

KANTHAL GLOBAL

A Sandvik Company

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Global® Non-Inductive Bulk Ceramic Resistors

Product Information

Global bulk ceramic resistors are problem solvers for:

- Impulse generators
- Motor drive circuits
- Snubber circuits
- Capacitor discharging
- Protecting silicon rectifiers
- High-frequency circuits
- High-voltage circuits
- X-ray equipment
- RF dummy loads
- Capacitor current limiting
- Parasitic oscillation protection

...just to name a few uses.

Global non-inductive resistors are supplied in a wide variety of sizes and wattages. This data sheet provides a short summary of standard groupings available. Many other sizes and shapes can be made to meet your requirements.

Terminal Options

Complete descriptions on axial and radial terminal lugs and anti-corona ring pulse power terminals are available on request.

Global Resistors are Supplied in Three Versions:

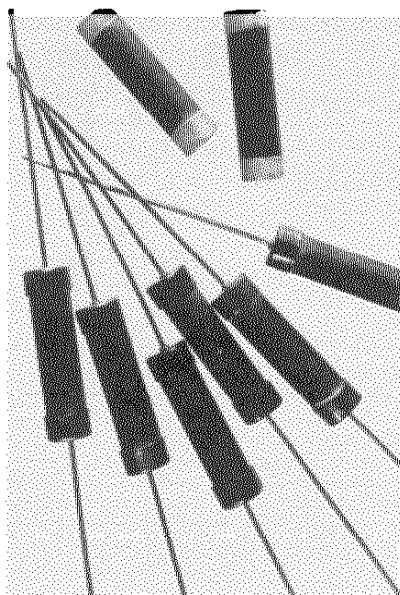
Type AS for its ability to absorb high amounts of energy and for its non-inductive property at high voltage.

Type SP for great AC power handling capacity at either power frequencies or at many megahertz.

Type A for a high power non-inductive resistor when high resistance is required.

Series 234 and 231 Resistors

Global Series 234 and 231 resistors are a small size non-inductive bulk type resistor (there are no spirals or windings), capable of dissipating a full 10 watts of power (Type SP) or absorbing 275 joules of energy (Type AS).

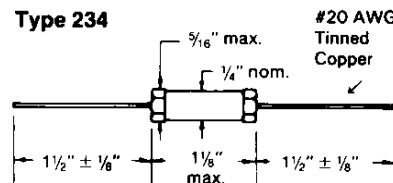


Specifications	234SP	234AS	231SP	231AS
Resistance, ohms $\pm 5\%$, $\pm 10\%$, $\pm 20\%$	1-330	12-5000	1-1000	25-6250
Peak voltage*	500 volts	2.5kv	375 volts	1.5kv
Power at 40°C	10 watts	3 watts	2.5 watts	1.5 watts
Derate linearly to 0 watts at:	350°C	230°C	350°C	230°C
Max. operating temperature	350°C	230°C	350°C	230°C
Peak energy*	30 joules	275 joules	15 joules	75 joules

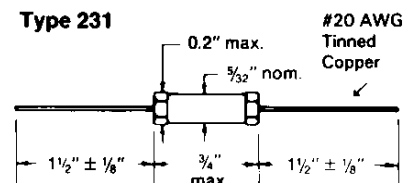
*Allowable peak energy/voltage will depend on the resistance value; consult factory.

Characteristics	234SP	234AS	231SP	231AS
Short time overload				
10 cycles of 1000% rated power	5% max.	1% max.	3.5% max.	1% max.
5 sec. on, 90 sec. off				
Life test 1000 hr. rated power	5% max.	5% max.	5% max.	5% max.
Temperature coefficient	$+0.2$ $-0.08\%/^{\circ}\text{C}$	$+0.0$ $-0.08\%/^{\circ}\text{C}$	$+0.2$ $-0.08\%/^{\circ}\text{C}$	$+0.0$ $-0.08\%/^{\circ}\text{C}$

Type 234



Type 231



Form C-1001 Effective 7/00
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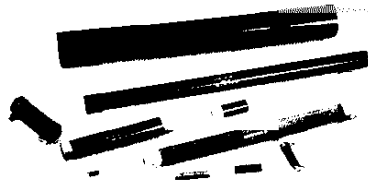
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Paper with Soybean inks
SCS 5M/7/00



Series 800 and 1000 Resistors

This general line is available in a wide variety of sizes and terminations. They retain the non-inductive and heavy load characteristics of all Globar bulk ceramic resistors. These resistors can handle up to 1000 watts, 165 KJ and 165 KV in resistance values from 1 ohm to 1 megohm.

Parts are specified by the four or five character type number (for example 885SP, 888AS, 890A), the first two digits



of the resistance, a single digit to indicate the power of ten multiplier, and "J" for $\pm 5\%$, a "K" for $\pm 10\%$, or an "L" for $\pm 20\%$. Where the resistance is less than ten ohms, the power of ten multiplier is not used, and an "R" replaces the decimal point. Thus R50 = 0.50 ohm, 7R5 = 7.5 ohm, 220 = 22.0 ohm, 152 = 1500 ohm, etc. Standard construction for type SP resistors provides aluminum metalization, while type A resistors have nickel metalization. Type AS resistors have silver metalization with a dielectric coating. These standard features are designated by the suffix "DS". The AS resistor can also be supplied for oil applications with the suffix "GO" or "HO" which provide a radial or horizontal tab terminated resistor, coated for use in oil. The suffix "N" provides a

Electrical Specifications

Length and Diameter	Type	Resistance Available ohms			Average Power @40°C (watts)	Peak* Energy (joules)	Peak** Voltage (volts)
		Min.	to	Max.			
2" x 1/2"	884SP	1.0		200	22.5	250	1,000
2 1/2" x 3/4"	885SP	1.0		130	45	250	1,000
	885AS . . DS	6.0		1200	15	2,800	8,000
	885A	1500		220K	15	750	3,750
5" x 3/4"	886SP	1.0		330	90	500	4,000
	886AS . . DS	15.0		3300	30	7,000	20,000
	886A	3900		390K	30	1,500	10,000
6" x 1"	887SP	1.0		330	150	1,600	4,000
	887AS . . DS	12.0		3300	50	13,000	30,000
	887A	3900		390K	50	6,000	12,000
6" x 1 1/2"	1026AS . . DS	5.0		1200	70	30,000	30,000
8" x 1"	888SP	1.0		390	190	2,100	6,000
	888AS . . DS	15.0		3900	75	16,500	45,000
	888A	4700		470K	60	7,500	15,000
8" x 1 1/2"	1028AS . . DS	6.5		1875	100	46,000	45,000
12" x 1"	889SP	1.0		680	275	3,200	10,000
	889AS . . DS	25.0		6800	100	27,000	75,000
	889A	8200		680K	90	12,500	25,000
12" x 1 1/2"	1032AS . . DS	9.0		2500	150	75,000	75,000
18" x 1"	890SP	1.0		1000	375	4,200	16,000
	890AS . . DS	40.0		10K	150	43,000	120,000
	890A	12K		1M	125	20,000	40,000
18" x 1 1/2"	1038AS . . DS	15.0		3800	225	119,000	120,000
18" x 2"	891SP	1.0		450	750	15,000	16,000
24" x 2"	892SP	1.0		600	1000	17,500	22,000
24" x 1 1/2"	1044AS . . DS	20.0		4800	300	164,000	165,000

* Allowable peak energy/voltage will depend on the resistance value; consult factory.

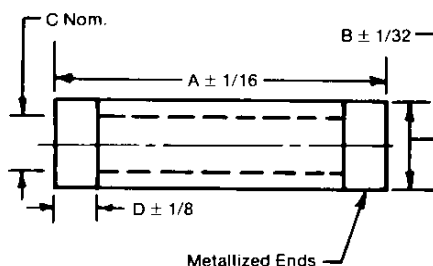
** Derate by 50% with oil resistant coating on Type AS resistors.

Energy ratings are based on pulses <10 milliseconds. Type SP ratings can be substantially greater for longer pulses. Consult factory.

no arc terminal with a dielectric coating for applications requiring high energy or current density performance. Consult customer service for additional details and part numbers. A typical part num-

ber would be 886AS501KDS. This represents a type AS resistor, 5" long x 3/4" diameter, 500 $\pm 10\%$ ohms, with dielectric coating, and silver terminations.

Characteristics	Type SP	Type AS	Type A
Maximum operating temperature: °C	350	230	230
Temperature coefficient: percent per degree C, -55°C to maximum rated temperature	+0.2 -0.08	+0.0 -0.08	+0.0 -0.2
Voltage coefficient: Maximum percent per kilovolt per inch active length (overall length less termination)	1.0	1.0	—
Short time overload: Maximum percent change after 5 cycles 10 times rated power, 5 seconds on, 90 seconds off	2.0	2.0	—
Moisture resistance: Maximum percent change when tested per MIL-STD-202 Method 103	2.5	2.5	2.5



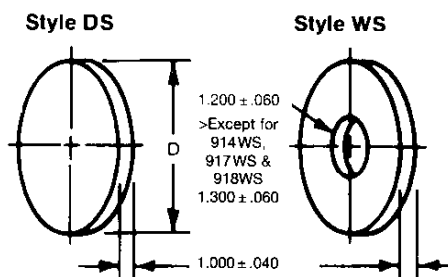
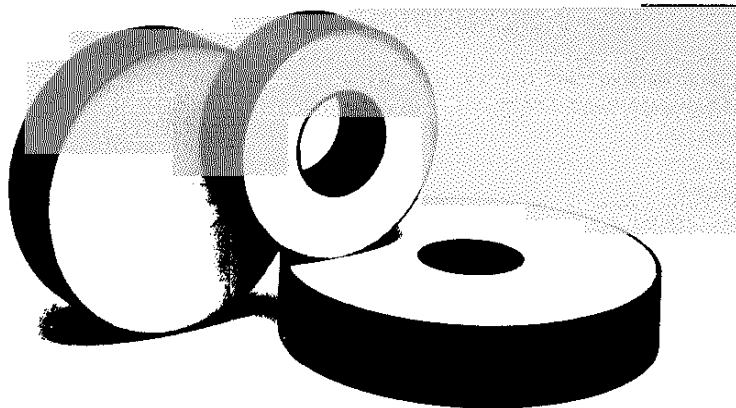
Standard Size Dimensions — inches

Type	A	B	C (SP&AS)	C (A)	D
884 SP	2.0	0.50	0.22	—	0.25
885 SP, AS, & A	2.5	0.75	0.50	0	0.50
886 SP, AS, & A	5.0	0.75	0.50	0	0.62
887 SP, AS & A	6.0	1.00	0.75	0.5	0.50
888 SP, AS, & A	8.0	1.00	0.75	0.5	0.88
889 SP, AS, & A	12.0	1.00	0.75	0.5	0.88
890 SP, AS & A	18.0	1.00	0.75	0.5	0.88
891 SP	18.0	2.00	1.50	—	1.00
892 SP	24.0	2.00	1.50	—	1.00
1026 AS	6.0	1.50	1.00	—	0.50
1028 AS	8.0	1.50	1.00	—	0.88
1032 AS	12.0	1.50	1.00	—	0.88
1038 AS	18.0	1.50	1.00	—	0.88
1044 AS	24.0	1.50	1.00	—	0.88

Special sizes are available; consult factory.

Series 900 Disc and Washer Style Resistors

This high energy series is available in solid discs and washer styles.



Type	Style	Diameter "D" (inches)	Peak Energy (joules)	Available Resistances	
				Minimum	Maximum
911DS	Solid Disc	1.60 ± 0.06	9,000	1.6	100
912DS	Solid Disc	2.37 ± 0.06	21,000	0.7	90
913DS	Solid Disc	3.00 ± 0.08	33,000	0.5	56
914DS	Solid Disc	3.75 ± 0.08	52,500	0.3	36
913WS	Washer	3.00 ± 0.08	27,600	0.5	78
914WS	Washer	3.75 ± 0.08	47,000	0.3	40
915WS	Washer	4.37 ± 0.08	65,500	0.2	28
916WS	Washer	4.75 ± 0.08	79,500	0.2	24
917WS	Washer	5.00 ± 0.08	80,500	0.2	20
918WS	Washer	5.90 ± 0.08	120,000	0.1	13

Characteristics

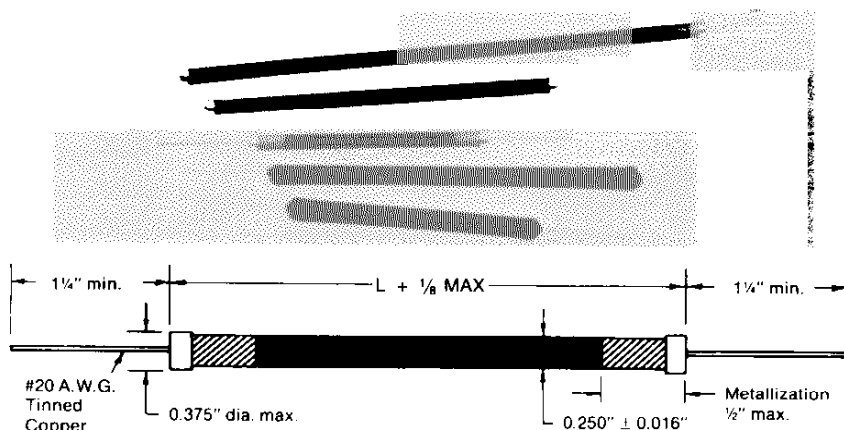
Maximum temperature:	230°C
Maximum peak voltage:	5000 volts
Contacts:	Brass metallization on faces
Recommended contact pressure:	25 psi, minimum; 100-300 psi preferred
Power rating:	Dependent upon mounting. In free air, parts will safely dissipate 2.5 watts per square inch of surface area at 40°C
Temperature coefficient of resistance:	-0.1%/°C to 0.0%/°C

Series 102/104/106/109 AS & SP Pencil-Type Resistors

These 1/4" diameter resistors are available in a variety of lengths. Pencil shaped resistors offer unique non-inductive and high-voltage properties in a compact, easily-wired configuration.

Type AS for high voltage and energy applications.

Type SP for high AC power handling capabilities.



Length	Type No.	Resistance Available (ohms)		Average Power @ 40° C (watts)	Peak* Energy (joules)	Peak* Voltage (volts)
		Min.	Max.			
2"	102AS	30	9,000	5	600	3,000
	102SP	1	700	15	50	1,000
4"	104AS	55	18,000	9	1,200	9,000
	104SP	2	1,500	25	95	3,600
6"	106AS	90	30,000	13	1,900	15,000
	106SP	3	2,400	36	155	5,000
9"	109AS	150	48,000	20	3,000	25,000
	109SP	4	3,800	55	250	8,800

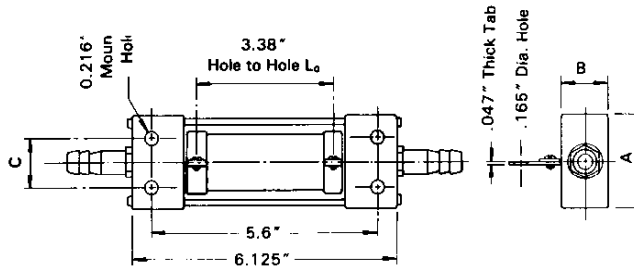
*Allowable peak energy/voltage will depend on the resistance value; consult factory.

Direct Water-Cooled Resistors

Globar water-cooled non-inductive resistors are capable of dissipating more power in a smaller package than previously available in the industry.

Type No.	Power, watts		Dimensions (in)			Nominal Resistance Range
	Rated Power	Max. Power	A	B	C	Tol. = $\pm 10\%$
W500SP	350	500	1.97	1.18	.79	1 - 100 Ω
W1000SP	750	1000	2.36	1.77	1.18	1 - 100 Ω

Part No. Example: W1000SP200K = Type W1000SP, 20 ohm $\pm 10\%$



Resistor body: Type SP
Hose connections: polycarbonate
End mounts: acrylic resin
End seals: silicone rubber

Good quality drinking water may give 1 to 2 years life where high purity water may increase life by a factor of 5.

Water pressure:

Assemblies are tested at 85 psi; however, for long-term reliability it is recommended that the operating pressure be at 42 psi or lower.

Mechanical considerations:

The ceramic resistor is fairly rugged; however, the acrylic and polycarbonate parts with the epoxy seals require that care be taken during assembly or transporting. Rapid water pressure changes should also be avoided.

APPLICATION CONSIDERATIONS:

Water purity:

Specific life data with defined water conditions is not available. It has been observed that life expectancy of higher resistances, (ex. W500SP > 20 ohms), may vary from 1 to 5 years, depending on the water purity.

Higher resistance values cause increased conduction in the water which deposits contaminants on the resistor I.D. These deposits reduce heat transfer, deteriorate the silicone seal and inhibit water flow, all of which can cause premature failure.

Termination Metals

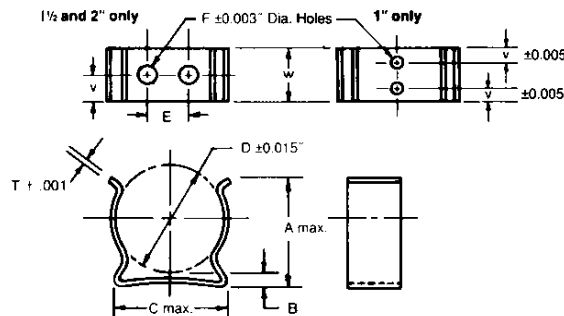
Electrical connection to the resistive bodies of resistors is made by metal end bands. The standard metal is

aluminum for type SP, silver for type AS and nickel for type A. Special terminations of brass, copper or tinned

ends are also available. Add "B," "C," or "T" respectively to the part number to designate these special terminations.

Mounting Clips and Connector Caps

In most cases, connections to the resistors may be made by using these stock clips and connector caps:

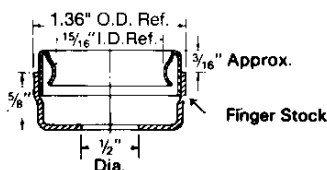


Mounting Clip Dimensions — inches

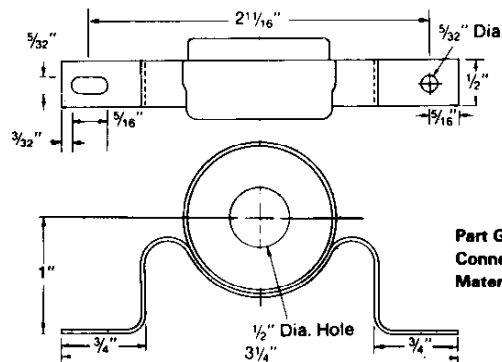
Stock No.	Size	Holes	A	B	C	D	E	F	T	V	W
35370	1/2"	1	0.620	0.090	0.560	0.500		0.093	0.020	0.188	0.375
35267	3/4"	1	0.940	0.155	0.830	0.750		0.144	0.020	0.312	0.625
35268	1"	2	1.230	0.170	1.070	1.000		0.128	0.024	0.156	0.625
35371	1-1/2"	2	1.650	0.100	1.650	1.500	0.925	0.103	0.032	0.250	0.500
35269	2"	2	2.375	0.544	1.080	2.000	0.375	0.125	0.043	0.375	0.750

Material: Beryllium Copper
Finish Electro Tin Plate

Connector Caps



Part G-4361
Connector Cap Assembly (without strap)
Material: Copper



Part G-4362
Connector Cap Assembly (with strap)
Material: Copper