

Actuator MK35



MK35 is an intelligent actuator with a control board inside. Its robust mechanical design provides up to 10,000N thrust and is IP66M/IP67, IPX9K ingress protection rated. A variety of performance and control options are available to suit the user's application. MK35 is ideal for applications such as agriculture, construction and industrial automation.

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Features and Options

- Main applications: Agriculture / Construction / Industrial Automation.
- Motor type: 12V / 24V / 48V PMDC Motor (Not support PWM control input power)
- Various control options to suit the user's application (Refer to Page 4)
- Spindle type: Ball screw
- Max. load: 10,000N (Push/Pull)
- Max. static load: 18,000N (Push)
- Max. speed at no load: 63mm/sec (Typical value of gear ratio 5:1)
- Stroke: 100~1,000mm (The max. stroke is depending on load, refer to Page 7)
- Manual drive capable by an hexagon socket wrench
- Stainless steel extension tube
- IP level: IP66M/IP67, IPX9K
- Salt spray tested for 500 hours
- Built-in stroke limit switches
- Optional external switch: 1x or 2x adjustable reed switches or only magnets installed (Refer to Page 26)
- Certified: CE Marking, EMC Directive 2014/30/EU (12V and 24V motors only)

Usages

- Duty cycle:

Gear type	05, 10, 15, 20	30
Duty cycle	25%, Max. 60Sec. On/180Sec. Off	15%, Max. 60Sec. On/340Sec. Off

- Operating ambient temperature: -40°C~+85°C (Full performance +5°C~40°C)
- Storage ambient temperature: -40°C~+100°C
- Relative humidity: Full performance from 20%~80% - non-condensing
- Atmospheric pressure: 700~1060hPa
- Height above mean sea level: Max. 3,000 meters



Control Options and Functions

1. DXX options (Traditional DC control, only available for 12/24V motors)

Directly swap the polarity of the input power to control the extension and retraction of the actuator.

	D00	D0L	DPL	DHL	D+L
Potentiometer output ⁽²⁾	-	-	✓	-	-
Hall signal output ⁽³⁾	-	-	-	✓	✓
EoS signal output ⁽⁴⁾	-	✓	✓	✓	✓
Over current protection ⁽⁵⁾	✓	✓	✓	✓	✓

2. Signal control

(Synchronous control option, only available for 12/24V motors)

Equipped with an H-bridge circuit which use low current signal (<10mA) to control the extension and retraction of the actuator. The motor is shorted when stopped during the whole stroke, as long as the actuator is powered.

	S0L	SPL	SHL	SYL	J00	N00
Control platform	Low current signal	Low current signal	Low current signal	Low current signal	CAN bus J1939	CANopen
H-bridge ⁽¹⁾	✓	✓	✓	✓	✓	✓
Potentiometer output ⁽²⁾	-	✓	-	-	-	-
Hall signal output ⁽³⁾	-	-	✓	-	-	-
EoS signal output ⁽⁴⁾	✓	✓	✓	-	-	-
Soft start/stop	✓	✓	✓	✓	✓	✓
Over current protection ⁽⁵⁾	✓	✓	✓	✓	✓	✓
Voltage range protection ⁽⁶⁾	✓	✓	✓	✓	✓	✓
Temperature protection ⁽⁷⁾	✓	✓	✓	✓	✓	✓
Low temp. response ⁽⁸⁾	✓	✓	✓	✓	✓	✓
Action status feedback	-	-	-	-	✓	✓
Current feedback	-	-	-	-	✓	✓
Position feedback	-	-	-	-	✓	✓
Speed feedback	-	-	-	-	✓	✓
Error code feedback	-	-	-	-	✓	✓

Notes:

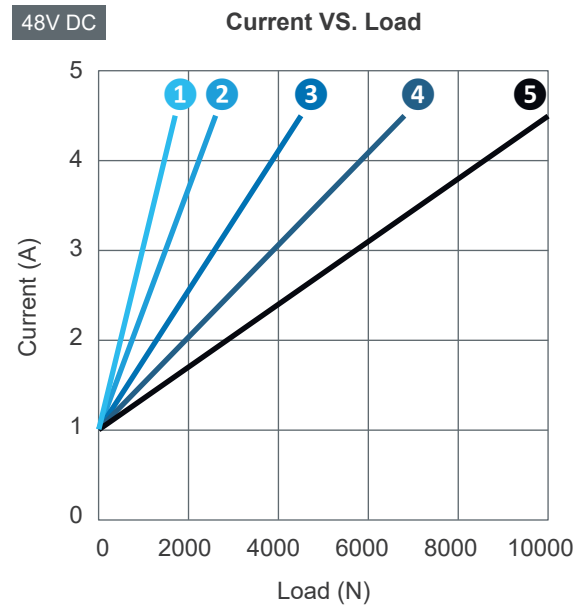
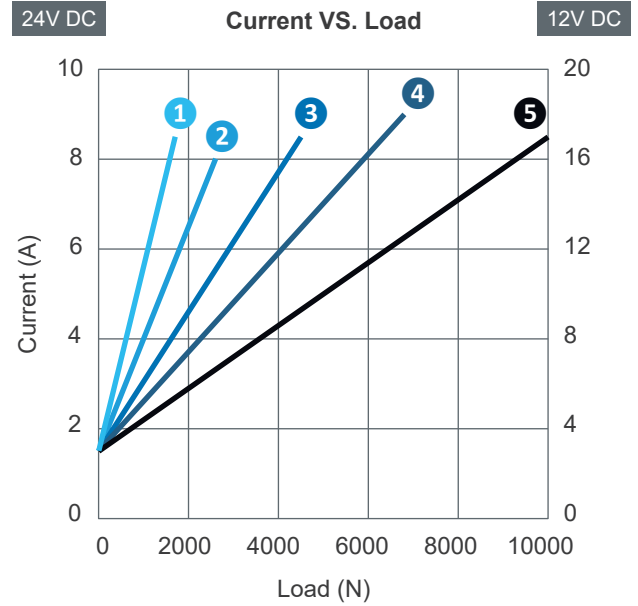
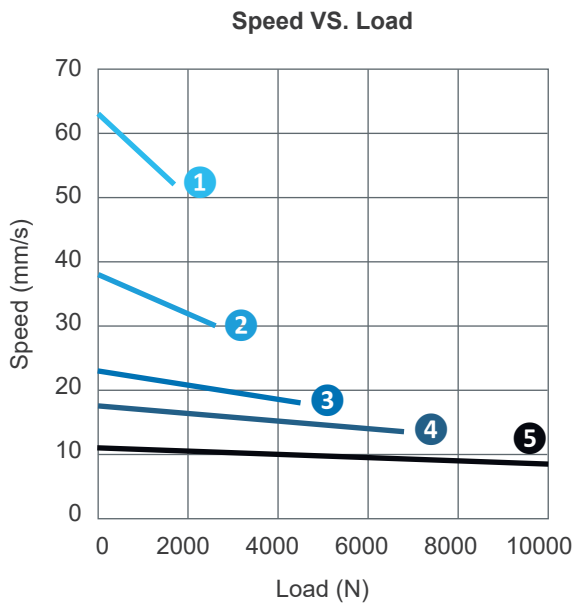
- ⁽¹⁾ The polarity of input DC power for the signal control options must be fixed and cannot be swapped; the stand-by current <20mA.
- ⁽²⁾ A wire connection of voltage input (Vin) is required. The recommended voltage is 5~32V DC.
- ⁽³⁾ The Hall feedback circuit of DHL and SHL options is NPN type; the Hall feedback circuit of D+L option is PNP type.
- ⁽⁴⁾ End of stroke signal output is not potential free. An external 5~24V power and pull-up resistor are required. (10K ohm resistor is recommended)
- ⁽⁵⁾ Over current protection: 25A @12V DC; 12.5A @24V DC; 6.5A @48V DC, actuator will be stopped automatically. Over current protection is only applicable in emergency situations. It should not be used for the normal routine stopping needs of the actuator, as this may damage the actuator.
- ⁽⁶⁾ Voltage protection: The allowable input voltage is 9~16V @12V DC; 18~32V@24V DC; 40~60V@48V DC, if it exceeds the range, actuator will be stopped automatically.
- ⁽⁷⁾ Temperature detection inside the actuator. When the temperature is detected outside the operating range, actuator will be stopped automatically. It will resume operation until the temperature return to a reasonable value range.
- ⁽⁸⁾ When the temperature inside the actuator is detected below 0°C, the overcurrent protection setting value will be automatically increased by 30%, which will reduce the over current protection caused by low temperature.



Performance Data

1. DXX options (Only available for 12/24V motors) / Signal control

No.	Gear ratio	Push / Pull Max. (N)	Typical speed (mm/s) ⁽¹⁾		Typical current (A) ⁽¹⁾						Duty cycle
			No load	Full load	No load			Full load			
					12V	24V	48V	12V	24V	48V	
1	5:1	1,700	63	52	3.0	1.5	1.0	17	8.5	4.5	25%
2	10:1	2,600	38	30	3.0	1.5	1.0	16	8.0	4.5	25%
3	15:1	4,500	23	18	3.0	1.5	1.0	17	8.5	4.5	25%
4	20:1	6,800	17.5	13.5	3.0	1.5	1.0	18	9.0	4.5	25%
5	30:1	10,000	11	8.5	3.0	1.5	1.0	17	8.5	4.5	15%



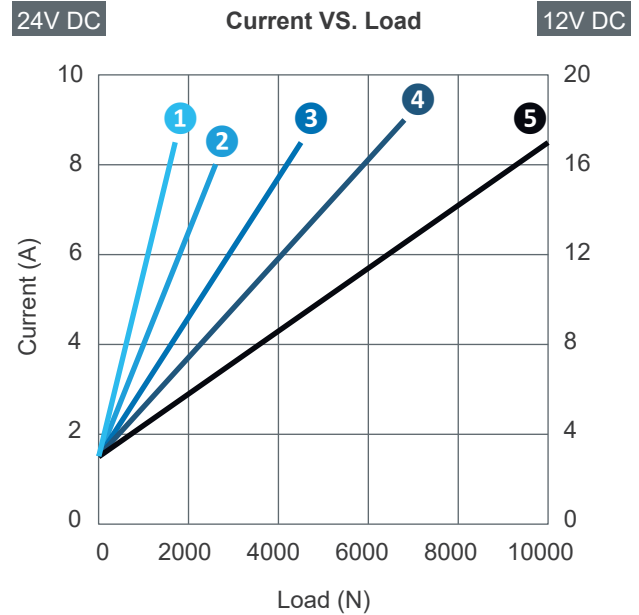
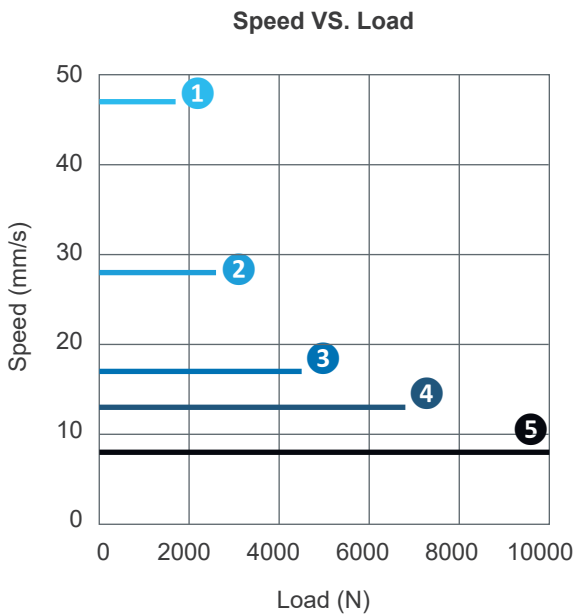
Note:

⁽¹⁾ The typical speed or typical current refers to an average value measured with a stable power supply and an ambient temperature of 20~25°C that is neither the upper limit nor the lower limit. The performance curves are made with typical values.



2. Synchronous control option

No.	Gear ratio	Push/Pull Max. (N)	Synchronous speed (mm/s) ⁽¹⁾	Typical current (A) ⁽²⁾				Duty cycle
				No load		Full load		
				12V	24V	12V	24V	
1	5:1	1,700	47	3.0	1.5	17	8.5	25%
2	10:1	2,600	28	3.0	1.5	16	8.0	25%
3	15:1	4,500	17	3.0	1.5	17	8.5	25%
4	20:1	6,800	13	3.0	1.5	18	9.0	25%
5	30:1	10,000	8	3.0	1.5	17	8.5	15%



Notes:

- ⁽¹⁾ The synchronous speed is regulated by internal control board. The actual speed may vary depending on the load level and distribution.
- ⁽²⁾ The typical current refers to an average value measured with a stable power supply and an ambient temperature of 20~25°C that is neither the upper limit nor the lower limit. The performance curves are made with typical values.

3. Inrush current

- When the actuator starts, an inrush current of about 0.2 seconds will be generated. The starting inrush current of MK35 can reach 3 times of the maximum current under the rated load of the actuator.
- If a circuit board power supply is used, the specifications must be sufficient to handle the inrush current. If batteries are used as the power source, inrush current will not be a problem. Besides, the connectors, switches and relays selected by user must also be able to withstand the inrush current.



Dimensions

1. Installation dimension

- Available stroke (S) range

Max. load	Stroke range
$\leq 1,700\text{N}$	100~1000 (+2/-6mm)
$\leq 2,600\text{N}$	
$\leq 4,500\text{N}$	100~800 (+2/-6mm)
$\leq 6,800\text{N}$	100~600 (+2/-6mm)
$\leq 10,000\text{N}$	100~500 (+2/-6mm)

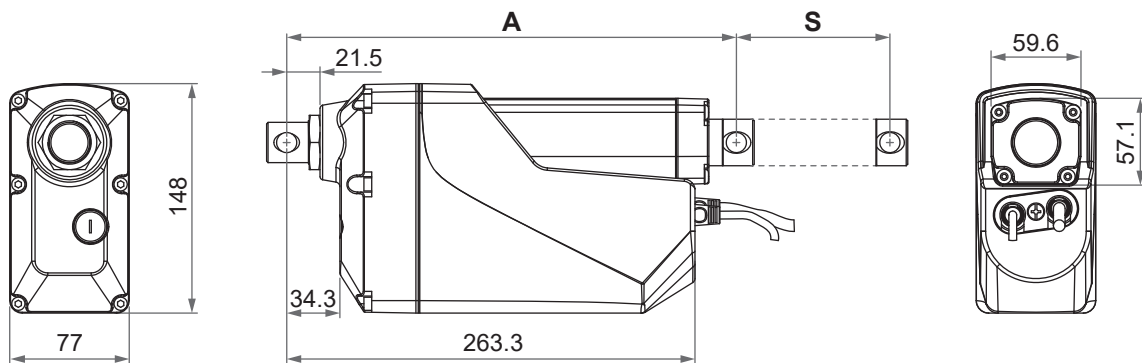
- Retracted length (A)

Unit: mm

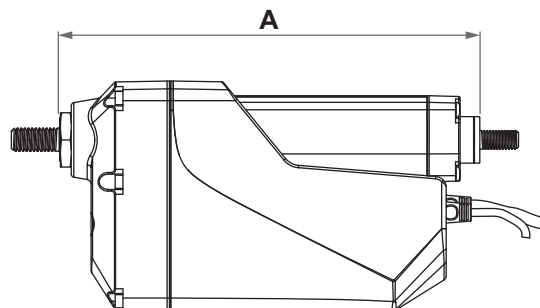
	Rear connector	Front connector			
		5, 7	2, 4, 6, 8	A	B
Retracted length (A) ($\pm 4\text{mm}$)	2, 4 ~ 8	$\geq S+190$	$\geq S+199$	$\geq S+185$	$\geq S+226.5$
	A	$\geq S+177$	$\geq S+186$	$\geq S+172$	$\geq S+213.5$

- Extended length = Retracted length (A) + Stroke (S)

2. Drawing



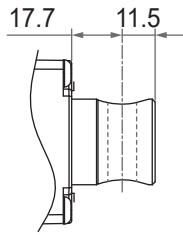
- Installation dimension (A) of front and rear connector A-type



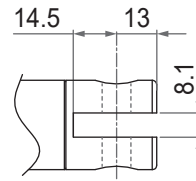
Unit: mm



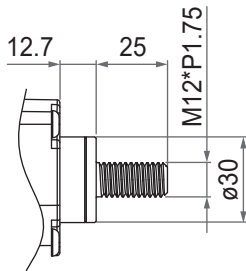
3. Front connector type



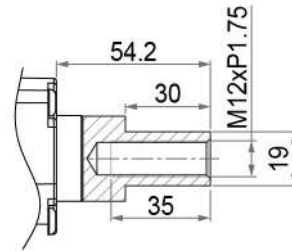
- ⑤ SUS304 solid, hole $\varnothing 12.2\text{mm}$
- ⑦ SUS304 solid, hole $\varnothing 13\text{mm}$



- ② Metal slot, hole $\varnothing 12.2\text{mm}$
- ④ Metal slot, hole $\varnothing 13\text{mm}$
- ⑥ SUS304 slot, hole $\varnothing 12.2\text{mm}$
- ⑧ SUS304 slot, hole $\varnothing 13\text{mm}$

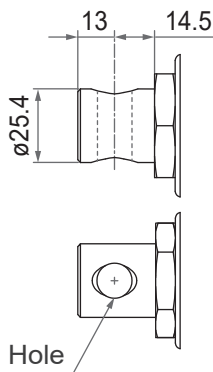


- Ⓐ SUS303 male thread M12x1.75mm

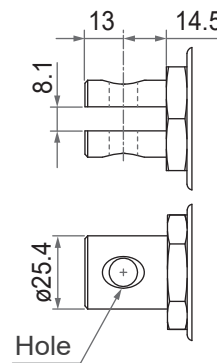


- Ⓑ SUS303 female thread M12x1.75mm

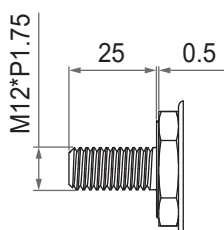
4. Rear connector type



- ⑤ SUS304 solid, hole $\varnothing 12.2\text{mm}$
- ⑦ SUS304 solid, hole $\varnothing 13\text{mm}$



- ② Metal slot, hole $\varnothing 12.2\text{mm}$
- ④ Metal slot, hole $\varnothing 13\text{mm}$
- ⑥ SUS304 slot, hole $\varnothing 12.2\text{mm}$
- ⑧ SUS304 slot, hole $\varnothing 13\text{mm}$

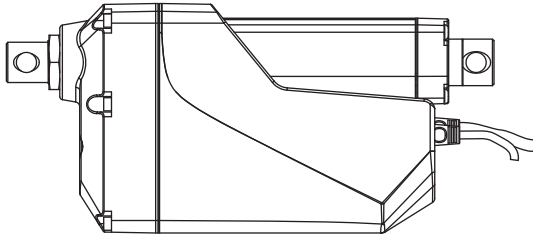


- Ⓐ SUS303 male thread M12x1.75mm

Unit: mm



5. Connector orientation



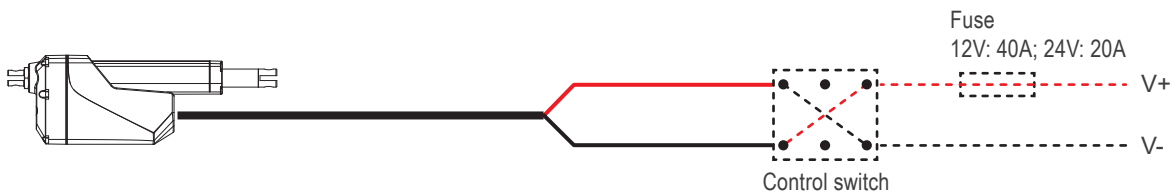
Note: Front and rear connectors shown in standard 0°

Wiring of Control Options

1. Control option D00 (DC control, without positioning feedback)

The D00 option does not include a signal cable, and the port has a waterproof cap.

• Wiring



Note: Dashed lines are connected by the customer.

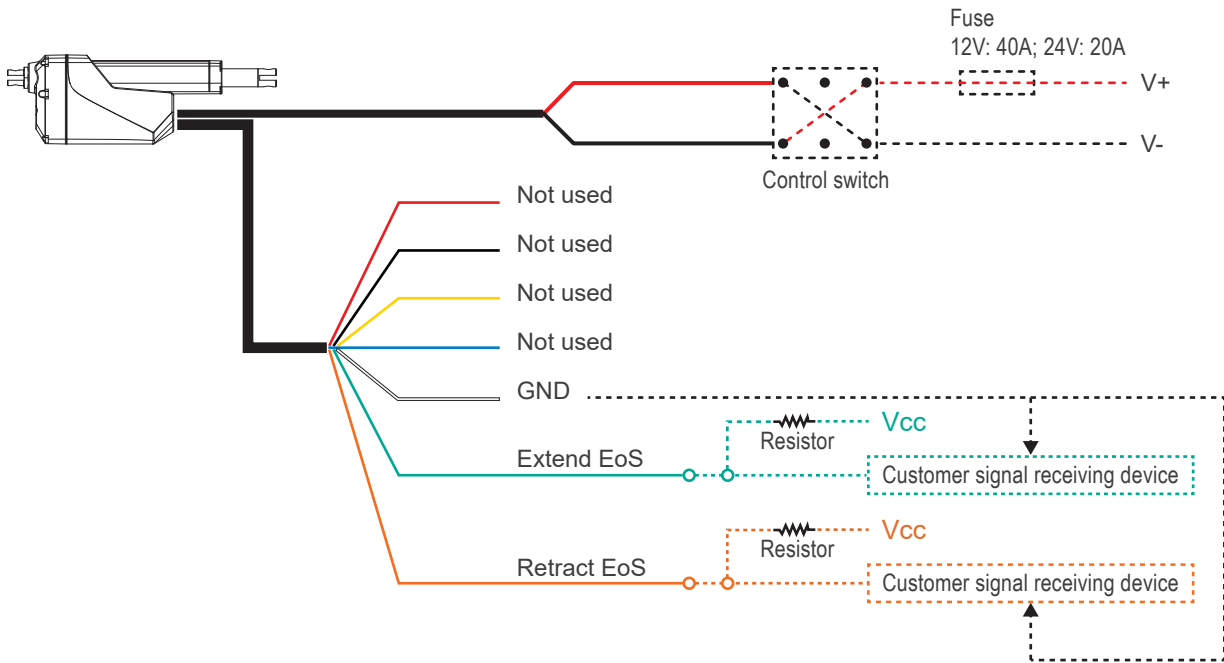
• Wire definitions

	Wire color	Definition	Description
Power cable	Red	DC power	<ul style="list-style-type: none"> Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it. Input voltage: According to actuator voltage specification $\pm 10\%$
	Black		



2. Control option D0L (DC control, with EoS signal output)

• Wiring



Note: All dashed lines are connected by the customer.

• Wire definitions

	Wire color	Definition	Description
Power cable	Red	DC power	<ul style="list-style-type: none"> Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it. Input voltage: According to actuator voltage specification $\pm 10\%$
	Black		
Signal cable	Red	Not used	
	Black	Not used	
	Yellow	Not used	
	Blue	Not used	
	White	GND	Connect to customer signal receiving device GND
	Green	Extend EoS output	<ul style="list-style-type: none"> The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 10), the resistance of 10KΩ is recommended.
	Orange	Retract EoS output	<ul style="list-style-type: none"> Recommended input voltage $V_{cc} = 5\sim 24V$ Signal voltage during the stroke = GND (Normally closed circuit) End of stroke signal voltage = V_{cc} (Open circuit)

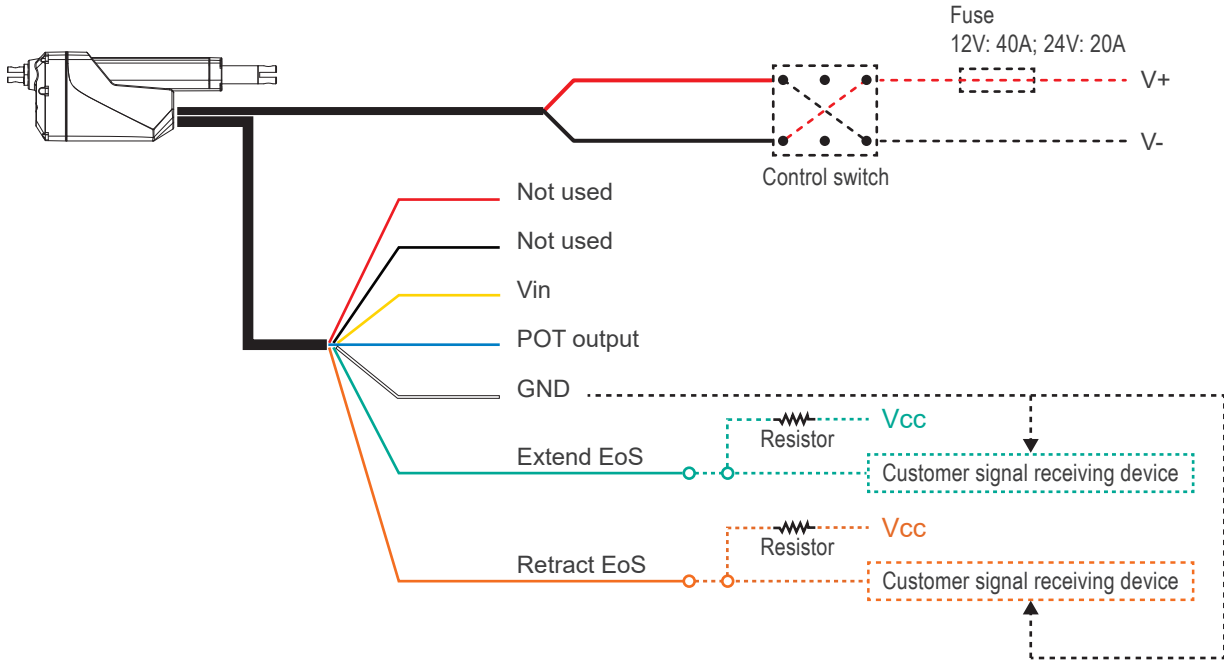
Notes:

- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not shorted to GND to prevent the malfunction of limit switches.



3. Control option DPL (DC control, with EoS signal output and potentiometer positioning output)

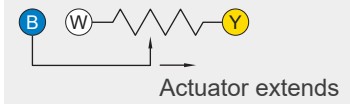
- Wiring



Note: All dashed lines are connected by the customer.



• Wire definitions: DPL

	Wire color	Definition	Description						
Power cable	Red	DC power	<ul style="list-style-type: none"> • Connect red wire to “Vdc +” & black wire to “Vdc -“ of DC power to extend the actuator. Switch the polarity of DC input to retract it. • Input voltage: According to actuator voltage specification $\pm 10\%$ 						
	Black								
Signal cable	Red	Not used							
	Black	Not used							
	Yellow	Vin	The recommended voltage: 5~32V						
	Blue	POT output	<p>1. Potentiometer specification:</p> <ul style="list-style-type: none"> - 10K ohm, 10 turns. - Total resistance tolerance $\pm 5\%$ - Independent linearity $\pm 0.25\%$ <p>2. Output voltage: The voltage (resistance) between Blue and White increases linearly from about 0 when the actuator extends from the lower limit position, and decreases when it retracts.</p>  <p>3. There are different resolutions according to the stroke length (as table below)</p> <table border="1" data-bbox="732 1008 1385 1135"> <thead> <tr> <th>Stroke range (mm)</th> <th>Resolution (ohm/mm)</th> </tr> </thead> <tbody> <tr> <td>100~450</td> <td>19.685</td> </tr> <tr> <td>451~950</td> <td>9.843</td> </tr> </tbody> </table> <p>4. The potential value can be measured through the POT output and GND wires.</p>	Stroke range (mm)	Resolution (ohm/mm)	100~450	19.685	451~950	9.843
	Stroke range (mm)	Resolution (ohm/mm)							
	100~450	19.685							
	451~950	9.843							
White	GND	Signal GND. Both for POT output and customer signal receiving device.							
Green	Extend EoS output	<ul style="list-style-type: none"> • The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 11), the resistance of 10KΩ is recommended. 							
Orange	Retract EoS output	<ul style="list-style-type: none"> • Recommended input voltage Vcc = 5~24V • Signal voltage during the stroke = GND (Normally closed circuit) • End of stroke signal voltage = Vcc (Open circuit) 							

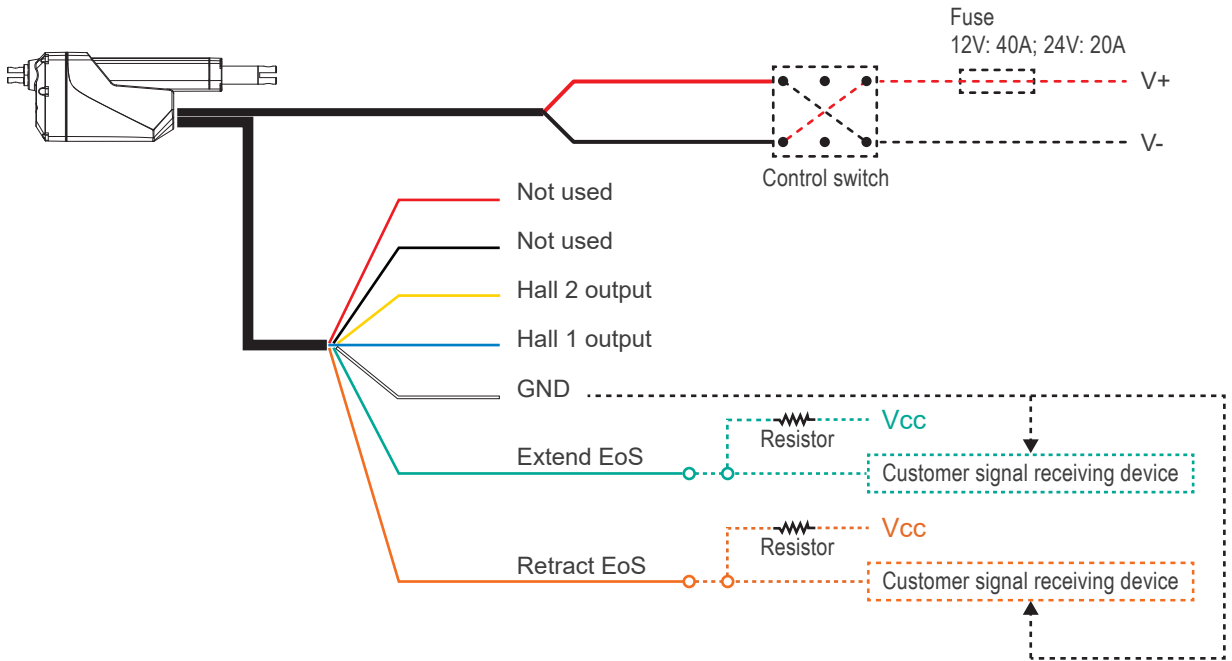
Notes:

- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not shorted to GND to prevent the malfunction of limit switches.



4. Control option DHL (DC control, with EoS signal output and dual Hall effect sensors feedback-NPN type)

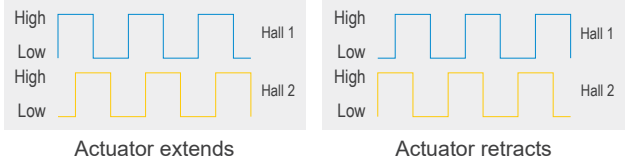
- Wiring



Note: All dashed lines are connected by the customer.



• Wire definitions: DHL

	Wire color	Definition	Description												
Power cable	Red	DC power	<ul style="list-style-type: none"> Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it. Input voltage: According to actuator voltage specification $\pm 10\%$ 												
	Black														
Signal cable	Red	Not used													
	Black	Not used													
	Yellow	Hall 2 output	High = 10.8V ($\pm 0.6V$), I _{max} 12.7mA Low = GND Hall signal data: 												
	Blue	Hall 1 output	Resolution: <table border="1" data-bbox="746 871 1374 1093"> <thead> <tr> <th>Gear ratio</th> <th>Resolution (Pulse/mm)</th> </tr> </thead> <tbody> <tr> <td>05</td> <td>1.0570</td> </tr> <tr> <td>10</td> <td>1.7601</td> </tr> <tr> <td>15</td> <td>2.9552</td> </tr> <tr> <td>20</td> <td>3.9028</td> </tr> <tr> <td>30</td> <td>6.1603</td> </tr> </tbody> </table>	Gear ratio	Resolution (Pulse/mm)	05	1.0570	10	1.7601	15	2.9552	20	3.9028	30	6.1603
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	10	1.7601													
15	2.9552														
20	3.9028														
30	6.1603														
White	GND	Signal GND. Both for Hall output and customer signal receiving device.													
Green	Extend EoS output	<ul style="list-style-type: none"> The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 13), the resistance of 10KΩ is recommended. 													
Orange	Retract EoS output	<ul style="list-style-type: none"> Recommended input voltage V_{cc} = 5~24V Signal voltage during the stroke = GND (Normally closed circuit) End of stroke signal voltage = V_{cc} (Open circuit) 													

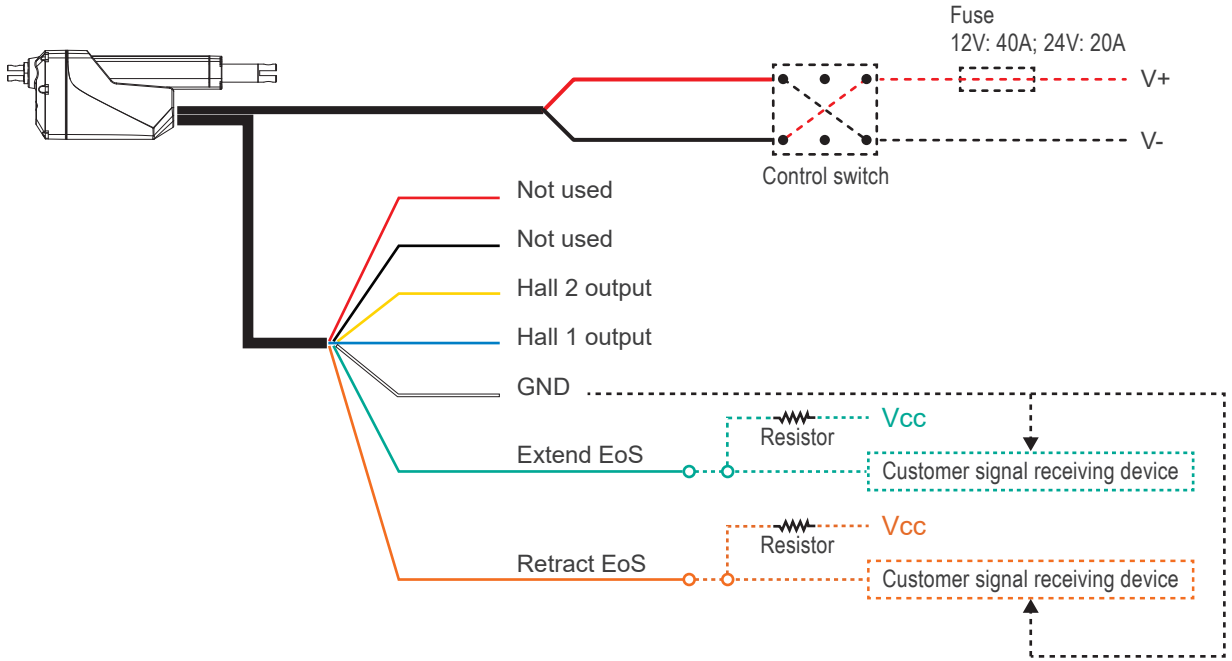
Notes:

- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not shorted to GND to prevent the malfunction of limit switches.



5. Control option D+L (DC control, with EoS signal output and dual Hall effect sensors feedback-PNP type)

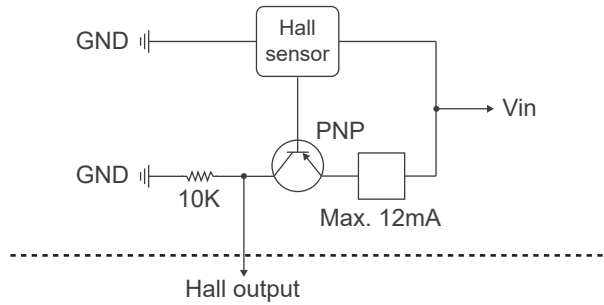
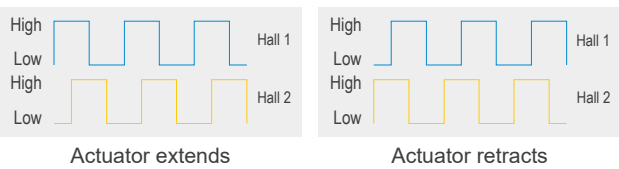
• Wiring



Note: All dashed lines are connected by the customer.



• Wire definitions: D+L

	Wire color	Definition	Description												
Power cable	Red	DC power	<ul style="list-style-type: none"> Connect red wire to "Vdc +" & black wire to "Vdc -" of DC power to extend the actuator. Switch the polarity of DC input to retract it. Input voltage: According to actuator voltage specification $\pm 10\%$ 												
	Black														
Signal cable	Red	Not used													
	Black	Not used													
	Yellow	Hall 2 output	<p>High = 10.8V ($\pm 0.6V$), Source current max. 12mA Low = 10KΩ pull down (See internal circuit diagram)</p>  <p>Hall signal data:</p>  <p>Resolution:</p> <table border="1" data-bbox="746 1198 1372 1422"> <thead> <tr> <th>Gear ratio</th> <th>Resolution (Pulse/mm)</th> </tr> </thead> <tbody> <tr> <td>05</td> <td>1.0570</td> </tr> <tr> <td>10</td> <td>1.7601</td> </tr> <tr> <td>15</td> <td>2.9552</td> </tr> <tr> <td>20</td> <td>3.9028</td> </tr> <tr> <td>30</td> <td>6.1603</td> </tr> </tbody> </table>	Gear ratio	Resolution (Pulse/mm)	05	1.0570	10	1.7601	15	2.9552	20	3.9028	30	6.1603
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30	6.1603														
Blue	Hall 1 output														
White	GND	Signal GND. Both for Hall output and customer signal receiving device.													
Green	Extend EoS output	<ul style="list-style-type: none"> The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-down resistor should be applied in user's control circuit (see the wiring diagram on Page 15), the resistance of 10KΩ is recommended. Recommended input voltage $V_{cc} = 5\sim 24V$ Signal voltage during the stroke = GND (Normally closed circuit) End of stroke signal voltage = V_{cc} (Open circuit) 													
Orange	Retract EoS output														

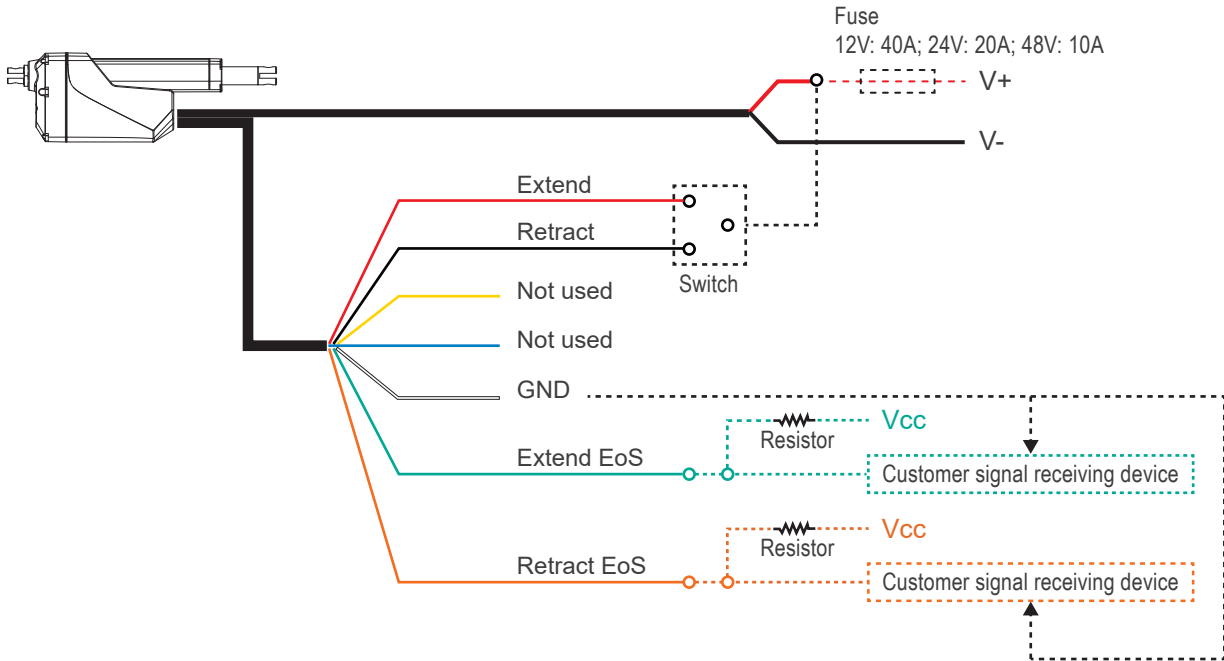
Notes:

- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not shorted to GND to prevent the malfunction of limit switches.



6. Control option S0L (Low current signal control, with EoS signal output)

• Wiring



Note: All dashed lines are connected by the customer.

• Wire definitions

	Wire color	Definition	Description
Power cable	Red	V+	<ul style="list-style-type: none"> • Connect Red to positive • Connect Black to negative • Do not swap the polarity • Input voltage: According to actuator voltage specification $\pm 10\%$
	Black	V-	
Signal cable	Red	Actuator extends	Connect Red to positive (V+) to extend, input current <10mA.
	Black	Actuator retracts	Connect Black to positive (V+) to retract, input current <10mA.
	Yellow	Not used	
	Blue	Not used	
	White	GND	Connect to customer signal receiving device GND
	Green	Extend EoS output	<ul style="list-style-type: none"> • The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 17), the resistance of 10KΩ is recommended. • Recommended input voltage $V_{cc} = 5\sim 24V$ • Signal voltage during the stroke = GND (Normally closed circuit) • End of stroke signal voltage = V_{cc} (Open circuit)
Orange	Retract EoS output		

Notes:

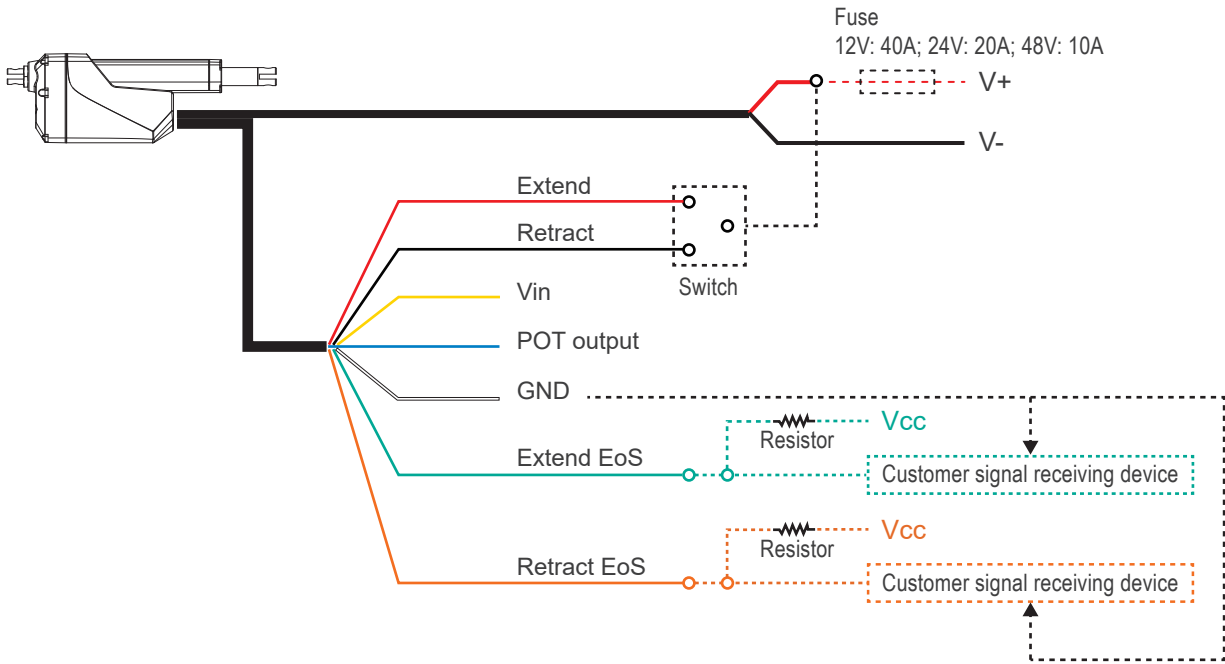
- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not be shorted to GND to prevent the malfunction of limit switches.



7. Control option SPL

(Low current signal control, with EoS signal output and potentiometer positioning output)

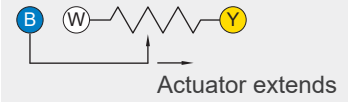
- Wiring



Note: All dashed lines are connected by the customer.



● Wire definitions: SPL

	Wire color	Definition	Description						
Power cable	Red	V+	<ul style="list-style-type: none"> • Connect Red to positive • Connect Black to negative • Do not swap the polarity • Input voltage: According to actuator voltage specification $\pm 10\%$ 						
	Black	V-							
Signal cable	Red	Actuator extends	Connect Red to positive (V+) to extend, input current $< 10\text{mA}$.						
	Black	Actuator retracts	Connect Black to positive (V+) to retract, input current $< 10\text{mA}$.						
	Yellow	Vin	The recommended voltage: 5~32V						
	Blue	POT output	<p>1. Potentiometer specification:</p> <ul style="list-style-type: none"> - 10K ohm, 10 turns. - Total resistance tolerance $\pm 5\%$ - Independent linearity $\pm 0.25\%$ <p>2. Output voltage: The voltage (resistance) between Blue and White increases linearly from about 0 when the actuator extends from the lower limit position, and decreases when it retracts.</p>  <p>3. There are different resolutions according to the stroke length (as table below)</p> <table border="1" data-bbox="732 1050 1385 1178"> <thead> <tr> <th>Stroke range (mm)</th> <th>Resolution (ohm/mm)</th> </tr> </thead> <tbody> <tr> <td>100~450</td> <td>19.685</td> </tr> <tr> <td>451~950</td> <td>9.843</td> </tr> </tbody> </table> <p>4. The potential value can be measured through the POT output and GND wires.</p>	Stroke range (mm)	Resolution (ohm/mm)	100~450	19.685	451~950	9.843
	Stroke range (mm)	Resolution (ohm/mm)							
	100~450	19.685							
	451~950	9.843							
White	GND	Signal GND. Both for POT output and customer signal receiving device.							
Green	Extend EoS output	<ul style="list-style-type: none"> • The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 18), the resistance of 10KΩ is recommended. • Recommended input voltage $V_{cc} = 5\sim 24\text{V}$ • Signal voltage during the stroke = GND (Normally closed circuit) • End of stroke signal voltage = V_{cc} (Open circuit) 							
Orange	Retract EoS output								

Notes:

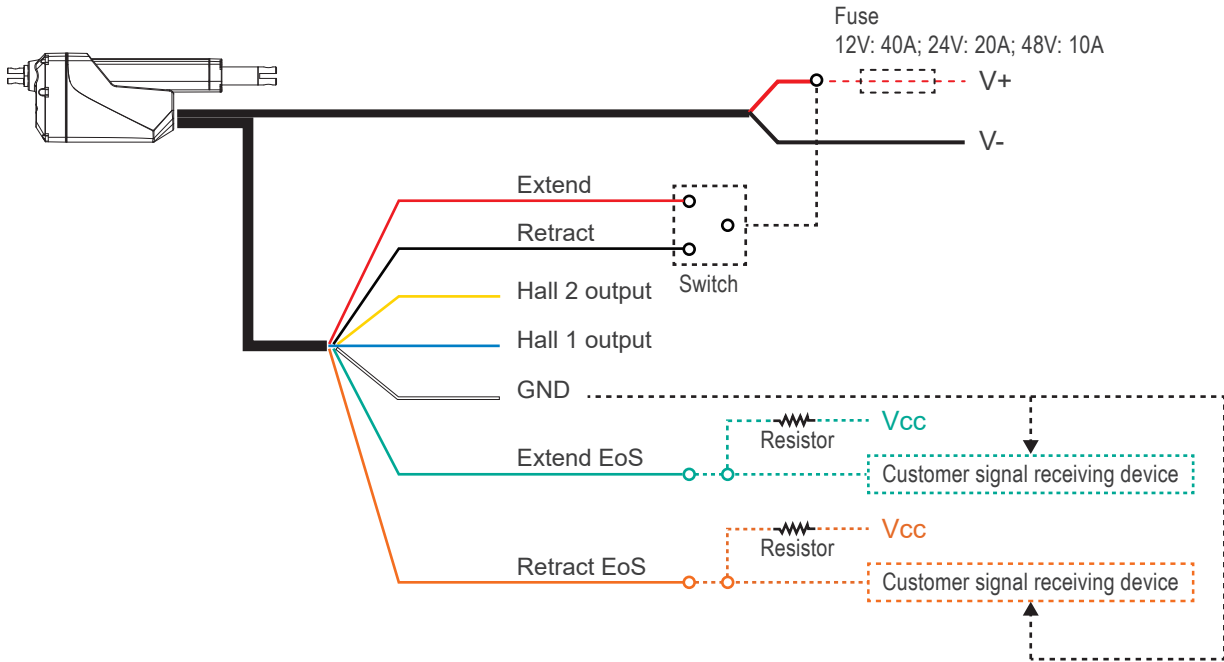
- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not be shorted to GND to prevent the malfunction of limit switches.



8. Control option SHL

(Low current signal control, with EoS signal output and dual Hall effect sensors feedback-NPN type)

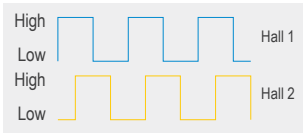
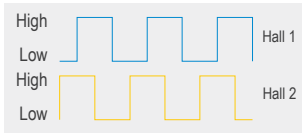
- Wiring



Note: All dashed lines are connected by the customer.



● Wire definitions: SHL

	Wire color	Definition	Description												
Power cable	Red	V+	<ul style="list-style-type: none"> • Connect Red to positive • Connect Black to negative • Do not swap the polarity • Input voltage: According to actuator voltage specification $\pm 10\%$ 												
	Black	V-													
Signal cable	Red	Actuator extends	Connect Red to positive (V+) to extend, input current <10mA.												
	Black	Actuator retracts	Connect Black to positive (V+) to retract, input current <10mA.												
	Yellow	Hall 2 output	High = 10.8V ($\pm 0.6V$), I _{max} 12.7mA Low = GND Hall signal data: <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>												
	Blue	Hall 1 output	Resolution: <table border="1" style="margin-top: 10px; width: 100%;"> <thead> <tr> <th>Gear ratio</th> <th>Resolution (Pulse/mm)</th> </tr> </thead> <tbody> <tr> <td>05</td> <td>1.0570</td> </tr> <tr> <td>10</td> <td>1.7601</td> </tr> <tr> <td>15</td> <td>2.9552</td> </tr> <tr> <td>20</td> <td>3.9028</td> </tr> <tr> <td>30</td> <td>6.1603</td> </tr> </tbody> </table>	Gear ratio	Resolution (Pulse/mm)	05	1.0570	10	1.7601	15	2.9552	20	3.9028	30	6.1603
	Gear ratio	Resolution (Pulse/mm)													
	05	1.0570													
	10	1.7601													
15	2.9552														
20	3.9028														
30	6.1603														
White	GND	Signal GND. Both for Hall output and customer signal receiving device.													
Green	Extend EoS output	<ul style="list-style-type: none"> • The stroke limit switches are open collector circuit, and the arrival signal output is not potential free. A pull-up resistor should be applied in user's control circuit (see the wiring diagram on Page 20), the resistance of 10KΩ is recommended. • Recommended input voltage V_{cc} = 5~24V • Signal voltage during the stroke = GND (Normally closed circuit) • End of stroke signal voltage = V_{cc} (Open circuit) 													
Orange	Retract EoS output														

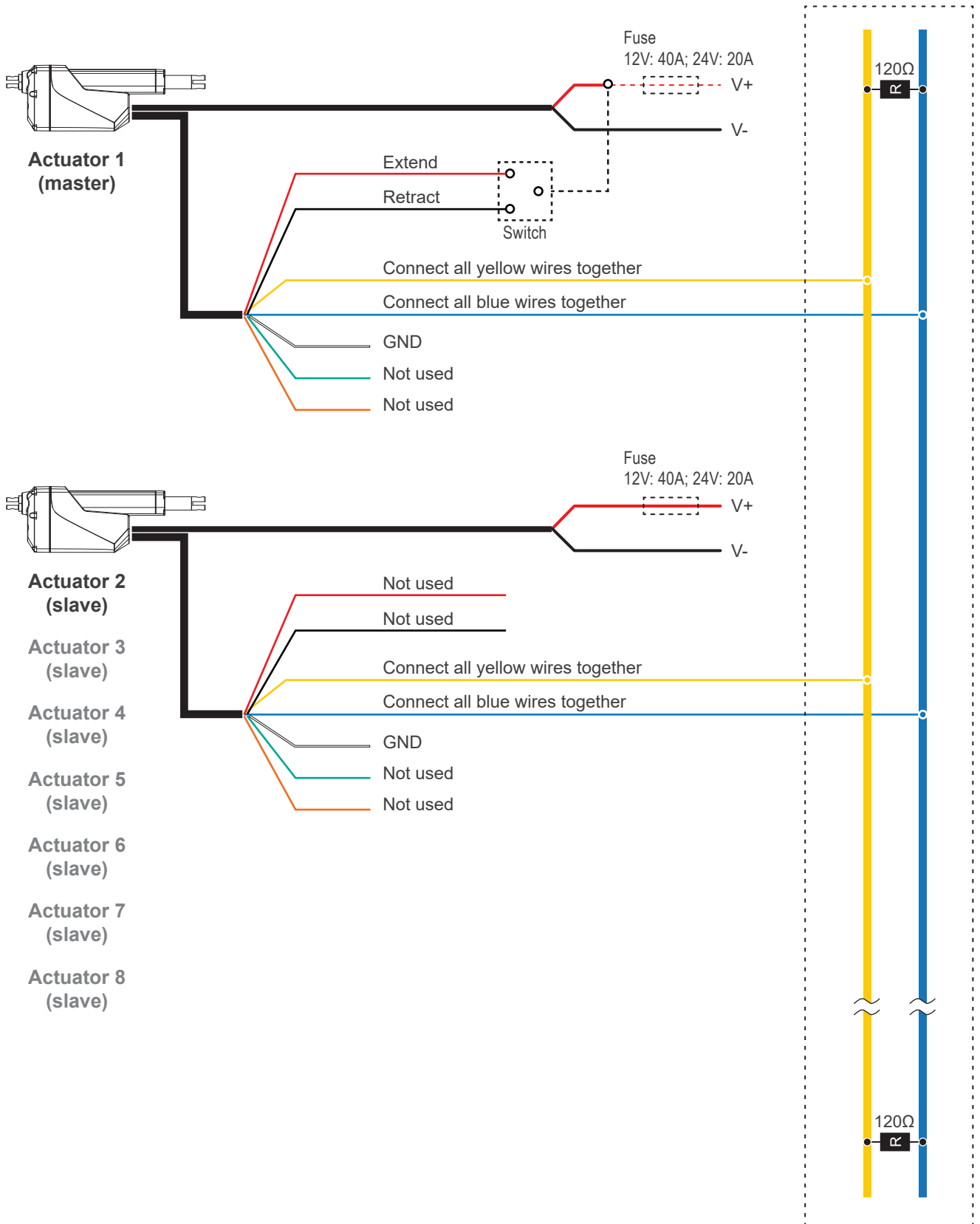
Notes:

- (1) To use the limit arrival signal, you must keep the power supply of the actuator, otherwise the signal will be lost.
- (2) Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.
- (3) The EoS signal output wire must not shorted to GND to prevent the malfunction of limit switches.



9. Control option SYL (Synchronous control)

• Wiring



Notes:

- (1) All dashed lines are connected by the customer.
- (2) At least one terminal resistor 120Ω should be added by customer.
- (3) Up to 8 actuators can be connected for SYL control option.
- (4) Please consult MOTECK for detailed setting instruction.



- **Wire definitions: SYL**

	Wire color	Definition	Description
Power cable	Red	V+	<ul style="list-style-type: none"> • Connect Red to positive • Connect Black to negative • Do not swap the polarity • Input voltage: According to actuator voltage specification $\pm 10\%$
	Black	V-	
Signal cable	Red	Actuator extends	Connect Red to positive (V+) to extend, input current <10mA. Only master actuator needs to use this wire. The other slave actuators do not use it.
	Black	Actuator retracts	Connect Black to positive (V+) to retract, input current <10mA. Only master actuator needs to use this wire. The other slave actuators do not use it.
	Yellow	SYL signal	Connect all yellow wires together
	Blue	SYL signal	Connect all blue wires together
	White	GND	Connect to customer signal receiving device GND
	Green	Not used	
	Orange	Not used	

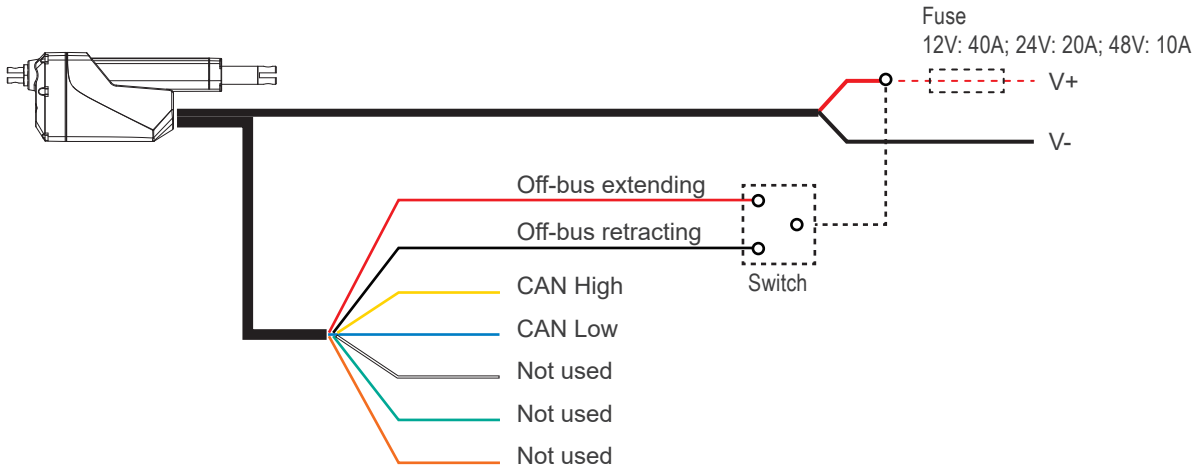
Note: Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.



10. Control option J00 (CAN bus J1939) / N00 (CANopen)

The users who choose the J00 or N00 option must have already established or well prepared to establish the CAN bus J1939 or CANopen system to apply this actuator. Please refer to the manual of MOTECK Actuator with CAN bus J1939 and the manual of MOTECK Actuator with CANopen for more detailed information.

• Wiring



Note: All dashed lines are connected by the customer.

• Wire definitions

	Wire color	Definition	Description
Power cable	Red	V+	<ul style="list-style-type: none"> • Connect Red to positive • Connect Black to negative • Do not swap the polarity • Input voltage: According to actuator voltage specification $\pm 10\%$
	Black	V-	
Signal cable	Red	Off-bus extending	Connect Red to positive (V+) to extend, input current <10mA.
	Black	Off-bus retracting	Connect Black to positive (V+) to retract, input current <10mA.
	Yellow	CAN High	
	Blue	CAN Low	
	White	Not used	
	Green	Not used	
	Orange	Not used	

Note: Please ensure that unused wires are well insulated to avoid damaging the internal circuit of the actuator.

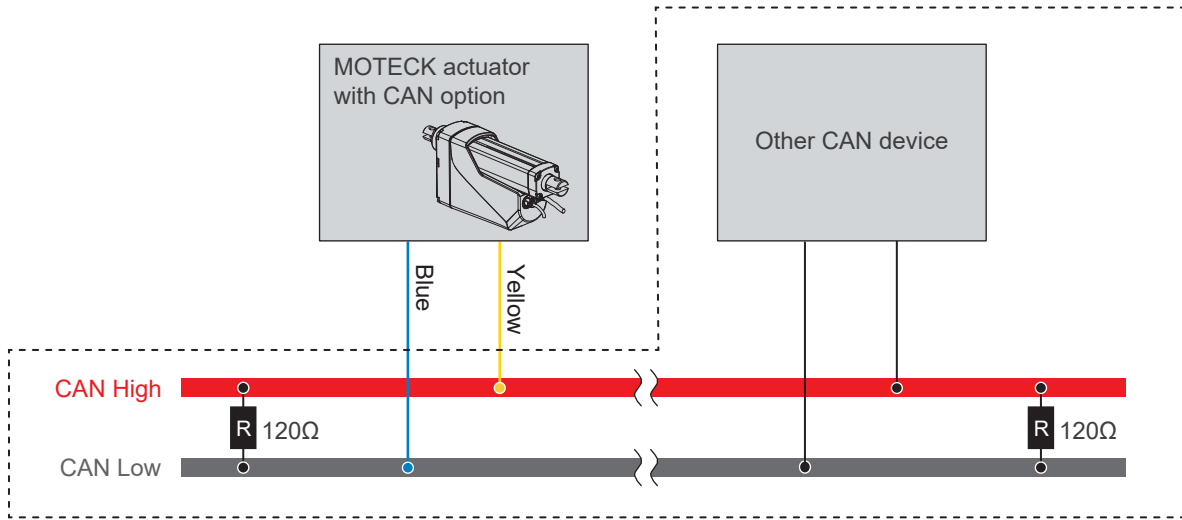
• Off-bus operation

- (1) When the actuator has the need to repair, maintain or test without the CAN commands.
There are 2 separate wires to perform the off-bus operation for extending or retracting the actuator.
- (2) It is not necessary to disconnect the CAN High and CAN Low wires when the off-bus operation is required.
The priority of CAN commands and off-bus control is that whose command comes first, it will be executed first, and the next command will be accepted after the execution is completed.



- **Bus connection**

Please follow the wiring guidelines of ISO-11898-1 / 11898-2 standard. The two ends of the CAN High / CAN Low harness should be connected with a 120Ω terminal resistor, as shown in the figure below.



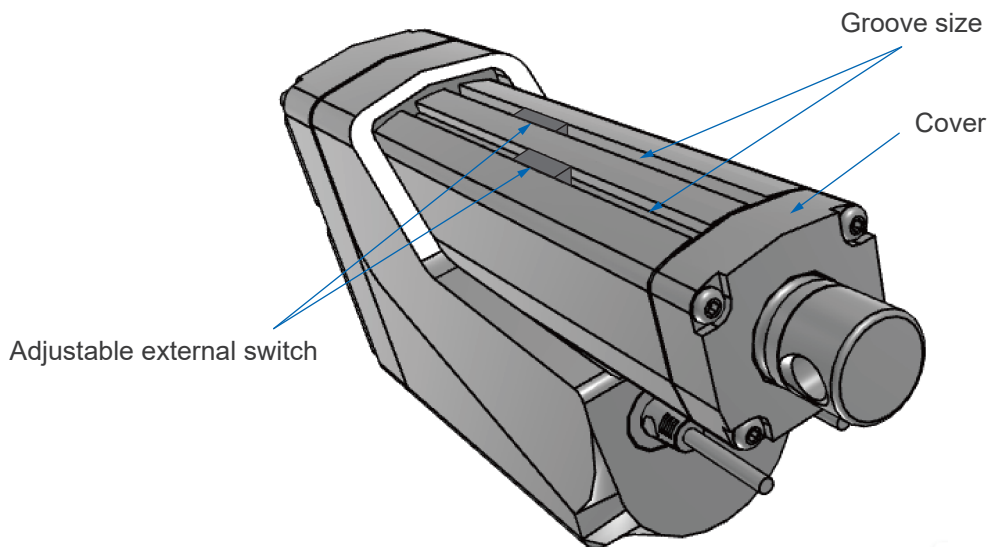
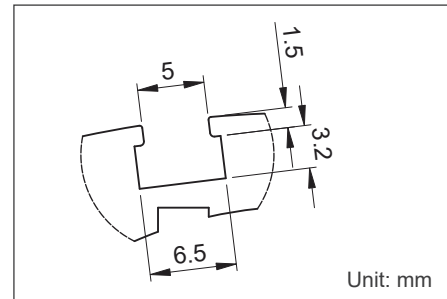
Note: Inside dashed lines are wirings and system of the customer.



Adjustable External Switch

In addition to the MK35's built-in stroke limit switches, external switches can be installed to provide additional position feedback signals for customer's application.

1. Customer can choose 1 or 2 reed switches (Normally Open), which are pre-assembled in the outer tube groove at the factory, and then adjust them to the desired position.



2. The groove size is attached for customer to prepare suitable reed switches or solid state switches and install the switches by yourself. Just ask MOTEK to assemble the magnets at factory.

Certifications

MK35 actuator is compliant with the following regulations, in terms of the essential conformity requirements of EMC Directive of 2014/30/EU.

Emission	Immunity
EN IEC 61000-6-3:2021 BS EN IEC 61000-6-3:2021	EN IEC 61000-6-1:2019 BS EN IEC 61000-6-1:2019



Ordering Key

	MK35-24-G5B-30-A00-J00-2-2-0-0-0-1										
Input voltage	12: 12V DC 24: 24V DC 48: 48V DC ⁽¹⁾										
Motor and spindle type	G5B: 4500rpm / 5.08mm pitch / Ball screw										
Gear ratio	05: 5:1 15: 15:1 30: 30:1										
	10: 10:1 20: 20:1										
Stroke	XXX: 100~950mm (one step in every 50mm); A00=1000mm										
Control options	D00 : DC control, without positioning feedback. D0L : DC control + EoS DPL: DC control + Potentiometer + EoS DHL: DC control + Dual Hall effect sensors (NPN) + EoS D+L: DC control + Dual Hall effect sensors (PNP) + EoS S0L : Low current signal control + EoS SPL : Low current signal control + Potentiometer + EoS SHL: Low current signal control + Dual Hall effect sensors (NPN) + EoS SYL: Synchronous control J00 : CAN bus J1939 N00 : CANopen										
Front connector (Refer to Page 8)	2, 4, 5, 6, 7, 8, A, B										
Rear connector (Refer to Page 8)	2, 4, 5, 6, 7, 8, A										
Connector orientation (Refer to Page 9)	0: 0° (Standard) 9: 90° (Front and rear connectors shown in standard 0°)										
External switch	0: None (Standard)					R: Adjustable reed switch x1					
	M: Only nut magnets installed					S: Adjustable reed switches x2					
Reserved	0										
Cable length ⁽²⁾	1: 500mm straight			5: 1500mm straight				7: 3000mm straight			

Notes:

- ⁽¹⁾ Only available for control options S0L / SPL / SHL / J00 / N00
- ⁽²⁾ The wiring harness is divided into power cable and signal cable, equal in length, with the bare wires at both ends are tinned. The D00 option only has a power cable but no signal cable.



For more information about installation and use, please refer to < MK35 Manual > on Moteck official website.
For more information about control options J00 / N00, please refer to < Manual of MOTECK Actuator with CAN bus J1939 > and < Manual of MOTECK Actuator with CANopen > on Moteck official website.

