

## DYNAMIC BRAKING (DB) KITS (BRAKING UNITS AND BRAKING RESISTOR UNITS)

SEE MODEL NUMBERS IN TABLE 1

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL** who is familiar with this type of equipment and the hazards involved, should **READ** this ENTIRE INSTRUCTION SHEET.

### IMPORTANT

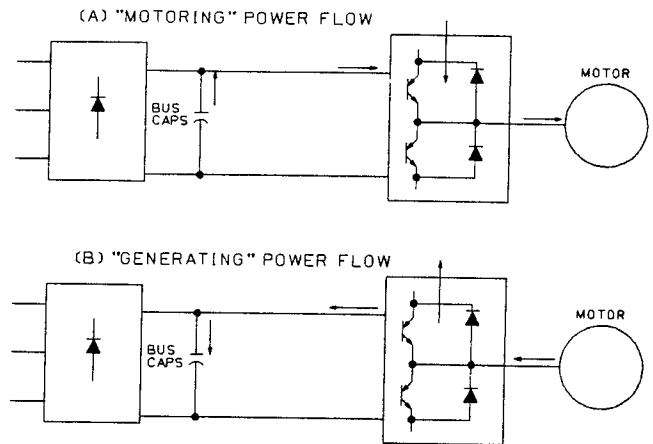
This kit may have been installed by the factory. However, certain steps can only be completed at the installation site. Therefore, review and then perform those steps which complete the installation process.

### DESCRIPTION

Installation of this kit enables the motor to be brought to a smooth and rapid stop. This is achieved by dissipating the regenerative energy of the AC motor across the resistive component(s) of the Dynamic Braking Kit.

### Dynamic Braking Operation

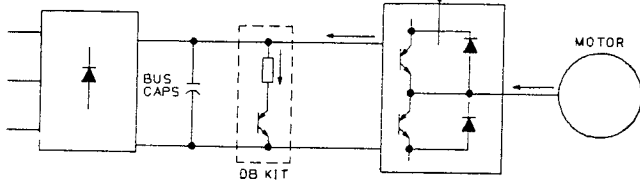
Whenever an excited motor is operated in the negative slip region (or is subjected to an overhauling load), the motor will behave as an induction generator. In this mode, energy will actually flow from the motor back into the inverter, as shown in the following illustration:



This energy will cause the DC Bus voltage to rise. This rise in DC Bus voltage can also result when high utility voltage causes the input contactor (IM) to disconnect the inverter from the incoming utility. When the DC Bus voltage reaches a certain level, the Dynamic Braking option will activate. This option will actually "shunt" the regenerative energy away from the bus capacitors and dissipate it as heat in the DB resistors. This is represented by the following illustration:

| CHANGE RECORD |          |              |  | DWG. NO. 02Y00025-0278 |
|---------------|----------|--------------|--|------------------------|
| 1             | STD-3583 |              |  | SHEET 1 OF 11          |
| 2             | STD-3683 | REV. 7-17-84 |  | EFF. 12/29/88 (K)      |
|               |          |              |  |                        |

(C) POWER SHUNTED FROM BUS CAPS



Since the energy is not returned to the DC Bus, the OV trip is prevented; thus the motor remains excited and continues to produce braking torque.

RECEIVING

All equipment is tested against defect at the factory. Report any damages or shortages evident when the equipment is

Table 1.

A. For 230V Inverters

| Inverter HP   | DB Kit Model No. | P/N (Qty.)    | Braking Unit     |      |       |      |      | Braking Resistor Unit |                  |       |       |       |       |
|---------------|------------------|---------------|------------------|------|-------|------|------|-----------------------|------------------|-------|-------|-------|-------|
|               |                  |               | Dimensions (In.) |      |       |      |      | P/N (Qty.)            | Dimensions (In.) |       |       |       |       |
|               |                  |               | H1               | W1   | H2    | W2   | D    |                       | H1               | W1    | H2    | W2    | D     |
| 15*, 20*, 25  | DS653            | 501850-04 (1) | 10.24            | 3.98 | 11.02 | 5.51 | 6.30 | 501851-03 (1)         | 13.78            | 17.52 | 18.90 | 18.31 | 10.63 |
| 25**, 30*, 40 | DS654            | 501850-05 (1) |                  |      |       |      |      | 501851-04 (1)         | 21.65            |       | 30.71 |       | 10.43 |
| 40**, 50      | DS655            | 501850-04 (2) |                  |      |       |      |      | 501851-03 (2)         | 13.78            |       | 18.90 |       | 10.63 |
| 60, 75        | DS656            | 501850-05 (2) |                  |      |       |      |      | 501851-04 (2)         | 21.65            |       | 30.71 |       | 10.43 |
| 100           | DS657            | 501850-04 (4) |                  |      |       |      |      | 501851-03 (4)         | 13.78            |       | 18.90 |       | 10.63 |
| 125           | DS658            | 501850-05 (4) |                  |      |       |      |      | 501851-04 (4)         | 21.65            |       | 30.71 |       | 10.43 |

B. For 460V Inverters

| Inverter HP   | DB Kit Model No. | P/N (Qty.)    | Braking Unit     |      |       |      |      | Braking Resistor Unit |                  |       |       |       |       |
|---------------|------------------|---------------|------------------|------|-------|------|------|-----------------------|------------------|-------|-------|-------|-------|
|               |                  |               | Dimensions (In.) |      |       |      |      | P/N (Qty.)            | Dimensions (In.) |       |       |       |       |
|               |                  |               | H1               | W1   | H2    | W2   | D    |                       | H1               | W1    | H2    | W2    | D     |
| 30*, 40*, 50  | DS664            | 501852-04 (1) | 10.24            | 3.98 | 11.02 | 5.51 | 6.30 | 501853-04 (1)         | 21.65            | 17.52 | 30.71 | 18.31 | 10.43 |
| 50**, 60*, 75 | DS665            | 501852-05 (1) |                  |      |       |      |      | 501853-05 (1)         | 27.65            |       | 36.22 |       |       |
| 100           | DS666            | 501852-04 (2) |                  |      |       |      |      | 501853-04 (2)         | 21.65            |       | 30.71 |       |       |
| 150           | DS667            | 501852-05 (2) |                  |      |       |      |      | 501853-05 (2)         | 27.65            |       | 36.22 |       |       |
| 200, 250      | DS668            | 501852-05 (3) |                  |      |       |      |      | 501853-05 (3)         | 27.65            |       | 36.22 |       |       |
| 300-600       | DS669            | 501850-05 (4) |                  |      |       |      |      | 501853-05 (4)         | 27.65            |       | 36.22 |       |       |

NOTE: \* indicates HP rating applies to either GPD 502 or 602;  
 \*\* indicates HP rating applies to GPD 502 only;  
 all other HP ratings are GPD 602 only

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received immediately to the commercial carrier who transported the equipment. Assistance, if required, is available from your MagneTek Drives & Systems representative.

#### STORAGE

If the kit is not to be installed immediately, it must be stored under the following conditions.

- Ambient temperature: -10 to +40°C
- Protected from rain or moisture.
- Free from corrosive gases or liquids.
- Free from dust or metal particles.
- Clean and dry.
- Free from excessive vibration.

#### INSTALLATION

##### Preliminary Procedure

##### WARNING

HAZARDOUS VOLTAGE CAN CAUSE SEVERE INJURY OR DEATH.

LOCK ALL POWER SOURCES FEEDING DRIVE IN "OFF" POSITION.

1. Disconnect all electrical power to drive.
2. Remove drive front cover.
3. Verify that voltage has been disconnected by using a voltmeter to check for voltage at the incoming power terminals.

#### Mounting and Wiring Units

##### IMPORTANT

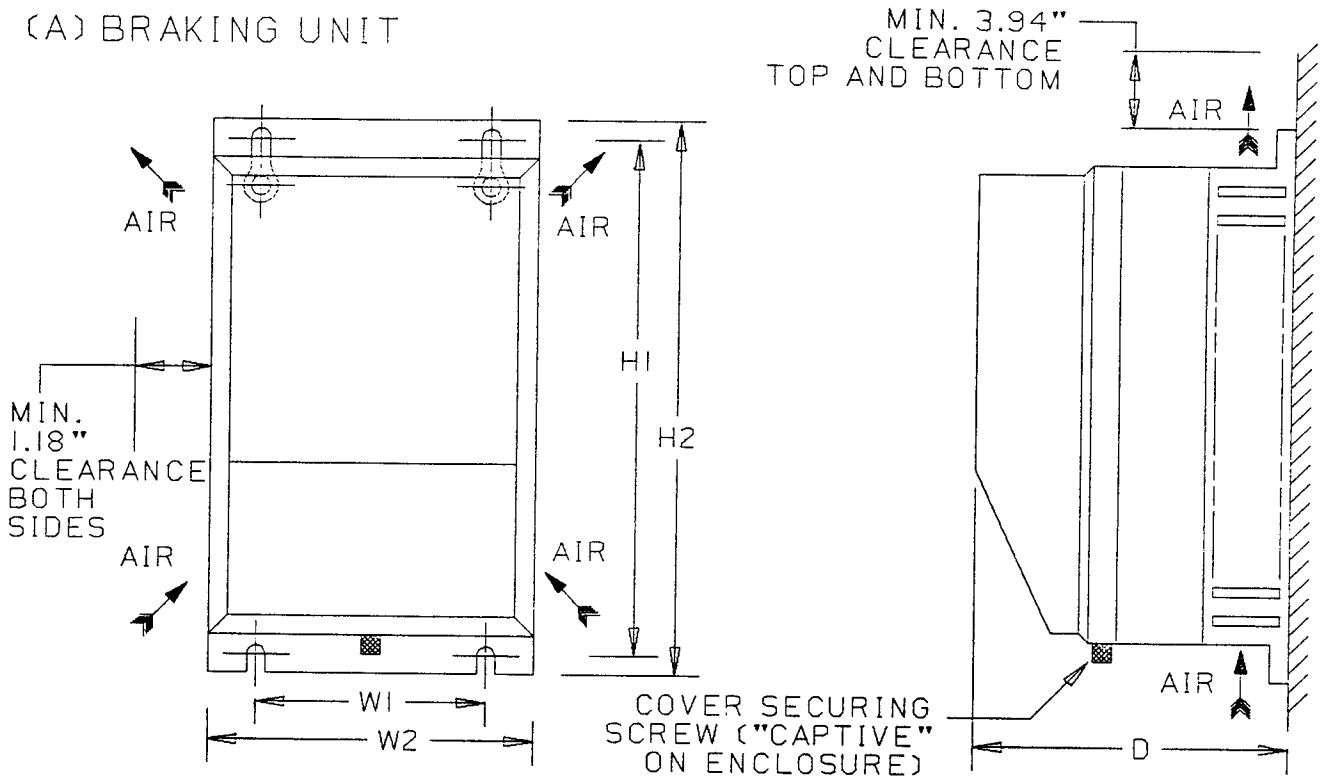
Since the braking resistor unit generates heat during dynamic braking operation, install it in a location away from other equipment which emits heat.

##### IMPORTANT

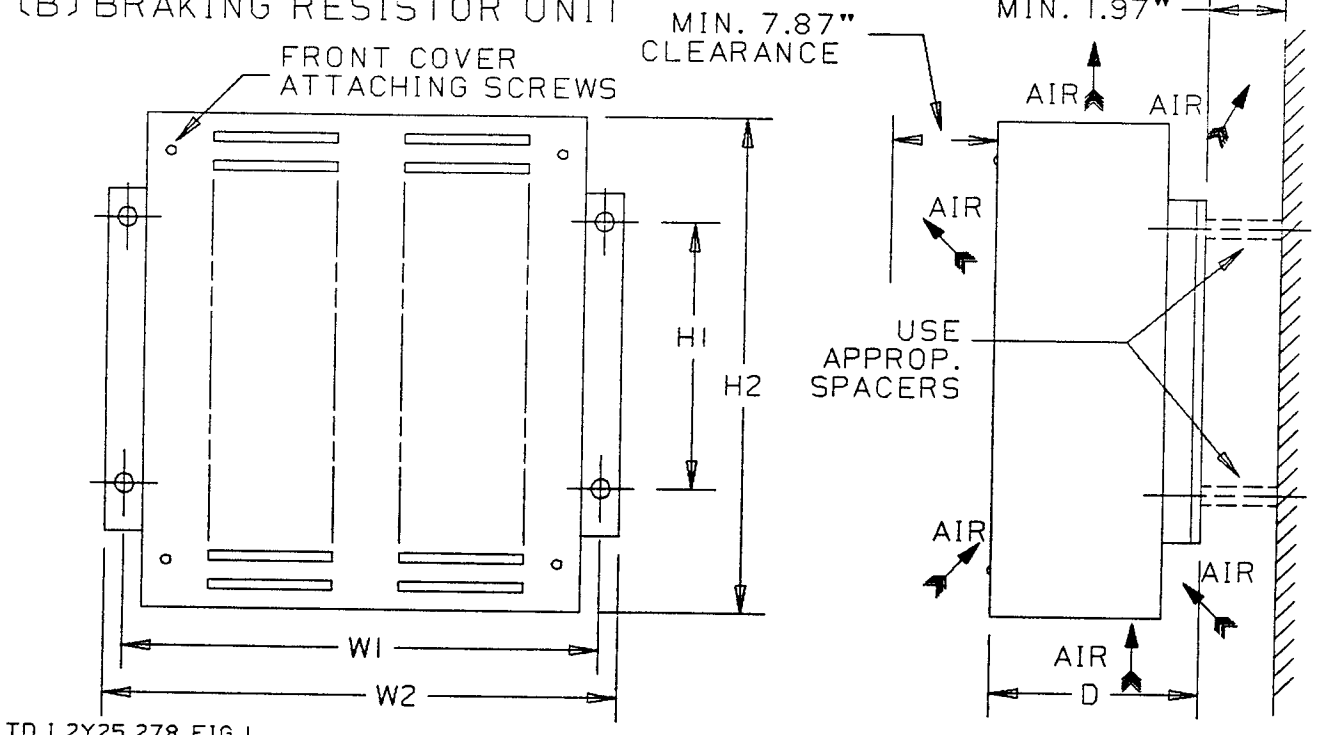
Select mounting locations so that the wiring distance between the inverter and the braking unit(s), and between the braking unit(s) and the braking resistor unit(s), is less than 10 meters (33 feet).

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(A) BRAKING UNIT



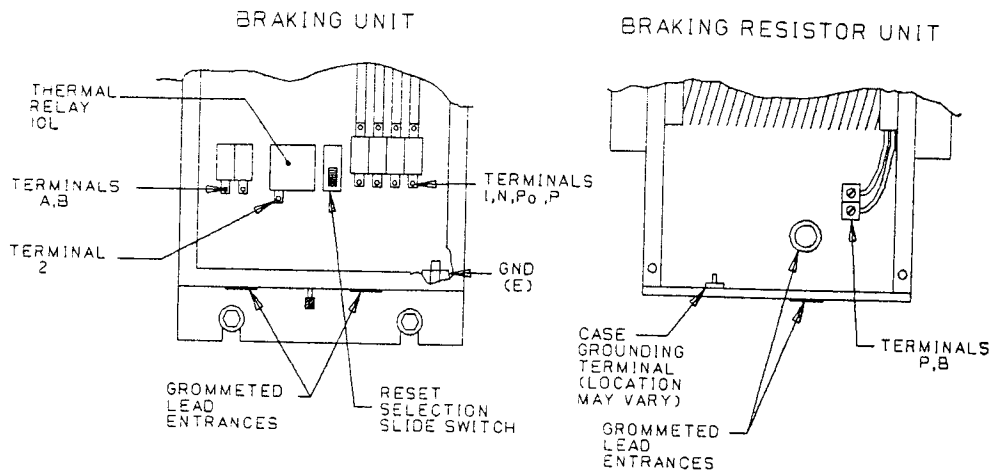
(B) BRAKING RESISTOR UNIT



TD.1.2Y25.278.FIG.1

Figure 1. Braking Unit and Braking Resistor Unit

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Figure 2. Braking Unit and Braking Resistor Unit Terminals

Table 2.

| UNIT                  | TERMINALS      | LEAD SIZE (AWG) | LEAD TYPE                | TERMINAL SCREWS |
|-----------------------|----------------|-----------------|--------------------------|-----------------|
| Braking Resistor Unit | B, P           | 12-10           | 600V vinyl-sheathed lead | M5              |
| Braking Unit          | P, Po, N, A, B | 12-10           | 600V vinyl-sheathed lead | M4              |
|                       | 1,2 *          | 18-14 *         |                          |                 |

\* Since power leads for the braking unit and braking resistor unit will generate high levels of electrical noise, these signal leads must be grouped separately.

4. Both the braking unit and the braking resistor unit require vertical installation with ample clearance space (see Figure 1) to achieve high cooling efficiency. Dimensions are given in Table 1.

5. Remove front covers from units to access terminals (see Figure 2). Make connections between inverter, braking unit(s) and braking resistor unit(s) according to Table 2 and the appropriate wiring diagram, Figure 3 or 4.

NOTE

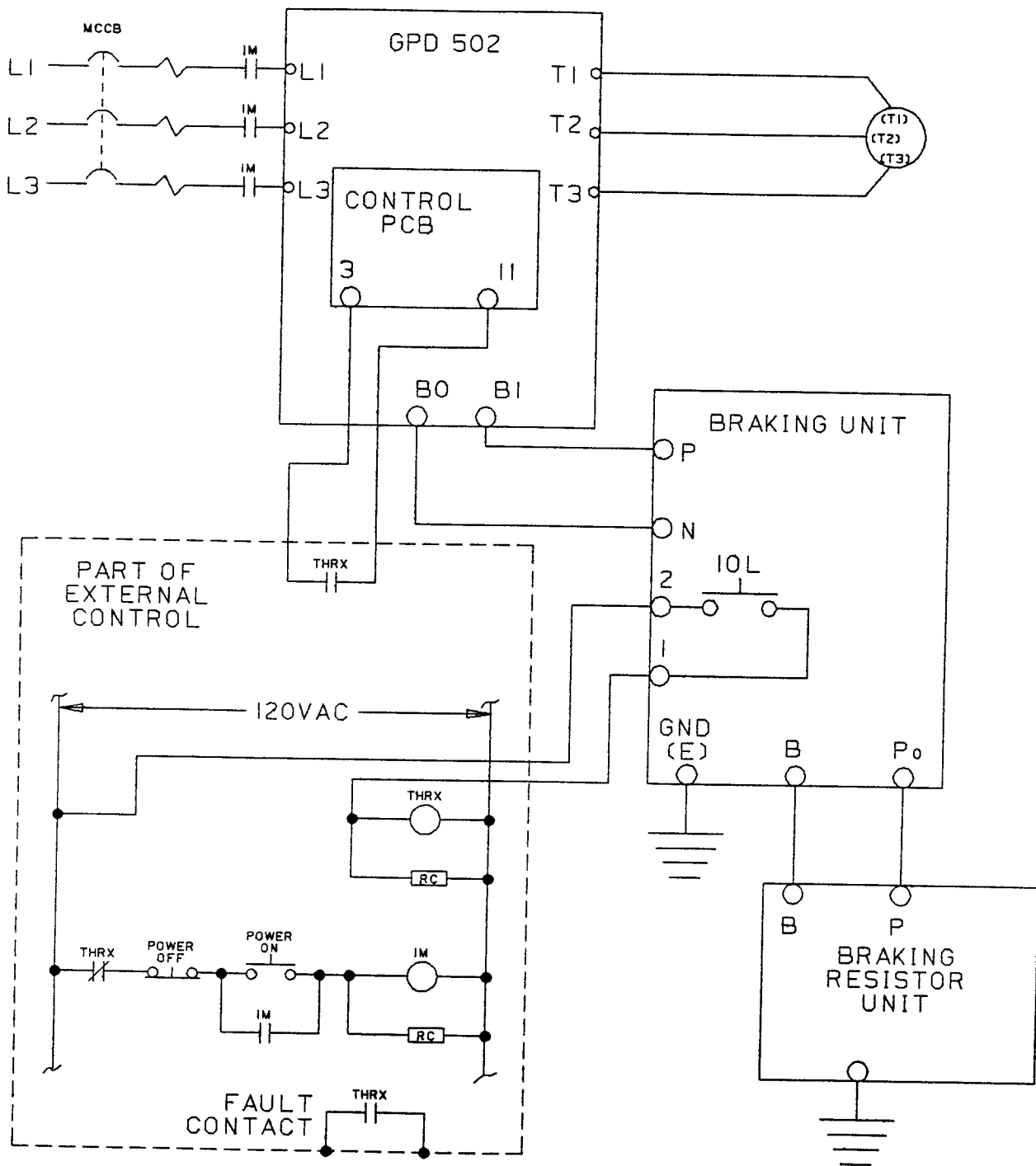
External control components shown in the Figures are not supplied with this kit. These components are necessary for safe operation of the Dynamic Braking Kit.

Grounding

6. The enclosure of the braking resistor unit must be grounded. If the braking resistor unit cannot be mounted

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(A) GPD 502, 230V, 15, 20HP



TD.I.2Y25.278.FIG.3A

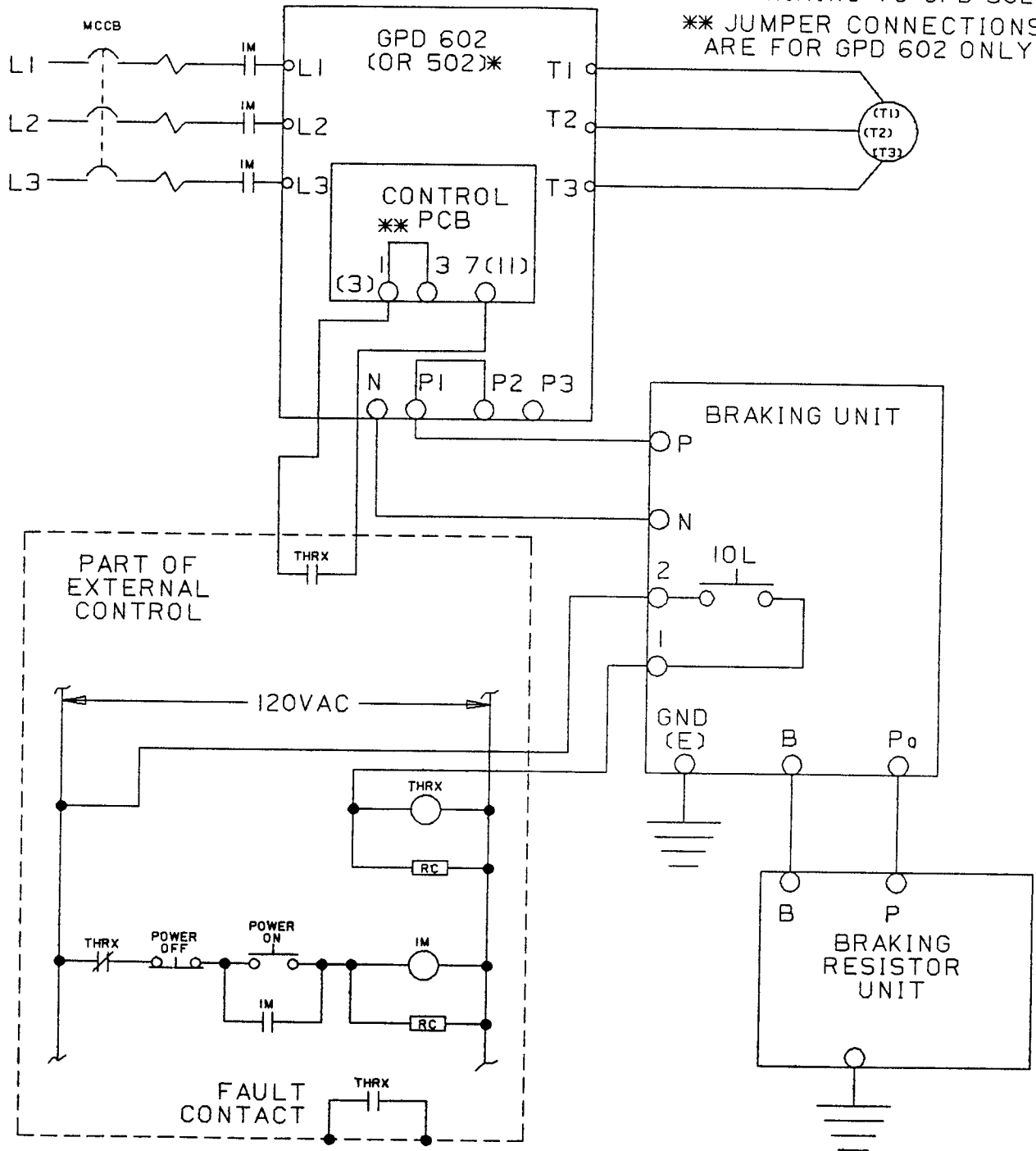
Figure 3. Wiring Single Braking Unit and Braking Resistor Unit to GPD 502 or 602  
(Sheet 1 of 2)

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(B) GPD 502, 230V, 25, 30HP ; 460V, 30-60HP  
 GPD 602, 230V, 15-40HP ; 460V, 30-75HP

\* TERMINAL NUMBERS IN PARENTHESES ARE FOR WIRING TO GPD 502.

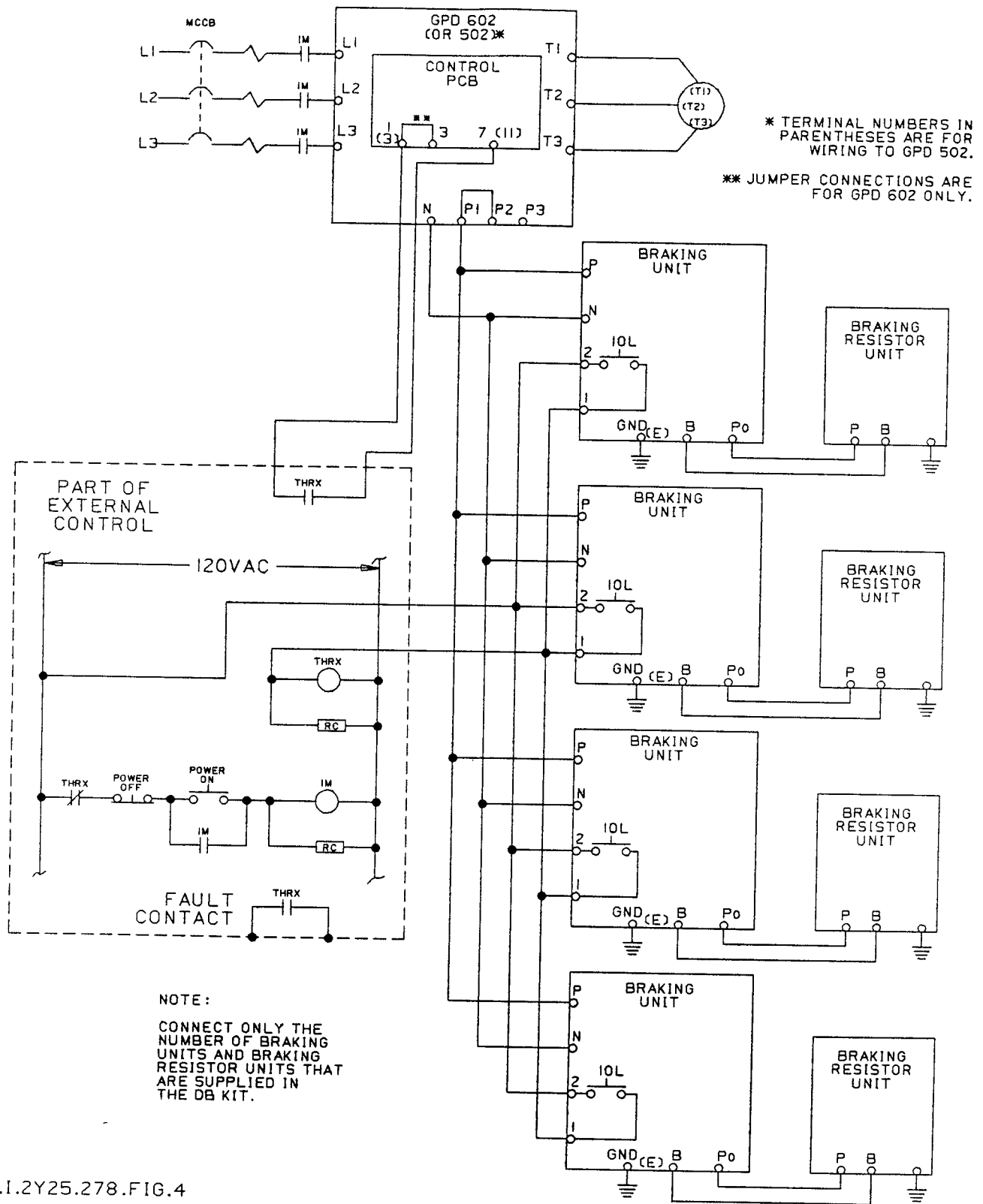
\*\* JUMPER CONNECTIONS ARE FOR GPD 602 ONLY.



TD.1.2Y25.278.FIG.3B

Figure 3. Wiring Single Braking Unit and Braking Resistor Unit to GPD 502 or 602  
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Figure 4. Wiring Multiple Braking Units and Braking Resistor Units to GPD 502 or 602

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in the grounded enclosure, ground it by using a lead from the mounting screw of the unit.

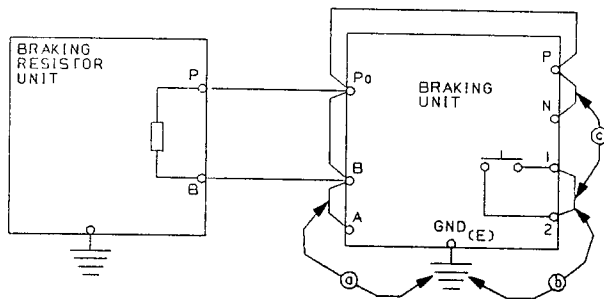
7. Grounding resistance of the braking unit should be 100 ohms or less.

8. Use grounding lead conforming to your National Electrical Code.

#### IMPORTANT

After wiring, test the insulation resistance of the braking circuit with a 500V megger as follows:

1. Disconnect leads between the braking unit and the GPD 602. If equipment with semiconductors is connected across terminals 1 and 2 of the braking unit, remove the wiring.
2. Connect common leads (jumpers) across braking unit terminals N, P, Po, B and A, and across 1 and 2, as shown in Figure 5.
3. Measure the insulation resistance at a, b and c with a megger. See Figure 5.



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Figure 5. Megger Test Method

#### NOTE

There are no adjustments to be made in the braking unit or the braking resistor unit.

#### Operational Check

#### NOTE

During dynamic braking operation, the operation indicating ("BRAKE") lamp in the braking unit lights. This lamp can be observed only with the front cover of the braking unit removed.

9. During dynamic braking operations make sure that the required deceleration characteristic is obtained. If not, contact MagneTek Drives & Systems for assistance.

#### CAUTION

DURING NORMAL OPERATION, THE BRAKING UNIT AND THE BRAKING RESISTOR UNIT MUST BE KEPT CLOSED, SINCE HIGH VOLTAGE IS APPLIED TO THE DYNAMIC BRAKING CIRCUIT.

10. Reinstall and secure front covers on drive, braking unit(s) and braking resistor unit(s).

11. Place this instruction sheet with the GPD Technical Manual.

This completes the installation of this kit.

#### TROUBLESHOOTING

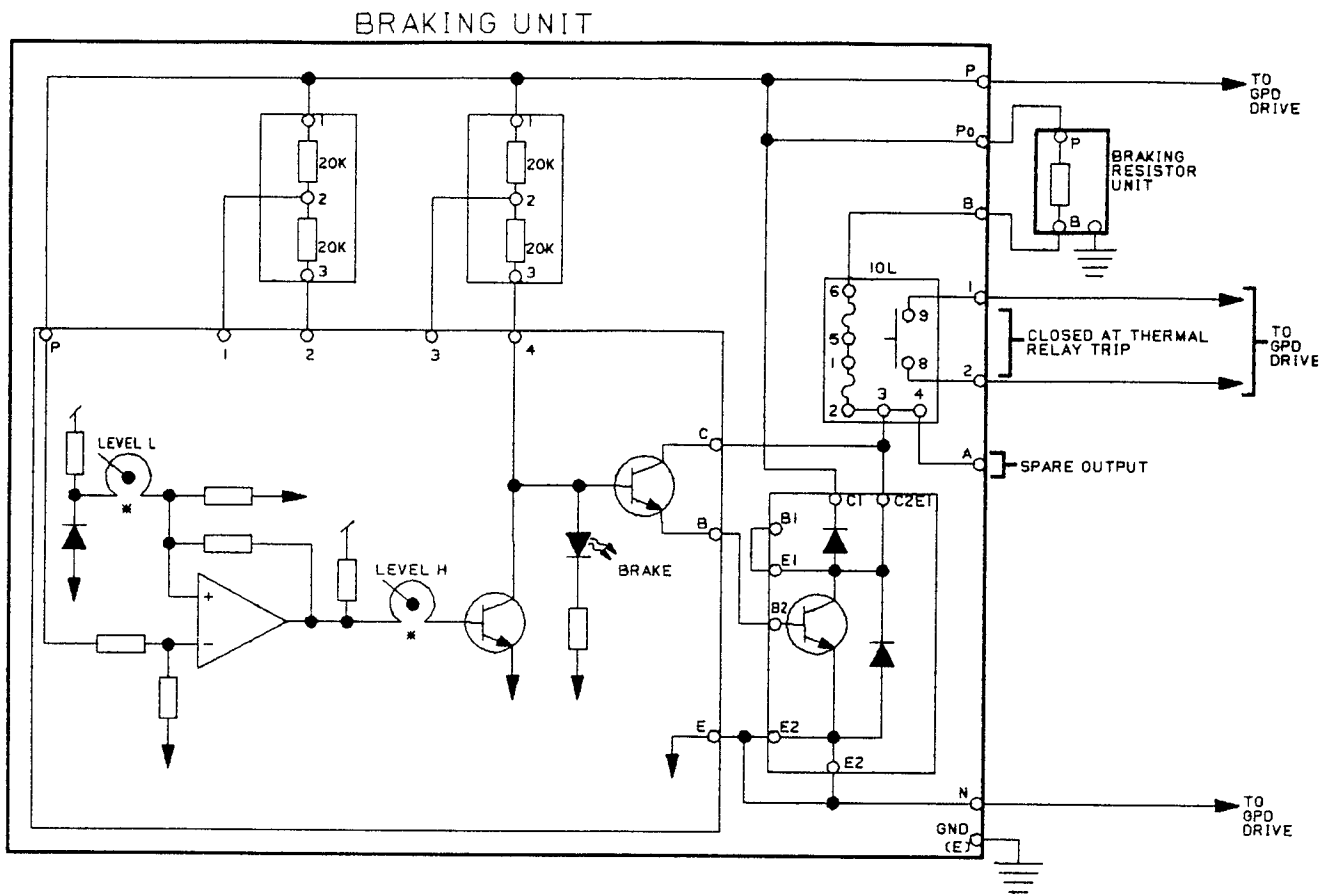
To troubleshoot the dynamic braking circuit (braking unit and braking resistor unit), refer to Table 3 and Figure 6.

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Table 3.

| SYMPTOM  | POSSIBLE CAUSE  | CORRECTIVE ACTION   |
|--|---|---|
| Thermal relay 10L trips with no deceleration.        | Short circuited main circuit discharging transistor ITR in braking unit.              | - Replace unit.<br>- Short circuit across terminals B1 and E1 of ITR.             |
| Overvoltage (OV) fault trip indicated by GPD 602.    | Braking resistor unit capacity too small for load ("BRAKE" lamp lit instantaneously). | Check the braking condition.  |
|  | Wrong wiring.   | Correct.  |
|  | Unsuitable combination of Lancer GPD 602 and DB kit.                                  | Select proper DB kit.   |
|  | Braking unit failure.   | Replace unit.   |
| Thermal relay sometimes trips.                       | Braking resistor unit capacity too small.   | Check the braking condition.-   |
|  | Wrong thermal relay setting.  | Check protective coordination of the braking resistor unit and the thermal relay. |
| After thermal relay trips, the relay does not reset. | Wrong resetting mode selected in braking unit.  | Set reset selection slide switch in braking unit for automatic reset.             |
|  | Faulty thermal relay.   | Replace braking unit.   |

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NOTES:

- 1 \*- INDICATES FACTORY ADJUSTMENTS.
- 2 THIS SCHEMATIC IS REPEATED FOR EACH PARALLEL "LEG" OF MULTIPLE-UNIT DYNAMIC BRAKING KIT INSTALLATION

TD.I 2Y25.278 FIG 6

Figure 6. Dynamic Braking Circuit Schematic

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