GE GE □□□ Series Service Manual

IS200TBTCH1CBB

1. Description

SPECIFICATIONS:

2. Specifications

Specification	Value
Manufacturer	**GE Industrial Systems**
Series	**EX2100**
Part	**Number IS200TBTCH1CBB**
Functional	**Acronym TBTC**
Functional	**Description Themocouple Terminal Board**
PCB	**Coating Conformal Coating**
Functional	**Revision 1 C**
Functional	**Revision 2 B**
Artwork	**Revision B**
About	**the IS200TBTCH1CBB**
This	**IS200TBTCH1CBB General Electric printed circuit board was originally manufactured for their special EX2100 Excitation Control System Series, and as such; was actually mass-produced by General Electric subsidiary manufacturer GE Industrial Systems. This printed circuit board or PCB for short is actually a modified version of the preexisting IS200TBTCH1 parent PCB product, also a member of this EX2100 Series. This product sports two functional revisions and a singular configuration artwork revision, and can be more explicitly defined by its factory-specified functional description as a thermocouple terminal board.**

3. Product Information

SPECIFICATIONS:

Part Number: IS200TBTCH1CBB

Manufacturer: General Electric

Series: Mark VIe

Product Type: Thermocouple Input Terminal Board

Number of channels: 24 channels

Thermocouple types: E, J, K, S, T

Span: -8 mV to +45 mV

Operating temperature: 0 to +45°C

Size: 15.9 cm high x 17.8 cm

Repair: 3-7 Days

Availability: In Stock

Country of Origin: United States

Manual: GEH-6421M

FUNCTIONAL DESCRIPTION:

IS200TBTCH1CBB is a Thermocouple Input Terminal Board manufactured and designed by General Electric as part of the Mark VIe Series used in GE Distributed Turbine Control Systems. The thermocouple terminal board TBTC accepts 24 type E, J, K, S, or T thermocouple inputs. These inputs are wired to two barrier-type blocks on the terminal board. Communication with the I/O processor is through DC-type connectors. There are two types of terminal board:

TBTCH1C for simplex applications has two DC-type connectors.

TBTCH1B for TMR applications has six DC-type connectors.

In the Mark VIe system, the PTCC I/O pack works with the TBTC board. Simplex, dual, and TMR systems are supported. In simplex systems, two PTCC packs plug into the TBTCH1C for a total of 24 inputs. With the TBTCH1,B one, two, or three PTCC packs plug in, supporting a variety of system configurations, but only 12 inputs are available.

INSTALLATION:

Thermocouples connect directly to two I/O terminal blocks, which are designed for easy installation and maintenance. These removable blocks are securely mounted onto the terminal board using two screws each. Every terminal block provides 24 individual terminals capable of accommodating wire sizes up to #12 AWG, ensuring compatibility with a variety of field wiring requirements.

To support proper grounding and signal integrity, each terminal block features a shield terminal strip located on its left side. This strip is connected to the chassis ground, helping to reduce electrical noise and improve system reliability.

In Mark VIe control systems, I/O packs interface with the terminal boards through J-type connectors. These I/O packs handle signal processing and communication with the controller. The number of I/O packs or cables used varies based on the required level of system redundancy, allowing for scalable configurations tailored to specific operational and reliability needs.

OPERATION:

The system supports 24 thermocouple inputs, which can be either grounded or ungrounded. These thermocouples may be installed up to 300 meters (984 feet) from the turbine control panel, with a maximum allowable two-way cable resistance of 450 ohms. To enhance signal quality, the TBTC terminal board includes high-frequency noise suppression and two cold junction reference devices, as illustrated in the accompanying figure.

Analog-to-digital conversion and thermocouple linearization are handled within the I/O processor, ensuring accurate temperature measurements specific to each thermocouple type. In Mark VI systems using the TBTCH1C terminal board, a single VTCC module is used to process all 24 thermocouple inputs. For Mark VIe systems, two PTCC I/O packs are plugged into the TBTC terminal board to acquire the same number of inputs.

For Triple Modular Redundant (TMR) configurations using the TBTCH1B board, thermocouple signals are distributed to three J-type connectors. These connectors either cable to or directly connect with three separate I/O processors, depending on the design. In this setup, the Mark VIe system handles 12 thermocouple inputs per processor, maintaining redundancy, while the Mark VI continues to support 24 inputs in total.

THERMOCOUPLE LIMITS:

The thermocouple inputs are designed to support a full-scale input range from -8.0 mV to +45.0 mV, making them versatile for measuring a wide variety of temperatures. The voltage output from the thermocouple is proportional to the temperature difference between the measurement point and the cold junction, which is referenced at a temperature range between -30°C and 65°C (-22°F to +149°F). The following table provides typical input voltages for various thermocouple types, corresponding to their minimum and maximum temperature ranges:

COLD JUNCTIONS:

The CJ signals go into signal space and are available for monitoring. Normally, the average of the two is used. Acceptable limits are configured, and if a CJ goes outside the limit, a logic signal is set. A 1°F error in the CJ compensation will cause a 1°F error in the thermocouple reading. Hard-coded limits are set at -40 to 85°C (-40 to +185 oF), and if a CJ goes outside these, it is regarded as faulted. Most CJ failures are open or short circuit. If the CJ is declared faulty, the backup value is used, which can be derived from CJ readings on other terminal boards or can be the configured default value.

WOC offers the largest inventory of OEM replacement parts for GE Distributed Turbine Control Systems. In addition to providing high-quality replacement parts, we also offer repair services for faulty boards and supply both unused and refurbished boards, all backed by a warranty for your peace of mind. Our team of experts is available 24/7 to assist with your OEM needs, ensuring you receive prompt and reliable support for your automation systems. For information on pricing, availability or to discuss repairs, please don't hesitate to contact our team by phone or email. We’re here to help with all your automation requirements.

IS200TBTCH1CBB Technical Specifications

Manufacturer GE Industrial Systems

Series EX2100

Part Number IS200TBTCH1CBB

Functional Acronym TBTC

Functional Description Themocouple Terminal Board

PCB Coating Conformal Coating

Functional Revision 1 C

Functional Revision 2 B

Artwork Revision B

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Hardware Tips and Specifications

This IS200TBTCH1CBB Thermocouple terminal printed circuit board is unique in a number of hardware specifications, configurations, and inclusions. With this being said, it is important to recognize that this IS200TBTCH1CBB PCB, like any other in the EX2100 Excitation Control System Series, has a specified range of intended applications that contextualize its hardware choices well. For starters, this PCB's primary intended function is its providing of 24 unique thermocouple outputs to the greater VTCC Thermocouple Processor Board assembly. Additional performance specifications for this IS200TBTCH1CBB Thermocouple Processor Board include its high frequency noise suppression and cold junction reference processing applications.

Now that the function of this IS200TBTCH1CBB PCB has been explored, its specific hardware components and component configuration can be contextualized. All 24 of the different thermocouple inputs accepted by this TBTC-abbreviated circuit board interface with this PCB through its two terminal blocks, which are affixed to the IS200TBTCH1CBB base board by the use of two screws per terminal block. These terminal blocks are pluggable for installation and maintenance purposes, and accept up to two total #12 style AWG wires with voltage maximum ratings of 300 volts.

Another hardware element immediately noticeable in this IS200TBTCH1CBB board's assembly is its series of six total connector ports. Each of these connector ports is labeled by their own factory-specified nomenclature labels, including the JTA, JTB, JSA, JSB, JRA, and JRB nomenclatures. Three LEDs present on the faceplate of the TBTC model PCB provide the drive assembly administrator with crucial insights into the assembly's normative function or fault conditions, and all of the hardware components affixed to this IS200TBTCH1CBB thermocouple terminal board should be well-protected beneath their conformal-style coating of printed circuit board protection.