

Medium Voltage Shunt Power Capacitors  
for Power Factor Correction (PFC)  
and other advanced applications,  
with and without internal fusing



### Introduction

Hubbell Power Systems, Inc (HPS) family of TRINETICS® shunt capacitors incorporate features for top performance and high field reliability in Medium Voltage distribution and substation applications. Capacitors are available in 15kV, 25kV & 35kV classes, offering power factor improvement advanced applications requiring voltage regulation, and loss reduction.

### Applications

- For Medium Voltage distribution and substation applications
- Power Factor Correction (PFC)
- Smart Grid applications including Volt/VAR Optimization (VVO) and Conservation Voltage Reduction (CVR)
- Advanced distribution grid solution applications
- Voltage regulation and loss reduction
- Metal enclosed banks or pole racks
- Harmonic filter banks



### Standard-Duty (SD type) Capacitors

Capacitors are intended to be operated at or below their rated voltage. All of our capacitors are designed with a continuous overvoltage capability of 110% of rated voltage. This overvoltage capability allows the capacitor to withstand unbalanced and system voltages higher than the rated maximum continuous operating voltage. Standard-Duty capacitors are designed for typical utility transmission and distribution applications.

#### Standard-Duty Ratings

- Continuous Overvoltage withstand: 110% of rated (RMS) voltage
- 120% of rated peak voltage (peak voltage not exceeding  $1.2 \times \sqrt{2} \times$  rated RMS voltage)
- 135% of nominal RMS current based on rated kVAR and rated voltage
- 135% of rated kVAR

### Heavy-Duty (HD type) Capacitors

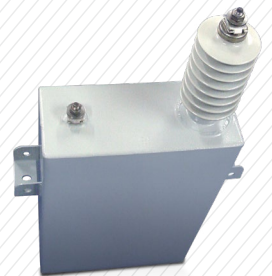
Heavy-Duty capacitors meet or exceed IEEE 18-2012 standards. Heavy-Duty capacitors are designed for applications where higher reliability is desired. The Heavy-Duty capacitor is more resistant to the effects of higher transients, harmonics, and voltage excursions than Standard-Duty capacitors.

#### Heavy-Duty Ratings

- Continuous Overvoltage withstand: 125% of rated (RMS) voltage
- Momentary (15-cycles) Overvoltage withstand: 225% of rated (RMS) voltage
- 135% of nominal RMS current based on rated kVAR and rated voltage
- 135% of rated kVAR
- Meets Performance Test requirements of IEEE 18-2012 standard

### Features and Benefits

- 409 series stainless steel case
- Finish allows superior heat dissipation and offers excellent protection against corrosion in outdoor environments
- Epoxy primer and two coats of polyurethane top coat
- Paint thickness exceeds 85 microns
- Welded terminals are mechanically stronger and provide more consistent mounting than soldered terminals
- Heavy-Duty bolted connections provide superior performance to tab-and-crimp
- Solid stud eliminates inconsistencies associated with solder-filled studs
- All polypropylene film, foil element construction, stainless steel enclosure, and non-PCB dielectric fluid
- High current withstand capability
- Externally fused standard, internally fused available as an option
- Conforms with IEEE-18/IEC60871-1
- 1- or 2-bushing designs
- 50, 100, 150, 200, 300, 400kVAR standard sizes
- 500, 600kVAR and other sizes available\*
- 95, 110, 125 or 150kV BIL (other BIL ratings available upon request)



### Technical Specifications

Applicable standards:	IEEE-18/IEC60871-1
Rated voltage range:	2 to 22kV
Rated kVAR range:	50kVAR to 750kVAR
Phases:	1 Ph/3 Ph
Rated frequency:	60Hz or 50Hz
Fuse protection:	Externally fused ratings (standard): 50-600kVAR, 2.4-19.92kV Internally fused ratings (optional): 100-750kVAR, 2.4-14.62kV
Discharge device:	Internally fitted discharge resistor
Dielectric type:	All polypropylene film
Impregnating oil:	Non-PCB, non-toxic oil
Ground connection:	Unpainted area under mounting bracket
Case material:	Stainless steel 409 series/ CRCA
Paint:	Gray ANSI-70 polyurethane paint suitable for outdoor application

### Bushing

Material:	Wet process porcelain
Standard creepage (min):	14.96" (380 mm) up to 15kV (95kV BIL)* 23.6" (600mm) up to 24 kV (110 or 125kV BIL) 30" (762 mm) for 150kV BIL upon request
Special creepage:	30" (762 mm) (upon request)
Insulation level:	95kV or 110kV up to 15kV
(1.2 x 50 $\mu$ sec wave):	125kV or 150kV up to 24kV

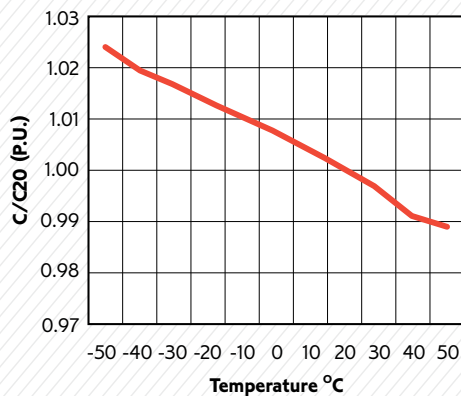
### Permissible overloads

	Standard-Duty	Heavy-Duty
Current:	135%	135%
Voltage:	110%	225% (15-cycles)
kVAR	135%	135%
Capacitance tolerance:	Per respective standard	
Weight:	Unit specific	
Temperature category:	-40°C (-40°F) to +55°C (130°F)	
Routine over voltage test:	4.3 times rated voltage DC	

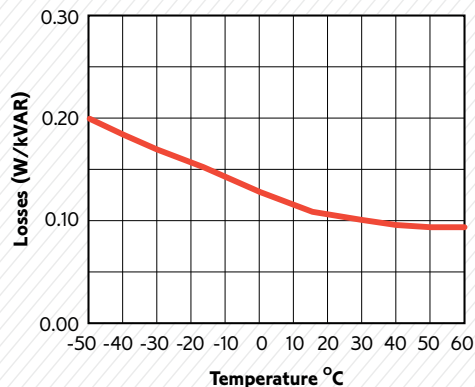
\*If using an 18kV, 450mm bushing for 95kV BIL, total height of 95kV BIL capacitors will be increased by one inch.

### Performance Curves

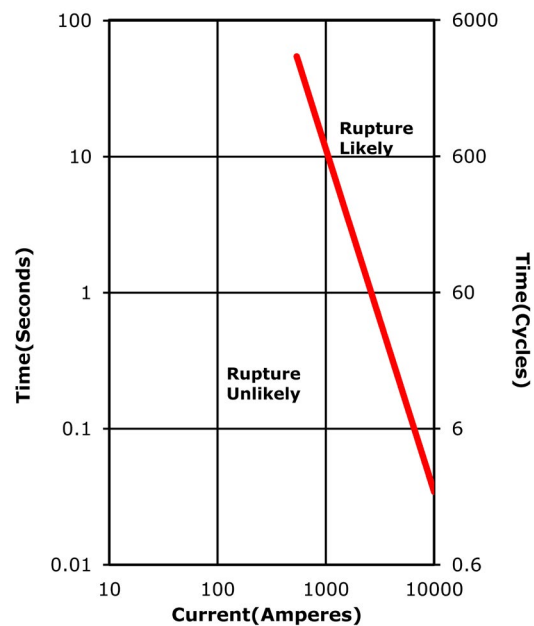
#### Capacitance vs. Temperature



#### Losses vs. Temperature



#### Probability of Case Rupture Curve



NOTE: Minimum  $i^2t$  for 100kVAR and larger capacitors is 3,500,000 Amps<sup>2</sup>seconds for fault currents less than 10,000 amperes.

## Standard-Duty Capacitor Dimensions

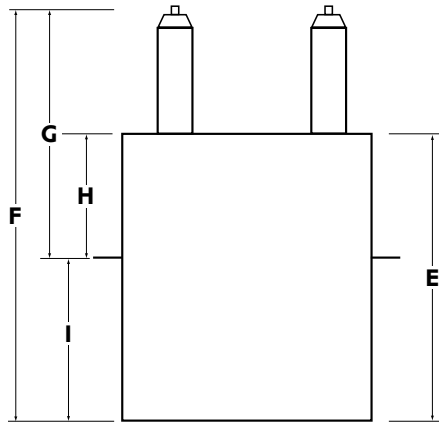
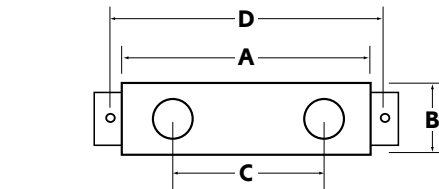
Class	15kV		15kV		25kV		35kV	
kV BIL	95		110		125		150	
kV	7.62		7.62		14.4		19.92	
kVAR	200	400	200	400	200	400	200	400
A	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
B	5.83	6.69	5.83	6.69	5.83	5.83	5.83	5.83
C	9.06	9.0x6	9.06	9.06	9.06	9.06	9.06	9.06
D	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63
E	14.37	22.13	14.37	22.13	14.96	26.38	15.35	27.56
F	23.81	31.57	25	32.76	26.38	37.8	26.77	38.98
G	16.69	22.82	17.88	22.82	18.5	22.82	18.5	22.82
H	7.24	13.39	7.24	12.21	7.09	11.42	7.09	11.42
I	7.12	8.74	7.12	9.92	7.87	14.96	8.27	16.14

## Heavy-Duty Capacitor Dimensions

Class	15kV		15kV		25kV		35kV	
kV BIL	95		110		125		150	
kV	7.62		7.62		14.4		19.92	
kVAR	200	400	200	400	200	400	200	400
A	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
B	5.83	6.69	5.83	7.70	6.02	7.02	6.02	7.70
C	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06
D	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63
E	18.11	25.20	18.11	25.2	19.49	27.56	18.70	25.59
F	27.40	34.49	27.40	34.49	30.75	38.82	32.76	39.65
G	16.54	16.54	16.54	16.54	18.74	18.74	21.54	21.54
H	7.24	7.24	7.24	7.24	7.48	7.48	7.48	7.48
I	10.87	17.96	10.87	17.96	12.01	20.08	11.22	18.11

NOTE: Dimensions shown are in inches and are approximate for Standard-Duty (SD) and Heavy-Duty (HD) capacitors as reference only.

## CATALOG DESCRIPTION FOR CAPACITOR



Capacitor

POSITION 1-2		POSITION 3		POSITION 4-6	
CODE A		CODE B		CODE C	
CP = Standard Duty (SD)		E = External fusing		025 = 25 kVAR	
CH = Heavy Duty (HD)		N = Internal fusing		050 = 50 kVAR	
				075 = 75 kVAR	
				084 = 83.5 kVAR	
				100 = 100 kVAR	
				125 = 125 kVAR	
				150 = 150 kVAR	
				200 = 200 kVAR	
				250 = 250 kVAR	
				300 = 300 kVAR	
				400 = 400 kVAR	
				500 = 500 kVAR	
				600 = 600 kVAR	
				700 = 700 kVAR	

POSITION 7		POSITION 8-12		POSITION 13	
CODE D		CODE E (LINE TO NEUTRAL VOLTAGE)		CODE F (FREQUENCY)	
A = 95kV BIL		00825 = 825		A = 50 Hz	
B = 125kV BIL		02400 = 2400		B = 60 Hz	
C = 150kV BIL		02770 = 2770			
D = 110kV BIL		04160 = 4160			
E = 200kV BIL		04800 = 4800			
F = 75kV BIL		06300 = 6300			
G = 60kV BIL		06350 = 6350			
H = 170kV BIL		06640 = 6640			
		07200 = 7200			
		07620 = 7620			
		07960 = 7960			
		08320 = 8320			
		09960 = 9960			
		11000 = 11000			
		11420 = 11420			

POSITION 14	
CODE G (# OF BUSHING)	
1 = Single-phase, 1 bushing	
2 = Single-phase, 2 bushing	
3 = 3-Phase, Delta connected	



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