

ScaleWatch Lite™ Data Acquisition Software Operation Manual

Part Number # SWL01



Load Cell Central

1-800-LOADCEL

PO Box 91, 216 Main St.
Monroeton, PA 18832
Tel: (570) 265-5015, Fax: (570) 265-5148
www.800loadcel.com

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contents	
SOFTWARE LICENSE AGREEMENT.....	1
SCALE WATCH LITE™ SOFTWARE LICENSE	2
CONTENTS.....	3
INTRODUCTION.....	7
SYSTEM REQUIREMENTS.....	8
INSTALLATION	9
BACKWARD COMPATIBILITY.....	9
QUICK START	10
COMMUNICATIONS.....	12
THE SERIAL COMMUNICATIONS PORT	12
THE MAIN PANEL.....	13
ADDRESS AND ACTIVE SENSOR.....	13
OPERATION MODE SWITCH	13
<i>Offline</i>	13
<i>Connected</i>	13
<i>Test</i>	14
SELECT ACTIVE SENSOR	14
PEAK/MAX.....	14
TRACK.....	14
<i>Units</i>	14
VALLEY/MIN.....	14
RELAY CONTROLS.....	14
<i>Relays 1 and 2</i>	15
<i>Relay Reset</i>	15
TEST CONTROLS.....	15
<i>Start</i>	16
<i>Stop</i>	16
<i>Save</i>	16
<i>Reset</i>	16
RESET PEAK/MAX	16
RESET VALLEY/MIN.....	16
TARE READING	17
COMMUNICATIONS LED	17
DATA STREAMING LED	17
TEST RUNNING LED	17
TEMPERATURE COMPENSATION LED.....	17
AUTO ID MATCH LED	17
MAIN MESSAGE TEXT BOX	17
PRINT THE MAIN PANEL.....	17
ADDING A WEIGHTSENSE™ TO THE SYSTEM.....	18
REMOVING A WEIGHTSENSE™ FROM THE SYSTEM.....	19
WEIGHTSENSE™ SETUP.....	20

THE WEIGHTSENSE™ SETUP PANEL	21
<i>WeightSense™ Address</i>	21
<i>Message Text Field</i>	21
<i>Serial Number</i>	21
<i>WeightSense™ Name</i>	21
<i>Analog Output</i>	21
<i>Temperature Compensation</i>	21
<i>Auto ID</i>	22
<i>Saving, Loading, and Activating Setups</i>	22
VIEW, LOAD AND PERFORM SENSOR CALIBRATIONS.....	23
CALIBRATION OPTIONS	23
<i>Calibrating a Sensor</i>	24
<i>Viewing Calibration Data</i>	31
<i>Loading Calibration Data</i>	31
SENSOR SETUP	33
THE SENSOR SETUP PANEL	33
<i>WeightSense™ Address</i>	33
<i>Active Sensor</i>	33
<i>Message Text Field</i>	33
<i>Serial Number</i>	34
<i>Display Precision</i>	34
<i>Filter</i>	34
<i>Sensor Analog Output</i>	34
<i>LCD Display</i>	34
<i>Base Per Cent Value</i>	35
<i>Saving, Loading, and Activating Setups</i>	35
AUTO TEST SETTINGS	36
ENABLE AUTO START	36
<i>Auto Start Item</i>	37
<i>Auto Start Condition</i>	37
<i>Auto Start Value</i>	37
ENABLE AUTO STOP.....	37
<i>Auto Stop Item</i>	37
<i>Auto Stop Condition</i>	37
<i>Auto Stop Value</i>	37
OK	37
STRESS MEASUREMENT	38
SAMPLE AREA PANEL	38
SHAPE	38
DIMENSIONS.....	39
AREA.....	39
SAVE	39
OK	39
USER DATA REFINEMENT	40
SELECT A BASE UNIT	40
ENABLE POLYNOMIAL DATA FILTER.....	41
A, B, C, D, E, AND F.....	41
LABEL	41
SAVE	41
OK	41

USING REFINE DATA WITH MULTIPLE SENSORS	41
RUNNING TESTS IN SCALEWATCH LITE™	42
USING AUTOSTART AND/OR AUTOSTOP	42
USING MANUAL START AND/OR STOP	42
SAVING TESTS	44
AUTO RELAY CONTROL	45
ENABLE AUTOMATIC CONTROL	46
INITIAL RELAY STATE	46
CHANGE RELAY STATE WHEN... ..	46
<i>Item</i>	46
<i>Condition</i> (< , >).....	46
<i>Unit</i>	46
<i>Value</i>	46
<i>Example</i>	47
AUTOMATIC RESET	47
RESET TO INITIAL STATE WHEN... ..	47
<i>Item</i>	47
<i>Condition</i> (< , >).....	48
<i>Unit</i>	48
<i>Value</i>	48
<i>Example</i>	48
MESSAGE	48
LOAD FROM FILE	48
ACTIVATE	48
SAVE TO FILE.....	49
OK	49
RESTRICTIONS ON AUTO RELAY CONTROL	49
<i>Toggle State</i>	49
<i>Time</i>	49
WEIGHTSENSE™ BACKUP AND RESTORE	50
BACKING UP THE WEIGHTSENSE™	50
RESTORING THE SYSTEM	51
DAC CALIBRATION.....	52
THE DAC CALIBRATION PANEL.....	53
<i>WeightSense™ Address</i>	53
<i>Offset Calibration</i>	53
<i>Positive Gain Calibration</i>	53
<i>Negative Gain Calibration</i>	53
<i>OK</i>	54
SCALEWATCH LITE™ SHORTCUT KEYS.....	55
TECHNICAL SUPPORT AND CUSTOMER SERVICE.....	55



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INTRODUCTION

The ScaleWatch LITE™ Graphical User Interface is designed to communicate with a precision WeightSense™ digitizing signal conditioner that is, itself, designed to amplify, filter, and linearize the output of a strain gage sensor. ScaleWatch LITE™ presents the user with a graphical user interface designed to monitor incoming data from the unit and to visualize and refine the data in a way that is useful to the user.

Here is a quick listing of features for the software:

- User interface connects to either a WeightSense™ unit
- User interface guides user through adding and removing Units
- WeightSenses™ can hold calibration data for up to three separate sensors
- Sensors may be load cells, extensometers, pressure sensors, or torque sensors
- User interface guides user through sensor calibrations including MilliVolt per Volt, 2 Point Mass, 6 Point Mass, and Shunt Calibrations
- User interface allows user to name Units
- User can tare and reset peak and valley for the sensor
- User can set filter level of the sensor
- User can save and load Unit setup and sensor setup information
- User has the option of setting up a test to start and/or stop automatically
- LEDs inform user of the operational status of the GUI
- User may save data and/or test information for use with MS Excel and other spread sheets
- User can control output using two relay switches set in the main panel as well as analog output of voltage.
- User can refine data as it comes into the Unit by applying a 5th order polynomial to the data and creating a name for the resulting new unit of measure.

SYSTEM REQUIREMENTS

	Recommended
Processor	Pentium IV 1GHz
Memory	1 G
Disk Space	100 MB
Video	SVGA
Screen Resolution	1024 x 768 Large Fonts
Windows Version	Windows XP Pro
Drive	CD-ROM
Printer	Windows Compatible

The table above shows the recommended requirements for running ScaleWatch LITE™. For the best performance the recommended system requirements should be followed. This is especially true if you expect to require fast sampling.

INSTALLATION

To install the ScaleWatch LITE™ GUI software, insert the CD into your CD-ROM drive. Select Run from your Start menu and type **d:\setup** (where **d:** is your CD-ROM drive) to begin the installation.

ScaleWatch LITE™ is installed in the directory C:\ ScaleWatchLITE200. When the installation is complete you will see a new program group called ScaleWatchLITE200. This group contains an icon labeled “ScaleWatchLITE200”.

All ScaleWatch LITE™ software is designed to run with desktop area of 1024 by 768 with 256 colors and large fonts. To setup your monitor left click the mouse on any part of the Windows background, select Properties from the popup menu, then choose the Settings tab on the Display Properties window. Other settings will still work, but the panels will not look as good.

BACKWARD COMPATIBILITY

ScaleWatch LITE™ 200 is compatible with WeightSense™ firmware versions 5.4.0 through 7.0.4. The latest versions of WeightSense™ firmware have added features that are supported in ScaleWatch LITE™ 200. If the user has older versions of firmware, ScaleWatch LITE™ will inform the user when a feature is not available for use. For example, firmware versions below 7.0.0 do not support the ability to change the sensor label on an attached LCD Display. This feature is part of the Sensor Setup settings. If the unit to which ScaleWatch LITE™ is connected has firmware version below 7.0.0 and the user opens the Sensor Setup panel, they will see a pop-up message informing them that the LCD Display feature is not supported by their firmware and it will be unavailable. Other added firmware features handled by ScaleWatch LITE™ include:

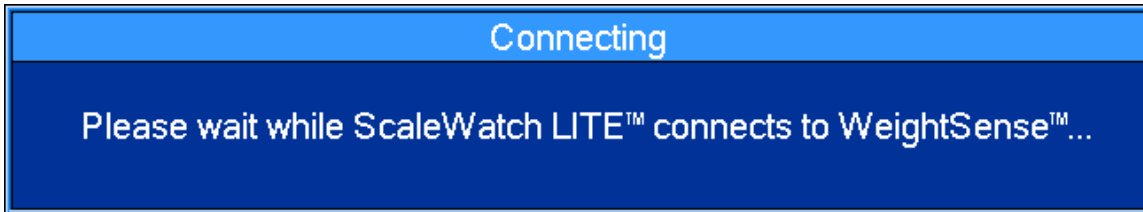
- the ability to use an alpha-numeric sensor serial number (firmware versions 7.0.1 and above),
- the ability to select a torque sensor type to calibrate along with units of Newton-meters (firmware versions 7.0.3 and above)
- the ability to select a pressure sensor type to calibrate along with units of PSI and calculated units of MPa (firmware versions 6.0.1 and above)
- the ability to select milli-volts per Volt as a test unit (firmware versions 6.0.1 and above)
- the ability to save a sensor calibration to a file on the host PC, and then load and save that calibration to the attached WeightSense™ (firmware version 6.0.1 and above).
- and, during testing with WeightSense™ firmware versions 7.0.1 and above, ScaleWatch LITE™ suspends the temperature compensation readings in the unit. They are resumed when the test is stopped.

QUICK START

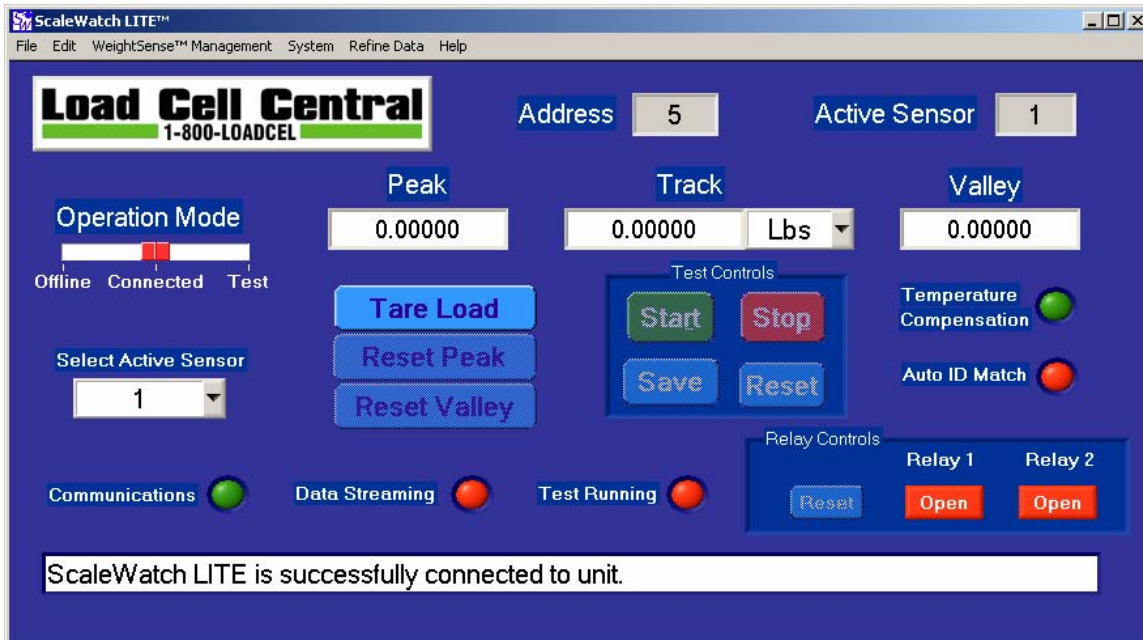
The first step is to set up the WeightSense™ product in accordance with instructions in the manual that accompanies it. Once that has been done and ScaleWatch LITE™ has been installed on the connected PC, the following instructions will guide the user through connecting, setting up and running tests with the WeightSense™ product.

The default communications port for communicating with the WeightSense™ unit is COM 1. If you need to change this to a different COM port, see the Communications section below for instructions on resetting the communications port.

When the system is first launched, before the main panel appears, the program attempts to communicate with a connected WeightSense™.



If no unit is connected, the GUI will inform the user that it was unable to connect to a unit. If a new unit is connected, the GUI will inform the user that the WeightSense™ must be added before it can be setup and its sensors calibrated. Newly purchased WeightSense™ units should connect easily with ScaleWatch LITE™. When ScaleWatch LITE™ connects to the unit, it will determine which type of unit is connected and inform the user on the Main panel (see Tester Type in the panel below).



If a unit does not have any address (its address is zero), its address must be set to a value between 1 and 254 by "Adding" the cell to the system.

The WeightSense™ unit connected to the GUI must be set up in a specific way:

- Connect to the WeightSense™ unit via a serial cable and place the GUI in Connected Mode.
- Add the WeightSense™ to the system by selecting WeightSense™ Management ->Add from the menu and following the directions in that panel's message text box.
- Set up the WeightSense™ Name, Analog Output Control, Auto ID settings and Temperature Compensation settings by selecting WeightSense™ Management ->Setup WeightSense™ from the menu and following the directions in that panel's message text box.
- Attach a sensor to the WeightSense™ Unit.
- Calibrate the sensor by selecting WeightSense™ Management->View | Load | Perform Sensor Calibration from the , clicking the Calibrate button on the Calibration options panel, and following the directions in the Calibration panel's message text box.
- Set up the Sensor Filter, Digits, Sensor Analog Output and Base Percent settings by selecting WeightSense™ Management ->Setup Active Sensor from the menu and following the directions in that panel's message text box.

Once the sensor has been calibrated and setup, the user can change the Operation Mode to Test (which will stream data) and, using the Start and Stop buttons on the GUI, perform tests.

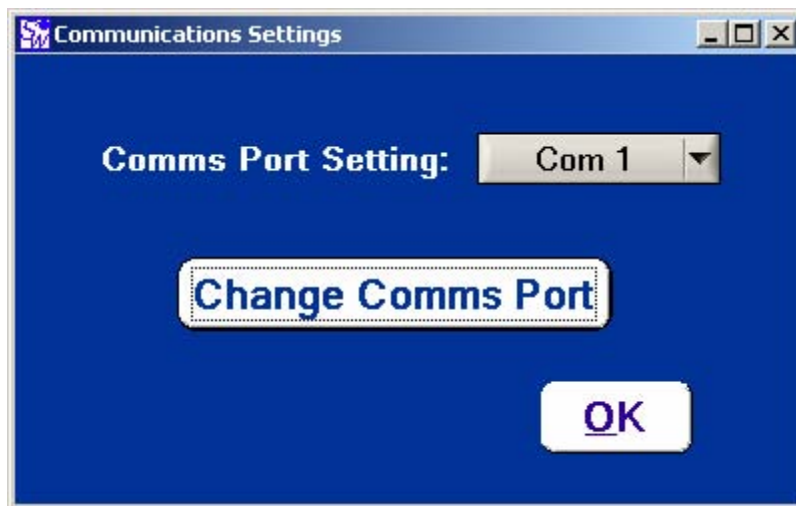
COMMUNICATIONS

The ScaleWatch LITE™ software works with the Windows software to handle serial communications with the WeightSense™ unit. Baud rates and other communications variables between the two are fixed. However, the user may be constrained by his/her computer hardware to using a specific communications port for serial communications.

Note: Do not disconnect the power from the WeightSense™ unit while ScaleWatch LITE™ is connecting to a unit or in Data Streaming Mode.

The Serial Communications Port

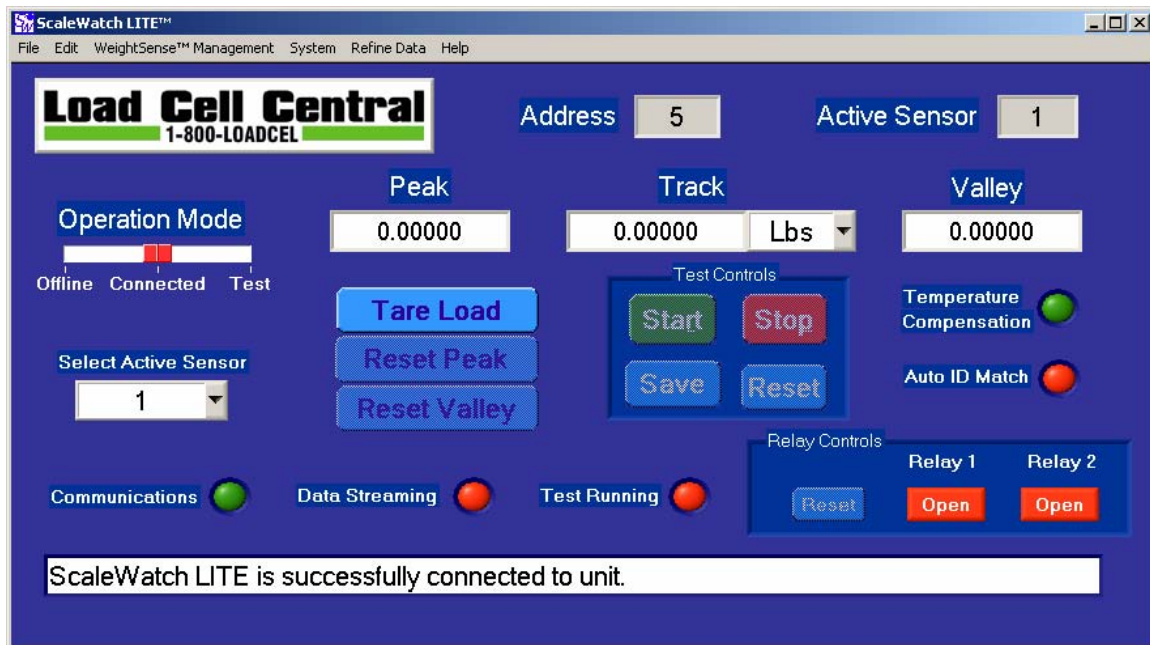
The default Communications (Comms) port that ScaleWatch LITE™ is programmed to use is Com1. To change the Comms port that the software uses to a different port, launch the software and wait until it finishes its connection sequence. Regardless of whether the software was able to connect to the WeightSense™ unit, the user will have the Edit->Communications Settings menu item. Select this item and the Communications Settings panel appears. The Communications LED on the main panel will turn yellow while the user edits these settings.



The user can select a new Comms port from the Comms port Setting pull-down menu. When done, clicking Change Comms Port will save the new Comms port and re-initialize the communications settings. A pop-up panel will inform the user if the software was unable to initialize communications with the new Comms port.

Clicking OK will close the panel and leave the software in Offline Mode. At this point, the user must change the Operation Mode switch on the Main Panel to Connected mode. The software will attempt to connect to the WeightSense™ unit using the new Comms port. A message will appear on the main panel informing the user of the connection status.

THE MAIN PANEL



The main panel in connected mode.

Address and Active Sensor

These display the address and the active sensor of the connected unit.

Operation Mode Switch

The operation mode of ScaleWatch LITE™ has three options: Offline, Connected, and Test. The WeightSense™ unit also has a setup mode that is not selectable, but goes into effect when a user opens a setup panel. This switch controls which of those selectable options is the active mode at any given time. When ScaleWatch LITE™ first starts up, it attempts to connect to a WeightSense™ unit. The message text box on the bottom of the screen will inform the user of the status of the connection and then the mode of operation.

Offline

ScaleWatch LITE™ will also go into offline mode if it cannot connect with the attached WeightSense™. The user may also place the unit in Offline mode. Then, when the user moves the switch to Connected mode, the GUI will read all data from the attached unit. Any time the user changes WeightSense™ units, they should go into Offline mode to do so, then reconnect and read the new data from the new WeightSense™.

Connected

The user can use this setting to try to reconnect if a connection has been lost (moving the switch from Offline to Connected), or to turn off data streaming after a test has finished (moving the switch from Test to Connected). Also,

many data streaming parameters, such as AutoStart, AutoStop, Refine Data, and the Test Unit must be set before data begins streaming. This is done in Connected mode.

Test

Setting the Operation Mode to Test will turn on data streaming and make various controls available in preparation for running and saving tests.

Select Active Sensor

This pull-down menu determines the active sensor calibration data used to interpret the incoming data signal on the WeightSense™ unit. Once the user has selected a sensor, all information entered into setup panels applies to that particular sensor.

For example, if the user selects sensor 1 and opens the Calibration panel, the information will reflect the settings for sensor 1.

Peak/Max

This field shows the peak value of data streaming into ScaleWatch LITE™. It is only active and updates when the Operation Mode is Test. In Connected mode, the field will reset its value to zero. The label will change from Peak to Max if the active sensor is calibrated as an extensometer, pressure, or torque sensor.

Track

This field shows the current value of data streaming into ScaleWatch LITE™. It is only active and updates when the Operation Mode is Test. In Connected mode, the field resets its value to zero.

Units

The units selected for tracking data are the units that the data will be stored in when a test is saved, regardless of the units that were used to calibrate the attached cell.

Valley/Min

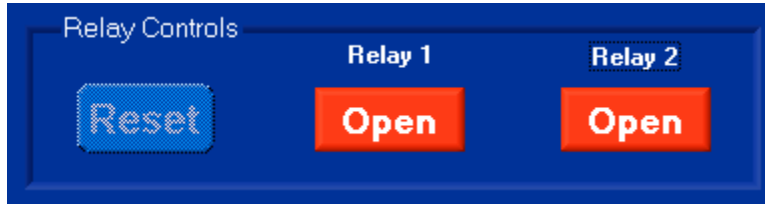
This field shows the valley measurement of data streaming into ScaleWatch LITE™. It is only active and updates when the Operation Mode is Test. In Connected mode, the field resets its value to zero. The label will change from Valley to Min if the active sensor is calibrated as an extensometer, pressure, or torque sensor.

Relay Controls

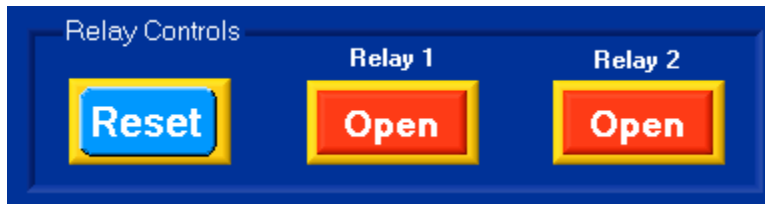
These buttons control the state of the two relay switches in the unit. They may be controlled automatically based upon the incoming data. See the section on the Auto Relay Control for more information.

Relays 1 and 2

Click on each relay button to change the state of that relay from open to closed and vice versa. When Auto Relay Control is enabled, the enabled relay buttons and the Reset button will have a yellow rim around them and the Reset button will be undimmed so that the user can easily discern the automatic control status of the relays. Auto Relay Control of either relay can easily be disabled by clicking on the appropriate relay button on the Main panel. To re-enable the Auto Relay Control for that relay, the user must re-open the Auto Relay Control panel and enable the automatic relay control again.



Auto Relay Control disabled



Auto Relay Control enabled

Relay Reset

Once tripped, relays may be reset to their normal state by clicking the Reset button. Note, however, that if the conditions are such that the relay will be tripped again, the Reset button will be ineffective. If Relay control is automatic and the relays have been tripped to their non-normal state, the user will be prompted to reset the relays before beginning a new test.

Test Controls

These are the buttons used for performing and saving tests with ScaleWatch LITE™. Note that tests may also be automatically started and stopped based on user-selected parameters. When the user chooses to automatically start or stop a test, the start, stop and reset button appear with a yellow rim around them. This way, the user can quickly tell if AutoStart or AutoStop is enabled. For more information on these options, see the section entitled AutoTesting.



AutoStart and AutoStop disabled



AutoStart and AutoStop enabled

Start

Clicking the Start button clears off any data from a previous test and begins a new test. When AutoStart is enabled, the user can wait until the test automatically starts OR begin it manually by clicking the start button. The start button is live under these circumstances.

Stop

Clicking the Stop button stops a currently running test. When AutoStop is enabled, the user can wait until the test automatically stops OR stop it manually by clicking the stop button. The stop button is live under these circumstances.

Save

The Save button undims when a test ends. Clicking the Save button will bring up a Windows file selection box allowing the user to select the name of the file to which the test data will be saved.

Reset

The Reset button undims when a test ends and AutoStart was enabled. When the user clicks the Start button to begin a test, the program knows to clear off any earlier test data at that time. When a test is started using AutoStart, the program allows the user to choose when to reset the test data. The user does this by clicking the Reset button. If AutoStart is disabled, the Reset button is dimmed.

Reset Peak/Max

The Reset Peak button is available whenever data is streaming and allows the user to reset the Peak value to the current reading from the sensor. The label will change from Peak to Max if the active sensor is calibrated as an extensometer, pressure or torque sensor.

Reset Valley/Min

The Reset Valley button is available whenever data is streaming and allows the user to reset the Valley value to the current reading from the sensor. The label will change from Valley to Min if the active sensor is calibrated as an extensometer, pressure or torque sensor.

Tare Reading

The Tare Load button is available whenever data is streaming and allows the user to reset the current Track value to zero. When the attached sensor is not a load cell, the button label will change to reflect the sensor type. Note that if mV/V units are selected for display, the data will not be tared.

Communications LED

The Communications LED is green when ScaleWatch LITE™ has successfully connected to the WeightSense™ unit, and red when the connection was not established. The LED is Yellow when the user is editing Communications Settings.

Data Streaming LED

The Data Streaming LED is green when data is streaming (the unit is in Test Mode) and red when data is not streaming (the unit is in Connected or Offline Mode).

Test Running LED

The Test Running LED turns green when the user begins a test or the test was automatically started. It turns red when a test is manually or automatically stopped.

Temperature Compensation LED

The temperature compensation mode is set by the user in the WeightSense™ Setup panel. When it is on, this LED is green. When it is off, this LED is red.

Auto ID Match LED

This LED shows red if either Auto ID is disabled, or there is no match of the sensor's Auto ID Tag to any of the calibrated sensors in the WeightSense™. If Auto ID is enabled and there is a match, the LED shows green.

Main Message Text Box

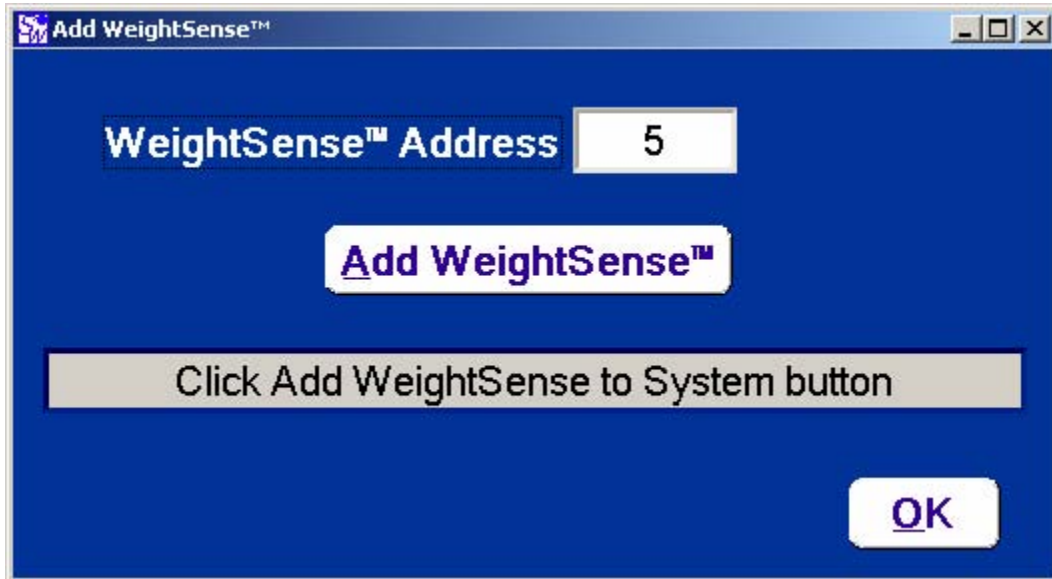
The Main Message text box informs the user when certain functions have been performed, such as a change of mode, a test beginning or ending, etc.

Print the Main Panel

Although this command control is not visible to the user, the user can print the Main panel by pressing F12 on the keyboard.

ADDING A WEIGHTSENSE™ TO THE SYSTEM

The WeightSense™ Unit must be “added” to the system by connecting it to a PC and assigning it an address. Removing a WeightSense™ must be done through the user interface and will be discussed in greater detail later.

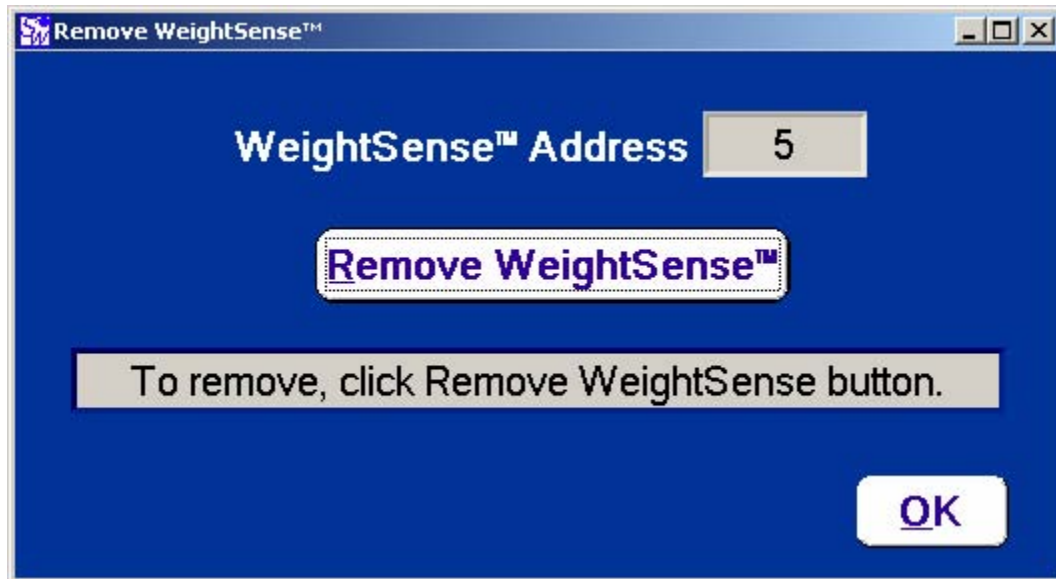


The Add WeightSense™ panel can be reached by clicking WeightSense™ Management -> Add on the menu of the Main panel. The user must select the new WeightSense™ address. The address will be 0 until the WeightSense™ has been added to the system. The Message text in this panel will walk the user through the process of adding a WeightSense™. Once a WeightSense™ has been added, it should not be replaced unless it has been removed through the user interface first. To do otherwise could cause addressing errors.

REMOVING A WEIGHTSENSE™ FROM THE SYSTEM

Addressing of a WeightSense™ unit is very important to maintaining the ScaleWatch LITE™-WeightSense™ communications. When a WeightSense™ is removed from the system, the software must clear the WeightSense™'s address before the WeightSense™ is detached. Therefore, if the user needs to replace a WeightSense™ unit, the user must remove the WeightSense™ from the system through the software before detaching it from the serial port. This prevents confusion of addresses by giving the same address to more than one WeightSense™ at a time.

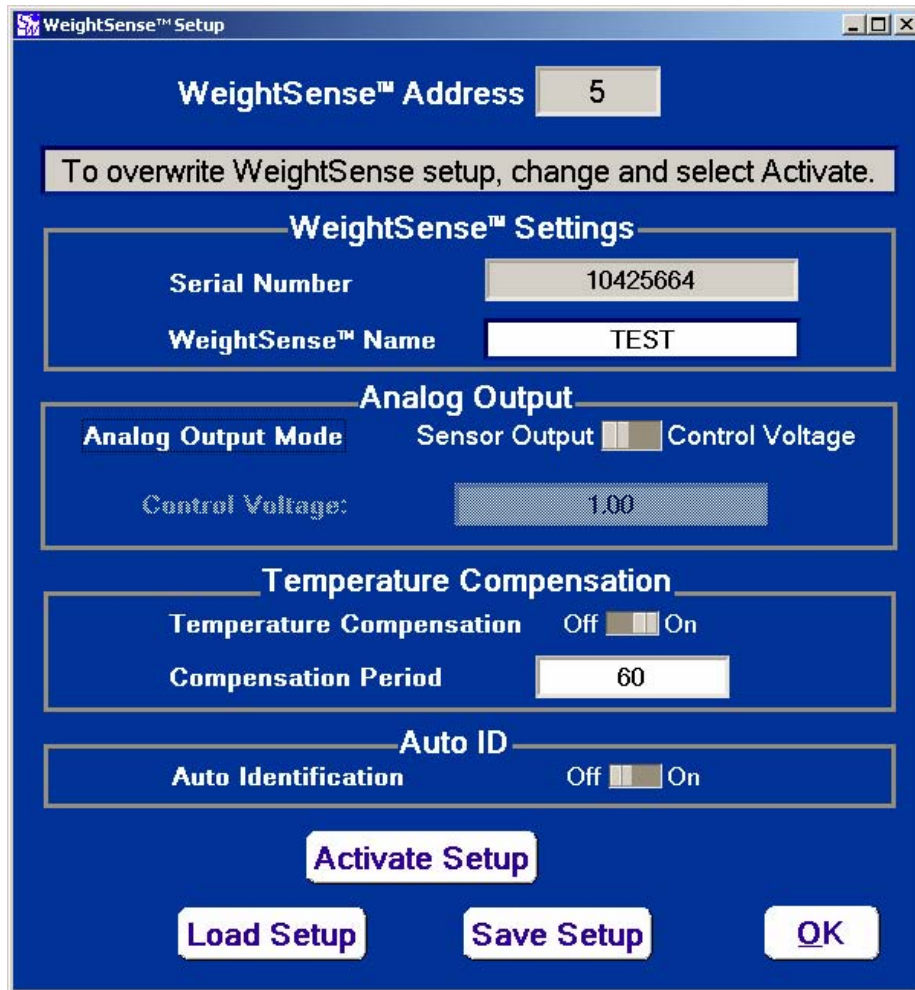
The Remove Cell panel can be reached by clicking WeightSense™ Management -> Remove on the menu of the Main panel.



The address in the WeightSense™ Address field should be that of the currently connected WeightSense™. The user must click Remove WeightSense™. Messages in the Remove WeightSense™ text box will guide the user through the process.

WEIGHTSENSE™ SETUP

To work effectively, a WeightSense™ must be setup once it has been added to the system. This setup can be changed after a sensor has been attached to the WeightSense™ and calibrated. The WeightSense™ Setup panel allows the user to see the serial number for the WeightSense™, set the name of the WeightSense™ (which will be visible on reports), set the Analog Output Mode and Voltage (if mode is set to Control Voltage), set the Temperature Compensation Mode and Period, and enable or disable Auto Identification of sensors. Setups may be saved and then loaded for viewing. If the user decides to use a setup they have loaded, they can activate the setup from this panel.



The screenshot shows the 'WeightSense™ Setup' window with a blue background. At the top, the title bar reads 'WeightSense™ Setup'. Below it, 'WeightSense™ Address' is set to '5'. A message box states: 'To overwrite WeightSense setup, change and select Activate.' The 'WeightSense™ Settings' section contains 'Serial Number' (10425664) and 'WeightSense™ Name' (TEST). The 'Analog Output' section shows 'Analog Output Mode' with a radio button selected for 'Sensor Output' and another for 'Control Voltage'. Below it, 'Control Voltage' is set to '1.00'. The 'Temperature Compensation' section has 'Temperature Compensation' with radio buttons for 'Off' (selected) and 'On', and 'Compensation Period' set to '60'. The 'Auto ID' section has 'Auto Identification' with radio buttons for 'Off' (selected) and 'On'. At the bottom are three buttons: 'Activate Setup', 'Load Setup', 'Save Setup', and 'OK'.

The WeightSense™ Setup panel can be reached by clicking WeightSense™ Management -> Setup WeightSense™ on the menu of the Main panel. The user will be guided through the setup of a WeightSense™ by the messages in the WeightSense™ Setup text box.

The WeightSense™ Setup Panel

WeightSense™ Address

This field shows the WeightSense™'s address. It is not editable.

Message Text Field

This field displays messages to the user from the program.

Serial Number

This field shows the factory serial number of the WeightSense™ unit. It is not editable.

WeightSense™ Name

The WeightSense™ name is useful for the user to distinguish which WeightSense™ is used for which function if they routinely swap out WeightSense™ units. This can be left blank, but it is advisable to label the WeightSense™ with something that distinguishes its use, i.e. "Load 1."

Analog Output

The WeightSense™ unit is capable of outputting an analog signal based on either the sensor data coming into the unit, or a set voltage. If the user selects Sensor for the Analog Output Mode, the analog output will reflect the data coming in from the active sensor only. Switching sensors will change the analog output to reflect the incoming data from the newly chosen sensor.

If the user selects a set voltage, the analog output voltage stays the same regardless of which sensor is active. Thus the analog output mode and voltage controls are "WeightSense™-wide" settings. If the sensor is selected to control analog output, the user can fine tune the analog output with controls that are available under the Sensor Setup panel.

Temperature Compensation

The Temperature Compensation works in the following manner: when on, the WeightSense™ unit will stop collecting data at certain periods to calculate temperature compensation for adjusting the data. The period – number of samples – at which these calculations will occur is set by the user in the Period field. During the time these calculations will take, the unit will output the most recently acquired sensor value until the calculations are finished. At this point the unit continues to output temperature-adjusted data. When temperature compensation is off, the unit continuously outputs data but these data points are not adjusted for any changes in temperature within the unit.

Important Note: As of ScaleWatch LITE™ Version 2.0.0 and above, the temperature compensation readings are not taken while a test is running. The most recently calculated compensation value prior to the start of the test is used for temperature compensation throughout the test. When the user stops the test manually, or the software stops the test automatically, temperature compensation readings will resume. We advise the user to allow the unit to power up and idle for at least a half hour before

running tests so that it has time to adjust the temperature compensation calculations to the ambient temperature.

Auto ID

When a sensor containing an Auto ID tag is calibrated, the WeightSense™ unit saves that tag into that particular sensor's calibration data. If the same sensor is removed from the unit and, later, re-attached while Auto ID is enabled, the user must cycle the power to the unit. The unit will read the tag from the extensometer and automatically activate the matching sensor calibration data.

For example: an extensometer with an ID is attached and Sensor 2 is calibrated. The extensometer is then removed. Later, the user has Sensor 1 active. The extensometer is then re-attached. The unit will switch the active sensor to Sensor 2 and disable the sensor select menu on the main panel so that the user can only use the appropriate calibration. The user can change sensors or calibrations at this point simply by turning Auto ID off, then going about their business.

Note: the user should not calibrate more than one sensor to a tagged extensometer. If this occurs and Auto ID is enabled, the first matching sensor becomes the active sensor. The next matching sensor will always be ignored.

Saving, Loading, and Activating Setups

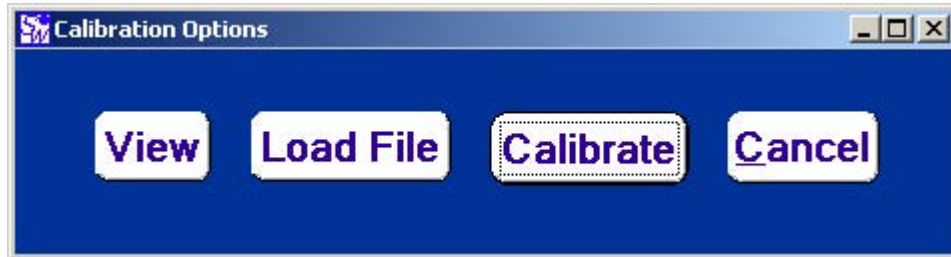
When the user is finished with these settings, the Activate Setup button must be clicked before the settings will be in effect. At this point the user can also save the setup to a file for later use.

Setups may be saved, loaded for viewing, and activated from this panel. The Save Setup button will bring up the Windows Save File panel allowing the user to select a name for the file prior to saving it. Load Setup will bring up the Windows File Select panel allowing the user to choose which file to load. The user can load as many files as they wish for viewing, but when they click the Activate Setup button, the data currently in the panel will then be the active setup data.

VIEW, LOAD AND PERFORM SENSOR CALIBRATIONS

After attaching the WeightSense™ to the system, the user must calibrate at least one sensor on the WeightSense™.

To begin calibrating a sensor, select the sensor to be calibrated in the Main panel to make it the active sensor, then select WeightSense™ Management ->View | Load | Perform Sensor Calibration from the menu. This will bring up the Calibration Options panel.



Calibration Options

WeightSenses™ can internally store up to three sensors' worth of calibration data. When the user selects the active sensor, the WeightSense™ uses that sensor's calibration data to "translate" the incoming signal from the sensor into load, extension, pressure or torque data.

If the user wishes to have more than three sensors' worth of calibration data available, they can save each set of additional calibration data to a file on the PC and re-load the data from a file on the PC to the WeightSense™. They can also view the current calibration data for a sensor.

However, before viewing, saving or loading calibration data for a sensor, the user must first calibrate the sensor. This will store the calibration data into one of the three internal data "slots" in the WeightSense™. The "slot" is determined by the active sensor number that the user selected before opening the calibration panel.

Calibrating a Sensor

To begin a sensor calibration, click Calibrate in the Calibration Options panel. The Calibration panel will appear in calibration mode. Below is an explanation of the panel features and an example sensor calibration.

The Calibration Panel

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V | 2 Pt Mass | 6 Pt Mass | Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: 0.000000 Mass Cal Points

Mass: 0.00000 Mass1: 0.00000

Mass2: 3.00000

Mass3: 0.00000

Mass4: 0.00000

Mass5: 0.00000

Mass6: 0.00000

Ready

Save

Quit

Calibration Check: 0.00000

Select the Sensor and Cal Type, Serial Number, Unit, and Rated Load, then click Ready

Save To File OK

The Calibration panel contains a number of fields and selection switches that will dim and undim as the calibration proceeds. Below is a listing of these controls and their uses.

WeightSense™ Address

This field shows the WeightSense™'s address. It is not editable.

Active Sensor

This field shows the sensor currently being calibrated. It is not editable.

Sensor Type

Sensor types supported by ScaleWatch LITE™ 200 are: Load Cell, Extensometer, Pressure Sensor, and Torque Sensor.

Message Text Field

This field displays messages to the user from the program.

Calibration Type

This switch allows the user to select the type of calibration to be performed.

Serial Number

This field allows the user to enter the sensor serial number (not to be confused with the serial number of the WeightSense™ unit). The serial number may be any combination of numbers and letters, but it CANNOT exceed eight characters.

Calibration Date

This is set to the current date when calibration begins. If the user is simply viewing the calibration data, this field is set to the date of last calibration of the sensor.

Rated Load

Here, the user must input the maximum rated load for the sensor being calibrated. This number should be a non-zero positive number.

Calibration Unit

This pull-down menu allows the user to select the units with which to perform the calibration. When the user selects the type of sensor to calibrate with the Sensor Type pull-down menu, these units will change accordingly. Selecting a load cell will enable load units to be selected here, while selecting either an will enable extension units. Pressure sensors will show pressure units, and torque sensors will have torque units available.

Shunt Value and Calibration Check

When calibrating a sensor on a WeightSense™ unit, the software will read the shunt value at the end of any mV/V or Mass calibration and put that value into the Shunt Value field. Later, if the user wants to make sure the calibration is still good, s/he can click the Calibration Check button, which will cause another shunt reading to be taken. The user can then compare the Calibration Check shunt value with the original Shunt Value and use that comparison to determine if the sensor needs re-calibrating. Additionally, the user can calibrate the sensor by Shunt calibration. If this was the selected calibration type, the user will be prompted during the calibration to enter the shunt constant into the Shunt Value field and then continue the calibration.

MVV Cal Point

These fields are where the user enters calibration data for a milli-volt per volt calibration if that is the type of calibration the user selected.

Mass/Extn/Pres/Torq Cal Points

These fields are where the user enters calibration data for mass, extension, pressure or torque calibration if that is the sensor type and type of calibration the user selected.

Ready

This is the button used to “inform” the program that all fields for each step have been set by the user and that it is time to move to the next step in the calibration.

Save

This button saves the calibration and writes the data to the WeightSense™ unit.

Quit

This button allows the user to cancel a calibration that is in progress. If clicked during the process, all calibration data entered up to that point will be discarded and the sensor will revert to its most recent calibration data. Once a calibration has been saved it cannot be cancelled.

OK

This button closes the calibration panel. If a calibration is in progress, the user will be prompted to save or cancel it before closing the panel.

Save To File

Once a sensor has been calibrated, the user can save the calibration data to a file and it can later be re-loaded to the unit. Each WeightSense™ can internally store up to three sensors' worth of calibration data, but this button allows the user to save however many sensors' calibration data as can be stored on their PC.

Example Calibration

Below is an example of a 2 point Mass calibration of a load sensor on a WeightSense™ unit. Note that the user will be instructed on each step by messages on the panel.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: 0.000000

Mass: 0.00000

Mass Cal Points:

Mass1	0.00000
Mass2	3.00000
Mass3	0.00000
Mass4	0.00000
Mass5	0.00000
Mass6	0.00000

Ready **Save** **Quit**

Calibration Check 0.00000

Select the Sensor and Cal Type, Serial Number, Unit, and Rated Load, then click Ready

Save To File **OK**

First the user will be prompted to select or enter the Sensor and Calibration Type, the sensor Serial Number, the Calibration Unit and the Rated Load. The Calibration Date will fill in automatically. The Channel Gain will change according to the selected Sensor Type. After entering this information the user must click the Ready button.

Depending on the calibration type selected, the user will be walked through the calibration procedure by the messages in the text box. In this case, the user is instructed to enter the first mass value for a 2 point Mass calibration. The Mass 1 field is undimmed for user entry and when the user is done, she/he must click Ready.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: mV/V 0.000000 Mass 0.00000

Mass Cal Points: Mass1 0.00000 Mass2 3.00000 Mass3 0.00000 Mass4 0.00000 Mass5 0.00000 Mass6 0.00000

Ready Save Quit

Calibration Check: 0.00000

Enter Mass 1, place the load on the sensor and click Ready.

Save To File OK

When the user clicks ready, the GUI begins reading data. When done with the reading and calculations, the GUI prompts the user to enter the second point in the calibration.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: mV/V 0.000000 Mass 0.00000

Mass Cal Points: Mass1 0.00000 Mass2 3.00000 Mass3 0.00000 Mass4 0.00000 Mass5 0.00000 Mass6 0.00000

Ready Save Quit

Calibration Check: 0.00000

Enter Mass 2, place the load on the sensor and click Ready.

Save To File OK

At this point the user is prompted to remove any load and click Ready. A shunt reading is taken.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: mV/V 0.000000 Mass 0.00000

Mass Cal Points: Mass1 0.00000, Mass2 3.00000, Mass3 0.00000, Mass4 0.00000, Mass5 0.00000, Mass6 0.00000

Ready, Save, Quit

Calibration Check: 0.00000

Remove any load from sensor and click Ready.

Save To File OK

Next, the user has the option of quitting or saving the calibration. One must be chosen in order to finish and close the panel.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/06

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45386

MVV Cal Point: mV/V 0.000000 Mass 0.00000

Mass Cal Points: Mass1 0.00000, Mass2 3.00000, Mass3 0.00000, Mass4 0.00000, Mass5 0.00000, Mass6 0.00000

Ready, Save, Quit

Calibration Check: 1.45394

Calibration readings finished. Click Save to finish the calibration.

Save To File OK

The user is notified that the calibration is finished.

Sensor Calibration

WeightSense™ Address Active Sensor

Sensor Type

Calibration Type

Serial Number

Calibration Date

Rated Load

Calibration Unit

Shunt Value

MVV Cal Point

Mass Cal Points

Mass Mass1

Mass2

Mass3

Mass4

Mass5

Mass6

Calibration finished.

Note: All multiple point calibrations must have the zero point as one of the points. A two point mass calibration will have the zero point as its first point. A six point mass calibration must “pass through” zero – it can have points less than zero, then the zero point, and points greater than zero.

Viewing Calibration Data

Calibration data for the active sensor may be viewed in ScaleWatch LITE™ by selecting View | Load | Perform Sensor Calibration from the WeightSense™ Management menu. Click View on the Calibration Options panel and the Calibration panel will come up in View Mode.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/2006

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: 0.000000

Mass Cal Points:

Mass1	0.00000
Mass2	3.00000
Mass3	0.00000
Mass4	0.00000
Mass5	0.00000
Mass6	0.00000

Buttons: Ready, Save, Quit, Calibration Check, OK

Status Bar: Viewing Cal Data. For Cal Check, click Calibration Check. Click OK when finished.

Bottom Buttons: Save To File, OK

In this mode, the user is unable to calibrate or load calibration data, but they can still save calibration data to a file and run a calibration check.

Loading Calibration Data

Sensor calibration data may be loaded to the active sensor in ScaleWatch LITE™ from a saved calibration file. To do this, select, View | Load | Perform Sensor Calibration from the WeightSense™ Management menu. Click Load File on the Calibration Options panel and the Calibration panel will come up in Load Mode.

Clicking the Load From File button will bring up the Windows File Selection popup where the user can select the proper file to load. This will load the data to the panel only and undim the Activate Cal button. The user can then view the data and, if they approve, click the Activate Cal button, which will then write the data to the WeightSense™. If they do not want this data, they can load another file or click OK to close the panel without changing the current calibration data.

Note that sensor calibration data should match the attached, active sensor. For example: the user has calibrated a sensor with serial number 321 in the Sensor 2 “slot” on the WeightSense™ and wishes to now use that slot for a sensor with serial number 456. There is a file on the PC for sensor 456. When the user loads this file, the program will notice that the serial numbers do not match. The user will be warned to make sure that the proper sensor (serial number 456) is now attached to the WeightSense™. If the

user did not change the attached sensor and used calibration data from sensor 456 with attached sensor 321, the results will be inaccurate.

Sensor Calibration

WeightSense™ Address: 5 Active Sensor: 1

Sensor Type: Load Cell

Calibration Type: mV/V 2 Pt Mass 6 Pt Mass Shunt

Serial Number: IJK17556

Calibration Date: 11/14/2006

Rated Load: 6.00000

Calibration Unit: Lbs

Shunt Value: 1.45384

MVV Cal Point: mV/V: 0.000000 Mass: 0.00000

Mass Cal Points:

Mass	Value
Mass1	0.00000
Mass2	3.00000
Mass3	0.00000
Mass4	0.00000
Mass5	0.00000
Mass6	0.00000

Buttons: Ready, Save, Quit

Calibration Check: 0.00000

To Load Cal Data, click Load From File. Click OK if finished.

Buttons: Save To File, Load From File, Activate Cal, OK

Calibration panel in Load Mode.

SENSOR SETUP

Once a sensor has been calibrated, it should be setup by the user. The user can, at this point rely on the default setup values, but should at least become familiar with the sensor setup options. The Active Sensor must be selected using the Select WeightSense™ Sensor pull-down menu on the Main panel before beginning the sensor setup process. The Active Sensor can be setup by selecting WeightSense™ Management->Setup Active Sensor. The sensor setup panel will appear and the user will be walked through the process with messages in the setup message text box.

The Sensor Setup Panel

Sensor Setup

WeightSense™ Address: 5 Active Sensor: 1

Enter Sensor Setup information and click Activate Setup

Sensor Settings

Serial Number: IJK17556 Display Precision: 5

Filter Averaging: 1 Points

Sensor Analog Output

Zero Reading Voltage: 1.14

Max Reading Voltage: 1.21

Min Reading Voltage: 1.09

LCD Display

☐ Use Default LCD Display Label

LCD Display Label: s1cA

Base %

Base Load: 6.00000 Lbs

Load Setup Activate Setup Save Setup

OK

WeightSense™ Address

This field shows the WeightSense™'s address. It is not editable.

Active Sensor

This field shows the sensor currently being set up. It is not editable.

Message Text Field

This field displays messages to the user from the program.

Serial Number

This field is not editable. This is the sensor serial number the user entered when calibrating the sensor.

Display Precision

This switch allows the user to select the number of digits beyond the decimal point that are displayed in the Main Panel Track, Peak, and Valley fields.

Filter

This control allows the user to select the number of points over which an average is taken in order to filter out noise. This can be set to any number from 0 to 128.

Sensor Analog Output

When the Analog Output Control mode in the Cell Setup panel is set to Sensor, the analog output is tied to the sensor reading. In these fields, the user must set the voltage they desire for maximum sensor output, zero sensor output, and minimum sensor output.

Zero Reading Output

Enter the voltage that the unit should output when the sensor reading is at 0.

Max Reading Output

Enter the voltage that the unit should output when the sensor reading is at the sensor maximum. The maximum voltage you can enter is 10 volts.

Min Reading Output

Enter the voltage that the unit should output when the sensor reading is at the sensor minimum. The minimum voltage you can enter is -10 volts.

LCD Display

The unit can optionally have an LCD Display attached to it to display readings on the active sensor. In these fields, the user can set the four-letter/digit label that the LCD Display to whatever is appropriate for the sensor.

Use Default LCD Display Label

The default label for the active sensor has the format “s<sensor number>c<channel letter>”, i.e. s1CA, where <sensor number> is the active sensor and <channel letter> is the channel on which the sensor was calibrated. When this checkbox is checked and the setup is activated, the LCD Display will show this as the label. Otherwise, the LCD Display label will be undimmed and the user can enter a different label. This field is not stored in the unit, so, initially, when the software reads the unit settings, this field will be off even though the label may actually be the default. Simply check the label in the LCD Display Label field to see the current label for the Display.

LCD Display Label

This is the label to use instead of the default label if the user selects not to use the default label. Enter up to four letters/digits. Changes go into effect when the setup is activated.

Base Per Cent Value

When the user selects % as the test unit on the main panel, this value represents 100% and all incoming data will be converted to per cent based on the value.

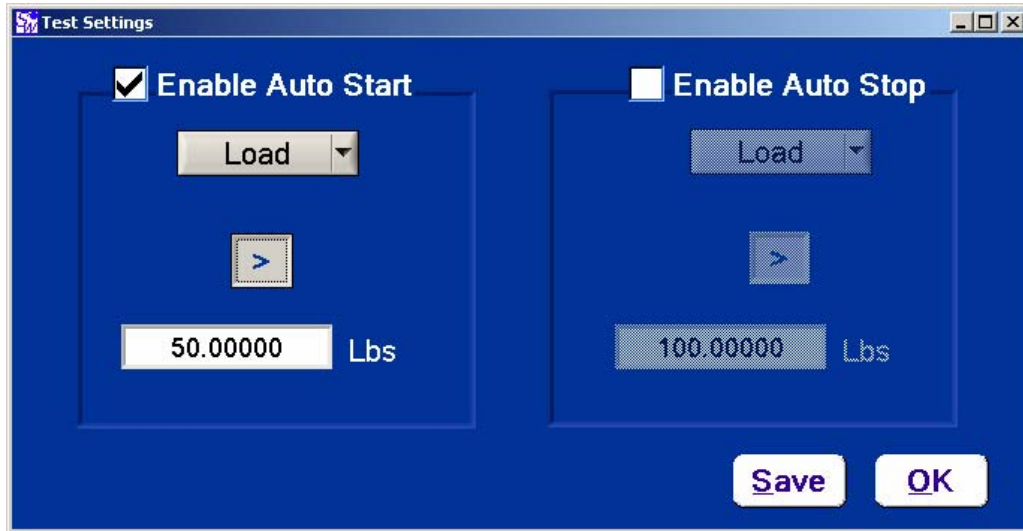
For example: if the base load value is 6.0 lbs, and the sensor gets a reading of 3.0 lbs., the display will show 50%. If the sensor gets a reading of 18.0 lbs, the display will show 300%. Base % must never be set to zero.

Saving, Loading, and Activating Setups

Like WeightSense™ Setups, Sensor Setups may be saved, loaded for viewing, and activated from this panel. The Save Setup button will bring up the Windows Save File panel allowing the user to select a name for the file prior to saving it. Load Setup will bring up the Windows File Select panel allowing the user to choose which file to load. The user can load as many files as they wish for viewing, but when they click the Activate Setup button, the data currently in the panel will then be the active setup data.

AUTO TEST SETTINGS

ScaleWatch LITE™ allows the user to automatically start and/or stop tests. Auto Test Settings can be viewed by selecting Edit->Auto Test Settings from the menu.



This panel essentially lets the user enable and set one, both, or neither of the following actions:

Start a test if [Auto Start Item] is [less than/greater than] [Auto Start Value].

Stop a test if [Auto Stop Item] is [less than/greater than] [Auto Stop Value].

Example:

The current settings on the panel above are:

Start test if Load is greater than 2.0 Lbs.

Stop test if Load is greater than 5.0 Lbs.

The resulting test will start when the load first exceeds 2 pounds, then the load can go back below the start condition without affecting the test, but when the load increases to the point where it exceeds 5 pounds, the test stops immediately. Note that the units on this panel for the values will always be the same as the Track units selected in the main panel.

Enable Auto Start

This enables the Auto Start feature so that once the conditions set in the Auto Start Item, Auto Start Condition, and Auto Start Value are reached, a test will automatically begin. When this happens, the user is notified in the Main Panel Message text box that a test was automatically started.

Note that when manually starting a test, the current test data is purged just before a new test begins. Clearing test data when automatically starting a test is a little more difficult, so the user must do this by clicking on the Reset. Therefore, enabling the Auto Start

feature of ScaleWatch LITE™ will require the use of the Reset button after a test is over and before automatically starting a new test.

Auto Start Item

This allows the user to select the item to use as a means of starting a test. The item list for a load sensor is: Load, Peak, Valley, Time. The item list for an extensometer is: Extn, Max, Min, Time. Pressure has Pressure, Max, Min, and Time. Torque has Torque, Max, Min, and Time.

Auto Start Condition

This button allows the user to select the “less than/greater than” part of the start condition. Note that when Time is selected as the Auto Start Item, the condition is limited to “greater than.” Setting a test to auto start when the time is below a certain value is the same as immediately manually clicking the Start button when leaving the Auto Test Settings panel.

Auto Start Value

This field allows the user to input the value that trips auto start.

Enable Auto Stop

This enables the Auto Stop feature so that once the conditions set in the Auto Stop Item, Auto Stop Condition, and Auto Stop Value are reached, a test will automatically end. When this happens, the user is notified in the Main Panel Message text box that a test was automatically stopped.

Auto Stop Item

This allows the user to select the item to use as a means of stopping a test. The item list for a load sensor is: Load, Peak, Valley, Time. The item list for an extensometer is: Extn, Max, Min, Time. Pressure has Pressure, Max, Min, and Time. Torque has Torque, Max, Min, and Time.

Auto Stop Condition

This button allows the user to select the “less than/greater than” part of the stop condition. Note that when Time is selected as the Auto Stop Item, the condition is limited to “greater than.” Setting a test to auto stop when the time is below a certain value is the same as immediately manually clicking the Stop button when leaving the Auto Test Settings panel.

Auto Stop Value

This field allows the user to input the value that trips auto stop.

OK

Applies the Auto Test conditions selected and closes the Auto Test Settings Panel.

STRESS MEASUREMENT

There are two ways for the user to measure stress with ScaleWatch LITE™:

- Calibrate a Pressure Sensor and take readings, or
- Calibrate a Load Sensor, measure the sample's cross section, and calculate the stress based on the incoming force from the sensor divided by the sample cross section area.

To do the former, the user can simply select Pressure as the sensor type in the calibration panel and continue the calibration. For the latter, the user must enter the cross-sectional sample area in the Sample Area panel.

SAMPLE AREA PANEL

The Sample Area Panel has several options. The user can have the software calculate the area based on the shape and dimensions entered or the user can directly enter the sample area. The user must click the Save button before exiting the panel to save the area for calculation of PSI or MPa.

Sample Area

Sample Area For Load Cell Stress

Shape

Rectangle Circle Direct Entry

Width: 1.00000 In

Thickness: 1.00000 In

Area: 1.00000 In^2

Save OK

Shape

This switch allows the user to select the shape of the sample (either rectangular or circular) or enter the Sample Area directly. If the user selects rectangle, the sample dimensions are Width and Thickness. If the user selects circle, the dimensions are Outer Diameter and Inner Diameter. If the user selects Direct Entry, the dimension fields are dimmed and the Area field is available for entry. The default shape is rectangle.

Dimensions

These fields are for the user to enter the dimensions. Be sure to select the appropriate unit for each dimension. Once the dimension is entered, the Area will be automatically calculated. The user can also change the unit of measure for the area. Default dimensions are 1.0 inch Width and 1.0 inch Thickness.

Area

The area can be calculated or directly entered. If the user has selected a shape and then directly enters the area, and that area does not match the calculated area based on the dimensions, the user will be notified of this. Default area is 1.0 square inches.

Save

The save button saves the area to be used in calculating the PSI or MPa that comes in from the sensor. Closing the panel without clicking Save will mean that the previous sample area will be used in these calculations.

OK

The OK button closes the Sample Area panel.

USER DATA REFINEMENT

ScaleWatch LITE™ allows the user to apply a conversion factor to incoming data so that the user can create their own units with which to save their data. The conversion factor is in the form of a quadratic equation that the user can manipulate by entering various values.

The equation is:

$$\begin{aligned} \text{Output Data} = & a(\text{Incoming data in selected units})^5 + \\ & b(\text{Incoming data in selected units})^4 + \\ & c(\text{Incoming data in selected units})^3 + \\ & d(\text{Incoming data in selected units})^2 + \\ & e(\text{Incoming data in selected units}) + f \end{aligned}$$

Select a Base Unit

The WeightSense™ unit can send load data in Lbs, Kg, and %. It can also send extension data for an extensometer in Inches, cm, mm, and %; pressure data for a pressure sensor in PSI and %; and torque data for a torque sensor in Nm and %. Units of mV/V may be selected, but only when mV/V is the selected test unit. The user must select the units in which the WeightSense™ will stream data, and the Polynomial equation will be applied to data in those units to convert the data to the user-defined units.

Enable Polynomial Data Filter

This enables the application of the user-entered refinements to the incoming data. Once this “filter” is enabled, the user **MUST** enter a label. The label can be characters or digits and must be at least one and not more than four characters long.

a, b, c, d, e, and f

The user can enter values for a, b, c, d, e, and f and apply the equation to the incoming data by enabling the Polynomial Data Filter.

Label

The label can be characters or digits and must be at least one and not more than four characters long. It will be added to various unit menus within ScaleWatch LITE™ if enable is checked or removed from those menus if enable is unchecked.

Save

This applies all of the panel settings. If the user has clicked the enable checkbox, the new unit is added to the various menus within ScaleWatch LITE™ and can be selected for testing.

OK

This button closes the Refine Data panel.

Using Refine Data with Multiple Sensors

If the quadratic equation is enabled and the user changes the active sensor, the user-defined units will remain available **ONLY IF** the new sensor is of the same type as the old sensor.

For example: the current active sensor is a load sensor and the user has created and enabled a unit (TONS) using the refine data panel with a base unit of Kg.

When the user switches to another sensor that is also a load cell, the TONS unit will remain in the main unit pull-down menu for the user to select. If the user has had the old sensor outputting data in TONS, the output units for the new sensor will revert to the base unit used to create TONS, i.e. the new sensor will begin with its output units set to Kg. If the old sensor was using another unit as the output unit, the new sensor will start off with that same unit.

If the user switches to another sensor that is calibrated as an extensometer, the TONS unit will not appear in the output units pull-down menu on the main panel. If the user brings up the refine data panel, they will still see all their coefficients and the TONS label, but the units will have been changed to Inches and the “filter” will have been disabled. The user can then re-set the panel and create a new unit based on Inches, cm, or mm. If the sensor is switched back to a load cell and the user wants to use TONS again, they must open the Refine Data panel and reset the panel, enabling the quadratic equation. When they close the panel, their changes will take effect and TONS will be back in the output units pull-down menu.

RUNNING TESTS IN SCALEWATCH LITE™

Once the sensor attached to the WeightSense™ unit has been calibrated, it is ready to begin streaming data.

Using AutoStart and/or AutoStop

If the user has elected to automatically start or stop a test, these settings must be made BEFORE streaming data, while in Connected Mode. Also, in this case, since the test could start without warning to the user, the user should set all desired parameters and any Data Refinement using the Polynomial Equation options prior to changing the mode to Test.

When all of these parameters are set, the user can change the Operation Mode to Test and data will start streaming, turning the Data Streaming LED to green.

When the conditions to start the test have been tripped:

- the Test Running LED will turn green,
- the start button will dim,
- the stop button will be undimmed,
- the Track unit will be set to indicator mode,
- the menu will dim,
- a message will appear in the Main Message text box informing the user that the test was started automatically.

When the conditions to stop the test have been tripped:

- the Stop button will dim,
- the Test Running LED will turn red,
- the Track unit will be restored to hot mode,
- the Save button will be undimmed,
- the Start button will be undimmed,
- the Reset button will be undimmed,
- the menu will be undimmed,
- a message will appear in the Main Message text box informing the user that the test was stopped automatically,
- the user will be prompted to save the test.

Using Manual Start and/or Stop

When AutoStart and/or AutoStop is disabled, the user can begin streaming data before making last minute settings of the data refinement because there is no concern that the test might begin without warning. It is still recommended that these changes be made before streaming data.

When all of these parameters are set, the user can change the Operation Mode to Test and data will start streaming. The Data Streaming LED will change to green.

When the user clicks the Start button:

- the Test Running LED will turn green,
- the start button will dim,
- the stop button will be undimmed,
- the menu will dim,
- a message will appear in the Main Message text box informing the user that the test was started manually.

When the user clicks the Stop button:

- the Stop button will dim,
- the Test Running LED will turn red,
- the Save button will be undimmed,
- the Start button will be undimmed,
- the menu will be undimmed,
- a message will appear in the Main Message text box informing the user that the test was stopped manually,
- the user will be prompted to save the test.

SAVING TESTS

When a test is over, the user is prompted to save the test. If the user elects not to save the test at this point, as long as the Operation Mode remains the same and the Start button is not clicked, the data will remain in memory. The user can then save the test by selecting File->Test->Save from the menu. It is recommended, however, that the test be saved immediately by using the Save button.

AUTO RELAY CONTROL

All WeightSense™ units contain two solid state relays that can be controlled using ScaleWatch LITE™. The Main panel has two buttons that the user can click while a test is running to trip the relay and open/close a circuit. This allows the user to control external electronics or machinery with these relays. ScaleWatch LITE™ version 2.0.0 has added the ability to automatically trip these relays based on current data being read from the active sensor OR based on the time as measured from when the user clicks the Start button to start a test. The Auto Relay Control panel may be viewed by selecting WeightSense™ Management->Auto Relay Control.

The screenshot shows the 'Automatic Relay Control' window with two panels for Relay 1 and Relay 2. Relay 1 has 'Enable Automatic Control' checked, 'Initial Relay State' set to 'Open', and 'Change Relay State When...' set to 'Load' with a value of 5.00000 Lbs. Relay 2 has 'Enable Automatic Control' unchecked, 'Initial Relay State' set to 'Open', and 'Change Relay State When...' set to 'Load' with a value of 0.00000 Lbs. Both relays have 'Automatic Reset' set to 'Off' and 'Reset to Initial State When...' set to 'Load' with a value of 2.00000 Lbs. At the bottom, there is a text box for 'Enter Auto Relay settings and click Activate.', an 'Active Sensor' dropdown set to '1', and buttons for 'Load from File', 'Activate', 'Save to File', and 'OK'.

Each relay has its own set of parameters that the user can adjust in order to set the conditions that will automatically change the state of that relay. When incoming data meets those conditions, the state of the relay will change.

After these settings have been activated, as long as the software is connected to the WeightSense™ and the sensor is not re-calibrated, these settings will apply until they are changed. When a sensor is changed, the Auto Relay Control settings for the new sensor will be put into place. When the software is disconnected from the WeightSense™, all Auto Relay Control settings for all sensors are disabled and the values reset to 0. The user must either enter all the parameters again, or simply load them from a file if they were saved.

IMPORTANT NOTE: Because the automatic control of these relays lies within ScaleWatch LITE™ and not within the WeightSense™ firmware, there may be a minor delay of up to 5 data points (less than 0.1 seconds) before the relay state change actually takes place through the WeightSense™ hardware.

Enable Automatic Control

This checkbox, when checked, allows the user to set the parameters to automatically trip the relay. When this box is not checked, the controls for that particular relay will all be dimmed and unavailable for use.

Initial Relay State

This switch lets the user set the initial state of the relay to open or closed (default is open). When the relay gets tripped during a test, the relay will be changed to the OPPOSITE of this state. When it is reset (either manually by clicking the relay's button on the main panel, or automatically by meeting the reset conditions in this panel) the state of the relay will return to this initial state.

Change Relay State When...

This area of the panel contains controls that the user can adjust to set the parameters for changing the state of the relay from its initial state (i.e. open) to the opposite state (i.e. closed).



Item

This pull-down menu will change according to the active sensor type. If the active sensor is a load sensor, the options in this menu will be Load and Time. If the active sensor is an extensometer, the options will be Extn and Time. If the sensor is a pressure sensor, the options will be Pressure and Time, and if the sensor is a Torque sensor, the options will be Torque and Time.

Condition (< , >)

This button allows the user to set the condition at which, when the value is compared to the incoming sensor data and this condition is true, the relay will change state.

Unit

To the right of the area is the unit pull-down menu. Select the unit of measure for the value at which the relay will trip. If a value exists in the value field, changing the unit will convert the value to the new unit. The exception to this conversion is when the unit is the User-Defined unit created in the Refine Data panel. This cannot be converted to any other unit and the user will be notified when such a change is made.

Value

This is the middle field where the user enters the value to use to trip the relay.

Example

If the user enables Relay 1, selects Load for the item, ">" for the condition, Lbs for the unit, and enters 5.0 for the value, Relay 1 will change from its initial state to the opposite state when the load on the attached sensor exceeds 5.0 Lbs. This is also true when the load on the sensor exceeds any other unit value that, when converted, equals 5.0 Lbs. If the user is testing in Kg and has the above settings, the relay will change state when the test data exceeds 2.268 Kg (the Kg equivalent of 5.0 Lbs).

Automatic Reset

Once the state of a relay has been changed automatically, it will stay in that state until one of two things happens:

- The user manually resets the relay to its initial state by clicking the relay's button on the Main panel, or
- The user turns on Automatic Reset and enters the parameters for the software to use to automatically reset the relay to its initial state.

The Automatic Reset switch allows the user to enable the automatic reset of the relay to its initial state. When the switch is set to "on", the reset parameter controls are undimmed and ready to use. When the switch is "off", these controls are dimmed and unavailable to the user. Note that if the initial state change condition is never met, the reset condition will never be met either. The software waits until the first relay state change is made before looking for the reset conditions.

Reset to Initial State When...

You will find these controls are the same as the controls used to change the relay in the first place. Change the controls to reflect the condition on which you want the relay to return to its original state.



Item

This pull-down menu will change according to the active sensor type. If the active sensor is a load sensor, the options in this menu will be Load and Time. If the active sensor is an extensometer, the options will be Extn and Time. If the sensor is a pressure sensor, the options will be Pressure and Time, and if the sensor is a Torque sensor, the options will be Torque and Time.

Condition (< , >)

This button allows the user to set the condition at which, when the value is compared to the incoming sensor data and this condition is true, the relay will change back to its initial state.

Unit

To the right of the area is the unit pull-down menu. Select the unit of measure for the value at which the relay will reset. If a value exists in the value field, changing the unit will convert the value to the new unit. The exception to this conversion is when the unit is the User-Defined unit created in the Refine Data panel. This cannot be converted to any other unit and the user will be notified when such a change is made.

Value

This is the middle field where the user enters the value to use to reset the relay.

Example

Continuing from the previous example: if the user enables reset on Relay 1, selects Load for the item, "<" for the condition, Lbs for the unit, and enters 2.0 for the value, Relay 1 will change back to its initial state when the load on the attached sensor goes below 2.0 Lbs. This is also true when the load on the sensor goes below any other unit value that, when converted, equals 2.0 Lbs. If the user is testing in Kg and has the above settings, the relay will change back to its initial state when the test data drops below 0.9072 Kg (the Kg equivalent of 2.0 Lbs).

Message

This field informs the user when certain events occur, i.e. settings have been saved to a file, etc.

Load From File

This button allows the user to load Auto Relay Control settings from a file that has been previously saved using the Save To File button. Only files that have the ".arc" extension are able to be loaded. Be aware that these settings are "sensor type" dependent. That means that if the user saves settings that were created for a load sensor, these settings cannot then be loaded and used when the active sensor is an extensometer. Doing so will result in a message popup to the user informing them that the settings cannot be used.

Activate

This button actually saves the current settings in the panel as the "active" automatic relay parameters for the active sensor. As long as the software is connected to the WeightSense™ and the sensor is not re-calibrated, these settings will apply until they are changed. When a sensor is changed, the Auto Relay Control settings for the new sensor will be put into place. When the software is disconnected from the WeightSense™, all Auto Relay Control settings for all sensors are disabled and the

values reset to 0. The user must either enter all the parameters again, or simply load them from a file if they were saved.

Save To File

This button allows the user to save the current Auto Relay Control settings in the panel to a file on the host PC. Note that Auto Relay Control settings are specific to one sensor type. Settings saved when the active sensor is a load sensor cannot then be loaded when the active sensor is an extensometer. It may be useful to include the sensor type in the file name as you save your settings, i.e. Load_Sensor1Test3.arc, so that it is easier to load the correct settings for the correct sensor type.

OK

This button closes the Auto Relay Control panel.

Restrictions on Auto Relay Control

Auto Relay settings are restricted to certain conditions so that conflicts will not arise in the software.

Toggle State

Certain conditions are not permitted because they will place the relay in a “toggle” state where it is constantly trying to change.

Example:

If you try to set Relay 1 to change state when the data is greater than 2.0 lbs, then automatically reset to its original state when the data is greater than 5.0 lbs, this will cause a conflict. After the data exceeds 5.0 lbs, BOTH conditions will be true at the same time.

Rather than allow the user to create this conflict, the settings are checked when they are saved or activated. If they will create a conflicting state, the user will be notified that the settings are invalid and cannot be used.

Time

The user may select Time as an item for the initial relay state change AND/OR the reset state change for a relay. However, there are restrictions.

- The value entered when the item is Time cannot be less than 0.
- If Time is selected for the initial change item, the time entered begins ticking when the user clicks the Start button for a test or, if Auto Test is on, when the conditions exist that automatically start the test.
- If Time is the reset item, the time entered begins ticking from the time the relay initially changes state.

WEIGHTSENSE™ BACKUP AND RESTORE

WeightSense™ Units have the ability to store a backup of calibration and settings data for each sensor as well as the “WeightSense™-wide” settings found in the WeightSense™ Setup panel. The GUI allows the user to select which information is backed up via the password protected WeightSense™ Backups panel. This allows the user to create “factory settings” by calibrating the sensors and placing defaults in all the settings, then back the factory settings up prior to sending the unit into the field. Then, if the end-user wishes to return to those factory settings, they can use the WeightSense™ Restore panel to restore any or all of the sensors and WeightSense™-wide information to those factory settings.

Backing Up the WeightSense™

Select the System->WeightSense Backup menu from the Main panel menus. You will see the WeightSense™ Backup Password panel.



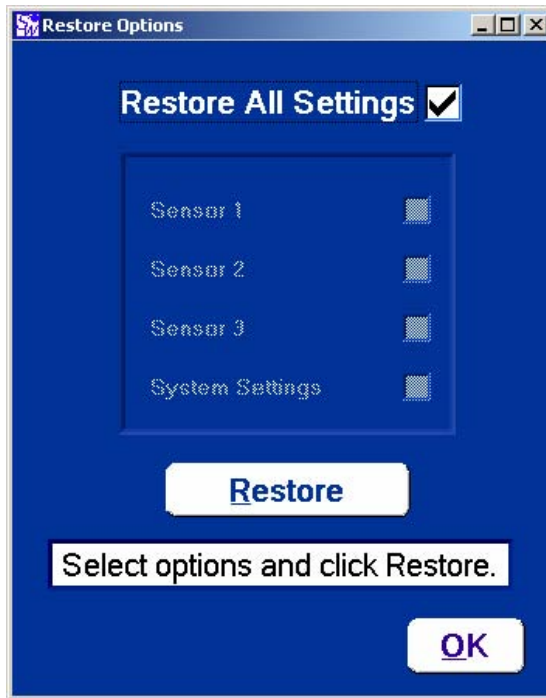
Enter the password and click OK. This will bring up the WeightSense™ Backup panel.



Select which sensor and/or the WeightSense™ settings you wish to back up and click the Backup button. A message will inform you when the unit has finished backing up the selected information. Click OK to return to the Main panel.

Restoring the System

Select the Edit->WeightSense Restore menu from the Main panel menus. This will bring up the Restore Options panel.



Select which sensor and/or the WeightSense™ settings you wish to restore and click the Restore button. A message will inform you when the unit has finished restoring the selected information. Click OK to return to the Main panel. When finished restoring factory backups, the GUI must be updated. Set the Operation Mode to Offline and then back to Connected to allow the GUI to read the restored information from the WeightSense™ unit.

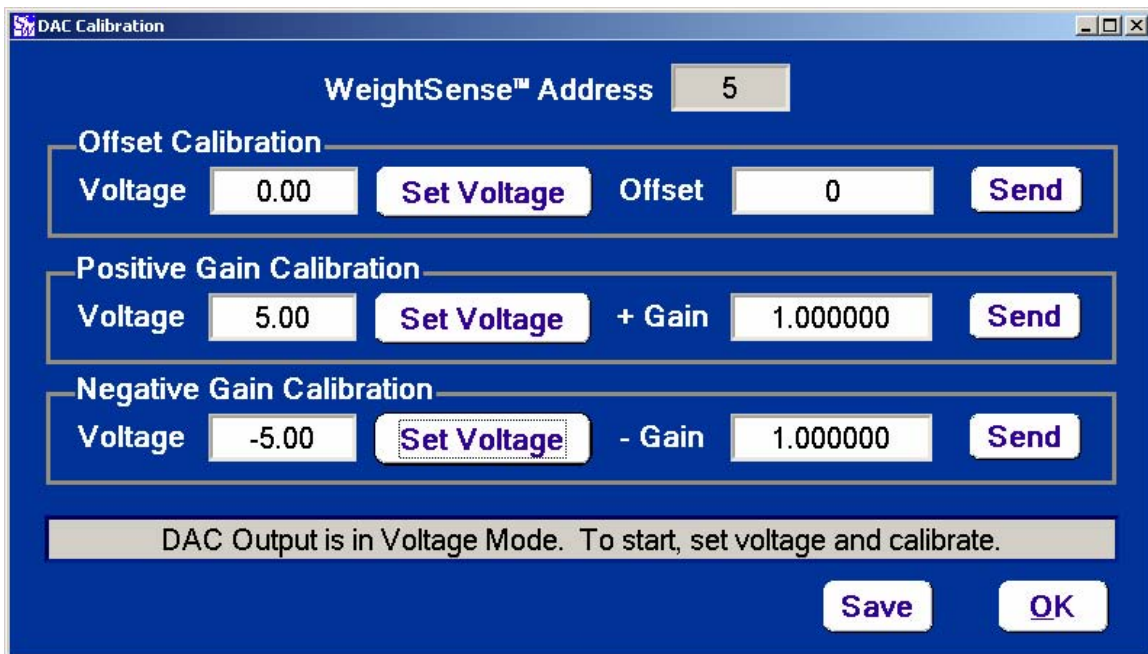
DAC CALIBRATION

The Analog Output from the unit, when it is dependant on the sensor output, must be calibrated before being used. This calibration is password protected so that only authorized users may perform this calibration. When the panel is entered, the unit is set to Analog Out Voltage Mode so that the user can monitor the effect on the voltage of the various settings. The Analog Out Mode returns to its prior setting when the user exits the panel.

Select System->DAC Calibration from the Main panel menu and you will see the DAC Calibration Password panel.



Entering the correct password will bring up the DAC Calibration panel.



For each part of the calibration (Offset, Positive Gain, and Negative Gain), the user must set the voltage to the desired value. Next, the user must send the Offset (or Positive or Negative Gain) Value to the unit, adjusting it until the Voltage from the Analog Output port on the unit reaches the desired value. When the calibration is finished, the user must click the Save button to save the data. Clicking OK will close the panel but will not, alone, save the data.

The DAC Calibration Panel

WeightSense™ Address

This field shows the WeightSense™'s address. It is not editable.

Offset Calibration

Voltage

This is the desired voltage output to which the offset is applied.

Set Voltage

This button writes the voltage to the WeightSense™.

Offset

The offset to send the unit repeatedly until the Analog Output is the correct value.

Send

This button sends the offset value to the WeightSense™.

Positive Gain Calibration

Voltage

The desired voltage output to which the positive gain is applied.

Set Voltage

This button writes the voltage to the WeightSense™.

Offset

The positive gain to send the unit repeatedly until the Analog Output is the correct value.

Send

This button sends the positive gain value to the WeightSense™.

Negative Gain Calibration

Voltage

The desired voltage output to which the Negative Gain is applied.

Set Voltage

This button writes the voltage to the WeightSense™.

Offset

The Negative Gain to send the unit repeatedly until the Analog Output is the correct value.

Send

This button sends the Negative Gain value to the WeightSense™.

Save

The Save Button finishes the calibration by instructing the WeightSense™ to save off the final values for Offset, Positive Gain, and Negative Gain. These values are the current calibration values until another calibration is performed and saved.

OK

The OK button closes the panel. It does not automatically save the calibration data. The user must explicitly save the calibration by clicking the Save button BEFORE closing the panel.

SCALEWATCH LITE™ SHORTCUT KEYS

ESC	Stop Test
F1	Start Test
F2	Reset Peak
F3	Reset Valley
F4	Save Test (Menu or Button)
F5	Tare
F6	Reset Relay
F9	Reset Test
F10	Auto Test Panel
F12	Print Main Panel
Ctrl + X	Exit ScaleWatch LITE™
Ctrl + M	Edit Communications Settings Panel
Ctrl + F	Restore System Settings Panel
Ctrl + A	Add WeightSense™ Panel
Ctrl + D	Remove WeightSense™ Panel
Ctrl + U	WeightSense™ Setup Panel
Ctrl + C	Sensor Calibration Options Panel
Ctrl + S	Setup Sensor Panel
Ctrl + B	Board Calibration Panel
Ctrl + K	Backup System Settings Panel
Ctrl + L	DAC Calibration Panel
Ctrl + R	Refine Data Panel
Ctrl + H	About ScaleWatch LITE™ Panel
Ctrl + T	Auto Relay Control Panel
Ctrl + N	Sample Area Panel

TECHNICAL SUPPORT AND CUSTOMER SERVICE

For Technical Support or Customer Service for any Load Cell Central product, call or contact RDR Technology, Inc. dba Load Cell Central, PO Box 91, 216 Main St., Monroeton, PA 18832, phone: 570-265-5015.