**Miniature Electric Cylinder**

**Ball Screw type Linear Actuator (Captive and Non-Captive type)**

Compact Cylinder with 2-phase Hollow Stepping Motor integrated with Ball Screw or Ball Screw with Ball Spline (BSSP).

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### Features

- The new Cylinder type Actuator comes with 2 Motor sizes, NEMA11 & NEMA17. AR type with anti-rotating device or CL type without anti-rotating device can be selected in each Motor size as standard.
- Variety of Shaft diameter & Lead combination allows wider selection of Accuracy and Thrust Force.

### Types

- **AR Cylinder (Captive type)**
  - KSS miniature Ball Screw with Ball Spline (BSSP) is used for an anti-rotating device.

- **CL Cylinder (Non-Captive type)**
  - Simple combination of the Hollow Motor and the Ball Screw contributes to lightweight and compact body.

### Variation

<table>
<thead>
<tr>
<th>Drive Screw</th>
<th>Notation</th>
<th>28 (NEMA11)</th>
<th>42 (NEMA17)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lead</td>
<td>Travel</td>
</tr>
<tr>
<td>AR type (Captive)</td>
<td>G</td>
<td>1,2</td>
<td>40</td>
</tr>
<tr>
<td>Precision Ball Screw</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision Ball Screw</td>
<td>G</td>
<td>1,2</td>
<td>40,80</td>
</tr>
<tr>
<td>Rolled Ball Screw</td>
<td>R</td>
<td>1,2</td>
<td>40,80</td>
</tr>
<tr>
<td>Resin Lead Screw</td>
<td>Re</td>
<td>2,6</td>
<td>40,80</td>
</tr>
</tbody>
</table>

**Note:** If the Lead other than the above is required, please ask KSS representative.

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### Model number notation

<table>
<thead>
<tr>
<th>DDA</th>
<th>AR</th>
<th>42</th>
<th>G</th>
<th>05</th>
<th>050</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

**Series No.**

- DDA : Direct Drive Actuator Series
- AR : Captive type (with anti-rotating device)
- CL : Non-Captive type (without anti-rotating device)

**Motor size**

- 42 : 28 Stepping Motor (NEMA17)
- 28 : 28 Stepping Motor (NEMA11)

**Lead / Pitch (mm) :**

- 05 means 5mm

**Travel (mm) :**

- 050 means 50mm

**Connector type**

- N : No connector (Bare)
- E : EI connector (Tyco Electronics)
**Standard products**
AR Series (Captive type)

### DDAAR28-G01 040
- **Motor Specifications**
  - Driving method: 2-phase Bi-polar
  - Rated Voltage: 3.8V (DC)
  - Rated current: 0.67A/phase
  - Winding resistance: 5.6Ω
  - Insulation Class: Class B (130℃)

### DDAAR28-G02 040
- **Motor Specifications**
  - Driving method: 2-phase Bi-polar
  - Rated Voltage: 3.8V (DC)
  - Rated current: 0.67A/phase
  - Winding resistance: 5.6Ω
  - Insulation Class: Class B (130℃)

### Specifications
- **Motor Frame Size**: 28 (NEMA11)
- **Drive Screw type**: Precision Ball Screw
- **Screw Lead**: 1mm
- **Travel**: 40mm
- **Repeatability**: ±0.005mm
- **Lost Motion**: 0.010mm
- **Maximum Speed**: 20mm/sec
- **Acceleration & Deceleration time**: Min. 0.2sec
- **Thrust Force**: 50N
- **Mass**: 270g
- **Operating Temperature**: 0~40℃ (No Condensation)

### Precautions
- Radial load is not able to apply on AR type (Captive type).
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not built in this standard design. Please ask KSS if necessary.
### Specifications

<table>
<thead>
<tr>
<th>Motor Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Frame Size</strong></td>
</tr>
<tr>
<td><strong>Drive Screw type</strong></td>
</tr>
<tr>
<td><strong>Screw Lead</strong></td>
</tr>
<tr>
<td><strong>Travel</strong></td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
</tr>
<tr>
<td><strong>Lost Motion</strong></td>
</tr>
<tr>
<td><strong>Maximum Speed</strong></td>
</tr>
<tr>
<td><strong>Acceleration &amp; Deceleration time</strong></td>
</tr>
<tr>
<td><strong>Thrust Force</strong></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
</tr>
</tbody>
</table>

### Motor Specifications

<table>
<thead>
<tr>
<th>Driving method</th>
<th>2-phase Bi-polar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>2.5V (DC)</td>
</tr>
<tr>
<td>Rated current</td>
<td>1.2A/phase</td>
</tr>
<tr>
<td>Winding resistance</td>
<td>2.1Ω</td>
</tr>
<tr>
<td>Insulation Class</td>
<td>Class B (130°C)</td>
</tr>
</tbody>
</table>

### Precautions

- Radial load is not able to apply on AR type (Captive type).
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not built in this standard design. Please ask KSS if necessary.
Standard products
CL Series (Non-Captive type)

**DDACL28-G01 040/080**
Lead: 1mm
Travel: 40/80mm

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Motor Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Frame Size</td>
<td>28 (NEMA11)</td>
</tr>
<tr>
<td>Drive Screw type</td>
<td>Precision Ball Screw</td>
</tr>
<tr>
<td>Screw Lead</td>
<td>1mm</td>
</tr>
<tr>
<td>Travel</td>
<td>40mm / 80mm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.005mm</td>
</tr>
<tr>
<td>Lost Motion</td>
<td>0.010mm</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>20mm/sec</td>
</tr>
<tr>
<td>Acceleration &amp; Deceleration time</td>
<td>Min. 0.2sec</td>
</tr>
<tr>
<td>Thrust Force</td>
<td>50N</td>
</tr>
<tr>
<td>Mass</td>
<td>Travel 40mm: 230g, Travel 80mm: 265g</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0~40°C (No Condensation)</td>
</tr>
</tbody>
</table>

**Motor Specifications**
- Driving method: 2-phase Bi-polar
- Rated Voltage: 3.8V (DC)
- Rated current: 0.67A/phase
- Winding resistance: 5.6Ω
- Insulation Class: Class B (130°C)

Precautions
- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not included in this standard design. Please ask KSS if necessary.

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Standard products
CL Series (Non-Captive type)

**DDACL28-G02 040/080**
Lead: 2mm
Travel: 40/80mm

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Motor Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Frame Size</td>
<td>28 (NEMA11)</td>
</tr>
<tr>
<td>Drive Screw type</td>
<td>Precision Ball Screw</td>
</tr>
<tr>
<td>Screw Lead</td>
<td>2mm</td>
</tr>
<tr>
<td>Travel</td>
<td>40mm / 80mm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.005mm</td>
</tr>
<tr>
<td>Lost Motion</td>
<td>0.010mm</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>40mm/sec</td>
</tr>
<tr>
<td>Acceleration &amp; Deceleration time</td>
<td>Min. 0.2sec</td>
</tr>
<tr>
<td>Thrust Force</td>
<td>25N</td>
</tr>
<tr>
<td>Mass</td>
<td>Travel 40mm: 230g, Travel 80mm: 265g</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0~40°C (No Condensation)</td>
</tr>
</tbody>
</table>

**Motor Specifications**
- Driving method: 2-phase Bi-polar
- Rated Voltage: 3.8V (DC)
- Rated current: 0.67A/phase
- Winding resistance: 5.6Ω
- Insulation Class: Class B (130°C)

Precautions
- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not included in this standard design. Please ask KSS if necessary.
DDACL28-R01 040/080  
Lead : 1mm  
Travel : 40/80mm

DDACL28-R02 040/080  
Lead : 2mm  
Travel : 40/80mm

Specifications
- Motor Frame Size: 28 (NEMA11)
- Drive Screw type: Rolled Ball Screw
- Screw Lead: 1mm
- Travel: 40mm / 80mm
- Repeatability: ±0.010mm
- Lost Motion: 0.020mm
- Maximum Speed: 20mm/sec
- Acceleration & Deceleration time: Min. 0.2sec
- Thrust Force: 50N
- Mass: Travel 40mm : 230g  
  Travel 80mm : 260g
- Operating Temperature: 0~40C (No Condensation)

Motor Specifications
- Driving method: 2-phase Bi-polar
- Rated Voltage: 3.8V (DC)
- Rated current: 0.67A/phase
- Winding resistance: 5.6Ω
- Insulation Class: Class B (130°C)

Precautions
- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not built in this standard design.
  Please ask KSS if necessary.
**Standard products**
**CL Series (Non-Captive type)**

**DDACL28-Re02 040/080**
Lead : 2mm  
Travel : 40/80mm

**DDACL28-Re06 040/080**
Lead : 6mm  
Travel : 40/80mm

### Specifications

<table>
<thead>
<tr>
<th>Motor Frame Size</th>
<th>28 (NEMA11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Screw type</td>
<td>Resin Lead Screw</td>
</tr>
<tr>
<td>Screw Lead</td>
<td>2mm</td>
</tr>
<tr>
<td>Travel</td>
<td>40mm / 80mm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.030mm</td>
</tr>
<tr>
<td>Lost Motion</td>
<td>0.060mm</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>20mm/sec</td>
</tr>
<tr>
<td>Acceleration &amp; Deceleration time</td>
<td>Min. 0.4sec</td>
</tr>
<tr>
<td>Thrust Force</td>
<td>10N</td>
</tr>
</tbody>
</table>
| Mass             | Travel 40mm : 210g  
                  | Travel 80mm : 220g |
| Operating Temperature | 0~40°C (No Condensation) |

### Motor Specifications

<table>
<thead>
<tr>
<th>Driving method</th>
<th>2-phase Bi-polar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>3.8V (DC)</td>
</tr>
<tr>
<td>Rated current</td>
<td>0.67A/phase</td>
</tr>
<tr>
<td>Winding resistance</td>
<td>5.6Ω</td>
</tr>
<tr>
<td>Insulation Class</td>
<td>Class B (130°C)</td>
</tr>
</tbody>
</table>

### Precautions

- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Specifications above are reference value measured in vertical position at virgin condition.
- Sensor is not built in this standard design.
- Please ask KSS if necessary.
**Miniature Electric Cylinder**

### Specifications

**Motor Frame Size**: 42 (NEMA17)

**Drive Screw type**: Precision Ball Screw

**Rated Voltage**: 2.5V (DC)

**Rated Current**: 1.2A/phase

**Winding Resistance**: 2.1Ω

**Insulation Class**: Class B (130°C)

**Acceleration & Deceleration time**: Min. 0.2sec

**Thrust Force**: 80N

**Mass**: Travel 50mm: 530g, Travel 100mm: 550g

**Operating Temperature**: 0~40°C (No Condensation)

**Precautions**

- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Sensor is not built in this standard design.
- Specifications above are reference value measured in vertical position at virgin condition.
- Please ask KSS if necessary.

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**Motor Lead wire**: 310mm

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**Motor Specifications**

**Driving method**: 2-phase Bi-polar

**Rated Voltage**: 2.5V (DC)

**Rated Current**: 1.2A/phase

**Winding Resistance**: 2.1Ω

**Insulation Class**: Class B (130°C)

**Acceleration & Deceleration time**: Min. 0.2sec

**Thrust Force**: 80N

**Mass**: Travel 50mm: 530g, Travel 100mm: 550g

**Operating Temperature**: 0~40°C (No Condensation)

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**Precautions**

- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Sensor is not built in this standard design.
- Specifications above are reference value measured in vertical position at virgin condition.
- Please ask KSS if necessary.
**Standard products**  
**CL Series (Non-Captive type)**

**DDACL42-R02 050/100**  
**Lead : 2mm**  
**Travel : 50/100mm**

**Specifications**
- **Motor Frame Size:** 32 (NEMA 17)
- **Drive Screw type:** Rolled Ball Screw
- **Screw Lead:** 2mm
- **Travel:** 50mm / 100mm
- **Repeatability:** ±0.010mm
- **Lost Motion:** 0.020mm
- **Maximum Speed:** 40mm/sec
- **Acceleration & Deceleration time:** Min. 0.2sec
- **Thrust Force:** 80N
- **Mass:** Travel 50mm : 330g  
  Travel 100mm : 350g
- **Operating Temperature:** 0~40°C (No Condensation)

**Motor Specifications**
- **Driving method:** 2-phase Bi-polar
- **Rated Voltage:** 2.5V (DC)
- **Rated current:** 1.2A/phase
- **Winding resistance:** 2.1Ω
- **Insulation Class:** Class B (130°C)

**Precautions**
- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when using.
- Sensor is not built in this standard design. Please ask KSS if necessary.

**Standard products**  
**CL Series (Non-Captive type)**

**DDACL42-R05 050/100**  
**Lead : 5mm**  
**Travel : 50/100mm**

**Specifications**
- **Motor Frame Size:** 32 (NEMA 17)
- **Drive Screw type:** Rolled Ball Screw
- **Screw Lead:** 5mm
- **Travel:** 50mm / 100mm
- **Repeatability:** ±0.010mm
- **Lost Motion:** 0.020mm
- **Maximum Speed:** 100mm/sec
- **Acceleration & Deceleration time:** Min. 0.2sec
- **Thrust Force:** 30N
- **Mass:** Travel 50mm : 330g  
  Travel 100mm : 350g
- **Operating Temperature:** 0~40°C (No Condensation)

**Motor Specifications**
- **Driving method:** 2-phase Bi-polar
- **Rated Voltage:** 2.5V (DC)
- **Rated current:** 1.2A/phase
- **Winding resistance:** 2.1Ω
- **Insulation Class:** Class B (130°C)

**Precautions**
- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when using.
- Sensor is not built in this standard design. Please ask KSS if necessary.
Miniature Electric Cylinder

**Specifications**

**Motor Specifications**

- **Driving method**: 2-phase Bi-polar
- **Rated Voltage**: 2.5V (DC)
- **Rated current**: 1.2A/phase
- **Winding resistance**: 2.1Ω
- **Insulation Class**: Class B (130°C)

**Motor Frame Size**: 42 (NEMA17)

**Drive Screw type**: Resin Lead Screw

**Screw Lead**: 2mm

**Travel**: 50mm / 100mm

**Repeatability**: ±0.030mm

**Lost Motion**: 0.060mm

**Maximum Speed**: 20mm/sec

**Acceleration & Deceleration time**: Min. 0.4sec

**Thrust Force**: 20N

**Mass**: Travel 50mm: 490g, Travel 100mm: 510g

**Operating Temperature**: 0~40°C (No Condensation)

**Precautions**

- CL type (Non-Captive type) does not have an anti-rotating device.
- External anti-rotating device should be set up when usage.
- Sensor is not built in this standard design.
- Specifications above are reference value measured in vertical position at virgin condition.
- Please ask KSS if necessary.
KSS provides Standard Stepping Motor Driver and Extension Cable for Linear Actuator (AR/CL Cylinder) in order to make it easy to use.

**[Stepping Motor Driver]**
SD4030B2

This is recommended Driver for 2-phase stepping Motor. It has Micro-Step function with 8-step angle. (page V108)

**[Extension Cable]**
Extension Cable between KSS Linear Actuator (AR/CL Cylinder) and KSS recommended Stepping Motor Driver. Please designate Cable length and Connector type in accordance with the example below.

Please note that one side of Extension Cable is cut end only (no connector).

**[Option]**

- KSS provides Standard Stepping Motor Driver and Extension Cable for Linear Actuator (AR/CL Cylinder) in order to make it easy to use.
- The factory setting of SD4030B2 is 2A.
- Please be sure to perform a current setup of Driver based on Motor Rated current before use.
- Please confirm with the operation manual attached to a Driver about current setup.

**EC**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>2</td>
<td>E(4)</td>
<td></td>
</tr>
</tbody>
</table>

- Extension Cable
- Cable type
- R : Robot Cable
- Cable length (m)
- Connector type
- N : No connector (Cut only)
- E(4) : EI connector 4-pins

*Note*: EI connector by Tyco Electronics

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**[Connection Diagram]**

Motor cable 172211-4 (male)
Motor Extension cable 171822-4 (female)

Motor cable 172211-4 (male)
Motor Extension cable 171822-4 (female)