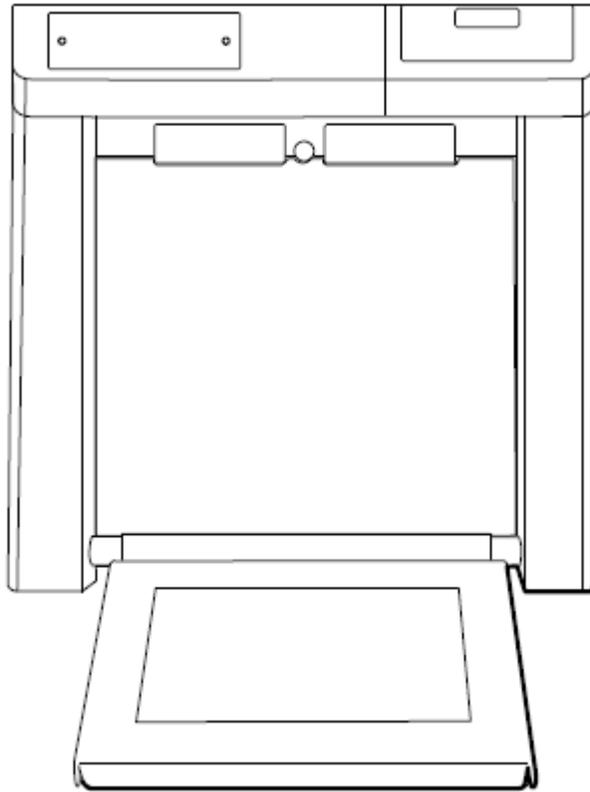# Welch Allyn Stow-A-Weigh Scales

Service Manual

Model 5202　– Stow-A-Weigh Stand-On Scale
Model 6202　– Stow-A-Weigh Wheel Chair Scale
Model 6202D – Stow-A-Weigh Wheel Chair Scale, Dual Platform

WelchAllyn®

Advancing Frontline Care™

For information about any Welch Allyn product, contact your local Welch Allyn representative:
http://www.welchallyn.com/en/other/contact-us.html

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9am - 5pm EST

Mon - Fri

CONTENTS

Scale Setup

You can customize the scale to best suit your needs. Configurations that can be selected include the automatic shut-off time, weighing units, weight resolution, and more.

Enter custom setup mode

1. Lower the weighing platform to the weighing position.
2. Make sure the scale is powered down
3. Press and hold "**ST"** button while pressing **ON**.
4. Once the scale powers up, press and release "**ST"** five times RAPIDLY. The scale displays **SEt-UP** and produces a series of four long beeps.

Set the options

Enter the custom setup as described.

1. Press **ST** to scroll through the custom setup options.

Note Options indicated with an asterisk (*) have multiple selections.

2. Press **RE CALL** once a value is displayed to change the value. When the desired value appears, press **ST** to set the new value.

3. You can exit the menu at any time by pressing **ON** to power down the scale. The scale saves all changes.

The options displayed with each press are as follows:

Option	displayed Feature
SOFt	This option displays the software version of your scale.
dAtE	This option displays the release date of the software. The format is MM/DD/YY.
SCALE	This option displays the model number of the scale.
AutOFF*	This displays the number of seconds before the scale turns off when operating on battery power. The **Cont** value prevents the scale from turning off automatically.
AC con*	This option causes the scale to remain on when plugged in to AC power. Press **RE CALL** to turn this option **ON** or **OFF**.
rES*	This option allows you to change the resolution of weight. Press **RE CALL** to switch between the following options: 0.1 pounds / 0.05 kilograms 0.1 pounds / 0.1 kilograms 0.2 pounds / 0.1 kilograms 0.5 pounds / 0.2 kilograms 1 pound / 0.5 kilograms
UnitS*	This option allows you to change the displayed weight unit.

Note Do not change the scale units if you have purchased the kilogram-only option.

Press **RE CALL** to switch between the following options:

KILOS*	This option allows the weight to display in kilograms.
POUNDS*	This option allows the weight to display in pounds.

bEEPEr* This option determines the audible signal that occurs when a front panel button is pressed. Press **RE CALL** to switch between **ON** and **OFF**.

rECALL* Press RE CALL to change the **RE CALL** button functionality between **ON** and **OFF**.

rS-232 Detailed instructions for this feature are available from Welch Allyn. Go to http://www.welchallyn.com/en/other/contact-us.html to find your local representative.

OutPut* This option displays the current data port output option. Detailed instructions for this feature are available from Welch Allyn. Go to http://www.welchallyn.com/en/other/contact-us.html to find your local representative.

Set the value to **OFF** to disable the optional internal printer or the RS-232 port.

PrtUnt* This option determines whether pounds or kilograms are displayed on a printout.

Press **RE CALL** to switch between the following options:

If the pounds and kilograms indicators are illuminated on the control panel, the printed output is determined by whichever unit is selected on the control panel.

If the kilogram indicator is illuminated, it will only print in kilograms, regardless of the unit is selected on the control panel.

If the pounds indicator is illuminated, it will only print in pounds, regardless of the unit is selected on the control panel.

PrtOPT* Press **RE CALL** to switch between the following options:

PnlPrt: The current weight is printed when **PRINT** is pressed on the control panel.

AutPrt: The current weight is automatically printed when a weight reading occurs.

bAud* This option allows you to set the baud rate.

Press **RE CALL** to switch between **1200**, **2400**, **4800**, **9600**, and **19200.**

pArity* Press **RE CALL** to switch between the following options:

Off:	No parity, 8 data bits
Odd:	Odd parity, 7 data bits
EuEn:	Even parity, 7 data bits

StPbit* Press **RE CALL** to switch between the following options:

1 bit: One stop at the end of a word
2 bits: Two stops at the end of a word

rtS.ctS*   Press **RE CALL** to switch between **ON** for the printer and **OFF** for RS232 transmissions.

Prtbtn*   Press **RE CALL** to turn **On** or **Off** the front panel **PRINT** button.

rtEPrt*   Press **RE CALL** to turn **On** or **Off** the enabling of printing from a remote location by connecting the receive line to the ground.

PC brd   This option displays the model number of the printed circuit board. A second press of **ST** displays the revision of the printed circuit board.

SEt-UP   This option is displayed when you have cycled through all the options. Press and hold **ON** to power down the scale.

Enter Advanced Service Mode

1. To enter the **"service"** mode start with the scale Lower the weighing platform to the weighing position.

2. Press on to turn the scale off

3. Note the small "ST" logo (*"ST"*) located directly above the "**RE CALL**" pushbutton, and below the "**Zero"** pushbutton on the front panel of the readout.

4. This "*ST*" actually contains a small hidden pushbutton.

5. Next; press and hold this "*Zero*" pushbutton on the front panel while turning the power on with the "**ON**" pushbutton.

6. As soon as the scale turns on release the "*Zero*" pushbutton, then quickly press and release *"ST"* logo pushbutton 5 times.

7. The scale will display "*SERVICE*" and produce a series of four long beeps.

8. "Service" mode has now been entered.

9. Pressing the "*ST*" pushbutton will advance the display to the next item.

10. The scale will exit the service mode automatically after 3 minutes, or shut-off by pressing and holding the "**ON**" pushbutton for 3 or 4 seconds.

11. When the scale is turned back on, normal scale operation will resume.

Menu List for Advanced Service Mode

1. "A/D", and next window on display will show the raw A/D reading. As you press on the Platform the A/D reading will chance. The weight chance reading should be positive proportionally with the applied weight in pounds.

2. "Test", and the next window will start displaying the display test, Number will show across from 0 to 9 and repeat w/ DP, from right side to left side.

3. "Pr-OnS" = Power on start-up, next display will show the number of times the "ON" pushbutton has been depressed.

4. "Pr-rcl" = Powered by Recall, next display will show the number of times the "RECALL" pushbutton has powered-up the scale (from an off state).

5. "COUntS" = Weighing Counts, next display will show the number of times a weight reading has been achieved.

6. "rEcntS" = Reweigh counts, next display will show the number of times "Reweigh" pushbutton has been depressed.

7. "rECLLS" = recalls, next display will show the number of times the "RECALL" pushbutton has been depressed.

8. "OFFS" = Turned Off, next display will show the number of times the scale has been turned off by holding the "ON" pushbutton down.

9. "PrintS" = Prints, next display will show the number of times the "Print" pushbutton has been depressed.

10. "SEtUPS" = set-up mode, next display will show the number of times the unit has entered into the set-up mode.

11. "SEruES" = service mode, next display will show the number of times the unit has entered into the service mode.

12. "CALS" = Cal mode, next display will show the number of times the unit has entered into the Cal mode.

Support services

If you have a problem with the device that you cannot resolve, call the Welch Allyn Technical Support Center nearest you for assistance. A representative will assist you in troubleshooting the problem and will make every effort to solve the problem over the phone, potentially avoiding an unnecessary return.
Technical support is available 9am-5pm EST @ 1.800.535.6663, Option 2, 1, 5

Welch Allyn offers the following technical support services:

- Telephone support
- Replacement service parts
- Product service

For information on any of these services, go to www.welchallyn.com/en/servicesupport.html.

Device Warranty

Welch Allyn will warranty the weight scale to be free of defects in material and workmanship and to perform in accordance with manufacturer specifications for the period of one year from the date of retail purchase.

The warranty period shall start on the date of purchase. The date of purchase is:

1) The invoiced ship date if the device was purchased directly from Welch Allyn
2) The date specified during product registration
3) The date of purchase of the product from a Welch Allyn authorized distributor as documented from a receipt from said distributor.

This warranty does NOT cover damages caused by misuse or abuse, including but not limited to:

1. Failure caused by unauthorized repairs or modifications
2. Damage caused by shock or dropping during transportation
3. Damage caused by improper use of the power supply
4. Failure caused by improper operation not consistent with the instructions stated in this *Directions for use*

Should this device require maintenance (or replacement at our option) under warranty, contact your local Welch Allyn representative: http://www.welchallyn.com/en/other/contact-us.html

Warranty service

All repairs on products under warranty must be performed or approved by Welch Allyn.

Refer all warranty service to Welch Allyn Product Service or another authorized Welch Allyn Service Center.

Obtain a Return Material Authorization (RMA) number for all returns to Welch Allyn Product Service.

CAUTION Unauthorized repairs will void the product warranty.

Non-warranty service

Welch Allyn Product Service Centers and Authorized Service Providers support non-warranty repairs. Contact any Welch Allyn regional service center for pricing and service options.

Welch Allyn offers modular repair parts for sale to support non-warranty service. This service must be performed only by qualified end-user biomedical/clinical engineers.

Repairs

A Welch Allyn Service Center or Authorized Service Provider must perform all repairs on products under warranty unless you are a properly certified technician.

CAUTION Unauthorized repairs will void the product warranty.

Qualified service personnel or a Welch Allyn Service Center should repair products out of warranty.

If you are advised to return a product to Welch Allyn for repair or routine maintenance, schedule the repair with the service center nearest you.

Returning products

When returning a product to Welch Allyn for service, ensure that you have the following information:

- Product name, model number, and serial number. This information may be found on the product and serial number labels.
- A complete return shipping address.
- A contact name and phone number.
- Any special shipping instructions.
- A purchase-order number or credit-card number if the product is not covered by a warranty.
- A full description of the problem or service request.

1. Obtain an RMA number. Contact Welch Allyn and request.

   Note: Welch Allyn does not accept returned products without an RMA.

2. Ship the device to Welch Allyn, observing these packing guidelines:

   Remove from the device the battery, all hoses, connectors, cables, power cords, and other ancillary products and equipment, except those items that might be associated with the problem.

   Dispose of damaged or leaking batteries in an environmentally safe manner consistent with local regulations.

   Note: To ensure safe receipt of your device by the service center and to expedite processing and return of the device to you, **thoroughly clean all residues from the device before you ship it to Welch Allyn**. For cleaning requirements, see the Cleaning instruction in the Directions for Use.

   Welch Allyn thoroughly cleans all returned devices on receipt, but any device that cannot be adequately cleaned cannot be repaired.

3. Write the Welch Allyn RMA number with the Welch Allyn address on the outside of the shipping carton.

Technical Descriptions

WELCH ALLYN Stow-A-Weigh SCALES utilize the latest developments in electronic scales and microcomputer technology to provide highly reliable weighing scales, engineered to be easy to use. This section describes the technical aspects of these scales.

Scale Technical Description

LOAD CELL TRANSDUCERS

The function of the load cell transducer is to convert the weight applied to the weighing platform into an electrical signal for further processing and subsequent display by the readout. **WELCH ALLYN** uses proprietarily designed load cells in most of the scales to optimize performance and reliability. One of three types of load cell transducers may be used in your **WELCH ALLYN** scale depending on the model number.

MODELS 5202, 6202D, 6202

The load cell employed in these devices is referred to as a "co-planar" beam. The design of the beams provides for a thin, low profile construction in order to keep the height of the scale's weighing platform to a minimum.

Each beam has strain gauges bonded to it that convert the weight-induced deflection of the beam into an output voltage. When powered ("excited") with a voltage the beam produces a linear voltage output that is directly proportional and linear to the weight applied. Additional components mounted on the beam correct for temperature effects and standardize the output voltage.

The weighing platforms of the models 5202 and 6202 contain four planar beams, one per corner. The output voltages of the four separate beams are connected in parallel on a "junction" printed circuit board in order to provide the total of the weight applied to the platform.

Dual platform systems, such as the model 6202D, incorporate an additional four planar beam load cells and junction printed circuit board in the "satellite" platform. When the satellite platform is in use, all eight load cells are in parallel and the resultant weight signals are passively summed.

LOAD CELL JUNCTION BOARD

A small printed circuit board is included in the weighing platform to sum the signals from the four co-planar beam load cells. This board contains no active circuitry, but has five parallel wired connectors (4 in and 1 out) to take the individual load cell signals and furnish their combined output to the instrument board.

MAIN & SATELLITE TERMINAL BOARD (6202D dual platform systems)

The On model 6202 dual platform scale two additional circuit boards are included for making connections between the load cells of the two platforms.

The main scale has a terminal board that provides terminal blocks for connections of its platform load cells, instrument board, and connector for the cross over cable to the satellite platform.

The satellite platform has a similar board, but it includes a relay for switching the satellite platform's load cell excitation voltage on or off depending on the position of the platform. When the platform is stowed in the "up" position the excitation voltage to the satellite's load cells is removed so that they do not contribute to the weight signal.

When the satellite platform is lowered "down" into the weighing position, a micro switch in the satellite platform mechanism closes, energizing a relay on the satellite terminal board, and excitation voltage is applied to the satellite platform's load cells. A signal representative of the weight applied to the satellite platform is then added to that of the main platform so the combined weight may be processed and displayed.

SCALE ELECTRONICS

Scale electronics consist of the following:

1. Differential signal amplification.
2. Additional amplification and signal filtering.
3. Analog-to-Digital (A/D) converter and Clock circuit.
4. Battery and support circuitry, voltage regulators, power supplies, etc.
5. Microcomputer and support circuitry.
6. Display board.
7. Printer assembly.
8. Printer interface board.

DIFFERENTIAL SIGNAL AMPLIFICATION

The weight dependent output signal produced by the load cell transducers in the weighing platform is a "differential signal", meaning it is the voltage difference between the "+ Signal" and "- Signal" leads. Integrated circuit U4, an instrumentation amplifier, is used to interface to this differential signal and amplify it.

The output signal from the load cells is applied to the protection network consisting of diodes CR4/CR5/CR6/CR7. These diodes prevent destructive overvoltage's caused by static discharges from damaging U4.

A high frequency filter, formed by L1/L2/C9/C10 couples the weight signal to the input of U4. In U4 the differential signal is amplified by a factor of 100, and converted to a "ground-referenced" voltage for further processing.

Capacitors C16/C17/C24 provide local bypassing of the power supplies used by instrumentation amplifier U4. Capacitor C18 furnishes compensation of U4 by reducing amplification at higher frequencies.

ADDITIONAL AMPLIFICATION AND SIGNAL FILTERING

Operational amplifier U5 is used to provide additional gain and signal filtering. U5, together with capacitors C14/C15 and resistors R17/R18, forms an active low-pass filter. This helps to remove fluctuations in the weight signal caused by movement of the patient on the scale. U5, like U4, is "chopper-stabilized" to correct internal offset and drift errors.

Resistors R24/R25 (optional) are used to increase gain; resistors R26/R27 (optional) are used for gain reduction. An additional low-pass filter stage is furnished by resistor R34 and capacitor C23.

ANALOG-TO-DIGITAL (A/D) CONVERSION

Integrated circuit U6 is the analog-to-digital converter. Included on this integrated circuit are auto-zero functions, auto-polarity, and the digital and analog functions necessary to perform dual slope integration conversion to 20,000 counts (4½ digits). The weight signal voltage is applied to the analog input (pin 10) of U6.

A reference voltage for the conversion is applied to pin 2 of U6. The reference voltage, nominally 1 Volt, is derived from the load cell transducer excitation voltage, by the divider network consisting of resistors R29, R30, and potentiometer P1. Adjusting P1 sets the "span" or weight calibration of the scale.
The system clock, applied at pin 22 of U6, is used to precisely time and control the phases of the dual slope conversion process. Refer to the converter timing diagram when reading the following description.
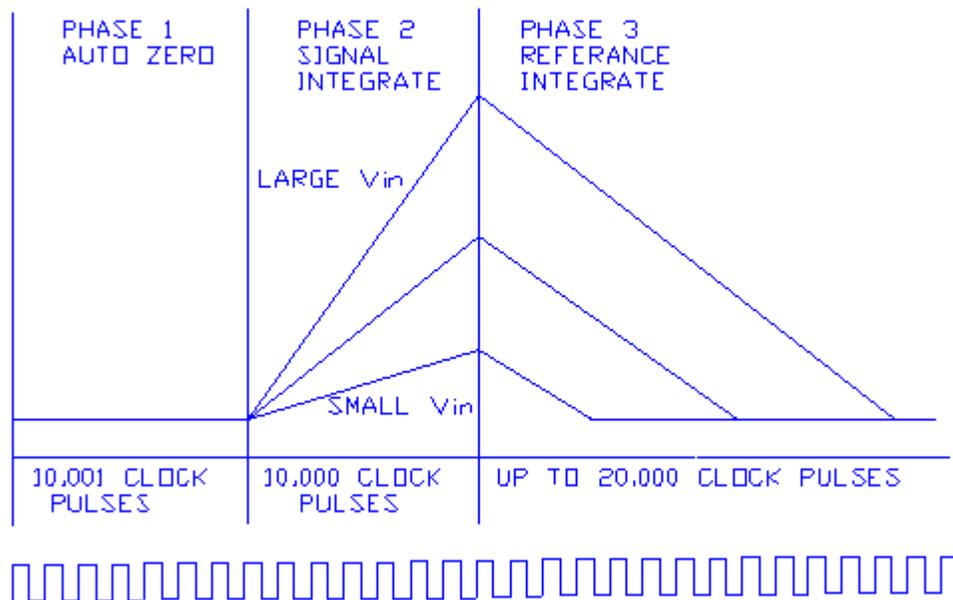
PHASE 1, AUTO ZERO

During auto zero, the errors in the analog components (offset voltages of buffers, comparators, etc.) will be automatically nulled out. This is performed by internal logic that disconnects the input pins (9 & 10) from the applied analog signal, connects them to ground, then closes an internal feedback loop such that offset error A/D information is stored in the "auto zero" capacitor, C21. Also during this phase, "reference capacitor" C22 is charged to the voltage present on "Vref" (pin 2 of U6).

PHASE 2, SIGNAL INTEGRATE

The input signal is reconnected and then integrated for exactly 10,000 clock pulses. On completion of the integration period, the voltage V is directly proportional to the input voltage, corresponding to the weight applied to the scale. Capacitor C20 is the integration capacitor, with resistor R32 setting the integration current. At the end of this phase the input signal polarity is determined.

PHASE 3, REF. INTEGRATE, SIGNAL DE-INTEGRATE

The input to the integrator is switched from the input signal to reference capacitor C22. Internal switches connect capacitor C22 to the integrator input so that its polarity is opposite that of the previously applied input signal. This causes the integrator to discharge back towards zero. The number of clock pulses counted between the beginning of this cycle and the time when the integrator output passes through zero is a digital measure of the magnitude of the input signal. This count is stored in an internal latch on U6 for output to the microcomputer.

ZERO INTEGRATOR PHASE

One minor additional phase is included to insure that the integration capacitor C20 is fully discharged to zero volts. This typically lasts 100-200 counts.

CLOCK CIRCUIT

A clock is required for the A/D converter, integrated circuit U6. A clock signal is generated internally in microcomputer U7 and appears on port pin "P1.0". The frequency is internally set by the microcomputer's software and is nominally 120 KHz.

POWER SWITCHING, VOLTAGE REGULATION AND SUPPORT CIRCUITRY

Depending upon their configuration, **WELCH ALLYN STOW-A-WEIGH®** scales operate on ordinary disposable alkaline cells. Additional circuitry is included to switch the battery supply, provide voltage regulation, and detect low battery voltage conditions.

BATTERY SWITCHING

In order to conserve battery life, the battery supply is switched on and off as needed by the scale.

A snap action switch is located in the scales counterbalance mechanism that interrupts the battery power applied to the scale when the platform is in the stowed or "up" position. When the weighing platform is in the "down" position it enables battery power to be applied to the scale's electronics.

Transistor Q1 is a series switch, which applies battery voltage to the remainder of the circuitry. Q1 is controlled by transistor Q2 which, in turn, is controlled by "watchdog timer" circuit U11.

To initiate power-on Q1 is turned on through momentary closure of membrane switch S9 ("**ON**") and diode CR10; diode CR13 is used to signal input pin "PB.7" of port expander U7 that the "**ON**" switch is pressed.

To provide automatic turn-on of the scale as the platform is lowered, a series network consisting of a resistor and capacitor is attached to the snap action switch in the counterbalance mechanism. This network is connected in parallel with the front panel's "ON" power switch through a connector labeled "J3 EXT SW", located on the display board assembly.
When the platform is lowered the snap action switch closes and applies battery power to the instrument board. At the same time the capacitor charges through the resistor, effectively providing a pulse, and simulating the pressing of the "ON" pushbutton.

When the platform is raised, the snap action switch interrupts the battery power to the board, and at the same time discharges the capacitor through the series resistor, readying it for the next time the platform is lowered.

A secondary turn-on circuit occurs through diode CR12 and switch S3 ("**RE CALL"**) to allow display of the previously stored weight if the scale is presently turned "off". The switch closure is coupled through diode CR14 to the input pin "PB.1" of port expander U7 so as to indicate when the "**RE CALL**" switch is pressed.

Once Q1 is on and voltage is applied to the circuit, watchdog timer U11 will keep transistor Q2 on through output line /WDO and resistor R5, subsequently keeping transistor Q1 energized. If no further action occurs an internal timer contained within watchdog timer U11 will time-out after approximately 1.6 seconds and switch off Q2, causing Q1 to turn off and remove power from the scale's circuitry.

Once energized and properly running, microcomputer U10 will keep resetting watchdog timer U11 by periodically pulsing U11's input line, labeled "WDI". Should the scale's operating program call for shut-off, or a hardware/software failure of microcomputer U10 occurs, the reset pulses to U11 will no longer occur and 1.6 seconds later U11 will time-out and cause the circuit power to switch off.

Resistors R1, R2, R3, R5, and R14 are included for proper circuit biasing. Capacitor C6 is used as an output filter.

VOLTAGE REGULATION

Voltage regulators VR1 and VR2 render regulated sources of +5 Volts D.C. for operation of the analog (VAA) and digital (VCC) circuits, respectively. Use of two separate +5V regulators helps to prevent noisy digital signals from entering the sensitive analog circuits. Capacitors C3 and C8 are used to insure regulator stability.

+9.5V/-7.5V SUPPLY

Integrated circuit U2 is used to convert +5 Volts D.C. to +9.5V and -7.5 Volts D.C. for use in the analog circuits. It contains an internal oscillator (operating at approximately 8 kHz) and a series of switches. During one half of the cycle capacitor C25 is connected between VAA and ground, charging C25 to VAA's potential of +5 Volts. During the other half cycle capacitor C25 is reconnected between VAA and pin 8 (negative lead of C25 to VAA) so that its voltage adds to VAA and charges filter capacitor C26 to approximately twice VAA or 9.5 to 10 Volts.

The remainder of U2 is used to generate a negative supply voltage. Capacitor C28 is connected between ground and the +9.5 Volt source on pin 8 during one half cycle of the internal oscillator. During the other half cycle, it is reconnected between ground and pin 4 such that its negative lead is connected to pin 4. This transfers C28's charge into filter capacitor C27 and produces a negative voltage. Diodes CR8 and CR9 reduce the voltage slightly to obtain the desired -7.5 Volts.

BATTERY MONITOR

Integrated circuit U3 is included to monitor the voltage of the battery and provide an indication to the scale's operator when battery replacement is required. Two states of weak battery operation are detected; "low-battery" (battery is usable but will soon need replacing) and "low-low battery" (battery is too weak to properly operate the scale).

Pins 1, 2 and 3 of U3 are connected to a voltage divider network consisting of R8, R9 and R10, to form the "low-battery" detector. The output of this circuit (pin 1) is normally low when the battery is good and switches high when the battery is low. It is coupled to the busy signal of U6 (pin 21) through resistor R36 to the driver for the front panel "**LO BATT**" indicator. This causes the "**LO BATT**" indicator to flash when the battery is low.

The remaining half of U3, pins 5, 6, and 7, are connected to resistors R11, R12, and R13 to form the "low-low battery" detector. The output on pin 7, which is normally "high" with a good battery, goes "low" when the battery is too weak to reliably operate the scale. This output is connected to an I/O pin on microcomputer U10 to signal the microcomputer that "low-low" battery has been recognized.

The microcomputer U10 will process the "low-low" battery signal and cause "***bAttrY***" to appear on the scale's front panel display, in addition to the flashing "**LO BATT**" annunciator.

MICROCOMPUTER AND SUPPORT CIRCUITS

To attain various additional features such as automatic zero tare, pounds/kilograms conversion, weight lock-in, previous weight memory, etc., a microcomputer is employed to additionally process the data supplied by the A/D converter. This microcomputer system consists of U10, a microcomputer; U7, a peripheral port expander to furnish additional input/output lines; U9, a non-volatile memory which stores the previous weight reading; and U11, a device to generate reset conditions for the microcomputer.

During operation of the scale the microcomputer continually receives the weight readings from the A/D converter. This data is received in a "multiplexed" format (one digit at a time) from the output of the A/D converter (microcomputer input lines P1.0 through P1.6). The microcomputer also continually scans the keyboard (using U7) looking for closed switches. If a key press is sensed the microcomputer executes whatever action is called for in its program. After processing the A/D data the microcomputer assembles it for viewing and transfers it to the front panel display.

U10 is a complete microcomputer, containing a software program stored in read-only memory, read/write memory for temporary storage of program variables, an arithmetic logic unit, input/output and other control lines, etc. Crystal XTAL1 and capacitors C29/C30 form the clock oscillator, which controls the internal timing of the microcomputer.

PORT EXPANDER/KEYBOARD/BEEPER

Integrated circuit U7 is included to supplement the I/O (input/output) of the microcomputer system. U7 contains additional I/O lines (referred to as "ports").
Microcomputer U10 reads (from input lines) or writes (to output lines) data to U7 periodically by use of the data bus (lines DB0 through DB7) and the /RD and /WR lines.

The front panel keyboard is attached to some of U7's input port pins (PB.0 through PB.7, and PC.4). Resistor networks R42/R43 serve as "pull-ups" and keep the input pins at a "high" state (+5V) until a key switch is pressed; this pulls the respective input pin "low" (0V). The microcomputer will recognize this key press when it reads the input pins from U7 and if the key remains closed for a number of milliseconds the microcomputer will execute that key's function.

A small audio annunciator is driven by transistor Q3, which in turn is controlled by U7's output pin PA.7. The annunciator gives a short beep as audible recognition of a key being pressed. The length of the beep and its various sequences are controlled by U10's software. Additional output lines of U7 are used to control the driver for annunciator lamps on the display.

NON-VOLATILE MEMORY

The internal memory of microcomputer U10 does not retain data when the power is switched off. Because some features of the scale may require lasting data retention (such as last weight recall) integrated circuit U9 is included. This device, called an "electrically erasable programmable read only memory", or "EEPROM" will store selected information for periods of up to 100 years.

Data that requires storage or retrieval from U9 is sent in serial form using the lines SCL (serial clock) and SDA (serial data). These are controlled by microcomputer U10. A data bit (a high or low level) is sent and received on SDA when the SCL line provides a pulse.

Resistors R54/R55 are provided as pull-ups on the SCL/SDA lines to insure the data and clock pulses are properly shaped. Capacitor C36 improves power supply bypassing.

RESET GENERATION

In order for microcomputer U10 to properly execute its software instructions it must be initialized to the start of the program when power is first turned on. Reset pin 9 of U10 will accomplish this when it is set "high."

A reset pulse of approximately 200 mS is automatically generated by "watchdog timer" U11 when the Vcc level rises above 4.65 volts. If Vcc is below 4.65 volts the reset line stays "high", keeping the microcomputer U10 in an inactive state. The reset pulse is also connected to port expander U7.

DISPLAY BOARD

Presentation of the weight information is performed by the model 22DSDP display board. It incorporates LED (light-emitting diode) digits and annunciators to provide a clear, bright, easy-to-read display.

The weight value is displayed on six, 0.43" high common cathode digits. These are driven in a multiplexed fashion (one digit on at a time) by LED driver U1. U1 receives the digit display information from the microcomputer's parallel data bus (DB0-DB7) and automatically performs the multiplexing function. Resistor package RP1 sets the operating current level for the displays.

A variety of LED annunciator lamps are contained on the front panel to indicate "**POUNDS**" or "**KILOGRAMS**", "**PRIOR WEIGHT**", and "**LO BATT**". These annunciator lamps contain multiple LED's to provide an evenly illuminated surface. They are driven by integrated circuit U2. U2 receives the on/off information for the annunciators from microcomputer U10 via port expander circuit U7. Resistor packs RP2 and RP3 provide current limiting for the annunciators.
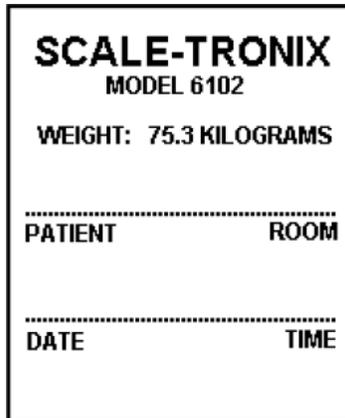
Printer General Description

SETUP

The optional printer assembly will normally be installed at the factory when your scale is produced and require no further attention during initial set-up. If you are installing the printer as a field modification.

PRINTER

On various model scales a digital paper tape printer can be supplied. The printer provides a convenient printed record of the weight. Space is provided on the tape printout to write in the patient's name or ID, Room number, and date. See the sample weight ticket printed below:

```
SCALE-TRONIX
MODEL 6102

WEIGHT: 75.3 KILOGRAMS

.....................................................
PATIENT                              ROOM


.....................................................
DATE                                  TIME
```

The printer will only print a valid weight. It will not print when the scale is reading "**0.0**" or is empty. It will Print the prior weight if that feature is currently activated. Press the front panel "**PRINT**" pushbutton to activate the printer. A single beep should be heard, then the printer will power-up and begin printing. A series of four (4) short beeps signifies that an invalid print request was made (weight not displayed on scale or a weight ticket already being printed). One long beep signals an internal problem with the printer, such as an out of paper condition, open print head or disconnected cable.

Printing may occur after the patient has left the scale. To print the previous patient's weight, press the "**RE CALL**" pushbutton followed by the "**PRINT**" pushbutton. The "**PRIOR WEIGHT**" annunciator will flash, and the scale's readout will display the previous patient's weight for a short time while the printing continues. The scale will not automatically shut-off until the printing is completed.

Various set-up options are available for the printer. These include "auto" print (weight is printed automatically on display), print only in selected units regardless of front panel display, etc. See the section pertaining to "**SET-UP**" in your scale manual for further information
.
The printer is a modern thermal type using a specially coated paper. The paper should be 2¼" wide by approximately 1 7/8" in diameter. One roll of paper will produce about 500 weight tickets. No ink ribbons are required. Additional rolls of paper can be purchased at many stationary supply stores or directly from **Welch Allyn** part number 23709.

Paper is loaded through a removable access door on most scale models. Be sure to install the paper as shown in the illustration.

PRINTER TECHNICAL DESCRIPTION GENERAL

This internal printer employs a thermal type print mechanism, which heats a specially coated paper to produce the resulting weight ticket. The use of a thermal printing mechanism eliminates the need for ribbons or ink cartridges, and provides quiet, maintenance-free operation. The total printing system consists of two assemblies:

1.) Printer mechanism assembly with stepper motor and thermal print head
2.) Printer interface board assembly

PRINTER MECHANISM:

The printer mechanism employs a thermal print head consisting of a horizontal row of 384 small heater resistors. The thermal print head also contains driver electronics that receive the formatted print data and control the 384 heater resistors.

When any of the heater resistors are momentarily energized (powered for about 3 milliseconds) it will produce a small rectangular black dot on the thermal paper. Each printed character composition is 10 dots wide by 24 dots high. The paper width allows a maximum of 24 characters per line, which includes spaces between characters and paper edge margins. Printed characters are formed as a series of
horizontal lines. A stepper motor in the printer mechanism advances the paper after printing a horizontal line of dots, to print the next line of dots, or to advance the paper on blank lines. The printer mechanism also contains an optical paper sensor consisting of an infrared light emitting diode and matching phototransistor. Light from the diode is reflected off the surface of the paper and sensed by the phototransistor.

An optional switch is also included to sense when the thermal print head is in the open, paper loading position. The printer mechanism is serviced as a complete assembly and is generally not repairable.

PRINTER INTERFACE ASSEMBLY

The printer interface assembly is used to control the printer mechanism. It contains all the circuitry needed to interface to the printer mechanism, scale's electronics, and battery/power supply. For technical explanation purposes it can be divided up into the following sections:

1.) Printer voltage regulation
2.) Microcontroller & support circuitry
3.) Interface to scale electronics
4.) Interface to thermal print head
5.) Interface to stepper motor
6.) Thermal print head temperature measurement
7.) Paper sensing and head position.
8.) Dip switch options

PRINTER VOLTAGE REGULATION

The printer mechanism and its electronics require a source of +5Vdc for operation. To increase battery life, the printer is only powered up when needed. Integrated circuit voltage regulator U201, an LTC1963, is employed to regulate the varying battery voltage to a constant +5V dc.

Input voltage to U201 is applied at connector J201. U201's output voltage is set by the resistor divider R210 and R211. U201 has internal current limiting and reverse battery protection, and has a switchable output controlled by an on/off terminal. Capacitors C201, C202, C205, and C206 provide filtering and insure regulator stability. Additional capacitors C207 and C210 are included to provide distributed filtering.

A series transistor switch network consisting of Q202 and Q203 is used turn the U201 regulator on when printer operation is required. Transistor Q202 is turned on when the scale's instrument board powers up and the RXD raises to a "high"; it remains on the entire time that the scale is on. Transistor Q203 is turned on when the scale's instrument board sets the RTS line "high", it is activated only when printing is desired.

Resistors R204, R205, R206, and R207 bias Q202 and Q203. Capacitors C203 and C204 are included to form time delays to prevent the printer electronics from inadvertently turning on as the scale powers on or off. R209 is included to keep U201's on/off terminal at ground potential until switched on.

An additional circuit to turn the printer on is the manual paper advance switch S201. One set of S201's contacts is used to apply battery voltage to U201's on/off terminal through resistor R208. The other set of S201's contacts is connected to microcontroller U202 to indicate that a paper advance is requested. On the 500057-B printed circuit boards, R220 is included to provide additional pull-up bias.

PRINTER MICROCONTROLLER & SUPPORT CIRCUITRY

Microcontroller U202 is included to perform all the data manipulation and timing required to make the printer mechanism work. It contains RAM (random access memory), a flash ROM (read only memory) with program software, I/O (input/output) ports, a UART (universal asynchronous receiver/transmitter) and the needed arithmetic logic, clock generating, and associated internal logic.

U202's internal software is loaded into the device through the ISP (in-circuit serial programming) port at J205 during manufacture.

A clock circuit for U202 is formed from crystal XTAL201 along with capacitors C208 and C209.

Reset supervisor U205 is provided to initialize microcontroller U202 on power up. U205 measures the circuit power supply and keeps U202's reset line high until the proper operating voltage has been reached. C212 determines the width of U205's reset pulse. R218 keeps U205's reset input biased high until pulled low for in circuit programming.

An 8-position dip switch assembly is attached to one port of U202 to allow operating options to be set.

D202, a bi-color (red/green) LED is used to indicate printer status. Internal software in U202 determines the operation of the LED. Resistor R212 sets the operating current for D202.

PRINTER INTERFACE TO SCALE ELECTRONICS

The printer electronics are powered "on" when the scale's electronics set the "RTS" line high on J202. The "RXD" will have been set high prior to the RTS line. This gates on the series transistor network of Q202 and Q203, turning on voltage regulator U201.

Data to be printed is transmitted to the printer through J202's "TXD" line. Data is sent in ASCII serial format at 9600 baud. A data bit is about 104uS in length. Word length is 8 bits, no parity, at TTL levels (0 to 5V). Data is buffered by sections of U206, a Schmitt trigger inverter. Resistors R201 and R202 are included for protection and circuit bias.
Printing begins once U202 receives a carriage return ("CR", ASCII 13) byte. While busy printing U202 will halt data transmission between the scale and printer by setting the "CTS" (clear to send) line of J202 high. The scale's electronics will recognize this and stop transmission until CTS goes low again. Diode D201, resistor R203 and sections of U206 are used to interface to the CTS line.

PRINTER INTERFACE TO THERMAL PRINT HEAD

Microcontroller U202 takes the character print data (letter, number, etc.) from the scale and then converts it into the appropriate dot pattern to form letters and numbers on the paper. This is a complex process executed by U202's internal software. Dots that need to be printed on the paper are set to a "1" level; blank dots are set to a "0" level.

Once converted, the resulting dot data string is transmitted in serial format through the "DI" (data in) line as the "CLK" (serial clock) line is pulsed. Once all 384 bits (1 per dot) have been sent, the "/LAT" (latch) line is pulsed to load the data into the thermal print head. The process is similar to manipulating a digital logic shift register. The thermal print head contains the appropriate logic interface and current drivers to operate the heater resistors.

Because of the current required per dot (about 35mA) only a limited number of dots can be energized at one time to avoid overloading the scale's power supply. This is accomplished by dividing the thermal head's heater resistors into segments by use of the STB1, STB2, STB3, and STB4 (strobe 1, strobe 2, etc.) lines.

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Note that STB2 and STB3 are joined together to divide the heater resistors into three, 128 heater resistor segments. U202 also controls the maximum number of heater resistors energized by assemblies using limiting the number of "on" dots in the dot data string sent to the thermal head.

With the dot data now loaded into the thermal print head, microcontroller U202 controls the length of time the heater resistors are on, typically around 3-4 mS, to form the dot image on the paper. Microcontroller U202 calculates this based on the temperature of the thermal print head, which is measured by a thermistor embedded in the head. U202 will pulse mosfet transistor Q201 to provide power for the heater resistors to match the interval required. This is repeated as necessary with the various STB sections until all the required dots on a single line are formed.

Resistors contained in RN201 provide pull-up bias on the various logic interface lines to insure a fast transition.

PRINTER INTERFACE TO STEPPER MOTOR

The printer mechanism contains a stepper motor to advance the paper during printing and paper feed. The stepper motor is driven by a separate IC designed for that purpose, U203, and is connected to lines OUT1, OUT2, OUT3, and OUT4. The stepper motor requires various combinations of high and low logic signals from U203 in order to rotate.

U202's operating software generates these combinations. A section of Schmitt trigger inverter U206 is used to enable U203 and insure the stepper motor is off while the microcontroller is reset.

To provide manual paper advance for paper loading, switch S201 is included. One section of S201 is used to turn on regulator U201 and provide circuit power; the other section is connected to microcontroller to U202 to request a paper advance. U202 will then provide the correct signals to U203 to operate the stepper motor and advance the paper.

PRINTER THERMAL PRINT HEAD TEMPERATURE MEASUREMENT

The temperature of the thermal print is measured to determine the correct "on" timing of the heater resistors. An NTC thermistor is embedded in the thermal print head and changes its resistance based on the print head's temperature. U204, a 10 bit (1 part in 1024) A/D (analog to digital) converter is included to measure the voltage developed by the divider formed of R217 and the thermistor connected at "TM".

U204 converts the thermistor voltage from an analog value to a digital number, and passes it to microcomputer U202.

Assemblies employing the 500057-A printed circuit board: The converted temperature value is passed to microcontroller U202 in I2C serial format via use of data (SDA) and clock (SCL) lines. Resistor R219 and capacitor C211 provide filtering of the temperature signal. Resistors contained in RN201 provide pull-up bias for the SDA and SCL lines.

Assemblies employing the 500057-B printed circuit board: The converted temperature value is passed to microcontroller U202 in SPI serial format via use of data (Dout) and clock (CLK) lines. When U204's chip select (/CS) line is pulled low by U202 the conversion process begins. Capacitor C211 provides filtering of the temperature signal.

Resistors contained in RN201, along with resistor R220, provide pull-up bias for the Dout, CLK, and /CS lines.

PRINTER PAPER SENSING AND HEAD POSITION

The printer mechanism contains an optical paper sensor consisting of an infrared diode emitter and a complimentary phototransistor. Light from the infrared emitter reflects off the paper and is detected by the phototransistor at connector J207. Microcontroller U202 uses this signal to determine the presence or absence of paper and take action accordingly. The infrared emitter is pulsed on by U202 to conserve battery and emitter life.

One section of U206 is used to process the detected signal before application to U202. Resistor R214 sets the operating current of the emitter. Resistor R215 provides the phototransistor load.

A snap action switch is incorporated within the printer mechanism to determine whether the thermal print head is open for paper insertion or closed for printing. Resistor R206 is included for circuit protection. A section of S202 parallels this switch so that mechanisms not equipped with this switch will operate properly.

PRINTER DIP SWITCH OPTIONS

An 8-position dip switch is included to allow troubleshooting and some adjustments to operating parameters. Note that the settings below may vary slightly depending on the current software revision.

For normal default operation all switches should be "OFF". Use a fine tip ballpoint pen to actuate the switches as follows:

S202-1: Puts printer in test mode. When "ON" and the paper advance switch is pressed, the printer will display the software version, date, and other dip switch options. If the paper advance is held long enough the printer will produce a variety of printable characters. When S202-1 is "OFF" paper advance operation is normal.

S202-2: Sets maximum number of simultaneous dots to be printed. With S202-2 "OFF" the maximum number of dots is 12. With S202-2 "ON" the maximum number of dots is 30. While increasing the maximum number of simultaneous dots produces faster print speeds, it also increases power consumption and reduces battery life. S202–2 "ON" should only be used with scales that have rechargeable battery packs.

S202-3 & S202-4: Increases resistor heater on time to improve printing contrast. May need to be adjusted depending on paper type. Adjustment as follows

S202-3 "OFF" & S202-4 "OFF" : 100%
S202-3 "OFF" & S202-4 "ON" : 115%
S202-3 "ON" & S202-4 "OFF" : 133%
S202-3 "ON" & S202-4 "ON" : 150%

Note that increasing the on time will slow the printing slightly and decrease battery life. Setting should be at the minimum consistent with good print results.

S202-5: Bypasses head temperature sensor circuitry and provides fixed resistor heater pulse width. Used for troubleshooting only.

S202-6 & S202-7: Not used
S202-8: Bypasses thermal head position switch. Used for printer mechanisms without head position switch or for troubleshooting.

Maintenance of Scales

Routinely perform the following preventive maintenance to keep your scale in working order.

1. Check the calibration annually or as required.
2. Inspect the scale for cracks or loose mounting hardware. Replace or repair as necessary.
3. Visually inspect the scale enclosure for damage or loose or missing hardware. Replace or repair as necessary.
4. Check load mounts for any visual signs of damage and replace as necessary.
5. Do not expose the scale to excessive water or moisture.
6. Check AC line Cord for any signs of damage and replace as needed.
7. Do not store the scale where heavy objects can be placed on it.
8. Replace the batteries annually or as required.
9. Do not service or perform maintenance while the scale is in use with a patient.

Battery replacement

⚠ **CAUTION** Use only size D disposable alkaline batteries. The use of any other battery will void the warranty.

1. Using a screwdriver, remove the two fasteners on the access door located on the front of the scale and remove the door.

2. Install six new batteries in the battery holder. Make sure to follow the polarity instructions.

3. Re-attach the access door.

In situations where the scale is not used extensively, the batteries should be replaced annually just as a precaution.

Typical battery life is in excess of one year depending on usage. When the battery voltage drops below a preset level, the "LO BATT" annunciator light will blink signaling the operator that the battery is wearing down. This is a preliminary warning. Immediate action is not required as there are several weighing's left in the battery when the "LO BATT" warning is activated. The batteries should be replaced within a few days of this warning.

A second low battery condition is detected when the voltage is inadequate to accurately operate the scale. At this point the "LO BATT" annunciator will continue to blink, and the scale will display "bAttrY" on the weight display accompanied by a series of four long beeps. This is done to eliminate the possibility of displaying erroneous weights by preventing the scale from being used. If the batteries are replaced when the "LO BATT" signal activates, this additional "low-low battery" signal will never be seen.

Change the printer paper

1. Use a screwdriver to loosen the screw on the battery access door and remove the printer access door.

2. Remove the spindle containing the empty printer paper roll from the printer paper well.

3. Replace the printer paper roll in the spindle. Make sure the new printer paper is advancing from the bottom of the roll.

4. Lift the green knob to lift the print head lever.
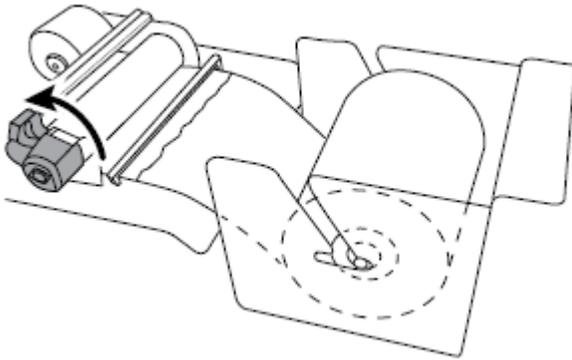
5. Insert the paper through the paper guide slot, and make sure it goes under and around the black roller bar.
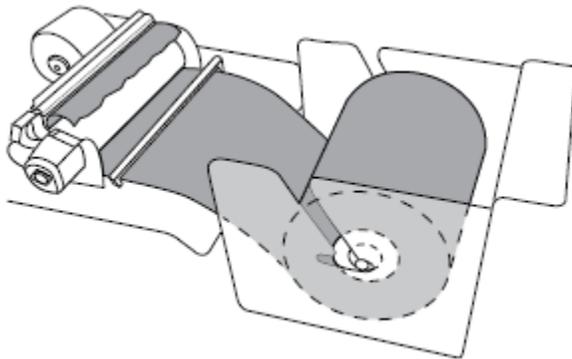
6. Pull the paper under the print head lever and push the green knob down to push the print head lever down.
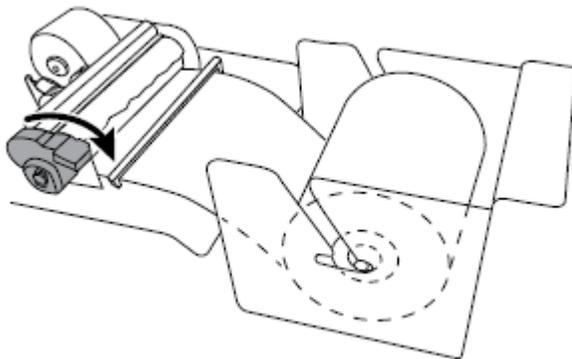
7. Press **PAPER ADVANCE** to move the paper through the printer.

8. Install the printer access door, and advance the new paper through the slot on the door.

9. Install the screw on the printer access door

Note: Never pull or force paper through the printer mechanism with the head lever in the "down" (or closed) position. Never insert any object besides paper into the printer head assembly. Damage to the print head can occur.

If problems occur with the printer, check the condition of the printer status light located on the printer assembly. Press the paper advance switch to power up the printer and activate the lamp.

Calibration of Scale

Your scale has been carefully calibrated at the factory. This calibration involves matching and tuning of the load cells and readout electronics. The scale calibration should be checked annually. Only use calibrated, certified scale test weights for this purpose. Traction or physical therapy weights are **NOT** acceptable since their actual weight can often be in error as much as +/-10%. Calibration weights may be purchased from **WELCH ALLYN** or a local scale dealer. An alternative to calibration weights is the weight comparison method. This requires a known accurate, calibrated scale. A fixed weight is "weighed" on the calibrated scale then the same weight is placed on the scale for comparison.

PRECISION TEST CALIBRATION WEIGHTS ARE AVAILABLE FROM WELCH ALLYN.

Three (3) 25 KILOGRAM TEST WEIGHTS ARE RECOMMENDED.

ORDER PART NO. 20021W: 25 Kilogram Test Weight

If only "pound" test weights are available conversion is as follows:

1.0 Pound = 0.454 Kilograms
5.0 Pounds = 2.268 Kilograms
10.0 Pounds = 4.536 Kilograms
20.0 Pounds = 9.072 Kilograms
25.0 Pounds = 11.34 Kilograms

Large changes in calibration often indicate a damaged load cell or faulty readout component. It is generally recommended that if calibration is necessary for your scale it should be returned to the factory. Calibration procedure follows for those situations where it is not desirable. Calibration should not be attempted by those not having the proper tools or knowledge of electronic systems and their attendant shock hazards.

Prepare for Calibration

1. Be sure the scale is off. The weighing platform must be in the "down" or operating procedure.

2. Detach the readout enclosure by removing the button head screws.

3. The scale's instrument board should now be in full view. Note the location of the trimmer potentiometer, "P1 Span".

Calibration Mode

Enter the "calibration mode" by following **exactly** the procedure outlined below:

1. Be sure scale is off. The weighing platform must be in the "down" or operating procedure.

2. Press and hold the "RE WEIGH" pushbutton.

3. While pressing the "RE WEIGH" pushbutton press and release the "ON" pushbutton.

4. The " ST" pushbutton is a special hidden programming and test pushbutton located under the SCALE-TRONIX® logo "ST" on the left side of the front panel between the "**ZERO**" and "**RE CALL**" pushbuttons. After the scale displays the test pattern of *"888888"* release the "**RE WEIGH**" button and press the "*ST*" **p**ushbutton five (5) times. This will cause the readout to enter the calibration mode. The display will indicate "*CAL*".

5. Press the "*ST*" pushbutton once more; the display will indicate "*A-d*"**.** This indicates the start of the "raw" analog-to-digital converter data being inputted to the microprocessor.

6. Press the "*ST*" pushbutton one more time. The number displayed is now the raw analog to digital data.

7. The automatic turn-off timer has also been programmed for an extended "on" period to give you time to calibrate the scale. This time period is three minutes. The scale may be turned off before this time period by simply pressing <u>and holding</u> the "**ON**" pushbutton. Hold it in for several seconds until the power shuts off. If additional time is needed to complete the calibration procedure, press the "**ON**" pushbutton briefly. This will reset the timer for an additional three minutes.

Calibration Procedure

The readout is displaying a number, which represents the zero offset value of the platform and load cell transducers, in tenths of pounds (0.1 pound). Note and record this value. (Even though your scale may be "kilograms only" in operation, pounds are used internally because of their finer resolution.) Unit's conversion is as follows:

>   1.0 Kilogram   = 2.2 (2.2046) pounds
>   5.0 Kilograms = 11.0 (11.0231) pounds
> 10.0 Kilograms = 22.0 (22.046) pounds.
> 25.0 Kilograms = 55.1 (55.116) pounds.
> 50.0 Kilograms = 110.2 (110.231) pounds.
> 75.0 Kilograms = 165.3 (165.346) pounds.
> 100 Kilograms = 220.4 (220.46) pounds.

Add the specified test weight to the platform. Note the new number displayed. Subtract the original zero offset value from this new number to obtain the scale's displayed value of the calibration weight.

Example: The zero offset value is "11.7" (representing 11.7 pounds). Adding the specified three 25-kilogram test weights (equivalent to 165.3 pounds) to the platform produces a reading of "177.1". The difference is 177.1-11.7 = 165.4 (equivalent to 165.4 pounds). This would indicate the calibration is 0.1 pound "high".

Using the specified three 25-kilogram test weights a difference of 165.3 +/- 0.1 pound should be obtained. If necessary, adjust potentiometer P1 (span adj.) on the instrument board until the correct value is obtained. Remove the test weight and recheck the zero offset value. Note that adjusting P1 may also alter the zero offset value. Repeat the process as necessary to obtain the correct difference.
Now you may turn the scale off by pressing the "ON" pushbutton and holding it in for a few seconds. That will force it to turn off. You may also wait for it to time out and turn off by itself.

Stow-A-Weigh Scales Disassembling Guide

Required tools

- 1/8" Allen wrench
- 5/16" socket
- 10 mm socket
- 3/8" socket
-3/8" wrench
- ½" open end wrench

- Small Philips screwdriver
- Small slotted screwdriver
- 5 mm nut-driver
- #1 Phillip screwdriver
- ¼" ratchet driver with extension

Power down the scale and remove any A/C power

<u>CAUTION:</u> Do not apply extra force to the base of the scale. The load cell capacity can overload and cause damage to the load cells.

Note: Whenever the scale is opened for repair purposes a Calibration must be performed.

5202 Disassembly:
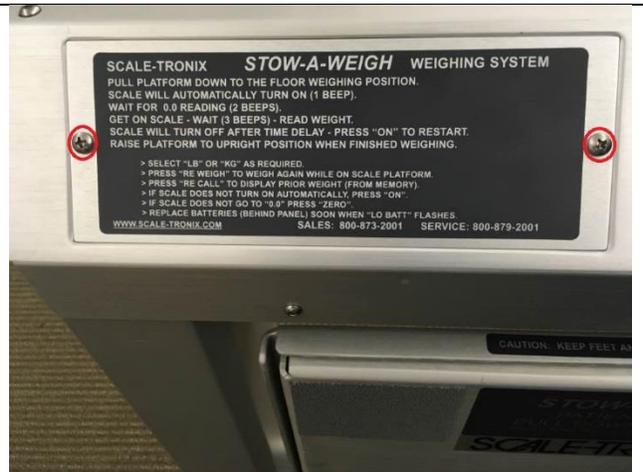
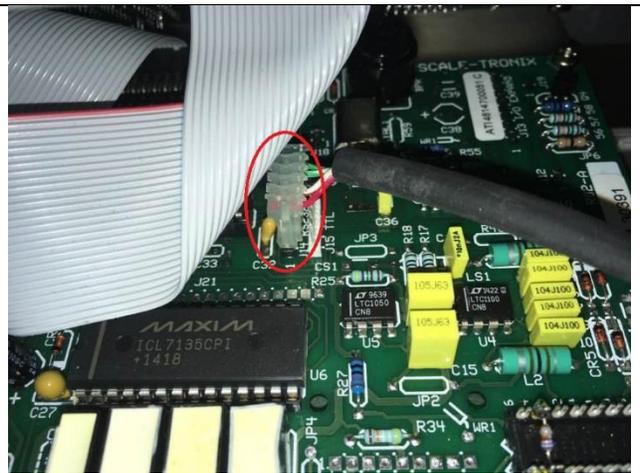|	
1. Use a #1 Phillip screwdriver to remove the battery access door's screws	
2. Remove batteries	
3. Use a 1/8" Allen wrench to remove the screws on the display panel	

4. Disconnect J1	
5. Disconnect three-pins harness	
6. Disconnect J14	
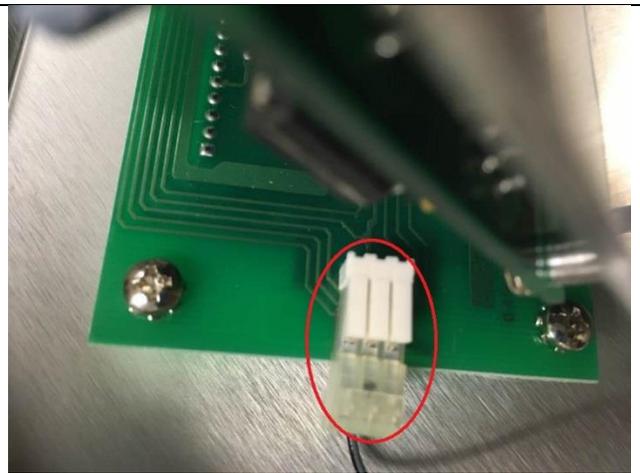
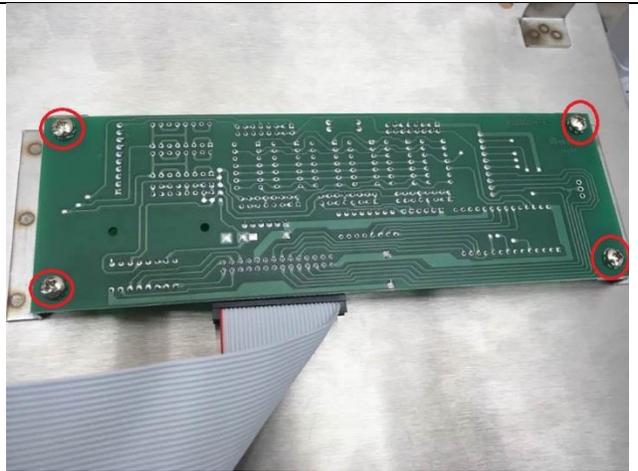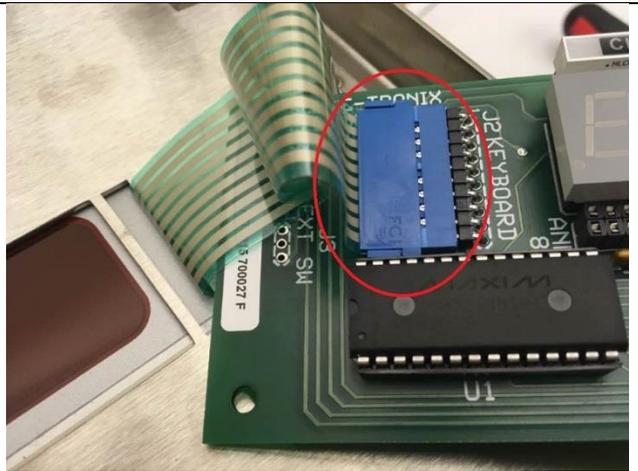|	
7. Disconnect J4	
8. Use a 5/16" socket to remove the nuts	
9. Disconnect J6	
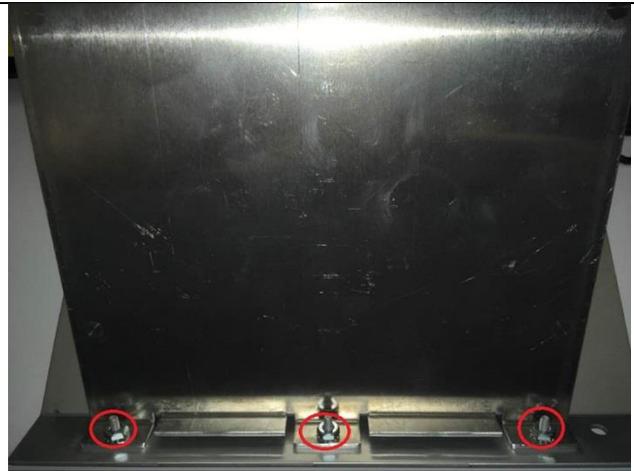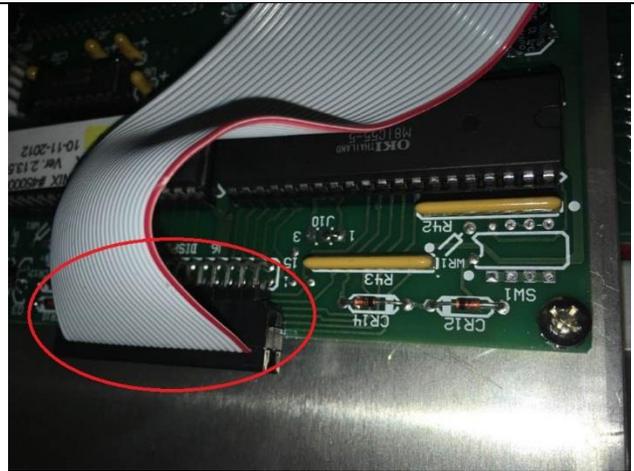
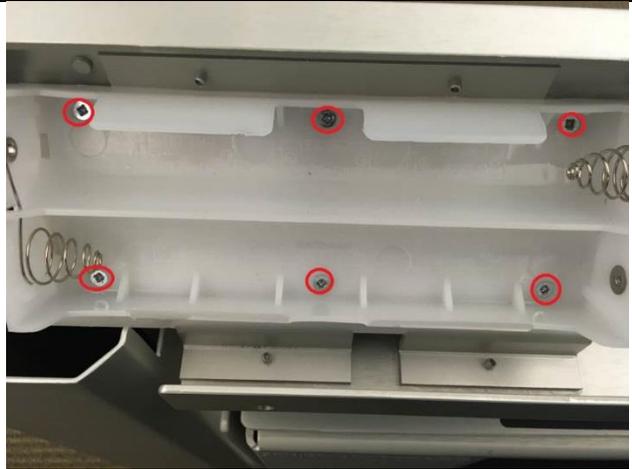|	
10. Use a #1 Phillip screwdriver to remove the screws on the board	
11. Use a #1 Phillip screwdriver to remove the screws on the display board	
12. Disconnect blue-ribbon cable	

13. Use a 1/8" Allen wrench to remove the screws on the panel cover	
14. Use a small Philips screwdriver to remove the screws on battery holder	

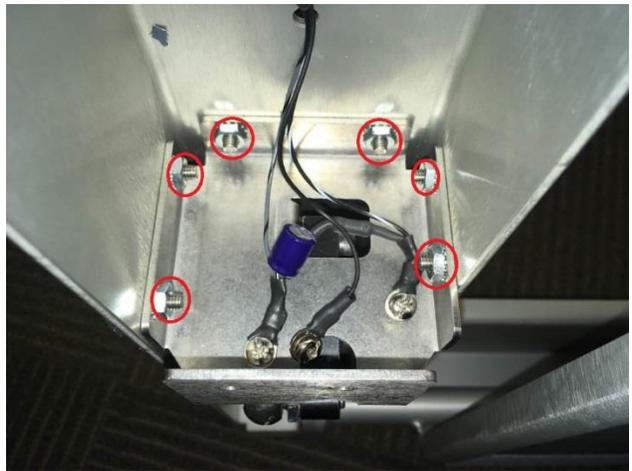|	
15. Use a 1/8" Allen wrench to remove the screws on the left and right leg cover	
16. Use a #1 Phillip screwdriver to remove screws on the momentary switch	

| 17. Use a #1 Phillip screwdriver to remove the bracket mount's screws

Use a 3/8" wrench to remove the nuts |
 |

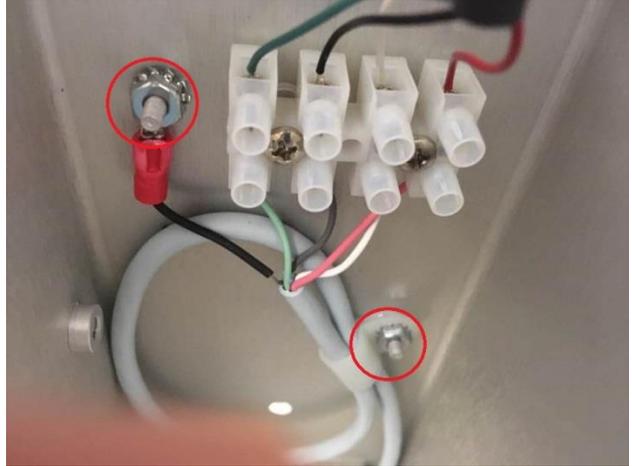|	
18. For replacement of the shock absorber and the ball mounts, use a small slotted screwdriver to push the latch on the shock absorber's socket down (for the top) and up (for the bottom) Remove the shock absorber by pulling it away from the ball Use a ½" wrench to remove the ball mounts Note: Apply the same procedure for both left and right side	
19. Use a #1 Phillips screwdriver to remove the screws on the terminal block	

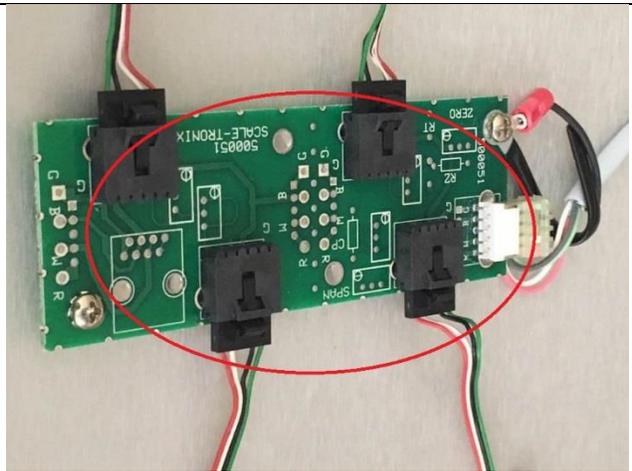|	
20. Use a 5/16" socket to remove the screws on the wire with loop and the cable clamp	
21. Use a #1 Phillip screwdriver to remove the screws Use a 3/8" wrench to remove the nuts of the bracket	
22. Use a 5 mm nutdriver to remove the screws on the RS232 port	

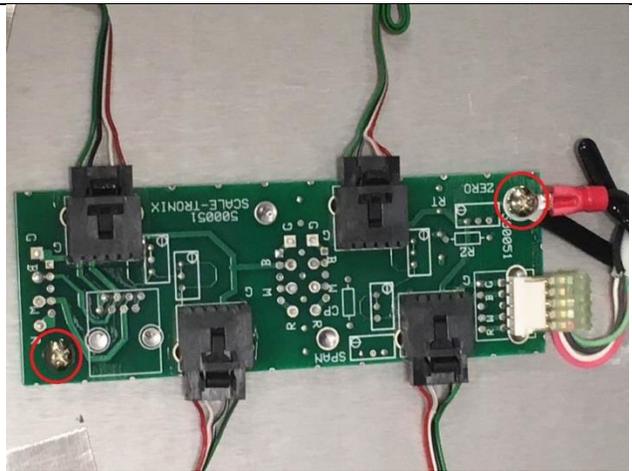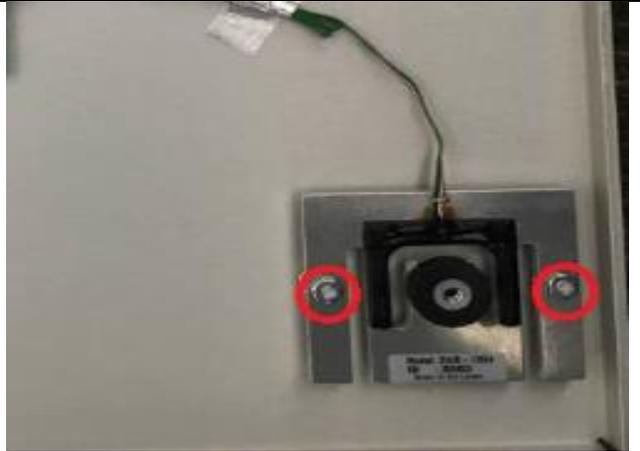|	
23. Use a 1/8" Allen wrench to remove the screws on the deck cover	
24. Disconnect the wire harnesses	
25. Use a #1 Phillip screwdriver to remove the screws on the board NOTE: Remove the tape or cable clamps that hold the load cell and the wire in place to the weldment	

26. Use a 3/8" socket to remove the nuts on each load cell CAUTION: Do not apply extra force to the base of the scale. The load cell capacity can overload and cause damage to the load cells.	

6202 & 6202D Disassembly:

1. Use a #1 Phillip screwdriver to remove the battery access door's screws	
2. Remove batteries	

3. Use a 1/8" Allen wrench to remove the screws on the readout assembly	
4. Disconnect J1	
5. Disconnect JTEST	
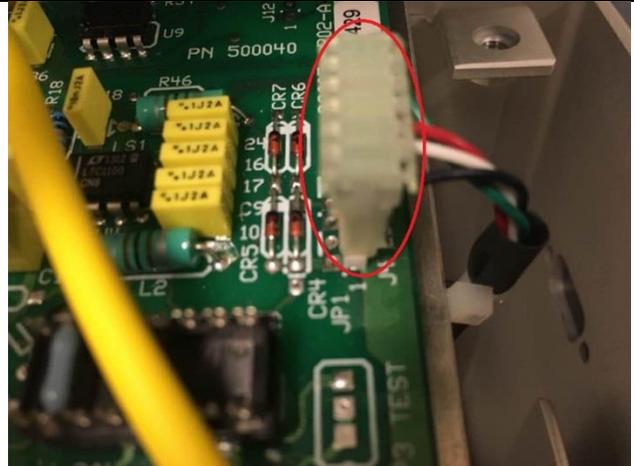
6. Disconnect J4	
7. Disconnect J15	
8. Disconnect three-pins harness	
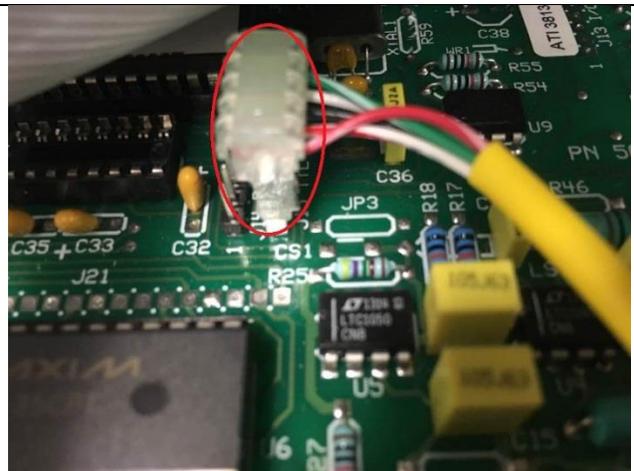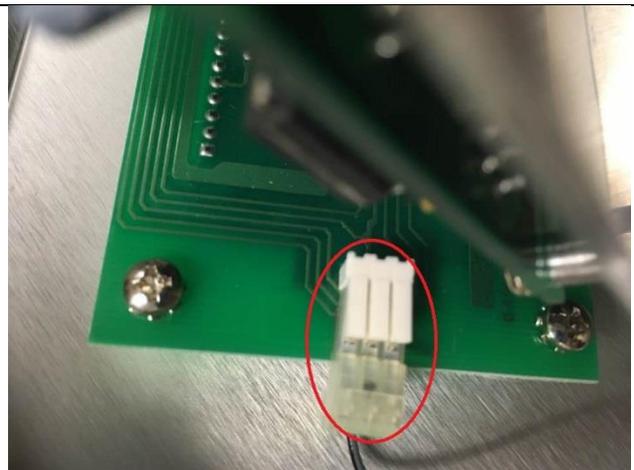
9. Use a 5/16" socket to remove the nuts	
10. Disconnect J6	
11. Use a #1 Phillip screwdriver to remove the screws on the board	
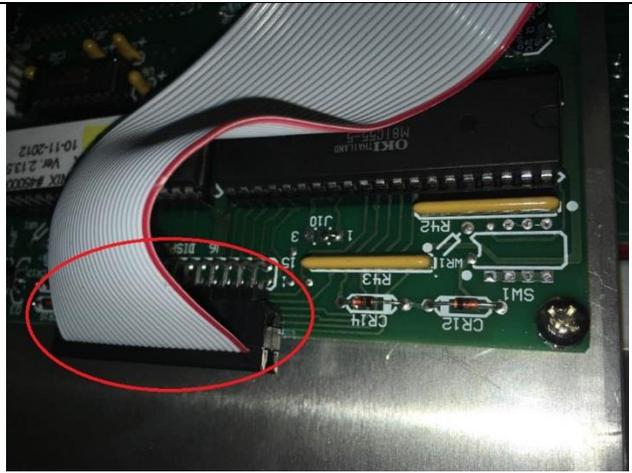
12. Use a #1 Phillip screwdriver to remove the screws on the display board	
13. Disconnect blue-ribbon cable	
14. Use a 1/8" Allen wrench to remove the screws on the front panel	
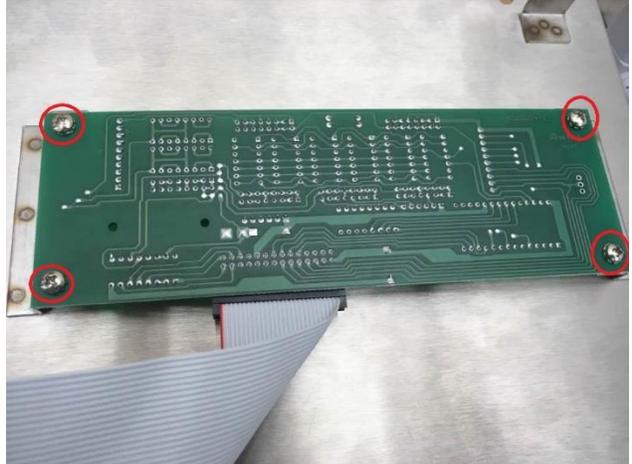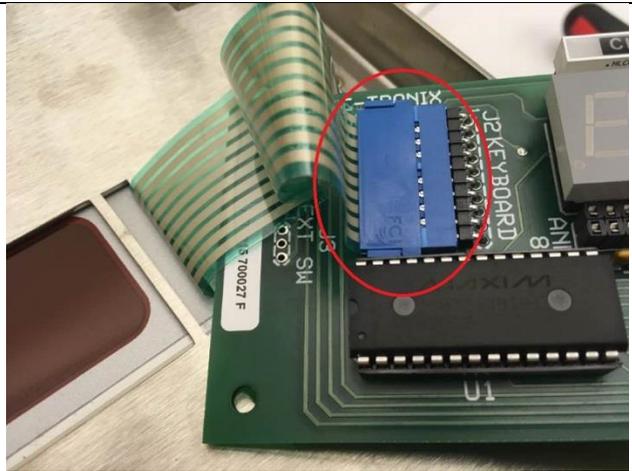
15. Use a small Philips screwdriver to remove the screws on the battery holder	
16. Use a small slotted screwdriver to loosen the screws on the wire harnesses and pull the wires out	
17. Use a #1 Phillip screwdriver to remove the screws	
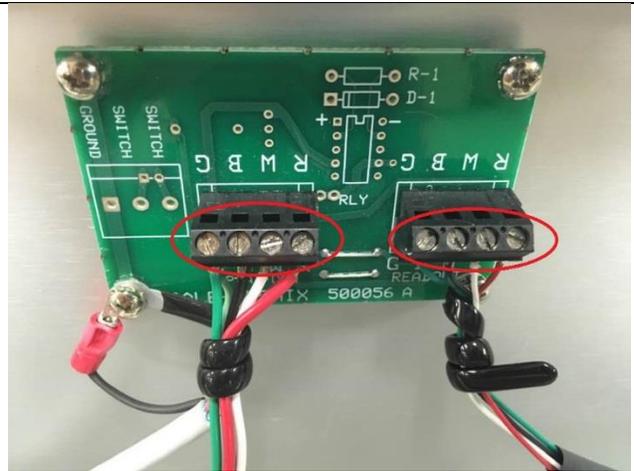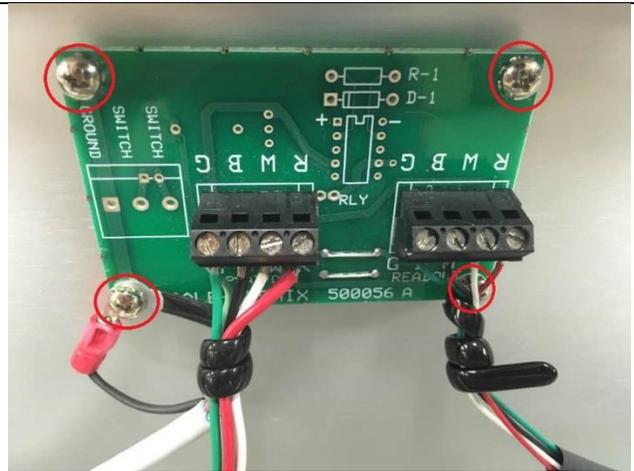
18. Use a 1/8" Allen wrench to remove the screws on the left and right leg cover	
19. Use a #1 Phillip screwdriver to remove the bracket mount's screws Use a 3/8" wrench to remove the nuts	

20. Use a 3/8" wrench to remove the nuts on the mounting bracket	
21. For replacement of the shock absorber and the ball mounts, use a small slotted screwdriver to push the latch away Remove the shock absorbers by pulling it away from the ball mount Use a ½" wrench to remove the ball mount Note: Apply the same procedure for both left and right side	
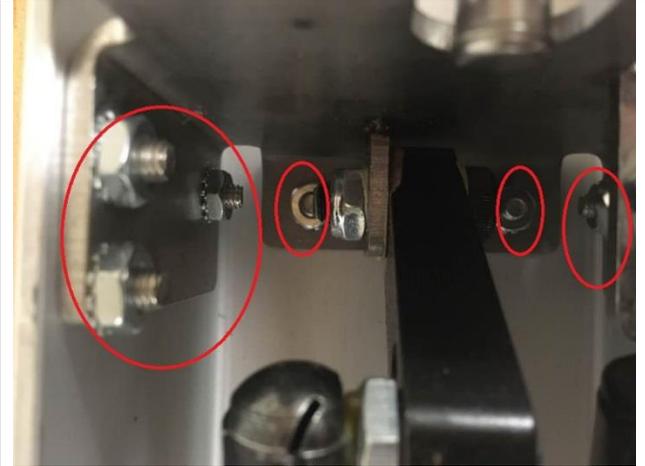
22. Printer disassembly: Disconnect J201 and J202	
23. Use a #1 Phillip screwdriver to remove the screws on the printer board	
24. Disconnect J204, J207, J206, J203	
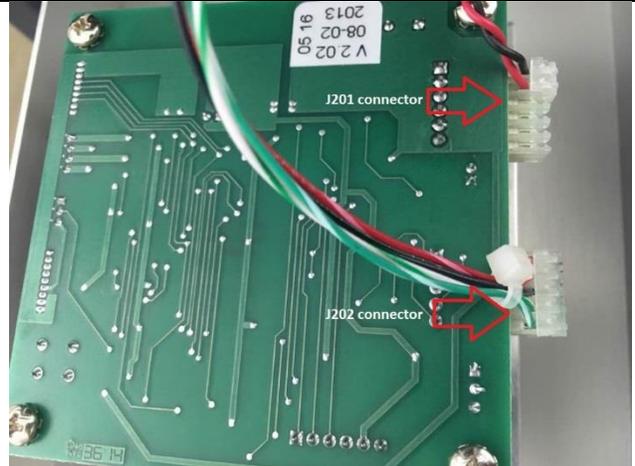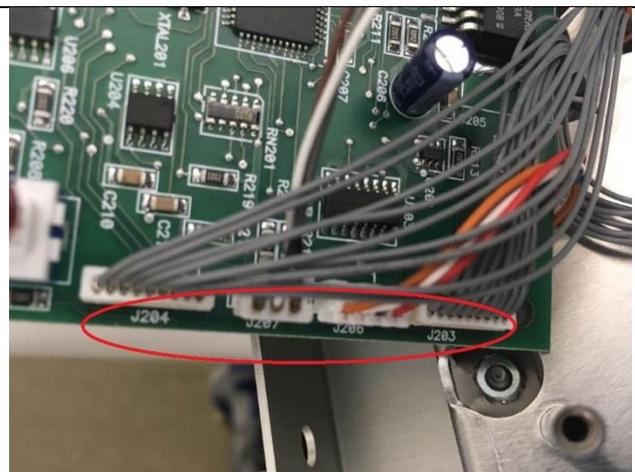
25. Use a 5/16" socket to remove the nuts on the printer mechanism assembly four screws	
26. Use a #1 Phillip screwdriver to remove the screw on the printer cover Use a small Philips screwdriver to remove the smaller screws	
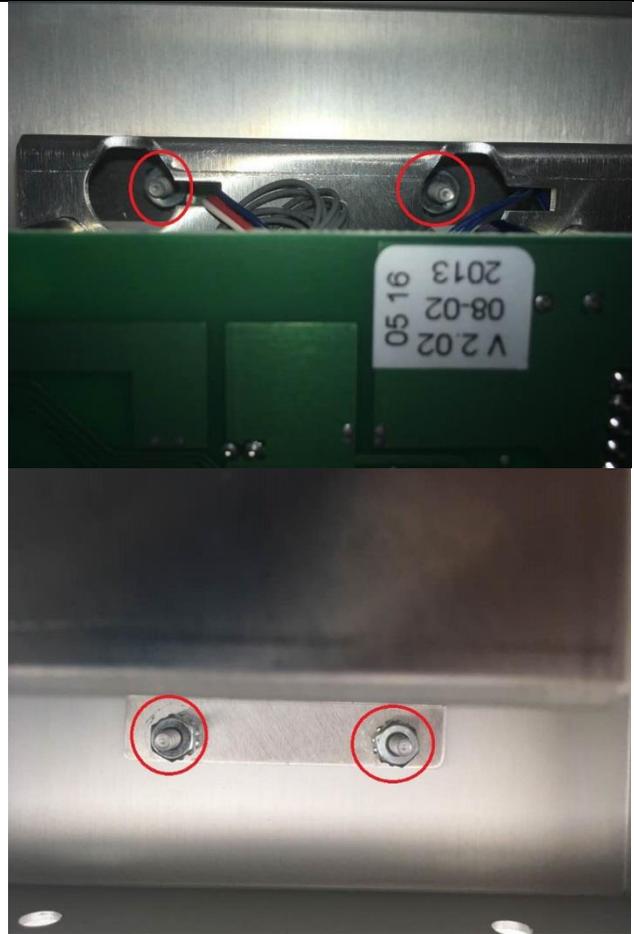
27. Use a #1 Phillip screwdriver to remove the screws on the power connector assembly	
28. Use a small slotted screwdriver to remove the wired connectors	
29. Use a 10 mm socket to remove the AC power jack	
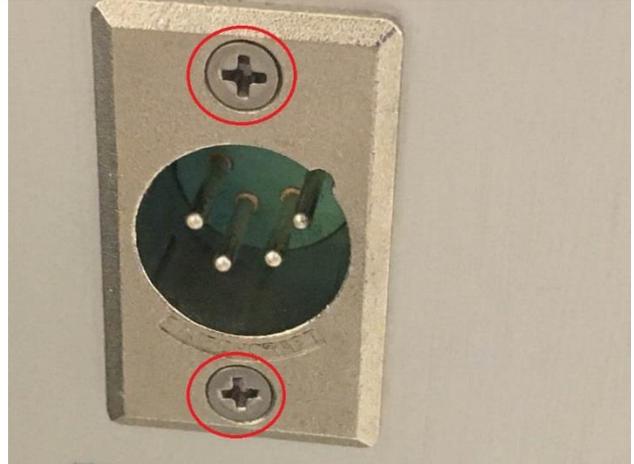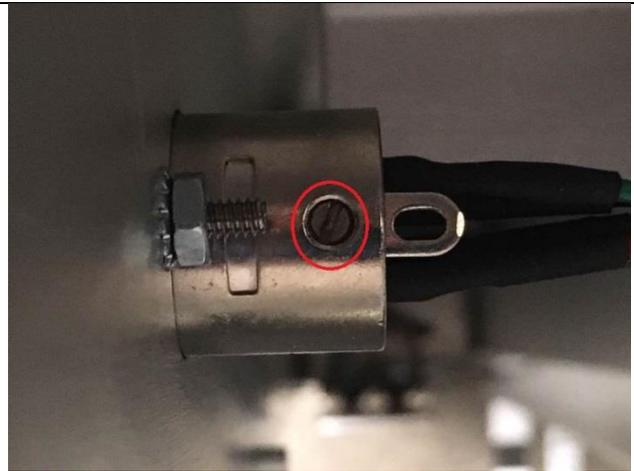
30. Use a 5/16" socket to remove the screws on the AC power cable clamp	
31. Use a 1/8" Allen wrench to remove the deck cover's screws	
32. Disconnect the wire harnesses	
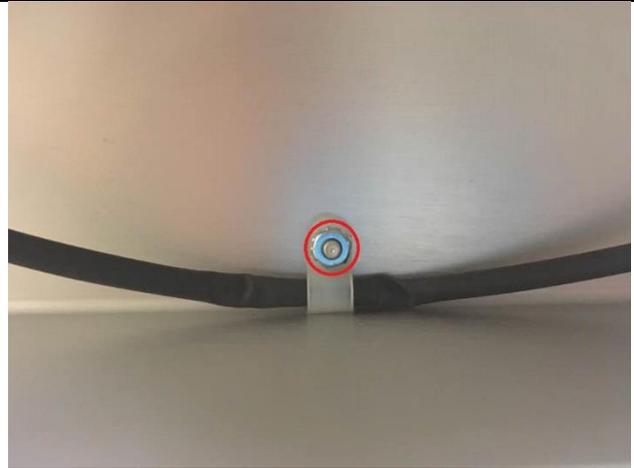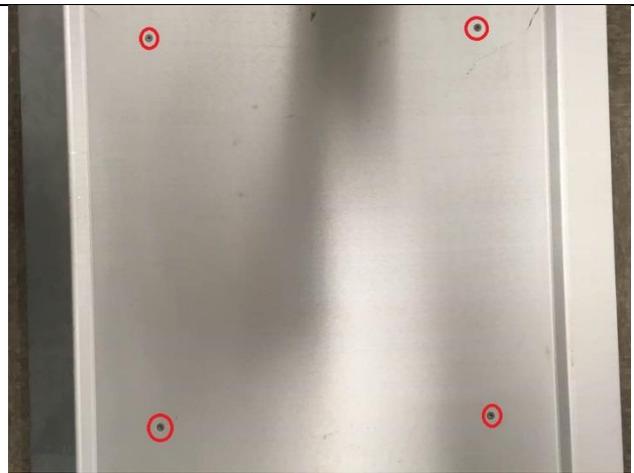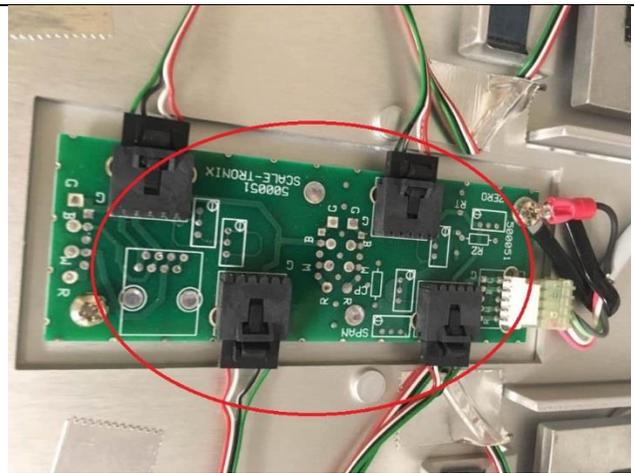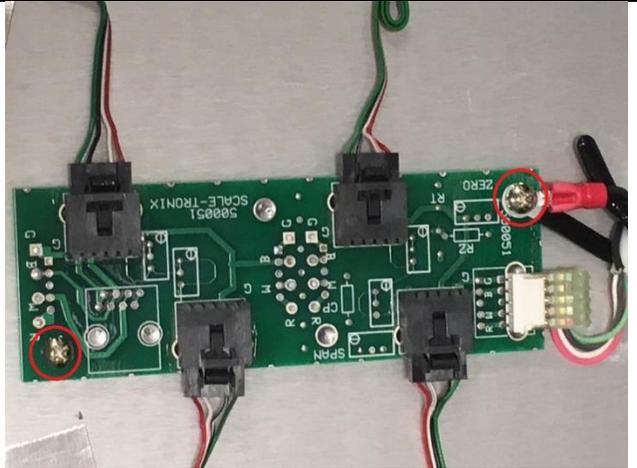
33. Use a #1 Phillip screwdriver to remove the board's screws NOTE: Remove the tape or cable clamps that hold the load cell and the wire in place to the weldment	
34. Use a 3/8" socket to remove the nuts on the load cells CAUTION: Do not apply extra force to the base of the scale. The load cell capacity can overload and cause damage to the load cells.	
35. Use a 1/8" Allen wrench to remove the screws on the springs and the rubber isolator	

Satellite base disassembly (6202D only):

1. Use a 1/8" Allen wrench to remove the screws on the panel covers	
2. Use a small Philips screwdriver to loosen the screws of the black plugs to remove the wires	

3. Use a #1 Phillip screwdriver to remove the screws on the board	
4. Use a 5/16" socket to remove the nut on the cable clamp	
5. Use a 1/8" Allen wrench to remove the screws on the left and right leg cover	

|	
6. Use a 3/8" wrench to remove the nuts on the mounting bracket	
7. For replacement of the shock absorber and the ball mounts, use a slotted screwdriver to push the latch down. Remove the shock absorbers by pulling it away from the ball mounts Use a ½" wrench to remove the ball mounts Note: Apply the same procedure for both left and right side	

8. Use a #1 Phillip screwdriver to remove the screws on the momentary switch	
9. Use a 1/8" Allen wrench to remove the deck cover's screws	
10. Disconnect the wire harnesses	
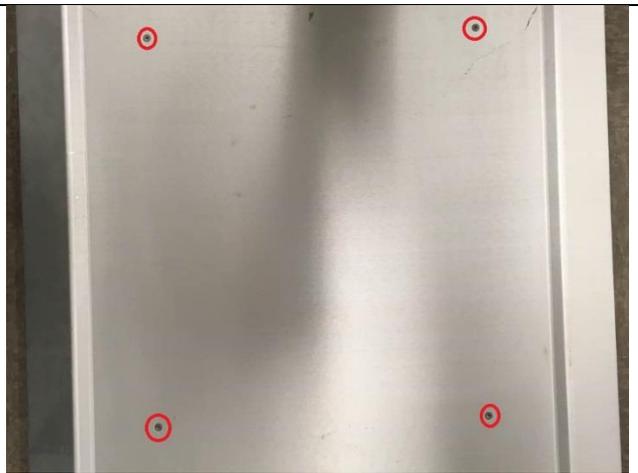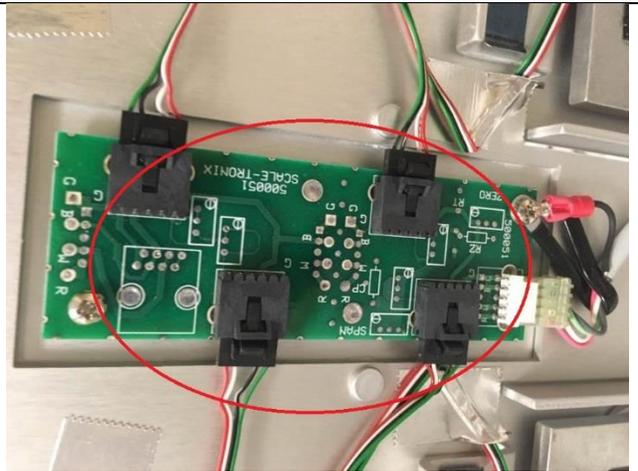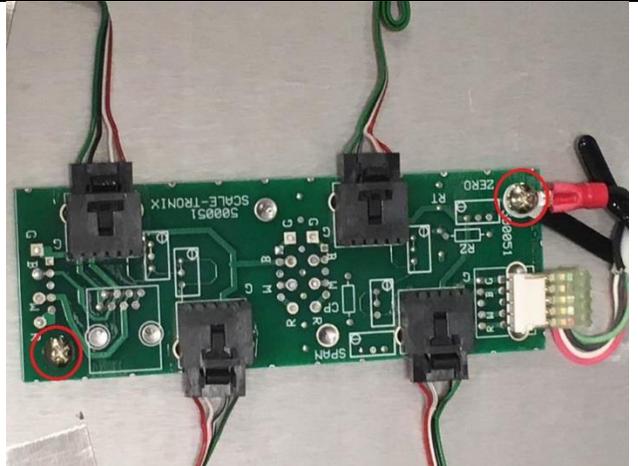
11. Use a #1 Phillip screwdriver to remove the board's screws NOTE: Remove the tape or cable clamps that hold the load cell and the wire in place to the weldment	
12. Use a 3/8" socket to remove the screws on the load cells CAUTION: Do not apply extra force to the base of the scale. The load cell capacity can overload and cause damage to the load cells.	
13. Use a 1/8" Allen wrench to remove the screws on the springs and the rubber isolator	
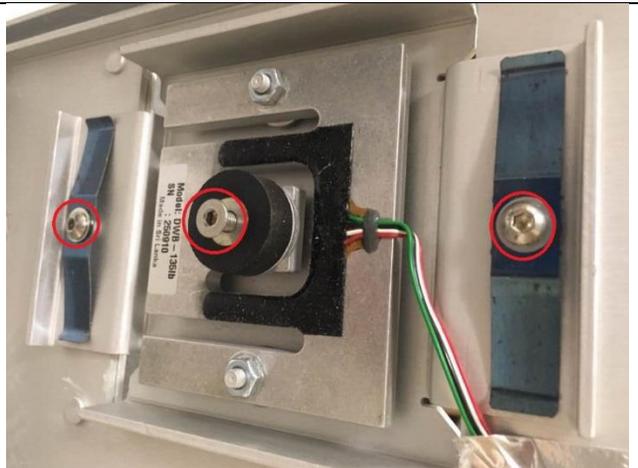
Troubleshooting

Scale Troubleshooting

The following simplified trouble shooting procedures are recommended for identifying defective system components. Certain corrective measures are provided.   More complicated servicing should only be performed by the factory or authorized service facilities. Most problems can be solved over the telephone. Problems requiring factory service are usually handled quickly and the scale is on its way back. Call first to discuss the problem.

DISPLAY DOES NOT ILLUMINATE

Check that known good "D" alkaline cells are properly installed in the battery holder. Remember that the weighing platform must be lowered into operating position in order for the scale to turn on.
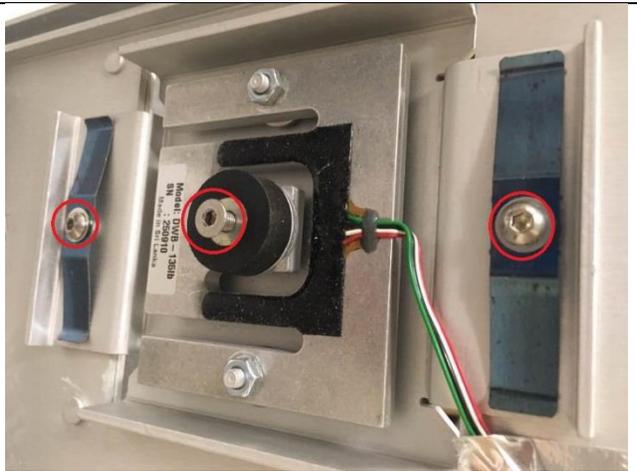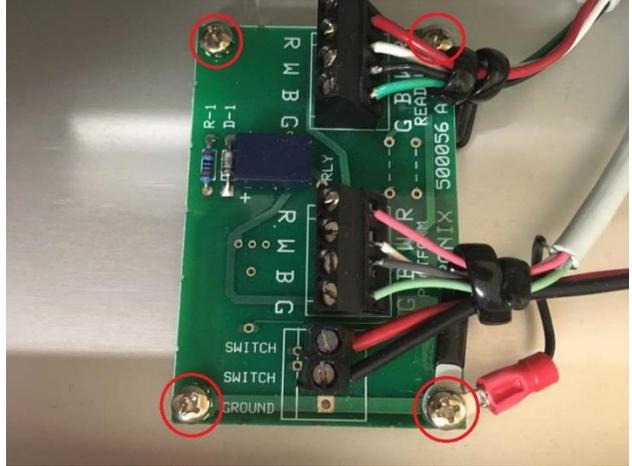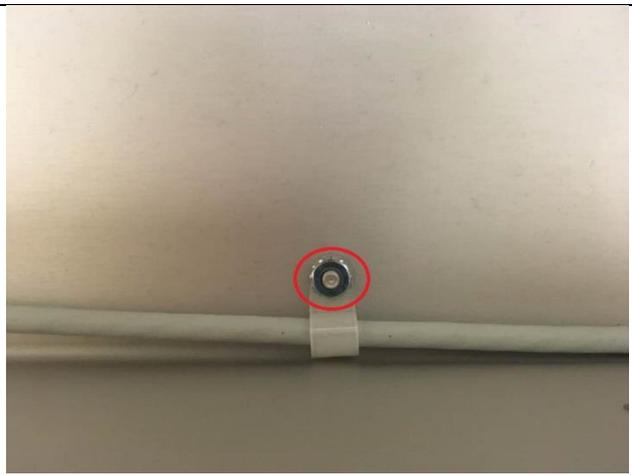
Check that the battery connector is properly connected to "J1 POWER" on the instrument circuit board. Check that the cable between the display board and instrument board is connected. Check that the membrane keyboard is connected to the display board.

Check the operation/continuity of the snap action switch attached to the counterbalance mechanism. Measurements of the D.C. supply voltages can be made with a DVM or analog multimeter.

SCALE DOES NOT AUTOMATICALLY SWITCH "ON" WHEN LOWERED

If the scale fails to switch on automatically, but works when the "ON" or "RE CALL" pushbuttons are operated, it indicates a problem with the snap action switch located in the counterbalance mechanism, or the pulse network consisting of R501 & C501**.** Also check the connection between the snap action switch/pulse network and the display board**,** located at "J3 EXT SW".

WEIGHT READING NOT ACCURATE

This can commonly be caused by a mechanical obstruction of the weighing platform. Check that the platform is not touching some foreign object so that it is restricted in its downward movement. Also check that the connecting cable is firmly plugged into the instrument circuit board (marked "J4 LOAD CELL"). If a test weight is available, alternately place the weight in each of the four corners of the platform and make a weight measurement. A corner that has a reading considerably different than the others may indicate a problem with the load cell transducer in that corner. Check that the four individual co-planar beam load cells are properly connected to the junction board located in the weighing platform.

WEIGHT READING TAKES EXCESSIVE TIME TO DISPLAY

If the platform is in motion the scale will wait for it to settle before displaying the weight. This can be caused by excessive patient motion. Examine the weighing platform to insure that it is not rubbing against a foreign object.

SCALE DISPLAYS "O-LOAd" or SCALE DISPLAYS "CAbLE"

This indicates the scale's internal microcomputer has received a signal in excess of its expected value. "*O-LOAd*" indicates the weight signal is larger than the maximum value assigned to that particular model (see specifications on inside front cover). If the weight value is within the specified range this indicate a damaged transducer or defective instrument board.

The "*CAbLE*" display indicates a signal outside the range of the internal a-d converter has been applied. This is most likely caused by a damaged or disconnected transducer cable. Also check the internal connection of the four wire cable to the "J4 LOAD CELL" connector.

READING DOES NOT CHANGE WHEN WEIGHT APPLIED

The platform cable, connector or a load cell transducer may be defective. The load cell transducer's resistance can be checked with an ohmmeter after unplugging from the junction board. The proper resistance values are listed below. Note that these numbers are for individual load cells that are unplugged from the junction board.

WIRE COLORS	RESISTANCE
GRN/BLK/WHT/RED to scale frame	>10MΩ
GRN to BLK	1150-1250Ω
WHT to RED	995-1005Ω

Consult factory if readings differ from those shown.

NOTE: Ohmmeters will not indicate a change in resistance of the load cell transducer when weights are applied to scale. This is due to the extremely small change in resistance of the strain gauges employed (<1 ohm) and the fact that the bridge configuration presents a constant value of resistance when measured from its terminals.

NON-FUNCTIONING KEY(S)

Check the front panel keyboard for visible signs of damage (punctures, dents, etc.). Check that the keyboard tail with connector is properly inserted into the display board.

If a particular function does not work (example: no kilogram units) check if that particular function is turned off in the "**SET-UP**" mode (see section 3.80)

Also remember that the scale will not function if the weighing platform is in the "up" or stowed position, since battery power is interrupted by the snap action switch in the counterbalance mechanism. This will inhibit operation of the "ON" and "RE CALL" pushbuttons.

ERROR MESSAGE DISPLAYED:

This indicates a failure of the internal microcomputer's memory during the start-up self-test.

"**E-FAIL**" indicates a failure of the microcomputer's eprom memory during the checksum test. Conditions require replacement of the microcomputer.
"**r-FAIL**" shows a failure of the random access memory. Conditions require replacement of the microcomputer.

Printer Troubleshooting

NO PRINT, FOUR SHORT BEEPS

This indicates a print request was made when a valid weight is not present. The patient's weight must be currently displayed on the scale's readout before the printer will function, or alternately, the "PRIOR WEIGHT" can be printed if the "PRINT" button is pressed immediately after pressing the "RECALL" button.

A second reason for this problem is if the print pushbutton is pressed while a ticket is currently printing. If this occurs simply wait for the current ticket to complete printing before requesting another by pressing the "PRINT" button.

NO PRINT, ONE LONG BEEP

This indicates the printer did not respond to the scale's request for printing. This can be caused by the printer being out of paper or the printer head switch being in the "UP" (open) position.

Observe the printer status lamp, LED D202, on the printer interface board; it should light immediately when the print button is pressed. If the lamp flashes "red". Check that the printer interface board has all cables connected and that the data cable is connected to the scale's data port connector.

PRINTER RUNS BUT RESULT IS BLANK OR FAINT:

This is generally indicative of a problem with the paper used for printing. This printer uses "thermal" type printer paper; using ordinary plain paper will not produce a printed result. Also, note that since thermal printer paper is coated on one side only, inserting the paper upside-down will result in a blank weight ticket. There are differences between the sensitivities of various thermal type papers, which can result in variations of print contrast.

PRINTED RESULT DISTORTED, PAPER   ADVANCE NOT WORKING PROPERLY, EDGE OF PAPER TICKET WRINKLED OR TORN:

Compressed printing may be caused by the paper not advancing properly. Press the paper advance switch and check that the paper feeds smoothly. Inspect the printer mechanism and look for small bits of paper or other debris on the paper drive roller. Check that nothing is interfering with the movement of the paper or paper roll. Check that the paper roll is the correct maximum diameter of 1 7/8" (about 47mm).

If problems are noted with the paper advance or if the edge of the weight ticket is wrinkled or torn, examine the paper for correct loading. Check that the paper roll is properly installed and is not dragging or rubbing due to interference.

SECTION OF PRINT OUT MISSING:

If a small section of printed output is missing, activate the print head lever, remove the paper, and look at the print head for small bits of loose paper or other debris. Blow gently in the print head to dislodge any foreign matter. If the problem continues it may indicate a defective thermal print head.

If a large continuous section of the printed output is missing, it likely indicates a problem with one of the strobe (STB) signals between the printer and interface board. This can be caused by a defective thermal print head, printer head cable, or interface board. The appropriate STB line can be identified as follows:

STB1: Controls left 1/3 printed area

STB2 & STB3: Controls center 1/3 printed area

STB4: Controls right 1/3 printed area

LOW BATTERY LIGHT FLASHES DURING PRINTING:

This is caused by batteries that are becoming weak. The large amount of power demanded by the printer taxes the batteries more than regular weighing use of the scale. Some occasional flashing while printing is acceptable. Replace batteries when possible.

PRINTER STATUS LIGHT FLASHES RED

The printer status lamp will change color from green to red if a problem is detected. It will also flash a predetermined number of times to indicate the cause of the malfunction. The flashing sequence is described below:

One flash: Needs paper. If paper is ok, then check connector J207.

Two flashes: Printer head is open. Close printer head. If problem continues check cable at J208. Check the printer head switch.

Three flashes: Indicates head temperature is outside of acceptable range. Check head cables J203 & J204. Check thermistor resistance; it should measure approximately 30k ohms at room temperature.

Four flashes: Indicates interface board has internal problems with its microcontroller. Replace interface board.

PRINTED PAPER TICKET TEARS POORLY, UNEVENLY:

Inspect the tear bar mounted in the enclosure top cover for signs of damage (missing teeth, cracks, missing fasteners, etc.). Some very early model scales had a plastic tear bar; a metal one is now available to improve the "tear-off" performance. Check with the factory service department (phone number & address inside front cover) for additional details.

Symptoms and solutions

Symptom	Possible Cause	Corrective Action
Scale does not turn on	**Scale is not in the open position**	Open Platform in the down position (Scale will only work when the platform is down)

	Faceplate	1. Remove Front Panel - Top of Faceplate using the 1/8" Allen Key
		    • Determine serial number prior to any replacement of faceplate
		    • check to make sure the Black and Red cable connector is connected to the J1 Power
		    •
		2. Replace the Faceplate
		
		    • Disconnect J1 Power and J4 Load Cell Connectors from the Main Board
		    • Remove 4 Philips head screws to pull back the display board and remove the blue ribbon cable and peel the faceplate off

	Batteries	Verify Batteries are good (test with a volt meter)

Symptom	Possible Cause	Corrective Action
	Display Board/Mainboard	Replace necessary components
	Cracked Battery Holder	Replace the Battery Holder Assembly. **Note** Black and White Wire that was unhooked from the faceplate pulls out with the Battery Holder & Bracket Assembly
Platform is falling open or does not want to close	**Damper Ring or Spring**	Replace damper and spring
Platform does not automatically lift	**Platform**	Currently there is no hydraulic lift for self-opening and closing. So you must manually lift and close.
Platform not coming to the floor	**Mounted incorrectly**	Platform only opens 90 Degrees so the scale must sit straight up and down. A furring strip may need to be installed between the bracket and wall. The floor may not be level. Thus, the bracket may not be flush.
Wheel Chair does not Fit	**Platform**	24 X 30 Base, some large wheel chairs may not fit - Use smaller wheel chair or take a fixed 4 legged chair and place on the platform. Select "0" have patient sit in the chair and get the weight of just the patient. Patient feet cannot be touching the floor
Stretcher does not fit	**Width of the Stretcher**	Scale can weigh stretchers, designed for EMT transports not every stretcher. Unlike the wheel chair the stretcher has an overhang on the top. Cannot be over 30" Width
	Access to the stretcher	Straddle the stretcher by moving sideways onto the scales
No Display	**Display Board/Mainboard**	1. Larger Board Check the U6, U7, and U10, IC Chips to make sure they are fully seated in IC Sockets.

Symptom	Possible Cause	Corrective Action
		  1. Test for +5 Volts across pins 1 and 8 of JTest connector, for VR1, after pressing the "On" button. 2. Test for +5 volts on VR2 Regulator Pin 3 for the Voltage to Microprocessor and the Display board, if no + 5 Volts, replace regulators, VR1, or VR2. 3. Check U10 chip across pins 20 to Pin 18 (2.31V), across Pin 20 to Pin 19 (2.33V) +/ − 0.1 Volts 4. Check the crystal chip to ensure it is operational and functional. If one of the pins is at 0 or 5 volts, then the scale will not turn on. Replace the Board if necessary.
Faint Low Battery Light	**Crystal**	1. Check U10 chip across pins 20 to Pin 18 (2.31V), across Pin 20 to Pin 19 (2.33V) +/ − 0.1 Volts. 2. Check the crystal chip to ensure it is operational and functional. If one of the pins is at 0 or 5 volts, then the scale will not turn on. Replace the Board if necessary.
Scale turns on for a moment then shuts off	**Front Panel Switch Assembly**	Visually inspect the front panel, to determine if any switches are indented concaved, nicked, battered, beat up, poked, jabbed, bruised, crushed or cracked. If so replace the front panel switch assembly. If the switch assembly looks good press on the U6, U7 and U10 IC chips to make sure they are fully seated. **Test switch assembly.** Unplug the switch connector from J2 on the Display board and short pins 1 and 10 together for one second to turn scale on

Symptom	Possible Cause	Corrective Action
		If Scale turns on replace the switch assembly. Follow the below instructions to replace the switch assembly. 1. Remove front panel switch assembly, there are two Screws on top of front panel with 1/8" Allen Key. 2. Check to make sure the Black and Red battery cable is connected to J1 Power. Unhook J1 Power from the main board. 3. Unplug the J4 Load Cell Connectors from the Main Board. 4. Remove 4 Philips head screws to pull back the display board and remove the blue ribbon cable from J2 of Display. 5. Peel off the front panel switch assembly from the front side of the faceplate
No Weight Change Scale Only Reads "0.0"	**Cable Assembly**	**Test Cable:** 1. Remove front panel and unplug the J4 Load Cell Connector

Symptom	Possible Cause	Corrective Action
		2. Turn scale on IF Scale displays **"Cable"** or **"O-Load"** Replace the MAST Cable **IF** Scale display remains at **"0.0"** 1. Test with DC Volt Meter across pins 1 and pin 7 of JTest • Voltage .985 or +/- .01 and stable 2. Test mV reading from **Pin 1** of **JTEST** to pin 10 of U6 approximately 100 lbs is 100 mV
	C21, C22 & U6 on the Main Board	IF the above test of pins 1 and pin 7 have the 100 mv reading then the components to check are C21, C22 and U6. Replace C21, C22 and U6 or Replace the main board
Inaccurate Weight Readings with the 4 Corner Test being stable and consistent	**Mechanical Hang-up on Platform Assembly**	**4 corner platform test using 25KG or 50lb certified weight** 1. Apply weight evenly on the center of the scale. Press "**REWEIGH**" two times and record your weight reading each time. 2. Remove weight from center and apply weight on each 4 corners one at a time and Press "**REWEIGH**" two times and record weight reading each time. **Examine your corner readings** Plot all readings and they should be within +/ - 0.4 lb./.2 kg from center reading. If not replace Load Cell, or Cal Chip.

Symptom	Possible Cause	Corrective Action
		The corner that reads the lowest is the problem area. Repeat corner test if need be.
Inaccurate Weights - Scale not weighing correctly, scale broken, drifting	**Load Cell/Calibration**	OHM out Load Cells - See trouble shooting section in this Manual
	Bad A/D Chip	Turn off the scale - Hold "REWEIGH" down while turning scale on. Release "REWEIGH". Immediately press and release ST button 5 times quickly to put the scale in the "Cal" Mode. ▪ Press ST button one more time to show A/D reading. ▪ **If stable** A/D reading, press on Platform and watch display for linear reading 10, 20, 30, 40, etc. up to 100, ▪ **If unstable** A/D reading (maybe Load Cell or PC Board issue).
	Cold Solder on the Calibration Plug	Repair or Replace
Only displays Scale Model #	**Bad A/D Chip**	**U10 Microprocessor not communicating U6** Check to make sure the U6 and U10 are seated all the way. Replace the Main Board if necessary.
-------------	**A/D Readings are unstable**	Removing the top plate, the load cells will be visible 1. Enter into **"Cal Mode"** from the front panel 2. Press and hold the Reweigh button 3. Turn the Scale on 4. Release the Reweigh button immediately 5. Immediately go to the **ST l**ogo and press 5 X 6. Display should say **"CAL"** 7. Press **ST** Logo two more times to display A/D Readings Note: A/D reading without a load. Look for a low stable weight reading less than 10 lbs and that is not drifting or unstable. Unplug each load cell and connect one at a time to see if your display becomes unstable. This will tell you which load cell needs to be replaced
	Load Cell/Calibration	(OHM out Load Cells) See Calibration procedure in this Service Manual.

Symptom	Possible Cause	Corrective Action
Weight Remains the same	**Memory Chip or Microprocessor**	U9 and EM1033 or Microprocessor – Replace the Main Board
Unable to Calibrate	**Cold Solder on the Calibration Plug**	Check Gain Resistor R24 on the Cal Chip, Replace Cal chip if necessary. ASSEMBLY MATERIAL / LOCATION / RESISTOR VALUE: 255029 — R24 — 3.4K 1% 1/8W 255006 — R24 — 23.7K 1% 1/8W 255008 — R24 — 68.1K 1% 1/8W
All the numbers are not lighting up (Missing Segments of the Numbers)	**LED**	**Remove the Display Board (see directions above)** 1. Gently, lift a working 7 Segment LED chip with a flat head screw driver and exchange with a non-working LED chip. 2. IF the trouble follows the LED chip replace the chip 3. IF the trouble stays in the socket replace the display board.
	Display Board	Repair or Replace
	Main Board	Repair or Replace
Beeping and Buzzing	**Bad Chip**	Check U7 Chip seating or replace the Main Board
Display says "Cable or O-	**Cable/Platform**	**Try to Zero first:**
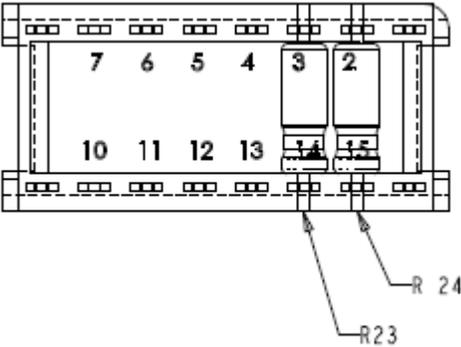
Symptom	Possible Cause	Corrective Action
Load" Flashes or Beeps		1. Remove Front Panel - Top of Faceplate (need 1/8" Allen key) 2. Check the green, white, black and red cable to make sure that it is connected to the J4 Load Cell 6 pin connector 3. Gently press all the chips on the Display board to make sure they are seated **Test Electronics** 1. Unplug J4 Load Cell connector 2. Short the two center pins 3 and 4 3. **IF** the electronic display goes to 0.0 this verifies that the electronics are working as expected. The problem is external. Check the continuity of the cable. IF cable is open replace cable. 4. Ohm out pins 1 and 6 of J4 connector. The reading should be approximately 270 – 290 Ohm to be stable. If outside of this range test the Load cells and replace as necessary. 5. Ohm out pins 3 and 4. The reading should be approximately 250 Ohm's. If outside of this range test the Load cells and replace as necessary.
Letters or Numbers across the Display	**IC Chips may be loose**	U1 on the Display Board – Reseat the IC chip (U1) on display or replace Display board
Any other Error Modes	**Main board, Display Board, Load Cell**	Repair or Replace
Paper Jam	Paper being torn off incorrectly	Must lift paper straight down or up at a slight angle, and do not pull out or to left or right side of paper slot (opening in door for paper).
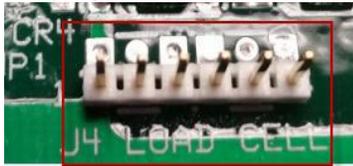
Symptom	Possible Cause	Corrective Action
Not printing, Paper not coming out of printer	Too much paper is curled up inside on roller	Have to remove paper from roller and redress paper in roller of printer mechanism.
	Orientation	In-Floor Scales Only – Re-orient the Printer door for Tearing of thermal paper.
	Installation of thermal paper	Paper may be installed upside down. Thermal paper is critical to the operation, and need to have the chemical treated side of paper facing print head.
Pink strip on paper	Almost out of paper	Time to change the thermal paper
Not operating/four long beeps	Yellow Data Cable	Open Front Panel, Locate Yellow Data Cable from side of printer to Main PCB J15 TTL port. Check the cable connection to J15, 5pin header to make sure it is correctly plugged into the J15 port, Red wire w/ white strip should be on Pin 1 of J15 TTL port (5 pin connector on the main board), and green wire with white stripe should be on pin 5 of J15 TTL port.
	U8 RS232 Chip	If U8 has the RS232 chip in socket, then remove the U8 IC Chip from IC socket for printer to operate.
Not operating	Weight on Display & No Print	**Note:** Printer will not print 0.0 lb/kg weight reading. When the "Print" button is depressed do you hear a beep or see a Data lamp light up on Display for a moment? If no, printer is shut off and needs to be activated in "Set-Up" mode, see manual. If yes, open printer door and view printer status light. See Printer section in the service manual.
One Flash	No Paper	Add/Install Thermal Paper.
Two Flashes	Print Lever not down	Close the print Lever, unit will not operate with lever up.
Three Flashes	Printer head temperature is out of operational range	Check cables J203, J204 from Printer PC Board to printer mechanism, see section in the service manual.
Four Flashes	Indicates printer PCB has trouble	Replace Printer PC Controller Board, which has failed.
Print is faint	Low Battery Pack, Low Batteries	Replace batteries

Symptom	Possible Cause	Corrective Action
	Printer Mechanism	Replace Printer Mechanism

Repair Parts List

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
23709	Thermal Printer Paper (Box 15 rolls)	630198	BATTERY HOLDER/SWITCH HARNESS, 5202
40408	BHSCS 10-32 X 3/8 18-8 STAINLESS STEEL	630203	HARNESS ASSY EXTERNAL POWER
41013	CONNECTOR, 5 PIN PANCON CE100F24-5-CB	630206	ASSY 6202 LOAD CELL
66430	CONNECTOR SHELL - D4M	630207	PRINTER, SUBASSEMBLY 6202/6202D
66611	FOOT, METAL CTS	700076	D CELL BATTERY
133086	LOADMOUNT 3/8" X 1" WITH 3/8"	700116	Main PCBA 6202,6202D (No Cal & Firmware chips)
134076	MOUNT, BALL 10mm	700123	PCB ASSY, 6202 TERMINAL
134077	SOCKET, 10 mm BALL	720024	SWITCH ASSY KG/LB W/RS232
134080	SPRING, LOAD CELL POD	720025	SWITCH ASSY KG ONLY W/RS232
134081	BUMPER RUBBER 3/4 X 3/4	725210	D CELL BATTERY LABEL
137036	SPRING GAS 30 LB 6mm X 3.15	846234	RS232 RETROFIT FOR 6202 LB/KG ONLY
137038	SPRING GAS 120LB 6mm X 3.15	846235	RS232 RETROFIT FOR 5202 LB/KG ONLY
137040	SPRING GAS 80LB 6mm X 3.15"	846236	RS232 RETROFIT FOR 6202 KG ONLY
137041	SPRING GAS 90LB 6mm X 3.15"	846237	RS232 RETROFIT FOR 5202 KG ONLY
137042	DAMPER AVM #SD400VEJPS006	50518	Load mount Washer
255006-KIT	CALIBRATION PLUG 5202 6202	700051W	PCB MAIN INSTRUMENT 5202 (No Cal & Firmware chips)
255029-KIT	CALIBRATION PLUG 6202D	750074	CABLE, INTERNAL LOADCELL 5202
341004	12VDC POWER SUPPLY W/CONNECTOR	750080	CABLE A4F to A4F 18
370041	SWITCH, MOMENTARY PIN PLUNGER	750084	CABLE, INTERNAL LOAD CELL, 133" 6202
390114	BLOCK, LEFT BEARING	750085	CABLE, INTERNAL LOAD CELL 78"
390115	BLOCK, RIGHT BEARING	030215W	PLATE, LOAD CELL MOUNTING
400039	LOAD BEAM WING BACK 135LB	039336W	LINK, SPRING ACTUATOR
450006-KIT	FIRMWARE KIT 5202 V2.13.5	039357W	COVER, 5202 BATTERY
450007-KIT	FIRMWARE KIT 6002 6202D V2.13.6	22P827	WASHER
531019	SHUR STEP GRAY 4" X 3.5"	620009W	COVER BATTERY
531020	SHUR STEP GRAY 12" X 11 -1/4"	700060W	PCB ASSEMBLY, DISPLAY 5202/6202/6202D
600025	BRACKET, LEFT SPRING MOUNTING	700119W	JUNCTION Bd 5202 6202 VG
600026	BRACKET, RIGHT SPRING MOUNTING	700124W	PCB ASSY 6202D TERMINAL
600037	BRACKET, 5202 RIGHT SPRING	710031W	HARNESS, RS-232 DATA
600038	BRACKET, 5202 LEFT SPRING		
620011	DOOR PRINTER		

710046W	HARNESS, INTERIOR LOADCELL	412319	ASSY 700051 MAIN PCBA, 5202, KG
710050W	HARNESS, 22" INTERIOR LOAD CEL	412328	ASSY 700116 MAIN PCBA FOR 6202, KG
710051W	HARNESS, 6202D SWITCH	412256	ASSY 700116 MAIN PCBA FOR 6202 STD
710052W	HARNESS, INTERNAL CONNECTING	412360	ASSY 700116 MAIN PCBA FOR 6202, KG, PRT
710059W	HARNESS, LC TO PCB PRINTER FOR 6202	412361	ASSY 700116 MAIN PCBA FOR 6202D, STD
710060W	HARNESS, PRINTER POWER		
AP-113	TERMINAL BLOCK		
CS-111	CONNECTOR, 6 PIN PANCON CE100F24-6-CB		
EM1038	DISPLAY CABLE FOR 22DSDP DISPLAY		
412318	ASSY 700051 MAIN PCBA, 5202, STD		
412329	ASSY 700116 MAIN PCBA FOR 6202, STD, PRT		

Schematics & Part Diagrams

WIRING DIAGRAM

SHIELD

CONNECT TO SCREW

CONNECT TO CHASSIS STUD

BLACK
WHITE
RED
GREEN

TERMINAL BLOCK

BLACK
WHITE
RED
GREEN

RED
WHITE
BLACK
GREEN

5 CKT CONN

JUNCTION BOARD

LOAD CELL x 4

EXT POWER JACK

BLACK/WHITE
RED
YELLOW

(CENTER +)
(OUTSIDE -)

BLACK/YELLOW
BLACK
RED/WHITE

J4

BLACK
WHITE
RED
GREEN

6 CKT CONN

INSTRUMENT BOARD

J1

5 CKT CONN

BLACK

BATTERY HOLDER
6 SIZE "D" ALKALINE CELLS

—

+

RED

1N4004

J6

28 CKT CABLE

PLATFORM SWITCH
(SHOWN W/ PLATFORM STOWED)

N.C.

N.O.

COM

GRAY/BLACK

BLACK/YELLOW

BLACK/WHITE

CAPACITOR
220µF / 50V

+
—

RESISTOR
100 OHM / 1 WATT

3 CKT CONN

J3

J1

DISPLAY BOARD

WIRING DIAGRAM w/EXTERNAL POWER JACK

6202-D DUAL SYSTEM
SATELLITE PLATFORM WIRING

SATELLITE TERMINAL JUNCTION BOARD

CONNECT TO SCREW

R W B G

R W B G

TO PLATFORM
CROSS OVER CABLE

1 4
2 3

PLATFORM SWITCH
(SHOWN W/ PLATFORM STOWED)

N.C.

N.O.

COM

CONNECT TO SCREW

RED
WHITE
BLACK
GREEN

5 CKT CONN

JUNCTION BOARD

LOAD CELL x 4
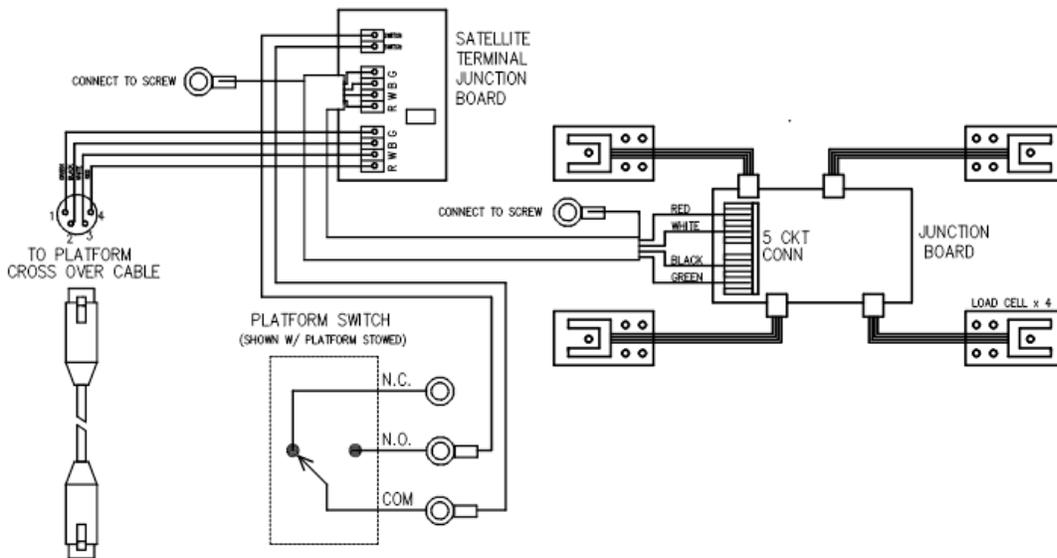
6202-D DUAL SYSTEM
MAIN PLATFORM WIRING

TERMINAL JUNCTION BOARD

TO PLATFORM CROSS OVER CABLE

R W B G   R W B G

CONNECT TO SCREW

CONNECT TO SCREW

RED
WHITE
BLACK
GREEN

5 CKT CONN

JUNCTION BOARD

LOAD CELL x 4

EXT POWER JACK

(CENTER +)
(OUTSIDE -)

BLACK/YELLOW
BLACK
RED/WHITE

BLACK/WHITE
RED
YELLOW

BATTERY HOLDER
6 SIZE "D" ALKALINE CELLS

BLACK

RED

1N4004

J4

BLACK
WHITE
RED
GREEN

6 CKT CONN

INSTRUMENT BOARD

J1

5 CKT CONN

J6

28 CKT CABLE

PLATFORM SWITCH
(SHOWN W/ PLATFORM STOWED)

N.C.   GRAY/BLACK

N.O.   BLACK/YELLOW

COM   BLACK/WHITE

CAPACITOR
220uF / 50V

+
-

RESISTOR
100 OHM / 1 WATT

3 CKT CONN

J3

J1

DISPLAY BOARD

#700060

#700049
10/01/03

75

EPSON M-T102 PRINTER ASSEMBLY

EPSON PRINTER INTERFACE

10/23/2008

PRINTER MECHANISM ASSEMBLY

OPTIONAL
AC ADAPTER JACK

BATTERY
(NOM SIX "D" CELLS)

PRINT HEAD "A"

MOTOR

HEAD SWITCH

PAPER SENSOR

PRINT HEAD "B"

9

4

2

3

9 WIRES

J203   J206   J207   J204

3 WIRES

2 WIRES

PLATFORM DOWN SWITCH

3 WIRES

J201

J208

J202

5 WIRES
DATA/CONTROL

23005 SCALE INSTRUMENT BOARD

RED/WHT TO PIN 1

J15 TTL

(1)

JTEST

2 WIRES POWER

J1

2 WIRES
(3 WIRES w/AC ADAPTER JACK)

OPTIONAL PRINTER HOOK-UP WIRING

FILE: 6202RPTR.DWG
05/13/2008

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#700060 DISPLAY BOARD COMPONENT LOCATIONS

SCALE-TRONIX

PN 500040

23005 R02-A

J4 LOAD CELL

CAL. PLUG

#700051 INSTRUMENT BOARD COMPONENT LOCATIONS

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6202 Platform, Gas Spring location

SPRING NO.	RATE	PART NO.	ACTUATOR POS.	BALL SOCKET
1	DAMPER	137042	N/A	2x 134077
2	80 LB	137040	3	2x 134077
3	90 LB	137041	3	2x 134077
4	120 LB	137038	N/A	2x 134077

SPRING #2

SPRING #1

2x 10mm BALL MOUNT

SPRING #4

SPRING #3

LOWER PLATFORM

30" DECK ASSEMBLY P/N 630217

#6-32x1/4''
PHIL PAN HD
48611

#6-32x 0.25
PHIL PAN HD
48611

WIRE WRAP
134063

NOTE: LOADCELL & GROUND
INPUT CONNECTIONS
FROM CABLE 750084

JUNCTION BOARD
700119

2X BUTT HD SOCK
SCREW #10-32x3/8''
40408

2x #10 FLAT WASHER
40409

2x SPRING
134080

4x ASSEMBLY, 6202 LOAD CELL POD
630206 (SEE INSTRUCTIONS PN 072065 PAGE 1of3)

CABLE CLAMP
MLA1022

4x 10mm BALL MOUNT
134076

CABLE
750084

WLD 62x LOWER DECK 30"
P/N 030213

81

6x #6-32x0.25
PHIL FLAT HEAD
130204

JUNCTION BOARD
700123

4x #6-32x1/4"
PHIL PAN HD SCW
48611

RS-232
HARNESS
710031
&
160231
SCREWS

2x 5/16-18 3/8Øx0.5"
SOCK SHOULDER SCREW
130242
2x 5/16-18 NUT
131053

1x D-CELL BATTERY HOLDER
630203

RIGHT SPRING BRACKET
600026
MOUNT WITH
6x #10-32 x 1/2"
130060 SS FLAT HEAD SCW
6X #10 KEPS NUT
24010

2x 0.75" Øx0.5" HI. BUMPER
134081
2x #8-32 KEPS NUT.
30349

1x POWER SWITCH, 370041
2x #8-32x1" PHIL PAN HD
130057
2x #8-32 KEPS NUT, 30349

2x SPRING ACTUATOR
039336

2x 10mm BALL MOUNT
134076

AC POWER LABEL
530237

SPRING #4

SPRING #3

LEFT BRACKET
600025
MOUNT WITH
8x #10-32 x 1/2"
SS FLAT HEAD SCW
130060
8x #10 KEPS NUT
24010

SPRING #2

SPRING #1

LOAD CELL CABLE
750084

RIGHT BEARING
390115

2x 10mm BALL MOUNT
134076
2x 5/16-18 NUT
131053

30" DECK ASSEMBLY
P/N 630217
(SEE DRAWING 072065 PAGE 3 of 4)

4x #10-32x0.75
SOCK FLAT HD
40523

2x FOOT
66611

LEFT BEARING
390114

2x #10-32x0.75
FLAT HEAD SOCK
40523

CONNECTIONS:
SWITCH: FOLLOW COLOR
CODE ON JUNCTION BOARD
GND LUG MUST BE MOUNTED
UNDER HEAD OF SCREW LOWER
LEFT CORNER
LOADCELL: FOLLOW COLOR CODE
ON JUNCTION BOARD

2x WIRE WRAP
134063
PLACE UNDER HEAD OF
SCREW IN ORDER TO SECURE
CABLES

DRESS LOAD CELL CABLE
ALONG LEG ATTACH WITH
CLAMP, 134010
AND #6 KEPS NUT, 21287
REPEAT IN OTHER LEG

DRESS LOAD CELL CABLE
ALONG LEG ATTACH WITH
CLAMP, 134010
AND #6 KEPS NUT, 21287

SPRING TABLE

SPRING NO.	RATE	PART NO.	ACTUATOR POS.	BALL SOCKET
1	DAMPER	137042	N/A	2x 134077
2	80 LB	137040	3	2x 134077
3	90 LB	137041	3	2x 134077
4	120 LB	137038	N/A	2x 134077

POS. #2

POS. #1

SPRING ACTUATOR

POS. #3
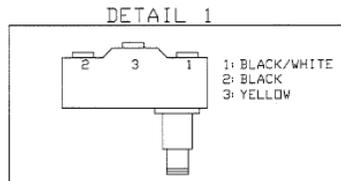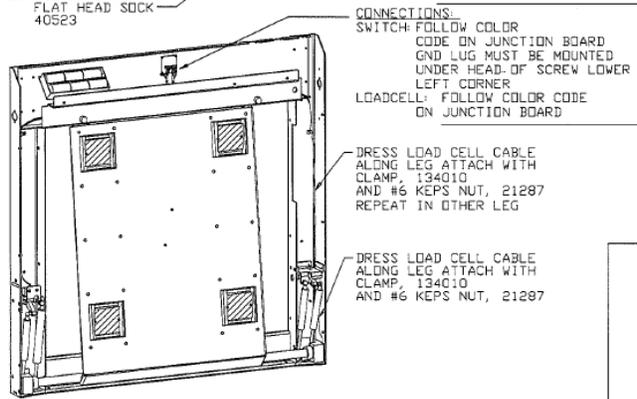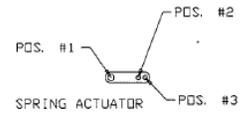
NOTES:
1. LUBRICATE THE INSIDE OF BOTH THE LEFT AND RIGHT BEARINGS WITH WHITE LITHIUM GREASE

2. PLACE THE BEARINGS OVER THE PIVOT TUBE. CAREFULLY ROUTE THE LOAD CELL CABLE THROUGH THE PIVOT TUBE AND THE RIGHT BEARING.

3. SLIDE LOWER DECK ASSEMBLY WITH BEARINGS AND SPRINGS IN TO THE FRAME. INSTALL BEARING MOUNTING SCREWS AS SHOWN.

4. FOLD THE LOWER DECK ASSEMBLY INTO THE FRAME. ATTACH THE UPPER SPRING MOUNTS TO THE BALL MOUNTS

5. INSTALL THE MICRO SWITCH (SEE DETAIL 1)

6. WITH THE LOWER DECK AND SPRINGS IN PLACE, INSTALL THE UPPER DECK AS SHOWN ON PAGE TWO.

DETAIL 1

2   3   1

1: BLACK/WHITE
2: BLACK
3: YELLOW

DETAIL A
CAL PLUG ORIENTATION

R26 R24 R23 R22 R44 R21 R20 R19

23.7 KΩ
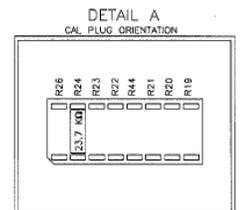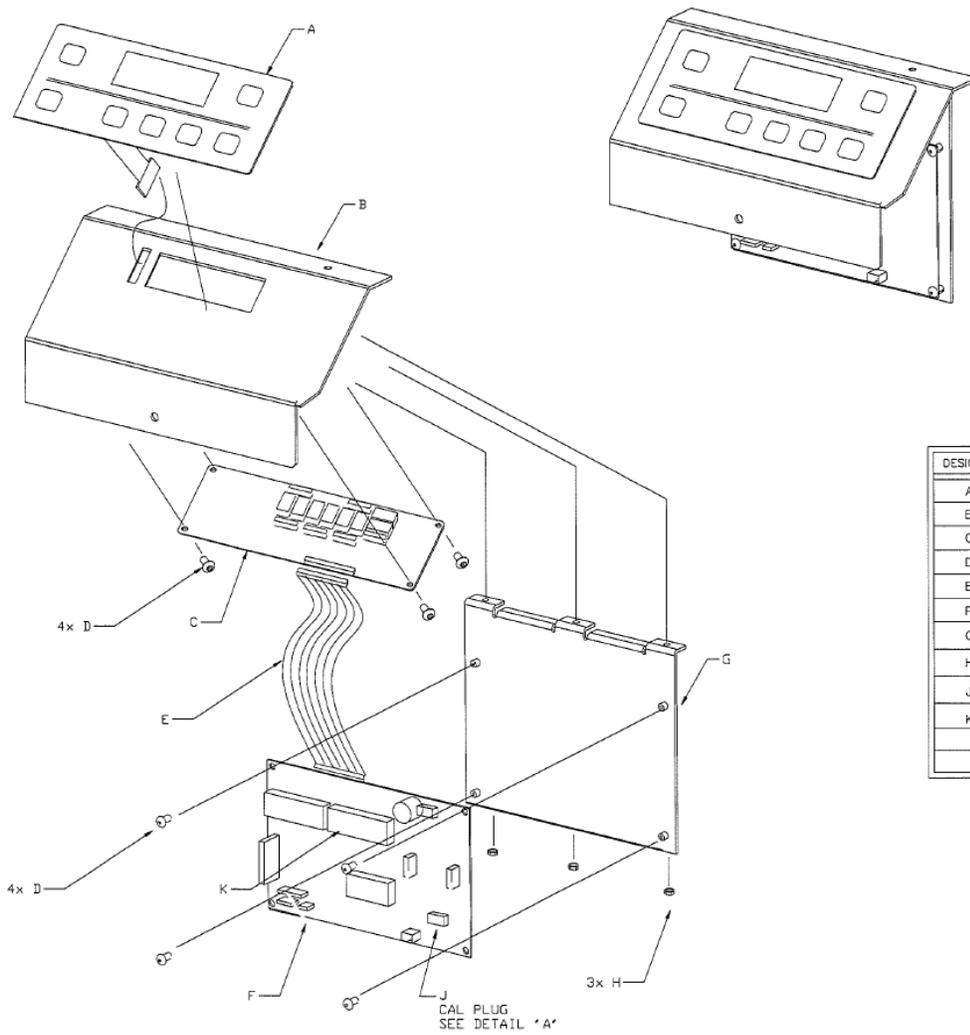
DESIGNATOR	QTY	PART No.	DESCRIPTION
A	1	720024	FRONT PANEL ASSEMBLY
B	1	039335	PANEL DISPLAY FACE
C	1	700060	PCB, DISPLAY ASSEMBLY
D	8	48611	SCW, 6-32 X 1/4" PHMS SEMS
E	1	EM-1038	CABLE, 8" GRAY RIBBON 28 COND.
F	1	700116	MAIN INSTRUMENT BOARD
G	1	030212	PLATE MAIN PCB
H	3	21287	#6-32 KEPS NUT
J	1	255006	CALIBRATION PLUG
K	1	450007	FIRMWARE

4x D

C

E

4x D

K

F

J
CAL PLUG
SEE DETAIL 'A'

3x H

G

83

POD ASSEMBLY P/N 630206

RUBBER ISOLATOR
1.0ø×0.38″
133086

WASHER 1″OD×0.25ID×0.13TK
50518

2x #10-32 NUT
131005

135 IB LOAD CELL
400039

2x WASHER 0.50D×0.25ID×0.13TK
132069

2x WASHER #10 FLAT
PN 40409

WLD LC MTG
030215

SHUR STEP
531019