Varifan®

Linear actuator

User Manual

1E_LinAct_User Manual_v3_1

www.varifan.com

Linear actuator

User Manual

IMPORTANT NOTICE

The manufacturer reserves the right to make changes without notice in product design and specifications as warranted by evolution in user needs, progress in engineering or manufacturing technology.

For more information about these products, visit the Web site at:

http://www.varifan.com

Monitrol Inc.
1291, rue Ampère
Boucherville (Qc) J4B5Z5
Canada

Tel.: 450.641.4810
Fax : 450.641.4631
E-mail : monitrol@monitrol.com
www.monitrol.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

The linear actuator is a system allowing for the opening and closing of air inlets in agricultural or industrial environments.

Notable features of the linear actuator include:

- Easy installation
- Reliable construction
- Low noise
- Powerful motor

1.1 Document icons

Various icons may be found throughout this document. These are explained in the table below:

Table 1 Document icons

Icon	Notice Type	Description
	Helpful Note	Useful instruction to remember during setup, operation and/or maintenance.
	Caution Note	Important point to remember during setup, operation and/or maintenance.
	**Warning Note**	**Critical information to prevent damage to equipment or physical injury to personnel.**

1.2 Hardware Description

Depending on the exact model number (refer to tables 4-6) you have purchased, your linear actuator system may include the following equipment:

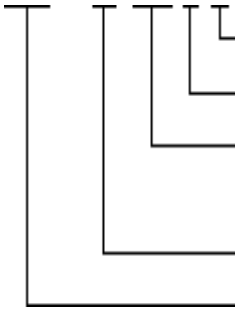
Table 2 Equipment description

Description	Visual	Qty.
Black model		0/1 (depends on purchased model)
Blue model		0/1 (depends on purchased model)
Cable kit Includes: V57-CTCABLE and EITHER: V57-PWCABLE or V57-PWCABLEDC		1
V57-00110 installation bracket		2
V57-8060 winch kit		0 (optional)

1.3 Model Description

The linear actuator system model number description is as follows:

Example: V57 – 12 120 P B



Color: B = Blue, N = black

P = with potentiometer

Input power:

120 = 120 VAC, 220 = 220 VAC, 36 = 36 VDC

Length (opened): 12, 24, 36 or 48 inches

Prefix

Table 3 120 VAC/50-60 Hz Model description

Model number	Maximum length	Maximum load	Potentiometer	Color
V57-12120B	12'' (30 cm)	650 lb (295 kg)	-	Blue
V57-12120PB	12'' (30 cm)	650 lb (295 kg)	10K	Blue
V57-24120B	24'' (60 cm)	650 lb (295 kg)	-	Blue
V57-24120PB	24'' (60 cm)	650 lb (295 kg)	10K	Blue
V57-24120PN	24'' (60 cm)	650 lb (295 kg)	10K	Black
V57-36120PB	36'' (90 cm)	650 lb (295 kg)	10K	Blue
V57-36120PN	36'' (90 cm)	650 lb (295 kg)	10K	Black
V57-48120PB	48'' (120 cm)	650 lb (295 kg)	10K	Blue

Table 4 220 VAC/50-60 Hz Model description

Model number	Maximum length	Maximum load	Potentiometer	Color
V57-24220PN	24'' (60 cm)	650 lb (295 kg)	10K	Black

Table 5 24-36 VDC Model description

Model number	Maximum length	Maximum load	Potentiometer	Color
V57-2436PB	24'' (60 cm)	650 lb (295 kg)	10K	Blue
V57-2436PN	24'' (60 cm)	650 lb (295 kg)	10K	Black
V57-3636PB	36'' (90 cm)	650 lb (295 kg)	10K	Blue

1.4 Replacement parts

The following figure details the part numbers of your linear actuator system.

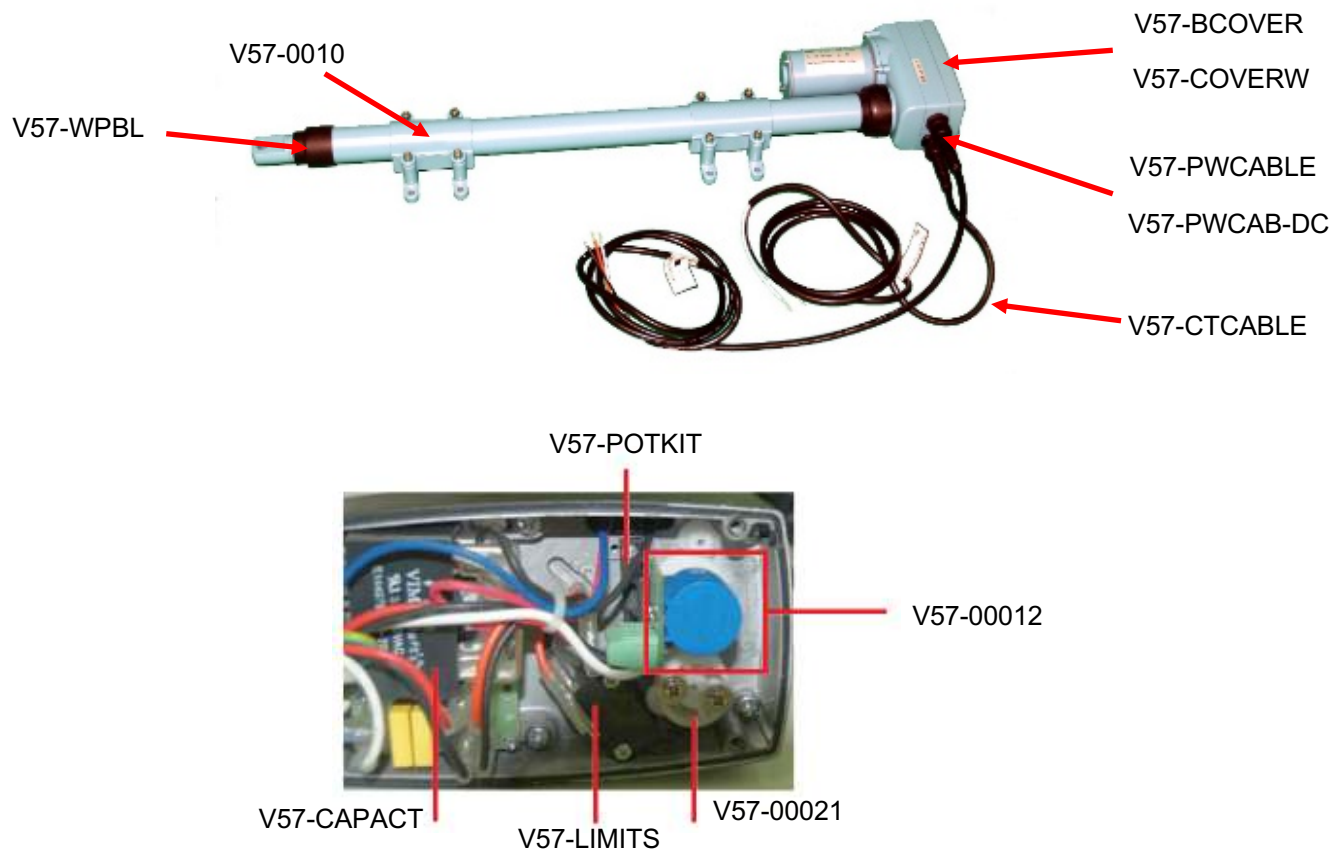


Figure 1: Linear actuator part number breakdown

Table 6 Replacement parts list

Part number	Description
V57-BRACKET	Adjustable bracket (1 only)
V57-00012	Potentiometer Bourns with PCB for Varifan
V57-00021	Gear plastic drive
V57-WPBL	Seal of the screw
V57-POTKIT	Kit for potentiometer support
V57-PWCABLE	AC power cable (4 pins)
V57-PWCAB-DC	DC power cable (2 pins)
V57-CTCABLE	Potentiometer cable (3 pins)
V57-BCOVER	Screw cover
V57-CAPACT	Capacitor
V57-COVERW	Cover and seal
V57-LIMITS	Limit switch

1.5 V57-8060 winch kit (optional)

The optional V57-8060 winch kit includes the following equipment.

Table 7 V57-8060 winch kit parts list

Item number	Part number	Description	Qty.
1	V57-8352	PVC cover	1
2	V57-8351	PVC tube and cover	1
3	V57-8326	Plate	1
4	V57-8204	Stainless steel cable, 5/32” (0.4 cm)	25’
5	V57-8069/M	Wall mount pulley, 3 1/2” (8.9 cm)	2
6	V57-8314	Heavy duty winch, 1400 lb (636 kg)	1
7	V52-0152	Nut	4

Item number	Part number	Description	Qty.
8	V52-0141	Washer	4
9	V52-0130	Bolt	4
10	V57-8382	Lag screw	4
11	V57-8360	Cable clamp	7
12	V57-8380	Screw hook, 0.25” x 3” (0.64 cm x 7.6 cm)	1
13	V57-8340	Nylon Pulley, 1 3/4” (4.4 cm), with swivelling eye	1
14	V57-8320	Metal pulley, 3 1/2” (8.9 cm), without eye bolt	1

Figure 2: Winch kit components

2 INSTALLATION

After the linear actuator has been unpacked from its box, follow the instructions in this chapter to install it in an appropriate area and make the proper connections. The manufacturer recommends that this installation be made by a certified electrician. Not respecting these conditions may void the warranty.

Never install the linear actuator vertically instead of horizontally. This will void the warranty.

2.1 Unpacking

Unpack the system and verify that the package contains all the components found in section 1.2 and 1.3. If one or more components are damaged or missing, contact your supplier.

2.2 Material requirements

In addition to the components included in the linear actuator package, the following items will be required for the installation:

- Screwdriver kit w/ appropriate screws
- Drill

2.3 Installation instructions

The actuator must be installed with the power and potentiometer connector facing down to avoid water infiltration. The installation must be done with the actuator completely closed. Use the actuator to adjust the completely closed position of the inlets. Make sure that the opening of the actuator does not interfere with any other equipment or installation.

The tightened cable must be aligned with the opening direction of the actuator.

The load limit for the actuator, cables and pulleys must be respected.

After the installation, test the operation of the actuator for its full extension. The actuator must open freely and the cables must run easily within the pulleys.

The actuator must then be calibrated (Refer to your controller's user manual).

2.4 Adjusting the limit switch

To adjust the limit switch of the linear actuator, refer to the following figure and follow the procedure below.

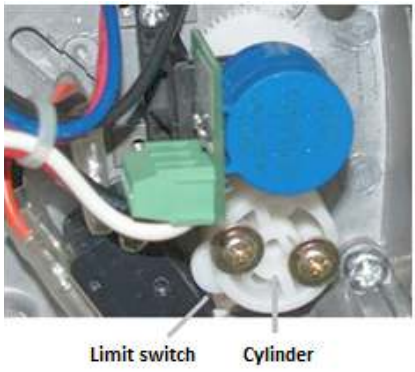


Figure 3: Limit switch

1. In manual mode, extend the actuator screw to its maximum position.
2. **Disconnect the power cable from the actuator.**
3. Unscrew the screws of the cylinder until the top cylinder can turn.
4. Turn the top cylinder until the switch button is pressed.
5. Screw back the screws of the cylinder.
6. Replace the cover and reconnect the power cable to the actuator.
7. In manual mode, ensure that the actuator opening stops at the desired position.

2.5 Suggested installation with ceiling inlet

A ceiling installation such as shown in the following figure will double the lift capacity of actuator. However, this also divides the travel length by two. You must therefore choose an actuator that has a travel length that is twice the travel length needed for the inlet. It is recommended that hooks be placed near the ceiling pulleys to avoid having the cable to get out of the pulley.
The ceiling pulleys must be aligned precisely. Use washers to modify the height.

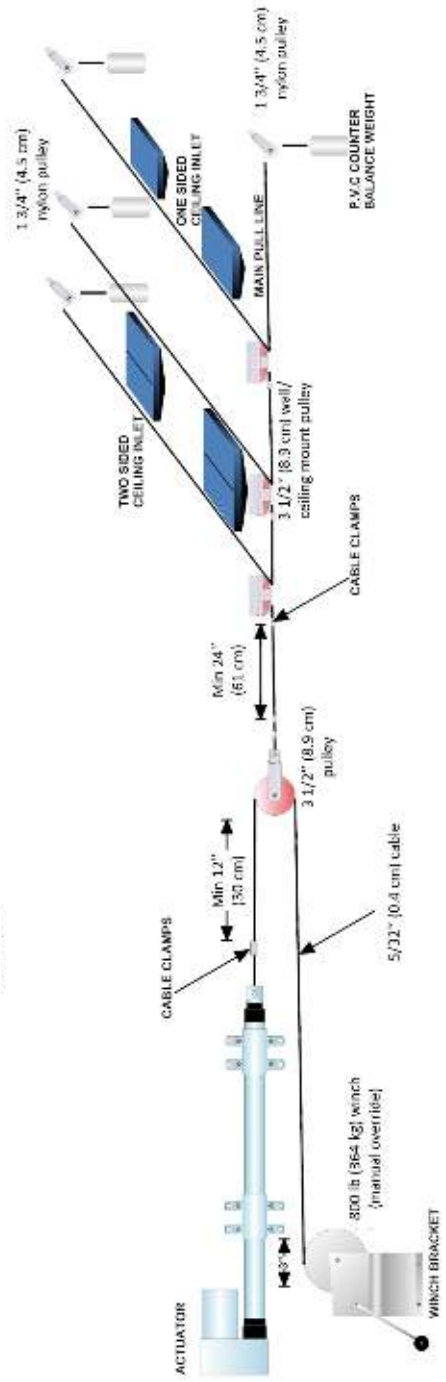


Figure 4: Installation diagram for ceiling air inlet

Figure 5: Example of winch, pulley and actuator installation

Figure 6: Example of ceiling inlet installation

Figure 7: Connection example of the air inlet and cable

2.6 Suggested installation with baffle (wall)

With this installation, it is possible to lift a panel of 224’ by 12’ (68 m x 3.7 m) (112’ (34 m) for each side). The actuator must be installed so that the actuator can extend at least 2’’ (5 cm) on the right of the section of 2’’x 10’’x 96’’ (5 cm x 25 cm x 244 cm) to facilitate maintenance, and a 16’’ (41 cm) minimum clearance must be left behind the actuator motor.

The sizes are approximate and may vary according to the position of the 2’’x 10’’x 96’’ (5 cm x 25 cm x 244 cm) section and the air inlets.

The pulleys installed on the 2’’x 10’’x 96’’ (5 cm x 25 cm x 244 cm) have a ½’’ (1.25 cm) height difference.
This installation results in doubling the lift capacity of actuator. However, this involved that the travel length is divided by two. Then, you must choose an actuator that has a travel length that is twice the travel length needed for the inlet.

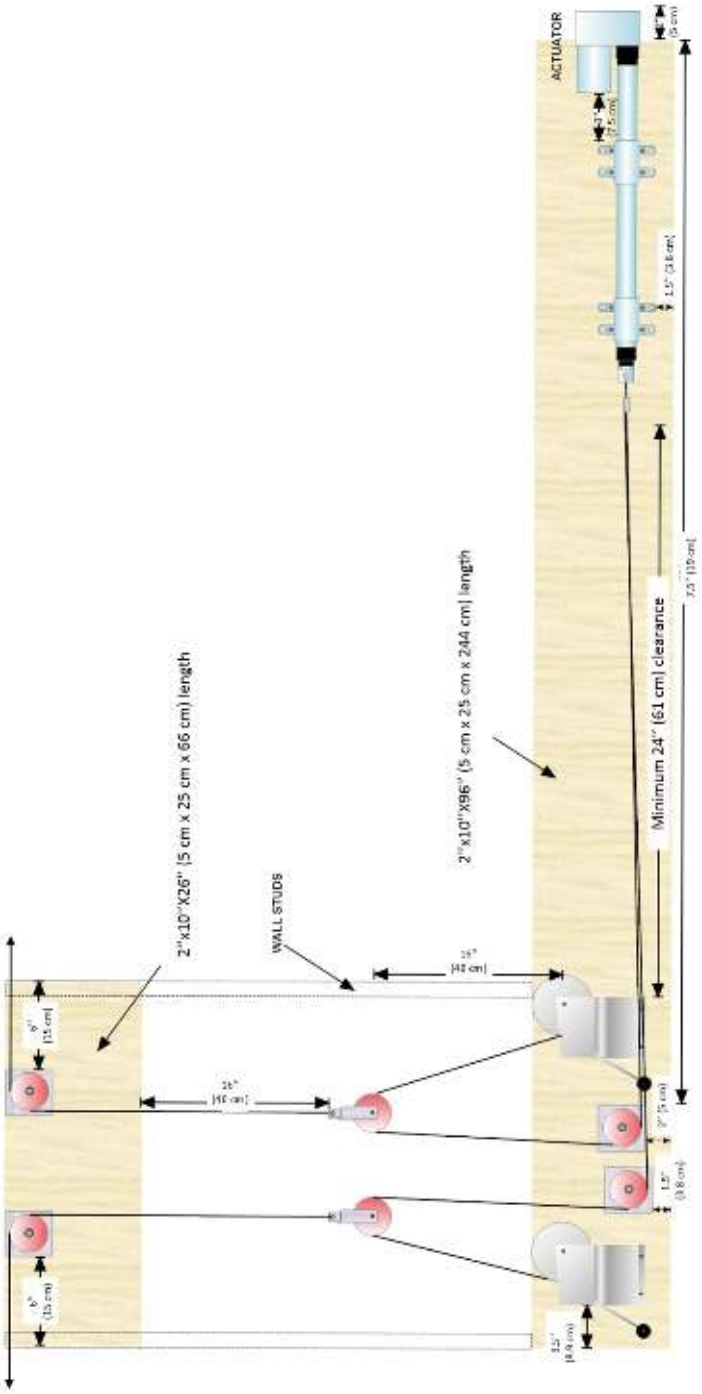


Figure 8: Installation diagram for air inlet on a wall

Figure 9: Another example of an air inlet installation on a wall

2.7 Cable color code

The following two tables describe the power cable color codes.

Table 8 120/220 VAC actuator cable color codes

Wire color	Description
RED	Open
BLACK	Close
WHITE	Neutral
GREEN	Ground

Table 9 36 VDC actuator cable color codes

Wire color	Description
WHITE	+ terminal
BLACK	- terminal

Refer to the following circuit diagram for the 120/220 VAC models.

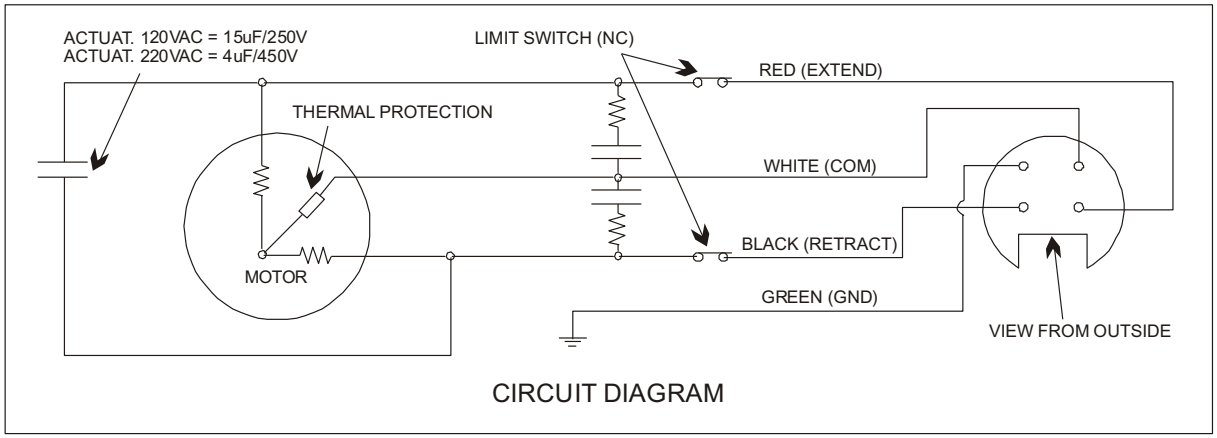


Figure 10: 120/220 VAC circuit diagram (inside the actuator)

Refer to the following diagram for the color code of the potentiometer cable.

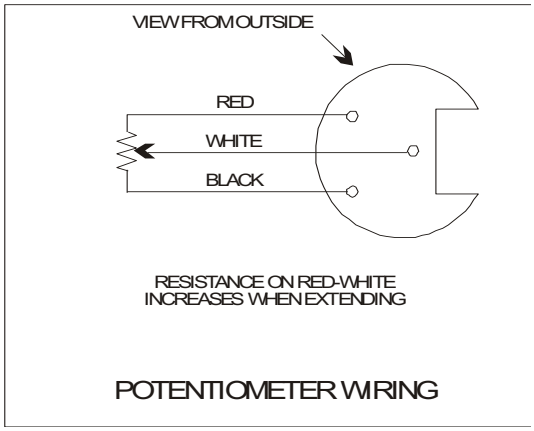


Figure 11: Potentiometer circuit diagram (inside the actuator)

For SVIM and DIP-1 the black wire is not used. For Genius controls, SVIM or DIP-1 the red wire is connected to GND or negative (-). For more details on wiring information for these or other controllers, refer to their respective installation guides.

2.8 General installation do's and don'ts

The following figure offers installation do's and don'ts for the linear actuator.

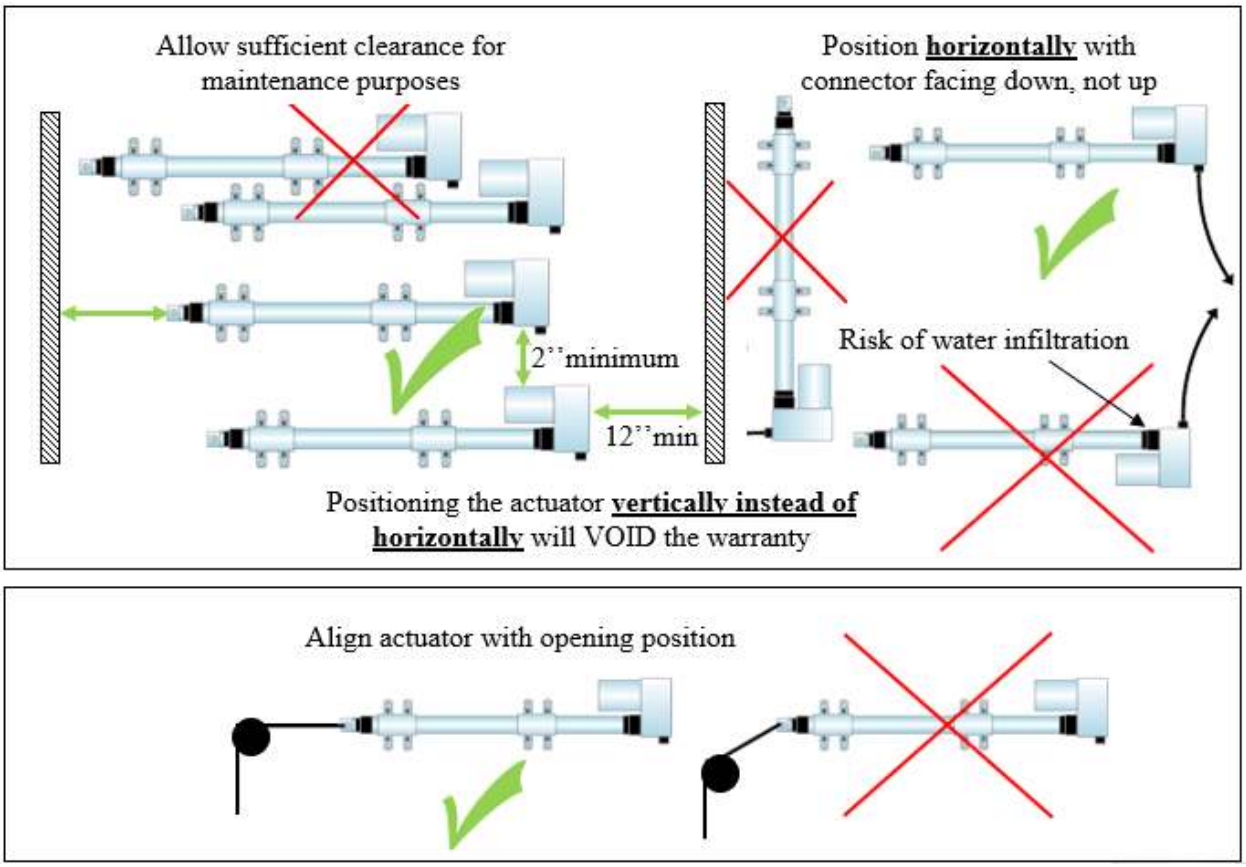


Figure 12: Installation do's and don'ts

When you effect any type of electrical connection with the linear actuator, refer to the following instructions and notes.

THE ACTUATOR'S MOTOR IS EQUIPPED WITH A THERMAL COUPLER. THIS MAY CAUSE THE MOTOR TO RESTART SUDDENLY WHEN THE ACTUATOR IS POWERED.

THE MOTOR MUST BE PROPERLY GROUNDED TO REDUCE THE RISK OF ELECTRICAL SHOCK.

DISCONNECT THE ELECTRICAL SUPPLY BEFORE SERVICING THE UNIT.

POTENTIOMETER TERMINALS ARE INTENDED ONLY FOR CONNECTION OF EXTRA-LOW VOLTAGE CLASS 2 CONTROL CIRCUITS (NOT EXCEEDING 30 V OPEN CIRCUIT VOLTAGE).

2.9 Specific installation examples with obstructions

The panels can be separated by different obstructions. Here is an example on how to avoid a door by using four pulleys.

Figure 13: Diagram of an installation that avoids a door

Figure 14: Example of an installation avoiding an obstruction (a door)

The actuator can be located on a different wall than the air inlet. In this situation, the cable must turn the corner of the wall without any friction. Here is an example of such an installation using 2 pulleys.

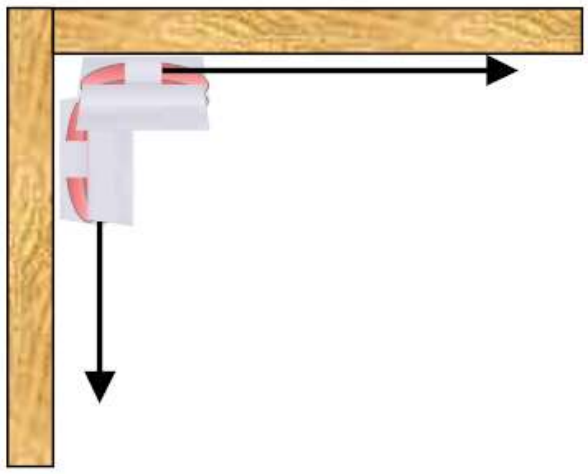


Figure 15: Diagram of an installation covering two perpendicular walls

Figure 16: Example of an installation on multiple walls

3 MAINTENANCE

The linear actuator requires a slight amount of periodic maintenance. The following table lists the necessary maintenance procedures, as well as their frequency and required equipment.

Table 10 Maintenance procedures

Procedure	Periodicity	Required equipment
Cleaning of actuator	As required	Gentle soap solution and clean cloth
Cable verification	Monthly	-

3.1 Cleaning of actuator

The linear actuator and its components can become dirty because of organic particles. To clean the system, simply use a clean cloth and gentle soap solution.

If you are washing rooms with pressurized water, in order to avoid water infiltration, do not spray water directly on the joint of the actuator, or on the cable connections for power and for the potentiometer.

3.2 Cable verification

Cabling should be verified monthly for signs of wear and replaced as needed.

4 TROUBLESHOOTING

4.1 The actuator does not move and will not open or close in manual mode

It is possible that the thermal protection switch is activated.

Troubleshooting procedure:

1. Wait ten minutes and retry.
2. Verify the cabling.
3. Contact your supplier if the cause is not determined.

4.2 The temperature of the actuator rises after prolonged use

The duty cycle of the actuator might be too high.

Troubleshooting procedure:

1. Lower the duty cycle of the actuator through your controller.
2. Contact your supplier if the cause is not determined.

4.3 The actuator does not open fully, or too much, when the controller requires 100% opening

The limit might not be correctly adjusted.

Troubleshooting procedure:

1. Verify the limit switch adjustment and calibrate the actuator again.
2. Contact your supplier if the cause is not determined.

5 LINEAR ACTUATOR SPECIFICATIONS

Table 11 Physical specifications

Actuator physical specifications	Value
Total length (depending on model)	From 22.36 ‘’ to 52.3’’ (56.8 cm to 132.8 cm)
Weight (depending on model)	From 16.5 lb to 27.2 lb (7.5 kg to 12.36 kg)

Table 12 Environmental specifications

Environmental specifications	Value
Temperature (storage)	-4 °F to 131 °F (-20 °C to 55 °C)
Temperature (usage)	32 °F to 122 °F (0 °C to 45 °C)

Table 13 Electrical specifications

Electrical specifications	Value
Typical operating voltage	120 VAC / 220 VAC / 24 VDC (depending on model)

Table 14 Certifications

	Organization
Certification	CUR/CSA approved

6 WARRANTY AND SUPPORT

6.1 Limited warranty

The manufactured equipment and supplied components have gone through rigorous inspection to assure optimal quality of product and reliability. Individual controls are factory tested under load, however the possibility of equipment failure and/or malfunction may still exist.

For service, contact your local retailer or supplier. The warranty period shall be for two years from manufacturing date. Proof of purchase is required for warranty validation.

In all cases, the warranty shall apply only to defects in workmanship and specifically exclude:

- Regular wear and tear
- Any damage caused by over-voltage, short circuit, misuse, acts of vandalism, lightning, fortuitous events, acts of God, flood, fire, hail or any other natural disaster.
- Return freight or delivery costs
- Installation or removal costs
- Loss or damage to property
- Damage resulting from unauthorized work, modification or repair on this product as well as damage resulting from improper maintenance or operation

The manufacturer assumes only those obligations set forth herein, excluding all other warranties or obligations. This warranty stipulates that in all cases the manufacturer shall be liable only for the supply of replacement parts or goods and shall not be liable for any personal injury, damages, loss of profits, interrupted operations, fines for infringement of the law or damages to the production of the PURCHASER and the PURCHASER shall take up the defense and hold the manufacturer faultless regarding any legal or extra legal proceedings, notice, or claim by the customer or by a third party, and regarding any legal and extra legal expenses and fees brought forward on by such damages.

6.2 Support

While under the period of warranty, the PURCHASER benefits from technical support services. Whenever an issue arises, the first step should always be to contact your dealer. If the issue remains unresolved afterwards, you or your dealer may contact technical support by using one of the following methods.

By e-mail

Contact support@monitrol.com

By phone

+1 (450) 641-4810