

Electrak 205 Series Electromechanical Linear Actuators



INTRODUCTION

Thomson has many years of experience designing and manufacturing linear actuators for a wide variety of applications on combines, school buses, industrial sweepers, vans for the handicapped, and other mobile applications. The Thomson linear actuator you have purchased is a well designed, high quality unit which will provide consistent, maintenance-free service throughout its life.

This actuator incorporates a potentiometer for stroke position sensing. When mated with an MCS-2051 or MCS-2052 control, it will provide feedback as well as controlled linear force for positioning, adjusting, closing or opening on in-plant applications.

This manual provides complete information needed to install and troubleshoot Thomson ALXX-XXB5-XXD AC Linear Actuators. All of these products are easy to apply.

Please follow the instructions provided in this manual carefully to ensure safe, reliable operation. The Application Notes found on page 3 are of paramount importance, so be sure to read them thoroughly before proceeding with installation. All stated or implied manufacturer's warranties are voided if this product is not installed and operated in accordance with these

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WARRANTY

Thomson 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 Thomson's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Thomson factory. Additional warranty information may be obtained by writing the Customer Service Department:

Thomson
45 Hazelwood Drive - Amherst, NY 14228
800-566-5274

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, without 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 warrant lasts, so the above limitation may not apply to you.

Thomson's obligation under this warranty is limited to the repair or replacement of the defective product and in no event shall Thomson be liable for consequential, indirect, or incidental damages of any kind incurred by reason of the manufacturer, sale or use of any defective product. Thomson 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 EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS.

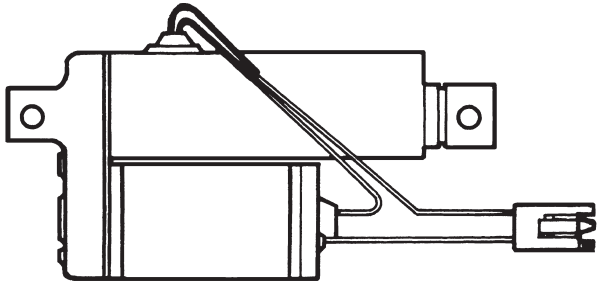
Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Other Actuator Products

Thomson's family of actuators offers the right load capacity, stroke length, and control package for almost every application. With stroke lengths from 2 to 24 inches, load ratings from 25 to 1000 lbs., AC or DC models, and control systems from simple on-off control to sophisticated closed loop sensing types, Thomson actuator systems

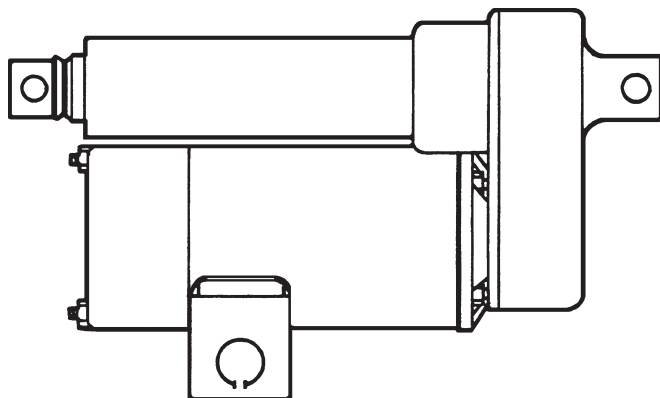
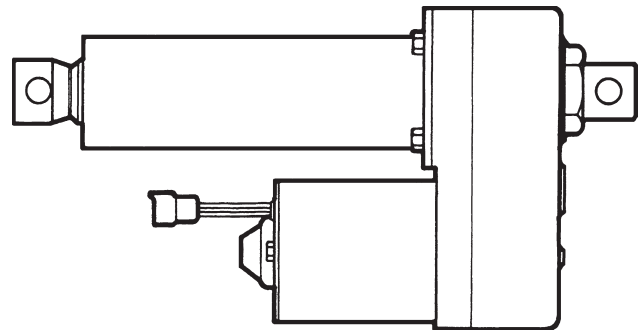
encompass a broad product range. The actuator series described on this page are available at your local Thomson distributor or directly from the address on the back cover of this manual.

Ask for catalog no. P-786 for more information on these products.



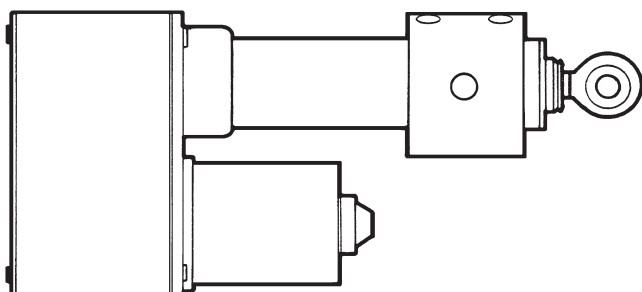
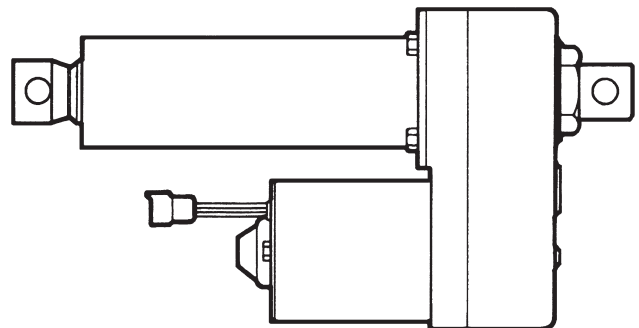
Electrak 1 – Nominal load capacities in a small package.
Load Ratings: 25 or 75 lbs. max.
Stroke Lengths: 2, 4, or 6 inches
Power Input: 12 or 24 VDC
Overall Lengths: 7 to 11 inches, depending on stroke.

Electrak 2 – Economy actuator for light load applications.
Load Ratings: 250 lbs. max.
Power Input: 12 VDC
Stroke Lengths: 4, 6, or 12 inches.



Electrak 5 – A 115 VAC for in-plant applications.
Load Ratings: 500 lbs. max.
Stroke Lengths: 4, 8, 12, 18 or 24 inches

Electrak 10 – The outdoor actuators – designed for mobile equipment.
Load Ratings: 500 or 1000 lbs. max.
Power Input: 12 or 24 VDC
Stroke Lengths: 4, 6, or 12 inches



Electrak 100 – Potentiometer position feedback control and internal adjustable limit switches make this Thomson's most sophisticated actuator.
Load Ratings: 500 or 1000 lbs.
Power Input: 24 VDC
Stroke Lengths: 4, 8, 12, 18, or 24 inches
Feedback: 10K ohm potentiometer

The Thomson family of actuator controls - a choice of separate or combined power supplies and controls to meet your various needs.

MCS-2015

A power supply for use with a remote control station, photoscanner or programmable controller to run any 24 VDC actuator. 115/230 VAC input, 24 VDC output, thermal overload protection, fused, power on/off switch.



MCS-2025

Combines the power supply of the MCS-2015 and the control of the PC compatible MCS 2020 in a single enclosure for ease of installation and wiring.



MCS-2020

A control that can be used with the MCS-2015 or other 12 or 24 VDC power sources. Provides extend, retract, jog, run and auto return functions. Programmable controller compatible, 12 or 24 VDC input-output.



MCS-2035

Combines the power supply of the MCS-2015 and the control of the PC compatible MCS-2030 in one enclosure for ease of installation and wiring.



MCS-2030

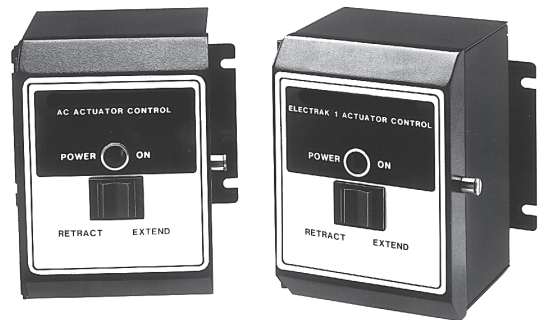
Same as the MCS-2020 but includes an analog meter to display the position feedback from the Electrak 100.



MCS-2041

MCS-2042

Electrak 5 controls which switch both the actuator motor and anti-coast brake. Rocker switch on control face extends and retracts actuator. Includes motor run capacitor.



MCS-2005

A simple control which converts a 120 VAC input to 24 VDC to operate an Electrak 1 actuator. Rocker switch controls extend/retract of actuator.

MCS-2041 115VAC
MCS-2042 230 VAC

Application Notes

Read the wiring instructions in this manual before wiring an Electrak 205 actuator to a Thomson MCS series or any other control.

WARNING: Turn power off before attempting to work on or near an actuator and/or its electrical controls. Leaving the power on can cause personal injury or death as well as damage to property.

2. Install a correct capacitor to start your Electrak 205 under load or it may fail to operate when current is applied. This capacitor is already installed in either the MCS-2051 or 2052 control. The capacitor must be ordered separately if neither of these controls is used.
3. The duty cycle for the Electrak 205 is 25% "on time" up to 45 seconds of operation or one full extend-retract cycle, whichever is longer. Thus, an actuator operating 45 seconds must remain off for 135 seconds (the remaining 75% of the total 180 second interval) before being operated again. Exceeding this maximum will cause the motor to overheat and trip its internal thermal limits. The thermal limiter reset is automatic after motor cool down.
4. Set the limit switches properly when installing the actuator. If they are set improperly, the actuator will extend/retract to its mechanical end of stroke and stall the motor. The motor draws an excessive amount of current when stalled and repeated operation under these conditions can damage the actuator.
5. Do not rotate the extension tube as this will cause a change in the limit switch and potentiometer settings.
6. Electrak 205 actuators can be mounted using the clevis mount provided or with the optional axial (tube) mounting kit which can be ordered by specifying part number 9110-448-007.
7. When operating in a moist environment, Electrak 205 actuators must be mounted with the extension tube down to prevent moisture buildup inside the actuator.
8. Lubrication — Although they are factory lubricated, Electrak 205 actuators require 2 oz. of Mobil 28 grease or equivalent after the first 25,000 cycles (or 6 months) and 1/2 oz. of the same grease every 25,000 cycles (or 6 months) thereafter. Grease is to be applied through the fitting on the outside of the actuator cover tube. When installing the actuator, be certain to provide access to this fitting.
9. Electrak 205 actuators are Totally Enclosed, Non-Ventilated (TENV) and are designed to operate in damp, oily and dusty atmospheres.

WARNING: Since Electrak 205 actuators are neither explosion nor dust ignition proof, do not use them in these atmospheres or personal injury, property damage or death may result.

SPECIFICATIONS

Actuator is U.L. and C.S.A. Recognized

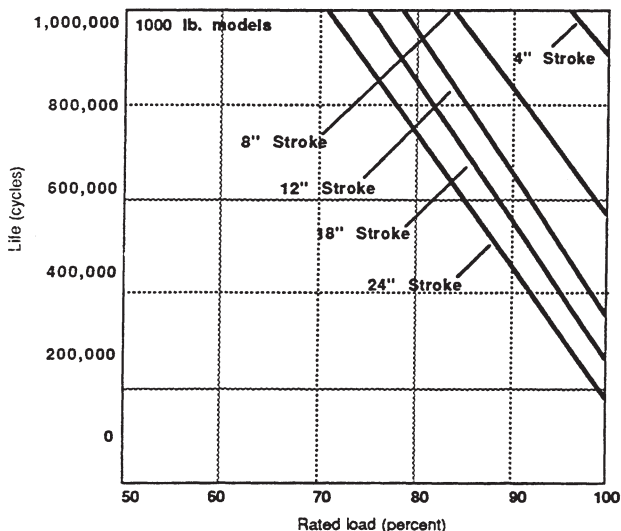
<p>Stroke Lengths: 4, 8, 12, 18 or 24 inches</p> <p>Duty Cycle: 25% on time at 77° F. at rated load.</p> <p>Life: 100,000 cycles minimum</p> <p>Motor Protection: Automatically reset thermal limiter</p> <p>Temperature Range: -15° F. to 150° F.</p> <p>End Play: .015 maximum, not including mounting points.</p> <p>Mounting: Actuator ends must be restrained from rotating (to counter 100 in. lb. maximum torque developed) and mounted with parallel half inch solid pins equally supported.</p>	<p>Feedback: 10,000 Ω potentiometer, accurate within ± .0025 for unidirectional loads and ± .010 for bidirectional loads, set for 385 Ω/inch of travel, preset for minimum resistance at full mechanical retract (200 Ω maximum)</p> <p>End of Stroke Protection: Externally adjustable end of stroke (extend & retract) limit switches.</p> <p>Conduit Opening: ½" & ¾" N.P.T.</p> <p>Static Loads: 4000 lbs. 18" stroke and under. 2500 lbs. 24 " stroke.</p>
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PERFORMANCE

Model	Voltage	Max. Load	Max. Amp. Draw	Speed at Max. Load
A12-05B5-XXD	115 VAC	500 lbs.	2.8	1.7 in. sec.
A22-05B5-XXD	230 VAC	500 lbs.	1.4	1.7 in. sec.
A12-10B5-XXD	115 VAC	1000 lbs.	2.8	.9 in. sec.
A22-10B5-XXD	230 VAC	1000 lbs.	1.4	.9 in. sec.

The graph below describes anticipated life under varying load and stroke conditions. This is based on lubrication per instructions found on page 3 under Application Notes. The adjacent chart indicates approximate component replacement requirements.

Life vs. Load



Component	Replace every
ER Brake	500,000 cycles
Feedback Potentiometer	250,000 to 800,000 cycles, depending on stroke length
Motor	375,000 to 1,000,000 cycles, depending on stroke length

Mounting

Electrak 205 Linear Actuators can be mounted by clipping pins through the mounting clevis or by using the tube mounting collar (not included).

When using the clevis method, half inch diameter solid pins should be fitted for maximum strength. Insert a retaining or cotter pin on each end to prevent the solid pin from falling out of its mounting bracket. Do not use roll or spring type mounting pins. The mounting pins must be parallel to each other as shown in Figure 1 to avoid binding.

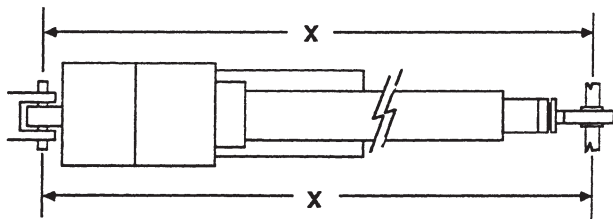


Figure 1

The load must act along the stroke axis of the actuator since off center loads will cause binding and lead to premature failure. See Figure 2.

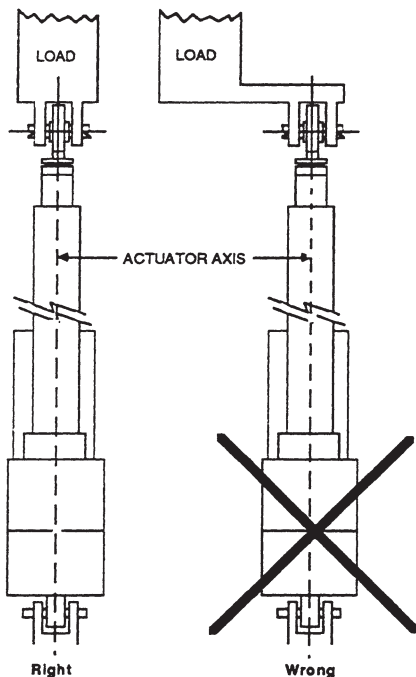


Figure 2

The actuator mounting brackets must be able to withstand the 100 in. lb. restraining torque which is developed when the unit extends or retracts, as shown in Figure 3 below.

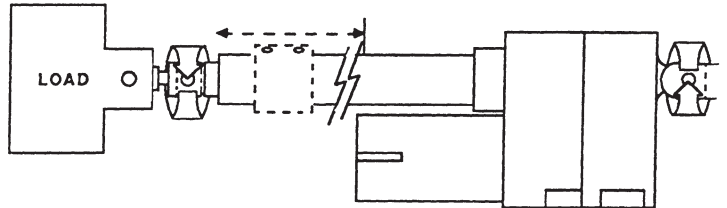


Figure 3

Adjust the tube mounting collar (not included) anywhere along the cover tube to allow flexibility of mount location. Tighten the four set screws to 22 in. lbs. torque after the mounting location has been determined.

If a customer designed tube mount is used, make sure the mount allows freedom of movement to assure the actuator does not bind during travel. The mount may be welded to the outer tube.

NOTE: Do not disassemble the tube from the actuator. Take care not to damage seals from excess heat when welding.

Make sure mounting pins are supported on both ends. **Cantilever mounts are unacceptable.** Failure to do so could shorten the life of the actuator.

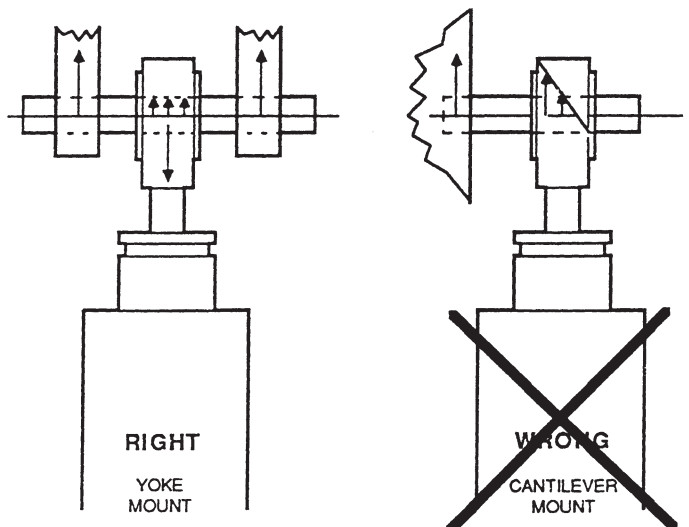


Figure 4

Electrical Installation

Wiring:

Thomson recommends using 16 gauge wire for applications where the actuator is up to 20 feet from the power source and 14 gauge wire for distances ranging from 20 to 60 feet.

Capacitor: *

Thomson AC actuators use permanent split capacitor motors which **require a properly wired capacitor for both starting and running**. Thomson offers capacitors as follows: If a control is purchased the capacitor is included in the control.

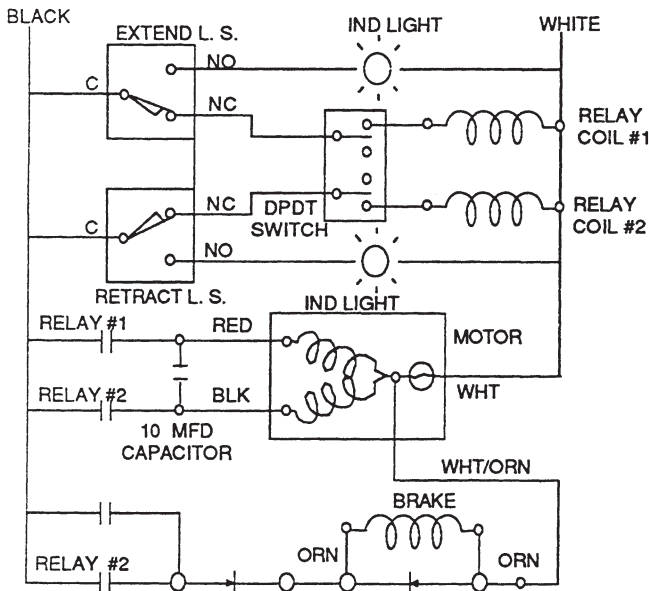
Motor Voltage	Capacitor Rating	Part Number
115 VAC	35 mfd, 240 VAC	9200-448-002
230 VAC	10 mfd, 370 VAC	9200-448-003

*Capacitors are integral to Thomson controls.

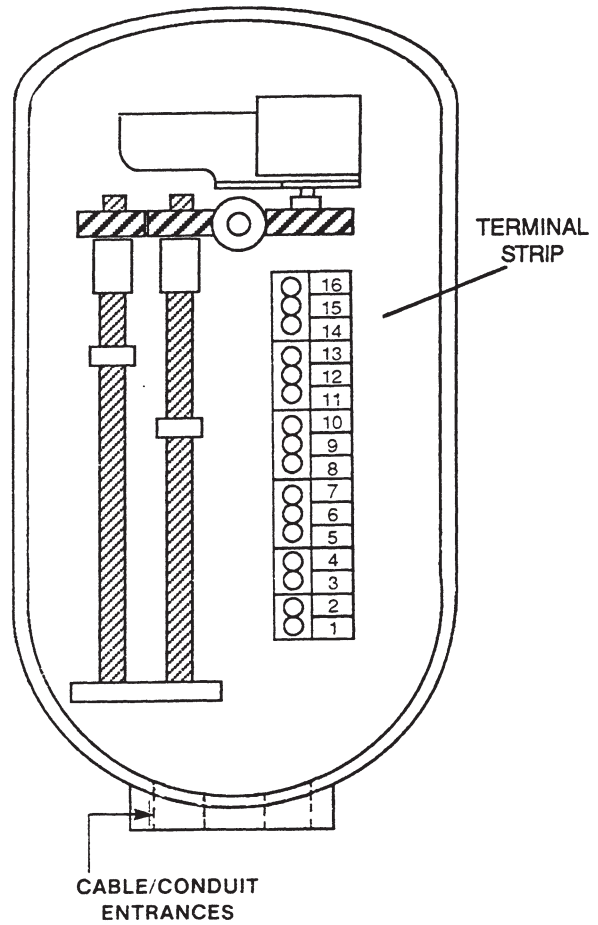
Connection:

WARNING: Turn power off before wiring actuator or control. Failure to do so can result in personal injury, property damage, and even death.

To wire the Electrak 205 actuator remove the rear cover to expose the terminal strip. Install wires in accordance with instructions for MCS-2051 or 2052 controls. If Thomson controls are not used, the actuator can be wired as follows.



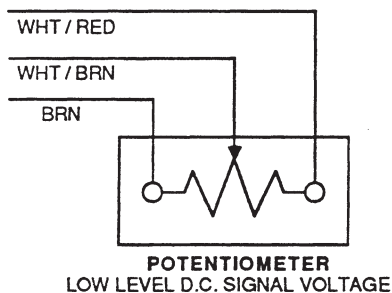
SYSTEM WIRING SCHEMATIC



**TERMINAL STRIP
SHOWN WITH BACK COVER REMOVED**

Potentiometer Connection:

Remove the rear cover to expose the terminal strip and install wires as follows: When the resistance is measured across white/brown terminal #15 and white/red #14 lead wires, the resistance will increase as the actuator extends. When the resistance is measured across white/brown #15 and brown #16 lead wires, the resistance will decrease as the actuator retracts. The resistance measured across white/red #14 and brown #16 is constant and can be used as a reference.



One revolution of the adjusting screw equals 1/2" stroke length change. Note: Minimum stroke length is one inch. After adjustment, run actuator to ensure the desired position was obtained. If not, repeat the adjustment procedure.

NOTES: Do not turn the adjusting screws beyond their maximum travel. Applying excess torque to the adjusting screws will damage the adjusting mechanism.

Do not rotate the extension tube as this will change limit switch and potentiometer settings.

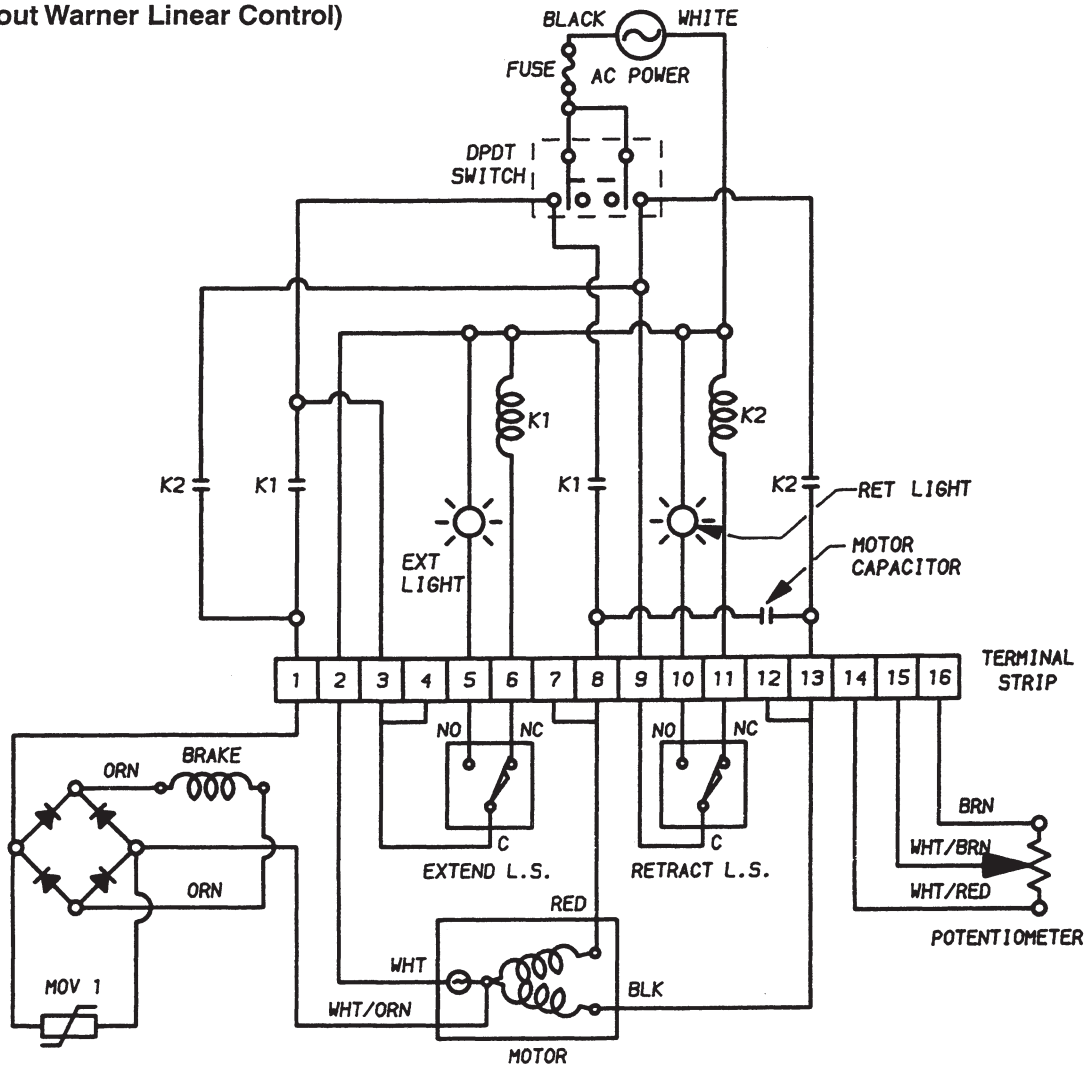
Actuator design allows for an additional 1/3 " travel beyond the nominal stroke length limits. Extending the stroke length beyond these limits will result in motor stall and possible actuator damage.

Limit Switch Adjustment:

Electrak 205 actuator limit switches are factory set for a normal stroke. The limit switches set the electrical stroke within the mechanical limits of the actuator. Stroke length adjustments can be made through one of the two adjustment ports in the base of the back cover, marked "extend" or "retract." To alter the stroke length:

- a. Insert a 9/64" Alien wrench into the appropriate port after removing the dust plug.
- b. Rotate the adjusting screw in the direction indicated by the arrow, + to increase the stroke length, - to decrease the stroke length.

WIRING DIAGRAM FOR 205 ACTUATOR
 (Without Warner Linear Control)



1. Wiring diagram depicts an actuator with a voltage input of 115 VAC. The wiring to the terminal block is the same regardless of an input voltage of 115 VAC or 230 VAC.
2. Install a fuse as shown in the diagram. Recommended size is 10 amps for 115 VAC or 5 amps for 230 VAC input.
3. A DPDT switch (not furnished) is required. Switch can be purchased under Warner Electric P/N 830-8004-016. See Specifications on page 38 of Warner Electric catalog P-786.
4. Relays (not furnished — 2 required) are DPST-NO with a contact rating of 5 amps minimum suitable for motor loads.
5. Lights are optional and can be used to indicate actuator position at full extend or retract when the switch is in the “on” position.
6. A motor capacitor (not furnished) is necessary for starting and running. Capacitor may be ordered separately. (See page 7)

ELECTRAK 205 SERIES TROUBLESHOOTING

This section covers all models, used with or without MCS series controllers.

General: The chart below will help you isolate malfunctions in the control system, counter difficulties with system start-up, and troubleshoot for worn or broken mechanical or electrical components in units which have been operating for some time. For correct diagnosis, perform all tests before removing the actuator or controller from service.

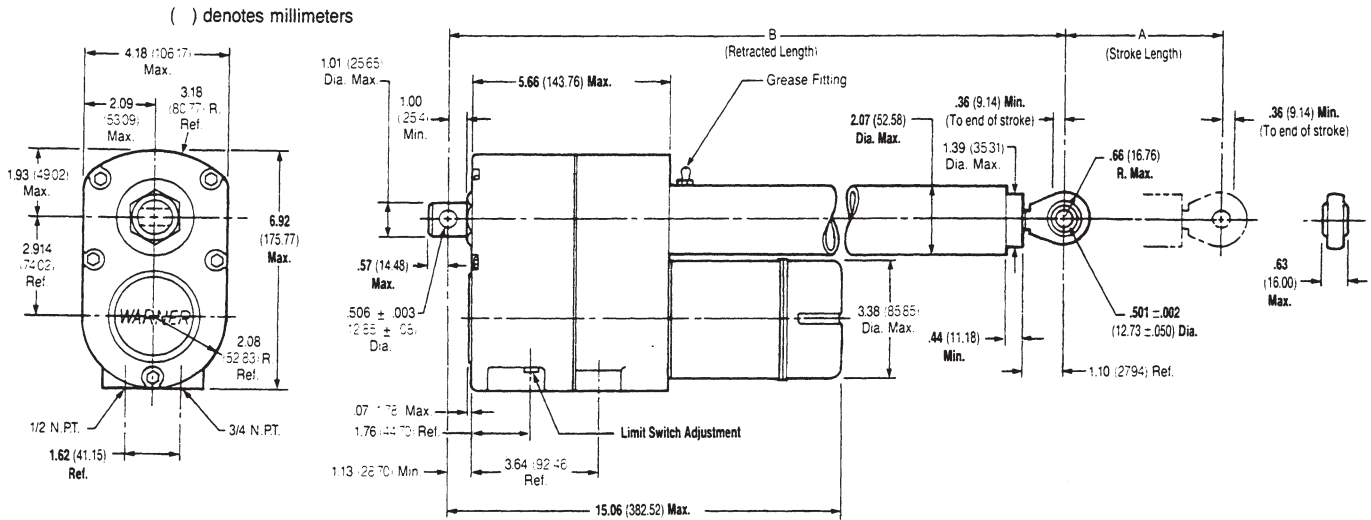
Symptom: Actuator will not extend/retract
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Checkpoint	Probable Cause	Possible Solution
No voltage or amp draw at controls.	Controller fuse(s) blown. Switch not turned on.	-Check manual for fuse location(s). Replace. -Put power to control.
Proper voltage, no amp draw.	Thermal breaker in actuator motor has tripped. Limit switch has been tripped. Limit switch not properly wired.	-Let cool, check duty cycle. -Check switch, reset. -Check control operations manual.
Motor hums, no movement.	Incorrectly wired capacitor. Incorrectly wired brake. Improperly set limit switch.	-Check wiring instructions. -Check wiring instructions. -Reset limit switches.
No amp draw.	Thermal cut-out in motor. Limit switch improperly set.	-Let cool, check duty cycle. -Reset switch (see wiring section).
Actuator does not move, amps present.	Motor stalled.	-Check voltage (too low).

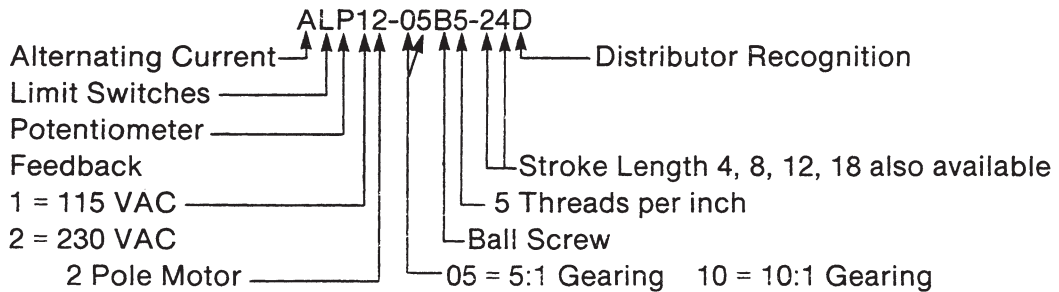
NOTE: If the above checks do not reveal the source of the difficulty, remove actuator from the mechanism to run by itself. Watch and listen for any changes in behavior.

Dimensions:

The outline below describes Electrak 205 actuators. The tabulated dimension chart shows lengths for each model and describes part numbers. Specifications, part numbers, dimensions, etc., may be changed without notice.



Nominal Retracted Length	Nominal Stroke Length
22.20	4
26.20	8
30.20	12
36.20	18
42.20	24



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