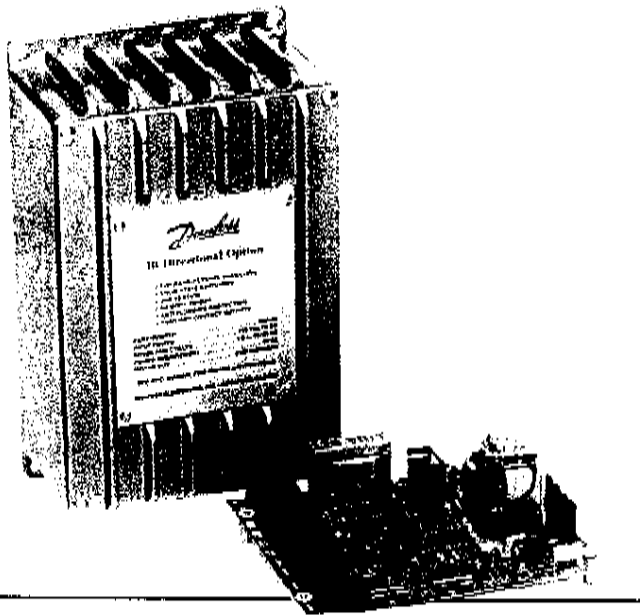

HAMPTON CONROLS
P.O BOX 187
WENDEL ROAD
WENDEL, PA 15691
PH: 1-724-861-0150 Fax: 1-724-861-0160



Bi-Directional Option
Instruction Manual

Bi-Directional Option

TABLE OF CONTENTS

Theory of Operation	2
Specifications	2
Control Inputs	2
Control Outputs	3
Suggestions Before Wiring	3
Wiring	3
Wiring Diagrams	4 - 6
Start-Up Procedure	7
Time/Speed Graph	8
Illustration	9
Trouble Shooting Guide	10
Outline Dimensions	11 - 13
Warranty	Back Cover

Bi-Directional Option

THEORY OF OPERATION

The Isolated BI-DIRECTIONAL OPTION (B.D.O.) provides safe rotation reversal of wound field or permanent magnet DC motors. The BDO receives directional start and stop commands from machine switches or relay logic and passes start and stop commands on to the Vari-Speed or Cycletrol drive. Armature polarity reversal is carried out on the Bi-Directional circuit board. No external reversing contacts are required. Reversing commands are stored in the memory of the BDO until the motor is ready to be safely reversed. The BDO accomplishes this by monitoring motor voltage and not allowing a reverse command to be carried out until zero speed is seen. (Plug reversal is eliminated yet relatively fast reversal times are achieved, typically 500 milliseconds when used with a Cycletrol).

SPECIFICATIONS

<u>INPUT POWER</u>	95-135 VAC, 10, 50/60 HZ 195-280 VAC, 10, 50/60 HZ
<u>HORSEPOWER RANGE</u>	1/8 to 3 HP
<u>ENCLOSURE</u>	Open Chassis NEMA 12,
<u>AMBIENT TEMPERATURE</u>	10° - 50° C (50° - 122° F)
<u>MOUNTING</u>	Vertical mounting recommended.
<u>RUN AND AUXILIARY OUTPUT CONTACT RATINGS</u>	120 Volt, AC or DC or Maximum current of 500 MA. Maximum switching capacity of 10 VA.

CONTROL INPUTS

<u>RUN FORWARD/RUN REVERSE</u>	Require N.O. momentary contacts. Momentarily closing the circuit between either of these inputs and common will cause the motor to run in the desired direction. A momentary closure of 50 milliseconds minimum duration will latch the control in a RUN mode. The control will remain in the run mode until a STOP command is received by the Bi-Directional Option. A maintained RUN closure will override any STOP command.
<u>JOG FORWARD/JOG REVERSE</u>	Require N.O. maintained contacts. Closing the circuit between either of these inputs and common will cause the motor to run in the desired direction. The control will run while the closure is maintained and will stop when they are re-opened.
<u>STOP</u>	Requires a N.O. momentary contact. Control will stop upon closure and will remain stopped until a RUN or JOG command is given. Control will NOT stop if closures are present on any of the RUN or JOG terminals.

CONTACT RATINGS

NOTE: All input signals are closures from the various input terminals to COMMON. (terminal #7). The switches or relays used must be capable of reliably switching 15VDC & MA power. (GOLD CONTACTS ARE RECOMMENDED).

CONTROL OUTPUTS

RUN OUTPUT

is a N.O. set of contacts which close whenever the control is in the RUN mode. The RUN/JOG mode is indicated by the yellow LED. This output is normally interfaced with the main motor control. (Cycletrol or Vari Speed)

AUXILIARY OUTPUT

is a N.O. (normally open) set of contacts which close whenever the control is in the REVERSE mode. The REVERSE mode is indicated by the red LED. This output can be used to switch in and out separate forward and reverse speed potentiometers, or light a reverse indicator lamp or perform some such other operation related to the reverse direction. (See page 2 "SPECIFICATIONS" for these output contact ratings).

SUGGESTIONS BEFORE WIRING

WIRE SIZE AND TYPE

#14 ga. or larger should be used for motor connections. Smaller wire may be used for all other connections. Insulation should be enough for operation at the motor controller line voltage.

CODE REQUIREMENTS

- 1.) A fuse or circuit breaker must be supplied by user on the incoming power to the BDO. Suggested fuse size for the BDO is 1 Amp Slo-Blo.
- 2.) The BDO plate (or enclosure casting) must be grounded.

MOUNTING SUGGESTIONS

Vertical mounting in an area where air can circulate is recommended for coolest operation.

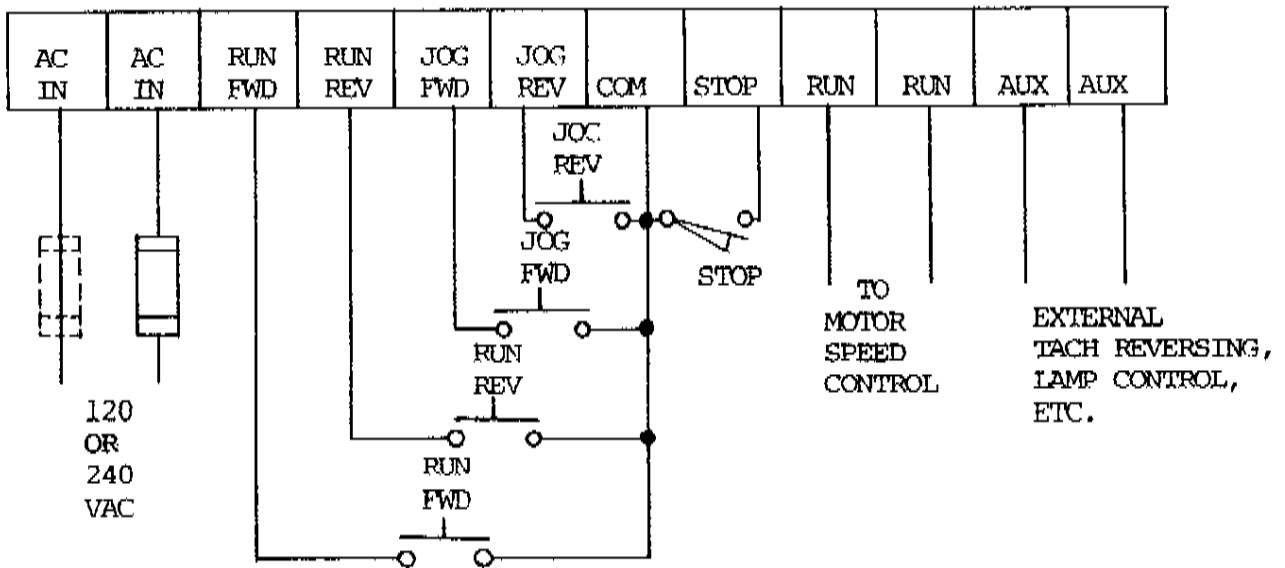
WIRING

With power off, connect the AC line to terminals 1 and 2 as shown on pages 4, 5 and 6. Connect N.O. switches, relays or pushbuttons to the appropriate terminals. The control will respond to a closure of any one set of contacts. (See "CONTACT RATING" pg. 2). A closure across any of the RUN or JOG terminals will initiate a "start" which will create an internal closure on terminals 9 & 10. (11 and 12 will also close if a REVERSE command is given). With terminals 9 & 10 tied to the proper main control terminals, the motor will run in either a forward or reverse mode depending on the command given. If forward and reverse commands are given simultaneously the control will ignore both commands and will not start.

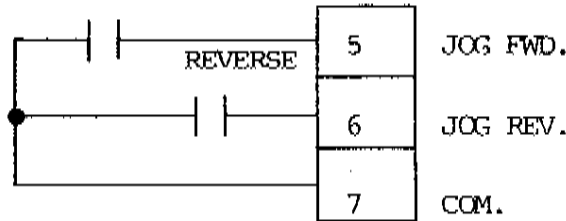
**Bi-Directional
Option**

WIRING CONT.

The following are typical control logic circuits. Many other configurations are possible. Consult factory where help is needed.

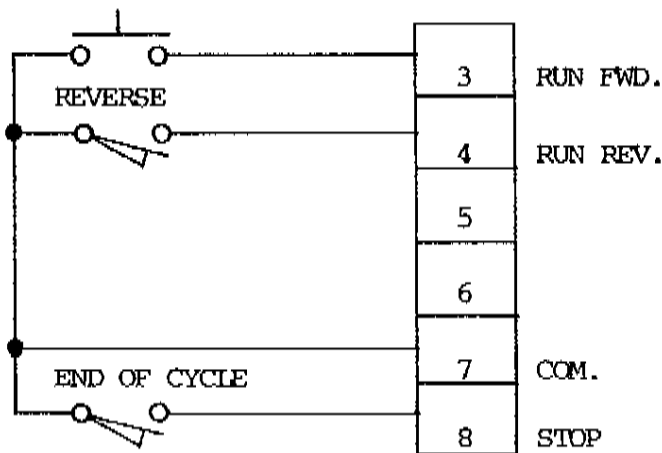


FORWARD

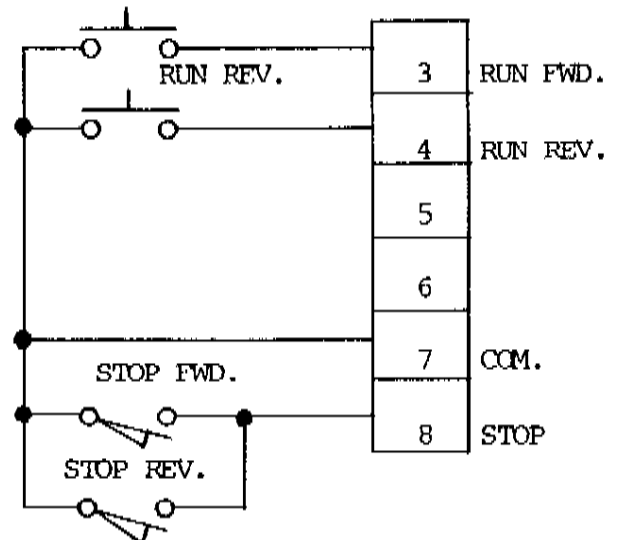


MAINTAINED CONTACTS

CYCLE START



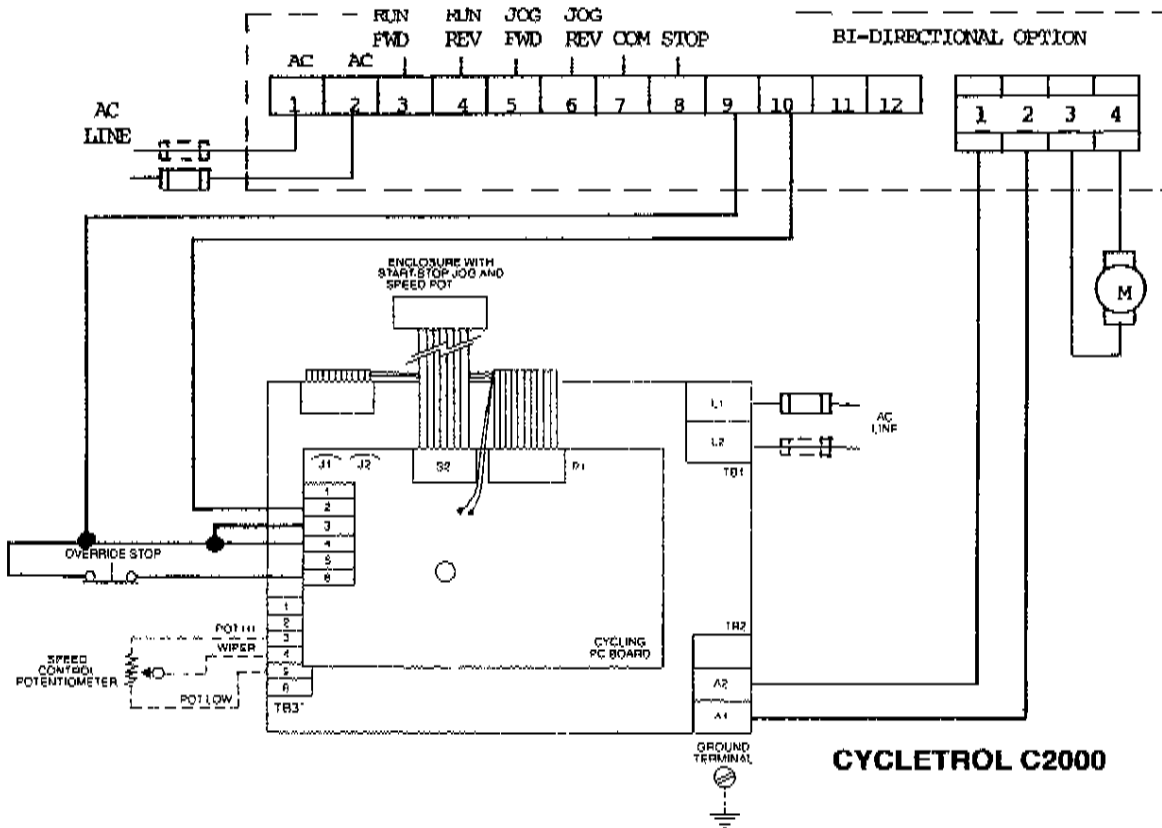
RUN FWD.



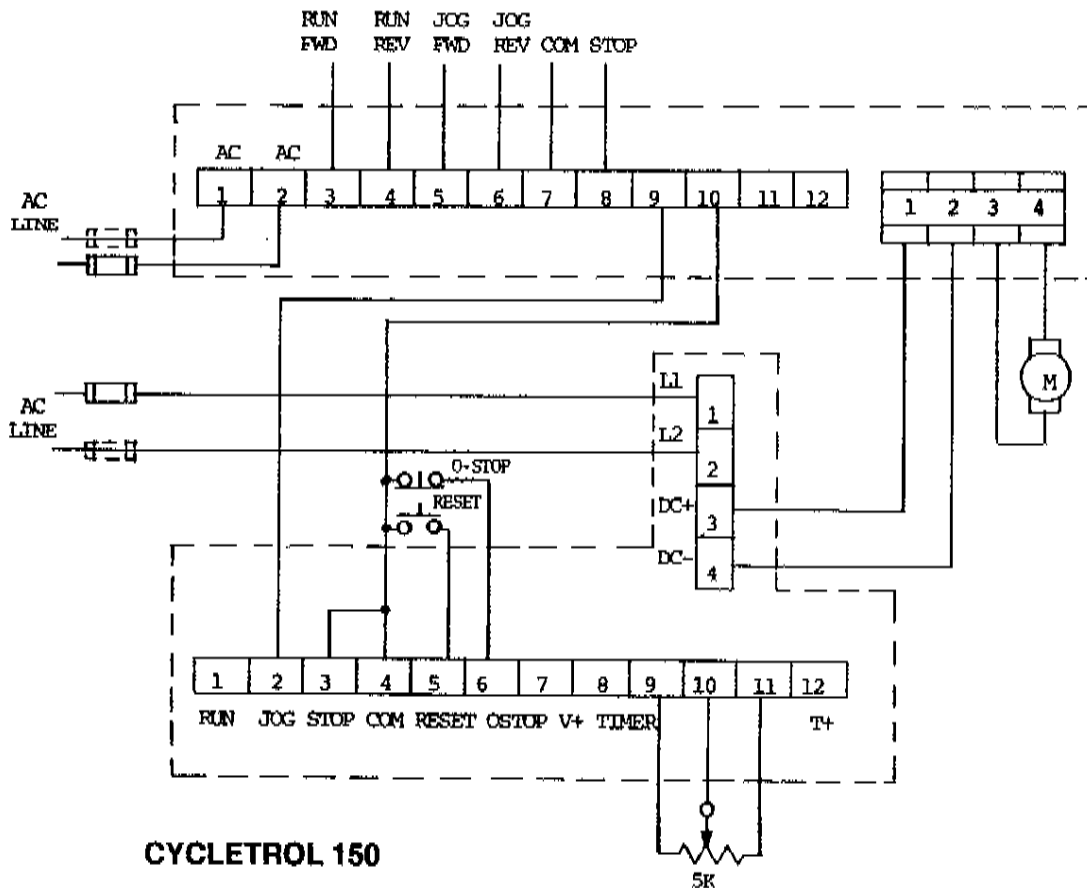
MOMENTARY CONTACTS

**BI-Directional
Option**

WIRING CONT.



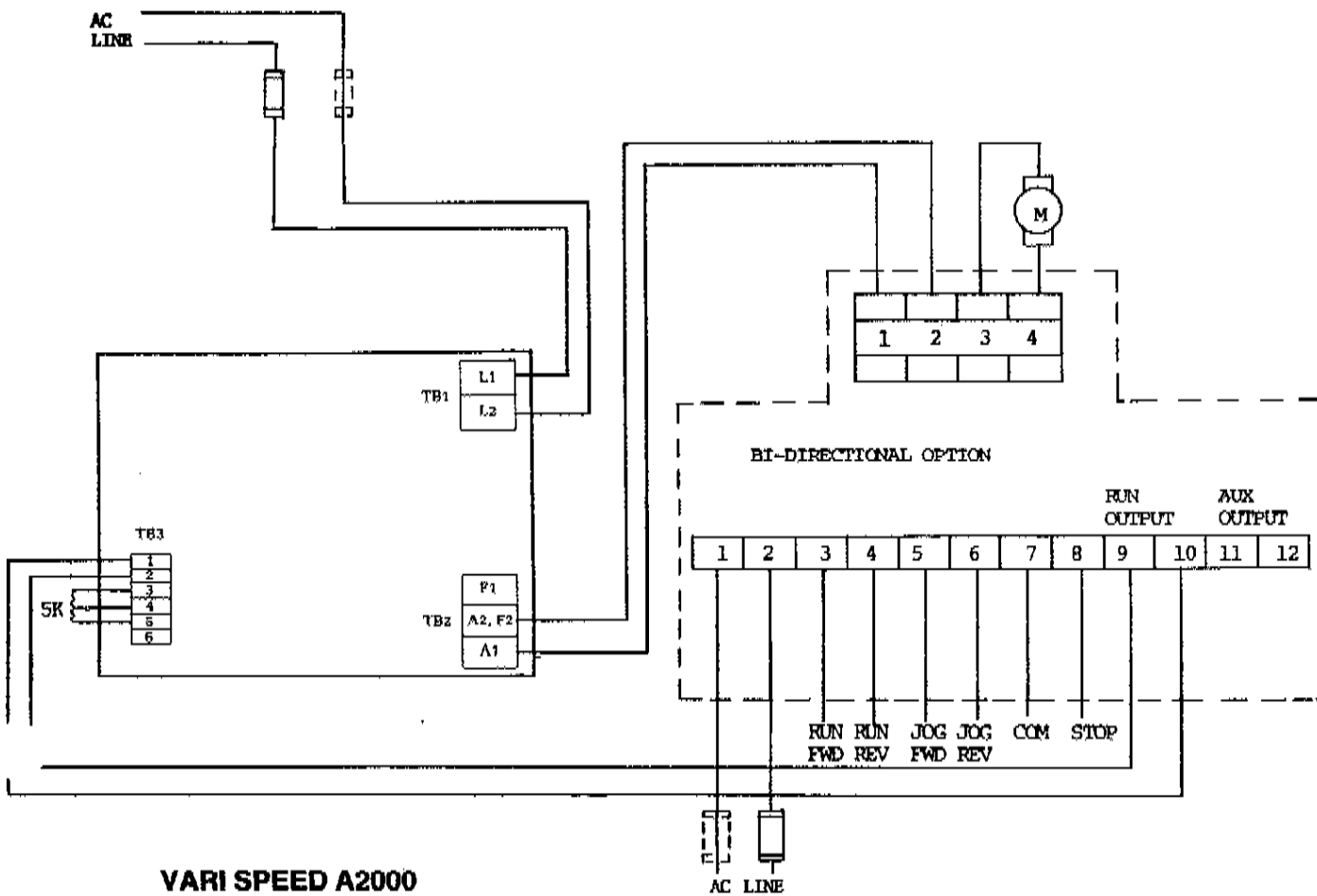
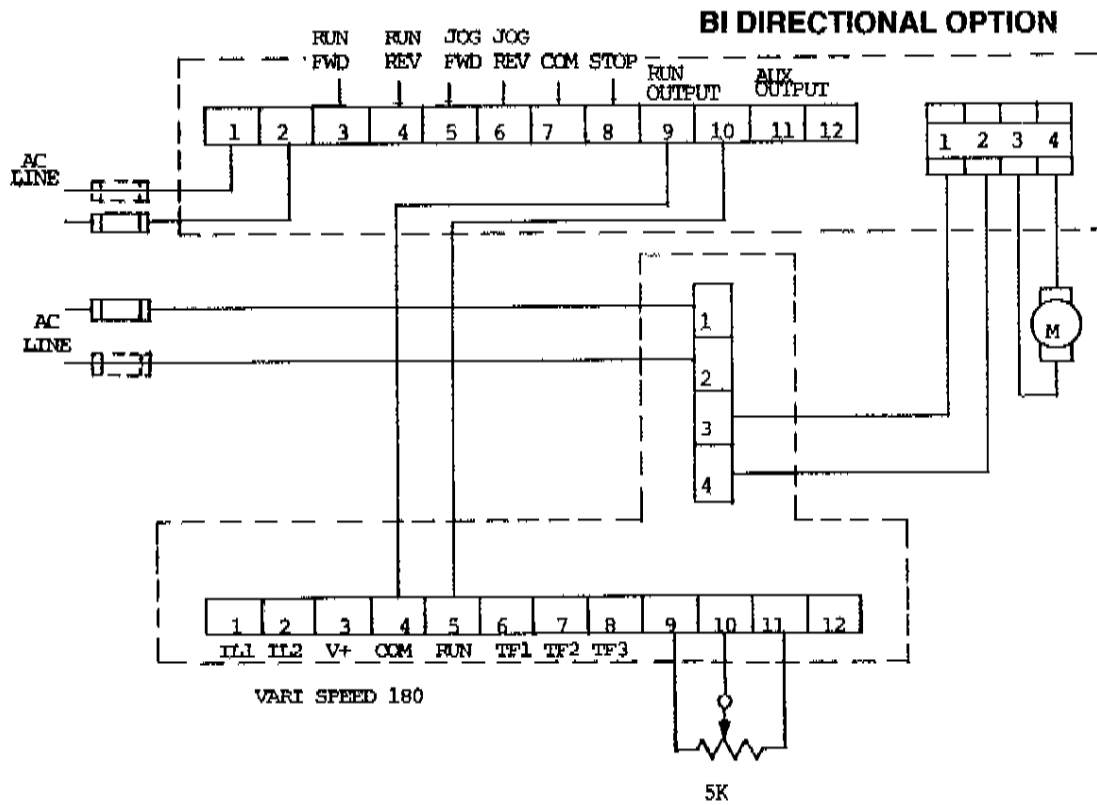
CYCLETROL C2000



CYCLETROL 150

**Bi-Directional
Option**

WIRING CONT.



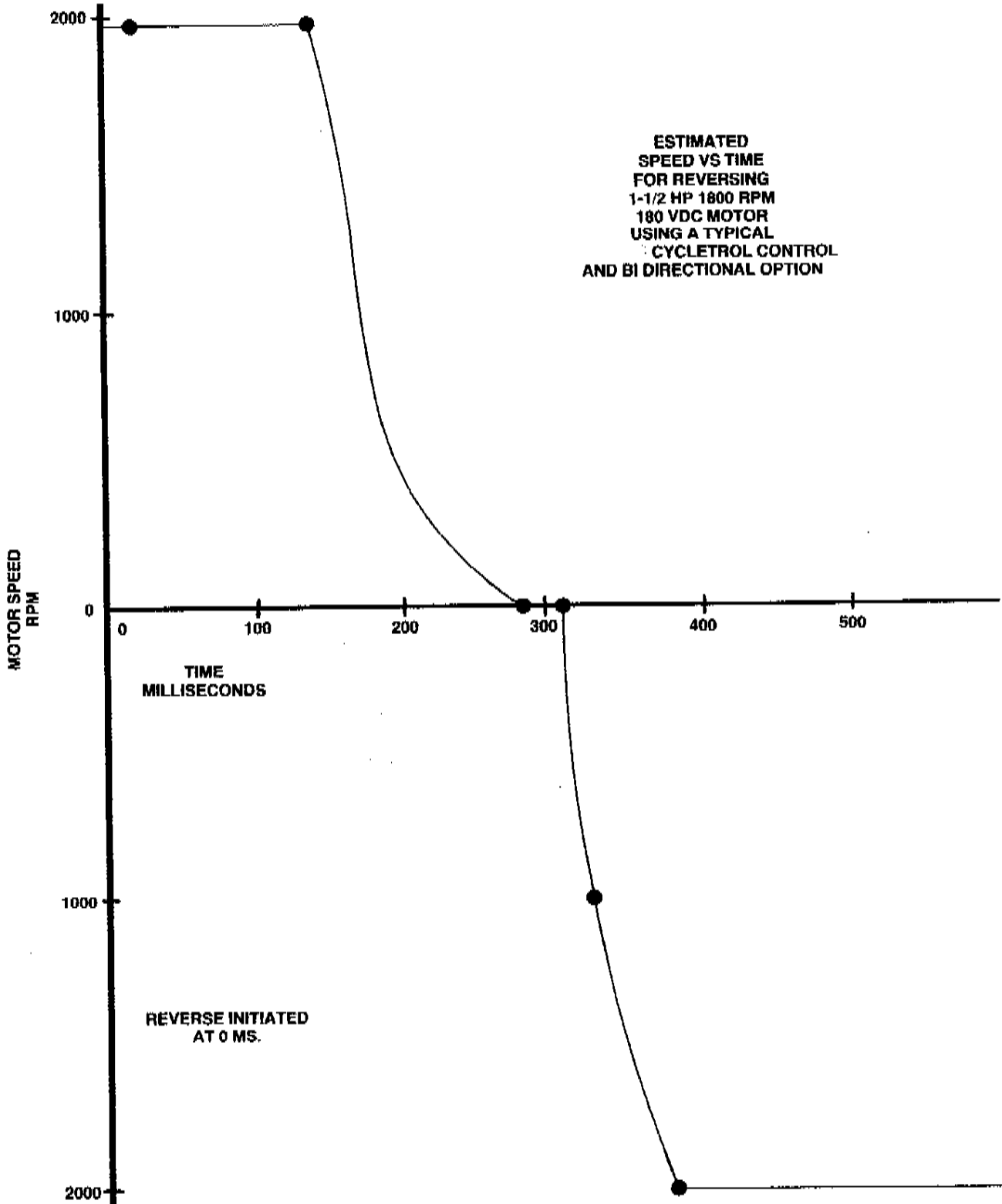
START-UP PROCEDURE

- 1.) Apply AC to the Bi-Directional option. The control is ready for operation if the green LED is on.
- 2.) Turn the speed control potentiometer to zero speed.
- 3.) Press the Run Forward button. The yellow LED should come on and remain on even after the Run Forward button has been released.
- 4.) Check to see that the motor speed control, Vari Speed or Cycletrol, has received a Run command (indicated by LED's on the motor control where applicable). Slowly increase the speed pot setting to insure that the motor is running in the proper direction. If it is not, remove AC from both BDO and motor speed control and reverse motor leads at the BDO. Repeat steps 1-4.
- 5.) Bring speed back to zero.
- 6.) Press the Stop button. The yellow LED on the BDO should turn off. See that the Run LED on the Cycletrol or the Vari Speed is also off.
- 7.) Press the Run Reverse button. The red LED and the yellow LED of the BDO should come on and remain on after the Run Reverse button is released.
- 8.) Check to see that the motor speed control has received the Run command. Turn the speed potentiometer slowly clockwise and see that the motor is running in the opposite direction that it was initially in step 4. Turn the speed pot back to zero.
- 9.) Press the Stop button. The yellow LED should turn off and the red LED should remain on. See that the Run LED of the Vari Speed or Cycletrol is also off.
- 10.) The Jog Forward and Jog Reverse operations must be tested in the same manner. However the control will stop when the buttons are released and it is not necessary to press the STOP button.
- 11.) It is now possible to give consecutive Forward and reverse commands without going to zero speed or giving STOP commands.

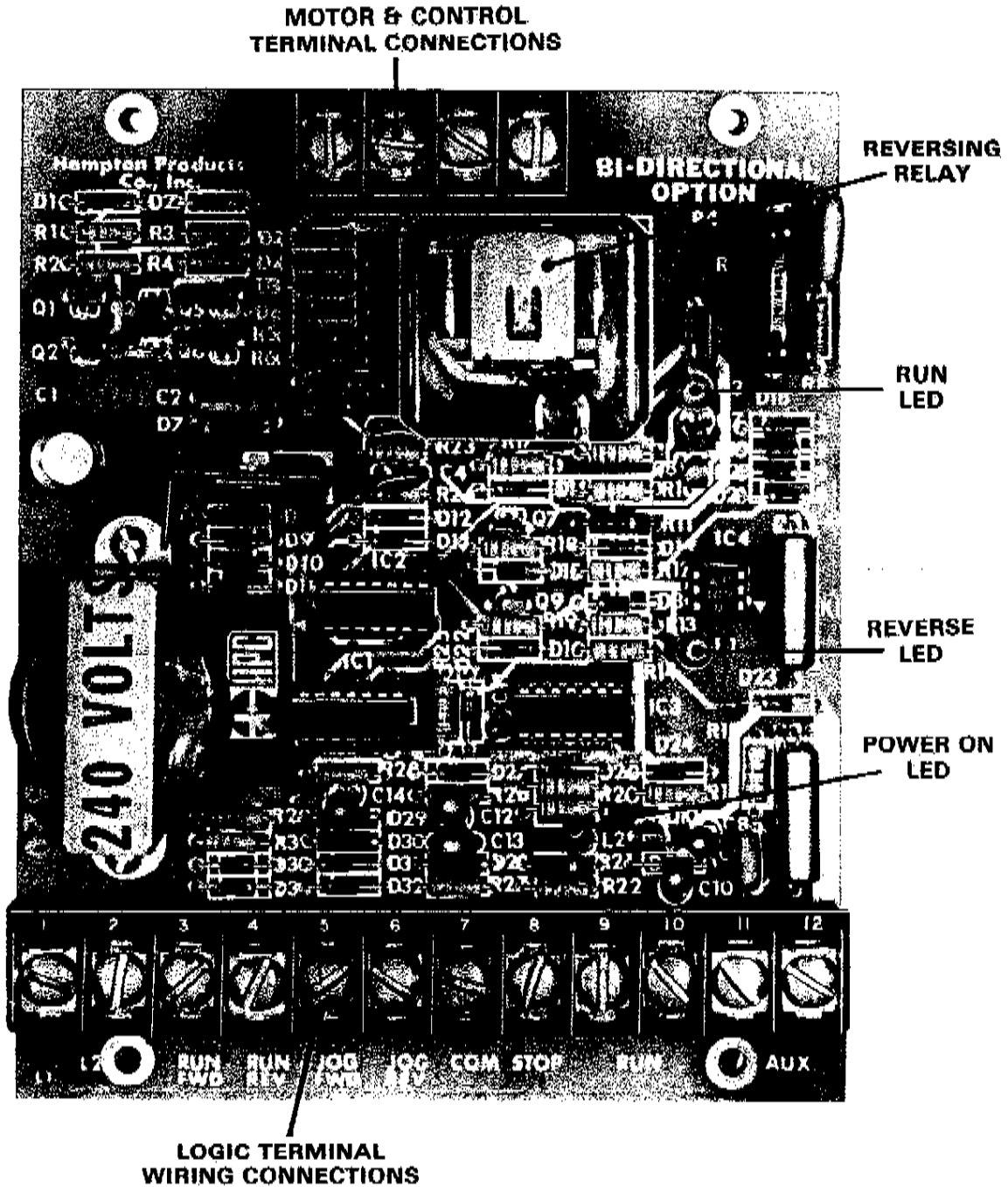
**Bi-Directional
Option**

TIME/SPEED GRAPH

The following graph is an example of the time required to accomplish motor reversal from full speed on a 1 1/2 HP, 180V DC motor. This time may vary as a function of load size and inertia.



ILLUSTRATION, CHASSIS MOUNT



**Bi-Directional
Option**

TROUBLE SHOOTING GUIDE**MOTOR WILL NOT RUN**

1. Is the green "POWER ON" LED of the BDO on? If yes, continue to step 2. If no, see step 5.
2. When a RUN command is given to the BDO, does the yellow "RUN" LED come on? If yes, continue to step 3. If no, see step 6.
3. Is continuity measured between terminals 9 & 10? If no, consult factory. If yes, see step 4.
4. Check wiring between BDO and motor control for the proper "logic terminations". Correct any errors. If wiring and interconnections are okay, consult the appropriate VarSpeed or Cycletrol manuals.
5. Check circuit breaker and line disconnects to see that they are turned on. Check to see that the appropriate line voltage is present at terminals 1 & 2 of the PCB. If everything checks okay, consult factory. Correct wiring errors where they are found.
6. Check for proper switch interconnections and positive switch contact closures. (See "contact ratings", page 2). If all is fine, consult factory.

MOTOR WILL NOT STOP

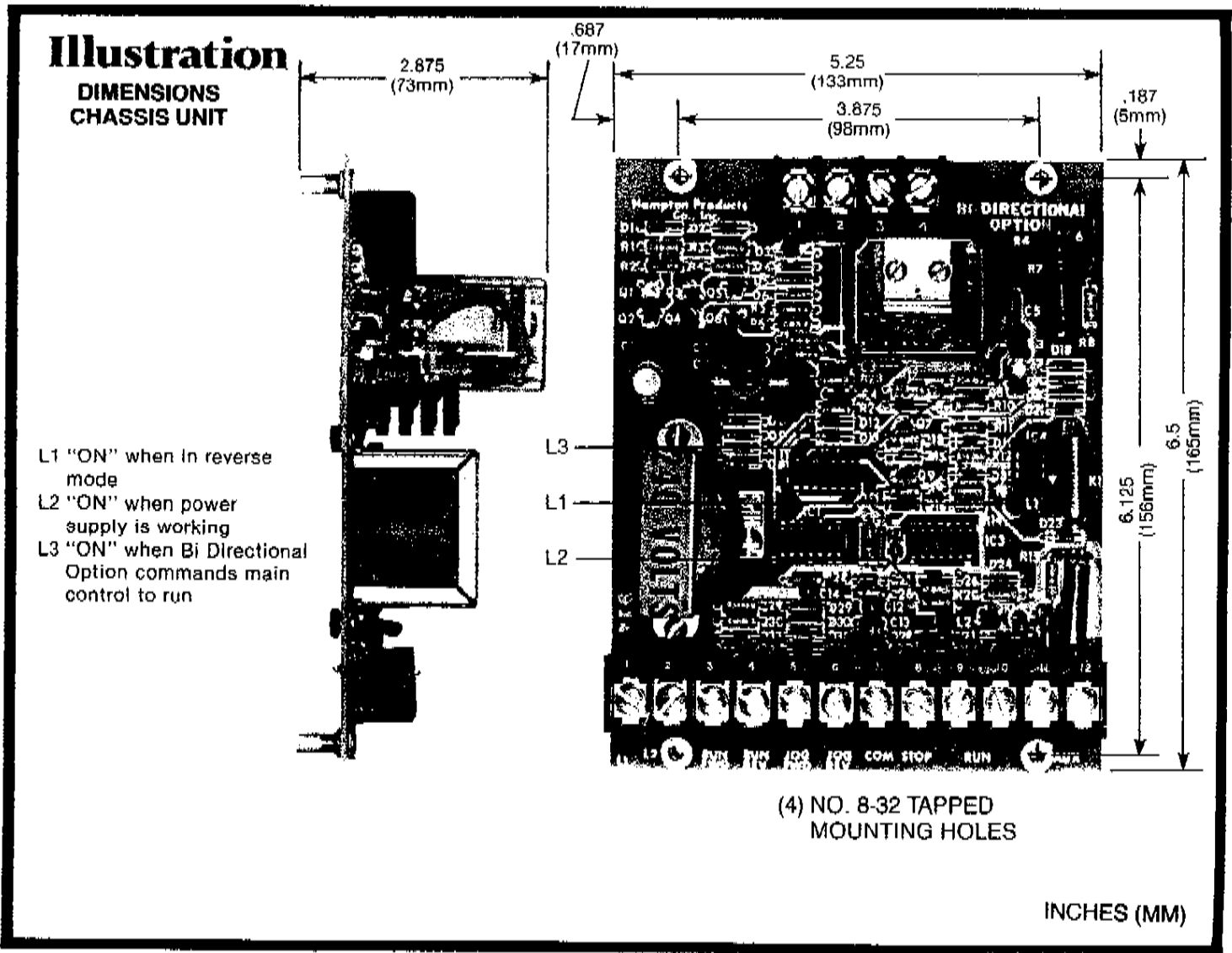
7. When a "STOP" command is given, does the yellow "RUN" LED turn off? If no, see step 6. If yes, continue to step 8.
8. Check to see that there is no continuity between terminals 9 & 10. If there is, consult factory. If there is none, see step 4.

MOTOR WILL NOT REVERSE

9. When a reverse command is given, does the red "REVERSE" LED come on? If no, see step 6. If yes, check the reversing relay for damaged contacts. If they appear fine, consult factory.
10. Verify that the VarSpeed or Cycletrol being used with the BDO is going to a zero (0) armature output level.

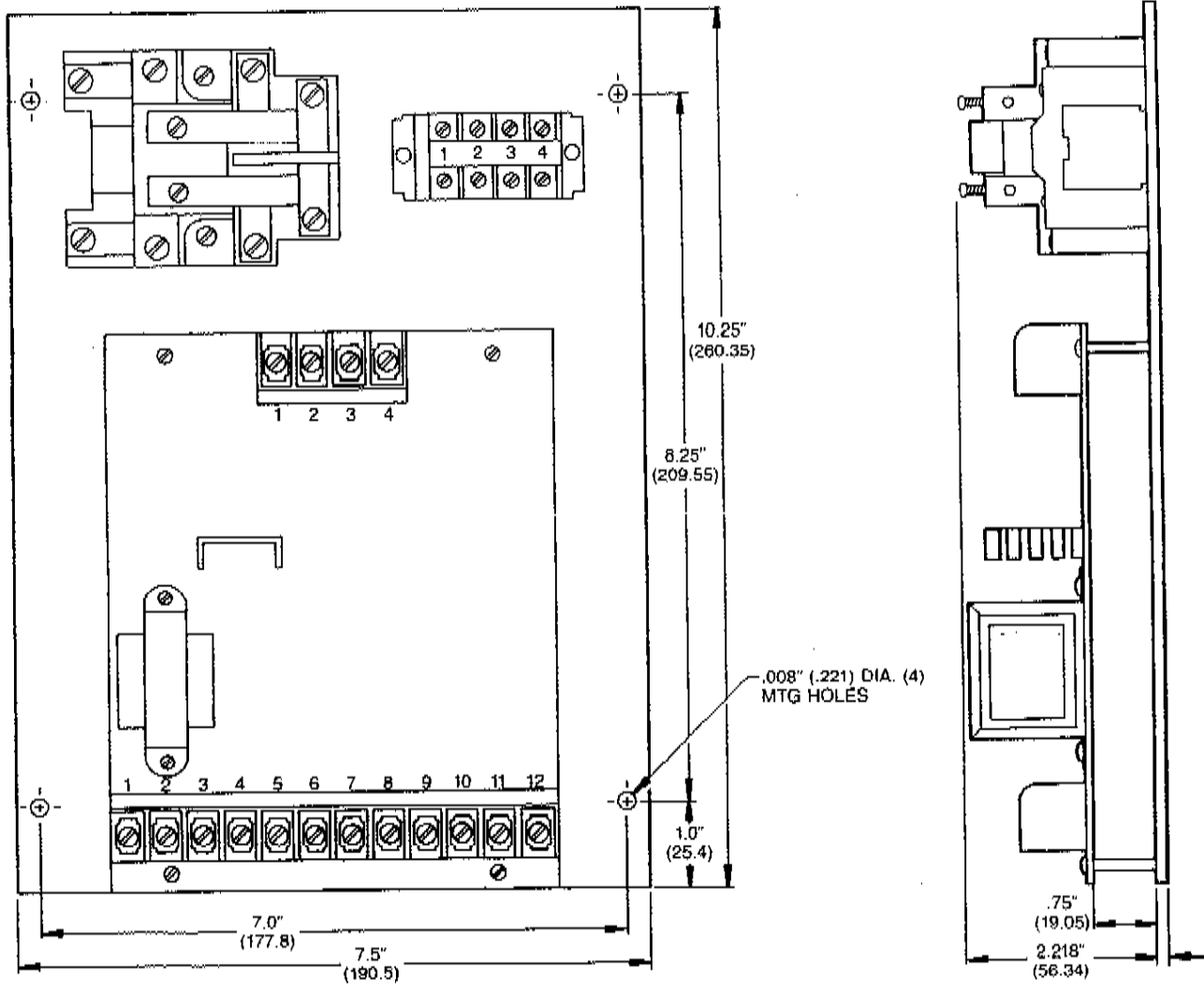
**Bi-Directional
Option**

DIMENSIONS, CHASSIS UNIT



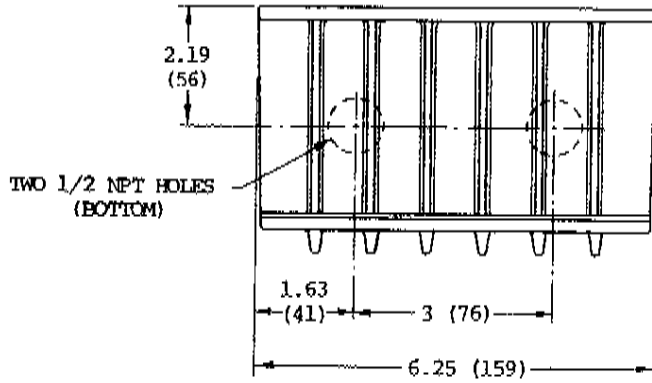
**Bi-Directional
Option**

DIMENSIONS, 5 HP UNIT



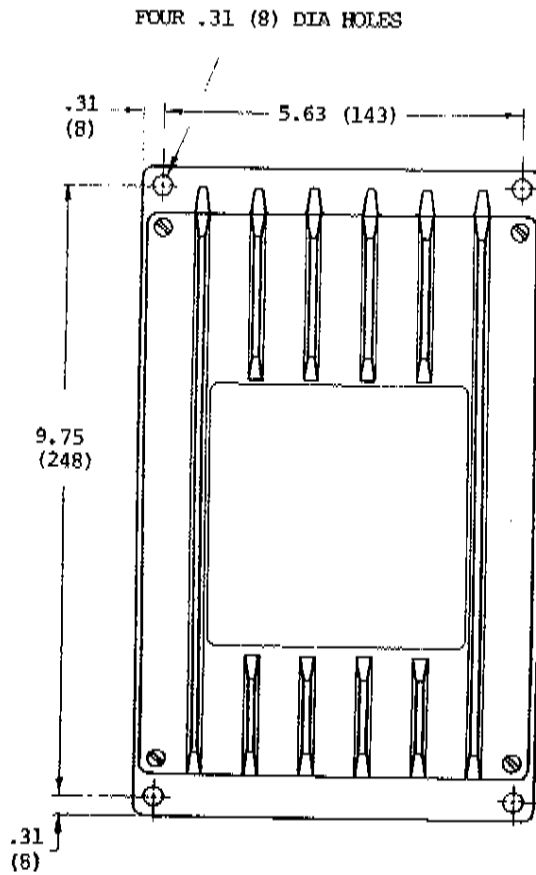
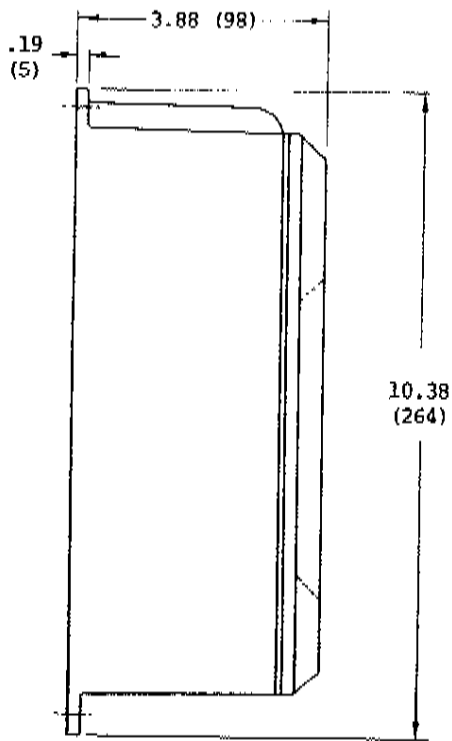
INCHES (mm)

DIMENSIONS, ENCLOSURE



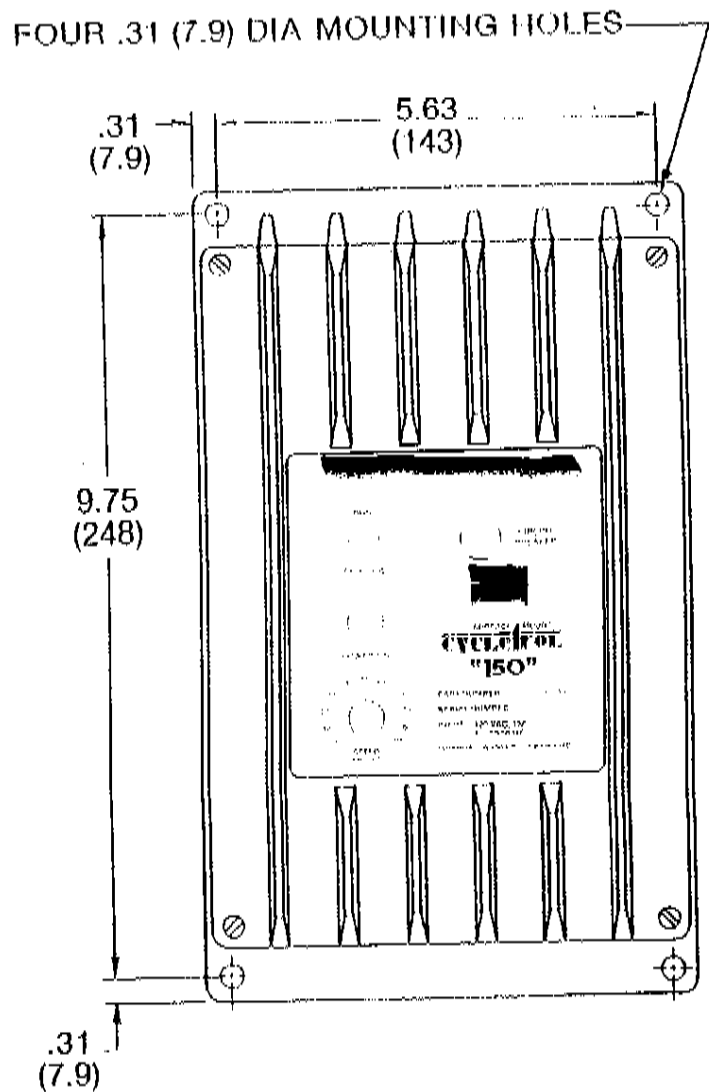
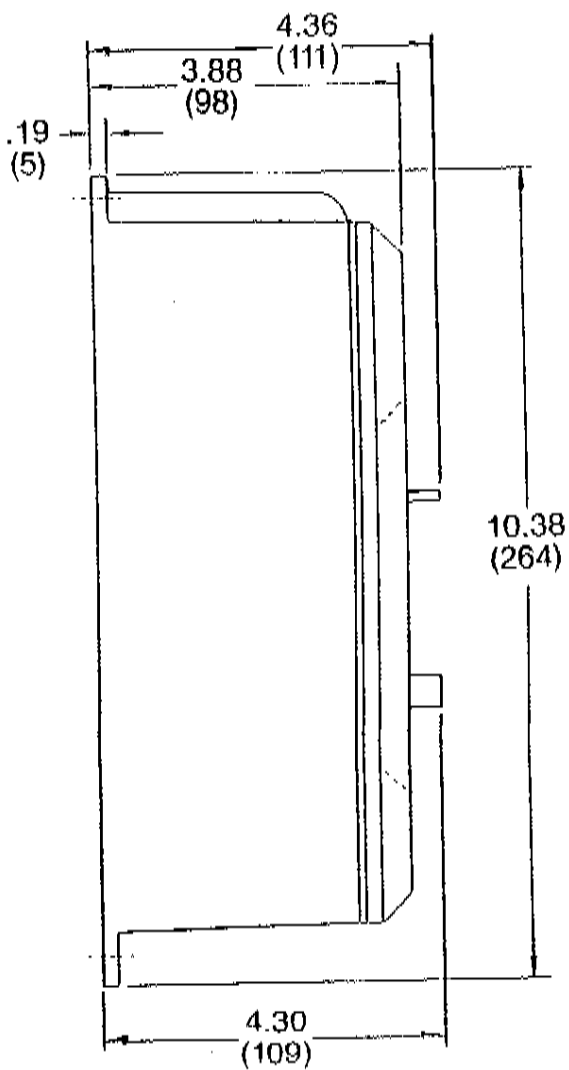
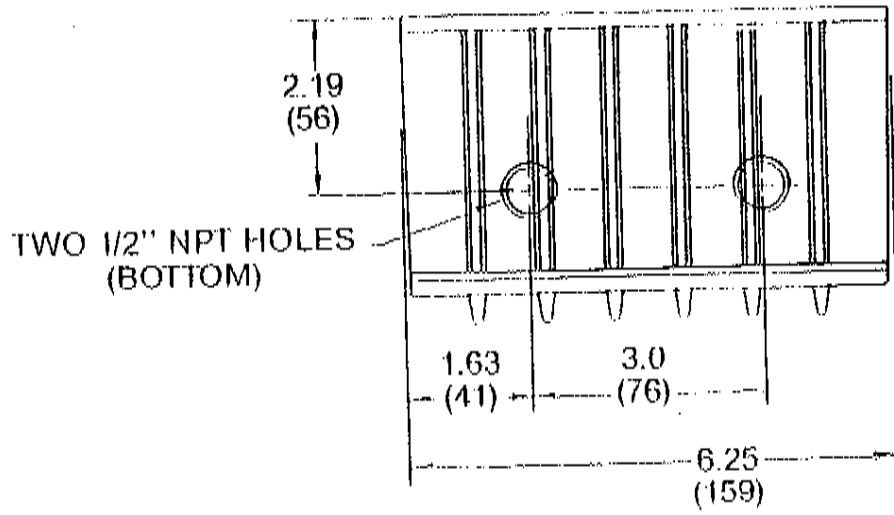
WEIGHT 7#

MATERIAL Aluminum



INCHES (MM)

OUTLINE DIMENSIONS



INCHES (MM)