

# 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

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- 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:  $\leq 53$ dB
- IP Level: IPX4
- Rear connector's pivot orientation can be chosen in every 30 degrees.
- Preset limit switches
- Aluminum outer tube
- Steel extension 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

## Options

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- Positioning signal feedback with Hall effect sensor x 1
- Positioning signal feedback with Hall effect sensor x 2
- Mechanical push only extension tube
- Safety nut (in push direction)
- IP Level: IPX6
- QR1 quick release (*Fig. 1*): Only go with motor and spindle code A8 or AC, and the loading conditions are shown in the table below for QR1 operation.

Motor and Spindle code	Max. Load	Min. Load
A8	$\leq 3000\text{N}$	$\geq 500\text{N}$
AC	$\leq 2000\text{N}$	$\geq 300\text{N}$

- QR2 quick release: To retract actuator quickly by pinching the QR2 grip while emergency (*Fig. 2*)
- 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. 3*)



Fig. 1

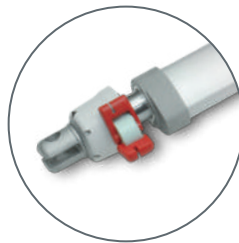


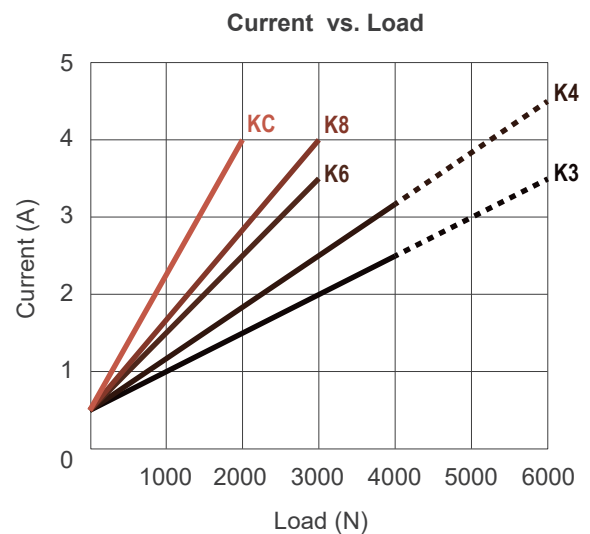
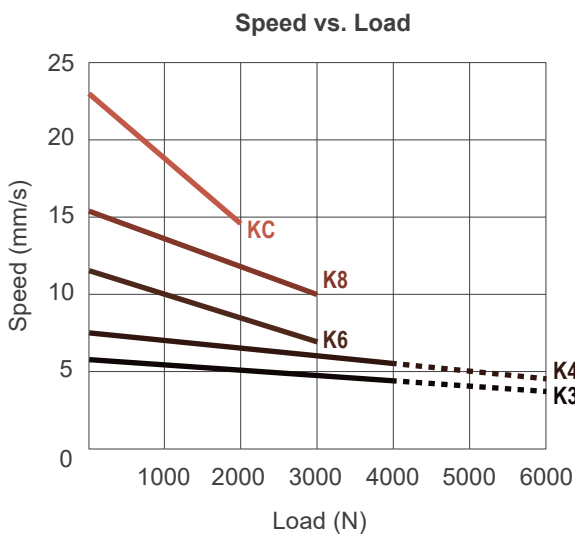
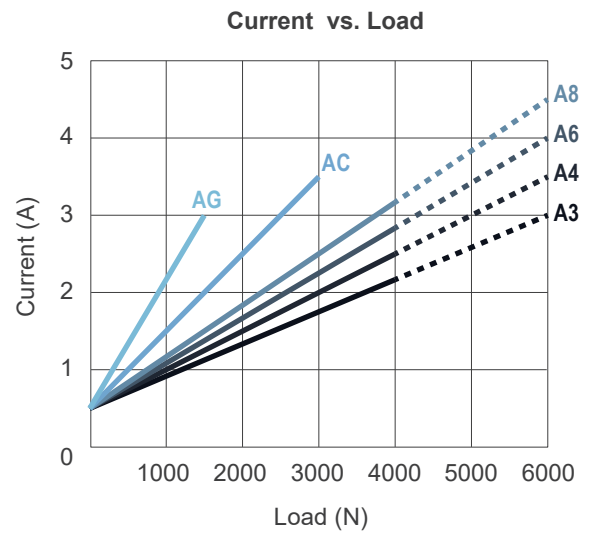
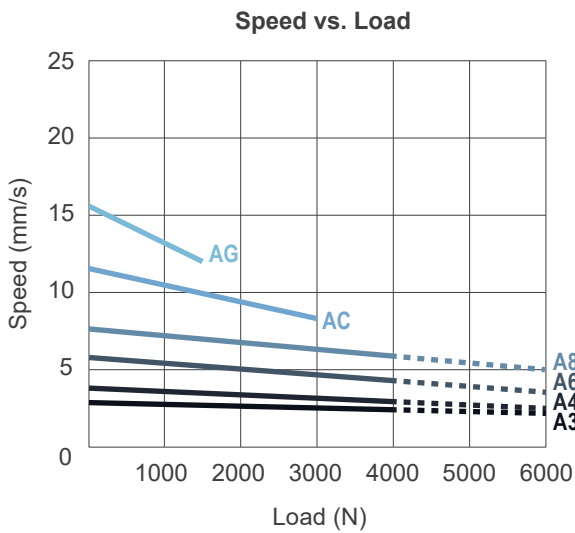
Fig. 2



Fig. 3

# 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- <b>A3</b> -XXX.XXX-CXX	6000	4000	2.9	2.1	0.5	3.0
MD60-24- <b>A4</b> -XXX.XXX-CXX	6000	4000	3.8	2.5	0.5	3.5
MD60-24- <b>A6</b> -XXX.XXX-CXX	6000	4000	5.8	3.6	0.5	4.0
MD60-24- <b>A8</b> -XXX.XXX-CXX	6000	4000	7.6	5.0	0.5	4.5
MD60-24- <b>A8</b> -XXX.XXX-CXX- <b>QR1</b>	3000	3000	7.6	6.3	0.5	2.5
MD60-24- <b>AC</b> -XXX.XXX-CXX	3000	3000	11.5	8.2	0.5	3.5
MD60-24- <b>AC</b> -XXX.XXX-CXX- <b>QR1</b>	2000	2000	11.5	9.3	0.5	2.5
MD60-24- <b>AG</b> -XXX.XXX-CXX	1500	1500	15.3	12.0	0.5	3.0
MD60-24- <b>K3</b> -XXX.XXX-CXX	6000	4000	5.8	3.8	0.5	3.5
MD60-24- <b>K4</b> -XXX.XXX-CXX	6000	4000	7.5	4.5	0.5	4.5
MD60-24- <b>K6</b> -XXX.XXX-CXX	3000	3000	11.5	6.9	0.5	3.5
MD60-24- <b>K8</b> -XXX.XXX-CXX	3000	3000	15.3	10.0	0.5	4.0
MD60-24- <b>KC</b> -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.

# Dimensions

## Installation Dimension

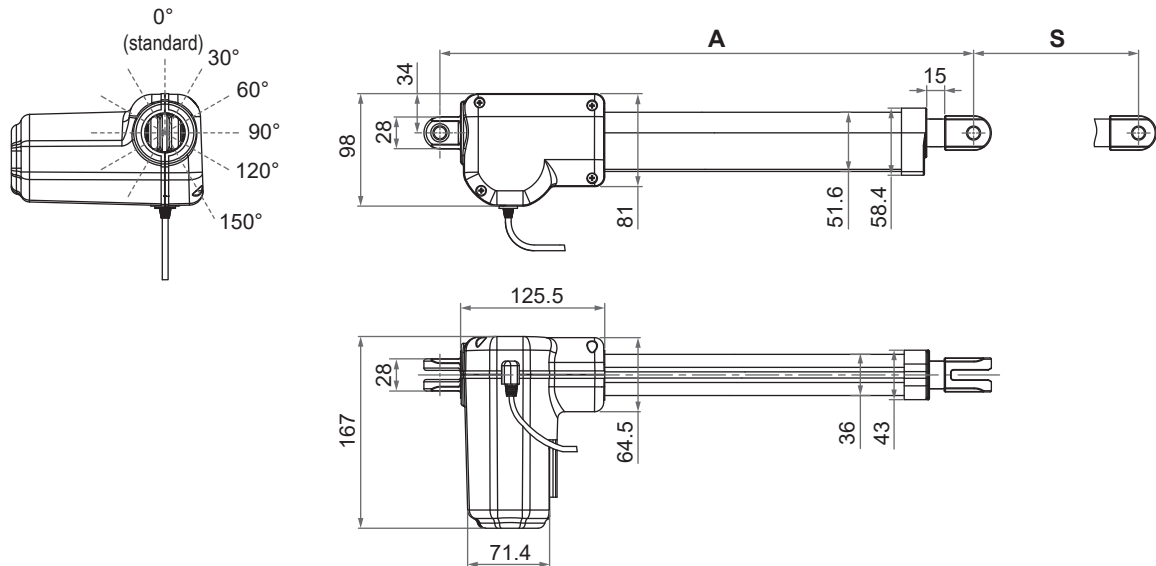
Unit: mm

Stroke (s)	$50 \leq S \leq 300\text{mm}$				
	Front connector	3, 7	1, 5, 8	Q (With QR2 quick release)	M, N (With MR3 manual release)
Retracted Length (A)	Safety option				
	No safety option	$A \geq S+155\text{mm}$	$A \geq S+179\text{mm}$	N/A	N/A
	With Safety Nut (SN)	$A \geq S+160\text{mm}$	$A \geq S+185\text{mm}$	$A \geq S+243\text{mm}$	$A \geq S+250\text{mm}$
	With quick release (QR1)	$A \geq S+165\text{mm}$	$A \geq S+190\text{mm}$	N/A	N/A
	With SN + QR1	$A \geq S+173\text{mm}$	$A \geq S+198\text{mm}$	N/A	N/A

•  $301 \leq S \leq 400\text{mm}$ , retracted length (A) + 30mm      • Tolerance:  $\pm 3\text{mm}$   
 •  $S \geq 401\text{mm}$ , Customized retracted length (A)

## Standard

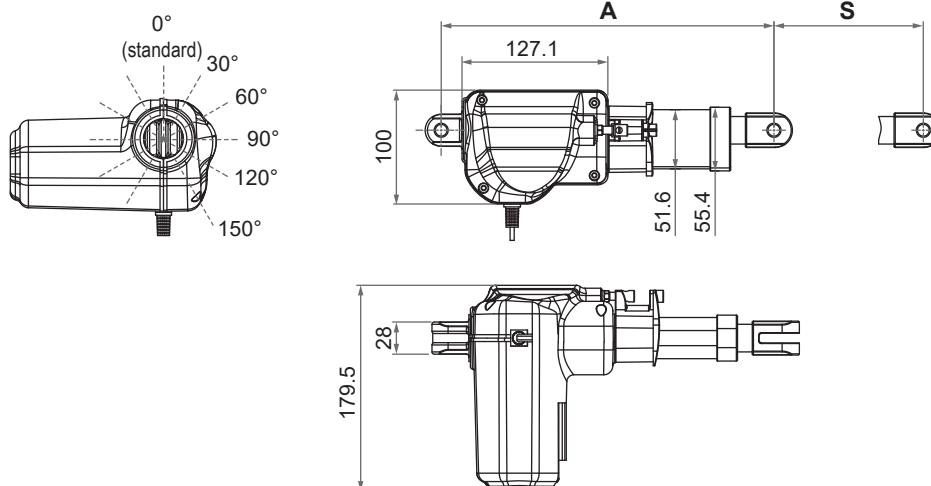
Pivot orientation of rear connectors



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

## With quick release (QR1)

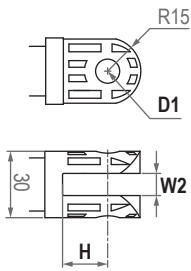
Pivot orientation of rear connectors



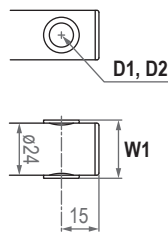
**Note:** As an example in 0° pivot of rear connector.

## Front Connector

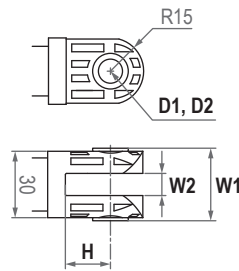
1: Plastic



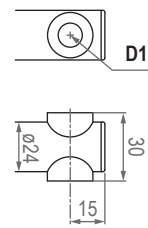
3: Drilled hole



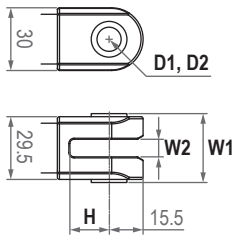
5: Zinc alloy clevis



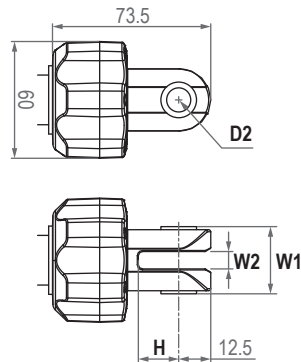
7: Drilled hole with nylon bushing



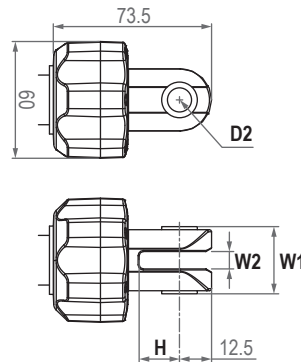
8: Aluminum alloy clevis



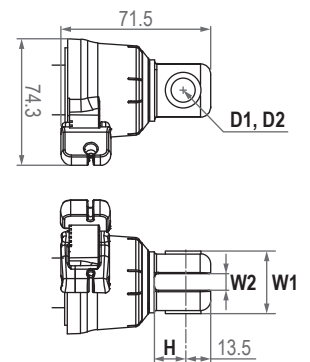
M: Aluminum alloy clevis with MR3 manual release



N: Zinc alloy clevis with MR3 manual release



Q: Zinc alloy clevis with QR2 quick release

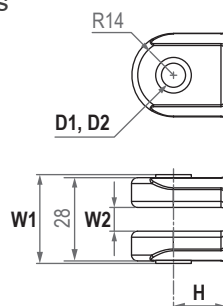


Front connector code	Diameter of pivot without bushing (D1)	Diameter of pivot with bushing (D2)	Width with bushing (W1)	Slot width (W2)	Slot depth (H)
1	ø8, ø10, ø12	N/A	N/A	10	20
3	ø8, ø10, ø12, ø14	ø8, ø10	26	N/A	N/A
5	ø8, ø10, ø12	ø8, ø10	32	10	20
7	ø10	N/A	N/A	N/A	N/A
8	ø10, ø12	ø8, ø10	31.5	8.3	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
<b>Control box</b>	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. MD6C, MD6C-M & CB2P control box can be attached to MD60 actuator except for MD60-QR1 model.
2. 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.
3. The outline dimensions of MD6C-M are same as MD6C.



MD60+MD6C

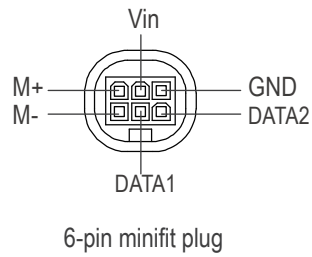


MD60+CB2P

## Cable Plug

### Motek LR-type minifit plug

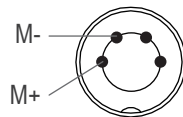
- With dual Hall effect sensors for positioning



LR-type

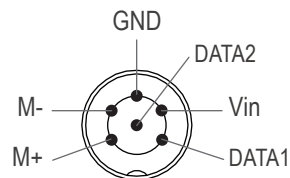
### Motek V-type or H-type DIN plug

- 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 ( $\pm 0.6V$ ) Low= GND Hall signal data: 																							
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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.																							
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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

<b>Input voltage</b>	24: 24V DC
<b>Motor and Spindle type</b>	<p>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</p>
<b>Retracted length</b> <i>(Refer to Page 4)</i>	XXX
<b>Extended length</b> <i>(Refer to Page 4)</i>	XXX
<b>Front connector</b> <i>(Refer to Page 5)</i>	<p>1: Plastic  3: Drilled hole  5: Zinc alloy clevis  7: Drilled hole with nylon 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)</p>
<b>Rear connector</b> <i>(Refer to Page 5)</i>	<p>1: Aluminum alloy clevis  2: Zinc alloy clevis</p>
<b>Positioning feedback</b>	<p>Blank: None  HS1: Hall effect sensor x 1  HS2: Hall effect sensor x 2</p>
<b>Options</b> <i>(multiple choice is allowed)</i>	<p>Blank: None  SN: Safety nut  PO: Push only  QR1: QR1 Quick release (Must with option of A8 or AC spindle)  X6: IPX6 Protection level</p>
<b>Cable length</b>	<p>0: 300mm straight  1: 1000mm straight  A: 400mm with 200mm coiled</p>

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