



# LINEAR-MOTION POTENTIOMETER

(Precision Linear-motion, Wirewound, Conductive Plastic & Hybrid Element)

**SAKAE Linear-motion Potentiometers** are compact in size and light in weight and are capable of transforming mechanical linear movements into corresponding electrical variations. Easy to operate and handy. It is suitable for measurement of linear movements in various machinery and tools and displacements in linearly moving objects such as steering angles, numerical control tooling machines, robots, etc.

Besides, wirewound type (LP), there is another kind of resistive element in this series: Conductive Plastic (FLP-A) which features high resolution, long life expectancy and excellent high speed tracking ability. Hybrid resistive element is also available in model 9HLP. Please select the resistive element appropriately according to your applications.

## THE NOMENCLATURE OF SAKAE LINEAR-MOTION POT. SERIES

**S 30 FLP 100 A - ○○○○**

● **Special Specifications**

**S** means the potentiometer with special mechanical specifications not applicable to our standard.

● **Diameter**

**30** means 30mm square in cross sectional outer size of the body of the potentiometer. The 8 standard sizes are available, namely, 8mm, 9mm, 13mm, 15mm, 18mm, 30mm, 40mm and 50mm, but subject to models.

● **Type**

**FLP-A** means linear-motion, conductive plastic resistive element type potentiometer. According to the kinds of resistive elements incorporated, there are 3 kinds:

**LP**.....Wirewound resistive element type (A is not given).

**FLP-A**.....Conductive plastic resistive element type.

**HLP**.....Hybrid resistive element type.

● **4 digits branch number** to be used for specific requirements.

● **Characteristics**

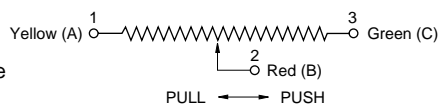
**A** means a conductive plastic resistive element type. (A is not given to wirewound type and hybrid type.)

● **Stroke**

**100** means effective electrical travel on the resistive element. The 15 standard strokes are available, namely, 10mm, 12mm, 15mm, 20mm, 25mm, 30mm, 50mm, 100mm, 120mm, 200mm, 300mm, 400mm, 500mm, 750mm and 1,000mm.

**NOTE:** The nomenclature of model 18 (F) LP series is mentioned in the next page 89 because of its complexity.

● **Terminal Connection Diagram**



Note: in case of with a connector, please use indications in the parenthesis.

## SELECTION GUIDE

Kind of Element	Size (mm)	Model No.	Stroke (mm)	Features
Wirewound	20×18	18LP	15, 30, 50, 100	This model is a substitute model against our old model 20LP series.
	32×32	30LP	50, 100, 200	These types have a shaft with front and rear extension as standard version. Available with special mechanical devices such as spring return device and position-adjustable limit-switches.
	50×50	50LP	300, 500, 1,000	The units with 300mm and 500mm strokes have a shaft with front and rear extension and the unit with 1,000mm stroke has a shaft with front extension only.
Conductive Plastic	8×7	8FLP	10	Low-cost and miniature size pot. with a shaft with front and rear extension. Available with spring return device incorporated as special.
	11×13	13FLP	12, 25, 50, 100	Popular type pot. with a front extended shaft. Available with spring return device as special version.
	15×14	15FLP	10, 15, 20, 30	Popular type pot. with screw-mounting method.
	20×18	18FLP-A, B, C	15, 30, 50, 75, 100, 150	Rigid housing case and can select the shaft shapes and with connector to your applications.
	32×32	30FLP	100, 200, 300, 400, 500, 750, 1,000	Long-life expectancy and low-cost pot. with a front extended shaft, Various strokes are available.
	47×40	40FLP	200, 300, 400, 500, 750, 1,000	Dust-proof and rigid construction most suitable for various kinds of robots, machine tools, etc.
	10×20	CFL	200, 300, 400, 500, 1,000	Sub-assembled resistive element unit with a wiper. Low-cost and open frame housing.
Hybrid	20×9	9HLP	100, 120	Can use a resistive element unit with a knob slider and long-life expectancy.

## THE NOMENCLATURE OF MODEL 18 (F) LP SERIES

**S** **18** **FLP** **B** **C** **100** **R** **E** **I** - ○○○○

● **Special Specifications**  
**S** means with special mechanical specifications not applicable to our standard.

● **Diameter**  
**18** means 18mm square in cross sectional outer size of the housing.

● **Type**  
**FLP** means linear-motion, conductive plastic resistive element type potentiometer. If the resistive element is a wirewound, F is not given and only LP is indicated.

● **Mounting Method and Shaft Shape**  
 - : Screw mounting, plain shaft  
**A**: Screw mounting, plain shaft  
**B**: Fixing nail mounting to the body, shaft with a cardan joint  
**C**: Fixing nail mounting to the body, shaft with a ball tip

● **Terminal Shape**  
**C**: Connector type  
**W**: Leadwire type  
 - : Lug type

● **Stroke**  
**100** means effective electrical travel of 100mm on the resistive element. 15mm to 200mm are available depending on the models.

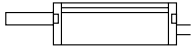
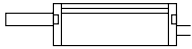
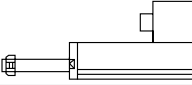
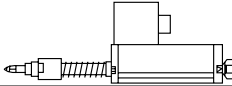
● **4 digits branch number** to be used for specific requirements.

● **Sealing**  
**I** : With simple sealing (Abt. IP54)  
 - : Without sealing

● **Shaft Extension**  
**E**: With front and rear extended shaft.  
 - : With front extended shaft.

● **With Spring Return Device**  
**R**: With spring return device  
 - : Without spring return device

### SELECTION GUIDE

Model	Outer Shape	Kind of Resistive Element	Mounting Method and Shaft Shape	Stroke (mm)
18LP		Wirewound	Screw mounting to the body. Plain shaft.	15, 30, 50, 100
18FLPA		Conductive Plastic	Screw mounting to the body. Plain shaft.	15, 30, 50, 100
18FLPB		Conductive Plastic	Fixing nail mounting to the body. Shaft with a cardan joint.	25, 50, 75, 100, 150
18FLPC		Conductive Plastic	Fixing nail mounting to the body. Shaft with a ball tip.	25, 50

## ● General Performances

Kind of Element	Model No.	Stroke (mm)	Standard Total Resistance Range (Ω)	Independent Linearity Tolerance (%)	Special Specifications				
					Spring Return Device	Front and Rear Shaft Extension	Extra Taps	Simple Sealing Type	With Switch
Wirewound	18LP	15 ~ 100	10 ~ 20k	±2.0 ~ ±0.25	○	○	○	○	—
	30LP	50 ~ 200	50 ~ 20k	±0.7 ~ ±0.25	○	○	○	○	○
	50LP	300 ~ 1,000	200 ~ 200k	±0.3 ~ ±0.1	○	○	○	○	○
Conductive Plastic	8FLP10A	10	1k ~ 50k	±2.0 ~ ±1.0	○	○	—	○	—
	13FLP-A	12, 25, 50, 100	500 ~ 20k	±2.0 ~ ±0.3	○	○	—	—	—
	15FLP-A	10 ~ 30	500 ~ 10k	±2.0 ~ ±0.5	○	○	—	○	—
	18FLPA	15 ~ 100	500 ~ 20k	±0.7 ~ ±0.2	○	—	—	○	—
	18FLPB	25 ~ 150	500 ~ 20k	±0.5 ~ ±0.05	○	—	○	○	—
	18FLPC	25 ~ 50	500 ~ 10k	±0.5 ~ ±0.1	○	○	○	○	—
	30FLP-A	100 ~ 1,000	1k ~ 500k	±0.5 ~ ±0.05	—	—	○	○	—
	40FLP-A	200 ~ 1,000	2k ~ 500k	±0.5 ~ ±0.1	—	—	—	—	—
Hybrid	9HLP	100, 120	1k ~ 10k	±0.5 ~ ±0.3	—	—	—	—	—

Note: 1. For detailed performances, please refer to the general specifications of each model in this catalog.  
 2. ○ means standard specifications and ◯ means special specifications available.  
 3. Standard total resistance values are based on 1, 2 and 5 series (i.e. 100Ω, 200Ω, 500Ω, 1kΩ, 2kΩ, 5kΩ...).

## ● Environmental Performances

Model Nos.	18LP, 30LP, 50LP	8FLP, 13FLP, 15FLP, 18FLPA, 18FLPB, 18FLPC, 30FLP, 40FLP, CFL, 9HLP
Parameters		
Operating Temperature Range	-30°C ~ +105°C	-30°C ~ +105°C *
Temperature Cycle	5 cycles under -30°C ~ +105°C Total resistance value variation: below ±5% No mechanical damage	5 cycles under -30°C ~ +105°C Total resistance value variation: below ±10% No mechanical damage
Exposure at Low Temperature	24 hours at -30°C Total resistance value variation: below ±5% No mechanical damage	24 hours at -30°C Total resistance value variation: below ±5% No mechanical damage
Exposure at High Temperature	1,000 hours at 105°C Total resistance value variation: below ±5% No mechanical damage	1,000 hours at 105°C Total resistance value variation: below ±10% No mechanical damage
Vibration	10Hz to 2,000Hz 147m/s <sup>2</sup> 12 hours Total resistance value variation: below ±5% No mechanical and electrical damage	10Hz to 2,000Hz 147m/s <sup>2</sup> 12 hours Total resistance value variation: below ±5% No mechanical and electrical damage
Shock	490m/s <sup>2</sup> 11ms 18 times Total resistance value variation: below ±1% No mechanical and electrical damage	490m/s <sup>2</sup> 11ms 18 times Total resistance value variation: below ±10% No mechanical and electrical damage
Moisture Resistance	40°C 95%RH 120 hours Total resistance value variation: below ±10% Insulation resistance: over 10MΩ	40°C 95%RH 120 hours Total resistance value variation: below ±10% Insulation resistance: over 10MΩ
Life Expectancy, Shaft Reciprocating Motions	No load at 60 c.p.m. 100,000 reciprocating motions Total resistance value variation: below ±5% against initial value Independent linearity tolerance: below 150% of specified value Noise: below 500Ω E.N.R.	No load at 120 c.p.m. 20,000,000 reciprocating motions (except 40FLP, CFL & 9HLP) 40FLP, CFL...10,000,000 reciprocating motions 9HLP...100,000 reciprocating motions Total resistance value variation: below ±10% against initial value Independent linearity tolerance: below 150% of specified value Output smoothness: below 150% of specified value

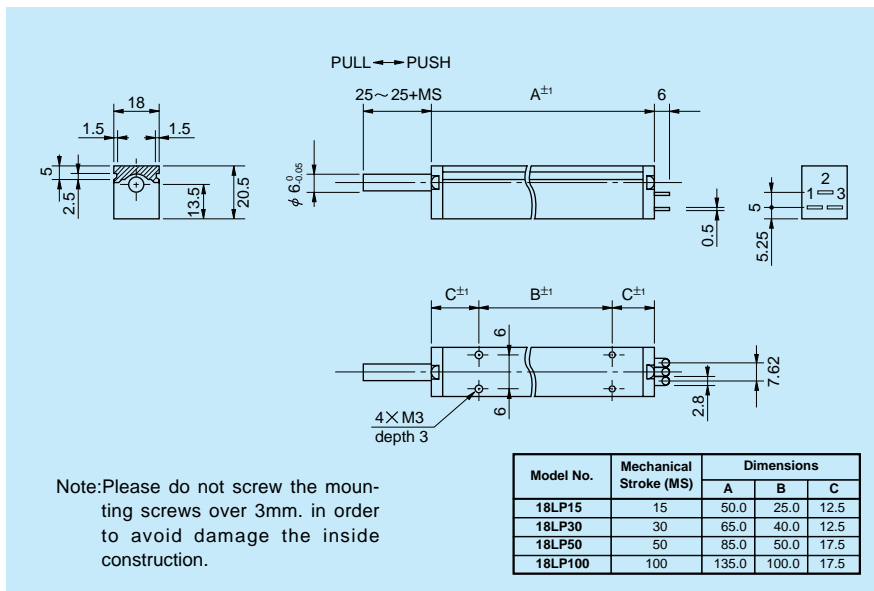
Note: 4. In case of the potentiometer with special resistance values and special specifications, the above performances may change and therefore, please consult us in advance, separately.  
 5. As for operating temperature range, we can not guarantee that all values of performances can satisfy within this operating temperature range. (Please see page 24 in this catalog for further details.)  
 6. The above values of performances based on each testings were measured after each testings completed, respectively, under standard conditions. As for the values during testings and other values not mentioning in the above table, please ask us separately.

※ N.B: Model 18 FLP series with spring return device and sealed version under IP54 have the operating temperature range of 0 °C to + 60. °C



Model 18LP50

● Standard Dimensions



● Standard Model Nos.

18LP15	Stroke	15mm
18LP30	Stroke	30mm
18LP50	Stroke	50mm
18LP100	Stroke	100mm

● General Specifications

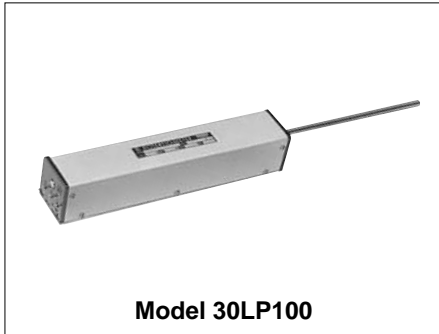
Model No.		18LP15	18LP30	18LP50	18LP100
Standard Resistance Range		10Ω ~ 5kΩ	20Ω ~ 10kΩ	50Ω ~ 10kΩ	50Ω ~ 20kΩ
Total Resistance Tolerance	Standard Class	±5% (J)			
	Precision Class	±3% (H)			
Independent Linearity Tolerance	Standard Class	±2.0%	±1.0%	±0.7%	±0.5%
	Precision Class	±1.0%	±0.5%	±0.4%	±0.25%
Power Rating		0.3W	0.5W	0.75W	1.0W
Noise		Below 100Ω E.N.R.			
Electrical Stroke		15±0.5mm	30±0.5mm	50±0.5mm	100±0.5mm
Mechanical Stroke (MS)		15 <sup>+2</sup> / <sub>0</sub> mm	30 <sup>+2</sup> / <sub>0</sub> mm	50 <sup>+2</sup> / <sub>0</sub> mm	100 <sup>+2</sup> / <sub>0</sub> mm
Insulation Resistance		Over 100MΩ at 1,000V.D.C.			
Dielectric Strength		1 minute at 1,000V.A.C.			
Friction		Below 0.6N (60gf)	Below 0.8N (80gf)	Below 1N (100gf)	
Stopper Strength		Approx. 90N (9kgf)			
Max. Working Voltage		100V			
Resistance Temperature Coefficient of Wire		±20 p.p.m./°C			
Mass		Approx. 60g	Approx. 70g	Approx. 100g	Approx. 140g

● Standard Resistance Values ■ No. of Wire Turns ■ Resistance Wire Used

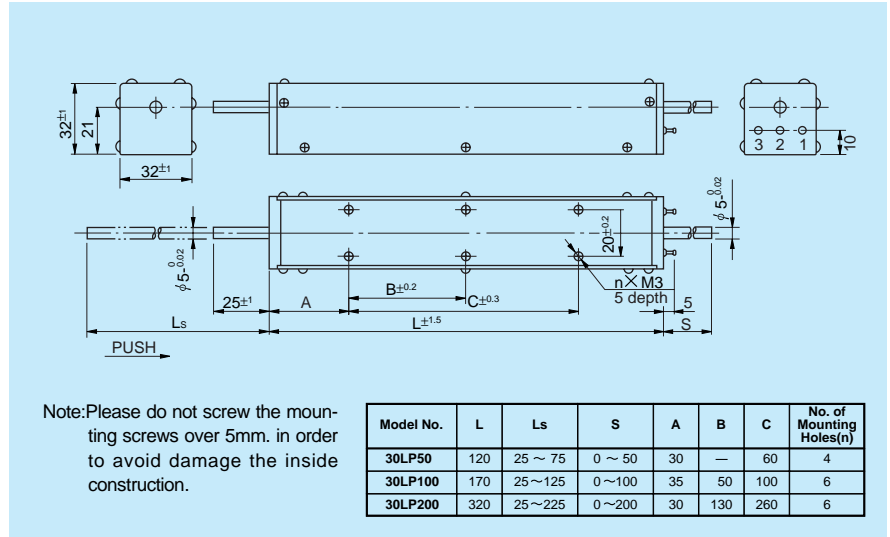
Resist. Value (Ω)	10	20	50	100	200	500	1k	2k	5k	10k	20k
18LP15	75	90	115	110	140	160	230	280	350	—	—
18LP30	—	150	190	240	210	280	360	450	580	780	—
18LP50	—	—	260	340	420	400	500	650	900	1,100	—
18LP100	—	—	400	530	670	900	900	1,000	1,200	1,600	2,400
Resist. Wire Used	Cu-Ni System						Ni-Cr System				

● Special Specifications Available

Stroke 150mm (S18LP150), Stroke 200mm (S18LP200), Sealed type (IP54, The length of "A" is extended by abt. 6mm.), With spring return device (up to 100mm. stroke, Friction is 3N [300gf]. Spring return device is mounted on the outer shaft. For details, please ask us.), Special machining on the shaft.



● Standard Dimensions



● Standard Model Nos.

- 30LP50      Stroke 50mm
- 30LP100    Stroke 100mm
- 30LP200    Stroke 200mm

● General Specifications

Model No.	30LP50	30LP100	30LP200
Standard Resistance Range	50Ω ~ 10kΩ	50Ω ~ 20kΩ	100Ω ~ 50kΩ
Total Resistance Tolerance	Standard Class	5% (J)	
	Precision Class	3% (H)	
Independent Linearity Tolerance	Standard Class	±0.7%	0.5%
	Precision Class	±0.4%	0.25%
Power Rating	0.75W	1.0W	2.0W
Noise	Below 100Ω E.N.R.		
Electrical Stroke	50±0.5mm	100%0.5mm	200%0.5mm
Mechanical Stroke (MS)	50 <sup>+2</sup> / <sub>0</sub> mm	100 <sup>+2</sup> / <sub>0</sub> mm	200 <sup>+2</sup> / <sub>0</sub> mm
Insulation Resistance	Over 100MΩ at 1,000V.D.C.		
Dielectric Strength	1 minute at 1,000V.A.C.		
Friction	Below 0.6N (60gf)	Below 0.6N (60gf)	Below 0.8N (80gf)
Stopper Strength	Approx. 90N (9kgf)		
Max. Working Voltage	200V		
Resistance Temperature Coefficient of Wire	±20 p.p.m./°C		
Mass	Approx. 170g	Approx. 220g	Approx. 300g

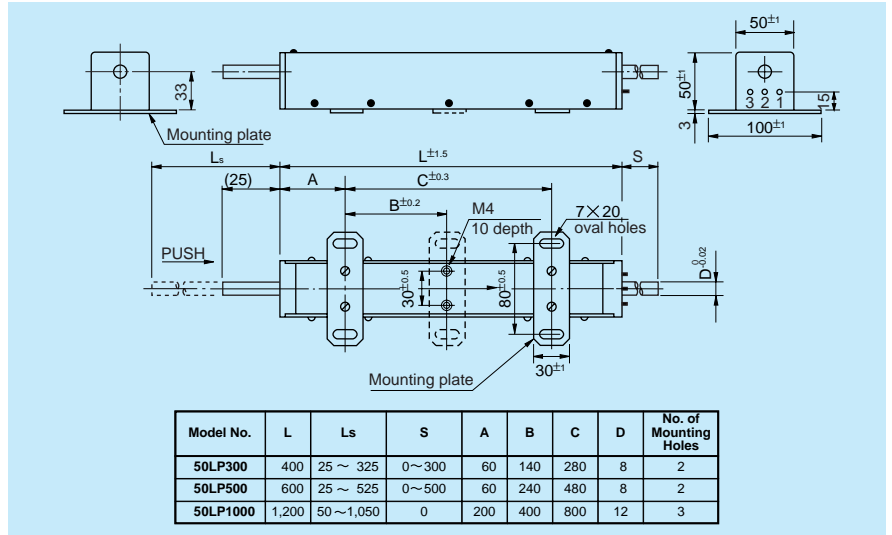
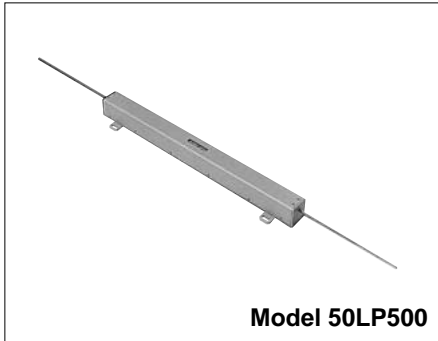
● Standard Resistance Values ■No. of Wire Turns ■Resistance Wire Used

Resist. Value (Ω)	50	100	200	500	1k	2k	5k	10k	20k	50k
30LP50	260	340	420	400	500	650	900	1,100	—	—
30LP100	400	530	670	900	900	1,000	1,200	1,600	2,400	—
30LP200	—	800	1,060	1,530	1,800	1,800	2,150	2,400	3,200	4,800
Resist. Wire Used	Cu-Ni System					Ni-Cr System				

● Special Specifications Available

Stroke 300mm (S30LP300), Stroke 400mm (S30LP400), Extra taps (Available up to 1 tap), Spring return device incorporated (Friction is approx. 2N [200gf].), With limit switches (Available up to 2 switches), Special machining on the shaft, Dual resistive elements, With a connector.

### ● Standard Dimensions



### ● Standard Model Nos.

<b>50LP300</b>	Stroke	300mm
<b>50LP500</b>	Stroke	500mm
<b>50LP1000</b>	Stroke	1,000mm

### ● General Specifications

Model No.	50LP300	50LP500	50LP1000
<b>Standard Resistance Range</b>	200Ω ~ 50kΩ	500Ω ~ 100kΩ	500Ω ~ 200kΩ
<b>Total Resistance Tolerance</b>	<b>Standard Class</b> ±5% (J)		
	<b>Precision Class</b> ±3% (H)		
<b>Independent Linearity Tolerance</b>	<b>Standard Class</b> ±0.3%	±0.25%	
	<b>Precision Class</b> ±0.15%	±0.1%	
<b>Power Rating</b>	3.0W	5.0W	9.0W
<b>Noise</b>	Below 100Ω E.N.R.		
<b>Electrical Stroke</b>	300±1mm	500±1mm	1,000±1mm
<b>Mechanical Stroke (MS)</b>	300 <sup>+2</sup> / <sub>0</sub> mm	500 <sup>+2</sup> / <sub>0</sub> mm	1,000 <sup>+2</sup> / <sub>0</sub> mm
<b>Insulation Resistance</b>	Over 100MΩ at 1,000V.D.C.		
<b>Dielectric Strength</b>	1 minute at 1,000V.A.C.		
<b>Friction</b>	Below 4N (400gf)		
<b>Stopper Strength</b>	Approx. 90N (9kgf)		
<b>Max. Working Voltage</b>	300V		
<b>Resistance Temperature Coefficient of Wire</b>	±20 p.p.m./°C		
<b>Mass</b>	Approx. 2kg	Approx. 3kg	Approx. 5kg

### ● Standard Resistance Values ■No. of Wire Turns ■Resistance Wire Used

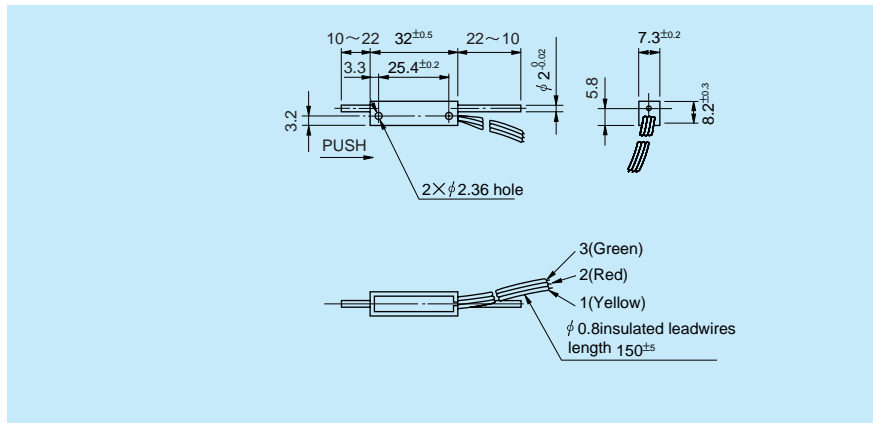
Resist. Value (Ω)	200	500	1k	2k	5k	10k	20k	50k	100k	200k
<b>50LP300</b>	1,400	1,900	2,400	2,200	3,000	3,800	4,750	6,450	—	—
<b>50LP500</b>	—	2,600	3,300	4,150	4,000	5,100	6,600	8,900	11,300	—
<b>50LP1000</b>	—	4,650	5,200	6,600	9,100	8,000	10,200	14,200	17,800	22,600
<b>Resist. Wire Used</b>	Cu-Ni System					Ni-Cr System				

### ● Special Specifications Available

Extra taps (Available up to 1 tap), Spring return device incorporated (Only available in models 50LP300 and 50LP500. Friction is approx. 6N [600gf].), With limit-switches (Available up to 2 switches), Special machining on the shaft, Dual resistive elements, With a connector.



● Standard Dimensions



● General Specifications

<b>Standard Resistance Values:</b>	1k, 2k, 5k, 10k, 20k (Ω)	<b>Power Rating:</b>	0.2W
<b>Max. Practical Resistance Value:</b>	50kΩ	<b>Electrical Stroke:</b>	11±0.5mm
<b>Total Resistance Tolerance:</b>	Standard Class ±15% (L) Precision Class ±10% (K)	<b>Mechanical Stroke:</b>	12mm
<b>Independent Linearity Tolerance:</b>	Standard Class ±2.0% Precision Class ±1.0%	<b>Insulation Resistance:</b>	Over 1,000MΩ at 500V.D.C.
<b>Resolution:</b>	Essentially infinite	<b>Dielectric Strength:</b>	1 minute at 500V.A.C.
<b>Output Smoothness:</b>	Below 0.1% against input voltage	<b>Friction:</b>	Below 0.3N (30gf)
<b>Contact Resistance Variation:</b>	Below 2% C.R.V.	<b>Stopper Strength:</b>	Approx. 10N (1kgf)
		<b>Resistance Temperature Coefficient:</b>	±400p.p.m./°C
		<b>Mass:</b>	Approx. 5g

● Special Specifications Available

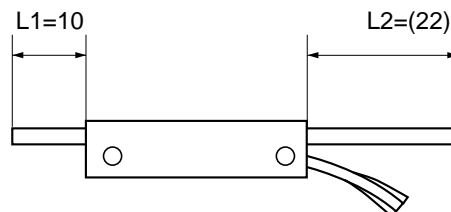
Spring return device incorporated (Friction is approx. 3N [300gf].), Special electrical stroke (8mm, 12mm), Special machining on the shaft.

● SPECIAL NOTE

When ordering on the requirement of special shaft length in case of our linear-motion potentiometers, especially models 30LP, 50LP, 8FLP and 15FLP series as standard version with front and rear shaft extension, please do not fail to specify the shaft length exactly when the shaft is completely pressed into the housing.

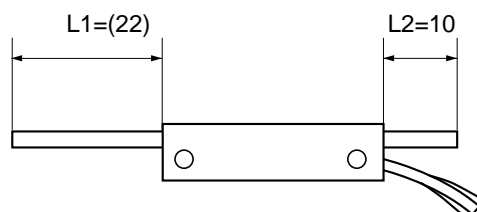
Example: In case of model 8FLP10A standard version

As you see from the above right drawing, please specify the exact length of L1 and L2 when the shaft is completely pressed into the housing.

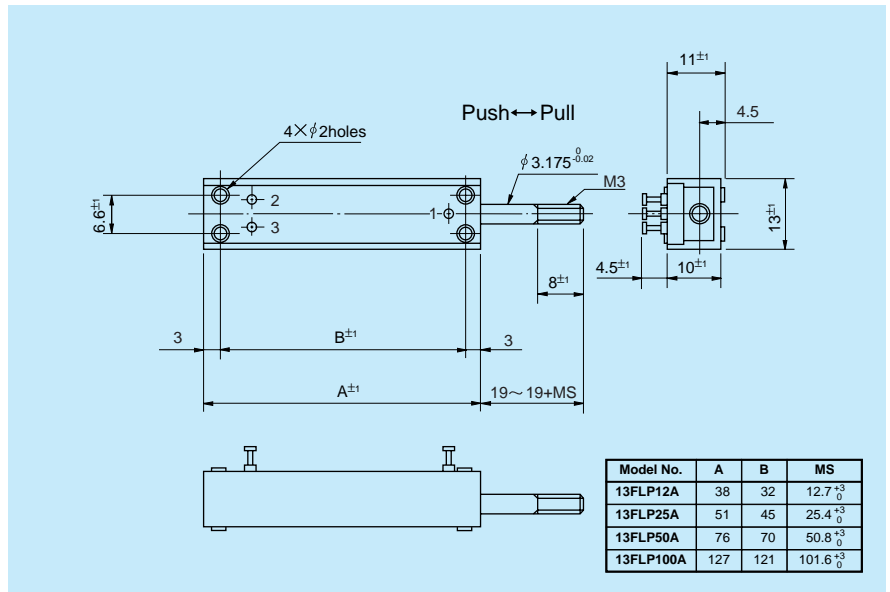
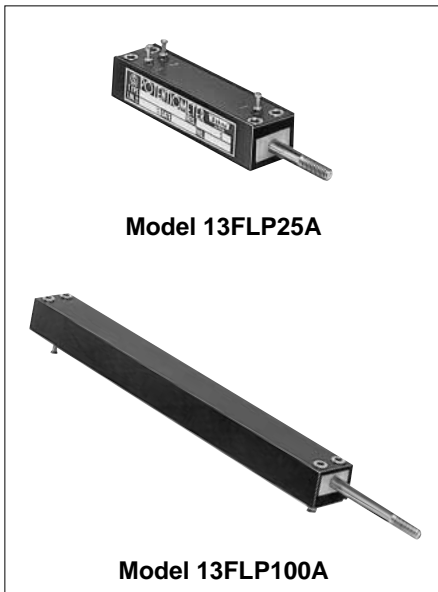


The condition of spring returned

In case of models with spring return device, the condition of spring returned is as right drawing and please specify the exact length of L1 and L2 when the shaft is completely pressed into the housing.



● Standard Dimensions



● Standard Model Nos.

- 13FLP12A Stroke 12mm
- 13FLP25A Stroke 25mm
- 13FLP50A Stroke 50mm
- 13FLP100A Stroke 100mm

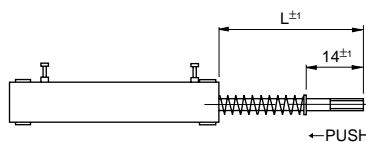
● General Specifications

Model No.		13FLP12A	13FLP25A	13FLP50A	13FLP100A
Standard Resistance Values		500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)	1k,2k,5k,10k,20k (Ω)	1k,2k,5k,10k,20k (Ω)
Total Resistance Tolerance		±20% (M)			
Independent Linearity Tolerance	Standard Class	±2.0%	±1.5%	±1.0%	±0.7%
	Precision Class	±1.0%	±0.7%	±0.5%	±0.3%
Resolution		Essentially Infinite			
Output Smoothness		Below 0.1% against input voltage			
Contact Resistance Variation		Below 2% C.R.V.			
Power Rating		0.2W	0.4W	0.7W	1.2W
Electrical Stroke		12.7±0.5mm	25.4±0.5mm	50.8±0.5mm	101.6±0.5mm
Mechanical Stroke (MS)		12.7 <sup>+3</sup> <sub>0</sub> mm	25.4 <sup>+3</sup> <sub>0</sub> mm	50.8 <sup>+3</sup> <sub>0</sub> mm	101.6 <sup>+3</sup> <sub>0</sub> mm
Insulation Resistance		Over 1,000MΩ at 500V.D.C.			
Dielectric Strength		1 minute at 500V.A.C.			
Friction		Below 0.5N (50gf)			Below 1.0N (100gf)
Stopper Strength		Approx. 20N (2kgf)			
Resistance Temperature Coefficient		±400p.p.m./°C			
Mass		Approx. 10g	Approx. 15g	Approx. 25g	Approx. 35g

● Special Specifications Available

Spring return device mounted on the shaft (Friction is referred as below table.), Special machining on the shaft, Wirewound resistive element type (13LP series).

In case of 13FLP series with spring return device, please note the following:  
The spring return device is mounted on the outside shaft, of which dimensions are as the table.



Model No.	L	Friction
S13FLP12A	30~30+MS	3.5N (350gf)
S13FLP25A	35~35+MS	5 N (500gf)
S13FLP50A	40~40+MS	5 N (500gf)
S13FLP100A	50~50+MS	5 N (500gf)

Note: MS means Mechanical Stroke.

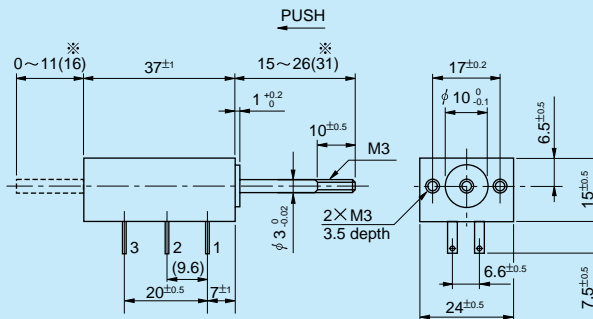




Model 15FLP15A

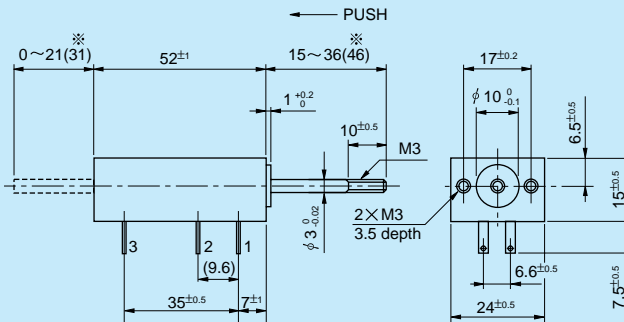
● Standard Dimensions

■ Model 15FLP10A & Model 15FLP15A



\* Numerals in parentheses show those of Model 15FLP15A.

■ Model 15FLP20A & Model 15FLP30A



\* Numerals in parentheses show those of Model 15FLP30A.

Note: 1. 2 pcs. each of flat-washer and hex nut are attached.  
2. All terminals can be fitted with the AMP 110 series faston receptacle (2.8×0.5mm) or equivalents.

● Standard Model Nos.

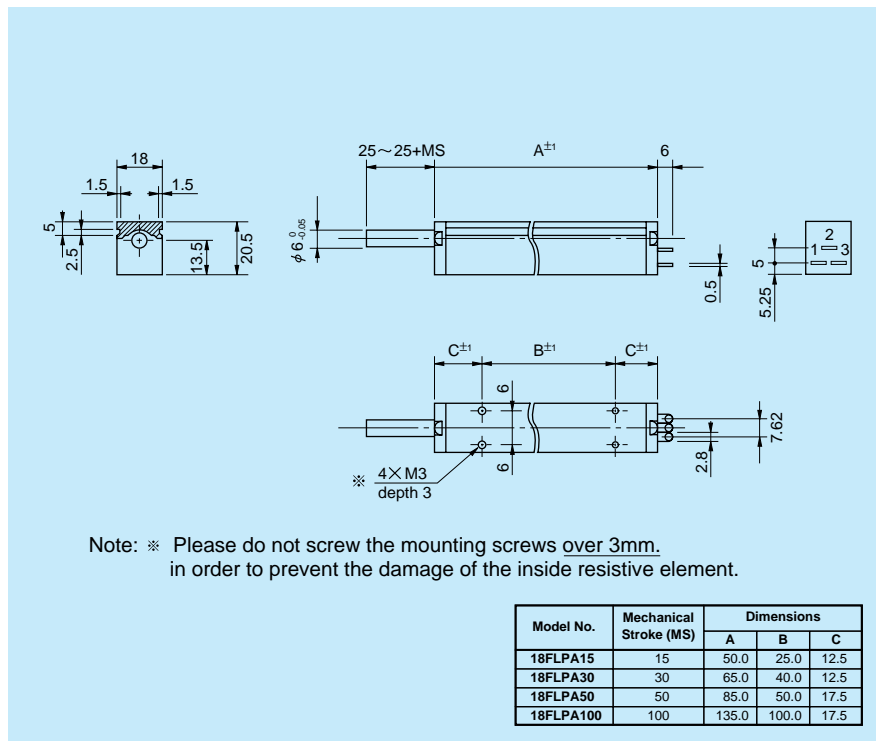
- 15FLP10A Stroke 10mm
- 15FLP15A Stroke 15mm
- 15FLP20A Stroke 20mm
- 15FLP30A Stroke 30mm

● General Specifications

Model No.		15FLP10A	15FLP15A	15FLP20A	15FLP30A
Standard Resistance Values		500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)
Total Resistance Tolerance		±10% (K)			
Independent Linearity Tolerance	Standard Class	±2.0%	±1.0%		
	Precision Class	±1.0%	±0.5%		
Resolution		Essentially Infinite			
Output Smoothness		Below 0.1% against input voltage			
Contact Resistance Variation		Below 2% C.R.V.			
Power Rating		0.2W	0.3W	0.4W	0.5W
Electrical Stroke		10±0.5mm	15±0.5mm	20±0.5mm	30±0.5mm
Mechanical Stroke (MS)		10 <sup>+2</sup> / <sub>0</sub> mm	15 <sup>+2</sup> / <sub>0</sub> mm	20 <sup>+2</sup> / <sub>0</sub> mm	30 <sup>+2</sup> / <sub>0</sub> mm
Insulation Resistance		Over 1,000MΩ at 1,000V.D.C.			
Dielectric Strength		1 minute at 1,000V.A.C.			
Friction		Below 0.3N (30gf)			
Stopper Strength		Approx. 20N (2kgf)			
Resistance Temperature Coefficient		±400p.p.m./°C			
Mass		Approx. 30g			

● Special Specifications Available

Spring return device incorporated (Friction is approx. 3N [300gf].), Special machining on the shaft.

**● Standard Dimensions**

**● Standard Model Nos.**

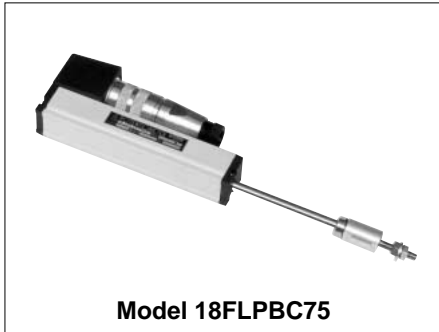
<b>18FLPA15</b>	Stroke	15mm
<b>18FLPA30</b>	Stroke	30mm
<b>18FLPA50</b>	Stroke	50mm
<b>18FLPA100</b>	Stroke	100mm

**● General Specifications**

Model No.	18FLPA15	18FLPA30	18FLPA50	18FLPA100
<b>Standard Resistance Values</b>	500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)	1k,2k,5k,10k,20k (Ω)
<b>Total Resistance Tolerance</b>	±10% (K)			
<b>Independent Linearity Tolerance</b>	<b>Standard Class</b>	±0.7%	±0.4%	±0.3%
	<b>Precision Class</b>	±0.5%	±0.25%	±0.2%
<b>Resolution</b>	Essentially Infinite			
<b>Output Smoothness</b>	Below 0.1% against input voltage			
<b>Contact Resistance Variation</b>	Below 2% C.R.V.			
<b>Power Rating</b>	0.3W	0.6W	0.75W	1.25W
<b>Electrical Stroke</b>	15±0.5mm	30±0.5mm	50±0.5mm	100±0.5mm
<b>Mechanical Stroke (MS)</b>	15 <sup>+2</sup> <sub>0</sub> mm	30 <sup>+2</sup> <sub>0</sub> mm	50 <sup>+2</sup> <sub>0</sub> mm	100 <sup>+2</sup> <sub>0</sub> mm
<b>Insulation Resistance</b>	Over 1,000MΩ at 1,000V.D.C.			
<b>Dielectric Strength</b>	1 minute at 1,000V.A.C.			
<b>Friction</b>	Below 0.3N (30gf)		Below 1N (100gf)	
<b>Stopper Strength</b>	Approx. 90N (9kgf)			
<b>Resistance Temperature Coefficient</b>	±400p.p.m./°C			
<b>Mass</b>	Approx. 60g	Approx. 70g	Approx. 100g	Approx. 140g

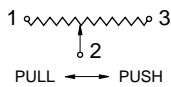
**● Special Specifications Available**

Stroke 150mm (S18FLPA150), Stroke 200mm (S18FLPA200), Sealed type (IP54, The length of "A" is extended by abt. 6mm.), With spring return device (up to 100mm. stroke. Friction is 3N [300gf]. Spring return device is mounted on the outer shaft and the shaft is extended by some extent depending on the models. For details, please ask us.), Special machining on the shaft.



Model 18FLPBC75

● Connector Terminal Connection Diagram



● Standard Model Nos.

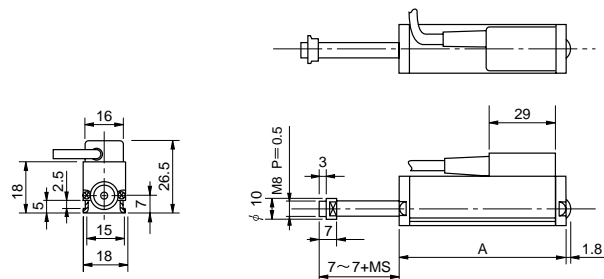
- 18FLPBC25 Stroke 25mm
- 18FLPBC50 Stroke 50mm
- 18FLPBC75 Stroke 75mm
- 18FLPBC100 Stroke 100mm
- 18FLPBC150 Stroke 150mm

● General Specifications

Model No.	18FLPBC25	18FLPBC50	18FLPBC75	18FLPBC100	18FLPBC150
Standard Resistance Values	500, 1k, 2k, 5k, 10k (Ω)	500, 1k, 2k, 5k, 10k (Ω)	500, 1k, 2k, 5k, 10k, 20k (Ω)	1k, 2k, 5k, 10k, 20k (Ω)	1k, 2k, 5k, 10k, 20k (Ω)
Total Resistance Tolerance	±10% (K)				
Independent Linearity Tolerance	Standard Class	±0.5%			
	Precision Class	±0.2%	±0.1%		±0.05%
Resolution	Essentially Infinite				
Output Smoothness	Below 0.1% against input voltage				
Contact Resistance Variation	Below 2% C.R.V.				
Power Rating	0.5W	0.75W	1.0W	1.25W	1.5W
Electrical Stroke	25±1mm	50±1mm	75±1mm	100±1mm	150±1mm
Mechanical Stroke (MS)	Approx. 30mm	Approx. 55mm	Approx. 80mm	Approx. 105mm	Approx. 155mm
Insulation Resistance	Over 1,000MΩ at 500V.D.C.				
Dielectric Strength	1 minute at 500V.A.C.				
Friction	Below 1.2N (120gf)				
Stopper Strength	Approx. 90N (9kgf)				
Resistance Temperature Coefficient	±400p.p.m./°C				
Mass	Approx. 90g	Approx. 120g	Approx. 140g	Approx. 160g	Approx. 250g

● Special Specifications Available

Stroke 200mm (S18FLBC200), Sealed type (IP54, The length of "A" is extended by abt. 6mm.), Extra Taps (Available up to 1 tap and only on the version with a connector.).  
 In case of with leadwire terminals, the dimensions are as the right drawing: (The dimensions of "A" & "L" are the same as above table.) Leadwire length is 1m.



● Standard Dimensions

**■ Cardan Joint Dimensions**

**● Fixing Nail**

**● Panel Arrangements**

4X M4 P=0.7 depth 5.5 min.

29<sup>±0.2</sup>

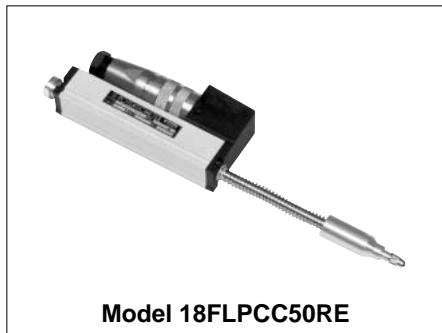
L

**■ Specifications of Connector**

Number of poles: 5 poles  
 Electrical wire diameter to be connected: Ø4.8mm max.

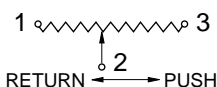
Model No.	Mechanical Stroke (MS)	Dimensions	
		A	L
18FLPBC25	30	74.5	44.5
18FLPBC50	55	99.5	69.5
18FLPBC75	80	124.5	94.5
18FLPBC100	105	149.5	119.5
18FLPBC150	155	199.5	169.5

Note: A cardan joint, mating connector and 4 pcs. of fixing nail are attached.



Model 18FLPCC50RE

Connector Terminal Connection Diagram



Standard Model Nos.

- 18FLPCC25RE Stroke 25mm
- 18FLPCC50RE Stroke 50mm

General Specifications

Model No.		18FLPCC25RE	18FLPCC50RE
Standard Resistance Values		500,1k,2k,5k,10k (Ω)	500,1k,2k,5k,10k (Ω)
Total Resistance Tolerance		±10% (K)	
Independent Linearity Tolerance	Standard Class	±0.5%	
	Precision Class	±0.2%	±0.1%
Resolution		Essentially Infinite	
Output Smoothness		Below 0.1% against input voltage	
Contact Resistance Variation		Below 2% C.R.V.	
Power Rating		0.5W	0.75W
Electrical Stroke		25±1mm	50±1mm
Mechanical Stroke (MS)		Approx. 30mm	Approx. 55mm
Insulation Resistance		Over 1,000MΩ at 500V.D.C.	
Dielectric Strength		1 minute at 500V.A.C.	
Friction		Below 3N (300gf)	
With Spring Return Device		Fitted (Standard)	
Stopper Strength		Approx. 90N (9kgf)	
Resistance Temperature Coefficient		±400p.p.m./°C	
Mass		Approx. 100g	Approx. 150g

Special Specifications Available

Stroke 75mm (S18FLPCC75), Stroke 100mm (S18FLPCC100), Stroke 150mm (S18FLPCC150), Stroke 200mm (S18FLPCC200), Sealed type (IP54, The length of "A" is extended by abt. 12mm.), With spring return device (Available 75mm & 100mm stroke. Friction is approx. 3N [300gf]. Spring return device is mounted on the outer shaft.), With a cardan joint (without spring return device).  
 Extra Taps (Available up to 1 tap and only on the version with a connector.)  
 In case of with leadwire terminals, the dimensions are as the right drawing: (The dimensions of "A", "B" & "L" are the same as above table.) Leadwire length is 1m.

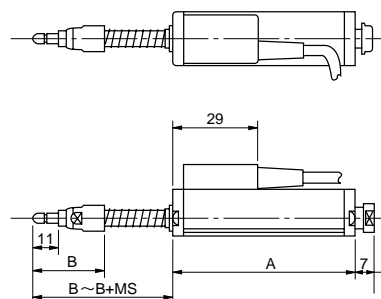
Standard Dimensions

■ Fixing Nail ■ Panel Arrangements

■ Specifications of Connector  
 Number of poles: 5 poles  
 Electrical wire diameter to be connected: Ø4.8mm max.

Model No.	Mechanical Stroke (MS)	Dimensions		
		A	B	L
18FLPCC25RE	30	63	32	33
18FLPCC50RE	55	88	40	58

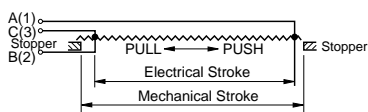
Note: 4 pcs. of fixing nail and mating connector are attached.





Model 30FLP200A

Terminal Connection Diagram



Standard Model Nos.

30FLP100A	Stroke	100mm
30FLP200A	Stroke	200mm
30FLP300A	Stroke	300mm
30FLP400A	Stroke	400mm
30FLP500A	Stroke	500mm
30FLP750A	Stroke	750mm
30FLP1000A	Stroke	1,000mm

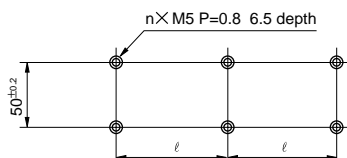
Standard Dimensions

**Specifications of Connector**  
 Number of poles: 6 poles  
 Electrical wire diameter to be connected:  $\phi 6.3$ mm max.

Model No.	L
30FLP100A	170
30FLP200A	270
30FLP300A	370
30FLP400A	470
30FLP500A	570
30FLP750A	820
30FLP1000A	1,070

Note: 2 pcs. mounting fixing plates are attached in models 30FLP100A to 30FLP500A and 3 pcs. mounting fixing plates are attached in models 30FLP750A and 30FLP1000A.

Panel Arrangements



Stroke mm	100	200	300	400	500	750	1,000
$\phi$ mm	70	170	270	370	470	360	485
Number of attached fixing plate	2	2	2	2	2	3	3

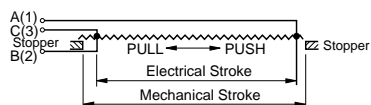
General Specifications

Model No.		30FLP100A	30FLP200A	30FLP300A	30FLP400A	30FLP500A	30FLP750A	30FLP1000A
Standard Resistance Range		1k ~ 10k $\Omega$	2k ~ 20k $\Omega$	5k ~ 20k $\Omega$	5k ~ 100k $\Omega$	5k ~ 200k $\Omega$	5k ~ 200k $\Omega$	10k ~ 500k $\Omega$
Total Resistance Tolerance	Standard Class	$\pm 20\%$ (M)						
	Precision Class	$\pm 10\%$ (K)						
Independent Linearity Tolerance	Standard Class	$\pm 0.5\%$						
	Precision Class	$\pm 0.1\%$						
	Super-precision Class	$\pm 0.075\%$	$\pm 0.05\%$				—	—
Resolution		Essentially infinite						
Output Smoothness		Below 0.1% against input voltage						
Contact Resistance Variation		Below 2% C.R.V.						
Power Rating		1.25W	1.5W	2.0W	2.5W	5.0W	7.5W	10.0W
Electrical Stroke		100 $\pm 1$ mm	200 $\pm 1$ mm	300 $\pm 1$ mm	400 $\pm 1$ mm	500 $\pm 1$ mm	750 $\pm 1$ mm	1,000 $\pm 1$ mm
Mechanical Stroke (MS) (Approx.)		105mm	205mm	305mm	405mm	505mm	705mm	1,005mm
Insulation Resistance		Over 1,000M $\Omega$ at 500V.D.C.						
Dielectric Strength		1 minute at 900V.A.C.						
Max. Working Voltage		500V						
Friction		Below 2N (200gf)						
Stopper Strength		Approx. 20N (2kgf)						
Resistance Temperature Coefficient		$\pm 400$ p.p.m./ $^{\circ}$ C						
Residual Resistance		1 ~ 10% against total resistance						
Mass		Approx. 200g	Approx. 350g	Approx. 500g	Approx. 650g	Approx. 800g	Approx. 1,300g	Approx. 1,600g



Model 40FLP500A

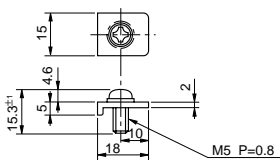
Terminal Connection Diagram



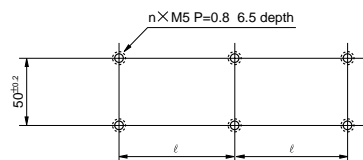
Standard Model Nos.

40FLP200A	Stroke	200mm
40FLP300A	Stroke	300mm
40FLP400A	Stroke	400mm
40FLP500A	Stroke	500mm
40FLP750A	Stroke	750mm
40FLP1000A	Stroke	1,000mm

Fixing Nail



Panel Arrangements

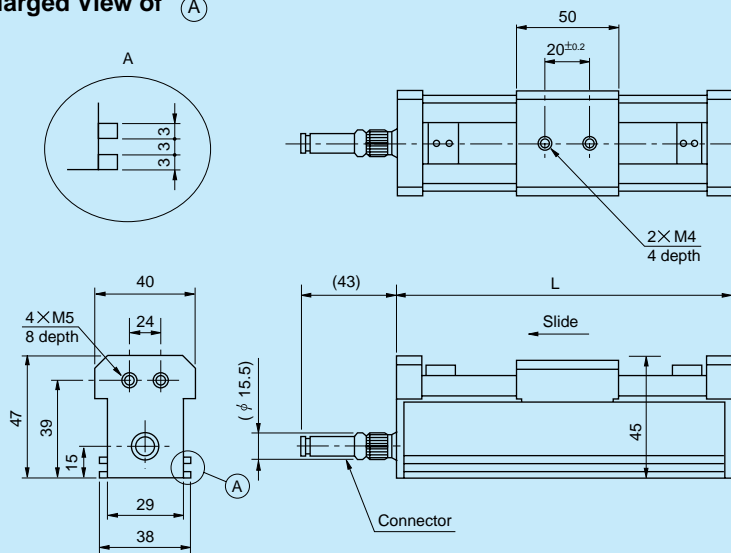


General Specifications

Model No.		40FLP200A	40FLP300A	40FLP400A	40FLP500A	40FLP750A	40FLP1000A
Standard Resistance Range		2k ~ 10kΩ	5k ~ 20kΩ	5k ~ 100kΩ	5k ~ 200kΩ		
Total Resistance Tolerance	Standard Class	±20% (M)					
	Precision Class	±10% (K)					
Independent Linearity Tolerance	Standard Class	±0.5%					
	Precision Class	±0.1%					
	Super-precision Class	±0.05%			—		—
Resolution		Essentially infinite					
Output Smoothness		Below 0.1% against input voltage					
Contact Resistance Variation		Below 2% C.R.V.					
Power Rating		1.5W	2.0W	2.5W	5.0W	7.5W	10.0W
Electrical Stroke		200±1mm	300±1mm	400±1mm	500±1mm	750±1mm	1000±1mm
Mechanical Stroke (MS) (Approx.)		205mm	305mm	405mm	505mm	755mm	1005mm
Insulation Resistance		Over 1,000MΩ at 500V.D.C.					
Dielectric Strength		1 minute at 900V.A.C.					
Max. Working Voltage		500V					
Friction		Below 2N (200gf)					
Stopper Strength		Approx. 20N (2kgf)					
Resistance Temperature Coefficient		±400p.p.m./°C					
Residual Resistance		1 ~ 10% against total resistance					
Mass		Approx. 1.2kg	Approx. 1.4kg	Approx. 1.6kg	Approx. 1.8kg	Approx. 2.3kg	Approx. 2.8kg

Standard Dimensions

Enlarged View of A



Specifications of Connector

Water-proof type  
 Number of poles: 6 poles  
 Electrical wire diameter to be connected: Ø6.3mm max.

Model No.	L
40FLP200A	360
40FLP300A	460
40FLP400A	560
40FLP500A	660
40FLP750A	910
40FLP1000A	1,160

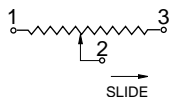
Stroke mm	200	300	400	500	750	1,000
∅ mm	260	340	400	260	300	420
Number of attached fixing nails	4	4	4	6	6	6

Note: For models 40FLP200A, 40FLP300A & 40FLP400A, 4 pcs Fixing Nails with M5×12 screw and spring washers for M5 are attached. For models 40FLP500A, 40FLP750A & 40FLP1000A, 6 pcs Fixing Nails with M5×12 screw and spring washers for M5 are attached.

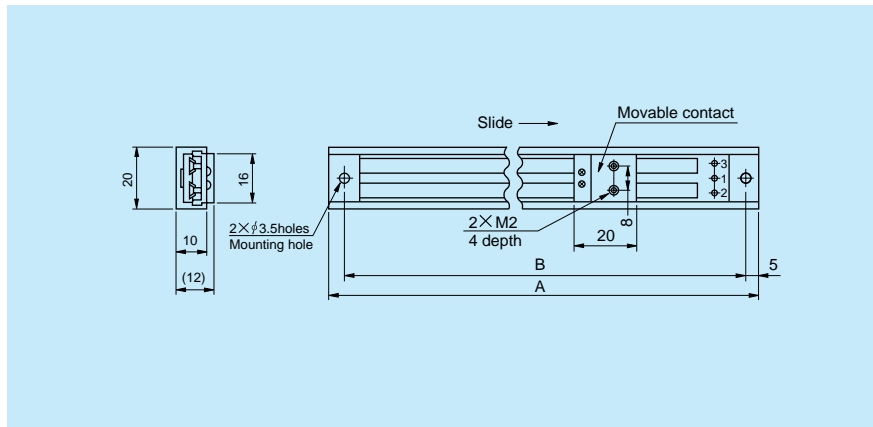


Model CFL200

Terminal Connection Diagram



Standard Dimensions



Standard Model Nos.

<b>CFL200</b>	Stroke	Approx.	203mm
<b>CFL300</b>	Stroke	Approx.	303mm
<b>CFL400</b>	Stroke	Approx.	403mm
<b>CFL500</b>	Stroke	Approx.	505mm
<b>CFL1000</b>	Stroke	Approx.	1,005mm

General Specifications

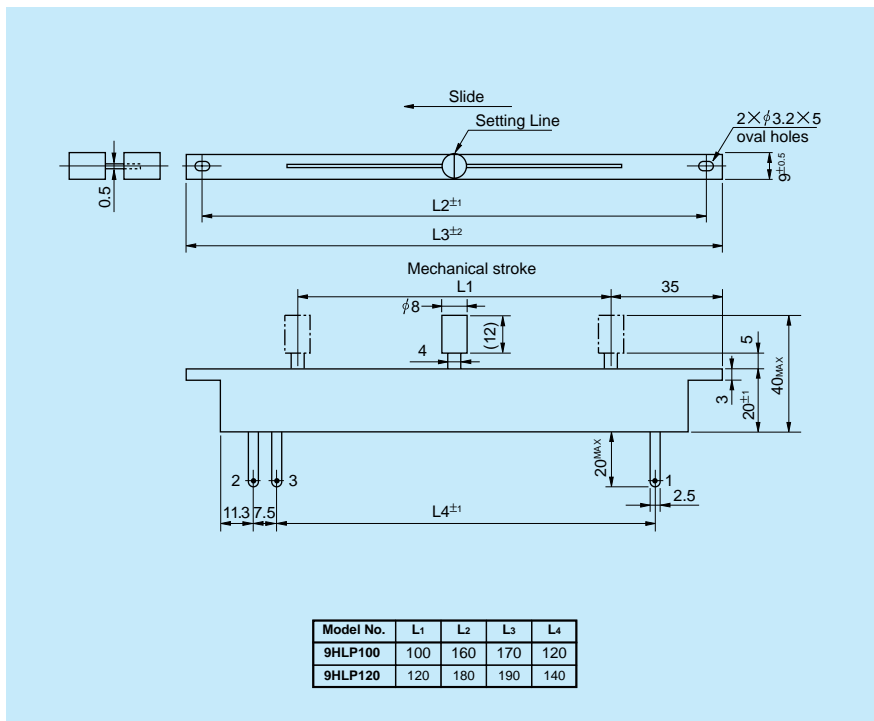
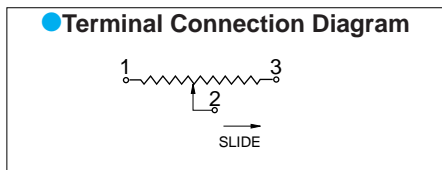
Model No.		CFL200	CFL300	CFL400	CFL500	CFL1000
Dimension	A±1	250mm	350mm	450mm	550mm	1,050mm
	B±0.5	240mm	340mm	440mm	540mm	1,040mm
Standard Resistance Values		2k, 5k, 10k (Ω)	5k, 10k, 20k (Ω)	5k, 10k, 20k 50k, 100k (Ω)	5k, 10k, 20k 50k, 100k 200k (Ω)	10k, 20k, 50k 100k, 200k 500k (Ω)
Total Resistance Tolerance	Standard Class	±20% (M)				
	Precision Class	±10% (K)				
Independent Linearity Tolerance	Standard Class	±0.5%				
	Precision Class	±0.1%				
	Super-Precision Class	±0.05%				
Output Smoothness		Below 0.1% against input voltage				
Contact Resistance Variation		Below 2% C.R.V.				
Power Rating		2.0W	2.5W	3.0W	4.0W	6.0W
Electrical Stroke		200±1mm	300±1mm	400±1mm	500±1mm	1000±1mm
Mechanical Stroke (See below note)		Approx. 203mm	Approx. 303mm	Approx. 403mm	Approx. 505mm	Approx. 1005mm
Insulation Resistance		Over 1,000MΩ at 500V.D.C.				
Dielectric Strength		1 minute at 500V.A.C.				
Max. Working Voltage		500V				
Resistance Temperature Coefficient		±400p.p.m./°C				
Life Expectancy		10,000,000 slider reciprocating motions				
Operating Temperature Range		-30°C ~ +105°C				
Mass (Approx.)		70g	100g	130g	160g	300g

Note: The values of mechanical stroke are approximate ones, because of no mechanical stopper being mounted at both ends. Whenever a movable contact operates at both ends, please be careful to operate it without leaving the track.

Special Specifications Available

Mechanical stops at both ends.

## Standard Dimensions



## Standard Model Nos.

- 9HLP100** Stroke 100mm
- 9HLP120** Stroke 120mm

## General Specifications

### Standard Resistance

**Values:** 1k, 2k, 5k, 10k ( $\Omega$ )

### Total Resistance

**Tolerance:** Standard Class  $\pm 10\%$  (K)  
Precision Class  $\pm 5\%$  (J)

### Independent Linearity

**Tolerance:** Standard Class  $\pm 0.5\%$   
Precision Class  $\pm 0.3\%$

### Resolution:

Essentially infinite

### Output Smoothness:

Below 0.1% against input voltage

### Contact Resistance

**Variation:** Below 5% C.R.V.

### Power Rating:

1.0W

### Electrical Travel:

100 $\pm$ 0.5mm (9HLP100)  
120 $\pm$ 0.5mm (9HLP120)

### Mechanical Stroke:

100 $^{+3}_0$  mm (9HLP100)

120 $^{+3}_0$  mm (9HLP120)

### Insulation Resistance:

Over 1,000M $\Omega$  at 1,000V.D.C.

### Dielectric Strength:

1 minute at 1,000V.A.C.

### Friction:

Below 4N (400gf)

### Stopper Strength:

Approx. 90N (9kgf)

### Resistance Temperature Coefficient:

$\pm 100$ p.p.m./ $^{\circ}$ C

### Operating Temperature Range:

-30 $^{\circ}$ C ~ +105 $^{\circ}$ C

### Life Expectancy, slider reciprocating motions:

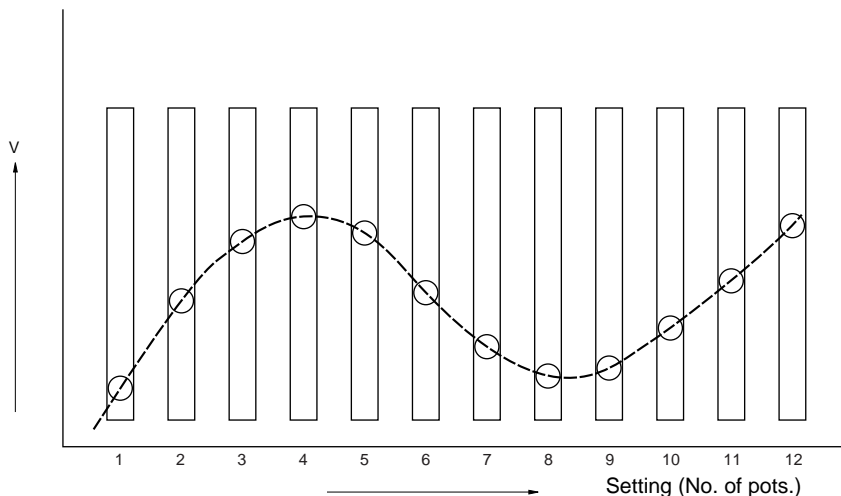
1,000,000 (no load)

### Mass:

Approx. 40g

## How to Use Model 9HLP

By using many 9HLPs, setpoint can plot desired functional output. The right-hand illustration shows the example of using 12 units on 9HLP.





# SPECIALLY ORDERED ITEMS

The following items discontinue to manufacture as our standard items and however, we can manufacture them as specially ordered items.

### Model 20LP50 (Wirewound) (Linear-motion pot.)



Standard Resistance Range : 50Ω ~ 10kΩ  
 Total Resistance Tolerance : ±5% (J)  
 Independent Linearity Tolerance : ±0.7%  
 Power Rating : 0.75W  
 Noise : Below 100Ω E.N.R.  
 Electrical Stroke : 50 ±0.5mm  
 Mechanical Stroke : 50 <sup>+2</sup>/<sub>0</sub> mm  
 Mass : Approx. 80g

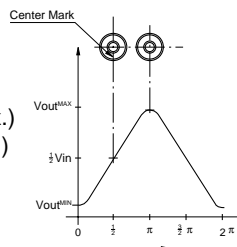
### Model 20FLP100A (Conductive Plastic) (Linear-motion pot.)



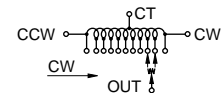
Standard Resistance Range : 1kΩ ~ 20kΩ  
 Total Resistance Tolerance : ±10% (K)  
 Independent Linearity Tolerance : ±0.5%  
 Power Rating : 1.25W  
 Output Smoothness : Below 0.1% against input voltage  
 Electrical Stroke : 100 ±0.5mm  
 Mechanical Stroke : 100 <sup>+2</sup>/<sub>0</sub> mm  
 Mass : Approx. 120g

### Model MP1201 (Contactless Magneto Resistor Type)

Resistance Value Between Input Terminals (at 25°C) : 6kΩ±4kΩ  
 Independent Linearity Tolerance (θ±45°) : ±1.5%  
 Input Voltage (Typical Value) : 6V.D.C.  
 Output Voltage (Typical Value) : 4.5V±0.5V (Max.)  
 1.5V±0.5V (Min.)  
 Effective Electrical Angle (θ) : ±45°  
 Mass : Approx. 10g



### A. C. POTENTIOMETER

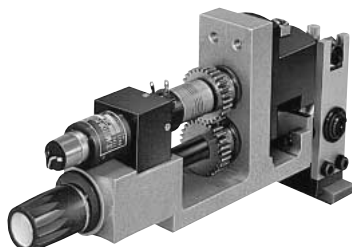


Model 23AC10-75 Input Impedance : Approx. 35kΩ  
 Absolute linearity Tolerance: ±0.05%  
 Model 27AC10-20 Input Impedance : Approx. 30kΩ  
 Absolute linearity Tolerance: ±0.05%  
 Model 27AC10-30 Input Impedance : Approx. 3kΩ  
 Absolute linearity Tolerance: ±0.05%  
 Model 44AC30-35 Input Impedance : Approx. 50kΩ  
 Absolute linearity Tolerance: ±0.01%  
 Model 44AC30-65 Input Impedance : Approx. 50kΩ  
 Absolute linearity Tolerance: ±0.01%

## SPECIALLY ORDERED UNIT MECHANISM

### ●Special Specifications Available

Special electro-mechanical unit mechanism consisting of our motor-potentiometer and mechanical parts to customer's requirements.



### Model S20LP4/8G



(Linear-motion Pot. with 2 ganged version and with ball tips at the end of the shaft.)