WLS-1

Wheel Loader Scale

Installation & User Manual

RICE LAKE WEIGHING SYSTEMS
Commitment Beyond Measurement®

ISO 9001 REGISTERED

101063

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Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at www.ricelake.com or obtained by calling 715-234-9171 and asking for the training department.

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Introduction

This manual is intended for use by technicians responsible for installing and servicing the WLS-1 Wheel Loader Scale.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at **www.ricelake.com**.

Unpack the contents of the shipment your system arrived in and verify the contents are correct, using the packing slip. Check for damage that could have occurred during shipment, and report any discrepancies immediately.

Before installing, ensure you have the following:

- Welder
- Mechanical and electrical tools
- Set of assorted wrenches
- Set of assorted screwdrivers
- Grinder
- Voltmeter
- Assorted hydraulic fittings

Warning If washing the machine with a high-pressure power washer, you must protect all system components from direct spraying to avoid damage to the components.

Safety Considerations

Before installing the WLS-1 Wheel Loader Scale, take the following measures to ensure your safety:

- Lower the wheel loader's bucket completely to the ground
- Remove keys from the ignition

Hydraulic Parts

Discharge all pressure from the hydraulic circuit before disconnecting or removing any plumbing, connector, or relative component. Always make certain that all moving parts have been locked and check for any residual pressure when disconnecting any hydraulic plumbing. Always let the bucket or other similar parts down to ground-level before carrying out any work on the machine.

Before working on any hydraulic lines, they must be removed for modification, then properly cleaned before re-installation.

1.0 Installation

When installing the components, use the appropriate brackets supplied. These can be mounted inside the cab onto the cab structure. It is recommended that you consult the machine's operator to ensure the indicator and remote control are mounted in convenient locations based on his/her needs. Make sure the components do not restrict the operator's vision or interfere with bodily movements.

Warning Do not attach the brackets to the dashboard or other non-metallic surface. Prior to altering the cab structure, customer approval should be attained due to EROPS and ROPS certifications.

1.1 Indicator Installation

1. Use the bracket as a template to drill holes.
2. Once the holes are drilled, mount the bracket.
3. Fasten screws holding the bracket in place. The bracket can now accept the indicator.
4. Loosen the bracket handle shown in Figure 1-1, place the indicator at the desired angle, and tighten the handle.

Figure 1-1. Bracket Mounted in Cab

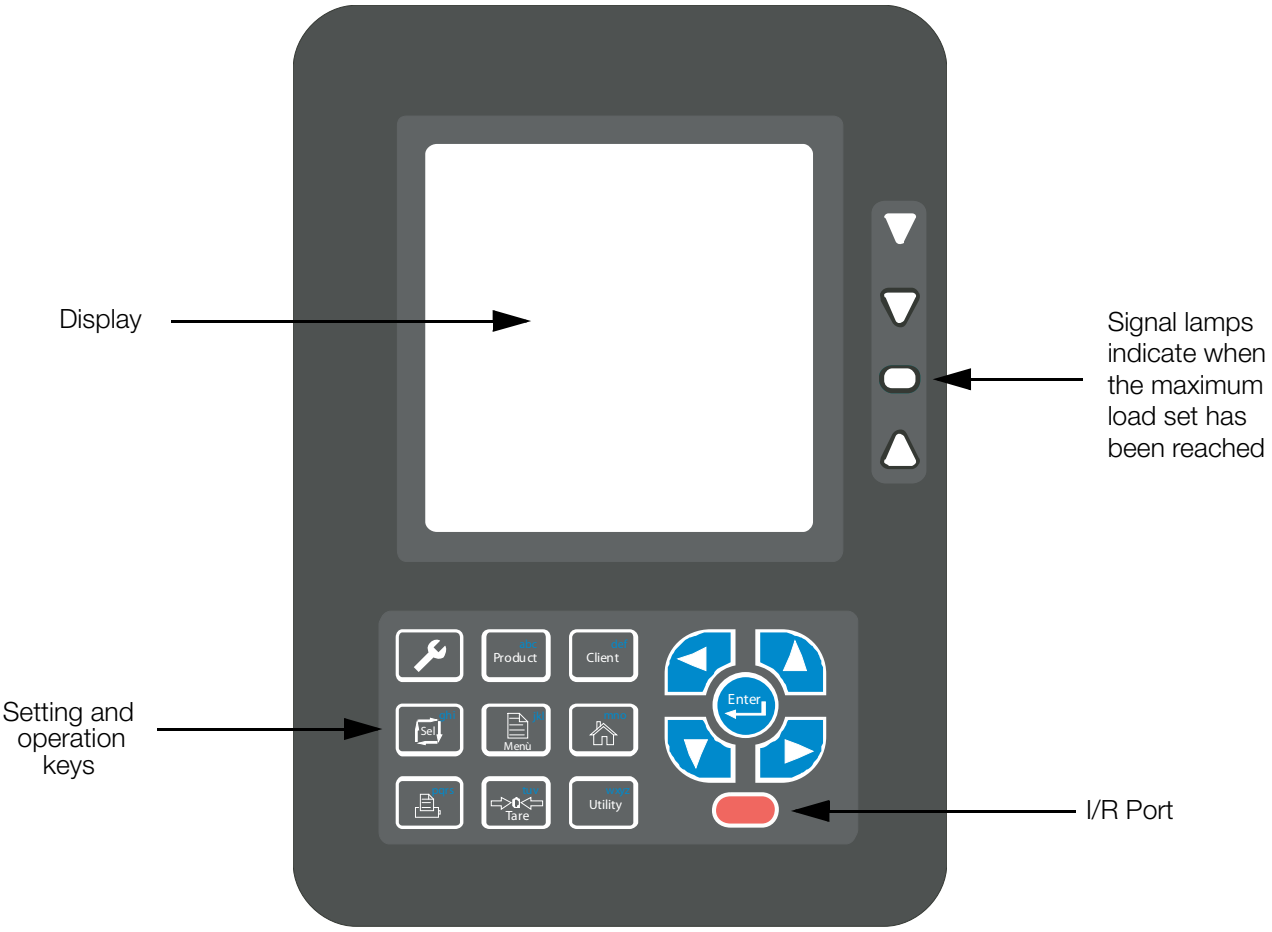


Figure 1-2. Indicator Front

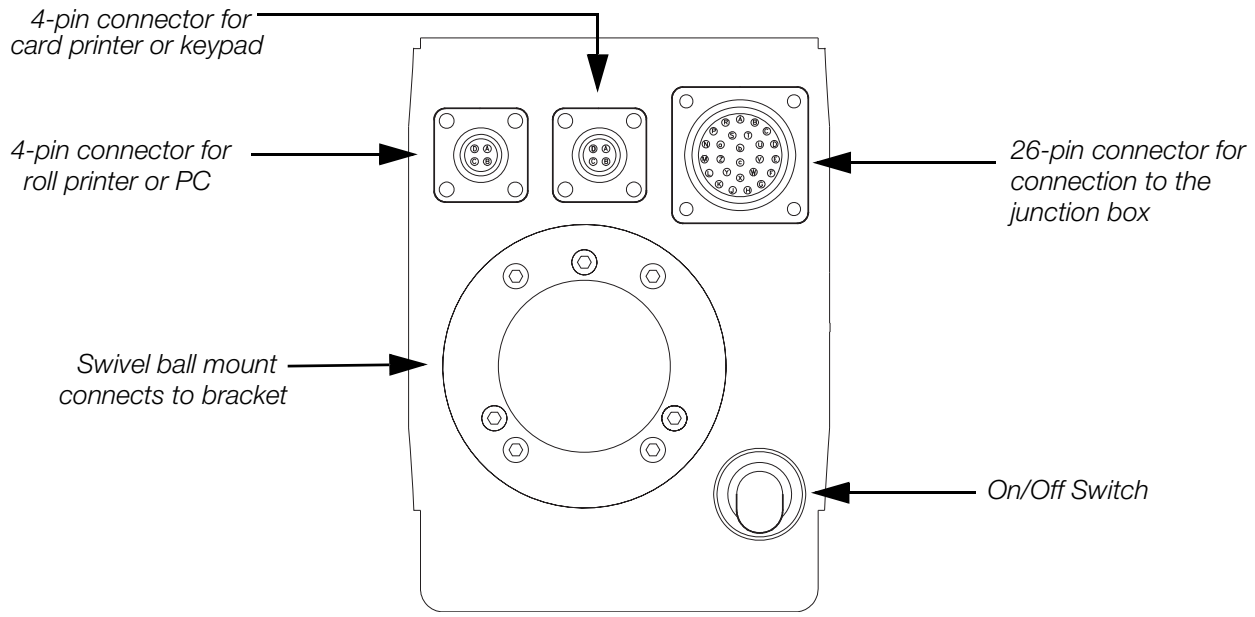


Figure 1-3. Indicator Back

1.2 Remote Control Installation

1. Using the holes in the remote control's base as a template, drill at the desired mounting location.
2. Mount the unit, tightening screws until the remote control is firmly in place.

Figure 1-4. Indicator and Remote Control Mounted in Cab

1.3 Pressure Sensor Installation

The pressure sensor reads the main line pressure of the lift cylinder (hydraulic line). Only one sensor is required; however, the WLS-1 Wheel Loader Scale may be used with two pressure sensors if needed. There are two options for pressure sensor installation:

- Attach the weld-on flange (supplied, see Figure 1-7 on page 4) directly to the hydraulic line. This should be performed by a qualified welder to ensure proper fitting and seal.
- Install a flange block where the hydraulic line attaches to the hydraulic fluid distributor. Use one of the fittings supplied to attach the sensor to the flange block. The kit comes with a few common fittings which fit the majority of wheel loaders. It may be required to locate special fittings for the installation. See Figure 1-5 through Figure 1-8 for a list of provided fittings..

Note: The best source for flange blocks is the local heel loader or skid steer dealer that sold the machine originally. An alternative source for flange blocks is www.mainmfg.com/mainhome.html.

Figure 1-5. 1/4" BSPP Straight Ftting

Figure 1-6. 1/4" NPT Male to 1/4" Female Straight Fitting

Pressure sensors are equipped with 1/4" BSPP threads; therefore, the fittings shown in through can be connected directly to the sensor with the copper o-ring seal (see Figure 1-9) in between. This seal must be installed on all pressors to ensure an air-tight seal.

Notes: The copper o-ring seal has a smooth side and a rough side. The seal should be installed so the smooth side touches the sensor.

There is also a rubber gasket on the sensor (see Figure 1-12 on page 5). Keep this in a safe place until ready to install, as it falls off easily.

The fittings shown in Figure 1-5, Figure 1-6 and Figure 1-8 can be connected directly to the valve of the machine. The weld-on fitting (Figure 1-7) can be used on the steel tubing of the cylinder line if you cannot tap the line.

The fitting shown in Figure 1-8 cannot be connected directly to the pressure sensor due to a 37-degree flare swivel end.

Kits for excavator systems have two pieces of each fitting equipped in the kit.

1. Select the fitting which works best.
2. Attach the fitting to the hydraulic valve.

Note: The hydraulic line may need to be removed if using the weld-on flange.

3. The fitting should be mounted in a position to allow it to self-bleed with gravity. If possible, mount at an angle rather than perpendicular to the hydraulic line. (See Figure 1-10 through Figure 1-12 for examples).

Figure 1-7. Weld-on Flange

Figure 1-8. 1/4" NPT male to 1/4" BSPP Female Swivel 90-Degree Fitting

Figure 1-9. Copper O-Ring Seal

Figure 1-10. Flange Welded to Hydraulic Line at Desired Angle

Figure 1-11. Sensor Mounted at Non-Recommended Angle

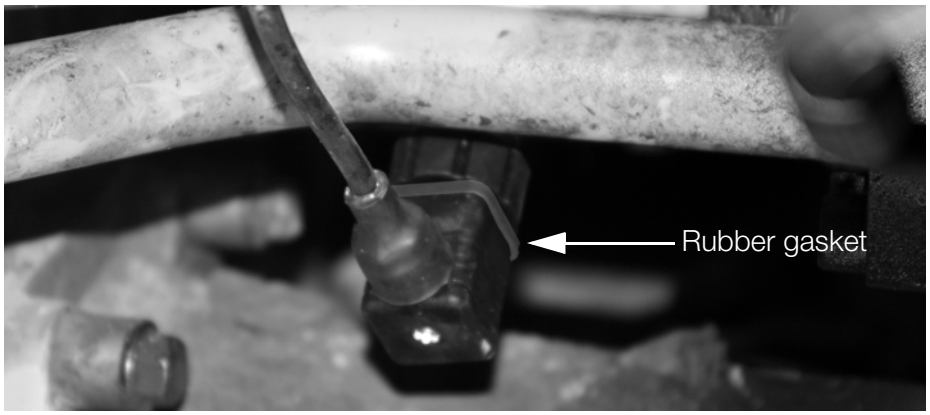


Figure 1-12. Sensor Mounted at Recommended Angle; Rubber Gasket Highlighted

4. Place the copper o-ring between the sensor and fitting (with the smooth side towards the sensor) and tighten the sensor with a crescent wrench.
5. Once the sensor is mounted, the hydraulic line can be bled.
6. After starting the machine, partially loosen the sensor.
7. Wait until fluid leaks out without any air bubbles before tightening it down.
8. Route wire back to where the j-box will be installed (preferably the cab). Route along a stationary area; tying to existing electrical lines is recommended (see).
9. Tie off excess wire in an open area of the wheel loader.
10. Check for leaks again after running the machine for a short period of time.

1.4 Angle Sensor Installation

The angle sensor can be installed in lieu of proximity sensors. This is the preferred method.

1. Using two to three 1" beads, weld the angle sensor's mounting plate to the inside of the support arm.

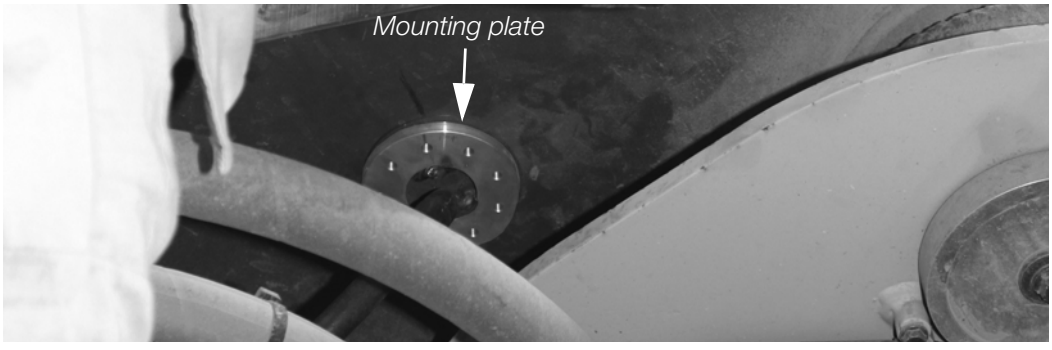


Figure 1-13. Weld The Angle Sensor Mounting Plate Onto The Support Arm

2. Fasten the sensor housing and angle sensor to the mounting plate.

Figure 1-14. Angle Sensor Installed On Support Arm.

3. Route the sensor's wire back to the area where the junction box will be installed (preferable the cab).

Notes: Ensure there is enough slack in the wire to allow the support arm to raise fully without over-tightening the wire. Route along a stationary area of the wheel loader. Figure 1-15 shows the pressure sensor and angle sensor wires routed between a stationary cylinder and existing electrical line; this provides optimal protection.

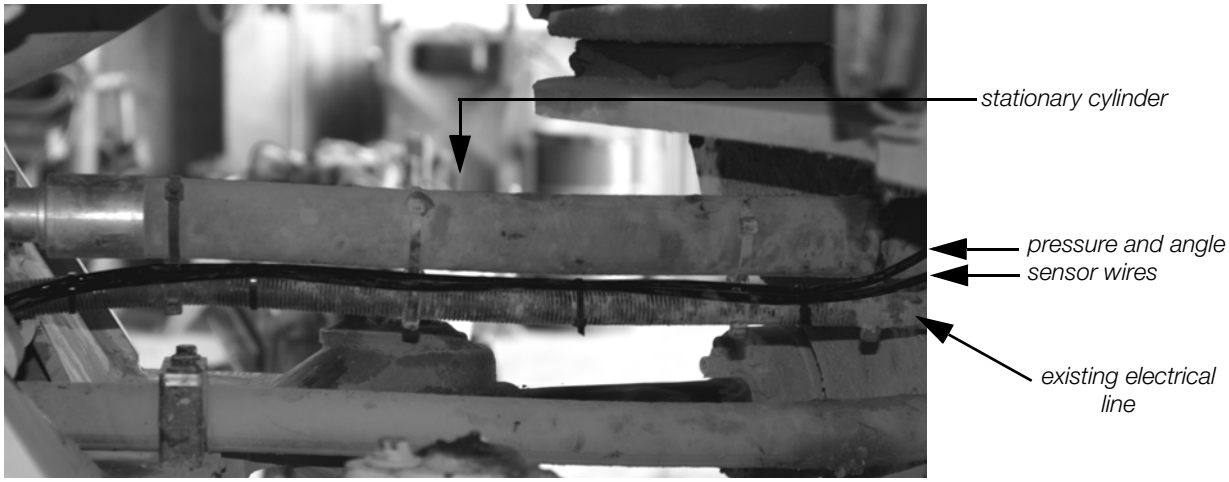


Figure 1-15. Wires Routed Along Existing Electrical Line.

4. Tie off excess wire in an open area of the wheel loader.

1.5 Junction Box Installation

Before you begin wiring the junction box, select an area where it can sit unobstructed. Beneath the operator's seat is typically a good choice. Avoid areas where it may get stepped on or have its connections pulled.

1. Connect the remote control, pressure sensor wire, angle sensor wire, indicator cable, and power supply to the junction box's inputs, as shown in

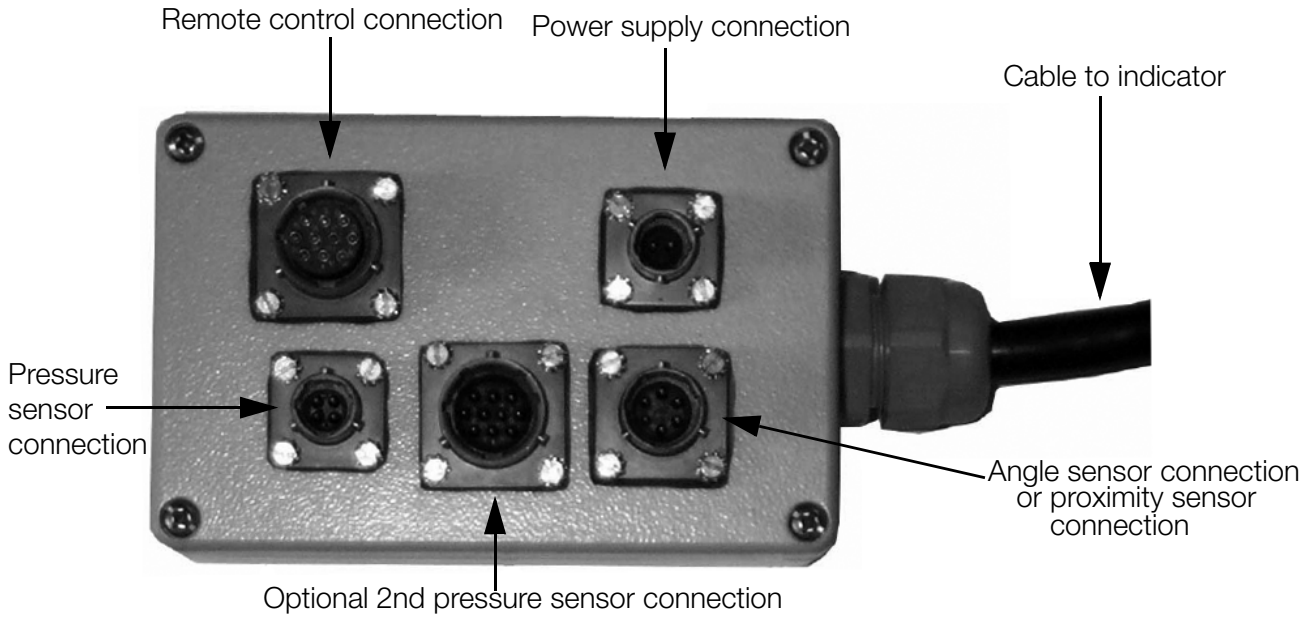


Figure 1-16. Junction Box Connections

2. Connect power to the junction box.

Note: The system comes with a power cable, which has a +VB (power 10-30 vdc input), -VB (ground), and shield cable (ground). It is recommended that the power supply and ground be connected to the battery, or to an unused circuit breaker to avoid any issues with the system.

2.0 Display Indications and Button Functions

2.1 Indicator Display

Rice Lake Weighing Systems' WLS1 indicator is capable of displaying multiple readouts depending on the function. Refer to Figure 2-1 and Table 2-1 for an explanation of these readouts.

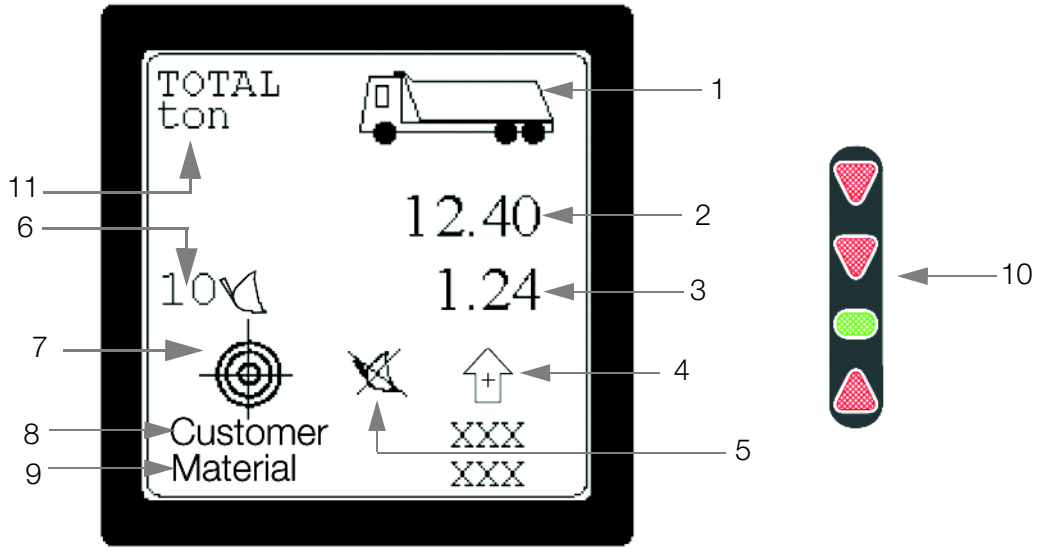


Figure 2-1. Indicator Display Readouts

Number referenced in Figure 2-1	Explanation
1	Display of dump body filling with respect to the maximum load set. The dump body fills in percentage with respect to the maximum load set.
2	Display of the total weight (total load lifted).
3	Display of the partial weight (each bucket load)
4	Display of the type of weighing. Indicates that it is weighing counting up Indicates that it is weighing counting down
5	Indicates weighing disabled.
6	Displays the number of weighing (buckets). The bucket icon moves dynamically until weighing is complete. Wait for weighing Start weighing Finished weighing
7	Indicates that a maximum load has been set (target load).
8	Displays the customer name or code number.
9	Displays the material name or code number.
10	Signal lamps: green lamp on and red lamps off means continue to weigh; red lamps on and green lamp off means the maximum load has been reached or exceeded.
11	Unit of measurement (lbs, tons, kgs, or tu [metric tonnes]).

Table 2-1. Explaination of Readouts

2.2 Indicator Buttons

Indicator buttons are your interface for communicating with the indicator. Refer to for an explanation of button functions.

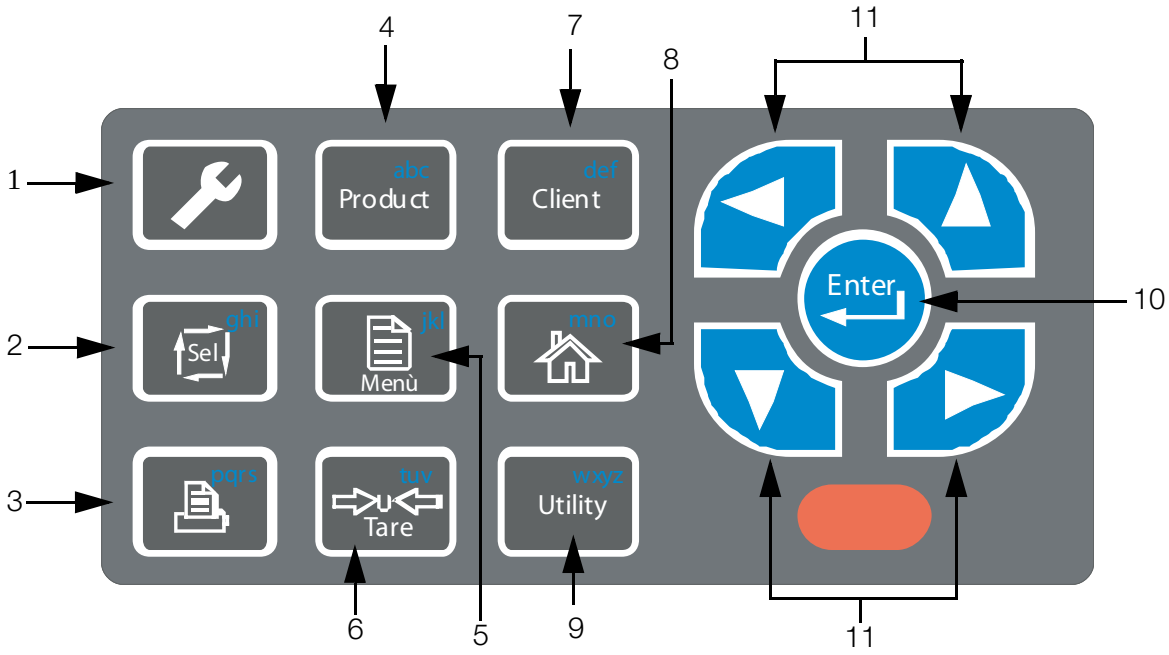


Figure 2-2. Indicator Keypad Buttons

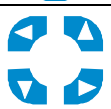
Number referenced in Figure 2-2	Button	Function
1		Accesses diagnostic and calibration procedures.
2		Accesses target and maximum load.
3		Executes printer functions.
4		Used for direct access of *Material* setting
5		Used for delete partial, total, tare procedure access.
6		Press to set tare or reset (press for more than 5 sec.).
7		Used for direct access to *Customer* setting.
8		Used to go back from selected menu to working page (home).
9		Used to access tare enabling and exclusion of weighing system.
10		Used to confirm selections and data.
11		Used to move UP and DOWN on a page or menu, and set values (+ and -).

Table 2-2. Keypad Button Functions

2.3 Remote Control

The remote control has three switches: the printer command switch (to request a ticket), the total zeroing switch (deletes display for new loading), and the partial zeroing switch (deletes last bucket load). It also includes an audible alarm/horn of operation, which is active in the measurement phase.

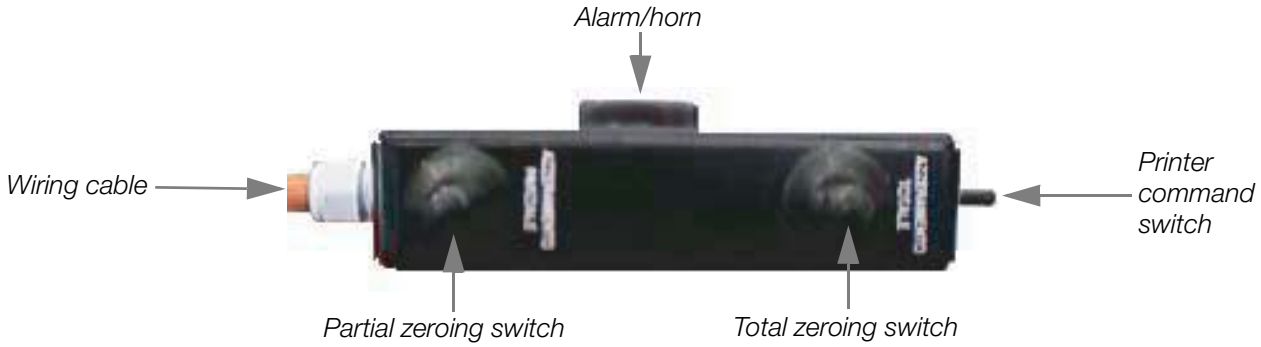


Figure 2-3. Remote Control And Its Elements

3.0 Calibration

To calibrate the WLS1, you must enter calibration mode. This allows you to alter system settings.

3.1 Entering Calibration Mode

1. Press the Wrench button on the indicator's keypad.
   The display changes to the calibration menu, shown in Figure 3-1.

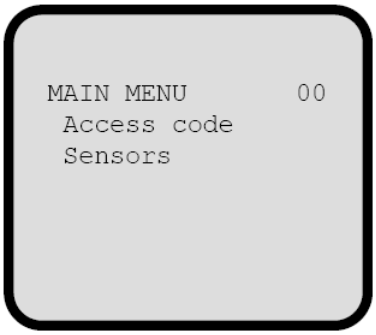


Figure 3-1. Calibration Menu

2. Press the Down button to scroll to the *Access code* line.
3. Press the Enter button.
   The display changes to code numbers.
4. Using the Up, Down, Left, or Right buttons, scroll to the each number of the access code and press the Enter button.
   The default access code is **4482**. You must enter the this code to enter the calibration area of the system.
5. Once 4482 is present on the display, navigate to the C selection (for confirm) and press Enter.

Figure 3-2. Access Code Entered in Display

6. Using the Up, Down, Left, or Right buttons, scroll to the proper number and press Set to confirm each number entered.
   You must highlight each number and press Set to confirm. When each is confirmed, it will appear on the display.

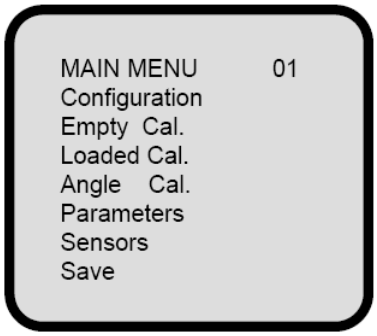


Figure 3-3. Press Set to Confirm Each Number

3.2 Parameters

Parameters are settings that the system uses to enable or disable a particular function. Modifying a parameter can compromise the system stability if an incorrect value is entered. A parameter is not saved until using the Save command in the *Calibration* menu. Parameter pages are shown in Figure 3-4.

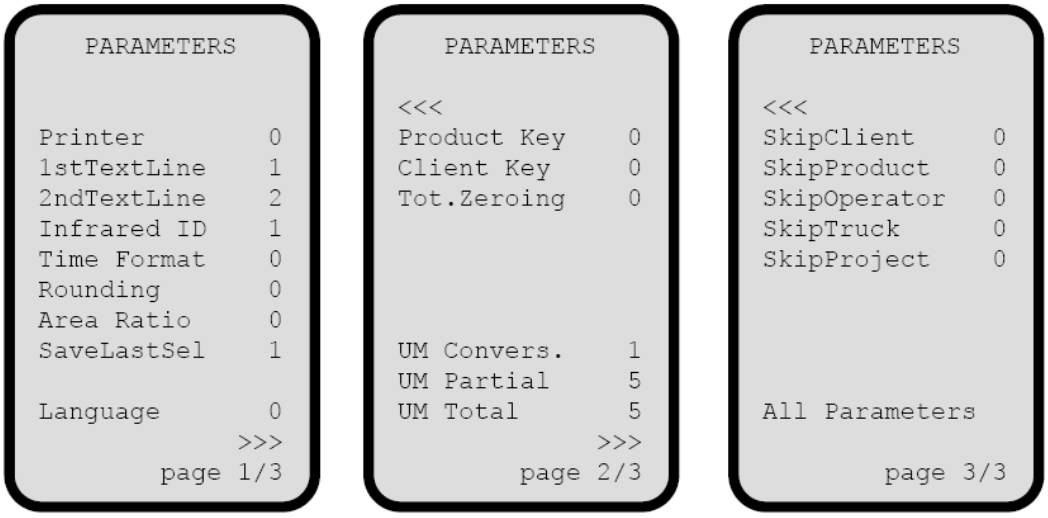


Figure 3-4. Parameter Pages

Parameter	Function	Selections
Printer	Selects system printer	0: Roll printer 1: Ticket printer
1stTextLine	Modifies first line of text (bottom of working page).	0: Nothing 1: Customer (default) 2: Material 3: Not used 4: Operator 5: Truck 6: Project
2ndTextLine	Modifies second line of text (bottom of working page).	0: Nothing 1: Customer 2: Material (default) 3: Not used 4: Operator 5: Truck 6: Project
Infrared ID	Sets the proper identification number of the machine to be downloaded.	Range from 1 (default) to 31
Time Format	Roll printer date format	0: DD/MM/YY 1: MM/DD/YY
Area Ratio	Only used if the system is equipped with the second pressure sensor. The system will calculate the area ratio value and also stores in the parameters 54 and 55 the calculated area value of each element.	Press Enter to display area ratio page, enter the cylinder and piston (rod) circumferences value in millimeters in the proper line, and press Enter.

Table 3-1.

Parameter	Function	Selections
Language	Selects the desired language.	Press Enter to display the system language page. Select the desired language with the down arrow. Press Enter to confirm and return to the parameter page. Parameter pages are displayed only in English.
Product Key	Selects which list you want to enter with this feature.	0: Nothing 1: Customer 2: Material (default setting) 3: Not used 4: Operator 5: Truck 6: Project
Client Key	Selects which list you want to enter with this feature.	0: Nothing 1: Customer (default) 2: Material 3: Not used 4: Operator 5: Truck 6: Project
Keep Totals	Selects whether you want to keep or delete all totals memorized after the end of the day printing.	1: Delete all totals memorized after the end of the day printing 2: Keep all totals memorized after the end of the day printing
UM Convers.	Enables unit of measurement conversion from the one you have used from calibration to the unit of measurement selected in the SEL page.	0: Disable U.M. converstion 1: Enable U.M. conversion
UM Partial	Enables partial unit of measurement conversion	0: Disable partial U.M. conversion 1: Enable partial U.M. conversion 1 = 1kg./2lb. increments 5 = 10kg./20lb. increments 10=100kg./200lb. increments
UM Total	Enables total unit of measurment conversion	0: Disable total U.M. conversion 1: Enable total U.M. conversion 1 = 1kg./2lb. increments 5 = 10kg./20lb. increments 10=100kg./200lb. increments
SkipClient, SkipProduct, etc.	Selects whether you want to skip in the total ticket printing a particular item	0: Don't skip 1: Skip
All Parameters	Displays all the system parameters list. Do not alter these factory settings. Scroll in the parameter list using the down arrow. Move to the next page by pressing the SEL button when on the last line of the page.	n/a
Software Version	Allows you to set values to increase memory	Set the values between WS02_01 and WS02_08 to 10 to increase the memory and avoid the system memory from filling up and counting down in production loading applications. Set the values between WS02_09 and WS02_11 to 20 to increase the memory and avoid the system memory from filling up and counting down in production loading applications WS02_13 does not require this and can be set to whatever the customer wants.

Table 3-1.

3.2.1 Setting and Saving Parameters

To set parameters and save changes:

1. Enter calibration mode (See Section 3.1 on page 11).
2. Scroll to the *Parameters* line and press Enter.
3. Using the Up, Down, Left, or Right buttons, change the parameter numbers as desired. Refer to for a listing of parameters.
4. Once you have entered the proper numbers in the *Parameters* menu, press the Home button to return to the main menu.
5. Scroll down to the Save line and press Enter.
   "Memorization In Progress" is displayed.

Note: Saving data should be done after each menu is complete. You must return to the main menu, scroll to the Save line, and press Enter to save changes. It is recommended to do this after each change is made. In the event that the power is switched off, all data not saved will be lost.

6. Once the information has been saved to memory, the display will indicate "Done." It will then automatically return to the main menu. Pressing the Home button will return the display to the normal operation mode.

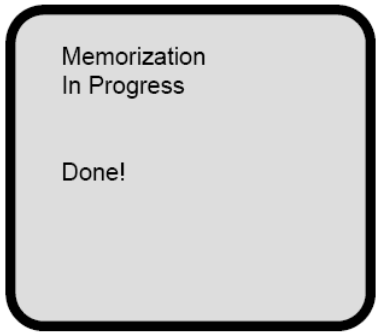


Figure 3-5. Memorization Screen

3.3 Angle Calibration

This type of calibration is used only in systems with the angle sensor installed rather than proximity switches.

1. Enter calibration mode (See Section 3.1 on page 11).
2. Scroll down to the Angle Cal. line and press Enter.
   The Angle Calibration screen appears.
3. Normally, the sensor is installed on the left side of the boom; if the sensor is installed on the right side, scroll the cursor to Change Dir. and press Enter.

Note: The weighing start point will be when the imaginary line, pin of the boom - pin of the bucket, is parallel to the ground level.

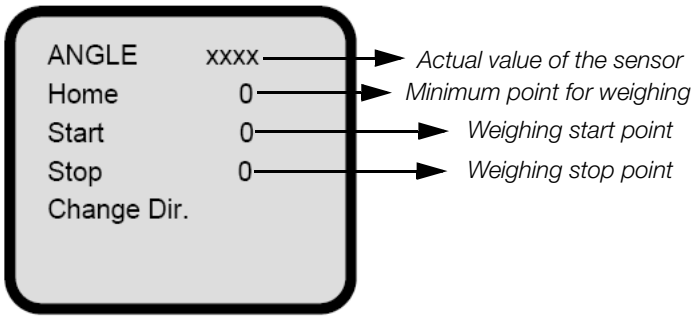


Figure 3-6. Angle Calibration Screen

4. Scroll to the Start position and raise the boom to the weighing start point.
5. Press the Enter button to confirm it. The system will take the value in memory.
6. Raise the boom up approximately 150-200 points higher than the weighing start point (read the position on the display in Angle).
7. Scroll the curser to the Stop line and press the Enter button to confirm it.
8. Lower the boom approximately 20 points lower than the value on Start.
9. Scroll the curser to the Home line and press the Enter button to confirm it.

3.4 Empty Calibration

The empty calibration menu is where the data for the empty calibration is created with no load in the bucket of the machine. The system can store calibrations for four separate machines.

3.4.1 Performing an Empty Calibration

To perform an empty calibration:

1. Enter calibration mode (See Section 3.1 on page 11).
2. Scroll to the Empty Cal. line.
3. Press Enter.
   The Calibration screen appears.
4. Use the Up or Down arrows to scroll to the desired Cal. line in which you want to store data.

Note: Select Cal. 1 for the first machine, Cal. 2 for the second machine, etc.

5. Press Enter.

Note: The value of Act in the empty calibration mode must be zero. To calibrate the system with no load, the bucket must be empty and closed. If the machine is equipped with a boom easy ride feature, disengage this when calibrating and keep it disengaged when testing or weighing with the system.

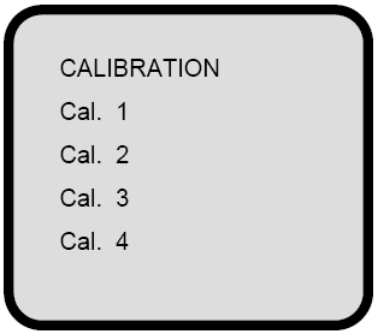


Figure 3-7. Calibration Screen

6. Position the bucket flat and on the ground.
7. Starting from the maximum machine RPM, slowly sweep the boom from bottom to the top of the stroke and continue this process until you have reached the minimum RPM range to save the time and pressure values.

Example: RPM @ 2900, slowly sweep the bucket the entire stroke of the cylinder. Now go to 2800 RPMs and repeat, then 2700 RPMs and so on until you get to the idle position. During the various RPM ranges, the accelerator must be constant and the raise (lifting) lever fully open to obtain max pressure in all conditions. A minimum of 10 setpoints must be made in order for the system to weigh properly. Maximum setpoints is 15; if exceeded, the system will dump the calibration mode. Decrease the motor RPMs evenly to save proportional points over the entire pressure curve. Use the machine RPM counter if there is one; if not, decelerate gradually on the pedal and listen for the engine noise to decrease appropriately.

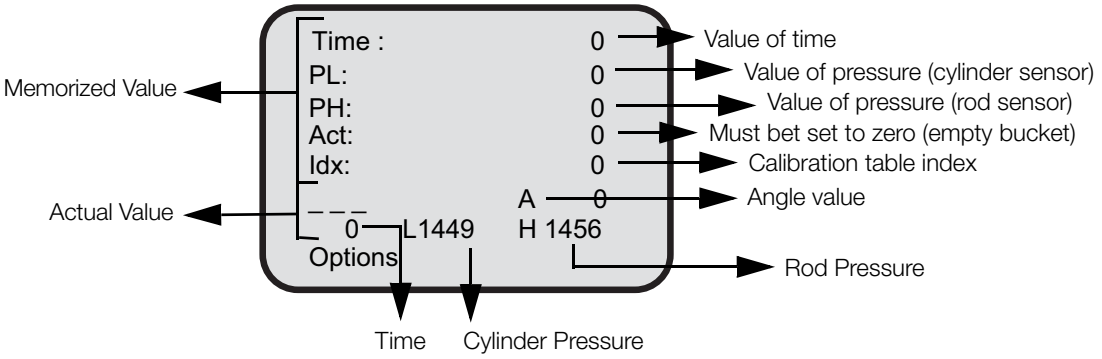


Figure 3-8. Screen Values

Notes: The display time, pressure, and index (Idx) values will change after each cycle. The index value is the number of cycles you have completed. You can view this information by scrolling to the Options line and pressing Enter. Graphics of each pressure curve can be viewed by selecting the Plot line. You can also see the graphics of each pressure curve by selecting Options, then Plot line.

8. Once 10 setpoints have been completed, press the Home button to return to the main menu.
9. Scroll down to the Save line and press Enter.
   "Memorization In Progress" is displayed.

Note: Saving data should be done after each menu is complete. You must return to the main menu, scroll to the Save line, and press Enter to save changes. It is recommended to do this after each change is made. In the event that the power is switched off, all data not saved will be lost.

10. Once the information has been saved to memory, the display will indicate "Done." It will then automatically return to the main menu. Pressing the Home button will return the display to the normal operation mode.

3.4.2 Empty Calibration Options

Empty calibration options are used for deleting a calibration index, plotting the index, and clearing or deleting the calibration entirely.

1. Enter calibration mode (See Section 3.1 on page 11).
2. Scroll to the Empty Cal. line.
3. Press Enter.
   The Calibration screen appears.
4. Use the Up or Down arrows to scroll to the desired Cal. line which contains the desired data.
5. Press Enter.
6. Scroll down to the Options line and press Enter.
   The Empty Calibration Options screen appears.

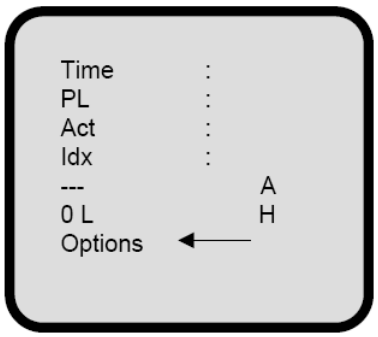


Figure 3-9. Select Options From This Screen

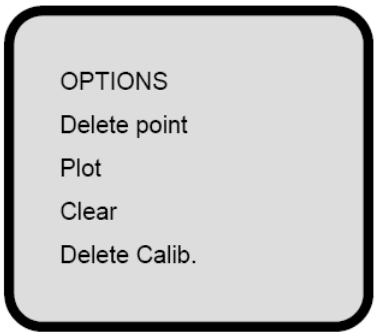


Figure 3-10. Empty Calibration Options Screen

7. Scroll to the function you want to change or use (See page 16 for an explanation of the functions).
8. Press Enter.

Delete Point

This option can be used to manually cancel an incorrect value.

1. Using the down arrow, select Delete Point.
2. Press Enter.
3. To return to the previous display, press Home.

Plot

This feature is used to see the graphics of the calibration values.

1. Using the down arrow, select Delete Point.
2. Press Enter.
3. To return to the previous display, press Home.

Clear

This feature (automatic cleaning) checks the calibration and automatically cancels any incorrect values.

Warning This feature should only be used if needed, and only at the end of calibration, as it will cancel some of the values. Only use this feature if you are sure of this operation.

1. Using the down arrow, select Clear.
2. Press Enter.
   The system will automatically clean any improper data.

Delete Calib.

This feature deletes all calibration selected in the previous pages.

1. Using the down arrow, select Delete Calib.
2. Press Enter.
   The system deletes all calibration data.

Print Calib.

If you have a roll printer, you can print current machine calibration (empty and loaded tables) to store for future use.

This feature is only available if you have a printer connected to the system.

1. Using the down arrow, select Print Calib.
2. Press Enter.
   The current machine calibration is printed.

3.5 Loaded Calibration

The loaded calibration menu is where the data for the loaded calibration is created with a known load in the bucket of the machine.

1. Enter calibration mode (See Section 3.1 on page 11).
2. Scroll to the Loaded Cal. line.
3. Press Enter.
4. Using the up and down arrows, scroll to the calibration line where you want to store data.
5. Press Enter.
   The Calibration screen appears (see Figure 3-8 on page 15).

Notes: When using material for the known load, use approximately 3/4 of a bucketful and equally distribute material in the bucket to ensure you do not lose any material. If using solid weight, it must fit entirely inside the bucket, and be equally distributed and secure.

6. The value of Act in the loaded calibration mode will be adjusted in the ACT setting. To calibrate the system with a known load, the bucket must be loaded and closed.
7. If the machine is equipped with a boom easy ride feature, disengage this when calibrating and keep it disengaged when testing or weighing with the system.
8. Position the bucket flat and on the ground.
9. Starting from the maximum machine RPM, slowly sweep the boom from bottom to the top of the stroke and continue this process until you have reached the minimum RPM range to save the time and pressure values.

Example: RPM @ 2900, slowly sweep the bucket the entire stroke of the cylinder. Now go to 2800 RPMs and repeat, then 2700 RPMs and so on until you get to the idle position. During the various RPM ranges, the accelerator must be constant and the raise (lifting) lever fully open to obtain max pressure in all conditions. A minimum of 10 setpoints must be made in order for the system to weigh properly. Maximum setpoints is 18; if exceeded, the system will dump the calibration mode. Decrease the motor RPMs evenly to save proportional points over the entire pressure curve. Use the machine RPM counter if there is one; if not, decelerate gradually on the pedal and listen for the engine noise to decrease appropriately. Make sure the bucket is closed during calibration.

Note: The display time, pressure and index (Idx) values will change after each cycle. The index value is the number of cycles you have completed. You can view this information by scrolling to the Options line and pressing Enter. Graphics of each pressure curve can be viewed by selecting the Plot line. You can also see the graphics of each pressure curve by selecting Options, then Plot line.

10. Once 10 setpoints have been completed, press the Home button to return to the main menu.
11. Scroll down to the Save line and press Enter.
    "Memorization In Progress" is displayed.

Note: Saving data should be done after each menu is complete. You must return to the main menu, scroll to the Save line, and press Enter to save changes. It is recommended to do this after each change is made. In the event that the power is switched off, all data not saved will be lost.

12. Once the information has been saved to memory, the display will indicate "Done." It will then automatically return to the main menu. Pressing the Home button will return the display to the normal operation mode.

3.5.1 Loaded Calibration Act Setting

The Act line in the loaded calibration mode contains the actual known weight value for the known weight used for the calibration process.

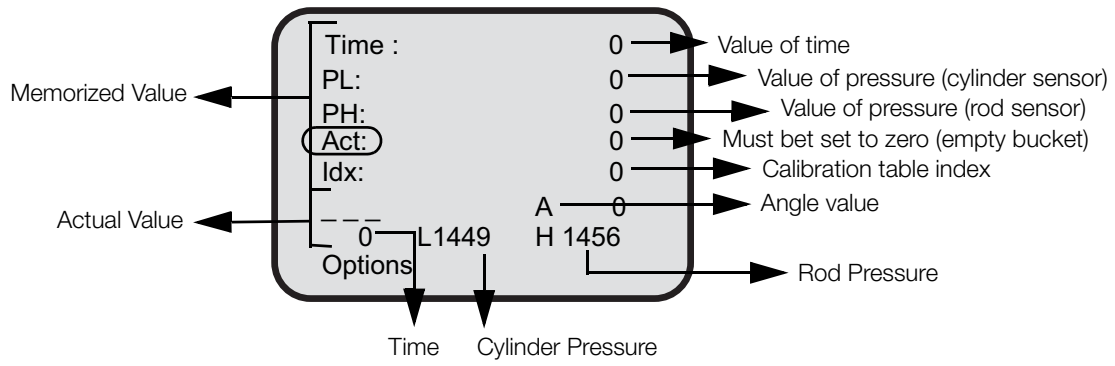


Figure 3-11. Calibration Screen Values; Select the Act. Line From This Screen

1. Use the up and down buttons to scroll to the Act line.
2. Press Enter.
3. Use the up, down, left, and right buttons to input the known (actual) weight value in tens of kilos.

Example: Known weight is 4000 lbs; enter 180 (number entered in tens of kilos). If entering short tons and the known weight is 4.80 short tons (iTon), enter 459 in the Act line (number is entered in tens of kilos). This entered number must be in tens of kilos in order for the unit to convert properly. 1 kilogram = 2.204 lbs.

4. Once the known (actual) weight value is entered in tens of kilos, press the Home button to return to the main menu.
5. Scroll down to the Save line and press Enter.
   "Memorization In Progress" is displayed.

Note: When making any adjustments to the Act line in the loaded calibration, you must save the data from the Main Menu before it will take effect. Load multiple truck loads before re-adjusting the system.

6. Once the information has been saved to memory, the display will indicate "Done." It will then automatically return to the main menu. Pressing the Home button will return the display to the normal operation mode.

3.6 Utilities Menu

There are multiple functions accessible under the *Utilities* menu.

Tare

Indicates the tare value of the system.

Disable

Selects the weighing to be enabled or disabled. An asterisk next *Disable* indicates the system has been disabled for weighing. Use the up or down buttons on the keypad to scroll to this feature and press the Enter button to enable/disable. The normal operation mode display will indicate a graphic bucket with an X to indicate the system is disabled.

Count Down

Selects the weighing to count up or count down. An asterisk next to Count Down indicates the system is counting down. Use the up or down buttons to scroll to this feature and press Enter to enable/disable. The normal operation display will have an arrow pointing down when enabled and pointing up when counting up the weight.

Machine

Selects and indicates the machine number for calibration information for multiple machine usage. The system is capable of four machine calibrations.

Time Setting

Used to set the date and time for the system. Scroll to with the Mode button and press Set to confirm.

3.6.1 Accessing System Menus

To access the system menus:

1. Press the Utility button.
   The *Utilities* menu screen appears.

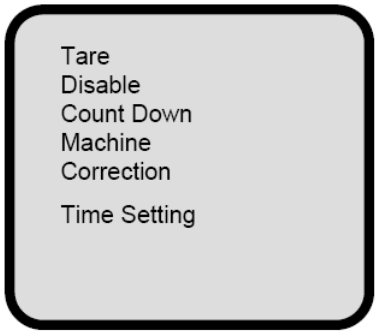


Figure 3-12. Utilities Menu Screen

2. Scroll to the desired selection.
3. Press Enter.

3.7 Print Menu

When you press the Print button on your keypad, the *Print* menu will appear. This offers you several print-related selections. To make a selection, scroll to the desired feature and press the Enter button.

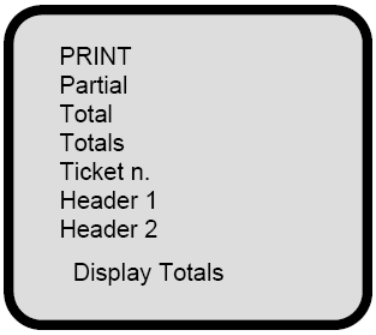


Figure 3-13. Print Menu

Partial
Prints out partial loads or individual load information.

Total
Prints out total load information.

Totals

Prints out total load information and clears memory of information.

Ticket n.

Selects ticket number for printing and indicates the ticket number to be printed.

Header 1

Printer header menu; enter information for the header to be printed.

Header 2

Printer header menu; enter information for the second header to be printed.

Display Totals

Displays totals of material numbers

3.8 Delete Menu

When you press the Menu button on your keypad, the *Delete* menu will appear. Its selections are described below.

Partial
Deletes the last load weighed--same function as the remote control's partial tare button.

Partial x 2
Deleted the last two loads weighed.

Total

Deletes all load information on display (new truck loading procedure). Same function as the total tare feature on the remote control.

Totals

Deletes all load information on display and clears all information in memory.

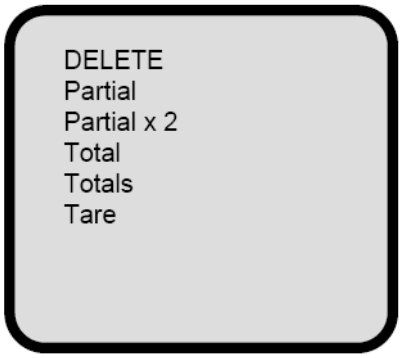


Figure 3-14. Delete Menu Screen

Tare

Deletes any material buildup, bucket changes, starting tare at zero.

3.9 System Menu

When you press the SEL button on the keypad, the *System* menu appears. This has multiple functions, described below. Use the up/down buttons to scroll to the desired feature, and the left/right buttons to adjust.

Figure 3-15. System Menu

Target

Used to set the target weight.

Unit Meas.

Used to set the unit of measurement. mTon is metric ton; LBS is pounds; KG is kilograms; iTon is imperial ton; sTon is short ton (U.S. measurement).

Customer

Used to select and set the customer name or number

Material

Used to select and set the material name or number.

Operator

Used to select and set the operator name or number.

Truck N.

Used to select and set the truck name or number.

Max N.W.

Used to select and set truck net weights.

Project

Used to select and set the project name or number.

3.10 Header/Print Menu

When you press the Print button, you can scroll down to access several commands which allow you to customize header and printer information. Here, you can modify data concerning the customer, material, operator, truck, etc. You can also enter the printer baud rate.

The procedure is the same for all data entry. The display will indicate that it is a ticket header.

Figure 3-16. Ticket Header Screen

Note: To use the standard printer, you have to set the parameter 0 = 0, printer speed up the printout and the baud rate on a printer. To do this, you have to switch on the printer with both push buttons pressed and held. The printer starts to print a setup page. Now, you can release both buttons and press the Feed button until you see the actual baud rate (every time the printer prints a text). Then, push the Print button until you see 9600 and push Feed until the end of the setting. Then, you can try to print.

4.0 Operation

The WLS1 system is based on the measurement of the lift cylinder piston pressure (by means of the pressure transducer) and the calculation of the raise speed (with angle sensor).

4.1 Making a Weighment

1. Raise the arm while keeping the engine RPMs constant and the lift lever full open.
2. Wait for the unit to give the audible signal. This indicates when the system is performing the weighing.

Note: During this audible signal, do not alter the conditions of the machine. The bucket must be completely closed, upward movement must remain constant as well as the RPMs. The machine must work level and should be subjected to as few movements as possible.

3. When the audible signal is finished, the central unit display will show the unit of measurement, the number of weighing, the customer code number or name, the material code number or name, the total weight, and the weight of the single load. See Figure 4-1.

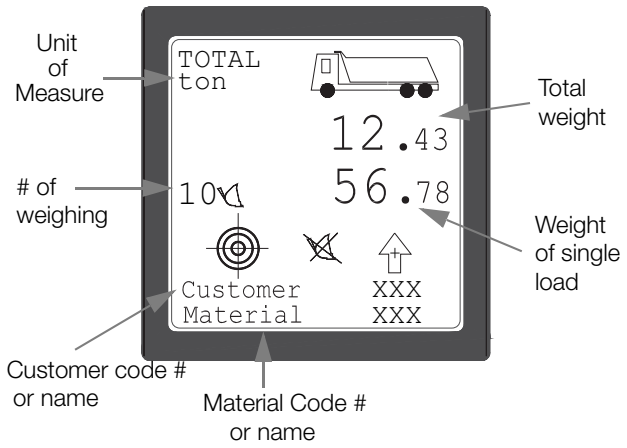


Figure 4-1. Display After Finished Weighment

Note: Units of measurement that can be displayed include mTon (metric ton), LBS (pounds) iTon (Imperial/Long ton), sTon (short ton), and KG (kilogram).

4.2 Setting a New Tare

A new tare should be set when the bucket is changed or the oil changed in the hydraulic system, or when residual material is built up in the bucket. When setting a new tare, the weight of the quantity deposited can be zeroed and only the material which is effectively loaded into the truck is weighed. Before beginning the loading operations, the state of the tare should be checked by performing an empty weighing. Repeat the process 2-3 times per day to compensate for variation of hydraulic oil temperature.

1. Perform an empty weighment while maintaining a constant raise speed. AFter the audible weighing signal (weighing performed correctly) is given, proceed with Step 2.
2. Press the Tare button.
   The displayed load will indicate zero.
3. Press Enter to save the new tare value.

Note: If you press the Tare function by mistake, press HOME to restore the old value.

4. Pressing and holding the Tare button for more than 5 seconds will zero the tare value. Press and release the Utility button to change the display.
   The tare value is displayed across from the tare line, on the right side of the label.
5. Using the remote control, pressing and holding the Total Zero switch will tare the value. To perform an empty weighing, press and hold the Total Zero switch and raise the boom at a constant RPM, with the raise lever fully open. The audible alarm will sound and stop.
   The new tare value is saved automatically.

4.3 Disabling the Weighing Feature

During the loading process, the machine may be used for other reasons and you might want to keep the value of the load performed to this point. The weighing can be suspended temporarily and then resumed later to finish loading the truck.

1. Press the Utility button.
   The display appears as in Figure 4-2.

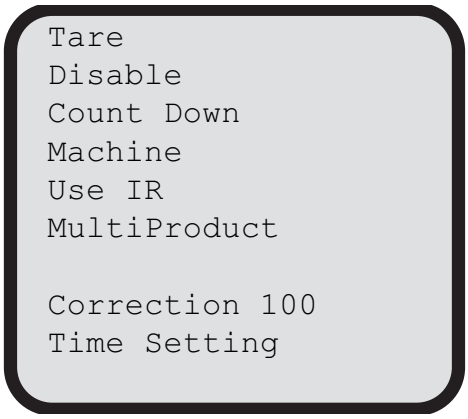


Figure 4-2. Screen After the Utility Button is Pressed

2. Press the Up or Down button to scroll to the *Disable* line.
3. Press Enter to disable the weighing.
   The asterisk to the left of *Disable* confirms that the weighing system is excluded.
4. To re-enable weighing, follow the above procedure and the asterisk will disappear.

4.4 Count Down Function

When using this feature, you must enter a target load in order for it to count down the weight (see Section 4.11 and Section 4.11.1 on page 24. Once activating the Count Down function, the maximum load value is shown on the display. Each partial is subtracted from the maximum load and when the maximum load is exceeded, the audible alarm will sound when the load is below zero.

To activate or deactivate the count down function,

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *Count Down* line.
3. Press Enter to enable the function.
   The asterisk to the left of *Count Down* confirms that the weighing is counting down.
4. To disable the function, follow the above procedure and the asterisk will disappear.

4.5 Machine Function

The display can be moved between four different machines and store four separate calibrations. The machine function can select the machine in use and thus its specific calibration at any time.

To set the machine in use:

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *Machine* line.
3. Press Left (-) or Right (-) to select the proper machine number.
4. Press Home to return to the main weighing display.

Note: Correction setting is used when adjusting the load when you have an error due to cold or hot conditions. It has no effect on the calibration and should be set back to 100% if adjusting it in these conditions.

4.6 Infrared Communication (Optional)

To use this function, you must have the *Dispenser* option to proceed as follows:

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *Use IR* line.
3. Enable the infrared transmission for a time-limited period (about 3 minutes). In this time, you can use the *Dispenser* tool (optional). Roll printer is disabled. See *Dispenser* user manual for further information.

4.7 Multi-Product/Multi-Truck Function

The multi-product function enables the possibility to load up to 10 different products on the same truck. The system memorizes all the material loaded at the end of the truckload. When “delete total” is pressed, actual total weight is stored in the total of the product selected in this moment. Nothing happens if the operator changes the product selected in the middle of the truckload. To use this function, you must have the *Dispenser* option to proceed as follows:

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *MultiProduct* line.
3. Select as usual the first material to load and start to fill the truck
4. After one or more buckets, the operator is free to select another material and start to load this material.
5. When the quantity of the second material is enough, the operator can select a third material to load or return to the first, continuing from the previous value of load reached.

If you have used the multi-product function during the load of a truck, you can see in the printer ticket the total truckload as usual and the single load of each material. The system memorizes this data at the end of the truckload as usual, keeping the correct load for every material.

During a multi-product load, you can see two icons on the display.

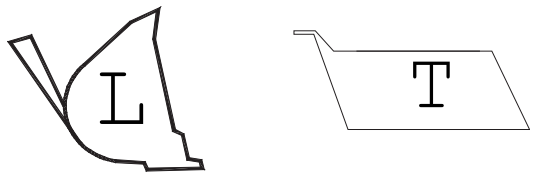


Figure 4-3. Last Bucket Load Icon (left) and Total For Select Material Icon (right)

You can switch between these visualizations by pressing the Right (+) button.

The multi-truck function is always enabled and is completely transparent by the operator. Changing the truck selected during a load (Total Load > 0) will freeze the system and reset the load to 0. Then, you can finish the second truck (usually with print total and delete total) and load again the previous truck, selecting its code.

Note: Using multi-product and multi-truck will lose all partial values when cycling the power during a load.

4.8 Correction Function

This function is used to correct constant errors in the weighing accuracy without affecting the calibration of the system when a variation is seen by the operator.

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *Correction 100* line.
3. Press Left (-) or Right (-) to increase or decrease the correction.

Example: If the WLS1 works with 5 percent less than the real weight, the value of correction must be increased 5 percentage points, to equal 105 percent. If the WLS1 works with 5 percent more than the real weight, the value of correction must be decreased by 5 percentage points to equal 95 percent. Once the situation changes due to temperature, etc. the correction should be returned to 100 percent.

4.9 Setting Date and Time

1. Press the Utility button.
   The display appears as in Figure 4-2.
2. Press the Up or Down button to scroll to the *Time Setting* line.
3. Press Enter to confirm. The display will appear as in Figure 4-4.

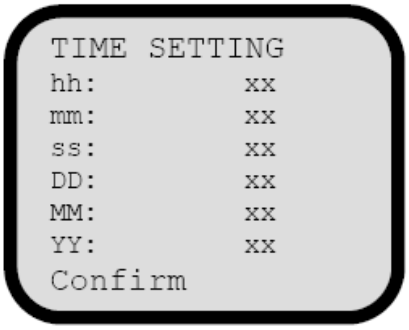


Figure 4-4. Time Setting Screen

4. Press the Up or Down button to scroll to the value you want to change.
5. Press the Left (-) or Right (+) button to change the value.
6. Once you have changed all values, use the Down button to scroll to the *Confirm* line and press Enter.
   After 5 seconds, the system returns to normal operation display.
   If a roll printer is used, the new date will be printed on the ticket.

4.10 Partial Zeroing, Partial x 2, Total, Totals, and Tare Procedure

When you press the Menu button, you can select between Delete, Partial, Partial x 2, Total, Totals, and Tare. The functions are described below.

Function	Description
Partial	Cancels the last weighing
Partial x 2	Last weight calibration function. When the last bucketload did not empty completely, to find out the effective total quantity unloaded, weigh the material which has remained in the bucket and use this function. It will remove twice the last value weighed from the total so you can find out the total value of material which has actually been put into the truck.
Total	Cancels the total load
Totals	Cancels the totals in the memory (end of the day, end of the week, etc.). This operation takes approximately 30 seconds.
Tare	Cancels the tare

Table 4-1.

To return to the main display, press the Home button.

4.11 Target, Unit of Measurement, Customer Code, Material, Operator, Truck, and Project

1. Press the SEL button.
   The display appears as in Figure 4-5.

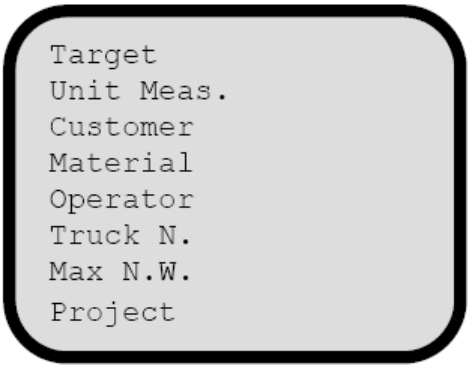


Figure 4-5. Selection Screen

2. Press the Up or Down button to scroll to the line you want to change.
3. Use the Left(-) or Right (+) buttons to change the value for the customer/material/operator code/truck number or project number.

4.11.1 Target (Maximum Load)

1. Press the SEL button.
   The display appears as in Figure 4-5
2. Use the Left(-) or Right (+) buttons to change the value required and confirm by pressing Enter. When the limit is reached, the system will sound an intermittent audible alarm.

Note: The target or maximum load is displayed on the basis of the unit of measurement chosen. In any case, the minimum increase/decrease step is 100 kg/lbs. or 0.1 ton. If the count down function is activated, the operative target will be the initial count down value.

4.12 Unit of Measurement

Unit of measurement selections include mTon (metric ton), Kg (kilograms), Lbs (pounds), iTon (imperial ton), sTon (short ton).

1. From the *Selection* screen, press the Up or Down (+) buttons to scroll to the *Unit Measure* line.
2. Use the Left(-) or Right (+) buttons to set the unit of measurement required.
3. Press Enter to confirm.

When finished, press the Home button to return to the normal display.

After 10 seconds of inactivity, the menu will automatically return to the normal weighing display.

4.12.1 Customer, Material, Operator, Truck, Max NW, Project Number

1. From the *Selection* screen, press the Up or Down button to scroll to on the code number with which the name is to be associated.
2. Press Menu.
   The display appears as in Figure 4-6.

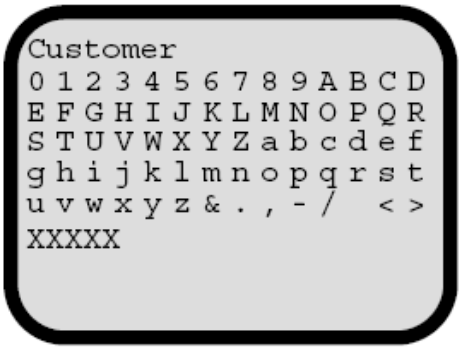


Figure 4-6. Text Entry Screen

3. To set the value, use the Left(-) or Right (+) buttons to move the curser along the same line; use the Up or Down buttons to move the curser between lines.
4. Press Enter each time the cursor is positioned on the letter or number desired.
5. Once the name is complete (it can be seen on the display at the bottom), press and hold the Home button for a few seconds to confirm. A total of eight character lines can be set.

Note: To scroll the page down (maximum 1000 code No.), position the cursor on the last code number displayed and press the SEL button. To scroll the page up, position the cursor on the first code number displayed and press the SEL button.

- Customer: eight lines of 16 characters can be set. (maximum 1000 code No.)
- Material: one 12-character line can be set. (maximum 200 code No.)
- Operator: one 12-character line can be set. (maximum 50 code No.)
- Truck: eight lines of 16 characters can be set. (maximum 500 code No.)
- Max N.W.: one 12-character line can be set. (maximum 500 code No.)
- Project: eight lines of 16 characters can be set. (maximum 100 code No.)

4.13 Density Function (Specific Gravity)

For this example, we will change the material to be printed in cubic yards/meters.

1. From the *Selection* screen (see Figure 4-5), press the Up or Down (+) buttons to scroll to the *Material* line.
2. Press Enter to access the *Material* screen.

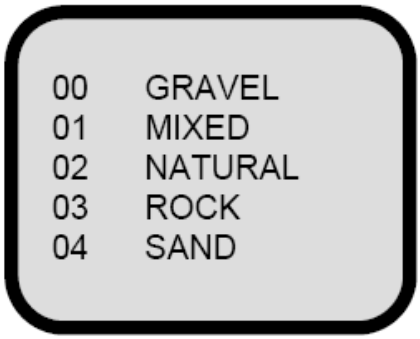


Figure 4-7. Material Screen

3. Press the Up or Down buttons to scroll to the material which is to be printed in cubic yards/meters.
4. Press the Wrench button.
   The display appears as shown below.

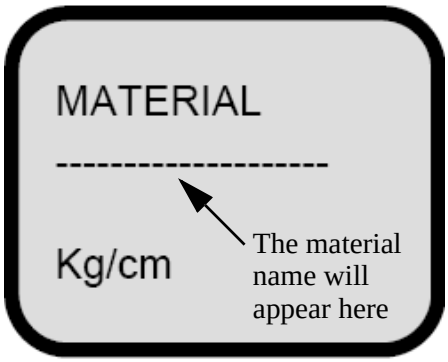


Figure 4-8. Material Density Value Screen

5. Press Down to scroll to the *LBS/CY* or *Kg/Cm* entry.
6. Use the Left (-) or Right (+) buttons to enter the material density value.
7. Press Enter.

4.14 Display Totals for Materials

1. Press the Print button.
2. Using the Up or Down buttons, scroll to *Display Totals*.
3. Press Enter.
   The *Material Code Number* screen appears.

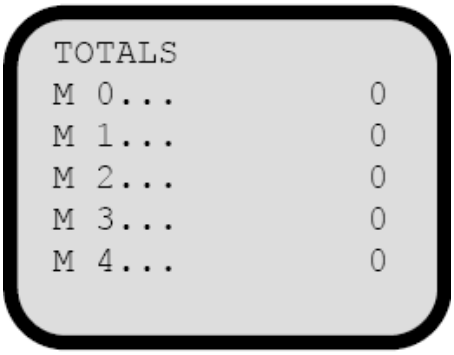


Figure 4-9. Material Code Number Screen

4. Using the Up or Down buttons, scroll to the material code number with which the total is to be associated.

Note: To scroll the page down (maximum 100 code No.), position the cursor on the last code No. displayed and press the SEL button. To scroll the page up, position the cursor on the first code No. displayed and press the Sel button.

5. To return to normal operation display, press Enter twice.
   The total of each material can be zeroed. Use the Up or Down buttons to position the cursor on the material whose total is to be zeroed, and press Enter.

4.15 Printer Function

If you have a printer installed, the following information can be printed on the ticket:

- Company name
- Date and time
- Operator code number or name
- Material code number or name
- Customer code number or name
- Number of weighing
- Indication of the weight in tons and in cubic yards/meters (if the specific gravity of the material loaded has been set)
- End of day summary

4.15.1 Printing the Ticket

1. Press the Print button.
   The *Print* screen appears.

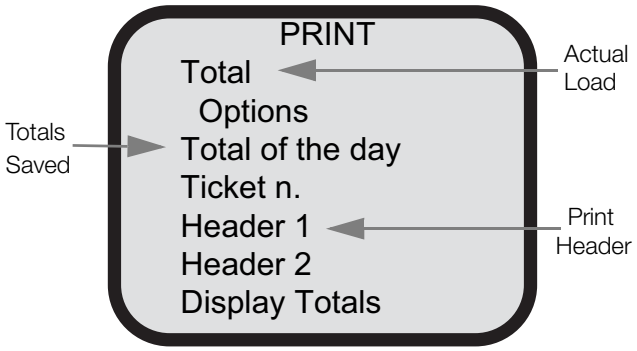


Figure 4-10. Print Screen

2. Press the Down button to show the cursor.
3. Position the cursor on the *Total* line and press Enter.
   The printer will print the actual total.
4. To print the end of day summary, move the cursor to *Total of the day* and press Enter.

Figure 4-11. Total of the Day Screen

5. Press Enter again on *Total of the day* to start the summary print. Otherwise, move the cursor to one of the other lines and press Enter to select what you want to be printed (marked with an asterisk).
6. At the completion of printing the total of the day ticket, the values saved are automatically zeroed so the next day's work can start without further operations. If you want to maintain it in memory, mark *Keep Totals* so that an asterisk appears next to it.

4.15.2 Printer Options

When *Options* is selected from the *Print* screen, the following screen is displayed (only for a 24-column roll printer).

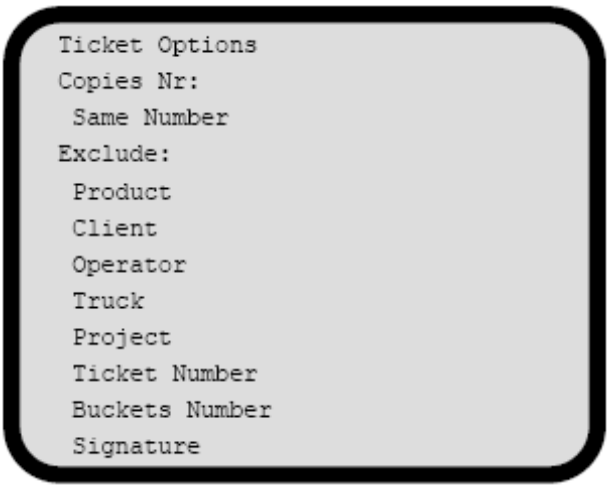


Figure 4-12. Ticket Options Screen

- Copies Nr: set how many ticket copies the system must print automatically when you press Print Total.
- Same Number: enabled (asterisk) with the Enter button to print same ticket for each ticket copy.
- To exclude some item from the roll printer ticket, position the cursor on item you do not want to be printed and press Enter to mark it with an asterisk.
  The selection is automatically memorized.

4.15.3 Zero or Change the Ticket Number

If the ticket number is not zeroed, the system automatically zeroes when it reaches 30,000. To manually zero the ticket number:

1. Scroll the cursor to *Ticket Number.*
2. Press Enter.
3. Scroll to *Zero Ticket Number.*
4. Press Enter.

4.15.4 Setting a Print Header

1. Scroll the cursor to *Header 1* (header before time print) or *Header 2* (header after time print).
2. Press Enter.
3. Type the information that you want to be printed (i.e., company name).
4. Proceed the same way for customer or material name insertion.

4.15.5 Ticket Printer Header

With a ticket printer, you can select how, and in which order, the ticket must be printed. Set in Header 1 for the corresponding command.

A	Line Feed
B	Normal Character
C	Double Width Character
D	Double Height Character
E	Double Width and Height Character
F	Time and Date
G	Product
H	Operator
I	Ticket Number
J	Print Total
KLMNOPQRS	Client (Note: only KL if you want to limit to 2 lines)
T	Cubic Meters
U	Truck
VWXYZ0123	Project
4	Weigh Number

Table 4-2. Ticket Printer Commands

Header example: B A F A G A H A K A L A M A N A O A P A Q A R A S A A I A E A J A
Note: Do not put a space between letters.

4.15.6 Remote Control Printing

Pressing and releasing the *Print* switch will print the ticket of the load performed.

Pressing and releasing the *Print* switch for five seconds will print the total loads saved.