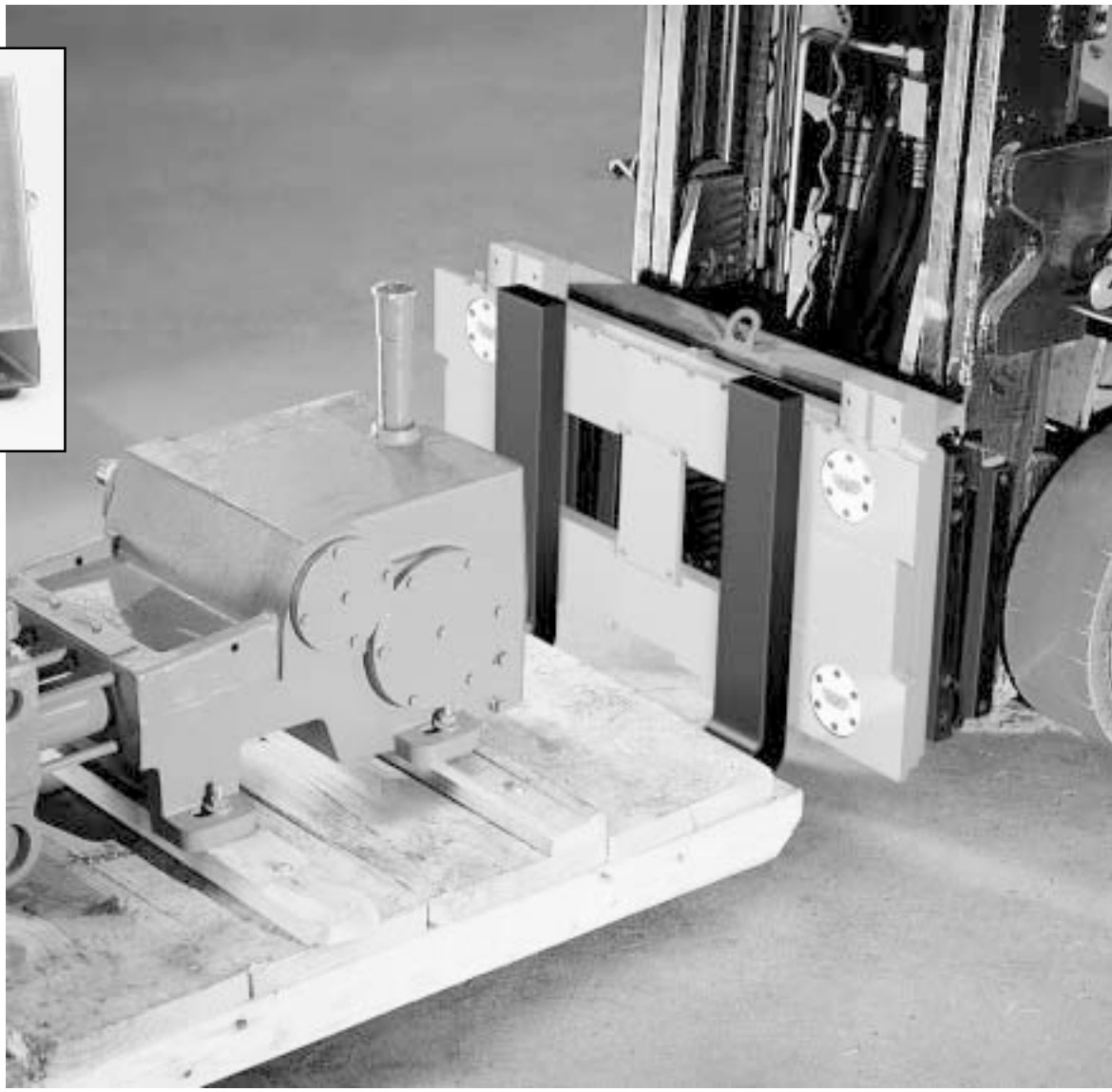
WEIGH-TRONIX



Certified Lift Truck Scale with SimulCast™ Instrument Service Manual

Table of Contents

Specifications

Indicator Specifications

Power input	10-90 volts DC
Display	1.6" H x 3.2" W electroluminescent dot graphic display (160 x 80 dot layout) Simultaneously displays 0.6" high readings of weight, pro number, accumulated weight and accumulated number of skids
Operational keys	Zero, Tare, Print, Units, Select, Enter, Escape, Clear, 0-9, decimal point and five soft keys labeled per selected operational routine All keys provide users with audio acknowledgment upon activation
Operational annunciators	Displayed symbols indicate motion, center of zero, unit of measure and more
Time and date	Battery protected real time clock is included
Angle compensation	Detects and automatically compensates for pitch and/or roll out of level weighing
Standard interface ports	(all with quick disconnects): • infrared communication port • RS-232 bar code reader port • RS-232 printer output • scale carriage input • power source input
Available options	• Memory expansion • Bar code wand • Infrared transceiver
Operating environment	14°F to 104°F - NTEP (-10°C to +40°C) -40°F to 140°F - Operational (-40°C to +60°C)
Enclosure	Stainless steel enclosure
Dimensions	10.5" H x 10.75" W x 4" D, (26.67 cm x 27.31 cm x 10.16 cm)
Weight	14 lb, 6.3 kg

Weigh Bar Specifications

Approvals	Legal for Trade: Certificate of Conformance #95-093
Zero balance	±0.10 mv/v
Non-linearity maximum	0.03% of rated output
Hysteresis maximum	0.03% of rated output
Temperature effect on output	±0.0025% °C of rated output (-10 to +40°C)
Temperature effect on zero balance	±1.70 x 10-7 volts per volt 5°C (-10 to +40°C)
Safe overload rating	150% of capacity
mV/V	5K systems: .27mV/V

Weight Summing and Angle Detection Assembly Specifications

Enclosure	Metal enclosure. Dust and water resistant. Electronic components surrounded by low modulus potting compound.
Environment	-40°C to 65°C
Angle sensors	.1 degree accuracy from 0-10 degrees
Angle sensor temperature coefficient	0.008°/°C

System Specifications

Approvals	Legal for Trade: Certificate of Conformance #95-126 NTEP Class III at 1,000 divisions
System compatibility	ITA Class II carriages up to 5,000 lb
Overload protection	Withstands up to 200% of full capacity applied any where up to 24" from frame and side loads up to 100% of full capacity.

Introduction

About This Manual

This manual covers the information you need to configure and service your WI-130 SimulCast™ indicator and QTLTSC lifttruck scale.

Major sections of this manual are headed by titles in a black bar like *Introduction* above. Subheadings appear in the left column. Instructions and text appear on the right side of the page. Occasionally notes, tips, and special instructions appear in the left column.

Front Panel Keys and Functions

The front panel is shown in Figure 1.

Figure 1
WI-130 SimulCast™ Front Panel

Hard Keys

Press any key to turn on the indicator.

The keys on the front panel of the WI-130 are of two types, hard keys and soft keys. Hard keys are labeled directly and soft key labels appear on the display. Soft keys function differently at different times so their labels change as needed.

Below are brief descriptions for each of the hard key functions:

Repeatedly press the **SELECT** key to scroll through the available weight reading displays. (Examples - gross, net, tare, etc.)

Press the **UNITS** key to scroll through the available units of measure

Press the **PRINT** key to send data to a connected printer.

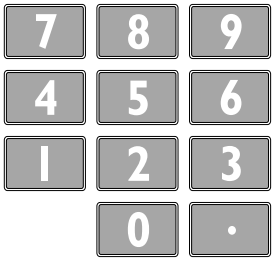
Press the **TARE** key to enter a tare weight, then press **SELECT** to see the net display mode.

Press the **ZERO** key to establish a zero reference. A center-of-zero icon will be displayed. During motion an M will appear below the center-of-zero icon.

Press the **ESCAPE** key to back out of menus or cancel a numeric entry without accepting the value.

Press the **CLEAR/OFF** to clear values while a system prompt is being displayed. Press and hold the **CLEAR/OFF** key to shut the indicator off.

Press the **ENTER** key to enter a keyed in value or accept a displayed choice.



The numeric keypad is for entering numbers.

Soft Keys (F1-F5)

Soft keys are so-called because their function is not fixed. They are labeled F1 through F5 and are located below the display. Their function can change as the mode of operation changes or as the program for your particular setup changes.

If the keys are needed during any operation, a label for each active key appears in the display directly above. There are only five key labels available at one time but this does not limit the potential usefulness of these keys. Programs can be created to enable one key to access another level of operation with five more key names and functions.

Error Messages

Following are the error messages involved with servicing issues.

Overload	The weight on the scale has exceeded the capacity of the system. Remove weight or troubleshoot equipment for defects.
Underload	The weight on the scale has exceeded the capacity of the system. Add weight or troubleshoot equipment for defects.
Over Angle	The angle of the fork lift has exceeded the angle used to calibrate the system. Decrease angle of the fork lift or troubleshoot equipment for defects.
ADC Reset	The analog to digital converter is not responding and/or is in a reset state. Cycle power, verify A/D board is plugged into main board or replace A/D board.
Dead Display	The unit may be in sleep mode. Press any key to turn the unit on or hold the **CLEAR** key for five seconds then press any key to turn the unit on.
Blank EE	The EEPROM IC is blank. Factory defaults or the backup copy of configuration settings will be used. Replace EEPROM IC which will force a recalibration.
Check EE	The EEPROM IC is not responding. Factory defaults or the backup copy of configuration settings will be used. Replace EEPROM IC which will force a recalibration.
Check Proms	The firmware chips are corrupted and need to be replaced.

Accessing Setup

The User level is not affected by the seal status of the indicator.

There are four levels of WI-130 menus you can access through the front panel:

User level	The first level is the **User** level. These are the most commonly changed values and parameters that you will use in the course of operating the WI-130.
Configuration level	The second level is the **Configuration** level. These items deal with some of the basic functions of the WI-130 and do not need to be accessed very often.
Calibration level	The third level is the **Calibration** level. This section will need to be accessed only when the scale is being calibrated, or if you change scale capacity or division size.
Test level	The fourth level is the test level. Access this to test the function of the keys, inputs, outputs, etc.

A different password is needed to access each level. Once you access the level you want, the display presents a series of soft key choices. By pressing the appropriate soft key and following text prompts on the display, you can set up your WI-130 to suit your needs.

Following are the instructions you need to access the menus of the WI-130.

1. Press and hold the **ESCAPE** key until you hear a second beep. . . The display changes and asks for a password. It looks like Figure 2.

You must key in the password within 5 seconds of accessing the password screen or the WI-130 returns to normal operation.

Figure 2
Password display

IMPORTANT NOTE
The WI-130 can be sealed for legal for trade use and the software protected from change by a hardware connection on the main board. If the system is sealed, programs cannot be downloaded.

On the following pages are the passwords and details for the four menu levels.

User level

The User level is not affected by the seal status of the indicator.

The default User password is 111.

Key in 111 and press **ENTER. . .** the screen in Figure 3 is displayed.

Figure 3
User level soft key group

Figure 4 is a flowchart showing what soft keys or choices appear as you press the soft keys shown in Figure 3.

The values under SELECT in the flowchart to the right are not saved after a power down and power up.

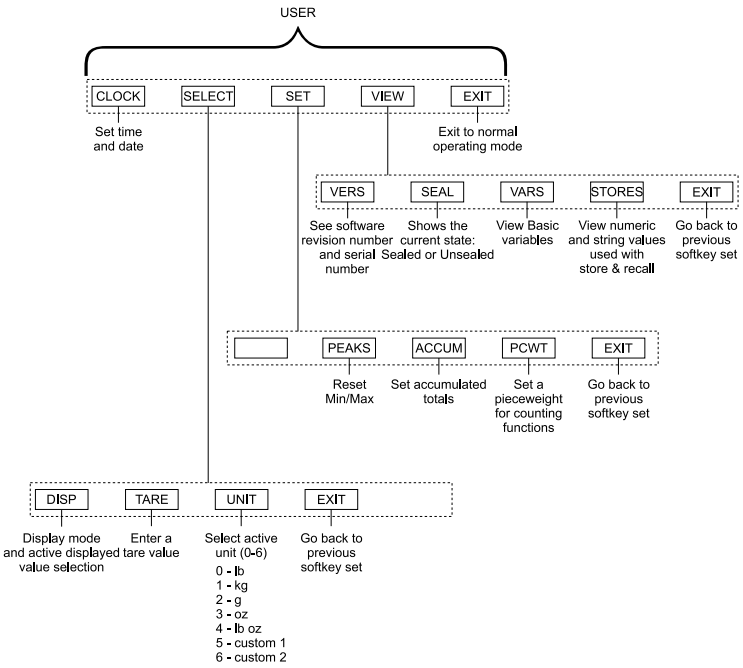


Figure 4
Soft key flowchart for User level

Clock

Press the **CLOCK** soft key to access the time and date setting function.

1. The display shows the current hour value. If this is not correct key in a new value and press **ENTER** or press **ENTER** to accept the current value. . . The display shows the minutes value.

2. Repeat step 1 for minutes, seconds, year, month, day, and day of the week (0=Sunday, 1=Monday, etc.). . . Display returns to display shown in Figure 3.

USER-SELECT Level

While in the this level the display will show USER-SELECT in the top left to remind you of where you are in the USER level.

Press the **SELECT** soft key to access the USER-SELECT soft key group:

- **DISP** Press this key to set the current display mode.
- **TARE** Press this key to enter a known tare weight.
- **UNIT** Press this key to select the active units of measure.
- **EXIT** Press this key to go back to the previous soft key set.

DISP (Display Mode)

Following is a detailed description of the four functions listed above.

If you press the **DISP** soft key, follow these instructions:

The display mode you pick may not be the one that appears on the display. A display mode called out in the WT BASIC program overrides the setting you make through the front panel.

1. The display shows the current display mode number. Press **ENTER** to accept this value or key in a new number from the list in Appendix 1, then press **ENTER** to accept it. — The display asks for the ACTIVE VALUE. This is the active display value.

2. Choose one of the following active display values by keying in 0-13, then press **ENTER**. . . — The display returns to the USER-SELECT screen.

Variable (#11) is a variable value called out in a WT-BASIC program. ADC (#13) stands for Analog to Digital Counts.

0 = Gross	4 = Max	8 = Count Total	12=Piece Weight
1 = Net	5 = Rate of Change	9 = Trans. Total	13=ADC
2 = Tare	6 = Gross Total	10=Count	
3 = Min	7 = Net Total	11=Variable	

TARE

If you press the **TARE** soft key the display will show the current tare value for the active scale. You may key in a new tare weight and press the **ENTER** key to override the previous tare weight.

UNIT

If you press the **UNIT** soft key the display will ask you to key in a number (0-6) which represents the value you want to be active. Below are the seven units to choose from and the corresponding number you need to key in for this function:

0- lb	4- lb oz
1- kg	5- custom 1
2- g	6- custom 2
3- oz	

Press the **EXIT** soft key to return to the USER level soft key group.

USER-SET Level

Press the **SET** soft key to access the USER-SET soft key group shown below:

- **PEAKS** Press this key to reset the Min/Max.
- **ACCUM** Press this key to set the accumulator totals.
- **PCWT** Press this key to set the pieceweight for counting functions.
- **EXIT** Press this key to go back to the previous soft key set.

Following is a detailed description of the four functions listed above.

PEAKS

If you press the **PEAKS** soft key the display asks if you want to reset the MIN and MAX values now in memory. You are given the choice of YES or NO. After choosing, the display returns to the USER-SET level display.

ACCUM

If you press the **ACCUM** soft key, follow these instructions:

1. The display shows you the current GROSS TOTAL in the accumulator. You can change this by keying in a new number and pressing **ENTER** or press **ENTER** to move to the next ACCUM value. . . — The display shows the NET TOTAL value.
2. Repeat step 1 for NET TOTAL, COUNT TOTAL, and TRANS(action) TOTAL. . . — The display returns to the USER-SET screen.

PCWT

If you press the PCWT soft key the display shows the current value for the piece weight. Accept this by pressing the **ENTER** key or key in a new piece weight and press **ENTER**.

Press the **EXIT** key to return to the USER level soft key group.

USER-VIEW Level

Press the **VIEW** soft key to access the USER-VIEW soft key group:

- **VERS** Press this key to see WI-130 firmware revision date and time. Serial number is currently not used. Configuration information is displayed if a program has been downloaded from SimPoser software.
- **SEAL** Press this key to view the SEALED or UNSEALED status of the indicator.
- **VARS** Press this key to view the BASIC variables.
- **STORES** Press this key to view the numeric and string values used with store and recall.
- **EXIT** Press this key to go back to the previous soft key set.

Following is a detailed description of the four functions listed above.

VERS

If you press the **VERS** soft key you will see the firmware version number. Serial number is currently not used. When you press any key, if you have never downloaded a file from SimPoser, you will see only the word CONFIGURATION and no other information. If you have downloaded a file, the following information is displayed:

License # of the SimPoser software.
Name of license holder.
Version number of the SimPoser software.
Name of the downloaded file (application program).
Time and date of the last download.
Indicator serial number.

Press any key again and the USER-VIEW level is displayed.

SEAL

Press the **SEAL** soft key to see the current status of the indicator. It is either sealed or unsealed. Toggle the status by pressing switch S1 beneath the plug on the back of the indicator while viewing this display.

Breaking a sealing wire or decal to access switch S1 will de-certify this product.

VARS

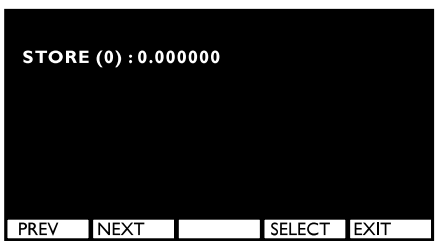
If you press the **VARS** soft key you will be able to scroll through the variables you have in your basic program. Press the **FIRST** soft key to see the first one and the **NEXT** soft key to scroll to the next one. Repeat this until you are through and press the **EXIT** soft key to return to the USER-VIEW level.

If no variables are defined the screen will show **NO VARIABLES DEFINED**.

STORES

If you press the **STORES** soft key, follow these instructions:

1. The display asks if you want to DISPLAY NUMERICS?, and gives you the choice of **YES** or **NO**. If you press **YES** the display will look like this:



There are two types of memory:
• Standard memory
• Expanded memory

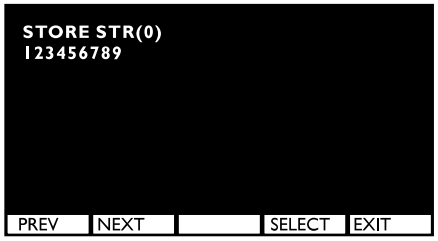
Standard memory has locations 0-8191 for numeric storage and 0-4095 for string storage.

The memory option has locations 8192-16,383 for numeric storage and 4096-8191 for string storage.

If you do not have the memory installed, the location returns a zero.

2. Press **PREV** (previous) to see the previous numeric record. Press **NEXT** to see the next numeric record. Press **SELECT** and the display will let you enter a specific numeric record number. When you press **ENTER** that record number will be displayed.

3. If you press **NO** in step one the following screen is displayed.



4. This screen lets you view all the strings stored in your BASIC program. View them the same way you did the numeric values.

5. Press **EXIT** to return to the USER-VIEW level.

Press **EXIT** to return to the USER level. Press EXIT one more time and you are back to normal operation. You have now seen all the parts of the USER level. The next section of the manual covers front panel configuration.

Configure Level

You must key in the password within 5 seconds of accessing the password screen or the WI-130 returns to normal operation.

The deafult password for the Configure level is 2045.

1. Press and hold the **ESCAPE** key for 3-5 seconds. You will hear a 2nd beep and the display will change. Key in 2045 and press **ENTER**. . . the screen in Figure 5 is displayed.

Figure 5
Configuration level display

Figure 6 is a flowchart showing what soft keys or choices appear as you press the soft keys shown in Figure 5.

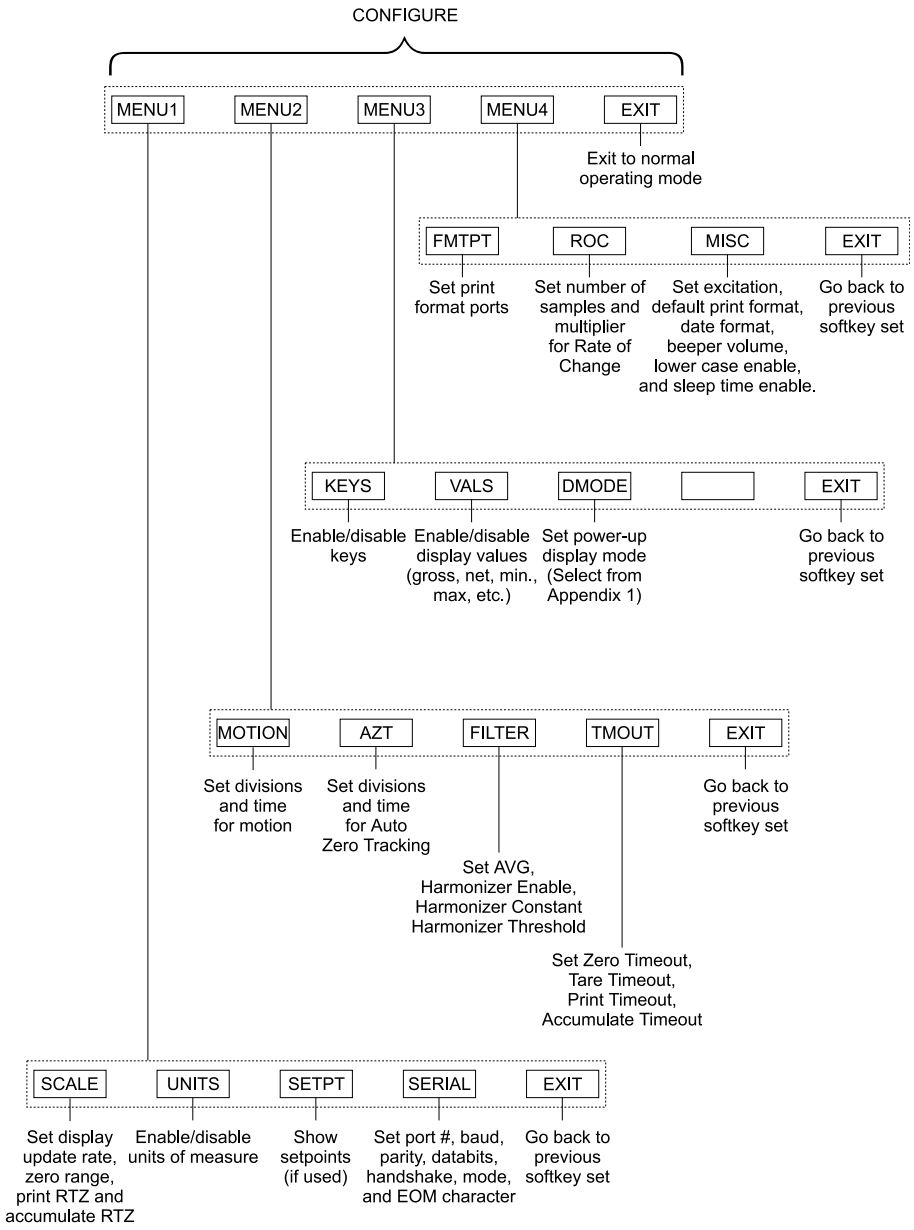


Figure 6
Soft key flowchart for Configure level

CONFIGURE-MENU 1 Level

Press the **MENU1** soft key to access the following soft key group:

- **SCALE** Press this key to set display update rate, zero range, print return to zero, and accumulate return to zero.
- **UNITS** Use this key to enable/disable units of measure.
- **SETPT** Use this key to show setpoints, if used.
- **SERIAL** Use this key to set port #, baud rate, parity, databits, handshake, mode, and EOM character.
- **EXIT** Press this key to go back to the previous soft key set.

Following are detailed instructions for setting these parameters.

SCALE

If you press the **SCALE** soft key, follow these instructions:

Any value for display update rate greater than 2 will be considered as the maximum update rate or 99.

1. The display will show the *current display rate* (.1, .25, .5, 1, 2, 99). Accept this by pressing the **ENTER** key or key in a new value and press the **ENTER** key. . . The display shows the zero range value. If a non-valid number is keyed in the value will default to 99.

2. Repeat step one for *zero range* (0-100% allowed). . . This is the percentage of capacity that you are allowed to zero using the **ZERO** hard key.

By default, when the ***PRINT*** key is pressed, a print operation and an accumulation take place. If you do not want the accumulation to occur, a WT-BASIC program assigning only the DO PRINT command to the ***PRINT*** key needs to be downloaded to the WI-130. A WT-BASIC program can also define an ACCUM. soft key and assign accumulation to that key only.

3. Repeat step one for *print return to zero* (0-100% of cap. allowed). . . If you press the PRINT key, the weight must fall below this percentage of scale capacity before another print operation will be allowed.

4. Repeat step one for *accumulate return to zero* (0-100% allowed). . . If you perform an accumulation, the weight must fall below this percentage of scale capacity before another accumulation operation will be allowed.

UNITS

If you press the **UNITS** soft key, follow these instructions:

Custom unit names must be defined by SimPoser software program.

1. The display asks if you want to enable the LB unit of measure and shows you the current state (ON or OFF). If the condition is as you want it, simply press the **ENTER** key. If you want to change the condition, press the YES or NO soft key, then the **ENTER** key to move to the next unit of measure. . . The kilogram unit of measure is the next one shown.

The custom conversion factor is the number to be multipied by the weight (in calibration units) to get the desired custom unit. Example: 1 lb = 5 inches of a certain steel rod. Custom unit is inches. Calibration unit is lb. Conversion factor is 5. With six lbs of weight on the scale, 30 inches would be displayed.
(Six lbs x 5 = 30 inches of steel)

2. Repeat step 1 for kilograms, grams, ounces, pounds & ounces, and custom units 1 and 2. The display asks for the conversion factor for each custom unit. Key in a value and press **ENTER**. . . The display returns to the CONFIGURE-MENU1 display.

SETPT

Setpoint operations must be defined by the SimPoser software program.

If you press the **SETPT** soft key the display asks you SHOW SETPOINTS? What this means is, if you say yes, the display will show when setpoints turn on and off by lighting small dots in the upper right corner. Press the **YES** soft key if you want to see these dots, and press **NO** if you do not.

SERIAL

If you press the **SERIAL** soft key, follow these instructions:

1. The display prompts you for serial port # to configure. Press **ENTER** if displayed port is OK or key in a new port number and press **ENTER**. . . The baud rate code number is displayed.

2. Press **ENTER** to accept the baud rate or key in a new baud rate code number from the table below and press **ENTER**. . . The parity code number is displayed.

   Baud Rate Codes

0 = 300	4 = 9600
1 = 1200	5 = 19,200
2 = 2400	6 = 38,400
3 = 4800	7 = 56,700

3. Press **ENTER** to accept the parity or key in a new parity code number from the table below and press **ENTER**. . . The databits setting is displayed.

   Setting this parameter to SET will simulate 2 stop bits and no parity detection.

   Parity Codes

0 = NONE	3 = SET
1 = ODD	4 = CLEAR
2 = EVEN	

4. Press **ENTER** to accept the databits setting or key in the new databits value (7 or 8) and press **ENTER**. . . The handshake protocol code number is displayed.

5. Press **ENTER** to accept the handshake protocol setting or key in a new code num ber for the handshake from the table below and press **ENTER**. . . The mode code number is displayed.

   Handshake Protocol Codes

0 = NONE	2 = Xon / Xoff
1 = CTS	3 = BOTH

   CTS is a hardware handshake (ready/busy) which requires two extra wires in your cable.

   Xon/Xoff is a software handshake requiring no additional hardware.

6. Press **ENTER** to accept the mode setting or key in a new code number from the table below and press **ENTER**. . . The EOM (end of message) value is displayed.

   Serial Mode Control Codes

0 = BASIC control	2 = Disabled
1 = Keyboard	3 = Multidrop

BASIC Control - Control of the serial port is through the BASIC program executing in the WI-130.

Keyboard - Control of the serial port is through an attached keyboard.

Disabled - The serial port is not in use for this configuration.

Multidrop - The serial port is configured in RS-485 Multidrop mode.

7. Press **ENTER** to accept the EOM character or key in a new number from 0-255 and press **ENTER**. . . The display returns to the CONFIGURE-MENU1 display.

EOM ASCII code #13 is carriage return.

This completes the instructions for all the parameters of Menu 1.

CONFIGURE-MENU 2 Level

Press the **MENU2** soft key to access the following soft key group:

• **MOTION** Use this key to set the motion detection window size in divisions and the time window in seconds.

For example: If you set divisions to 3 and seconds to 1, if the weight value does not change more than 3 divisions in one second, the scale or weight is considered stable.

• **AZT** Use this key to enable AZT. If you enable AZT you can set the division size and seconds. The division size you pick defines a range above and below zero. When scale weight is inside this range for the number of seconds you picked, ½ of the weight will be zeroed. The indicator will repeat removing ½ the weight every X seconds. X being the number of seconds you have picked.

•**FILTER** Use this key to set up the Harmonizer filtering. A full explanation is given below. See Appendix 2 for tips on using Harmonizer.

The A-D weight conversion happens 60 times per second in the WI-130. AVG is the number of conversions you want to average. For example, if you pick 30, the unit will average the weight values from the last 30 conversions or ½ second and uses that value for displayed data.

In the SimPoser software the Harmonizer constant choices are 0 through 6. This setting is to be made in the "real world" on a working system so there are more levels available from the front panel.

The next choice you have is for turning the Harmonizer filtering on or off. If you turn the Harmonizer filtering on you need to set the Harmonizer Constant. Typical values are between 1-8. Set the number low for small vibration problems and higher for more dampening effect.

The purpose of the Harmonizer Threshold is so the indicator will respond quickly to large weight changes. Harmonizer Threshold is the amount of weight change, in calibration units, beyond which the Harmonizer will be temporarily disabled. For example, if you set this to 10 lbs, a weight change over 10 pounds occuring during the sample time (½ sec. in our example) will disable the Harmonizer until the weight change during the sample time drops below 10 lbs.

- **TMOUT** Use this key to set Zero Timeout, Tare Timeout, Print Timeout and Accumulate Timeout. This is the amount of time the WI-130 will wait for motion to cease and perform the function after the key is pressed.

  For example, if Zero Timeout is set to 3 seconds, when the **ZERO** key is pressed the unit will zero the scale if there is no motion. If there is motion and motion ceases within 3 seconds the unit will zero the scale. If motion doesn't cease the key press is ignored.

- **EXIT** Press this key to go back to the previous soft key set.

Following are detailed instructions for setting these parameters.

MOT'N (motion)

If you press the **MOT'N** soft key, follow these instructions:

1. The current value for the motion window size, in divisions, is shown. Press **ENTER** to accept this value or key in a new value and press **ENTER**. . . — The current time window in seconds is displayed.
2. Press **ENTER** to accept this time period or key in a new value and press **ENTER**. . . — The display returns to the CONFIGURE-MENU2 display.

AZT (auto zero tracking)

If you press the **AZT** soft key, follow these instructions:

1. The current value for the AZT window size, in divisions, is shown. Press **ENTER** to accept this value or key in a new value and press **ENTER**. . . — The current time window in seconds for AZT is displayed.
2. Press **ENTER** to accept this time period or key in a new value and press **ENTER**. . . — The display returns to the CONFIGURE-MENU2 display.

FILTER

If you press the **FILTER** soft key, follow these instructions:

1. The display shows the current value for the number of samples to average. Press **ENTER** to accept this value or key in a new value and press **ENTER**. . . — The display shows the state of the Harmonizer filtering(ON or OFF).
2. Press **YES** to enable Harmonizer or **NO** to disable the Harmonizer parameter, then press **ENTER** . . . — The current Harmonizer Constant value is displayed.

See Appendix 2 for tips on using the Filter.

3. Press **ENTER** to accept this value or key in a new value and press **ENTER**. . . The current Harmonizer Threshold value is displayed. This value is in calibration units.

4. Press **ENTER** to accept this value or key in a new value and press **ENTER**. . . The display returns to the CONFIGURE-MENU2 display.

TMOUT (timeout)

If you press the **TMOUT** soft key, follow these instructions:

1. The current value for Accumulate Timeout is displayed. Press **ENTER** to accept this value or key in a new value and press **ENTER**.

2. Repeat step 1 for Print Timeout, Zero Timeout, and Tare Timeout. . . The display returns to the CONFIGURE-MENU2 display.

Press the **EXIT** soft key to return to the CONFIGURE display.

CONFIGURE- MENU 3 Level

Press the **MENU3** soft key to access the following soft key group:

- **KEYS** Press this key to enable or disable front panel keys.
- **VALS** Press this key to enable or disable the display values (gross, net, min., max., ect.)
- **DMODE** Press this key to pick a power-up display mode from the over 35 available. See *Appendix 1: Display Samples*.
- **EXIT** Press this key to go back to the previous soft key set.

Following are detailed instructions for setting these parameters.

KEYS

If you press the **KEYS** soft key, follow these instructions:

1. The current setting (enabled ON or OFF) for the **SELECT** hard key is displayed. Press **YES** to enable the key or **NO** to disable the key, then press **ENTER** . . The current setting for the **UNITS** hard key is displayed.

2. Repeat step 1 for **UNITS**, **PRINT**, **TARE**, **ZERO**, **AUTOTARE**, and **KEYPAD TARE**. . . The display returns to the CONFIGURE-MENU3 display.

VALS

If you press the **VALS** soft key, follow these instructions.

1. The current setting (enabled ON or OFF) for the **GROSS** display value is displayed. Press **YES** to enable the active value or **NO** to disable this active display value, then press **ENTER** . .

   The current setting for the **NET** active value is displayed.

2. Repeat step 1 for all the display values (NET, TARE, MIN., MAX., ROC, G-TOT, N-TOT, C-TOT, #-TOT, COUNT, VARIABLE, PCWT, and ADC. . .

   The display returns to the CONFIGURE-MENU3 display.

DMODE

If you press the **DMODE** soft key, press **ENTER** to accept the display mode number shown or key in a new number (see *Appendix 1*) and press ENTER.

The display returns to the CONFIGURE-MENU3 display. Press the **EXIT** key to return to the CONFIGURE display.

CONFIGURE-MENU 4 Level

Press the **MENU4** soft key to access the CONFIGURE-MENU 4 soft key set:

- **FMTPT** Press this key and enter the serial port # you want each of 16 print formats to be printed through.

- **ROC** ROC stands for Rate of Change. Press this key to set up your WI-130 Indicator to calculate Rate of Change for flow rate, or weight/time, applications.

  ROC Samples - The number of samples over which the rate of change of weight is determined. The WI-130 converts weight from A to D at 60 times per second. If ROC Samples is set to 60, the WI-130 is determining the rate of weight change over one full second.

  ROC Mult - The ROC Multiplier allows you to enter a conversion factor to translate weight to some other unit of measure, such as gallons or some other weight unit based upon the calibration unit of measure.

ROC Examples:

If pounds is your calibration unit, pick a sample value of 60 and a multiplier of 1. The display will show the rate of change in pounds/second.

For gallons of water/second set the sample value at 60 and the multiplier to 0.125. Water = 8 lbs/gallon (8 lbs is close enough for our example) so their are 0.125 gallons per pound. See formula to the left.

$$\frac{\text{Cal Unit}}{\text{Custom Unit weight in Calibration Units}} = \frac{1}{8} = 0.125$$

To get gallons/minute, do not change the sample size but rather multiply the 0.125 by 60 to get a value equal to gallons/pounds/minute (7.5). The display will then show you a rate of change in gallons per minute. (This is the flow over the last second not over a whole minute's time.)

- **MISC** Press this key to set excitation, default print format, date order, beeper volume, lower case enable (for pre-formatted text only), and sleep timer enable, sleep timer, and sleep timer warning.

- **EXIT** Press this key to go back to the previous soft key set.

Following are detailed instructions for setting these parameters.

FMTPT

The default print format 0 shows gross, tare and net weights. If you choose another print format (1-16) you need to define the format in SimPoser and download it to the WI-130.

If you press the **FMTPT** soft key, follow these instructions:

1. The current serial port number assigned to Format 1 is displayed. Press **ENTER** to accept this serial port or key in a new serial port number and press **ENTER**. . .

   The serial port assignment for Format 2 is displayed.

2. Repeat step 1 for up to 16 print formats and press the **ENTER** key. . .

   The display returns to the CONFIGURE-MENU4 display.

ROC

If you press the **ROC** soft key, follow these instructions:

1. The display shows the current value for SAMPLES. Press **ENTER** to accept the current value or key in a new one and press **ENTER**. . .

   The current multiplier value is displayed.

2. Press **ENTER** to accept the current value or key in a new one and press **ENTER**. . .

   The display returns to the CONFIGURE-MENU4 display.

MISC

If you press the **MISC** soft key, follow these instructions.

1. The display shows current setting for the AC excitation. Press **ENTER** to accept the current setting or key in a new setting from the table below and press **ENTER**. . .

   The display shows the default print format.

   AC Excitation

   0 = DC
   1 = 300 Hz
   2 = 600 Hz
   3 = 1200 Hz

The default print format 0 shows gross, tare and net weights. If you choose another print format (1-16) you need to define the format in SimPoser and download it to the WI-130.

2. Press **ENTER** to accept the current print format as the default for the **PRINT** key or key in a new format (0-16) and press **ENTER**. . .

   The display shows the date preference format.

3. Press **ENTER** to accept the date format or key in a new one from table below and press **ENTER**. . .

   The display shows the beeper volume setting.

   Date Preference Format
   0 = MMDDYY
   1 = DDMMYY

4. Press **ENTER** to accept the current volume level or key in a new level (see table below) and press **ENTER**. . .

   The display shows the current type style selection for screen text.

   Beeper Volume
   0 = OFF
   1 = Low
   2 = Medium
   3 = High

5. Press **ENTER** to accept the current type style selection or key in a new style from the table below and press **ENTER**. . .

   The display shows the current sleep timer setting

   Type Style
   0 = no lowercase
   1 = lowercase

6. Press **NO** to return to the Configure-Menu 4 display. Press **YES** to enable the sleep timer. Press **ENTER** to accept this setting. . .

   The display prompts you to enter a value for the inactivity sleep timer in hours

7. Key in a value in hours and press **ENTER**. . .

   The display asks if you want to enable or disable the Sleep Warning and shows the current status (ON or OFF).

8. Press **NO** to return to the Configure-Menu 4 display. Press **YES** to enable a one minute warning beep prior to shutdown. Press **ENTER** to accept this new setting. . .

   The display returns to the Configure-Menu 4 display.

Press **EXIT** twice to return to normal operation. If you changed the configuration you will be asked if you want to save changes. Press **YES** if you do. **NO**, if not.

Calibrate level

Unsealing the WI-130

You must key in the password within five seconds or the WI-130 returns to normal operation.

The WI-130 must be unsealed before you can attempt calibration. Follow these steps to unseal you indicator:

1. Access the User's menu by pressing and holding the **ESCAPE** key until the display prompts for a password. Key in your user's password (factory default is 111) and press **ENTER**.
2. Press the **VIEW** softkey, then the **SEAL** softkey.
3. Press the SW1 switch behind the access plug on the back of the indicator to toggle the state from Sealed to Unsealed.
4. Press any key to return to the entry level, then press the **EXIT** softkey to return to normal weigh mode.

Entering the Calibration Mode

You may use as little as 1% of full capacity to span the system but Weigh-Tronix recommends a minimum of 25% be used. Using full capacity is ideal.

Enter the calibration mode by pressing and holding the **ESCAPE** key until the display asks for a password. Key in your calibration password (factory default is 30456) and press the **ENTER** key.

The screen in Figure 7 is displayed.

Figure 7
Calibrate level display

Figure 8 is a flowchart showing what soft keys or choices appear as you press the soft keys shown in Figure 7.

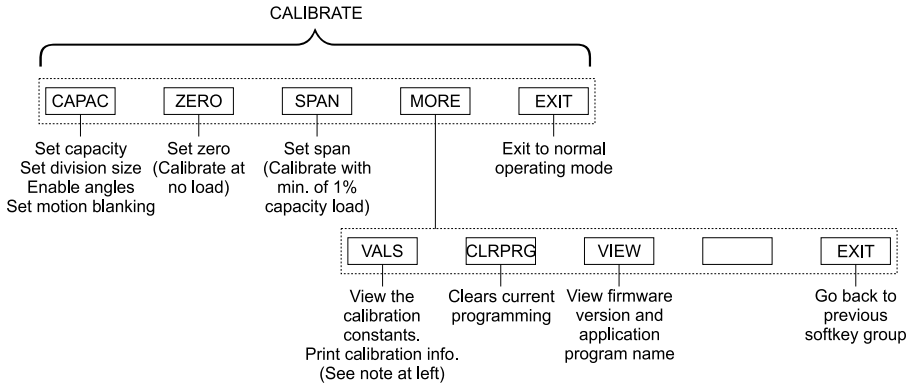


Figure 8
Soft key flowchart for Calibrate level

*Under **VALS** you will be prompted to **PRESS ANY KEY** two times. The second time this is displayed press the **PRINT** key if you want to output the 16 point calibration information through COMM 2.*

If you enable ANGLES under the **CAPAC** (F1) softkey you can perform the *Legal for Trade Calibration Procedure* below. If you do not enable ANGLES, use the *Non-Legal for Trade Calibration Procedure*.

Legal for Trade Calibration Procedure

Any reference to Right or Left is done from the driver's point of view.

1. Place all deadload objects (pallets, chains, etc.) on the forks.

2. Press the **ZERO** key. . .

   Display will ask you to remove all weight (not your deadload) and press **ENTER**. The display will show zero.

3. Press any key.

4. With Angles enabled, if you press the **SPAN** (F3) soft key, the display asks if you want to perform span or angle calibration. Press the **SPAN** (F1) or **ANGLE** (F5) soft key to choose which you want to calibrate. Steps 2-5 are for SPAN calibration and steps 9-18 are for ANGLE calibration.

5. If you press **SPAN**, you will be allowed to adjust the overall span of the WI-130. This operation should only be performed if the error following installation is uniform over all angles and is linear through the applied test weights. . .

   The current span calibration weight is displayed.

6. Press **ENTER** to accept this weight or key in a new one and press **ENTER**. . .

   The display prompts you to apply the test weight load to the scale.

7. Apply the test weight load to the scale and press **ENTER**. . .

   The indicator determines the span and tells you when it is done. Above the text, the display should show you the correct test weight. If not perform the span again.

8. Press any key to return to the CALIBRATE display.

9. If you press **ANGLE**, the following is displayed. . .

The first line of text tells you which point you are acquiring data for. In this case it is NO WEIGHT LEVEL, which means there is no weight on the forks and they are level.

The second lines shows the current SCL (scale) raw counts, P (pitch) raw counts, and R (roll) raw counts. The third line shows the acquired values from the last calibration procedure. ACT, on the third line is the actual weight being used for this part of the calibration. It automatically starts at 0 weight.

Soft keys

ACQUI (F1) Stands for acquire. Press this to take sample calibration points at different weights and angles. There are 16 points to sample in angle calibration.

NEXT (F2) Press this key to move to the next sample point.

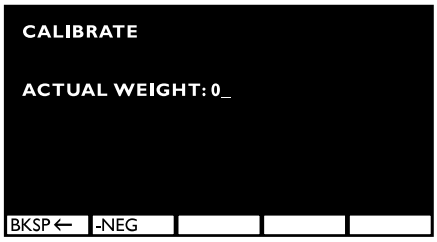
PREV (F3) Press this key to move to the previous sample point.

KEYIN (F4) Reference the *Non-Legal 16-point Calibration Transfer* section of this manual.

DONE (F5) Press this key when you are done sampling all 16 points.

10. With no weight on the scale and the forks level, press the **ACQUI** (F1) softkey. . .

The following is displayed:



11. Key in the actual weight you are using for this part of the calibration. Zero weight is already displayed so press **ENTER** to accept. . .

The screen shown in step 9 is displayed except that the values in the third line now reflect the newly acquired values.

12. Press **NEXT** (F2) to go to the next calibration point. . .

POINT: 2 NO WEIGHT ROLL LEFT is displayed. See Table 1 below and *Appendix 4* for tips on tipping your lifttruck.

Table 1
Inch Equivalent of Five Degrees

If your lift truck width is:	Five degrees is:
48 inches	4.2 inches
42 inches	3.7 inches
36 inches	3.2 inches
30 inches	2.6 inches
24 inches	2.1 inches

Here is a list of all 16 calibration points in the order they appear:

NO WEIGHT LEVEL
NO WEIGHT ROLL LEFT
NO WEIGH ROLL RIGHT
NO WEIGHT PITCH FWD
NO WEIGHT PITCH BACK
HALF WT. LEVEL
HALF WT. ROLL LEFT
HALF WT. ROLL RIGHT
HALF WEIGHT PITCH FWD
HALF WEIGHT PITCH BACK
FULL WT. LEVEL
FULL WT. ROLL LEFT
FULL WT. ROLL RIGHT
FULL WT. PITCH FWD
FULL WT. PITCH BACK
HALF WT. LEVEL

13. With no weight on the scale and the lifttruck tilted to the left approximately 5 degrees press the **ACQUI** (F1) softkey. . .

    You will see the same display shown in step 10.

14. Repeat steps 11-13 while rolling or pitching the lifttruck as directed by the display.

15. When you have completed all the NO WEIGHT calibration points, the display asks for the HALF WT. LEVEL point. (See the list at left to see all the calibration points.) Use one half of the weight you want to use at full span.

    For example, if you want to use 4000 lbs as your upper span test weight, use 2000 lbs for this part of the calibration.

    Perform all five half weight calibration points. . .

    The display asks for the FULL WT. LEVEL point.

16. Perform all five full weight calibration points using your full 4000 lbs (in this example).

17. The indicator asks for one more calibration point—HALF WT. LEVEL. Acquire this last point then press the **DONE** (F5) key. . .

    The display will ask if you are done. If you press **YES**, the display will ask if you want to PERFORM FIT? If you want to have the indicator fit these new calibration points to a new calibration setup, press **YES**. If you press **YES**, the display will eventually show the current weight on the scale and ask you to press any key to continue.

18. Press any key. . .

    Display returns to the CALIBRATE screen.

Non-Legal for Trade Calibration Procedure

1. Press the **ZERO** (F2) softkey. . .	The display asks you to remove all weight from the scale then press **ENTER**.
2. Remove all weight from the scale and press the **ENTER** key. . .	After the indicator has calibrated the zero point, the display says DONE.
3. Press **ENTER** . . .	The display returns to the CALIBRATE display.
4. Press the **SPAN** (F3) soft key.	
5. Key in the amount of weight you will use for calibration and press **ENTER**. . .	The display prompts you to apply the test weight load to the scale.
6. Apply the test weight load to the scale and press **ENTER**. . .	The indicator determines the span and tells you when it is done. Above the text, the display should show you the correct test weight. If not perform the span again.
7. Press any key to return to the CALIBRATE display.	

When you make changes to the calibration of your system and press **EXIT** (F5) to leave the calibration setup, the display will always ask if you want to save the changes you have made. Press **YES** to save the changes and press **NO** to leave calibration without saving the changes you have made.

Non-Legal 16-Point Calibration Transfer

To use this calibration procedure you must have a printout of the 16 point calibration in hand. See the note on page 19 for obtaining this printout.

1. With Angles enabled, press the **SPAN** softkey, the **ANGLE** softkey then the **KEYIN** softkey. . .	The display prompts you to enter the scale counts, pitch counts, roll counts and actual weight. All of these can be found on the printout.
2. Key in the requested information.	
3. Repeat step 2 for all 16 points.	
4. Press the **DONE** (F5) key. . .	The display will ask if you are done. If you press **YES**, the display will ask if you want to PERFORM FIT? If you want to have the indicator fit these new calibration points to a new calibration setup, press **YES**. If you press **YES**, the display will eventually show the current weight on the scale and ask you to press any key to continue. The display returns to the CALIBRATE screen.

Any changes to the carriage invalidates this procedure.

Corner Balancing the Weigh Bars

Caution

DO NOT ADJUST THE PITCH AND ROLL POTS! These are factory set and should be left alone.

Calibration of the QTLTSC system consists of two processes; cornering and calibration of the system. Cornering makes the Weigh Bars work together and is usually not required unless you replace a Weigh Bar or junction box. Calibration of the system was covered in the previous pages of this manual. This section covers cornering the Weigh Bars.

Below are instructions for calibrating the J-box shown in Figure 9. To access the junction box, remove the protective plate in the center of the scale. Remove the sealing wire and the two screws fastening the access cover.

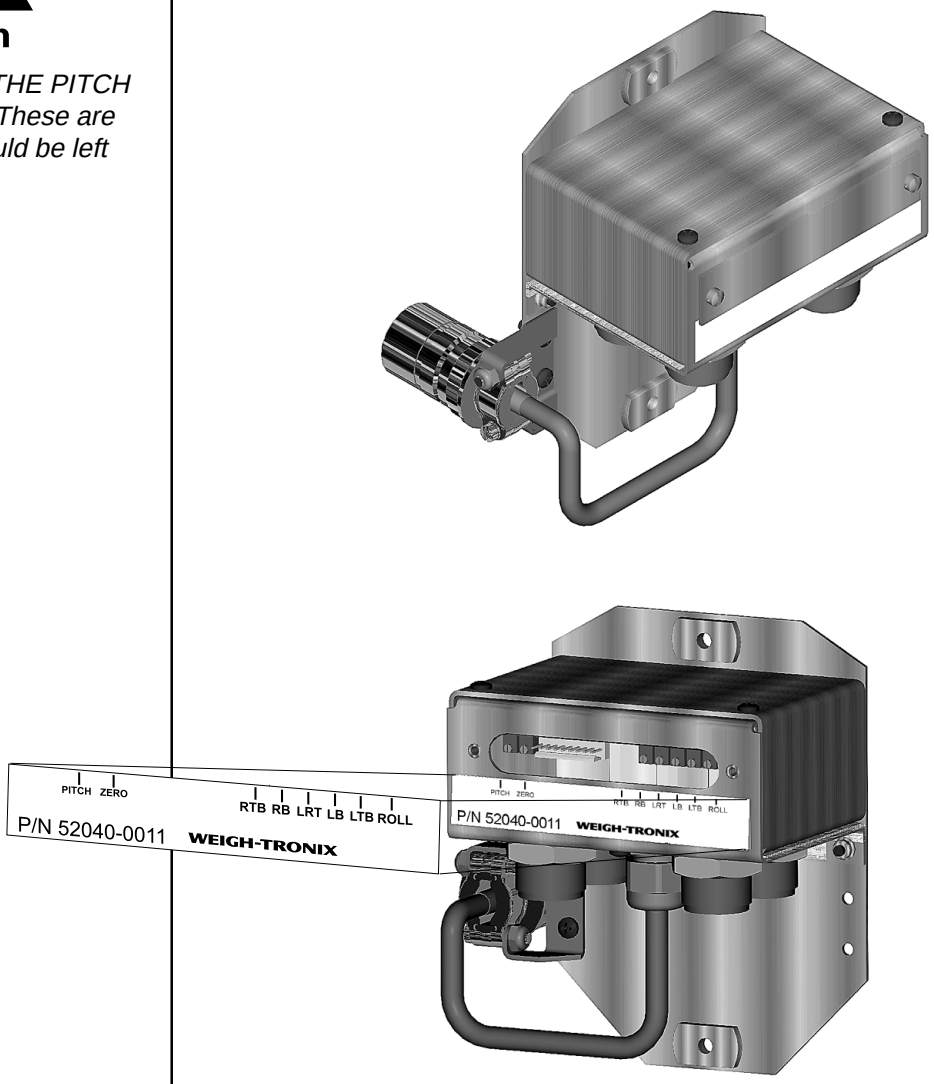


Figure 9
J-box

Trim Potentiometer Adjustment

The right fork and left forks are those that are on the right and left ***when you are sitting in the lift truck seat****.*

Letters (LRT, RTB, etc.) refer to the potentiometer labels on the J-Box.

0.15% of 1000 lbs = 1.5 pounds
0.15% of 2000 lbs = 3 pounds
0.15% of 3000 lbs = 4.5 pounds
0.15% of 4000 lbs = 6 pounds
0.15% of 5000 lbs = 7.5 pounds

0.05% of 1000 lbs = 0.5 pounds
0.05% of 2000 lbs = 1 pound
0.05% of 3000 lbs = 1.5 pounds
0.05% of 4000 lbs = 2 pounds
0.05% of 5000 lbs = 2.5 pounds

A zero shift will occur whenever any of the potentiometers are adjusted. Remove all weight from the forks and zero the indicator after making any adjustments.

Prior to beginning any adjustments, obtain a 42", square, heavy duty pallet that will support the weights you will be using during the calibration process. To exercise the system, it is recommended that you place the pallet and weights on the lift truck and drive it around. Once you start this procedure, do not move the lift truck to another location until the procedure is completed.

1. Set the WI-130 indicator to read in one pound divisions.
2. Set the forks directly over the Weigh Bars™. Place the cornering weight (recommend 50% of capacity) on each of the four corners of the pallet one at a time and record the weight of each location.
3. Starting with the fork that has the largest difference between front and rear weight readings, adjust the trim balance (RTB for right trim balance and LTB for the left trim balance) to reduce the difference to less than 0.15% of the cornering weight you are using. See *Guidelines for Adjusting the Trim Potentiometers* below to determine which way to turn the potentiometer.
4. Switch to the other fork. Adjust the trim balance for that fork to reduce the difference between front and rear weight readings to less than 0.15% of the cornering weight you are using.
5. Place the cornering weight on the center of each fork and record the weight. Adjust the left-right balance (LRT) until the difference between these readings is less than 0.15% of the cornering weight you are using.
6. Repeat steps 3 through 5, but reduce the allowable difference to 0.05% of the cornering weight you are using.

Guidelines for Adjusting the Trim Potentiometers

(refer to Figure 7 for potentiometer location)

- The right trim balance (RTB) reduces the difference in weight readings on the right fork. For example, if the weight reading on the end of the right fork is less than the reading at the base of the right fork, slightly turn the RTB clockwise.
- The left trim balance (LTB) reduces the difference in weight readings on the left fork. For example, if the weight reading on the end of the left fork is less than the reading at the base of the left fork, slightly turn the LTB clockwise.
- The left-right trim (LRT) reduces the difference in weight readings between the left and right forks. For example, if the weight reading of the left fork is less than the reading of the right fork, turn the LRT clockwise.

Balance Potentiometer Adjustment

The following directions will enable you to adjust the scale so that it is insensitive to changes in fork position.

1. Place the cornering weight (recommend 50% of capacity) on the center of the right fork and record the weight. Move the right fork in six inches. Once again, place the weight on the center of the right fork and record the weight. Move the right fork out six inches so that it is in its original position.

The right fork and left forks are those that are on the right and left ***when you are sitting in the lift truck seat.***

2. Place the cornering weight on the center of the left fork and record the weight. Move the left fork in six inches. Once again, place the weight on the center of the left fork and record the weight. Move the left fork out six inches to its original position.

3. Starting with the fork that has the largest difference in weight readings between the two positions, adjust the balance potentiometer (RB or LB) to reduce the difference to less than 0.15% of the cornering weight you are using. See *Guidelines for Adjusting the Balance Potentiometers* below to determine which way to turn the potentiometer.

0.15% of 1000 lbs = 1.5 pounds
0.15% of 2000 lbs = 3 pounds
0.15% of 3000 lbs = 4.5 pounds
0.15% of 4000 lbs = 6 pounds
0.15% of 5000 lbs = 7.5 pounds

0.05% of 1000 lbs = 0.5 pounds
0.05% of 2000 lbs = 1 pound
0.05% of 3000 lbs = 1.5 pounds
0.05% of 4000 lbs = 2 pounds
0.05% of 5000 lbs = 2.5 pounds

4. Switch to the other fork. Adjust the balance potentiometer (RB or LB) to reduce the difference between the two readings to less than three pounds.

5. Repeat steps three and four, but reduce the allowable difference to 0.05% of the cornering weight you are using.

6. Adjusting the balance potentiometers may cause errors in the cornering. You can correct these errors by repeating the steps listed under *Guidelines for Adjusting the Trim Potentiometers*. If large adjustments are necessary, the balance potentiometers may need to be readjusted by following the steps under *Balance Potentiometer Adjustment.*

A zero shift will occur whenever any of the potentiometers are adjusted. Remove all weight from the forks and zero the indicator after making any adjustments.

Guidelines for Adjusting the Balance Potentiometers

(refer to Figure 7 for potentiometer location)

- The right balance potentiometer (RB) reduces the weight reading difference between the two positions of the right fork. For example, if the weight reading when the right fork is moved in six inches is less than the reading when the fork is directly over the Weigh Bars™, turn the right balance potentiometer (RB) clockwise.

- The left balance potentiometer (LB) reduces the weight reading difference between the two positions of the left fork. For example, if the weight reading when the left fork is moved in six inches is less than the reading when the fork is directly over the Weigh Bars™, turn the left balance potentiometer (LB) counterclockwise.

This concludes the calibration section of the manual.

Test level

The deafult password for the Test level is 911.

Press and hold the **ESCAPE** key for 3-5 seconds. You will hear a 2nd beep and the display will change. Key in 911 and press **ENTER**. The screen in Figure 10 is displayed.

Figure 10
Test level display

Figure 11 shows a flowchart for this menu.

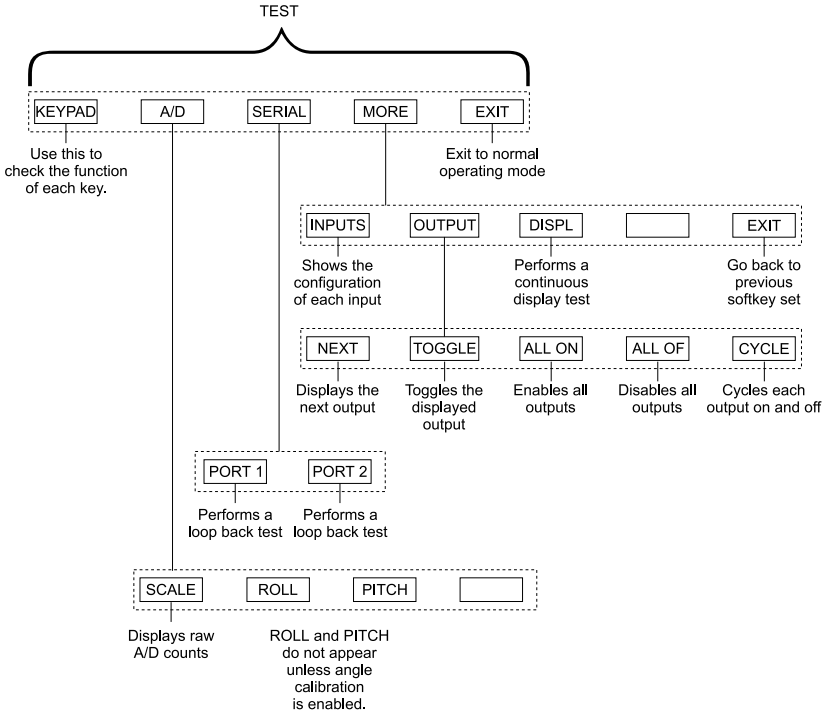


Figure 11
Test menu

The following softkeys are displayed:

KEYPAD Press this softkey to start a key test. Press any key and the name of that key will be displayed to show that it is working properly. Press the **ESCAPE** key to stop the test.

A/D Press this softkey to see the raw A/D counts of the scale or the pitch and roll angle sensors (if enabled). For the scale the screen will show the raw A/D counts and the mV/V value. While in this screen you can press the **ZERO** key to zero the raw counts value. Press any key to return to the previous softkey set.

SERIAL Press this softkey to test the serial ports.

To test port 1, press the PORT 1 softkey. Jumper the TX line and RX line (pins 2 & 3) and the RTS and CTS lines (pins 7 & 8) for loop and busy tests.

To test port 2, press the PORT 2 softkey. To test the A section of the port, jumper the TX of port 2 to the RX of the wand port. To test the B section, jumper the TX and RX pins of port 2.

MORE Press this softkey to see the following new softkeys:

- **INPUTS** Press this softkey to see the list of configured inputs (1-32 possible). If the input is activated there is an arrow next to the input number. There is no arrow if the input is deactivated.
- **OUTPUTS** Press this softkey to see the status of any outputs enabled in the programming. Softkeys allow you to advance to the next output, toggle the displayed output on and off, turn all the outputs on, turn all the outputs off, and to sequentially cycle each output on and off. Press the **ESCAPE** key to exit this screen.
- **DISP** Press this softkey to perform a continuous display test. Press any key to stop the test.
- **EXIT** Press this softkey to return to the previous softkey set.

EXIT Press this softkey to return to the previous softkey set.

Disassembly and Reassembly of the WI-130

Disassembly

Follow the instructions in this section to disassamble the WI-130.

1. Disconnect the WI-130 from the power source.
2. Remove the back of the WI-130 by removing the fourteen acorn nuts and pulling the back cover from the case. See Figure 12.

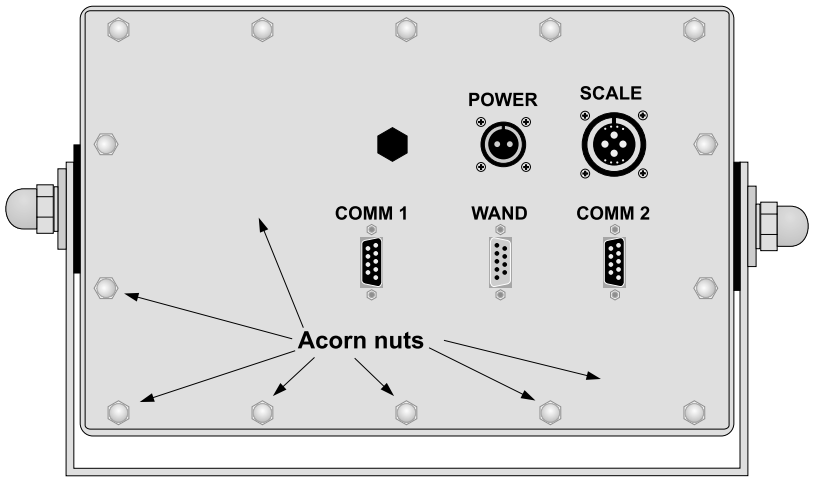


Figure 12
Back view of the WI-30

3. If you need to remove the power supply board from the inside of the back cover, begin by disconnecting the power supply wires and the wires leading to the main board. Remove the screws holding the pc board shown in Figure 13.

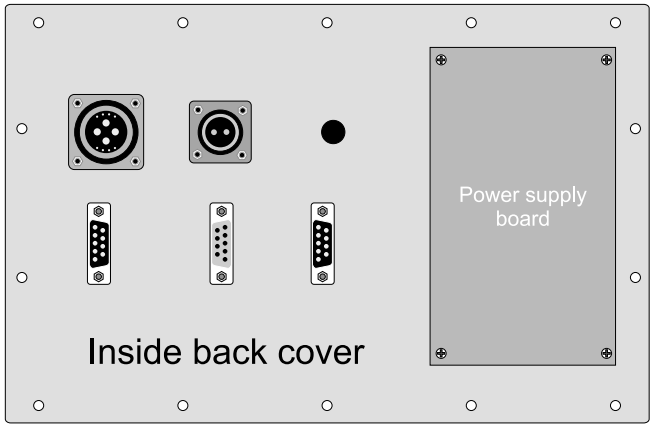


Figure 13
Power supply board

4. If you need to remove the main board, disconnect the ribbon cable from the main board. Refer to Figure 14. Remove the hold down screws on the angle sensor board. Remove the stand offs and screws holding the main PC board and pull it out.

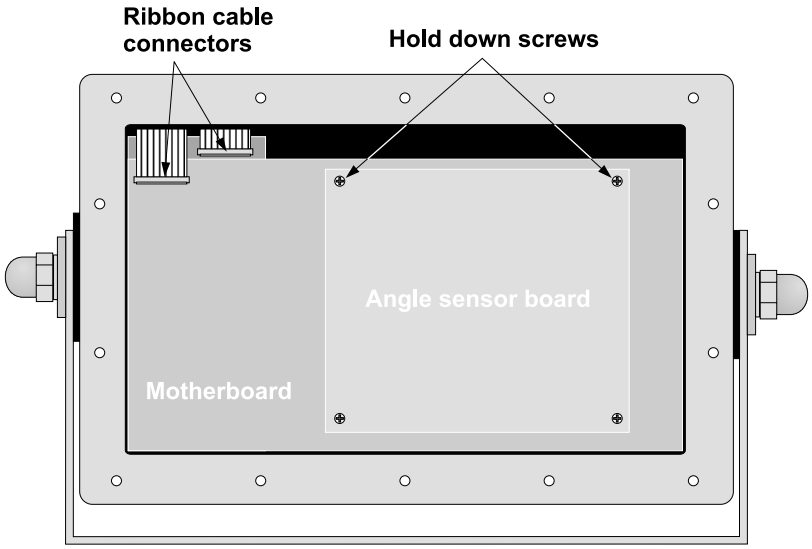


Figure 14
Main board

5. The display and display driver boards are underneath the motherboard. See Figure 15. If you need to remove the display driver board or display, remove the hold down screws.

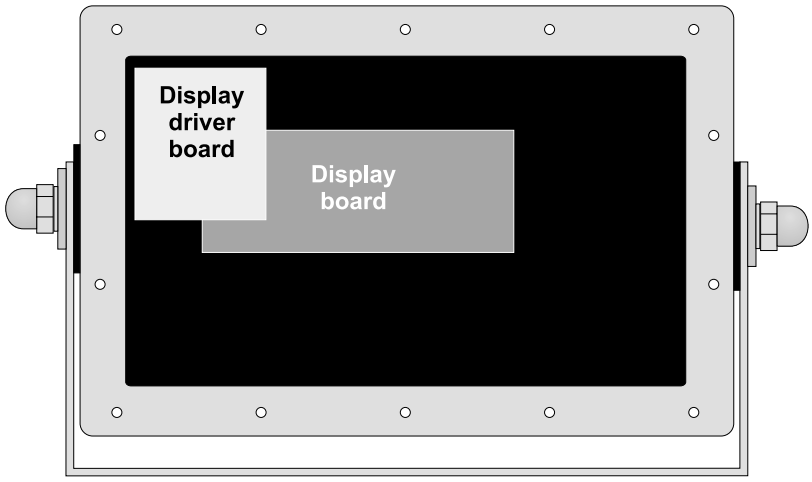


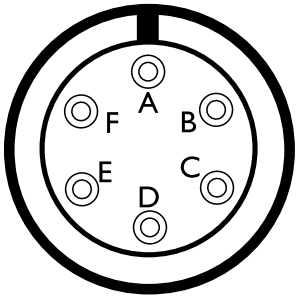
Figure 15
Display and display driver boards

Re-assembly

Replace any of the boards if needed and re-assemble the unit by reversing the disassembly procedure.

Resistance Test of QTLTSC Weigh Bars

Perform these resistance checks to test the legal for trade lift truck scale Weigh Bars. With the meter set on the appropriate ohms scale, check for the following values between the color coded wires on the section of the cord connected to the Weigh Bar or the corresponding pin out for the connectr. See Figure 13.



Pin A - Red wire, Pin B - Green wire, Pin C - White wire,
Pin D - Black wire, Pin E - Blue wire, Pin F - Shield wire

Figure 13
Six pin male connector

The electrical connections of the QTLTSC Weigh Bar with a six pin male connector, shown above, can be verified by measuring the resistances listed below:

Pins	Wires	Reading	Tolerance ±5%
B to D	Green to Black	_____	1032 ohms
B to C	Green to White	_____	780 ohms
B to A	Green to Red	_____	780 ohms
B to E	Green to Blue	_____	1363 ohms
E to C	Blue to White	_____	1060 ohms
E to A	Blue to Red	_____	1060 ohms
E to D	Blue to Black	_____	364 ohms
C to A	White to Red	_____	954 ohms
D to A	Black to Red	_____	729 ohms
D to C	Black to White	_____	729 ohms

All pins or wires to the metal of the Weigh Bar should greater than 20.0 megaohms.

Replacing a Weigh Bar

Tools needed

- Minimum 12 inch/pounds torque wrench
- Minimum 65 foot/pounds torque wrench
- $^{5}/_{32}$ hex Allen
- $^{3}/_{8}$ hex Allen
- 6 transducer bolts, part # 17704-5929
- $^{17}/_{16}$ socket
- ¾" socket
- ^{1} $/_{2}$"socket
- (2) $^{3}/_{32}$" cable ties
- side cutters
- another person--this disassembly and reassembly procedure is a two person task

Disassembly

1. Remove forks.
2. Raise lift truck carriage and remove mounting hooks from bottom of QuickTach carriage.
3. Remove junction box shield.
4. Disconnect cables from junction box.
5. Place a pallet under carriage and lower the carriage until it is resting loosely on the pallet.
6. Tilt the carriage off and lay flat.
7. Remove the six bolts from the cable shield.
8. Loosen set screws according to the instructions on the next page.
9. Remove set screws.
10. Remove front carriage from rear carriage, being careful not to damage the transducer cables.
11. Remove the cable tie securing the cables to the cable shield.
12. Tilt the front carriage up and remove the transducer bolts and the transducer.

Reassembly

To reassemble, reverse the steps listed above and pay close attention to the following notes:

1. Make sure the transducer cables are positioned correctly behind the cable guard. See the illustration under Scale Carriage Assembly in the back of this manual. Also make sure the cables are secured and not pinched.
2. You must replace the transducer bolts with new ones during reassembly. The part number is 17704-5929.
3. When tightening the tansducer bolts, they must be torqued at 65 foot pounds in a star pattern starting with the top and bottom bolts.

Loosening Procedure

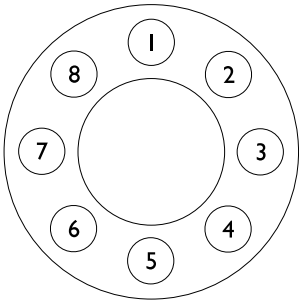


Figure 16
Circular Pattern

Set screws should be loosened with care. Loosening can be accomplished quickly, but do not rush to completely loosen individual set screws. Remember that the intent is to slowly release the preload force. All set screws should be loosened uniformly and usually there is no need to remove any set screw from the tensioner body during loosening.

1, Turn the first set screw counterclockwise until it feels loose (no more than half a turn). The idea is just to unload each set screw, not to completely loosen it.

2. Move in a circular pattern to the next set screw (see Figure 16) and repeat step 1.

3. Continue repeating until all set screws have been unloaded.

4. By the time you get back to the first set screw, it will be tight again. Repeat the process, moving in a circular pattern.

5. Usually, after two or three passes, the tensioner can be spun off the bolt or stud by hand.

6. Before reusing any tensioner, the set screws should be removed in the appropriate manner, the body and set screws cleaned and relubricated with approved lubricant to insure proper set screw torque vs. preload performance on installation.

Tightening Procedure

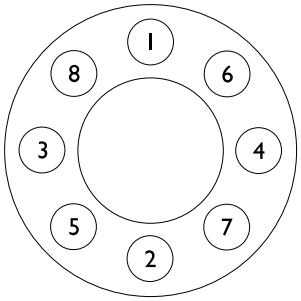


Figure17
Star Pattern

To ensure proper torque, new set screws must be used. Do not reuse old set screws. Attempt to tighten as consistently as possible. Do not tighten all at once. Use a standard torque wrench to verify final torque values.

1. This product is designed for use with hardened surface washers. Slide the washer onto the bolt or stud first.

2. Check the base of the tensioner(s) and verify that all set screws are flush with the bottom of the tensioner body.

3. Clear any dirt or chips from the threads of the bolt or stud and from the main internal thread of the tensioner.

4. Spin the tensioner body down on the main thread of the bolt or stud by hand. The tensioner body should be in light contact with the hardened washer.

5. Tighten the set screws in the star pattern shown in Figure 17 to 15 in/lbs or so that they are all hand tight against the washer.

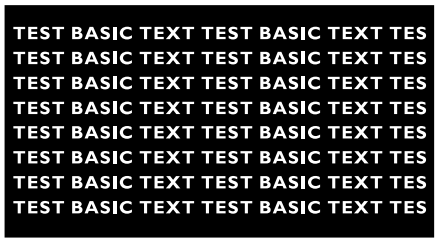
6. Tighten the set screws in the same star pattern to 72 in/lbs (6 ft/lbs).

7. Tighten the set screws in the circular pattern shown in Figure 10 to 108 in/lbs (9 ft/lbs).

8. Tighten the set screws in the same circular pattern to 144 in/lbs (12 ft/lbs).

9. Set the torque wrench for the final torque value and continue to repeat the circular pattern until all the set screws are torqued to the same value. Do not exceed the torque value stamped on the tensioner.

Appendix 1: Display Samples



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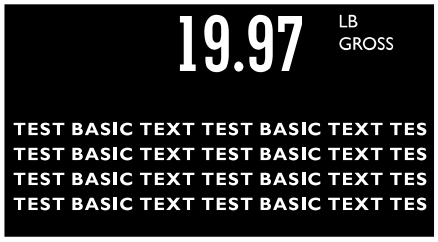

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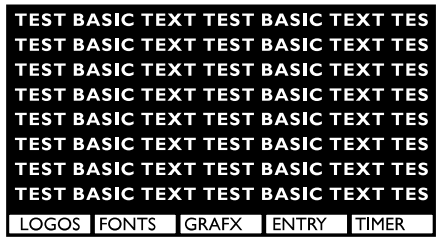
#10



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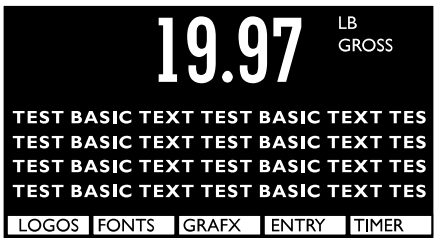

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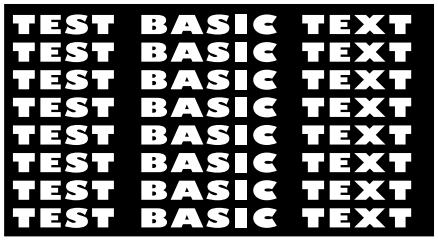

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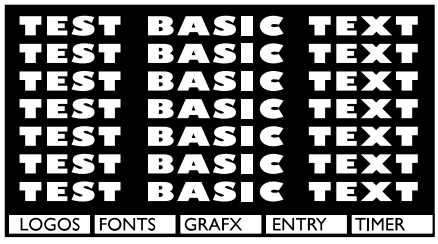

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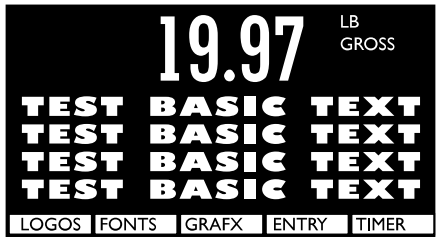


#31

Appendix 2: Tips on Using Harmonizer

To find the best settings for your filter needs, follow the steps listed below.

1. **What to Do:** Determine the amount of positive and negative force exerted by the vibration on the scale.

   How to Do It: Set Threshld to 0.0, Constant to OFF, and Samples to Average to 1.0 A-Ds. Return to weigh mode and observe the weight swings. Record the difference between the highest and lowest displayed weight values. Add 30 to 50% to this value. This is a good starting value for the Threshld setting. Do not set your indicator to this value until told to in step 7.

2. Setting the Average to higher values increases the filtering effect.

   What to Do: Set Threshld to 0.0, Constant to OFF and Samples to Average to 15.0 A-Ds. Check the stability of the scale.

   How to Do It: Save changes and exit to normal weight mode. Observe the Center of Zero light. If it is on all the time your scale is stable within ¼ division. If the Center of Zero light blinks more filtering is required. Go to step 3.

3. Repeat step 2 but increase the Samples to Average by 15.0 A-Ds. Keep repeating steps 2 and 3 until the scale is stable or you've tried the entire range of Samples to Average (60 A-Ds). If the scale is still not stable go to step 4.

4. Setting the Constant to higher values increases the filtering effect.

   What to Do: Set Threshld to 0.0, Constant to 1.0 and Samples to Average to 60 A-Ds. Check the stability of the scale.

   How to Do It: Save changes and exit to normal weight mode. Observe the Center of Zero light. If it is on all the time your scale is stable within ¼ division. If the Center of Zero light blinks more filtering is required. Go to step 5.

5. Repeat step 4 but increase the Constant by 1.0. Keep repeating steps 4 and 5 until the scale is stable or you've tried the entire range of Constant (10). If the scale is still not stable, decrease your display update rate and start over at step 1 using the new, slower display rate.

6. After the Constant value is established you may wish to lower the Samples to Average value to improve display response time.

7. After a final value for Constant and Samples to Average has been set, enter the Threshld value established in step 1. If this value is too small your scale will act as if the filtering is off or not working. Increase the Threshld value until your scale stabilizes.

   If the Threshld value is too high your scale will react slowly to weight changes.

   When Harmonizer is properly adjusted the scale will be stable at zero and will rapidly display a stable test weight value.

Appendix 3: Factory Defaults

Configuration for Scale #1

Scale Type: Analog
Capacity: 5000
Divisions: 5
Update Rate: Max

Units of Measure

Units selected: lb, kg
Calibration unit: lb

Key Enable Controls

Select: Off
Unit: On
Print: On
Tare: Off
Zero: On
PB Tare: Off
KB Tare: Off

Active Display Values/Modes

Gross Wt: On
Net Wt: On
Tare Wt: On
Min Wt: Off
Max Wt: Off
ROC: Off
Gross Tot: Off
Net Tot: Off
Count Tot: Off
Trans Tot: Off
Count: Off
Variable: Off
Piece Wt: Off

Time Out Parameters

Accumulate: 0
Print: 0
Zero: 0
Tare: 0

Motion Detection

Motion Enabled: Divisions - 3
Seconds - 1

Zero Tracking

Zero Tracking Enabled: Divisions - 3
Seconds - 1

Instrument Filtering

Averaging: 30
Harmonizer: Off
Constant: 0
Threshold: 0

Rate of Change

ROC Sample: 0
ROC Multiplier: 0

Serial Ports

Serial Port #1

Baud: 9600
Parity: none
Data Bits: 8
Handshake: None
Mode: BASIC Control
Message: 13

Serial Port #2

Baud: 9600
Parity: none
Data Bits: 8
Handshake: None
Mode: BASIC Control
Message: 13

Miscellaneous Settings

Date Preference: MM/DD/YY
AC Excitation: 300
Deault Print Format: 1
Beeper Volume: High
Lock Program Retrieval: Off
Enable Small Font Lower Case: Off
Enable Decimal Point Display Mode Cycle: Off
Setup Password: 111
Configure Password: 2045
Calibrate Password: 30456
Sleep: Timer on, 240 minutes, warning on

Counting Scale Settings

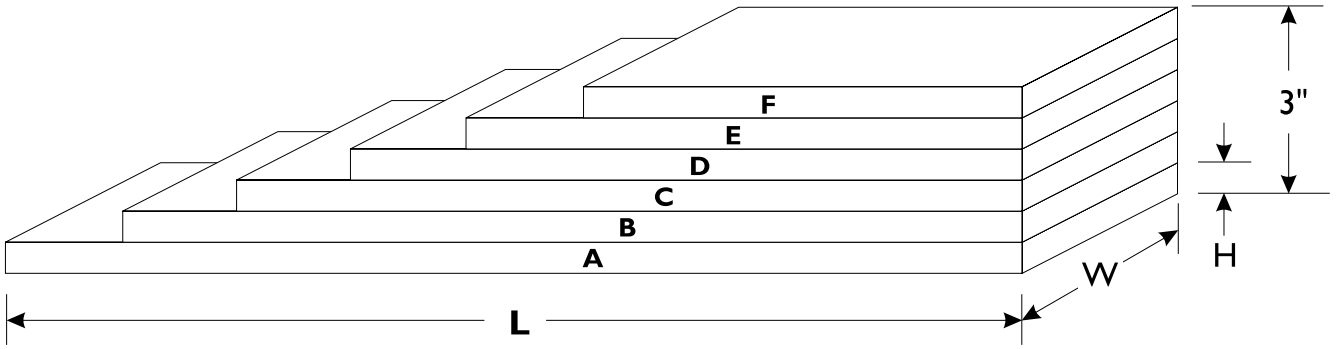
Divisions: 3
Seconds: 1

Print Format Destination Ports

Port 1: Formats 1, 6, 7, 8, 9, 10, 11, 12
Port 2: Formats 2, 3, 4, 5, 13, 14, 15, 16

Appendix 4: Making a Ramp for Tilting the Lift Truck

1. **With plywood, build two ramps, following the diagram below.**
2. **Nail them together.**

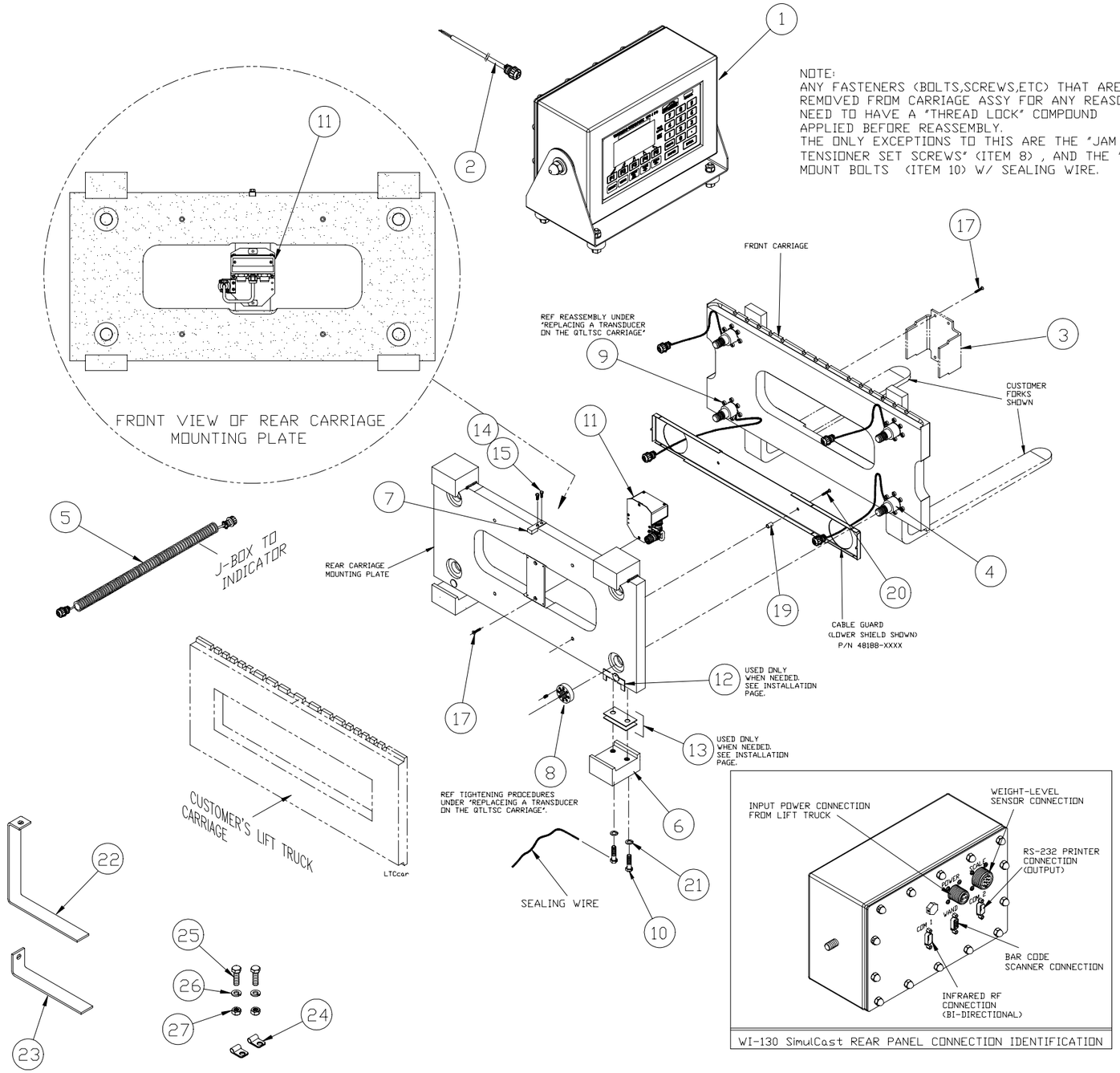


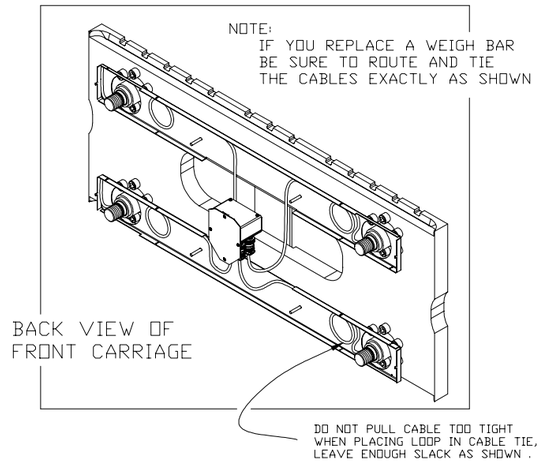
Board	H (in inches)	W (in inches)	L (in inches)
A	0.5	8	24"
B	0.5	8	22"
C	0.5	8	20"
D	0.5	8	18"
E	0.5	8	16"
F	0.5	8	14"

CERTIFIED LIFT TRUCK SCALE W/ SimulCast™

5,000 lb CLASS II SCALE CARRIAGE PARTS *AND* ASSY.

CARRIAGE ASSEMBLY P/N 50846-00XX





ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	Wi-130 SimulCast Indicator Assy	51285-0025	1
2	DC Pwr Cable *(12' Long)*	19266-0124	1
3	J-BOX Shield	52529-0011	1
4	Weigh Bar Assy	48304-0010	4
5	Retractable InterfaceCable (18'-20' stretched)	48432-0023	1
6	Mounting Hook	19967-0019	2
7	Carriage Centering Pin	19968-0018	1
8	Jam Nut Tensioner *Assy*	46687-0011	4
9	Bolt, Soc, 7/16" x 1 1/2" Long	17704-5929	24
10	Hook Mount Bolt, ½" x 1 ½" L	49889-0011	4
11	J-Box Assy *(Incl. Level sensor)*	52040-0011	1
12	Shim *(.059" thk)*	48876-0018	1
	Shim *(.048" thk)*	48876-0026	1
	Shim *(.035" thk)*	48876-0034	1
13	Spacer Plate, Zink Plate *(.0747" thk)*	49890-0018	1
14	Bolt, 1/4"-20 x 3/4"L	14476-0014	2
15	Lock Washer, 1/4"	14474-0065	2
16	Pitch / Roll Trouble Shooting Simulator *(not shown)*	49656-0012	1
17	Socket Screw, 1/4" x 5/8" L	16192-0020	6
19	Spacer	27417-0018	4
20	Socket Screw, ¼ x 1 ½" L	16192-0079	4
21	Lock Washer, .50"	14474-0107	4
22	"Coil Cable" Mounting Bracket	22456-0011	1
23	"Coil Cable" Mounting Bracket	22455-0012	1
24	Cable Clamp	17783-0098	2
25	Bolt 5/16" x 1" L	14472-0133	2
26	Lock Washer,5/16"	14474-0073	2
27	Nut, 5/16"	14471-0076	2

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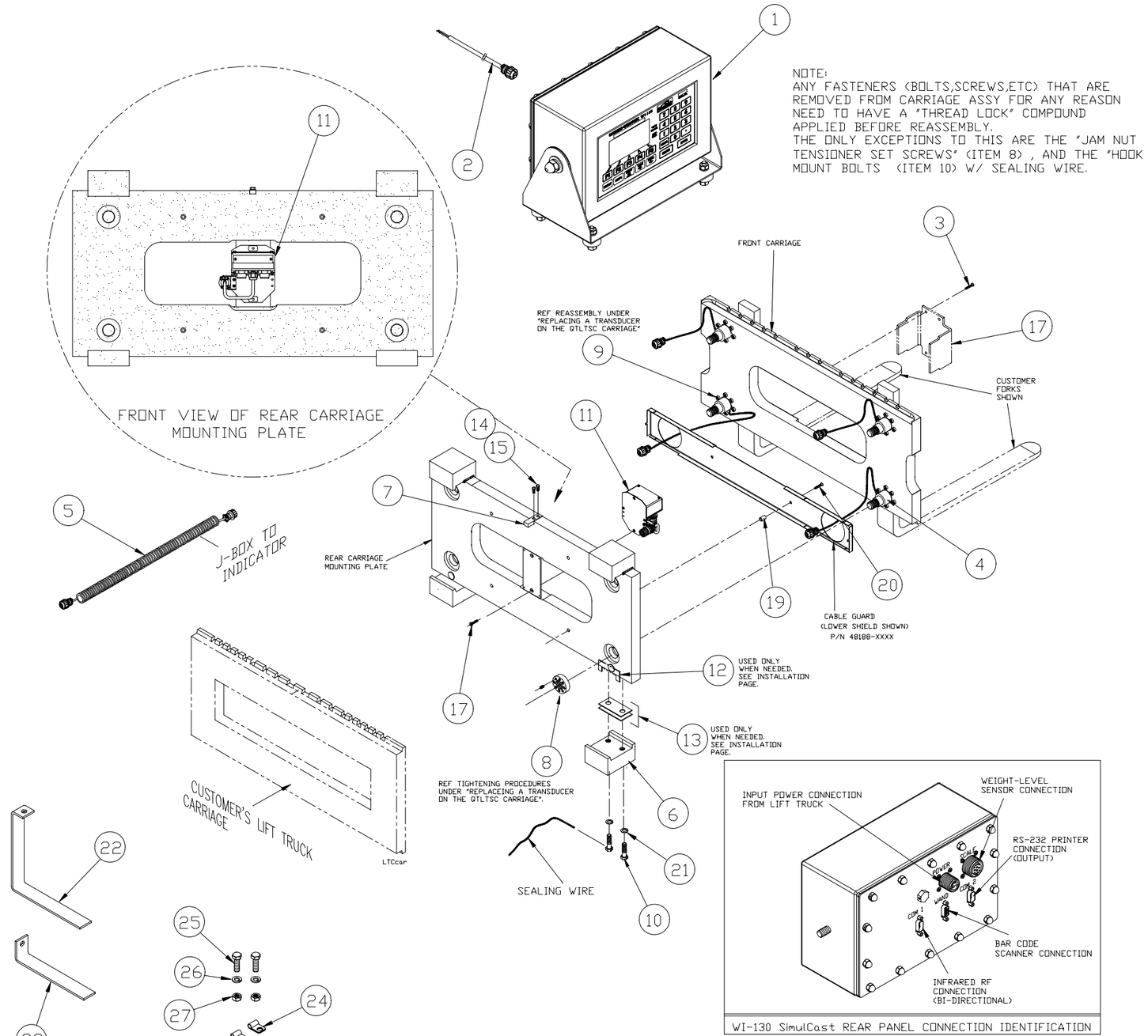
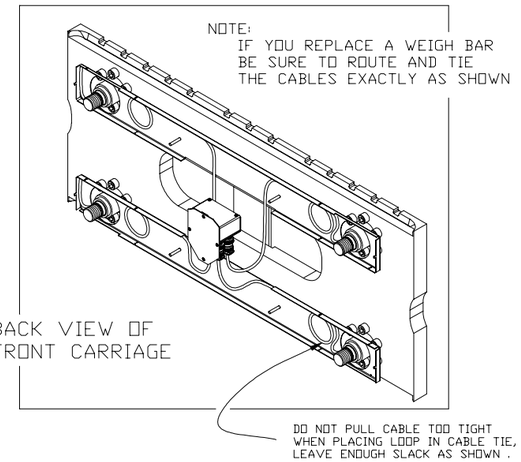
CERTIFIED LIFT TRUCK SCALE W/ SimulCast™

10,000 lb CLASS III SCALE CARRIAGE PARTS *AND* ASSY.

CARRIAGE ASSEMBLY P/N 51857-00XX





ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	Wi-130 SimulCast Indicator Assy	51285-0025	1
2	DC Pwr Cable *(12' Long)*	19266-0124	1
3	J-BOX Shield	52529-0011	1
4	Weigh Bar Assy	50468-0018	4
5	Retractable InterfaceCable (18'-20' stretched)	48432-0023	1
6	Mounting Hook	20732-0011	2
7	Carriage Centering Pin	19968-0018	1
8	Jam Nut Tensioner *Assy*	46687-0037	4
9	Bolt, Soc, 7/16" x 1 1/2" Long	17704-6224	24
10	Hook Mount Bolt, 5/8" x 2 ¾" L	49889-0029	4
11	J-Box Assy *(Incl. Level sensor)*	52040-0011	1
12	Shim *(.059" thk)*	48876-0018	1
	Shim *(.048" thk)*	48876-0026	1
	Shim *(.035" thk)*	48876-0034	1
13	Spacer Plate, Zink Plate *(.0747" thk)*	49890-0018	1
14	Bolt, 1/4"-20 x 3/4"L	14476-0014	2
15	Lock Washer, 1/4"	14474-0065	2
16	Pitch / Roll Trouble Shooting Simulator *(not shown)*	49656-0012	1
17	Socket Screw, 1/4" x 5/8" L	16192-0020	6
19	Spacer	27417-0018	4
20	Socket Screw, ¼ x 1 ½" L	16192-0079	4
21	Lock Washer, 5/8"	14474-0115	4
22	"Coil Cable" Mounting Bracket	22456-0011	1
23	"Coil Cable" Mounting Bracket	22455-0012	1
24	Cable Clamp	17783-0031	2
25	Bolt 5/16" x 1" L	14472-0133	2
26	Lock Washer,5/16"	14474-0073	2
27	Nut, 5/16"	14471-0076	2

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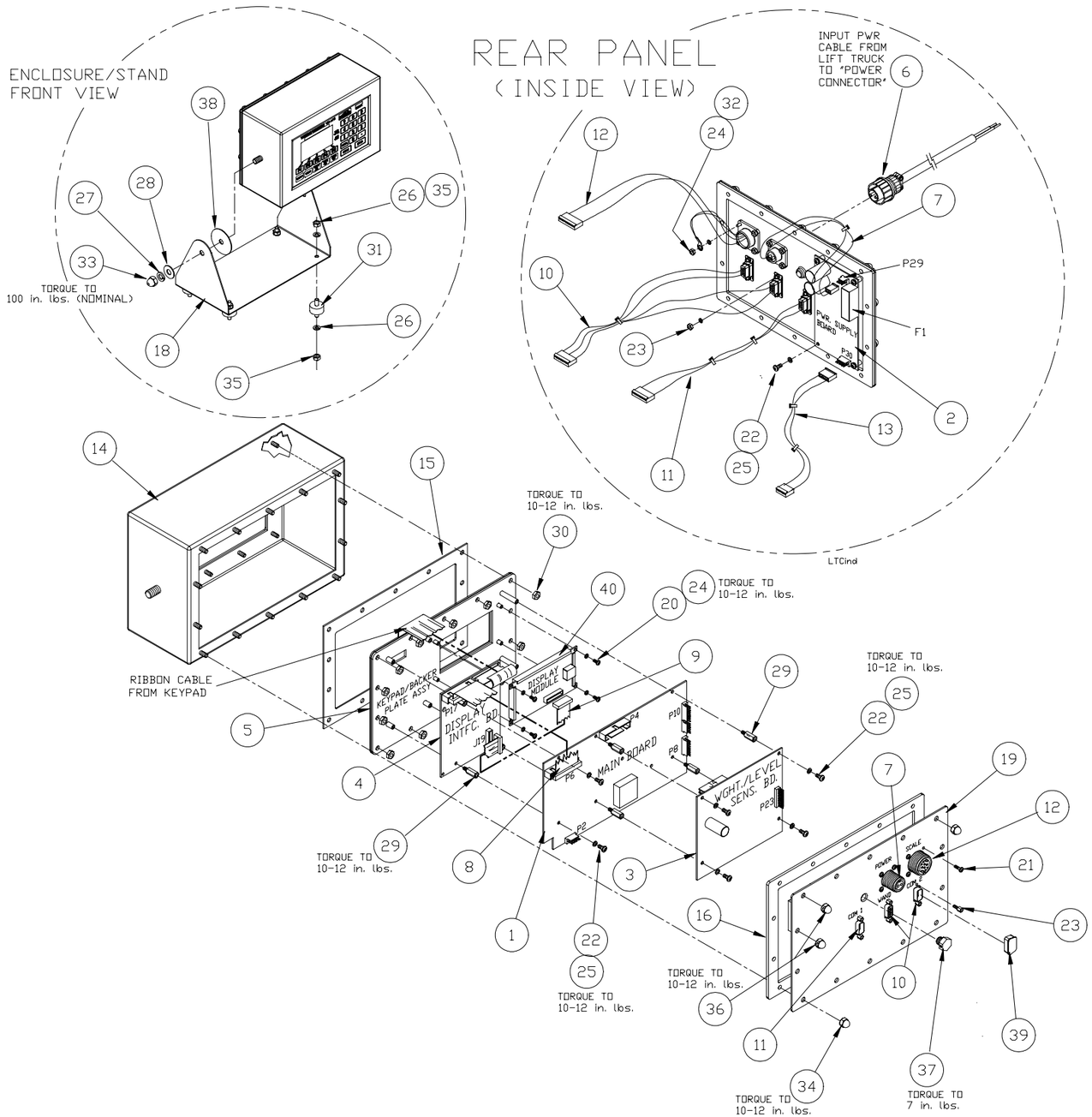

ITEM NO.	DESCRIPTION	W-T P/N	QTY
1	WI-130 Main Pc Board Assy	50908-0024	1
2	DC Power Supply Pc Bd	50928-0012	1
3	Weight Sensor / Level Sensor Pc Bd Assy	50920-0010	1
4	Display Interface PC Board	49951-0014	1
5	Keypad /Backer Plate Assy	98370-0014	1
6	DC Power Cable Assy (12' long)	19266-0124	1
7	Input Power Connector/Cable Assy (2-pin)	51493-0015	1
8	Main-to-Display Intfc. BD. Cable Assy (30-pin)	51490-0018	1
9	Displ. Intfc. BD-to-Display Cable Assy (20-pin)	49986-0021	1
10	Dual RS-232 Connector/Cable Assy (9-pin)	51497-0011	1
11	RS-232 Connector/Cable Assy (9-pin)	51492-0016	1
12	Weight Sens - Level Sens Conn / Cable Assy	51495-0013	1
13	Power Supply to Main Bd. Conn / Cable Assy	51494-0014	1
14	Enclosure	51286-0016	1
15	Front Gasket	51289-0013	1
16	Rear Gasket	51292-0018	1
18	Stand Bracket	51288-0014	1
19	Rear Panel	51287-0015	1
20	Screw #4 x 1/4"L (pan hd)	14473-0108	4
21	Screw #4 x 3/8"L (pan hd)	14473-0124	8
22	Screw #6 x 5/16"L (pan hd)	14473-0223	10
23	Screw/Lock Assy (incl.: coupling nut, washers nut,)	14538-0010	6
24	Lock Washer #4	14474-0024	12
25	Lock Washer #6	14474-0032	10
26	Lock Washer 1/4"	14474-0198	8
27	Lock Washer 3/8"	14474-0214	2
28	Flat Washer 3/8"	16163-0066	2
29	Standoff #6-32 x 9/16"L (m/f)	15437-5000	8
30	Kep Nut, #8	1025-00125	14
31	Vibration Mount	17807-0090	4
32	Hex nut, #4	14471-0027	8
33	Cap Nut 3/8"-16	15771-0070	2
34	Cap Nut #10-32	15786-0016	12
35	Nut 1/4"-20	14471-0209	8
36	Cap Nut #10-32 (modified)	26513-0013	2
37	Reset Access Plug 3/8" x 5/16"L (nylon)	1019-11926	1
38	Pad (neopr)	19563-0025	2
39	Connector Cover	27369-1014	1
40	Display Module	48568-0011	1

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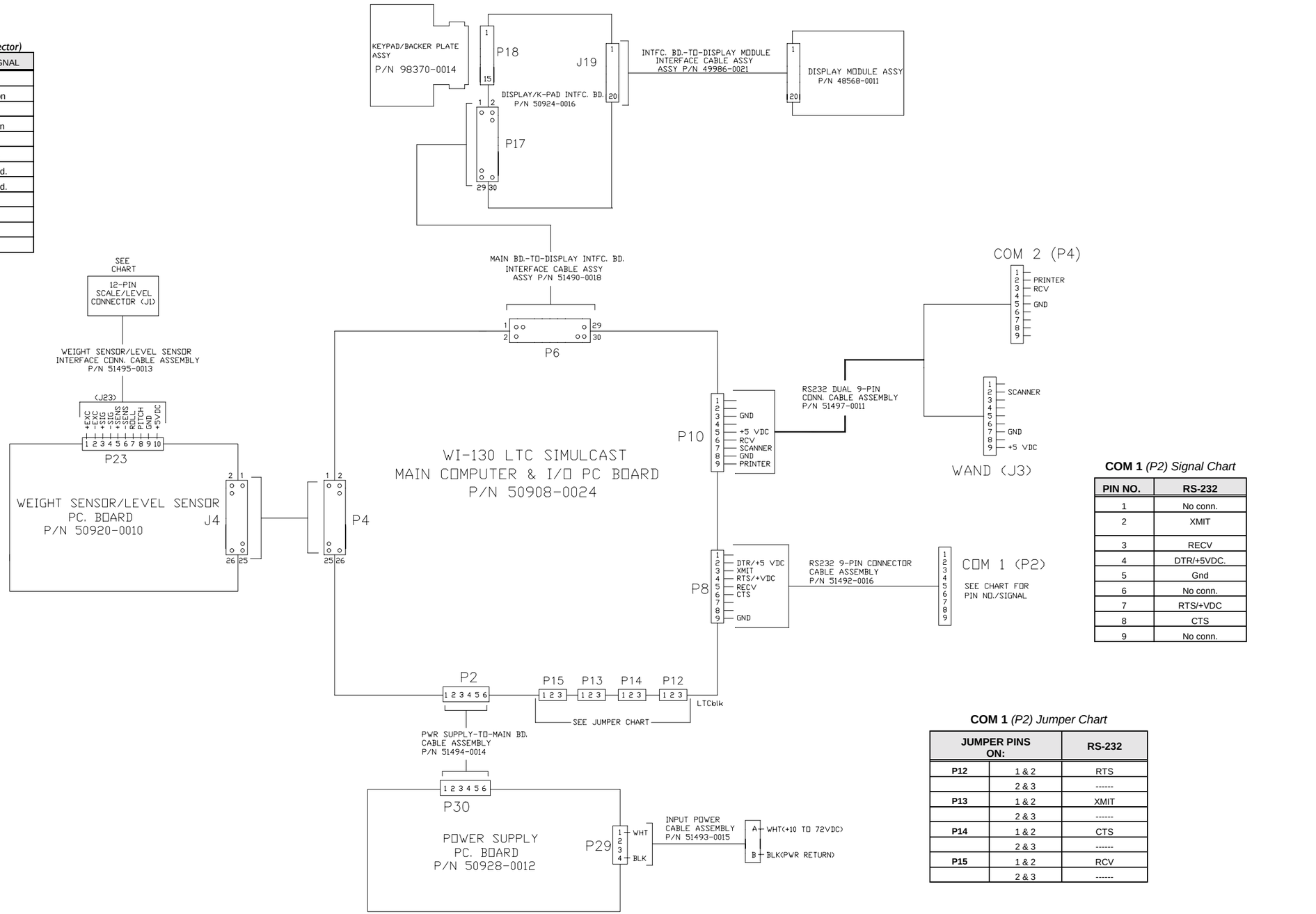
CERTIFIED LIFT TRUCK SCALE W/ SimulCast™

SYSTEM BLOCK DIAGRAM

J1

(12-pin scale / level connector)

PIN NO.	ANALOG SIGNAL
A	-Signal
B	+Excitation
C	+Signal
D	-Excitation
E	-Sense
F	+Sense
G	Chasis gnd.
H	Chasis gnd.
J	Pitch
K	+5VDC
L	Roll
M	Gnd.



COM 1 *(P2) Signal Chart*

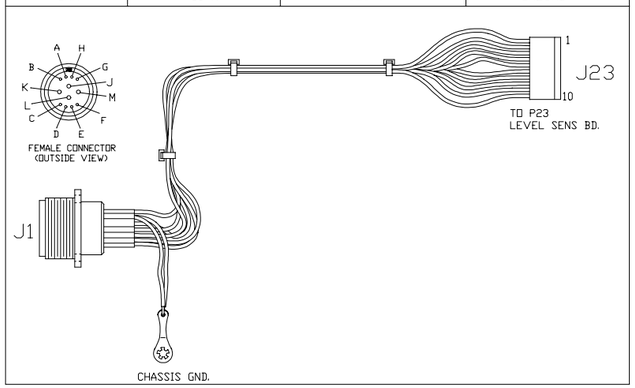
PIN NO.	RS-232
1	No conn.
2	XMIT
3	RECV
4	DTR/+5VDC.
5	Gnd
6	No conn.
7	RTS/+VDC
8	CTS
9	No conn.

COM 1 *(P2) Jumper Chart*

JUMPER PINS ON:		RS-232
P12	1 & 2	RTS
	2 & 3	------
P13	1 & 2	XMIT
	2 & 3	------
P14	1 & 2	CTS
	2 & 3	------
P15	1 & 2	RCV
	2 & 3	------

130 SimulCast™ LTC INDICATOR
INTERNAL INTERFACE CABLE ASSEMBLIES
AND PIN-OUTS

WEIGHT SENS-LEVEL SENS CONNECTOR/CABLE ASSY P/N 51495-0013			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
RED	J1-A	J23-4	-SIGNAL
GRN	J1-B	J23-1	+EXCITATION
WHT	J1-C	J23-3	+SIGNAL
BLK	J1-D	J23-2	-EXCITATION
BLU	J1-E	J23-6	-SENSE
YEL	J1-F	J23-5	+SENSE
WHT/ORN	J1-G	GND-1 (2)	CHASSIS GROUND
WHT/ORN	J1-H	GND-1 (2)	CHASSIS GROUND
BRN	J1-J	J23-8	PITCH
ORN	J1-K	J23-10	+5V
VIO	J1-L	J23-7	ROLL
GRA	J1-M	J23-9	GROUND



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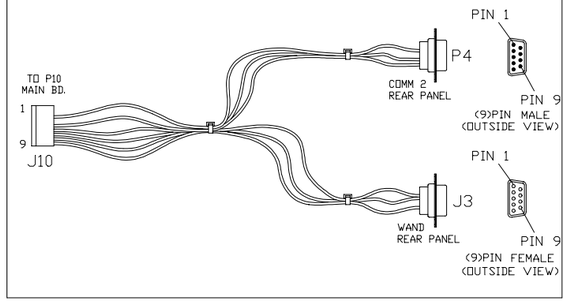
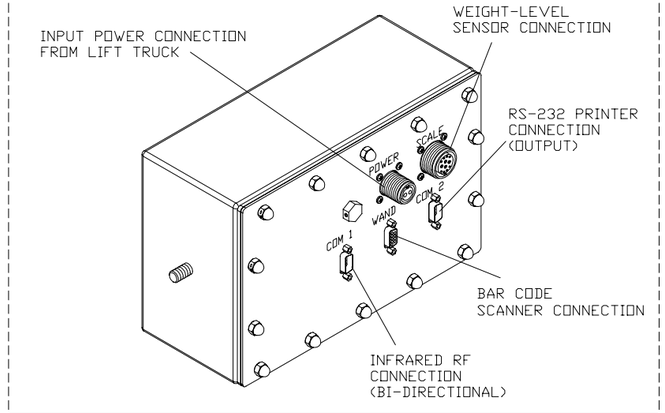
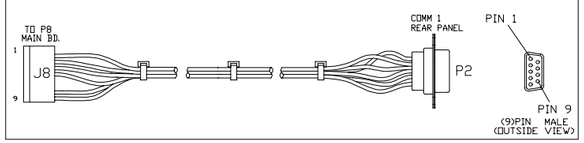
DUAL RS-232 CONNECTOR/CABLE ASSY P/N 51497-0011			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
RED	J10-9	P4-2	PRINTER
GRN	J10-7	J3-2	SCANNER
ORN	J10-5	J3-9	+5VDC
BLK	J10-8	J3-7	GND
BRN	J10-3	P4-5	GND
BLU	J10-6	P4-3	RECEIVE



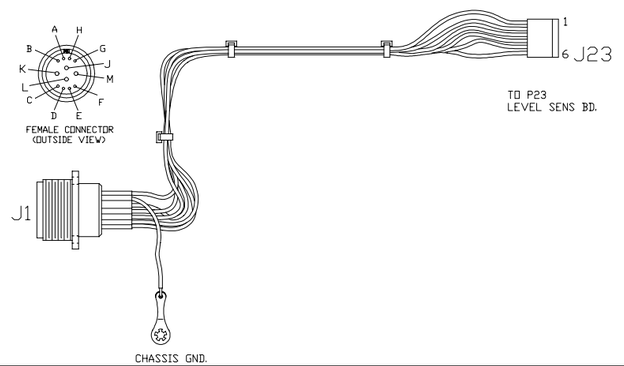


WI-130 SimulCast REAR PANEL CONNECTION IDENTIFICATION

RS-232 9-PIN CONNECTOR / CABLE ASSY P/N 51492-0016			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
RED	J8-3	J2-2	TRANSMIT
GRN	J8-5	J2-3	RECEIVE
BLU	J8-4	J2-7	RTS/+VDC
BLK	J8-9	J2-5	GROUND
ORN	J8-2	J2-4	DTR/+5VDC
YELLOW	J8-6	J2-8	CTS



WEIGHT SENSOR CABLE ASSY FOR NON-LEGAL INDICATORS (P/N 52242-xxxx)			
WEIGHT SENS CONNECTOR/CABLE ASSY P/N 52243-0016			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
RED	J1-A	J23-4	-SIGNAL
GRN	J1-B	J23-1	+EXCITATION
WHT	J1-C	J23-3	+SIGNAL
BLK	J1-D	J23-2	-EXCITATION
BLU	J1-E	J23-6	-SENSE
YEL	J1-F	J23-5	+SENSE
WHT/ORN	J1-G	GND-1 (2)	CHASSIS GROUND



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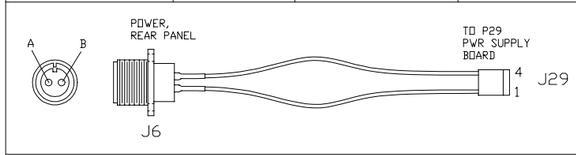
MAIN BD / PWR. SUPP. BD. CABLE ASSY P/N 51494-0014			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
BROWN	J2-1	J30-1	+12V
RED	J2-2	J30-2	+12V
ORANGE	J2-3	J30-3	+5V RAM
YELLOW	J2-4	J30-4	PWR ON
GRN	J2-5	J30-5	GND
BLU	J2-6	J30-6	GND

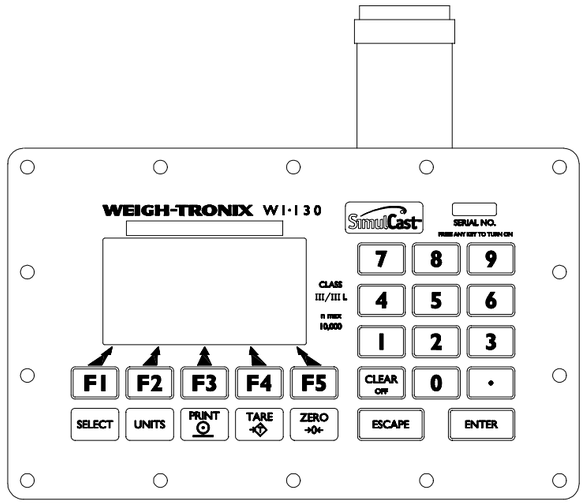
TWO-PIN POWER CONN / CABLE ASSY P/N 51493-0015			
W-T WIRE COLOR	ORIGIN TERMINATION	DESTINATION TERMINATION	SIGNAL
BLACK	J6-B	J29-4	POWER RETURN
WHITE	J6-A	J29-1	+10 TO +72 V



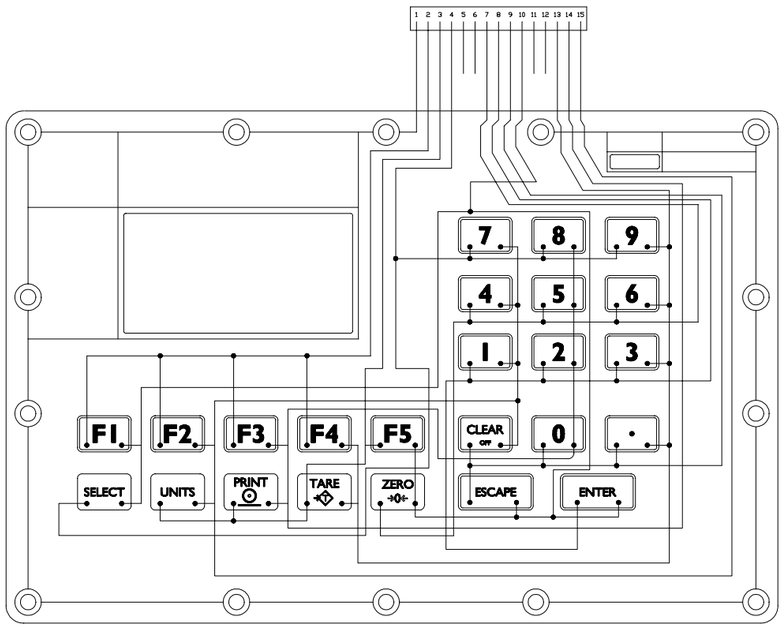
LTCcab1

CERTIFIED LIFT TRUCK SCALE W/ SimulCast™

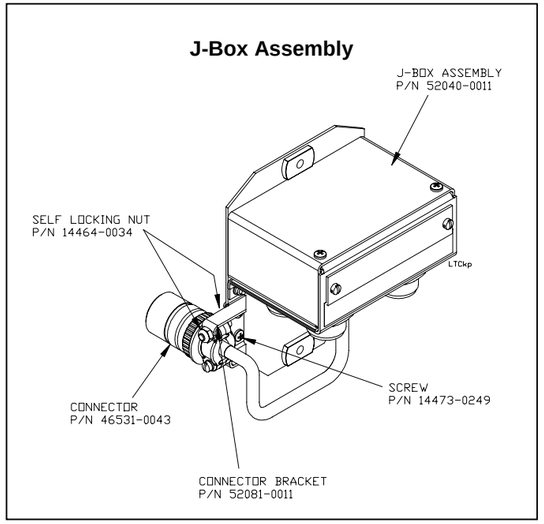
KEYPAD (P/N 51291-0019) *AND* SCHEMATIC,
J-BOX ASSEMBLY P/N 52040-0011

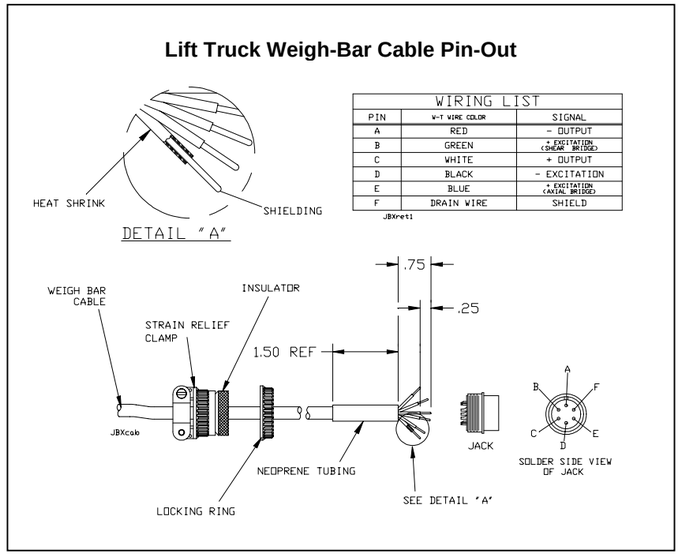


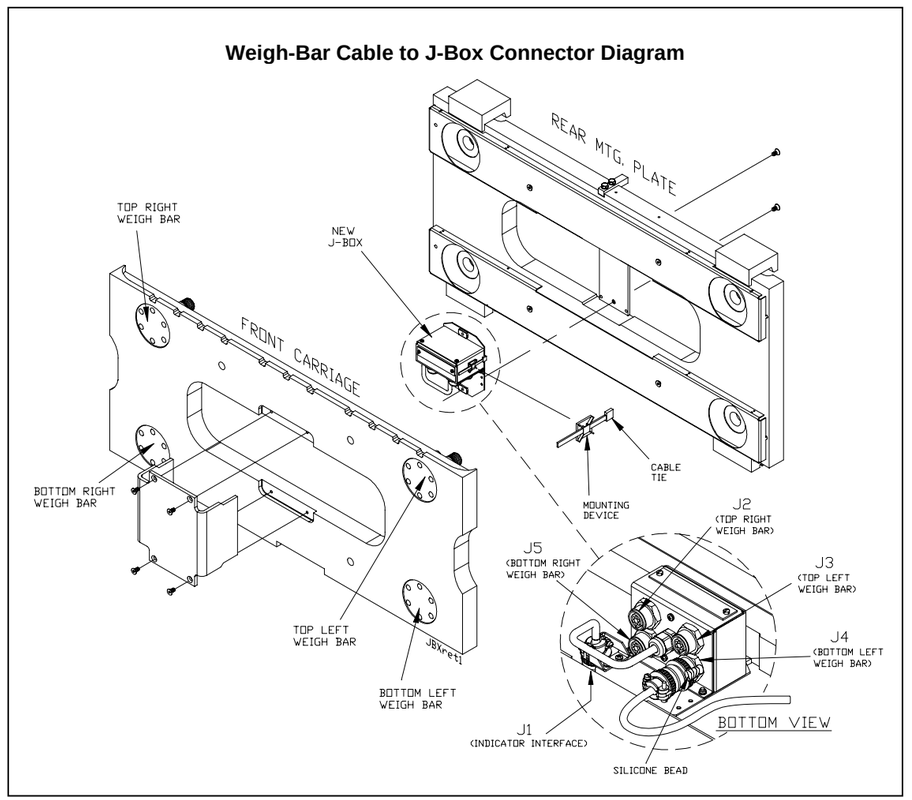
KEYPAD LTCkp



KEYPAD SCHEMATIC

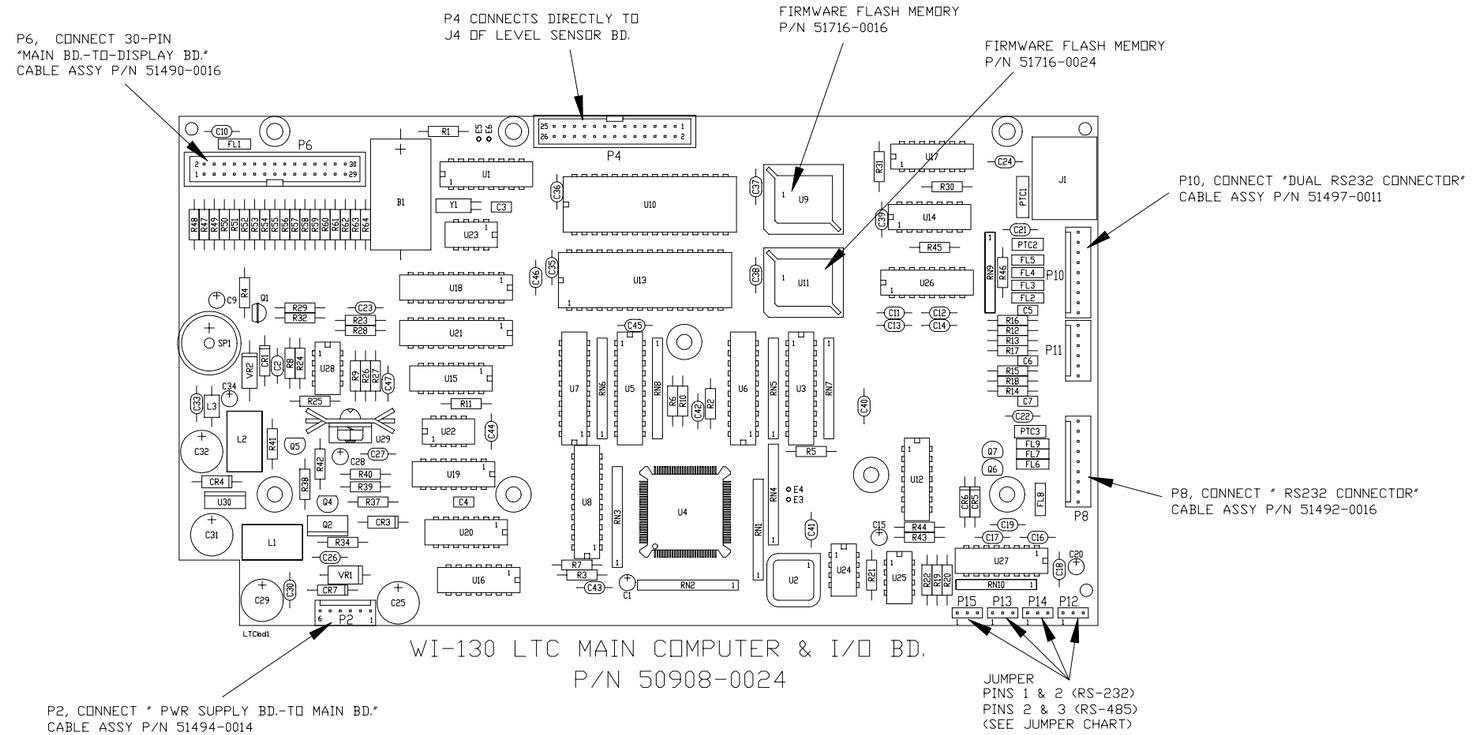






130 SimulCast™ LTC INDICATOR

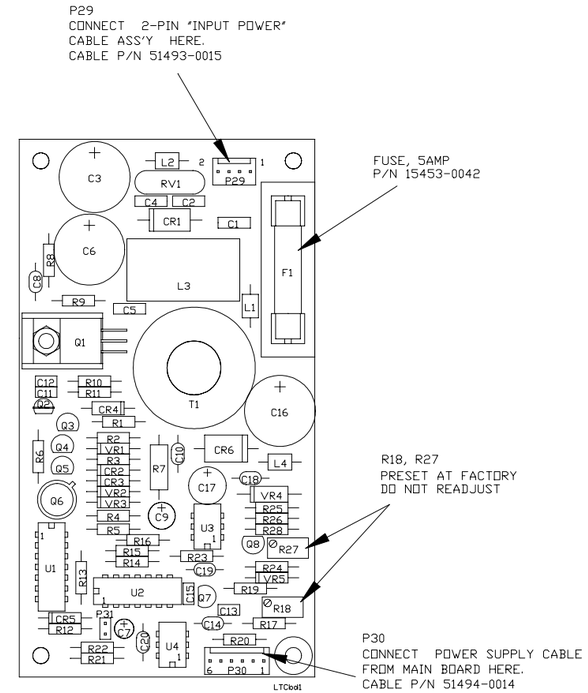
MAIN COMPUTER I/O BOARD *AND*
POWER SUPPLY BOARD



WI-130 LTC MAIN COMPUTER & I/O BD.
P/N 50908-0024

COM 1 *(P2) Jumper Chart*

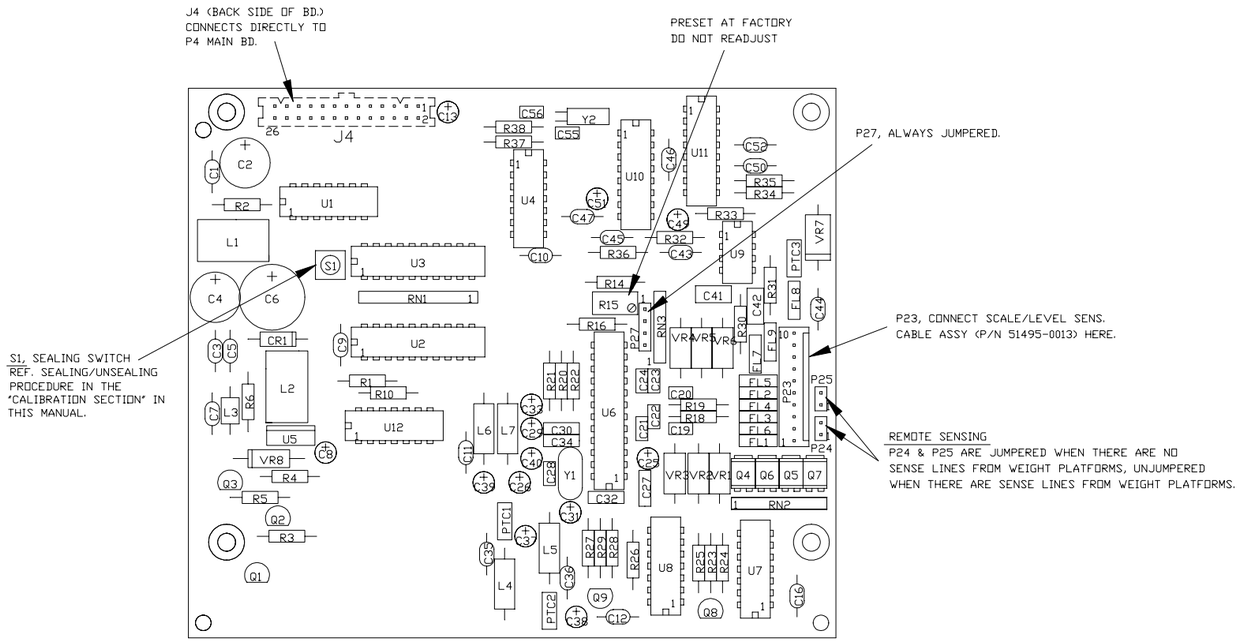
JUMPER PINS ON:		RS-232
P12	1 & 2	RTS
	2 & 3	------
P13	1 & 2	XMIT
	2 & 3	------
P14	1 & 2	CTS
	2 & 3	------
P15	1 & 2	RCV
	2 & 3	------



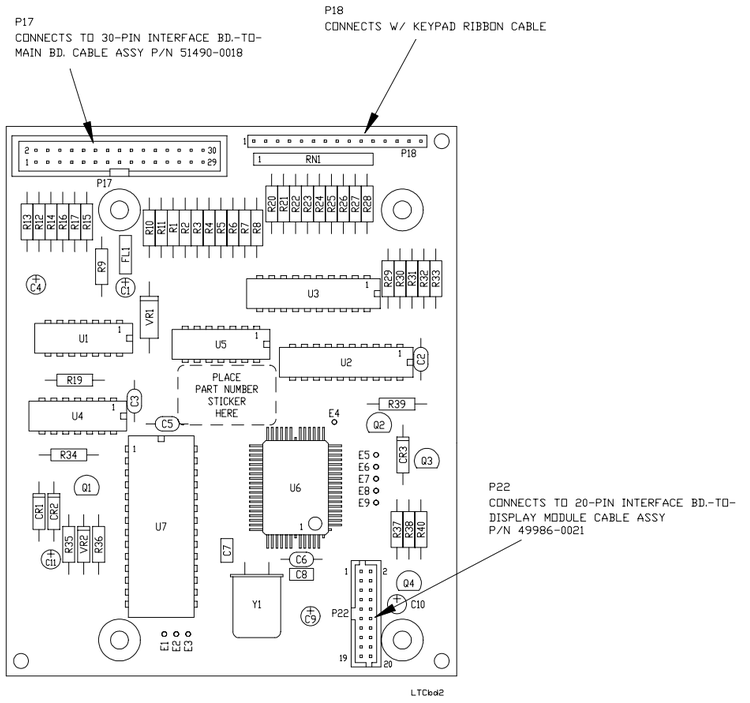
WI-130 LTC POWER SUPPLY BD.
P/N 50928-0012

130 SimulCast™ LTC INDICATOR

LEVEL SENSOR / A-D BOARD *AND*
DISPLAY INTERFACE BOARD



WI-130 LTC LEVEL SENSOR/A-D BD.
P/N 50920-0010



WI-130 LTC DISPLAY INTERFACE BD.
P/N 50924-0016

Installing the Quick-Tach Carriage

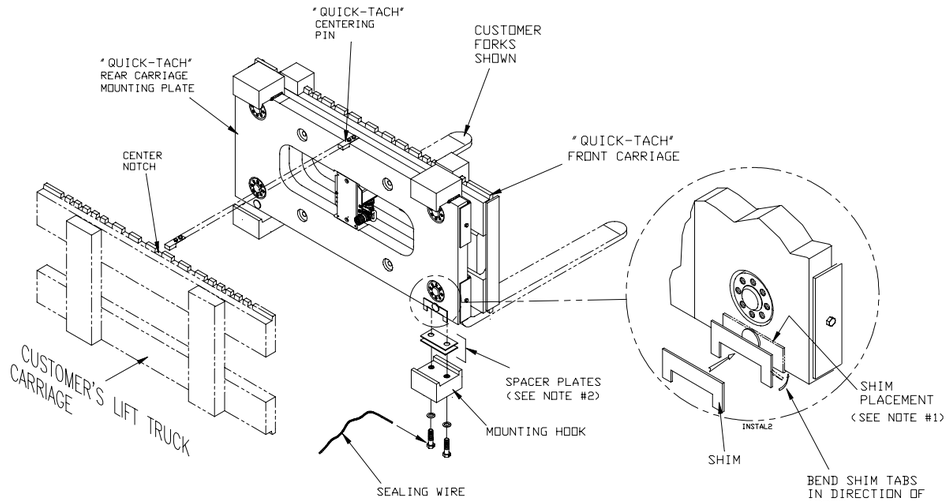


FIG. 1

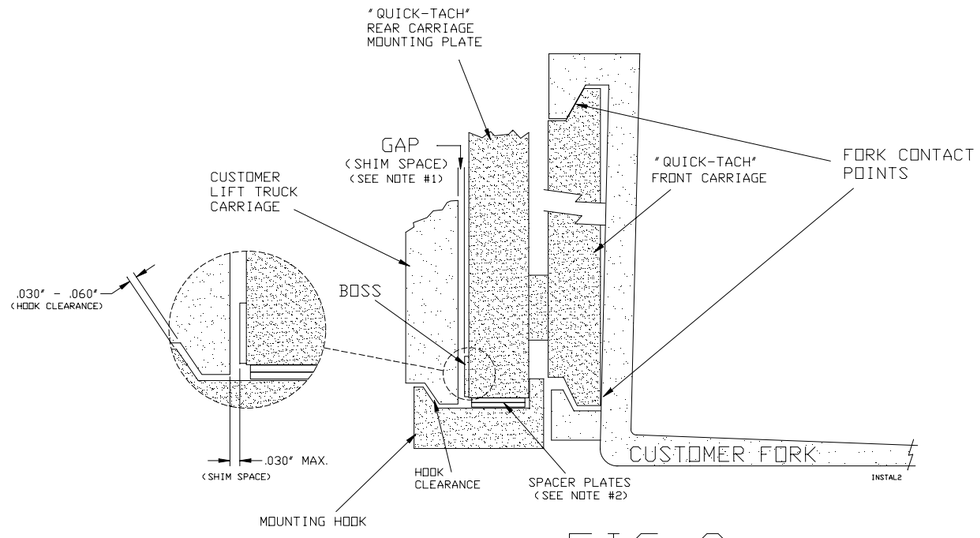


FIG. 2

- Remove the customer's forks before you mount the Quik-Tach carriage. Check the forks for wear or damage and make any necessary repairs.
- Clean and inspect the customer's lift truck carriage. Both the upper and lower sections of the carriage should be flat and not twisted or bent out of shape. It is especially important that the upper carriage notches are not excessively worn.
- Remove the two mounting hooks and washers bolted to the bottom of the Quik-Tach carriage ***(see Figure 1).*** The hooks secure the scale to the lift truck and will be reattached after the scale is properly positioned.
- Raise the Quik-Tach carriage to a vertical position on the pallet and drive the lift truck into position.
- Align the Quik-Tach carriage centering pin with the center notch in the customer's lift truck carriage. The rear face of the scale carriage must be against the customer's lift truck carriage and the top mounting blocks of the scale carriage must be over the top of the customer's lift truck carriage lip and seated firmly in place.
- Raise the carriage and back the lift truck away with the Quik-Tach scale in place.
- Raise the carriage to a convenient height for remounting the two mounting hooks. Make certain the customer's carriage is clean where the hooks will be positioned. Attach the mounting hooks and tighten the bolts. The torque specification for these bolts is 70 foot pounds (class II & III 5,000 lb.), 125 foot pounds (class III 10,000 lb.). Install sealing wire on both mounting hooks.

NOTE #1: ***(See Figure 2)*** Make sure the bosses on the Quik-Tach carriage make contact with the customer's lift truck when both forks are seated. If there is more than .030" gap between the Quik-Tach and the customer's lift truck carriage ***(see Figure 2)*** when the forks are seated, use the included shims as needed to close the gap on either end, then bend over the tabs to hold them in place as shown in ***Figure 1***. There are three shim thicknesses (.035", .048", .059"). If you have to stack more than two shims on either end, your carriage is bent and needs to be fixed or replaced.

NOTE #2: There must be 0.030" to 0.060" space between the customer's lift truck carriage and the mounting hooks of the Quik-Tach scale. See Hook Clearance in ***Figure 2***. These parts must not touch or the scale won't weigh correctly. Use the spacer plates as needed to be sure this space exists. Also be sure that the customer's lift truck forks contact the scale only at the positions shown in ***Figure 2.*** Repair or replace the forks if they are bent or have protrusions which contact the face of the scale.

- Mount the forks on the Quik-Tach scale carriage in the same way they attach to the regular lift truck carriage and move the forks into the positions they will be used during normal operation. Make sure all carriage components are firmly and safely in place. Apply a drop of thread locking compound such as "locktite #242, (W-T p/n 15566-0061) to all threaded fasteners. ***Do not apply to cable connectors.***

LTCsv

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04/17/00 SIMLSERV.P65 PN 29702-0018e1 Printed in USA