# Actuator
# LD3

LD3 features its compact design, which is suitable for various applications that require limited installation space, such as window or gate opener, adjustable seat tilting and medical devices.

## Features and Options

**Main applications:** Industrial, Furniture, Home care, Medical

**Standard features:**

- Input voltage: 12 / 24V DC
- Max. load: 1000N (Push / Pull)
- Max. static load: 2500N (Push / Pull)
- Speed at no load: 43.9mm/sec (Typical value)
- Speed at full load: 5.5mm/sec (Typical value @1000N loaded)
- Stroke: 50 / 100 / 150 / 200 / 250 / 300mm
- Noise level: Please refer to Performance Data
- IP level: IP54
- Preset limit switches
- Duty cycle: 25%, max. 1 min. continuous operation in 4 min.
- Operating ambient temperature: -25°C ~ +65°C
- Certified: CE Marking, Electromagnetic Compatibility Directive 2014/30/EU (for LD3 only)

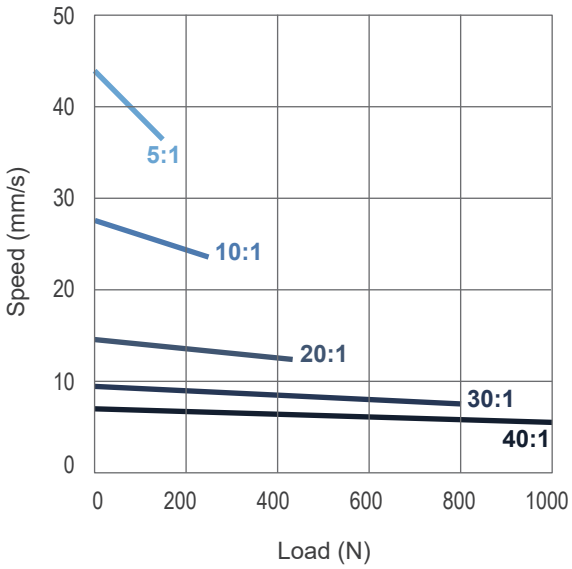
**Options:**

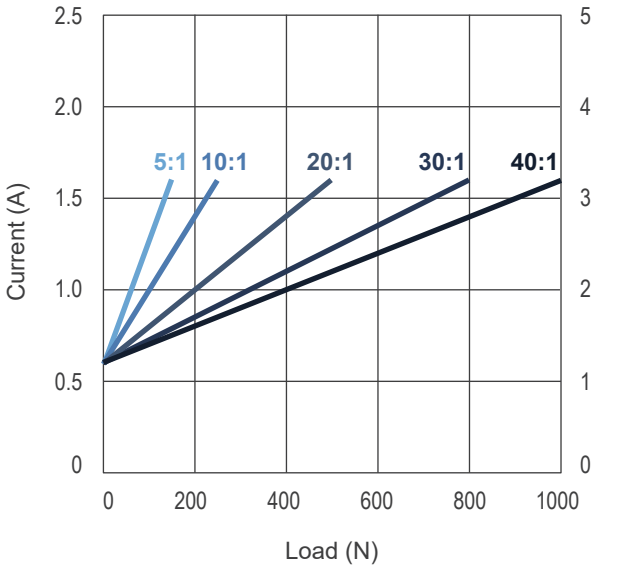
- Medical version (LD3M, compliance with EN 60601)
- Quiet version (LD3Q, noise level ≦55dB)
- Positioning signal feedback with Hall effect sensor x 1
- Positioning signal feedback with Hall effect sensor x 2
- Analog positioning feedback with Potentiometer (POT)
- IP level: IP65

## Performance Data

### Regular version (LD3)

| Model No. | Gear Ratio | Push / Pull Max. (N) | Self-locking force Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | | | | Noise Level (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Load | Full Load | No Load | | Full Load | | |
| | | | | | | 24V | 12V | 24V | 12V | |
| LD3-XX-05-K3... | 5:1 | 150 | 2500 | 43.9 | 36.5 | 0.6 | 1.2 | 1.6 | 3.2 | ≦70 |
| LD3-XX-10-K3... | 10:1 | 250 | 2500 | 27.6 | 23.5 | 0.6 | 1.2 | 1.6 | 3.2 | ≦70 |
| LD3-XX-20-K3... | 20:1 | 500 | 2500 | 14.6 | 12.3 | 0.6 | 1.2 | 1.6 | 3.2 | ≦70 |
| LD3-XX-30-K3... | 30:1 | 800 | 2500 | 9.5 | 7.5 | 0.6 | 1.2 | 1.6 | 3.2 | ≦70 |
| LD3-XX-40-K3... | 40:1 | 1000 | 2500 | 7.0 | 5.5 | 0.6 | 1.2 | 1.6 | 3.2 | ≦70 |



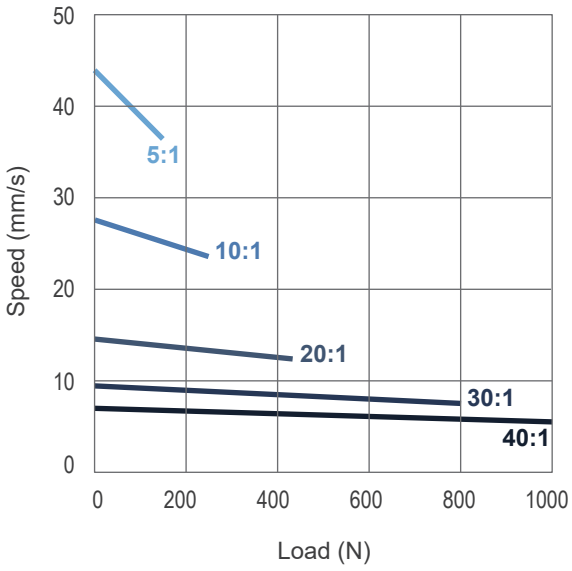

**Remarks:**

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

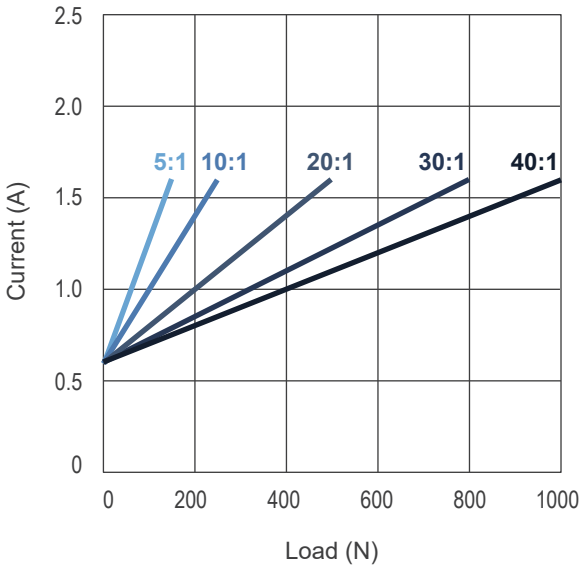
## Medical version (LD3M)

| Model No. | Gear Ratio | Push / Pull Max. (N) | Self-locking force Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) @24V DC | | Noise Level (dB) |
|---|---|---|---|---|---|---|---|---|
| | | | | No Load | Full Load | No Load | Full Load | |
| LD3M-XX-05-K3... | 5:1 | 150 | 2500 | 43.9 | 36.5 | 0.6 | 1.6 | ≦70 |
| LD3M-XX-10-K3... | 10:1 | 250 | 2500 | 27.6 | 23.5 | 0.6 | 1.6 | ≦70 |
| LD3M-XX-20-K3... | 20:1 | 500 | 2500 | 14.6 | 12.3 | 0.6 | 1.6 | ≦70 |
| LD3M-XX-30-K3... | 30:1 | 800 | 2500 | 9.5 | 7.5 | 0.6 | 1.6 | ≦70 |
| LD3M-XX-40-K3... | 40:1 | 1000 | 2500 | 7.0 | 5.5 | 0.6 | 1.6 | ≦70 |

**Speed vs Load**




**Current vs Load**

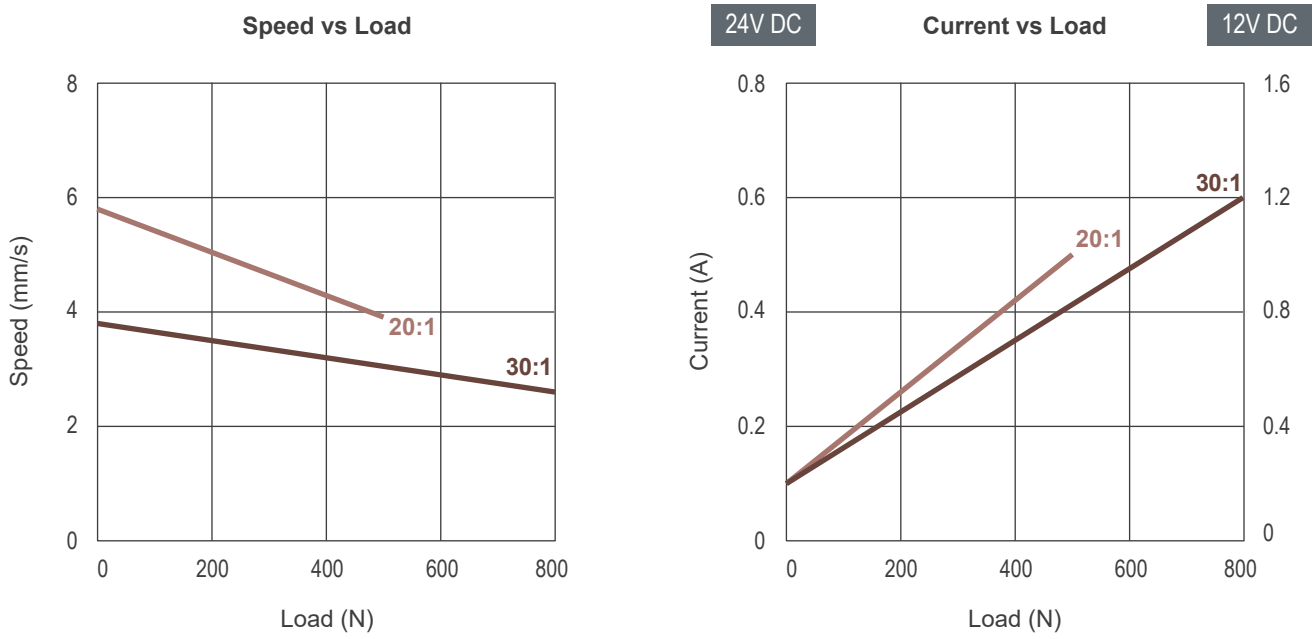



**Remarks:**

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

**Quiet version (LD3Q)**

| Model No. | Gear Ratio | Push / Pull Max. (N) | Self-locking force Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | | | | Noise Level (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Load | Full Load | No Load | | Full Load | | |
| | | | | | | 24V | 12V | 24V | 12V | |
| LD3Q-XX-20-D3... | 20:1 | 500 | 2500 | 5.8 | 3.9 | 0.1 | 0.2 | 0.5 | 1.0 | ≦55 |
| LD3Q-XX-30-D3... | 30:1 | 800 | 2500 | 3.8 | 2.6 | 0.1 | 0.2 | 0.6 | 1.2 | ≦55 |




**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

### Retracted length (A)

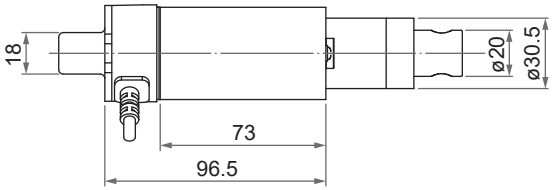
| Option | Front connector code | Stroke (S) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 200 | 250 | 300 |
| Basic or with Hall sensor | 1 | 158 | 209 | 260 | 311 | 362 | 413 |
| | 3 | 199 | 250 | 301 | 352 | 403 | 454 |
| | 6 | 168.5 | 219.5 | 270.5 | 321.5 | 372.5 | 423.5 |
| With POT | 1 | 195 | 246 | 297 | 348 | 399 | 450 |
| | 3 | 236 | 287 | 338 | 389 | 440 | 491 |
| | 6 | 205.5 | 256.5 | 307.5 | 358.5 | 409.5 | 460.5 |

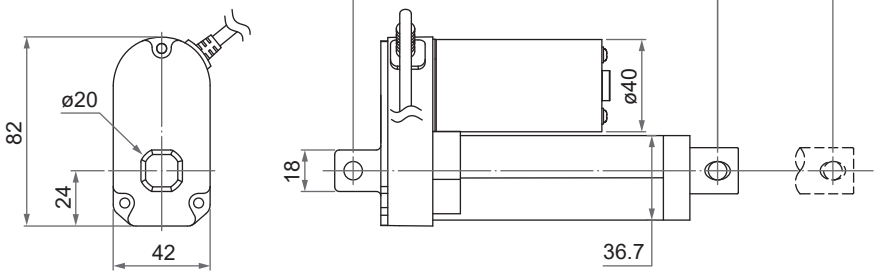
(tolerance: ±3mm)

**Note:** The dimension “A” is shown in page 5 & 6, as indicated in the figure below.

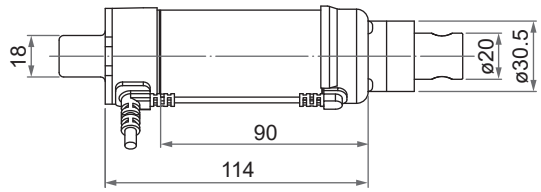
### Drawing

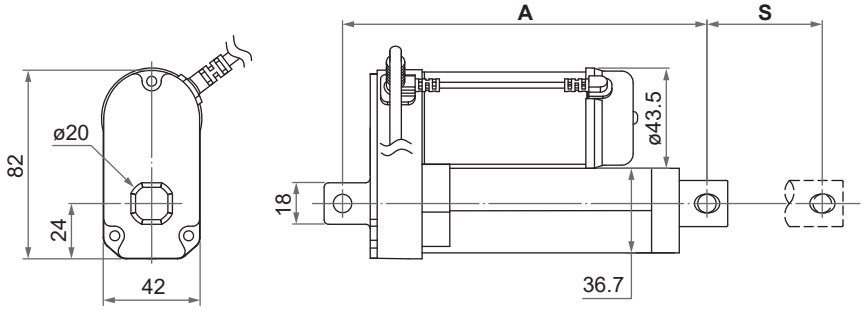
- **Regular version (LD3) & Quiet version (LD3Q)**
  - Basic, without positioning feedback.




  - With Hall effect sensor positioning feedback

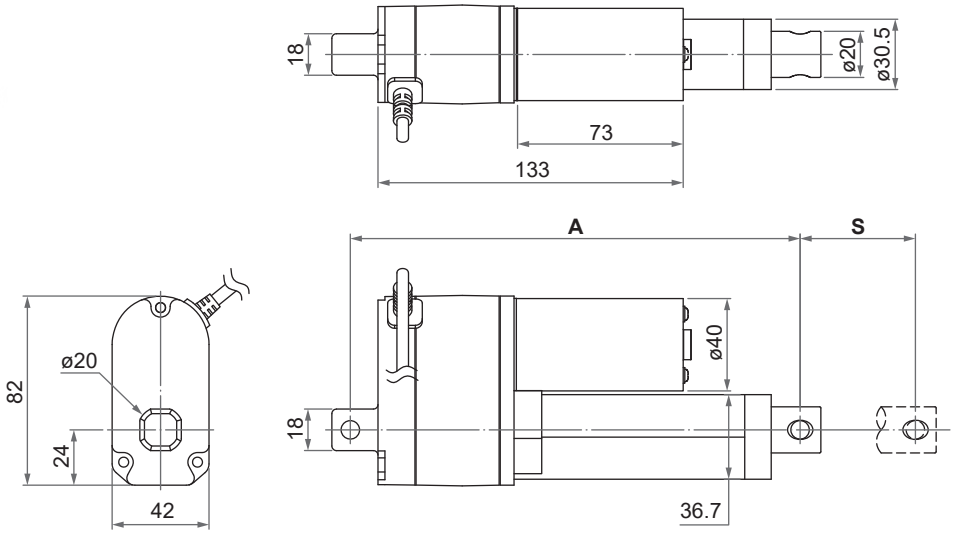


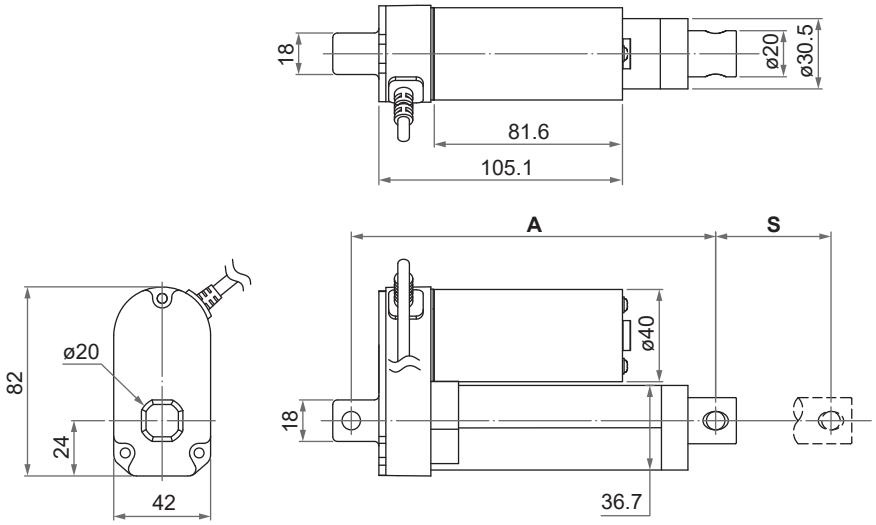

**Note:** As an example in 0° orientation for rear connector.

Unit: mm

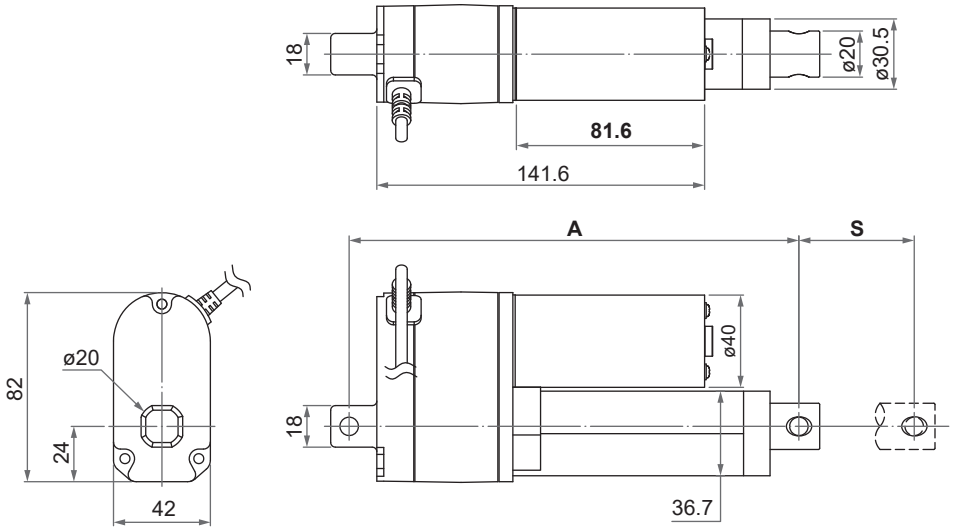
- With potentiometer (POT) absolute positioning feedback




- **Medical version (LD3M)**
  - Basic, without positioning feedback




- With potentiometer (POT) absolute positioning feedback

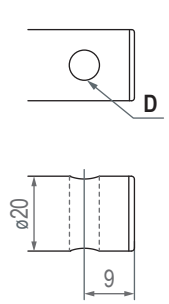



**Note:** As an example in 0° orientation for rear connector.

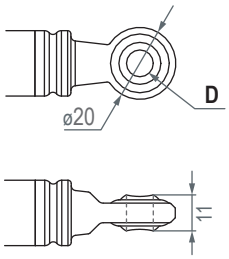
Unit: mm

- **Front connector**

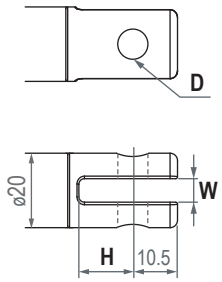
**1**: Drilled hole




**3:** Spherical rod eye



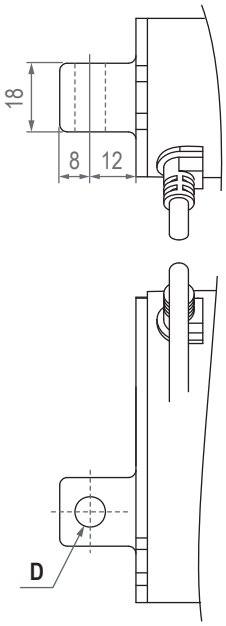

**6**: Plastic slot



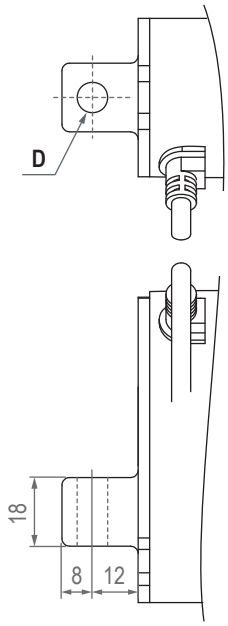

| Front connector code | Diameter of pivot without bushing (D) | Slot width (W) | Slot depth (H) |
|---|---|---|---|
| **1** | ø6.4, ø8, ø10 | N/A | N/A |
| **3** | ø8 | N/A | N/A |
| **6** | ø8, ø10 | 6 | 15 |

- **Rear connector**

**1**: Zinc alloy clevis, 0°




**3**: Zinc alloy clevis, 90°




| Rear connector code | Diameter of pivot without bushing (D) | Slot width (W) | Slot depth (H) |
|---|---|---|---|
| **1, 3** | ø6.4, ø8, ø10 | N/A | N/A |

Unit: mm

## Compatibility

| Product | Model | LD3 spec |
|---|---|---|
| **Controller** | CI72 | Standard |
| **Accessory** | MB22 mounting bracket (Fig. 1) | Standard, mounting hole ø6.4mm, ø8mm or ø10mm |
| | C15 clamp (Fig. 2) | Comply with the section shape and size of the outer tube. |

Fig. 1

Fig. 2

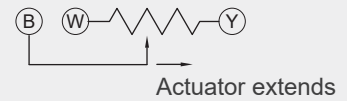
Unit: mm

## Wiring

- **Basic, without positioning feedback.**

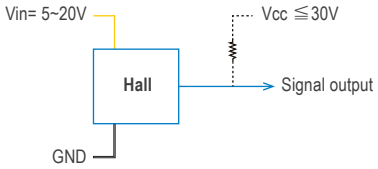
| | Wire color | Definition | Descriptions |
|---|---|---|---|
| **Power wires** | Red | DC power | Connect red wire to “Vdc +” & black wire to “Vdc -“ of DC power to extend the actuator. Switch the polarity of DC input to retract it. |
| | Black | | |

- **With potentiometer (POT) absolute positioning feedback**

| | Wire color | Definition | Descriptions |
|---|---|---|---|
| **Power wires** | Red | DC power | 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. |
| | Black | | |
| **Signal wires** | Yellow | Vin | Input voltage 70V max. |
| | Blue | POT output | 1. Potentiometer specification:<br>- 10K ohm, 10 turns.<br>- Tolerance ±5%<br>2. Output voltage: The voltage (resistance) between Blue and White increases linearly from about 0 when the actuator extends, and decreases when it retracts.<br>  <br>3. There are different resolutions according to the stroke length (as table below) |
| | White | GND | |

| Stroke | Resistance (tolerance: ±0.3KΩ) |
|---|---|
| 50mm | 0.3 ~ 9.3K |
| 100mm | 0.3 ~ 9.7K |
| 150mm | 0.3 ~ 8.6K |
| 200mm | 0.3 ~ 9.6K |
| 250mm | 0.3 ~ 9.3K |
| 300mm | 0.3 ~ 9.3K |

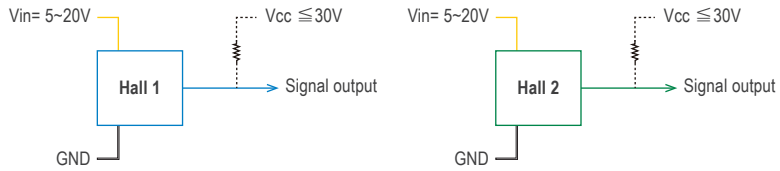
- **With single Hall effect sensor positioning feedback**

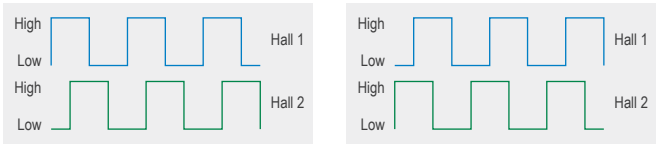
<table>
<tr><th></th><th>Wire color</th><th>Definition</th><th>Descriptions</th></tr>
<tr><td rowspan="2">Power wires</td><td>Red<br>Black</td><td>DC power</td><td>Connect red wire to “Vdc +” & black wire to “Vdc -“ of DC power to extend the actuator. Switch the polarity of DC input to retract it.</td></tr>
<tr><td rowspan="3">Signal wires</td><td>Yellow</td><td>Vin</td><td>Voltage input range: 5 ~ 20V</td></tr>
<tr><td>Blue</td><td>Hall output</td><td>The signal wires output should connect the pull-up resistor to the operating voltage (Vcc) of the system. (10KΩ resistor is recommended)<br>Wiring:<br> 

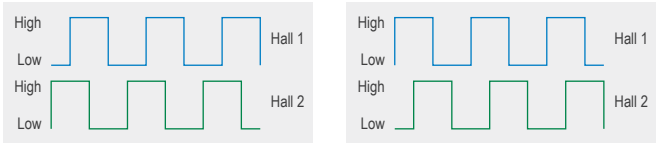
<br>High= Determined by Vcc and the pull-up resistor.<br>Low= GND<br>Hall signal data:<br>

<br>Hall effect sensor resolution:
<table>
<tr><th>Gear ratio</th><th>Resolution (pulses/mm)</th></tr>
<tr><td>5:1</td><td>2.27</td></tr>
<tr><td>10:1</td><td>3.62</td></tr>
<tr><td>20:1</td><td>6.86</td></tr>
<tr><td>30.1</td><td>10.57</td></tr>
<tr><td>40:1</td><td>14.27</td></tr>
</table></td></tr>
<tr><td>White</td><td>GND</td><td></td></tr>
</table>

- **With dual Hall effect sensors positioning feedback**

<table>
<tr><th></th><th>Wire color</th><th>Definition</th><th>Descriptions</th></tr>
<tr><td rowspan="2">Power wires</td><td>Red<br>Black</td><td>DC power</td><td>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.</td></tr>
<tr><td rowspan="4">Signal wires</td><td>Yellow</td><td>Vin</td><td>Voltage input range: 5 ~ 20V</td></tr>
<tr><td>Blue</td><td>Hall 1 output</td><td rowspan="2">The signal wires output should connect the pull-up resistor to the operating voltage (Vcc) of the system. (10KΩ resistor is recommended)<br>Wiring:<br> 

High= Determined by Vcc and the pull-up resistor.<br>Low= GND<br>Hall signal data:<br>- A type<br> 

<br>- B type<br> 

<br>Hall effect sensor resolution:
<table>
<tr><th>Gear ratio</th><th>Resolution (pulses/mm)</th><th>Hall signal data type</th></tr>
<tr><td>5:1</td><td>2.27</td><td>B type</td></tr>
<tr><td>10:1</td><td>3.62</td><td>A type</td></tr>
<tr><td>20:1</td><td>6.86</td><td>A type</td></tr>
<tr><td>30.1</td><td>10.57</td><td>A type</td></tr>
<tr><td>40:1</td><td>14.27</td><td>B type</td></tr>
</table></td></tr>
<tr><td>Green</td><td>Hall 2 output</td></tr>
<tr><td>White</td><td>GND</td><td></td></tr>
</table>

## Ordering Key

### Regular version

**LD3- 24 - 05 - K3 - 150 - 1 1 D 4 0 3**

| | |
|---|---|
| **Input voltage** | **12**: 12V DC<br>**24**: 24V DC |
| **Gear type** | **05**: 5:1<br>**10**: 10:1<br>**20**: 20:1<br>**30**: 30:1<br>**40**: 40:1 |
| **Motor and Spindle type** | **K3**: 6000rpm / 3mm pitch |
| **Stroke** | **050**: 50mm<br>**100**: 100mm<br>**150**: 150mm<br>**200**: 200mm<br>**250**: 250mm<br>**300**: 300mm |
| **Front connector** *(Refer to Page 7)* | **1**: Drilled hole<br>**3**: Spherical rod eye<br>**6**: Plastic slot |
| **Rear connector** *(Refer to Page 7)* | **1**: Zinc alloy clevis, 0°<br>**3**: Zinc alloy clevis, 90° |
| **Positioning feedback** | **0**: Basic, without positioning feedback.<br>**S**: Hall effect sensor x 1<br>**D**: Hall effect sensor x 2<br>**P**: Potentiometer (POT) |
| **IP level** | **4**: IP54 (standard)<br>**5**: IP65 |
| **Reserved** | **0** |
| **Cable length** | **3**: 900mm straight<br>**5**: 1500mm straight<br>**6**: 2000mm straight |

## Medical version

**LD3M- 24 - 05 - K3 - 150 - 1 1 P 4 0 3**

| | |
|---|---|
| **Input voltage** | **24**: 24V DC |
| **Gear type** | **05**: 5:1<br>**10**: 10:1<br>**20**: 20:1<br>**30**: 30:1<br>**40**: 40:1 |
| **Motor and Spindle type** | **K3**: 6000rpm / 3mm pitch |
| **Stroke** | **050**: 50mm<br>**100**: 100mm<br>**150**: 150mm<br>**200**: 200mm<br>**250**: 250mm<br>**300**: 300mm |
| **Front connector** *(Refer to Page 7)* | **1**: Drilled hole<br>**3**: Spherical rod eye<br>**6**: Plastic slot |
| **Rear connector** *(Refer to Page 7)* | **1**: Zinc alloy clevis, 0°<br>**3**: Zinc alloy clevis, 90° |
| **Positioning feedback** | **0**: Basic, without positioning feedback.<br>**P**: Potentiometer (POT) |
| **IP level** | **4**: IP54 (standard)<br>**5**: IP65 |
| **Reserved** | **0** |
| **Cable length** | **3**: 900mm straight<br>**5**: 1500mm straight<br>**6**: 2000mm straight |

**Quiet version**

**LD3Q- 24 - 20 - D3 - 150 - 1 1 D 4 0 3**

| | |
|---|---|
| **Input voltage** | **12**: 12V DC<br>**24**: 24V DC |
| **Gear type** | **20**: 20:1<br>**30**: 30:1 |
| **Motor and Spindle type** | **D3**: 2400rpm / 3mm pitch |
| **Stroke** | **050**: 50mm<br>**100**: 100mm<br>**150**: 150mm<br>**200**: 200mm<br>**250**: 250mm<br>**300**: 300mm |
| **Front connector** *(Refer to Page 7)* | **1**: Drilled hole<br>**3**: Spherical rod eye<br>**6**: Plastic slot |
| **Rear connector** *(Refer to Page 7)* | **1**: Zinc alloy clevis, 0°<br>**3**: Zinc alloy clevis, 90° |
| **Positioning feedback** | **0**: Basic, without positioning feedback.<br>**S**: Hall effect sensor x 1<br>**D**: Hall effect sensor x 2<br>**P**: Potentiometer (POT) |
| **IP level** | **4**: IP54 (standard)<br>**5**: IP65 |
| **Reserved** | **0** |
| **Cable length** | **3**: 900mm straight<br>**5**: 1500mm straight<br>**6**: 2000mm straight |

## Certifications

### Regular version

LD3 actuator is compliant with the following regulations, in terms of the essential conformity requirements of EMC Directive of 2014/30/EU.

| Emission | Immunity |
|---|---|
| EN55014-1:2017+A11:2020 | EN 55014-2:2015 |



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