Shreem

AC Power Factor Improvement Products

Standard Product Catalogue

Shreem

AC Power Factor Improvement Products

Products

- **L. V. MKP Capacitors** (Normal & Heavy Duty)
- **L. V. Gas Filled Capacitors**
- **L. V. APP Capacitors**
- **Series Reactors**
- **Power Factor Controllers**

Need of Capacitor

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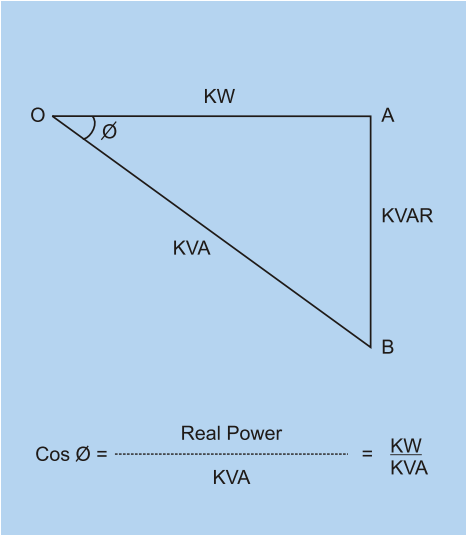
In A.C. electric system inductive loads consume active power and also reactive power. This reactive power is needed to generate magnetic field for inductive loads.

The power factor is the ratio of KW (active power) component to the KVA (apparent power) component.



Power factor will be leading if current is leading the voltage and it is lagging when current is lagging the voltage. The reactive power needs to be generated in electrical system. For that most of electrical utilities penalise for lower power factor with additional charges. A.C. capacitor is the most economical component to supply reactive power which gives following advantages. ...

- Power factor improvement.
- Additional power will be available at secondary of transformer.
- Decrease in cable losses.
- Improved voltage profile.

The reactive power necessary to achieve the P.F. is calculated as under

KVAR = KW (tan Ø1 - tan Ø2)

Cos Ø1 - original P.F.

Cos Ø2 - desired P.F.

The multiplying factors to calculate required KVAR are given in following table. -

Original P. F.	Multiplication factor (tan Ø1 - tan Ø2) for a target power factor									
Cos Ø1					Cos Ø2					
	0.70	0.75	0.80	0.85	0.90	0.92	0.94	0.96	0.98	1.00
0.40	1.271	1.409	1.541	1.672	1.807	1.865	1.928	2.000	2.088	2.291
0.45	0.964	1.103	1.235	1.365	1.500	1.559	1.622	1.693	1.781	1.985
0.50	0.712	0.850	0.982	1.112	1.248	1.306	1.369	1.440	1.529	1.732
0.55	0.498	0.637	0.768	0.899	1.034	1.092	1.156	1.227	1.315	1.518
0.60	0.313	0.451	0.583	0.714	**0.849**	0.907	0.970	1.042	1.130	1.333
0.65	0.149	0.287	0.419	0.549	0.685	0.743	0.806	0.877	0.966	1.169
0.70		0.138	0.270	0.400	0.536	0.594	0.657	0.729	0.817	1.020
0.75			0.132	0.262	0.398	0.456	0.519	0.590	0.679	0.882
0.80				0.130	0.266	0.324	0.387	0.458	0.547	0.750
0.85					0.135	0.194	0.257	0.328	0.417	0.620
0.90						0.058	0.421	0.193	0.281	0.484
0.95								0.037	0.126	0.329

Example :

a) Consumption of active energy Ew = 300 000 Kwh

b) Consumption of reactive energy EB = 400 000 Kvarh

c) No. of working hours t = 600 h

Active energy power $P = \frac{300\,000 \text{ Kwh}}{600 \text{ h}} = 500 \text{ KW}$

Calculation of the original power factor Cos Ø1 : =

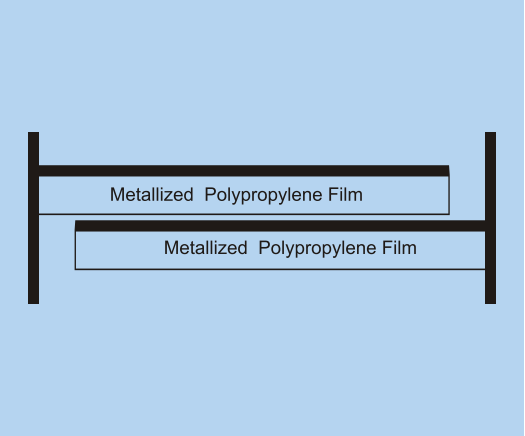
$$\frac{1}{\sqrt{\left(\frac{EB}{Ew}\right)^2 + 1}} = \frac{1}{\sqrt{\left(\frac{400\,000}{300\,000}\right)^2 + 1}} = 0.6$$

For the improvement of the power factor from 0.6 to 0.9 we read factor 0.849 from table.
Hence required capacitor power is Qc = 500KW X 0.849 ≅ 425 KVAR

L.V. Capacitor Technology

Since last 20 years it is observed that service life of capacitor is hampered due to following causes.

- Use of low priced material hampers quality, technology working environment resulting in low life of capacitors.
- Non linear inductive loads such as drives, furnaces etc. generate harmonics which leads to increase in voltage and current across capacitor.
- Ambient temperature.



Type of L. V. capacitors

Shreem low voltage capacitors are designed and manufactured with most advanced technology which can sustain 10% to 25% of harmonic generating load (w.r.t. total connected load) and provide complete range of P. F. correction system.

A) MKP capacitors (metallised polypropylene film)

The MKP type capacitor consist of a low-loss Di-electric formed by pure polypropylene film. A thin self healing mixture of zinc and aluminum is metallized directly on one side of the PP-film under vacuum. This technology ensures a long operating life of the capacitor. The capacitor elements, after insertion into the capacitor case, a patented viscous polyurethane resin, mainly containing castor oil, is introduced.

Self-healing dielectric

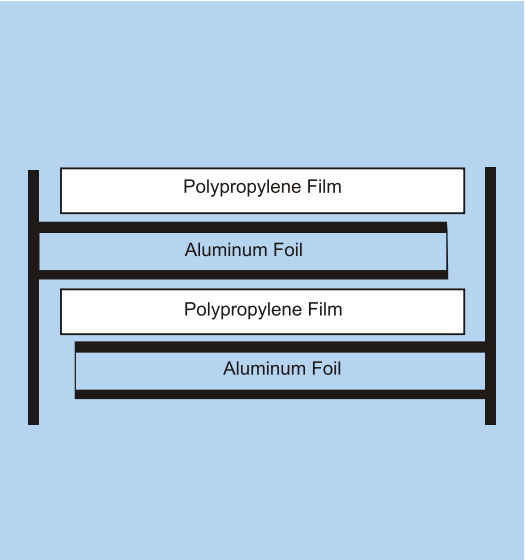
Both dielectric structures described above are “self healing” : In event of a voltage breakdown the metal layers around the breakdown channel are evaporated by the temperature of the electric arc that forms between the electrodes. They are removed within a few microseconds and pushed apart by the over pressure generated in the center of the breakdown spot. An insulation area is formed which is reliably resistive and voltage proof for all operating requirements of the capacitor. The capacitor remains fully functional during and after the breakdown.

Advantages of MKP technology

- Result of the comparably simple construction technology, MKP capacitor can be manufactured using less material and consequently enjoy a competitive price level.
- With a thicker dielectric, capacitors usually have smaller dimensions.
- MKP-type capacitors have a high specific capacitance and a high AC load capacity.

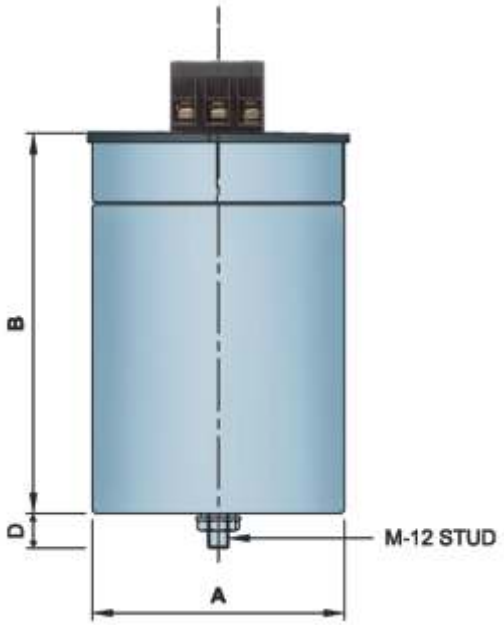
B) APP capacitors
APP (all polypropylene) film type i.e. film + foil

The dielectric of APP-type capacitors takes the form of a low-loss polypropylene film + foil elements completely dried in high vacuum and impregnated in NPCB oil.

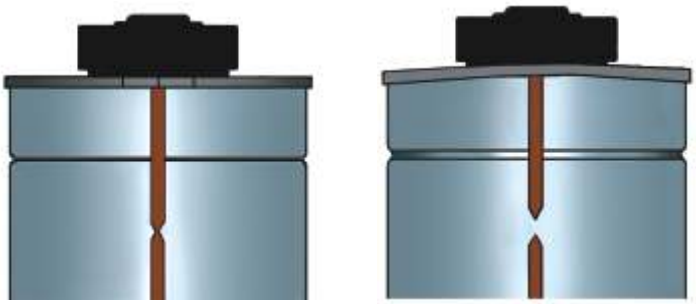


Advantages of the APP technology

- The vacuum drying and impregnation procedure frees the dielectric from any voids and minimize the occurrence of partial discharges. This results in long life expectancy and extremely stable electrical characteristics.
- The zinc contact layer forms a stable contact with the foil and guarantee a very high resistance to impulse charges reducing the self-inductance of the capacitor.
- Very low losses through the application of polypropylene dielectric and aluminum foil.
- Thanks to its low losses and the heat dissipation qualities of the oil impregnant, the capacitor may be operated at high ambient and case temperatures upto 70° C without effecting the life of the capacitor.



ELEVATION



Protection against failure

In MPP type capacitors pressure increases inside the capacitor due to number of self healing breakdowns in event of over-voltage. This results in bursting of capacitor. In order to prevent it from bursting protection is provided. In this provision when pressure is increased inside the capacitor, there is change in length of capacitor due to expansion, due to which the conductor gets separated resulting in disconnection of capacitor from the circuit.

Cylindrical - Industrial MKP Capacitor

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Features

- Metallised polypropylene (MKP) film design
- Compact Cylindrical Al. can design.
- Jelly impregnation gives cooling effect
- Better heat dissipation
- Explosion proof design (Over pressure disconnector)
- Low losses due to advanced winding and zinc spray equipments.

Application

- Fixed PF. correction
- Automatic P.F. Correction
- Harmonic Filter System

THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING.
TECHNICAL DATA

STANDARDS	IS 13340 + 1 IEC-60831
RATED VOLTAGE.	230...440 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER VOLTAGE.	UN + 10% 8 h in every 24 h. UN + 15% 30 min in every 24 h. UN + 20% 5 min in every 24 h. UN + 30% 1 min in every 24 h.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS. (Internal capacitor standard.)
TEST VOLTAGE, TERMINAL.	1.75 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	3.5 Kv ,AC 2S.
INRUSH CURRENT.	Max 200 * IN
LOSSES.	App.< 0.25 W/kVAr (without discharge resistors) App.< 0.50 W/kVAr (inclusive discharge resistors as per BIS)
CASING.	Cylindrical aluminum can
ENCLOSURE.	IP00, on request IP54 outdoor mounting.
LIFE EXPECTANCY.	>100.000h Temp level D >130.000h Temp level C.
AMBIENT TEMPERATURE.	-10 / D
COOLING.	Natural air cooled Casing temp max 60 C permitted on top of the can.
DIELECTRIC SYSTEM.	MKP metallised polypropylene film , self-healing property.
IMPREGNATION.	NPCB, biodegradable natural oil semi soft jelly .
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
ALTITUDE.	Max.2000 mtr above sea level.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Vertical.
MOUNTING & EARTHING.	M12X16mm threaded stud at bottom of the case with nut & spring washer.
DISCHARGE RESISTORS.	External 1 minutes,50 V
TERMINALS	Mcap - M5 screw on single three-way terminals.

MONO PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING.

MONO Phase SERIES, RATED VOLTAGE **230** V,50Hz, 1-PHASE CONNECTION.

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
MONO230,1,00.80	0.8	48.2	3.48	50*135	0.29	C-1
MONO230,1,01.33	1.33	80.02	5.78	65*130	0.47	C-2
MONO230,1,01.67	1.67	100.47	7.26	75*196	0.80	C--5
MONO230,1,03.30	3.3	198.55	14.35	75*196	0.87	C--5

MONO Phase SERIES, RATED VOLTAGE **400** V,50Hz, 1-PHASE CONNECTION.

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
MONO400,1,00.80	0.8	15.91	2	50*75	0.19	C-1
MONO400,1,01.67	1.67	33.22	4.18	50*135	0.29	C-1
MONO400,1,02.50	2.5	49.73	6.25	50*135	0.29	C-1
MONO400,1,03.30	3.3	65.65	8.25	65*130	0.47	C-2
MONO400,1,04.17	4.17	82.95	10.43	65*130	0.47	C-2
MONO400,1,05.00	5	99.5	12.5	75*196	0.87	C-5

THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING. (Industrial Duty)

IND. SERIES, RATED VOLTAGE **400** V,50Hz, 3-PHASE, DELTA CONNECTION.

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
Mcap 400,3,01.00	1	3*6.63	1.44	50*125	0.28	C-1
Mcap 400,3,02.00	2	3*13.26	2.89	50*125	0.28	C-1
Mcap 400,3,03.00	3	3*19.89	4.33	65*130	0.48	C-2
Mcap 400,3,04.00	4	3*26.52	5.77	65*130	0.48	C-2
Mcap 400,3,05.00	5	3*33.15	7.22	75*196	0.95	C-3
Mcap 400,3,07.50	7.5	3*49.73	10.83	75*196	0.95	C-3
Mcap 400,3,10.00	10	3*66.31	14.43	90*203	1.40	C-3
Mcap 400,3,12.50	12.5	3*82.88	18.04	90*203	1.40	C-3
Mcap 400,3,15.00	15	3*99.46	21.65	90*243	1.75	C-3
Mcap 400,3,20.00	20	3*132.61	28.87	116*243	2.60	C-4
Mcap 400,3,25.00	25	3*165.76	36.08	116*283	3.10	C-4

IND. SERIES, RATED VOLTAGE **440** V,50Hz, 3-PHASE, DELTA CONNECTION

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
Mcap 440,3,01.00	1	3*5.48	1.31	50*125	0.26	C-1
Mcap 440,3,02.00	2	3*11.00	2.62	50*125	0.27	C-1
Mcap 440,3,03.00	3	3*16.44	3.93	65*130	0.45	C-2
Mcap 440,3,04.00	4	3*21.92	5.24	65*130	0.46	C-2
Mcap 440,3,05.00	5	3*27.40	6.56	75*196	0.95	C-3
Mcap 440,3,07.50	7.5	3*41.10	9.84	75*196	0.95	C-3
Mcap 440,3,10.00	10	3*54.80	13.12	90*203	1.40	C-3
Mcap 440,3,12.50	12.5	3*68.50	16.4	90*203	1.40	C-3
Mcap 440,3,15.00	15	3*82.20	19.68	90*243	1.75	C-3
Mcap 440,3,20.00	20	3*109.60	26.4	116*243	2.50	C-4
Mcap 440,3,25.00	25	3*137.00	32.8	116*243	2.60	C-4
Mcap 440,3,30.00	30	3*164.40	39.36	116*283	3.10	C-4

Other voltage rating ,output Kvar,single-phase and Frequency available on request.

Cylindrical - Heavy Duty MKP Capacitor

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Features

- Metallised polypropylene (MKP) film design
- Compact Cylindrical Al. can design.
- Jelly/oil impregnation gives cooling effect
- Better heat dissipation
- Explosion proof design (internal fuse protection)
- Low losses due to advanced winding and zinc spray equipments.
- Finger touch proof terminal connectors

- Fixed PF. correction
- Automatic P.F. Correction
- Harmonic Filter System

THREE PHASE CAPACITORS IN GAS FILLED CYLINDRICAL ALUMINUM CASING.
TECHNICAL DATA

STANDARDS	BIS 13340 + 1, IEC 60831 + 1 ,EN 60831 + 1
RATED VOLTAGE.	400-525 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER VOLTAGE.	UN + 10% 12 h in every 24 h. UN + 15% 30 min in every 24 h. UN + 20% 5 min in every 24 h. UN + 30% 1 min in every 24 h.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS. (Internal capacitor standard.)
TEST VOLTAGE, TERMINAL.	2.15 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	4.8 Kv ,AC 2S.
INRUSH CURRENT.	Max 300 * IN
LOSSES.	App.< 0.25 W/kVAr (without discharge resistors) App.< 0.45 W/kVAr (inclusive discharge resistors as per IEC) App.< 0.50 W/kVAr (inclusive discharge resistors as per BIS)
CASING.	Cylindrical aluminum can
ENCLOSURE.	IP00, IP20, on request IP54, outdoor mounting.
LIFE EXPECTANCY.	>100.000h Temp level D >130.000h Temp level C.
AMBIENT TEMPERATURE.	.-25 / D
COOLING.	Natural air cooled Casing temp max 60 C permitted on top of the can.
DIELECTRIC SYSTEM.	MKP metallised polypropylene film , self-healing property.
IMPREGNATION.	Inert Gas or NPCB, biodegradable natural oil.
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
ALTITUDE.	Max.2000 mtr above sea level.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Random.
MOUNTING & EARTHING.	M12X16mm threaded stud at bottom of the case with nut & spring washer.
DISCHARGE RESISTORS.	External 1 minutes,50 V / 3 minutes, 75 V
TERMINALS	FTMKP-M5 screw on double three-way terminals.

FTMKP Type. (HD) : FTMKP SERIES, RATED VOLTAGE 400 V,50Hz, 3-PHASE, DELTA CONNECTION

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
FTMKP 400,3,05.00	5	3*33.15	7.22	75*196	0.95	C-5
FTMKP 400,3,07.50	7.5	3*49.73	10.83	75*196	0.95	C-5
FTMKP 400,3,10.00	10	3*66.31	14.43	90*203	1.40	C-5
FTMKP 400,3,12.50	12.5	3*82.88	18.04	90*203	1.40	C-5
FTMKP 400,3,15.00	15	3*99.46	21.65	90*243	1.75	C-5
FTMKP 400,3,20.00	20	3*132.61	28.87	116*243	2.60	C-5
FTMKP 400,3,25.00	25	3*165.76	36.08	116*283	3.10	C-5
FTMKP 400,3,30.00	30	3*198.92	43.3	116*283	3.50	C-5
FTMKP 400,3,41,31.00	41.3	3*294.00	59.9	136*343	5.10	C-6

FTMKP Type. (HD) : FTMKP SERIES, RATED VOLTAGE **415** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 415,3,05.00	5	3*30.8	6.96	75*196	0.95	C-5
FTMKP 415,3,07.50	7.5	3*46.20	10.43	75*196	0.95	C-5
FTMKP 415,3,10.00	10	3*61.60	13.91	90*203	1.40	C-5
FTMKP 415,3,12.50	12.5	3*77.00	17.39	90*203	1.40	C-5
FTMKP 415,3,15.00	15	3*92.40	20.87	90*243	1.75	C-5
FTMKP 415,3,20.00	20	3*123.20	27.82	116*243	2.60	C-5
FTMKP 415,3,25.00	25	3*154.00	34.74	116*283	3.00	C-5
FTMKP 415,3,44,5.00	44.5	3*274.00	61.91	136*343	5.1	C-6

FTMKP SERIES, RATED VOLTAGE **440** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 440,3,05.00	5	3*27.40	6.56	75*196	0.95	C-5
FTMKP 440,3,07.50	7.5	3*41.10	9.84	75*196	0.95	C-5
FTMKP 440,3,10.00	10	3*54.80	13.12	90*203	1.40	C-5
FTMKP 440,3,12.50	12.5	3*68.50	16.40	90*203	1.40	C-5
FTMKP 440,3,15.00	15	3*82.20	19.68	90*243	1.75	C-5
FTMKP 440,3,20.00	20	3*109.60	26.40	116*243	2.50	C-5
FTMKP 440,3,25.00	25	3*137.00	32.80	116*243	2.60	C-5
FTMKP 440,3,30.00	30	3*164.40	39.36	116*283	3.10	C-5
FTMKP 440,3,50.00	50	3*274.00	65.61	136*355	4.60	C-6

FTMKP SERIES, RATED VOLTAGE **480** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 440,3,05.00	5	3*23.02	6.01	75*196	0.95	C-5
FTMKP 440,3,07.50	7.5	3*34.53	9.02	75*196	0.95	C-5
FTMKP 440,3,10.00	10	3*46.05	12.03	90*203	1.40	C-5
FTMKP 440,3,12.50	12.5	3*57.56	12.03	90*203	1.40	C-5
FTMKP 440,3,15.00	15	3*69.07	18.04	90*243	1.75	C-5
FTMKP 440,3,20.00	20	3*92.03	24.06	116*243	2.50	C-5
FTMKP 440,3,25.00	25	3*115.11	30.07	116*243	2.60	C-5
FTMKP 440,3,30.00	30	3*138.14	36.08	116*283	3.10	C-5
FTMKP 440,3,50.00	50	3*230.23	60.14	136*355	4.60	C-6

FTMKP SERIES, RATED VOLTAGE **525** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 525,3,05.00	5	3*19.25	5.50	75*196	0.95	C-5
FTMKP 525,3,07.50	7.5	3*28.87	8.25	75*196	0.95	C-5
FTMKP 525,3,10.00	10	3*38.49	11.00	75*196	1.05	C-5
FTMKP 525,3,12.50	12.5	3*48.11	13.75	90*203	1.30	C-5
FTMKP 525,3,15.00	15	3*57.74	16.50	90*203	1.40	C-5
FTMKP 525,3,20.00	20	3*76.98	21.99	90*243	1.75	C-5
FTMKP 525,3,25.00	25	3*96.23	27.49	116*243	2.45	C-5
FTMKP 525,3,30.00	30	3*115.47	32.99	116*243	2.60	C-5
FTMKP 525,3,50.00	50	3*192.45	54.99	136*343	5.00	C-6

Cylindrical - Gas Filled MKP Capacitor

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Features

- Metallised polypropylene/Wavy cut (MKP) film design
- Compact Cylindrical Al. can design.
- Gas impregnation gives cooling effect
- Better heat dissipation
- Explosion proof design (internal over pressure disconnector)
- Low losses due to advanced winding and zinc spray equipments.
- Finger touch proof terminal connectors (Scope to parallel Connection)

Application

- Fixed PF. correction
- Automatic P.F. Correction
- Harmonic Filter System

THREE PHASE CAPACITORS IN GAS FILLED CYLINDRICAL ALUMINUM CASING.
TECHNICAL DATA

STANDARDS	IS 13340 + 1, IEC 60831 + 1 ,EN 60831 + 1
RATED VOLTAGE.	230-525 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER VOLTAGE.	UN + 10% 12 h in every 24 h. UN + 15% 30 min in every 24 h. UN + 20% 5 min in every 24 h. UN + 30% 1 min in every 24 h.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS. (Internal capacitor standard.)
TEST VOLTAGE, TERMINAL.	2.15 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	4.8 Kv ,AC 2S.
INRUSH CURRENT.	Max 300 * IN
LOSSES.	App.< 0.25 W/kVAr (without discharge resistors) App.< 0.45 W/kVAr (inclusive discharge resistors as per IEC) App.< 0.50 W/kVAr (inclusive discharge resistors as per IS)
CASING.	Cylindrical aluminum can
ENCLOSURE.	IP20, on request IP54, outdoor mounting.
LIFE EXPECTANCY.	>100.000h Temp level D >130.000h Temp level C.
AMBIENT TEMPERATURE.	.-25 / D
COOLING.	Natural air cooled Casing temp max 60 C permitted on top of the can.
DIELECTRIC SYSTEM.	MKP metallised polypropylene film , self-healing property.
IMPREGNATION.	Inert dry Gas .
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
ALTITUDE.	Max.2000 mtr above sea level.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Random.
MOUNTING & EARTHING.	M12X16mm threaded stud at bottom of the case with nut & spring washer.
DISCHARGE RESISTORS.	External 1 minutes,50 V / 3 minutes, 75 V
TERMINALS	FTMKP-M5 screw on double three-way terminals.

FTMKP Type. (Gas Filled) : FTMKP SERIES, RATED VOLTAGE 400 V,50Hz, 3-PHASE, DELTA CONNECTION

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
FTMKP 400,3,05.00	5	3*33.15	7.22	75*196	0.95	C-5
FTMKP 400,3,07.50	7.5	3*49.73	10.83	75*196	0.95	C-5
FTMKP 400,3,10.00	10	3*66.31	14.43	90*203	1.30	C-5
FTMKP 400,3,12.50	12.5	3*82.88	18.04	90*203	1.30	C-5
FTMKP 400,3,15.00	15	3*99.46	21.65	90*243	1.55	C-5
FTMKP 400,3,20.00	20	3*132.61	28.87	116*243	2.10	C-5
FTMKP 400,3,25.00	25	3*165.76	36.08	116*283	2.85	C-5
FTMKP 400,3,30.00	30	3*198.92	43.3	116*283	2.95	C-5

FTMKP Type. : FTMKP SERIES, RATED VOLTAGE **415** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 415,3,05.00	5	3*30.8	6.96	75*196	0.95	C-5
FTMKP 415,3,07.50	7.5	3*46.20	10.43	75*196	0.95	C-5
FTMKP 415,3,10.00	10	3*61.60	13.91	90*203	1.40	C-5
FTMKP 415,3,12.50	12.5	3*77.00	17.39	90*203	1.40	C-5
FTMKP 415,3,15.00	15	3*92.40	20.87	90*243	1.75	C-5
FTMKP 415,3,20.00	20	3*123.20	27.82	116*243	2.60	C-5
FTMKP 415,3,25.00	25	3*154.00	34.74	116*283	3.00	C-5
FTMKP 415,3,44,5.00	44.5	3*274.00	61.91	136*343	5.1	C-6

FTMKP SERIES, RATED VOLTAGE **440** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 440,3,05.00	5	3*27.40	6.56	75*196	0.95	C-5
FTMKP 440,3,07.50	7.5	3*41.10	9.84	75*196	0.95	C-5
FTMKP 440,3,10.00	10	3*54.80	13.12	90*203	1.40	C-5
FTMKP 440,3,12.50	12.5	3*68.50	16.40	90*203	1.40	C-5
FTMKP 440,3,15.00	15	3*82.20	19.68	90*243	1.75	C-5
FTMKP 440,3,20.00	20	3*109.60	26.40	116*243	2.50	C-5
FTMKP 440,3,25.00	25	3*137.00	32.80	116*243	2.60	C-5
FTMKP 440,3,30.00	30	3*164.40	39.36	116*283	3.10	C-5
FTMKP 440,3,50.00	50	3*274.00	65.61	136*355	4.60	C-6

FTMKP SERIES, RATED VOLTAGE **480** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 440,3,05.00	5	3*23.02	6.01	75*196	0.95	C-5
FTMKP 440,3,07.50	7.5	3*34.53	9.02	75*196	0.95	C-5
FTMKP 440,3,10.00	10	3*46.05	12.03	90*203	1.40	C-5
FTMKP 440,3,12.50	12.5	3*57.56	15.04	90*203	1.40	C-5
FTMKP 440,3,15.00	15	3*69.07	18.04	90*243	1.75	C-5
FTMKP 440,3,20.00	20	3*92.03	24.06	116*243	2.50	C-5
FTMKP 440,3,25.00	25	3*115.11	30.07	116*243	2.60	C-5
FTMKP 440,3,30.00	30	3*138.14	36.08	116*283	3.10	C-5
FTMKP 440,3,50.00	50	3*230.23	60.14	136*355	4.60	C-6

FTMKP SERIES, RATED VOLTAGE **525** V,50Hz, 3-PHASE, DELTA CONNECTION

FTMKP 525,3,05.00	5	3*19.25	5.50	75*196	0.95	C-5
FTMKP 525,3,07.50	7.5	3*28.87	8.25	75*196	0.95	C-5
FTMKP 525,3,10.00	10	3*38.49	11.00	75*196	1.05	C-5
FTMKP 525,3,12.50	12.5	3*48.11	13.75	90*203	1.30	C-5
FTMKP 525,3,15.00	15	3*57.74	16.50	90*203	1.40	C-5
FTMKP 525,3,20.00	20	3*76.98	21.99	90*243	1.75	C-5
FTMKP 525,3,25.00	25	3*96.23	27.49	116*243	2.45	C-5
FTMKP 525,3,30.00	30	3*115.47	32.99	116*243	2.60	C-5
FTMKP 525,3,50.00	50	3*192.45	54.99	136*343	5.00	C-6

Windmill application Capacitor

Features

- Metallised polypropylene/Wavy cut (MKP) film design
- Compact Cylindrical Al. can design.
- Gas impregnation gives cooling effect
- Better heat dissipation
- Explosion proof design (internal fuse protection)
- Low losses due to advanced winding and zinc spray equipments.
- Finger touch proof terminal connectors

Application - Wind mills

THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING.
TECHNICAL DATA

STANDARDS	IS 13340 + 1, IEC 60831 + 1 ,EN 60831 + 1
RATED VOLTAGE.	690 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER VOLTAGE.	UN + 10% 12 h in every 24 h. UN + 15% 30 min in every 24 h. UN + 20% 5 min in every 24 h. UN + 30% 1 min in every 24 h.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS. (Internal capacitor standard.)
TEST VOLTAGE, TERMINAL.	2.15 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	4.8 Kv ,AC 2S.
INRUSH CURRENT.	Max 300 * IN
LOSSES.	App.< 0.25 W/kVAr (without discharge resistors) App.< 0.45 W/kVAr (inclusive discharge resistors as per IEC) App.< 0.50 W/kVAr (inclusive discharge resistors as per IS)
CASING.	Cylindrical aluminum can
ENCLOSURE.	IP20, on request IP54, outoor mounting.
LIFE EXPECTANCY.	>100.000h Temp level D >130.000h Temp level C.
AMBIENT TEMPERATURE.	.-25 / D
COOLING.	Natural air cooled Casing temp max 60 C permitted on top of the can.
DIELECTRIC SYSTEM.	MKP metallised polypropylene Wavy Cut film , self-healing property.
IMPREGNATION.	NPCB , Gas Filled.
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
ALTITUDE.	Max.2000 mtr above sea level.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Random.
MOUNTING & EARTHING.	M12X16mm threaded stud at bottom of the case with nut & spring washer.
DISCHARGE RESISTORS.	External 1 minutes,50 V / 3 minutes, 75 V
TERMINALS	Mcap - M5 screw on single three-way terminals or FTMKP-M5 screw on double three-way terminals.

FTMKP SERIES, RATED VOLTAGE **690** V,50Hz, 3-PHASE, DELTA CONNECTION

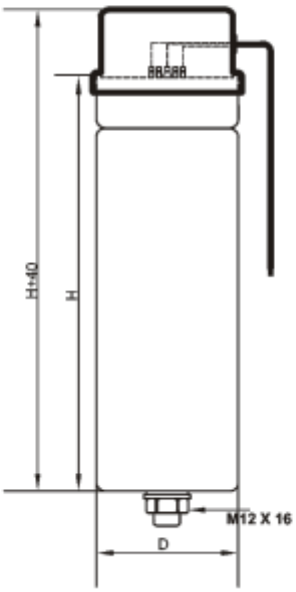
Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
FTMKP 690,3,12.50	12.5	3*27.85	10.46	90*193	2.35	C-5
FTMKP 690,3,15.00	15	3*33.42	12.55	90*243	2.50	C-5
FTMKP 690,3,20.00	20	3*44.57	16.73	116*243 / 90 x 296	2.85	C-5
FTMKP 690,3,25.00	25	3*55.71	20.92	116*243 / 90 x 296	3.00	C-5

Dimension - Reference Drawings

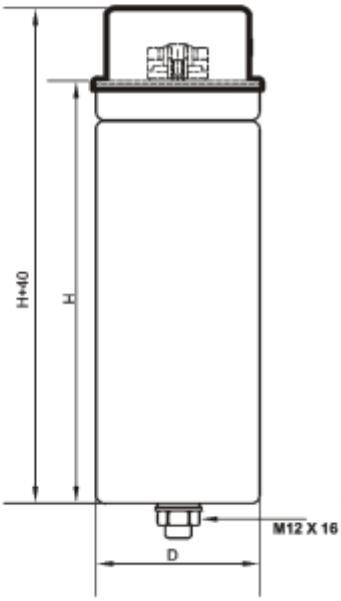
Shreem

AW MCAP
DRAW. **C-1**

AW MCAP
DRAW. **C-2**



AW MCAP
DRAW. **C-3**



AW MCAP
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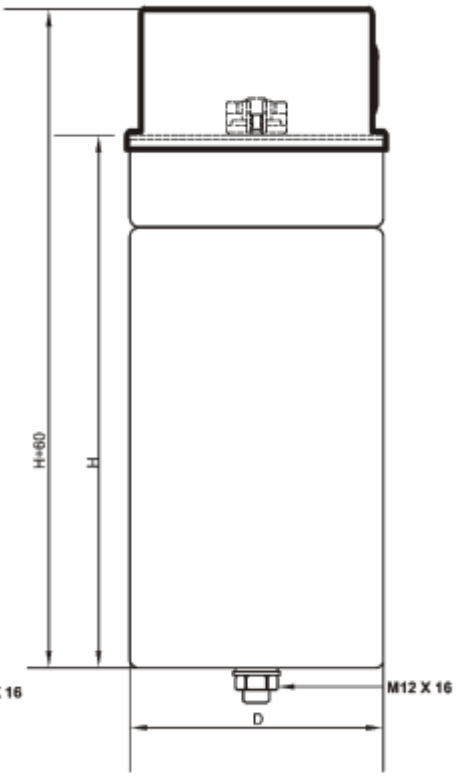

AW MCAP
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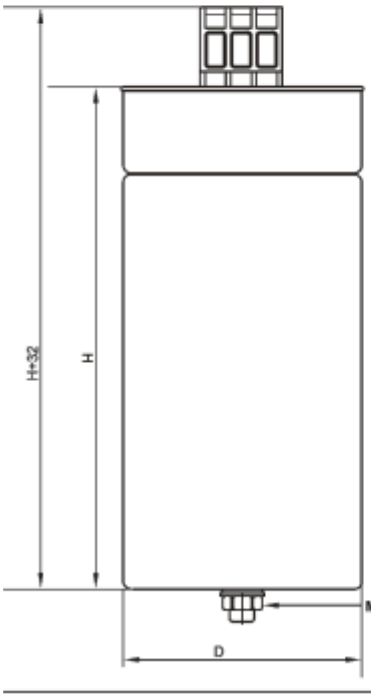
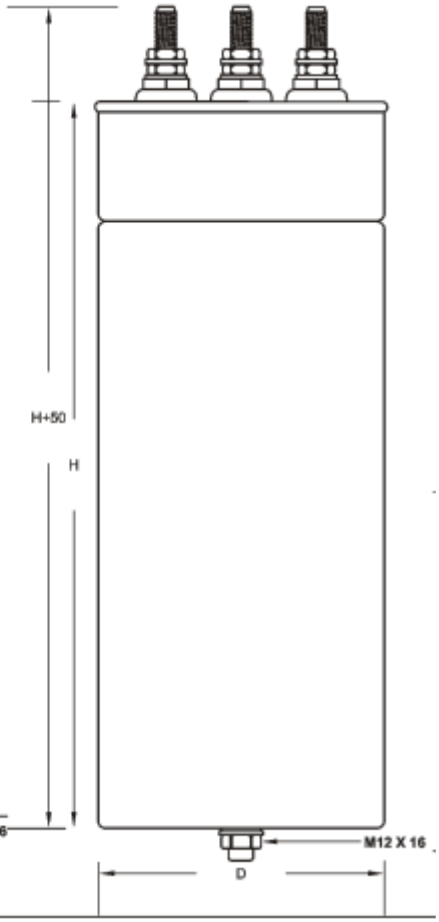


AW MCAP
DRAW. **C-6**



Industrial Rectangular Heavy Duty MKP Capacitor

Shreem

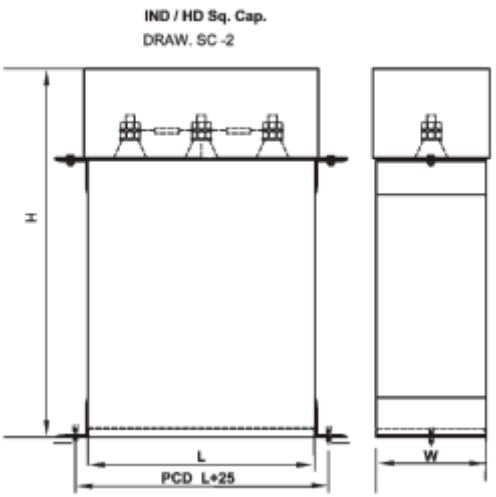
Types in Heavy Duty Capacitors :

- **Heavy Duty MKP Capacitor**
- **Double Dielectric MKP Capacitor**
- **Oil Filled MKP Capacitor**

THREE PHASE CAPACITORS IN SQURE BOX CASING. (C.R.C.A.)

TECHNICAL DATA

STANDARDS	IS 13340 + 1, IEC 60831 + 1 ,EN 60831 + 1
RATED VOLTAGE.	230….525 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER VOLTAGE.	UN + 10% 12 h in every 24 h. UN + 15% 30 min in every 24 h. UN + 20% 5 min in every 24 h. UN + 30% 1 min in every 24 h.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS (Internal Capacitor Standard.)
TEST VOLTAGE, TERMINAL.	2.15 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	4.8 Kv ,AC 2S.
INRUSH CURRENT.	Max 300 * IN
LOSSES.	App.< 0.25 W/kVAr (without discharge resistors) App.< 0.50 W/kVAr (inclusive discharge resistors as per IEC) App.< 0.60 W/kVAr (inclusive discharge resistors as per BIS)
CASING.	C.R.C.A. squre box casing.
ENCLOSURE.	Indoor mounting.
LIFE EXPECTANCY.	>100.000h Temp level D. >130.000h Temp level C
AMBIENT TEMPERATURE.	.-25 / D
COOLING.	Natural air cooled
DIELECTRIC SYSTEM.	MKP metallised polypropylene film , self-healing property.
IMPREGNATION.	NPCB,biodegradable natural oil.
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
ALTITUDE.	Max.2000 mtr above sea level.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Vertical.
MOUNTING & EARTHING.	Vertical or wall mounting, refer drawing nos. for mounting PCD.
DISCHARGE RESISTORS.	External ,1 minutes,50 V.
TERMINALS.	AW SqcAP Cable provided for connections. Threaded studs,M4,M6,M8,M10 & M12.



THREE PHASE CAPACITORS IN SQURE BOX CASING.(C.R.C.A.) INDUSTRIAL SqCap. Type.

IND SqCap SERIES, RATED VOLTAGE **440** V,50Hz, 3-PHASE, DELTA CONNECTION

Type	Reactive Power	Capacitance	Current	Dimensions L*W*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
IND SqCap 440,3,01.00	1	3*5.48	1.37	150*55*220	1.29	SC-2
IND SqCap 440,3,02.00	2	3*11.00	2.62	150*55*220	1.32	SC-2
IND SqCap 440,3,03.00	3	3*16.44	3.94	150*55*220	1.36	SC-2
IND SqCap 440,3,04.00	4	3*21.92	5.25	150*55*220	1.40	SC-2
IND SqCap 440,3,05.00	5	3*27.40	6.56	190*80*235	2.30	SC-2
IND SqCap 440,3,07.50	7.5	3*41.10	9.84	190*80*235	2.40	SC-2
IND SqCap 440,3,10.00	10	3*54.80	13.12	180*120*280	3.60	SC-2
IND SqCap 440,3,12.50	12.5	3*68.5	16.40	180*120*280	3.70	SC-2
IND SqCap 440,3,15.00	15	3*82.2	16.68	225*155*320	5.20	SC-2
IND SqCap 440,3,20.00	20	3*109.6	26.24	225*155*320	5.50	SC-2
IND SqCap 440,3,25.00	25	3*137.0	32.80	225*155*320	5.80	SC-2

Standard banks of 75 kVAr to 200kVAr avaiable on request.

INDUSTRIAL SqCap. Type. : IND SqCap SERIES, RATED VOLTAGE **415** V,50Hz, 3-PHASE, DELTA CONNECTION

IND SqCap 415,3,01.00	1	3*6.16	1.39	150*55*220	1.41	SC-2
IND SqCap 415,3,02.00	2	3*12.32	2.78	150*55*220	1.49	SC-2
IND SqCap 415,3,03.00	3	3*18.48	4.17	150*55*220	1.55	SC-2
IND SqCap 415,3,04.00	4	3*24.64	5.56	150*55*220	1.61	SC-2
IND SqCap 415,3,05.00	5	3*30.80	6.96	190*80*235	2.40	SC-2
IND SqCap 415,3,07.50	7.5	3*46.20	10.43	190*80*235	2.55	SC-2
IND SqCap 415,3,10.00	10	3*61.60	13.91	180*120*280	3.62	SC-2
IND SqCap 415,3,12.50	12.5	3*77.00	17.39	180*120*280	3.92	SC-2
IND SqCap 415,3,15.00	15	3*92.40	20.87	225*155*320	5.30	SC-2
IND SqCap 415,3,20.00	20	3*123.20	27.82	225*155*320	5.90	SC-2
IND SqCap 415,3,25.00	25	3*154.00	34.78	225*155*320	6.30	SC-2

HEAVY DUTY /DDXL SqCap. Type. L: HD. SqCap SERIES, RATED VOLTAGE **440** V,50Hz, 3-PHASE, DELTA CONNECTION

HD SqCap 440,3,05.00	5	3*27.40	6.56	185*75*265	2.25	SC-2
HD SqCap 440,3,07.50	7.5	3*41.10	9.84	185*75*265	2.40	SC-2
HD SqCap 440,3,10.00	10	3*54.80	13.12	205*130*315	3.75	SC-2
HD SqCap 440,3,12.50	12.5	3*68.5	16.40	205*130*315	3.85	SC-2
HD SqCap 440,3,15.00	15	3*82.2	16.68	205*130*315	4.25	SC-2
HD SqCap 440,3,20.00	20	3*109.6	26.24	240*190*370	7.00	SC-2
HD SqCap 440,3,25.00	25	3*137.0	32.80	240*190*370	7.21	SC-2
HD SqCap 440,3,50.00	50	3*274.0	65.61	305*160*455	10.20	SC-2

HD. SqCap SERIES, RATED VOLTAGE **525** V,50Hz, 3-PHASE, DELTA CONNECTION

HD SqCap 525,3,05.00	5	3*19.25	5.50	185*75*265	2.32	SC-2
HD SqCap 525,3,07.50	7.5	3*28.87	8.25	185*75*265	2.65	SC-2
HD SqCap 525,3,10.00	10	3*38.49	11.00	205*130*315	3.75	SC-2
HD SqCap 525,3,12.50	12.5	3*48.11	13.75	205*130*315	4.05	SC-2
HD SqCap 525,3,15.00	15	3*57.74	16.50	205*130*315	4.50	SC-2
HD SqCap 525,3,20.00	20	3*76.98	21.99	240*190*370	7.30	SC-2
HD SqCap 525,3,25.00	25	3*96.23	27.49	240*190*370	7.74	SC-2

Other voltage rating ,output Kvar,single-phase and Frequency available on request.
Drawing at end of data sheet.

Agristar Cylindrical Capacitor

Shreem

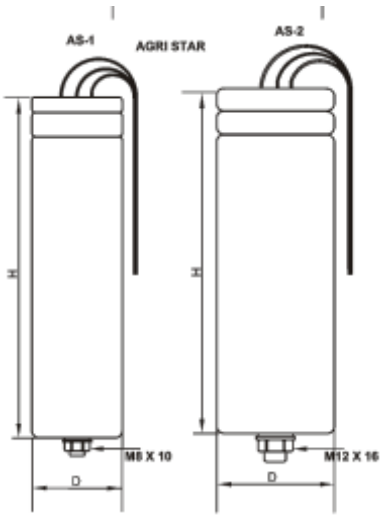
Application :

- Agricultural loads
- Light Loads

THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING.

TECHNICAL DATA

STANDARDS	IS 13340 + 1, IEC 60831 + 1 ,EN 60831 + 1
RATED VOLTAGE.	440 VOLT.
RATED FREQUENCY.	50/60 Hz.
OVER CURRENT.	1.3 * IN
CAPACITANCE TOLERANCE.	.-5 to + 10 % As per standards. 0 to + 5% As per our ICS. (Internal capacitor standard.)
TEST VOLTAGE, TERMINAL.	1.75 * UN ,AC. 2S
TEST VOLTAGE, TERMINAL/CASE.	3.5 Kv ,AC 2S.
INRUSH CURRENT.	Max 300 * IN
CASING.	Cylindrical aluminum can
LIFE EXPECTANCY.	>100.000h Temp level C
AMBIENT TEMPERATURE.	.-25 / D
COOLING.	Natural air cooled Casing temp max 60 C permitted on top of the can.
DIELECTRIC SYSTEM.	MKP metallised polypropylene film , self-healing property.
IMPREGNATION.	NPCB, biodegradable natural oil Jelly or dry .
SAFETY FEATURES.	Over pressure sensitive 3 phase disconnector.
RELATIVE HUMIDITY.	Max 95 %
MOUNTING POSITION.	Random.
MOUNTING & EARTHING.	M12X16mm threaded stud at bottom of the case with nut clamp & spring washer.
DISCHARGE RESISTORS.	External 1 minutes,50 V
TERMINALS	Terminals with extended 300mm wires.



AGRI STAR Cap. Type. : A.W. MCap SERIES, RATED VOLTAGE **440** V,50Hz, 1 & 3-Ph, DELTA CONNECTION

Type	Reactive Power	Capacitance	Current	Dimensions D*H mm	Weight Kg.(Appr.)	Drawing No.
	Output Kvar.	mf	A			
AS Mcap 440,1,01.00	1	1*16.44	2.27	50*85	0.20	AS-1
AS Mcap 440,1,02.00	2	1*32.88	4.55	50*125	0.25	AS-1
AS Mcap 440,3,01.00	1	3*5.48	1.31	50*125	0.26	AS-1
AS Mcap 440,3,02.00	2	3*11.00	2.62	50*125	0.27	AS-1
AS Mcap 440,3,03.00	3	3*16.44	3.93	65*130	0.45	AS-2
AS Mcap 440,3,04.00	4	3*21.92	5.24	65*130	0.46	AS-2
AS Mcap 440,3,05.00	5	3*27.40	6.55	65*190	0.63	AS-2
AS Mcap 440,3,06.00	6	3*32.88	7.86	65*190	0.64	AS-2
AS Mcap 440,3,09.00	9	3*49.32	11.79	65*265	0.92	AS-2
AS Mcap 440,3,09.00	10	3*55	13.2	65*265	1.02	AS-2

AGRI STAR. Cap Series with inclusive of standard accessory Wall mounting clamp, screws, cable length for 1 kvar to 10 kvar 300mm.

APP (all polypropylene) film capacitors

Shreem

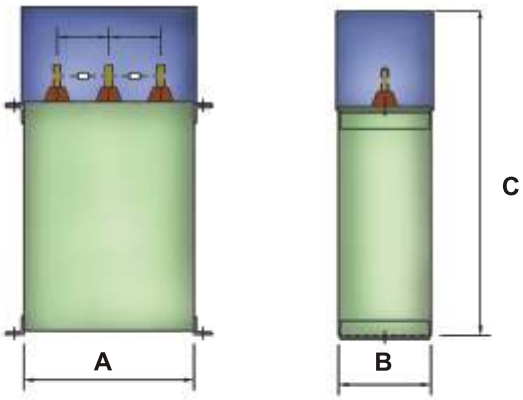
Features

- Film + foil design
- Operated at high temperature
- Better thermal conductivity & higher viscosity of impregnating oil
- Highest inrush current withstanding capacity.
- Epoxy moulded bushings, leakage is avoided
- Low losses
- High grade steel tank
- Best suitable design in Supertropical countries like India
- Design is available upto 1000V

Application

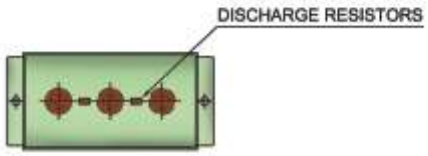
- Fixed & Automatic P.F. Correction
- Tunned & Detuned Filters
- Outdoor use
- It is recommended to use at extreme high temperature environment like foundries & Steel industries.

Capacitor Bank



Three Phase Capacitors (440 V, 3 ph, 50 Hz)

KVAR	Current	Dimensions (in mm)		
		A	B	C
5	6.56	260	125	210
7.5	9.84	260	125	250
10	13.12	260	125	260
12.5	16.4	260	125	290
15	19.68	280	130	350
20	26.24	280	130	400
25	32.8	280	130	460
50	65.6	405	130	600



Series Reactor for harmonics Protection

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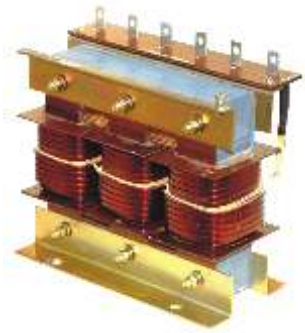
Technical Data



- **Specification** : IS - 5553 - 1990 / IEC - 60289 (1988)
- Range :
  - Output up to 100 KVAR
  - Filter factor 5.67%, 7%, 14%
  - Rated voltage - 440 V, 550 V, 690 V
- Type : Detuned, Copper wound-iron core dry type

Features

- Reactors manufactured as per IS 5553 / IEC - 60289 (1988)
- Linearity of more than 160%
- Insulation class 'F' but temp. rise restricted to class 'B' with harmonics 6-10% above fundamental current.
- Value accuracy within + 1.5%
- Fully copper wound with tin plated terminals for connections.
- Winding kept open to atmosphere for efficient cooling.
- Noise level less than 60dB at rated load.
- Inductance phase values within + 1.2%
- Temperature rise not exceeding 50-55* C above ambient with 10% harmonic currents super imposed.
- Coil wound with multiple conductors to reduce skin effect.
- Adequate cushion provided to avoid heating due to leakage flux.
- Mechanically sturdy design to withstand vibrations., keep low noise level & ensure performance guarantee.
- 25kVAr & 50 kVAr ratings are also manufactured in aluminum conductor for cost saving with above features.

1) Capacitor + Reactor detuned filter suppresses desired harmonics.
2) Harmonics being bi-directional in-coming supply harmonics also get suppressed along with harmonics generated in the equipment where harmonic filter is used.
3) Reactor and Capacitor both being passive components (No moving parts) there is no ageing / deterioration.
4) This reactor + capacitor filter combination -
   a) Increase distribution system efficiency.
   b) Keeps your MD well under control.
   c) Gives harmonic free supply to your equipments.

Value	Dimensions (in mm)			Weight (in kg)
	A	B	C	
5 KVAR 7%	210	110	170	5.5
10 KVAR 7%	210	110	190	7.5
15 KVAR 7%	210	116	220	11.5
20 KVAR 7%	240	135	220	14
25 KVAR 7%	240	135	240	16
30 KVAR 7%	240	135	260	18
40 KVAR 7%	270	140	280	24
50 KVAR 7%	300	145	280	28
75 KVAR 7%	300	165	290	38
100 KVAR 7%	300	185	300	47

Automatic Power Factor Controller

Shreem

Features :

- Controller measures and displays various electrical parameters such as Voltage, Current, Active power, Reactive power, Apperant power, Frequency, Temperature. Also THD measurement & display for supply voltage, current relative to fundamental & RMS Values.
- Various possibilities for bank selection including user defined bank values in KVAR.
- Input sensing line-to-line voltage.
- Selectable current input range 1Amp and 5 Amp. (CT input).
- Protection against Over/Under voltage, Over/Under load, Over Temperature etc.
- Compensation on fundamental waveform, KVAR calculation which includes the effects of supply frequency and voltage.
- Output of relay contacts available upto 12 steps.
- Standard 144 x 144mm panel flush mounting arrangement. Max depth 60mm. Recommended cutout for panel front door is 138 x 138mm.
- Two modes of operation : Auto, Manual.
- Various editable parameters such as General & IO Parameters, Fault parameters, Step parameter, System parameters like PT ratio, CT primary current, P.F. Upper & lower limits.
- Password protection and unit identification (ID) Facility.
- Various correction type like Binary/unequal/C series/ E series.

Technical Data :

- Auxiliary voltage (L-L) 415 Volt, optional 230 Volt 110 Volt, measurement Voltage (L-L) : 415 Volt , Voltage tolerance $\pm$ 10%.
- Input measurement current : 1A/5 A selectable .
- Contact rating for output suitable for 5A, 230 Volt.
- measurement accuracy : Class-1.
- Operating temperature : 0 to 55 ^{o}C.
- Storage temperature : -10 to +75°C.

  Terminals : Screw-type pluggable, max 2.5 sq. mm.
- Casing : Front - instrument casing plastic, Rear-metal.
- Protection class : Front IP 54, Rear - IP 20.
- Display : 2 x 16 char. LCD display.

Shreem

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