



HIGH PERFORMANCE CAPACITORS

PFC (KVAR) | MOTOR STAR/AIR CON | MOTOR RUN & FAN CAPACITOR
REACTOR | TRANSFORMER

HARMONIZER EXPERIENCE

The Hyper Heavy Duty Capacitor (HHDC) type Power Capacitor represents reliable and optimized solution for Power Factor Correction. The output of these capacitors ranges from 0.5 kVAR to 50 kVAR.

The HHDC series is a 3 Phase integrated capacitor design particularly made for Power Factor Correction in Commercial & Industrial applications. These Capacitors feature the use of a unique Metalized Polypropylene film as the dielectric to ensure a long working life with low losses.

The HHDC series are Self healing Capacitors, where the Electrode layer which is a special metal alloy is vacuum deposited on to the Polypropylene film dielectric. The 3 Phase Capacitor is internally composed of 3 Single Phase Capacitor windings assembled in an optimized geometric design. The electrode of the capacitor i.e., the special Metal alloy layer is connected in parallel using a special purpose Metal Spraying technology.

This special process combined with the design of the electrode enables the capacitor to have high peak current withstand levels. The Capacitor elements are processed under high vacuum to eliminate all moisture as well as to impart the correct level of thermal stability. This is an extremely critical process by which oxidation and partial discharges can be avoided during the working life of the capacitor and thus ensure better capacitance stability. The Capacitor elements are encapsulated in a special purpose synthetic material which ensures better dimensional stability and thermal conduction of heat from the insides of the capacitor.

All Cylindrical Capacitors are sealed with high end technology Faculty that makes Capacitor Leak Proof and also our Capacitor manufactured with burst proof mechanism that protect other Panel Components getting damaged in case of Capacitor Failure and Punctured it's on the Spot.

The HHDC Capacitor features the use of a highly reliable two way terminal design involving the use of copper and brass terminal clamps.

In addition the clamping screws that are used are of large size to ensure proper torque application on the connecting cable. This terminal design has therefore a very long and reliable performance capability in comparison to conventional terminal technologies.



The entire capacitor assembly is housed in an extruded cylindrical aluminum case and sealed with a special double seaming technology.

The HHDC Capacitor technology features a triple safety system i.e., Self healing - this is a process by which the Capacitor restores itself in the event of a fault in the dielectric which can happen during high overloads, voltage transients etc., Pressure sensitive disconnecter - this is provided in each phase of the capacitor and enables safe disconnection and electrical isolation at the end of the life of the capacitor & Finger Proof Assembly of Cover.

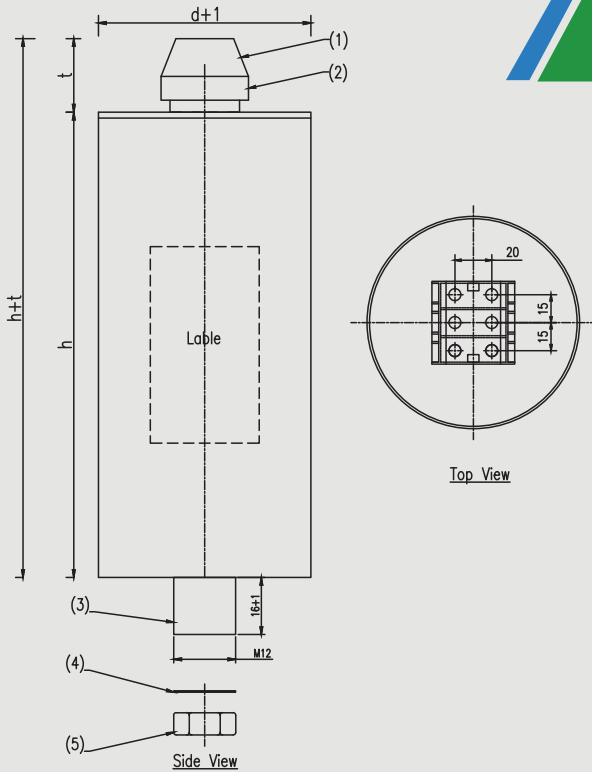
Discharge resistor modules are available in a completely integrated design which can be easily fixed on to the capacitor. The terminal of the capacitor also enables multiple capacitor units to be banked within its permissible current carrying capacity. The HHDC series is therefore an optimal combination of high technology and ergonomic design which offers to the customer.



Technical Specifications

Standards	-	IEC 60831- Part -1 &2 IS 13340 - 1&2
Rated Reactive Power	KVAR	0.25- 50 KVAR (Single & Three Phase)
Rated Voltage	VAC	230-690V AC
Type	-	Cylindrical
Temperature Category	°C	-25 C to 55 C
Protection Class	-	IP20
Tolerance on Capacitance	%	± 5% as per standards
Over Current	In	1.3 x In
Rated Frequency	Hz	50/60Hz
Over Voltage	VMAX	Vn+10% (Upto 8 Hrs in 24 Hrs) / Vn+15% (Upto 30 min in 24 Hrs) Vn+20% (Upto 5 min in 24 Hrs) / Vn+30% (Upto 1 min in 24 Hrs)
Over Current	IMAX	Upto 1.3* In (Upto 1.5* IR including combined effects of harmonics, overvoltages and capacitance)
Peak Inrush Current	Ip	200 X In
In Operating Losses	-	≤ 0.5 W/kVAR, excluding discharge resistor Loss
Test Voltage (Terminal to Terminal)	VTT	2.15 x Un (AC), 2 sec
Test Voltage (Terminal & Casing)	VAC	3000 V AC for 10 Sec
Mean Life Expectancy	-	1,50,000 operating hours at 55 C
Cooling	-	Naturally air cooled (or forced cooled)
Permissible Relative Humidity	-	Max.95%
Maximum Allowed Altitude	-	Max.4000m above sea level
Mounting Position	-	Vertically (Preferred)
Mounting & Grounding	-	With Threaded M 8 /M12 Stud
Protection Type	-	Self Healing, Over Pressure Sensitive 3 Phase Disconnecter
Discharge Resistors / Time Resistor	-	Special Design Internal Discharge Resistance 50V in less than 75 Sec
Casing	-	Extruded Aluminum Type
Dielectric	-	Metalized Polypropylene Film (MPP Film)
Impregnation	-	Biodegradable soft Jelly form Resin, Non PCB
Terminal	-	Screw Terminals Connections from 75mm to 100mm & Stud Terminals connections 116mm & 136 mm
Number of Switching Operations		Imax. 5000 switching/year according to IEC 60831
Installation		Indoor

DRAWING

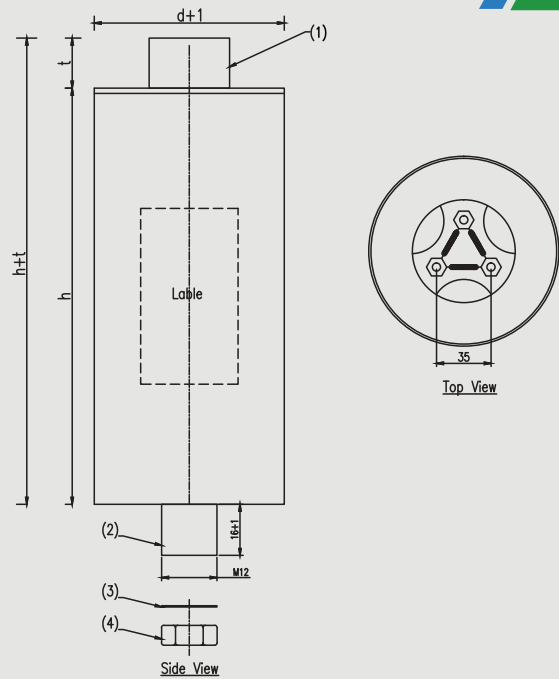


Screw Connector

SR. NO	PARAMETERS	SPECIFICATION
1	CREEPAGE DISTANCE	12 mm
2	CLEARANCE	10 mm
3	TORQUE M5	2.5 Nm
4	TORQUE M12	10 Nm
5	TERMINAL ASSEMBLY Ht	$t = 44$ mm

SR. NO	DESCRIPTION	
1	FINGER PROOF TERMINAL	Yes
2	RESISTOR ASSEMBLY	Yes
3	STUDE	M 12
4	TOOTHED WASHER	M 12
5	HEX NUT	M 12

Bolt Type Connector



SR. NO	PARAMETERS	SPECIFICATION
1	CREEPAGE DISTANCE	18 mm
2	CLEARANCE	26 mm
3	TORQUE M8	10 Nm
4	TORQUE M12	10 Nm
5	TERMINAL ASSEMBLY Ht	$t = 39$ mm

SR. NO	DESCRIPTION	
1	TERMINAL WITH RESISTOR ASSEMBLY	Yes
2	STUDE	M 12
3	TOOTHED WASHER	M 12
4	HEX NUT	M 12

TECHNICAL SPECIFICATIONS


Freq.	Operating Voltage						Current of Max. Voltage	Rated Capacitance	Dimension (dxh)	Appro. Weight	YCPL Part Number	AL CAN
	400V	415V	440V	480V	525V	690V						
50	5	-	-	-	-	-	7.2	3x33.2	75X170	0.8	HHDC-05-400V-3 Ph	S
50	7.5	-	-	-	-	-	10.8	3x49.8	75X170	0.8	HHDC-7.5-400V-3 Ph	S
50	10	-	-	-	-	-	14.4	3x66.3	75X200	1.1	HHDC-10-400V-3 Ph	S
50	12.5	-	-	-	-	-	18.0	3x82.9	85X200	1.3	HHDC-12.5-400V-3 Ph	S
50	15	-	-	-	-	-	21.7	3x99.5	85X200	1.4	HHDC-15-400V-3 Ph	S
50	20	-	-	-	-	-	28.9	3x132.7	95X210	1.7	HHDC-20-400V-3 Ph	S
50	25	-	-	-	-	-	36.1	3x165.9	95X247	1.9	HHDC-25-400V-3 Ph	S
50	30	-	-	-	-	-	43.3	3x199	116X210	2.4	HHDC-30-400V-3 Ph	B
50	40	-	-	-	-	-	57.7	3x265.4	116X247	2.9	HHDC-40-400V-3 Ph	B
50	50	-	-	-	-	-	72.2	3x331.7	136X247	3.9	HHDC-50-400V-3 Ph	B

Hz	KVAr	KVAr	KVAr	KVAr	KVAr	KVAr	Amp	µF	mm	Kg	Code	Type
50	4.6	5	-	-	-	-	7.0	3x30.8	75X170	0.8	HHDC-05-415V-3 Ph	S
50	7.0	7.5	-	-	-	-	10.4	3x46.2	75X170	1	HHDC-7.5-415V-3 Ph	S
50	9.3	10	-	-	-	-	13.9	3x61.6	75X200	1.2	HHDC-10-415V-3 Ph	S
50	11.6	12.5	-	-	-	-	17.4	3 x 7 7	85X200	1.4	HHDC-12.5-415V-3 Ph	S
50	13.9	15	-	-	-	-	20.9	3x92.5	85X200	1.6	HHDC-15-415V-3 Ph	S
50	18.6	20	-	-	-	-	27.8	3x123.3	95X210	1.9	HHDC-20-415V-3 Ph	S
50	23.2	25	-	-	-	-	34.8	3x154.1	95X247	2	HHDC-25-415V-3 Ph	S
50	27.9	30	-	-	-	-	41.7	3x184.9	116X210	2.5	HHDC-30-415V-3 Ph	B
50	37.2	40	-	-	-	-	55.6	3x246.6	116X247	3.1	HHDC-40-415V-3 Ph	B
50	46.5	50	-	-	-	-	69.6	3x308.2	136X247	3.5	HHDC-50-415V-3 Ph	B

Hz	KVAr	KVAr	KVAr	KVAr	KVAr	KVAr	Amp	µF	mm	Kg	Code	Type
50	4.1	4.4	5	-	-	-	6.6	3x27.4	75X170	0.8	HHDC-05-440V-3 Ph	S
50	6.2	6.7	7.5	-	-	-	9.8	3x41.1	75X170	1	HHDC-7.5-440V-3 Ph	S
50	8.3	8.9	10	-	-	-	13.1	3x54.8	75X200	1.2	HHDC-10-440V-3 Ph	S
50	10.3	11.1	12.5	-	-	-	16.4	3x68.5	85X200	1.4	HHDC-12.5-440V-3 Ph	S
50	12.4	13.3	15	-	-	-	19.7	3x82.2	75X254	1.6	HHDC-15-440V-3 Ph	S
50	16.5	17.8	20	-	-	-	26.2	3x109.7	85X254	1.9	HHDC20-440V-3 Ph	S
50	13.8	14.8	25	-	-	-	32.8	3x137.1	95X247	2	HHDC-25-440V-3 Ph	S
50	24.8	26.7	30	-	-	-	39.4	3x164.5	116X247	2.5	HHDC-30-440V-3 Ph	B
50	33.1	35.6	40	-	-	-	52.5	3x219.3	136X247	3.1	HHDC-40-440V-3 Ph	B
50	41.3	44.5	50	-	-	-	65.6	3x247.2	136X247	3.5	HHDC-50-440V-3 Ph	B

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TECHNICAL SPECIFICATIONS

Freq.	Operating Voltage						Current of Max. Voltage	Rated Capacitance	Dimension (dxh)	Appro. Weight	Y CPL Part Number	AL CAN
	400V	415V	440V	480V	525V	690V						

Hz	KVAr	KVAr	KVAr	KVAr	KVAr	KVAr	Amp	µF	mm	Kg	Code	Type
50	3.7	4.0	4.5	5	-	-	6.0	3x23	75x170	0.75	HHDC-05-400V-3 Ph	S
50	5.2	5.6	6.3	7.5	-	-	9.0	3x34.6	75x170	0.825	HHDC-7.5-400V-3 Ph	S
50	6.9	7.5	8.4	10	-	-	12.0	3x46.1	75x200	1.1	HHDC-10-400V-3 Ph	S
50	8.7	9.3	10.5	12.5	-	-	15.0	3x57.6	85x200	1.3	HHDC-12.5-400V-3 Ph	S
50	10.4	11.2	12.6	15	-	-	18.0	3x69.1	85x200	1.4	HHDC-15-400V-3 Ph	S
50	13.9	14.9	16.8	20	-	-	24.1	3x92.2	95x210	1.7	HHDC-20-400V-3 Ph	S
50	17.4	18.7	21.0	25	-	-	30.1	3x115.2	95x247	1.9	HHDC-25-400V-3 Ph	S
50	20.8	22.4	25.2	30	-	-	36.1	3x138.2	116x210	2.4	HHDC-30-400V-3 Ph	B
50	27.8	29.9	33.6	40	-	-	48.1	3x184.3	136x247	2.9	HHDC-40-400V-3 Ph	B
50	34.7	37.4	42.0	50	-	-	60.1	3x230.4	136x247	3.9	HHDC-50-400V-3 Ph	B

Hz	KVAr	KVAr	KVAr	KVAr	KVAr	KVAr	Amp	µF	mm	Kg	Code	Type
50	2.9	3.1	3.5	4.2	5	-	5.5	3x19.3	75x170	0.9	HHDC-05-525V-3 Ph	S
50	4.4	4.7	5.3	6.3	7.5	-	8.2	3x28.9	75x170	1	HHDC-7.5-525V-3 Ph	S
50	5.8	6.2	7.0	8.4	10	-	11.0	3x38.5	75x200	1.2	HHDC-10-525V-3 Ph	S
50	7.3	7.8	8.8	10.5	12.5	-	13.7	3x48.1	85x200	1.4	HHDC-12.5-525V-3 Ph	S
50	8.7	9.4	10.5	12.6	15	-	16.5	3x57.8	85x200	1.6	HHDC-15-525V-3 Ph	S
50	11.6	12.5	14.1	16.7	20	-	22.0	3x77	95x247	1.9	HHDC-20-525V-3 Ph	S
50	14.5	15.6	17.6	20.9	25	-	27.5	3x96.3	116x210	2.7	HHDC-25-525V-3 Ph	S
50	17.4	18.7	21.1	25.1	30	-	33.0	3x115.5	116x250	3.1	HHDC-30-525V-3 Ph	B
50	23.2	25.0	28.1	33.5	40	-	44.0	3x154.1	136x250	3.7	HHDC-40-525V-3 Ph	B
50	29.0	31.2	35.1	41.9	50	-	55.0	3x192.6	136x250	3.9	HHDC-50-525V-3 Ph	B

Hz	KVAr	KVAr	KVAr	KVAr	KVAr	KVAr	Amp	µF	mm	Kg	Code	Type
50	1.7	1.8	2.0	2.4	2.9	5	4.2	3x11.1	75X170	1.2	HHDC-05-690V-3 Ph	S
50	2.5	2.7	3.1	3.6	4.3	7.5	6.3	3x16.7	75X170	1.4	HHDC-7.5-690V-3 Ph	S
50	3.4	3.6	4.1	4.8	5.8	10	8.4	3x22.3	75X200	1.7	HHDC-10-690V-3 Ph	S
50	4.2	4.5	5.1	6.1	7.2	12.5	10.5	3x27.9	85X200	2	HHDC-12.5-690V-3 Ph	S
50	5.0	5.4	6.1	7.3	8.7	15	12.6	3x33.4	85X200	2.3	HHDC-15-690V-3 Ph	S
50	6.7	7.2	8.1	9.7	11.5	20	16.7	3x44.6	95X247	2.5	HHDC-20-690V-3 Ph	S
50	8.4	9.0	10.2	12.1	14.4	25	20.9	3x55.7	136X247	3.4	HHDC-25-690V-3 Ph	S
50	10.1	10.8	12.2	14.5	17.3	30	25.1	3x66.9	136X247	3.7	HHDC-30-690V-3 Ph	B
50	13.4	14.5	16.3	19.4	23.1	40	33.5	3x89.2	136X247	4	HHDC-40-690V-3 Ph	B
50	16.8	18.1	20.3	24.2	28.8	50	41.8	3x111.5	136X247	4.3	HHDC-50-690V-3 Ph	B

S - Screw Type Connector Ref. page No. - 7
 B - Bolt Type Connector Ref. page No. - 7

A.C. Motor Start, Capacitor Motor Run & Fan Capacitor

Our Capacitors are made of highly efficient and innovative technology which helps to deliver best quality and reliable performance to our valued customers. These Capacitors are made of MPP Film with dry impregnates which gives long lasting performance and longer life.

Capacitance Range (µF) Motor Start	From 20-30 µF to 250-300µF
Capacitance Range (%) Motor Run	2 µF to 108 µF
Capacitance Tolerance(%)	+5 %
Duty Cycle Motor Start	20 times start/Hr max., each of duration not exceeding 3 Sec., and every discharge 3 min
Insulation	2KV withstood for 10 sec.
Rated Voltage Motor Start	230V RMS
Voltage VTT Motor Start	275 V RMS
Rated Voltage (Vac) Motor Run	250 V AC & 440V AC ,50Hz also upto 1KV AC as per requirement.
H.V. test between Terminal	2.0 Times Rated Voltage. For 2 Sec
Temperature Limit	-25°C to 85°C
Climate Category	25/85/21
Reference Standard	IS 2993/IEC60252-1 & 2



Dimension for Motor Start

Capacitance(µF)	Motor HP	Rated Voltage	Surge Voltage	Dimension	
				D	L
40-60 (30µF)	0.25	230	275	40	76
60-80(45µF)	0.33	230	275	40	76
80-100(60µF)	0.5	230	275	40	96
100-120(75µF)	0.75	230	275	40	96
120-150(90µF)	1	230	275	45	96
150-200(105µF)	1.5	230	275	50	96
200-250(120µF)	2	230	275	50	96
250-300(135µF)	2.5	230	275	50	96

CANNY LOW VOLTAGE DETUNED REACTOR

CANNY Detuned reactors are used to protect the shunt Capacitors bank from Harmonic Amplification & Harmonic Overloading of Capacitors. De-Tuning reactors are used to tune the capacitors Bank to know desirable Frequency to avoid the probability of resonance or harmonic amplification & thus protect the capacitors from Harmonic overloading.

CANNY offers a wide range of reactors for Capacitors banks rated from 5 KVAR to 100 KVAR with % impedance of 5.67%, 7% & 14%.

Features

- High Harmonic Loading Capacity.
- Low Losses
- Convenient Mounting
- Temperature protection (NC Contact)
- High Class Copper, AL Flat & AL Foil used
- Vacuum Impregnation which ensures they can withstand high Voltage, have low noise & offer a long operating time
- High Class Iron Core with multiple Air Gaps as well as staid design approach. Guarantee high. Current Linearity & Low heat dissipation Losses.



Available Types

- Aluminum Flat
- Aluminum Foil
- Copper Conductor

Technical Data

Description	Three-Phase Dry Type Magnetic Circuit Impregnated
Standard	IS 5553-5 IEC60076-6
Degree of protection	IP00
Insulation Class	F & H
Rated Voltage	400 to 690 Volt- 50 Hz. 400 to 690 Volt- 60 Hz.
Detuning	5.67 %, 7 %, 14%
Cooling Type	Natural
Ambient Temp.	55°C
Temperature protection	Thermal Switch (NC)
Inductance Tolerance	± 5%
Dielectric Test 50Hz / 60Hz Bet. Winding & Winding to body	3KV for 1 Min.



Temperature Rise Test Limit

The temperature rise limit is as per IEC 60076-6 & IEC 60076-11

For class F = 100 °C

For class H = 125 °C

Insulation system temperature	Average winding temp. rise limit at rated Current
155 (F)	100
180 (H)	125

Reactor Sizing Calculation

Please measure / check the value of capacitance and inductance & ensure that computed tuning freq. is in a line with design application requirement

% Reactor Impedance	% Reactor Impedance	% Reactor Impedance	% Reactor Impedance
155 (F)	155 (F)	155 (F)	155 (F)
180 (H)	180 (H)	180 (H)	180 (H)

Tuning Frequency

$$F = 1 / (2 \times \pi) \sqrt{LC}$$

C (µF) - Capacitance

L (mH) - Inductance

Installation Guidelines

The detuned reactor always requires forced ventilation system

Mounting of reactor should be in zig zag manner so that heating of one reactor should not affect another reactor

Install the reactor in vertical position

Ensure that the ambient temperature installation does not exceed beyond 55°C (inside the panel)

Reactor should be earth to earth point

DRAWING

