

# AVX High Voltage Ceramic Capacitors



Version 18.3

**AVX**  
A KYOCERA GROUP COMPANY

# High Voltage Ceramic Capacitors

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# High Voltage Ceramic Capacitors



## Type HP/HW/HK – Strontium-based Dielectric

### HOW TO ORDER

<p><b>HP40</b></p> <p> </p> <p>Type/Size High Voltage Radial-leaded</p> <p><b>Coated Discs</b></p> <p>HD    30       40       60</p> <p>HP     30       40       50       60</p> <p><b>Uncoated Discs with fixtures</b></p> <p>HW     30       40       50       60</p> <p><b>Uncoated Discs without fixtures</b></p> <p>HE     30       40       60</p> <p>HK     30       40       50       60</p>	<p><b>E</b></p> <p> </p> <p><b>Dielectric Type II</b> E = N4700</p>	<p><b>3</b></p> <p> </p> <p><b>Voltage</b> X = 15 kV Y = 20 kV 3 = 30 kV 4 = 40 kV 5 = 50 kV 6 = 60 kV 9 = 100 kV</p>	<p><b>0102</b></p> <p> </p> <p><b>Capacitance (EIA Code)</b></p> <p><b>Capacitance expressed by 2 significant figures</b> 1st digit: 0 (zero) 2nd and 3rd digits: the 2 significant figures of the capacitance value. 4th digit: - for values <math>\geq 10\text{pF}</math> and <math>\leq 999\text{pF}</math>: the number of ZEROS to be added to the capacitance values. - for values <math>\geq 1\text{pF}</math> and <math>\leq 9.9\text{pF}</math>: the figure 9 signifying that the capacitance value is to be multiplied by 0.1 Examples: 1000pF : 0102           8.2pF : 0829</p> <p><b>Capacitance expressed by 3 significant figures</b> 1st, 2nd and 3rd digits: the 3 significant figures of the capacitance value. 4th digit: - for values <math>&gt; 100\text{pF}</math> and <math>\leq 999\text{pF}</math>: the number of ZEROS to be added to the capacitance values. - for values <math>&gt; 10\text{pF}</math> and <math>&lt; 100\text{pF}</math>: the figure 9 signifying that the capacitance value is to be multiplied by 0.01 - for values <math>\geq 1\text{pF}</math> and <math>\leq 10\text{pF}</math>: the figure 8 signifying that the capacitance value is to be multiplied by 0.01 Examples: 196pF : 1960           47.2pF : 4729           8.28pF : 8288</p>	<p><b>M</b></p> <p> </p> <p><b>Tolerance</b> K = <math>\pm 10\%</math> M = <math>\pm 20\%</math></p>	<p><b>--</b></p> <p> </p> <p><b>Suffix</b> -- = bulk</p>
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Not RoHS Compliant

# High Voltage Ceramic Capacitors



Type HP/HW/HK  
Type HD/HE



## GENERAL CHARACTERISTICS

### HIGH VOLTAGE / AC USES

- The main applications include live line indicators, AC dividers, grading systems for power distribution network, protection for HV switches and power circuit breakers. Coupling, by-passing high frequency circuits also use HV ceramic disc capacitors.
- These applications require:
  - a high internal resistance.
  - a high dielectric strength.
  - low or moderate losses at working frequencies (from 50 Hz up to 10 kHz).

The active power (or losses) being:

$$W_a = 2\pi f C \cdot \text{tg } \delta \cdot V^2 = k (C \cdot \text{tg } \delta) (F \cdot V^2)$$

This shows that improved performances are obtained when:

- Good dielectric properties (low tg δ) and
- No long term overvoltage are present and
- Capacitors free of “partial discharge” (corona) effect, up to rated rms voltage.

TPC is able to perform “discharge free test” and may guarantee a rate as low as 5 picocoulombs at  $V_{\text{rms}}$  upon request.

- High voltage capacitors for AC uses are mainly made of type II dielectrics. Most of these materials except strontium titanate exhibit a significant non-linearity. Consequently, the capacitance value depends on the voltage across the component and on the frequency of the applied signal.

## SELECTION GUIDE

Application	Series	Type	Size	Finish
High energy pulses or AC or DC	Coated discs with fixtures	HP	30 40 50 60	Epoxy potted
	Uncoated discs with fixtures	HW	30 40 50 60	Uncoated
	Uncoated discs without fixtures	HK	30 40 50 60	Bare disc
AC voltage dividers at line frequency (50 & 60Hz)	Coated discs with fixtures	HD	30 40 60	Epoxy potted
	Uncoated discs without fixtures	HE	30 40 60	Bare disc

### HIGH ENERGY PULSES

- Laser pulses circuitry, high energy/high voltage test equipment (HV accelerators, physics research) require products especially adapted to their specific requirements.
- Because of the high energy involved, the design of the capacitors have to provide:
  - a very low ESR (equivalent series resistance) to minimize the losted energy.

$$W = \int_0^{i_p} (\text{ESR} \cdot I^2) di$$

- a very low ESL (equivalent series inductance) to keep the correct pulse shape.

Typically due to the design of the electrodes, the products exhibit:

- ESR: ~ 10 mΩ
- ESL: < 30 nH
- peak current up to 50 kA
- a high withstanding of very large  $\frac{dV}{dt}$  or short signal rise time.
- a high energy density J

$$J = \frac{1}{2} k \epsilon_o \epsilon_r E^2 \text{ (with } E = V/m)$$

even under high electric field, (implying that  $\epsilon_r$  is very little voltage dependent).

Through the use of almost linear or non-voltage dependent capacitors, the stored energy can reach 50 to 100 J/liter for the HP/HW/HK products.

- To ensure these properties, traditional ferroelectric type II capacitors cannot be used due to their electrostrictive and piezoelectric properties. The capacitors use quasi “paraelectric”, strontium-based, ceramic material.
- The main applications are coupling, decoupling, multipliers circuits, HV DC power supplies, high voltage dividers.

# High Voltage Ceramic Capacitors



## HP/HW/HK Type – Strontium-based Dielectric

### FEATURES

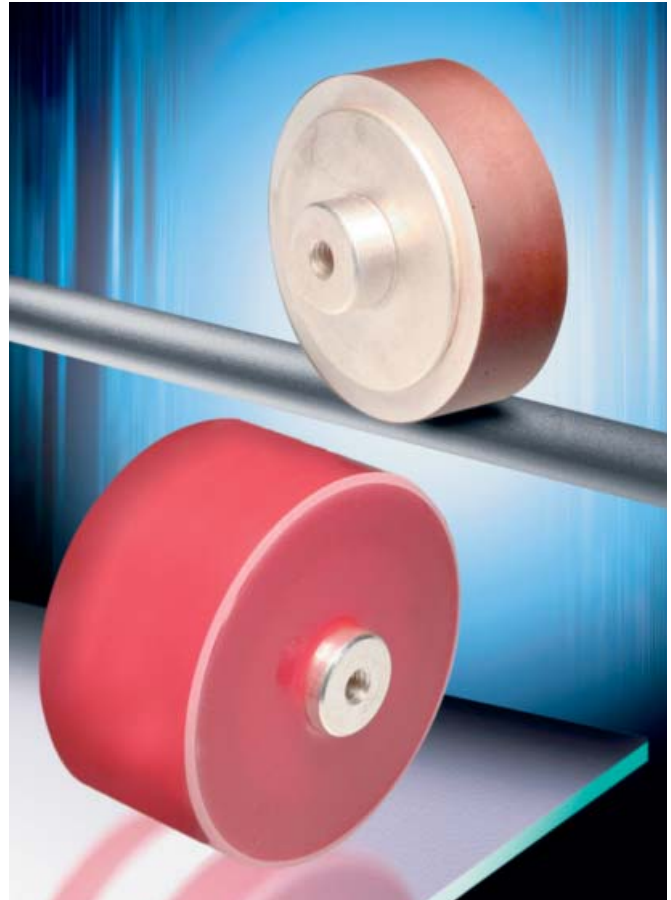
- Excellent behavior on pulse and fast discharge conditions
- Excellent capacitance vs voltage characteristic
- Low dissipation factor
- Very low Corona effect
- Coated and uncoated devices available

### APPLICATIONS

- High-voltage supply for gas lasers
- High-voltage dividers
- Marx generators
- Power generators
- High-voltage power supply
- High-voltage coupling devices
- Power line coupling system for Internet & Telecom

### TECHNOLOGY

- **HP** range: Coated capacitor with fixtures
- **HW** range: Uncoated capacitor with fixtures
- **HK** range: Uncoated capacitor without fixtures
- Fixtures: M5
- Delivery mode: bulk in carton box
- Dielectric Type II: N4700 class (see typical curves page 13)



### DIELECTRIC CHARACTERISTICS

TPC code	E
Dielectric class (DIN)	N4700
Operating temperature range (°C)	-30/+85°C
Capacitance change with temperature (%)	+22/-33%
Typical dielectric constant	1850
Dielectric strength kV <sub>DC</sub> /mm	8.0
Dissipation factor (1kHz/1V <sub>RMS</sub> /20°C)	20.10 <sup>-4</sup>
Insulation resistance (1000V <sub>b</sub> /20°C/60s)	>100GΩ

### ELECTRICAL CHARACTERISTICS

Rated voltage (V <sub>R</sub> )	15 to 100 kVdc*
Test voltage (V <sub>t</sub> ) (50Hz, in oil, 60s)	12 to 80 kVrms
Operating Temperature ranges	-30 +85°C
Temperature characteristic	N4700
Dissipation factor (20°C, 1kHz, 1V <sub>RMS</sub> )	<20.10 <sup>-4</sup>
Insulation resistance (1000Vdc/60s)	>100GΩ
Capacitance range (20°C – 1kHz – 1V <sub>RMS</sub> )	195pF to 5600pF
Tolerance	Standard: ±20% On request: ±10%
Self-inductance	L <sub>s</sub> ≤ 30nH

\*up to 150kVdc: upon request

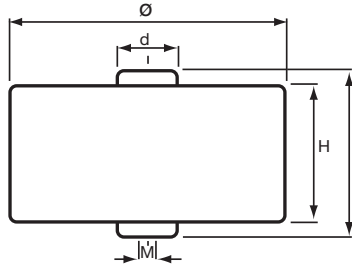
# High Voltage Ceramic Capacitors



## HP/HW/HK Type – Strontium-based Dielectric

### HP RANGE: COATED DEVICES WITH FIXTURES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE



All fixtures: M5  
(0.197)

Part Number	Rated Voltage kVdc	Rated Voltage kVrms	Test Voltage kVrms	Corona Inception Voltage (kVrms) (<10pc)	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)				Packaging Unit						
						Ø ± 1	d	L ± 1	H ± 2							
HP30EX0561M --	15	10	12	6	560	28 (1.100)	12 (0.472)	22 (0.866)	16 (0.630)	40						
HP30EX0751M --					750	28 (1.100)	12 (0.472)			40						
HP30EX0102M --					1000	28 (1.100)	12 (0.472)			40						
HP40EX0152M --					1500	38 (1.500)	12 (0.472)			40						
HP40EX0182M --					1800	38 (1.500)	12 (0.472)			40						
HP40EX0202M --					2000	38 (1.500)	12 (0.472)			40						
HP50EX0252M --					2500	48 (1.900)	12 (0.472)			45						
HP50EX0272M --					2700	48 (1.900)	12 (0.472)			45						
HP50EX0332M --					3300	48 (1.900)	12 (0.472)			45						
HP60EX0372M --					3700	58 (2.283)	15 (0.591)			20						
HP60EX0402M --					4000	58 (2.283)	15 (0.591)			20						
HP60EX0502M --					5000	58 (2.283)	15 (0.591)			20						
HP60EX0562M --	5600	58 (2.283)	15 (0.591)	20												
HP30EY0501M --	20	15	18	9	500	28 (1.100)	12 (0.472)	24 (0.945)	18 (0.709)	40						
HP30EY0561M --					560	28 (1.100)	12 (0.472)			40						
HP30EY0751M --					750	28 (1.100)	12 (0.472)			40						
HP40EY0102M --					1000	38 (1.500)	12 (0.472)			40						
HP40EY0132M --					1300	38 (1.500)	12 (0.472)			40						
HP40EY0152M --					1500	38 (1.500)	12 (0.472)			40						
HP50EY0202M --					2000	48 (1.900)	12 (0.472)			45						
HP50EY0222M --					2200	48 (1.900)	12 (0.472)			45						
HP50EY0252M --					2500	48 (1.900)	12 (0.472)			45						
HP60EY0302M --					3000	58 (2.283)	15 (0.591)			20						
HP60EY0332M --					3300	58 (2.283)	15 (0.591)			20						
HP60EY0372M --					3700	58 (2.283)	15 (0.591)			20						
HP60EY0402M --	4000	58 (2.283)	15 (0.591)	20												
HP30E30561M --	30	20	24	12	560	28 (1.100)	12 (0.472)	26 (1.024)	20 (0.787)	40						
HP40E30821M --					820	38 (1.500)	12 (0.472)			40						
HP40E30102M --					1000	38 (1.500)	12 (0.472)			40						
HP40E31121M --					1120	38 (1.500)	12 (0.472)			40						
HP50E30152M --					1500	48 (1.900)	12 (0.472)			45						
HP50E30172M --					1700	48 (1.900)	12 (0.472)			45						
HP50E30202M --					2000	48 (1.900)	12 (0.472)			45						
HP60E30272M --					2700	58 (2.283)	15 (0.591)			20						
HP60E30302M --					3000	58 (2.283)	15 (0.591)			20						
HP60E30332M --					3300	58 (2.283)	15 (0.591)			20						
HP30E40391M --					40	28	33			17	390	28 (1.100)	12 (0.472)	30 (1.180)	24 (0.945)	40
HP40E40751M --											750	38 (1.500)	12 (0.472)			40
HP50E40102M --	1000	48 (1.900)	12 (0.472)	30												
HP50E40142M --	1400	48 (1.900)	12 (0.472)	30												
HP60E40172M --	1700	58 (2.283)	15 (0.591)	20												
HP60E40202M --	2000	58 (2.283)	15 (0.591)	20												
HP60E40242M --	2400	58 (2.283)	15 (0.591)	20												

-Other tolerance on capacitance value: please consult us

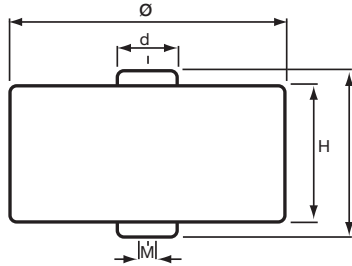
# High Voltage Ceramic Capacitors



## HP/HW/HK Type – Strontium-based Dielectric

### HP RANGE: COATED DEVICES WITH FIXTURES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE



All fixtures: M5  
(0.197)

Part Number	Rated Voltage kVdc	Rated Voltage kVrms	Test Voltage kVrms	Corona Inception Voltage (kVrms) (<10pc)	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)				Packaging Unit
						Ø ± 1	d	L ± 1	H ± 2	
HP30E50281M - -	50	35	42	21	280	28 (1.100)	12 (0.472)	37 (1.457)	31 (1.221)	X
HP40E50411M - -					410	38 (1.500)	12 (0.472)			
HP40E50501M - -					500	38 (1.500)	12 (0.472)			
HP40E50561M - -					560	38 (1.500)	12 (0.472)			
HP50E50751M - -					750	48 (1.900)	12 (0.472)			
HP50E50851M - -					850	48 (1.900)	12 (0.472)			
HP50E50102M - -					1000	48 (1.900)	12 (0.472)			
HP60E51351M - -					1350	58 (2.283)	15 (0.591)			
HP60E50152M - -					1500	58 (2.283)	15 (0.591)			
HP60E51651M - -					1650	58 (2.283)	15 (0.591)			
HP30E61950M - -	60	42	50	25	195	28 (1.100)	12 (0.472)	45 (1.772)	39 (1.536)	X
HP40E63750M - -					375	38 (1.500)	12 (0.472)			
HP50E60501M - -					500	48 (1.900)	12 (0.472)			
HP50E60701M - -					700	48 (1.900)	12 (0.472)			
HP60E60851M - -					850	58 (2.283)	15 (0.591)			
HP60E60102M - -					1000	58 (2.283)	15 (0.591)			
HP60E60122M - -					1200	58 (2.283)	15 (0.591)			
HP50E90501M - -	100	70	80	40	500	48 (1.900)	12 (0.472)	58.5 (2.303)	53 (2.087)	15
HP60E96750M - -					675	58 (2.283)	15 (0.591)			10
HP60E90751M - -					750	58 (2.283)	15 (0.591)			10
HP60E98250M - -					825	58 (2.283)	15 (0.591)			10

**NEW**

X = open request

-Other tolerance on capacitance value: please consult us

# High Voltage Ceramic Capacitors

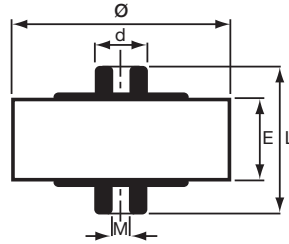


## HP/HW/HK Type – Strontium-based Dielectric

### HW RANGE: UNCOATED DEVICES WITH FIXTURES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE

Handling of uncoated devices must be done under strict cleanliness conditions.



All fixtures: M5  
(0.197)

Part Number	Rated Voltage (kVdc)	Rated Voltage (kVrms)	Test Voltage (kVrms)*	Corona Inception Voltage (kVrms) (<12pC)*	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)			Packaging Unit						
						Ø ± 2	L ± 1	E ± 2							
HW30EX0561M --	15	10	12	6	560	17 (0.670)	22 (0.866)	6 (0.236)	40						
HW30EX0751M --					750	18 (0.719)			40						
HW30EX0102M --					1000	21 (0.827)			40						
HW40EX0152M --					1500	26 (1.024)			40						
HW40EX0182M --					1800	28 (1.103)			40						
HW40EX0202M --					2000	29 (1.142)			60						
HW50EX0252M --					2500	34 (1.339)			45						
HW50EX0272M --					2700	35 (1.378)			45						
HW50EX0332M --					3300	38 (1.496)			45						
HW60EX0372M --					3700	41 (1.614)			30						
HW60EX0402M --					4000	43 (1.692)			30						
HW60EX0502M --					5000	47 (1.850)			30						
HW60EX0562M --	5600	49 (1.929)	30												
HW30EY0501M --	20	15	18	9	500	17 (0.670)	24 (0.945)	8 (0.314)	40						
HW30EY0561M --					560	18 (0.719)			40						
HW30EY0751M --					750	21 (0.827)			40						
HW40EY0102M --					1000	26 (1.024)			40						
HW40EY0132M --					1300	28 (1.103)			40						
HW40EY0152M --					1500	29 (1.142)			40						
HW50EY0202M --					2000	34 (1.339)			45						
HW50EY0222M --					2200	35 (1.378)			45						
HW50EY0252M --					2500	38 (1.496)			45						
HW60EY0302M --					3000	41 (1.614)			20						
HW60EY0332M --					3300	43 (1.692)			20						
HW60EY0372M --					3700	47 (1.850)			20						
HW60EY0402M --	4000	49 (1.929)	20												
HW30E30561M --	30	20	24	12	560	21 (0.827)	26 (1.024)	10 (0.394)	40						
HW40E30821M --					820	26 (1.024)			40						
HW40E30102M --					1000	28 (1.103)			40						
HW40E31121M --					1120	29 (1.142)			40						
HW50E30152M --					1500	34 (1.339)			45						
HW50E30172M --					1700	35 (1.378)			45						
HW50E30202M --					2000	38 (1.496)			45						
HW60E30272M --					2700	43 (1.692)			20						
HW60E30302M --					3000	47 (1.850)			20						
HW60E30332M --					3300	49 (1.929)			20						
HW30E40391M --					40	28			33	17	390	21 (0.827)	30 (1.180)	14 (0.552)	40
HW40E40751M --											750	28 (1.103)			40
HW50E40102M --	1000	34 (1.339)	30												
HW50E40142M --	1400	38 (1.496)	30												
HW60E40172M --	1700	41 (1.614)	20												
HW60E40202M --	2000	47 (1.850)	20												
HW60E40242M --	2400	49 (1.929)	20												

\*tested in oil or Galden

-Other tolerance on capacitance value: please consult us



# High Voltage Ceramic Capacitors

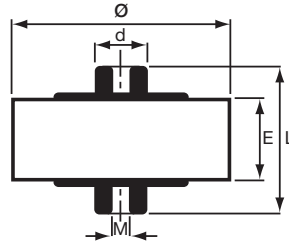


## HP/HW/HK Type – Strontium-based Dielectric

### HW RANGE: UNCOATED DEVICES WITH FIXTURES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE

Handling of uncoated devices must be done under strict cleanliness conditions.



All fixtures: M5  
(0.197)

Part Number	Rated Voltage (kVdc)	Rated Voltage (kVrms)	Test Voltage (kVrms)*	Corona Inception Voltage (kVrms) (<12pC)*	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)			Packaging Unit
						Ø ± 2	L ± 1	E ± 2	
HW30E50281M --	50	35	42	21	280	21 (0.827)	37 (1.457)	21 (0.827)	X
HW40E50411M --					410	26 (1.024)			
HW40E50501M --					500	28 (1.103)			
HW40E50561M --					560	29 (1.142)			
HW50E50751M --					750	34 (1.339)			
HW50E50851M --					850	35 (1.378)			
HW50E50102M --					1000	38 (1.496)			
HW60E51351M --					1350	43 (1.692)			
HW60E50152M --					1500	47 (1.850)			
HW60E51651M --					1650	49 (1.929)			
HW30E61950M --	60	42	50	25	195	21 (0.827)	45 (1.772)	29 (1.142)	X
HW40E63750M --					375	28 (1.024)			
HW50E60501M --					500	34 (1.339)			
HW50E60701M --					700	38 (1.496)			
HW60E60851M --					850	41 (1.614)			
HW60E60102M --					1000	47 (1.850)			
HW60E60122M --					1200	49 (1.929)			
HW50E90501M --	100	70	80	40	500	38 (1.496)	58.5 (2.303)	43 (1.693)	15
HW60E96750M --					675	43 (1.693)			10
HW60E90751M --					750	47 (1.850)			10
HW60E98250M --					825	49 (1.929)			10

**NEW**

\*tested in oil or Galden

X = open request

-Other tolerance on capacitance value: please consult us

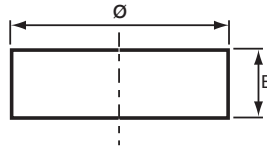
# High Voltage Ceramic Capacitors



## HP/HW/HK Type – Strontium-based Dielectric

### HK RANGE: UNCOATED DEVICES WITHOUT FIXTURES REFERENCES – VOLTAGE AND CAPACITANCE RANGE

Handling of uncoated devices must be done under strict cleanliness conditions.



Part Number	Rated Voltage (kVdc)	Rated Voltage (kVrms)	Test Voltage (kVrms)*	Corona Inception Voltage (kVrms) (<12pC)*	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)						
						Ø ± 2	E ± 2					
HK30EX0561M --	15	10	12	6	560	17 (0.670)	6 (0.236)					
HK30EX0751M --					750	18 (0.719)						
HK30EX0102M --					1000	21 (0.827)						
HK40EX0152M --					1500	26 (1.024)						
HK40EX0182M --					1800	28 (1.103)						
HK40EX0202M --					2000	29 (1.142)						
HK50EX0252M --					2500	34 (1.339)						
HK50EX0272M --					2700	35 (1.378)						
HK50EX0332M --					3300	38 (1.496)						
HK60EX0372M --					3700	41 (1.614)						
HK60EX0402M --					4000	43 (1.692)						
HK60EX0502M --					5000	47 (1.850)						
HK60EX0562M --	5600	49 (1.929)										
HK30EY0501M --	20	15	18	9	500	17 (0.670)	8 (0.314)					
HK30EY0561M --					560	18 (0.719)						
HK30EY0751M --					750	21 (0.827)						
HK40EY0102M --					1000	26 (1.024)						
HK40EY0132M --					1300	28 (1.103)						
HK40EY0152M --					1500	29 (1.142)						
HK50EY0202M --					2000	34 (1.339)						
HK50EY0222M --					2200	35 (1.378)						
HK50EY0252M --					2500	38 (1.496)						
HK60EY0302M --					3000	41 (1.614)						
HK60EY0302M --					3300	43 (1.692)						
HK60EY0372M --					3700	47 (1.850)						
HK60EY0402M --	4000	49 (1.929)										
HK30E30561M --	30	20	24	12	560	21 (0.827)	10 (0.394)					
HK40E30821M --					820	26 (1.024)						
HK40E30102M --					1000	28 (1.103)						
HK40E31121M --					1120	29 (1.142)						
HK50E30152M --					1500	34 (1.339)						
HK50E30172M --					1700	35 (1.378)						
HK50E30202M --					2000	38 (1.496)						
HK60E30272M --					2700	43 (1.692)						
HK60E30302M --					3000	47 (1.850)						
HK60E30332M --					3300	49 (1.929)						
HK30E40391M --					40	28		33	17	390	21 (0.827)	14 (0.552)
HK40E40721M --										720	28 (1.103)	
HK50E40102M --	1000	34 (1.339)										
HK50E40142M --	1400	38 (1.496)										
HK60E40172M --	1700	41 (1.614)										
HK60E40202M --	2000	47 (1.850)										
HK60E40242M --	2400	49 (1.929)										

**NEW**

\*tested in oil or Galden

-Other tolerance on capacitance value: please consult us

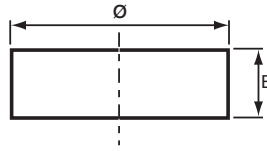
# High Voltage Ceramic Capacitors



## HP/HW/HK Type – Strontium-based Dielectric

### HK RANGE: UNCOATED DEVICES WITHOUT FIXTURES REFERENCES – VOLTAGE AND CAPACITANCE RANGE

Handling of uncoated devices must be done under strict cleanliness conditions.



Part Number	Rated Voltage (kVdc)	Rated Voltage (kVrms)	Test Voltage (kVrms)*	Corona Inception Voltage (kVrms) (<12pC)*	Capacitance ±20% (pF) ±10% on request	Dimensions millimeters (inches)	
						Ø ± 2	E ± 2
HK30E50281M --	50	35	42	21	280	21 (0.827)	21 (0.827)
HK40E50411M --					410	26 (1.024)	
HK40E50501M --					500	28 (1.103)	
HK40E50561M --					560	29 (1.142)	
HK50E50751M --					750	34 (1.339)	
HK50E50851M --					850	35 (1.378)	
HK50E50102M --					1000	38 (1.496)	
HK60E51351M --					1350	43 (1.692)	
HK60E50152M --					1500	47 (1.850)	
HK60E51651M --					1650	49 (1.929)	
HK30E61950M --	60	42	50	25	195	21 (0.827)	29 (1.142)
HK40E63750M --					375	28 (1.024)	
HK50E60501M --					500	34 (1.339)	
HK50E60701M --					700	38 (1.496)	
HK60E60851M --					850	41 (1.614)	
HK60E60102M --					1000	47 (1.850)	
HK60E60122M --					1200	49 (1.929)	
HK50E90501M --	100	70	80	40	500	38 (1.496)	43 (1.693)
HK60E96750M --					675	43 (1.693)	
HK60E90751M --					750	47 (1.850)	
HK60E98250M --					825	49 (1.929)	



\*tested in oil or Galden

-Other tolerance on capacitance value: please consult us

# High Voltage Ceramic Capacitors



## HD/HE Type – Type N4700 – Maintenance Only

### FEATURES

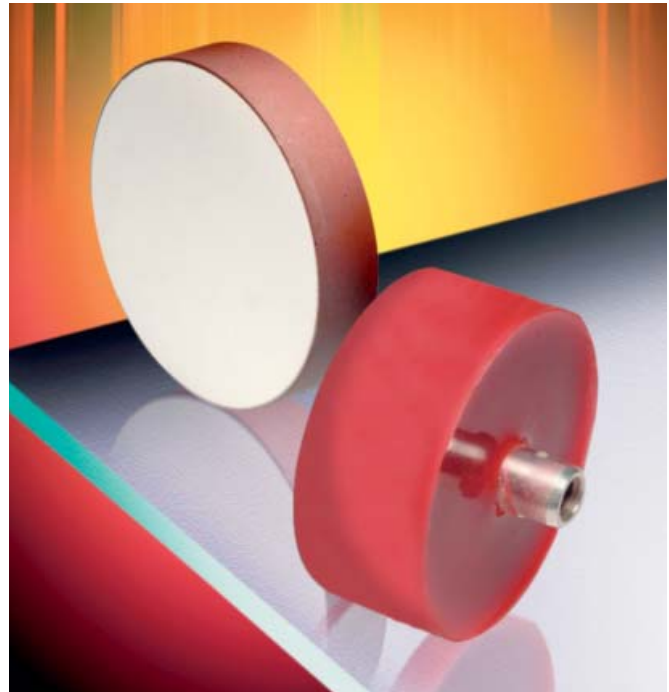
- Disc capacitor, type N4700
- Excellent capacitance vs voltage characteristic
- Low dissipation factor
- Good behavior vs frequency

### APPLICATIONS

- AC voltage dividers at industrial frequency
- High frequency coupling and decoupling
- Other special HV applications

### TECHNOLOGY

- **HD** range: Molded type with fixtures M5 or M8
- **HE** range: uncoated type without fixtures (silvered ceramic) disc
- Delivery mode: bulk in carton box
- Dielectric Type: N4700 class (see typical curves on page 13)



### DIELECTRIC CHARACTERISTICS

TPC code	E
Dielectric class (DIN)	N4700
Operating temperature range (°C)	-30/+85°C
Capacitance change with temperature (%)	+22/-33%
Typical dielectric constant at 0.25 kV/mm	1850
Dielectric strength kV <sub>DC</sub> /mm	8.0
Dissipation factor (1kHz/1V <sub>RMS</sub> /20°C)	20.10 <sup>-4</sup>
Insulation resistance (500V/20°C)	>10G

### ELECTRICAL CHARACTERISTICS

Operating temperature range	-30/+85°C
Rated voltage (V <sub>RMS</sub> /50Hz)	15 and 20 kVrms
Test voltage (V <sub>RMS</sub> /50Hz)	18 and 24 kVrms
Capacitance range	500 to 3000pF
Capacitance tolerance	±20%
Dissipation factor (20°C - 1kHz - 1V <sub>RMS</sub> )	20.10 <sup>-4</sup>
Self-inductance	L <sub>S</sub> ≤40nH
Tolerance	Standard: ±20% On request: ±10%

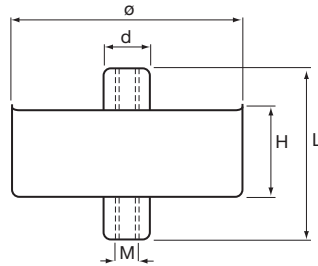
# High Voltage Ceramic Capacitors



## HD/HE Type – Type N4700 – Maintenance Only

### HD RANGE: COATED DEVICES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE

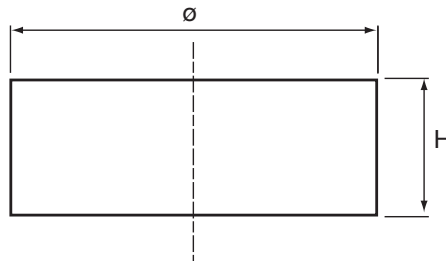


Part Number	Rated Voltage kVdc	Rated Voltage kVrms	Test Voltage kVrms	Capacitance ±20% (pF)*	Dimensions millimeters (inches)					Packaging Unit
					Ø ± 1	L ± 1	H ± 2	d	Fixtures	
HD300X0501M - -	20	15	18	500	26 (1.024)	32 (1.261)	17 (0.670)	8 (0.315)	M5 (0.197)	40
HD400X0102M - -	20	15	18	1000	40 (1.575)	32 (1.261)	17 (0.670)	8 (0.315)	M5 (0.197)	40
HD600X0302M - -	20	15	18	3000	57 (2.245)	40 (1.575)	17 (0.670)	12 (0.473)	M8 (0.315)	10
HD600Y0202M - -	30	20	24	2000	57 (2.245)	42 (1.655)	19 (0.748)	12 (0.473)	M8 (0.315)	10

\*tolerance 10% available on request.

### HE RANGE: UNCOATED DEVICES

### REFERENCES – VOLTAGE AND CAPACITANCE RANGE



Part Number	Rated Voltage kVdc	Rated Voltage kVrms	Test Voltage kVrms	Capacitance ±20% (pF)*	Dimensions millimeters (inches)		Packaging Unit
					Ø ± 1	H ± 2	
HE300X0501M - -	20	15	15	500	17 (0.670)	8 (0.314)	20
HE400X0102M - -	20	15	15	1000	26 (1.024)	8 (0.314)	20
HE600X0302M - -	20	15	15	3000	41 (1.614)	8 (0.314)	6
HE600Y0202M - -	30	20	20	2000	38 (1.496)	10 (0.394)	6

\*tolerance 10% available on request.

#### IMPORTANT: HE TYPE

Handling of uncoated devices must be done under strict cleanliness conditions.

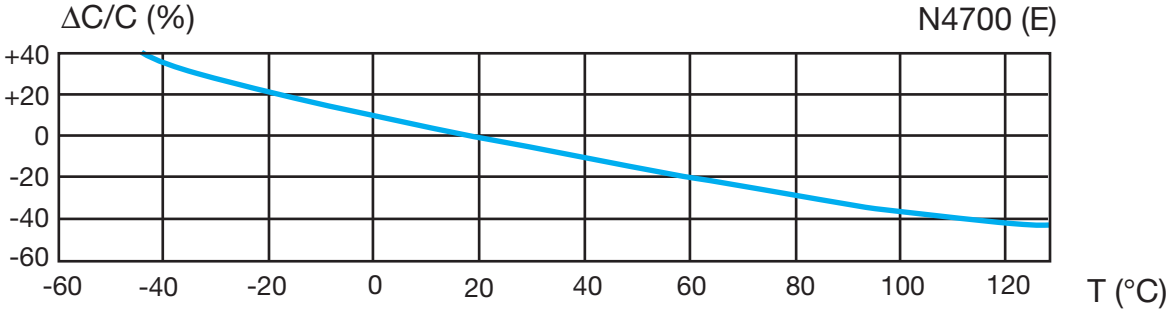
# High Voltage Ceramic Capacitors



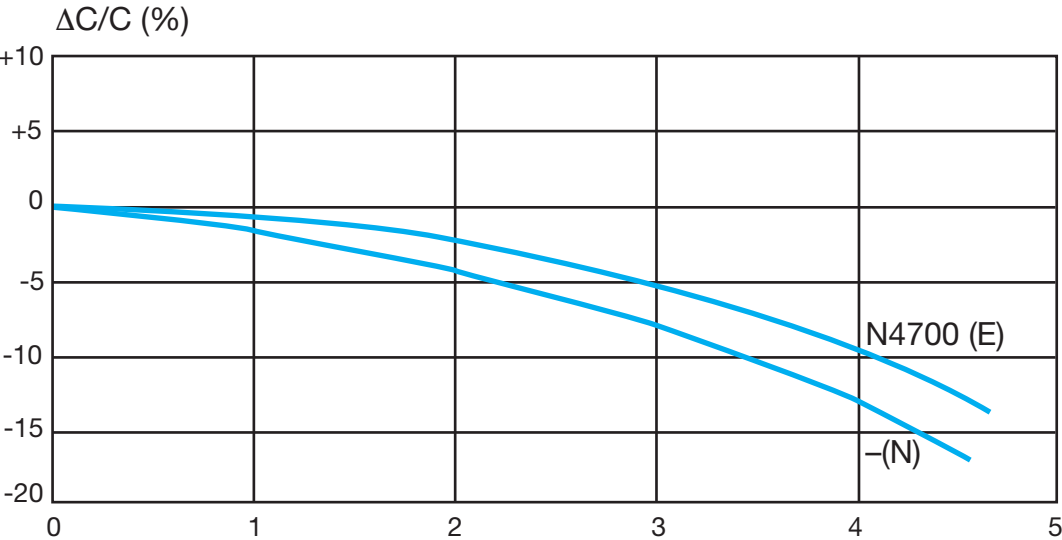
Type HP/HW/HK  
Type HD/HE

## TYPICAL CURVES: DIELECTRIC N4700

### TYPICAL TEMPERATURE COEFFICIENT OF CAPACITANCE



### TYPICAL D.C. VOLTAGE COEFFICIENT



## Quality Assurance

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### LOT RELEASE

Every high voltage and power capacitor is inspected individually during manufacture.

They must, before shipping, satisfy the criteria of the quality control department.

Each lot is checked in accordance with defined sampling plans.

The tests are performed in accordance with the specifications hereunder.

### MECHANICAL TESTS

Dimensions of each unit are inspected and must be in accordance with the characteristics specified on the particular data sheet.

### OPERATING CLIMATIC CONDITIONS

These power capacitors temperature range, in normal utilization, is from  $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

However if provided power is decreased as previously indicated, it is possible to use them at higher temperatures.

Please refer to us.

### ELECTRICAL TESTS

- **Capacitance and tangent of loss angle (DF)**

Tests are made at room temperature and the measurement conditions are:

Type I -  $C < 1000\text{pF}$ :

- measuring frequency: 1 MHz
  - measuring voltage:  $\leq 10\text{ Vrms}$
- $C \geq 1000\text{ pF}$ :
- measuring frequency: 1 kHz
  - measuring voltage:  $\leq 10\text{ Vrms}$

Type II -  $C < 100\text{pF}$ :

- measuring frequency: 1 MHz
  - measuring voltage:  $\leq 1\text{ Vrms}$
- $C \geq 100\text{pF}$ :
- measuring frequency: 1 kHz
  - measuring voltage:  $\leq 1\text{ Vrms}$

- **Dielectric strength**

This test is realized with DC or AC/50 Hz voltage (refer to individual data sheet for each type). Units are kept under applied voltage for 1 min.

- **Insulation resistance**

Insulation resistance value is warranted higher than  $10\text{ G}\Omega$  after 1 min at 1000 VDC.

- **Temperature coefficient**

Temperature coefficients are measured with voltage less than 10V in temperature range from  $+20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ . Temperature coefficients are within the tolerances specified in particular data sheets.

NOTICE: Specifications are subject to change without notice. Contact your nearest AVX Sales Office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable, but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required. Specifications are typical and may not apply to all applications.

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