

ERVICE MANUAL



IMPORTANT: *Tampering or removing iForks NTEP Security wire or label will void NTEP Certification. If NTEP iForks require service, fork will need to be recertified.*

IMPORTANT: *iForks system (forks and display) are paired and calibrated as a set. Do not separate. Consult Cascade Service department with any questions.*

CAUTION: *This is a precise weighing system, treat 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 effect performance of the iForks.*

Manual Number 6823346-R1



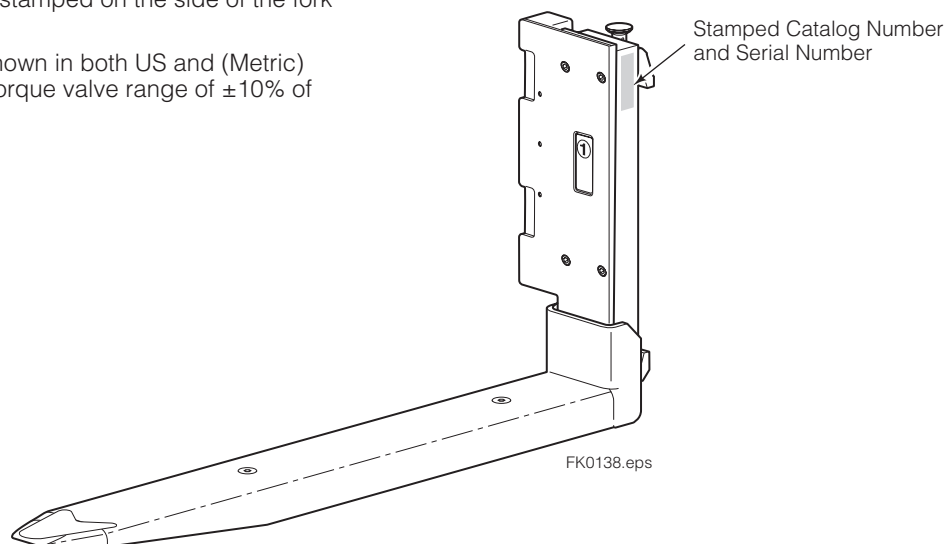
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1.1 Introduction

This manual provides Periodic Maintenance, Troubleshooting and Service for Cascade-Ravas iForks.

In any communication about the iForks, refer to the product catalog and serial numbers stamped on the side of the fork shank.

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



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 your 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 your job easier.

IMPORTANT: Only trained and authorized personnel are allowed to service iFork assemblies. Other maintenance procedures are the sole responsibility of the purchaser.

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.

1.1 100-Hour Maintenance

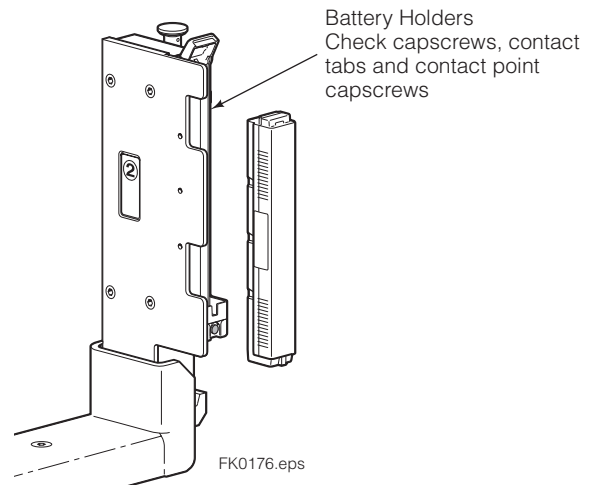
Every time the lift truck is serviced or every 100 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Check for debris between fork and fork shoe (e.g. wood chips).
- Inspect the bottom of the forks for debris that might be wedged between the fork and the fork shoe. Remove any debris found.
- Check for pinched wires at bottom of batteries.
- Tighten fork shoe capscrews after initial 100 hours of service. Tighten to a torque of 80 ft.-lbs. (112 Nm). As necessary, replace a cover spool, fork shoe capscrews and nuts.
- Every 100 hours or when the battery packs are changed, inspect the battery holders for damage and debris. Remove any debris found and check to make sure that the capscrews are tight and contact tabs not damaged or bent. If required, tighten the contact point capscrews.

Cleaning iForks

As required, use a mild cleanser and wipe down the forks with a towel. Rinse the fork with a non-pressurized stream of water.

CAUTION: Do not rinse display.



1.2 2000-Hour Maintenance

After 2000 hours of truck operation, 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.

Inspect fork hooks and carriage bar clearance

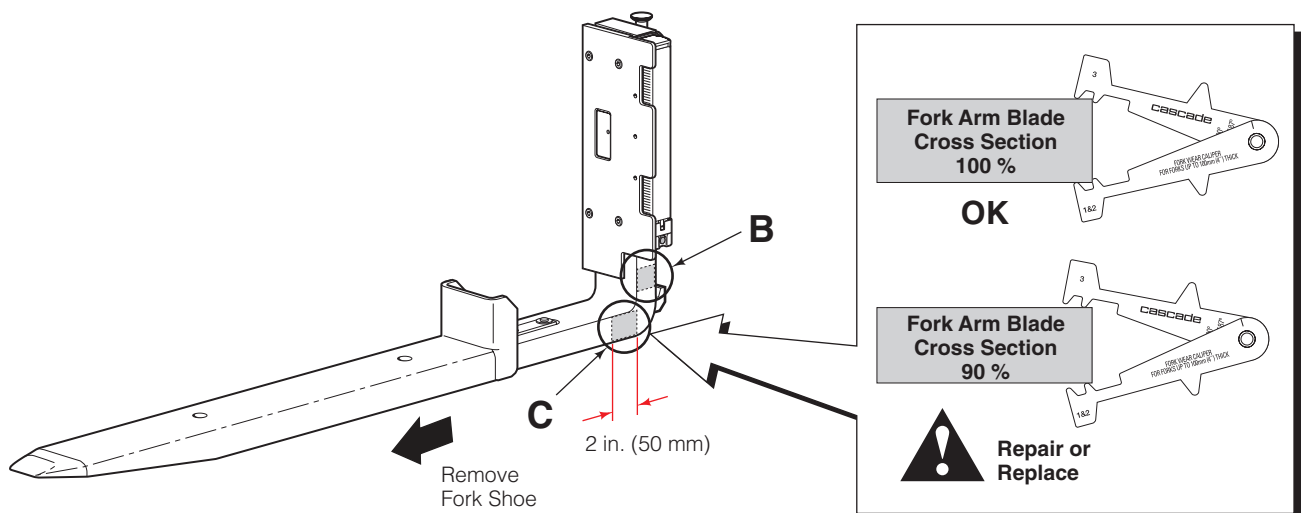
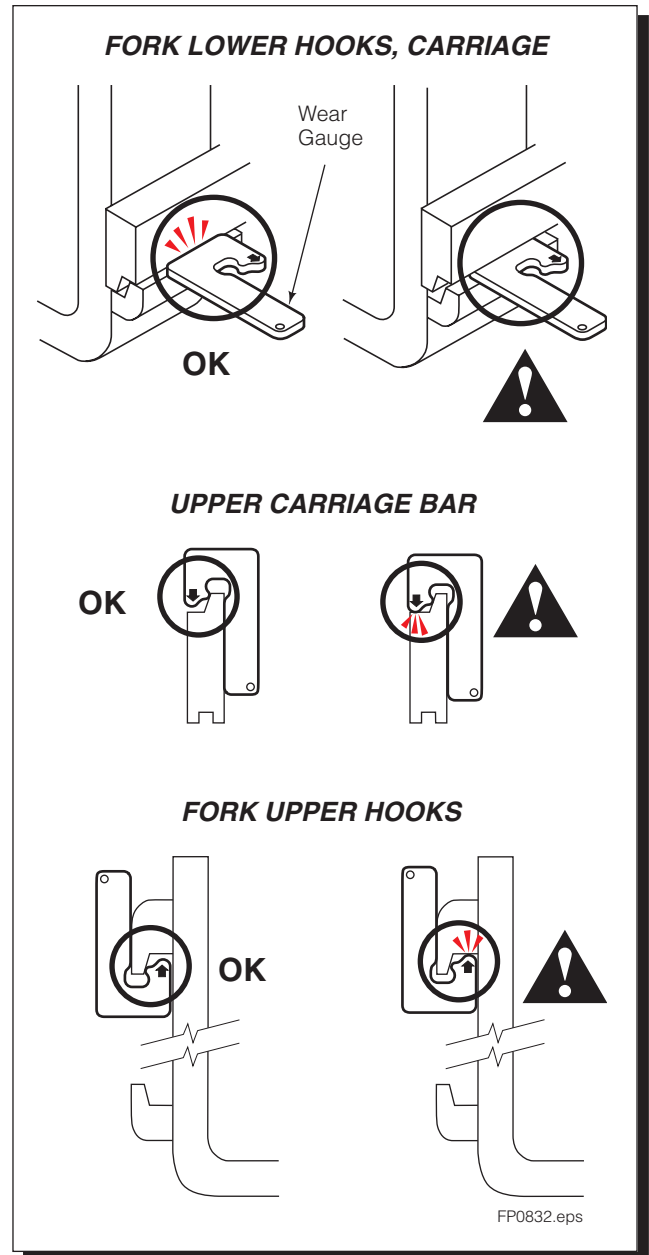
NOTE: Use go/no-go Wear Gauge Part No. 209560 (Class II) or 209561 (Class III).

- A** Inspect the fork lower hooks and carriage bar. If the gauge fits between the carriage bar and lower hook, repair or replacement is needed.
- B** Inspect the upper carriage bar. If the gauge arrow touches the carriage bar, repair or replacement is needed.
- C** Inspect the fork upper hooks. If the gauge arrow touches the hook, repair or replacement is needed.

Inspect forks

NOTE: Use fork calipers on forks up to and including 4 in. (100 mm) thick. Fork calipers indicate a 10% wear factor if the calipers can pass over the blade cross-section.

- A** Remove fork shoe from forks. For reassembly, tighten capscrews to a torque of 80 ft.-lbs. (108 Nm).
- B** Measure the fork shank thickness with the caliper outer teeth approximately 2 in. (50 mm) above top of blade. Hold this setting for step C.
- C** Position the caliper inner teeth on the fork arm blade approximately 2 in. (50 mm) out from the face of the shank.
 - If the inside teeth of the caliper hit the fork, it has less than 10% wear and requires no replacement.
 - If the inside teeth of the caliper pass over the fork freely, the fork must be taken out of service. The fork has 10% wear and 20% reduction in capacity.



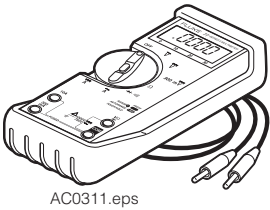
2.1 Preparation

2.1-1 Tool Required

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

- Digital Multimeter, test leads and adapter (Service Kit 213867)

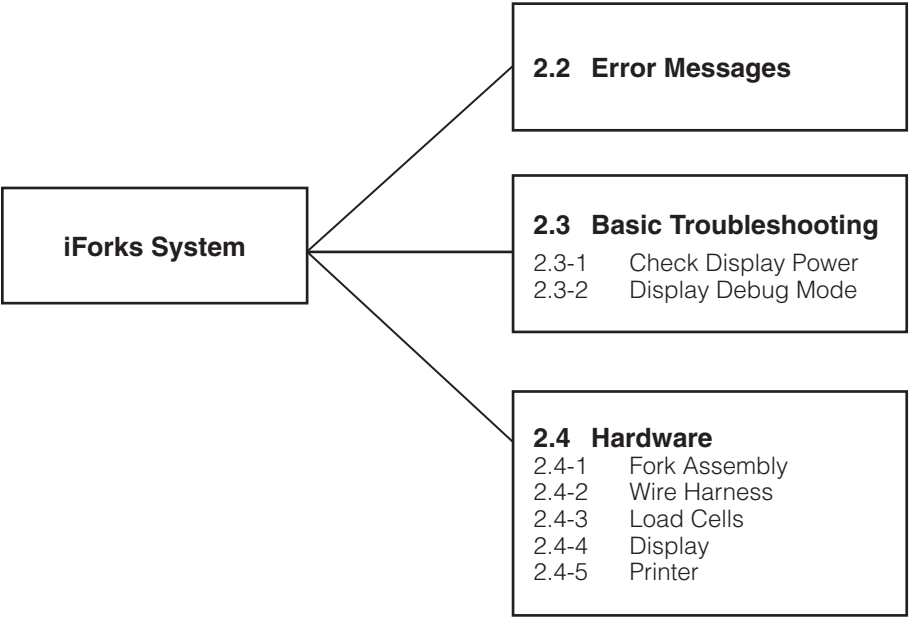
Digital Multimeter Kit 213867



2.1-2 Before Starting

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

Determine All The Facts – It is important to gather all the facts about the problem before beginning any service procedures. The first step is to talk to the equipment operator and ask for a complete description of the malfunction or problem.



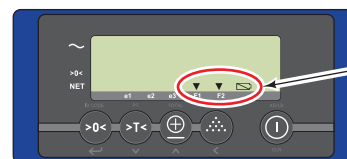
2.2 Error Messages

Error Messages



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Display	Meaning	Out of error mode
Err01	Load cell signal is unstable	Automatic
Err02	Overload on full scale	Automatic after removing weight
Err03	Gross negative. This action is not allowed	Automatic
Err04	Out of zero range	Press any key
Err05	Sampling accuracy too low	Press any key
Err06	Input signal too high	Automatic after correcting input
Err08	Calibration out of range (negative)	Automatic
Err09	Calibration out of range (signal too low)	Automatic
Err10	Calibration count 2nd(3rd) point lower than count 1st(2nd) point	Automatic
Err14	Setpoint value 2 < setpoint value 1. This is not allowed	Automatic
Err97	Legal for trade version: not allowed action	When action is intended, install jumper JP1 (attention: after this action a complete new calibration and stamping of the system is necessary)
Err98	Calibration point must be higher than previous one	Automatic
Err99	Action only allowed in startup units	Automatic
ErrF1	Problem with fork 1 (no communication)	Restart indicator. Restart forks & indicator.
ErrF2	Problem with fork 2 (no communication)	Restart indicator. Restart forks & indicator.
-----	Load cell signal negative	Lift up the forks from the ground. Zero calibrate, if needed (Refer to section 3.1).
L - _	Forks are out of level (only legal for trade version)	Put the forks into horizontal position
ErrCS	Problem with correction sensor	Contact the Cascade Service department



Low Battery Indicators

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Low Battery Messages

Display	Meaning	Out of error mode
	Battery of display is low	Replace the 4 AA batteries
+F1 ▼	Fork 1 battery is low	Replace the D cells in both battery packs or charge both battery packs
+F2 ▼	Fork 2 battery is low	Replace the D cells in both battery packs or charge both battery packs

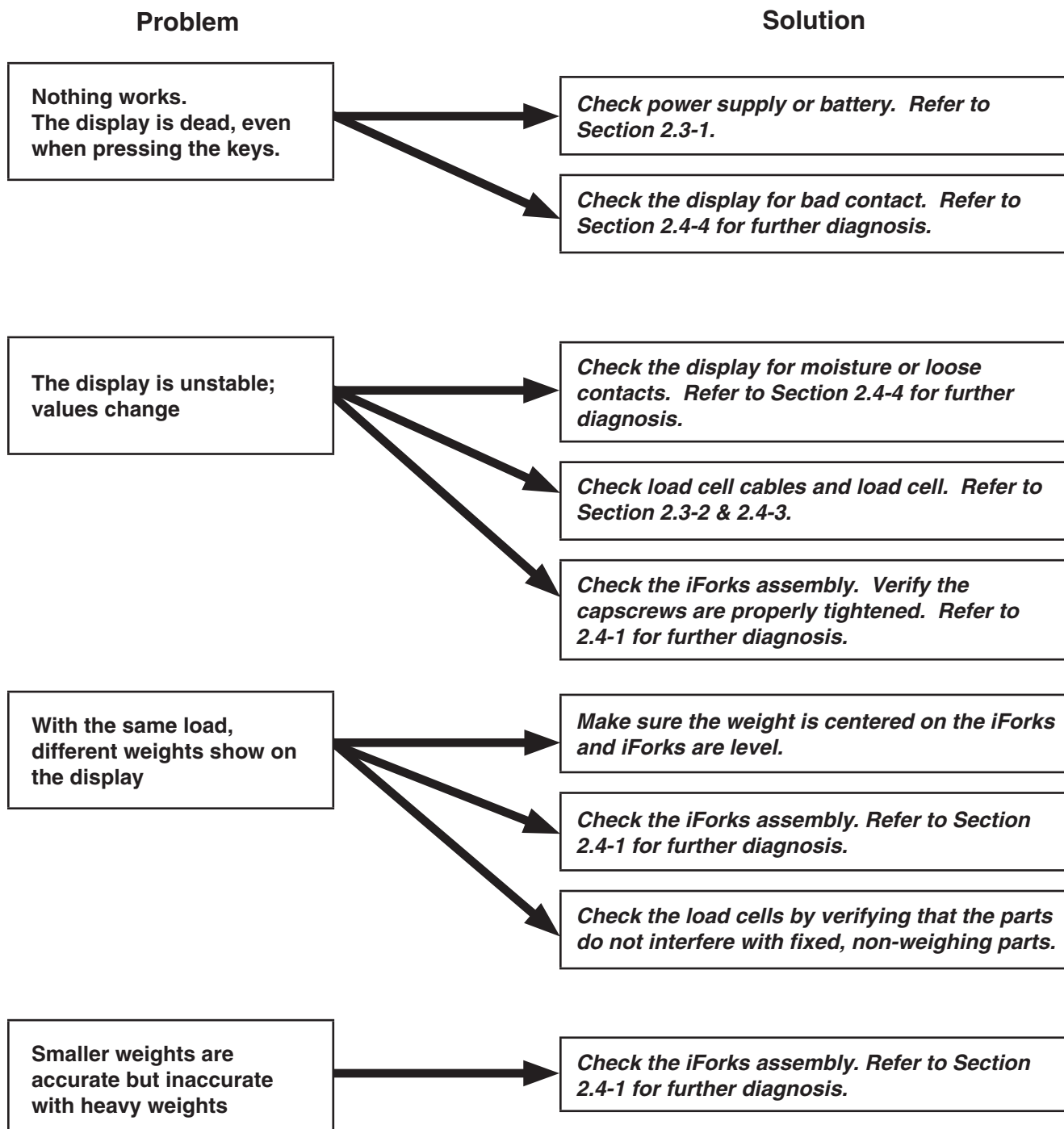
Display Messages

Display	Meaning	
BlitF1	Successful Bluetooth link with fork 1	No error
BlitF2	Successful Bluetooth link with fork 2	No error

2.3 Basic Troubleshooting

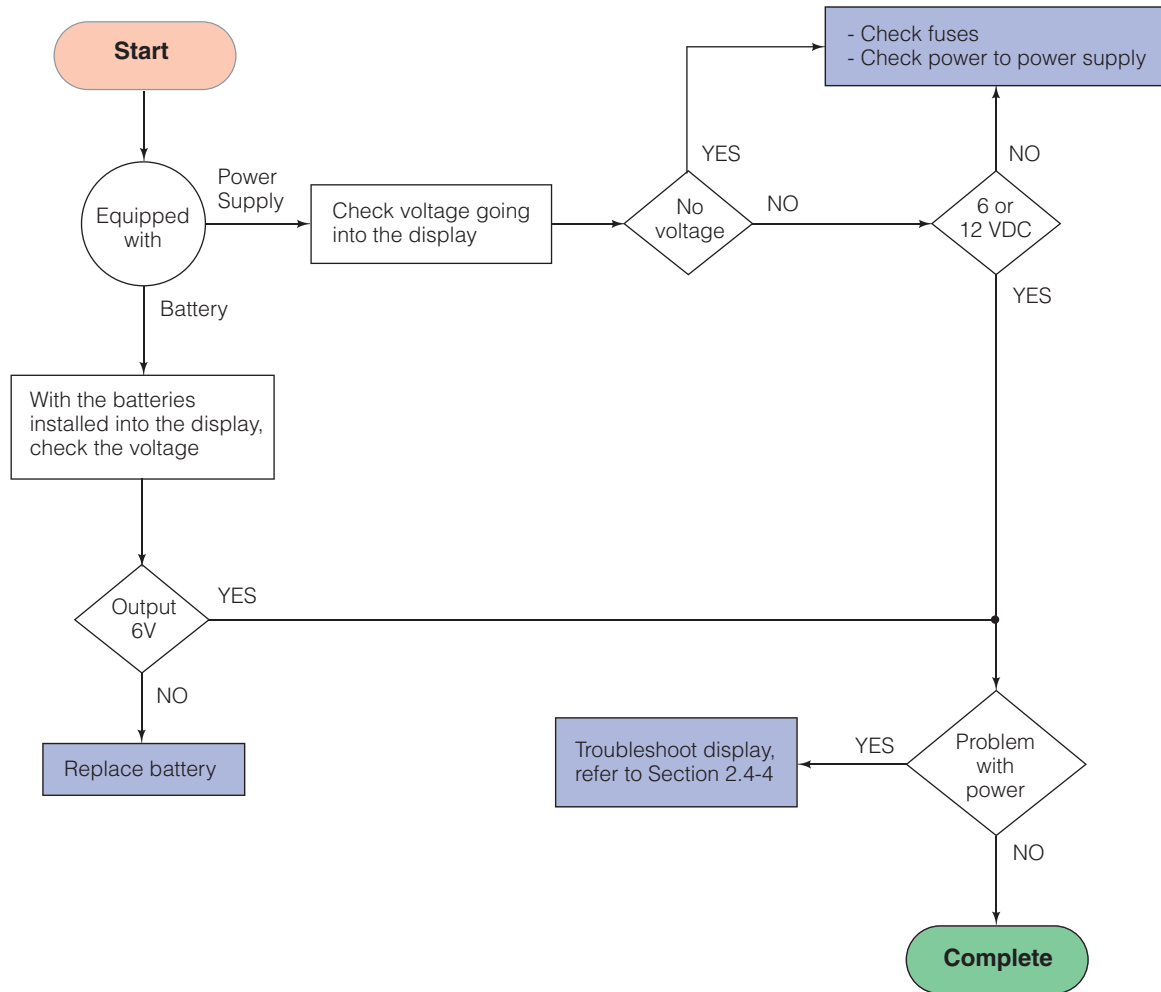
There are 6 potential problem areas that can affect the function of iForks:

- Power supply – Worn out battery, broken fuse, or power supply.
- Bad or broken contacts.
- Pinched or worn out cabling.
- Loose screws or bolts.
- Mechanical problems – Weighing part interferes with a non-weighing parts of the system due to deformation or accumulated dirt or debris in between components.
- Moisture in the electronics or load cells.



Problem	Solution
System is inaccurate but linear.	<i>Calibrate the system. Refer to Section 3.1.</i>
Display shows a positive or negative, weight and the display wont zero. The scale reacts normal when a load is placed on the scale.	<i>Calibrate the system. Refer to Section 3.1.</i>
With or without a load, the display shows an over or underload error message	<div> <i>Calibrate the system. Refer to Section 3.1.</i> </div> <div> <i>Check load cell cables and load cell. Refer to Section 2.3-2 & 2.4-3.</i> </div> <div> <i>Check the display. Refer to Section 2.4-4 for further diagnosis.</i> </div>
The display does not react to loads being weighed	<i>Check load cell cables and load cell. Refer to Section 2.3-2 & 2.4-3.</i>
The keys do not work	<i>Check the display. Refer to Section 2.4-4 for further diagnosis.</i>
Segments fail on the display	<i>Check the display. Refer to Section 2.4-4 for further diagnosis.</i>

2.3-1 Check Display Power



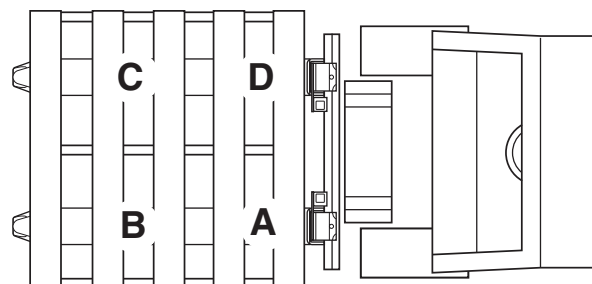
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2.3-2 Display Debug Mode

Debug mode is a useful service tool for dealing with display instability problems or when calibration is lost. Each iFork assembly transmitter module has two AD (analog-to-digital converter) chips and each load cell has one AD chip. When the display is in debug mode, the number of counts received from each AD chip is shown, individually. This helps isolate which load cell could be the problem.

NOTE: The AD values shown on the display should be close to each other for calibration.

NOTE: Both iFork assemblies must be turned on.



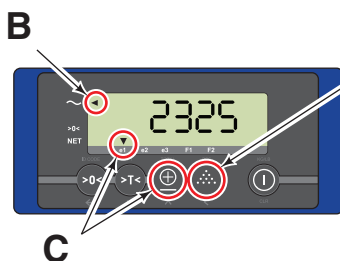
Load Cell	Display Arrow
A	e1
B	e2
C	e3
D	F1

- 1** Turn on display
- 2** Hold the "Tare" button for 25 seconds
- 3** Press "Total" button until the "DEBUG" shows
- 4** Press the "Zero" button to enter debug mode
- 5** Press the "Total" button to view the AD count for each load cell. The arrow will move to indicate which load cell is being measured.

Activate Digital Corner Calibration

Arrow indicates that the AD count has correction factors applied

Example:
AD Count: 2319
Correction factors: 1.0026
Calibrated AD Count: 2325



Press the "Total" button to view the AD count for each load cell. The arrow will move to indicate which load cell is being measured.

Press the "Piece Count" button to a active digital corner calibration

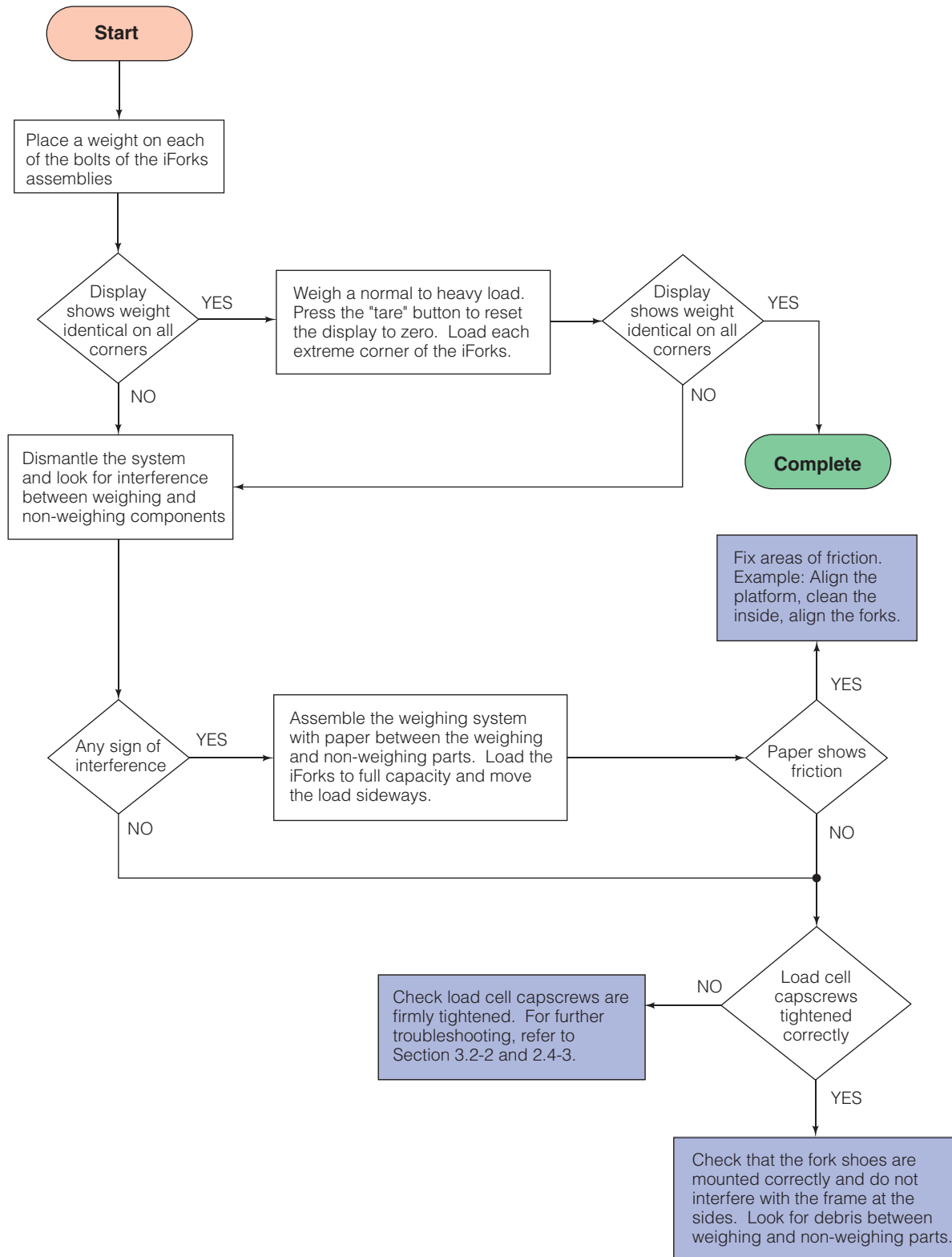
Exit Debug Mode



Press "On/Off" button to leave debug mode. The display will go back to weighing mode.

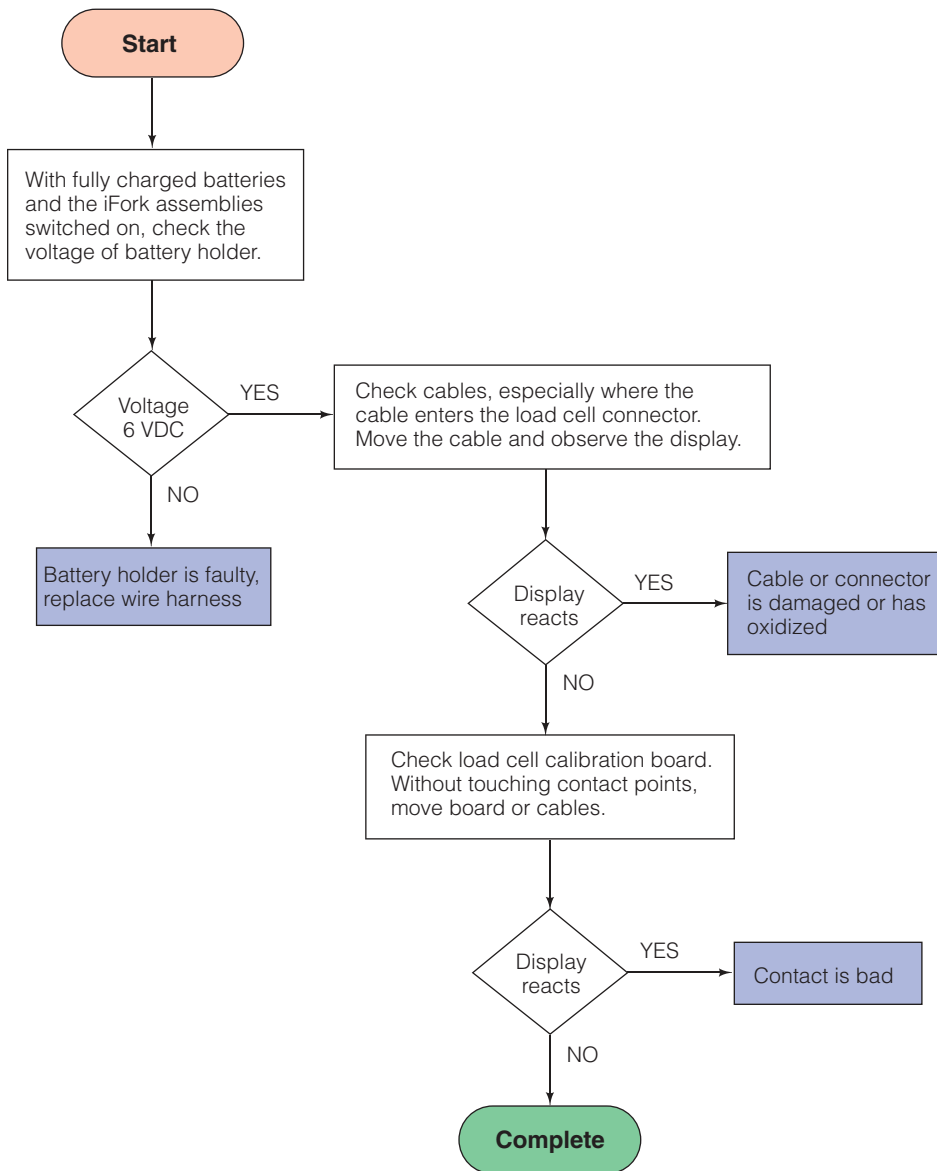
2.4 Hardware

2.4-1 Fork Assembly



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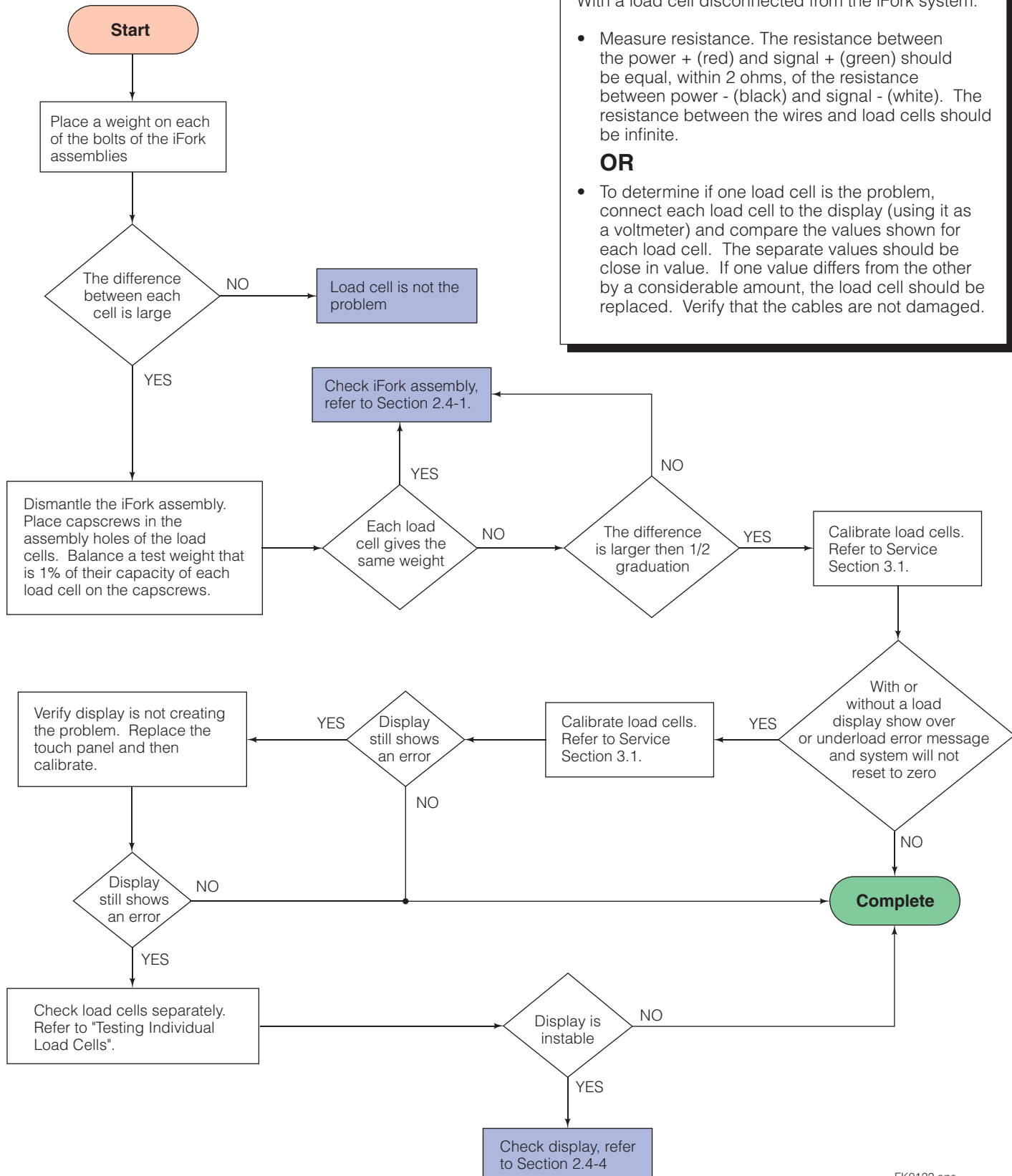
2.4-2 Wire Harness



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2.4-3 Load Cells

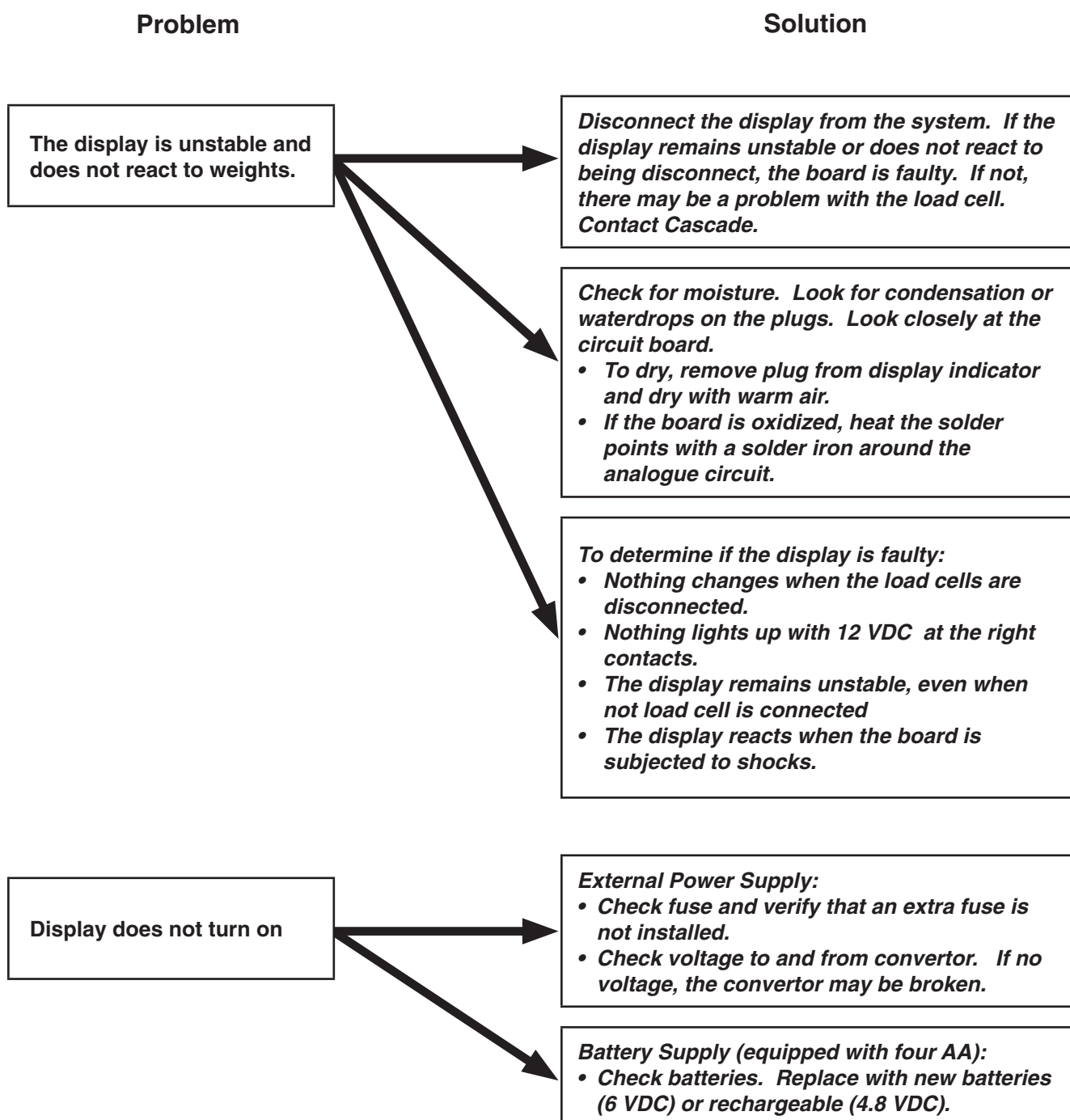
NOTE: Cascade recommends using Debug Mode first. If further troubleshooting is required, follow this flow chart.



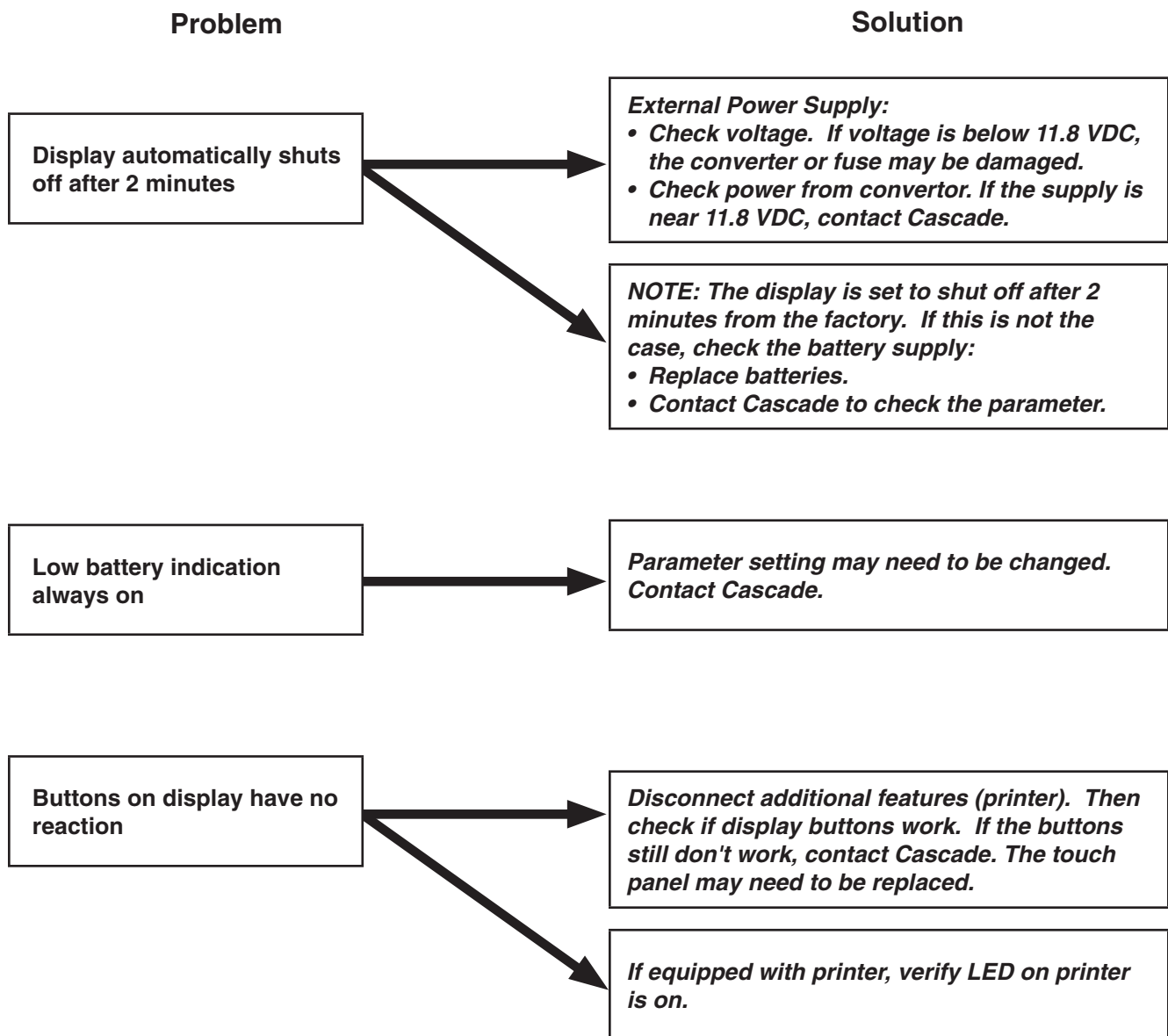
2.4-4 Display

Check the following:

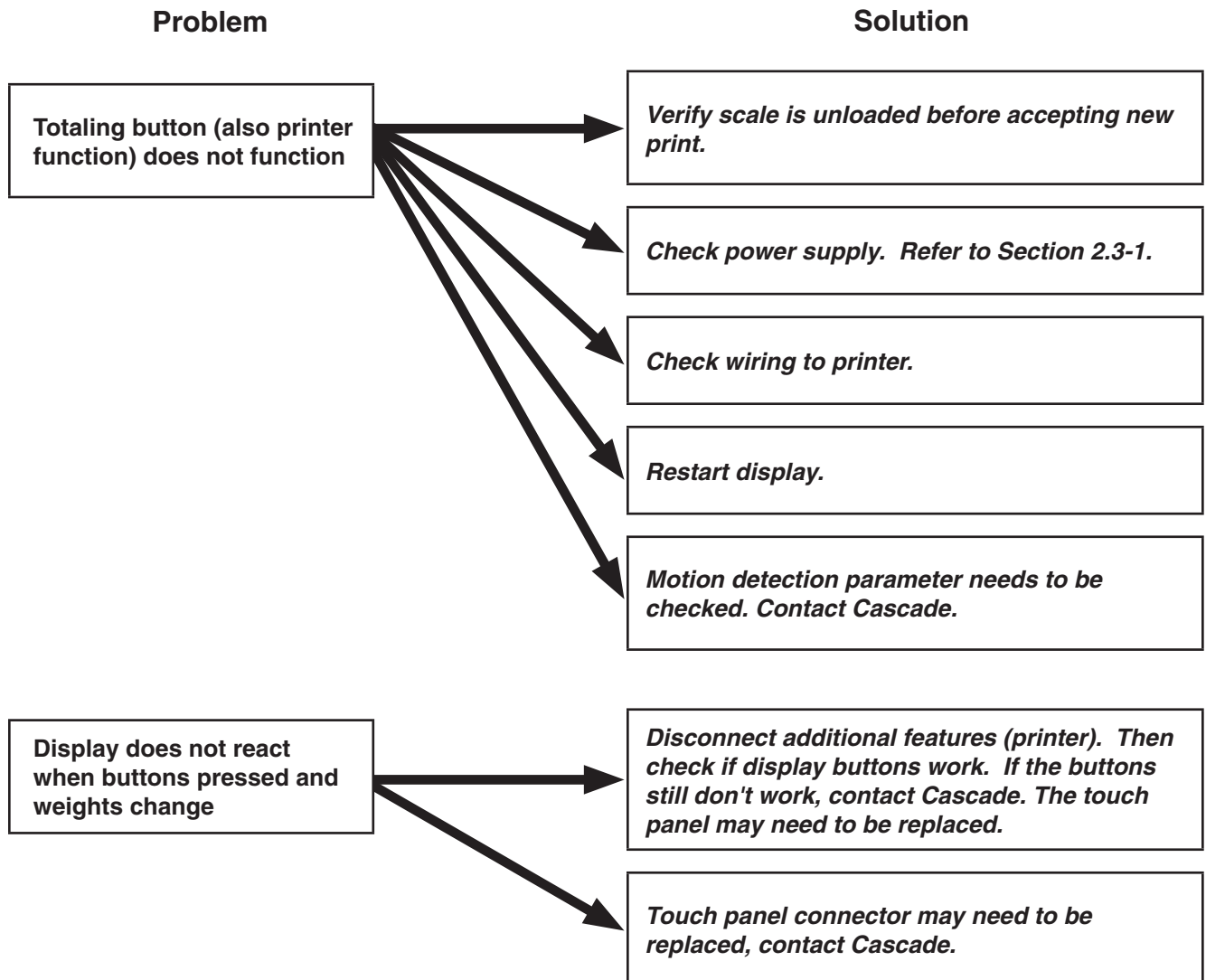
- Check separate components on the display board are secure and not loose. If needed, remove the display board, check if components are loose. See if bending the board changes the problem.
- Check for broken connections. None of the cables to the switch, safety fuse or plug should be loose.



2.4-4 Display (continued)



2.4-4 Display (continued)



2.4-5 Printer

Problem

Solution

Low battery indication on or unstable while printing

External Power Supply:

- Check voltage output. If voltage is below 11.8 VDC, check converter or fuse for damage.
- With printer installed, check amperage to and from convertor. Amperage should be 3 Amps.

Battery Supply (equipped with four AA):

- Replace with new batteries (6 VDC) or rechargeable (4.8 VDC).

No printout while printer is on – Display shows subtotal and sequence number on the display but the display *does not* show "added"

Contact Cascade to check parameter P35.

No printout while printer is on – Display shows subtotal and sequence number on the display and the display *does* show "added"

Wrong COM port selected (user settings submenu on display).

Wrong parameter setting. Contact Cascade.

CTS wire may be damaged. Contact Cascade.

Wiring to display may be wrong. Contact Cascade.

No printout while printer is off – Display shows subtotal and sequence number on the display and the display *does* show "added"

Check printer cable is installed.

No printout – Display shows "NTEP"

Action not allowed because system is NTEP approved. Unload scale then perform next weighing and printing action. NTEP regulations allow for weight to be recorded once.

3.1 Three Part Calibration

3.1-1 Calibration Introduction

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

There are three parts to calibrating iForks. Some cases only require a portion of the Three Part Calibration to be performed. A summary of each part is as follows:

- **Zero Calibration** – Determines and sets the zero point for the iForks system.
- **Corner Calibration** – Take any inconsistency between the corners and equalizes them with each other.
- **Weight Calibration** – Determines and sets the weight range for the iForks system by using a sample of known weight(s).

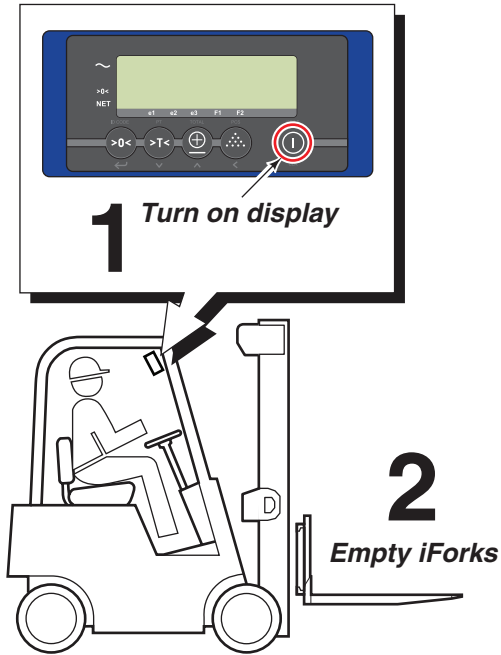
When to Calibrate ■	Tasks to perform ◆
When the iForks are not within system tolerance.	Perform Zero Calibration (Section 3.1-2) and Weight Calibration (Section 3.3-4) with at least one known weight
When the weighing range does not meet end user preferences.	Perform Zero Calibration (Section 3.1-2) and Weight Calibration (Section 3.3-4) with at least one known weight
When the display or wire harness has been replaced.	Pair (establish a connection) the display with the iFork bluetooth receivers. Perform Zero Calibration (Section 3.1-2), Corner Calibration (Section 3.1-3) and Weight Calibration (Section 3.3-4)

■ **CAUTION:** Always use proper handling and troubleshoot the iFork assemblies first before calibrating. Inaccuracies can occur when debris becomes wedged into and between the fork shoe and arm. **Always use calibration as a last result.**

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

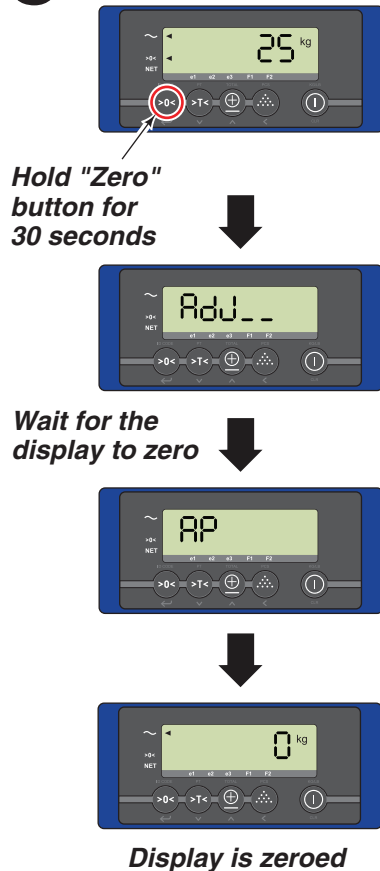
3.1-2 Zero Calibration

Zero Calibration is the first step in completely calibrating the iForks system. This calibration step defines the zero point of the system.

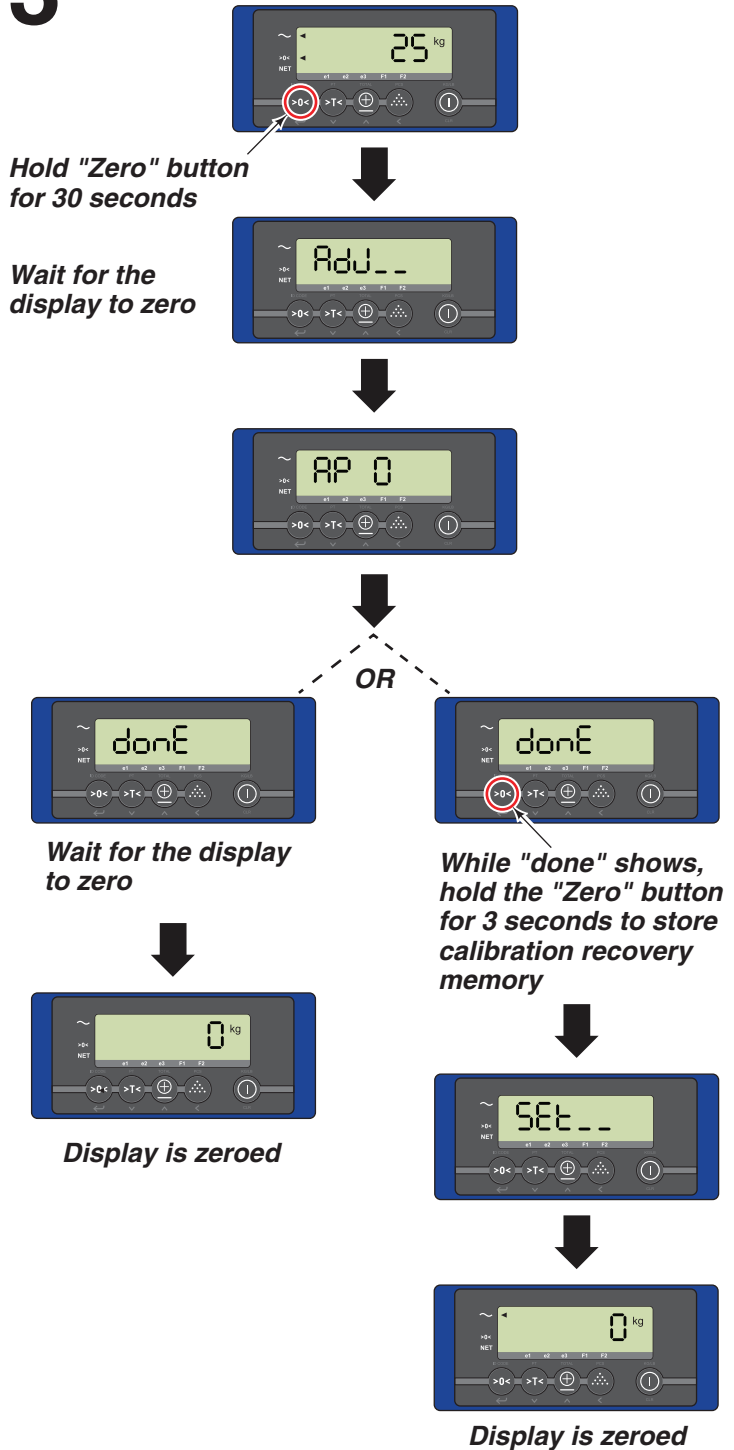


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3 For software versions earlier than 2.13:

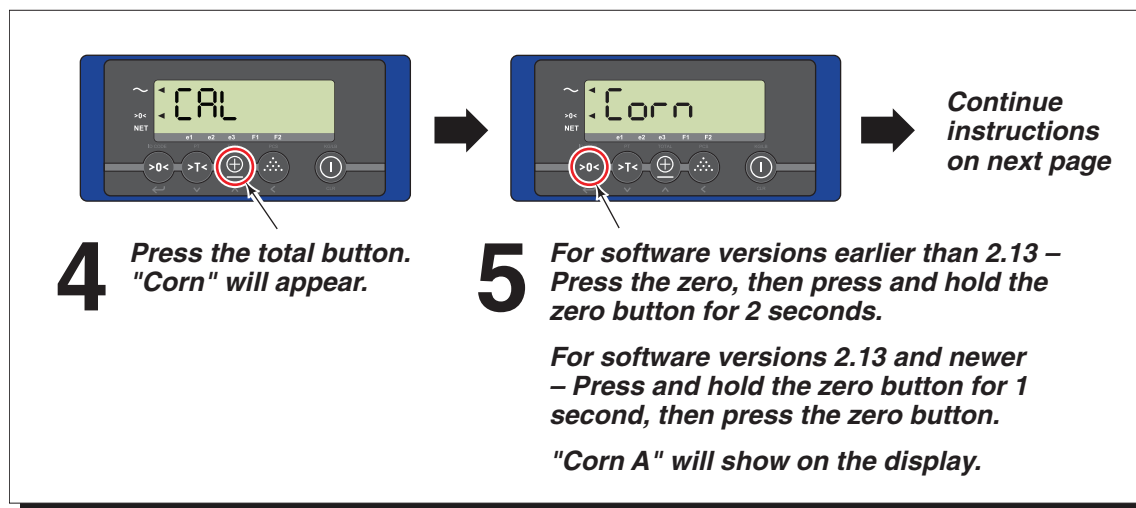
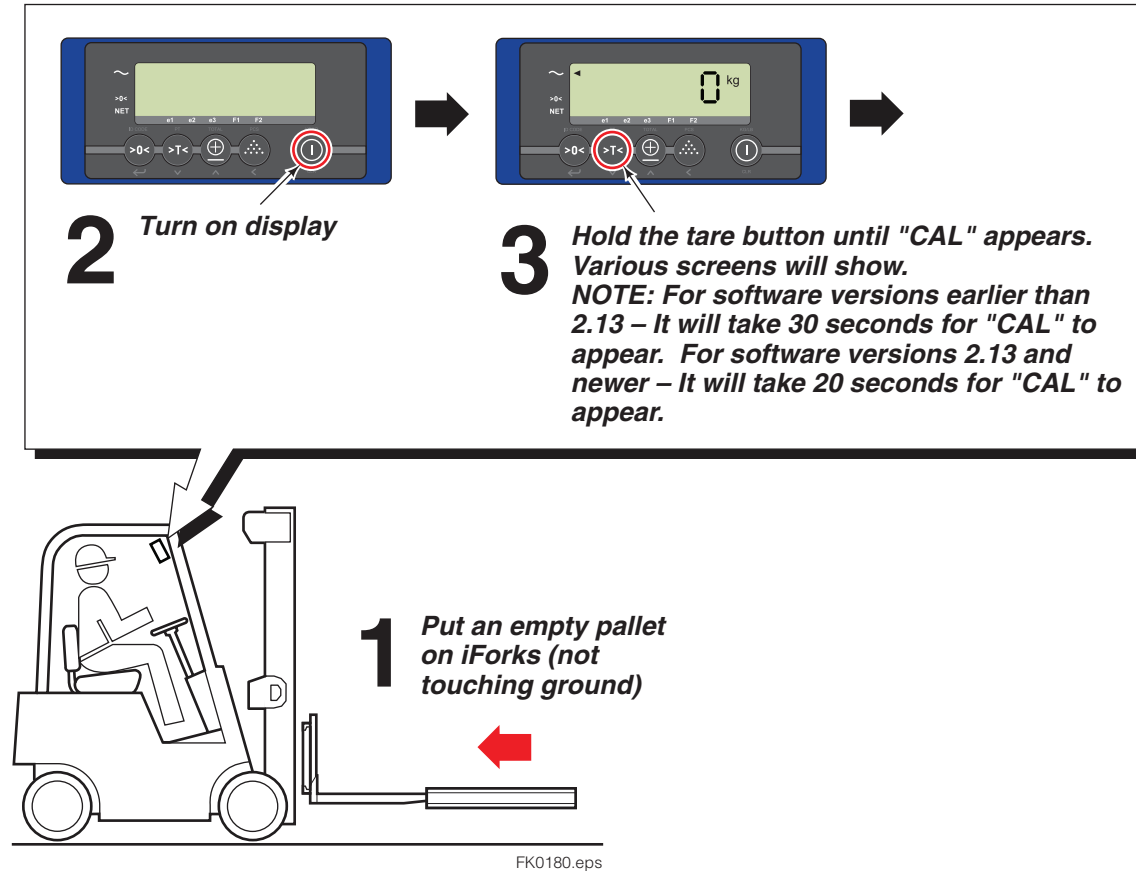


3 For software versions 2.13 and newer:



3.1-3 Corner Calibration

Corner Calibration is the second step in completely calibrating the iForks system. This calibration step takes the measurement of a single weight on each corner. The load cell readings are then adjusted to be equalized for accuracy of weight.



8 Place a weight on pallet, position C



Press the enter key, to accept weight

IMPORTANT: Use a minimum 100 lbs. (45 kg). For optimal corner calibration, use 1000 lbs. (454 kg).

9 Place a weight on pallet, position D



Press the enter key, to accept weight

7 Place a weight on pallet, position B



Press the enter key, to accept weight

6 Place a weight on pallet, position A



Press the enter key, to accept weight

IMPORTANT: Use the same weight for each corner.

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10 For software versions earlier than 2.13:



Press the enter key to exit

For software versions 2.13 and newer:



Wait for the display to zero



Display is zeroed

OR



While "done" shows, hold the "Zero" button for three seconds to store calibration recovery memory



The weight recorded will show

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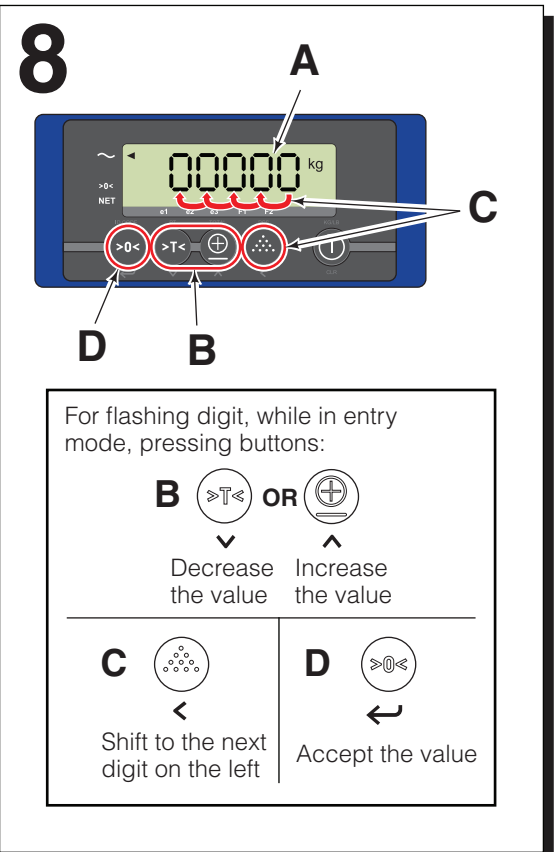
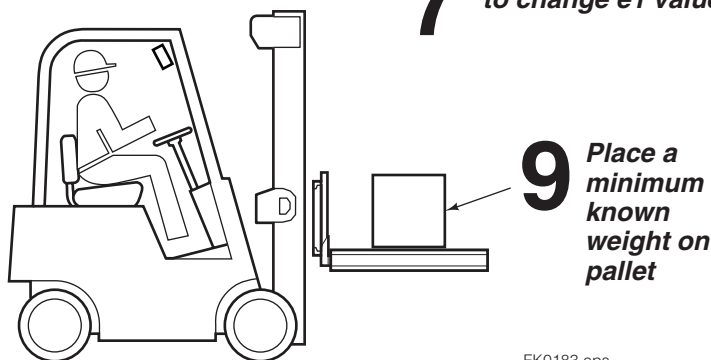
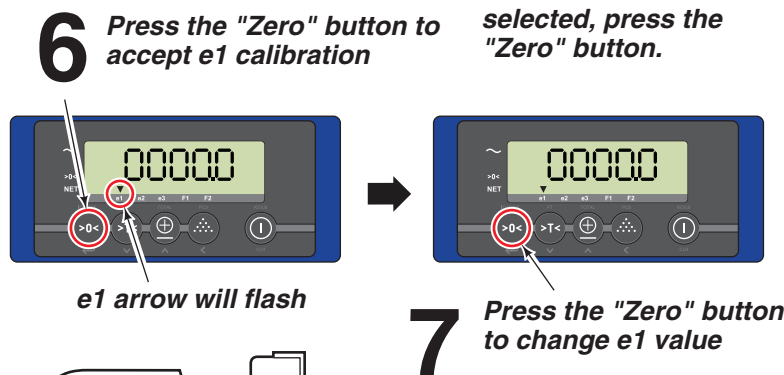
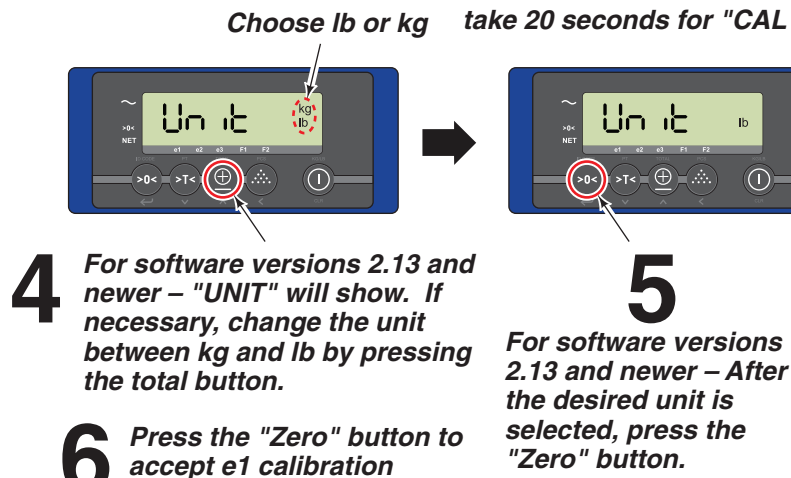
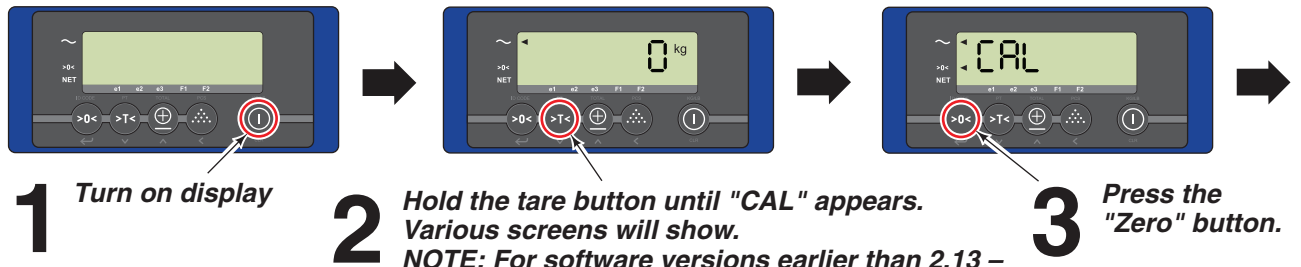
3.1-4 Weight Calibration

Weight Calibration is the third step in completely calibrating the iForks system. This step uses the sample of weights to determine the curve of how the system measures weight. This calibration step requires three 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:

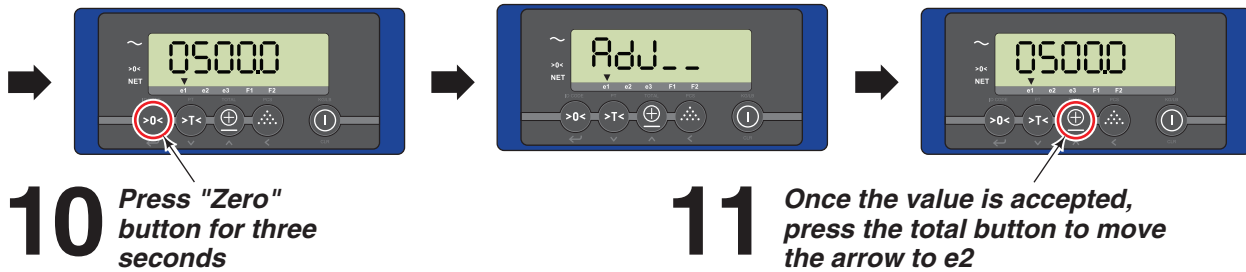
M1 = 1/3 Capacity, e.g. 2,000 lb (900 kg)
M2 = 2/3 Capacity, e.g. 4,000 lb (1,800 kg)
M3 = Full Capacity, e.g. 6,000 lb (2,700 kg)

NOTE: The selected weights, M, is the total calibration weight loaded onto the iForks (includes pallet, if used).

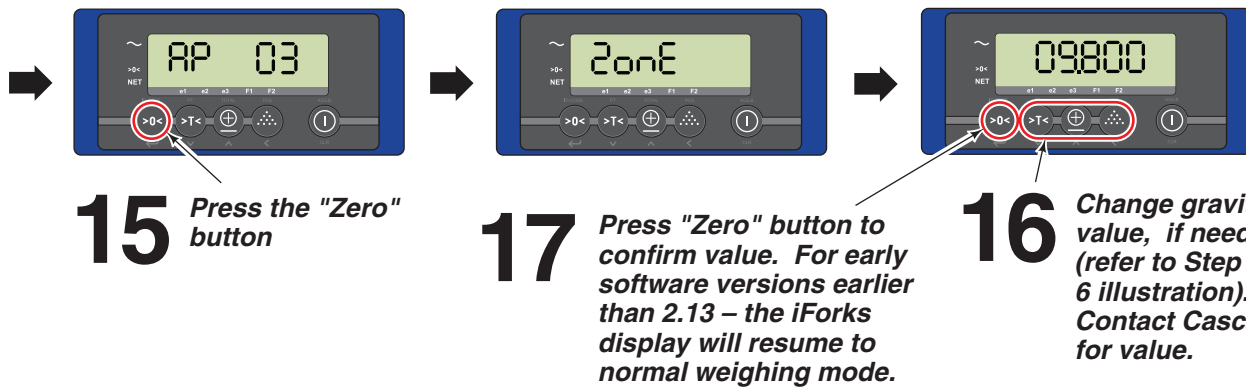
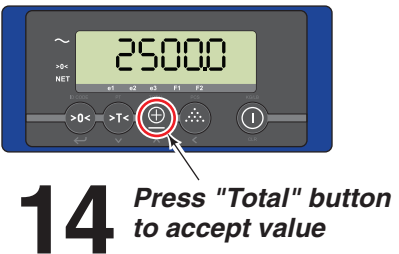
CAUTION: The iForks system tolerance can be achieved using three known weights (0.1 %). If the handled product weight range is very consistent, 1 or 2 weight(s) is sufficient.



3.1-4 Weight Calibration (continued)

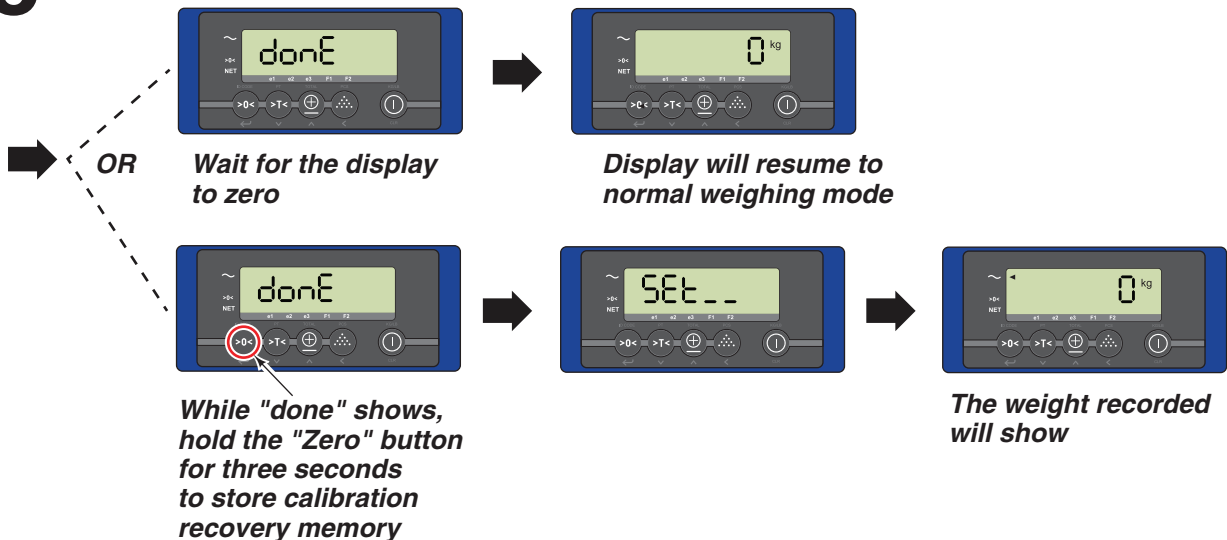


NOTE: If calibrating with one or two weights, e2 (if no known weight) and e3 (if no known weight) values should be set zero. Step 9 should be skipped.



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18 For software versions 2.13 and newer:



3.2 Display

3.2-1 Pairing Dual Bluetooth PCB to iForks

For situations where the dual bluetooth circuit board has been replaced or the complete display is replaced, it is necessary to pair the two sets of bluetooth receiver.

1 Determine mac addresses for each receiver

Option 1

If the complete display was not replaced, look on the back of the display (some displays).

NOTE: Remove display from mounting bracket to find the mac addresses.

IMPORTANT: If the mac address sticker is missing, a duplicate is located inside the display.

IMPORTANT: For displays wired directly to the truck power, disconnect the display from the power source before opening the display.



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Option 2

Use any device that has bluetooth pairing capabilities: PDA, Mobile Telephone, PC, Terminal, etc.

IMPORTANT: The following procedure can not be performed with Apple® products (iPhones, iPads, etc).

- A** Turn on Fork 1.
- B** In the device's settings, select "Search for devices" or similar command.
- C** The device will show all active bluetooth devices available. The iForks will start with "008098" or "Ezurio Blu2i". The last 6 characters is the Mac address and record this.
- D** Turn off Fork 1 by holding the blue battery button until the bluetooth receiver illuminates constantly. Release button.
- E** Repeat the Steps **A** thru **D** for Fork 2.

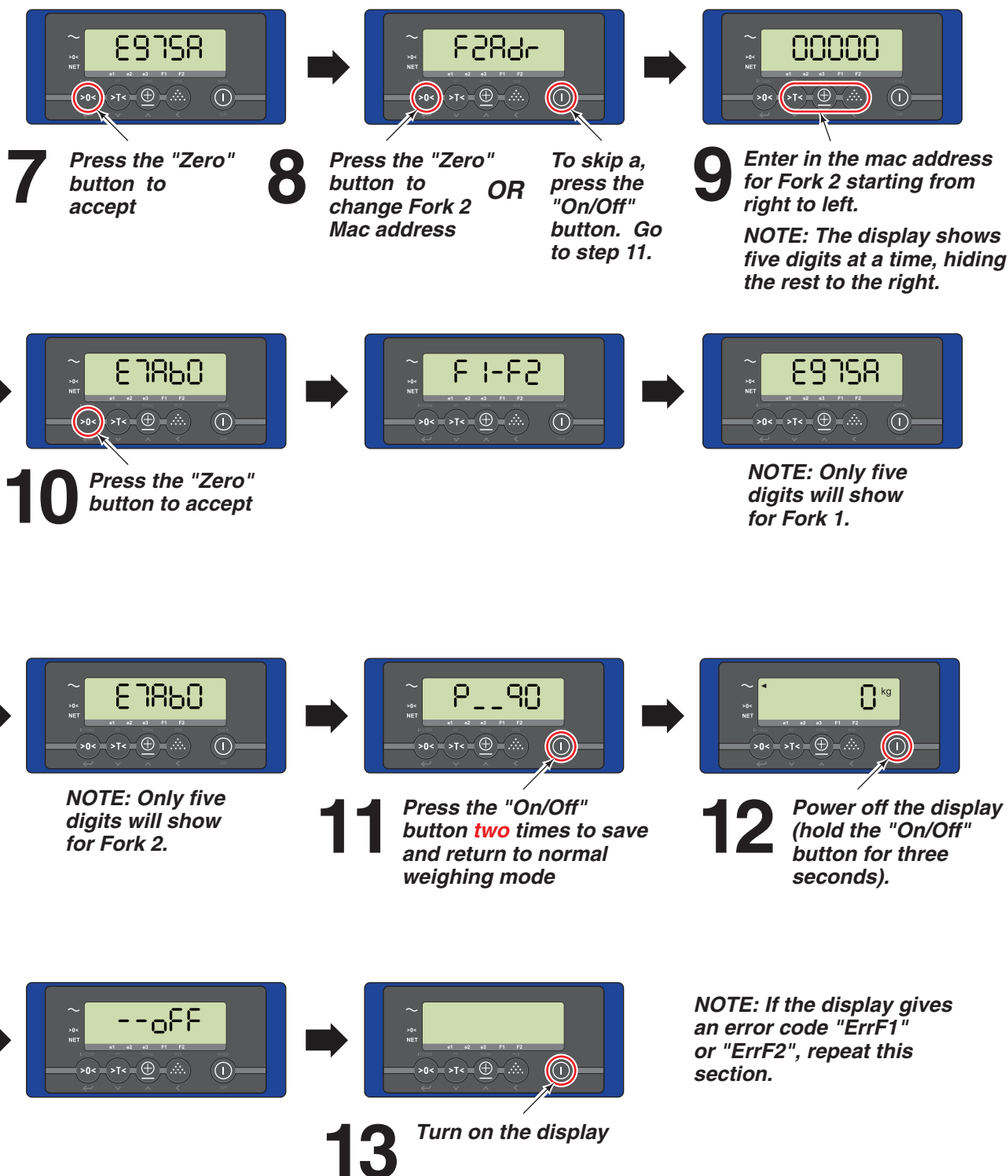
Example using a PDA:



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IMPORTANT: Shut off iFork assemblies when continuing to step 2.

3.2-1 Pairing Dual Bluetooth PCB to iForks (continued)



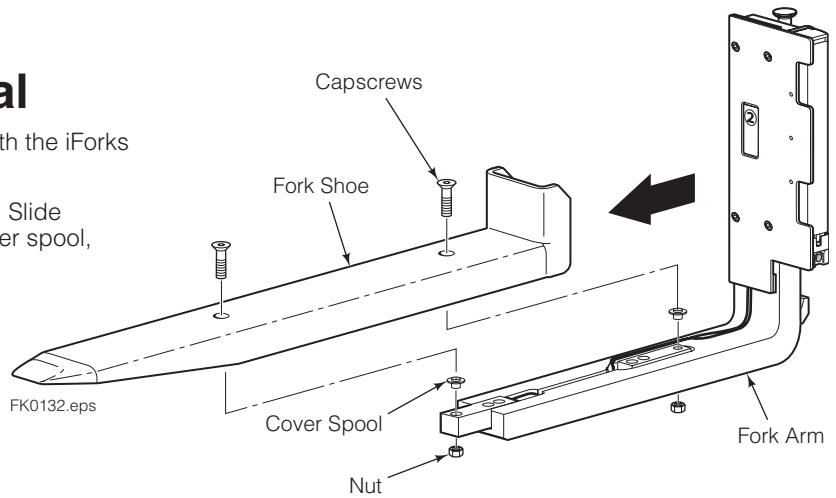
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3.3 Wire Harness

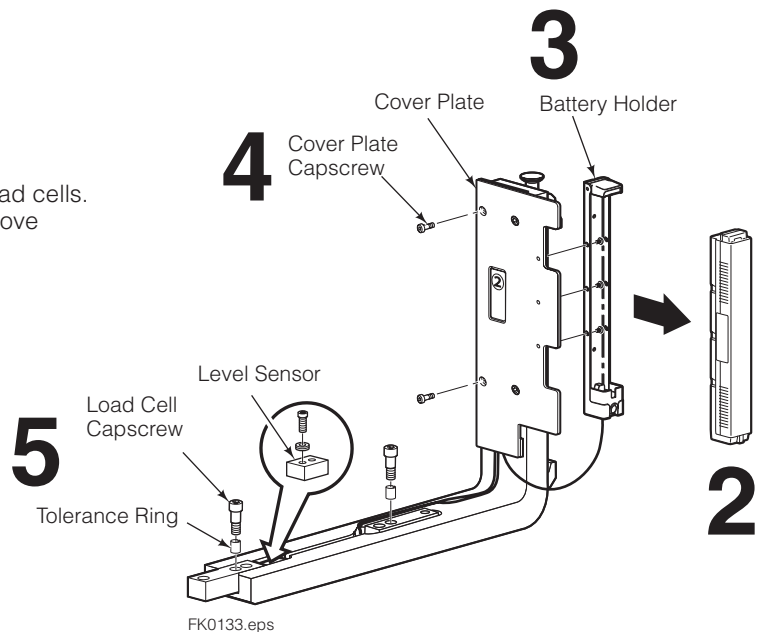
3.3-1 Wire Harness Removal

The following procedure can be performed with the iForks mounted on the truck carriage.

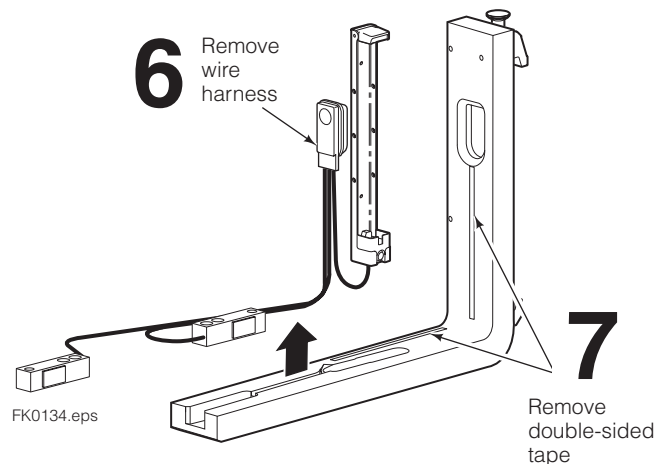
- 1 Remove capscrew and nut from fork shoe. Slide fork shoe from fork arm. Keep track of cover spool, capscrew and nut.



- 2 Remove battery from battery holder.
- 3 Remove battery holder from cover plate.
- 4 Remove cover plate.
- 5 Remove capscrews and tolerance ring from load cells. If equipped with level sensor (NTEP only), remove capscrews.



- 6 Remove the fork wire harness from the fork arm.
- 7 Remove all double-sided tape from fork arm.
- 8 Clean tape surface and clean any debris and dirt from the fork arm, fork shoe and other components.

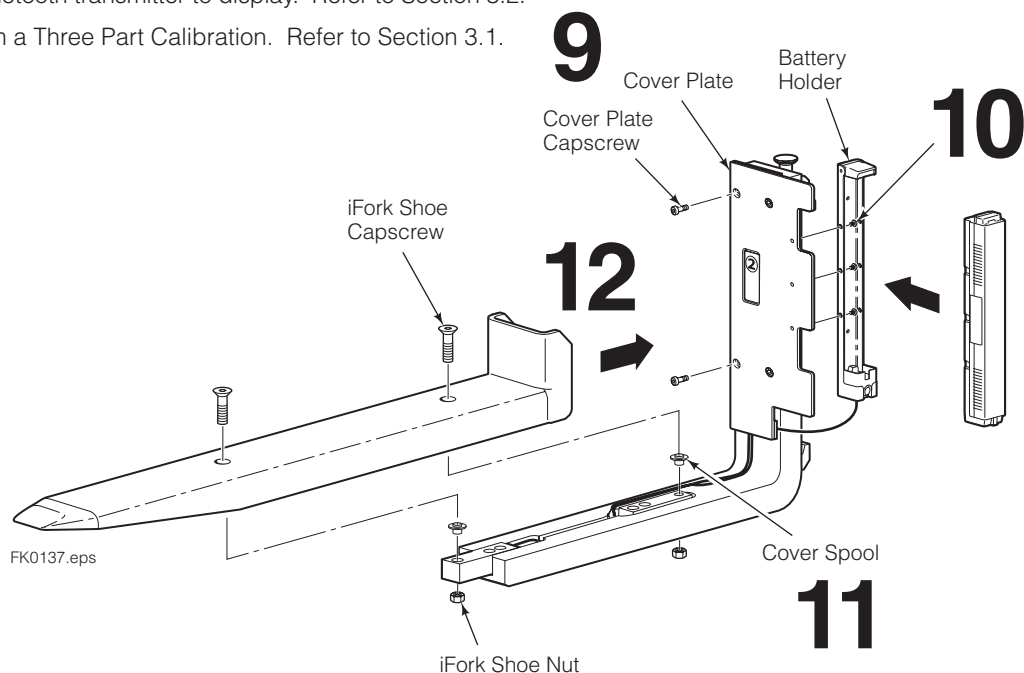
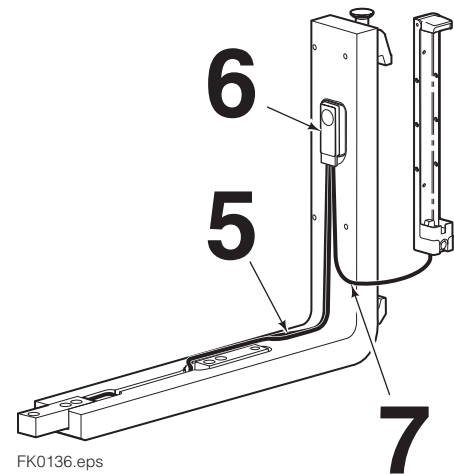
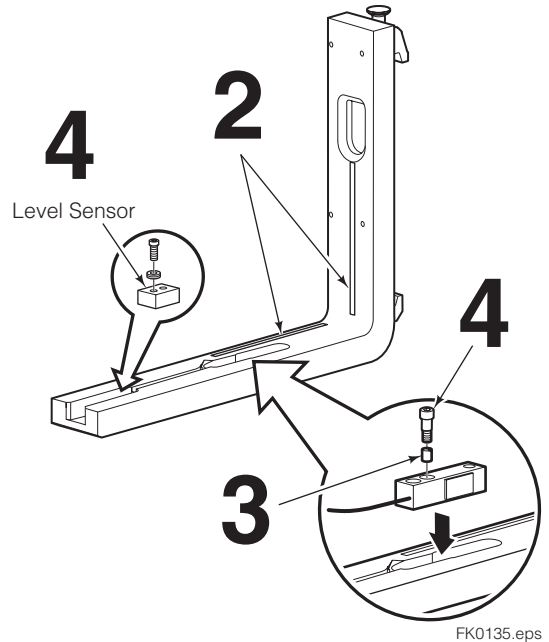


3.3-2 New Wire Harness Installation

CAUTION: Do not pick up the wire harness by its wires. This can damage the connection between the load cell and wires.

CAUTION: Do not let the cells hit each other. Handle components with care.

- 1 Remove old wire harness as described in Section 3.2-1.
 - 2 Place new double-sided tape on the fork arm wire channels.
 - 3 Install two tolerance rings to each load cell.
 - 4 Install load cells and load sensor (if equipped) into fork arm. Tighten capscrews to 80 ft.-lbs. (110 Nm).
 - 5 Route wiring in channels to the cutout in the fork shank.
- IMPORTANT:** Do not cross the wires over each other. It affects the current when wired.
- 6 Install the transmitter in the shank cut out.
 - 7 Route wiring to the battery carrier in the wire channel.
 - 8 Verify that the wires are properly seated by using the cover plate. The cover plate should not rock side to side and does not pinch wires.
 - 9 Install the cover plate. Tighten capscrews to 7 ft.-lbs. (9.5 Nm).
- CAUTION:** Be very careful to not pinch wires underneath the cover plate. This will damage the communication of the system.
- 10 Mount the battery carrier to the cover plate.
 - 11 Install cover spools to the load cells.
 - 12 Carefully slide the iForks shoe onto the fork arm until the mounting holes line up. Install capscrews and nuts and tighten to 80 ft.-lbs (110 Nm).
 - 13 Pair bluetooth transmitter to display. Refer to Section 3.2.
 - 14 Perform a Three Part Calibration. Refer to Section 3.1.



Do you have questions you need

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