

Table of Contents

TTURH1B Primary Turbine Protection Input	2
Functional Description	2
Installation	3
Operation	5
Specifications	7
Diagnostics	8
Configuration	8

Mr. Lucian

Sales manager

Joyoung International Trading Co., Ltd

Whatsapp/Wechat: +86 18106906650

Email: Lily@htechplc.com

Mobile: +86 18106906650

Website: www.xm-dcs.com

Address: Room 1503, Building B, Diamond Coast,
No. 96 Lujiang Road, Siming District, Xiamen Fujian

Wechat



TTURH1B Primary Turbine Protection Input

Functional Description

The Primary Turbine Protection Input (TTURH1B) terminal board works with VTUR and has the following inputs and outputs:

- Twelve passive pulse rate devices sensing a toothed wheel to measure the turbine speed
- Generator voltage and bus voltage signals from potential transformers
- 125 V dc output to the main breaker coil for automatic generator synchronizing
- Inputs from the shaft voltage and current sensors to measure induced shaft voltage and current

TTUR has three relays, K25, K25P, and K25A, that all have to close to provide 125 V dc power to close the main breaker, 52G. The speed signal cable to VTUR uses the JR5 connector, and the other signals use the JR1 connector. For TMR systems, signals fan out to the JR5, JS5, JT5, JR1, JS1, and JT1 connectors.

Mark VI Systems

In the Mark* VI system, the TTUR works with the VTUR processor and supports simplex and TMR applications. In TMR systems, TTURH1B connects to three VTUR boards.

Note TTURH1B does not support I/O packs, see Mark VIe below.

Mark VIe Systems

For the Mark VIe system, a new design board, the TTURH1C, is used.

Note This document does not describe TTURH1C. For details, refer to *GEI-100575 PTUR Turbine Specific Primary Trip*.

Mr. Lucian

Sales manager

Joyoung International Trading Co., Ltd

Whatsapp/Wechat: +86 18106906650

Email: Lily@htechplc.com

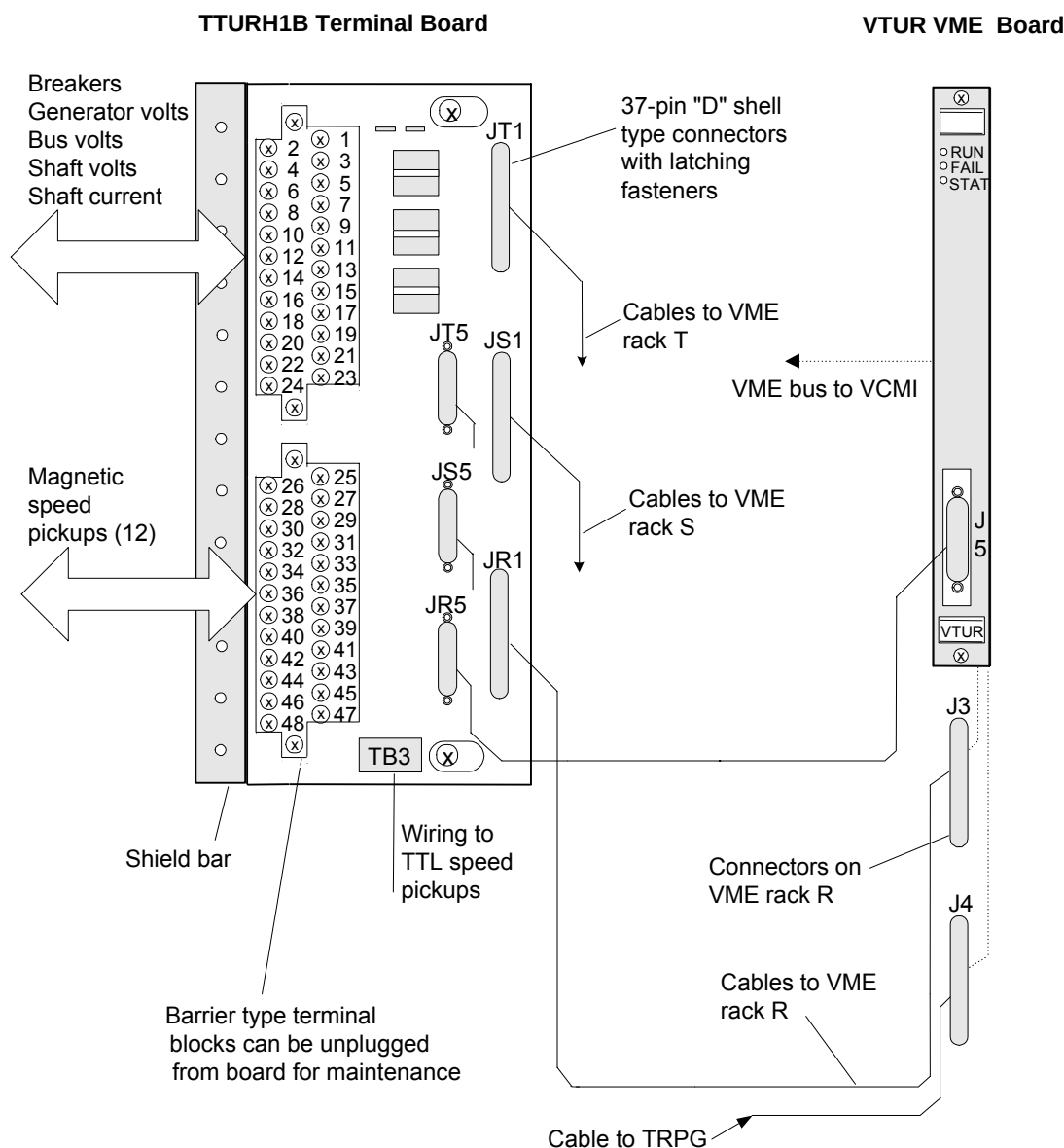
Mobile: +86 18106906650

Website: www.xm-dcs.com

Address: Room 1503, Building B, Diamond Coast,
No. 96 Lujiang Road, Siming District, Xiamen Fujian

Wechat





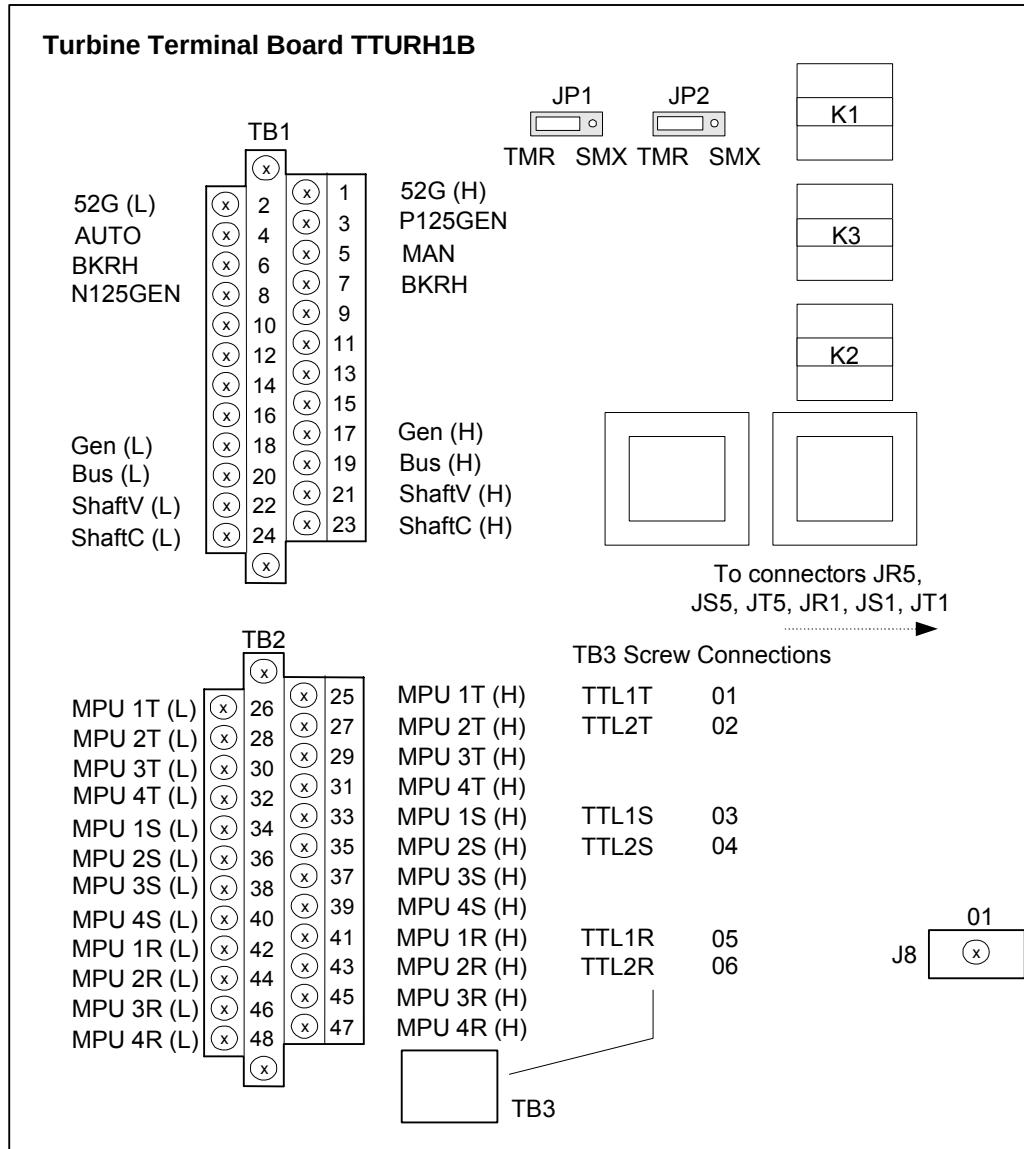
TTUR Turbine Terminal Board, Processor Board, and Cabling

Installation

Connect the wires for the magnetic pick ups, shaft pick ups, potential transformers, and breaker relays to the two I/O terminal blocks TB1 and TB2, as shown in the figure, *TTUR Terminal Board Wiring*. Each block is held down with two screws and has 24 terminals accepting up to #12 AWG wires. A shield termination strip attached to chassis ground is located immediately to the left of each terminal block.

Use jumpers JP1 and JP2 to select either SMX or TMR for relay drivers K25 and K25P. If used, connect the wires for optional TTL active speed pick ups to TB3; these require an external power supply.

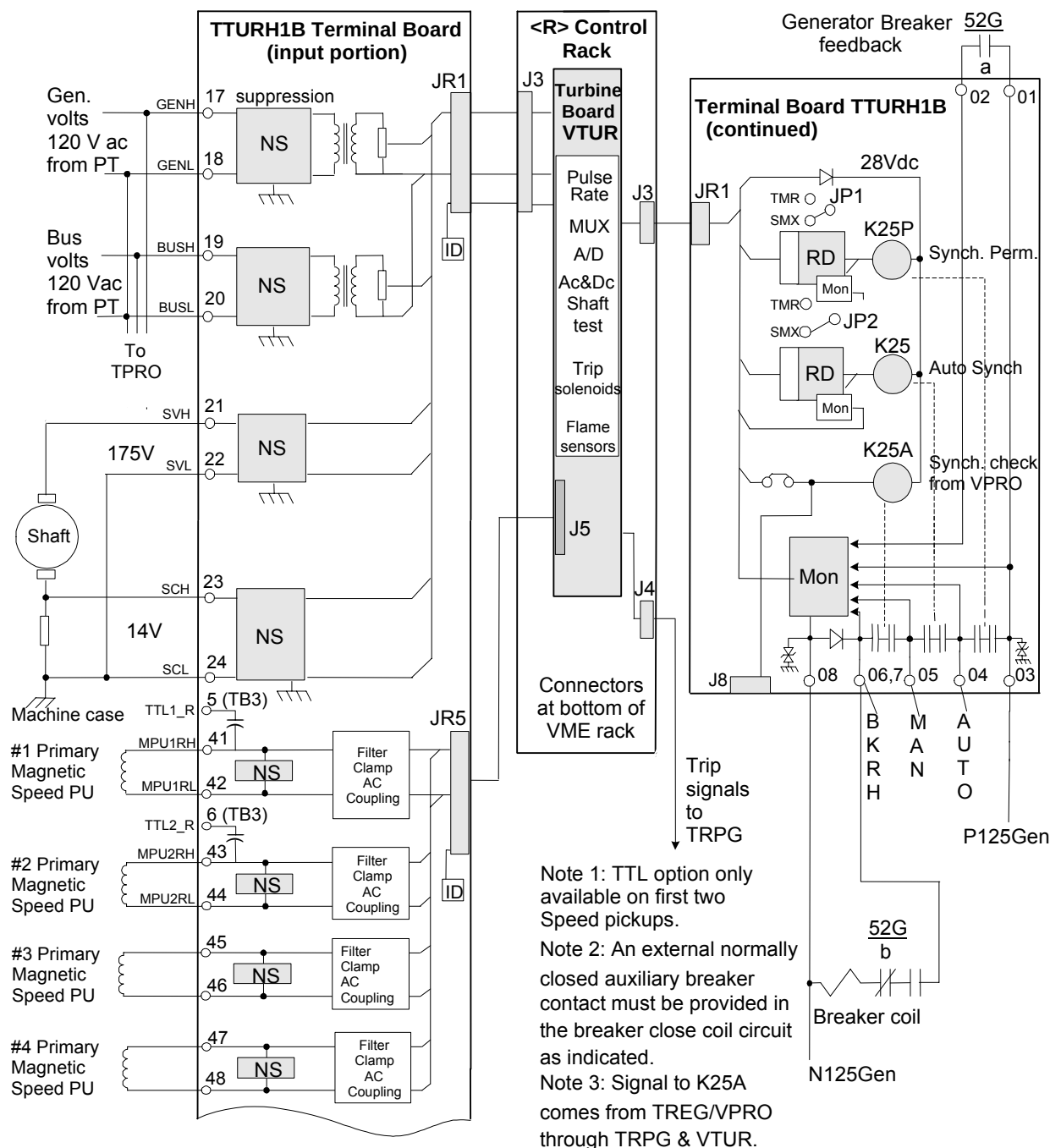
Simplex systems use cable connectors JR5 and JR1. TMR systems use all six cable connectors.



TTUR Terminal Board Wiring

Operation

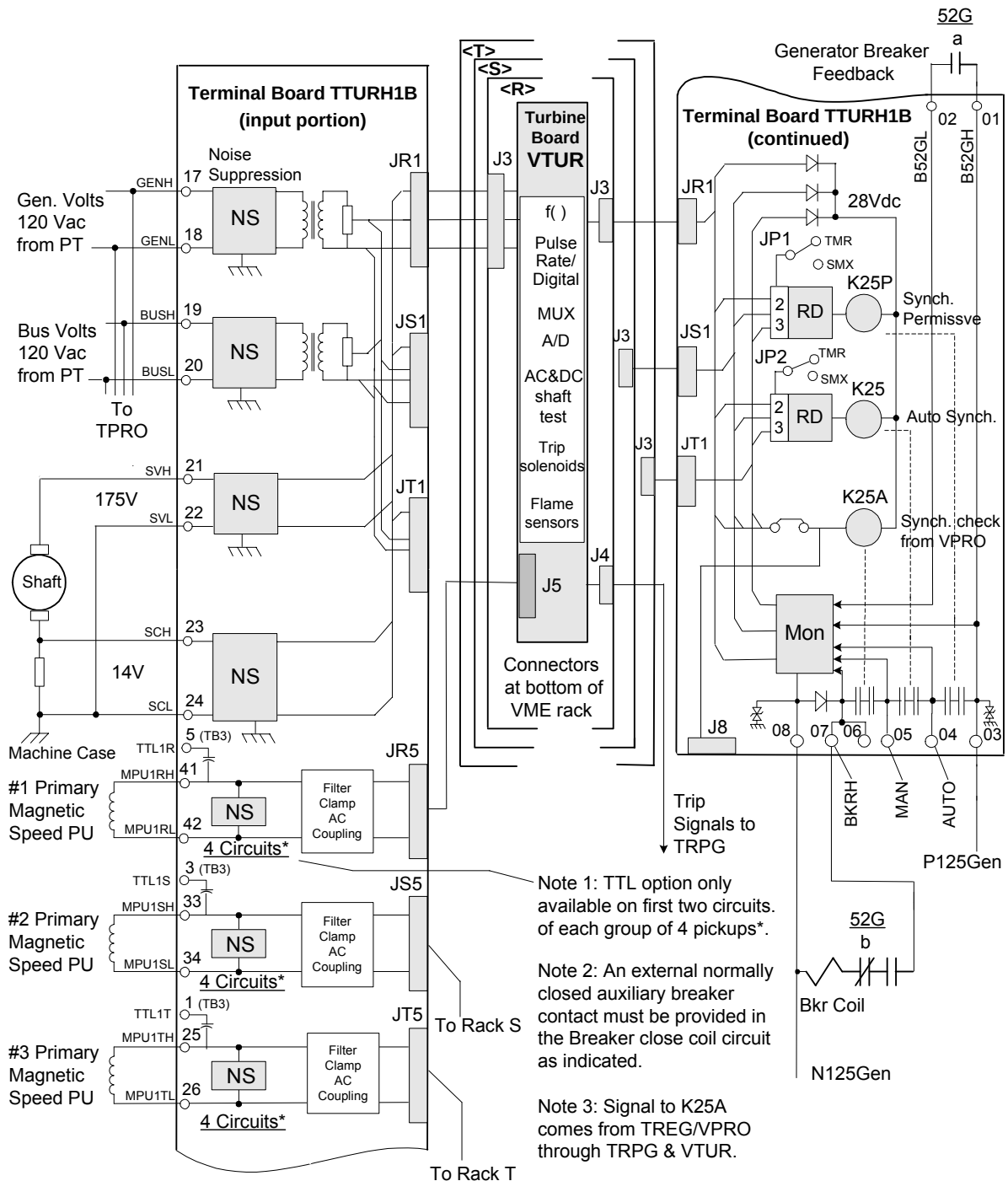
In simplex applications, up to four pulse rate signals can be used to measure turbine speed. Generator and bus voltages are brought into TTUR for automatic synchronizing in conjunction with VTUR, the turbine controller, and excitation system. TTUR has permissive generator synchronizing relays and controls the main breaker relay coil, 52G.



TTUR Control I/O and VTUR Board, Simplex

In TMR applications all inputs fan to the three control racks. Control signals coming into TTUR from R, S, and T are voted before they actuate permissive relays K25 and K25P. Relay K25A is controlled by the VPRO and TREG boards.

Note All three relays have two normally open contacts in series with the breaker close coil.



TTUR Control I/O and VTUR Board, TMR

Specifications

Item	Specification
Number of inputs	12 passive speed pickups. 1 shaft voltage and 1 shaft current measurement. 1 generator and 1 bus voltage. Generator breaker status contact. Signal to K25A relay.
Number of outputs	Generator breaker coil, 5 A at 125 V dc
Power supply voltage	Nominal 125 V dc to breaker coil
MPU pulse rate range	2 Hz to 20 kHz
MPU pulse rate accuracy	0.05% of reading
MPU input circuit sensitivity	27 mV pk (detects 2 rpm speed)
Shaft voltage monitor	Signal is frequency of ± 5 V dc (0 – 1 MHz) pulses from 0 to 2,000 Hz
Shaft voltage wiring	Up to 300 m (984 ft), with maximum two-way cable resistance of 15 Ω
Shaft voltage dc test	Applies a 5 V dc source to test integrity of the external turbine circuit and measures dc current flow.
Shaft voltage ac test	Applies a test voltage of 1 kHz to the input of the VTUR shaft voltage circuit (R module only).
Shaft current input	Measures shaft current in amps ac (shunt voltage up to 0.1 V pp)
Generator and bus voltage sensors	Two single phase potential transformers, with secondary output supplying a nominal 115 V rms Each input has less than 3 VA of loading Allowable voltage range for synch is 75 to 130 V rms Each PT input is magnetically isolated with a 1,500 V rms barrier Cable length can be up to 1,000 ft. of 18 AWG wiring
Generator breaker circuits (synchronizing)	External circuits should have a voltage range within 20 to 140 V dc. The external circuit must include a NC breaker auxiliary contact to interrupt the current Circuits are rated for NEMA class E creepage and clearance 250 V dc applications require interposing relays
Contact voltage sensing	20 V dc indicates high and 6 V dc indicates low Each circuit is optically isolated and filtered for 4 ms
Size	33.0 cm high x 17.8 cm wide (13 in. x 7 in.)
Technology	Surface mount
Temperature	Operating: -30 to 65°C (-22 to 149 °F)

Diagnostics

VTUR makes diagnostic tests on the terminal board and connections as follows:

- Feedback from the solenoid relay drivers; if they do not agree with the control signal a fault is created.
- Feedback from the relay contacts; if they do not agree with the control signal a fault is created.
- Loss of solenoid power, which creates a fault.
- Slow synch check relay, slow auto synch relay, and locked up K25 relay; all of these create a fault.
- If any one of the above signals goes unhealthy, a composite diagnostic alarm L3DIAG_VTUR occurs. The diagnostic signals can be individually latched and then reset with the RESET_DIA signal if they go healthy.
- Terminal board connectors JR1, JS1, JT1, JR5, JS5, JT5 have their own ID device that is interrogated by the I/O board. The ID device is a read-only chip coded with the terminal board serial number, board type, revision number, and plug location. When the chip is read by VTUR and a mismatch is encountered, a hardware incompatibility fault is created.

Configuration

Jumpers JP1 and JP2 select either simplex or TMR for relay drivers K25 and K25P. There are no switches on the board.