1. OVERVIEW

The VTS201 containerized Truck Scale are the newest products which is suitable for container shipment. The scale is robotically welded, machine-fixtured and has the highest quality paint finish available in the industry. These scales consists of a state-of-the-art orthotropic deck and hermetically sealed stainless steel load cells (RC3 analog load cell) and an intelligent weighing terminal.

The VTS201 is designed to optimize the state of the art orthotropic design to fulfill two important goals; to accurately weigh on-the-road trucks under medium to heavy traffic conditions and to reduce your long-term service and maintenance costs.

The entire weighing system is built on high-accuracy and good working reliability. The analog system provides weighing accuracy. The VTS201 are designed to be transported in a standard sea container or on a flatbed truck without the added expense of a wide-load permit and extra safety precautions such as flashing lights and escort vehicles. The scale can also be disassembled and transported to another site, provided that there is an adequate foundation and the installation is supervised by technician trained by ASPIRE. These scales are ideally suited for above-ground mounting where debris typically accumulates and must be periodically cleaned to insure that these materials do not effect the scale operation like that of many competitive models which are not so easily cleaned.

The entire weighing system also can be equipped with peripherals like printers, scoreboards, PCs and with truck weighing software to meet the customer's specific requirements.

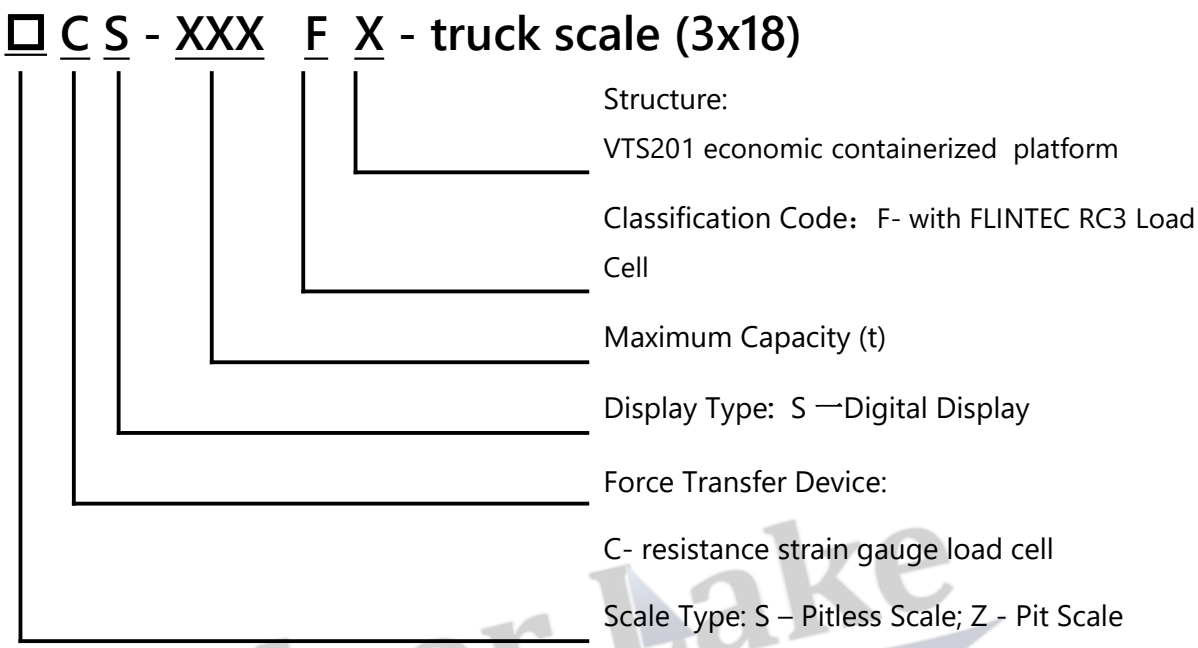
Note: all measures in this document refer to Scientific (SI) Units, otherwise referred to as metric. Other dimensions are for reference.

2. WORKING CONDITION

- Environment Humidity: ≤ 95%
- Operation Voltage: 87 ~264 VAC , 49~61 Hz
- Temperature, For Load Cell: -30°C ~+65°C, For Indicator: -10°C~+45°C

3. SPECIFICATION AND TECHNICAL PARAMETERS

3.1 MODEL



For Example: SCS-60F is an analog Container Ready Truck Scale with the maximum capacity of 60t. 60t is the typical OIML build for a 16.5meter truck on an 18m scale and is not a representation of the strength of the scale normally determined by Concentrated Load Capacity (CLC) discussed earlier.

Note: The model is based on China standard GB/T7723-2002, "stationary electronic scale"

3.2 SPECIFICATION AND TECHNICAL PARAMETERS

3.2.1 Specification (See Table 1)

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Table 1

Max. Capacity (t)		30	50	60	80	100	Module Number-Combination	Scale Size (Actual)
Rated Axle load (t)		28	28	28	40	40		
Scale Increment (nMax)		3000	2500	3000	4000	5000		
Interval (kg)		10	20	20	20	20		
Accuracy Class		Ⅲ						
Scale Size (standard)	3X6	*					1-5.8	3X5.8
	3X8	*					2-4+4	3X8
	3X10	*					2-5+5	3X10
	3X12		*	*			2-5.8+5.8	3X11.6
	3X15		*	*	*	*	3-5+5+5	3X15
	3X16		*	*	*	*	3-5.8+5+5	3X15.8
	3X18		*	*	*	*	3-5.8+5.8+5.8	3X17.4
	3X20					*	4-5+5+5+5	3X20
	3X21					*	4-5.8+5+5+5	3X20.8
	3X24					*	4-5.8+5.8+5.8+5.8	3X23.2

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Notes:

- In order to suit for the container packing, the module length of 6m has been reduced to 5.8m; this is the primary reason for the net difference between the actual size and nominal size of scale. If the modules were increased an 18m bridge would require a 40' container effectively doubling the shipping cost.
- According to customer's requirements, ASPIRE can also customize the specific truck scale by changing the length & width of the platform. For example:

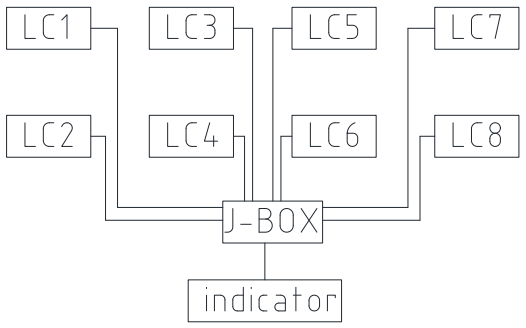
The specific width could be 3.4m instead of 3.0m, a possible length could be 30m; Note: Specific size should specific packaged using the different container type.

3.2.2 Technical Parameter for RC3 Load Cell

Table 2

Maximum capacity 量程 (Emax)	t	7.5/15/22.5/30/40/50/100/150/300	7.5/15/22.5/30/40/50			
Rated Output 输出灵敏度（Cn）	mV/V	2 ± 0.1%				
Calibration in mV/V/Ω 数字标定精度	%Cn	⩽ ± 0.05 (⩽ ± 0.005)				
Accuracy class according to OIML R 60 精度等级		(GP)	C1	C3	C4	C3 MI 8
Maximum number of verification intervals 最大检定分度数(Nmax)		n.a.	1000	3000	4000	3000
Minimum load cell verification interval 最小检定分度(Vmin)		n.a.	Emax/5000	Emax/15000		
Combined error 综合误差	%Cn	⩽ ± 0.040	⩽ ± 0.030	⩽ ± 0.020	⩽ ± 0.018	⩽ ± 0.015
Creep error (30 minutes)/DR 蠕变	%Cn	⩽ ± 0.060	⩽ ± 0.049	⩽ ± 0.016	⩽ ± 0.012	⩽ ± 0.006
Temperature effect on minimum dead load output 零点温度系数	%Cn/℃	⩽ ± 0.0040	⩽ ± 0.0028	⩽ ± 0.0009	⩽ ± 0.0009	⩽ ± 0.0009
Temperature effect on sensitivity 灵敏度温度系数	%/℃	⩽ ± 0.0020	⩽ ± 0.0015	⩽ ± 0.0010	⩽ ± 0.0008	⩽ ± 0.0010
Excitation voltage 激励电压	V	5…15				
Zero balance 零点平衡	%Cn	⩽ ± 5				
Input resistance 输入电阻	Ω	1150 ± 50				
Output resistance 输出电阻	Ω	1000 ± 2				
Insulation resistance 绝缘电阻	MΩ	⩾ 5000				
Compensated temperature range 补偿温度范围	℃	-10…+40				
Operating temperature range 工作温度范围	℃	-40…+80				
Safe load limit 安全载荷限制	%Emax	200				
Ultimate load 极限载荷	%Emax	300				
Load cell material 材料		stainless steel 17-4 PH (1.4548) 不锈钢				
Sealing 密封		complete hermetic sealing; 全金属焊接密封				
Protection according DIN 40.050 防护等级		IP 68				

3.2.3 Configurations for Modules, J-Boxes and Load Cells (See Figure 1)



Note: LC1, LC2,.LC10 are load cells.

Figure 1

3.2.4 Technical Standard

OIML R76 Non-automatic weighing instruments

GB/T 7723-2002 Standard of Fixed Electronic Scale

JJG539-97 Verification Regulation Of Digital Indicating Weighing Instrument

4. WEIGHING SYSTEM AND STRUCTURE

4.1 SYSTEM CONFIGURATION

The container ready truck scale is composed of two parts: the weighing structure (platform) and the display (the indicator and the instrument cable). Optional devices such as computer, printer, scoreboard, surge protector, safe power supply, and socket plug can also be equipped per user's specific requirements. See Figure 2 for details.

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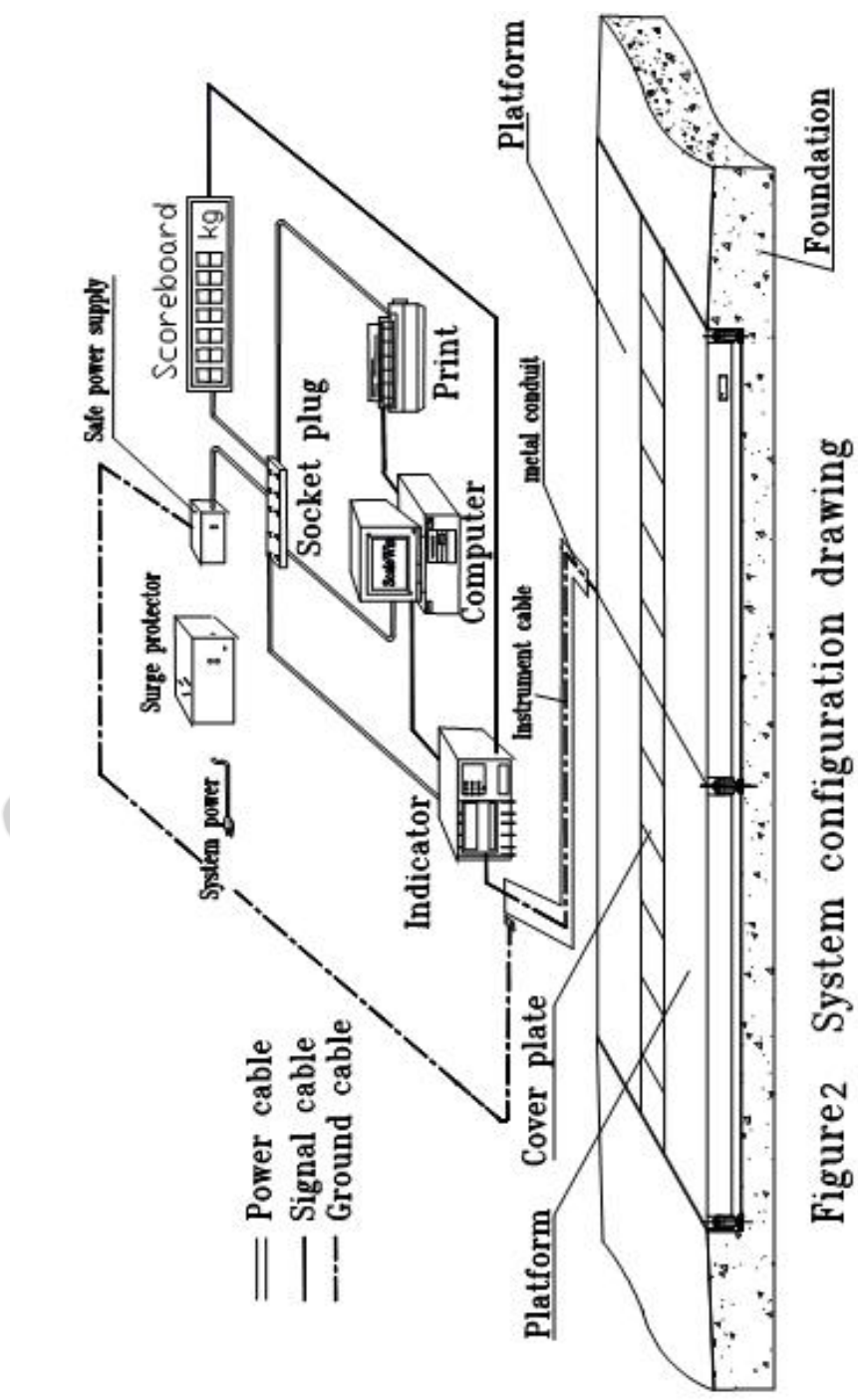

Figure2 System configuration drawing

4.2 WORKING PRINCIPLE

The elastic body of a load cell deforms under the weight of a loaded truck driven onto the scale. The strain gauge bridge bonded to the elastic body loses its resistance balance and outputs an analog electric signal proportional to the weight of the loaded truck. The signal is transferred into a digital signal through the amplifier and A/D transfer of indicator and the indicator displays the weight directly after the signal is processed by the CPU of indicator. When the indicator is connected to a PC and a printer, the indicator outputs the weight signal to the Weighing

Management System composed by the indicator, PC, and printer. See Figure 3 for the Wiring Scheme of Truck Scale with eight load cells equipped.

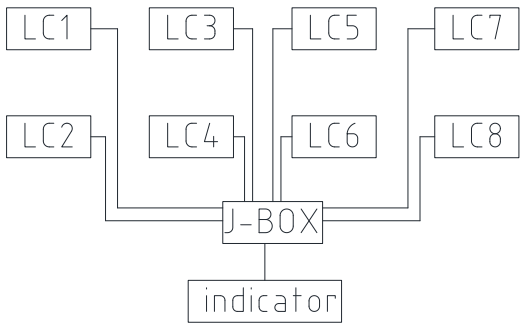

Figure 3 Wiring Scheme of Truck Scale

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5. INSTALLATION AND CONNECTION

5.1 STACK AND STORAGE OF SCALE

- Ensure the scale modules are in a level position.
- Blocks should be placed between scale modules. No clearance is allowed between module and block. Blocks should be kept in (two) straight lines in order to prevent modules from deforming. See figure 4.

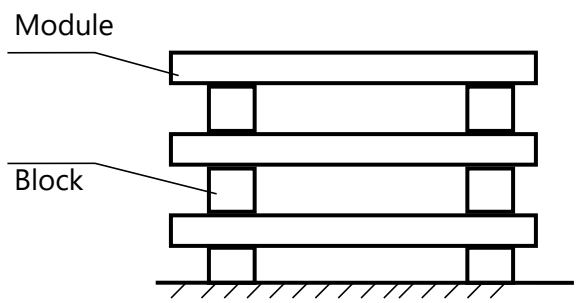

Figure 4

5.2 FOUNDATION REQUIREMENTS

5.2.1 Foundations for electronic truck scale made by ASPIRE have two basic types: shallow pit and pit-less. The pit-less scale is built up from the grade, pit scale is built over a foundation built into

excavated ground, and the surface of the weighing platform is typically flush with the ground to allow trucks to easily move across and around the scale. Please see any of our Foundation Drawings for details. The difference between two types is as shown below (See Figure 5):

Scale shown above ground with concrete Ramps

Scale shown pit mounted

Figure 5

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	Pit less (Above Ground)	Shallow pit (In Ground)
Approaches	Ramps	No Ramps required
Side rails	Based on the customer's requirement	No exposed side rails. W&M regulations require curbs on surrounding paving to prevent vehicle from contacting the surrounding area causing weighing errors.
Excavation - depth	900mm	1350mm
Clean out	Hose out from side or from the center access area. Quick and easy	Typically through the center access plates and a pump should water enter the foundation, drains should always be free of material.
Drainage	Washout slab and deck self draining	Drain or sump required. Deep pits, or low lying sites, may require a sump pump to evacuate accumulated rain water. In chemical industries, accumulated liquids must be treated according to local regulations.
Hazard Potential	Little or none with frequent cleanout	Varies. Pit collects water and debris. Can collect fuel and heavier-than-air

		gases. Can also attract rodents and vermin. Some safety issues with confined areas.
Relocation	Can be very cost effective. Especially if considered in planning	Very Costly. In ground scale considered a permanent installation.
Service and calibration access	From the sides of the scale.	Requires access holes built into the sides of the foundation – see the foundation drawings for details
Foundation Cost	Less expensive	More expensive

5.2.2 Users should design the working drawing using the foundation drawings supplied by ASPIRE as a reference.

While designing the working drawing, the following requirements should be met:

- The foundation or supporting structure should be built according to local building and civil regulations.
- A pit type foundation may be heated to achieve -10° in colder climates for compliance to weights and measures regulations OIML R76. Heating to above =0°C reduces accumulated ice and snow provided the melt water can be ducted away from the foundation.
- The bearing capacity of the ground under the foundation should be greater than 98 KPa (10t/m^2) to support the weight of the truck, scale and foundation. If this requirement can not be met, we recommend a ASPIRE beam slab foundation unless the ground requires pilings. The earth must be consistently stable under the scale and approach ramps to insure that the foundation doesn't move during the life of the scale. This prevents structural failures as well as potential errors.
- The pit should be deep enough to penetrate the frost line.
- For the foundation for the pit scale, drain pipes should be introduced as recommend in the foundation drawings. The aperture of the drain should be large enough to accommodate the water flow typical for the weather in the region. Position of the surrounding access covers should also be taken into account in order to ensure enough space is considered for maintenance and service of the drain. For the foundation of a pit-

less scale, the surrounding drain pipes should be introduced to protect the scale from being submerged due to rainstorms.

- The diameter conduit in the foundation transitioning to the scale terminal should be a minimum of 50mm and the fillet radius "r" must exceed six times diameter of the pipe when the pipe changes direction. If this radius is too small a transition well must be considered, otherwise it is difficult to thread the home-run cable through.
- For the foundation of a truck scale with the explosion proof device equipped, the following requirement should also be met.
- For truck scales operated in the area where explosive gas exists, the working drawing should be designed by a qualified organization with experience for designing explosion proof buildings.
- Read the requirements specified on the foundation drawing and the Explosion Proof Electronic Truck Scale Operator Manual in detail before designing the working drawing.
- The resistance of the safety ground connection from the barrier to the grounding electrode should not exceed 4Ω.
- The instrument cable for an explosion-proof scale will pass through the barrier and be terminated at the indicator located at a safe area. In general, the barrier is located at the hazardous side of the safety wall. So the conduit for the instrument cable stops at the safety barrier, and then the instrument cable enters into the metal conduit and reaches the safe zone through a sealing connector. The length and the location for metal conduit are determined according to site situations.

5.2.3 Foundation parts (such as base plates, anchor bolts, retaining plates, etc.) are supplied by ASPIRE. Measures should be taken to ensure the proper positions of both the anchor bolts, base plates and retaining plates. The base plates and the retaining plates should be level and on the same plane (the permitted error limit specified in foundation drawing). Double grouting is recommended to locate anchor bolts and base plates to correct positions.

5.2.4 Regular maintenance is needed after the foundation is completed. Scale should not be installed until the concrete reaches the strength required.

5.2.5 The site should have adequate room designed by users according to their actual requirements for trucks to properly align with the platform before pulling on. The style of grounding electrode, the system electrical equipment's connection and power supply please refer to "**Appendix A**" and "**wiring diagram"**.

5.2.6 A instrument cable is educed from the J-Box and enters the instrument room through a metal conduit. The location and layout of the metal conduit should be designed by users

according to the foundation drawings and the site layout. While laying the metal conduit, the guide wire for the instrument cable should pass through the conduit.

5.2.7 The metal conduit must be reliably connected with the foundation distributed grounding net.Refer to"**Appendix A**".

5.2.8 For the foundation of a truck scale with lightning strike device equipped, the detail of the distributed grounding net. Refer to"**Appendix A**".

删除[Xu Bing]: e

5.3 UNLOADING THE TRUCK SCALE FROM THE SHIPPING CONTAINER

5.3.1 Remove the door seal (bolt) with a cutting tool appropriate for the task. This usually requires removing the shipping bolt with a ca. 70cm to 100cm bolt cutter see the photograph below.

5.3.2 Open and secure the container doors. The doors can be blocked open with a heavy object or a sufficiently sturdy stake driven into the ground.

5.3.3 All of the modules and bearing frames should be lying flat inside the container. Make sure that the components are in good condition and are stacked safely inside the container (they are not likely to fall, causing personal injury). If there is damage, contact the carrier immediately to report the damage.

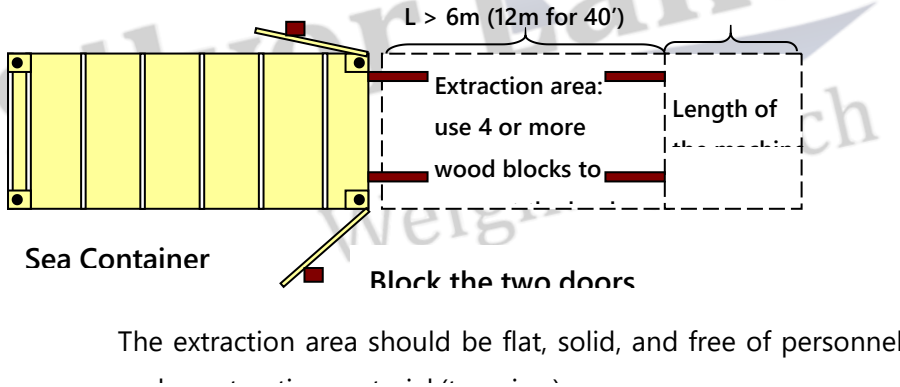
5.3.4 Remove the turnbuckles and steel cables, which secure the scale to the corners of the container's opening. The turnbuckles and steel cables should be recycled as scrap metal. Under no circumstances should they be left on site or around the work area as they may cause a safety risk to others. Also remove the wooden blocks which are secured (with nails or screws) to the floor of the shipping container).

5.3.5 Place at least two hard wooden blocks (10 cm by 10 cm by at least 50 cm) on the ground in front of the container door and perpendicular to the opening. The purpose of these blocks is to support the end of the bottom module when the scale is removed from the shipping container. In other words, it bridges the small height gap between the ground and the floor of the container. Two more can be used to support the opposite end when the module stack is lowered.

5.3.6 It is now possible to remove most of the steel modules using either a heavy-duty forklift or small crane (review the next paragraphs before proceeding):

Note: Make sure that you have at least 10 meters (30 feet) of unobstructed free space surrounding the doors of the container to safely extract the scale. This area must also be free of personnel. Again, make sure that the doors are propped open and that you have removed all of the packing material from the extraction path.

Note: The scale has a steel roller mounted on the opposite end to facilitate easy extraction from the container.



Removing Modules from the Container

Forklift: Use a forklift with a lifting capacity of greater than 5t. Place the forks under the lowest module, lift the module approximately 10 cm (4 inches), and slowly back away from the container until the modules are free from the container – it may be necessary to bind the module to the forklift mast with nylon webbing with sufficient strength to withstand the pulling force to aid in the extraction. Lower the module and place two hard wooden blocks (10 cm by 10 cm by 50 cm) under the module to support it above the ground. Lift the opposing end with your lifting machine and place wooden blocks under the scale. Remove the roller. This roller can be recycled as scrap steel.

Crane: Attach a chain with two safety hooks to the two 35mm holes in the lowest module. Secure the chain to the tow-bar on the crane, and gently pull all of the modules from the container. Lower the module and place two hard wooden blocks (10 cm by 10 cm by 50 cm)

under the module to support it above the ground. Lift the opposing end with your lifting machine and place wooden blocks under the scale. Remove the roller. This roller can be recycled as scrap steel.

5.3.7 First remove the modules: The forklift drives forward slowly to pull the modules out (with the help of the crane, unloading is easier); Be careful: keep a small part of the modules in the container, or use the wood blocks mentioned above.)

5.3.8 Second: remove the bearing frames

Pull the bearing frames with the forklift or move them out with the under iron bar.

5.4 INSTALLATION

5.4.1 Equipment and Tool Kits Needed for Installation and Test On Site

- Hoist. The maximum weight of the scale module and the operating location of the hoist determine the tonnage required. It is recommended that the tonnage of the hoist should be two times the weight of a module. Forklifts can be used to handle standard weights during the test.
- Quality grease.
- Depending on local building requirements: Non-shrink, high-quality grout, such as PCI 'Verguss-Fix' and mixing tools, bucket, fresh water (usually used to secure base plates).
- Locktite® "RED" e.g., #271 (01-27100).
- 4 - 20cm x 20cm x 50cm hard (Oak or similar) wooden blocks to support the modules during assembly.
- Wooden shims – to adjust level and position the modules when assembling.
- 1 liter (quart) of RAL 7038 'agate gray' acrylic polyurethane, brush, cleaning supplies for touch-up.

5.4.2 Safety

- Barriers to block traffic from entering the scale
- Approved hardhat
- Approved safety glasses
- Steel toed/capped boots
- Industrial quality work gloves
- Fluorescent safety vest

Bolt cutter

5.4.3 Tools

Normal installation tool kit including many of the following items:

- Transit, tripod, rod
- 15cm (6-inch) spirit level
- 5 meter measuring tape
- Bolt cutters to cut ca. 12-18,m security bolt on the shipping container
- 30m (100-foot) measuring tape
- 30m (100-foot) chalk line
- Power cables to reach from local power to the scale – sufficient conductors for the below drill.
- Hammer drill, with sufficient minimum >25mm (1 inch) chuck.

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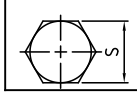
- At least two 20mm (3/4-inch) diameter carbide drill bits at least 50cm (18 inches) long for sufficient for drilling the anchor bolts.
- Electric surface grinder and abrasive disk in the event the foundation is not constructed according to drawings and material may need to be removed from the piers.
- 1-2 kg hammer.
- 30 cm (12 inch) long standard screwdriver.
- Small standard screwdriver with 2mm wide blade
- Number 2 Phillips screw driver for junction box covers.
- Crescent wrench to tighten cord grip bushings
- Electricians tools such as wire cutters and strippers
- 2 meter (6-foot) crowbar to align base plates and modules
- Beckman or Fluke digital multi-meter, 10+ meg Ohm for insulation, wiring, and ground check
- Slings or chains sufficient to safely lift a 3.1t module. Considering normal safety factors these should be capable of supporting a 10t load.
- Four swivel hooks, anchor shackles, eye-hooks or similar devices for lifting partially assembled and fully assembled modules; again they should be rated for the load.
- Torque Wrench, 40kg-m or greater capacity corresponding to the socket set below
- Socket set, with sockets, and 20cm extension for the following bolt sizes as shown in table below
- Five Taps (10mm, 20mm, 24mm, 27mm and 30mm), 27mm, 30mm sleeve (each) and a group of lengthened poles.

Hex. Head Size	M10	M12	M14	M16	M20	M24	M27	M30
	16 mm	18 mm	21 mm	24 mm	30mm	36 mm	41mm	46mm

- Standard weights with the total weight exceeding one half of to the entire the scale capacity depending on local regulations. One set of weight sensitive weights of 1, 2 and 5kg.
- 10 Large hardwood wood bocks 20 x 20 x 40cm. Metal or structurally suitable concrete blocks are can also be used.
- Hoist. The tonnage required is determined by the maximum weight of the scale module and the operating location of the hoist. It is recommended that the tonnage of the hoist

should be two times the weight of a module. Forklifts can be used to handle standard weights during the test.

- One hydraulic jack: capacity ≥5t.Four shackles(2.1t),Two M27 eye-Bolts
- Two 12" adjustable spanners, two #41 split wrenches, two #46 split wrenches, 20m tape and one kit of combination turning tools.
- Gradienter grease, plug gauge and multimeter.
- Five Taps (10mm, 24mm, 27mm and 30mm), 30mm sleeve and a group of lengthened poles.
- Standard weights with the total weight exceeding one half of the scale capacity. One suit of weight sensitive weights.

5.4.4 Preparation

- Inspecting the foundation according to specification stated on the foundation drawing. Check the location dimension, the level degree and the relative elevation of load cell supporting plates. Carry out the following inspections only when the foundation is up to standard.
- Inspect the metal conduit of the instrument cable and the drainpipes. Clean the contamination.
- Inspect all grounding parts and measure the grounding resistance to see if they conform with the requirements.
- Check power supply to see if it conforms with the requirement. Don't use the phase line or the zero line of the three-phase power as a power supply. When it is unable to be avoided, protections should be taken to protect the indicator from interference.
- Open wooden boxes and cartons delivered together with the scale and check off all items received against the packing list.

5.4.5 Install Adjusting plates

- Draw centerline of each power cell with chalk before place adjusting plates. Then place the adjusting plates and the retaining plates on the base plate. Moving the adjusting plates to adjust position.
- The holes on the adjusting plates are used to adjust the position of adjusting plates (±15 mm) while installing load cells. See figure 6 for detail.

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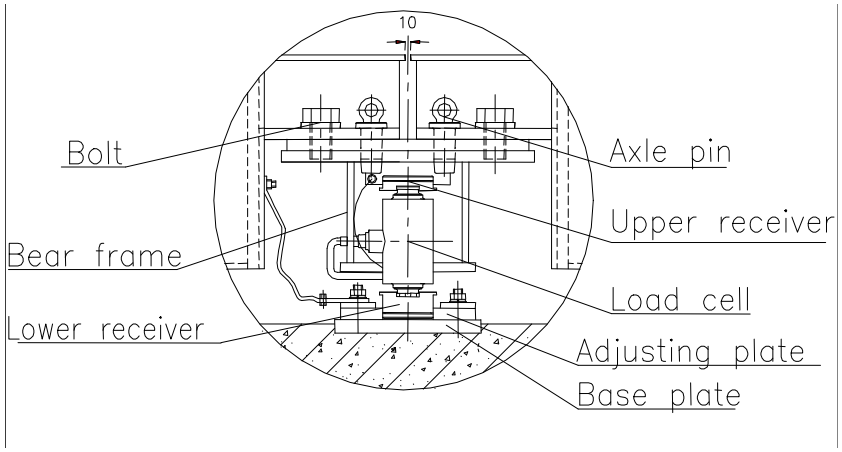


Figure 6

- Installation of the adjusting plate and retaining plates

Figure 7 illustrate the layout of adjusting plates and retaining plates of the truck scale.

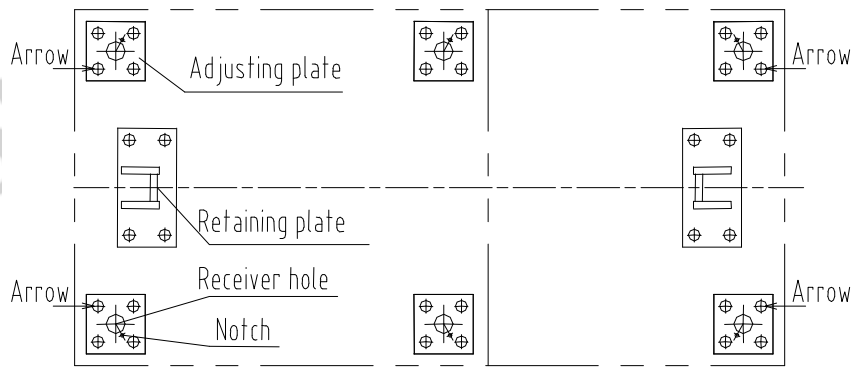


Figure 7

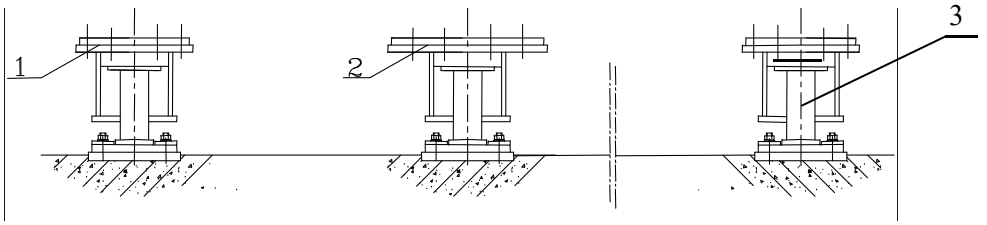
5.4.6 Installation of Modules

5.4.6.1 Installation of Locating Tools

Clean the locating tool used as load cell and insert a locating tool in each of the adjusting plate, Ensure verticality of all locating tools. See Figure 6.

5.4.6.2 Installation of bearing frames

Lift bearing frame and slowly lower into the pit. Bearing frame (end) is narrow; bearing frame (mid) is wide. See Figure 8. The locating tool should be inserted into the supporting hole of the bearing frames. Then move the bearing frames to proper position according to relative dimensions (See table3). All dimensional tolerances are in A2mm. (See figure 9)



1--Bearing frame (end) 2--Bearing frame (mid) 3-- Locating tool

Figure 8

Note: a)For a double-module truck scale, two end bearing frames and one mid bearing frame equipped;

b) For a tri-module truck scale, two end bearing frames and two mid bearing frames equipped;

c)For a four-module truck scale, two end bearing frames and three mid bearing frames equipped;

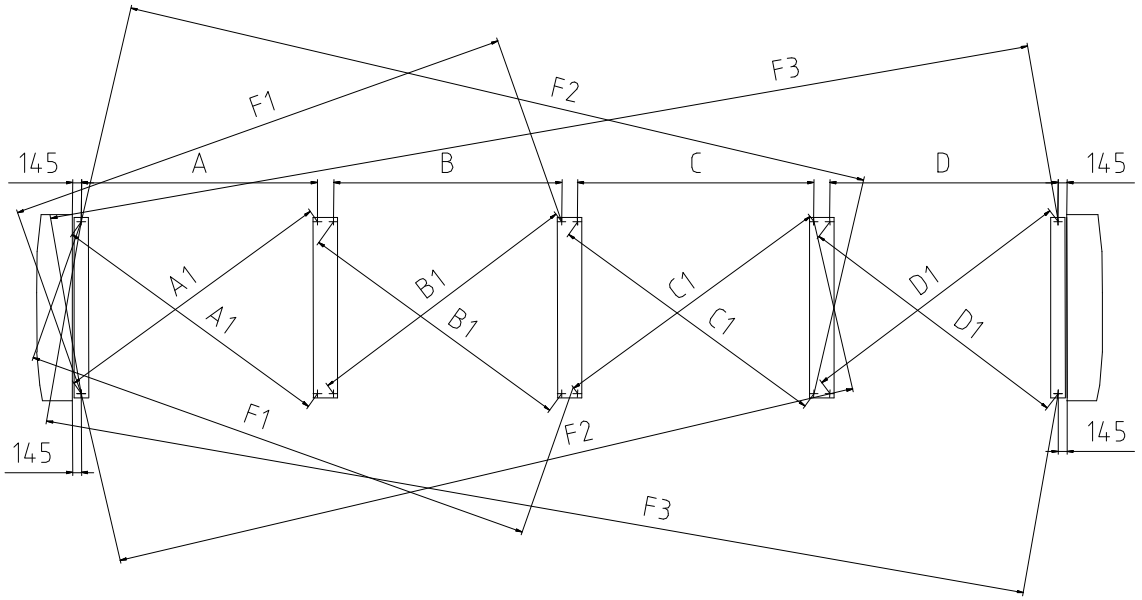


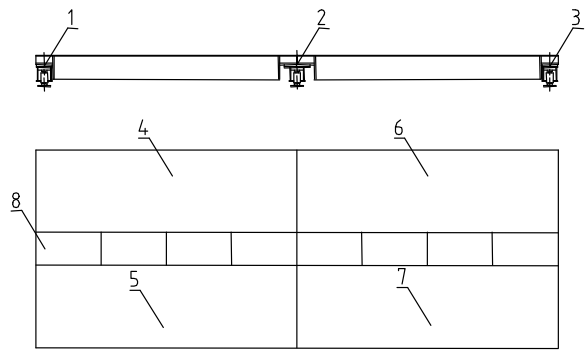
Figure 9

Table3

Size(m)	A	B	C	D	A1	B1	C1	D1	F1	F2	F3
3X8	3750	3750			4680	4680			8250		
3X10	4750	4750			5514	5514			10154		
3X12	5550	5550			6216	6216			11700		
3X15	4750	4750	4750		5514	5514	5514			15033	
3X16	5550	4750	4750		6216	5514	5514			15820	
3X18	5550	5550	5550		6216	6216	6216			17397	
3X21	5550	4750	4750	4750	6216	5514	5514	5514			20770

5.4.6.3 Lift one platform and slowly lower it onto the bearing frame according to the Figure 10, in sequence of the number (4, 5, 6…). Be sure the field angle between the tight sling and the module

is larger than 45°. See Figure11. Use the axle pins and bolts to locate and assemble the platform on the bearing frame respectively. (See figure 6).



1.3. --Bearing frame (end) 2-- Bearing frame (mid) 4.5.6.7-- Platform 8--Cover plate

Figure 10

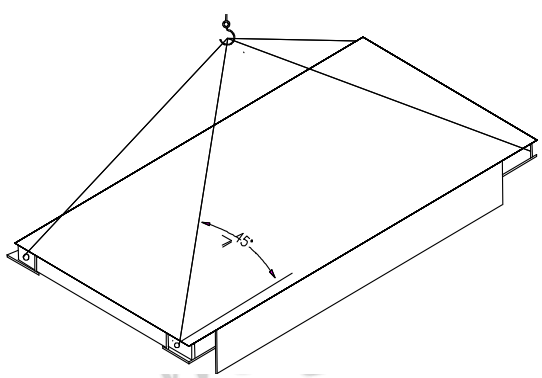


Figure 11

5.4.6.4 After the modules are installed, use the gradienter to check the level position of the module, then check and adjust the clearance around the modules to the required value. If you need to adjust the height of the deck, add shims under the bottom receiver and above the top receiver. The maximum shimming to be used for a load cell is 16mm. DO NOT PLACE more than 8mm of shims at the top or bottom receiver, or the receiver could become dislodged.

5.4.6.5 The adjusting hole of the adjusting plate and the retaining plate must be filled with PORROK epoxy or expanding cement. Compressive resistance is larger than 10MPa. Then screw the anchor bolts tightly. (See Figure 7: **Except the anchor bolts pointed by arrow**.) **The epoxy and the expanding cement should be prepared by customer.**

5.4.7 Installation of RC3 load cells

5.4.7.1 Check the verticality degree of the locating tools by using the prism.

5.4.7.2 Lift one end of the module by a hydraulic jack to take the locating tool out (Note: Don't raise it too high. The height should be just right to take the locating tool out. Put some wood blocks under the modules. **Screw the anchor bolts pointed by arrow in Figure 7**).

5.4.7.3 Grease the lower receiver and insert them in each of the Adjusting plate, (Note: notch of the receiver fixed by a roll pin, see Figure 7 for details). The upper receiver of the load cell should be inserted in the supporting hole of the bearing frame.

5.4.7.4 The upper receiver of the load cell should be inserted in the supporting hole of the bearing frame. Then place the greased and cleaned 0782 load cells on location. Special attention should be paid to place the load cell on location according to the marks of the product before delivery. Repeat all the above procedures until all load cells are finished installing. At the same time, we recommend that you use an appropriate prism level to check the load cell's perpendicular mounting position by holding it against the cylindrical housing tube.

Note：The location of the last number of the load cell kits (i.e. 6# of the double-module, 8# of the tri-module, 10# of the four-module) is just the location of the name plate.

5.4.8 Installation of retaining bolts and adjusting retaining clearance.

5.4.8.1 Install transverse retaining bolts: secure the retaining bolts and lock nut tightly. Ensure that the clearance between the bolt head and the side of bearing frame is about 3mm. See Figure 12.

5.4.8.2 Install longitudinal retaining bolts: secure the retaining bolt and lock nut tightly. Ensure that the clearance between the bolt head and the side of bearing frame is about 3mm. See Figure 12.

5.4.9 Installation of cover plate

All linking bolts (see figure 6) should be tightened and then tightened 1/4 circle with long wrench. Then Place the cover plates onto the platforms after wire connection finished.

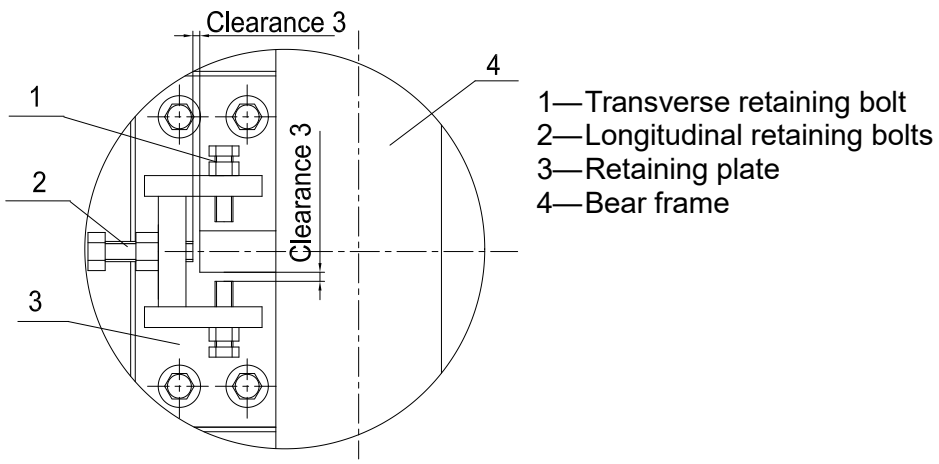


Figure 12

5.5 CONNECTION AND GROUNDING

5.5.1 Connection

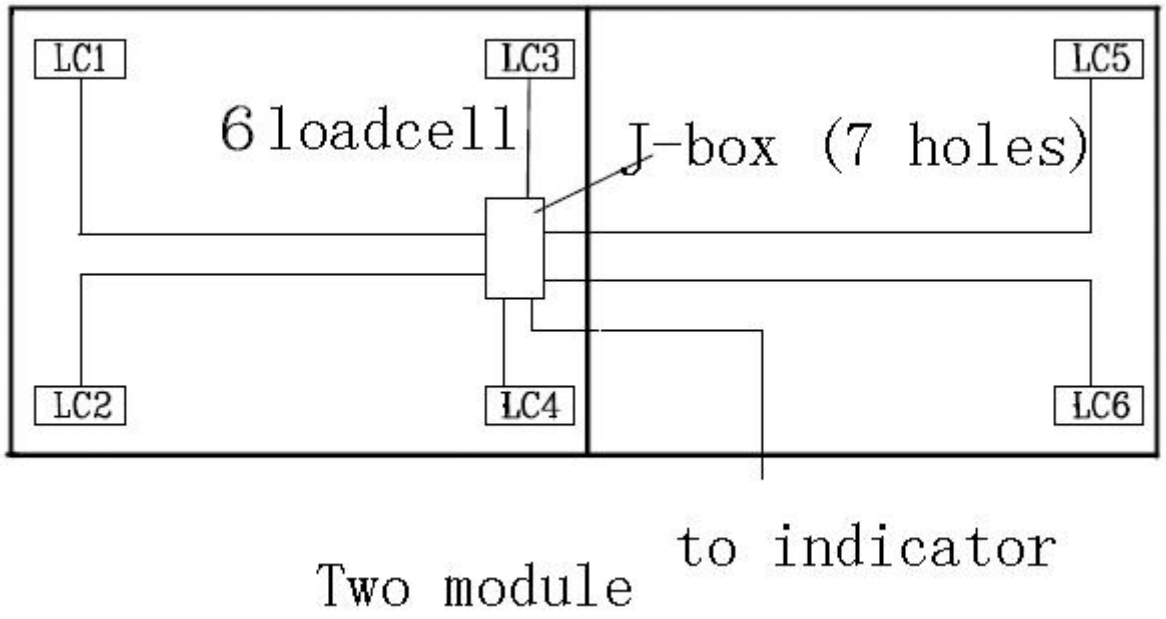
Wiring connection of the container ready truck scale includes cabling/wiring connection between load cells, J-Boxes, indicator, printer, and computer. See the drawing "**System Wiring Diagram" (in the document bag)** for details.

5.5.2 Load Cell Cabling

Route the load cell cable through the scale and connect it into the J-Box through a sealing joint. Then terminate core wires to their respective weld disks or connective poles according to their colors.

See Figure 13, 14, and 15 for routing load cell cables.

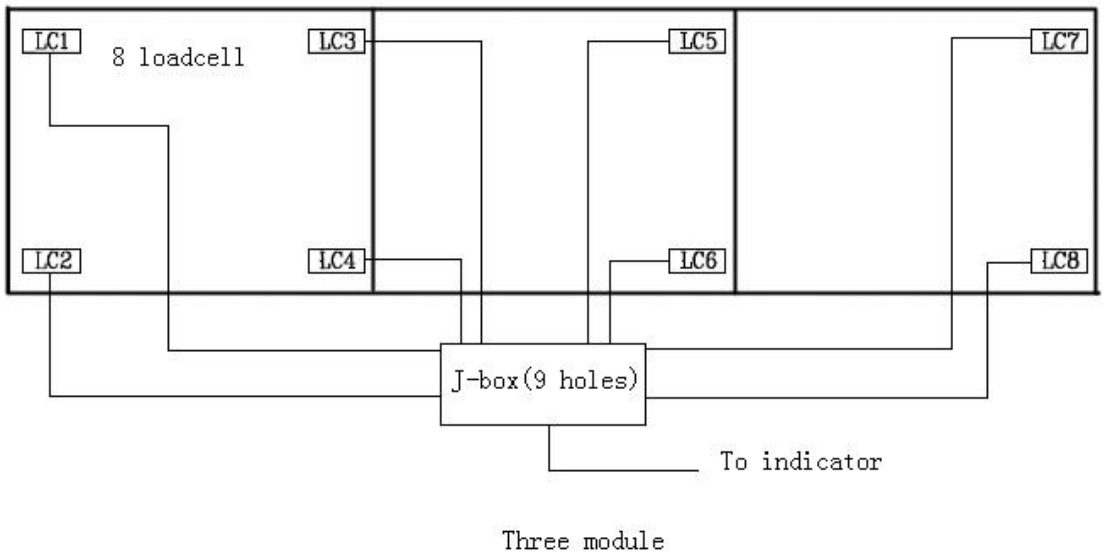
- Routing Load Cell Cables for the Two-Module Truck Scale.



LC-load cell; HR-cable from J-box to indicator; T2-7 hole J-box

Figure 13

- Routing Load Cell Cables for the Tri-Module Truck Scale.



IC-connection cable from J-box to J-box; T3—3 hole J-box

Figure 14

- Routing Load Cell Cables for the Four-Module Truck Scale.

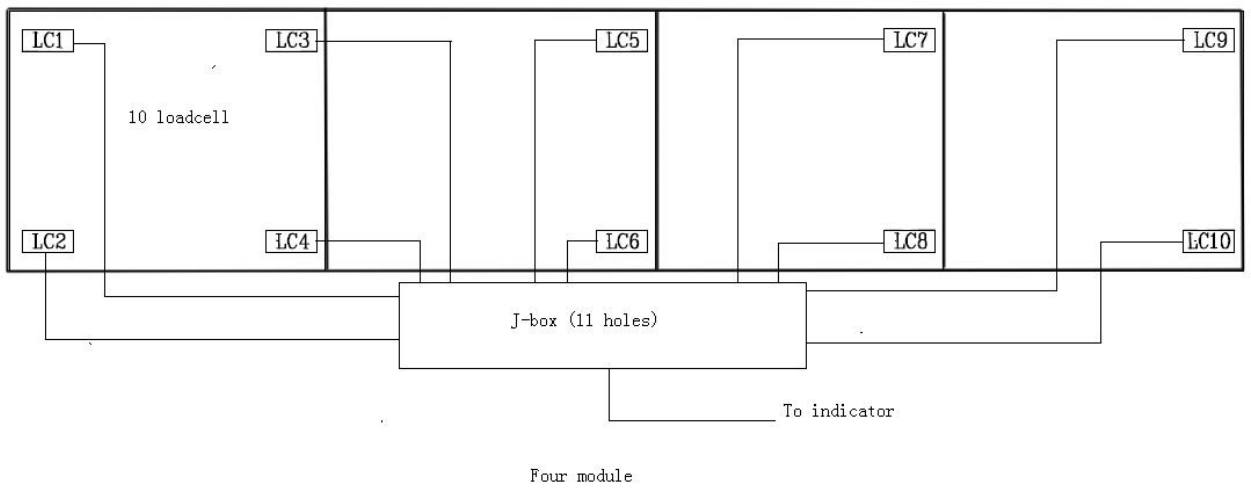


Figure 15

5.5.3 Connect J-Box to Indicator

Connect one end of the instrument cable to the J-Box through the sealing connector and then terminate the core wires to their respective weld disks/connector poles. Then pass the other end of the cable through the metal conduit and connect it to a 9-core D flat plug. Insert the plug to the Load cell interface of the indicator. Refer to ***system wiring diagram*** for details.

5.5.4 Power Connection

Insert the power plugs of the indicator, printer, or computer into a multi-function socket plug which is connected to the outer power supply. If a safe power supply is purchased, the plug of this socket plug is connected to the output of the safe power supply. Refer to **System Wiring Diagram** for details.

5.5.5 System proper Grounding

Effective grounding is required for safe, reliable and stable operation. The detail of grounding, refer to "**Appendix A**".

5.5.6 System Connection

Connect all the electrical parts according to the system's wiring scheme (See Figure 2) and complete the entire installation.

5.5.7 PREPARATION

- Check the wiring and ensure that all connections are fine and that no loose or broken wiring exists.
- Knowing how to operate an indicator, power on the system and warm up the indicator for 15 minutes.
- Test weights and hoist ready on site.

7. OPERATION

- Many functions are provided for indicators like the FT-11. Functions such as Time/Date modification, Tare Weight storage, accumulation, etc. are available. For details, refer to ***Indicator Technical Manual.***
- Once a PCB is replaced, just enter the original setup parameters into the new PCB. User do not need to re-calibrate the scale.
- For detailed operations for the indicator and printer after they are connected, refer to Printer Operator Manual and Indicator Operator Manual.
- For detailed operations for the computer and printer after they are connected, refer to Electronic Scale Weighing Management System Operator Manual.
- Only trained and qualified personnel can operate and maintain the scale.
- When error code is displayed, refer to Indicator Technical Manual for resolving.
- Truck scale can be put into formal operation only when it has passed the inspection carried out by the national metrology department.

8. MAINTENANCE AND SERVICE

8.1 MAINTENANCE

- Refer to related technical manuals and operator manuals for how to maintain and service an indicator, printer, and computer.
- Prevent the scale from being locked by litter or blocks in order to ensure the weighing precision.
- Check the clearances of load cells and scale frequently and adjust them to proper value (about 2~3 mm). Incorrect clearance will affect weighing precision.
- The bumper clearance should be checked every six months.
- The pit should be kept free of water. Pump or drain water out of pit after a rainstorm. Once the load cell and J-box are submerged in water, they should be inspected thoroughly. Only after the load cell and J-box are dry again can the system be powered on.
- Truck speed when passing the scale should not exceed 5 km/h.
- Turn off the power before off duty. Truck long time loading over the platform is unpermitted.
- The total weight of a loaded truck should not exceed the rated capacity and the total allowable axle load.
- Fire-resistant equipment should be equipped in an instrument room.
- The scale should be inspected regularly by the Legal Measuring Management Department.
- Welding and using the platform as weld ground wire is prohibited.

8.2 REPLACE DAMAGED LOAD CELL

- Raise the platform with a hydraulic jack, and remove the damaged load cell .
- Reinstall the new load cell in position, Check the verticality of all load cells.
- Open the J-Box and remove the cable of the damaged load cell.
- Route the cable of new load cell through the scale and connect or weld the core wires of the cable to the connector poles or weld points in the J-Box according to the system wiring drawing.

Note: Clean the weld with alcohol and avoid void welding.

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- Install the connective parts (grease the support head), release the hydraulic jack, and place the module in position.
- Re-calibrate and re-setup the truck scale after replacing a load cell.

9. TROUBLESHOOTING

9.1 FIND OUT PROBLEMS

When the truck scale fails to work, the simplest way to find the problem is to use a simulator.

Remove the cable between the J-Box and the indicator from the indicator and insert a plug (9-core D type flat plug) into the Load cell interface of the indicator. Turn the power on to see if the indicator works. If the indicator works well, it means that the indicator is OK and it is the scale that has the problem. If not, the indicator has the problem.

9.2 TROUBLESHOOTING FOR INDICATOR

Only qualified personnel can examine and fix an indicator problem. Users can change the PCB to make the scale work and send the damaged PCB for repair. Distributors or Technical Service Dept. of ASPIRE can repair the PCB for users.

9.3 TROUBLESHOOTING FOR SCALE

9.3.1 Check the J-Box to see if it is affected by moisture. If so, scrub away the moisture, clean the interior of the J-Box with alcohol, and blow it with a hair drier.

9.3.2 Check the wiring for any short circuits. Measure the resistance between the shield wiring (+Shie, green/yellow) inside the J-Box and other wiring and/or scale respectively with a multimeter to see if there are any leakage or short circuits. Also check all the wiring, ground electrode, and the stainless steel shielding wiring of the signal cable to see if there are any leakage or short circuits and replace any defective wiring. If all wiring is OK, inspect the load cell.

9.3.3 Procedures for inspecting a load cell

- Disconnect the load cells one by one and measure the positive output (+SIG) and negative output (-SIG) at the general output end with a multimeter, the resistance should be about 1000Ω. Measure the positive exciting (+EXC) and negative exciting (-EXC) at the general output end with a multimeter, the resistance should be about 1160 Ω. Thus to find the damaged load cell. If no problem is found, carry out the following inspection.

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- Place standard weights on each section one by one, if the display at one section is incorrect, put the weight on the corner of load cell at that section to find out the damaged load cell. For how to replace a load cell, refer to Section 8.2.
- Or disconnect the +SIG and -SIG of the load cell and measure the resistance when power is off. It should be about 1000 Ω. When the power is on, measure the direct current voltage between the two ends. When the 8142PRO indicator is used, suppose the load cell capacity is K, the force actually load on it is F, the voltage measure should be about 10×2F/K (mV).

9.4 TROUBLESHOOTING

Problems	Solutions
9.4.1 Incorrect data displayed	
• The bumper bolt interferes with the platform.	Adjust the bumper gap.
• The level degree of the weighbridge is out of tolerance.	Ensure the same level with the stainless receiver shims.
• The scale is blocked by sundries or rubbish	Check and clear any sundries.
• PCB aging or resistance welding loosen	Replace the J-Box PCB or Re-weld the adjustable resistance.
• Weight Difference due to temperature between day and night, the warm-up time in winter is not enough.	The warm-up time for the indicator should be 30 min in winter.
• Load cell failure.	Replace L.C.
9.4.2 Data displayed is unstable and drifting.	
• The joint between the instrument cable and indicator connected badly or welded defectively	Re-weld the cable.
• The cable connector of the L.C. is affected by moisture.	Dry it with hair drier.
• The wind is strong.	Adjust the filter parameters of the

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	indicator.
• No grounding cable for the indicator.	Set grounding cable.
• No stable input power.	Use the illuminative power supply or use voltage stabilizer.
• Low isolation resistance of L.C. due to the L.C. cable scraped.	Replace L.C. cable
• Low isolation resistance of the main PCB in the J-Box	Replace PCB of the J-box.

9.4.3 Can't return to gross zero after unloading the scale.

• The bumper bolt is malfunctioned	Readjust the bumper gap.
• Bad performance with the L.C..	Check and replace the L.C..
• Too High AZM settings	Readjust the AZM settings.
• Not clear tare	Press "Clear" key to return gross weight mode.

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10. DOCUMENTS SHIPPING WITH SCALE

Table 4

No.	Description	Qty.	Remarks
1	Layout Drawing	1	
2	Foundation Drawing	1	
3	Wiring Diagram for Analog Truck Scale	1	
4	VTS202 Container ready Truck Scale Operator Manual	1	
5	Indicator Technical Manual and Operator Manual	1 for each	
6	Electronic Scale Weighing Software Operator Manual	1	Optional
7	Printer Operator Manual	1	Optional
8	Scoreboard Operator Manual	1	Optional
9	Packing List	1	
10	Certificate of Truck Scale	1	

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Appendix A: Power Supply and Grounding System for Weighing System

In order to assure the weighing system running stably and reliably, a grounding system in good quality is very CRITICAL to protect indicator from being damaged due to the affect such as disturbance, static and power problem.

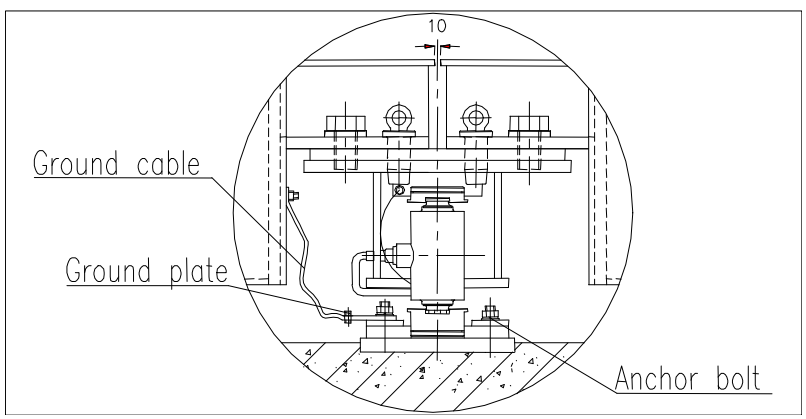
1. Standard grounding style for Truck Scale

1.1 For the foundation of a truck scale, the following requirements must be met:

- At least 50% of the cross pionts in the reinforcing steel net laid inside the concret should be tied up with #16 steel wire. Anchor bolts should be welded to the steel net firmly in order to form a distributed grounding net. Grounding resistance should not exceed 4Ω.
- The metal conduit for the instrument cable must be reliably welded to the steel net. The metal conduit is used as grounding electrode in the instrument room and the grounding resistance≤4Ω.
- If the first requirement mentioned above can't be met or the foundation is rebuilt from an old one, a grounding electrode should be set near the scale (grounding resistance $\leq 4\,\Omega$). While installing the scale, connect the scale grounding cable to the grounding electrode.

1.2 All load cells are protected using the ground cables. The whole platforms are connected to the foundation distributed grounding net through the ground cable.

The ground cable is connected to the screw on the platform at one end and is connected to the anchor bolt through a brazen plate with bolt, nut and shim at the other end. See figure



17.

Figure 17

1.3 Insert all the power plugs of the scale electrical parts such as indicator, printer, or computer and other outer devices into a multi-function socket plug. If a safe power supply is

purchased, the input of the safe power supply is three wires: Line(L), Neutral (N), and the ground (G). The output three wires (L,N,G) should be connected to the socket plug.

1.4 Grounding for the system equipment

If the distance between instrument room and the foundation is lower than 15m, lead the metal conduit into the room. All the system ground is connected to the metal conduit, refer to "**wiring diagram**";

Otherwise, a grounding electrode should be set near the scale (grounding resistance≤4Ω). All the system ground is connected to the grounding electrode , refer to "wiring diagram";

1.5 Grounding for the instrument cable

Instrument cable shield is connected to the grounding screw of the J-Box at one end and is connected to the indicator shell at the other end.

1.6 All the system equipment shells must be connected to the ground so that to protect person from electric shock. If any equipment outside the instrument room (different power system) connected to the indicator and computer, a isolate must be set on the communication port.

Note:

- **The ground line should be in copper with diameter of no less than 25 square millimeter and with the resistance of no more than 1Ω.**
- **No paint is allowed on the connecting surface.**
- **It is recommended that the grounding terminal should be labeled promptly.**
- **All the construction should be complied with the "Regulation of low voltage devices".**
- **At least electrical connection check once per year and grounding system check twice per year is recommended. The good timing is in the period of season changing .**

2. Lightning Strike Protection Device

2.1 The grounding style must be followed according to 1.1~1.6.

2.2 Anti-surge protection must be provided for truck scales by connecting a voltage protector to the power supply to form a parallel circuit and protect the scale from being damaged by voltage transients or lightning strikes. If a safe power supply is purchased, the voltage protector must be connected between the safe power supply and outer power.

2.3 For a scale operated in an area with frequent thunder, a lightning rod is needed. Only qualified professionals can mount the lightning rod.

3. Power supply for the weighing system

3.1 The power voltage should be 220 VAC±10%, and the electrical outlets MUST be arranged as, Ground in the top-middle, Neutral on the left and the Line on the right by down looking.

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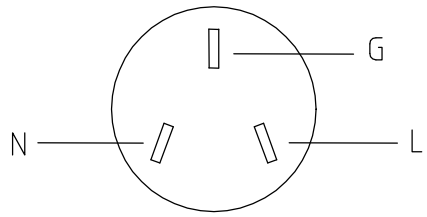

3.2 The Neutral MUST be double grounded right prior to running into the weighing house.

3.3 Within whole power system, it is a MUST to apply only one protecting method, either Neutralized Protection Method or Grounded Protection Method. The mix of these two methods is prohibited.

3.4 Neither fuse is allowed on the neutralized protection line nor on the grounded protection line.

3.5 When the neutralized protection method is applied to the weighing system, a sole neutral line should be considered. And no other electrical device is allowed to use this line.

3.6 All the grounding resistance should be less than 4 Ω.

4. Construction of grounding electrode

4.1 Minimum of 2 meters for vertical construction method is applied.
Minimum of 0.7 meter for horizontal construction method is applied.

4.2 The grounding conductive should be zinc or copper plated and painting is not allowed.

4.3 The following table gives the minimum size of the grounding conductive.

Shape	Specification	Minimal Dimension	Type recommended
Pipe Steel	Diameter	8 mm	
Angle Steel	Thickness	4 mm	30 X 30 X 4
Tube Steel	Thickness	3.5 mm	Dia. 25 ~ 50
Flat Steel	Section	4.8 (mm^2)	12 X 4
	Thickness	4 mm	

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