WLS432 Series
Load Weighing System

Basic Installation, Calibration and Operating Instructions

Important Safety Information

Precautionary Statements

Warning– Indicates a potentially hazardous situation which, if not avoided, could lead to serious injury or death.

Caution– Indicates a potentially hazardous situation which, if not avoided, could lead to a mild to moderate injury.

Information – Indicates important points that Operators and Installers need to fully understand.

Refer to Documentation – Indicates important points which must be obtained by referring to manufacturers Service, Operation, or Maintenance Manuals.

It is your sole responsibility to install, operate, and maintain the SCI system in a manner that will not cause damage to persons, property, or anything else. Always use safe practices and adhere to any laws that may be in place.

Do not install, operate, or maintain the SCI system unless you are completely competent and understand the system and equipment it is mounted on.

Read this manual completely prior to use and familiarize yourself with the components and locations.

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1. Introduction

The WLS432 Weighing Indicator is IP67 rated digital indicator designed for use on wheel loaders in temperatures between -22F – 158F degrees.

Operating Voltage is 8-32 Volts DC.

The WLS432 will generally be installed with a hydraulic pressure transducers mounted in the piston / ram side and the rod / retract side of the lift circuit cylinder. The hydraulic transducers should be mounted in an area that is not affected by high pressure cleaning. **DO NOT SPRAY HARDWARE WITH HIGH PRESSURE WASHERS.**

1.1. Components

Standard Components

Figure 1

1. **Proximity Switches**
2. **Hydraulic Adapters – Customer Specified**
3. **Wire Harness**
4. **Display / Head Unit**
5. **Pressure Transducer**
6. **Proximity Switch Mounting Bracket and Hardware**
7. **Display Mount**

Optional Printer Components

Figure 2

1. **Printer Mount**
2. **Printer with supplied Wall Charger**
3. **Wireless Accessory Module**
4. **Thermal Paper (Max Size 3-1/8” x 90’ rolls)**
5. **Printer Mount Plate and Hardware Pack**
6. **Power Supply Kit (includes USB cable, Dual USB Port 12-24vdc and Lighter Power Adapter 12-24vdc)**

2. Installation Procedure for the WLS432

WARNING: These basic installation instructions are given based on the installer having previous experience in the servicing and maintenance of machinery. General safety precautions should be undertaken similar to carrying out maintenance on this type of machinery. Inexperienced personnel should not undertake this task if they are unsure of the safety precautions necessary.

2.1. Fitting the Display to the Operators Cabin

Select a suitable location and using the mounting bracket, mount the display. Bolt on brackets are provided. Allow plenty of room for the cable at the rear of the display. A minimum of 3" should be provided between the display and any surface for adequate cable routing and connector removal.

DO NOT DRILL OR WELD ONTO ANY PORTION OF A R.O.P.S. or F.O.P.S.

A bracket, however, can be bolted onto a lock striker plate, window frame aperture or turret support. Consider wiring and cabling when choosing a mounting position. Consideration should also be given so the instrument does not impede operator vision. Vibration should also be taken into account so as not to damage the hardware.

2.2. Installing the Pressure Transducers

PRECAUTIONS

1. Lower Boom completely to the ground and stop the engine.
2. Operate the tilt, and lift levers to ensure no residual pressure is present in the hydraulic system. Refer to Owner's Manual to relieve pressure.
3. Remove the hydraulic tank filler cap to remove any pressure from the oil reservoir tank.
4. Slightly loosen any "easy to get at" fitting in the piston and rod sides of the lifting circuit to ensure no pressure is present. The transducer is to be fitted into the lifting circuit of the hydraulic system between the control valve and the lifting cylinders. See Appendix A for hydraulic information. Connect appropriate adapter to allow transducer to be mounted in a safe position. Avoid areas that are subject to oil and water. Do not run cable through articulated or moving areas of the machine. Tighten the fittings. Start the engine and lift the forklift boom carriage approx. ½" from the ground. **Bleed the air from the line**, then using wrenches/spanners, retighten the transducer.

2.3. Wiring the WLS432 to the Loader

The WLS432 fits machines that have 8-32Vdc power supply. Voltages other than this may require a voltage converter.
RED = Power. This is constant supply voltage and keeps the clock running. Loss of power to this connection for long periods will require the clock to be set.
YELLOW = Switched supply. Can be tied to Ignition/Accessory or its own circuit to turn the system on.
BLACK = Ground

2.4. Installing the Proximity Switches and brackets

The WLS432 is a dynamic scale. This means the system calculates weight while the boom is moving between two fixed points. It uses hydraulic pressure from the lift cylinders and 2 proximity sensors to determine weight. Speed of the boom must be stable between those positions to provide accurate results. The START point for a medium size Loader is usually with the bucket about 3 feet above the ground. The WEIGH point it is usually 3 feet above the START point or about when the loader arms are approximately horizontal. Other positions can be selected, but at least 500ms of time must elapse between the 2 sensors while operating at full speed.

The brackets provided are general purpose to use on all machines and can be adapted to suit the installation. To provide the best adjustability, mount the switch brackets as close as possible to the loader pivot pin. The Proximity switches must trigger on the boom and be active any time the boom is above those set points.

Figure 3 **Figure 4** **Figure 5**

CAT 938K Wheel Loader
Bolted through frame

Deere 644J

These sensors detect any ferrous material and ideally are mounted such that the boom arms are what triggers them. The sensors have a sensing distance of 1/8" – 1/2". Ensure there is enough clearance to the boom so they don't shear off. **DO NOT DRILL OR WELD ON ROPS / FOPS STRUCTURES.**

2.5. Optional Printer Installation

The optional wireless printer utilizes a Bluetooth connection to the Wireless Accessory Module. No wires will be connected between them. Mount the included RAM style Bracket to the Printer Mounting Plate using the 4 countersunk head screws and lock nuts. Then attach the printer plate to the bottom of the printer using the included M3 machine screws and star washers. DO NOT over tighten. Then select an appropriate mounting location to mount the printer assembly within reach of the operator. Be careful to not drill or weld on a ROPS enclosure. Because the printer is not weatherproof, it is mandatory that printers installed in open compartments only be used when weather is favorable and be removed when not in use. Printers are not warrantied against water or dirt ingress. Lastly, connect the Wireless Accessory Module to the 4 pin connector and use Zip Ties to affix the module to the wire harness. Use included Power Supply or USB Outlet adapter to charge the printer.

3. Display Operation

3.1 Home Screen

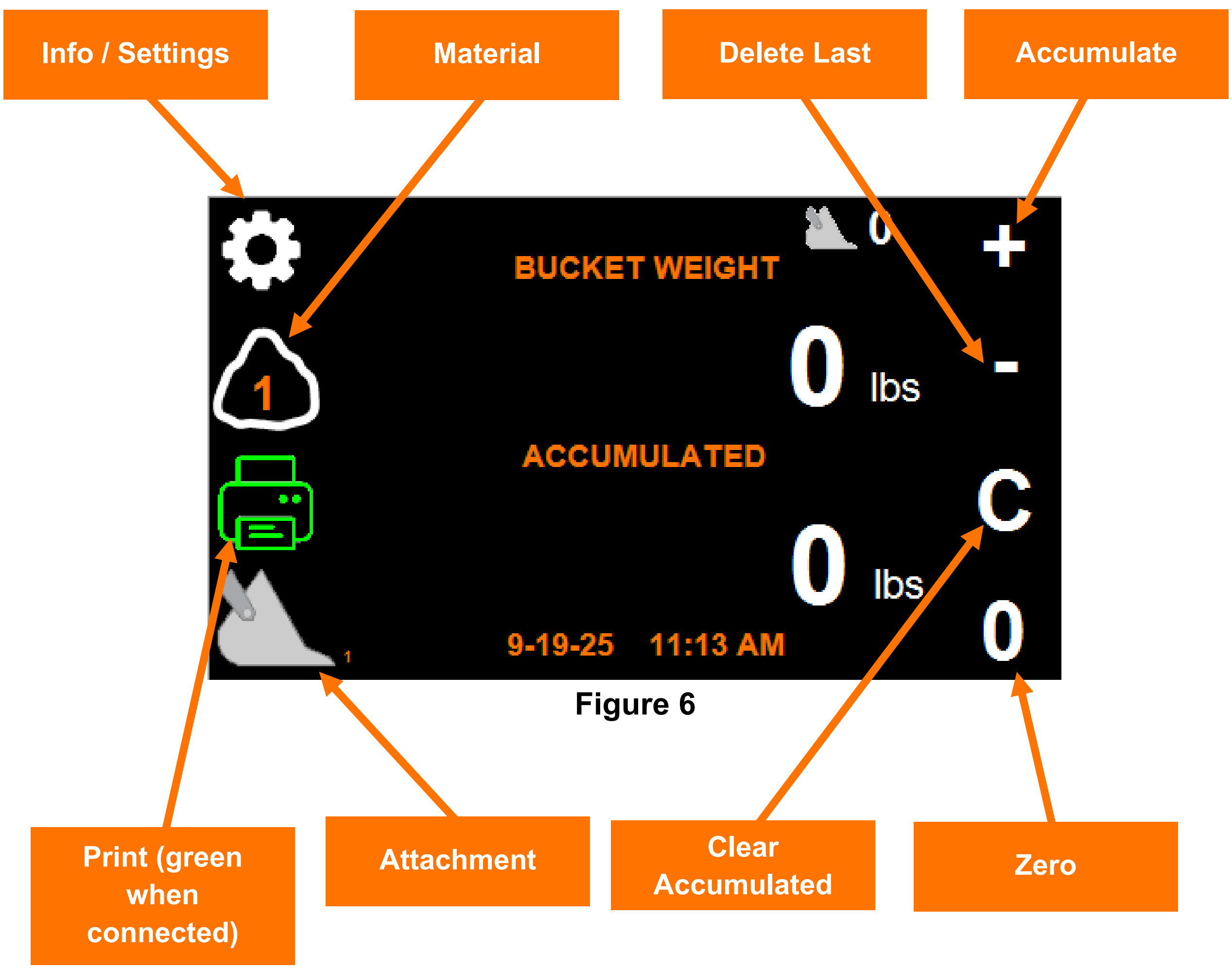


Figure 6

3.2 Info/Settings Page

Figure 7

3.3 Additional Settings Page

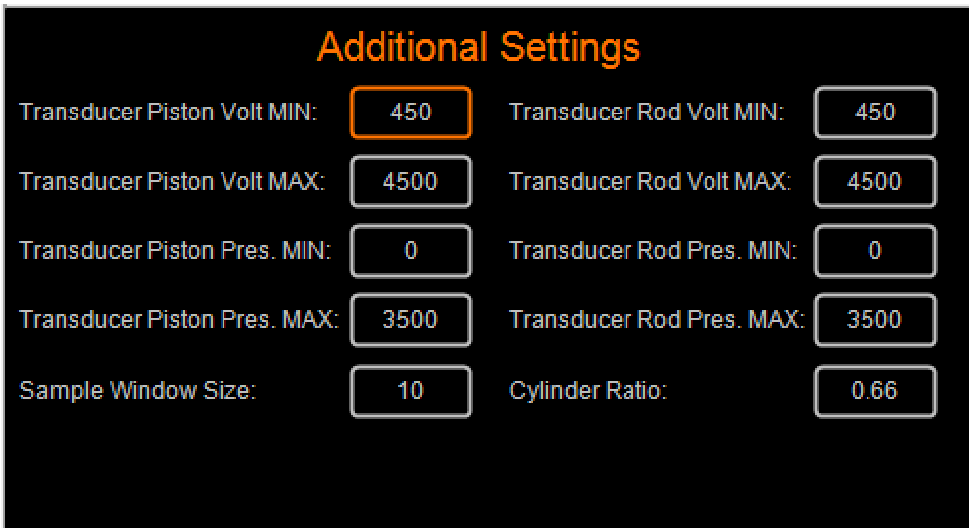


Figure 8

Use navigational buttons at bottom of display to move orange rectangle to desired field. Press OK to modify value.

3.4 Clock Page

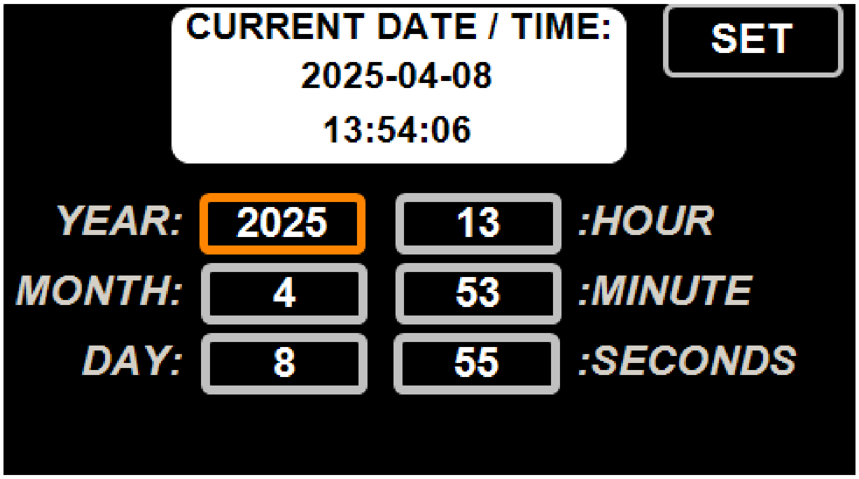


Figure 9

Use navigational buttons at the bottom of the screen to navigate to desired field. Press OK to select and edit value. Press SET before leaving screen.

3.5 Printer Settings Page

Figure 10

Using navigational buttons at the bottom of the screen, set the values to the last 6 characters of the BT MAC address. By default, the first 2 digits should be 70. The last four digits can be found on the printers display. However, as more printers are produced, they could have first 2 digits between 66 and FF. To find the full BT MAC address, you can perform a “Self Test” on the printer by holding the right button until the settings menu starts. Press the right button repeatedly until 6/15 (Self Test) shows. Then press and release the left button (power). The printer will print a settings report. Locate the BT MAC number under the bottom bar code on the report. Set the Printer Settings page to the last 6 digits from the BT MAC address.

3.6 Settings Page

Figure 11

Press left buttons to cycle through the selectable values. Center provides current values of the Inputs. The Right buttons take you to additional settings.

“Set Backlight” – press the button to adjust the display backlight level. Each press will increase the brightness until 100 is reached, then it will cycle back to 10.

“Set Key Backlight” - press the button to adjust the button backlight level. Each press will increase the brightness until 100 is reached, then it will cycle back to 10.

“Set Units” – 4 units are available. LBS, KGS, TON, and MTON. 1 TON is equal to 2000lbs. 1 MTON is equal to 1000kg. 1kg is 2.206lbs.

“Set Increment” – Press to change the displayed increment value. Available options include 1lbs, 2lbs, 5lbs, 10lbs, 25lbs, 50lbs, 100lbs, 250lbs, 500lbs.

3.7 Bucket Setup Page

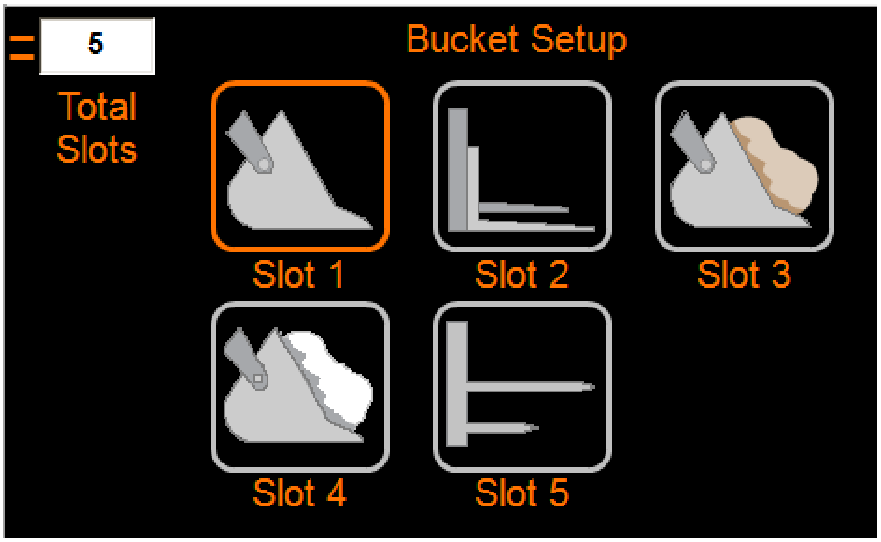


Figure 12

Press upper left button to toggle through the number of attachments your machine has (up to 5). Use navigational buttons at the bottom of the screen to select the slot and change the icon. Icon can only be used once in the system and will be represented on the home screen when selected.

3.8 Bucket Calibration Page

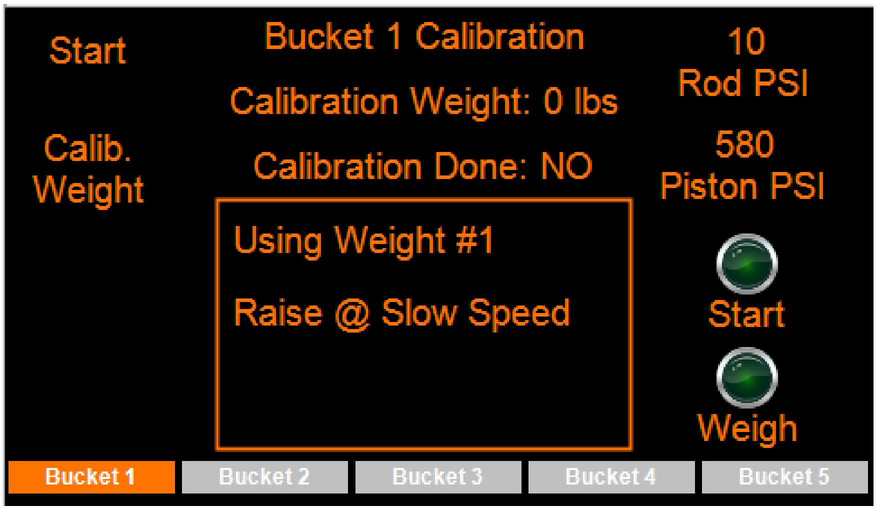


Figure 13

Use buttons at bottom to select appropriate Bucket. Press upper Left Button to Start Calibration. Use second button on left to set Weight being calibrated (amount of weight in the bucket). See Calibration Instructions later in this manual for further instructions.

The right side shows current values of sensors. Piston pressure should always be higher than Rod pressure. Start Prox and Weigh Prox will indicate when boom is in front of sensors.

3.9 Calibration Data

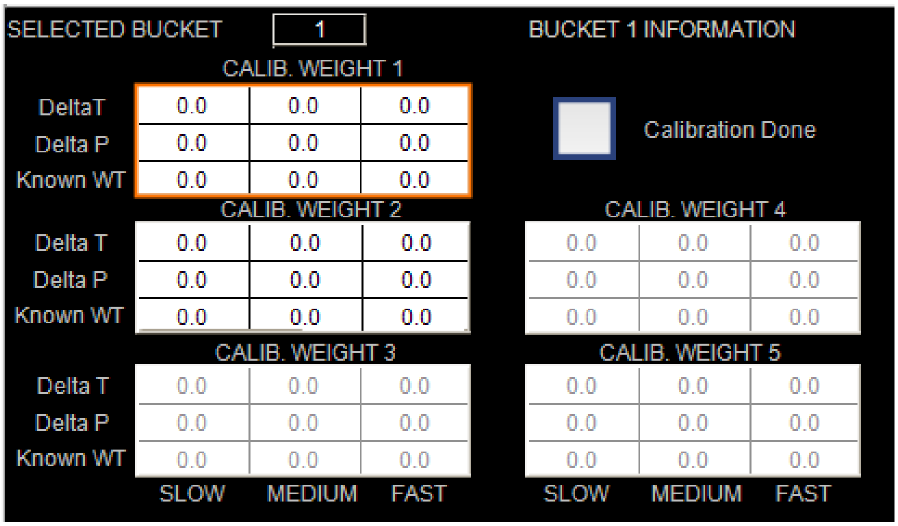


Figure 14

Contact Tech Support before making any changes to this page. These are the values recorded during the calibration process. Modification can be detrimental to the calibration. It is best to record values (write down or take pic) before adjusting.

3.10 Calibration Settings

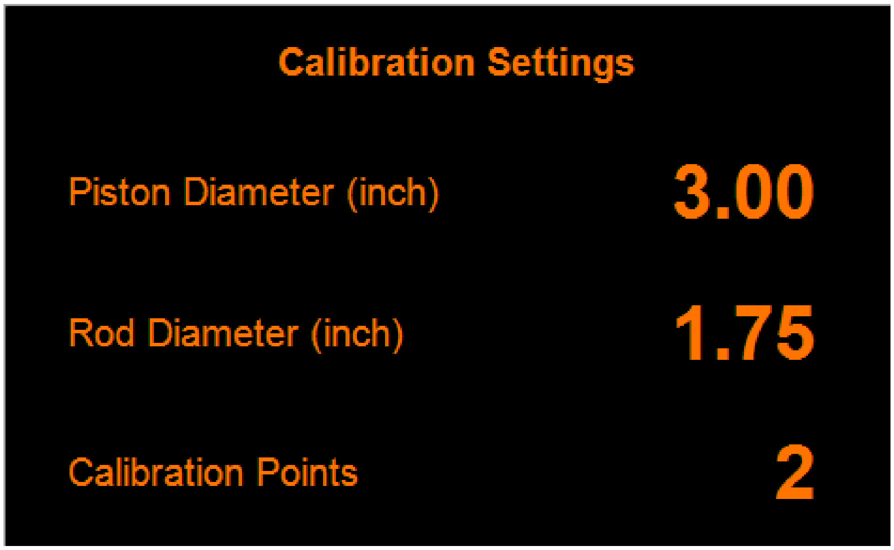


Figure 15

Press buttons on right to modify values. Bore diameter is the internal diameter of the lift cylinder. Use OEM data sheet or contact Equipment Dealer to determine. If cannot be provided, measure outside circumference (distance around barrel) and divide by 3.14. Then subtract 0.75" and use that value. Rod diameter can be measured with caliper or divide rod circumference by 3.14. Calibration Points should be set to 2 unless Tech Support suggests otherwise.

3.1.

4. Basic Calibration Instructions

The calibration instructions below are given based on a typical installation.
This system can be used in a large variety of applications, and changing the parameters that are set will greatly affect the performance of this scale.

1. Ensure you have an accurate test weight of approx. 1/3 – ½ of the machine capacity. The more accurate the test weight, the more accurate the scale. The test weight must fill the bucket like the material you will be weighing. Any protrusion of the test weight past the buckets cutting edges will greatly reduce accuracy.
2. Make sure the attachment is free of any material (stuck dirt or extra rigging). Make sure the machine is properly functioning (no leaks or drifting valves) and lubricated. Machine should be warmed up per manufacturer's instructions.
3. Start the forklift or loader, and the WLS432 should also turn on. The indicator should power up and go through a short power up cycle. Once the power up cycle finishes, the indicator will show the HOME screen (figure 6). To ensure you have the hydraulic pressure transducer fitted correctly, raising of the forks or bucket should result in the Pressures on the Settings Page (figure 11) rising.
4. Press the settings button (GEAR) on the top left-hand corner of the screen to enter the settings page (Figure 11).
5. Make sure the attachment desired is setup in the Bucket Setup Page (figure 12).
6. In the Settings Page setup, the Calibrations Page.
7. Now Select Bucket Calibration from the Settings Page.
8. In the Bucket Calibration page, use the bottom buttons to set the current bucket (in orange background.
9. With the bucket curled completely back and empty, set Calib Weight (second button on left) to 0lbs. Then press Start (top left button).
10. Follow the instructions listed in the rectangle. They will ask you to raise the loader at various speeds. When it says SLOW, it means as slow as possible. Medium means 1/3 Throttle – 1/3 Joystick. Fast is best performed by pulling the joystick back at idle and then tromping the foot accelerator to let the engine raise as fast as possible. These operations need to be performed as indicated and smoothly. Maintain the speed between the START and WEIGH proximity switches.
11. When the instructions ask for Weight #2, you must fill the bucket with your known weight. Sand bags work well. Concrete blocks do not fill your bucket like actual material and will provide poor results. If you don't have access to known weight, contact Tech Support for assistance. DO NOT Raise Loader arm when loading the known weight. During the calibration, any loader arm movements above the proximity switches will be recorded.
12. Enter the amount of known weight that is in the bucket by pressing the Calib Weight button.
13. Follow the instructions in the rectangle using the same speeds used in step 10.
14. Once instructions are completed for the second point, press ESC until you get to the HOME screen. Once on the HOME screen, lift loader arm to weigh the bucket of material. Validate the display shows your known weight.

Perform as many test weighing until you are satisfied the system is working correctly.

5. Basic Weighing

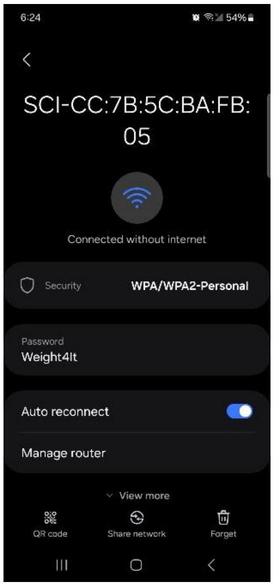
1. With the Attachment empty, raise loader arm up to the weighing position (WEIGH switch).
2. If other than 0.00 (zero) is displayed press ZERO key
3. Apply the load and raise up to the weighing position (past the START switch and in front of the WEIGH switch) (see Figure 3-5). Load will be indicated in the BUCKET WEIGHT field.
4. To Accumulate the weight once the weight has been obtained, Push the + Key (upper right-hand corner) once. The Bucket Count and the Accumulated weight will be displayed. Repeat Step 3 and 4 to accumulate further buckets.
5. To CLEAR the TOTAL, press the “C” button (bottom right-hand corner) The TOTAL and Bucket Count will return to zero to allow the next Load to be completed.
6. NOTE: - Pushing the “-“ button will delete the current bucket weight only.

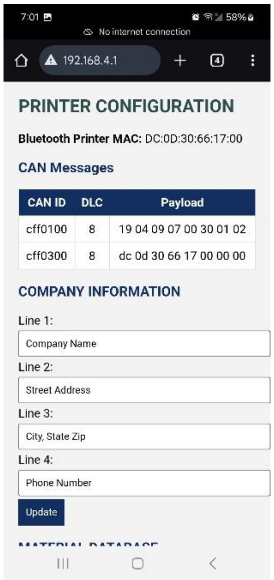
6. Printer Ticket Settings - Optional

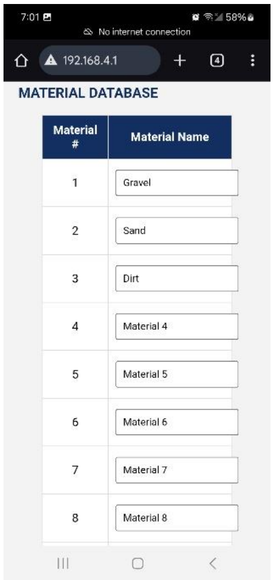
There are a couple settings you can adjust in the tickets.

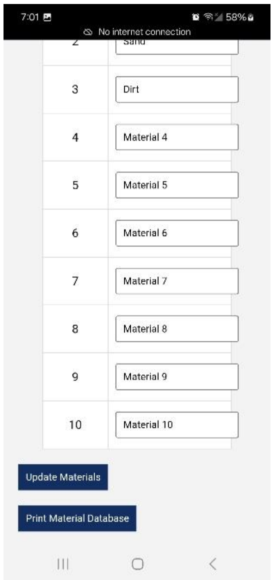
1. Seller Info at the top of the ticket (Co Name, Address, City, State Zip, and Phone Number).
2. Materials indicated (1-10) on the Home page can be links to Proper Names on a printed ticket.

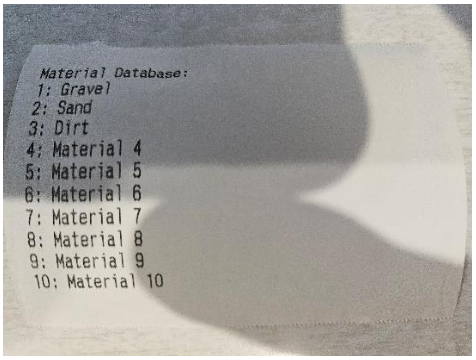
To access these settings, you will need to connect to the WiFi signal (SSID) provided by the Wireless Accessory Module (SCI-AA:BB:CC:DD:EE:FF) with some device with a web browser. The password is **Weight4It** Once connected, it will say “Connected without Internet”. Go to your Browser and search for 192.168.4.1 The settings page will show up. Enter your information into Customer Information. Press the Update button to save. Then enter your desired Material Names into the list below. Press Update Materials to save. Press Print Material Database to Print a Legend to put in the clear holder provided to use as an In cab reference to select the material that you will load material for. The ticket will print the proper name associated, with the material number, on the ticket.





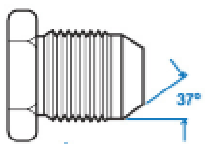
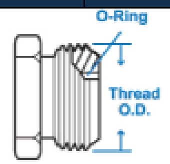
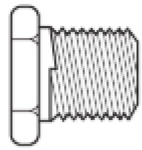
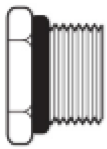






Appendix A – Hydraulics

Adapter Size Identification Chart

Size	JIC Thread	JIC Wrench	ORS Thread	ORS Wrench	Pipe Thread	Pipe Wrench	ORB Thread	ORB Wrench
								
-04	7/16-20	9/16	9/16-18	11/16	1/4-18	11/16	7/16-20	9/16
-06	9/16-18	11/16	11/16-16	13/16	3/8-18	7/8	9/16-18	11/16
-08	3/4-16	7/8	13/16-16	15/16	1/2-14	1	3/4-16	7/8
-10	7/8-14	1	1-14	1 1/4			7/8-14	1
-12	1 1/16-12	1 1/4	1 3/16-12	1 3/8	3/4-14	1 1/4	1 1/16-12	1 1/4
-16	1 5/16-12	1 1/2	1 7/16-12	1 5/8	1-11 1/2	1 1/2	1 5/16-12	1 1/2
-20	1 5/8-12	2	1 11/16-12	1 7/8	1 1/4-11 1/2	1 7/8	1 5/8-12	2

Proper tightening techniques

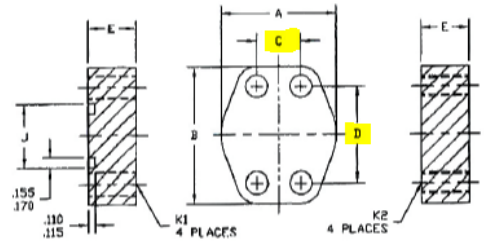
Using proper tightening techniques is important to keep the environment clean and prevent costly repairs and maintenance on hydraulic equipment. Here, http://blog.parker.com/turn-vs-torque-how-making-the-right-choice-keeps-your-hydraulic-fitting-connections-leak-free, you will find valuable information on proper installation and tightening of adapters. Here, http://blog.parker.com/10-things-not-to-do-when-your-hydraulic-fitting-leaks, is additional information on how to prevent leaks.

Key points for working on hydraulic systems

1. Do not use Teflon Tape on hydraulic systems. The tape can break free and move through the system and get caught in valve spools and pumps causing damage.
2. Use two wrenches when tightening adapters and hoses. One wrench holds the hose or adapter and the other tightens the nut.
3. LOTO – Lock Out Tag Out. Hydraulic systems are dangerous to work on and proper training should be obtained before maintaining or modifying any connections. Preventing someone from operating while working on the system is imperative.
4. Hydraulic fluid under pressure can kill. Know what you are doing and read the manufacturer's manuals completely.

Code 61 Flange Dimensions

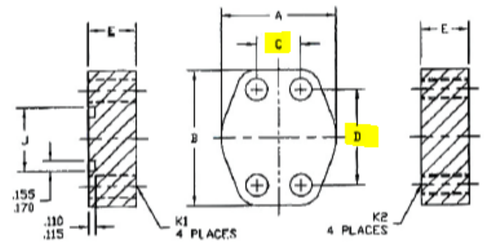
PLUG BLOCK - CODE 61 (O-RING FACE)



PART NO.	Flange Size	A	B	C	D	E	J Min	J Max	K1 Drill	K2 Thread
1942-61-08	1/2	1.813	2.125	0.688	1.500	0.750	1.000	1.005	0.344	5/16-18
1942-61-12	3/4	2.063	2.563	0.875	1.875	0.750	1.250	1.255	0.406	3/8-16
1942-61-16	1	2.313	2.750	1.031	2.063	0.880	1.560	1.565	0.406	3/8-16
1942-61-20	1-1/4	2.875	3.125	1.188	2.313	0.940	1.750	1.755	0.469	7/16-14
1942-61-24	1-1/2	3.250	3.688	1.406	2.750	1.190	2.115	2.125	0.531	1/2-13
1942-61-32	2	3.813	4.000	1.688	3.063	1.440	2.490	2.500	0.531	1/2-13
1942-61-40	2-1/2	4.281	4.500	2.000	3.500	1.820	2.995	3.005	0.531	1/2-13
1942-61-48	3	5.156	5.313	2.438	4.188	2.190	3.615	3.625	0.656	5/8-11

Code 62 Flange Dimensions

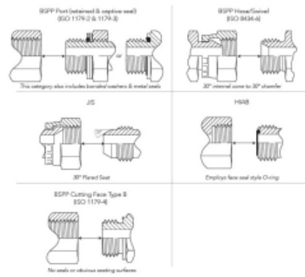
PLUG BLOCK - CODE 62 (O-RING FACE)



PART NO.	Flange Size	A	B	C	D	E	J Min	J Max	K1 Drill	K2 Thread
1942-62-12	3/4	2.500	2.950	0.937	2.000	1.250	1.245	1.255	0.406	3/8-16
1942-62-16	1	2.750	3.190	1.093	2.250	1.500	1.560	1.565	0.469	7/16-14
1942-62-20	1-1/4	3.060	3.750	1.250	2.625	1.500	1.750	1.755	0.531	1/2-13
1942-62-24	1-1/2	3.750	4.440	1.437	3.125	1.820	2.115	2.125	0.656	5/8-11
1942-62-32	2	4.500	5.250	1.750	3.812	1.750	2.490	2.500	0.781	3/4-10

Flange, JIC, flat face O-ring

Dash Size (Nominal Size)	Thread Pitch	Male Thread O.D. mm	Male Thread O.D. inches	Female Thread I.D. mm	Female Thread I.D. inches
-02 (1/8)	28	9.7	0.38	8.9	0.35
-04 (1/4)	19	13.2	0.52	11.9	0.47
-06 (3/8)	19	16.5	0.65	15.2	0.60
-08 (1/2)	14	20.8	0.82	19.1	0.75
-10 (5/8)	14	22.4	0.88	20.3	0.80
-12 (3/4)	14	26.4	1.04	24.6	0.97
-16 (1)	11	33.0	1.30	31.0	1.22
-20 (1 ¼)	11	41.9	1.65	39.6	1.56
-24 (1 ½)	11	47.8	1.88	45.5	1.79
-32 (2)	11	59.7	2.35	57.4	2.26

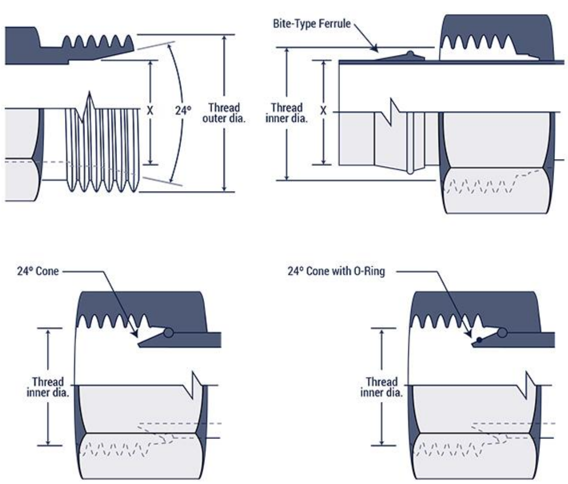


BSPP Chart

Metric Tube Compression (DIN 2353 24° Cone)

The male connector has a 240 Cone with a straight thread, while the three female connectors have straight threads with a sealing surface. The seal forms between the cone on the male and the sealing areas on the females.

Fittings are available in two categories: DIN 2353 L (light) and DIN 2353 S (heavy) classes. Each has its own tube sizes and thread dimensions as shown in the following table:



DIN 2353 L Tube O.D.(mm)	DIN 2353 S Tube O.D. (mm)	Metric Thread Size	Male Thread O.D. (mm)	Female Thread I.D (mm)
6		M12 x 1.5	12	10.5
8	6	M14 x 1.5	14	12.5
10	8	M16 x 1.5	16	14.5
12	10	M18 x 1.5	18	16.5
	12	M20 x 1.5	20	18.5
15	14	M22 x 1.5	22	20.5
	16	M24 x 1.5	24	22.5
18		M26 x 1.5	26	24.5
22	20	M30 x 2.0	30	28
28	25	M36 x 2.0	36	34
	30	M42 x 2.0	42	40
35		M45 x 2.0	45	43
42	38	M52 x 2.0	52	50

DIN Chart

NOTES

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Contact us today!

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