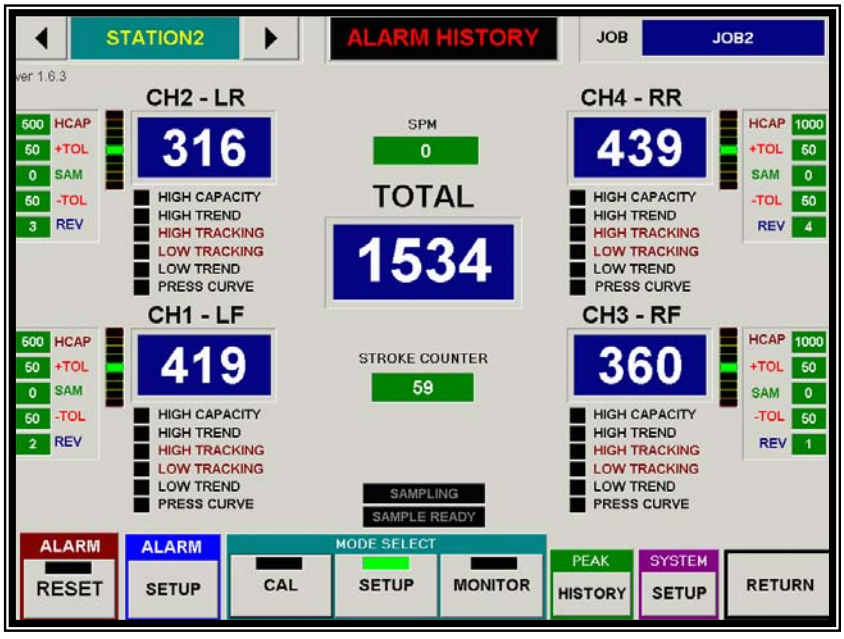
MARINER RS
SOFTWARE
for
ControlLogix
HM1756 SGI-TSM



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INTRODUCTION

- MarinerRS is the software tool that provides the easier way of configuring and monitoring the HM1756SGI-TSM module from existing operator interface via RSLink.

SOFTWARE FEATURES

- Interface with up to 60 HM1756SGI Modules
- 2 or 4 Ch Tonnage & Status Screen
- Easy to Use Module Configuration Screen
- Sophisticated signature Analysis Screen
- Comprehensive signature overlaying to compare between different signatures
- You can store captured signature and recall later for analysis
- Point & Click read tonnage at angle for easy tonnage reading on signature screen.
- Peak History Graph *(stores up to 10,000 peaks / ch)*
- Peak history data export feature (Microsoft Excel format)

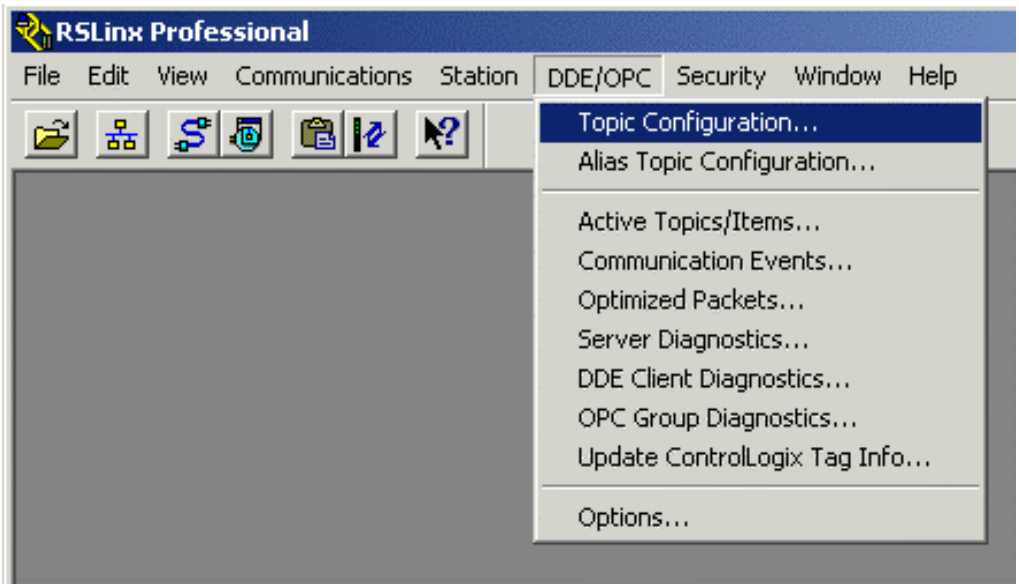
- Variety SPC Charts
  - ✓ Individual & Range
  - ✓ Average & Moving Range
  - ✓ Median & Moving angel
  - ✓ Average Standard Deviation
  - ✓ Printing
  - ✓ Chart Export (Bitmap, Meta File formats)

- Alarm History
- Job Storage Feature for Quick and Easy Job Download
- Multi-Level Password to protect unauthorized job changes
- ADC Feature to Automatically Download New Job parameters by PLC command.

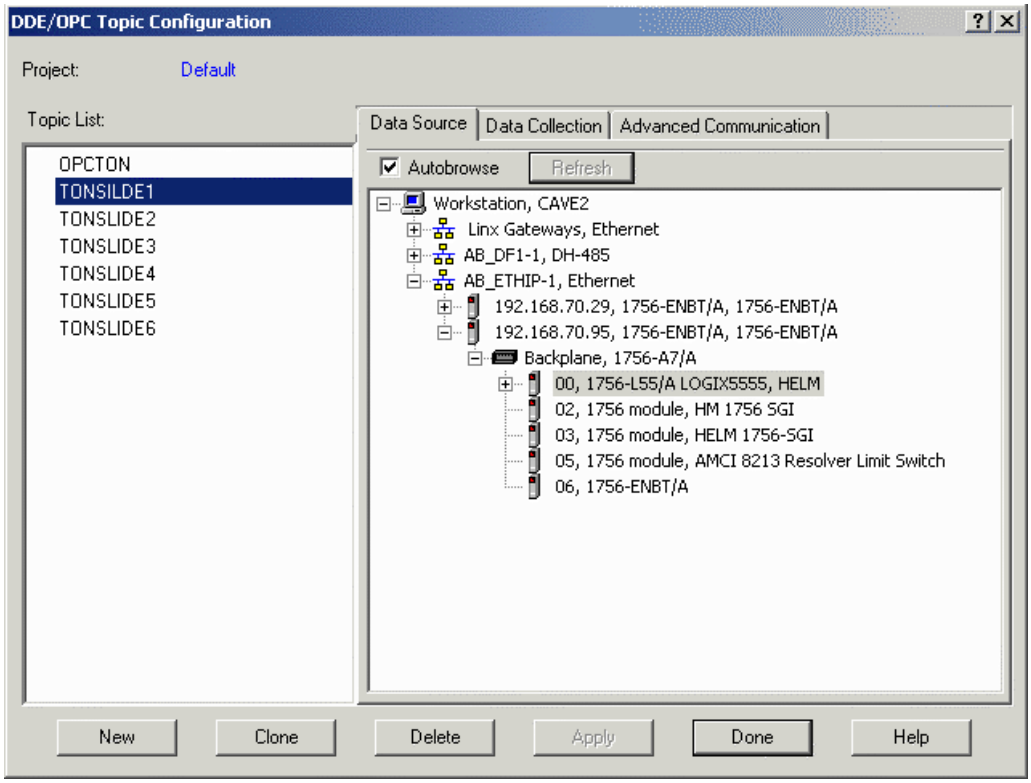
GETTING STARTED FOR FIRT TIME

SETTING UP RSLINX

1. First, you need to set up the OPC Topics for each ControlLogix processor for all slides from RSLinx. Click on Topic Configuration at DDE/OPC from the menu bar.



2. Add OPC topics and connect to each ControlLogix processor



* You need to create 6 Topics

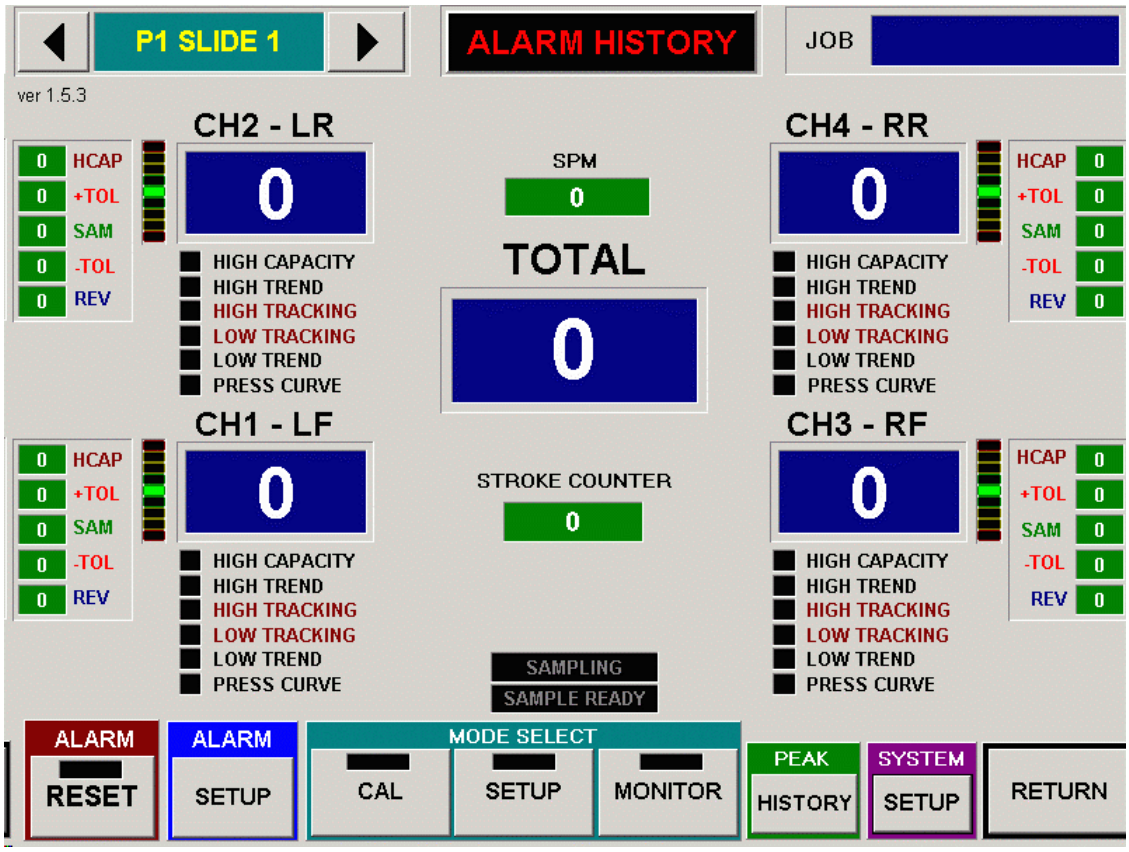
TONSLIDE1 for Rack No.1
TONSLIDE2 for Rack No.2
TONSLIDE3 for Rack No.3
TONSLIDE4 for Rack No.4
TONSLIDE5 for Rack No.5
TONSLIDE6 for Rack No.6

When you are finished, click Done to complete RSLinx setup.

3. Install MarinerRS software

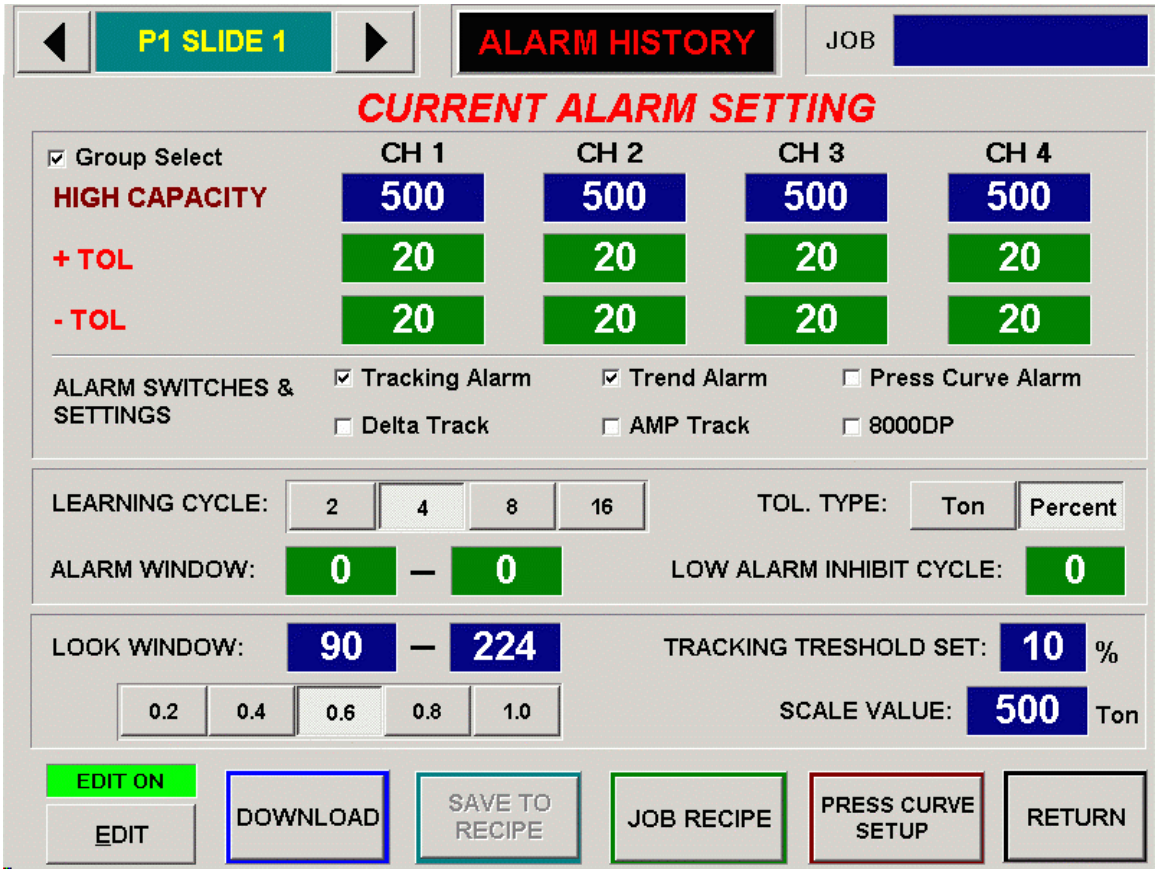
FIRST TIME MARINER RS START UP

1. Default setting of the software is configured for your current project. Therefore, the software should run without a problem. However, if you see *Initializing* message box or *Connecting SEQ1* and these messages do not go away after you started the software, please wait until it times out. Usually, it times out within 30 seconds. Once it does, you can go to Setup screen and check SEQ Setup configuration table for trouble shoot.



You can use the navigation buttons on top left side of the screen to go to different slide setup.

2. First, you have to enter the scale value for each slide.
   Go to Slide1 screen and click on ALARM SETUP button at the bottom of the screen.



Click on EDIT button and enter a password to edit the setting on the screen.

Default Password:
Operator password = “123”
Administrator Password = “123456”
Master Password = “1968”

There are some restrictions on editable contents based on the password type.

Functions	Operator Password	Administrator Password	Master Password
Scale Value change	X	X	O
High Capacity Setting	X	X	O
Look Window Setting	X	X	O
Tracking Threshold Set	X	X	O
High/Low Tolerance setting	O	O	O
Alarm Switches & Settings	O	O	O
Learn Cycle Count	O	O	O
Tolerance Type	O	O	O
Alarm Window Setting	O	O	O
Low Alarm Inhibit Cycle Count	O	O	O

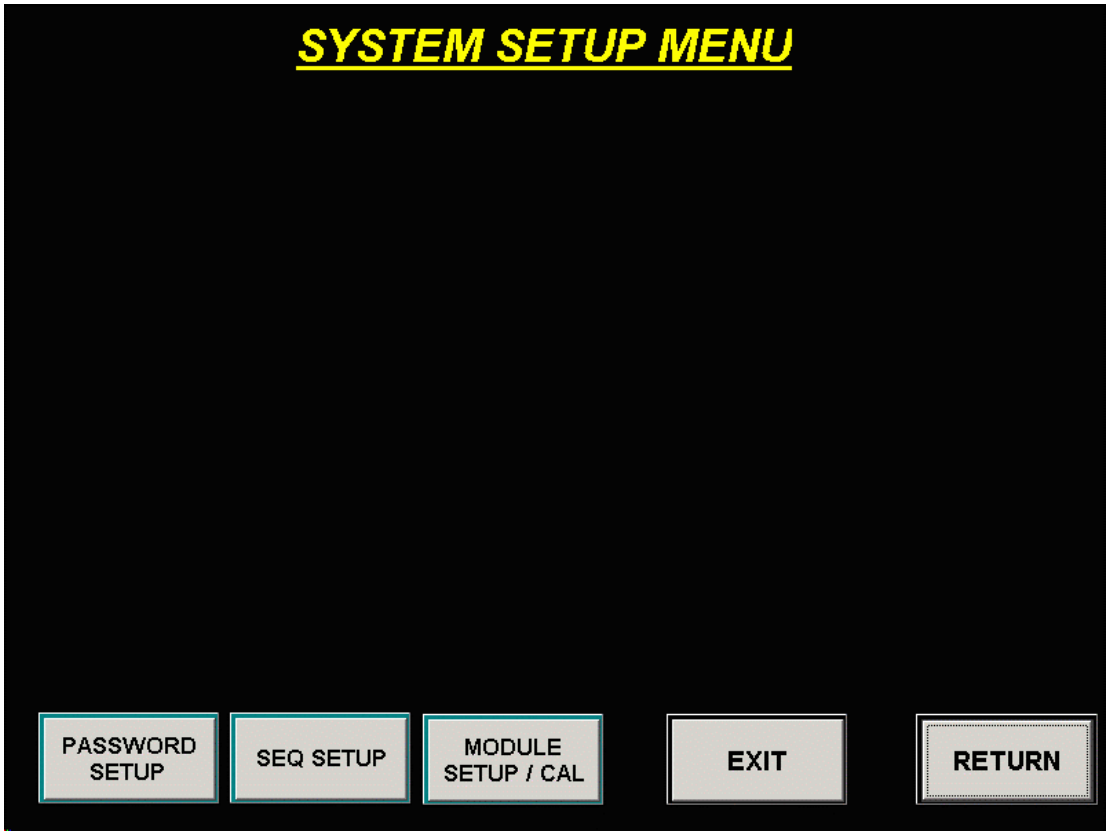
Use Master password to turn Edit on and click on the Scale Value display box, enter the scale value for the slide1. Normally, Scale value = Capacity of the slide / number of Channel

1. Enter the value 10, for Tracking Threshold Set
2. Enter Look Window Start angle at 90
3. Click on 0.6 button below to set Stop angle
4. Normally set the High Capacity value same as the scale value.
5. Click Download button for the changes on the modules to take effect
6. Use the navigation buttons on the top of the screen to go to Slide 2
7. Repeat step2 –step7
8. Return back to main menu by clicking on the Return button

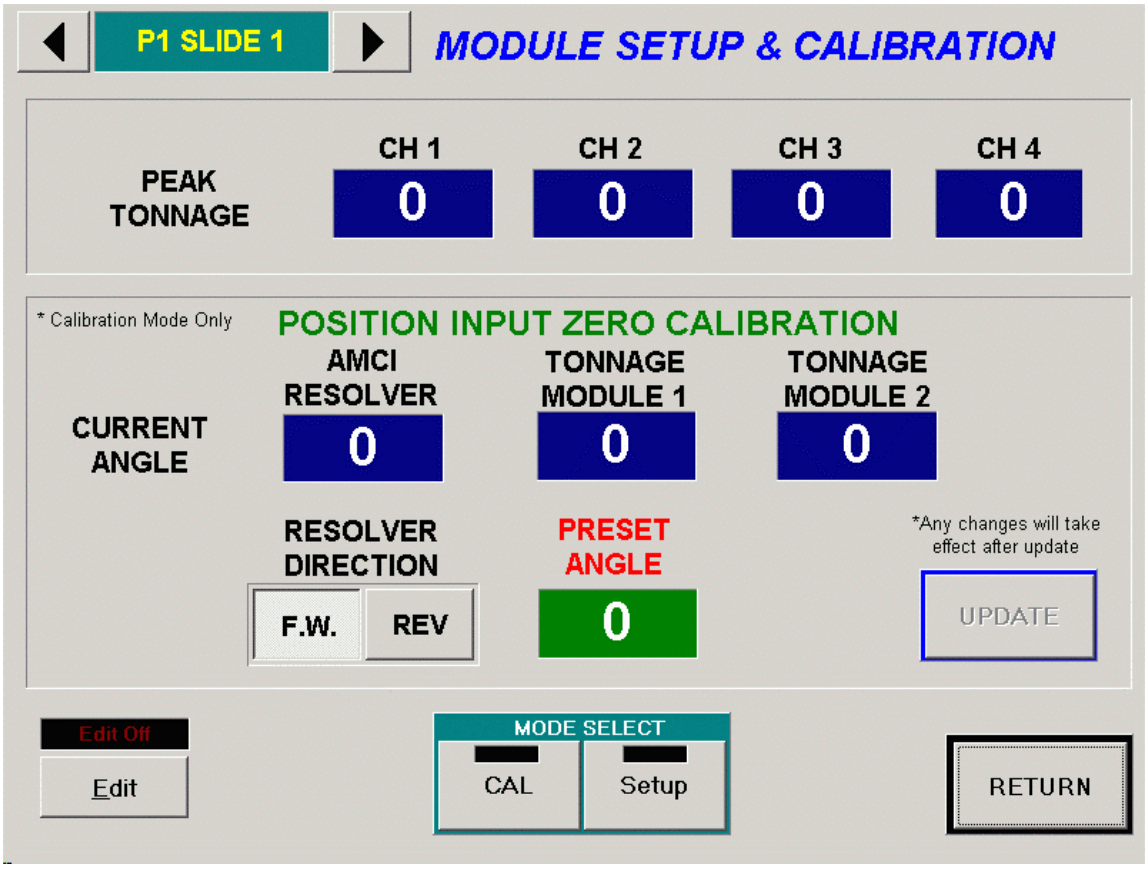
Once all the basic settings are downloaded to the modules, you have to calibrate the position input for all the slides of the modules.

POSITION INPUT ZERO CALIBRATION

1. Click SYSTEM SETUP button from main screen.

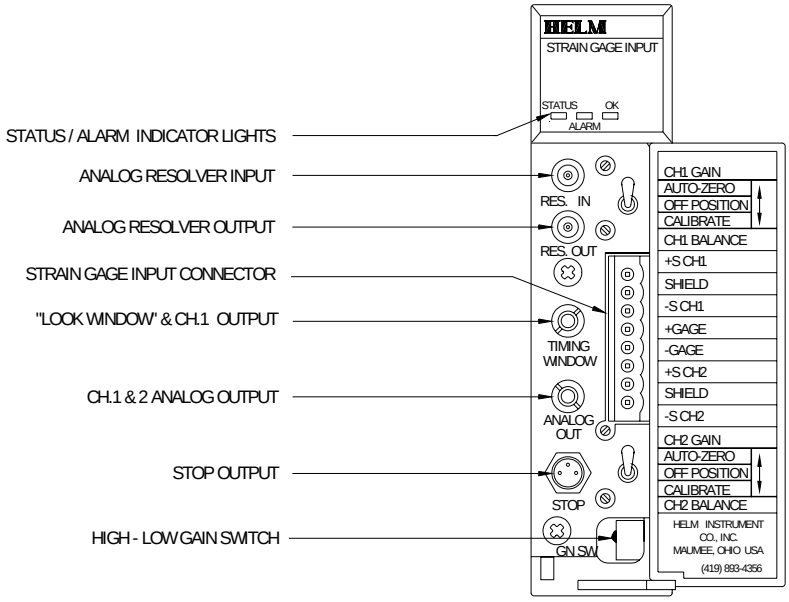


2. Click MODULE SETUP/CAL button to go to the MODULE SETUP & CALIBRAION screen



3. Master Password is required for any changes on this screen.
4. Click on CAL button to set the modules into Calibrate mode
5. Enter current slide angle position at the PRESET ANGLE
6. Click UPDATE button. You should see the current angles for AMCI RESOLVER, TONNAGE MODULE 1, and TONNAGE MODULE 2 become same as the PRESET ANGLE you entered previously.
7. Inch the slide and make sure all the current angle values follow the actual angle of the slide. If the AMCI REOLVER angle changes in reverse direction, change the RESOLVER DIRECTION option below. If the TONNAGE MODULE angle changes in reverse direction, you have to physically swap the S1 and S3 cables connection at the HELM SCA Convert module.
8. This completes the position input calibration.
9. Now the module is ready for actual load calibration.

HM1756 SGI-TSM DIAGRAM & DESCRIPTION



Status / Alarm Indicator Lights
Status light is on (green) when module is in Peak or Monitor Parts Mode.
Status light is off when module is in Calibrate Mode.

Alarm light is off when no tonnage fault is present.
Alarm light is on (red) when tonnage fault is present.

OK light is on (green) when PLC communication is OK.

Module Setup

All values are 0 (default) on initial start-up. This means that all alarms are disabled. You must make the following adjustments for proper operation:

- **set calibration numbers**
- **set meter scale**
- **set capacity (maximum load) alarms**
- **set minimum load alarms**
- **set sample count**
- **set trend alarms**

Set the Run mode bit to Calibrate

⇒ From your operator interface, put the tonnage module into Calibrate mode. (The STATUS light on the tonnage module will turn off.)

Balance Sensor Input

1. Set three-position switch to OFF (center) position
2. Turn balance potentiometer until 0's are all displayed
3. If two sensors are wired, follow this procedure for both channels

Calibration Numbers

1. Set three-position switch to calibrate (down position)
2. Turn Gain Potentiometer to dial in calibration numbers.
3. If two sensors are wired, follow this procedure for both channels.

Always make sure that the three-position switch is in ON (top position) for normal operation.

The remaining setup procedures can be accomplished with the Run Mode bit in either Bypass, Peak or Monitor Parts Mode. However, the Bypass Mode should only be used when setting calibration values or zero balancing the sensor input.

MARINER RS SCREENS

MONITOR SCREEN

The monitor screen displays the tonnages, strokes per minute, parts count, alarm status, and alarm settings.

Variations of the monitor screen include two, and four channel screens.

The four-channel screen (Figure B1) contains five tonnage meter displays. Each corner meter displays the tonnage reading corresponding to the channel, and the center meter displays the sum of the four channels.

The two-channel screen (Figure B2) contains two tonnage meters and a total tons meter.

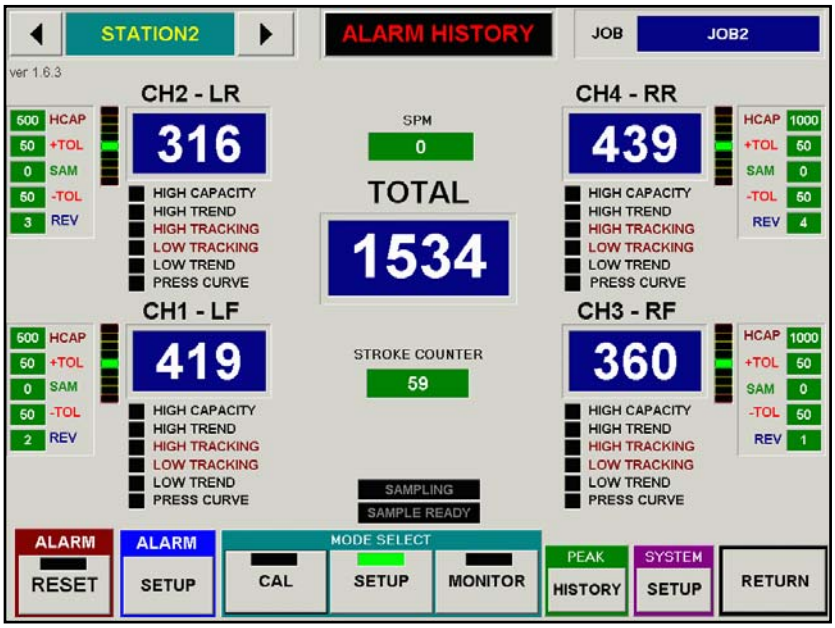


Figure B1 – 4 CHANNEL MONITOR SCREEN

TREND LIGHTS

All monitor screens contain a set of 9 "LED display trend lights" located to the left or right of each tonnage meter. These lights give the following alarm indications corresponding to that particular channel:

Capacity Alarm: Top LED red

Hi Tolerance (Track or Trend) Alarm: Top 4 LED's

Lo Tolerance (Track or Trend) Alarm: Bottom 4 LED's

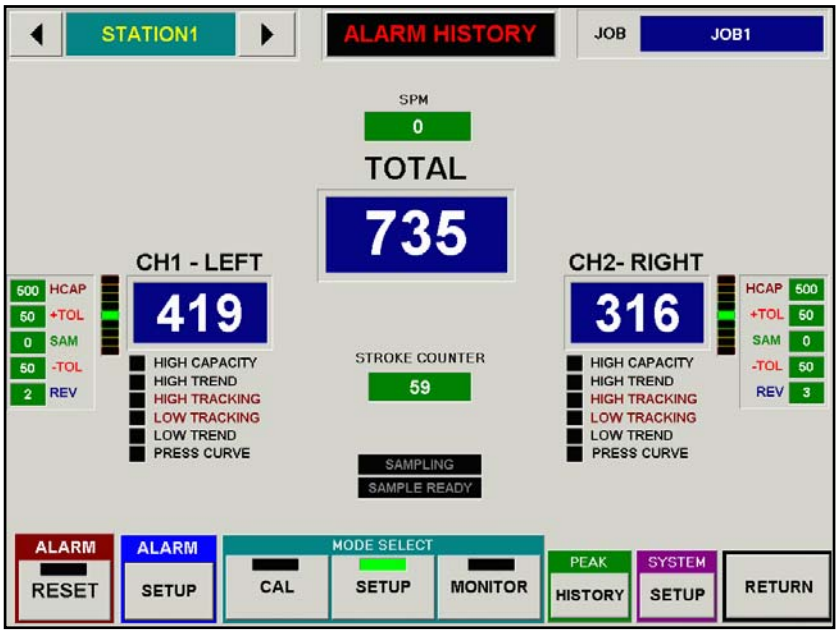


Figure B2– *2 CHANNEL MONITOR SCREEN*

The trend lights also give an indication of peak tonnage variation during the part making process. Tonnage values changing too high (or low) over (or under) the sample value, cause the LED lights to light up above (or below) the center green LED. If the peak tonnage reaches the tolerance limits, a trend alarm will be triggered. Trend lights step (from center green, green, yellow, yellow, and red) in 25% increments of the difference between the sample and the tolerance limit. The tolerance limits are the boundaries set by the operator (high and low tolerance settings in the jobs screen) as the percentage (or tons) above and below the sample value to provide part quality control.

MONITOR SETTINGS/READINGS

Each monitor screen displays the strokes per minute (SPM), and parts count. Parts Batch is a value (set in jobs/settings screen) that stops the press when the parts count value reaches the parts batch value.

The following settings are displayed adjacent to each tonnage meter:
HCAP: Capacity alarm value in tons
+TOL: High Tolerance (Trend/Track Alarm) setting in tons or percent
SAM: Sample Value – "learned" during trending in tons
-TOL: Low Tolerance (Trend/Track Alarm) setting in tons or percent
REV: Reverse Load in tons

At the top of the monitor screen, the corresponding sequence name and present job name are displayed.

ALARMS HISTORY

In case of tonnage alarm, this indicator will flash the message between "Alarm" and "Click here for Details" Click this indicator anytime to access details of the alarm message including previous alarms.

BUTTONS

At the bottom of the monitor screen are eight buttons activated when pressed. The left seven buttons may be "locked out" in the Supervisor screen to prevent operator use.

- **Sequence Navigation button** - Press the arrow buttons by the sequence name to navigate between different sequences. In general, each sequence represents one press or slide of up to four channels.
- **Reset Button** – Press button to reset any alarms, which caused the relay to trip and stop the press.
- **Alarm Setup** – Press to view or change Jobs settings
- **Mode Buttons (CAL, SETUP, MONITOR)** – Press button to change mode. System will be in one of the three modes: Calibrate, Setup, Monitor Parts (white button indicates present mode). More than one white button is an illegal mode, press a button to activate desired mode.
- **Peak History –** Press to view peak tonnage history records and SPC charting
- **System Setup –** This will lead to variety system related setup screen such as configuring modules, calibration of resolver input, press curve

CURRENT ALARM SETTINGS SCREEN

This screen (Figure B3) allows the operator to change alarm settings for current job.

Keypad
If you click on any green colored numeric display, a keypad will pop up so that you can make entry using touch screen.

Job
This displays the current job name that which was downloaded from the job recipe.

Sequence Name
The area in the top left corner displays the current sequence name being viewed.

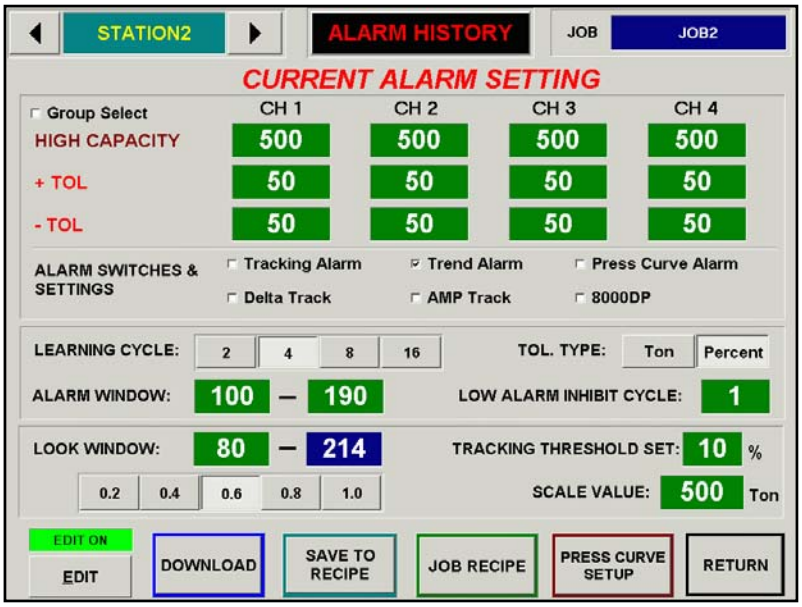


Figure B3 – ***CURRENT ALARM SETTINGS SCREEN***

High Capacity
Capacity alarms are active in setup and monitor-parts modes (not calibrate) usually for press protection. The typical values entered are press capacity divided by number of channels. For example, on a 500 Ton press using four channels, capacities are set at 125 tons per channel.

+ / - TOL (Tolerance Alarm Values)
Tolerance alarm settings correlate to both trend and tracking alarm settings. Select and enter valid range (0-50) if it is in percent, (0-255) if it is in Ton. These alarms are active in "monitor parts" mode only and are based off of the "learned" sample value. Entering a "0" into the keypad turns the tolerance (high or low) off for that particular alarm.

Trend Alarms
Trend alarms, are valid in "monitor-parts" mode only, and are base off of the "sample peak" taken during the "learn cycle". Trend alarms provide a "parts quality" type of feature, triggering alarms if the peak tonnage goes out of range of the tolerance.

Tracking Alarms
Tracking alarms, are valid in "monitor-parts" mode only, and are based off of the "sample curve" taken during the "learn cycle". Track alarms provide a thorough "parts quality" type of feature, because monitoring continues throughout the press stroke (based on the look window settings in the "Other Settings" screen).

Delta Track
The delta track feature pertains to the filtering of tracking alarms, and helps to avoid "nuisance" type of alarms. The filtering occurs during sudden force change within the press stroke. Delta track filtering can be seen in the wave screen, where high slopes of the sample signature (along with the tracking bands) get filtered during relatively small portions of the stroke.

Press Curve
Press Curve alarms are valid in “setup” mode only, and provide press protection. Data points are retrieved from the press manufacturer, and activated in the “press curve” screen. These points represent tonnage limitations per angle of the press stroke. During the part process, if the tonnage exceeds the press curve limitation at any specific angle, a press curve alarm is triggered. Press curve may be viewed in the “wave” screen.

AMP Track
The AMP track is another type of filtering to avoid “nuisance” alarms. The filtering consists of masking points where the variance between samples surpasses the alarm limit.

Tons/Percent
Tolerance alarms run in either tons or percent, which is selected in the jobs screen. At loads less than peak (throughout the stroke), tolerance in the percent mode is less than tons mode. This can be seen in the “wave” screen when comparing tons to percent.

Learning Cycle
The learning cycles (selectable 2, 4, 8, or 16) are the number of counts taken during the “sample” cycle of the system. Sampling occurs when the operator enters monitor- parts mode from setup-mode. After the number of press strokes reaches the set learning cycles, the module takes an average tonnage (and wave) per channel. This average is referred to as the sample, and becomes the benchmark in which the high and low tolerances are based

Alarm Window
The operator may choose to confine the alarm window to avoid possible nuisance alarms. Start and end angles must be within the look window. Select and enter values in keypad.

Low Alarm Inhibit Cycle
The low alarm inhibit cycle is the number of times that a less than low trend sample peak will be ignored before firing an alarm.

Look Window
The look window includes the start and end angles of the press, where alarm monitoring is active. The optimal settings are to start the look window at die contact with the stock, and end the look window at stock release. View waveform screen to verify desired look window settings (default settings are 60-283 degrees). To change start angle, select look window start angle and enter 30-285. Select end angle (1-6 choices depending on start angle value) below start angle reading, which is highlighted in green.

Tracking Threshold Set
The tracking threshold set feature sets a “bottom-line” when monitoring the tracking alarm. In Figure B3, the tracking threshold set is ten percent. This means that the tracking alarm will only monitored above the ten percent threshold limit.

Scale Value
Set the scale based on total press capacity divided by number of channels. For example, when using a four-channel sensor system on a 500-ton maximum capacity press, set the scale to 125.

Current Alarm Settings Buttons

- **Edit** – This button enables the user to allow editing of the current recipe that he/she is viewing.
- **Download –** Downloads the viewing recipe to the HM1756 SGI-TSM
- **Save To Recipe -** Saves the edited changes to the recipe for future use
- **Job Recipe –** Allows user to view another recipe
- **Press Curve Setup –** This button directs the user to a MarinerRS system that allows the operator to enter the specified 36 press curve points.
- **Return -** To "Monitor" screen.

KEYPAD

The Keypad allows the operator to edit number values, and is used in several of the MarinerRS Screens. This screen is accessed by clicking on a green colored numeric display to edit.

Figure B4 displays the keyboard screen being used to edit values in the Current Alarms Setting Screen.

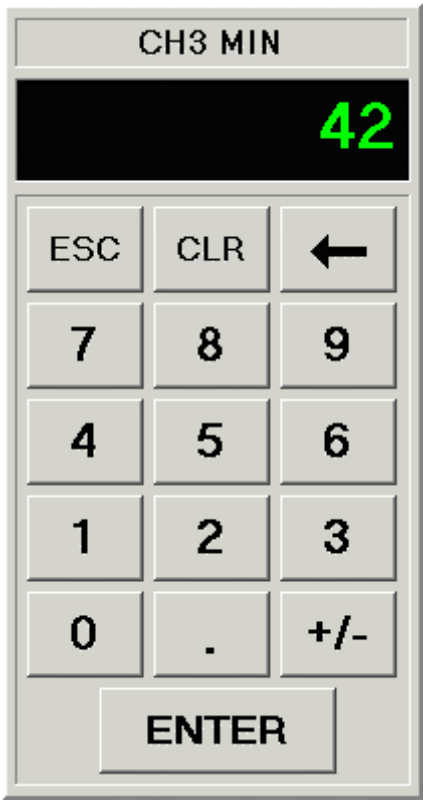


Figure B4 – ***KEYPAD***

SIGNATURE (WAVE) DISPLAY SCREEN

The wave (also called signature) screen (Figure B5) is reached by touching the tonnage meters in the monitor screen.

The waves display the force (tons) versus the position of the press (usually in degrees) per channel. Variations of force per angle with each press stroke give an indication of problems in the part making process.

Pressing the "Total" meter in the monitor screen allows the operator to view all four channels (two channels in two channel system) of waves. Pressing any of the "Channel" meters in the monitor screen, or pressing the wave in the four channel wave screen, displays the corresponding wave in a single wave format (Figure B5). This allows the operator to view a particular wave in a higher resolution.

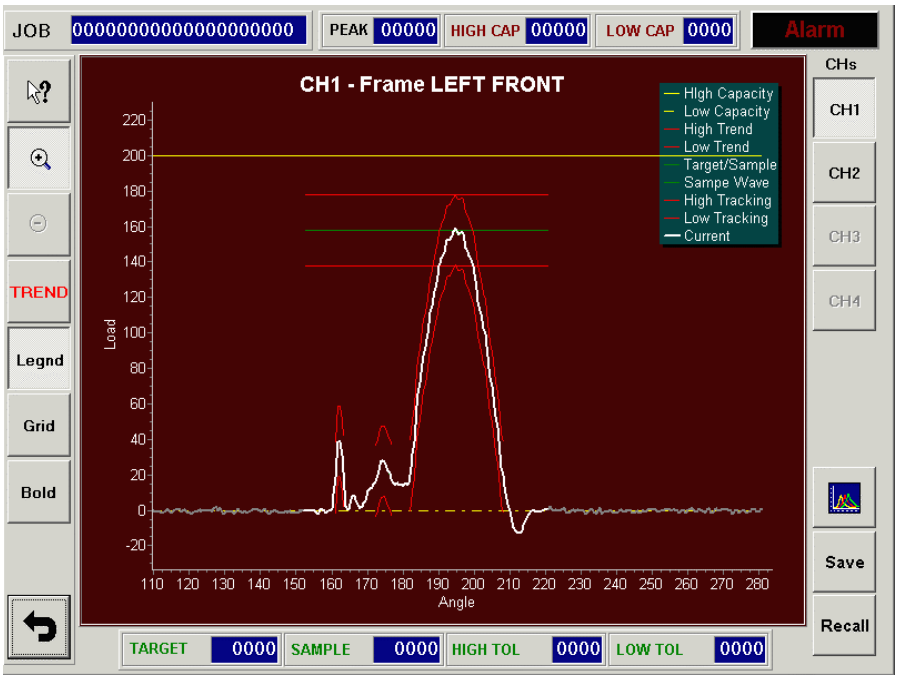


Figure B5 – *SIGNATURE SCREEN*

The drawn waveform is based on the tonnage scale shown at the left axis, and the angle (or distance) shown at the bottom axis.

The following key is given for the settings and values per channel.

JOB This is the current job name downloaded from RECIPE MANAGER.

PEAK Current peak tonnage value in tons for the channel currently displayed.

HIGH CAP High Capacity Alarm setting value in tons for the channel currently displayed.

LOW CAP (Not used)

TARGET (Not Used)

SAMPLE Sample value in ton, sampled from the learning process for the channel currently displayed.

HIGH TOL High tolerance setting value in ton or percent for the channel currently displayed.

LOW TOL Low tolerance setting value in ton or percent for the channel currently displayed.

WAVE VIEWING WINDOW

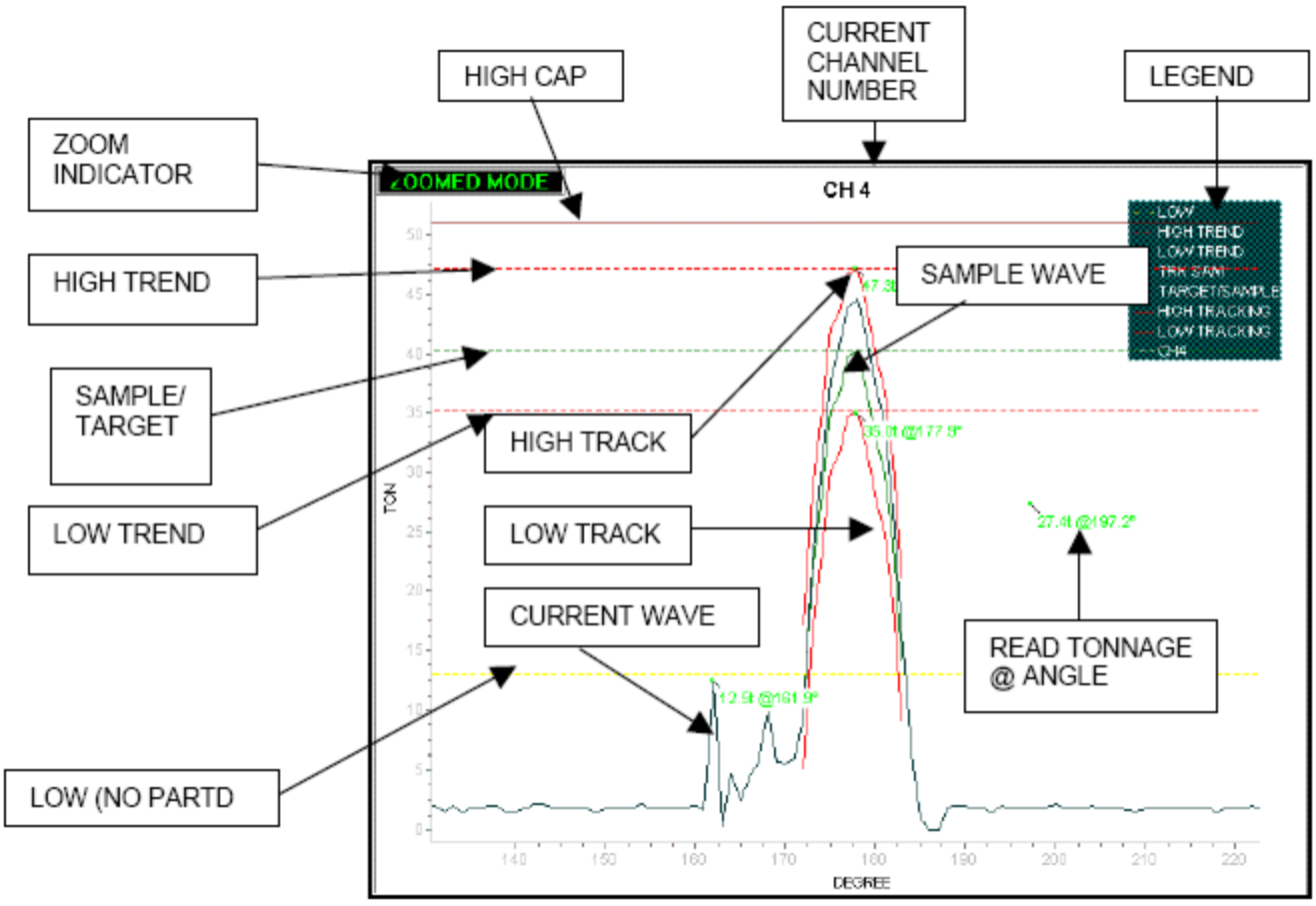


Figure B6 – ***WAVE VIEWING WINDOW***

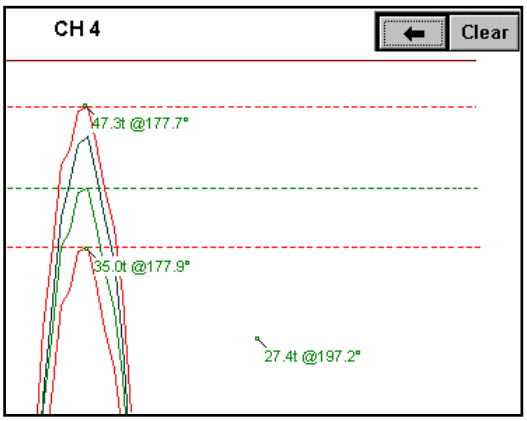
ZOOM INDICATOR:	Indicates the graph is currently zoomed
HIGH CAP:	High Capacity alarm band
HIGH TREND:	Upper limit of trend alarm band
LOW TREND:	Lower limit of trend alarm band
SAMPLE:	In SETUP and LEARN mode, it displays the Target bend In AUTOMATIC mode, it displays the Sample band
SAMPLE WAVE:	Average of the current waves during the learning period
HIGH TRACKING:	Upper limit of Tracking alarm band around the Sample wave
LOW TRACKING:	Lower limit of Tracking alarm band around the Sample wave
CURRENT WAVE:	Current tonnage signature read from sensor

READ TONNAGE AT ANGLE

Click on this button to read tonnage and angle at any desire coordinates from the signature screen. You can view up to 20 readings on a screen simultaneously. Use Back or Clear button at the top-right corner to delete unwanted readings.

To delete last reading on the screen

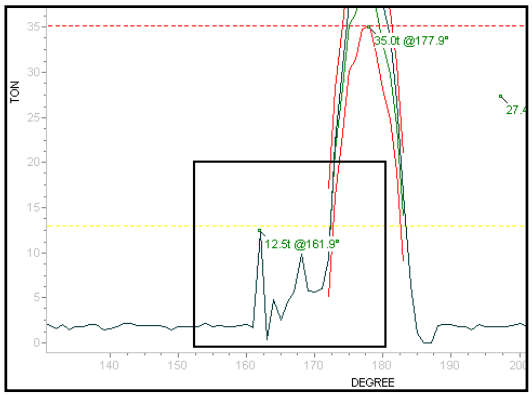
To clear all readings on the screen



ZOOM IN

The Zoom feature allows the operator to "zoom in" on a selected area of a wave for analysis at a higher resolution. Click this button to put the wave screen in zoom mode.

Note: Once the wave is zoomed, a message "ZOOMED" shows up on the top-left corner of the Wave View Window to indicate that it is currently in zoomed portion of the signature.



To select area to zoom in: Press touch screen (and keep pressed) at top left area of desired part of wave to zoom in, and drag finger at a diagonal down and to the right. A box will be drawn and finger followed as the touch screen is pressed. Release touch screen to draw zoomed-in part of the wave.

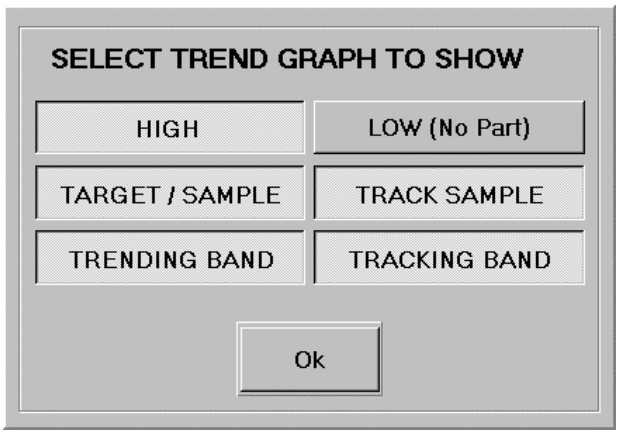
Repeat Zooming is permitted to continuously zoom in on a particular area of a signature.

RESET ZOOM

Click this button to return to full view(unzoom)

TREND TYPE

Click this button to open the SELECT TREND GRAPH TO SHOW screen where you can



Select the type of graphs you desire to overlay for Trend graph display feature. To select, click on the button you desire. When the button is pushed in, the option for the graph is on. Click again to deselect.

TREND

Toggle this button to show or hide the trend graphs selected from TREND TYPE option. This will give the visual references of the alarm settings and forming force related to the Sample Wave.

GRID

Click this button to show or hide vertical and horizontal grid lines on the wave screen.

BOLD

Click this toggle button to bold the current signature graph.

LEGEND

Click this button to show or hide the legend of the graphs displayed on the screen.

CHANNEL SELECT

Thru

Select a button to display the corresponding channel signature on the screen.

OVERLAY

Click this button to view the overlay of 4 channel current signatures
You cannot view Trend graphs in this screen. All other features are still available.

PEAK TONNAGE HISTORY

PEAK TONNAGE HISTORY displays last 500 recorded peak values as history graphs. It also provides the features to help analyzing the history data such as SELECTABLE CHANNEL, ZOOM, SCROLL, GRID, and more.

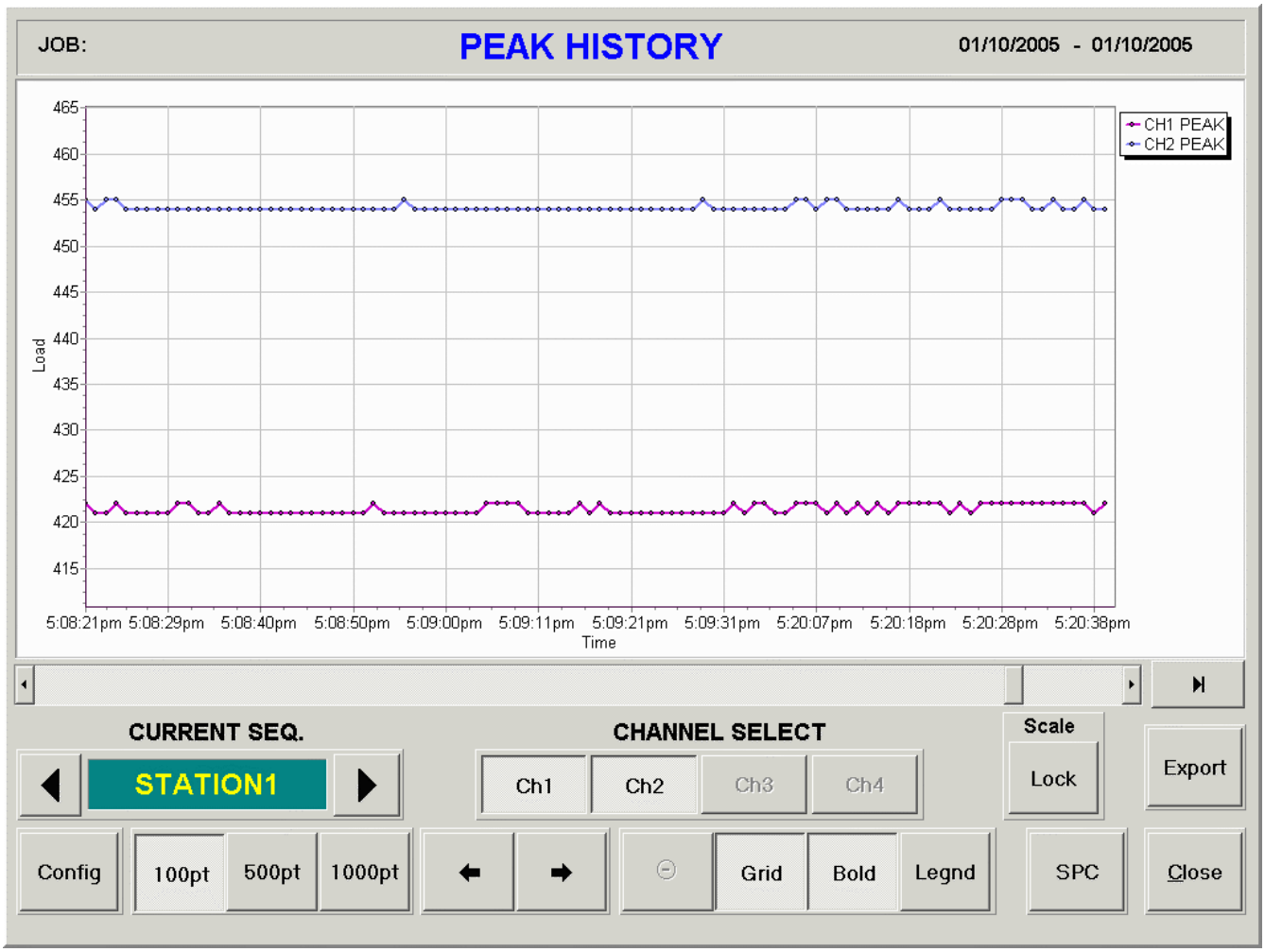


Figure B7 – *PEAK HISTORY VIEWING WINDOW*

CURRENT SEQ. allows you to select the peak history of the station you would like to view.

Click the arrows to scroll through the different stations

CHANNEL SELECT buttons help you to choose the channel history you desire to see. Push a button down to show the graph of the channel. Push again to hide the channel

SCALE LOCK button gives you the choice of using a built-in auto-scale function to allow better analyzing of the peak history. This function can be toggled on and off.

Click this button to toggle auto-scaling on/off

EXPORT 

button brings up the following export display from where you can export the viewing peak history.

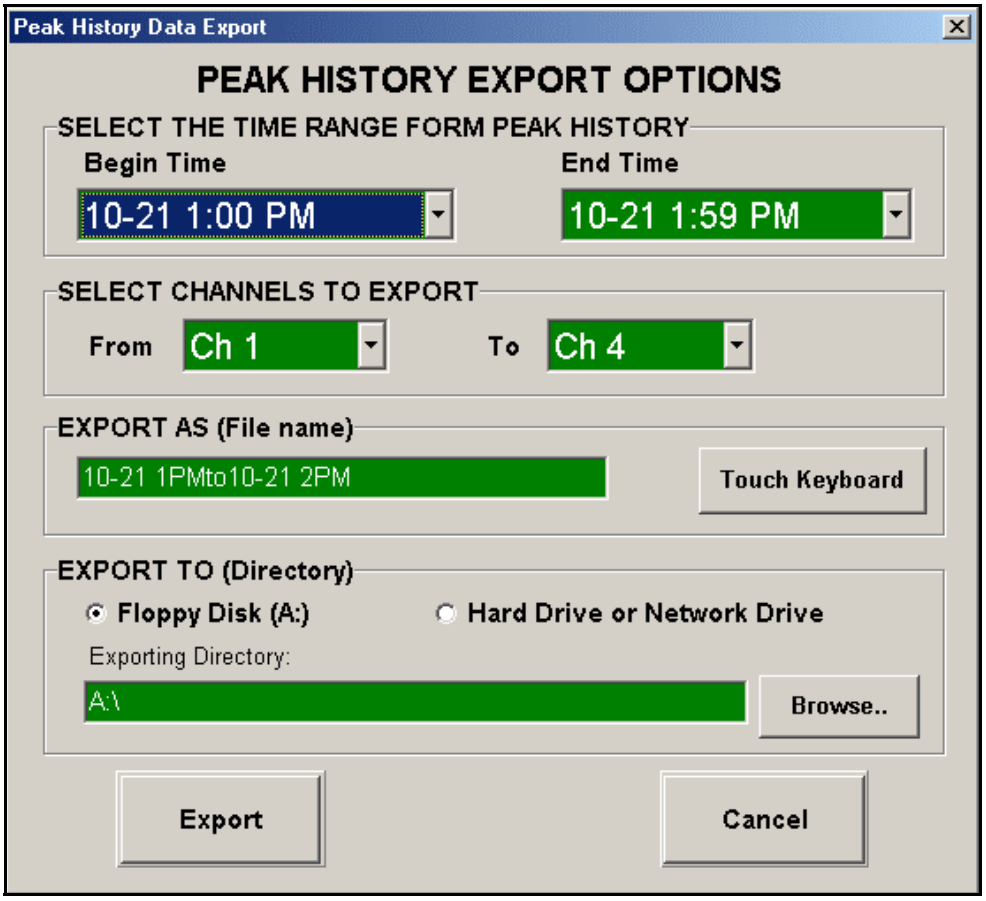


Figure B8 – ***PEAK HISTORY EXPORT OPTIONS WINDOW***

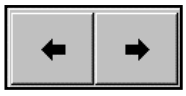
CONFIG button opens a display to allow the user to edit the frequency of which peak history will be saved into memory.

Click this button to open the display for storing peak history

100pt, 500pt, 1000pt buttons allows the user to configure the ‘resolution of their peak history graph. The 100pt, 500pt, and 1000pt buttons correlate to the amount of points that are used to construct the graph in the given time period.

Click one of these three buttons to your preference of the graphing resolution.

SCROLL buttons let you scroll left or right to view entire graph when it is zoomed.



Click left arrow button to scroll left, right arrow button to

ZOOMED MODE indicates that the current history graph has been zoomed. To zoom, point to the area on the screen where you want to start zooming and drag the point down to create a zoom rectangle. Once the inside of the zoom rectangle covers the area where you want to zoom, release the point from the screen. You can repeat this to continue zooming in the area.

Click this button to reset the zoom and return to original size

Click this button to show or hide vertical and horizontal grid lines on the wave screen.

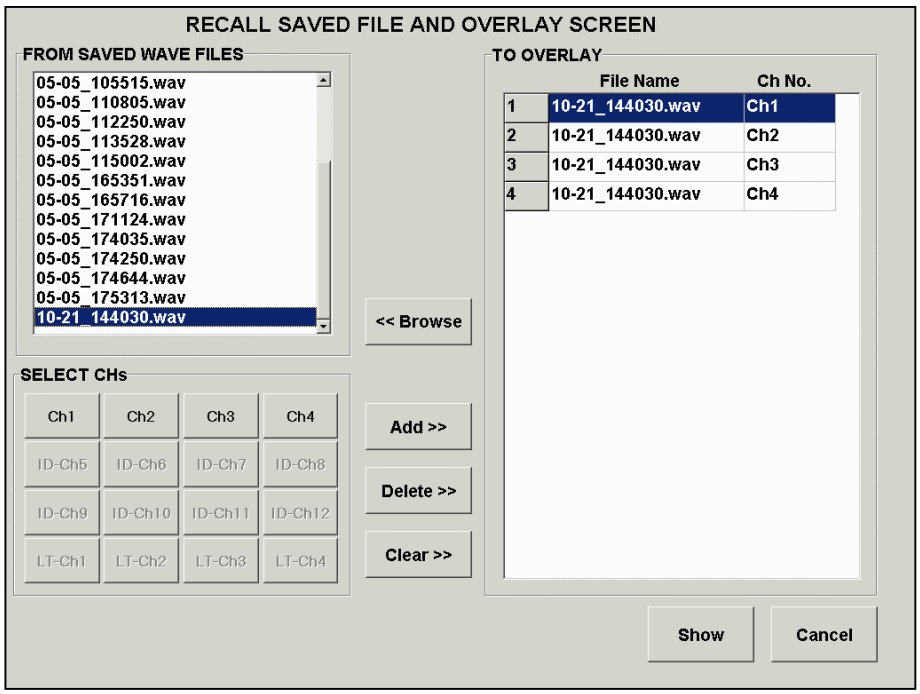
Click this toggle button to bold the current signature graph.

Click this button to display or hide the legend

OVERLAYS SCREEN

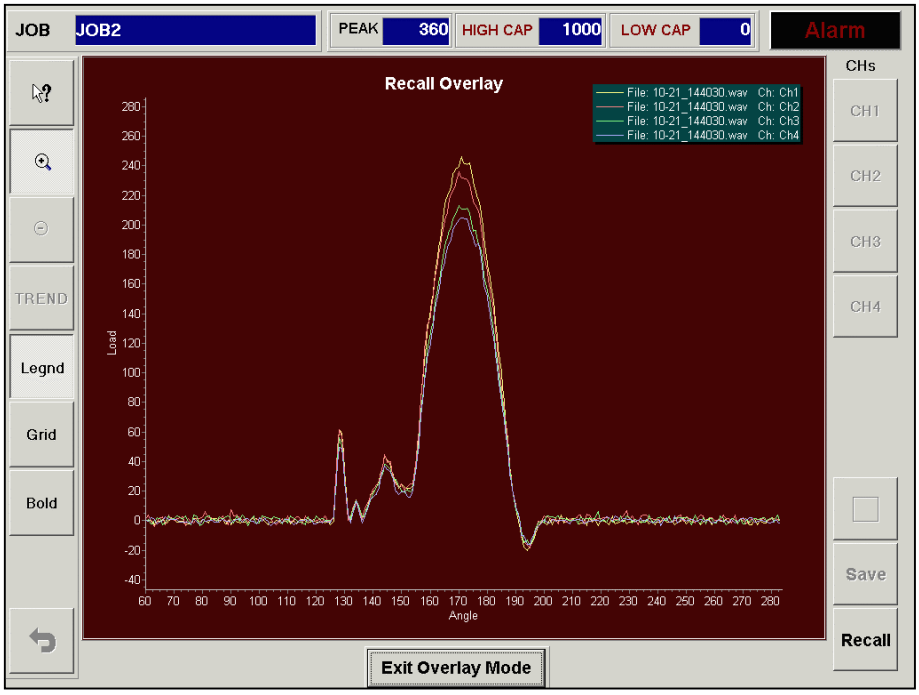
The Overlays Screen (viewed by pressing the "Overlays" button in the wave screen) allows the operator to manage various stored waves, and select up to 20 wave overlays to be displayed in the wave screen.

1. Use <<Browse button to select the folder where the wave file(s) is located.
2. Select a stored wave file from "FROM SAVED WAVE FILES" box .
3. Select channel(s) you want to overlay together from the selected file.
4. Click Add button to add the selected wave channels into "TO OVERLAY" Box. You can add up to 20 waves in the box.
5. Once you add all wave files that you want to overlay together, click Show button to update the wave screen.



OVERLAY EXAMPLE

Figure B10 displays 4 signatures overlayed on one another. From this menu you can zoom in at certain points for better analyzing at the users discretion.



SEQUENCE CONFIGURATION SCREEN

From this menu you can view and edit the sequence information. This is useful to add a more meaningful name to a sequence rather than a number. Users can view the status of the sequence number, the number of channels, group, base module, OPC topic name, as well as edit a number of different categories.

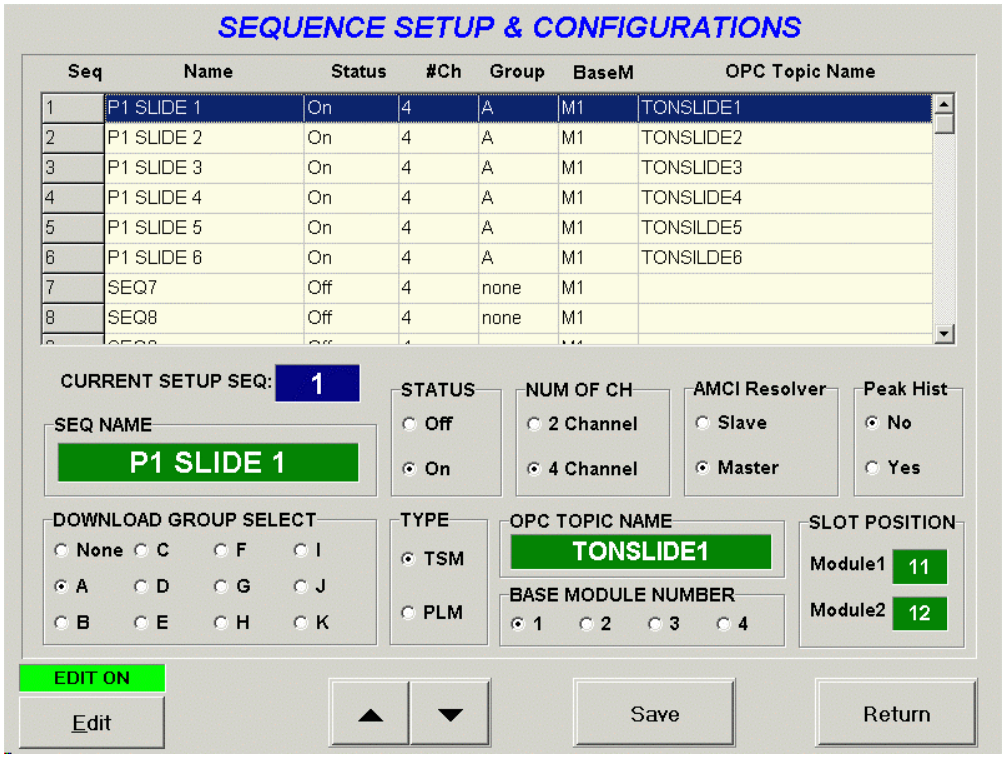


Figure B11 –*SEQUENCE CONFIGURATION WINDOW*

CURRENT SETUP SEQUENCE

This is displaying the currently selected sequence number from the chart directly above.

SEQ NAME

The sequence name is given to the sequence number to better reference a module. The name can be customized to the owner's discretion.

STATUS

These on/off radio buttons control the status of the selected module.

NUM OF CH

This number represents the number of channels that the selected module.

AMCI RESOLVER

AMCI Resolver can be set to either Master or Slave. Set this option to Master if there is only one module. If there are more than one module, one must be master while the others, slave.

PEAK HIST

From here users can choose to store the peak history or disregard.

DOWNLOAD GROUP SELECT

This is a feature that allows its users to download from multiple grouped modules at one time. For example, if there are three modules that have a DOWNLOAD GROUP of A and two modules have a DOWNLOAD GROUP of B, then when DOWNLOAD GROUP SELECT is set to A, and DOWNLOAD is pressed. Then only the three modules that have the DOWNLOAD GROUP of A will be downloaded because it matches the DOWNLOAD GROUP SELECT, A.

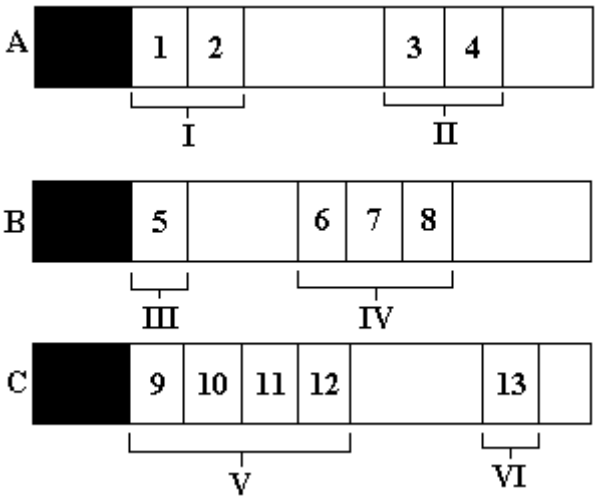
TYPE

Users must choose between a Thru-Stroke Module (TSM) and a Peak Load Module (PLM). All PLMs must have their own Peak Load ladder program to use this option in MarinerRS.

OPC TOPIC NAME

The OPC Topic Name is the name of the module that the current sequence number is communicating with. OPC Topic Name's are used to help differentiate between module processors.

BASE MODULE NUMBER



From the figure above, there are 3 racks (A, B, C), holding a total of 13 modules. In this setup there are 6 groupings of modules. The BASE MODULE NUMBER is the first modules slot number of the group.

Example:

Group I: Base Number = 1
Group II: Base Number = 3
Group III: Base Number = 5
Group IV: Base Number = 6
Group V: Base Number = 9
Group VI: Base Number = 13

SLOT POSITION

The SLOT POSITION is the position of the module on the rack.

JOB RECIPE SETUP SCREEN

The job recipe setup screen (Figure B12) is reached by touching the JOB RECIPE button on the MarinerRS software.

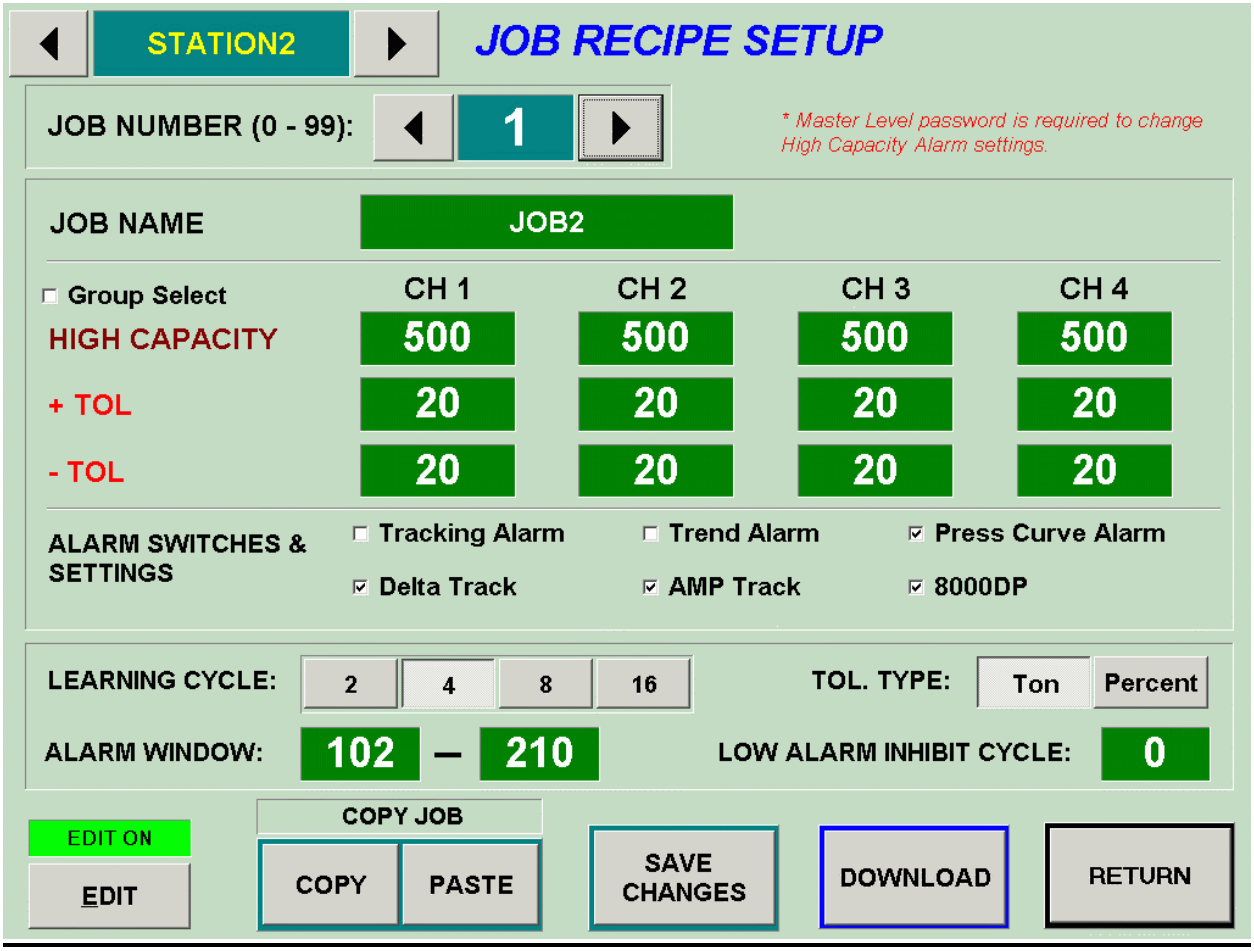


Figure B12 – *JOB RECIPE SETUP SCREEN*

JOB NUMBER

Users can store up to 99 different jobs per sequence to allow the users to be able to reference back to different jobs and allow them to download different job without having to change settings.

Other value descriptions can be viewed in the CURRENT ALARM SETUP SCREEN section.