Panasonic
ideas for life

Your Simple, Accurate and Economical Temperature Controller
Compact temperature controller (DIN 48×24) that can support pattern control
Additions to KT2 series

KT Temperature Controller

Broad lineup of temperature controllers allow you to satisfy application and space requirements.

Compliance with RoHS Directive

FEATURES

1. Multi-input
Versatile thermocouple, RTD, DC voltage and DC current input for temperature detecting sensors

2. Simple operation enables highly accurate temperature control
All required operations can be enabled by the front keys and highly accurate PID control mode ensures an input span of ±0.2%.

3. DIN Rail mounting types are aligned taking global market demand into consideration
The KT7 series is equipped with DIN rail mounting complying to DIN standards. Furthermore, because its control panel is compact, the KT7 saves space.

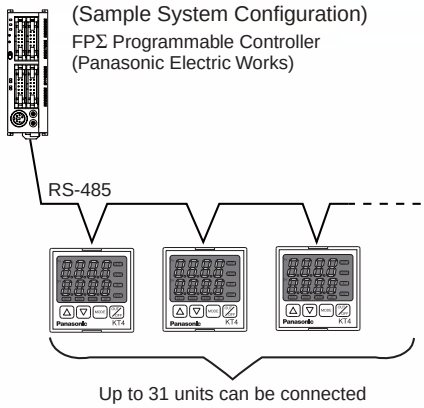
4. Nine step pattern control possible.
For KT2 series, despite DIN 48 × 24 size, selection is possible of control with fixed set point and nine step pattern control.

5. Meets market demands for cost-effectiveness
The KT series offers both economy and high performance.

6. The KT series complies with UL, CSA standards and CE marking.

7. Improved visibility and ease of operation
More compact than before
The KT4H/KT4B series features the largest PV digit size in the industry. Visibility is improved with an 11-segment display. Connectable to a PC, it offers a full range of control and communication functions.

8. Communication specification uses RS485 (Modbus protocol)



*In the configuration above, the FPΣ requires a communication cassette (FPG-COM3).
*Modbus is a communication protocol developed for PLCs by Modicon Inc.

PRODUCT TYPES

1. KT2 Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/ cooling control	Heater burnout alarm	Commu- nication function	Description	
AKT2								48 × 24 × 98.5mm	
	1							100 to 240V AC	Must be specified
	2							24V AC/DC	
		1						Multi-input (Thermocouple, RTD, DC current and DC voltage)	
			1					Relay contact output 1a 3A 250V AC	Must be specified
			2					Non-contact voltage output (for SSR drive)	
			3					Current output	
				2	0	0	Blank	When both heating/cooling and communication functions are not added: Relay contact output (alarm 1): Can be used Open collector output (alarm 2): Can be used	
				1	1	0	Blank	When only heating/cooling function is added: Relay contact output (alarm 1): Cannot be used Open collector output (alarm 2): Can be used	
				1	0	0	1	When only communication function is added: Relay contact output (alarm 1): Can be used Open collector output (alarm 2): Cannot be used	
				0	1	0	1	When both heating/cooling and communication functions are added: Relay contact output (alarm 1): Cannot be used Open collector output (alarm 2): Cannot be used	

* When heating/cooling is selected, alarm output 1 cannot be used.
When the communication function is selected, alarm output 2 cannot be used.

• Part No.

(Ex) Part No. when the optional functions (of Heating/Cooling control: relay contact output + Communications function) is added on to the basic model are as follows; Part No.: AKT21110101

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT2801

Note: When Current input is specified, a shunt resistor (sold separately) is required.

2. KT4 Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/ cooling control	Heater burnout alarm	Commu- nications function	Description
AKT4								48 × 48 × 95mm
	1							100 to 240V AC
	2							24V AC/DC
		1						Multi-input (Thermocouple, RTD, DC Voltage and DC Current)
			1					Relay contact output 1a 3A 250V AC
			2					Non-contact voltage output (for SSR drive)
			3					Current output
				1				Relay contact output 1a (Alarm output 1)
				2				Relay contact output 1a (Alarm output 2)
					0			Not available
					4			SSR output 0.3A 250V AC (Heating/Cooling control not supported when 2 alarm output points are selected)
						0		Not available
						1		5A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						2		10A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						3		20A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						4		50A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
								Not available
							1	Available

Notes: 1. CT1 or CT2 for current detection is provided as an accessory when heater burn-out alarm function is added.
2. Event output will be shared if you choose alarm output 2 and the heater burnout alarm.

• Part No.

(Ex) Part No. when the optional functions (of Heating/Cooling control: SSR output + Communications function) is added on to the basic model are as follows; Part No.: AKT41111401

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT4801

Note: When Current input is specified, a shunt resistor (sold separately) is required.

3. KT8 Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/cooling control	Heater burn-out alarm	Communications function	Description
AKT8								48 × 96 × 98.5mm
	1							100 to 240V AC
	2							24V AC/DC
		1						Multi-input (Thermocouple, RTD, DC Voltage and DC Current)
			1					Relay contact output 1a1b 3A 250V AC
			2					Non-contact voltage output (for SSR drive)
			3					Current output
				1				Relay contact output 1a (Alarm output 1)
				2				Relay contact output 1a (Alarm output 2)
					0			Not available
					1			Relay contact output 1a
					2			Non-contact voltage output (for SSR drive)
					3			Current output
						0		Not available
						1		5A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						2		10A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						3		20A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						4		50A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
								Not available
							1	Available

Notes: 1. CT1 or CT2 for current detection is provided as an accessory when heater burn-out alarm function is added.
2. If a communication function is added, second main setup is not possible

• Part No.

(Ex) Part No. when the optional functions (of Alarm output; Alarm output 2 + Heating/Cooling control: Current output) are added on to the basic model are as follows; Part No.: AKT8111230

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT8801

Note: When Current input is specified, a shunt resistor (sold separately) is required.

4. KT9 Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/cooling control	Heater burn-out alarm	Communications function	Description
AKT9								96 × 96 × 98.5mm
	1							100 to 240V AC
	2							24V AC/DC
		1						Multi-input (Thermocouple, RTD, DC Voltage and DC Current)
			1					Relay contact output 1a1b 3A 250V AC
			2					Non-contact voltage output (for SSR drive)
			3					Current output
				1				Relay contact output 1a (Alarm output 1)
				2				Relay contact output 1a (Alarm output 2)
					0			Not available
					1			Relay contact output 1a
					2			Non-contact voltage output (for SSR drive)
					3			Current output
						0		Not available
						1		5A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						2		10A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						3		20A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
						4		50A (Heater burn-out alarm not supported when control output is current output type/not supported when heating and cooling control is selected)
								Not available
							1	Available

Notes: 1. CT1 or CT2 for current detection is provided as an accessory when heater burn-out alarm function is added.
2. If a communication function is added, second main setup is not possible

• Part No.

(Ex) Part No. when the optional functions (of Alarm output; Alarm output 2 + Heating/Cooling control: Non-contact voltage output) are added on to the basic model are as follows; Part No.: AKT9111220

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT9801

Note: When Current input is specified, a shunt resistor (sold separately) is required.

KT (AKT2,4,7,8,9,4H,4B)

5. KT7 Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/ cooling control	Heater burnout alarm	Commu-nications function	Description
AKT7								22.5 × 75 × 100mm
	1							100 to 240V AC
	2							24V AC/DC
		1						Multi-input (Thermocouple, RTD, DC Voltage and DC Current)
			1					Relay contact output 1a 3A 250V AC
			2					Non-contact voltage output (for SSR drive)
			3					Current output
				1				Open collector output (Alarm output 1)
					0			Not available (without Heating/Cooling function)
						0		Not available
						1		5A (not available for the Current output type) Open collector output
						2		10A (not available for the Current output type) Open collector output
						3		20A (not available for the Current output type) Open collector output
						4		50A (not available for the Current output type) Open collector output
								Not available
							1	Available

Note: CT1 or CT2 for current detection is provided as an accessory when heater burn-out alarm function is added.

• Part No.

(Ex) Part No. when the optional function (of Heater burnout alarm: 10A) is added on to the base model are as follows;
Part No.: AKT7111102

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4811

Note: When Current input is specified, a shunt resistor (sold separately) is required.

6. KT4H Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/ cooling control	Heater burnout alarm	Commu-nications function	Description
AKT4H								
	1							100 to 240V AC
	2							24V AC/DC
		1						Multi-input (Thermocouple, RTD, DC Voltage and DC Current)
			1					Relay contact
			2					Non-contact voltage (for SSR drive)
			3			0		DC current **Heater burn-out alarm not possible.**
				1				1 point (1a)
				2	0			2 points (1a + 1a) **Heating/cooling control output not possible.**
					0			Not available
					1	0		Relay contact **Heater burn-out alarm not possible.**
					2	0		Non-contact voltage (for SSR drive) **Heater burn-out alarm not possible.**
						0		Not available
			1 or 2		0	3		Single phase 20A (Heater burn-out alarm not supported when control output is DC output type/not supported when heating and cooling control is selected)
			1 or 2		0	4		Single phase 50A (Heater burn-out alarm not supported when control output is DC output type/not supported when heating and cooling control is selected)
			1 or 2		0	5		Three phase 20A (Heater burn-out alarm not supported when control output is DC output type/not supported when heating and cooling control is selected)
			1 or 2		0	6		Three phase 50A (Heater burn-out alarm not supported when control output is DC output type/not supported when heating and cooling control is selected)
							Blank	Not available
							1	Serial communication RS-485
							2	Contact input

Notes: 1. CT1 or CT2 for current transformer is provided as an accessory when heater burn-out alarm function is added.
2. Under some conditions, option functions (shaded items) may not be available; please check the “Descriptions” of the above table for non-functioning circumstances.

• Part No.

(Ex) Part No. when the optional functions (Heating/Cooling control + communication function) are added on to the basic model are as follows; Part No.: AKT4H1111101

• Options

Product name	Part No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT4H801
Tool cable	AKT4H820

• Setting software

Product name	Description	Remark
KT Monitor	Editing of all types of data, File saving Monitoring of readings, Saving of log files	Available for download at no charge from company website. http://www.panasonic-electric-works.net/ac

Note: Please download user manual from the company website.

7. KT4B Series

Base model	Power supply	Sensor input	Control output	Alarm output	Heating/cooling control	Heater burnout alarm	Communications function	Model No.
AKT4B	1 (100 to 240V AC)	1 (Multi-input)	1 (Relay contact)	1 (1 point)	0 (Not available)	0 (Not available)	Blank (Not available)	AKT4B111100
							1 (Serial communication)	AKT4B1111001
				2 (2 points)			Blank (Not available)	AKT4B111200
							1 (Serial communication)	AKT4B1112001
			2 (Non-contact voltage)	1 (1 point)			Blank (Not available)	AKT4B112100
							1 (Serial communication)	AKT4B1121001
				2 (2 points)			Blank (Not available)	AKT4B112200
							1 (Serial communication)	AKT4B1122001
			3 (DC current)	1 (1 point)			Blank (Not available)	AKT4B113100
							1 (Serial communication)	AKT4B1131001
				2 (2 points)			Blank (Not available)	AKT4B113200
							1 (Serial communication)	AKT4B1132001

*Please inquire if you need specifications not included in the model numbers above.
*Use RS485 for serial communication.
Example Model No.: AKT4B111100
Specifications: Power supply 100 to 240V AC, Heating/cooling control: Not available,
Sensor input: Multi-input, Heater burnout alarm: Not available,
Control output: Relay contact, Communications function: Not available,
Alarm output: 1 point

• Options (Common for KT4H and KT4B)

Product name	Model No.
Shunt resistor (for Current input)	AKT4810
Terminal cover	AKT4H801
Tool cable	AKT4H820

RATING & SPECIFICATIONS

Display			Specifications					
			KT2	KT4	KT8	KT9	KT7	KT4H/4B
Size (W × H × D)			48 × 24 × 98.5mm	48 × 48 × 95mm	48 × 96 × 98.5mm	96 × 96 × 98.5mm	22.5 × 75 × 100mm	48 × 48 × 62mm
Supply voltage (Must be specified)			100 to 240V AC					
			24V AC/DC					
Frequency			50/60Hz					
Power consumption			Approx. 5VA	Approx. 8VA			Approx. 6VA	Approx. 8VA
Input type			Input range					
Thermocouple		K	–200 to 1370°C (–320 to 2500°F)					
			–199.9 to 400.0°C (–199.9 to 750.0°F)					–200.0 to 400.0°C (–320 to 750.0°F)
		J	–200 to 1000°C (–320 to 1800°F)					
		R	0 to 1760°C (0 to 3200°F)					
		S	0 to 1760°C (0 to 3200°F)					
		B	0 to 1820°C (0 to 3300°F)					
		E	–200 to 800°C (–320 to 1500°F)					
		T	–199.9 to 400.0°C (–199.9 to 750.0°F)					–200.0 to 400.0°C (–320 to 750.0°F)
		N	–200 to 1300°C (–320 to 2300°F)					
		PL-II	0 to 1390°C (0 to 2500°F)					
		C (W/Re5-26)	0 to 2315°C (0 to 4200°F)					
RTD		Pt100	–200 to 850°C (–300 to 1500°F)					
			–199.9 to 850.0°C (–199.9 to 999.9°F)					–200.0 to 850.0°C (–320.0 to 1500.0°F)
		JPt100	–200 to 500°C (–300 to 900°F)					
			–199.9 to 500.0°C (–199.9 to 900.0°F)					–200.0 to 500.0°C (–320.0 to 900.0°F)
DC	Current	4 to 20mA DC	–1999 to 9999, –199.9 to 999.9 –19.99 to 99.99, –1.999 to 9.999 • Scaling and change to the decimal point position is possible for DC current and DC voltage input. • DC current input is supported with an externally mounted 50Ω shunt resistor (sold separately).					–2000 to 10000
		0 to 20mA DC						
	Voltage	0 to 1V DC						
		0 to 10V DC						
		1 to 5V DC						
		0 to 5V DC						
Multi-input	Thermocouple		K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) External resistor: Max. 100Ω (max. 40Ω external resistor for B input)					
	RTD		Pt100, JPt100Ω 3-conductor system (Allowable input conductor resistance for each conductor: max. 10Ω)					
	DC current	0 to 20mA DC	Input impedance: 50Ω (Connect 50Ω shunt resistor between input terminals.) Allowable input current: max. 50 mA (when 50Ω shunt resistor is used)					
		4 to 20mA DC						
	DC voltage	0 to 1V DC	Input impedance: min. 1 MΩ, Allowable input voltage: max 5 V, Allowable signal source resistance: max. 2 kΩ					
		0 to 5V DC	Input impedance: min. 100 kΩ, Allowable input voltage: max 15 V, Allowable signal source resistance: max. 100Ω					
		1 to 5V DC						
		0 to 10V DC						
Control output (Must be specified)		Relay contact (contact material: silver alloy)	1a	1a	1a1b		1a	1a
			3A 250V AC (Resistive load), 1A 250V AC (Inductive load cosϕ=0.4), Electric life: 100,000 times					
		Non-contact DC voltage	12^{+2}_{0}V DC, Max. load current: 40mA (Short-circuit protected)					12V DC ±15%, Max. load current: 40mA (Short-circuit protected)
		DC current	4 to 20mADC Load resistance: Max. 550Ω					
Alarm output 1 (EVT1) Relay contact (Contact material: Ag alloy)			Relay contact 1a 3A 250V AC (Resistive load), 1a 1A 250V AC (Inductive load cosϕ=0.4)	Relay contact 1a 3A 250VAC (Resistive load) Electric life: 100,000 times			Open collector, Control capacity: 24V DC 0.1A (Max.)	Relay contact 1a: 3A 250VAC (Resistive load) Electric life: 100,000 times
Alarm output 2 (EVT2)			Open collector 0.1A 24V DC	The same as the one of Alarm output 1			None	Same as Alarm output 1
Control mode			Actions mentioned below can be selected by key operation. [Default PID] PID (with auto-tuning function), PI, PD (with manual reset function), P (with manual reset function), ON/OFF action					
Target temperature setting			Primary setting/ secondary setting (switched by external terminal)	—	Primary setting/secondary setting (switched by external terminal)		—	Primary setting/ secondary setting/ third setting/fourth setting (switched by external terminal)
Program control function			1 pattern, 9 step setting is possible (However, make function selection setting of either control with fixed set point or program control.)	—				
Accuracy	Thermocouple		Within ±0.2% ±1 digit of each input span or within ±2°C (4°F) whichever is greater However, R and S input; Within ±6°C (12°F) in the range of 0 to 200°C (0 to 400°F) B input 0 to 300°C (0 to 600°F): Accuracy is not guaranteed. K, J, T, E, and N input less than 0°C (32°F): Within ±0.4% ±1 digit of input span					
	RTD		Within ±0.1% ±1 digit of each input span or ±1°C (2°F) whichever is greater					
	DC current and DC voltage		Within ±0.2% ±1 digit of each input span					
Sampling period			250ms					

Display		Specifications					
		KT2	KT4	KT8	KT9	KT7	KT4H/4B
Hysteresis (ON/OFF)		Thermocouple & RTD: 0.1 to 100.0°C (32.18 to 212°F) DC current and DC voltage: 1 to 1000 (The decimal point place follows the selection)					
Proportional band		For sensor input range and DC current, DC voltage 0.0 to 110.0%	Thermocouple: 0 to 1000°C (0 to 2000°F) RTD: 0.0 to 999.9°C (0.0 to 999.9°F) DC current and DC voltage: 0.0 to 100.0%			For sensor input range and DC current, DC voltage 0.0 to 110.0%	0 to 1000°C (32 to 1832°F) The decimal point input: 0.0 to 1000°C (32 to 1832°F) DC current and DC voltage: 0.0 to 100.0%
Integral time		0 to 1000 seconds					
Derivative time		0 to 300 seconds					
Proportional cycle		1 to 120 seconds					
Allowable voltage fluctuation		When 100 to 240V AC; 85 to 264V AC When 24V AC/DC; 20 to 28V AC/DC					
Insulated resistance		500V DC 10MΩ or greater					
Breakdown voltage		1.5kV AC for 1 min between input terminal and power terminal, & between output terminal and power terminal	1.5kV AC for 1min between input terminal and ground terminal, between input terminal and power terminal between power terminal and ground terminal between output terminal and ground terminal, & between output terminal and power terminal			1.5kV AC for 1 min between input terminal and power terminal, & between output terminal and power terminal	
Malfunction vibration		10 to 55 Hz (0.35 mm) to each direction (120ms sweep) for 10 min.					10 to 55 Hz (1 cycle/min.) single amplitude 0.35 mm (10 min. on 3 axes)
Breakdown vibration		10 to 55 Hz (0.75 mm) to each direction (120ms sweep) for 10 min.					10 to 55 Hz (1 cycle/min.) single amplitude 0.75 mm (1 hour on 3 axes)
Malfunction shock		X, Y & Z each direction for 5 times 98m/s² (10G)					
Breakdown shock		Same as above, but 294m/s² (30G)					
Ambient temperature		0 to 50°C					
Ambient humidity		35 to 85%RH (No condensation)					
Mass		Approx. 120g	Approx. 130g	Approx. 240g	Approx. 370g	Approx. 150g	Approx. 120g
Waterproof		IP66 (applicable only to the front panel subject to rubber gasket employed)				None	IP66 (applicable only to the front panel subject to rubber gasket employed)
Display character height		PV: 8.7mm, SV: 8.7mm (PV/SV switching display)	PV: 10.2mm SV: 8.8mm	PV: 11.2mm SV: 11.2mm	PV: 18mm SV: 13.2mm	PV: 7.4mm SV: 7.4mm	PV: 12mm SV: 6mm
Options	Heating/Cooling control (Relay contact material: silver alloy)	Relay contact: 1a 3A 250V DC (Resistive load)	Non contact relay 0.3A 250V AC (Resistive load)	• Relay contact: 1a 250V AC 3A (Resistive load), 250V AC 3A (Inductive load cosø=0.4), Electric life: 100,000 times • Non-contact voltage: 12 +2 −0 V DC Max. 40mA (Short-circuit protected) • DC current: 4 to 20mA DC Load resistance: Max. 550Ω		None	Relay contact: Control capacity 1a: 3A 250V AC (Resistive load), Electric life: 100,000 times Non-contact voltage: 12V DC±15% Max. 40mA (Short-circuit protected)
	Heater burn-out alarm output (Relay contact material: silver alloy)	—	Heater rated current must be selected from 5A, 10A, 20A and 50A. Setting accuracy: Within 5% of heater rated current Relay contact 1a 250V AC 3A (Resistive load), Electric life: 100,000 times			Open collector, Control capacity: 24V DC 0.1A (Max.)	Specify either single-phase 20 A, single-phase 50 A, 3-phase 20 A, or 3-phase 50 A for rated heater current. Setting accuracy: within ±5% of rated heater current Relay contact 1a: 3A 250V AC (Resistive load), Electric life: 100,000 times
	Communication function	RS-485/Modbus Protocol (Modbus is a communication protocol developed for PLCs by Modicon Inc.) Communication speed: 2400/4800/9600/19200bps					
Tool port		—					Communication interface C-MOS level Cannot be used at the same time as serial communication (option). *This port can only be used with the tool cable (AKT4H820).
Accessories	Mounting frame	Included with unit				Not available	Included with unit
	Terminal cover	Sold separately				Not available	Not available
	Rubber gasket	Not available					Included with unit

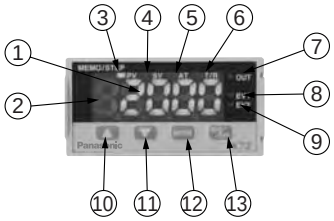
COMMUNICATION FUNCTION OVERVIEW

Item	Specification	
	KT2, 4, 8, 9, 7	KT4H/4B
Communication type	Half-duplex	
Communication speed	Select 2400, 4800, 9600, or 19200 bps using key operation.	
Synchronization type	Asynchronous	
Protocol	Modbus	Modbus RTU, Modbus ASCII, MEWTOCOL (Slave)
Coding	ASCII	Binary/ASCII
Error correcting	Command re-send	
Error detection	Parity check, check sum	
Data structure	Start bit: 1, Data bit: 7, Parity: Even parity, Stop bit: 1	
Interface	EIA RS485 compliant	
No. of nodes	31	
Maximum cable length	1,000 m (cable resistance must be within 50Ω)	

Note: That main setting No. 2 will not be possible on the KT8 and KT9 when the communications functions is added.

PARTS AND FUNCTIONS

1. KT2 series



① PV/SV display (red): Indicates the input value and setting value. During setting mode, characters and setting value of the setting item are indicated in turn.

② MEMO/STEP display (green): Indicates memory number during fixed value control. Indicates step number during program control.

③ PV indicator (red): Lights up when the input value (PV) is indicated.

④ SV indicator (green): Lights up when main setting value (SV) is indicated.

⑤ AT indicator (yellow): Flashes during AT (auto-tuning).

⑥ T/R indicator (yellow): Flashes during serial communication (Lit while sending data, Unlit while receiving data)

⑦ OUT indicator (green): Lights up when control output or OUT1 (Heating side, option Heating/Cooling control) is ON. (For DC current output type, it flashes corresponding to the manipulated variable in a 0.25 second cycle)

⑧ EV1 indicator (red): Lights up when Event output 1 or OUT2 (Cooling side, option Heating/Cooling control) is ON.

⑨ EV2 indicator (red): Lights up when Event output 2 is ON.

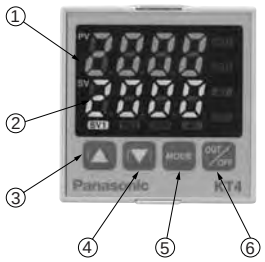
⑩ Increase key (△): Increases the numeric value.

⑪ Decrease key (▽): Decreases the numeric value.

⑫ Mode key (MODE): Selects the setting mode or registers the setting value.
(By pressing the Mode key, the setting value or selected value can be registered)

⑬ OUT/OFF key (OUT/OFF): The control output OUT/OFF or program control RUN/STOP can be switched.

2. KT4 series

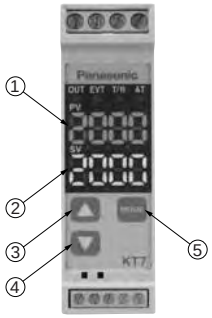


3. KT8 series

① PV display
Indicates PV (process variable).
② SV display
Indicates SV (setting value).
③ Increase key
Increases numerical value.
④ Decrease key
Decreases numerical value.
⑤ Mode key
Switches the setting mode.
⑥ OUT/OFF key
Control output is turned on or off when control output is ON.

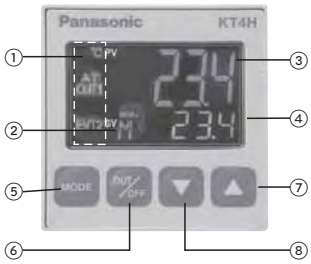
4. KT9 series

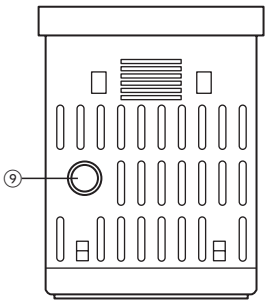
5. KT7 series



Note: Color selection is the same for each size.

6. KT4H/4B series





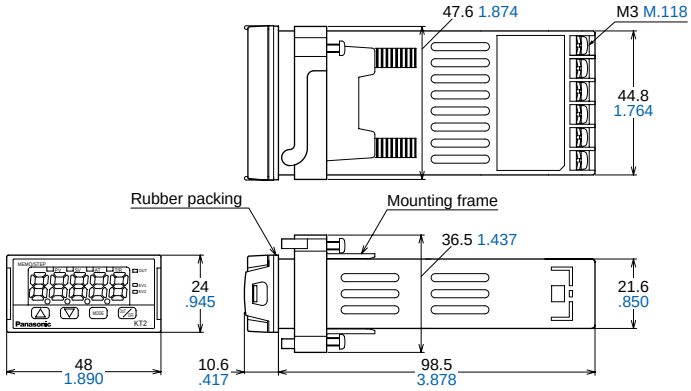
(Bottom side)

① Action indicators (backlight: orange)
°F °C ..... Lights respectively when temperature unit °F/°C is selected.
T/R ..... Lights during Serial communication (option) TX output.
AT ..... Flashes during auto-tuning or auto-reset
OUT1 ..... Lights when control output is ON or Heating output (option) is ON.
For DC current output type, it flashes corresponding to the manipulated variable in 0.25 second cycles.
OUT2 ..... Lights when Cooling output (option) is ON.
EVT1 ..... Lights when Alarm 1 output is ON.
EVT2 ..... Lights when Alarm 2 output (option) is ON or Heater burnout alarm (option) is ON.
LOCK ..... Lights when Lock 1, Lock 2 or Lock 3 is selected.
② MEMO display ..... Indicates the set value memory number (backlight: green).
③ PV display ..... Indicates the PV (process variable) (backlight: red/orange/green).
④ SV display ..... Indicates the SV (set value) (backlight: green).
⑤ Mode key ..... Selects the setting mode, and registers the set value.
⑥ OUT/OFF key ..... The control output ON/OFF or Auto/Manual control can be switched.
⑦ Increase key ..... Increases the numeric value.
⑧ Decrease key ..... Decreases the numeric value.
⑨ Tool connector ..... By connecting the tool cable, the following operations can be conducted from the external computer using the exclusive tool software.
- Reading and setting of SV, PID and various set values from external computer
- Reading of PV and action status
- Function change

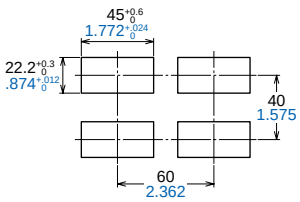
DIMENSIONS (unit: mm inch) Tolerance: ±1 ±.039

1. KT2 series

• External dimension



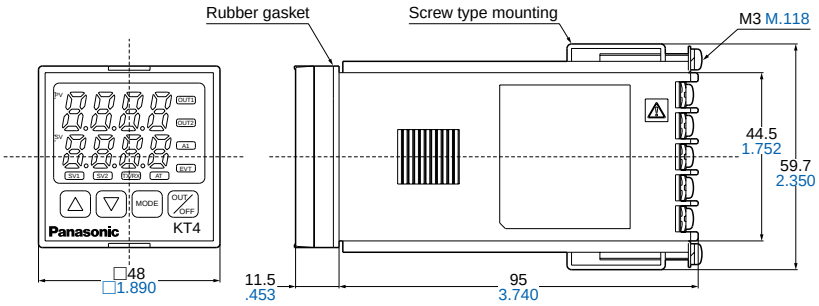
• Panel cutout



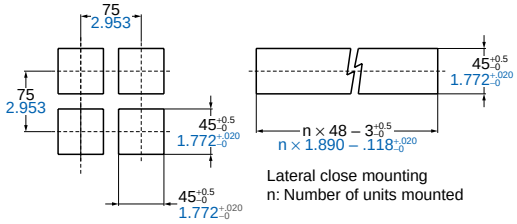
Note: The communications terminal is the screw terminal on the back of the unit.

2. KT4 series

• External dimension



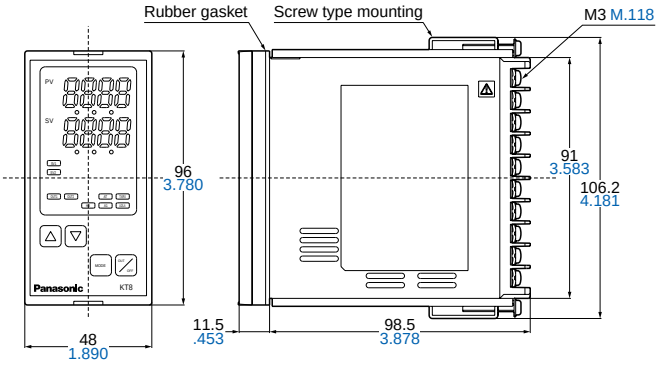
• Panel cutout



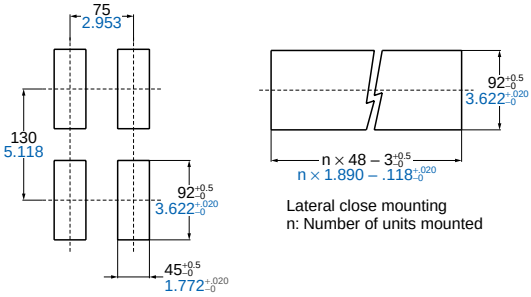
Note: The communications terminal is the screw terminal on the back of the unit.

3. KT8 series

• External dimension



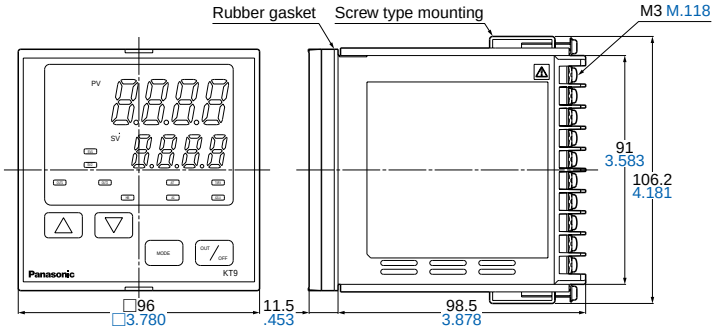
• Panel cutout



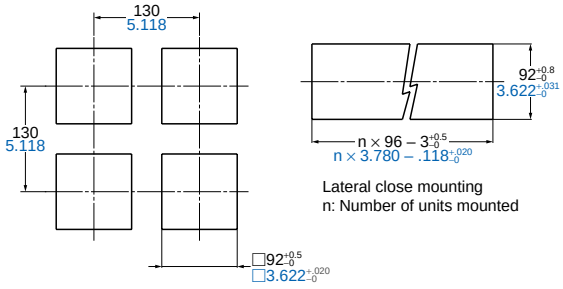
Note: The communications terminal is the screw terminal on the back of the unit.

4. KT9 series

• External dimension



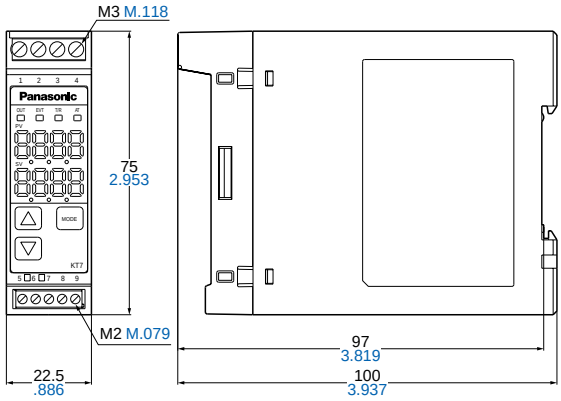
• Panel cutout



Note: The communications terminal is the screw terminal on the back of the unit.

5. KT7 series

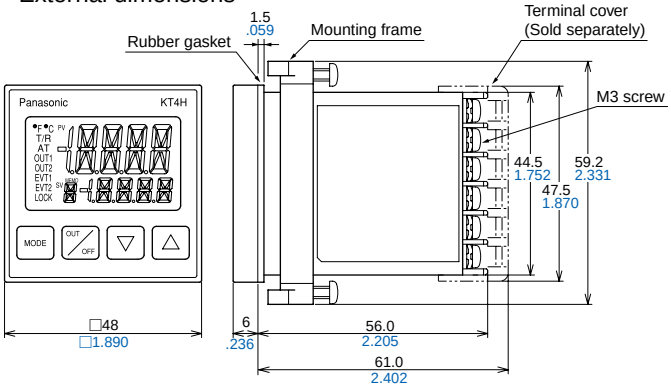
• External dimension



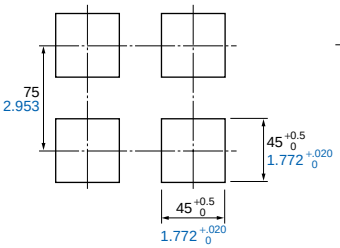
Note: The communications terminal is the modular jack on the bottom of the unit.

6. KT4H/4B series

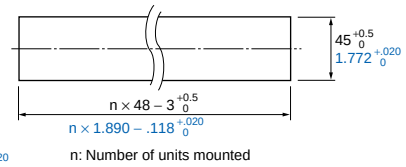
• External dimensions



• Panel cutout



• Lateral close mounting



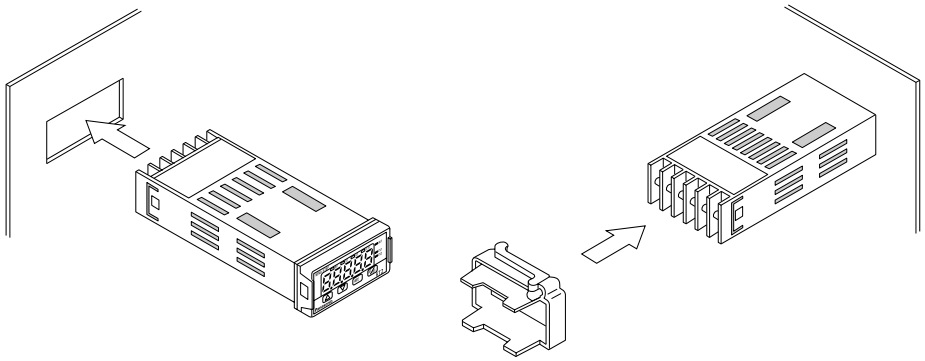
n: Number of units mounted

Notes: If lateral close mounting is used for the controller, IP66 specification (Dust-proof/Drip-proof) may be compromised, and all warranties will be invalidated.

INSTALLATION

1. KT2 series

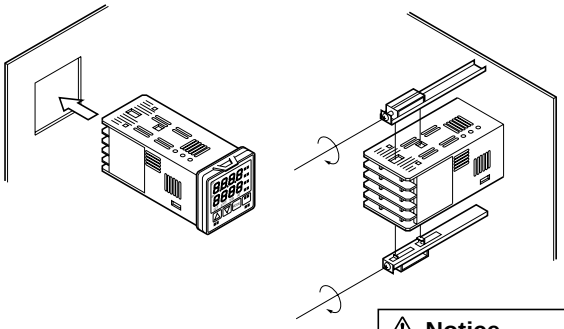
Please install vertically in order to satisfy the IP66 specification for dust and splash proofing.
The possible control panel plate thickness for installation is between 1 to 10 mm.
(1) Insert the unit from the front of the control panel.
(2) Insert the mounting frame until that the edges (2) make contact with the panel.
(3) Tighten the clamp screw and then turn it 3/4 of a turn after the edge of the screw reaches the panel.



2. KT4, 7, 8, 9 series

• Panel Mounting

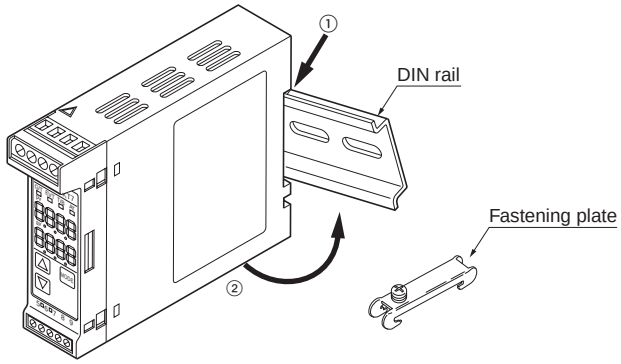
Mountable panel thickness: Within 1 to 15mm .039 to .591inch
Insert a controller from the front side of the panel.
Attach the mounting brackets by the holes at the top and bottom of the case and secure the controller in place with the screws.



⚠ Notice
As the case is made of resin, do not use excessive force while screwing in the mounting bracket. The torque is approximately 0.12N·m

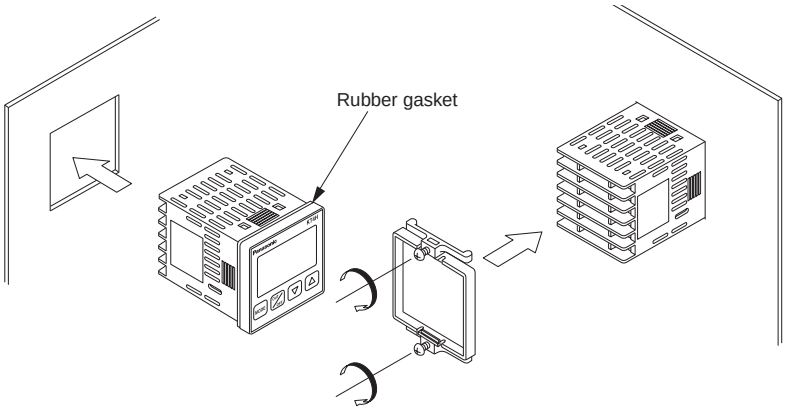
• DIN rail mounting (KT7)

1) Hook ① of the KT7 on the upper side of the DIN rail.
2) Making the ① part of the KT7 as a support, fit the lower part of the KT7 to the DIN rail.
KT7 will be completely fixed to the DIN rail with a “Click” sound.
Recommended DIN rail: Part No. ATA48011
Recommended fastening plate: Part No. ATA4806



3. KT4H/4B series

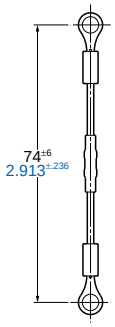
Please install vertically in order to satisfy the IP66 specification for dust and splash proofing.
The possible control panel plate thickness for installation is between 1 to 5 mm.
1) Insert the unit from the front of the control panel.
2) Push the installation frame fully into contact with the panel and tighten the screws (screw torque from 0.05 N·m to 0.06N·m).



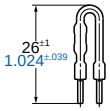
OPTION

1. Shunt resistor

AKT4810 (for KT2, 4, 8, 9, 4H and 4B)

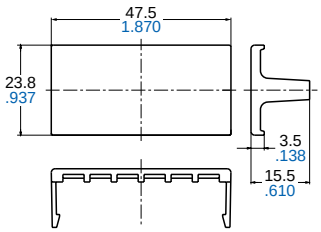


AKT4811 (for KT7)

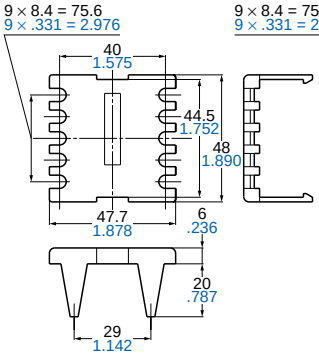


2. Terminal cover

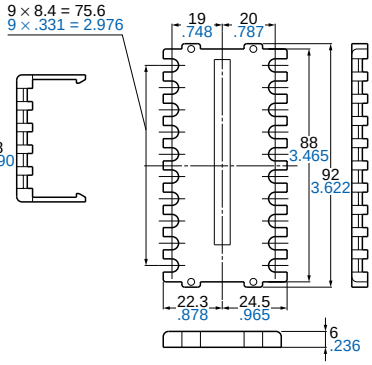
AKT2801 (for KT2)



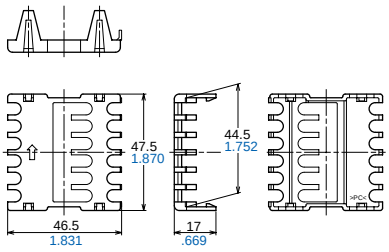
AKT4801 (for KT4)



AKT8801 (for KT8)
AKT9801 (for KT9)



AKT4H801 (for KT4H/4B)

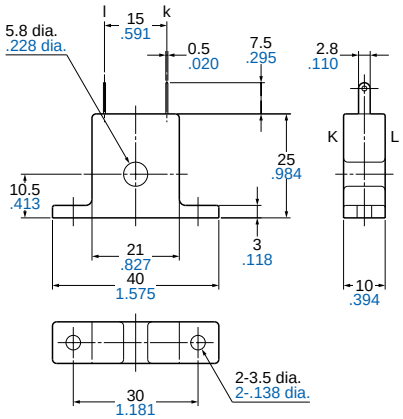


Note: 2pcs of terminal cover of AKT8801 can be used as an AKT9801 cover.

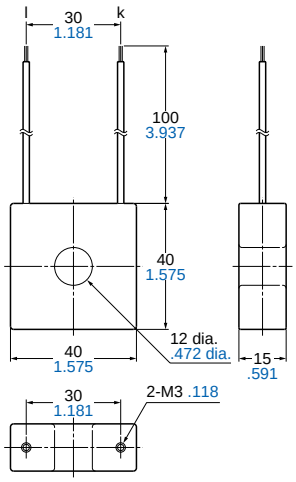
3. Current transformer (CT)

• External dimension

1) CT1 (for 5,10 and 20A)



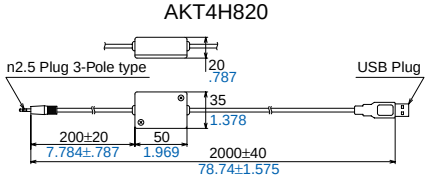
2) CT2 (for 50A)



Note: CT1 or CT2 for current detection is provided as an accessory when heater burn-out alarm function is added.

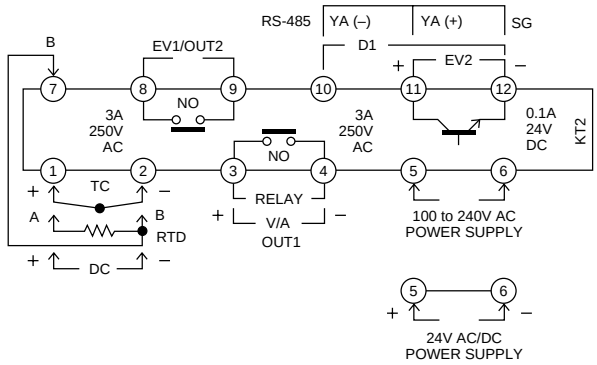
4. Tool cable

AKT4H820



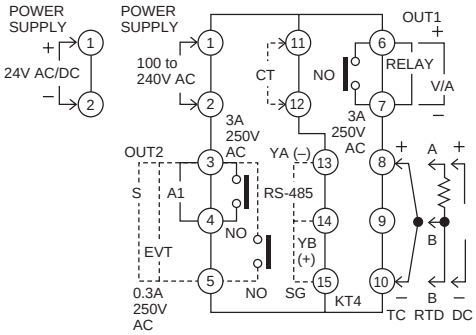
EXTERNAL CONNECTION DIAGRAM

1. KT2 series



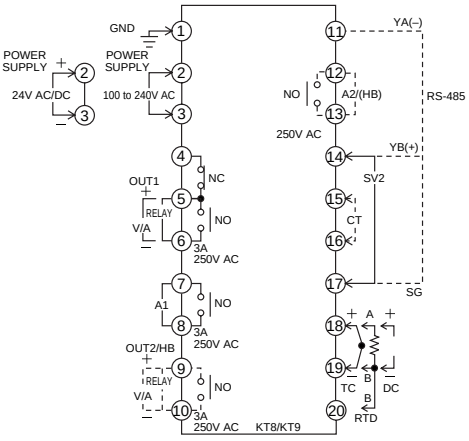
- TC: Input terminal for thermo couple.
- RTD: Input terminal for the resistance temperature sensor.
- DC: Input terminal for DC current or DC voltage.
  For DC current input, connect a separately sold receipt resistor (50Ω) between the input terminals.
- OUT1: Output terminal for the control output or heating output [option: heating/cooling control].
- POWER SUPPLY: Power supply terminal.
- EV1/OUT2: Output terminal for event output 1 or cooling output [option: heating/cooling control].
- EV2: Output terminal for event output 2.
- DI: Input terminal for DI input. (There are three types of D1 input, the SV1/SV2 external switching function, the OUT/OFF (RUN/STOP) output switching function, and timer function.)
- RS-485: Communication terminal for serial communication. (EV1, 2 is alarm output)

2. KT4 series



- POWER SUPPLY: Power supply
- OUT1: Control output 1 (heat output)
- OUT2: Control output 2 (cooling output)
- RELAY: Relay contact output
- V/A: DC voltage output/direct current output
- V: Contactless relay output
- A1: Alarm 1 output
- EVT: Event output (A2 output and heater cutoff alarm output)
- CT: CT input
- TC: Thermocouple
- RTD: Resistance temperature detection
- DC: Direct current or DC voltage
- RS-485: Serial communications

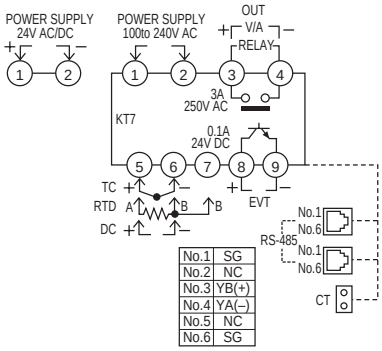
3. KT8 and KT9 series



- POWER SUPPLY: Power supply
- OUT1: Control output 1
- OUT2: Control output 2 (cooling output)
- RELAY: Relay contact output
- V/A: DC voltage output/direct current output
- A1: Alarm 1 output
- A2: Alarm 2 output
- HB: Heater cutoff alarm output
- SV2: Second main setup
- CT: CT input
- TC: Thermocouple
- RTD: Resistance temperature detection
- DC: Direct current or DC voltage
- RS-485: Serial communications

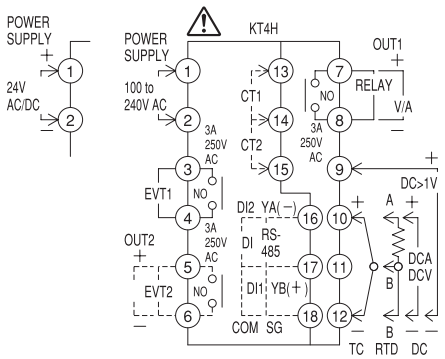
Note: That main setting No. 2 will not be possible on the KT8 and KT9 when the communications functions is added.

4. KT7 series



- POWER SUPPLY: Power supply
- OUT: Control output
- RELAY: Relay contact output
- V/A: DC voltage output/direct current output
- EVT: Event output
  [Alarm, loop fault alarm or heater cutoff alarm (optional)]
- TC: Thermocouple
- RTD: Resistance temperature detection
- DC: Direct current or DC voltage
- RS-485: Serial communications
- CT: CT input

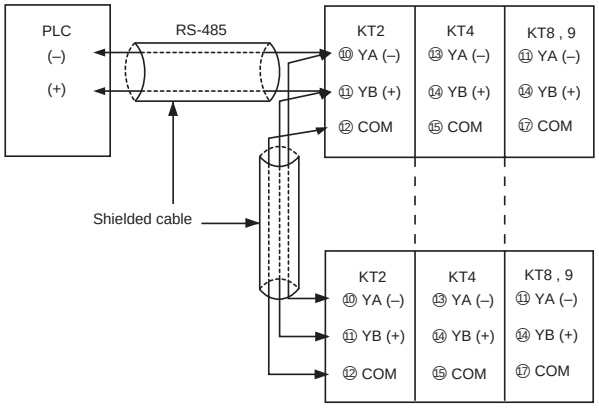
5. KT4H/4B series



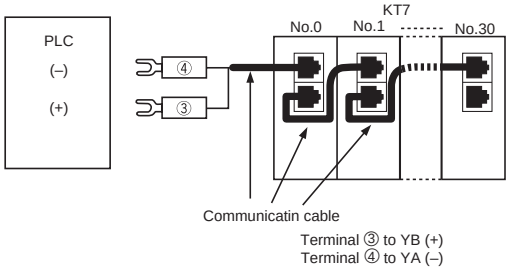
POWER SUPPLY ..... Power supply
EVT1 ..... Alarm 1 output
EVT2 ..... Alarm 2 output (option) or heater burn-out
Alarm output (option)
OUT1 ..... Control output or heating output (option)
OUT2 ..... Cooling output (option)
TC ..... Thermocouple input
RTD ..... Resistance temperature detection input
DC ..... Direct current input (DCA) or DC voltage input (DCV)
(For DC voltage input, + side terminal number differs depending on the voltage.
Also, DC current input, connect s shunt resistor between No. 10 and 12 terminal.)
CT1 ..... Current transformer input 1 (option: Single, three phase)
CT2 ..... Current transformer input 2 (option: Three-phase)
DI ..... Contact input (option)
RS-485 ..... Serial communication RS-485 (option)

Communication Function Connection Diagram (PLC Connection Diagram)

1. KT2, 4, 8 and 9 series

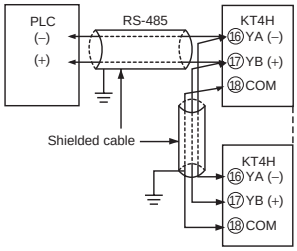


2. KT7 series



Notes: 1. Terminating Resistors (Terminators)
The KT series has a built-in pull-up resistor or pull-down resistor, which serves as the terminating resistor. For this reason, do not connect the terminating resistor on the communication line.
2. Please use a RJ-116 polarized type modular connector.
Please use a cable that is suitable for a modular connector.

3. KT4H/4B series



Notes:
1. To prevent current flow along shield sections, ground one end of the shield line. (If both ends of the shield section are grounded, a closed circuit with the earth will form and electricity flowing through the shield line will cause increased susceptibility to noise.)
2. Terminating Resistors (Terminators)
The KT4H series has a built-in pull-up resistor or pull-down resistor. For this reason, do not connect the terminating resistor on the communication line.

NOTICE ON OPERATION

1. NOTICE ON SITE SELECTION

This instrument is intended to be used in the following environment (IEC61010-1) Overvoltage category II, Pollution degree 2

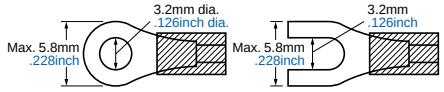
Mount the controller in a place with:

1) A minimum of dust, and an absence of corrosive gases
2) No flammable, explosive gases
3) Few mechanical vibrations or shocks
4) No exposure to direct sunlight, an ambient temperature of 0 to 50°C (32 to 122°F) that does not change rapidly (When installing inside a panel, make particular allowance for heat dissipation. Avoid installation in situations such as above equipment that generates heat.)
5) Locations in which temperature rapidly changes may cause condensation.
6) Locations or atmospheres in which gasoline, thinners, alcohol, or other organic solvents are present, or in which ammonia, sodium hydroxide, or other strong alkaline substances may adhere.
7) Locations susceptible to direct impact or the transmission of vibrations, or where splashing with water is possible.
8) In the proximity of equipment in which large switching surges occur or near high-voltage cables, high-voltage equipment, power lines, power equipment, ham radio transmitters, or equipment containing these or similar devices.
9) An ambient non-condensing humidity of 35 to 85%RH
10) No large capacity electromagnetic switches or cables through which large current is flowing
11) No water, oil or chemicals or where the vapors of these substances can come into direct contact with the controller

2. NOTICE ON THE WIRING

1) The terminal block of KT4, 8, 9, 4H, 4B series are designed to be wired from the left side (KT2 series are designed to be wired from the upper and lower direction). The lead wire must be inserted from the left side of the terminal, and fastened by the terminal screw. Use a solderless terminal with insulation sleeve that fits to the M3 screw.

Wire-pressed terminal	Company name	Part number	Fastening torque
Fork type	NICHIFU Co., Ltd.	1.25Y-3	0.6 N·m, Max. 1.0 N·m.
	J.S.T. Mfg. Co., Ltd.	VD1.25-B3A	
Round type	NICHIFU Co., Ltd.	1.25-3	
	J.S.T. Mfg. Co., Ltd.	V1.25-3	



2) Terminal fastening torque is approximately 0.6N·m to 1.0N·m (KT4, 8, 9, 4H and 4B).
For KT7 series by M3.0 screw is less than 0.5N·m and by M2.0 screw 0.25N·m respectively.
3) Use a thermocouple and compensating lead wire according to the input specification of the controller.
4) Use a 3-wire system of RTD according to the input specification of the controller.
5) This controller has no built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install them in the circuit near the external controller.
(Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
6) In the case of 24V AC/DC power supply, do not confuse the polarity when it is DC.
7) With the relay contact output type, use an auxiliary electromagnetic switch externally according to the capacity of the load to protect the built-in relay contact.
8) When wiring, keep input wire (thermocouple, RTD, etc.) away from AC source and load wire to avoid external interference.
9) Turn the power supply to the instrument off before wiring or checking. Working or touching the terminal with the power switched on may result in Electric Shock which could cause severe injury or death.

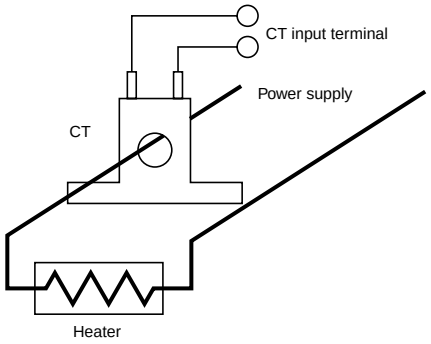
10) Do not drop wire chips into the holes of vent when wiring, because they could cause fire, malfunction or trouble with the device.
11) To prevent the unit from harmful effects of unexpected high level noise, it is recommended that a surge absorber be installed between the electromagnetic switch coils.

3. NOTICE ON THE MOUNTING

1) Do not use excessive force while screwing in the mounting bracket of KT4, 8, 9, 4H and 4B series. For KT4, 8 and 9 series, recommended torque is approximately 0.12N·m. For KT4H and 4B, recommended torque is approximately 0.05 to 0.06 N·m.
2) When mounting the KT7 series to the DIN rail, mount it in a lateral direction. Make sure a click is audible when fixed into place.

4. OPTIONAL HEATER BURN-OUT ALARM OUTPUT (KT4, 7, 8, 9, 4H and 4B series)

1) This alarm is not available for detecting current under phase control.
2) Use the current transformer (CT) provided, and pass one lead wire of the heater circuit into the hole of CT.
3) When wiring, keep CT wire away from AC source and load wire to avoid external interference.
4) In three phase installations, ensure that R, S, and T are each connected to a 2-line CT that connects with CT1 ((13)–(14)) and CT2 ((14)–(15)) terminals.



5. Please use rod terminals for the terminal portion of the KT7 series.

We recommend terminals made by Phoenix Contact.
(1) to (4) are AI0.25–8YE, AI0.34–8TQ, AI0.5–8WH, AI0.75–8GY, AI1.0–8RD, and AI1.5–8BK.
(5) to (9) are AI0.25–8YE, AI0.34–8TQ, and AI0.5–8WH.
The screw tightening torque for (1) to (4) should be no more than 0.5 N·m and for (5) to (9) it should be no more than 0.25 N·m. Make sure no screw is loose.

KT Monitor

Available for download free of charge. Use it to acquire data from the KT series temperature controller.

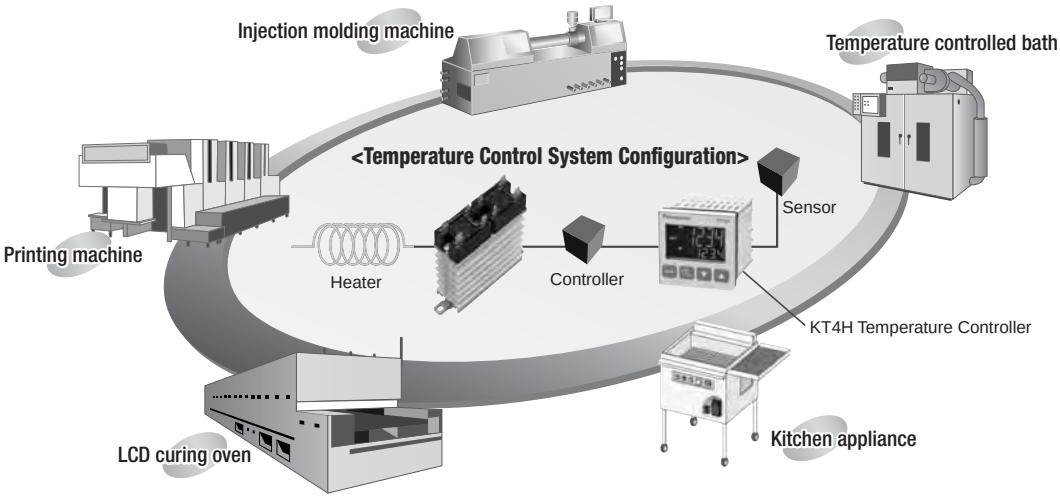
Download from http://www.panasonic-electric-works.net/ac

FEATURES

1. Parameters can be set from a computer.
2. Measurement data can be monitored from a computer.
3. Measurement data can be logged to a computer.

Applications

Contributing to space savings of various heater control systems



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