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We Manufacture Solutions For Your Challenges

SOFT LIMIT CONSOLE

CHAIN HOIST CONTROL SYSTEMS

USER MANUAL

Console
Touch Screen Operating System
A-17-005-0013
TSOS Interface
A-17-005-0103

This chain hoist control system is intended for professional use only
Read this entire document before installing operating or using
this chain hoist control system

■ ORIGINAL INSTRUCTIONS

Original Instructions
SOFT LIMIT CONSOLE
Rev ORG
Released 09-2018

- **USER DOCUMENTATION**

WARNING

Before installing and commissioning the Soft Limit Control System, you must read all safety instructions and warnings carefully including all the warning labels attached to the equipment. Make sure that the warning labels are kept in legible condition and replace missing or damaged labels.

REGIONAL CONTACTS

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- **CENTRAL TECHNICAL SUPPORT**

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- **USE FOR INTENDED PURPOSE ONLY**

The equipment may be used only for the application stated in the manual and only in conjunction with devices and components recommended and authorized by Motion Laboratories Inc.

- **IDENTIFICATION**

This user manual pertains to Potable Soft Limit Automation Control System models containing large format HMI Touch Screen Operating Systems:
A-17-005-0013

Table of Contents

- **SYMBOLS**

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Used without a safety alert symbol indicates a potentially hazardous situation which, if not avoided may result in property damage.

- **DON'Ts**

Do NOT allow lifting operations unless carried out by a competent person.
Do NOT operate hoists without a clear view of the load or reliable communication with an observer.
Do NOT operate hoists unless the hazard zone has been cleared
Do NOT operate system until a full risk assessment for your particular application has been completed.
Do NOT operate system until all safety conditions have been assessed and only in emergency situations or initial setup.
Do NOT operate system until the E-stop system has been connected and tested.
Do NOT operate system unless all operators and observers have been informed of the location of all Emergency Stop (E-stop) switches.

- **GENERAL SAFETY INFORMATION**

This manual must be kept by a person in charge in a suitable place and ready for consultation, in optimal conditions. Should it be lost or damaged, the manual can easily be retrieved on the manufacturer's website: www.motionlabs.com.
The manufacturer retains all material and intellectual rights on the manual, and restricts its duplication, even partial, for any commercial use.

CAUTION

All marking data should not be removed by grinding, abrasion or peeling, whether accidental or not. Any unit that does not carry the proper identification references should be removed from service until those references can be replaced.

WARNING

This equipment contains dangerous voltages and controls potentially dangerous rotating mechanical parts. Non-compliance with or failure to follow the instructions contained in this manual can result loss of life, severe personal injury or serious damage to property.

- **ELECTRICAL SAFETY INFORMATION**

The Soft Limit Control System operates at high voltages. There are no user serviceable parts inside the enclosure.

DANGER

Risk of electric shock. Disconnect the power supply across all poles before opening the equipment for access. Repairs on equipment must only be carried out by trained NA service technicians familiar with technical specifications contained in this unit.

To ensure proper operation and dependability, any defective electrical component must be replaced using parts contained in the relevant spare parts list.

- **OPERATIONAL SAFETY INFORMATION**

The Soft Limit Control System has setup and configuration for safe and reliable operation. It is imperative that the user read and understand the instructions contained in the manual before attempting to operate.

DANGER

The "SAFETY OVERRIDE MANUAL CONTROL" function will by-pass all safety features. Care must be taken to assess the situation carefully before operating in this mode.

This controller uses industry standard color codes for illumination. Red is for safety warnings, Blue indicates a reset requirement and Green indicates a ready state to operate.

1.800.227.6784 FOR MORE INFORMATION
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USA

Soft Limit Console – User Manual – Safety Instructions
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- **PRODUCT DEFINITION**

  The Portable Soft Limit Control System identified in this manual are 8 channel, rack mount, control systems that are linkable up to 80 hoists.

  The Soft Limit Control System must be used with a hoist system which uses position and or weight feedback to operate the hoists in a safe manner. The system shall use encoder feedback for position control. If the system has loadcells to monitor weight, it shall use upper and lower weight limits to move the loads safely in both directions.

  These systems are intended to operate fixed speed electric chain hoists modified to provide feedback. The components or Kits available for feedback are encoders/kits and loadcells. For reference part numbers for those parts are as follows:

- A-16-003-0001 – A-16-003-0099   Encoders
- A-16-003-0100 – A-16-003-0199   Encoder Kits
- A-17-003-XXXX   Load Cells

  The Soft Limit Control System has the following features:

- E-Stop system with global E-stop switches and reset switches
- HMI Touchscreen operator/display
- Manual Override input connector

- **PRODUCT PERFORMANCE**

  The Soft Limit Control System's Console identified in this manual monitor the following criteria:

- E-Stop circuit; the console has both E-Stop and reset functions locally.
- Hoist Position; the console displays position feedback from the system.
- Hoist Weight; the console displays weight feedback from the system.

  The Soft Limit Control System's Console identified in this manual have the following features:

- Manual Hoist Control.
- Soft Limit Hoist Control.

- **TOUCH SCREEN OPERATING SYSTEM, CONSOLE, FRONT**
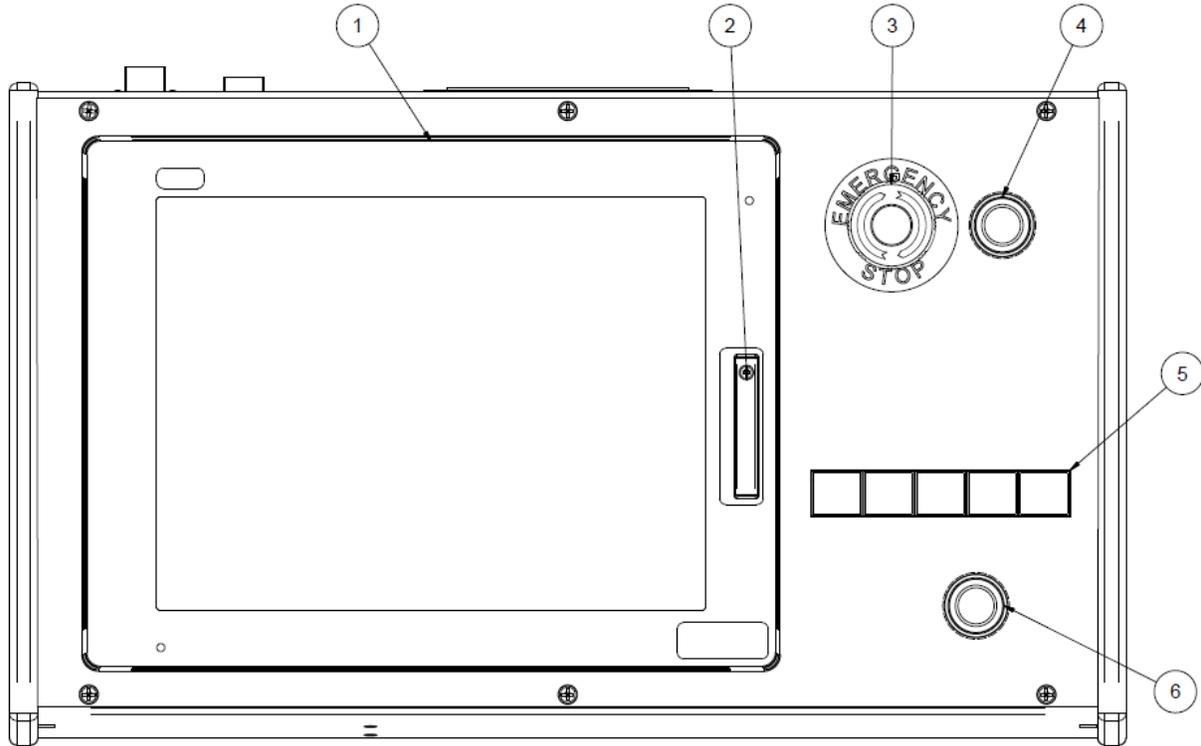
1. HMI.
2. USB Port (for updating system).
3. Emergency Stop Button.
4. Reset Button.
5. OLED 5 Button Panel.
6. GO Button.

- **TOUCH SCREEN OPERATING SYSTEM, CONSOLE, REAR**
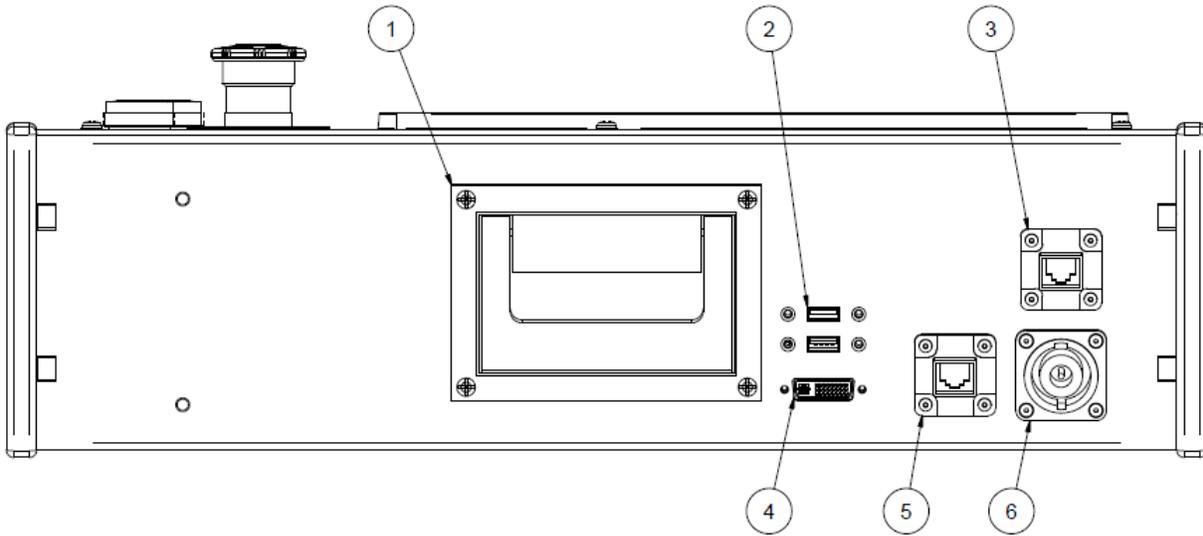
1. **Handle.**
2. **USB Port.** This port is for peripheral devices like a mouse and keyboard.
3. **Harting RJ45 PushPull Connector.** This is for the connection of the Touch Screen Operating System (TSOS) Console to the TSOS Interface. It is for communication between the Touch Screen Operating System and the Programable Logic Controller (PLC).
4. **DVI-D Video Port.** This port is for a secondary monitor.
5. **Harting RJ45 PushPull Connector.** This is for the connection of the TSOS Console to the TSOS Interface. It is for communication between the Touch Screen Operating System and the PLC.
6. **NL8 Connector.** This is for connection of the TSOS Console to the TSOS Interface. It is for the Power & Emergency Stop Circuit.

- **TSOS INTERFACE, FRONT**
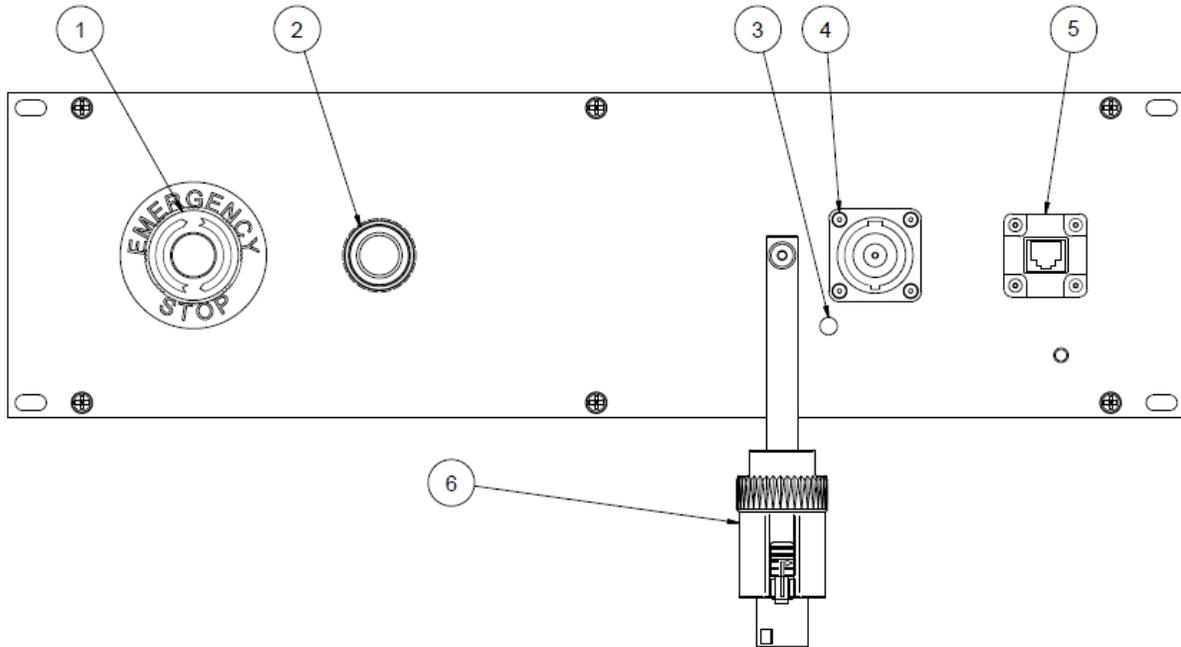
1. **Emergency Stop Button.**
2. **Reset Button.**
3. **TSOS Power Indicator.**
4. **NL8 Connector.**
5. **Harting RJ45 PushPull Connector**
6. **NL8 Shorting Plug.**

- **TSOS INTERFACE, REAR**
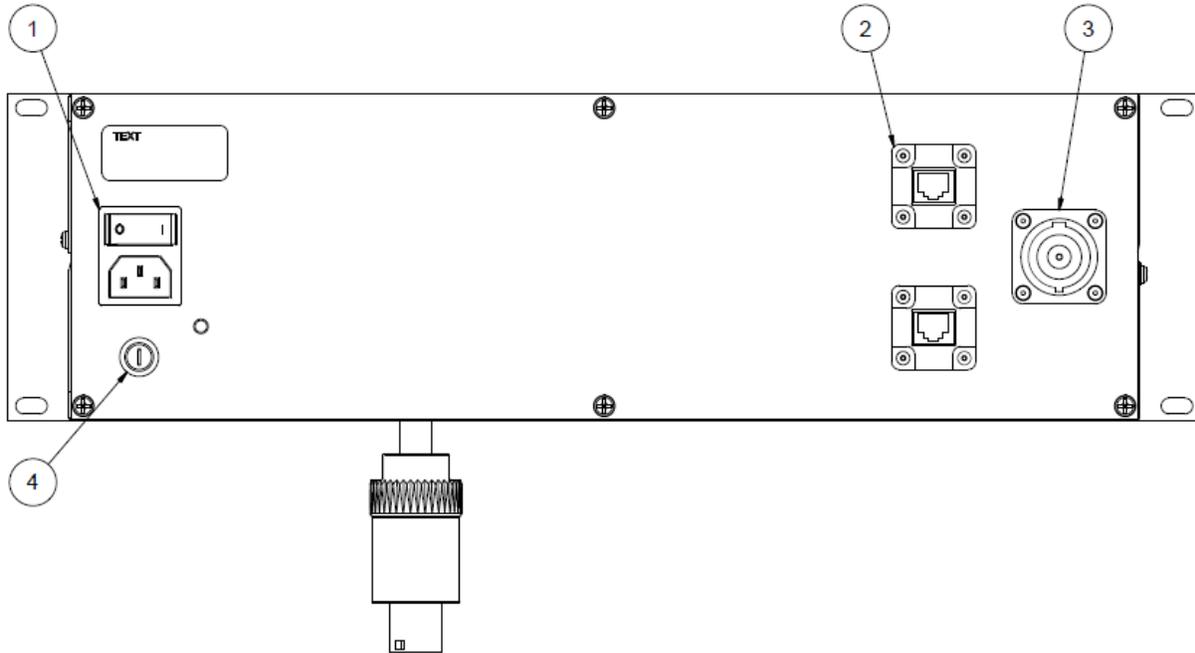
1. **IEC Input & Main Power Rocker Switch.**
2. **Harting RJ45 PushPull Connector.**
3. **NL8 Connector.**
4. **Fuse Holder & Fuse.**

- **PART NUMBERS**

PART NUMBER CONFIGURATION			
GROUP	**CATEGORY**	**SUBDIVISION**	**ID NUMBER**
A = Top Level Assembly	- 17 = Rigging Electronics	- 005 = HMI Touch Screen Operating System (TSOS)	- xxx = Ideration

PART NUMBER TABLE		
Part Number	**Type**	**Description**
A-17-005-0013	TSOS	PLC Control System, Touch-Screen Operating System, HMI 12" with Enclosure, E-Stop, Reset, Go, OLED Buttons, NL8, Harting PushPull
A-17-005-0103	Interface	PLC Control System,HMI Interface,RP3,IEC Input,E-Stop,NL8

- **SYSTEM CAPACITY**

The Soft Limit Control System in this manual can run 1 to 80 Chain Hoists. The TSOS's Capacity is based on user scope and how many hoists can be defined on a specific HMI Screen size.

- **ELECTRICAL SPECIFICATIONS, TOUCH SCREEN OPERATING SYSTEM, CONSOLE**

Input Power…………………………………………………………………………………………………… 24DVC
Current Rating……………………………………………………………………………………………….. 3A max

- **ELECTRICAL SPECIFICATIONS, TSOS INTERFACE**

Input Power…………………………………………………………………………………….. 100 - 120VAC 1 Phase
Frequency………………………………………………………………………………………………………. 60Hz
Current Rating…………………………………………………………………………………………………. 3A max

- **PHYSICAL SPECIFICATIONS, TOUCH SCREEN OPERATING SYSTEM, CONSOLE**

Chassis……………………………………………………………………. .090" Steel, black powder coat finish
Front Panel………………………………………………………….. .090" Aluminum, black powder coat finish
End Caps…………………………………………………………………………………………….. Yellow ASA
Chassis Width…………………………………………………………………………………………… 19.82"
Chassis Height…………………………………………………………………………………………… 5.49"
Chassis Depth……………………………………………………………………………………………. 11.75"
Weight………………………………………………………………………………………………… 35 lbs.

- **PHYSICAL SPECIFICATIONS, TSOS INTERFACE**

Chassis……………………………………………………………………. .090" Steel, black powder coat finish
Front Panel…………………………………………………………….. .125" Aluminum, black powder coat finish
Rear Panel…………………………………………………………….. .090" Aluminum, black powder coat finish
Chassis Height………………………………………………………………………………………………… 3RU
Chassis Width………………………………………………………………………………………………… 19"

Chassis Depth... 5.5"
Weight... 5 lbs.

- **DATA SPECIFICATIONS**

Data Communication Protocol, Console to Interface…………………………………………………… Modbus TCP
Data Communications Protocol, Interface to Controller…………………………………………….. Modbus TCP

- **ENVIRONMENTAL SPECIFICATIONS**

Indoor Use Only
IP Rating... IP40
NEMA... NEMA1
Operating Temperature Range... 0°C to 70°C

- **CABLE SPECIFICATIONS**

NL8 POWER/EMERGENCY STOP CIRCUIT CABLE

The Power/Emergency Stop Circuit Cable uses Neutrik NL8 8 pin connectors with 16/7 cable.

Console Power / E-Stop Connector		motionlabs
PIN	FUNCTION	COLOR
1+	E-Stop A	N/A
1-	E-Stop B	N/A
2+	Reset A	N/A
2-	Reset B	N/A
3+	24 VDC	N/A
3-	0 VDC	N/A
4+	Ground	N/A
4-	-	N/A

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DATA CABLE

The Data Cable uses Harting RJ45 PushPull connectors with Cat6 cable. Cable is a MLI product, part number 1002-09-45-600-0522

Console RJ45 PushPull Connector		
PIN	FUNCTION	COLOR
1	Rx +	N/A
2	Rx -	N/A
3	Tx +	N/A
4	-	N/A
5	-	N/A
6	Tx -	N/A
7	-	N/A
8	-	N/A

- **SYSTEM CONNECTIONS**

Note: System connections details all cable connections related to Portable Automation Console. Please refer to the System Schematic for other connections in the system.

TOUCH SCREEN OPERATING SYSTEM CONNECTIONS, CONSOLE
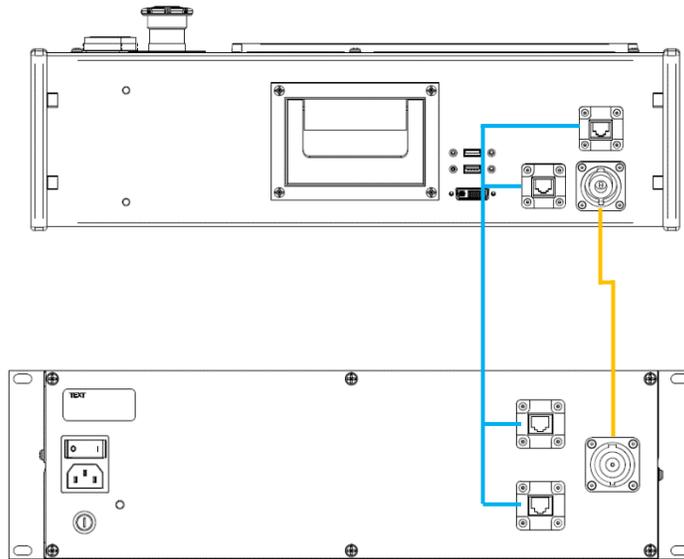
TOUCH SCREEN OPERATING SYSTEM CONNECTIONS, CONSOLE, PERIPHERALS
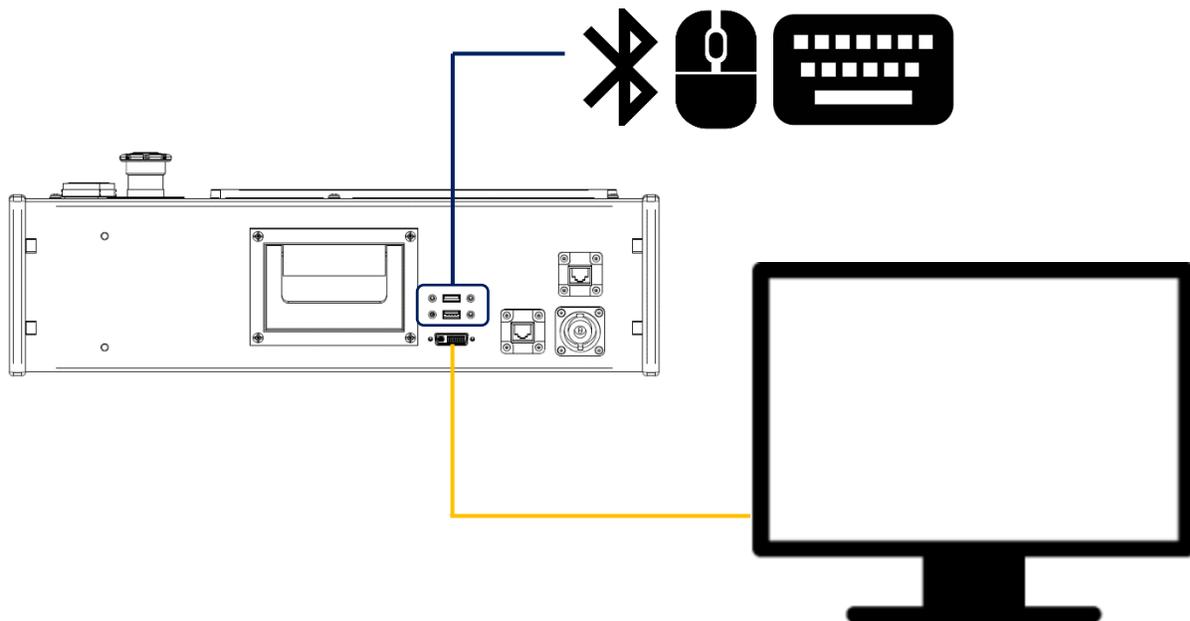
- **POWER UP**

Connecting the NL8 Cable to the TSOS Console will power the device. Connecting the Ca6 Cable to the TSOS Console will provide communications path.

The Emergency Stop Circuit must be satisfied. All E-Stop button quarter turned to release and reset button pressed.

Once the PLC and other electronic devices in the unit have cycled on and booted up, the TSOS Console will be ready to operate

- **SETUP / CONFIGURATION**

HOME PAGE
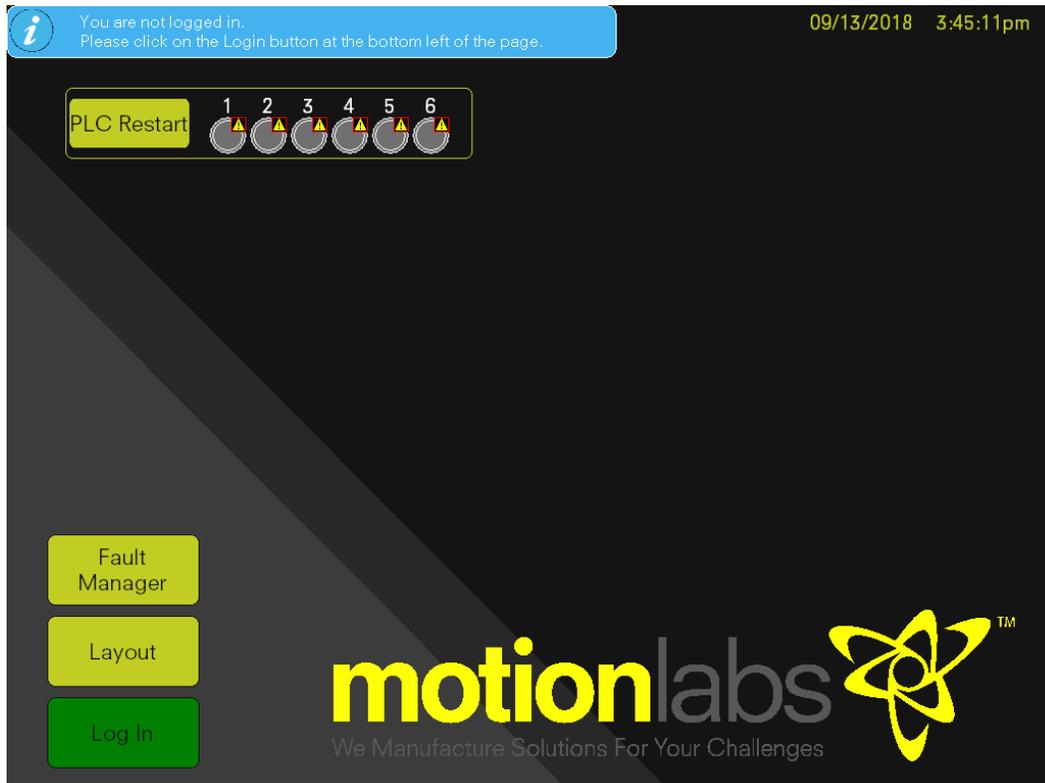
The **HOME** page is the main page where all other pages can be accessed, including the Login Menu. The upper left corner displays the login name and security level of the current user.

LOGIN – HOME PAGE

Press the Login button to open the sign in screen.
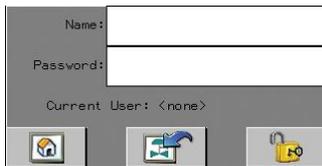
Press the "NAME" text field to enter your login name. After you initiate the "NAME" field a standard keyboard screen will pop up, type your name and hit enter. Next press the "PASSWORD field and repeat the process to enter your login password.

Press the unlock icon to unlock the user. You are now logged in.

Press the home icon to go back to the home page.

NOTE: Users must be entered into each HMI as a part of a system setup procedure. On initial startup, there are two default users and passwords provided. This is detailed in the "USER MANAGEMENT" section.

Once completed with the Login process, the HOME page displays security level and login name.

PLC RESTART

The PLC Restart section has indicators for each PLC's encoder counters. They all must be green for the system to run. If they are not green press the "PLC Restart" button. This will re-initialize the counters.

RUNTIME

The "Runtime" button brings up the runtime sub menu.

The Submenu has two buttons

EXIT – this will exit the runtime. Exiting the runtime will close the Soft Limit program.

CONFIG – This will display the runtime configuration. This function is reserved for Administrator and above user levels.

FAULT MANAGER
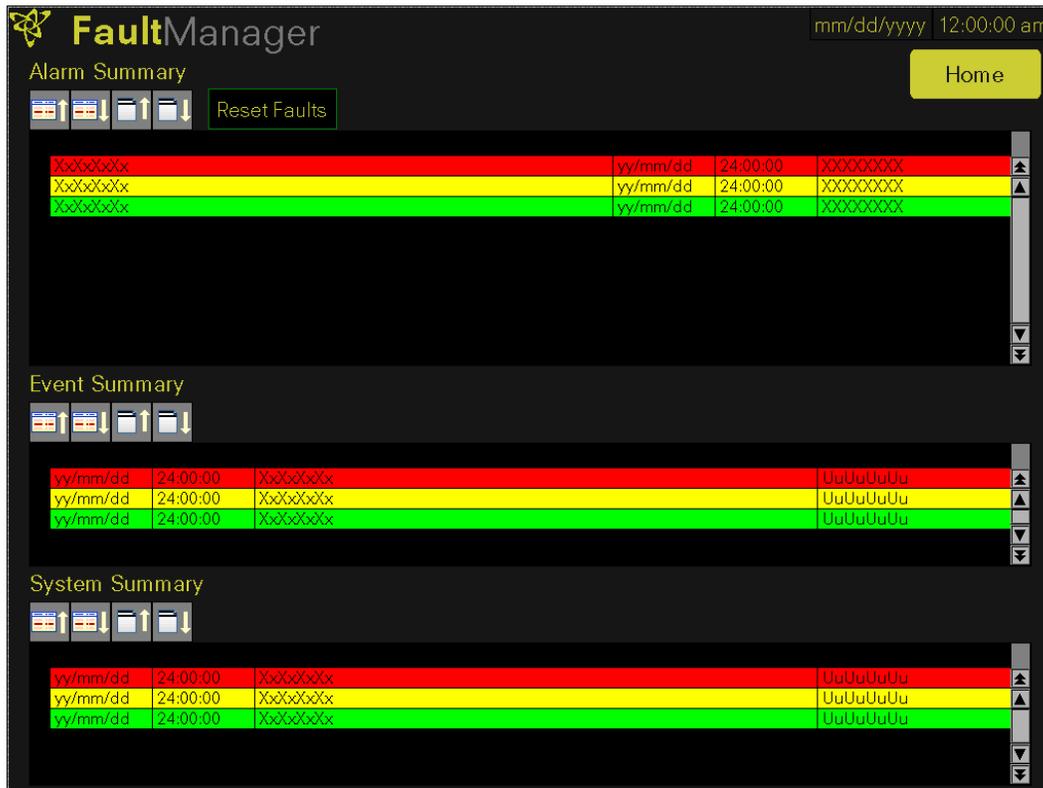
The Fault Manager displays three Summary lists.

- Alarm Summary - The Alarm Summary is used to display any active faults of the system.
- Event Summary - The Event Summary is reserved for future use.
- System Summary - The System Summary shows all event that have taken place such as log in, log out, system events, system failures.

The "Reset Faults" will attempt clear all faults. If a fault remains, the condition which caused the fault still exists.

LAYOUT

The LAYOUT page(s) are custom made pages based on the user scope. They provide data to the user on layout and system configurations.

USER MANAGEMENT. This allows the addition of users and security groups.

The system comes with two preloaded users and passwords. One with user level security and one with administrator level security.

User Name	Password	Security Level
USER	USER	User Level (1)
ADMIN	ADMIN	Administrator Level (3)

*Note – it is advisable to change the default passwords on initial startup. Add any new user information here but keep password records in a secure location.

User level security (1) allows access to:

- The HOME page.
- The SOFT LIMIT CONTROL page
- FAULT MANAGER
- LAYOUT pages

Administrator level security (3) allows access to all program features and parameters.

Note that you must be logged in as an administrator to add, remove, or otherwise edit user level information. Admins cannot be created, only the password can be changed. Pressing the "USER MANAGEMENT BUTTON" brings up the following page:

ADD- adds new user to the security group

EDIT- Edits the user (password)

DELETE- Deletes the selected user

EXIT- Returns to the previous page

ADD NEW USER

1. Select the security group from the drop-down list
2. Enter the new user's name in the user field.
3. Enter the new user's password into both the "Pwd" and "Confirm Pwd" field.
4. Touch the add button.

DELETE USER (This includes Password Information)

1. Select the security group from the drop-down list
2. Select the user from the user drop-down list.
3. Touch the delete button.

CHANGE PASSWORD

1. Select the security group from the drop-down list.
2. Select the user from the user drop-down list.
3. Enter the new password into both the "Pwd" and "Confirm Pwd" fields
4. Touch the edit button

HOIST MANAGER

The Hoist Manager allows you to change hoist names and access the Position Manager. Hoist Names display on every page where hoists are referenced and will help identify channel assignments.
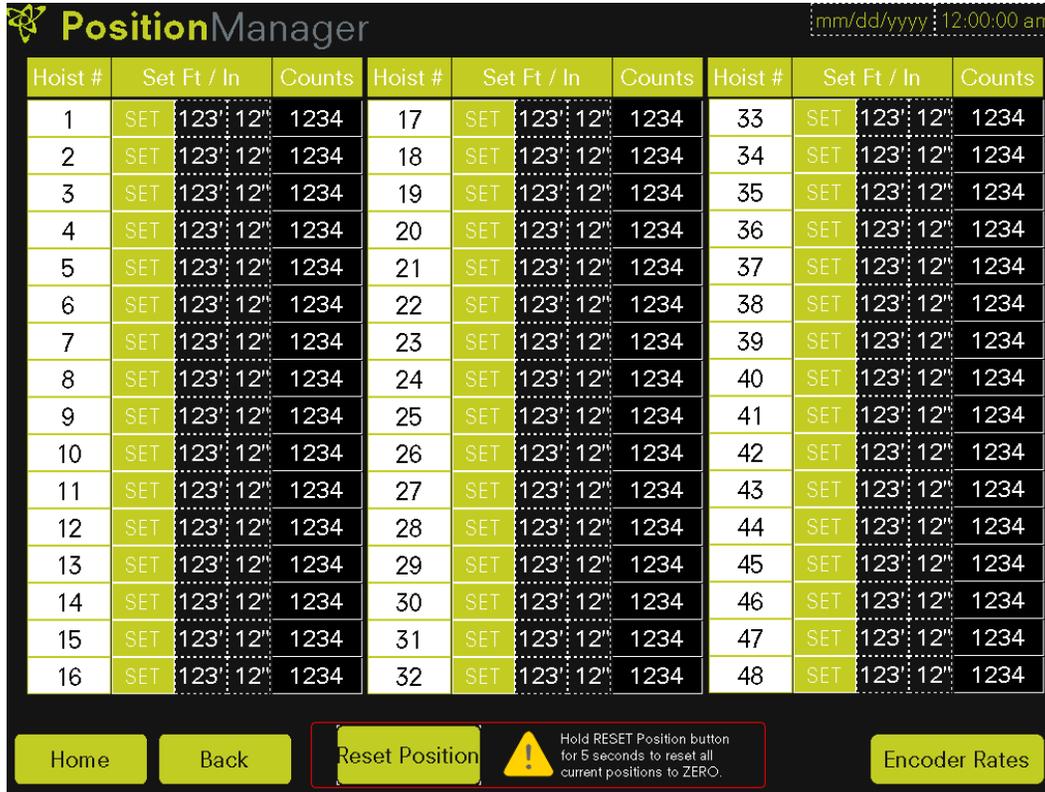
POSITION MANAGER

The Position Manager allows you to change the current position value of any hoist to zero or a predetermined location. It also allows access to system encoder rates.

Changing Positions

To change a position, enter the desired position into the Set Ft / In fields. After the desired position has been entered hold the "SET" button for approximately 5 seconds. You will see the counts change to the new desired position counts per encoder rate. Verify the new setpoint position was accepted. If not repeat the process. Be sure to hold the "SET" button for the required time to allow the change to take place.

Resetting Positions to Zero

Holding the "Reset Position" button will change ALL channels/hoists positions to 0' 0". Please make sure this is your intention before doing so as this action cannot be undone.
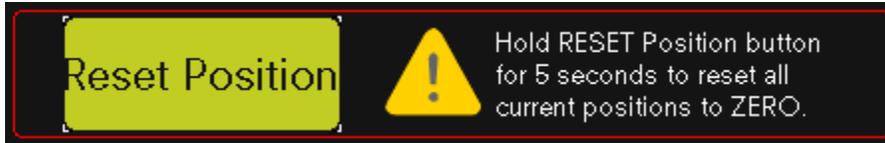
ENCODER RATE

This page is for administration only. This page is used to change the encoder rates to match the hoists connected to the system. A Motion Labs technician will set encoder rates during commissioning and will leave notes on the page designating the encoder rates used. These rates SHOULD NOT be changed. Doing so will lead to erroneous position control.

SOFT LIMIT SETUP
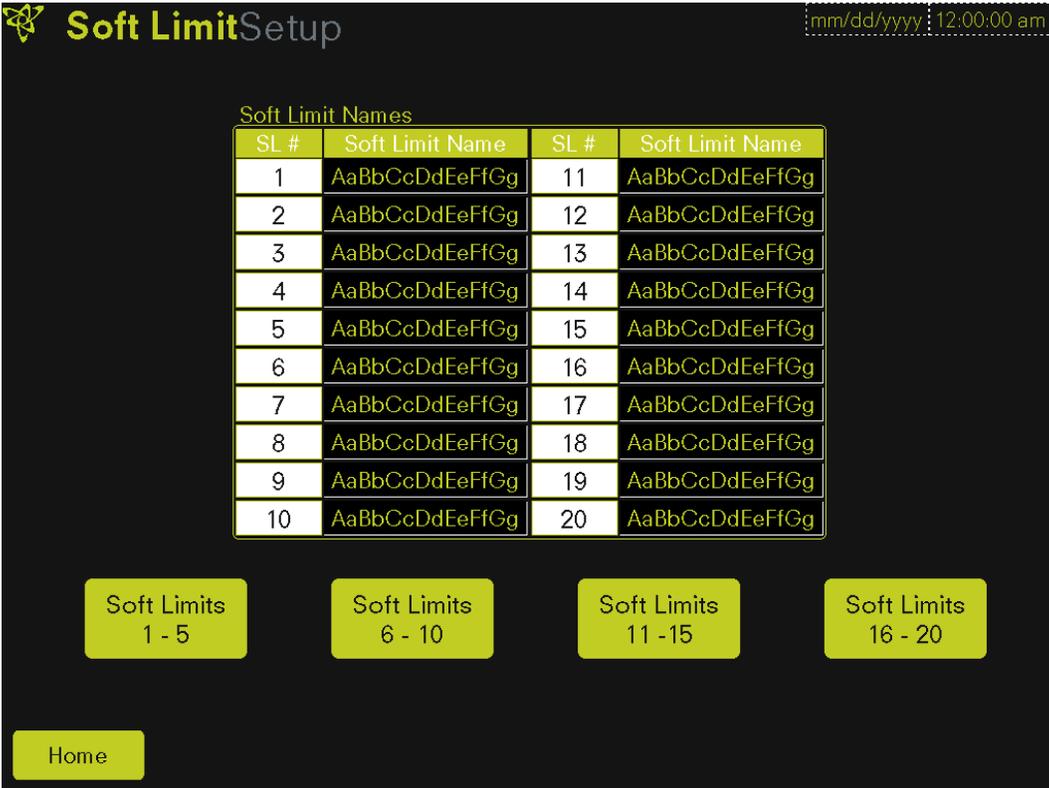
Soft Limit Setup allows you to change Soft Limit names and access the pages for setting up Soft Limits. Soft Limit names display on every page where Soft Limits are referenced and will help identify movement assignments.

Hoist Channel Selection Buttons

Legend

Set Position Soft Limit Selection Buttons

Soft Limit Selection Buttons

Hoist Channel Selection Buttons - All 80 hoist's information cannot fit on one page. Use these buttons to choose the set of 16 hoists you wish to modify.

Legend – Displays selection status for a hoist. The selected hoist(s) is the one(s) which will be modified. Press on the channel number to highlight the channels to be modified.

Set Position Soft Limit Selection Buttons - When your desired hoists are selected and ready for the current position to be entered in to a soft limit, press this button for 5 seconds or until you see the change take place. Note that this will only affect the channels displayed on the soft limit configuration page. If you would like to modify other channels, then you must use the Hoist Channel Selection Buttons to modify the other channels.

Soft Limit Selection Buttons – All 20 soft limit's information cannot be displayed at the same time due to screen area restrictions. Use these buttons to choose the set of soft limits you will be modifying.

- **OPERATION**

Prior to operation, all system set up procedures must be completed. These are the methods of operation available:

- MANUAL CONTROL
- SOFT LIMIT CONTROL

MANUAL CONTROL. (Manual up and down control).

This operating method is for jogging hoists up or down. There is no setpoint required to run in this mode. The hoists will move in the direction selected when the "GO" button is pressed and all safety conditions are met. Any hoist(s) can be moved in this control method.

Channel Number
Hoist Name
Current Position

Up Direction Button

Down Direction Button

Up Direction Selected

Down Direction Selected
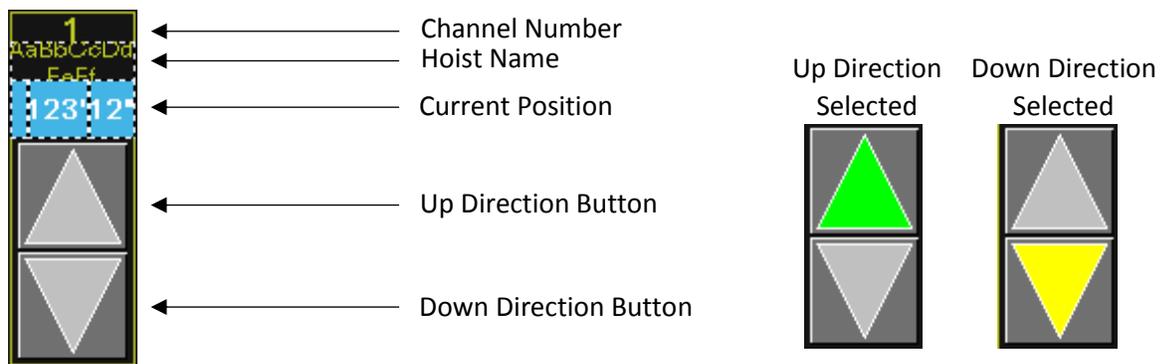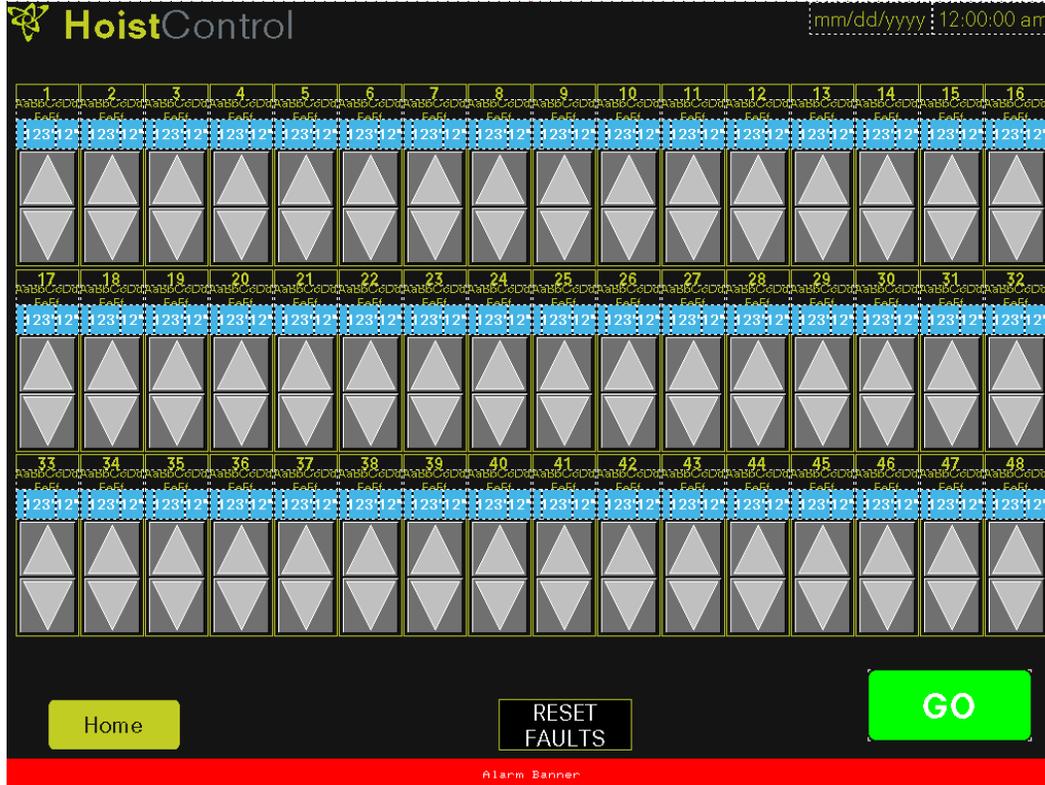
RUNNING IN MANUAL CONTROL

Before running in any mode make sure that the system is fully powered on and that all setup and configuration steps have been completed.

Choose the desired direction for the hoists intended to run. After hoist(s) are selected press the GO button to run. This is a momentary button and must be held to continue operation.

SOFT LIMIT CONTROL

Soft Limit Group Selection

Hoist Enable Popup Button

View Soft Limit Popup Buttons

Hoist View

Legend

Soft Limit Run Buttons

Soft Limit Group Selection – Five soft limits can be displayed at the same time due to screen area restrictions. Use these buttons to choose the set of five soft limit you will be moving hoists to.

Hoist Enable Popup Button – When the button pressed, it brings up Hoist Enable Popup. This popup allows you to enable channels to run.

Soft Limit Run Buttons – These five buttons are the Run buttons for movement to soft limits.

View Soft Limit Popup Buttons – This Popup allows you to preview the setpoint positions assigned to the soft limit.

Hoist View – This area is where is can view if a channel has been enabled and the current position.

Not Enabled ⟶
Enabled ⟶

Current Position

Legend – The Legend displays the representation of channel/hoist enabled. (Please see above.)

RUNNING IN SOFT LIMIT CONTROL

Before running in any mode make sure that the system is fully powered on and that all setup and configuration steps have been completed.

Before running, enable hoists intended to move via the hoist enable Popup. Make sure hoists you have enabled are properly displayed in Hoist View.

Press the Soft Limit Run button to move to the intended Soft Limit. This is a momentary button and must be held to continue operation. When it reaches its soft limit position the button will illuminate green (shown below).

FAULTS

On the bottom of the Control Screens there is an alarm banner that, when an active fault is present, scrolls across the bottom of the page. To clear faults press the reset faults button.

The following is the Fault table.

FAULT	CAUSE
<"Hoist Name"> Encoder Up Fault	An enabled channel has been asked to move up and its respective encoder has not counted any counts or counted in the opposite direction. There are three main events that would normally cause this fault. a.) the system has not fully satisfied the Emergency Stop Circuit. Make sure the system is ready to run; All e-stop buttons are released and a reset command has occurred. b.) the respective channels supplemental breaker is tripped/off or the fuse is blown/removed. c.) the encoder is damaged.
<"Hoist Name"> Encoder Down Fault	An enabled channel has been asked to move down and its respective encoder has not counted any counts or counted in the opposite direction. There are three main events that would normally cause this fault. a.) the system has not fully satisfied the Emergency Stop Circuit. Make sure the system is ready to run; All e-stop buttons are released and a reset command has occurred. b.) the respective channels supplemental breaker is tripped/off or the fuse is blown/removed. c.) the encoder is damaged.
note: Each hoist will show it's name during a fault. Multiple faults will show at the same time.	

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Soft Limit Console – User Manual – Installation
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The Soft Limit Console is designed as part of a Soft Limit System. The system consists of:

- Motor Controller. This can be presently installed in a venue or portable.
- The Soft Limit Automation Controller.
- Hoists modified with MLI encoders
- Load Cells, a variety of options are available to interface with the hoist to allow weight monitoring.

- SPARE PARTS

Only original spare parts may be used. Motion Laboratories Inc. cannot be held responsible for failures and breakdowns caused by the use of non-OEM or incorrect spare parts.

In case of necessity, please contact:

Motion Laboratories Inc.
520 Furnace Dock Road, Cortlandt Manor, NY 10567, USA
TEL: 800.277.6784 I TEL: +1 (914) 788-8877 I FAX: +1 (914) 788-8866
www.motionlabs.com

- DISPOSAL

The Soft Limit Console should be scrapped by cutting, so that it can no longer be used, whether at the end of its expected lifetime.

Upon demolition, plastic parts must be separated from electric components and must be sent to selective collections according to regulations in force.
With regard to metal elements and components, all materials shall be separated by type such as ferrous materials or aluminum and shipped for recycling.