IAI
Quality and Innovation

Introduction to ROBO Cylinder

ROBO CYLINDER

Stainless Steel Dust Strip:
Keeps contaminates out of the system, prolonging actuator performance and efficiency.

Easy Programming:
Acceleration and deceleration can be set independent of each other, providing excellent control of work. Dramatically reduce work damage and error.

Ball Screw Lubrication:
The AQ Seal is engineered to provide precise lubrication to critical points and will ensure optimal maintenance-free operation.

Coupling Motor Specification:
Optimized for fast and easy motor change-outs. Reduce downtime and maximize your return.

Rod Type Actuators:
Mounts like an air cylinder and operates at speeds of up to 800 mm/s at strokes of 300 mm offering smooth transitions unseen with air cylinders. With up to 1500 positioning points, you can produce a variety of products on the same automation line.

Slider Type Actuators:
Speeds of up to 1500mm/s and stroke lengths of 1200mm, the slider type actuator performs flawlessly in many applications.

green automation
IAI

Quality & Innovation

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Over 30 Years of IAI!

Established in 1976, IAI has grown globally to serve over 12 countries. IAI has 24 regional offices in Japan and is proud to announce a newly constructed headquarters, with an adjacent state of the art manufacturing facility to produce the highest quality automation robots. IAI is constantly striving in the pursuit of 'Quality and Innovation.' Our focus is always aimed at our customers and their needs to offer high quality and innovative solutions tailored for specific customer applications. IAI America Inc. was established in 1989 to better serve the needs of factory automation. With 3 main offices in the United States, support is always a phone call away where you can reach experienced engineers.

From our easy to use software, to complete automation solutions, we provide you with the tools necessary to scale your business. When you demand innovative and high quality robots, excellent service and support for your unique needs, demand IAI!

IAI Headquarters
On the windows of the newly constructed headquarters spell out the character for 'heart' in Japanese. This character is rich and meaningful, symbolizing the heart, spirit, attention and sincerity of IAI's commitment to the users of IAI products.

ISO 9001:2000
IAI has been certified for ISO 9001:2000 and JIS Q9001:2000 by an independent auditor to be in conformance with ISO 9001:2000 and JIS 9001:2000. We at IAI are continually improving our methods to produce quality products and services that surpass customer expectations.

ISO 9001:2000 JIS Q9001:2000

RoHS Compliant
IAI is RoHS compliant and recognizes the responsibility in reducing hazardous substances to better serve our customers and our environment.

RoHS

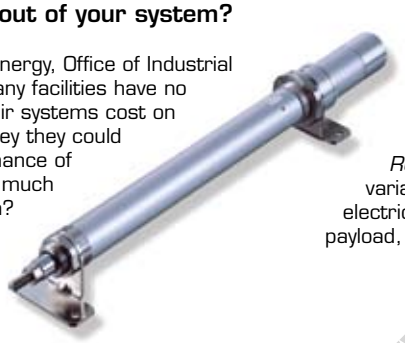
Green Automation

green automation IAI
Quality and Innovation

Higher Quality, Lower Running Costs, Environmentally Friendly

How much money is leaking out of your system?

The United States Department of Energy, Office of Industrial Technologies has reported that "many facilities have no idea how much their compressed air systems cost on an annual basis, or how much money they could be **saving** by improving the performance of these systems." Do you know how much money is leaking out of your system?



The excessive cost of leaks

An example of how expensive one small leak can cost, consider the figure below:

Size	Cost per Year
1/16"	$1,004.16
1/8"	$4,022.40
1/4"	$16,093.44

Costs calculated using electricity rate of $0.096 per kWh*, assuming constant operation and an efficient compressor. *Cost adjusted for average commercial retail price of electricity (Nov. 2007)

An example of how expensive one small leak can cost, look at the figure to the right. Just one small ¼" hole can cost you $16,093.44 per year! Even without a visible hole, pinhole leaks are very common and add up to a costly energy bill. Energy costs are **skyrocketing** and so will the cost of air leaks that plague most systems. DOE also states "leaks can be a significant source of **wasted** energy in an industrial compressed air system, sometimes wasting 20-30% of a compressor's output." Leaks will drop system pressure and make "air tools function less efficiently, adversely affecting production."

Eliminate your problems with *ROBO Cylinder*

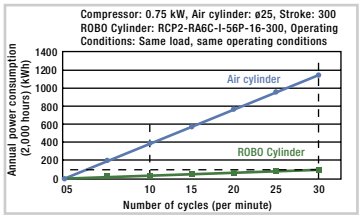
You can **eliminate** costly losses with IAI's *ROBO Cylinder* electric actuator today! *ROBO Cylinder* offers you easy to use software and all of the **benefits** of a high-quality electric actuator. Did you know that the effective energy efficiency of IAI's *ROBO Cylinder* line is 80-90%, while "a typical overall efficiency is around 10%" for a compressed air system"? (U.S. DOE, OIT Sourcebook CAC F2-1)

Power Consumption Test: *ROBO Cylinder* vs Air Cylinder

IAI devised a precision power consumption test procedure to measure energy efficiency. Both the air cylinder and *ROBO Cylinder* were tested with identical variables. Variables included dwell time, cost of electricity, cost of compressed air, speed, payload, stroke, ambient temp and operating time.

ROBO Cylinder Running Costs only 1/3 to 1/10 of an Air Cylinder

As the operation frequency increases, the energy requirements of air cylinders increase exponentially, while the power consumption rate remains constant with the energy efficient *ROBO Cylinder*. Therefore, the differentials in power consumption between the two actuators increase as the number of cycles per minute increases. Based on IAI's calculations, when the two actuators are operating at 10 cycles per minute, the *ROBO Cylinder* only requires 1/3 the power of the air cylinder. When the actuators are operating at 30 cycles per minute, the difference is even more profound, with the *ROBO Cylinder* only requiring 1/10 the power of the air cylinder! Keep in mind that no industrial plant uses just one actuator; the more actuators your plant requires, the more savings and ROI with energy efficient *ROBO Cylinders*.

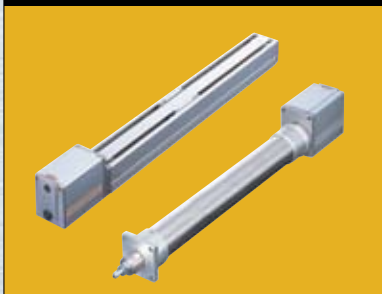


Source:
1. Energy Information Administration, Form EIA-826, "Monthly Electric Sales and Revenue Report with State Distributions Report."
2. Department of Energy, Office of Industrial Technologies: Compressed Air Challenge "Inappropriate Uses of Compressed Air" Fact Sheet #2
3. Department of Energy, Office of Industrial Technologies: Compressed Air Challenge "Compressed Air System Leaks" Fact Sheet #7
4. Department of Energy, Office of Industrial Technologies: Compressed Air Challenge "Compressed Air System Economics" Fact Sheet #9
5. IAI Japan Internal R&D Testing Reports.
6. Pneumatic Energy Evaluation Report by Tokyo Institute of Technology

ROBO CYLINDER

Model Categories

Controller-integrated Type

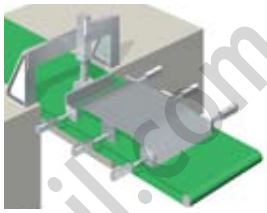


Features

ERC2 electric actuators are low-cost, controller-integrated actuators with a built-in controller. You do not need extra space for a separate controller minimizing the control area. These electric actuators are available at affordable prices similar to those of air cylinders, and thus are great economical, high-quality candidates for replacing air cylinders.

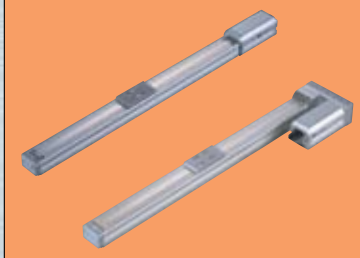
Applications

Use of multiple actuators in one system.
Transfer, raising/lowering, push-out, push-motion.



Example: Positioning of automobile rear panels

Slider Type

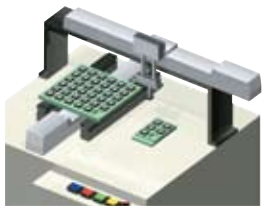


Features

The slider on the actuator moves forward and backward to perform positioning operations. The built-in linear guide helps achieve excellent linearity and also enables handling of an uneven load. Slide-type actuators are available in one of three motor-installation specifications including the coupling type, built-in (direct connection) type and reversing type.

Applications

Transfer and positioning along a straight line
Product picking & placement systems consisting of multiple axes



Example: Picking & placement of products

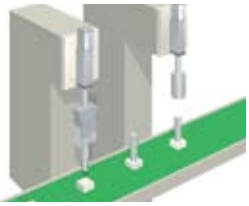
Rod Type

Features

The rod extends and contracts from/into the actuator to perform positioning and push-motion operations. You can select one of three guide options including "no guide," "single guide" and "double guides." Rod-type actuators are available in one of three motor-installation specifications including the coupling type, built-in (direct connection) type and reversing type.

Applications

Raising/lowering of loads and stockers
Pushing-out of products (pushers)
Press-fitting of loads, crimping



Example: Press-fitting and assembly of resin parts

Table type/ Arm type/Flat type

Features

The table or arm on the actuator slides to perform positioning and push-motion operations. The built-in linear guide helps achieve excellent linearity and also enables handling of an uneven load. Compared to rod-type actuators, these actuators allow for easy installation of devices.

Applications

Raising/lowering of loads and stockers (Effective for devices and loads having many overhangs)
Pushing-out of products (pushers)

Example: Raising/lowering of inkjet heads

ROBO CYLINDER

Gripper type/ Rotary type

Features

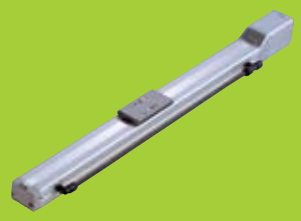
Gripper-type actuators allow for adjustment of gripping force to hold even fragile loads with soft gripping action. Rotary-type actuators offer versatility, functioning both as an index station to perform 360-degree positioning operations, and as a conveyor that rotates infinitely in the same direction.

Applications

Gripper - Gripping and centering of loads
Rotary - Indexing and rotation/movement of loads

Example: Palletizing of loads using a SCARA robot

Cleanroom specification

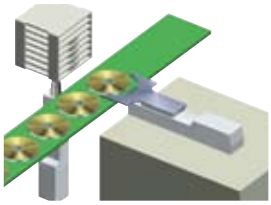


Features

These actuators are designed for the cleanroom environment and achieve cleanliness of class 10 (0.1 mm).
The stainless sheet prevents dust from being raised inside the actuator, which helps achieve high cleanliness with a light vacuum.

Applications

Transfer and positioning inside a clean room



Example: Stacking of discs

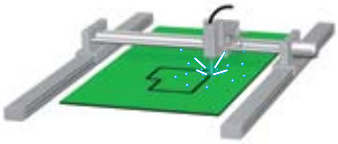
Dust-proof/ Splash-proof specification

Features

These actuators have an IP65 protective structure to withstand use in a harsh environment where the actuator comes in contact with powder dust, water splashes, etc.

Applications

Transfer & positioning structure in machine tools, food processing machines and cleaning systems



Example: Feeding of water jets

Controller

Features

Our controllers support various control methods including positioner control, solenoid-valve control, pulse-train control, serial communication, field network (DeviceNet/CC-Link/ProfiBus), and program operation.

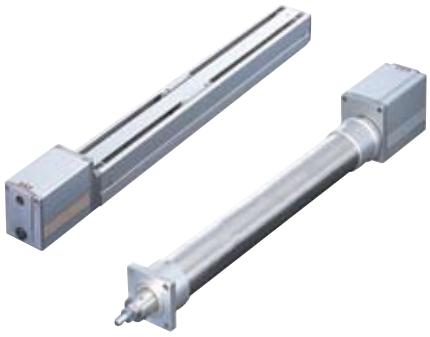
Applications

Simple positioning - Positioner control, solenoid-valve control
At-will control - Pulse-train control, serial communication
Simultaneous control with peripherals - Field network
Independent control - Program control

ROBO Cylinder Series

Pulse Motor Actuators

ERC2 series



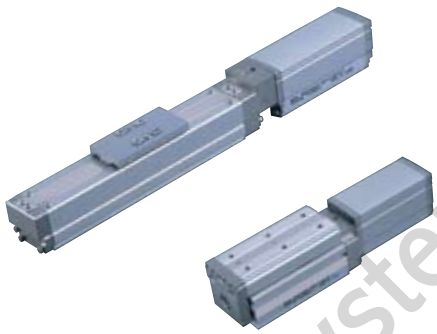
The ERC2 series actuators are the affordable SOLUTION and benefit from a built-in controller improving usability

Features

1. The built-in controller offers simple wiring.
2. No need for extra installation space for controllers.
3. Exceptional value; actuator price includes the controller.

Controller (Built-in) **Input Power** DC24V

RCP3 series



Through improvement of production TECHNOLOGY, the new RCP3 series actuators have become even more affordable and easier to use.

Features

1. The table type is constructed with a high-rigidity slide mechanism for greater moment loads.
2. An ultra-slim model with a width of 32 mm/1.26" (SA3 type) is the solution for applications requiring small actuators.
3. Motor change-outs are as easy as unscrewing one bolt.

Controller PCON PSEL **Input Power** DC24V

RCP2 series

The RCP2 series actuators are high-value and driven by a pulse motor capable of generating high FORCE at low speed.

Features

1. Vast variety of unique electric actuators.
2. The characteristics of a pulse motor are utilized to generate strong push force.
3. Various control methods are possible with controller support.

Controller PCON PSEL **Input Power** DC24V

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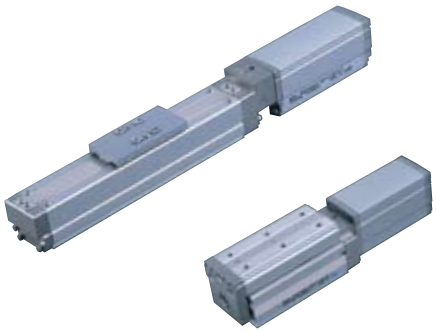
Servo Motor Actuators

RCA2 series



The RCA2 series continues on the path of the RCA series delivering a low cost and UNPARALLELED serviceability

Features

1. The table type is constructed with a high-rigidity slide mechanism for greater moment loads.
2. An ultra-slim model with a width of 32 mm/1.26" (SA3 type) is the solution for applications requiring small actuators.
3. Easy motor change-outs.

Controller ACON ASEL **Input Power** DC24V

RCA series

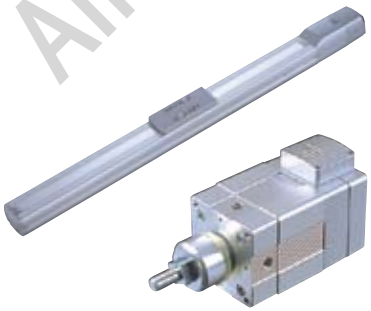
The RCA series is powered by a 24V servo motor that can be installed in the same manner as air cylinders

Features

1. Various mounting brackets similar to what you normally use with air cylinders are supported.
2. Available in one of three motor-installation specifications including the coupling type, built-in (direct connection) type and reversing type.
3. Home check sensor (optional)
4. Optional high acceleration/deceleration function that enables operations at 1G. A power-saving option that lowers power consumptionis also offered.

Controller ACON ASEL **Input Power** DC24V

RCS2 series



Small/Medium size actuators that can be operated with a 100/200V power supply

Features

1. Max speed of 1,000 mm/s, max load capacity of 60kg, and max stroke of 1,000 mm.
2. With the XSEL controller, 3 or more axes can be combined as cartesian systems.
3. Available in one of three motor-installation specifications including the coupling type, built-in (direct connection) type and reversing type.
4. Optional high acceleration/deceleration function that enables operations at 1G.

Controller SCON SSEL XSEL **Input Power** AC100V/200V

New ROBO Cylinder Multi-Axes

Multi-Axes System | IK Series

New

ROBO Cylinder IK Series

Your Multi-Axes Solution!

Easy Assembly
The complete kit includes everything needed for fast and easy assembly

Low Cost
With the IK Series, your ROI is realized faster than you can imagine, making IAI the perfect complete solution for any application!

Motor Options
The IK Series is offered in both pulse and servo motors. Choose the pulse motor for applications requiring high thrust at low speeds. Choose the servo motor for applications requiring constant thrust regardless of the operating speed.

High Functionality
Combined with the PCON/PSEL/SCON/SSEL/XSEL controllers, complex programming is made easy.

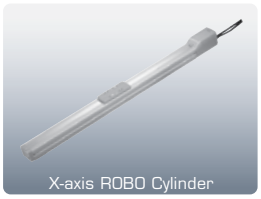
ROBO CYLINDER

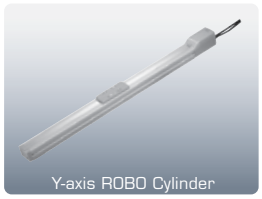
Multi-Axes System

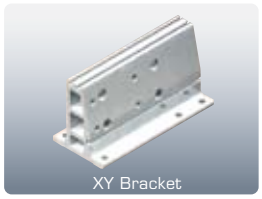
IK Series Parts

New

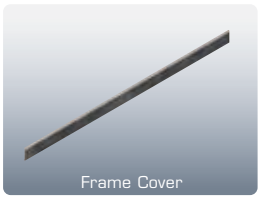
The IK Series offers the easy cost effective **SOLUTION** tailored to your needs.
The kit comprises the following components needed to assemble a cartesian robot

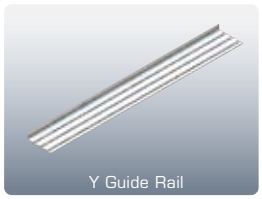

X-axis ROBO Cylinder

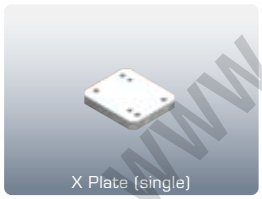

Y-axis ROBO Cylinder

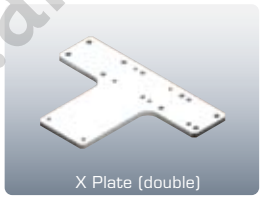

XY Bracket

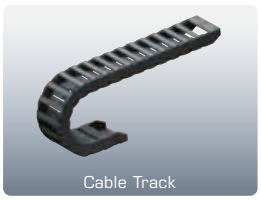

X Guide Rail

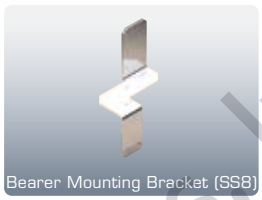

Frame Cover

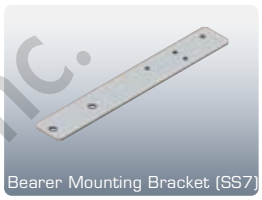

Y Guide Rail

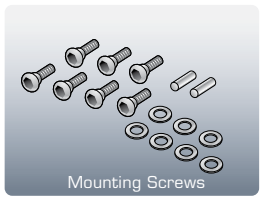

X Plate (single)


X Plate (double)

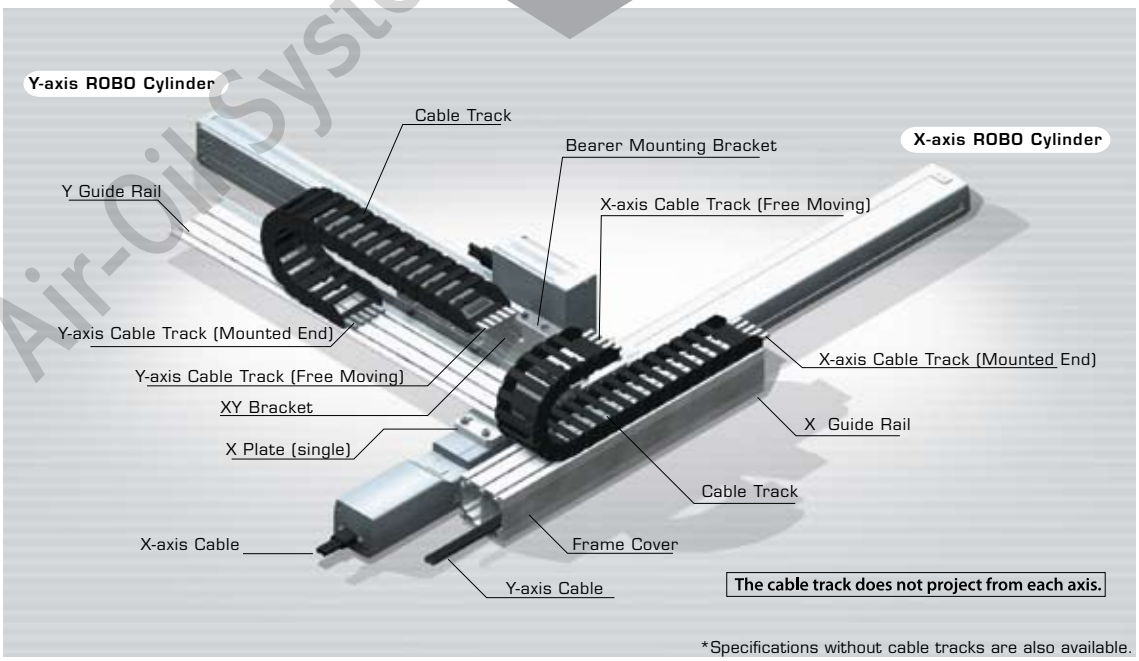

Cable Track


Bearer Mounting Bracket (SS8)


Bearer Mounting Bracket (SS7)


Mounting Screws

Note: The above images are provided for reference purposes only.
The actual components may vary depending on the combination type, direction, etc.



*Specifications without cable tracks are also available.

New ROBO Cylinder Lineup

ROBO Cylinder — RCP3/RCA2 Series

The New ROBO Cylinders have become more affordable and easier to use

New

Our Advancement for Your Benefit
We have taken the time to completely re-engineer the guide, ball screws and servo motor to reduce manufacturing costs. We are proud to make IAI's high-quality electric actuators even more affordable!

New Table Type Actuators
Perfect for applications that require the handling of high moment loads, the new Table Type actuators have a built-in guide to handle loads with ease.

New Ultra-slim Slider Type (32mm in width)
The ideal for applications with space constraints, the new ultra-slim type SA3 (32mm wide) actuator is the ideal choice when only the best will do.

No-Cover Option
You can choose to have your actuator supplied without the exterior covers and stainless steel dust cover for even more cost savings.

Pulse-Motor RCP3 Series & Servo-Motor RCA2 Series
The RCP3 series is driven by a pulse motor and is affordably priced offering excellent push-motion performance, etc. The RCA2 series is driven by a servo motor and achieves high-speed movement while also ensuring quiet operation.

High-Speed Type — RCA/RCS2 Series

New

Achieve 1G with the High-Acceleration/Deceleration ROBO Cylinders

Shorten your Cycle Time with Increased Acceleration/Deceleration
Since the acceleration can be increased to a max of 1G, the high-speed actuators will allow shorter cycle times speeding up production.

Keep your Load Capacity even when the Acceleration/Deceleration is increased
Even with 1G acceleration/deceleration, the RCA/RCS2 series can operate at the same load capacity as lower acceleration.

*The maximum load capacity will not increase when the acceleration/deceleration is decreased.

RCA / RCS2

ROBO CYLINDER

Ultra-High Thrust Type — RCS2-RA13R Series

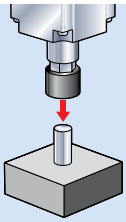
New

Ultra-High Thrust Actuators Capable of 2t Press Force

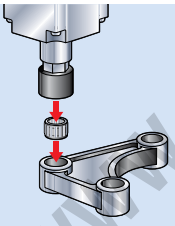
With the high-output servo motor, these motorized actuators can perform push-motion operation with a maximum push force of 2 tons and also achieve high-precision position control. The RCS2-RA13R series lets you adjust the push force and control positions, which are difficult to do with hydraulic actuators.

RA13R

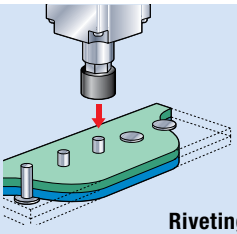
Application Examples



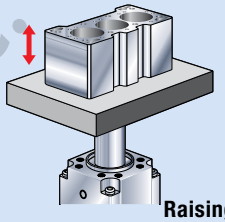
Press-Fitting of Pins
Press-fit position (height) can be adjusted



Press-Fitting of Bearings
Push speed can be adjusted



Riveting
Push force can be adjusted



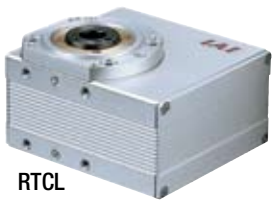
Raising/Lowering of Heavy Objects
Weights up to 300kg can be raised/lowered

Rotary Type — RCP2-RTBL/RTCL Series

New

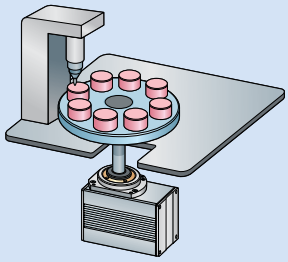
Multiple Rotation Actuators Capable of Rotating Continuously in the Same Direction

RTBL



RTCL

Application Example



RCP2-RTBL/RTCL used in an index table (linked rotation) for processing parts

Positioning Operations Involving Rotations of 360 Degrees or More
Since there are no stoppers, positioning operations involving rotations of 360 degrees or more are supported

Multiple Rotation Operations
Since the RCP2-RTBL/RTCL series can be operated in the same rotating direction, the series is ideal for applications where loads are fed continuously in the same direction.
*The multiple rotation operation mode, each travel is limited to a range within +/-360 degrees.

New ROBO Cylinder Lineup

Ultra-small Linear Servo Cylinder — Micro Cylinder RCL

New

Ultra-Small High Speed Linear Servo Actuator with Up to 2G Acceleration

Built-in encoder supports multiple positioning points

Thanks to its built-in encoder, the RCL series can perform positioning to a maximum of 512 points when combined with a compact, affordable ACON controller.

Smooth, Quiet Operation

The sine-wave drive using 3-phase coil eliminates cogging. Furthermore, there's virtually no outside leakage of magnetism.

Compact size

IAI adopted the linear motor method requiring no rotating speed-reducer mechanism to accommodate all these features in a compact body.

Teach Pendant — CON-T/SEL-T (TD)

New

A New Teach Pendant Series Offering Improved Environmental Resistance and Safety Specifications

IP54 Protection

The excellent dust-proof/splash-proof performance makes the teach pendants usable in an undesirable environment where the teach pendant comes in contact with fine particles and moisture.

Compliance with the CE Mark Standard (ANSI standard)

All models comply with the CE Mark standard. The SEL-TD type is also UL and ANSI-compliant.

High-Output Actuator Controller — PCON-CF

New

The PCON-CF Controller is Designed Exclusively for use with RCP2 Series High-Output Motors

ROBO Cylinder High-Thrust Type
RCP2-RA10C

ROBO Cylinder High-Speed Type
RCP2-HS8C/HS8R

ROBO Cylinder Waterproof Type
RCP2W-SA16C

ROBO CYLINDER

Network Controller — ROBONET

New

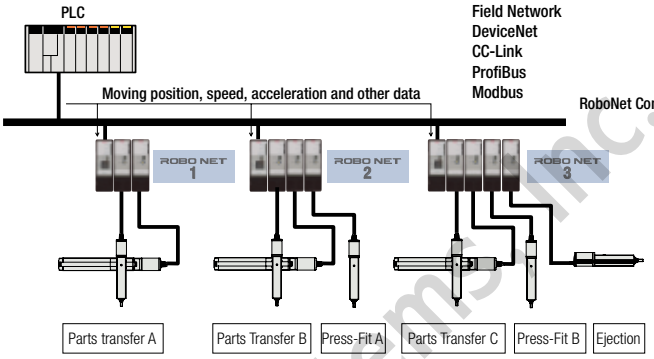
A New Concept: Network Controller that Significantly Reduces the Hassle of Wiring and Installation

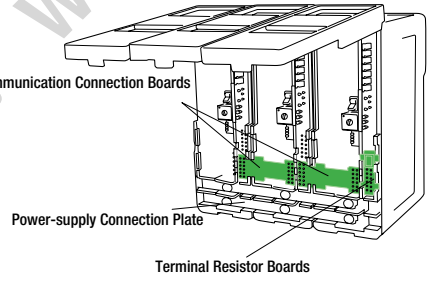
Connection to Field Networks
The RoboNet supports many major network protocols such as DeviceNet, CC-Link and ProfiBus.

Reduced Man-Hours Through Wire-Saving Design
Since the I/O signals can be wired using a single dedicated network cable, wiring man-hours can be reduced significantly.

Easy Serial Communication Using Function Blocks
Function blocks that eliminate the need for communication programs are available as options (provided free of charge)

Operation by Numerical Specification of Moving Position, Speed, Etc.
Instead of registering positions beforehand, you can operate your system by sending desired positions and speeds as data.





Simple Absolute Unit — PCON/ACON-ABU

New

All you Need is to Connect your Incremental Actuator to a PCON/ACON Controller, and the Actuator can be Used as a Simple Absolute Actuator. (The simple absolute unit is also set in RoboNet)

No Need for Home Return
The built-in rechargeable battery in the simple absolute unit retains the encoder data even after the controller power is cut off. Accordingly, the actuator will not require home return the next time the power is turned on.

Retention of Encoder Data for up to 20 Days
Encoder data can be retained for up to 20 consecutive days.

Controllers

Supported Controllers — Controllers

	RCP2 RCP3 series	RCL RCA RCA2 series	RCS2 series
	24 VDC pulse motor type	24 VDC servo motor type	200 VAC servo motor type
Position controller			

Position controller

Positioner Type
These controllers support a maximum of 512 positioning points. You can also use it as a solenoid valve controller or serial communications controller, simply by changing the mode setting.

Solenoid Valve Type
Controls are made easy with effortless 3-point positioning. You can use the same solenoid-valve control operations you are already familiar with on your air cylinders.

Pulse-Train Input Type
These controllers eliminate the need to input positions in advance. They are ideal in applications require many or complex operation patterns, or where flexibility is required in changing speed and other settings.

Serial Communication Type
These controllers are used to connect to DeviceNet, CC-Link and FieldBus via a gateway unit. Their compact, low-cost construction is perfect for multi-axis operations.

RoboNet
Reduce wiring and installation headaches with RoboNet. Operate via field network and connect up to 16 axes and register up to 768 points in Positioner mode and Simple Direct Value Mode. There is no limit on the number of positioning points when in Direct Numeric Value Mode. DIN rail installation means that the controller can be fastened and removed with ease.

PCON

PCON-C/CG
PCON-CY
PCON-PL/PO
PCON-SE
PCON-CF (High Output)

ACON

ACON-C/CG
ACON-CY
ACON-PL/PO
ACON-SE

SCON

SCON-C

ROBO NET

RPCON

ROBO NET

RACON

Program controller

Program Type
Program controllers can operate 1, 2 and up to 6 axes. Since interpolation operation is possible, they are ideal for coating and palletizing operations requiring synchronized movements of 2 axes. You can set a maximum of 1,500 positions and 20,000 positions on the newly improved XSEL controller. The XSEL controller was further improved with the new ROBO Cylinder gateway function, which added the capacity to control a total of 22 axes.

PSEL

1-axis type

2-axis type

PSEL-C

ASEL

1-axis type

2-axis type

ASEL-C

X-SEL

SSEL

1-axis type

2-axis type

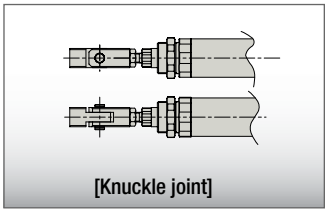
SSEL-C

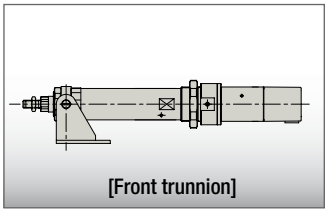
* Refer to ROBO Cylinder General Catalog for more info

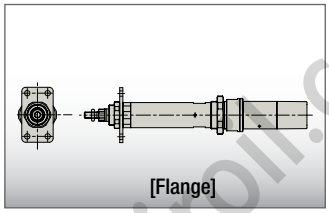
Mounting

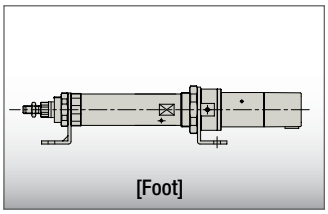
Various Mounting Methods — Mounting

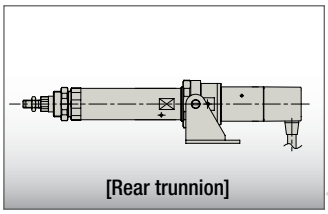
ENERGY EFFICIENT ROBO Cylinder RCA/RCS2 actuators are available with optional MOUNTING BRACKETS similar to those normally used with air cylinders, such as the foot, TRUNNION and clevis. The rod tip accepts a knuckle joint, floating joint or other mounting brackets, so you can quickly and COST-EFFECTIVELY convert your existing air cylinder to a ROBO Cylinder to maximize ROI.

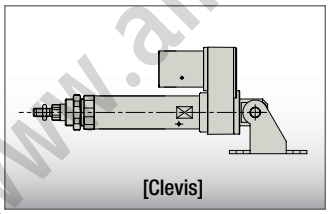

[Knuckle joint]


[Front trunnion]


[Flange]


[Foot]


[Rear trunnion]

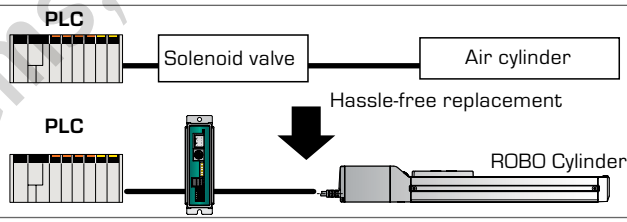

[Clevis]

Application Examples

Want to replace an existing air cylinder without hassle

Solenoid valve type

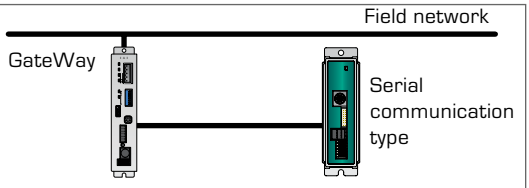
The PCON-CY and ACON-CY are recommended.
(You can also use the SCON-C in the PIO mode.)
Your ROBO Cylinder can be controlled just like an air cylinder.



Want to connect to CC-Link and DeviceNet

Serial communication type

You can connect the PCON-SE or ACON-SE to a gateway unit.
The SCON connects directly to field networks.



Number of connectable units: DeviceNet – 16 units, CC-Link – 14 units

Want to operate it using a PLC based on pulse trains

Pulse-train input type

You can use the PCON-PL/PO, ACON-PL/PO or SCON-C.

Want to operate two axes

The PSEL, ASEL and SSEL have two-axis types. They can perform synchronized operation and interpolation operation.

Want to install it based on clevis/trunnion mount

Select either the rod-type RA3 or RA4 in the RCA/RCS2 series.

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