



SureTarget™

Motorized Rigging Control System Operating Instructions

©2010 J.R. Clancy, Inc.

JRCLANCY Design, Manufacture and Installation of Theatrical Equipment Worldwide
(315) 451-3440 ■ Fax (315) 451-1766 ■ www.jrclancy.com
Rev 1: 26 February 2010

Table of Contents

	Spread/Page
Introduction	1
System Overview.....	2
CONTROL SYSTEM.....	2
System Components.....	2
EMERGENCY STOP SYSTEM.....	2
MOTOR STARTERS.....	2
LIMIT SWITCHES	2
End-of-travel limits	2
Limit switch types	3
CONTROL PANEL.....	3
SERVICE LIGHT	3
System Setup & Operation	4
RECORDING OFFSETS.....	4
RECORDING SOFT LIMITS	4
NORMAL OPERATION.....	5

Introduction

The SureTarget motorized winch control system offers targeting operation for a fixed-speed hoist or rigging winch. The control system is designed to enable the safe operation of the motorized winch. Before operating any stage equipment, all operators *must* be given the necessary training and then should work only under the direction of qualified supervisors. Stage equipment can be hazardous when improperly operated and maintained.

A number of principles guide the safe operation of rigging equipment- one in particular is worth reiterating:

WATCH THE PIECE!

Whenever a set is being moved, the operator must make sure that he/she can see the entire piece throughout its path of travel. If he/she cannot maintain a direct view of the unit throughout the move, he/she must locate spotters where they can see and be in clear, reliable communication with the spotters throughout the move. This level of vigilance is necessary to safely operate rigging equipment- always take a moment to make sure attention is paid to the important stuff - the moving iron, not flashing lights! **WATCH THE PIECE!**

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

- Learn the feel, sound, and even the smell of your equipment so that you will immediately sense when something is abnormal or incorrect.
- Study and abide by the capacities and capabilities of each system and its components.
- Thoroughly learn and practice the proper operating procedures.
- Before operating any equipment, inspect the equipment, surrounding area, and path of travel. Look for any existing conditions which may affect proper operation or which could be affected by proper operation. For example, is anything fouling the equipment or in the path of its intended travel?

Any problem noticed during setup or operation of the stage equipment should be corrected IMMEDIATELY. Someone's life could be at risk!

A routine maintenance schedule should be established and followed and appropriate records should be maintained. This should include emergency procedures in case of fire or injury that should be practiced with periodic drills.

In accordance with OSHA standard 29 CFR 1926.550, ANSI/ESTA standard E 1.4-2009 (where applicable), and the terms of J.R. Clancy's warranty, a qualified rigging firm must perform yearly inspections and correct any deficiencies discovered. These firms have personnel who are trained to spot both present and potential hazards. The routine maintenance they provide also prolongs the useful life of equipment and keeps it operating at peak efficiency for the easiest and quietest possible operation. Contact your J.R. Clancy dealer/installer or J.R. Clancy directly for more details.

System Overview

The SureTarget control system includes a pushbutton control station, motorized winch/hoist with limit switches and encoder, and electronic motor controls. With the control station, the system permits the operator to record targets (called “soft limits”), operate the winch to those targets, or stop at any position between the safe limits of travel.

CONTROL SYSTEM

The winch/hoist motor is connected to a set of electronic motor controls. These connections include wiring to the motor, motor brake, limit switches, and a motor-mounted encoder. The electronic motor controls for each unit are housed in an individual starter cabinet. This cabinet also includes a programmable logic controller (PLC), a small, dedicated-purpose industrial computer. The PLC gathers data from the electronic motor controls and issues commands to them. The system control panel that houses the operator controls may be located on the face of a remote control station or on the starter cabinet itself.

System Components

EMERGENCY STOP SYSTEM

The Emergency Stop system is operated through a red, latching, mushroom-head Emergency Stop (“E-STOP”) button on the control panel. All E-STOP buttons in the control system are wired in a series loop; pressing the button will break the loop and signal an emergency stop condition.

Pressing an E-STOP button will immediately stop the motor by removing control power to the starter cabinet and signal the PLC that an emergency stop condition exists. The E-STOP button latches when pressed; to release the E-STOP button, turn the button one-quarter turn clockwise (as indicated by arrows on the button) and allow the button to pop out.

MOTOR STARTERS

Each winch includes a fixed-speed starter, which contains circuit protection and electronic motor control devices. The starter controls the mains power feed to the motor and monitors the current flow to the motor, providing both instantaneous shutoff in case of a short circuit and thermal protection against motor in case of a motor overload.

LIMIT SWITCHES

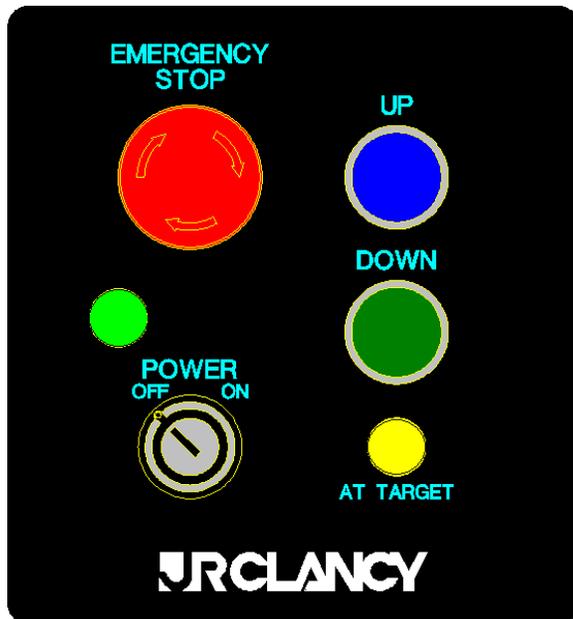
End-of-travel limits

The equipment is fitted 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 cause the starter control power be cut off, preventing all motion of the equipment.

Striking an overtravel is an abnormal situation! A careful inspection of the equipment must be conducted to determine why an overtravel limit switch was activated and the situation safely rectified. A specific maintenance procedure is required to restore normal operation.

Limit switch types

Limit switch functions can be accomplished either with 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, using a tooth-like bump to strike 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).



CONTROL PANEL

The SureTarget control panel is the main point of user control and contains the following items:

POWER – A key switch used to power the control system on or off. The key switch also has an unlabeled, momentary third position used for system programming. The key can only be removed from the OFF position.

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

UP and DOWN – Momentary (hold-to-run) push buttons used to execute an action, such as move UP or DOWN, and facilitate system programming, discussed below.

AT TARGET indicator – This amber indicator lights when the winch is at a programmed soft limit position.

SERVICE LIGHT

Every rigging system should be inspected regularly to verify it is in safe operating condition. An amber LED labeled “SERVICE” (not shown above) will illuminate one year after system startup as a reminder to have a safety inspection performed on the equipment and rigging system. A J.R. Clancy authorized service representative will be able to reset the service light timer at the completion of inspection and maintenance.

System Setup & Operation

RECORDING OFFSETS

After mechanical and electrical connections are complete, the installer/operator must record the stopping distance(s) required for the equipment, referred to as an “up offset” or “down offset”. Recording offsets ensures the equipment will stop reliably at the programmed positions. Typically, the up and down offsets only need to be set once, during this initial system setup. To record the offsets, the operator must first move the equipment to a point near its mid-travel. Since no soft limits have been set at the initial system setup, they may be bypassed to allow the equipment to move freely inside its safe limits of travel. Simply hold the POWER key switch in the momentary third position and press/hold UP or DOWN appropriately to move the equipment to its mid-travel position.

1. Next, press and latch the E-STOP button and hold the POWER key switch in the momentary third position.
2. While the key switch is held, press and hold the UP button. Press the DOWN button six (6) times.
3. Release the POWER key switch to the ON (middle) position and release the UP and E-STOP buttons.
4. Push and hold the UP button until the equipment is moving steadily at its rated speed (3-5 seconds).
5. When the equipment is moving at speed, release the button and wait ten (10) seconds. The up offset value will be calculated and stored by the PLC.

To record the down offset, repeat the above procedure, moving the winch down (step 4) instead of up. At the end of the down move (step 5), wait ten (10) seconds for the down offset to be calculated and stored by the PLC.

RECORDING SOFT LIMITS

An operator may record a position as one of the four soft limits, referred to below as “soft lower”, “lower intermediate”, “upper intermediate”, or “soft upper” limit. This is done in snapshot fashion by first moving the equipment to the desired position, then recording the position as a soft limit. All four should be recorded at system startup for easy system operation, and any or all may be changed later using the procedure below.

If the desired position is above the soft upper limit, or below the soft lower limit, the soft limits may be bypassed as described below. To bypass the soft limits, turn the key switch to the momentary third position and hold while pressing the UP or DOWN pushbuttons. In this mode, the equipment may be run between the up and down normal end-of-travel limits. If the desired position is between the soft upper and soft lower limits, the equipment may be run normally as described in “Normal Operation” below. Once the equipment is at the desired position, that position may be recorded as a soft limit:

1. Press and latch the E-STOP button and hold the POWER key switch in the momentary third position.
2. While the key switch is held, press and hold the UP button.
3. Press the DOWN button as follows:
 - a. One (1x) time to record the soft upper limit,
 - b. Two (2x) times to record the upper intermediate limit,
 - c. Three (3x) times to record the lower intermediate limit, or
 - d. Four (4x) times to record the soft lower limit.
4. Release the POWER key switch to the ON (middle) position and release the UP and E-STOP buttons.
5. The AT TARGET light will illuminate to indicate the position was recorded as a soft limit.

NORMAL OPERATION

For normal operation, turn the key switch to the ON position and ensure the E-STOP button is released. After verifying a safe path of travel and a clear view of the equipment, press and hold the UP or DOWN button to move the set.

If the UP or DOWN button is released at any point, the equipment will stop. The equipment will also stop when it reaches the next soft limit, indicated by the AT TARGET indicator. To continue moving, release the pushbutton, then press and hold it again. The equipment will continue to the next soft limit.

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.