24 Volt
LVC (Low Voltage Control)
MAGNETIC MOTOR CONTROL SYSTEMS

INSTRUCTION MANUAL

INTRODUCTION

The single and three phase Delta definite purpose Low Voltage Control (LVC) motor starters have been designed exclusively for use on Delta machinery.

The basic function of a Delta definite purpose starter is to provide ON-OFF motor control. In addition to providing ON-OFF control, every Delta motor starter offers the following features:

Motor Overload Protection - All starters are supplied with thermal overload relays which protect the power tool motor from burnouts due to excessive heat resulting from a sustained motor overload, extended motor cycling, or stalled rotor.

No Voltage or Low Voltage Protection (LVP) - No voltage or low voltage protection prevents the dangerous restarting of a power tool following a temporary power failure. Upon a loss of voltage or a reduction of voltage, the magnetic contactor in the starter will open. When power is restored, the motor will not automatically restart, but must be manually restarted by pushing the start button of the ON-OFF switch.

Low Voltage Control (LVC) -The Delta definite purpose motor starters provide low voltage control as a unique safety feature. The pushbutton ON-OFF switch operates at a 24 volt level, not at line voltage. The 24 volt low voltage control eliminates the possibility of dangerous electrical shock to the operator.

This manual includes a description of the basic LVC motor starters, instructions for wiring the starters to the power source, and instructions for changing the voltage of an LVC motor starter.

Dated 5-10-85

Part No. 438-01-655-0002

DELTA

TABLE OF CONTENTS

SAFETY RULES

1. Installing and servicing should always be accomplished by qualified electrical personnel.

2. Read the instruction manual before wiring and operating this motor starter. Failure to follow instructions can cause injury.

3. Always disconnect the electrical power before removing the cover of the starter.

4. Operate the motor starter only with the cover of the starter in place.

5. Do not operate the machine unless the motor starter is properly grounded as specified in the instructions.

6. Follow national and local electrical codes when wiring the motor starter.

7. Always use proper heater coils as specified in the heater coil chart located on the inside of the starter cover.

8. Make sure the motor starter is disconnected from the electrical power source before the primary connections of the control transformer are changed.

9. The LVC Motor Starter has been designed and engineered for use only on Delta Machinery.

10. Occasionally inspect the starter to ensure that it is securely mounted, clean and dry.

11. Always use the LVC Motor Starter with an electrical disconnect switch with over-current protection.

SINGLE PHASE LVC MAGNETIC MOTOR STARTER

Fig. 1, illustrates the standard single phase LVC magnetic motor starter, Delta Part No. 52-704.

The starter is made up of four basic components: 1) overload block, 2) magnetic contactor, 3) transformer, and 4) start/stop station. The start/stop station is not shown in Fig. 1. Neither are the input connections from the start/stop station, input connections for single phase electrical power, or the leads from the motor.

A wiring diagram and schematic diagram of the single phase LVC magnetic motor starter is shown in Fig. 2.

The wiring diagram indicates the relative physical location of each component, wire, and terminal; whereas, the schematic diagram does not show the physical relationship of the components. The schematic diagram does show in a straight line form the circuit functions of the various components.

The single phase starter is comprised of a power circuit and a control circuit.

The power circuit carries the motor load current and is shown with heavy lines in the wiring and schematic diagrams to represent heavy gage wire sized for the motor current. In the motor starter, the power circuit is wired with black wires.

The main function of the control circuit is to start and stop the electric motor by means of the start/stop pushbuttons. The diagrams in Fig. 2 illustrates the control circuit with light lines to represent light gage wire sized for control current. The control circuit consists of the control transformer with fuse, start/stop push buttons, start button interlock contact, magnetic contactor coil, and overload switch. The control circuit is wired with red wires in the motor starter.

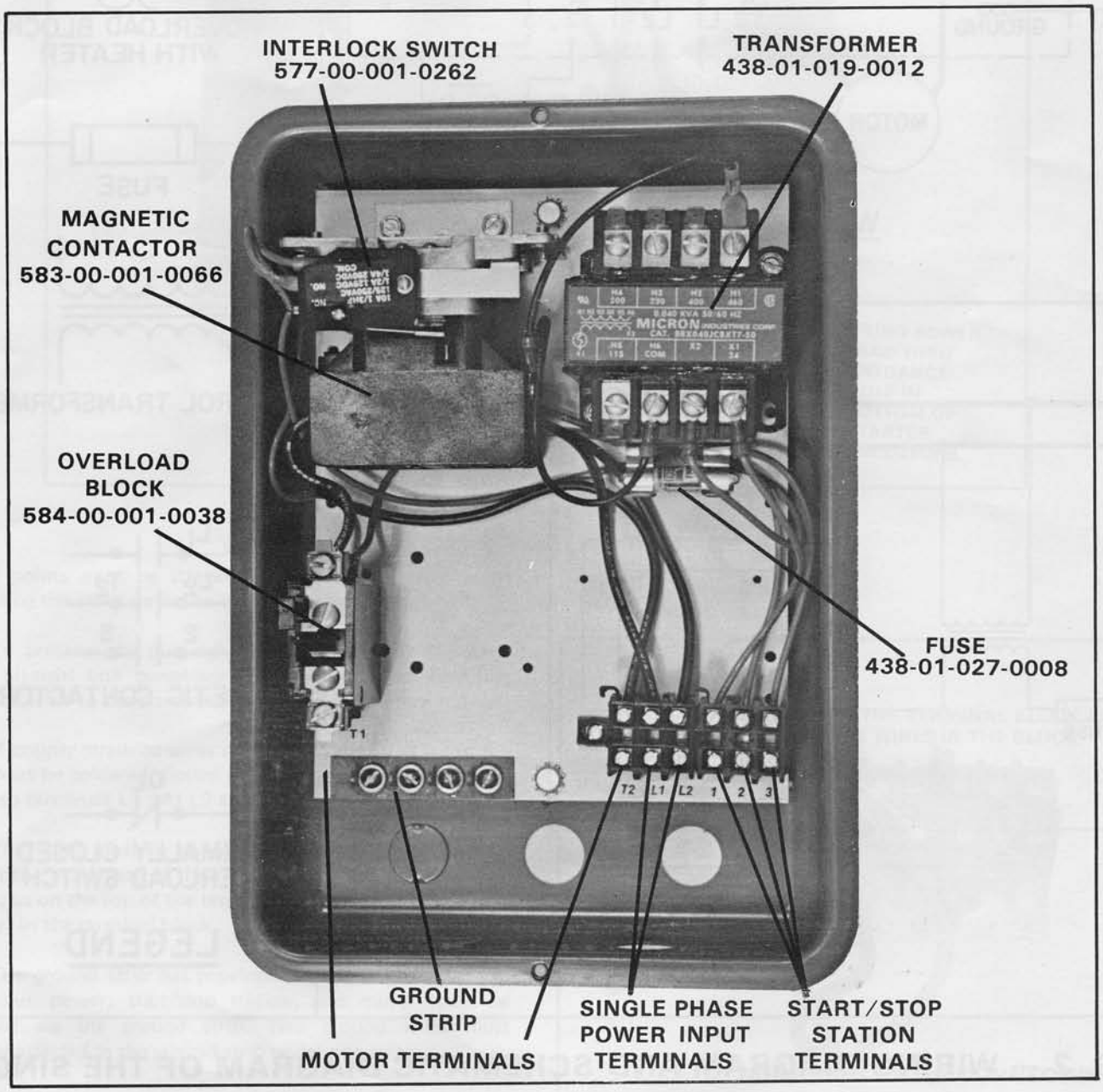


FIG. 1 — STANDARD SINGLE PHASE MOTOR STARTER, DELTA NO. 52-704

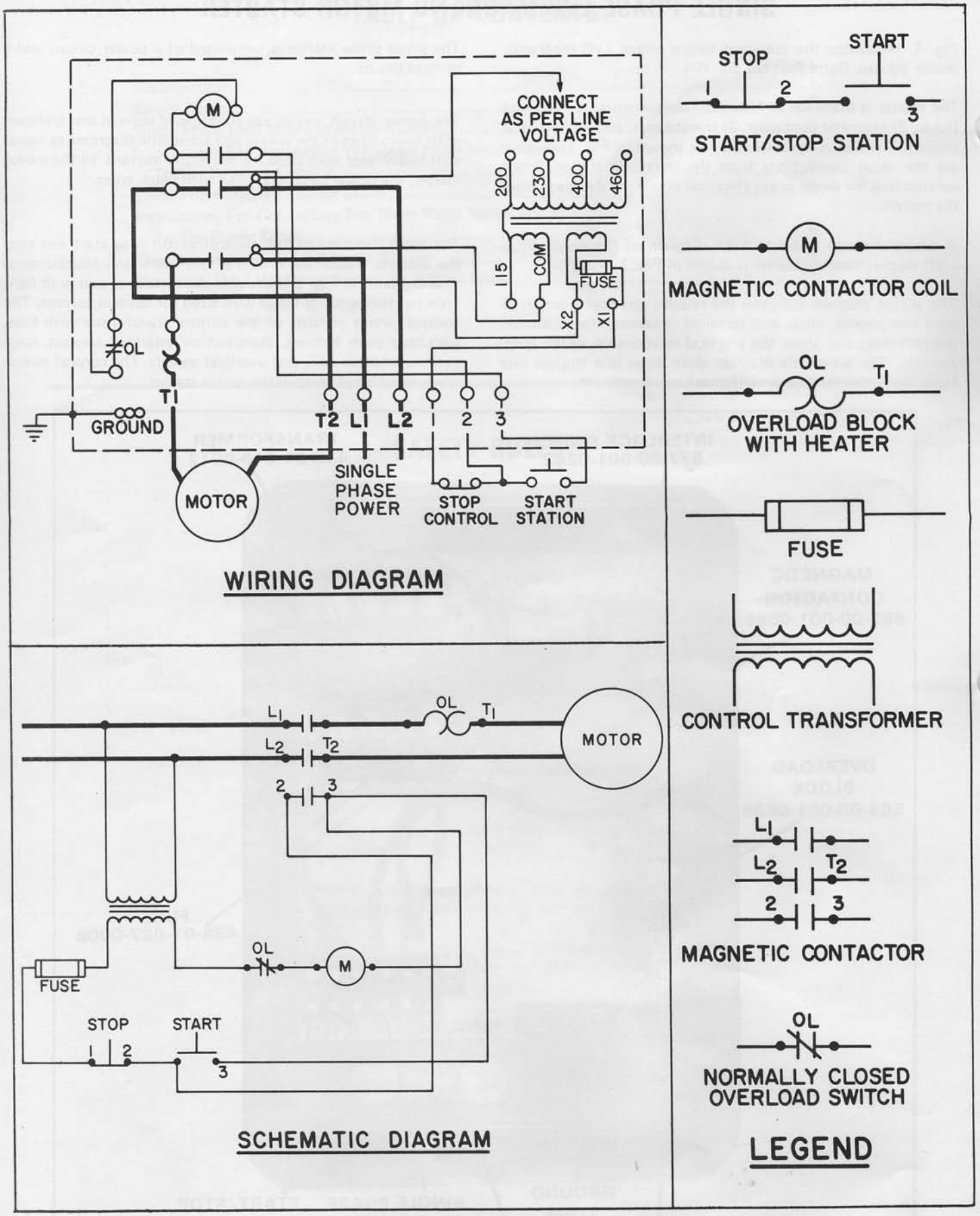


FIG. 2 — WIRING DIAGRAM AND SCHEMATIC DIAGRAM OF THE SINGLE PHASE LVC MOTOR STARTER, DELTA NO. 52-704

INSTRUCTIONS FOR CONNECTING THE SINGLE PHASE MOTOR STARTER TO THE POWER SUPPLY

In general, stationary tools ordered with a single phase motor 1-1/2 horsepower or less are shipped from the factory with a cord set and plug. No field wiring is necessary.

Stationary tools ordered with a single phase motor greater than 1-1/2 horsepower must be wired in the field. The single phase LVC motor starter should be wired as follows:

Bring the input power cord through the entrance hole in the bottom of the starter enclosure, Fig. 3. Connect the black power lead to terminal L1, the white power lead to terminal L2, and the green ground lead to the ground strip in the lower left hand corner of the starter enclosure.

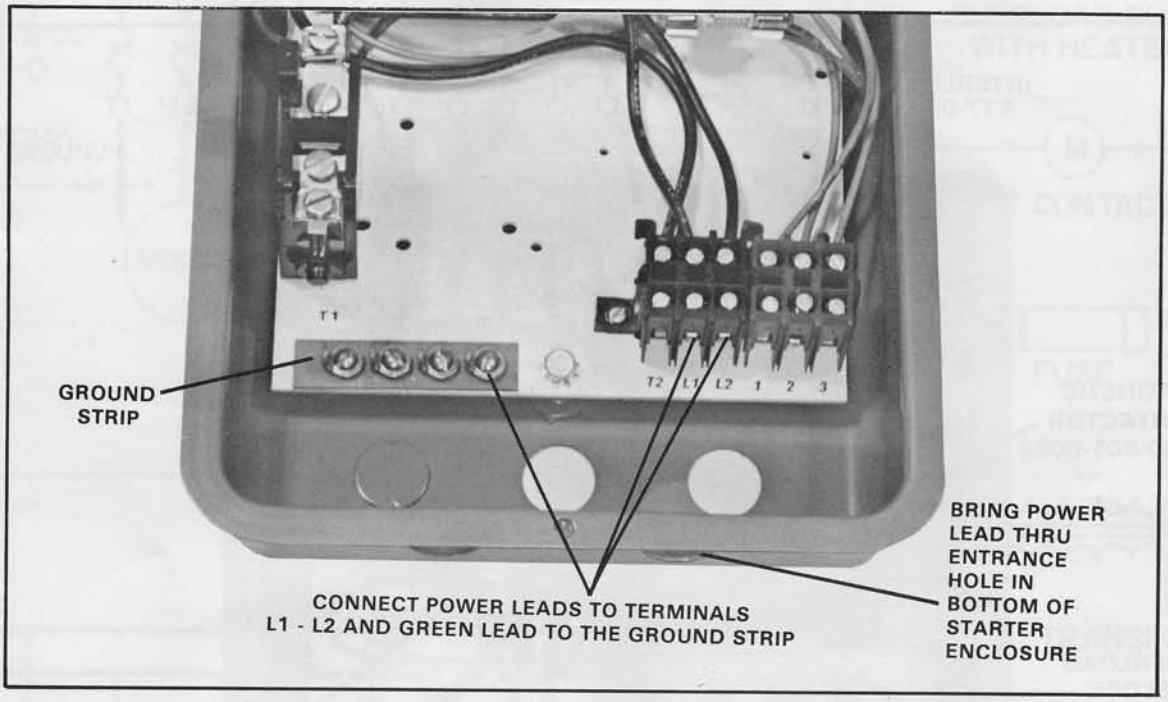


Fig. 3

Several points must be stressed and closely followed when connecting the input power to the motor starter.

1. To preserve the dust-tight integrity of the motor starter, an oil-tight box connector should be used for fastening the input cable to the starter enclosure at the entrance hole.

2. If copper stranded wires are used for the input leads, the wires must be soldered dipped or tinned before they are connected to terminals L1 and L2 and the ground strip.

3. The wires must be connected to terminals L1 and L2 through the front face of the terminal block as shown in Fig. 4. The screws on the top of the terminal block are used for clamping the wires in the terminal block.

4. The ground strip has provisions for four ground leads. The input power, start/stop station, and motor must be grounded via the ground strip. Two ground wires must never be inserted in the ground strip under one screw.

5. If metal conduit is used in place of cable, the green ground wire from the single phase input power system is omitted.

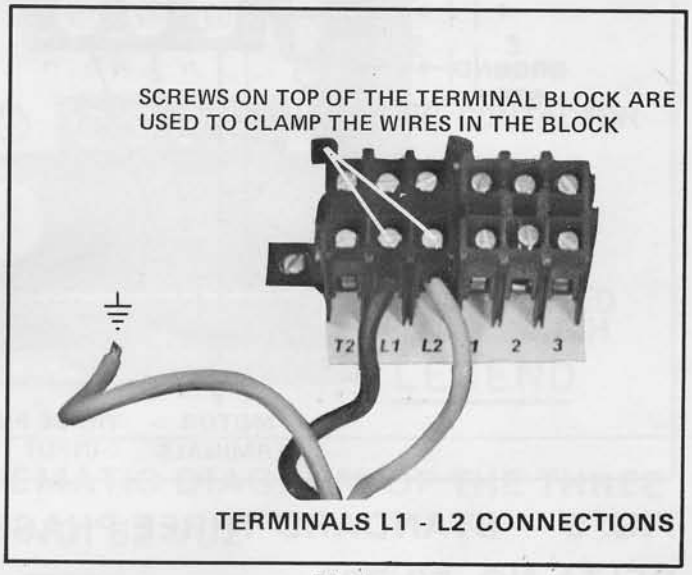


Fig. 4

THREE PHASE LVC MAGNETIC MOTOR STARTER

Fig. 5, illustrates the standard three phase LVC magnetic motor starter, Delta Part No. 52-702.

The three phase starter consists of four basic components: (1) overload block with heaters, (2) magnetic contactor (3) transformer, (4) start/stop station. The start/stop station is not shown in Fig. 5. Neither are the input connections from the start/stop station and the input connections from the three phase motor or power supply.

A wiring diagram and schematic diagram of the three phase LVC magnetic motor starter is shown in Fig. 6.

The wiring diagram indicates the relative physical location of each component, wire, and terminal; whereas, the schematic diagram does not show the physical relationship of the components. The schematic diagram does show in straight line form the circuit functions of the various components.

The three phase LVC motor starter is comprised of a power circuit and a control circuit. The diagrams in Fig. 6 illustrates the power circuit with heavy lines to represent heavy gage wire sized for the motor current; whereas, the control circuit is shown with light lines in the diagrams to represent light gage wire sized for control current. In the motor starter, the power circuit is wired with black wires and the control circuit is wired with red wires.

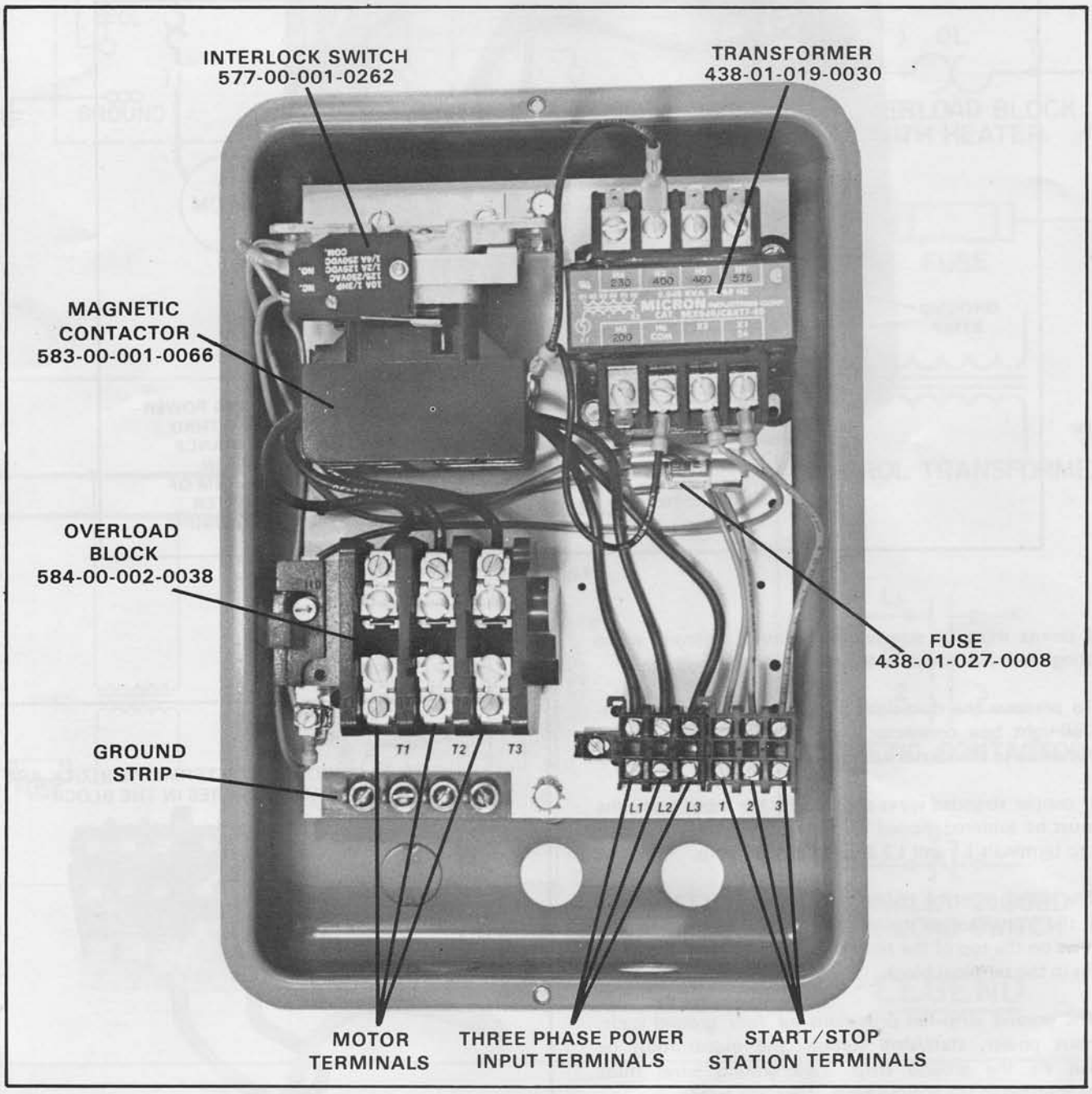


FIG. 5 — STANDARD THREE PHASE MOTOR STARTER, DELTA NO. 52-702

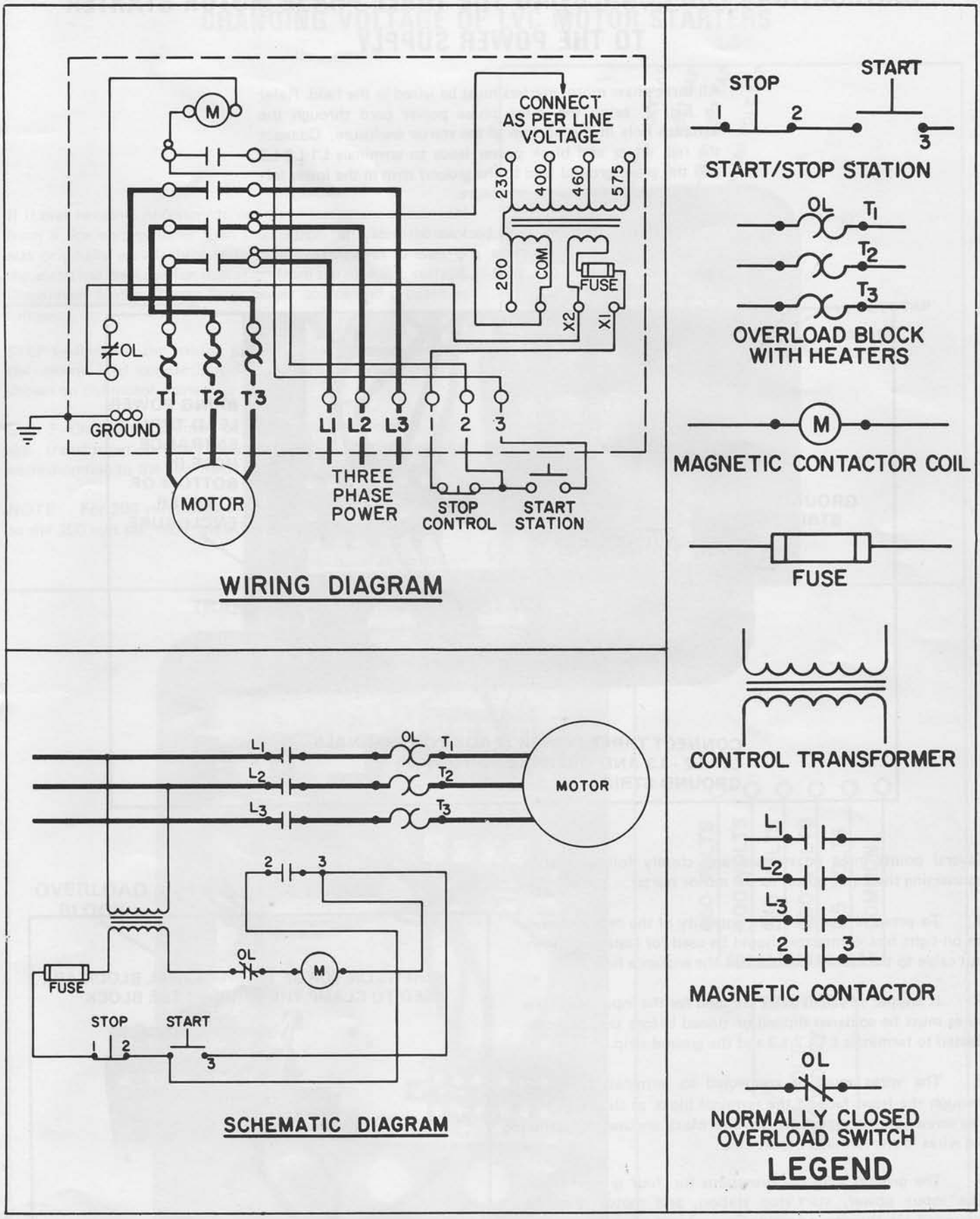


FIG. 6 — WIRING DIAGRAM AND SCHEMATIC DIAGRAM OF THE THREE PHASE LVC MOTOR STARTER, DELTA NO. 52-702

INSTRUCTIONS FOR CONNECTING THE THREE PHASE MOTOR STARTER TO THE POWER SUPPLY

All three phase motor starters must be wired in the field. Refer to Fig. 7, bring the three phase power cord through the entrance hole in the bottom of the starter enclosure. Connect the red, white and black power leads to terminals L1-L2-L3 and the green ground lead to the ground strip in the lower left hand corner of the starter enclosure.

NOTE: If the machine runs backwards once the motor is turned on, simply interchange any two of the three input power leads in terminals L1-L2—L3.

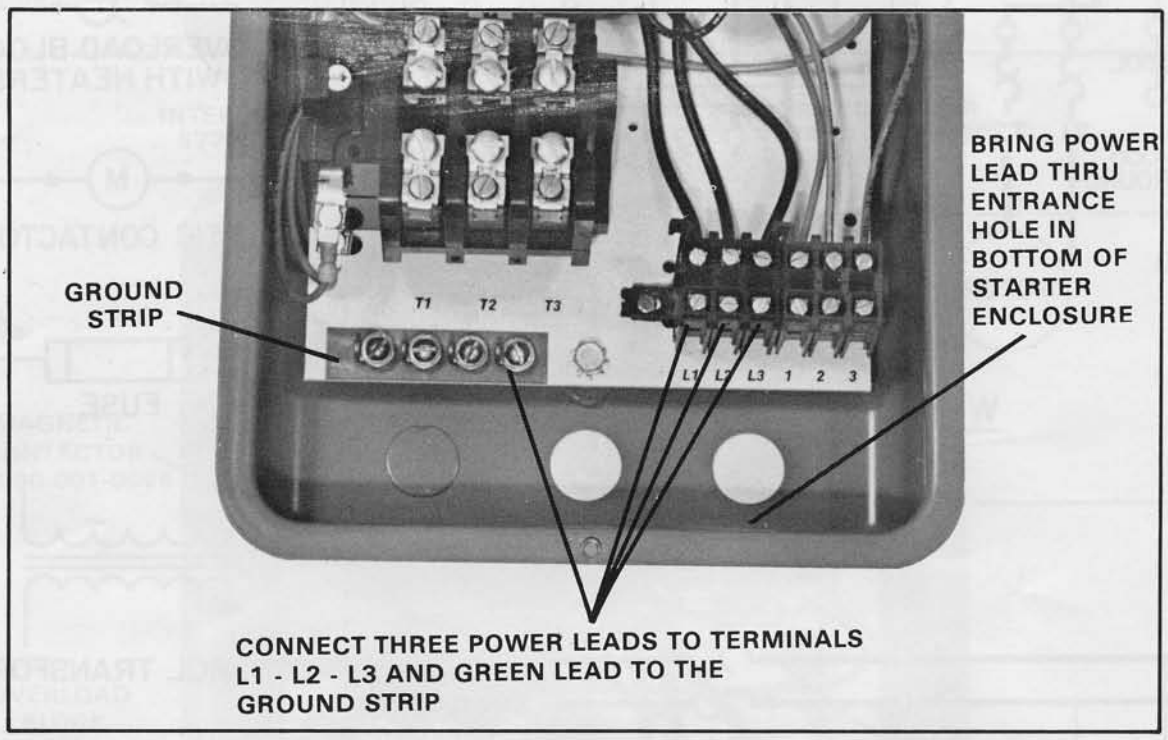


Fig. 7

Several points must be stressed and closely followed when connecting the input power to the motor starter.

1. To preserve the dust-tight integrity of the motor starter, an oil-tight box connector should be used for fastening the input cable to the starter enclosure at the entrance hole.

2. If copper stranded wires are used for the input leads, the wires must be soldered dipped or tinned before they are connected to terminals L1-L2-L3 and the ground strip.

3. The wires must be connected to terminals L1-L2-L3 through the front face of the terminal block as shown in Fig. 8. The screws on the top of the terminal block are used for clamping the wires in the terminal block.

4. The ground strip has provisions for four ground leads. The input power, start/stop station, and motor must be grounded via the ground strip. Two ground wires must never be inserted in the ground strip under one screw.

5. If metal conduit is used in place of cable, the green ground wire from the three phase input power system is omitted.

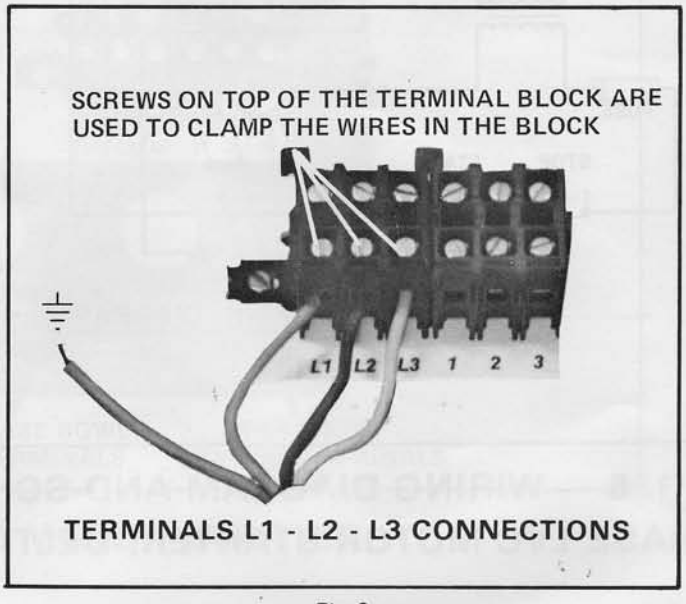


Fig. 8

CHANGING VOLTAGE OF LVC MOTOR STARTERS

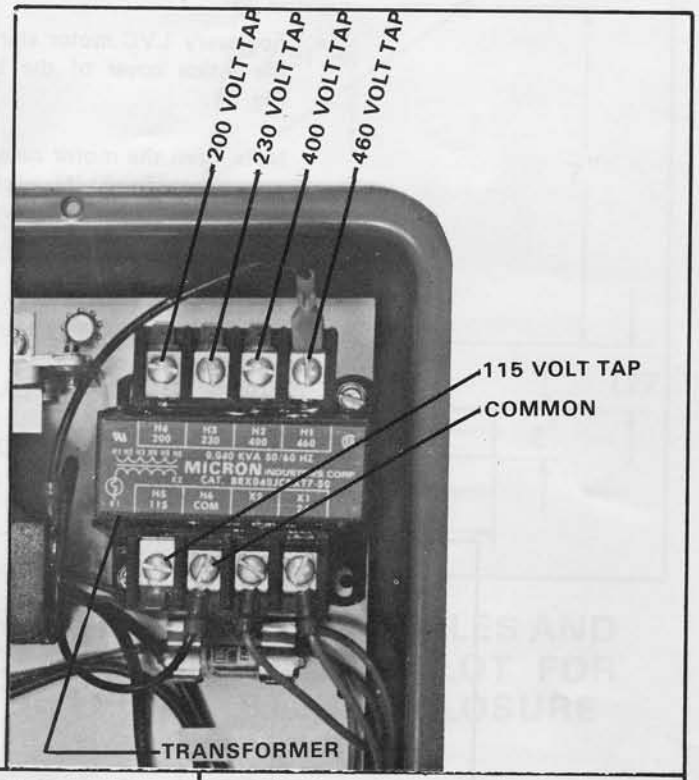
If it ever becomes necessary to operate a stationary power tool from a line voltage other than the voltage for which the tool was originally wired, three steps must be followed to modify the electrical package for operation from the new line voltage. Disconnect Motor Starter from power source and proceed as follows:

STEP 1—Remove the motor junction box cover and change the motor lead connections for the proper line voltage as shown on the motor nameplate.

Step 2—Change the primary of the control transformer. Move the transformer primary pigtail to the proper terminal corresponding to the new input voltage. See Fig. 10.

NOTE: For 208 volt power systems, connect the transformer to the 200 volt tap, NOT the 230 volt tap.

Continued on next page



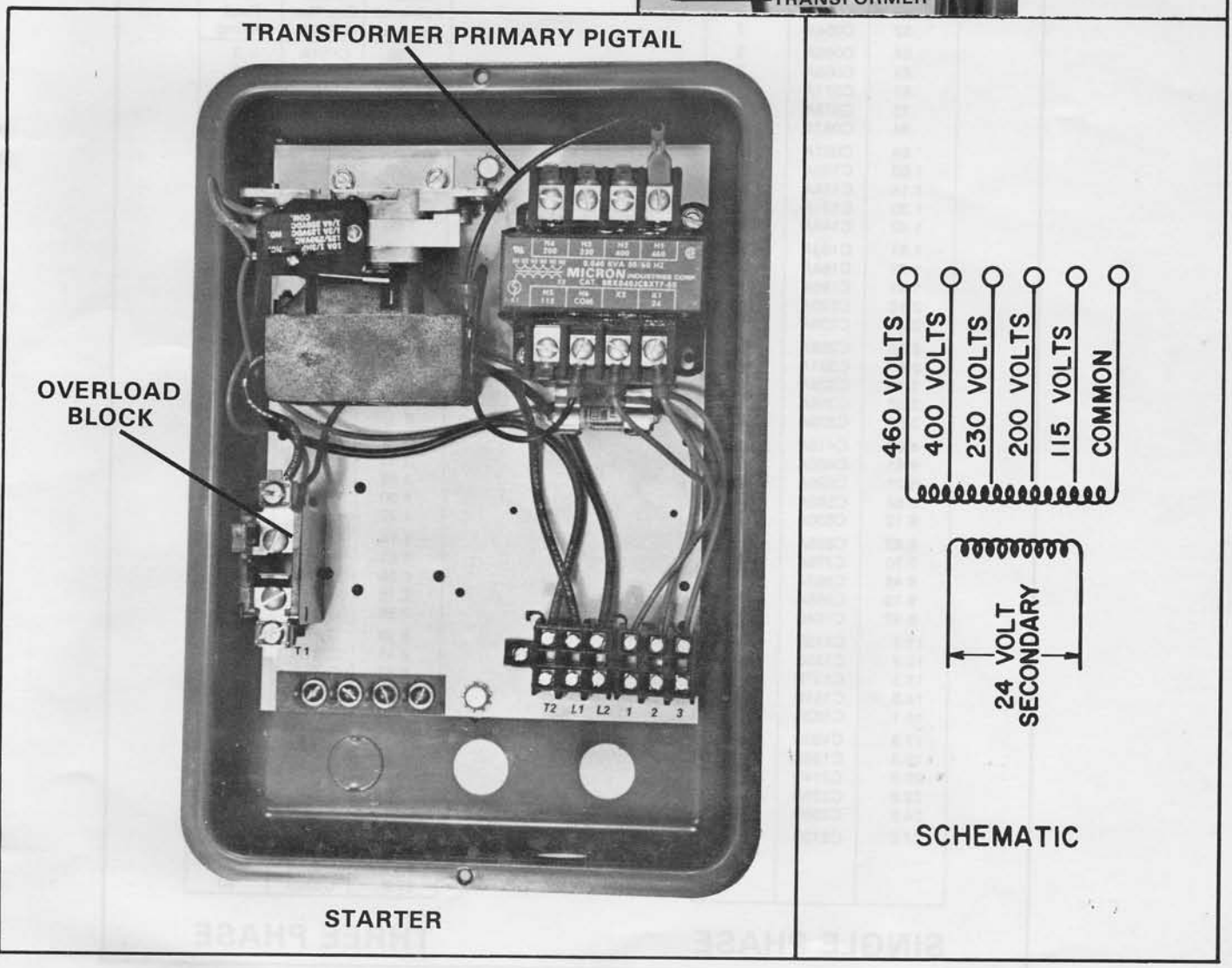


FIG. 10 — CHANGING VOLTAGE

STEP 3—Change the heater elements in the overload block for the proper voltage/amperage rating shown on the motor nameplate.

For every LVC motor starter, a heater coil chart is located on the inside cover of the LVC motor starter enclosure. See Fig. 11.

Note from the motor nameplate, the full load current for the new line voltage. Multiply the full load current by 0.9, and select the heaters from the chart equal to or immediately greater than the product of 0.9 times the full load amperes.

For example: Assume it is necessary to specify heaters for a three phase, 7½ HP, 230 volt motor with a nameplate full load ampere rating of 22

22 x 0.9 = 19.8 amperes

Specify HEATER NO. CR123C228B from chart. Three (3) heaters required for three phase power.

P/N CR123 C_____.

Max. Motor Full-load Amperes	Heater Cat. No. CR123	Max. Fuse Rating
.33	C036A	3
.37	C039A	3
.41	C043A	3
.46	C048A	3
.52	C054A	3
.57	C060A	3
.61	C066A	3
.67	C071A	3
.75	C078A	3
.84	C087A	3
.94	C097A	3
1.03	C109A	3
1.14	C118A	3
1.30	C131A	3
1.42	C148A	3
1.61	C163A	6
1.72	C184A	6
1.93	C196A	6
2.10	C220A	6
2.34	C239A	6
2.64	C268A	10
2.86	C301A	10
3.13	C326A	10
3.32	C356A	10
3.68	C379A	10
4.08	C419A	15
4.61	C466A	15
5.21	C526A	20
5.62	C592A	20
6.12	C630A	20
6.83	C695A	25
7.70	C778A	25
8.48	C867A	30
9.19	C955A	30
9.92	C104B	30
11.1	C113B	35
12.2	C125B	40
13.5	C137B	45
14.6	C151B	50
16.1	C163B	50
17.9	C180B	60
19.3	C198B	60
20.6	C214B	70
22.6	C228B	70
24.8	C250B	80
27.0	C273B	90
.....		
.....		
.....		

SINGLE PHASE

P/N CR123 C_____.

Max. Motor Full-load Amperes	Heater Cat. No. CR123	Max. Fuse Rating
.39	C054A	3
.42	C060A	3
.45	C066A	3
.51	C071A	3
.56	C078A	3
.65	C087A	3
.73	C097A	3
.81	C109A	3
.90	C118A	3
1.00	C131A	3
1.10	C148A	3
1.21	C163A	3
1.35	C184A	3
1.50	C196A	6
1.64	C220A	6
1.78	C239A	6
1.98	C268A	6
2.15	C301A	6
2.42	C326A	6
2.88	C356A	10
3.22	C379A	12
3.53	C419A	12
3.89	C466A	15
4.30	C526A	15
4.77	C592A	15
5.14	C630A	20
5.63	C695A	20
6.26	C778A	25
7.15	C867A	25
7.58	C955A	30
8.39	C104B	30
9.11	C113B	35
9.67	C125B	35
11.0	C137B	40
11.9	C151B	45
14.3	C163B	50
16.1	C180B	60
17.2	C198B	60
19.2	C214B	70
20.6	C228B	80
21.8	C250B	80
23.4	C273B	80
26.1	C303B	90
27.0	C330B	90

THREE PHASE

Fig. 11

MOUNTING THE LVC MOTOR STARTER TO A STEEL STAND

When field mounting an LVC motor starter, it is necessary to provide three 5/16" mounting holes and a 2" x 6" cable clearance slot in the base or cabinet of the machine. See Fig. 12.

The LVC enclosure is supplied with three 1/4"-20 weld nuts tacked in the bottom of the enclosure at the position shown in Fig. 12.

Assemble the LVC Motor Starter flush to the base or cabinet of the machine using three flat washers and three 1/4"-20 machine screws supplied.

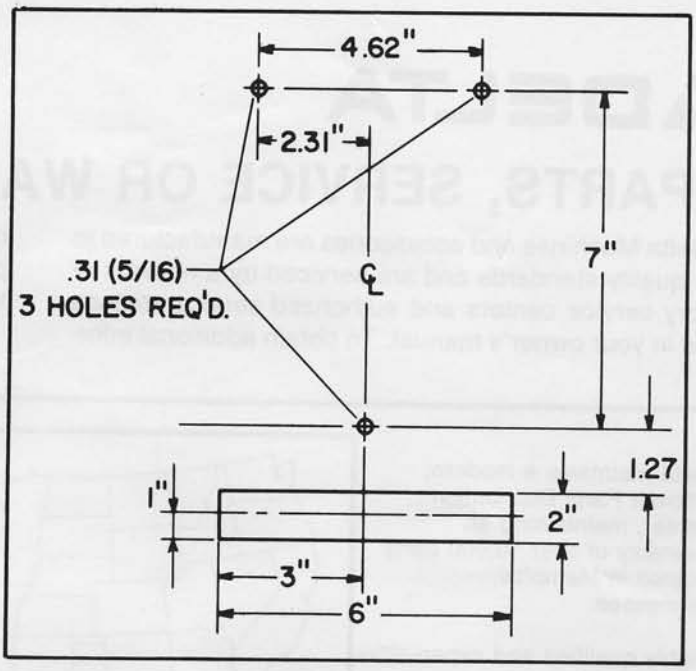


FIG. 12—MOUNTING HOLES AND CABLE CLEARANCE SLOT FOR THE LVC STARTER ENCLOSURE

DELTA

PARTS, SERVICE OR WARRANTY ASSISTANCE

All Delta Machines and accessories are manufactured to high quality standards and are serviced by a network of factory service centers and authorized service stations listed in your owner's manual. To obtain additional information regarding your Delta quality product or to obtain parts, service or warranty assistance, please call Delta's toll-free 'hotline' telephone number.

Delta maintains a modern, efficient Parts Distribution Center, maintaining an inventory of over 10,000 parts located in Memphis, Tennessee.

Highly qualified and experienced Customer Service Representatives are standing by to assist you on weekdays from 8:00 A.M. to 5:00 P.M. Memphis time.

Memphis, TN 38118
4290 Raines Road
Phone: (901) 363-8800
HOTLINE
800-223-PART
(In Tennessee 800-238-PART)

FACTORY SERVICE CENTERS

ALABAMA
Birmingham 35209
Porter-Cable Corporation
131 W. Oxmoor Road, Suite 105
205-942-6325

CALIFORNIA
Los Angeles 90007
Porter-Cable Corporation
2400 S. Grand Avenue
213-749-0386

Orange 92668
Porter-Cable Corporation
385 North Anaheim Blvd.
714-634-4111

San Leandro 94577
Porter-Cable Corporation
3039 Teagarden Street
P.O. Box 1913
415-357-9762

COLORADO
Denver 80207
Porter-Cable Corporation
4900 E. 39th Avenue
303-388-5803

CONNECTICUT
Manchester 06040
Porter-Cable Corporation
57 Tolland Turnpike
203-646-1078

FLORIDA
Hialeah 33014
Porter-Cable Corporation
16373 NW 57th Avenue
305-624-2523

Orlando 32803
Porter-Cable Corporation
1807 1/2 Winter Park Road
305-644-8100

Tampa 33609
Porter-Cable Corporation
4536 W. Kennedy Blvd.
813-877-9585

GEORGIA
Forest Park 30050
Porter-Cable Corporation
4017 Jonesboro Road
404-363-8000

ILLINOIS
Addison (Chicago) 60101
Porter-Cable Corporation
311 Laura Drive
312-628-6100

LOUISIANA
Kenner 70062
Porter-Cable Corporation
2440-0 Veterans Memorial Hwy.
504-469-7363

MARYLAND
Baltimore 21205
Porter-Cable Corporation
4714 Erdman Avenue
301-483-3100

Hyattsville 20781
Porter-Cable Corporation
4811 Kenilworth Avenue
301-779-8080

MASSACHUSETTS
Boston (Allston) 02134
Porter-Cable Corporation
414 Cambridge Street
617-782-1700

MICHIGAN
Grand Rapids 49506
Porter-Cable Corporation
2750 Birchcrest Drive S.E.
616-949-9040

Southfield (Detroit) 48075
Porter-Cable Corporation
18650 W. Eight Mile Road
313-569-4333

MINNESOTA
Minneapolis 55429
Porter-Cable Corporation
4315 68th Avenue North
612-561-9080

MISSOURI
North Kansas City 64116
Porter-Cable Corporation
1141 Swift Avenue
P.O. Box 12393
816-221-2070

St.Louis 63119
Porter-Cable Corporation
7574 Watson Road
314-968-8950

NEW JERSEY
Union 07083
Porter-Cable Corporation
945 Ball Avenue
201-964-1730

NEW YORK
Flushing 11365
Porter-Cable Corporation
175-25 Horace Harding Expwy.
212-225-2040

NORTH CAROLINA
Charlotte 28209
Porter-Cable Corporation
4612 South Boulevard
704-525-4410

OHIO
Cleveland 44146
Porter-Cable Corporation
5188 Richmond Road
216-675-1244

Columbus 43215
Porter-Cable Corporation
4560 Indianola Avenue
614-263-0929

PENNSYLVANIA
Bensalem 19020
Porter-Cable Corporation
Expressway 95
Industrial Center
3599 Meadow Lanes
215-638-4114

RHODE ISLAND
Providence 02914
Porter-Cable Corporation
1009 Waterman Avenue
401-434-3620

TEXAS
Dallas 75220
Porter-Cable Corporation
10714 N. Spemmons Freeway
214-353-2996

Houston 77092
Porter-Cable Corporation
5201 Mitchelldale, Suite B-9
713-682-0334

San Antonio 78218
Porter-Cable Corporation
2600 N.E. Loop 410
512-654-1061

UTAH
Salt Lake City 84115
Porter-Cable Corporation
2990 S.W.Temple
801-487-4953

VIRGINIA
Richmond 23220
Porter-Cable Corporation
1705 Dabney Road
804-257-7348

WASHINGTON
Renton 98055
Porter-Cable Corporation
268 Southeast 43rd Street
206-251-6680

WISCONSIN
Milwaukee 53222
Porter-Cable Corporation
10700 W. Burleigh Street
414-774-3650

Printed in U.S.A.
Nupp Printing Co.