

SPOTLINE PRACTICAL™

REFERENCE MANUAL V2.0

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GETTING STARTED

Congratulations on your purchase of the **Spotline Practical** hoist from Creative Conners, Inc. The **Spotline Practical** is a fully-fledged hoist for practical, electrified effects. The **Spotline Practical** is ideal for all locations since it operates on standard 120V power. The **Spotline Practical** is a **Smart Machine**, the **Stagehand** controller is built in. Simply connect the Input power, Ethernet and Showstopper cables and you'll be ready to *Make It Move!*

This manual will direct you through:

- 1. Unpacking
- 2. Installing & Testing
- 3. Operation Procedures
- 4. Scheduled Maintenance

If you need help along the way, contact us!

- Online: www.creativeconners.com
- Email: support@creativeconners.com
- Phone: 401-289-2942 x2

A Word About Safety

The **Spotline Practical** is a powerful machine designed with safety in mind. If used improperly, the 40lb payload can cause significant damage to scenery, machinery, and even people. The integrated ultimate and slack-line sensors help to mitigate these risks, but ultimately depend on you the operator to identify and mitigate any additional risk during installation and operation of your hoist.

- Proper overhead rigging techniques should always be understood and practiced when installing any machinery including both the **Spotline Practical** hoist and its payload.
 - Attach the hoist to a pipe using at least (2) pipe couplers, (1) on each pipe at the top of the machine frame.
 - Use a safety cable of at least 1/8" diameter aircraft cable to further secure the hoist to its hanging point.
- Do not exceed the 40lb payload rating of the hoist.

What's included

- **Spotline Practical** hoist
- 2 x 10' Edison to powerCON TRUE1 power cables
- 1 x powerCON TRUE1 connector (for your electrified payload)

Required Tools

Making adjustments to the **Spotline Practical** will require a hand tool:

• 4" long, #1 Flat Head Screwdriver (rotary limit adjustment)

Features

The **Spotline Practical** is a smart machine, meaning the Stagehand controller is built right in. The all-in-one design incorporates the following safety features:

- ANSI E1.6-1 2019 compliance
- 3rd party engineering review
- Emergency Stop circuit
- Dual brakes
- Forward and reverse limit switches
- Ultimate limit circuit (indicating on drum) to prevent overtravel of payload into machine body
- Slack-line detection sensor
- Branch circuit protection for both machine power and payload power.

General Features

- 35' max travel
- Flat lifting line to reduce spinning
- Power (110VAC 10A Max) and data circuit (4 twisted pairs x 30AWG @ 100ohm) in lifting line.
- 200W servo capable of lifting 40lb payload at 34"/sec
- 110VAC 60Hz 1-phase machine input power (powerCON TRUE1)
- 110VAC 10A (1200W) max payload input power (powerCON TRUE1)

Overview











Stagehand Controller - Onboard

- 1. Momentary Limit Override buttons When pressed, the onboard **Stagehand** will temporarily override the FWD, REV, or ULT limits. This feature is intended to be used when manually jogging the **Spotline Practical**.
- 2. Manual Jog Buttons When pressed, the onboard **Stagehand** will switch to manual operation, allowing jogging in forward or reverse.
- OLED Display The OLED display shows information about the Stagehand's status. When idle, it shows the current IP address and the network connection status to the PC running Spikemark.
- 4. Multi-function Jog Wheel The Jog Wheel has two functions:
 - a. If either the FWD or REV jog buttons are pressed, the knob functions as a speed dial.
 - b. Clicking the wheel (it's also a button) allows the user to set the IP Address or the Subnet.
- 5. Brake Test buttons When pressed, each brake will be able to independently release. This feature is intended to be used to verify brake functionality.



- 6. Input Power This is the 120VAC single phase power input from the distribution panel or wall power to power the **Spotline Practical**.
- 7. LX Power This is the 120VAC single phase power input from the distribution panel or wall power to power the payload.
- Showstopper Input The E-Stop (Emergency Stop) receptacle is a 5-pin XLR connector (a.k.a. standard DMX cable). The 24VDC E-Stop signal is provided by the Showstopper 3 system. If the signal is present, the machine is free to move, when the signal is interrupted all motion will stop.
- Ethernet The Ethernet receptacle accepts both Ethercon as well as standard RJ45 connectors. The Spotline Practical uses Ethernet to communicate with the PC running Spikemark software.
- 10. LX Data The Ethernet receptacle accepts both Ethercon as well as standard RJ45 connectors to send data down the lifting line.



11. Branch Circuit Protection - Individual breakers allow you to de-energize the main power to the Spotline Practical as well as the power to the lifting line.

INSTALLATION



The **Spotline Practical** mounts to any standard 1-½" schedule 40 or 80 pipe with 2 cheeseboros; 1 attached to each of the top pipes of the machine. The cheeseboroughs require a minimum safe working load (SWL) of 1100 pounds, Creative Conners Inc recommends the use of The Light Source's Mega Coupler. In order to keep the **Practical** balanced, attach the machine to your rigging pipe or batten with the cheeseboroughs finger tight. Then shift the machine parallel to the pipes until the machine is level, and tightening both cheeseboroughs fully.

The machine must also have a secondary safety cable made of at least ½" diameter wire rope. Wrap the machine's top pipes and the supporting structure with your safety cable, and take additional wraps as needed to limit slack that could cause excessive shock loading of the safety or ensnaring the safety on moving parts of the machine.

The **Spotline Practical** weighs 90 pounds, has a working load limit of 40 pounds and requires a minimum load of 5lbs. If your lighting practical weighs more than 40 pounds you will need to use a **Spotline Mini** or the full-size **Spotline** hoist. If your practical weighs less than 5 pounds you will need to add additional weight to allow the slackline detection to respond properly.

The **Spotline Practical** comes pre-reaved with at least 35' of flat cable specially designed for lifting with power, data, and a 3/32" wire rope core that has been factory terminated to a thimble. Attach the payload to the provided thimble following best theatrical rigging practices. Ensure that the wire rope is bearing the load not the power or data lines. If your lifting cable is damaged, disconnect the input LX Power and LX Data cables from the Stagehand and do not continue to operate the machine. Give us a call at 401-289-2942 x2 or drop us a line at support@creativeconners.com, and we can arrange a repair.

MAKING THE CONNECTIONS

The **Spoline Practical** is part of Creative Conners, Inc's line of smart machines. The **Stagehand** motion controller is built right in! Below is a list of all the connections required to integrate a **Spotline Practical** in your **Spikemark** network.

Input Power

The **Spotline Practical** requires 120VAC, 10A input power and includes branch circuit protection. The circuit breaker is a great way to know for certain that the machine will not move when servicing, and is also a convenient method to reboot the internal electronics if required.

The power inlet of the **Spotline Practical** is a Neutrik powerCON TRUE1 Appliance Inlet (NAC3MPX). The mating connection on the included power cord is a NAC3FX-W connector. The powerCON TRUE1 is rated for breaking capacity, meaning it is safe to disconnect under load. It should also be noted that the TRUE1 connectors are not compatible with standard "Blue" powerCON connectors. See below for wiring details inside the TRUE1 connector.



E-Stop

The **Showstopper** is Creative Conners, Inc's emergency stop safety controller. Each **Stagehand** and smart machine requires a direct connection to a **Showstopper 3 Base** or **Showstopper 3 E-Stop Hub**. These connections are made with a 5-pin XLR cable. There's no tech wizardry here, any 5-pin XLR cable will work as long as the polarity is correct. See below for connection details.



Ethernet

Although the **Spotline Practical** can be manually jogged from the onboard **Stagehand** controller, the real power is unleashed when connected through the network to **Spikemark** software. As with all **Stagehands** or Smart Machines, each controller must be connected to the network with an Ethernet (CAT5/CAT6) cable back to a network switch. The **Spotline Practical** has an etherCON receptacle which accepts the rugged etherCON connector or a standard RJ45 connector.

LX Power

The **Spotline Practical** passes 120VAC, 10A power to the outlet at the end of its lifting line. As an added feature there is local branch circuit protection built into the machine. The circuit breaker is a great way to know for certain that the payload is not energized during loading/unloading.

The LX power inlet of the **Spotline Practical** is a Neutrik powerCON TRUE1 Appliance Inlet (NAC3MPX). The mating connection on the included power cord is a NAC3FX-W connector. The powerCON TRUE1 is rated for breaking capacity meaning it is safe to disconnect under load. The TRUE1 connectors are not compatible with standard "Blue" powerCON connectors. See below for wiring details inside the connector.



LX Data

The **Spotline Practical** passes data to the EtherCON at the end of its lifting line. At a basic level, it provides 4 twisted pairs of 30AWG conductors at 100ohm impedance (comparable to Cat 5e), from the **LX Data** etherCON connector to the end of the lifting line.

At assembly, we install an etherCON connector at the end of the lifting cable, however, you can swap to another connector of your choosing, such an XLR. If doing so, follow the manufacturer's installation specifications for the connector of your choosing, and refer to the wiring details below to ensure proper continuity. Because our composite flat lifting cable is a custom construction, the wire coloring differs from the T-568B pinout that we use at the input etherCON connector.



IP Address

Once the **Spotline Practical** is physically connected to the network, you will need to set the IP address to communicate with **Spikemark**. This is accomplished the same way as any other **Stagehand** controller.

- Click the jog wheel, the SET IP screen will be displayed
- Scroll to the octet to change and click the wheel
- Turn the wheel to increase or decrease the number until you reach your desired value. Click the jog wheel to set the value.
- Repeat the process for all octets that need to be adjusted.
- Once complete use the jog wheel to highlight 'OK' and click the wheel

Subnet Mask

In addition to the IP address each **Stagehand** controller also has the ability to set the subnet mask. The default subnet mask is 255.255.255.0. If you find yourself in a position where you need to adjust the subnet mask, please take a step back and ask yourself if it is really necessary. If the answer is yes, click and hold the scroll wheel to reveal the SET SUBNET screen. Follow the same procedures used to set the IP address to adjust the subnet mask.

RIGGING THE MACHINE

The **Spotline Practical** comes pre-reaved with at least 35' of flat cable specially designed for lifting. This machine is designed and engineered for vertical lifting with the cable exiting from the bottom of the machine. Attach your payload to the provided thimble following best theatrical rigging practices. Ensure that your wire rope is bearing the load when you suspend your practical effect from the lifting line, rather than the power or data lines. Check that your practical travels perpendicular to the drum and the cable feeds cleanly around the idler pulley at the bottom of the machine. If your practical is not traveling perpendicular to the drum, you may need to shift the cheeseboroughs supporting the machine in order to level it.

If you find yourself in the weeds at any point, give us a call at 401-289-2942 x2, or drop us a line at support@creativeconners.com.

Setting the Limits - Rotary Limit Switch

The Spotline Practical uses a 4 pole rotary limit switch connected to the drive shaft with #35 chain. These hard limits need to be set each time the machine is installed and a new payload is attached. Let's take a moment to familiarize ourselves with the rotary limit switch.

Inside the cover is a four layer CAM stack (think of it like a layer cake), each CAM layer corresponds to a physical limit circuit: FWD-ULT, FWD, REV, REV-ULT. The CAM stack rotates as the input shaft

turns, activating the corresponding micro switch engaging the limit circuit. The CAM stack rotates CCW when the **Spotline Practical** is moving Forward.

There are 5 set screws on top of the limit stack used to adjust the position of each CAM. The center screw locks the CAMs in position while the four screws around the outside (noon, 3, 6 9) are used to adjust the CAMs. The limit switch will be damaged if the center locking screw is not loosened prior to adjusting the CAM positions. Also important, the locking screw must be tightened down after adjusting the limits or the limits will drift. With the basics of the rotary limit switch out of the way let's take a look at how the limits are intended to operate.

The hard limits (set at the rotary limit switch) should be used as overtravel limits. During normal operation the limits should not be engaged - they are intended to stop motion if there is a failure or while manually jogging the machine. Take a look at the diagram below for a visual representation of where each limit is set based on total travel.



- 1. Using the onboard controls on the **Spotline Practical**, slowly move the payload to its highest safe position (Fwd) to ensure the cable feeds on the drum properly.
 - 1.1. Pro Tip: leave a few inches of overhead in case the Ultimate FWD limit does not engage in the exact same place. Remember wire rope stretches over time, including the lifting cable's core.
- 2. With the payload in its highest safe position, set the Ultimate FWD Limit by following the steps below.
 - 2.1. Remove the cover of the rotary limit switch by removing two philips head screws and pulling off the cover.



2.2. On the limit switch, you will see a set screw with 4 smaller set screws positioned around the center set screw. The center set screw is the locking screw. Loosen (1 turn) the locking set screw with a flat-head screwdriver.

Caution: You MUST loosen your center set screw first. If you do not loosen the center set screw before adjusting the outside limit screws, you could damage your limit switch. The only way to fix this is by ordering a new limit switch.



2.3. The four smaller screws around the outside are used to adjust each of the individual limits' CAMs. Each adjustment screw has a number and a color next to it, which corresponds to which layer (FWD ULT, FWD, REV, or REV ULT) it adjusts.



- 2.4. The rotary limit has 4 layers, each layer includes a CAM lever and a micro-switch to activate the individual limit.
- 2.5. Adjust the limit that you are setting by turning the corresponding set screw until the CAM strikes the switch.



- 3. Repeat steps 2.3-2.5 to set your other 3 limits. The steps below explain the location you should jog your machine to when setting each limit.
 - 3.1. FWD ULT Highest safe position.
 - 3.2. FWD Highest position that you would move the hoist to on a daily basis.
 - 3.3. REV Lowest position that you would move the hoist to on a daily basis.
 - 3.4. REV ULT Lowest safe position.
- 4. When you finish setting your limits, lock your center set screw to hold your newly adjusted limits. Then reattach the limit cover.

Setting the Limits - Slackline Detection



LIFTING CABLE UNDER TENSION

The **Spotline Practical** has a minimum load requirement of 5lbs. When the **Spotline Practical** is lifting less than 5lbs, the lifting line will have the tendency to become slack. To combat this problem, the **Spotline Practical** has a rod arm style limit switch wired into the ultimate limit circuit to detect when the lifting line has gone slack. The rod must be retained by the tension on the lifting cable, in order to move.

This feature prevents the lifting line from unspooling and getting caught inside the enclosure. When the slack line detection trips, you will usually need to add more weight to your lifting line. In some rare occasions, if the ultimate limit override was used to move through the slackline detection, the limit switch's rod arm could slip in front of the lifting line and keep you in a constant ultimate limit state. To fix this problem, you will need to shut down the machine and manually reset the slackline limit. This can be done by breasting the lifting cable, so the rod arm is again behind the lifting cable.

The slackline limit switch comes to you factory calibrated to a minimum payload of 5lb and should not require adjustment. However, if the slackline limit switch is moved for any reason, then you can follow these steps to calibrate the switch. The resting position of the rod is locked by the screw on top of the pivoting head. When loosened, the rod's resting position can be adjusted in 5° increments, so shift it 2 increments counter-clockwise or 10°, and then lock the adjustment screw. Without a load, the switch should push the lifting cable and trigger a slackline. Apply a 5lb load to the lifting line, and check that you can run the load up and down without triggering a slackline. If you find yourself needing help with adjusting the slackline switch, give us a call at 401-289-2942 x2, or drop us a line at support@creativeconners.com.



LIFTING CABLE UNDER TENSION

Brake Testing Functionality

Now that your machine is rigged and limits are set it's a great time to test the motor and load brakes with the on-board test buttons. Combining the brake testing with limit setting during load in ensures it will happen on a regular basis.

Testing brakes can be hazardous without taking proper steps to ensure safety. The brake test functionality ensures that only one brake can be released at a time, so the load will not be released. However, if one brake fails it is possible for the load to fall. To reduce the likelihood of damage or injury we recommend lowering the load within 12" of the ground while testing the brakes.

- Before you conduct the test, check and see that nobody is working inside the machine or near test load.
- Jog the **Spotline Practical** so the payload (a 40lb sandbag would be a great choice) is 6-12 inches off the ground.
- On the **Spotline Practical** control panel, press the blue **Enable** button and the **Motor** button to release the motor brake. You should hear a click when the brake releases and engages.
- After testing the motor brake, test the load brake by pressing the blue **Enable** button and then the **Load** button. You should hear a click when the brake releases and engages.
 - If during the **Motor** Brake test, the load falls to the ground, the load brake would need maintenance.
 - If during the Load Brake test, the load falls to the ground, the motor brake would need maintenance. If you find that a brake needs maintenance, remove all scenery and do not operate the machine.
- Note: If you were to press the Enable, Motor, and Load button at the same time, the safety circuitry will not release both brakes at the same time.

If you find yourself needing help with the brake test functionality or experiencing undesirable results, give us a call at 401-289-2942 x2, or drop us a line at support@creativeconners.com.

TROUBLESHOOTING

We aim to make any product as plug and play as possible, though sometimes challenges crop up right out of the box or years down the road. See below for solutions to common operational challenges.

Motion

lssue	Checkpoint
Motion is not smooth	Confirm cable is wrapped flat on the drum.
	Confirm practical effect is travelling perpendicular to drum, not catching on idler pulley
	Confirm cable and practical effect path is clear of obstructions.
	 Check PID tuning in Spikemark: Proportional Gain = 20 Derivative Gain = 0 Integral Gain = 0
Motor is spinning, drum is not moving	Confirm drive chain is connected and intact and under tension.

Rigging

Issue	Checkpoint
Cable is rubbing on idler pulley or keeper.	Level machine.
Machine is experiencing faults at repeating locations	Verify that your practical effect weighs at least 5lbs and the cable is feeding cleanly onto the idler pulley Verify Max Speed is set correctly in Spikemark

Stagehand Display	Checkpoint
E STOP + IP Address	The E-stop cable is unplugged or the E-stop is engaged.
DISCONNECTED + IP Address	Machine is on and ready to connect to Spikemark.
CONNECTED + IP Address	Machine is on and connected to Spikemark.
SET IP	Confirm the IP Address is correct, use the scroll wheel to highlight OK and click.
SET SUBNET	Confirm display shows 255.255.255.0, use the scroll wheel to highlight OK and click.
DRIVE FAULT	The Servo Drive is in a fault state, reset from Spikemark or by removing the main power at the breaker for 30 seconds.
BRAKE FAULT	you have a problem with the wiring of your brake. If you experience a brake fault, your machine is likely in need of repair and you should give us a call at 401-289-2942 x2, or drop us a line at support@creativeconners.com
FWD LIMIT + IP Address	The Forward limit is engaged. Manually jog off the limit and adjust the set screw of the rotary limit.
REV LIMIT + IP Address	The Reverse limit is engaged. Manually jog off the limit and adjust the set screw of the rotary limit.
ULT Limit + IP Address	The Forward Ultimate or Reverse Ultimate limit is engaged or a slack line has been detected. First, verify that the slackline rod arm is captured behind the lifting cable, and reset if in front of the cable. Then, manually jog off the limit and adjust the set screw of the rotary limit.
Blank Display	Check main power and local breaker.

Onboard Stagehand Display

Connection/Power

Issue	Checkpoint
Stagehand display is blank	Confirm machine power is connected and the local breaker is ON.
Able to manually jog the machine from the Stagehand	Confirm IP Address is set correctly on the Stagehand, in your computer's network settings, as well as in Spikemark.
but unable to connect	Confirm Ethernet cable is connected.
unough spikemark	Confirm network switch is connected and powered on.
LX Power not transmitting	Check breaker on side of Stagehand, continuity from input receptacle to cable PowerCON connector
LX Data not transmitting	Check continuity from input receptacle to cable EtherCON connector

Maintenance Schedule

Like any machine, the **Spotline Practical** requires regular maintenance to stay operating at full capacity.

Daily Operation

- Ensure the encoder is counting correctly.
 - FWD Encoder Counts Up.
 - REV Encoder Counts Down.
- Confirm that cable is wrapping cleanly onto and off of the idler pulley and drum.
 - The practical effect is travelling perpendicular to the drum.
 - Cable is not slacklined.

Monthly

- Visually inspect that nothing has been entangled into the machine and there are no loose wires.
- Visually inspect the drum for damage and that full length of lifting chable is free of cuts, nicks, and wear spots.
 - Do not use if the lifting cable has been damaged and contact us to arrange repair.
- Check Forward and Reverse Limits.
- Perform the brake test as outlined above.

Semi-Annually

- Visually inspect the drive chain and verify that the chain is tensioned so that there is more than 1/16" but less than 1/8" of deflection in the drive chain from when the drive chain is at rest to pulling the drive chain taut. Same for the rotary limit chain.
- Ensure that the drive chain guards are tight and in place.
- Ensure the drum key is engaged.
- Ensure the brake key is engaged.
- (2) clamping screws on the drum shaft collar are tight.

TECHNICAL SUPPORT

If you get stuck, we're here to help. The best way to get in touch with a tech expert is via email - even during normal business hours - because most days we are spread around the shop and may not be near the phone. There's someone in the office from 8:30a-5pm EST Monday - Friday and will return an email or phone call quickly. After hours (honestly when most tech support issues arise) we have a crack team monitoring email and voicemail who will respond quickly to help get you moving.

- Online: www.creativeconners.com
- Email: support@creativeconners.com
- Phone: 401-289-2942 x2

SPECIFICATIONS

Physical Specifications

Description	Value
Max Line Pull	40lb
Max Line Speed	34in/s
Max Travel	35'
Machine Weight	90lb
Overall Dimensions	19" H x 21" W x 15" D

Electrical Specifications

Description	Value
Input Voltage	100-120VAC 50/60Hz
Max Input Current	10A
Load Brake Voltage	105VDC
Motor Capacity	Mitsubishi Servo 200w
Servo Drive	Mitsubishi MR-J4-20A1-RJ

