

Creative Conners, Inc TRICKLINE <sup>TM</sup>

# **REFERENCE MANUAL V1.0**

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## **GETTING STARTED**

Congratulations on your purchase of the **Trickline** from Creative Conners, Inc. The **Trickline** is our belt driven linear actuator available in lengths from 4' all the way up to 32'.

The **Trickline** can be used to actuate a wide variety of effects including moving a trap door, pop up props, counterweight assist lifting or sliding steps. Pair the **Trickline** with a curtain track and move drapes, flats, projection screens, LED panels, or even futuristic Star Trek doors. Connect the **Trickline** to a **Stagehand Apprentice** and **Showstopper 3 Base**, and you will be ready to *Make It Move!* 

This manual will direct you through:

- 1. Unpacking
- 2. Installing & Testing
- 3. Operation Procedures

If you need help along the way, contact us!

- Online: <u>www.creativeconners.com</u>
- Email: <u>support@creativeconners.com</u>
- Phone: 401-289-2942 x2

## A Word About Safety

The **Trickline** may seem small and harmless, but if operated incorrectly can be dangerous. The **Trickline** is not designed for overhead lifting, nor for lifting people. Follow the information in this manual to ensure you install and operate your **Trickline** safely.

### What's included

- 1. Trickline
- 2. 2 mounting feet
- 3. 2 limit switches

#### Features

The **Trickline** is constructed of lightweight and durable aluminum 80/20 extrusion that can be easily made to almost any length. This little ½ horsepower motor can move 150lbs at 15 in/sec and is easily mounted in multiple orientations. Using the **Trickline** eliminates the hassle and mess of running hydraulics while offering better control than pneumatics and can be mated with curtain track to automate scenic elements and curtains.

### Overview



## INSTALLATION

## Required Tools

- 3/16" Hex Key (belt tensioning)
- 5/32" Hex Key (adjusting limits and mounting feet and Splice Connection)

## **Installation Options**

The **Trickline** can be mounted vertically or horizontally. When mounting vertically the motor can be at the top or bottom, though we recommend putting the motor down just because it makes more sense to have the weight lower. When mounting horizontally, the beam can be up or down. In the end, the choice is yours based on the installation conditions.

#### **Mounting Feet**

There are two mounting feet attached to your **Trickline** when you receive it. These can be adjusted by loosening the 5/16" cap screws with a 5/32" hex key. If the feet are sitting on the ground, your **Trickline** can either be bolted or lagged down. If your **Trickline** is in any other orientation, your attachments should be made with bolts. The holes in the mounting feet are drilled for 3/8" hardware.







## Adding An Extension

The max travel without a splice is 8'-8" - this is a 10' beam minus the motor and belt pulley brackets. If 8'-8" isn't quite enough travel, the **Trickline** can be spliced for up to 30' of travel.

Let's go through the steps of installing your extension. If you do not have an extension, skip to the **Making The Connections** section of this manual.

#### What's Included

- 6 Splice Plates
- 18 5/16"-18 x 5/16" Set Screws
- 2 Alignment Pins

To instal your extension, slide your 6 Splice Plates into each slot in your track.



Next, insert your 2 Alignment Pins



PRO TIP: This is a great time to install the carriage on the beam.

Then, center your splice places so that you have 3 Set Screws on each piece of track for each Splice Plate and tighten your set screws with a 5/32" Hex Key.



Lastly, Clamp your belt to the carrier on your **Trickline**.



## **MAKING THE CONNECTIONS**

To run your **Trickline**, you will need a 120VAC **1HP Stagehand Apprentice** and a few cables.

The **Stagehand Apprentice** will need input power and an E-stop connection to a **Showstopper 3 Base** and a CAT5 cable connecting to Spikemark for cued motion. From the **Stagehand Apprentice** to your **Trickline**, you will need an Apprentice motor/brake cable and a signal cable. On single section machines, the outboard limits are wired permanently to the **Trickline's** J-Box. Multi-section machines include a hard wired REV limit while the FWD limit is connectorized.

## Installing the Belt

On a multiple section Trickline you'll need to install the belt before you can make your scenery move. You can also use these steps if you need to replace a worn or damaged belt. If you have a single section machine skip ahead to the next section.

The Trickline uses a <sup>3</sup>/<sub>4</sub>" wide L series single sided timing belt and forms an endless loop once both ends are clamped to the carriage. The belt we use can be found from McMaster-Carr, part #1840K4 or any other supplier you choose.

First, remove the four ¼-20 SHCS holding each of the two belt clamps to the carriage exposing the teeth to capture the belt. Next, feed the belt through the center of the beam with the teeth UP. Carefully thread the belt under each keeper on both pulleys - if the belt is over any of the keepers there will be awful noise and terrible motion. While installing the belt you may find it easiest to remove the keepers from the motor end pulley, as that pulley is locked in place by the motor brake.

Pull enough belt through the motor end so you can easily work on the carriage. Confirm the belt is seated properly on the motor pulley and reinstall any keepers which were removed. Clamp the motor side of the belt to the carriage with the clamp plate and 4 bolts.

Confirm the belt is fully engaged on the return pulley and clamp the free end of the belt to the carriage with the 2nd clamp plate. You may need to loosen the jack bolts on the return pulley in order to make the connection.

Once both ends of the belt are connected, evenly re-tension the belt using the jack bolts and tighten the locking bolts in the cheek plates.

## Motor/Brake Connection

The cable that powers your **Trickline's** motor and brake is connected to your **Trickline** with a 6 pin locking Harting connector that utilizes Han E type pin and socket crimp connectors. The **Trickline** motor operates at 230VAC, while the brake operates at 120VAC.



## **Signal Connection**

Any encoder or limit signals are sent through the Signal Cable. This cable and pinout is used across all current **Stagehand** controllers - so any signal cable you have on hand will work. Since this one cable can be used with any machine there are a lot of conductors in there - the **Trickline** only uses a few of them:

- Position Encoder
- FWD Limit
- REV Limit

Due to the large number of connections, the signal cable utilizes a Harting style IRC-6B 24P locking connector. Below is the pinout for any **Signal** cable:



#### Limits

There are two limit cables integrated into the **Trickline's** J-box: one each for the Reverse and Forward initial limits. The **Trickline** doesn't utilize the Ultimate Limit circuit.

On a single beam **Trickline** both limits are hard wired directly into the machine J-Box. If you have a multi-section **Trickline** then the FWD limit will be hardwired to the J-Box, while the REV limit will be

connectorized with the tried-and-true MLP1 connectors. This allows you to remove the REV limit for storage.



Included with the **Trickline** are cable management clips to prevent your limit cable from hanging too low and also to prevent the cable from getting in the way of the carrier. To install your clips, simply insert the clip into the track sideways, and rotate the clip 90 degrees to lock the clip in place.



## **Testing The Motor**

Prior to connecting your scenery or prop to the Trickline is the best time to confirm all is functioning as expected. With the Motor and Signal cables connected to the Stagehand Apprentice, the limits set, and the Showstopper 3 connected and powered up let's *Make It Move*!

- 1. Release the E-Stop. You should hear a "click" from the Stagehand. The OLED display will change from "EMERGENCY STOP" to "DISCONNECTED"
- 2. Brake and Motion test. Press and hold the FWD jog button on the Stagehand, the display will show FWD: 0% and POS: with a number. Turn the jog wheel CW to display 1%. You should hear a click from the motor and Stagehand and the motor will begin to spin. Release the jog button and test with in REV.
  - a. While jogging FWD the POS readout should be increasing
  - b. While jogging REV the POS readout should be decreasing
- 3. Limit switches. Manually test both the FWD and REV limit switches, confirming the status changes on the Stagehand display.

### **Connecting Scenery**

Without scenery connected, the **Trickline** is only a cool linear actuator - so let's make it awesome by moving your scenery. The **Trickline** carriage includes four ¼-20 tapped holes for attachment - two in each belt clamp plate. Feel free to attach directly to the carriage plate, or mount your own intermediate plate to the carriage.



### Setting the Limits

Setting the hard limits is important for operating any automated effect. Properly set limits will prevent travel past the maximum safe amount - protecting against damage to the scenery or the **Trickline**.

The Trickline includes two hard limits: Forward and Reverse. The limit switches are rod acting, N.C. devices which can be adjusted along the length of the 80/20 track and are actuated by the carriage.

To adjust your limits, loosen the LHCS attaching the limit bracket to the track with a 5/32" allen key. Move the limit to the desired location and re-tighten the LHCS to set the limit into place on the track.



Keep in mind there can be several inches of over travel once the limit is engaged. The amount varies depending on the velocity of the carriage. This means you may need to set the limits to trigger before the very end of travel in order to protect against machine damage.

## **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

## TROUBLESHOOTING

Below are common issues encountered with the Trickline and how to address them.

#### Belt Tension

Many challenges are associated with belt tension.

#### Motion is not smooth

Rough motion is most likely due to poor belt tension.

Check to make sure the belt on your **Trickline** is not slack. If there is not enough tension, the belt teeth will not catch the pulley teeth and the motion will be jerky. To tension the belt follow these simple steps

- 1. Move the carriage to the center of the beam.
- Loosen, but do not remove the 8 pulley attachment low head cap screws with a 5/32" hex key

   There are four 5/16"-18 x <sup>5</sup>/<sub>8</sub>" bolts on each side
- 3. Tighten the  $\frac{1}{4}$ "-20 x 2- $\frac{1}{4}$ " Jack Bolt with a 3/16" hex key until the belt has approximately 1/64" of deflection per inch of belt.
  - a. Measure the deflection at the center of the belt between the carriage and turnaround pulley.
- 4. Tighten the 8 pulley attachment 5/16"-18 x 5%" low head cap screws with 5/32" hex key



If adjusting the belt tension doesn't solve the poor motion, it's time to confirm there isn't binding. The quickest way to figure this out is to disconnect the scenery from the Trickline and run the machine. If the problem goes away, attempt to manually move the scenery to find the binding point.

#### Excessive belt noise

Without enough belt tension, the belt could be rubbing against the inside of the 80/20.

#### Belt alignment

Confirm the belt is running approximately in the center of the pulleys. Belt noise can be caused by rubbing against the pulley flange. Adjust the belt tracking by adding or releasing tension on the appropriate jock bolt.

#### Popping noise

A slipping drive belt will make a popping noise. This can be caused by poor belt tension, excessive weight, binding of the load or too steep of an acceleration.

#### **Sloppy Position accuracy**

Sloppy positioning on the Trickline generally accompanies popping noises from the drive belt. Position is taken from the motor, so any slippage on the belt will translate to poor positioning in real life. The most common reasons for sloppy positioning include poor belt tension, excessive load, excessive speed or acceleration and binding.

#### Limit is activated

When a limit is activated, further motion in that direction will be prohibited. Adjust the physical limit switch location to allow motion.

#### Stagehand or Spikemark Displays Drive Fault

A drive fault can be caused by many factors. To reset a drive fault use the drive reset button in Spikemark or power cycle (disconnecting input power for 25 seconds) the Stagehand. If a drive fault reappears see the Stagehand reference manual for further troubleshooting.

## SPECIFICATIONS

Description	Value
Max Belt Pull	150lbs
Min Belt Speed	.25 in/sec
Max Belt Speed*	15 in/sec
Motor Horsepower	1/2 HP
Motor Voltage	230/460 VAC 60 Hz 3-Phase
Max Input Current	1.84/0.92 A
Brake Voltage	115 VAC
Machine Weight	95lbs at 48" of travel
Overall Dimensions	7.53" H x 12.47" W x Length is dependant on what length you purchase

\* Trickline can move up to 30"/sec by overspeeding at the Stagehand.

## Drawings

