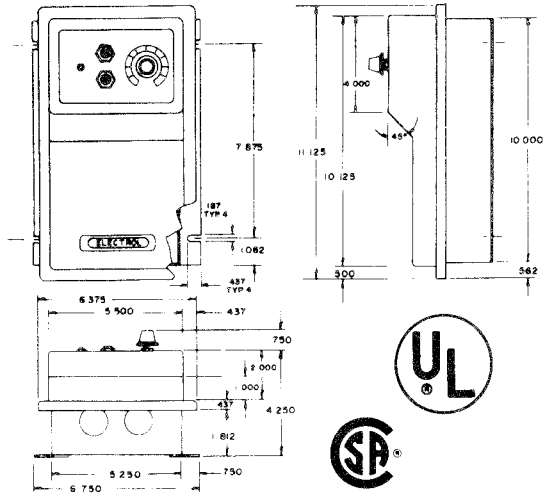
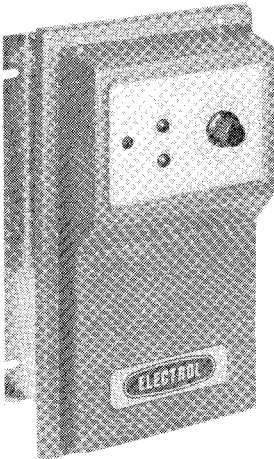


# ELECTROL

## INSTALLATION & MAINTENANCE MANUAL DC MOTOR CONTROLLER – D-TROL MODEL C-MH-W-754A-E MODEL C-MH-13-754A-CM



### Standard Features

- **Dual Input Voltage** – 115/230V AC, 50/60 Hz., Single Phase/ adjustable with two PC mounted labeled slide switches
- **Dual Output Voltage** – 0-90/0-180V DC PM or Shunt Wound Motors (Field Voltage 100/200V DC)
- **Horsepower Range** – Multi-HP 1/8 - 1 HP 90V, 1/4 - 2 HP 180V
- **Speed Regulation** – 2% of Base Speed
- **Speed Range** – 50:1 Constant Torque
- **Full Wave Rectification**
- **Independently adjustable** – Accel., Decel. .5 sec. to 15 sec.
- **Minimum Speed Adjustment** – Sets low end speed limit
- **Maximum Speed Adjustment** – Sets high end speed limit
- **IR Compensation** – Adjustable No Load to Full Load Motor RPM
- **Torque (Current Limit)** – Adjustable maximum current cut-off
- **Built-in Transient and Surge Protection**
- **Built-in Line Voltage Compensation**
- **Fuse Protection** – Line and motor
- **On-Off Switch**
- **Master Speed Pot**
- **Power "On" Indicator Light**
- **NEMA 12 Enclosure** – Attractive plastic lid with metal bottom

## **WARRANTY**

ELECTROL controls are warranted by ELECTROL CO., INC. to the original user against defects in workmanship or materials under normal use (rental excluded) for one (1) year after purchase.

Any part which is determined to be defective in material or workmanship must be returned to ELECTROL headquarters, or an authorized service center, as ELECTROL designates, shipping costs prepaid. Contact factory for an RMA number before returning. The control will be repaired or replaced at ELECTROL's option. Expenses incurred by buyer in repairing or replacing any defective product will not be allowed except where authorized in writing and signed by an officer of the company.

Removal of torque seal on the PC board of any control will void warranty. This indicates the control has been disassembled.

Use type ABC or rectifier standard blow fuses only. Use of a slow blow or other non-specified fuse will not adequately protect control and will void warranty.

## **APPLICATION INFORMATION**

1. If you replace an AC induction motor with a DC motor and adjustable speed drive, consideration must be given to the full load torque rating of the AC induction motor that is being replaced. The full load torque rating of the DC motor must be equal to or greater than the full load torque rating of the AC motor it is going to replace.
2. When replacing an AC induction motor with a DC motor and adjustable speed control the DC motors starting torque must be limited to 200% of full load torque (150% of full torque for gearmotors). The reason for these limits is to protect the motor or gearmotor from damaging overloads. Cyclic type loads should be avoided.
3. Soft Start – The DC motor accelerates from 0 to full load RPM smoothly and takes 1 to 3 seconds to reach full load RPM. Acceleration rate varies with respect to speed setting and amount of inertia in the system.

4. The motor controller has circuitry to protect it from normal line surges, and transients. If, however, the control will be used in an environment where these are present constantly, such as high frequency welding equipment, an isolation transformer or other line filtering device should be used.
5. The Electrol adjustable speed DC motor control is designed for use on constant (or diminishing) torque applications such as conveyors, fans, blowers, etc.

**WARNING: NOT INTENDED FOR USE WITH SAWS, DRILL PRESSES, OR OTHER CONSTANT HP APPLICATIONS. NOT TO BE USED IN AN EXPLOSIVE ATMOSPHERE!**

If your control is equipped with DYNAMIC BRAKING, the following applies: Use only on motors up to 1 HP.

Dynamic Braking functions in the control when the FWD/BRAKE/REV switch is moved to the BRAKE position while the motor is running. This allows the motor to come to a quick smooth stop.

NOTE: Dynamic braking resistors are sized to function on the basis of no appreciable external inertia. The following is the maximum allowable motor starts and stops:

1/6 - 1 HP DC motors – 5 per minute max.

## CONNECTION

**CAUTION: Disconnect power source before connecting controller or motor. Use No. 12 AWG (minimum size) wire for controller input lines, and for interconnection lines between controller and motor.**

Make connections to the controller and the motor in accordance with the Connection Chart. The controller terminal strip is located inside the controller enclosure. To reach the terminal strip, loosen the captive screw in the top of the controller front panel, then swing the panel open. To feed wiring to the terminal strip, remove the two button plugs from the bottom of the controller enclosure.

## CUSTOMER CONNECTION AND ADJUSTMENTS

**CAUTION:** Follow local electrical codes and proper electrical practices during hook-up of controller. The customer is responsible for supplying and connecting an external power disconnect, such as a 20 Amp circuit breaker or DPDT toggle switch. Disconnect power source before connecting control and motor. Use #12 gauge wire for input lines to the control and lines to motor armature. The control features P.C. mounted line and motor fuses, power on indicator LED and motor start stop push button switches. Turn power off at external disconnect when control is not in use.

### TERMINAL BLOCK CONNECTIONS:

#### **TB1**

Customer Hook-up:	GND.	Earth Ground
	L1-L2	Single Phase Ac Input
	A1-A2	Motor Armature
	F1-F2	Motor Field (Shunt Wound)
	1 & 4	Power LED
	2 & 5	Motor Run LED
	1 & 3	Start Pushbutton Switch (N.O.)
	2 & 3	Stop Pushbutton Switch (N.C.)
	6-7-8	5K ohm Master Speed Pot

#### **TB2**

T1	Neg. Tach. Input
T2	Pos. Tach. Input
1	Relay Contact Common
2	Relay Contact NC
3	Relay Contact NO

These relay contacts can be used to activate other equipment or indicators.

Factory Hook-up:	6-7-8	5K ohm Master Speed Pot
On Enclosed Models	1 & 4	L.E.D. Indicator (Power On)
	1 & 3	Start Push Button Switch (NO)
	2 & 3	Stop Push Button Switch (NC)

P1, a four prong header, is provided for means of quick disconnect of power on a motor run status indicating LED's. (Consult wiring schematic ) Female portion of adapter is available. Consult factory for 9100-9166.

## **ADJUSTMENTS:**

Controls are shipped set up and adjusted for 2 HP, 230V AC. If any other horsepower and/or voltage is desired, follow the instructions below:

### **A. Horsepower Selection:**

Position 4, 5, & 6 of the Dip Switch on the PC board are for horsepower selection.

HP		DIP SWITCH	2 LINE FUSES
115V	230V		
1/6	1/4	4, 5, & 6 OFF (OPEN)	3
1/4	1/2 - 3/4	4 & 5 OFF (OPEN)-6 ON (CLOSED)	5
1/3 - 1/2	1	4 & 6 OFF (OPEN)-5 ON (CLOSED)	10
3/4	1-1/2	4 OFF (OPEN)-5 & 6 ON (CLOSED)	15
1	2	4 ON (CLOSED)-5 & 6 OFF (OPEN)	20

Note: When 230V is selected a 180VDC Motor armature should be used.

When 115V is selected a 90VDC Motor armature should be used.

### **B. Voltage Selection:**

For 115V - 115/230 Switch on 115 Dip Switch V(2) on.

For 230V - 115/230 Switch on 230, Dip Switch V(2) off.

**NOTE:** A. 90VDC motor can be used with 230 VAC input with reduced speed regulation. (4% of base speed) Speed Range 25:1. To use the control for this mode of operation, the following setup is necessary.

1. Large 115/230 volt selector set at 230V.
2. Dip Switch V(2) on.
3. Reduce max. trim pot CCW for 90VDC output to the armature.

**WARNING: DO NOT OPERATE A 90VDC MOTOR ABOVE 110VDC, OR THIS WILL DAMAGE THE MOTOR.**

We recommend this feature only when standardization on one motor voltage is more critical than speed regulation. For example, 4% of 1800 RPM yields up to 72 RPM difference which could be of concern at the low speed end.

### **C. Armature or Tach Feedback:**

The control is shipped from the factory setup for Armature Feedback. If you desire to use Tach Feedback or change you unit back to Armature Feedback, use the following setup.

1. Armature Feedback: Position "A" (3) of the Dip Switch

should be in the "ON" (closed) position.

2. Tach Feedback: Position "A" (3) of the Dip Switch should be in the "OFF" (open) position.
3. Two voltage Tach's will operate with this control.
  - A. 90V DC output at full speed. Position "V" (2) of the Dip Switch should be in the "ON" (closed) position.
  - B. 180 V DC output at full speed. Position "V" (2) of the Dip Switch should be in the "ON" (open) position.

Correct polarity must be observed when the tach is connected to the control. TB2-T1 Negative (-)  
TB2-TS Positive (+)

#### D. Remote Torque Control:

The control is shipped from the factory setup for internal Torque Control. The Torque Trim Pot (R29) is for the adjustment. If you require Remote Torque Control, follow these connections.

1. Internal Torque Control: Position "T" (1) of the Dip Switch should be in the "ON" (closed) position. Use of the Torque Control on the printed wiring board to make adjustment.
2. Remote Torque Control: Position "T" (1) of the Dip Switch should be in the "OFF" (open) position. Connect a remote torque control of 4.7k – 5K ohm to header P2 on the control board.

P2-1 Counter Clockwise side of control.

P2-2 Wiper connection of control.

P2-3 Clockwise side of control.

#### E. Start-up procedures:

1. Set master speed pot to 0%.
2. Apply power to unit and select "Start" button.
3. Turn speed pot up and check for proper rotation of motor shaft. Reverse motor leads to change rotation, if necessary.
4. trim pot adjustments, if necessary.
  - A. MIN RPM Trim: To adjust master pot low end speed

range, turn CCW to decrease speed range. Turn CW to increase speed range.

- B. MAX RPM Trim: To adjust master pot high end speed range, turn CCW to decrease speed range. Turn CW to increase speed range.
- C. Torque Trim: To adjust maximum current available to motor armature, do not exceed full load current of motor.
- D. IR Comp: To maintain no load motor RPM with load applied, turn CW to increase compensation. Turn CCW to decrease compensation. CAUTION: Over adjustment will cause motor RPM at low speed settings to rise excessively under full load conditions.
- E. ACCEL Trim: To adjust Acceleration time from .5-15 sec., turn CW to decrease time & CCW to increase time.
- F. DECEL Trim: To adjust Deceleration time from .5-15 sec., turn CW to decrease time and CCW to increase time.

D. Dynamic Braking and Manual Reversing (MRDB) options:

When specifying the Manual Reversing Dynamic Braking (MRDB option), note the Forward/Brake/Reverse switch is rated for 3/4 HP Max. If the master speed pot is set at zero and motor completely stops, the MRDB switch may be used for 1 HP.

The Dynamic Braking Resistors on the standard options are intended for intermittent operation. If continuous braking operations are necessary, a larger Dynamic Braking resistor will be required.

See options A-19 and A-20 in ELECTRO-LINE Catalog for additional information.

To Request Schematic  
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