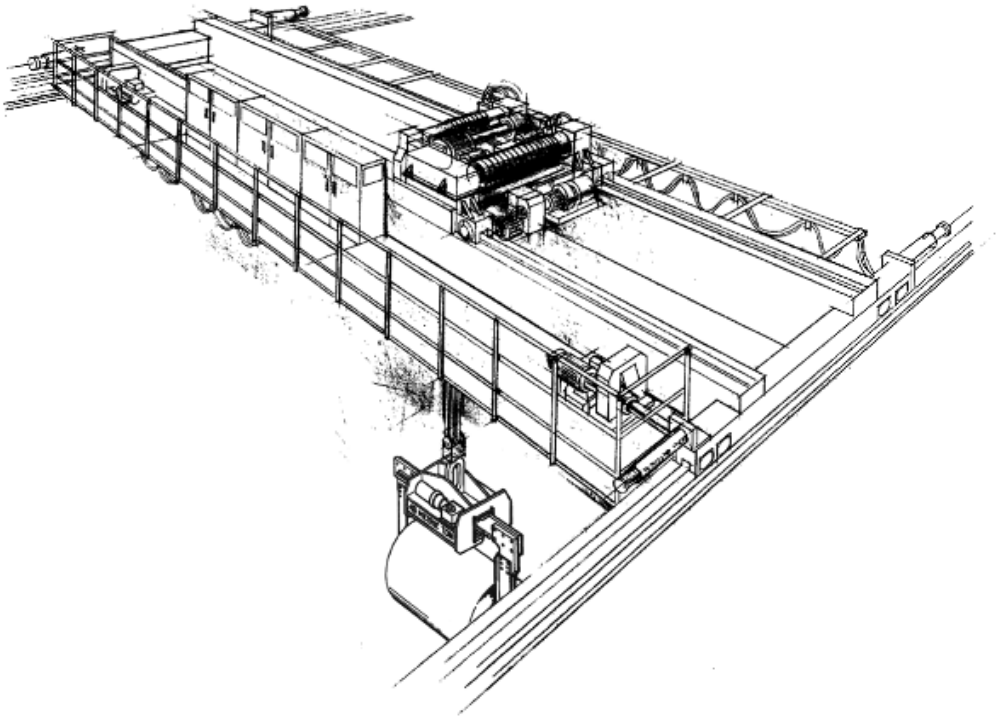


GBC Brake Controller
Instruction Manual

MAGNETEK
MATERIAL HANDLING
MONDEL

September 2012
Part Number: 452026 R1

1. Preface and Safety

Product Safety Information

Magnetek, Inc. (Magnetek) offers a broad range of radio remote control products, control products and adjustable frequency drives, and industrial braking systems for material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists, lifting devices or other equipment which use or include Magnetek Products:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the Magnetek Products are used,
- Plant safety rules and procedures of the employers and the owners of the facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state, provincial, or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the industries in which Magnetek Products are used.

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of the Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the employer to make its employees aware of all of the above listed requirements and to make certain that all operators are properly trained. **No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations for this manual.**

Product Warranty Information

Magnetek, hereafter referred to as Company, assumes no responsibility for improper programming of a drive by untrained personnel. A drive should only be programmed by a trained technician who has read and understands the contents of this manual. Improper programming of a drive can lead to unexpected, undesirable, or unsafe operation or performance of the drive. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of such programming. Company neither assumes nor authorizes any other person to assume for Company any other liability in connection with the sale or use of this product.

For information on Magnetek's product warranties by product type, please visit www.magnetekmh.com.

Registered Trademarks

Trademarks are the property of their respective owners.

Supplemental Safety Instructions

Read and understand this manual before installing, operating, or servicing this product. Install the product according to this manual and local codes.

The following conventions indicate safety messages in this manual. Failure to heed these messages could cause fatal injury or damage products and related equipment and systems.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

NOTICE indicates an equipment damage message.

NOTE: A NOTE statement is used to notify installation, operation, programming, or maintenance information that is important, but not hazard-related.

2. Product Overview

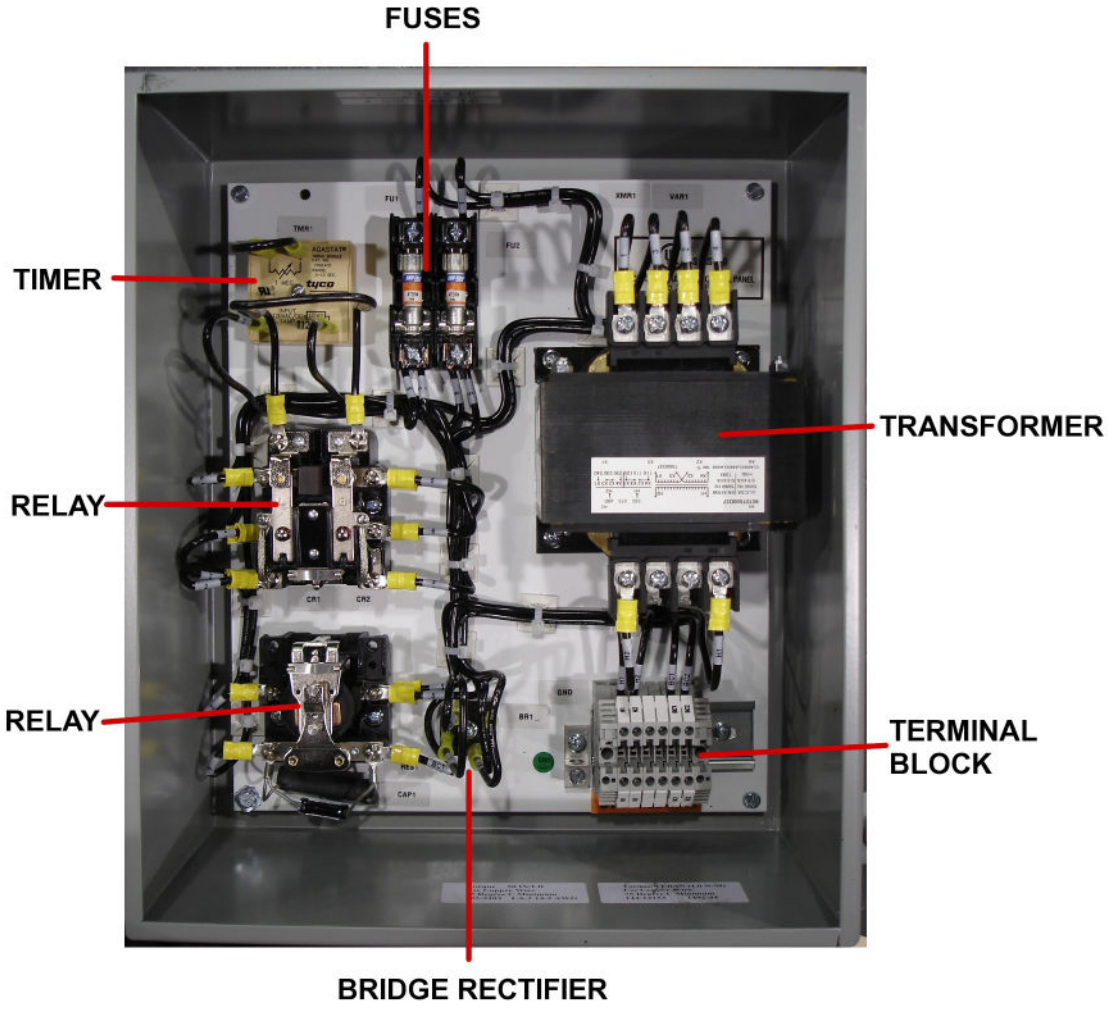


Figure 1: Brake Controller

Single Brake Controller

The GBC brake controller is used to operate a Direct Current (DC) Magnet shoe type electric brake when the brake is used on equipment powered by Alternating Current (AC).

The brake controller has two circuits: one for releasing the brake quickly, and the other for holding the brake in the released position. This is called a forcing & holding brake controller. See Figure 2 for details.

Single phase AC power is applied to the primary side of the transformer when the main control's brake contactor closes. When power is applied to the transformer's primary terminals, two AC voltages are available at the transformer's secondary terminals. The higher voltage is applied to the brake for approximately one second to force current through the coil. The voltage then drops down to the lower holding voltage. This is accomplished by the timing relay. It is activated when power is initially applied; its relay opens when the timer expires, which blocks the higher voltage and leaves only the lower voltage to hold the brake in the released position. Dropping to a lower holding voltage is good for two reasons: it allows the brake to set faster when the main control brake relay opens, and it also reduces coil heating by lowering the current in the coil.

The bridge rectifiers (shown in the circuit) convert the AC secondary voltage to DC, and apply the DC to the brake coil, which in turn releases the brake. This particular rectifier is commonly referred to as a full-wave rectifier. The principle behind this is that the positive half AC waveform is not affected and the negative AC waveform is “flipped” to be the same as the positive wave form. This rectified AC voltage is roughly equivalent to 83% of the AC voltage (120 VAC in, 100 VDC out). The lumpiness of the rectifier output is effectively smoothed by the coil’s inductance.

Dual Brake Controller

The operating principle of the dual brake controller is the same as the single brake controller. The difference is that the dual brake controller uses double the output voltages for forcing and holding so that each brake gets the proper voltages, since the brakes are wired in series. See Figure 3 for details.

Dual Brake Controller (with time delay for one brake)

This circuit is different from the dual brake controller only by the addition of a diode rectifier across one brake coil. When power is removed from the brakes, the diode rectifier allows energy in the delayed brake to decay more slowly than the other brake. This causes a short set delay in one brake. The purpose is to reduce the mechanical shock caused to the attached equipment that would be caused if two brakes set at the same time. See Figure 4 for details.

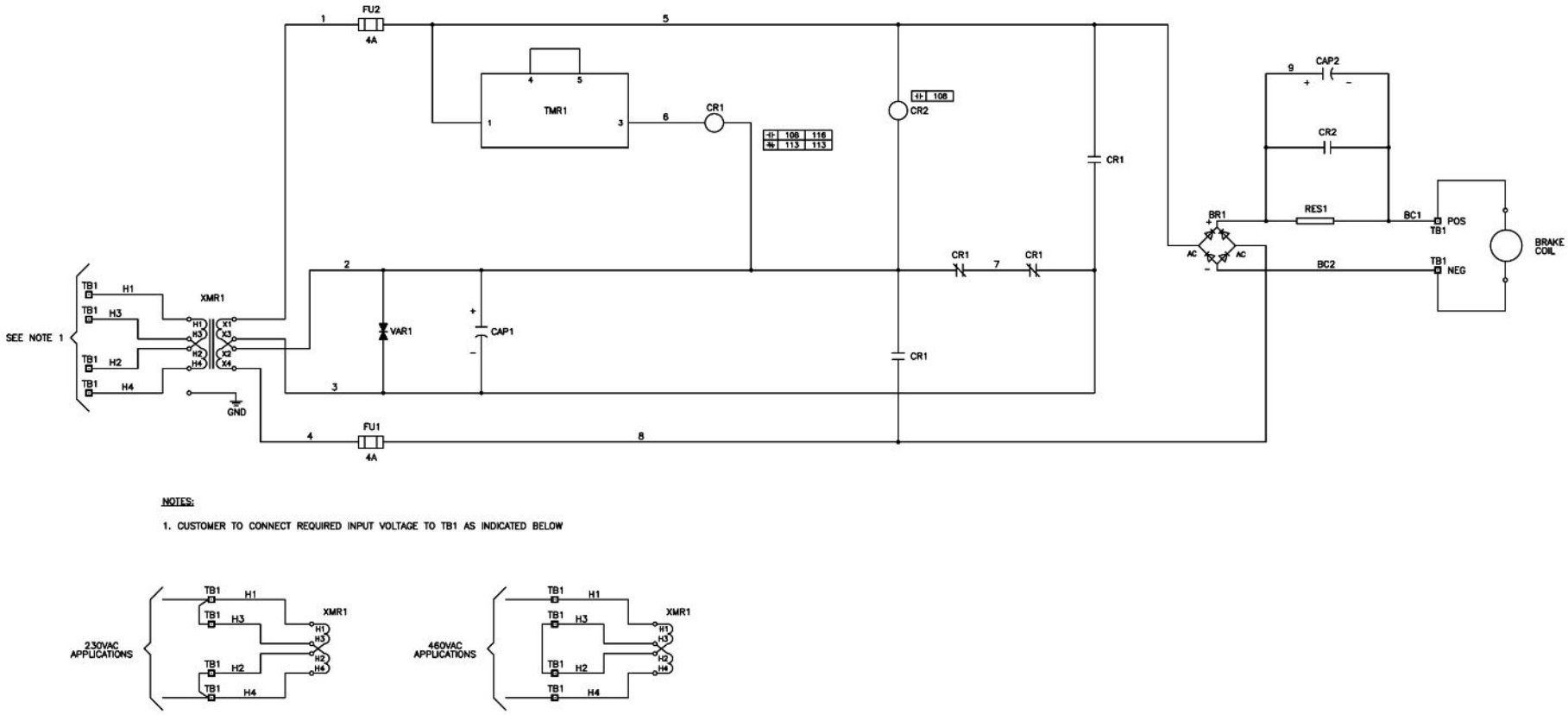
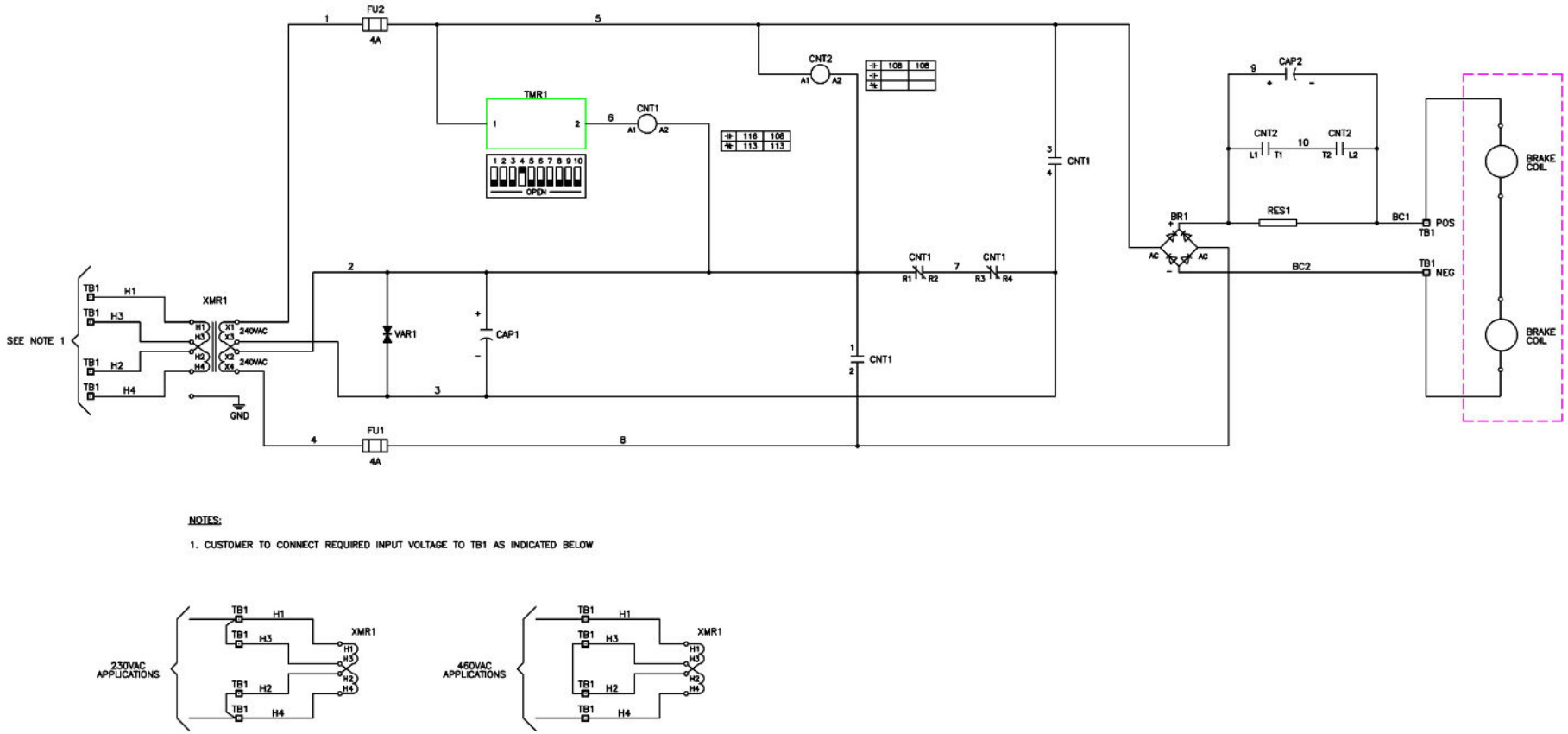


Figure 2: Brake Controller Schematic (Single Brake Coil)



NOTES:

1. CUSTOMER TO CONNECT REQUIRED INPUT VOLTAGE TO TB1 AS INDICATED BELOW

Figure 3: Brake Controller Schematic (Dual Brake Coil)

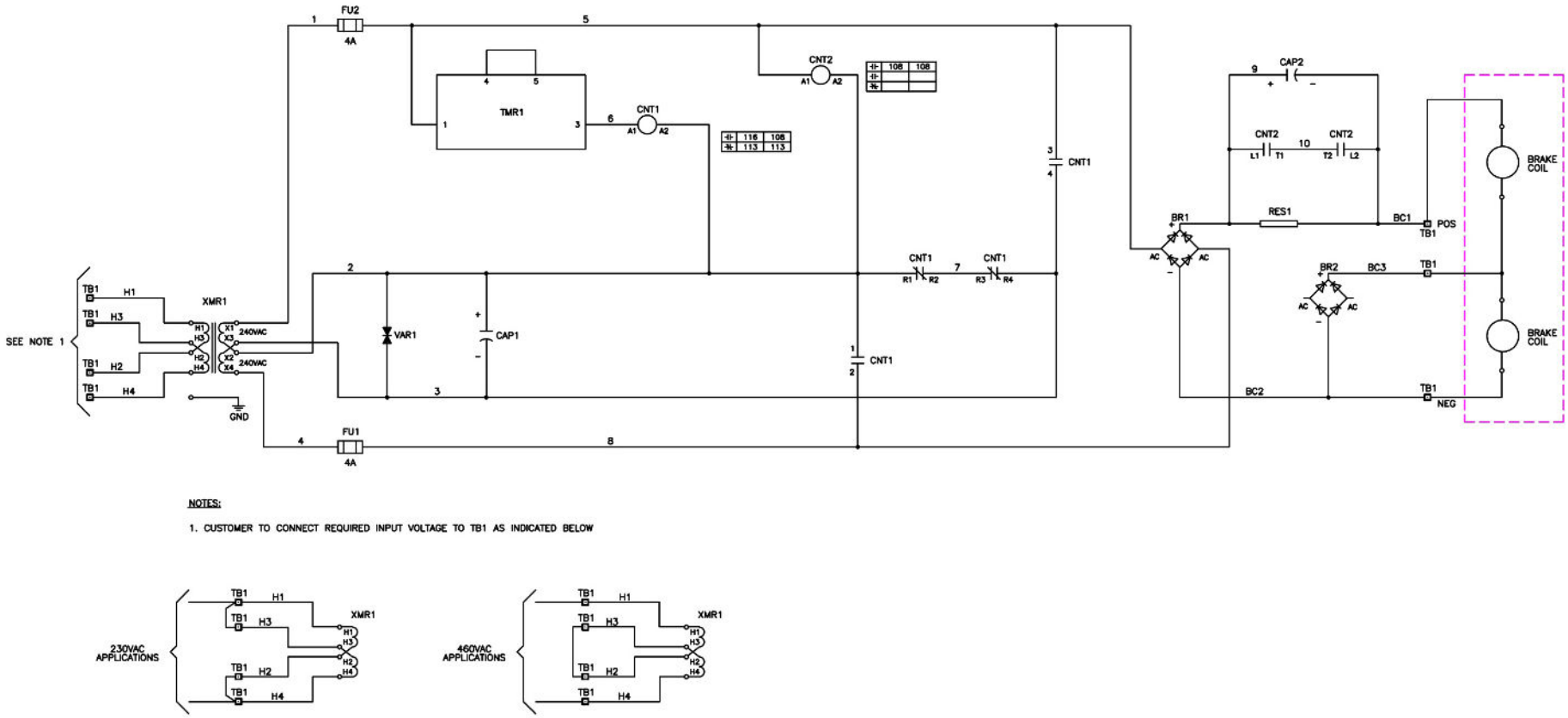


Figure 4: Brake Controller Schematic (Dual Brake Coil & Time Delay Rectifier)

3. Installation

Installing the Brake Controller

Refer to drawing supplied with the controller for your specific schematic diagram.

1. Attach the controller panel to a sturdy structure as near the brake as possible.
2. Connect the single phase AC power from the main control's brake control contactor to the transformer's primary terminals.
3. Apply power to the brake controller, and check that it operates the brake(s) properly.

DANGER

HIGH VOLTAGES ARE PRESENT IN THE CONTROL PANEL, ELECTRICAL COMPONENTS, AND THE CONNECTION BETWEEN THESE COMPONENTS.

Before installing, servicing, or inspecting any electrical or mechanical components of this power equipment, power must be disconnected at the source and proper lockout/tagout procedures followed.

DO NOT make or break electrical connections (for example, plugs and receptacles) without first disconnecting power at the source and following proper lockout/tagout procedures.

REFER TO ANSI Z244.1 PERSONNEL PROTECTION - LOCKOUT/TAGOUT OF ENERGY SOURCES.

Only qualified personnel should install components, inspect, and/or service this equipment.

WARNING

It has been a common practice to connect a brake or brake controller to the associated motor's "T-Leads" so that the brake releases whenever the motor has power, and it sets when power to the motor is removed. The problem with this practice is that energy from the motor's rotation can be converted into electrical energy and keep the brake released for a period of time, even when power to the motor is removed. Because of this, it is recommended that a separate contactor or relay be used to operate the brake controller.

4. Troubleshooting

In the event that the brake fails to operate properly and the brake controller is suspected, the following procedure should be used to check the brake controller.

1. Check the voltage at each of the brake coils. The voltage should measure 200 VDC for one second, then drop to 100 VDC.
   - If the voltage measures 200 VDC only, the timing relay or one of the power relays may be defective.
   - If the voltage measures 100 VDC only, the timing relay or one of the power relays may be defective.
2. If no voltage is measured, check all fuses and rectifier input voltages. If the bridge rectifier input voltage is correct, the rectifier may be defective and require replacement. If the rectifier is OK, check the power relays