

# Linear Actuators

P-6150-WL

## Installation Instructions



An Altra Industrial Motion Company

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**⚠ WARNING** Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

## Introduction

Warner Electric has many years of experience in providing linear actuators for a variety of applications on a wide range of mobile applications such as combines, school buses, industrial sweepers; as well as in factory applications such as lift tables, die handling racks, diverters and vent positioning. The Warner Electric linear actuator you have purchased is a well designed quality unit which will provide consistent maintenance-free service throughout its life.

Warner Linear actuators are ideally suited for intermittent duty cycle applications requiring lifting, positioning, sorting, opening or adjusting on both in-plant or mobile applications. This manual provides information needed to install all Warner Linear actuators.

Please follow the instructions provided in this manual carefully to ensure safe reliable operation. Mounting Guidelines on page 4 are of key importance, so please be sure to read them thoroughly before proceeding with unit installation.

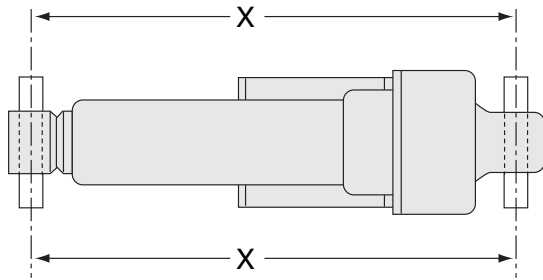
# Mounting

Warner Linear actuators are quickly and easily mounted by slipping pins through the holes at each end of the unit and into brackets on the machine frame and load to be moved.

Proper diameter\* solid pins provide maximum holding capability. Use of a retaining ring or cotter pin on each end will prevent the solid pin from falling out of the mounting bracket. (It is best to avoid roll pins and spring pins.)

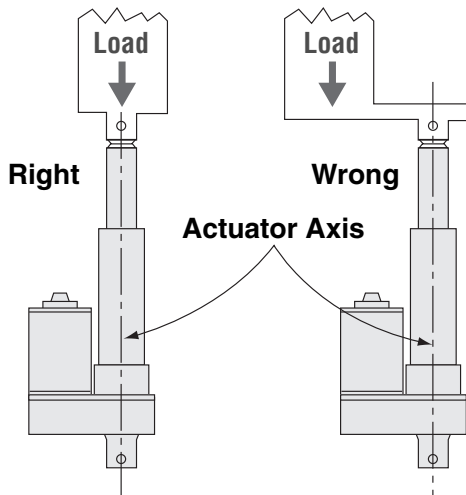
Mounting pins must be parallel to each other as shown in Figure 1. Pins which are not parallel can cause excess vibration or binding.

\*M-Track 1 - 1/4 inch (.250)  
All Others - 1/2 inch (.500)



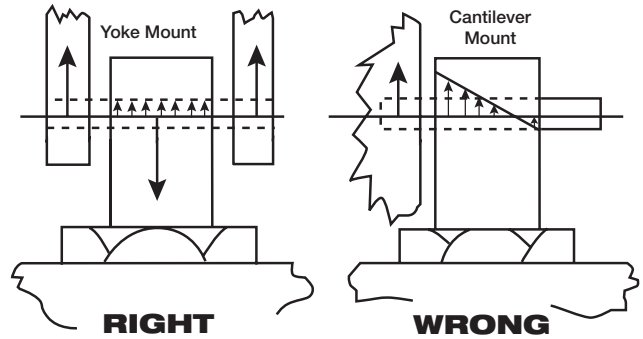
**Figure 1**

Loads should act along the axis of the actuator. Off center loads may cause binding and lead to premature unit failure. (See Figure 2)



**Figure 2**

Ensure that mounting pins are supported at both ends. Cantilevered mounting is unacceptable.

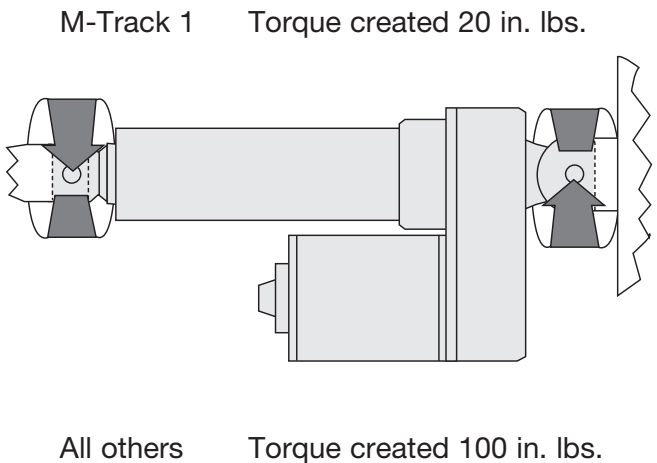


Failure to provide proper support will shorten unit life.

**Figure 3**

Do not attempt to mount Warner Linear actuators by the cover tube. The tube is not designed to support the forces required for tube mounting.

The actuator mounting supports must be capable of withstanding the load and torque developed when the unit extends or retracts. Restraining torque values are also provided with the details on each unit.



**Figure 4**

## Electrical Installation

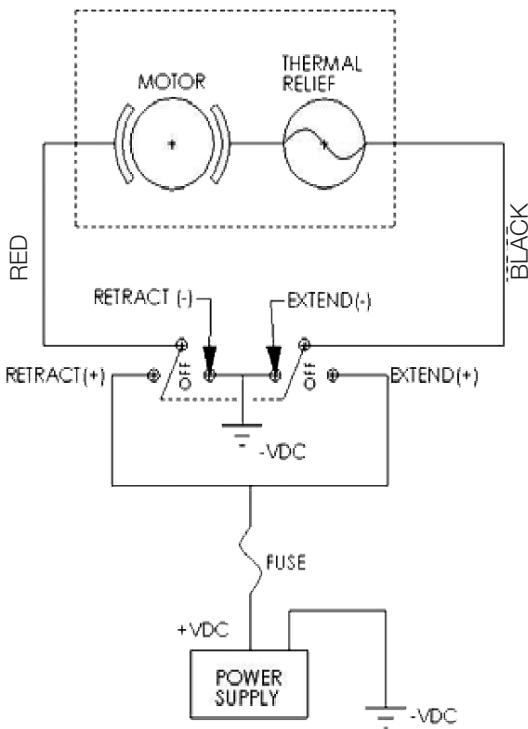
One connector is provided mounted to the actuator, the mating connector is included in the actuator box.

### M-Track 1 (with limit switches)

Use wire gauge 16 AWG

#### Packard (Delphi) Connectors

- Male Connector 8911773
- Male Terminal 6294511 (2 required)
- Female Connector 8911772
- Female Terminal 12040508 (2 required)

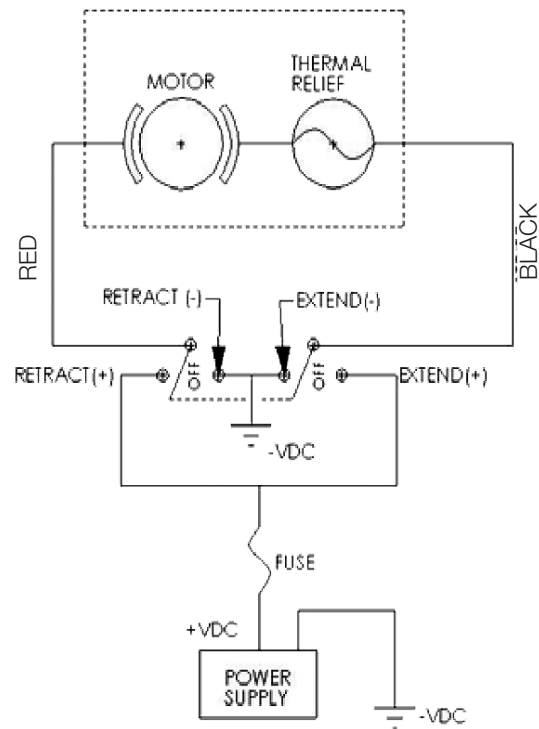


## M-Track 1 (with potentiometer feedback)

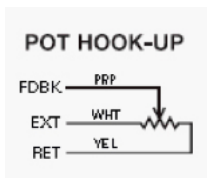
Use wire gauge 16 AWG

#### Packard (Delphi) Connectors

- Male Connector 8911773
- Male Terminal 6294511 (2 required)
- Female Connector 8911772
- Female Terminal 12040508 (2 required)



Wire Color	Wire Gauge	Connect To	
White	22 AWG	10 K	
Purple	22 AWG	Feedback	Potentiometer
Yellow	22 AWG	0 OHM	



## S-Track Mechanical

The end of travel limit switches are factory set for selected stroke length and are not adjustable. Extension Tube anti-rotation is built into the body of the actuator.

## S-Track Electrical

12 or 24 volt DC power

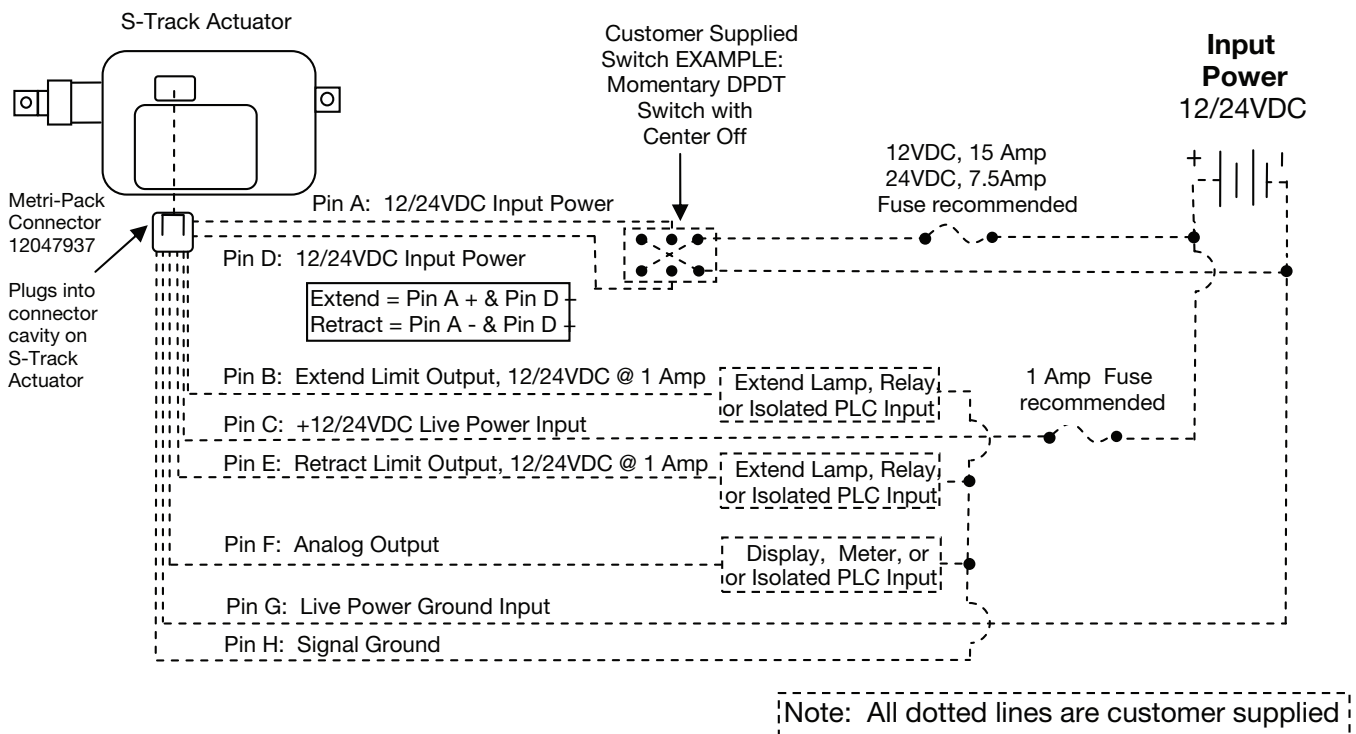
Feedback will be voltage or current depending upon which unit configuration has been ordered.

- Port A = Motor power in (+/-12 or 24 VDC)
- Port B = Extend end limit output
- Port C = Live power in (+/-12 or 24 VDC)
- Port D = Motor power in (+/-12 VDC)
- Port E = Retract end limit output
- Port F = Stroke position output  
(0-10 VDC, 4-20 mA, ect.)
- Port G = Live power in (12/24 VDC ground)
- Port H = Signal ground out

## Integral Metri-Pack 150 Series – 8 PIN Connector

Mating Part #

- 12047937 Body
- 12066304 TPA
- 12048074 Terminal (8 pcs)
- 12089678 Seal (8 pcs)
- 12059168 Plug (if less than 8 connections are made)



# STrack2 – Adjustable End Limit Control Operation

## Features

12/24VDC @ 15/7.5Amps maximum

4 Adjustable Stop Positions using Membrane Keypad

- Shipped from factory to stop at maximum retract and extend positions using internal switches on potentiometer strip
- Customer can adjust Retract & Extend stops using membrane keypad. These values will be stored in permanent EEPROM memory for the life of the actuator.
- Adjusted stop positions can also be erased at any time to go back to factory default.
- Retract is Stop 1 and Extend is Stop 2. Stop 3 and Stop 4 can be set anywhere inside these two values.
- When Stop 1 (Retract) and Stop 2 (Extend) positions are reached the actuator will automatically stop and not allow movement in that direction. Power will have to be reversed in the opposite direction to move actuator.
- If Stop 3 and Stop 4 positions are used, when these positions are reached the control will remove power to the actuator until input power is cycled. Then when power is reapplied it can move in either direction.
- Positional Accuracy, under no load conditions from the initial stop position setting is within 0.10". This will improve with loaded applications since there will be less coast.
- Repeatability of hitting the same stop position every time is within .010".

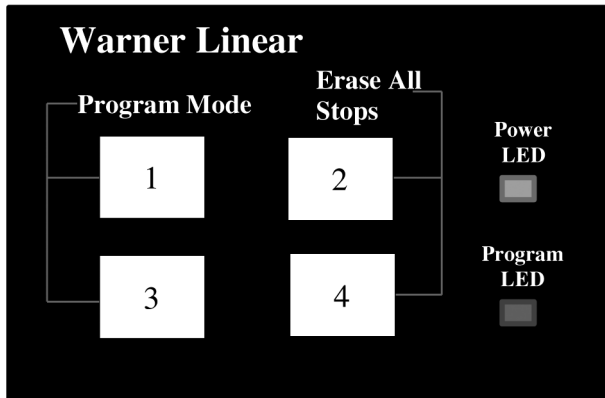
## Outputs

- Stop 1 (Retract) and Stop 2 (Extend) Outputs – 12/24VDC @ 1 amp maximum
  - Active High or Low (factory set to Active High)
- Positional Feedback – Signal conditioned potentiometer feedback, available in:
  - 0-5, or 0-10, or 1-5, or 2-10 VDC
  - 0-10, or 0-20, or 2-10, or 4-20 mAThe signal conditioned feature adjusts the output so Stop 1 (full Retract) is always 0 (or min. value of the output setting chosen) even if the potentiometer value is not zero. Therefore, Stop 2 (full Extend) is also conditioned to be the maximum output of the setting chosen. This conditioning is done once (either at the factory or when either Stop 1 or Stop 2 is changed). Then the value is saved in EEPROM for the life of the actuator.
- Live Power – Keeps outputs and feedback information on when switched power off.
  - This power needs to be from the same source as the actuator main power, just taken before the switched.

**Note:** If Positions 1 or 4 are changed the analog output will reset to provide full range of output for the new positions. For example, if Full Retract is set at +1 inch, then '0' volt output will be at +1 inch.

## Molded 8-pin Sealed Connector for Customer Connections

## STrack2 – Adjustable End Limit Control Operation



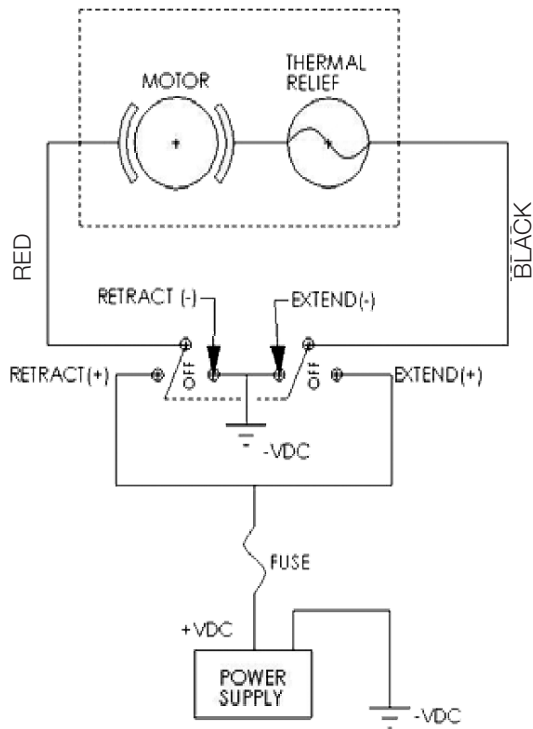
- **Green LED** indicates there is **Power** to the control
- **Red LED** indicates when in **Program Mode**
- Press **keys 1 & 3** together to enter **Program Mode**
  - Red LED stays LIT for ~90 seconds waiting for another key command until:
    - Actuator is commanded to extend or retract (immediately leaves programming mode)
    - One of the keys listed below is pressed, Red LED will turn off and control will return to normal operation
    - No key is pressed after ~90 seconds, Red LED will turn off and control will return to normal operation
- **Press key 1 or**
  - New Retract end limit stop position
  - Signal conditioned output will change this position to 0V output
  - Red LED will turn off & program returns to normal operation
- **Press key 2 or**
  - New Extend end limit stop position
  - Signal conditioned output will change this position to ~5V output
  - Red LED will turn off & program returns to normal operation

- **Press key 3 or**
    - 3rd Stop position Set
    - Red LED will turn off & program returns to normal operation
  - **Press key 4 or**
    - 4th Stop position Set
    - Red LED will turn off & program returns to normal operation
  - **Press keys 2 & 4**
    - Erase all 4 stop positions and goes back to factory default (maximum stroke)
- OR
- To change only one stop position, press one of the keys 1 to 4 again in the new desired location

# K2VL, K2 and K2X DC Electrical Wiring

## Packard (Delphi) Connectors (Warner Linear part number)

Male connector	2973781	(055-0101-01)
Male Terminal (2 req)	2962573	(055-0107-01)
Female connector	2984883	(055-01010-02)
Female terminal (2 req)	2962987	(055-0107-02)

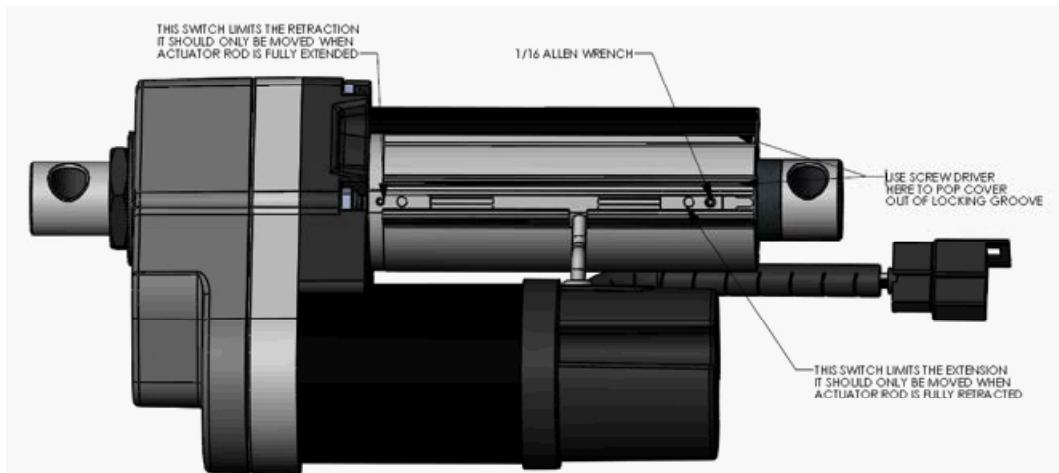


**Note: Wiring diagrams for limit switch and potentiometer feedback are included in the manual for those products.**



## K2/K2X EP

The external Limit Switch design allows the customer to set the end of travel stop position for the both the extend and retract of the extension tube. The design includes a magnet within the extension tube and one limit switch at each end of the cover tube. As the magnet crosses in front of the switch, the switch will change states from open to close.



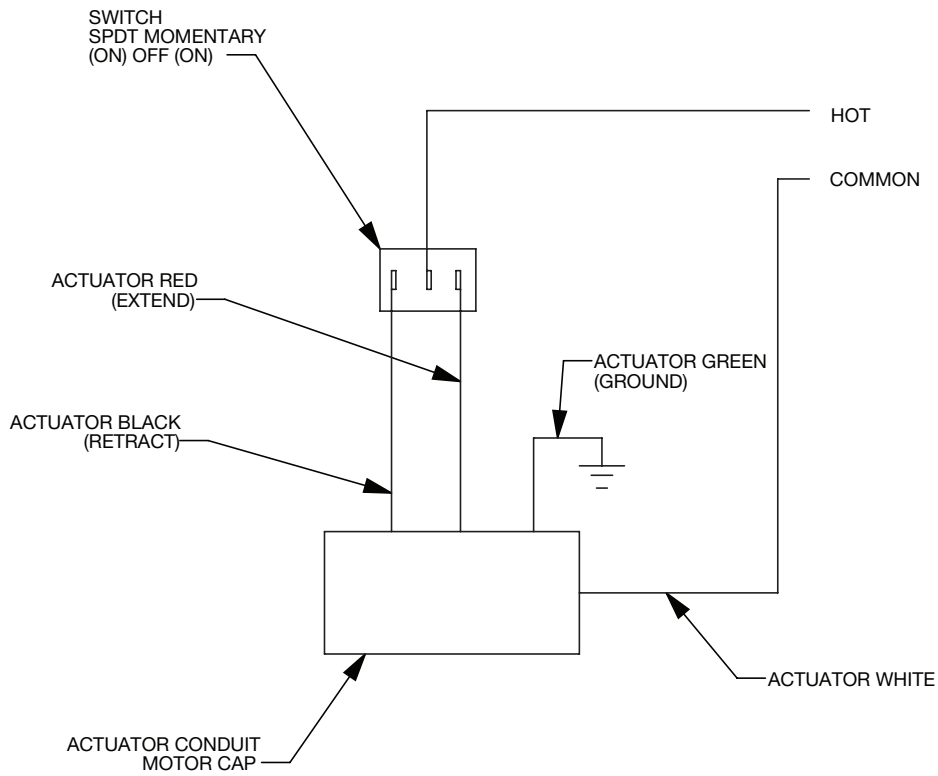
To access the limit switches use a thin flat head screw driver to remove the end cap from the side cover. Slide the cover off of the unit to expose the limit switches.



When the actuator leaves the manufacturing plant, the switches are set at the maximum stroke for that unit. Care should be taken so that the switch is not moved past the point where the extension tube can travel. If this happens, the actuator will continue to drive causing excess wear on the clutch assembly. Wiring for the EP limit switch design is the same as for internal limit switches

## K2AC and K2XAC

23-1/2 inch long cable provided  
Green to ground  
White to Neutral  
Black (Hot) to retract  
Red (Hot) to extend



# Troubleshooting

Unit will not extend or retract (power concerns)	
Possible Problem	Recommended Action
Unit Overloaded	<p><b>A. Inspection Method</b> Use voltmeter to confirm that power is reaching the motor lead wires.</p> <p><b>B. Open/Blown Fuse</b> Confirm that the fuse installed is sized properly for the application. Current draw information for each motor is included with the data for each model of actuator.</p> <p><b>C. Switch Failure</b> If power reaches the switch, but not the actuator, the switch has failed and must be replaced.</p> <p><b>D. Switch Wiring</b> Confirm that the wiring at the switch is accurate per the wiring diagram provided with each model of actuator. Re-wire as needed.</p> <p><b>E. Wiring Failure</b> Inspect for cut or broken wires between the power source and the switch and between the switch and the actuator. Replace wires as needed.</p>
Motor Failure	<p><b>Inspection</b> Use ohmmeter to check resistance of the coil.</p>
Thermal Overload Open	<p>If the actuator has been run at a duty cycle greater than 25% or the unit has been overloaded, the thermal overload in the motor may have opened to protect the motor.</p> <p>Allow sufficient time for the motor to cool which will allow the overload to reset. Confirm the application to ensure that the unit is not overloaded and that it is not running at greater than 25% duty cycle.</p>
Insufficient Current	<p>Power may be reaching the motor, but with insufficient current to provide full load moving capacity. Use an amp meter to confirm that sufficient current is reaching the actuator. Use the load/current charts in the catalog to confirm current requirements based on the unit loading.</p>

## Troubleshooting

<b>Unit will not extend or retract (mechanical issues)</b> Power is reaching the motor, but the unit will not move the load.	
<b>Possible Problem</b>	<b>Recommended Action</b>
Unit Overloaded	Inspect to confirm that the load applied does not exceed the rating for the actuator. Reduce load as needed, or replace actuator with a unit with sufficient capacity for the load applied.
Unit Binding	As noted on page 3 mounting pins must be parallel and mounting must avoid side loading. Out-of-parallel pins or sidelading may cause unit binding that will reduce unit capacity.  If the above checks do not reveal the source of the problem, remove the unit from its mounting and run the unit under no load. Observe unit behavior and make adjustments as necessary.
<b>Unit will not extend/retract or stops in mid stroke</b>	
<b>Possible Problem</b>	<b>Recommended Action</b>
Overloading Clutch Slipping	When a unit is overloaded in a sufficient amount, the clutch will slip. This will generate a ratcheting noise within the unit.  Load has exceeded the capacity of the unit. Reduce the load to fall within unit specifications; or, replace the actuator with a unit with sufficient capacity to move the load.  If the unit has seen many slip occurrences, the clutch may be worn out.
Insufficient Current	Insufficient current is reaching the unit to provide full load capability. Use the load/current draw charts provided for each unit to confirm current requirements and adjust power source accordingly.
<b>Motor hums, but does not move the load AC actuators</b>	
<b>Possible Problem</b>	<b>Recommended Action</b>
	Inspect to confirm that the load applied does not exceed the rating for the actuator. Reduce load as needed, or replace actuator with a unit with sufficient capacity for the load applied.
<b>Unit stops at mid stroke or exceeds stroke length</b> Units with limit switches	
<b>Possible Problem</b>	<b>Recommended Action</b>
	The limit switches have been improperly set. Review the limit switch adjustment process and correct so that the unit travel is set properly.

# Warranty

Warner Linear warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

This warranty extends only to the original purchaser and is not transferable or assignable without Warner Linear's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Warner Electric LLC factory. Additional warranty information may be obtained by writing the Customer Satisfaction Department, Warner Linear, 5693 Revlon Drive, Belvidere, IL 61008, or by calling 815-547-1106.

A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

This warranty covers normal use and does not cover damage or defect which results from alteration, accident, neglect, or improper installation, operation, or maintenance.

Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

Warner Linear's obligation under this warranty is limited to the repair or replacement of the defective product and in no event shall Warner Linear be liable for consequential, indirect, or incidental damages of any kind incurred by reason of the manufacture, sale or use of any defective product. Warner Linear neither assumes nor authorizes any other person to give any other warranty or to assume any other obligation or liability on its behalf.

WITH RESPECT TO CONSUMER USE OF THE PRODUCT, ANY IMPLIED WARRANTIES WHICH THE CONSUMER MAY HAVE ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL CONSUMER PURCHASE. WITH RESPECT TO COMMERCIAL AND INDUSTRIAL USES OF THE PRODUCT, THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

## Changes in Dimensions and Specifications

All dimensions and specifications shown in Warner Linear catalogs are subject to change without notice. Weights do not include weight of boxing for shipment. Certified prints will be furnished without charge on request to Warner Linear.



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