Power Cylinder

F series

Thrust：100N to 6.00kN {10.2kgf to 612kgf}

Small thrust type Power Cylinder, driven by DC (Battery) power source.
AC power source is also available with AC adaptor (Option).
Optimum for outdoor use, such as agricultural machine, multistory car parking.

● Light weight, small type
Compact design where the operating part and the motor part are right angle.

● Effective utilization of installation space
The hole of the clevis fitting is made in 2 directions at right angles to each other, the installation method can be selected from 4 directions so that it does not interfere with machine, etc.

● Versatile power source
The DC power source type (12V DC, 24V DC) is standard. By using the AC adapter (sold separately), it can also be used with an AC power source. (LPF010, 020, 040 types)

● Wide variety of options
Various options are available in comparison to the conventional type.
- Stroke adjustment external limit switch
- Bellows
- Position detection unit (internal limit switch, potentiometer)
- Overload detection unit

Model No. designation

LP F 040 L 2.0 V K2J

- **Power Cylinder** → LP
- **F series** → F
- **Thrust** → 040
  - **010**: 100N {10.2kgf}
  - **020**: 200N {20.4kgf}
  - **040**: 400N {40.8kgf}
  - **100**: 1.00kN {102kgf}
  - **200**: 2.00kN {204kgf}
  - **300**: 3.00kN {306kgf}
  - **600**: 6.00kN {612kgf}
- **Speed** → L
  - **L, M, H**
  - * The speed is determined for each thrust.
- **Nominal stroke** → 2.0
  - **0.5**: 50mm
  - **1.0**: 100mm
  - **1.5**: 150mm
  - **2.0**: 200mm
  - * The above is an indication example.
- **Voltage code** → V
  - No code: 12V DC
  - **V**: 24V DC
- **Options** → K2J
  - No code: Standard type
  - **L**: With external LS for stroke adjustment (not available for a stroke 50mm model)
  - **K2**: with internal LS for position detection (Cannot be used together with P) (LPF-600 cannot be manufactured)
  - **P**: With potentiometer (Cannot be used together with K2) (LPF-600 cannot be manufactured)
  - **J**: With bellows
  - * Arrange the optional codes in the above specified order.

Standard model list

Model number		Rated thrust		Stroke	Rated speed	Power source	Rated load current	Locked rotor current
		N	{kgf}	mm	mm/s	V	A	A
0.5	0.5 V	100	10.2	50	54	12 DC or 24 DC	3.2 (1.6)	16.7 (7.5)
1.0	1.0 V			100				
LPF010H 1.5	LPF010H 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	200	20.4	50	24		3.2 (1.6)	16.7 (7.5)
1.0	1.0 V			100				
LPF020M 1.5	LPF020M 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	400	40.8	50	15		3.7 (1.8)	16.7 (7.5)
1.0	1.0 V			100				
LPF040L 1.5	LPF040L 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	1.00k	102	50	30		18 (10)	63 (52)
1.0	1.0 V			100				
LPF100H 1.5	LPF100H 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	2.00k	204	50	18		22 (11)	63 (52)
1.0	1.0 V			100				
LPF200M 1.5	LPF200M 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	3.00k	306	50	9		22 (11)	63 (52)
1.0	1.0 V			100				
LPF300L 1.5	LPF300L 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
1.0	1.0 V	6.00k	612	100	8		20 (10)	63 (52)
2.0	2.0 V			200				
3.0	3.0 V			300				
LPF600L 4.0	LPF600L 4.0 V			400				
5.0	5.0 V			500				
6.0	6.0 V			600				

Note) 1. In the case of 24V DC, V is attached at the end of the model number.
2. The numerical value in parentheses is an electric current value at the time of 24V DC.
3. Use a power source with a sufficient capacity in consideration of the locked rotor current.

Motor specifications

Item / Model	Voltage	Output	Rated time
	V	W	
LPF010 H	12	29	5 minutes
LPF010 H V	24		
LPF020 M	12		
LPF020 M V	24		
LPF040 L	12		
LPF040 L V	24		
LPF100 H	12	160	5 minutes
LPF100 H V	24		
LPF200 M	12		
LPF200 M V	24		
LPF300 L	12		
LPF300 L V	24		
LPF600 L	12		
LPF600 L V	24		

Standard use environment

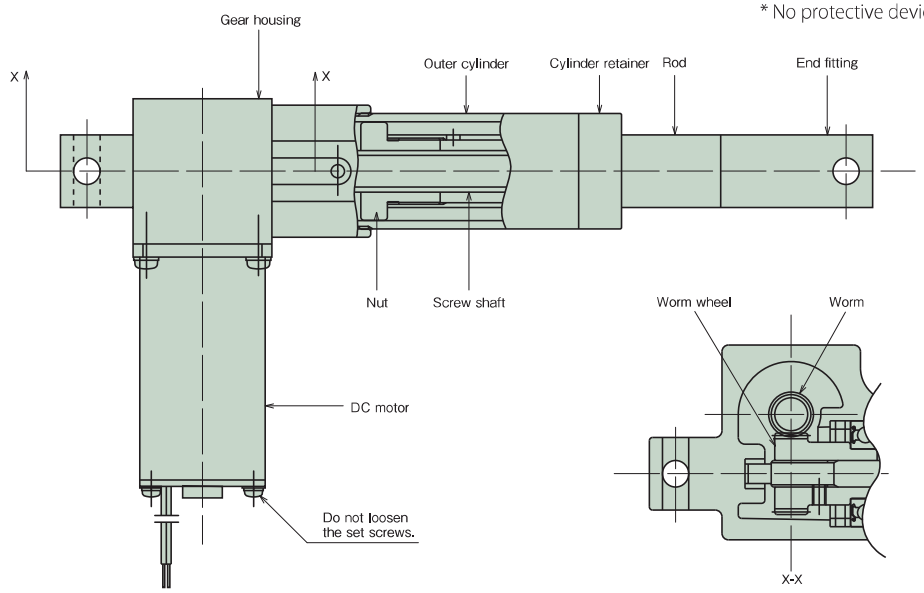
Environment / Model	Outdoor type
Ambient temperature	−5℃ to 40℃
Relative humidity	85% or less (no dew condensation)
Shock resistance value	1G or less
Installation altitude	1000m or lower above sea level
Atmosphere	Normally outdoors

1) If used below the freezing point, the characteristics of the cylinder (current value, speed) may change from the influence of grease.
2) Cylinders with bellows are recommended in an excessively dusty location.
3) All models are totally enclosed structures so that they can be used normally outdoors, however, when exposed to constant adverse conditions such as water, steam and snow accumulation, an appropriate cover is required. When using at 40℃ or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere. Otherwise it may cause an explosion and fire. In addition, avoid using in a location where vibration or shock exceeding 1G is applied.
4) For use in a misty atmosphere, contact us.

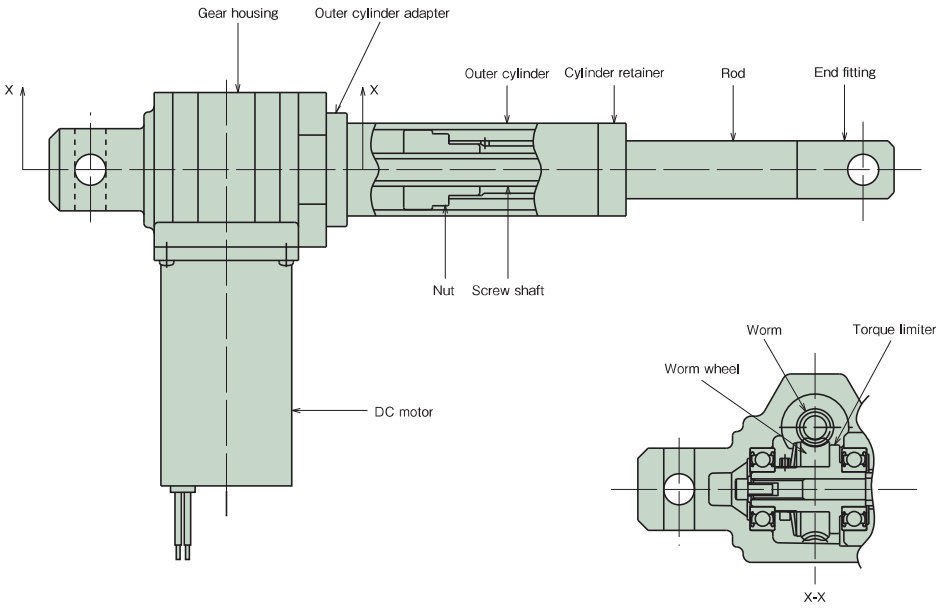
Structure

LPF010 to LPF040

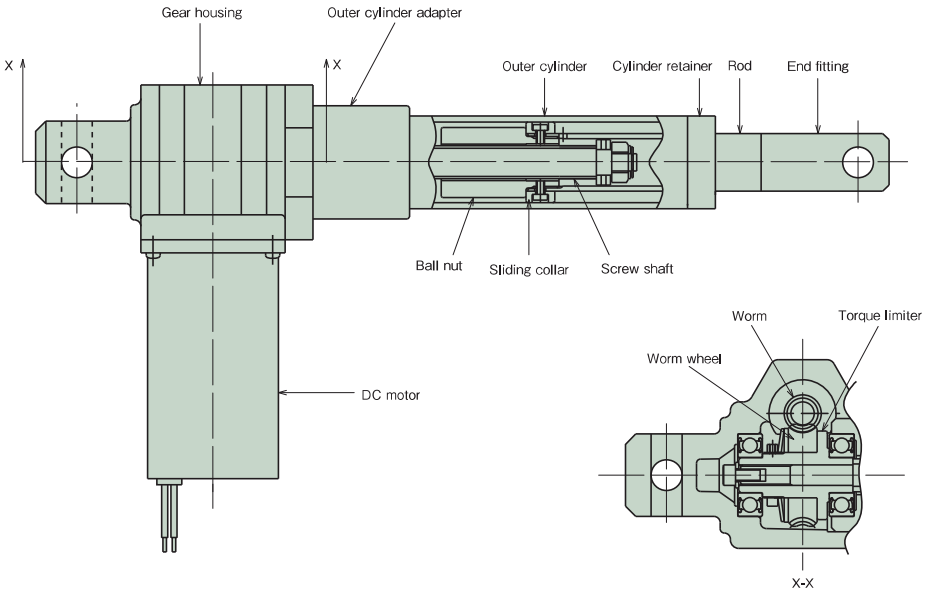
* No protective device is equipped.



LPF100 to LPF300



LPF600



Selection

Operating conditions required for selection

1. Used machine and application
2. Thrust or load N { kgf }
3. Stroke mm
4. Speed mm/s
5. Frequency of operation, number of start/min.
6. Power voltage, frequency

Selecting procedures

1. Select a suitable model number based on the thrust or load N {kgf}, stroke mm, speed mm/s.
2. Use the cylinder at an allowable operating frequency 2 times/min., allowable duty factor: 25%ED (5 minute basis), as for the frequency of operation.

   The Working time rate is a ratio of the operating time per 5 minutes on a 5-minute basis.

$$\text{Working time rate (\%ED)} = \frac{\text{Operating time of 1 cycle}}{\text{Operating time of 1 cycle} + \text{dwell time}} \times 100\%$$

Duration of life as a guide

Duration of life is 15,000 reciprocations, as a guide.

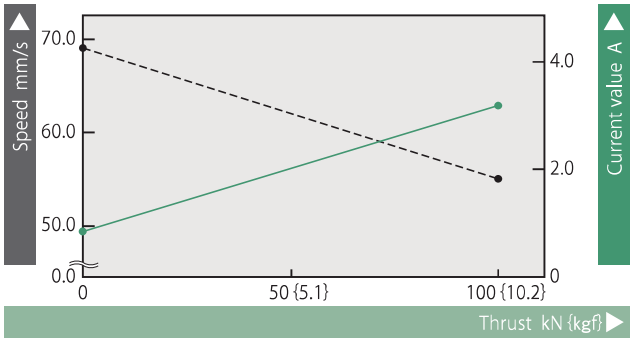
* Select a power cylinder of a sufficient thrust, allowing for a safety factor so that the loads used (static and dynamic) do not exceed the rated thrust.

Characteristics graph

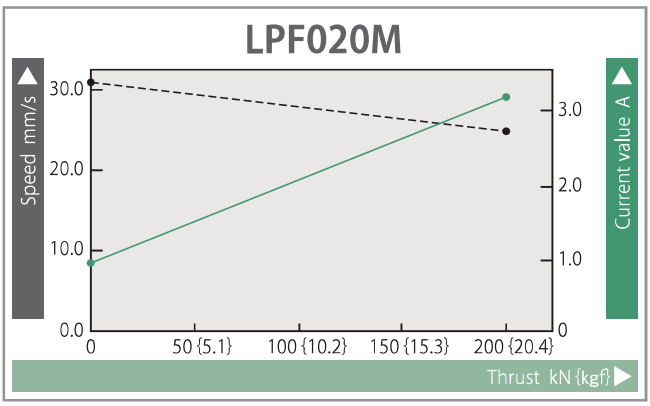
Legend: Speed, Current

12V DC power source

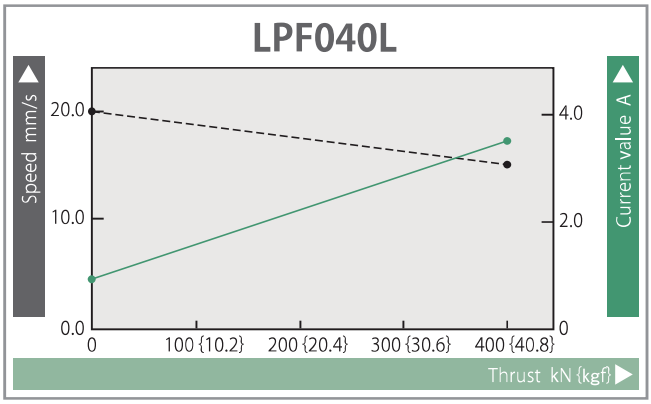
LPF010H



LPF020M

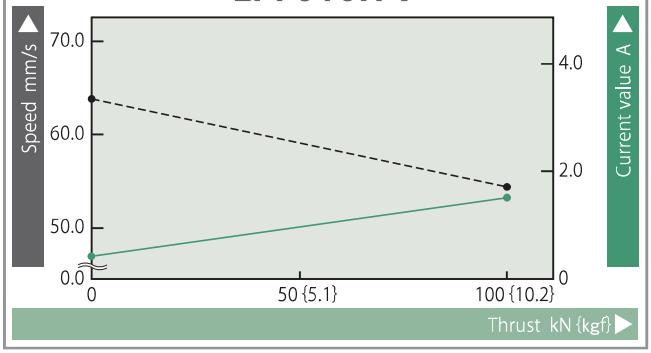


LPF040L

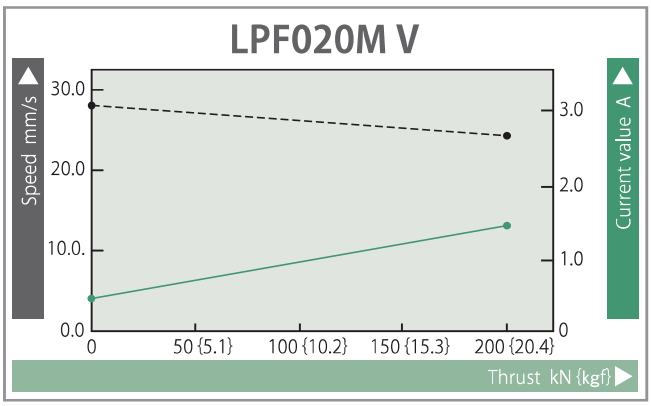


24V DC power source

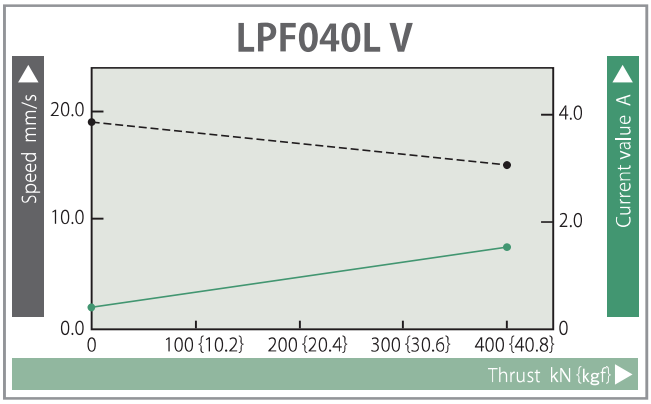
LPF010H V



LPF020M V



LPF040L V

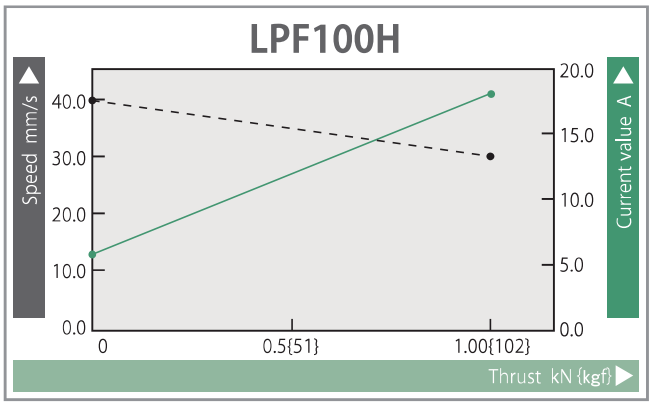


Note) The graphs show standard values (12V/24V DC power source, ambient temperature 20°C). The speed and the current value vary depending on conditions of power source and ambient temperatures, etc.

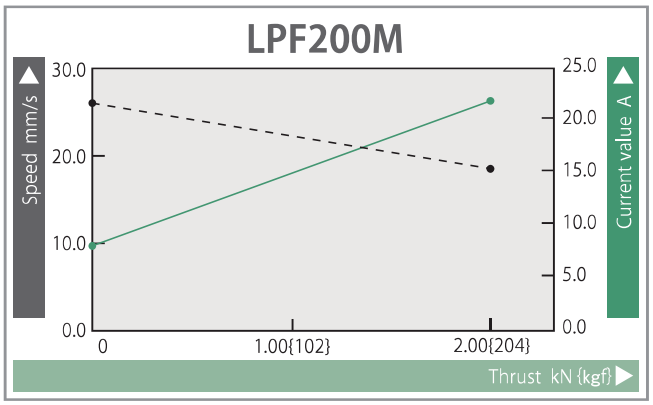
Legend: Speed, Current

12V DC power source

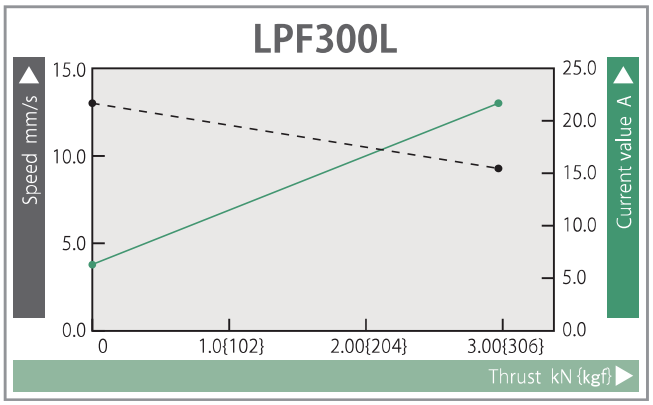
LPF100H



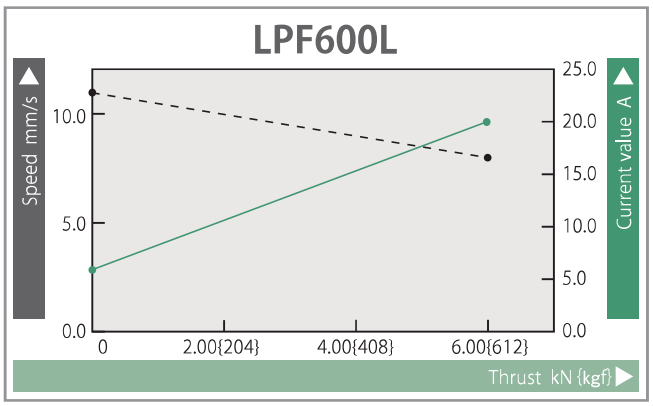
LPF200M



LPF300L

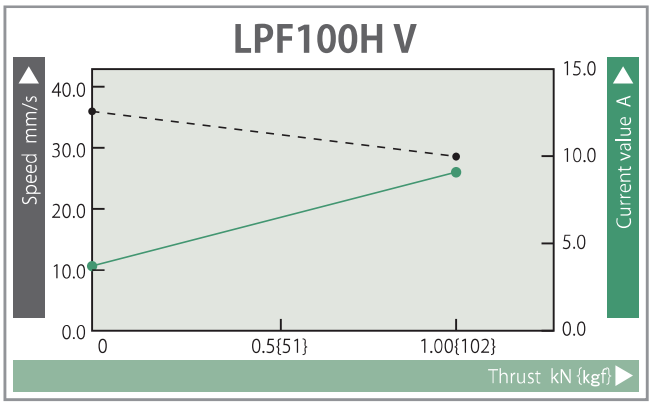


LPF600L

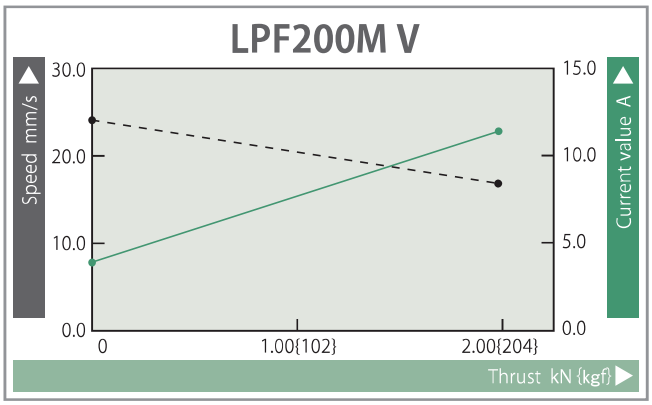


24V DC power source

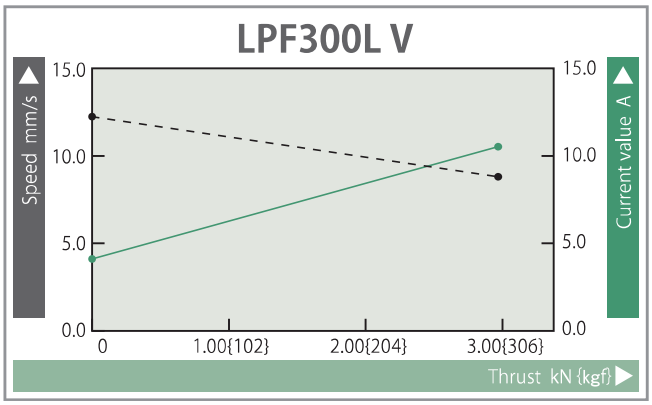
LPF100H V



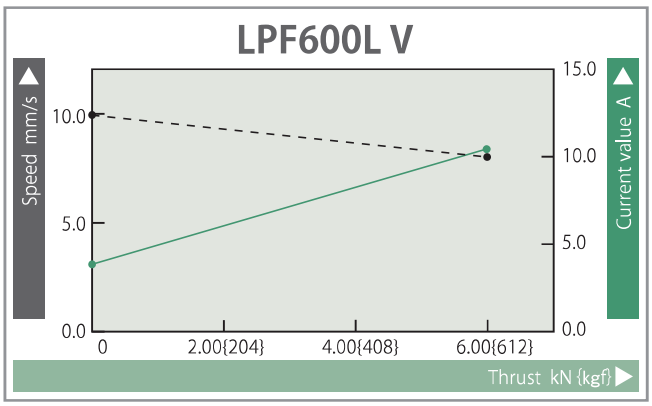
LPF200M V



LPF300L V



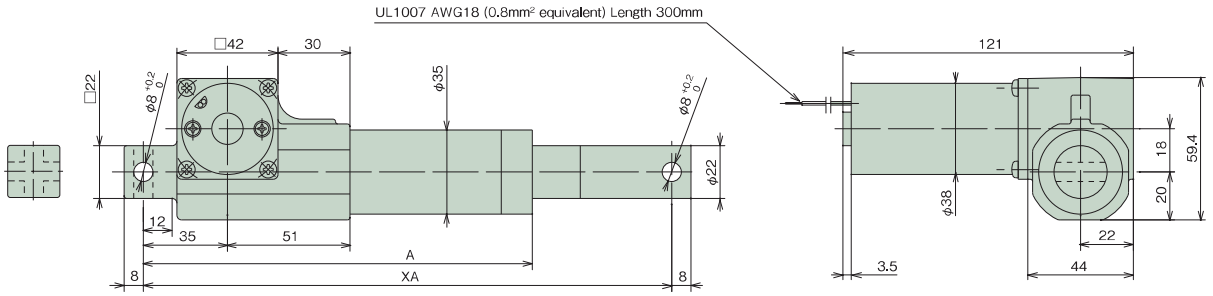
LPF600L V



Note) The graphs show standard values (12V/24V DC power source, ambient temperature 20°C). The speed and the current value vary depending on conditions of power source and ambient temperatures, etc.

Dimensions Table

LPF010 to LPF040：Basic type



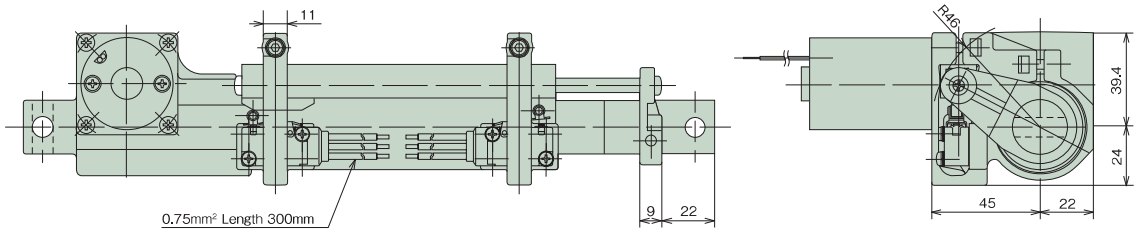
Model number		Rated thrust		Stroke	Rated speed	Dimensions mm			Approximate mass
						A	XA		
		N	{kgf}	mm	mm/s		MIN.	MAX.	kg
0.5	0.5 V	100	10.2	50	54	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF010H 1.5	LPF010H 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0
0.5	0.5 V	200	20.4	50	24	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF020M 1.5	LPF020M 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0
0.5	0.5 V	400	40.8	50	15	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF040L 1.5	LPF040L 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0

Note) V is attached at the end of the model number for 24V DC.

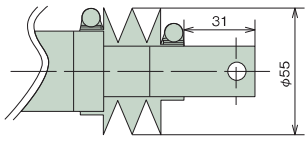
Options

■With external limit switch for stroke adjustment

Note) No limit switch for stroke adjustment is attached to the model of 50 mm stroke.
The above-mentioned XA dimensions will not change even after attaching an external limit switch for stroke adjustment and bellows.
The mechanical stroke preset value is 60mm or more. However, note that it does not include the coasting distance.



■With bellows

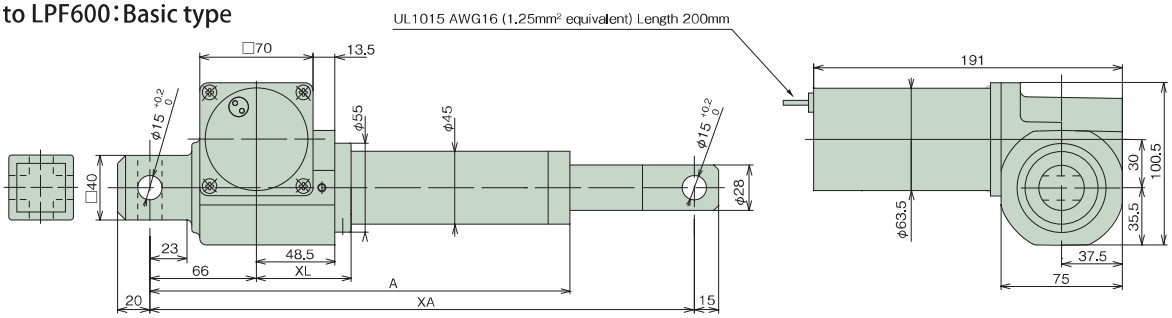


■LS specification (common for LPF010H – LPF600L)

Model	D2VW-5L2A-1M equivalent OMRON
Circuit configuration	Red — Black, Blue
Power rating	250V AC 4A (cos ϕ=0.7)、30V DC 4A (time constant 7ms or less)
Connection	0.75mm²×3C Length 300m, discrete lead wire

Dimensions Table

LPF100 to LPF600 : Basic type



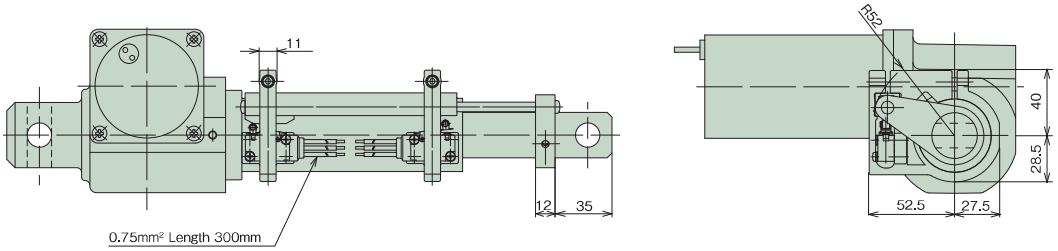
Model number		Rated thrust		Stroke	Rated speed	Dimensions mm				Approximate mass
						XL	A	XA		
		kN	{kgf}	mm	mm/s			MIN.	MAX.	kg
0.5	0.5 V	1.00	102	50	30	58.5	210	275	325	5.0
1.0	1.0 V			100			260	325	425	5.3
LPF100H 1.5	LPF100H 1.5 V			150			310	395	545	5.6
2.0	2.0 V			200			360	445	645	5.9
3.0	3.0 V			300			460	545	845	6.5
0.5	0.5 V	2.00	204	50	18		210	275	325	5.0
1.0	1.0 V			100			260	325	425	5.3
LPF200M 1.5	LPF200M 1.5 V			150			310	395	545	5.6
2.0	2.0 V			200			360	445	645	5.9
3.0	3.0 V			300			460	545	845	6.5
0.5	0.5 V	3.00	306	50	9		210	275	325	5.0
1.0	1.0 V			100			260	325	425	5.3
LPF300L 1.5	LPF300L 1.5 V			150			310	395	545	5.6
2.0	2.0 V			200			360	445	645	5.9
3.0	3.0 V			300			460	545	845	6.5
1.0	1.0 V	6.00	612	100	8	95.5	297	360	460	5.9
2.0	2.0 V			200			397	480	680	6.5
3.0	3.0 V			300			497	580	880	7.1
LPF600L 4.0	LPF600L 4.0 V			400			597	705	1105	7.8
5.0	5.0 V			500			697	805	1305	8.4
6.0	6.0 V			600			797	920	1520	9.0

Note) V is attached at the end of the model number for 24V DC.

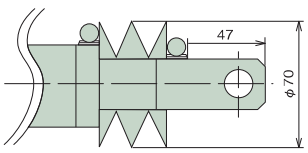
Options

■With external limit switch for stroke adjustment

Note) No limit switch for stroke adjustment is attached to the model of 50 mm stroke.
The above-mentioned XA dimensions will not change even after attaching an external limit switch for stroke adjustment and bellows.
The mechanical stroke preset value is 60mm or more. However, note that it does not include the coasting distance.

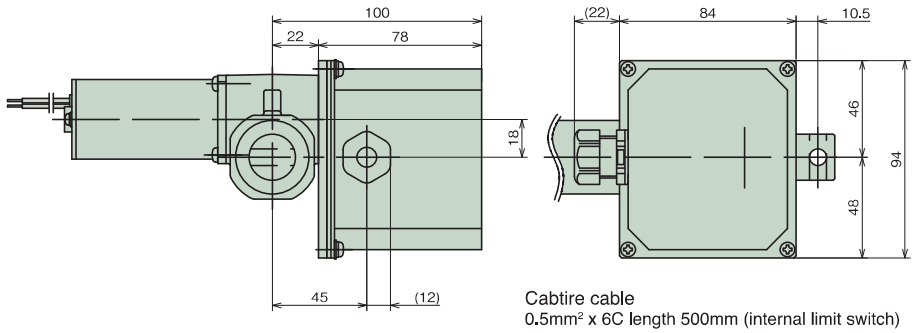


■With bellows



Position Detection unit

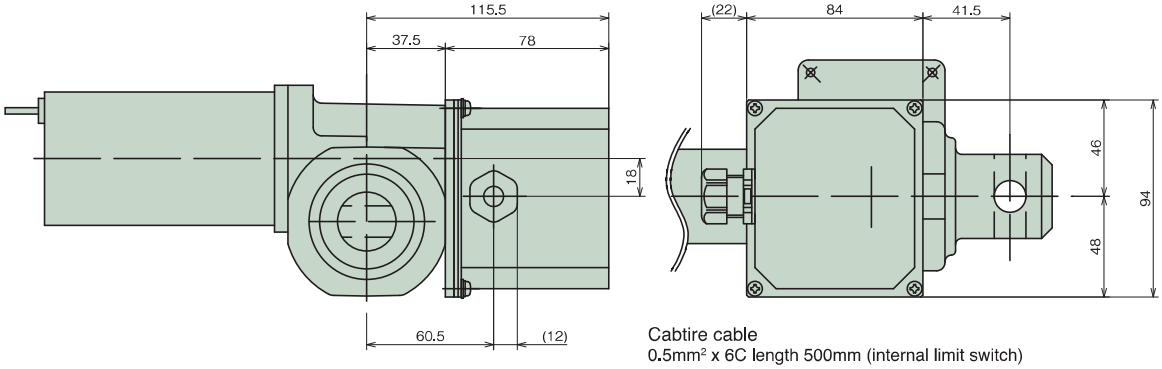
① LPF010 to LPF040



Cabtire cable
0.5mm² x 6C length 500mm (internal limit switch)
0.5mm² x 3C length 500mm (potentiometer)

For connection, see the position detecting device specifications on page 108.

② LPF100 to LPF300



Cabtire cable
0.5mm² x 6C length 500mm (internal limit switch)
0.5mm² x 3C length 500mm (potentiometer)

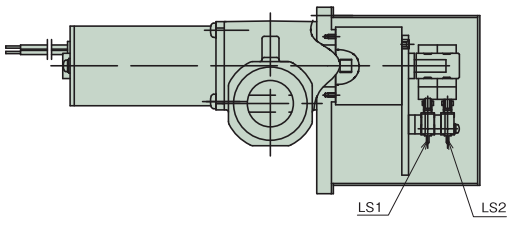
Note) Note that a position detecting unit cannot be manufactured for LPF600.

For connection, see the position detecting device specifications on page 108.

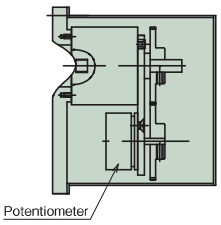
Internal structure

For the position detecting unit, the following 2 types of position detecting devices can be built in as requested.

① Internal limit switch for position detection



② Potentiometer



Note) An internal limit switch for position detection and a potentiometer cannot be used together.

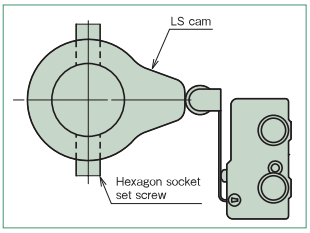
Position detecting device specifications

Internal limit switch for position detection

Use this LS when an external limit switch cannot be attached for reasons of installation space, or when the atmosphere is an adverse environment (with litter, dust, corrosion, etc.). When attaching 2 positions: Option code K2

Note) Up to 2 internal limit switches can be built in. (A position detecting device with 4 internal LS cannot be manufactured)

Model	SS-5GL2 equivalent OMRON	
Circuit configuration	LS 1 for extend Red Black White	LS 2 for retract Green Yellow Brown
Electrical rating	250V AC 2A (cos ϕ=0.4)	
Connection	0.5mm²×6C Length 500 mm Cabtire cable	



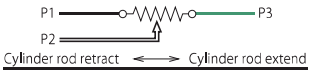
Setting of limit switch

1. Operate the power cylinder individually before installing to the machine and check the rotation direction of the LS cam.
2. Install the power cylinder to the machine, and move the rod to a desired position to stop or to a position to detect the position.
3. Rotate the LS cam and tighten the hexagon socket set screw and fix it at the position where the microswitch acts. At this point, based on the previously checked rotating direction, set the LS at the front side considering the cylinder coasting amount.

Potentiometer

This is a variable resistor to output electrical signals according to the stroke amount of the cylinder.
Use it together with a print board and a stroke indication meter.
The resistance value according to the model is already adjusted at the time of shipment.
The potentiometer is set to work within the effective angle.
Note that if the rod is rotated before installation, a phase with stroke will shift.

Model	CP-30 equivalent Sakae Tsushin Kogyo
Total resistance	1kΩ
Power rating	0.75W
Dielectric strength	1000V AC 1min.
Effective electrical angle	355° ±5°
Effective mechanical angle	360° Endless
Connection	0.5mm²×3C Length 500 mm Cabtire cable



<Cautions>

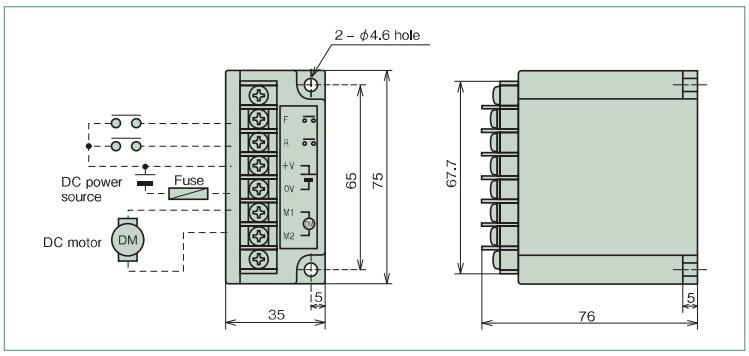
* Note that LPF600 type with a position detecting unit is not available.
* When an internal limit switch for position detection and a potentiometer are attached, the torque limiter mechanism is removed to prevent deviation in the preset values. Do not apply any load of the rated thrust or more to the cylinder during installation and operation of the cylinder. It may cause burnout of the motor. And do not hit the cylinder on the stroke end. It may cause the rod to get caught or burnout the motor.

Control optional

Overload detection unit

Necessary for protection against instantaneous overload and for press contact stop.

Applicable for LPF010, LPF020, LPF040 * For LPF100 through 600, the overload detection unit is a special type.

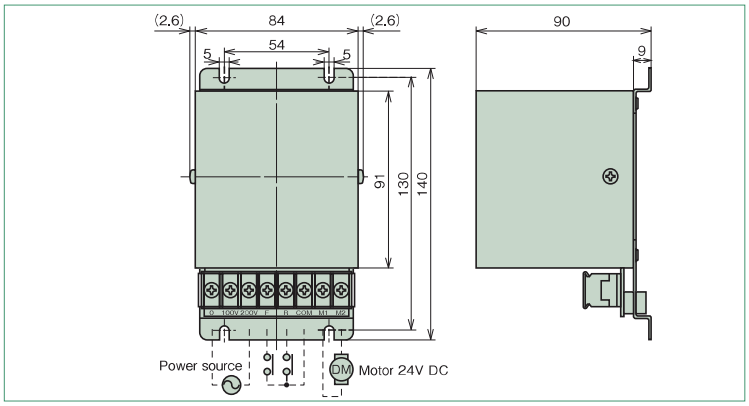


Model number		LPF−K12	LPF−K24
Power source		10 to 14V DC	20 to 28V DC
Rated current		3.7A DC	1.8A DC
Overload protection function	Load current	7.0A DC (fixed)	4.0A DC (fixed)
	Start time	0.3s (fixed)	
	Shock time	0.1s or less (fixed)	
Operation specifications		Rod extend at ON between F and +V Rod retract at ON between R and +V Rod stops with ON both between F and +V and between R and +V	
Ambient temperature		−15 to 40℃	
Ambient humidity		45 to 85%RH (no dew condensation)	
Structure		Panel inside storing type Case: ABS	
Mass		0.2kg	

* No signal is output at time of overload.

AC adapter

Applicable for LPF010, LPF020, LPF040 * AC adaptor for LPF100 to 600 is not available.



Model number		LPF−A24
Applicable motor		24V DC 29W
Power source		Commercial power source 100V AC 50/60Hz 200/220V AC 50/60Hz
Rated current		1.8A DC
Overload protection function	Load current	4.0A DC (fixed)
	Start time	0.3s (fixed)
	Shock time	0.1s or less (fixed)
Operation specifications		Rod extend at ON between F and COM Rod retract at ON between R and COM Rod stops with ON both between F and COM and between R and COM
Ambient temperature		−15 to 40℃
Ambient humidity		45 to 85%RH (no dew condensation)
Structure		Panel inside storing type Case: SPCC
Mass		2.5kg

* The overload protection function is built in the AC adapter.

Note) Check the cautions on page 110 when using an AC adapter.

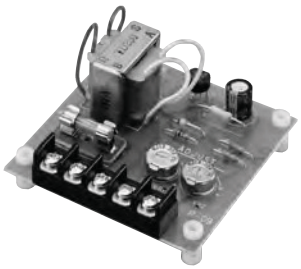
Control option (for potentiometer)

Stroke indication meter

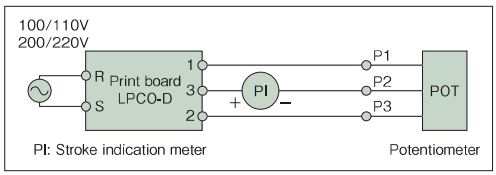
Stroke is indicated by % according to the signal from the print board.

Model number	RM80B (100 μA DC) equivalent
Class	JIS C 1102 2.5 class
Appearance	Frame・Black
Scale specifications	Full stroke indicated by 100%

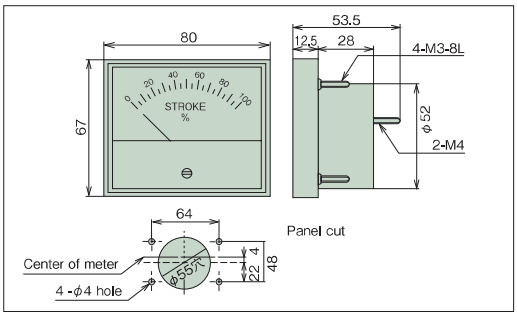
Print board Model number LPCO—D1 (Operation power: 100/110V 50/60Hz)
LPCO—D2 (Operation power: 200/220V 50/60Hz)

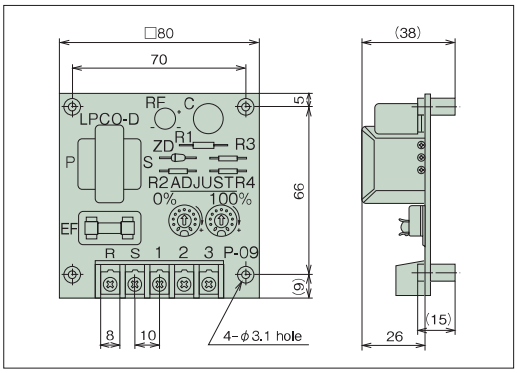


The voltage signal from the potentiometer of the position detecting unit of the Power Cylinder F series is converted to a current value.



Adjust the meter with the adjustment dial on the print board. Do not make a mistake with the stroke indication meter (+) and (-). Replace the terminals 1 and 2 on the print board to make the indication meter 100% when the stroke is minimum.



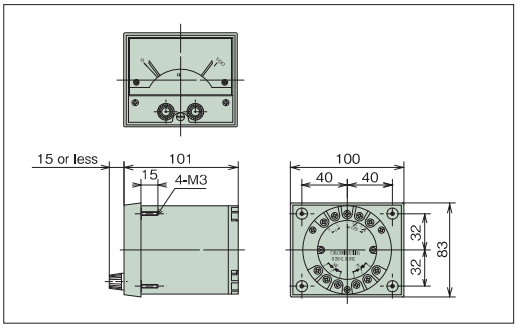


Meter relay (the print board is the same as the print board of the stroke indication meter.)

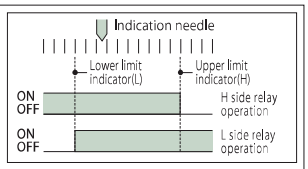
Used for simple adjustment of stroke on the operation panel.

(Iron panel is standard.
Contact Tsubakimoto chain when installing an aluminum panel.)

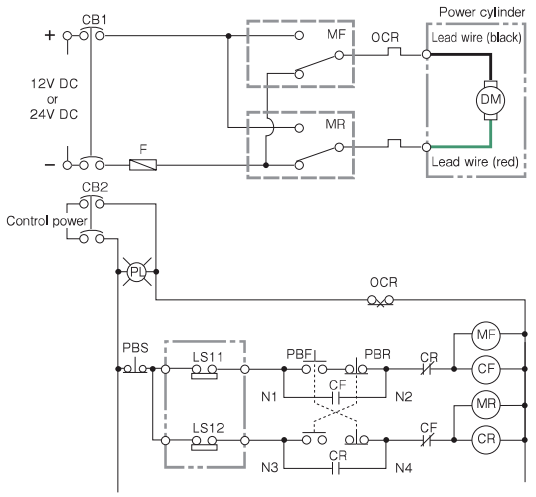
Model number	NRC-100HL (TSURUGA) equivalent
Class	JIS C 1102 2.5 class
Appearance	Frame: Black
Scale	Full stroke indicated by 100%
Power source	100/100V AC, 200/220V AC 50/60Hz
Input	100 μA DC maximum
Output contact structure	1C for both HIGH, LOW sides (Refer to the figure at the right)
Contact capacity	250V AC 3A (cos φ=1)



<Relay operation>
(In the case of b contact)
Wiring is the same as the stroke indication meter, however, power supply is separately required for the meter relay. Supply from the operation power source, etc. As for the output contact, it is easy to connect the b contact serially to the b contact of the stroke adjustment LS, etc.



Wire connection diagram



LS11: Extend stroke adjustment external LS

LS12: Retract stroke adjustment external LS

NOTE :

(1) This diagram shows a single-acting circuit. When using in an inching circuit, remove the wire connections between N1 and N2, N3 and N4, and short-circuit the PBS.
(2) A [ ] portion indicate a supply range of the power cylinder. Provide others than the [ ] portion on your side. (Stroke adjustment external LS is our option.)
(3) Recommended breakers for LPF100H through LPF600L
For 12V DC: NF32-SW 30A 250V DC (Mitsubishi Electric) or equivalent
For 24V DC: NF32-SW 15A 250V DC (Mitsubishi Electric) or equivalent
(4) Thermal relays for LPF100H through LPF600L
For 12V DC: TH-N20 (Mitsubishi Electric) or equivalent
For 24V DC: TH-N12 (Mitsubishi Electric) or equivalent

Use drive relays (MF, MR) with the following capacities.

Model	12V DC Spec.	24V DC Spec.
LPF010H LPF020M LPF040L	30A or more (14V DC)	30A or more (28V DC)
LPF100H LPF200M LPF300L LPF600L	70A or more (12V DC)	60A or more (24V DC)

* Drive relays for LPF100H through 600L are also available from us. Contact us.

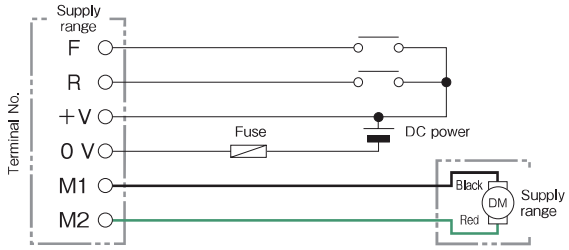
Use fuses with the following capacities as a guide.

Model	12V DC Spec.	24V DC Spec.
LPF010H LPF020M LPF040L	10A	5A
LPF100H LPF200M LPF300L LPF600L	20A	10A

* CAUTION

Be careful of the wire length (between motor and DC power source) and wire diameter in order to prevent voltage drop. Voltage drop may reduce the predetermined performance.

Overload detection unit (used for LPF010 through LPF040)

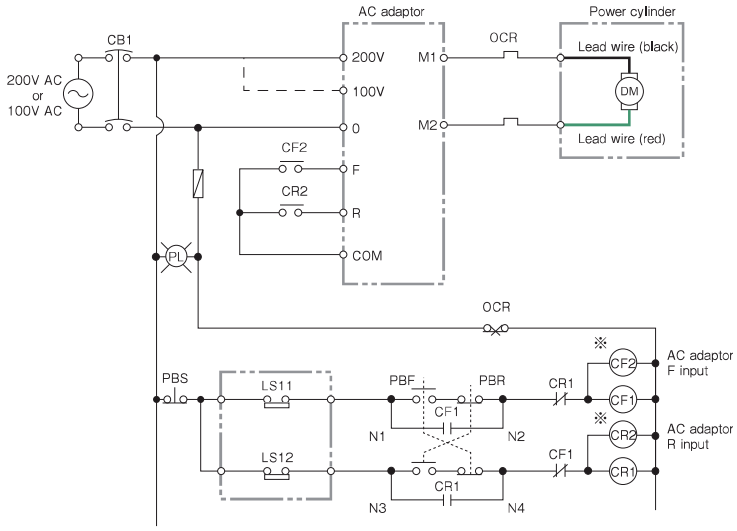


* CAUTION

When the overload detection has tripped, it is necessary to turn OFF the operation signal F or R once. If it is not turned OFF (not reset), a state that voltage is not output to the motor will be held. (Common to AC adaptor)

(In the case of jogging operation, it is reset as the contact is opened when the push button is released (F or R is turned OFF).)

AC adaptor wire connection diagram (used for LPF010 through LPF040)



LS11: Extend stroke adjustment external LS

LS12: Retract stroke adjustment external LS

NOTE :

(1) This diagram shows a single-acting circuit. When using in an inching circuit, remove wire connections between N1, N2, N3 and N4.
(2) A [ ] portion indicate a supply range of the power cylinder and AC adaptor. Provide others than the [ ] portion on your side. (Stroke adjustment external LS is our option.)
(3) For relays of CF1, CF2, CR1 and CR2, OMRON relay MY or equivalent is recommended.
(4) If the power source is 100V AC, connect the power to the dotted line part (100V terminal).

* CAUTION

1. Securely separate contacts of the relays CF2, CR2 connected to the operation signals F, R on the AC adaptor from the AC circuit (200V class, 400V class) for use. If the AC circuit is built in the same relay, arc is generated between contacts due to surge, and the AC adaptor may be broken.
2. If a surge intrudes from the power line, connect a surge killer to the power terminal as a surge countermeasure. Surge killers which we recommend are 100V terminal – ENC221D-*, 200V terminal – ENC471D-*(Fuji Electric). For details on surge countermeasures, contact Tsubakimoto chain.

⚠ WARNING

■ Cautions for installation

- Use pins to connect the power cylinder with the equipment. Align phases of pins (clevis fitting pin and end fitting pin).
- Apply grease into the clevis fitting holes and end fitting holes, and pins before installation.
- Pay attention so as not to apply a lateral load on the power cylinder when installing.
- All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. The power cylinder can generally be used in a range of -5℃ to 40℃, although it varies depending on the use conditions. When using at 40℃ or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.
- The main body is of outdoor specifications however, carry out proper waterproofing treatment on the motor lead wire terminal with waterproofing connectors etc.

■ Cautions for use

- Speed and current value change with an increase/decrease in load. For details, refer to the characteristics diagram. Linkage operation cannot be performed due to characteristics of the motor.
- When rectifying alternating current to use without using battery power, make sure to smoothen the current and provide a DC power supply with a capacity so that the voltage does not drop. It greatly affects performance of the power cylinder and the duration of the life of the brush. (As an option, an AC adaptor for an output voltage of 24V is available. This adaptor supports LPF010 to 040 only. For LPF 100 or larger, contact us separately. When using with other than commercial power supply, check that power voltage variation is within a range of ±10 % and the power supply is an alternating current power supply without strain.)
- When using an AC adaptor, use a power cylinder of 24V DC specifications.
- 12V DC specifications are within a voltage range from 10 to 14V, and 24V DC specifications are within a voltage range from 20 to 28V. Note that the speed varies if the voltage varies due to the characteristics of the DC motor.
- No overload detection mechanism is built in the LPF series. When detecting an overload, commonly use the overload detection unit as an option. For LPF010 to 040, combine with the overload detection unit to allow for press stopping. (For LPF100 to 600, an overload detection unit of special model can be manufactured, however, press stopping cannot be performed.)
  When press stopping is performed, allow the equipment to have a sufficient strength (rated thrust x 300%)
  When not using the overload detection unit, never perform press stopping, and use within the stroke range otherwise the power cylinder may be damaged.
- A model of stroke 50mm cannot be equipped with a stroke adjustment external LS. The mechanical stroke adjusting range of the stroke adjustment external LS is 60mm or more. However, note that it does not include a coasting distance.
- If coasting becomes a problem, provide a dynamic brake circuit separately.
- Our overload detection unit and AC adapter are provided with a dynamic brake circuit.
- Anti-rotation is required because the rod of the power cylinder generates a rotating force with thrust. The rotating force of the rod is as follows.

Model		LPF010H	LPF020M	LPF040L	LPF100H	LPF200M	LPF300L	LPF600L
Rod rotating force	N·m	0.14	0.28	0.55	1.75	3.50	5.25	5.81
	{kgf·m}	0.014	0.029	0.056	0.179	0.357	0.536	0.593

■ Cautions for maintenance and inspection

- The operating portion and reduction portion are filled with grease, therefore, it is not necessary for them to be greased.
- The duration of life is 15000 reciprocations as a guide.
- Structurally, repairs and parts supply are not available.
  If the above reference life is exceeded, replace the main body with a new one.

F series plus α

Plus α Ver.1 with AC motor

Model designation

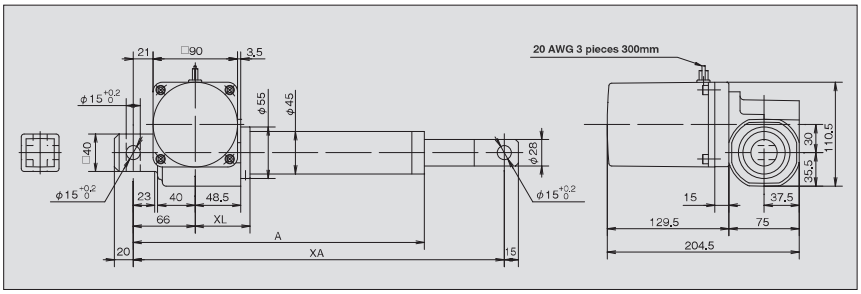
LPF 100 H 1.0 X - TK

- LPF: LPF series
- 100: Thrust
- H: Speed
- 1.0: Stroke
- X: With special motor
- TK: Special model

* Specify single-phase or three-phase power voltage.
(Power cylinder with brake is also available.)

Optimum for food machines, air conditioning equipment and incineration equipment!

Operable with commercial power (single-phase, three-phase)



Dimensions Table

Model	Stroke mm	Dimensions mm			
		XL	A	XA	
				MIN	MAX
LPF100H LPF200M LPF300L	50	58.5	210	275	325
	100		260	325	425
	150		310	395	545
	200		360	445	645
	300		460	545	845
LPF600L	100	95.5	297	360	460
	200		397	480	680
	300		497	580	880
	400		597	705	1105
	500		697	805	1305
	600		797	920	1520

Motor specification

		Single-phase		Three-phase
Model		Capacitor run	Capacitor run	Induction motor
Output		90W	90W	90W
Number of poles		Four-pole	Four-pole	Four-pole
Power	Voltage	100/100V	200/200V	200/200/220V
	Frequency	50/60Hz	50/60Hz	50/60/60Hz
Heat resistance class		E	E	E
Capacitor capacity		30μF (Attached)	7.5μF (Attached)	
Time rating		S2 15min	S2 15min	S2 15min
Protection class		(Indoor type) IP42	(Indoor type) IP42	(Indoor type) IP42

Nominal speed list

mm/s

Type	Single-phase		Three-phase
	100/100v 50/60Hz	200/200v 50/60Hz	200/200/220v 50/60/60Hz
LPF100H	9.0 / 11		9.0 / 11 / 11
LPF200M	6.0 / 7.0		6.0 / 7.0/ 8.0
LPF300L	3.0 / 4.0		3.0 / 4.0 / 4.0
LPF600L	2.5 / 3.0		2.5 / 3.0 / 3.0

Standard use environment

Model		Indoor type
Environment	Ambient temperature	5 to 40℃
	Relative humidity	85% or less
	Impact resistance value	1G or less
	Installation altitude	1000m or lower above sea level
	Atmosphere	● Indoor location which is not directly exposed to rain, wind, lightning or sunlight. ● Extent of sand and dust which exist in general factory (5mg/m³ or less)

1) Characteristic current value and speed of the cylinder may change due to influence of grease when it is used at low temperatures.
2) Cylinders with bellows are recommended in an excessively dusty location.

Plus α Ver.2 with ball clutch type overload protection device

Model designation

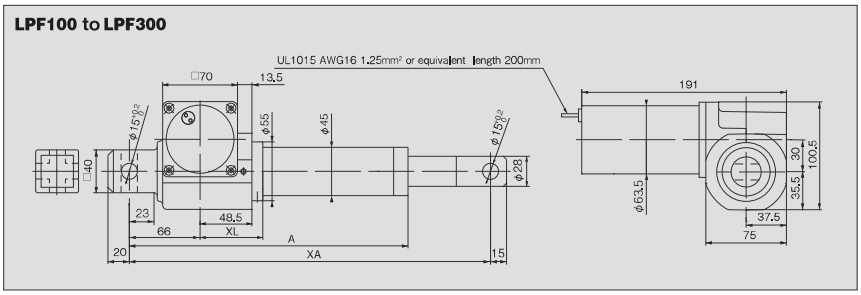
LPF 100 H 1.0 - TK

- LPF: LPF series
- 100: Thrust
- H: Speed
- 1.0: Stroke
- TK: Special model

* Designate as "with ball clutch type overload protection device."

Optimum for agricultural machines!

Clicking sound informs of overload!



Dimensions Table

Model				Rated thrust		Stroke	Rated speed	Dimensions (mm)				Approx. Mass
				kN	{kgf}	mm	mm/s	XL	A	XA		kg
										MIN	MAX	
	0.5		0.5 V	1.00	102	50	30	58.5	210	275	325	5.0
	1.0		1.0 V			100			260	325	425	5.3
LPF100H	1.5	LPF100H	1.5 V			150			310	395	545	5.6
	2.0		2.0 V			200			360	445	645	5.9
	3.0		3.0 V			300			460	545	845	6.5
	0.5		0.5 V	2.00	204	50	18		210	275	325	5.0
	1.0		1.0 V			100			260	325	425	5.3
LPF200M	1.5	LPF200M	1.5 V			150			310	395	545	5.6
	2.0		2.0 V			200			360	445	645	5.9
	3.0		3.0 V			300			460	545	845	6.5
	0.5		0.5 V	3.00	306	50	9		210	275	325	5.0
	1.0		1.0 V			100			260	325	425	5.3
LPF300L	1.5	LPF300L	1.5 V			150			310	395	545	5.6
	2.0		2.0 V			200			360	445	645	5.9
	3.0		3.0 V			300			460	545	845	6.5

Motor specifications

Item / Model	Voltage V	Output W	Rated time
LPF100H	12	160	5 minutes
LPF100H V	24		
LPF200M	12		
LPF200M V	24		
LPF300L	12		
LPF300L V	24		

Standard use environment

Model		Outdoor type
Environment	Ambient temperature	-5 to 40℃
	Relative humidity	85% or less
	Impact resistance value	1G or less
	Installation altitude	1000m or lower above sea level
	Atmosphere	Normal outdoors

1) If used below the freezing point, the characteristics of the cylinder (current value, speed) may change from the influence of grease.
2) Cylinders with bellows are recommended in an excessively dusty location.
3) All models are totally enclosed structures so that they can be used normally outdoors, however, when exposed to constant adverse conditions such as water, steam and snow accumulation, an appropriate cover is required. When using at 40℃ or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.

F series Plus α

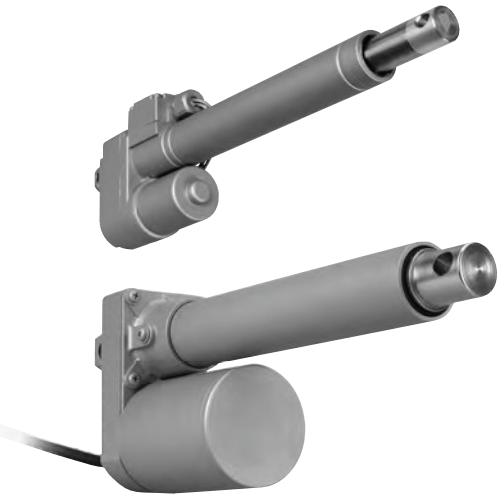
Plus α Ver.3A Parallel (folded type)

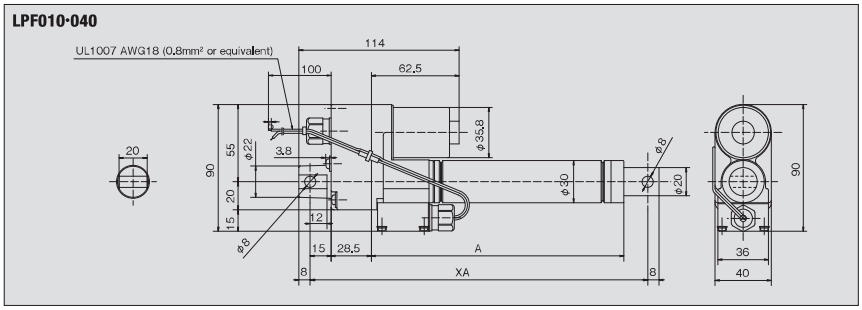
Model designation

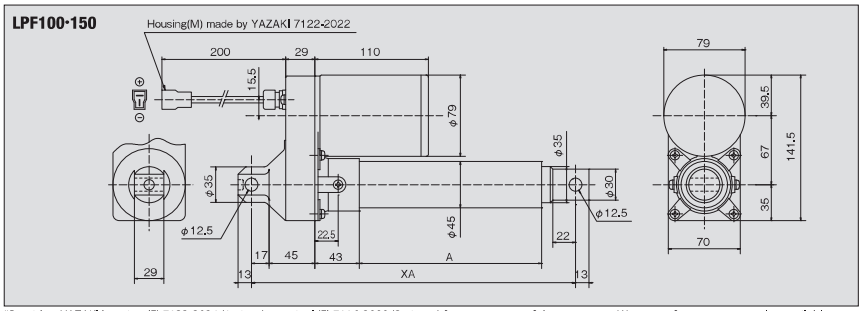
LPF 100 M K 1.0 - TK

LPF	100	M	K	1.0	TK
LPF series	Thrust	Speed	Parallel	Stroke	Special model

Optimum for outdoor use such as agricultural machines!







*Provide a YAZAKI housing (F) 7123-2024 (1 piece), terminal (F) 7116-2090 (2 pieces) for counterpart of the connector. Waterproof connectors are also available.

■Dimensions Table

LPF010-040

Model	Stroke	Dimension mm A	Dimension mm XA MIN	Dimension mm XA MAX	Approx. mass
	mm				kg
LPF010MK 0.5(V)	50	129.5	190	240	0.8
LPF040LK 0.5(V)					
LPF010MK 1.0(V)	100	179.5	240	340	0.9
LPF040LK 1.0(V)					
LPF010MK 1.5(V)	150	229.5	290	440	1.0
LPF040LK 1.5(V)					
LPF010MK 2.0(V)	200	279.5	340	540	1.1
LPF040LK 2.0(V)					

LPF100-150

Model	Stroke	Dimension mm A	Dimension mm XA MIN	Dimension mm XA MAX	Approx. mass
	mm				kg
LPF100MK 0.5(V)	50	77	205	255	3.6
LPF150LK 0.5(V)					
LPF100MK 1.0(V)	100	127	255	355	3.9
LPF150LK 1.0(V)					
LPF100MK 1.5(V)	150	177	305	455	4.2
LPF150LK 1.5(V)					
LPF100MK 2.0(V)	200	227	355	555	4.5
LPF150LK 2.0(V)					

■Standard model

Model	Rated thrust N	Rated thrust {kgf}	Thrust detecting load N	Thrust detecting load {kgf}	Stroke mm	Rated speed mm/s	Power V	Rated load current A	Locked rotor current A
LPF010MK	100	10.2	157	16	50	50	12V DC (24V DC)	3.4 (1.7)	9.0 (4.2)
					100				
					150				
					200				
LPF040LK	400	40.8	490	50	50	15	12V DC (24V DC)	3.0 (1.5)	9.0 (4.2)
					100				
					150				
					200				
LPF100MK	1.00k	102	Without thrust detecting mechanism * A ball clutch is built in for overload protection. However, it cannot be used for press stopping.		50	27	12V DC (24V DC)	13 (6.5)	58 (34)
					100				
					150				
					200				
LPF150LK	1.50k	153			50	17	12V DC (24V DC)	13 (6.5)	58 (34)
					100				
					150				
					200				

■Standard use environment

Model		Outdoor type
Environment	Ambient temperature	-5 to 40℃
	Relative humidity	85% or less
	Impact resistance value	1G or less
	Installation altitude	1000m or lower above sea level
	Atmosphere	Normal outdoors

Precautions for use

1. About voltage
   The voltage shall be 12V DC ±10% or 24V DC ±10%. If the voltage is low, the cylinder will slow down, due to which the overload detection LS may not operate.
   Be aware that if the voltage is high, it may be caught at the stroke end.
   (LPF100 and LPF150 should also be used within the above voltage range).
2. Pressing force
   In the case of press contact stopping, maximum pressing forces of 245N {25kgf} and 784N {80kgf} are exerted on LPF010MK and LPF040LK, respectively. Be aware that LPF100 and LPF150 cannot be used for press contact stopping.
3. Outdoor use
   All models have a totally enclosed structure so that they can be used normally outdoors. Even so, however, an appropriate cover is required in a severe environment that is splashed with water or vapor or in such a location where snow accumulates.
   For lead wire connection, use a waterproof connector.
4. Other
   With use below freezing, the characteristics (current value and speed) of the cylinder may vary according to the effect of grease.
   For use at 40° C or higher, always protect with a heat-insulating cover, etc.
   Never use in a flammable atmosphere. Doing so may cause an explosion or fire.
   In addition, avoid using in a location subjected to vibration or impact exceeding 1G.