

## SP Resistor

- Feature
- Application
- Dimensions
- Reference Standards
- Power And Resistance etc
- Derating Curve
- Frequency Characteristics
- Power vs.Surface Temperature increase(1)
- Power vs.Surface Temperature increase(2)
- Temperature coefficient of resistance vs. specific resistance (room temperature to 200°C )
- Performance
- Ordering Information



## Features

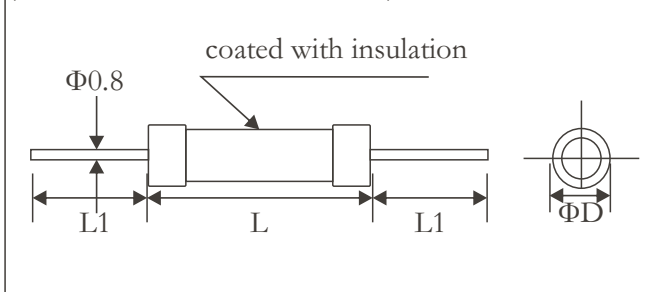
SP, with the inner and outer surfaces coated with a special glass, features higher thermal resistance and larger electric power capacity for the compact volume. Unlike conventional wire wound resistors, the volumetric resistor will provide superior stability versus frequency and higher durability against transient voltage. Further, SP can be used in water, which enables the resistor to be suitable for the application with large current as well as high frequency circuit.

## Applications

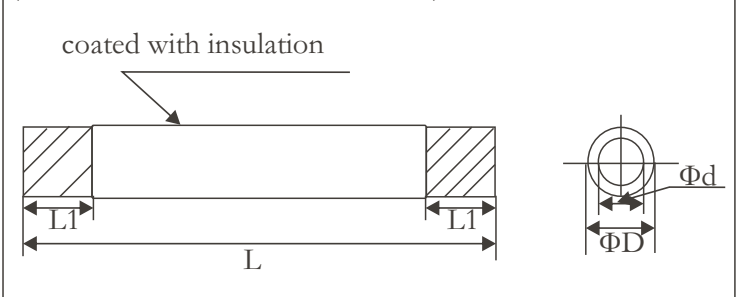
- Power supply circuits
- Circuits for protecting against parasitic oscillation
- High-frequency circuits
- Other high-current circuits
- Other applications: far-infrared heaters, microwave absorber
- Dummy loads
- PT protection
- Accelerators
- Surge absorption, . .
- Ultrasonic devices

## Dimensions

(SP With lead wires SP3~SP10)

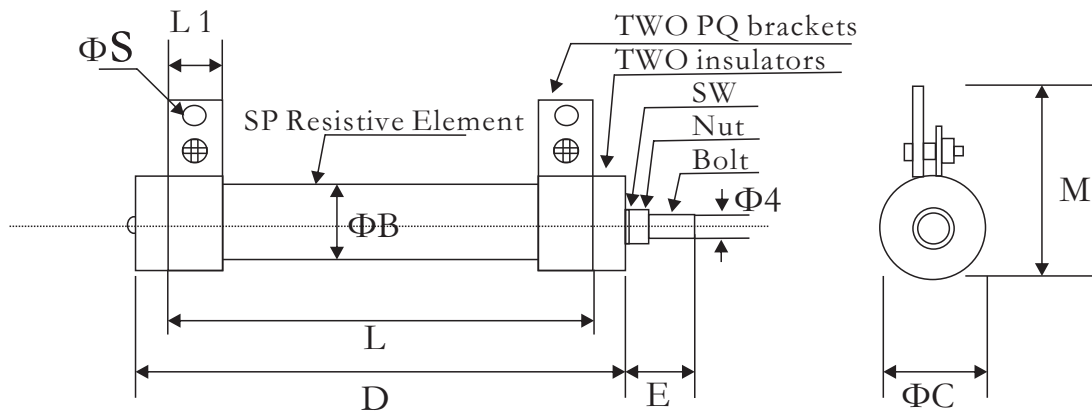


(SP without terminal SP20~SP500)

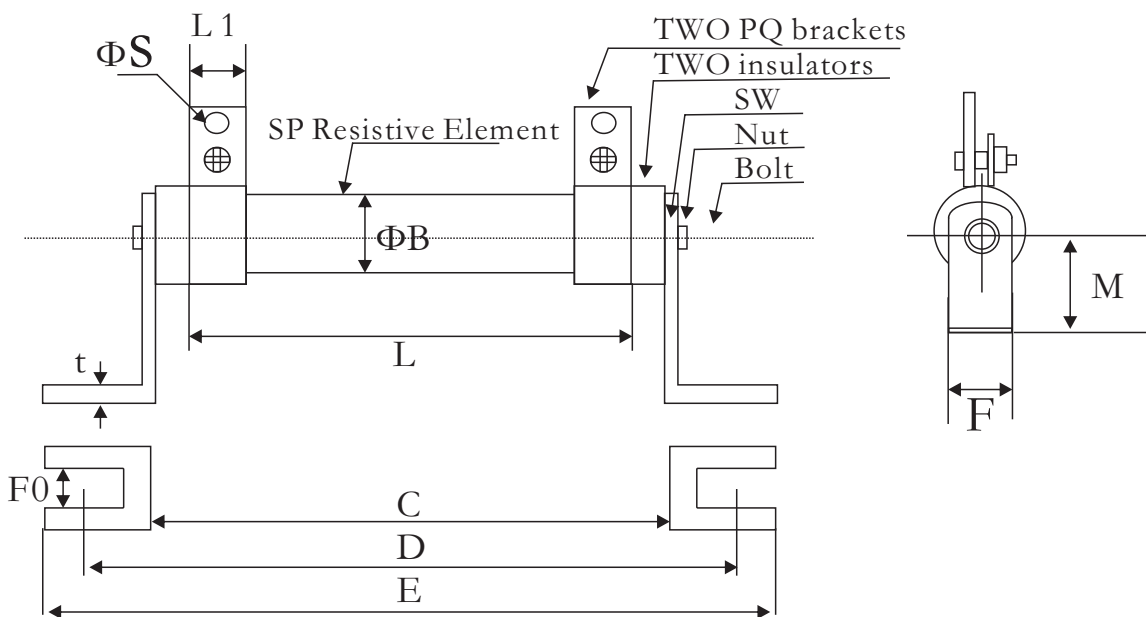


Type	Power	Dimensions(mm)				Cross sections (cm <sup>2</sup> )	Effective length (cm)	Volume (cm <sup>3</sup> )
		ΦD	Φd	L	L1			
SP 3	3	4.5 ± 1.0	-	20.0 ± 1.0	38 ± 2.0	0.13	1.4	0.18
SP 5	5	8.5 ± 1.0	-	25.0 ± 1.0	38 ± 2.0	0.50	1.8	0.90
SP 10	10	8.5 ± 1.0	-	40.0 ± 1.0	38 ± 2.0	0.50	3.3	2.01
SP 20	20	14.0 ± 0.5	8	60.0 ± 0.8	10 ± 2.0	1.04	4.0	6.22
SP 30	30	14.0 ± 0.5	8	80.0 ± 1.0	10 ± 2.0	1.04	6.0	7.67
SP 50	50	20.0 ± 0.8	14	100 ± 1.0	13 ± 2.0	1.60	7.4	11.9
SP 100	100	20.0 ± 0.8	14	200 ± 1.2	15 ± 2.0	1.60	17.0	27.2
SP 150	150	25.0 ± 1.0	18	250 ± 1.5	22 ± 2.0	2.36	20.6	48.7
SP 200	200	25.0 ± 1.0	18	300 ± 1.5	22 ± 2.0	2.36	25.6	60.5
SP 300	300	40.0 ± 1.3	32	300 ± 1.5	22 ± 2.0	4.50	25.6	116
SP 500	500	50.0 ± 1.5	40	450 ± 2.0	22 ± 2.0	7.07	40.0	283
SP 750	750	50.0 ± 1.5	40	450 ± 2.0	22 ± 2.0	7.07	40.0	283

. The sp3 to sp 10 models come with lead wires.  
 . Upon request, we will attach a standard terminal to any of the sp 20 to sp 750(for details, see “standard mounting terminals” on page14.)



Type	Rated Power (W)	Dimensions (mm)								Maximum Operating Impulse Voltage (KV)*1.2/50μs
		ΦB	L	L1	D	ΦC	ΦS	M	E	
SPT	20	14	60	9	70	16	3.2	31	10	2
	30	14	80	9	90	16	3.2	31	10	3
	50	20	100	12	100	22	4.2	42	10	4



Type No.	Rated Power (W)	Dimensions (mm)											Maximum Operating Impulse Voltage (KV)*1.2/50μs
		øB	L	L1	øS	C	E	D	F	F0	M	t	
SPY	20	14	60	9	3.2	70	103	90	16	5.0	16	0.8	2
SPY	30	14	80	9	3.2	90	123	110	16	5.0	16	0.8	3
SPY	50	20	100	12	4.2	110	143	130	16	5.0	16	0.8	4
SPY	100	20	200	12	4.2	210	243	230	16	5.0	16	0.8	6
SPY	150	25	250	21	5.2	262	315	300	26	6.2	27	1.0	6*2
SPY	200	25	300	21	5.2	312	365	350	26	6.2	27	1.0	6*2
SPY	300	40	300	21	5.2	320	380	360	40	10	40	1.5	6*2

Note: These resistors are designed to withstand up to 6kv(1.2/50μs) because the insulators have a dielectric breakdown voltage of 10kv (1.2/50μs)

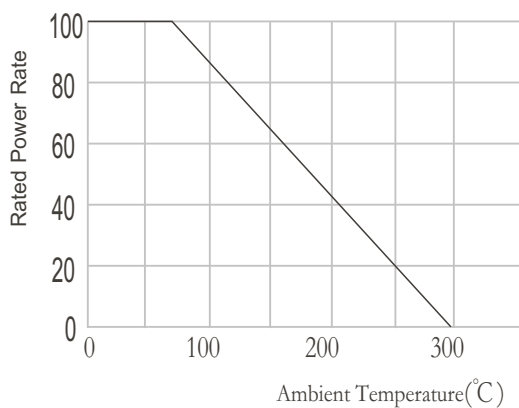
## Reference Standards

JIS C 5201-1

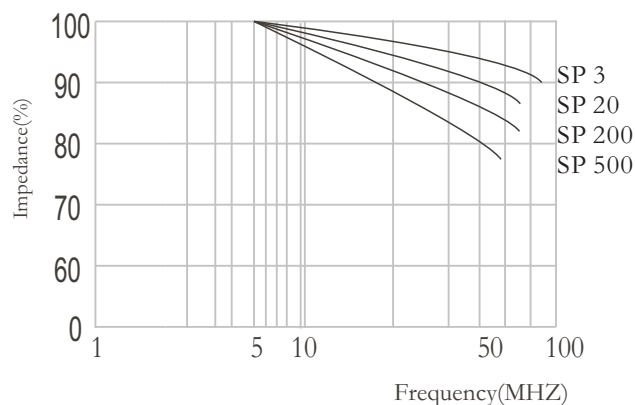
## Power And Resistance etc

Type	Rated Power(W)	Max. Allowable Impulse Voltage (kV)1.2x50μS	Resistance Value Range (Ω)	Standard Resistance(Ω)	TCR (PPM/°C)	Resistance Tolerance	Allowable injection Energy(J)
SP	3	0.5	1.0-390	4.7 10 22 47 100	±300ppm/°C	K ±10% M ±20%	11
	5	0.5	1.0-150	4.7 10 22 47 100 220			63
	10	1.0	1.0-270	4.7 10 22 47 100 220			110
	20	2.0	0.33-220	4.7 10 22 47 100 220			290
	30	3.0	0.47-230	4.7 10 47 100 220			430
	50	4.0	0.47-270	4.7 10 22 47 100 220			830
	100	8.5	1.0-680	4.7 10 22 47 100 220			1900
	150	10.0	0.82-470	4.7 10 47 100 220			3400
	200	12.5	1.0-680	4.7 10 22 47 100 220			4240
	300	12.5	0.56-330	4.7 10 22 47 100 220			8100
	500	20.0	0.56-330	10 22 47 100 220			19800
	750	20.0	0.56-330	10 22 47 100 220			22500

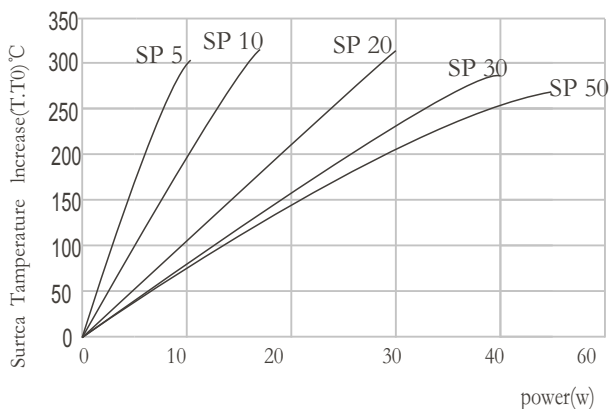
## Derating Curve



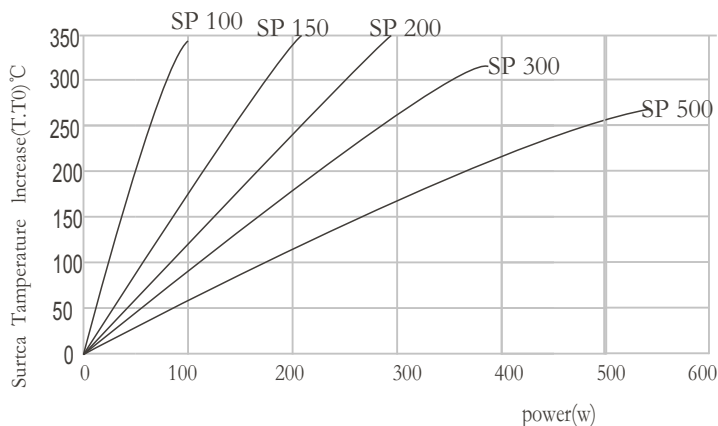
## Frequency Characteristics



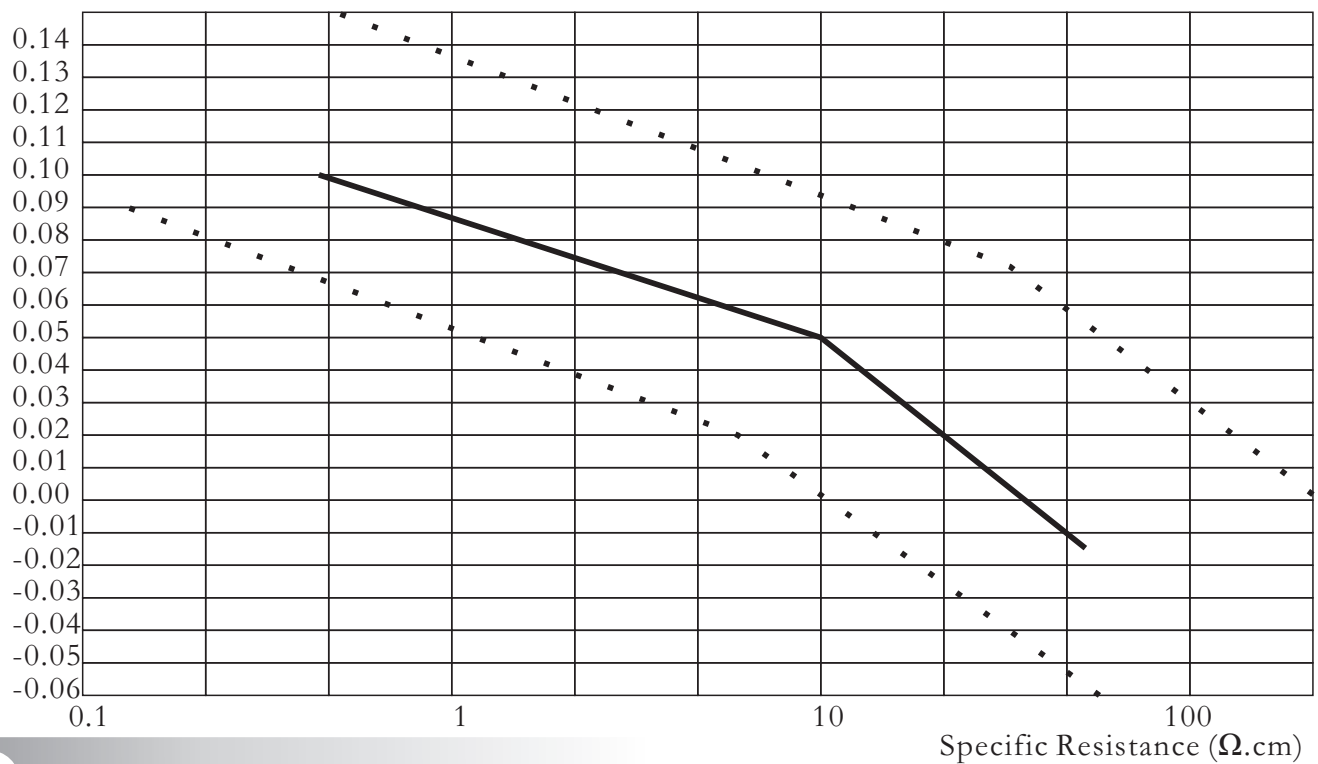
## Power vs.Surface Temperature increase(1)



## Power vs.Surface Temperature increase(2)



Temperature coefficient of resistance vs. specific resistance (room temperature to 200°C )



Performance

Item	Characteristic value
Normal operating temperature	300°C
Maximum operating temperature	250°C
Temperature coefficient	± 0.15%/°C
Withstand voltage(1.2/50μs)	0.5kv/cm.
Rate of change of resistance when current is applied (rated time of 500h)	± 10%
Short-time overloading (10 times *5sec)	± 2 (Max)
Short-time injection capacity	70J/cm <sup>3</sup>
bulk specific gravity	2.0~2.4
Specific heat	630J/(kg,k)
Thermal expansion coefficient	3~5x10 <sup>-6</sup> (/°C)

Ordering Information

Example

SP	300	K	300	100R0
Product Name	Power	Tol	TCR	Ohm
SP	3=3W 5=5W 10=10W 20=20W 30=30W 50=50W 100=100W .....	K= ± 10% M= ± 20%	± 300ppm/°C	R100=0.1R、 1R00=1Ω、 10R0=10Ω、 100R0=100Ω