

Single Loop Controller

Model C45A/C46A

Overview

The C45A/C46A (hereafter C45A or C46A) is a highly advanced, high-precision compact single loop controller, featuring dual 5-digit indicators, an input sampling cycle of 25 ms, indication accuracy of $\pm 0.1\%$ of reading, and up to 2 control loops. It offers PID control using the latest "RationaLOOP" algorithms.

Up to seven control outputs (depending on the model) are available, selectable from relay contact, voltage pulse, triac (for position proportional output), current, continuous voltage, and transmitter power (24 V DC).

Additionally, the controller can be configured with as many as 14 digital inputs (DIs) and 8 digital outputs (DOs). A mode change function to handle automatic equipment operation, a variety of alarms, and various status outputs are provided to support safe operation. Easy setup and monitoring from a PC are available using the Smart Loader Package.

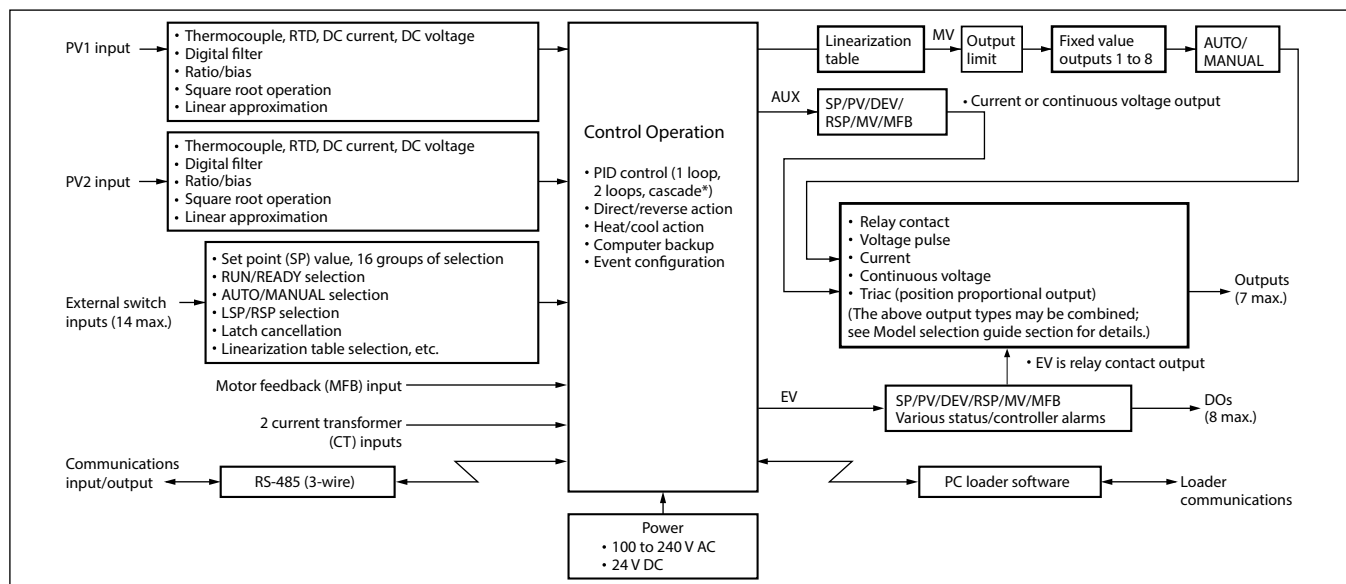
Features

- Control, ranging from cascade to backup control, is available for 1 or 2 loops.
- High-speed 25 ms sampling cycle and accuracy of $\pm 0.1\%$ rdg.
- Ample room for indication of vital information on dual 7-segment, 5-digit LED displays and an auxiliary 11-segment, 3-digit LED display



- Full multi-range input, allowing input type to be freely changed between thermocouple, RTD, current and volt-age
- Heat/cool control, using two control outputs
- Using the optional transmitter power supply function, a pressure transmitter can be directly connected.
- IP65 protection for the front panel
- Up to 16 recipe settings involving SP, event settings, etc., and 8 groups of fixed-value control output settings support automatic operation of equipment.
- Support for nonlinear processes using input/output broken line linear approximation tables
- Customizable parameter keys and LED
- A variety of inputs and outputs
- 2 inputs, 7 outputs, 14 DIs, 8 DOs, 2 CT inputs, RS-485 communications
- RoHS-compliant

Basic function block of model C45A/C46A



Specifications

| | | |
|----------------------------|--|---|
| Analog input | Input type | Full multi-range input: thermocouple, RTD, DC current and DC voltage |
| | Input sampling time | 25 ms, 50 ms, 100 ms, 300 ms (according to the setting) |
| | Input bias current (under standard conditions) | Thermocouple input: DC voltage (mV-range) input: 0.2 μ A (flowed out from the positive (+) terminal.) When the thermocouple/mV input burnout setup is set at "upscale at burnout": 0.05 μ A (flowed out from the positive (+) terminal or flowed into the positive (+) terminal) When the thermocouple/mV input burnout setup is set at "unknown at burnout." DC voltage (V-range) input: 1 μ A max. (flowed out from the positive (+) terminal or flowed into the positive (+) terminal) Each of 0 to 1 V and -1 to +1 V ranges 5 μ A max. (flowed into the positive (+) terminal.) Each of 1 to 5 V and 0 to 5 V ranges 10 μ A max. (flowed into the positive (+) terminal.) 0 to 10 V range |
| | Input impedance | Thermocouple input: 1 M Ω min. DC voltage input: 1 M Ω min. DC current input: 110 Ω max. |
| | Measuring current | RTD input: 1 mA \pm 0.02 mA Flowed out from the terminals A and C to the terminal B. |
| | Influence of wiring resistance (under standard conditions) | RTD input: 0.02 $^{\circ}$ C/ Ω max., wiring resistance is 85 Ω max. |
| | Allowable wiring resistance | RTD input: 85 Ω max. including the Zener barrier resistance per RTD. |
| | Allowable input voltage | Thermocouple input: -1.0 to +3.5 V DC voltage (mV-range) input: -1.0 to +2.5 V DC voltage (V-range) input: -10 to +25 V DC current input: -1 to +4 V |
| | Burnout indication | Varies with input range |
| | Cold junction compensation accuracy | \pm 0.5 $^{\circ}$ C (under standard conditions) \pm 1.0 $^{\circ}$ C Ambient temperature, 0 to 50 $^{\circ}$ C (under other standard conditions) |
| | Cold junction compensation method | Internal/external (0 $^{\circ}$ C only) compensation selectable |
| | Scaling | -19999 to +32000U (Linear DC voltage/current input only. Reverse scaling and decimal point repositioning available. Effective resolution depends on the range.) |
| | Indicators and configuration | PV, SP indication |
| Auxiliary indication | | 3-digit, 11-segment orange LED |
| Multi-status indicator | | 12-segment LED, green or orange (depending on the model). Displays status of control output, alarm, RUN/READY, etc. |
| No. of status displays | | C45A: 17, C46A: 19 LED displays |
| Operation keys | | C45A: 11, C46A: 13 rubber keys |
| Number of local set points | | 16 groups |
| Memory storage system | | EEPROM |
| Indicating range | | -19999 to +32000U (or to the SP limit, if it is set) |
| SP limits | | Lower limit: -19999 to upper limit value. Upper limit: lower limit value to 32000U. |
| SP ramp | | 0.0 to 3200.0 s, min, or h (both up- and down-ramp), Disabled if 0.0 is selected. |
| Input readout accuracy | | \pm 0.1% FS \pm 1 digit (depending on the range; see Table 1) |
| Indicating range | | See Table 1 |
| Digital input (DI) | Number of inputs | C45A: 10 max. C46A: 14 max. |
| | Types of connectable outputs | Dry contact or transistor (sink type) |
| | Open terminal voltage | 7 V DC \pm 15 % (under standard conditions) |
| | Terminal current (during short-circuit) | 3 to 7 mA |
| | Allowable ON contact resistance | 500 Ω max. |
| | Allowable OFF contact resistance | 100 k Ω min. |
| | Allowable open-collector ON-state residual current | 1.5 V or less (under standard conditions) |
| | Allowable open-collector OFF-state leakage current | 0.1 mA max. |
| | Computation cycle | 25 ms, 50 ms, 100 ms, 300 ms (depending on the setting) |
| | Min. detection holding time | 2 times the input sampling cycle |
| | Assignable functions | RUN/READY, AUTO/MANUAL, REMOTE/LOCAL, auto tuning start/stop, control action direct/reverse selection, SP group/recipe group selection, fixed value outputs 1 to 8 selection, linear approximation table selection, computer backup selection |

| | | | |
|-----------------------------------|--|--|---|
| Control | PID control | Proportional band (P) | 0.1 to 3200.0 % |
| | | Integral time (I) | 0 to 32000, 0.0 to 3200.0, 0.00 to 320.00 seconds |
| | | Derivative time (D) | 0 to 32000, 0.0 to 3200.0, 0.00 to 320.00 seconds |
| | | MV limit | Lower limit: -10.0 to upper limit % Upper limit: lower limit to +110.0 % |
| | | Manual reset | -10.0 to +110.0 % |
| | | Number of PID groups | 16 |
| | | PID group selection | By console or DI |
| | | MV change limit | 0.00 to 320.00 %/s, no limit at 0.0 % |
| | | Auto tuning | Automatic PID value setting by limit cycle method. Additionally, one of the following 3 control characteristics can be selected: <ul style="list-style-type: none"> • Standard • Quick disturbance response • Less up/down fluctuation |
| | | Position proportional dead zone | 0.5 to 25.0 % |
| | Heat/cool dead zone | -100.0 to +100.0 % | |
| Direct/reverse action selection | Available | | |
| Output | Relay contact, form 1a (outputs 1 & 2) | Contact rating: 250 V AC/30 V DC, 1 A (resistive load) Contact voltage: 250 V AC or less / 30 V DC or less Service life: 100,000 cycles or more (rated load) Min. switching specifications: 10 mA/5 V DC | |
| | Relay contact, form 1a1b (outputs 1 & 2) | Contact rating: 250 V AC/30 V DC, 3 A (resistive load) Contact voltage: 250 V AC or less / 30 V DC or less Service life: 100,000 cycles or more (rated load) Min. switching specifications: 100 mA/5 V DC | |
| | Relay contact, form 1a (outputs 3 to 5) | Contact rating: 250 V AC/30 V DC, 3 A (resistive load) Contact voltage: 250 V AC or less / 12 DC or less Service life: 100,000 cycles or more (rated load) Min. switching specifications: 100 mA/5 V DC | |
| | Triac (outputs 3 & 4, position proportional output) | Compatible motors: ECM3000F1___ (100 V AC, relay contact input) | |
| | Motor drive relay | Contact configuration: 1a (output 3) + 1a (output 4) Contact rating: 2 A 250 V AC max./cosφ=0.4 2.5 A 24 V DC (L/R=0.7 ms) Contact voltage: 250 V AC max./125 V DC max. Life: Min. 100,000 operations (rated load) Min. switching specifications: 40 mA/24 V DC | |
| | Current (outputs 3 to 7) | Output current: 4 to 20 mA DC (2.4 to 21.6 mA DC) 0 to 20 mA DC (0.0 to 22.0 mA DC) Load resistance: 600 Ω or less Output accuracy: ±0.1 % FS or less (under standard conditions) Output resolution: 1/15000 or more (in the 0 to 20 mA DC FS range) Voltage (open): 23 V DC or less | |
| | Voltage pulse | Output voltage: 12 V DC+15 %/-10 % Load current: 30 mA or less | |
| | Continuous voltage | Output voltage: 0 to 5 V DC (0.0 to 5.5 V DC) 1 to 5 V DC (0.6 to 5.4 V DC) 0 to 10 V DC (0.0 to 11.0 V DC) Load resistance: 1 kΩ or more Load limit current: 21 mA (standard value under standard conditions) Output accuracy: ±0.1 % FS or less (under standard conditions) Output resolution: 1/20000 or more (for 0 to 10 V) | |
| Transmitter power supply function | Output voltage: 24 V DC±10% Load current: 30 mA or less Load limit current: 45 mA (standard value under standard conditions) | | |

| | | | | |
|---------------------------------------|---|---|--|------------------------|
| Digital output (DO) | Event types (assignable to relay output) | PV direct, PV reverse, deviation direct, deviation reverse, absolute value deviation direct, absolute value deviation reverse, MV direct, MV reverse, RSP direct, RSP reverse, SP direct, SP reverse, sum of all alarms, PV range alarm, controller alarm, manual status, READY status, local status, auto tuning execution | | |
| | Settable ranges | PV (direct, reverse): -19999 to +32000U RSP (direct, reverse): -19999 to +32000U Deviation (direct, reverse): -19999 to +32000U Absolute value deviation (direct, reverse): 0 to +32000U MV (direct, reverse): -10.0 to +110.0 % | | |
| | Operation differential (hysteresis) setting range | 0 to 200U (except MV, MFB event, process alarm) 0.0 to 20.0 % for MV, MFB event, process alarm | | |
| | ON delay time | 0.1 to 3200.0 seconds | | |
| | Output operation | ON/OFF action, latch action | | |
| | Output rating | Output type: Transistor (sink type) Load resistance: 4.5 to 28 V DC Load current: 70 mA/output max. 500 mA/all outputs max. | | |
| | Auxiliary output | Number of outputs | 4 max. assignable | |
| Output types | | PV, SP, DEV, RSP, MV, MFB, etc. can be selected | | |
| Output method | | Current or continuous voltage | | |
| Communications | Communications system | Protocol | RS-485 | |
| | | Network | Multidrop. Slave station only. Connect up to 31 units. | |
| | | Data flow | Half-duplex | |
| | | Synchronization method | Start/stop synchronization | |
| | Interface | Transmission system | Balance (differential) type | |
| | | Transmission type | Bit serial | |
| | | Transmit/receive lines | 3 | |
| | | Speed | 4800, 9600, 19200, 38400 bps | |
| | | Distance | 500 m max. | |
| | | Protocol | RS-485 (3-wire type) | |
| | | Message characters | Character configuration | 9 to 12 bits/character |
| | | Data length | 7 or 8 bits | |
| | | Stop bit length | 1 or 2 bits | |
| | | Parity bit | Even parity, odd parity, or non-parity | |
| PC loader | Communications line | 3-wire type | | |
| | Communications speed | 38400 bps (fixed) | | |
| | Recommended cable | Dedicated cable | | |
| Current transformer (CT) input | Number of inputs | 2 | | |
| | Detection function | When control output is ON: heater line break or overcurrent detection When control output is OFF: final control device short circuit detection | | |
| | Input device | Current transformer (sold separately), 800 turns • QN212A, 5.8 mm dia. hole • QN206A, 12 mm dia. hole | | |
| | Input range | AC 0.0 to 50.0 A | | |
| | Measurement current range | 0.0 to 55.0 Aac (accuracy may be out of specifications for less than 0.4 Aac.) | | |
| | Indication accuracy | ±3 %FS ±1 digit (50/60 Hz, when measuring the sine wave) | | |
| | Indication resolution | AC 0.1 A | | |
| General specifications | Memory backup | EEPROM | | |
| | Power | AC100 to 240 V (100 to 240 V AC power model) DC24V (24 V DC power model) | | |
| | Power consumption | 30 VA max. (C45A: 100 to 240 V AC power model) 40 VA max. (C46A: 100 to 240 V AC power model) 12 W max. (C45A: 24 V DC power model) 15 W max. (C46A: 24 V DC power model) | | |
| | Power ON inrush current | 35 A max./10 ms max. (100 to 240 V AC power model) 20 A max./10 ms max. (24 V DC power model) | | |
| | Power ON operation | Reset time: 6 s max. (time until normal operation starts under standard conditions) | | |
| | Allowable transient power loss | 20 ms min. | | |
| | Insulation resistance | 20 MΩ or more between power supply terminal 1 or 2 and FG terminal 3 (500 V DC megger) | | |
| | Dielectric strength | 1500 V AC for 1 min (100 to 240 V AC power model), 500 V AC for 1 min (24 V DC power model) • Between power supply terminal 1 or 2 or FG terminal 3 and secondary terminal • Between power supply terminal 1 or 2 and FG terminal 3 | | |

| | | | | | |
|-------------------------------|--|--|--|-----------------------|---|
| General specifications | Standard conditions | Ambient temperature | 23±2 °C | | |
| | | Ambient humidity | 60±5 % RH | | |
| | | Power voltage | 105 V AC ± 1 % (100 to 240 V AC power model) 24 V DC ± 5 % (24 V DC power model) | | |
| | | Power frequency | 50±1 Hz or 60±1 Hz (100 to 240 V power model) | | |
| | | Vibration resistance | 0 m/s ² | | |
| | | Shock resistance | 0 m/s ² | | |
| | | Mounting angle | Reference plane ±3° | | |
| | | Clear space | 100 mm min. vertically and horizontally | | |
| | Operating conditions | Ambient temperature | 0 to 50 °C | | |
| | | Ambient humidity | 10 to 90 % RH (without condensation) | | |
| | | Power voltage | 85 to 264 V AC (100 to 240 V AC power model), 21.6 to 26.4 V DC (24 V DC power model) | | |
| | | Power frequency | 50±2 Hz or 60±2 Hz (100 to 240 V AC power model) | | |
| | | Vibration resistance | 0 to 2 m/s ² (10 to 60 Hz for 2 h each in X, Y, and Z directions) | | |
| | | Shock resistance | 0 to 10 m/s ² | | |
| | | Mounting angle | Reference plane ±10° | | |
| | | Altitude | 2000 m max. | | |
| | | Clear space | 50 mm min. above and below | | |
| | Transportation conditions | Ambient temperature | -20 to +70 °C | | |
| | | Ambient humidity | 10 to 95 % RH (without condensation) | | |
| Vibration resistance | | 0 to 5 m/s ² (10 to 60 Hz for 2 h each in X, Y, and Z directions) | | | |
| Shock resistance | | 0 to 500 m/s ² (3 times each in X, Y, and Z directions) | | | |
| Front panel protection | IP65 (under operating conditions) | | | | |
| Console and case material | PPO, Modified PPE | | | | |
| Console and case color | Black | | | | |
| Standards compliance | EN61010-1, EN61326-1 (For use in industrial locations) During EMC testing, the reading or output may fluctuate by ±10 %FS. UL61010-1, CAN/CSA C22.2 No.61010-1 ^{*1} | | | | |
| Overvoltage category | Category II (IEC60364-4-443, IEC60664-1) | | | | |
| Mounting | Panel mounted (with dedicated mounting bracket) | | | | |
| Mass | C45A: Approx. 400 g (including dedicated mounting bracket) C46A: Approx. 700 g (including dedicated mounting bracket) | | | | |
| Accessories (included) | Part name | Model | Optional parts (sold separately) | Part name | Model |
| | Mounting brackets (2) | 81405411-004 | | Mounting brackets (2) | 81405411-003 |
| | Gasket | 81421863-001 (for C45A) | | Current transformer | QN206A (5.8 mm dia. hole) QN212A (12 mm dia. hole) |
| | | 81421864-001 (for C46A) | | | |
| | User's manual | CP-UM-5445E | | Hard cover | 81441421-001 (for C45A) 81441422-001 (for C46A) |
| | | | | | Terminal cover |

*1: Depends on the model.

*2: 1 for C45A, 2 for C46A

Table 1. Input types and ranges

| Input type | Pv-01 | Sensor type | Range | | Accuracy |
|------------------------------------|-------|-------------------|-----------------------|-----------------------|------------------------------------|
| Thermocouple | 1 | K | -270.0 to +1372.0 °C | -454 to +2502 °F | ±0.1 % rdg. ±1 digit ^{*1} |
| | 2 | E | -270.0 to +1000.0 °C | -454 to +1832 °F | ±0.1 % rdg. ±1 digit ^{*2} |
| | 3 | J | -200.0 to +1200.0 °C | -328 to +2192 °F | ±0.1 % rdg. ±1 digit ^{*3} |
| | 4 | T | -270.0 to +400.0 °C | -454 to +752 °F | ±0.5 °C ^{*4} |
| | 5 | B | 0.0 to 1800.0 °C | 32 to 3272 °F | ±2.0 °C ^{*5} |
| | 6 | R | -50.0 to +1768.0 °C | -58 to +3214 °F | ±0.1 % rdg. ±1 digit ^{*6} |
| | 7 | S | -50.0 to +1768.0 °C | -58 to +3214 °F | ±0.1 % rdg. ±1 digit ^{*6} |
| | 8 | W (WRe5-26) | 0.0 to 2300.0 °C | 32 to 4172 °F | ±0.1 % rdg. ±1 digit ^{*7} |
| | 9 | PR40-20 | 0.0 to 1900.0 °C | 32 to 3452 °F | ±8.0 °C ^{*8} |
| | 10 | Ni-NiMo | 0.0 to 1300.0 °C | 32 to 2372 °F | ±1.4 °C |
| | 11 | N | -200.0 to +1300.0 °C | -328 to +2372 °F | ±1.4 °C ^{*9} |
| | 12 | PL II | 0.0 to 1390.0 °C | 32 to 2534 °F | ±1.4 °C |
| | 13 | DIN U | -200.0 to +600.0 °C | -328 to +1112 °F | ±0.7 °C ^{*10} |
| | 14 | DIN L | -200.0 to +900.0 °C | -328 to +1652 °F | ±1.0 °C ^{*11} |
| | 15 | Gold-iron/Chromel | -273.0 to +27.0 °C | -459 to +80 °F | ±1.5 °C |
| RTD | 21 | Pt100 | -200.0 to +850.0 °C | -328.0 to +1562.0 °F | ±0.3 °C |
| | 22 | | -200.00 to +300.00 °C | -328.00 to +572.00 °F | ±0.15 °C |
| | 31 | JPt100 | -200.0 to +640.0 °C | -328.0 to +1184.0 °F | ±0.3 °C |
| | 32 | | -200.00 to +300.00 °C | -328.00 to +572.00 °F | ±0.15 °C |
| Linear (DC voltage /current) | 41 | Current | 4 to 20 mA | | ±0.1 % FS ±1 digit |
| | 42 | | 0 to 20 mA | | ±0.1 % FS ±1 digit |
| | 43 | Voltage | 0 to 10 mV | | ±0.1 % FS ±1 digit |
| | 44 | | -10 to +10 mV | | ±0.1 % FS ±1 digit |
| | 45 | | 0 to 100 mV | | ±0.1 % FS ±1 digit |
| | 46 | | -100 to +100 mV | | ±0.1 % FS ±1 digit |
| | 47 | | 0 to 1 V | | ±0.1 % FS ±1 digit |
| | 48 | | -1 to +1 V | | ±0.1 % FS ±1 digit |
| | 49 | | 1 to 5 V | | ±0.1 % FS ±1 digit |
| | 50 | | 0 to 5 V | | ±0.1 % FS ±1 digit |
| | 51 | | 0 to 10 V | | ±0.1 % FS ±1 digit |

- *1: At 400 °C or higher.
±0.5 °C (-100 to less than +400 °C)
±1.0 °C (-200 to less than -100 °C)
±20.0 °C (Less than -200 °C)
- *2: At 400 °C or higher.
±0.5 °C (-100 to less than +400 °C)
±1.0 °C (-200 to less than -100 °C)
±15.0 °C (Less than -200 °C)
- *3: At 400 °C or higher.
±0.5 °C (-100 to less than +400 °C)
±1.0 °C (Less than -100 °C)

- *4: At -100 °C or higher.
±1.0 °C (-200 to less than -100 °C)
±10.0 °C (Less than -200 °C)
- *5: At 800 °C or higher.
±4.0 °C (260 to less than 800 °C)
±70 °C (Less than 260 °C)
- *6: At 1000 °C or higher.
±2.0 °C (0 to less than 1000 °C)
±4.0 °C (Less than 0 °C)
- *7: At 1400 °C or higher.
±1.5 °C (Less than 1400 °C)

- *8: At 800 °C or higher.
±20.0 °C (300 to less than 800 °C)
±40.0 °C (Less than 300 °C)
- *9: At 0 °C or higher.
±4.0 °C (Less than 0 °C)
- *10: At 0 °C or higher.
±1.0 °C (Less than 0 °C)
- *11: At 0 °C or higher.
±1.5 °C (Less than 0 °C)

■ Standards for input sensors

● Thermocouple

- K, E, J, T, B, R, S, N: JIS C 1602-1995
- WRe5-26: ASTM E988-96
- PR40-20: ASTM E1751-00
- Ni-NiMo: ASTM E1751-00
- PL II: ASTM E1751-00
- DIN U, DIN L: DIN 43710-1985
- Gold-iron/Chromel: ASTM E1751-00

● RTD

- Pt 100, JPt 100: JIS C 1604-1989

■ Model C45A selection guide

● Choose the appropriate type of model number:

- **Detailed model number**
Specifications required for a particular application can be selected in detail, allowing purchase of the optimal device (especially useful for equipment manufacturers).
- **Combined function model number**
Easy selection from premade combinations of required functions. Selections have multiple I/Os, so these devices can be used flexibly for a variety of application requirements (especially useful for engineering manufacturers and factory maintenance staff).

● Detailed model No.

I II III IV V VI VII VIII IX X Ex.: C45A1A1C000000

| I | II | III | IV | V | VI | VII | VIII | IX | X | Descriptions |
|-------------|--------|-------|-----------------|-----------------|----------|-----------------|---------|-----------------------|-----------------------|---|
| Basic model | Inputs | Power | Outputs 1 and 2 | Outputs 3 and 4 | Output 5 | Outputs 6 and 7 | Options | Additional features 1 | Additional features 2 | |
| C45A | | | | | | | | | | Standard model |
| | 1 | | | | | | | | | 1 full multiple input |
| | 2 | | | | | | | | | 2 full multiple inputs |
| | | A | | | | | | | | 100 to 240 V AC |
| | | D | | | | | | | | 24 V DC ^{*3} |
| | | | 1 | | | | | | | 1a1b relay: 1 |
| | | | 2 | | | | | | | 1a relay: 2 |
| | | | | CO | | | | | | Current (OUT3) |
| | | | | DO | | | | | | Continuous voltage (OUT3) |
| | | | | VO | | | | | | Voltage pulse (OUT3) |
| | | | | RR | | | | | | 1a relay + 1a relay |
| | | | | CC | | | | | | Current + current |
| | | | | VV | | | | | | Voltage pulse + voltage pulse |
| | | | | CV | | | | | | Current (OUT3) + voltage pulse (OUT4) |
| | | | | SS | | | | | | Motor drive (triac), MFB input: 1 |
| | | | | | 0 | | | | | None |
| | | | | | R | | | | | 1a relay |
| | | | | | C | | | | | Current |
| | | | | | D | | | | | Continuous voltage |
| | | | | | P | | | | | Power supply for signal transmitter |
| | | | | | | 0 | | | | None |
| | | | | | | | 0 | | | DI: 2 (terminals F1 and F2) ^{*1} |
| | | | | | | | 1 | | | DI: 10 ^{*2} |
| | | | | | | | 2 | | | DI: 2, DO: 8 ^{*1} |
| | | | | | | | 3 | | | DI: 2, DO: 8, RS-485 ^{*1} |
| | | | | | | | 4 | | | CT input: 2 ^{*3} |
| | | | | | | | 5 | | | CT input: 2, DI: 8 ^{*3} |
| | | | | | | | 6 | | | CT input: 2, DO: 8 ^{*3} |
| | | | | | | | 7 | | | CT input: 2, DO: 8, RS-485 ^{*3} |
| | | | | | | | | 0 | | None |
| | | | | | | | | D | | With inspection data |
| | | | | | | | | Y | | With traceability certification |
| | | | | | | | | | 0 | None |
| | | | | | | | | | 1 | Orange color for all LEDs |
| | | | | | | | | | A | UL-marked product |
| | | | | | | | | | B | UL-marked product, orange LEDs only |

*1 When "SS" is selected for outputs 3 and 4, DI: 0.

*2 When "SS" is selected for outputs 3 and 4, DI: 8.

*3 When "SS" is selected for outputs 3 and 4, this option code is not selectable.

* Additionally, tropicalization and anti-sulfidation treatments can be ordered. However, there are some specifications restrictions. For details, contact the azbil Group.

● Combined function model No. (with orange LEDs for all displays; power: 100 to 240 V AC)

I II III IV Ex.: C45A000

| I | II | III | IV | Descriptions |
|-----------------|---------|----------|----------|--|
| Basic model No. | Set No. | Option 1 | Option 2 | |
| C45A | | | | Standard model, with 2 alarm outputs |
| | 0 | | | (Reserved for future use) |
| | | 0 | | Regular type 1: Plus 1 current output, 2 relay outputs, and 2 DIs |
| | | 1 | | Regular type 2: Plus 1 current output, 1 voltage pulse output, 1 relay output, and 2 DIs |
| | | 2 | | Position proportion type: Plus 1 relay output, and 2 triac outputs |
| | | 3 | | Regular type 3: Plus 2 current outputs, transmitter power supply (24 V), and 2 DIs |
| | | 4 | | Position proportion type 2: Plus transmitter power supply (24 V), and 2 triac outputs |
| | | | 0 | None |
| | | | 1 | RS-485 communications, PV input 2, 8 DOs |
| | | | 2 | PV input 2, 8 DOs |
| | | | 3 | 8 DOs |
| | | | 4 | PV input 2 |

■ Model C46A selection guide

● Choose the appropriate type of model number:

• Detailed model number

Specifications required for a particular application can be selected in detail, allowing purchase of the optimal device (especially useful for equipment manufacturers).

• Combined function model number

Easy selection from premade combinations of required functions. Selections have multiple I/Os, so these devices can be used flexibly for a variety of application requirements (especially useful for engineering manufacturers and factory maintenance staff).

● Detailed model No.

I II III IV V VI VII VIII IX X Ex.: C46A1A1C000000

| I | II | III | IV | V | VI | VII | VIII | IX | X | Descriptions |
|-------------|--------|-------|-----------------|-----------------|----------|-----------------|---------|-----------------------|-----------------------|---|
| Basic model | Inputs | Power | Outputs 1 and 2 | Outputs 3 and 4 | Output 5 | Outputs 6 and 7 | Options | Additional features 1 | Additional features 2 | |
| C46A | | | | | | | | | | Standard model |
| | 1 | | | | | | | | | 1 full multiple input |
| | 2 | | | | | | | | | 2 full multiple inputs |
| | | A | | | | | | | | 100 to 240 V AC |
| | | D | | | | | | | | 24 V DC ^{*4} |
| | | | 1 | | | | | | | 1a1b relay: 1 |
| | | | 2 | | | | | | | 1a relay: 2 |
| | | | | C0 | | | | | | Current (OUT3) |
| | | | | D0 | | | | | | Continuous voltage (OUT3) |
| | | | | V0 | | | | | | Voltage pulse (OUT3) |
| | | | | RR | | | | | | 1a relay + 1a relay |
| | | | | CC | | | | | | Current + current |
| | | | | VV | | | | | | Voltage pulse + voltage pulse |
| | | | | CV | | | | | | Current (OUT3) + voltage pulse (OUT4) |
| | | | | SS | | | | | | Motor drive triac, MFB input: 1 |
| | | | | R1 | | | | | | Motor drive relay, MFB input: 1 |
| | | | | | 0 | | | | | None ^{*4} |
| | | | | | R | | | | | 1a relay ^{*4} |
| | | | | | C | | | | | Current ^{*4} |
| | | | | | D | | | | | Continuous voltage ^{*4} |
| | | | | | P | | | | | Power supply for signal transmitter ^{*4} |
| | | | | | | 0 | | | | None |
| | | | | | | 1 | | | | Current (OUT6) |
| | | | | | | 2 | | | | Power supply for signal transmitter (OUT7) |
| | | | | | | 3 | | | | Current + current ^{*1} |
| | | | | | | 4 | | | | Current (OUT6) + power supply for signal transmitter (OUT7) |
| | | | | | | | 0 | | | DI: 2 (terminals F1 and F2) ^{*2} |
| | | | | | | | 1 | | | DI: 14 ^{*3} |
| | | | | | | | 2 | | | DI: 14, DO: 8 ^{*3} |
| | | | | | | | 3 | | | DI: 14, DO: 8, RS-485 ^{*3} |
| | | | | | | | 4 | | | CT input: 2 ^{*4} |
| | | | | | | | 5 | | | CT input: 2, DI: 12 ^{*4} |
| | | | | | | | 6 | | | CT input: 2, DI: 12, DO: 8 ^{*4} |
| | | | | | | | 7 | | | CT input: 2, DI: 12, DO: 8, RS-485 ^{*4} |
| | | | | | | | | 0 | | None |
| | | | | | | | | D | | With inspection data |
| | | | | | | | | Y | | With traceability certification |
| | | | | | | | | | 0 | None |
| | | | | | | | | | 1 | Orange color for all LEDs |
| | | | | | | | | | A | UL-marked product |
| | | | | | | | | | B | UL-marked product, orange LEDs only |

*1 When "CC" is selected for outputs 3 and 4, and "C" for output 5, this code 3 is not selectable.

*2 When "SS" or "R1" is selected for outputs 3 and 4, DI: 0.

*3 When "SS" or "R1" is selected for outputs 3 and 4, DI: 12.

*4 When "SS" or "R1" is selected for outputs 3 and 4, this option code is not selectable.

* Additionally, tropicalization and anti-sulfidation treatments can be ordered. However, there are some specifications restrictions. For details, contact the azbil Group.

● Combined function model No. (with orange LEDs for all displays; power: 100 to 240 V AC)

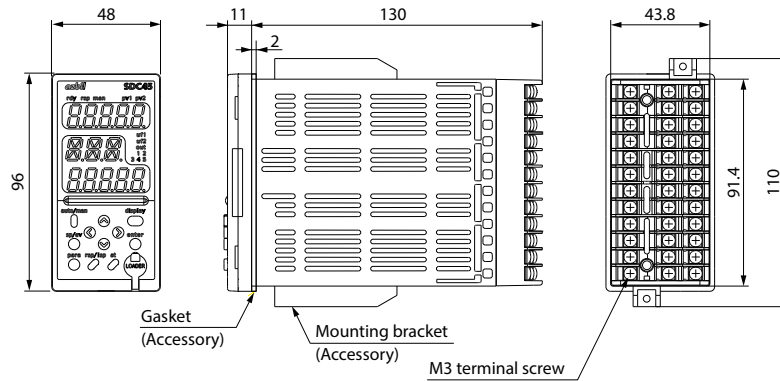
I II III IV Ex.: C46A000

| I | II | III | IV | Descriptions |
|-----------------|---------|----------|--------------|--|
| Basic model No. | Set No. | Option 1 | Option 2 | |
| C46A | 0 | | | Standard model, with 1 current output and 2 alarm outputs |
| | | | | (Reserved for future use) |
| | 0 | | | Regular type 1: Plus 1 current output, 2 relay outputs, and 2 DIs |
| | 1 | | | Regular type 2: Plus 1 current output, 1 voltage pulse output, 1 relay output, and 2 DIs |
| | 2 | | | Position proportion type: Plus 1 relay output, and 2 triac outputs |
| | 3 | | | Regular type 3: Plus 2 current outputs, transmitter power supply (24 V), and 2 DIs |
| | 4 | | | Position proportion type 2 : Plus 2 triac outputs, 1 relay output, and transmitter power supply (24 V) |
| | 0 | | | None |
| | 1 | | | RS-485 communications, PV input 2, 12 DIs, 8 DOs |
| | 2 | | | PV input 2, 12 DIs, 8 DOs |
| 3 | | | 2 DIs, 8 DOs | |
| 4 | | | PV input 2 | |

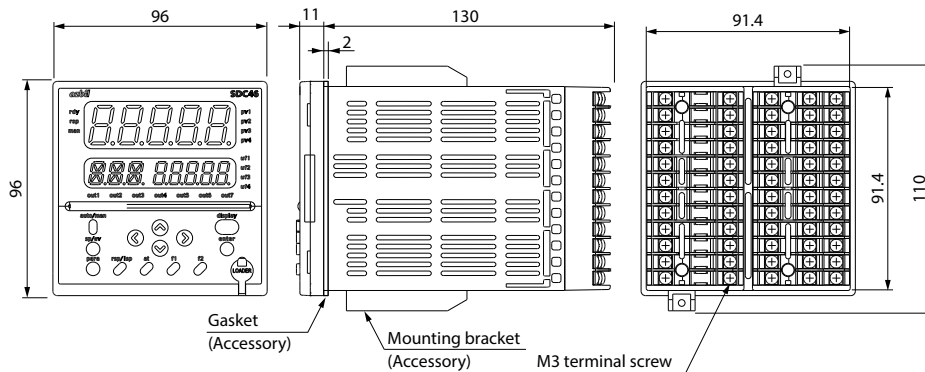
Dimensions

(Unit: mm)

● C45A



● C46A

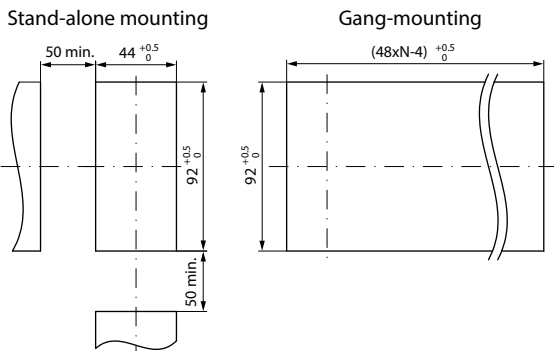


! Handling Precautions

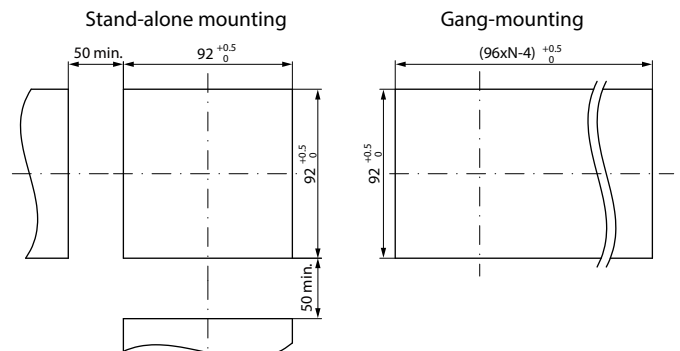
- When fastening this controller onto the panel, tighten the mounting bracket screws until there is no play between the bracket and panel, and then turn one more turn. Overtightening the screws may deform the controller case.

● Panel cutout diagram

● C45A



● C46A

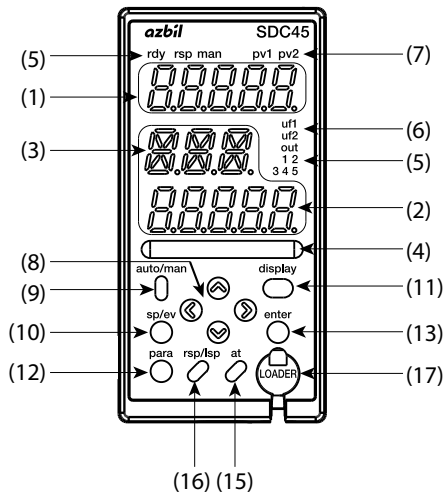


! Handling Precautions

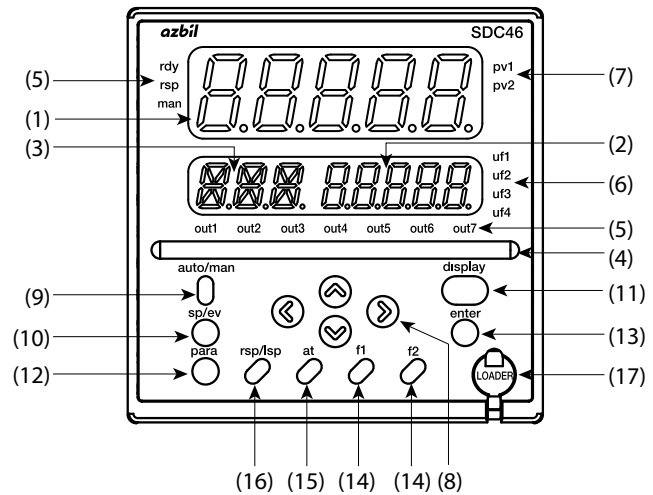
- If three or more units are gang-mounted horizontally, the maximum allowable ambient temperature is 40 °C.

Console parts and functions

● C45A Front Panel



● C46A Front Panel

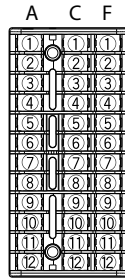


- (1) Upper display: for PV values (present temperature, etc.) or setup items.
- (2) Lower display: for SP values (set temperature, etc.) or other parameter values.
- (3) Auxiliary display:
Displays group No., loop* No., and channel No. of setup item.
* The series of connections from PV input to PID operation through to control output is generically called a loop.
- (4) Multi-status (MS) indicator:
for MV, DI/DO status, etc.
- (5) Mode indicator lights
rdy: Ready
rsp: Remote setup input
man: Manual
out1-7: Control outputs 1-7, (1-5 for C45A)
- (6) User function indicators
uf1-4: Display user-assigned items, (uf1, 2 for C45A)

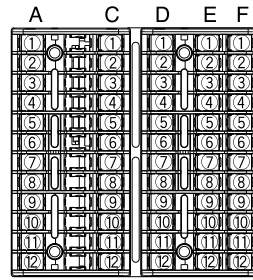
- (7) Loop number indicators
pv1, pv2: Indicate the loop number of the displayed PV value
- (8) √, ∧, <, >: Increment numeric values and shift between digits or settable items.
- (9) auto/man: Changes AUTO/MANUAL mode.
- (10) sp/ev: Selects or sets LOCAL SP or EVENT.
- (11) display: Changes the display contents in operation display mode.
- (12) para: Changes the setting mode.
- (13) enter: Used during setup, especially to finalize the user's selection of a value.
- (14) f1-f2: Perform user-assigned functions (C46A only).
- (15) at: For auto-tuning executing/cancellation, or for user-assigned functions.
- (16) rsp/lsp: Changes between remote and local set point, or executes user-assigned functions.
- (17) Loader jack: For connection of PC loader cable.

Terminal connections

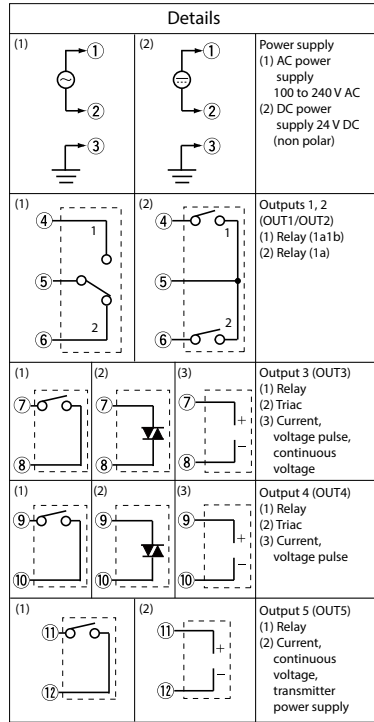
C45A Back



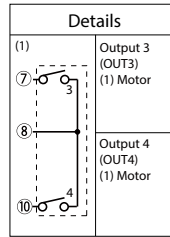
C46A Back



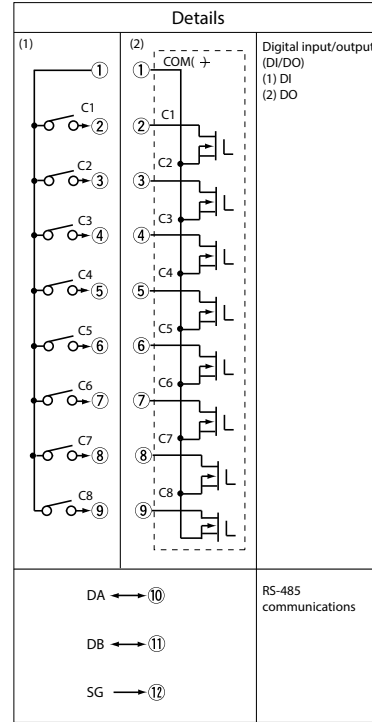
A (C45A/46A)



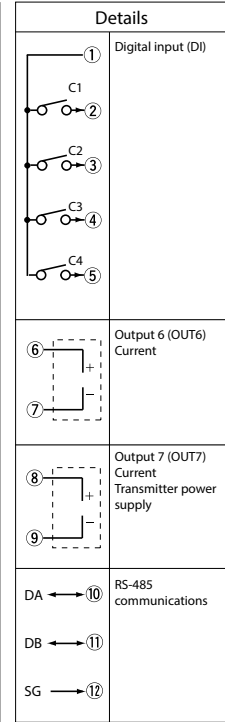
A (C46A Motor drive relay model)



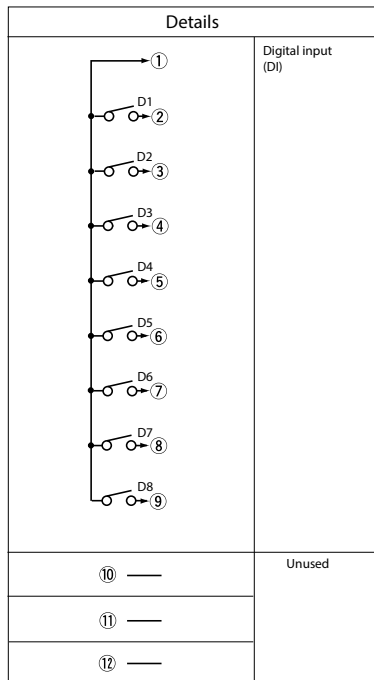
C (C45A)



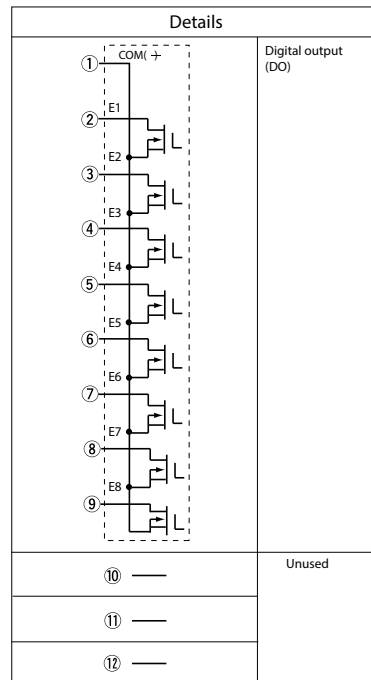
C (C46A)



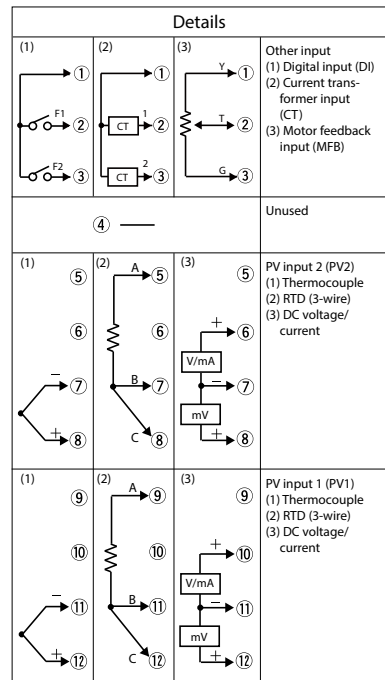
D (C46A)



E (C46A)



F (C45A/C46A)



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