SERVICE MANUAL

A-Series

Hang-on Weighing
– Carriage
– Sideshifter
– Sideshifting Fork Positioner

Manual Number 9022578

cascade® corporation

CONTENTS

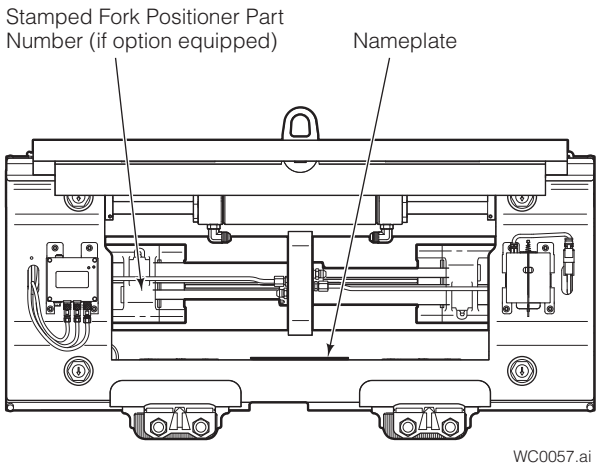
1.1 Introduction

This manual provides Periodic Maintenance, Troubleshooting, Service and Specifications for Cascade A-Series ActivWeigh hang-on attachments.

In any communication about the weigh system, refer to the product model number and serial number. Additionally, a decal with the serial number is located on the back face of the display indicator. Refer to the back cover for Cascade contact information.

NOTE: Specifications are shown in both US and (Metric) units. All fasteners have a torque value range of ±10% of stated value unless otherwise stated.

NOTE: Hydraulic terminations shown in this manual are generic and may vary on actual units.



Back (Driver's) View
(Sideshifting Fork Positioner model shown)

1.2 Special Definitions

The statements shown appear throughout this manual where special emphasis is required. Read all **WARNINGS** and **CAUTIONS** before proceeding with any work. Statements labeled **IMPORTANT** and **NOTE** are provided as additional information of special significance or to make the job easier.

WARNING – A statement preceded by **WARNING** is information that should be acted upon to prevent **bodily injury**. A **WARNING** is always inside a ruled box.

CAUTION – A statement preceded by **CAUTION** is information that should be acted upon to prevent machine damage.

IMPORTANT – A statement preceded by **IMPORTANT** is information that possesses special significance.

NOTE – A statement preceded by **NOTE** is information that is handy to know and may make the job easier.

1.3 Terminology

- **Legal for Trade** or **Legal for Commerce** or **Trade Approved** scales are intended for commercial applications where product is sold by weight and meets legal requirements in the region of sale for design, accuracy, manufacturing quality and labeling. These scales are certified and secured by local metrology agencies or an approved qualifier. Examples include NTEP, OIML, MC, etc.
- **WIM –** Weigh In Motion
- **DJB –** Digital Junction Box
- **Load receiver –** The platform that holds the load. Examples include forks, pallet, etc.

1.4 Warnings & Safety Measures

WARNING: Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than shown on the attachment nameplate. Consult the truck nameplate.

WARNING: Cascade Corporation does not evaluate the effects the attachments may have on a host system once installed. It is the OEM or installer's responsibility to assess the effect of Cascade Corporation equipment on specifications, stability, performance, operation and safe use of OEM equipment after the installation of Cascade attachments.

WARNING: Any piece of equipment can present a hazard when used inappropriately or by an untrained operator (driver) or service technician. This equipment must be serviced by qualified, properly trained personnel only.

WARNING: Residual risk exists to pedestrians, bystanders and service technicians in the work area. Operate lift trucks and accessory equipment in a safe working area and in compliance with facility, local and national standards and rules.

IMPORTANT: Tampering or removing Legal for Trade Certified security wire (or wires) or label will void certification.

IMPORTANT: The load cells and indicator are calibrated as a set. Do not separate. Consult Cascade Service department with questions.

CAUTION: Treat this precise weighing system with care. Environment and application will affect the system and its components. Conditions with mud, grime, water, corrosive chemicals and abrasive substances can damage or affect performance of the weigh system.

IMPORTANT: Cascade is not responsible for errors that occur due to incorrect weighing or inaccurate scales. The purchaser is responsible to train employees and maintain the weigh system with regular calibration and maintenance.

IMPORTANT: All safety regulations that apply to the truck remain valid and unchanged. Always follow the operating, maintenance and repair instructions for the truck.

IMPORTANT: If display indicator batteries are low, communication to the display indicator can be affected.

1.5 Decommissioning

When possible take advantage of the Cascade "buyback" policy to ensure maximum recycling and proper disposal to minimize environmental impact. Otherwise, dispose of non recyclable content in accordance with local laws. Note that the recyclable content of this accessory is very high.

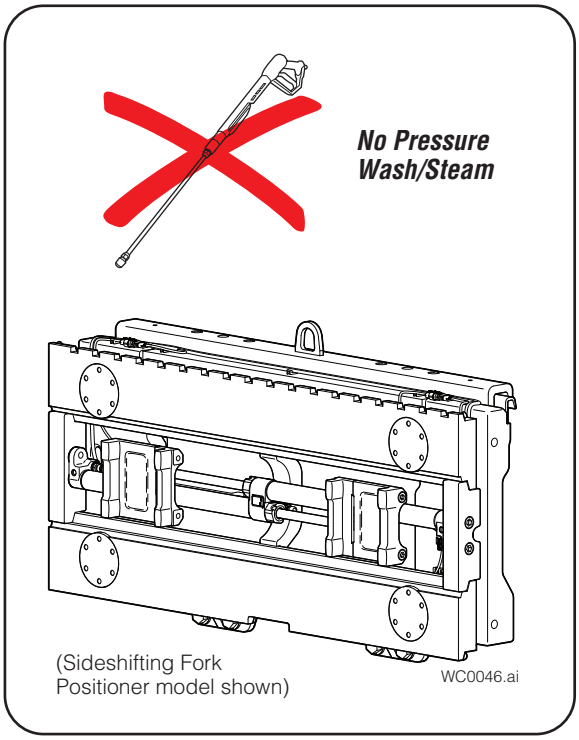
2.1 Weighing System

IMPORTANT: Only trained and authorized personnel are allowed to service the weighing system. Other maintenance procedures are the sole responsibility of the purchaser. Legal for Trade scale components and display indicator should be serviced and calibrated by authorized scale personnel only or Legal for Trade certification may be voided.

IMPORTANT: To prevent weighing inaccuracies, the end user is responsible to check accuracy on a regular basis at intervals that best fit their application and requirements. Development of a periodic schedule will prevent faulty readings. Cascade recommends a minimum interval of every 12 months or 2000 hours, whichever comes first.

NOTE: For cleaning, as required, use a mild cleanser and wipe down the weighing system with a towel. Rinse the unit with a non-pressurized stream of water.

WARNING: After completing any service procedure, always test the attachment through five complete cycles to make sure the attachment operates correctly before returning it to the job.



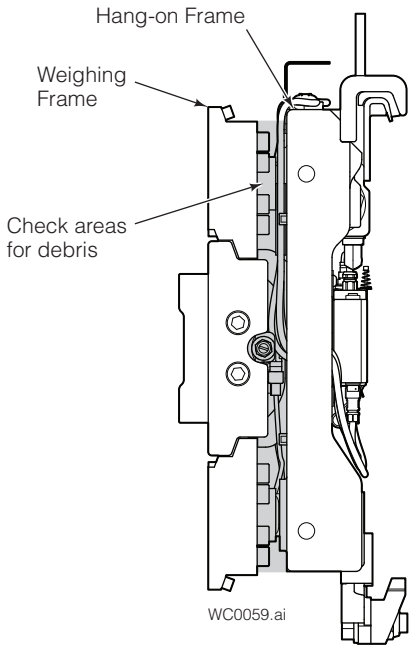
(Sideshifting Fork Positioner model shown)

2.1-1 Daily Inspection

Prior to each shift of truck operation, complete the following procedures:

- Inspect electrical wiring for pinching, damage or wear.
- Inspect battery pack for damage.
- When the battery pack is changed, inspect the battery holder for damage and debris. Remove any debris found.
- Check for debris of the upper and lower areas between the weighing frame and sideshift (or carriage) frame. Remove any debris found.

  IMPORTANT: Any object or debris found between the frames can affect weight reading.



Left Side Shown

2.2 Hydraulic System

2.2-1 Daily Inspection

Prior to each shift of truck operation, complete the following procedures:

- Check for the following:
  - Loose or missing hardware,
  - Damaged or missing fork stops,
  - Worn or damaged hoses,
  - Hydraulic leaks
- Check decals and nameplate for legibility.

2.2-2 1000-Hour Maintenance

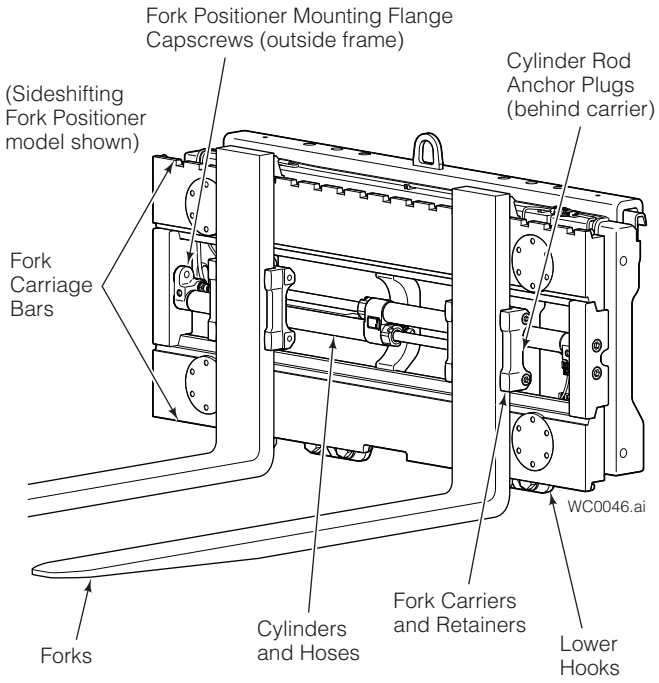
Every time the lift truck is serviced or every 1000 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Inspect sideshifter lower hooks for wear and proper clearance. Adjust if necessary. Refer to Installation Section, Step 2. Tighten lower hooks to:

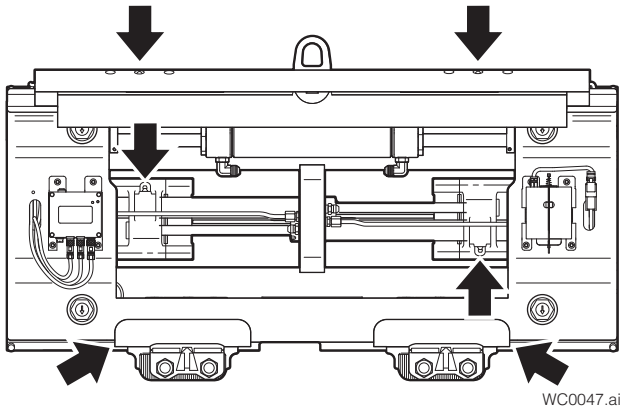
  Class II/III – 120 ft.-lbs. (165 Nm)
  Class IV – 235 ft.-lbs. (320 Nm)
- Tighten fork positioner mounting flange capscrews 50 ft.-lbs. (65 Nm).
- Tighten fork carrier capscrews to 25 ft.-lbs. (35 Nm).
- Tighten fork positioner cylinder rod anchor plugs to 50 ft.-lbs. (65 Nm).
- If equipped, tighten backrest capscrews (Cascade only) to 145 ft.-lbs. (195 Nm).
- Apply general-purpose lithium-based chassis grease to sideshifter upper bearing grease fittings and sideshifter lower bearings, as shown. Apply a single pump of grease for the fork carrier grease fittings.
- Apply graphite dry-lube to fork carriage bars as required ('Slip Plate Aerosol' - Cascade Part No. 599489, 'GraphoKote', or equivalent).
- Inspect fork carriers for looseness on bearing tubes, and cylinder rod anchors for excessive end play. Refer to service manual for repair procedures.

  NOTE: Cylinder rod anchors operate with a loose clearance.
- Inspect Sideshifter upper and lower bearings for wear. If any bearing is worn to less than 0.09 in. (2.5 mm) thickness replace the entire bearing set. Refer to service manual for repair procedures.

WARNING: After completing any service procedure, always test the attachment through five complete cycles to make sure the attachment operates correctly before returning it to the job.



Lubrication Points



Back (Driver's) View
(Sideshifting Fork Positioner model shown)

2.2 Hydraulic System (continued)

2.2-3 2000-Hour Maintenance

After 2000 hours of truck operation, in addition to the 1000-hour maintenance, forks in use shall be inspected at intervals of not more than 12 months (for single shift operations) or whenever any defect or permanent deformation is detected. Severe applications will require more frequent inspection.

Fork inspection shall be carried out by trained personnel to detect any damage that might impair safe use. Any fork that is defective shall be removed from service. Reference ANSI B56.1-2005 (ISO 5057).

Inspect for the following defects:

- Surface cracks
- Straightness of blade and shank
- Fork angle
- Difference in height of fork tips
- Positioning lock
- Wear on fork blade and shank
- Wear on fork hooks
- Legibility of marking

NOTE: Fork Safety Kit 3014162 contains wear calipers, inspection sheets and safety poster. Also available is fork hook & carriage wear gauge 209560.

3.1 Hydraulic Equipped – General Procedures

3.1-1 Truck System Requirements

- Truck hydraulic pressure should be within the range shown in Specifications, Section 5.1. **PRESSURE TO THE ATTACHMENT MUST NOT EXCEED 3500 psi (245 bar).**
- Truck hydraulic flow should be within the range shown in Specifications, Section 5.1.
- Hydraulic fluid supplied to the attachment must meet the requirements shown in Specifications, Section 5.1.

WARNING: Before servicing any hydraulic component, relieve pressure in the system. Turn the truck off and move the truck auxiliary control valves several times in both directions.

After completing any service procedure, test the attachment through several cycles. First test the attachment empty to bleed any air trapped in the system to the truck tank. Then test the attachment with a load to be sure it operates correctly before returning to the job.

Stay clear of the load while testing. Do not raise the load more than 4 in. (10 cm) off the floor while testing.

3.1-2 Tools Required

- In addition to a normal selection of mechanic's hand tools, the following are required:
- In-line Flow Meter Kit:

  10 GPM (37 L/min) – Cascade Part No. 671476

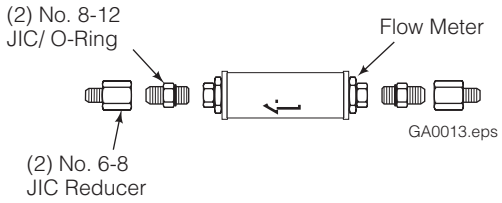
  OR

  20 GPM (75 L/min) – Cascade Part No. 671477
- Pressure Gauge Kit:

  5000 psi (345 bar) – Cascade Part No. 671212.
- Assorted fittings, hoses, and quick-disconnect couplers is required.

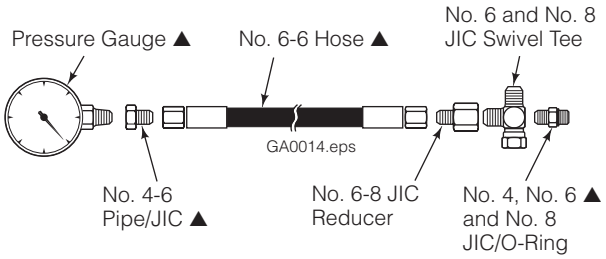
Flow Meter Kit

671476 – 10 GPM (37 L/min)
671477 – 20 GPM (75 L/min)



Pressure Gauge

671212



3.1-3 Troubleshooting Chart

Determine All The Facts – It is important that all the facts regarding the problem are gathered before beginning service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction. The following guidelines can then be used as a starting point to begin troubleshooting procedures:

Fork Positioning Circuit

- Forks do not move.
- Forks move slowly or unevenly.

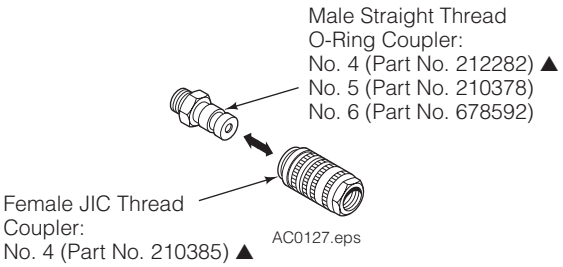
To correct one of these problems, see Section 3.3.

Sideshift Circuit

- Attachment will not sideshift.
- Attachment sideshifts slowly.

To correct one of these problems, see Section 3.4.

Quick-Disconnect Couplers



▲ **NOTE:** Diagnostics Kit 394382 includes items marked.

3.2 Hydraulic Equipped – Plumbing

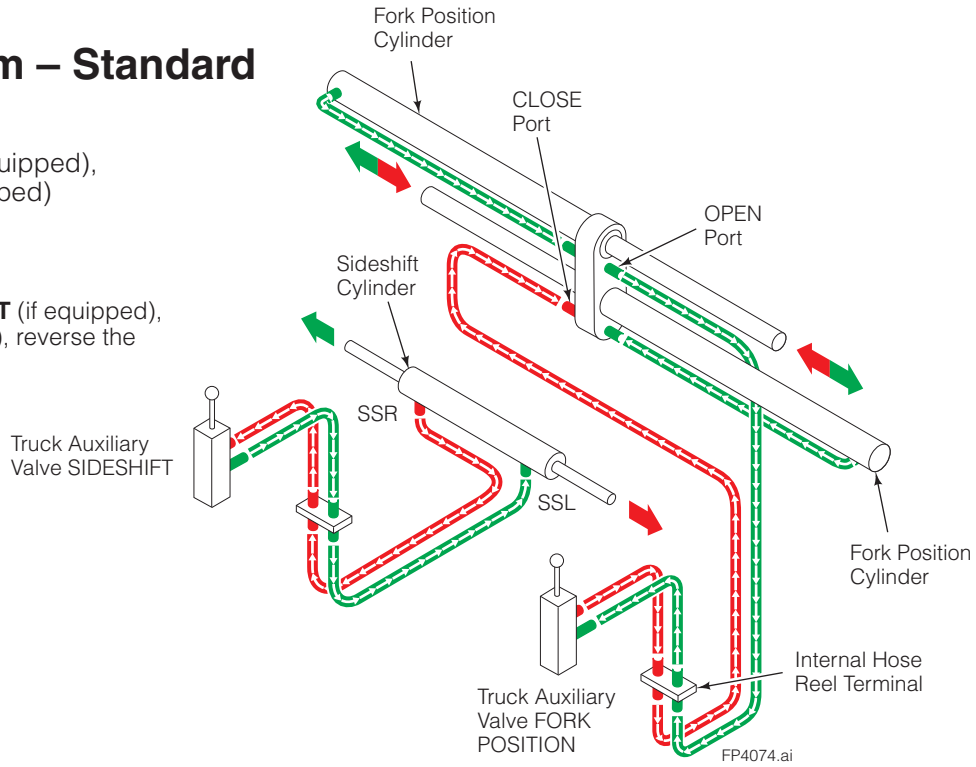
3.2-1 Hosing Diagram – Standard

SIDESHIFT RIGHT (if equipped), **CLOSE FORKS** (if equipped)

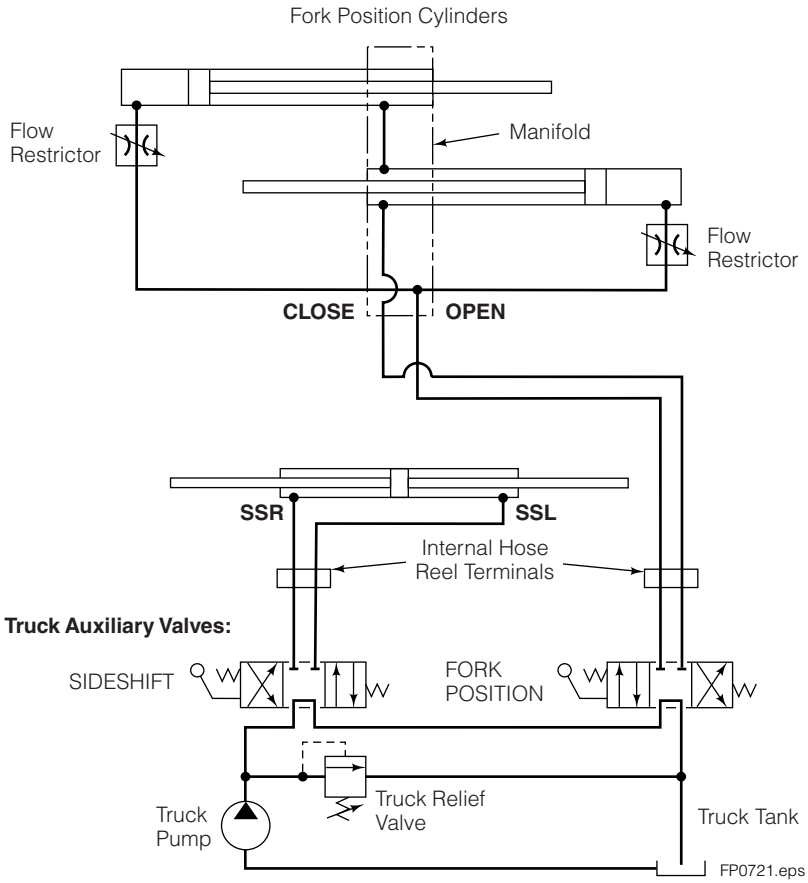
PRESSURE

RETURN

NOTE: For **SIDESHIFT LEFT** (if equipped), **OPEN FORKS** (if equipped), reverse the colors and arrows shown.



3.2-2 Hydraulic Schematic



3.3 Fork Position Function

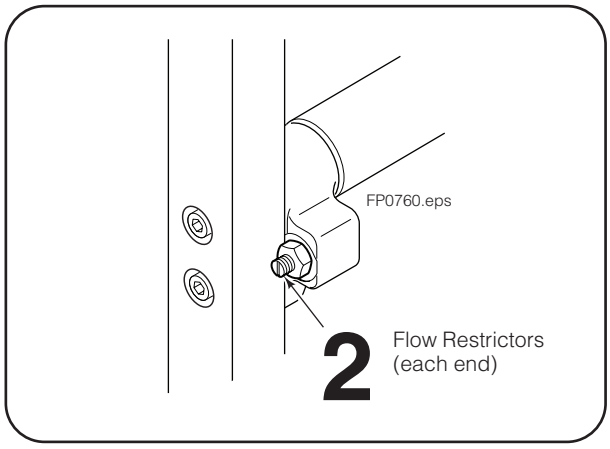
Five potential problems can affect the fork positioning function:

- Binding due to bending damage, wear, lack of lubrication.
- Incorrect hydraulic pressure or flow from truck.
- Flow restrictor fittings plugged or improperly adjusted.
- **Solenoid equipped –** Electrical circuits faults, defective solenoid coil or valve.
- External leaks due to worn or defective cylinder seals.

WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

3.3-1 Supply Circuit Test

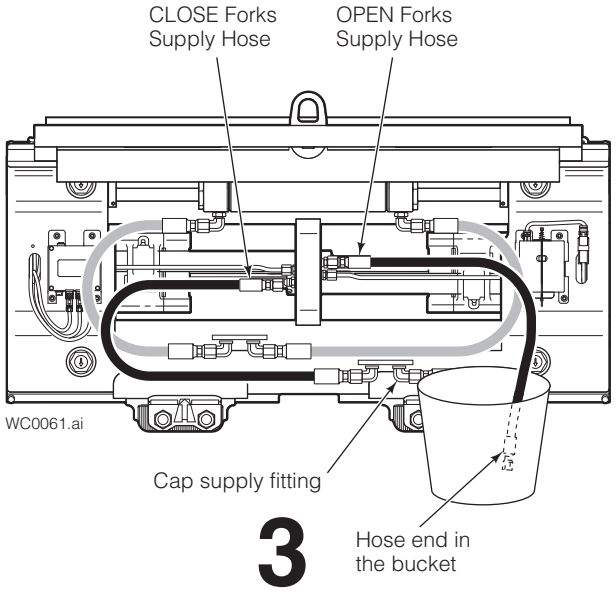
1. Check the pressure supplied by the truck at the carriage hose terminals. Pressure must be within the range shown in Specifications, Section 5.1. **PRESSURE TO THE FORK POSITIONER MUST NOT EXCEED 3500 psi (241 bar).**
2. Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications Section 5.1.
3. Fully open the forks. Hold the lever in the OPEN position for several seconds. Release the lever and check for external leaks at the fittings, tubing, hose, and manifold.



3.3-2 Fork Position Circuit Test

1. If equipped, press the solenoid button. Listen for a 'click' from the solenoid valve. If no sound is heard, check the fuse, wiring and coil. Repair as necessary.

   IMPORTANT: Solenoid-operated valve should be plumbed so that the solenoid is **energized** during the fork-positioning function.
2. Fully open or close the forks. If the forks move unevenly, slowly or not at all, check flow restrictors for contamination or improper adjustment. Refer to Section 4.1. Speed should be 3 in. (75 mm) per second at specified flow rate.
3. If forks still do not move correctly, fully close forks. Turn the truck off. Relieve the attachment's system pressure. Disconnect the OPEN supply hose from the truck hose terminal and route to a drain bucket. Cap the supply fitting.
4. Start the truck and slowly actuate the CLOSE forks lever until forks are fully closed. Hold lever for 5 seconds.
   - If there is **substantial hydraulic flow** out of the drain hose, one of the cylinders has faulty piston seals. Replace the complete unit or service the piston seals. Refer to Section 4.1.
   - If there is **little or no hydraulic flow** out of the hose, the problem is not hydraulic. Refer the list of potential problems at the beginning of Section 3.3.



3.4 Sideshift Function

Six potential problems can affect the sideshifting function:

- Binding due to bending damage, wear, lack of lubrication.
- Incorrect hydraulic pressure or flow from truck.
- Flow restrictor orifices plugged, incorrect type, or improperly installed.
- **Solenoid equipped –** Electrical circuit faults, defective solenoid coil or valve.
- Lower mounting hooks installed with incorrect clearance.
- External leaks due to worn or defective cylinder seals.

WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

3.4-1 Supply Circuit Test

1 Check the pressure supplied by the truck at the carriage hose terminals. Pressure must be within the range shown in Specifications, Section 5.1. **PRESSURE TO THE FORK POSITIONER MUST NOT EXCEED 3500 psi (241 bar).**

2 Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications Section 5.1.

3 Sideshift fully to the left and hold the lever in the SIDESHIFT LEFT position for several seconds. Release the lever and check for external leaks at the fittings, hoses and cylinder rod ends.

3.4-2 Sideshift Circuit Test

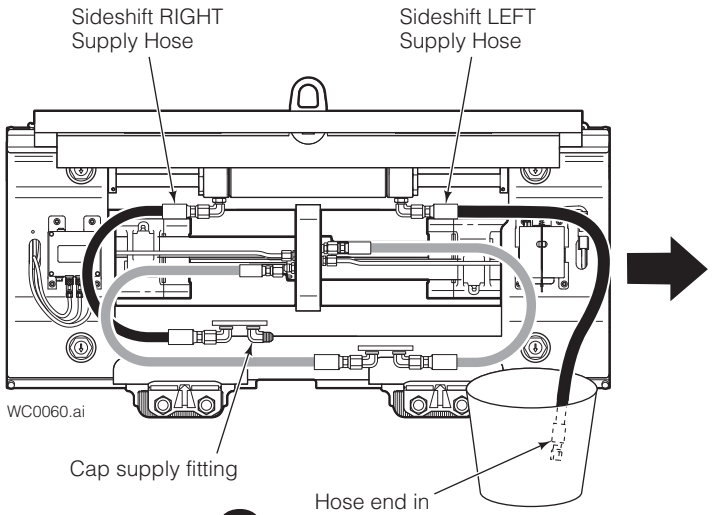
1 If equipped, press the solenoid button. Listen for a 'click' from the solenoid valve. If no sound is heard, check the fuse, wiring and coil. Repair as necessary.

IMPORTANT: Solenoid-operated valve should be plumbed so that the solenoid is **not energized** during the sideshifting function (straight-through).

2 Fully sideshift right. Turn the truck off and relieve the attachment's system pressure. Disconnect the SIDESHIFT LEFT supply hose from the truck hose terminal and route to a drain bucket. Cap the supply fitting.

3 Start the truck and actuate the SIDESHIFT RIGHT lever for 5 seconds.

- If there is **substantial hydraulic flow** out of the drain hose, the sideshift cylinder is faulty and requires replacement. Refer to Section 4.2-4.
- If there is **little or no hydraulic flow** out of the hose, first check for plugged or incorrectly-installed flow restrictor washers and fittings. Refer to Section 4.2-4. If there is still no hydraulic flow, the problem is not hydraulic. Refer the list of potential problems at the beginning of Section 3.4.



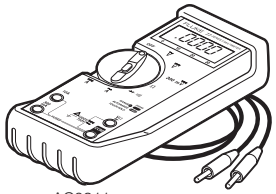
3.5 Weigh System

3.5-1 Tools Required

In addition to a normal selection of technician's hand tools, the following are needed to troubleshoot the weigh system:

- Digital Multimeter with test leads (Service Kit 213867)

Digital Multimeter Kit 213867



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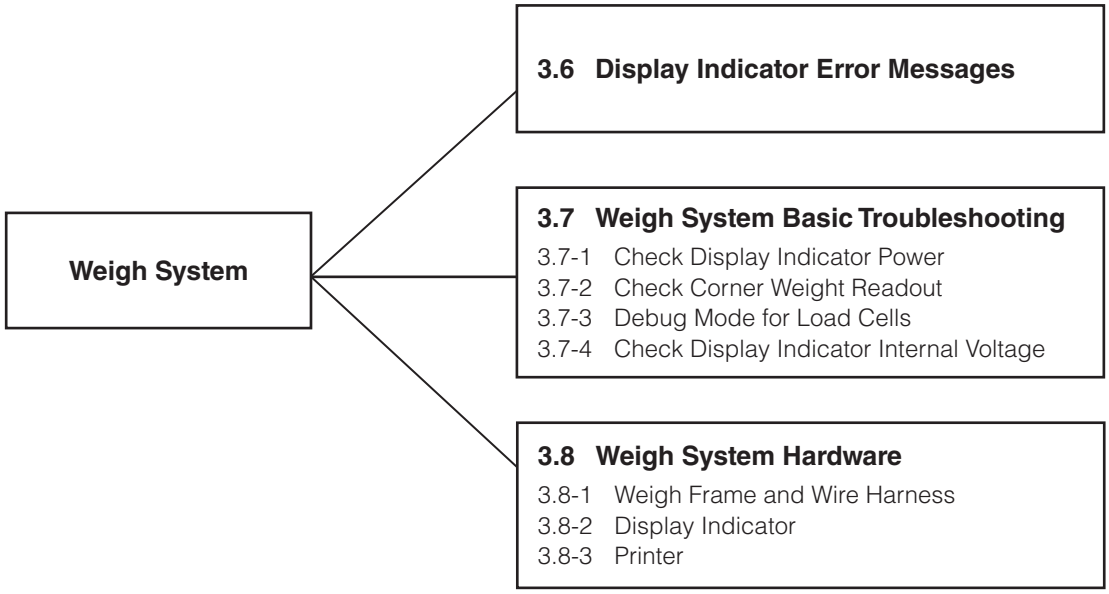
3.5-2 Before Starting

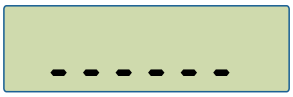
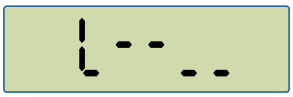
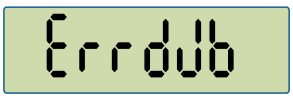
Weigh system problems and solutions are listed on the following pages, under one of the categories shown below:

Determine All The Facts – It is important that all the facts regarding the problem are gathered before beginning service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction.



3.6 Display Indicator Error Messages

3.6-1 Weigh Mode Error Messages

Error Message	Meaning	To Exit Error Mode
	The system is overloaded.	Automatic after removing weight.
	Weight on scale is negative or load cell signal is negative.	Press the ZERO/OFF key. Lift the unit from the ground.
	The weighing system's out-of-level conditions have been exceeded, side to side or front to back.	Put the unit in level position.
	No communication with the digital junction box.	Verify the digital juction box is powered ON and the unit is within range of the display indicator. Restart display indicator. Restart the digital junction box and display indicator.

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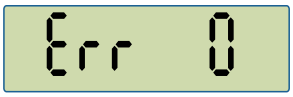
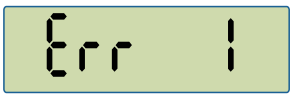
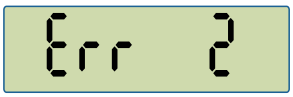
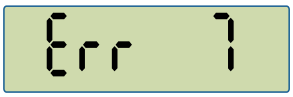
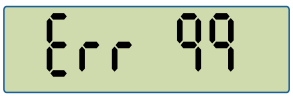
3.6-2 Other Error Messages

Error Message	Meaning	To Exit Error Mode
	Calibration Error – Test weight (or keyed in weight) is larger than the capacity of scale.	Use a different test weight. Check input data.
	Calibration Error – Test weight (or keyed in weight) is smaller than 1% of full capacity of the scale.	Use a different test weight. Check input data.
	Calibration Error – The load cell signal is too low.	Check load cell wiring, a mechanical obstruction or faulty/damaged load cell.
	Input signal is low.	Check loose wiring and connectors for the load cells, junction box, and display indicator.
	Parameters are blocked.	Press the "UNITS" button.

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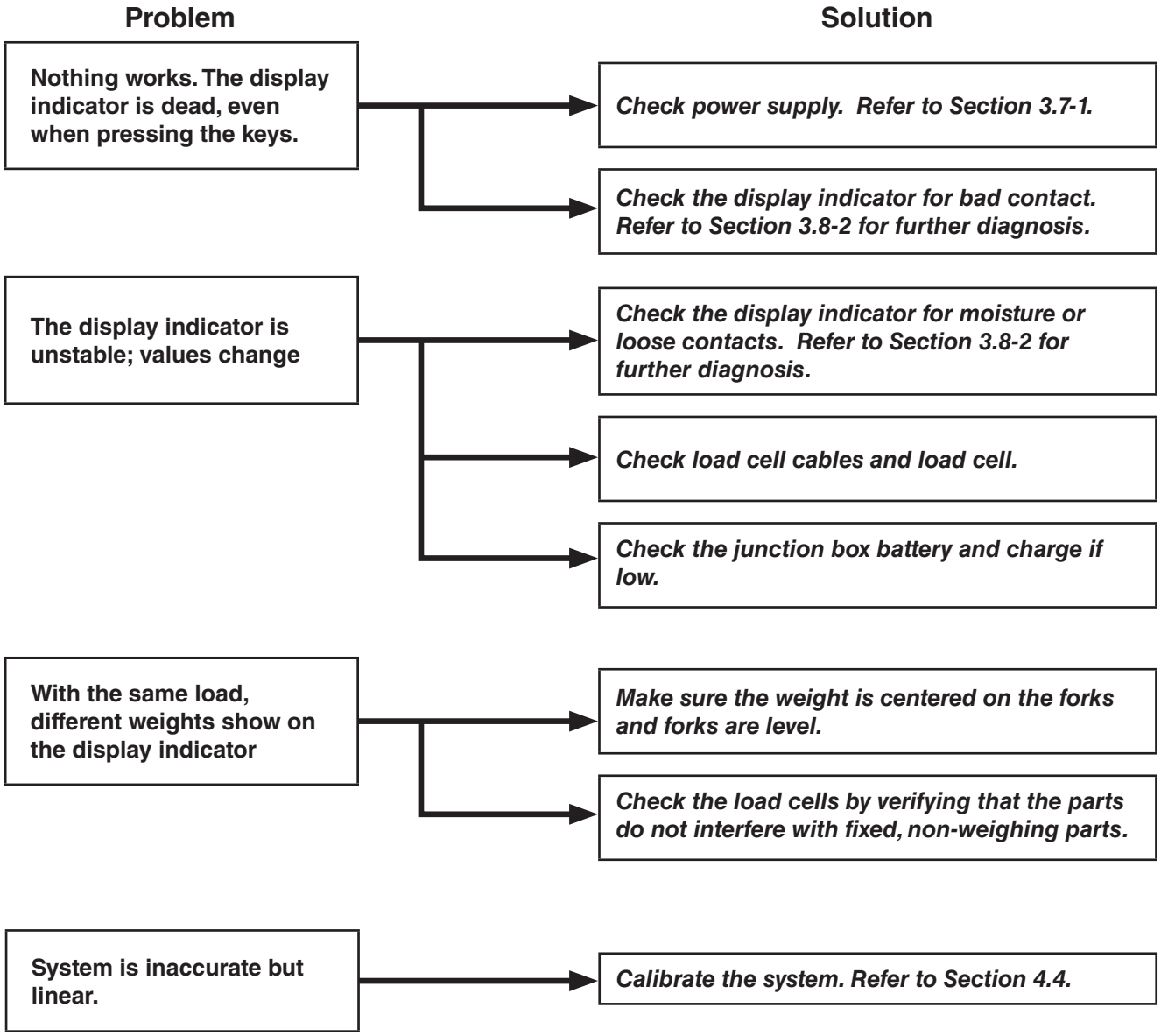
3.7 Weigh System Basic Troubleshooting

There are seven potential problem areas that can affect the function of weigh system:

- **Power supply –** Battery condition, damaged fuse or damaged power supply.
- Bad or broken contacts.
- Pinched or worn out cabling.
- Loose screws or bolts.
- Moisture in the electronics or load cells.
- **Mechanical problems –** Weighing part interferes with a non-weighing parts of the system due to deformation, accumulated dirt or debris between components.
- **Low battery –** Weigh system indicating low battery can affect weighing accuracy and communication to the indicator.



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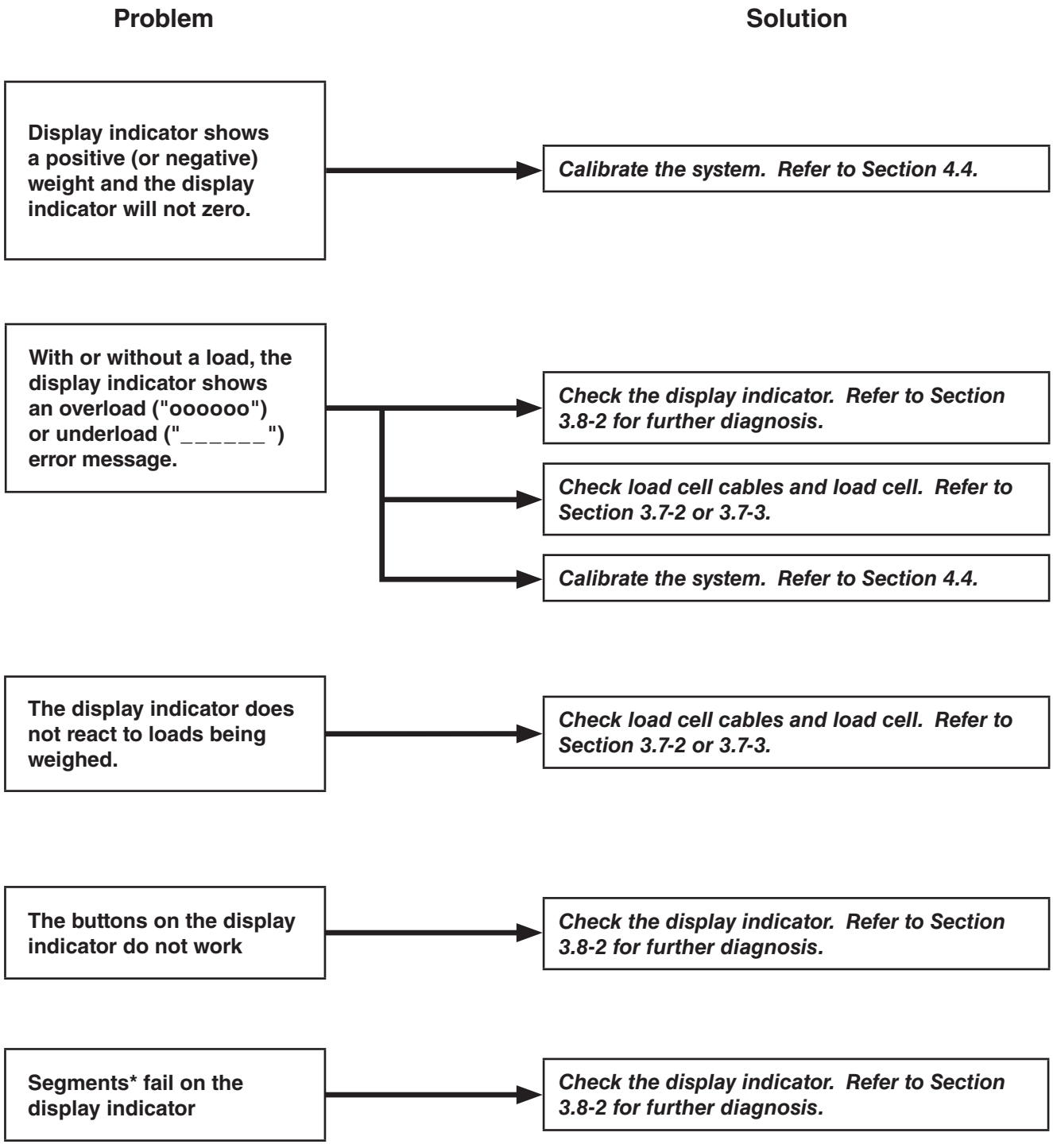
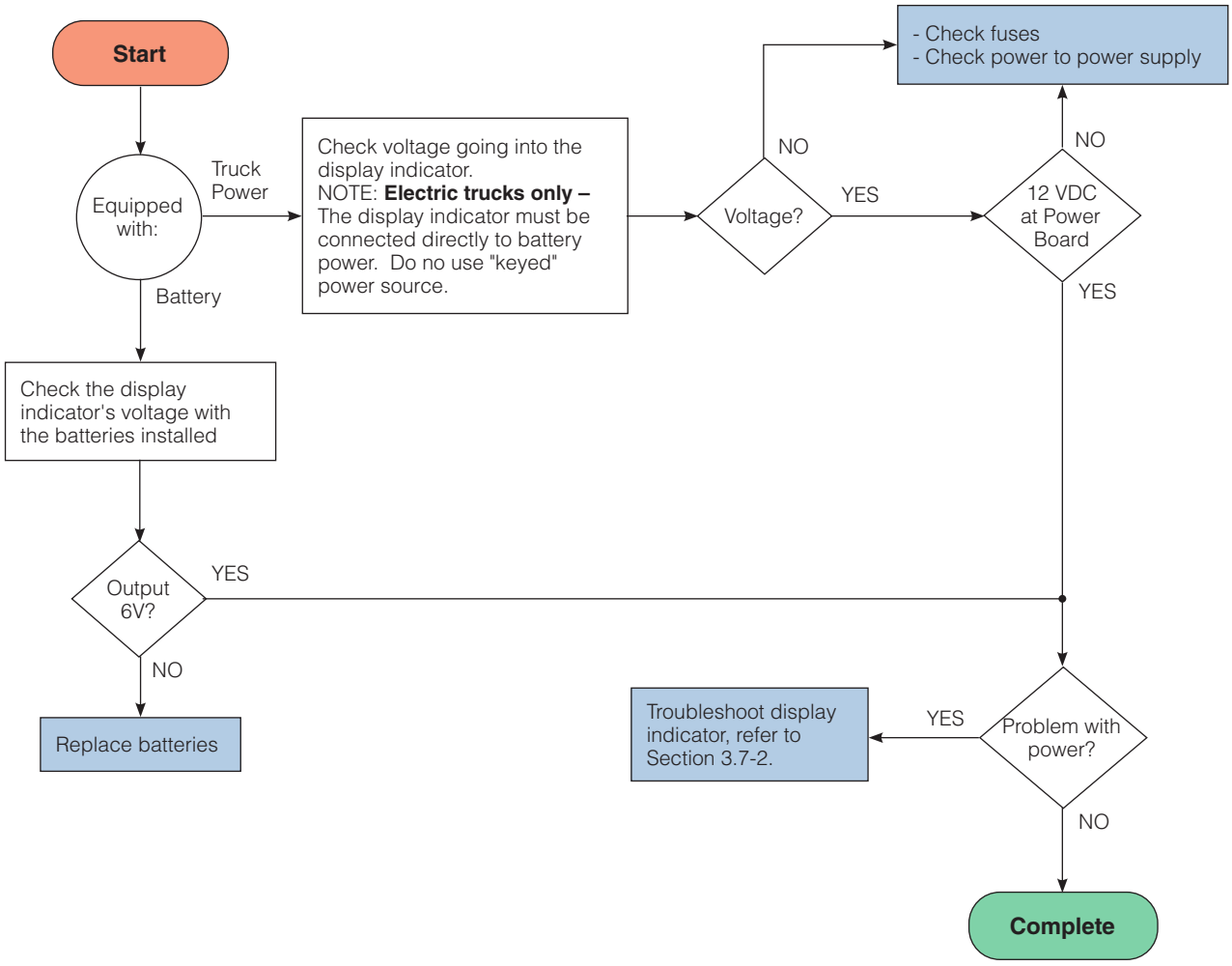
3.7 Basic Troubleshooting (continued)



*Each digit has seven segments (bars). When all segments are in use, the digit displays an "8".

3.7 Basic Troubleshooting (continued)

3.7-1 Check Display Indicator Power



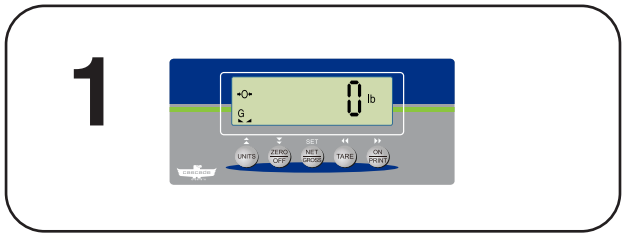
3.7 Basic Troubleshooting (continued)

3.7-2 Check Corner Weight Readout

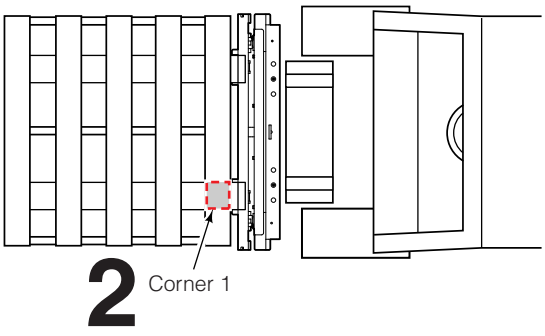
Use this procedure to determine if the display indicator is showing instability problems (weight changes).

NOTE: For this procedure, a weight of at least 50 lb. (23 kg) is required.

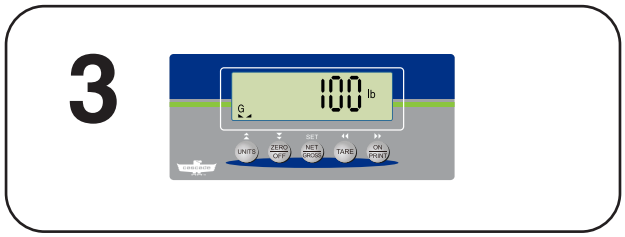
1 If required, turn on display indicator. Verify that the display indicator is zeroed.



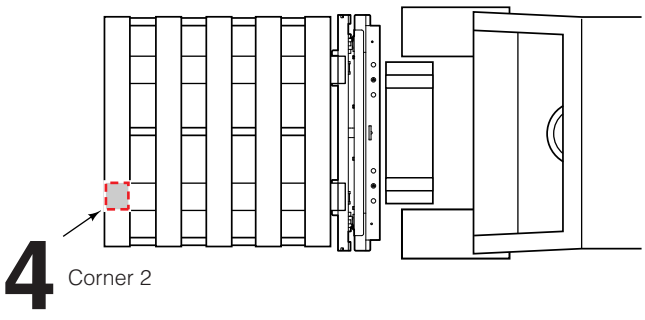
2 Place a known weight on Corner 1, as shown.



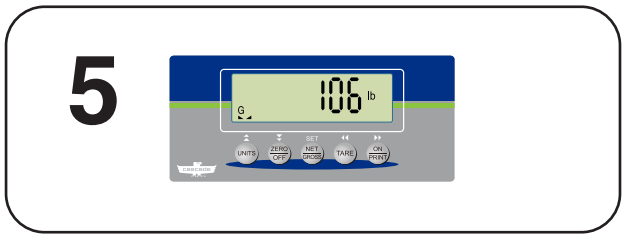
3 Note the weight shown on the display indicator.



4 Move the weight to Corner 2, as shown.



5 Note the weight shown on the display indicator.



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Procedure continued on next page

3.7 Basic Troubleshooting (continued)

3.7-2 Check Corner Weight Readout (continued)

6 Move the weight to Corner 3, as shown.

7 Note the weight shown on the display indicator.

8 Move the weight to Corner 4, as shown.

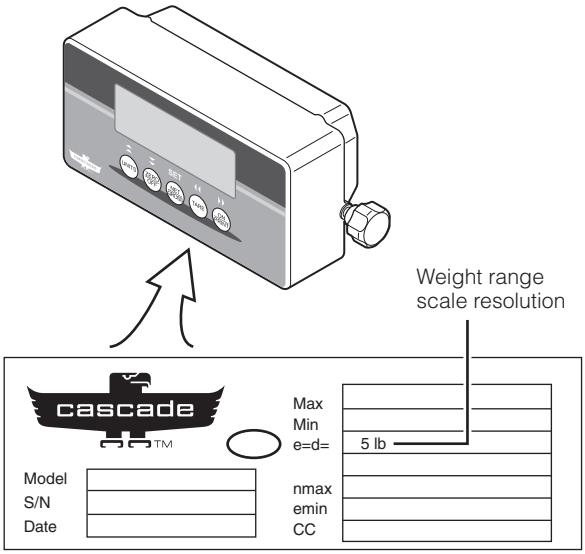
9 Note the weight shown on the display indicator.

10 If the any of weights are not within the display indicator's scale resolution, the system may require further troubleshooting or service. Contact Cascade Service department. Refer to the back cover of this manual.

IMPORTANT: To find the scale resolution, refer to the label (bottom surface) on the display indicator as shown.

NOTE: For systems with two values:

- The first value is the lower weight range scale resolution.
- The second value is the upper weight range scale resolution.



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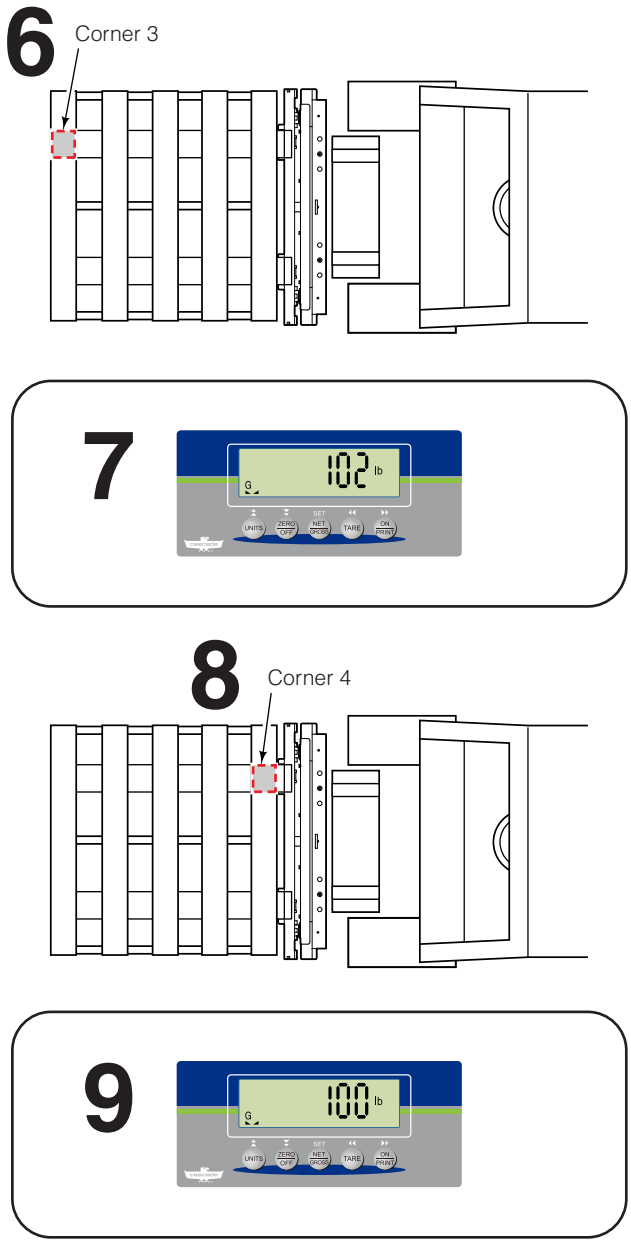

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3.7 Basic Troubleshooting (continued)

3.7-3 Debug Mode for Load Cells and Level Sensor

NOTE: This procedure is recommended for scale technicians.

Debug mode is a useful service tool for dealing with display indicator instability problems or when calibration is lost. Each load cell and level sensor has one AD chip. When the display indicator is in debug mode, the number of counts received from each load cell AD chip is shown individually. This helps isolate which load cell could be the problem. For the level sensor, this can be used to detect any output or calibration issues.

1 Press and hold the "UNITS" button for 3 seconds.

2 The display indicator will show the AD count for load cell B and an arrow in the first position will appear. Note the load cell and reading (AD count) for comparing in Step 4.

3 To view each load cell's reading, press the "ZERO/OFF" button. Each time the "ZERO/OFF" button is pressed, the arrow will progress to the next position.

4 Compare the readings of upper left and right load cell values (B & C). Then compare the lower left and right load cell values (A & D). The readings left to right should be close.

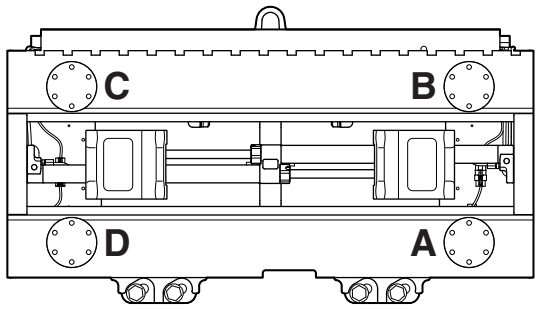
NOTE: Lower load cell readings may show negative values when unloaded. This does not indicate an issue.

5 When the arrow progresses to the fifth position, the display indicator will show the angle measurement of the level sensor in degrees (OIML only) or the AD count from the level sensor (all other configurations).

NOTE: The Level Sensor will read "0" when the junction box is vertical front to back and side-to-side.

6 To exit Debug mode, press "UNITS" button. The display indicator will go back to weighing mode.

Load Cell Layout and Corresponding Display Indicator Arrow Position



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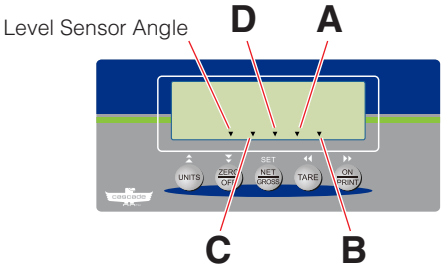
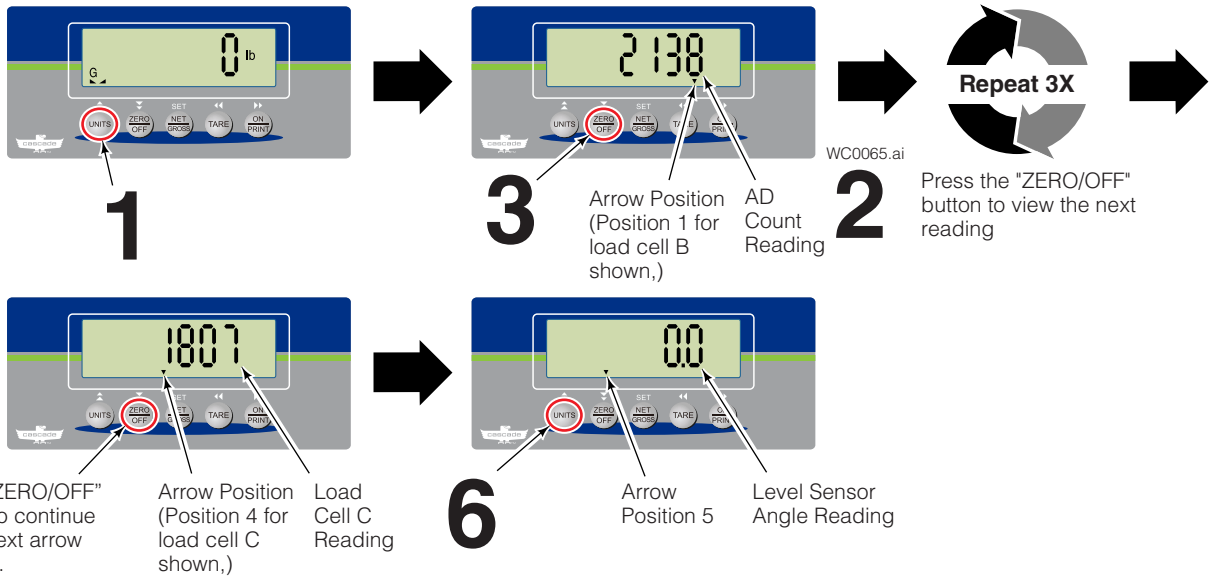




3.7 Basic Troubleshooting (continued)

3.7-4 Check Display Indicator Internal Voltage

NOTE: Low supply voltages from the truck can damage the internal regulator or converter components.

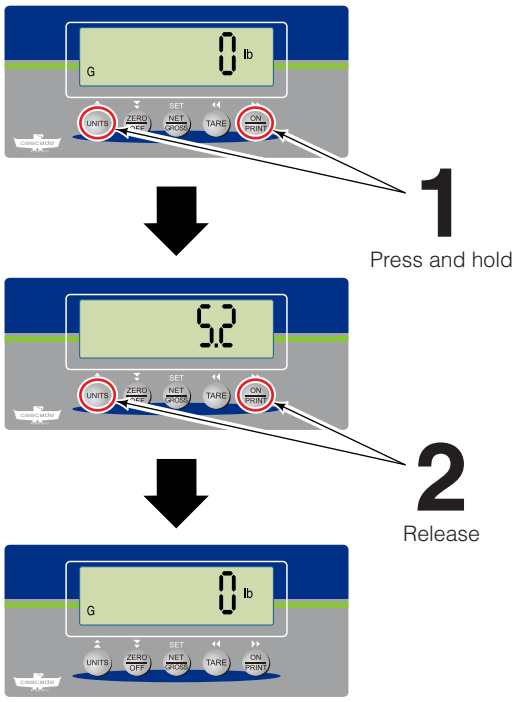
To check the voltage at the display indicator main board:

1. Hold the ON/PRINT and the UNITS buttons until numbers stop flashing. This value is the main board supply voltage.
2. Release buttons to return to normal operation.
3. Acceptable voltage ranges are as follows:

   Battery powered display "On" – 5.2 to 6.3 V

   Battery powered display "Off" – 4.2 V

   Truck powered display – 12.0 to 12.5 V



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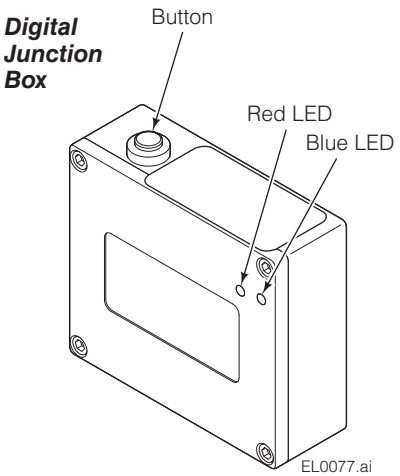
3.7-5 Digital Junction Box

Action	Power Button	LED Behavior
Turn on the junction box	Short Press	• Red LED one fast flash • Blue LED is solid for 5 seconds then begins blinking mode (see battery levels in this table)
Turn off the junction box	Hold 3 seconds, then release	• Red LED and Blue LED are solid then both LEDs no longer illuminated.
Nominal battery level (Ok indication)	Not applicable	Display Indicator On • Red LED remains off • Blue LED blinks 1 time every 2 seconds Display Indicator Off • Red LED remains off • Blue LED blinks 1 time every 4 seconds
Low battery level	Not applicable	• Red LED is solid • Blue LED blinks 1 time every 2 seconds



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Automatic power off feature

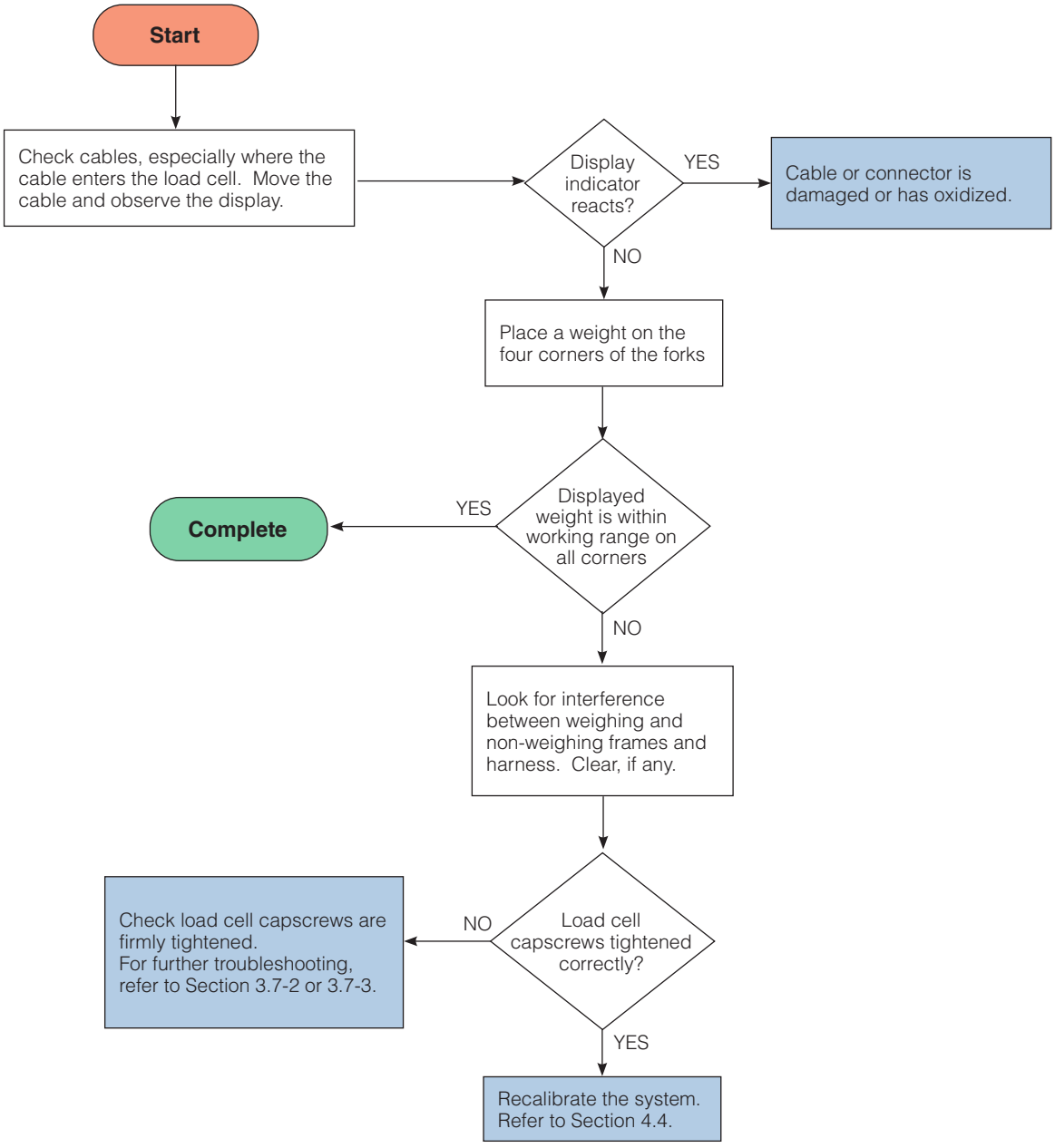
NOTE: The indicator is not connected

- At low battery level, the junction box will power off after 10 minutes.
- At nominal battery level, the junction box will power off after 2 hours.

NOTE: To configure the junction box power off time, refer to parameter B8. Refer to section 4.3-6.

3.8 Weigh System Hardware

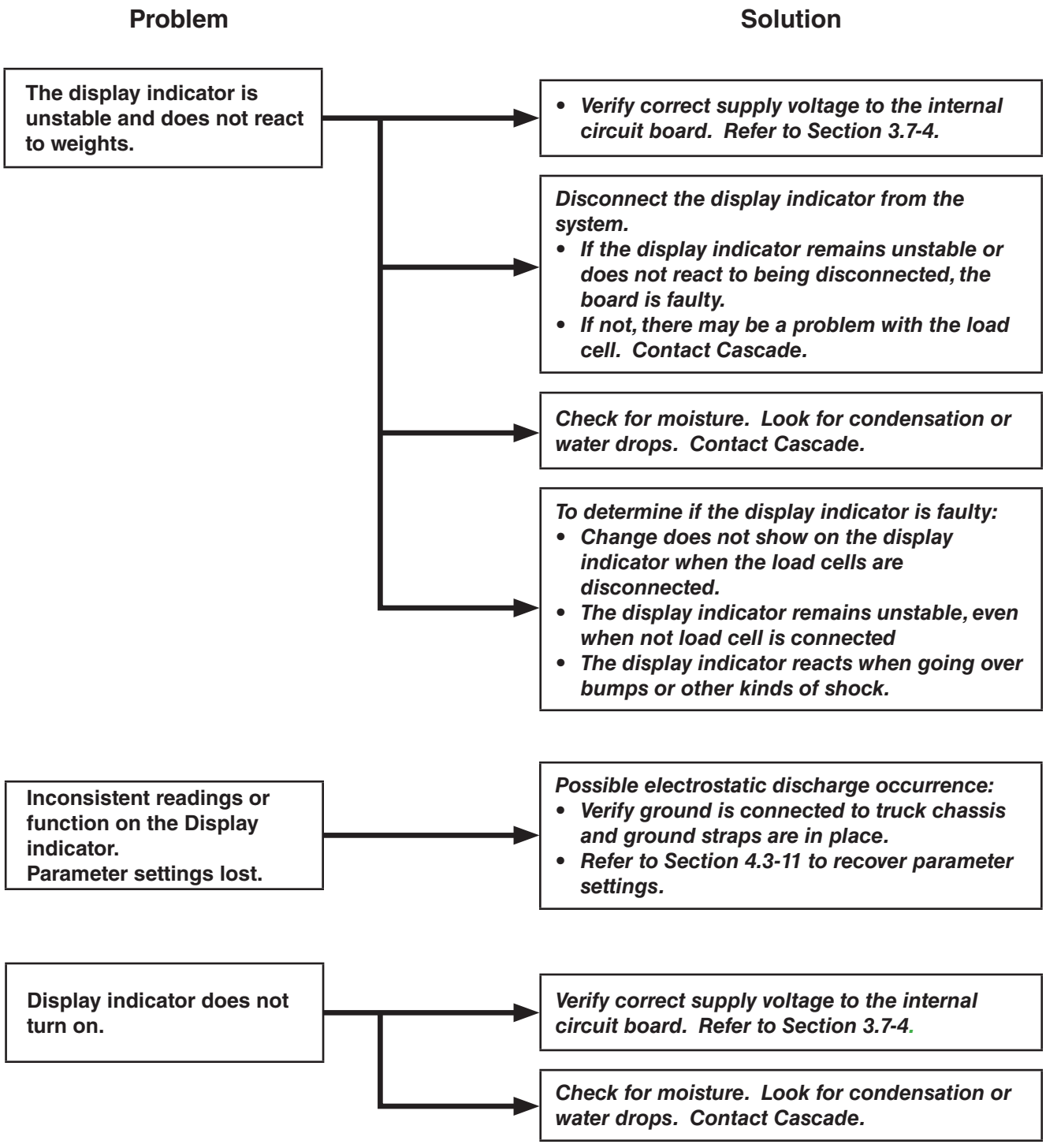
3.8-1 Weigh Frame and Wire Harness



3.8 Weigh System Hardware (continued)

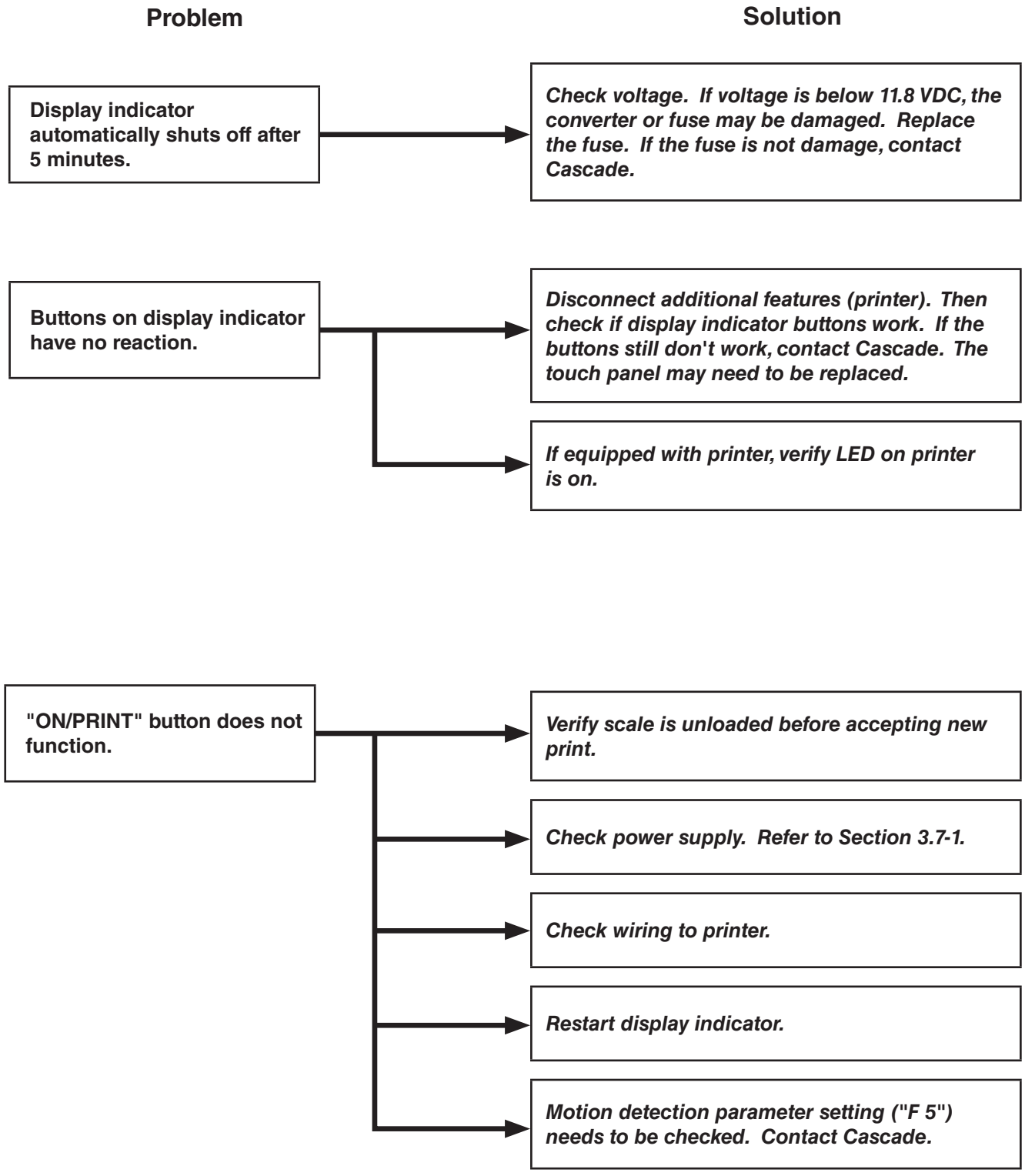
3.8-2 Display Indicator

NOTE: Electric trucks only – The display indicator must be connected directly to battery power. Do no use "keyed" power source.



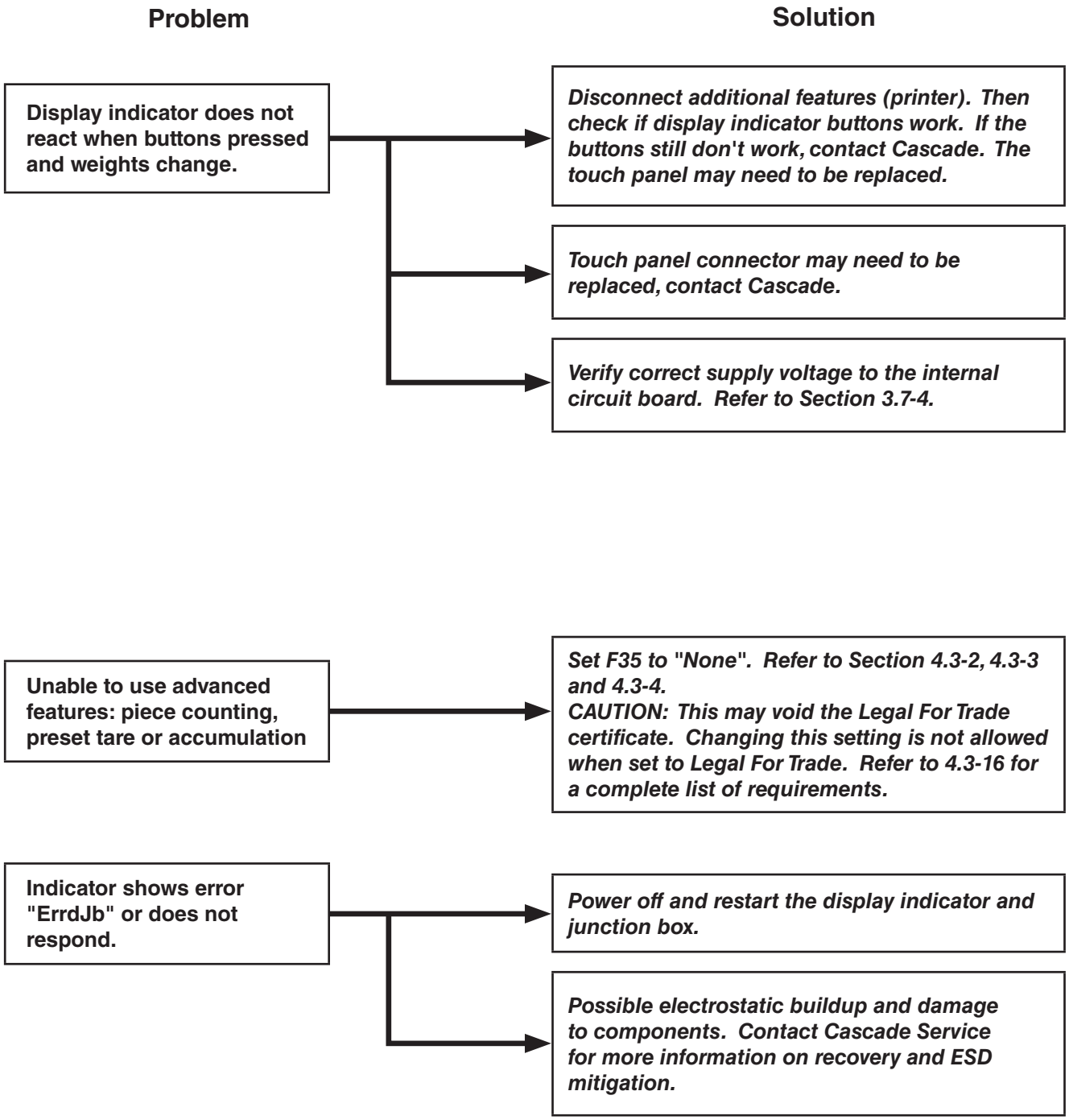
3.8 Weigh System Hardware (continued)

3.8-2 Display Indicator (continued)



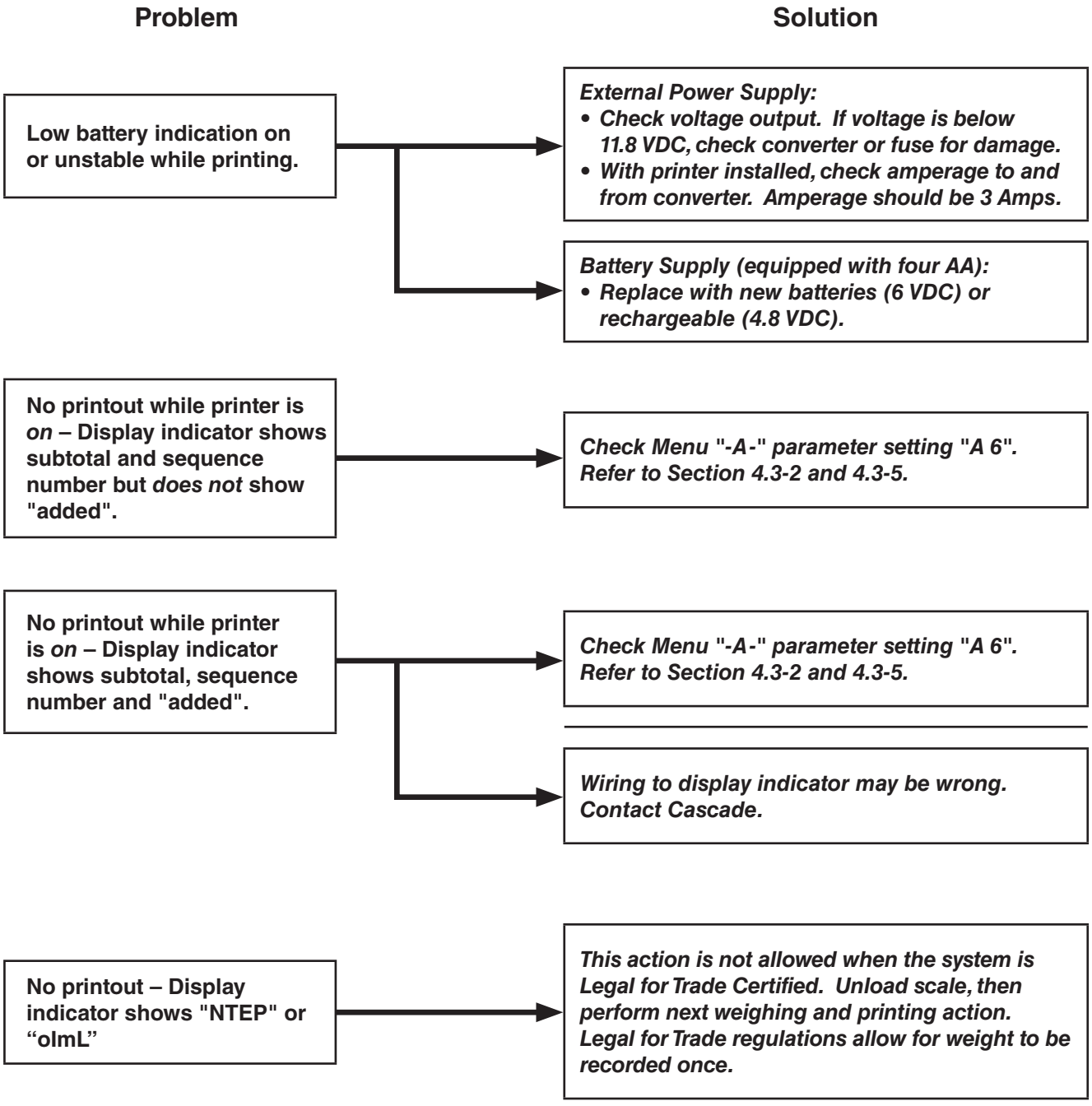
3.8 Weigh System Hardware (continued)

3.8-2 Display Indicator (continued)



3.8 Weigh System Hardware (continued)

3.8-3 Printer



4.1 Fork Positioner Equipped

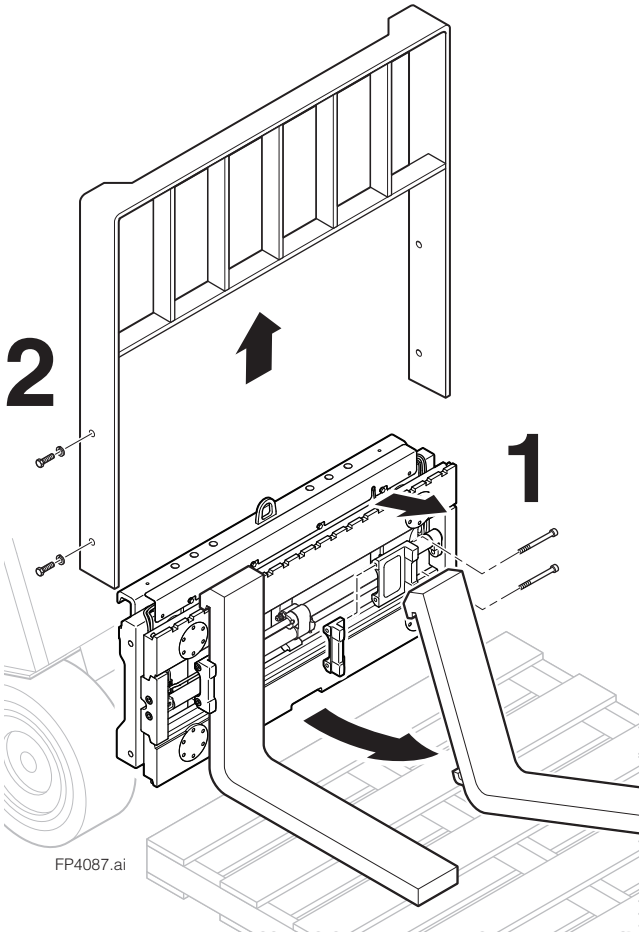
4.1-1 Removal and Replacement

NOTE: Fork positioner assembly may be removed separately or complete with the sideshifter service.

1 Remove capscrews fastening inner fork carriers and remove forks.

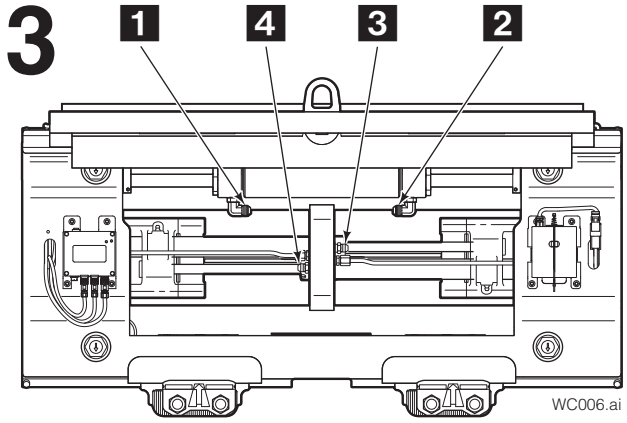
WARNING: Make sure locking pins are removed from the forks. Forks must slide freely on sideshifter frame or carriage bars.

2 If equipped, remove backrest to provide access to Fork Positioner mounting capscrews. For Cascade backrests only, tighten capscrews to 145 ft.-lbs. (195 Nm). Refer to the truck service manual for truck manufacturer's backrest.



WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve (or valves) several times in both directions.

3 Disconnect supply hoses from fork positioner manifold and tag for reassembly.



1 Sideshift Right
2 Sideshift Left
3 Open Forks
4 Close Forks

Back (Driver's) View
(Sideshifting Fork Positioner model shown)

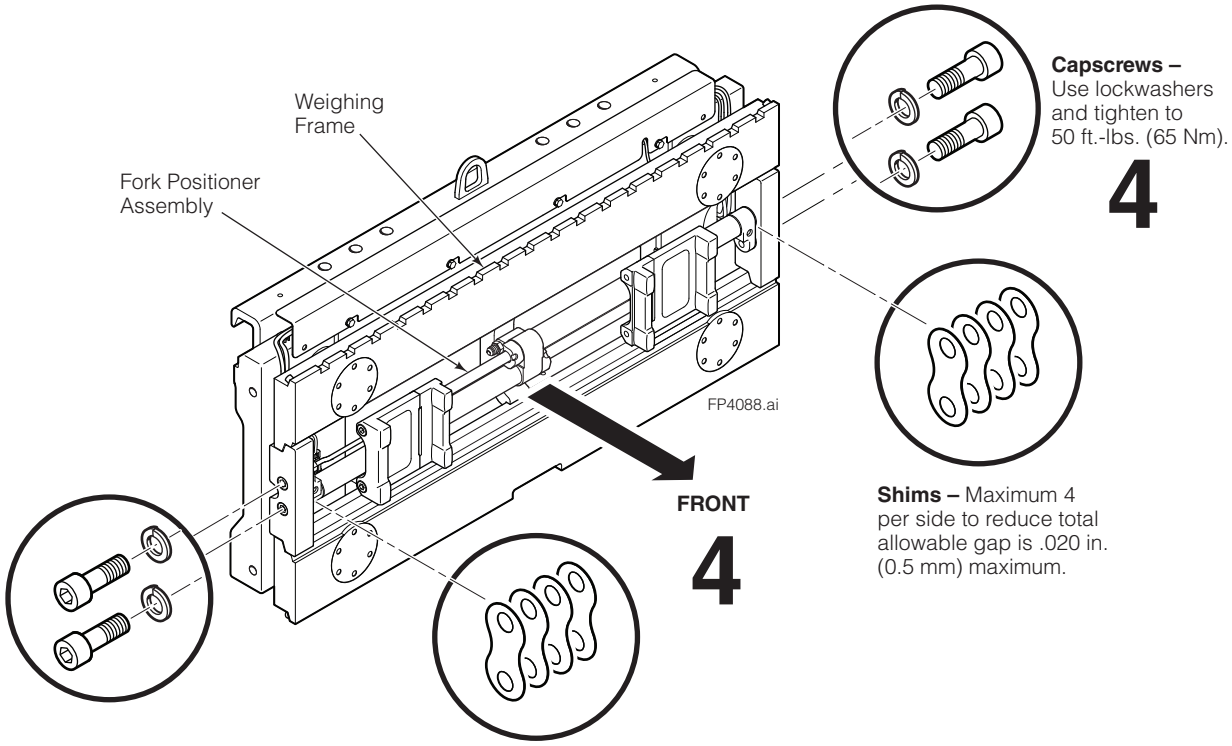
4.1 Fork Positioner Equipped (continued)

4.1-1 Removal and Replacement (continued)

4 Remove capscrews fastening fork positioner to weighing frame and remove unit through front. Keep track of shims. For reassembly, shim as necessary, with a maximum of 4 shims per side. Tighten mounting capscrews to 50 ft.-lbs. (65 Nm).

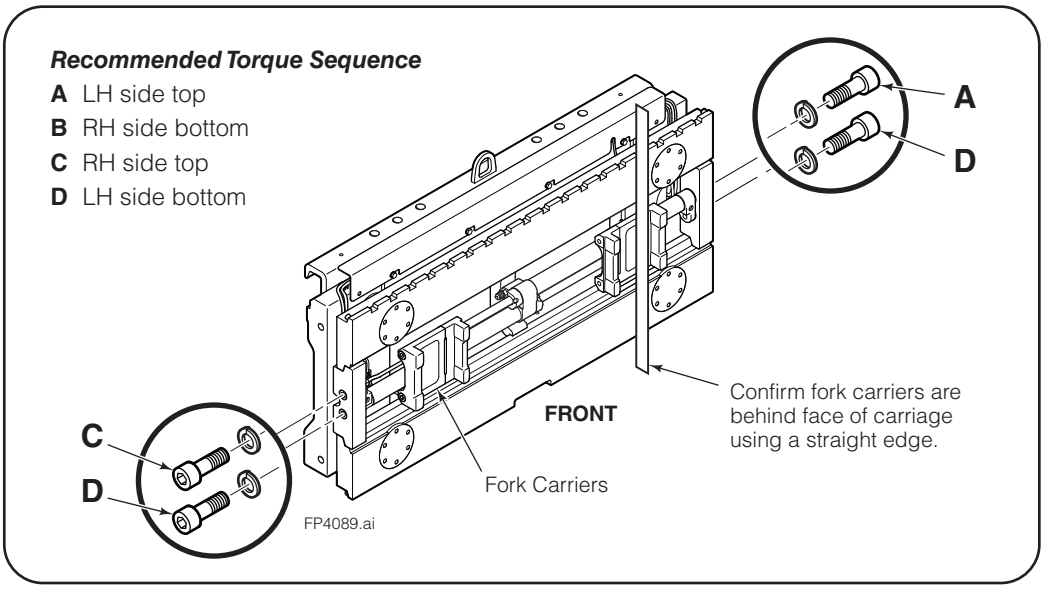
CAUTION: Maximum difference in number of shims per side is 2 and the total allowable gap before tightening capscrews is 0.020 in. (0.5 mm).

Fork Positioner Mounting



Recommended Torque Sequence

A LH side top
B RH side bottom
C RH side top
D LH side bottom



4.1 Fork Positioner Equipped (continued)

4.1-1 Removal and Replacement (continued)

5 For installation, reverse the above procedures with the following exceptions:

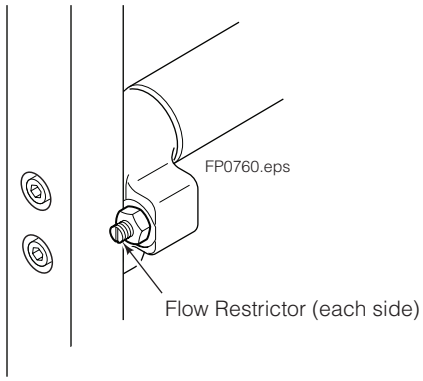
- Service fork positioner components. Refer to Section 4.1-3.
- If necessary, adjust flow restrictors for equal fork movement as follows:

  A Loosen jam nuts and screw both flow restrictors in (CW) fully. Then, screw each restrictor out (CCW) 1/2 turn.

  B Open forks fully, then close. Look for unequal fork movement.

  C The restrictor on the faster fork (one that bottoms first), screw flow restrictor in (CW) 1/4 turn and test again.

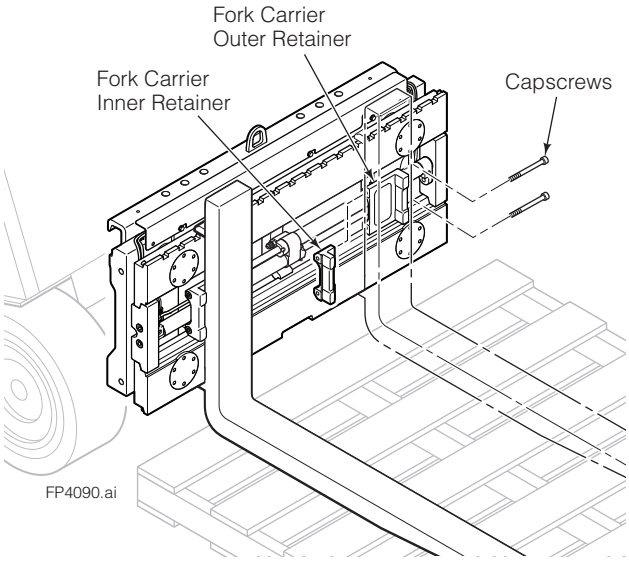
  D Repeat procedure until fork movement is equal. Positioning speed should be approximately 3 in. (75 mm) per second. Tighten jam nuts.

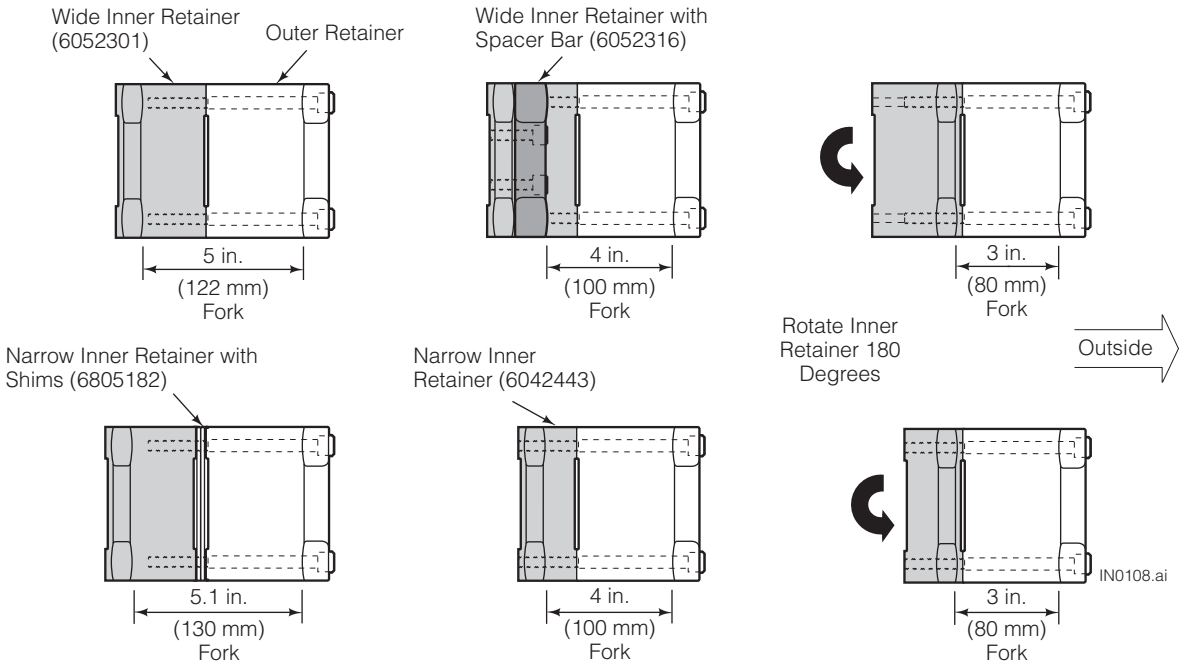


4.1 Fork Positioner Equipped (continued)

4.1-2 Fork Carrier Configuration

NOTE: Refer to the layouts below to position inner retainers for various fork widths. Tighten fork carrier inner retainer capscrews to 50 ft.-lbs. (65 Nm).





FORK CARRIER CONFIGURATIONS
RH Front Views
NOTE: Recommended gap between sides of fork and fork retainer should be 0.08 – 0.38 in. (2 mm – 10 mm).

4.1 Fork Positioner Equipped (continued)

4.1-3 Fork Positioner Service – Disassembly

1 Use C-clamps to clamp fork positioner assembly face down onto a bench top as shown. Use 2 x 4 in. (5 x 10 cm) wood blocks for clearance and to keep parts in alignment.

2 Remove cylinder rod anchor plug. Move fork carrier toward manifold and remove half-ring keepers. Move cylinder rod to fully retracted position as shown.

3 Unscrew cylinder retainer using Cascade socket tool, part no. 6039273, to remove cylinder assembly from the manifold.

4 Disconnect hydraulic tubes at manifold. Remove C-clamp and remove cylinder/fork carrier assembly.

IMPORTANT: If tubes are removed from cylinder head end, reinstall prior to installation of cylinder/fork carrier assembly to manifold. Do not bend tubes.

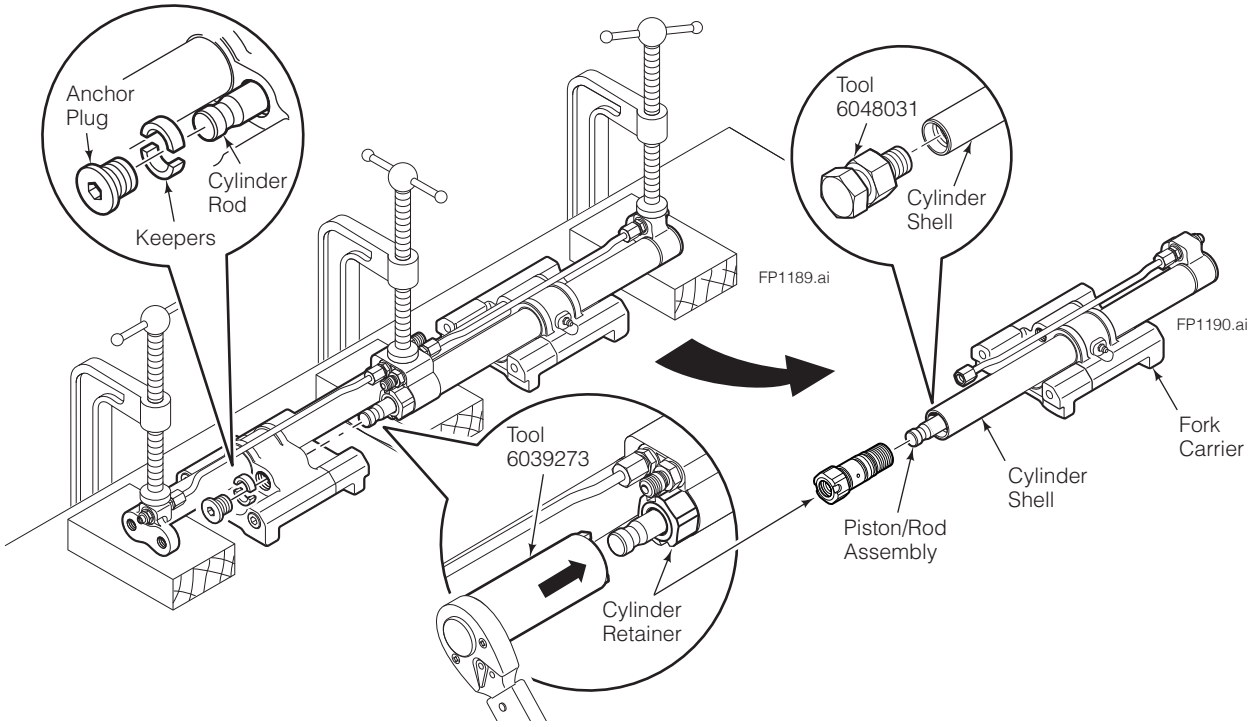
5 Slide fork carrier from cylinder shell. Remove piston/rod assembly from cylinder shell.

6 Remove all seals, O-ring, wear rings and bearings from components, as shown.

CAUTION: Do not scratch seal grooves. Use brass seal removal tools to pry items from grooves.

7 If required, unscrew cylinder shell from head end using Tool 6048031, as shown. For reassembly, replace cylinder head end O-ring and apply Loctite 242 (blue) to threads. Clamp head end in vise and tighten shell to 200 ft.-lbs. (270 Nm).

NOTE: Capscrew (M25 x 1.5 x 60 mm L) and Jam Nut (M25 x 1.5) may also be used.



4.1-4 Fork Positioner Service – Inspection

IMPORTANT: If bending damage is found, Fork Positioner / Sideshifter assembly should be replaced as a complete unit.

- Inspect rod, piston and retainer for nicks and burrs. Remove minor imperfections using 400 grit emery cloth.
- Inspect cylinder bore for minor nicks and burrs. Remove minor imperfections with a hone (butterfly).
- Inspect cylinder shells for deformities, cracks that could impair performance or cause leaks under pressure.
- Inspect fork carrier bearings for wear (see 1000 hour inspection criteria) and replace as necessary.

4.1 Fork Positioner Equipped (continued)

4.1-5 Fork Positioner Service – Reassembly

1 Lubricate new seals, O-rings and wear rings with O-ring lube, hydraulic fluid or petroleum jelly.

2 If necessary, use 400-grit emery cloth to break any sharp edges on the piston, retainer and cylinder shell chamfer angles and threads to prevent seal damage.

3 Install new seals, O-rings, wear rings and fork carrier bearings as shown below. See retainer seal loading technique shown to the right.

NOTE: Fork carrier bearings snap into their respective grooves. Bronze bearings consist of three separate segments.

4 Install piston/rod assembly into cylinder shell. Push rod fully into cylinder.

CAUTION: Make sure piston seal is not damaged by cylinder shell threads during installation.

5 Slide fork carrier onto cylinder shell with the capscrew heads facing outwards.

6 Align cylinder assembly to manifold and engage opposite cylinder rod into fork carrier.

NOTE: Install external spacer on cylinder rod, if required. Install cylinder retainer through opposite side of manifold and screw partially into cylinder shell.

7 Make sure cylinder is properly oriented with restrictor fittings on backside. Engage tubes and screw retainer fully into shell. Reclamp assembly to bench.

8 Tighten retainer to 120 ft.-lbs. (165 Nm). Tighten hydraulic tubes at manifold and cylinder head end.

Installing Retainer Internal Seals

3 Twist seal into 'figure 8' or 'half-circle' shape to insert into retainer

Lubricate seal and force partially into groove.

Note Seal Direction.

0.375 in. (10 mm) pin punch – no sharp edge

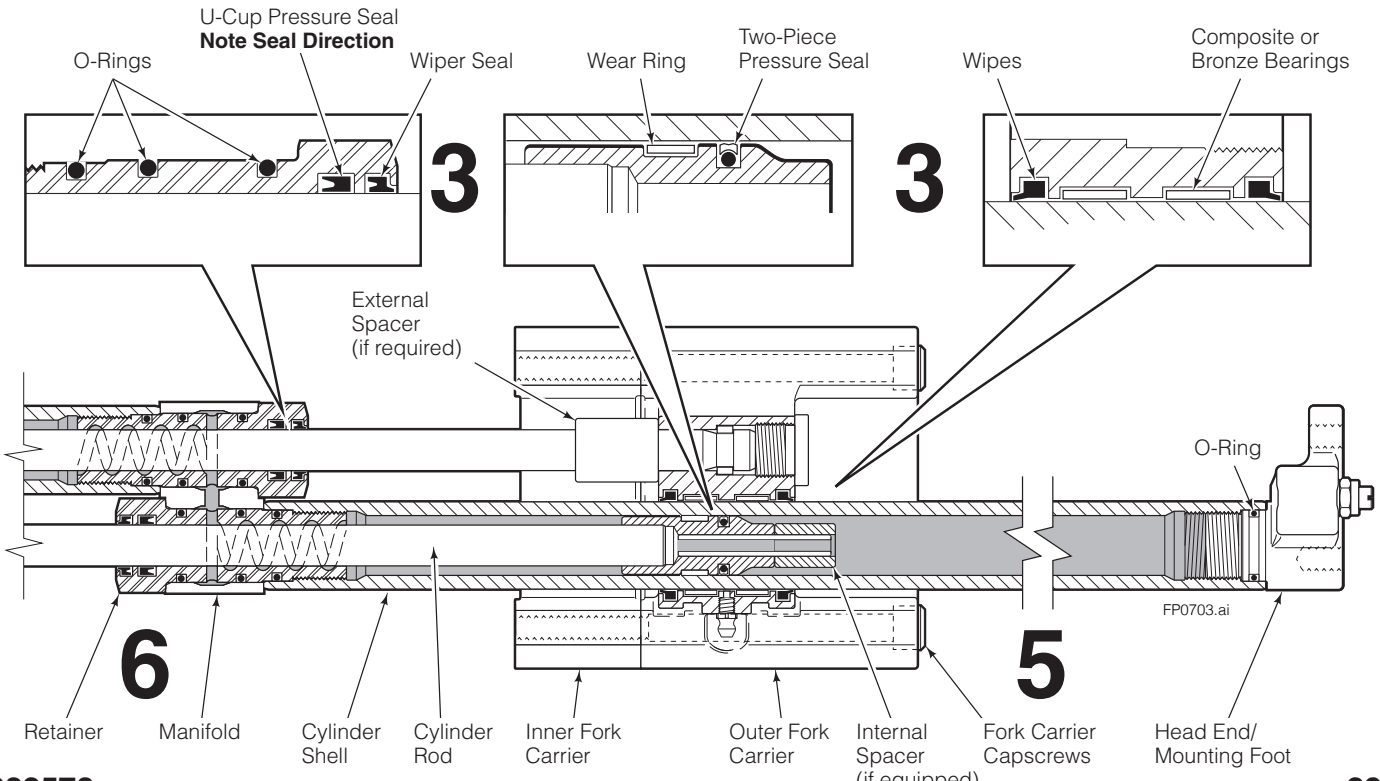
FP0710.eps

0.5 in. (12-15 mm) diameter rod located flush with bottom of seal groove.

FP0709.eps

Twist seal into 'figure 8' or 'half-circle' shape to insert into retainer

FP0829.eps



4.2 Sideshifter Equipped

4.2-1 Frame Assembly Removal

NOTE: Fork positioner assembly may be removed prior to sideshifter service or can remain installed on the hang-on frame. Refer to Section 4.1 for fork positioner removal.

1 Remove the forks (or load receiver) and backrest from the weigh frame. For Cascade backrest reassembly, tighten the capscrews to 145 ft.-lbs. (195 Nm).

> **WARNING:** Before disconnecting hoses, relieve pressure in the Attachment hydraulic system. Turn the truck off and move the truck control handle several times in both directions.

2 Disconnect and plug the hoses from the sideshifter cylinder. Tag for reassembly.

3 If rod seals are to be serviced, loosen seal carriers before removing sideshifter frame. For reassembly, tighten seal carriers to 170 ft.-lbs (230 Nm)

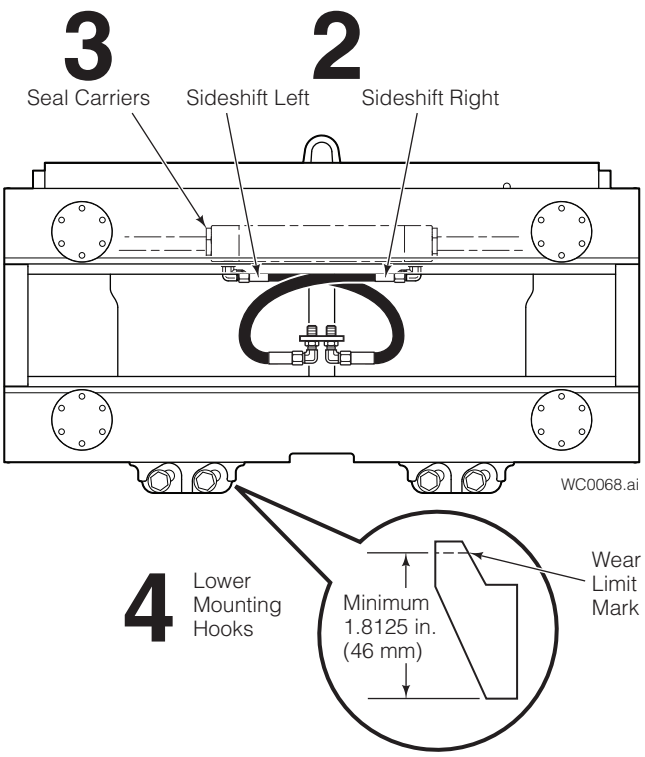
4 Remove the lower mounting hooks and inspect for wear. For reassembly, adjust hooks as shown below and tighten to 120 ft.-lbs. (165 Nm).

> **WARNING:** Check the attachment weight (located on the nameplate) to make sure the overhead hoist and chains or straps are at least the rated capacity of the attachment.

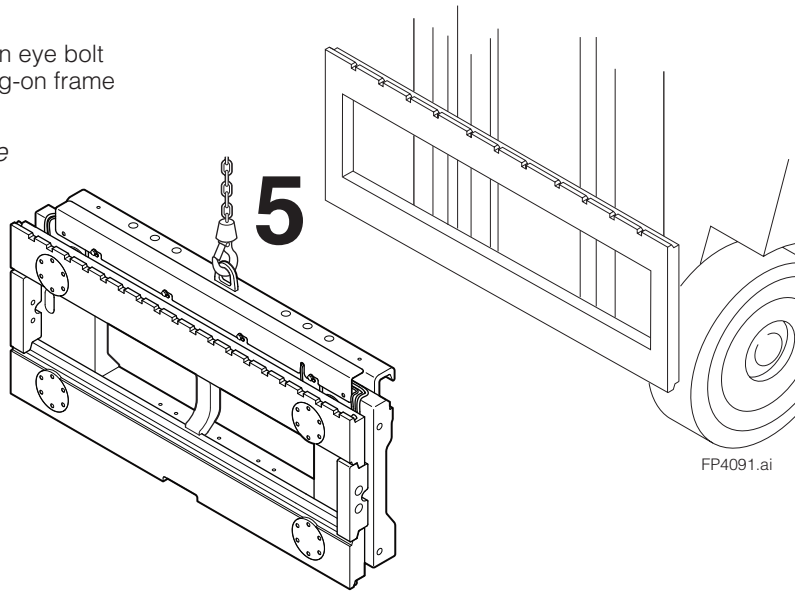
5 Attach an overhead hoist to the hang-on lifting eye and lift the frame away from the truck.

NOTE: If lifting eye is not equipped, install an eye bolt (M12) to the center threaded hole in the hang-on frame assembly's top bar.

Procedure continued on the following page



Front View



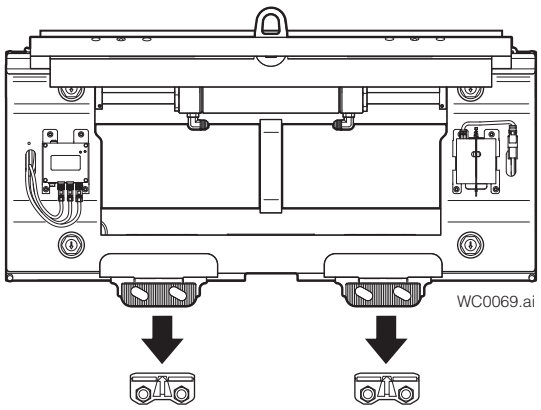
4.2 Sideshifter Equipped (continued)

4.2-1 Frame Assembly Removal (continued)

4 For installation, reverse the above procedures with the following exceptions:

- Clean and inspect carriage bars for damage and smoothness. Make sure that bars are parallel and that ends are flush.
- Clean all bearing areas of built-up dirt and grease.
- Inspect upper and lower sideshift bearings for wear and replace as necessary. Refer to section 4.2-3.
- Install and adjust lower hooks as shown below.

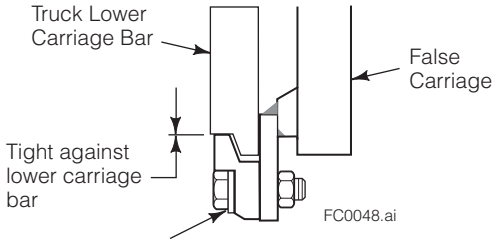
  CAUTION: Lower hook clearance must be adjusted as shown for proper sideshifter operation.
- Lubricate both upper and lower sideshift bearings with general-purpose chassis grease.



Front View
(Sideshifting Fork Positioner model shown)

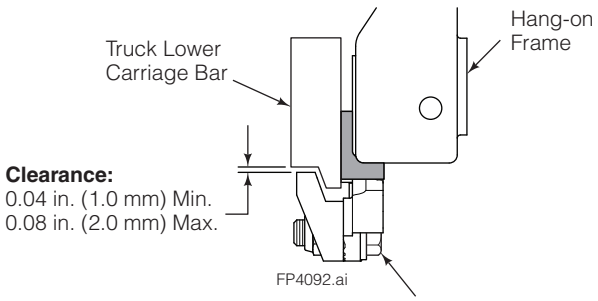
BOLT-ON HOOKS

Carriage



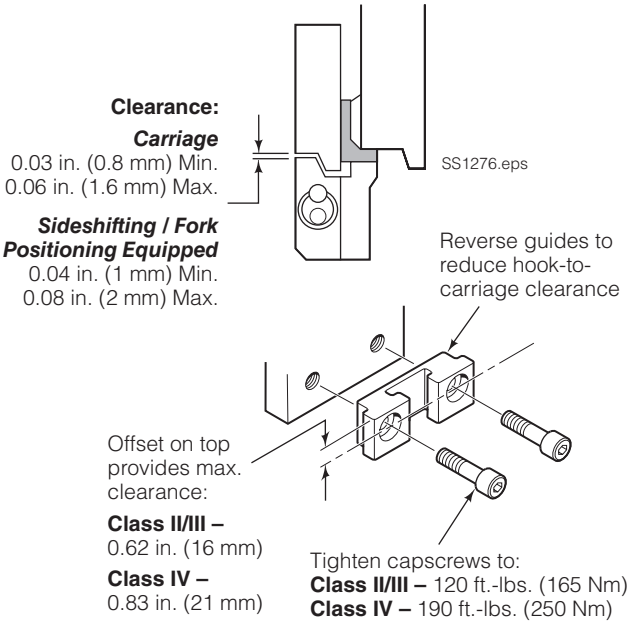
Tighten capscrews to:
Class II/III – 120 ft.-lbs. (165 Nm)
Class IV – 235 ft.-lbs. (320 Nm)

Sideshifting / Fork Positioning Equipped



Tighten capscrews to:
Class II/III – 120 ft.-lbs (165 Nm)
Class IV – 235 ft.-lbs (320 Nm)

QUICK-DISCONNECT

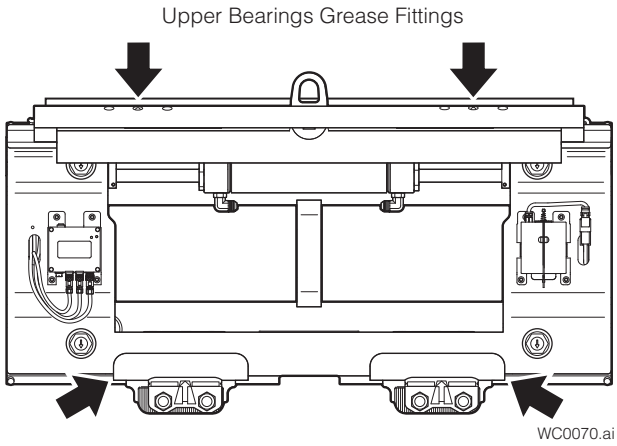


Tighten capscrews to:
Class II/III – 120 ft.-lbs. (165 Nm)
Class IV – 190 ft.-lbs. (250 Nm)

4.2 Sideshifter Equipped (continued)

4.2-2 Bearing – Lubrication

Lubricate both the upper and lower sideshift bearings with chassis grease every 1000 hours or 25 weeks of operation, whichever comes first. In contaminated environments, lubricate every week or as required.



Back (Driver's) View
Lower Bearings Grease Fittings

4.2-3 Bearings – Service

1 Remove the frame assembly from the truck carriage as described in Section 4.2-1 and lay flat on a pallet or workbench.

2 Remove retainer pins and cylinder assembly from the frame.

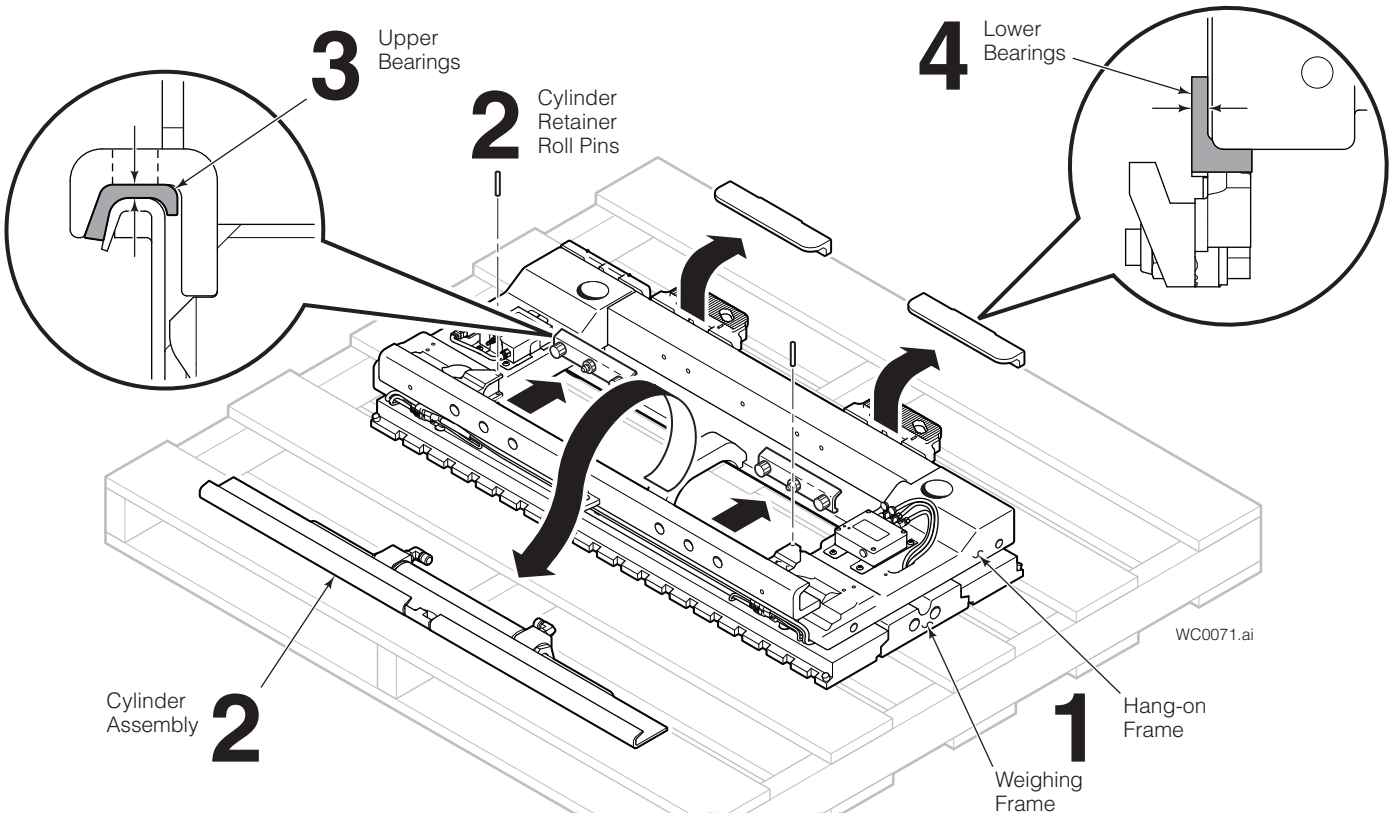
3 Remove the upper bearings by driving out of the frame. If any bearing is worn to less than 0.375 in. (2.5 mm) thickness, replace both upper bearings.

IMPORTANT: Use a wood block or rubber hammer to fully seat new bearings into the upper weighing frame, as shown. Proper clearance requires that bearings be fully seated into upper hook of the frame.

4 Remove the lower bearings by prying them from the lower frame. If any bearing is worn to less then 0.375 in. (2.5 mm) thickness, replace both lower bearings.

5 For reassembly, reverse the above procedures with the following exceptions:

- Grease upper and lower bearings with general purpose chassis grease.



4.2 Sideshifter Equipped (continued)

4.2-4 Sideshift Cylinder – Removal, Inspection and Replacement

> **WARNING:** Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve (or valves) several times in both directions.

1 Disconnect the hoses from the cylinder and tag for reassembly. Cap the cylinder fittings.

2 Remove the retainer pins and cylinder assembly from the frame as shown in 4.2-3.

3 Inspect the outside of the cylinder shell for damage that could impair performance or cause leaks under pressure. If damage is found, replace the complete cylinder assembly.

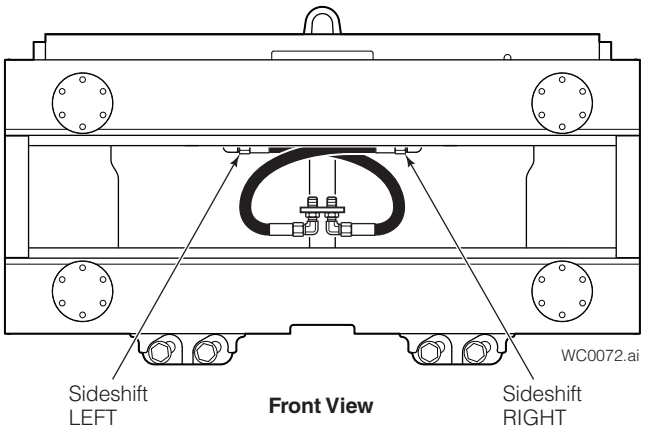
NOTE: Make sure cylinder fittings and flow restrictors are installed correctly, as shown.

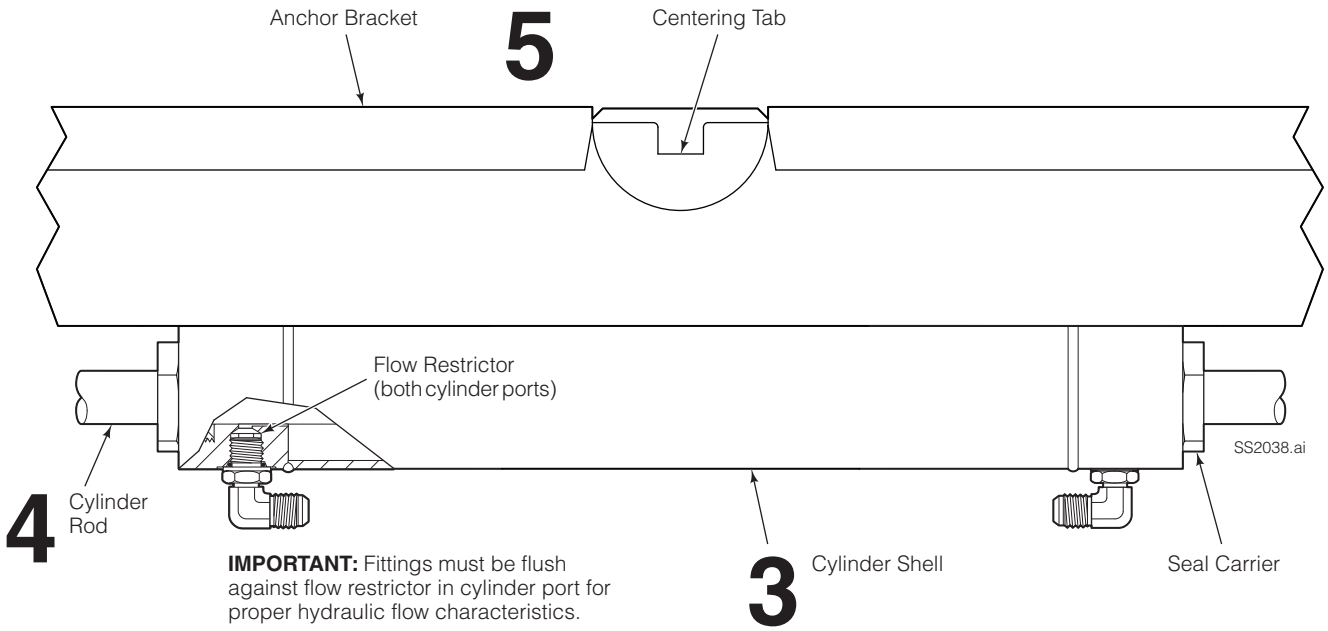
4 Inspect the cylinder rods for damage. If bent or scored, replace the complete cylinder.

5 Inspect the anchor bracket and centering tab for damage. If damage is found, replace the complete cylinder assembly.

6 For reassembly, reverse the above procedures with the following exceptions:

- Use new cylinder retainer roll pins.





4.2 Sideshifter Equipped (continued)

4.2-5 Sideshift Cylinder – Rod Seal Carrier Replacement

NOTE: The frame assembly must be removed from the truck to replace the cylinder rod seals.

1 Loosen the seal carriers, then remove the sideshifter frame from the truck as described in Section 4.2-1.

2 Remove the cylinder assembly from the frame assembly as described in Section 4.2-3.

3 In a soft jawed vise, clamp the cylinder assembly on the bracket.

CAUTION: Do not clamp on the cylinder shell.

4 With the cylinder rod centered, unscrew the seal carriers from each end of the cylinder shell. Slide the seal carriers off the cylinder rod.

NOTE: If installing new loaded (seals installed) seal carriers, proceed to Step 8 below.

5 Use a brass O-ring tool to remove seals and O-rings, as shown.

CAUTION: Do not scratch the seal grooves.

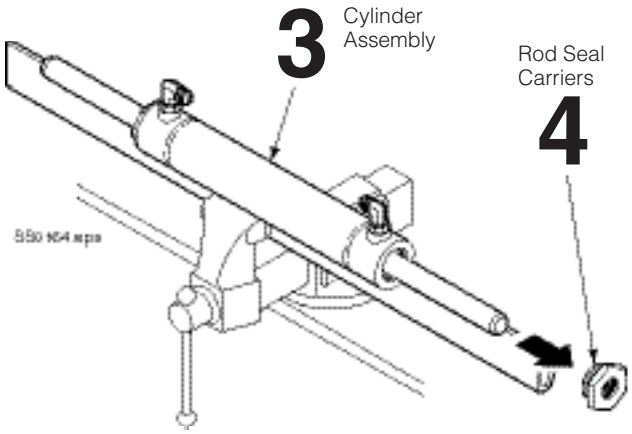
6 Clean the seal carrier and cylinder rod with cleaning solvent. Break any sharp edges on the cylinder rod end. Lubricate the new seals and O-rings with petroleum jelly.

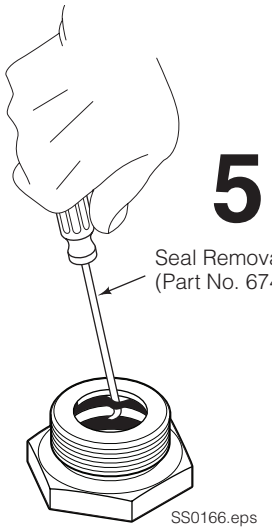
7 Install the seals into the seal carrier grooves. Form the seals into a 'kidney' shape to ease placement into the bore. Note the direction of the U-cup seals: **Pressure seals are installed with the lip toward the pressure side of the cylinder**, as shown.

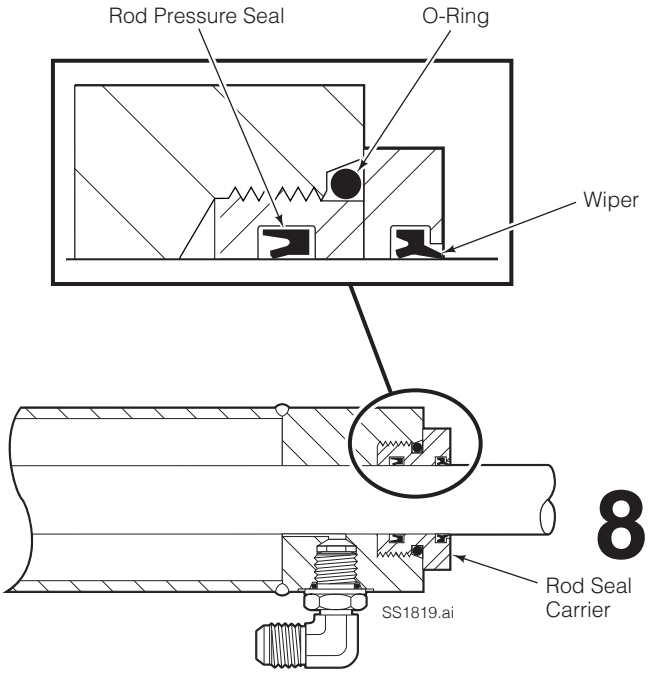
8 Apply a thick film of petroleum jelly to the inside of the seal carrier and slide onto the cylinder rod. Screw the seal carriers into the cylinder shell. Tighten to 160 ft.-lbs. (220 Nm).

9 For reassembly, reverse the above procedures with the following exceptions:

- Break any sharp edges on the cylinder rod end and clean with solvent.







4.3 Display Indicator Parameters

4.3-1 About

IMPORTANT: The display indicator's firmware version may have different parameters and setting options. The tables will note these differences in Section 4.3-4, 4.3-5 and 4.3-6. The firmware version can be determined by powering on the display indicator and noting the screen's third sequence number.

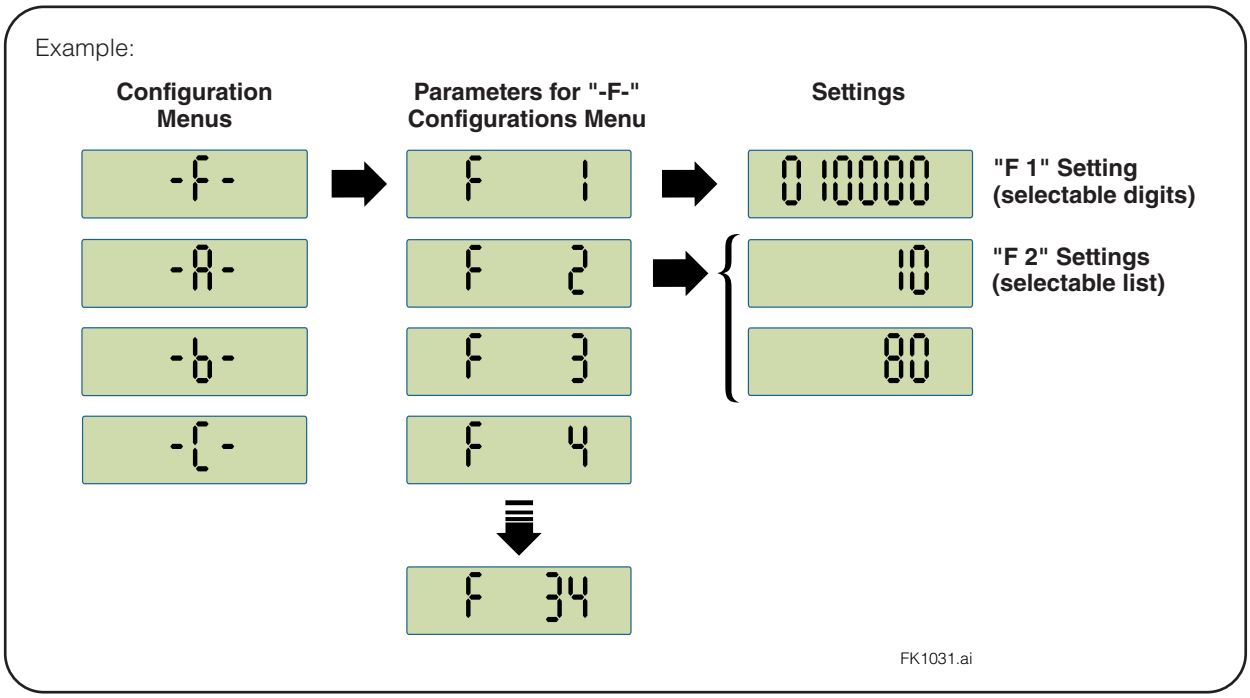
IMPORTANT: Parameters should only be changed by a certified scale technician or qualified service technician. Caution should be use when changing or adjusting parameters. Before making changes to the parameters, it is recommended to contact Cascade.

Legal for Trade units:

- When the F35 parameter is set a legal for trade option, this will lock out some scale features including piece counting and preset tare. Refer to Section 4.3-16 for requirements.
- Changing parameters will alter the calibration counter (CA) and/or the configuration number (CF). This may void the legal for trade certification issued by local metrology agencies (or approved qualifier). Refer to Section 4.3-16 for requirements.

Parameter Groups

Parameters are grouped into three configuration menus. Each configuration menu contains a list of numbered parameters. Each parameter contains selectable settings.



Configuration Menus

- **Menu "-F-" –** All scale related parameters including calibration procedures.
- **Menu "-A-" –** Communication parameters and other miscellaneous parameters.
- **Menu "-b-" –** All parameters relating to weighing modules.
- **Menu "-C-" –** Com2 communication parameters. This menu is available for units hardwired to the truck.

4.3 Display Indicator Parameters (continued)

4.3-1 About (continued)

Configuration Mode Button Functions

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Configuration Menus	Exit Configuration Menu	Enter Parameter (from Configuration Menu)	–	Show previous Configuration Menu	Show next Configuration Menu
Parameters	Exit Parameters and return to Configuration Menu	Enter Settings (from Parameters)	–	Show previous Parameter number	Show next Parameter number
Settings – Selectable Digits	Increase Digit	Decrease Digit	Accept Value	Shift to next digit, Left	Shift to next digit, Right
Settings – Selectable List	–	–	Accept Value	Show previous Setting	Show next Setting

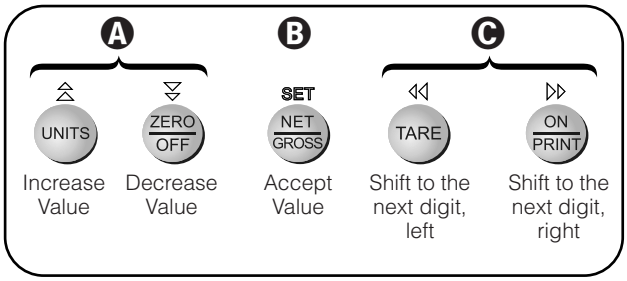
4.3-2 Accessing The Configuration Menus

1 With the display indicator powered off, press and hold the “ON/PRINT” button for approximately 20 seconds.

NOTE: If equipped with Auto-On jumper (display indicator will have a “J” decal located on the back), first hold the “NET/GROSS” button. Then press and hold the “UNITS” button for 20 seconds.

2 The screen will show 5 zeros with left most digit blinking. Refer to the button detail, below, to enter in the passcode “02201”.

3 After the passcode is entered, press the “NET/GROSS” button to accept.



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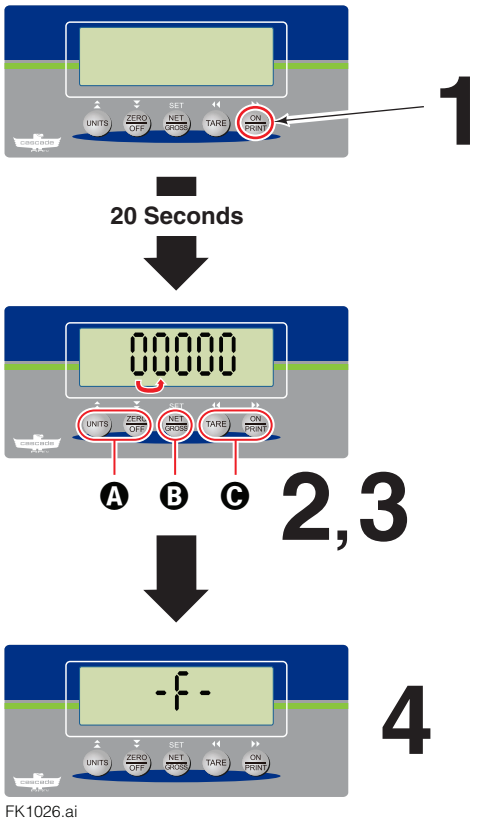
4 The display indicator will show “-F-”.

This procedure is continued on the next page



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4.3 Display Indicator Parameters (continued)

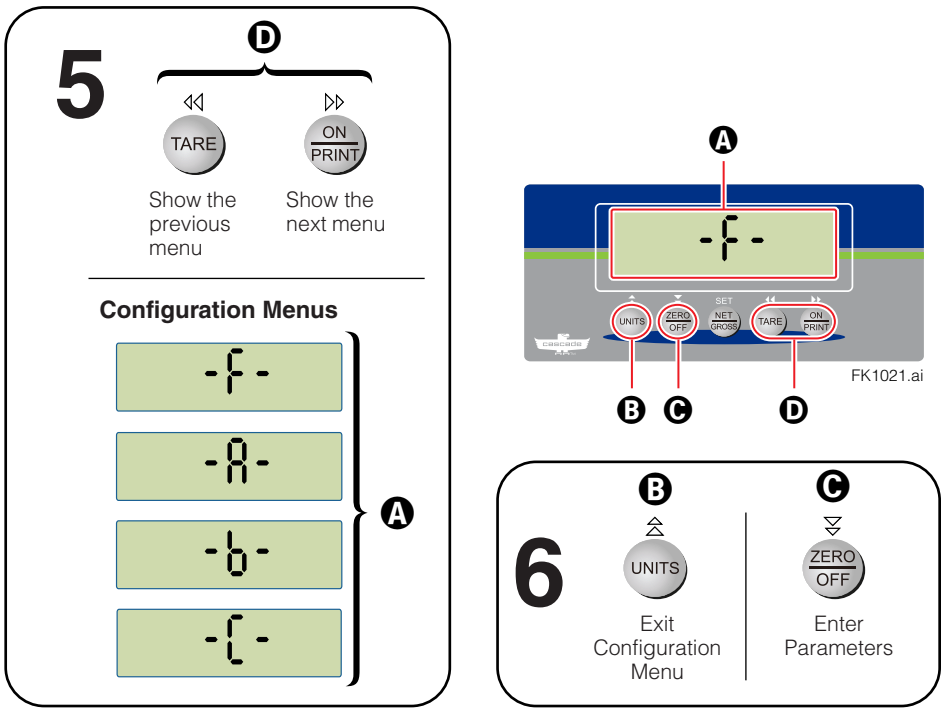
4.3-2 Accessing The Configuration Menus (continued)

5 Press the “ON/PRINT” button to view each available Configuration Menu. Pressing the “TARE” button will show the previous menu.

6 Press one of the following buttons:

“UNITS” – Exits the Configuration Menu. The display indicator will show “Set”, if changes were made to parameter settings, and then automatically power off.

“ZERO/OFF” – View the parameters of a Configuration Menu. Continue to the following section, Section 4.3-3.



4.3 Display Indicator Parameters (continued)

4.3-3 Configuration Menu Parameters

IMPORTANT: Changing some parameters can void Legal For Trade certification. Parameters are indicated in sections 4.3-4 and 4.3-6.

1 Access and choose a Configuration Menu, referring to Section 4.3-1.

2 Press the "TARE" and "ON/PRINT" buttons to view each parameter number.

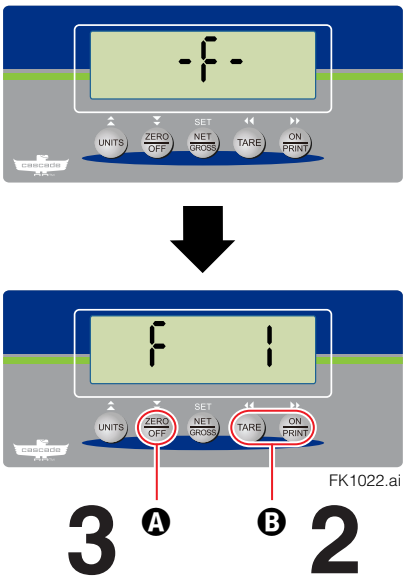
3 Press the "ZERO/OFF" button to view or change the parameter's setting. Refer to the following sections for a list of parameters and available settings:

Menu ("-F-") Parameters – Section 4.3-4

Menu ("-A-") Parameters – Section 4.3-5

Menu ("-b-") Parameters – Section 4.3-6

Menu ("-C-") Parameters (hardwired units only) – Section 4.3-7



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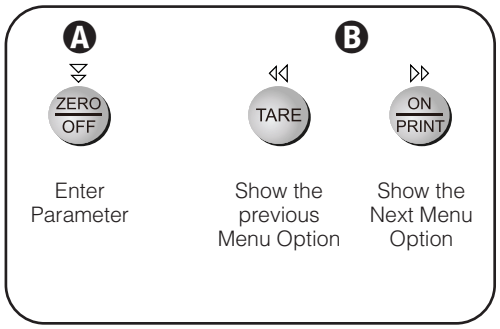
4 A value will show and can be changed using one of the following options:

- Selectable Digit – One digit will flash. The value can be changed within a set range, one digit at a time.
- Selectable List – The value has a list of settings to choose from.

This procedure is continued on the next page



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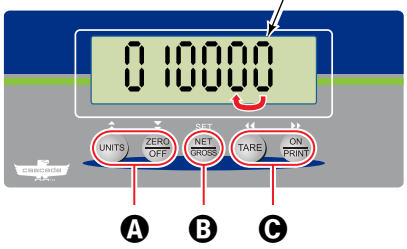
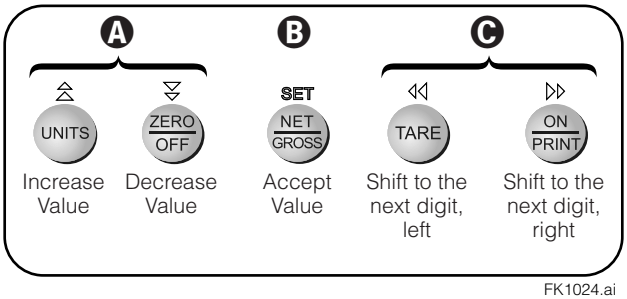
4,5

Example: F1

Selected digit will flash





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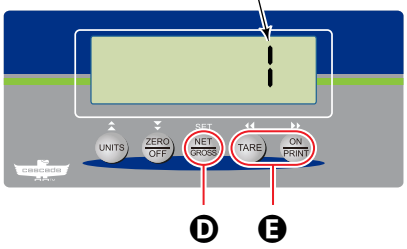
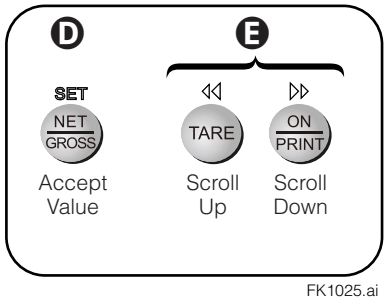
Example: F8

Current value selected





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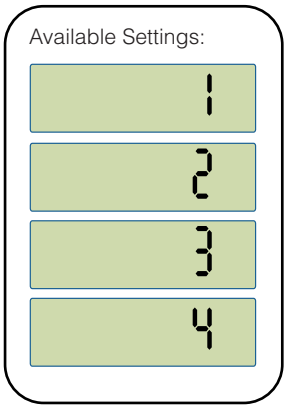

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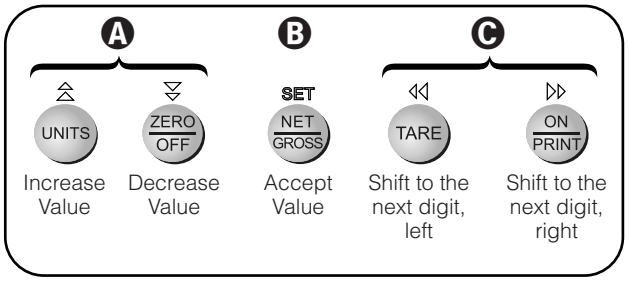
4.3 Display Indicator Parameters (continued)

4.3-3 Configuration Menu Parameters (continued)

4 (continued)

NOTE: For numeric values greater than 6 digits, an annunciator arrow will show on the bottom right of the screen, to designate 1,000,000. For example, if 268641 is showing and the annunciator arrow is present, the value is actually, 1,268,641.

To view these values, press the "NET/GROSS" button to step through each screen. The lower 6 digits are identified with "Ld-6" and the upper digits are identified with "hd-2". To change a value, use the buttons, as shown, if applicable.



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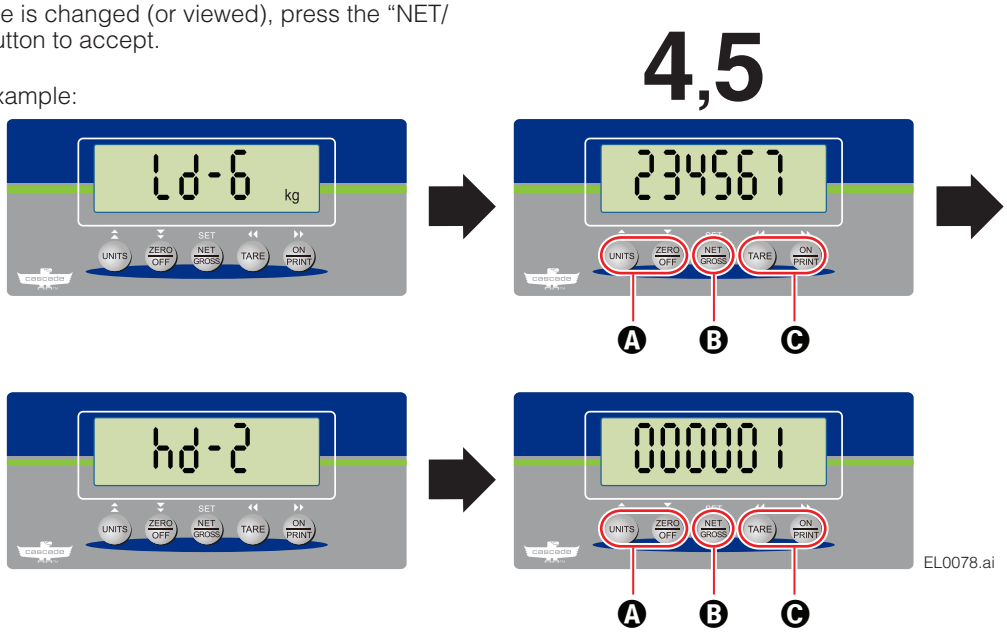
5 After a value is changed (or viewed), press the "NET/GROSS" button to accept.

Example:



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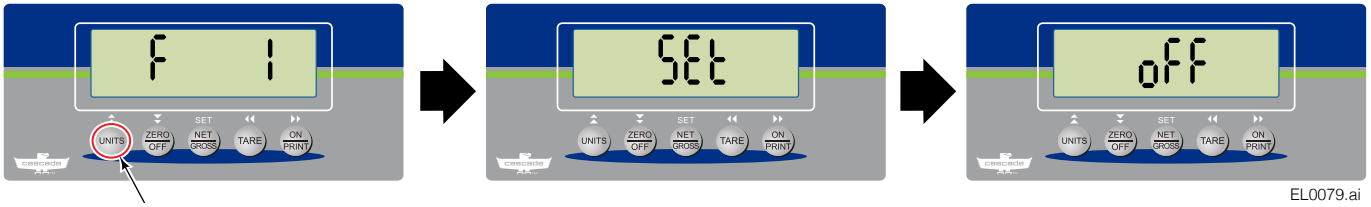
6 After the setting is accepted, the display indicator will return to the parameter showing the current parameter number. Repeat Steps 2 through 5 for each parameter setting to be changed.

7 Press the "UNITS" button two times to save and exit Configuration Mode.

8 The display indicator will show "SEt" and automatically power off.



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4.3 Display Indicator Parameters (continued)

4.3-4 Menu "-F-" Parameters

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
F1	**Graduations –** Number of full-scale graduations (capacity / division). The value must be consistent with legal regulations and environmental limits.	2750	100 – 50000
F2	**Sampling Rate –** Sampling rate in Hertz (per second). Most applications use 10 Hz. For a fast response time, use 80 Hz.	10	10, 80
F3 Ⓐ	**Zero Track Band –** Range for scale to automatically zero. Scale must be in standstill to automatically zero.	0.5d	OFF, 0.25d, 0.5d, 0.6d, 1d, 3d, 5d (d = divisions)
F4 Ⓐ	**Zero Range –** Percentage value (and below) the scale capacity to accept the display indicator's zero button command. Scale must be in standstill to zero.	100	0 – 100 (percentage)
F5	**Motion Band (Motion detection level) –** When no motion is detected on the scale, printing or zeroing can be performed.	1d	OFF, 0.25d, 0.5d, 1d, 3d, 5d (d = divisions)
F6	**Digital Filter –** Average weight reading for higher stability. Speed is selected based on application	nnEd	FAST = fast, nned = medium, SLo = slow
F7 Ⓐ	**Overload Limit –** Determine the point the display indicator shows overload. Selections should be based on the primary unit selected in F8.	FS + 2%	FS (FS=Full Scale Capacity), FS + 2%, FS + 5%, FS + 1d, FS + 9d,
F8	**Calibration Units –** Select the primary base unit to be used in the calibration process. This is also the default unit for normal operation.	1	Primary Unit: 1 = lb, 2 = kg, 3 = oz, 4 = g
F9	**Display Indicator Divisions –** Select the weight increments. The value must be consistent with legal regulations.	2	1, 2, 5
F10	**Decimal Point –** Select the location of the decimal point.	0	0, 0.0, 0.00, 0.000, 0.0000, 00
F11	**Number Of Load Cell Wires –** Select the number of wires on the load cells to be connected to the display indicator (hardwired versions only).	4	4 wires, 6 wires (SENSE)
F12	**Percentage Hold Weight –** Select the percentage weight change of the displayed hold value before the scale unlocks and relocks onto the new weight.	10%	5%, 10%, 20%, 50%, 75%, 100%
F13	**Gravity (g) –** Based on location of the scale system, select the gravity (g), in m/s^2.	9.797	9.750 – 9.850

Ⓐ If a legal for trade option is enabled (F35), these parameters have set values. Refer to 4.3-16

4.3 Display Indicator Parameters (continued)

4.3-4 Setup Menu, "-F-" Parameters (continued)

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
F14	**Power-On Zero (IZSM) –** Enable or disable power-on zero (IZSM) when within the maximum allowable range.	yE5	yE5 = enable IZSM, no = disable IZSM
F16	**Zero Calibration –** Perform zero calibration sequence. Refer to Section 4.4-4.		
F17	**Weight (Span) Calibration –** Perform weight (span) calibration sequence. Refer to Section 4.4-5.		
F18	**View Calibration –** View both zero and weight (span) calibration values. The values displayed are valid only after calibration has been successfully completed. Refer to Section 4.4-6.		
F19	**Key-In Zero –** In the event of memory loss, the zero calibration value can be keyed in. Refer to Section 4.4-8.		
F20	**Key-In Weight (Span) –** In the event of memory loss, weight (span) calibration value can be keyed in. Refer to Section 4.4-8.		
F21	**Factory Reset (US) (keep calibration) –** Reset all parameters in the "F" and "A" menus to the default settings. Calibration data will not be overwritten. **Use with caution.** Refer to Section 4.3-13.		
F22	**Factory Reset (EU) (keep calibration) –** Reset all parameters in the "F" and "A" menus to the default settings. Calibration data will not be overwritten. **Use with caution.** Refer to Section 4.3-13.		
F23	**Full Factory Reset (reset calibration) –** Reset all system parameters to the default settings. **Calibration data will be overwritten. Use with extreme caution.** Refer to Section 4.3-14.		
F25 Ⓐ	**Set Point Function –** Select the number of set point functions and relay outputs.	0	0 = off 1 = Gross Weight trigger with two Set Points Ⓑ 2 – 10 = undefined
F26 Ⓐ	**Multi-Interval Segments –** Select the number of multi-interval segments.	1	0 = None (No multi-interval), 1, 2

Ⓐ **IMPORTANT:** Changing this parameter may void Legal For Trade certification.

Ⓑ During normal operation, Set Point values can be changed. Contact Cascade for settings these values.

4.3 Display Indicator Parameters (continued)

4.3-4 Setup Menu, "-F-" Parameters (continued)

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
F27	**Number of Scale Divisions WS1 –** Number of divisions used for Weighing Segment 1 (WS1). Selections should be based on F1, F9 and F10 settings.	1000	100 – 50000
F28	**Number of Scale Divisions WS2 –** Number of divisions used for Weighing Segment 2 (WS2). Selections should be based on F1, F9 and F10 settings	0	100 – 50000
F29	**Load Cell Input –** Select load cell input source.	dJb	AdC = Internal A/D (cabled), 1rAdIo = One external wireless A/D modules, 2rAdIo = Two external wireless A/D modules, dJb = Digital junction box
F30	**Special Application –** Select one special application feature. Application must be consistent with legal regulations. **NOTE:** Settings "1" and "3" are only available if F35 is set to "nonE".	0	0 = None (Gross/Net) 1 = Totaling 2 = Remote Indicator 3 = Sampling Weight (Piece Count) 5 = Hold 6 = Activate Set Point
F31	**Gross Zero Band –** Range for scale to automatically clear the tare and switch to gross mode. Scale must be in standstill.	00	0 –10 divisions (d) 0 = disabled
F32	**Center of Zero Band –** Range of display indicator to show the center of zero indication >0<.	0.25d	0.25d, 0.5d (d = divisions)
F34	**Auto Print Minimum Weight –** Select auto print function minimum weight.	001	0 – 100 divisions (d) 0 = disabled
F35	**Legal Metrology –** Select the legal metrology rules to abide to. **IMPORTANT:** When setting the Legal Metrology (F35) parameter, some parameters will be locked to meet legal metrology requirements. Refer to Section 4.3-15.	nonE	nonE = Not legal for trade ntEP = NTEP (US) OinnL = OIML (EU or other Member State) Ⓐ nnc = MC (Measurement Canada) Ⓑ
F36	**Preset Tares –** Program up to 6 preset tare values. Refer to Section 4.3-9. **NOTE:** This is setting is only available if F35 is set to "nonE".	0	
F37	**Preset Average Piece Weights (APWs) –** Program up to 6 preset average piece weights (APWs) values. Refer to Section 4.3-10. **NOTE:** This is setting is only available if F35 is set to "nonE".	0.000	

Ⓐ If F35 is set to "Oinnl", F30 "3" and F 36 are disabled. Refer to Section 4.3-15 "Legal for Trade Requirements".

Ⓑ If F35 is set to "nnc", F30 "5" will be disabled and F32 will not be active. Refer to Section 4.3-15 "Legal for Trade Requirements".

4.3 Display Indicator Parameters (continued)

4.3-5 User Menu, "-A-" Parameters

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
A1	**Baud Rate –** Select baud rate for data transmission through serial port.	9600	600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
A2	**Data Bits, Parity and Stop Bits –** Select the number of data bits and parity of serial transmission.	8_n_1	8_n_1 = 8 data bits with no parity and one stop bit, 8_n_2 = 8 data bits with no parity and two stop bits, 7_n_1 = 7 data bits with no parity and one stop bit, 7_n_2 = 7 data bits with no parity and two stop bits, 7_E_1 = 7 data bits with even parity and one stop bit, 7_E_2 = 7 data bits with even parity and two stop bits, 7_o_1 = 7 data bits with odd parity and one stop bit, 7_o_2 = 7 data bits with odd parity and two stop bits
A3	**Serial Port Mode –** Select the mode of the serial port.	0	0 = Demand Full Duplex, 1 = Continuous Full Duplex, 2 = Auto Print, 3 = RFID, 4 = Test and Measurement, 5 = 0-20 mA output, 6 = 0-10 mA output
A4	**MP-20 Print Header –** Print header information (MP-20 Printer). A6 selections should be set to "2" or "4".	0	0 = Do not print header 1 = Print header
A5	**UNITS Button –** Enable or disable "UNITS" button. **NOTE:** Ounces and grams (F8) disables the "UNITS" button.	yE5	no = Disabled, yE5 = Enabled
A6	**Output String –** Select output string for serial port.	0	0 = String Format 1 (Condec Demand), 1 = String Format 2 (Condec Continuous), 2 = Text Print Ticket, 3 = Text Print Ticket with MP-20 Auto Label Feed, 4 = Dot Matrix Printer, 5 = Thermal Receipt Printer, 6 = Label Printer, 7 = Bluetooth Option, 8 = Bluetooth Option + Thermal Receipt Printer, 9 = Dot Matrix Printer with WiFi
A7	**ID Number –** Enable or disable ID number mode	no	no = Disabled, yE5 = Enabled
A8	**Set ID Number –** Enter in ID number.	123456	0 to 999999
A9	**Line Feeds –** Enter in the number of line feeds.	08	0 to 99

4.3 Display Indicator Parameters (continued)

4.3-5 User Menu, "-A-" Parameters (continued)

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
A10	**Display Indicator Auto Power Off –** Enter the number of minutes that the display indicator and weigh system is inactive, the display indicator will power off.	5	0 to 30
A11	**Hold Mode –** Enable automatic, manual or peak hold to capture a weight of an unstable load and lock the value on the display indicator. Parameter F30 setting "5" must be selected.	0	0 = Off 1 = Automatic 2 = Manual 3 = Peak Hold
A13	**Handshaking –** Enable or disable hardware handshaking function.	0	0 = Disabled, 1 = Enabled
A14	**Backlight –** Configure the amount of time (in minutes), the screen is inactive to keep the backlight on.	01	00 to 99 (00 = backlight remains on indefinitely)
A18	**Date –** Enable or disable date printout	no	no = Disabled, yE5 = Enabled
A19	**Date Format –** Select date format.	USA	USA = mm/dd/yy IntL = dd/mm/yy
A20	**Set System Time & Date –** Set the system time and date. Refer to Section 4.3-8.		
A22	**Display Indicator Low Battery Auto Power Off –** Enter the number of minutes that the display indicator will power off after the low battery icon appears.	10	0 to 99
A25	**Decimal Point –** Select type decimal point character	0	0 = Period ('.') 1 = Comma (',')
A30	**Upload EID Database –** Configure the transmit function for EID database information to go through RFID serial for mode (A3).		
A31	**Clear EID Database –** Clear stored EID database information.		
A33	**Level Sensor Calibration –** Calibrate the angle span, zero reference and angle limit. Refer to Section 4.4-6.		
A34	**Level Sensor Setting –** Level sensor compensation.	2	0 = Disable level sensor, 1 = Compensation with no angle limits, 2 = Compensation with legal for trade limits 3 = Legal for trade limits with no compensation

4.3 Display Indicator Parameters (continued)

4.3-6 Bluetooth Menu, "-B-" Parameters

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
B1	**Adjust Load Cell A –** Adjust the digital corner compensation factor for load cell A. **IMPORTANT:** Perform Parameter B10 before changing this parameter setting.	5.0000	4 to 6
B2	**Adjust Load Cell B –** Adjust the digital corner compensation factor for load cell B. **IMPORTANT:** Perform Parameter B10 before changing this parameter setting.	5.0000	4 to 6
B3	**Adjust Load Cell C –** Adjust the digital corner compensation factor for load cell C. **IMPORTANT:** Perform Parameter B10 before changing this parameter setting.	5.0000	4 to 6
B4	**Adjust Load Cell D –** Adjust the digital corner compensation factor for load cell D. **IMPORTANT:** Perform Parameter B10 before changing this parameter setting.	5.0000	4 to 6
B6	**Back-up/Recover –** Back-up or restore all parameters and calibration settings from non-volatile memory. A back-up is always created at the factory, but a new back-up can be created if the unit is re-calibrated in the field. Refer to Section 4.3-11.		
B8	**Digital Junction Box Auto Power Off –** Time before the junction box will automatically shut off when not connected to the display indicator. **Note:** When the junction box battery is low it will always shut off after 10 minutes.	3	0 = Off 1 = 30 minutes 2 = 1 hour 3 = 2 hours
B9	For Cascade Use Only		
B10	**Digital Corner Calibration –** Perform digital corner calibration sequence. Refer to Section 4.4-3.		
B11	**Bluetooth Pairing –** Pair the junction box to the display indicator. Refer to Section 4.5.		
B20	For Cascade Use Only		
B21	For Cascade Use Only		
B22	For Cascade Use Only		
B23	For Cascade Use Only		

4.3 Display Indicator Parameters (continued)

4.3-6 Bluetooth Menu, "-B-" Parameters (continued)

Parameter Number	Name – Description	Default Setting	Available Parameter Settings
B24	For Cascade Use Only		
B25	For Cascade Use Only		
B26	For Cascade Use Only		
B27	For Cascade Use Only		
B30	**Weigh in Motion (WIM) –** Turns the weigh in motion feature on or off.	no	yE5 = Enabled, no = Disabled
B31	**WIM Latch Value –** The minimum value, d, to latch and unlatch. A live weight will show when below the value. The minimum weight value is F9 multiplied by B31. **Example:** If F9 = 2 and B31 = 20, 2 x 20 = 40 lbs. The display indicator will show a live weight until it exceeds 40 lbs.	0020	2 to 200
B32	**WIM Latch Level –** Changes sensitivity of WIM filter. Choosing a higher value will increase accuracy and decrease latch speed.	4	1 to 5

4.3 Display Indicator Parameters (continued)

4.3-7 Com2 Menu, "-C-" Parameters

The following parameters are available for units hardwired to the truck.

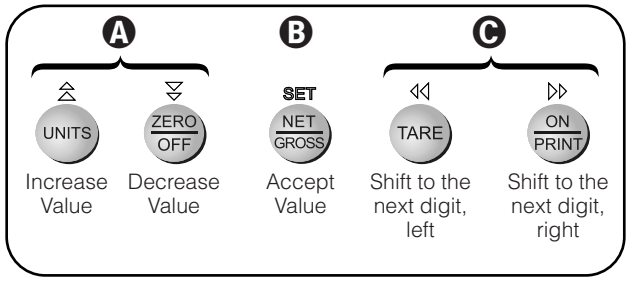
Parameter Number	Name – Description	Default Setting	Available Parameter Settings
C1	**Baud Rate –** Select baud rate for data transmission through serial port.	9600	600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
C2	**Data Bits, Parity and Stop Bits –** Select the number of data bits and parity of serial transmission.	8_n_1	8_n_1 = 8 data bits with no parity and one stop bit, 8_n_2 = 8 data bits with no parity and two stop bits, 7_n_1 = 7 data bits with no parity and one stop bit, 7_n_2 = 7 data bits with no parity and two stop bits, 7_E_1 = 7 data bits with even parity and one stop bit, 7_E_2 = 7 data bits with even parity and two stop bits, 7_o_1 = 7 data bits with odd parity and one stop bit, 7_o_2 = 7 data bits with odd parity and two stop bits
C3	**Serial Port Mode –** Select the mode of the serial port.	0	0 = Demand Full Duplex, 1 = Continuous Full Duplex, 2 = Auto Print, 3 = RFID, 4 = Test and Measurement
C6	**Output String –** Select output string for serial port.	0	0 = String Format 1 (Condec Demand), 1 = String Format 2 (Condec Continuous), 2 = Text Print Ticket, 3 = Text Print Ticket with MP-20 Auto Label Feed
C9	**Line Feeds –** Enter in the number of line feeds.	08	0 to 99
C13	**Handshaking –** Enable or disable hardware handshaking function.	0	0 = Disabled, 1 = Enabled

4.3 Display Indicator Parameters (continued)

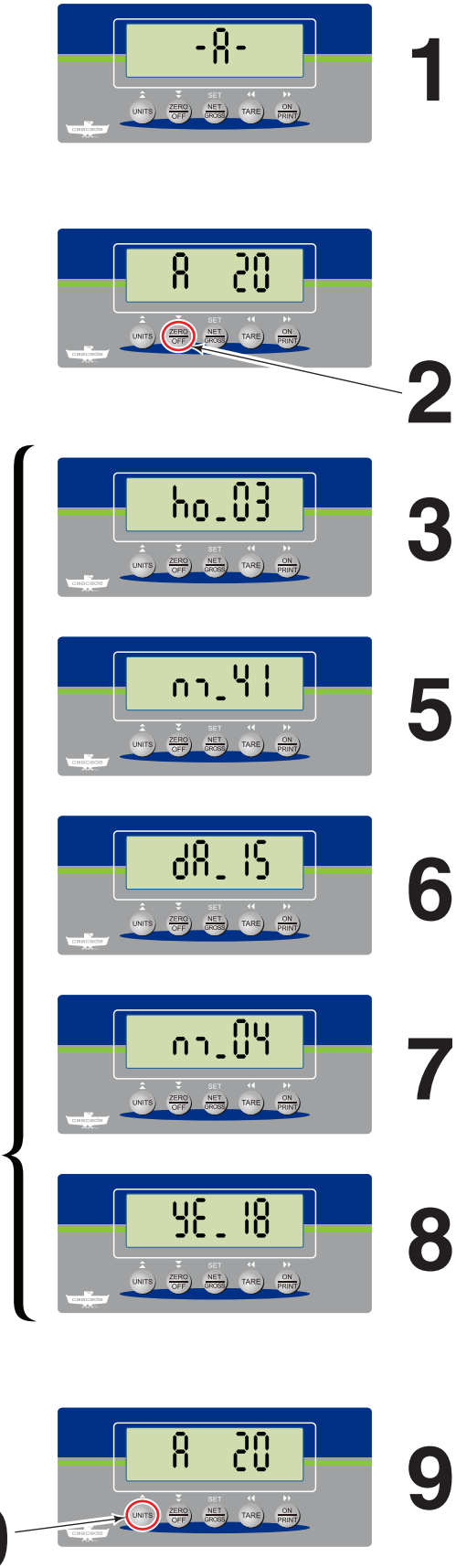
4.3-8 Set (or Change) Time and Date

1. Access the Configuration Menu and Menu "-A-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter number "A 20".
2. Enter Parameter Setting "A 20", by pressing the "ZERO/ OFF" button.
3. The screen will show "ho_XX" where "XX" is the display indicator's current hour (example "03"). One digit will be flashing.
4. Refer to "Configuration Mode Button Functions" (below) to change the current hour to the actual hour.
5. Once the hour value is accepted, the display indicator will show the current minute. Change the current minute to the actual minute.
6. Once the minute value is accepted, the display indicator will show the current day. Change the current day to the actual day.
7. Once the day value is accepted, the display indicator will show the current month. Change the current month to the actual month.
8. Once the month value is accepted, the display indicator will show the current year. Change the current year to the actual year,
9. The display indicator will revert to parameters, showing "A 20".
10. Press the "UNITS" button **two** times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.

Configuration Mode Button Functions



FK1024.ai



FK0583.eps

4.3 Display Indicator Parameters (continued)

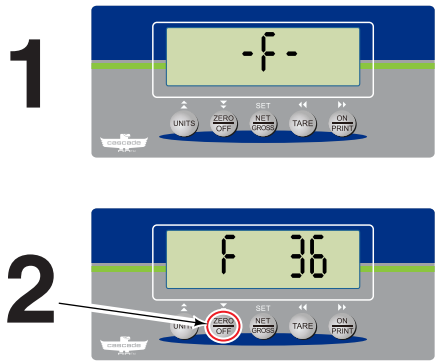
4.3-9 Programming Preset Tare Values

NOTE: Preset tares are not available for legal for trade models. Verify that “F 35” is set to “none”.

1 Access the Configuration Menu and Menu “-F-” as described in Section 4.3-1 and 4.3-2. Navigate to parameter number “F 36”.

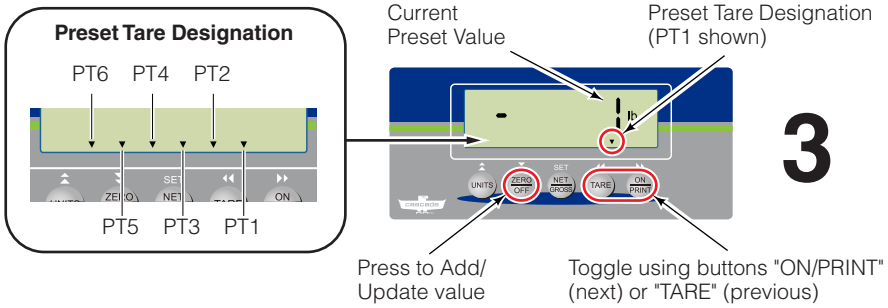
2 Enter Parameter Setting “F 36”, by pressing the “ZERO/OFF” button.

3 Use the “ON/PRINT” (next) and “TARE” (previous) buttons to view each preset tare (default values are “ -1” lb). An arrow at the bottom of the screen and its position, shows which preset tare value is shown. Press the “ZERO/OFF” button to add (or update) a preset tare value. If only viewing tare values, continue to Step 7.

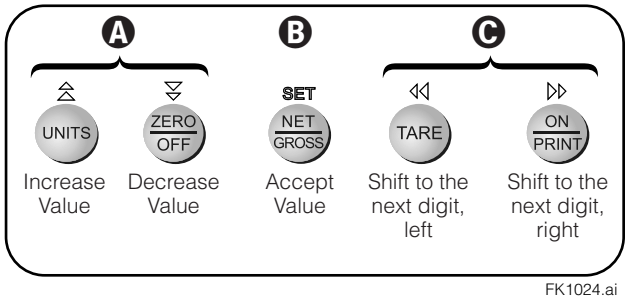


Record PT values:

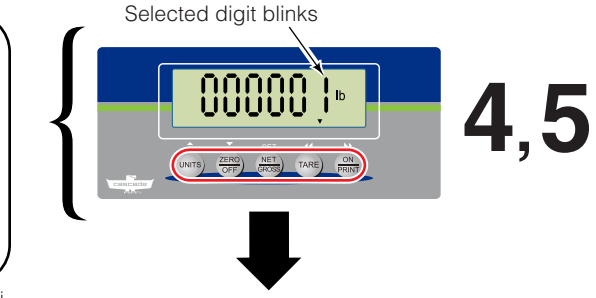
PT1	
PT2	
PT3	
PT4	
PT5	
PT6	



Configuration Mode Button Functions



FK1024.ai



4 The right most digit will blink. Refer to “Configuration Mode Button Functions” for adding (or updating) the value.

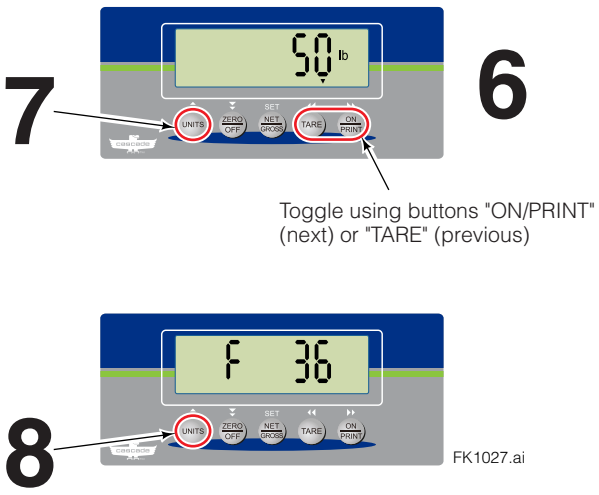
NOTE: The weight’s units must match the units of the display indicator. Refer to Parameter F8, Section 4.3-4.

5 After the value is added (or updated), press the “NET/GROSS” button to accept.

6 Continue to the next preset tare value, by repeating Steps 3 through 5.

7 When all values are added (or updated or viewed), press the “UNITS” button. The display indicator will revert to parameters, showing parameter “F 36”.

8 Press the “UNITS” button two times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.



FK1027.ai

4.3 Display Indicator Parameters (continued)

4.3-10 Programming Preset Average Piece Weight (APW) Values

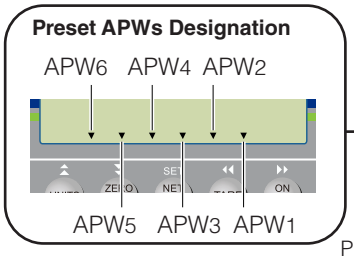
NOTE: Piece counting (sampling) is not available for legal for trade models. Verify that "F 35" is set to "none".

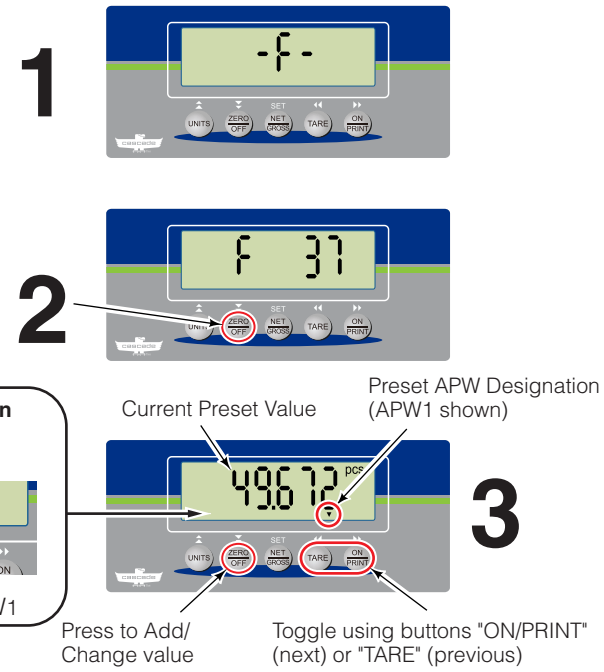
1 Access the Configuration Menu and Menu "-F-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter number "F 37".

2 Enter Parameter Setting "F 37", by pressing the "ZERO/OFF" button.

Record APW values:

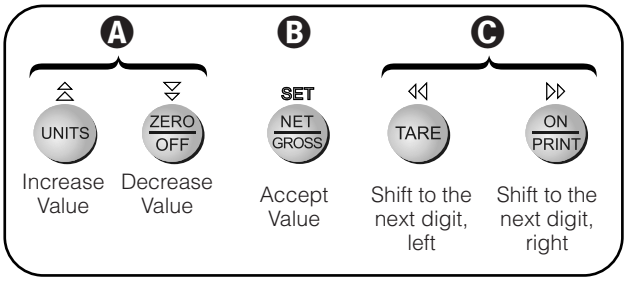
APW1	
APW2	
APW3	
APW4	
APW5	
APW6	





3 Use the "ON/PRINT" (next) and "TARE" (previous) buttons to view each preset APW (49.672 lb. is the default value). An arrow at the bottom of the screen and its position, shows which preset APW value is shown. Press the "ZERO/OFF" button to add (or update) the value. If only viewing APW values, continue to Step 7.

Configuration Mode Button Functions



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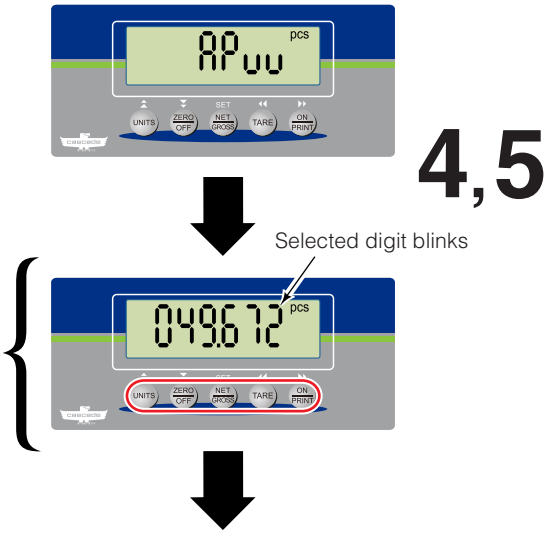


4 The screen will show "APW" momentarily and then how the value with the far right digit blinking. Refer to "Configuration Mode Button Functions" for adding a preset tare value.

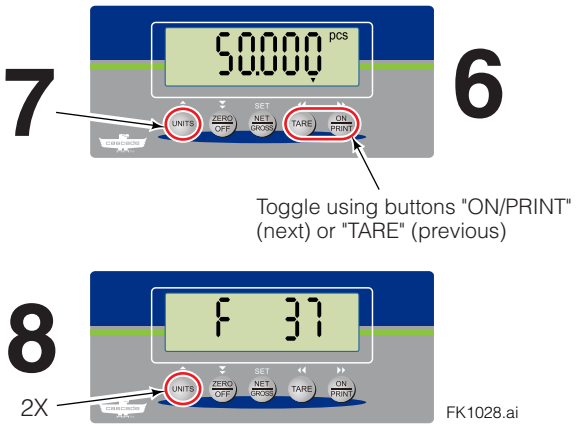
NOTE: The weight's units must match the units of the display indicator. Refer to Parameter F8, Section 4.3-4.

5 After a value is added (or updated), press the "NET/GROSS" button to accept.

6 Continue to the next value, as required, by repeating Steps 3 through 5.

7 When all values are added (updated, or viewed), press the "UNITS" button. The display indicator will revert to parameters, showing parameter "F 37".

8 Press the "UNITS" button two times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.



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4.3 Display Indicator Parameters (continued)

4.3-11 Recover Parameters/Calibration

1 Access the Configuration Menu and Bluetooth Menu "-b-" as described in Section 4.1-1 and 4.1-2. Navigate to parameter "b 6".

2 Press the "ZERO/OFF" button to enter parameter "b 6".

3 The screen will show 5 zeros with left most digit blinking. Refer to the button detail, below, to enter in the passcode “02501”.

4 After the passcode is entered, press the “NET/GROSS” button to accept.

Configuration Mode Button Functions

UNITS	ZERO OFF	SET NET GROSS	TARE	ON PRINT
Increase Value	Decrease Value	Accept Value	Shift to the next digit, left	Shift to the next digit, right

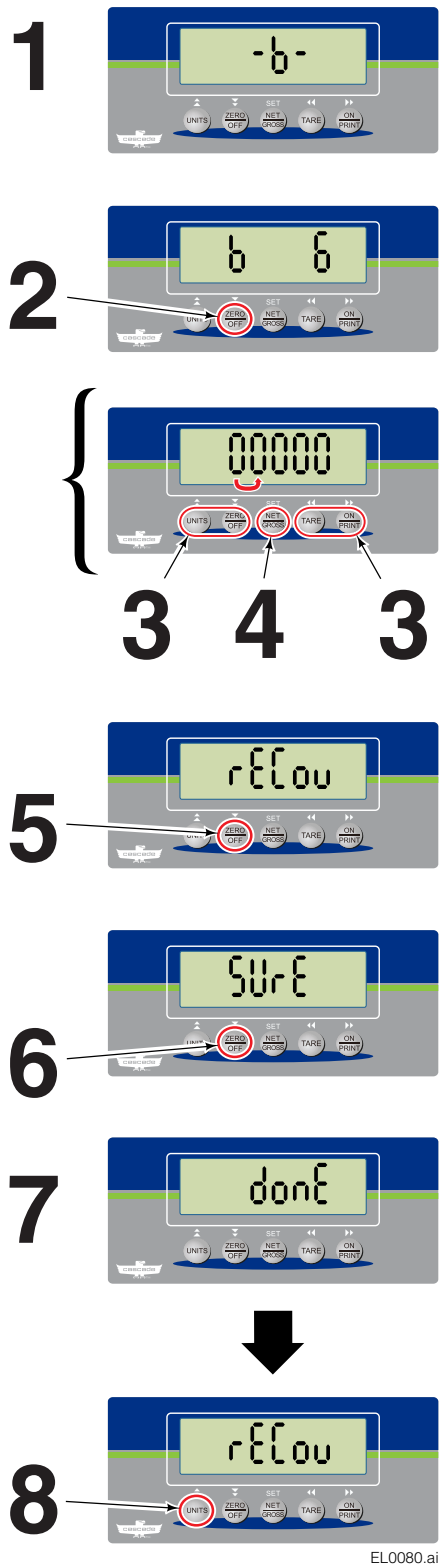
FK1041.ai

5 The screen will show “rECou”, press the "ZERO/OFF" button.

6 The screen will show “SUrE”. To confirm calibration recovery, press the "ZERO/OFF" button.

7 When completed, the screen will show "donE", then "rECou".

8 Press the "UNITS" button 3 times to save, exit and shut off the display indicator.



EL0080.ai

4.3 Display Indicator Parameters (continued)

4.3-12 Back-up Parameters/Calibration

NOTE: The default factory settings are backed up before shipping. The following procedure can be used to back up new calibration and settings in the field if changes are made to the unit.

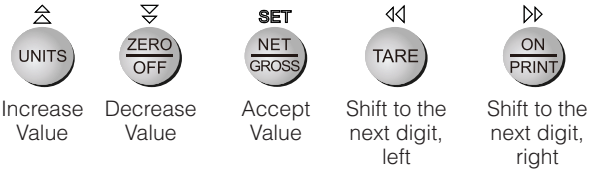
1 Access the Configuration Menu and Bluetooth Menu "-b-" as described in Section 4.1-1 and 4.1-2. Navigate to parameter "b 6".

2 Press the "ZERO/OFF" button to enter parameter "b 6".

3 The screen will show 5 zeros with left most digit blinking. Refer to the button detail, below, to enter in the passcode “02501”.

4 After the passcode is entered, press the “NET/GROSS” button to accept.

Configuration Mode Button Functions



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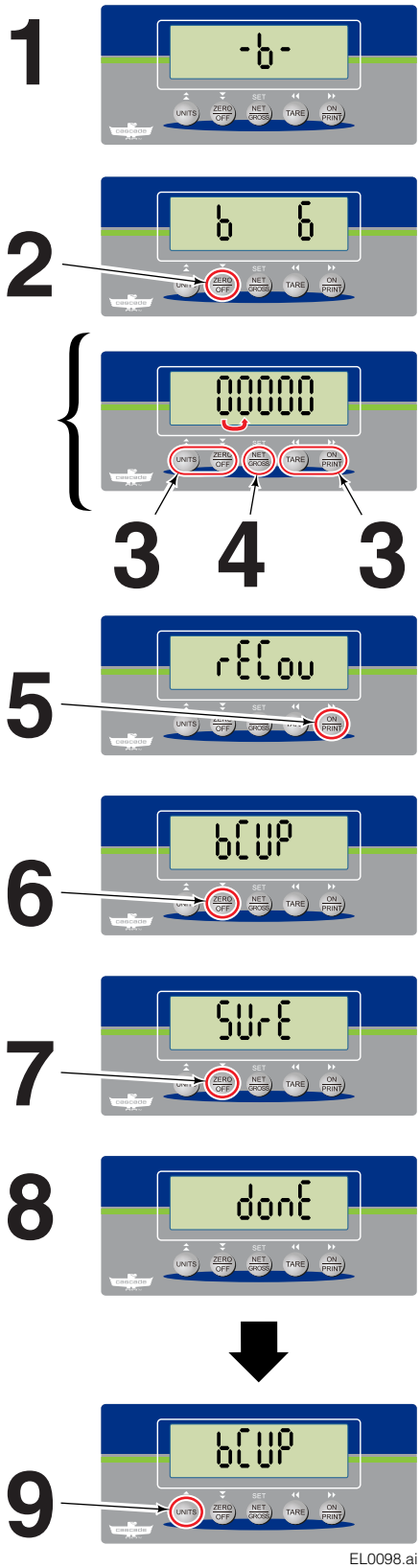
5 The screen will show “rECou”, press the "ON/PRINT" button.

6 The screen will show “bCUP”, press the "ZERO/OFF" button.

7 The screen will show “SUrE”. To confirm back-up parameters/calibration, press the "ZERO/OFF" button.

8 When completed, the screen will show "donE", then "bCUP".

9 Press the "UNITS" button 3 times to save, exit and shut off the display indicator.



EL0098.ai

4.3 Display Indicator Parameters (continued)

4.3-13 Reset Only Parameter Settings

IMPORTANT: The following procedure resets parameters to **default** settings and keeps calibration data. This procedure can not be undone.

1 Access the Configuration Menu and Menu "-F-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "F 21" (US) or "F 22" (EU).

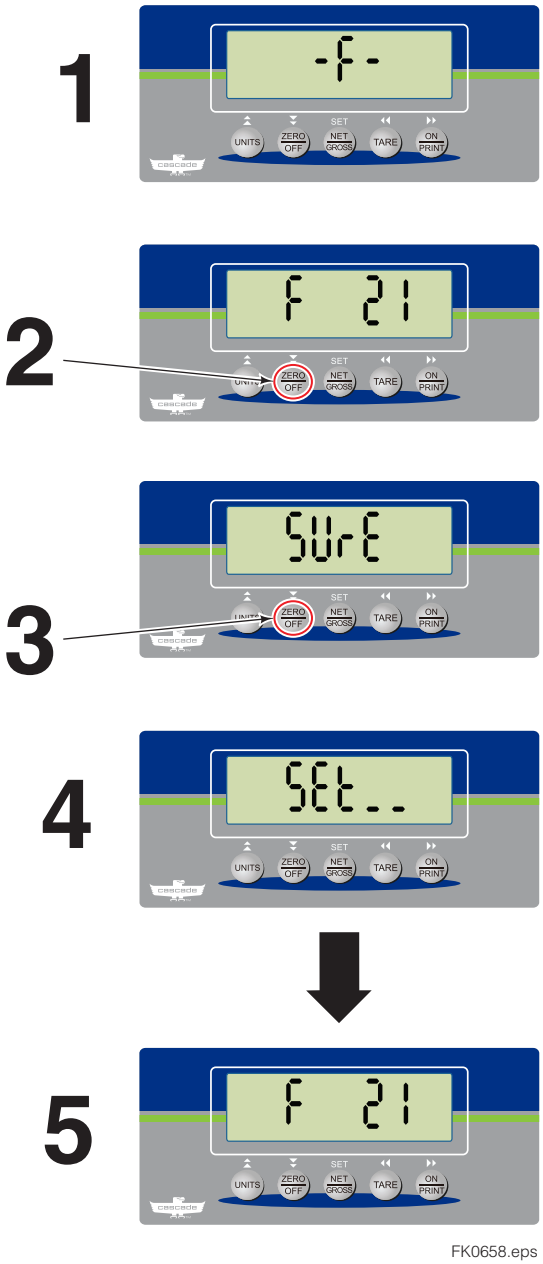
2 Press the "ZERO/OFF" button to enter parameter "F 21" (US) or "F 22" (EU).

3 The display indicator will show "SUrE" to proceed with reset. Press the "ZERO/OFF" button to confirm reset.

4 The display indicator will show "Set__" for approximately 2 seconds.

5 The display indicator will revert to parameters, showing parameter "F 21" (US) or F 22 (EU).

6 Press the "UNITS" button two times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.



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4.3 Display Indicator Parameters (continued)

4.3-14 Full Reset

IMPORTANT: The following procedure resets all parameters to default and erases calibration data. This procedure can not be undone. Use with extreme caution.

1 Access the configuration menus and Menu "-F-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "F 23".

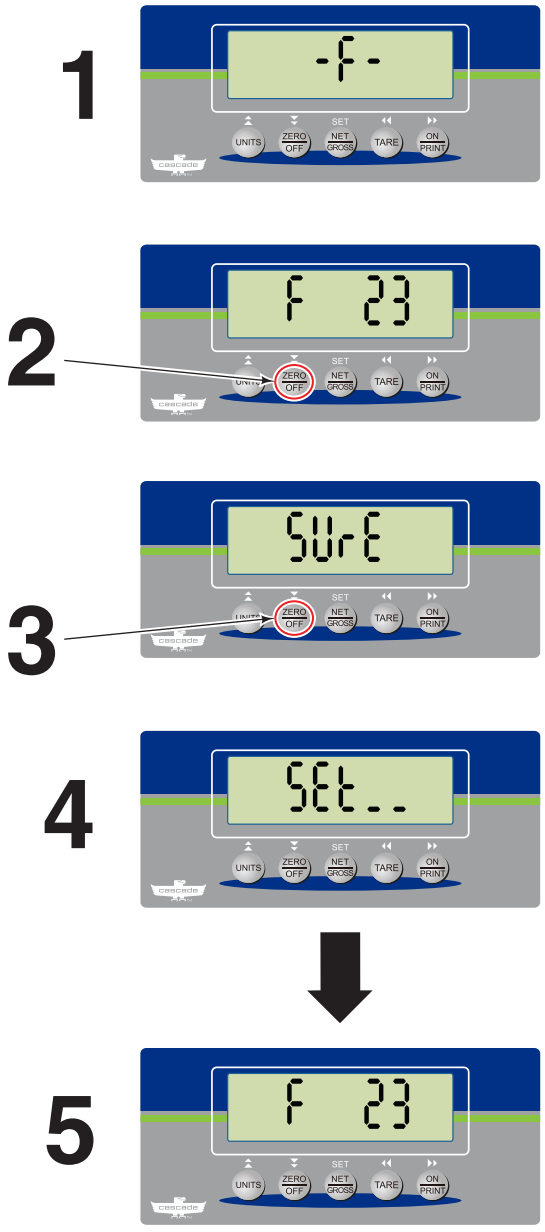
2 Press the "ZERO/OFF" button to enter parameter "F 23".

3 The display indicator will show "SUrE" to proceed with reset. Press the "ZERO/OFF" button to confirm reset.

4 The display indicator will show "Set__" for approximately 2 seconds.

5 The display indicator will revert to parameters, showing parameter "F 23".

6 Press the "UNITS" button two times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.



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4.3 Display Indicator Parameters (continued)

4.3-15 Legal for Trade Requirements

A local governing body may require parameters or settings to be disabled in order to meet trade regulations. Refer to the following tables for a summary. In Table A, if F35 is changed to NTEP, OIML or MC, the parameters listed after will either require change or will be automatically be disabled.

Table A – Parameters

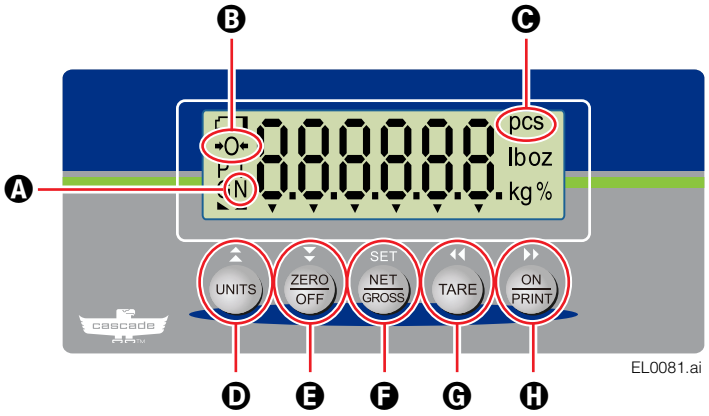
Parameter Number	Parameter Name	Setting Requirements and Description	
		NTEP	OIML
F35	Legal Metrology	ntEP	OinnL
F8	Calibration Units	—	2 (kg units)
F3	Zero Track Band	0.5d	0.25d
F4	Zero Range	2 (2%)	2 (2%)
A5	UNITS Button	yE5 (Enable UNITS button)	no (Disable UNITS button)
F7	Overload Limit	—	9d (full scale load + 9 divisions)
F30	Special Application	See Table B	
F32	Zero Indication	—	0.25d
F36	Preset Tares	Disabled	Disabled
F37	Preset Average Piece Weights (APWs)	Disabled	Disabled
A34	Correction Sensor Setting	2 (Compensation with 3° limit)	3 (No compensation with 1° limit)

Table B –Special Application features (Parameter F30)

0	Gross/Net	—	—
1	Totaling	Disabled	Disabled
2	Remote Indicator	—	—
3	Sampling Weight (Piece Count)	Disabled	Disabled
5	Hold	Disabled	Disabled
6	Set Point	—	—

4.3 Display Indicator Parameters (continued)

4.3-15 Legal for Trade Requirements (continued)



REF	Table C – Display Indicator Limitations	
	NTEP	OIML
A	—	—
B	Allowed	Allowed
C	Disabled	Disabled
D	Allowed	Disabled
E	—	—
G	Allowed	Allowed
H	Conditional	Conditional

Calibration Counter (CA) and Configuration Number (CF)

IMPORTANT: The following parameters will cause an internal counter to increase the increment number for the calibration counter (CA) and/or the configuration number (CF). The values can be view when the display indicator is powered on, first showing the CF number and then the CA number.

Configuration Number (CF) – F1 to F11, F13, F14, F21, F22, F23, F25 to F32, F35, A5, A3, B1, B2, B3, B4, B32

Calibration Number (CA) – F16, F17, F19, F20, F23, F24, A33, B1, B2, B3, B4, B6, B10

4.4 Weigh System Calibration

4.4-1 Calibration Introduction

CAUTION: Always contact Cascade prior to performing any calibration procedure. Read all the instructions prior to performing each calibration procedure. Failure to follow instructions exactly will change the accuracy of the weigh system and could compromise the system's ability to weigh.

IMPORTANT: If equipped with sideshift, make sure the sideshift frame is centered before completing any calibration procedures.

IMPORTANT: Calibration of weigh system with Legal for Trade certification must be performed by a scale technician.

IMPORTANT: Before calibrating, change the parameter "Correction Level Sensor Setting", A34, to "0" (zero). When calibration is complete, "A34" should be changed back as follows:

Legal for Trade – "2" for NTEP, "3" for OIML
All other units with a level sensor – "1"

There are four parts to calibrating the weigh system. Some cases only require a portion of the System Calibration to be performed. Refer to chart below. A summary of each part is as follows:

- **Corner Calibration –** Compensates for slight differences in total system output based on weight location and applies compensation factors to the output of each load cell (parameters B1-B4).
- **Zero Calibration –** Determines and sets the zero point for the weigh system.
- **Weight (Span) Calibration –** Determines and sets the weight range for the weigh system by using a sample of known weight (or weights).
- **Level Sensor Calibration –** Determines and sets the zero reference, span and angle shut-off for the level sensor.

  NOTE: The level sensor angle span calibration is set from the factory. Calibrate only if there is an issue with it.

IMPORTANT: Always perform corner calibration first, followed by zero calibration, then weight (span) calibration, and finally level sensor calibration, if needed.

NOTE: After calibration is complete, perform a system back-up and record the zero and weight (span) calibration values. This will eliminate the need for test weights in the field, where calibration information is lost (rare). Refer to Section 4.3-12 (Back-up Parameters/Calibration), Section 4.4-6 (View Calibration Values) and Section 4.4-8 (Input Calibration Values).

When to Calibrate ■	Calibration Procedures ◆
When the weigh system is not within system tolerance.	Perform Zero Calibration (Section 4.4-4) and Weight (Span) Calibration (Section 4.4-5) with at least one known weight
When the weighing range does not meet end user preferences.	Perform Zero Calibration (Section 4.4-4) and Weight (Span) Calibration (Section 4.4-5) with at least one known weight
When the display indicator or load cell (or load cells) have been replaced.	Perform Corner Calibration (Section 4.4-3), Zero Calibration (Section 4.4-4), Weight (Span) Calibration (Section 4.4-5) and Level Sensor Calibration (Section 4.4-6).

■ **CAUTION:** Always use proper handling and troubleshoot the weigh system first before calibrating. Inaccuracies can occur when debris becomes wedged between the frames. Always use calibration as a last option.

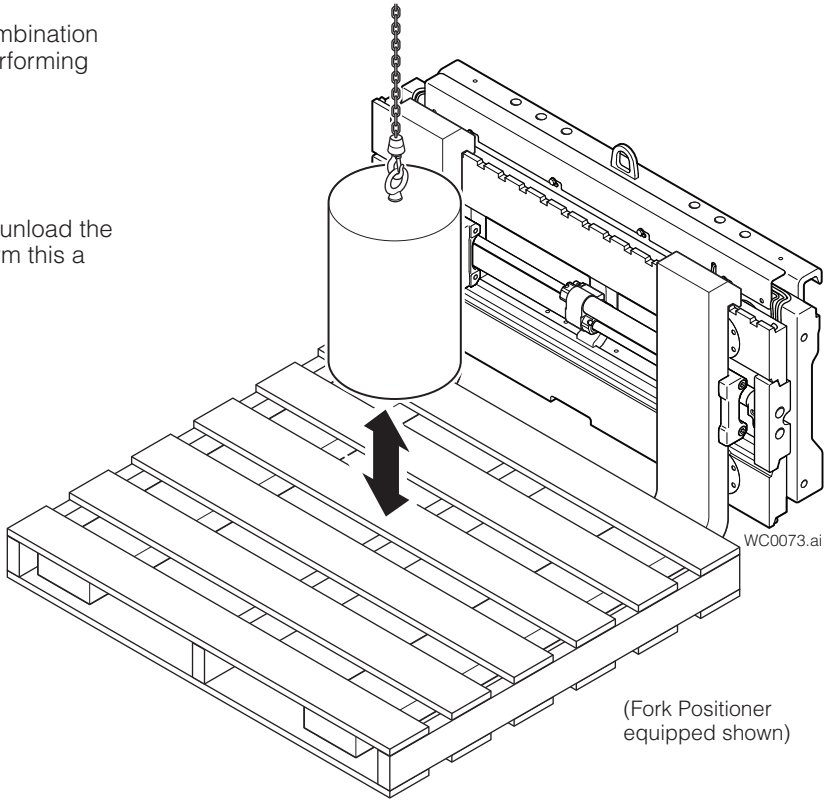
◆ **CAUTION:** Always perform the tasks and calibration in the order listed.

4.4 Weigh System Calibration (continued)

4.4-2 Prior to Calibration

IMPORTANT: The weigh system and fork combination should not be touching the ground before performing calibration procedures.

1. Position forks all the way out.
2. Place a pallet on forks.
3. Use calibration weight stacks to load and unload the attachment to exercise the system. Perform this a minimum of 3 times.



(Fork Positioner equipped shown)

4.4 Weigh System Calibration (continued)

4.4-3 Corner Calibration

Corner Calibration is the first procedure of the System Calibration. This calibration procedure generates correction factors (Parameters B1-B4) to apply to each load cell output. This idealizes (equalizes) the weight reading across the entire load receiver.

IMPORTANT: Use a minimum 50 lbs. (23 kg). For optimal corner calibration, use 1000 lbs. (454 kg).

IMPORTANT: Use the same weight for each corner.

IMPORTANT: Verify that the primary base unit (lbs. or kg) is determined prior to calibration. To update units, Parameter F8, refer to Section 4.3-2 and 4.3-4.

1 Access the Configuration Menu and Menu "-b-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "b 10".

2 Press the "ZERO/OFF" button to enter parameter "B 10".

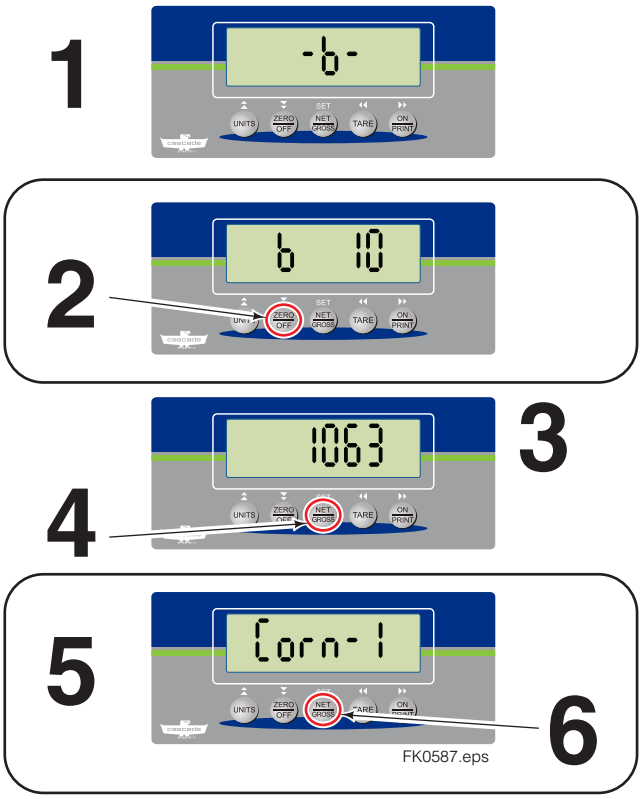
3 The display indicator will show a A/D count value (example 1063). Verify that the load receiver is clear of any loads or objects and the unit is level.

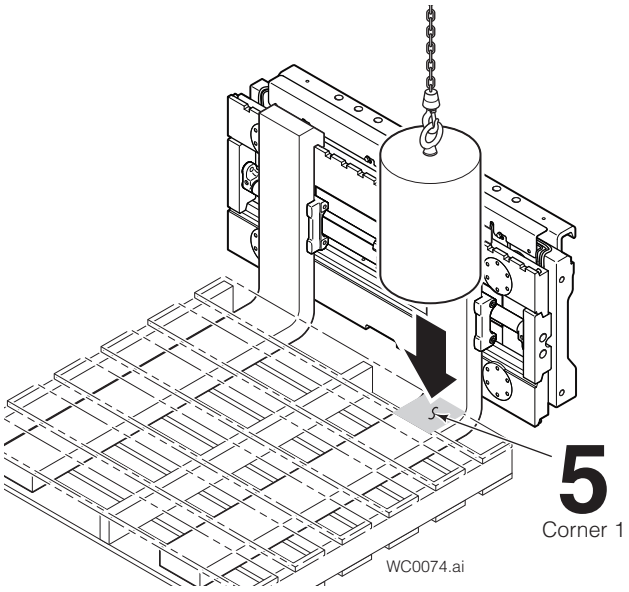
4 Press the "NET/GROSS" button to accept the zero point A/D value.

5 The display indicator will show "Corn-1". Place the test weight on Corner 1 as shown. Wait five seconds for the load to stabilize.

6 Press the "NET/GROSS" button to accept the Corner 1 calibration value.

This procedure is continued on the next page



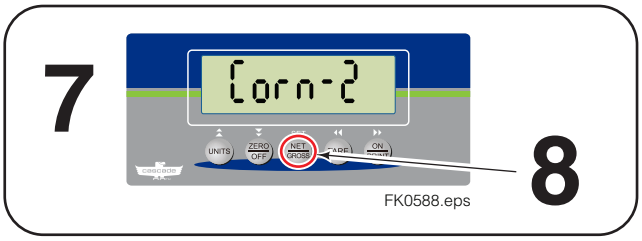


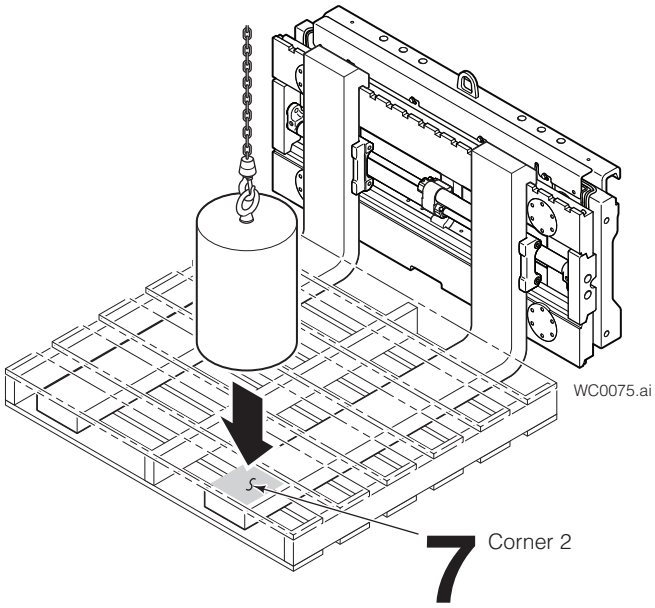
4.4 Weigh System Calibration (continued)

4.4-3 Corner Calibration (continued)

7 The display indicator will show “Corn-2”. Place the test weight on Corner 2 as shown. Wait five seconds for the load to stabilize.

8 Press the “NET/GROSS” button to accept the Corner 2 calibration value.

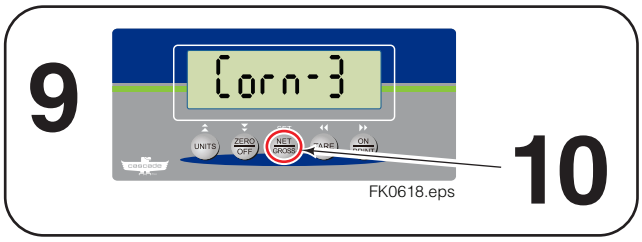


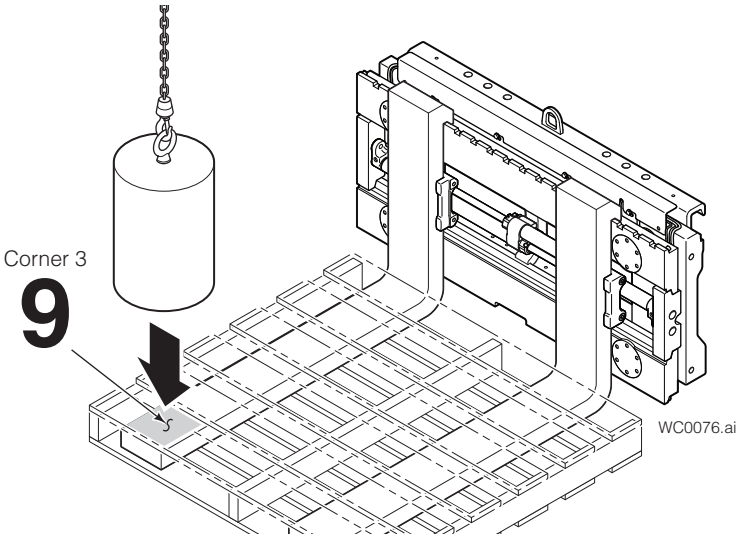


9 The display indicator will show “Corn-3”. Place the test weight on Corner 3 as shown. Wait five seconds for the load to stabilize.

10 Press the “NET/GROSS” button to accept the Corner 3 calibration value.

This procedure is continued on the next page



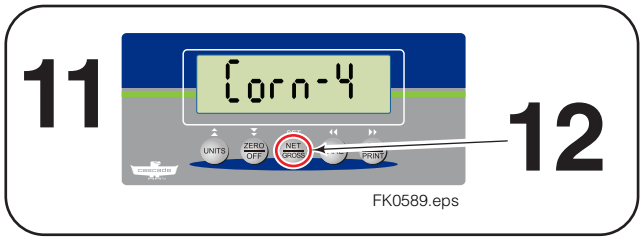


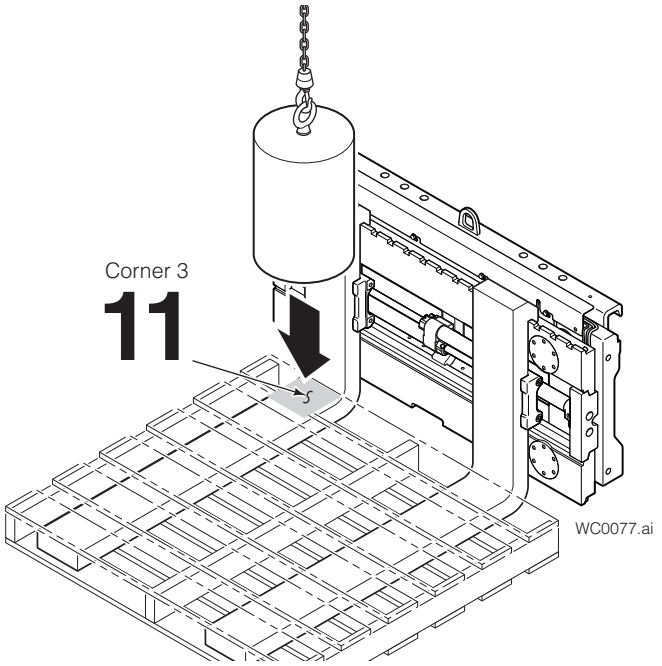
4.4 Weigh System Calibration (continued)

4.4-3 Corner Calibration (continued)

11 The display indicator will show “Corn-4”. Place the test weight on Corner 4 as shown. Wait five seconds for the load to stabilize.

12 Press the “NET/GROSS” button to accept the Corner 4 calibration value.





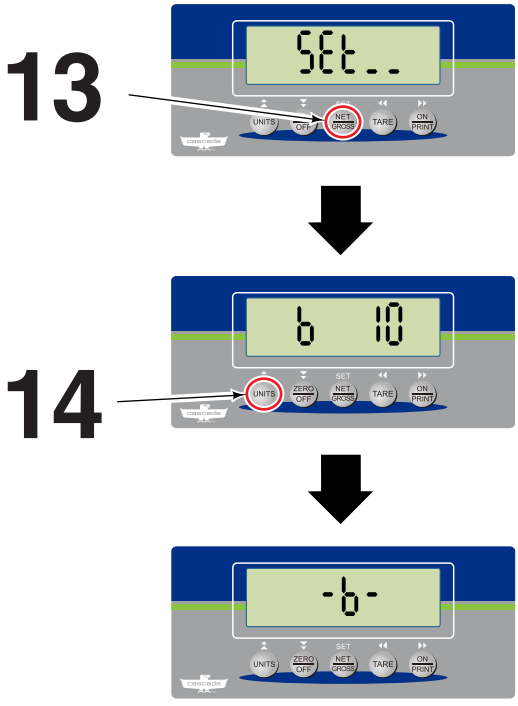
13 The display indicator will show “SEt--”. Press the “NET/GROSS” button to accept the calibration values and to revert to the parameters list, showing “b 10”.

14 Press the “UNITS” button to return the Configuration menu.

15 Navigate to parameter “b 1” and press the “ZERO/OFF” button. Note the value. Press “UNITS” to return to the b parameters menu. Repeat for parameters "b 2", "b 3" and "b 4" values.

The B1-B4 values generated should be 5.0000 ± 0.2 for best scale performance.

- If the values are significantly outside the recommended range, check the weigh system for binding, pinched wires or other hindrances. Repeat this section's calibration procedure.



4.4 Weigh System Calibration (continued)

4.4-4 Zero Calibration

Zero Calibration is the second procedure of the System Calibration. This procedure is also used when the scale is not within system tolerance or end user preferences. This calibration procedure defines the zero point of the system.

1 Access the configuration menus and Menu "-F-" as described in Section 4.3-1 and 4.3-2. Navigate to Configuration Parameter "F 16".

2 Enter Parameter Setting "F 16", by pressing the "ZERO/OFF" button.

3 The display indicator will show "C 0" and then a A/D count value (example 3672). Verify that the load receiver is clear of any loads or objects.

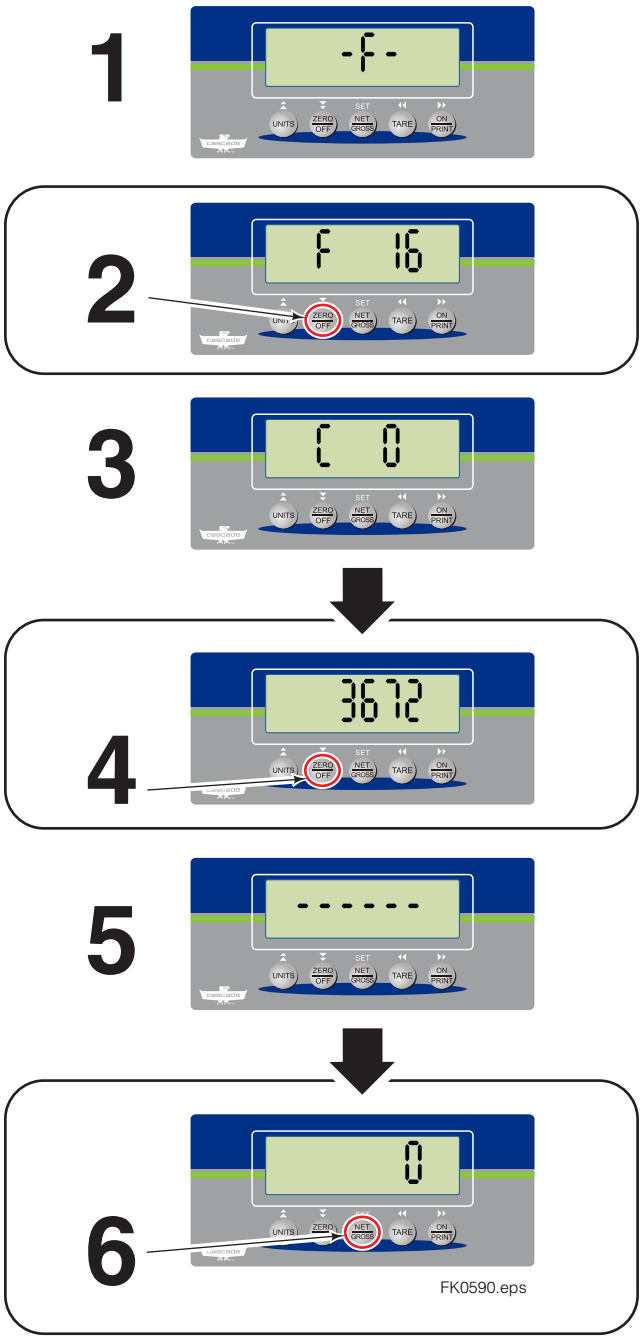
IMPORTANT: If a pallet is to be used during the next calibration procedure, Weight (Span) Calibration (Section 4.4-5), zero the pallet in this step. Then, only the weight of the calibration weights need to be known for the procedure. When the Weight (Span) Calibration procedure is complete, return to this section and perform the Zero Calibration with the forks (or load receiver) only.

4 Press the "ZERO/OFF" button to zero the displayed value.

5 The display indicator will count down to ending in "- - - - - -" and then a zeroed A/D count value.

6 Press and hold the "NET/GROSS" button while several screens show, as follows: "SEt", "EndC0" and "F 16". Release button after "F 16" shows.

7 Continue to Weight (Span) Calibration, Section 4.4-5.



4.4 Weigh System Calibration (continued)

4.4-5 Weight (Span) Calibration

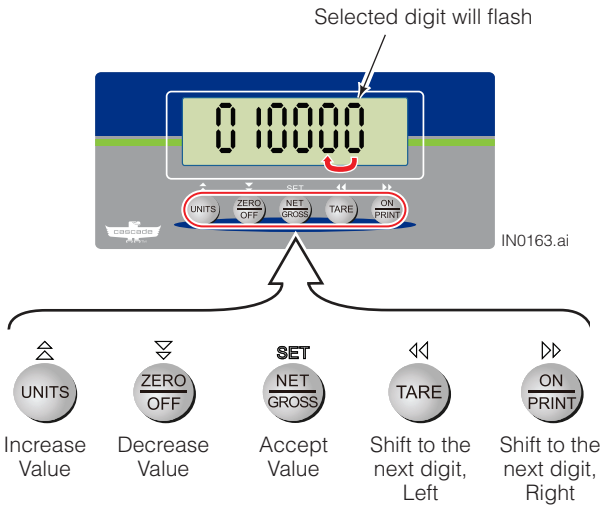
Weight calibration is the last procedure for System Calibration. This procedure uses the sample of weights to determine the curve of how the system measures weight based on up to five known weights. If no known weights are available, contact your local dealer or scale company to obtain the weights. Weight range should be as follows:

Weight 1 – 1/5 Capacity, example: 1,200 lb (540 kg)
Weight 2 – 2/5 Capacity, example: 2,400 lb (1,080 kg)
Weight 3 – 3/5 Capacity, example: 3,600 lb (1,620 kg)
Weight 4 – 4/5 Capacity, example: 4,800 lb (2,160 kg)
Weight 5 – Full Capacity, example: 6,000 lb (2,700 kg)

NOTE: These weight values are an example and not an exact requirement. Other weigh values can be used but must be a known or calibrated weight.

IMPORTANT: If using a pallet in this procedure, the pallet must be zeroed with the unit. Perform the Zero Calibration (Section 4.4-4) procedure with the pallet on the load receiver.

Configuration Mode Button Functions

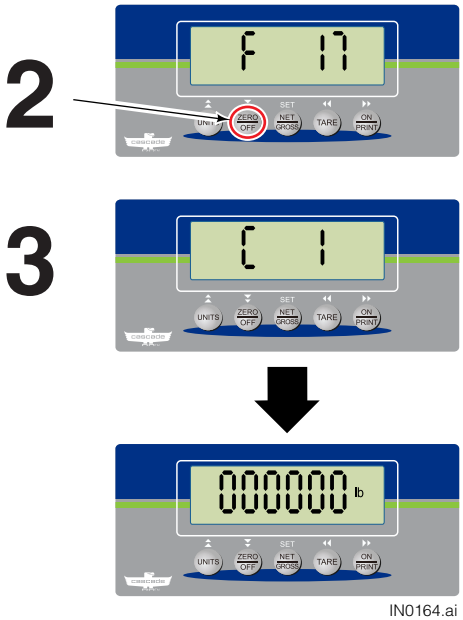


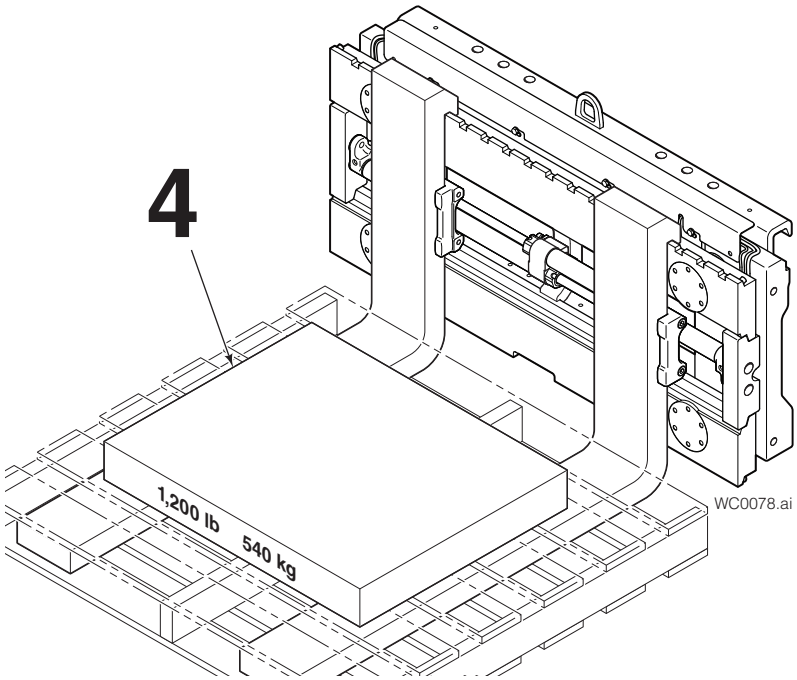
1 Press the “ON/PRINT” button until “F 17” shows.

2 Press the “ZERO/OFF” button.

3 The indicator will show “C 1” and then a value with a flashing digit.

4 Place **Weight 1** on the center of the load receiver.





5 If required, change the weight value shown on the indicator to match the actual weight value on the load receiver, **Weight 1**. Refer to “Configuration Mode Button Functions” to change the value.

6 After entering the value, press the “NET/GROSS” button.

This procedure is continued on the next page

4.4 Weigh System Calibration (continued)

4.4-5 Weight (Span) Calibration (continued)

7 The indicator will show “EndC1”, then “C 2” and end with showing a value with a flashing digit.

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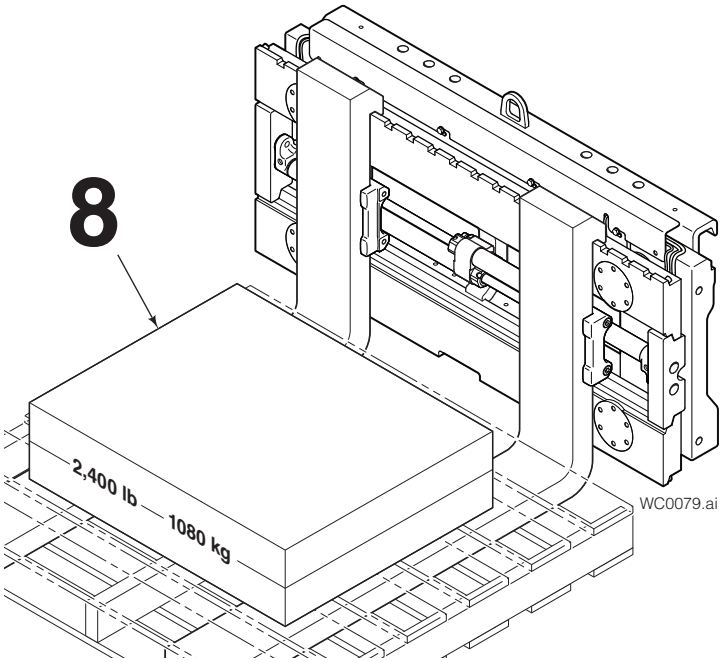
8 Place **Weight 2** on the center of the load receiver.



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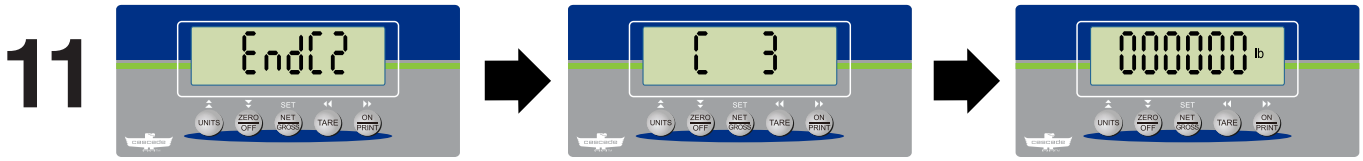
9 If required, change the weight value shown on the indicator to match the actual weight value on the load receiver, **Weight 2**. Refer to “Configuration Mode Button Functions” to change the value.

10 After entering the value, press the “NET/GROSS” button.

11 The indicator will show “EndC2”, then “C 3” and end with showing a value with a flashing digit.



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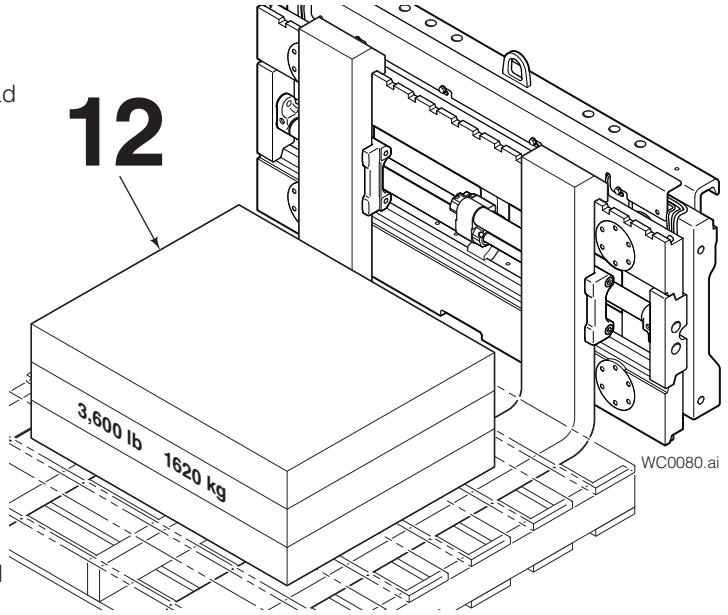
This procedure is continued on the next page

4.4 Weigh System Calibration (continued)

4.4-5 Weight (Span) Calibration (continued)

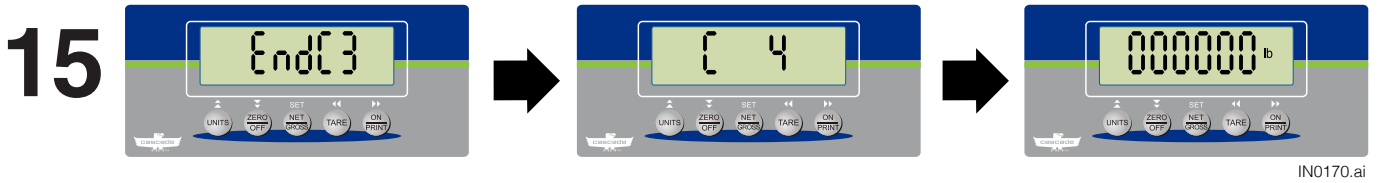
12 Place **Weight 3** on the center of the load receiver.

13 If required, change the weight value shown on the indicator to match the actual weight value on the load receiver, **Weight 3**. Refer to "Configuration Mode Button Functions" to change the value.



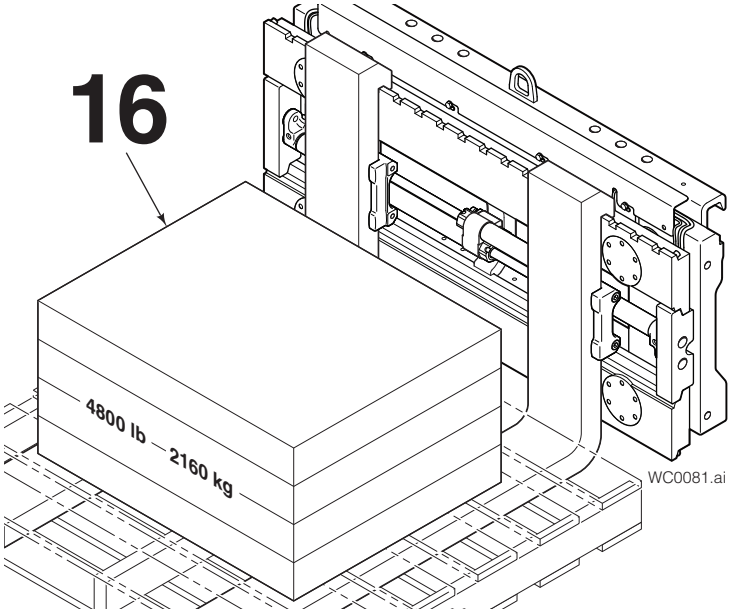
14 After entering the value, press the "NET/GROSS" button.

15 The indicator will show "EndC3", then "C 4" and end with showing a value with a flashing digit.



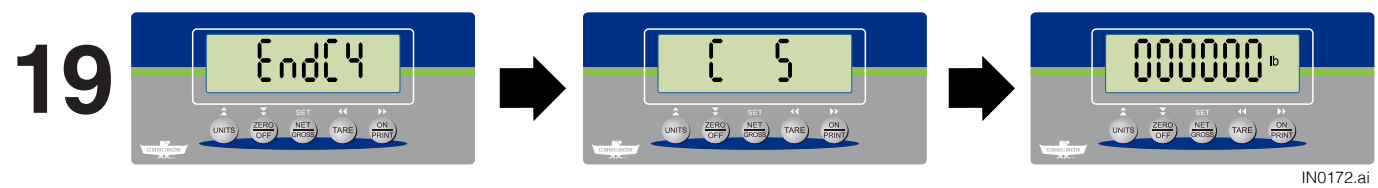
16 Place **Weight 4** on the center of the load receiver.

17 If required, change the weight value shown on the indicator to match the actual weight value on the load receiver, **Weight 4**. Refer to "Configuration Mode Button Functions" to change the value.



18 After entering the value, press the "NET/GROSS" button.

19 The indicator will show "EndC4", then "C 5" and end with showing a value with a flashing digit.



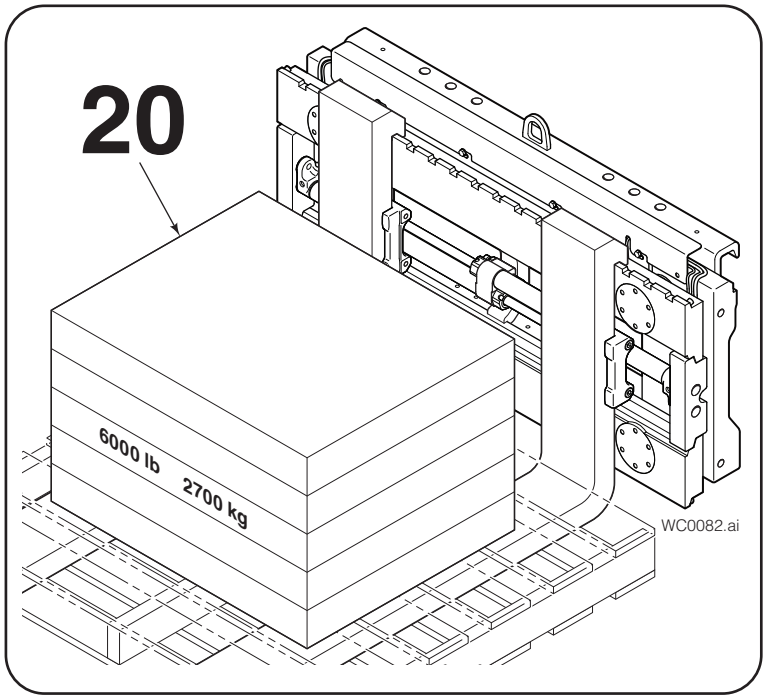
This procedure is continued on the next page

4.4 Weigh System Calibration (continued)

4.4-5 Weight (Span) Calibration (continued)

20 Place **Weight 5** on the center of the load receiver.

21 If required, change the weight value shown on the indicator to match the actual weight value on the load receiver, **Weight 5**. Refer to "Configuration Mode Button Functions" to change the value.



22 After entering the value, press the "NET/GROSS" button.

23 The indicator will show "EndC5" for a moment and then shows the gravity settings.

24 Enter the local gravitational constant (m/sec^2) if known. Refer to "Configuration Mode Button Functions" to change the value. When complete or unchanged, press the NET/GROSS button.

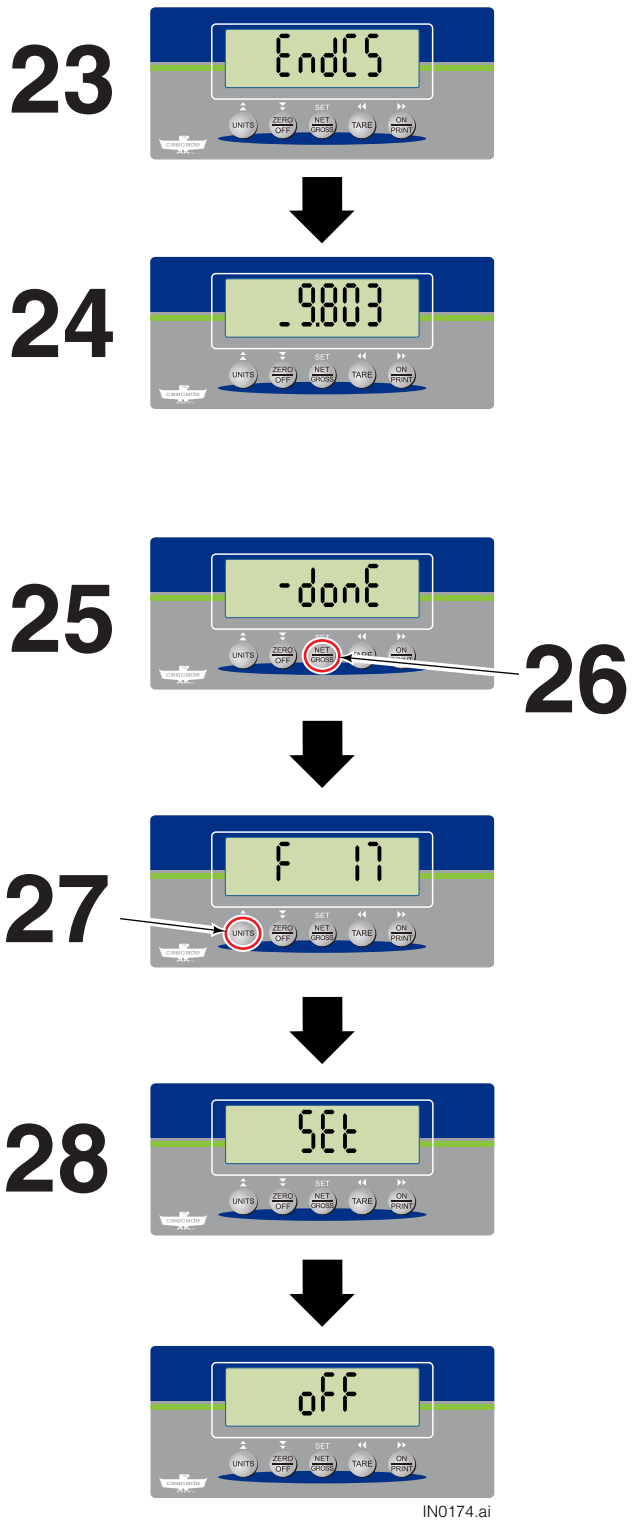
25 The indicator will show, "-donE".

26 Press the "NET/GROSS" button to accept the calibration values and to return to parameters, showing "F 17".

27 Press the "UNITS" button two times to save all changes and exit the Configuration Menu.

28 The indicator will show "SEt" and automatically power off.

IMPORTANT: If a pallet was used during this calibration procedure, perform the Zero Calibration (Section 4.4-4), without the pallet.



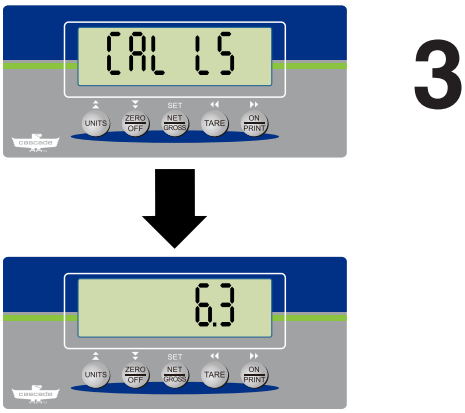
4.4 Weigh System Calibration (continued)

4.4-6 Level Sensor Calibration (Firmware 1.xxxx)

There are three settings that can be calibrated or set in A33 parameter:

- Level sensor zero angle calibration
- Level sensor angle span calibration
- Level sensor shut-off angle

NOTE: The level sensor angle span calibration is set from the factory. Calibrate only if there is an issue with it.

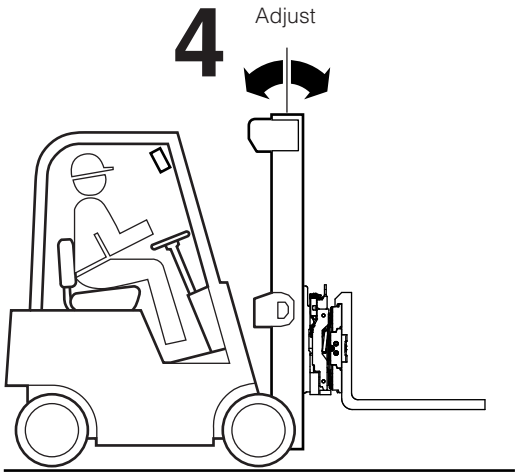


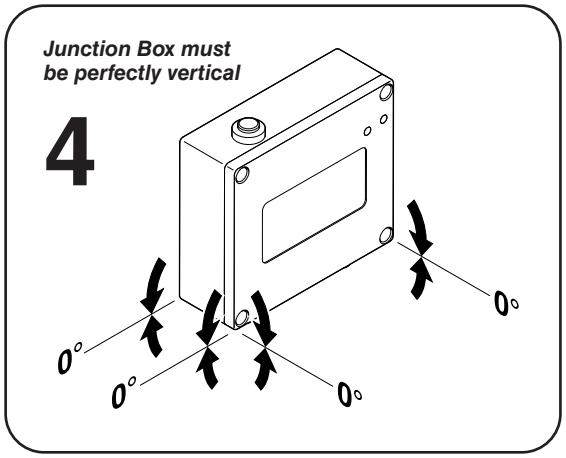
1 Access the Configuration Menu and User Menu "-A-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter number "A 33".

2 Enter Parameter Setting "A 33", by pressing the "ZERO/OFF" button.

3 The screen will show the angle measurement of the level sensor located in the junction box.

4 **Zero Angle Calibration –** Adjust tilt to establish a 0° reference. The junction box **must** be vertical front and back and side-to-side, as shown.





5 **Zero Angle Calibration –** Press the "ZERO/OFF" button to set the value as the zero degree reference.

6 To continue with additional calibration adjustments, press the "NET/GROSS" button. To return to the parameters menu, press the "UNITS" button.

4.4 Weigh System Calibration (continued)

4.4-6 Level Sensor Calibration (Firmware 1.xxxx) (continued)

7 **Shut-off Angle Calibration –** The display will show "SEt LS" for a moment, then "0000.0" with the right digit flashing.

8 **Shut-off Angle Calibration –** Change the value to the shut-off angle in degrees. Refer to "Configuration Mode Button Functions". Press "NET/GROSS" to accept the value.

9 The screen will show "SEt LS" and revert back to the current angle measurement.

10 **Angle Span Calibration –** With a digital protractor with the junction box, tilt the mast and note the angle.

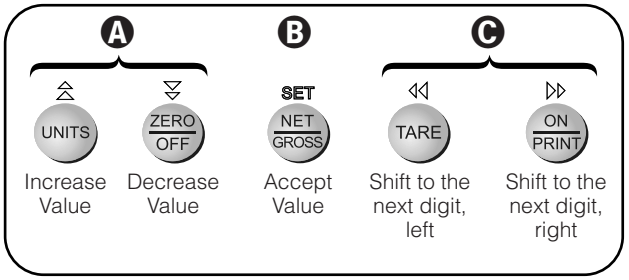
11 **Angle Span Calibration –** Press the "TARE" button. The screen will show "CAL Fd" then "0000.0" with the right digit flashing.

12 **Angle Span Calibration –** Change the value to the measured angle in degrees. Refer to "Configuration Mode Button Functions". Press "NET/GROSS" to accept the value.

13 **Angle Span Calibration –** The screen will show "SEt Fd" and revert back to the current angle measurement.

14 Press the "UNITS" button three times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.

Configuration Mode Button Functions



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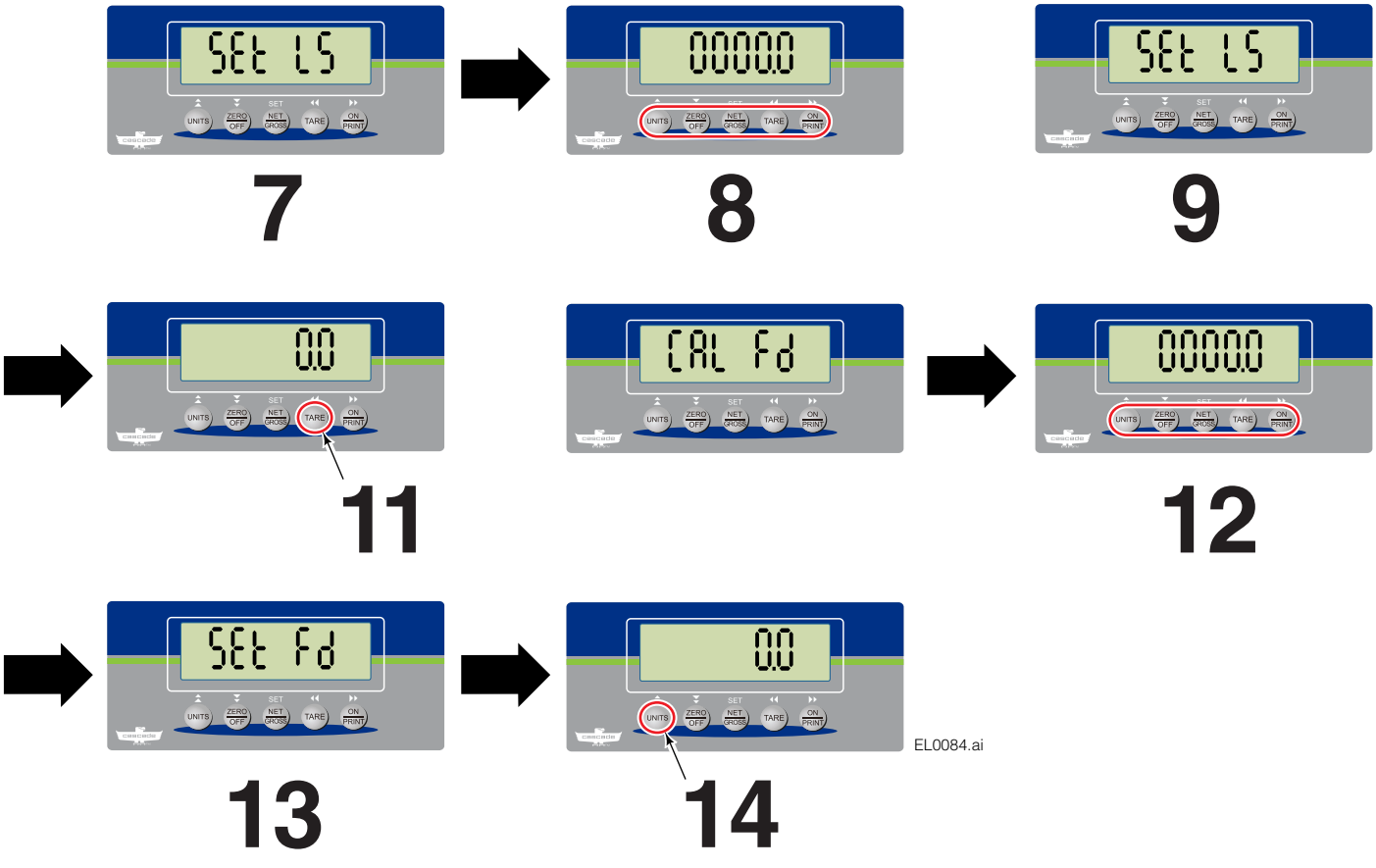

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4.4 Weigh System Calibration (continued)

4.4-6 Level Sensor Calibration (Firmware 19.xxxx) (continued)

1 Access the Configuration Menu and User Menu "-A-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "A 33".

2 Enter Parameter "A 33", by pressing the "ZERO/OFF" button.

3 The screen will show an A/D count of the level sensor located in the junction box.

4 Adjust tilt to establish a 0° reference. The junction box **must** be vertical front and back and side-to-side, as shown.

IMPORTANT: If the display indicator is showing all six (6) annunciator arrows, the junction box is beyond the current calibrated 3 degree value.

5 Press the "ZERO/OFF" button to set the value shown on the display indicator as the zero degree reference.

6 The display indicator will show "SEt 0d" for a moment and revert to showing the raw A/D count.

7 **Shut-off Angle Calibration –** This is the out-of-level angle that shows "L--__" error during weighing operation.

A To calibrate the shut-off angle, tilt the unit so the junction box is at an angle of 3 degrees from vertical in a single direction.

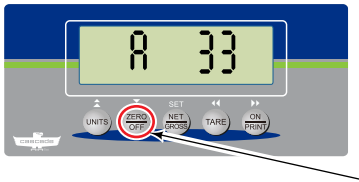
B Press the "TARE" button to calibrate the shut-off angle at the current angle.

C The indicator will show "SEt 3d" before reverting back to the current level sensor A/D count.

NOTE: The shut-off can only be set to 90 +/- 20 A/D counts (about 2.7-3.3 degrees).

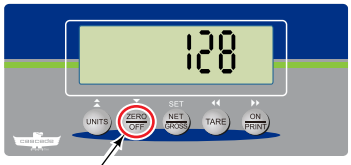
8 Press the "UNITS" button three times to save and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.

1



2

3



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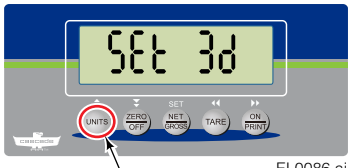
5

6

7B



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8

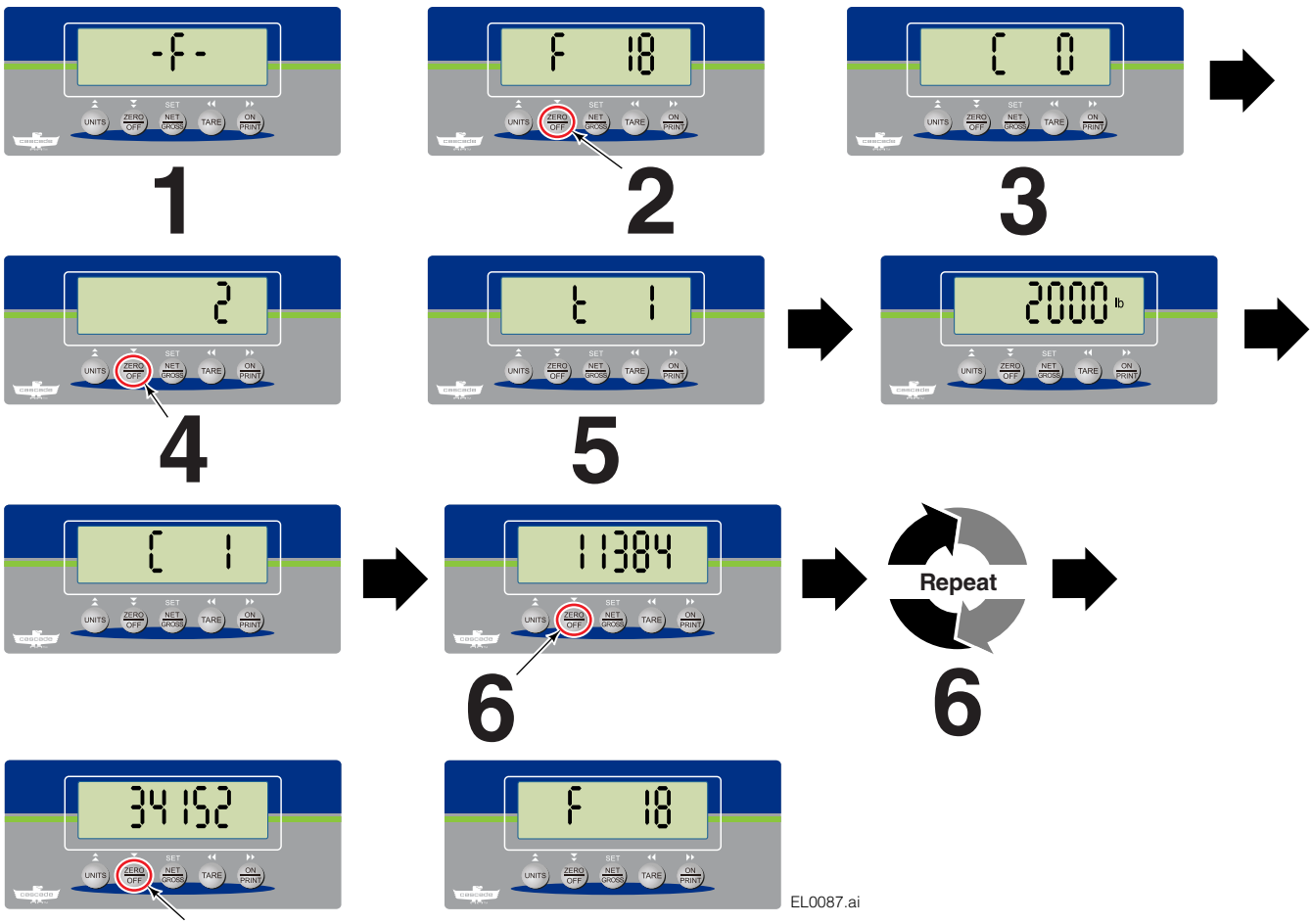
4.4 Weigh System Calibration (continued)

4.4-7 View Calibration Values

1. Access the Configuration Menu and Menu “-F-” as described in Section 4.3-1 and 4.3-2. Navigate to parameter “F 18”.
2. Press the “ZERO/OFF” button to enter parameter “F 18”.
3. The display indicator will show “C 0” and then a value. Record the value.
4. To continue to the next value, press the “ZERO/OFF” button.
5. The display indicator will show the following sequence: “t 1” (calibration weight value in lbs or kg), “C 1” (load cell A/D count). Record the values in the table for reference.
6. To continue to the next "T" calibration value, press the “ZERO/OFF” button. Repeat Step 5 until "C 5".

   NOTE: When the "C 5" value shows, pressing “ZERO/OFF” button will revert to parameters, showing “F 18”.

	Value
C 0	
t 1	
C 1	
t 2	
C 2	
t 3	
C 3	
t 4	
C 4	
t 5	
C 5	



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NOTE: When "C 5" value shows, pressing “ZERO/OFF” button will revert to parameters.

4.4 Weigh System Calibration (continued)

4.4-8 Input Calibration Values

This procedure is intended for **emergency use only** on the rare occasion that the memory is lost. Successful calibrations for zero (F16) and weight (span) (F17) must have occurred previously and the values recorded (refer to Section 4.4-6).

IMPORTANT: Contact Cascade Service Department to determine if this procedure is applicable.

1 Access the Configuration Menu and Menu "-F-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "F 19".

2 Press the "ZERO/OFF" button to enter parameter "F 19".

3 The display indicator will momentarily show "CAL 0", then "E CAL0" and lastly "000000" with the far right digit flashing.

4 Change the value to the recorded value in Section 4.4-6, Step 3. Refer to "Configuration Mode Button Functions" to change the value.

4 Configuration Mode Button Functions

UNITS	ZERO OFF	TARE	ON PRINT
Increase Value	Decrease Value	Shift to the next digit, Left	Shift to the next digit, Right

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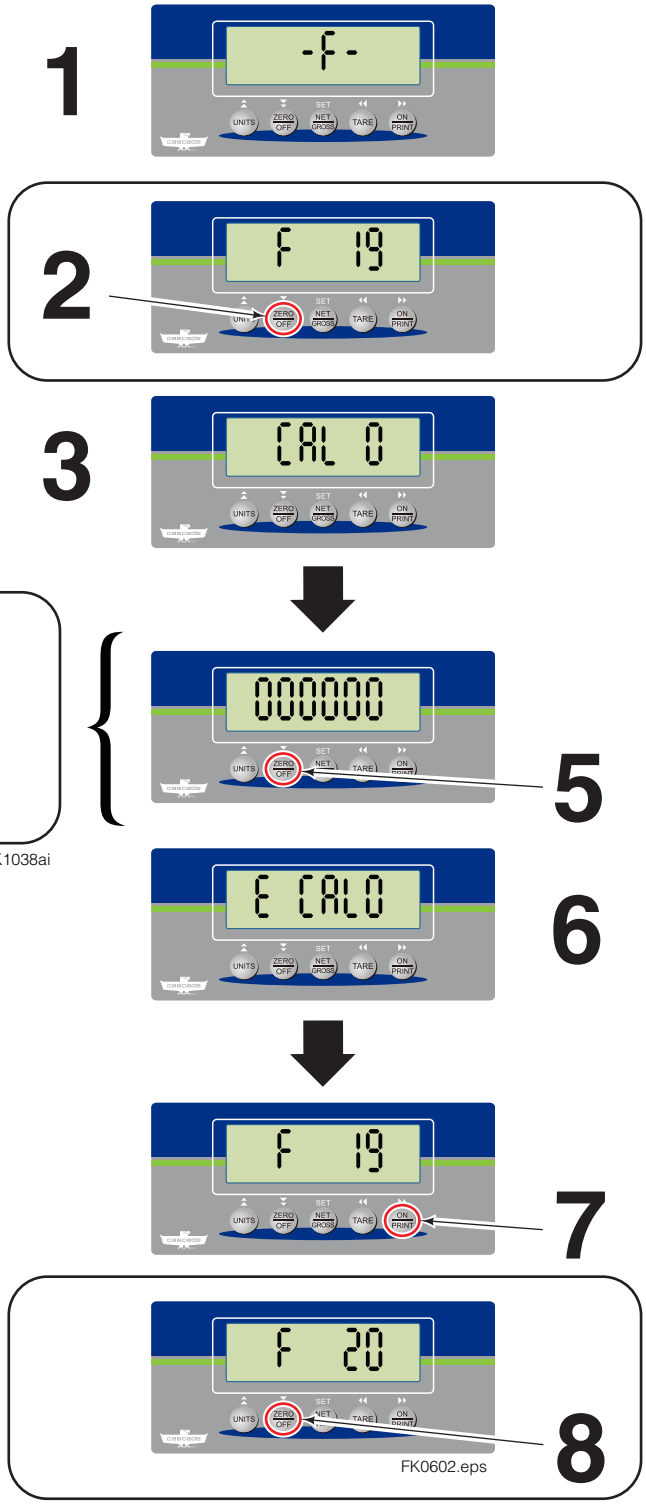
5 Press the "NET/GROSS" button to accept the value.

6 The display indicator will show "E CAL0" and then revert to parameters, showing "F 19".

7 Press the "ON/PRINT" button to continue to the next parameter.

8 Press the "ZERO/OFF" button to enter parameter "F 20".



This procedure is continued on the next page

4.4 Weigh System Calibration (continued)

4.4-8 Input Calibration Values (continued)

9 The display indicator will show “Et t1” and then a value. The value should match the “t 1” value recorded in Section 4.4-7, Step 5.

10 If needed, change the value to the “t 1” value on record. Refer to “Configuration Mode Button Functions” to change the value.

10 **Configuration Mode Button Functions**

UNITS	ZERO OFF	TARE	ON PRINT
Increase Value	Decrease Value	Shift to the next digit, Left	Shift to the next digit, Right

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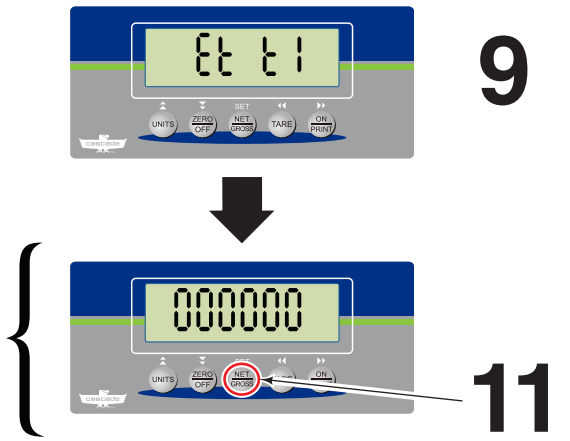

11 Press the “NET/GROSS” button to accept the value.

12 Repeat Steps 9, 10 and 11 for each of the following values recorded in Section 4.4-5 :

Et C1 – Use “C 1” value
Et t2 – Use “t 2” value
Et C2 – Use C 2” value
Et t3 – Use “t 3” value
Et C3 – Use “C 3” value
Et t4 – Use “t 4” value
Et C4 – Use C 4” value
Et t5 – Use “t 5” value
Et C5 – Use “C 5” value

13 After the all values have been entered, the display indicator will return to parameters, showing “F 20”.

14 Press the “UNITS” button two times to save all input calibration values and exit the Configuration Menu. Refer to Section 4.3-3, Steps 7 and 8.

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4.5 Display Indicator

4.5-1 Pairing to the Digital Junction Box

For situations where the junction box and/or display indicator has been replaced, it is necessary to pair the indicator to the junction box Bluetooth® receiver.

1 Determine the MAC address for the digital junction box. The address can be found on the side as shown, in the format of "XX:XX:XX:XX:XX:XX". If the label is missing, the cover can be removed. The address can be found on the Bluetooth® module.

IMPORTANT: If the system is legal for trade, opening the junction box will void certification.

NOTE: Alternatively, any device equipped with Bluetooth®, such as a mobile phone, can be used to determine the junction box's MAC address. From the device's Bluetooth® settings, search for the MAC address. Apple® products will not work for this method.

2 Access the configuration menus and Setup Menu "-b-" as described in Section 4.3-1 and 4.3-2. Navigate to parameter "b 11".

3 Enter Parameter Setting "b 11", by pressing the "ZERO/OFF" button.

4 The screen will show the first 6 digits of the last known MAC address (or "000000") with the far right digit flashing.

5 Change the value to the junction box's MAC address. Refer to "Configuration Mode Button Functions" to change the value.

6 After entering the value, press the "NET/GROSS" button.

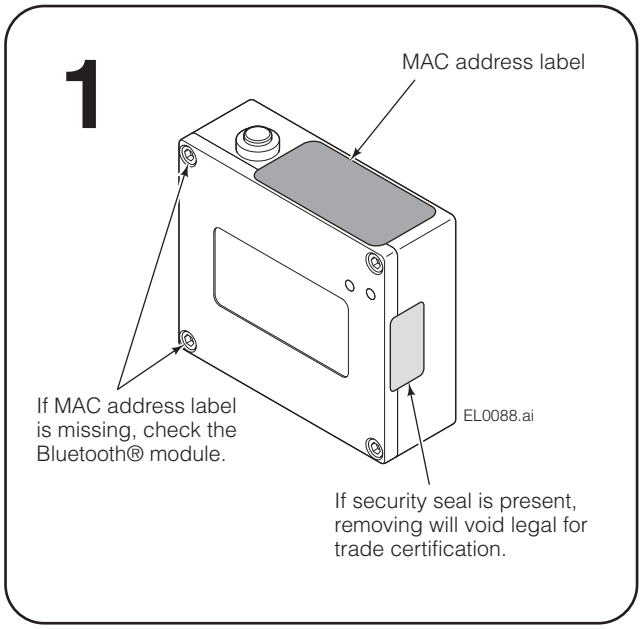
7 The screen will show the next 6 digits. Change the value to the next 6 digits of junction box's MAC address.

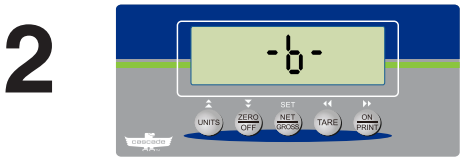
8 After entering the value, press the "NET/GROSS" button.

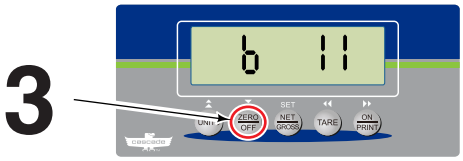
9 The screen will momentarily show "bt Adr", the first six digits and then the last six of the MAC address.

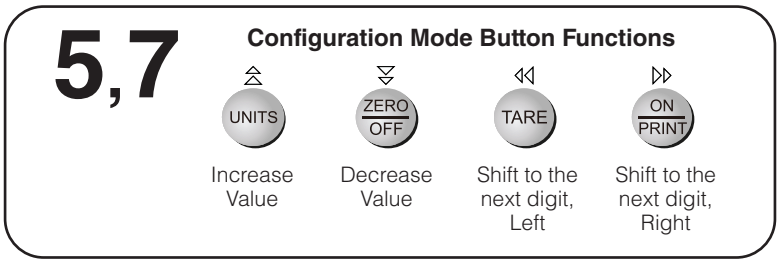
10 The display indicator will revert to parameters, showing "b 11".

11 Press the "UNITS" button two times to save all changes and exit the Configuration Menu.









4.6 Weigh System

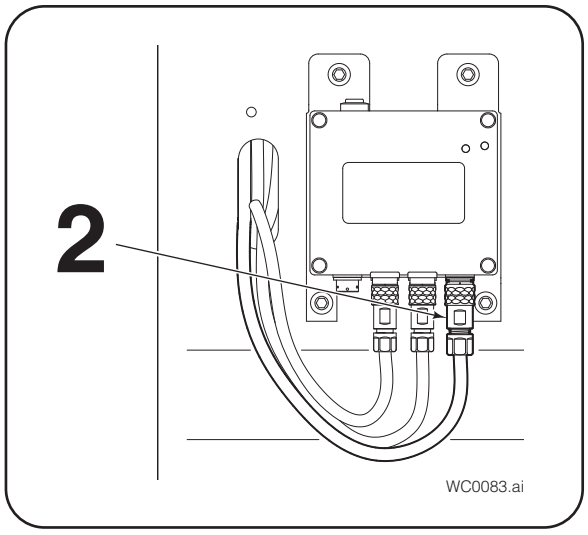
4.6-1 Cabling Removal and Replacement

1 Remove forks (or load receiver) and backrest. Disconnect supply hoses from the fork positioner manifold (if equipped) and sideshift cylinder (if equipped). Refer to following sections:

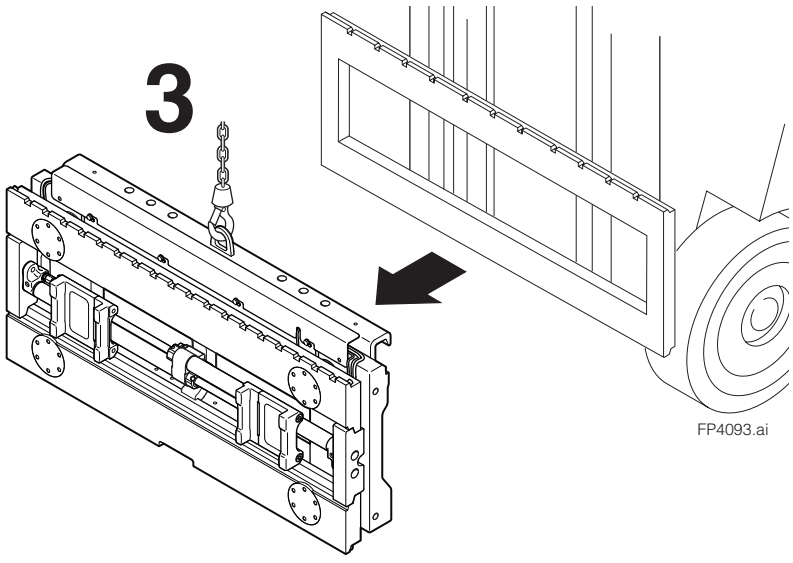
Fork Positioner equipped – Section 4.1-1, steps 1-3
Sideshift equipped – Section 4.2-1, steps 1 and 2

WARNING: Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve (valves) several times in both directions.

2 Disconnect the power connector (CN4) from the junction box, if applicable.



3 Attach an overhead hoist to the frame assembly lifting eye. Lift the frame away from the truck and lay on a work bench with two 4 x 4 in. (10 x 10 cm) wood blocks. Position the wood blocks so that the loads cells are outside of the wood blocks.



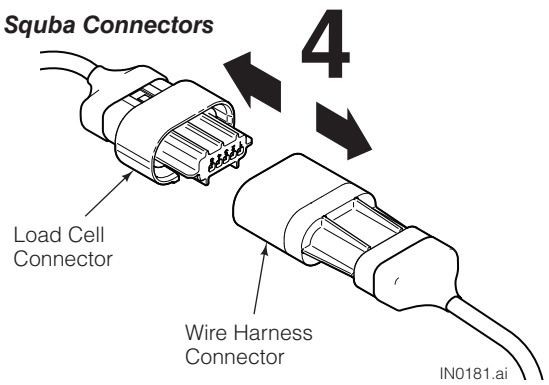
4.6 Weigh System (continued)

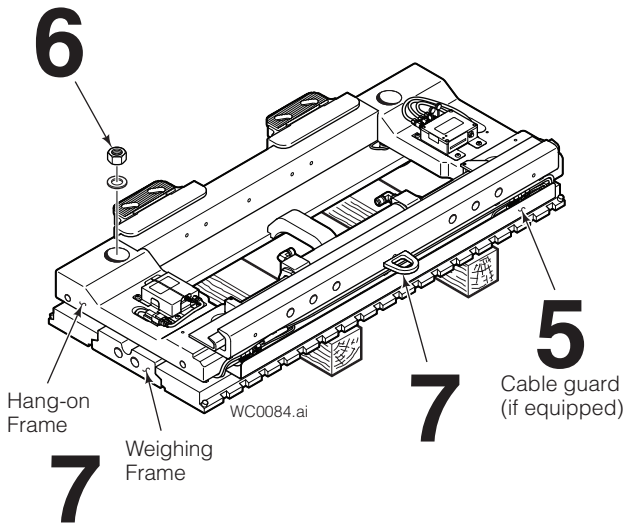
4.6-1 Cabling Removal and Replacement (continued)

4 **Squba Connectors equipped –** Cut and remove cable ties anchoring the load cell cables. Disconnect all load cell connectors.

5 If equipped, remove cable guard and capscrews. For reassembly tighten capscrews to a torque of 5.8 ft.-lbs. (7.9 Nm).

6 Remove nuts fastening the load cells to the hang-on frame.





(Fork Positioner Mechanism not shown)

WARNING: Check the attachment weight (located on the nameplate) to make sure the overhead hoist and chains or straps are at least the rated capacity of the attachment.

7 Attach an overhead hoist to the hang-on frame lifting eye and the lower bar. Secure the lower bar using a magnet or clamp. Lift away from the hang-on frame evenly while guiding the cables.

NOTE: To ease access to the connectors, lift the sideshift frame 1-2 in. (25-50 mm). Use caution to avoid stretching or damaging the load cell cables.

4.6 Weigh System (continued)

4.6-1 Cabling Removal and Replacement (continued)

8 For each load cell, perform the following:

A Remove the capscrews and washers fastening the load cell to the weighing frame.

B Remove the load cell from the weighing frame.

C Run kit load cell through the frame's load cell hole, then install the load cell. Position the arrow (located on the threaded end of the shaft) toward the frame's base, as shown. Loosely install two M10 hex head capscrews and lockwashers to hold the load cell.

9 Carefully place the hang-on frame on the weighing frame. Check all load cells are seated properly between the two frames. Tighten each hex head capscrew to fix the load cells in place.

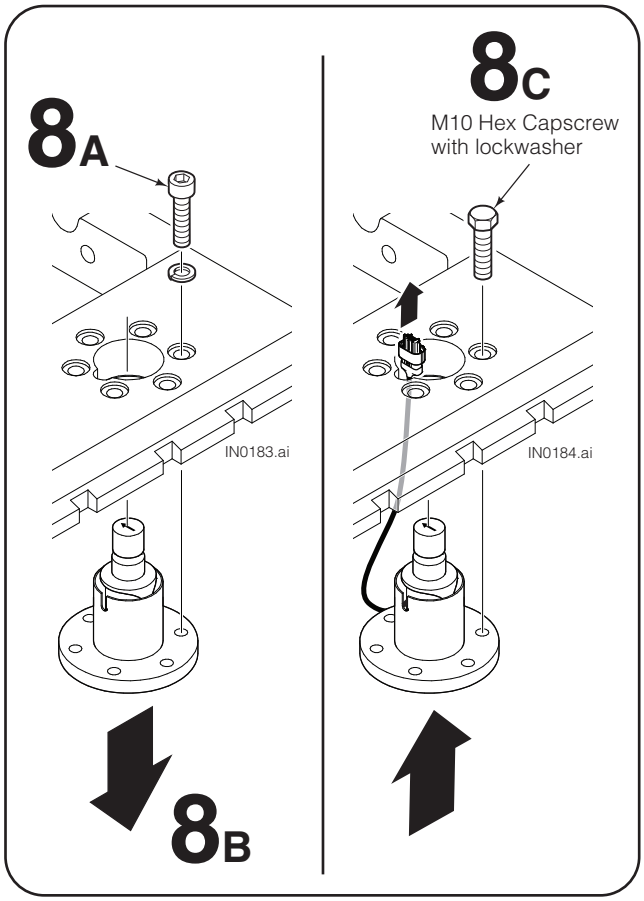
10 Remove hang-on frame from weighing frame.

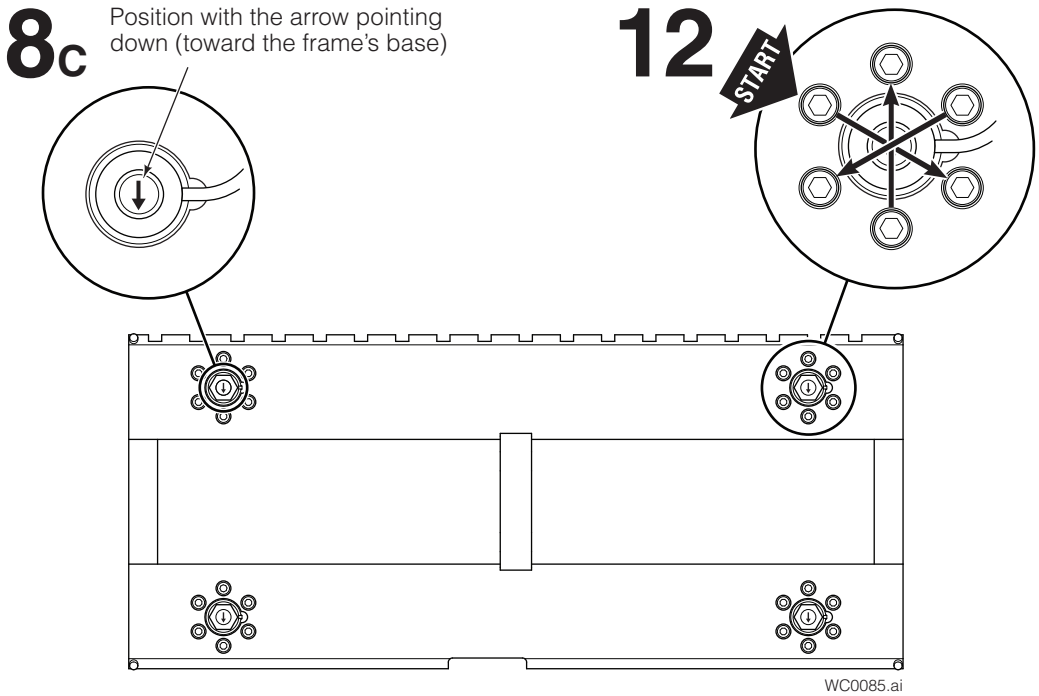
11 Clean and dry kit capscrews. Apply Loctite 242 (blue) to capscrew threads. Install capscrews with washers into the four open holes in frame and tighten to half the torque as indicated in the next step.

NOTE: Threads must be clean and dry for Loctite to cure properly.

IMPORTANT: Keep the hex head capscrews installed while performing Step 11.

12 Remove the hex head capscrews and lockwashers and insert the kit capscrews and washers. In alternating cross pattern, tighten capscrews to a final torque of 37 ft.-lbs. (50 Nm).





Back (Driver's) View
(Weighing Frame only shown)

4.6 Weigh System (continued)

4.6-1 Cabling Removal and Replacement (continued)

13 For reassembly, reverse steps 1 through 7, with the following exceptions, then install the frame assembly on the truck.

- **Load Cell Nuts –**

A With the weighing frame laying front face on a table, carefully place the sideshift frame on the weighing frame.

B Apply Loctite 242 (blue) to kit nut threads. Tighten load cell nuts until the bottom of nut is at the bottom of the counter bore hole. Verify that the weighing frame loosely moves.

> **WARNING:** Check the attachment weight (located on the nameplate) to make sure the overhead hoist and chains or straps are at least the rated capacity of the attachment.

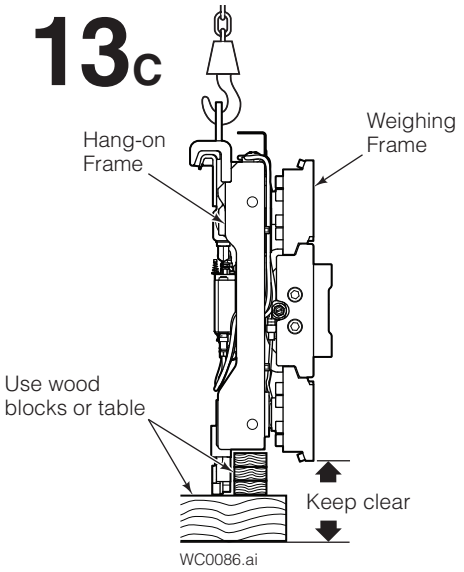
C Attach an overhead hoist to the hang-on frame lifting eye and take up the slack in the chain. Lift the hang-on frame and support the bottom of the frame with the table or wood blocks.

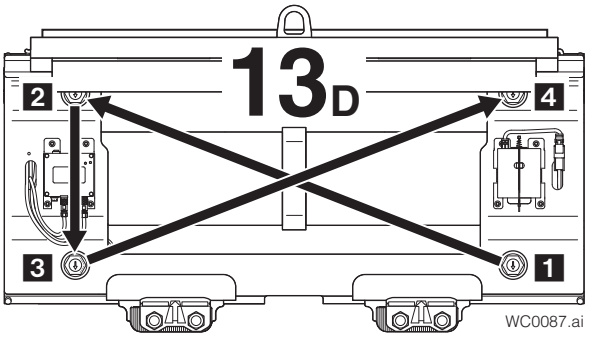
IMPORTANT: Make sure that the weighing frame is only supported by the hang-on frame. The load cell studs should touch the bottom surface of the holes in the hang-on frame.

D Tighten nuts to 320 ft.-lbs. (435 Nm) using the pattern shown.

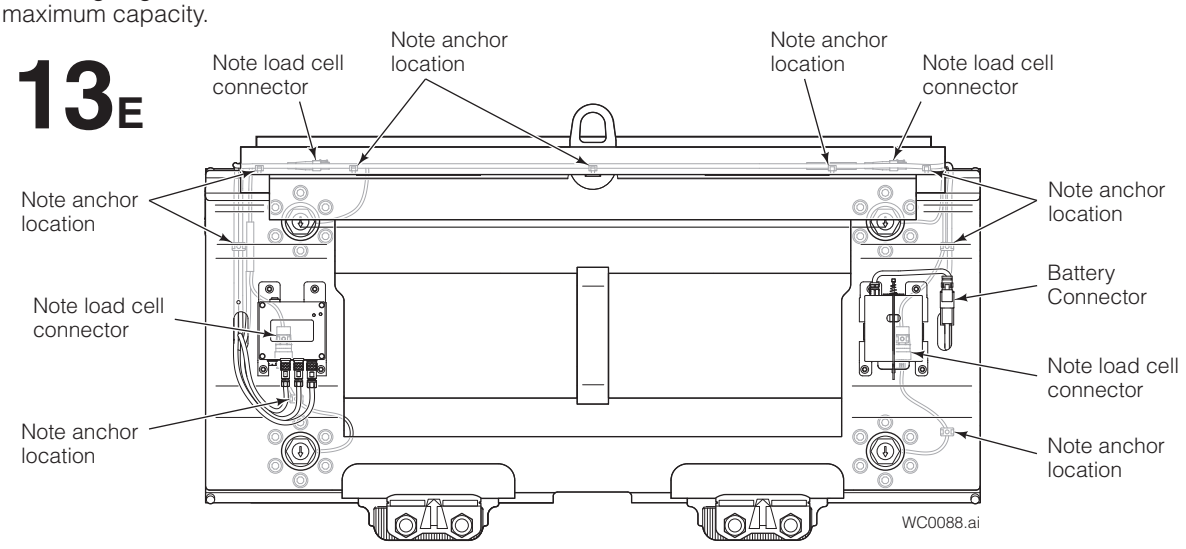
E Connect all load cell connectors. Adjust cabling for smooth transitions. Use cable ties to loosely secure the load cell cabling to hang-on frame anchors.

- After the attachment is installed on the truck and load receiver is installed, rapidly load and unload the attachment a minimum of three times. Use a load weighing at least 70% of the attachment's rated maximum capacity.





Load Cell Nut Tightening Pattern



(Frame with squba connectors shown)

5.1 Hydraulics

Truck Relief Setting

2200 psi (152 bar) Recommended
3500 psi (241 bar) Maximum

Truck Flow Volume ①

	Min. ②	Recommended	Max. ③
25A, 30A	1 GPM 4 L/min.	2 GPM 7.5 L/min.	3 GPM 12 L/min.

① Cascade Sideshifting / Fork Positioning attachments are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.

② Flow less than recommended will result in reduced system performance.

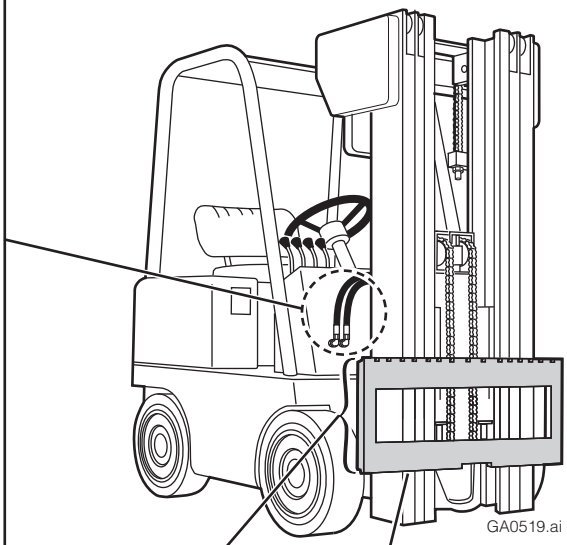
③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

Hoses and Fittings

Fork Position function: No. 3 hose/No. 4 fittings with 0.156 in. (4 mm) minimum ID.

Sideshift function: No. 4 hose/No. 6 fittings with 0.19 in. (5 mm) minimum ID.

WARNING: Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.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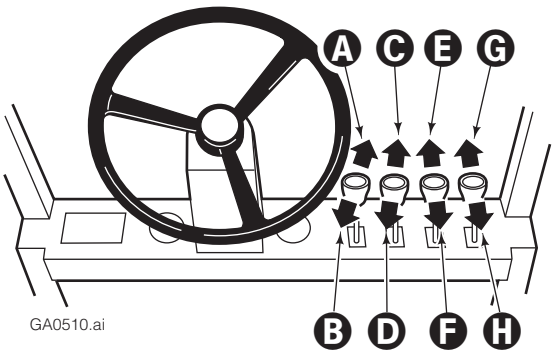
Carriage Mount Dimension (A) ANSI (ISO)

	Minimum	Maximum
Class II	14.94 in. (380.0 mm)	15.00 in. (381.0 mm)
Class III	18.68 in. (474.5 mm)	18.74 in. (476.0 mm)
Class IV	23.44 in. (595.5 mm)	23.50 in. (597.0 mm)

Carriage

Clean carriage bars and inspect carriage bars. Make sure the bars are parallel and that ends are flush. Repair any damaged notches.

5.2 Auxiliary Valve Functions



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Main Functions

A	Hoist Down	C	Tilt Forward
B	Hoist Up	D	Tilt Back

Auxiliary Functions

E	Sideshift Left	G	Open Forks
F	Sideshift Right	H	Close Forks

5.3 Torque Values

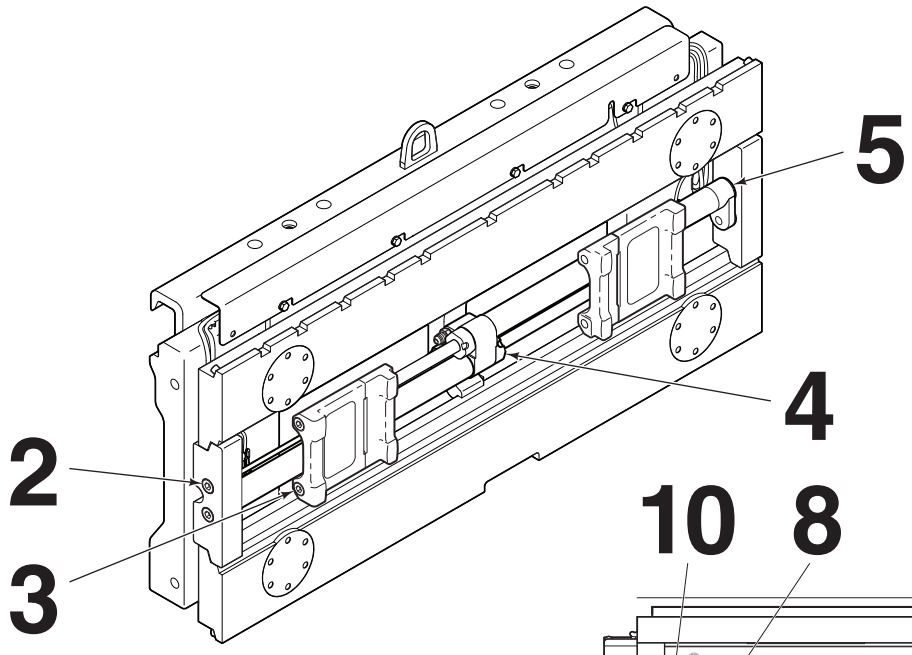
Fastener torque values for ActivWeigh Hang-on attachments are shown in the table below in US and metric units. All torque values are also called out in each specific service procedure section through out the manual.

NOTE: All fasteners have a torque value range of ±10% of stated value.

Ref.	Fastener Location	Size	ft.-lbs.	Nm
1	Lower Hook Capscrew	M16	120	165
2	Fork Positioner Mounting Capscrew	M12	50	65
3	Fork Carrier Capscrew	M10	25	35
4	Fork Positioner Cylinder Retainer	—	120	165
5	Fork Positioner Head End ①	—	20	25

Ref.	Fastener Location	Size	ft.-lbs.	Nm
6	Fork Positioner Cylinder Rod Anchor Plug	M20	50	65
7	Sideshifter Cylinder Rod Seal Carrier	—	150	200
8	Load Cell Mounting Capscrews ①	M10	37	50
9	Load Cell Nut ①	M20	320	435
10	Electrical Bracket Mounting Capscrews	M5	40.7 in.- lbs.	4.6

① Apply Loctite 242 (blue) to threads.



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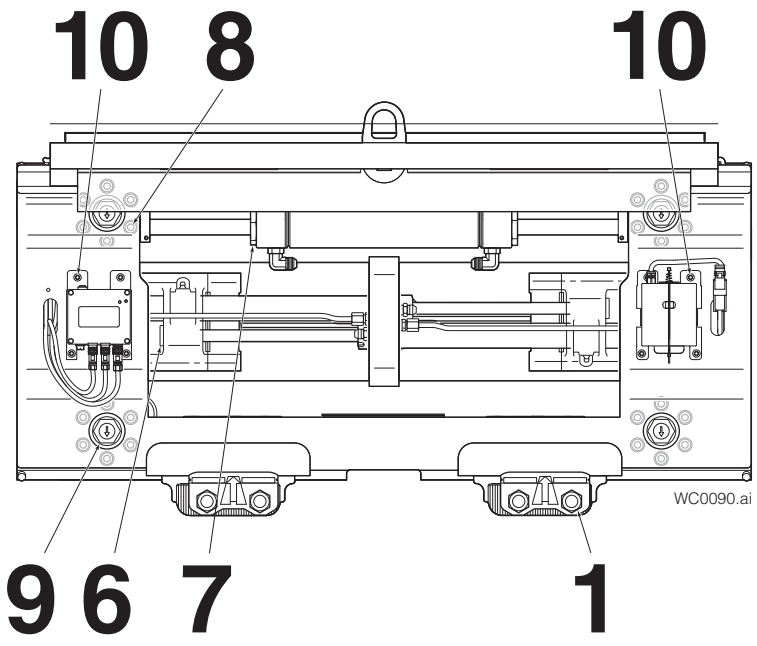

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Back (Driver's) View

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Visit us online at www.cascorp.com

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