Table of Contents

TRLYH1B Relay Output with Coil Sensing 2
Functional Description 2
Mark VI Systems 2
Mark VIe Systems 2
Installation 3
Operation 4
Specifications 6
Diagnostics 6
Configuration 7
TRLYH1C Relay Output with Contact Sensing 7
Functional Description 7
Mark VI Systems 7

TRLYH1B Relay Output with Coil Sensing

Functional Description

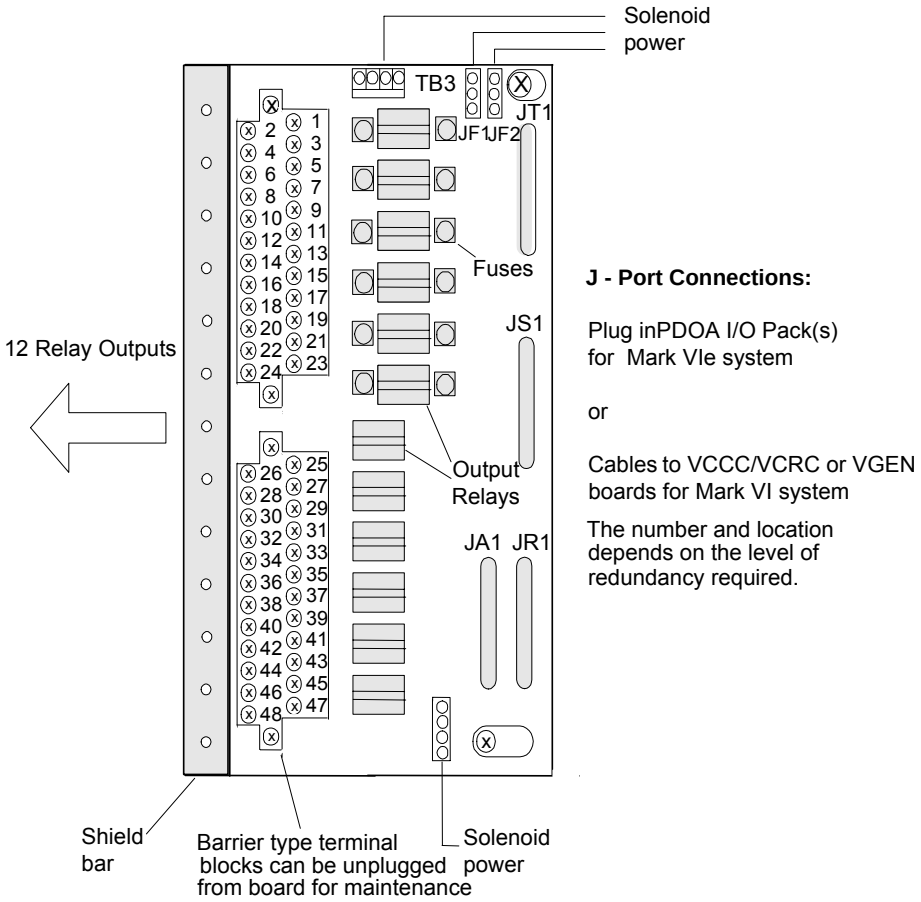
The Relay Output with coil sensing (TRLYH1B) terminal board holds 12 plug-in magnetic relays. The first six relay circuits configured by jumpers for either dry, Form-C contact outputs, or to drive external solenoids. A standard 125 V dc or 115/230 V ac source, or an optional 24 V dc source with individual jumper selectable fuses and on-board suppression, can be provided for field solenoid power. The next five relays (7-11) are unpowered isolated Form-C contacts. Output 12 is an isolated Form-C contact, used for special applications such as ignition transformers.

Mark VI Systems

In Mark* VI systems, TRLY is controlled by the VCCC, VCRC, or VGEN board and supports simplex and TMR applications. Cables with molded plugs connect the terminal board to the VME rack where the I/O boards are mounted. Connector JA1 is used on simplex systems, and connectors JR1, JS1, and JT1 are used for TMR systems.

Mark VIe Systems

In the Mark VIe system, the TRLY works with the PDOA I/O pack and supports simplex and TMR applications. PDOA plugs into the DC-37 pin connectors on the terminal board. Connector JA1 is used on simplex systems, and connectors JR1, JS1, and JT1 are used for TMR systems.



TRLYH1B Relay Output Terminal Board

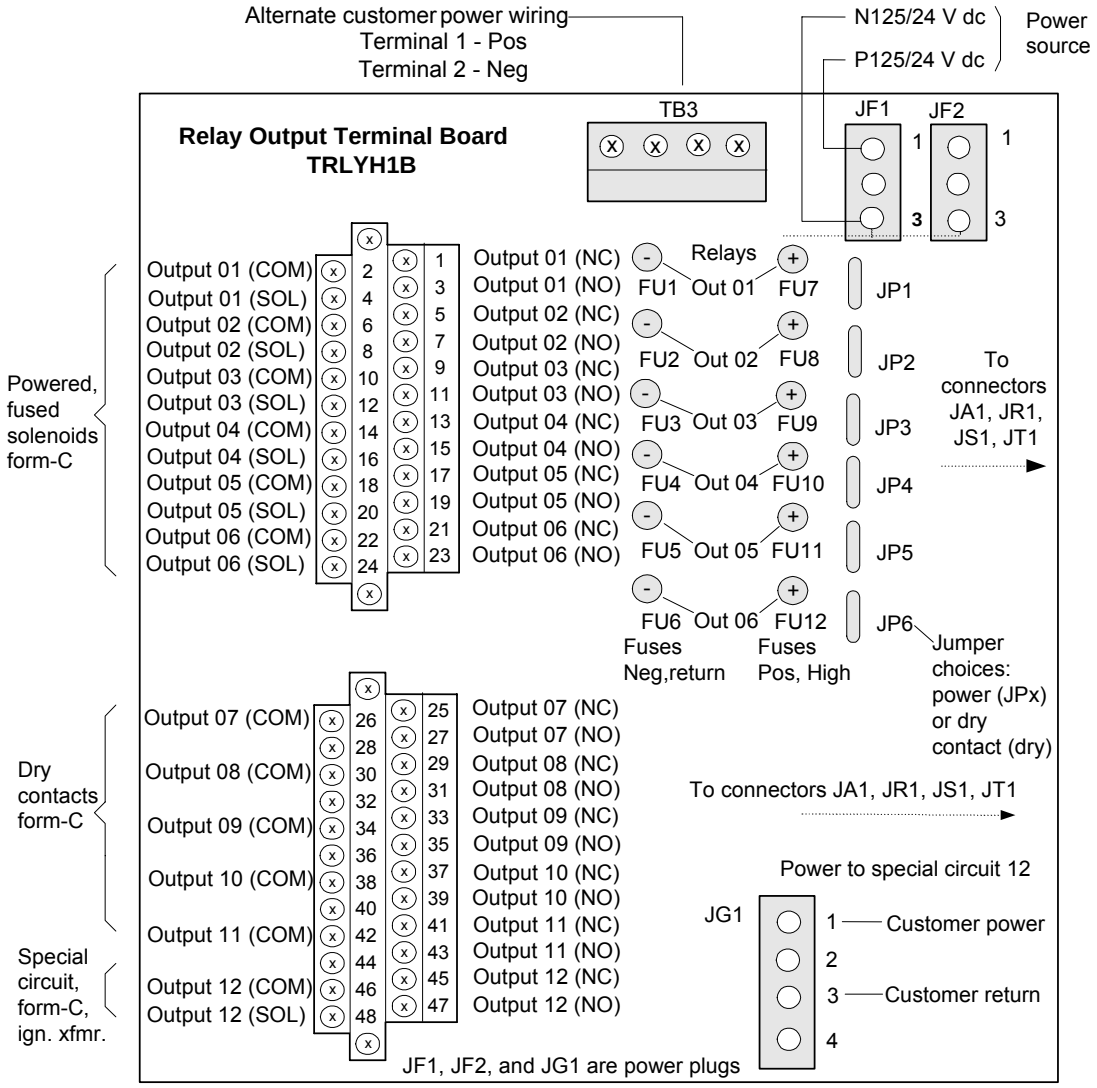
Installation

Connect the wires for the 12 relay outputs directly to two I/O terminal blocks on the terminal board as shown in the figure, *TRLYH1B Terminal Board Wiring*. Each block is held down with two screws and has 24 terminals accepting up to #12 AWG wires. A shield terminal strip attached to chassis ground is located on to the left side of each terminal block.

Connect the solenoid power for outputs 1-6 to JF1. JF2 can be used to daisy chain power to other TRLYs. Alternatively, power can be wired directly to TB3 when JF1/JF2 are not used. Connect power for the special solenoid, Output 12, to connector JG1.

Jumpers JP1-JP6 are removed in the factory and shipped in a plastic bag. Re-install the appropriate jumper if power to a field solenoid is required. Conduct individual loop energization checks as per standard practices and install the jumpers as required. For isolated contact applications, remove the fuses to ensure that suppression leakage is removed from the power bus.

Note These jumpers are also for isolation of the monitor circuit when used on isolated contact applications.

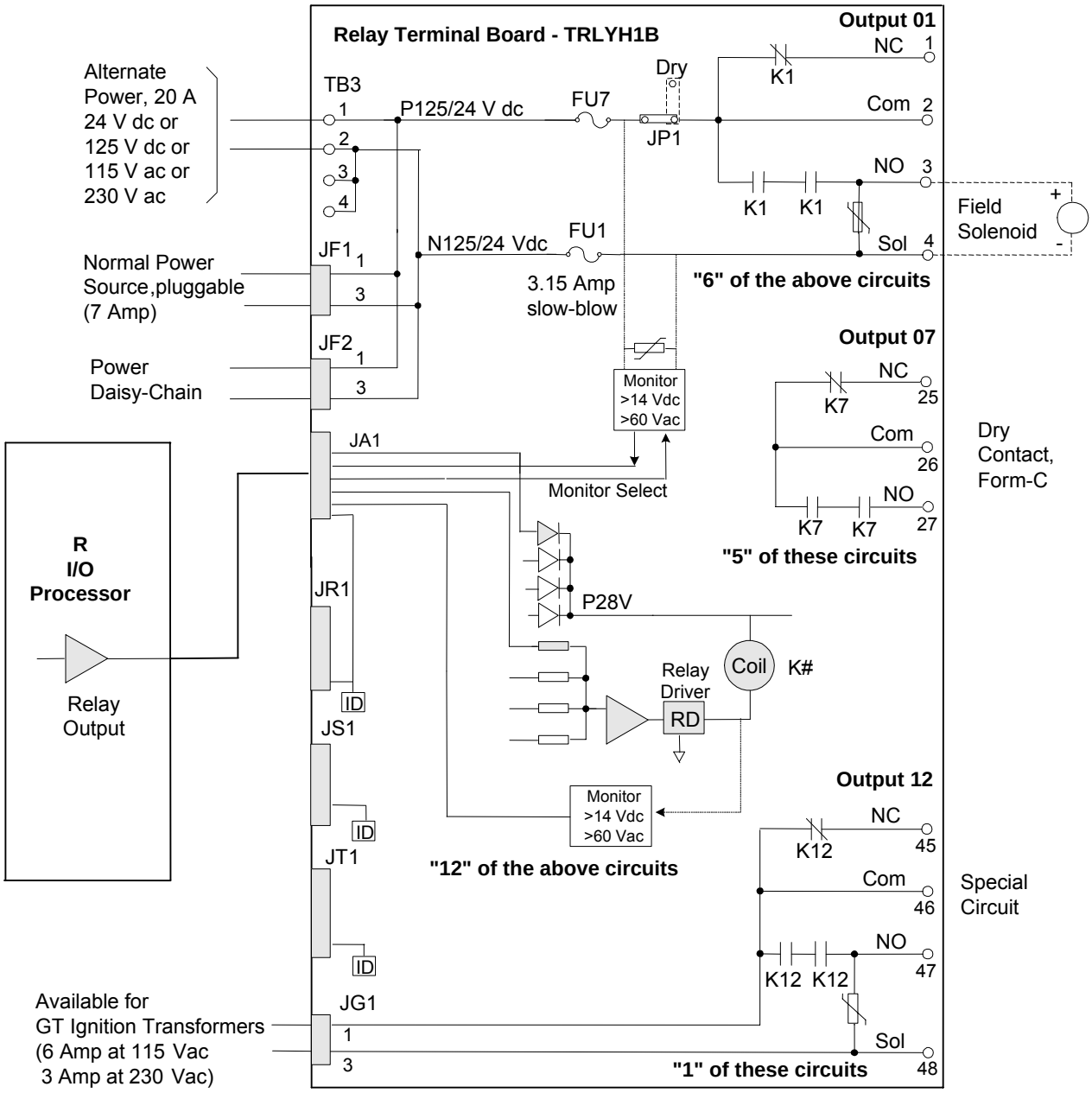


TRLYH1B Terminal Board Wiring

Operation

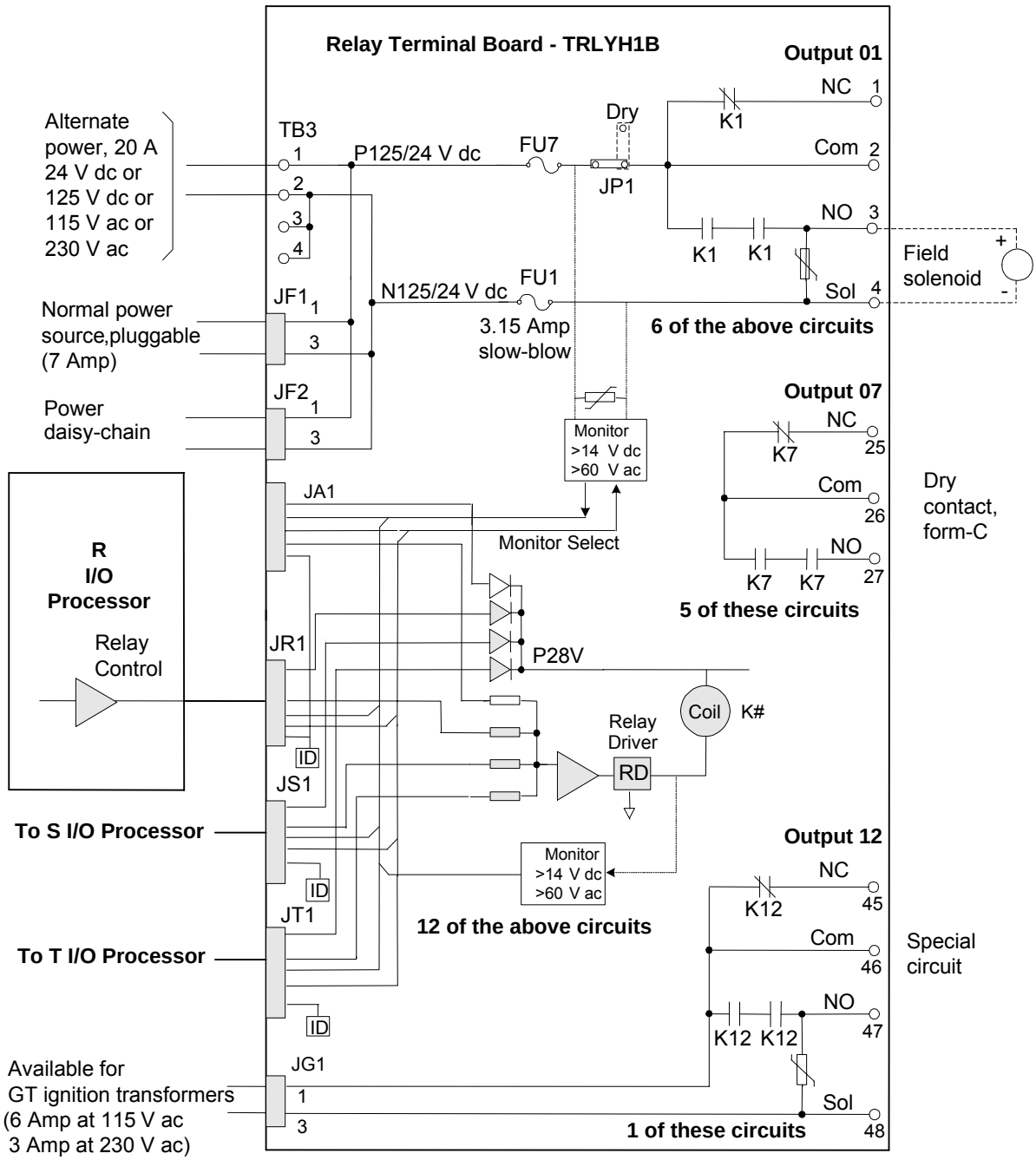
Relay drivers, fuses, and jumpers are mounted on the TRLYH1B. For simplex operation, D-type connectors carry control signals and monitor feedback voltages between the I/O processors and TRLY through JA1.

Relays are driven at the frame rate and have a 3.0 A rating. The rated contact-to-contact voltage is 500 V ac for one minute. The rated coil to contact voltage is 1,500 V ac for one minute. The typical time to operate is 10 ms. Relays 1-6 have a 250 V metal oxide varistor (MOV) for transient suppression between normally open (NO) and the power return terminals. The relay outputs have a failsafe feature that vote to de-energize the corresponding relay when a cable is unplugged or communication with the associated I/O processor is lost.



TRLYH1B Circuits, Simplex System

For TMR applications, relay control signals are fanned into TRLY from the three I/O processors R, S, and T through plugs JR1, JS1, and JT1. These signals are voted and the result controls the corresponding relay driver. Power for the relay coils comes from all three I/O processors and is diode-shared. The following figure shows a TRLYH1B in a TMR system.



TRLYH1B Circuits, TMR System

Specifications

Item	Specifications	
Number of relay channels on one TRLY board	12:	6 relays with optional solenoid driver voltages
		5 relays with dry contacts only
		1 relay with 7 A rating
Rated voltage on relays	a:	Nominal 125 V dc or 24 V dc
	b:	Nominal 115/230 V ac
Max load current	a:	0.6 A for 125 V dc operation
	b:	3.0 A for 24 V dc operation
	c:	3.0 A for 115/230 V ac, 50/60 Hz operation
Max response time on	25 ms typical	
Max response time off	25 ms typical	
Maximum inrush current	10 A	
Contact material	Silver cad-oxide	
Contact life	Electrical operations:	100,000
	Mechanical operations:	10,000,000
Fault detection	Loss of relay solenoid excitation current	
	Coil current disagreement with command	
	Unplugged cable or loss of communication with I/O board; relays de-energize if communication with associated I/O board is lost.	
Physical		
Size	17.8 cm wide x 33.02 cm high (7.0 in x 13.0 in)	
Temperature	-30 to + 65ºC (-22 to +149 ºF)	

Diagnostics

Diagnostic tests to components on the terminal boards are as follows:

- The output of each relay (coil current) is monitored and checked against the command at the frame rate. If there is no agreement for two consecutive checks, an alarm is latched.
- The solenoid excitation voltage is monitored downstream of the fuses and an alarm is latched if it falls below 12 V dc.
- If any one of the outputs goes unhealthy a composite diagnostics alarm, L3DIAG_xxxx occurs.
- When an ID chip is read by the I/O processor and a mismatch is encountered, a hardware incompatibility fault is created.
- Each terminal board connector has it own ID device that is interrogated by the I/O pack/board. The connector ID is coded into a read-only chip containing the board serial number, board type, revision number, and the JR1/JS1/JT1 connector location. When the chip is read by the I/O processor and mismatch is encountered, a hardware incompatibility fault is created.
- Relay contact voltage is monitored.
- Details of the individual diagnostics are available in the configuration application. The diagnostic signals can be individually latched, and then reset with the RESET_DIA signal if they go healthy.

Configuration

Board adjustments are made as follows:

- Jumpers JP1 through JP12. If contact voltage sensing is required, insert jumpers for selected relays.
- Fuses FU1 through FU12. If power is required for relays 1-6, two fuses should be placed in each power circuit supplying those relays. For example, FU1 and FU7 supply relay output 1. Refer to terminal board wiring diagram for more information.

TRLYH1C Relay Output with Contact Sensing

Functional Description

The Relay Output with contact sensing (TRLYH1C) terminal board holds 12 plug-in magnetic relays. The first six relay circuits are Form-C contact outputs to drive external solenoids. A standard 125 V dc or 115 V ac source with fuses and on-board suppression is provided for field solenoid power. TRLYH2C holds 12 plug-in magnetic relays. The first six relay circuits are Form-C contact outputs to drive external solenoids. A standard 24 V dc source with fuses and on-board suppression is provided for field solenoid power.

The next five relays (7-11) are unpowered, isolated Form-C contacts. Output 12 is an isolated Form-C contact with non-fused power supply, used for ignition transformers. For example, 12 NO contacts have jumpers to apply or remove the feedback voltage sensing.

TRLYH1C and H2C are the same as the standard TRLYH1B board except for the following:

- Six jumpers for converting the solenoid outputs to dry contact type are removed. These jumpers were associated with the fuse monitoring.
- Input relay coil monitoring is removed from the 12 relays.
- Relay contact voltage monitoring is added to the 12 relays. Individual monitoring circuits have voltage suppression and can be isolated by removing their associated jumper.
- High-frequency snubbers are installed across the NO and SOL terminals on the six solenoid driver circuits and on the special circuit, output 12.

Mark VI Systems

In the Mark* VI system, the TRLY is controlled by the VCCC or VCRC board and supports simplex and TMR applications. Cables with molded plugs connect the terminal board to the VME rack where the I/O boards are mounted. Connector JA1 is used on simplex systems, and connectors JR1, JS1, and JT1 are used for TMR systems.