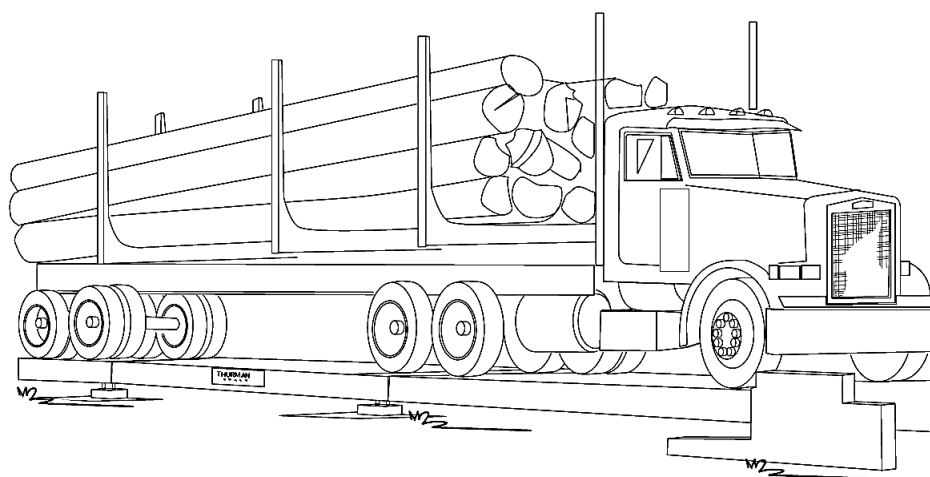


Diamondback Truck Scale

Portable Vehicle Scale

8560 PV Series





Disclaimer

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Amendment Record

Diamondback Truck Scale

Portable Vehicle Scale

8560 PV Series

Installation Manual

Document 51162

Manufactured by Thurman Scale
4025 Lakeview Crossing
Groveport, Ohio 43215

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Section 1: General Information

INTRODUCTION

The 8560 Portable Vehicle (PV) Truck Scale, is a uniquely designed truck scale, combining the proven reliability of a double ended shear beam load cell system with the added benefit of an above grade, low profile, portable, steel deck design scale.

The model 8560PV uses a double-ended shear beam load cell system combined with a Intalogix™ Technology indicator.

DESCRIPTION

The **8560 PV Weighbridge** consists of factory assembled **steel deck** modules. Each module bolts to the adjoining module. The modules come preassembled to the section stands and bulkheads on the end modules. The load cells are pre-wired to the smart sectional controllers. Simply set the modules in place and bolt together.

- The low profile foundation design offers many benefits over the traditional scale pit design including reduced construction costs and simplified maintenance.
- Each module connects to the adjoining module through the use of an exclusive connecting step hinge.
- The module connecting step hinges are manufactured as matched sets to ensure proper fit and performance.
- With the scale installed completely above ground, the load cell system, suspension components and weighbridge are not subjected to the harsh, corrosive environment found in a scale pit.

DOUBLE ENDED SHEAR BEAM LOAD CELL SYSTEMS

Double Ended Shear Beam Load Cell Systems use environmentally sealed cells and an exclusive parallel link suspension system.

- Parallel links offer load cell protection by absorbing the motion and shock caused by vehicles stopping and starting on the weighbridge.
- The load cells are nickel plated, internally potted with a patented material.
- The cells have welded covers over the internal strain gage for environmental protection and long life.
- Armor Guard sheathing helps protect the cable.

INTALOGIX™ TECHNOLOGY

This technology comes standard and offers outstanding resolution, surge voltage protection, and built-in diagnostics.

SPECIFICATIONS

- NTEP Certificate of Conformance: 89-016
- Accuracy: Designed to meet or exceed **National Institute of Standards and Technology Handbook H-44** requirements for Class III-L devices.

Section 3: Installation

The 8560 PV scale can be set almost anywhere it's needed. The soil bearing under the sub frame (scale) 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.

- The scale is shipped fully assembled with stands, suspension hardware, and load cells installed.
- The shipping bolts for each module **MUST BE REMOVED** once the modules are set and secured.

(See drawings on [page 11](#)).

- Each load cell enclosure area has a tapped bar for mounting smart sectional controllers (SSC) and /or the pit power supply (PPS). Load cells are pre-wired into the SSC boxes.

SITE PREPARATION

Please refer to the **data tag located on the Weighbridge** to verify the capacity of the scale to be installed. Use certified prints for all concrete work.

1. Select a site which allows easy access to and from the scale, ensuring enough area for straight and level approaches to meet all state and local Weights and Measures regulations.
2. The site should have good drainage and surrounding areas must not drain into or through the scale site.
3. The soil must have a minimum bearing pressure of 3000 PSF, or as specified on the certified foundation drawings supplied by Thurman Scale.
4. Obtain all necessary permits and licenses prior to beginning construction.

NOTE: Always “*Call before you dig*”.

1-888-258-0808

5. Using a transit, sight in and mark with stakes the area where the excavation is to occur and where concrete forms are to be built.
6. When constructing forms, make sure they are plumb, square, and level.
7. Place and compact gravel into the base of the forms if necessary.
8. Cut and position rebar into the form as per the schedule detailed on the certified foundation prints supplied by Thurman Scale.

9. The scale is designed to be anchored to the foundation through the use of the following:
 - Expansion anchors (included) 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.*
10. Pour concrete, using a mix to yield a minimum 4000 PSI. Vibrate the concrete into position to ensure consistency.
 - *All concrete work should conform to standards set forth by the American Concrete Institute Code.*
11. Allow concrete to cure several days before erecting the scale.
12. Remove forms and backfill for proper drainage.
 - A slope away from the scale is recommended.
13. 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.

MORE ABOUT INSTALLATIONS

- The weighbridge is shipped in one or more connecting modules, depending on the total length of the scale.
- There are three different module configurations. The base, intermediate and end modules.
 - The base module has provisions for four load cells.
 - The intermediate module has connecting hinge plates on both ends of the module, and has provisions for two load cells.
 - The end module contains connecting hinge plates on only one end, and provisions for two load cells on the opposite end.
- The modules are placed into position starting with the base module, then intermediate modules (if needed), with the end modules positioned last.

INSTALLING THE MODULES

1. Using a chalk line, mark the foundation to determine the center line of the foundation and position of the anchor bolts using a Certified Print.
2. Remove the access plates from the weighbridge modules exposing the load cell area cavity.

C A U T I O N

Module Assemblies are heavy and awkward to handle.

Exercise extreme care when lifting a module assembly so as 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.

- Using a sufficient sized crane, lift and set the center/base module assembly in place on the support area. The side of the module with the junction boxes needs to be positioned towards the scale house. Always attach the lifting chains to the scale weighbridge. Do not attach the chains to the sub-frame. The sub-frame is secured to the weighbridge and will lift together as a complete module assembly.

TYPICAL MODULE CONFIGURATION

Please refer to *certified drawings* for your specific installation.

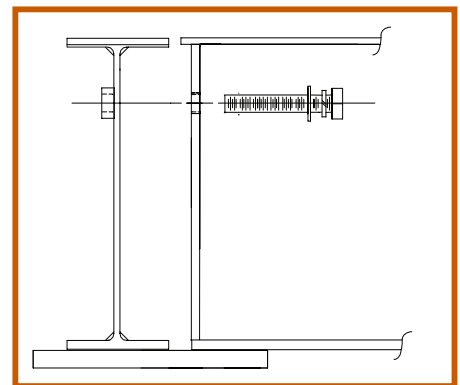
Length	No. of Modules	Type of Modules
10' to 23'	1	(1) Base
30' to 46'	2	(1) Base, (1) End
60' to 70'	3	(1) Base, (2) End
80' to 90'	4	(1) Base, (1) Intermediate, (2) End

- Lower the next module into place, aligning the module with the connecting step hinges of the preceding module, with the Junction Box on the appropriate side.
- While the crane is still attached to the module, insert a bolt with **both a flat and a lock washer** into the holes of each hinge
 - Use of anti-seize thread product is recommended.
- Thread the bolt, but **DO NOT TIGHTEN DOWN** at this time.
- Continue lowering the module so that it rests on the load cell assemblies.



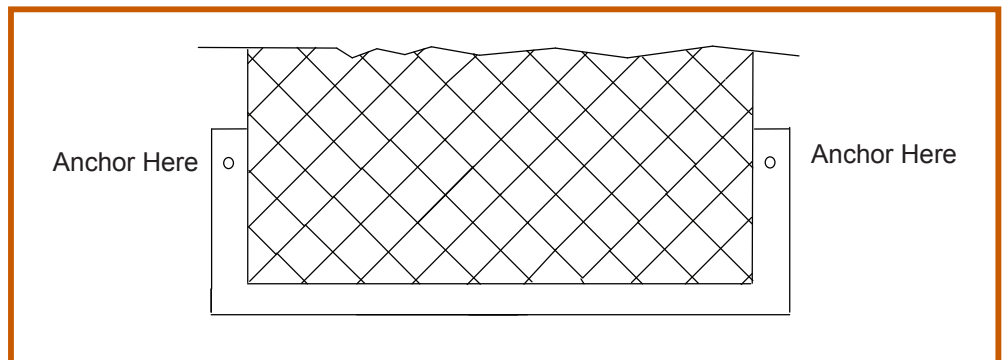
8. Disconnect the lifting chains and attach to the next module to be set in place.
9. Repeat steps 4-8 until the last module has been placed.
10. Tighten all hinge bolts to a maximum of **180 ft/lbs**.
11. Secure the sub-frames to the support piers or suitable foundation using anchor bolts (2 per section.)
12. If optional steel ramps are used, follow steps 12-16.
13. Place ramp onto the steel base plates of the bulkhead and align the holes in the end weldment with the holes in the bulkhead.

14. Thread a 1" x 5" bolt with both a flat and lock washer as shown.

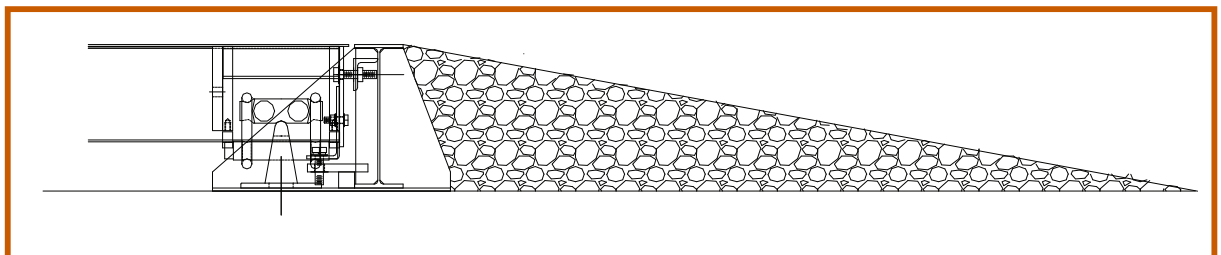


15. Tighten bolt to a maximum of **180 ft/lbs**.

16. Anchor the ramps to the foundation using the provided anchor bolts. (2 per ramp)

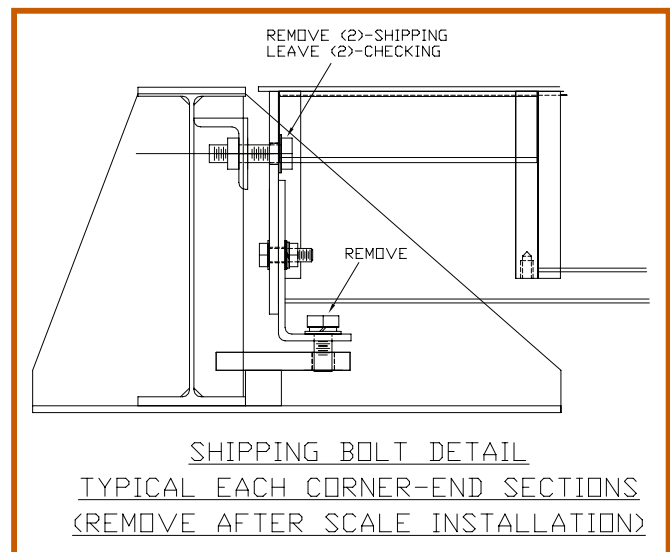
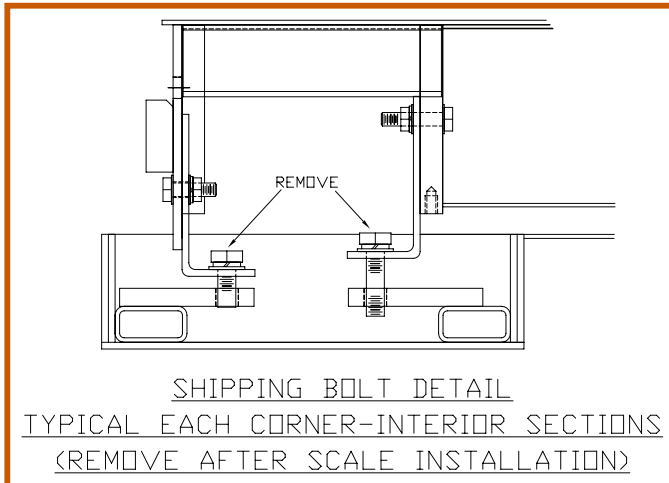


17. If steel ramp option is not ordered, build a ramp of suitable material adjacent to the bulkhead.



18. Remove the shipping bolts that retain the weighbridges to the sub-frames (2 bolts per corner, 4 bolts per section, 2 bolts total per bulkhead).

— See drawings below.



19. Verify that there is equal dead load on all load cells (dead load will be higher on middle load cells of multi-module scale installations.) Add or remove pin seat shims from the same section as needed to adjust the deadload.

20. Re-install the access covers on the weighbridge.

— Using anti-seize thread product is recommended.

21. Proceed to the wiring section to complete the installation.

Section 4: Wiring for Intalogix™ Systems

INTRODUCTION

Intalogix™ systems use Smart Sectional Controllers (SSCs) and Pit Power Supplies (PPSs) for load cell excitation and signal processing.

DESCRIPTION

- One (1) SSC per section.
- One (1) PPS per platform unless the number and resistance of the cells require a second Pit Power Supply.
- SSC boxes have four (4) terminals, two (2) for load cells and two (2) for daisy chaining to other SSC enclosure or terminating to a pit power supply
- All cell/section/scale adjustments are made via the Intalogix™ Technology instrument.

INSTALLATION

- **Enclosures**

The enclosures have tabs for bolting to mounting bars located on one side of each module.

- All enclosures come pre-mounted to the module(s).
- On PPS boxes, secure the isolated Ground Wire to the separate Ground Rod, as noted on the *Certified Print*.
- Tighten all connections securely to provide a good electrical ground.

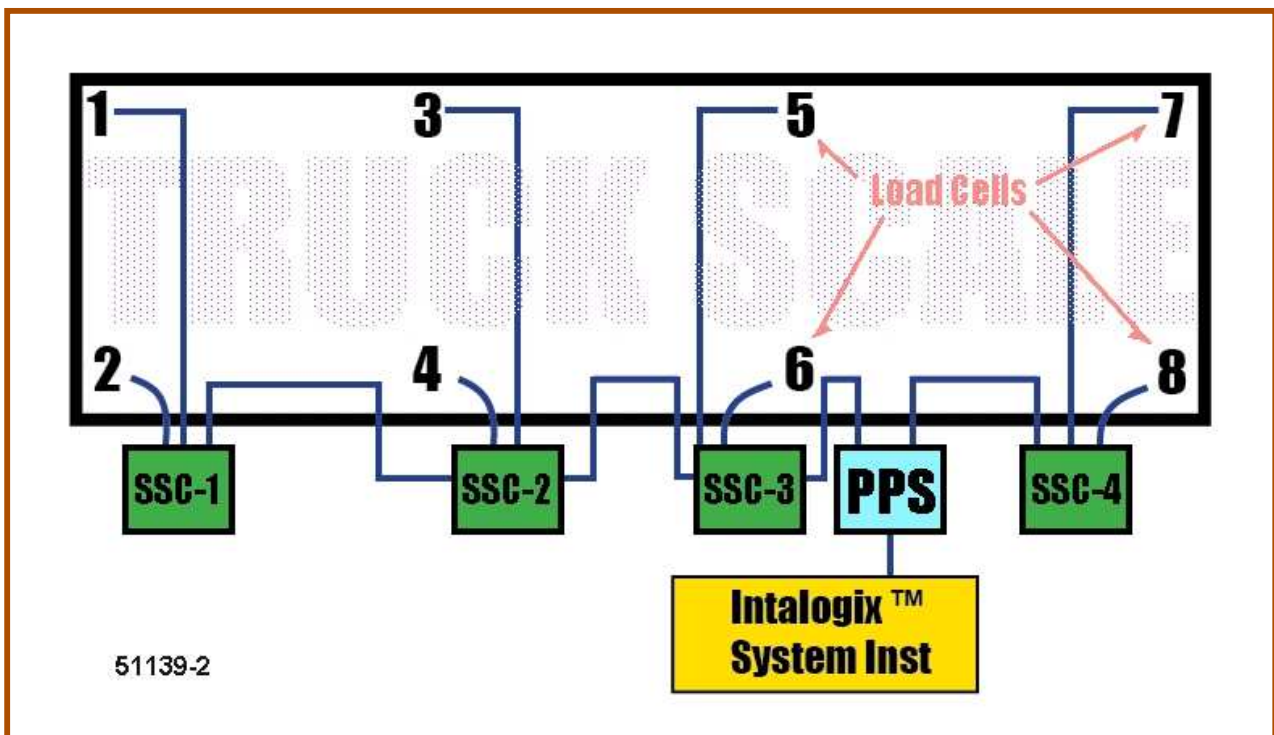
- **SSCs**

1. Load cells are pre-wired into the SSCs.
2. Connect the SSC to SSC cabling.
3. Set the address switches in the SSCs.

LOAD CELL WIRING

Cell Numbering

- With respect to the following starting position, face the platform from where the indicator is located.
- The cell at the upper left (far side) of the platform is **Cell One (1)**.
- The cell positions along the **far side** are odd cell numbers,
- The **near side locations** are even cell numbers.



Above is an example of four (4) section cell numberings using SSCs.

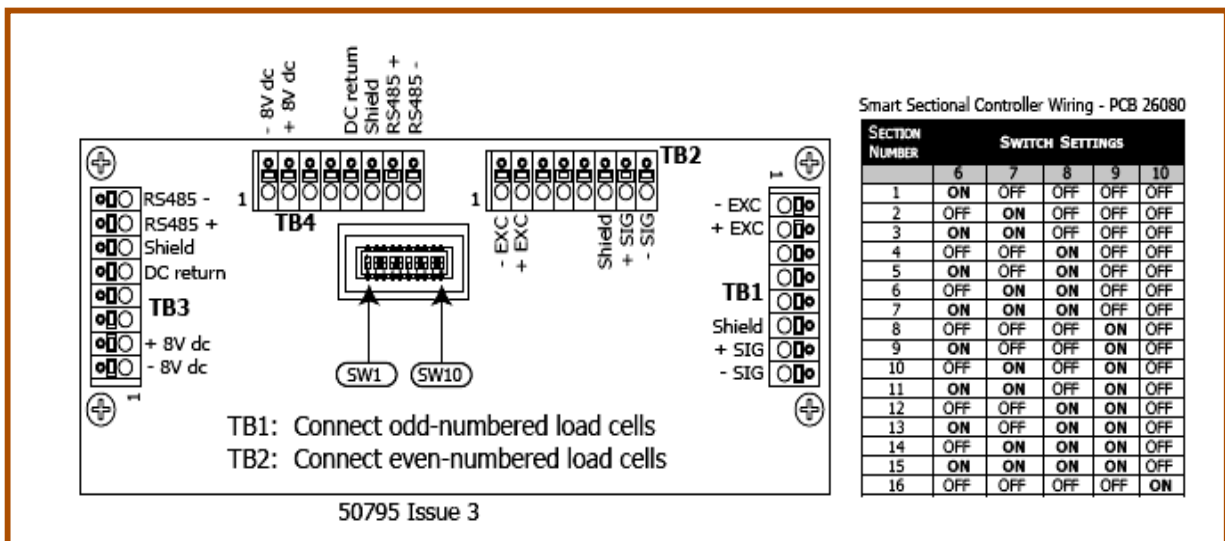
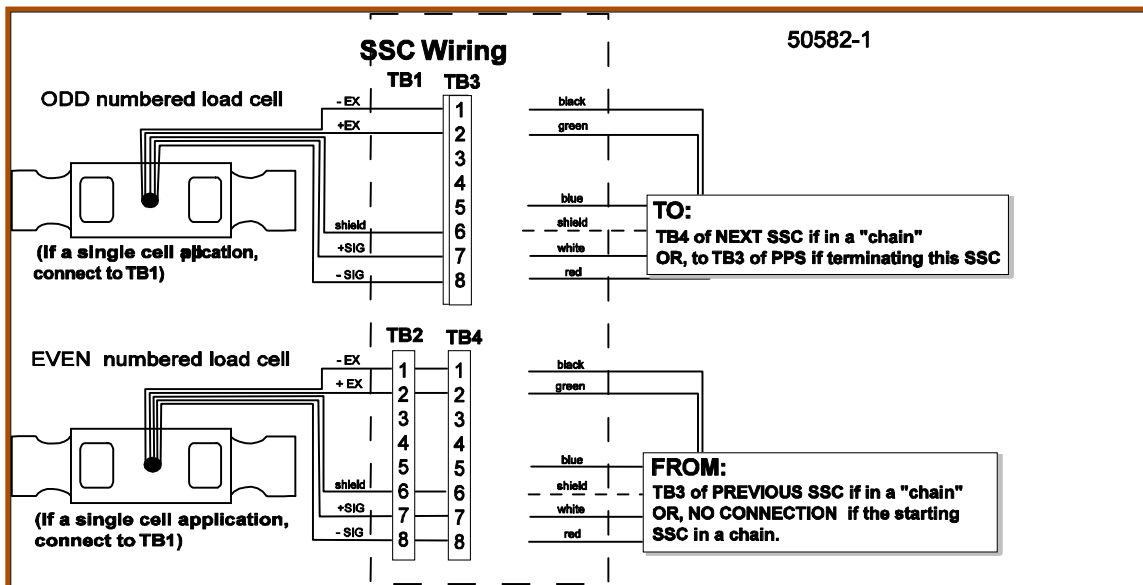
NOTE: SSCs have connections for two (2) Load Cells, labeled **TB1** and **TB2**.

- The odd numbered cell goes to **TB1**.
- The even numbered cell goes to **TB2**.

Load Cell Wiring, Continued

Installation Information

- The cable used in *all* wiring (other than load cells) must be a **minimum of 18 AWG (Cable 17246)**.
- The SSC boxes are daisy-chained to the end where they terminate into the Pit Power Supply (**24722**).



1. Wire the SSCs to each other.

SSC-to-SSC 'Daisy Chain' Connections

TB3 or TB4 in SSC	Function	17246 Cable
1	(-) 8.0 volts	Black
2	(+) 8.0 volts	Green
5	DC Return	Blue
6	Shield	Shield
7	RS-485 (+)	White
8	RS-485 (-)	Red

NOTE: On the 17246 Cable daisy chain connections, the Orange wire is not used.

2. Set the Switches

Dip (Address) Switch Setup, SSCs

- In each of the smart SSC boxes there is an 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, 3, 4, are always OFF. Leave these switch settings alone.

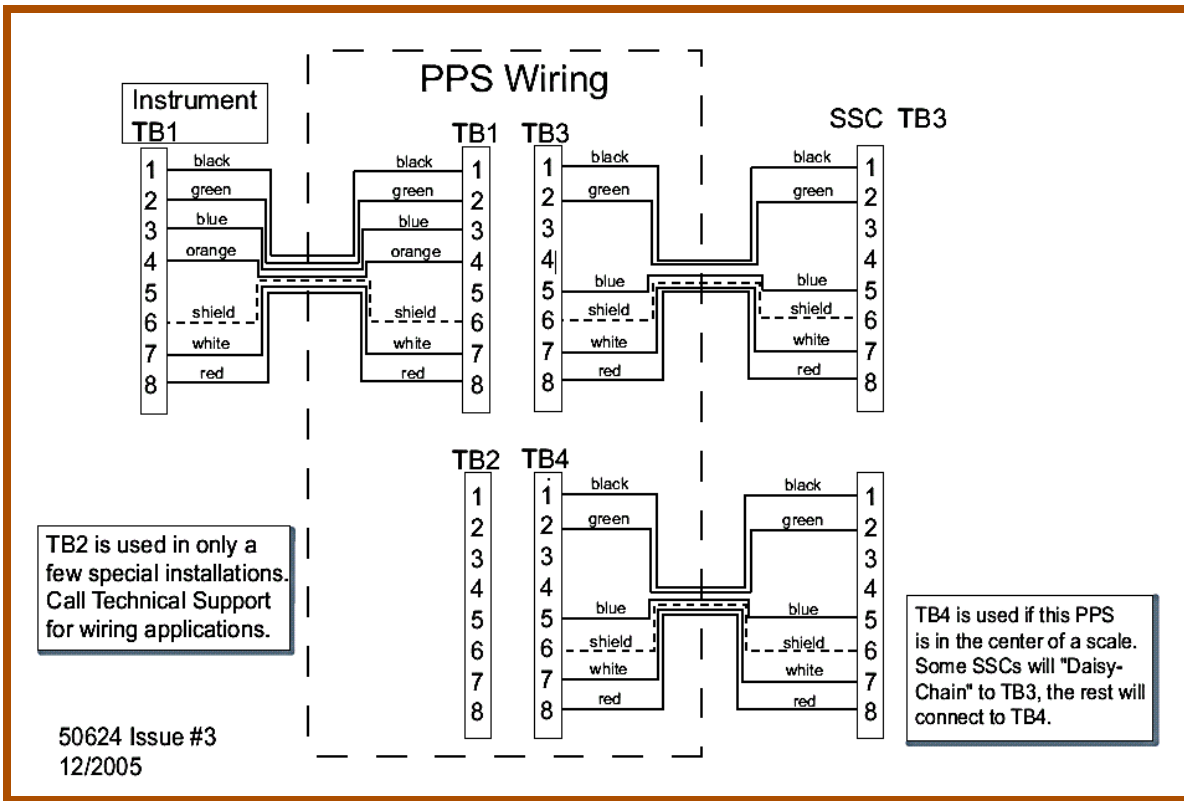
SW 1 position 5 setting

OFF = 350 Ω load cells

ON = 700/1000 Ω load cells

- Switches 6 thru 10 are used to set the section (section address) numbers.
- Set the section number according to the following chart.
- Continue in this manner until each SSC box has a unique section number entered on the dip switches.

POWER SUPPLY



1. Connect the PPS to an SSC (#1 or any SSC).

— Feed a cable from SSC#1 TB3 through the bushing for in the PPS for TB3 and make connections as follows:

TB3 SSC#1	TB3 PPS	17246 Cable	Description
1	1	Black	(-) 8.0 volts
2	2	Green	(+) 8.0 volts
5	5	Blue	DC Return
6	6	Shield	Shield
7	7	White	RS-485 (+)
8	8	Red	RS-485 (-)

2. Wire the PPS to the Instrument.

— Run the 'Home-Run' cable from the PPS, TB1 to the Instrument's TB1, wire as follows:

TB1 PPS	TB1 Inst	17246 Cable	Description
1	1	Black	28 volts, AC
2	2	Green	AC Return
3	3	Blue	20 Volts, DC
4	4	Orange	Enable
6	6	Shield	Shield/DC Return
7	7	White	Transmit
8	8	Red	Receive

NOTE: Shields are used for DC Return and **MUST** be connected.

GROUNDING

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 location. Below are points to correctly ground the system:

- It is recommended that the grounding be done with #8 or larger wire or braided ground straps.
- All of the ground connections should be **2 feet** or as short as possible.
- 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 scale ground rod.

GROUNDING continued

- The insulated WHITE wire from the PPS connects directly to the separate ground rod (not to the same rod as the steel).
- The **117 VAC SVP Unit (23143)** 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 **0.2VAC or LESS.***

DATA RECORDING

- Record the scale serial numbers from the tag.
- Record the instrument, SSC, PPS, and load cell serial numbers.
- Keep a copy of the sheet in the customer file.
- Use Appendix II for additional information.

Full Electronic Scales are designed to provide protection from moisture.

- The load cells are calibrated with the cable attached, and therefore ***the cable should NOT be cut.***
- The cable is connected directly to the SSC through a gland fitting which ***MUST be tightened*** with pliers 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 gland fittings have O-rings that can be forced out of position if the bushing itself is not tight.
 - *To prevent this, first tighten the inner nut securing the bushing in the hole, then insert cable and carefully tighten gland with pliers until it is very snug.*
 - *Do not over-tighten where bushing 'turns.*

Section 5: Calibration

INITIAL ZERO AND SPAN ADJUSTMENTS

1. Seat the suspension components.
 - a. Drive the test truck across the scale stopping and starting several times.
 - b. *Repeat this procedure **at least three times** to assure that all parts are properly seated.*
2. The zero and span of the scale need not be set perfectly, but it should be roughly adjusted to check for repeatability.
 - a. Return to zero and properly adjust the section readings.
3. Refer to the appropriate technical manual for the scale indicator for the initial and span calibration procedures.
4. Perform the coarse initial and span adjustments.
 - a. Final zero and span adjustments are performed after adjusting the sections.

REPEATABILITY AND RETURN-TO-ZERO PERFORMANCE TESTS

1. Position the test truck in the center of the Weighbridge.
2. Note the weight reading.
3. Pull the truck off the scale and note the return to zero.
 - a. Repeat this procedure at least three times to assure consistency.
 - b. If the scale does not repeat the readings, within tolerance, check for mechanical obstructions or "touches".
 - c. Check the scale thoroughly for proper assembly
 - d. Check the load cells for proper alignment and to be certain it is plumb.

NOTE: *This is best accomplished with the **AZT disabled**.*

SECTION TEST AND ADJUSTMENTS

- The section test should be conducted centering the test load over each section.
 - A weight cart, block weights, rear axles of the test truck.
- Note the weight indication of each section.
 - The sections should be adjusted so the weight indications of all sections match within the tolerances set forth by the **National Institute of Standards and Technology's Handbook H-44**.
- Place the test load over each section and Trim the sections by adjusting the selected section as described in the appropriate Intalogix™ instrument service manual.

DIGITAL INDICATOR SPAN CALIBRATION

- Perform the span adjustments, following the appropriate Intalogix™ instrument service manual.

Section 6: Maintenance

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 all boxes' (SSCs, PPSs & Junction Box) covers are secure

LOAD CELL REPLACEMENT

1. Remove power from the system at the instrument
2. Jack the scale at the 'bad' load cell location
3. Lift off links, remove old cell
4. Apply a small amount of grease on cell 'pivot', then install a new cell
5. Place links over load cell ends making sure links are in the grooves of load pins
6. Gently lower scale assembly ensuring proper placement of cell, links, and load pin
7. Loosen the gland nut, then unwire the 'bad' cell from the box, note wire color code
8. Wire the new cell into box, tighten the gland nut around the cable using pliers
9. Close the box.
10. Reapply power to the instrument
11. Check operation, calibrate as necessary

SSC BOARD REPLACEMENT

1. Remove power from the system at the instrument
2. Remove cover, disconnect all wiring, noting colors and terminal locations
3. Remove screws securing PC board
4. Carefully remove prom and insert in new PC board, note dip switch settings
5. Set dip switches for proper address on new PC board
6. Install PCB and secure with all screws
7. Connect all wires

SSC BOARD REPLACEMENT, CONTINUED

8. Close the box.
9. Tighten all gland nuts with pliers to secure.

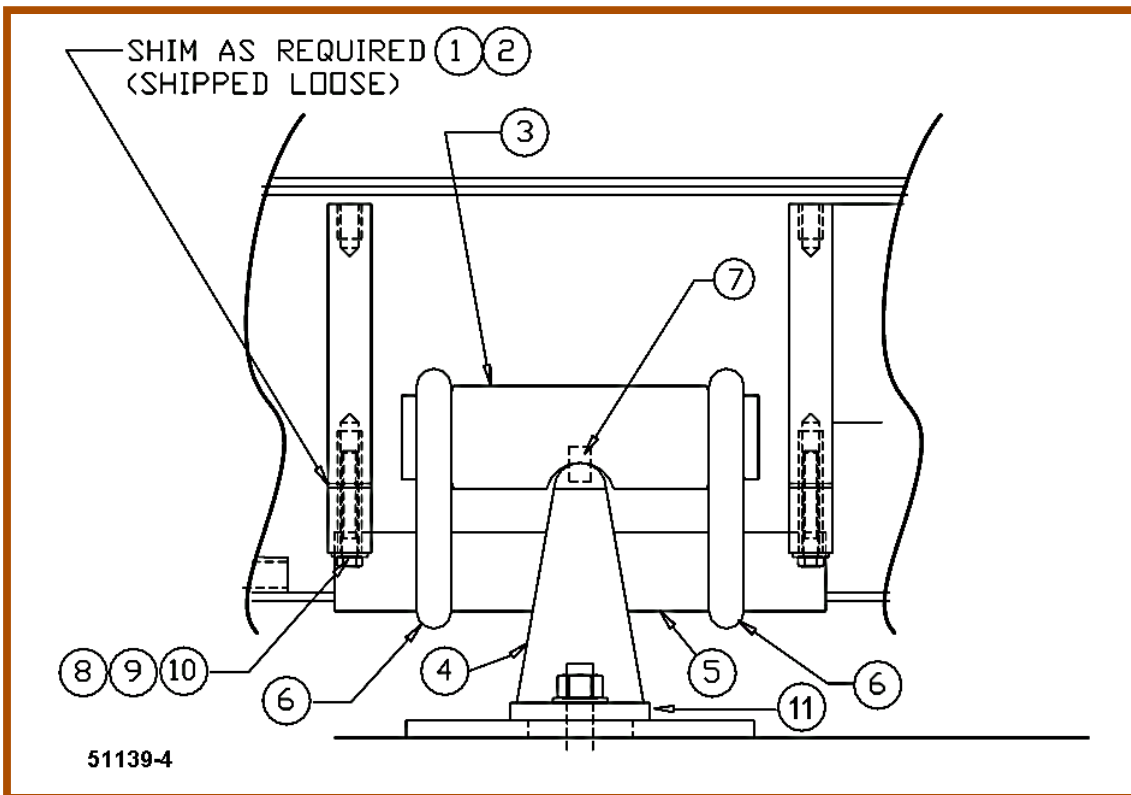
PPS BOARD REPLACEMENT

1. Remove power from the system at the instrument
2. Remove PPS cover and disconnect all wiring
3. Remove screws securing power board
4. Remove old PCB, secure ground wire to new PCB
5. Remake all connections, install the new PCB and secure all screws
6. Close the box.
7. Tighten all gland nuts with pliers to secure

Section 7: Parts

SCALE COMPONENTS

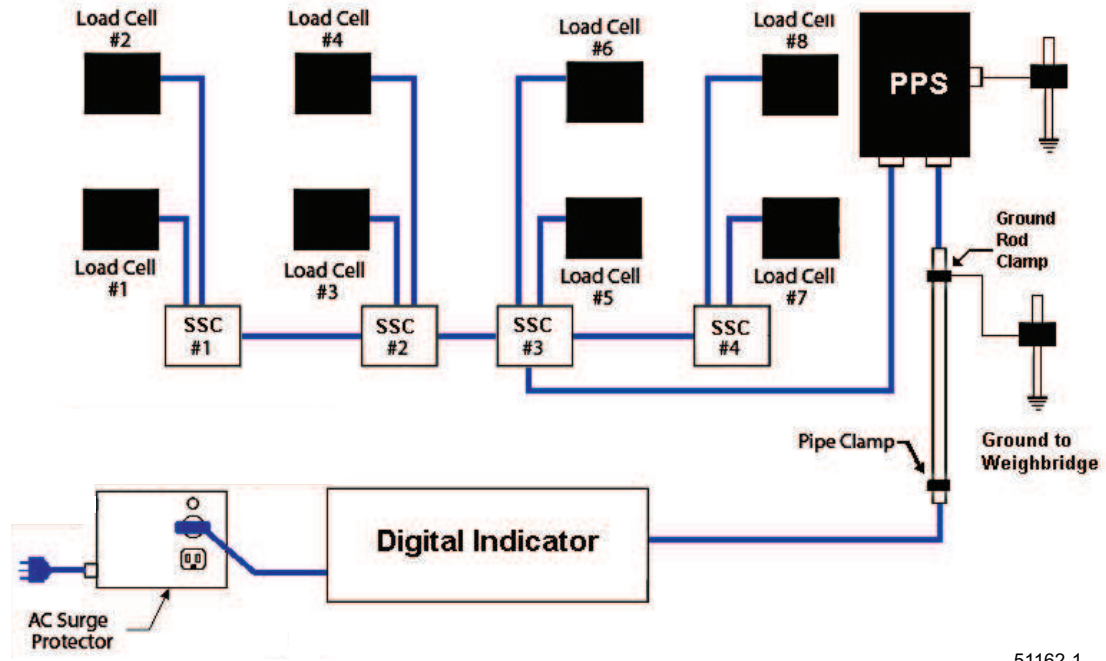
Item #	Part #	Description
1	66971	1/16" Pin Seat Shims
2	66974	1/8" Pin Seat Shims
3	149075	Load Cell, 75K DE Shear Beam, 3mV/V (20' Cable)
4	64805	Corner Stand, DB Load Cell
5	64812	Load Pin
6	66347	Link 1-1/4"
7	64824	Dowel Pin, 5/8" Dia. X 1" Long
8	64822	Pin Seat
9	54769	Lock Washer, 1/2"
10	54401	Bolt, 1/2"-13 x 3"
11	61743	Clamp Bar
No Ref	23143	Surge Protector, AC
No Ref	55010	Ground Kit



INTALOGIX™ TECHNOLOGY SCALE COMPONENTS

Number	Description
27926	Sectional Controller Assembly (SSC)
26164	SSC Box
26080E	SSC PCB Only
32163	Pit Power Supply Assembly (PPS)
31500	Pit Power Supply PCB only (Latched Style)
15646	Pit Power Supply Box (Bolted Style)
23393	Pit Power Supply PCB only (Bolted Style)
17545	Connector, Liquid Tite (small) (PPS)
17535	Connector, Liquid Tite (large) (PPS)
24977	Connector, Liquid Tite (SSC)

Appendix I: Wiring



51162-1

Appendix II: Data Recording

Location/Name _____ Phone # _____

Scale Model _____ Serial _____

Date Installed _____

Date placed in service _____

Installer's Name _____

Instrument Model _____ Serial _____

Load Cell #1 Serial _____

Load Cell #2 Serial _____

#1 SSC or J Box Serial _____

Load Cell #3 Serial _____

Load Cell #4 Serial _____

#2 SSC or J Box Serial _____

Load Cell #5 Serial _____

Load Cell #6 Serial _____

#3 SSC or J Box Serial _____

Load Cell #7 Serial _____

Load Cell #8 Serial _____

#4 SSC or J Box Serial _____

PPS Serial _____

Location/Name _____ Phone # _____

Scale Model _____ Serial _____

Date Installed _____

Date placed in service _____

Installer's Name _____

Instrument Model _____ Serial _____

Load Cell #1 Serial _____

Load Cell #2 Serial _____

#1 SSC or J Box Serial _____

Load Cell #3 Serial _____

Load Cell #4 Serial _____

#2 SSC or J Box Serial _____

Load Cell #5 Serial _____

Load Cell #6 Serial _____

#3 SSC or J Box Serial _____

Load Cell #7 Serial _____

Load Cell #8 Serial _____

#4 SSC or J Box Serial _____

PPS Serial _____



Manufactured by Thurman Scale Inc.
4025 Lakeview Crossing
Groveport, Ohio 43215

www.thurmanscale.com

Diamondback PV

Model: 8560

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