

Control Motor ECM3000

The ECM3000 is a control motor designed for various industrial equipment applications.

Two models are available: 90° angular stroke motor for applications such as burner controls and 160° angular stroke motor for valve controls of hot and cold water or steam. Three kinds of control signal input types are available: relay contact, 4 to 20mA_{dc}, and potentiometer.

Three kinds of power supply voltage types are available: 24Vac, 100Vac and 200Vac. Additionally, a power supply unit applicable to a voltage range of 85 to 264Vac is also available for the 4 to 20mA_{dc} input type. The ECM3000 contains a standard bracket accessory for retrofitting Yamatake's older motors.



■ Features

- Robust aluminum die-cast body.
- Long life parts are used for the internal potentiometers and bearings of the motor.
- Input is selectable - 3 input types. (According to model No.)
Relay contact, 4 to 20mA_{dc} and potentiometer.
- The 90° angular stroke motor type has a pointer to indicate the position of the rotating shaft and a rotating direction label.

- Four optional auxiliary switches are available with the 90° angular stroke motor type.
- Splash-proof structure IP54 or equivalent, superior to environment resistance.
- Motor mounting bracket (standard accessory part) is compatible to replacing from Yamatake's older motor being used at present.
- Two angular strokes available for several applications. 90° type and 160° type
- Output torque is 12.5N·m.

■ Specifications

Model No.	Power supply voltage (50/60Hz)	Input signal	Angular stroke	Motor timing		Output torque	Remarks	Auxiliary switch (option)
				50Hz	60Hz			
ECM3000D01□0*	24Vac	Relay contact	90°	39s	33s	12.5N·m	ON/OFF control action	4 points (factory option)
ECM3000D11□0*	100Vac	Relay contact						
ECM3000D21□0*	200Vac	Relay contact						
ECM3000E01□0*	24Vac	Potentiometer						
ECM3000F01□0*	24Vac	Relay contact						
ECM3000F11□0*	100Vac	Relay contact						
ECM3000F21□0*	200Vac	Relay contact						
ECM3000G01□0*	24Vac	4 to 20mA _{dc}						
ECM3000G91□0*	85 to 264Vac	4 to 20mA _{dc}						
ECM3000F03□0*	24Vac	Relay contact						
ECM3000D0200	24Vac	Relay contact	160°	69s	58s	12.5N·m	ON/OFF control action	None
ECM3000E0200	24Vac	Potentiometer						
ECM3000F0200	24Vac	Relay contact						
ECM3000F1200	100Vac	Relay contact						
ECM3000F2200	200Vac	Relay contact						
ECM3000G0200	24Vac	4 to 20mA _{dc}						
ECM3000G9200	85 to 264Vac	4 to 20mA _{dc}						
ECM3000F0400	24Vac	Relay contact						

Note: * An auxiliary switch (4 pieces) can be built into the 90° stroke motor. (Selectable by model No.)

Meaning of □ in model No. 0: Auxiliary switch is not built-in, 1: 4 auxiliary switches built-in

! Handling Precautions

The high-speed motor type must be used within a duty ratio (operation ratio) of 40%.

■ Specifications

	Item	Description	
Basic specifications	Operation mode (fixed according to model No.)	ON-OFF or position proportioning	
	Input signal (fixed according to model No.)	Relay contact, 4 to 20mA _{dc} , potentiometer (nominal 135Ω)	
	Feedback potentiometer Nominal value	135Ω, 0.5W	
	Potentiometer Max. applied voltage	5V _{dc}	
	Input impedance (for 4 to 20mA _{dc} input signal)	50Ω ± 5%	
	Angular stroke (selectable by model No.)	90° or 160°	
	Motor timing	39/33s (relay contact, angular stroke 90° motor, no-load, 50/60Hz) 69/58s (relay contact, angular stroke 160° motor, no-load, 50/60Hz)	
	Output torque	12.5N·m (high-speed motor type 6N·m)	
	Power supply voltage (fixed according to model No.)	24Vac, 100Vac, 200Vac, 85 to 264Vac 50/60Hz	
	Power consumption (during operation)	9VA (relay contact, potentiometer type), 14W (4 to 20mA, 85 to 264Vac type). (14VA for high-speed motor type)	
	Protection	Splash-proof structure IP54 or equivalent when water-proof cable gland is used.	
	Material	Case: Die-cast aluminum Cover: Polycarbonate resin with GF Bracket: Steel	
	Mass (weight)	Approx. 3kg	
Reference operating conditions	Temperature	23±2°C	
	Humidity	50±10%RH	
Rated operating conditions	Ambient temperature	-20 to +60°C	
	Ambient humidity	5 to 95%RH (no condensation allowed)	
	Vibration resistance	4.9m/s ²	
Operation limits	Ambient temperature	-20 to +60°C	
	Ambient humidity	5 to 95%RH (no condensation allowed)	
	Vibration resistance	9.8m/s ²	
Transportation/storage conditions (packaged condition)	Temperature	-20 to +70°C	
	Humidity	5 to 95%RH (no condensation allowed)	
	Vibration resistance	19.6m/s ²	
Insulation resistance	Between power supply terminals and casing, and between input terminals and casing	5MΩ or more by 500V _{dc} megger	
	Between auxiliary switch terminals and casing	20MΩ or more by 500V _{dc} megger	
Dielectric strength	Between power supply terminals and casing, and between input terminals and casing	Leakage current 0.5mA or less	
		24Vac type	500Vac, 60s
		100Vac type	1200Vac, 60s
		200Vac type	1500Vac, 60s
	85 to 264Vac type	1500Vac, 60s	
Between auxiliary switch terminals and casing	Leakage current 0.5mA or less 1500Vac, 60s		
Auxiliary switch (option)	Number of points	4	
	Contact rating	250Vac, 5A (resistive load)	
	Position at factory setting	Close → Open (A,C): Position of output opening 10%, position of 9°±5°. Open → Close (B,D): Position of output opening 90%, position of 81°±5°.	
	Settable range	Output opening range of 5 to 95%. However, it must be the internal area of end switches.	
	Repeatability	±3%	
	Operation type	1 – 2 terminals: NO, 1 – 3 terminals: NC	

■ Optional parts

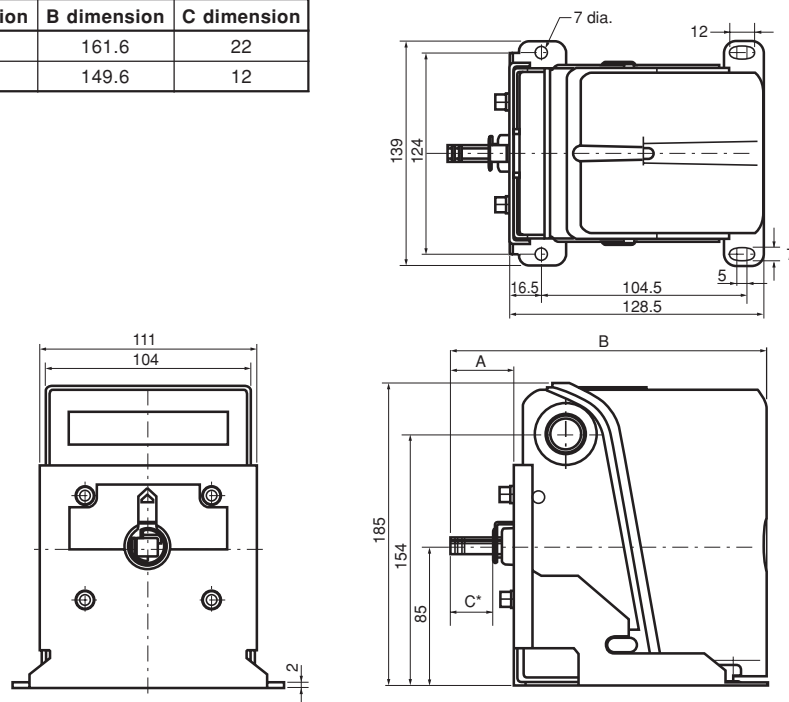
Name		Part No.
Crank arm		N-3128
Damper arm		J-26026G-ARM
Valve linkage		Q455C, D
Damper linkage		Q605A, D, E
Bracket for V51E		83165292-001
Extension unit*	Auxiliary switches (4 units built-in)	83165271-004
	Auxiliary potentiometer for 90° type	83165272-001
	Auxiliary potentiometer for 160° type	83165272-002

* Only one type of extension unit can be mounted on the model without internal auxiliary switch.

■ Dimensions

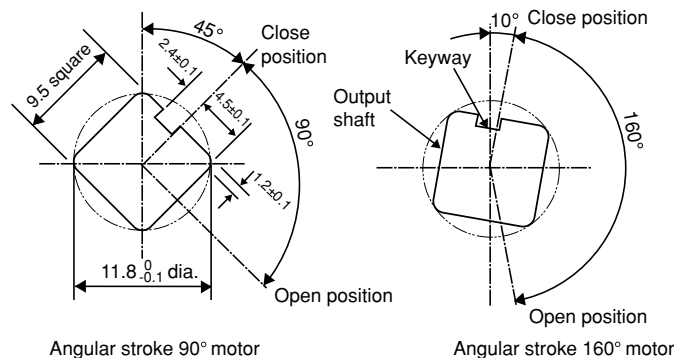
Angular stroke	A dimension	B dimension	C dimension
90° type	32.5	161.6	22
160° type	20.5	149.6	12

(Unit: mm)



* Size C shows the length of the output shaft (9.5 square).

● 0% position of the output shaft (view from the output shaft)



Angular stroke 90° motor

Angular stroke 160° motor

■ Mounting precautions

● Mounting locations

Do not install the ECM3000 at locations shown below.

- Locations where hazardous chemicals, corrosive gas or briny/salty air exists.
- Locations where the ECM3000 is exposed to high temperatures.
- Locations where moisture or droplets exist.
- Locations where the ECM3000 is exposed to vibrations for a long period.
- Locations where the ECM3000 is exposed to direct sunlight.

Additionally, when installing the ECM3000 outdoors, an appropriate protective device such as protective cover must be installed.

! Handling Precautions

Pay special attention so that any foreign matter or moisture content does not enter from the output shaft. In an application that the ECM3000 is combined with a control valve, such as fluid control, condensed moisture content is transferred from the valve and might enter the internals of the motor.

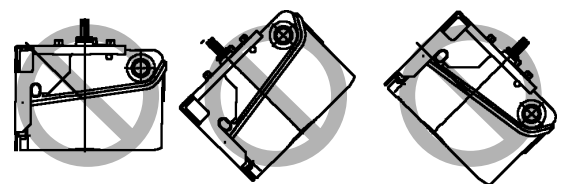
● Mounting direction

• Angular stroke 90° motor

This type can be mounted in a desired direction with its motor output shaft pointing horizontally or vertically upward.

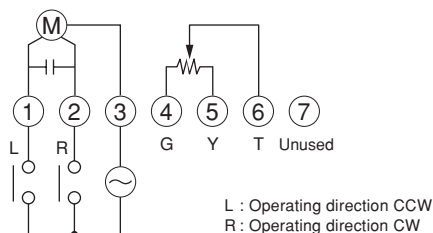
• Angular stroke 160° motor

This type can be mounted with the output shaft placed horizontally. Do not mount this type with its motor output shaft pointing vertically upward.



■ Wiring

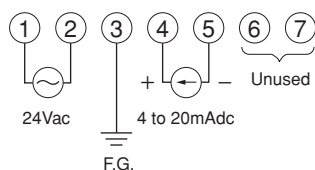
● Relay contact input (24Vac power supply)



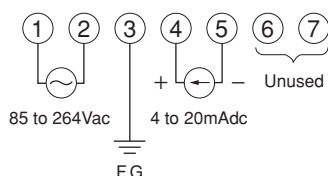
! Handling Precautions

In using ON-OFF control action, terminal No. 4, 5 and 6 are not connected.

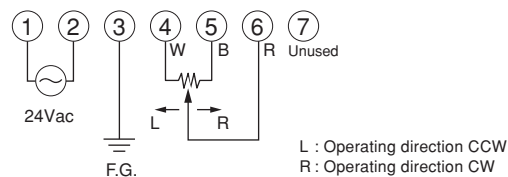
● 4 to 20mA dc input (24Vac power supply)



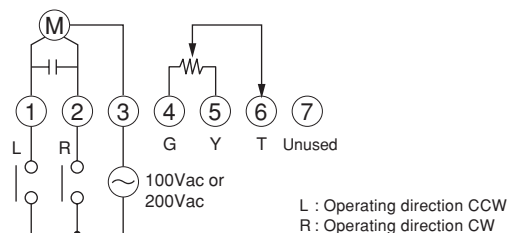
● 4 to 20mA dc input (85 to 264Vac power supply)



● Potentiometer input (24Vac power supply)



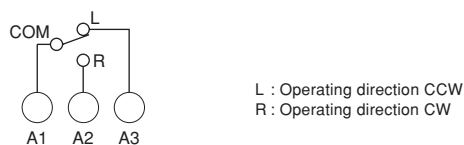
● Relay contact input (100Vac/200Vac power supply)



! Handling Precautions

- Connect the power supply voltage according to the model No.
- Set the parameters of the controller, (for example derivative time (D) is set to 0 second or dead band is widened), so that the internal relay of the controller does not repeat ON and OFF excessively due to hunting during motor operation. If the internal relay operates excessively, the life of the motor or the relay of the controller on the host side might be shortened. If frequent operation cannot be avoided, an auxiliary relay must be installed between the motor and the controller.

● Auxiliary switch (4 units)



(Note) The connection of internal switches from B to D is same as the connection of A.

! 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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