CARBON FILM FIXED RESISTOR

Features

- Automatically insertable
- High quality performance
- Non - Flame type available
- Cost effective and commonly used
- Too low or too high can be supplied on a case to case basis

Explanation of Part Number & Ordering Procedure:

B	C	W	4	J	0	1	0	1	A	0	0

Resistor Type:
Coated Resistors

Series Code:
C ~ Carbon film fixed resistors.
L ~ Non-Flame carbon film fixed resistors.
U ~ Non-Inductive.
1 ~ Cutting semi-finished product.
2 ~ Welding semi-finished product.

Power Rating:
W8 ~ 1/8W, S4 ~ 1/4W-S
W4 ~ 1/4W, S3 ~ 1/3W-S
W3 ~ 1/3W, S2 ~ 1/2W-S
W2 ~ 1/2W, 1S ~ 1W-S
1W ~ 1W, 2S ~ 2W-S
2W ~ 2W, 3S ~ 3W-S
T2 ~ 1/2W-SS

Tolerance:
F = ±1%, G = ±2%,
J = ±5%, K = ±10%

Resistance Value:

- **E-6, E-12, E-24 series**

a.) Normally for these series, the box No. 6 is "0".
b.) Boxes No. 7 & 8 are for the Ohmic Value.
c.) Box No. 9 is for the multiplier or indication for no. of zeros.

- **E-96 series**

a.) Boxes No. 6 to 8 are for the Ohmic Value.
b.) Box No. 9 is for the multiplier or indication for no. of zeros.

Decimal point is expressed by:
"J"- 0.1, "K"- 0.01, "L"- 0.001
Ex. 2Ω26 ~ 226K, 226Ω ~ 2260

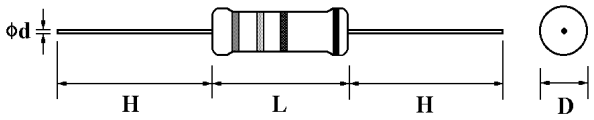
Packing Type:
A = Tape / Box
B = Bulk / Box
T = Tape / Reel

Suffix for Special Features:
F ~ F Type, M ~ M Type, P ~ Panasert, T ~ T Type,
V ~ AVI Type, 2 ~ Lead wire 28mm, 7 ~ Lead wire 38mm
0 ~ PT-52 mm, 1 ~ PT-26 mm, 8 ~ PT-58 mm, 9 ~ PT-64 mm

Assistance Code:
Usually is "0"
As: F(3) Type = 3
AVI(2) = 2 etc.

CARBON FILM FIXED RESISTOR

Dimension:



Normal Size

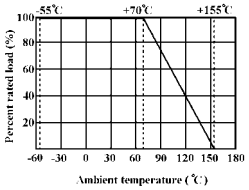
Part No.	Style	Power Rating at 70°C	Dimension (mm)				Max. Working Voltage	Max. Overload Voltage	Dielectric With-standing Voltage	Resistance Range
			D Max	L Max.	H ± 3	d +0.02 -0.05				
BCW8	CR-12	1/8W(0.125W)	1.85	3.5	28	0.5	200 V	400 V	400 V	1Ω ~ 1MΩ
BCW4	CR-25	1/4W(0.25W)	2.5	6.8	28	0.6	250 V	500 V	500 V	1Ω ~ 10MΩ
BCW2	CR-50	1/2W(0.5W)	3.5	10.0	28	0.6	350 V	700 V	700 V	1Ω ~ 10MΩ
BC1W	CR-100	1W	5.5	16.0	28	0.8	500 V	1000V	1000 V	1Ω ~ 10MΩ
BC2W	CR-200	2W	6.5	17.5	28	0.8	500 V	1000 V	1000 V	1Ω ~ 10MΩ

Small Size

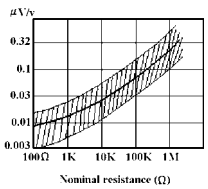
Part No.	Style	Power Rating at 70°C	Dimension (mm)				Max. Working Voltage	Max. Overload Voltage	Dielectric With-standing Voltage	Resistance Range
			D Max	L Max.	H ± 3	d +0.02 -0.05				
BCS4	CR-25-S	1/4W(0.25W)	1.85	3.5	28	0.5	200 V	400 V	400 V	1Ω ~ 1MΩ
BCS2	CR-50-S	1/2W(0.5W)	3.0	9.0	28	0.6	350 V	700 V	700 V	1Ω ~ 10MΩ
BLT2	CR-50-SS	1/2W(0.5W)	2.5	6.8	28	0.6	250 V	500 V	250 V	1Ω ~ 10MΩ
BC1S	CR-100-S	1W	5.0	12.0	28	0.8	500 V	1000V	1000 V	1Ω ~ 10MΩ
BC2S	CR-200-S	2W	5.5	16.0	28	0.8	500 V	1000V	1000 V	1Ω ~ 10MΩ
BC3S	CR-300-S	3W	6.5	17.5	28	0.8	500 V	1000 V	1000 V	1Ω ~ 10MΩ

Note: CR-xx-SS is Non-Flame coating

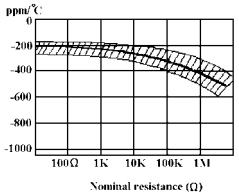
Derating Curve



Current Noise

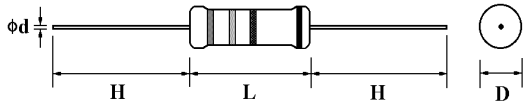


Temp. Coefficient



CARBON FILM FIXED RESISTOR

(1) Copper Plated Steel Lead Wire Type



Part no. of Box No. 2 as follows:

P ~ Copper plated steel wire carbon film fixed resistors
V ~ Tin copper plated steel wire carbon film fixed resistors
R ~ Copper plated steel wire Non-Flame carbon film fixed resistors
X ~ Tin copper plated steel wire Non-Flame carbon film fixed resistors

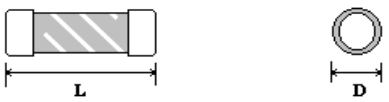
Dimension & Rating

Style	Power Rating at 70°C	Dimension (mm)				Max. Working Voltage	Max. Over-load Voltage	Resistance Range
		D Max.	L Max.	d ± 0.02	H ± 3			
CP-12	1/8W (0.125W)	1.85	3.5	0.5	28	200V	400V	1Ω ~ 10MΩ
CP-25	1/4W (0.25W)	2.5	6.8	0.5	28/38	250V	500V	1Ω ~ 10MΩ
CP-33-S	1/3W	2.5	6.8	0.5	28/38	300V	600V	1Ω ~ 10MΩ
CP-33	1/3W	3.0	9.0	0.5	28	300V	600V	1Ω ~ 10MΩ
CP-50-S	1/2W (0.5W)	3.0	9.0	0.5	28	350V	700V	1Ω ~ 10MΩ

(2) Cutting Type

- This kind of resistor is without coating.
- Cutting type resistors are special requirements of customers.
- Too low or too high ohmic value can be supplied on a case to case basis.
- Cap plated a) Tin plated b) Nickel plated

Dimension



Part no.	Style	Power Rating at 70°C	Dimension (mm)		Resistance Range
			D Max.	L Max.	
B1W8	CO-12	0.125W	1.6	3.2	1Ω ~ 10MΩ
B1W4	CO-25	0.25W	2.2	5.8	1Ω ~ 10MΩ
B1A4	CO-25A	0.25W	2.2	6.0	1Ω ~ 10MΩ
B1B4	CO-25B	0.25W	2.2	6.6	1Ω ~ 10MΩ

LAUBE

CARBON FILM FIXED RESISTOR

Performance Specifications:

Characteristics	Test Methods	Limits
Temperature coefficient JIS – C – 5202 5.2	Natural resistance change per temp. degree centigrade $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6$ (PPM / ºC) R_1 : Resistance value at room temperature (t_1) R_2 : Resistance value at room temp. plus 100ºC (t_2)	RANGE / T.C.R. ≤ 10 Ω / 0 ~ ± 350PPM / °C 11 Ω - 99K Ω / 0 ~ - 450PPM / °C 100K Ω - 1M Ω / 0 ~ - 700PPM / °C 1.1M Ω - 10M Ω / 0 ~ - 1500PPM / °C
Short – time overload JIS – C – 5202 5.5	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.	Resistance change rate is ± (1.0%+0.05 Ω) No evidence of mechanical damage.
Insulation resistance JIS – C – 5202 5.6	Resistors shall be clamped in the trough of a 90 ° metallic V - block and shall be tested at DC potential respectively specified in the above list for 60 + 10 / -0 seconds.	Insulation resistance is 10,000 Mega Ohm or more
Dielectric withstanding voltage JIS – C – 5202 5.7	Resistors shall be clamped in the trough of a 90 ° metallic V- block and shall be tested at AC potential respectively specified in the above list for 60 + 10 / -0 seconds.	No evidence of flashover mechanical damage, arcing or insulation break down.
Terminal strength JIS – C – 5202 6.1	**Direct load:** Resistance to a 2.5 kgs. direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. **Twist test:** Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations.	No evidence of mechanical damage.
Resistance to Soldering Heat JIS – C – 5202 6.4	Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350°C ± 10°C solder for 3 ± 0.5 seconds	Resistance change rate is ± (1.0%+0.05 Ω) No evidence of mechanical damage.
Solderability JIS – C – 5202 6.5	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder: 235°C ± 5°C Dwell time in solder: 3 +0.5/ -0 seconds	95% coverage Min.
Resistance to solvent JIS - C - 5202 6.9	Specimens shall be immersed in a bath of trichroethane completely for 3 mins. with ultrasonic.	No deterioration of protective coating and markings.

* RCWV = Rated Continuous Working Voltage = $\sqrt{\text{Rated Power x Resistance Value}}$

CARBON FILM FIXED RESISTOR

Performance Specifications:

<table>
<tr><th>Characteristics</th><th>Test Methods</th><th>Limits</th></tr>
<tr><td>Temperature cycling
JIS – C – 5202 7.4</td><td>Resistance change after continuous five cycles for duty cycle specified below:<table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>-55℃±3℃</td><td>30 mins.</td></tr><tr><td>2</td><td>Room temp.</td><td>10 – 15 mins.</td></tr><tr><td>3</td><td>+155 ℃±2 ℃</td><td>30 mins.</td></tr><tr><td>4</td><td>Room temp.</td><td>10 – 15 mins.</td></tr></table></td><td>Resistance change rate is ± (1.0%+0.05 Ω)
No evidence of mechanical damage.</td></tr>
<tr><td>Load life in humidity
JIS - C - 5202 7.9</td><td>Resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours “on”, 0.5 hour “off”) in a humidity test chamber controlled at 40°C ± 2°C and 90 to 95% relative humidity.</td><td><table><tr><th colspan="2">Resistance Value</th><th>ΔR/R</th></tr><tr><td rowspan="2">Normal type</td><td>Less than 100KΩ</td><td>± 3%</td></tr><tr><td>100KΩ or more</td><td>± 5%</td></tr><tr><td rowspan="2">Non-Flame type</td><td>Less than 100KΩ</td><td>± 5%</td></tr><tr><td>100KΩ or more</td><td>± 10%</td></tr></table></td></tr>
<tr><td>Load life
JIS - C - 5202 7.10</td><td>Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours “on”, 0.5 hour “off”) at 70° C ± 2°C ambient.</td><td><table><tr><th colspan="2">Resistance Value</th><th>ΔR/R</th></tr><tr><td rowspan="2">Normal type</td><td>Less than 56KΩ</td><td>± 2%</td></tr><tr><td>56KΩ or more</td><td>± 3%</td></tr><tr><td rowspan="2">Non-Flame type</td><td>Less than 100KΩ</td><td>± 5%</td></tr><tr><td>100KΩ or more</td><td>± 10%</td></tr></table></td></tr>
</table>

* RCWV = Rated Continuous Working Voltage = $\sqrt{\text{Rated Power x Resistance Value}}$