



- High Surge Energy Rating
- High Voltage Withstand
- Essentially Non-Inductive
- Wide Resistivity Range
- Air / Oil / SF6 Environments
- Single Disc or Modular Assemblies

With the capacity of sustaining energies ranging from Joules to Mega-Joules, at frequencies up to Mega-Hz, HVR High Energy Disk Resistors can be used in even the most demanding applications such as electrical transmission, traction, AC/DC drives, pulsed power, dummy loads, induction heating and pulse forming networks.

Disk Size (mm)	D <sub>o</sub> (mm)	D <sub>i</sub> (type)	Thickness <sup>1</sup> (mm)	Max. Energy <sup>2</sup> (KJ)	Max. Impulse Volts <sup>3</sup> (kV)	Resistance Range (Ω)
032	32	D	25.4	5	18.7	2.0—10K
050	50	C		12	20.4	1.0—3.3K
075	75	A,B,C		25	23.3	0.5—1.0K
112	112	A,B,C		67	26.2	0.2—390
152	152	A,B,C		110	28.3	0.1—100

Notes:

<sup>1</sup> Custom thickness available, affects ratings

<sup>2</sup> Single impulse to cause 125°C temperature rise

<sup>3</sup> Standardized for 50Ω resistor in air, 1.2/50μsec pulse width

### Ordering Information

#### W DDD I Y XXX X

W w/ center bore  
D no center bore

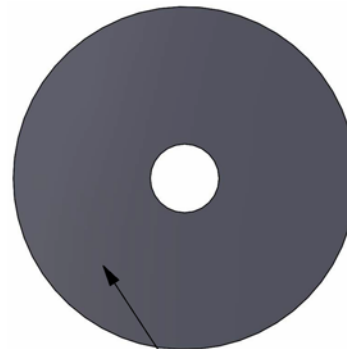
Disk Size (mm)

D <sub>i</sub> type	Size (mm)	code	Thick. (mm)
A	26	8	25.4
B	34		
C	20		
D	11		

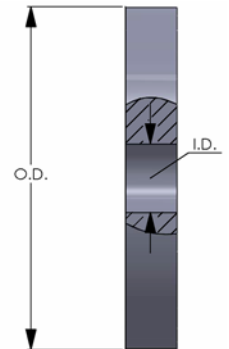
Toler.	Value (%)
J	5
K	10
L	20

Resistance = 2 digits x n<sup>th</sup> power  
 Example: **331** = 33x10<sup>1</sup> = 330Ω  
 <10 Ω, R=decimal  
 Example: **4R7** = 4.7Ω

### Configuration



Metallized on top and bottom faces



Dielectric coating on I.D. and O.D. or as requested

Metallized terminations are flame sprayed onto the opposing flat surfaces. Standard metallized contacts are Aluminum—Please contact HVR APC Engineering for other options.



### Power Dissipation

- Heat generated by the *High Energy Disk Resistors* is dissipated mainly by **radiation** and **convection** from the exposed surface areas. Within restricted domains, mathematical models may be employed to permit heat transfer estimations.
- Higher power dissipation is achieved using conduction cooling through either one or both mounting surfaces using:
  - ⇒ Air heat sink
  - ⇒ Water cooled heat sink

### Radiation and Convection

$$W_a = 0.00026(\Delta T)^{1.4}$$

$W_a$  = Watts/Units Exposed Surface Area ( $W.cm^{-2}$ )

$\Delta T$  = 50°C to 175°C,  $D_o=1.9$  to 15.1 cm, Ambient 25°C

### Recommended Operation Temperatures

Disc diameters ≤ 11.2 cm	≤ 300 °C (Infrequent Operation)
Disc diameters > 11.2 cm	≤ 250 °C (Infrequent Operation)
All Disc diameters	≤ 150 °C (Continuous Operation)

### Impulse Voltage

- Maximum impulse voltage is a function of:
  - **Mainly—Resistance value** and **pulse width**
  - **Lesser Extent—Surface temperature** and **dielectric medium**

### Resistivity Range— $\rho$

**3Ω cm to 30000Ω cm**

$$\rho = R \times A/L$$

R = Resistance value, A = Surface area, L = Length

**Temperature Coefficient** -0.05% to -0.15% per °C rise (depending on Resistivity value)

**Voltage Coefficient** -0.5% to -7.5% per kV/cm (for  $\rho$  domain 10Ω cm to 7500Ω cm)

### Maximum Working Voltage Withstand per cm of Disk Length ( $V_{wk}$ )

SF6  $V_{wk} = 8.0 \times 1.2\sqrt{\text{Log}(R/2.54 \times A/L)}$  kV/cm 1.2/50μs Waveform

AIR  $V_{wk} = 4.3 \times 1.2\sqrt{\text{Log}(R/2.54 \times A/L)}$  kV/cm 1.2/50μs Waveform

AIR  $V_{wk} = 3.0 \times \text{Log}(R/2.54 \times A/L)$  kV/cm 50/1000μs Waveform

AIR  $V_{wk} = 1.5 \times (\text{Log}(R/2.54 \times A/L))^{1.25}$  kV/cm 100/10000μs Waveform