



SureTarget™ 10

Motorized Rigging Control System Operating Instructions

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Introduction

The SureTarget 10 Motorized Rigging control system offers flexible control of fixed or variable-speed rigging winches. It uses a touchscreen operator interface, and offers simple modes of operation for rapid, easy use. A number of powerful features provide great flexibility of operation.

The control system is designed to enable the safe operation of the motorized equipment. It is crucial that, before operating any stage equipment, all operators should be given the necessary training and should then work only under the direction of qualified supervisors. Stage equipment can be hazardous when improperly operated and maintained.

While there are a number of principles that guide the safe operation of rigging equipment, there is one that will be reiterated throughout this manual:

WATCH THE PIECE!

Whenever a set is being moved by the motorized rigging system, make sure that the operator can see the entire piece throughout its path of travel. If the operator cannot see the entire piece, or the entire path, then spotters must be positioned to supplement the operator's view. All spotters must be in clear and reliable communication with the operator throughout the move. This is the level of vigilance that is necessary to safely operate rigging equipment. Whenever you see the words "WATCH THE PIECE!" take a second to make sure you are paying attention to the important stuff - the moving iron, not the flashing pixels!

While the information in this manual will not cover all possible situations (nor, due to the nature of theatre, could such instructions be possibly written), it is intended to provide a guide to the safe and efficient operation of the furnished stage equipment and its routine maintenance. No manual can replace constant vigilance and common sense.

A routine maintenance schedule should be established and followed and appropriate records should be maintained.

- Learn the feel, sound, and even the smell of your equipment so that you will immediately sense when something is not correct.
- Study the capacities and capabilities of each system and its components.
- Thoroughly learn and practice the proper operating procedures.
- Before operating any equipment, inspect the machinery area, examine the equipment, and look for any existing conditions which may affect proper operation or which could be affected by its operation. For example, is anything fouling the equipment or in the path of its intended travel?

Further, any problem noticed during setup or operation of the stage equipment should be corrected IMMEDIATELY. Someone's life could be at stake. We suggest that emergency procedures be established in case of fire or injury and that periodic drills be held.

In addition to routine maintenance, we strongly recommend that a qualified rigging firm be engaged to perform periodic inspections and to correct any deficiencies discovered. These firms have personnel who are trained to spot present hazards and many "potential" hazards. Routine maintenance also prolongs the useful life of equipment and keeps it operating at peak efficiency for the quietest possible operation and so that less effort is required on the part of the operator.

System Overview

The system includes a touch-screen control station, (which may be a fixed-position wall-mount or a portable pendant), motorized winches/hoists (“units”) - each with limit switches and encoder- and electronic motor controls. In addition to moving equipment up and down, the system permits the operator to specify a target move. In variable-speed applications, the operator may also specify the unit's speed and acceleration/deceleration times. These parameters may be entered "on the fly", or may be recorded as presets for later playback.

CONTROL SYSTEM

The motor for each unit is connected to electronic motor controls. These connections include wiring to the motor, motor brake, limit switches, and motor encoder. The electronic motor controls for each winch may be housed in an individual starter cabinet or grouped together in larger cabinets called motor control centers (MCCs).

The electronic motor controls are connected through network wiring to a logic cabinet which houses a programmable logic controller (PLC). The PLC is a dedicated-purpose industrial computer. The PLC gathers data from the electronic motor controls and issues commands to them. The logic cabinet also contains power supply for the system power and emergency stop system. In wall-mount systems, the system control panel is located on the face of the logic cabinet. In systems operated through a portable control pendant, control pendant receptacles may be located on the logic cabinet or at a remote location.

System Components

EMERGENCY STOP SYSTEM

The Emergency Stop system is operated through latching mushroom-head Emergency Stop (E-STOP) buttons in the control system. These are located as required throughout the performance space. The E-STOP buttons are joined in a series loop; pushing any of the buttons will break the loop and signal an emergency stop condition.

Pressing an E-STOP button will immediately stop all motors in the system by removing the control power to each starter cabinet or MCC. Pressing the E-STOP button will also signal the PLC that an emergency stop condition exists. The E-STOP buttons latch when pressed; to release a non-illuminated E-STOP button, turn the button one-quarter turn clockwise (as indicated by arrows on the button) and allow the button to pop out. To release an illuminated E-STOP button, simply pull the button to its released position.

MOTOR STARTERS

Each unit includes a starter which contains circuit protection and electronic motor control devices. In variable-speed units, each starter includes a vector inverter drive. Each starter takes in data from the motor encoder and winch limit switches, provides motor power and brake release signals, and communicates with the programmable logic controller. The vector inverter drive incorporates motor protection functions, including overload sensing, and provides fault status information. Fixed-speed starters include remote I/O (input/output) or a PLC and a reversing contactor/starter with circuit and motor overload protection.

LIMIT SWITCHES

End-of-travel limits

Each unit is equipped with end-of-travel limit switches. End-of-travel limits are classified by their function, either as normal limits or overtravel limits. The normal limits stop motion in the selected direction, but permit motion in the opposite direction. Each normal limit is paired with an overtravel (or ultimate) limit; striking an overtravel limit will cut control power to the starter, preventing all motion of the unit. *This is not a normal situation!* A careful inspection of the unit must be conducted to determine the reason an overtravel limit switch was activated. A specific maintenance procedure is required to clear this condition.

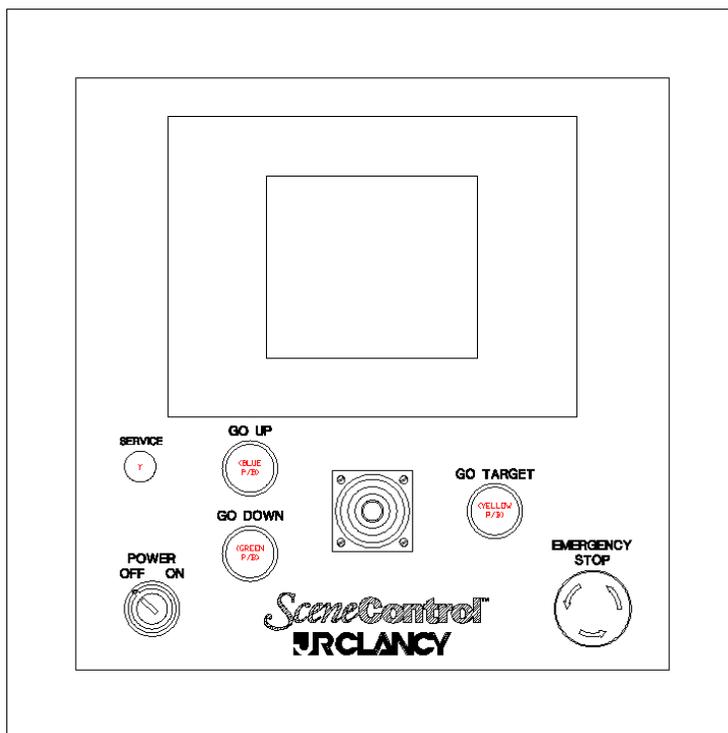
Both normal limits and overtravel limits are tied into the system control in all modes of operation, whether operating from the main control system or from any maintenance controls on the motor control or starter cabinet.

Limit switch types

Limit switch functions can be accomplished with either rotary or direct-struck limit switches. Rotary limit switches are mechanically coupled to the drive mechanism. Each rotary limit switch has four elements (up overtravel, up, down, and down overtravel) that rotate in unison, utilizing a tooth-like bump to engage a switch. Direct-struck limit switches are struck by a piece of the driven mechanism (e.g. a moving drum flange, a cam mounted on the counterweight arbor, cable clew, or lift guide).

WALL-MOUNT CONTROL STATION

The SureTarget 10 wall-mount control station is the main control point for the motorized rigging system. It contains the following controls:



POWER key switch - Used to power the control system on or off. Key can only be removed when switch in the off position.

EMERGENCY STOP – A red, latching, mushroom-head button pressed to initiate an emergency stop condition and released to re-enable normal system operation.

UP, DOWN, and GO TARGET buttons – Momentary (hold-to-run) buttons used to execute an action selected on the DISPLAY.

SPEED – A spring-return-to-center joystick control used to vary the speed of moving equipment. (variable-speed systems only)

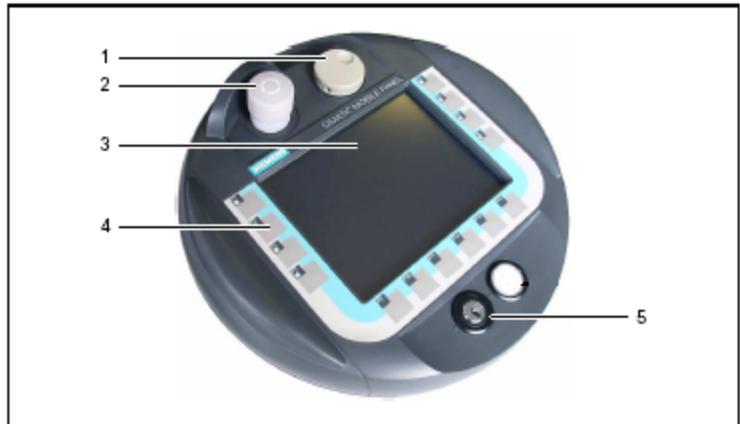
DISPLAY - A touchscreen display containing the control selections and status displays to operate the system.

PORTABLE CONTROL PENDANT

Some SureTarget 10 systems use a portable control pendant as either the main controller or as an auxiliary control point. The pendant is equipped with a cable (usually 10m or 30' long, but optionally as much as 25m long). This cable is plugged into designated pendant receptacles.

The features and controls of the portable control pendant are as follows:

1. Rotary "speed" wheel
2. Emergency Stop button
3. Liquid Crystal Display (5.7" diag. touchscreen)
4. Membrane type function keys
5. Key switch operator



The screens on the LCD display will be the same for both a wall-mount station and portable control pendant.

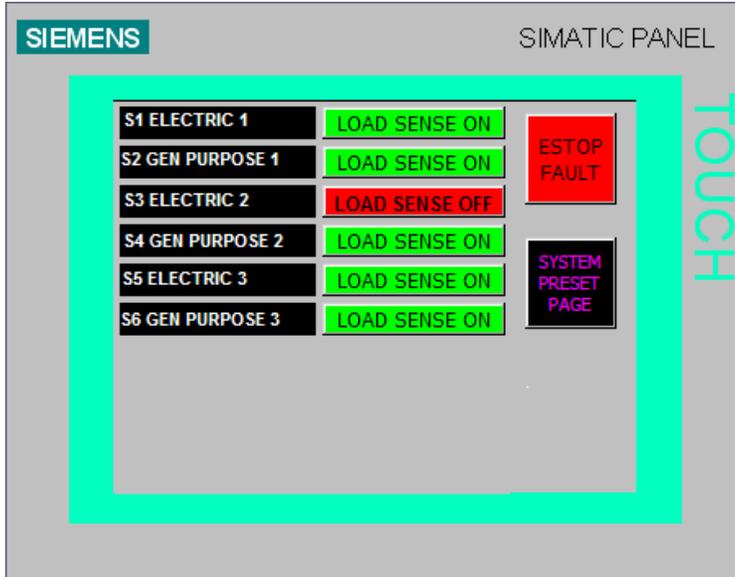
Function keys on the left of the screen on the pendant are used to control motion in lieu of the pushbuttons on the face of a wall-mount. The upper left button is GO UP, followed immediately below by GO DOWN, and the very bottom button on the left side, GO TARGET. These buttons operate in "dead man" or hold-to-run mode, just like the panel-mounted pushbuttons; the buttons must be pressed and held to initiate and maintain motion; releasing the button will cause the equipment to stop (or decelerate and stop if variable speed).

In systems where both a wall-mount and a pendant station are installed, the pendant will take priority. While the pendant is plugged in, the GO UP/GO DOWN/GO TARGET pushbuttons on the wall-mount station are disabled. While the pendant is plugged in, its Emergency Stop button is part of the E-stop system; the pendant E-stop button, wall-mount E-stop button, and any remote E-stop buttons must be released to allow motion of any equipment. When the pendant is unplugged, the E-stop circuit is automatically shunted through that receptacle, keeping the rest of the system operational.

Pendant plug connectors have a red dot to indicate the proper orientation of the plug. While facing the front of the receptacle station, hold the plug with the dot facing upward, and insert the plug without twisting. To remove the plug from the receptacle, grasp the plug by the knurled ridges, and pull the plug straight out. The ridges are attached to a latching mechanism that prevents accidental unplugging- pulling on the plug by any other part will not release the latch.

System Operation

BASE SCREEN – MULTIPLE UNIT SYSTEMS



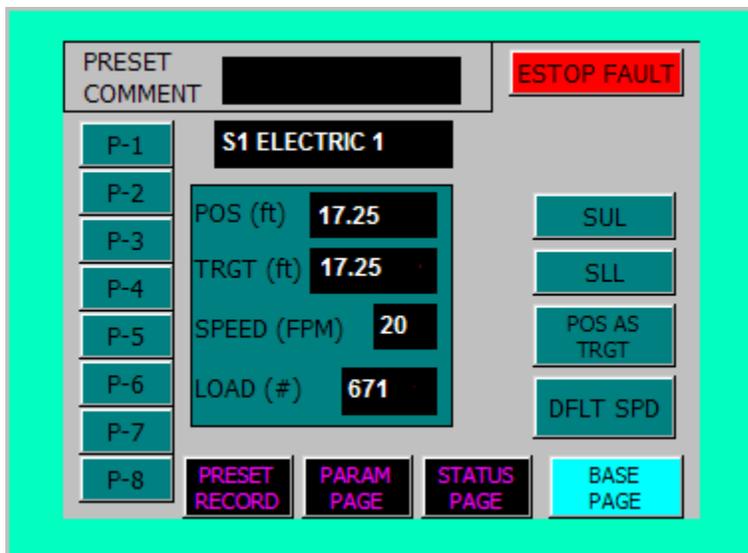
The SureTarget 10 can be used to operate multiple units from a single control station. In multiple unit systems, the first screen appearing on power-up is a winch selection screen.

An area at the top right of this screen will be green and display the message ESTOP OK if the emergency stop system is healthy. When there is an emergency stop condition, this area will turn red and the message will read ESTOP FAULT. The fields in the left column of this screen are used to select the desired unit for operation. Touching one of the fields will load the base page for that unit. The unit may then be operated as explained in the following sections of this manual. In systems equipped

with load sensing, a button to the right of each winch selection field indicates whether load sensing is on or off.

The SYSTEM PRESET PAGE (button) is covered in a later section of this manual. If only one unit is being controlled, on power up the SureTarget 10 will automatically load the unit's base page, bypassing the selection screen above.

UNIT BASE PAGE



Each unit controlled by the system utilizes a base page. As on the selection screen, the area at the top right corner of the screen will be green and display "ESTOP OK" if the emergency stop system is healthy, or be red and display "ESTOP FAULT" if an E-STOP button has been pressed.

The name of the selected unit will appear in the upper center of the screen, followed by:

POS (ft): Displays the current position of the unit (for battens, typically in decimal feet above the stage floor).

TRGT (ft): Displays the current target of the unit, equal to position when base page is

loaded. To designate a new target, touch the TRGT field. A numeric keypad will open; use it to key in a new numeric target. When you touch the ENTER key on the keypad, the keypad will close and the new value will be shown in the TRGT field.

SPEED (FPM): (Variable-speed units only) Displays the current speed setting of the unit in feet-per-minute, equal to the default speed when the base page is loaded. To designate a new speed value, touch the SPEED field. A numeric keypad will open; use it to key in a new numeric target. When you touch the ENTER key on the keypad, the keypad will close and the new value will be shown the SPEED field.

LOAD (#): (Load sensing units only) Displays the total load, in pounds, on the unit (typically at the head block).

SUL: Loads the soft(ware) upper limit into the TRGT field.

SLL: Loads the soft lower limit into the TRGT field.

POS AS TRGT: Loads the current position into the TRGT field.

DFLT SPD: (Variable-speed units only) Loads the default speed into the SPEED field.

P-1 to P-8: Loads a preset value into the TRGT field (and SPEED field for variable-speed units). When a preset button is touched, the associated description will appear in the PRESET COMMENT area at the top of the screen.

PRESET RECORD: Loads the preset record page. Recording presets is discussed in a later section.

PARAM PAGE: Loads the parameter page, showing the unit configuration. Discussed in a later section.

STATUS PAGE: Loads the status page, showing details about the unit. Discussed in a later section.

BASE PAGE: (Multiple unit systems only) Returns user to winch selection page.

WINCH OPERATION- DIRECT CONTROL

When the base page for a unit is loaded, the current position is displayed in the POSITION and TARGET fields and, for variable-speed units, the default speed is displayed in the SPEED field. To run the unit up or down, press and hold the GO UP or GO DOWN button on the control station. The winch will accelerate to the rated (fixed-speed units) or default speed (variable-speed units) and travel until the GO button is released or until the winch reaches its soft upper or soft lower limit.

Changing the speed of variable-speed units

The speed of a variable-speed unit may be changed in two ways: by altering the SPEED field prior to a move or using the joystick during a move. To designate a new speed, touch the SPEED field on the unit base page and use the keypad as described above to enter a new speed (in feet per minute). After a new speed is entered, the unit may be run as described above.

The joystick can change the speed of a variable-speed unit during a move. Pushing the joystick up will increase the speed and pulling the joystick down will decrease the speed, always proportionate to the degree of joystick movement.

NOTE: This system uses "dead man", or hold-to-run operation for all equipment. If the GO UP/GO DOWN/GO TARGET button is released, all equipment will come to a stop. This is done to ensure the operator cannot initiate a move and then leave the operator station while the move is in progress.

CAUTION!

Never move a unit which you, the operator, do not have in direct view. Damage or injury may occur if a unit is moved without first checking that the unit is clear to move. If you cannot maintain a direct view of the unit throughout the move, you must locate spotters where they can have a direct view and stay in clear, reliable communication with them throughout the move.

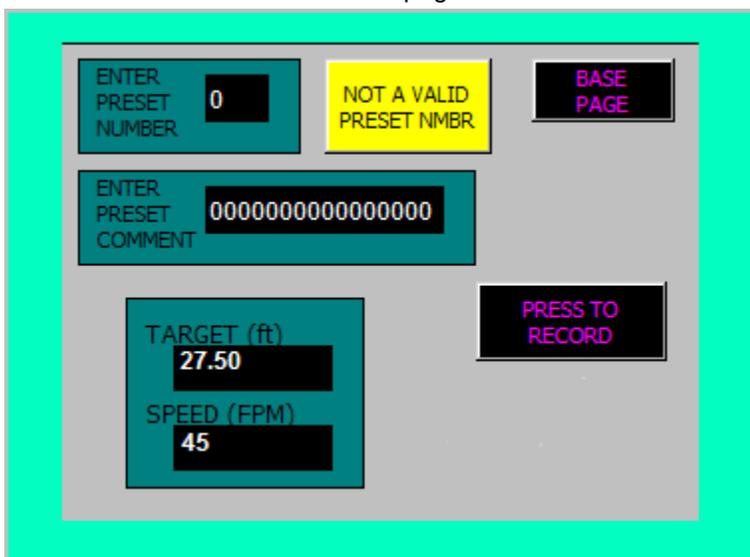
WINCH OPERATION- TARGET CONTROL

There are several ways to designate a target for unit operation. To enter a target explicitly, touch the TRGT field and use the keypad as described above. A pre-recorded target may also be loaded into the TRGT field by touching the SUL (Soft Upper Limit), SLL (Soft Lower Limit), POS AS TRGT (Position as Target) or one of the Preset buttons (P-1 through P-8).

Once a target has been designated, the unit may be run to that target by pressing and holding the GO TARGET button on the control station or pendant. The unit will accelerate to the rated (fixed-speed) or designated (variable-speed) speed and travel until it reaches the target. If the GO TARGET button is released before the unit reaches the target, the unit will decelerate to a stop. For variable-speed units, the speed may be changed as described above.

RECORDING PRESETS

It is possible to record up to eight presets per winch on the system. A preset consists of a comment and a target, along with a speed (variable-speed units only). To record a preset, first designate the desired target and speed on the unit base page, as described above. Next, open the Preset Record page by touching the PRESET RECORD button on the unit base page.



Touchscreen display winch preset record screen

NOTE: Preset recording is a password-protected function. If a password is not currently active, the login screen will pop up, prompting you to enter a user name and password using the on-screen keyboard. To enter the user name, touch the user name field; an alphanumeric keypad will appear. Use this to key in the appropriate user name, then press the ENTER (-) key on the keypad. Follow the same procedure with the password field to enter the password.

When these have been successfully entered, verify that the desired target and speed values are correct and touch the PRESET RECORD button again to open the preset record page.

When the Preset Record page loads, the preset number is set to zero, and the message “NOT A VALID PRESET NMBR” appears in the top center of the screen. Enter a preset number (1-8) by touching the ENTER PRESET NUMBER field. A keypad will open on the screen; touch the desired number (1-8) and then touch the ENTER key to return to the preset record page.

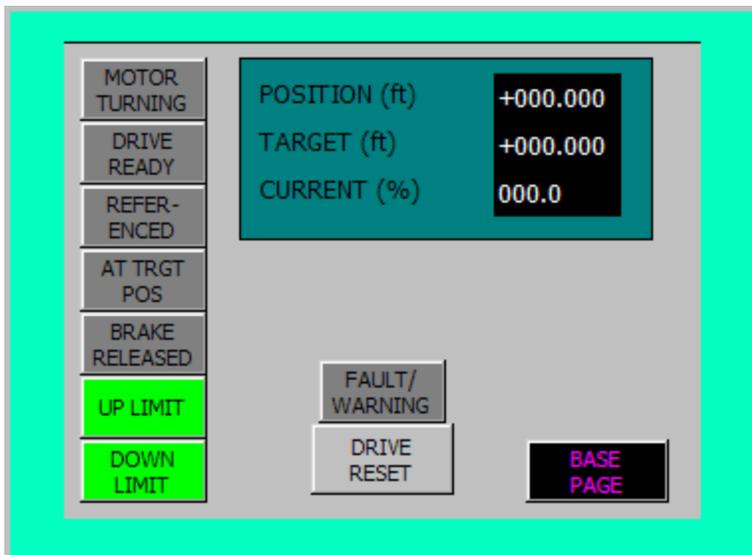
Once the desired preset number has been selected, enter a comment describing the preset by touching the ENTER PRESET COMMENT field. An alphanumeric keypad will appear; use it to key in the comment, followed by the ENTER key. The preset record page will re-appear.

Verify that the preset number, description, target and speed are all correct. Once this is done, touch the PRESS TO RECORD button. The prompt “ARE YOU SURE?” will appear, along with YES and NO buttons. Press the YES button to save the preset, or the NO button to cancel the save process.

To prevent unauthorized use, the system will automatically the user log off after five minutes. Touch the BASE PAGE button at any time to return to the unit base page.

STATUS PAGE

Touching the STATUS PAGE button on the winch base page will open the status page. This screen contains indicators and displays to show the status of the unit and (where applicable) its associated inverter drive. The indicators on the left and center of the screen are as follows:



MOTOR TURNING: Green if the motor is in motion, grey if it is not moving

DRIVE READY: Green if there is power to the drive/PLC, grey if the drive/PLC is off

REFERENCED: Green if the drive/PLC is referenced (ready to operate), grey if it is not referenced.

AT TRGT POS: Green if the unit is at its target position, grey if it is not at its target.

BRAKE RELEASED: Green when the unit brake(s) is/are released (unit in motion), grey when the brake(s) is/are applied (unit stopped).

UP LIMIT: Red when the unit is on the up hard limit switch, green if it is not on the limit

DOWN LIMIT: Red when the unit is on the down hard limit switch, green if it is not on the limit.

FAULT/WARNING: Red when there is a drive fault or warning, grey otherwise. In case of a fault, the drive must be reset before it can be referenced for operation can occur.

DRIVE RESET: Button used to reset the inverter drive after a fault or warning has occurred and the condition has been cleared.

The Displays at the top of the screen are as follows:

POSITION: Shows the current position of the unit. (For battens, typically height in decimal feet above the stage.)

TARGET: Shows the current target of the unit.

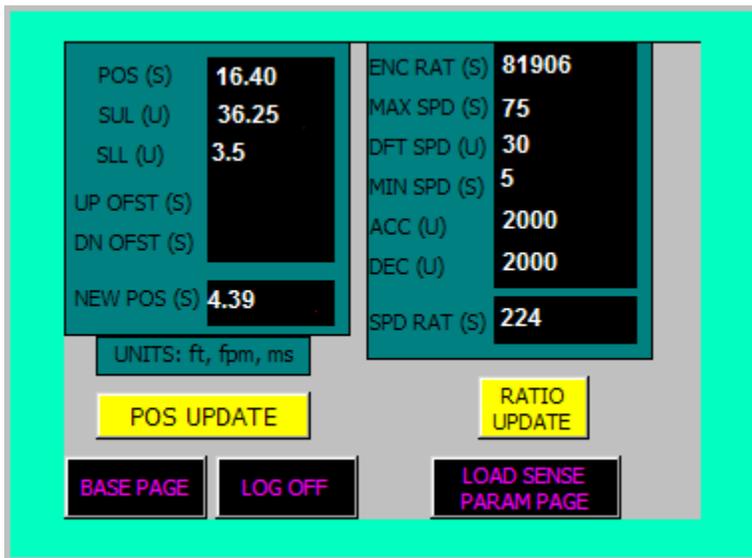
CURRENT: Shows the amperage draw of the inverter drive as a percentage of its full load current.

BASE PAGE: Loads the unit base page.

Some of these indicators are only active during winch operation; however, it is not possible to initiate winch motion while on this page. To monitor the status of an indicator, go to the unit base page, start motion by pushing and holding a GO button, and switch to the Status Page while the winch is in motion. Make sure that a spotter is watching the piece while you watch the screen!

PARAMETER PAGE

From a unit base page, the PARAM PAGE button loads the unit's parameter page.



The parameter page displays certain values and provides a place where an authorized user can change those values. The BASE PAGE button at the bottom left of the screen will return to the unit base page.

Values displayed on this page are password-protected. Certain crucial values are protected by the system level password. These are indicated by an “(S)” following their descriptor. Other values have the indication “(U)” following their descriptor. These values may be adjusted by an operator logged in with the User level username and password. If an operator is not logged in, touching a numeric entry field will pop up the user name and password entry fields. Enter the user name

and password as described above. Once the access privileges have been established, touching an appropriate entry field will bring up a keypad to permit the user to enter a new value.

The LOG OFF button is used to log the user off after changing parameters. The system will automatically log off the user after five minutes to prevent unauthorized access to parameters.

User-level privileges permit changes to the following items, indicated by a (U) following their descriptors:

SUL: The Soft Upper Limit is uppermost safe point of travel for a unit prior to striking the up limit switch.

SLL: The Soft Lower Limit is lowermost safe point of travel for a unit prior to striking the down limit switch.

DFT SPD: (Variable-speed winches only) The default speed loaded into the SPEED field when the unit base page is opened or when the DFLT SPD button on the unit base page is pressed.

ACC: (Variable-speed winches only) Time (in milliseconds) for the unit to accelerate to full speed. As an example, with a setting of 3000, the unit will reach full speed in 3 seconds. If the selected speed is less than full speed, it will require proportionately less time to reach that speed.

DEC: (Variable-speed winches only) Time (in milliseconds) for the unit to decelerate from full speed to a stop. A setting of 3000 will cause the unit to decelerate from full speed to a stop in 3 seconds. If the winch is traveling at less than full speed, it will require proportionately less time to decelerate to a stop.

System-level privileges are required to change system parameters. These are indicated by the letter (S) following their descriptors. If an operator is not logged in with system-level privileges, touching a field for a system parameter will bring up the user name and password entry fields. Once the operator is logged in with the appropriate privileges, touching the field will bring up a numeric keypad for a new value to be entered.

The system parameters are accessed for initial setup and maintenance purposes only. These are identified below for reference only.

POS: Displays the current position of the unit.

UP OFST: (Fixed-speed units only) Displays/Sets the stopping distance calculated into target moves for the unit when moving upward, in decimal feet.

DN OFST: (Fixed-speed units only) Displays/Sets the stopping distance calculated into target moves for the unit when moving downward, in decimal feet.

NEW POS: Sets a new position for the current unit.

ENC RAT: Displays/Sets the encoder ratio.

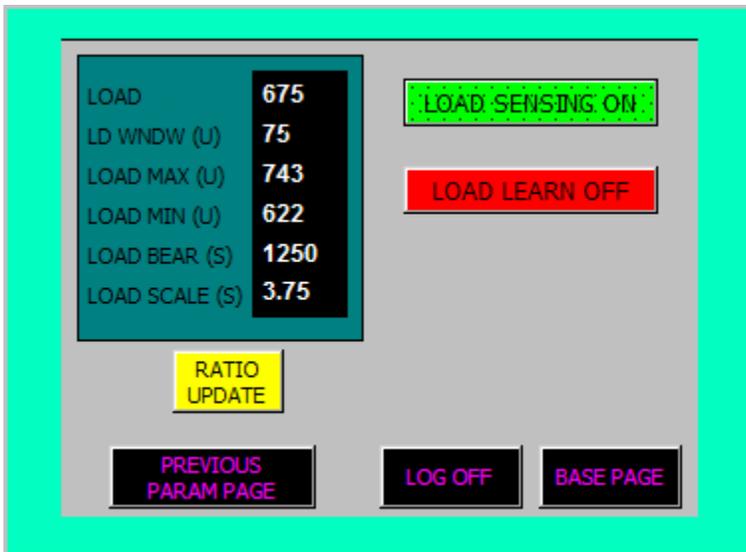
MAX SPD: (Variable-speed units only) Displays/Sets the maximum speed of the unit, in feet per minute.

MIN SPD: (Variable-speed units only) Displays/Sets the minimum speed of the unit, in feet per minute.

POS UPDATE: Updates unit with the new position displayed in the NEW POS field.

LOAD SENSE PARAM PAGE: (Load sensing units only) Loads a page for editing load-sensing parameters.

LOAD SENSE PARAMETERS PAGE



Some units are equipped with load sensing. Load sensing parameters can be accessed by first opening the unit's parameter page, then pressing the LOAD SENSE PARAM PAGE button. This will open the load sensing parameters page.

The load sensing parameters page displays certain values and provides a place where an authorized user can change them. The BASE PAGE button at the bottom right of the screen will return to the unit base page, while the PREVIOUS PARAM PAGE button at the bottom left of the screen is used to return to the unit's main parameter page.

Values on this page are password-protected as on the main parameter page. Certain crucial values are protected by the system level password, indicated by and (S) following their descriptor. Other values have the indication (U) following their descriptor. These values may be adjusted by an operator logged in with the User level username and password. If an operator is not logged in, touching a numeric entry field will pop up the user name and password entry fields. Enter the appropriate user name and password as described above. Once the access privileges have been established, touching an appropriate entry field will bring up a keypad to permit the user to enter a new value.

The LOG OFF button is used to log the user off after changing parameters. The system will automatically log off the user after five minutes to prevent unauthorized access to parameters.

User-level privileges permit changes to the following items, indicated by a (U) following their descriptors:

LD WNDW: Displays/Sets the load window, in pounds. This is the acceptable variance from moment to moment during movement- set this initially to 10% of the winch load, then decrease to make the system more sensitive or increase to eliminate false/nuisance tripping.

LOAD MAX: Displays/Sets the maximum permissible load, in pounds. This value corresponds to the largest load imposed on the system during load learning, including acceleration and deceleration loads, cable weight pickup, etc. and may be manually adjusted after load learning.

LOAD MIN: Displays/Sets the minimum permissible load, in pounds. This value corresponds to the smallest load imposed on the system during load learning, including acceleration and deceleration loads, cable weight transfer, etc. and may be manually adjusted after load learning.

LOAD SENSING ON/OFF: Turn load sensing on or off for this unit.

System-level privileges are required to change system parameters, indicated by the letter (S) following their descriptors. These values are set at initial startup and changed for maintenance purposes only. These are identified below for reference only.

LOAD BEAR: Displays/Sets the maximum load (bearing) capacity of the unit, including cable, batten and all other items suspended from the unit. Typically, this is the total load imposed at the head block.

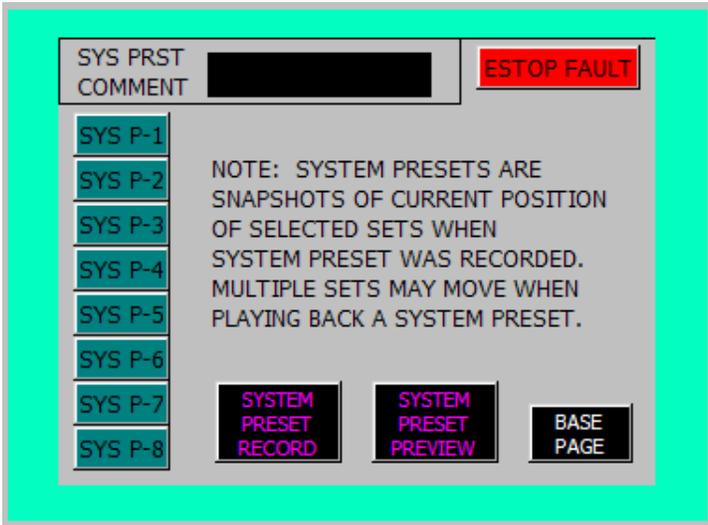
LOAD SCALE: Displays/Sets the scale factor used to convert the output of the load cell amplifiers to pounds.

Load Learning

The load sensing parameters may be automatically calculated for a unit using the load learning procedure:

1. Load the unit as it will be during operation. On the load sensing parameters page, touch LOAD LEARN button to begin the load learning process. The button should read "LOAD LEARN ON".
2. Return to the unit base page and run the winch according to its intended operation, be sure to include the greatest speed, shortest acceleration/deceleration times, and highest/lowest positions that will be required under intended operation.
3. Return to the load sensing parameters page. Touch the LOAD LEARN button to turn load learning OFF. Verify the values now entered in the LOAD WNDW, LOAD MAX, and LOAD MIN fields.
4. Touch the LOAD SENSING button to turn load sensing ON. Return to the unit base page and run the unit again to verify that the parameters are adequate for normal operation. If load faults occur during normal operation (false/nuisance tripping), return to the load sensing parameters page and increase the value of the LOAD WNDW parameter.

SYSTEM PRESETS PAGE



From the system base screen, the SYSTEM PRESETS touchbutton opens the system presets page for the control system. The SYSTEM PRESETS touchbutton is password-protected; the operator must enter the user-level user name and password to access the system presets playback or record functions.

The indicator at the top right corner of the screen will be green and display the message ESTOP OK if the emergency stop system is healthy or be red and display the message ESTOP FAULT if an emergency stop button has been pressed.

The buttons on the left of this screen correspond to eight system presets. Each system preset contains a target for the selected winches in that

preset. To select a system preset, touch the desired preset selection button (SYS P-1 through SYS P-8). When selected, the system preset comment recorded with that preset will display at the top of the page. To see the contents of the selected system preset, touch the SYSTEM PRESET PREVIEW touchbutton. This will open the system preset preview page below.

SLCT	MOTOR	POS	TRGT	SPD
<input checked="" type="checkbox"/>	S1 ELECTRIC 1	6.79	18.00	30
<input type="checkbox"/>	S2 GEN PURP 2	16.59	16.59	30
<input checked="" type="checkbox"/>	S3 ELECTRIC 2	7.12	18.00	30
<input type="checkbox"/>	S4 GEN PURP 2	17.22	17.22	30
<input checked="" type="checkbox"/>	S5 ELECTRIC 3	5.25	18.00	30
<input type="checkbox"/>	S6 GEN PURP 3	19.59	19.59	30

There is a green indicator next to each unit that is enabled for this system preset. The positions of all units are shown in the column at the center of the screen and the targets for the units are shown in the next column. The column at the right indicates the speed of variable-speed units. System presets use each unit's default speed when recorded.

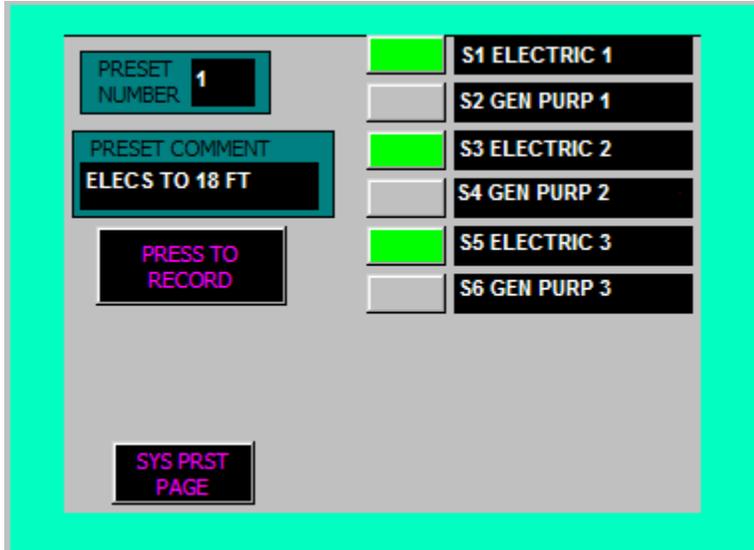
To run a selected system preset, return to the system preset base page and hold the GO TARGET button. The speed of the winches may be varied with the joystick, as described in single winch movement. You may monitor the actual positions and speeds of the winches by returning to the system preset preview

page during the move. Make sure that a spotter is watching the piece while you watch the screen!

NOTE: A system preset contains targets for all units in the control system. Before running a system preset, be sure that **all** of the units in the preset are clear to move. Make sure that the operator can see all of the sets being operated during the move. If the operator cannot see all of the units throughout their travel, spotters *must* be positioned where they can observe the move and have a reliable means of communication between the spotters and the operator.

SYSTEM PRESETS RECORD PAGE

From the system presets screen, press the PRESET RECORD button to load the system presets record page.



Since a system preset will record the current position of every unit as targets, the operator should first use each unit's base page to run the unit to the desired position. When all units are in position, navigate to the system presets record page.

To record a preset, first touch the field to the right of the ENTER PRESET NUMBER prompt. A numeric keypad will pop up. Key in a preset number (1-8), and press the ENTER (<-) key to enter it. Next, touch the field below the ENTER PRESET COMMENT prompt. An alphabetic keyboard will pop up. Use this keyboard to enter a preset comment (up to 16 characters), and press the ENTER key. Next,

touch the selection buttons next to the unit names to enable the desired units for this preset; these buttons will toggle on or off when pressed. Once the units have been enabled, touch the PRESS TO RECORD button. The prompt "ARE YOU SURE?" will appear below this button, along with YES and NO buttons. Touch the YES button to record the preset or the NO button to cancel the record operation.

Touch the SYS PRST PAGE button to return to the system presets page.

Appendix I: Troubleshooting

If a unit fails to operate, first check the unit's status page for information. See the status page section of this manual for details.

OTHER PROBLEMS:

In case of problems operating the system, the attached document "Troubleshooting Powered Equipment" (JR Clancy manual P359908) provides guidelines for troubleshooting. If trouble cannot be cleared using the steps outlined in this document, contact J.R. Clancy, Inc. directly.