



ROBO Cylinder RCP6/RCP6S Actuator Wide Radial Cylinder Instruction Manual

═══════════════════ **Second Edition** ════════════════════

Motor Straight Type: WRA10C, WRA12C, WRA14C,
WRA16C

Motor Reversing Type: WRA10R, WRA12R, WRA14R,
WRA16R

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, among others, providing the information you need to know to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

The DVD that comes with the product contains instruction manuals for IAI products.

When using the product, refer to the necessary portions of the applicable instruction manual by printing them out or displaying them on a PC.

After reading the instruction manual, keep it in a convenient place so that whoever is handling this product can reference it quickly when necessary.

[Important]

- This instruction manual is original.
- This product is not to be used for any other purpose from what is noted in this instruction manual. IAI shall not be liable whatsoever for any loss or damage arising from the result of using the product for any other purpose from what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of production improvement.
- If you have any question or finding regarding the information contained in this instruction manual, contact our customer center or our sales office near you.
- Using or copying all or a part of this instruction manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

RC ROBO
CYLINDER

Table of Contents

Safety Guide	1
Caution in Handling	8
International Standards Compliances	10
Names of the Parts	11
1. Specifications Check.....	13
1.1 Checking the Product.....	13
1.1.1 Parts.....	13
1.1.2 Related Instruction Manuals for the Each Controller Supported by This Product ...	13
1.1.3 How to Read the Model Nameplate.....	13
1.1.4 How to Read the Model Number	14
1.2 Specifications	15
1.2.1 Speed.....	15
1.2.2 Maximum Acceleration and Payload	19
1.2.3 Driving System • Position Detector	39
1.2.4 Positioning Precision.....	39
1.2.5 Current Limit Value and Pressing Force	40
1.2.6 Allowable Load and Torque on Rod Tip	44
1.2.7 Rod Flexure (Reference)	65
1.2.8 Continuous Operation Duty	67
1.3 Options	68
1.3.1 Brake Type (Model Code: B).....	68
1.3.2 Reversed-home Specification (Model Code: NM)	68
1.3.3 Flange Bracket (Front) (Model Code: FL).....	68
1.3.4 Motor Left Reversed, Motor Right Reversed (Model Code: ML, MR)	69
1.3.5 Cable Eject Direction Changed (Model Code: CJT, CJR, CJL, CJB, CJO).....	70
1.3.6 T-Slot Nut Bar (Model Code: NTBL, NTBR)	70
1.4 Motor • Encoder Cables	71
1.4.1 Motor • Encoder Integrated Cables (WRA10, WRA12 and WRA14).....	71
1.4.2 Motor • Encoder Integrated Cables Robot Type (WRA10, WRA12 and WRA14) ...	72
1.4.3 Motor • Encoder Integrated Cables (WRA16).....	73
1.4.4 Motor • Encoder Integrated Cables Robot Type (WRA16)	74
2. Installation.....	75
2.1 Transportation	75
2.2 Installation and Storage • Preservation Environment.....	77
2.3 How to Install.....	78
2.3.1 Installation	78
2.3.2 Installation of the Main Unit.....	79
3. Connecting with the Controller.....	94
4. Caution for Operation	98
5. Maintenance and Inspection	99
5.1 Inspection Items and Schedule	99
5.2 External Visual Inspection	100
5.3 Cleaning	100
5.4 Internal Inspections	101
5.5 Internal Cleaning	101
5.6 Grease Supply.....	102
5.6.1 What Grease to Use	102
5.6.2 How to Apply Grease	102
5.7 Procedure for Belt Replacement and Tuning	104

5.7.1	Inspection of the Belt	104
5.7.2	Belts to be Used.....	104
5.7.3	Replacement of the Belt	105
5.8	Replacement Process	108
5.8.1	WRA10C, WRA12C, WRA14C and WRA16C.....	108
5.8.2	WRA10R, WRA12R, WRA14R and WRA16R.....	110
6.	Cable Ejecting Position Change	115
7.	External Dimensions.....	116
7.1	Standard specification RCP6-WRA10C	116
7.2	Built-in Controller Specification RCP6S-WRA10C	117
7.3	Standard Specification RCP6-WRA12C.....	118
7.4	Built-in Controller Specification RCP6S-WRA12C	119
7.5	Standard Specification RCP6-WRA14C.....	120
7.6	Built-in Controller Specification RCP6S-WRA14C	121
7.7	Standard Specification RCP6-WRA16C.....	122
7.8	Built-in Controller Specification RCP6S-WRA16C	123
7.9	Standard Specification RCP6-WRA10R Left Reversed (Model No.: ML)	124
7.10	Built-in Controller Specification RCP6S-WRA10R Left Reversed (Model No.: ML).....	125
7.11	Standard Specification RCP6-WRA12R Left Reversed (Model No.: ML)	126
7.12	Built-in Controller Specification RCP6S-WRA12R Left Reversed (Model No.: ML).....	127
7.13	Standard Specification RCP6-WRA14R Left Reversed (Model No.: ML)	128
7.14	Built-in Controller Specification RCP6S-WRA14R Left Reversed (Model No.: ML).....	129
7.15	Standard Specification RCP6-WRA16R Left Reversed (Model No.: ML)	130
7.16	Built-in Controller Specification RCP6S-WRA16R Left Reversed (Model No.: ML).....	131
8.	Life	132
9.	Warranty	133
9.1	Warranty Period.....	133
9.2	Scope of the Warranty.....	133
9.3	Honoring the Warranty	133
9.4	Limited Liability.....	133
9.5	Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications	134
9.6	Other Items Excluded from Warranty	134
	Change History.....	135

Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it 1before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	<ul style="list-style-type: none"> • This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. <ol style="list-style-type: none"> 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) • Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. • Do not use it in any of the following environments. <ol style="list-style-type: none"> 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact • For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
	Transportation	<ul style="list-style-type: none"> ● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment's capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	<ul style="list-style-type: none"> ● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	<p>(1) Installation of Robot Main Body and Controller, etc.</p> <ul style="list-style-type: none"> ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. <ol style="list-style-type: none"> 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	<p>(2) Cable Wiring</p> <ul style="list-style-type: none"> ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire. <p>(3) Grounding</p> <ul style="list-style-type: none"> ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, make sure to use a twisted pair cable with wire thickness 0.5mm² (AWG20 or equivalent) or more for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). ● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).

No.	Operation Description	Description
4	Installation and Start	<p>(4) Safety Measures</p> <ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot's movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as "Under Operation; Do not turn ON the power!" etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the "Stipulations for the Operation" and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign "Under Operation" at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>

No.	Operation Description	Description
6	Trial Operation	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	<ul style="list-style-type: none"> ● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	<ul style="list-style-type: none"> ● When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the cover or untightened screws, and make sure to put the product back to the original condition after maintenance and inspection works. <p>Use in incomplete condition may cause damage to the product or an injury.</p> <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>
9	Modification and Dismantle	<ul style="list-style-type: none"> ● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	<ul style="list-style-type: none"> ● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	<ul style="list-style-type: none"> ● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

Caution in Handling

1. Make sure to follow the usage condition, environment and specification range of the product.
In case it is not secured, it may cause a drop in performance or malfunction of the product.
2. Do not attempt to have any handling or operation that is not stated in this Instruction manual.
3. It is recommended to apply our products for the wiring between the actuator and the controller.
4. Do not attempt to establish the settings for the speed and acceleration/deceleration above the allowable range.
An operation with speed and acceleration/deceleration beyond the allowable range may cause an abnormal noise, vibration, malfunction or shortened life.
5. Set the allowable load of the move on rod tip within the allowable range.
An operation with the load beyond the allowable load of the move on rod tip may cause an abnormal noise, vibration, malfunction or shortened life. If it is extreme, flaking may occur on the guide.
6. Set the load offset distance within the allowable range.
Attaching a load with an load offset distance above the allowable range may cause vibration and abnormal noise.
7. If back and forth operations are performed repeatedly in short distance, it may wear out the film of grease.
Continuous back and forth operation within a distance less than 30mm may cause wear of grease. As a reference, have approximately 5 cycles of back and forth operation in a distance more than 50mm in every 5,000 to 10,000 cycles to regenerate the oil film. Keep using the actuator with the grease worn out may cause malfunction. If it is extreme, flaking may occur on the guide, ball screw.
8. Do not attempt to hit the rod against an abstacle with high speed.
It may destroy the coupling.
9. Make sure to attach the actuator properly by following this instruction manual.
Using the product with the actuator not being certainly retained or affixed may cause abnormal noise, vibration, malfunction or shorten the product life.

10. Although PCON-CB and MCON Controllers (Option: T) are available for switching between valid and invalid of high output setting in the parameter settings, use the controllers with the high output setting valid.

(It is set to valid for the high output setting at the delivery.)

For MSEL Controller, the high output setting is effective and cannot switch it over to ineffective.

[Refer to an instruction manual for each controller for details]

The performance of weight capacity at each speed and acceleration/deceleration setting differs between the high output setting being effective and ineffective. Refer to the applicable performance when the high output setting is valid or invalid in 1.2 Specifications.

Controller	Parameter	Remarks
PCON-CB	No.152 High Output Setting [0: Ineffective, 1: Effective]	
MCON	No.152 High Output Setting [0: Ineffective, 1: Effective]	Option T: In high output setting, available to have high output setting effective.

International Standards Compliances

This actuator complies with the following overseas standard.
Refer to Overseas Standard Compliance Manual (ME0287) for more detailed information.

RoHS Directive	CE Marking
<input type="checkbox"/>	<input type="checkbox"/>

Names of the Parts

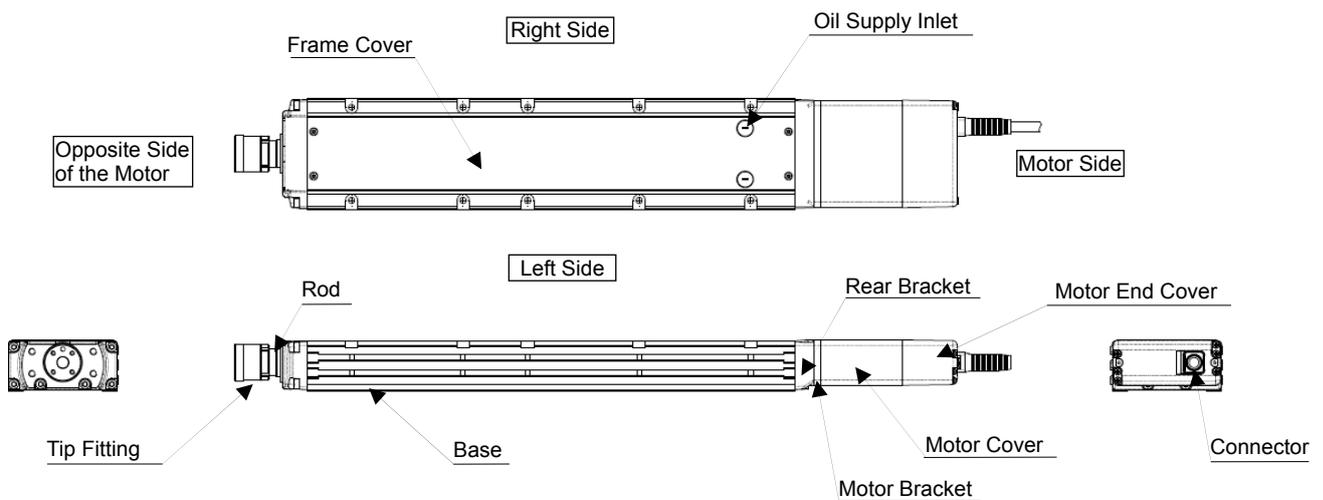
In this Instruction Manual, the left and right sides are indicated by looking at the actuator from the motor end, with the actuator placed horizontally, as shown in the figure below.

1. Standard Specification

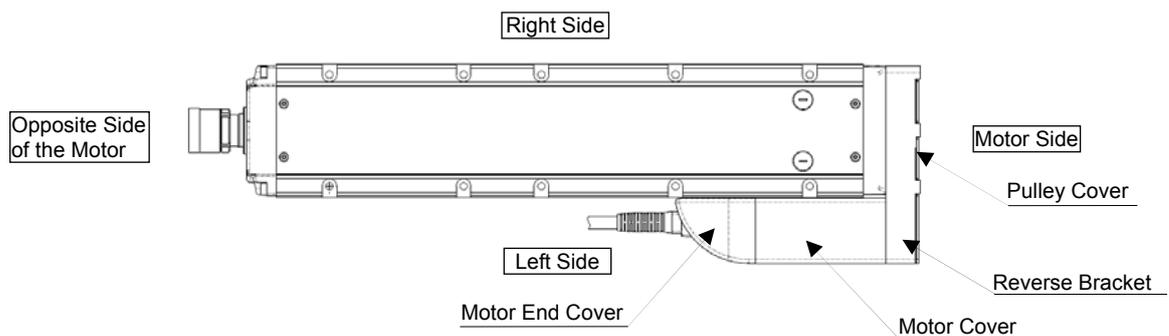
Motor Straight Type: RCP6-WRA10C, WRA12C, WRA14C, WRA16C

Motor Reversing Type: RCP6-WRA10R, WRA12R, WRA14R, WRA16R

[Motor Straight Type]



[Motor Reversing Type]



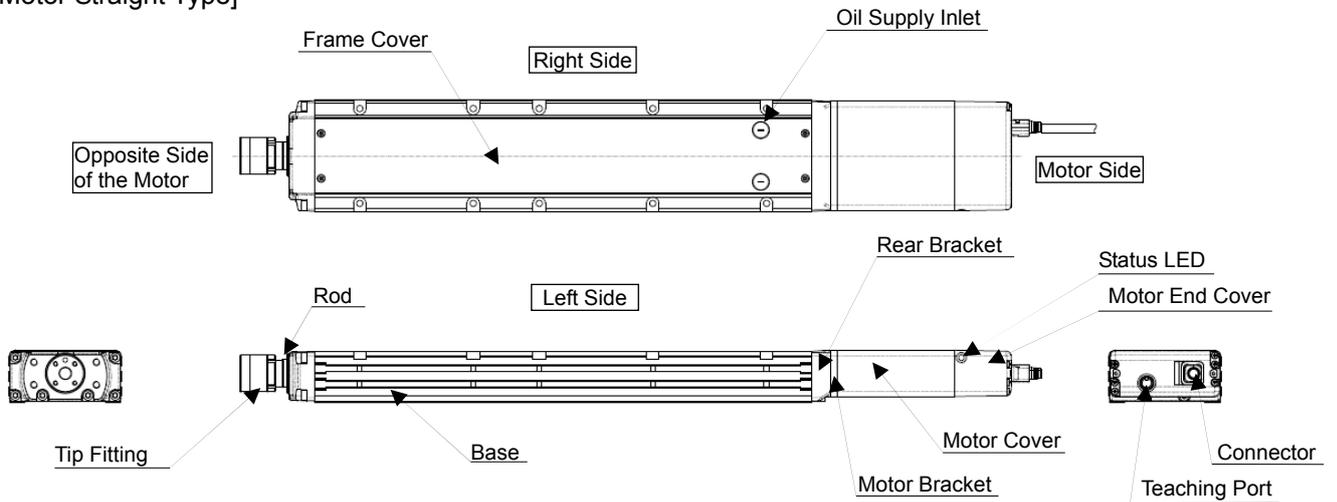
The direction of the motor is either left reversed: ML (shown in figure above) or right reversed: MR.

2. Built-in Controller Specification

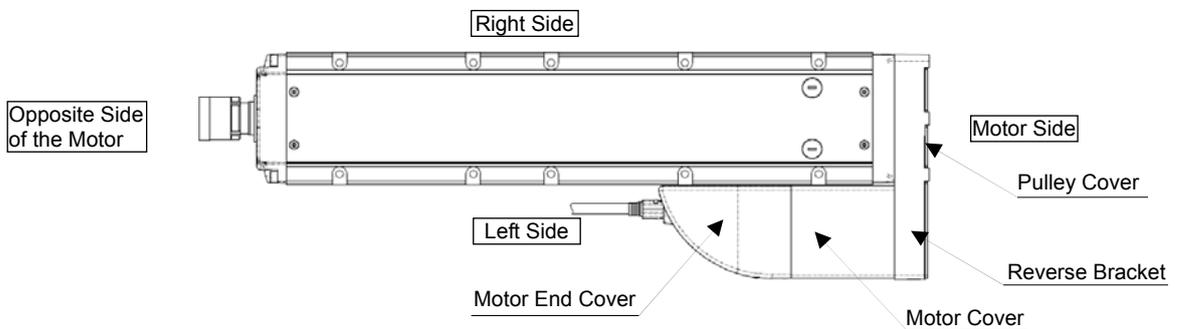
Motor Straight Type: RCP6S-WRA10C, WRA12C, WRA14C, WRA16C

Motor Reversing Type: RCP6S-WRA10R, WRA12R, WRA14R, WRA16R

[Motor Straight Type]



[Motor Reversing Type]



The direction of the motor is either left reversed: ML (shown in figure above) or right reversed: MR.

1. Specifications Check

1.1 Checking the Product

The standard configuration of this product is comprised of the following parts. See the component list for the details of the enclosed components. If you find any fault or missing parts, contact your local IAI distributor.

1.1.1 Parts

No.	Name	Model number	Quantity	Remarks
1	Actuator	Refer to "How to Read the Model Nameplate" and "How to Read the Model Number."	1	
Accessories				
2	Motor • Encoder Cables ^(Note1)		1	
3	First Step Guide		1	
4	Instruction Manual (DVD)		1	
5	Safety Guide		1	

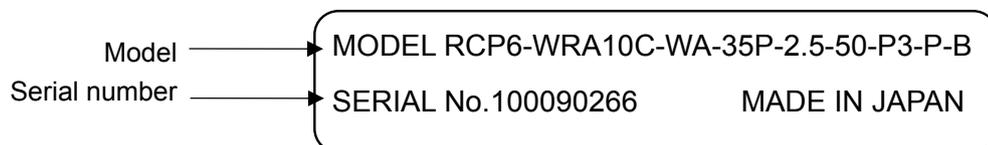
Note1 The motor • encoder cables supplied vary depending on the controller used.
[Refer to 1.4, "Motor • Encoder Cables."]

1.1.2 Related Instruction Manuals for the Each Controller Supported by This Product

Shown below is a list of the instruction manuals for the controllers related to this product which is recorded in Instruction Manual (DVD).

No.	Name	Control No.
1	Instruction Manual for PCON-CB/CFB Controller	ME0342
2	Instruction Manual for MCON-C/CG Controller	ME0341
3	Instruction Manual for MSEL Controller	ME0336
4	Instruction Manual for RC PC Software RCM-101-MW/RCM-101-USB	ME0155
5	Instruction Manual for Touch Panel Teaching Pendant CON-PTA/PDA/PGA	ME0295
6	Instruction Manual for Touch Panel Teaching Pendant TB-01/01D/01DR Applicable for Position Controller	ME0324

1.1.3 How to Read the Model Nameplate



1.1.4 How to Read the Model Number

RCP6 - WRA10C - WA - 35P - 2.5 - 50 - P3 - P - B - **

<Series name>
Standard specification
RCP6
Built-in controller specification
RCP6S

<Type>
Motor straight type
WRA10C
WRA12C
WRA14C
WRA16C
Motor reversing type
WRA10R
WRA12R
WRA14R
WRA16R

<Encoder type>
WA : Battery-less absolute

<Motor type>
35P : 35□size
42P : 42□size
56P : 56□size
60P : 60□size

<Lead>
WRA10C, WRA10R
2.5/5/10/16
WRA12C, WRA12R
3/6/12/20
WRA14C, WRA14R
4/8/16/24
WRA16C, WRA16R
5/10/20

Identification for IAI use only (Note1)

<Options>
B : Brake
NM : Reversed-home specification
FL : Flange bracket
NTBL : T-slot nut bar type (Left)
NTBR : T-slot nut bar type (Right)
ML : Motor left reversed (Standard)
MR : Motor right reversed
CJT : Cable exit direction changed (Top)
CJR : Cable exit direction changed (Right)
CJL : Cable exit direction changed (Left)
CJO : Cable exit direction changed (Outside)
CJB : Cable exit direction changed (Bottom)

<Cable length>
N : None
P : 1m
S : 3m
M : 5m
X□□ : Length specification
R□□ : Robot cable

Standard Specification
<Controller>
P3 : PCON-CB
MCON
MSEL
P4 : PCON-CFB

Built-in Controller Specification
<I/O type>
SE : SIO type

<Stroke>
[Refer to 1.2 Specifications]

Note 1 Identification for IAI use only: It may be displayed for IAI use. It is not a code to show the model type.

1.2 Specifications

1.2.1 Speed

[1] Motor Straight Type

(Note) For Lead 10 and 16 of WRA10C, Lead 12 and 20 of WRA12C, Lead 16 and 24 of WRA14C and Lead 20 of WSA16C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

[When high-output setting is effective]

Speed limits [Unit: mm/s]

Size	Motor Type	Lead [mm]	Horizontal / Vertical	Stroke [mm]																	
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800		
WRA 10C	35P	2.5	Horizontal	175										145	120	-	-	-	-	-	-
			Vertical	175										145	120	-	-	-	-	-	-
		5	Horizontal	350										290	240	-	-	-	-	-	-
			Vertical	260										240	-	-	-	-	-	-	-
		10	Horizontal	525										490	-	-	-	-	-	-	-
			Vertical	-										-	-	-	-	-	-	-	-
		16	Horizontal	700										-	-	-	-	-	-	-	-
			Vertical	-										-	-	-	-	-	-	-	-
WRA 12C	42P	3	Horizontal	225								220	185	-	-	-	-	-	-		
			Vertical	200								185	-	-	-	-	-	-	-		
		6	Horizontal	400								375	-	-	-	-	-	-	-		
			Vertical	340								-	-	-	-	-	-	-	-		
		12	Horizontal	560								-	-	-	-	-	-	-	-		
			Vertical	-								-	-	-	-	-	-	-	-		
		20	Horizontal	800								-	-	-	-	-	-	-	-		
			Vertical	-								-	-	-	-	-	-	-	-		
WRA 14C	56P	4	Horizontal	210										195	-	-	-	-	-		
			Vertical	130										-	-	-	-	-	-		
		8	Horizontal	420										395	-	-	-	-	-		
			Vertical	210										-	-	-	-	-	-		
		16	Horizontal	560										-	-	-	-	-	-		
			Vertical	-										-	-	-	-	-	-		
		24	Horizontal	630										-	-	-	-	-	-		
			Vertical	-										-	-	-	-	-	-		
WRA 16C	60P	5	Horizontal	130						115	95	80	70	60	55	50	45				
			Vertical	100						95	80	70	60	55	50	45					
		10	Horizontal	240						230	195	165	145	125	110	100	90				
			Vertical	200						195	165	145	125	110	100	90					
		20	Horizontal	280	405	450				400	340	295	260	225	200	180					
			Vertical	-																	

WRA16C has no relation to the high output setting. There is no parameter setting.

 **Caution:** When a speed less than the min. speed, operation will not made in the set speed. Do not attempt to set a speed less than the min. speed. Figure out the minimum speed using the following formula.
 Min. Speed [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]

[2] Motor Reversing Type

(Note) For Lead 10 and 16 of WRA10R, Lead 12 and 20 of WRA12R, Lead 16 and 24 of WRA14R and Lead 20 of WSA16R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

[When high-output setting is effective]

Speed limits [Unit: mm/s]

Size	Motor Type	Lead [mm]	Horizontal / Vertical	Stroke [mm]																
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	
WRA 10R	35P	2.5	Horizontal	175						145	120	-	-	-	-	-	-	-	-	
			Vertical	150						145	120	-	-	-	-	-	-	-	-	
		5	Horizontal	350						290	240	-	-	-	-	-	-	-	-	
			Vertical	260						240	240	-	-	-	-	-	-	-	-	
		10	Horizontal	525						490	490	-	-	-	-	-	-	-	-	-
			Vertical	-						-	-	-	-	-	-	-	-	-	-	-
16	Horizontal	700						-	-	-	-	-	-	-	-	-	-	-		
	Vertical	-						-	-	-	-	-	-	-	-	-	-	-		
WRA 12R	42P	3	Horizontal	225						220	185	-	-	-	-	-	-	-	-	
			Vertical	200						185	185	-	-	-	-	-	-	-	-	
		6	Horizontal	400						375	375	-	-	-	-	-	-	-	-	
			Vertical	280						-	-	-	-	-	-	-	-	-	-	
		12	Horizontal	560						-	-	-	-	-	-	-	-	-	-	
			Vertical	-						-	-	-	-	-	-	-	-	-	-	-
20	Horizontal	800						-	-	-	-	-	-	-	-	-	-			
	Vertical	-						-	-	-	-	-	-	-	-	-	-	-		
WRA 14R	56P	4	Horizontal	175						-	-	-	-	-	-	-	-	-		
			Vertical	130						-	-	-	-	-	-	-	-	-		
		8	Horizontal	350						-	-	-	-	-	-	-	-	-		
			Vertical	210						-	-	-	-	-	-	-	-	-		
		16	Horizontal	560						-	-	-	-	-	-	-	-	-		
			Vertical	-						-	-	-	-	-	-	-	-	-		
24	Horizontal	630						-	-	-	-	-	-	-	-	-				
	Vertical	-						-	-	-	-	-	-	-	-	-				
WRA 16R	60P	5	Horizontal	120						115	95	80	70	60	55	50	45			
			Vertical	100						95	80	70	60	55	50	45				
		10	Horizontal	240						230	195	165	145	125	110	100	90			
			Vertical	180						195	165	145	125	110	100	90				
		20	Horizontal	280	405	420				400	340	295	260	225	200	180				
			Vertical	-						-	-	-	-	-	-	-				

WRA16R has no relation to the high output setting. There is no parameter setting.

	<p>Caution: When a speed less than the min. speed, operation will not made in the set speed. Do not attempt to set a speed less than the min. speed. Figure out the minimum speed using the following formula. Min. Speed [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]</p>
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[3] Motor Straight Type

(Note) For Lead 10 and 16 of WRA10R, Lead 12 and 20 of WRA12C, Lead 16 and 24 of WRA14C and Lead 20, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

(Note) There is no high output setting prepared for WRA16C and WRA16R which are to be operated with PCON-CFB controller.

[When high-output setting is ineffective]

Speed limits [Unit: mm/s]

Size	Motor Type	Lead [mm]	Horizontal / Vertical	Stroke [mm]																	
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800		
WRA 10C	35P	2.5	Horizontal	130											120	-	-	-	-	-	-
			Vertical	130											120	-	-	-	-	-	-
		5	Horizontal	260											240	-	-	-	-	-	-
			Vertical	215											-	-	-	-	-	-	-
		10	Horizontal	435											-	-	-	-	-	-	-
			Vertical	-											-	-	-	-	-	-	-
		16	Horizontal	560											-	-	-	-	-	-	-
			Vertical	-											-	-	-	-	-	-	-
WRA 12C	42P	3	Horizontal	110											-	-	-	-	-	-	
			Vertical	110											-	-	-	-	-	-	
		6	Horizontal	220											-	-	-	-	-	-	
			Vertical	220											-	-	-	-	-	-	
		12	Horizontal	440											-	-	-	-	-	-	
			Vertical	-											-	-	-	-	-	-	
		20	Horizontal	480											-	-	-	-	-	-	
			Vertical	-											-	-	-	-	-	-	
WRA 14C	56P	4	Horizontal	105											-	-	-	-	-		
			Vertical	105											-	-	-	-	-		
		8	Horizontal	210											-	-	-	-	-		
			Vertical	140											-	-	-	-	-		
		16	Horizontal	420											-	-	-	-	-		
			Vertical	-											-	-	-	-	-		
		24	Horizontal	420											-	-	-	-	-		
			Vertical	-											-	-	-	-	-		

WRA16R has no relation to the high output setting. There is no parameter setting.

 **Caution:** When a speed less than the min. speed, operation will not made in the set speed. Do not attempt to set a speed less than the min. speed. Figure out the minimum speed using the following formula.
 Min. Speed [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]

[4] Motor Reversing Type

(Note) For Lead 10 and 16 of WRA10R, Lead 12 and 20 of WRA12C, Lead 16 and 24 of WRA14C and Lead 20, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

(Note) There is no high output setting prepared for WRA16C and WRA16R which are to be operated with PCON-CFB controller.

[When high-output setting is ineffective]

Speed limits [Unit: mm/s]

Size	Motor Type	Lead [mm]	Horizontal / Vertical	Stroke [mm]																	
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800		
WRA 10R	35P	2.5	Horizontal	130											120	-	-	-	-	-	-
			Vertical	130											120	-	-	-	-	-	-
		5	Horizontal	260											240	-	-	-	-	-	-
			Vertical	215											-	-	-	-	-	-	-
		10	Horizontal	435											-	-	-	-	-	-	-
			Vertical	-											-	-	-	-	-	-	-
16	Horizontal	560											-	-	-	-	-	-	-		
	Vertical	-											-	-	-	-	-	-	-		
WRA 12R	42P	3	Horizontal	110											-	-	-	-	-	-	
			Vertical	110											-	-	-	-	-	-	
		6	Horizontal	220											-	-	-	-	-	-	
			Vertical	220											-	-	-	-	-	-	
		12	Horizontal	440											-	-	-	-	-	-	
			Vertical	-											-	-	-	-	-	-	
20	Horizontal	480											-	-	-	-	-	-			
	Vertical	-											-	-	-	-	-	-			
WRA 14R	56P	4	Horizontal	105											-	-	-	-	-		
			Vertical	105											-	-	-	-	-		
		8	Horizontal	210											-	-	-	-	-		
			Vertical	140											-	-	-	-	-		
		16	Horizontal	420											-	-	-	-	-		
			Vertical	-											-	-	-	-	-		
24	Horizontal	420											-	-	-	-	-				
	Vertical	-											-	-	-	-	-				

WRA16R has no relation to the high output setting. There is no parameter setting.

 **Caution:** When a speed less than the min. speed, operation will not made in the set speed.
 Do not attempt to set a speed less than the min. speed.
 Figure out the minimum speed using the following formula.
 Min. Speed [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]

1.2.2 Maximum Acceleration and Payload

If the payload is smaller than as specified, the acceleration/deceleration can be raised beyond the applicable level.

(Note) The payloads in horizontal orientation are the values when the rod is held by external guides.

[1] Motor Straight Type

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA10C	35P	2.5	Horizontal	0	40	40	40	35	30
				20	40	40	40	35	30
				40	40	40	40	35	30
				65	40	40	40	35	30
				85	40	40	40	35	30
				105	40	40	35	35	30
				130	40	40	35	30	30
				150	40	35	35	30	30
			175	40	33.5	29.5	27.5	17.5	
			Vertical	0	10	10	10	-	-
				20	10	10	10	-	-
				40	10	10	10	-	-
				65	10	10	10	-	-
				85	10	10	10	-	-
		105		10	10	10	-	-	
		130		8.5	8.5	8.5	-	-	
		150		5.5	5.5	5.5	-	-	
		175	2.5	2.5	0.5	-	-		
		5	Horizontal	0	28	25	22	20	20
				40	28	25	22	20	20
				85	28	25	22	20	20
				130	28	25	22	20	20
				175	28	25	22	20	20
				215	28	25	22	20	13.5
				260	28	25	20.5	15.5	12.5
				305	28	17.5	13.5	12.5	7.5
			350	28	9.5	5.5	4.5	2.5	
			Vertical	0	5	5	5	-	-
40	5			5	5	-	-		
85	5			5	5	-	-		
130	5			5	5	-	-		
175	5			5	5	-	-		
215	3	3		3	-	-			
260	1	1	1	-	-				
305	-	-	-	-	-				
350	-	-	-	-	-				

[When high-output setting for motor straight type is effective]

(Note) For Lead 10 and 16 of WRA10C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA10C	35P	10	Horizontal	0	14.5	14.5	13	12.5	12
				85	14.5	14.5	13	12.5	12
				175	14.5	14.5	12.5	11.5	9.5
				260	14.5	14.5	12.5	8.5	6.5
				350	14.5	14.5	11.5	7.5	3.5
				435	14.5	12.5	7.5	4.5	2.5
				525	10.5	7.5	2.5	0.5	-
		610	-	-	-	-	-		
		700	-	-	-	-	-		
		16	Horizontal	0	4	4	3.5	2.5	1.5
				140	4	4	3.5	2.5	1.5
				280	4	4	3.5	2.5	1
				420	4	4	3.5	2	0.5
				560	-	2.5	2.5	-	-
700	-			-	0.5	-	-		

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA12C	42P	3	Horizontal	0	70	60	50	45	40
				20	70	60	50	45	40
				50	70	60	50	45	40
				80	70	60	50	45	40
				110	70	60	50	45	40
				140	70	50	40	30	25
				170	70	40	35	25	20
				200	70	35	30	20	14
			225	50	16	16	10	6	
			Vertical	0	17.5	17.5	17.5	-	-
				20	17.5	17.5	17.5	-	-
				50	17.5	17.5	17.5	-	-
				80	17.5	17.5	17.5	-	-
				110	17.5	17.5	17.5	-	-
				140	13.5	13.5	6	-	-
				170	3.5	3.5	3.5	-	-
		200		1	1	1	-	-	
		225	-	-	-	-	-		
		6	Horizontal	0	55	40	35	30	25
				40	55	40	35	30	25
				100	55	40	35	30	25
				160	55	40	32.5	25	25
				220	55	40	27.5	25	19.5
				280	55	35	25	20	14
				340	55	22.5	14	12	10
				400	45	12.5	10	6	3.5
			Vertical	0	7.5	7.5	7.5	-	-
				40	7.5	7.5	7.5	-	-
				100	7.5	7.5	7.5	-	-
				160	7.5	7.5	7.5	-	-
				220	7.5	7.5	6.5	-	-
				280	4.5	4.5	4.5	-	-
340	0.5			-	-	-	-		
400	-			-	-	-	-		

[When high-output setting for motor straight type is effective]

(Note) For Lead 12 and 20 of WRA12C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA12C	42P	12	Horizontal	0	30	25	18	16	12
				80	30	25	18	16	12
				200	30	25	18	16	10
				320	30	25	18	12	8
				440	25	20	13.5	10	6
				560	-	15	8	6	4
		20	Horizontal	0	7.5	7.5	5.5	5.5	5.5
				160	7.5	7.5	5.5	5.5	5.5
				320	7.5	7.5	4.5	2.5	1.5
				480	7.5	4.5	3.5	0.5	0.5
				640	-	4.5	3.5	-	-
				800	-	0.5	0.5	-	-

[When high-output setting for motor straight type is effective]

(Note) For Lead 16 and 24 of WRA14C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA14C	56P	4	Horizontal	0	85	80	70	65	60
				35	85	80	70	65	60
				70	85	80	70	65	60
				105	85	80	60	50	40
				130	85	50	30	20	15
				175	55	11	-	-	-
				210	15	-	-	-	-
			Vertical	0	25	25	25	-	-
				35	25	25	25	-	-
				70	25	25	25	-	-
				105	21	19	17	-	-
				130	11	9	7	-	-
				175	-	-	-	-	-
				210	-	-	-	-	-
		8	Horizontal	0	65	65	55	50	45
				70	65	65	55	50	45
				140	65	65	55	50	45
				210	65	65	40	30	25
				280	65	30	17	9	3
				350	50	7	-	-	-
				420	7	-	-	-	-
			Vertical	0	15	15	15	-	-
				70	15	15	15	-	-
				140	15	15	11	-	-
				210	7	5	4	-	-
				280	-	-	-	-	-
				350	-	-	-	-	-
				420	-	-	-	-	-
		16	Horizontal	0	50	50	40	35	30
				140	50	50	40	35	30
				280	50	50	31	25	20
				420	50	25	14	8	6
				560	10	6	-	-	-
		24	Horizontal	0	25	22	14	12	12
				210	25	22	14	12	12
				420	25	18	14	6	5
				630	20	8	2	-	-

[Motor straight type]

(Note) For Lead 20 of WRA16C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

WRA16C has no relation to the high output setting. There is no parameter setting.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.1G	0.2G
WRA16C	60P	5	Horizontal	0	100	-
				90	100	-
				120	58	-
				130	24	-
			Vertical	0	70	-
				48	70	-
				60	50	-
				70	35	-
				80	25	-
				90	20	-
				100	13	-
				10	Horizontal	0
		150	-			60
		200	-			45
		240	-			36
		Vertical	0		-	36.5
			88		-	36.5
			100		-	29.5
			110		-	24.5
			120		-	19.5
			130		-	16.5
			140		-	14.5
			150		-	11
		20	Horizontal	0	-	30
				240	-	30
				300	-	30
				360	-	24
				420	-	14
				450	-	5



Caution: Do not set speeds and accelerations/decelerations equal to or greater than the respective ratings. Doing so may result in vibration, failure or shorter life. If any acceleration/deceleration equal to or greater than the rated acceleration/deceleration is set, a creep phenomenon or slipped coupling may occur.

[2] Motor Reversing Type

[When high-output setting for motor reversing is effective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA10R	35P	2.5	Horizontal	0	40	40	40	35	30
				20	40	40	40	35	30
				40	40	40	40	35	30
				65	40	40	40	35	30
				85	40	40	40	35	30
				105	40	40	35	35	30
				130	40	40	35	30	30
				150	40	35	35	30	30
			175	40	33.5	29.5	25.5	17.5	
			Vertical	0	10	10	10	-	-
				20	10	10	10	-	-
				40	10	10	10	-	-
				65	10	10	10	-	-
				85	10	10	10	-	-
				105	10	10	10	-	-
				130	3.5	3.5	3.5	-	-
		150		1.5	1.5	1.5	-	-	
		175	-	-	-	-	-		
		5	Horizontal	0	28	25	22	20	20
				40	28	25	22	20	20
				85	28	25	22	20	20
				130	28	25	22	20	20
				175	28	25	22	20	20
				215	28	25	22	20	13.5
				260	28	25	20.5	15.5	12.5
				305	28	17.5	12.5	10.5	7.5
			350	28	9.5	5.5	3.5	0.5	
			Vertical	0	5	5	5	-	-
				40	5	5	5	-	-
				85	5	5	5	-	-
				130	5	5	5	-	-
				175	5	5	5	-	-
215	3			3	3	-	-		
260	1			1	1	-	-		
305	-	-		-	-	-			
350	-	-	-	-	-				

[When high-output setting for motor reversing is effective]

(Note) For Lead 10 and 16 of WRA10R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA10R	35P	10	Horizontal	0	11.5	11.5	8.5	8.5	6.5
				85	11.5	11.5	8.5	8.5	6.5
				175	11.5	11.5	8.5	8.5	3.5
				260	11.5	11.5	8.5	7.5	2.5
				350	11.5	11.5	8.5	6.5	2.5
				435	11.5	8.5	6.5	3.5	1.5
				525	10.5	6.5	2.5	0.5	-
		610	-	-	-	-	-		
		0	4	3.5	2.5	0.5	-		
		140	4	3.5	2.5	0.5	-		
		280	4	3.5	2.5	0.5	-		
		420	4	3.5	2.5	0.5	-		
		560	-	2.5	2	-	-		
		700	-	-	0.5	-	-		

[When high-output setting for motor reversing is effective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA12R	42P	3	Horizontal	0	70	60	50	45	40
				20	70	60	50	45	40
				50	70	60	50	45	40
				80	70	60	50	45	40
				110	70	60	50	45	40
				140	70	50	40	30	25
				170	70	40	35	25	20
				200	70	35	30	20	14
			225	50	16	16	10	6	
			Vertical	0	17.5	17.5	17.5	-	-
				20	17.5	17.5	17.5	-	-
				50	17.5	17.5	17.5	-	-
				80	17.5	17.5	17.5	-	-
				110	17.5	17.5	17.5	-	-
		140		13.5	10	6	-	-	
		6	Horizontal	170	3.5	3.5	3.5	-	-
				200	1	1	0.5	-	-
				225	-	-	-	-	-
				0	55	40	35	30	25
				40	55	40	35	30	25
				100	55	40	35	30	25
				160	55	40	32.5	25	25
				220	55	40	27.5	25	19.5
			Vertical	280	55	35	25	20	14
				340	55	22.5	14	12	10
				400	45	12.5	10	6	3.5
				0	7.5	7.5	7.5	-	-
				40	7.5	7.5	7.5	-	-
100	7.5			7.5	7.5	-	-		
6	Vertical	160	7.5	7.5	7.5	-	-		
		220	7.5	7.5	6.5	-	-		
		280	3.5	3.5	3.5	-	-		
		340	-	-	-	-	-		
		400	-	-	-	-	-		

[When high-output setting for motor straight type is effective]

(Note) For Lead 12 and 20 of WRA12R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA12R	42P	12	Horizontal	0	30	25	18	16	10
				80	30	25	18	16	10
				200	30	25	18	16	10
				320	30	25	18	12	8
				440	25	20	13.5	10	6
				560	-	13.5	8	5.5	3.5
		20	Horizontal	0	7.5	7.5	5.5	5.5	5.5
				160	7.5	7.5	5.5	5.5	5.5
				320	7.5	7.5	4.5	2.5	1.5
				480	7.5	4.5	3.5	0.5	0.5
				640	-	4.5	3.5	-	-
				800	-	0.5	0.5	-	-

[When high-output setting for motor straight type is effective]

(Note) For Lead 16 and 24 of WRA14R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Speed [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
WRA14R	56P	4	Horizontal	0	85	80	70	65	60
				35	85	80	70	65	60
				70	85	80	70	65	60
				105	85	80	60	50	40
				130	85	50	10	6	6
				175	45	-	-	-	-
				210	-	-	-	-	-
			Vertical	0	25	23	23	-	-
				35	25	23	23	-	-
				70	25	23	23	-	-
				105	19	17	17	-	-
				130	7	4	-	-	-
				175	-	-	-	-	-
				210	-	-	-	-	-
		8	Horizontal	0	65	65	55	50	45
				70	65	65	55	50	45
				140	65	65	55	50	45
				210	65	65	40	30	23
				280	65	25	13	7	3
				350	35	-	-	-	-
				420	-	-	-	-	-
			Vertical	0	15	15	15	-	-
				70	15	15	15	-	-
				140	13	13	10	-	-
				210	5	5	4	-	-
				280	-	-	-	-	-
				350	-	-	-	-	-
				420	-	-	-	-	-
		16	Horizontal	0	50	50	40	35	30
				140	50	50	40	35	30
				280	50	46	31	22	18
				420	50	22	12	8	6
				560	10	2	-	-	-
		24	Horizontal	0	25	22	14	12	8
				210	25	22	14	12	8
				420	25	18	14	6	3
				630	-	8	2	-	-

[Motor Reversing Type]

(Note) For Lead 20 of WRA16R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

WRA16C has no relation to the high output setting. There is no parameter setting.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.1G	0.2G
WRA16R	60P	5	Horizontal	0	100	-
				90	100	-
				120	58	-
			Vertical	0	63	-
				48	63	-
				60	33	-
				70	28	-
				80	18	-
		10	Horizontal	90	9	-
				100	2	-
				0	-	60
				150	-	60
			Vertical	200	-	45
				240	-	18
				0	-	34.5
				88	-	34.5
				100	-	24.5
				110	-	19.5
				120	-	16.5
		20	Horizontal	130	-	14.5
				140	-	11.5
				150	-	7.5
				160	-	5.5
				170	-	4.5
			Vertical	180	-	2.5
				0	-	30
				240	-	30
				300	-	30
				360	-	19
				420	-	10.5



Caution: Do not set speeds and accelerations/decelerations equal to or greater than the respective ratings. Doing so may result in vibration, failure or shorter life. If any acceleration/deceleration equal to or greater than the rated acceleration/deceleration is set, a creep phenomenon or slipped coupling may occur.

[3] Motor Straight Type

(Note) There is no high output setting prepared for WRA16C and WRA16R which are to be operated with PCON-CFB controller.

[When high-output setting for motor straight type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA10C	35P	2.5	Horizontal	0	40	27
				20	40	27
				40	36	27
				65	36	27
				85	36	27
				105	36	27
				130	33	22.5
			Vertical	0	10	-
				20	10	-
				40	10	-
				65	10	-
				85	8.5	-
				105	6	-
				130	3.5	-
		5	Horizontal	0	25	19
				40	25	19
				85	25	19
				130	25	19
				175	25	15.5
				215	18	12
				260	10.5	6.5
			Vertical	0	5	-
				40	5	-
				85	5	-
				130	5	-
				175	4	-
				215	2.5	-
				260	-	-

[When high-output setting for motor straight type is ineffective]

(Note) For Lead 10 and 16 of WRA10C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA10C	35P	10	Horizontal	0	9.5	8
				85	9.5	8
				175	9.5	8
				260	9.5	6.5
				350	7.5	6
				435	5	2.5
		16	Horizontal	0	3.5	0.5
				140	3.5	0.5
				280	3.5	0.5
				420	3.5	0.5
		560	2.5	-		

[When high-output setting for motor straight type is ineffective]

(Note) For Lead 12 and 20 of WRA12C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA12C	42P	3	Horizontal	0	60	45
				20	60	45
				50	60	45
				80	60	45
				110	60	45
			Vertical	0	13	-
				20	13	-
				50	13	-
				80	12	-
				110	6	-
		6	Horizontal	0	39	30
				40	39	30
				100	39	30
				160	39	24
				220	24	15
			Vertical	0	6	-
				40	6	-
				100	6	-
				160	5	-
				220	2	-
		12	Horizontal	0	18.5	10.5
				80	18.5	10.5
				200	18.5	9.5
				320	15	7
				440	3	1.5
		20	Horizontal	0	7.5	5.5
				160	7.5	5.5
				320	7.5	2.5
480	3			0.5		

[When high-output setting for motor straight type is ineffective]

(Note) For Lead 16 and 24 of WRA14C, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA14C	56P	4	Horizontal	0	57	48
				35	57	48
				70	57	48
				105	12	7.5
			Vertical	0	18	-
				35	18	-
				70	13.5	-
				105	1	-
		8	Horizontal	0	45	33
				70	45	33
				140	45	27
				210	12	4.5
			Vertical	0	12	-
				70	12	-
				140	6	-
				210	-	-
		16	Horizontal	0	37	27
				140	37	27
				280	18	13
				420	3.5	-
24	Horizontal	0	18	9.5		
		210	18	9.5		
		420	8	3		



Caution: Do not set speeds and accelerations/decelerations equal to or greater than the respective ratings. Doing so may result in vibration, failure or shorter life. If any acceleration/deceleration equal to or greater than the rated acceleration/deceleration is set, a creep phenomenon or slipped coupling may occur.

[4] Motor Reversing Type

(Note) There is no high output setting prepared for WRA16C and WRA16R which are to be operated with PCON-CFB controller.

[When high-output setting for motor reversing type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA10R	35P	2.5	Horizontal	0	40	27
				20	40	27
				40	36	27
				65	36	27
				85	36	27
				105	36	27
				130	33	22.5
			Vertical	0	10	-
				20	10	-
				40	10	-
				65	10	-
				85	8.5	-
				105	6	-
				130	3.5	-
		5	Horizontal	0	25	19
				40	25	19
				85	25	19
				130	25	19
				175	25	15.5
				215	18	12.
				260	10.5	6.5
			Vertical	0	5	-
				40	5	-
				85	5	-
				130	5	-
				175	4	-
				215	2.5	-
				260	-	-

[When high-output setting for motor reversing type is ineffective]

(Note) For Lead 10 and 16 of WRA10R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA10R	35P	10	Horizontal	0	9.5	8
				85	9.5	8
				175	9.5	8
				260	9.5	6.5
				350	7.5	6
				435	5	2.5
		16	Horizontal	0	3.5	0.5
				140	3.5	0.5
				280	3.5	0.5
				420	3.5	0.5
				560	2.5	-

[When high-output setting for motor reversing type is ineffective]

(Note) For Lead 12 and 20 of WRA12R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA12R	42P	3	Horizontal	0	60	45
				20	60	45
				50	60	45
				80	60	45
				110	60	45
			Vertical	0	13	-
				20	13	-
				50	13	-
				80	12	-
				110	6	-
		6	Horizontal	0	39	30
				40	39	30
				100	39	30
				160	39	24
				220	24	15
			Vertical	0	6	-
				40	6	-
				100	6	-
				160	5	-
				220	2	-
		12	Horizontal	0	18.5	10.5
				80	18.5	10.5
				200	18.5	9.5
				320	15	7
				440	3	1.5
		20	Horizontal	0	7.5	5.5
				160	7.5	5.5
				320	7.5	2.5
480	3			0.5		

[When high-output setting for motor reversing type is ineffective]
 (Note) For Lead 16 and 24 of WRA14R, there is no setting of the maximum payload type against the speed and acceleration as the payload is low for vertical orientation. Use the radial cylinder type.

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]		
				Speed [mm/s]	0.3G	0.7G
WRA14R	56P	4	Horizontal	0	57	48
				35	57	48
				70	57	48
				105	12	7.5
			Vertical	0	18	-
				35	18	-
				70	13.5	-
				105	1	-
		8	Horizontal	0	45	33
				70	45	33
				140	45	27
				210	12	4.5
			Vertical	0	12	-
				70	12	-
				140	6	-
				210	-	-
		16	Horizontal	0	37	27
				140	37	27
				280	18	13
				420	3.5	-
		24	Horizontal	0	18	9.5
				210	18	9.5
				420	8	3



Caution: Do not set speeds and accelerations/decelerations equal to or greater than the respective ratings. Doing so may result in vibration, failure or shorter life. If any acceleration/deceleration equal to or greater than the rated acceleration/deceleration is set, a creep phenomenon or slipped coupling may occur.

1.2.3 Driving System • Position Detector

Type	Motor Type	Lead	No. of Encoder Pulses	Ball Screw Type		
				Type	Diameter	Accuracy
WRA10C WRA10R	35P	2.5	8192	Rolled	φ8mm	C10
		5				
		10				
		16				
WRA12C WRA12R	42P	3		Rolled	φ10mm	C10
		6				
		12				
		20				
WRA14C WRA14R	56P	4		Rolled	φ12mm	C10
		8				
		16				
		24				
WRA16C WRA16R	60P	5	Rolled	φ16mm	C10	
		10				
		20				

1.2.4 Positioning Precision

Type	Lead	Item	Tolerance
WRA10C WRA10R	2.5, 5, 10, 16	Positioning repeatability	±0.01mm
		Lost motion	0.1mm or less
WRA12C WRA12R	3, 6, 12, 20	Positioning repeatability	±0.01mm
		Lost motion	0.1mm or less
WRA14C WRA14R	4, 8, 16, 24	Positioning repeatability	±0.01mm
		Lost motion	0.1mm or less
WRA16C WRA16R	5, 10, 20	Positioning repeatability	±0.01mm
		Lost motion	0.1mm or less

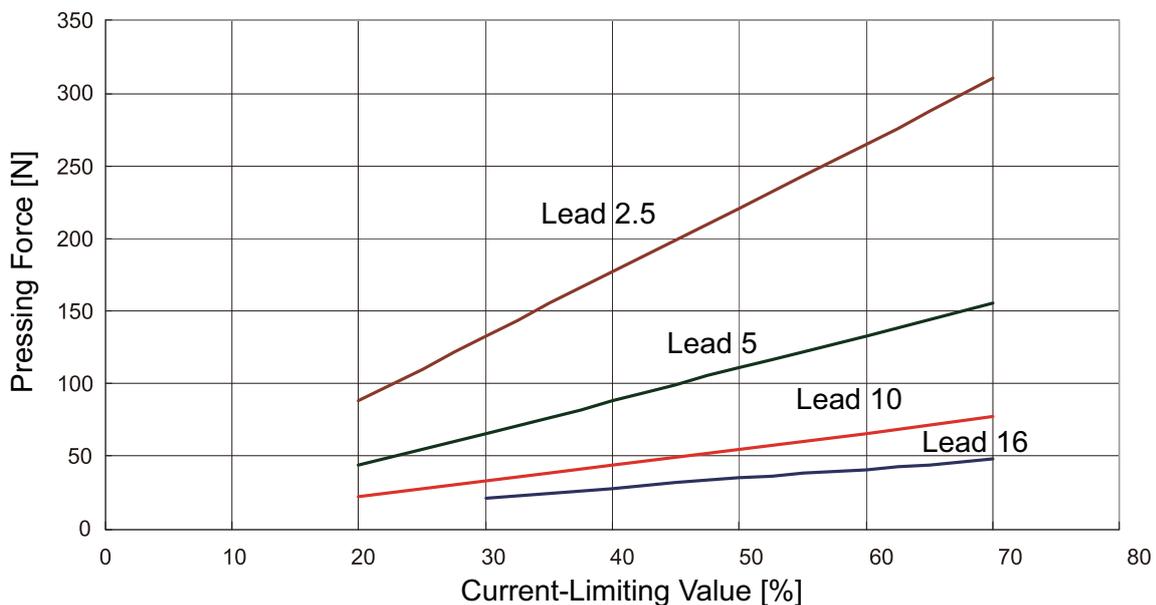
This is an option already attached when it is shipped out from the factory.
It does not include the consideration of time-dependent change as it is used.

1.2.5 Current Limit Value and Pressing Force

[1] WRA10C and WRA10R Motor Type 35P

Current Limiting Value	Lead 2.5 [N]	Lead 5 [N]	Lead 10 [N]	Lead 16 [N]
20%	89	44	22	-
30%	133	66	33	21
40%	177	88	44	27
50%	221	111	55	34
60%	266	133	66	41
70%	310	155	77	48

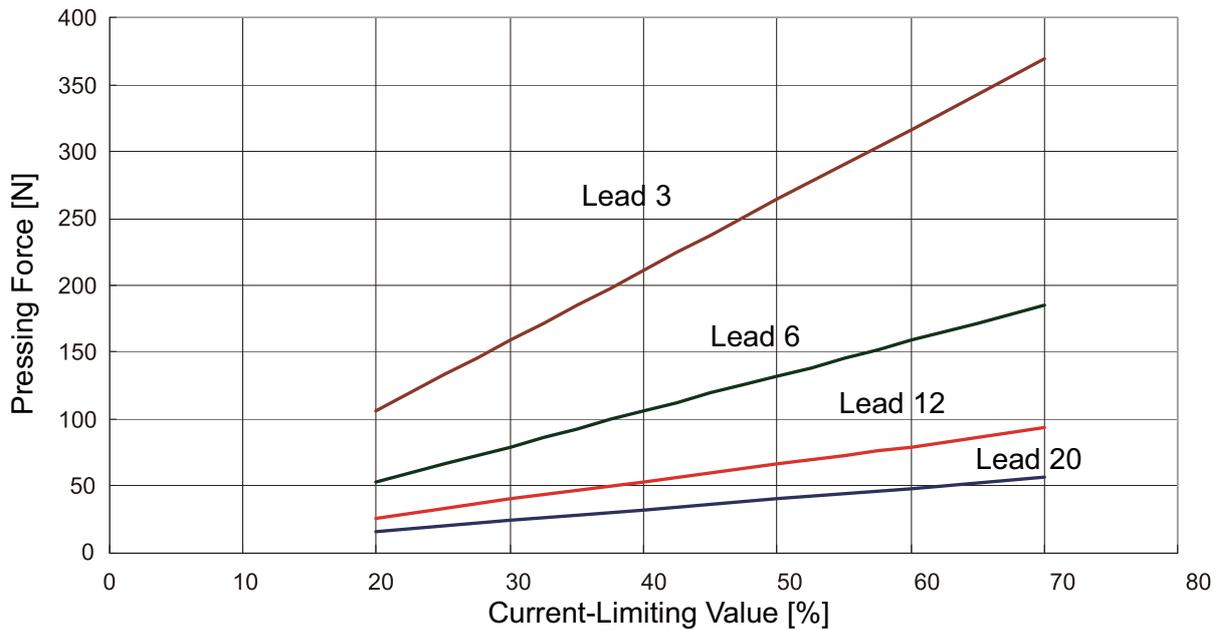
WRA10C/R Current Limiting Values and Pressing Force



- ⚠ Caution:**
- (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
 - (2) There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
 - (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20% (below 30% for Lead 16). There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
 - (4) For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.
For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

[2] WRA12C and WRA12R Motor Type 42P

Current Limiting Value	Lead 3 [N]	Lead 6 [N]	Lead 12 [N]	Lead 20 [N]
20%	106	53	26	16
30%	159	79	40	24
40%	211	106	53	32
50%	264	132	66	40
60%	317	159	79	48
70%	370	185	93	56

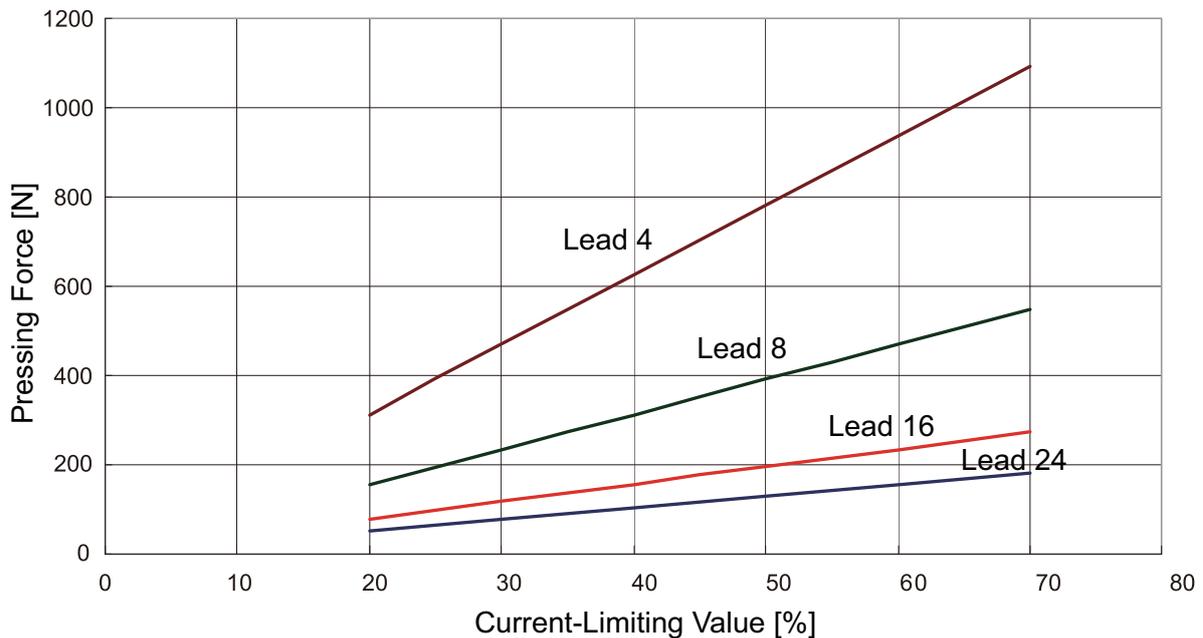
WRA12C/R Current Limiting Values and Pressing Force


- Caution: (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
- (2) There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- (4) For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.
For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

[3] WRA14C and WRA14R Motor Type 56P

Current Limiting Value	Lead 4 [N]	Lead 8 [N]	Lead 16 [N]	Lead 24 [N]
20%	312	156	78	52
30%	469	234	117	78
40%	625	312	156	104
50%	781	391	195	130
60%	937	469	234	156
70%	1094	547	273	182

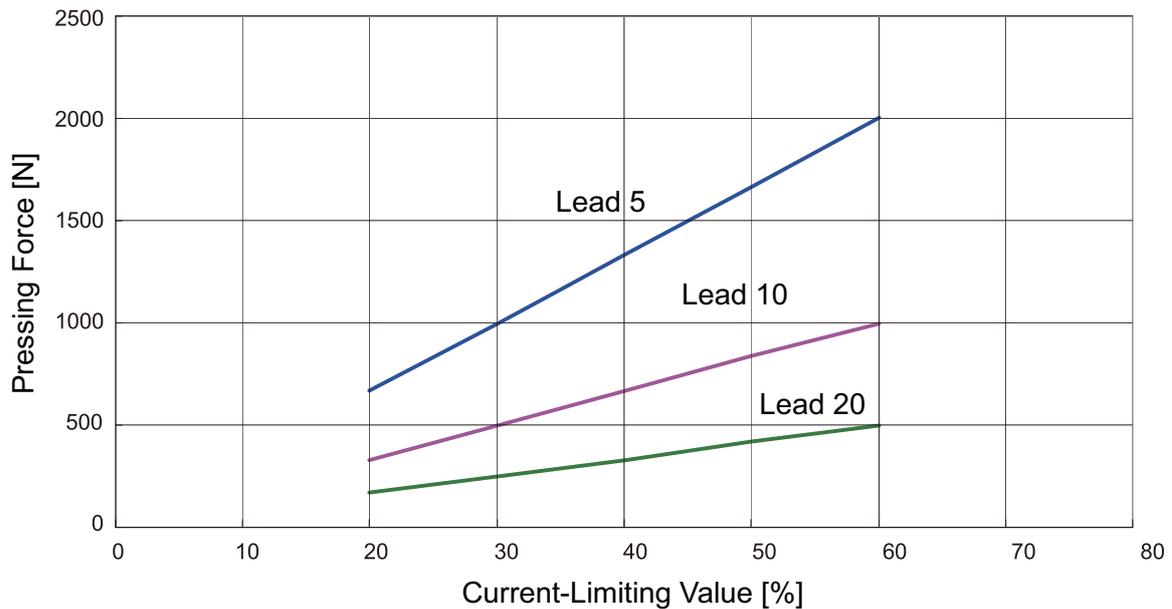
WRA14C/R Current Limiting Values and Pressing Force



Caution: (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
 (2) There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
 (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
 (4) For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.
 For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

[4] WRA16C and WRA16R Motor Type 60P

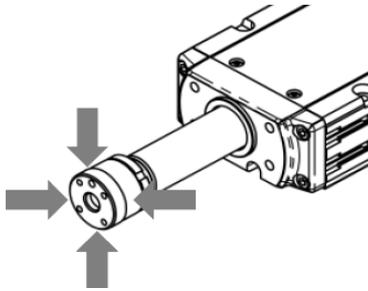
Current Limiting Value	Lead5 [N]	Lead10 [N]	Lead20 [N]
20%	667	333	167
30%	1000	500	250
40%	1333	667	333
50%	1667	833	417
60%	2000	1000	500

WRA16C/R Current Limiting Values and Pressing Force


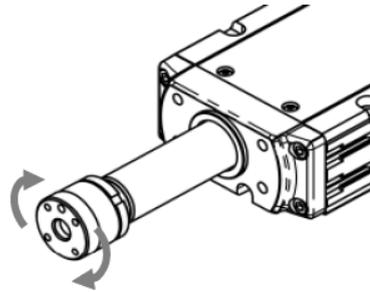
- Caution: (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 10mm/s.
- (2) There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 60%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- (4) For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 10mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.
- For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

1.2.6 Allowable Load and Torque on Rod Tip

- Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table. Applying excess load may cause an operation failure, parts malfunction and shortened life.



Should be below allowable load
Do not attempt to apply impact load



Should be below allowable torque

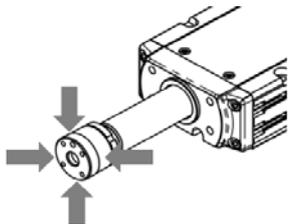
©WRA10C and WRA10R

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Rod Tip Static Allowable Load ^(Note 1)	[N]		196	196	196	196	196	196	196	196	184	169
Rod Tip Dynamic Allowable Load (Operating life 3,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	98	98	98	95	85	76	68	62	57	52
	[N]	Rod Tip Offset Distance 100mm	50	50	50	50	50	50	50	50	50	49
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	98	98	91	80	71	63	57	52	47	43
	[N]	Rod Tip Offset Distance 100mm	50	50	50	50	50	50	50	48	44	40
Rod Tip Offset Distance (Center of overhang load gravity)	[mm]		100 or less									
Rod Tip Overhang Distance	[mm]		100 or less									
Rod Tip Static Allowable Torque	[N•m]		10	10	10	10	10	10	10	10	10	10
Rod Tip Dynamic Allowable Torque (Operating life 3,000km Remaining Probability 90%)	[N•m]		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.9
Rod Tip Dynamic Allowable Torque (Operating life 5,000km Remaining Probability 90%)	[N•m]		5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.8	4.4	4.0
Rod Non-Rotation Accuracy ^(Note 2)	[deg]		0									

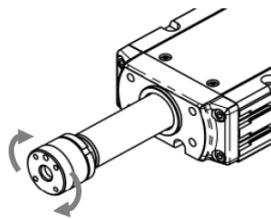
Note 1 It is the value for when the rod tip offset distance is 0mm and also the rod tip overhang distance is 0mm.

Note 2 It shows the displacement angle in the rod rotational direction at no load.

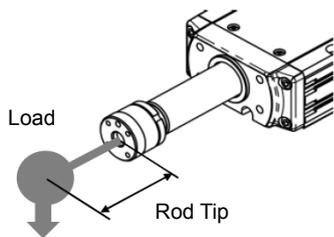
[Rod Tip Static Allowable Load]



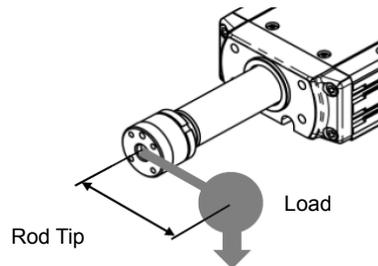
[Rod Tip Allowable Torque]



[Rod Tip Offset Distance]



[Rod Tip Overhang Distance]



● WRA10C and WRA10R: Allowable Payload for 3,000km of Operational Life

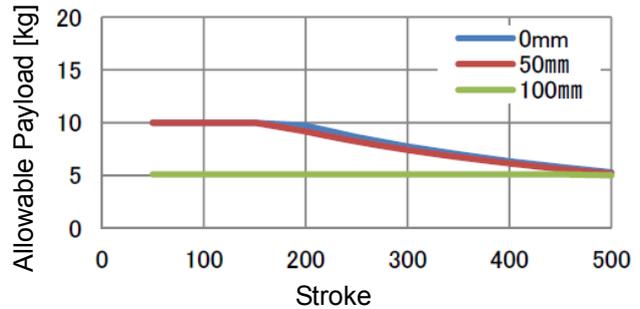
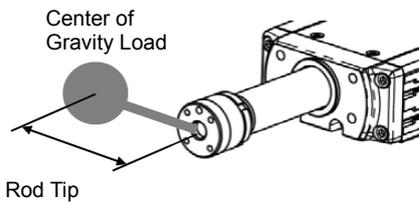
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

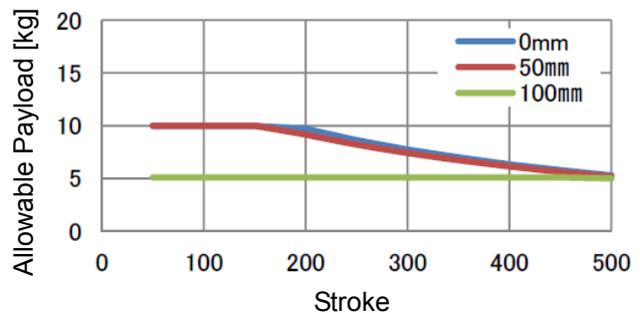
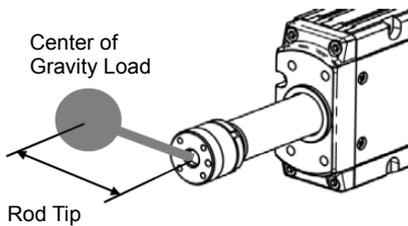
[Horizontal Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	10.0	10.0	10.0	9.7	8.6	7.7	7.0	6.3	5.8	5.3
	[kg] Rod Tip Offset Distance 50mm	10.0	10.0	10.0	9.2	8.2	7.4	6.7	6.1	5.6	5.1
	[kg] Rod Tip Offset Distance 100mm	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.0



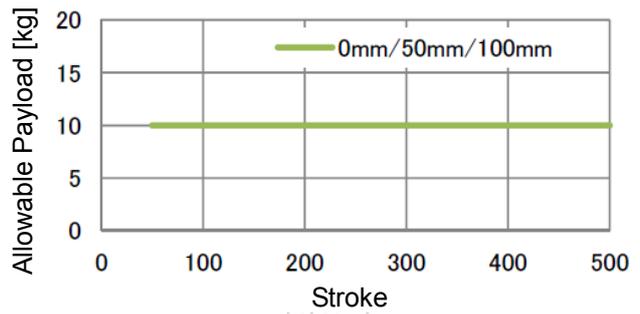
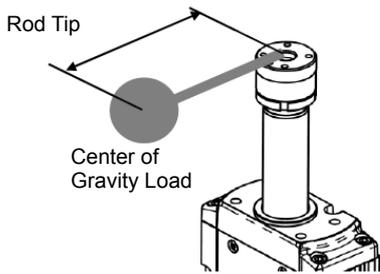
[Sideways Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	10.0	10.0	10.0	9.7	8.6	7.7	7.0	6.3	5.8	5.3
	[kg] Rod Tip Offset Distance 50mm	10.0	10.0	10.0	9.2	8.2	7.4	6.7	6.1	5.6	5.1
	[kg] Rod Tip Offset Distance 100mm	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.0



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	[kg]	Rod Tip Eccentricity Distance 50mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	[kg]	Rod Tip Eccentricity Distance 100mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0



● WRA10C and WRA10R: Allowable Payload for 5,000km of Operational Life

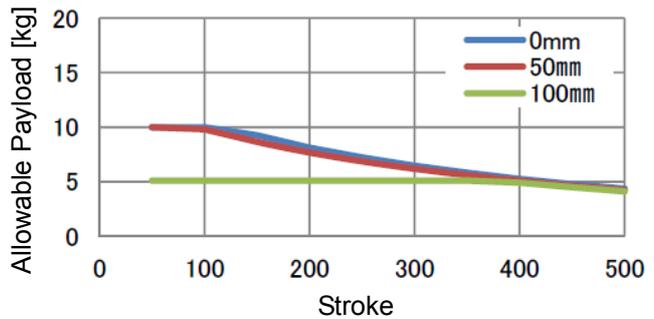
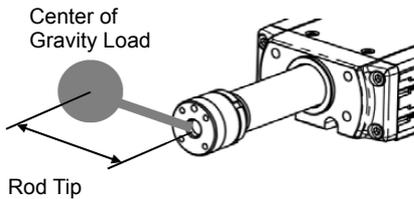
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

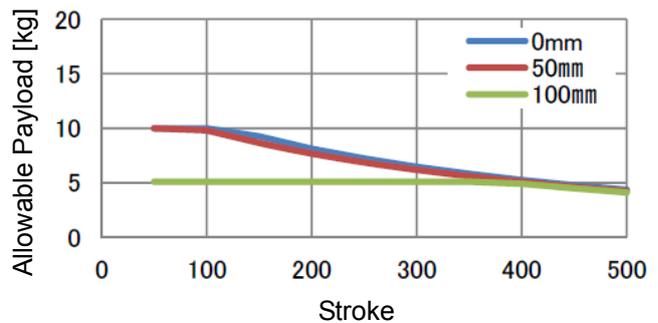
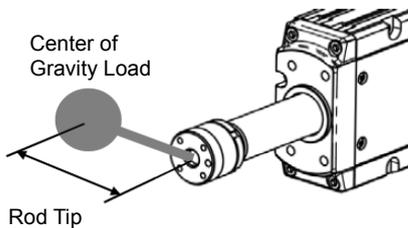
[Horizontal Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	10.0	10.0	9.3	8.1	7.2	6.5	5.8	5.3	4.8	4.4
	[kg]	Rod Tip Offset Distance 50mm	10.0	9.8	8.6	7.7	6.9	6.2	5.6	5.1	4.6	4.2
	[kg]	Rod Tip Offset Distance 100mm	5.1	5.1	5.1	5.1	5.1	5.1	5.1	4.9	4.5	4.1



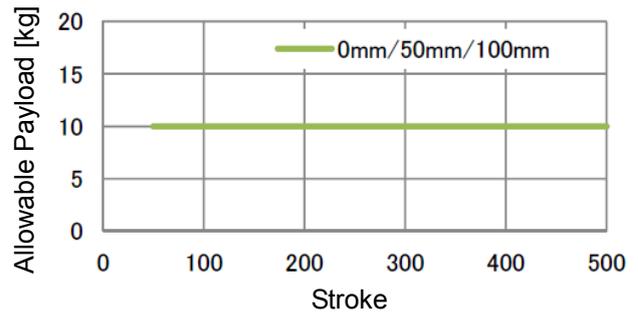
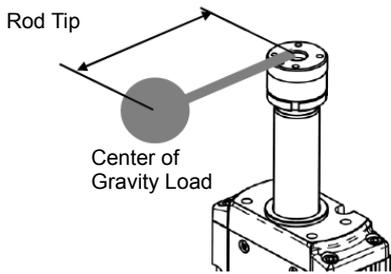
[Sideways Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	10.0	10.0	9.3	8.1	7.2	6.5	5.8	5.3	4.8	4.4
	[kg]	Rod Tip Offset Distance 50mm	10.0	9.8	8.6	7.7	6.9	6.2	5.6	5.1	4.6	4.2
	[kg]	Rod Tip Offset Distance 100mm	5.1	5.1	5.1	5.1	5.1	5.1	5.1	4.9	4.5	4.1



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	[kg]	Rod Tip Eccentricity Distance 50mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	[kg]	Rod Tip Eccentricity Distance 100mm	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0



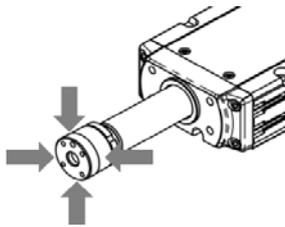
@WRA12C and WRA12R

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Rod Tip Static Allowable Load ^(Note 1)	[N]		294	294	294	294	294	269	241	218	198	181
Rod Tip Dynamic Allowable Load (Operating life 3,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	147	147	137	121	107	96	87	79	72	65
	[N]	Rod Tip Offset Distance 100mm	100	100	100	100	99	90	82	75	68	63
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	147	133	115	101	90	80	72	65	59	54
	[N]	Rod Tip Offset Distance 100mm	100	100	100	92	83	75	68	62	56	51
Rod Tip Offset Distance (Center of overhang load gravity)	[mm]		100 or less									
Rod Tip Overhang Distance	[mm]		100 or less									
Rod Tip Static Allowable Torque	[N•m]		20	20	20	20	20	20	20	20	20	20
Rod Tip Dynamic Allowable Torque (Operating life 3,000km Remaining Probability 90%)	[N•m]		10.0	10.0	10.0	10.0	9.9	9.0	8.2	7.5	6.8	6.3
Rod Tip Dynamic Allowable Torque (Operating life 5,000km Remaining Probability 90%)	[N•m]		10.0	10.0	10.0	9.2	8.3	7.5	6.8	6.2	5.6	5.1
Rod Non-Rotation Accuracy ^(Note 2)	[deg]		0									

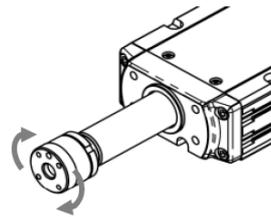
Note 1 It is the value for when the rod tip offset distance is 0mm and also the rod tip overhang distance is 0mm.

Note 2 It shows the displacement angle in the rod rotational direction at no load.

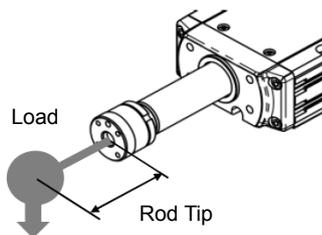
[Rod Tip Static Allowable Load]



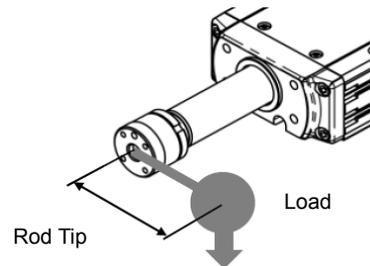
[Rod Tip Allowable Torque]



[Rod Tip Offset Distance]



[Rod Tip Overhang Distance]



● WRA12C and WRA12R: Allowable Payload for 3,000km of Operational Life

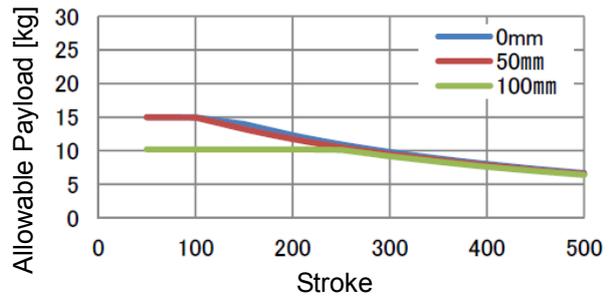
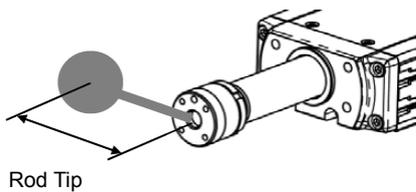
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

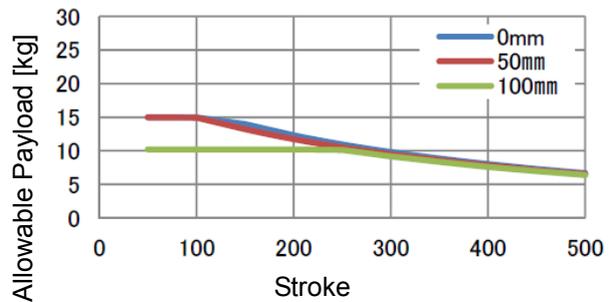
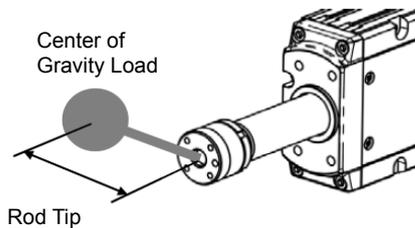
[Horizontal Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	15.0	15.0	14.0	12.3	10.9	9.8	8.9	8.0	7.3	6.7
	[kg]	Rod Tip Offset Distance 50mm	15.0	14.9	13.2	11.7	10.5	9.5	8.6	7.8	7.1	6.5
	[kg]	Rod Tip Offset Distance 100mm	10.2	10.2	10.2	10.2	10.1	9.2	8.3	7.6	7.0	6.4



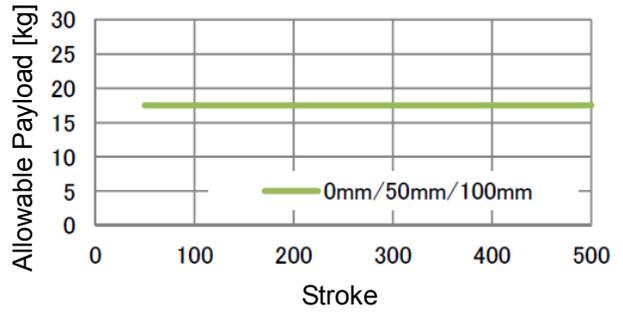
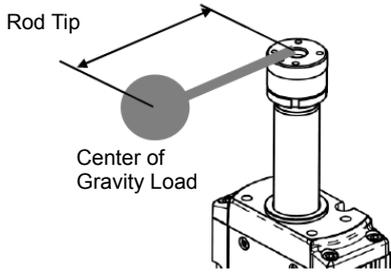
[Sideways Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	15.0	15.0	14.0	12.3	10.9	9.8	8.9	8.0	7.3	6.7
	[kg]	Rod Tip Offset Distance 50mm	15.0	14.9	13.2	11.7	10.5	9.5	8.6	7.8	7.1	6.5
	[kg]	Rod Tip Offset Distance 100mm	10.2	10.2	10.2	10.2	10.1	9.2	8.3	7.6	7.0	6.4



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	[kg]	Rod Tip Eccentricity Distance 50mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	[kg]	Rod Tip Eccentricity Distance 100mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5



● WRA12C and WRA12R: Allowable Payload for 5,000km of Operational Life

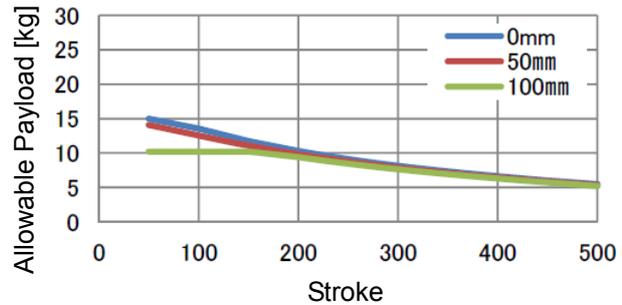
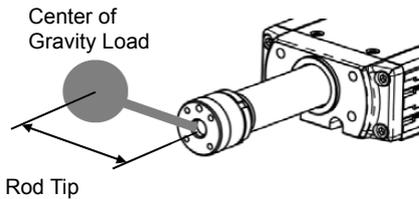
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

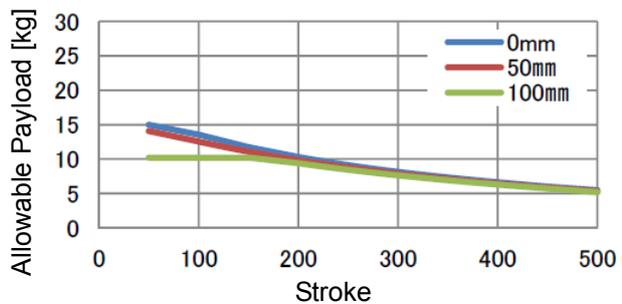
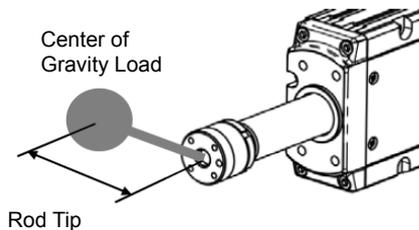
[Horizontal Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	15.0	13.5	11.7	10.3	9.1	8.2	7.3	6.6	6.0	5.5
	[kg]	Rod Tip Offset Distance 50mm	14.1	12.5	11.1	9.8	8.8	7.9	7.1	6.5	5.9	5.3
	[kg]	Rod Tip Offset Distance 100mm	10.2	10.2	10.2	9.4	8.4	7.6	6.9	6.3	5.7	5.2



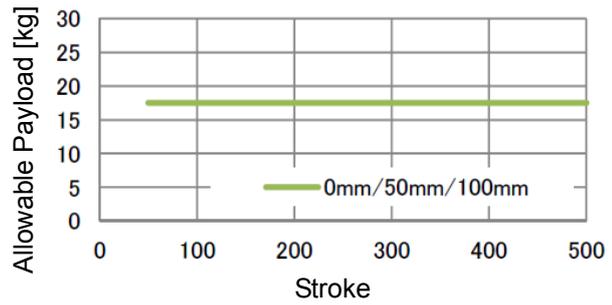
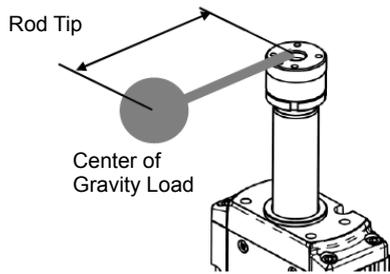
[Sideways Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	15.0	13.5	11.7	10.3	9.1	8.2	7.3	6.6	6.0	5.5
	[kg]	Rod Tip Offset Distance 50mm	14.1	12.6	11.1	9.8	8.8	7.9	7.1	6.5	5.9	5.3
	[kg]	Rod Tip Offset Distance 100mm	10.2	10.2	10.2	9.4	8.5	7.6	6.9	6.3	5.7	5.2



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	[kg]	Rod Tip Eccentricity Distance 50mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	[kg]	Rod Tip Eccentricity Distance 100mm	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5



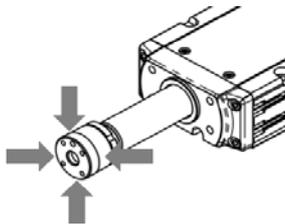
©WRA14C and WRA14R

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Rod Tip Static Allowable Load ^(Note 1)	[N]		454	392	345	307	276	251	229	210	193	179	166	154
Rod Tip Dynamic Allowable Load (Operating life 3,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	199	170	148	131	117	104	94	85	77	70	64	58
	[N]	Rod Tip Offset Distance 150mm	100	100	100	100	100	95	87	79	72	66	60	55
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	167	143	124	109	97	87	78	70	63	57	51	46
	[N]	Rod Tip Offset Distance 150mm	100	100	100	96	87	79	71	65	59	53	48	44
Rod Tip Offset Distance (Center of overhang load gravity)	[mm]		100 or less											
Rod Tip Overhang Distance	[mm]		150 or less											
Rod Tip Static Allowable Torque	[N•m]		30	30	30	30	30	30	30	30	30	30	30	30
Rod Tip Dynamic Allowable Torque (Operating life 3,000km Remaining Probability 90%)	[N•m]		15.0	15.0	15.0	15.0	15.0	14.3	13.0	11.8	10.8	9.9	9.0	8.2
Rod Tip Dynamic Allowable Torque (Operating life 5,000km Remaining Probability 90%)	[N•m]		15.0	15.0	15.0	14.4	13.0	11.8	10.7	9.7	8.8	8.0	7.3	6.6
Rod Non-Rotation Accuracy ^(Note 2)	[deg]		0											

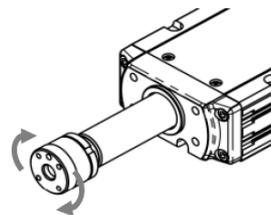
Note 1 It is the value for when the rod tip offset distance is 0mm and also the rod tip overhang distance is 0mm.

Note 2 It shows the displacement angle in the rod rotational direction at no load.

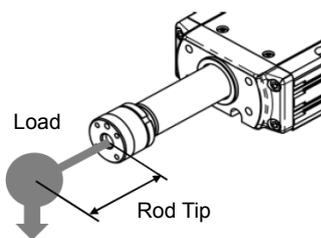
[Rod Tip Static Allowable Load]



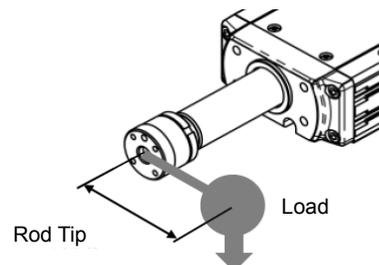
[Rod Tip Allowable Torque]



[Rod Tip Offset Distance]



[Rod Tip Overhang Distance]



● WRA14C and WRA14R: Allowable Payload for 3,000km of Operational Life

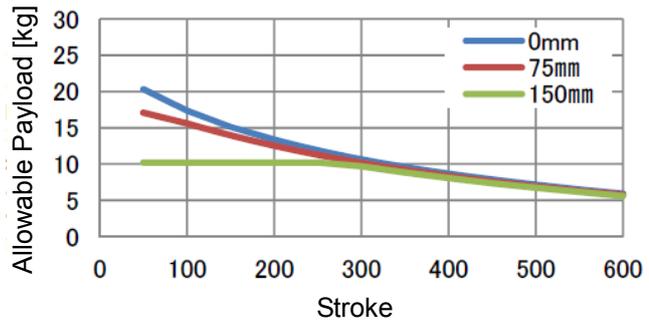
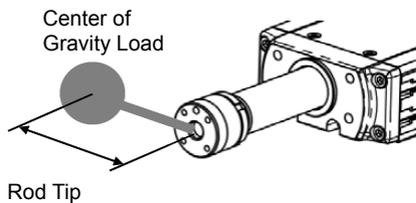
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

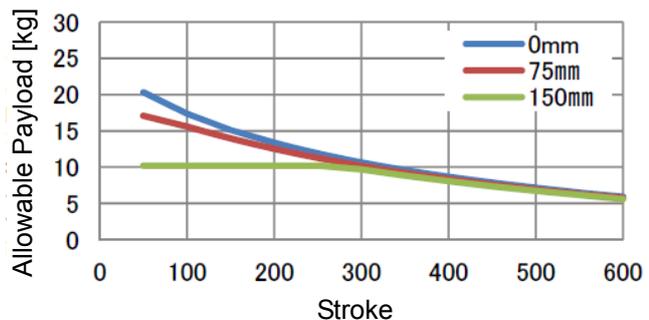
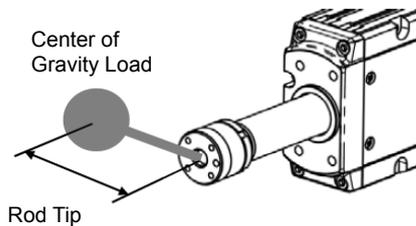
[Horizontal Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	20.3	17.4	15.1	13.4	11.9	10.7	9.6	8.7	7.9	7.2	6.5	5.9
	[kg] Rod Tip Offset Distance 75mm	17.1	15.6	14.0	12.5	11.3	10.2	9.2	8.4	7.6	6.9	6.3	5.8
	[kg] Rod Tip Offset Distance 150mm	10.2	10.2	10.2	10.2	10.2	9.7	8.8	8.1	7.4	6.7	6.1	5.6



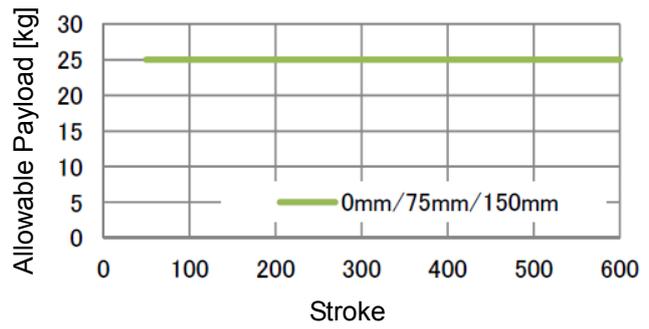
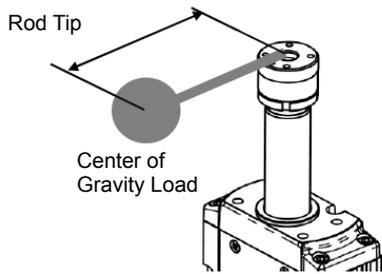
[Sideways Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	20.3	17.4	15.1	13.4	11.9	10.7	9.6	8.7	7.9	7.2	6.5	5.9
	[kg] Rod Tip Offset Distance 75mm	17.4	15.8	14.1	12.6	11.3	10.2	9.2	8.4	7.6	6.9	6.3	5.8
	[kg] Rod Tip Offset Distance 150mm	10.2	10.2	10.2	10.2	10.2	9.7	8.8	8.1	7.4	6.7	6.1	5.6



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
	[kg]	Rod Tip Eccentricity Distance 75mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
	[kg]	Rod Tip Eccentricity Distance 150mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0



● WRA14C and WRA14R: Allowable Payload for 5,000km of Operational Life

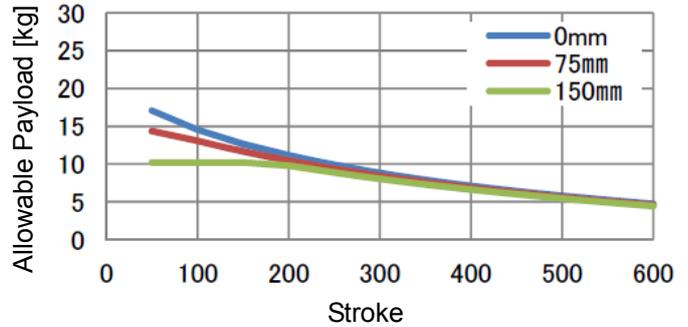
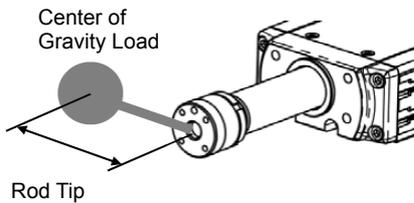
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 1G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

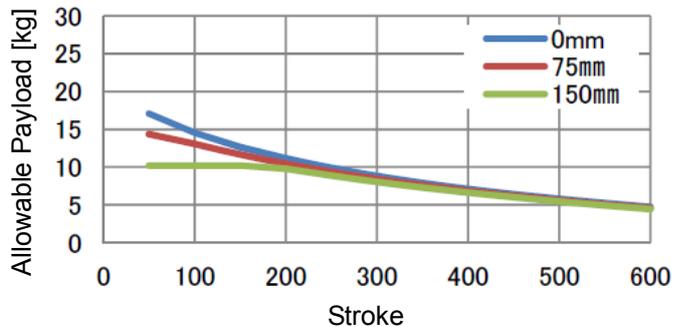
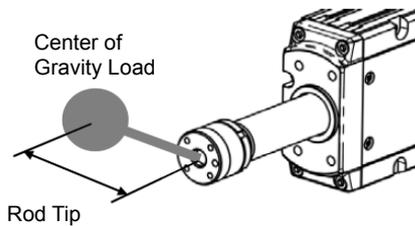
[Horizontal Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	17.1	14.6	12.7	11.1	9.9	8.8	7.9	7.1	6.4	5.8	5.2	4.7
	[kg]	Rod Tip Offset Distance 75mm	14.3	13.1	11.7	10.5	9.4	8.4	7.6	6.9	6.2	5.6	5.1	4.6
	[kg]	Rod Tip Offset Distance 150mm	10.2	10.2	10.2	9.8	8.9	8.0	7.3	6.6	6.0	5.4	4.9	4.5



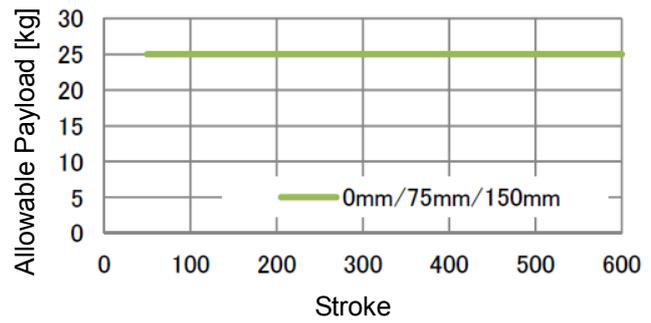
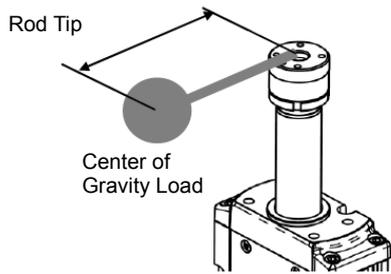
[Sideways Installation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Offset Distance 0mm	17.1	14.6	12.7	11.1	9.9	8.8	7.9	7.1	6.4	5.8	5.2	4.7
	[kg]	Rod Tip Offset Distance 75mm	14.6	13.2	11.8	10.5	9.4	8.4	7.6	6.9	6.2	5.6	5.1	4.6
	[kg]	Rod Tip Offset Distance 150mm	10.2	10.2	10.2	9.8	8.9	8.1	7.3	6.6	6.0	5.5	4.9	4.5



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
	[kg]	Rod Tip Eccentricity Distance 75mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
	[kg]	Rod Tip Eccentricity Distance 150mm	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0



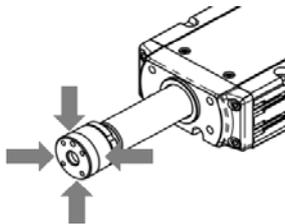
@WRA16C and WRA16R

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Rod Tip Static Allowable Load <small>(Note 1)</small>	[N]		588	588	588	511	451	402	362	329	300	275	254	235	217	202	188	176
Rod Tip Dynamic Allowable Load (Operating life 3,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	255	220	191	168	149	134	120	109	99	90	81	74	67	61	55	50
	[N]	Rod Tip Offset Distance 150mm	133	133	133	133	133	122	111	101	92	84	77	70	64	58	53	48
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	[N]	Rod Tip Offset Distance 0mm	214	184	160	140	124	111	99	89	80	72	65	59	53	47	42	37
	[N]	Rod Tip Offset Distance 150mm	133	133	133	124	112	101	91	83	75	68	62	56	50	45	40	36
Rod Tip Offset Distance (Center of overhang load gravity)	[mm]		100 or less															
Rod Tip Overhang Distance	[mm]		150 or less															
Rod Tip Static Allowable Torque	[N•m]		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Rod Tip Dynamic Allowable Torque (Operating life 3,000km Remaining Probability 90%)	[N•m]		20.0	20.0	20.0	20.0	20.0	18.3	16.7	15.2	13.8	12.6	11.5	10.5	9.6	8.7	7.9	7.1
Rod Tip Dynamic Allowable Torque (Operating life 5,000km Remaining Probability 90%)	[N•m]		20.0	20.0	20.0	18.6	16.8	15.2	13.7	12.4	11.3	10.2	9.2	8.4	7.5	6.8	6.0	5.3
Rod Non-Rotation Accuracy <small>(Note 2)</small>	[deg]		0															

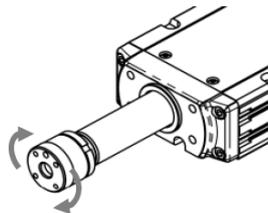
Note 1 It is the value for when the rod tip offset distance is 0mm and also the rod tip overhang distance is 0mm.

Note 2 It shows the displacement angle in the rod rotational direction at no load.

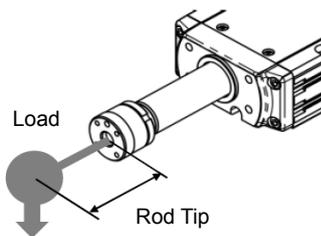
[Rod Tip Static Allowable Load]



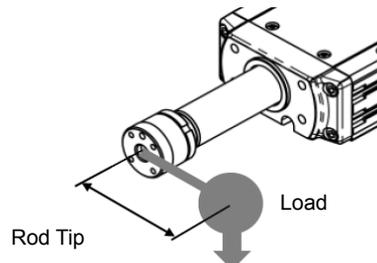
[Rod Tip Allowable Torque]



[Rod Tip Offset Distance]



[Rod Tip Overhang Distance]



● WRA16C and WRA16R: Allowable Payload for 3,000km of Operational Life

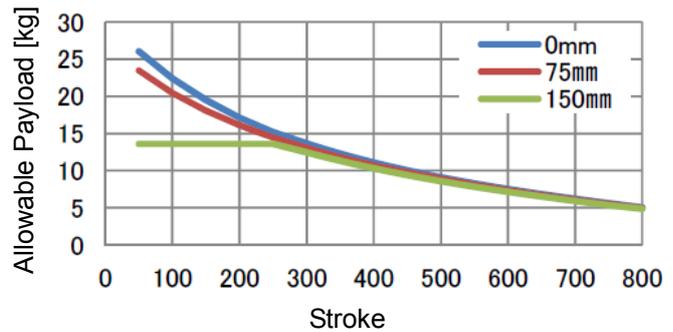
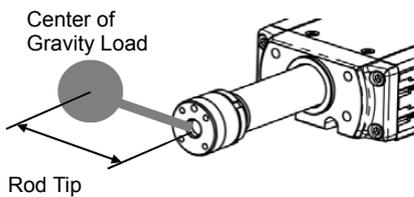
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 0.2G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

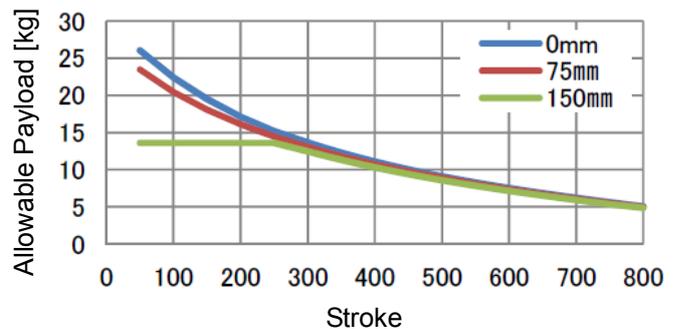
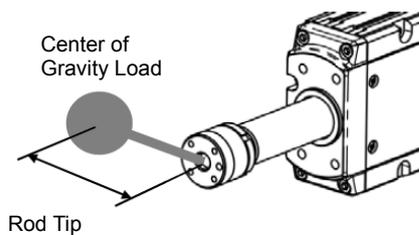
[Horizontal Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	26.0	22.4	19.5	17.1	15.2	13.6	12.3	11.1	10.1	9.1	8.3	7.5	6.9	6.2	5.6	5.1
	[kg] Rod Tip Offset Distance 75mm	23.5	20.5	18.1	16.1	14.4	13.0	11.8	10.7	9.7	8.9	8.1	7.3	6.7	6.1	5.5	5.0
	[kg] Rod Tip Offset Distance 150mm	13.6	13.6	13.6	13.6	13.6	12.5	11.3	10.3	9.4	8.6	7.8	7.2	6.5	5.9	5.4	4.9



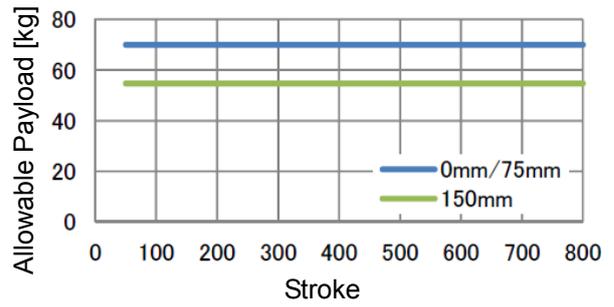
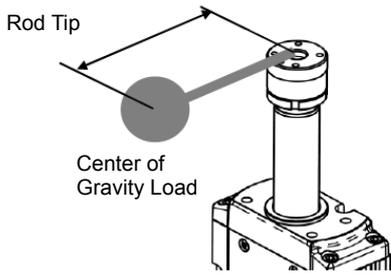
[Sideways Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	26.0	22.4	19.5	17.1	15.2	13.6	12.3	11.1	10.1	9.1	8.3	7.5	6.9	6.2	5.6	5.1
	[kg] Rod Tip Offset Distance 75mm	23.6	20.6	18.2	16.2	14.5	13.0	11.8	10.7	9.7	8.9	8.1	7.3	6.7	6.1	5.5	5.0
	[kg] Rod Tip Offset Distance 150mm	13.6	13.6	13.6	13.6	13.6	12.5	11.3	10.3	9.4	8.6	7.8	7.2	6.5	5.9	5.4	4.9



[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 3,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
	[kg]	Rod Tip Eccentricity Distance 75mm	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
	[kg]	Rod Tip Eccentricity Distance 150mm	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6



● WRA16C and WRA16R: Allowable Payload for 5,000km of Operational Life

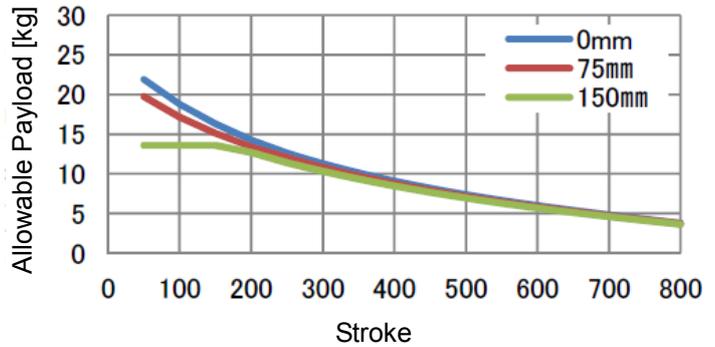
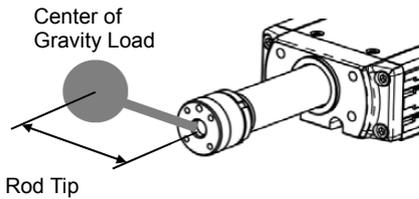
(Note) It is the value for when the rod tip overhang distance is 100mm or less for horizontal orientation and horizontally oriented wall mount.

The calculation was conducted under the condition that the actuator drives continuously at 500mm/s of velocity and 0.2G of acceleration / deceleration in the whole stroke range.

(Note) Transportation above the maximum payload is not allowed. Check in 1.2.2 Max. Acceleration and Payload.

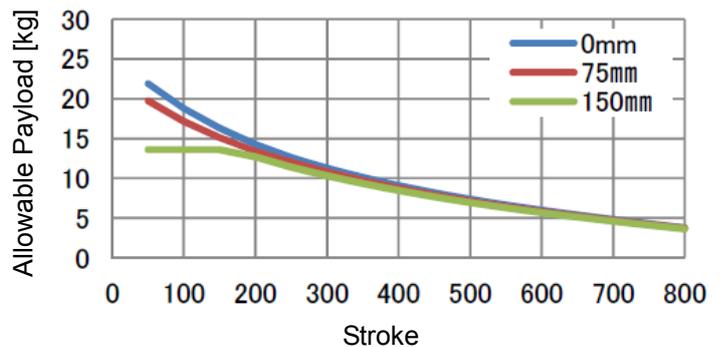
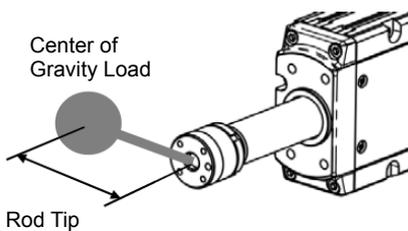
[Horizontal Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	21.9	18.8	16.3	14.3	12.6	11.3	10.1	9.1	8.2	7.4	6.7	6.0	5.4	4.8	4.3	3.8
	[kg] Rod Tip Offset Distance 75mm	19.7	17.2	15.1	13.4	12.0	10.8	9.7	8.8	7.9	7.2	6.5	5.8	5.2	4.7	4.2	3.7
	[kg] Rod Tip Offset Distance 150mm	13.6	13.6	13.6	12.7	11.4	10.3	9.3	8.5	7.7	6.9	6.3	5.7	5.1	4.6	4.1	3.6



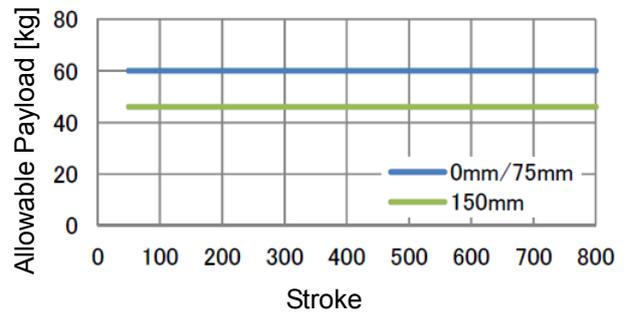
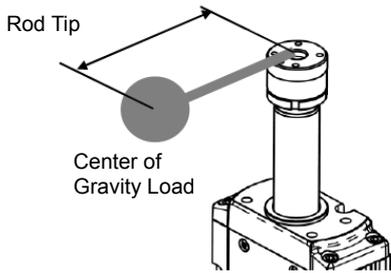
[Sideways Installation]

Item	Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg] Rod Tip Offset Distance 0mm	21.9	18.8	16.3	14.3	12.6	11.3	10.1	9.1	8.2	7.4	6.7	6.0	5.4	4.8	4.3	3.8
	[kg] Rod Tip Offset Distance 75mm	19.9	17.3	15.2	13.5	12.0	10.8	9.7	8.8	7.9	7.2	6.5	5.8	5.3	4.7	4.2	3.7
	[kg] Rod Tip Offset Distance 150mm	13.6	13.6	13.6	12.7	11.4	10.3	9.3	8.5	7.7	7.0	6.3	5.7	5.1	4.6	4.1	3.6



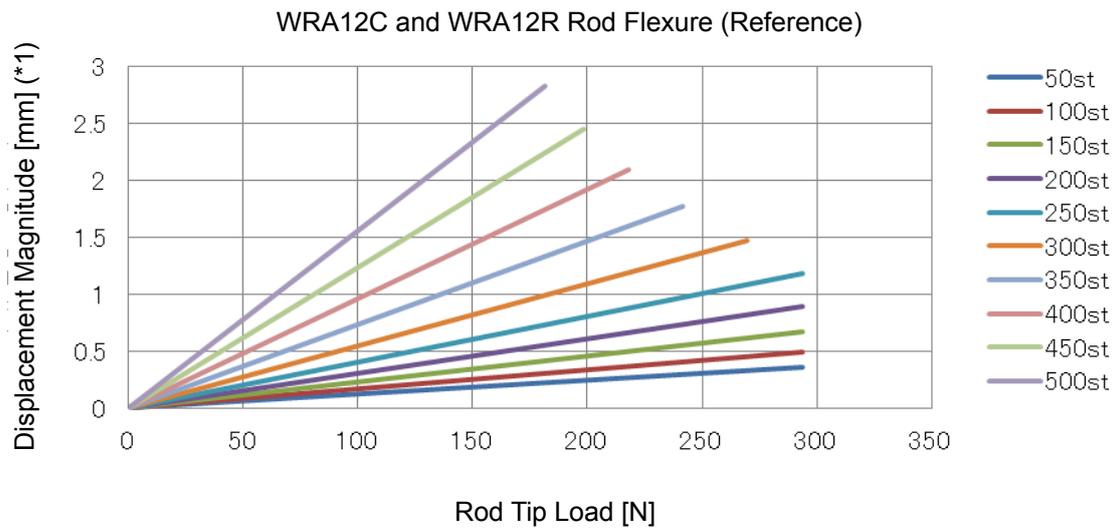
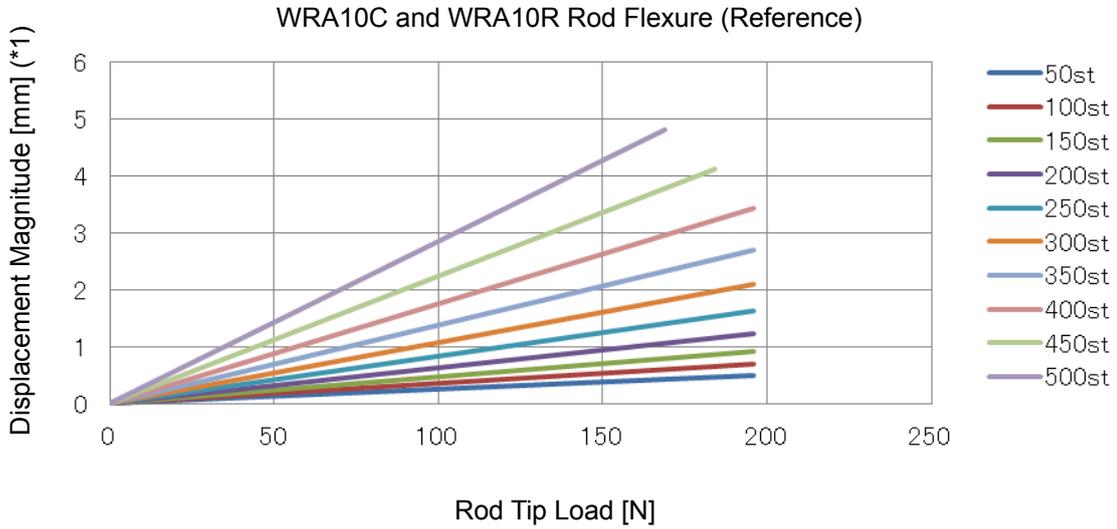
[Vertical Orientation]

Item		Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Allowable Payload (Operating life 5,000km Remaining Probability 90%)	[kg]	Rod Tip Eccentricity Distance 0mm	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
	[kg]	Rod Tip Eccentricity Distance 75mm	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
	[kg]	Rod Tip Eccentricity Distance 150mm	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1

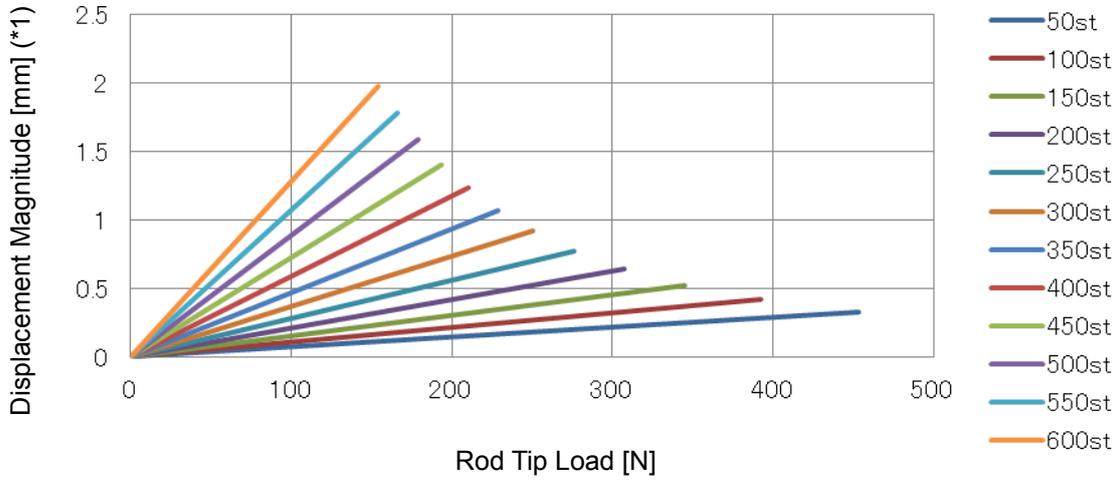


1.2.7 Rod Flexure (Reference)

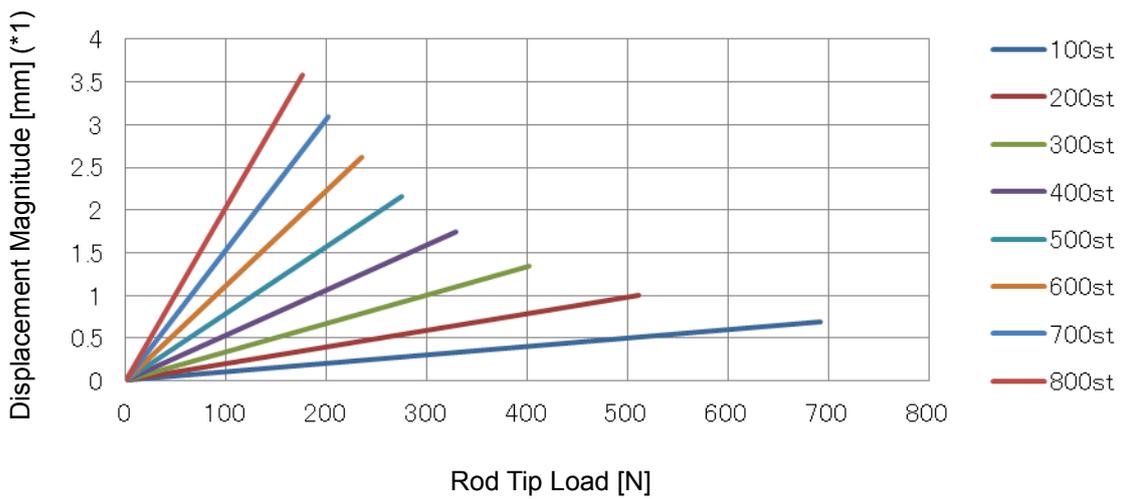
(Note) This is the flexure of the rod when the actuator is installed horizontally. It does not include the flexure caused by the weight of itself.



WRA14C and WRA14R Rod Flexure (Reference)



WRA16C and WRA16R Rod Flexure (Reference)



1.2.8 Continuous Operation Duty

[Standard Specification]

Continuous operation is available with the duty ratio 100%.

[Built-in Controller Specification]

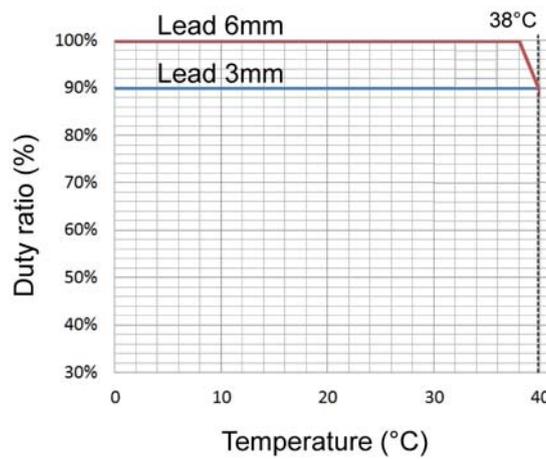
©RCP6S-WRA10C and 10R

Continuous operation is available with the duty ratio 100%.

©RCP6S-WRA12C and 12R

Lead 12mm and 20mm are available for continuous operation at 100% of the duty ratio.

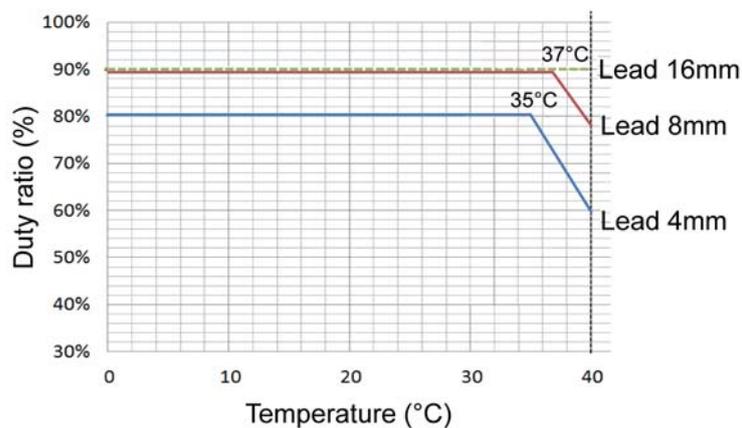
Follow the graph below for the duty ratio when operating Lead 3mm and 6mm.



©RCP6S-WRA14C and 14R

Lead 24mm are available for continuous operation at 100% of the duty ratio.

Follow the graph below for the duty ratio when operating Lead 4mm, 8mm and 16mm.



©RCP6S-WRA16C and 16R

Perform operation at 70% of duty ratio or less.

Duty ratio is the rate of operation expressed in % that presents the time of the actuator being operated in 1 cycle of operation.

1.3 Options

1.3.1 Brake Type (Model Code: B)

The brake is a mechanism designed to prevent the rod from dropping on a vertically installed actuator when the power or servo is turned OFF.

Use the brake to prevent the installed load, etc., from being damaged due to the falling rod.

1.3.2 Reversed-home Specification (Model Code: NM)

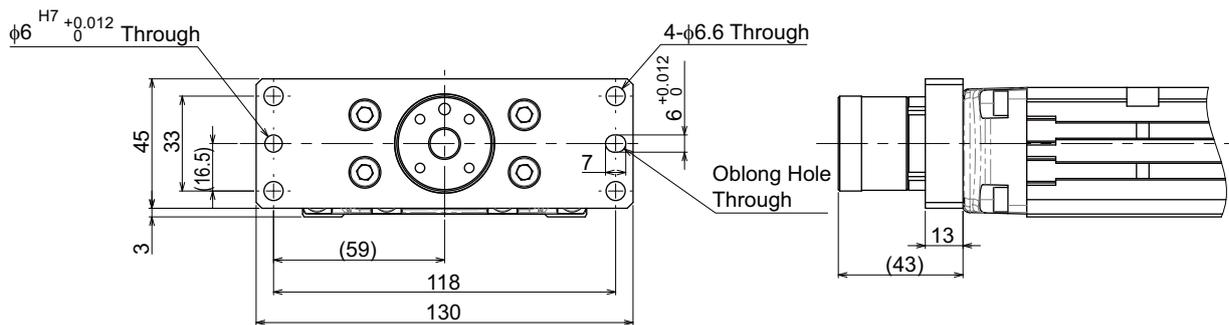
The standard home position is on the motor side. However, the motor position will be reversed if it is desirable in view of the layout of the system, etc.

(Note) The home position is adjusted at the factory before shipment. If you wish to change the home after the delivery of your actuator, you must return the actuator to IAI for adjustment.

1.3.3 Flange Bracket (Front) (Model Code: FL)

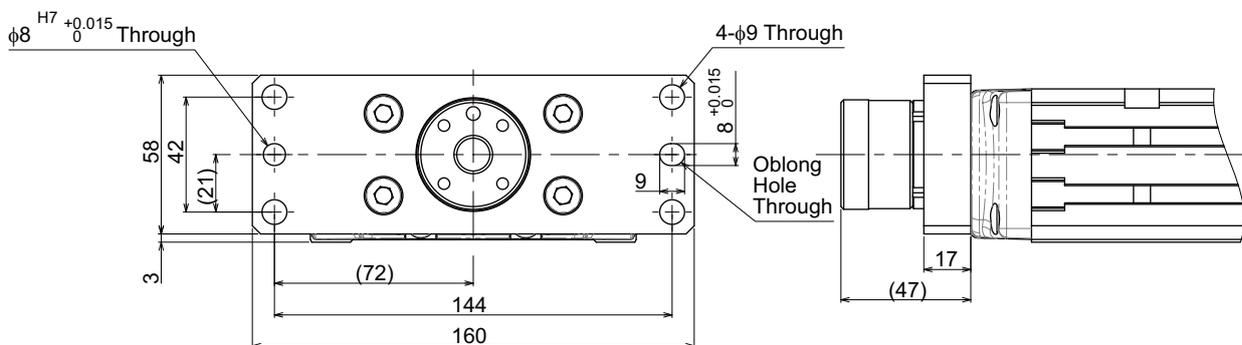
This is the flange bracket to attach on the front of the main unit.

[Model code of single product: RCP6-FL-WRA10]



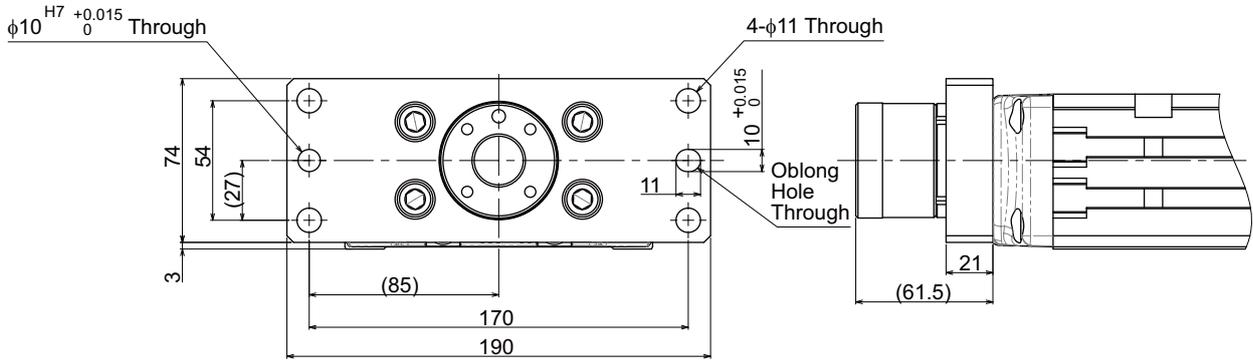
RCP6-WRA10C and WRA10R

[Model code of single product: RCP6-FL-WRA12]



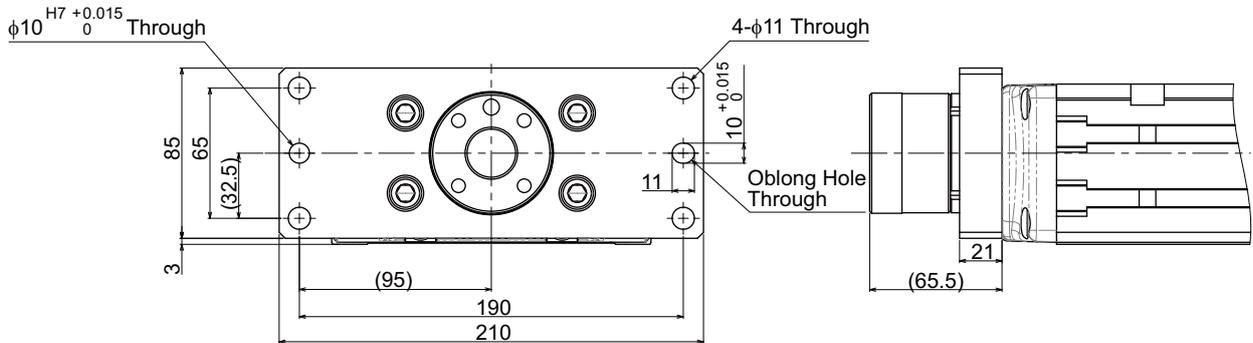
RCP6-WRA12C and WRA12R

[Model code of single product: RCP6-FL-WRA14]



RCP6-WRA14C and WRA14R

[Model code of single product: RCP6-FL-WRA16]

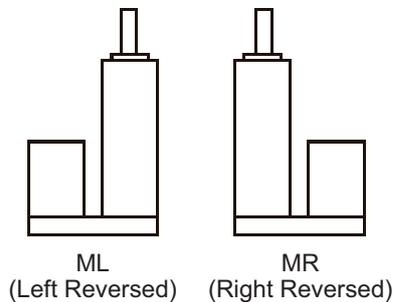


RCP6-WRA16C and WRA16R

1.3.4 Motor Left Reversed, Motor Right Reversed (Model Code: ML, MR)

Applicable Units: WRA10R, WRA12R, WRA14R and WRA16R

From the view of the motor side, the type with the motor reversed to the left is ML, and the motor reversed to the right is MR.



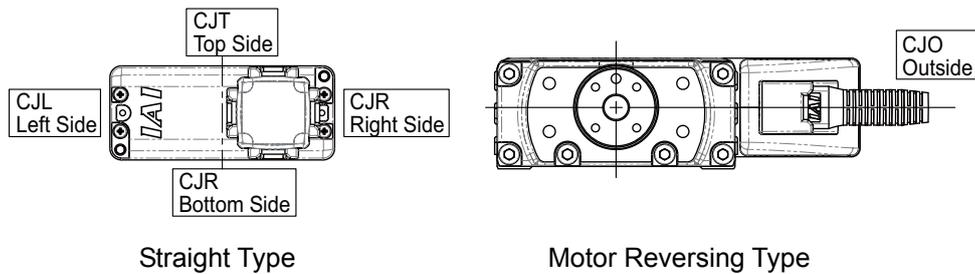
1.3.5 Cable Eject Direction Changed (Model Code: CJT, CJR, CJL, CJB, CJO)

If a change in the cable ejection direction is made, the direction of cable ejection will be changed. There are ejection directions, top (model code: CJT), right (model code: CJR), left (model code: CJL), bottom (model code: CJB) and outside (model code: CJO).

CJO cannot be selected for the straight type WRA10C, WRA12C, WRA14C and WRA16C.

CJL cannot be selected for the straight type RCP6S-WRA10C.

Only CJO can be selected for the reversed type WRA10, WRA12R, WRA14R and WRA16R.



1.3.6 T-Slot Nut Bar (Model Code: NTBL, NTBR)

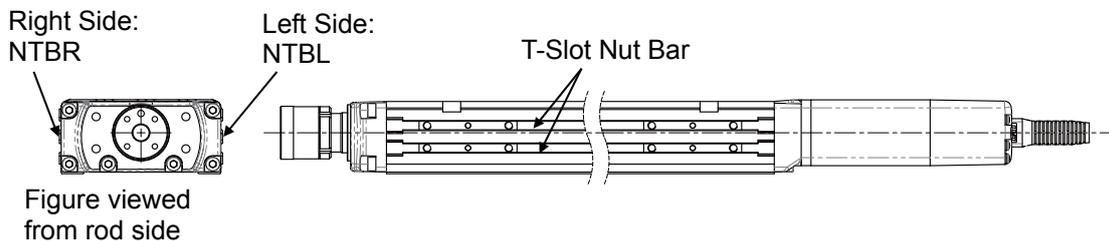
It is a bar-shaped component to put into the T-slot on the actuator.

For T-Slot Nut Bar (Right) NTBR, it is to be inserted on the right side if you look from the motor end.

For T-Slot Nut Bar (Left) NTBL, it is to be inserted on the left side if you look from the motor end.

On the T-slot nut bar, there are nut holes at the determined points

[Refer to 2.3.5 Installation Using Foot Bracket (Option Model Code: FT) for the dimensions]



Model Code of Single Product	
WRA10C, WRA10R	RCP6-NTB-RA10
WRA12C, WRA12R	RCP6-NTB-RA12
WRA14C, WRA14R	RCP6-NTB-RA14
WRA16C, WRA16R	RCP6-NTB-RA16

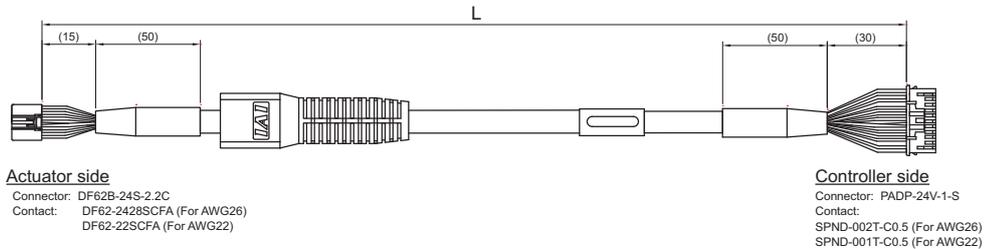
(Note) The installation hole on the top of the base, which crosses T-slot nut bar, cannot be used.

1.4 Motor • Encoder Cables

1.4.1 Motor • Encoder Integrated Cables (WRA10, WRA12 and WRA14)

CB-CAN-MPA□□□

□□□ indicates the cable length (L) (Example: 030=3m), Max.20m



Connection diagram

Actuator side

Thickness	Electric Wire Color	Symbol	Pin No.
AWG22/19	Blue	ϕ A	3
AWG22/19	Orange	VMM	5
AWG22/19	Brown	ϕ B	10
AWG22/19	Gray	VMM	9
AWG22/19	Green	ϕ _A	4
AWG22/19	Red	ϕ _B	15
AWG26	Black	LS+	8
AWG26	Yellow	LS-	14
AWG26	Blue	SA	12
AWG26	Orange	SB	17
AWG26	Green	A+	1
AWG26	Brown	A-	6
AWG26	Gray	B+	11
AWG26	Red	B-	16
AWG26	Blue	BK+	20
AWG26	Orange	BK-	2
AWG26	Gray	VCC	21
AWG26	Red	GND	7
AWG26	Brown	VPS	18
AWG26	Green	LS_GND	13
-	-	-	19
AWG26	Pink	-	22
-	-	-	23
AWG26	Black	FG	24

Controller side

Pin No.	Symbol	Electric Wire Color	Thickness
1	ϕ A	Blue	AWG22/19
2	VMM	Orange	AWG22/19
3	ϕ B	Brown	AWG22/19
4	VMM	Gray	AWG22/19
5	ϕ _A	Green	AWG22/19
6	ϕ _B	Red	AWG22/19
7	LS+	Black	AWG26
8	LS-	Yellow	AWG26
11	SA	Blue	AWG26
12	SB	Orange	AWG26
13	A+	Green	AWG26
14	A-	Brown	AWG26
15	B+	Gray	AWG26
16	B-	Red	AWG26
9	BK+	Blue	AWG26
10	BK-	Orange	AWG26
17	VCC	Gray	AWG26
19	GND	Red	AWG26
18	VPS	Brown	AWG26
20	LS_GND	Green	AWG26
22	-	-	-
21	-	Pink	AWG26
23	-	-	-
24	FG	Black	AWG26

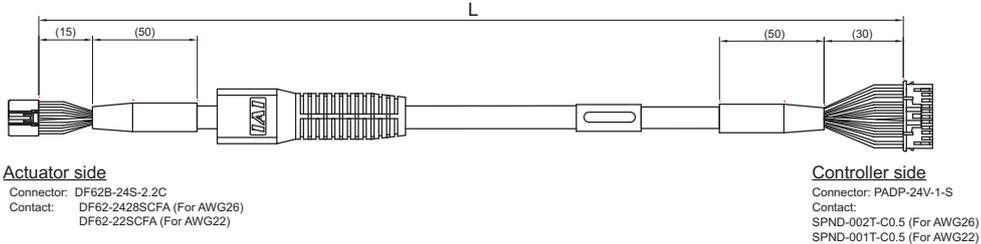
(Note) About thickness AWG22/19

The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

1.4.2 Motor • Encoder Integrated Cables Robot Type (WRA10, WRA12 and WRA14)

CB-CAN-MPA□□□-RB

□□□ indicates the cable length (L) (Example: 030=3m), Max.20m



Connection diagram

Actuator side

Controller side

Thickness	Electric Wire Color	Symbol	Pin No.		Pin No.	Symbol	Electric Wire Color	Thickness
AWG22/19	Blue	ϕ A	3		1	ϕ A	Blue	AWG22/19
AWG22/19	Orange	VMM	5		2	VMM	Orange	AWG22/19
AWG22/19	Brown	ϕ B	10		3	ϕ B	Brown	AWG22/19
AWG22/19	Gray	VMM	9		4	VMM	Gray	AWG22/19
AWG22/19	Green	ϕ _A	4		5	ϕ _A	Green	AWG22/19
AWG22/19	Red	ϕ _B	15		6	ϕ _B	Red	AWG22/19
AWG26	Black	LS+	8		7	LS+	Black	AWG26
AWG26	Yellow	LS-	14		8	LS-	Yellow	AWG26
AWG26	Blue	SA	12		11	SA	Blue	AWG26
AWG26	Orange	SB	17		12	SB	Orange	AWG26
AWG26	Green	A+	1		13	A+	Green	AWG26
AWG26	Brown	A-	6		14	A-	Brown	AWG26
AWG26	Gray	B+	11		15	B+	Gray	AWG26
AWG26	Red	B-	16		16	B-	Red	AWG26
AWG26	Blue	BK+	20		9	BK+	Blue	AWG26
AWG26	Orange	BK-	2		10	BK-	Orange	AWG26
AWG26	Gray	VCC	21		17	VCC	Gray	AWG26
AWG26	Red	GND	7		19	GND	Red	AWG26
AWG26	Brown	VPS	18		18	VPS	Brown	AWG26
AWG26	Green	LS_GND	13		20	LS_GND	Green	AWG26
-	-	-	19		22	-	-	-
AWG26	Pink	-	22		21	-	Pink	AWG26
-	-	-	23		23	-	-	-
AWG26	Black	FG	24		24	FG	Black	AWG26

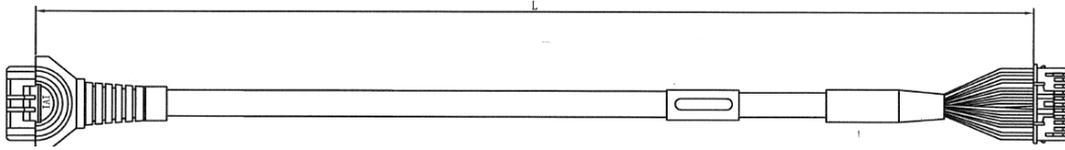
(Note) About thickness AWG22/19

The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

1.4.3 Motor • Encoder Integrated Cables (WRA16)

CB-CFA3-MPA□□□

□□□ indicates the cable length (L) (Example: 030=3m), Max.20m



Actuator side

Connector: 1-1827863-1
Contact: 1827570-2

Controller side

Connector: PADP-24V-1-S
Contact: SPND-002T-C0.5(AWG26)
SPND-001T-C0.5(AWG22)

Connection diagram

Actuator side

Thickness	Electric Wire Color	Symbol	Pin No.
AWG22/19	Blue	ϕ A	A1
AWG22/19	Orange	VMM	B1
AWG22/19	Green	ϕ _A	A2
AWG22/19	Brown	ϕ B	B2
AWG22/19	Gray	VMM	A3
AWG22/19	Red	ϕ _B	B3
AWG26	Black	LS+	A4
AWG26	Yellow	LS-	B4
AWG26	Blue	SA	A6
AWG26	Orange	SB	B6
AWG26	Green	A+	A7
AWG26	Brown	A-	B7
AWG26	Gray	B+	A8
AWG26	Red	B-	B8
AWG26	Blue	BK+	A5
AWG26	Orange	BK-	B5
AWG26	Green	LS_GND	A9
AWG26	Brown	VPS	B9
AWG26	Gray	VCC	A10
AWG26	Red	GND	B10
-	-	-	A11
AWG26	Black	FG	B11

Controller side

Pin No.	Symbol	Electric Wire Color	Thickness
1	ϕ A	Blue	AWG22/19
2	VMM	Orange	AWG22/19
5	ϕ _A	Green	AWG22/19
3	ϕ B	Brown	AWG22/19
4	VMM	Gray	AWG22/19
6	ϕ _B	Red	AWG22/19
7	LS+	Black	AWG26
8	LS-	Yellow	AWG26
11	SA	Blue	AWG26
12	SB	Orange	AWG26
13	A+	Green	AWG26
14	A-	Brown	AWG26
15	B+	Gray	AWG26
16	B-	Red	AWG26
9	BK+	Blue	AWG26
10	BK-	Orange	AWG26
20	LS_GND	Green	AWG26
18	VPS	Brown	AWG26
21	VCC	Gray	AWG26
19	GND	Red	AWG26
17	-	-	-
22	-	-	AWG26
23	-	-	-
24	FG	Black	AWG26

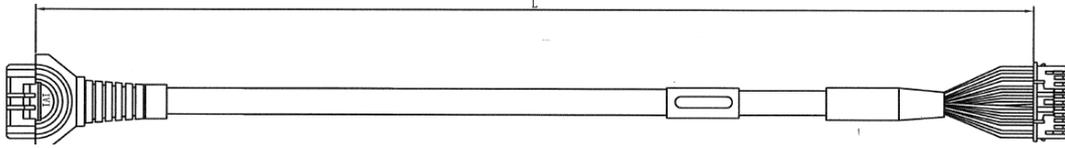
(Note) About thickness AWG22/19

The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

1.4.4 Motor • Encoder Integrated Cables Robot Type (WRA16)

CB-CFA3-MPA□□□-RB

□□□ indicates the cable length (L) (Example: 030=3m), Max.20m



Actuator side

Connector: 1-1827863-1
Contact: 1827570-2

Controller side

Connector: PADP-24V-1-S
Contact: SPND-002T-C0.5(AWG26)
SPND-001T-C0.5(AWG22)

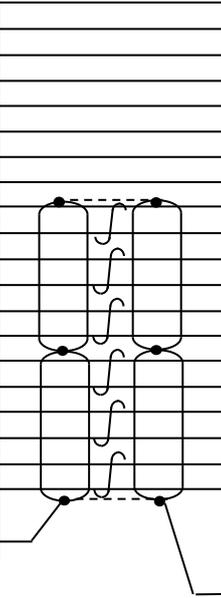
Connection diagram

Actuator side

Thickness	Electric Wire Color	Symbol	Pin No.
AWG22/19	Blue	ϕ A	A1
AWG22/19	Orange	VMM	B1
AWG22/19	Green	ϕ _A	A2
AWG22/19	Brown	ϕ B	B2
AWG22/19	Gray	VMM	A3
AWG22/19	Red	ϕ _B	B3
AWG26	Black	LS+	A4
AWG26	Yellow	LS-	B4
AWG26	Blue	SA	A6
AWG26	Orange	SB	B6
AWG26	Green	A+	A7
AWG26	Brown	A-	B7
AWG26	Gray	B+	A8
AWG26	Red	B-	B8
AWG26	Blue	BK+	A5
AWG26	Orange	BK-	B5
AWG26	Green	LS_GND	A9
AWG26	Brown	VPS	B9
AWG26	Gray	VCC	A10
AWG26	Red	GND	B10
-	-	-	A11
AWG26	Black	FG	B11

Controller side

Pin No.	Symbol	Electric Wire Color	Thickness
1	ϕ A	Blue	AWG22/19
2	VMM	Orange	AWG22/19
5	ϕ _A	Green	AWG22/19
3	ϕ B	Brown	AWG22/19
4	VMM	Gray	AWG22/19
6	ϕ _B	Red	AWG22/19
7	LS+	Black	AWG26
8	LS-	Yellow	AWG26
11	SA	Blue	AWG26
12	SB	Orange	AWG26
13	A+	Green	AWG26
14	A-	Brown	AWG26
15	B+	Gray	AWG26
16	B-	Red	AWG26
9	BK+	Blue	AWG26
10	BK-	Orange	AWG26
20	LS_GND	Green	AWG26
18	VPS	Brown	AWG26
21	VCC	Gray	AWG26
19	GND	Red	AWG26
17	-	-	-
22	-	-	AWG26
23	-	-	-
24	FG	Black	AWG26



(Note) About thickness AWG22/19

The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

2. Installation

2.1 Transportation

[1] Handling of Robot

(1) Handling the Packed Unit

Unless otherwise specified, the actuator is shipped with each axis packaged separately.

- Do not damage or drop. The package is not applied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Transport a heavy package with at least more than two operators. Consider an appropriate method for transportation.
- Keep the unit in horizontal orientation when placing it on the ground or transporting. Follow the instruction if there is any for the packaging condition.
- Do not step or sit on the package.
- Do not put any load that may cause a deformation or breakage of the package.

(2) Handling the Actuator After Unpacking

- Do not carry an actuator by motor unit and a cable or attempt to move it by pulling the cable.
- Be careful not to bump the actuator into anything when moving it.
- Hold the body base when transporting the actuator.
- Do not apply an excessive force to each part of the actuator. In particular, prevent the motor unit and rear bracket from receiving an unnecessary force.

Supplement) For the names of each part of the actuator, refer to “Names of the Parts”

[2] Handling in the Assembled Condition

This is the case when the product is delivered from our factory under a condition that it is assembled with other actuators. The combined axes are delivered in a package that the frame is nailed on the lumber base. Fix the rod so that would not accidentally move during transportation. The actuators are also fixed so the tip of it would not shake due to the external vibration.

(1) How to Handle the Package

- Do not hit or drop the package. No special treatment is conducted on this package to endure a drop or impact on it.
- Do not attempt to carry a heavy package with only one worker. Also, have an appropriate method for transportation.
- When hanging up with ropes, support on the reinforcement frame on the bottom of the lumber base. When bringing up the package with a forklift, also support on the bottom of the lumber base.
- Handle with care when putting the package down to avoid impact or bounce.
- Do not step on the package.
- Do not put anything on the package that could deform or damage it.

(2) How to Handle after Unpackaged

- Secure the rods to prevent sudden movement during transport.
- If the tip of an actuator is overhanging, have an appropriate way to fix it to avoid shake due to the external vibration. In the transportation without the tip being fixed, do not apply any impact with 0.3G or more.
- When hanging up with ropes, have appropriate cushioning to avoid any deformation of the actuator body. Also keep it in stable horizontal orientation. Make a fixture utilizing the attachment holes and the tapped holes on the actuator body if necessary.
- Do not attempt to apply load on the actuators or the connector box. Also pay attention not to pinch cables and bend or deform them forcefully.

[3] Handling in Condition of being assembled in Machinery Equipment (System)

These are some caution notes for when transporting the actuator being assembled in the machinery equipment (system):

- Fix the rod so that it would not move during transportation.
- If the tip of an actuator is overhanging, have an appropriate way to fix it to avoid shake due to the external vibration. In the transportation without the tip being fixed, do not apply any impact with 0.3G or more.
- When hanging up the machinery equipment (system) with ropes, do not attempt to apply load on the actuators or the connector box. Also pay attention not to pinch cables and bend or deform them forcefully.

2.2 Installation and Storage • Preservation Environment

[1] Installation Environment

The actuator should be installed in a location other than those specified below.

In general, the installation environment should be one in which an operator can work without protective gear.

Also provide sufficient work space required for maintenance inspection.

- Where the actuator receives radiant heat from strong heat sources such as heat treatment furnaces
- Where the ambient temperature exceeds the range of 0 to 40°C
- Where the temperature changes rapidly and condensation occurs
- Where the relative humidity exceeds 85% RH
- Where the actuator receives direct sunlight
- Where the actuator is exposed to corrosive or combustible gases
- Where the ambient air contains a large amount of powder dust, salt or iron (at level exceeding what is normally expected in an assembly plant)
- Where the actuator is subject to splashed water, oil (including oil mist or cutting fluid) or chemical solutions
- Where the actuator receives impact or vibration
- Where the altitude is more than 2,000m

If the actuator is used in any of the following locations, provide sufficient shielding measures:

- Where noise generates due to static electricity, etc.
- Where the actuator is subject to a strong electric or magnetic field
- Where the actuator is subject to ultraviolet ray or radiation

[2] Storage • Preservation Environment

- The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no dew condensation forms.
- Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.
- For storage and preservation temperature, the machine withstands temperatures up to 60°C for a short time, but in the case of the storage and preservation period of 1 month or more, control the temperature to 50°C or less.
- Storage and preservation should be performed in the horizontal condition. In the case it is stored in the packaged condition, follow the posture instruction if any displayed on the package.

2.3 How to Install

This chapter explains how to install the actuator on your mechanical system.

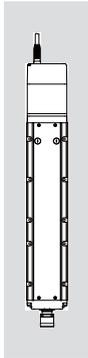
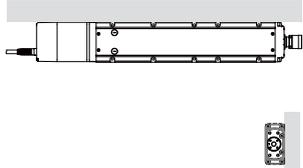
2.3.1 Installation

Follow the information below when installing the actuator, as a rule. Do pay attention to these items (except with custom-order models).

○ : Possible △ : Daily inspection is required × : Not possible

Model Name	Horizontal Installation	Vertical Installation	Sideway Installation	Ceiling mount Installation
WRA10C、WRA10R WRA12C、WRA12R WRA14C、WRA14R WRA16C、WRA16R	○	○	○	○

Installation Orientation

Horizontal	Vertical	Sideways	Ceiling Mount
			



Caution: When the unit is installed vertically oriented, Motor straight type is attempt to put the motor up unless there is a special reason. Putting the motor on the lower side would not cause a problem in an ordinary operation. However, it may rarely cause a problem, when it is not operated for a long period, depending on the surrounding environment (especially high temperature), caused by the grease being separated and the base oil flowing into the motor unit.

2.3.2 Installation of the Main Unit

The surface to mount the main unit should be a machined surface or a plane that possesses an equivalent accuracy and the flatness should be within 0.05mm/m. Also, the platform should have a structure stiff enough to install the unit so it would not generate vibration or other abnormality.

Also consider enough space necessary for maintenance work such as actuator replacement and inspection.

On the base there is a datum surface prepared for the attachment slotted holes.

On the back side of the actuator, there are through holes, positioning reamed holes and slotted holes.

For the details of the positions and dimensions, check in the appearance drawings. [Refer to 7. "External Dimensions"]

When repeatability in re-attaching is required after it is detached, utilize the reamed holes. Please note, however, that a consideration is necessary such as to use only one point on the motor side of the reamed holes when a fine-tuning such as perpendicularity is required.

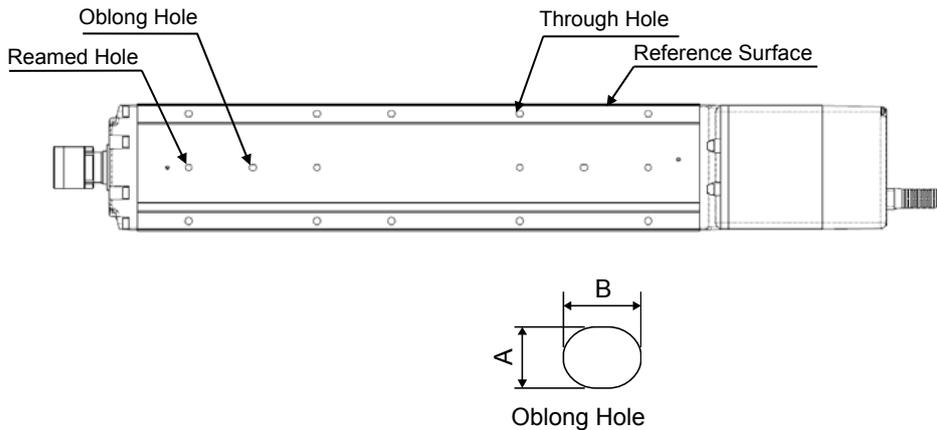
[1] Using the Through Holes

This actuator has through holes for mounting so it can be fixed from the bottom of the base.

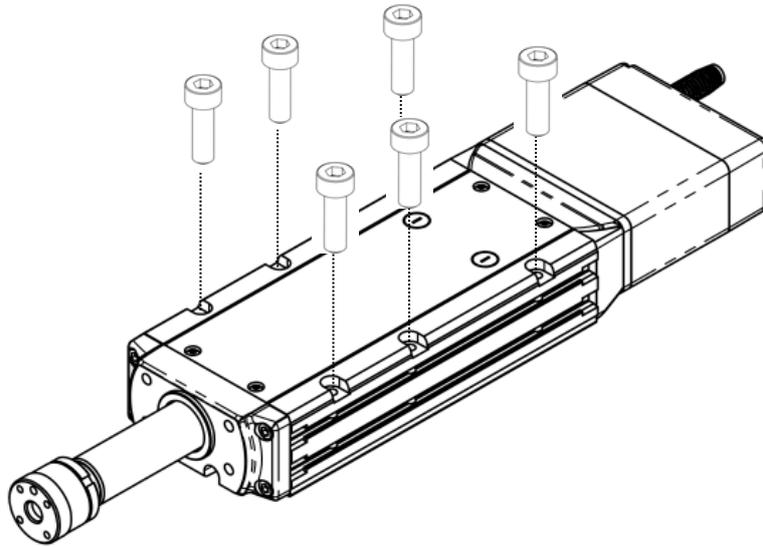
(Note that the tapped holes size depends on the model. Please see the diagrams below and 7. "External Dimensions")

Also, there are reamed holes and a oblong hole for positioning pins.

(Note) There are no oblong holes on Stroke 50mm and 100mm.



Model Name	Reamed Hole [mm]	Oblong Hole
WRA10C, WRA10R	$\phi 5H7$ depth 5	A: $5^{+0.012}_0$ B: 6 depth 5mm or less
WRA12C, WRA12R	$\phi 6H7$ depth 6	A: $6^{+0.012}_0$ B: 7 depth 6mm or less
WRA14C, WRA14R	$\phi 8H7$ depth 9	A: $8^{+0.015}_0$ B: 9 depth 9mm or less
WRA16C, WRA16R	$\phi 8H7$ depth 9	A: $8^{+0.015}_0$ B: 4 depth 9mm or less



Apply the socket head cap screw indicated in the table below suitable for the platform material.

Model Name	Through Holes	Mounting Screw	Tightening Torque
WRA10C, WRA10R	$\phi 5.5$ drilled hole, $\phi 11$ counterbore	M5	3.42N•m (0.35kgf•m)
WRA12C, WRA12R	$\phi 6.6$ drilled hole, $\phi 12.5$ counterbore	M6	5.36N•m (0.55kgf•m)
WRA14C, WRA14R	$\phi 9$ drilled hole, $\phi 16.5$ counterbore	M8	11.48N•m (1.17kgf•m)
WRA16C, WRA16R	$\phi 9$ drilled hole, $\phi 16.5$ counterbore	M8	11.48N•m (1.17kgf•m)

Tightening screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- For the effective engagement length between the bolt and female thread, provide at least the applicable value specified below:
 Female thread is made of steel material → Same length as the nominal diameter
 Female thread is made of aluminum → 1.8 times of nominal diameter

⚠ Caution: Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, the tapped holes may be damaged, actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.

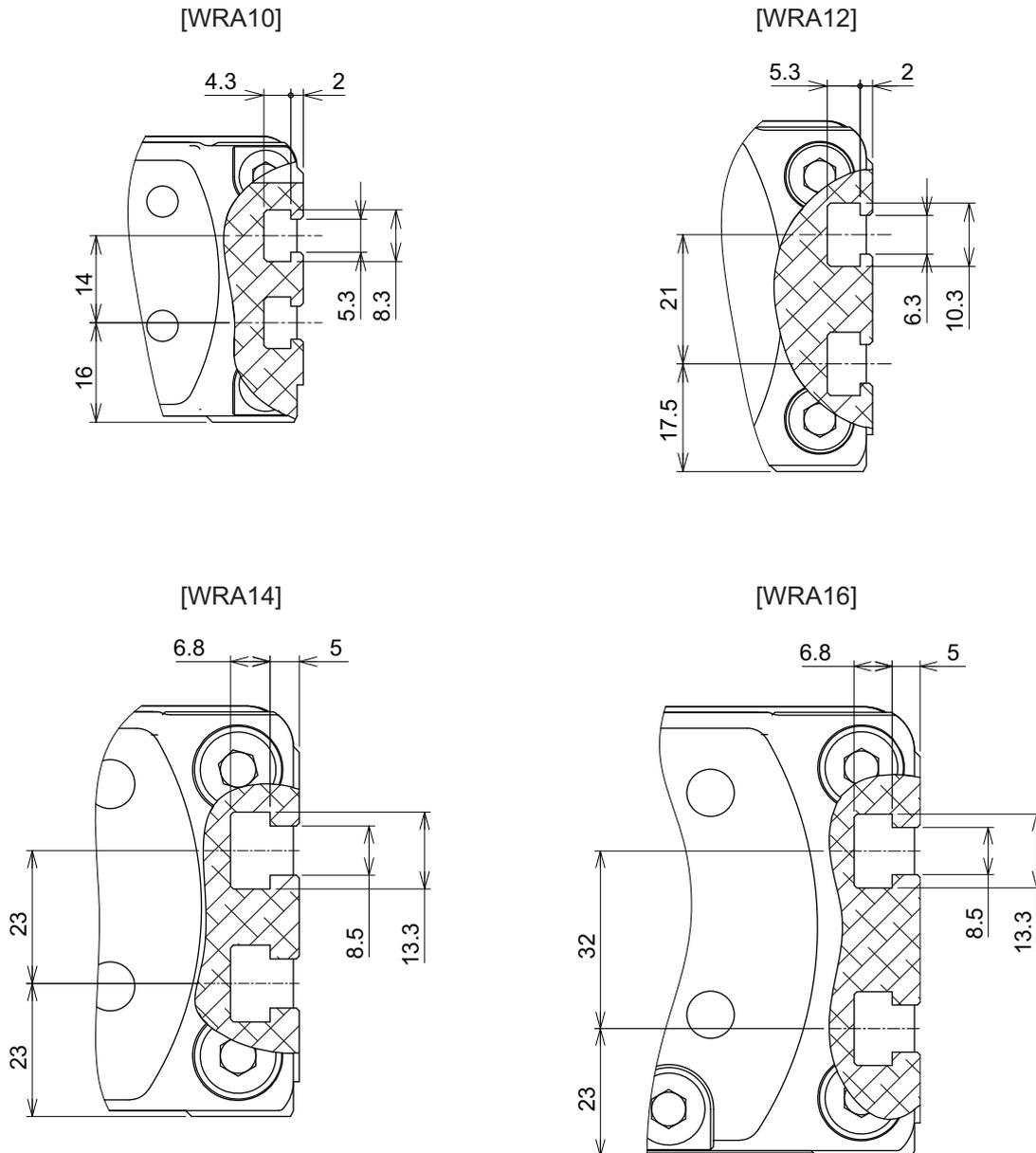
[2] When Using T-Slot on Side

On this actuator, there are T-slots equipped on sides for installation so the actuator can be mounted on the sides.

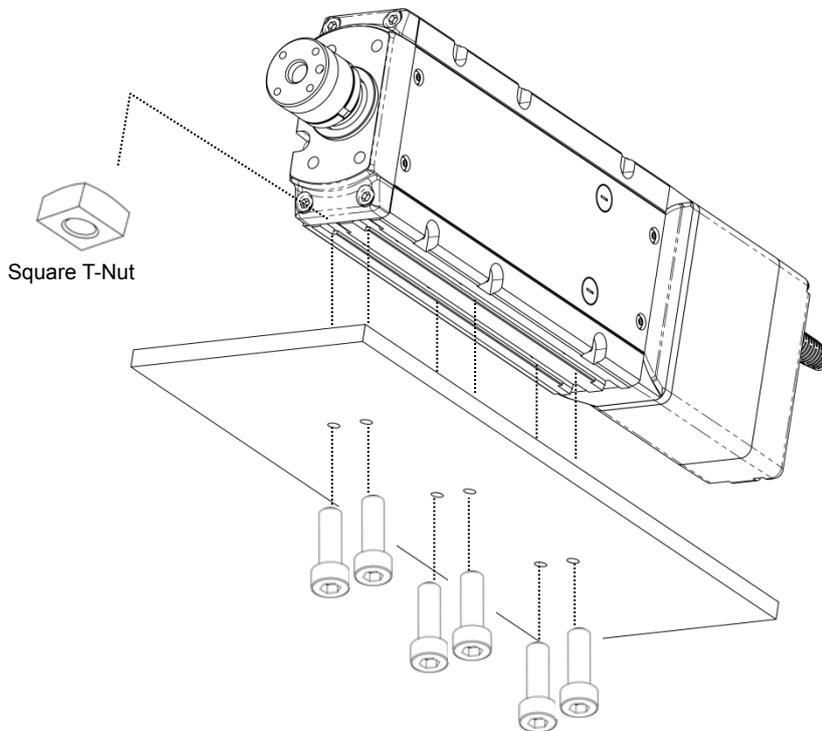
There are two ways to install the actuator by using the T-slot, one with using a square T-nut to attach, and the other with using a T-slot nut bar (model code: NTBL or NTBR).

(Note) The installation hole on the top of the base, which crosses a square T-nut or T-slot nut bar, cannot be used.

(1) Dimensions for T-Slot



(2) Installation Using Square T-Nut



On the T-slot, square T-nuts specified in JIS B 1163 are available to use.

Also, it is available to use the optional T-slot nut bar (model code: NTBL or NTBR) instead of square T-nuts for installation.

Follow the minimum number of fixing bolts and tightening torque specified in the table below for installation.

	WRA10	WRA12	WRA14	WRA16
Min. Number of Fixing Bolt [pieces]	6	6	6	6
Tightening Torque [N·m]	3.42	5.36	11.5	11.5

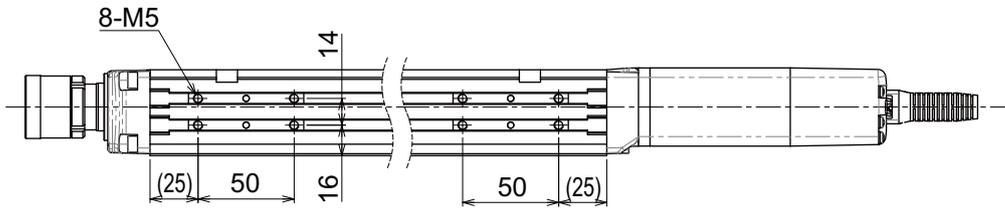


Caution: Pay attention when choosing the screw length. In case that insufficient length of screws is chosen, it may cause such problems as the strength not being enough on the actuator attachment, interference with driving part, drop in accuracy performance and unexpected accidents.

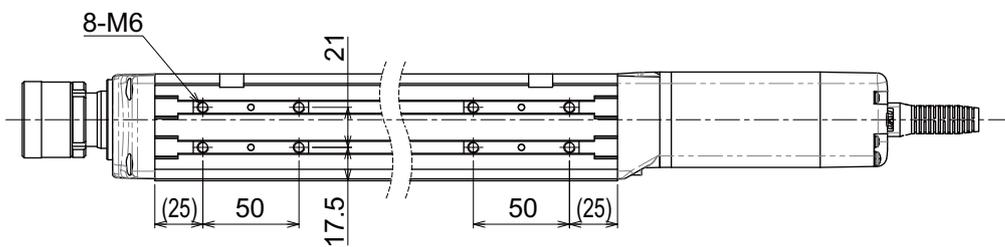
The equipment is delivered under the condition that the T-slot nut bar is fixed at the positions shown below.

When installing the actuator, adjust the T-slot nut bar positions.

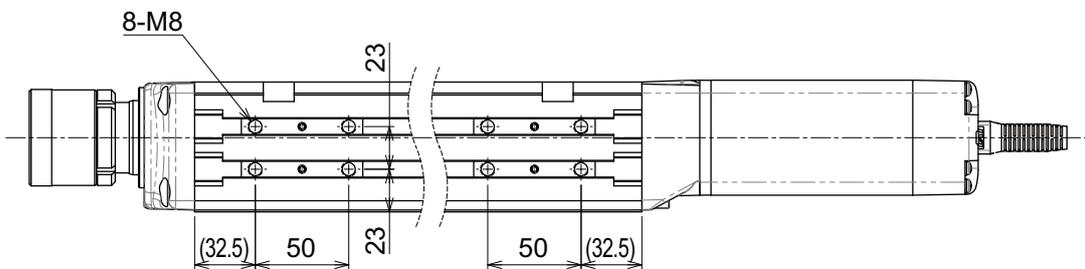
(Note) The installation hole on the top of the base, which crosses T-slot nut bar, cannot be used.



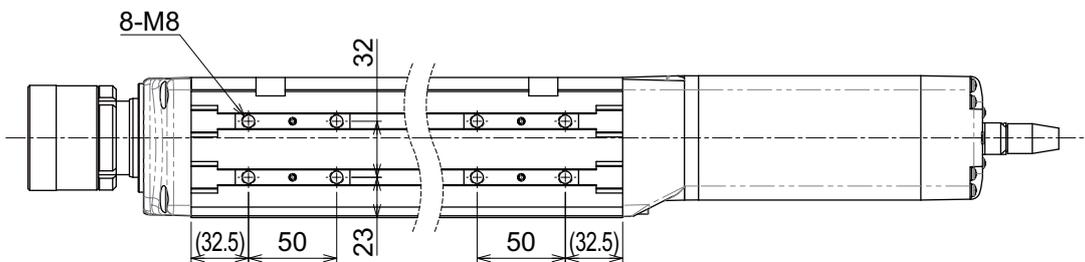
WRA10



WRA12



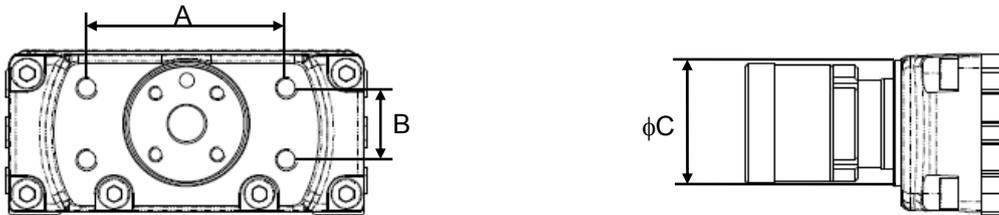
WRA14



WRA16

[3] When using Tapped Holes on Front Bracket

There are tapped holes equipped on the front bracket.
Utilize these tapped holes for installation.
The effective depth for the attachment screws is as shown below;



Model Name	Tapped Hole Size	A	B	Screw Effective Depth	Tightening Torque		φ C
					In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:	
WRA10C WRA10R	M6	55	20	12	12.3N•m (1.26kgf•m)	5.36N•m (0.55kgf•m)	φ 35h7
WRA12C WRA12R	M8	65	30	12	29.97N•m (3.06kgf•m)	11.48N•m (1.17kgf•m)	φ 42h7
WRA14C WRA14R	M10	75	35	15	59.37N•m (6.06kgf•m)	23.3N•m (2.4kgf•m)	φ 54h7
WRA16C WRA16R	M10	85	40	15	59.37N•m (6.06kgf•m)	23.3N•m (2.4kgf•m)	φ 62h7

Make sure to follow “ⓈCaution for Installation using Front Bracket and Front Flange”

Tightening screws

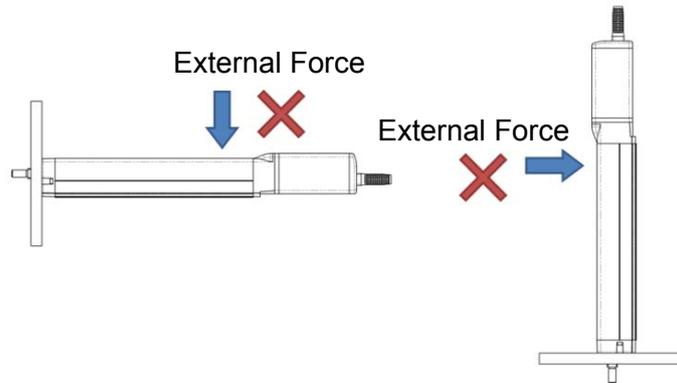
- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Have the length of thread engagement approximately 1.2 times of the nominal diameter.



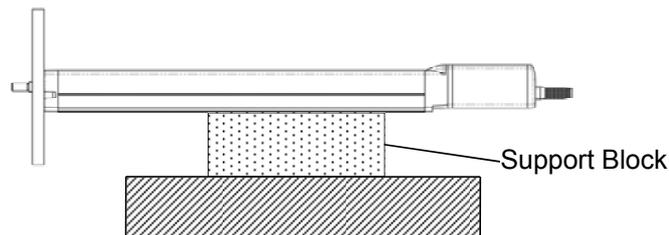
Caution: Pay attention when choosing the bolt length. In case that insufficient length of bolts is chosen, it may cause such problems as the strength not being enough on the actuator attachment, interference with driving part, drop in accuracy performance and unexpected accidents.

Ⓢ Caution for Installation using Front Bracket

Do not attempt to apply any external force to the body when installing with front bracket. External force may cause an operation failure or parts malfunction.



Prepare a support block as shown in the figure below for the horizontal installation of the unit with its stroke more than 150 even if there is no external force applied on the body. Even for those with the stroke less than 150, it is recommended to have a support block to avoid vibration being generated due to the operation condition or installation environment, which may cause an operation failure or parts malfunction.



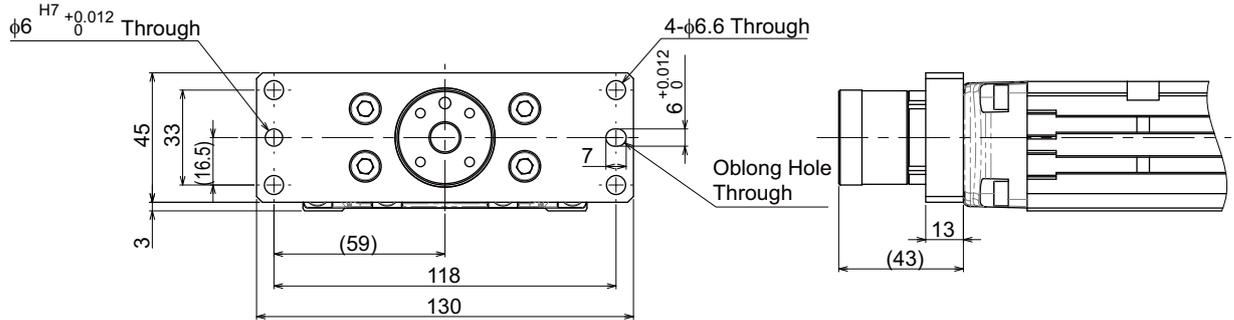
Operation of the actuator with attachment only on the front bracket applies the external force of the acceleration/deceleration multiplied by the weight of the actuator to the unit body. Control the acceleration/deceleration at 0.05G or less (for reference) when the actuator is moved with attachment only on the front bracket.

[4] When using Front Flange (Option)

There are tapped holes equipped on the front housing (Option).
Utilize these holes for the installation.
The attachment holes are located as shown below;

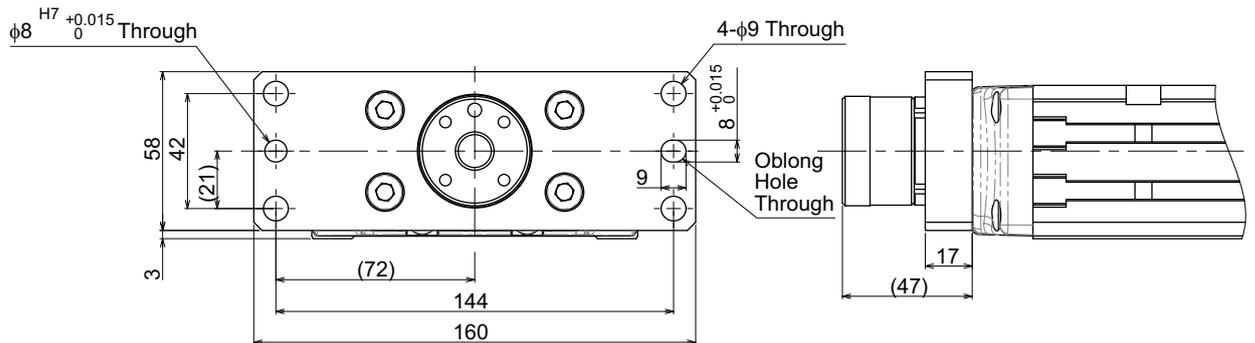
- WRA10C and WRA10R

(Note) In the delivery of IAI, the flatness is secured in the way described in the figure.



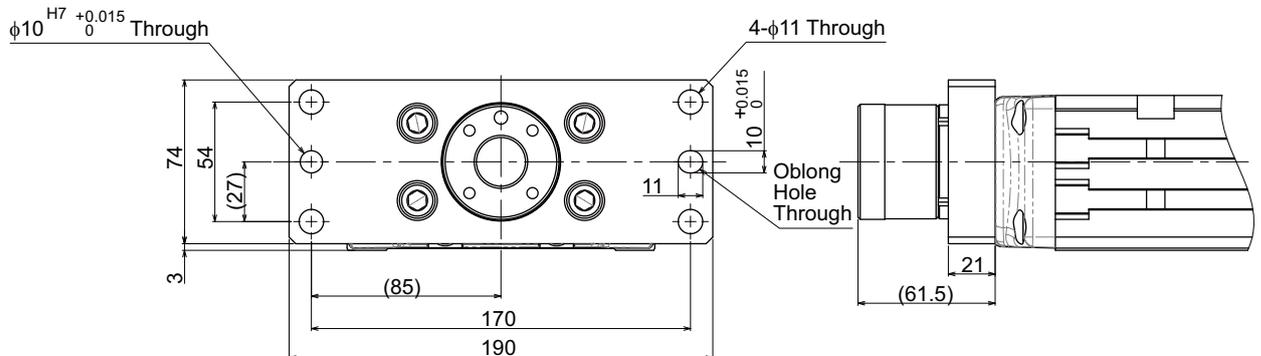
- WRA12C and WRA12R

(Note) In the delivery of IAI, the flatness is secured in the way described in the figure.



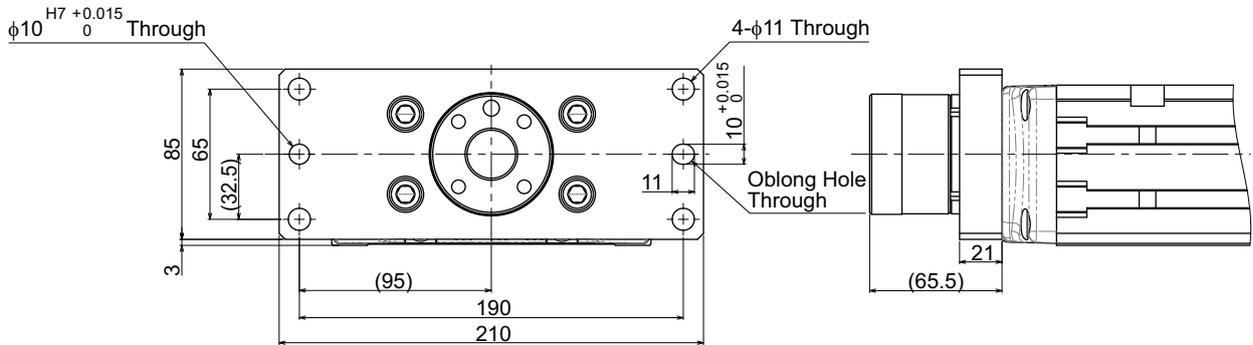
- WRA14C and WRA14R

(Note) In the delivery of IAI, the flatness is secured in the way described in the figure.



● WRA16C and WRA16R

(Note) In the delivery of IAI, the flatness is secured in the way described in the figure.



Make sure to follow “ⓈCaution for Installation using Front Bracket and Front Flange”

Tightening screws

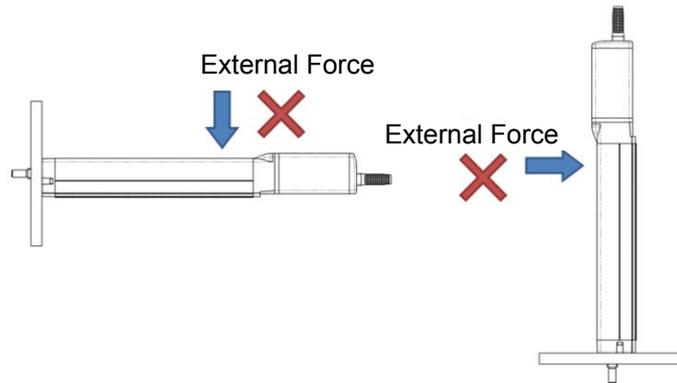
- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- For the effective engagement length between the bolt and female thread, provide at least the applicable value specified below:
 Female thread is made of steel material → Same length as the nominal diameter
 Female thread is made of aluminum → 1.8 times of nominal diameter



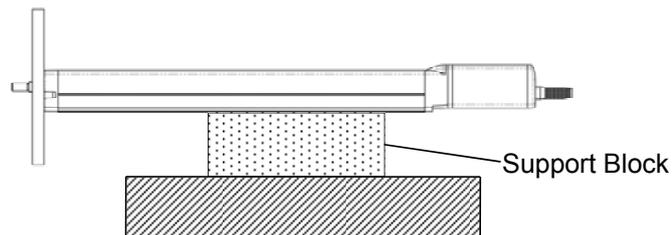
Caution: Pay attention when choosing the bolt length. In case that insufficient length of bolts is chosen, it may cause such problems as the strength not being enough on the actuator attachment, interference with driving part, drop in accuracy performance and unexpected accidents.

© Caution for Installation using Front Bracket and Front Flange

Do not attempt to apply any external force to the body when installing with front bracket or front flange (option). External force may cause an operation failure or parts malfunction



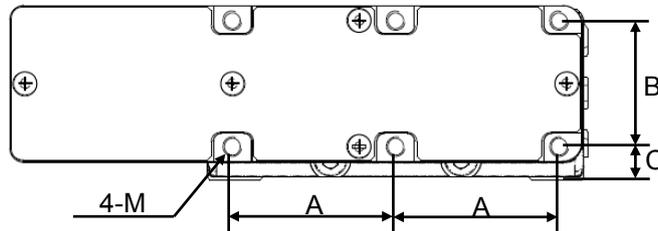
Prepare a support block as shown in the figure below for the horizontal installation of the unit with its stroke more than 150 even if there is no external force applied on the body. Even for those with the stroke less than 150, it is recommended to have a support block to avoid vibration being generated due to the operation condition or installation environment, which may cause an operation failure or parts malfunction.



Operation of the actuator with attachment only on the front bracket and the front flange (option) applies the external force of the acceleration/deceleration multiplied by the weight of the actuator to the unit body. Control the acceleration/deceleration at 0.05G or less (for reference) when the actuator is moved with attachment only on the front bracket and the front flange (option).

[5] When Utilizing Attachment Holes on the Bracket for Motor-Reversed Type

There are tapped holes prepared on the reversing bracket. (See the table below for the detailed dimensions.)



	A	B	C	Tapped Hole
WRA10R	42.5	33	9	M5 depth 10
WRA12R	51.5	41	11.5	M6 depth 10
WRA14R	60	50	15	M8 depth 12
WRA16R	70.5	59	16	M8 depth 16

Model Name	Attachment Holes	Attachment Hole Depth	Tightening Torque	
			In the case that steel is used for the bolt seating surface:	In the case that steel is used for the bolt seating surface:
WRA10R	M5	10mm	7.27N•m (0.74kgf•m)	3.42N•m (0.35kgf•m)
WRA12R	M6	10mm	12.3N•m (1.26kgf•m)	5.36N•m (0.55kgf•m)
WRA14R	M8	12mm	29.97N•m (3.06kgf•m)	11.48N•m (1.17kgf•m)
WRA16R	M8	16mm	29.97N•m (3.06kgf•m)	11.48N•m (1.17kgf•m)

Tightening screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Have the length of thread engagement approximately 1.8 times of the nominal diameter.

 **Caution:** Pay attention when choosing the bolt length. In case that insufficient length of bolts is chosen, it may cause such problems as the strength not being enough on the actuator attachment, interference with driving part, drop in accuracy performance and unexpected accidents.

[Precautions for Attachments]

Please note the following caution notes when installing the unit with using the tapped holes on the reversing bracket.

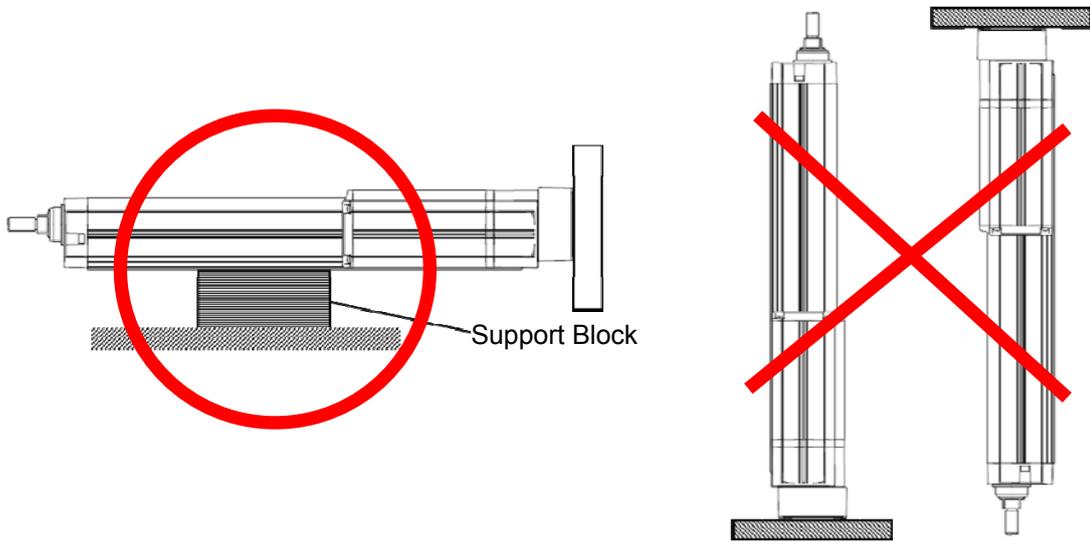
Do not attempt to affix the unit only with the tapped holes on the reversing bracket.

Do not apply external force to the main body.

There may be caused vibration due to the operating condition or installation environment, which may result in operational failures or components malfunction.

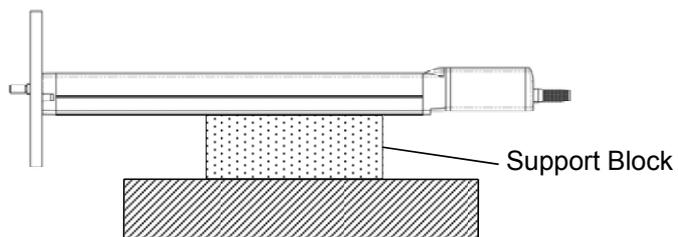
Availability of installation for each installation posture is as shown below:

(Note) When it is perpendicular installation without support etc., external force does not act, it is not attempt to apply the radial load.



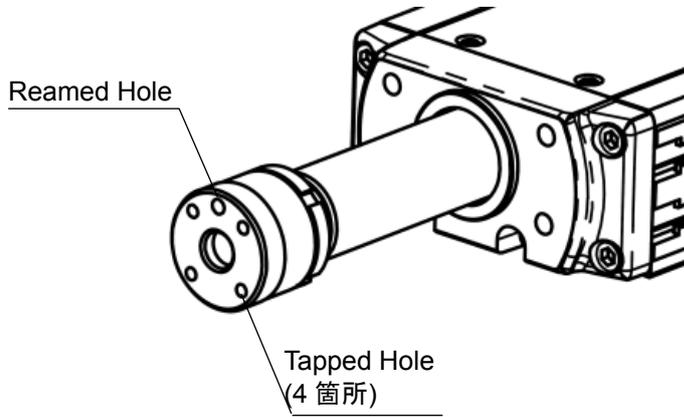
Installation Posture			Supports
Horizontal	Vertical	Ceiling Mount	
×	×	×	No
○	×	×	Yes

When using the unit in the horizontal or vertical orientation, have a pedestal to support the body to avoid external force being applied to the unit.



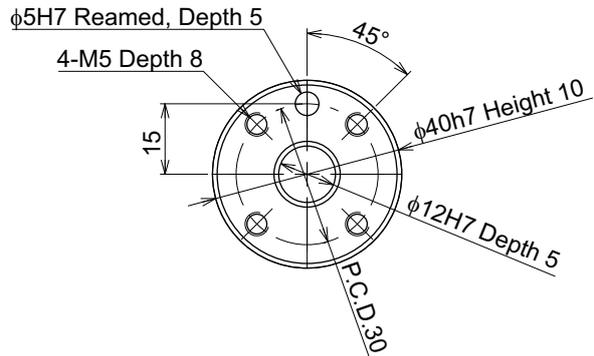
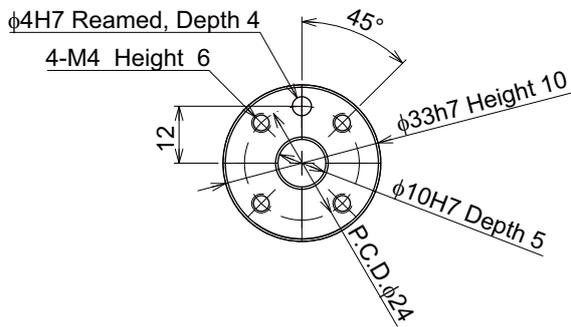
[6] Attachment of Work Part (Transported Object)

There are tapped holes equipped on the tip bracket on the rod. Utilize them to attach a transported object. Also, use the reamed hole when it is necessary to ensure the repeatability when attached repeatedly.



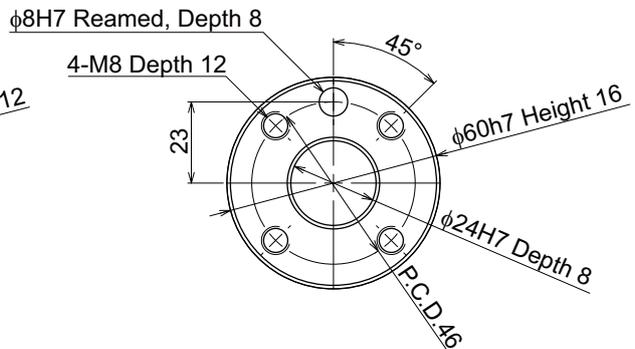
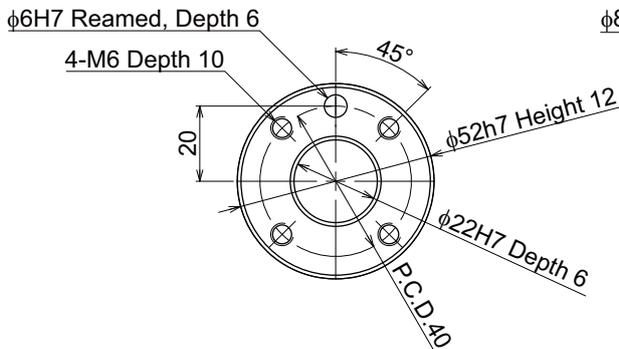
[WRA10]

[WRA12]



[WRA14]

[WRA16]



Model Name	Attachment Holes	Attachment Hole Depth	Tightening Torque	
			In the case that steel is used for the bolt seating surface:	In the case that steel is used for the bolt seating surface:
WRA10R	M4	6mm	3.59N•m (0.37kgf•m)	1.76N•m (0.18kgf•m)
WRA12R	M5	8mm	7.27N•m (0.74kgf•m)	3.42N•m (0.35kgf•m)
WRA14R	M6	10mm	12.3N•m (1.26kgf•m)	5.36N•m (0.55kgf•m)
WRA16R	M8	12mm	29.97N•m (3.06kgf•m)	11.48N•m (1.17kgf•m)

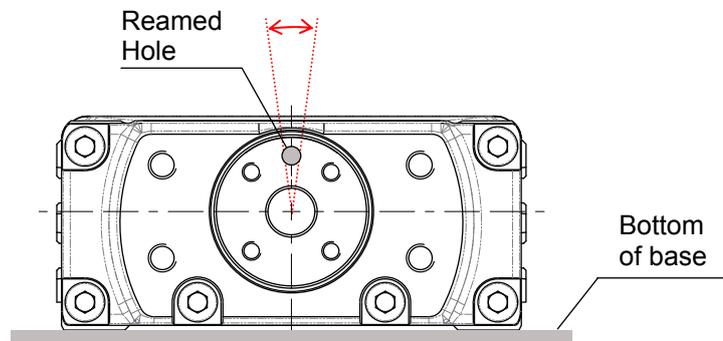
Tightening screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Have the length of thread engagement approximately 1.8 times of the nominal diameter.

[Precautions for Attachments]

- Do not attempt to apply torque above the allowable static torque on the rod.
- The variation in angle for the reamed hole on the tip bracket against the bottom of the base is $\pm 1^\circ$ at the maximum.

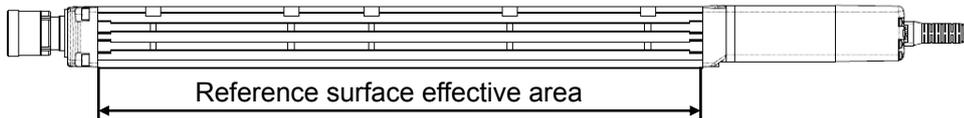
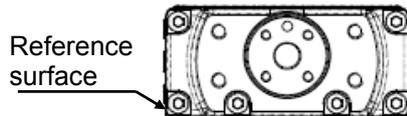
When the overhang of a transported object is large or when severe angle tuning is required, do not use the reamed hole for installation of the transported object.



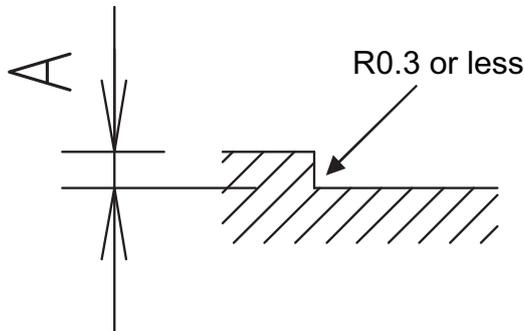
[7] Mounting Surface

- The platform to install the actuator should possess a structure that ensures enough stiffness, and should be free from vibration.
- The surface where the actuator will be mounted should be a machined surface or that with an accuracy equivalent to it, and the flatness should be 0.05mm/m or below.
- Ensure a room for maintenance work.
- The side and bottom surfaces of the base on the actuator work as the datum surfaces for the side of the rod.

Use these surfaces as the datum surfaces for mounting.



Follow the diagram below when installing the device using the reference surface.



Model Name	A Dimensions [mm]
WRA10C, WRA10R WRA12C, WRA12R WRA14C, WRA14R WRA16C, WRA16R	3 to 5

⚠ Caution: As there could be a case that the width dimension of the front bracket or rear bracket is wider than the datum surface dimension on the side, have them pushed towards the datum surface within the datum surface effective range. Having machining work to press the brackets towards the datum surface outside the datum surface effective range may cause interference to brackets and motors.

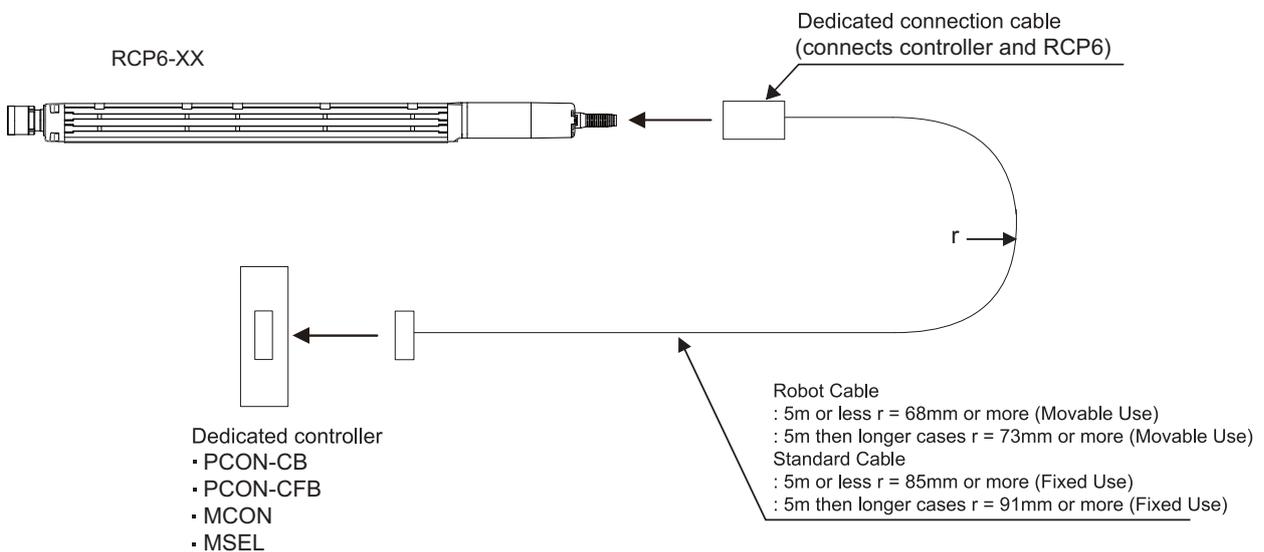
3. Connecting with the Controller

As the connection cable for the controller and RCP6 (this actuator), use the IAI-dedicated controller and dedicated connection cable.

This section explains the wiring method for a single axis.

- If the dedicated connection cable cannot be secured, reduce the load on the cable by allowing it to deflect only by the weight of the cable or wire it in a self-standing cable hose, etc., having a large radius.
- Do not cut and reconnect the dedicated connection cable for extension or shorten the cable.
- Do not pull on the dedicated connection cable or bend it forcibly.
- The actuator cable coming out of the motor unit is not meant to be bent. Fix the cable so it would not be bent repeatedly

Please consult with IAI if you require a different kind of cable than the one supplied.



Dedicated connection cable
WRA10, WRA12 and WRA14

- Motor • encoder integrated cables : CB-CAN-MPA□□□
- Motor • encoder integrated cables robot type : CB-CAN-MPA□□□-RB

WRA16

- Motor • encoder integrated cables : CB-CFA3-MPA□□□
- Motor • encoder integrated cables robot type : CB-CFA3-MPA□□□-RB

*) □□□ indicates the cable length. Up to 20m can be specified.
Example) 080=8m

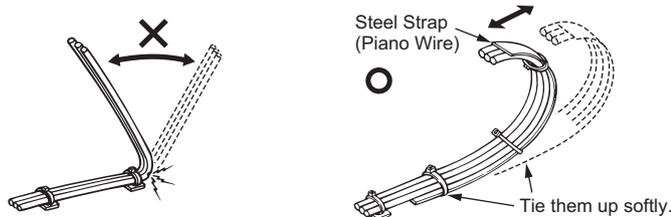


Warning: For wiring, please follow the warnings stated below. When constructing a system as the machinery equipment, pay attention to the wiring and connection of each cable so they are conducted properly. Not following them may cause not only a malfunction such as cable breakage or connection failure, or an operation error, but also electric shock or electric leakage, or may even cause a fire.

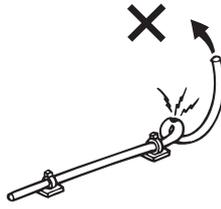
- Use dedicated cables of IAI indicated in this instruction manual. Contact us if you wish to have a change to the specifications of the dedicated cables.
- Make sure to turn the power off in the process of power line or cable connection or disconnection.
- Do not attempt to cut a dedicated cable with connectors on both ends to extend, shorten or re-joint it.
- Hold the dedicated cable to avoid mechanical force being applied to the terminals and connectors.
- Use a cable pipe or duct to have an appropriate protection when there is a possibility of mechanical damage on a dedicated cable.
- In case a dedicated cable is to be used at a moving part, make sure to lay out the cable without applying any force to pull the connector or extreme bend on the cable. Do not attempt to use the cable with a bending radius below the allowable value.
- Make certain that the connectors are plugged properly. Insufficient connection may cause an operation error, thus it is extremely risky.
- Do not lay out the cables to where the machine runs over them.
- Pay attention to the cable layout so it would not hit peripherals during an operation. In case it does, have an appropriate protection such as a cable track.
- When a cable is used hanging on the ceiling, prevent an environment that the cable swings with acceleration or wind velocity.
- Make sure there is not too much friction inside the cable storage equipment.
- Do not apply radiated heat to power line or cables.
- Do not bend the cable in the area from the connector tip inward to 150mm on both ends.
 Motor • Encoder Integrated Cables : CB-CAN-MPA□□□, CB-CFA3-MPA□□□
 Motor • Encoder Integrated Cables Robot Type : CB-CAN-MPA□□□-RB, CB-CFA3-MPA□□□-RB



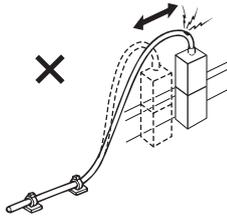
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



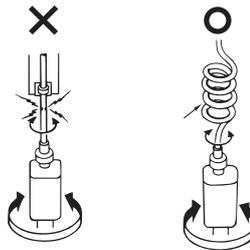
- Do not let the cable bend, kink or twist.



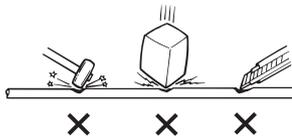
- Do not pull the cable with a strong force.



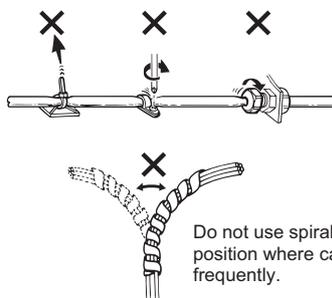
- Pay attention not to concentrate the twisting force to one point on a cable.



- Do not pinch, drop a heavy object onto or cut the cable.

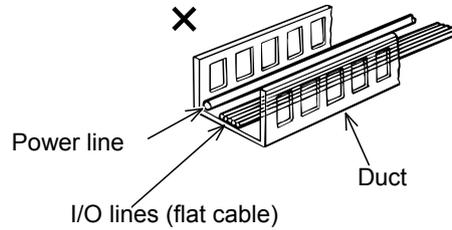


- When a cable is fastened to affix, make sure to have an appropriate force and do not tighten too much.



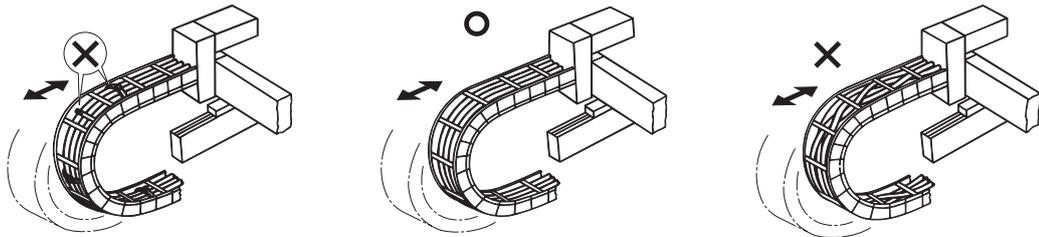
Do not use spiral tube in any position where cables are bent frequently.

- PIO line, communication line, power and driving lines are to be put separately from each other and do not tie them together. Arrange so that such lines are independently routed in the duct.



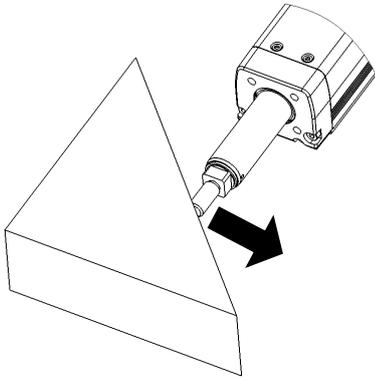
Follow the instructions below when using a cable track.

- If there is an indication to the cable for the space factor in a cable track, refer to the wiring instruction given by the supplier when storing the cable in the cable track.
- Avoid the cables to get twined or twisted in the cable track, and also to have the cables move freely and do not tie them up. (Avoid tension being applied when the cables are bent.) Do not pile up cables. It may cause faster abrasion of the sheaths or cable breakage.



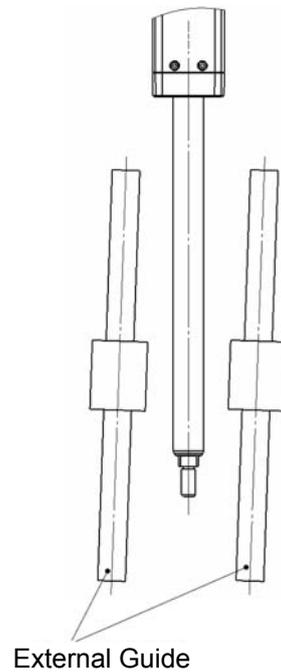
4. Caution for Operation

- When the reaction force against the pressing operation is the side-way force, make sure it would not exceed the allowable load.

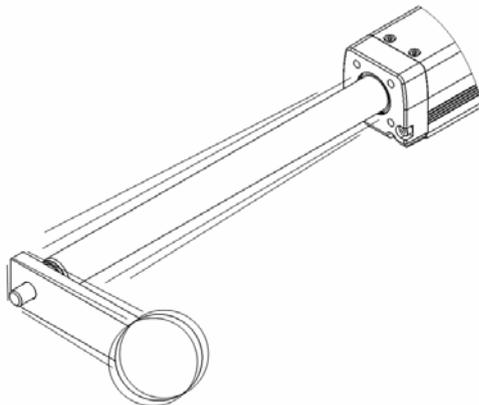


Be careful on the direction of the reaction force against the pressing operation.

- When connecting the rod to external guides, be careful on the parallelism of the guides to the rod. When connecting and fixing the rod to external guides, be careful not to apply excess side-way load to the rod because of the assembly variation. For the connection of the rod and guides, have a component such as a free joint to accept the assembly variation.



- The rod may generate vibration in some operation conditions. Apply guides to control the vibration.



5. Maintenance and Inspection

5.1 Inspection Items and Schedule

Follow the maintenance inspection schedule below.

It is assumed that the equipment is operating 8 hours per day.

If the equipment is running continuously night and day or otherwise running at a high operating rate, inspect more often as needed.

	External Visual Inspection	Internal Inspection (Note 1)	Greasing (Note 3)
Start of work inspection	○		
1 month inspection	○		
3 month inspection	○		○ (Rod sliding surface, ball screw and guide)
Every 3 months thereafter	○		○ (Rod sliding surface)
3 months after starting operation			Depends on grease supply timing (reference) of ball screw and guide
6 month inspection	○	○ (Note 1)	
Every 6 months thereafter	○	○ (Note 1)	

Note 1 Check the condition of grease, and wipe off the grease before supplying new in case it is extremely dirty.

Note 2 If the actuators are moved back and forth continuously over a short distance of 30mm or less, grease film may run out. As a guide, move the actuators back and forth repeatedly for around 5 cycles over a distance of 50mm or more after every 5,000 to 10,000 cycles. A layer of the grease will recover.

*1 : Supply grease to the rod sliding surface when grease is used up in the inspection at work start or every three months. First, wipe off the old grease and then supply new grease. Sometimes grease is separated from the base oil due to the installing posture or operating conditions and the base oil leaks from the inside of actuator to the outside. Check visually whether the oil drips or not when supplying grease.

[Grease Supply Timing of Ball Screw and Guide (Reference)]

Perform grease supply when it has reached to either the operation distance or spent months described in the table below.

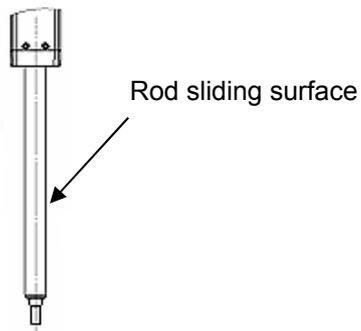
Maximum Speed of Use [mm/s]	Grease Supply Timing (Reference)	
	Operated distance	Months
0 to 750 or less	1,250km	12 month
750 to 800	2,500km	

- ⚠ Caution:**
- An actuator after 6 months of storage may have caused a degradation of the grease.
Supply grease before start using. [Refer to 5.6 “Grease Supply”]
 - Degradation speed of grease may differ depending on the environment of use (temperature, humidity and ambient conditions). It is recommended to shorten the grease supply period if the actuator is used under a bad condition such as in high temperature, high humidity or in dusty ambience.
Also, it is recommended to improve the environment conditions in case the grease changes its color due to the bad condition of use.

5.2 External Visual Inspection

An external visual inspection should check the following things.

Main unit	Loose actuator mounting bolts, other loose items
Rod sliding surface	Grease lubrication Dripping of grease base oil, etc. Dust or foreign objects on sliding surface
Cables	Scratches, proper connections
Overall	Irregular noise, vibration



5.3 Cleaning

- Clean exterior surfaces as necessary.
- If the grease base oil or others drip on the rod sliding surface and its periphery, wipe it off with a soft cloth, etc.
- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air as it may cause dust to get in through the gaps.
- Do not use oil-based solvents as they can harm lacquered and painted surfaces.
- To remove severe buildup, wipe gently with a soft cloth soaked in a neutral detergent or alcohol.

5.4 Internal Inspections

For RRA4, RRA6 and RRA7, turn off the power, remove the side cover and have a visual inspection. When inspecting the interior, check the following items.

Main unit	Loose mounting bolts, other loose items
Guide section	Lubrication, buildup
Ball screw	Lubrication, buildup

Visually inspect the interior of the equipment. Check whether dust or other foreign matter has gotten inside and check the lubrication state.

The lubrication may have turned brown. This is not a problem as long as the travel surfaces shine as though they are wet.

If the grease is mixed with dust and does not have a shiny appearance, or if the grease has lost its efficacy due to prolonged use, then clean each section and reapply grease.

The procedure for internal inspections is outlined below.

- 1) With 1.5mm (WRA10C, WRA10R) or with 2.5mm (WRA12C, WRA12R, WRA14C, WRA14R, WRA16C and WRA16R) hex wrench, loosen the bolts holding the frame cover, and detach the frame cover.
- 2) Check inside.
Extend the rod when checking the ball screw. The ball screw will appear. Slide the rod manually with hand or move it with JOG operation of the controller.
- 3) After finishing the inspection, assemble back in the reverse order.

When affixing the frame cover, tighten the bolts with the tightening torque described below.

Model Name	Bolt Diameter	Tightening Torque
WRA10C, WRA10R	M3	0.62N•m
WRA12C, WRA12R	M4	1.76N•m
WRA14C, WRA14R	M4	1.76N•m
WRA16C, WRA16R	M4	1.76N•m

5.5 Internal Cleaning

- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air as it may cause dust to get in through the gaps.
- Do not use oil-based solvents, neutral detergent or alcohol.

5.6 Grease Supply

5.6.1 What Grease to Use

IAI uses the following grease in our plant.

Guide and Ball Screw	Kyodo Yushi	Multemp PS No. 2
Rod (sliding surface)	Kyodo Yushi	Multemp PS No. 2

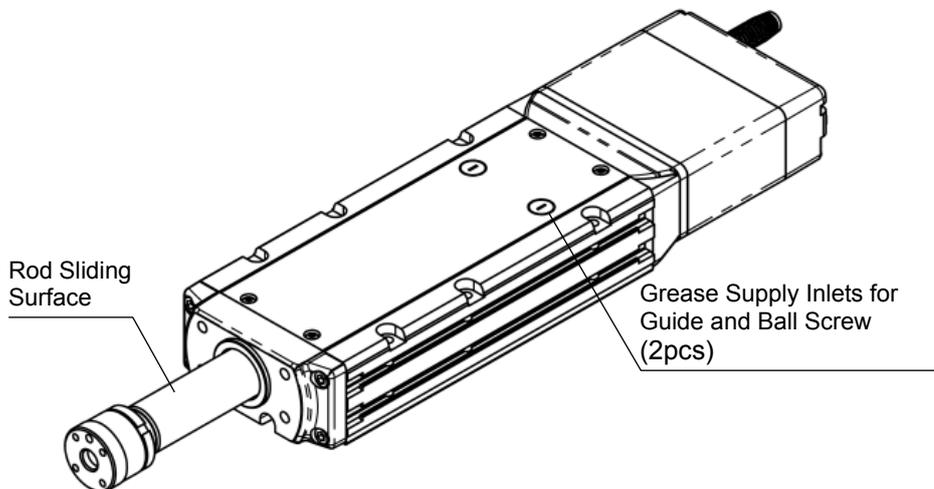
Other companies also sell similar types of grease. For more detailed information, ask the supplier to find an equivalent for you by telling them the name of the grease.

 **Warning:** Do not attempt to apply fluorine grease. Mixing lithium grease with other grease not only reduces the performance of the grease, it may even cause damage to the actuator.

5.6.2 How to Apply Grease

For the grease supply to the ball screw and guide, apply on the inlets (grease nipples) on the top of the frame.

- 1) Detach the caps on the grease supply inlets.



- 2) Move the rod to the home position manually or with JOG operation of the controller.
- 3) Insert a grease gun to the supply hole ($\phi 11$) on the top of the frame, hold the gun on the grease nipple and supply grease.
By supplying grease only to this grease nipple, grease can be supplied to both the ball screw and guide.

(Note) Prepare a grease gun suitable for the diameter of the grease nipples stated below.

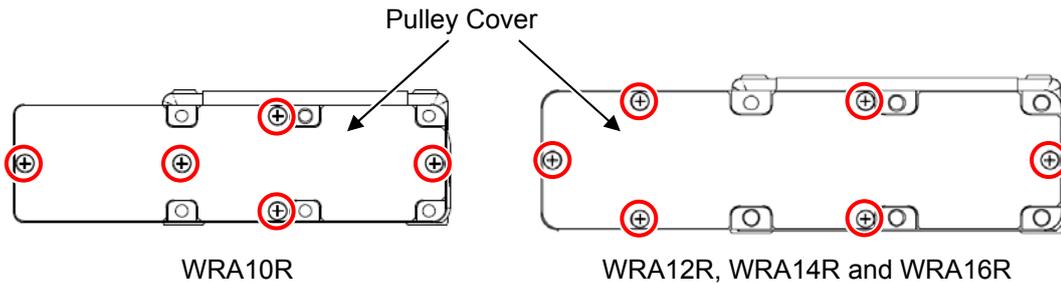
Model	Grease Nipple Diameter [mm]
WRA10C, WRA10R	$\phi 3.5$
WRA12C, WRA12R, WRA14C, WRA14R, WRA16C, WRA16R	$\phi 6.0$

5.7 Procedure for Belt Replacement and Tuning

Applicable Units: WRA10R, WRA12R, WRA14R and WRA16R

5.7.1 Inspection of the Belt

For inspection work, detach the pulley cover with a hex wrench and carry it out by visual. Remove the five pieces of cross recessed flat-head screws for WRA10R or six pieces for WRA12R, WRA14R and WRA16R (in areas marked with circles).



The period of replacement for the belt cannot be clearly defined as the durability of it is impacted so much by the operational conditions.

In generally speaking, it possesses bending life of several million times.

The timing belt gets worn away as the time passes, and it is necessary to have replacement at regular intervals with the following conditions as reference.

- When the gear and belt area show obvious friction.
- When swelling occurs as a result of oil adhesion.
- When damages such as a crack occurs on the belt gear and back side.

Also, for the toothed belt, it is recommended to set the interval of regular replacement cycle when in use under high wire fatigue condition in high acceleration and deceleration because it is difficult to judge the right timing for replacement by checking appearance or looseness of the wires strengthening the belt.

5.7.2 Belts to be Used

IAI uses the following belt in our plant

Model	IAI Maintenance Parts Model	Supplier Parts	
WRA10R	TB-RCP6-WSRA10R	60S2M208GB	Rubber Super Torque G Bare-back type (Mitsuboshi belting Ltd.)
WRA12R	TB-RCP6-WSRA12R	60S2M250GB	Rubber Super Torque G Bare-back type (Mitsuboshi belting Ltd.)
WRA14R	TB-RCP6-WSRA14R	100S3M303GB	Rubber Super Torque G Bare-back type (Mitsuboshi belting Ltd.)
WRA16R	TB-RCP6-WSRA16R	365-EV5GT-15	Rubber EV Belt (Gates Unitta Asia)

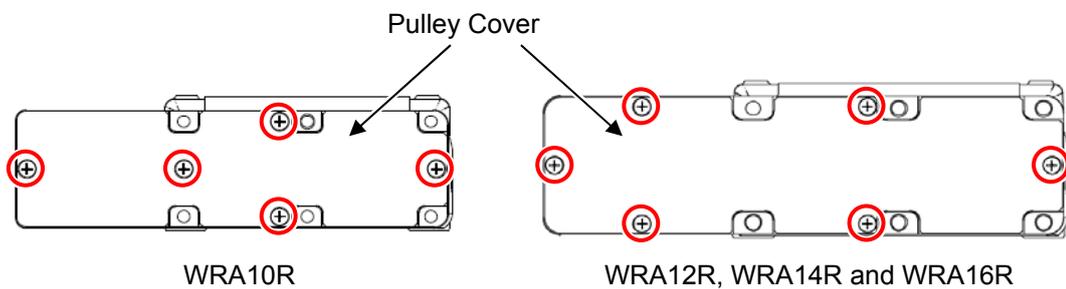
5.7.3 Replacement of the Belt

[Items Required for Replacemet Work]

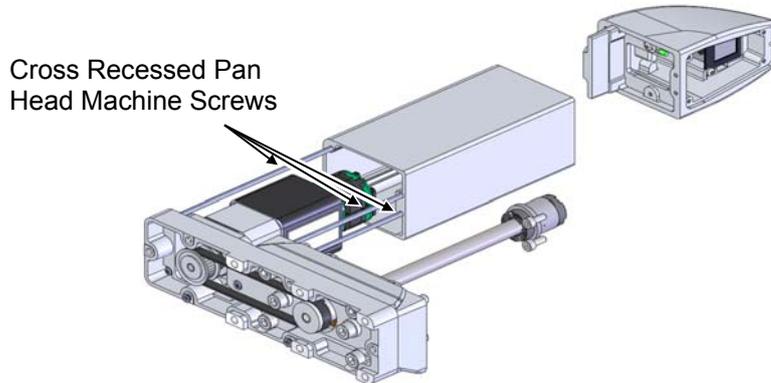
- Belt for replacement
- Phillips screwdriver
- Hex wrench 2.5mm (WRA10R), 3mm (WRA12R/WRA14R), 4mm (WRA16R) and 2mm (for hex socket head cap bolt) - sized
- Spring scale (that is available for pulling with 30kgf)
- Long tie-band (thin string)

[Procedures]

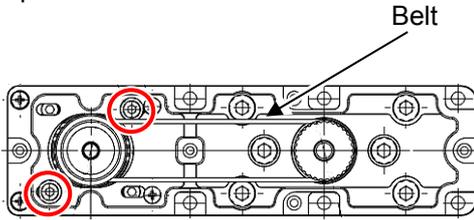
- 1) Remove the five pieces of cross recessed flat-head screws for WRA10R or six pieces for WRA12R, WRA14R and WRA16R (in areas marked with circles). Detach the pulley cover.



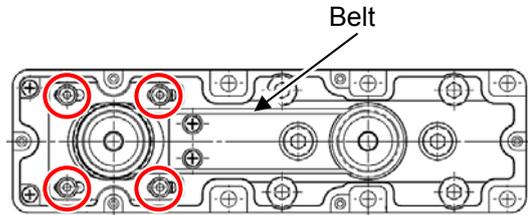
- 2) Remove the four sets of cross recessed pan head machine screws and conical spring washers holding the motor cover with using a Phillips screwdriver, and detach the motor cover.



- 3) Loosen the screws holding the motor (in marked with circles, two pieces for WRA10R and WRA12R and four pieces for WRA14R and WRA16R) with using a 2.5mm-sized (for WRA10R), 3mm-sized (for WRA12R/WRA14R) or 4mm-sized (for WRA16R) hex wrench. Replace the belt.

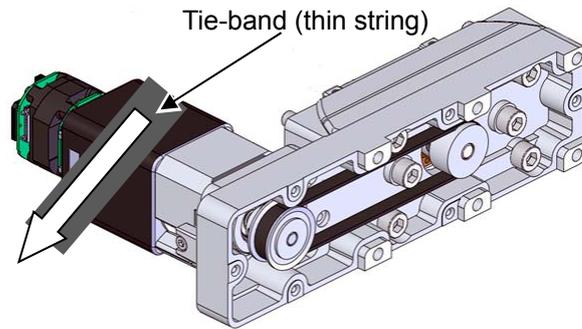


WRA10R and WRA12R

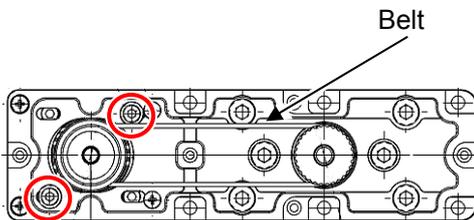


WRA14R and WRA16R

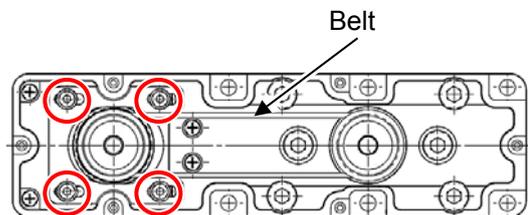
- 4) Adjust the belt tension. Hang a tie-band (thin string) on the end of the motor unit and pull it in specified load (specified tensile strength) with a spring scale. Once the load reached the specified, tighten the bolts with a 2.5mm-sized (for WRA10R), 3mm-sized (for WRA12R/WRA14R) or 4mm-sized (for WRA16R) hex wrench to affix.



Model	Tension Force
WRA10R	2 to 2.6kgf
WRA12R	2 to 2.6kgf
WRA14R	7 to 9.4kgf
WRA16R	26 to 30kgf



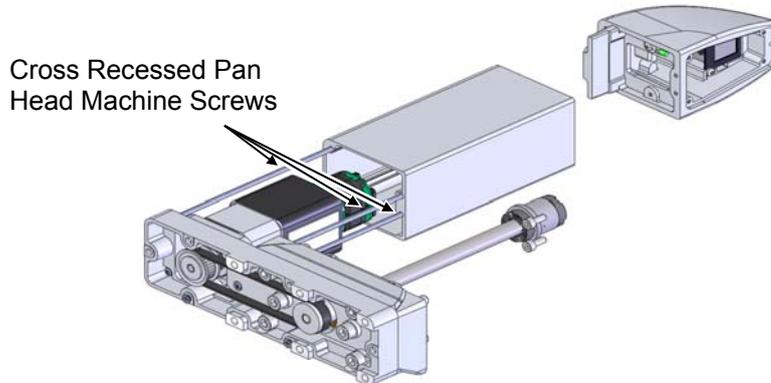
WRA10R and WRA12R



WRA14R and WRA16R

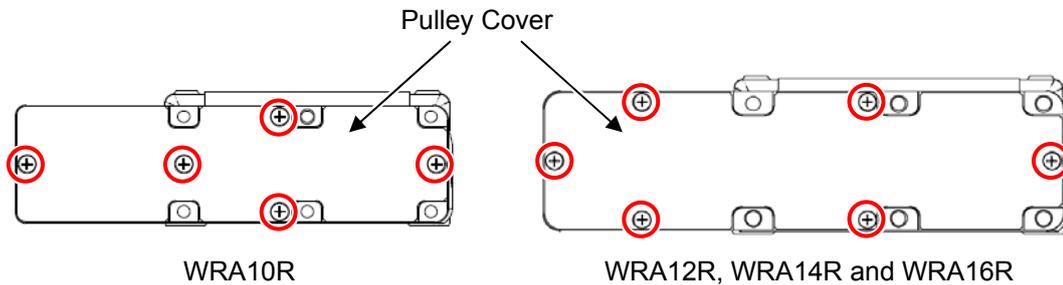
Model	Tightening Torque
WRA10R	162N•cm
WRA12R	323N•cm
WRA14R	323N•cm
WRA16R	631N•cm

- 5) Attach the motor cover with the four sets of cross recessed pan head machine screws and conical spring washers, and tighten them up with using a Phillips screwdriver.



Model	Tightening Torque
WRA10R, WRA12R	51.7N•cm
WRA14R, WRA16R	120.0N•cm

- 6) Attach the pulley cover with the five pieces of cross recessed flat-head screws for WRA10R or six pieces for WRA12R, WRA14R and WRA16R (in areas marked with circles), and tighten them up with using a Phillips screwdriver.



Tightening Torque
51.7N•cm

5.8 Replacement Process



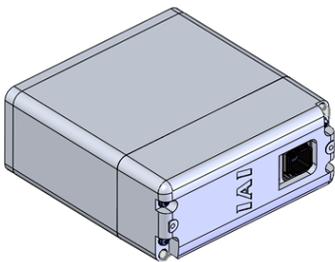
Caution : The encoder area in the motor for replacement and the control PC boards in RCP6S may get damaged by static electricity. Follow the caution notes below when having a work.

- Do not attempt to touch the encoder area in the motor for replacement directly with hand.
- Do not attempt to touch the control PC boards in RCP6S directly with hand except for replacement work.
- Touch a metal before starting the work in order to release static electricity from the body.
- Do not attempt to conduct the replacement work in a circumstance that is easy to generate static electricity (such as on a carpet).

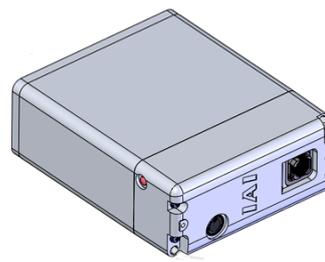
5.8.1 WRA10C, WRA12C, WRA14C and WRA16C

[Items required for replacing the motor]

- Motor unit for replacement



RCP6

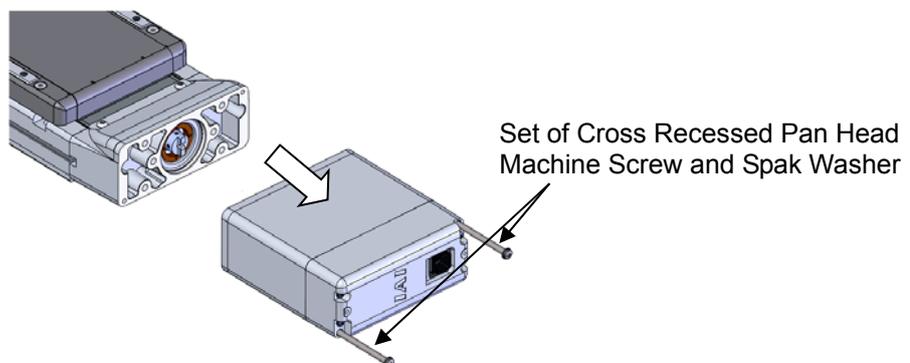


RCP6S

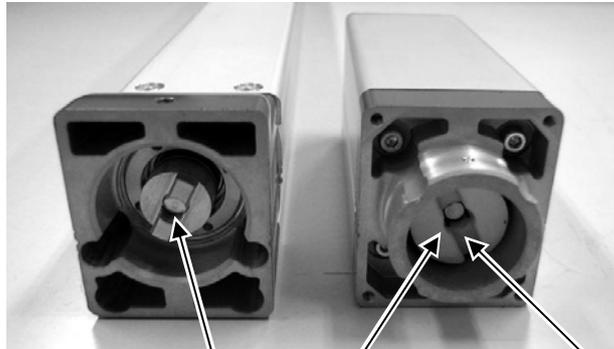
- Phillips screwdriver

[Procedure]

- 1) Remove the cross recessed pan head machine screws and spak washers (two sets for WRA10C and WRA12C and four sets for WRA14C and WRA16C) holding the actuator and the motor unit with using a Phillips screwdriver.
- 2) Detach the motor unit.



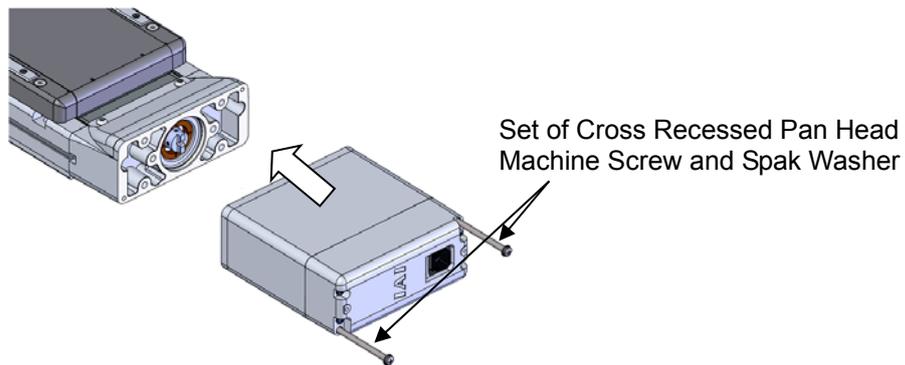
- 3) Make the profiles on the actuator side and motor unit side aligned so the projection matches to the slit.



Make the projection and slit matched with each other.

Apply grease to the coupling part.
NOXLUB TL1010 grease made by NOK

- 4) Attach the motor unit for replacement with the projection being matched with the slit.
- 5) Tighten the cross recessed pan head machine screws and spak washers (two sets for WRA10C and WRA12C and four sets for WRA14C and WRA16C) holding the actuator and the motor unit with using a Phillips screwdriver.



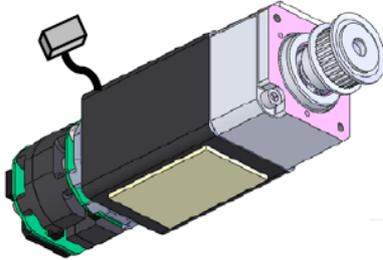
Model	Tightening Torque
WRA10C	41.4N•cm
WRA12C, WRA14C, WRA16C	96.4N•cm

- 6) Do not fail to conduct home-return operation on the PC or touch panel teaching after replacing the motor.

5.8.2 WRA10R, WRA12R, WRA14R and WRA16R

[Items Required for Replacement Work]

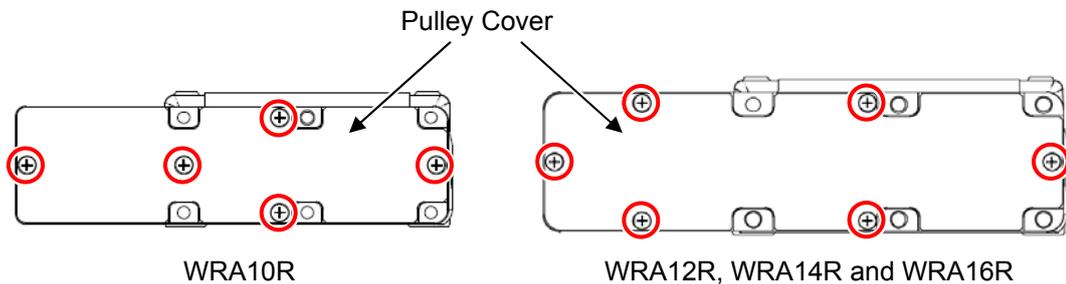
- Motor unit for replacement



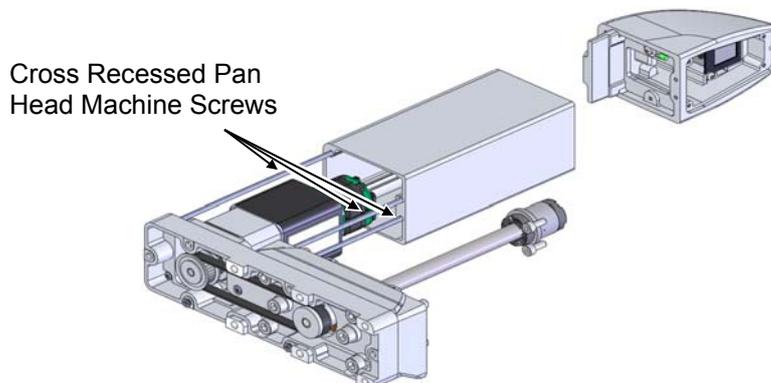
- Hex wrench: 2.5mm (WRA10R), 3mm (WRA12R/WRA14R), 4mm (WRA16R) and 2mm (for hex socket flat head cap screw)
- Spring scale (that is available for pulling with 30kgf)
- Long tie-band (thin string)

[Procedure]

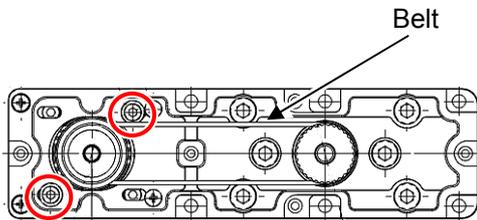
- 1) Remove the five pieces of cross recessed flat-head screws for WSA10R or six pieces for WSA12R, WSA14R and WSA16R (in areas marked with circles). Detach the pulley cover.



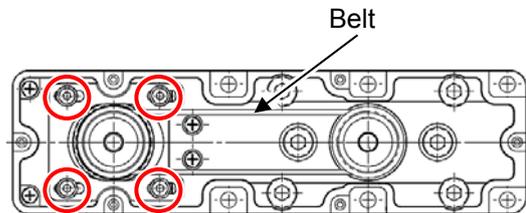
- 2) Remove the four sets of cross recessed pan head machine screws and conical spring washers holding the motor cover with using a Phillips screwdriver, and detach the motor cover.



- 3) Loosen the screws holding the motor (in marked with circles, two pieces for WRA10R and WRA12R and four pieces for WRA14R and WRA16R) with using a 2.5mm-sized (for WRA10R), 3mm-sized (for WRA12R/WRA14R) or 4mm-sized (for WRA16R) hex wrench. Replace the belt if it is necessary to replace.

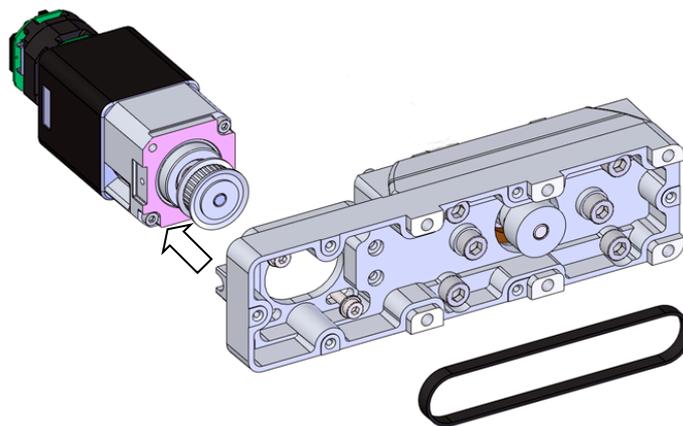


WRA10R and WRA12R

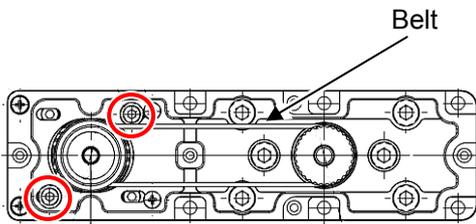
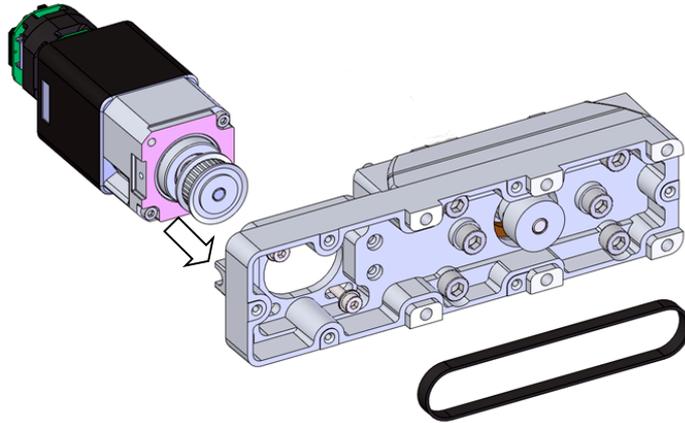


WRA14R and WRA16R

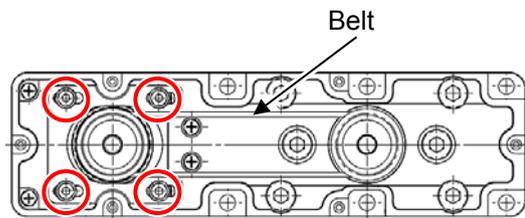
- 4) Take out the belt off the pulleys.
- 5) Take out the two bolts for WRA10R and WRA12R and four bolts for WRA14R and WRA16R, and pull out the motor unit.



- 6) Attach a new motor and tighten the tension adjustment screw (in area marked with a circle) temporarily.
Hang over the timing belt.



WRA10R and WRA12R

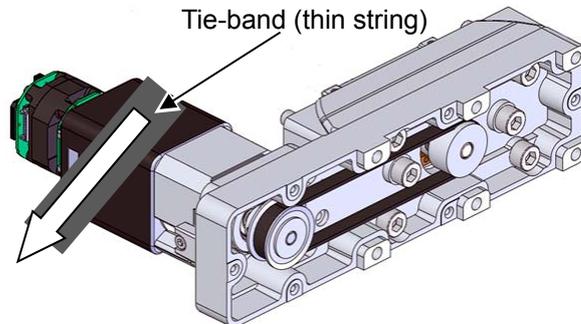


WRA14R and WRA16R

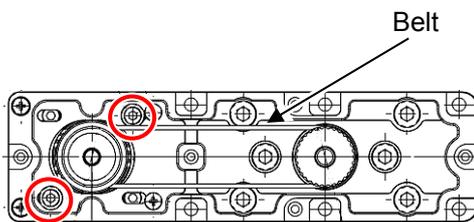
7) Adjust the belt tension.

Hang a tie-band (or thin string) at the edge of the motor unit and pull it to the specified load (specified amount of the belt tension) with a spring scale.

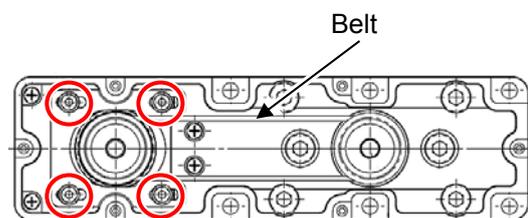
Once the tension reaches the specified load, tighten the bolts with using a 2.5mm-sized (for WRA10R), 3mm-sized (for WRA12R/WRA14R) or 4mm-sized (for WRA16R) hex wrench to fix.



Model	Tension Force
WRA10R	2 to 2.6kgf
WRA12R	2 to 2.6kgf
WRA14R	7 to 9.4kgf
WRA16R	26 to 30kgf



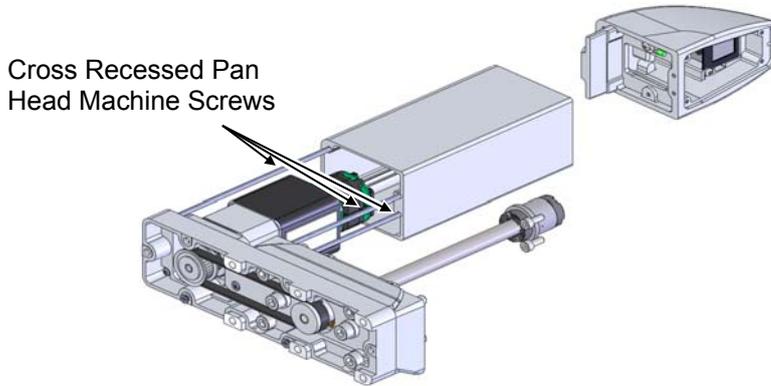
WRA10R and WRA12R



WRA14R and WRA16R

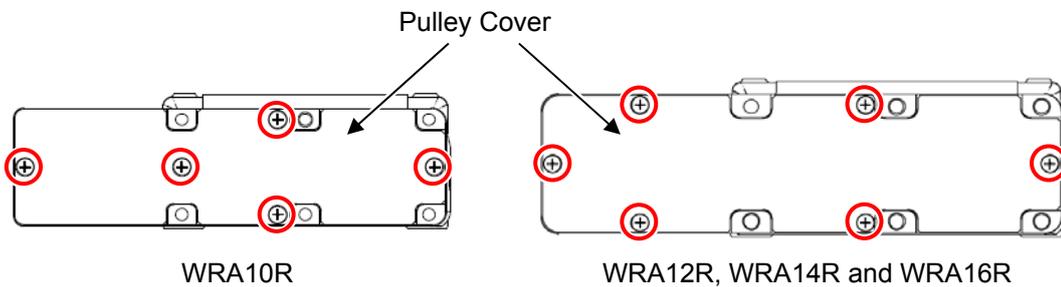
Model	Tightening Torque
WRA10R	162N•cm
WRA12R	323N•cm
WRA14R	323N•cm
WRA16R	631N•cm

- 8) Attach the motor cover with the four sets of cross recessed pan head machine screws and conical spring washers, and tighten them up with using a Phillips screwdriver.



Model	Tightening Torque
WRA10R, WRA12R	51.7N·cm
WRA14R, WRA16R	120.0N·cm

- 9) Attach the pulley cover with the five pieces of cross recessed flat-head screws for WRA10R or six pieces for WRA12R, WRA14R and WRA16R (in areas marked with circles), and tighten them up with using a Phillips screwdriver.

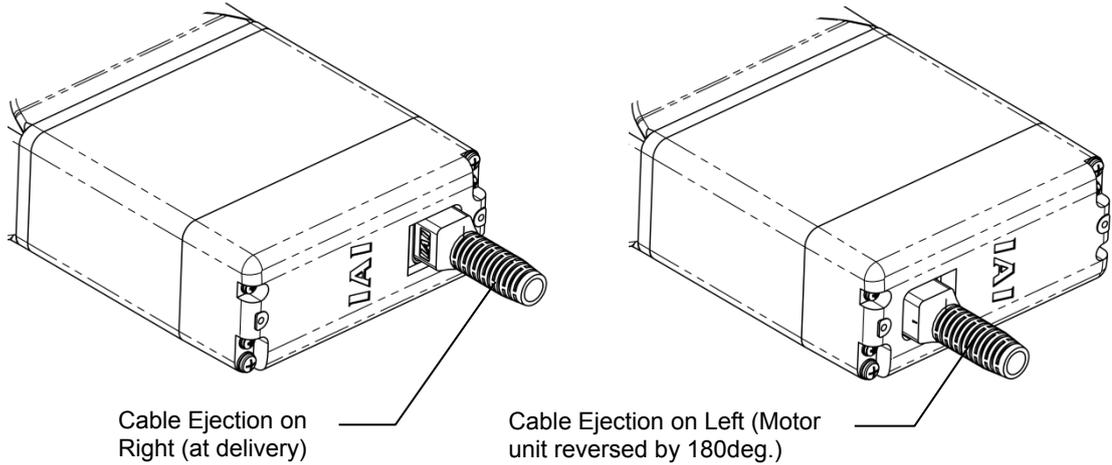


Tightening Torque
51.7N·cm

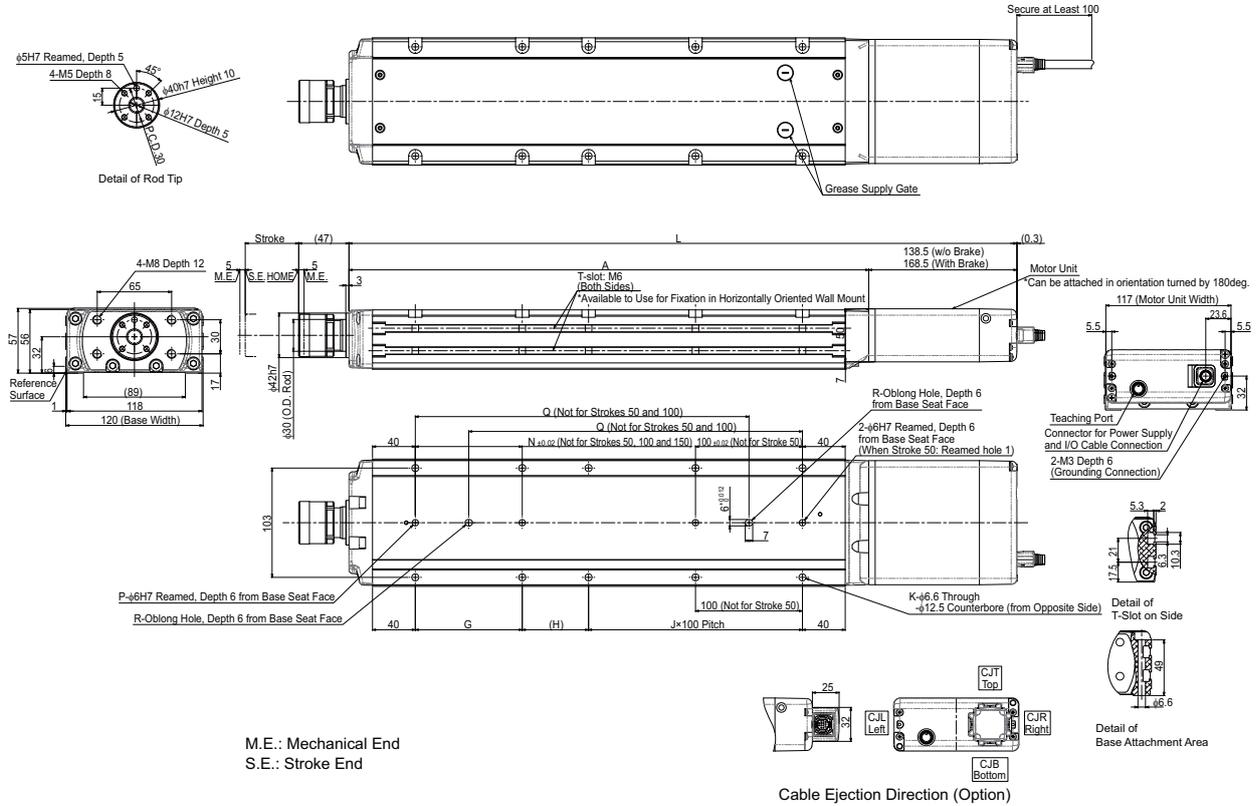
- 10) Do not fail to conduct home-return operation on the PC or touch panel teaching after replacing the motor.

6. Cable Ejecting Position Change

The cable ejection position for the coupling type at the delivery is on the right hand side when you put the unit horizontally and view it from the motor side. By turning the motor unit by 180deg to install, the cable ejection position can be reversed from right to left. To detach and attach the motor unit, refer to "Motor Replacement Procedure"



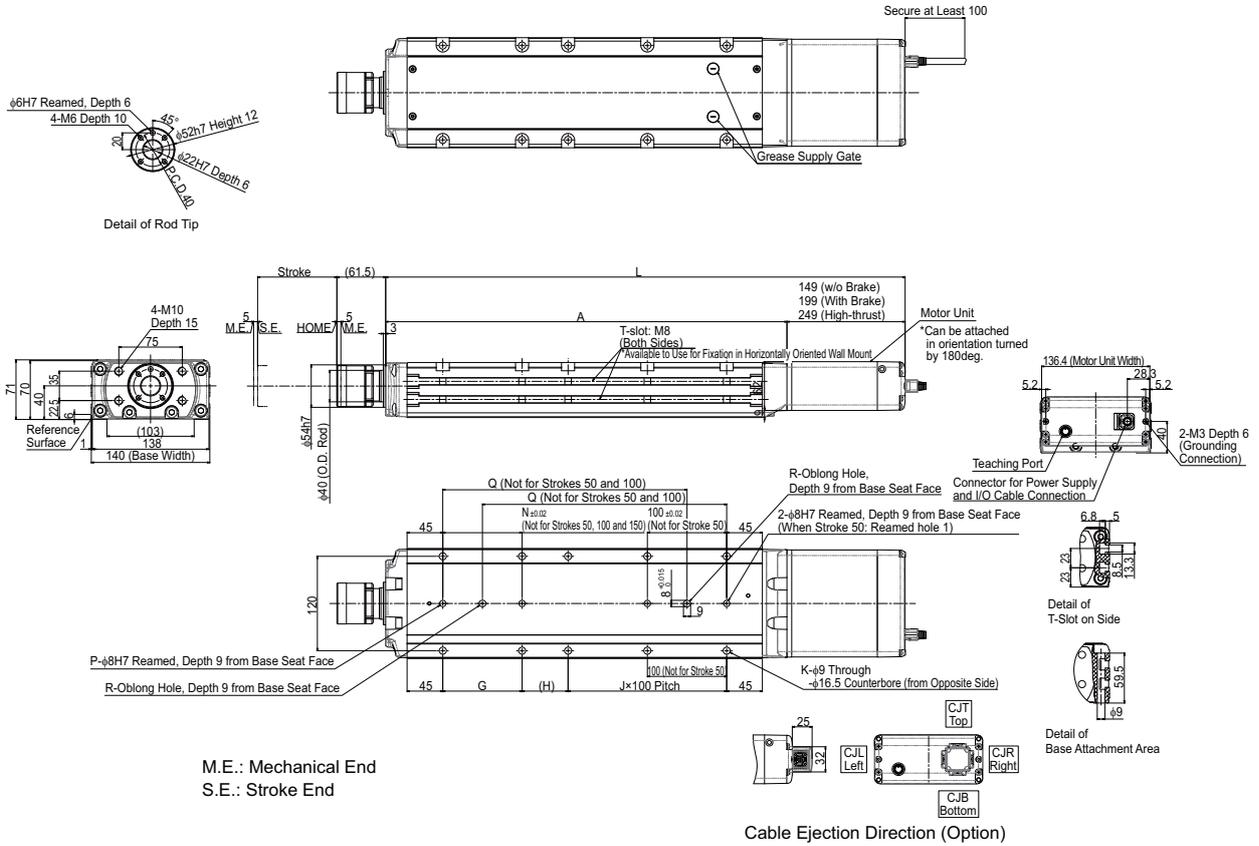
7.4 Built-in Controller Specification RCP6S-WRA12C



Stroke	L		A	G	H	J	K	N	P	Q	R	Mass [kg]	
	w/o Brake	With Brake										w/o Brake	With Brake
50	374.5	404.5	236	-	112	0	4	-	1	-	0	4.8	5.0
100	424.5	454.5	286	-	62	1	6	-	1	-	0	5.4	5.7
150	474.5	504.5	336	-	112	1	6	-	1	162	1	6.1	6.3
200	524.5	554.5	386	100	62	1	8	100	2	212	1	6.7	6.9
250	574.5	604.5	436	100	112	1	8	100	2	262	1	7.3	7.6
300	624.5	654.5	486	100	62	2	10	100	2	312	1	8.0	8.2
350	674.5	704.5	536	100	112	2	10	100	2	362	1	8.6	8.9
400	724.5	754.5	586	100	62	3	12	100	2	412	1	9.3	9.5
450	774.5	804.5	636	100	112	3	12	100	2	462	1	9.9	10.1
500	824.5	854.5	686	100	62	4	14	100	2	512	1	10.5	10.8

(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 25mm.

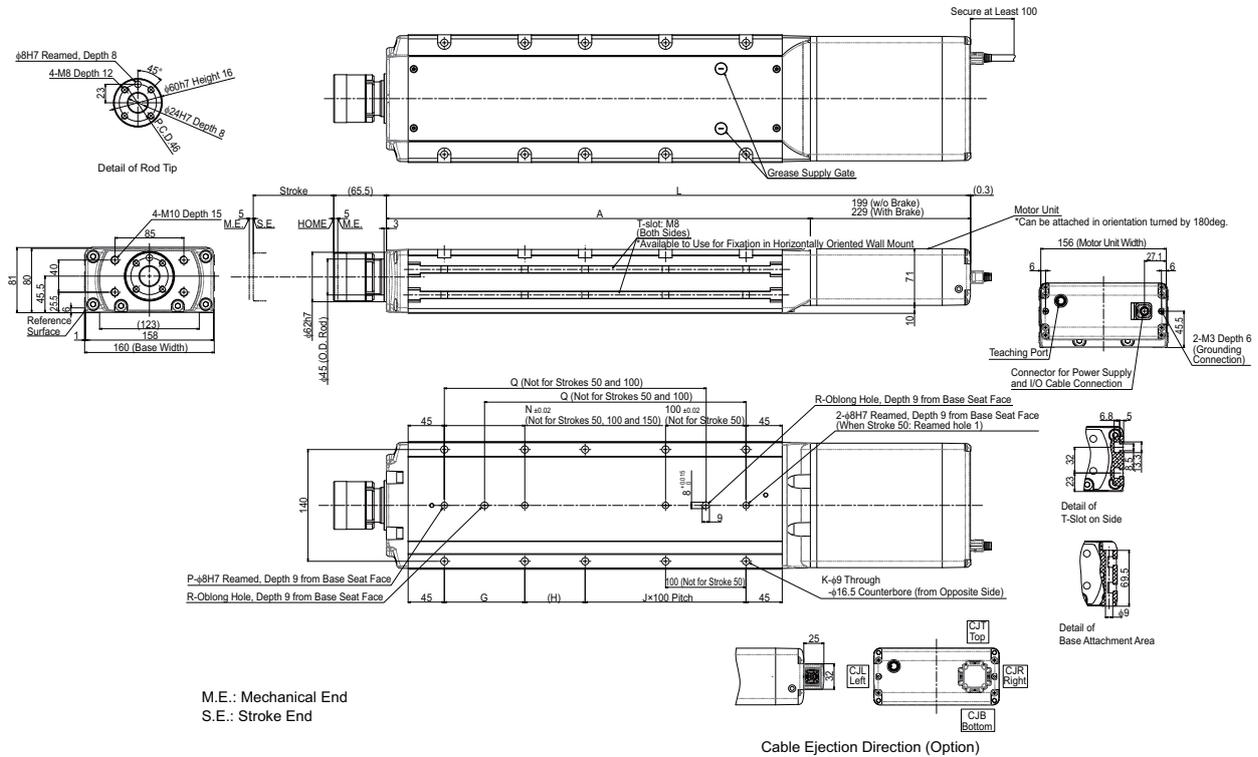
7.6 Built-in Controller Specification RCP6S-WRA14C



Stroke	L		A	G	H	J	K	N	P	Q	R	Mass [kg]	
	w/o Brake	With Brake										w/o Brake	With Brake
50	405	455	256	-	108	0	4	-	1	-	0	8.0	8.5
100	455	505	306	-	58	1	6	-	1	-	0	8.9	9.4
150	505	555	356	-	108	1	6	-	1	158	1	9.8	10.3
200	555	605	406	100	58	1	8	100	2	208	1	10.7	11.2
250	605	655	456	100	108	1	8	100	2	258	1	11.6	12.0
300	655	705	506	100	58	2	10	100	2	308	1	12.4	12.9
350	705	755	556	100	108	2	10	100	2	358	1	13.3	13.8
400	755	805	606	100	58	3	12	100	2	408	1	14.2	14.7
450	805	855	656	100	108	3	12	100	2	458	1	15.1	15.6
500	855	905	706	100	58	4	14	100	2	508	1	16.0	16.4
550	905	955	756	100	108	4	14	100	2	558	1	16.8	17.3
600	955	1005	806	100	58	5	16	100	2	608	1	17.7	18.2

(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 25mm.

7.8 Built-in Controller Specification RCP6S-WRA16C

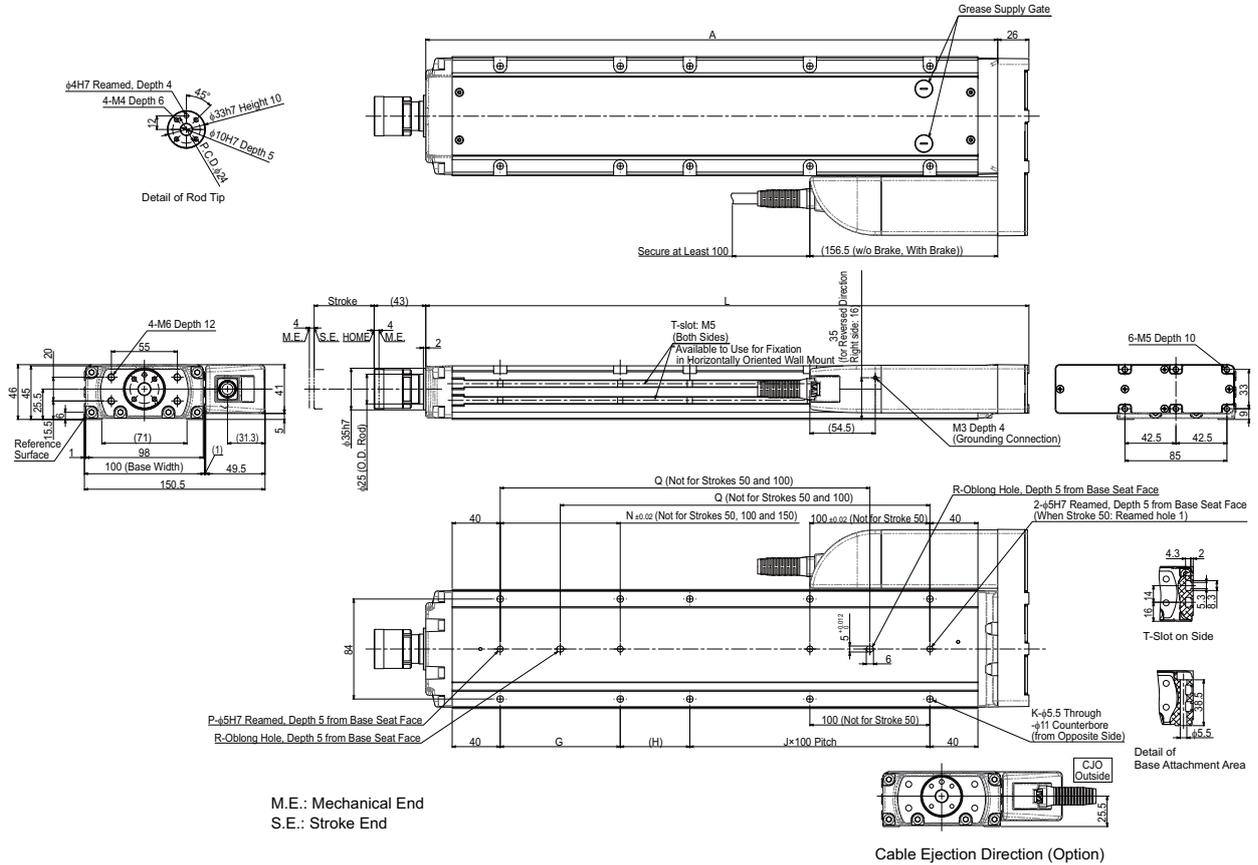


Stroke	L		A	G	H	J	K	N	P	Q	R	Mass [kg]	
	w/o Brake	With Brake										w/o Brake	With Brake
50	476	506	277	-	125	0	4	-	1	-	0	11.6	12.1
100	526	556	327	-	75	1	6	-	1	-	0	12.7	13.3
150	576	606	377	-	125	1	6	-	1	175	1	13.9	14.4
200	626	656	427	100	75	1	8	100	2	225	1	15.0	15.5
250	676	706	477	100	125	1	8	100	2	275	1	16.2	16.7
300	726	756	527	100	75	2	10	100	2	325	1	17.3	17.8
350	776	806	577	100	125	2	10	100	2	375	1	18.4	18.9
400	826	856	627	100	75	3	12	100	2	425	1	19.5	20.1
450	876	906	677	100	125	3	12	100	2	475	1	20.7	21.2
500	926	956	727	100	75	4	14	100	2	525	1	21.8	22.3
550	976	1006	777	100	125	4	14	100	2	575	1	23.0	23.5
600	1026	1056	827	100	75	5	16	100	2	625	1	24.1	24.6
650	1076	1106	877	100	125	5	16	100	2	675	1	25.2	25.8
700	1126	1156	927	100	75	6	18	100	2	725	1	26.3	26.9
750	1176	1206	977	100	125	6	18	100	2	775	1	27.5	28.0
800	1226	1256	1027	100	75	7	20	100	2	825	1	28.6	29.1

(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 25mm.

7.9 Standard Specification RCP6-WRA10R Left Reversed (Model No.: ML)

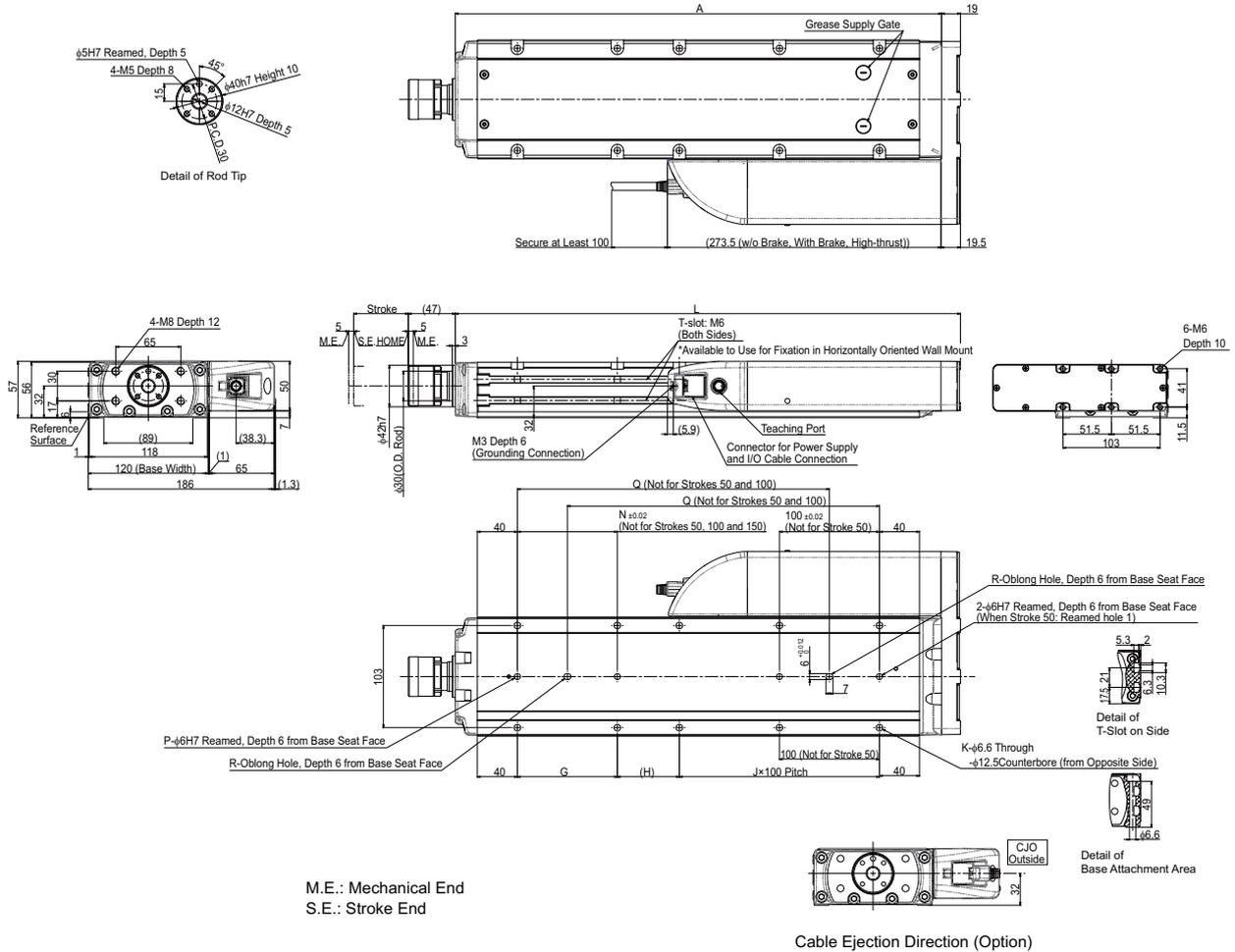
(Note) The motor reversed direction in the drawing below becomes right for the right-reversed type (Model Code: MR).



Stroke	L	A	G	H	J	K	N	P	Q	R	Mass [kg]	
											w/o Brake	With Brake
50	252.5	226.5	-	108	0	4	-	1	-	0	3.4	3.5
100	302.5	276.5	-	58	1	6	-	1	-	0	3.8	3.9
150	352.5	326.5	-	108	1	6	-	1	158	1	4.3	4.4
200	402.5	376.5	100	58	1	8	100	2	208	1	4.7	4.8
250	452.5	426.5	100	108	1	8	100	2	258	1	5.2	5.3
300	502.5	476.5	100	58	2	10	100	2	308	1	5.6	5.7
350	552.5	526.5	100	108	2	10	100	2	358	1	6.1	6.1
400	602.5	576.5	100	58	3	12	100	2	408	1	6.5	6.6
450	652.5	626.5	100	108	3	12	100	2	458	1	7.0	7.0
500	702.5	676.5	100	58	4	14	100	2	508	1	7.4	7.5

7.12 Built-in Controller Specification RCP6S-WRA12R Left Reversed (Model No.: ML)

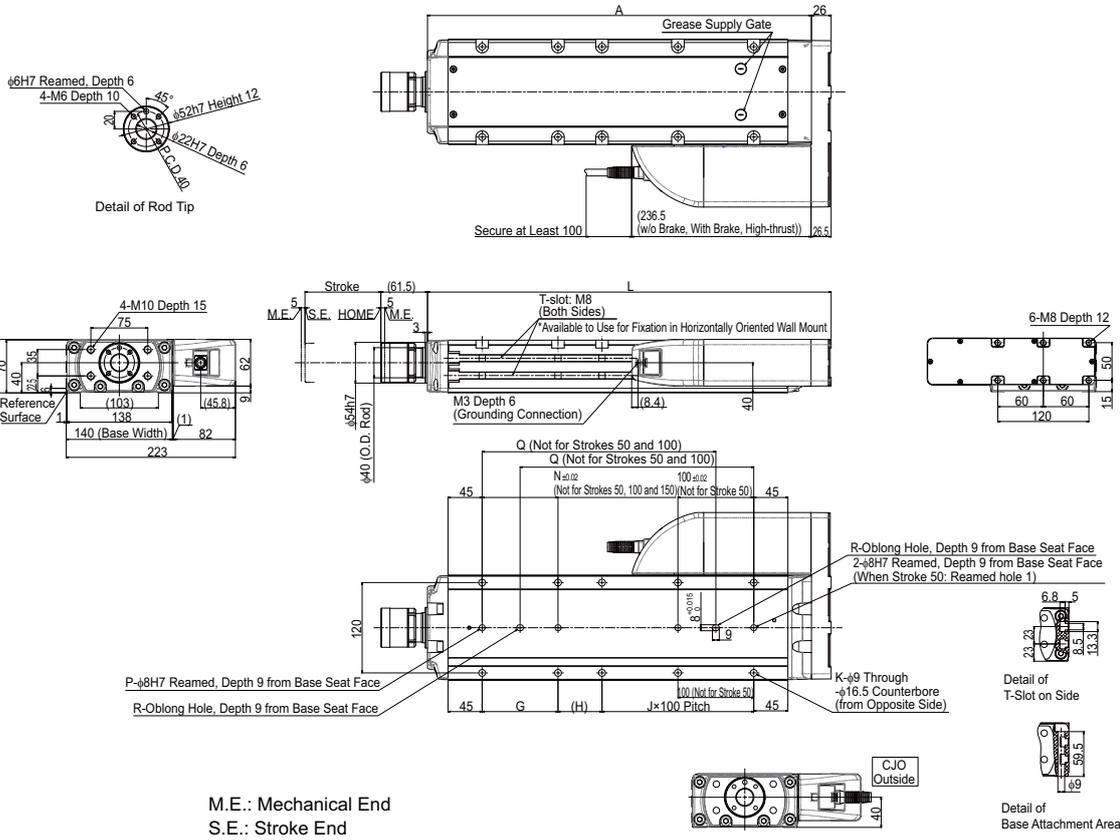
(Note) The motor reversed direction in the drawing below becomes right for the right-reversed type (Model Code: MR).



Stroke	L	A	G	H	J	K	N	P	Q	R	Mass [kg]	
											w/o Brake	With Brake
50	255	236	-	112	0	4	-	1	-	0	5.2	5.3
100	305	286	-	62	1	6	-	1	-	0	5.8	5.9
150	355	336	-	112	1	6	-	1	162	1	6.5	6.5
200	405	386	100	62	1	8	100	2	212	1	7.1	7.2
250	455	436	100	112	1	8	100	2	262	1	7.7	7.8
300	505	486	100	62	2	10	100	2	312	1	8.4	8.4
350	555	536	100	112	2	10	100	2	362	1	9.0	9.1
400	605	586	100	62	3	12	100	2	412	1	9.6	9.7
450	655	636	100	112	3	12	100	2	462	1	10.3	10.4
500	705	686	100	62	4	14	100	2	512	1	10.9	11.0

7.13 Standard Specification RCP6-WRA14R Left Reversed (Model No.: ML)

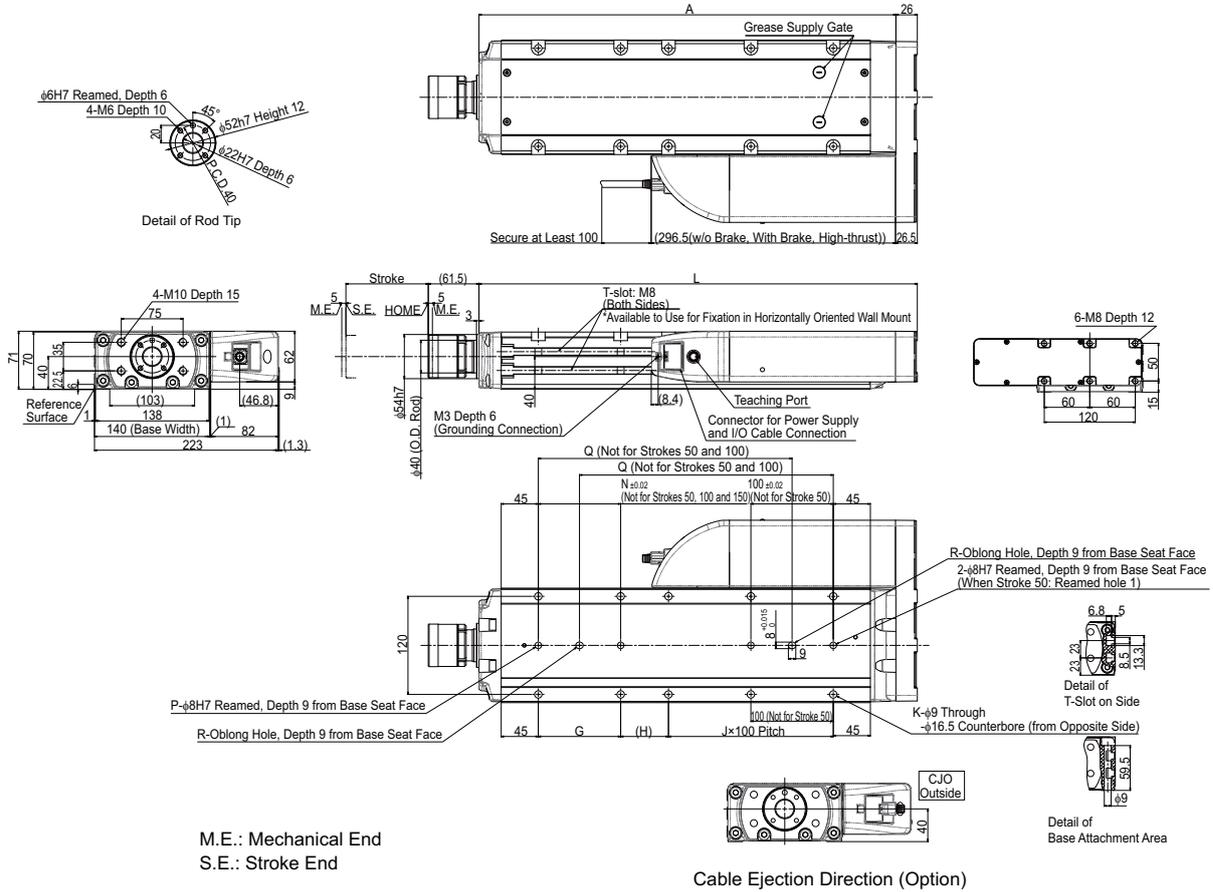
(Note) The motor reversed direction in the drawing below becomes right for the right-reversed type (Model Code: MR).



Stroke	L	A	G	H	J	K	N	P	Q	R	Mass [kg]	
											w/o Brake	With Brake
50	282	256	-	108	0	4	-	1	-	0	8.7	8.9
100	332	306	-	58	1	6	-	1	-	0	9.6	9.7
150	382	356	-	108	1	6	-	1	158	1	10.5	10.6
200	432	406	100	58	1	8	100	2	208	1	11.4	11.5
250	482	456	100	108	1	8	100	2	258	1	12.2	12.4
300	532	506	100	58	2	10	100	2	308	1	13.1	13.2
350	582	556	100	108	2	10	100	2	358	1	14.0	14.1
400	632	606	100	58	3	12	100	2	408	1	14.9	15.0
450	682	656	100	108	3	12	100	2	458	1	15.7	15.9
500	732	706	100	58	4	14	100	2	508	1	16.6	16.7
550	782	756	100	108	4	14	100	2	558	1	17.5	17.6
600	832	806	100	58	5	16	100	2	608	1	18.4	18.5

7.14 Built-in Controller Specification RCP6S-WRA14R Left Reversed (Model No.: ML)

(Note) The motor reversed direction in the drawing below becomes right for the right-reversed type (Model Code: MR).



Stroke	L	A	G	H	J	K	N	P	Q	R	Mass [kg]	
											w/o Brake	With Brake
50	282	256	-	108	0	4	-	1	-	0	8.9	9.0
100	332	306	-	58	1	6	-	1	-	0	9.8	9.9
150	382	356	-	108	1	6	-	1	158	1	10.7	10.8
200	432	406	100	58	1	8	100	2	208	1	11.5	11.6
250	482	456	100	108	1	8	100	2	258	1	12.4	12.5
300	532	506	100	58	2	10	100	2	308	1	13.3	13.4
350	582	556	100	108	2	10	100	2	358	1	14.2	14.3
400	632	606	100	58	3	12	100	2	408	1	15.0	15.2
450	682	656	100	108	3	12	100	2	458	1	15.9	16.0
500	732	706	100	58	4	14	100	2	508	1	16.8	16.9
550	782	756	100	108	4	14	100	2	558	1	17.7	17.8
600	832	806	100	58	5	16	100	2	608	1	18.5	18.7

8. Life

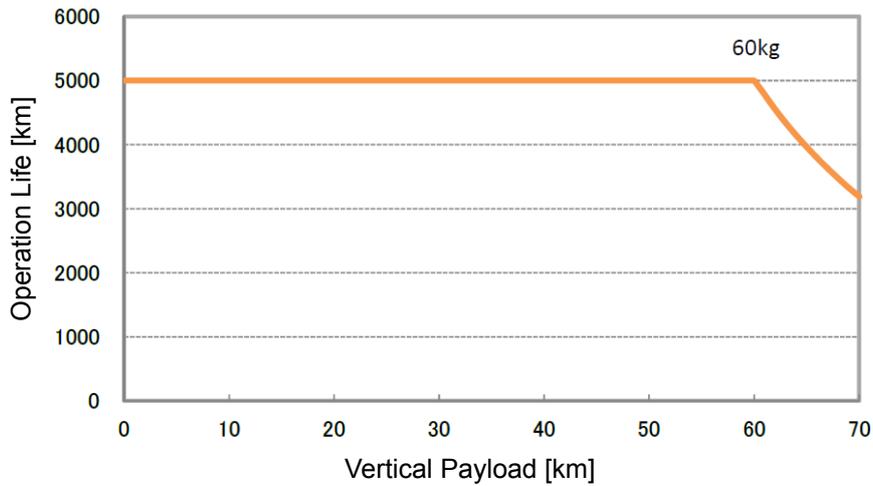
The life is assumed under condition of operation with maximum payload and maximum acceleration/deceleration, and it is 3,000km or 5,000km (reference).

The operation life, whether it is 3,000km or 5,000km (reference), depends on the allowable load weight and the allowable torque of each.

[Refer to 1.2.6 Allowable Load and Allowable Torque on Rod Tip]

For vertical orientation of Lead 5mm of WRA16C and WRA16R, the operation life may vary depending on the payload.

The graph below shows the relation of payload and life.



9. Warranty

9.1 Warranty Period

One of the following periods, whichever is shorter:

- 18 months after shipment from IAI
- 12 months after delivery to the specified location
- 2,500 hours of operation

9.2 Scope of the Warranty

Our products are covered by warranty when all of the following conditions are met. Faulty products covered by warranty will be replaced or repaired free of charge:

- (1) The breakdown or problem in question pertains to our product as delivered by us or our authorized dealer.
- (2) The breakdown or problem in question occurred during the warranty period.
- (3) The breakdown or problem in question occurred while the product was in use for an appropriate purpose under the conditions and environment of use specified in the instruction manual and catalog.
- (4) The breakdown of problem in question was caused by a specification defect or problem, or by a quality issue with our product.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:

- [1] Anything other than our product
- [2] Modification or repair performed by a party other than us (unless we have approved such modification or repair)
- [3] Anything that could not be easily predicted with the level of science and technology available at the time of shipment from our company
- [4] A natural disaster, man-made disaster, incident or accident for which we are not liable
- [5] Natural fading of paint or other symptoms of aging
- [6] Wear, depletion or other expected result of use
- [7] Operation noise, vibration or other subjective sensation not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

9.3 Honoring the Warranty

As a rule, the product must be brought to us for repair under warranty.

9.4 Limited Liability

- (1) We shall assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.
- (2) We shall not be liable for any program or control method created by the customer to operate our product or for the result of such program or control method.

9.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications

- (1) If our product is combined with another product or any system, device, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc. In such a case we will not be liable for the conformance of our product with the applicable standards, etc.
- (2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications. Contact us if you must use our product for any of these applications:
 - [1] Medical equipment pertaining to maintenance or management of human life or health
 - [2] A mechanism or mechanical equipment intended to move or transport people (such as a vehicle, railway facility or aviation facility)
 - [3] Important safety parts of mechanical equipment (such as safety devices)
 - [4] Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact us at the earliest opportunity if our product is to be used in any condition or environment that differs from what is specified in the catalog or instruction manual.

9.6 Other Items Excluded from Warranty

The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

- [1] Guidance for installation/adjustment and witnessing of test operation
- [2] Maintenance and inspection
- [3] Technical guidance and education on operating/wiring methods, etc.
- [4] Technical guidance and education on programming and other items related to programs

Change History

Revision Date	Description of Revision
2016.01	First edition
2016.03	1B edition <ul style="list-style-type: none"> • P.15 and 16 Correction Number of encoder pulse → 800 • P.60 "CJL cannot be selected for RCP6S-WRA10C." is added • P.60, P.71 and P.73 "The installation hole on the top of the base, which crosses a square T-nut or T-slot nut bar, cannot be used." is added • P.76 and P.77 "In the delivery of IAI, the screws are glued." is deleted • P.89 and P.90 The contents about grease supply on rod sliding surface and cleaning are added • P.94 Maker and type of belt for WRA10R to WRA14R are changed.
2016.05	1C edition <ul style="list-style-type: none"> • P.98 Caution notes added for static electricity at motor replacement work
2016.06	Second Edition <ul style="list-style-type: none"> Performance when high output setting invalid added • P.67 Change made to graph of duty • P.89, 130, 131 Position dimension of attachment holes on the bracket are changed 79 → 70.5 158 → 141 • P.102 Change made to grease Daphne Eponex Grease No.2 → Multemp PS No.2 • P.103 Change made to grease gun and nozzle
2016.08	2B edition <ul style="list-style-type: none"> • P.102, 103 Grease nipple diameter and amount of grease supply (reference) added



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