

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

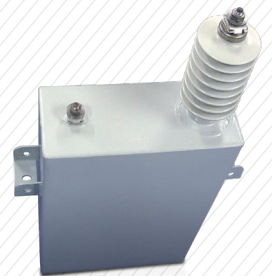
Heavy-Duty capacitors meet or exceed IEEE 18-2012 standards. Heavy-Duty capacitors are designed for applications where higher reliability is desired. The Heavy-Duty capacitor is more resistant to the effects of higher transients, harmonics, and voltage excursions than Standard-Duty capacitors.

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 μ sec wave):	125kV or 150kV up to 24kV

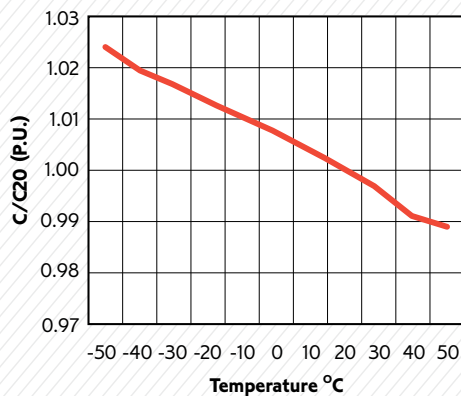
Permissible overloads

	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	

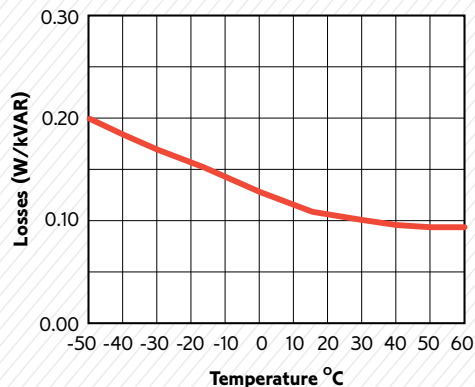
*If using an 18kV, 450mm bushing for 95kV BIL, total height of 95kV BIL capacitors will be increased by one inch.

Performance Curves

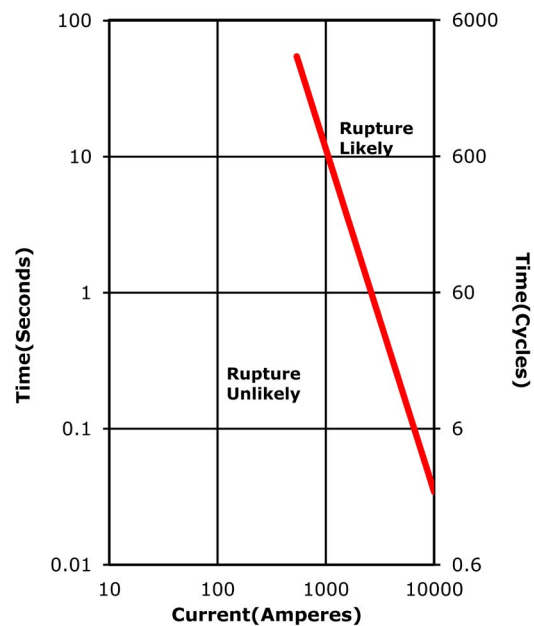
Capacitance vs. Temperature



Losses vs. Temperature



Probability of Case Rupture Curve



NOTE: Minimum i^2t for 100kVAR and larger capacitors is 3,500,000 Amps²seconds for fault currents less than 10,000 amperes.

Standard-Duty Capacitor Dimensions

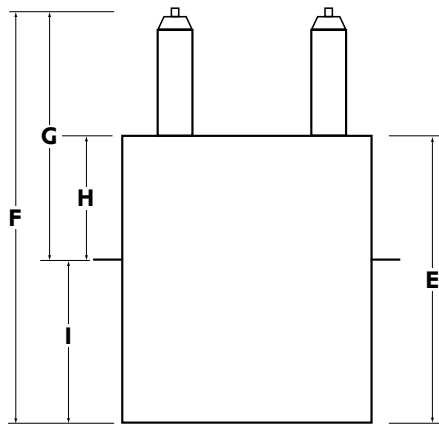
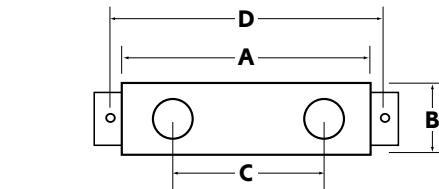
Class	15kV		15kV		25kV		35kV	
kV BIL	95		110		125		150	
kV	7.62		7.62		14.4		19.92	
kVAR	200	400	200	400	200	400	200	400
A	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
B	5.83	6.69	5.83	6.69	5.83	5.83	5.83	5.83
C	9.06	9.0x6	9.06	9.06	9.06	9.06	9.06	9.06
D	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63
E	14.37	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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