YAMATAKE

Specification

DigitroniK

Digital Indicating Controller SDC30

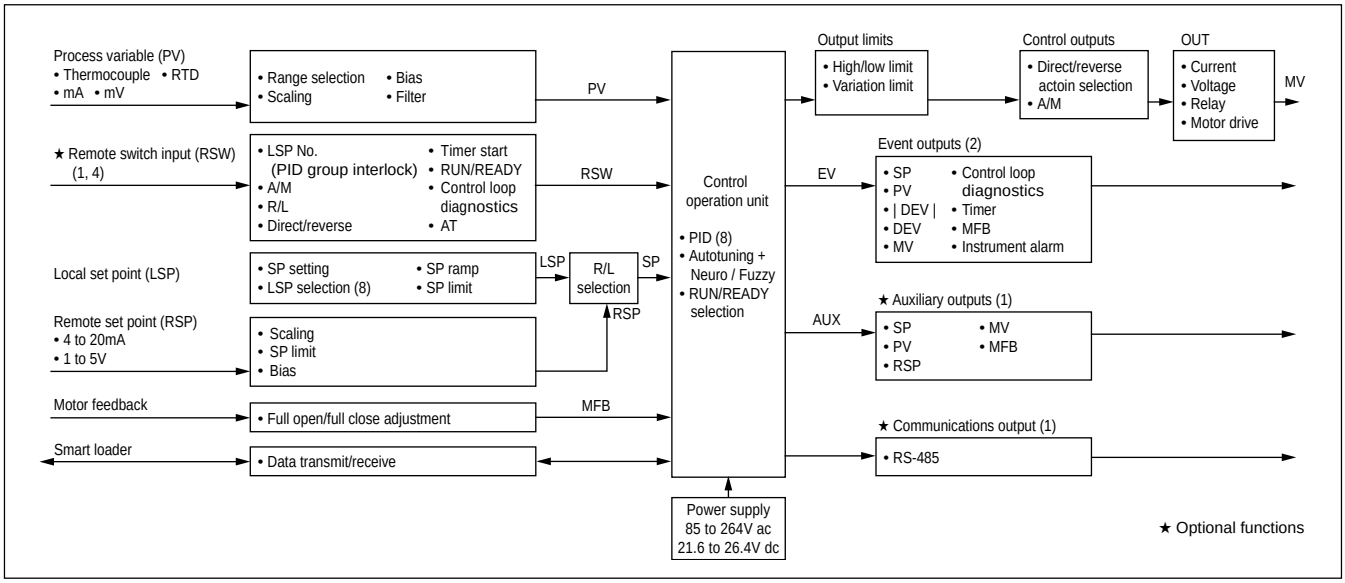
The DigitroniK SDC30 is a compact (48 mm x 96 mm) digital indicating controller offering standard PID control and an advanced neural/fuzzy PID that performs process diagnostics and reduces overshoot.
The SDC30 offers full, multi-range inputs, selectable from the keypad, including thermocouple, resistance temperature detector (RTD), DC voltage and DC current inputs.
The SDC30 provides a comprehensive range of strategies including time proportional PID (relay output, voltage output), current output PID, and position proportional PID.
The controller also enhances process visibility with such functions as remote switch input, control parameters, and local set points, which can be easily set using the smart loader package.

■ Features

- High accuracy of ±0.2% FS.
- Input types and ranges are selectable at the keypad.
- SP1 to SP8 can be selected by the operators.
- 8 groups of PID control constants are provided. Each PID group can be optimized using a range of configurable values.
- Neural/Fuzzy and conventional autotuning allows simultaneous implementation of the rising, disturbance response, and overshoot prevention characteristics.
- Abnormal operation diagnostics allow automatic changeover of motors to their estimated stop position by detection of abnormal feedback resistance.
- Control loop diagnostics check the output condition at PV change.
- PV bias and RSP bias can be set.
- The setpoint value ramp function allows setting of the SP change ratio.
- Two event outputs are provided: enabling one with a timer function, and a motor opening event to be set.
- The operation modes are selectable by external switch inputs (local/remote, auto/manual, RUN/READY, selection of 8 local set points, AT start, direct/reverse action, timer event start).
- Versatile optional functions support a broad range of applications:
  ★ Event outputs (2 points)
  ★ Digital inputs (1 or 4 points)
  ★ Auxiliary output (1 point)
  ★ RS-485 Communications
- CE marking compliant
  Adaptive standards: EN61010-1, EN50081-2, EN50082-2

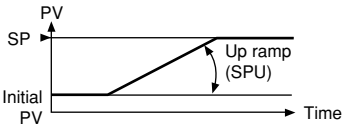
■ Basic Function Block Diagram

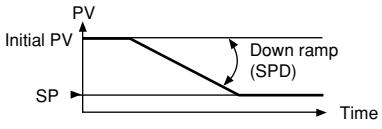
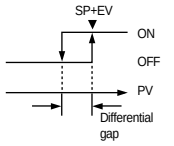
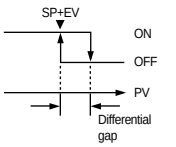
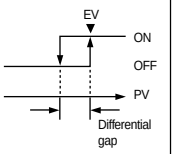
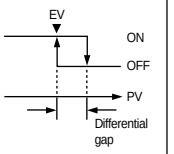
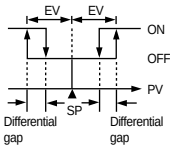
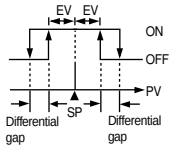
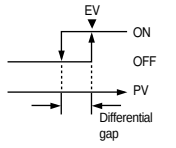
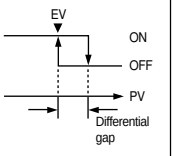
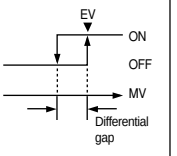
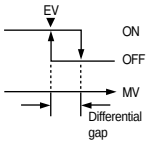
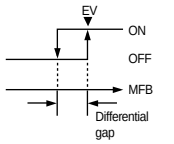
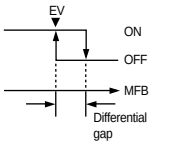
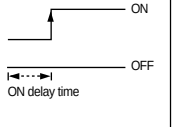
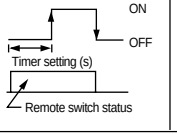
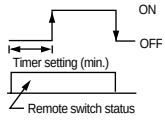
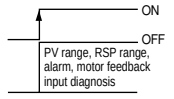
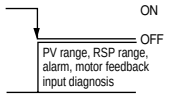
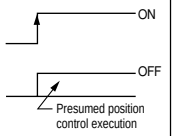
• Standard Model, and Remote SP Model



■ Specifications

PV input	**Type of input**	Multi-ranges of thermocouple, resistance temperature detector, DC voltage and DC current.			
	Sampling cycle	0.2s			
	Input bias	–1000 to +1000U variable: U: °C, kPa, % and other industrial units, including decimal point positioning			
	Input digital filter	0.0 to 25.0s variable	Note: 1. When the resistor or A line is broken: Upscale + alarm When B line is broken: Downscale + alarm When C line is broken: Undefined indication + alarm When A and B lines are broken: Upscale + alarm When B and C lines are broken: Upscale + alarm When A and C lines are broken: Upscale + alarm When A, B and C lines are broken: Upscale + alarm Note: 2. For 0 to 20mA inputs, burnout can be detected.		
	Input bias current	Thermocouple input: 0.16 μA max.			
		RTD input: 1 mA			
		DC voltage input: –0.6 μA min.			
	Input impedance	Current input: 100Ω ±1%			
	Allowable of wiring resistance	Thermocouple input: 0.16 μV/Ω max.			
		RTD input: –100 to +200°C range: ±0.036% FS/Ω Max. –200 to +500°C range: ±0.064% FS/Ω Max.			
	Burnout	Thermocouple input: Upscale + alarm indication			
		RTD input (see note 1)			
		DC voltage input: Downscale + alarm indication			
		DC current input: Downscale + alarm indication (see note 2)			
Data display and setting	**Indication method**	4-digit and 7-segment LED indication			
	OK lamp	Control deviation status is shown in a "green belt".			
	Number of setting points	1 to 8 points. Optional selection and changeover use are enabled.			
	Data storage	Non-volatile EPROM			
	Range	Thermocouple or RTD input (see Table 1).			
		DC voltage or current (programmable range) input: –1999 to +9999, to 3 decimal places.			
	Accuracy	±0.2% FS±1 digit for display (except for thermocouple B ranged between 0 and 260°C). ±0.3% FS±1 digit for 0 to 10mV input			
	Setting range	Thermocouple or RTD input: 1, 0.1°C or 10.1°F (depends on input type)			
		DC voltage or current (programmable range) input: 1, 0.1, 0.01, 0.001 (depends on input type)			
	Setting system	Local: Standard			
		Remote: Optional function (Remote/Local changeable)			
Control output	**Model number**	**C300D**	**C306D**	**C305G**	**C302G**
	Output type	SPDT relay contact	Voltage	Current (4 to 20mA)	Relay contact to drive Modutrol motors
	Control action	Time proportional PID	Time proportional PID	Continuous PID	Position proportional PID
	Number of PID sets	8 sets	8 sets	8 sets	8 sets
	PID automatic selection	One of 8 PID sets is automatically selected using max. 8 zones where LSP or RSP is located.			
	PID autotuning	Automatic setting of PID values by limit cycle method and neural/fuzzy learning/smart method			
	Output rating	Contact type: SPDT Resistive load: 250V ac, 5A	Open voltage: 22.5V dc ±15% Internal resistance: 1120Ω, 5A	Output current: 4 to 20mA dc Load resistance: 750Ω max. Output accuracy: 0.2% under standard conditions Output resolution: Within 0.01% Output update cycle: 0.2s	Contact type: 2SPST Resistive load: 250V ac, 8A Inductive load: 250V ac, 3.5A Feedback resistance: 100 to 2500Ω
	Proportional band (P): %FS	0.0 to 999.9 (on/off operation at P=0.0)	0.0 to 999.9 (on/off operation at P=0.0)	0.1 to 999.9 (on/off operation disabled)	0.1 to 999.9 (on/off operation disabled)
	Cycle time: s	5 to 120	1 to 120	—	—
	Integral time (I): s	0 to 3600 (PD action at I = 0)	0 to 3600 (PD action at I = 0)	0 to 3600 (PD action at I = 0)	0 to 3600 (PD action at I = 0)
	Derivative time (D): s	0 to 1200 (PI action at D = 0)	0 to 1200 (PI action at D = 0)	0 to 1200 (PI action at D = 0)	0 to 1200 (PI action at D = 0)
	Manual reset: %	0 to 100	0 to 100	0 to 100	0 to 100
	Differential gap: U	0 to 100 (when ON/OFF operation)	0 to 100 (when ON/OFF operation)	—	—
	Output limiter% Lower limits	0 to high limit	0 to high limit	0 to high limit	0 to high limit
	Output limiter% Upper limits	low limit to 100	low limit to 100	low limit to 100	low limit to 100
	Output action changeover	Direct/reverse change-over is enabled.	Direct/reverse change-over is enabled.	Direct/reverse change-over is enabled.	Direct/reverse change-over is enabled.
	Deadband: % OUT	—	—	—	0.5 to 25.0
	Manipulated variable change ratio limiter: %	0.0 to 100.0 (every 0.2s)	0.0 to 100.0 (every 0.2s)	0.0 to 100.0 (every 0.2s)	0.0 to 100.0 (every 0.2s)
	Modutrol motor control system	—	—	—	Any of the following three systems is selectable: • Motor feedback is provided. (see note 3) • Motor feedback is provided. (see note 4) • No motor feedback is provided.
		Notes 3 Control is based on the specified motor feedback resistance value from which abnormal values have been rejected. This mode automatically changes to the control without motor feedback, when the motor feedback resistor T line is broken. 4 Control is based on the specified motor feedback resistance value from which abnormal values are not rejected. This mode automatically changes to the control without motor feedback, if T line is broken.			

<table>
<tr><td rowspan="3">Control output</td><td rowspan="3">Set point ramp</td><td>Function</td><td colspan="5">Sets the set point change ratio.</td></tr>
<tr><td>Range</td><td colspan="5">0 to 9999U/min, 0 to 999.9U/min, 0 to 9999U/hr, 0 to 999.9U/hr</td></tr>
<tr><td>Setting</td><td colspan="5">The SP ramp does not function when the set point value is 0, LSP is changed to RSP, or the instrument is operated by RSP.
 


</td></tr>
<tr><td rowspan="15">Optional functions</td><td rowspan="11">Event (EV)</td><td>Number of outputs</td><td colspan="5">2 points (standard)</td></tr>
<tr><td rowspan="8">Types of event</td><td>Direct deviation</td><td>Reverse deviation</td><td>Direct PV</td><td>Reverse PV</td><td>Differential gap</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>Reverse absolute deviation value</td><td>Direct SP</td><td>Reverse SP</td><td>Direct MV</td><td>Reverse MV</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>Direct motor feedback</td><td>Reverse motor feedback</td><td>Control loop diagnosis (Note 5)</td><td>Timer (s)</td><td>Timer (min.)</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>Direct alarm</td><td>Reverse alarm</td><td>Presumed position execution (Note 6)</td><td colspan="2" rowspan="2">Note 5 Control loop diagnostic event
This tums ON, when the event ON lag is exceded, but the temperature does not rise beyond the differentiaal gap (does not fall if direct action) though a manipulated variable value is larger than the set output value (0 to 100%) for this event.
Note 6 Presumed position execution
This turnes ON when the instrument is changed to the presumed position control due to motor feedback resistor breakage.</td></tr>
<tr><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="4">Event (EV)</td><td>Setting range</td><td colspan="5">Deviation (direct, reverse): Within ±PV range/2 (within -1999U)
PV (direct, reverse): Within PV range
Absolute deviation value (direct, reverse): 0 to PV range/2
SP (direct, reverse): Within SP limit
MV (direct, reverse): –10.0 to +110.0%
Motor feedback (direct, reverse): 0.0 to 100.0%
Control loop diagnosis: 0.0 to 100.0%
Timer (sec or min): 1 to 9999 s or min</td></tr>
<tr><td>Differential gap</td><td colspan="5">0 to 100U (This cannot be set when the event type is alarm, timer, or position proportional.)</td></tr>
<tr><td>On delay time</td><td colspan="5">0 to 9999 s (This cannot be set when the event type is timer or position proportional.)</td></tr>
<tr><td>Standby sequence</td><td colspan="5">Presence or absence selectable.
(This cannot be set when the event type is alarm, timer or position proportional.)</td></tr>
<tr><td>Output rating</td><td colspan="5">SPST relay contact, 250V ac, 30V dc, 5A, resistive load</td></tr>
<tr><td rowspan="3">Remote switch input (RSW)</td><td>Number of input points</td><td colspan="5">1 or 4 points selectable.</td></tr>
<tr><td>Function</td><td colspan="5">Allocates an optional function selectively from among SP (PID interlock), RUN/READY, AUTO/MANUAL, LOCAL/REMOTE, autotuning start, deirect/reverse, and timer start.</td></tr>
<tr><td>Input rating</td><td colspan="5">Dry contact or open collector transistor, OFF-terminal voltage: 5±1V, ON current: 5±2mA</td></tr>
<tr><td rowspan="6">Auxiliary output (AUX)</td><td>Number of AUX points</td><td colspan="5">1 point</td></tr>
<tr><td>Output type</td><td colspan="5">Selectable from among process variable (PV), set point (SP), remote set point, remote set point before bias, control output, and motor open.</td></tr>
<tr><td>Output rating</td><td colspan="5">4 to 20mA dc Load resistance: 750Ω max.</td></tr>
<tr><td>Output accuracy</td><td colspan="5">±0.2% FS (under standard conditions)</td></tr>
<tr><td>Output resolution</td><td colspan="5">0.01 min</td></tr>
<tr><td>Output update cycle</td><td colspan="5">0.2s</td></tr>
<tr><td rowspan="4">Remote set point (RSP)</td><td>Types</td><td colspan="5">4 to 20mA dc or 1 to 5V dc, depending on controller.</td></tr>
<tr><td>Accuracy</td><td colspan="5">±0.2% FS (±1 digit under standard conditions)</td></tr>
<tr><td>Sampling cycle</td><td colspan="5">0.2s</td></tr>
<tr><td>Bias</td><td colspan="5">–1999 to +9999U</td></tr>
</table>

General specifications	**Communication**	**Communication system**	Communication protocols	RS-485
			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).
			Data flow	Half duplex
			Synchronization	Start/stop synchronization
		Interface system	Transmission system	Balanced (differential)
			Data line	Bit serial
			Signal lines	5 transmit/receive lines (3-wire connection is also possible with DIM)
			Transmission speed	1200, 2400, 4800, 9600bps
			Communication distance	300m max. (DIM), 500m max.
			Others	Correspond to RS-485
		Message characters	Character configuration	11 bits/character
			Format	1 start bit, even parity, and 1 stop bit, or 1 start bit, no parity, and 2 stop bits
			Data length	8 bits
		Isolation	Completely isolated between the input and output except external switch input.	
		Note: For RS-485 communication, the device can be connected to Yamatake's MX100 (SCM), MA500 (DK link II DIM) or CMA50 controllers.		
	Memory backup	Non-volatile EPROM		
	Rated power	100 to 240V ac, 50 to 60Hz (AC power supply model), 24V dc (DC power supply model)		
	Operating power	85 to 264V ac, at 50Hz: 50±2Hz, at 60Hz: 60±2Hz (AC power supply model), 21.6 to 26.4V dc (DC power supply model)		
	Inrush current	30A max. (AC power supply model), 20A max. (DC power supply model)		
	Power consumption	18VA max. (operating)		
	Insulation resistance	More than 50MΩ between the case or ground terminal and power terminal by 500V dc megger		
	Dielectric strength	1500V ac for 1 min between the case or ground terminal and power terminal. (AC power supply model), 500V ac 1 min (DC power supply model).		
	Operating conditions	**Operating temperature**	0 to 50°C	
		Operating humidity	10 to 90%RH	
		Vibration resistance	2.0m/s² max.	
		Sock resistance	9.8m/s² max.	
	Transport / storage conditions	**Storage temperature**	–20 to +70°C	
		Storage humidity	10 to 95%RH	
		Vibration resistance	4.9m/s² max., 10 to 60Hz, for 2h each in X, Y and Z directions.	
		Shock resistance	490m/s² max., 3 times in vertical direction when in box.	
		Package drop test	Drop height 90cm (1 angle, 3 edges, 6 planes, free fall)	
	Construction	Mask: Multilon Case: Polycarbonate		
	Colors	Mask: Dark gray Case: Light gray		
	Mounting	Panel flush mount		
	Installation	Vertical plane ±15°		
	Weight	Approx. 400g		

Attachments	**Item**	**Model No.**	**Quantity**	**Options**	**Item**	**Model No.**
	Unit indicating label	N-3132	1 sheet		Hard dustproof cover	81446082-001
	Mounting bracket	81405411-001	2 pcs.		Soft dustproof cover	81446086-001
	Instruction Manual	No. CP-UM-1586E	1 book		Terminal cover	81446088-001

Table 1 Types of Inputs and Ranges (selectable at keypad)

Type of input	Symbol	°C range	°F range	Type of input	Symbol	°C range	°F range
Thermo-couple	K	0 to 1200	0 to 2200	Thermo-couple	Ni-Mo	0 to 1300	32 to 2372
		0.0 to 800.0	0 to 1400		DIN U	–199.9* to +400.0	–300 to +700
		–200.0* to +400.0	–300 to +700		DIN L	0.0 to 800.0	0 to 1400
	J	0 to 1200	0 to 2000	RTD	JIS Pt100	–199.9* to +500.0	–300 to +700
		0.0 to 800.0	0 to 1400		(IEC/DIN)	–100.0 to +200.0	–150.0 to +400.0
		–200.0* to +400.0	–300 to +700		JIS JPt100	–199.9* to +500.0	–300 to +700
	E	0.0 to 800.0	0 to 1400			–100.0 to +200.0	–150.0 to +400.0
	T	–200.0* to +400.0	–300 to +700	DC current voltage	4 to 20mA	Scaling setting range –1999 to +9999 (Decimal point position is not fixed.)	
	R	0 to 1600	0 to 3000		0 to 20mA		
	S	0 to 1600	0 to 3000		1 to 5V		
	B	0 to 1800	0 to 3200		0 to 5V		
	N	0 to 1300	32 to 2372		0 to 10mV		
	PLII	0 to 1300	32 to 2372		0 to 100mV		
	WRe5-26	0 to 2300	0 to 4000		–10 to +10mV		

Note (*) Although –200.0 cannot be set nor indicated, the calibaration has been performed at –200.0°C.

Model Selection Guide

I	II	III	IV	V	0

Example: C302GA000100

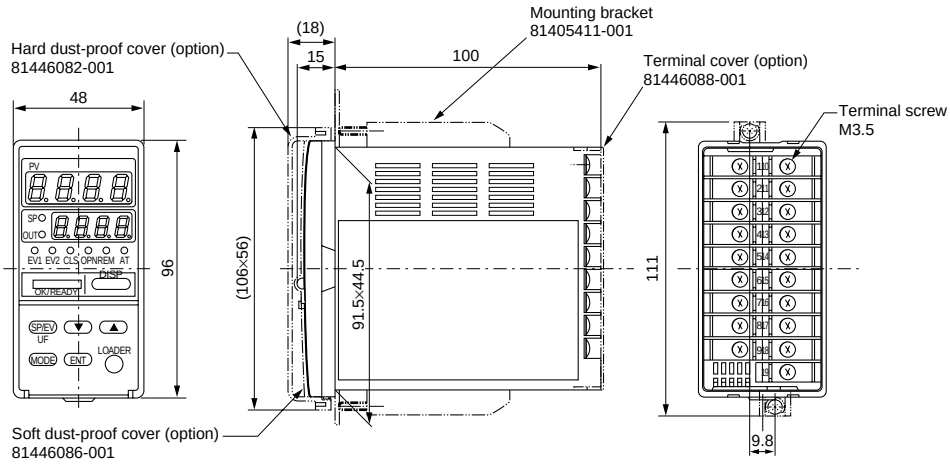
I	II	III	IV	V	Contents
Basic model number	Control action	Power supply	Optional function	Additional processing	(○ : Included — : Not included ▭ : Corresponding version available)
C30					Digital controller
	0D				Time proportional PID: Relay contact, 250V ac, 5A, resistive load
	6D				Time proportional PID: Voltage 22.5V dc ±15%
	5G				Continuous PID: Current 4 to 20mA dc, resistive load 570Ω max.
	2G				Position procortional PID: M/M drive relay contact, 250V ac, 8A (resistive load), 3.5A (inductive load)
		A0			100 to 240V ac, 50 to 60Hz
		D0			21.6 to 26.4V dc

		Event		Auxiliary output	Remote setting input		Remote switch input		Communi-cations	0D	6D	5G	2G
		EV1	EV2	AUX	RSPA (4 to 20mA)	RSPV (1 to 5V)	RSW (1 point)	RSW (4 points)	RS-485				
001		○	○	—	—	—	—	—	—	○	○	○	○
002		○	○	—	—	—	○	—	—	—	—	—	○
003		○	○	—	—	—	—	○	—	○	○	○	—
004		○	○	○	—	—	○	—	—	○	○	○	—
040		—	—	—	—	—	—	—	○	—	—	—	○
041		○	○	—	—	—	—	—	○	○	○	○	—
402		○	○	—	○	—	○	—	—	○	○	○	—
406		○	○	○	○	—	—	—	—	○	○	○	—
407		○	—	—	○	—	—	—	—	—	—	—	○
502		○	○	—	—	○	○	—	—	○	○	○	—
506		○	○	○	—	○	—	—	—	○	○	○	—
507		○	—	—	—	○	—	—	—	—	—	—	○
	0	Not provided											

■ Dimensions

C30 Controller

(Unit: mm)

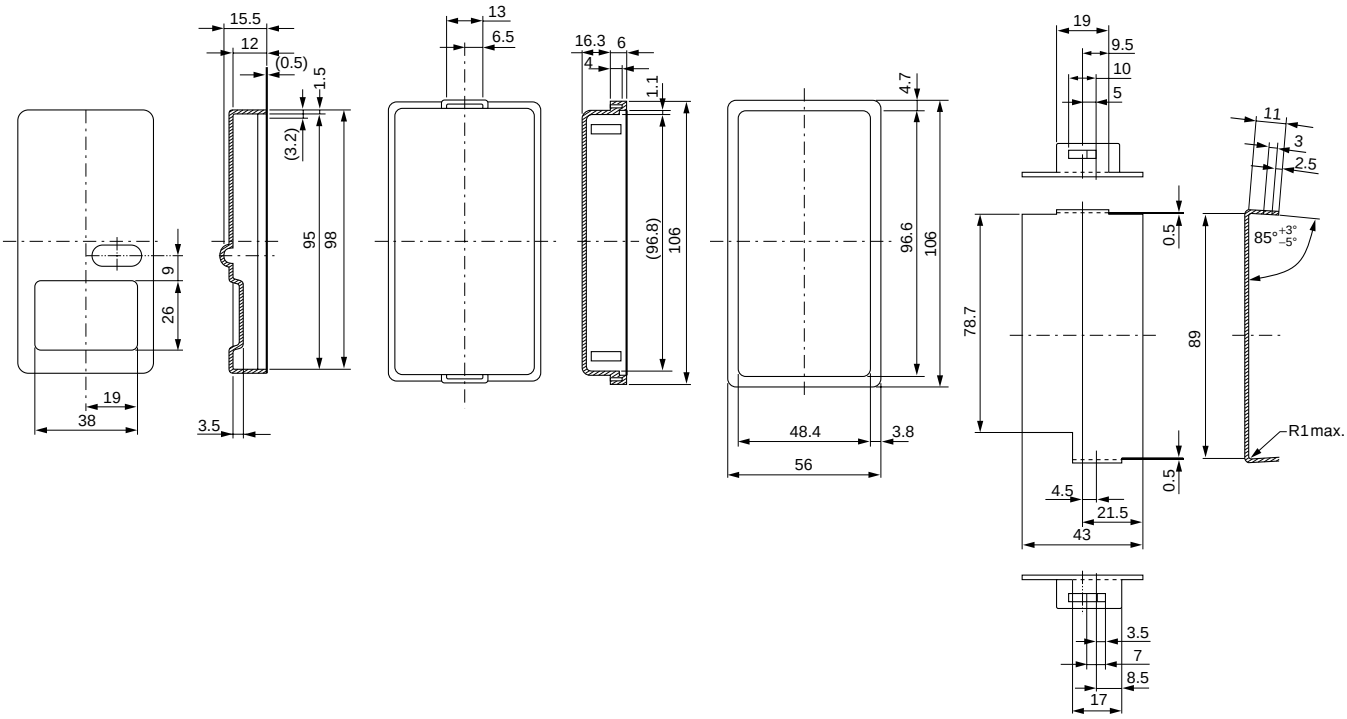


Soft dust-proof cover
Part No. 81446086-001

Hard dust-proof cover
Part No. 81446082-001

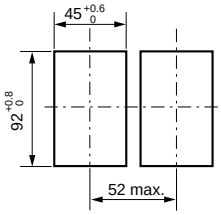
Terminal cover
Part No. 81446088-001

Packing

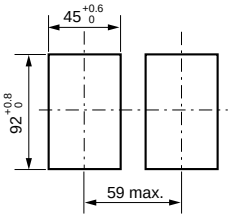


Panel Cutout

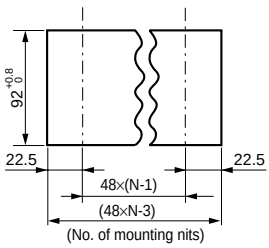
For standard application or with soft dust-proof cover



When the hard dust-proof cover is used

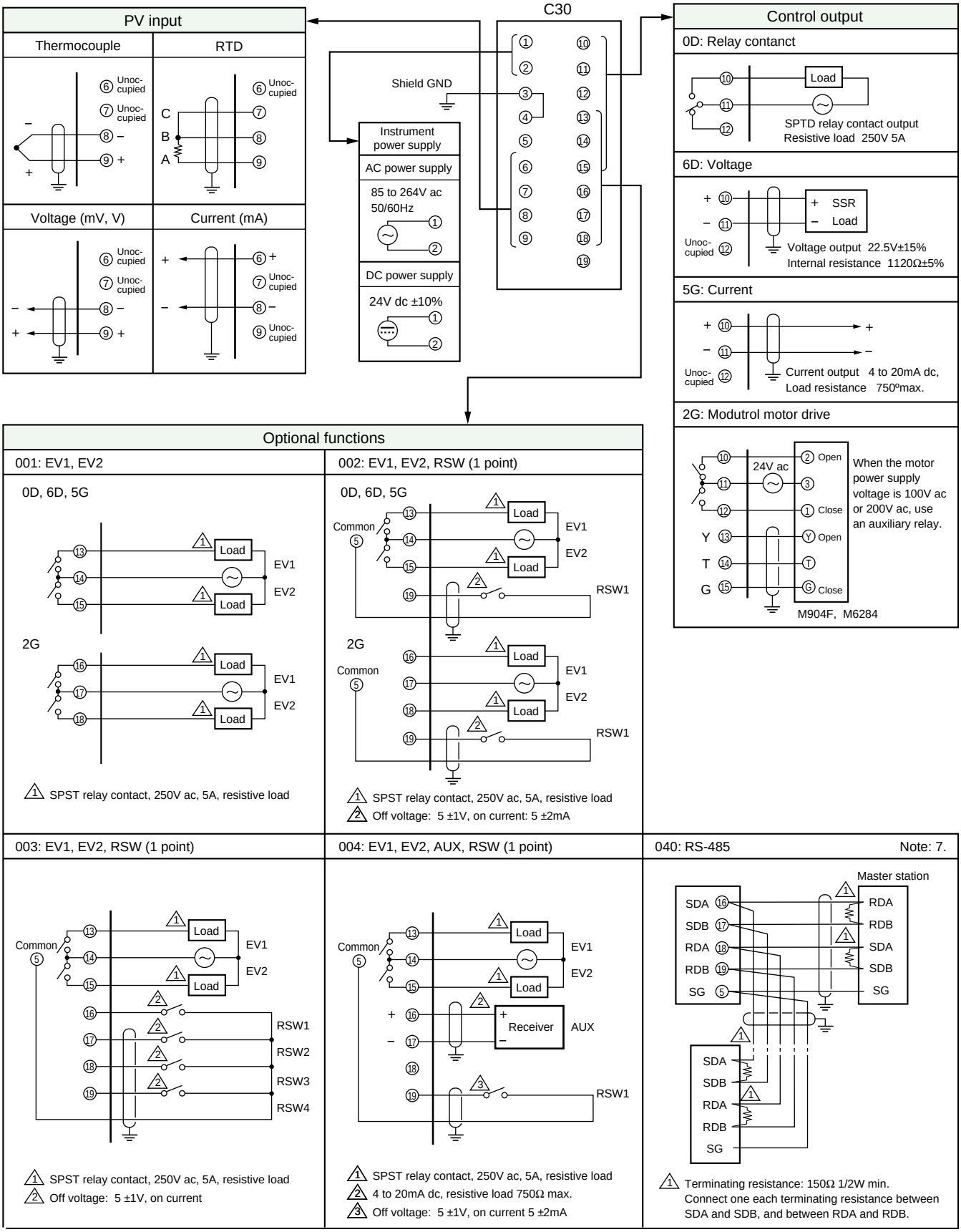


Serial mounting



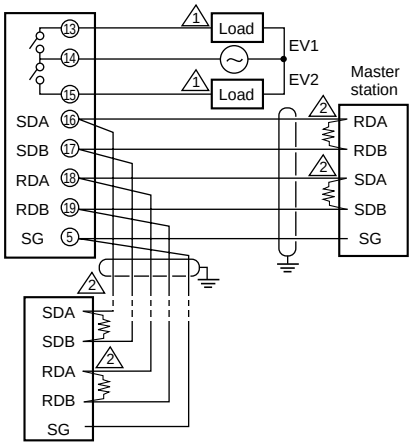
Ambient temperature must be 40°C max.
even for side-by-side mounting

■ Wiring


PV input
Thermocouple
RTD
Voltage (mV, V)
Current (mA)
Unoc-cupied
C30
Shield GND
Instrument power supply
AC power supply
85 to 264V ac 50/60Hz
DC power supply
24V dc ±10%
Control output
0D: Relay contanct
Load
SPTD relay contact output
Resistive load 250V 5A
6D: Voltage
SSR
Load
Voltage output 22.5V±15%
Internal resistance 1120Ω±5%
5G: Current
Current output 4 to 20mA dc,
Load resistance 750ºmax.
2G: Modutrol motor drive
24V ac
Open
Close
When the motor power supply voltage is 100V ac or 200V ac, use an auxiliary relay.
M904F, M6284
Optional functions
001: EV1, EV2
0D, 6D, 5G
2G
EV1
EV2
SPST relay contact, 250V ac, 5A, resistive load
002: EV1, EV2, RSW (1 point)
Common
RSW1
Off voltage: 5 ±1V, on current: 5 ±2mA
003: EV1, EV2, RSW (1 point)
RSW2
RSW3
RSW4
Off voltage: 5 ±1V, on current
004: EV1, EV2, AUX, RSW (1 point)
Receiver
AUX
4 to 20mA dc, resistive load 750Ω max.
Off voltage: 5 ±1V, on current 5 ±2mA
040: RS-485
Note: 7.
Master station
SDA
SDB
RDA
RDB
SG
Terminating resistance: 150Ω 1/2W min.
Connect one each terminating resistance between SDA and SDB, and between RDA and RDB.

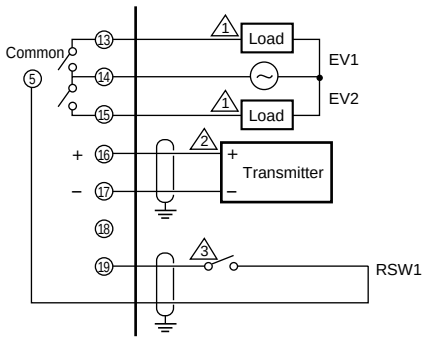
Optional functions

041: EV1, EV2, RS-485 Note: 7



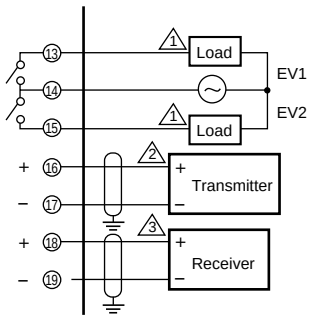
1 SPST relay contact, 250V ac, 5A, resistive load
2 Terminating resistance: 150Ω 1/2W min.

402: EV1, EV2, RSP (4 to 20mA), RSW (1 point)
502: EV1, EV2, RSP (1 to 5V), RSW (1 point)



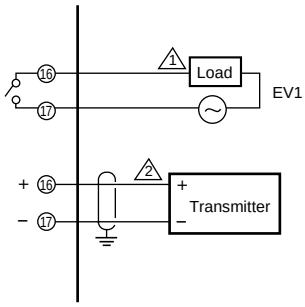
1 SPST relay contact, 250V ac, 5A, resistive load
2 1 to 5V dc (502), 4-20mA dc (402)
3 Off voltage: 5 ±1V, on current: 5 ±2mA

406: EV1, EV2, AUX, RSP (4 to 20mA)
506: EV1, EV2, AUX, RSP (1 to 5V)



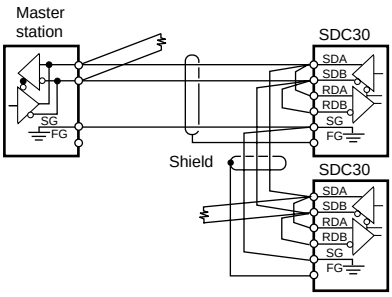
1 SPST relay contact, 250V ac, 5A, resistive load
2 1 to 5V dc (506), 4-20mA dc (406)
3 4 to 20mA dc, resistive load 750W max.

407: EV1, RSP (4 to 20mA)
507: EV1, RSP (1 to 5V)



1 SPST relay contact, 250V ac, 5A, resistive load
2 1 to 5V dc (507), 4-20mA (407)

Note 7. When making three-wire system connection in the RS-485 type, short circuit between SDA and RDA, and between SDB and RDB of this instrument.



■ Cautions for wiring

1. Isolation

The section bounded by a solid line (——) is isolated from the rest of the circuit.

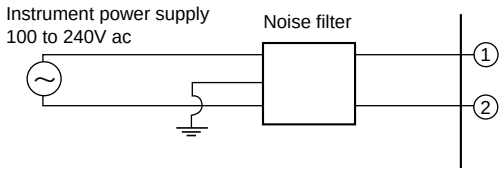
The section bounded by a dotted line (- - - -) is not isolated from the rest of the circuit.

<table>
<tr><td colspan="2">Loader interface</td><td>Moter feedback
Potentiometer input</td></tr>
<tr><td rowspan="2">Remote setting input</td><td rowspan="6">Digital circuit</td><td>Current output (Control output)</td></tr>
<tr><td>Current output (Auxiliary output)</td></tr>
<tr><td rowspan="4">PV input</td><td>Voltage output (Control output)</td></tr>
<tr><td>Relay output (Cotrol output)</td></tr>
<tr><td>Event output 1</td></tr>
<tr><td>Event output 2</td></tr>
<tr><td colspan="2">Remote switch input</td><td>Communication I/O</td></tr>
</table>

2. Power supply noise

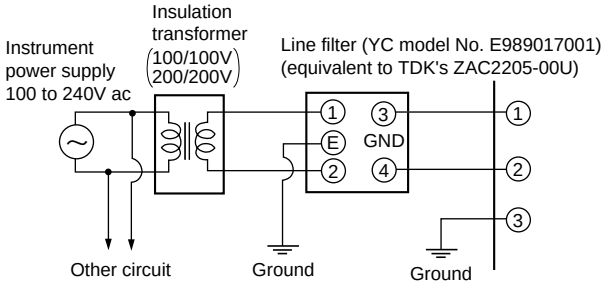
(1) Noise reduction techniques

Always use a noise filter to suppress the influence of noise as much as possible, even if noise is unnoticeable.



(2) When noise is evident

If noise is observable, suppress it by using an insulation transformer and line filter.



3. Noise

Possible noise sources in the installation environment are:

Relays and contacts, electromagnetic coils, solenoid valves, power lines (specifically, those higher than 100V ac), motor commutators, phase angle control SCRs, radio equipment, welding machines, high-voltage ignition devices, etc.

(1) Suppression techniques for quick rising noise

A CR filter is effective for quick rising noise.

Recommended filter: No. 81446365-001

(2) Suppression technique, for noise with large peaks:

A varistor is effective for reducing noise with large peaks. However, care should be taken to avoid shorting if varistor is faulty.

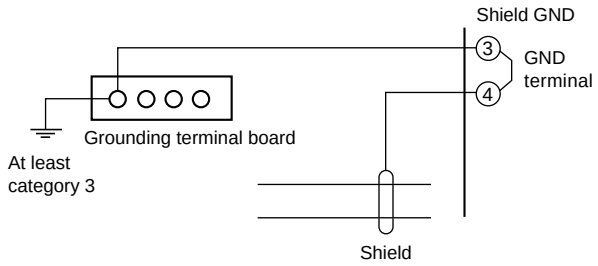
4. Grounding

Ground this controller at a single point to GND terminal ③ to ④. Don't connect any jumper wiring. Prepare a grounding terminal board separately if grounding of a shield wire is difficult.

Grounding type: At least category 3 (100W max.)

Grounding wire: Soft steel wire (AWG14) of more than 2mm^2.

Grounding wire length: 20m max.



5. Wiring operations

(1) Don't bundle the primary and secondary power lines together, and don't run them in the same wiring conduit or duct after carrying out noise countermeasures.

(2) Run the input/output and communication lines more than 50cm from drive power or power lines of higher than 100Vac. Don't run these wires in the same wiring conduit or duct.

6. Check after wiring

After wiring, be sure to check the connecting line conditions. Be careful: incorrect wiring will cause the instrument to fail.

⚠ 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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This has been printed on recycled paper. (01)

Printed in Japan. (H)
1st Edition: Issued in May, 1994
5th Edition: Issued in June, 2003