

Actuator

MD60

MD60 is a quiet and powerful actuator up to 6000N thrust, designed for use in a variety of medical and home care applications such as patient hoist and bed.



Features and Options

- Main applications: Home care, medical
- Input voltage: 24V DC
- Max. load: 6000N (push) / 4000N (pull)
- Typical speed at no load: 23 mm/sec
- Typical speed at full load: 5.0 mm/sec (6000N load)
- Stroke: 50 ~ 400 mm
- Noise level: ≤ 53 dB
- IP Level: IPX4
- Rear connector's pivot orientation can be chosen in every 30 degrees.
- Preset limit switches
- Aluminum outer tube
- Color: Light gray RAL 7035
- Duty cycle: 10% and max. 2 min. continuous operation in 20 min.
- Ambient operation temperature: +5°C ~ +40°C
- Certified: CE Marking, EN 60601-1-2, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-8 RoHS, Directive 2011/65/EU and commission delegated Directive (EU)2015/863, (EU)2017/2102
- Optional Positioning signal feedback with Hall effect sensor x 1 or 2
- Optional Mechanical push only extension tube or Safety nut (in push direction)
- Optional IPX6
- Optional QR2 quick release: To retract actuator quickly by pinching the QR2 grip while emergency (*Fig. 1*)
- Optional MR3 manual release: To retract actuator slowly and put down the patient safely by turning the MR3 knob with hand when losing power in the application of patient hoist (*Fig. 2*)

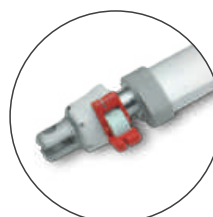


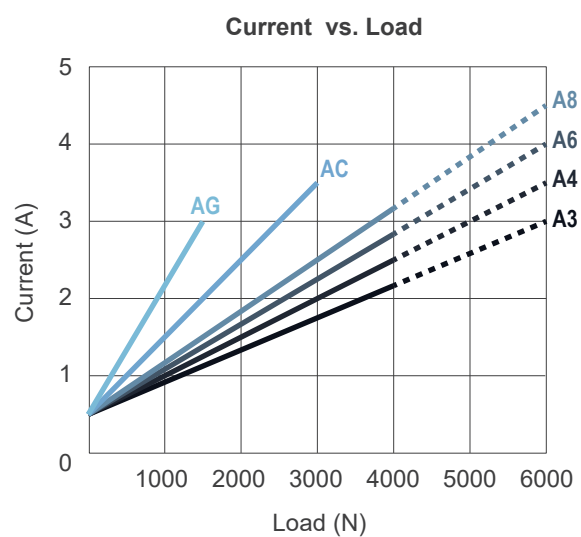
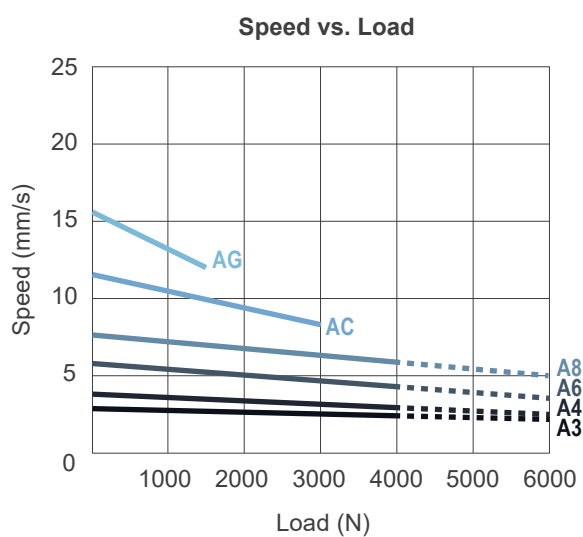
Fig. 1



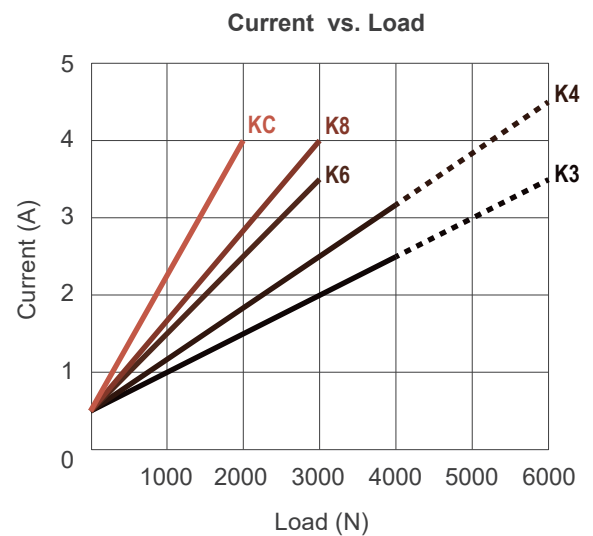
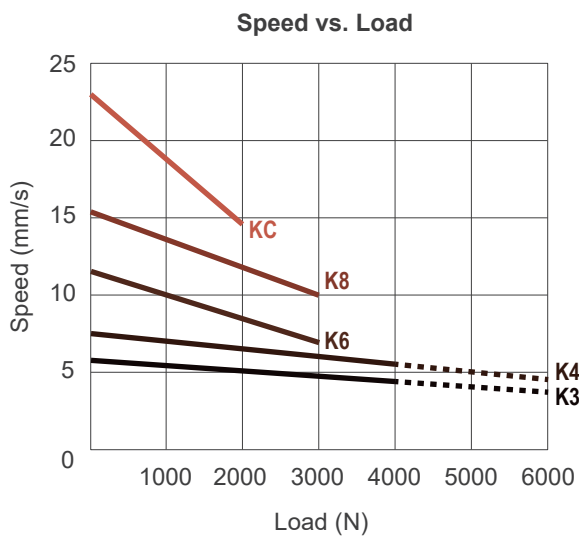
Fig. 2

Performance Data

| Model No. | Push Max. (N) | Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) @ 24V | |
|---------------------------------|------------------|------------------|------------------------|-----------|-----------------------------|-----------|
| | | | No load | Full load | No load | Full load |
| MD60-24- A3 -XXX.XXX-CXX | 6000 | 4000 | 2.9 | 2.1 | 0.5 | 3.0 |
| MD60-24- A4 -XXX.XXX-CXX | 6000 | 4000 | 3.8 | 2.5 | 0.5 | 3.5 |
| MD60-24- A6 -XXX.XXX-CXX | 6000 | 4000 | 5.8 | 3.6 | 0.5 | 4.0 |
| MD60-24- A8 -XXX.XXX-CXX | 6000 | 4000 | 7.6 | 5.0 | 0.5 | 4.5 |
| MD60-24- AC -XXX.XXX-CXX | 3000 | 3000 | 11.5 | 8.2 | 0.5 | 3.5 |
| MD60-24- AG -XXX.XXX-CXX | 1500 | 1500 | 15.3 | 12.0 | 0.5 | 3.0 |



| Model No. | Push Max. (N) | Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) @ 24V | |
|---------------------------------|------------------|------------------|------------------------|-----------|-----------------------------|-----------|
| | | | No load | Full load | No load | Full load |
| MD60-24- K3 -XXX.XXX-CXX | 6000 | 4000 | 5.8 | 3.8 | 0.5 | 3.5 |
| MD60-24- K4 -XXX.XXX-CXX | 6000 | 4000 | 7.5 | 4.5 | 0.5 | 4.5 |
| MD60-24- K6 -XXX.XXX-CXX | 3000 | 3000 | 11.5 | 6.9 | 0.5 | 3.5 |
| MD60-24- K8 -XXX.XXX-CXX | 3000 | 3000 | 15.3 | 10.0 | 0.5 | 4.0 |
| MD60-24- KC -XXX.XXX-CXX | 2000 | 2000 | 23.0 | 14.7 | 0.5 | 4.0 |



Push / Pull Load — Push Load - - -

Remarks:

- * The typical speed or typical current means the average value neither upper limit nor lower limit. The performance curves are made with typical values.

• Inrush current



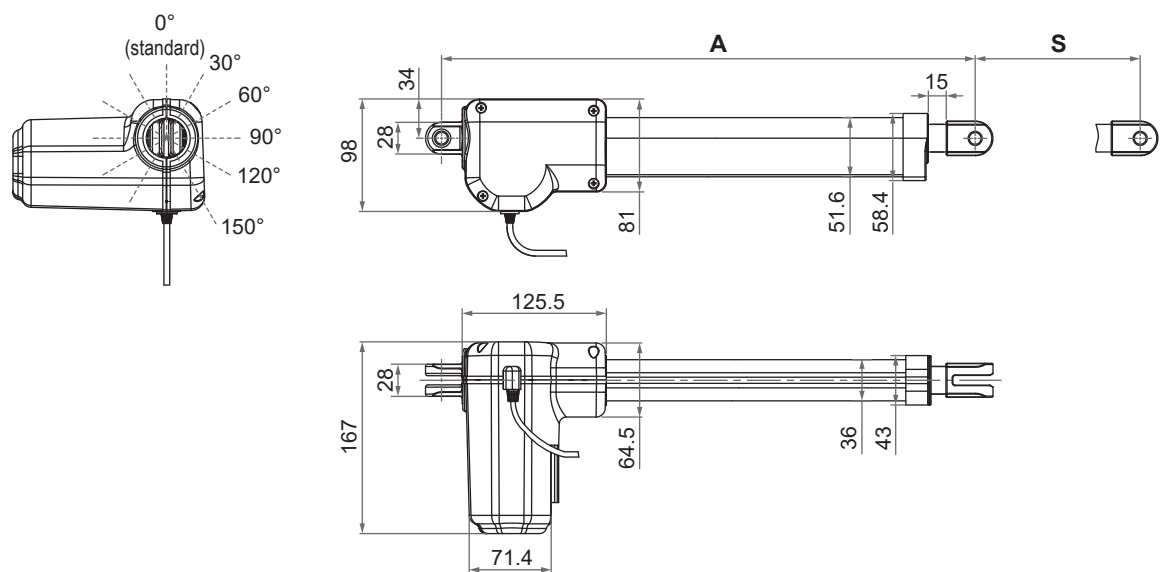
- When the actuator starts to operate, an inrush current of about 0.2 seconds will be generated. The starting inrush current of MD60 can reach about 3 times of the typical current under the actuator load.
- If a circuit board power supply is used, the specifications must be sufficient to handle the inrush current. If batteries are used as the power source, inrush current will not be a problem.
- MOTECK controllers are designed to take into account the inrush current when the actuator starts. If the user provides his or her own controller, this feature must be considered in the specifications and protection mechanisms. Besides, the connectors, switches and relays selected by users must also be able to withstand the starting currents.

Dimensions

Installation Dimension

Unit: mm

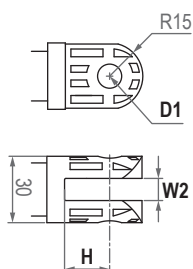
| Stroke (s) | 50 ≤ S ≤ 300mm | | | | |
|--|----------------------|-------------|-------------|----------------------------|--------------------------------|
| Retracted Length (A) | Front connector | 3, 7 | 1, 5, 8 | Q (With QR2 quick release) | M, N (With MR3 manual release) |
| | Safety option | | | | |
| | No safety option | A ≥ S+155mm | A ≥ S+179mm | N/A | N/A |
| | With Safety Nut (SN) | A ≥ S+160mm | A ≥ S+185mm | A ≥ S+243mm | A ≥ S+250mm |
| <div>• 301 ≤ S ≤ 400mm, retracted length (A) + 30mm</div> <div>• S ≥ 401mm, Customized retracted length (A)</div> <div>• Tolerance: ±3mm</div> | | | | | |



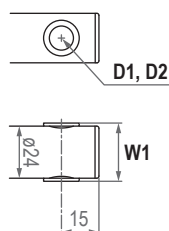
Note: As an example in 0° pivot of rear connector.

Front Connector

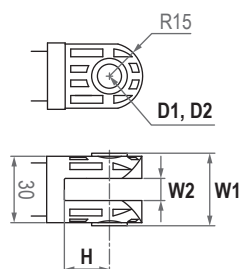
1: Plastic



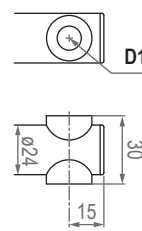
3: Drilled hole



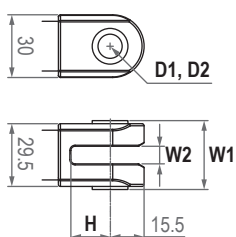
5: Zinc alloy clevis



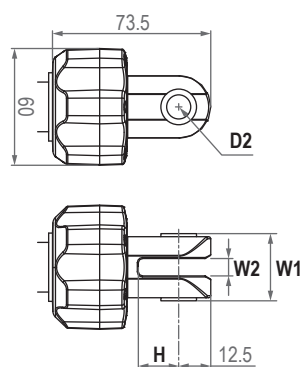
7: Plastic bushing



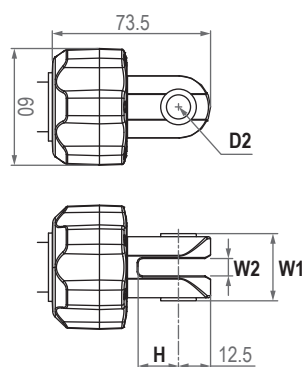
8: Aluminum alloy clevis



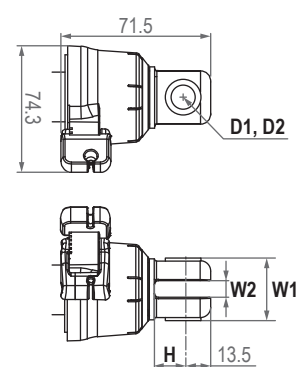
M: Aluminum alloy clevis with MR3 manual release



N: Zinc alloy clevis with MR3 manual release



Q: Zinc alloy clevis with QR2 quick release

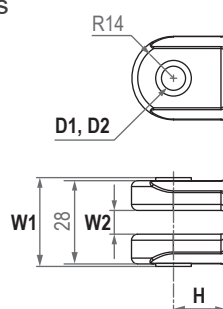


| Front connector code | Diameter of pivot without bushing (D1) | Diameter of pivot with bushing (D2) | Width with bushing (W1) | Slot width (W2) | Slot depth (H) |
|----------------------|--|-------------------------------------|-------------------------|-----------------|----------------|
| 1 | ø8, ø10, ø12 | N/A | N/A | 10 | 20 |
| 3 | N/A | ø8, ø10 | 26 | N/A | N/A |
| 5 | ø8, ø10, ø12 | ø8, ø10 | 32 | 10 | 20 |
| 7 | N/A | ø10 | N/A | N/A | N/A |
| 8 | ø10, ø12 | ø8, ø10 | 31.5 | 8.3 | 19.5 |
| M | N/A | ø10 | 29.5 | 8.4 | 19.5 |
| N | N/A | ø10 | 29.5 | 8.4 | 19.5 |
| Q | ø12 | ø10 | 29.6 | 8.2 | 14 |

Rear Connector

1: Aluminum alloy clevis

2: Zinc alloy clevis



| Rear connector code | Diameter of pivot without bushing (D1) | Diameter of pivot with bushing (D2) | Width with bushing (W1) | Slot width (W2) | Slot depth (H) |
|---------------------|--|-------------------------------------|-------------------------|-----------------|----------------|
| 1 | ø10, ø12 | ø8, ø10 | 30 | 8 | 18 |
| 2 | ø10, ø12 | ø8, ø10 | 30 | 8 | 18 |

Compatibility

| Product | Model | Application condition | MD60 spec |
|--------------------|---------------------------|--------------------------------|---|
| Control box | MD6C, MD6C-M | - Max. 5A current per channel | - Without positioning sensor feedback - 4-pin Moteck H-type or V-type DIN plug |
| | CB2P, CB4P, MD7C | - Max. 3A current per channel | - Without positioning sensor feedback - 4-pin Moteck H-type or V-type DIN plug |
| | MD6C-M | - Max. 5A current per channel | - With dual Hall effect sensors for positioning - 6-pin Moteck H-type or V-type DIN plug |
| | CB4P-SY (Synchronization) | - Max. 4.5A current 2 channels | - With dual Hall effect sensors for positioning - 6-pin Moteck H-type or V-type DIN plug |
| | CB5P-M | - Max. 5A current per channel | - With dual Hall effect sensors for positioning - 6-pin Moteck LR-type minifit plug |

Remarks:

1. If the current limit of the selected control box is lower than the typical current of the actuator model under full load, the actuator could not be operated in full performance.
2. The outline dimensions of MD6C-M are same as MD6C.



MD60+MD6C

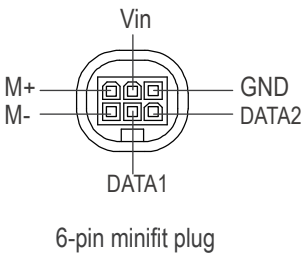


MD60+CB2P

Cable Plug

Moteck LR-type minifit plug

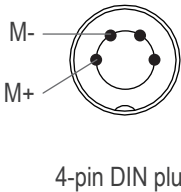
- With dual Hall effect sensors for positioning



LR-type

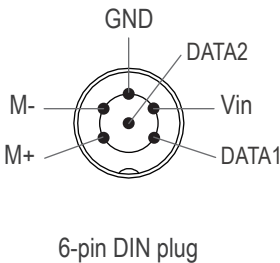
Moteck V-type or H-type DIN plug

- Without positioning feedback



V-type

- With dual Hall effect sensors for positioning



H-type

Note:


Connect M+ to “Vdc +” & M- to “Vdc -” of DC power to extend the actuator. Switch the polarity of DC input to retract it.

Cable with Flying Leads


Without positioning feedback

| | Wire color | Definition | Comments |
|-------------|------------|------------|--|
| Power wires | White | DC power | Connect white wire to “Vdc +” & black wire to “Vdc -” of DC power to extend the actuator. Switch the polarity of DC input to retract it. |
| | Black | | |

With single Hall effect sensor for positioning

| | Wire color | Definition | Comments | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|------------|-------------|---|------------------------|------------------------|----------------------------|-------|----------------------------|------|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|
| Power wires | Blue | DC power | Connect blue wire to “Vdc +” & Brown wire to “Vdc -“ of DC power to extend the actuator. Switch the polarity of DC input to retract it. | | | | | | | | | | | | | | | | | | | | | | | | |
| | Brown | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal wires | Yellow | Vin | Voltage input range: 5 ~ 20V | | | | | | | | | | | | | | | | | | | | | | | | |
| | Red | Hall output | High= Input - 1.2V (±0.6V) Low= GND Hall signal data:  Hall effect sensor resolution: <table><tr><th>Model No.</th><th>Resolution (pulses/mm)</th></tr><tr><td>MD60-24-A3-XXX.XXX-CXX-HSX</td><td>13.33</td></tr><tr><td>MD60-24-A4-XXX.XXX-CXX-HSX</td><td>10.0</td></tr><tr><td>MD60-24-A6-XXX.XXX-CXX-HSX</td><td>6.67</td></tr><tr><td>MD60-24-A8-XXX.XXX-CXX-HSX</td><td>5.0</td></tr><tr><td>MD60-24-AC-XXX.XXX-CXX-HSX</td><td>3.34</td></tr><tr><td>MD60-24-AG-XXX.XXX-CXX-HSX</td><td>2.5</td></tr><tr><td>MD60-24-K3-XXX.XXX-CXX-HSX</td><td>6.67</td></tr><tr><td>MD60-24-K4-XXX.XXX-CXX-HSX</td><td>5.0</td></tr><tr><td>MD60-24-K6-XXX.XXX-CXX-HSX</td><td>3.34</td></tr><tr><td>MD60-24-K8-XXX.XXX-CXX-HSX</td><td>2.5</td></tr><tr><td>MD60-24-KC-XXX.XXX-CXX-HSX</td><td>1.66</td></tr></table> | Model No. | Resolution (pulses/mm) | MD60-24-A3-XXX.XXX-CXX-HSX | 13.33 | MD60-24-A4-XXX.XXX-CXX-HSX | 10.0 | MD60-24-A6-XXX.XXX-CXX-HSX | 6.67 | MD60-24-A8-XXX.XXX-CXX-HSX | 5.0 | MD60-24-AC-XXX.XXX-CXX-HSX | 3.34 | MD60-24-AG-XXX.XXX-CXX-HSX | 2.5 | MD60-24-K3-XXX.XXX-CXX-HSX | 6.67 | MD60-24-K4-XXX.XXX-CXX-HSX | 5.0 | MD60-24-K6-XXX.XXX-CXX-HSX | 3.34 | MD60-24-K8-XXX.XXX-CXX-HSX | 2.5 | MD60-24-KC-XXX.XXX-CXX-HSX | 1.66 |
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| MD60-24-A6-XXX.XXX-CXX-HSX | | | 6.67 | | | | | | | | | | | | | | | | | | | | | | | | |
| MD60-24-A8-XXX.XXX-CXX-HSX | | | 5.0 | | | | | | | | | | | | | | | | | | | | | | | | |
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| MD60-24-KC-XXX.XXX-CXX-HSX | 1.66 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black | GND | | | | | | | | | | | | | | | | | | | | | | | | | | |

With dual Hall effect sensors for positioning

| | Wire color | Definition | Comments | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|----------------------------|------------------------|---|-----------|------------------------|----------------------------|-------|----------------------------|------|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|----------------------------|-----|----------------------------|------|
| Power wires | Blue | DC power | Connect blue wire to “Vdc +” & Brown wire to “Vdc -” of DC power to extend the actuator. Switch the polarity of DC input to retract it. | | | | | | | | | | | | | | | | | | | | | | | | |
| | Brown | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal wires | Yellow | Vin | Voltage input range: 5 ~ 20V | | | | | | | | | | | | | | | | | | | | | | | | |
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| MD60-24-KC-XXX.XXX-CXX-HSX | 1.66 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Green | Hall 2 output | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black | GND | | | | | | | | | | | | | | | | | | | | | | | | | | |

Ordering Key

| | | MD60- | 24 | A8 | 560 | 850 | C | Q | 2 | HS2 | PO | A |
|--|---|-------|----|----|-----|-----|---|---|---|-----|----|---|
| Input voltage | 24: 24V DC | | | | | | | | | | | |
| Motor and Spindle type | A3: 2500rpm / 3mm pitch A4: 2500rpm / 4mm pitch A6: 2500rpm / 6mm pitch A8: 2500rpm / 8mm pitch AC: 2500rpm / 12mm pitch AG: 2500rpm / 16mm pitch K3: 2500rpm / 3mm pitch K4: 2500rpm / 4mm pitch K6: 2500rpm / 6mm pitch K8: 2500rpm / 8mm pitch KC: 2500rpm / 12mm pitch | | | | | | | | | | | |
| Retracted length <i>(Refer to Page 4)</i> | XXX | | | | | | | | | | | |
| Extended length <i>(Refer to Page 4)</i> | XXX | | | | | | | | | | | |
| Front connector <i>(Refer to Page 5)</i> | 1: Plastic 3: Drilled hole 5: Zinc alloy clevis 7: Plastic bushing 8: Aluminum alloy clevis M: Aluminum alloy clevis with MR3 manual release (must with options of Push only and Safety nut, A8 or AC spindle) N: Zinc alloy clevis with MR3 manual release (must with options of Push only and Safety nut, A8 or AC spindle) Q: Zinc alloy clevis with QR2 quick release (must with options of Push only and Safety nut, A8 or AC spindle) | | | | | | | | | | | |
| Rear connector <i>(Refer to Page 5)</i> | 1: Aluminum alloy clevis 2: Zinc alloy clevis | | | | | | | | | | | |
| Positioning feedback | Blank: None HS1: Hall effect sensor x 1 HS2: Hall effect sensor x 2 | | | | | | | | | | | |
| Options <i>(multiple choice is allowed)</i> | Blank: None SN: Safety nut PO: Push only X6: IPX6 Protection level | | | | | | | | | | | |
| Cable length | 0: 300mm straight 1: 1000mm straight A: 400mm with 200mm coiled | | | | | | | | | | | |

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