Innovation in Motion
TSUBAKI

POWER CYLINDER™
LINIPOWER™ JACK

Case examples of special action responses

Finding the optimal measures for various themes

TSUBAKI ECO LINK

Contributing to the stable operation of LINIPOWER™ JACK products that

Search using themes

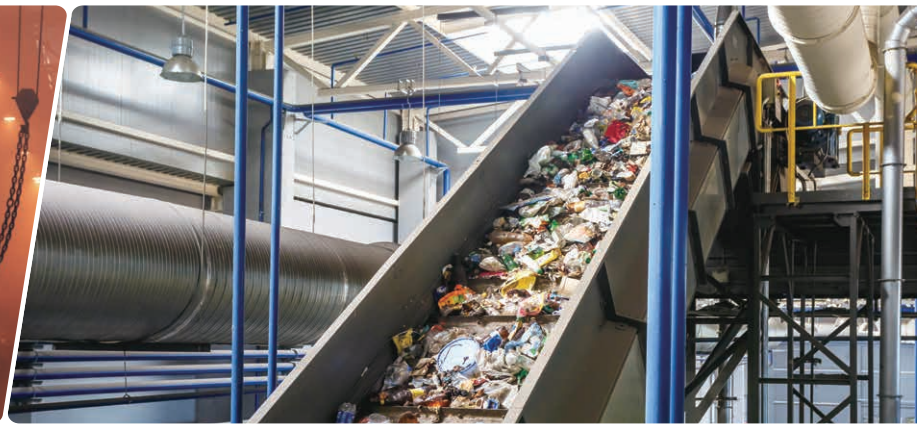
POWER CYLINDER™

LINIPOWER™ JACK

Search using the industry

Search using application examples

equipment with POWER CYLINDER™ and can be used in harsh environments



Standard lineup of POWER CYLINDER™ and LINIPOWER™ JACK products

There are also cases where special action is possible on series other than those introduced in these case examples.

POWER CYLINDER™

U series	(Thrust 58.8 kN to 490 kN)
T series	(Thrust 2.45 kN to 39.2 kN)
Worm series	(Thrust 49 kN to 490 kN)
G series	(Thrust 700 N to 3.0 kN)
F series (DC power drive)	(Thrust 100 N to 6.0 kN)
Mini series	(Thrust 98 N to 392 N)
Eco series servo type	(Thrust 150 N to 15 kN)
Eco series CDS type	(Thrust 250 N to 1,000 N)

LINIPOWER™ JACK

Ball screw type	(Basic capacity 4.9 kN to 980 kN)
High lead ball screw type	(Basic capacity 9.8 kN to 196 kN)
Machine screw type	(Basic capacity 1.96 kN to 980 kN)

*In addition to the product groups listed above, there are also Linispeed Jack products that support high speeds and high frequencies.

High-Temperature Environments

Example use	Opening and closing mechanism on ladle lid
Example industries	Steel, Waste disposal

For use in high-temperature environments

Ideal for cases where Power Cylinders are used in a high-temperature environment, especially in the steel industry. For example, they are used for the opening and closing of the lid on a ladle, and using a link mechanism can realize various motions such as rocking. Components with superior heat resistance are used for applications where heat resistance is demanded, but the use is restricted to the usable temperature range for the Power Cylinder.
Depending on the layout of the equipment, it may be necessary to add a cover to the Power Cylinder, or to move the Power Cylinder away from the heat source.

Example adoption for this application

POWER CYLINDER™ U series

Reference Model No.	LPUC12000H15LJ-TK
Thrust	117kN(12000kgf)
Nominal stroke	1500mm
Speed (50/60 Hz)	30/36mm/s
Motor capacity	5.5kW

Check the actual movement from the 2D barcode

Example high-temperature countermeasures on bellows

	Standard item	Special item
	Neoprene cloth (for outdoor use)	Glass cloth
Heat resistance temperature*	100°C	250°C

If the standard item is used in a high-temperature environment, there is a risk that the bellows may be damaged by scattered high-temperature material.

*This is the heat resistance temperature for the bellows alone. Please use the Power Cylinder within the usable temperature range.

Example high-temperature countermeasures in the coating

	Standard item	Special item
	Lacquer coating	Heat-resistant silver coating
Heat resistance temperature*	80°C	200°C

Using a heat-resistant coating prevents the deterioration and peeling of the coated film.

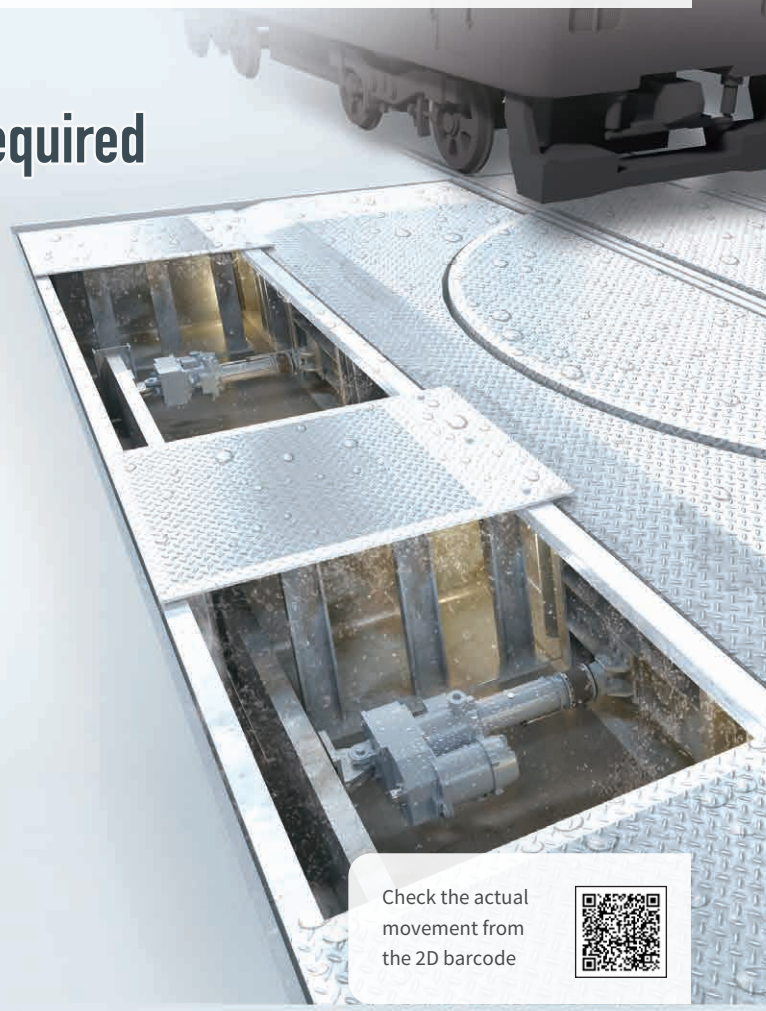
*This is the heat resistance temperature for the coated film. Please use the Power Cylinder within the usable temperature range.

Corrosive Environments

Example use	Railroad vehicle testing equipment
Example industries	Infrastructure, Ports and harbors

Cases where waterproofing and rust prevention measures are required

Special action is possible as measures for rust prevention and waterproofing, such as action against rain, wind, and seawater salt damage.
For example, this has been adopted on the rail width adjustment mechanism on railroad vehicle testing equipment. In this example, the mechanism is installed underground and there is a risk of it getting wet during rainy weather, so special waterproofing and rust prevention specifications were demanded.



Check the actual movement from the 2D barcode

Example adoption for this application

POWER CYLINDER™ T series

Reference Model No.	LPTC4000L2LCJ-TK
Thrust	39.2kN(4000kgf)
Nominal stroke	200mm
Speed (50/60 Hz)	25/30mm/s
Motor capacity	1.5kW

Example rust prevention measures in product specifications

	Standard item	Special item
Material	Carbon steel	Stainless steel

It is also possible to change the rod, end fitting, bellows band, and bolt (excluding strength member) material to stainless steel.

Example rust prevention measures in the coating

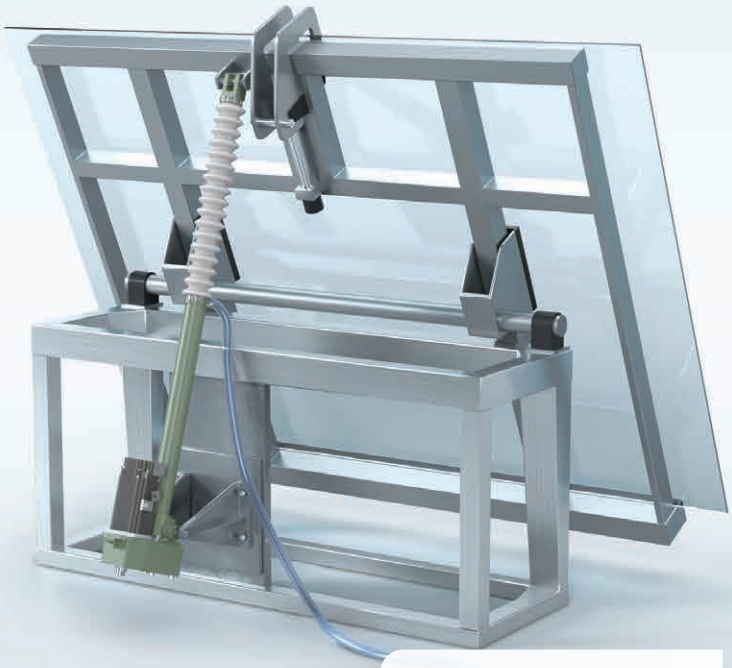
Standard item	Special item
Acrylic lacquer coating	Special coating Please consult us - we will provide support according to your requirements.

The standard item Power Cylinder can also be used outdoors, but anticorrosive coating to suit the requirements can be applied if specified by the user, so please consult us.

Example use	FPD tilting device
Example industries	FPD, Semiconductors

For use in clean environments

Power Cylinders have also been adopted for many applications in the FPD and semiconductor industries. For example, they are ideal for the tilting of flat panels and for the opening and closing of chamber lids.
When using these products in the FPD and semiconductor industries, there may be demands for improvement of the cleanliness, stopping accuracy or operation cycles.
The special action that can be taken on the Power Cylinders includes changing the specifications of the bellows to suppress dust generation, and special action to improve the speed and precision.



Check the actual movement from the 2D barcode

Example adoption for this application

POWER CYLINDER™ T series

Reference Model No.*	LPTA1000D8XJ-TK
Thrust	9.8kN(1000kgf)
Nominal stroke	800mm
Speed	200mm/s
Motor capacity	7kW

*A 78.4 kN (8,000 kgf) sized Power Cylinder is used in this case example.

Example dust generation countermeasures on bellows

Standard item	Special item
Neoprene cloth (for outdoor use)	Aramid fiber

This is ideal to suppress the generation of dust due to bellows friction.

Example customization of operation speed

Standard item	Special item
Characteristics listed in catalogs	Speed that responds to your usage conditions

In cases where the standard item speed cannot satisfy the operation requirements of the customer, there are cases where the requirements can be satisfied through methods such as special

Other example dust generation countermeasures

With hole for air tube attachment

The bellows on Power Cylinders normally have an air hole for breathing during the expansion and contraction. However, there is a risk of dust leaking from this hole. In cases where it is necessary to suppress the external leakage of this dust, a hole for an air tube can be added on the part where the bellows are attached (the outer cylinder) so that the air can be released to the outside.

Sticking during oscillating operation

Example use	Opening and closing mechanism for hopper gate
Example industries	Waste disposal, Water treatment

For use in oscillating operation

Power Cylinders have also been adopted for many oscillating and tilting applications. For example, they have been adopted for use in many hopper opening and closing applications on waste disposal equipment and water treatment equipment. It is possible to prevent any problems of sticking with the shaft by installing a sliding bearing on the pin hole part of the trunnion fittings and tip fittings that slide when the Power Cylinder oscillates. Also, in cases where it is necessary to seal the hopper, selecting the C type with a thrust detection mechanism makes it possible to prevent the leakage of the contents when the hopper is closed.

Example adoption for this application

POWER CYLINDER™ T series

Reference Model No.	LPTC2000M6LJ-TK
Thrust	19.6kN(2000kgf)
Nominal stroke	600mm
Speed(50/60Hz)	50/60mm/s
Motor capacity	1.5kW

Check the actual movement from the 2D barcode

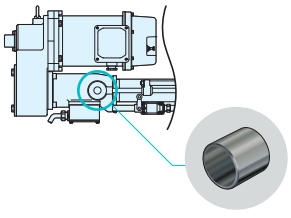
Example measures against sticking

Plain bearing

A Plain bearing can be installed on the tip fitting and Power Cylinder bracket part trunnion hole. This is the optimal specification to reduce the risk of fitting and pin sticking during oscillating operation.

Special item

Plain bearings can be installed on bracket part trunnion holes

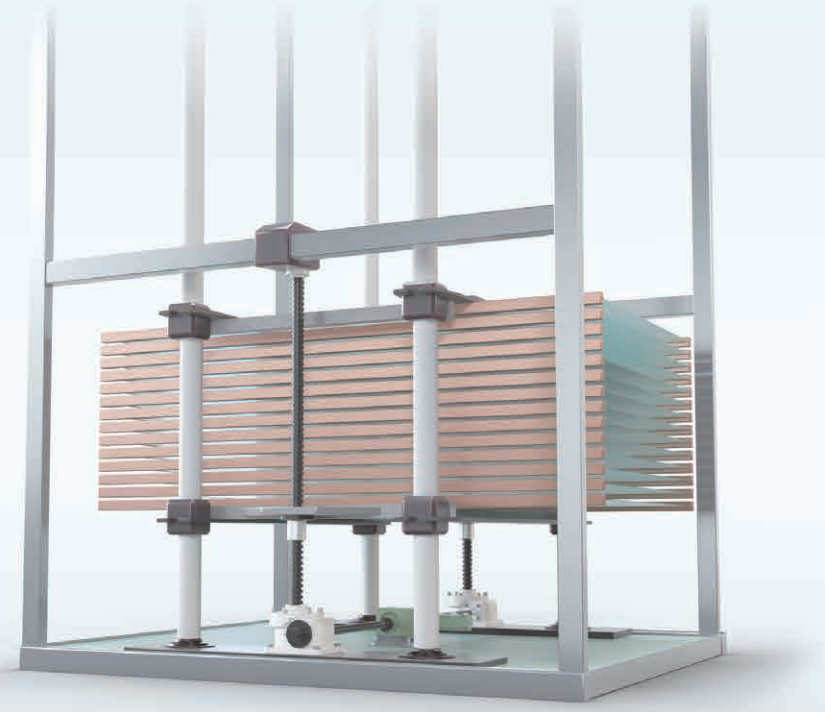


Trunnion fitting

Example use	Glass substrate stacking device
Example industries	FPD, Semiconductors

For use in clean environments

Linipower Jacks have also been adopted for many applications in the FPD and Semiconductor industries. For example, in glass substrate stacking applications, multiple Linipower Jacks are operated together for the lifting and lowering.
They are also ideal for the opening and closing of chamber lids, and for the lifting and lowering of accumulation rollers in film manufacturing.



Example adoption for this application

LINIPOWER™JACK Ball screw type

Reference Model No.	JWB025URH8U-TK
Basic capacity	24.5kN(2500kgf)
Nominal stroke	800mm

Check the actual movement from the 2D barcode

Example dust generation countermeasures on screw shafts

Standard item	Special item
No surface treatment	RAYDENT™ treatment *RAYDENT™ treatment is a registered trademark of Raydent Industrial Co., Ltd.

A rustproofing effect can be expected when a special surface treatment is performed on the screw shaft.
If requested, the RAYDENT treatment can also be performed on the outer surface of ball nuts. There is no reduction of capacity due to this specification.

Example dust generation countermeasures for coating

Standard item	Special item
Acrylic lacquer coating	Urethane resin coating

This is less likely to peel off than standard coating, so the generation of dust from the coated surface is suppressed.

Example dust generation countermeasures for grease

Standard item	Special item
Grease listed in catalogs	Clean grease

The application of grease for cleanroom use can suppress the generation of dust.

Example dust generation countermeasures for sliding parts

Standard item	Special item
None	Input shaft cap attachment

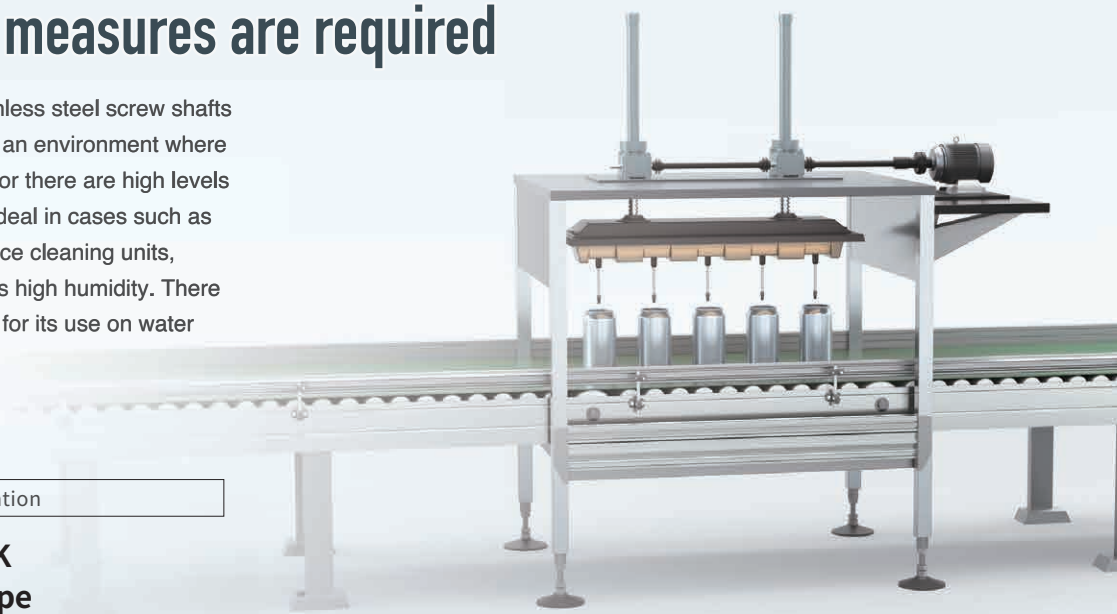
The jack input shaft can be a source of dust generation as it slides with the oil seal. The jack input shaft is positioned so that it protrudes from both the left and right sides of the case. Where shafts are not connected with a coupling, we recommend the attachment of input shaft caps.

Corrosive Environments

Example use	Beverage can cleaning device
Example industries	Food, Infrastructure

Cases where waterproofing and rust prevention measures are required

It is also possible to produce stainless steel screw shafts for the use of a Linipower Jack in an environment where water will get on the screw shaft, or there are high levels of humidity. For example, this is ideal in cases such as the lifting and lowering of workpiece cleaning units, where water splashes and there is high humidity. There are also extensive proven results for its use on water gates installed outdoors.



Example adoption for this application

LINIPOWER™ JACK Machine screw type

Reference Model No.	JWM025DSH5-S-TK
Basic capacity	12.25kN(1250kgf)*
Nominal stroke	500mm

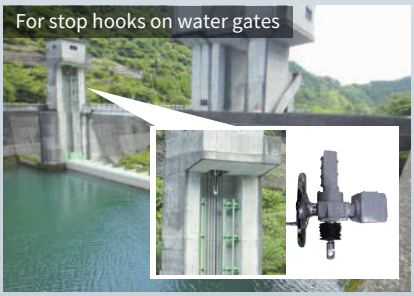
*The basic capacity is reduced in the stainless steel specifications.

Check the actual movement from the 2D barcode

Example rust prevention measures on the screw shaft

Standard item	Carbon steel
Special item	Stainless steel (sus303)

We have made stainless steel screw shafts a standard item for the 24.5 kN and 49 kN frames.
*The basic capacity will be reduced in this case, so caution is required.
There are also extensive proven results for other sizes.



LINIPOWER™ JACK Other example rust prevention measures

For stop hooks on water gates, horizontal pulling type gates, swing gates

The Linipower Jack does not have specifications for outdoor use, so even when the screw shaft is changed to stainless steel, it is necessary to implement measures such as the installation of a cover.

Backlash

Example use	Roller adjustment mechanism for leveler
Example industries	Steel, Metalworking

Cases where backlash countermeasures are required

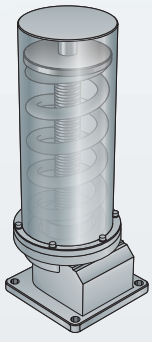
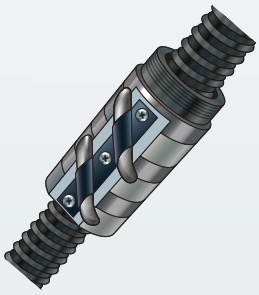
When the Linipower Jack is installed in a suspended configuration and the user wants to suppress backlash in an application where the workpiece is being pressed down, it is possible to consider anti-backlash specifications.
For example, this has been adopted on roller pressure mechanisms on levelers. This is ideal in cases where the requirements for stopping accuracy cannot be satisfied with the standard Linipower Jack products.

Example adoption for this application

LINIPOWER™JACK Machine screw type

Reference Model No.	JWM150DML2I-TK
Basic capacity	147kN(15000kgf)
Nominal stroke	200mm

Example backlash countermeasures

Standard item	There is a slight backlash on the screw and nut on the standard Linipower Jack products. Depending on the usage application, there may be cases where this backlash has an impact on quality.	
Example past results	Method using a coil spring	Method using an over-sized ball
		
	It is possible to suppress backlash by using a coil spring built inside the screw cover to apply pressure to the screw shaft.	On the ball screw type, it is possible to suppress backlash by using steel balls of a diameter that is slightly larger than the screw groove.

The backlash countermeasure methods described above are just examples. The method will be considered depending on the product type and the frame number used. Please inquire about the details.

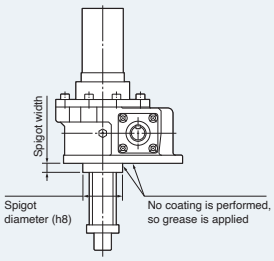
Case examples of other special action responses

LINIPOWER™JACK : When you want to simplify the installation

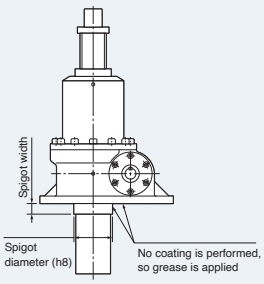
For cases where the user wants to simplify the positioning at the time of Linipower Jack installation, it is possible to produce a product with a spigot.
The spigot is a convex dimension part with a tolerance established and is suitable for the improvement of reproducibility and installation accuracy in cases where it is necessary to disassemble and reassemble the equipment.
The spigot diameter and dimensional tolerance can also be adjusted to meet customer requirements, so please make an inquiry.
In positioning, in addition to a spigot, it is also possible to produce items such as parts with positioning pin holes, so please inquire about detailed specifications.

Example specifications

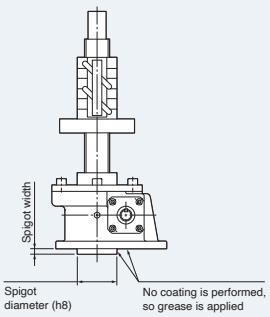
Basic specifications -
For suspension,
with spigot



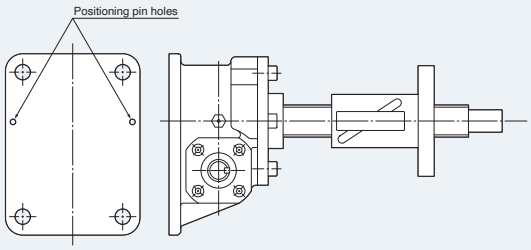
Basic specifications -
For pushing upwards,
with spigot



Traveling nut specifications -
For pushing upwards,
with spigot



Traveling nut specifications -
For pushing upwards,
with positioning pin holes

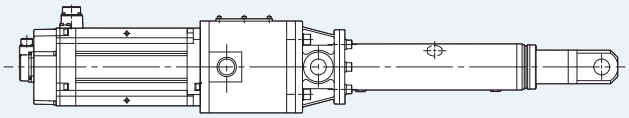


POWER CYLINDER™ : When requirements cannot be satisfied with the standard items

When a Power Cylinder is being considered, if the customer requirements cannot be satisfied with the standard item connection and characteristics, special action is possible to fit with the usage conditions.

Example 1 Straight Type

Consideration is also possible for series that only have the parallel profile (motor side mounting) as the standard lineup.



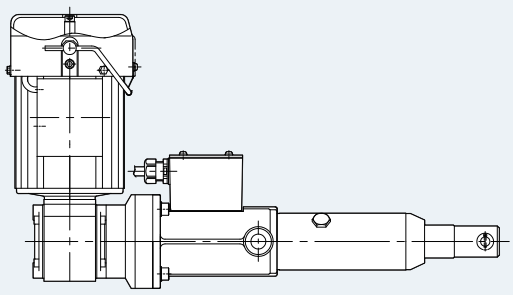
Power Cylinder U series (117 kN frame) base

Advantage

- It can contribute to a more compact design in cases where there are restrictions in the vertical direction, such as with horizontal use

Example 2 Right-angle Type

This profile has the motor orthogonal (at a right angle) to the operating part of the Power Cylinder.



Power Cylinder G series (3.0 kN frame) base

Advantage

- Realizes quietness in use for a worm gear
- Contributes to safety with self-lock on worm gears
- Contributes to more compact designs in the longitudinal direction

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