MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GENERAL ELECTRIC

IS200TTURH1BCC

TURBINE PROTECTION TERMINAL BOARD

Used with the applicable Mark VI TTUR H1B configuration.

REFERENCE PACKAGE

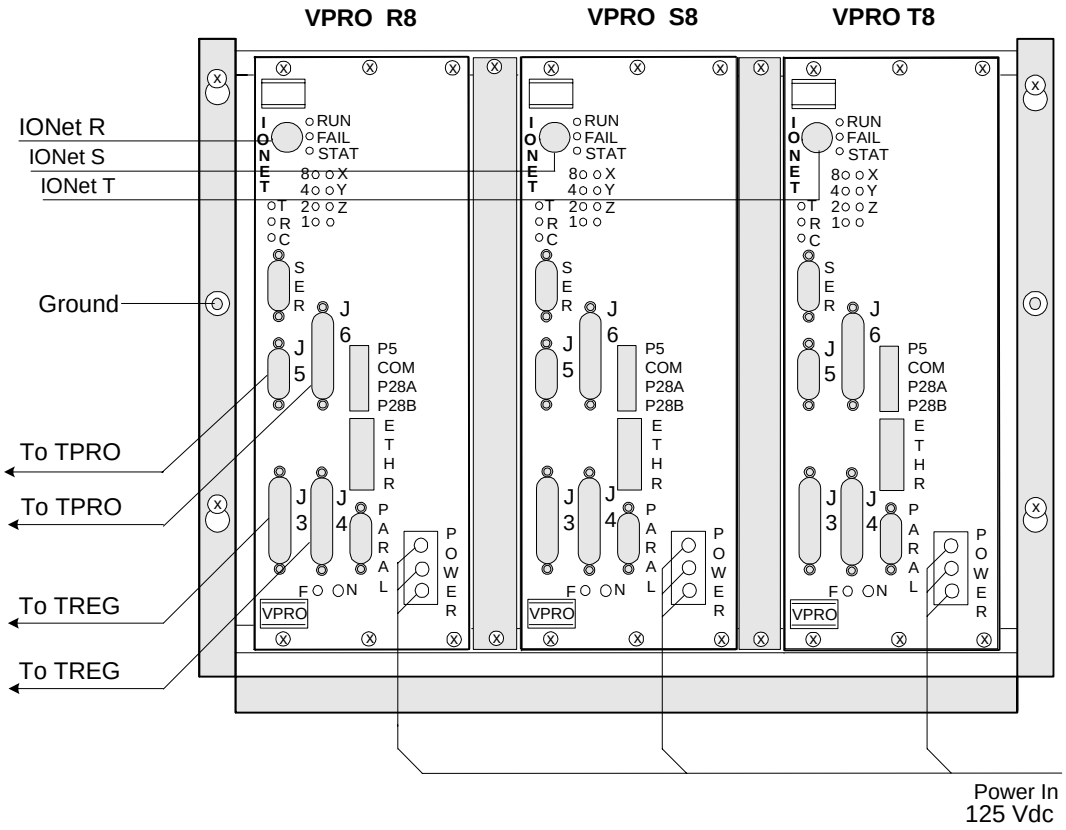
OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Original GEH-6421H Volume I turbine protection and synchronizing drawings; GEH-6421M TTUR family section and exact H1B reseller support

Turbine Protection Module

The Turbine Protection Module (VPRO) and associated terminal boards (TPRO and TREG) provide an independent emergency overspeed protection for turbines that do not have a mechanical overspeed bolt. The protection module is separate from the turbine control and consists of triple redundant VPRO boards, each with their own on-board power supply, as shown in the following figure. VPRO controls the trip solenoids through relay voting circuits on the TREG, TREL, and TRES boards.



Turbine Protection Module with Cabling Connections

The TPRO terminal board provides independent speed pickups to each VPRO, which processes them at high speed. This high speed reduces the maximum time delay to calculate a trip and signal the ETR relay driver to 20 ms. In addition to calculating speed, VPRO calculates acceleration which is another input to the overspeed logic.

TPRO fans out generator and line voltage inputs to each VPRO where an independent generator synchronization check is made. Until VPRO closes the K25A permissive relay on TTUR, generator synchronization cannot occur. For gas turbine applications, inputs from temperature sensors are brought into the module for exhaust over temperature protection.

The VPRO boards do not communicate over the VME backplane. Failures on TREG are detected by VPRO and fed back to the control system over the IONet. Each VPRO has an IONet communication port equivalent to that of the VCMI.

Hardware

The synchronizing system interfaces to the breaker close coil via the TTUR terminal board as in the following figure. Three Mark VI relays must be picked up, plus external permissives must be true, before a breaker closure can be made.

The K25P relay is directly driven from the controller application code. In a TMR system, it is driven from <R>, <S>, and <T>, using 2/3 logic voting. For a simplex system, it may be configured by jumper to be driven from <R> only.

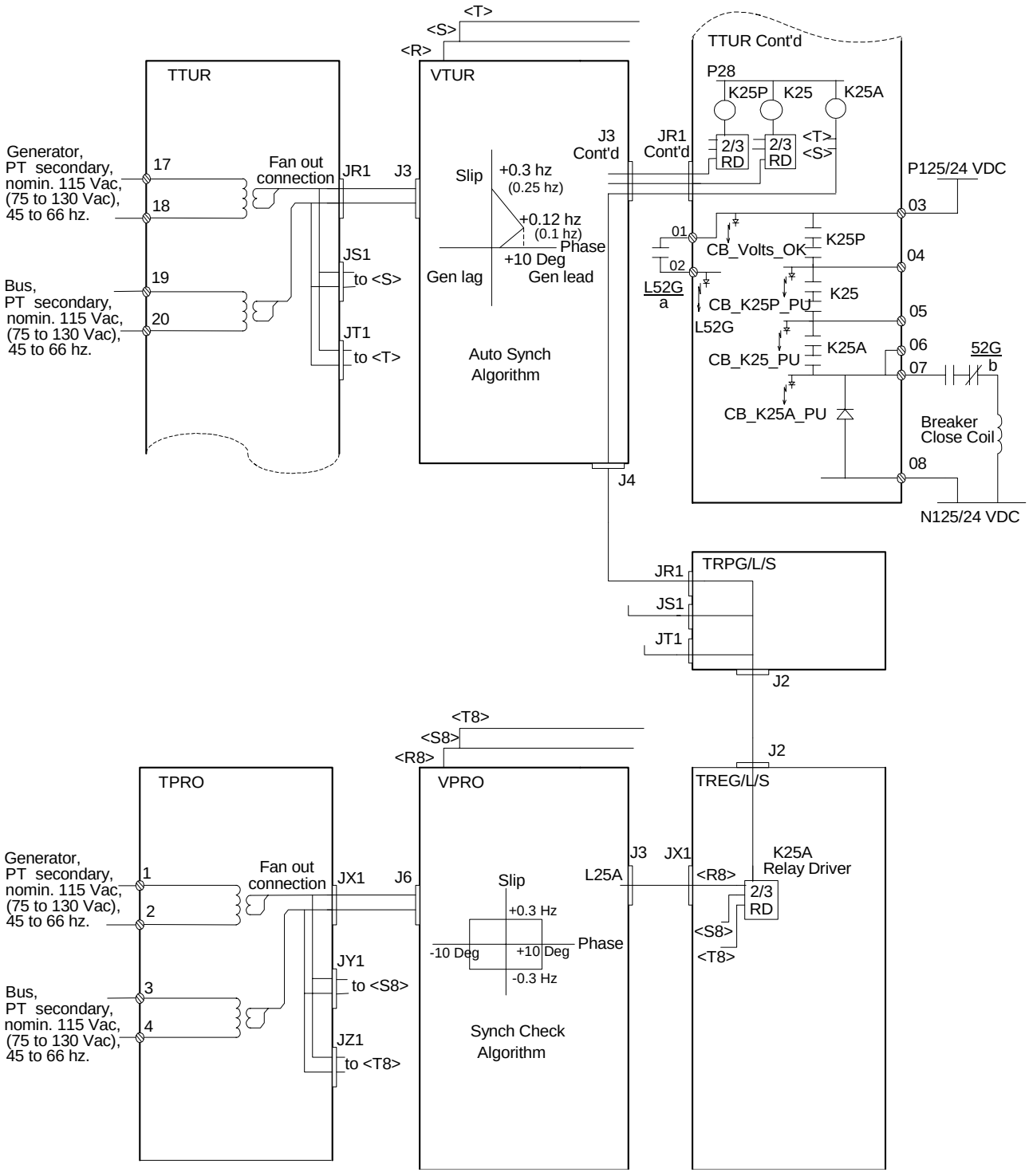
The K25 relay is driven from the VTUR auto synch algorithm, which is managed by the controller application code. In a TMR system, it is driven from <R>, <S>, and <T>, using 2/3 logic voting. Again for a simplex system, it may be configured by jumper to be driven from <R> only.

The K25A relay is located on TTUR, but is driven from the VPRO synch check algorithm, which is managed by the controller application code. The relay is driven from VPRO, <R8>, <S8>, and <T8>, using 2/3 logic voting in TREG/L/S.

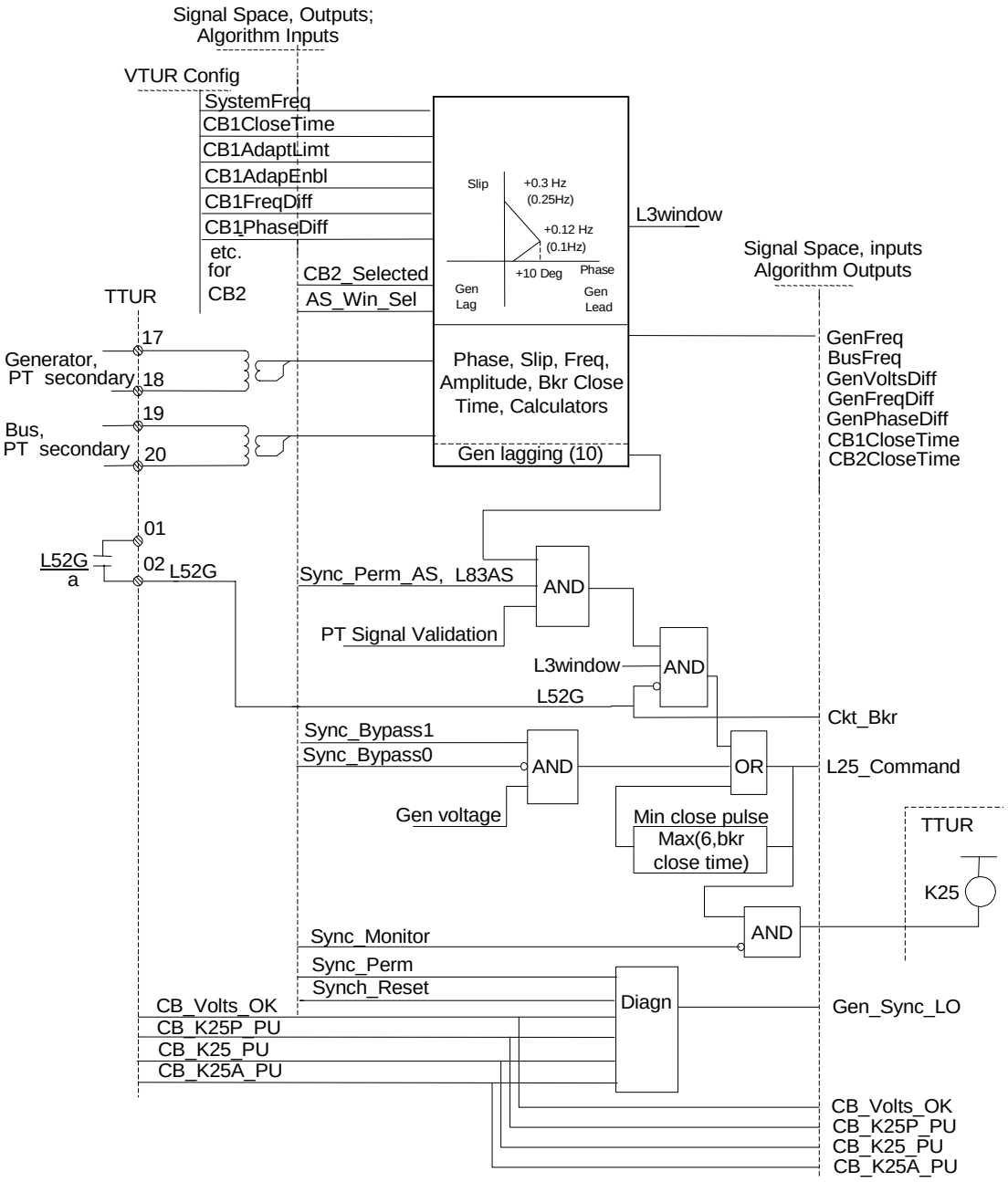
The synch check relay driver (located on TREG/L/S) is connected to the K25A relay coil (located on TTUR) through cabling through J2 to TRPG/L/S. It then goes through JR1 (and JS1, JT1) to J4 and VTUR, then J3, JR1 to TTUR.

Both sides of the breaker close coil power bus must be connected to the TTUR board. This provides diagnostic information and also measures the breaker closure time, through the normally open breaker auxiliary contact for optimization.

The breaker close circuit is rated to make (close) 10 A at 125 V dc, but to open only 0.6 A. A normally open auxiliary contact on the breaker is required to interrupt the closing coil current.



Generator Synchronizing System



Automatic Synchronizing on VTUR