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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON E5CN. You'll find the answers to all your questions on the OMRON E5CN in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual OMRON E5CN
User guide OMRON E5CN
Operating instructions OMRON E5CN
Instructions for use OMRON E5CN
Instruction manual OMRON E5CN

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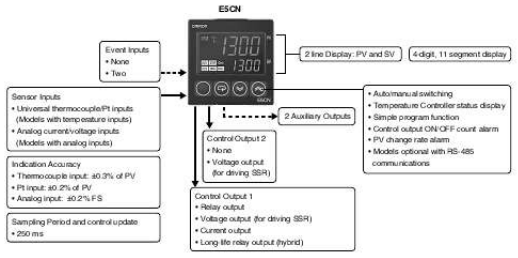
Basic-type Digital Temperature Controller
E5CN/E5CN-U (48 x 48 mm)

New 48 x 48-mm Basic Temperature Controller with Enhanced Functions and Performance. Improved Indication Accuracy and Preventive Maintenance Function.



- Indication Accuracy
Thermocouple input: $\pm 0.3\%$ of PV (previous models: $\pm 0.5\%$)
PI input: $\pm 0.2\%$ of PV (previous models: $\pm 0.5\%$)
Analog input: $\pm 0.2\%$ FS (previous models: $\pm 0.5\%$)
- New E5CN-U Models (Plug-in Models) with analog inputs and current outputs.
- A PV/SV-status display function can be set to alternate between displaying the PV or SV and the status of the Temperature Controller (auto/manual, RUN/STOP and alarms).
- Preventive maintenance for relays using a Control Output ON/OFF Counter.

Main I/O Functions



Event Inputs
• None
• Two

Sensor Inputs
• Universal thermocouple/PI inputs (Models with temperature inputs)
• Analog current/voltage inputs (Models with analog inputs)

Indication Accuracy
• Thermocouple input: $\pm 0.3\%$ of PV
• PI input: $\pm 0.2\%$ of PV
• Analog input: $\pm 0.2\%$ FS

Sampling Period and control update
• 250 ms

Control Output 1
• Relay output
• Voltage output (for driving SSR)
• Current output
• Long life relay output (hybrid)

Control Output 2
• None
• Voltage output (for driving SSR)

2 Auxiliary Outputs

2 line Display: PV and SV
4 digit, 11 segment display

Automanual switching
• Temperature Controller status display
• Simple program function
• Control output ON/OFF count alarm
• PV change rate alarm
• Models optional with RS-485 communications

This data sheet is provided as a guideline for selecting products. Be sure to refer to the following user manuals for application precautions and other information required for operation before attempting to use the product.
E5CN/E5CN-U Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156)
E5CN/E5CN-U Digital Temperature Controllers Communications Manual Basic Type (Cat. No. H158)

Basic-type Digital Temperature Controller **E5CNE5CN-U** 1



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Manual abstract:

Main I/O Functions E5CN Event Inputs · None · Two Sensor Inputs · Universal thermocouple/Pt inputs (Models with temperature inputs) · Analog current/voltage inputs (Models with analog inputs) Indication Accuracy · Thermocouple input: $\pm 0.3\%$ of PV · Pt input: $\pm 0.2\%$ of PV · Analog input: $\pm 0.2\%$ FS Sampling Period and control update · 250 ms 2 line Display: PV and SV 4-digit, 11 segment display 2 Auxiliary Outputs Control Output 2 · None · Voltage output (for driving SSR) Control Output 1 · Relay output · Voltage output (for driving SSR) · Current output · Long-life relay output (hybrid) · Auto/manual switching · Temperature Controller status display · Simple program function · Control output ON/OFF count alarm · PV change rate alarm · Models optional with RS-485 communications This data sheet is provided as a guideline for selecting products. Be sure to refer to the following user manuals for application precautions and other information required for operation before attempting to use the product. E5CN/E5AN/E5EN Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156) E5CN/E5AN/E5EN Digital Temperature Controllers Communications Manual Basic Type (Cat. No. H158) Basic-type Digital Temperature Controller E5CN/E5CN-U 1 Lineup 1 control output Temperature input 2 control outputs Terminal block 1 control output 2 auxiliary outputs 2 auxiliary outputs 2 auxiliary outputs E5CN Basic Type Analog input 2 control outputs Temperature input Plug-in Analog input 1 control output 2 auxiliary outputs 2 auxiliary outputs 1 control output 2 auxiliary outputs Note: All models can be used for Heating, Cooling and Heating & Cooling control Model Number Structure Model Number Legend Controllers Option Units E5CN-@ 2 M@@-@-500 12345 6 7 1.

Control Output 1 R: Relay output Q: Voltage output (for driving SSR) C: Current output Y: Long-life relay output (hybrid) 1 2. Auxiliary Outputs 2 2: Two outputs 3. Option M: Option Unit can be mounted. 4. Input Type T: Universal thermocouple/platinum resistance thermometer L: Analog current/voltage input 5.

Power Supply Voltage Blank: 100 to 240 VAC D: 24 VAC/VDC 6. Case Color Blank: Black W: Silver (contact your local sales for more information) 7. Terminal Cover -500: With terminal cover E53-CN@@N2 1 2 3 4 1. Applicable Controller CN: E5CN 2. Function 1 Blank: None Q: Control output 2 (voltage for driving SSR) P: Power supply for sensor 3.

Function 2 Blank: None H: Heater burnout/SSR failure/Heater overcurrent detection (CT1) HH: Heater burnout/SSR failure/Heater overcurrent detection (For 3-phase heater applications, 2x CT) B: Two event inputs 03: RS-485 communications H03: Heater burnout/SSR failure/Heater overcurrent detection (CT1) + RS-485 communications HB: Heater burnout/SSR failure/Heater overcurrent detection (CT1) + Two event inputs HH03: Heater burnout/SSR failure/Heater overcurrent detection (For 3-phase heater applications, 2x CT) 4. Version N2: Applicable only to models produced after January 2008 (Box marked with N6) Note: Not all combinations of function 1 and function 2 specifications are possible for Option Units (E53-CN@@N2). 1. Always connect an AC load to a long-life relay output. The output will not turn OFF if a DC load is connected because a triac is used for switching the circuit. For details, check the conditions in Ratings. 2. Auxiliary outputs are contact outputs that can be used to output alarms, control or results of logic operations. 2 Basic-type Digital Temperature Controller E5CN/E5CN-U Ordering Information Controllers with Terminal Blocks Size Case color Power supply voltage Input type Auxiliary outputs Control output 1 Relay output 100 to 240 VAC Thermocouple or Resistance thermometer 2 Voltage output (for driving SSR) Current output Long-life relay output (hybrid) 24 VAC/VDC 1/16 DIN 48 × 48 × 78 (W × H × D) Black 100 to 240 VAC Analog (current/voltage) 2 Thermocouple or Resistance thermometer Relay output 2 Voltage output (for driving SSR) Current output Relay output Voltage output (for driving SSR) Current output Long-life relay output (hybrid) Relay output 24 VAC/VDC Analog (current/voltage) 2 Voltage output (for driving SSR) Current output Model E5CN-R2MT-500 E5CN-Q2MT-500 E5CN-C2MT-500 E5CN-Y2MT-500 E5CN-R2MTD-500 E5CN-Q2MTD-500 E5CN-C2MTD-500 E5CN-R2ML-500 E5CN-Q2ML-500 E5CN-C2ML-500 E5CN-Y2ML-500 E5CN-R2MLD-500 E5CN-Q2MLD-500 E5CN-C2MLD-500 Note: add power supply voltage to model to complete ordering code (ie. E5CN-R2MT-500 AC100-240 or E5CN-R2MTD-500 AC/DC24) Option Units One of the following Option Units can be mounted to provide the E5CN with additional functions.

Functions Event inputs Event inputs Event inputs Event inputs Communications RS-485 Communications RS-485 Communications RS-485 Communications RS-485 Communications RS-485 Heater burnout/SSR failure/Heater overcurrent detection 3-phase heater burnout/SSR failure/ Heater overcurrent detection Heater burnout/SSR failure/Heater overcurrent detection Control output 2 (Voltage for driving SSR) Control output 2 (Voltage for driving SSR) External power supply for ES1B Heater burnout/SSR failure/Heater overcurrent detection 3-phase heater burnout/SSR failure/ Heater overcurrent detection External power supply for ES1B Control output 2 (Voltage for driving SSR) Heater burnout/SSR failure/Heater overcurrent detection External power supply for ES1B Control output 2 (Voltage for driving SSR) Model E53-CNBN2 E53-CNQBN2 E53-CNHBN2 E53-CNPBN2 E53-CN03N2 E53-CNQ03N2 E53-CNH03N2 E53-CNHH03N2 E53-CNP03N2 E53-CNQH2 E53-CNQH2N2 E53-CNPHN2 Note: Option Units cannot be used for plug-in models. These Option Units are applicable only to models produced after January 2008 (Box marked with N6). Basic-type Digital Temperature Controller E5CN/E5CN-U 3 Model Number Structure Model Number Legend (Plug-in-type Controllers) E5CN-@ 2 @ U 1234 1. Output Type R: Relay output Q: Voltage output (for driving SSR) C: Current output 2. Number of Alarms 2: Two alarms 3. Input Type T: Universal thermocouple/platinum resistance thermometer L: Analog Input 4. Plug-in type U: Plug-in type Ordering Information Plug-in-type Controllers Size Case color Power supply voltage Input type Thermocouple or resistance thermometer 100 to 240 VAC 1/16 DIN Black Analog 2 (current/voltage) Thermocouple or resistance thermometer Auxiliary outputs 2 Control output 1 Relay output Current output Relay output Current output Relay output 2 Current output 24 VAC/VDC Model E5CN-R2TU E5CN-C2TU E5CN-R2LU E5CN-C2LU E5CN-R2TDU E5CN-C2TDU Voltage output (for driving SSR) E5CN-Q2TU Voltage output (for driving SSR) E5CN-Q2LU Voltage output (for driving SSR) E5CN-Q2TDU Note: add power supply voltage to model to complete ordering code.



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(ie. E5CN-R2TU AC100-240 or E5CN-R2TDU AC/DC24) 4 Basic-type Digital Temperature Controller E5CN/E5CN-U Accessories (Order Separately) USB-Serial Conversion Cable Model E58-CIFQ1 Adapter Connectable models Terminal block models Model Y92F-45 Terminal Cover Connectable models Model Terminal block models E53-COV17 Note: Use this Adapter when the panel has been previously prepared for the E5B@ (72x72 mm panel cut-out). Sockets (for Plug-in Models) Type Model P2CF-11 P2CF-11-E P3GA-11 Y92A-48G Front-connecting Socket Front-connecting Socket with Finger Protection Back-connecting Socket Note: The Terminal Cover comes with the E5CN-@@@-500 models.

Waterproof Packing Model Y92S-29 Note: The Waterproof Packing is included with the Controller only for models with terminal blocks. Terminal Cover for Back-connecting socket with Finger Protection CX-Thermo Support Software Model EST2-2C-MV4 Current Transformers (CTs) Hole diameter 5.8 dia. 12.0 dia.

Model E54-CT1 E54-CT3 Basic-type Digital Temperature Controller E5CN/E5CN-U 5 Specifications Ratings Power supply voltage Operating voltage range Power consumption E5CN E5CN-U No D in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC 85% to 110% of rated supply voltage 100 to 240 VAC: 7.5 VA (max.) (E5CN-R2T at 100 VAC: 3.0 VA) 24 VAC/VDC: 5 VA/3 W (max.) (E5CN-R2TD at 24 VAC: 2.7 VA) 100 to 240 VAC: 6 VA (max.) 24 VAC/VDC: 3 VA/2 W (max.) (models with current output: 4 VA/2 W) Models with temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor: 10 to 70° C, 60 to 120° C, 115 to 165° C, or 140 to 260° C Voltage input: 0 to 50 mV Models with analog inputs Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V Input impedance Control method Current input: 150 max., Voltage input: 1 M min. (Use a 1:1 connection when connecting the ES2-HB.) ON/OFF control or 2-PID control (with auto-tuning) E5CN Relay output E5CN-U Control outputs Voltage output (for driving SSR) Current output Long-life relay output Auxiliary outputs E5CN E5CN-U E5CN E5CN SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA SPDT, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA Output voltage: 12 VDC ±15% (PNP), max. load current: 21 mA, with short-circuit protection circuit 4 to 20 mA DC/0 to 20 mA DC, load: 600 max., resolution: approx. 10,000 SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 1,000,000 operations, load power supply voltage: 75 to 250 VAC (DC loads cannot be connected.), minimum applicable load: 5 V, 10 mA, leakage current: 5 mA max.

(250 VAC, 60 Hz) Sensor input Number of outputs 2 Output specifications Number of inputs Relay output: SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA 2 Contact input: ON: 1 k max., OFF: 100 k min. Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max. Current flow: Approx. 7 mA per contact Digital setting using front panel keys 11-segment digital display and individual indicators (7-segment display emulation also possible) Character height: PV: 11 mm, SV: 6.5 mm Up to four set points (SP0 to SP3) can be saved and selected using event inputs, key operations, or serial communications. Not supported Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout detection, 40% AT, 100% AT, MV limiter, input digital filter, self-tuning, temperature input shift, run/stop, protection functions, control output ON/OFF counter, extraction of square root, MV change rate limit, logic operations, PV/SV status display, simple program, automatic cooling coefficient adjustment 25% to 85% - to 65° C (with no condensation or icing) 25 Event inputs External contact input specifications External power supply for ES1B 12 VDC ±10%, 20 mA, short-circuit protection circuit provided Setting method Indication method Multi SP Bank switching Other functions Ambient operating temperature - to 55° C (with no condensation or icing), for 3-year warranty: - to 50° C 10 10 Ambient operating humidity Storage temperature 6 Basic-type Digital Temperature Controller E5CN/E5CN-U Input Ranges Thermocouple/Platinum Resistance Thermometer (Universal Inputs) Input Type Name 2300 1800 1700 1600 1500 1400 1700 1700 Platinum resistance thermometer Pt100 JPt100 K J T Thermocouple E L U N R S B W 2300 1800 Infrared temperature sensor PL II 10 to 70° C 60 to 120° C 115 to 165° C 140 to 260° C Analog input 0 to 50 mV Temperature range (° C) 1300 1200 1100 1000 900 800 700 600 500 400 300 200 100 0 - 100.

0 - 200.0 - 200 - 199.9 100.0 0.0 - 199.9 100.0 500.0 500.0 850 1300 1300 1300 850 82° C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: Terminal block models (E5CN) and plug-in models (E5CN-U): (±0.2% of indicated value or ±0.8° C, whichever is greater) ±1 digit max. Analog input: Terminal block models (E5CN) and plug-in models (E5CN-U): ±0.2% FS ±1 digit max. CT input: Terminal block models (E5CN): ±5% FS ±1 digit max. Thermocouple input (R, S, B, W, PL II): Terminal block models (E5CN): (±1% of PV or ±10° C, whichever is greater) ±1 digit max. Plug-in models (E5CN-U): (±2% of PV or ±10° C, whichever is greater) ±1 digit max. Other thermocouple input: 3 Terminal block models (E5CN): (±1% of PV or ±4° C, whichever is greater) ±1 digit max. Plug-in models (E5CN-U): (±2% of PV or ±4° C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: Terminal block models (E5CN) and plug-in models (E5CN-U): (±1% of PV or ±2° C, whichever is greater) ±1 digit max.

Analog input: Terminal block models (E5CN) and plug-in models (E5CN-U): (±1%FS) ±1 digit max. 250 ms Models with thermocouple/platinum resistance thermometer input (universal input): 0.1 to 999.9 EU (in units of 0.1 EU) 4 Models with analog input: 0.01 to 99.99% FS (in units of 0.01% FS) Models with thermocouple/platinum resistance thermometer input (universal input): 0.1 to 999.9 EU (in units of 0.1 EU) 4 Models with analog input: 0.1 to 999.9% FS (in units of 0.1% FS) 0 to 3999 s (in units of 1 s) 0 to 3999 s (in units of 1 s) 5 0.5, 1 to 99 s (in units of 1 s) 0. 0 to 100.0% (in units of 0.1%) - 1999 to 9999 (decimal point position depends on input type) Indication accuracy Influence of temperature 2 Influence of voltage 2 Input sampling period Hysteresis Proportional band (P) Integral time (I) Derivative time (D) Control period Manual reset value Alarm setting range Affect of signal source resis- Thermocouple: 0.



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1° C/ max. (100 max.)

) tance Platinum resistance thermometer: 0.1° C/ max. (10 max.) Insulation resistance Dielectric strength Vibration resistance Shock resistance Weight Degree of protection Setup Tool Setup Tool port Approved standards 7 Conformed standards Malfunction Destruction Malfunction Destruction E5CN E5CN-U E5CN E5CN-U 20 M min. (at 500 VDC) 2,300 VAC, 50 or 60 Hz for 1 min (between terminals with different charge) 10 to 55 Hz, 20 m/s² for 10 min each in X, Y, and Z directions 10 to 55 Hz, 0.75-mm single amplitude for 2 hrs each in X, Y, and Z directions 100 m/s², 3 times each in X, Y, and Z directions 300 m/s², 3 times each in X, Y, and Z directions Controller: Approx. 150 g, Mounting Bracket: Approx. 10 g Controller: Approx. 110 g, Mounting Bracket: Approx. 10 g Front panel: IP66, Rear case: IP20, Terminals: IP00 Front panel: IP50, Rear case: IP20, Terminals: IP00 Non-volatile memory (number of writes: 1,000,000 times) CX-Thermo version 4.

0 or higher Provided on the bottom of the E5CN. Use this port to connect a computer to the E5CN when using the Setup Tool. An E58-CIFQ1 USB-Serial Conversion Cable is required to connect the computer to the E5CN. 6 UL 61010-1, CSA C22.2 No. 1010-1 EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II EMI: Radiated Interference Electromagnetic Field Strength: Noise Terminal Voltage: EMS: ESD Immunity: Electromagnetic Field Immunity: Burst Noise Immunity: Conducted Disturbance Immunity: Surge Immunity: Power Frequency Magnetic Field Immunity: Voltage Dip/Interrupting Immunity: EN 61326 EN 55011 Group 1, class A EN 55011 Group 1, class A EN 61326 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-6 EN 61000-4-5 EN 61000-4-8 EN 61000-4-11 Memory protection Standards EMC 1. The indication accuracy of K thermocouples in the - 200 to 1300° C range, T and N thermocouples at a temperature of - 100° C max., and U and L thermocouples at any temperatures is ±2° C ±1 digit max. The indication accuracy of the B thermocouple at a temperature of 400° C max. is not specified.

The indication accuracy of B thermocouples in the 400 to 800° C range is ±3° C max. The indication accuracy of the R and S thermocouples at a temperature of 200° C max. is ±3° C ±1 digit max. The indication accuracy of W thermocouples is ±0.3 of PV or ±3° C, whichever is greater, ±1 digit max.

The indication accuracy of PL II thermocouples is ±0.3 of PV or ±2° C, whichever is greater, ±1 digit max. 2. Ambient temperature: - C to 23° C to 55° C, Voltage range: - 10° 15% to 10% of rated voltage 3. K thermocouple at - 100° C max. : ±10° max. 4. "EU" stands for Engineering Unit and is used as the unit after scaling. For a temperature sensor, the EU is ° C or ° F. 5. When robust tuning (RT) is ON, the differential time is 0.0 to 999.9 (in units of 0.1 s). 6.

External communications (RS-485) and cable communications for the Setup Tool can be used at the same time. 7. The E5CN-U plug-in model is certified for UL listing only when used together with the OMRON P2CF-11 Socket. Basic-type Digital Temperature Controller E5CN/E5CN-U 9 USB-Serial Conversion Cable Applicable OS Applicable software Applicable models Windows 2000, XP, or Vista Thermo Mini, CX-Thermo version 4.0 or higher E5AN/E5EN/E5CN/E5CN-U/E5AN-H/ E5EN-H/E5CN-H 38400 bps Computer: USB (type A plug) Temperature Controller: Setup Tool port (on bottom of Controller) Bus power (Supplied from USB host controller.) 5 VDC 70 mA 0 to 55°C (with no condensation or icing) 10% to 80% - to 60°C (with no condensation or 20 icing) 10% to 80% 2,000 m max. Approx. 100 g Current Transformer (Order Separately) Ratings Dielectric strength 1,000 VAC for 1 min E54-CT1: Approx. 11.5 g, E54-CT3: Approx.

50 g Armatures (2) Plugs (2) Vibration resistance 50 Hz, 98 m/s² Weight Accessories (E54-CT3 only) USB interface standard Conforms to USB Specification 1.1. DTE speed Connector specifications Power supply Power supply voltage Current consumption Ambient operating temperature Ambient operating humidity Storage temperature Storage humidity Altitude Weight Heater Burnout Alarms, SSR Failure Alarms, and Heater Overcurrent Alarms CT input (for heater current detection) Models with detection for single-phase heaters: One input Models with detection for single-phase or three-phase heaters: Two inputs Maximum heater current 50 A AC Input current indication accuracy Heater burnout alarm setting range 1 SSR failure alarm setting range 2 Heater overcurrent alarm setting range 3 ±5% FS ±1 digit max. 0.1 to 49.

9 A (in units of 0.1 A) Minimum detection ON time: 100 ms 0.1 to 49.9 A (in units of 0.1 A) Minimum detection OFF time: 100 ms 0.

1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms Note: A driver must be installed in the personal computer. Refer to installation information in the operation manual for the Conversion Cable. Communications Specifications Transmission line RS-485: Multipoint connection method Communications Synchronization method Protocol Baud rate RS-485 (two-wire, half duplex) Start-stop synchronization CompoWay/F, SYSWAY, or Modbus 1200, 2400, 4800, 9600, 19200, 38400, or 57600 bps 7 or 8 bits 1 or 2 bits Vertical parity (none, even, odd) Frame check sequence (FCS) with SYSWAY Block check character (BCC) with CompoWay/F or CRC-16 Modbus None RS-485 None 1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output assigned to the alarm 1 function will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value). 2. For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output assigned to the alarm 1 function will turn ON if the heater current is higher than the set value (i.

e., SSR failure detection current value). 3. For heater overcurrent alarms, the heater current will be measured when the control output is ON, and the output assigned to the alarm 1 function will turn ON if the heater current is higher than the set value (i.e., heater overcurrent detection current value). Transmission code ASCII Data bit length Stop bit length Error detection Electrical Life Expectancy Curve for Relays (Reference Values) Life (× 10⁴ operations) 500 300 100 50 30 Flow control Interface Retry function Communications buffer Communications response wait time 10 5 E5CN 250 VAC, 30 VDC (resistive load) cos = 1 0 1 2 3 4 5 6 217 bytes 0 to 99 ms Default: 20 ms 3 1 Switching current (A) The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level. Note: Do not connect a DC load to a Controller with a Long-life Relay Output. 10 Basic-type Digital Temperature Controller E5CN/E5CN-U External Connections · A voltage output (control output, for driving SSR) is not electrically insulated from the internal circuits.



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When using a grounding thermocouple, do not connect any of the control output terminals to ground.

(If the control output terminals are connected to ground, errors will occur in the measured temperature values as a result of leakage current.) · Consult with your OMRON representative before using the external power supply for the ES1B for any other purpose. E5CN Controllers Control output 1 Long-life relay output 250 VAC, 3 A (resistive load) Relay output 250 VAC, 3 A (resistive load) Voltage output (for driving SSR) 12 VDC, 21 mA Current output 0 to 20 mA

DC 4 to 20 mA DC Load: 600 max. + Control output 1 + DO NOT USE DO NOT USE Auxiliary outputs (relay outputs) 250 VAC, 3 A (resistive load) Auxiliary output 2 Auxiliary output 1 A heater burnout alarm, heater short alarm, heater overcurrent alarm, or input alarm is sent to the output to which the alarm 1 function is assigned. - A B B mA - DO NOT USE - - + V Input power supply · 100 to 240 VAC · 24 VAC/VDC (no polarity) + mA Volt Analog input T/c Pt Temperature input Option Units Control output 2 Voltage output (for driving SSR) 12 VDC, 21 mA E53-CNHH03N2 Communications (RS-485) and CT2 B(+)

RS-485 E53-CNHB2 Event inputs and CT 11 E53-CNQ03N2 Communications (RS-485) and Control Output 2 B(+)

RS-485 E53-CNPBN2 Event Inputs and External Power Supply 11 E53-CNPHN2 External Power Supply and CT External + 11 12 VDC, power supply 20 mA E53-CNP03N2 Communications (RS-485) and External Power Supply B(+)

RS-485 11 12 13 11 12 13 14 15 11 12 13 A(-) EV1 EV2 CT1 12 13 14 15 A(-) DO NOT USE EV1 EV2 + 12 13 - 12 13 14 A(-) DO NOT USE CT2 CT1 14 15 DO NOT USE CT1 + Control output 2 14 12 VDC, External power supply 20 mA - - 15 14 External 12 VDC, power supply 20 mA + 15 - 15 E53-CNH03N2 Communications (RS-485) and CT B(+)

RS-485 E53-CN03N2 Communications (RS-485) B(+)

RS-485 E53-CNBN2 Event inputs E53-CNQHN2 Control Output 2 and CT + - DO NOT USE CT1 E53-CNQH2 Control Output 2 and CT2 + - 11 12 13 CT2 CT1 E53-CNQB2 Event Inputs and Control Output 2 11 11 12 13 14 11 12 13 14 15 11 11 12 13 14 15 Control output 2 Control output 2 A(-) DO NOT USE CT1 A(-) DO NOT USE DO NOT USE DO NOT USE EV1 EV2 DO NOT USE DO NOT USE 12 13 14 15 EV1 EV2 + - 12 13 14 15 14 15 Control output 2 15 E5CN-U Auxiliary output 250 VAC, 3 A (resistive load) (Relay outputs) Control output 1 Relay output (three terminals used) SPDT, 250 VAC, 3 A (resistive load) Voltage output (for driving SSR) 12 VDC, 21 mA Current output 4 to 20 mA DC 0 to 20 mA DC Load: 600 W max.

Control output 1 DO NOT USE DO NOT USE A B Auxiliary output 1 Auxiliary output 2 (Control output (cooling side)) An input error is sent to the output to which the alarm 1 function is assigned. Input power supply · 100 to 240 VAC · 24 VAC/VDC (no polarity) mA V DO NOT USE B T/c Pt Temperature input mA Volt Analog input Note: For the Wiring Socket, purchase the P2CF-11 or PG3A-11 separately. Basic-type Digital Temperature Controller E5CN/E5CN-U 11 Nomenclature E5CN E5CN-U The front panel is the same for the E5CN and E5CN-U. Temperature unit No.1 display Operation indicators No. 2 display Level Key Up Key Mode Key Down Key Dimensions E5CN Terminal Models 6 48 × 48 1.5 91 78 (Unit: mm) Panel Cutout Mounted Separately Group Mounted (48 × number of units - 2.5) +1.0 0 45 +0.6 0 58 44.8 × 44.8 48.8 60 min. Group mounting does not allow waterproofing. 45 +0.6 0 Waterproof Mounting Adapter Packing (Accessory) (Accessory) Terminal Cover (E53-COV17) (Accessory) 45 +0.6 0 Note: The terminal block cannot be removed. · Recommended panel thickness is 1 to 5 mm. · Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.) · To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller. · When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications. E5CN-U Plug-in Models 48 × 48 6 (84.7) 70.5 14.

2 Panel Cutout Mounted Separately Group Mounted (48 × number of units - 2.5) +1.0 0 45 58 44.8 × 44.8 60 min. +0.6 0 +0.6 0 Mounting Adapter (Accessory) 45 +0.6 0 45 · Recommended panel thickness is 1 to 5 mm. · Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.) · When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications. Accessories (Order Separately) USB-Serial Conversion Cable E58-CIFQ1 250 (2,100) LED indicator (SD) 1,765 USB connector (type A plug) LED indicator (RD) Serial connector 12 Basic-type Digital Temperature Controller E5CN/E5CN-U Terminal Cover E53-COV17 Waterproof Packing Y92S-29 (for DIN 48 × 48) Note: The E53-COV10 cannot be used. 48 48.8 22 Order the Waterproof Packing separately if it becomes lost or damaged. The Waterproof Packing can be used to achieve an IP66 degree of protection. (Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended to ensure the level of waterproofing specified in IP66. The time for periodic replacement depends on the operating environment. Be sure to confirm this point at your site.

Consider one year a rough standard. OMRON shall not be liable for the level of water resistance if the customer does not perform periodic replacement.) The Waterproof Packing does not need to be attached if a waterproof structure is not required. 9.1 Current Transformers E54-CT1 21 15 5.8 dia. 7.5 2.8 E54-CT1 Thru-current (Io) vs. Output Voltage (Eo) (Reference Values) Maximum continuous heater current: 50 A (50/60 Hz) Number of windings: 400±2 Winding resistance: 18±2 Output voltage (Eo) V (r. m.s.) 100 V 10 50 Hz 25 3 10.5 40 Two, 3.5 dia. 10 30 1 k Distortion factor 10% 3% 1% 1 100 mV 100 RL = 10 10 E54-CT3 30 12 dia. 2.36 dia. 1 100 V 10 1 9 10 100 mA 1 10 100 1,000 A 40 × 40 Thru-current (Io) A (r.m. s.) Two, M3 (depth: 4) E54-CT3 Thru-current (Io) vs. Output Voltage (Eo) (Reference Values) Maximum continuous heater current: 120 A (50/60 Hz) (Maximum continuous heater current for the Temperature Controller is 50 A.) Number of windings: 400±2 Winding resistance: 8±0.8 Output voltage (Eo) V (r.m.s.) 100 V 10 50 Hz 1 k 500 15 30 E54-CT3 Accessory · Armature Approx.



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3 dia. Connection Example Armature Plug Lead 1 Distortion factor 10% 3% 1% 100 mV 100 50 RL = 10 1 100 V 10 1 18 10 · Plug Approx.

6 dia. (22) 10 100 mA 1 10 100 1,000 A Thru-current (Io) A (r.m.s.) Basic-type Digital Temperature Controller E5CN/E5CN-U 13 Adapter Y92F-45 Note: Use this Adapter when the panel has already been prepared for the E5B@. Fixture (Accessory) 4.7 72 × 72 76 69.6 to 77.6 67 × 67 87 Mounted to E5CN 72 × 72 Panel (1 to 8 mm) 48 × 48 2.2 4.

7 77.3 (to back of E5CN) E5CN-U Wiring Socket Front-connecting Socket Eleven, M3.5 × 7.5 sems screws P2CF-11 3 7.8 4.

5 Terminal Layout/Internal Connections (Top View) 8765 4 Mounting Holes Two, 4.5 dia. mounting holes 70 max. Two, 4.5-dia. holes 35.4 9 3 10 11 1 2 40±0.2 Note: Can also be mounted to a DIN track. 4 50 max. 31.2 max. Note: A model with finger protection (P2CF-11-E) is also available. Back-connecting Socket P3GA-11 27 dia. 4 7 3 Terminal Layout/Internal Connections (Bottom View) 5678 4 45 25.6 3 9 2 1 11 10 45 4.

5 16.3 6.2 8.7 6 Note: 1. Using any other sockets will adversely affect accuracy. Use only the specified sockets. 2. A Protective Cover for finger protection (Y92A-48G) is also available. 14 Basic-type Digital Temperature Controller E5CN/E5CN-U Operation Setting Levels Diagram This diagram shows all of the setting levels. To move to the advanced function setting level and calibration level, you must enter passwords.

Some parameters are not displayed depending on the protect level setting and the conditions of use. Control stops when you move from the operation level to the initial setting level. Basic Type Start in manual mode. Power ON Start in automatic mode. Press the O Key or the PF Key for at least 1 s.

4 Operation Level Adjustment Level Press the O Key less than 1 s. a-m Manual mode Press the O Key for at least 3 s while a-m is displayed. (a-m will flash after 1st second.) Press the O+ M Keys for at least 3 s. (Display will flash after 1st second.)

) Press the O+ M Keys for at least 1 s. c 25 100 3 Manual Control Level c Press the O Key for at least 1 s. 25 100 Press the O Key for at least 3 s. (Display will flash after 1st second.) Protect Level Note: The time taken to move to the protect level can be adjusted by changing the "Move to protect level time" setting. *1 Control stops. Initial Setting Level Press the O Key for less than 1 s. Communications Setting Level Press the O Key for at least 1 s. Input password while amoV is displayed. (Set value -169) Advanced Function Setting Level Input password.

Control in progress Control stopped Calibration Level 2 Not displayed for some models Level change 1. You can return to the operation level by executing a software reset. 2. It is not possible to move to other levels from the calibration level by operating the keys on the front panel. It can be done only by first turning OFF the power. 3. From the manual control level, key operations can be used to move to the operation level only. Error Displays (Troubleshooting)

When an error occurs, the No.1 display shows the error code. Take necessary measure according to the error code, referring the table below.

No.1 display Meaning Input error A/D converter error Memory error Action Check the wiring of inputs for miswiring, disconnections, and short-circuits and check the input type. Turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system.

Check for external noise. Turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.

Status at error Control output OFF OFF Alarm output Operates as above the upper limit. OFF s.err (S. Err) e333 (E333) e111 (E111) OFF OFF Note: If the input value exceeds the display limit (-1999 to 9999), though it is within the control range, will be displayed under -1999 and above 9999. Under these conditions, control output and alarm output will operate normally. For details on the control range, refer to the E5CN/E5AN/E5EN Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156). These errors are displayed only when the PV/SP is displayed. Errors are not displayed for other displays.

Basic-type Digital Temperature Controller E5CN/E5CN-U 15 Parameters Basic Type Some parameters are not displayed depending on the model of the Controller and parameter settings. For details, refer to the E5CN/E5AN/E5EN Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156). Starting in manual mode. Power ON Starting in automatic mode. Press the O Key for at least 3 s. Other than the Auto/Manual Switch display Manual Control Level C Press the PID O Key for at 25 Control least 1 s. only Initial Setting Level Press the O Key for at least 1 s. @@@@Press the O and M Keys for at least 1 s.

@@@@@@@@@@@@@@@@Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur. @@Malfunction may occur due to noise in the cable. @@Doing so may occasionally result in minor electric shock or fire. @@Minor electric shock, fire, or malfunction may occasionally occur.

@@@@@@@@c) Signal inputs are SELV, limited energy. @@@@@@@@@@Tighten the terminal screws to between 0.74 and 0.90 N·m. 3 Loose screws may occasionally result in fire.

@@@@@@@@To maintain safety in the event of malfunction of the product, take appropriate safety measures, such as installing a monitoring device on a separate line. A semiconductor is used in the output section of long-life relays. If excessive noise or surge is impressed on the output terminals, a short-circuit failure is likely to occur. If the output remains shorted, fire will occur due to overheating of the heater or other cause. Take measures in the overall system to prevent excessive temperature increase and to prevent fire from spreading. Do not allow pieces of metal or wire cuttings to get inside the cable connector for the Support Software. Failure to do so may occasionally result in minor electric shock, fire, or damage to equipment. Do not allow dust and dirt to collect between the pins in the connector on the Conversion Cable. Failure to do so may occasionally result in fire. When inserting the body of the Temperature Controller into the case, confirm that the hooks on the top and bottom are securely engaged with the case.

If the body of the Temperature Controller is not inserted properly, faulty contact in the terminal section or reduced water resistance may occasionally result in fire or malfunction. When connecting the Control Output Unit to the socket, press it in until there is no gap between the Control Output Unit and the socket.



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Otherwise contact faults in the connector pins may occasionally result in fire or malfunction. 1. An SELV circuit is one separated from the power supply with double insulation or reinforced insulation, that does not exceed 30 V r.m.s. and 42.4 V peak or 60 VDC. 2.

A class 2 power supply is one tested and certified by UL as having the current and voltage of the secondary output restricted to specific levels. 3. The tightening torque for E5CN-U is 0.5 N·m. Precautions for Safe Use Be sure to observe the following precautions to prevent malfunction or adverse effects on the performance or functionality of the product.

Not doing so may occasionally result in faulty operation. 1. This product is specifically designed for indoor use only. Do not use this product in the following places: · Places directly subject to heat radiated from heating equipment. · Places subject to splashing liquid or oil atmosphere.

· Places subject to direct sunlight. · Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas). · Places subject to intense temperature change. · Places subject to icing and condensation. · Places subject to vibration and large shocks. 2. Use and store the product within the rated ambient temperature and humidity. Gang-mounting two or more Temperature Controllers, or mounting Temperature Controllers above each other may cause heat to build up inside the Temperature Controllers, which will shorten their service life. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Temperature Controllers. 3.

To allow heat to escape, do not block the area around the product. Do not block the ventilation holes on the product. 4. Be sure to wire properly with correct polarity of terminals. 5. Use the specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use stranded or solid copper wires with a gage of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.

081 mm²). (The stripping length is 5 to 6 mm.) Up to two wires of the same size and type or two crimp terminals can be inserted into a single terminal. 6. Do not wire the terminals that are not used.

7. To avoid inductive noise, keep the wiring for the product's terminal block away from power cables carry high voltages or large currents. Also, do not wire power lines together with or parallel to product wiring. Using shielded cables and using separate conduits or ducts is recommended. Attach a surge suppressor or noise filter to peripheral devices that generate noise (in particular, motors, transformers, solenoids, magnetic coils, or other equipment that have an inductance component).

When a noise filter is used at the power supply, first check the voltage or current, and attach the noise filter as close as possible to the product. Allow as much space as possible between the product and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge. 8. Use this product within the rated load and power supply. 9. Make sure that the rated voltage is attained within two seconds of turning ON the power using a switch or relay contact. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur. 10. Make sure that the Temperature Controller has 30 minutes or more to warm up after turning ON the power before starting actual control operations to ensure the correct temperature display.

18 Basic-type Digital Temperature Controller E5CN/E5CN-U 11. When executing self-tuning, turn ON power to the load (e.g., heater) at the same time as or before supplying power to the product. If power is turned ON to the product before turning ON power to the load, self-tuning will not be performed properly and optimum control will not be achieved. 12. A switch or circuit breaker must be provided close to the product. The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for this unit. 13. Always turn OFF the power supply before pulling out the interior of the product, and never touch nor apply shock to the terminals or electronic components.

When inserting the interior of the product, do not allow the electronic components to touch the case. 14. Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol. 15.

Design the system (e.g., control panel) considering the 2 seconds of delay that the product's output to be set after power ON. 16. The output may turn OFF when shifting to certain levels.

Take this into consideration when performing control. 17. The number of EEPROM write operations is limited. Therefore, use RAM write mode when frequently overwriting data during communications or other operations. 18. Always touch a grounded piece of metal before touching the Temperature Controller to discharge static electricity from your body. 19. Do not remove the terminal block. Doing so may result in failure or malfunction. 20.

Control outputs (for driving SSR) that are voltage outputs are not isolated from the internal circuits. When using a grounded thermocouple, do not connect any of the control output terminals to ground. (Doing so may result in an unwanted circuit path, causing error in the measured temperature.) 21. When replacing the body of the Temperature Controller, check the condition of the terminals. If corroded terminals are used, contact failure in the terminals may cause the temperature inside the Temperature Controller to increase, possibly resulting in fire. If the terminals are corroded, replace the case as well. 22. Use suitable tools when taking the Temperature Controller apart for disposal. Sharp parts inside the Temperature Controller may cause injury.

23. Before connecting an Output Unit, confirm the specifications and thoroughly read relevant information in the datasheet and manual for the Temperature Controller. 24. Check the orientation of the connectors on the Conversion Cable before connecting the Conversion Cable. Do not force a connector if it does not connect smoothly.

Using excessive force may damage the connector. 25. Do not place heavy object on the Conversion Cable, bend the cable past its natural bending radius, or pull on the cable with undue force. 26. Do not connect or disconnect the Conversion Cable while communications are in progress.

Product faults or malfunction may occur. 27. Make sure that the Conversion Cable's metal components are not touching the external power terminals. 28. Do not touch the connectors on the Conversion Cable with wet hands. Electrical shock may result. 29. Before using infrared communications, correctly attach the enclosed Mounting Adapter to the cable for the Support Software. When connecting the infrared port on the cable to the Support Software into the Adapter, insert the connector to the specified line. Communications may not be possible if the connector is not connected properly.

the temperature, the longer the service life.



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Therefore, the service life can be extended by lowering the temperature of the Temperature Controller. 3. When two or more Temperature Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to heat radiated by the Temperature Controllers and the service life will decrease. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Temperature Controllers. When providing forced cooling, however, be careful not to cool down the terminals sections alone to avoid measurement errors. Measurement Accuracy 1. When extending or connecting the thermocouple lead wire, be sure to use compensating wires that match the thermocouple types. 2. When extending or connecting the lead wire of the platinum resistance thermometer, be sure to use wires that have low resistance and keep the resistance of the three lead wires the same.

3. Mount the product so that it is horizontally level. 4. If the measurement accuracy is low, check to see if input shift has been set correctly. Waterproofing The degree of protection is as shown below.

Sections without any specification on their degree of protection or those with IP@0 are not waterproof. Front panel: IP66 Rear case: IP20, Terminal section: IP00 (E5CN-U: Front panel: IP50, rear case: IP20, terminals: IP00) Operating Precautions 1. It takes approximately two seconds for the outputs to turn ON from after the power supply is turned ON. Due consideration must be given to this time when incorporating Temperature Controllers in a sequence circuit. 2. When using self-tuning, turn ON power for the load (e.g., heater) at the same time as or before supplying power to the Temperature Controller. If power is turned ON for the Temperature Controller before turning ON power for the load, self-tuning will not be performed properly and optimum control will not be achieved. 3. When starting operation after the Temperature Controller has warmed up, turn OFF the power and then turn it ON again at the same time as turning ON power for the load. (Instead of turning the Temperature Controller OFF and ON again, switching from STOP mode to RUN mode can also be used.) 4. Avoid using the Controller in places near a radio, television set, or wireless installing. These devices can cause radio disturbances which adversely affect the performance of the Controller.

Others 1. The disk that is included with the Conversion Cable is designed for a computer CD-ROM driver. Never attempt to play the disk in a general-purpose audio player. 2. Do not connect or disconnect the Conversion Cable connector repeatedly over a short period of time. The computer may malfunction. 3. After connecting the Conversion Cable to the computer, check the COM port number before starting communications. The computer requires time to recognize the cable connection. This delay does not indicate failure.

4. Do not connect the Conversion Cable through a USB hub. Doing so may damage the Conversion Cable. 5. Do not use an extension cable to extend the Conversion Cable length when connecting to the computer.

Doing so may damage the Conversion Cable. Precautions for Correct Use Service Life 1. Use the product within the following temperature and humidity ranges: Temperature: - to 55° C (with no icing or condensation) 10 Humidity: 25% to 85% If the product is installed inside a control board, the ambient temperature must be kept to under 55° C, including the temperature around the product. 2. The service life of electronic devices like Temperature Controllers is determined not only by the number of times the relay is switched but also by the service life of internal electronic components.

Component service life is affected by the ambient temperature: the higher the temperature, the shorter the service life and, the lower Basic-type Digital Temperature Controller E5CN/E5CN-U 19 Mounting Mounting to a Panel For waterproof mounting, waterproof packing must be installed on the Controller. Waterproofing is not possible when group mounting several Controllers. Waterproof packing is not necessary when there is no need for the waterproofing function. Order the P2CF-11 or P3GA-11 Socket separately. Precautions when Wiring · Separate input leads and power lines in order to prevent external noise. · Use wires with a gage of AWG24 (cross-sectional area: 0.205 mm²) to AWG14 (cross-sectional area: 2.081 mm²) twistedpair cable (stripping length: 5 to 6 mm). · Use crimp terminals when wiring the terminals. · Tighten the terminal screws to a torque of 0.

74 to 0.90 N·m, however the terminal screws on the E5CN-U must be tightened to a torque of 0.5 N·m. · Use the following types of crimp terminals for M3.5 screws. E53-COV17 Terminal Cover (Accessory) Adapter (Accessory) 7.2 mm max. 7.2 mm max. E5CN-U Waterproof packing (Accessory) Panel For Front-mounting Socket (Panel mounting is also possible).

E5CN · Do not remove the terminal block. Doing so will result in malfunction or failure. 1. The Panel Mounting Adapter is also included with the E5CN-U. There is no waterproof packing included with the E5CN-U.

2. Insert the E5CN/E5CN-U into the mounting hole in the panel. 3. Push the adapter from the terminals up to the panel, and temporarily fasten the E5CN/E5CN-U. 4.

Tighten the two fastening screws on the adapter. @@@@ Insert a flat-blade screwdriver into the two tool insertion holes (one on the top and one on the bottom) to release the hooks. 2. Insert the flat-blade screwdriver in the gap between the front panel and rear case, and pull out the front panel slightly.

Hold the top and bottom of the front panel and carefully pull it out toward you, without applying unnecessary force. 3. When inserting the body of the Temperature Controller into the case, make sure the PCBs are parallel to each other, make sure that the sealing rubber is in place, and press the E5CN toward the rear case into position. While pushing the E5CN into place, push down on the hooks on the top and bottom surfaces of the rear case so that the hooks are securely locked in place. Be sure that electronic components do not come into contact with the case. 20 Basic-type Digital Temperature Controller E5CN/E5CN-U Basic-type Digital Temperature Controller E5CN/E5CN-U 21 Warranty and Application Considerations Read and Understand This Catalog

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