



Installation Manual

AxleSurance Weigh System

AMENDMENT RECORD

AxleSurance Weigh System

Document 51431

Manufactured by **Fairbanks Scales Inc.**

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Table of Contents

SECTION 1: GENERAL INFORMATION	6
1.1. Introduction	6
1.2. Basic Requirements	6
1.2.1. Foundation.....	6
1.2.2. Drainage.....	6
1.2.3. Power	7
1.2.4. Cabling	7
1.2.5. Controller.....	7
1.3. SPECIFICATIONS	7
SECTION 2: COMPANY SERVICE INFORMATION	9
2.1. General Service Policy	9
2.1.1. Pre-Installation Checklist.....	10
2.1.2. Unpacking.....	11
2.1.3. Equipment Location.....	11
2.1.4. Safety	12
2.2. Users' Responsibilities	12
SECTION 3: INSTALLATION.....	13
3.1. Introduction	13
3.2. Scale Installation.....	13
3.2.1. Tools, Equipment, and Materials Required	13
3.2.2. Selecting and Preparing a Site (Step 1).....	14
3.2.3. Excavating the Site (Step 2).....	15
3.2.4. Dig drain line and lay drain (Step 3).....	15
3.2.5. Install First layer of Crushed Stone (Step 4)	16
3.2.6. Install Second layer of Crushed Stone Base (Step 5).....	16
3.2.7. Review final level (Step 6).....	17
3.2.8. Set the Scale (Step 7)	17
3.2.9. Connect Drain (Step 8).....	18
3.2.10. Controller conduit (Step 9)	19
3.2.11. Connect Load cells (Step 10).....	20
3.2.12. Backfill and final compacting (Step 11).....	20
3.3. Controller and Accessories Installation	22
3.3.1. Install Console and Accessories	22
3.3.2. Complete Power and Cables.....	23
SECTION 4: STARTUP PROCEDURES	26
4.1. Basic Functions	26
4.1.1. Screen Display Fields.....	27
4.1.2. Annunciators.....	27
4.1.3. Keypad	28
4.1.4. INITIAL SETUP	29
SECTION 5: CALIBRATION	30
5.1. Known Weights	30
5.2. Dynamic Scale Factor.....	31
SECTION 6: INFORMATION MANAGEMENT SETUP	32



6.1. Aggregate, Harvest, Generic & Truck CSV File Configuration	32
6.1.1. <i>USB Files.....</i>	32
6.1.2. <i>Truck.csv File editing.....</i>	34
SECTION 7: INSTRUMENT SETUP	36
7.1. USB Operation	36
7.2. Clicker Operation	37
7.2.1. <i>To add a Clicker/Key Fob to a New Entry:</i>	37
7.2.2. <i>To add a Clicker/Key Fob to an Existing Truck ID:</i>	38
7.2.3. <i>To Add an Unassigned clicker and Truck ID:.....</i>	38
7.2.4. <i>Strings</i>	38
7.2.5. <i>Turn Instrument ON / OFF</i>	39
7.2.6. <i>Viewing Truck IDs</i>	39
7.2.7. <i>Editing Truck Data (existing)</i>	40
7.2.8. <i>Editing the Available Fields for Each Truck ID</i>	40
7.3. Clock	40
7.3.1. <i>Traffic Lights.....</i>	41
7.3.2. <i>Printer Operation</i>	42
SECTION 8: SCALE OPERATION.....	43
8.1. Function Keys	43
8.1.1. <i>Introduction.....</i>	43
8.1.2. <i>Zero Key.....</i>	43
8.2. Truck Weighing Operation	44
8.2.1. <i>Weighing.....</i>	44
8.2.2. <i>Weighing Out with First Weight.....</i>	44
8.2.3. <i>Weighing First then Configuring.....</i>	44
8.2.4. <i>[F3] Configuration Menu (long press).....</i>	45
8.3. Error Messages	45
8.3.1. <i>Overview.....</i>	45
8.3.2. <i>Weighing Errors.....</i>	45
8.3.3. <i>Definitions:.....</i>	47
SECTION 9: PARTS	48
9.1. Parts List.....	48
APPENDIX I: FOUNDATION SETTING PLAN.....	49

Section 1: General Information

1.1. Introduction

The Fairbanks AxleSurance Weigh System is a semi-portable axle weightment system with a small footprint and faster install time compared to similar systems. Weightments are performed on each axle as a vehicle slowly moves across the scale. The instrument records the individual axle weights along with a total weight value.

The instrument is designed to be used outdoors as an IP66 panel mount.

This instrument uses advanced firmware and the LUA module to perform axle weighing. The category logging program records truck weights to a database for later recovery using a USB drive. There is a soft power on/off function that retains memory of its state. Once an instrument is turned on, it will automatically start up again if the external power is interrupted. Day-to-day settings (Clock, Trucks, and Pre-set Tares etc.) are retained when power is removed.

The instrument provides **Zero**, **Truck** and **Re-print** keys on the front panel of the instrument and supports special functions (farm/field setup, 1 key access to configuration menu.), via function key and remote inputs (*clickers*). The **Up/Down** arrow and **[OK]** keys are used in most menus to make selections.

This manual provides the necessary steps to install the complete AxleSurance Weigh System.

1.2. Basic Requirements

1.2.1. Foundation

- Scale should rest on a 12-inch bed of 1 ½" crushed stone. Concrete bed is NOT recommended for this scale.
 - Foundation is created by compacting two 6-inch layers of 1 ½" crushed stone. Each 6-inch layer of fill to be compacted to a dry density of 95% in compliance with ASTM "D 698".
 - Fill should extend at least 1 foot beyond limits of the scale
 - Top layer to be "Flat and Level" to within 1/8 inch for best results.
- Installer is responsible for providing foundation drainage to prevent frost heave.

1.2.2. Drainage

- Suitable drainage is required to prevent water accumulation in the scale and to prevent potential frost heave.
- The scale has a 4-inch Schedule 40 PVC drain connection point. Drain outlet must be connected to gravity or rock (French) drain.

1.2.3. Power

- 120VAC power required at point where controller is to be installed.
- Outdoor applications use buried 1-inch conduit to supply power.
- Indoor applications use a 120VAC duplex outlet.
- There is a soft power on/off function that retains memory of its state. Once an instrument is turned on it will automatically start up again if the external power is interrupted.

1.2.4. Cabling

- The Scale is provided with up to 100 feet of home run cable that should be run in 1-inch conduit between scale and controller.

1.2.5. Controller

- The Outdoor controller is a 12 X 14 X 8-inch fiberglass enclosure with optional door mounted printer and red/green traffic control lights on both sides.
- Controller is customer installed and can be mounted indoors or a protected outdoor environment.
- Controller should not be exposed to direct sunlight or driving rain without additional protection.

1.3. SPECIFICATIONS

SPECIFICATIONS	
Capacity	50,000 lbs. (25t) per axle
Display Resolution	20 lbs. (10kg)
Operating Speeds	Structurally Certified for "in road use" at 40 mph up to 50,000 lbs. (22.7t)
	Recommended 2-3 mph (5km/h)
	Speed error above 7 mph
Static Overload	150% overload on 80,000 lbs. load cells = 120,000 lbs. (60t)
SCALE	
Precast Foundation	Dimensions: 8.5 x 12 x 11.5' (2.6 x 3.7 x 3.5m)
	Weight: 16,000 lbs. (7.3t)
Scale Insert	Dimensions: 2.5' x 11' x 5" (0.76 x 3.4 x .125m)
	Weight: 1,500 lbs. (0.7t)
Mounting Assembly	Outboard, In-tension cradle assembly, self-contained

Load Cells	4 x 20,000 lbs. (10t) folded shear beam load cells
	Stainless Steel, Hermetically Sealed,
	IP68 ingress Protection, M12 Watertight connectors
ELECTRONICS	
Zero Cancellation	+/- 2.0mV/V
Span Adjustment	0.1mV/V to 3.0mV/V
A/D Type	24bit Sigma Delta with $\pm 8,388,608$ internal counts
Operating Environment	Temperature: ambient: 14°F to 122 °F
	storage: -4°F to 122 °F
Display	LCD with 4 alpha-numeric displays and LED backlighting:
	Primary display: 6 x 1.12" (28.4mm) high digits with units and annunciators
	2nd display: 9 x 0.7" (17.6 mm) digits with units
	3rd display: 8 x 0.2" (6.1 mm) digits
	4th display: 4 x 0.3" (7.6 mm) digits
Serial Outputs	Serial 1A: RS-232 serial port for remote display, network or printer supports.
	Serial 1B: RS485 transmit only for remote display
Battery Backed Clock Calendar	Battery life 10 years minimum
Additional Communications	Module: RS232/RS232 Module: RS232/RS485 Module: RS485/RS485
Data Storage Device	1
Ethernet TCP/IP	1

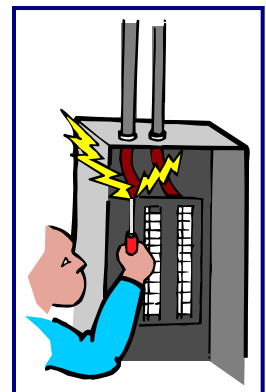
Section 2: Company Service Information

2.1. General Service Policy

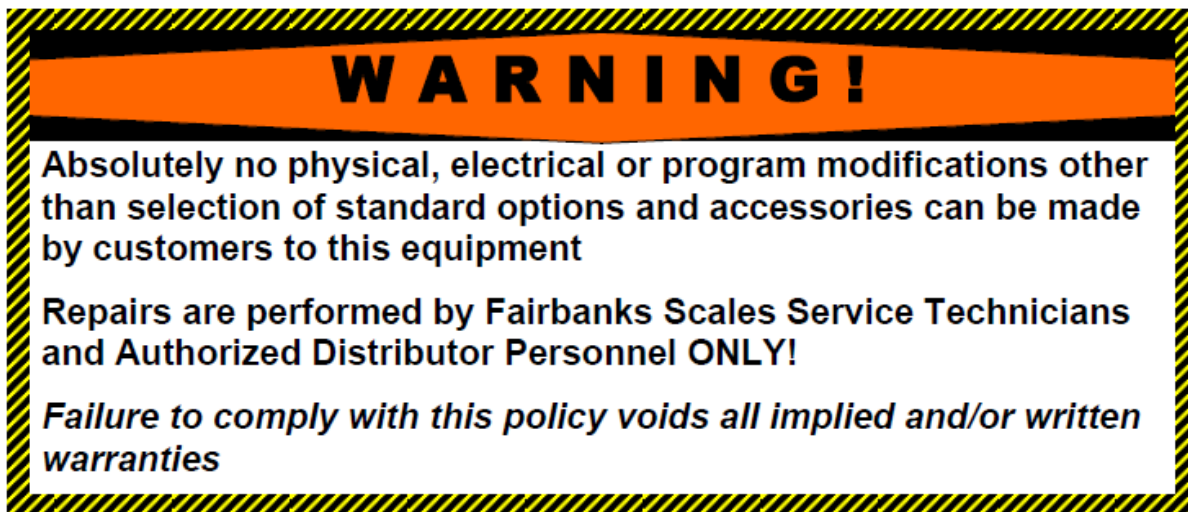
- Prior to installation, always verify that the equipment satisfies the customer's requirements as supplied, and as described in this manual.
- If the equipment cannot satisfy the application and the application cannot be modified to meet the design parameters of the equipment, **the installation should NOT be attempted.**
- Instructions within this manual apply to the instrument and its specific accessories. Installation procedures for printers and other peripherals are given in manuals specifically provided for those units. The instructions include a pre-installation checkout which must be performed either at the service center before the technician goes to the site, or at the site before he places the equipment in service.
- All electronic and mechanical calibrations and/or adjustments required to make this equipment perform to accuracy and operational specifications are considered to be part of the installation, and are included in the installation charge. **Only those charges which are incurred as a result of the equipment's inability to be adjusted or calibrated to performance specifications may be charged to warranty.**
- Absolutely no physical, electrical, or program modifications other than selection of standard options and accessories are to be made to this equipment. Electrical connections other than those specified may not be performed, and no physical alterations (mounting holes, etc.) are allowed and will immediately void warranty

All load cells, load cell cables, and all interconnecting cables used for the scale components **must be located a minimum of thirty-six inches (36") away from all single and multiple phase high energy circuits and electric current-carrying conductors.**

- This includes, but is not limited to digital weight instruments, junction boxes, sectional controllers, and power supplies.
- This includes any peripheral devices, such as printers, remote displays, relay boxes, remote terminals, card readers, and auxiliary data entry devices.
- Scale components themselves must also be at least **thirty-six inches (36") away** from other high energy components, including the following devices.
 - Any machinery with outputs of **120, 240, or 480 volts AC.**



- High voltage wiring runs and stations, AC power transformers, overhead or buried cables, electric distribution panels, electric motors, florescent and high intensity lighting which utilize ballast assemblies, electric heating equipment, traffic light wiring and power, and all relay boxes.
- Scale components are not designed to operate on internal combustion engine driven electric generators and other similar equipment.
 - This includes all digital weight Instruments and peripheral devices.
- Electric arc welding can severely damage scale components, such as digital weight Instruments, junction boxes, sectional controllers, power supplies, and load cells.
- The Service Technician's responsibility that all personnel are fully trained and familiar with the equipment's capabilities and limitations before the installation is considered complete.



***Please call your local
FAIRBANKS SCALES REPRESENTATIVE
for any questions, problems, or comments.***

2.1.1. Pre-Installation Checklist

The following points should be checked and discussed with the **Area Sales Manager and/or customer**, if necessary, before the technician goes to the site and installs the equipment:

- ✓ Check the customer's application to make certain it is within the capabilities and design parameters of the equipment.
- ✓ If the installation process might disrupt normal business operations, tell the customer and ask that they make ample arrangements.
- ✓ Is properly grounded power available at the installation location?
- ✓ Be sure that the equipment operator(s) are available for training.
- ✓ The Service Technician must thoroughly review the installation procedures.
- ✓ The service technician reviews the recommended setup with the Area Sales Manager or Area Service Manager, and together they identify all necessary variations to satisfy the customer's application.



2.1.2. Unpacking

Follow these guidelines when unpacking all equipment.

- ✓ Check in all components and accessories according to the customer's order.
- ✓ Remove all components from their packing material, checking against the invoice that they are accounted for and not damaged.
 - Advise the shipper immediately, if damage has occurred.
 - Order any parts necessary to replace those which have been damaged.
 - Keep the shipping container and packing material for future use.
 - Check the packing list.
- ✓ Collect all necessary installation manuals for the equipment and accessories.
- ✓ Open the equipment and perform an inspection, making certain that all hardware, electrical connections, and printed circuit assemblies are secure.
- ✓ Do not reinstall the cover if the final installation is to be performed after the pre-installation checkout.

2.1.3. Equipment Location

Position the equipment with these points in mind.

- ✓ Intense direct sunlight can harm the display.
- ✓ Airborne particles can activate the touchscreen.
- ✓ Work areas should be relatively free from drafts and vibrations.
- ✓ Do not locate near magnetic material or equipment/instruments which use magnets in their design.

- ✓ Avoid areas which have extreme variations in room temperatures. Temperatures outside the instrument's specifications will affect the weighing accuracy of this product.

2.1.4. Safety

Follow these safety precautions during operation.

- ✓ Properly shutdown the equipment and remove power before any cables or hardware is disconnected.
- ✓ Remove power to the equipment after a proper shut down before servicing the equipment.



2.2. Users' Responsibilities

- ✓ All electronic and mechanical calibrations and/or adjustments required for making this equipment perform to accuracy and operational specifications should be performed by ***trained service personnel***.
- ✓ Absolutely no physical, electrical or program modifications other than selection of standard options and accessories are to be made to this equipment.
 - Electrical connections other than those specified may not be performed
 - Physical alterations, such as holes, etc., are not allowed.



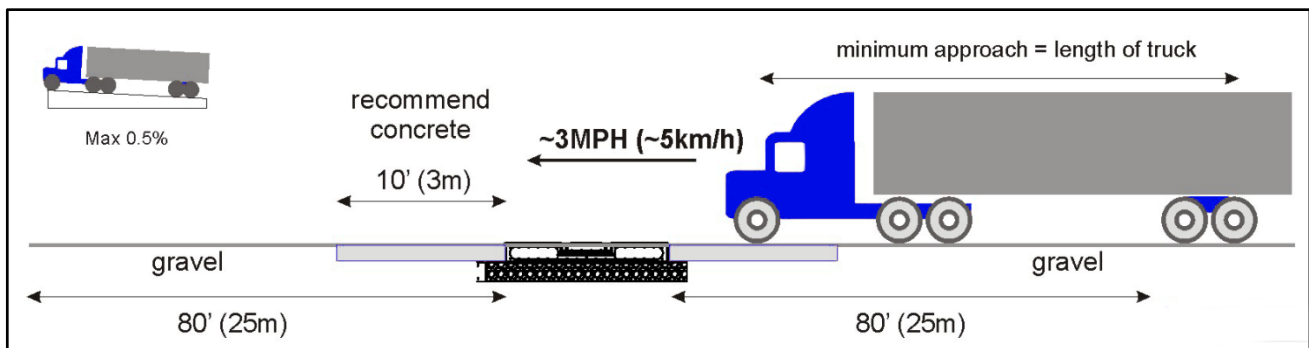
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Section 3: Installation

3.1. Introduction

Installation consists of the following:

- Foundation check, layout, and base plate setting.
- Tools, materials, documentation, and a crane.
- Setting the foundation.



3.2. Scale Installation

Correct installation and maintenance of the Fairbanks AxleSurance Weigh System is important for accuracy and achieving trouble free operation. Below is an overview of what is required for scale installation.

3.2.1. Tools, Equipment, and Materials Required

The following needed supplies are generally supplied by the customer:

- Transit, measuring tape, shovel, rake, plate compactor or equivalent
- Suitable parts to mount Controller
- Backhoe or equivalent to dig scale hole.
- Approximately 14 tons of 1 ½" crushed stone.
NOTE: Soft ground will require 6-8" of 2" stone under the crushed stone base.
- Crane or equivalent of sufficient capacity to safely lift and place the scale: Use provided 3/8" chain pick points (4 places) to lift scale. Often the equipment used to dig the scale hole can also be used to set the scale.

3.2.2. Selecting and Preparing a Site (Step 1)

- Choose site with flat and level approaches twice the length of your longest truck.

A general recommendation is a flat and level approach at least 80-foot to and from the scale platform equal to the distance of the vehicle being weighed is recommended. Failure to provide suitable approach may affect scale accuracy.

- A **small** gradient is acceptable provided the scale is used in one direction only.
- Curves, humps, items to jump over such as raised dumps are NOT acceptable.
- Truck must be straight when it crosses the scale.
- Layout the scale area and approaches

A poured concrete approach to the scale is not required but will improve accuracy and reduce maintenance - a minimum of a 10-foot poured concrete approach is recommended.

- Reference Document #AXLE-615-100 Foundation/Setting Plan



3.2.3. Excavating the Site (Step 2)

- Excavate and compact 14' x 10'5" area 2' deep.



- If ground is soft you will need to dig at least 6-8" deeper to install a layer of 2" limestone packed with plate compactor.
- Depth of 2" limestone will be determined by the soil condition. The softer the soil, the deeper the 2" limestone needs to be installed.
- Reference document **#AXLE-615-100** Foundation/Setting Plan



3.2.4. Dig drain line and lay drain (Step 3)

- Dig a drain line for scale pit. It is acceptable to run drain into a sump well provided the pump is on all the time.
- If the area around scale gets water saturated it is best to install a field tile (French drain) in the sub base to keep water away from bottom of scale.
- Lay 4" tile drain
- Separate drain line connection to scale is a 4" Schedule 40 PVC coupling.
- Bottom of drain pipe is 8" down from top of scale deck.
- Both drains must run downhill away from scale and foundation.



3.2.5. Install First layer of Crushed Stone (Step 4)

- Install and level first 6" layer of 1 ½" crushed stone.
- Compact to 95% using plate compactor



3.2.6. Install Second layer of Crushed Stone Base (Step 5)

- Lay second layer of stone, compact flat and level.
- Surface should be level within 1/8" and is 11 ½" below grade.



3.2.7. Review final level (Step 6)

- Lay a straight 2x6 on the compacted rock base; it should have no gaps under the board in either direction.



- The entire foundation must be flat and level.
- This is the most critical step to achieving accuracy

3.2.8. Set the Scale (Step 7)

- Set the scale using 50' of mason twine to ensure it is parallel to the road.



3.2.9. Connect Drain (Step 8)

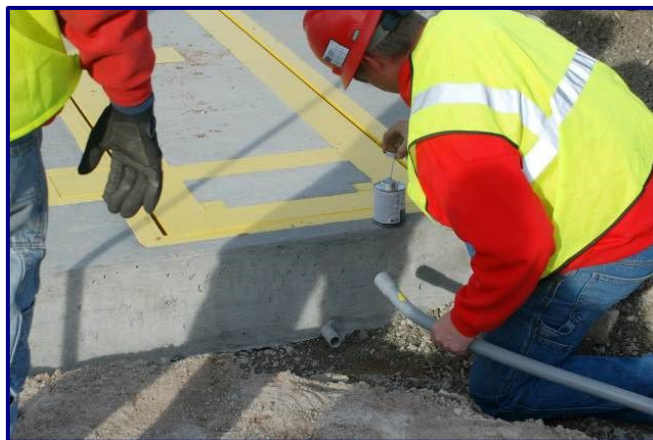
- Slope 4" PCV drain away from foundation





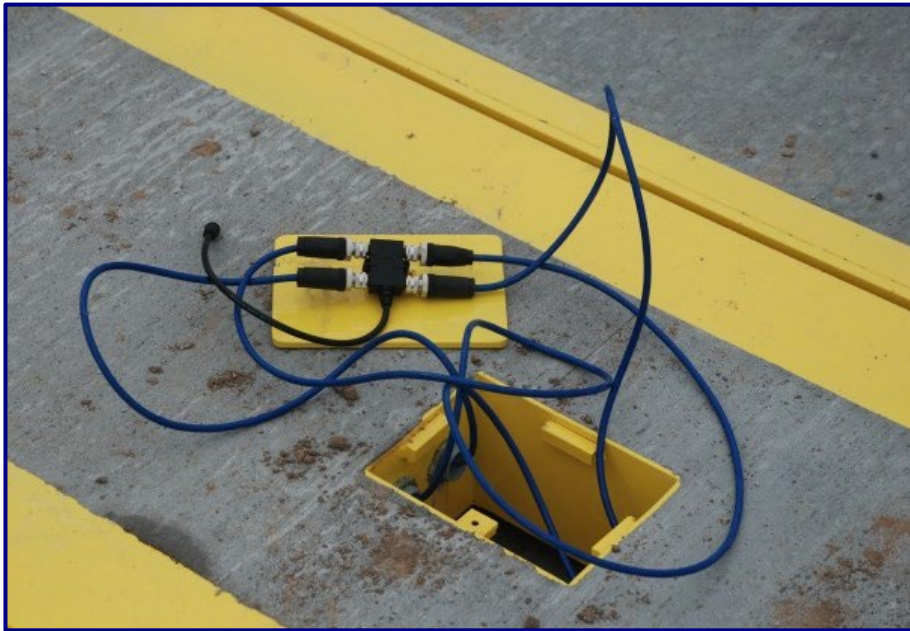
3.2.10. Controller conduit (Step 9)

- Install a 1" PVC electrical conduit from scale to Controller location.
- Conduit for homerun cable can be attached to either side of scale.
- Connection point is 9 ½" below grade.



3.2.11. Connect Load cells (Step 10)

- Make watertight electrical connections at scale and controller.



3.2.12. Backfill and final compacting (Step 11)

- Back fill perimeter of scale, drains and conduit runs.
- Compact material around scale using crushed stone and plate compactor.





3.3. Controller and Accessories Installation

3.3.1. Install Console and Accessories

- Mount console box to remote pole kit, or desired mounting location.
- Install Remote Display (if applicable) so display is visible from scale.
- Install powered antennae box (if applicable) below the console, ensuring the box is facing oncoming traffic to the scale for maximum range.
- Remove any bags/items inside the box (service kit and documentation usually shipped inside box.)



3.3.2. Complete Power and Cables

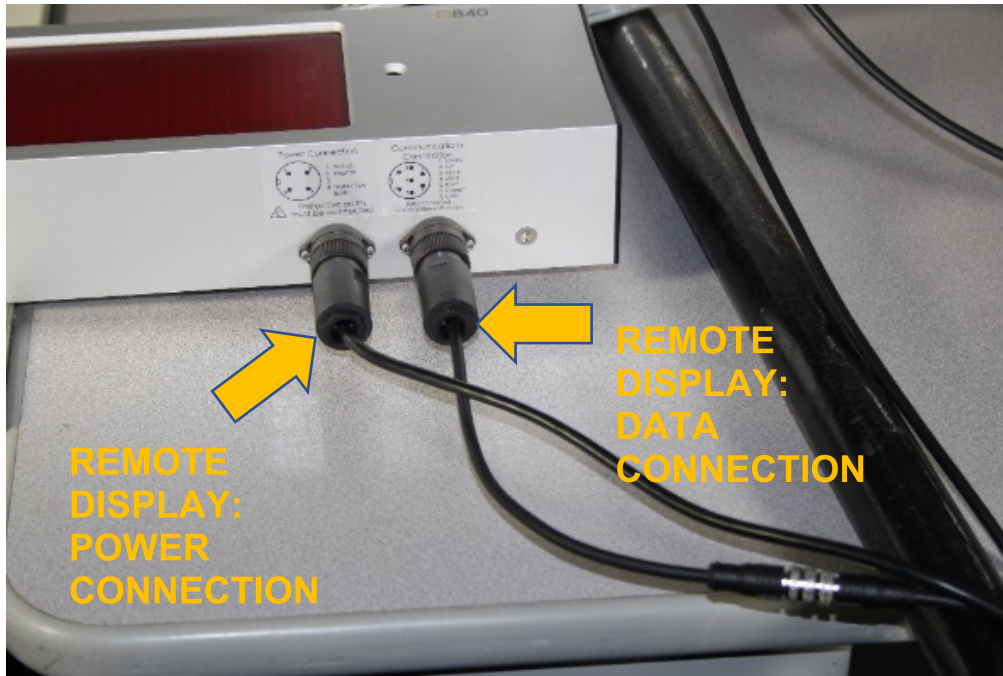
- Connect power to console unit.



- Connect homerun cable to "Scale" connection



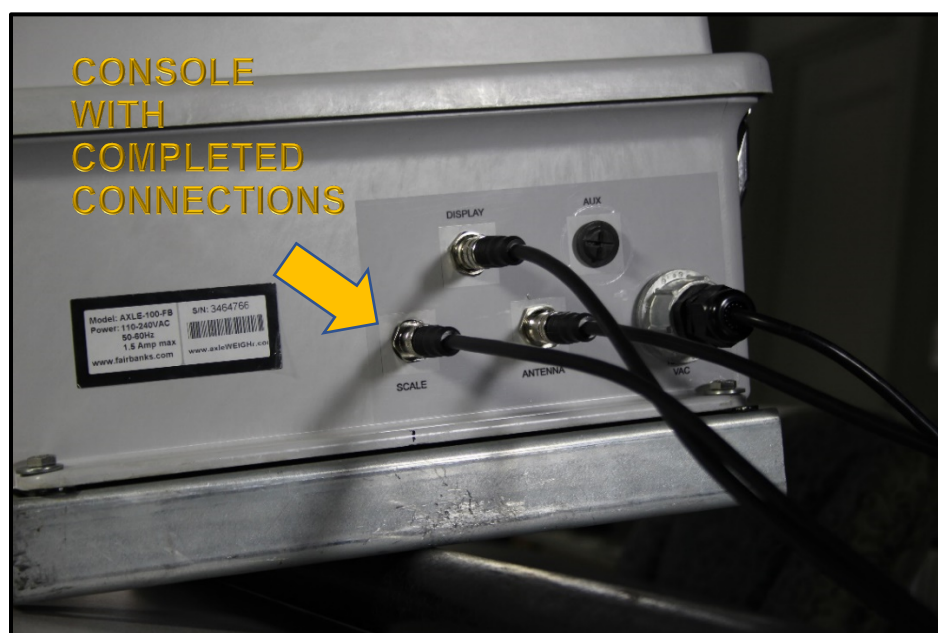
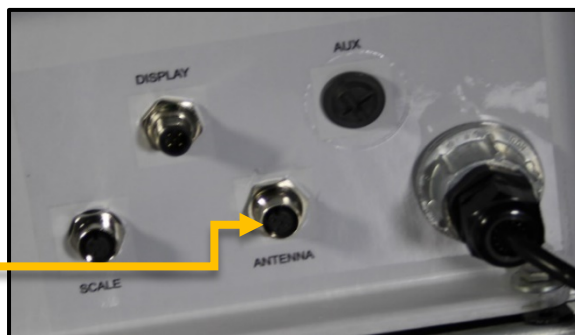
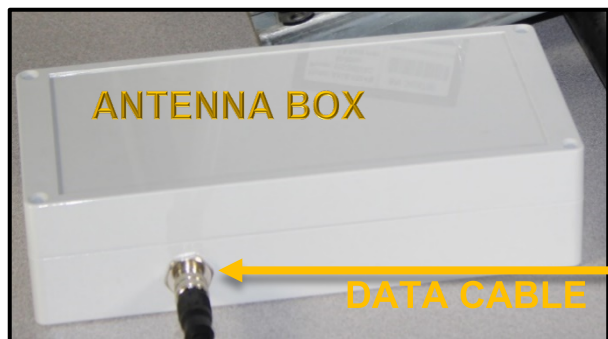
- Connect **power** and **data** cables to remote display box



- Connect remote display cable to “Display” connection



- Connect remote antenna cable to “Antenna” connection on the **Console** and to the **Antenna Box**.



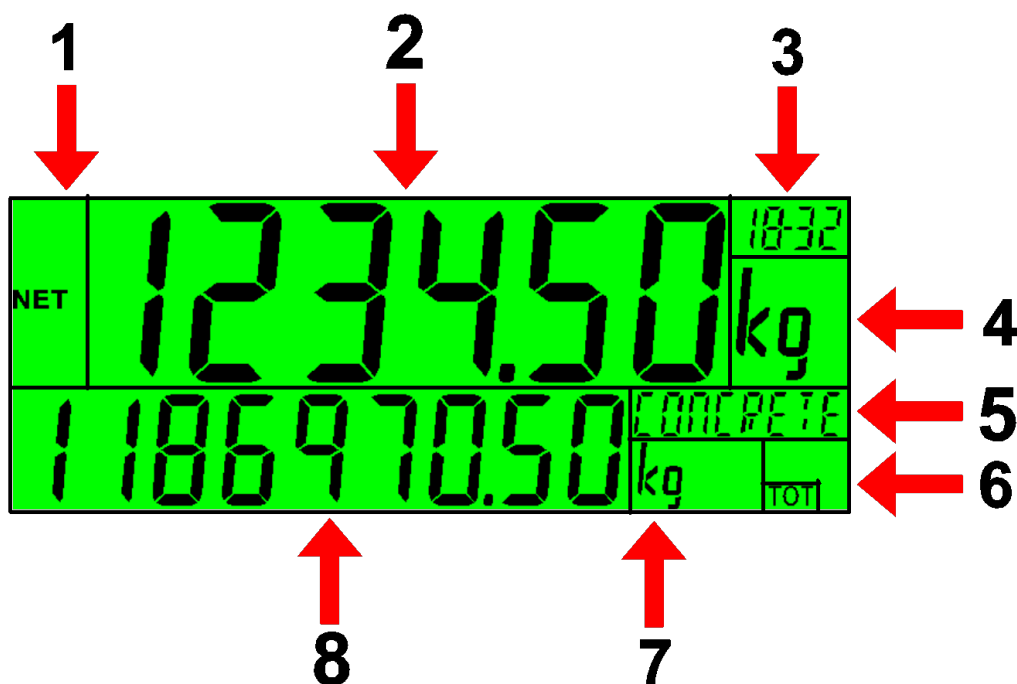
Section 4: Startup Procedures

4.1. Basic Functions



#	Description
1	Display
2	Power Key
3	Function Keys (Fixed)
4	Numeric Keypad

4.1.1. Screen Display Fields








#	Description
1	Primary Annunciators
2	Primary Display
3	Auxiliary Display (WO or WO-PT)
4	Primary Units
5	Category prompt: example Farm
6	Miscellaneous Annunciators
7	Secondary Units (<i>function not available</i>)
8	Secondary Display (<i>totalized weight of last truck</i>)

4.1.2. Annunciators

Symbol	Name	Description
HOLD	HOLD	Visible when the displayed reading is held.
NET	NET	Visible when the displayed reading represents Net weight.
→0←	ZERO	Visible when the gross reading is within $\pm \frac{1}{4}$ of a division of true zero.
~	MOTION	Visible when the displayed reading is not stable.
[]	ZERO BAND	Visible when the displayed weight is within the zero 'dead' band setting.

4.1.3. Keypad



Code	Description	
1	Number Buttons	0-9 (short press)
2	Black Characters	Hold 2 seconds (#1 key allows time & date configuration)
3	Orange Characters	[F1]-[F3]*
	Cancel	Undo last command; step backwards (including in setup menus).
	Up	Move cursor backwards; previous option (use for trucks & farm/field selections)
	Down	Move cursor forwards; next option (use for trucks & farm/field selections)
	OK	Accept this choice
	Decimal Point	Place decimal point

4.1.4. INITIAL SETUP

Before the instrument is ready for use, a pre-configured software package must be selected. To select a software package:

1. Boot up instrument. Hold power button for 3 seconds until power-on procedure begins.



2. The available software packages appear. Push the **DOWN** or **UP** arrow(s) to navigate to the preferred software package (below) and push **[OK]**. Available options are:

- Aggregate
- Generic
- Harvest



3. Press the **POWER** button to power down the instrument and then restart the instrument (see **Step 1**).

Section 5: Calibration

5.1. Known Weights

1. Identify truck to use for calibration and take truck to a local certified static scale to obtain "known weights."
2. Drive the truck with known weights on scale in the same direction at least 5 times and record each individual weight.
 - Record weights in supplied spreadsheet, entering the known weight in the Green "Known Weight" column, and the weights from each of the 5 runs in the "Actual Weight" column.

FAIRBANKS SCALES		AxleSurance Weigh System		Test & Calibration Calculator				
Directions:		Enter Known weights. Run truck across scale 5 times Always start a minimum of 20' away from scale, idle across the scale without using the gas pedal. Enter Values into Green colored cells below Enter 'Cal Factor' in instrument setup under "Dynamic Scale Factor" section of manual						
Truck no#								
TEST 1	Known Weight	Actual Weight				Error	% error +/-	
1st Run	27150	27064				-86	-0.32%	
2nd Run	27150	27089				-61	-0.22%	
3rd Run	27150	27100				-50	-0.18%	
4th Run	27150	27107				-43	-0.16%	
5th Run	27150	27134				-16	-0.06%	
Average Weight	27150	27099	Cal Factor	Factory	Cal Number	Enter Cal Factor		
			1.001889		1.000000	1.001889	-51	-0.19%

OR

- Alternatively, you can use the below formula to average weights and determine dynamic scale adjustment factor:
 - Divide the average of 5 weighments using formula $K/R=D$
 - K = Known weight of truck (reference)
 - R = Average reading of 5 weighments from axle scale
 - D = Dynamic Scale Adjustment
3. Using "Cal Factor" result in spreadsheet/formula, set the calibration factor in the instrument.

5.2. Dynamic Scale Factor

To set the Dynamic Scale Factor:

1. Press and hold **[F3]** for 2 seconds to enter the configuration menu.
2. The lower display will show: **DISCARD**.
3. Use the **[UP]** **[DOWN]** arrow keys to scroll to **DYN SCL**. Press **[OK]** to show **INBOUND**. Press **[OK]** to change current value: 1.000000.
4. Enter your Dynamic factor up to 6 decimal places. X.XXXXXX and press **[OK]**.
5. Use the **[UP]** **[DOWN]** arrow keys until **QUIT** appears then press **[OK]** to exit.



Section 6: Information Management Setup

6.1. Aggregate, Harvest, Generic & Truck CSV File Configuration

6.1.1. USB Files

A USB jump drive comes with the console unit, part of the service kit supplied with the unit. The USB is used to store the CSV files the console uses for transaction and ticket configuration. Basic prestored information comes preloaded on the console once the desired package is selected. Further customization is possible using the USB jump drive.

To customize the files, an external PC/tablet with USB drive is required. Once the files are modified on a PC/tablet, the USB is temporarily installed in the console and the existing files are replaced with the newly changed files.

The USB drive is also used to download transaction records (as needed) to integrate into the owners' system.

To customize the CSV file:

1. Remove the USB from the instrument and insert in the USB drive of a PC or tablet.
2. Locate and open the USB drive. Click the appropriate file (aggregate.csv, harvest.csv, or generic.csv) that matches the information package selected during startup. (An example of the harvest file is shown below.)
3. **Do not change the data in the header (data inside the yellow box).** To setup your data, change the names to suit your operation. The example used below shows the **Harvest** setup. The procedures are the same for **Aggregate** and **Generic** file setup.

If you only have 1 farm then the farm names in the “**farm**” column will all be the same. The “**field**” names however MUST all be different.

*This menu controls critical AxleSurance settings.
The default menu settings should not be altered
unless advised by Fairbanks Technicians*

farm	field	Descriptic	Map	acres	TotalAcre:	Crop	Variety
FARM 1	FIELD 1					Corn	P104
FARM 1	FIELD 2					Corn	P104
FARM 2	FIELD 1					Corn	P104
FARM 2	FIELD 2					Corn	P104
FARM 3	FIELD 1					Corn	P104

EXAMPLE PRINT OUT

04/17/15 09:03:31 000000168
FARM: FARM 1:FIELD 2 MAP:
CROP: Corn VARIETY: P104
TRUCK: TRUCK 1

AXLE 1: 22320 lb
AXLE 2: 22320 lb

TARE: 22000 lb
GROSS: 44640 lb
NET: 22640 lb

OUTBOUND TICKET W/PRE-SET TARE

Farm & Field Column

This information should be setup and edited as new farms/ fields are added or removed. These should all be typed in capital letters. The R423 display is optimal with upper case lettering.

Description, Map, Acres Column

This information will not print on the ticket but will be stored in the database and pulled out when using thumb drive.

Crop & Variety Column

This information will print out on the ticket and will need to be updated yearly based on crop data.

Example: Aggregate.csv setup

	A	B	C	D	E	F
1	Pit_ID	Pit_Description	Material_ID	Material_Description	Destination	
2	Pit 1	Southwest	10	Washed Sand	Kansas City	
3	Pit 2	North	20	1/2" Washed rock	Meridian	
4	Pit 3	East	30	3/4" Washed rock	St Johnsbur	
5	Pit 4	Lane County	40	Slag	Meridian	
6	Pit 5	Johnson County	50	Granite	Kansas City	
7						

Example: Generic.csv setup

	A	B	C	D
1	Material_ID	Material_Description	Origin	Destination
2	10	Washed Sand	St. Louis	Kansas City
3	20	1/2" Washed rock	Chicago	Meridian
4	30	3/4" Washed rock	Dallas	St Johnsburg
5	40	Black mulch	Kansas City	Overland Park
6	50	Missouri River Rock	Warsaw	Kansas City
7				

- Once you have completed updating your files on the USB drive, remove the USB from the PC/Tablet and return it to the USB port in the console to complete the uploading process. (**Note – this only needs to be done once a year.**)

6.1.2. Truck.csv File editing

The truck file allows for editing/ adding trucks. You can create custom names instead of the default "Truck 1", "Truck 2" etc. The header should not be altered (**id, truck, pass, tare**) but the data below it is configurable.

TRUCK.CSV SETUP				EXAMPLE PRINT OUT
id	truck	pass	tare	
1	TRUCK 1	1	27150	<div> <div>HARVEST</div> <div> 06/15/18 13:23:06 000000243 FARM: FARM1:FIELD 1 MAP: CROP: Corn VARIETY: P110 </div> <div>TRUCK: TRUCK 1</div> <div> AXLE 1: 6520 lb AXLE 2: 8780 lb AXLE 3: 6740 lb AXLE 4: 5460 lb AXLE 5: 4820 lb </div> <div> TARE: 27150 lb GROSS: 32320 lb NET: 5170 lb </div> <div>OUTBOUND TICKET W/PRE-SET TARE</div> </div>
2	TRUCK 2	1	26500	
3	FB1	1	27150	
4	FB2	1	26500	
5	FAIRBANKS3	2	0	
6	FAIRBANKS4	2	0	
7	MERIDIAN1	2	0	
8	MERIDIAN2	2	0	

Id & Truck Column

Id and truck must be unique and will display to the screen & print on the ticket. The id number should be sequential and in order. (Example: 1,2,3,4 etc.)

The labels in the truck column will print out to the ticket.

Pass & Tare Column

If pass equals 1 pass then you must enter in the tare weight. If pass equals 2 then tare will equal zero lbs. Pass must be equal to "1" or a "2".

The tare value will print to the ticket. The tare value is typically the empty weight of the truck/ wagon.

Data Log Output

The harvest_datastore.csv (or aggregate_datastore.csv, or generic_datastore.csv) file contains all the weight data for each truck including the location and material configuration.

Example: Harvest_datastore.csv

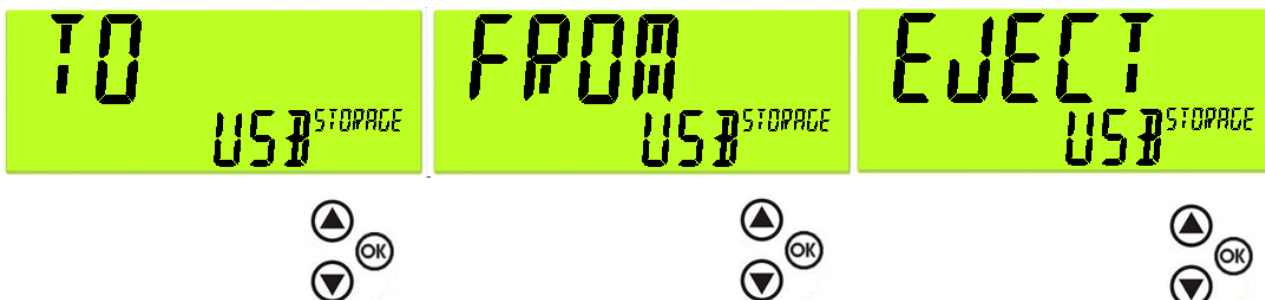
date	time	printid	truck.id	Truck	gross	Net	farm	farm.field	farm.varie	moisture
4/13/2015	9:50:34	120	1	TRUCK 1	44640	0	FARM 1	FIELD 1	P104	1
4/13/2015	9:51:08	121	2	TRUCK 2	44640	43990	FARM 3	FIELD 1	P104	99
4/13/2015	9:52:27	123	1	TRUCK 1	44640	0	FARM 2	FIELD 2	P104	15
4/13/2015	9:52:48	124	2	TRUCK 2	44640	43990	FARM 3	FIELD 1	P104	99
4/13/2015	9:54:34	127	1	TRUCK 1	44640	0	FARM 2	FIELD 2	P104	15
4/13/2015	9:54:49	128	2	TRUCK 2	44640	43990	FARM 3	FIELD 1	P104	99
4/13/2015	10:17:09	130	1	TRUCK 1	44640	22640	FARM 1	FIELD 1	P104	15
4/13/2015	10:17:37	131	2	TRUCK 2	44640	43990	FARM 2	FIELD 2	P104	22
4/13/2015	10:22:19	137	1	TRUCK 1	44640	22640	FARM 1	FIELD 1	P104	15
4/13/2015	10:22:49	139	2	TRUCK 2	44640	43990	?	?	?	0
4/13/2015	10:23:21	141	4	TRUCK 4	66960	22320	?	?	?	0
4/13/2015	10:24:03	142	1	TRUCK 1	44640	22640	FARM 1	FIELD 1	P104	15
4/13/2015	10:28:01	143	9	AARON	44640	44005	FARM 3	FIELD 1	P104	66
4/13/2015	10:33:07	144	2	TRUCK 2	44640	43990	?	?	?	0
4/13/2015	10:33:25	145	9	AARON	44640	44005	FARM 3	FIELD 1	P104	66
4/13/2015	10:33:53	146	1	TRUCK 1	44640	22640	?	?	?	0
4/13/2015	10:34:51	147	1	TRUCK 1	44640	22640	FARM 1	FIELD 1	P104	1
4/13/2015	10:35:51	149	3	TRUCK 3	44640	0	FARM 1	FIELD 2	P104	66

Section 7: Instrument Setup

7.1. USB Operation

Using the USB drive provided with the AxleSurance system, the CSV files can be moved from the USB to the console and back to the USB.

There are 3 options to select once the USB drive has been detected by the console.



- TO USB

This means you will send the harvestlog.csv (or aggregatelog.csv, or genericlog.csv) file to the USB drive. (This creates a copy only – the original log file will remain on the console).

- FROM USB

This means you will duplicate the files from the USB drive. If you have modified the truck.csv file or the harvestlog.csv (or aggregatelog.csv, or genericlog.csv) file then they will overwrite your truck configuration and your farm & field configuration.

- EJECT USB

This will prepare the console for the USB drive to be removed.

To manually move the files:

The files are stored in the console in the folder named “Data Store.” The 2 files you will be using need to be moved to the ROOT directory of the USB drive. (This means the upper most level of the USB directory).

7.2. Clicker Operation

The AxelSurance Weigh System includes remote “clickers” (key fobs) that interact with the console and accelerate the weighing process. Each clicker gets assigned to a specific truck. Assigning a clicker/key fob to a vehicle may be completed by the scale operator or by the driver during the first weighment.

The clicker has a small red LED inside the case that lights when pressed. When pressing the key fob, the user should be somewhere in the range of 75-150 feet from the antennae system. If the “GREEN” traffic light does not illuminate after pressing the button, verify the red LED on key fob lights when pressed.

If the red LED does not light when pressed, try replacing the battery. The fob uses battery **L1028 (A23 alkaline 12V)**. The fob will need to be replaced if the replacement battery does not correct the problem.



7.2.1. To add a Clicker/Key Fob to a New Entry:

The scale operator may assign the clicker/key fob as follows:

1. Press the arrow **UP (ADD)** key.
2. Use the console keypad to type a truck name and push **[OK]**.
3. Choose **ONE PASS** or press the down arrow to switch to **TWO PASS**. Press **[OK]**.
4. Choose **FARM** and/or **FARM FIELD** (options may change depending on the software package chosen at startup). Use the UP/Down arrows to change options and click **[OK]**.
5. When the green traffic light appears, long press **F3**. Configuration options appear.
6. Scroll to **KEY BIND** and press **[OK]**.
7. Press the clicker and **DONE** appears.

The clicker is now linked to the ID.

7.2.2. To add a Clicker/Key Fob to an Existing Truck ID:

1. Short press **[F1]** and the list of existing truck ID appears.
2. Choose **FARM** and/or **FARM FIELD** (options may change depending on the software package chosen at startup). Use the UP/Down arrows to change options and click **[OK]**.
3. When the green traffic light appears, long press **F3**. Configuration options appear.
4. Scroll to **KEY BIND** and press **[OK]**.
5. Press the clicker and **DONE** appears.

The clicker is now linked to the ID.

7.2.3. To Add an Unassigned clicker and Truck ID:

If a driver has been given a clicker not yet associated to the truck, they will receive the message “NOT FOUND” when the button is pressed. This means the clicker is functional and been detected by the system but the truck ID has not been created. The driver can long press the **UP**-arrow key to create the new truck name and complete the remaining steps under [To add a Clicker/Key Fob to a New Entry](#).

7.2.4. Strings

To enter custom names via the keypad, press the number keys repeatedly and the characters will scroll through. For example, pressing the #2 key twice will produce a “B”. If you wait 2 seconds and press the #2 key again you can enter an “A”.

Normal String Editing

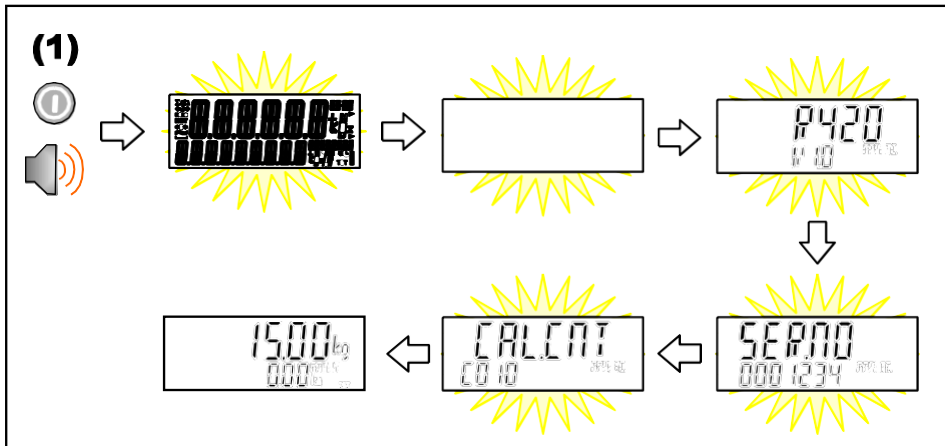
Normal string editing is most useful where strings are small and contain no lowercase or unprintable characters. The available characters are printed in orange on the keypad.

Special keys are:

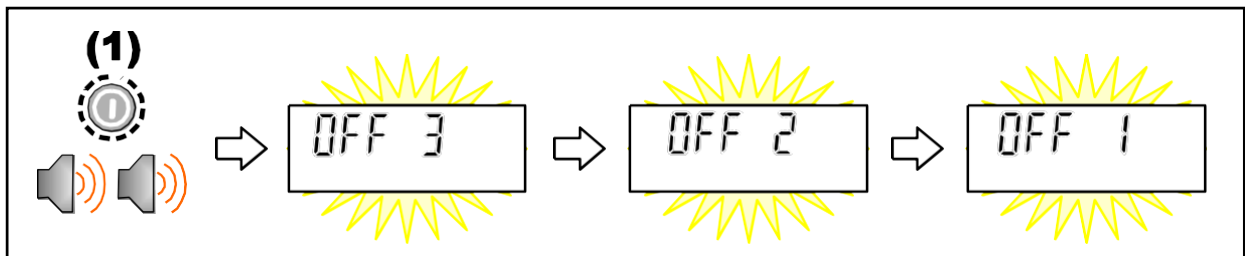
- <OK>: Accept changes and finish.
- <Long press of cancel>: Cancel and exit without changes
- <Cancel>: Delete character
- <Up>, <Down>: Move cursor

- <Long press of down>: Delete string after cursor
- <+/->: Switch editing modes

7.2.5. Turn Instrument ON / OFF



Turn Instrument ON - Short press <Power>



Turn Instrument OFF - Long press <Power>

7.2.6. Viewing Truck IDs

1. Short Press of **[F1]** (TRUCK KEY)
2. Use the **UP/DOWN** keys to scroll through the list of Truck IDs.

7.2.7. Editing Truck Data (existing)

Editing data for a specific Truck ID, can be done in the console or on the CSV file (see [Section 5: Information Management Setup](#))

To edit a specific Truck ID through the console:

1. Short Press of **[F1]**
2. Use the **UP/DOWN** keys to scroll through the list of Truck IDs. Press **[OK]**
Alternately, use the key fob linked to that Truck ID.
3. Use the **UP/DOWN** keys to view the available fields. Press **[OK]**.
4. Use the **UP/DOWN** keys to

Press the cancel key at any time to return to weigh mode with no truck selected.

7.2.8. Editing the Available Fields for Each Truck ID

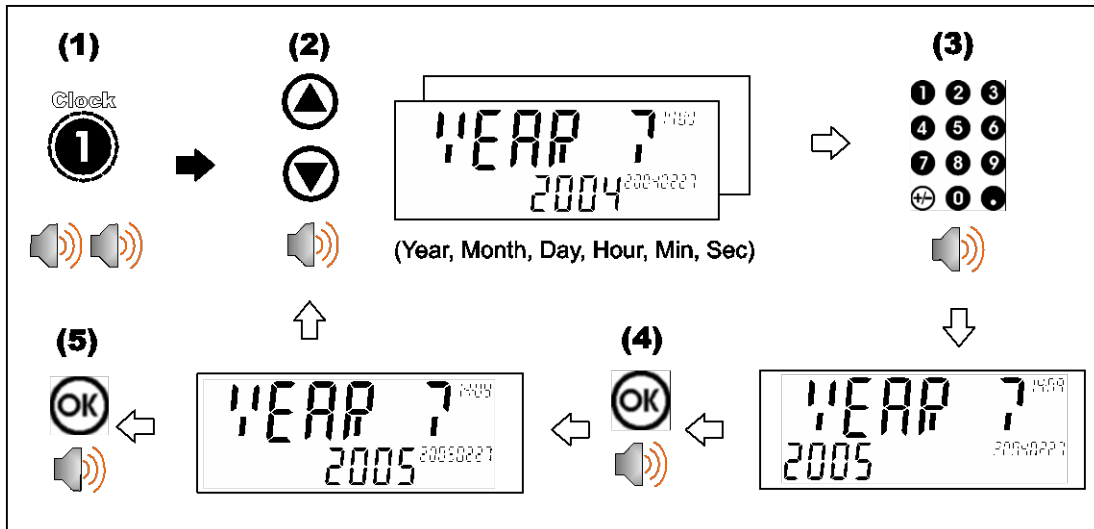
These options are associated with the Truck key and allow different fields to be assigned to different trucks based upon your preset CSV file options.

If fields are not available in the front panel, then these fields will be blank in the csv database.

To modify the CSV file so different options appear under a specific Truck ID, go to: [Section 5: Information Management Setup](#))

7.3. Clock

A long press of the 1 key (Clock) allows the system time and date to be viewed and changed.



NOTE: Stability Considerations - Some functions (e.g. Tare and Zero) require a stable weight. These functions will wait for up to 10 seconds for stable weight. If a stable weight is not available 'MOTION ERROR' is displayed and the function is cancelled.

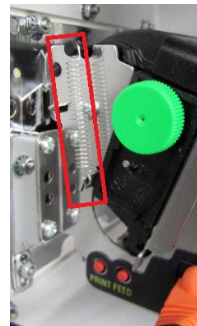
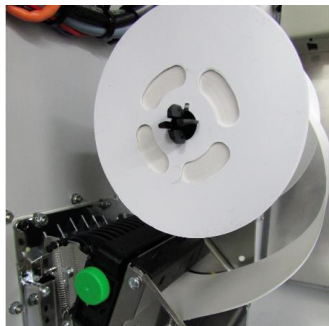
7.3.1. Traffic Lights

While at Zero & stable weight the traffic lights should both be off. There are various conditions that will activate the lights. If there are errors the RED light will activate. See table below.

TRAFFIC LIGHT STATUS		
Code	Description	
RED	SOLID ON	ERROR – CHECK SCALE DISPLAY FOR CODE
RED	5 SEC THEN OFF	NORMAL OPERATION (TICKET PRINTS)
GREEN	SOLID ON	CLICKER PRESS DETECTED/ TRUCK IN PROCESS OF WEIGHING/ MOTION DETECTED OVER 1000 lbs
BOTH OFF	GREEN & RED ARE BOTH OFF	SCALE IS IN IDLE MODE/ NO POWER TO SCALE

7.3.2. Printer Operation

The Kiosk style printer uses thermal paper that will need to be loaded upon first use. This paper is a special thermal style paper that can be ordered directly through Fairbanks Scales. Load the paper into the printer with the inside facing upwards as shown below. If the power is on to the printer the paper sensor will feed automatically once paper is detected.



Ensure tension spring is configured for maximum tension as shown above to ensure optimal printing operation. There is a “PRINT” test button shown in figure above used to perform a single test page.

Section 8: Scale Operation

8.1. Function Keys

8.1.1. Introduction



The instrument has 3 special function keys on the front panel.

It uses:

[F1] as the Truck key

[F2] as a re-Print key.

[F3] long allow for resetting of farm field database settings.

TRUCK [F1]

A short press of the **[F1]** button will allow you to select from your list of permanent trucks. Use the **<arrow>** keys to select truck.

Short press: Select of Truck

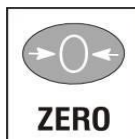
Long press: Configure Truck. (last selected)

PRINT [F2]

Short press: Reprint last truck

Long press: Configuration menu

8.1.2. Zero Key



When an empty scale has drifted away from a true zero reading, this key is used to perform a zero adjustment on the scale display. The zero adjustment is stored when power is removed and is re-used when next powered up.

8.2. Truck Weighing Operation

8.2.1. Weighing

Once a Truck has begun to scale you can either press the clicker button/ **[F1]** key to select the truck or do nothing and the weight will totalize and display on the lower display for a period of time. If you do nothing then the data will not be stored in the database and a ticket will not print out.



Weighing out with pre-set tare

Once a truck with a pre-set tare is selected the indicator will move to weigh out with pre-set tare mode. The tare weight will display on the lower display. The Cancel key **<C>** or **<OK>** key allows you to cancel out of the weigh out mode and return to normal mode without adding any weight to totals.



8.2.2. Weighing Out with First Weight

Once a Truck with a stored first weight is selected the indicator will move to weigh out with first weight mode.

The Cancel key **<C>** or **<OK>** key allows you to cancel out of the weigh out mode and return to normal mode without clearing the first weight or adding any weight to totals.



8.2.3. Weighing First then Configuring

If you are making use of the **"DISCARD"** timeout setting you are going to want to set this setting for 120 (120 seconds). See **[F2]** Configuration menu at end of manual.

With the discard timeout you can either use the clicker to id the truck or manually setup your truck from the front panel after you weigh. If you are making use of the information management configuration and you have not setup your customer fields yet, then you will want to use the **[F1]** key after weighing. This will allow your first time configuration of the truck. Once you have completed this step, you can use the clicker for the rest of the day and it will recall your farm field selection.

8.2.4. [F3] Configuration Menu (long press)

Menu	Description
Timeout	Time in between axles before controller times out and complete axle captures. (default 20 sec)
Discard	Timer allowing for truck id press after weighing has taken place. (default 10 sec)
Dyn.Scl	Dynamic scaling factor for “in-motion” calibration adjust.
Zero	Zero calibration capture (do not use)
Span	Span calibration capture. (do not use)
MvV	Raw millivolt reading from scale base. (example .2234 +/- .0001)

*(Note: to exit the configuration menu either press the **clear** key or **scroll** to quit and press the **[OK]** key)*

8.3. Error Messages

8.3.1. Overview

A number of error messages may be displayed to warn of operation outside of the acceptable limits. These messages may appear on either the primary or the secondary display. Short messages (XXXXXX) will appear as a single message. Longer messages (XXXXXX) (YYYYYY) will appear on the display in two parts, first the (XXXXXX) part, then the (YYYYYY) part.

8.3.2. Weighing Errors

These messages show status messages or errors that may occur during normal weighing operation.

Error	Description	Resolution
(U.LOAD)	The weight is below the minimum allowable weight reading.	Increase the weight or decrease the minimum allowable weight reading.
(O.LOAD)	The weight is above the maximum allowable weight reading. Warning - overloading may damage mechanical scale elements.	Check the condition of load cell connections. Check for damaged load cell.
(ERROR) (RANGE)	The weight reading is beyond the limit set for Zero operation. The operation of the <ZERO> key is limited in the setup during installation. The indicator cannot be Zeroed at this weight.	Increase the Zero Range (Z.RANGE) or use the <TARE> key instead.
(ERROR) (MOTION)	Scale motion has prevented a <ZERO> or <TARE> operation from occurring on command.	Try the operation again once the scale is stable.
(ERROR) (ADC)	An error with the ADC has prevented a <ZERO> or <TARE> operation from occurring	Ensure load cell cabling is correct.
(E2000)	Cable error – 4/6 mode not selected	Check for broken wires & check 4 way
(NOT FOUND)	No truck data has been found in database.	Create truck using up arrow or USB drive.

Table 1: Errors: weighing

Error	Description
(WEIGHT)	The captured axle weight was below the value set in MIN.WGT
(LOW)	
(TOO)	The capture was shorter than the time set in MIN.TIM.
(FAST)	
(TOO)	The capture took too long.
(SLOW)	
(WRONG)	Truck crossed the weigh bridge in the wrong direction (only when using start and end inputs).
(WAY)	
(ERROR)	The interlock went low during an axle capture or the interlock time was exceeded.
(ILOCK)	
(ERROR)	Axle weighing will be aborted if an application error occurs during the truck.
(Exxxx)	
(ERROR)	Axle weighing will be aborted if the scale is overloaded during the truck.
(O.LOAD)	
(ERROR)	Axle weighing will be aborted if the scale is underloaded during the truck
(U.LOAD)	

SENSOR NOTES:

EMITTERS (BLUE MARKED CABLES)

RECEIVERS (GREEN/RED MARKED CABLES)

GREEN MARKED RECIEVER = INBOUND DIRECTION

RED MARKED RECEIVER = OUTBOUND
DIRECTION

INBOUND DYN.SCL SETTING MUST BE SET FIRST

8.3.3. Definitions:

Console - This can include the Fairbanks instrument and up to the entire AxleSurance box including kiosk printer

R423 - This is the stainless indicator mounted on the front of the AxleSurance unattended console.

LUA - The lua module is located on the back of the stainless indicator nearest the green 2 pin power connector

Arrow Keys - The up and down arrows are located on the number pad keypad Clicker: Small black key fob used for remote id of trucks

Power Supply - 120 VAC Power supply located inside the enclosure near the M12 connectors (see figure 1)

Section 9: Parts

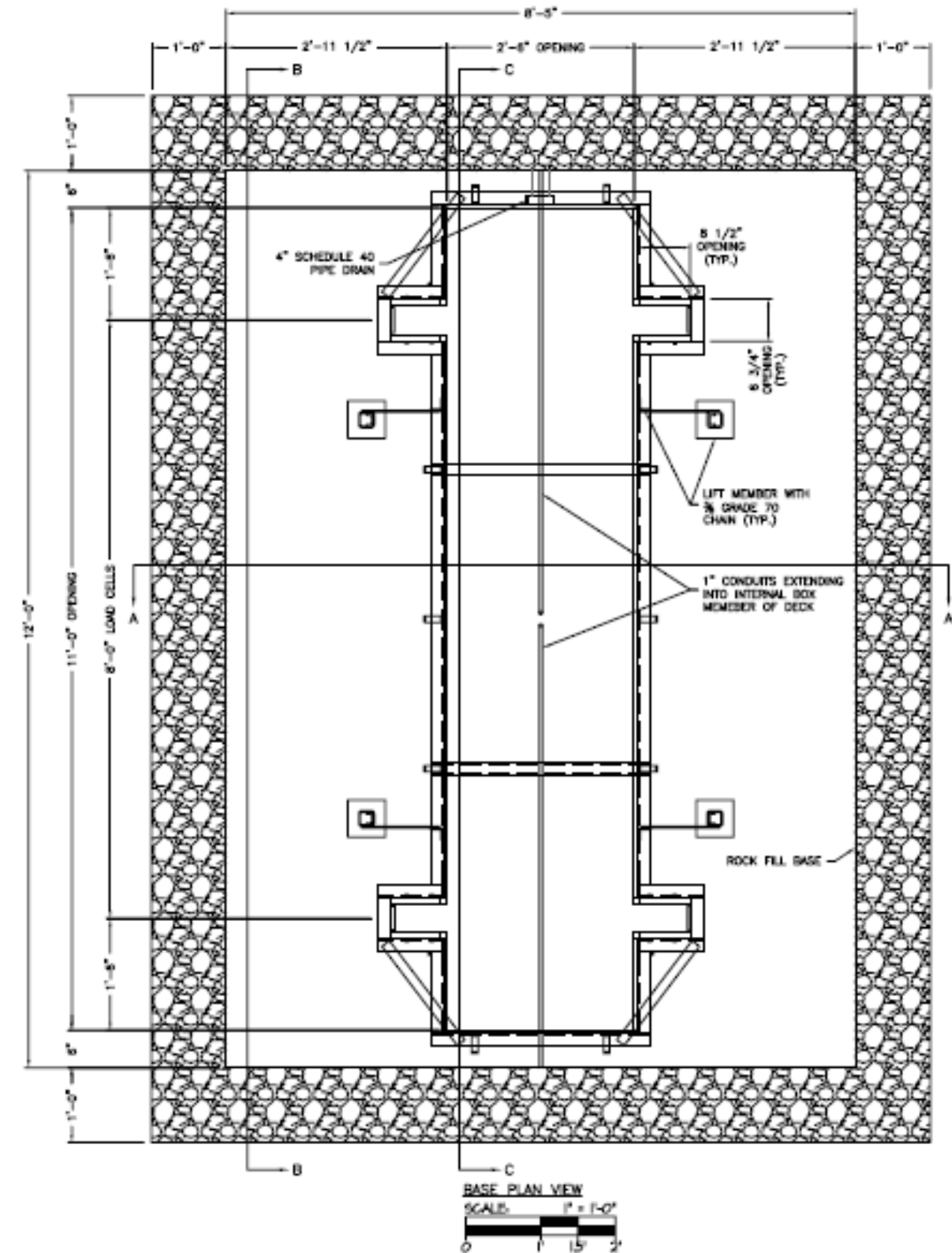
9.1. Parts List

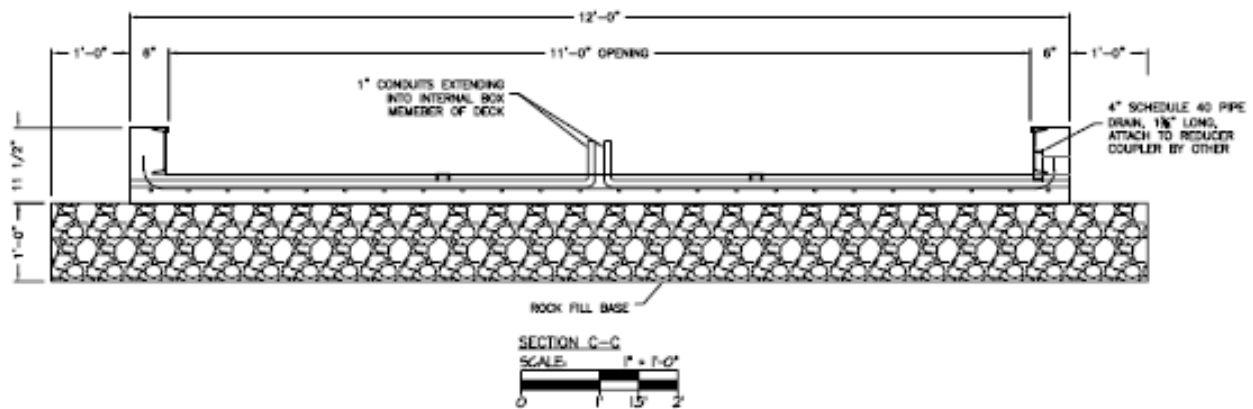
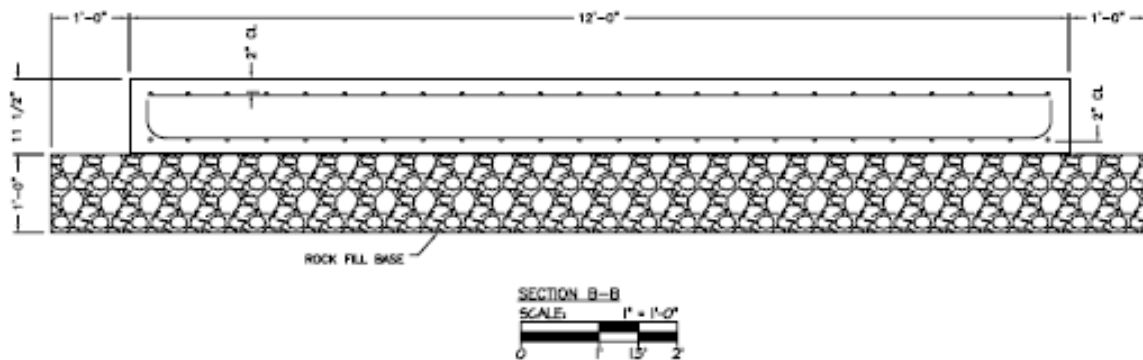
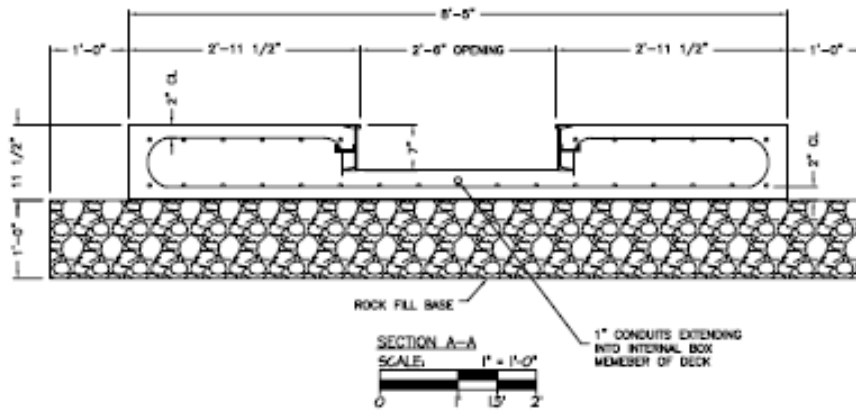
Product #	Description
Individual Components of Measurement Chain	
165668	10t Single Load cell for DWIM
165669	4-way Summer for DWIM scales, works with m12 connectors only
165670	Retro fit grounding kit (grounding rod not included)

Cables	
165671	3'2" (1m) quick disconnect data/homerun cable
167672	9'8" (3m) quick disconnect data/homerun cable
164647	19' (6m) quick disconnect data/homerun cable
165674	29' (9m) quick disconnect data/homerun cable
164644	49' (15m) quick disconnect data/homerun cable
164786	98' (30m) quick disconnect data/homerun cable

Accessories	
165676	Service Kit; Includes: single step load cell simulator, RIN-LINK Cable
165677	Paper rolls for Outdoor Console printer – pack of 10
165678	KUBE II desktop journal printer
165679	Paper rolls for KUBE II desktop printer - pack of 10
165680	KUBE II Printer adaptor (to connect KUBE II printer to console)
165681	TM U295 Printer adaptor (to connect TM U295 printer to console)

Weighbridge Accessories and Replacement Parts	
165682	Brick ledge or Drill and Pin on (164640) or RWI1001.
165683	Load cell cover plate (Include SN of scale base)
165684	Saddle blocks (set of two) includes new bolts
165685	Junction box cover (include SN of scale base)
165686	Cover for pick recess on ends of Deck (Include SN of scale base)
165688	Upper Pin (Include SN of scale base) 7.25" x 1.25" Stainless Steel
165689	Lower Pin (include SN of scale base) 4" x 1" Stainless Steel
165691	Shim Kit, includes two of each size, .125", .060", .035", .020", .010"







Manufactured by Fairbanks Scales Inc.

www.fairbanks.com

AxleSurance Weigh System

Installation Manual

Document 51431