

DigitroniK™ Digital Indicating Controller SDC40A

The DigitroniK™ SDC40A is a compact (96mm x 96mm) digital controller. The SDC40A features a wide variety of input options: thermocouples, resistance temperature detectors, DC voltage and DC current inputs are supported. Control outputs consist of time proportional PID (relay output, voltage output), current output PID, position proportional PID, and heat/cool PID. The SDC40A simplifies control with PID auto tuning and systems. The SDC40A can optionally be provided with a maximum of 12 remote switch inputs and a maximum of 8 event outputs for automatic operation in combination with a PLC.

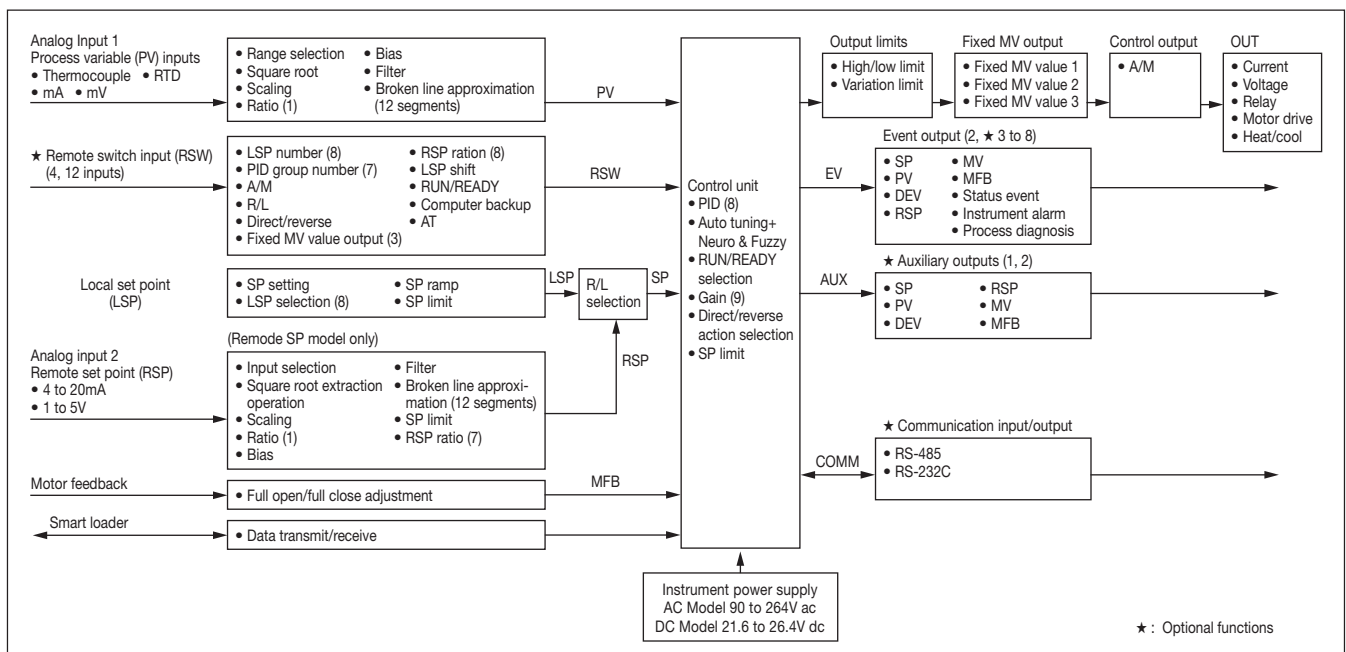


■ Features

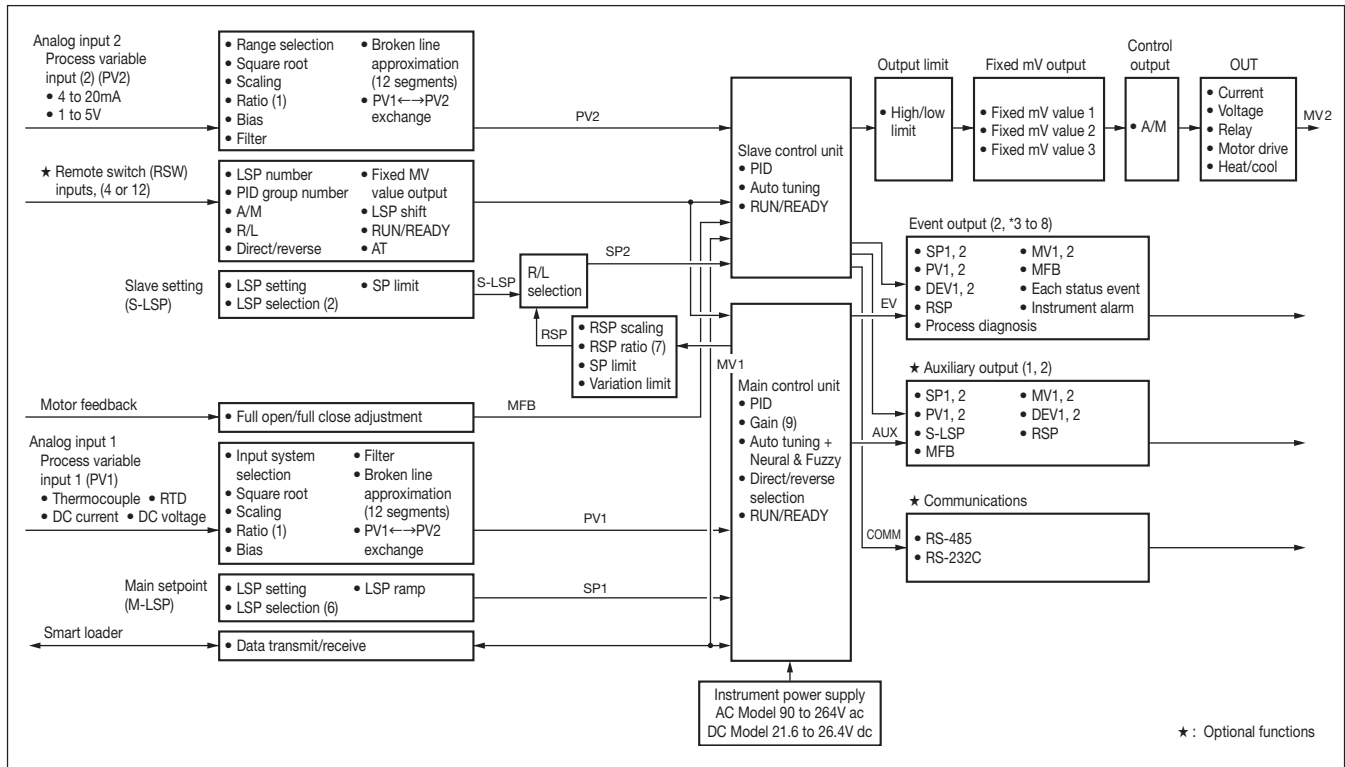
- Four or five digit display.
- Accuracy of $\pm 0.1\%$ FS.
- 100ms input sampling cycle.
- Input type and range are selectable by operator keys.
- Up to eight individual set points.
- Eight groups of PID control constants. These can also be automatically set by autotuning.
- Group of gain constants enables variable gain control.
- Set point change rate can be set using the SP ramp function.
- Two event outputs are standard.
- The remote SP model features one group of ratio constants for ratio control.
- Computer backup of process data is available in the remote SP model.
- Internal cascade algorithm provides internal linking of the primary and secondary controllers in one device.
- Two user-defined pushbuttons are available.
- A 10-segment bargraph displays 0-100% control output at a glance. It can also be used as a “Green belt” OK indicator, event output monitor, remote switch input or motor opening monitor.
- To enable use in a wide range of application options include:
 - ★ Events (3, 8 points)
 - ★ Digital inputs (4, 12 points)
 - ★ Auxiliary output (1 or 2 points)
 - ★ Serial communications (RS-485, RS-232C)
- Basic models:
 - Standard model
 - Remote SP model
 - Internal cascade model
- CE approval obtained

■ Basic Function Block Diagram

• Standard Model, and Remote SP Model



Internal Cascade Model



Specifications

Analog input 1 (PV1 input)	Type of inputs	A variety of thermocouples, RTDs, mV and mA.
Input display accuracy	$\pm 0.1\% \text{ FS} \pm 1\text{U}$ (under standard conditions) This may be affected by indication value conversion.	
Input sampling cycle	100ms	
Input digital filter	Variable 0.0 to 120.0s (there is no filter at 0.0)	
Input bias	-1000 to +1000U (U: °C, KPa, % and other standard industrial units)	
Input ratio	0.001 to 9.999	
Input broken line approximation	12 point broken line approximation can be assigned to analog inputs 1 or 2.	
Square root operation dropout	0.0 to 10.0% FS (no square root calculation is performed at 0.0)	
Input bias current	Thermocouple, DC voltage input: $\pm 1.3\mu\text{A}$ max. (peak, standard conditions) $-3\mu\text{A}$ max. in the linear V range above 1V	
Input impedance	DC current input: $50\Omega \pm 10\%$ (under operating conditions)	
Measuring current	RTD input: $1.04 \text{ mA} \pm 0.02 \text{ mA}$, terminal A (under operating conditions)	
Influence of wiring resistance	Thermocouple: Variation in the displayed value due to input conversion when the wiring resistance at both ends is 250Ω : <ul style="list-style-type: none"> M01, L02; $35\mu\text{V}$ max. L01; $60\mu\text{V}$ max. Others; $750\mu\text{V}$ max. RTD: $\pm 0.01\% \text{ FS}/\Omega$ max. within wiring resistance range of 0 to 10Ω . $\pm 0.02\% \text{ FS}/\Omega$ in the range whose minimum resolution is 0.01°C . The allowable wiring resistance is 85Ω max. (except for 0.01°C resolution) (A zener barrier is available for on site adjustment.)	
Allowable parallel resistance	Allowable parallel resistance for thermocouple break detection is $1\text{M}\Omega$ min.	
Maximum allowable input	Thermocouple, mV input: -5 to +15V mA input: 28 mA	
Burnout	Thermocouple input: Upscale + Alarm indication (AL01) (including the DC mV range) DC voltage input: Downscale + Alarm indication (AL02) DC current input: Downscale + Alarm indication (AL02) However, near 0% FS in the 0 to 20 mA range, neither burnout nor alarm indication is performed. RTD input: When "C" wire is broken: Upscale + Alarm indication (AL01 + AL09) When resistance element and "A" wire, or resistance element and "B" wire, or "A" wire and "B" wire are broken: Upscale + Alarm indication (AL01 + AL07) When "B" wire, or resistance element and "C" wire, "A" wire and "C" wire, or "B" wire and "C" wire, or resistance element, "B" wire and "C" wire, or "A" wire, "B" wire and "C" wire are broken: Upscale + Alarm indication (AL01 + AL08)	
Over range detection threshold	Higher than 110% FS: Upscale Lower than -10% FS: Downscale (however, downscaling is not performed by F50 and P50 models. The lower indication limit of the B19 model is $20^\circ\text{C}/60^\circ\text{F}$.)	
Cold junction compensation accuracy	$\pm 0.5^\circ\text{C}$ (standard conditions)	
Cold junction compensation method	Compensation inside the instrument or compensation outside the instrument (0°C only) is selectable.	

Analog input 2 (RSP input of remote SP model or PV2 input of internal cascade model)	Type of input	4 to 20mA or 1 to 5V dc																						
	Input indication accuracy	±0.1% FS±1U (standard conditions), when converted to displayed value (may differ, depending on range)																						
	Input sampling cycle	0.1s																						
	Input digital filter	Variable 0.0 to 120.0s (there is no filter at 0.0)																						
	Input bias	-19999 to +30000U																						
	Input ratio	0.001 to 30,000 (gain cannot be used in case of selection of the multi ratio of 8 groups. Trade off.)																						
	Input broken line approximation	12 broken lines of approximation (which can be assigned to either of analog inputs 1 or 2.)																						
	Square root operation threshold	0.0 to 10.0% FS (no square root calculation is performed at 0.0.)																						
	Scaling	-19999 to +26000U (reverse scaling is also possible. The decimal point position can be changed. Resolution is 1/26000.)																						
	Input bias current	1 to 5V input: +10µA max. (under operating conditions)																						
	Input impedance	1 to 5V input: 1MΩ min. (under operating conditions) 4 to 20mA input: 50Ω ±10% (under operating conditions)																						
	Allowable maximum input	1 to 5V input: 0 to 6V 4 to 20mA input: 28mA																						
	Burnout	Downscale + Alarm indication (AL04)																						
	Over range detection threshold	More than 110% FS: Regarded as upscale. Less than -10% FS: Regarded as downscale.																						
	PV1 ↔ PV2 switch	Internally switchable in the internal cascade model.																						
Indications and setting	PV and SP indication	5-digit 7-segment LED																						
	Function indication	2-digit 7-segment LED																						
	LED bar	Ten LED segments out of twelve indicate control output: • When motor opening indication (2G) is selected, ten segments are used. • When the OK indicator function is selected, all twelve segments are used as a "green belt". • This LED bar can also be used to monitor events 4 to 8 and RSW 1 to 12.																						
	Status indication	18 LEDs (some models do not include all indicators)																						
	Operating keypad	13 rubber keys (there may be dead keys depending on model).																						
	Number of set points	1 to 8 points (selection and changeover use available) with the internal cascade model, up to 6 points are allowed on the master side, up to 2 points are allowed on the slave side.																						
	Memory storage	Non-volatile semiconductor memory (EEPROM)																						
	Indication ranges	-10 to +110% FS of range or scaling value (-10% FS is not applicable for F50, P50 and B18 models.)																						
	Setting range	-19999 to +26000U (when an SP limit is applied, the relevant value is used.)																						
	Indication masking	The least significant digit can be masked for 4-digit indication.																						
	SP limits	Low limit: -19999U to high limit value High limit: Low limit value to 26000U																						
	SP ramp (separately set for LSP and RSP)	UP ramp: 0 to 26000U (no ramp at 0) Down ramp: 0 to 26000U (no ramp at 0) The measurement interval can be selected from among the following: • U/hr • 0.1U/hr • U/min • 0.1U/min																						
	Control output	Model number	0D	2G	5G	6D	3D, AK, 5K, 9K, BK																	
Type of output		SPDT relay contact output	M/M driving relay contact output	Current output (4 to 20mA dc)	Voltage output (load current is adjustable)	*See Table 1.																		
Control action		Time proportional PID	Position proportional PID	Current proportional PID	Time proportional PID	2-stage (heat/cool) PID																		
No. of PID groups		8 groups	8 groups	8 groups	8 groups	4groups on each of heat and cool sides																		
PID autotuning		Autotuning allowed.	Autotuning allowed.	Autotuning allowed.	Autotuning allowed.	Autotuning not allowed.																		
Output rating		Contact rating: 5A (30V dc/ 120V ac, resistive load) 4A (240V dc, resistive load) Allowable contact voltage: 250V ac, resistive load 125V dc, resistive load Maximum switching power: 150W, 960VA (resistive load) Mechanical life: 10,000,000 repetitions Electrical life: 100,000 repetitions (at contact rating, COS φ = 1, frequency 30 times/min) Minimum switching voltage: 5V Minimum switching current: 100mA Minimum on/off time: 100ms on, on/off control 100ms on, time proportional control	Contact ratings: 2.5A (30V dc L/R=0.7ms) 4A (120V ac COS φ = 0.4) 2A (240V ac COS φ = 0.4) Allowable contact voltage: 250V ac, resistive load 125V dc, resistive load 125V dc L/R=0.7ms 250V ac COS φ = 0.4 Maximum switching power: 75W (L/R=0.7ms) 480VA (COS φ = 0.4) Mechanical life: 10,000,000 repetitions Electrical life: 100,000 repetitions (at contact rating, COS φ = 0.4, frequency 30 times/min) Minimum switching voltage: 5V Minimum switching current: 100mA	Max. allowable load resistance: 680Ω (under operating conditions) Output accuracy: ±0.1% FS max. (under operating conditions) Output resolution: 1/2000 min Inrush current: 25mA max., 50ms max. (with 250Ω load) Maximum output current: 21.6mA dc Minimum output current: 2.4mA dc Opening terminal voltage: 25V max. Output update cycle: 100ms	Max. allowable load internal resistance: 680Ω (under operating conditions) Load current setting accuracy: ±0.2% FS max. (under operating conditions) Load current setting resolution: 1/200min Inrush current: 25mA max. 50ms max. (with 250Ω load) Maximum output current: 21.6mA dc Minimum output current: 2.4mA dc Off time leak current: 100 µA max. (with load is shorted under operating conditions) Output update cycle: 100ms Minimum on-off time: 100ms on, on-off control 100ms on, time proportional control (cycle time: 10s min.) 0.1% of cycle time (cycle time: less than 10s)	Table 1 <table border="1"> <thead> <tr> <th></th> <th>Heat side</th> <th>Cool side</th> </tr> </thead> <tbody> <tr> <td>3D</td> <td>0D</td> <td>0D</td> </tr> <tr> <td>AK</td> <td>0D</td> <td>5G</td> </tr> <tr> <td>5K</td> <td>5G</td> <td>5G</td> </tr> <tr> <td>9K</td> <td>0D</td> <td>6D</td> </tr> <tr> <td>BK</td> <td>5G</td> <td>6D</td> </tr> </tbody> </table> <p>In the heat/cool model, the output type differs between the heat side and cool side as shown in the above table. Each output rating is the same as for 0D, 2G, 5G, or 6D.</p> <p>*The heat side and cool side can be switched. *Direct or reverse action can be selected by remote switching, as in the other models.</p>		Heat side	Cool side	3D	0D	0D	AK	0D	5G	5K	5G	5G	9K	0D	6D	BK	5G	6D
		Heat side	Cool side																					
3D	0D	0D																						
AK	0D	5G																						
5K	5G	5G																						
9K	0D	6D																						
BK	5G	6D																						
Proportional band (P)	0.0 to 1000.0% FS (On-off operation when P=0)	0.1 to 1000.0% FS (On-off operation is not allowed)	0.1 to 1000.0% FS (On-off operation is not possible)	0.0 to 1000.0% FS (On-off operation when P=0)	0.1 to 1000.0% FS (On-off operation is not allowed)																			

Control output	Model number	0D	2G	5G	6D	3D, AK, 5K, 9K, BK									
	Cycle time	5 to 120s (setting possible every second)	—	—	1 to 60s (setting possible every second)	Same as for each type of output									
	Integral time (I)	0 to 3600s (PD action when I=0)	0 to 3600s (PD action when I=0)	0 to 3600s (PD action when I=0)	0 to 3600s (PD action when I=0)	0 to 3600s (PD action when I=0)									
	Derivative time (D)	0 to 1200s (PI action when D=0)	0 to 1200s (PI action when D=0)	0 to 1200s (PI action when D=0)	0 to 1200s (PI action when D=0)	0 to 1200s (PI action when D=0)									
	Differential gap	0 to 1000U (in on-off operation)	—	0 to 1000U (in on-off operation)	0 to 1000U (in on-off operation)	Same as in each output type.									
	Dead band	—	0.5 to 25.0% OUT	—	—	-100.0 to +5.0% OUT									
	Output limiter	Low limit value: -10% to high limit value (-10 to 0% become 0%) High limit value: Low limit value to 110% (100 to 110% become 100%)	Low limit value: -10% to high limit value High limit value: Low limit value to 110%	Low limit value: -10% to high limit value High limit value: Low limit value to 110%	Low limit value: -10% to high limit value (-10 to 0% become 0%) High limit value: Low limit value to 110% (100 to 110% become 100%)	Low limit value: -10% to high limit value High limit value: Low limit value to 110%									
	Manipulated variable change rate limiter	1 to 100% (every 100 ms)	1 to 100% (every 100 ms)	1 to 100% (every 100 ms)	1 to 100% (every 100 ms)	1 to 100% (every 100 ms)									
	MFB (Motor Feed back) input range	—	100 to 2500Ω	—	—	—									
	MFB (Motor Feed back) break control	—	Whether action is to be continued is selected by MFB position assumption.	—	—	—									
Variable gain	<p>If the load characteristic of the control system is non-linear, stable control characteristics are obtained by changing the gain according to the deviation. Control conforms to the following equation:</p> $\text{Set proportional band (p)} \times \frac{1}{\text{Gain value}} = \text{Real proportional band.}$ <p>Set value range: 0.01 to 300.00</p> <table border="0"> <tr> <td>Gain 1: when -20% FS</td> <td>Gain 6: when 2% FS</td> </tr> <tr> <td>Gain 2: when -10% FS</td> <td>Gain 7: when 5% FS</td> </tr> <tr> <td>Gain 3: when -5% FS</td> <td>Gain 8: when 10% FS</td> </tr> <tr> <td>Gain 4: when -2% FS</td> <td>Gain 9: when 20% FS</td> </tr> <tr> <td>Gain 5: when 0% FS</td> <td></td> </tr> </table> <p>The gain ramp is automatically calculated using set gains, when the deviation is less than -20% or more than 20%, calculation uses the extended characteristic.</p>					Gain 1: when -20% FS	Gain 6: when 2% FS	Gain 2: when -10% FS	Gain 7: when 5% FS	Gain 3: when -5% FS	Gain 8: when 10% FS	Gain 4: when -2% FS	Gain 9: when 20% FS	Gain 5: when 0% FS	
Gain 1: when -20% FS	Gain 6: when 2% FS														
Gain 2: when -10% FS	Gain 7: when 5% FS														
Gain 3: when -5% FS	Gain 8: when 10% FS														
Gain 4: when -2% FS	Gain 9: when 20% FS														
Gain 5: when 0% FS															
Remote switch Input (RSW)	No. of input points	4 or 12 (option)													
	Connectable outputs	Dry contact (relay contact) and open collector (current sink to ground)													
	Opening terminal voltage	12V ^{+0.6V} / _{-1.6V} between common terminal (No. 25) and each input terminal (under operating conditions)													
	Shorting terminal current	The current from each terminal is 5.0 to 6.6mA (under operating conditions)													
	Allowable contact resistance (dry contact)	On: Less than 700Ω (under operating conditions) Off: More than 10kΩ (under operating conditions)													
	Residual voltage at open collector on time	3V max. (under operating conditions)													
	Leak current at open collector off time	100μA max. (under operating conditions)													
	Parallel connection with other instrument	Interconnection of SDC40A units is possible. Connection with compatible units other than SDC40A is also allowed.													
	Input sampling cycle	0.1s													
	Minimum hold time of on detection	0.2s													
Function allocation	<p>NOP, RUN/READY, AUTO/MANUAL, REMOTE/LOCAL, AT start/stop, direct/reverse action, LSP number and PID number selection 0/+1, 0/+2, and 0/+4 (PID No. 0 cannot be selected) Fixed MV value output 1, 2 and 3 LSP shift 0/+1, 0/+2, 0/+4, 0/+8, 0/+16, 0/+32, 0/+64, 0/+128, 0/+256, 0/+512 Analog input 2 ratio number selection 0/+1, 0/+2, 0/+4 Computer backup system 1 and 2</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><u>How to use LSP number / LSP shift</u></p> </div> <div style="text-align: center;"> <p><u>Computer backup system usage</u></p> </div> </div> <p>The output is changed over by remote switch input to control by SDC40A One of the following two configurations must then be selected by the remote switch: ① PV at changeover is used as SP. ② LSP preset is used as SP.</p>														

Event	No. of output points	2 points: standard (SPST relay contact). 1 point (SPDT relay contact) and 5 points (open collector output) can optionally be added.				
	Event setting	Direct PV	Reverse PV	Direct deviation	Reverse deviation	Direct absolute deviation value
		Reverse absolute deviation value	Direct MV	Reverse MV	Direct RSP	Reverse RSP
		Direct SP	Reverse SP	Direct motor feedback	Reverse motor feedback	All alarm sum
		PV range alarm	Instrument alarm	Manual status	READY status	Local status
		Auto tuning status	Process diagnosis*	* Process diagnosis event: This is turned ON if the event on delay time is exceeded, but the temperature does not rise beyond the differential gap (does not lower in the case of direct action) when the manipulated variable is larger than the event set output value.		
		Setting range	PV (direct, reverse): -19999 to +26000U Deviation (direct, reverse): -19999 to +26000U Absolute deviation value: 0 to 26000U MV (direct, reverse): -10.0 to +110.0%		RSP (direct, reverse): -19999 to +26000U MFB (direct, reverse): -10.0 to +110.0% Process diagnostics: -10.0 to +110.0%	
Differential gap (hysteresis) setting range	MV event, other than MFB: 0 to 200U, MV event, MFB: 0.0 to 20.0% However, when alarm event or status alarm is set, no differential gap can be set.					
On delay time	0 to 20000s(min) The on delay time can be set for event output EV1 to EV3.					
Output action	On-off					
Output rating	Item \ Event		EV ₁ , EV ₂ (standard)	EV ₃ (option)	EV ₄ to EV ₈ (option)	
	Type of output		SPST (1a) relay contact	SPDT (1a1b) relay contact	Open collector output	
	Contact rating		1A (30V dc/250V ac with resistive load)	2A (30V dc/250V ac with resistive load)	—	
	Allowable contact voltage		250V ac with resistive load 30V dc with resistive load	250V ac with resistive load 30V dc with resistive load	—	
	Mechanical life		20,000,000 cycles	50,000,000 cycles	—	
	Electrical life		100,000 cycles (at contact rating, and frequency of 20 times/min.), COSφ=1	100,000 cycles (at contact rating, and frequency of 20 times/min.), COSφ=1	—	
	Minimum on-off voltage		10V	10V	—	
	Minimum on-off current		10mA (Use a bleeder resistor if necessary.)	10mA (Use a bleeder resistor if necessary.)	—	
	Load drive power voltage range		—	—	10 to 29V dc	
	Maximum output current		—	—	70mA/point max. (under operating conditions)	
	Off time leak current		—	—	0.1mA/point max. (under operating conditions, within load drive power voltage range)	
	Off time residual voltage		—	—	1.6V max. (under operating conditions, within load drive power voltage range, and at maximum output current)	

Auxiliary output	No. of output points	1 or 2 (1 point in 2G, 3D, AK, 5K, 9K, and BK models)				
	Type of output	Selectable from PV, SP, DEV, RSP, MV and MFB.				
	Output rating	4 to 20mA dc. Max. allowable load resistance: 680Ω				
	Output accuracy	±0.1%FS (under standard conditions)				
	Output resolution	1/10000 (numeric value of independent resolution; for example, the input resolution of PV or MFB is not included)				
	Inrush current	25mA max. 50ms max. (with 250Ω load)				
	Maximum output current	21.6mA				
	Minimum output current	2.4mA				
	Opening terminal voltage	25V max.				
	Output update cycle	0.1s				
	Communication	Communication system	Communication protocols	RS-485 (Note 1)		RS-232C
Network			Multidrop The device is provided only with the slave station function, 1 to 16 units max. (DIM), 1 to 31 units max. (CMA, SCM).		The device is provided only with the slave station function	
Data flow			Half duplex		Half duplex	
Synchronization			Start/stop synchronization		Start/stop synchronization	
Interface system		Transmission system	Balanced (differential)		Unbalanced	
		Data line	Bit serial		Bit serial	
		Signal lines	5 transmit/receive lines (3-wire connection is also possible)		3 transmit/receive lines	
		Transmission speed	4800, 9600 bps		4800, 9600 bps	
		Communication distance	500m max. (total)		15m max.	
		Protocol	RS-485		RS-232C	
		Message characters	Character configuration	11 bits/character		11 bits/character
Format			1 start bit, even parity, and 1 stop bit, or 1 start bit, no parity, and 2 stop bits		1 start bit, even parity, and 1 stop bit, or 1 start bit, no parity, and 2 stop bits	
Data length			8 bits		8 bits	
Isolation		Completely isolated between the input and output.				
Note 1. For RS-485, communications, the device can be connected not only to computers equipped with RS-485, but also to Yamatake Corporation's MX200, MA500 (DK link II DIM) or CMC10 controllers.						
General specifications		Memory backup	Non-volatile semiconductor memory (EEPROM)			
		Rated power voltage	AC model: 90 to 264V ac 50/60Hz, DC model: 21.6 to 26.4V dc			
	Power consumption	AC model: 30VA max., DC model: 12W max.				
	Power switching inrush current	15A max. 10ms (under operating conditions) Caution: When applying power to a number of SDC40As simultaneously, ensure sufficient power is supplied, or start up the SDC40As in series. Otherwise, the controllers may not start up normally due to voltage drop from the inrush current. It is necessary to reach the stable voltage within 2s of power being supplied.				
	Insulation resistance	More than 20MΩ between power terminal 1 or 2 and ground terminal 3 (using 500V dc megger).				
	Dielectric strength	1500V ac (AC model) or 500V ac (DC model), 50/60Hz for 1 min between power terminal and ground terminal 1500V ac, 50/60Hz for 1 min between relay output and ground terminal 500V ac, 50/60Hz for 1 min between any other part and ground terminal 500V ac, 50/60Hz for 1 min between isolated terminals				
	Standard conditions	Ambient temperature	23 ±2°C			
		Ambient humidity	60 ±5% RH			
		Rated power voltage	AC Model	105V ac ±1%		
			DC Model	24V dc ±5%		
		Power frequency	AC model: 50 ±1Hz or 60 ±1Hz			
		Vibration resistance	0m/s ²			
		Shock resistance	0m/s ²			
		Mounting angle	Reference plane (vertical) ±3°			
	Operating conditions	Ambient temperature range	0 to 50°C			
		Ambient humidity range	10 to 90% RH (non-condensing)			
		Rated power voltage	AC Model	90 to 264V ac		
			DC Model	21.6 to 26.4V dc		
		Power frequency	50 ±2Hz or 60 ±2Hz			
		Vibration resistance	0 to 1.96m/s ²			
		Shock resistance	0 to 9.81m/s ²			
		Mounting angle	Reference plane (vertical) ±10°			
	Transport/storage conditions	Ambient temperature range	-20 to +70°C			
Ambient humidity range		10 to 95% RH (non-condensing)				
Vibration resistance		0 to 4.90m/s ² (10 to 60Hz, for 2hr each in X, Y and Z directions)				
Shock resistance		0 to 490m/s ² (3 times in vertical direction)				
Package drop test		Drop height: 90cm (1 angle, 3 edges, 6 planes, freefall)				
Materials of mask and case	Mask: Multilon Case: Polycarbonate					

General specifications	Colors of mask and case	Mask: Dark gray Case: Light gray				
	Mounting	Panel flush type, using the dedicated mounting bracket				
	Weight	Approx. 750g (Extension terminal base: Approx. 150g)				
Standard accessories	Name	Model No.	Q'ty	Options	Name	Model No.
	Unit indicating label	N-3132	1		Hard dust-proof cover set	81446083-001
	Mounting bracket	81405411-001	2		Soft dust-proof cover set	81446087-001
	Instruction manual	CP-UM-1580E	1		Terminal cover	81446084-001
					PC loader	SLP-C40AJ20

Table of Selectable Inputs and Ranges

Symbol	°C Range	°F Range
K (CA)	0.0 to 1200.0	0 to 2400
K (CA)	0.0 to 800.0	0 to 1600
K (CA)	0.0 to 400.0	0 to 750
K (CA)	-200.0 to +1200.0	-300 to +2400
K (CA)	-200.0 to +300.0	-300 to +700
K (CA)	-200.0 to +200.0	-300 to +400
E (CRC)	0.0 to 800.0	0 to 1800
J (IC)	0.0 to 800.0	0 to 1600
T (CC)	-200.0 to +300.0	-300 to +700
B (PR30-6)	0.0 to 1800.0	0 to 3300
R (PR13)	0.0 to 1600.0	0 to 3100
S (PR10)	0.0 to 1600.0	0 to 3100
W (WRe5-26)	0.0 to 2300.0	0 to 4200
W (WRe5-26)	0.0 to 1400.0	0 to 2552
PR40-20	0.0 to 1900.0	0 to 3400
Ni-Ni · Mo	0.0 to 1300.0	32 to 2372
N	0.0 to 1300.0	32 to 2372
PL II	0.0 to 1300.0	32 to 2372
DIN U	-200.0 to +400.0	-300 to +750
DIN L	-200.0 to +800.0	-300 to +1600
Gold iron-chromel	0.0 to 300.0K	—

The ±0.1% FS input indication accuracy is not applicable to the following input conditions:

- Lower than -100°C on K thermocouple and T thermocouple: ±1°C ±1U
- Lower than 260°C on B thermocouple: ±4.0% FS ±1U
- 260°C to 800°C of B thermocouple: ±0.4% FS ±1U
- 800°C to 1800°C of B thermocouple: ±0.2% FS ±1U
- Lower than 100°C on R thermocouple and S thermocouple: ±0.2% FS ±1U
- 100 to 1600°C on R thermocouple and S thermocouple: ±0.15% FS ±1U
- Lower than 300°C on PR40-20 thermocouple: ±2.5% FS ±1U
- 300 to 800°C on PR40-20 thermocouple: ±1.5% FS ±1U
- 800 to 1900°C on PR40-20 thermocouple: ±0.5% FS ±1U
- Gold iron-chromel: ±1.5K ±1U
- The range of two decimal digits of RTD input: ±0.15%FS ±1U
- 0 to 10mV range: ±0.15%FS ±1U
- Lower than -100°C on DIN U: ±2°C ±1U
- Between -100°C and 0°C on DIN U: ±1°C ±1U
- Lower than -100°C on DIN L: ±1.5°C ±1U

Symbol	°C Range	°F Range
JIS '89 Pt100 (IEC/DIN)	-200.0 to +500.0	-300.0 to +900.0
	-200.0 to +200.0	-300.0 to +400.0
	-100.0 to +150.0	-150.0 to +300.0
	-50.0 to +200.0	-50.0 to +400.0
	-60.00 to +40.00	-76.00 to +104.00
	-40.00 to +60.00	-40.00 to +140.00
	0.0 to 500.0	0.0 to 900.0
	0.0 to 300.0	0.0 to 500.0
JIS '89 JPt100	0.00 to 100.00	0.00 to 200.00
	-200.0 to +500.0	-300.0 to +900.0
	-200.0 to +200.0	-300.0 to +400.0
	-100.0 to +150.0	-150.0 to +300.0
	-50.0 to +200.0	-50.0 to +400.0
	-60.00 to +40.00	-76.00 to +104.00
	-40.00 to +60.00	-40.00 to +140.00
	0.0 to 500.0	0.0 to 900.0
0.0 to 300.0	0.0 to 500.0	
0.00 to 100.00	0.00 to 200.00	
4 to 20mA	Scaling setting range -19999 to +26000 (Decimal point position is variable.) (Reverse scaling possible)	
0 to 20mA		
0 to 10mV		
-10 to +10mV		
0 to 100mV		
0 to 1V		
-1 to +1V		
1 to 5V		
0 to 5V		
0 to 10V		

Input type

- Thermocouple: K, E, J, T, B, R, S (JIS C 1602-1981)
WRe5-26 (Hoskins Data)
PR40-20 (Johnson Matthey Data)
Ni-NiMo (General Electric Data)
N (N.B.S. Monograph 161)
PL II (Engelhard Industries Data (IPTS68))
DIN U, DIN L (DIN 43710-1985)
Gold iron chromel (Hayashidenko Data)
Resistance temperature detector (RTD): Pt100, JPt100
(JIS C 1604-1989)

Model Selection Guide Table

Example C40A5G0AS04100

Basic Model No.	Control output	Function	Power supply	Option 1	Options 2	Additional processing	Description	
C40A							Digital indicating controller	
	0D						Relay output (on-off or time proportional)	
	6D						Voltage output (with current value adjusting function, on-off or time proportional)	
	2G						Position proportional output	
	5G						Current output (4 to 20mA)	
	3D						Heat/cool control, relay output + relay output	
	AK						Heat/cool control, relay output + current output	
	5K						Heat/cool control, current output + current output	
	6K						Heat/cool control, voltage output + voltage output	
	9K						Heat/cool control, relay output + voltage output	
	BK						Heat/cool control, current output + voltage output	
		0						Standard model
		1						Remote SP function model
		2						Internal cascade function model
			AS					AC power supply (90 to 264V ac: Free power supply)
			DS					DC power supply (21.6 to 26.4V dc)
					00			Option 1 is not provided (2 SPST relay contact event outputs are provided)
					01			With 4 points of remote switching
					02			With one SPDT relay contact event output added
					03			With 4 points of remote switching + 1 SPDT relay contact event output added
				04			With 4 points of remote switching + 1 point of auxiliary output	
				05			with 1 SPDT of event output + 1 point of auxiliary output	
				06			With 4 points of remote switching + 1 SPDT relay contact even + output + 1 point of auxiliary output	
				07			With 4 points of remote switching + 2 points of auxiliary output	
				08			With 1 SPDT of event output + 2 points of auxiliary output	
				09			With 4 points of remote switching + 1 SPDTof event output (SPDT relay contact) + 2 points of auxiliary output	
				0			Option 2 is not provided (if option 1 is not designated, 0 will be selected.)	
				1			With 8 points of added remote switching + 5 event output points (with open collector output)	
				2			With 8 points of added remote switching + event output (open collector output) + RS-485 communication	
				3			With 8 points of added remote switching + event output (open collector output) + RS-232C communication	
					00		Additional processing not provided.	
					T0		Tropicalization treatment applied	
					K0		Antisulfidation corrosion treatment applied	
					D0		Data attached	
					B0		Tropicalization treatment applied + data attached	
					L0		Antisulfidation corrosion treatment applied plus attached	
					Y0		Comply with the traceability	

Notes:

The two auxiliary output points of option 1 cannot be specified for the following control outputs:

2G, 3D, AK, 5K, 6K, 9K, BK

Any of 1 to 3 of option 2 can be selected only when four points of remote switching are provided in option 1 (01, 03, 04, 06, 07, 09).

Selection guide table

○: Combination possible

×: Combination not possible.

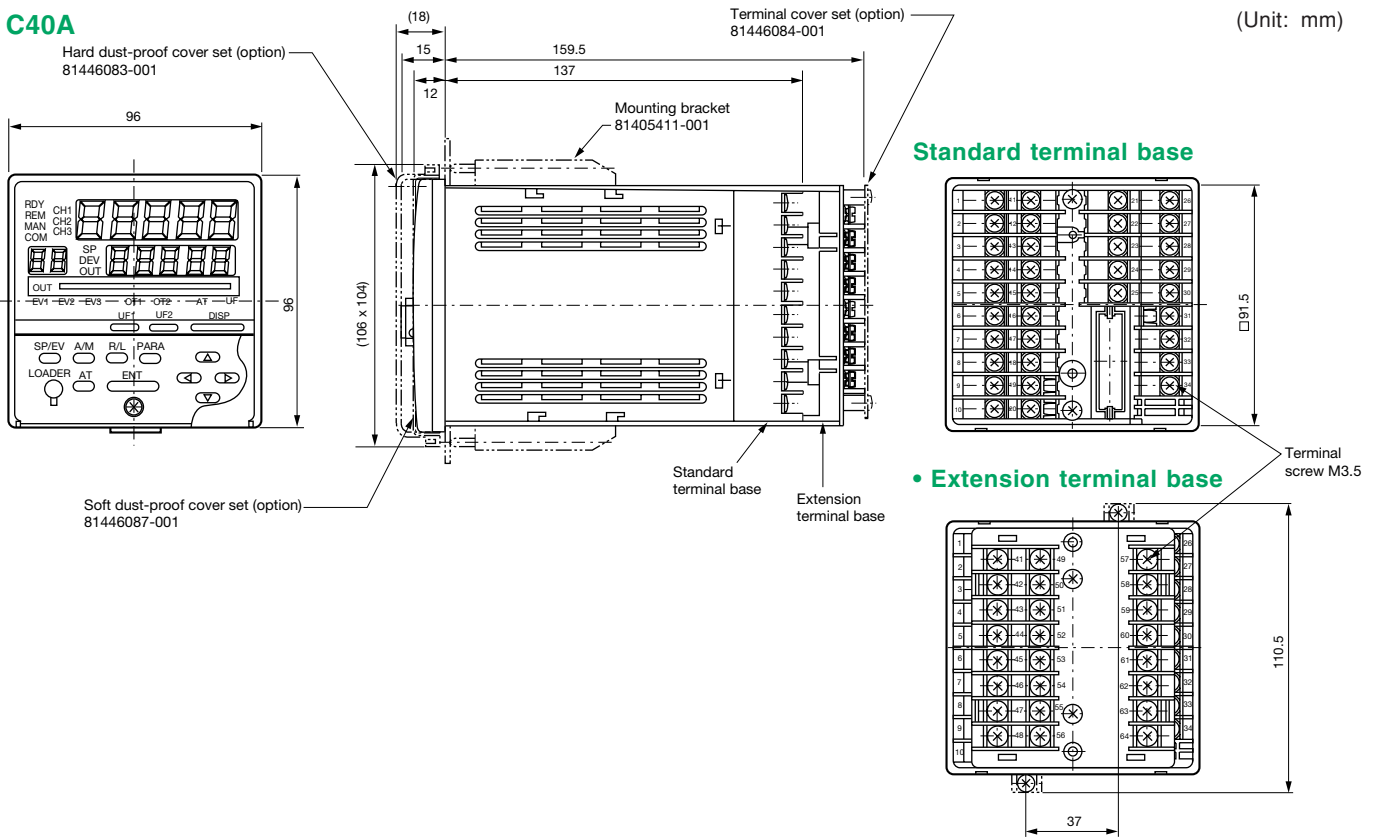
Option 1 \ Option 2	Option 2			
	0	1	2	3
00	○	×	×	×
01	○	○	○	○
02	○	×	×	×
03	○	○	○	○
04	○	○	○	○
05	○	×	×	×
06	○	○	○	○
07	○	○	○	○
08	○	×	×	×
09	○	○	○	○

Note: If any of 1 to 3 of option 2 are selected the extension terminal base is provided.

■ Dimensions

C40A

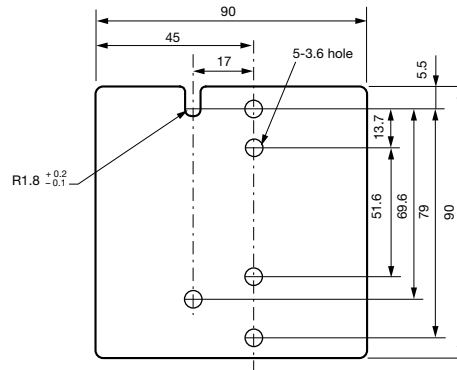
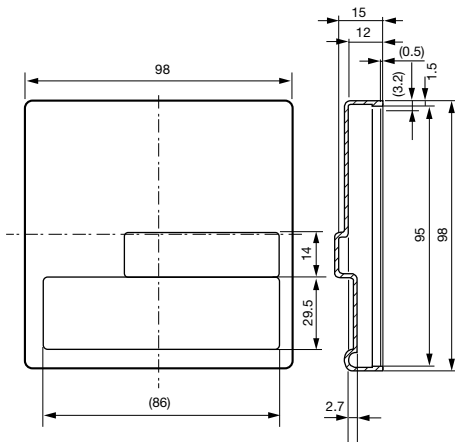
(Unit: mm)



Soft dust-proof cover set: Part No. 81446087-001
(silicon rubber, transparent)

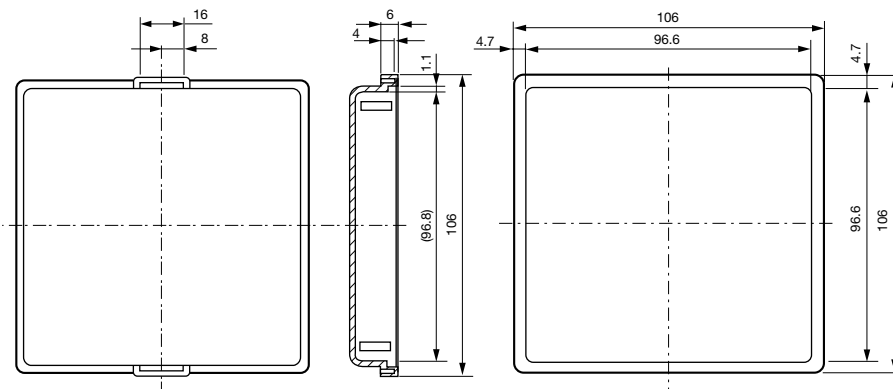
Terminal cover set: Part No. 81446084-001

This can be fitted to both the standard terminal base and to the extension terminal base. (construction: incombustible polyvinyl chloride sheet (gray))



Hard dust-proof cover set: Part No. 81446083-001
(polycarbonate, transparent)

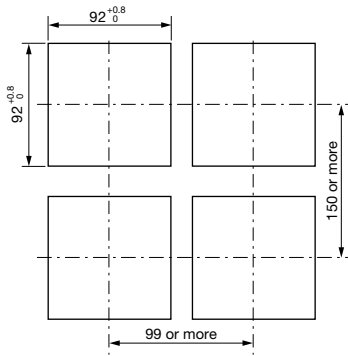
Packing



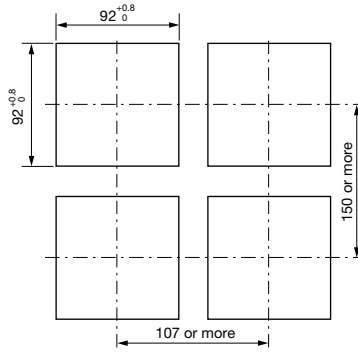
Panel cutout

(Unit: mm)

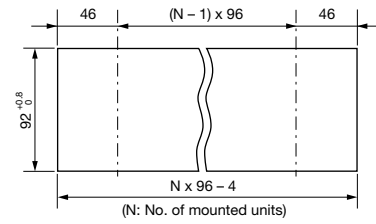
For standard application or with soft dust-proof cover



When the hard dust-proof cover is used

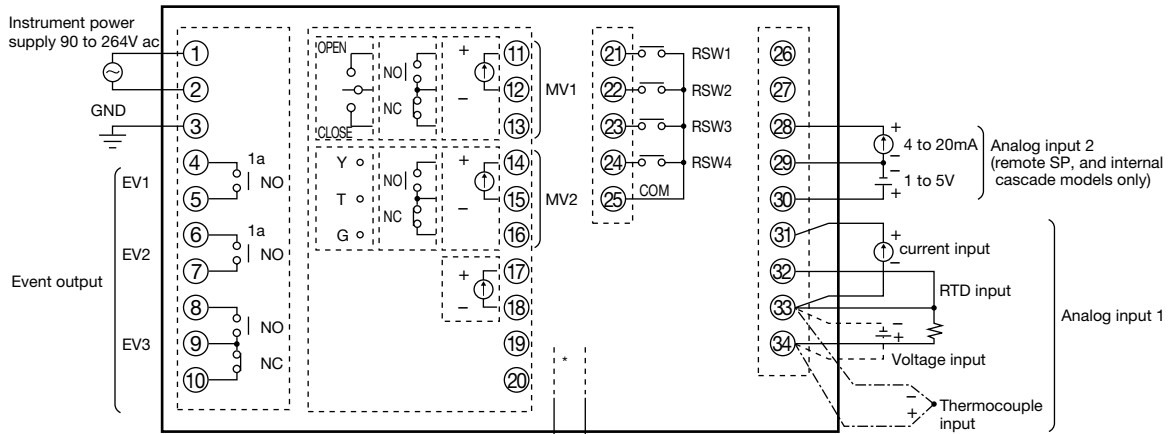


Lateral series mounting

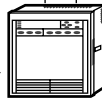


Standard terminal layout

• AC Model

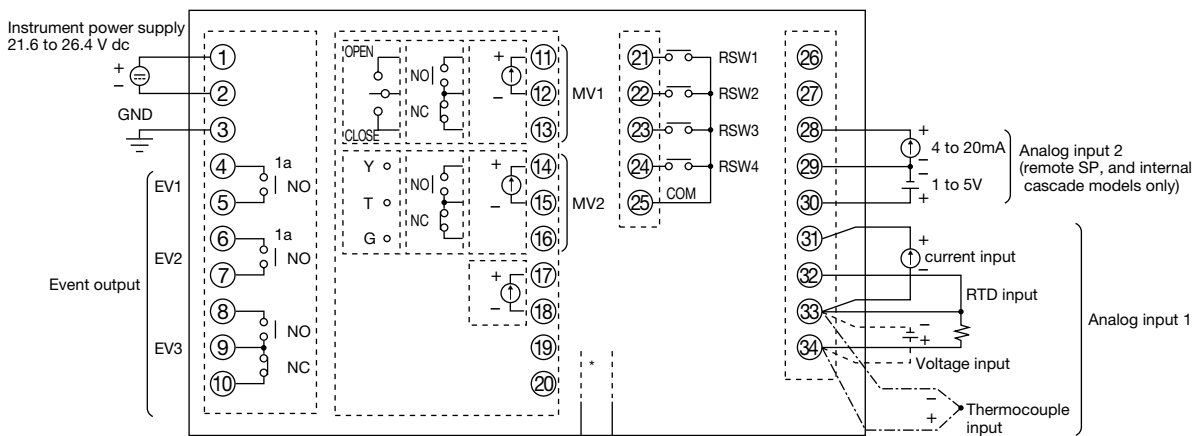


* Auxiliary output
4 to 20mA
Recorder or other
similar device

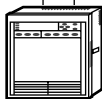


* For 2G, 3D, AK, 5K, 9K and BK models,
the auxiliary output terminals are (17) and (18).
for 0D, 6D and 5G models, the auxiliary output 1 terminals are
(14) and (15), and the auxiliary output 2 terminals are (17) and (18).

• DC Model

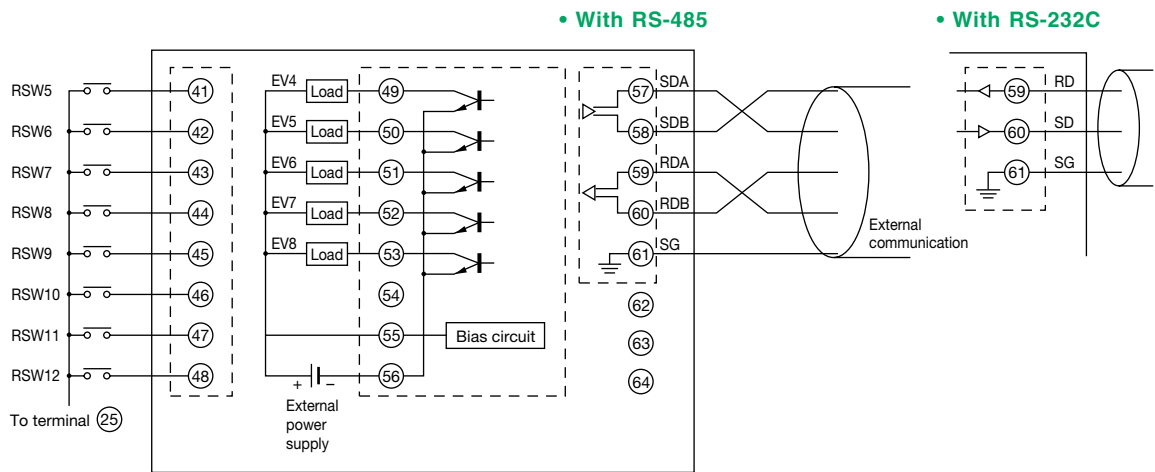


* Auxiliary output
4 to 20mA
Recorder or other
similar device



* For 2G, 3D, AK, 5K, 9K and BK models,
the auxiliary output terminals are (17) and (18).
for 0D, 6D and 5G models, the auxiliary output 1 terminals are
(14) and (15), and the auxiliary output 2 terminals are (17) and (18).

Extension terminal layout





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.

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Printed on recycled paper.

(04)

Printed in Japan. (H)
1st Edition: Issued in May, 1994
7th Edition: Issued in June, 2005

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