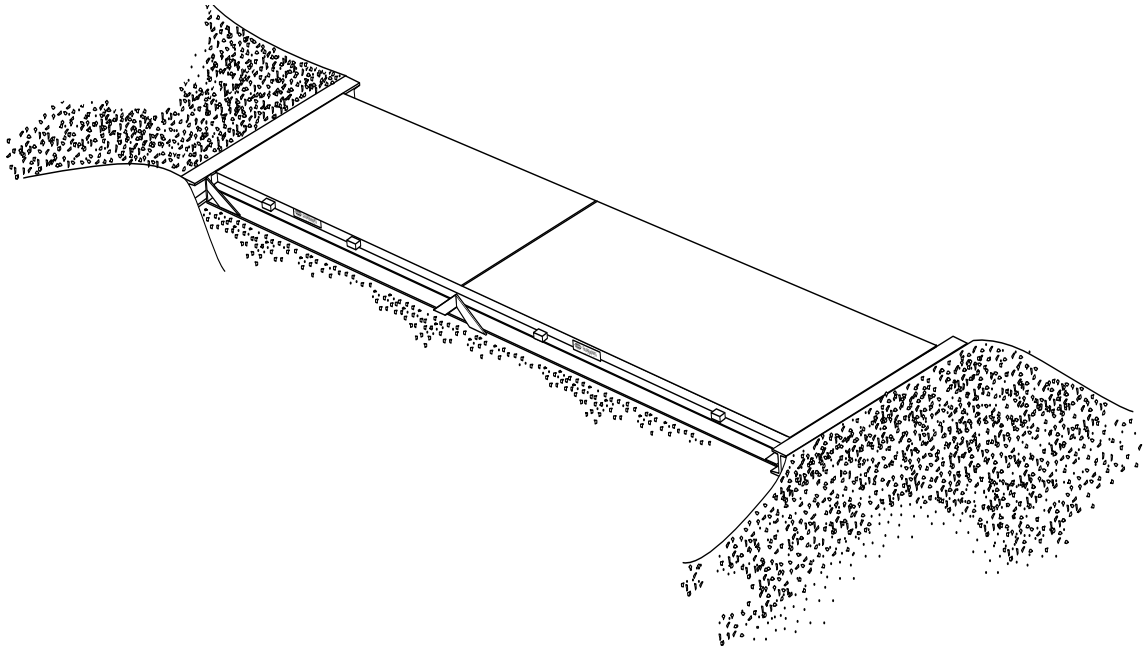
Installation Manual

Titan Series Portable Vehicle Scale Model 6020



50753
Issue 5 – 12/12

Amendment Record

Titan Series
Portable Vehicle Scale
50753

Manufactured by Fairbanks Scales Inc.
821 Locust
Kansas City, Missouri 64106

Issue 1	03/2004	New product
Issue 2	08/2005	Revised installation instructions
Issue 3	07/2006	Revised installation instructions
Issue 4	11/2010	Revised instructions with regard to on-site construction
Issue 5	12/2012	Revised specifications on page 5.

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Disclaimer

Every effort has been made to provide complete and accurate information in this manual. However, although this manual may include a specifically identified warranty notice for the product, Fairbanks Scales makes no representations or warranties with respect to the contents of this manual, and reserves the right to make changes to this manual without notice when and as improvements are made.

Section 1: General Information

A. Introduction

The Titan Portable Vehicle Scale (PLT-6020-XXX) is a uniquely designed truck scale, combining the proven reliability of a hermetically sealed load cell system with the added benefit of an above grade, low profile, portable, steel deck design scale. The Titan Series PV scale uses a Rocker Column load cell system combined with Intalogix™ Technology.

B. Description

The Titan weighbridge consists of 35' factory assembled steel deck modules.
Each module bolts to the adjoining module. With the scale installed completely above ground, the load cell system, suspension components and weighbridge are not subjected to the harsh, corrosive environments found in a scale pit.

1. **Rocker Column** load cell systems are hermetically sealed cells completely constucted out of stainless steel. A stainless steel sheathing protects the load cell cable.

2. **Intalogix™ Technology** offers the customer outstanding resolution, surge voltage protection, and built-in diagnostics.

C. Specifications

CLC:	100,000 lbs..
Capacity:	250,000 lbs.. for a 3 section scale
	300,000 lbs.. for a 4 section scale
Load cell data:	
Capacity:	100,000 lbs.
Type:	Rocker Column
Environmental:	Stainless steel, hermetically sealed
Bridge Resistance:	1000 W
Output:	2 mV/V
Construction:	Welded structural steel I-beam
Module Design:	Orthotropic
Module Understructure:	Open bottom
Lengths:	30’, 35’, 60’, 70’, and 80’.

Width:	10’
Deck plate thickness:	*3/8”*
Material:	ASTM A-36 Steel
Soil bearing required:	3000 psf
NTEP Certificate of Conformance Number:	96-089A2

D. Accessories

73164	Bulkheads
73170	Approach Coping (2 pieces)

Section 2: Installation

A. Introduction

The Titan Portable Vehicle Scale can be set almost anywhere it's needed. The soil bearing under the scale sub frame must be firm and unyielding. i.e. - 3000 P.S.F. concrete piers are the best method of assuring a solid, level base for the sub frame to be anchored to. However, the sub frame may be set on firm level ground, a leveled gravel area or heavy wood supports. If concrete work is performed, use only certified prints. For example, a 35' module would be a complete two (2) section scale. A seventy (70) foot scale will use two (2) modules with the sub-frames bolted together.

- **Standard practice for onsite construction of earthen ramps for Portable Vehicle scales uses compacted graduated limestone fill, or caliche fill (provided by others). Either of these choices typically will provide a solid non-yielding base if installed and compacted correctly. Concrete berms along the sides of the ramps may be used to keep the material from spreading out during the compacting process, but this is typically not necessary.**
- The scale is shipped fully assembled with stands, suspension hardware, with load cells installed.
- There are eight (8) shipping bolts for each 35' module which MUST BE REMOVED once the modules are set and secured. (See drawing 50598-4.)

B. Site Preparation - All foundation types

1. Help the customer select a site which allows easy access to and from the scale, ensuring enough area for straight and level approaches, and to meet all state and local Weights and Measures regulations.

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2. The site should have good drainage away from the scale and surrounding areas must not drain into, or through the scale site.
3. Obtain all necessary permits and licenses prior to beginning construction.
4. Using a transit, sight in and mark with stakes the area where the placement is to occur and where supports, forms, or concrete are to be built.
5. When constructing forms, make sure they are plumb, square, and level.
6. Place and compact gravel into the base of the forms if necessary.

a. Concrete Pier Installations:

1. Cut and position rebar into the form as per the schedule detailed on the certified foundation prints supplied.

2. The scale is designed so the sub-frame may be anchored to the foundation by using expansion anchors which are inserted into the concrete after it has cured. Expansion anchors are recommended because of the flexibility allowed in final positioning of the scale. Use certified prints for anchor locations.

3. Pour concrete, using a mix to yield a minimum 4000 PSI Vibrate the concrete into position to ensure consistency. All concrete work MUST conform to standards set forth by the American Concrete Institute Code.

4. Allow concrete to cure several days before erecting the scale. Remove forms and backfill for proper drainage. A slope away from the scale is recommended.

5. Allow concrete to cure for 28 days or until a test cylinder indicates the concrete has reached its design strength before allowing traffic on the scale.

Remove the wood shipping blocks from between the frame and weighbridge.

Caution: *Module Assemblies are heavy and awkward to handle. Exercise extreme care when lifting a module assembly, to avoid personal bodily harm or damage to any equipment. When lifting the modules, ensure that the lifting chains are equally loaded, secure, and that an angle of greater than 30 degrees is maintained.*

b. Installing Modules - All installations types

Using a chalk line, mark the foundation to determine the center line of the foundation and position of the anchor bolts (concrete piers) using the Certified print.

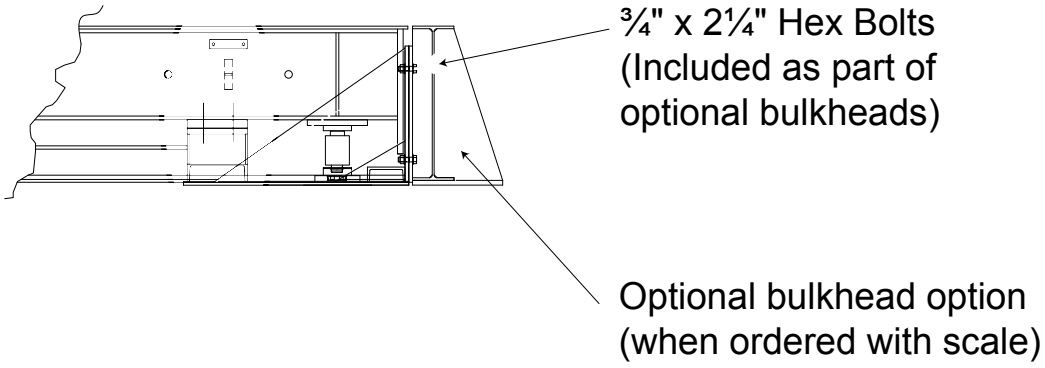
1. Using a suitable and safe crane, lift and set a 35-foot module assembly in place on the support area. The end of the module with the step plates needs to be positioned away from the first approach end. **Always attach the lifting chains to the scale weighbridge. Do not attach the chains to the subframe.**
   The subframe is secured to the weighbridge and will lift together as a complete module assembly. A 35-foot module assembly weighs approximately 10 tons or 20,000 pounds.

2. If installing a single module scale, proceed to step 5. The installation of a mutiple module scale varies slightly from the installation of a single module scale. Follow the steps as identified for the size scale you are installing.

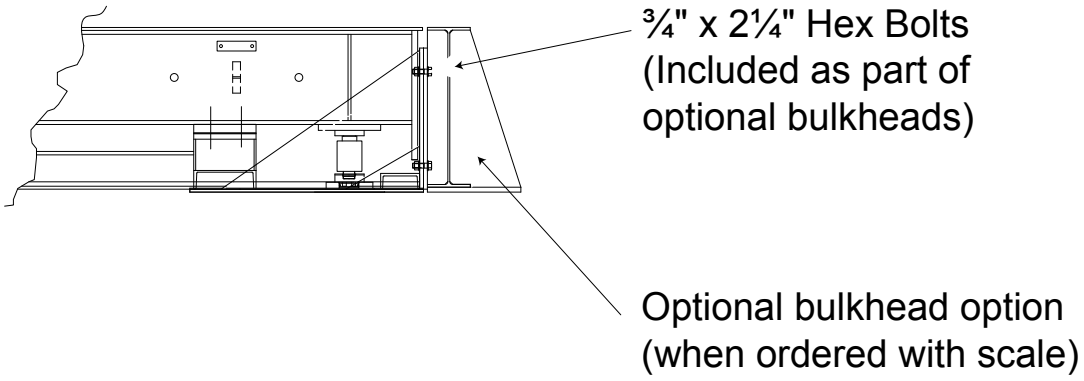
3. The 60' and 70’ scales are two module scales. With the first 27’, 30', or 35’ module already in place, lift and set the second 27, 30', or 35’ module assembly so that the end with the step plates is set on the first module step plates. Place the module so both subframes are in line and touching. Bolt the two subframes together, 2 bolts, and proceed to step 5.

4. The 80' scales are comprised of three modules. With the first 27' module already in place with the step block end away from the first approach, near the next module, lift and set the next module and place it at the end of the first.

5. Remove the shipping bolts that retain the 27’, 30', or 35’ weighbridges to the subframes (2 bolts per corner, 8 bolts total per 27’, 30', or 35’ module). See drawing below.



6. Secure the subframes to the support piers using anchor bolts (1 per corner, 4 total per subframe.).



7. Lift and set the steel bulkheads, if purchased, and bolt to the subframe ends. Secure the steel bulkheads to the support piers using anchor bolts (4 bolts per bulkhead, 8 total). See drawing below.

8. Verify that there is equal dead load on all load cells (dead load will be higher on middle load cells of 60', 70' and 80' scale installations.) Add or remove shims as needed to adjust the dead load.

9. Adjust side and end checking per certified prints.

10. Proceed to the electrical installation section to complete the installation.

Section 3: Electrical Installation

A. Introduction

The Titan PV scale was designed to be used with Intalogix™ systems. Intalogix™ systems utilize smart sectional controllers (SSC) and pit power supplies (PPS) for load cell excitation and signal processing.

B. Description

There is one (1) SSC per section and one (1) PPS for the entire platform unless the number and resistance of the cells require a second pit power supply. Smart sectional controller boxes have four (4) terminals two (2) for load cells and two (2) for interfacing to other SSC boxes or terminating to a pit power supply. All cell/section/scale adjustments are made via the Intalogix™ system instrument.

C. Installation

a. Boxes

The box has mounting brackets which allow mounting to adapters located inside each load cell access hole of the Titan modules.

b. Wiring

Cable used in all wiring must be a minimum of 18 AWG. Use cable 17204 or 17246. Use appropriate service manual for the indicator being installed or refer to the Appendix for typical wiring information.

c. Smart Sectional Controller

Wire cells into each sections sectional controller per the appropriate service manual. Refer to the Appendix for typical wiring information.

Load Cell Wiring Designations

Color	Description
Black	(-) Excitation
Green	(+) Excitation
Red	(-) Signal
White	(+) Signal
Yellow	Shield

Notes: *The Titan PV scale has been designed to provide protection from the effects of moisture. The load cells have been calibrated with the cable attached, therefore the cable should NOT be cut.*

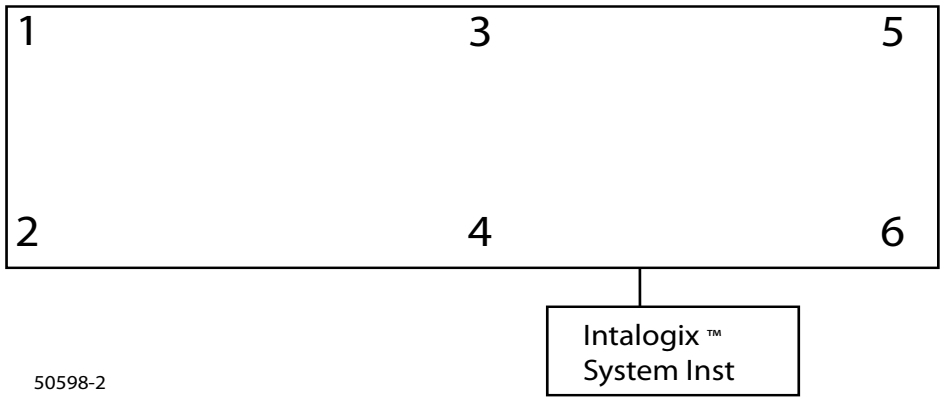
The cable is connected directly to the sectional controller through a sealed gland fitting which MUST be tightened properly to keep water/moisture out of the box.

All cabling should have a drip loop at the cell or box entry location to help prevent water entry.

On all boxes, the load cell cable gland fittings have O-rings that can be forced out of position if tightened improperly. To prevent this, first tighten the inner nut securing the gland in the hole, insert the cable, and carefully tighten the gland. Do not over-tighten where the gland turns. The cover MUST be secured with ALL screws tightened properly (10 in/lbs.) for protection against moisture.

Note:
Smart Sectional Controllers have connections for two (2) load cells, TB1 and TB2. The odd numbered cell connects to TB1 and the even numbered cell connects to TB2.

Example of three (3) section cell numbering:



Note:
Intalogix™ installations utilize a specific numbering system for load cells because of digital addressing of the SSCs. Number the load cells as follows: With respect to the following starting position, face the platform from where the indicator is located. The cell at the upper left or far side of the platform is Cell 1. The cell positions along the far side will be odd cell numbers, the near side locations will be even cell numbers.

d. Grounding - Smart Sectional Controllers

Intalogix™ systems must have two (2) ground rods in the pit for proper connection. Pit power supplies use a ground separate from the weighbridge and sectional controller ground rod. For accurate operation and protection against damage from lightning strikes, all of the components of the system must be properly grounded. The grounding system contains ground rods for the scale pit location. The following steps must be taken to correctly ground the system:

1. It is recommended that the grounding be done with 8 AWG or larger wire or braided ground straps.

2. All of the ground connections should be 2 feet or as short as possible.

3. The case of the SSCs and PPSs must be attached in a clean electrical connection to the platform frame. The platform frame is then connected to a pit ground rod.

4. The insulated WHITE wire from the PPS connects directly to the separate ground rod (not to the same rod as the weighbridge).

5. The 117 VAC SVP unit must be connected to a known good ground at the instrument location. Use a voltmeter to test the electrical power source available for the Neutral-to-Ground voltage level; it must be 0.2 VAC or less. If you are unsure, or if the testing reveals a higher than acceptable level (0.2 VAC maximum), make provisions to install a separate ground rod at the SVP location. Use braided cable or 8 AWG wire to make the SVP to ground rod connection.

Caution: *Improper grounding will prevent the surge voltage protection from adequately protecting the scale.*

e. Indicator to Pit Power Supply Cable Connection

Prepare the cable ends in the standard manner. Use the appropriate manual for wiring instructions for the sectional controllers and power supplies. Connect the indicator interface cable to the instrument in the scale house per the instructions in the appropriate indicator service manual.

f. SSC DIP (Address) Switch

In each of the smart SSC boxes there is an eight (8) position DIP switch labeled S1. This switch is used to identify the section in a binary code. The switches must be set properly for the scale to operate.

Note: *Switches 1, 2, and 3 are always OFF. Do not change these switch settings. Switches 4 through 8 are used to set the section address locations.* ***Set the section number according to the chart below.***

Section number	**Switch settings**				
	4	**5**	**6**	**7**	**8**
Sec 1	ON	OFF	OFF	OFF	OFF
Sec 2	OFF	ON	OFF	OFF	OFF
Sec 3	ON	ON	OFF	OFF	OFF
Sec 4	OFF	OFF	ON	OFF	OFF

Section 4: Calibration

A. Preliminary Checks

1. Seat the suspension components. Drive the test truck across the scale stopping and starting several times across the scale. Repeat this procedure at least three times to assure that all parts are properly seated.

2. Refer to the appropriate technical manual for the particular Intalogix™ Technology indicator for the setup and calibration procedures.

B. Repeatability and Return-to-Zero performance tests

Position the test truck in the center of the weighbridge and note the weight reading. Pull the truck off the scale and note the return to zero. Repeat this procedure at least three times to assure consistency. If the scale does not repeat the readings, within tolerance, check for mechanical obstructions or alignment problems. Check to see the scale is assembled properly and the load cells are aligned, level, and the load is equally distributed on each load cell. Add or remove shims as required to improve deadload distribution.

C. Section test and adjustment

The section test should be conducted centering the test load, weight cart or test weights, directly over each section. Record the weight indication of each section. The sections should be adjusted so that the weight indications of all sections match within the tolerances set forth by the National Institute of Standards and Technology Handbook H-44.

Section 5: Maintenance

A. Maintenance Inspections

- Ensure that the system is maintaining proper ground connections
- Check module to module bolts for tightness
- Check that the frame has not shifted, that all bolts are secure
- Check for 'give' or washout under any temporary pier structures
- Check load cells for a level condition
- Examine load cell cables and module interconnect cables for problems
- Ensure that the SSCs and the PPSs covers are secure

B. Load cell Replacement

- Remove power from the system at the instrument
- Jack the scale at the 'bad' load cell location
- Remove the old load cell.
- Apply a small amount of grease to the load cell buttons (top and bottom), then install the new load cell.
- Gently lower scale assembly ensuring proper placement of load cell.
- Loosen the gland nut, unwire the defective load cell from the SSC, record the wire color code
- Wire the new cell into SSC, tighten the gland nut around the cable.
- Close the SSC and tighten all screws to 10-12 in.-lbs..
- Reapply power to the instrument
- Check operation, calibrate as necessary

C. Smart Sectional Controller Replacement

- Remove power from the system at the instrument
- Remove cover, disconnect all wiring, noting colors and terminal locations
- Remove screws securing PC board
- Carefully remove prom and insert in new PC board, note DIP switch settings
- Set DIP switches for proper address on new PC board
- Install PCB and secure with all screws
- Connect all wires
- Secure cover with all screws torqued to 10-12 in.-lbs.
- Tighten all gland nuts to secure.

D. Pit Power Supply Replacement

- Remove power from the system at the instrument
- Remove PPS cover and disconnect all wiring
- Remove screws securing power board
- Remove old PCB, secure ground wire to new PCB
- Remake all connections, install the new PCB and secure all screws
- Secure cover with all screws torqued to 10-12 in.-lbs..
- Tighten all gland nuts to secure.

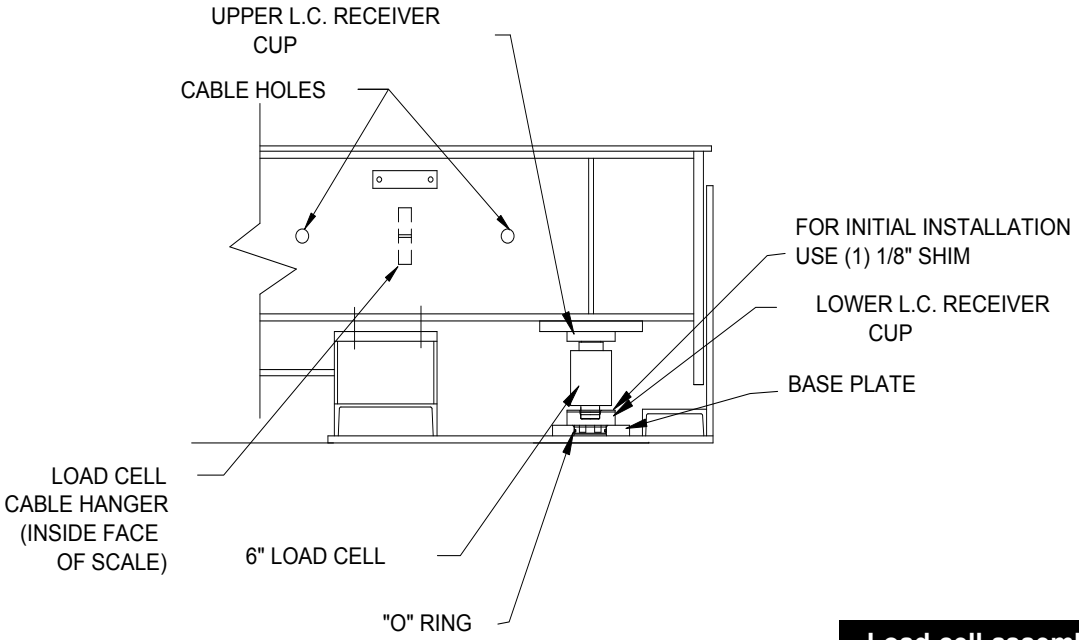
Section 6: Parts

A. Parts List

Part No.	Description
75458	1 1/8" - x 4 1/2" w/ nut (module - module)
54788	1 1/8" lock washer (module - module)
54255	1 1/8" flat washer (module - module)
80955	Load Cell Base Plate
61743	Clamp Bar Washer (base plates)
62857	5/8" x 6" Anchor Bolts
55010	Ground Rod Kit

B. Load Cells and Load Cell Hardware

Part No.	Description
80453	Load Cell, 6" RC, 100K, 1000 ohm, 2mv/v
73682	Shim, receiver cup, 1/16"
64338	Shim, receiver cup, 1/8"
64334	Shim, receiver cup, 3/16"
72274	"O" Ring, INSIDE of Cup, ANSI #222
64340	"O" Ring, OUTSIDE of Cup ANSI #228
70511	Receiver Cup, LOWER (w/ anti-rotation pin)
70512	Receiver Cup, UPPER
64382	Roll Pin, 1/2" x 2½" anti-rotation, baseplate
63981	Anti-Rotation Pin, LOWER Receiver Cup 3/8" x 2 ½"
71717	Locating Tool 5½"



Load cell assembly detail

Appendix I: Wiring