V★S DRIVES

INSTRUCTION SHEET D2-3222-2
Motor Overload Kit
Model 1ML2010, 1ML4020 and 1ML5020 (1–20 HP 230/400/575 VAC)
Model 1ML4050 (25–50 HP @ 460 VAC, 30–40 HP @ 575, 15–20 HP @ 230/208, 22 KW @ 380/416)
GP2000/VTAC V A-C V★S© Drives

DANGER

ONLY QUALIFIED ELECTRICAL PERSONNEL FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THIS EQUIPMENT AND THE HAZARDS INVOLVED SHOULD INSTALL, ADJUST, OPERATE, AND/OR SERVICE THIS EQUIPMENT. READ AND UNDERSTAND THIS MANUAL IN ITS ENTIRETY BEFORE PROCEEDING. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

DESCRIPTION

The products described in this instruction manual are manufactured by Reliance® Electric Industrial Company.

The Motor Overload Kit is a thermal device designed to protect one A-C motor operated with an A-C V★S Drive Controller, as listed above, from extended overload operation.

It is important to note that this kit effectively provides overload protection for single motor applications only. Multiple motor applications may require individual overload relays for each of the motors in the system to comply with electrical codes. This kit can be used with a 1–20 HP stand-alone controller, with a 1–20 HP controller mounted in an Expanded Cabinet, or a 25–50 HP GP2000/VTAC V Controller.

Note: When used with a 1 20 HP stand-alone controller, the Control Signal Buffer Kit must be installed prior to installing the Motor Overload Kit.

Note: This kit need not be installed in a 1–20 HP Controller with an Expanded Cabinet or the 25–40 HP GP2000/1–50 HP VTAC V **with Bypass** (Bypass contains motor overload protection).

The National Electrical Code and Canadian Electrical Code require that an overload protection device responsive to motor current be installed in each power line of the motor, or that a thermal protectiondevice responsive to motor heat be built into or attached to the winding of the motor to provide motor running overload protection for both the motor and the motor branch circuit. For a motor operating on adjustable frequency power, the current responsive type device (motor overload relay) is less reliable than the thermal protection device responsive to motor heat since the motor's cooling capacity reduces with speed. It is recommended, therefore, that the thermal protection device responsive to motor heat be used. If at all possible. Refer to Application Manual D-9084 for motor thermal capability curves to verify that the continuous operating torque requirements of the application are within the continuous capability of the selected motor.

Both automatic and manual reset are provided, but only one is operational at a time. Changing from automatic to manual, or vice versa, is explained under "ADJUSTMENTS".

RECEIVE AND ACCEPT THE SHIPMENT

Reliance Electric's terms of sale, in all instances, are F.O.B. point of origin. The user is responsible for thoroughly inspecting the equipment before accepting shipment from the transportation company.

If all the items called for on the bill of lading or on the express receipt are not included or if any items are obviously damaged, do not accept the shipment until the freight or express agent makes an appropriate notation on your freight bill or express receipt. If any concealed loss or damage is discovered later, notify your freight or express agent within 15 days of receipt and request that he make an inspection of the shipment. Keep the entire shipment intact it its original shipping container.

The user is responsible for making claim against the Carrier for any shortage or damage occurring in transit. Claims for loss or damage in shipment must not be deducted from the Reliance Electric invoice, nor should payment of the invoice be withheld while awaiting adjustment of such claims since the Carrier guarantees safe delivery.

RELIANCE ELECTRIC

File a Return Request

1. To return equipment, send a written request to Reliance Electric within ten days of receipt.
2. Do not return equipment without a numbered Equipment Return Authorization (ERA) from Reliance Electric.
3. Reliance Electric reserves the right to inspect the equipment on site.

Store the Kit until Installation

After receipt inspections, repack the kit in its original shipping container until installation. If a period of storage is expected, store in the original shipping container with its internal packing.

To ensure satisfactory operation at startup and to maintain warranty coverage, store the equipment:

- in its original shipping container in a clean, dry, safe place.
- within an ambient temperature range of 40°C to 65°C (40°F to 149°F).
- within a relative humidity range of 5 to 95% without condensation.
- away from a highly corrosive atmosphere. In harsh environments, cover the shipping/ storage container.

Upon receiving, check the contents of the kit received with the contents as listed in Table 1.

Tables 1 and 2 list the data needed to select the correct overload heaters. (Table 2 is for selection of overload heaters for ambient compensated drives).

Table 1. Complete Parts List. (Models 1ML2010, 1ML4020, 1–20 HP all ratings)

Description	Quantity	Part Number
Overload Relay Block	1	704263-3A
M4 x 8 TTS	3	419062-100PGF
Wire Harness	1	611899-51A
Wire Harness	1	611899-51B
Wire Harness	1	611899-51C
Wire Harness	1	611899-52R
Overload Heater		
FH30	3	701815-10AE
FH37	3	701815-10AM
FH41	3	701815-10AR
FH46	3	701815-10AW
FH50	3	701815-10BC
FH52	3	701815-10BE
Overload Heater		
FH23	3	701815-10W
FH29	3	701815-10AD
FH33	3	701815-10AH
FH38	3	701815-10AN
FH42	3	701815-10AS
FH45	3	701815-10AV
FH49	3	701815-10AZ
FH52	3	701815-10BE
Overload Heater		
FH20	3	701815-10T
FH27	3	701815-10AB
FH31	3	701815-10AF
FH36	3	701815-10AL
FH40	3	701815-10AQ
FH42	3	701815-10AS
FH47	3	701815-10AX
FH50	3	701815-10BC

Table 1. Complete Parts List. (Models 1ML4050, 25–50 HP all ratings), cont'd.

Overload Relay Block	1	704263-5A
M6 x 8 TTS	3	419062-100PJF
Wire Harness (601A Jumper)	1	803132-87V
Wire Harness (602A Jumper)	1	803432-87W
Wire Harness (603A Jumper)	1	803432-87X
Wire Harness	1	611899-62R
Overload Heater		
FH75	3	701815-10BQ
FH76	3	701815-10BR
FH77	3	701815-10BS
FH78	3	701815-10BT
FH79	3	701815-10BU
FH80	3	701815-10BV
FH81	3	701815-10BW
FH82	3	701815-10BX
FH83	3	701815-10BY
FH84	3	701815-10BZ

Table 2. Overload Heater Selection for use with GP2000 A-C V★S Drives (Ambient Compensated).

Catalog Number	Full Load Motor Current (AMPS)	
	Min	Max
FH20	1.35	1.47
FH23	1.79	1.95
FH27	2.59	2.83
FH29	3.12	3.42
FH30	3.43	3.73
FH31	3.74	4.07
FH33	4.40	4.87
FH36	6.0	6.4
FH37	6.5	7.1
FH38	7.2	7.6
FH40	8.6	9.4
FH41	9.5	10.3
FH42	10.4	11.3
FH45	13.6	14.9
FH46	15.0	16.3
FH47	16.4	18.0
FH49	19.9	21.7
FH50	21.8	23.9
FH52	24.0	26.3
FH75	25.3	27.8
FH76	27.9	30.6
FH77	30.7	33.5
FH78	33.6	37.5
FH79	37.6	41.5
FH80	41.6	46.3
FH81	46.4	50.0
FH82	51.0	55.0
FH83	56.0	61.0
FH84	62.0	66.0

INSTALLATION: 1–20 HP GP2000 STAND-ALONE CONTROLLER

DANGER

DO NOT INSTALL MODIFICATION KITS WITH POWER APPLIED TO THE UNIT. DISCONNECT AND LOCK OUT INCOMING POWER BEFORE ATTEMPTING SUCH INSTALLATION. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

1. Disconnect all power to the controller before installing this kit.
2. Select a mounting location for the overload relay within 1000 feet of the controller for proper performance.

DANGER

THE USER IS RESPONSIBLE FOR CONFORMING WITH THE NATIONAL ELECTRICAL CODE AND ALL OTHER APPLICABLE LOCAL CODES. ENCLOSURES FOR THIS EQUIPMENT ARE OF PARTICULAR IMPORTANCE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

3. Mount the overload relay in the selected location. Refer to Figure 1 for mounting hole detail.

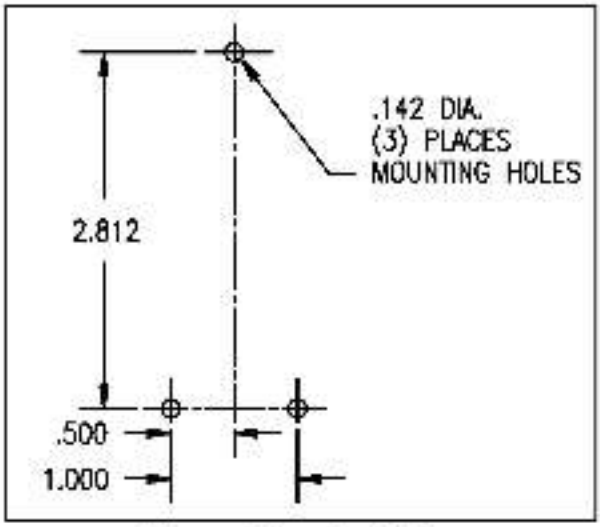

Figure 1. Overload Relay Mounting Hole Dimensions.

4. Determine the full load motor current of the motor being used as part of the A-C V★S Drive and select the correct heater catalog number as detailed in Table 2. Select the part number of the correct set of three heaters as determined in Table 1.
5. Insert the overload heaters into the overload relay.
6. Remove the controller cover and set this aside for reassembly.
7. Disconnect the motor conductors from the controller output terminals U, V, and W if they are already connected. Tag the leads so that the desired motor rotation will be maintained. The controller output terminals are located on the lower right-hand side of the controller.

DANGER

THE USER IS RESPONSIBLE FOR CONFORMING TO THE NATIONAL ELECTRICAL CODE AND ALL OTHER APPLICABLE LOCAL CODES WITH RESPECT TO WIRING, GROUNDING, DISCONNECTS, AND OVERCURRENT PROTECTION. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

8. Follow the wiring diagrams and instructions in the Controller Instruction Manual, and/or any appropriate kit instruction manuals (if other kits are installed) for all wires except those wires detailed in this instruction manual.

   Note: The wire harnesses provided in this kit are designed for use with an Expanded Cabinet Kit and may not be usable with the GP2000 stand-alone controller (without the expanded cabinet).
9. Connect from terminals U, V, W on the controller to the appropriate terminals on the overload relay. If an Output Contactor Kit is installed, connect U, V, W to the output contactor and connect the output contactor to the overload relay. Refer to Figure 2 for wiring detail.

DANGER

WHEN WIRING THE MOTOR OVERLOAD RELAY AND OTHER INTERLOCK DEVICES MAKE CERTAIN THAT ALL CONNECTIONS ARE IN SERIES. NO DEVICE CONNECTIONS CAN BE IN PARALLEL WITH EACH OTHER. ALL WIRE JUMPERS THAT ARE IN PARALLEL WITH SAFETY INTERLOCK DEVICES MUST BE REMOVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

10. Using wire harness 611899-62R (or twisted pair wire), connect from terminals NC and COM on the overload relay to terminals I1 and 12 (or function loss terminals) on the Control Signal Buffer. Refer to Figure 2 for wiring detail.
11. Connect the motor leads to terminals T1, T2, and T3 on the overload relay. Refer to Figure 2 for wiring detail.
12. Replace controller cover.
13. Turn power ON.

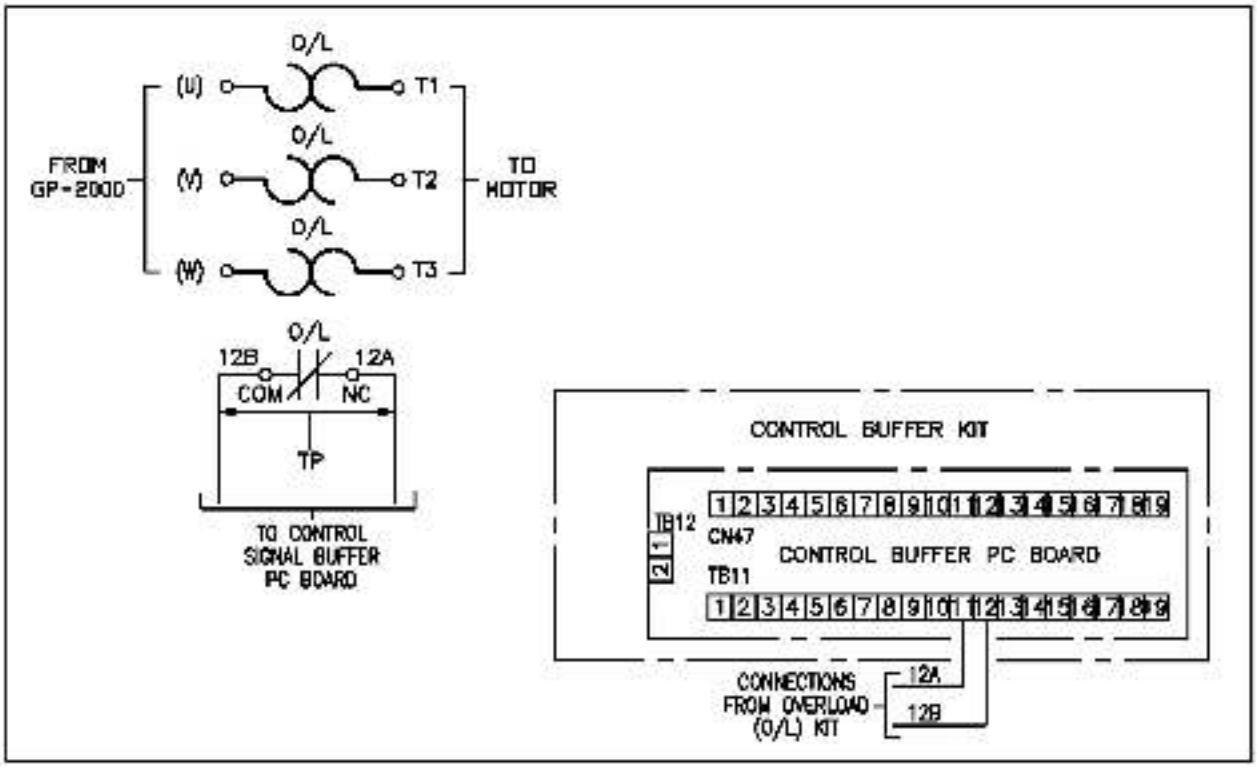

Figure 2. Overload Relay Connection Diagram (GP2000 Stand-alone Controller [no expanded cabinet] with Required Control Signal Buffer Kit).

INSTALLATION: 1–20 HP GP2000 WITH EXPANDED CABINET-MOUNTED CONTROLLER, 25–40 HP GP2000, OR 1–50 HP VTAC V

DANGER

DO NOT INSTALL MODIFICATION KITS WITH POWER APPLIED TO THE UNIT. DISCONNECT AND LOCK OUT INCOMING POWER BEFORE ATTEMPTING SUCH INSTALLATION. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

1. Disconnect all power to the controller before installing this kit.
2. Remove the controller cover and set this aside for reassembly.
3. Mount the overload relay in the Expanded Cabinet. Refer to Figure 3 (1–20 HP GP2000 with Expanded Cabinet) or to Figure 4 (25–40 HP GP2000 or 1 50 HP VTAC V) for mounting location.

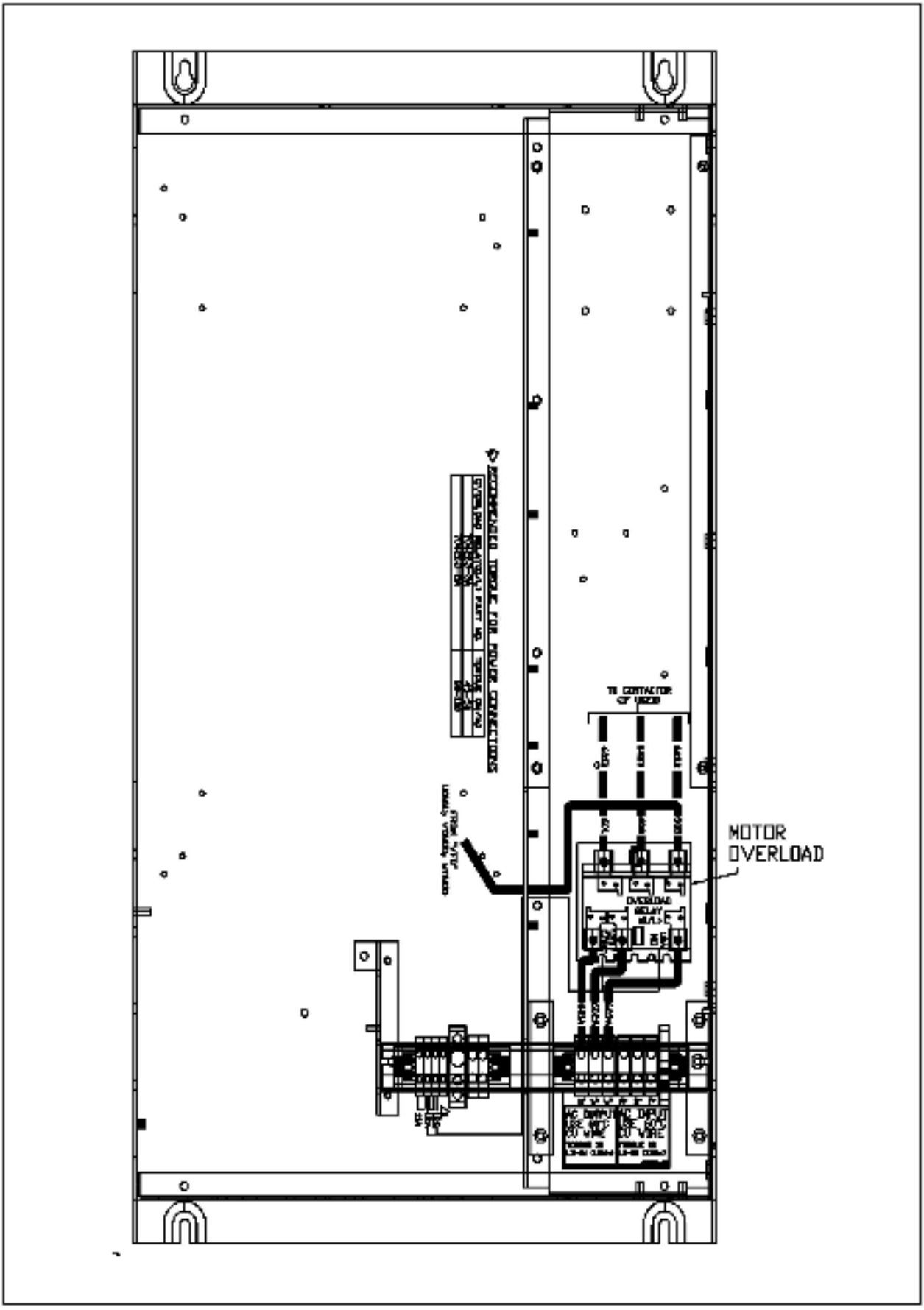

Figure 3. 1–20 HP GP2000 with Expanded Cabinet Overload Relay Mounting Location.

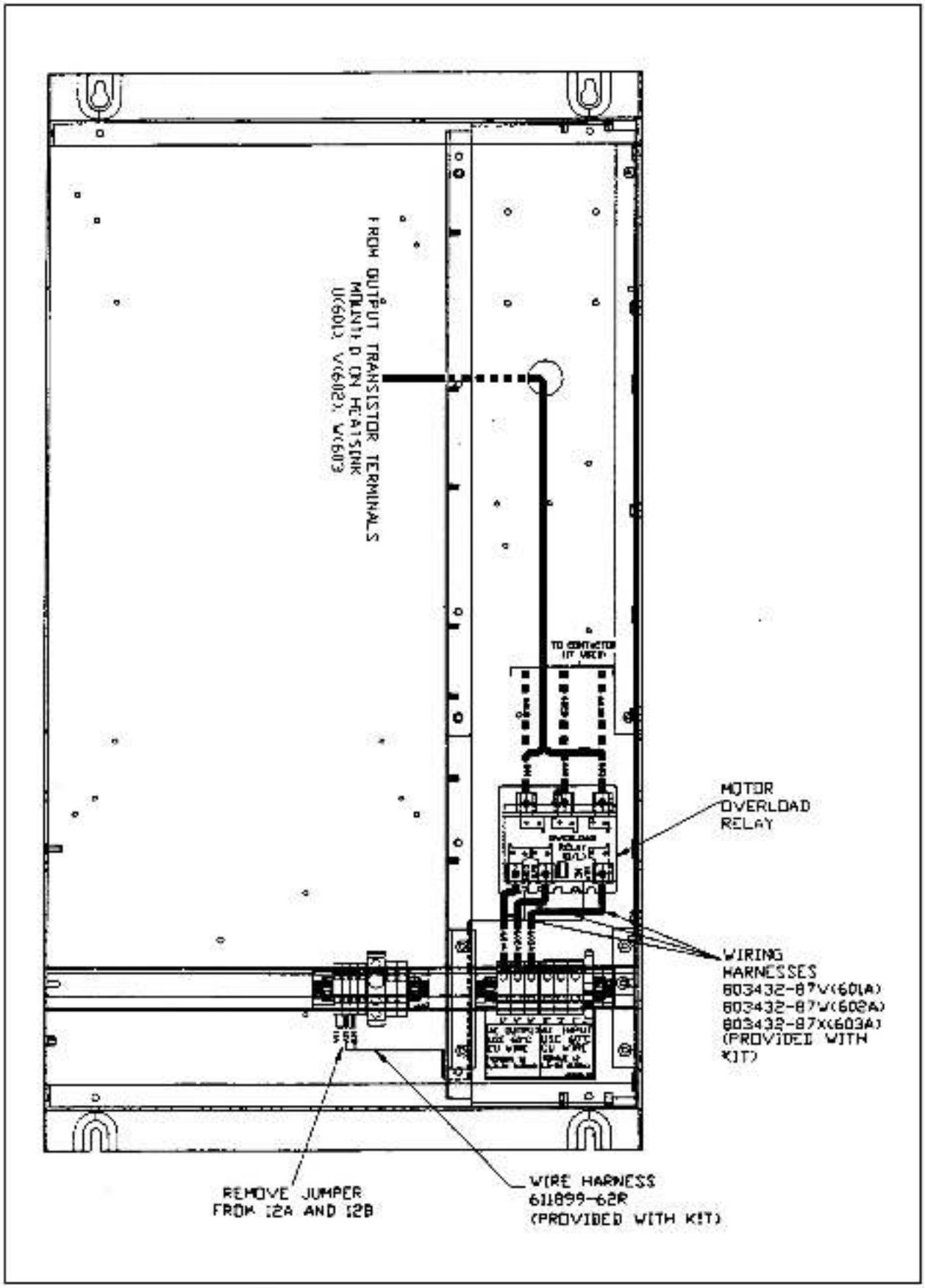

Figure 4. 25–40 HP GP2000 or 1–50 HP VTAC V, Overload Relay Mounting Location.

4. Determine the full load motor current of the motor being used as part of the controller and select the correct heater catalog number as detailed in Table 2. Select the part number of the correct set of three (3) heaters as detailed in Table 1.

5. Insert the overload heaters into the overload relay.

DANGER

THE USER IS RESPONSIBLE FOR CONFORMING TO ALL THE NEC AND ALL OTHER APPLICABLE LOCAL CODES WITH RESPECT TO WIRING, GROUNDING, DISCONNECTS, AND OVERCURRENT PROTECTION. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

6. Follow the wiring diagrams and instructions in the Controller Instruction Manual and/or any appropriate kit instruction manuals (if other kits are installed) for all wires except those wires detailed in this instruction manual.

7. Disconnect internal wire harness 601A, 602A, and 603A from controller output terminals 601A, 602A, and 603A.

8. Connect the three output leads 601A, 602A, and 603A to the appropriate terminals on the overload relay. Refer to Figure 5 for wiring detail.

DANGER

WHEN WIRING THE MOTOR OVERLOAD RELAY AND OTHER INTERLOCK DEVICES MAKE CERTAIN THAT ALL CONNECTIONS ARE IN SERIES. NO DEVICE CONNECTIONS CAN BE IN PARALLEL WITH EACH OTHER. ALL WIRE JUMPERS THAT ARE IN PARALLEL WITH SAFETY INTERLOCK DEVICES MUST BE REMOVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

9. Remove the factory-installed jumper between terminals 12A and 12B on the terminal board.

10. Using wire harness 611899-62R, connect from terminals NC and COM on the overload relay to terminals 12A and 12B on the terminal board assembly. Refer to Figure 5 for wiring detail.

11. Using wire harness 611899-51A, (803132-87V for 25–50 HP GP2000, VTAC V) 611899-51B, (803432-87W for 25–50 HP GP2000, VTAC V) and 611899-51C (803132-87X for 25 50 HP GP2000, VTAC V) connect overload relay output terminals T1, T2, and T3 to the terminal board (601A/U', 602A/V', 603A/W"). Refer to Figure 5 for wiring detail.

12. Replace controller cover.

13. Turn power ON.

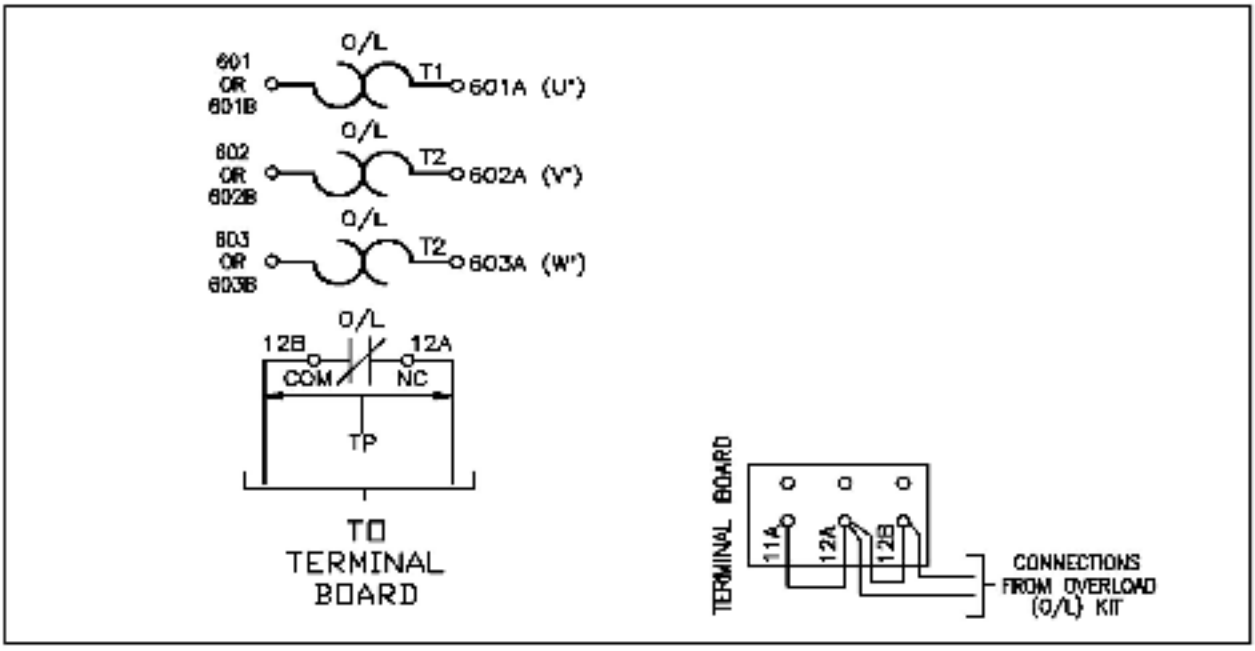

Figure 5. Overload Relay Connection Diagram

ADJUSTMENTS

DANGER

DO NOT ADJUST MODIFICATION KITS WITH POWER APPLIED TO THE CONTROLLER. DISCONNECT AND LOCK OUT INCOMING POWER BEFORE ATTEMPTING ADJUSTMENTS. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

1. **Adjusting the Trip Setting.** The overload relay with the heaters installed per Tables 1 and 2 has been sized for use with an induction motor rated 1.0 to 1.15 service factor having nameplate full load amps within the range listed when the trip adjustment knob is set at 100%. Turning the adjustment knob will increase or decrease the adjustment range (listed in Table 1) 15% (85% to 115%) to match the selected motor.

   Note: The overload relay trip setting adjustment should be used only for fine-tuning. The proper heaters must be selected from Tables 1 and 2.

WARNING

SELECTING AUTOMATIC RESET OF THE OVERLOAD RELAY OR WIRING THE START CIRCUITRY IN A MANNER OTHER THAN SHOWN IN THIS AND OTHER APPLICABLE INSTRUCTION MANUALS MAY CAUSE INADVERTENT AND/OR UNEXPECTED MACHINE MOVEMENT. MAKE A CONSCIOUS DECISION BEFORE SETTING UP THE DRIVE IN SUCH A MANNER. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

2. **Changing Auto/Manual Reset.** The overload relay can be set for automatic or manual reset. The operational mode is determined by the position of the reset slide. To reset a manual overload relay, depress the trip indicator until it clicks.

3. **Resetting the Controller.** After the overload is RESET, the controller will remain OFF until one of the following actions is taken:

   - The STOP/RESET button (located on the keypad) is pressed.
   - Power from the controller is momentarily interrupted.

   After the controller is RESET, a START command will resume operation.

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Printed in U.S.A. D2-3222-2 4/92