

TRACO ENGINEERING CO., INC.
MODEL SERIES TB5, TB5A, TB5B, TB5D, TB6, TB7
INSTALLATION, ADJUSTMENT & MAINTENANCE INSTRUCTIONS

INSTALLATION

MOUNTING OF ENCLOSED CONTROLLERS. Mount the controller by means of the four holes in the back of the enclosure. Mount in the vertical position (terminal strip on bottom) in such a manner that there is a free flow of air around the bottom, top and sides of the enclosure. While it is not a necessity, cooling of the unit will be greatly increased if the back of the enclosure is not covered and/or the enclosure is mounted to a metal or other heat conducting surface.

MOUNTING OF OPEN TYPE CONTROLLERS. Cooling of the heat producing components of TB5D, TB5, TB6 and TB7 units is accomplished by transferring the heat to the metal surface to which it is mounted. It is therefore essential that this surface be flat, smooth and free of burrs and projections, so that intimate contact is obtained between it and the four controller mounting controls, use No. 8 flat washers resting on the power module printed circuit boards. Mount TB5A units with insulated spacers at least ½" away from panel.

WIRING. If one side of the AC line is grounded, make sure the grounded side is connected to terminal 1. If there is any doubt as to which motor leads are the field or armature, measure their resistance. The pair with the lowest resistance is the armature. On permanent magnet motors there will be no connection to the motor field.

Fuses or circuit breakers are normally selected to permit accelerating currents above full load current and to provide overload and short circuit protection.

<u>HP.</u>	<u>AC INPUT</u>	<u>ARM. VOLTS (DC)</u>	<u>FIELD VOLTS (DC)</u>	<u>FUSE OR CB RATING</u>
1/8	115 Volts	90	100	1.5
1/4	115 Volts	90	100	4
1/3	115 Volts	90	100	6
1/2	115 Volts	90	100	8
3/4	115 Volts	90	100	10
1	115 Volts	90	100	15
1	230 Volts	180	200	8
1 1/2	230 Volts	180	200	10
2	230 Volts	180	200	15
3	230 Volts	180	200	25
5	230 Volts	180	200	40

* Do not replace with a larger fuse or different type than indicated. Use slow blow type FNM, SC, or 3AG.

CONTROL ADJUSTMENTS

The control adjusting potentiometers (pots) are located on the etched circuit board and can be rotated with a small screwdriver.

CURRENT LIMIT Limits the amount of armature current (and torque) of the motor during overload, stall and accelerating conditions. On most TB5A units and all TB5D's this is not adjustable. Not furnished on TB5B.

IR COMP. This adjustment varies the degree to which the controller will compensate for changes in motor load. When Properly set, the motor speed will remain essentially constant from no load to full load at all speeds. On some TB5A and TB5D units this is not adjustable. Not adjustable on TB5B.

MIN. SPEED & MAX SPEED These adjustments set the motor speed which will be obtained when the main speed setting pot is turned full CCW and full CW respectively. When shipped the controller is adjusted for average operating conditions. If desired the drive can be adjusted for optimum performance by following the procedure below.

ADJUSTMENT PROCEDURE

1. Disconnect the motor from the load. Turn the current limit pot full CW. Turn the IR Comp. pot and the main speed setting pot full CCW.
2. Turn on power and adjust the min. speed pot to the desired low speed.
3. Turn main speed setting pot full CW and adjust the max. speed pot to the desired top speed.

4. Turn the main speed setting pot full CCW and readjust the min. speed to that desired (this is necessary as there is some interaction between the min. and max. speed pots). Measure the min. motor RPM.
5. Shut off drive and connect the motor to the load. Start drive and note the motor speed. Turn the IR Comp. pot CW until the motor RPM is the same as that measured in Step 4 above. Do not overcompensate as the drive may become unstable.
6. Turn the main speed setting pot full CW to top speed with full load on motor. Adjust the current limit pot CCW until the motor speed just begins to fall off. Then turn CW until just beyond the point where full speed is again reached. If required for more rapid acceleration, this pot may be turned slightly more CW but do not go too far or excessive currents may occur.
- 7.

SERVICE & MAINTENANCE

This controller does not generally require servicing as it is designed in such a manner that its life is indefinitely long. Normal maintenance should consist of keeping the controller clean and free of dirt. Occasional blowing out with a dry air hose is sufficient if required.

TROUBLESHOOTING GUIDE

Except for the simplest of troubles, it is normally recommended that controllers be replaced rather than attempting repair. Much of the information given below is for the occasional person who wishes to go deeper into servicing than is normally recommended. Note that the warranty will be void on a controller returned to the factory if it is evident that it has been abused while attempting to make repairs.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>SOLUTION</u>
Motor won't run	No AC power	Check for proper AC voltage On terminal strip
Motor won't run	Open wire to motor or brush Not riding on commutator	Correct
Motor won't run	Fuse blown	Replace with same type and size fuse (also see below under fuse blows)
Motor won't run	Defective speed setting pot Or max. speed pot	Correct.
Motor won't run or runs away Max. and/or min. pot burned out (often visible)	Reference circuit grounded (Speed pot circuit)	Replace max., min. and speed pots. Replace the upper 6.8V reference diode and the 1N4001 diode in series with terminal 8. Check for grounded wires.
Motor won't run or runs away without load	No field on motor. Field circuit open	Correct.
Motor won't run or runs away without load	No field voltage on term. 4 & 5 Diodes open (CR12, 13.) (See Procedure below)	Replace with 1 amp., 1000V diodes. (3A. 600V on TB6 and TB7)
Motor runs at high speed - no speed control	Defective speed setting pot or min. speed pot	Correct
Motor runs at high speed - no speed control	Shorted or defective SCR (SCR 1,2). (See procedure below)	Replace with SCR furnished or proper SCR or power module
Fuse blows after motor is running	Motor overloaded	Remove cause
Fuse blows When AC power is applied or when motor is started`	Shorted diode CR9, 10, 11, 12, 13 or SCR 1,2. (See procedure below)	Replace with proper component or module. If SCR1, 2 are shorted, firing transistors may be damaged
Fuse blows when AC power is applied or when motor is started	Shorted transient suppressor (SP1)	Replace

If none of the above corrects the trouble, it is likely that there is a defective component on the etched circuit board. If the defective component can be easily located it may be replaced but do not attempt unless the person making the replacement has the proper tools and is skilled at this type of work. Otherwise, replace the controller.

PROCEDURE TO DETERMINE IF POWER CIRCUIT COMPONENTS ARE SHORTED

1. Disconnect all wires to the terminal strip.
2. Make sure the fuse is not blown.
3. Using an ohmmeter set at its lowest range, check resistance at the terminals indicated:

<u>TERMINALS</u>	<u>APPROXIMATE NORMAL READING</u>	<u>ABNORMAL READING</u>
1, 3	400 ohm 115V, 1500 ohm 230V	Zero. SP1, two diodes, or two SCRs shorted
3, 4	10-30 ohm one polarity, very high the other polarity	(if open, xfmr primary is open)
1, 4	Same as 3, 4	Zero or open. CR13 shorted or open
3, 5	Same as 3, 4	Zero or open. CR11 shorted or open
1, 5	Same as 3, 4	Zero or open. CR10 shorted or open
5, 6	Same as 3, 4	Zero or open. CR 9 shorted or open
1, 6	Very high both polarities	Near zero. SCR1 shorted
3, 6	Very high both polarities	Near zero. SCR2 shorted

PROCEDURE TO REPLACE POWER COMPONENTS (Module Construction)

1. Remove all wires to controller and remove controller from enclosure.
2. Remove and replace defective module using special care with the following:
 - a. Make sure all the nuts on the new power module are tight.
 - b. Install the modules to the main printed circuit board using the same hardware as furnished.
3. Replace and rewire controller. Be sure to use #8 flat washers resting on the module pc boards.

PROCEDURE TO REPLACE POWER COMPONENTS (Etched Board and aluminum Heat Sink Construction)

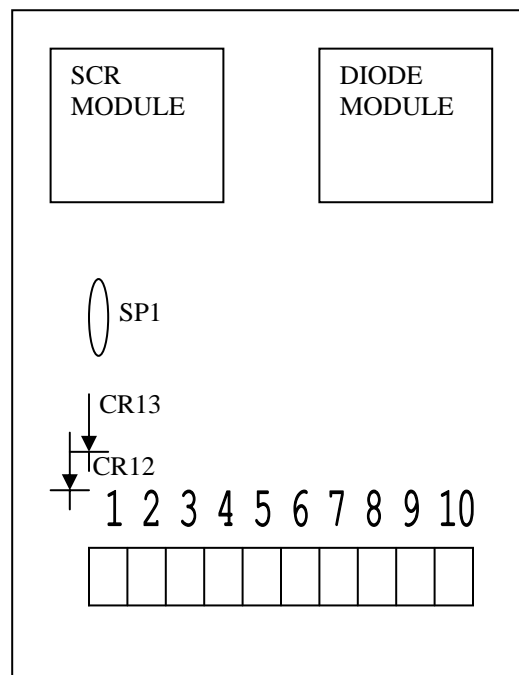
1. Remove all external wires to controller and remove from panel.
2. Use rosin core solder and do not use excessive heat when removing or placing components.
3. Be sure to use the original insulators furnished with the unit (where applicable.)

SCR Modules:

TB5, 115V models use a TB115S module.

TB5, 230V models use a TB230S module.

TB6 models use a TB230SH module.



Diode Modules:

TB5, 115V models use a TB115D module.

TB5, 230V models use a TB230D module.

TB6 models use a TB230DH module.

Wiring Diagram

