creative conners, inc.

Spotline Reference Manual

Version 1.3

Spotline Reference Manual

1 – Getting Started

Congratulations on your purchase of the **Spotline** hoist from Creative Conners, Inc. **Spotline** is a hoist designed to meet the demands of scenic automation in vertical applications.

This manual will direct you through:

1. Unpacking
2. Installing & testing
3. Operation procedures

If you need help along the way contact us either on our website (www.creativeconners.com), via email (support@creativeconners.com), or by phone (401.289.2942)

A word about safety

The **Spotline** hoist is a versatile and powerful machine for moving scenery and performers in a vertical application. With the addition of the Spotline Tensioner, the Spotline hoist can become a formidable deck winch. Such power requires a great deal of respect and attentiveness as the repercussions could be hazardous to the equipment and more importantly people. Proper rigging techniques should be understood and practiced when installing, rigging, and operating the **Spotline**.

The Spotline conforms to ANSI E1.6-2012 Entertainment Technology – Powered Hoist Systems. It is built with redundant brakes, redundant limit switches, and when used with the Stagehand Pro, can detect an overspeed condition and safely stop the hoist if the motor or encoder fail to operate properly. Lifting scenery directly above people is inherently dangerous. Even though the Spotline has been rigorously engineered by Creative Conners and reviewed by third-party engineers, you should take every reasonable precaution to keep performers and technicians safe on stage. During a full-speed, downward movement, the sensing technology in the Stagehand Pro control may take several inches to recognize that an overspeed condition has occurred and stop the hoist.

Consider a cue that is supposed to lower 500 pounds of scenery and stop just an inch above a performer's head. If the encoder, the sensor that measures the distance the hoist has traveled, fails right before the hoist reaches position the hoist will overspeed for several inches before the safety circuitry detects the problem and triggers both brakes on the hoist for an abrupt stop. Even though the possibility of this particular failure is incredibly small, the tolerance for failure is zero since a failure would result in serious injury or death. Is this risk avoidable? Of course, simply re-block the action on stage so that the performer is not standing underneath the moving load.

The risk analysis outlined above should be considered anytime you are moving scenery that could pose a danger. The ANSI Specification mentioned above has an excellent section describing a formal process for risk analysis. It is not a magical process, rather it relies on competent people discussing the possible risks in the performance and ways to reduce those risks. **For general use, we recommend never moving a load that is suspended directly above people.** The risk of equipment failure is small, but the result of such failure would be terrible and can be almost always easily avoided with good planning. When the load is stopped, it is very safely held in place by two mechanical, spring-set, fail-safe brakes. The risk grows greater once those safety brakes are released and the load begins to move. If you have a performance that requires moving a load directly above people, please contact us so that we can assist in the risk analysis and engineer a solution with you to keep your production safe.

The Spotline conforms to ANSI E1.43-2016 Entertainment Technology – Performer Flying Systems. It is built with redundant brakes, redundant limit switches, and when used with the Stagehand Pro, can detect an overspeed condition and safely stop the hoist if the motor or encoder fail to operate properly. When using the Spotline to lift performers every precaution must be taken to ensure the safety of the performer and to mitigate the effects of a Category '0' Stop. For instance, if a performer weighing 125lbs is traveling at the maximum speed will result in force on their harness & body of 569lbs.

The best approach to mitigate these issues is to consult a Performer Flying Specialist.

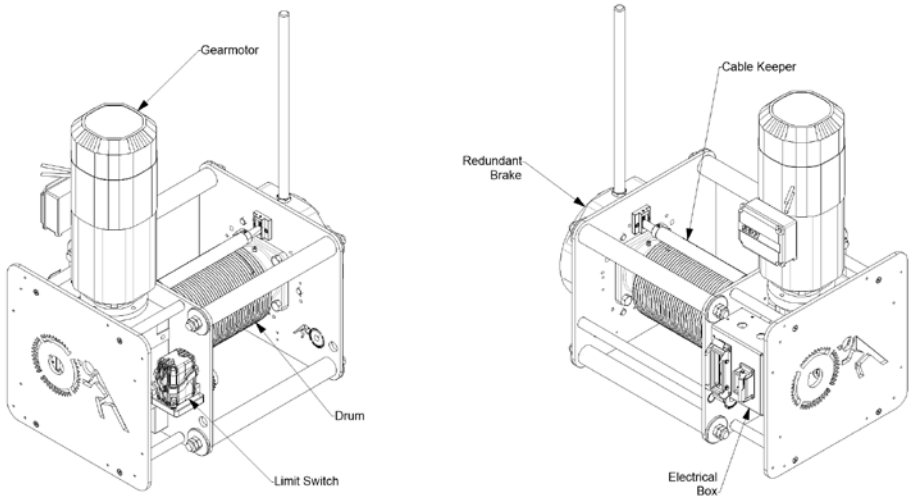
Spotline Overview

Spotline hoists are designed for vertical lifting applications. The **Spotline** is constructed to be rugged and versatile allowing the user to mount the **Spotline** in multiple orientations. The **Spotline** is equipped with a redundant safety brake and a four position limit switch. The Spotline has a maximum lifting capacity of 500 pounds with a maximum speed of 3 feet per a second.

The **Spotline** hoist is constructed to be easy to use and tough enough to withstand the rigors of any show or venue. All **Spotline** hoists come equipped with the following components (shown in Figure 1.1):

- Gearmotor with integrated brake and encoder
- Redundant brake
- 8” grooved drum
- Delrin cable keeper
- 4-Pole rotary limit switch
- Electrical Box

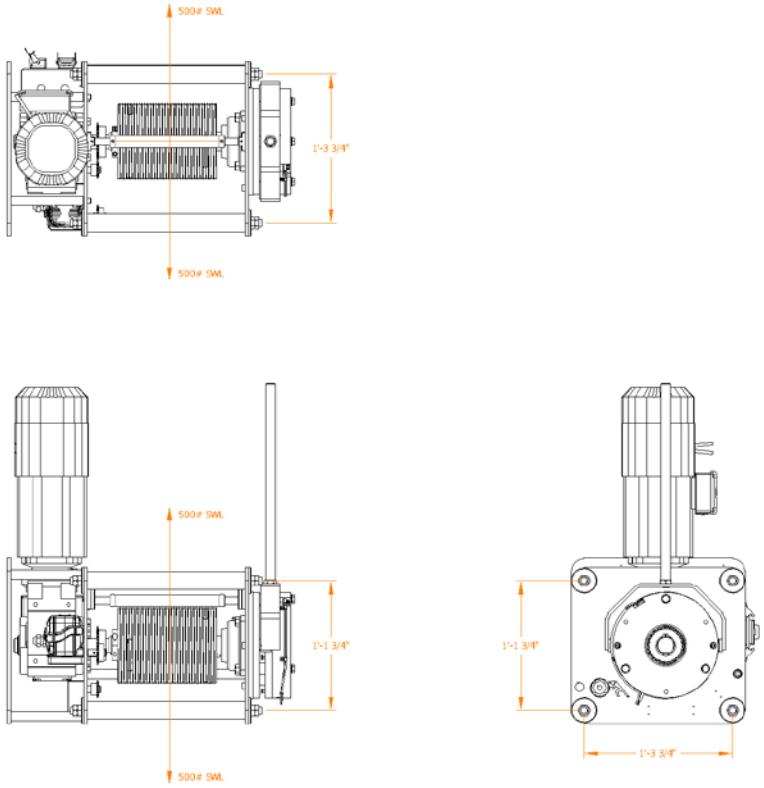
Figure 1.1



Installing Spotline

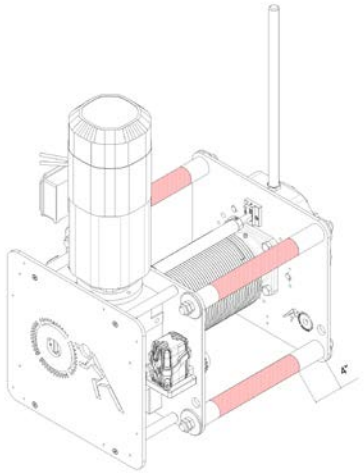
Mounting the Spotline

Figure 1.3



The **Spotline** is designed to be mounted in multiple configurations. The cable can enter and exit the frame on all sides. The **Spotline** is designed to be mounted with 4 cheeseboros (2 on each cross pipe), it is important to follow the guidelines pictured in Figure 1.4 in which the cheeseboros are spaced within the dictated area. The distance between the edge of the cheeseboro and the nearest side plate cannot exceed 4" (see Figure 1.4). The cheeseboros require a minimum safe working load (SWL) of 1100 pounds, Creative Conners Inc. recommends the use of The Light Source's Mega Coupler. **The Spotline cannot be supported in the middle of the cross pipe.**

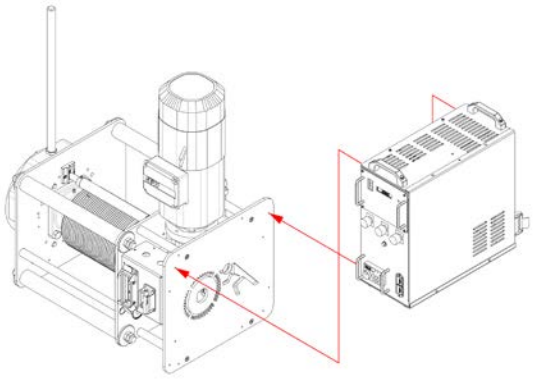
Figure 1.4



Mounting the Stagehand Pro AC to the Spotline

The **Spotline** is designed to allow the user to mount the **Stagehand Pro AC** to the machine allowing for a compact package. Mounting the **Stagehand Pro AC** to the **Spotline** requires four (4) .25 X .75 Socket Head Cap Screws, McMaster #91251A540. See drawing below to mounting directions.

Figure 1.5



Connecting the Spotline to a Stagehand AC Pro

Prior to attaching the **Spotline** to a piece of scenery, it is important to confirm proper operation. To test the **Spotline's** operation you will need a **Stagehand Pro AC** motor controller

(refer to your **Stagehand Pro AC** manual for installation instructions. With the **Stagehand Pro AC** installed, make the following connections between the **Spotline** and **Stagehand Pro AC**:

1. Connect the control connector to the **Stagehand AC Pro**.
2. Connect the motor and brake connector to the **Stagehand AC Pro**.
3. Using a network cable (RJ45 Cat5), connect the **Ethernet socket** to an Ethernet hub.
4. Using a **Showstopper cable** (5-pin XLR) connect the **Showstopper** to the **E-Stop** inlet on the **Stagehand AC**.
5. After completing the steps outlined above follow the Preinstall Inspection Checklist on Page 11.

Testing Brake Functionality

The **Stagehand Pro AC** is equipped with a brake testing feature. This feature allows the end user to check the functionality of both brakes, motor and redundant brake. It is vital to perform this test on a regular basis, for directions on operating the test please refer to the **Stagehand AC Pro manual.**

Testing a motor

To confirm that your motor is properly connected to the **Stagehand Pro AC** you should test these conditions:

1. *E-Stop* – Release the E-Stop button on **Showstopper**. You should hear a “click” from inside the Stagehand, this is the E-Stop contactor closing. The LCD display should show that the E-Stop is released by switching the status display to:

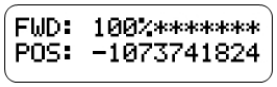
Figure 1.11

“Not Connected” indicates that the Stagehand is not communicating with a computer running **Spikemark**.

2. *Brake release* – Press the **fwd** jog button. You should hear a distinct “click” from your redundant brake quickly followed by the motor brake. This is the sound of the

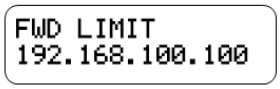
brake releasing. Release the **fwd** job button. You should hear a click of the brakes engaging.

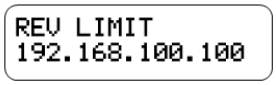
3. *Motor Motion* – Press the **fwd** jog button and slowly turn the knob clockwise. The motor should begin moving. Turn the knob counterclockwise to slow the motor to a stop, then release the jog button. Repeat with the rev jog button.
4. *Encoder* – When jogging the motor the LCD will display the encoder counts. While jogging the motor verify the counts are increasing while running in the forward direction and decreasing while running in the reverse direction.



5. *Limit Switches* – Manually activate the ultimate forward limit and the forward limit then activate the ultimate reverse limit and reverse limit. The LCD display on the Stagehand should indicate when a limit is detected.

Figure 1.12

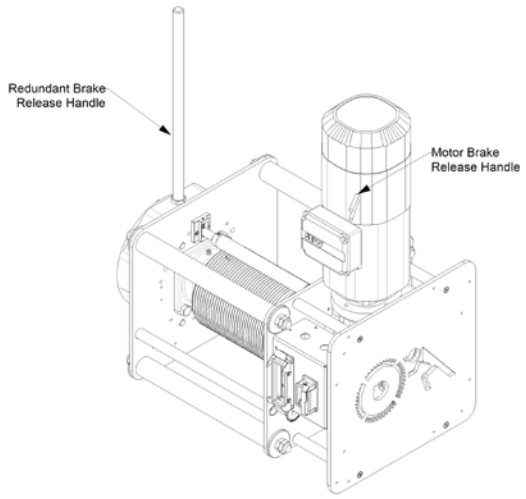




Manually Releasing the Brakes

Both the motor and redundant brake can be manually released if required by the user. The release handle for the motor brake is stored on the motor and is screwed into the slot on the top of the motor. The release handle for the redundant brake is attached to the hoist side plate closest to the motor. This handle threads into the yoke on the redundant brake. See figure 1.13 for clarification on the handles after installation.

Figure 1.13



2 – Rigging a Spotline

Setting the Limits

Before you can rig the **Spotline** in any configuration, you need to know how to adjust and set the limits. The **Spotline** includes four (4) limits: FWD-ULT, FWD, REV & REV-ULT limits. All four limits are adjusted from the rotary limit switch mounted to the **Spotline** frame. The limits should be used as Overtravel Limits. During normal cue control operation the limits should not be struck, they are intended to halt motion if there is a failure.

The rotary limit has 4 layers, each layer includes a CAM lever and a micro-switch to activate the individual limit. When the **Spotline** is moving in REV the limit stack is rotating **Clockwise.** The limit stack rotates **Counter Clockwise** when moving FWD.

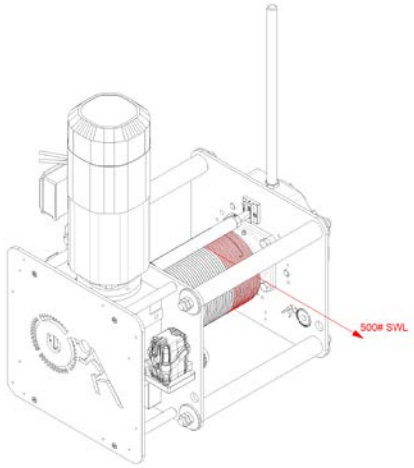
To adjust the limits, remove the cover to expose the limit switch stack. You will see 5 screws on the top of the stack. The center screw is the locking screw, which locks the layers in place relative to each other. The four smaller screws around the outside are used to adjust each of the individual switch CAM's. Each adjustment screw has a number next to it, which corresponds to which layer it adjusts. Turning the adjustment screw CW will move the CAM CW.

Before moving the machine, it is advised to open the rotary limit box and confirm the CAM's are all positioned correctly to allow enough movement to rig the winch. Because we will be rigging the drum by jogging the machine in REV, both the REV and REV-ULT CAM's should be located "above" the micro switch column. The FWD and FWD-ULT CAM's should be "below" the switch column.

Single Point Hoist Rigging

After you have assured the **Spotline** is functioning properly, the **Spotline** can be rigged. The **Spotline** can have the cable enter and exit from all sides of the drum. It is important the cable keeper is mounted as close as possible to the cable exit path to allow for the correct cable entrance and exit. The directions below will guide you through rigging the **Spotline** for a single point pick. The figure below is a schematic drawing of the rig.

Figure 2.1



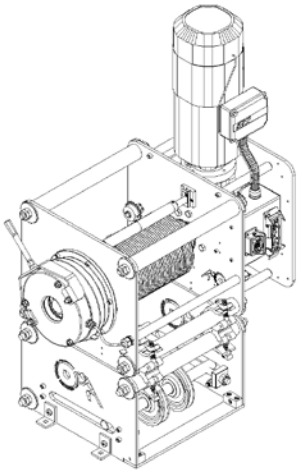
1. Place a spool of 7X19 ¼”wire rope next to the **piece of scenery that will be lifted by the hoist.**
2. Run the end of the cable through all of the necessary pulleys and into the hoist**. The fleet angle of the wire rope off the drum cannot exceed 2 degrees.**
3. Run the wire rope through the hole drilled in the drum on the “brake side”. Terminate the wire rope with a NicoPress stop sleeve in the drum. Use the termination as per the manufacturer’s guidelines.
4. Using the **Stagehand Pro AC**, slowly move the motor FWD with the manual jog controls. The cable should begin to wind up onto the drum. Note: Keep tension on the cable throughout this process.
5. Take a minimum of 3 safety wraps on the drum.

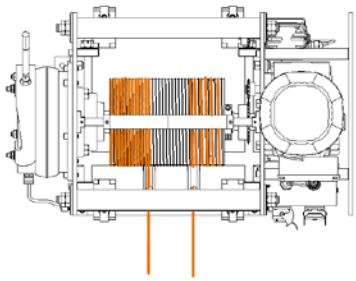
6. Decide how much extra travel is needed when piece of scenery would need to be at its lowest position possible and add those wraps. (1 Wrap = 25”).
7. Cut the wire rope from the spool and now attach it to your piece of scenery.
8. Using the **Stagehand Pro AC** slowly move the piece of scenery to its highest position to ensure the cable piles on the drum properly.
9. With your piece of scenery in its highest safe position set the Ultimate FWD limit.
10. Then move your piece to the highest you would move it on a daily basis and set the FWD limit.
11. Fly the piece of scenery in to its lowest safe position and set the Ultimate REV limit.
12. Then move your piece to the lowest you would move it on a daily basis and set the REV limit.

Your **Spotline is now ready to FLY!**

Deck Winch

The **Spotline** can be easily rigged as a deck winch with the addition of the **Spotline Tensioner**. Although it is not required, it is best practice to follow the same brake and limit testing procedures when using the **Spotline** as a deck or track winch. Once you have assured the **Spotline** is functioning properly, the machine can be rigged. When rigged as a deck winch with the **Spotline Tensioner**, both ends of the line will feed through the **Tensioner** and terminate to the drum. The directions below will guide you through the process of rigging the **Spotline** and **Spotline Tensioner** for use as a deck or track winch. The figure below is a typical schematic view of the rigging.





1. Install the Spotline Tensioner with 4 (four) cheesebouroughs.
2. Confirm tensioner pulley assembly is run fully to the side of the **Tensioner** with the flat stock (the exit position)
3. Place the spool of 7x19 aircraft cable in front of the **Spotline** on the Gearmotor side.
4. With the spool of cable able to spin freely, feed the end of the wire rope through the system.
    a. Do not forget to install the **Dog** while at this time.
5. With the free end of the rope run through the system and back at the **Spotline,** feed it through the tensioner pulley, and terminate it inside the *BRAKE* side of the **Spotline** drum.
    a. Terminate the wire rope in accordance with the manufacturer's specification.
6. Jog the **Spotline** in REV to begin spooling cable onto the drum, so you end up with three (3) dead wraps on the drum.
    a. The cable should wind into the grooves and under the cable keeper.
7. Continue wrapping the drum with cable until you have added enough cable to complete your move
8. Continue spooling on four (4) additional wraps.
    a. This will give you your remaining three (3) dead wraps along with a little extra insurance

9. Unspool and cut enough wire rope to run through the remaining tensioner pulley and to terminate through the motor end of the drum.
10. Feed the free end through the drum and terminate inside the drum.
    a. Remove as much slack as possible when making this termination.
    b. We find it easiest to use a Fist Grip cable grip for this termination.
    c. Trim any excess wire rope
11. Slide dog along the wire rope, a minimum of 6'-0".
12. Using the 2 tension nuts, take us as much slack as possible by hand.
13. Jog the machine FWD until there are 3 dead wraps on the motor side of the drum.
14. Adjust the position of the dog and lock it to the wire rope with the four set screws.
    a. At this point you will only be able to jog the **Spotline** FWD to maintain the 3 wrap minimum on the drum.
15. Using an 1-1/8" wrench take up as much tension as possible between the 2 tensioning nuts.
    a. The pulley shaft should be kept as parallel as possible with the drum.
16. Jog the **Spotline** to the max FWD travel position.
17. Remove the limit box cover
18. Loosen the center locking screw half a turn.
19. Adjust both the FWD and FWD-ULT cams to the BOTTOM of the switch stack.
    a. The FWD cam should be just activated in this position. The FWD-ULT is just behind it.
20. Tighten the locking screw.
21. Jog the **Spotline** to the max REV travel position and loosen the center locking screw.
22. Adjust both the REV and REV-ULT cams to the TOP of the switch stack, following the same guidelines as above.
23. Tighten the locking screw
24. Test the limits by jogging the machine, adjust as necessary.

Your **Spotline** and **Spotline Tensioner** are now ready to roll!

3 – Inspection Checklists

The following is a checklist to inspect the **Spotline** prior to rigging. It is necessary to perform the checklists detailed below to ensure all components of the **Spotline** are operating correctly. If any component fails the test do not use the **Spotline** and consult Creative Conners Inc.

Pre-Install

The following items should be inspected each time the Spotline is installed.

Mechanical

- Gearmotor Key Engaged
- Drum Key Engaged
- Brake Key Engaged
- Gearmotor Retaining Ring Installed
- Brake Retaining Ring Installed
- Set Screws on Drum are tight
- Chain tension is correct on Limit Switch
- Drum Grooves are not damaged or crushed

Electrical

- Spotline runs correctly in Manual Jog mode
- Stagehand Pro displays encoder counts while jogging
    - Counts must increase when jogging FWD
- Ultimate FWD, FWD, Ultimate REV, and REV limits operate correctly
- Run Brake Test Sequence
- LCD displays encoder counts correctly

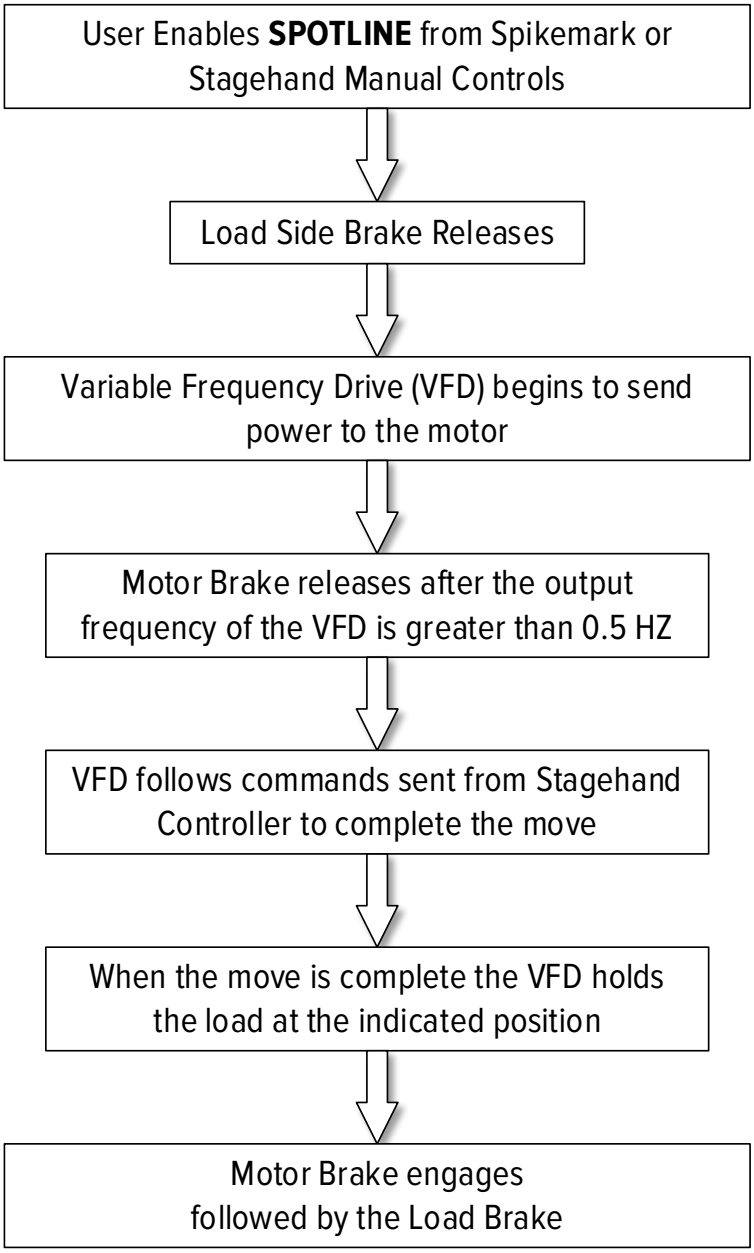
Preshow

The following items should be checked each day the hoist is in service.

- Run brake test sequence
- Check Forward Limit
- Check Reverse Limit
- Ensure encoder is counting correctly
- Confirm cable is wrapping onto drum correctly

4 – Spotline Operation

Below is a flow chart for proper **Spotline** operation. It is important for the end user to understand and recognize the normal sequence of operation to be able to quickly recognize problems.



5 – Troubleshooting

Though the combination of **Spotline**, **Spikemark, Stagehand Pro AC**, and **Showstopper** strives to make automation easy, there are certainly times when things don't work. This part of the guide will give you some earned advice about what to culprits to look for when motors refuse to move.

Motor is jerky.

Ensure that both brakes are disengaging.
Run the auto tune process outlined in the Stagehand Pro AC manual. Adjust the tuning parameters in Spikemark (see Spikemark manual). Stagehand Pro AC displays "Brake Fault"
Ensure the motor/brake cable is plugged in.
Call Creative Conners Inc.

When trying to move the Stagehand Pro AC displays "Drive Fault"

Ensure that the motor and brake connector is plugged in
Ensure that the control cable copnnector is plugged in
Call Creative Conners Inc. with the fault code displayed on the Mitsubishi keypad.

Cable does not wrap onto the drum correctly or makes a "crunchy" sound

Check the fleet angle of the cable. You might need to move your closest pulley further away to decrease the fleet angle, the maximum fleet angle is 2 degrees.

Limit Switch is not activating

Ensure the limit switch is accurately adjusted

Ensure the limit switch chain has tension, if tension needs to be adjusted adjust the 3/8" bolt on the chain tensioner block to increase tension.

6 – Technical Support

Though we try our best to produce reliable products and clear instructions, there may come a time when you need personal support.

Email

Most questions can be answered quickly via email. Please send any technical questions to support@creativeconners.com and one of our support team will quickly respond.

Phone Support

You can call our technical support at 401-289-2942 Monday-Saturday from 8am – 6pm EST. Phone support is free for 90 days, after that a rate of $30/hr. applies to support calls.

Web Support

There is an active user sone of our support team will quickly respond.upport forum on our website.
http://www.creativeconners.com/phpBB2/index.php

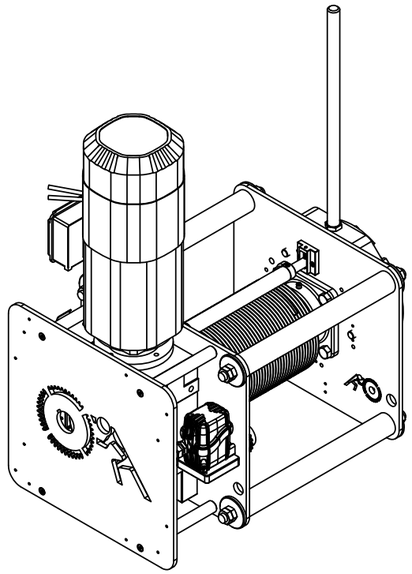
7 – Specifications

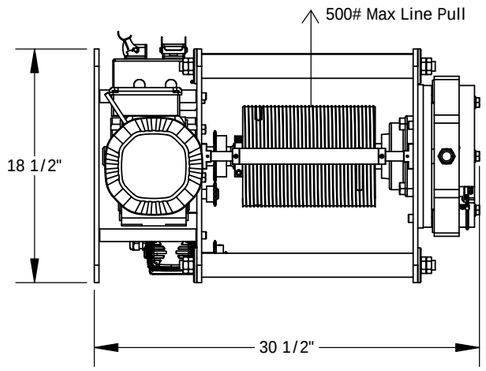
Specifications

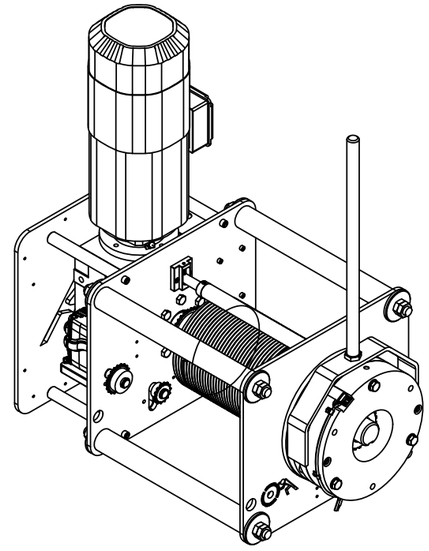
INPUT VOLTAGE	230V 60HZ, 3 PHASE	460V 50HZ, 3 PHASE
MAX INPUT CURRENT	13.6 amps	7 amps
MOTOR BRAKE INPUT	200-240VAC	200-240VAC
LOAD BRAKE INPUT	200-240VAC	200-240VAC
MAX LIFT	500 lbs.	226 kg.
MAX LINE SPEED	36”/sec.	914mm/sec
REQUIRED WIRE ROPE SIZE	¼”	¼”
MAX WIRE ROPE CAPACITY	70’	21.3m

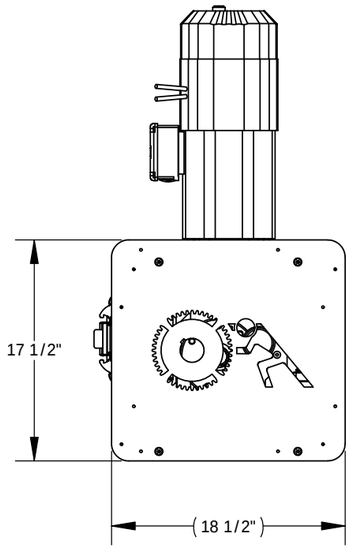
Physical Specifications

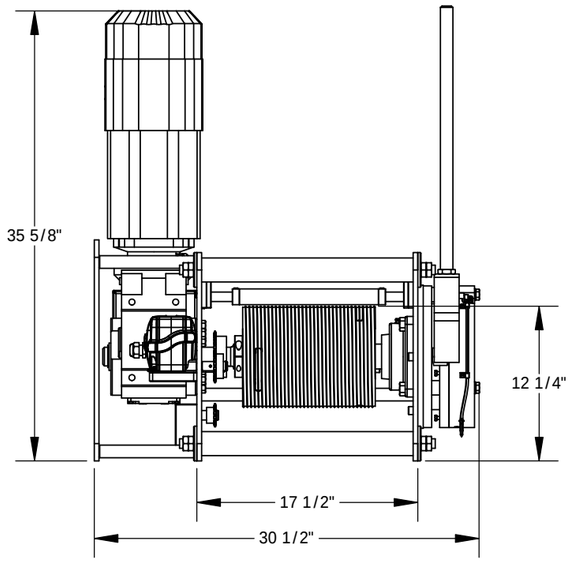
See attached drawing

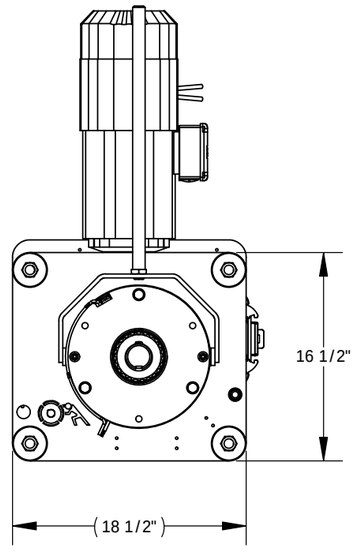












1 SL16 Spotline Overview
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Hoist Data	
Gearmotor Model	KA67DRE100LC4BE5HR/ES7C
Gearmotor Current Rating	13.6 AMPS
Gearmotor Voltage Rating	230 VAC, 60 HZ
Output Torque	3450 in-lb
Output RPM	90 RPM
Secondary Brake Model	Mayr Type 896.105.30 size 500
Secondary Brake Model	
Secondary Brake Capacity	500 NM
Rated Line Pull	500 lbs
Line Speed	36 in/sec

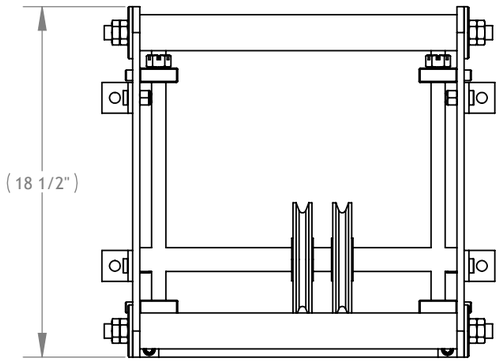
creative conners, inc.
84 cutler st. #7 | warren, ri 02885
401-289-2942

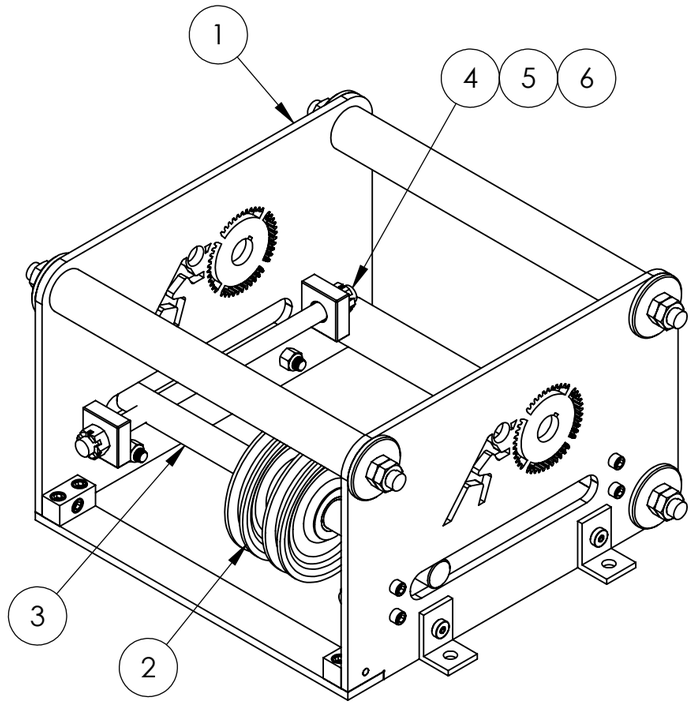
Spotline
Spotline Overivew
Scale: as noted
Drawn on: 2/6/2013
Revised on: -

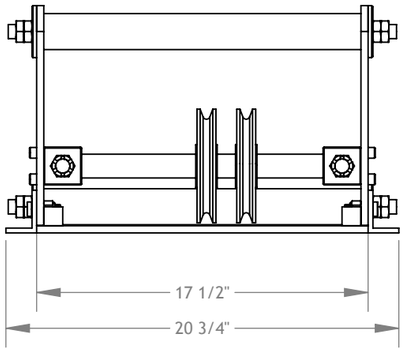
tolerances:
X/X : ±1/16"
.xx : ±0.010
.xxx : ±.003

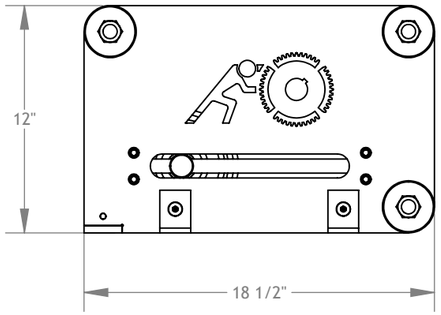
SL16

REVISIONS			
Rev.	Drawn	Date	Revisions









1/ST1 Spotline Tensioner Overview
scale = 1:8

Item #	Detail Number	Item Description or Part Number	Qty.
1	1/ST2	Assembly- Spotline Tensioner Frame	1
2	--	6in OD Pulley, McMaster #3175T49	2
3	3/ST4	Part - Tensioner Shaft	1
4	2/ST4	Part - .75 Tensioner Frame Threaded Rod	2
5	--	.75-10 Castle Nut, McMaster #97190A035	4
6	--	5/32" X 1.125" Roll Pin, McMaster #98296A899	4

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Spotline Tensioner
Spotline Tenioner Overview
Scale: as noted
Drawn on: 1/2/2015
Revised on: -

tolerances:
$^{x}/_{x}$: $\pm^{1}/_{16}$"
.xx : ±0.010
.xxx : ±.003

ST1