

# ESC3

## Controller



## CONTENTS

Product introduction	Intro Page
● Specifications / How to order / Dimensions diagram /	
System configuration	100
· Parallel I/O (PIO)	102
· Cables	104
▲ · Related parts	105
Safety precautions	216

D Series (Screw drive)					D Series (Spring drive)			ESC3 (Controller)	G Series						ECG-A (Controller)	ECG-B (Controller)	Safety Caution	Model selection Check sheet
DSSD2	DSTK	DSTG	DSTS	DSTL	DMSDG	DLSH	DCKW		GSSD2	GSTK	GSTG	GSTS	GSTL	GCKW				

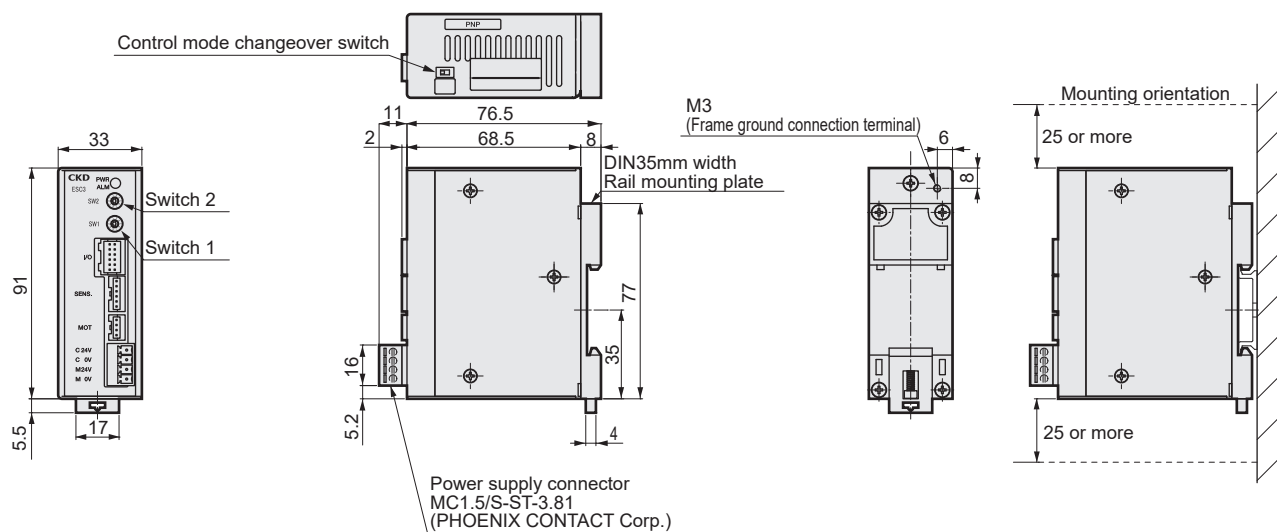


## General specifications

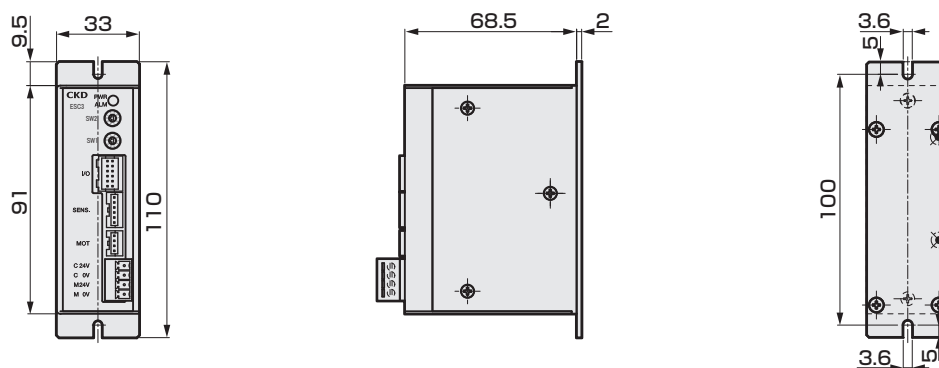
Item		Description				
Applicable actuators		DSSD2, DMSDG, DSTK, DSTG, DSTS, DSTL, DLSH, DCKW				
Applicable motor sizes		□20	□28	□35	□42	□56
Settings tool		Controller rotary switch				
External interface		24 VDC ±10%, input 3 points, output 3 points, cable length up to 10 m				
Indicator lamp		Green ON: Motor in energized state, green blinking: Motor not energized Red ON: Alarm ON (system error), red blinking: Alarm ON (operation error)				
Power supply voltage	Control power	24 VDC±10%				
	Motion power supply	24 VDC±10%				
Current consumption	Control power	100 mA or less				
	Motion power supply	0.8 A or less	2 A or less	3 A or less	3 A or less	3 A or less
Insulation resistance		20 MΩ and over at 500 VDC				
Withstand voltage		1000 VAC for 1 minute				
Operating ambient temperature		0 to 40°C (no freezing)				
Operating ambient humidity		35 to 85% RH (no condensation)				
Storage ambient temperature		-10 to 50°C (no freezing)				
Storage ambient humidity		35 to 85% RH (no condensation)				
Working atmosphere		No corrosive gas, explosive gas, or dust				
Degree of protection		IP30				
Weight		Approx. 145 g				

## Dimensions

### ● DIN rail mount



### ● Panel mount



## Parallel I/O (PIO) input/output circuit

### Input specification

Item	ESC3
No. of inputs	3 points
Input voltage	24 VDC $\pm$ 10%
Input current	3 mA / point
Input current when ON	2 mA or more
Input current when OFF	0.5 mA or less

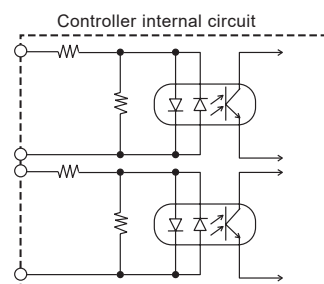
### Input circuit

PUSH / Opening operation input  
PULL / closing operation input

Operation input COM

Alarm reset input

Alarm reset input COM



The input is not polarized.  
(The input COM can be used with either + or - )

### Output specifications

Item	ESC3
No. of output points	3 points
Load voltage	24 VDC $\pm$ 10%
Load current	10 mA / point
Internal voltage drop when ON	6 V or less (at 25°C) *
Leakage current when OFF	10 $\mu$ A
Output short-circuit protection circuit	Yes
Connecting load	PLC, etc.

\* At 40°C, the load current is 9 mA and 6 V or less.

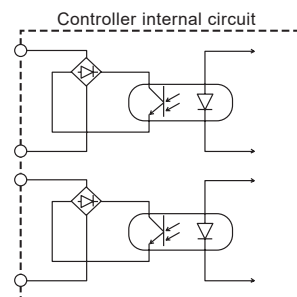
### Output circuit

PUSH / open side switch output  
PULL / closed side switch output

Switch output COM

Alarm output

Alarm output COM



The output is not polarized.  
(The output COM can be used with either + or - )

## Rotary switch setting

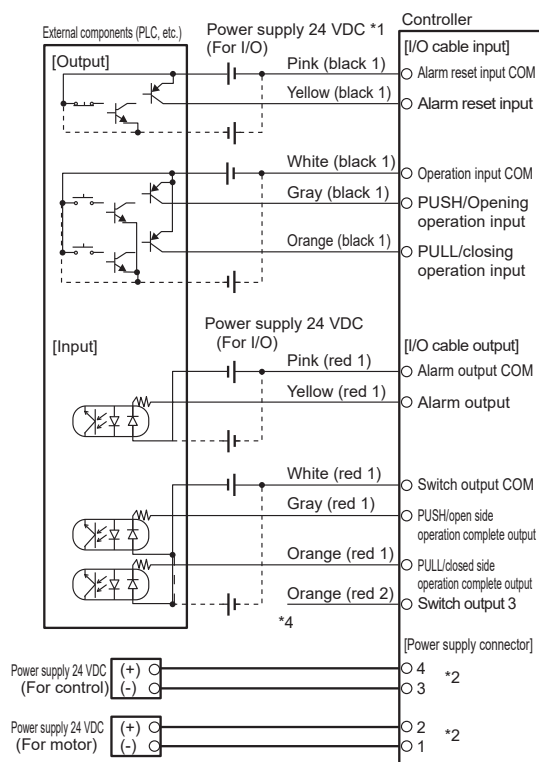
Model	Switch 1	Switch 2
DSSD2	PULL speed	PUSH speed
DSTK		
DSTG		
DSTS		
DSTL		
DMSDG	PUSH & PULL speed	Pressing force
DLSH	Open / Close speed	Gripping force
DCKW		

## Control mode changeover switch setting

Code	Operation mode	Overview
V2	Solenoid valve mode double 2-position	This mode is equivalent to 2-position solenoid valve. The ON edge of the operation input moves between the 2 points.
V3	Solenoid valve mode double 3-position	This mode is equivalent to 3 positions of solenoid valves. Move between 2 points by turning the operation input ON (level input).

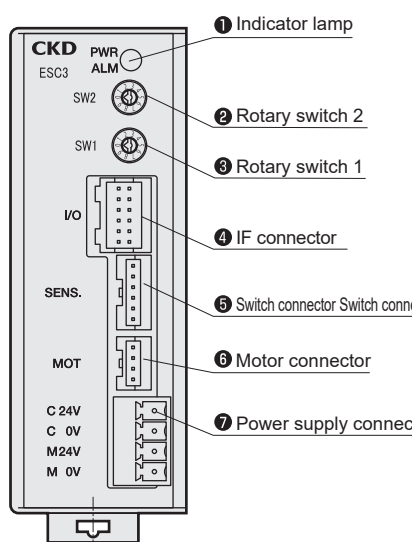
### Parallel I/O (PIO) connection diagram

#### Basic configuration



- \*1 Determine the polarity of the I/O power supply according to the specifications of the external device.
- \*2 The Control power supply (-) and power supply (-) are internally connected.
- \*3 The COMs are not internally connected. Be sure to provide wiring.
- \*4 Do not connect anything to switch output 3, which is unused. Be sure to provide insulation.
- \*5 The cable color parentheses indicate the dot color and number of the cable.

#### [Panel description]



#### ● Attachments

#### Power supply connector (controller accessory)

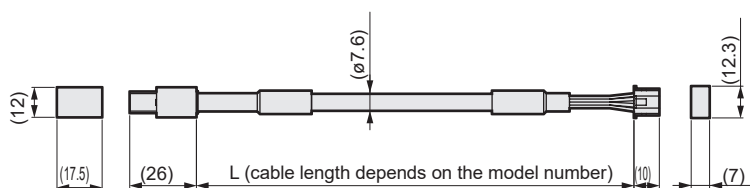
Model No.: MC1.5/4-ST-3.81 (manufactured by PHOENIX CONTACT)  
 Compatible electric wire size: 0.14 to 1.5 mm<sup>2</sup> / 28 to 16 AWG  
 Stripped wire length: 7 mm  
 Screw tightening torque: 0.22 to 0.25 N·m

Pin No.	Signal name	Name
1	M0V	Power supply (-)
2	M24V	Motor power supply (+)
3	C0V	Control power (-)
4	C24V	Control power (+)

## Relay cable

### ● Motor relay cable

- \* Selectable with actuator
- \* Movable cable.



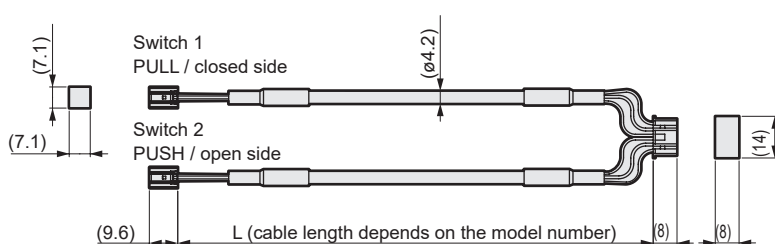
ESC3 - M2 - R 1

#### ① Cable length

1	1 m
3	3 m
5	5 m
X	10 m

### ● Switch relay cable

- \* Selectable with actuator
- \* Movable cable.



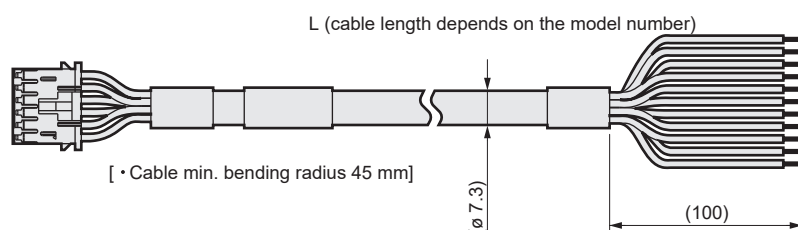
ESC3 - S2 - R 1

#### ① Cable length

1	1 m
3	3 m
5	5 m
X	10 m

### ● I/O cable

- \* Selectable with actuator



ESC3 - NP2 - 1

#### ① Cable length

1	1 m
3	3 m
5	5 m
X	10 m

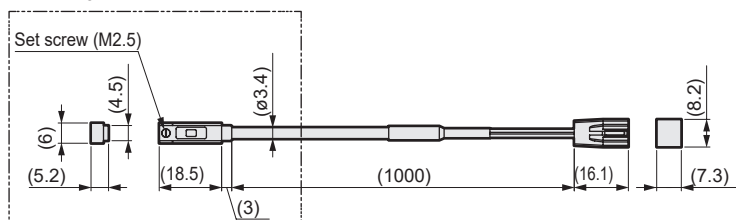
### ● Cylinder switch cable

- \* Selectable with actuator
- \* Refer to the specifications page of each actuator for the type of compatible switch.

ESC3 - SW - T3PH

①

\* When T3PH is selected

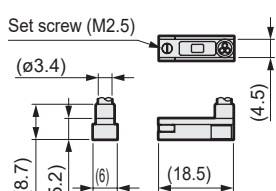


#### ① Switch

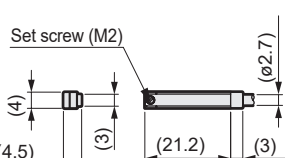
T3PH	T-type straight
T3PV	T-shaped L-type
F3PH	F-type straight
F3PV	F-type L-shaped

Depending on the switch model No. selection, the dotted lines are as shown below.

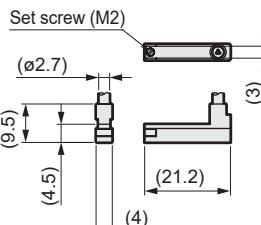
\* When T3PV is selected



\* When F3PH is selected



\* When F3PV is selected



### How to order related parts

#### ●DC power supply



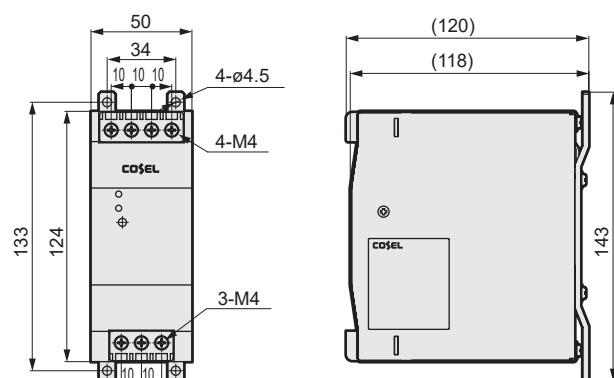
Model No.			EA-PWR-KHNA240F-24-N2 (screw mounted) EA-PWR-KHNA240F-24 (DIN rail mount)
Item			
Manufacturer			COSEL Co., Ltd.
Manufacturer model No.	Mounting screw	KHNA240F-24-N2	
	DIN rail mount	KHNA240F-24	
Input voltage			85 AC to 264 V 1ø or 88 DC to 370 V
Output	Power	240 W	
	Voltage / Current	24V10A	
	Variable voltage range	22.5 to 28.5V	
Included functions	Overcurrent protection	Operating at 101% min of peak current	
	Overvoltage protection	30.0 to 36.0V	
	Remote control	Possible	
	Remote sensing	-	
Other			DC_OK display, ALARM display
Operating temperature / humidity			-25 to + 70°C, 20 to 90%RH (no condensation), -40°C Bootable *
Applicable standards	Safety standards	AC input	AC input: Certified UL60950-1, C-UL (CSA60950-1), EN62368-1
		DC input	UL508, ANSI / ISA12.12.01, ATEX acquired, CKD compliant *
	Noise terminal voltage		UL60950-1, C-UL (CSA60950-1), EN62368-1
	Harmonic current		Compliant with IEC61000-3-2 (class A)*
Structure	Dimensions (W x H x D)		50×124×117 mm
	Weight		900 g max
	Cooling method		Natural air cooling

\* Refer to the manufacturer's HP for details.

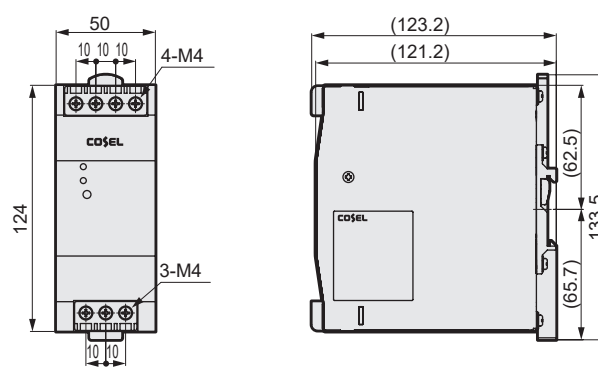
\* CE marking and ROHS are obtained with the manufacturer model No.

#### Part names and dimensions

##### ●EA-PWR-KHNA240F-24-N2 (24 V screw mounted)



##### ●EA-PWR-KHNA240F-24 (24 V DIN rail mounted)



#### ●Other components

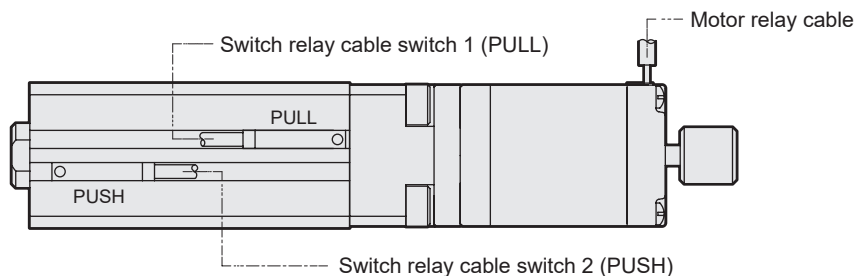
Part name	Model No.
Noise filter for power supply (single phase, 15 A)	AX-NSF-NF2015A-0D

## How to use electric actuator D Series

DSSD2, DSTK, DSTG, DSTS, DSTL Series

### STEP 1 Wiring

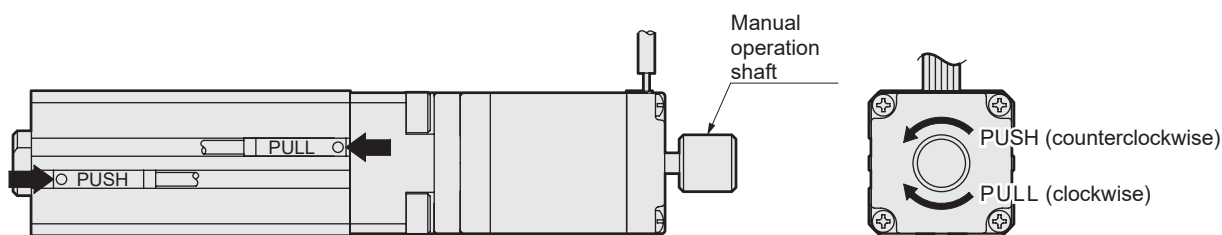
Connect the actuator and controller cable, then turn ON the Control power supply.



- \* Slide the cylinder switch and confirm that it turns ON.
- \* Wire the switch relay cable according to the number.
- 1: Switch 1 (PULL), 2: Switch 2 (PUSH)

### STEP 2 Cylinder switch position adjustment

Rotate the manual operation shaft, and move the movable part of the actuator to a desired position. Slide the cylinder switch from the outside of the operating range and fix when the LED lights. Use PUSH and PULL, respectively.



- \* The actuator detects the rising edge of the cylinder switch and decelerates and stops. Consider the deceleration stop distance and set the cylinder switch position.
- \* Correctly set the PULL and PUSH positions on the cylinder switch. Malfunction may occur if the installation position is reversed.
- \* Check that both cylinder switches are ON. If operated when the lamp is not turned ON, it may cause malfunction.
- \* The lighting range of the cylinder switch varies slightly due to the effect of temperature, etc. Fix the cylinder switch at a position allowing margin with respect to the stroke. There is a risk that it will collide with the mechanical end and cause the motor to step out.
- \* Do not apply excessive torque to the manual operation shaft. Otherwise it could be damaged or malfunction.

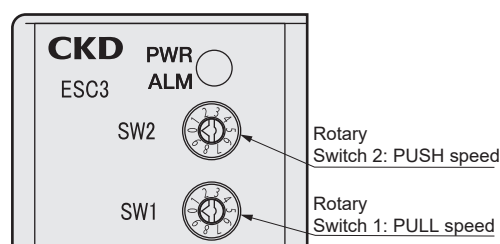


## STEP 3 Trial run

Turn power ON, then turn the operation input signal ON to operate the actuator. If the position is different from the desired position, adjust the position of the cylinder switch. Switch the controller rotary switch with a flathead screwdriver, etc., and adjust the actuator operation speed.

[PUSH, PULL speed setting] (mm/s)

Switch Setting	Size 20		Size 32		Size 50	
	L6	L9	L6	L12	L6	L12
0	15	23	15	30	15	30
1	23	35	23	47	21	47
2	32	48	32	63	28	63
3	40	60	40	80	34	80
4	48	73	48	97	40	97
5	57	85	57	113	47	113
6	65	98	65	130	53	130
7	73	110	73	147	59	147
8	82	123	82	163	66	163
9	90	135	90	180	72	144



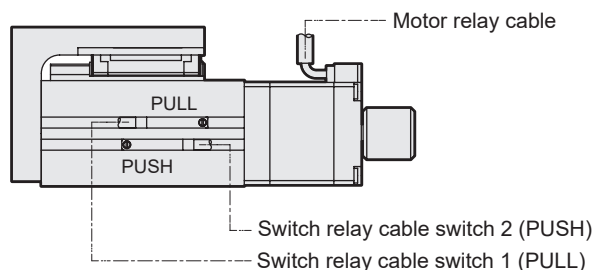
- \* The speed setting is a guideline.  
Even at the same setting, switch adjustment, power supply voltage, individual motor differences, variations in mechanical efficiency, and temperature may result in differing actual values.
- \* Refer to the instruction manual for details.
- \* Pressing operation is not supported.

## How to use electric actuator D Series

DMSDG Series

### STEP 1 Wiring

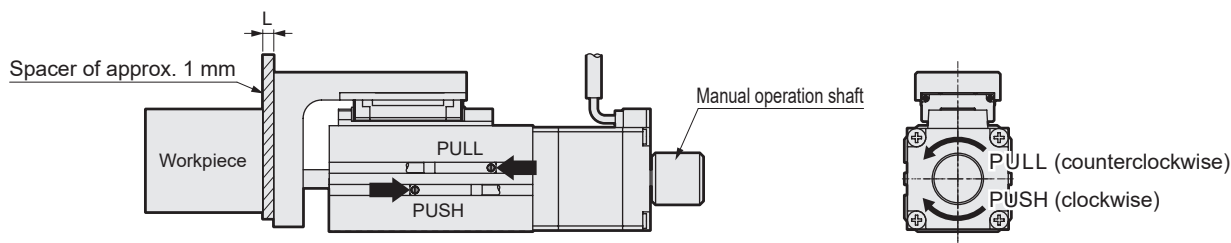
Connect the actuator and controller cable, then turn ON the Control power supply.



- \* Slide the cylinder switch and confirm that it turns ON.
- \* Wire the switch relay cable according to the number.
- 1: Switch 1 (PULL), 2: Switch 2 (PUSH)

### STEP 2 Cylinder switch position adjustment

Insert a 1 mm spacer between the table and the workpiece. Rotate the manual operation shaft, and lightly press the table against the workpiece and spacer. Slide the cylinder switch on the PUSH side from the outside of the operating range, and fix when the LED turns ON. Rotate the manual operation knob, and move it to a desired position on the PULL side. After movement, slide the cylinder switch on the PULL side from the outside of the operating range, and fix when the LED is ON.



- \* Correctly set the PULL and PUSH positions on the cylinder switch. Malfunction may occur if the installation position is reversed.
- \* After pressing the workpiece, do not turn the manual operation shaft with excessive force. Doing so may lead to damage.
- \* Check that both cylinder switches are ON. If operated when the lamp is not turned ON, it may cause malfunction.
- \* Pressing operation is possible only with PUSH. Pressing at PULL is not supported.
- \* For the pressing position, we recommend the center of the stroke. Refer to the instruction manual for details.
- \* The lighting range of the cylinder switch varies slightly due to the influence of temperature or workpiece dimension error. Check that the LED lights in the pressed state.
- \* Do not apply excessive torque to the manual operation shaft. Otherwise it could be damaged or malfunction.

## STEP 3 Trial run

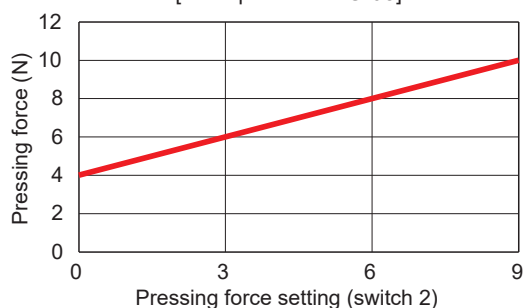
Turn the power supply ON, the operation input signal ON, and the actuator. Switch the rotary switch on the controller, and adjust the pressing force and PULL & PUSH speed.

[PULL & PUSH Speed setting] (mm/s)

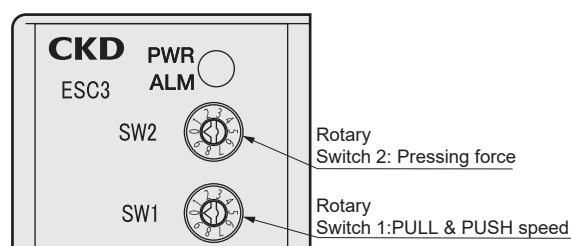
Size	Switch 1 setting									
	0	1	2	3	4	5	6	7	8	9
08	8	13	17	22	27	31	36	40	45	50
16	13	20	27	34	41	48	55	62	69	77

[Pressing force setting]

[Example: DMSDG-08]



\* Refer to page 72 for other sizes.



\* The speed and pressing force settings are merely guidelines. Even at the same setting, switch adjustment, power supply voltage, individual motor differences, variations in mechanical efficiency, and temperature may result in differing actual values.

\* Refer to the instruction manual for details.

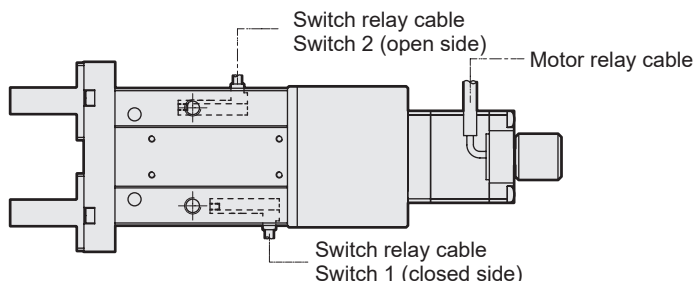
\* If pressing / gripping operation is performed near the stroke end, the motor may step out, causing a buzzing sound or reverse rotation. In this case, move the pressing and gripping position to near the stroke center or reduce the pressing and gripping settings.

## How to use electric actuator D Series

DLSH, DCKW Series

### STEP 1 Wiring

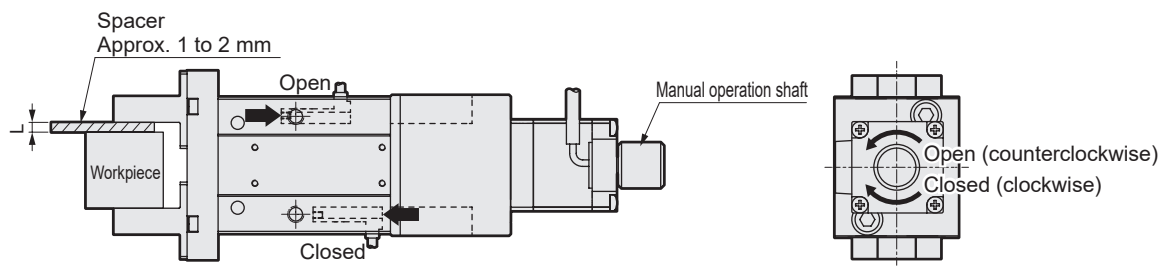
Connect the actuator and controller cable, then turn ON the Control power supply.



- \* Slide the cylinder switch and confirm that it turns ON.
- \* Wire the switch relay cable according to the number.  
1: Switch 1 (closed side), 2: Switch 2 (open side)

### STEP 2 Cylinder switch position adjustment

Insert a 1 to 2 mm spacer between the finger and workpiece. Rotate the manual operation shaft, and lightly grip the workpiece and spacer. Slide the closed cylinder switch from the outside of the operating range, and fix when the LED turns ON. Rotate the manual operation shaft, and move it to a desired position on the open side. After moving, slide the cylinder switch on the open side from the outside of the operating range, and fix when the LED lights.



- \* Set the cylinder switch open/close position correctly. Malfunction may occur if the installation position is reversed.
- \* After gripping the workpiece, do not turn the manual operation knob with excessive force. Doing so may lead to damage.
- \* Check that both cylinder switches are ON. If operated when the lamp is not turned ON, it may cause malfunction.
- \* This product is used for external diameter gripping. Inner diameter gripping is not supported.
- \* As for the gripping position, we recommend the center of the stroke. Refer to the instruction manual for details.
- \* The lighting range of the cylinder switch varies slightly due to the influence of temperature or workpiece dimension error. Confirm that the LED lights in the gripped state.
- \* Do not apply excessive torque to the manual operation shaft. Otherwise it could be damaged or malfunction.

