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Specification

DigitroniK™

Digital Indicating Controller SDC45V/46V

The SDC45V/46V DigitroniK is a highly advanced, high-precision compact digital indicating controller, featuring a 5-digit indicator, an input sampling cycle of 100ms, indication accuracy of ±0.1%* of reading, and either 2 full multi-range analog inputs or 1 full multi-range input plus 2 DC current/voltage inputs. A dual-input computation function can be used for each input and output processing unit, allowing sensor input changeover, control based on the average of 2 PV values, control output changeover, feed-forward control, override control, etc. In addition, the input processing unit has a temperature-pressure correction function (2-input model: temperature correction or pressure correction).

Like the SDC45A/46A, the SDC45V/46V has a high visibility LED display and rich variety of inputs, outputs, and operation keys supporting its many features (input-output linearization, single loop/cascade/backup control modes, etc.). Easy setup and monitoring from a PC are available using the Smart Loader Package.

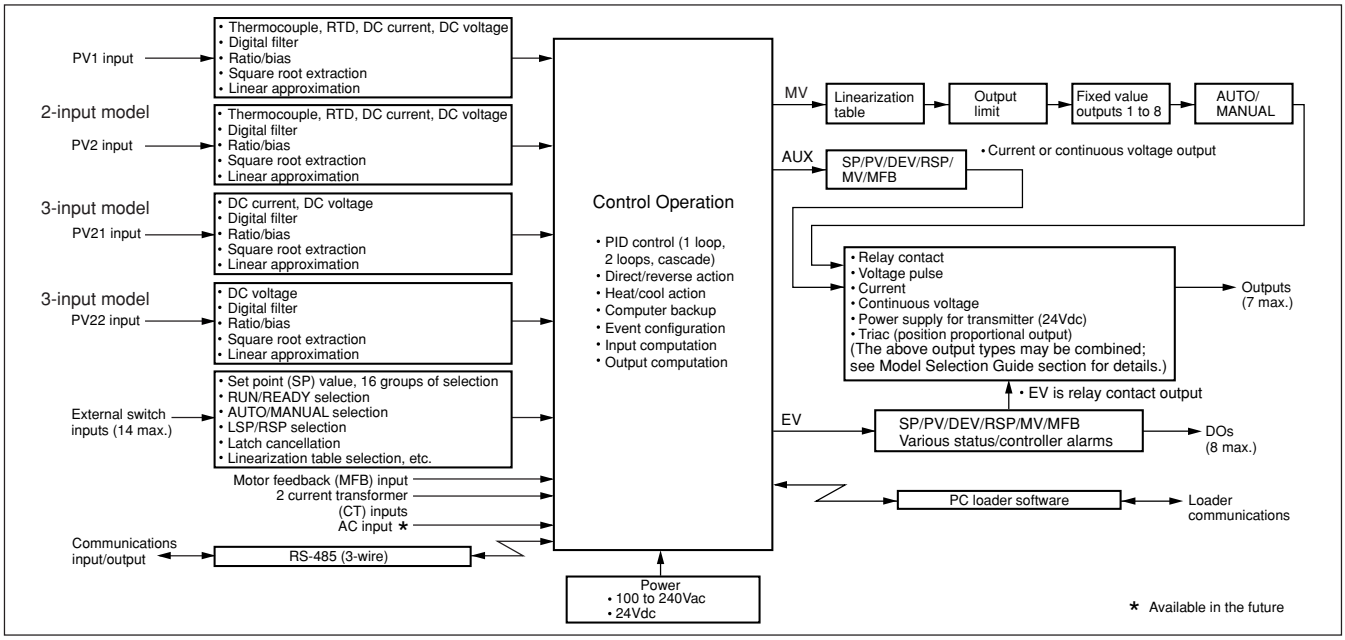
This controller is compliant with IEC directives, and is CE-marked.

* A representative figure. Indication accuracy differs depending on the input range type and temperature band.

■ Features

- Dual-input computation capability and temeprature-pressure correction are built in.
- The number of analog inputs, either two (full multi) or three (1 full multi and 2 DC current/voltage), can be selected (by model number).
- Control, ranging from cascade to backup control, is available for 1 or 2 loops.
- Sampling cycle of 100ms and accuracy of ±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
- 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 or AT inputs, RS-485 communications

■ Basic Function Block Diagram for the C45V/46V



■ Specifications

Analog input	Input type	2-input model	Full multi-range input: thermocouple, RTD, DC current and DC voltage
		3-input model	Input 1: thermocouple, RTD, DC current and DC voltage full multi-range inputs
			Input 21: DC current and DC voltage
			Input 22: DC current
	Input sampling time		100ms
	Input bias current (under standard conditions)		Thermocouple input: -0.2µA (upscale burnout indication) +0.13µA (downscale burnout indication) ±0.05µA (no burnout detection) Note: Negative current flow is from terminal B, positive is to terminal B. DC voltage input: -0.2µA in the ±100mV range and lower ranges (upscale burnout indication) +0.13µA in the ±100mV range and lower ranges (downscale burnout indication) ±0.05µA in the ±100mV range and lower ranges (burnout detection) ±1µA or less in the 0 to 1V and -1 to +1V ranges -5µA or less in the 1 to 5V and 0 to 5V ranges -10µA or less in the 10V range
	Input impedance		Current input: 110Ω or less
	Measuring current		RTD input: 1.0mA ±2%
	Influence of wiring resistance (under standard conditions)		Thermocouple input: 0.2µV/Ω (upscale burnout indication) 0.13µV/Ω (downscale burnout indication) 0.05µV/Ω (no burnout detection) DC voltage input: 0.2µV/Ω or less in the ±100mV range and lower ranges (upscale burnout indication) 0.13µV/Ω or less in the ±100mV range and lower ranges (downscale burnout indication) 0.05µV/Ω in the ±100mV range and lower ranges (burnout detection) 1µV/Ω or less in the 0 to 1V and -1 to +1V ranges 5µV/Ω or less in the 1 to 5V and 0 to 5V ranges and lower ranges 10µV/Ω or less in the 10V range and lower ranges
	RTD input allowable wiring resistance		85Ω or less (Zener barrier + wire, per wire)
	Max. allowable input		Thermocouple input, DC voltage input (in the 100mV range and lower ranges): -1.0 to +2.5Vdc
	Burnout indication		Varies with input range
	Over-range detection threshold		Varies with upper/lower limit value of PV range or input range (fixed)
	Cold junction compensation accuracy		±0.5°C (under standard conditions)
	Infl. of ambient temp. on cold junction compensation		±1.0°C (in the 0 to 50°C range under standard conditions)
	Cold junction compensation method		Internal/external (0°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		5-digit, 7-segment LED. PV: green or orange (depending on the model) upper display. SP: lower orange display.
	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		C45V: 17, C46V: 19 LED displays
	Operation keys		C45V: 11, C46V: 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 3200.0s, min, or h (both up- and down-ramp), Disabled if 0.0 is selected.
	Input readout accuracy		±0.1% FS ±1 digit (depending on the range; see Table 1)
	Indicating range		See Table 1
Digital input (DI)	Number of inputs		C45V: 10 max. C46V: 14 max. (For models with CT input, C45V: 8 max. C46V: 12 max.)
	Types of connectable outputs		Dry contact or open-collector (open drain, sink)
	Open terminal voltage		7 Vdc±15% (under standard conditions)
	Terminal current (during short-circuit)		3 to 5 mA (optional 8 or 12 inputs under standard conditions), 3 to 7mA (standard 2 inputs under standard conditions)
	Allowable contact resistance (dry contact)		500Ω or less (under standard conditions)
	Allowable open-collector ON-state residual current		1.5V or less (under standard conditions)
	Allowable open-collector OFF-state leakage current		100µA or less (under standard conditions)
	Sampling cycle		100ms
	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: • 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 1a1b (outputs 1 & 2)	Contact rating: 250Vac/30Vdc, 3A (resistive load) Contact voltage: 250Vac or less / 125Vdc or less Service life: 100,000 cycles or more (under rated conditions) Min. switching specifications: 100mA/5Vdc	
	Relay contact, form 1a (outputs 1 & 2)	Contact rating: 250Vac/30Vdc, 1A (resistive load) Contact voltage: 250Vac or less / 110Vdc or less Service life: 100,000 cycles or more (under rated conditions) Min. switching specifications: 10mA/5Vdc	
	Relay contact , form 1a (outputs 3 to 5)	Contact rating: 250Vac/30Vdc, 3A (resistive load) Contact voltage: 250Vac or less / 125Vdc or less Service life: 100,000 cycles or more (under rated conditions) Min. switching specifications: 100mA/5Vdc	
	Triac (outputs 3 & 4, position proportional output)	Compatible motors: ECM3000F1100, ECM3000F1110 ECM3000F1200 (100Vac type)	
	Current (outputs 3 to 7)	Output current: 4 to 20mAdc (2.4 to 21.6mAdc) 0 to 20mAdc (0.0 to 22.0mAdc) Load resistance: 600Ω or less Output accuracy: ±0.1% FS or less (under standard conditions) Output resolution: 1/15000 or more (in the 0 to 20mAdc FS range) Voltage (open): 23Vdc or less	
	Voltage pulse	Output voltage: 12Vdc+15%/-10% Load current: 30mA or less	
	Continuous voltage	Output voltage: 0 to 5Vdc (0.0 to 5.5Vdc) 1 to 5Vdc (0.6 to 5.4Vdc) 0 to 10Vdc (0.0 to 11.0Vdc) Load resistance: 1kΩ or more Load limit current: 12mA or more Output accuracy: ±0.1% FS or less (under standard conditions) Output resolution: 1/20000 or more (in the 1 to 10Vdc FS range)	
	Transmitter power supply function	Output voltage: 24Vdc±10% Load current: 30mA or less Load limit current: 45mA	
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: open-collector (open drain) sink method Load resistance: 4.5 to 28Vdc Load current: 70mA/output max. 500mA/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	500m 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 • QN216¡, 5.8mm dia. hole • QN206A, 12mm dia. hole	
	Input range	AC 0.0 to 50.0A	
	Measurement current range	AC 0.4 to 55.0A	
	Indication accuracy	±3% FS ± 1 digit (AC 0.4A or more, under standard conditions) excluding CT accuracy	
	Indication resolution	AC 0.1A	
General specifications	Memory backup	EEPROM, battery and double layer capacitor for SRAM	
	Backup life	EEPROM 10 years SRAM • 3 years by battery (at 10 to 35°C ambient temperature, without connection to power) • 30 min by double layer capacitor (while changing battery, at an ambient temperature of 35°C or less, after capacitor is charged for 1 h or more)	
	Power	100 to 240Vac, 50/60Hz ± 2Hz, 24Vdc	
	Power consumption	30VA or less. (C45V: 100 to 240Vac power model), 40VA or less. (C46V: 100 to 240Vac power model), 12W or less (C45V: 24Vdc power model), 15W or less (C46V: 24Vdc power model).	
	Power ON inrush current	35A or less/10ms or less (100 to 240Vac power model), 20V or less/10ms (24Vdc power model)	
	Power ON operation	Reset time: 6s max. (time until normal operation starts under standard conditions)	
	Battery life	3 years at 10 to 35°C ambient temperature, without connection to power	
	Insulation resistance	20MΩ or more between power supply terminal 1 or 2 and FG terminal 3 (500Vdc megger)	
	Dielectric strength	1500Vac for 1min (100 to 240Vac 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	
	Standard conditions	Ambient temperature	23±2°C
		Ambient humidity	60±5% RH
		Power voltage	105Vac±1% (100 to 240V power model), 24Vdc±5% (24Vdc power model)
		Power frequency	50±1Hz or 60±1Hz (100 to 240V power model)
		Vibration resistance	0m/s²
		Shock resistance	0m/s²
		Mounting angle	Reference plane ±3°
		Clear space	100mm min. vertically and horizontally
	Operating conditions	Ambient temperature	0 to 50°C
		Ambient humidity	10 to 90% RH (without condensation)
		Power voltage	85 to 264Vac (100 to 240Vac power model), 21.6 to 26.4Vdc (24Vdc power model)
		Power frequency	50±2Hz or 60±2Hz (100 to 240Vac power model)
		Vibration resistance	0 to 2m/s² (10 to 60Hz for 2h each in X, Y, and Z directions)
		Shock resistance	0 to 10m/s²
		Mounting angle	Reference plane ±10°
		Altitude	2000m max.
		Clear space	50mm min. above and below
	Transportation conditions	Ambient temperature	-20 to +70°C
		Ambient humidity	10 to 95% RH (without condensation)
		Vibration resistance	0 to 5m/s² (10 to 60Hz for 2h each in X, Y, and Z directions)
		Shock resistance	0 to 500m/s² (3 times each in X, Y, and Z directions)
		Front panel protection	IP65
		Console and case material	Polyphenylene oxide
		Console and case color	Black
		Standards compliance	EN61010-1 (CE-LVD), EN61326 (CE-EMC)
		Overvoltage category	Category II (IEC60364-4-443, IEC60664-1)
		Mounting	Panel mounted (with dedicated mounting bracket)
		Mass	C45V: Approx. 400g (including dedicated mounting bracket) C46V: Approx. 700g (including dedicated mounting bracket)

Accessories (included)	Part name	Model
	Mounting brackets (2)	**81405411-004**
	Gasket	**81421863-001** (for C45V)
		81421864-001 (for C46V)
	User's manual	**CP-UM-5445E**

Optional parts (sold separately)	Part name	Model
	Mounting brackets (2)	**81405411-003**
	Current Transformer	**QN206A** (5.8mm dia. hole)
		QN212A (12mm dia. hole)
	Hard cover	**81441421-001** (for C45V)
		81441422-001 (for C46V)
	Terminal cover	**81441420-001***

*1 for C45V, 2 for C46V

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 20mA		±0.1% FS ±1 digit
	42		0 to 20mA		±0.1% FS ±1 digit
	43	Voltage	0 to 10mV		±0.1% FS ±1 digit
	44		-10 to +10mV		±0.1% FS ±1 digit
	45		0 to 100mV		±0.1% FS ±1 digit
	46		-100 to +100mV		±0.1% FS ±1 digit
	47		0 to 1V		±0.1% FS ±1 digit
	48		-1 to +1V		±0.1% FS ±1 digit
	49		1 to 5V		±0.1% FS ±1 digit
	50		0 to 5V		±0.1% FS ±1 digit
	51		0 to 10V		±0.1% FS ±1 digit

*1: At 400°C and above.
±0.5°C (< +400 to –100°C)
±1.0°C (< –100 to –200°C)
±20.0°C (< -200°C)

*2: At 400°C and above.
±0.5°C (<+400 to –100°C)
±1.0°C (<-100 to –200°C)
±15.0°C (<-200°C)

*3: At 400°C and above.
±0.5°C (<+400 to –100°C)
±1.0°C (<-100°C)

*4: At -100°C and above.
±1.0°C (< -100 to –200°C)
±10.0°C (< -200°C)

*5: At 800°C and above.
±4.0°C (< 800 to 260°C)
±70°C (< 260°C)

*6: At 1000°C and above.
±2.0°C (< 1000°C to 0°C)
±4.0°C (< 0°C)

*7: At 1400°C and above.
±1.5°C (< 1400°C)

*8: At 800°C and above.
±20.0°C (< 800 to 300°C)
±40.0°C (< 300°C)

*9: At 0°C and above.
±4.0°C (< 0°C)

*10: At 0°C and above.
±1.0°C (< 0°C)

*11: At 0°C and above.
±1.5°C (< 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

Note: For PV21 input, Pv-01 settings 41, 42, 49, 50 and 51 can be used.
For PV22 input, Pv-01 settings 49, 50 and 51 can be used.

■ C45V Model Selection Guide [I] [II] [III] [IV] [V] [VI] [VII] [VIII] [IX] [X] Ex.: C45V2A1C000000

I	II	III	IV	V	VI	VII	VIII	IX	X	Descriptions
Basic Model	Input	Power	Outputs 1, 2	Outputs 3, 4	Output 5	Outputs 6, 7	Option	Additional processing 1	Additional processing 2	
C45V										Computation function model
	2									2-input model (full-multi: 2)
	3									3-input model (full-multi: 1, DC current / voltage: 2)
		A								100 to 240Vac
		D								24Vdc
			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
					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
								T		Tropicalization
								K		Antisulfidization
								D		With inspection data
								B		Tropicalization + inspection data
								L		Antisulfidizaiton + inspection data
								Y		With traceability certification
								Z		Tropicalization + traceability certification
								X		Antisulfidizaiton + traceability certification
									0	None
									1	Orange color for all LEDs

***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.**

■ C46V Model Selection Guide [I] [II] [III] [IV] [V] [VI] [VII] [VIII] [IX] [X] Ex.: C46V2A1C000000

I	II	III	IV	V	VI	VII	VIII	IX	X	Descriptions
Basic Model	Input	Power	Outputs 1, 2	Outputs 3, 4	Output 5	Outputs 6, 7	Option	Additional processing 1	Additional processing 2	
C46V										Computation function model
	2									2-input model (full-multi: 2)
	3									3-input model (full-multi: 1, DC current / voltage: 2)
		A								100 to 240Vac
		D								24Vdc
			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 *5
					R					1a relay *5
					C					Current *5
					D					Continuous voltage *5
					P					Power supply for signal transmitter *5
						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
								T		Tropicalization
								K		Antisulfidization
								D		With inspection data
								B		Tropicalization + inspection data
								L		Antisulfidizaiton + inspection data
								Y		With traceability certification
								Z		Tropicalization + traceability certification
								X		Antisulfidizaiton + traceability certification
									0	None
									1	Orange color for all LEDs

***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.**

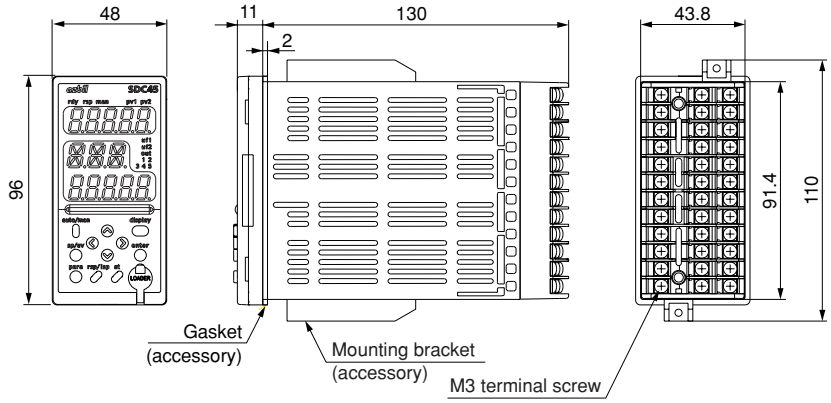
***4. When "SS" or "R1" is selected for outputs 3 and 4, this option code is not selectable.**

***5. When "R1" is selected for outputs 3 and 4, the code 0 only can be selected.**

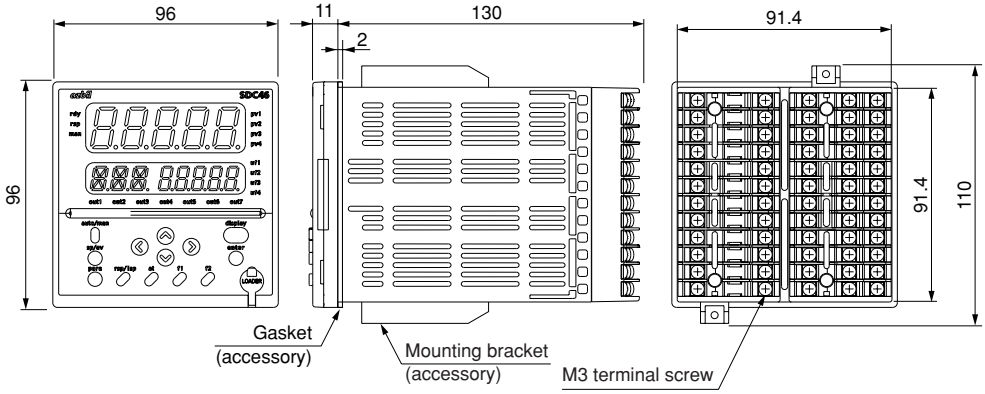
■ Dimensions

(Unit: mm)

● C45V



● C46V

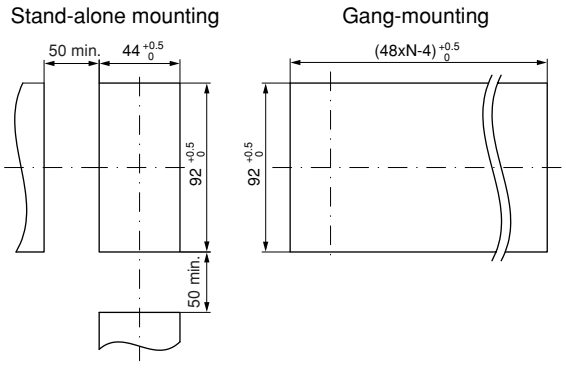


! Precautions in Handling

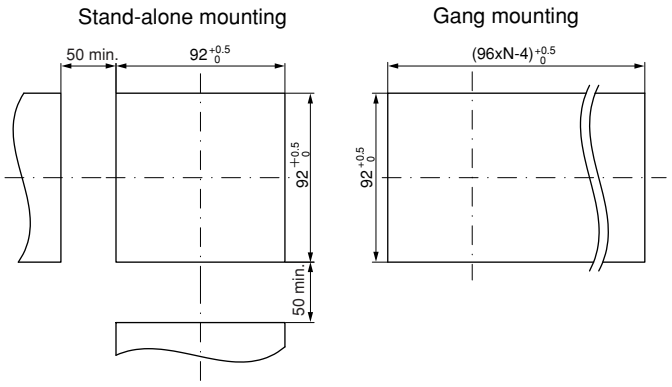
When fastening this controller onto the panel, tighten the mounting bracket screws until there is no play between the bracket and panel, and then turn one more full turn. Overtightening the screws may deform the controller case.

● Panel cutout diagram

• **C45V**



• **C46V**

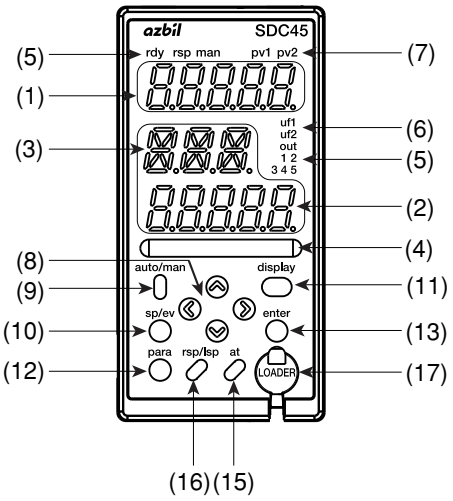


! Precautions in Handling

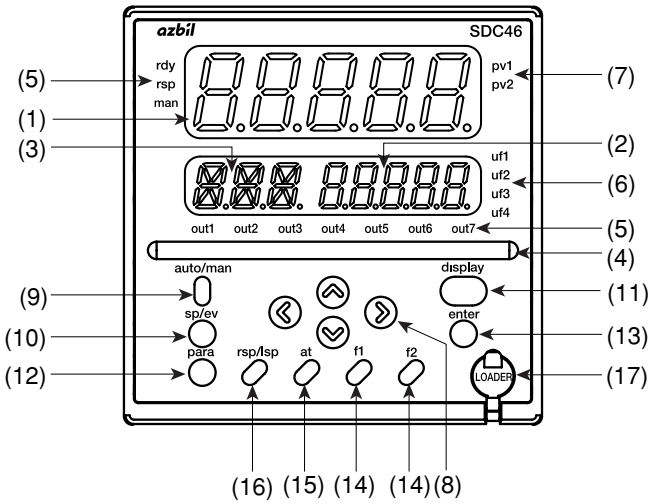
If three or more units are gang-mounted horizontally, the maximum allowable ambient temperature is 40°C.

■ Console Parts and Functions

● **C45V Front Panel**



● **C46V 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: For setup items or tag names.

(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 C45V)

(6) User function indicators:

- uf1–4: Display user-assigned items, (uf1, 2 for C45V)

(7) Loop number indicators:

- pv1-4: Indicate the loop number of the displayed PV value (pv1, 2 for C45V)

(8) v, ^, <, >: 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 (C46V only).

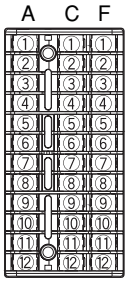
(15) at: For auto-tuning executing/cancellation, or for user-assigned functions.

(16) rsp/lsp: Changes between remote and local set point, or executes user-assigned functions.

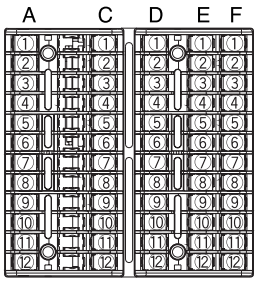
(17) Loader jack: For connection of PC loader cable.

■ Terminal Connections

C45V Back



C46V Back



A (C45V/46V)

Details	
(1) ① ② ③ (2) ① ② ③	Power supply (1) AC power supply 100 to 240 Vac (2) DC power supply 24 Vdc (non polar)
(1) ④ 1 ⑤ 2 ⑥ (2) ④ 1 ⑤ 2 ⑥	Outputs 1, 2 (OUT1/OUT2) (1) Relay (1a1b) (2) Relay (1a)
(1) ⑦ ⑧ (2) ⑦ ⑧ (3) ⑦ + − ⑧	Output 3 (OUT3) (1) Relay (2) Triac (3) Current, voltage pulse, continuous voltage
(1) ⑨ ⑩ (2) ⑨ ⑩ (3) ⑨ + − ⑩	Output 4 (OUT4) (1) Relay (2) Triac (3) Current, voltage pulse
(1) ⑪ ⑫ (2) ⑪ + − ⑫	Output 5 (OUT5) (1) Relay (2) Current, continuous voltage, transmitter power supply

A (SDC46V)

(1) ⑦ 3 ⑧ ⑩ 4	Output 3 (OUT3) (1) Motor Output 4 (OUT4) (1) Motor

C (C45V)

Details	
(1) ① C1 ② C2 ③ C3 ④ C4 ⑤ C5 ⑥ C6 ⑦ C7 ⑧ C8 ⑨ (2) ① COM(−) ① C1 ② C2 ③ C3 ④ C4 ⑤ C5 ⑥ C6 ⑦ C7 ⑧ C8 ⑨ L	Digital input/ output (DI/DO) (1) DI (2) DO
DA ⟷ ⑩ DB ⟷ ⑪ SG ⟶ ⑫	RS-485 communica-tions

C (C46V)

Details	
① C1 ② C2 ③ C3 ④ C4 ⑤	Digital input (DI)
⑥ + − ⑦	Output 6 (OUT6) Current
⑧ + − ⑨	Output 7 (OUT7) Current Transmitter power supply
DA ⟷ ⑩ DB ⟷ ⑪ SG ⟶ ⑫	RS-485 communications

D (C46V)

Details	
① D1 ② D2 ③ D3 ④ D4 ⑤ D5 ⑥ D6 ⑦ D7 ⑧ D8 ⑨	Digital input (DI)
⑩ ——	Unused
⑪ ——	
⑫ ——	

E (C46V)

Details	
① COM(−) ① E1 ② E2 ③ E3 ④ E4 ⑤ E5 ⑥ E6 ⑦ E7 ⑧ E8 ⑨ L	Digital output (DO)
⑩ ——	Unused
⑪ ——	
⑫ ——	

F (C45V/46V)

Details	
(1) ① 1 ② 2 ③ (2) ① CT 1 ② CT 2 ③ (3) Y ① T ② G ③	Other (1) Digital input (DI) (2) Current transformerer input (3) Motor feed-back input
(1) ⑤ ⑥ − ⑦ + ⑧ (2) A ⑤ ⑥ B ⑦ C ⑧ (3) ⑤ + ⑥ V/mA − ⑦ mV + ⑧ (4) + ⑤ 22 V − ⑥ + ⑦ 21 V/mA − ⑧	PV2 input (1) Thermocouple (2) RTD (3-wire) (3) DC voltage/ current (1) to (3) : (2-input model only)
	(4) DC voltage/ current + DC voltage (3-input model only)
(1) ⑨ ⑩ − ⑪ + ⑫ (2) A ⑨ ⑩ B ⑪ C ⑫ (3) ⑨ + ⑩ V/mA − ⑪ mV + ⑫	PV1 input (1) Thermocouple (2) RTD (3-wire) (3) DC voltage/ current

■ Timing of computation pattern execution

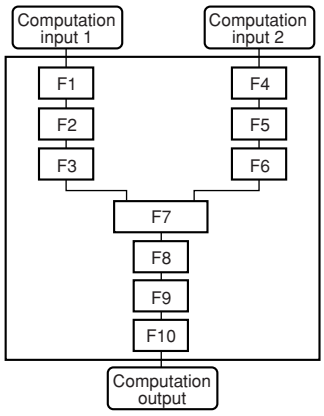
Two sets of computation patterns can be executed, one after PV input and one before MV output.

<Processing flow for each sampling cycle>

Digital input processing
↓
Internal contact input processing
↓
Mode processing
↓
PV processing
↓
CT processing
↓
Alarm processing
↓
Temperature-pressure compensation computation
↓
Input computation
↓
SP processing
↓
Control computation
↓
Event processing
↓
Logical operations
↓
Output computation
↓
Output processing
↓
Digital output processing

■ Computation patterns

Twenty one types of mathematical/logical operation can be assigned to up to 10 computation units (F1 to F10).



- PV and MV can be assigned to computation input 1 or computation input 2.
- Computation patterns are executed in numerical order from F1 to F10.
- Computation output is a standard numerical value.

■ Operation type

Type setting	Abbrev.	Description
0	NOP	No operation
1	FLT	First order lag filter
2	R/B	Ratio/bias
3	HLL	High/low limiter
4	DRL	Change rate limiter
5	LED	Differentiation
6	L/L	Advance/delay
7	ABS	Absolute value
8	TBL	Linearization table
9	MAX	Maximum value hold
10	MIN	Minimum value hold
11	HLD	Hold
12	PRS	Preset value
13	SPR	Soft (slow) preset value
14-30	NOP	No operation
31	ADD	Addition/subtraction
32	MUL	Multiplication
33	DIV	Division
34	HSE	High selector
35	LSE	Low selector
36	SWS	Switch selector
37	CPS	Change point selector
38	SSS	Soft (slow) switching selector

⚠ RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in the applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- **Safety devices for plant worker protection**
- **Start/stop control devices for transportation and material handling machines**
- **Aeronautical/aerospace machines**
- **Control devices for nuclear reactors**

Never use this product in applications where human safety may be put at risk.

Specifications are subject to change without notice.

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