

16mm Diameter, Single-Turn, Cermet Industrial Panel Controls



Features

- 16mm diameter, single-turn industrial panel controls
- Cermet film element
- Single unit, single shaft
- Excellent environmental characteristics
- Wide temperature range of -55°C to $+125^{\circ}\text{C}$
- Metal shaft and bushing
- Linear taper
- Shaft lock available
- Panel and PCB mounting styles
- Lug or right angle mount pin terminals
- 3.2mm diameter shafts in slot, flat or round end styles
- Standard 10mm or 15mm shaft length

Specifications

Electrical

Standard Resistance Range	100 Ω to 1M Ω
Resistance Tolerance	$\pm 20\%$ standard ($\pm 10\%$ special order)
End Resistance	3 Ω max.
Resistance Taper	B = linear
Peak Noise (C.R.V.)	3% or 5 Ω , whichever is greater
Power Rating	0.5 watt at $+70^{\circ}\text{C}$, 0 watt at $+120^{\circ}\text{C}$
Maximum Input Voltage	400VDC or power rating, whichever is smaller
Temperature Coefficient	$\pm 100\text{ppm}/^{\circ}\text{C}$, 200 Ω to 500k Ω $\pm 250\text{ppm}/^{\circ}\text{C}$, other values
Insulation Resistance	500M Ω minimum at 500VDC
Dielectric Strength	500VAC, 1 minute

Mechanical

Mechanical Travel	$260^{\circ} \pm 10^{\circ}$
Shaft Torque	20 to 200 gf•cm (0.277 to 2.773 oz•in)
Stop Strength	3 kgf•cm (41.59 oz•in) max.
Mounting Nut Torque	10.2 kgf•cm (141.4 oz•in) max.
Solderability	235°C , 5 seconds
Marking	Model type, taper, resistance, shaft type, terminal identification, date code

Environmental

Temperature Range	-55°C to $+125^{\circ}\text{C}$
High Temperature Exposure	$+120^{\circ}\text{C}$, 250 hours $\Delta T/R \leq \pm 4\%$
Load Life	$+70^{\circ}\text{C}$, 1,000 hours with rated load $\Delta T/R \leq \pm 5\%$
Thermal Shock	-55°C ~ $+120^{\circ}\text{C}$, 5 cycles without load $\Delta T/R \leq \pm 3\%$
Vibration	10-55Hz, 1.5mm amplitude, 3 directions, 2 hours each $\Delta T/R \leq \pm 2\%$
Soldering Heat Resistance	350°C , 3 seconds $\Delta T/R \leq \pm 1\%$
Rotational Life	15,000 cycles (500 cycles for shaft lock models only) without load $\Delta T/R \leq \pm 4\%$

$\Delta T/R$ = Total Resistance Change

GF16

Technical drawing of the shaft type S, showing a side view and a top view.

Side View Dimensions:

- Thread: M6 x P0.75
- Inner Diameter: $\phi 3.2 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$
- Length: $L \pm 1$
- Minimum Length: 1.2 Min.
- Maximum Length: 9.5 Max.
- Distance from end to center: 6 ± 1
- Rotation: CCW

Top View Dimensions:

- Outer Diameter: 16.5 ± 1
- Inner Diameter: 9.5 ± 0.5
- Maximum Inner Diameter: 15 Max.
- Distance from center to mounting hole: 1.2 ± 0.3
- Width of mounting hole: $W1 \pm 0.1$
- Material: Epoxy

A technical drawing of a circle. A horizontal dimension line passes through the center of the circle, with arrows at both ends pointing to the circle's edge. To the right of the circle, the dimension is labeled $\phi 6.2$.

Technical drawing of the shaft assembly showing side and front views with dimensions.

Side View Dimensions:

- Shaft type: S
- Thread: M6 x P0.75
- Internal thread: $\phi 3.2_{-0.1}^{+0}$
- CCW (Counter-Clockwise)
- Distance from end face to thread start: 1.2 ± 0.3
- Distance from end face to thread end: $W1 \pm 0.3$
- Distance from end face to center: 7.5 ± 0.5
- Minimum distance from end face to center: 1.2 Min.
- Maximum distance from end face to center: 9.5 Max.
- Distance from end face to center: $L \pm 1$

Front View Dimensions:

- Overall width: 16.5 ± 1
- Distance from center to mounting hole center: 9.5 ± 0.5
- Distance from center to mounting hole center: 15 Max.
- Distance from center to mounting hole center: 17.5 ± 1
- Material: Epoxy

A technical drawing of a circle. A horizontal dimension line passes through the center of the circle, with arrows at both ends pointing to the circle's edge. To the right of the circle, the dimension is labeled $\phi 6.2$.

Shaft type: S

Technical drawing showing three views of a component (Shaft type: S) with dimensions in millimeters.

Front View (Left):

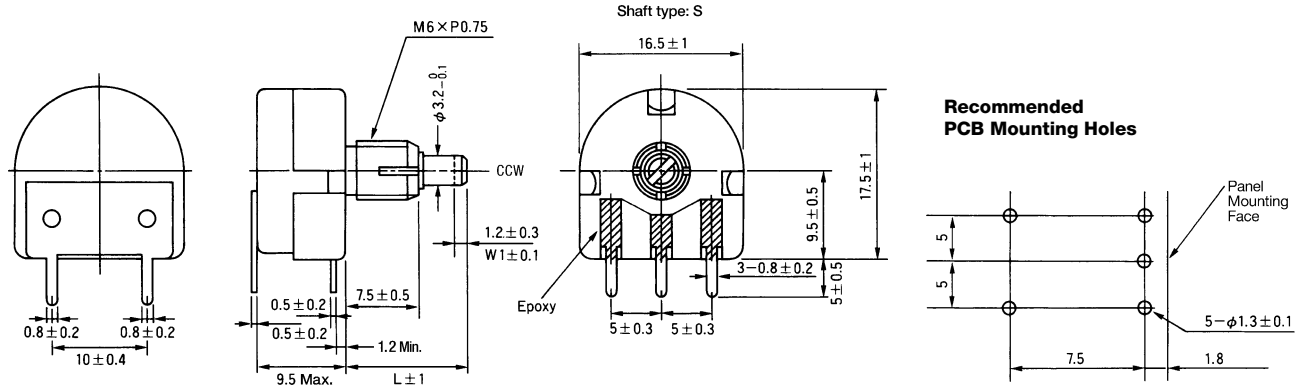
- Top width: 10 ± 0.4
- Slot width (left): 0.8 ± 0.2
- Slot width (right): 0.8 ± 0.2

Side View (Middle):

- Top width: 1.8 ± 0.5
- Slot width (left): 0.5 ± 0.2
- Slot width (right): 0.5 ± 0.2
- Distance from left edge to slot center: 7.5 ± 0.3
- Distance from slot center to right edge: $L \pm 1$
- Distance from slot center to right edge (alternative): 6 ± 1
- Shaft diameter: $\phi 3.2 \pm 0.1$
- Shaft length: 1.2 ± 0.3
- Shaft thread: $M6 \times P0.75$
- Shaft type: CCW
- Distance from slot center to right edge (alternative): $W1 \pm 0.1$

Top View (Right):

- Top width: 16.5 ± 1
- Slot width (left): 0.8 ± 0.2
- Slot width (middle): 0.8 ± 0.2
- Slot width (right): 0.8 ± 0.2
- Distance from left edge to slot center: 5 ± 0.3
- Distance from slot center to right edge: 5 ± 0.3
- Distance from slot center to right edge (alternative): 9.5 ± 0.5
- Distance from slot center to right edge (alternative): 5 ± 0.5
- Material: Epoxy

GF16L**PCB Mount, Single Unit, Single Shaft with Shaft Lock****Right Angle Mount Pin Terminals, 3-Pin Inline Pattern, 2-Pin Rear Support Bracket**

GF P 16 L 10 S B 103 M

NOTE: FMS = From Mounting Surface

Resistance Tolerance: **M** = $\pm 20\%$ (standard).
K = $\pm 10\%$ (special order).

Resistance Code: Expressed in ohms. A three digit code where the first two digits are significant figures, and the third digit indicates the number of zeros that follow these figures (i.e., 100 = 10 Ω ; 101 = 100 Ω ; 102 = 1,000 Ω ; 103 = 10,000 Ω ; 105 = 1,000,000 Ω). See table for standard resistance values.

Resistance Taper: **B** = Linear.

Shaft End Style: **S** = Slotted.
F = Flatted.
R = Round.

Standard Shaft Length: **10** = 10mm FMS.
15 = 15mm FMS.
Up to 30mm shaft length available (special order).

Shaft Lock: **L** = With Shaft Lock.
Blank = Without Shaft Lock.

Size: **16** = 16mm Diameter.

Style: **Blank** = Panel Mount, Single Unit, Single Shaft, Right Angle
Ear-Lug Terminals, 3-Lug Inline Pattern.
P = PCB Mount, Single Unit, Single Shaft, Right Angle
Mount Pin Terminals, 3-Pin Inline Pattern, 2-Pin Rear
Support Bracket.

TOCOS Series Name: **GF** = Cermet Film Element.

Standard Resistance Values and Part Numbering Codes

Standard Nominal Total Resistance Values and Part Numbering Codes

Resistance (Ω)	Code	Resistance (Ω)	Code	Resistance (Ω)	Code	Resistance (Ω)	Code	Resistance (Ω)	Code
100	101	1,000	102	10,000	103	100,000	104	1,000,000	105
200	201	2,000	202	20,000	203	200,000	204		
500	501	5,000	502	50,000	503	500,000	504		

Refer to Shaft End Styles Specifications and Hardware Specifications for details and availability.
For additional information, refer to Guidelines and Precautions for Using Panel Controls.