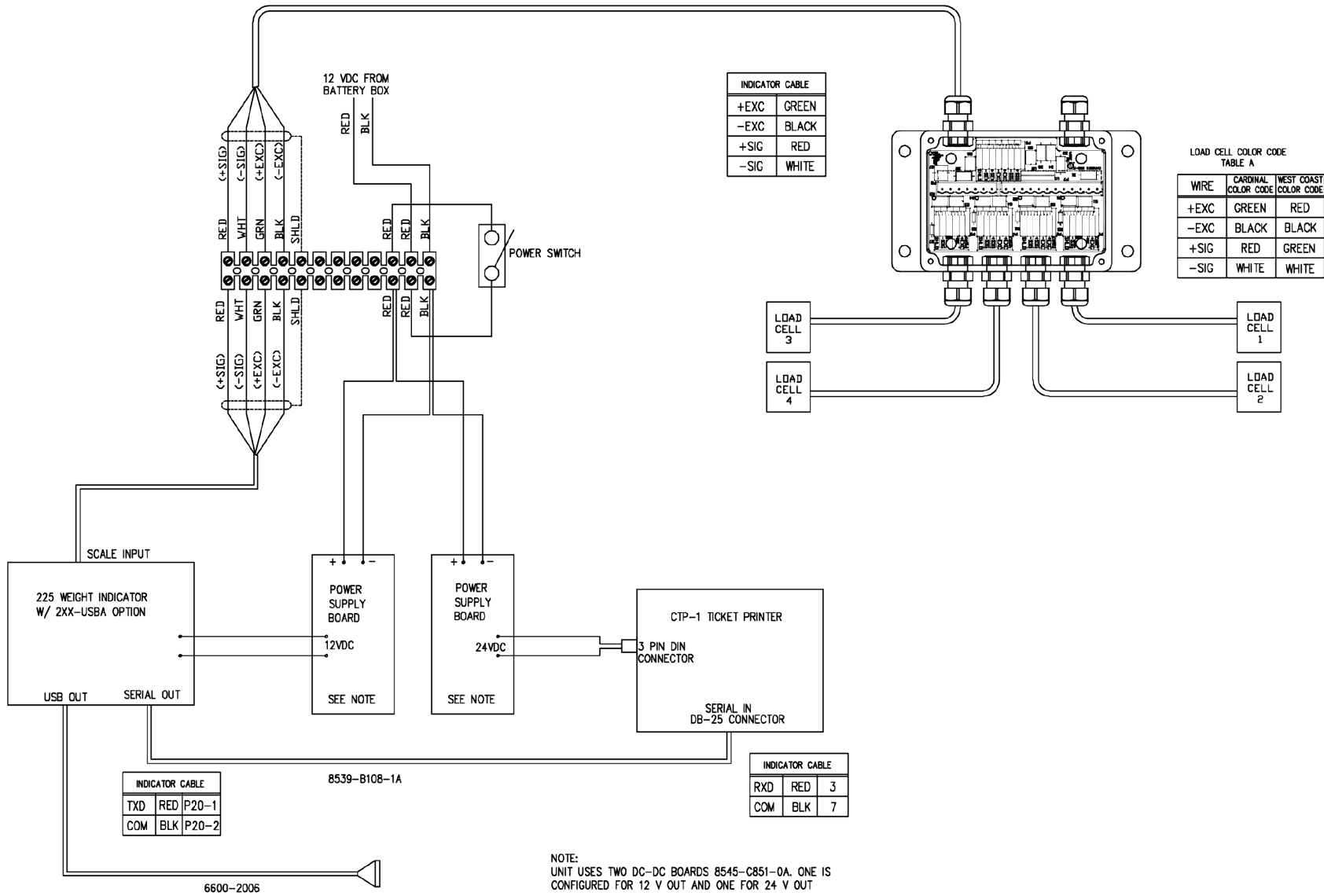


**WARNING!** Do not move the vehicle until the scale is in transport mode, all air valves are closed, the scale hitch jack is retracted, and the safety chains are crossed under the scale hitch and attached to the tow vehicle.

# SCALE WIRING DIAGRAM



# MWC225P WIRING DIAGRAM



## TROUBLESHOOTING

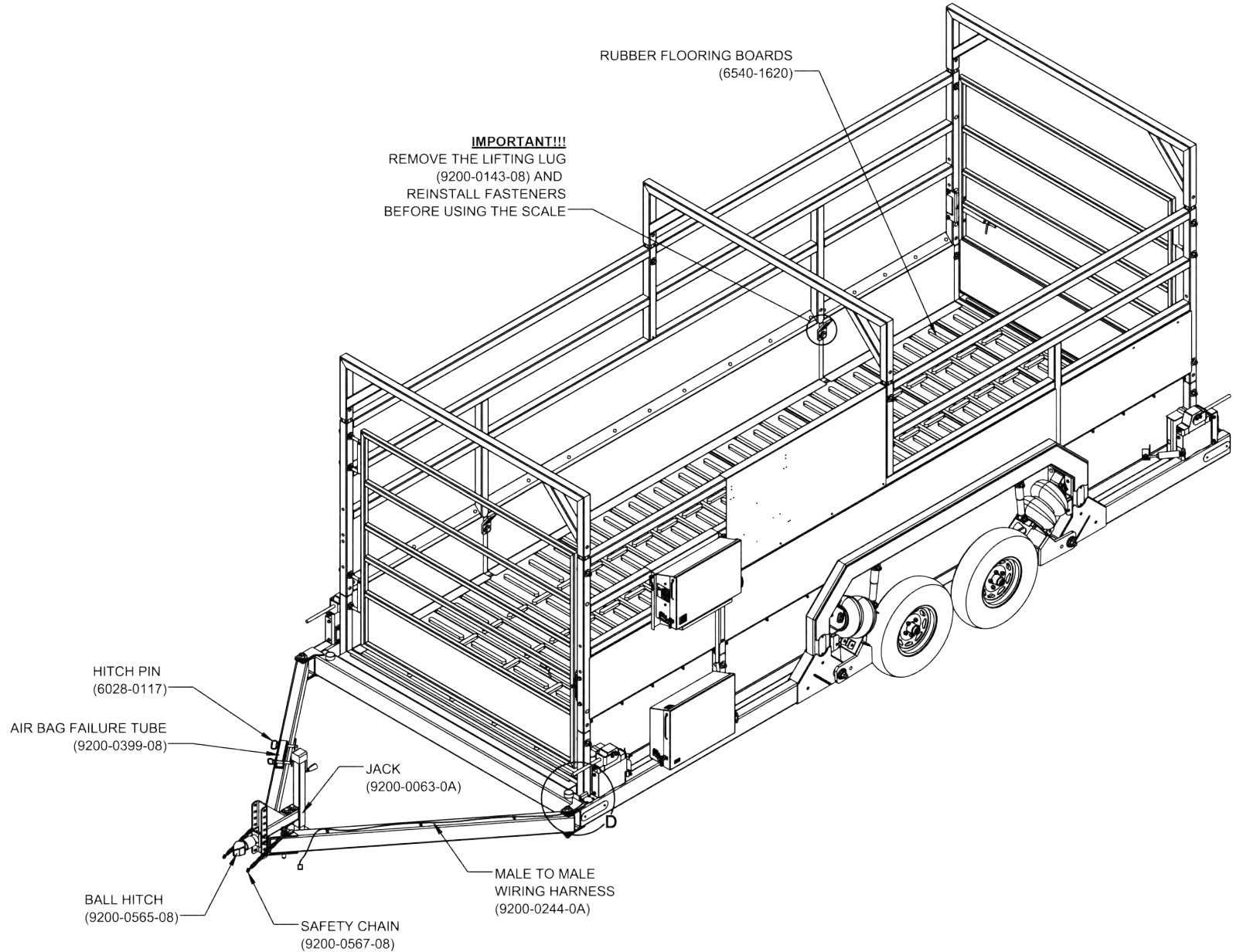
Symptom	Probable Cause	Action
The scale indicator will not power up.	Blown in-line fuse.	Replace the in-line fuse. The fuse holder is located near the battery or the indicator.
	Voltage is less than 11 volts.	Repair faulty electrical system. The scale indicator panel requires at least 11 volts to operate properly.
The indicator turns off or resets in the middle of a transaction.	Low voltage to the control panel.	Check other electrical equipment that may be operating. Check for corrosion or damaged wiring. Measure voltage.
The weight reading on the indicator is unstable.	The circuit board in the control panel may be wet or the junction box for the load cells may have moisture.	Dry any areas that are contaminated with moisture. Check for leaks and reseal.
	A load cell cable may be pinched or damaged.	Contact Cardinal Tech Support or a qualified dealer for support. Cutting the load cell cable will void the warranty. Special repair techniques are required.
The scale has a positive error when loading or a negative error when unloading.	Mechanical binding problem on the scale.	Check for debris around or under the scale. Check each load cell location for foreign material. Check all items that run from on the scale to off the scale. Check all gates or gathering panels for contact.
The scale has a negative error when loading or a positive error when unloading.	Moisture is present somewhere in the electrical system.	Dry any areas that are contaminated with moisture. Check for leaks and reseal.
The scale will not ZERO.	The weight on the scale is larger than the allowable ZERO amount.	Clean the scale deck of debris, and then Zero the scale.

## TROUBLESHOOTING, CONT.

Symptom	Probable Cause	Action
The printer is not functioning – nothing is being printed.	Is the release light on the printer flashing? This could indicate a low voltage to the printer.	The scale system requires at least 11 volts to operate properly.  Is the tow vehicle running? The tow vehicle may need to be running to supply enough power – OR – the tow vehicle may have a faulty electrical system.
	The print head may be jammed with paper.	Remove the print head cover and ribbon. Check for bits of paper stuck in the paper feed mechanism.
	The print head may be packed with dirt from operating in dusty conditions.	Remove the print head cover and ribbon. Blow out with air. If the printer is very dirty, it may require service by a qualified technician.
The printer is printing unrecognizable characters.	The power supply is excessively noisy.	Contact Cardinal Tech Support or a qualified dealer.
The printing on the ticket is faint or hard to read.	The printer's ribbon may need to be replaced.	Replace ribbon.
	The printer head may be damaged.	Requires service by a qualified technician.
The Air Compressor runs continuously, and airflow is lower than normal.	Loose connections.	Check all connections with soap and water solution. Tighten loose connections.
	Clogged air filter element.	Replace the air filter element.
		Contact Cardinal Tech Support or a qualified dealer.
The Air Compressor does not run.	Check the fuse for the compressor. Check the air relay.	Replace fuse (refer to scale wiring diagram).  Contact Cardinal Tech Support or a qualified dealer.
Airbags will not inflate.	Check for air leaks and ensure all valves are in the correct positions.	Make sure the dump valve (located on the battery box) is closed and the airbag valves (located above each airbag) are open.
Airbags will not stay inflated.	Check for air leaks and that all valves are closed.	The dump valve (located on the battery box) and the airbag valves (located above each airbag) must be closed.

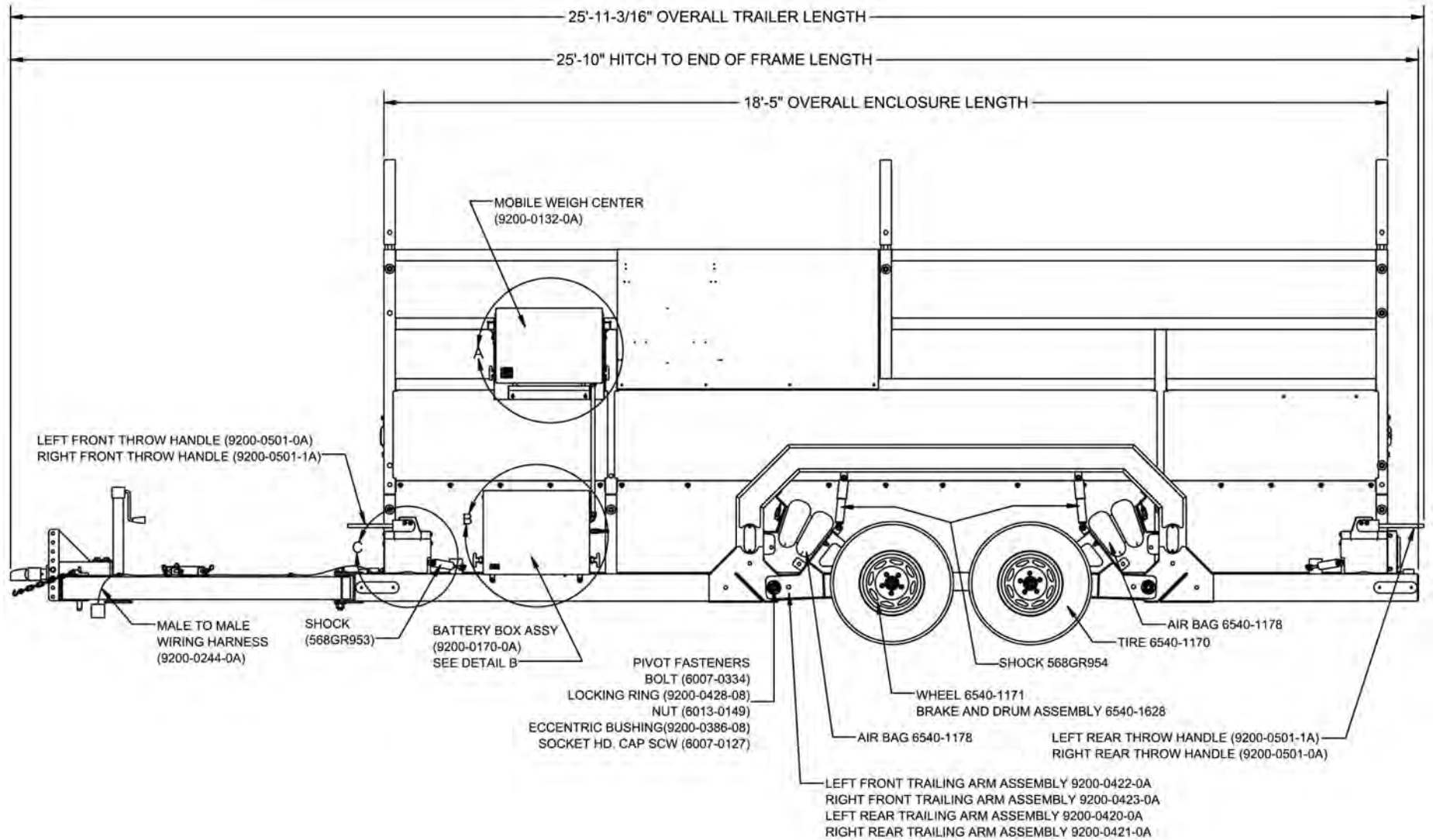
# PARTS IDENTIFICATION

## LSM2018-MWC225P – Final Assembly Front View



# PARTS IDENTIFICATION, CONT.

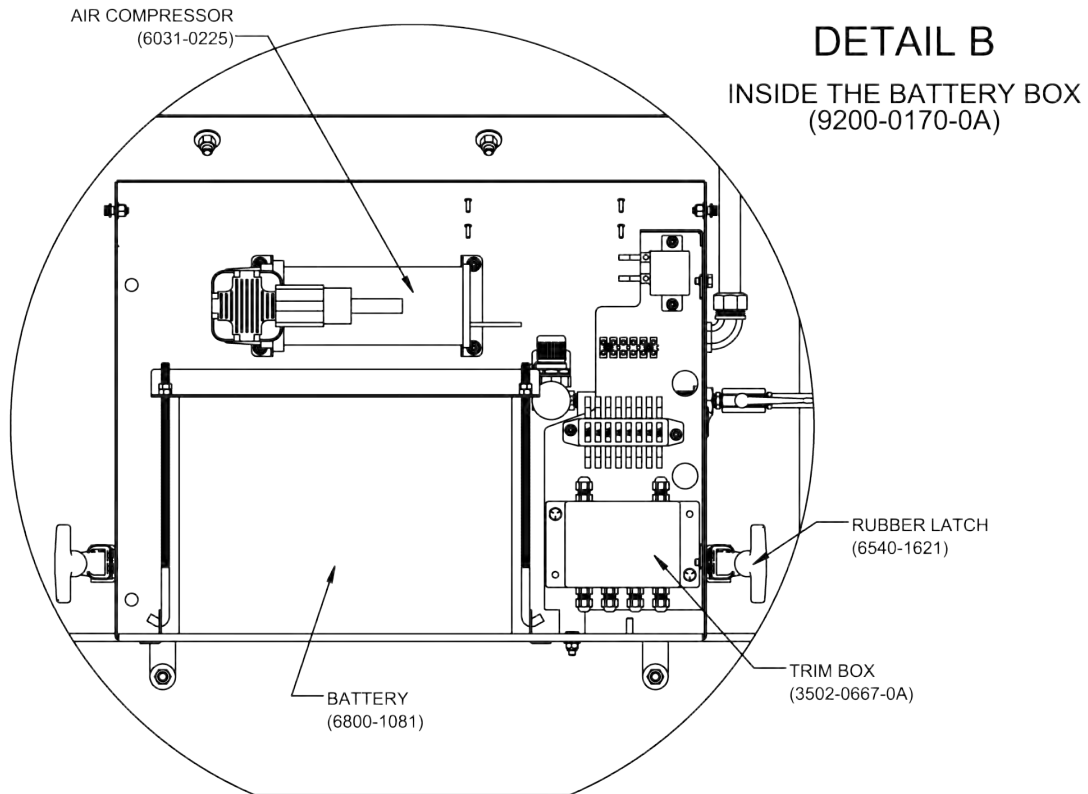
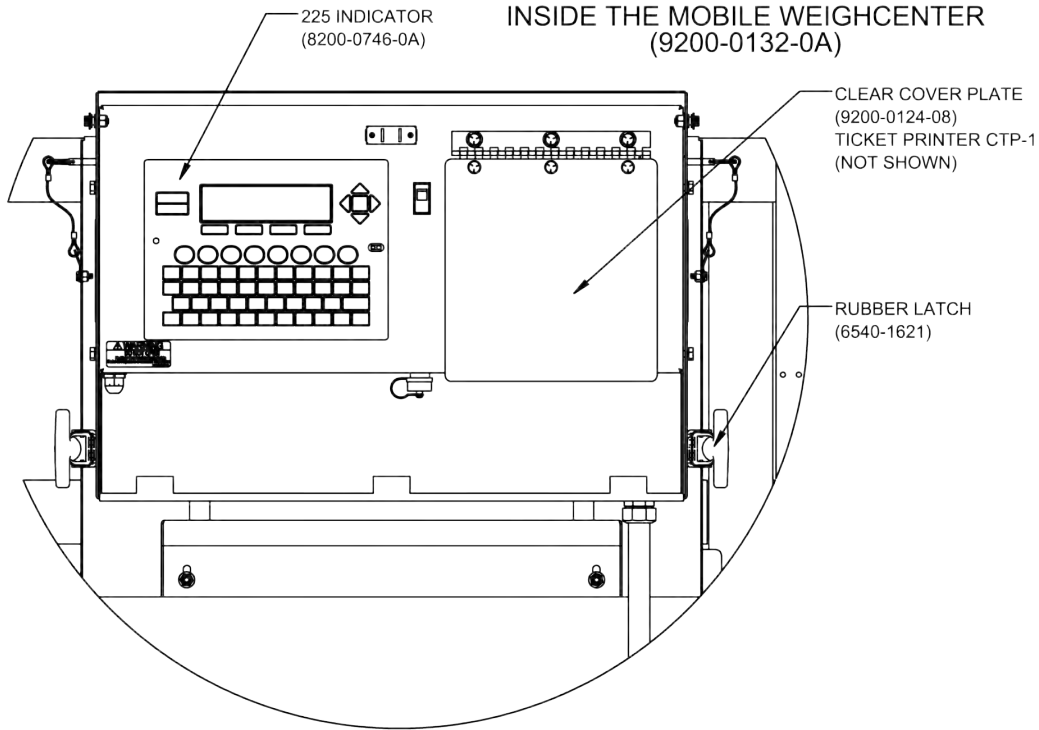
## LSM2018-MWC225P – Final Assembly Side View



# PARTS IDENTIFICATION, CONT.

## LSM2018-MWC225P – Final Assembly Detail A and Detail B Views

### DETAIL A

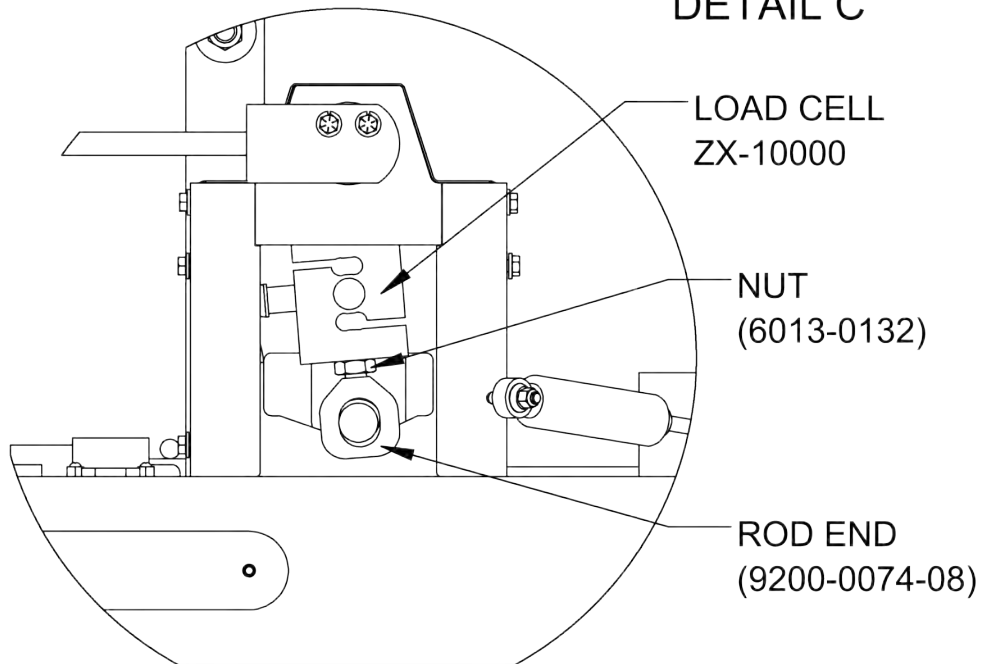




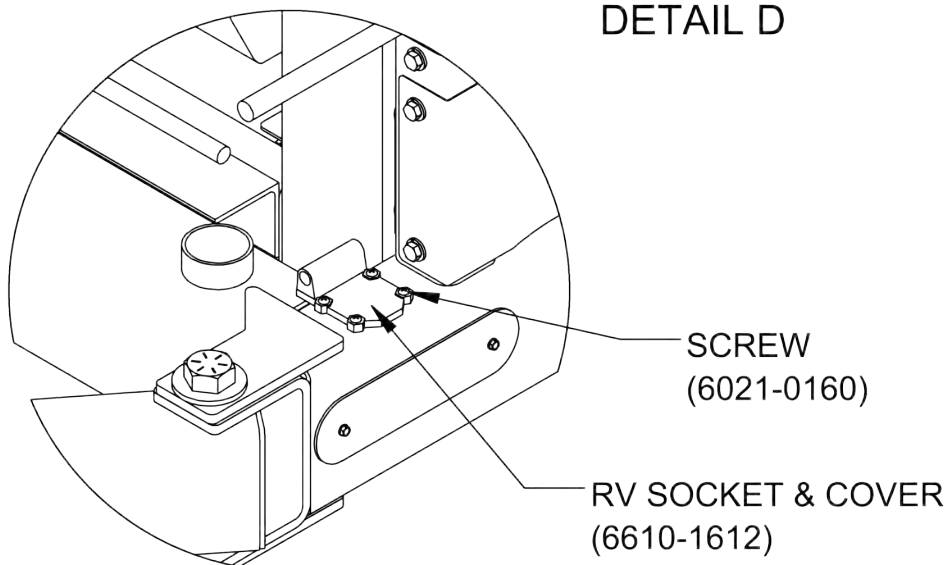
# PARTS IDENTIFICATION, CONT.

## LSM2018-MWC225P – Final Assembly Detail C and Detail D Views

### DETAIL C

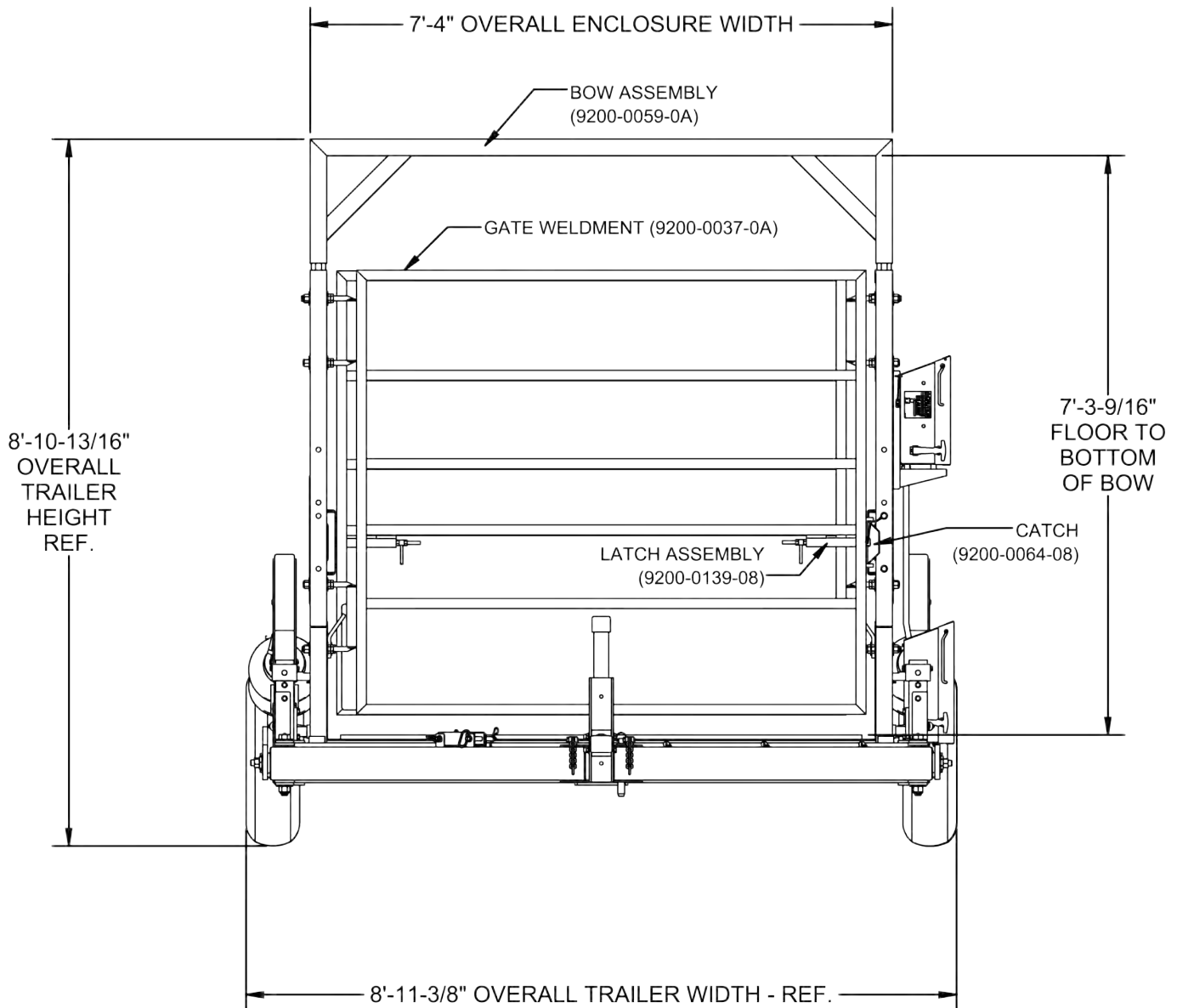


### DETAIL D



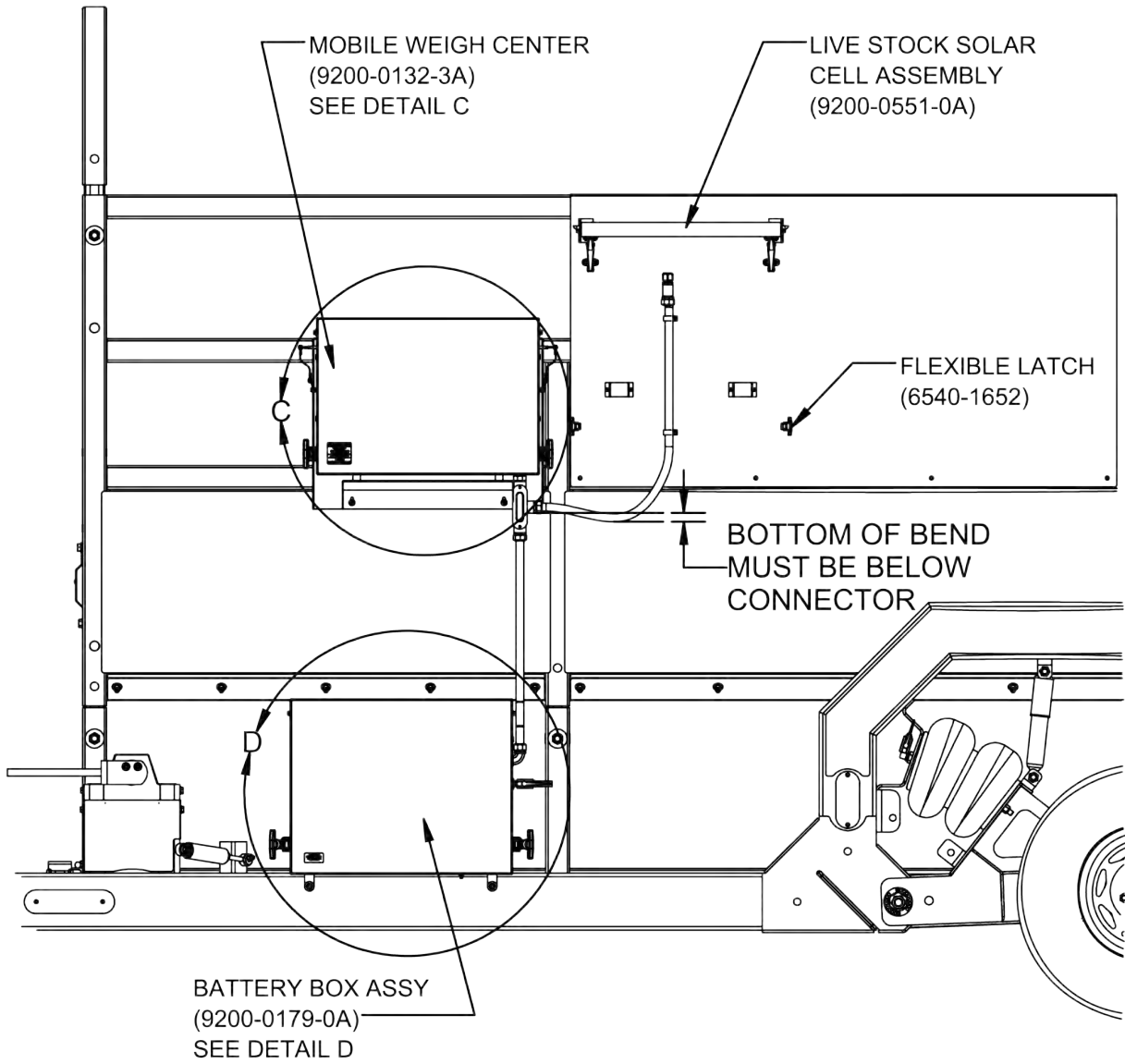
# PARTS IDENTIFICATION, CONT.

## LSM2018-MWC225P – Final Assembly Gate View



# PARTS IDENTIFICATION, CONT.

## LSM2018-MWC225P – Solar Panel Option View

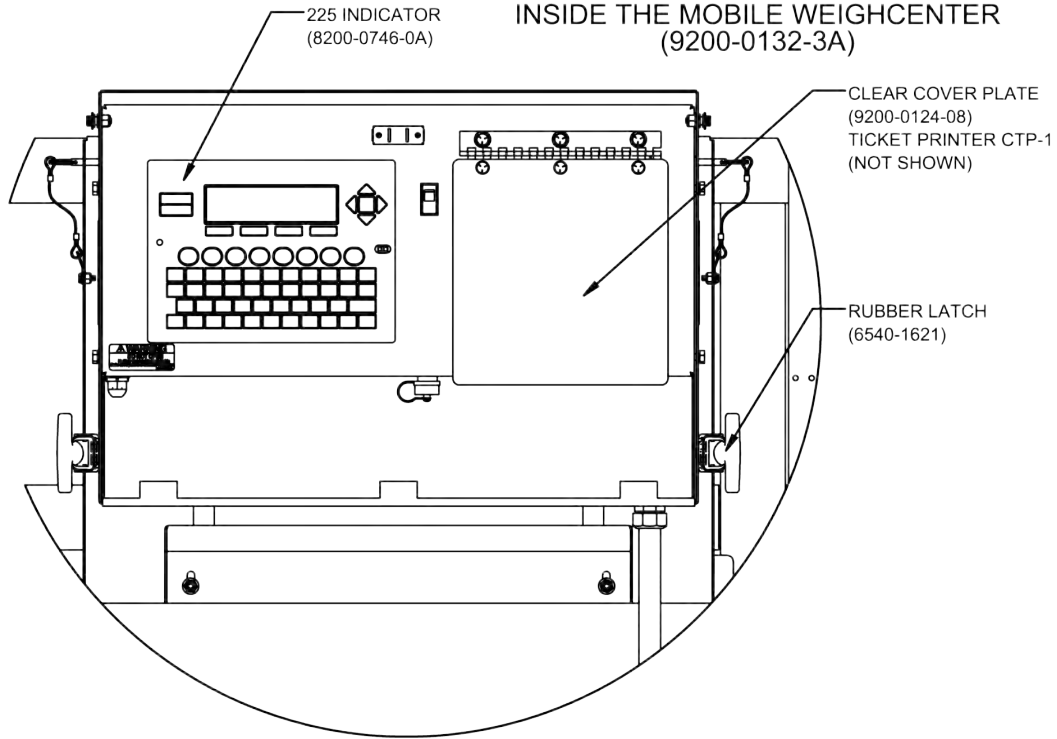


# PARTS IDENTIFICATION, CONT.

## LSM2018-MWC225P – Solar Panel Option Detail C and Detail D Views

### DETAIL C

INSIDE THE MOBILE WEIGHCENTER  
(9200-0132-3A)

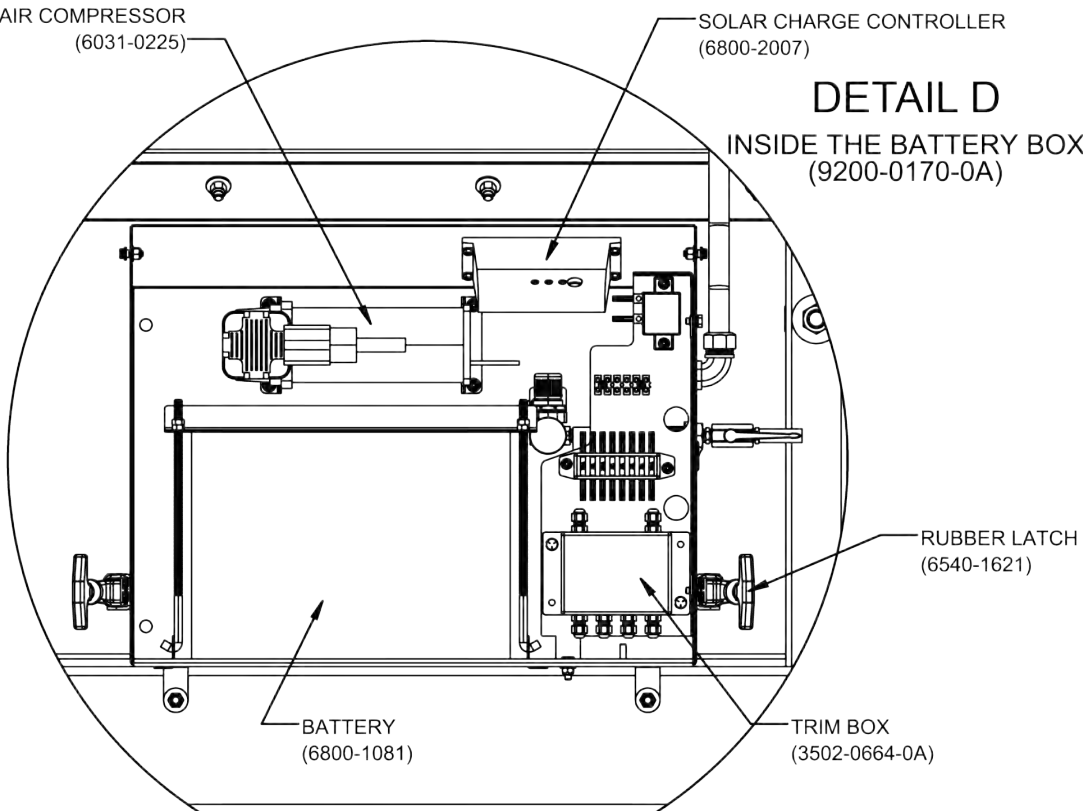


AIR COMPRESSOR  
(6031-0225)

SOLAR CHARGE CONTROLLER  
(6800-2007)

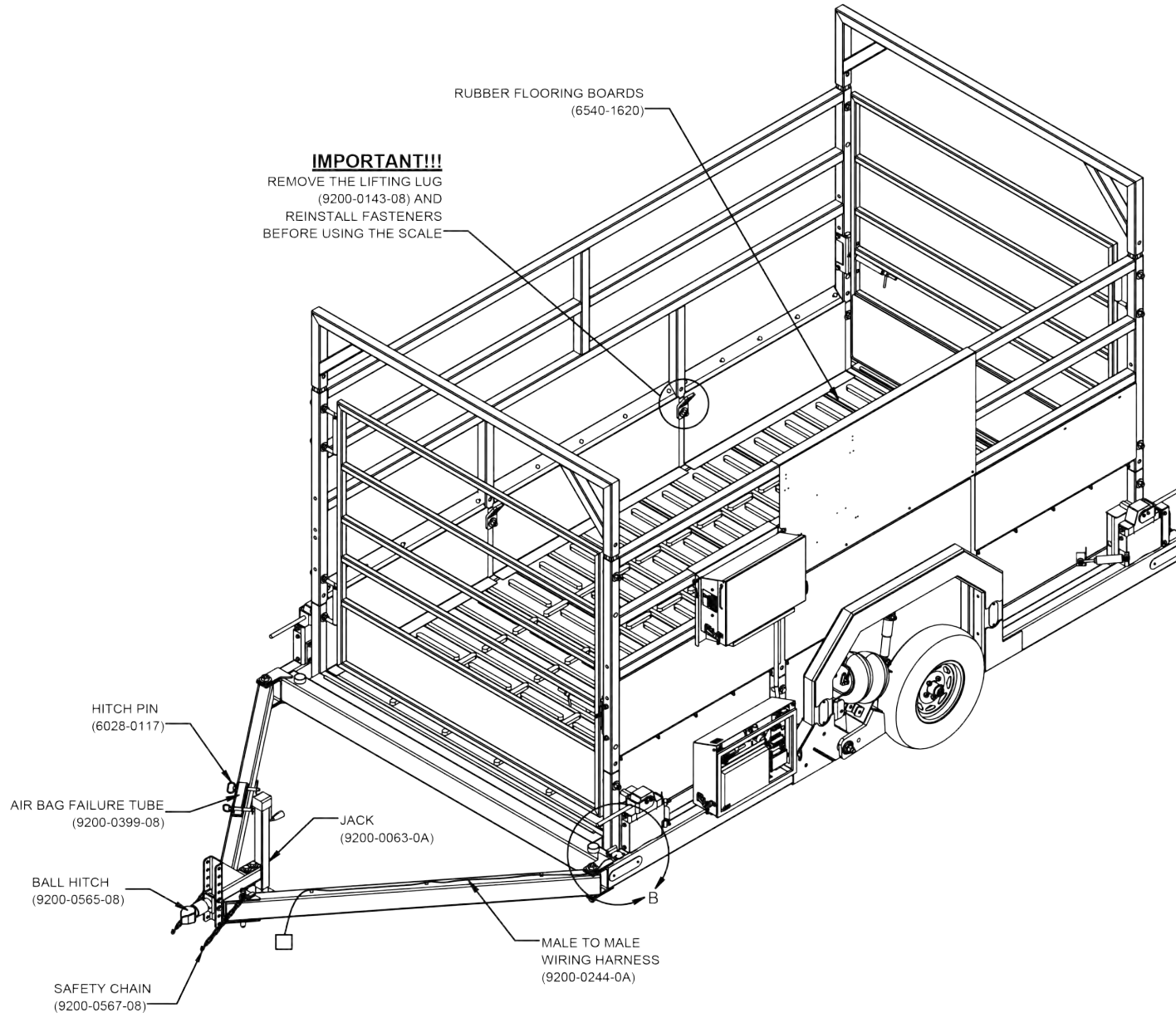
### DETAIL D

INSIDE THE BATTERY BOX  
(9200-0170-0A)



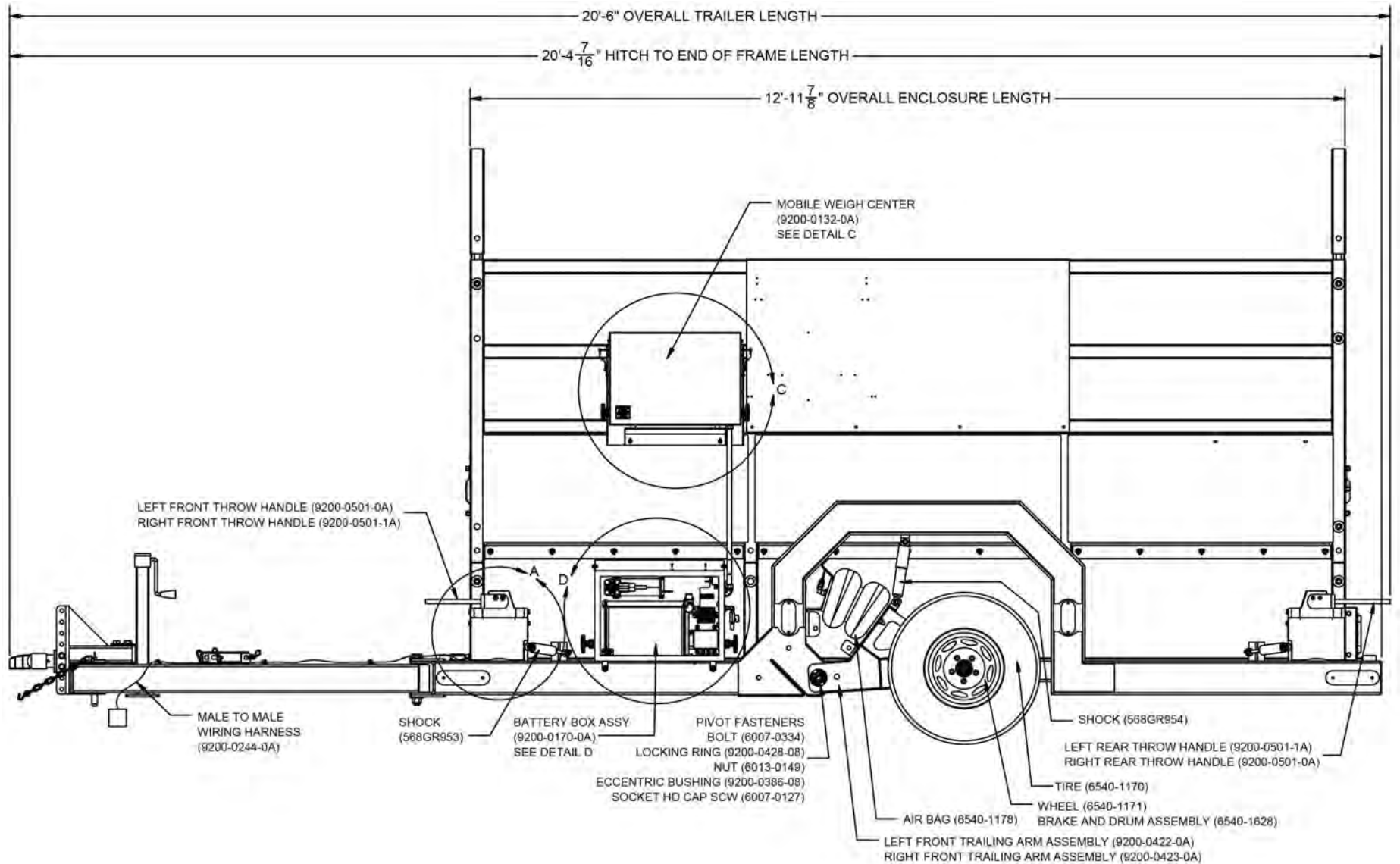
# PARTS IDENTIFICATION

## LSM1513-MWC225P – Final Assembly Front View



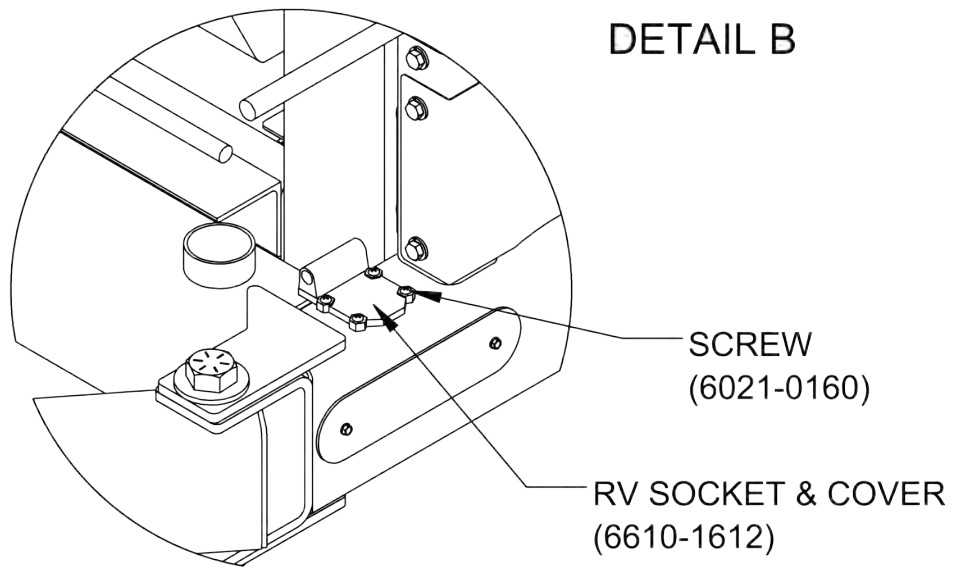
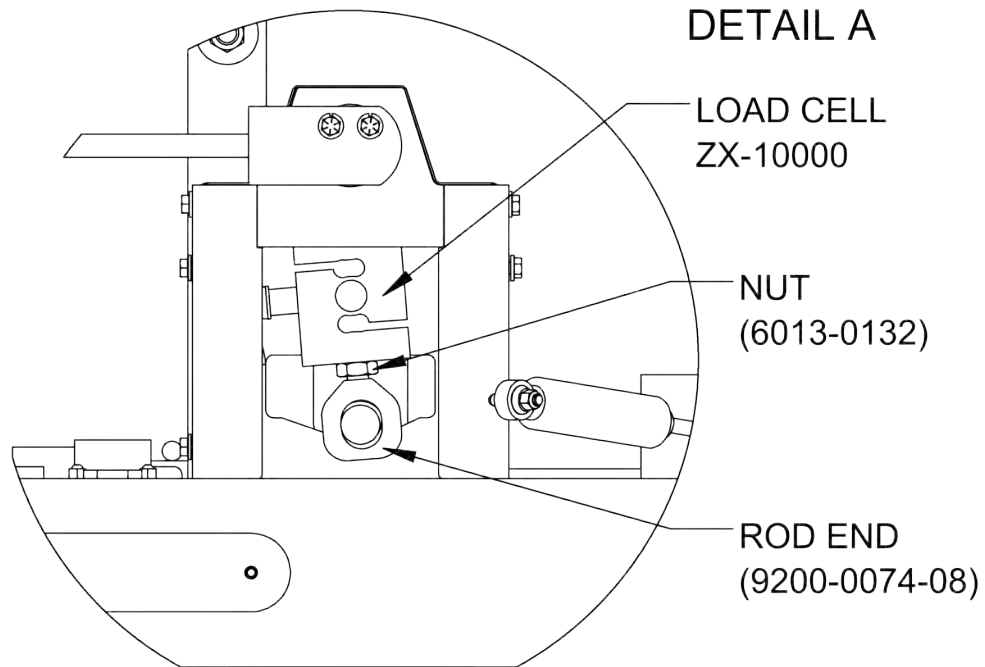
# PARTS IDENTIFICATION

## LSM1513-MWC225P – Final Assembly Side View



# PARTS IDENTIFICATION, CONT.

## LSM1513-MWC225P – Final Assembly Detail A and Detail B Views

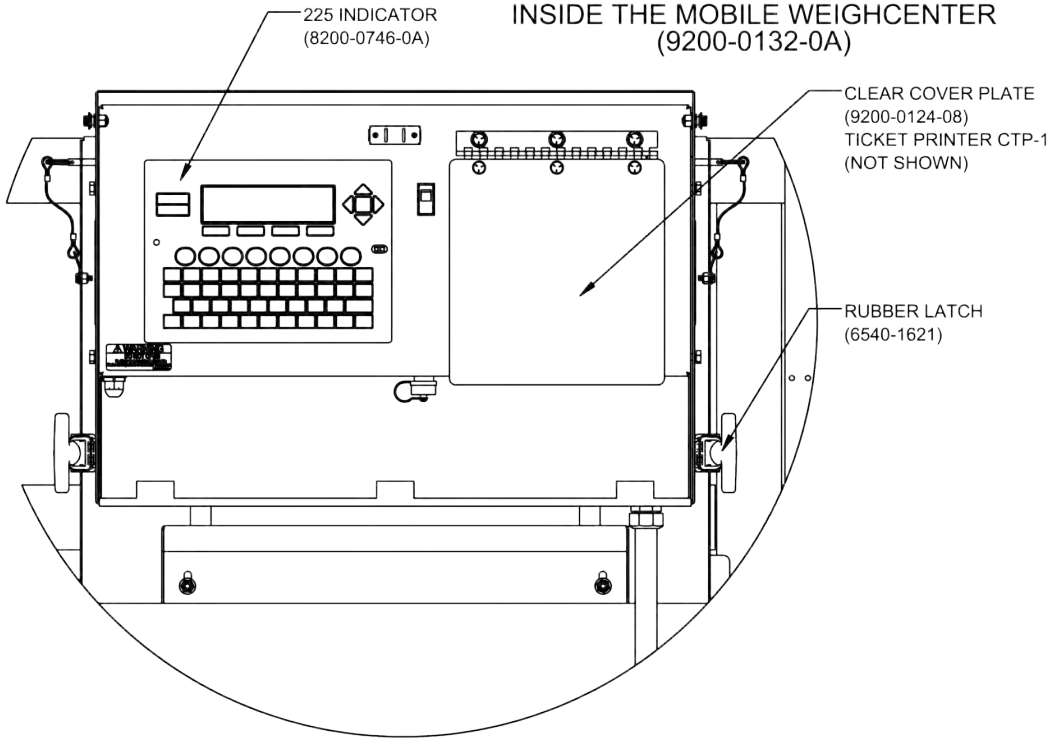


# PARTS IDENTIFICATION, CONT.

## LSM1513-MWC225P – Final Assembly Detail C and Detail D Views

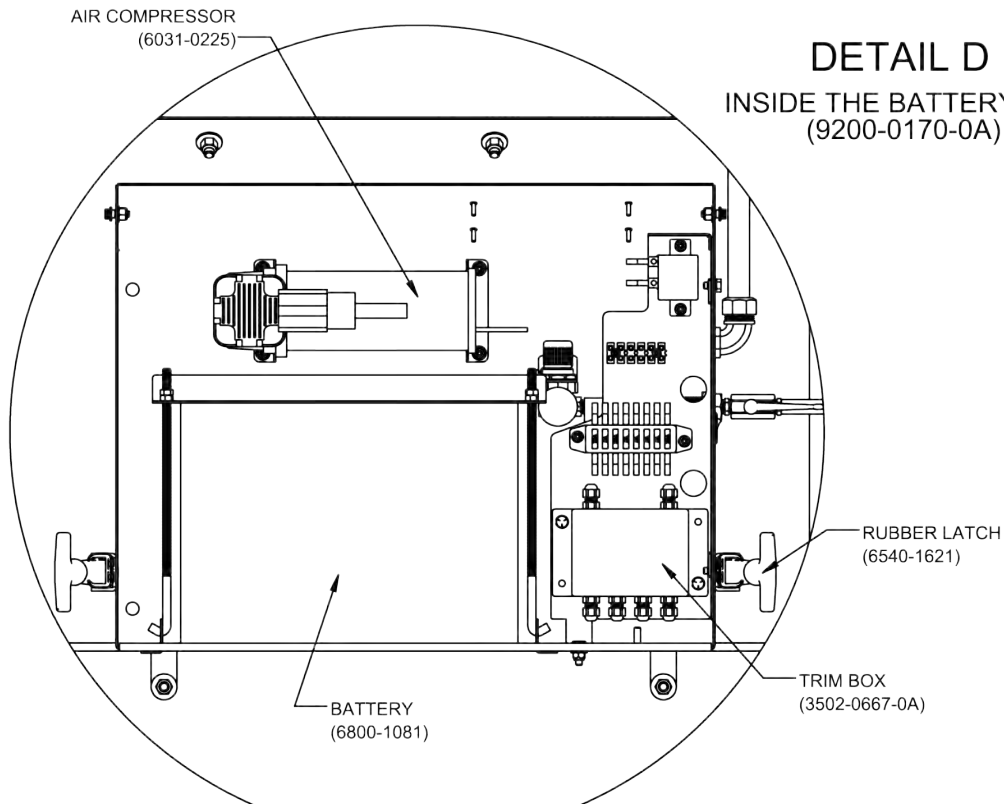
### DETAIL C

INSIDE THE MOBILE WEIGHCENTER  
(9200-0132-0A)



### DETAIL D

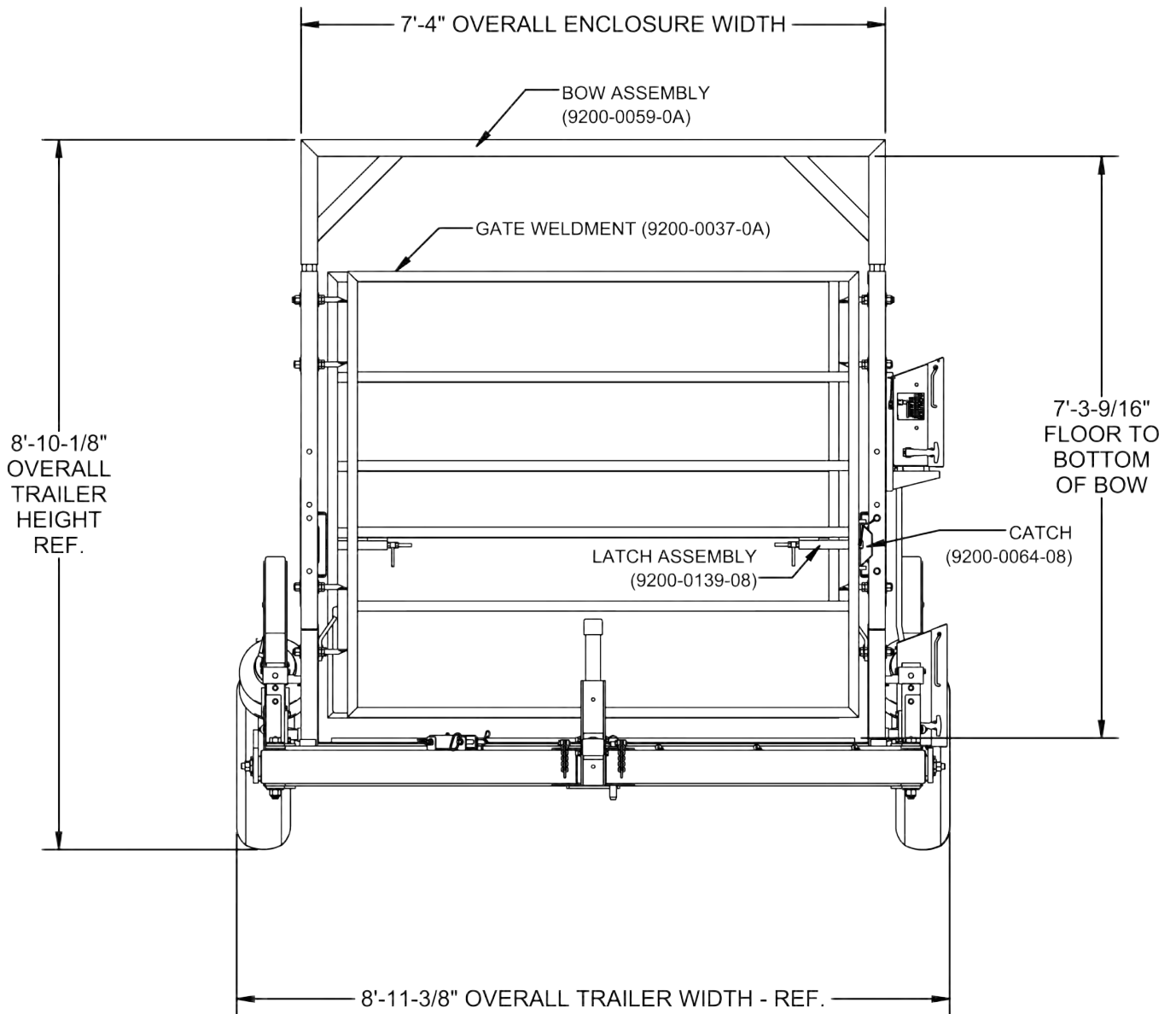
INSIDE THE BATTERY BOX  
(9200-0170-0A)





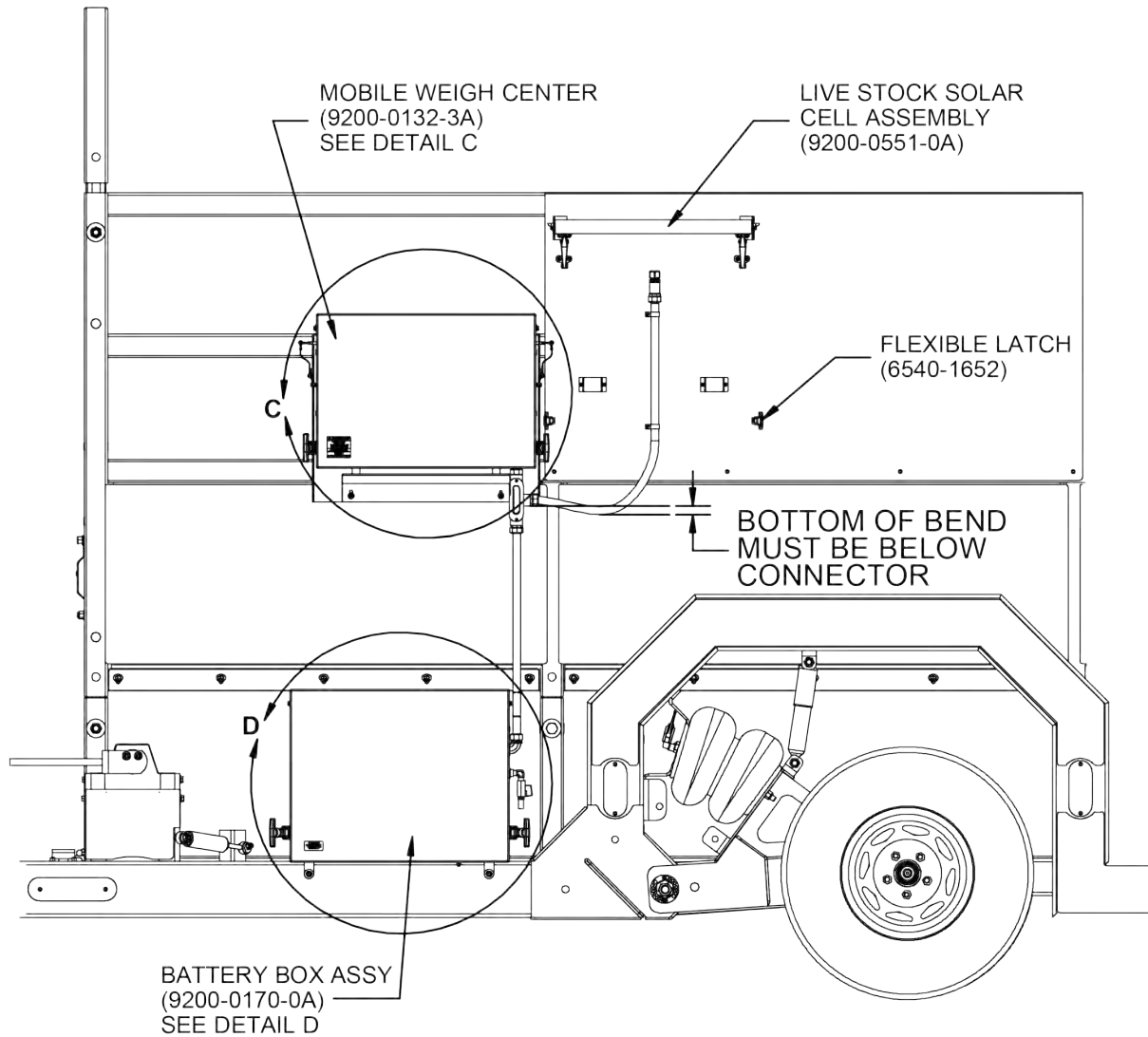
# PARTS IDENTIFICATION, CONT.

## LSM1513-MWC225P – Final Assembly Gate View



# PARTS IDENTIFICATION, CONT.

## LSM1513-MWC225P – Solar Panel Option View

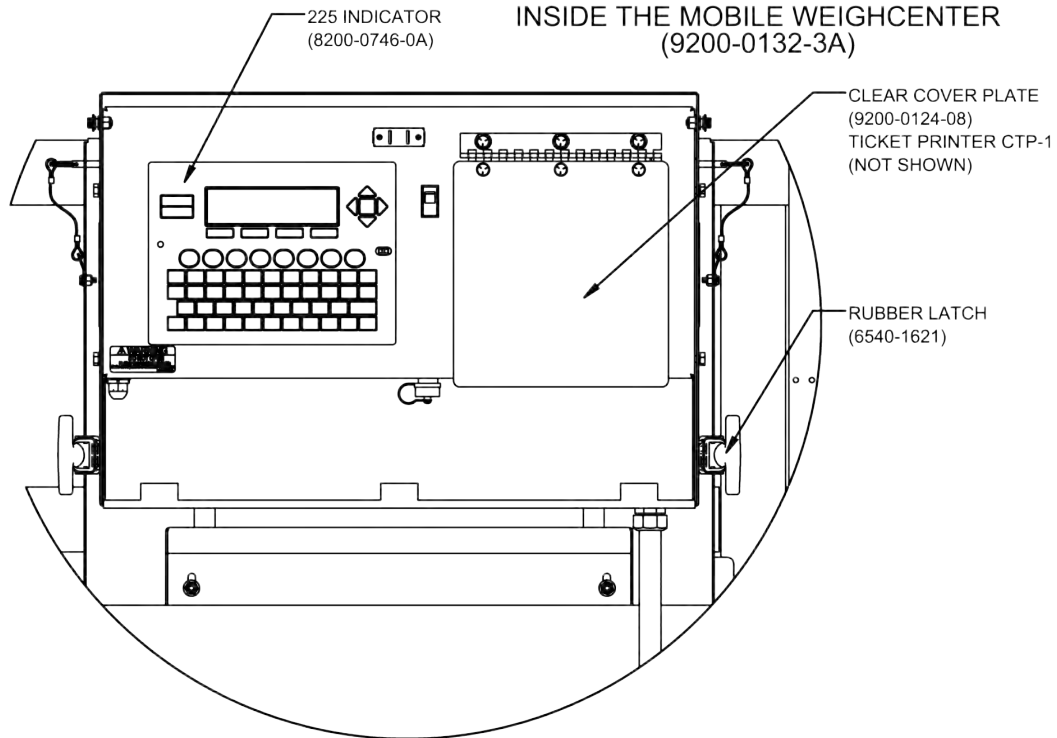


# PARTS IDENTIFICATION, CONT.

## LSM1513-MWC225P – Solar Panel Option Detail C and Detail D Views

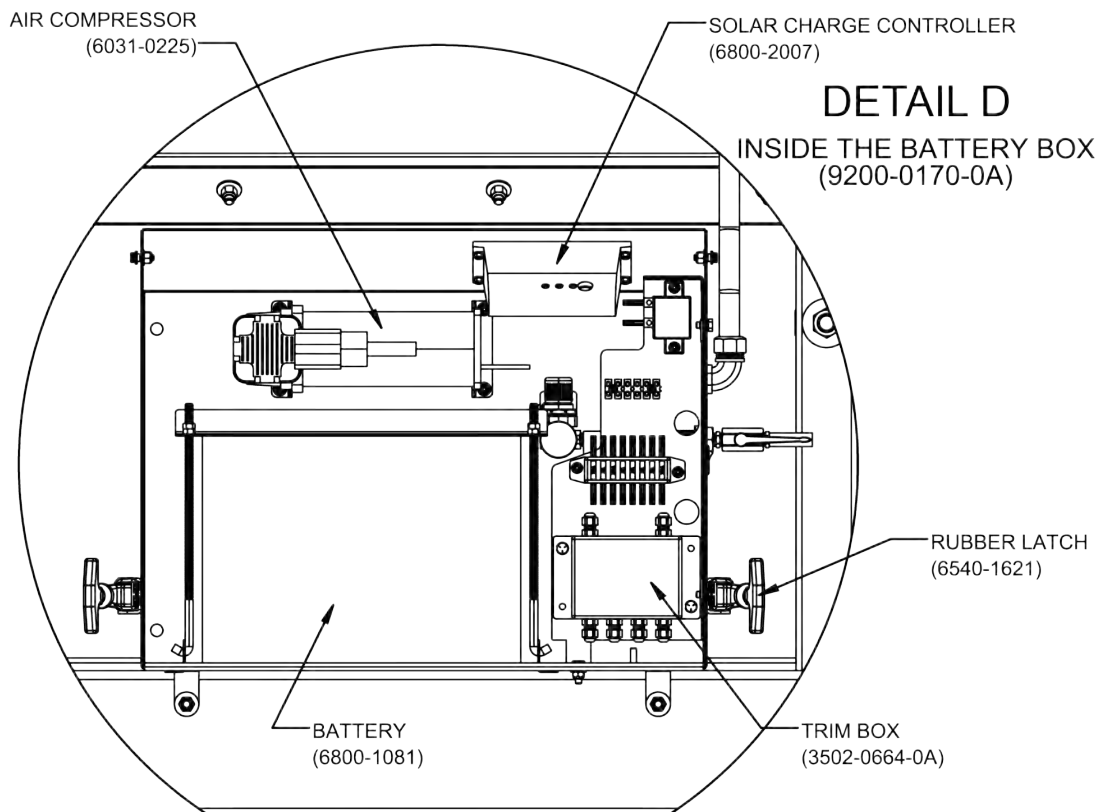
### DETAIL C

INSIDE THE MOBILE WEIGHCENTER  
(9200-0132-3A)



### DETAIL D

INSIDE THE BATTERY BOX  
(9200-0170-0A)



# 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
<b>WEIGHT INDICATORS</b>	90 DAY REPLACEMENT ----- 1 YEAR PARTS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
<b>LOAD CELLS</b> (Excluding Hydraulic)	1 YEAR	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
<b>HYDRAULIC LOAD CELLS</b> (When purchased with Guardian Vehicle Scale)	LIFETIME	YES	YES	YES	YES	90 DAYS	1, 5, 6, 8 A, B, C, D
<b>HYDRAULIC LOAD CELLS</b> (When purchased separately)	10 YEARS	YES	YES	YES	YES	NO	1, 5, 6, 8, 9 A, B, C, D
<b>VEHICLE SCALE</b> (Deck and Below Excl. PSC Series)	5 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6 A, B, C, D, E
<b>LSC SCALE</b> (Deck and Below)	3 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6, 11 A, B, C, D
<b>GUARDIAN FLOOR SCALES</b>	10 YEARS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6, 9, 10 A, B, C, D
<b>ALL OTHER CARDINAL PRODUCTS</b>	1 YEAR	YES	YES	YES	YES	NO	1, 2, 5, 6 A, B, C, D, E
<b>REPLACEMENT PARTS</b>	90 DAYS	YES	YES	YES	YES	NO	1, 2, 4, 5, 6 A, B, C, D
<b>SWIM AND 760 SERIES VEHICLE SCALES</b>	1 YEAR	YES	YES	YES	YES	90 DAYS	1, 2, 5, 6 A, B, C, D
<b>SOFTWARE</b>	90 DAYS	YES	N/A	N/A	N/A	NO	1, 6 B, C, D
<b>CONVEYOR BELT SCALES</b> (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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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.



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*[www.cardinalscales.com](http://www.cardinalscales.com)*

*Technical Support: 1-866-254-8261*

*E-mail: [tech@cardet.com](mailto:tech@cardet.com)*

Printed in USA

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