

SERIES EMC30

■ MICROPROCESSOR-BASED INTELLIGENT SERVO CONTROLLER



One-Output (Single) Type

Two-Output (Dual) Type

BASIC FEATURES

- High visibility of Control Motor opening display, which is shown in a bar graph (51 dots) and 7 segments.
- Zero/Span adjustment of opening can be done automatically at the touch of a single button.
- Constant monitoring for abnormal functioning of potentiometer and motor loop during operation. In case of abnormal functioning, the place where it originated will be displayed in a message.
- During trial operation, a wiring diagnostic TEST function will notify in a display message, if motor and potentiometer circuit have not been wired or if they have been wired incorrectly.
- By means of the combination of SSR and relay, the drive unit can control directly large capacities (20-240V / 2A).
- A two-output (dual) model is suitable for controlling of heating / cooling valves.
- A wide selection of additional functions (optional) is available to suit various requirements. (Events, analog output, external operation, square root extraction, ratio set up)

SPECIFICATIONS

Display

Display of opening (Position indicator)	First output - Red
Color of output display (LED bar graph):	Second output - Green
Display resolution / dots:	2% / 51 dots
Data display (DATA DISPLAY)	4 digits / 7 segments green
Digits / color:	0.1%
Display resolution (opening, input, deviation):	0.25 seconds
Display renewal cycle:	Opening and input value: -10.0~110.0%
Display range:	Deviation: -100.0~100.0%
Monitor display:	POSITION (1, 2), DEV (1, 2), INPUT EV1~EV3, DI1~DI3, MAN (1, 2), OPEN (1, 2), CLOSE (1, 2), DA (1, 2), RA (1, 2)

Control Input

Current / receiving impedance: 4~20, 0~20mA DC / 100Ω
 Potentiometer: Between 100Ω and 2kΩ / three-wire system
 Voltage / input impedance: 0~1, 1~5, 0~10V DC / 500kΩ
 Input filter: 0~99 seconds

Setting

Setting system: By front keys (7 keys)
 Selectable setting items
 Display switching: INPUT, POSI, DEV, EV, DI
 Auto / manual switching: Balanceless bumpless
 Manual operation mode: MTR / Setting by opening OBJ / Setting by opening value
 Manually operable range: 0.0~100.0%
 Status display during manual operation: MAN lamp (red) flashes
 Automatic adjustment
 Zero span adjustment: Normal (DA) / reverse (RA)
 Selection of control characteristics: Input values against 0% and 100% openings
 Setting of control characteristic gain: 0~99 seconds
 Setting of input filter: Higher limit 1~100%, lower limit 0~99% (higher limit > lower limit)
 Setting of opening limiters: 1~100%
 Setting of speed gain: 0.1~5.0% of input signal
 Setting of hysteresis: 2~9 times as much as hysteresis (interlocked with hysteresis)
 Setting of dead band: 4-stage locking
 Setting of keylock:

Feedback

Feedback potentiometer rating: Between 100Ω and 2kΩ / three-wire system

Control Output

Output type: Sparkless non-voltage contact 20~240V AC
 Contact capacity: 2A inductive load (AC load)
 Number of output points: 1 point / 2 points selectable
 Output characteristics: Normal (DA) / reverse (RA) selectable by key or external operation (DI)
 Action display: Green lamp lights during opening or closing.
 Display of output characteristic: DA or RA to be indicated by green lamp

Wiring Diagnostic and Auto Tuning Functions

Wiring diagnostic (TEST) function: Wiring for motor and potentiometer to be checked automatically
 Motor / wiring / potential difference diagnosis: Problem arising during operation to be detected, with error message on display
 Automatic zero span adjustment: Equipped with auto adjustment function according to control program

Event Output (Option)

Number of points: 3 (EV1, EV2 and EV3)
 Types: Maximum of 20 types of deviation (1, 2) / higher and lower limit alarms, potential difference (1, 2) / higher and lower limit alarms, Input value / higher and lower limit alarms, output (1, 2) / manual, output (1, 2) / auto, potentiometer (1, 2) / error, motor (1, 2) / error, keylock, Non are assigned to 3 points.
 Output rating / structure: 240V AC 1.5A resistive load / "a" contact
 Action display: Green lamps light when EV1~EV3 are in action

External Operation (Option)

Number of points: 3 (DI1, DI2 and DI3)
 Externally operable items: Present opening commands or output inversion assignable to the 3 points
 Operation: In operation only when no-voltage contact is on.

Setting of Second Output Ratio (Option)

Setting of ratio: 30~300% of the opening of first output
 Setting of bias: Bias to set ratio -100~ +100%

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Analog Output (Option)

Applicable output:	Either opening or control input to be selected
Analog output / rating:	4~20mA FS / load resistance 600Ω
Accuracy of output:	±0.5%FS

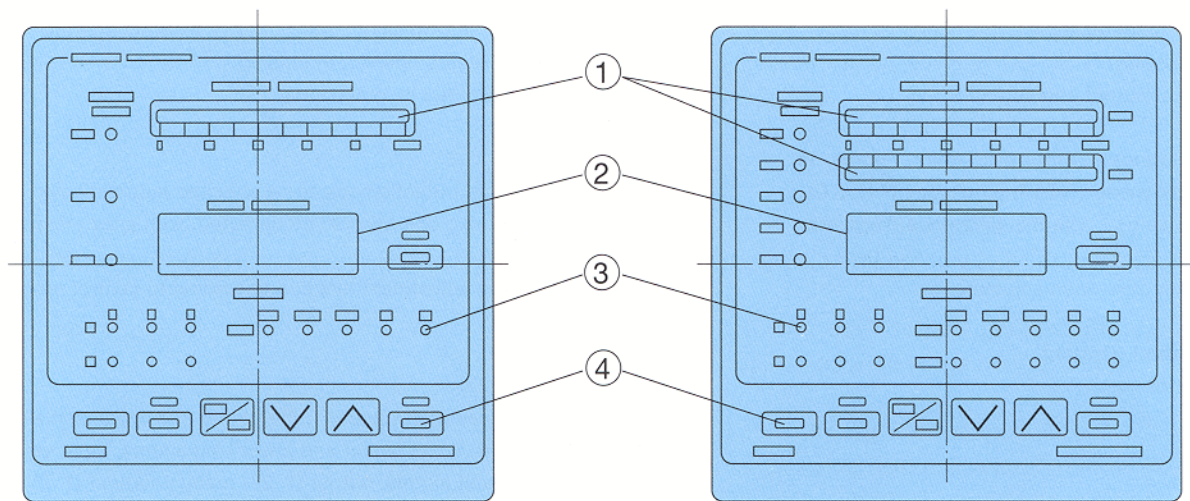
Square Root Extraction Control (Option)

Output control (opening) by extracting square root of input

Others

Data storage:	EEPROM memory
Operating ambient temperature / humidity ranges:	-10~50 °C / 90%RH or below (no dew condensation)
Supply voltage:	Selectable from 100 to 240V AC ±10% 50 / 60Hz, 24V AC ±10% 50 / 60Hz and 24V DC ±10%
Power consumption:	10VA maximum
Insulation resistance:	500V DC 20MΩ or above between input / output terminals and power supply terminals 500V DC 20MΩ or above between power supply terminals and ground terminal
Dielectric strength:	1000V AC for 1 minute between input / output terminals and power supply terminals 1500V AC for 1 minute between power supply terminals and ground terminal
Protective structure:	Only front panel has simple dust-proof and drip-proof structure
Material:	Resin molding
External dimensions:	96 (H) × 96 (W) × 110 (D) mm (Panel depth 100mm)
Mounting:	Push-in panel (no mounting hardware necessary)
Panel thickness:	1~3.5 mm
Panel cutout:	92 (H) × 92 (W) mm (Tolerance: +0.8 and -0.0 mm)
Weight:	Approx. 500g

FRONT PANEL



One-Output (Single) Type

Two-Output (Dual) Type

Names and Functions

No.	Name	Function
①	Opening / position display	To display opening / position by 51-dot red LED bar graphs To display opening / position by 51-dot green LED bar graphs (provided in 2-output type)
②	Data display	To display opening / position, deviation of input relative to opening, input value, parameters, set values of parameters & error messages
③	Function / action lamps	Event: EV1, EV2, EV3 External: DI 1, DI 2, DI 3 Status: Man, Close, Open, RA, DA POSI: 1, 2 DEV: 1, 2
④	Operating Keys	7 keys: MODE SHIFT/PARA AUT/MAN ▲ ▼ EXEC/ENT TEST/DISP

ADDITIONAL FUNCTIONS (OPTIONAL)

① **Selection of Event Function (Optional)**

Assign functions selected from the following (20 points) to EV 1, EV 2, and EV 3.

Code	Event Function (Selectable Range)	Assignment Mode		
		Auto	Manual	Stop
1	non	Not in use		
2	in L	Lower limit of input (0~100%)		
3	in H	Higher limit of input (0~100%)		
4	P1 L	Lower limit of opening 1 (0~100%)		
5	P2 L	Lower limit of opening 2 (0~100%)		
6	P1 H	Higher limit of opening 1 (0~100%)		
7	P2 H	Higher limit of opening 2 (0~100%)		
8	d1 L	Lower limit of deviation 1 (-100~0%)		
9	d2 L	Lower limit of deviation 2 (-100~0%)		
10	d1 H	Higher limit of deviation 1 (0~100%)		
11	d2 H	Higher limit of deviation 2 (0~100%)		

Code	Event Function (Selectable Range)	Assignment Mode		
		Auto	Manual	Stop
12	mAn1	Output 1 in manual mode		
13	mAn2	Output 2 in manual mode		
14	Aut1	Output 1 in automatic mode		
15	Aut2	Output 2 in automatic mode		
16	P1Er	Output when potentiometer 1 error arises		
17	P2Er	Output when potentiometer 2 error arises		
18	m1Er	Output when motor 1 error arises		
19	m2Er	Output when motor 2 error arises		
20	Lock	Output while Lock mode is ON		

② **Ratio of External Control Function (optional)**

DI No.	Working Terminals
DI 1	COM (25) and DI 1 (26) are short-circuited
DI 2	COM (25) and DI 2 (27) are short-circuited
DI 3	COM (25) and DI 3 (28) are short-circuited

③ **Operating Function at Set Ratio (A)**

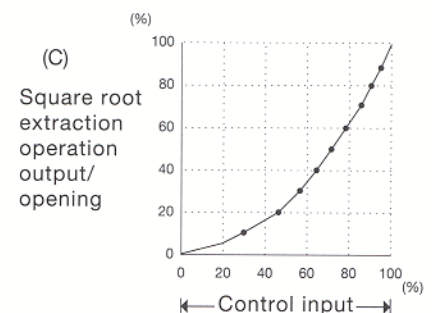
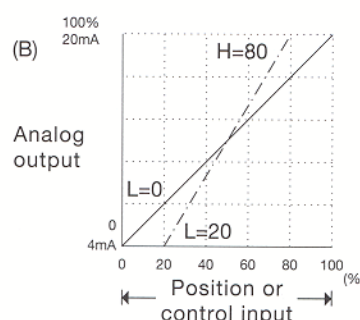
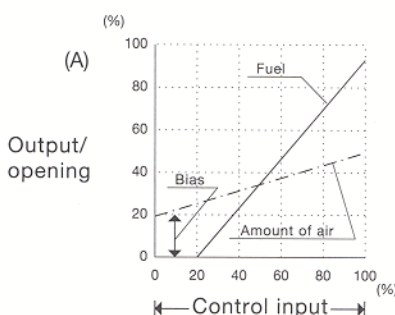
Setting of ratio of second output. In the 2-output type, the value of the second output can have a ratio between 30 and 300% of the value of the first output. (The function can be made use of as a ratio between air and fuel.)

④ **Selection of Analog Output Type (B)**

Control input or the degree of opening can be output as signals of DC 4~20mA.

⑤ **Square Root Extraction of Operating Characteristics (C)**

The amount of fluid which the control value allows to flow is called the Cv value. Since the Cv value is generally not linear to the opening (butterfly value, for example), it can be controlled so as to be linear to control signals by using the square root extraction function.

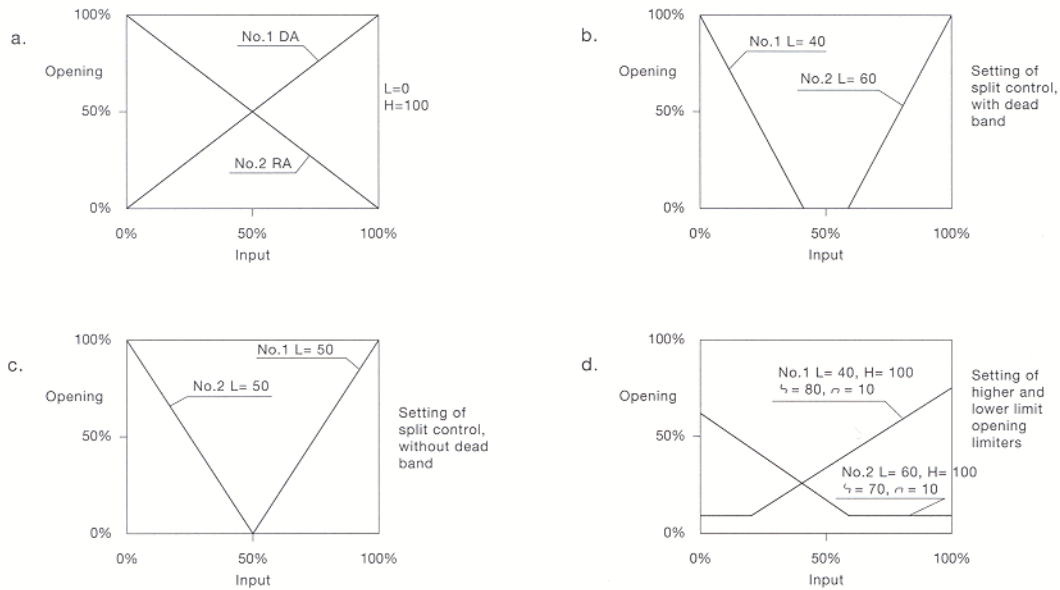


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⑥ Use of Two-Output Type Controller

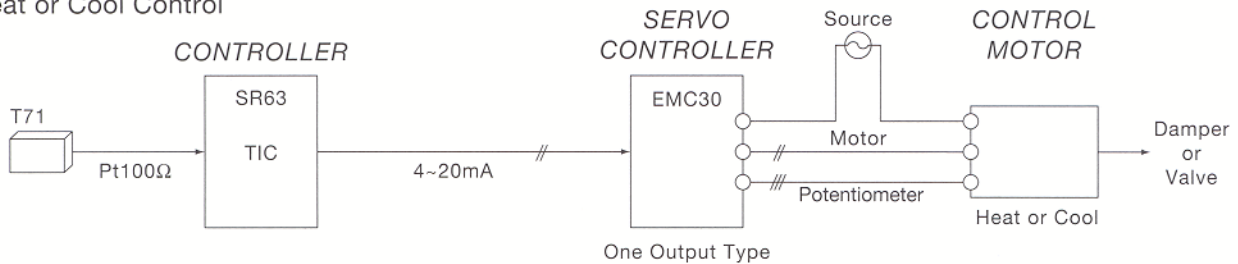
So as to control two control motors by means of one control signal, this type of controller has two circuits each for the potentiometer and output. This enables individual control in addition to split control.

Examples of Two Output Control

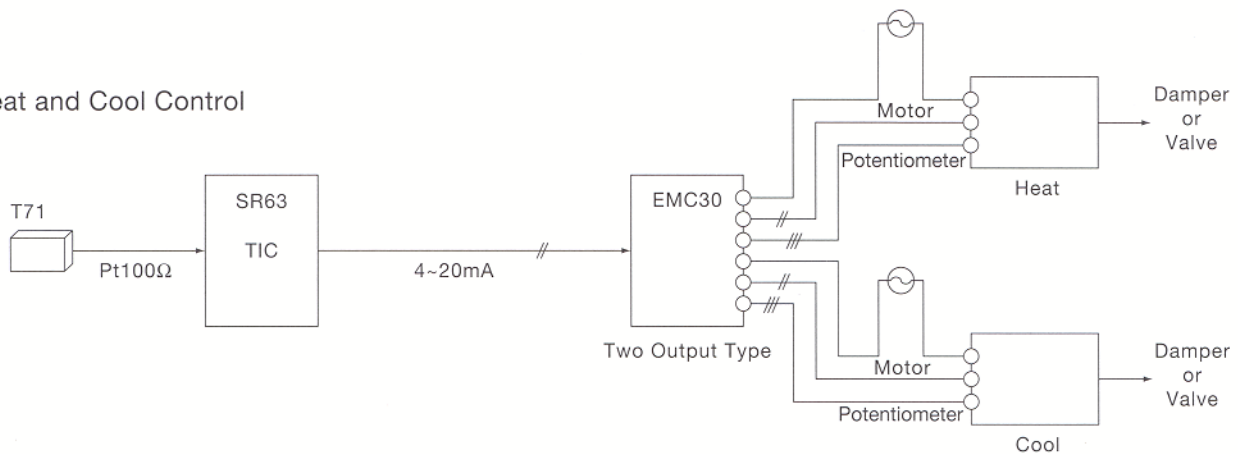


APPLICATION EXAMPLE

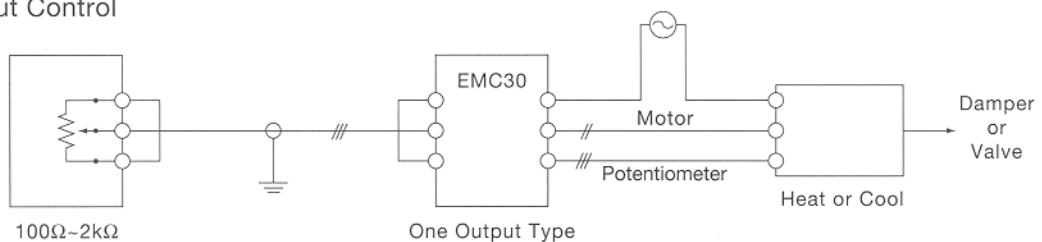
(1) Heat or Cool Control



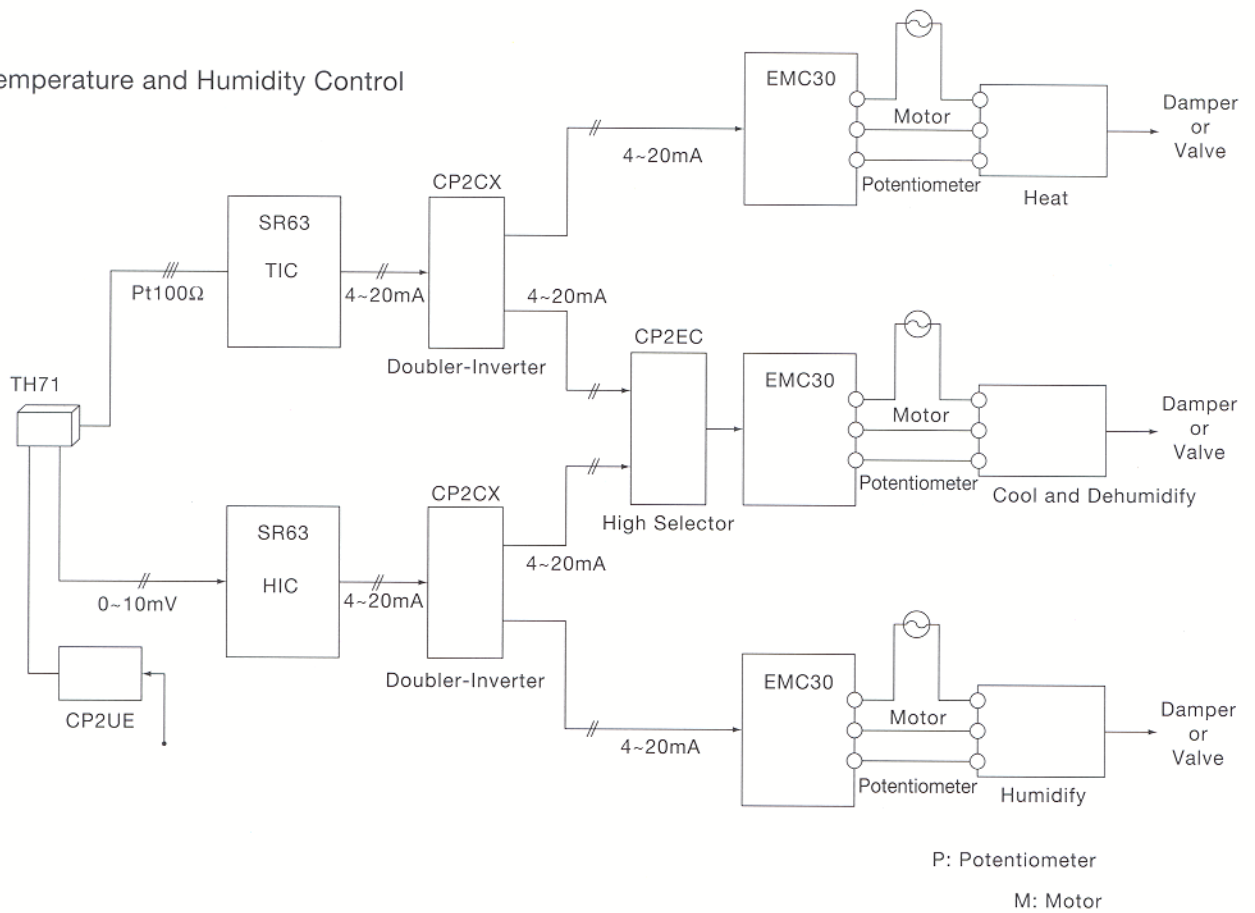
(2) Heat and Cool Control



(3) Potentiometer Input Control

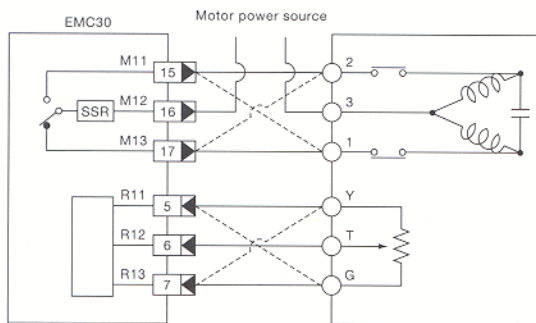


(4) Temperature and Humidity Control



WIRING EXAMPLE

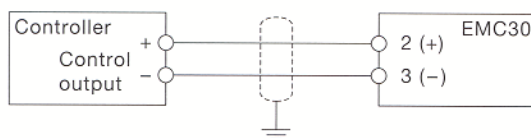
(1) Wiring of Motor and Potentiometer Circuits



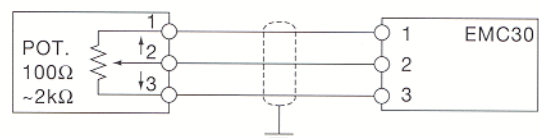
- * In wiring an input circuit, care should be taken to prevent noise.
 - a. Input circuit wiring should be positioned apart from the power line and load wiring.
 - b. Shield wire can be used effectively to prevent static induction noise.
 - c. Twisting input wires at short intervals is effective in preventing magnetic induction noise.

(2) Wiring of Control Input, Event Output, External Control (DI) Input, and Analog Output Signal

a. For Voltage/Current Input



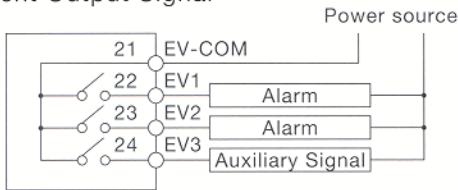
b. For Potentiometer Input



* Wiper 2 increases the opening in 3 (→) directions (DA)

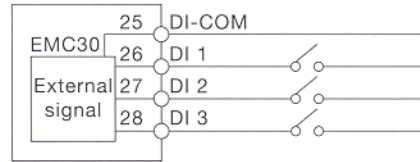
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c. Event Output Signal



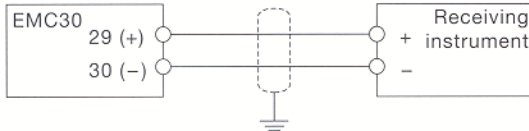
Relay rating: 240V AC 1.5A
Output type: " a " contact

d. External Control (DI) Signal Input



DI signal: Non-voltage contact
External resistance: 3kΩ

e. Analog Output Signal

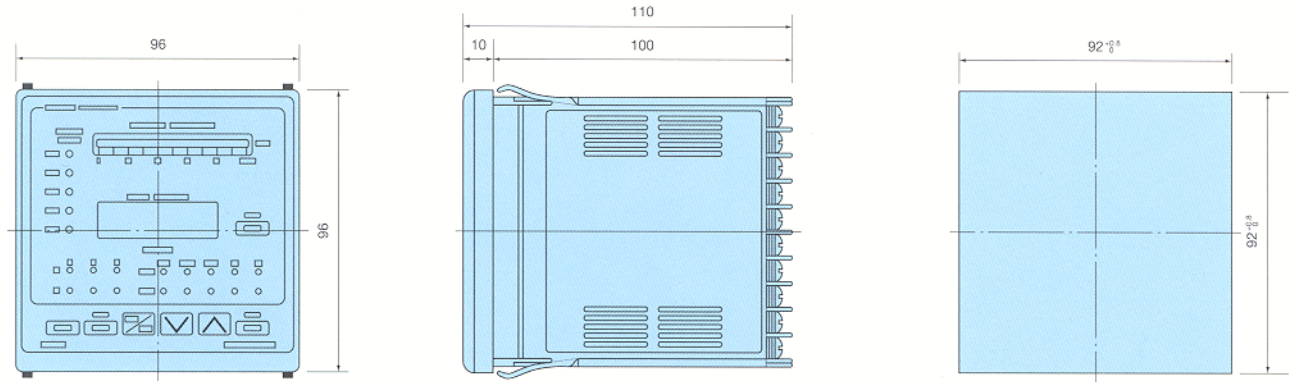


Output signal: 4~20mA
Allowable load: 600Ω maximum

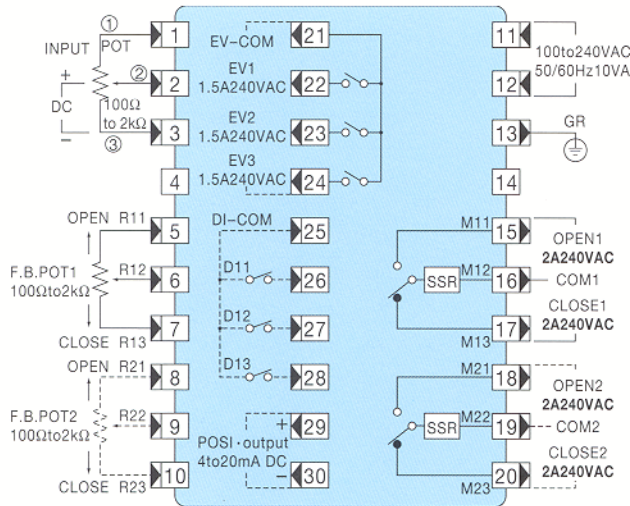
ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS	
SERIES	EMC30-	96 × 96 DIN size, Intelligent servo controller	
CONTROL INPUT	4	Current	4~20 / 0~20mA DC Receiving impedance: 100Ω
	5	Potentiometer	100Ω~2kΩ Three-wire system
	6	Voltage	0~1 / 1~5 / 0~10 V DC Input impedance: 500kΩ
NO. OF CONTROL OUTPUT POINTS & DRIVING POWER SUPPLY	1A	1 point SSR control system	20~240 V AC / 2A Inductive load
	2A	2 point SSR control system	20~240 V AC / 2A Inductive load
POWER SUPPLY	90-	100~240 V AC±10% 50/60 Hz	
	10-	24 V AC±10% 50/60 Hz	
	02-	24 V DC±10%	
EVENT OUTPUT	0	Without	
	1	Contact output (1a) / 3 points (INPUT, OUT1/2, DEV1/2, MAN, AUTO, POT, MOT-ERR to be assigned)	
EXTERNAL OPERATION (DI)	0	Without	
	1	Preset to interruption for opening / output inversion possible.	
SETTING OF SECOND OUTPUT RATIO (ratio of air vs. fuel, etc.) (Selectable only for 2 point output 2A)	N	Without (N is selected during 1 point output.)	
	P	To be output at ratio of 0.3~3.0 to first output, Bias±100%	
ANALOG OUTPUT	0	Without	
	1	4~20mA DC / POT, INPUT	
SQUARE ROOT EXTRACTION	N	Without	
	P	Output by square root extraction of control input signal	
REMARKS	0	Without	
	9	With (Please consult before ordering.)	

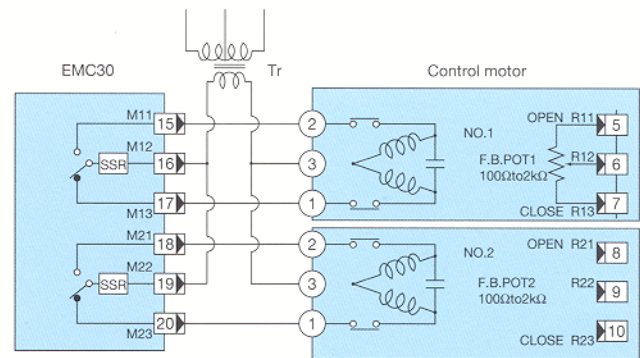
EXTERNAL DIMENSIONS & PANEL CUTOUT



TERMINAL ARRANGEMENT



WIRING EXAMPLE (Two-Output Type)



TERMINAL COVER (AVAILABLE SEPARATELY)

Model	
EMC30	SR5301-9

Material/Appearance: PVC/transparent
Thickness: 1mm

