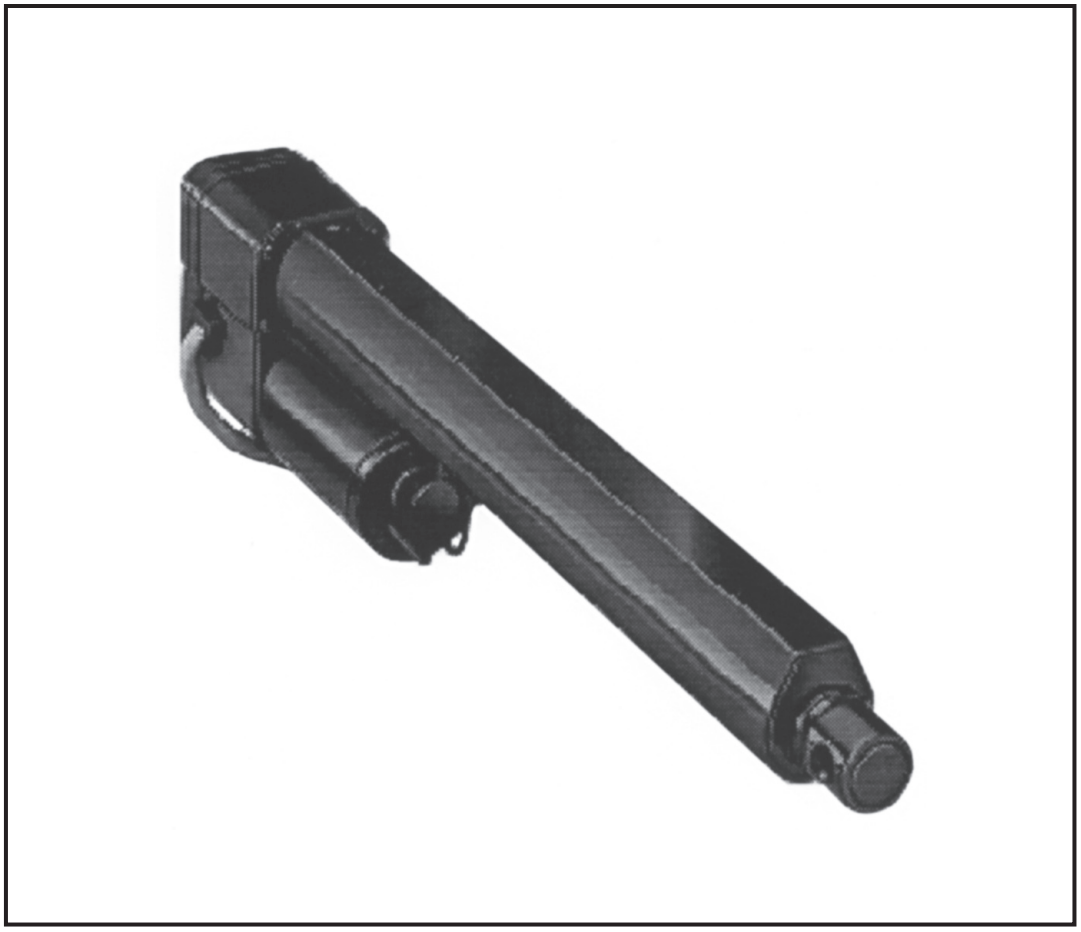
THOMSON™

www.thomsonlinear.com

Installation & Operation Manual

Electrak 1 Series / Electromechanical Linear Actuators Limit Switch, & Potentiometer Feedback, and Long Life Models



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. When the Electrak 1 is ideallt suited for intermittent duty cycle applications which require lifting, positioning, sorting, opening, closing, or adjusting, on in-plant or mobile applications.

This manual provides complete information needed to install all Electrak 1 linear actuators. All of these products are easy to apply and require no maintenance.

Please follow the instructions provided in this manual carefully to ensure safe, reliable operation. The Application Notes found on page 5 & 10 are of paramount importance, so be sure to read them care 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 instructions.

TABLE OF CONTENTS

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
1300 N. State St.
Marengo, Il. 60152
Phone: 1-800-554-8466

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.

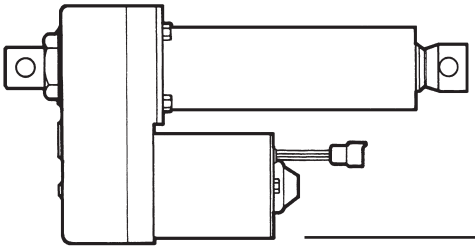
WITH RESPECT TO CONSUMER USE OF THE PRODUCT, ANY IMPLIED WARRANTIES WHICH THE CONSUMER MAY HAVE ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL CONSUMER PURCHASE. WITH RESPECT TO COMMERCIAL AND INDUSTRIAL USES OF THE PRODUCT, THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, 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 the following catalogs for more information on these products.

Electrak AC and DC Models:	P-786
Electrak 2000 Programmable Actuators:	P-1023
Rapidtrak Rodless Actuator Modules:	P-958
Linear Ball Bearings and Shafting:	P-1039

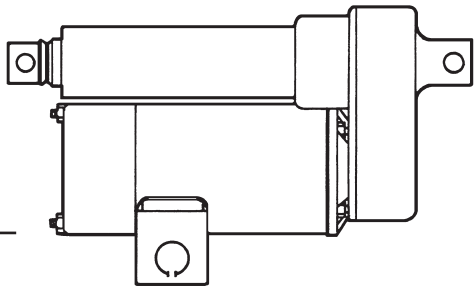


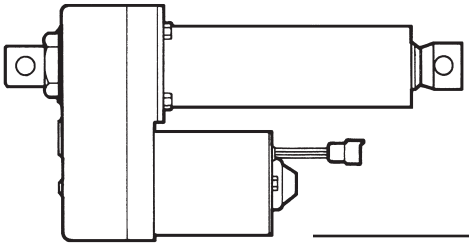
Electrak 2

Economical, general purpose DC actuator for light loads.
Load Ratings: 250 lbs. max.
Stroke Lengths: 4, 8, or 12 inches
Power Input: 12 VDC

Electrak 5

A 115 VAC model for in-plant applications.
Load Ratings: 500 lbs. or 1000 lbs. max.
Stroke Lengths: 4, 8, 12, 18 or 24 inches



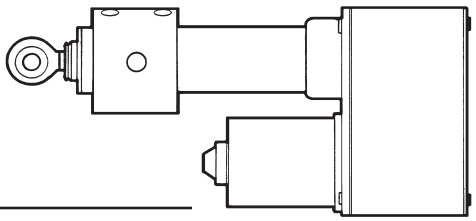


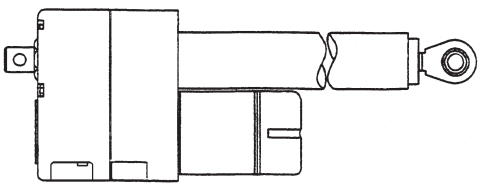
Electrak 10

The outdoor actuators - designed for mobile equipment.
Load Ratings: 500 lbs. or 1000 lbs. max.
Stroke Lengths: 4, 8, or 12 inches
Power Input: 12 or 24 VDC

Electrak 100

DC Actustor with Feedback
Load Ratings: 500 lbs. or 1000 lbs. max.
Stroke Lengths: 4, 8, 12, 18 or 24 inches
Feedback: Internal Potentiometer for Closed Loop Feedback
Limit Switches: Internal Adjustable.





Electrak 205

Extended Life AC Actuator*
Load Ratings: 500 lbs. or 1000 lbs. max.
Stroke Lengths: 4, 8, 12, 18 or 24 inches
Feedback: 10 turn internal potentiometer for closed loop feedback
Limit Switches: Internal Adjustable

*Unit life to 1,000,000 cycles - for demanding long term applications

Controls

The Thomson family of actuator controls provides a choice of separate or combined power supplies and controls with the manual or automatic controls needed for your application.

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-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-2030
Same as the MCS-2020 but includes an analog meter to display the position feedback from the Electrak 100.

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-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-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-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-2041 115 VAC
MCS-2042 230 VAC

ELECTRAK 1 ACTUATOR WITH INTERNAL LIMIT SWITCHES, STANDARD AND LONG LIFE

Application Notes

1. Always make sure power is off before attempting to work on or near actuators and their electrical controls.
2. When installed, the actuator must be free to extend through its full stroke length. Restraining the actuator will prevent it from shutting off through its internal limit switches. If mid-stroke shutoff is required, this must be done manually or with external limit switches.
3. External limit switches will be required if end of stroke shutoffs are not used. Electrak 1 actuators do not include slip clutches.
4. Each Electrak 1 actuator should be externally fused; the motor is thermally protected.
5. The duty cycle for the Electrak 1 actuator under full load is 25 percent "on time." For example, an actuator operating with a 20 second on time must remain off 60 seconds. Exceeding this 25 percent duty cycle maximum will often cause the motor to overheat and may damage the motor. See the load/duty cycle chart to determine the maximum duty cycle allowed for your application.
6. Electrak 1 actuators are weather protected for use in outdoor applications, but they are not waterproof and should not be used in underwater conditions.
7. Electrak 1 actuators are factory lubricated for life. No disassembly is ever required for routine maintenance purposes.
8. Electrak 1 actuators are not explosion or dust ignition proof; do not used in those types of environments.

SPECIFICATIONS

Stroke Lengths: 2, 4 or 6"

Duty Cycle: 25% on time at 77° F. at rated load (higher duty cycles at lower loads)

Life:
Standard: 20,000 cycles, nominal
Long Life: 80,000 cycles, nominal

End ot Stroke: Non-adjustable limit switches

Motor Protection: Recommend externally mounted fuse—6 amp for 12 VDC actuators,3 amp for 24 VDC units.

Temperature Range: -15° F. to 150° F.

End Play: .050 inch maximum

Overload Protection: Provided by externally mounted fuse.

Mounting: Actuator ends must be restrained from rotating (to counter 20 in. lb. maximum torque developed) and mounted with parallel 1/4 inch solid pins equally supported on both ends.

Lead Wires: 18 gauge, 4 inch standard length

Static Loads: 250 lbs.

DYNAMIC LOADS for S, SL Models

	Model	Voltage	Max. Load	Max. Amp. Draw	Speed at Max. Load
Standard	S12-09A4	12 VDC	25 lbs.	5.6	2.00 in. sec.
	S24-09A4	24 VDC	25 lbs.	2.8	2.00 in. sec.
	S12-17A8	12 VDC	75 lbs.	5.6	.60 in. sec.
	S24-17A8	24 VDC	75 lbs.	2.8	.60 in. sec.
Long Life	SL12-09A4	12 VDC	25 lbs.	5.6	2.00 in. sec.
	SL24-09A4	24 VDC	25 lbs.	2.8	2.00 in. sec.
	SL12-17A8	12 VDC	75 lbs.	5.6	.60 in. sec.
	SL24-17A8	24 VDC	75 lbs.	2.8	.60 in. sec.

MOUNTING

Thomson linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the unit and into brackets on the machine frame and the load.

Quarter inch diameter solid pins provide maximum holding strength and a retaining or cotter pin on each end will prevent the solid pin from falling out of its mounting bracket. Roll or spring type mounting pins should be avoided. The mounting pins must be parallel to each other as shown in Figure 1. Pins which are not parallel to each other may cause the actuator to bind.

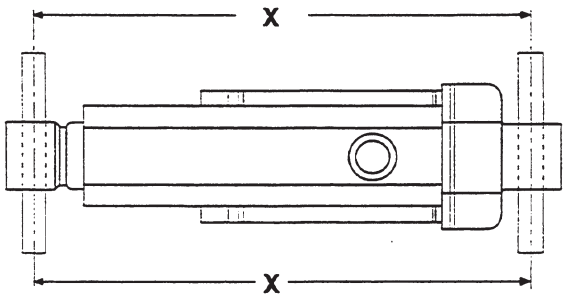


Figure 1

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

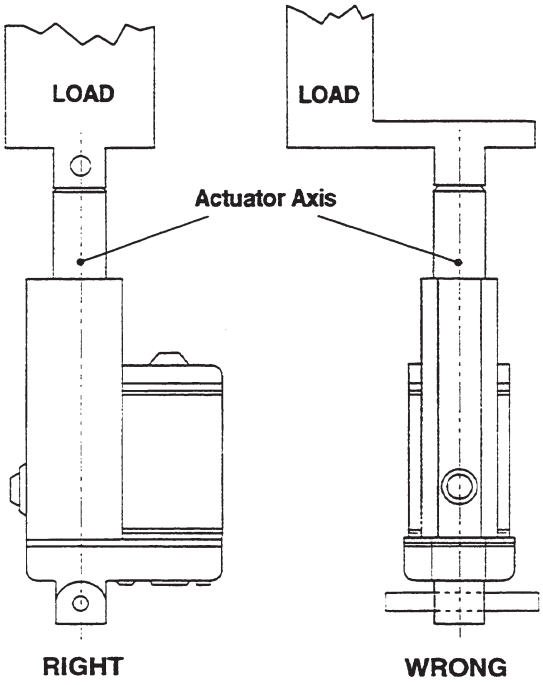


Figure 2

The actuator mounting brackets must be able to withstand the torque which is developed when the unit extends or retracts. Restraining torque required is 20 in-lbs, as designated in Figure 3.

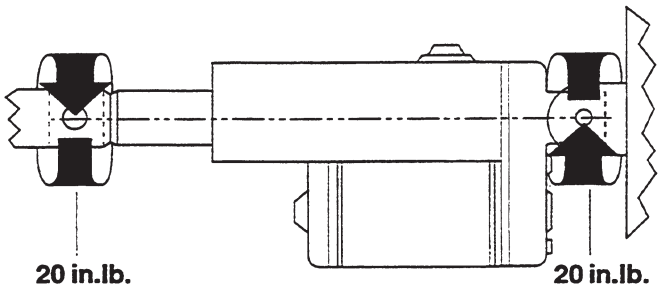


Figure 3

Make sure mounting pins are supported on both ends. Cantilever mounts are unacceptable. See Figure 4. Failure to properly support the pins could shorten the life of the actuator.

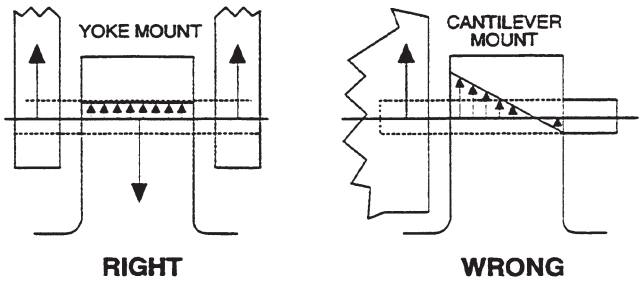


Figure 4

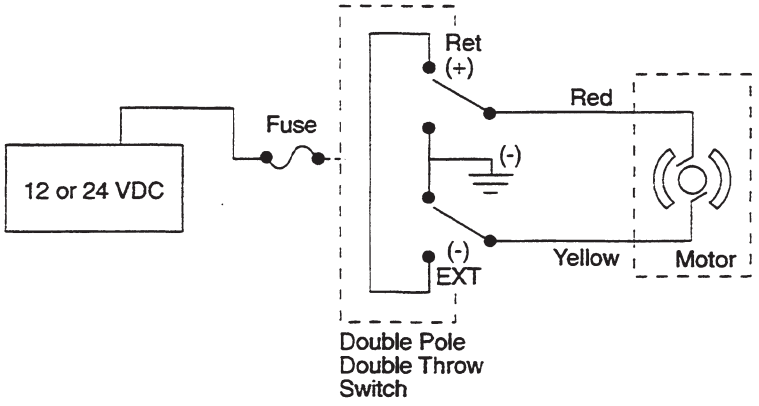
Note: When installed, the actuator must be free to extend through its full stroke length. Restraining the actuator will prevent it from shutting off through its internal limit switches. If mid-stroke shut-off is required, this must be done manually or with external limit switches.

ELECTRICAL INSTALLATION

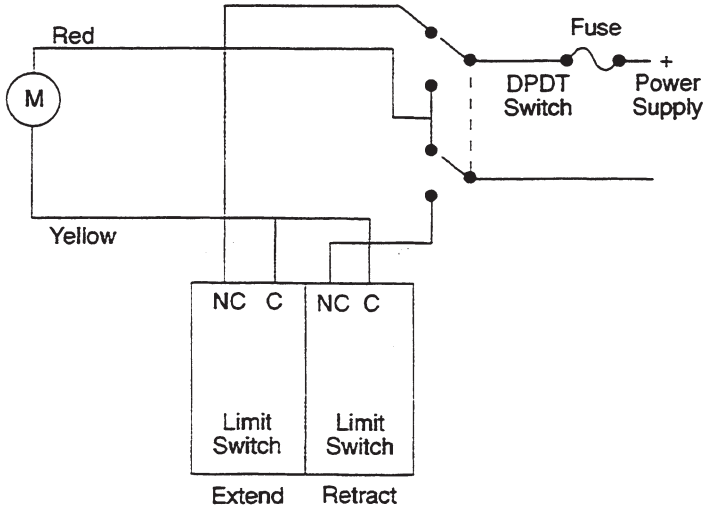
Actuators: To retract the actuator, connect the red lead to positive and the yellow lead to negative. Reverse the polarity to extend.

*Fuse: Actuator motor must be externally fused (fuse and holder supplied). A 6 amp fuse is required for a 12 VDC actuator. A 3 amp fuse is required for a 24 VDC unit.

Connectors: The connector furnished on the actuator is a Packard Electric Pack-Con male 8911773 with terminal 6294511, or equivalent. The mating connector is a Pack-Con 8911772 with terminal 8911639 or equivalent (provided).



Optional External Limit Switch Wiring



Note: External limit switch setting must be inside of designed stroke length or external limit switches will not be tripped.

ELECTRAK 1 WITH INTERNAL LIMIT SWITCHES

Troubleshooting

General: The chart below will be helpful for isolating malfunctions in the control system, countering difficulties with system start-up, and in troubleshooting for worn or broken mechanical or electrical components in units which have been operating for some time. For correct diagnosis, it is important to do all tests before disassembling the actuator.

Symptom: Actuator will not extend/retract

Checkpoint	Probable Cause	Possible Solution
Proper voltage, no amp draw	Dead motor Actuator has reached limit switch	-Replace (make sure actuator is fused) -Reverse motor polarity
No voltage or amp draw	Actuator not receiving power	-Check power supply -Replace fuse -Make sure actuator travel is not being restricted
Proper voltage, amp draw present	Actuator overloaded	-Check rated load

Symptom: Actuator stops in mid-stroke

Checkpoint	Probable Cause	Possible Solution
Amp draw present	Actuator overloaded Motor stalled	-Check rated load -Check voltage (too low)
No amps present	Blown fuse	-Replace fuse -Make sure actuator travel is not being restricted

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.

ELECTRAK 1 WITH INTERNAL LIMIT SWITCHES DIMENSIONS

The outline drawing shown below describes Electrak 1 compact actuators.
The tabulated dimensions chart shows lengths for each of the three stroke lengths.

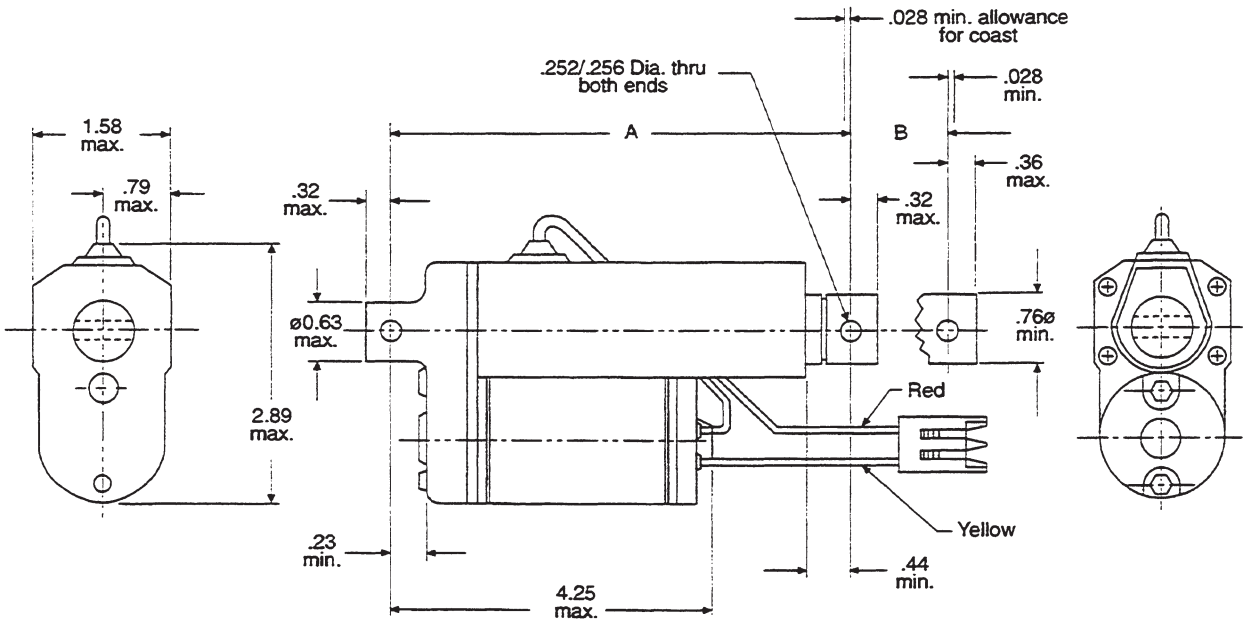
S 1 2 - 1 7 A 8 - 0 6

12 - 12 VDC
24 - 24 VDC

17A8-75#
09A4-25#

-02
-04
-06

Retracted Length A	Stroke Length B
6.26/6.22	1.835/1.805
8.26/8.22	3.835/3.805
10.26/10.22	5.805/5.835



LONG LIFE ELECTRAK 1 WITH INTERNAL LIMIT SWITCHES DIMENSIONS

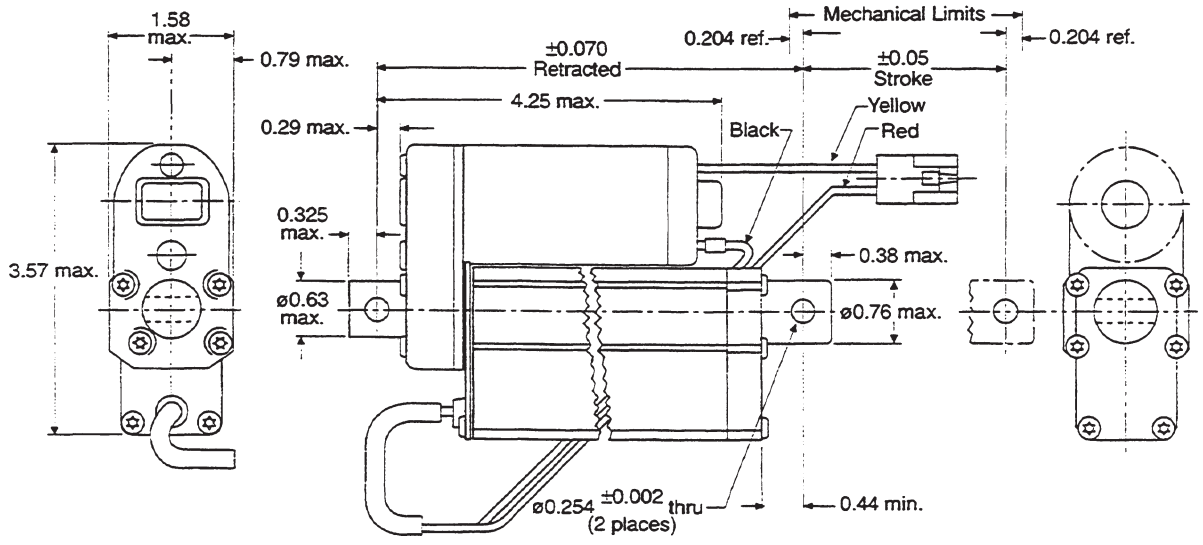
SL 1 2 - 1 7 A 8 - 0 6

12 - 12 VDC
24 - 24 VDC

17A8-75#
09A4-25#

-01
-02
-04
-06

	Retracted Length	Stroke Length
1"	5.34 ± 0.07	0.900 ± 0.05
2"	6.34 ± 0.07	1.900 ± 0.05
4"	8.34 ± 0.07	3.900 ± 0.05
6"	10.34 ± 0.07	5.900 ± 0.05



ELECTRAK 1 ACTUATOR WITH POTENTIOMETER FEEDBACK

Application Notes

1. Always make sure power is off before attempting to work on or near actuators and their electrical controls.
2. External limit switches will be required if end of stroke shutoffs are not used. Electrak 1 actuators do not include slip clutches.
3. The motor is thermally protected, however, each Electrak 1 actuator should be externally fused to protect wiring.
4. The duty cycle for the Electrak 1 actuator under full load is 25 percent "on time." For example, an actuator operating with a 20 second on time must remain off 60 seconds. Exceeding this 25 percent duty cycle maximum will often cause the motor to overheat and open the motor thermal breaker. See the load/duty cycle chart to determine the maximum duty cycle allowed for your application.
5. Electrak 1 actuators are weather protected for use in outdoor applications, but they are not waterproof and should not be used in underwater conditions.
6. Electrak 1 actuators are factory lubricated for life. No disassembly is ever required for routine maintenance purposes.
7. Electrak 1 actuators are not explosion or dust ignition proof; do not used in those types of environments.

SPECIFICATIONS

Stroke Lengths: 2, 4 or 6"

Duty Cycle: 25% on time at 77° F. at rated load (higher duty cycles at lower loads)

Life: 20,000 cycles, nominal

Motor Protection: Motor is thermally protected. Recommend externally mounted fuse - 6 amp for 12 VDC actuators, 3 amp for 24 VDC units.

Temperature Range: -15° F. to 150° F.

End Play: .050 inch maximum

Overload Protection: Provided by externally mounted fuse & motor thermal breaker

Mounting: Actuator extension tube is keyed to the cover tube. Mount with parallel 1/4 inch solid pins equally supported on both ends.

Lead Wires: 18 gauge, 4 inch standard length

Static Loads: 250 lbs.

Feedback: 4800 ohms over entire stroke length regardless of stroke

End of Stroke: Customer must supply end of stroke protection to shut off the actuator.

DYNAMIC LOADS

Model	Voltage	Max. Load	Max. Amp. Draw	Speed at Max. Load
SP12-09A4	12 VDC	25 lbs.	5.6	2.00 in. sec.
SP24-09A4	24 VDC	25 lbs.	2.8	2.00 in. sec.
SP12-17A8	12 VDC	75 lbs.	5.6	.60 in. sec.
SP24-17A8	24 VDC	75 lbs.	2.8	.60 in. sec.

MOUNTING

Thomson linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the unit and into brackets on the machine frame and the load.

Quarter inch diameter solid pins provide maximum holding strength and a retaining or cotter pin on each end will prevent the solid pin from falling out of its mounting bracket. Roll or spring type mounting pins should be avoided. The mounting pins must be parallel to each other as shown in Figure 1. Pins which are not parallel to each other may cause the actuator to bind.

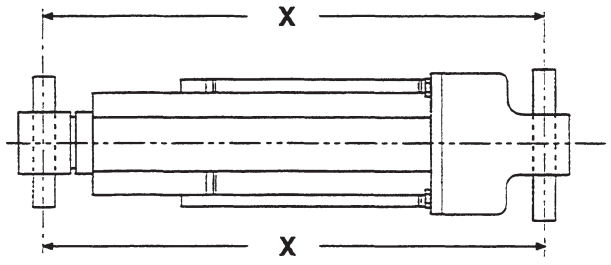


Figure 1

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

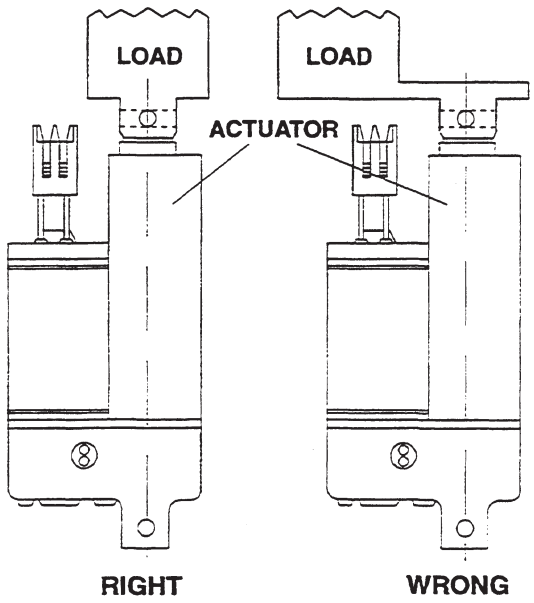


Figure 2

The actuator mounting brackets must be able to withstand the torque which is developed when the unit extends or retracts. Restraining torque required is 20 in-lbs, as designated in Figure 3.

Make sure mounting pins are supported on both ends. Cantilever mounts are unacceptable. See Figure 4. Failure to properly support the pins could shorten the life of the actuator.

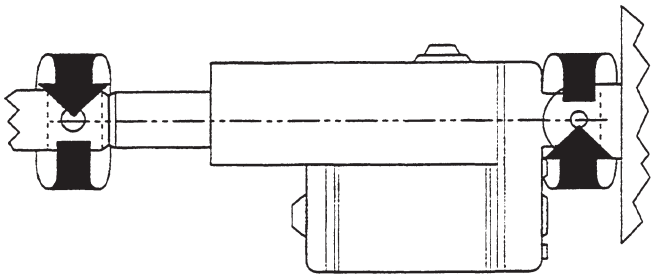


Figure 3

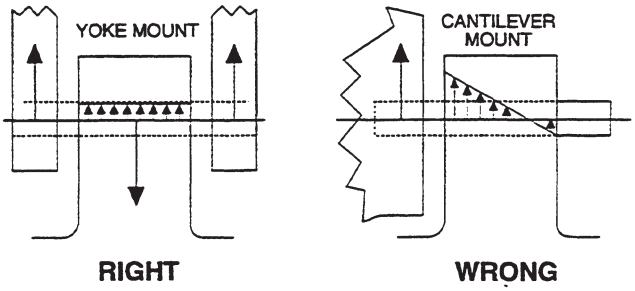
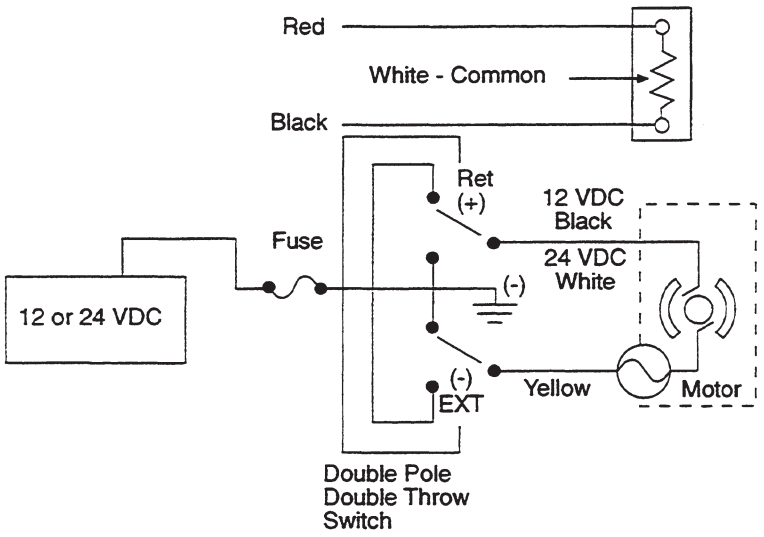


Figure 4

Note: When installed, the actuator must be free to extend through its full stroke length. Restraining the actuator will prevent it from shutting off through its internal limit switches. If mid-stroke shut-off is required, this must be done manually or with external limit switches. On Electrak 1 actuators with feedback the stroke can be adjusted to suit the application when used with the MCS-2007 control.

ELECTRICAL INSTALLATION



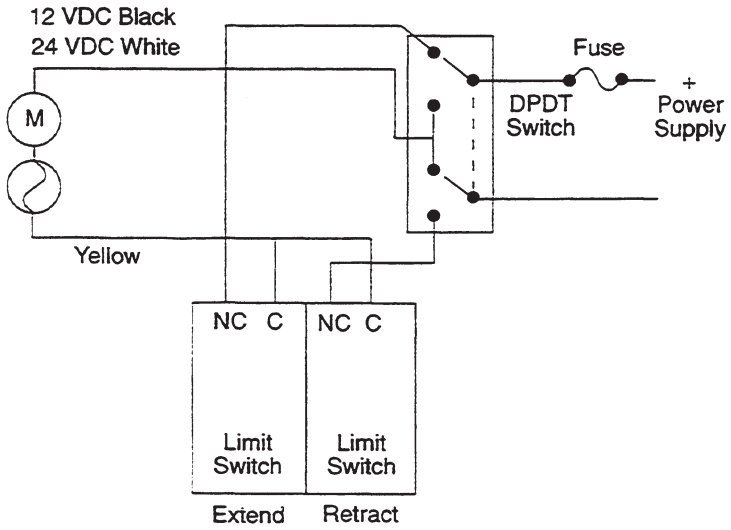
Actuators: To retract the actuator, connect the white lead (for 24 VDC and black lead for 12 VDC) to positive and the yellow lead to negative. Reverse the polarity to extend.

***Fuse:** Actuator motor should be externally fused to protect wiring. A 6 amp fuse is required for a 12 VDC actuator. A 3 amp fuse is required for a 24 VDC unit.

Connectors: The connector furnished on the actuator is a Packard Electric Pack-Con male 8911773 with terminal 6294511, or equivalent. The mating connector is a Pack-Con 8911772 with terminal 8911639 or equivalent (provided).

Feedback: While actuator is extending, the resistance will increase when measured between red and white leads and decrease when measured between black and white leads.

Optional External Limit Switch Wiring



Note: External limit switch setting must be inside of designed stroke length or actuator will be stalled.

ELECTRAK 1 WITH POTENTIOMETER FEEDBACK

Troubleshooting

General: The chart below will be helpful for isolating malfunctions in the control system, countering difficulties with system start-up, and in troubleshooting for worn or broken mechanical or electrical components in units which have been operating for some time. For correct diagnosis, it is important to do all tests before disassembling the actuator.

Symptom: Actuator will not extend/retract

Checkpoint	Probable Cause	Possible Solution
Proper voltage, no amp draw	Dead motor	-Replace (make sure actuator is fused)
	Motor thermal open	-Reduce duty cycle or remove overload
No voltage or amp draw	Actuator not receiving power	-Check power supply -Replace fuse -Make sure actuator travel is not being restricted
Proper voltage, amp draw present	Actuator overloaded	-Check rated load

Symptom: Actuator stops in mid-stroke

Checkpoint	Probable Cause	Possible Solution
Amp draw present	Actuator overloaded Motor stalled	-Check rated load -Check voltage (too low)
No amps present	Blown fuse Motor thermal open	-Replace fuse -Check duty cycle -Make sure actuator travel is not being restricted

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.

ELECTRAK 1 WITH POTENTIOMETER FEEDBACK
DIMENSIONS

The outline drawing shown below describes Electrak 1 compact actuators.
The tabulated dimensions chart shows lengths for each of the three stroke lengths.

Retracted Length	Stroke Length
A	B
7.66/7.91	2.242/2.382
9.88/10.13	4.462/4.602
12.094/12.344	6.682/6.822

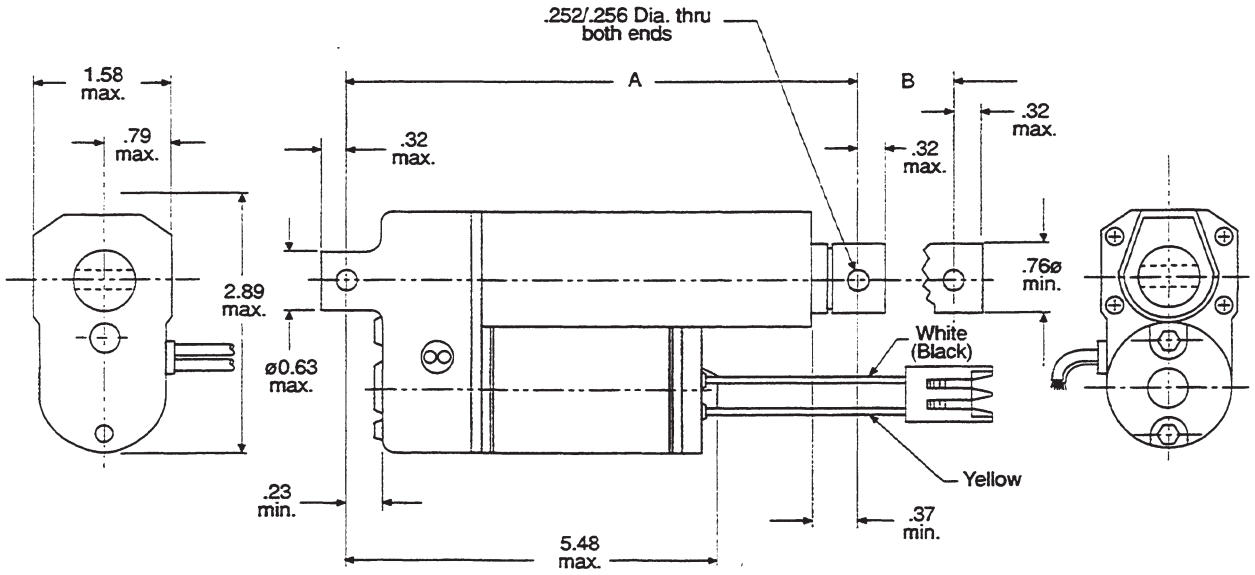
SP 1 2 - 1 7 A 8 - 0 6

Potentiometer Feedback

12 - 12 VDC
24 - 24 VDC

17A8-75#
09A4-25#

-02
-04
-06



Specifications, part numbers, dimensions, etc., may be changed without notifications.

EUROPE

United Kingdom
Thomson
Office 9, The Barns
Caddsdown Business Park
Bideford
Devon, EX39 3BT
Phone: +44 (0) 1271 334 500
E-mail: sales.uk@thomsonlinear.com

Germany
Thomson
Nürtinger Straße 70
72649 Wolfschlugen
Phone: +49 (0) 7022 504 0
Fax: +49 (0) 7022 504 405
E-mail: sales.germany@thomsonlinear.com

France
Thomson
Phone: +33 (0) 243 50 03 30
Fax: +33 (0) 243 50 03 39
E-mail: sales.france@thomsonlinear.com

Italy
Thomson
Largo Brughetti
20030 Bovisio Masciago
Phone: +39 0362 594260
Fax: +39 0362 594263
E-mail: info@thomsonlinear.it

Spain
Thomson
E-mail: sales.esm@thomsonlinear.com

Sweden
Thomson
Estridsväg 10
29109 Kristianstad
Phone: +46 (0) 44 24 67 00
Fax: +46 (0) 44 24 40 85
E-mail: sales.scandinavia@thomsonlinear.com

SOUTH AMERICA

Brazil
Thomson
Av. Tamboré, 1077
Barueri, SP – 06460-000
Phone: +55 (11) 3616-0191
Fax: +55 (11) 3611-1982
E-mail: sales.brasil@thomsonlinear.com

USA, CANADA and MEXICO
Thomson
203A West Rock Road
Radford, VA 24141, USA
Phone: 1-540-633-3549
Fax: 1-540-633-0294
E-mail: thomson@thomsonlinear.com
Literature: literature.thomsonlinear.com

ASIA

Asia Pacific
Thomson
E-mail: sales.apac@thomsonlinear.com

China
Thomson
Rm 2205, Scitech Tower
22 Jianguomen Wai Street
Beijing 100004
Phone: +86 400 6661 802
Fax: +86 10 6515 0263
E-mail: sales.china@thomsonlinear.com

India
Thomson
c/o Fluke Technologies Pvt. Ltd.
#424, Deodhar Center,
Marol Maroshi Road,
Andheri – E, Mumbai – 400059 India
Phone: +91 22 28207641
E-mail: sales.india@thomsonlinear.com

Japan
Thomson
Minami-Kaneden 2-12-23, Suita
Osaka 564-0044 Japan
Phone: +81-6-6386-8001
Fax: +81-6-6386-5022
E-mail: csjapan@scgap.com

Korea
Thomson
F7 Ilsong Bldg, 157-37
Samsung-dong, Kangnam-gu,
Seoul, Korea (135-090)
Phone: +82 2 6917 5049
Fax: +82 2 528 1456
E-mail: sales.korea@thomsonliear.com

P-264-1 9/04 Printed in U.S.A.