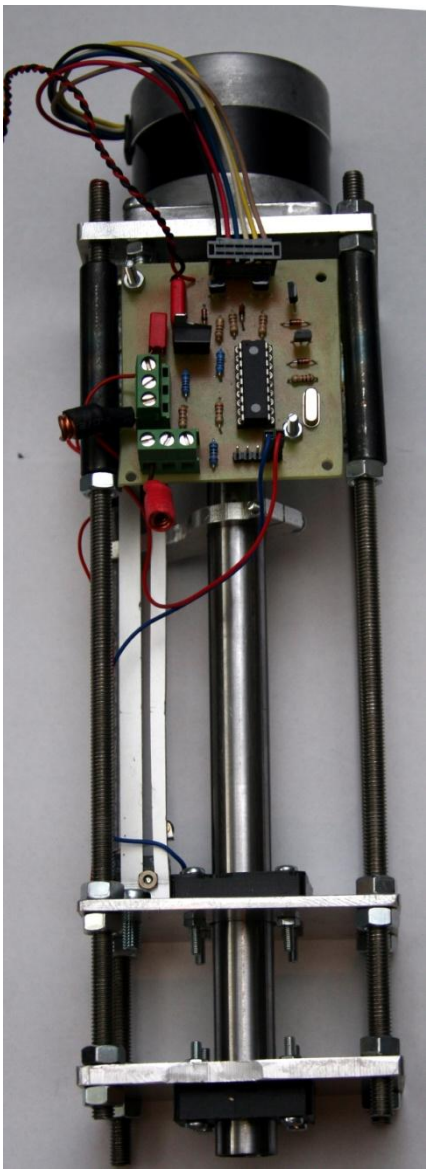


LINEAR ACTUATOR INSTALLATION AND OPERATION MANUAL

P/N 10001002

WARNING: TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE UNIT TO RAIN OR MOISTURE!

Table of contents

OPERATION

DEFINITIONS:

OPEN in this manual means position where piston is extended ***outwards*** of the unit

CLOSE in this manual means position where piston is pulled ***inwards*** to the unit

Attention must be paid to ensure correct action direction of the unit to be controlled as this may or may not correspond to “open” and “close” definitions of the linear actuator. The control box indicator lamp lenses colors and push button functions correspond initially:

GREEN = OPEN or “go” position
RED = CLOSE or “stop” position

If the action direction of the unit to be controlled is other than that of the linear actuator, following must be done:

- Change indicator lenses across
- Use appropriate face plate in the control box , showing “OPEN” and “CLOSE” or texts describing the function.

NORMAL OPERATION:

When in CLOSE position**:**

Control by push buttons:

Pressing CLOSE button: No piston movement action, CLOSE indicator blinks once to indicate Current position
Pressing OPEN button: Piston starts to travel into OPEN position, green indicator lamp starts blinking until OPEN position is reached after which green indicator goes off.

When in OPEN position:

Control by push buttons:

Pressing OPEN button: No piston movement action, OPEN indicator blinks once to indicate Current position
Pressing CLOSE button: Piston starts to travel into CLOSE position, red indicator lamp starts blinking until CLOSE position is reached after which red indicator goes off.

When not in OPEN or CLOSE position e.g. after power break or when piston is moving into either direction

Control by push buttons:

Pressing OPEN button: Motor starts opening, green indicator lamp starts blinking until OPEN position is reached after which green indicator goes off.

Pressing CLOSE button: Motor starts closing, red indicator lamp starts blinking until CLOSE position is reached after which red indicator goes off.

When moving into OPEN direction, pressing CLOSE push button reverses immediately the direction of the piston and unit travels to CLOSE limit.

When moving into CLOSE direction, pressing OPEN push button reverses immediately the direction of the piston and unit travels to OPEN limit.

INSTALLATION

Unit is designed to be installed indoors in a dry place. Install unit's piston aligned and same height with the shaft of the unit to be operated. Use mounting blocks as required.

ADJUSTMENTS

ADJUSTING STROKE

The stroke of the unit is adjustable approximately from 0 to 100 mm. Limitation of the stroke can be done by adjusting the torque rod and the CLOSE limit switch closer to the OPEN limit switch. Adjust these approximately to correct positions.

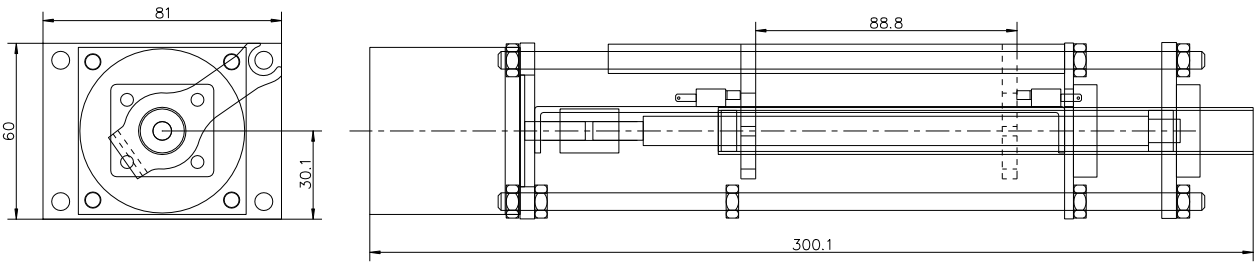
CONNECTING LINEAR ACTUATOR TO UNIT TO BE OPERATED

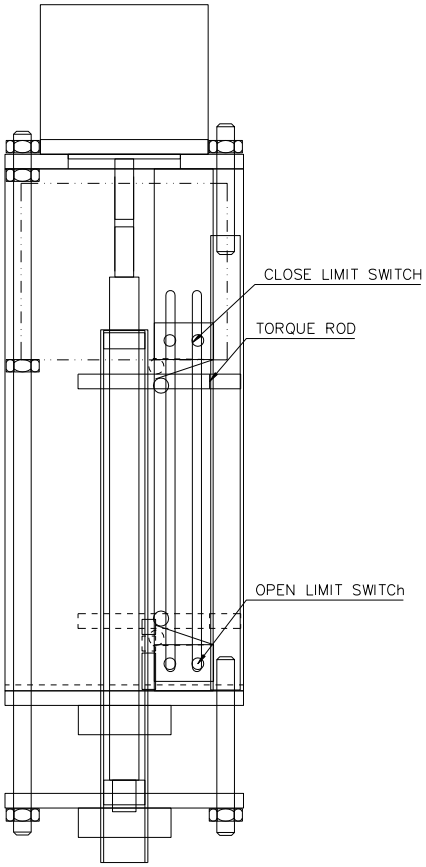
Drive the linear actuator electrically to OPEN position (to the OPEN limit switch) Do not connect the actuator mechanically yet.. Move the unit to be operated manually to position which corresponds to OPEN position of the linear actuator.

Connect the linear actuator mechanically to the unit to be operated and fix actuator in that place.

Check that CLOSE limit switch is approximately at correct distance (or slightly less). Operate the actuator electrically towards CLOSE position of the linear actuator. Observe that CLOSE limit switch stops the movement at correct place. Readjust as required. Check finally that both directions work correctly.

DIMENSIONS

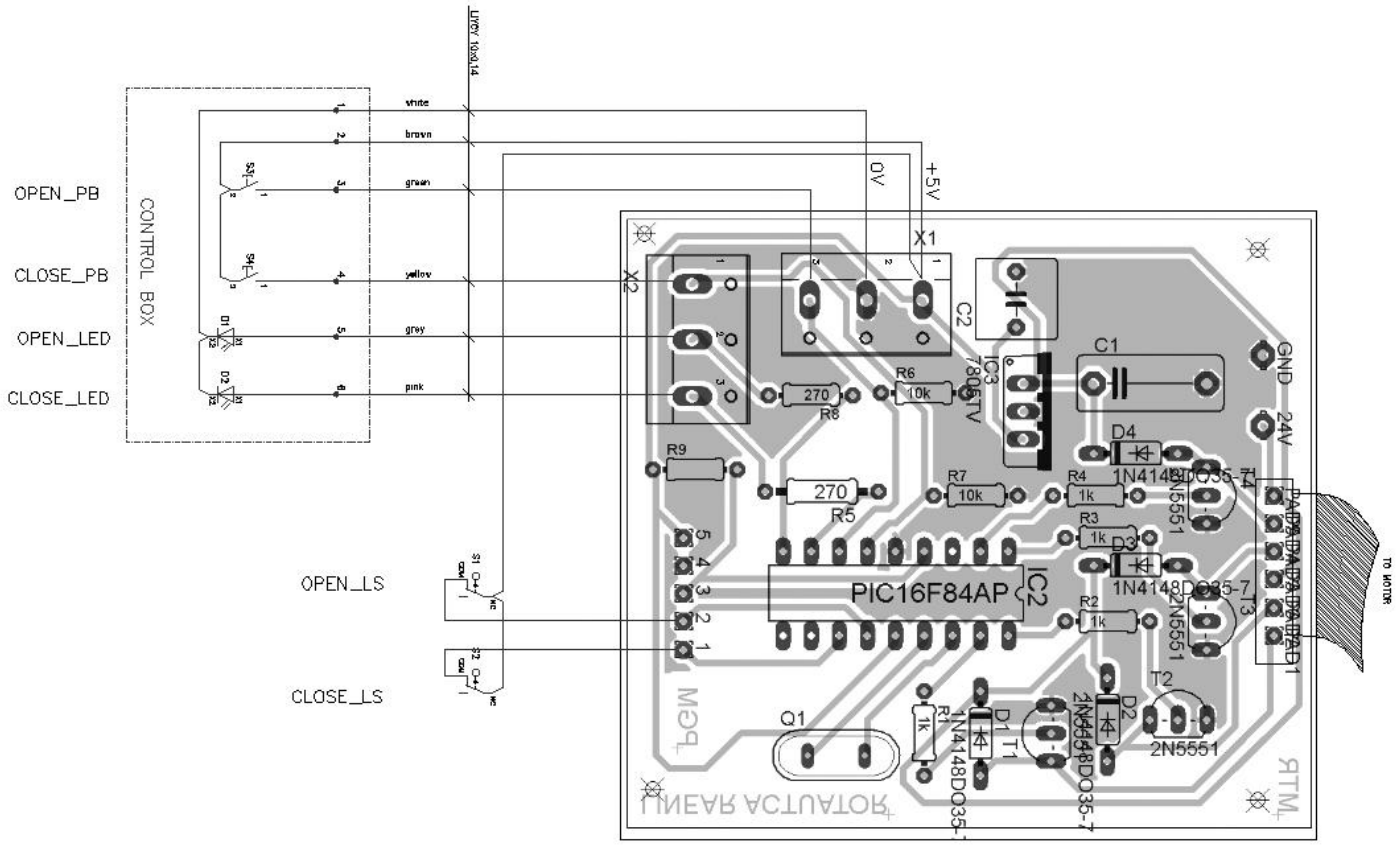

81
60
30.1
88.8
300.1


CLOSE LIMIT SWITCH
TORQUE ROD
OPEN LIMIT SWITCh

POWER ADAPTER

A commercial 12-24V DC / min. 1A power adapter can be used. Unit operates already with 12 volts, but the torque of the motor is reduced. However the screw piston provides a lot of linear force.

WIRING DIAGRAM



PRINTED CIRCUIT BOARD Connectors

X1: Control box supply and I/O
X2: I/O
PGM: Pin strip Programming terminal, used also for limit switch inputs (terminals 1 & 2)
MTR: Pin strip for stepper motor
24V: 24VDC Supply positive, red lead
GND:24V DC supply negative, black lead

LIMIT SWITCHES :

Switches are installed on a support strip which enables the switches to be repositioned by loosening the fixing screws (2/switch). OPEN limit switch (OPEN_LS) defines how far outwards the piston extends from the unit. Likewise, CLOSE limit switch (CLOSE_LS) defines how far inwards the piston shall be pulled inside the unit. Limit switches are operated by torque rod which also can be adjusted by loosening its screw and sliding it along the piston to offset the actual stroke position in relation to the unit.

CONTROL BOX

Control box contains two push button switches with led indicators. Standard 3mm leds can be used inside the push button units. When replacing the leds cut the leads to approximately 5mm length. Ensure the anode to be positioned correctly.

CONTROL CABLE

Control box can be positioned in a suitable place using a control cable between the actuator unit and the control box. Cable type LIYCY 10x0,14 is suitable. Refer to wiring diagram for details. Control box contains only 5V DC voltage level.

STEPPER MOTOR

Stepper motor is a 24V unit with four single-ended windings.

TROUBLESHOOTER'S CHECKLIST

If the unit is set up but does not function, check the following items:

- Is the power cord properly plugged into an electrical outlet?
- Is there power at the outlet?
- Check all terminals and connections also in the control box
- Check voltage between X1:poles 1-2 it should be +5VDC
- Check the operation of limit switches, readjust as required
- Check the flexible coupling for slipping between the stepper motor and main screw (plastic hose and hose clamps)

PARTS LIST

	Component	Manufacture	Type	Technical properties	Pcs.
	Stepper motor	Dynasyn	4SHG-24OA51S	24V 80 ohm	1
	1-pole push button / w light round red ON/(ON)				1
	1-pole push button / w light round green ON/(ON)				1
	Micro switch w rollerA 5A 250VAC	Omron			2
	LED 3mm warm white 7,5cd 30 deg				2
	Box 41x49x71 black				1
	Transistor		ZTX653	Uceo=100V, Ic= 2A	4
	Cable		LIYCY 10x0,14		3
	Microcontroller	Microchip	PIC 16F84A		1
	Base DIP18				1
	Crystal		20 MHz HC49		1
	Regulator		7805		1
	Diode		1N4148		4
	Metallic foil resistor			1kohm 0,6W	2
	Metallic foil resistor			10kohm 0,6W	2
	Metallic foil resistor			270 ohm 0,6W	2
	Connector		3x10mm R5	3-pole	2
	Capacitor		1 uF polyester		1
	Capacitor		0,1 uF polyester		1
	Pin strip connector			1 row R2.54 (5)	1
	Pin strip connector			1 row R2.54 (6)	1
	Plastic plate 8mm				
	Duraluminum plate 5mm				
	Threaded bar 6mm RST				
	Threaded bar 8mm RST				
	Nuts 6mm				
	Screw 3x30				
	Nut 3mm				
	Screw 2,5x10				
	Nut 2,5mm				

LINEAR ACTUATOR SPECIFICATIONS

		Units
DIMENSIONS (CLOSED)(l x w x h)	300 x 81 x 60	mm
MAX STROKE:	100	mm
WEIGHT:	2	kg
VOLTAGE:	24	VDC
CURRENT DRAW:	0,4 at load	A
MAX LINEAR FORCE:	TBD	N
PISTON TRAVEL TIME (80MM)	appr. 50	s
SOFTWARE DEVELOPMENT PLATFORM/ LANGUAGE	MPLAB IDE/ HITECH C-compiler	

.