

SECTION 11071
MOTORIZED RIGGING SPECIFICATION

GENERAL

1.01 SCOPE

- A. This specification covers the fabrication, furnishing, delivery, and installation of a PowerLift motorized rigging system. The Rigging Contractor shall provide a complete, fully functional system as described herein.
- B. Related Work: Related work which is not included in this section:
 - 1. Head and loft block beams, ladders, catwalks, and all other structural steel and miscellaneous metals not specifically called out as part of this section.
 - 2. Electrical connections, conduit, boxes, and wiring of any type.
- C. The Rigging Contractor shall be an authorized PowerLift dealer, such as Janson Industries, Canton, OH (800-548-8982)

1.02 SUBMISSIONS

- A. Drawings: Submit component and installation drawings and schedules showing all information necessary to fully explain the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation. They shall be approved by the Architect before beginning any fabrication, installation, or erection.
- B. Instructions: Upon completion of the work, submit three copies of a detailed Operating and Maintenance Manual including as-built shop drawings, equipment descriptions, and parts lists. The Rigging Contractor shall go through the manual with personnel designated by the owner to demonstrate and explain the maintenance and operation of the systems.

1.03 WARRANTY

- A. The PowerLift motorized rigging system shall be provided with a three year written guarantee against defects in materials or workmanship that goes into effect on the date of system acceptance by the Owner's representative.

PRODUCTS

1.04 MANUFACTURERS

- A. PowerLift motorized rigging systems are manufactured by:

J.R. Clancy, Inc.	Phone: 1-800-836-1885, 315-451-3440
7041 Interstate Island Road	Fax: 315-451-1766
Syracuse, New York 13209	www.clancypowerlift.info

- B. The manufacturer must have a product testing program, including determination of recommended working loads for products based on destructive testing by an independent laboratory and review by an independent licensed engineer.
- C. The rigging equipment manufacturer must have a quality management system registered to the ISO 9001:2000 standard.
- D. The manufacturer must carry primary product liability, general liability, and errors & omissions insurance of \$2,000,000 each, and excess liability of \$10,000,000. A statement from an insurance company showing these coverages shall be required.
- E. Approval to bid does not release the manufacturer from meeting requirements listed above.

1.05 POWERLIFT WINCH:

A. General

- 1. The PowerLift shall have a compact design with all required components integrated into its structure. To allow easy mounting horizontally or vertically on beams with up to 12' centers, it shall incorporate a structural backbone with adjustable steel mounting clips.
- 2. The drum shall move along its axis as it rotates so that there is a zero degree fleet angle between the cable takeoff points on the drum and the head block sheaves incorporated in the winch.
- 3. All components shall be designed to properly support the required loads.
- 4. Characteristics: The winch shall have the following characteristics:
 - a. Available Speeds: 20 fpm fixed speed, 0 – 120 fpm and 0 – 180 fpm variable speeds, with the highest capacity model being able to lift 2,000 lbs.
 - b. Travel: 65'
 - c. Lift Lines: 7 @ 3/16" diameter 7X19 galvanized aircraft cable

B. Gearmotor and Brake:

- 1. The motor, primary brake, and gearbox shall be an integrated unit from a single manufacturer. For enhanced reliability a continuous shaft shall carry the brake, motor armature, and the first stage pinion gear without the use of couplings.
- 2. Motors shall be totally enclosed fan cooled (TEFC) per NEMA MG1.
- 3. The gear reducer shall employ helical gearing. The gear case shall be cast iron for protection against shock damage. The output shaft shall have triple lip oil seals to prevent leaks.
- 4. The integral electro-magnetic brake shall be spring applied and electrically released, with minimum retarding torque equal to 200% of motor full load torque.

C. Drum & Sheaves

- 1. The drum shall be helically grooved to accept a single layer of cable accommodating the entire travel distance plus three dead wraps per cable.

2. Cables shall enter the drum through key slots and be retained by a Nicopress™ stop sleeve.
 3. Chase rollers shall be provided to keep lift lines in their grooves.
 4. The pitch diameter of all drums and sheaves shall meet or exceed the wire rope manufacturer's minimum recommended D/d ratio. Wire rope groove profiles shall meet the recommendations of the Wire Rope Technical Board.
 5. Sheaves shall be Nylatron® or Polyamide Nylon (PA6-G). The groove shall be deeper than the cable diameter for protection. The sheave shall be equipped with a 12 mm diameter machined steel shaft and two sealed, precision ball bearings.
- D. Load Brake: For added security the PowerLift shall incorporate the SureBrake™, a Weston style load brake located on the output shaft of the gearbox. This brake is self applied, controlling the load in a manner that prevents runaways and shock loads.
- E. Limit Switches
1. Positively driven mechanical limit switches or solid state encoders shall be provided for normal end of travel indication.
 2. Positively driven mechanical limit switches shall be provided for overtravel indication. Actuation of an overtravel limit switch shall positively disconnect power from the winch, using a "failsafe" circuit.
- F. Motor Controllers:
1. For fire and electrical safety, motor controllers conform to the NEC, are built in accordance with UL Standard 508, and are "touch safe" per IEC 204-1 "Protection against direct contact" rules.
 2. Controllers are wired so that operation of the normal end of travel limit switches shall only allow movement away from the limit switch.
 3. The E-stop and overtravel limit switches shall be part of a circuit which is separate from and redundant to the normal end of travel limit switches. Operation of an E-stop or overtravel limit switch directly disconnects power from the winch(es), applies the primary brake(s), and shall not allow further movement in either direction. An override mechanism to allow resetting of the overtravel limits shall be included.
 4. Variable speed controllers shall be solid state flux vector controllers designed for hoisting duty. Each controller shall incorporate closed loop feedback using a solid state position encoder mounted on the motor shaft to provide the greatest accuracy and performance. The controller shall provide an essentially infinite speed range, including the ability to produce full torque at zero speed. The use of open loop drives is prohibited.
 5. Controllers shall provide under voltage, over voltage, instantaneous over current, overload, and phase loss protection.

- G. Installation supervision and commissioning of the motorized rigging system shall be performed by a factory authorized and trained technician.

1.06 SCENECONTROL™

- A. The SceneControl is specifically designed for the control of theatrical rigging equipment. The control system shall be built from standard, off the shelf industrial grade Programmable Logic Controller (PLC) components or an industrial grade PC selected for long term, reliable operation under the conditions and environment at the site. "Home" computers are not acceptable for overhead motion control.
- B. Operations:
 - 1. Manual Control: The system shall allow the selection of one to six motors for control. Selected motors may be controlled directly using manual "GO UP" and "GO DOWN" controls, or they may be directed to target positions selected numerically with the on screen keyboard.
 - 2. Cue Control: Motor speeds and target positions can be composed, stored, modified, and recalled in the form of cues. Each cue shall control up to six motors, each with an individual direction, speed, and target position.
 - 3. Groups: Several motors may be grouped together for synchronized operation. During group movement, the system shall track the positions of all of the motors in the group and shall make any required correction to keep the group synchronized. Operation of individual motors in the group is allowed only for trimming functions.
 - 4. The system shall monitor the load on each winch and stop motion in the event of an overload or underload.
 - 5. The system shall include password-protected access, with separate levels for user, supervisor, and setup functions.
- C. Operator Interface:
 - 1. The SceneControl graphic user interface shall be provided for ease of operation. For reliability, this shall be an industrial grade video touch screen that includes a winch controller; cue creation and editing; and a display of the current position and target position of each winch. The user shall be able to view the status of each winch, including running hours and fault indications.
 - 2. Two cue controllers shall be provided, each with a compact industrial joystick and pushbuttons. Joysticks shall provide velocity adjustment of movements in progress.
 - 3. All direct control of motion shall be through joysticks and illuminated pushbuttons. "Deadman" operation is required, so that the operator must be at the console and pressing a button for motion to continue. Systems that allow motion to occur with no operator presence are not acceptable.
 - 4. A mushroom head "EMERGENCY STOP" button and an "ON/OFF" key operated switch shall be provided on the control console.

5. The console shall be height adjustable.
- D. All hardware components shall be industrial grade equipment designed for use in a typical theatre environment. These components shall be widely available on an international basis to ensure ease of replacement and maintenance.

1.07 PUSH BUTTON CONTROLS (OPTIONAL)

- A. Control Stations:
 1. Control stations shall be wall mounted NEMA 1 enclosures, containing hold to operate (dead man) Up and Down pushbuttons for each winch. A key operated On / Off switch shall be provided. A red, mushroom head emergency stop pushbutton shall be provided, which directly controls the line contactor in the starter.
 2. Panel components (pushbuttons, key switches, switches, indicators, E-stop switches, and the like) shall be industrial grade, heavy-duty components.

END OF SECTION

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