

<RoHS Compliance>

# CP-45H

## FEATURES

- Contactless rotary sensor, Combination of a magnet, Hall Effect Sensing Element and Custom IC
- Excellent absolute linearity
- Superb temperature characteristic
- Wide angle
- Long useful life

## Electrical Specifications

<b>Electrical Angle</b>	360°
<b>Output Range</b>	5~95%Vin
<b>Absolute Linearity</b>	±0.4%FS(Ind.Linearity:±0.2%FS)
<b>Input Voltage</b>	DC 5±0.5V
<b>Load Resistance</b>	1MΩMIN.
<b>Supply Current</b>	30mA MAX.
<b>Resolution</b>	0.1°MAX. (400rpm MAX.)
<b>Hysteresis</b>	±0.5° (±0.14%FS=360°)
<b>Temp. Characteristics</b> -40°C~100°C (Reference Temp. 25°C)	±0.3%FS (=±1.08°) FS=360°

## Mechanical Specifications

<b>Mechanical Angle</b>	360° Endless
<b>Torque</b>	1.8mN·m MAX.
<b>Weight</b>	Approx. 80g
<b>Shaft radial load</b>	6N MAX.
<b>Shaft thrust load</b>	2N MAX.

## Environmental Specifications

<b>Life Cycles</b>	50M Cycle MIN.
<b>Vibration</b>	200m/s <sup>2</sup> 5~500Hz(6min) 3axis 2hours
<b>Shock</b>	1,000m/s <sup>2</sup> 11ms 6axis 3times
<b>EMS(IEC 61000-4-2)</b>	10V/m. 80M~1GHz
<b>Operating Temp.</b>	-40~100°C
<b>Storage Temp.</b>	-40~100°C
<b>ESD(Case~Each Terminal)</b>	±8kV (IEC 61000-4-2)
<b>ESD(Each Terminal)</b>	±8kV (IEC 61000-4-2)
<b>IP Level</b>	IP40

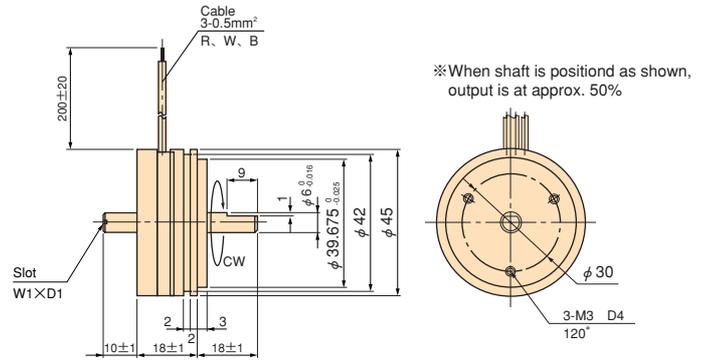
## OPTIONS

- Electrical angle: 300°, 200°
- Drip-proof : IP65

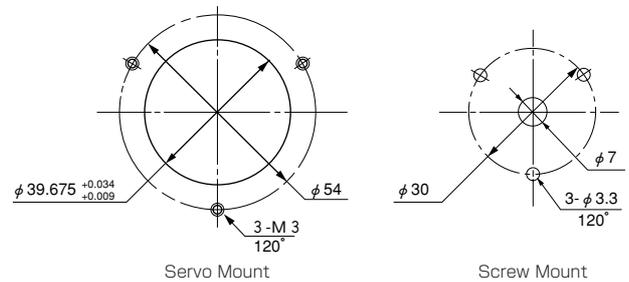
## HANDLING INSTRUCTION

- In applying input power, voltage Vin must rise to 4.5V within 0.2 seconds, otherwise, output shall be disabled(Vout=0V)
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

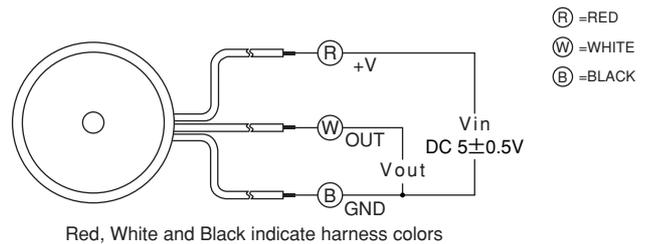
## DIMENSION (mm)



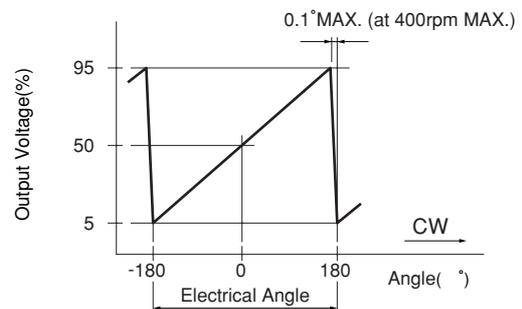
## MOUNTING



## SCHEMATIC



## OUTPUT CHARACTERISTICS



## MOUNTING HARDWARE

Cleats : 3pcs

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# CP-45H-10S

## FEATURES

- Contactless multiturn sensor with Gear Head Assy combination of CP-45H and an anti-backlash herical gear
- Excellent absolute linearity
- Repeatability:  $\pm 0.2\%$  max. (Incl. backlash)
- Superb temperature characteristic

## Electrical Specifications

Electrical Angle	3500°
Output Range	5~95%Vin
Absolute Linearity	$\pm 0.4\%$ FS (Ind.Linearity: $\pm 0.2\%$ FS)
Input Voltage	DC 5 $\pm 0.5$ V
Load Resistance	1M $\Omega$ MIN.
Supply Current	30mA MAX.
Resolution	1° MAX. (4000rpm MAX.)
Temp. Characteristics -40°C~100°C (Reference Temp. 25°C)	$\pm 0.3\%$ FS (FS=3500°)

## Mechanical Specifications

Mechanical Angle	3600° Endless
Gear Ratio	10 : 1
Torque	4mN·m MAX.
Repeatability	$\pm 7^\circ$ ( $\pm 0.2\%$ FS=3500°) Including Backlash
Weight	Approx. 260g
Shaft radial load	16N MAX.
Shaft thrust load	5N MAX.

## Environmental Specifications

EMS(IEC 61000-4-2)	10V/m, 80M~1GHz
Operating Temp.	-40~100°C
Storage Temp.	-40~100°C
ESD(Case~Each Terminal)	$\pm 8$ kV (IEC 61000-4-2)
ESD(Each Terminal)	$\pm 8$ kV (IEC 61000-4-2)
IP Level	IP40

## OPTIONS

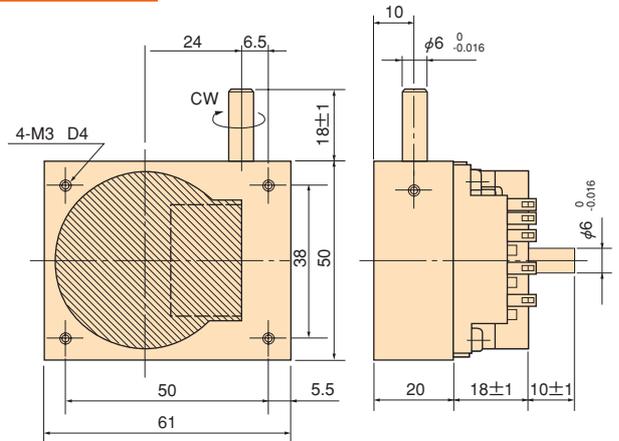
- Gear ratio

100 : 1	CP-45H-100S
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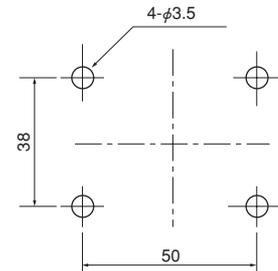
## HANDLING INSTRUCTION

- In applying input power, voltage Vin must rise to 4.5V within 0.2 seconds, otherwise, output shall be disabled(Vout=0V)
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

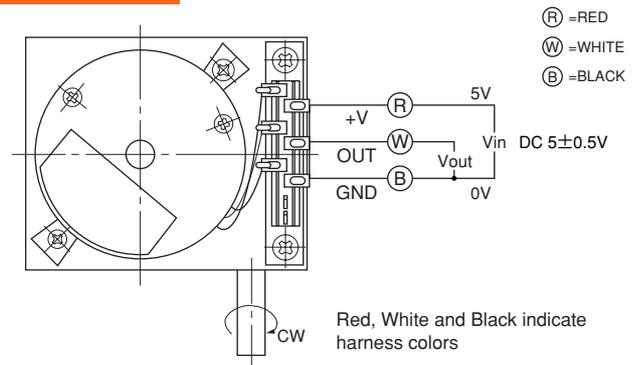
## DIMENSION (mm)



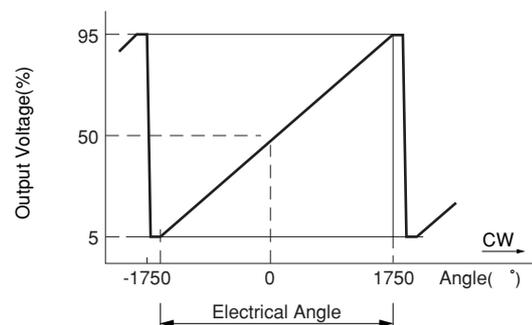
## MOUNTING



## SCHEMATIC



## OUTPUT CHARACTERISTICS



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# CP-3HK-100

## FEATURES

- Contactless rotary sensor, combination of a magnet, Hall Effect Sensing Element and custom IC
- Wide angle range: Electrical angle range 360° max.
- Excellent absolute linearity
- Long useful life
- Superb temperature characteristic

## Electrical Specifications

<b>Electrical Angle</b>	360°
<b>Output Range</b>	5~95%Vin
<b>Absolute Linearity</b>	±0.4%FS(Ind.Linearity:±0.2%FS)
<b>Input Voltage</b>	DC 5±0.5V
<b>Load Resistance</b>	1MΩ MIN.
<b>Supply Current</b>	30mA MAX.
<b>Resolution</b>	0.1° MAX. (400rpm MAX.)
<b>Hysteresis</b>	±0.5° (±0.14%FS=360°)
<b>Temp. Characteristics</b> -40°C~100°C (Reference Temp. 25°C)	±0.3%FS (±1.08°) FS=360°

## Mechanical Specifications

<b>Mechanical Angle</b>	360° Endless
<b>Torque</b>	2mN·m MAX.
<b>Weight</b>	Approx. 80g
<b>Shaft radial load</b>	14N MAX.
<b>Shaft thrust load</b>	4N MAX.

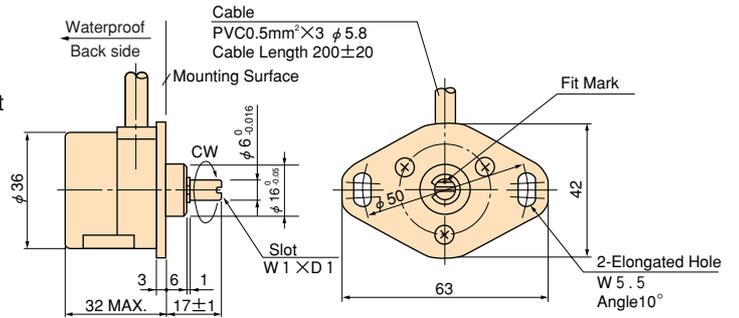
## Environmental Specifications

<b>Life Cycles</b>	50M Cycle MIN.
<b>Vibration</b>	100m/s <sup>2</sup> 5~500Hz(6min) 3axis 2hours
<b>Shock</b>	1,000m/s <sup>2</sup> 11ms 6axis 3times
<b>Operating Temp.</b>	-40~100°C
<b>Storage Temp.</b>	-40~100°C
<b>ESD(Case~Each Terminal)</b>	±8kV (IEC 61000-4-2)
<b>ESD(Each Terminal)</b>	±8kV (IEC 61000-4-2)
<b>IP Level</b>	IP54 Excluding Seal Between Shaft and Bushing

**HANDLING INSTRUCTION**

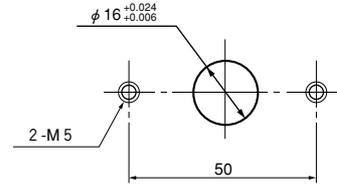
- In applying input power, voltage Vin must rise to 4.5V within 0.2 seconds, otherwise, output shall be disabled(Vout=0V)
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

## DIMENSION (mm)

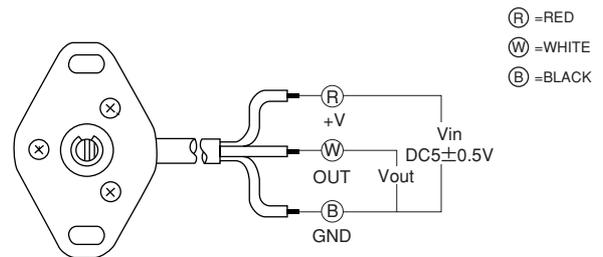


※When shaft is positioned as shown, output is at approx. 50%

## MOUNTING

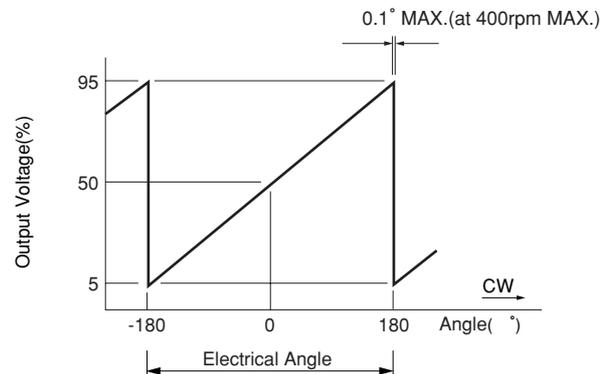


## SCHEMATIC



Red, White and Black indicate harness colors

## OUTPUT CHARACTERISTICS





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# CP-30H

## FEATURES

- Suitable for application such as Dancer and Tension Controllers
- High resistance to radial and thrust shaft load
- Very low torque
- Very long useful life

## Electrical Specifications

Electrical Angle	±50°
Output Range	10~90%Vin
Absolute Linearity (Independent Linearity)	±6%FS (FS=100°) (±3%FS)
Input Voltage	DC 5±0.5V
Load Resistance	10kΩ MIN.
Supply Current	10mA MAX.
Insulation Resistance	DC50V 100MΩ MIN.
Temp. Characteristics -20°C~80°C (Reference Temp. 25°C)	0° : ±1.6° ±50° : ±3.2°

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	0.3mN·m MAX.
Weight	Approx. 50g
Shaft radial load	10N
Shaft thrust load	5N

## Environmental Specifications

Life Cycles	±50°, 5Hz 10M Cycle MIN.
Vibration	100m/s <sup>2</sup> 50~2,000Hz/5min 3axis 2hours
Shock	500m/s <sup>2</sup> , 11ms 3axis 3times
EMS	50V/m, 80k~1MHz
Operating Temp.	-20~80°C
Storage Temp.	-40~80°C
ESD(Case~Each Terminal)	±3.5kV
ESD(Each Terminal)	±7.5kV
IP Level	IP50

## OPTIONS

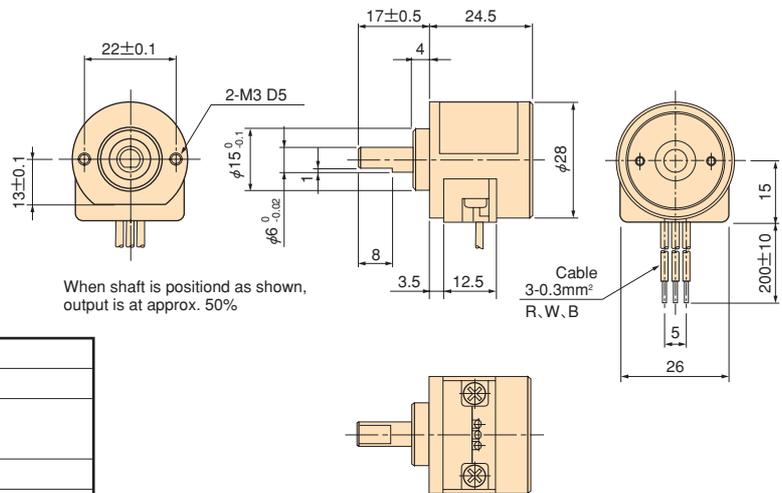
- Electrical angle: ±30°



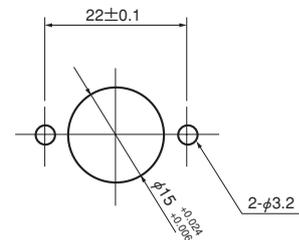
### HANDLING INSTRUCTION

- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

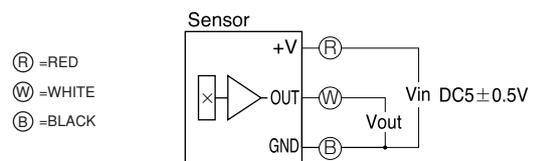
## DIMENSION (mm)



## MOUNTING

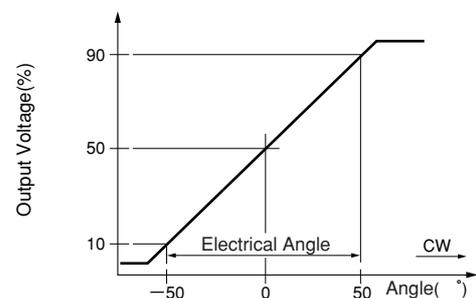


## SCHEMATIC



Red, White and Black indicate harness colors

## OUTPUT CHARACTERISTICS



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# QP-2H QP-2HC

## FEATURES

- Compact, light weight, low cost & ultra low torque
- Both side ball bearings
- High resolution due to wider output range
- Superb temperature characteristics

## Electrical Specifications

Electrical Angle	$\pm 45^\circ$ (90°)
Output Range	10~90%Vin
Independent Linearity	$\pm 1.5\%$ FS (FS=90°)
Input Voltage	DC5 $\pm$ 0.5V
Load Resistance	10k $\Omega$ MIN.
Supply Current	10mA MAX.
Insulation Resistance	DC50V 100M $\Omega$ MIN.
Temp. Characteristics	Center Position $\pm 1.5^\circ$ $\pm 45^\circ$ Position $\pm 2.5^\circ$ } -30~100°C

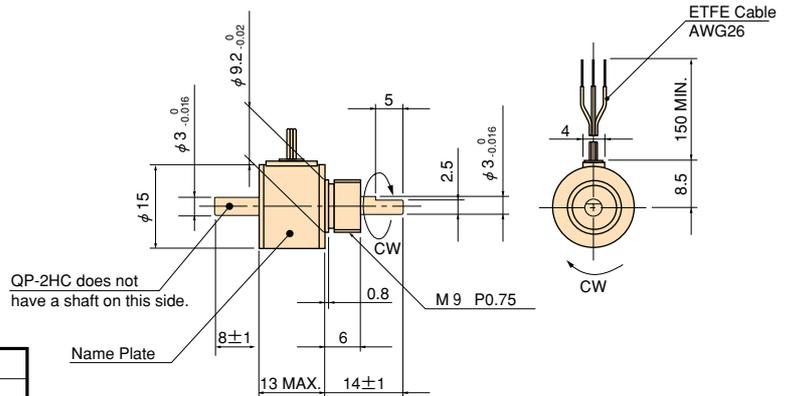
## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	0.05m N · m MAX.
Weight	Approx. 10g
Shaft radial load	3N MAX.
Shaft thrust load	1N MAX.

## Environmental Specifications

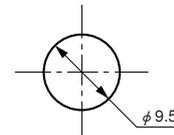
Operating Temp.	-30~100°C
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## DIMENSION (mm)

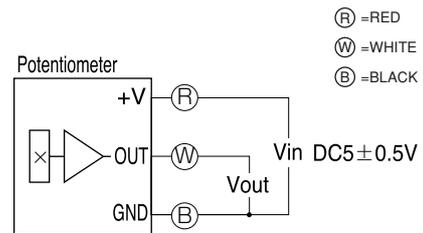


• When shaft is positioned as shown, output is at approx. 50%

## MOUNTING

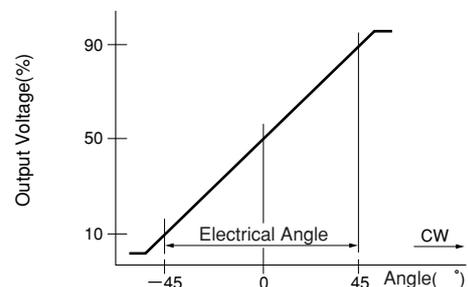


## SCHEMATIC



Red, White and Black indicate harness colors

## OUTPUT CHARACTERISTICS



## HANDLING INSTRUCTION

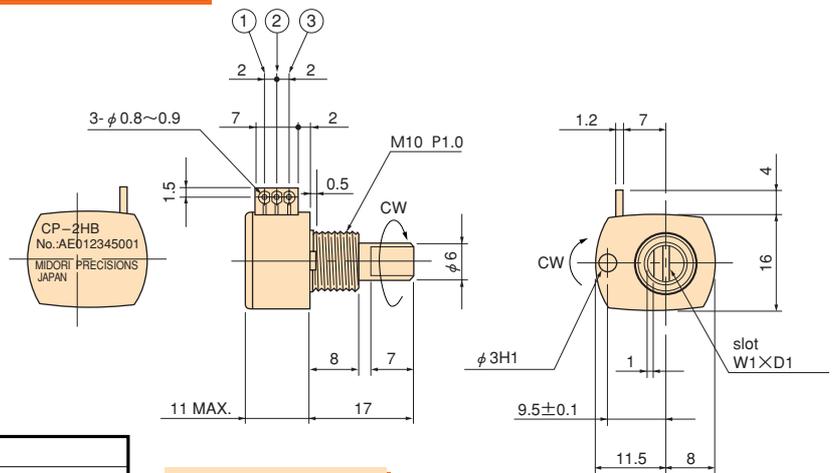
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

## MOUNTING HARDWARE

M9 Nut, Lock Washer

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**CP-2HB**

**■ DIMENSION** (mm)



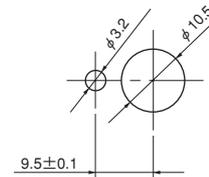
**■ FEATURES**

- Compact & light weight
- Low cost

**■ Electrical Specifications**

Electrical Angle	±45° (90°)
Output Range	10~90%Vin
Independent Linearity	±3%FS (FS=90°)
Input Voltage	DC5±0.5V
Load Resistance	10kΩ MIN.
Supply Current	10mA MAX.
Insulation Resistance	DC50V 100MΩ MIN.
Temp. Characteristics	±3° / -20~100°C

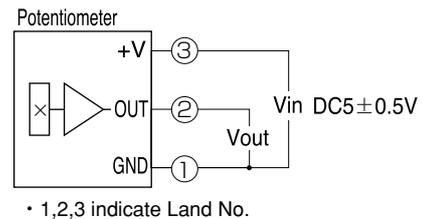
**■ MOUNTING**



**■ Mechanical Specifications**

Mechanical Angle	360° Endless
Torque	5m N · m MAX.
Weight	Approx. 10g

**■ SCHEMATIC**

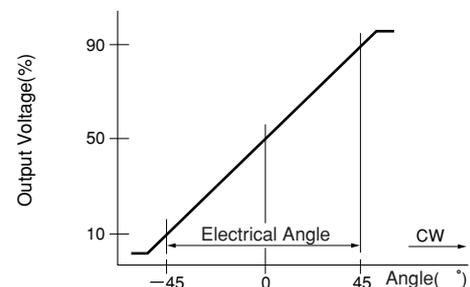


**■ Enviromental Specifications**

Operating Temp.	-20~100°C
Life Cycles	10M Cycle MIN.
Vibration	98m/s <sup>2</sup> 3axis 2hours
EMS	100V <sub>m</sub> 10k~1GHz
ESD(Case~Each Terminal)	±2.5kV
ESD(Each Terminal)	±4kV

Mating connector : MOLEX  
Wafer assembly: 53253-0370  
Housing: 51065-0300

**■ OUTPUT CHARACTERISTICS**



**HANDLING INSTRUCTION**

- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.

**■ MOUNTING HARDWARE**

M10 nut, Lock Washer

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# PMP-S10HT

## FEATURES

- Contactless inclination sensor for  $\pm 10^\circ$  angle, using Hall effect IC.
- Compact and low cost.
- Long useful life

## Electrical Specifications

<b>Electrical Tilt Angle</b>	$\pm 10^\circ$
<b>Tilt Sensitivity</b>	0.02° MAX.
<b>Output Range</b>	10~90%Vin
<b>Index Point</b>	50 $\pm$ 1%Vin
<b>*Zero-Based Lin.</b>	$\pm 1\%$ FS*
<b>Input Voltage</b>	DC5 $\pm$ 0.5V
<b>Load Resistance</b>	10k $\Omega$ MIN.
<b>Supply Current</b>	10mA MAX.
<b>Insulation Resistance</b>	DC50V 100M $\Omega$ MIN.
<b>Temp. Characteristics (-20°C~80°C)</b>	0° Position $\pm 1^\circ$
<b>Based Temp. 25°C</b>	$\pm 10^\circ$ Position $\pm 1.5^\circ$

 \*over  $\pm 20^\circ$  angle, linearity is 1.5° FS

## Mechanical Specifications

<b>Mechanical Angle</b>	$\pm 12^\circ$ MIN.
<b>Response Time</b>	Approx. 0.3 sec. (Damper Oil 200cst)
<b>Weight</b>	Approx. 35g

## Environmental Specifications

<b>Vibration</b>	70m/s <sup>2</sup> 3axis 2hours
<b>Shock</b>	1,000m/s <sup>2</sup> 6axis 3times
<b>EMS</b>	100V/m, 200M~1GHz
<b>Operating Temp.</b>	-20~80°C
<b>Storage Temp.</b>	-40~80°C
<b>ESD(Case~Each Terminal)</b>	$\pm 4$ kV
<b>ESD(Each Terminal)</b>	$\pm 4$ kV
<b>IP Level</b>	IP65 (without Terminals)

## OPTIONS

- Electrical tilt angle:  $\pm 5^\circ$ ,  $\pm 20^\circ$ ,  $\pm 30^\circ$

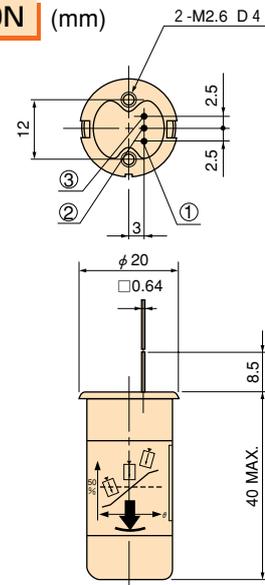
Temp. Characteristics of special Elect. angle

Elect. angle	PMP-S5HT	PMP-S20HT	PMP-S30HT
At 0°	1.0°	2.5°	2.5°
At $\pm X^\circ$	1.5°	2.5°	3.0°

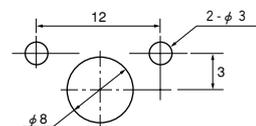
X° = max. tilt angle

Temp. Range : -20~80°C (Ref. Temp.25°C)

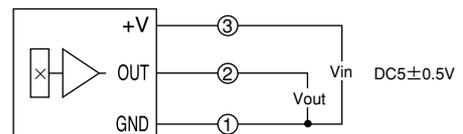
## DIMENSION (mm)



## MOUNTING

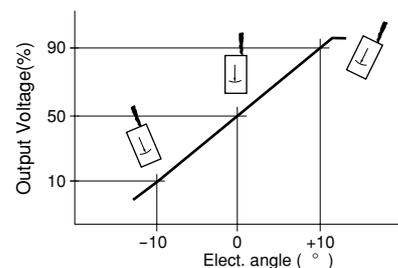


## SCHEMATIC



• 1,2,3 indicate Terminal No.

## OUTPUT CHARACTERISTICS



## HANDLING INSTRUCTION

- This product may be damaged by extreme shock such as dropping on the floor and storing sideways.
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.
- Silicom damper oil is filled in the housing.
- Response time is step response time at room temperature.

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# PMP-10HTZL

## FEATURES

- Contactless inclination sensor, set 2pieces of PMP-S10HT in an alminum die-casting housing
- X and Y axis inclination sensing capability
- Dripproof: IP65
- Long useful life

## Electrical Specifications

<b>Electrical Tilt Angle</b>	$\pm 10^\circ$
<b>Tilt Sensitivity</b>	0.02° MAX.
<b>Output Range</b>	10~90%Vin
<b>Index Point</b>	$50 \pm 2\%V_{in}$
<b>Zero-Based* Lin.</b>	$\pm 1\%FS^*$
<b>Input Voltage</b>	DC5 $\pm$ 0.5V
<b>Load Resistance</b>	10k $\Omega$ MIN.
<b>Supply Current</b>	20mA MAX.
<b>Insulation Resistance</b>	DC50V 100M $\Omega$ MIN.
<b>Temp. Characteristics (-20°C~80°C)</b>	0° Position $\pm 1^\circ$
<b>Based Temp. 25°C</b>	$\pm 10^\circ$ Position $\pm 1.5^\circ$

 \*over  $\pm 20^\circ$  angle, linearity is 1.5° FS

## Mechanical Specifications

<b>Mechanical Angle</b>	$\pm 12^\circ$ MIN.
<b>Response Time</b>	Approx. 0.5 sec. (Damper Oil 1,000cst)
<b>Weight</b>	Approx. 230g

## Enviromental Specifications

<b>Vibration</b>	70m/s <sup>2</sup> 3axis 2hours
<b>Shock</b>	1,000m/s <sup>2</sup> 6axis 3times
<b>EMS</b>	100V/m, 200M~1GHz
<b>Operating Temp.</b>	-20~80°C
<b>Storage Temp.</b>	-40~80°C
<b>ESD(Case~Each Terminal)</b>	$\pm 4kV$
<b>ESD(Each Terminal)</b>	$\pm 4kV$
<b>IP Level</b>	IP65

## OPTIONS

- Electrical Tilt Angle:  $\pm 5^\circ$ 、 $\pm 20^\circ$ 、 $\pm 30^\circ$
- Available with different electrical angel on X and Y axis
- Available with X-axis only

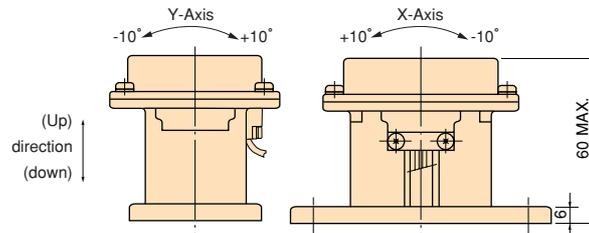
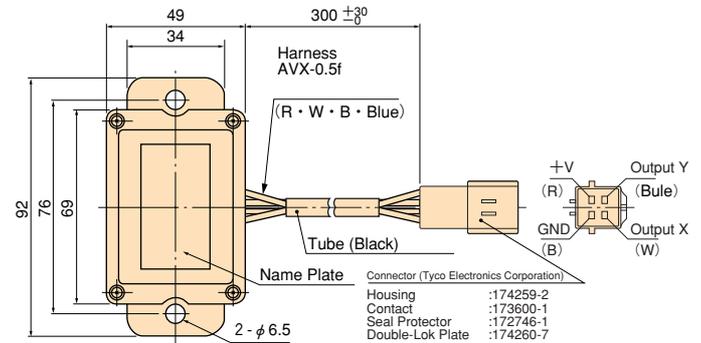
Temp. Characteristics of special Elect. angle

Elect. angle	PMP-S5HT	PMP-S20HT	PMP-S30HT
At 0°	1.0°	2.5°	2.5°
At $\pm X^\circ$	1.5°	2.5°	3.0°

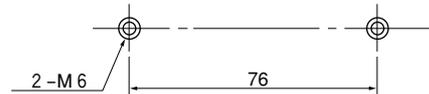
X° = max. tilt angle

Temp. Range : -20~80°C (Ref. Temp.25°C)

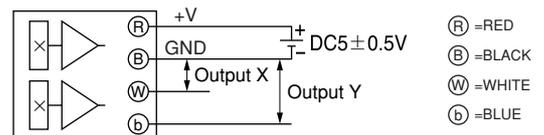
## DIMENSION (mm)



## MOUNTING

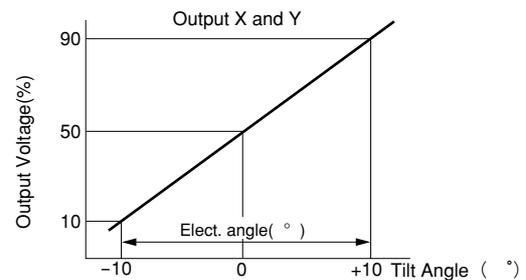


## SCHEMATIC



Red, White, Black and blue indicate harness colors

## OUTPUT CHARACTERISTICS



## HANDLING INSTRUCTION

- This product may be damaged by extreme shock such as dropping on the floor and storing sideways.
- This product may be influenced from external magnetic field of apparatus which generates a magnetic field.
- Use this sensor in the place where is protected from ESD.
- Silicom damper oil is filled in the housing.
- Response time is step response time at room temperature.

&lt;RoHS Compliance&gt;

# WR-7UH

## FEATURES

- Contactless inclination sensor, combination of a magnet, Hall Effect Sensing Element and Custom IC
- Suitable for boom angle control of construction vehicles
- Superb Temperature Characteristic
- Excellent Absolute Linearity
- Long useful life

## Electrical Specifications

Electrical Tilt Angle	120°
Output Range	5~95%Vin
Index Point	50±1%Vin
Absolute Linearity	±0.8%FS
Tilt Sensitivity	0.6° MAX. (Including Hysteresis)
Input Voltage	DC 4.75~5.5V
Load Resistance	1MΩ MIN.
Supply Current	30mA MAX.
Temp. Characteristics -30°C~80°C (Reference Temp. 25°C)	±0.4%FS (=±0.48°) FS=120°

## Mechanical Specifications

Mechanical Angle	360° Endless
Response Level	Approx. 0.5 sec. (Step Response)
Weight	Approx. 260g

## Environmental Specifications

Vibration	50m / s <sup>2</sup> 5~500Hz(6min) 3axis 2hours
Shock	500m / s <sup>2</sup> 11ms 6axis 3times
EMS	100V/m, 200MHz~1GHz
Operating Temp.	-30~80°C
Storage Temp.	-40~80°C
ESD(Case~Each Terminal)	±8kV (IEC 61000-4-2)
ESD(Each Terminal)	±8kV (IEC 61000-4-2)
IP Level	IP64

## OPTIONS

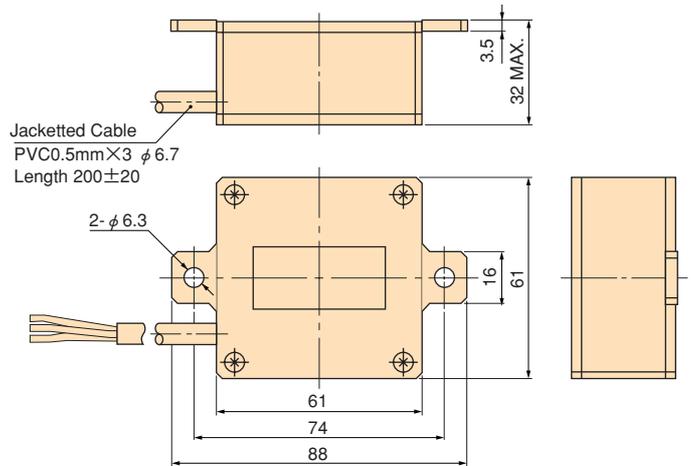
- Electrical Angle: 200°, 360°



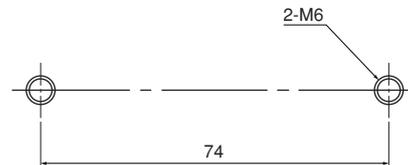
## HANDLING INSTRUCTION

- In applying input Power, voltage Vin must rise to 4.5V within 0.2 seconds, otherwise, output shall be disabled (Vout=0V)
- Use this sensor in the place where is protected from ESD.
- This product may have external magnetic influence of the apparatus which generates a magnetic field.

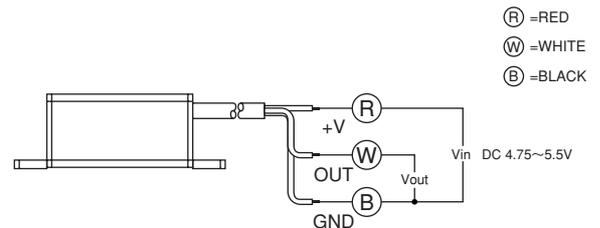
## DIMENSION (mm)



## MOUNTING

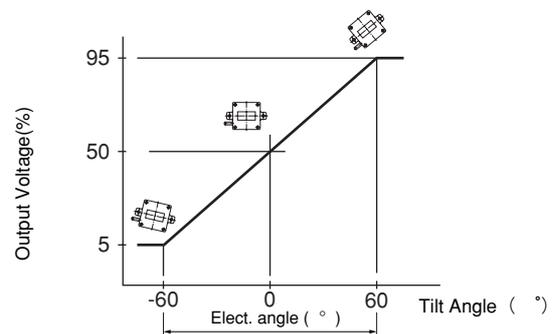


## SCHEMATIC



Red, White and Black indicate harness colors

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CP-2FK (b)

## FEATURES

- Compact & low cost
- Servo mount
- 2 Ball Bearings

## Electrical Specifications

Electrical Angle	340° $\begin{smallmatrix} +2^\circ \\ -3^\circ \end{smallmatrix}$
Total Resistance	0.5、1、2、5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1%
Power Rating	0.5W/50°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC1000V 1 Minute
TC of Resistance	±400ppm / °C

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	0.5mN·m MAX.
Weight	Approx. 20g
Radial Load	5N MAX.
Thrust Load	2N MAX.

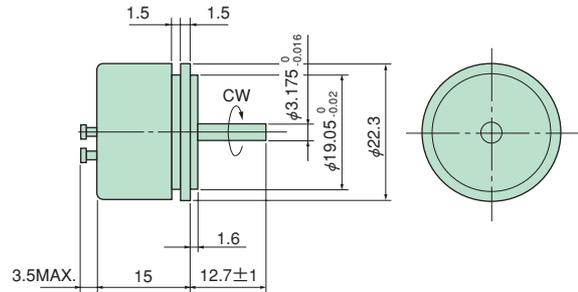
## Environmental Specifications

Operating Temperature	-40~100°C
Vibration	150m / s <sup>2</sup> 2000Hz 3 axis 2hours each
Shock	490m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	10M Cycle MIN.

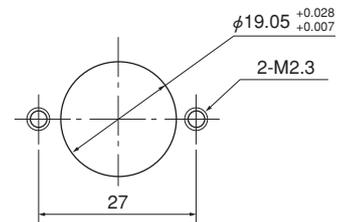
## OPTIONS

- Metal sleeve bearing "Model CP-2FK(m)"

## DIMENSION (mm)

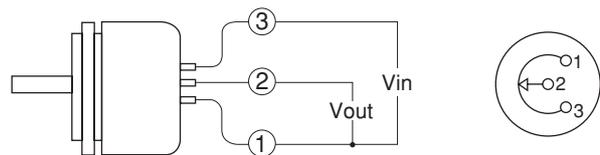


## MOUNTING



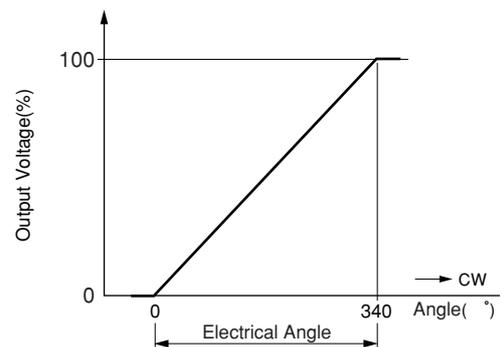
■ MOUNTING HARDWARE  
Cleats: 3pcs

## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CP-2FB (b)

## FEATURES

- Compact & low cost.
- Bushing mount
- 2 Ball Bearings

## Electrical Specifications

Electrical Angle	340° $\begin{smallmatrix} +2^\circ \\ -3^\circ \end{smallmatrix}$
Total Resistance	0.5、1、2、5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1%
Power Rating	0.5W/50°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC1000V 1 Minute
TC of Resistance	±400ppm / °C

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	0.5mN·m MAX.
Weight	Approx. 20g
Radial Load	5N MAX.
Thrust Load	2N MAX.

## Environmental Specifications

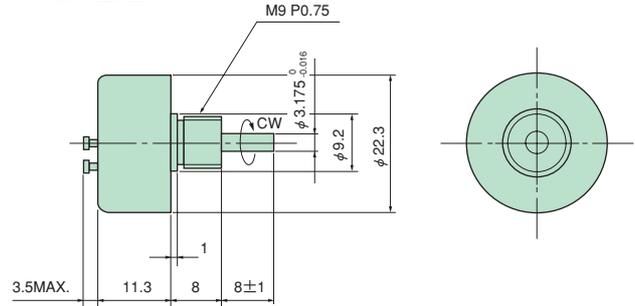
Operating Temperature	-40~100°C
Vibration	150m / s <sup>2</sup> 2000Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	10MCycle MIN.

## OPTIONS

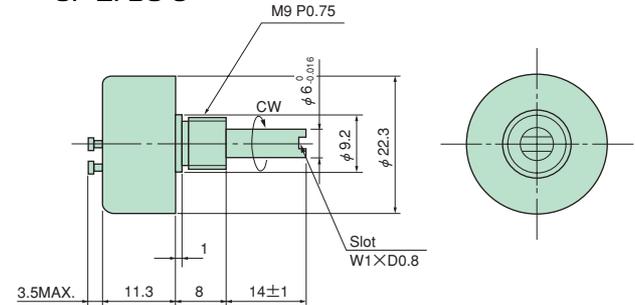
- Meatl Sleeve Bearing "Model CP-2FB(m)"
- φ6 shaft : CP-2FB-6 Teflon coating bearing
- φ6 shaft & O-ring : CP-2FBG-6 Teflon coating bearing

## DIMENSION (mm)

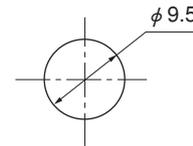
### • CP-2FB



### • CP-2FBG-6

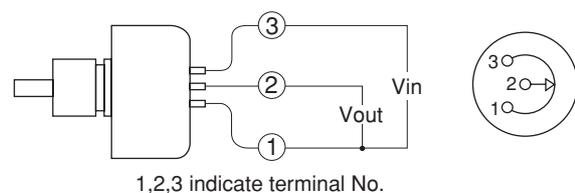


## MOUNTING

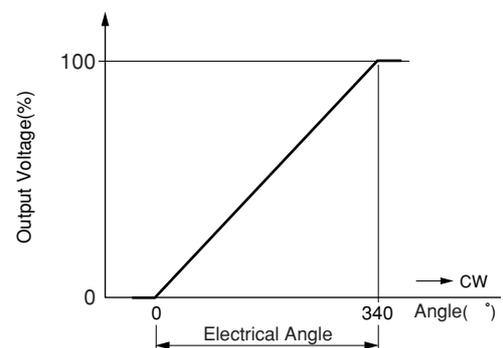


- MOUNTING HARDWARE  
1-M9 Nut, 1-Lock Washer

## SCHEMATIC



## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CP-2FCB (m)

## FEATURES

- Suitable for wide range of commercial and Industrial Applications
- Bushing mount
- Metal sleeve bearing
- Mating connector with lead wires(L=200mm)

## Electrical Specifications

Electrical Angle	340° $\begin{smallmatrix} +2^\circ \\ -3^\circ \end{smallmatrix}$
Total Resistance	5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1%
Power Rating	0.5W/50°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC1000V 1 Minute
TC of Resistance	±1000ppm / °C

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	2mN·mMAX.
Weight	Approx. 20g
Radial Load	5N MAX.
Thrust Load	2N MAX.

## Environmental Specifications

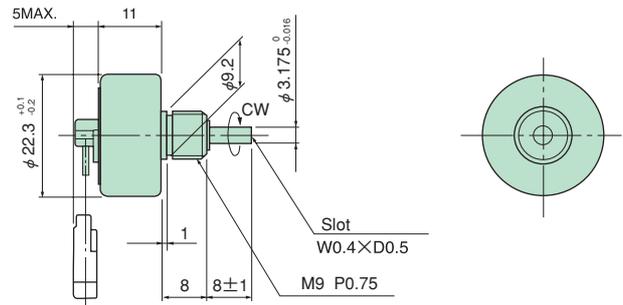
Operating Temperature	-40~100°C
Vibration	150m / s <sup>2</sup> 2000Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	10MCycle MIN.

## OPTIONS

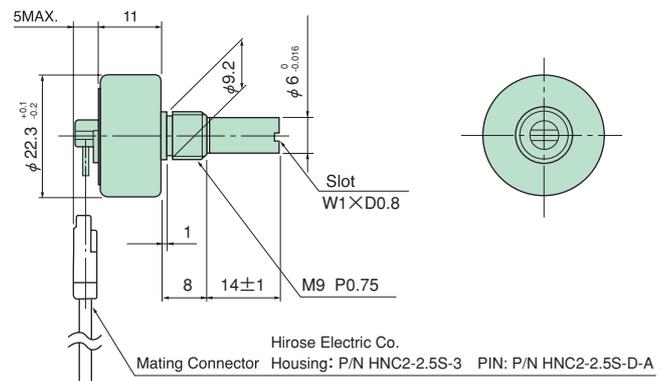
- φ6 shaft type : CP-2FC-6
- φ6 shaft & O-ring type : CP-2FCG-6

## DIMENSION (mm)

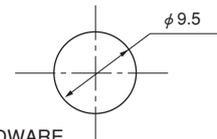
### CP-2FCB(m)



### CP-2FC-6

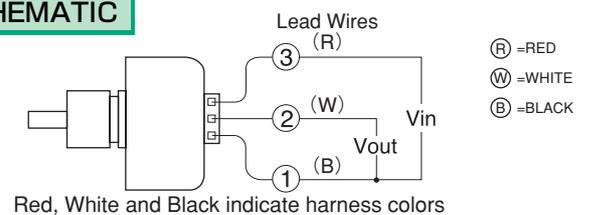


## MOUNTING

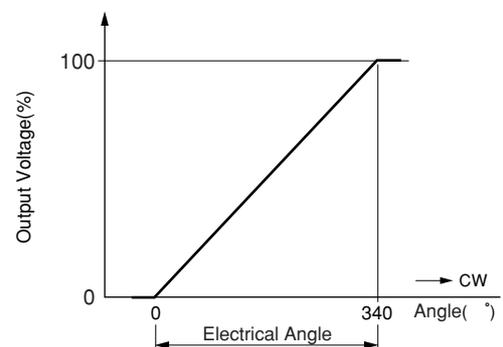


- MOUNTING HARDWARE**  
 1-M9 Nut, 1-Lock Washer

## SCHEMATIC



## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CPP-45 CPP-45B

## FEATURES

- Suitable for precision position sensing applications
- Shaft  $\phi$  4mm : CPP-45
- Shaft  $\phi$  6mm : CPP-45B
- Ball bearing

## Electrical Specifications

Electrical Angle	350° $^{+2}_{-3}$
Total Resistance	0.5、1、2、5、10、20k $\Omega$
Total Resistance Tolerance	$\pm 15\%$
Independent Linearity	$\pm 0.3\%$
Power Rating	3W/70°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100M $\Omega$ MIN. DC 1000V
Dielectric Strength	AC1000V 1 Minute
TC of Resistance	$\pm 400$ ppm / °C

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	1.8mN·mMAX. (+1.5mN·m/+one section)
Weight	Approx. 60g(+10g/+one section)
Radial Load(MAX.)	5N (CPP-45) ,6N (CPP-45B)
Thrust Load(MAX.)	1N (CPP-45) ,2N (CPP-45B)

## Environmental Specifications

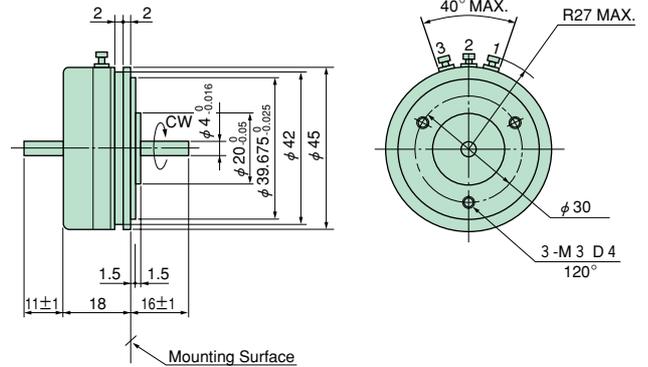
Operating Temperature	-40~120°C
Vibration	150m / s <sup>2</sup> 2000Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	10MCycle MIN.

## OPTIONS

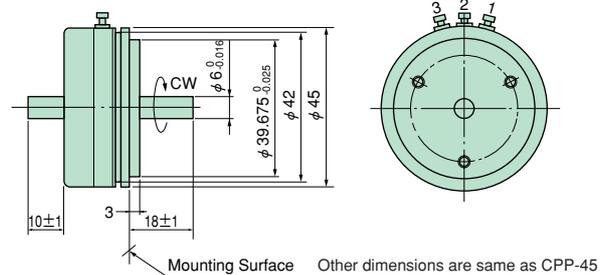
- Independent Linearity :  $\pm 0.1\%$
- Ganging : Up to 8 sections
- Additional Taps : Up to 8 taps  
For output : Type (A) ··· No shorted angle  
For input : Type (B) ··· 3° shorted on Tap
- Center Tap  
For output : Type C.T(A)  
For input : Type C.T(B)

## DIMENSION (mm)

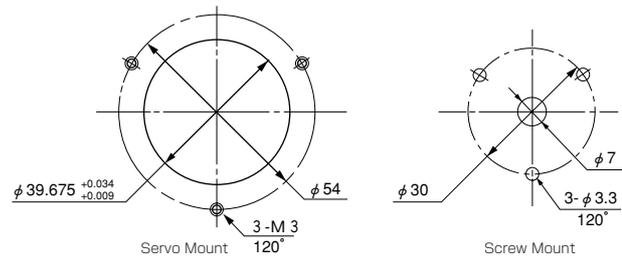
### • CPP-45



### • CPP-45B

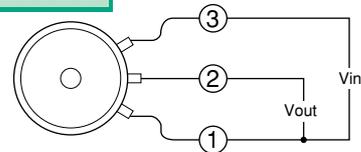


## MOUNTING



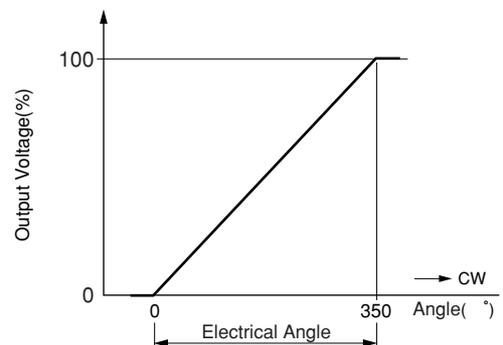
■ MOUNTING HARDWARE  
Cleats : 3pcs

## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CPP-45SB

## FEATURES

- Suitable for Applications in harsh environment (High Humidity, Dusty and Greasy)

## Electrical Specifications

Electrical Angle	350° $\begin{smallmatrix} +2^\circ \\ -3^\circ \end{smallmatrix}$
Total Resistance	0.5、1、2、5、10、20kΩ
Total Resistance Tolerance	±15%
Independent Linearity	±0.3%
Power Rating	3W/70°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC1000V 1 Minute
TC of Resistance	±400ppm / °C

## Mechanical Specifications

Mechanical Angle	360° Endless
Torque	15mN·mMAX.
Weight	Approx. 60g(+10g/+one section)
Radial Load	9N MAX.
Thrust Load	3N MAX.

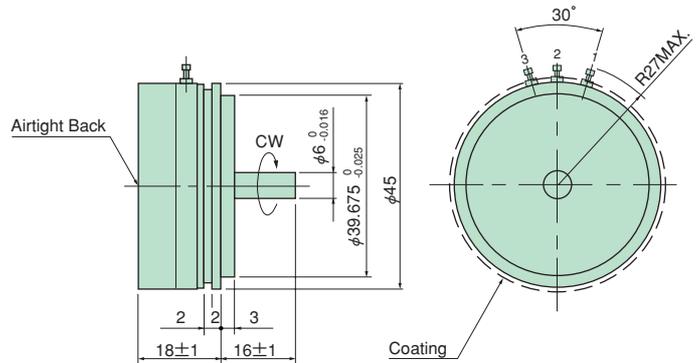
## Environmental Specifications

Operating Temperature	-30~90°C
Vibration	150m / s <sup>2</sup> 2000Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	10M Cycle MIN.
IP Level	IP 54

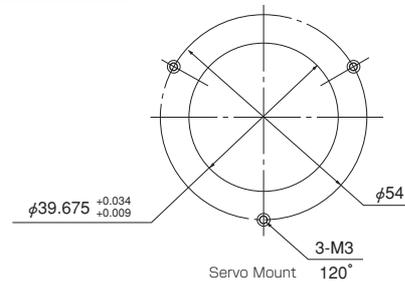
## OPTIONS

- Independent Linearity : ±0.1%
- Ganging : Up to 2 sections CH=23
- Center Tap
  - A-Type for output
  - B-Type for input
- Screw mount (3-M3 thread holes) : CPP-45SB-3

## DIMENSION (mm)

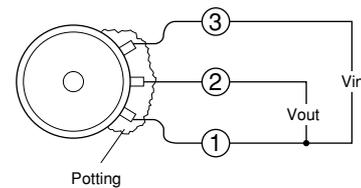


## MOUNTING



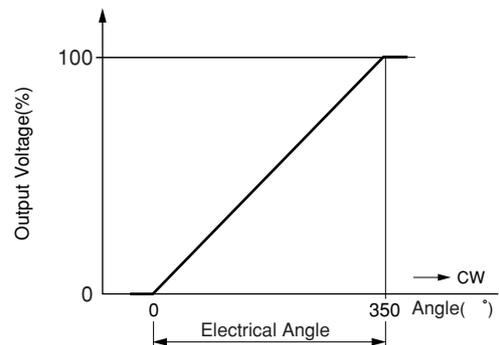
**MOUNTING HARDWARE**  
 Cleats : 3pcs

## SCHEMATIC



- We recommend potting treatment at the terminal outlet for water-proof after connected leadwires.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CP-2F-10S-RB

## FEATURES

- Multi-Turn Potentiometer
- Setting CP-element and Anti-Backlash gears in a compact package
- Ball bearing
- Reliable wide angle position sensing solution

## Electrical Specifications

Electrical Angle	3400° $\begin{smallmatrix} +20^\circ \\ -30^\circ \end{smallmatrix}$
Total Resistance	1、2、5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1.5% (Including Backlash)
Power Rating	0.5W/50°C
Output Smoothness	0.1% MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC 1000V 1 Minute
TC of Resistance	±400ppm/°C

## Mechanical Specifications

Gear Ratio	10 : 1
Torque	4mN·m MAX.
Repeatability	0.5% MAX. (Including Backlash)
Weight	Approx. 30g
Radial Load	5N MAX.
Thrust Load	3N MAX.

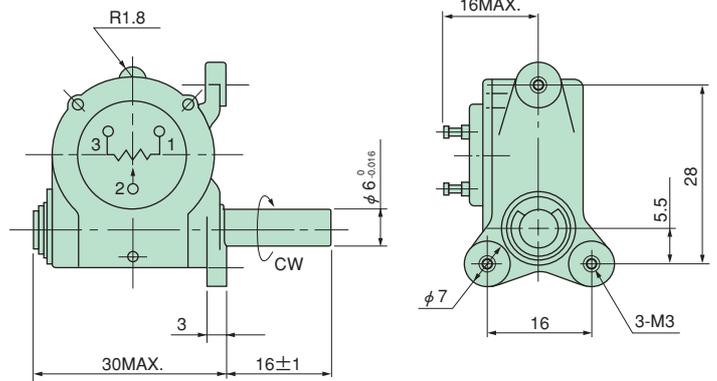
## Environmental Specifications

Operating Temperature	-40~100°C
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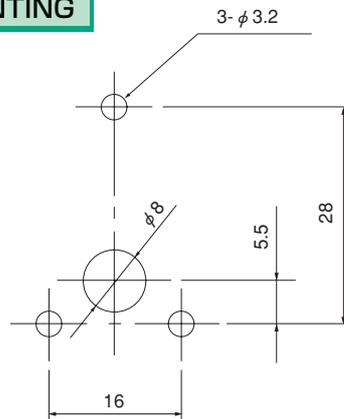
## OPTIONS

- Shaft D-cut type: CP-2F-10S-RB-1

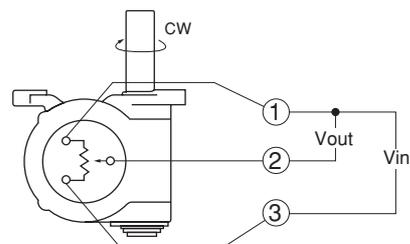
## DIMENSION (mm)



## MOUNTING

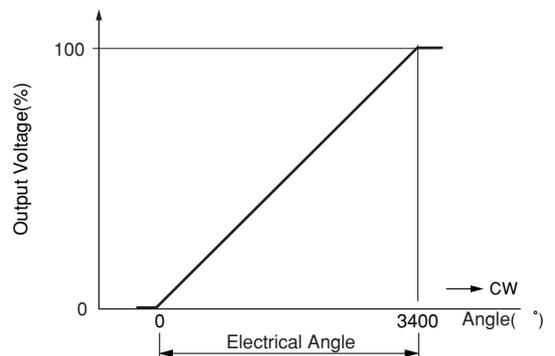


## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



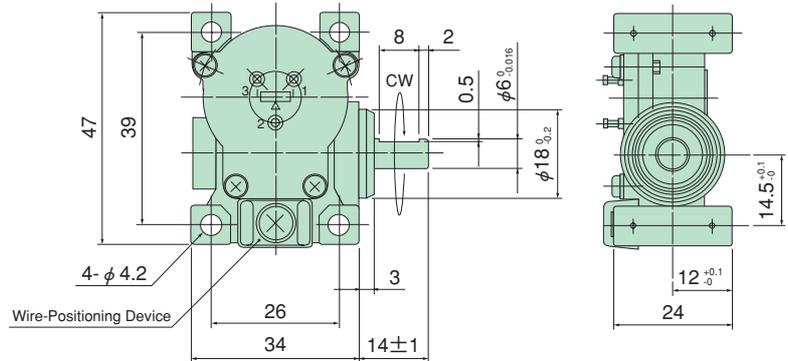
&lt;RoHS Compliance&gt;

# CP-2FWP-10S

## FEATURES

- Dustproof & Dripproof type (Except terminal area)
- Shaft D-cut
- Housing: aluminum die-casting

## DIMENSION (mm)



## Electrical Specifications

Electrical Angle	3400° $\begin{smallmatrix} +20^\circ \\ -30^\circ \end{smallmatrix}$
Total Resistance	1、2、5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1.5% (Including Backlash)
Power Rating	0.5W/50°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 1000V
Dielectric Strength	AC 1000V 1 Minute
TC of Resistance	±400ppm/°C

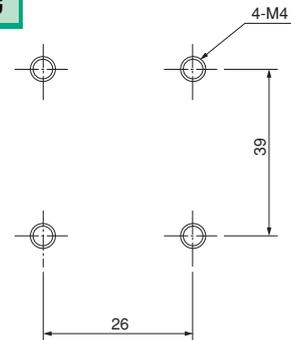
## Mechanical Specifications

Gear Ratio	10 : 1
Torque	25mN·mMAX.
Repeatability	0.5% MAX. (Including Backlash)
Weight	Approx. 55g
Radial Load	5N MAX.
Thrust Load	3N MAX.

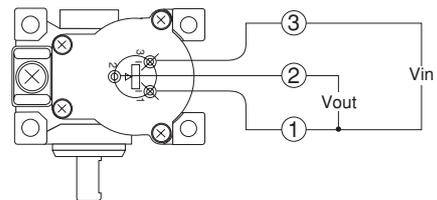
## Environmental Specifications

Operating Temperature	-40~80°C
IP Level	IP65

## MOUNTING



## SCHEMATIC

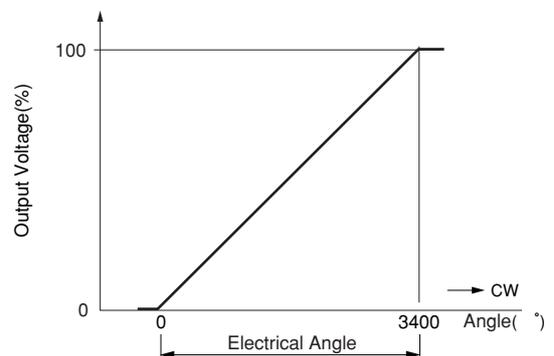


1,2,3 indicate terminal No.



• We recommend potting treatment at the terminal outlet for water-proof after connected leadwires.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# CPP-45-10SX

## FEATURES

- Multi turns
- Setting CPP-45 and Anti-Backlash gears in an aluminum die-casting housing

## Electrical Specifications

Electrical Angle	3500° $\pm_{-30}^{+20}$
Total Resistance	0.5、1、2、5、10、20k $\Omega$
Total Resistance Tolerance	$\pm 15\%$
Independent Linearity	$\pm 0.3\%$
Power Rating	3W/70°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100M $\Omega$ MIN. DC 1000V
Dielectric Strength	AC 1000V 1 Minute
TC of Resistance	$\pm 400$ ppm/°C

## Mechanical Specifications

Gear Ratio	10 : 1
Torque	4mN·m MAX.
Repeatability	0.03% MAX. (Including Backlash)
Weight	Approx. 220g
Radial Load	16N MAX.
Thrust Load	5N MAX.

## Environmental Specifications

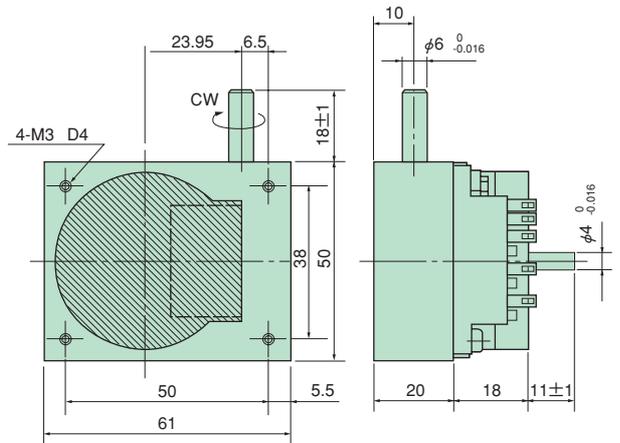
Operating Temperature	-40~125°C
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## OPTIONS

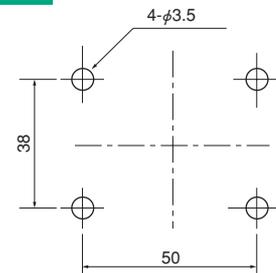
- Independent Linearity :  $\pm 0.1\%$
- Gear ratio

Gear ratio	Model No.
24 : 1	CPP-45-24SX
35 : 1	CPP-45-35SX
60 : 1	CPP-45-60SX
100 : 1	CPP-45-100SX

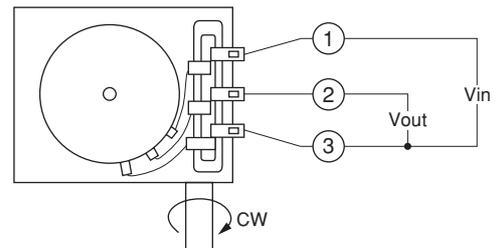
## DIMENSION (mm)



## MOUNTING

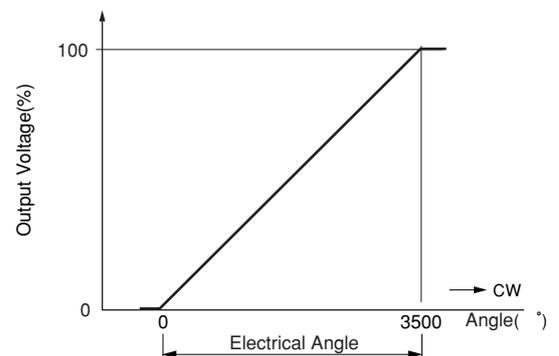


## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



<RoHS Compliance>

## CP-2FABSJ

### FEATURES

- Seald IP-65
- Suitable for automotive & off-road equipment applications.
- Low cost
- Easy to joint: Shaft top has both side cut and thread.
- Built-in Return Spring

### Electrical Specifications

<b>Electrical Angle</b>	90±3°
<b>Total Resistance</b>	1kΩ
<b>Total Resistance Tolerance</b>	±20%
<b>Independent Linearity</b>	±3%
<b>Max. Input Voltage</b>	DC18V MAX. @50°C
<b>Insulation Resistance</b>	100MΩ MIN. DC 1000V
<b>Dielectric Strength</b>	AC 1000V 1 Minute
<b>TC of Resistance</b>	±400ppm / °C

### Mechanical Specifications

<b>Mechanical Angle</b>	100±5°
<b>Torque</b>	20~100mN·m
<b>Stopper Strength</b>	1N·m MIN.
<b>Weight</b>	Approx. 35g
<b>Radial Load</b>	4N MAX.
<b>Thrust Load</b>	3N MAX.

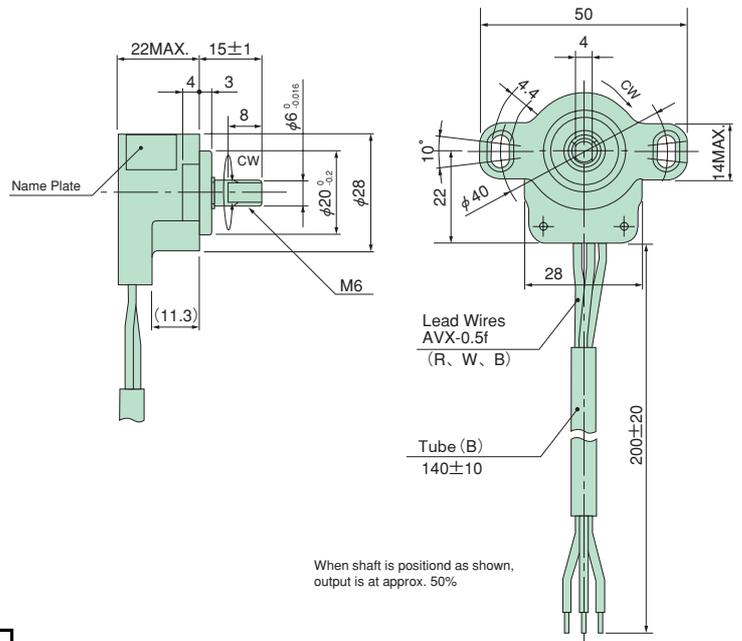
### Enviromental Specifications

<b>Operating Temperature</b>	-40~100°C
<b>Vibration</b>	245m/s² 20~500Hz 3 axis 2hours each
<b>Shock</b>	500m/s² 11ms 3 axis 6 axis 3times
<b>Life Cycle</b>	5M Cycles
<b>IP Level</b>	IP65

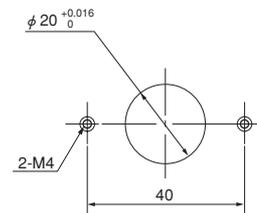
### OPTIONS

- Without Return spring
- Total resistance: 1k~5kΩ/90° on request
- Different electrical angle  
Single output – 340°  
Dual output – 90°MAX.

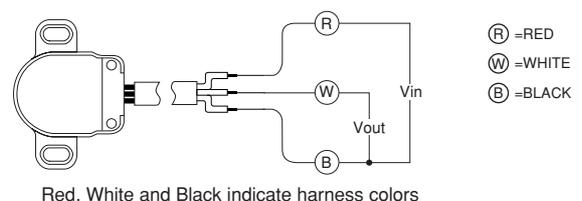
### DIMENSION (mm)



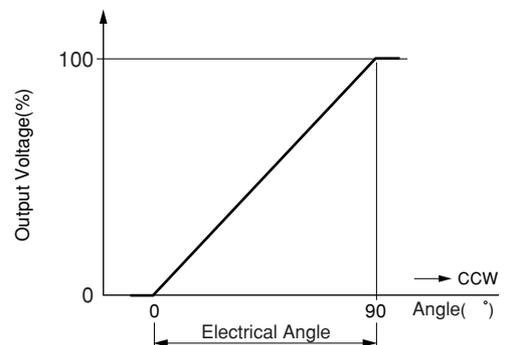
### MOUNTING



### SCHEMATIC



### OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# LP-10F

# LP-10FB

## FEATURES

- 10mm stroke
- Low friction & long life
- 2 types Input shaft Interface.
- Available with mounting 4 surface

## Electrical Specifications

Electrical Stroke	10mm±0.5mm
Total Resistance	1kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±1%
Power Rating	0.3W/50°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC 500V
Dielectric Strength	AC500V 1 Minute
TC of Resistance	±1000ppm / °C

## Mechanical Specifications

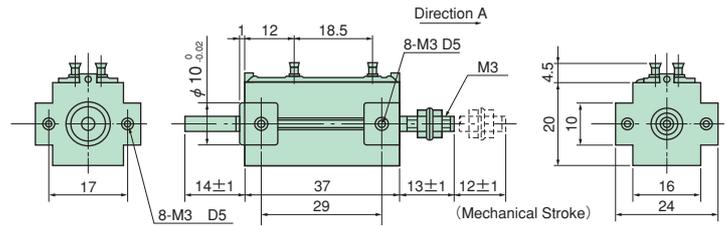
Mechanical Stroke	12mm±1mm
Friction	LP-10F : 0.3N MAX. LP-10FB : 3N MAX.(Spring Strength)
Weight	Approx. 60g

## Environmental Specifications

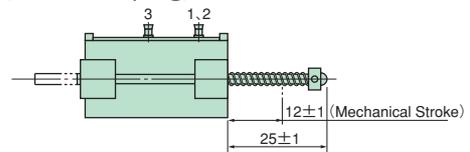
Operating Temperature	-40~100°C
Vibration	100m / s <sup>2</sup> 500Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	5M Cycles MIN.

## DIMENSION (mm)

### • LP-10F

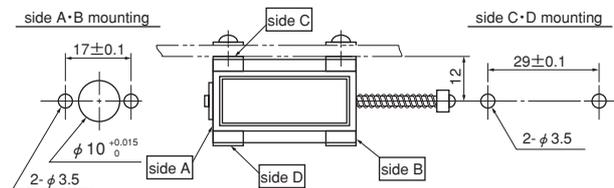


### • LP-10FB (With Back Spring)



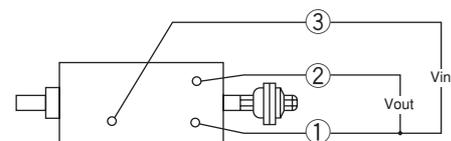
Other dimensions are same as LP-10F

## MOUNTING



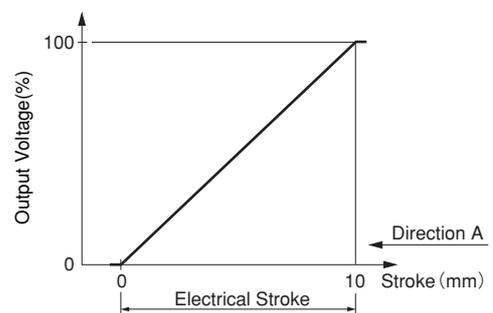
■ MOUNTING HARDWARE  
2-M3 Nuts, 2-Lock Washers

## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

# LP-20F LP-20FB

## FEATURES

- 20mm stroke
- Low friction & long life
- 2 types Input shaft Interface.

## Electrical Specifications

<b>Electrical Stroke</b>	20mm±0.5mm
<b>Total Resistance</b>	1、2kΩ
<b>Total Resistance Tolerance</b>	±20%
<b>Independent Linearity</b>	±1%
<b>Power Rating</b>	0.6W/70°C
<b>Output Smoothness</b>	0.1%MAX.
<b>Insulation Resistance</b>	100MΩ MIN. DC 500V
<b>Dielectric Strength</b>	AC500V 1 Minute
<b>TC of Resistance</b>	±400ppm / °C

## Mechanical Specifications

<b>Mechanical Stroke</b>	22mm±1mm
<b>Friction</b>	LP-20F : 0.3N MAX. LP-20FB : 3N MAX. (Spring Strength)
<b>Weight</b>	Approx. 60g

## Environmental Specifications

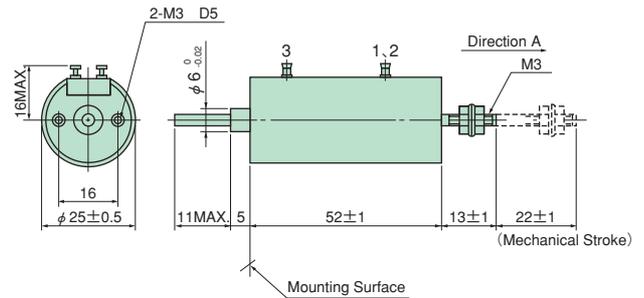
<b>Operating Temperature</b>	-40~100°C
<b>Vibration</b>	100m / s <sup>2</sup> 500Hz 3 axis 2hours each
<b>Shock</b>	500m / s <sup>2</sup> 11ms 6 axis 3times
<b>Life Cycle</b>	5M Cycles MIN.

## OPTIONS

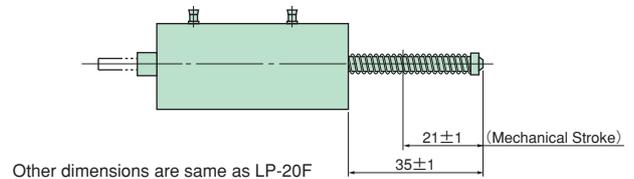
- Independent Linearity : ±0.5%

## DIMENSION (mm)

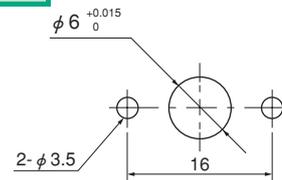
### • LP-20F



### • LP-20FB (With Back Spring)

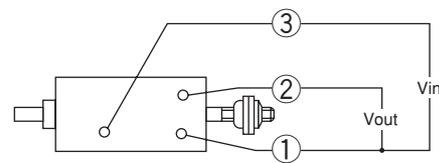


## MOUNTING



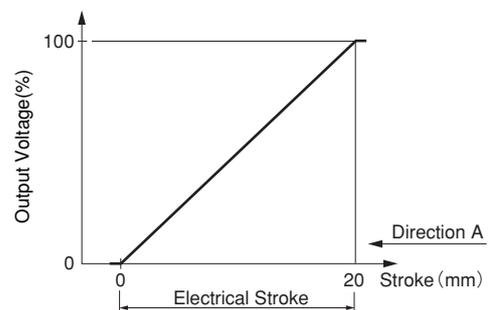
■ MOUNTING HARDWARE  
2-M3 Nuts, 2-Lock Washers

## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



&lt;RoHS Compliance&gt;

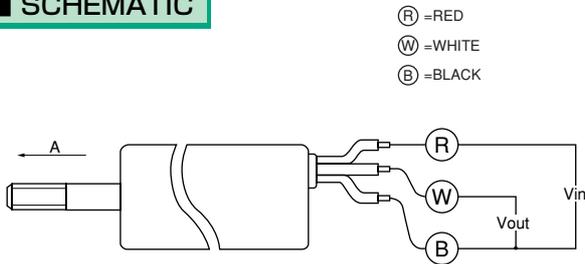
# LP-FP series

## LP-30FQJ

### FEATURES

- Compact & Light weight
- $\phi$  12mm housing: LP-FP series
- $\phi$  8mm housing: LP-30FQJ

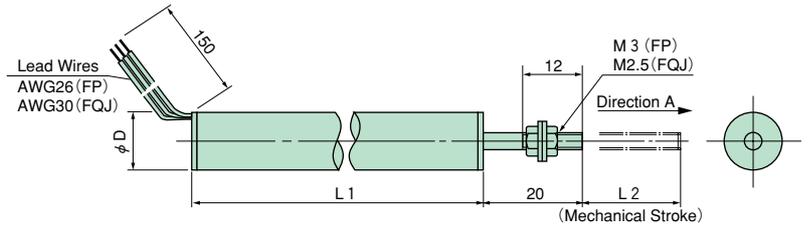
### SCHEMATIC



Red, White and Black indicate harness colors

(R) =RED  
 (W) =WHITE  
 (B) =BLACK

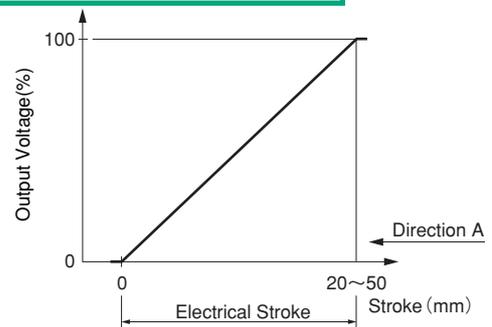
### DIMENSION (mm)



### Housing Length

Model No.	LP-20FP	LP-30FP	LP-50FP	LP-30FQJ
Housing	48mm	58mm	78mm	63mm
Length(L1)	$\phi$ 12mm			$\phi$ 8mm
Mech. Stroke(L2)	22 $\pm$ 1mm	32 $\pm$ 1mm	52 $\pm$ 1mm	35 $\pm$ 1mm

### OUTPUT CHARACTERISTICS



### Electrical Specifications

Model No.	LP-20FP	LP-30FP	LP-50FP	LP-30FQJ
Electrical Stroke	20mm $\pm$ 0.5mm	30mm $\pm$ 0.5mm	50mm $\pm$ 0.5mm	30mm $\pm$ 0.5mm
Total Resistance	1k $\Omega$			1k $\Omega$
Total Resistance Tolerance	$\pm$ 20%			
Independent Linearity	$\pm$ 1%			
Power Rating	0.6W/70 $^{\circ}$ C	0.9W/70 $^{\circ}$ C	1.5W/70 $^{\circ}$ C	0.9W/70 $^{\circ}$ C
Output Smoothness	0.1%MAX.			
Insulation Resistance	100M $\Omega$ MIN. DC 500V			
Dielectric Strength	AC500V 1 Minute			
TC of Resistance	$\pm$ 1000ppm / $^{\circ}$ C			$\pm$ 400ppm / $^{\circ}$ C

### Mechanical Specifications

Friction		0.4N MAX.		0.3N MAX.
Weight	Approx. 18g	Approx. 20g	Approx. 25g	Approx. 15g

### MOUNTING HARDWARE

2-M3 Nuts, 2-Washers

&lt;RoHS Compliance&gt;

# LP-50F

# LP-50FB

## FEATURES

- 2 types Input shaft Interface.
- Low friction, superb smoothness and long life operation.

## Electrical Specifications

Electrical Stroke	50mm±0.5mm
Total Resistance	1、2、5kΩ
Total Resistance Tolerance	±20%
Independent Linearity	±0.5%
Power Rating	1.5W/70°C
Output Smoothness	0.1%MAX.
Insulation Resistance	100MΩ MIN. DC500V
Dielectric Strength	AC500V 1 Minute
TC of Resistance	±400ppm / °C

## Mechanical Specifications

Mechanical Stroke	55mm±1mm
Friction	LP-50F : 0.5N MAX.
	LP-50FB : 1.7NMAX.(Spring Strength)
Weight	Approx. 75g

## Environmental Specifications

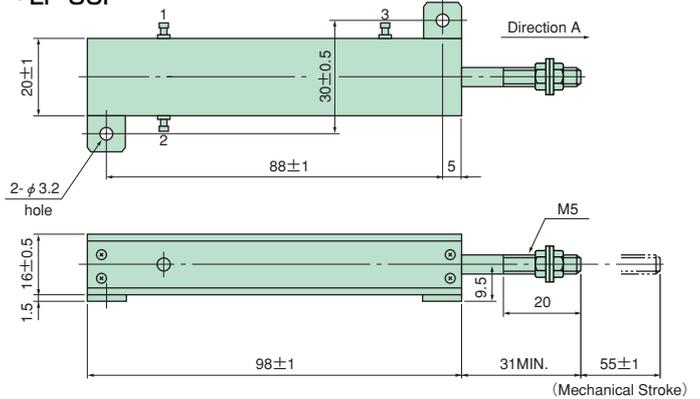
Operating Temperature	-40~100°C
Vibrations	100m / s <sup>2</sup> 500Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	5M Cycles MIN.

## OPTIONS

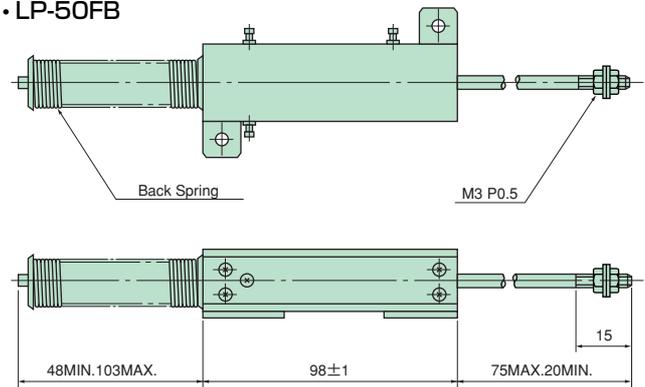
- Independent Linearity : ±0.2%

## DIMENSION (mm)

### LP-50F

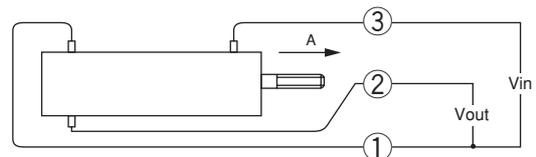


### LP-50FB



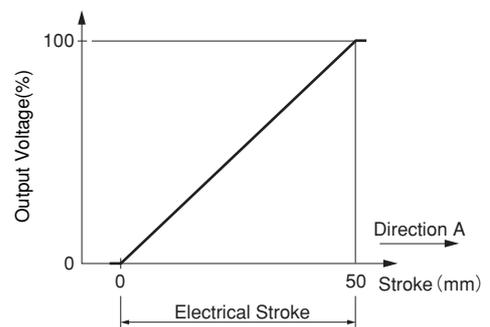
Other dimensions are same as LP-50F

## SCHEMATIC



1,2,3 indicate terminal No.

## OUTPUT CHARACTERISTICS



## MOUNTING HARDWARE

- 2- M5 Nuts, 2-Lock Washers
- (LP-50FB: 2-M3 Nuts, 2-Lock Washers)

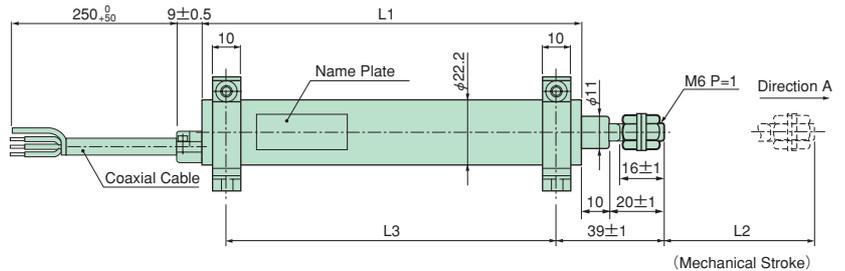
<RoHS Compliance>

# LP-FJ series

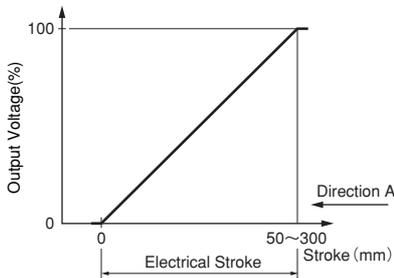
## FEATURES

- Coaxial cable (0.5mm<sub>±</sub>)
- Shaft  $\phi$  6.

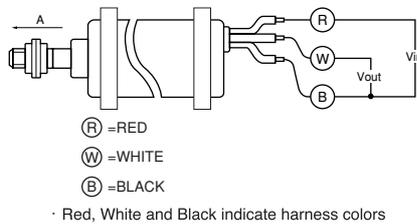
## DIMENSION (mm)



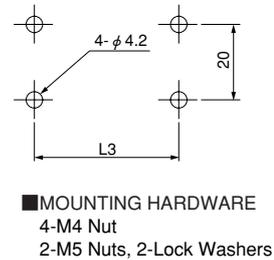
## OUTPUT CHARACTERISTICS



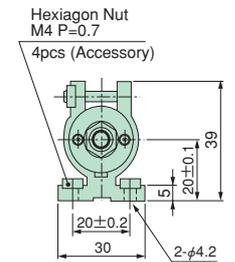
## SCHEMATIC



## MOUNTING



## MTG Holes Spacing



## Housing Length · Mounting Water proof type : LP-xxFJS

Model No.	LP-50FJ	LP-100FJ	LP-150FJ	LP-200FJ	LP-250FJ	LP-300FJ
Housing Length(L1)	88mm $\pm$ 1mm	138mm $\pm$ 1mm	188mm $\pm$ 1mm	238mm $\pm$ 1mm	288mm $\pm$ 1mm	338mm $\pm$ 1mm
Mech. Stroke(L2)	54mm $\pm$ 1mm	104mm $\pm$ 1mm	154mm $\pm$ 1mm	204mm $\pm$ 1mm	254mm $\pm$ 1mm	304mm $\pm$ 1mm
MTG Holes Spacing(L3)	70mm $\pm$ 1mm	120mm $\pm$ 1mm	170mm $\pm$ 1mm	220mm $\pm$ 1mm	270mm $\pm$ 1mm	320mm $\pm$ 1mm

## Electrical Specifications

Model No.	LP-50FJ	LP-100FJ	LP-150FJ	LP-200FJ	LP-250FJ	LP-300FJ
Electrical Stroke	50mm $\pm$ 0.5mm	100mm $\pm$ 0.5mm	150mm $\pm$ 0.5mm	200mm $\pm$ 1mm	250mm $\pm$ 1mm	300mm $\pm$ 1mm
Total Resistance	1k, 5k $\Omega$	1k, 5k $\Omega$	1k, 5k $\Omega$	1k, 5k $\Omega$	5k $\Omega$	10k $\Omega$
Total Resistance Tolerance	$\pm$ 20%					
Independent Linearity	$\pm$ 0.5%	$\pm$ 0.3% (Special Linearity $\pm$ 0.1%)				
Power Rating	DC36V MAX. / 50 $^{\circ}$ C					
Output Smoothness	0.1% / MAX.					
Insulation Resistance	100M $\Omega$ MIN. DC500V					
Dielectric Strength	AC500V 1 Minute					
TC of Resistance	$\pm$ 400ppm / $^{\circ}$ C					

## Mechanical Specifications

Friction	1N MAX.					
Weight	Approx. 120g	Approx. 160g	Approx. 200g	Approx. 240g	Approx. 280g	Approx. 320g

## OPTIONS

- LP-FJ for 50~300mm are designed in same construction for lower cost, therefore available with the total resistances only as shown in specifications
- Water proof type: LP-xxFJS

## Environmental Specifications

Life Cycle	5M Cycles
Vibration	100m / s <sup>2</sup> 20~500Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup>
IP Level	IP40
Perating Temperature	-25~80 $^{\circ}$ C
Storage Temp.	-25~80 $^{\circ}$ C

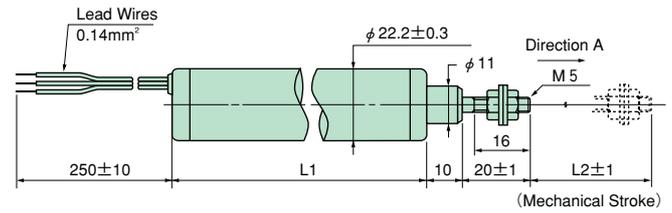
&lt;RoHS Compliance&gt;

# LP-F series

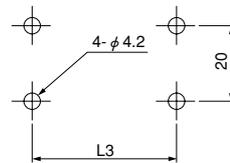
## FEATURES

- Light Weight
- Low friction.

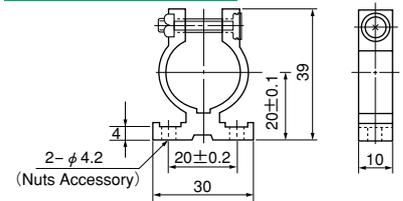
## DIMENSION (mm)



## MOUNTING



## MTG Holes Spacing



## Housing Length · Mounting

Model No.	LP-100F-C	LP-150F-C	LP-200F-C	LP-250F-C	LP-300F-C
Housing Length(L1)	138±1mm	188±1mm	238±1mm	288±1mm	338±1mm
Mech. Stroke(L2)	103±1mm	153±1mm	203±1mm	253±1mm	303±1mm
MTG Holes Spacing(L3)	124mm	174mm	224mm	274mm	324mm

## Electrical Specifications

Model No.	LP-100F-C	LP-150F-C	LP-200F-C	LP-250F-C	LP-300F-C
Electrical Stroke	100mm±0.5mm	150mm±0.5mm	200mm±1mm	250mm±1mm	300mm±1mm
Total Resistance	1, 2, 5, 10kΩ	1, 2, 5, 10kΩ	1, 2, 5, 10kΩ	2, 5, 10kΩ	2, 5, 10kΩ
Total Resistance Tolerance	±20%				
Independent Linearity	±0.3%				
Power Rating	2W / 70°C	3W / 70°C	4W / 70°C	4W / 70°C	4W / 70°C
Output Smoothness	0.1% / MAX.				
Insulation Resistance	100MΩ MIN.DC500V				
Dielectric Strength	AC500V 1 Minute				
TC of Resistance	±400ppm / °C				

## Mechanical Specifications

Friction	1N MAX.				
Weight	Approx. 110g	Approx. 140g	Approx. 170g	Approx. 200g	Approx. 230g

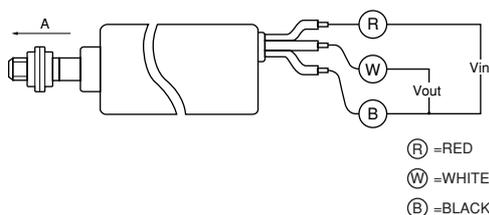
## Environmental Specifications

Operating Temperature	-25~80°C
Vibration	100m / s <sup>2</sup> 500Hz 3 axis 2hours each
Shock	500m / s <sup>2</sup> 11ms 6 axis 3times
Life Cycle	5M Cycles MIN.

## OPTIONS

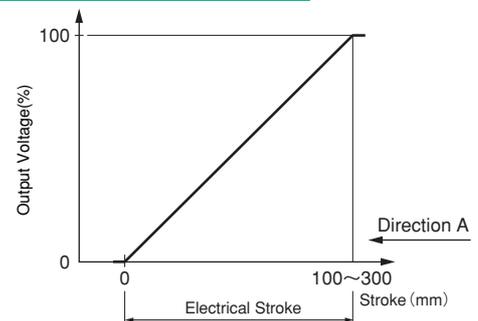
- 2 sections
- Independent Linearity : ±0.1%

## SCHEMATIC



Red, White and Black indicate harness colors

## OUTPUT CHARACTERISTICS



## MOUNTING HARDWARE

- 4-M4 Nuts
- 2-M5 Nuts, 2-Lock Washers