Thin Gripper RCP6-GRT7

Equipped with a Battery-less Absolute Encoder

www.intelligentactuator.com
Gripper First!
New Type Equipped with Battery-less Absolute Encoder!!
Flat shape, thin size with height of 39 mm achieved.

---

**Equipped with a Battery-less Absolute Encoder as Standard**

With orthogonal axis + gripper pick and place, all axes can be configured with battery-less absolute encoder equipped products. Home return is no longer required when restarting the equipment; you can move to the next operation while gripping the workpiece.

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**Flat Shape with Height of 39 mm**

The height has been reduced.

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**High Rigidity**

By adopting an integrated body frame guide with proven performance for linear axes, the gripping point distance and overhang amount have been improved greatly.

---

**High Grip Force**

IAI presents our highest-class grip force. (Current limit value 70%)
Improved Mounting Freedom

4-side mounting (including mounting on the finger operation surface), wiring exit direction and surface can be changed. Select the mounting/wiring position according to the equipment.

Advantage 5

Inexpensive

Compared with our products with equivalent stroke, it is 39% cheaper.

Model Specification Items

RCP6 - WA - 28P -

Series Type Encoder Type Motor Size Deceleration Ratio Pattern Stroke Applicable Controllers Cable Length Options

GRT7A GRT7B

WA Battery-less Absolute

Feed screw lead 1.5mm Pulley deceleration ratio 1.5 (GRT7A)

Feed screw lead 2mm Pulley deceleration ratio 1.25 (GRT7B)

Feed screw lead 2mm Pulley deceleration ratio 2.5 (GRT7B)

P3 PCON-CB/CGB PCON-CYB/PLB/POB MCON-C/CG/LC/LCG M5EL-PC/PG RCM-P6PC

P5

N None P 1m S 3m M 5m

30 30mm (15mm on one side) 40 40mm (20mm on one side) 80 80mm (40mm on one side)

X Specified length □ Robot cable

Conventional model

RCP2-GRST(40ST)

New

About 39% reduction

RCP6-GRT7B(40ST)
RCP6 GRT7A

Model Specification Items

**ROBO Cylinder®**

### RCP6-GRT7A-WA 28P 1 30

**Cable Code**

- **WA**: Battery-less
- **28P**: Stepper Motor
- **1**: Fixed Screw Lead 1.5mm
- **30**: Stroke 30mm

**Applicable Controllers**

- **P: PCON**
- **M: MCON**
- **MSEL**
- **P5: RCM-P6PC**

**Cable Length**

- **WA**: Battery-less
- **P: 1m**
- **S: 3m**
- **M: 5m**
- **X: 28**: Specified Length

Please refer to the option price list below.

Be sure to select a symbol for the cable exit direction.

#### Side Cable Exit

- **Option Code**: CJBS
- **Side**: Left side

- **Option Code**: CJRS
- **Side**: Right side

- **Option Code**: CJBB
- **Side**: Back

#### Rear Cable Exit

- **Option Code**: CJTB
- **Side**: Left side

- **Option Code**: CJKB
- **Side**: Right side

- **Option Code**: CKJB
- **Side**: Back

#### Actuator Specifications

- **Type**: 2-Finger Gripper
- **Thin Slide Type**: 66 mm
- **Stepper Motor**: 24v

**Legend**

- **Applicable Controllers**: [ ]
- **Cable Length**: [ ]
- **Options**: [ ]

### Stroke and Max Opening/Closing Speed

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>RCP6-GRT7A</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

#### Stroke

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>Deceleration ratio</th>
<th>Max grip force (N)</th>
<th>Stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1</td>
<td>120 (one side 60)</td>
<td>30 (one side 15)</td>
</tr>
</tbody>
</table>

#### Options

<table>
<thead>
<tr>
<th>Name</th>
<th>Option code</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator’s pigtail cable 1m specification</td>
<td>AC1</td>
<td>P 8</td>
</tr>
<tr>
<td>Actuator’s pigtail cable 2m specification</td>
<td>AC2</td>
<td>P 8</td>
</tr>
<tr>
<td>Actuator’s pigtail cable 3m specification</td>
<td>AC3</td>
<td>P 8</td>
</tr>
<tr>
<td>Rear cable exit from top</td>
<td>CJKB</td>
<td>P 8</td>
</tr>
<tr>
<td>Rear cable exit from bottom</td>
<td>CJKB</td>
<td>P 8</td>
</tr>
<tr>
<td>Side cable exit from top</td>
<td>CJTS</td>
<td>P 8</td>
</tr>
<tr>
<td>Side cable exit from left side</td>
<td>CJKS</td>
<td>P 8</td>
</tr>
<tr>
<td>Side cable exit from right side</td>
<td>CJKB</td>
<td>P 8</td>
</tr>
<tr>
<td>Non-motor end specification</td>
<td>NM</td>
<td>P 8</td>
</tr>
</tbody>
</table>

#### Actuator Specifications

**Type**: Cable code

<table>
<thead>
<tr>
<th>Type</th>
<th>Cable code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1m</td>
<td>RC1</td>
</tr>
<tr>
<td>S3m</td>
<td>RC2</td>
</tr>
<tr>
<td>M5m</td>
<td>RC3</td>
</tr>
</tbody>
</table>

**Specified length**

- **X06**: 6mm
- **X11**: 11mm
- **X16**: 16mm

**Robot cable**

- **R01**: 1m
- **R04**: 4m
- **R06**: 6m
- **R11**: 11m
- **R15**: 15m
- **R20**: 20m

**Drive system**

- **Timing belt + left/right trapezoidal screw 48**

**Positioning repeatability**

- ±0.01mm

**Backlash**

- One side 0.2mm or less

**Lost motion**

- One side 0.2mm or less

**Allowable static moment**

- Ma: 3.6N·m, Mb: 3.6N·m, Mc: 10.2N·m

**Mass**

- 0.46kg

**Ambient operating temperature/humidity**

- 0~40°C, 85% RH or less (non-condensing)
Dimensions

CAD drawings can be downloaded from our website.
www.intelligentactuator.com

* The open side of the finger is at home position.
* To prevent intrusion of foreign matter, it is plugged with a set screw.
Remove when using it as a mounting surface.

<table>
<thead>
<tr>
<th>Applicable Controllers</th>
</tr>
</thead>
</table>

The RCP6 series actuators can be operated by the controllers indicated below. Please select the type depending on your intended use.

<table>
<thead>
<tr>
<th>Name</th>
<th>External view</th>
<th>Max. number of connectable axes</th>
<th>Power supply voltage</th>
<th>Control method</th>
<th>Maximum number of positioning points</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCON-CYB/PLB/POB</td>
<td>1</td>
<td>1</td>
<td>24VDC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>PCON-CB/GB</td>
<td>1</td>
<td>1</td>
<td>24VDC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>MCON-C/CG</td>
<td>8</td>
<td>8</td>
<td>100~230VAC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>MCON-LC/CG</td>
<td>6</td>
<td>6</td>
<td>100~230VAC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>MSEL-PC/PG</td>
<td>4</td>
<td>4</td>
<td>100~230VAC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>RCM-P6PC</td>
<td>1</td>
<td>1</td>
<td>100~230VAC</td>
<td>1Positioner 1Pulse-train 1Program 1Network 1selection 1</td>
<td>Network cannot be selected 64</td>
<td>Contact IAI</td>
</tr>
</tbody>
</table>
**RCP6-GRT7B**

### Model Specification Items

- **Series**
  - RCP6-GRT7B
- **Type**
  - WA
- **Encoder Type**
  - 28P
- **Motor Type**
  - Stepper Motor
- **Deceleration Ratio Pattern**
  - 1: Feed Screw Lead 2mm & Half Deceleration Rate 1/2
  - 2: Feed Screw Lead 2mm & Valley Deceleration Rate 1/2
- **Stroke**
  - 40-40mm
  - 80-80mm
- **Applicable Controllers**
  - P: PCON
  - M: MCON
  - N: Name
  - MSEL: MSEL
  - P5: RCM-P6PC

### Options

- **Name**
  - Actuator’s pigtail cable 1m specification: AC1
  - Actuator’s pigtail cable 2m specification: AC2
  - Actuator’s pigtail cable 3m specification: AC3
  - Rear cable exit from top: CJTB
  - Rear cable exit from left side: CJLB
  - Rear cable exit from right side: CJRB
  - Side cable exit from top: CJTS
  - Side cable exit from left side: CJLS
  - Side cable exit from right side: CJRS
  - Side cable exit from bottom: CJBS
  - Non-motor end specification: NM

### Notes

1. The maximum opening/closing speed indicates the operating speed on one side. The relative operating speed is twice this value.
2. The maximum gripping force is the sum of the gripping forces of both fingers, at a gripping point where there is no offset or overhang distance. The workpiece weight that can be actually moved depends on the friction coefficient between the gripper fingers and the workpiece, as well as on the shape of the workpiece. As a rough guide, a workpiece’s weight should not exceed 1/10 to 1/20 of the gripping force. (See page 9 for details.)
3. The rated acceleration while moving is 0.3 G.

---

**Actuator Specifications**

<table>
<thead>
<tr>
<th>Model specification items</th>
<th>Deceleration ratio pattern</th>
<th>Max grip force (N)</th>
<th>Stroke (mm)</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP6-GRT7B-WA-28P-1</td>
<td>1</td>
<td>150 (one side 75)</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>RCP6-GRT7B-WA-28P-2</td>
<td>2</td>
<td>300 (one side 150)</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Legend: 1 Stroke   2 Applicable Controllers   3 Cable Length   4 Options

**Stroke**

1. **Stroke (mm)**
   - 40
   - 80

**Options**

- **Name**
  - Actuator’s pigtail cable 1m specification: AC1
  - Actuator’s pigtail cable 2m specification: AC2
  - Actuator’s pigtail cable 3m specification: AC3
  - Rear cable exit from top: CJTB
  - Rear cable exit from left side: CJLB
  - Rear cable exit from right side: CJRB
  - Side cable exit from top: CJTS
  - Side cable exit from left side: CJLS
  - Side cable exit from right side: CJRS
  - Side cable exit from bottom: CJBS
  - Non-motor end specification: NM

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**Gripping Force vs. Electric Current Limit**

The gripping (pushing) force can be adjusted freely within the range of electric current limits of 20% to 70%.

* For L1 and L2, please refer to the gripper selection method on P.9.
* The gripping force in the graph below assumes that L1 and L2 are zero. (Refer to P.10 for the rough guide gripping force at each distance of L1.) Also note that the gripping force is the sum of the gripping forces of both fingers.

---

**Stroke and Max Opening/Closing Speed**

<table>
<thead>
<tr>
<th>Stroke (mm)</th>
<th>Deceleration ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>2</td>
</tr>
</tbody>
</table>

(Unit mm/s)

---

**Cable Length**

- **Type**
  - Standard type: P(1m)
  - S(3m)
  - M(5m)
- **Specified length**
  - X06 (6m) ~ X10 (10m)
  - X11 (11m) ~ X15 (15m)
  - X16 (16m) ~ X20 (20m)*
  - R01 (1m) ~ R03 (3m)
  - R04 (4m) ~ R05 (5m)
  - R06 (6m) ~ R10 (10m)
  - R11 (11m) ~ R15 (15m)
  - R16 (16m) ~ R20 (20m)*

- **Robot cable**
  - X: Specified length

---

**Options**

- **Name**
  - Drive system: Timing belt + left/right trapezoidal screw ø10
  - Positioning repeatability: ±0.01mm
  - Backlash: One side 0.2mm or less
  - Limit motion: One side 0.2mm or less
  - Allowable static moment: Ma: 7.5N.m Mb: 7.5N.m Mc: 15.3N.m
  - Mass: 0.68kg (40 stroke), 0.84kg (80 stroke)
  - Ambient operating temperature/humidity: 0~40°C, 85% RH or less (non-condensing)

---

* Be sure to select a symbol for the cable exit direction.
### Dimensions

* The open side of the finger is at home position.
* To prevent intrusion of foreign matter, it is plugged with a set screw. Remove when using it as a mounting surface.

---

#### Applicable Controllers

The RCP6 series actuators can be operated by the controllers indicated below. Please select the type depending on your intended use.

<table>
<thead>
<tr>
<th>Name</th>
<th>External view</th>
<th>Standard interface/joint axis</th>
<th>Power supply voltage</th>
<th>Positioner</th>
<th>Pulse train</th>
<th>Control method</th>
<th>Maximum number of positioning points</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCON-CYB/PLB/POB</td>
<td>1</td>
<td></td>
<td>24VDC</td>
<td>* Selection</td>
<td>* Selection</td>
<td>Program</td>
<td>64</td>
<td>512 (768 for network spec.)</td>
</tr>
<tr>
<td>PCON-CB/CGB</td>
<td>1</td>
<td></td>
<td></td>
<td>* Selection</td>
<td>* Selection</td>
<td>−</td>
<td>512 (768 for network spec.)</td>
<td>Contact IAI</td>
</tr>
<tr>
<td>MCON-C/CG</td>
<td>8</td>
<td></td>
<td>200VDC</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>MCON-LC/LCG</td>
<td>6</td>
<td></td>
<td>200VDC</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>30000</td>
<td>30000</td>
</tr>
<tr>
<td>MSEL-PC/PG</td>
<td>4</td>
<td></td>
<td>200VDC</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>768</td>
<td>Refer to the RCP6 catalog (CJ0238-3A)</td>
</tr>
<tr>
<td>RCM-P6PC</td>
<td>1</td>
<td></td>
<td>200VDC</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>768</td>
<td>768</td>
</tr>
</tbody>
</table>

Note: The type of compatible networks will vary depending on the controller. Please refer to reference page for more information.
### Applicable Controllers

The RCP6 series actuators can be operated by the controllers indicated below. Please select the type depending on your intended use.

<table>
<thead>
<tr>
<th>Name</th>
<th>External view</th>
<th>Max. number of connectable axes</th>
<th>Power supply voltage</th>
<th>Control method</th>
<th>Maximum number of positioning points</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCON-CYB/PLB/POB</td>
<td>1</td>
<td>1</td>
<td>24VDC</td>
<td>Positioner</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>PCON-CB/CGB</td>
<td>1</td>
<td>1</td>
<td>24VDC</td>
<td>Positioner</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>MCON-C/CG</td>
<td>8</td>
<td>8</td>
<td>100~230VAC</td>
<td>Positioner</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>MCON-LC/LCG</td>
<td>6</td>
<td>6</td>
<td>100~230VAC</td>
<td>Positioner</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>MSEL-PC/PG</td>
<td>4</td>
<td>4</td>
<td>Single phase 100~230VAC</td>
<td>Positioner</td>
<td>30000</td>
<td>30000</td>
</tr>
<tr>
<td>RCM-P6PC</td>
<td>1</td>
<td>1</td>
<td>100~230VAC</td>
<td>Positioner</td>
<td>768</td>
<td>768</td>
</tr>
</tbody>
</table>

*Note:* The type of compatible networks will vary depending on the controller. Please refer to reference page for more information.

### Dimensions

- **80 stroke**

*The open side of the finger is at home position.*

*1 To prevent intrusion of foreign matter, it is plugged with a set screw. Remove when using it as a mounting surface.*
### Actuator's pigtail cable

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1/AC2/AC3</td>
<td>Although the standard length of the Actuator's pigtail cable is 200mm, it can be changed to 1000/2000/3000mm as an option.</td>
</tr>
</tbody>
</table>

### Cable exit direction

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJTB/CJLB/CJRB/CJBB/CJTS/CJLS/CJRS/CJBS</td>
<td>The mounting direction of the Actuator's pigtail cable can be changed to top, bottom, left, or right.</td>
</tr>
</tbody>
</table>

### Non-motor end specification

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>The home position is set to the finger open side. If you want to set the home position on the opposite end due to the layout of your system, etc., you can do so by selecting this option. (Since your actuator has been shipped with its home position pre-adjusted at the factory, you must send the actuator back to us for adjustment to change the home direction after delivery.)</td>
</tr>
</tbody>
</table>
**Gripper Selection Method**

### Step 1
Check the required grip force and allowable workpiece mass

When gripping the workpiece with frictional grip force, calculate the required grip force as follows.

**(1) For normal transfer**

- **F**: Grip force (N), total value of push force of each claw
- **μ**: Static friction coefficient between the finger attachment and the workpiece
- **m**: Workpiece mass (kg)
- **g**: Gravitational acceleration (≈9.8 m/s²)

\[ F > \frac{W}{\mu} \]

\[ F > \frac{mg}{\mu} \]

- The conditions under which the work part remains statically gripped without dropping are as follows:

\[ F > \mu W \]

\[ F > \frac{mg}{\mu} \]

- Assuming a recommended safety factor of 2 for normal transfer, the required gripping force is calculated as follows:

\[ F > \frac{mg}{\mu} \times 2 \]

- When the friction coefficient is \( \mu = 0.1 \sim 0.2 \)

\[ F > \frac{mg}{0.1 \sim 0.2} \times 2 = (10 \sim 20) \times mg \]

**For ordinary workpiece transferring**

- Required grip force: \( 10 \sim 20 \) times or more the workpiece mass
- Max. allowable mass: Not more than 1/10th to 1/20th the gripping force

**(2) When considerable acceleration, deceleration, or impact force is applied when transferring the workpiece**

In addition to gravity, if a stronger inertial force operates on the workpiece then select a model with an even higher safety factor.

- **When large acceleration, deceleration, or shock is applied**

\[ F > \frac{mg}{\mu} \times 20 \]

- Required grip force: \( 30 \sim 50 \) times or more the workpiece mass
- Max. allowable mass: 1/30 \sim 1/50 or less of the grip force

### Step 2
Check the gripping point distance

Use the actuator so that the distances (L1, L2) from the finger mounting surface to the gripping point fall in the ranges specified below. If the limits are exceeded, excessive moments may act upon the sliding part of the finger and internal mechanism, negatively affecting the service life of the actuator.

**RCP6-GRT7A**

- Deceleration ratio 1

**RCP6-GRT7B (Deceleration ratio: 1)**

- Deceleration ratio 2

**RCP6-GRT7B (Deceleration ratio: 2)**

Even if the gripping point distance is within the limit range, keep it as small and lightweight as possible.

- If the fingers are long and large, or if the mass is large, inertial force and bending moment during opening and closing may worsen the performance and adversely affect the guide section.

---

*The greater the coefficient of static friction, the greater the maximum allowable work mass becomes. To ensure safety, however, select a model that can generate a gripping force of at least 10 to 20 times this work part mass.*
Gripper Selection Method

**Step 3** Check external force applied to fingers

(1) **Allowable vertical load**
Make sure that the vertical load applied to each finger is less than the allowable load.

(2) **Allowable load moment**
Calculate \( M_a \) and \( M_b \) with \( L_1 \), and \( M_c \) with \( L_2 \). Make sure the moment applied to each finger is less than the maximum allowable load moment.

\[
\text{Allowable load } F(N) > \frac{M\text{ (Maximum allowable moment (N·m))}}{L(\text{mm})\times10^{3}}
\]

Calculate both \( L_1 \) and \( L_2 \) for the allowable load \( F(N) \).
Check that the external force applied to the finger is less than the calculated allowable load \( F(N) \) (the smaller value of \( L_1 \) and \( L_2 \)).

<table>
<thead>
<tr>
<th>Model</th>
<th>Allowable vertical load ( F(N) ) (Note 1)</th>
<th>Maximum allowable load moment ( M\text{ (N·m)} ) (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( M_a ) ( M_b ) ( M_c )</td>
</tr>
<tr>
<td>RCP6-GRT7A</td>
<td>598</td>
<td>3.6 \quad 3.6 \quad 10.2</td>
</tr>
<tr>
<td>RCP6-GRT7B</td>
<td>898</td>
<td>7.5 \quad 7.5 \quad 15.3</td>
</tr>
</tbody>
</table>

(Note 1) The allowable value above indicates a static value. (Note 2) Indicates the allowable value per finger.

* The weight of the finger and the workpiece weight are also part of the external force. Other external forces applied to the fingers are the centrifugal force when swiveling the gripper with the workpiece gripped and the inertia force due to acceleration/deceleration during travel.

Guideline for load shape and mass

1. These graphs show the grip force based on the gripping point distance when the maximum grip force is taken as 100%.
2. The gripping point distance indicates the vertical distance from the finger attachment mounting surface to the gripping point.
3. Grip force may vary due to individual differences. Consider this as a guideline only.

![Graphs showing change in grip force due to gripping point distance](image)