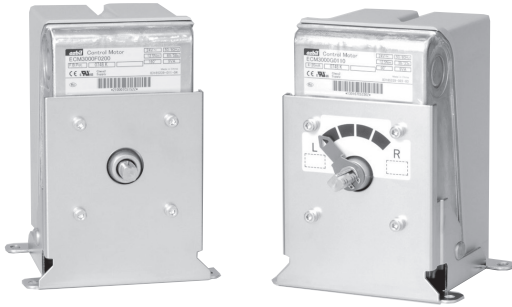


Control Motor Model ECM3000 User's Manual



Thank you for purchasing an Azbil Corporation product. This manual contains information for ensuring the correct use of this product. This manual should be read by those who design and maintain equipment that uses this product. Be sure to keep this manual nearby for handy reference. Please read "Terms and Conditions" from the following URL before ordering and use. <https://www.azbil.com/products/factory/order.html>

NOTICE

Be sure that the user receives this manual before the product is used. Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice. Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact the azbil Group. In no event is Azbil Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

SAFETY PRECAUTIONS

Safety precautions are for ensuring safe and correct use of this product, and for preventing injury to the operator and other people or damage to property. You must observe these safety precautions. Also, be sure to read and understand the contents of this user's manual. If this device is used in a manner not specified by the manufacturer, its built-in protective functions may be impaired.

● Key to symbols

WARNING

Warnings are indicated when mishandling this product might result in death or serious injury to the user.

CAUTION

Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to this product.

WARNING



Before doing other wiring work, connect the frame ground terminal to ground. The ground connection should have a resistance of 100 Ω or less. Afterwards connect the other circuits.



Before removing, mounting, or wiring this device, be sure to turn off the power to the device and all connected devices. Failure to do so may cause electric shock.



Do not touch electrically charged parts such as the power terminals. There is a risk of electric shock.

CAUTION

- In order to use this product correctly, be sure to follow this manual, the manuals for any associated devices and equipment.
- Installation, wiring, inspection, adjustment, maintenance, etc., should be carried out only by trained and experienced technicians who have knowledge and technical skills related to this device and associated equipment.
- Be sure to use this device correctly, within the ranges specified in this user's manual. Otherwise device failure or malfunction could result.
- Avoid installing the device where it will be subject to conditions such as the following. Otherwise device failure could result.
 - Certain chemicals, corrosive gases, or salt
 - High temperatures
 - Prolonged vibration
 - Direct sunlight
- Do not stand on this device or use it as a step. Doing so could damage the device, and if you lose your footing you may be injured.
- Wire this device properly according to indoor wiring standards, technical standards, etc., using the types of wire and wiring methods specified in the user's manual. Otherwise, device failure or malfunction could result.
- The motor part of this device can reach a high temperature during operation. There is a risk of burns if the cover is opened and the motor is touched immediately after the power has been turned off.
- While power is being supplied and during operation, do not touch any movable part. Doing so may cause injury.
- If equipment safety may be endangered by the failure of this device, consider having a fail-safe design for the system as a whole, with circuit breakers, duplexed controllers, and limiter; or use a redundant design.
- When discarding this device, dispose of it properly as industrial waste, following local regulations.

WARNING SYMBOLS USED FOR THE PRODUCT



To reduce the risk of an electric shock, resulting in personal injury, and to ensure safe operation of devices, follow all safety notices in this document.



This symbol warns the user when there is a danger of electric shock from accidental contact.



This symbol on the motor warns the user that there is a danger of burns from accidental contact.

UNPACKING

Check the following items when removing the ECM3000 from its package:

Name	Part No.	Q'ty	Remarks
• Upset head bolt with captive washer	395-106-25A	4	M6 size
• label [0],[100]	83165267-001	1	0(fully closed) and 100(fully open)
• User's Manual	CP-UM-5306JE	1	This Manual

OVERVIEW

ECM3000 control motors are designed to control various types of industrial equipment. There are two types of strokes: a 90° stroke for burner control and a 160° stroke for valve control using hot and cold water, steam, etc. There are three types of control signal inputs: relay contact, 4–20 mA DC, and potentiometer (nominal 135 Ω resistance input). 24, 100, and 200 V AC models are available. Flexible 85–264 V AC powered models are also available for 4–20 mA DC signal input models. The included bracket can be used for replacement of an older Azbil Corporation motor with this one.

MODEL SELECTION TABLE

✓: Applicable —: Not applicable

Model No.	Power	Signal name	Rotation angle	Rotation time		Output torque	Power consumption	Notes	UL*1*8	CE*1*9
				50Hz	60Hz					
ECM3000D01 __	24 V AC	Relay contacts	90°	39 s	33 s	12.5 N·m	9 VA*4	ON/OFF operation	✓	✓
ECM3000D11 __	100 V AC								—	—
ECM3000D21 __	200 V AC								—	—
ECM3000E01 __	24 V AC	Potentiometer	160°	69 s	58 s	12.5 N·m	9 VA*4	Position proportional operation	✓	✓
ECM3000F01 __	24 V AC	Relay contacts							✓	✓
ECM3000F11 __	100 V AC								—	—
ECM3000F21 __	200 V AC								—	—
ECM3000G01 __*2	24 V AC	4~20 mA DC	39 s	14 W*5	6 N·m	14 VA	High-speed motor model	Position proportional operation	✓	✓
ECM3000G91 __*2	85~264 V AC								—	—
ECM3000F03 __	24 V AC	Relay contacts	20 s	16 s	6 N·m	14 VA	High-speed motor model	Position proportional operation	—	✓
ECM3000D020 _	24 V AC								Relay contacts	69 s
ECM3000E020 _		Potentiometer	35 s	29 s	6 N·m	14 VA	High-speed motor model	Position proportional operation	—	
ECM3000F020 _	Relay contacts	—							—	
ECM3000F120 _	100 V AC								—	—
ECM3000F220 _	200 V AC								—	—
ECM3000G02 __*2*7	24 V AC	4~20 mA DC	72 s	14 W*5	6 N·m	14 VA	High-speed motor model	Position proportional operation	✓	✓
ECM3000G92 __*2*7	85~264 V AC								—	—
ECM3000F040 _	24 V AC	Relay contacts	35 s	29 s	6 N·m	14 VA	High-speed motor model	Position proportional operation	—	✓

(Example) ECM3000D01



0 (zero): not GB-compliant, C: GB-compliant

0 (zero): No options*3

3: 4 built-in auxiliary switches (for standard model. Contact current: 100 mA to 5 A [resistive load], 100 mA to 3 A [inductive load])*7 *8

4: 2 built-in auxiliary switches (for standard model. Contact current: 100 mA to 5 A [resistive load], 100 mA to 3 A [inductive load]) with forced open/close function*6 *8

5: 4 built-in auxiliary switches (for low-current model. Contact current: 1 to 100 mA [inductive load, including inrush current])*7*8

6: 2 built-in auxiliary switches (for low-current model. Contact current: 1 to 100 mA [inductive load, including inrush current]) with forced open/close function*6 *8

*1. GB-compliant models are not compliant with UL or CE standards.

*2. Direct/reverse operation can be switched and zero point, span, and deadband can be adjusted. The device is adjusted at the factory with the direct operation setting. Readjustment is essential if the type of operation is switched.

*3. An extension unit can be mounted.

*4. Power consumption of the following models is 11 VA. ECM3000G014_, ECM3000G016_, ECM3000G024_, ECM3000G026_

*5. Power consumption of the following models is 15 W. ECM3000G914_, ECM3000G916_, ECM3000G924_, ECM3000G926_

*6. Selectable only for ECM3000G01 __, ECM3000G91 __, ECM3000G02 __, ECM3000G92 __.

*7. 4 built-in auxiliary switches models can not be selected.

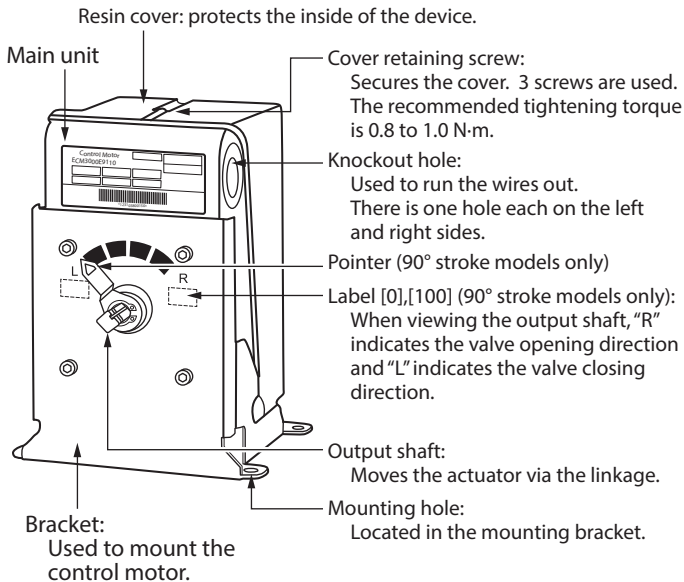
*8. Use a class 2 power supplies with double or reinforced isolation from the MAINS power supply for the power supply and auxiliary switches.

*9. Use a limited-energy circuit (EN61010-1) with double or reinforced isolation from the MAINS power supply for the power supply and auxiliary switches.

! Handling Precautions

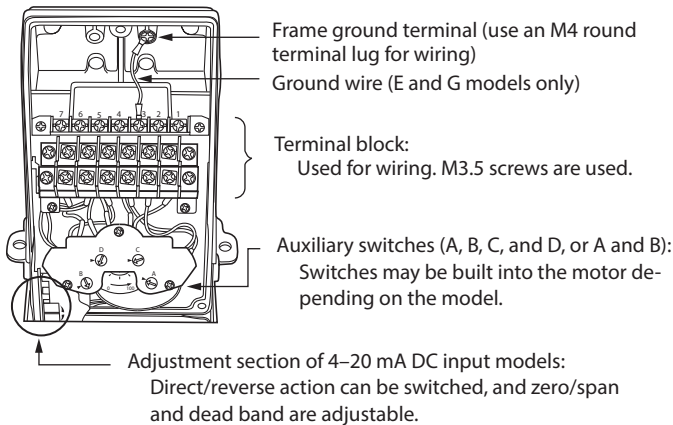
- Use high-speed motor models at a duty ratio (operating ratio) of 40 % or less.
- Do not connect the ECM3000F to a mechanical balancing relay such as the R9107A or R927C. Doing so may apply excessive voltage to the potentiometer, resulting in device failure.
- Be sure to connect non-voltage contacts to terminals S, CONT, CW, and CCW of an ECM3000 model with forced open/close function. In the case of the M744 and M7284, 24 V AC may be applied to the S, CONT, CW, and CCW terminals. If the ECM3000 is replaced with a forced open/close function model, do not apply 24 V AC to any terminal. Doing so will damage the circuit.
- For the ECM3000F and ECM3000D, leakage current from the snubber circuit protecting the motor drive element (relay or SSR) must be within the following.
 - 100 V AC: 0.8 mA (RMS) max.
 - 200 V AC: 0.4 mA (RMS) max.

NAMES OF PARTS



! Handling Precautions

- The default setting for the output shaft is 0 % opening.
- L: counterclockwise (CCW) rotation
R: clockwise (CW) rotation
CW: Clockwise CCW: Counterclockwise



• Terminal block

- For 4 built-in auxiliary switches

7 6 5 4 3 2 1 For the power supply and signals

D3	D2	D1	C3	C2	C1
B3	B2	B1	A3	A2	A1

} For auxiliary switches A to D

- 2 built-in auxiliary switches with forced open/close function

7 6 5 4 3 2 1 For the power supply and signals

S	CONT	CW	CCW	Not used	Not used
B3	B2	B1	A3	A2	A1

Forced open/close function
Auxiliary switches A and B

MOUNTING

■ Installation location

To install the ECM 3000, use the supplied bolt or equivalent (M6 size, with spring washer and flat washer). Use a nut (not supplied) if necessary.

Bolt tightening torque: 4.1 to 5.2 N·m

Do not install the device in locations prohibited in the SAFETY PRECAUTIONS section. For outdoor use, use a protective cover or the like.

! Handling Precautions

- Prevent foreign matter or moisture from entering the device from the output shaft.

- When the motor is used with a control valve in an application such as fluid control, if the control valve is located higher than the motor, water drops may enter the motor by running along the valve.

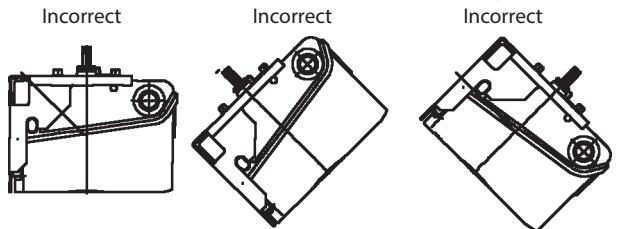
■ Mounting orientation

● 90° stroke model

This model can be mounted with any desired orientation. However, take measures to prevent water and foreign matter from entering the output shaft.

● 160° stroke model

This device can be mounted with the output shaft horizontal or facing downwards. To prevent water drops from entering the device, do not mount with the output shaft facing upward.



● To ensure splash-proofing

Close the cover securely so that the packing and cable are not pinched. Make the knockout hole watertight after wiring.

- Use a waterproof connector for the cables running from the motor. Recommended waterproof connector: refer to the sealing item of specifications
- If a conduit is used, use a waterproof precut tube or the like to ensure waterproofing.

WIRING

Symbols used on the device:

Symbol	Meaning
~	AC power supply
≡	DC signal
⏏	Functional ground terminal (not a protective ground terminal)

⚠ CAUTION

- Make sure that the frame ground terminal is properly grounded (100 Ω max.) using at least 2 mm² wire and M4 crimp terminals with insulating sleeves.

During wiring, open a knockout hole (22 mm dia.) on either side, and pull out the cables from the hole. For wiring to the terminals, follow the terminal label indicated on the terminal block, and be sure to use M3.5 crimp terminals with insulating sleeves.

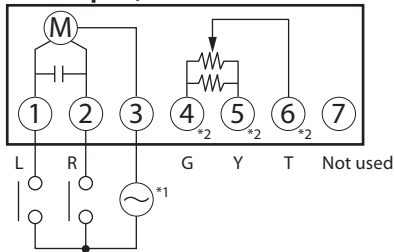
! Handling Precautions

- To open a knockout hole, using a flat-head screwdriver, set its tip on the outer edge of the knockout plug, and lightly tap the screwdriver all the way around this edge until the knockout is removed.
- Do not allow any fragments to enter the actuator when the knockout hole is opened.
- Do not use unused terminals on the device as relay terminals.
- Be sure to attach the cover after wiring is complete.
- Do not run the signal wires in the same conduit as power lines.
- Keep power cables at least 50 cm away from signal cables.
 - If the power and signal cables must run together in the same conduit, use JCS4364-compliant instrument cable for signals.
- Use the appropriate supply voltage according to the model No.
- Be sure to install a circuit breaker (8A max) for the power source.
- During motor operation, in order to stop hunting (which causes the controller's internal relay to turn ON and OFF excessively), change the parameters of the controller. For example, set the derivative time (D) to 0 seconds, set a wider dead band, etc. If the internal relay operates excessively, the life of the motor or the host controller relay will be shortened.

● **Cables**

Except for 24 V AC models, use a power cable rated at 600 V or more and 70 °C or higher.
 For 24 V AC models, use a power cable rated at 60 V or more and 70 °C or higher.
 The auxiliary switch cable should be rated at a voltage sufficient for the operating voltage and rated at 70 °C or higher.
 For other signal lines, use cables rated at 60 V or more and 70 °C or higher.

● **Relay contact input (ECM3000D and ECM3000F)**



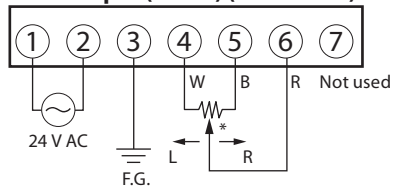
L: counterclockwise (CCW) rotation
 R: clockwise (CW) rotation
 CW: Clockwise CCW: Counterclockwise

*1. The supply voltage varies depending on the model.
 MODEL SELECTION TABLE (page 2)
 *2. Terminals 4–6 of the ECM3000D are not used.

! **Handling Precautions**

- The default setting for the output shaft is 0 % opening.

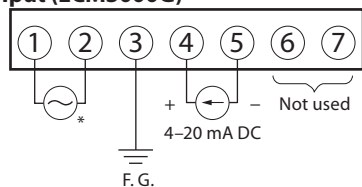
● **Potentiometer input (135 Ω) (ECM3000E)**



L: counterclockwise (CCW) rotation
 R: clockwise (CW) rotation

* For details on TY9000, etc., contact the azbil Group.

● **4–20 mA input (ECM3000G)**



* The supply voltage varies depending on the model.
 MODEL SELECTION TABLE (page 2)

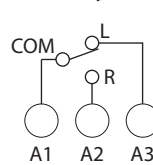
📖 **Note**

- The 4–20 mA input circuit is isolated from the power circuit inside the device.

! **Handling Precautions**

- During motor operation, in order to stop hunting (which causes the controller's internal relay to turn ON and OFF excessively), change the parameters of the controller. For example, set the derivative time (D) to 0 seconds, set a wider dead band, etc.
 If the internal relay operates excessively, the life of the motor or the host controller relay will be shortened. If frequent operation cannot be avoided, install an auxiliary relay between the motor and controller.
- The feedback potentiometer of the ECM3000F is a combination resistor consisting of two different resistors connected in parallel. Accordingly, the angle of rotation of the ECM3000F is proportional not to the resistance of the feedback potentiometer but to the voltage ratio between the potentiometer terminals (T–G voltage or Y–G voltage). The resistance of the feedback potentiometer cannot be used to measure the angle of the motor rotation.

● **Auxiliary switch (up to 4)**



L: counterclockwise (CCW) rotation
 R: clockwise (CW) rotation

Note: The internal connections of switches B, C, and D are the same as those of switch A. Models with forced open/close function have only auxiliary switches A and B.

● **Forced open/close input**

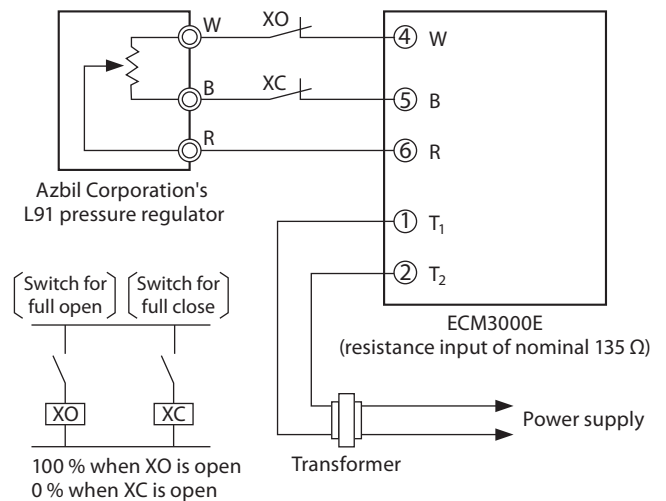
(a) Forced fully closed (b) Forced fully open (c) Automatic operation



! **Handling Precautions**

- Before shipment, terminals CONT and S are connected. Disconnect these terminals if operation with the valve forced fully open (or closed) is desired.
- Only one of terminals CCW, CW, and CONT can be connected to terminal S. Multiple terminals cannot be connected to terminal S.
- Be sure to connect non-voltage contacts to terminal S, CONT, CW, or CCW of an ECM3000 model with a forced open/close function. If 24 V AC is applied, the circuits will fail.
- If the same signal is input to multiple control motors that are connected in parallel, faulty operation may result. The same contact signal cannot synchronize multiple ECM3000 motors.

● **If the ECM3000E is used to fully open/close the valve**



Note: Recommended contact rating for XO and XC
 Material: Gold plating
 Rated voltage: 15 V DC min.
 Rated current: 100 mA

INSPECTION AND MAINTENANCE

■ Inspection Method

Item	Frequency	Inspection method
Visual inspection	6 months	<ul style="list-style-type: none"> • Check for loose screws. • Check for damage to the motor.
Operation state	6 months	<ul style="list-style-type: none"> • Check for unusual noise or vibration. • Check that the motor operation is normal.
Daily inspection	As needed	<ul style="list-style-type: none"> • Check for unusual noise or vibration. • Check that the motor operation is normal. • Check hunting.

■ Maintenance method

Cleaning: If the module is dirty, wipe it with a soft, dry cloth. Do not use a detergent or an organic solvent like thinner or benzene. Check the motor operation visually every six months. If a problem is found, take corrective actions.

Problem	Check item	Corrective action
<ul style="list-style-type: none"> • The motor does not work. 	<ul style="list-style-type: none"> • Wiring status and disconnection. • Supply power voltage. 	<ul style="list-style-type: none"> • Check the wiring. • Check the supply power voltage.
<ul style="list-style-type: none"> • The motor rotation stops halfway. 	<ul style="list-style-type: none"> • Check for loose terminal screws. 	<ul style="list-style-type: none"> • Tighten terminal screws.
<ul style="list-style-type: none"> • Auxiliary switches do not work.*1 	<ul style="list-style-type: none"> • Check the auxiliary switch cam. • Wiring status and disconnection. 	<ul style="list-style-type: none"> • Set it up again. • Check the wiring.
<ul style="list-style-type: none"> • The feedback potentiometer does not work.*2 	<ul style="list-style-type: none"> • Check the resistance. • Wiring status and disconnection. • Check for loose terminal screws. 	<ul style="list-style-type: none"> • Set it up again. • Check the wiring. • Tighten terminal screws.
<ul style="list-style-type: none"> • Decreased control sensitivity. • Decreased motor torque. 	<ul style="list-style-type: none"> • Wiring status and disconnection. • Check for loose terminal screws. • Supply power voltage. 	<ul style="list-style-type: none"> • Check the wiring. • Tighten terminal screws. • Check the supply power voltage.

*1. For models with auxiliary switch

*2. For models with feedback potentiometer

AUXILIARY SWITCH (OPTIONAL)

■ Adjustment

● Operating point

An auxiliary switch can turn on if the arrow on the setting dial (A, B, C, or D) is aligned with the ► mark.

The operating point can be set in a range of 5–95% opening.

The repeatability is within $\pm 3\%$.

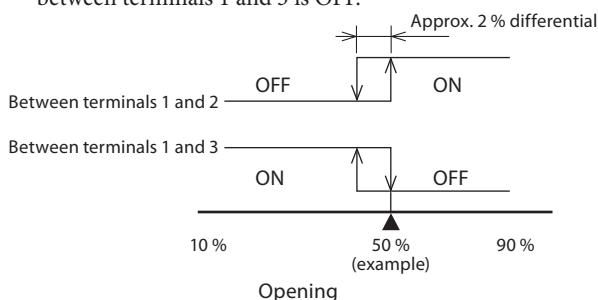
The differential is approximately 2%.

After the settings are changed, make sure that the switch operates before the motor reaches the fully-open and fully-closed positions.

● Operation type

If the actual opening is greater than the set opening, connection between terminals 1 and 2 (Common–NO) will be electrically continuous, but connection between terminals 1 and 3 (Common–NC) will not be.

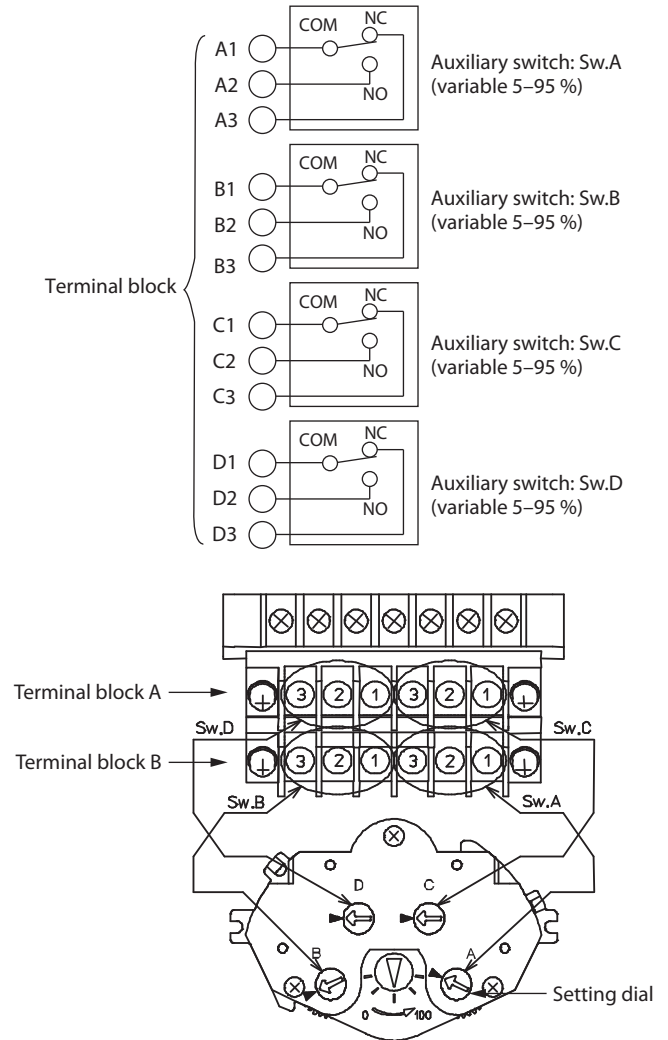
The figure below shows an example in which, at 50% opening, connection between terminals 1 and 2 is ON while connection between terminals 1 and 3 is OFF.



● How to set the operating point

- (1) Operate the motor electrically until the output shaft travels to the desired angle that turns on the switch. Then, align the arrow on the setting dial with the ► mark using a flat-head screwdriver.
- (2) Operate the motor electrically to rotate the output shaft near the set travel position, and check that the switch works normally.

The figure below shows an example of setting at 50% opening.



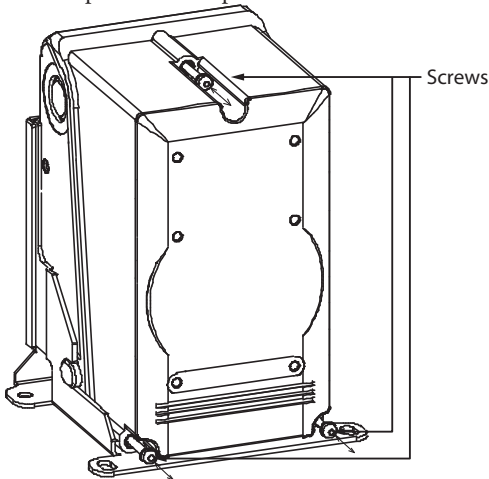
📖 Note

- Use a 6 mm flat-head screwdriver for the slotted-head screws (JIS B 4609).

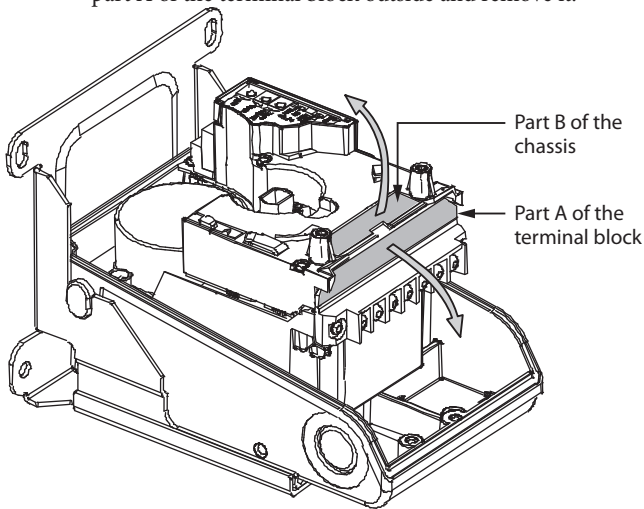
■ Installation and removal

● Installation

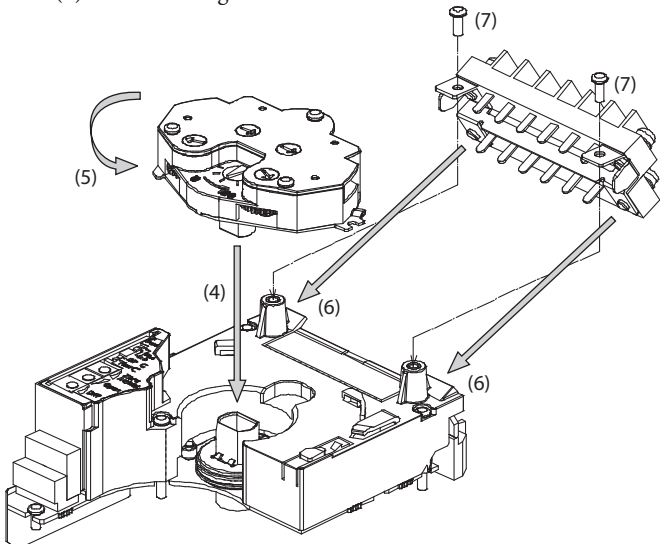
- (1) Turn OFF the power.
- (2) Loosen the 3 screws and remove the cover. Keep the removed parts in a safe place.



- (3) Rotate part B of the chassis upward and remove it. Fold part A of the terminal block outside and remove it.

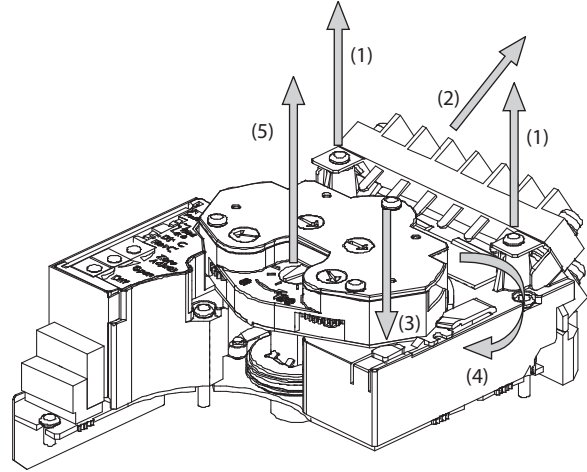


- (4) Insert the shaft of the auxiliary switch into the actuator shaft. (The triangular arrow on the 0-100 dial should be positioned within the scale.)
- (5) Turn the auxiliary switch unit counterclockwise until it clicks.
- (6) Align the holes on the terminal block bracket with the holes on the chassis.
- (7) Insert and tighten the 2 screws.



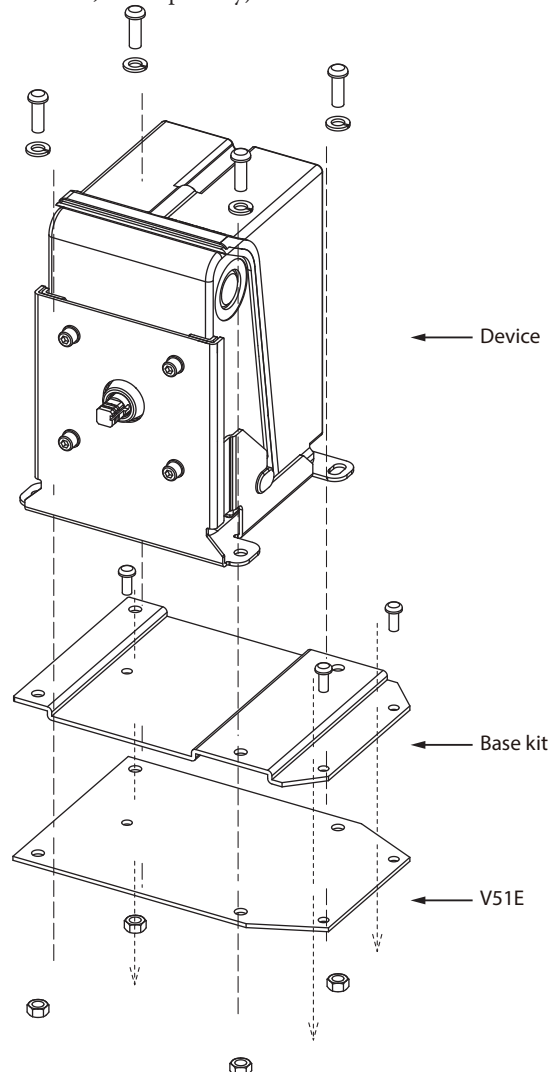
● Removal

- (1) Remove the 2 screws.
- (2) Remove the terminal block. The bracket is combined with the terminal block.
- (3) Press and hold the release button.
- (4) Turn the auxiliary switch unit clockwise.
- (5) Remove the unit by pulling it up.



MOUNTING ON A BUTTERFLY VALVE (V51E)

If this device is mounted on the V51E, install the base kit (83165292-001, sold separately) between the V51E and the device.



SPECIFICATIONS

■ Specifications

Item	Specifications		
Operation mode (fixed by the model)	ON-OFF or position proportioning		
Input signal	Relay contact, 4–20 mA DC, potentiometer		
Feedback potentiometer	Reference resistance for selection: 135 Ω (combination resistor*1) Max. applied voltage: 5 V DC		
Input impedance (with 4–20 mA DC input)	125 Ω max. (at 20 mA) (45 Ω of signal reception resistor + resistance of overcurrent protection circuit)		
Angle of rotation (fixed by the model)	90° or 160°		
Rotation time	90° stroke model	39/33 s	Relay contact, 50/60 Hz without load
		39 s	Supply power: 85–264 V AC, 50/60 Hz without load
		20/16 s	Relay contact, 50/60 Hz, without load, high-speed motor model
	160° stroke model	69/58 s	Relay contact, 50/60 Hz without load
		72 s	Supply power: 85–264 V AC, no load, 50/60 Hz without load
		35/29 s	Relay contact, 50/60 Hz, without load, high-speed motor
Output torque	12.5 N·m (high-speed motor: 6 N·m)		
Supply power voltage (fixed by the model)	24 V AC ±15 %, 50/60 Hz 100 V AC ±10 %, 50/60 Hz 200 V AC ±10 %, 50/60 Hz 85–264 V AC, 50/60 Hz		
Power consumption (during operation)	👉 MODEL SELECTION TABLE (page 2)		
Standard operating conditions	23±2 °C, 50 ±10 %RH		
Ambient temperature	–20 to +60 °C		
Ambient humidity	5–95 %RH (without condensation)		
Vibration resistance	4.9 m/s ²		
Insulation resistance	5 MΩ min. with a 500 V DC megger between housing and power supply, signal terminals, or forced open/close input terminals 20 MΩ min. with a 500 V DC megger between housing and auxiliary switches		
Dielectric strength	500 V AC for 60 s (24 V AC models), 1200 V AC for 60 s (100 V AC models), 1500 V AC for 60 s (200 V AC and 85–264 V AC models) between housing and power & signal terminals		
	1500 V AC for 60 s between housing and auxiliary switch terminals		
	500 V AC for 60 s (24 V AC models), 1200 V AC for 60 s (100 V AC models), 1500 V AC for 60 s (200 V AC and 85–264 V AC models) between housing and power & forced open/close input terminals		
Default positions of auxiliary switches*2	A and C: at 9° ±5° B and D: at 81° ±5°		
Forced open/close input	Non-voltage contact Contact rating: 15 V DC min., 100 mA min, Contact resistance: 10 Ω max. (at 1 mA DC)		
Sealing	Equivalent to IP54 when using the following waterproof connector. However, not UL-certified. Model no. : 83104346-003 Lock nut tightening torque : 1.0 N·m Tightening cap (cable) tightening torque : 1.5 N·m Applicable cable diameter : 7 to 9 mm		
Material	Case: Die-cast aluminum Cover: Glass-containing polycarbonate resin Bracket: Steel		
Installation location	Indoors		
Altitude	2000 m max.		
Pollution degree	3		
Mass	Approx. 3 kg		

Item	Specifications
Terminal screw tightening torque and wire size	For power and signal terminals: 0.8 N·m 14 to 18 AWG (0.75 to 2.0 mm ²) For auxiliary switches and forced open/close function: 0.8 to 1.2 N·m 14 to 18 AWG (0.75 to 2.0 mm ²)
Standards compliance*3	CE: EN 55011, EN 61000-6-2 *4 UL: UL 61010-1 GB: GB 30439.8

*1. Feedback potentiometer output specifications

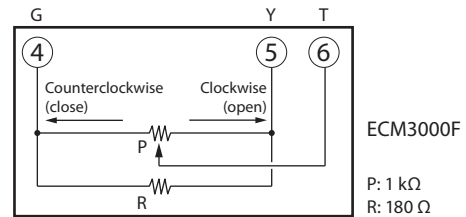
The feedback potentiometer of the ECM3000F has the following equivalent circuit. (See the diagram of parallel resistors below.)

In the controller, the resistance of the feedback potentiometer is converted to voltage, which indicates the motor opening.

In other words, the angle of rotation is not calculated directly from the resistance of the potentiometer. But if a combination resistor (1 kΩ + 180 Ω) is used, the resistance can be close to 135 Ω, which has been conventionally used in the industry.

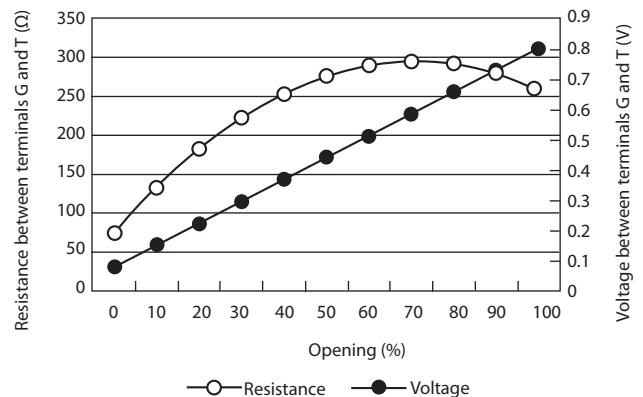
The following are Azbil Corporation's controllers compatible with this device: SDC35/36, SDC45/46, the SDC40 series, DMC10, Network Instrumentation Modules, RN748.

For other products, please contact the azbil Group.



📖 Note

- In old models, such as the M904, because the feedback potentiometer uses a single resistor, if the resistance of the potentiometer is measured (between terminals G and T) with a continuity tester, the motor opening can be deduced. However, the output part of the feedback potentiometer of this device consists of multiple resistors. Thus, unlike old models, its resistance is not proportional to the motor opening. The controller calculates the motor opening from the voltage between terminals G and T. The voltage between terminals G and T is linear to the motor opening, but if the resistance between these terminals is measured, as was possible for older models, the result will not be linear to the motor opening. Instead, the relationship can be graphed as a parabola, as shown below.



*2. For 90° stroke models with auxiliary switches

*3. Varies depending on the model.

👉 MODEL SELECTION TABLE (page 2)

*4. During EMC testing, the reading may fluctuate by ±5 %FS

■ Optional parts (sold separately)

Name		Model No.
Crank arm		N-3128
Damper arm		J-26026G-ARM
Ball joint		J-27518-JOINT
Valve linkage*1		Q455C/D
Damper linkage		Q605A/D/E
V51 base kit		83165292-001
Waterproof connector		83104346-003
24 V AC power transformer		AT72-J1
Extension unit*2	4 built-in auxiliary switches	83174065-002 (Contact current: 100 mA to 5 A [resistive load], 100 mA to 3 A [inductive load])
		83174065-102 (Contact current: 1 to 100 mA [inductive load, including inrush current])
		83174065-003*3 (Contact current: 100 mA to 5 A [resistive load], 100 mA to 3 A [inductive load])
		83174065-103*3 (Contact current: 1 to 100 mA [inductive load, including inrush current])
	Auxiliary potentiometer for 90° stroke	83165272-001
	Auxiliary potentiometer for 160° stroke	83165272-002

*1. Can be attached to 160° stroke models.

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

*3. For compliance with GB standards, use this model.

! Handling Precautions

- The output of the auxiliary potentiometer cannot be connected to an M904E Modutrol motor and to an ECM3000E motor. Use the potentiometer for output to an external valve-opening indicator or the like.

● Auxiliary switch

Item	Specifications
Auxiliary switches*	4 (or 2)
Contact rating	Standard model.: 250 V AC, 100 mA to 5 A (resistive load), 100 mA to 3 A (inductive load)
	Low-current model.: 250 V AC, 1 to 100 mA (inductive load, including inrush current)
	Note: See Model Selection Table notes *8 and *9.
Service life	Standard model: 50,000 cycles or more.
	Low-current model: 200,000 cycles or more.
	Note: Service life figures assume a resistive load.
Default positions	A and C: at 9°±5° B and D: at 81°±5°
Setting range	5–95 % opening
Terminals (4 or 2)	1 Common
	2 NO (Normally Open)
	3 NC (Normally Closed)

* Models with forced open/close function have only auxiliary switches A and B.

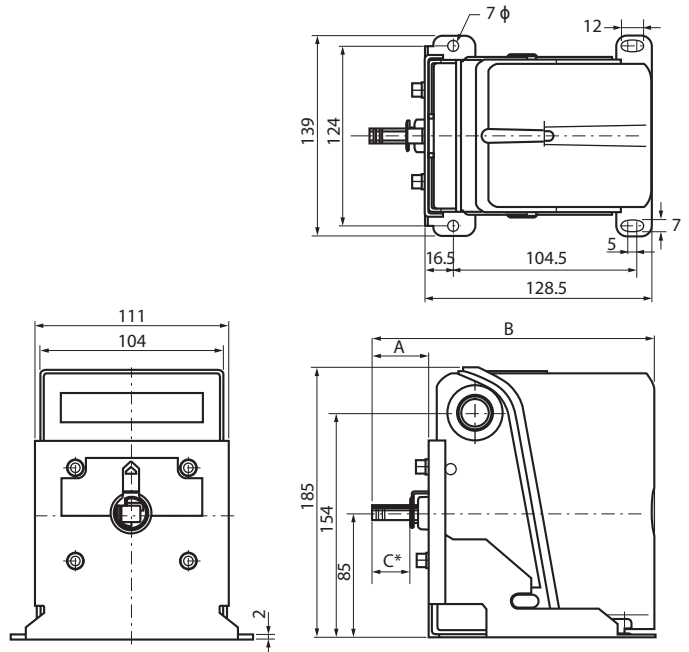
● Auxiliary potentiometer

Total resistance	1 kΩ ±10 %
Accuracy	±8 %FS
Hysteresis	±5 %FS
Terminal Y voltage change in relation to the applied voltage	Continuous change between 14±6 % (0 % opening) and 86±6 % (100 % opening)
Max. applied voltage	5 V DC

■ External dimensions

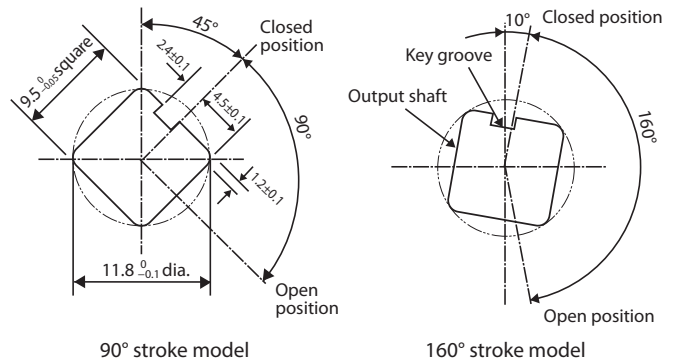
Unit: mm

Angle of rotation	A	B	C
90° stroke model	32.5	161.6	22
160° stroke model	20.5	149.6	12



* C is the length of the output shaft (9.5 mm square).

● 0 % opening position of the output shaft (when viewing the output shaft)



! Handling Precautions

- The length of the output shaft varies depending on the model. Only 90° stroke models have a pointer.

基于SJ/T11364-2014「电子电气产品有害物质限制使用标识要求」的表示式样
产品中有害物质的名称及含量



部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件	×	○	○	○	○	○
本体	×	○	○	○	○	○

本表格依据SJ/T 11364 的规定编制。

○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

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azbil
Specifications are subject to change without notice. (11)