



QMS
ISO 9001:2000
登録番号 JSAQ 097

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DIGITAL BOARD TYPE CONTROLLER

TTM-00BT/00B



TOHO ELECTRONICS INC.

DIGITAL BOARD TYPE CONTROLLER TTM-00BT

- Multi-channel board type controller
- Possible to operate 8 points of temperature control in one board
- RS-232C or RS-485 is equipped for data communication between a host computer
- 8 points of current detector (CT) input & 1 voltage input are equipped as standard
- 11 points of event output (Open Collector) is equipped as standard
- Event output can be used as a cooling output (Under particular condition)

Standard Specifications

Number of Input	8point		Model selection	
Type of Input	Thermocouple	K/J (JIS C 1602-1995) Input resistance 1MΩ standard (output resistance 0.4μV / Ω or less (approx 0.01°C / Ω or less))		
	R.T.D	Pt100 JPt100 (JIS C 1604-1997) (output resistance 0.2°C / Ω)		
Display	LED Lamp (22 pcs)	Heater break alarm, SSR fault, Abnormality, Event output 1-8 (Red) Power, Communication (Green) Control output (Orange)		
Control Method (Heating or Heating/Cooling)	PID (Type A, Type B) Auto-Tuning Self-Tuning	Proportional band (P1)	0.1-200.0% of setting limiter span	
		Proportional band of OUT2 (P2)	0.10-10.00 times (Magnification to P1)	
		Integral time (I)	1-3600sec (0: OFF)	
		Derivative time (D)	1-3600sec (0: OFF)	
		Proportional cycle (T1, T2)	1-120sec	
		Dead band (DB)	-100.0 - +100.0 or -100 - +100 (°C)	
		Control sensitivity (C1, C2)	0-999 or 0.0-999.9 (°C)	
	ON/OFF	Position of setting	-199-999 or 199.9-999.9 (°C)	
Control Output	Open Collector	Output Rating	24VDC 100mA (MAX)	
Sampling Time	200mS			
Setting Accuracy	Thermocouple	± (0.3% + 1 digit) of measurement value or ±2°C, either of bigger numerical values is taken.		
	R.T.D.	± (0.3% + 1 digit) of measurement value or ±0.9°C, either of bigger numerical values is taken.		
Setting Resolution	Thermocouple	1°C or 0.1°C		
	R.T.D.	1°C or 0.1°C		
Other Input	Current Detector (CT)	Number of Input	8 points Single phase detection and three phase detection are assigned to each CT input. However, the voltage of heater doesn't decrease 5% or more.	
		Measurement, setting range	AC0.0-50.0A	
		Setting Resolution	0.1A	
		Measurement Accuracy	±5% of full span	
	Voltage Input (DI)	Input point	1 point	
		Input range	12-24VDC ±10%	
		Voltage (ON)	Minimum 10.8V	
		Current (ON)	Minimum 4mA	
		Voltage (OFF)	Maximum 4V	
		Minimum Input Time	500ms or more	
Function	0)Non function 1)SV1/SV2 switchable (ON: SV2) 2)Auto/Manual switchable (ON: Manual) 3)Run/Ready switchable (ON: Ready) 4)Normal/Reverse switchable (ON: Normal) 5)Normal (SV2)/Reverse (SV2) switchable (ON: Normal (SV2) 6)Auto Tuning start			
Event Output	Open Collector	Temperature alarm (8 points)	Non-PV alarm, Deviation high and low, Deviation high Deviator low, Deviation high and low range, high and low absolute value, high absolute value, low absolute value, high and low absolute value range Hold and Standby functions can be performed in all 8 points.	
		Heater break alarm (1 point)	1 point synthesis output for all channels Output will be ON when heater break occurs 190ms. or more.	
		SSR fault alarm (1)	1 point synthesis output for all channels Output will be ON when SSR fault occurs 190ms. or more.	
		Abnormal alarm (1)	1 point synthesis output for all channels Output will be ON when memory error, A/D error and sensor abnormal occurs.	
		Output rating	24VDC 100mA (MAX)	
Communication Functions	Standard	RS-232C	Three line system 1:1	Model selection
		RS-485	Two line system 1:16	
		Specification	Protocol	
		Communication Method	Semi-duplex	
		Communication Parameter	BBC check/, Non-parity, 8 bits, stop-bit2,	
		Synchronous method	Asynchronous	
		Transmission code	ASC II code	
		Communication Speed	4800/9600/19200/38400bps	
		Communication distance	RS-232C 15m, RS-485 500m	
		Unit Number	0-F	
		Response Delay Time	0-250mS	

*Heater break, SSR fault and abnormal alarm will not be available when temperature alarm is used for cooling output.

Specification

Memory element	EEPROM
Supply voltage	24VDC +10%-15%
Power consumption	8W
Instant power failure	40ms or less
Insulation resistance	Between each input and output 500VDC 20MΩ or more
Voltage-proof	Between each input and output 500VAC for 1 minute
Standard condition	Temperature: 23°C ±10°C Humidity: 45-75%RH Vibration: 0G
Operation condition	Temperature: -10°C-55°C Humidity: 35-85%RH (Under non-condensation)
Preservation environmental conditions	Temperature: -20°C-65°C Humidity: 20-90%RH (Under non-condensation)
Weight	Approx. 450g

Temperature Range

	Measurement range	Setting range
K Thermocouple	-40.0-1326.0°C	0.0-1300.0°C
J Thermocouple	-31.0- 850.0°C	0.0- 800.0°C
Pt100	-199.9- 539.1°C	-199.9- 500.0°C
JPt100	-199.9- 539.1°C	-199.9- 500.0°C

Alarm Setting Range

Deviation alarm	-199-1500 or -1999-15000
Absolute value alarm	-199-1500 or -1999-15000

Isolation

Temperature Input	Insulation of CPU circuit, Output, Power circuit, Between each channel and Communication circuit
CT Input	Non-Insulation of CPU circuit, and Insulation of Output, Power circuit, Temperature Input, Communication circuit.
Voltage Input	Insulation of CPU circuit, Output, Power circuit, Temperature Input, Communication circuit.
Control Output	Insulation of CPU circuit, Other output, Power circuit, Temperature Input, Communication circuit.
Event Output	Insulation of CPU circuit, Output, Power circuit, Temperature Input, Communication circuit.

Model Configurations

TTM-00BT- ① -R- ②

① Type of Input	0: Thermocouple, 1: R.T.D.
② Communication Method	M1: RS-485, M2: RS-232C

DIGITAL BOARD TYPE CONTROLLER TTM-00B

- Digital Board Type Temperature Controller with functions of TTM-004 (Timer function is equipped)
- Feasible to use with wide application range, due to versatile specifications and options

Standard Specifications

Input (Multi Input) Change by key S/W	Thermocouple	K, J, R, T, N, S, B. (JIS 1602-1995)	
	R.T.D.	Pt100 JPt100 (output resistance 10Ω or less)	
Control Method	PID (Type A, Type B) Auto-Tuning Self-Tuning	Proportional band (P1)	0.1-200.0% of setting limiter span
		Proportional band of OUT2 (P2)	0.10-10.00 times (Magnification to P1)
		Integral time (I)	1-3600sec (0: OFF)
		Derivative time (D)	1-3600sec (0: OFF)
		Proportional cycle (T1, T2)	1-120sec
	Dead band (DB)	-100.0 - +100.0 or -100 - +100 (°C)	
	ON/OFF	Control sensitivity (C1, C2)	0-999 or 0.0-999.9 (°C)
Control Output	OFF point of OUT 1&2	Position of setting	-199-999 or -199.9-999.9 (°C)
	Relay Contact	250VAC, 4A (Load resistance) 1a contact	
	SSR Drive Voltage	0-12VDC (Load resistance: 600Ω or more)	
Setting and Indication Accuracy	Current	4-20mADC (Load resistance: 600Ω or less)	
	Thermocouple	± (0.3% + 1 digit) of process value or ±2°C, either of bigger numerical values is taken. (Ambient temperature: 23°C ± 10°C) -100 - 0°C: ±3°C, -200 - 100°C: ±4°C Thermocouple B under 400°C is not regulated.	
	R.T.D.	± (0.3% + 1 digit) of setting value or ±0.9°C, either of bigger numerical values is taken. (Ambient temperature: 23°C ± 10°C) Ambient temperature 0-50°C: ± (0.5% + 1 digit) or 1.5°C, either of bigger numerical values is taken.	
Voltage Source	100VAC-240VAC (50/60Hz)		
Board Size	Control board	W85×D75×H14 mm	
	Display board	W70×D 65×H10 mm	
Operating Condition	0-50°C, 20-90%RH (under non-condensation)		
Storage Condition	-25-70°C, 5-95%RH (under non-freezing and non-condensation)		

*Please refer to the catalogue of TTM-000 series about detailed specifications and functions.

Options

Event Output 1 (AL1) Event Output 2 (AL2 or Out2)	Function: PV contact output (8 modes), Special function (3 modes), Additional function (3 modes) Setting Range: -199.9-999.9 or -1999-9999 (°C) Sensitivity: 0.0-999.9 or 0-9999 (°C) Rating: 250VAC 2.4A (Load resistance) 1a contact when selecting output 2 at contact output 2, the output generates on cooling side during heating/cooling. Contact polarity is selectable, either normal open or normal close.
DI	Function: SV/SV2 switchable (OFF: SV2), Auto/Manual switchable (OFF: Manual), Run/Ready switchable (OFF: Ready), Normal/Reverse switchable (OFF: Normal), Normal (SV2)/Reverse (SV2) switchable (OFF: Normal SV2), Timer Start/Reset (OFF: Counting) Input Specifications: Minimum input time: 500ms, OFF voltage: 6VDC max, ON current: 6mA max, Permissible resistance value between contacts ON: 333Ω max, OFF: 500kΩ min.
CT Input	Setting Range 1-30A/AC, Accuracy: 5% (setting resolution 1A)
Heating & Cooling	See "Control Output" in standard specifications.
Communication	RS-485 conformable: Multi-Drop 2 line system. 1: 31 stations max. Protocol: TOHO protocol Communication parameter: BBC check/Non-BBC check, 7bits/8bits. Non-parity/odd number/even number, stop-bit 1/2. Communication Speed: 1200/2400/4800/9600/19200 BPS Communication Address: 1-99 Response Delay Time: 0-250m sec.

*Possible to produce the setting portion as OEM.

*Due to the board type controller, installation into short depth and low space is more effective.

*A display panel can be used in accordance with requested design.

Model Configurations

TTM-00B- ① - ②

① Output 1	R : Relay Contact Output P : SSR Drive Voltage Output I : Current Output
② Option	A : EV1 B : EV2 D : CT E : DI M : RS-485 P : SSR Drive Voltage Output

*EV2 is not available when EV1 is selected.

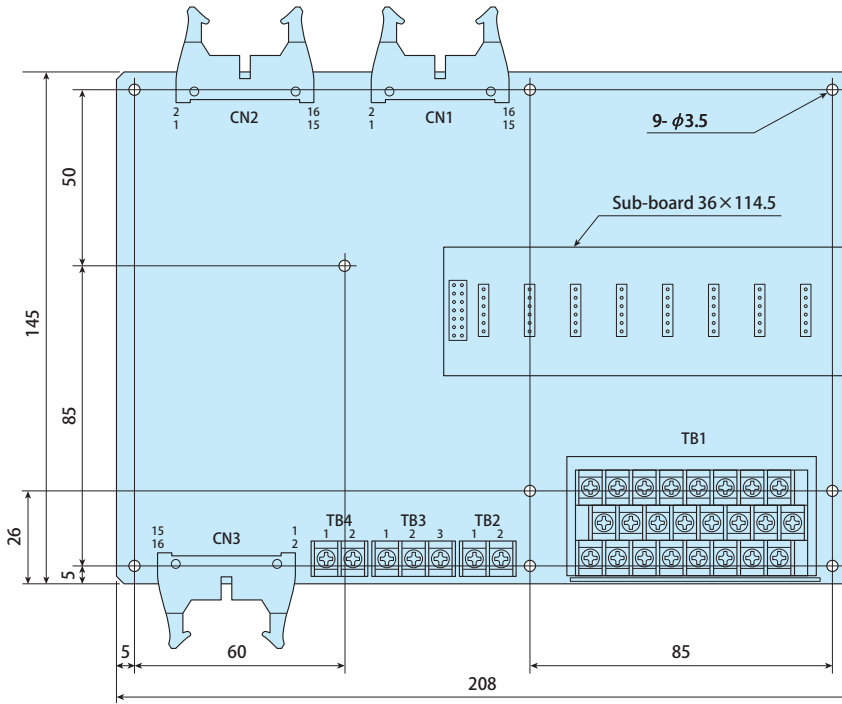
*B & P both are not available in one model.

*D is not available when A is not selected.

*D is not available when I is chosen for output 1.

Installation

●TTM-OOBT Dimensions



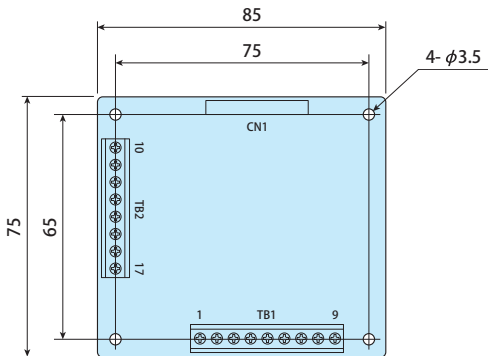
●Installation Method

- Install 9 places ($\phi 3.5$) by screws (M3).
- Horizontal installation or vertical installation with input terminals facing below are appropriate.
- Keep space of the board more than 5mm by spacer etc.
- Take interval 50mm distance in case of consecutive installation.

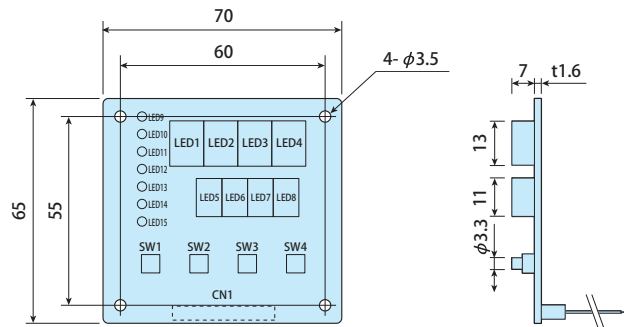
●Wiring Method

TB1	Temperature Input
TB2	Power Supply
TB3	Communication
TB4	Voltage Input
CN1	Control Output
CN2	Event Output
CN3	CT Input

●TTM-OOB Control Board Dimension



●TTM-OOB Display Board Dimension



- Please request the product specification when you need to know size of each LED and SW.

●Specifications are subject to change without notice.
Note: The color printed in this catalog may be different from actual color.



TOHO ELECTRONICS INC.

Head Office: 1-13-21, Tanashioda, Sagami-hara Kanagawa 229-1125 Japan.

Phone: +81-42-777-3311 FAX: +81-42-777-3751

E-Mail: overseas@toho-inc.co.jp

Web site: <http://www.toho-inc.co.jp>