# Official Product Identity Mapping

## TK4S-B4RN

Official Autonics exact-model identity: TK4S-B4RN

DIN 48 x 48 mm high-performance PID temperature controller

100 to 240 V AC supply; relay OUT1; normal type without OUT2

Alarm 1, Alarm 2 and RS485 option package

Selected TK manual pages define configuration, ratings and dimensions.

Official model page:
https://www.autonics.com/glb/model/TK4S-B4RN

- 24 VAC~, 24-48 VDC⎓ power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Do not overlapping communication line and power line. Use twisted pair wire for communication line and connect ferrite bead at each end of line to reduce the effect of external noise.
- Make a required space around the unit for radiation of heat. For accurate temperature measurement, warm up the unit over 20 min after turning on the power.
- Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
- Do not wire to terminals which are not used.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude Max. 2,000 m
  - Pollution degree 2
  - Installation category II

## Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website .

T K ❶ ❷ - ❸ ❹ ❺ ❻

**❶ Digit**
4: 4 digit

**❷ Size**
N: DIN W 48 × H 24 mm
SP: DIN W 48 × H 48 mm (11 pin plug type)
S: DIN W 48 × H 48 mm
M: DIN W 72 × H 72 mm
W: DIN W 96 × H 48 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

**❸ Option in/output**

| Size: N | | |
|---|---|---|
| **PN** | **OUT2** | **Function** |
| 1 | Normal type[01] | Alarm 1 + CT input |
| | Heating & Cooling | Alarm 2 |
| 2 | Normal type | Alarm 1 + Alarm 2 |
| D | Normal type | Alarm 1 + Digital input 1/2 |
| | Heating & Cooling | Digital input 1/2 |
| R | Normal type | Alarm 1+Transmission output |
| | Heating & Cooling | Transmission output |
| T | Normal type | Alarm output 1 + RS485 communication |
| | Heating & Cooling | RS485 communication |

| Size: SP | |
|---|---|
| **PN** | **Function** |
| 1 | Alarm 1 |

| Size: S, M, W, H, L | |
|---|---|
| **PN** | **Function** |
| 1 | Alarm 1 |
| 2 | Alarm 1 + Alarm output 2 |
| R | Alarm 1 + Transmission output |
| T | Alarm 1 + RS485 communication |
| A | Alarm 1 + Alarm 2 + Transmission output |
| B | Alarm 1 + Alarm 2 + RS485 communication |
| D | Alarm 1 + Alarm 2 + Digital input 1/2[02] |

**❹ Power supply**
2: 24 VAC 50/60 Hz, 24-48 VDC
4: 100-240 VAC 50/60 Hz

**❺ OUT1 Control output**
R: Relay
S: SSR drive
C: Selectable current or SSR drive output

**❻ OUT2 Control output**
N: Normal type
[No OUT2 (Heating or Cooling)]
R: Heating & Cooling type
[Relay output][03]
C: Heating & Cooling type
[Selectable current or SSR drive output][04]

01) The CT input model of TK4N can be selected only in the normal type model with alarm output 1. (except TK4SP)
02) Only for TK4S-D, OUT2 output terminal is used as DI-2 input terminal.
03) When operating mode is heating or cooling control, OUT2 can be used as alarm output 3 (except TK4N).
04) When operating mode is heating or cooling control, OUT2 can be used as transmission output 2.

## Product Components

- Product (+ bracket)
- [TK4N] Terminal protection cover × 1
- Instruction manual

## Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.
Download the manuals from the Autonics website.

## Software

Download the installation file and the manuals from the Autonics website.

### ■ DAQMaster

DAQMaster is comprehensive device management program. It is available for parameter setting, monitoring.

## Sold Separately

- Current transformer (CT)
- 11-pin controller socket: PG-11, PS-11 (N)
- Terminal protection cover: RSA / RMA / RHA / RLA-Cover
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48

## Specifications

| Series | | TK4N | TK4SP | TK4S | TK4M |
|---|---|---|---|---|---|
| Power supply | AC type | 100 - 240 VAC~ 50/60 Hz | | | |
| | AC/DC type | - | 24 VAC~ 50/60 Hz, 24-48 VDC⎓ | | |
| Permissible voltage range | | 90 to 110 % of rated voltage | | | |
| Power consumption | AC type | ≤ 6 VA | ≤ 8 VA | | |
| | AC/DC type | - | AC: ≤ 8 VA, DC ≤ 5 W | | |
| Unit weight (packaged) | | ≈ 70 g (≈ 140 g) | ≈ 85 g (≈ 130 g) | ≈ 105 g (≈ 150 g) | ≈ 140 g (≈ 210 g) |

| Series | | TK4W | TK4H | TK4L |
|---|---|---|---|---|
| Power supply | AC type | 100 - 240 VAC~ 50/60 Hz | | |
| | AC/DC type | 24 VAC~ 50/60 Hz, 24-48 VDC⎓ | | |
| Permissible voltage range | | 90 to 110 % of rated voltage | | |
| Power consumption | AC type | ≤ 8 VA | | |
| | AC/DC type | AC: ≤ 8 VA, DC ≤ 5 W | | |
| Unit weight (packaged) | | ≈ 141 g (≈ 211 g) | ≈ 141 g (≈ 211 g) | ≈ 198 g (≈ 294 g) |

| | | |
|---|---|---|
| Sampling period | | 50 ms |
| Input specification | | Refer to 'Input Type and Using Range' |
| Option input | CT input | • 0.0-50.0 A (primary current measurement range)<br>• CT ratio: 1/1,000<br>• Measurement accuracy: ±5% F.S. ±1digit |
| | Digital input | • Contact - ON: ≤ 2 kΩ, OFF: ≥ 90 kΩ<br>• Non contact - residual voltage ≤ 1.0 V, leakage current ≤ 0.1 mA<br>• Outflow current: ≈ 0.5 mA per input |
| Control output | Relay | 250 VAC~ 3 A, 30 VDC⎓ 3 A 1a |
| | SSR | 11 VDC⎓ ±2 V, ≤ 20 mA |
| | Current | DC 4-20 mA or DC 0-20 mA (parameter), Load resistance: ≤ 500 Ω |
| Alarm output | Relay | AL1, AL2: 250 VAC~ 3 A 1a<br>• TK4N AL2: 250 VAC~ 0.5 A 1a (≤ 125 VA) |
| Option output | Transmission | DC 4 - 20 mA (Load resistance: ≤ 500 Ω, Output accuracy: ±0.3% F.S.) |
| | RS485 comm. | Modbus RTU |
| Display type | | 7 segment (red, green, yellow), LED type |
| Control type | Heating, Cooling<br>Heating & Cooling | ON/OFF, P, PI, PD, PID Control |
| Hysteresis | | • Thermocouple, RTD: 1 to 100 (0.1 to 100.0) °C/°F<br>• Analog: 1 to 100 digit |
| Proportional band (P) | | 0.1 to 999.9 °C/°F (0.1 to 999.9%) |
| Integral time (I) | | 0 to 9,999 sec |
| Derivative time (D) | | 0 to 9,999 sec |
| Control cycle (T) | | • Relay output, SSR drive output: 0.1 to 120.0 sec<br>• Selectable current or SSR drive output: 1.0 to 120.0 sec |
| Manual reset | | 0.0 to 100.0% |
| Relay life cycle | Mechanical | OUT1/2: ≥ 5,000,000 operations<br>AL1/2: ≥ 20,000,000 operations (TK4H/W/L: ≥ 5,000,000 operations) |
| | Electrical | ≥ 100,000 operations |
| Dielectric strength | | Dependent on the power supply |
| AC voltage type | | Between the charging part and the case: 3,000 VAC ~ 50/60 Hz for 1 minute |
| AC / DC voltage type | | Between the charging part and the case: 2,000 VAC ~ 50/60 Hz for 1 minute |
| Vibration | | 0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours |
| Insulation resistance | | ≥ 100 MΩ (500 VDC⎓ megger) |
| Noise immunity | | ±2 kV square shaped noise by noise simulator (pulse width: 1 μs) R-phase, S-phase |
| Memory retention | | ≈ 10 years (non-volatile semiconductor memory type) |
| Ambient temperature | | -10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation) |
| Ambient humidity | | 35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation) |
| Protection structure | | IP65 (Front panel, IEC standards)<br>• TK4SP: IP50 (Front panel, IEC standards) |
| Insulation type | | Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 2 kV) |
| Certification | | CE UK CA cULus EAC |

## Communication Interface

### ■ RS485

| | |
|---|---|
| Comm. protocol | Modbus RTU |
| Connection type | RS485 |
| Application standard | EIA RS485 compliance with |
| Maximum connection | 31 units (address: 01 to 99) |
| Synchronous method | Asynchronous |
| Comm. Method | Two-wire half duplex |
| Comm. effective range | ≤ 800 m |
| Comm. speed | 2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps (parameter) |
| Response time | 5 to 99 ms (default: 20 ms) |
| Start bit | 1 bit (fixed) |
| Data bit | 8 bit (fixed) |
| Parity bit | None (default), Odd, Even |
| Stop bit | 1 bit, 2 bit (default) |
| EEPROM life cycle | ≈ 1,000,000 operations (Erase / Write) |

## Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

| Input type | | Decimal point | Display | Using range (°C) | Using range (°F) |
|---|---|---|---|---|---|
| Thermo -couple | K (CA) | 1 | K CA H | -200 to 1,350 | -328 to 2,462 |
| | | 0.1 | K CA L | -199.9 to 999.9 | -199.9 to 999.9 |
| | J (IC) | 1 | J I C H | -200 to 800 | -328 to 1,472 |
| | | 0.1 | J I C L | -199.9 to 800.0 | -199.9 to 999.9 |
| | E (CR) | 1 | E C r H | -200 to 800 | -328 to 1,472 |
| | | 0.1 | E C r L | -199.9 to 800.0 | -199.9 to 999.9 |
| | T (CC) | 1 | T C C H | -200 to 400 | -328 to 752 |
| | | 0.1 | T C C L | -199.9 to 400.0 | -199.9 to 752.0 |
| | B (PR) | 1 | b P r | 0 to 1,800 | 32 to 3,272 |
| | R (PR) | 1 | r P r | 0 to 1,750 | 32 to 3,182 |
| | S (PR) | 1 | S P r | 0 to 1,750 | 32 to 3,182 |
| | N (NN) | 1 | n n n | -200 to 1,300 | -328 to 2,372 |
| | C (TT)[01] | 1 | C t t | 0 to 2,300 | 32 to 4,172 |
| | G (TT)[02] | 1 | G t t | 0 to 2,300 | 32 to 4,172 |
| | L (IC) | 1 | L I C H | -200 to 900 | -328 to 1,652 |
| | | 0.1 | L I C L | -199.9 to 900.0 | -199.9 to 999.9 |
| | U (CC) | 1 | U C C H | -200 to 400 | -328 to 752 |
| | | 0.1 | U C C L | -199.9 to 400.0 | -199.9 to 752.0 |
| | Platinel II | 1 | P L I I | 0 to 1,390 | 32 to 2,534 |
| RTD | Cu50 Ω | 0.1 | C U 5 | -199.9 to 200.0 | -199.9 to 392.0 |
| | Cu100 Ω | 0.1 | C U 10 | -199.9 to 200.0 | -199.9 to 392.0 |
| | JPt100 Ω | 1 | J P t H | -200 to 650 | -328 to 1,202 |
| | | 0.1 | J P t L | -199.9 to 650.0 | -199.9 to 999.9 |
| | DPt50 Ω | 0.1 | d P t 5 | -199.9 to 600.0 | -199.9 to 999.9 |
| | DPt100 Ω | 1 | d P t H | -200 to 650 | -328 to 1,202 |
| | | 0.1 | d P t L | -199.9 to 650.0 | -199.9 to 999.9 |
| | Nickel120 Ω | 1 | n i 12 | -80 to 200 | -112 to 392 |
| Analog | 0 to 10 V | - | A u 1 | 0 to 10 V | |
| | 0 to 5 V | - | A u 2 | 0 to 5 V | |
| | 1 to 5 V | - | A u 3 | 1 to 5 V | |
| | 0 to 100 mV | - | A n u 1 | 0 to 100 mV | |
| | 0 to 20 mA | - | A A A 1 | 0 to 20 mA | |
| | 4 to 20 mA | - | A A A 2 | 4 to 20 mA | |

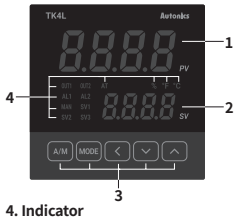
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor
- Permissible line resistance per line: ≤ 5 Ω

### Display accuracy

| Input type | Using temperature | Display accuracy |
|---|---|---|
| Thermo -couple RTD | At room temperature (23°C ±5 °C) | (PV ±0.3% or ±1 °C higher one) ±1-digit<br>• Thermocouple K, J, T, N, E below -100 °C and L, U, PLII, RTD Cu50 Ω, DPt50 Ω: (PV ±0.3% or ±2 °C higher one) ±1-digit<br>• Thermocouple C, G and R, S below 200 °C: (PV ±0.3% or ±3 °C higher one) ±1-digit<br>• Thermocouple B below 400 °C: There is no accuracy standards |
| | Out of room temperature range | (PV ±0.5% or ±2 °C higher one) ±1-digit<br>• RTD Cu50 Ω, DPt50 Ω: (PV ±0.5% or ±3 °C higher one) ±1-digit<br>• Thermocouple R, S, B, C, G: (PV ±0.5% or ±5 °C higher one) ±1-digit<br>• Other sensors: ≤ ±5 °C (≤-100 °C) |
| Analog | At room temperature (23°C ±5 °C) | ±0.3% F.S. ±1-digit |
| | Out of room temperature range | ±0.5% F.S. ±1-digit |

- In case of TK4SP Series, ±1 °C will be added to the degree standard.

## Unit Descriptions




**1. PV display part (Red)**
- Run mode: Displays PV (Present value).
- Setting mode: Displays parameter name.

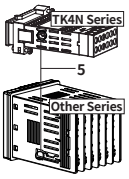
**2. SV display part (Green)**
- Run mode: Displays SV (Setting value).
- Setting mode: Displays parameter setting value.

**3. Input key**

| Display | Name |
|---|---|
| [A/M] | Control switching key |
| [MODE] | Mode key |
| [◀], [▼], [▲] | Setting value control key |

**4. Indicator**

| Display | Name | Description |
|---|---|---|
| °C, %, °F | Unit | Displays selected unit (parameter) |
| AT | Auto tuning | Flashes during auto tuning every 1 sec |
| OUT1/2 | Control output | Turns ON when the control output is ON<br>• SSR output (cycle/phase control) MV over 5% ON<br>• Current output Manual control: 0% OFF, over ON Auto control: below 2% OFF, over 3% ON |
| AL1/2 | Alarm output | Turns ON when the alarm output is ON |
| MAN | Manual control | Turns ON during manual control |
| SV1/2/3 | Multi SV | The SV indicator is ON which is currently displayed. (When using multi SV function) |



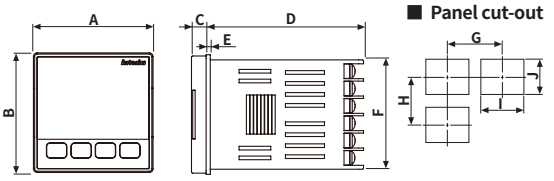

**5. PC loader port:** For connecting communication converter (SCM Series).

- For the details about old model, refer to the user manual. Download the manuals from the Autonics website.

## Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- Below is based on TK4S Series.

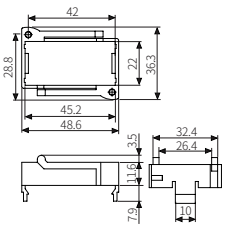
### Panel cut-out



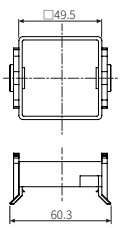

| | Body | | | | | | Panel cut-out | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J |
| TK4N | 48 | 24 | 3 | 91.8 | - | 21.8 | ≥ 55 | ≥ 37 | $45^{+0.6}_{0}$ | $22.2^{+0.3}_{0}$ |
| TK4S | 48 | 48 | 6 | 64.5 | 1.7 | 44.8 | ≥ 65 | ≥ 65 | $45^{+0.6}_{0}$ | $45^{+0.6}_{0}$ |
| TK4SP | 48 | 48 | 6 | 72.2 | 1.7 | 44.8 | ≥ 65 | ≥ 65 | $45^{+0.6}_{0}$ | $45^{+0.6}_{0}$ |
| TK4M | 72 | 72 | 6 | 64.5 | 1.5 | 67.5 | ≥ 90 | ≥ 90 | $68^{+0.7}_{0}$ | $68^{+0.7}_{0}$ |
| TK4W | 96 | 48 | 6 | 64.5 | 1.5 | 44.7 | ≥ 115 | ≥ 65 | $92^{+0.8}_{0}$ | $45^{+0.6}_{0}$ |
| TK4H | 48 | 96 | 6 | 64.5 | 1.5 | 91.5 | ≥ 65 | ≥ 115 | $45^{+0.6}_{0}$ | $92^{+0.8}_{0}$ |
| TK4L | 96 | 96 | 6 | 64.5 | 1.5 | 91.5 | ≥ 115 | ≥ 115 | $92^{+0.8}_{0}$ | $92^{+0.8}_{0}$ |

### Bracket

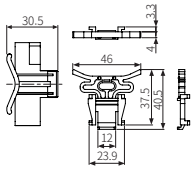
**TK4N**




**TK4S/SP**

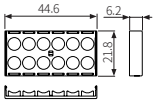



**Other Series**




### Terminal protection cover

**TK4N**



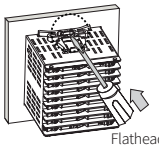

## Installation Method

### TK4N

Screwdriver

After mounting the product to panel with bracket, fasten the bolts by using screwdriver.

### Other Series



Flathead screwdriver

Insert the unit into a panel, fasten the bracket by pushing with a flathead screwdriver.

## Errors

| Display | Input | Description | Output | Troubleshooting |
|---|---|---|---|---|
| oPEn | Temperature sensor | Flashes at 0.5 sec interval when input sensor is disconnected or sensor is not connected. | 'Sensor error, MV' parameter setting value | Check input sensor status. |
| | Analog | Flashes at 0.5 sec interval when input is over F.S. ±10%. | 'Sensor error, MV' parameter setting value | Check analog input status. |
| HHHH | Temperature sensor | Flashes at 0.5 sec intervals if the input value is above the input range.[01] | Heating: 0%, Cooling: 100% | When input is within the rated input range, this display disappears. |
| | Analog | Flashes at 0.5 sec intervals if the input value is over 5 to 10% of high limit or low limit value. | Normal output | |
| LLLL | Temperature sensor | Flashes at 0.5 sec. intervals if the input value is below the input range.[01] | Heating: 100%, Cooling: 0% | |
| | Analog | Flashes at 0.5 sec intervals if the input value is over -5 to -10% of low limit or high limit value. | Normal output | |
| Err | Temperature sensor | Flashes at 0.5 sec intervals if there is error for setting and it returns to the error-before screen. | - | Check setting method. |
| | Analog | | | |

01) Be careful that when HHHH / LLLL error occurs, the control output may occur by recognizing the maximum or minimum input depending on the control type.

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