



Essential Solutions For Reactive Energy Compensation



www.viztechnologies.biz



About Us

Viz is a leading ISO 9001 certified manufacturer of power factor correction, motor run, motor start and power electronic capacitors. We are constantly working with our customers with the goal to offer them innovative engineering solutions, reliable service and high quality products. Viz is the only approved Indian manufacturer of 690 VAC and 800 VAC rated power factor correction capacitors for the extremely demanding wind turbine application. Viz is also an OEM manufacturer, as we brand label capacitors for several of our partners, including leading multinational companies in various countries - yet another testament to our outstanding quality.

Viz focuses on technologically driven applications, such as power quality, industrial, renewable energy, consumer electronics, automotive and power electronics.

Viz has 2 state-of-art manufacturing facilities, both located in Hyderabad, India equipped with the latest and best machines and testing equipment available internationally. Both the plants are managed and run by highly experienced, qualified and motivated teams. Through investment in Research and Development Viz continues to develop new products for its customers, which are type tested and validated at Viz's fully equipped in house laboratory.

Viz uses the best available raw materials, which are validated through a detailed and painstaking process. 100% of Viz capacitors are checked several times during the manufacturing process to ensure all specifications are met and our customers receive only top quality capacitors. Viz's quality has also meant a wider global reach, to customers in Europe, Middle East, CIS and Southeast Asia.



PFC Introduction

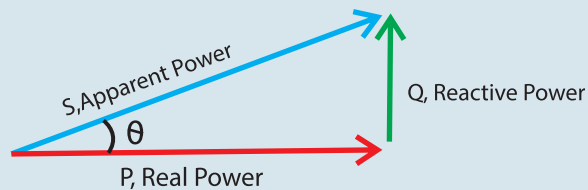
Energy Saved is Energy Produced!

The demand for power has increased exponentially, resulting in growing awareness of power quality. Enhancing power quality by improving power factor and harmonic filtering results in energy savings and a fast return on investment.

In Direct Current (DC) Circuits, only resistance restricts the current flow. In Alternating Current (AC) Circuits, there are additional aspects which determine the current flow. Though similar to resistance, they do not actually consume any power, but load the system with reactive currents, and are hence called "Reactance".

Reactance is either caused by inductance, when current lags the voltage, or by capacitance, when current leads the voltage. All industrial and commercial loads are inductive in nature, leading to unnecessary loading of the system, while performing no real work. To counter this lagging current, leading current should be added in the circuit. This leading current is added by introducing capacitors in the circuit.

The above phenomenon can also be described by the following Power Triangle:



where,

Real Power: Also known as active power, is the energy used to do actual useful work and is measured in watts (W).

Apparent Power: Is the total current drawn from the generator and is measured in volt amperes (VA).

Reactive Power: This occurs in an AC circuit when voltage and current are not in phase and is measured in volt ampere reactive (var).

The reactive power can be "supplied" by a capacitor, thereby reducing the phase angle.

Power Factor is the ratio of real power (W) / Apparent Power (VA). When $W = VA$, then the power factor is 1 or unity.

Advantages of power factor correction:

- Avoid the penalty applied by the energy suppliers to the users with low PF.
- For new plants, optimize the dimensioning of the plant depending on the actual planned production capability.
- For existing plants, recover productive capability without adding/increasing the performances of what is already installed (transformers, cables)
- Reduce line voltage drop
- Reduce energy losses due to Joule effect in transformers and cables

MPP Wind Turbine Power Capacitors

- ♦ Up to 25 kvar
- ♦ Soft Resin-impregnated
- ♦ 4 Safety Features



General

The Viz Wind Turbine Power Capacitor is the only Indian product approved for the demanding wind turbine application.

The Viz Wind Turbine Power Capacitor is especially designed for use in the highly challenging wind turbine application to enable it to withstand the continuous switching operations in the high wind season caused by constant changes in wind speed.

Applications

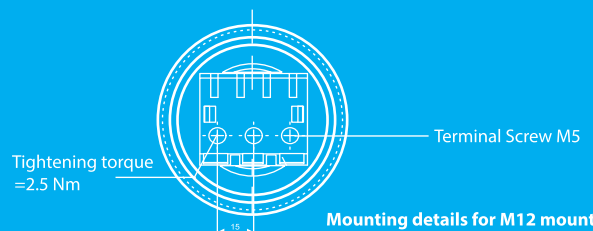
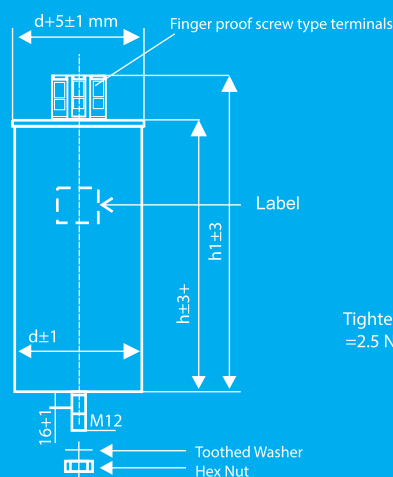
- ♦ Automatic PFC equipment, capacitor banks especially designed for wind turbine applications.

Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ Comes with In built discharge resistors

Features

- ♦ Long life
- ♦ Compact design in cylindrical aluminium can with stud
- ♦ Stacked type construction
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 690 to 800 V Output range 10 to 25 kvar
- ♦ Low losses
- ♦ High inrush current withstand capability (up to 200• IR)
- ♦ No Maintenance



Mounting details for M12 mounting

- Torque T=12Nm
- Star Washer 12.5
- Hex Nut: 12

Power	QR	10 to 25 kvar
Rated Voltage	VR	690 to 800 V AC
Overvoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.3 • IR including combined effects of harmonics, over voltages and capacitance tolerance
Inrush current	IS	up to 200 • IR
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.45
Rated frequency	f	50/60 Hz
Capacitance tolerance	VTT	– 5% / +10%
Test voltage, terminal/terminal	VTc	2.15 • VR1, AC, 2 s
Test voltage, terminal/case		6000 V AC, 2 s
Mean life expectancy		up to 150 000 h (temperature class –40/C) up to 120 000 h (temperature class –40/D)
Ambient temperature		–40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	H _{rel}	max. 97%
Altitude		max. 4000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		soft resin impregnated, pressure sensitive device, self- healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
Discharge resistors		in built
Case		extruded aluminum can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		optimized capacitor safety terminal with electric shock (IP20), protection max. 25 mm ² cable cross section, max. current 130 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

WIND TURBINE POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Cap (μF) *	Dimensions 3LxWxH (mm)	Rated Reactive Power in KVAR @ rated voltage 50 Hz	
				660	690
1	VTCCD-810	22.3	75 x 278	9.15	10.00
2	VTCCD-812	27.9	85 x 278	11.44	12.50
3	VTCCD-815	33.4	85 x 278	13.73	15.00
4	VTCCD-820	44.6	85 x 360	18.30	20.00
5	VTCCD-825	55.7	85 x 360	22.88	25.00



MPP Super Heavy Duty Capacitors

- ♦ Heavy Duty
- ♦ Up to 40 kvar
- ♦ Soft Resin-impregnated
- ♦ 4 Safety Features

General

The Super HD series is a new development in MPP Technology, covering the power range up to 40 kvar with just one capacitor in a cylindrical aluminium case.

The Super HD is especially designed for use in applications that have a requirement of high inrush current up to to 300•IR along with a long service life

Applications

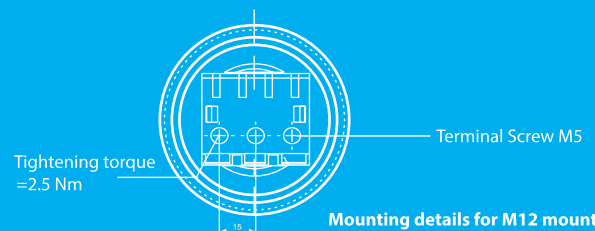
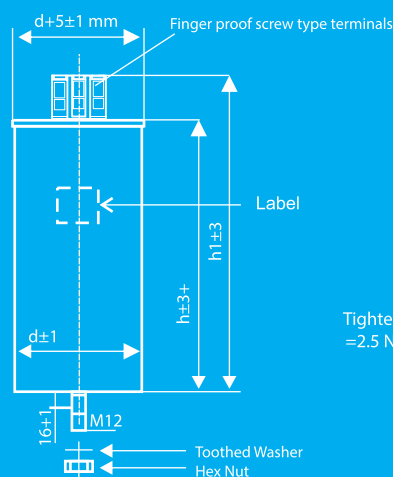
- ♦ Automatic PFC equipment, capacitor banks,
- ♦ Individual fixed PFC (e.g. motors, transformers, lighting)
- ♦ Group fixed PFC
- ♦ Tuned and detuned capacitor banks
- ♦ Filter applications
- ♦ Dynamic PFC
- ♦ Hybrid capacitor banks with active filters.

Features

- ♦ Long life
- ♦ Compact design in cylindrical aluminium can with stud
- ♦ Stacked type construction
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 400 to 525 V
- ♦ Output range 5 kvar to 40 kvar (50 Hz)
- ♦ Low losses
- ♦ High inrush current withstand capability (up to 300• IR)
- ♦ No Maintenance

Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ Comes with In built discharge resistors



Mounting details for M12 mounting

- Torque T=12Nm
- Star Washer 12.5
- Hex Nut: 12

Power	QR	5 to 40 kvar
Rated Voltage	VR	400 to 525 V AC
Overtoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.5 • IR including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	IS	up to 300 • IR
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.45
Rated frequency	f	50/60 Hz
Capacitance tolerance		– 5% / +10%
Test voltage, terminal/terminal	VTT	2.15 • VR1, AC, 10 s
Test voltage, terminal/case	VTC	3600 V AC, 2 s
Mean life expectancy		up to 180 000 h (temperature class –40/C) up to 130 000 h (temperature class –40/D) Ambient temperature –40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	H _{rel}	max. 95%
Altitude		max. 4 000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		soft resin impregnated, pressure sensitive device, self-healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
Discharge resistors		in built
Case		extruded aluminum can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		optimized capacitor safety terminal with electric shock protection (IP20), max. 25 mm ² cable cross section, max. current 130 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

SUPER HEAVY DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Cap (µF) * 3	Dimensions LxWxH (mm)	Rated Reactive Power in KVAR @ rated voltage 50 Hz				
				400	415	440	480	525
1	VTCCH-305	27.4	75 x 160	4.13	4.45	5.00	5.95	7.12
2	VTCCH-307	41.1	75 x 278	6.20	6.67	7.50	8.93	10.68
3	VTCCH-308	45.7	75 x 278	6.89	7.41	8.33	9.92	11.86
4	VTCCH-310	54.8	75 x 278	8.27	8.90	10.00	11.90	14.24
5	VTCCH-312	68.5	85 x 278	10.33	11.12	12.50	14.88	17.80
6	VTCCH-315	82.2	90 x 278	12.40	13.35	15.00	17.86	21.36
7	VTCCH-320	109.6	90 x 360	16.53	17.79	20.00	23.80	28.47
8	VTCCH-325	137.0	100 x 360	20.66	22.24	25.00	29.75	35.59
9	VTCCH-330	164.4	116 x 360	24.79	26.69	30.00		
10	VTCCH-340	219.1	136 x 360	33.06	35.58	40.00		



MPP Heavy Duty Capacitors

- ♦ Heavy Duty
- ♦ Up to 50 kvar
- ♦ Soft Resin-impregnated
- ♦ 4 Safety Features

General

The Heavy Duty series is a very robust capacitor, covering the power range up to 50 kvar with just one capacitor in a cylindrical aluminium case.

The Heavy Duty is especially designed for use in most applications that require a reliable long lasting, zero maintenance capacitor.

Applications

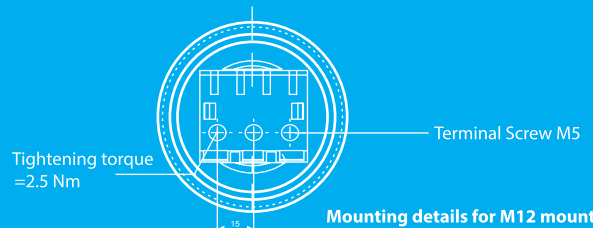
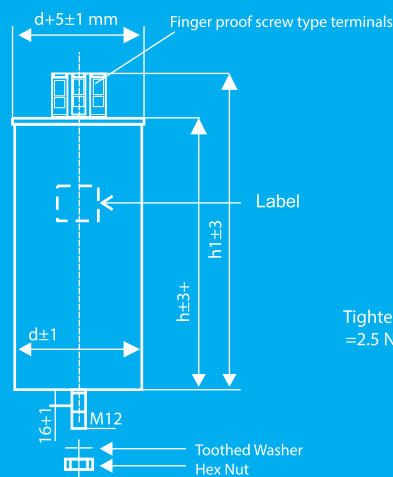
- ♦ Automatic PFC equipment, capacitor banks
- ♦ Individual fixed PFC (e.g. motors, transformers, lighting)
- ♦ Group fixed PFC
- ♦ Tuned and detuned capacitor banks
- ♦ Filter applications
- ♦ Dynamic PFC
- ♦ Hybrid capacitor banks with active filters.

Features

- ♦ Long life
- ♦ Compact design in cylindrical aluminium can with stud
- ♦ Stacked type construction
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 400 to 525 V
- ♦ Output range 50 kvar (50 Hz) / 60 kvar (60 Hz)
- ♦ Low losses
- ♦ No Maintenance

Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ Comes with In built discharge resistors



Mounting details for M12 mounting

- Torque T=12Nm
- Star Washer 12.5
- Hex Nut: 12

Power	QR	5 to 50 kvar
Rated Voltage	VR	400 to 525 V AC
Overvoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.3 • IR including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	IS	up to 250 • IR
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.45
Rated frequency	f	50/60 Hz
Capacitance tolerance		– 5% / +10%
Test voltage, terminal/terminal	VTT	2.15 • VR1, AC, 10 s
Test voltage, terminal/case	VTC	3600 V AC, 2 s
Mean life expectancy		up to 150 000 h (temperature class –40/C) up to 120 000 h (temperature class –40/D)
Ambient temperature		–40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	H _{rel}	max. 95%
Altitude		max. 3000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		soft resin impregnated, pressure sensitive device, self-healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
resistors		in built
Case		extruded aluminum can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		optimized capacitor safety terminal with electric shock protection (IP20), max. 25 mm ² cable cross section, max. current 130 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

HEAVY DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Cap (µF) * 3	Dimensions LxWxH (mm)	Rated Reactive Power in KVAR @ rated voltage 50 Hz				
				400	415	440	480	525
1	VTCCD-305	27.4	63.5 x 155	2.76	2.97	5.00	3.97	4.75
2	VTCCD-307	41.1	75 x 203	4.13	4.45	7.50	5.95	7.12
3	VTCCD-308	45.7	75 x 203	4.59	4.94	8.33	6.61	7.91
4	VTCCD-310	54.8	85 x 203	5.51	5.93	10.00	7.94	9.49
5	VTCCD-312	68.5	85 x 278	6.89	7.42	12.50	9.92	11.87
6	VTCCD-315	82.2	85 x 278	8.27	8.90	15.00	11.90	14.24
7	VTCCD-320	109.6	85 x 360	11.02	11.86	20.00	15.87	18.98
8	VTCCD-325	137.0	90 x 360	13.77	14.83	25.00	19.83	23.73
9	VTCCD-330	164.4	100 x 360	16.53	17.79	30.00		
10	VTCCD-340	219.1	116 x 360	22.04	23.72	40.00		
11	VTCCD-350	273.9	136 x 360	27.55	29.65	50.00		



MPP Standard Duty Capacitors

- ♦ Up to 50 kvar
- ♦ Stack Winding
- ♦ Soft Resin-impregnated
- ♦ 4 Safety Features

General

The Standard Duty series is one of the most popular capacitor sold across the world, covering the power range up to 50 kvar with just one capacitor in a cylindrical aluminium case.

The Standard Duty is especially designed for use in commercial and industrial applications. The capacitors are made in stack windings to allow for better heat dissipation.

Applications

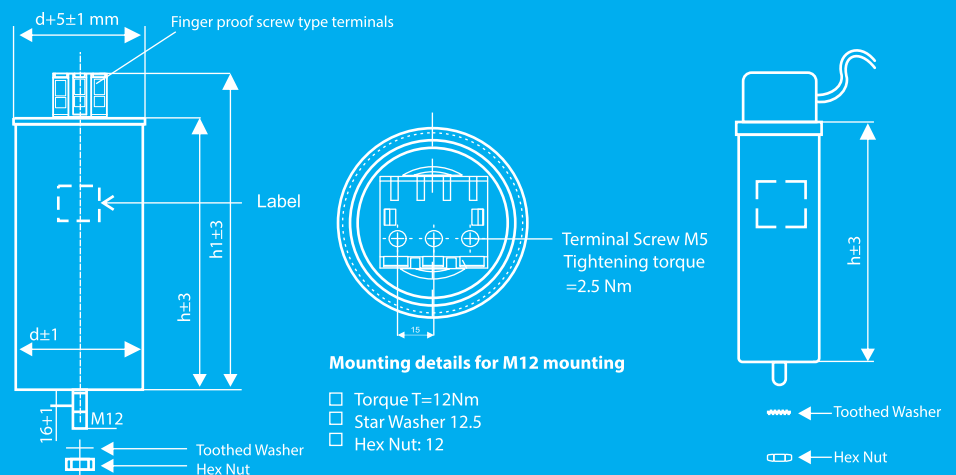
- ♦ Automatic PFC equipment, capacitor banks
- ♦ Individual fixed PFC (e.g. motors, transformers, lighting)
- ♦ Group fixed PFC
- ♦ Tuned and detuned capacitor banks
- ♦ Filter applications
- ♦ Dynamic PFC
- ♦ Hybrid capacitor banks with active filters.

Features

- ♦ Compact design in cylindrical aluminium can with stud
- ♦ Low weight
- ♦ Stacked type construction
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 230 to 480 V
- ♦ Output range 1 to 50 kvar (50 Hz)
- ♦ Starts from 1 kvar, to help achieve Power Factor close to unity
- ♦ Low losses
- ♦ Zero Maintenance

Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ Comes with In built discharge resistors



Power	QR	1 to 50 kvar
Rated Voltage	VR	230 to 480 V AC
Overvoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.5 • IR including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	IS	up to 200 • IR
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.45
Rated frequency	f	50/60 Hz
Capacitance tolerance		– 5% / +10%
Test voltage, terminal/terminal	VTT	2.15 • VR1, AC, 10 s
Test voltage, terminal/case	VTC	3600 V AC, 2 s
Mean life expectancy		up to 135 000 h (temperature class –40/C) up to 100 000 h (temperature class –40/D)
Ambient temperature		–40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	H _{rel}	max. 95%
Altitude		max. 3000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		soft resin impregnated, pressure sensitive device, self-healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
Discharge resistors		in built
Case		extruded aluminium can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		optimized capacitor safety terminal with electric shock protection (IP20), max. 25 mm ² cable cross section, max. current 130 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

STANDARD DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Dimensions		Rated Reactive Power in KVAR @ rated voltage 50 Hz						
		Capacitance (µF) * 3	LxWxH(mm)	230	250	300	400	415	440	480
1	VTCCF-301	5.5	50 x 110	0.3	0.3	0.5	0.8	0.9	1.0	1.2
2	VTCCF-302	11.0	50 x 130	0.5	0.6	0.9	1.7	1.8	2.0	2.4
3	VTCCF-303	16.5	50 x 155	0.8	1.0	1.4	2.5	2.7	3.0	3.6
4	VTCCF-304	32.9	63.5 x 133	1.6	1.9	2.8	5.0	5.3	6.0	7.1
5	VTCCF-305	27.4	63.5 x 155	1.4	1.6	2.3	4.1	4.4	5.0	6.0
6	VTCCF-306	32.8	63.5 x 190	1.6	1.9	2.8	4.9	5.3	6.0	7.1
7	VTCCF-307	41.1	75 x 160	2.0	2.4	3.5	6.2	6.7	7.5	8.9
8	VTCCF-308	45.7	75 x 160	2.3	2.7	3.9	6.9	7.4	8.3	9.9
9	VTCCF-310	54.8	75 x 203	2.7	3.2	4.7	8.3	8.9	10.0	11.9
10	VTCCF-312	68.5	85 x 203	3.4	4.0	5.8	10.3	11.1	12.5	14.9
11	VTCCF-315	82.2	85 x 203	4.1	4.8	7.0	12.4	13.3	15.0	17.9
12	VTCCF-320	109.6	85 x 278	5.5	6.5	9.3	16.5	17.8	20.0	23.8
13	VTCCF-325	137.0	90 x 278	6.8	8.1	11.6	20.7	22.2	25.0	29.8
14	VTCCF-330	164.4	100 x 278	8.2	9.7	13.9	24.8	26.7	30.0	
15	VTCCF-340	219.1	116 x 278	10.9	12.9	18.6	33.1	35.6	40.0	
16	VTCCF-350	273.9	136 x 278	13.7	16.1	23.2	41.3	44.5	50.0	



MPP Basic Duty Capacitors

- ♦ Up to 25 kvar
- ♦ Stack Winding
- ♦ Soft Resin-impregnated
- ♦ 4 Safety Features

General

The Basic Duty series is a super compact economical series, covering the power range up to 25 kvar with just one capacitor in a cylindrical aluminium case.

The Basic Duty is especially designed for use in simple light load applications where there are no harmonics present in the system. The capacitors are made in stack windings to allow for better heat dissipation.

Applications

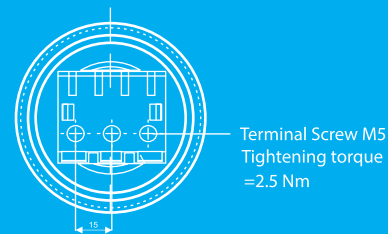
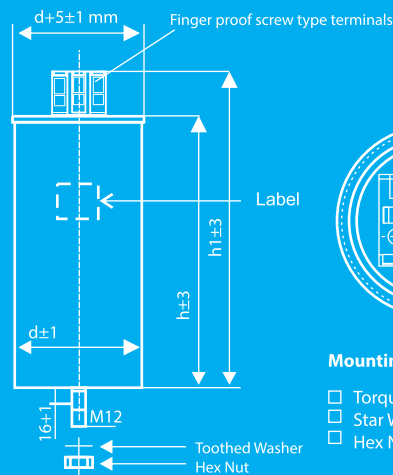
- ♦ Automatic PFC equipment, capacitor banks
- ♦ Individual fixed PFC (e.g. motors, transformers, lighting)
- ♦ Group fixed PFC

Features

- ♦ Super Compact design in cylindrical aluminium can with stud
- ♦ Very low weight
- ♦ Stacked type construction
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 230 to 440 V
- ♦ Output range 1 to 25 kvar (50 Hz)
- ♦ Starts from 1 kvar, to achieve Power Factor close to unity
- ♦ Low losses
- ♦ Zero Maintenance

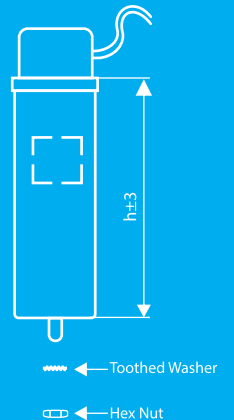
Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ In built discharge resistors



Mounting details for M12 mounting

- Torque T=12Nm
- Star Washer 12.5
- Hex Nut: 12



Power	QR	1 to 25 kvar
Rated Voltage	VR	230 to 440 V AC
Overvoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.3 • IR including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	IS	up to 180 • IR
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.45
Rated frequency	f	50/60 Hz
Capacitance tolerance		– 5% / +10%
Test voltage, terminal/terminal	VTT	2.15 • VR1, AC, 10 s
Test voltage, terminal/case	VTC	3600 V AC, 2 s
Mean life expectancy		up to 100 000 h (temperature class –40/C) up to 80 000 h (temperature class –40/D)
Ambient temperature		–40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	H _{rel}	max. 95%
Altitude		max. 3000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		soft resin impregnated, pressure sensitive device, self-healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
Discharge resistors		in built
Case		extruded aluminium can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		optimized capacitor safety terminal with electric shock protection (IP20), max. 16 mm ² cable cross section, max. current 130 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

BASIC DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.no	Item/Code	Dimensions		Rated Reactive Power in KVAR @ rated voltage 50 Hz					
		Capacitance (µF) * 3	LxWxH(mm)	230	250	300	400	415	440
1	VTCCA-301	5.5	50 x 110	0.27	0.32	0.47	0.83	0.89	1.00
2	VTCCA-302	11.0	50 x 130	0.55	0.65	0.93	1.65	1.78	2.00
3	VTCCA-303	16.5	50 x 130	0.82	0.97	1.40	2.48	2.67	3.00
4	VTCCA-304	32.9	63.5 x 133	1.64	1.94	2.79	4.96	5.33	6.00
5	VTCCA-305	27.4	63.5 x 133	1.37	1.61	2.33	4.13	4.45	5.00
6	VTCCA-306	32.8	63.5 x 133	1.64	1.93	2.78	4.95	5.33	5.99
7	VTCCA-307	41.1	75 x 160	2.05	2.42	3.49	6.20	6.67	7.50
8	VTCCA-308	45.7	75 x 160	2.28	2.69	3.87	6.89	7.41	8.33
9	VTCCA-310	54.8	75 x 160	2.73	3.23	4.65	8.27	8.90	10.00
10	VTCCA-312	68.5	75 x 203	3.42	4.04	5.81	10.33	11.12	12.50
11	VTCCA-315	82.2	75 x 203	4.10	4.84	6.98	12.40	13.35	15.00
12	VTCCA-320	109.6	75 x 278	5.46	6.46	9.30	16.53	17.79	20.00
13	VTCCA-325	137.0	85 x 278	6.83	8.07	11.62	20.66	22.24	25.00

MPP Box Type Capacitors



- ♦ Super Heavy & Heavy Duty
- ♦ Up to 50 kvar
- ♦ Soft Resin-impregnated
- ♦ Fast Cooling
- ♦ 4 Safety Features

General

The Box Type Capacitors are the most robust design for any kind of application. They come only in the heavy & super heavy duty designs.

The Box Type Capacitors are especially designed for use in the most challenging applications with excellent heat dissipation, which is achieved by housing each element in individual aluminium containers, also resulting in high inrush current withstanding capacity of up to 350 • IR along with a long service life.

Applications

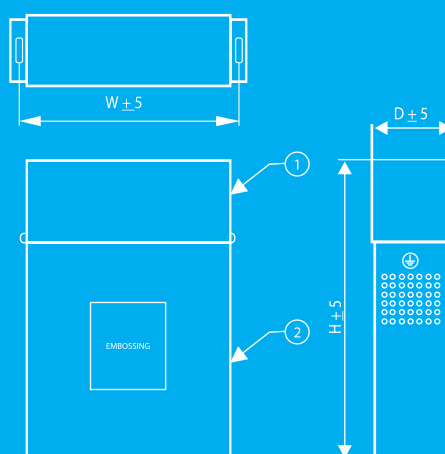
- ♦ Automatic PFC equipment, capacitor banks
- ♦ Individual fixed PFC (e.g. motors, transformers, lighting)
- ♦ Group fixed PFC
- ♦ Tuned and detuned capacitor banks
- ♦ Filter applications
- ♦ Dynamic PFC
- ♦ Hybrid capacitor banks with active filters.

Features

- ♦ Super Long life
- ♦ Separate container per element
- ♦ Excellent heat dissipation
- ♦ MPP-technology with heavy edge ramp metallization
- ♦ Voltage range 400 to 525 V
- ♦ Output range 50 kvar (50 Hz) / 60 kvar (60 Hz)
- ♦ Low losses
- ♦ High inrush current withstand capability (up to 350 • IR)
- ♦ No Maintenance

Safety

- ♦ Self Healing Technology
- ♦ Pressure Sensitive Device
- ♦ IP 20 Terminals
- ♦ Comes with In built discharge resistors



- 1) Cable Box Colour Da Gray Hym 608.
2) Body Colour Satin Siemens Gray (RAL7310)

Standards IEC 60831-1+2 | EN 60831-1+2 | IS 13340-1+2

Power	QR	5 to 50 kvar
Rated Voltage	VR	400 to 525 V AC
Overvoltage	Vmax	VR + 10% (up to 8 h daily) / VR + 15% (up to 30 min daily) / VR + 20% (up to 5 min daily) / VR + 30% (up to 1 min daily)
Overcurrent	I _{max}	up to 1.5 • IR including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	IS	up to 300 • IR (Heavy Duty) up to 350 • IR (Super Heavy Duty)
Losses:		
– Dielectric	W/kvar	< 0.2
– Total*	W/kvar	< 0.5
Rated frequency	f	50/60 Hz – 5% / +10%
Capacitance tolerance		
Test voltage, terminal/terminal	VTT	2.15 • VR1, AC, 10 s 3600 V AC, 2 s
Test voltage, terminal/case	VTC	
Mean life expectancy		up to 180 000 h (temperature class –40/C) } Super Heavy Duty up to 140 000 h (temperature class –40/D) } up to 170 000 h (temperature class –40/C) } Heavy Duty up to 130 000 h (temperature class –40/D) }
Ambient temperature		–40/D; max. temp. 55 °C; max. mean 24 h = 45 °C; max. mean 1 year = 35 °C; lowest temperature = –25 °C
Cooling		natural or forced
Humidity	Hrel	max. 95%
Altitude		max. 4 000 m above sea level
Mounting position		upright
Mounting and grounding		mounting clamps provided
Safety		soft resin impregnated, pressure sensitive device, self-healing technology, maximum allowed fault current 10 000 A in accordance with UL 810
Discharge resistors		external
Case		extruded aluminum cans housed in sheet metal enclosure
Enclosure		IP41, indoor mounting
Dielectric		polypropylene film
Impregnation		Soft Polyurethane Resin (NPCB)
Terminals		Stud type Terminals enclosed in sheet metal cover with electric shock protection (IP41), max. 50 mm ² cable cross section, max. current 150 A
Number of switching operations		up to 5 000 switching operations per year according to IEC 60831-1+2

* Without discharge resistor

SUPER HEAVY DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Capacitance (μF) * 3	Dimensions H x W x D (mm)	Rated Reactive Power in KVAR @ rated voltage 60 Hz							
				230	250	300	400	415	440	480	525
1	VTBCH-305	27.4	240 x 180 x 60	1.4	1.6	2.3	4.1	4.4	5.0	6.0	7.1
2	VTBCH-307	41.1	300 x 240 x 80	2.0	2.4	3.5	6.2	6.7	7.5	8.9	10.7
3	VTBCH-308	45.7	300 x 240 x 80	2.3	2.7	3.9	6.9	7.4	8.3	9.9	11.9
4	VTBCH-310	54.8	300 x 240 x 80	2.7	3.2	4.7	8.3	8.9	10.0	11.9	14.2
5	VTBCH-312	68.5	300 x 240 x 80	3.4	4.0	5.8	10.3	11.1	12.5	14.9	17.8
6	VTBCH-315	82.2	300 x 240 x 160	4.1	4.8	7.0	12.4	13.3	15.0	17.9	21.4
7	VTBCH-320	109.6	300 x 240 x 160	5.5	6.5	9.3	16.5	17.8	20.0	23.8	28.5
8	VTBCH-325	137.0	300 x 240 x 160	6.8	8.1	11.6	20.7	22.2	25.0	29.8	35.6
9	VTBCH-330	164.4	300 x 240 x 320	8.2	9.7	13.9	24.8	26.7	30.0		
10	VTBCH-340	219.1	300 x 240 x 320	10.9	12.9	18.6	33.1	35.6	40.0		
11	VTBCH-350	273.9	300 x 240 x 320	13.7	16.1	23.2	41.3	44.5	50.0		

HEAVY DUTY POWER FACTOR CORRECTION CAPACITORS

Sl.No	Item/Code	Capacitance (μF) * 3	Dimensions H x W x D (mm)	Rated Reactive Power in KVAR @ rated voltage 50 Hz							
				230	250	300	400	415	440	480	525
1	VTBCD-305	27.4	200 x 75 x 75	1.4	1.6	2.3	4.1	4.4	5.0	6.0	7.1
2	VTBCD-307	41.1	300 x 240 x 80	2.0	2.4	3.5	6.2	6.7	7.5	8.9	10.7
3	VTBCD-308	45.7	300 x 240 x 80	2.3	2.7	3.9	6.9	7.4	8.3	9.9	11.9
4	VTBCD-310	54.8	300 x 240 x 80	2.7	3.2	4.7	8.3	8.9	10.0	11.9	14.2
5	VTBCD-312	68.5	300 x 240 x 80	3.4	4.0	5.8	10.3	11.1	12.5	14.9	17.8
6	VTBCD-315	82.2	300 x 240 x 80	4.1	4.8	7.0	12.4	13.3	15.0	17.9	21.4
7	VTBCD-320	109.6	300 x 240 x 160	5.5	6.5	9.3	16.5	17.8	20.0	23.8	28.5
8	VTBCD-325	137.0	300 x 240 x 160	6.8	8.1	11.6	20.7	22.2	25.0	29.8	35.6
9	VTBCD-330	164.4	300 x 240 x 160	8.2	9.7	13.9	24.8	26.7	30.0		
10	VTBCD-340	219.1	300 x 240 x 320	10.9	12.9	18.6	33.1	35.6	40.0		
11	VTBCD-350	273.9	300 x 240 x 320	13.7	16.1	23.2	41.3	44.5	50.0		



Microcontroller Automatic Power Factor Relay

VIZ Power Factor Controller senses the power factor of the load and automatically switches on the required amount of capacitors in order to maintain the power factor at the set value. VIZ offers a wide range of controllers from 4 steps to 16 steps. Measuring technologies include single CT as well as 3 CT sensing options. Our controllers are available with wide range of features and various degrees of intelligence and various data logging communication features. Our controllers come with advanced features such as data logging and auto synchronization particularly for distribution systems.

Range

- ◆ Steps – 4,6,8,12,14,16.
- ◆ Sensing - 1CT or 3 CT.
- ◆ Measurement Current – x/5 or x/1A Selectable.
- ◆ Switching - Contactor, Thyristor, Hybrid.
- ◆ Communication – RS232, RS485.
- ◆ Display Parameters – PF, V, I, KW, KVAR, KVR, THD-1, THD-V.
- ◆ Data logging and Auto Synchronization are available on request.



Harmonic Filter Reactors

De-tuning reactors are used to tune the capacitor bank to desirable frequency in order to avoid the probability of Harmonic amplification and thereby protect the capacitors from adverse effects of harmonics. They also help in limiting switching inrush current.

Viz reactors are designed for low loss, 3 phase assembly complete with mounting brackets and connecting cables.

Viz offers wide range of reactors from 230V to 1000V systems for capacitors banks rated from 5 KVAR to 100 KVAR with impedances of 5.67%, 6%, 7% and 14% (of capacitor bank)

IMPORTANT NOTE

Please use only the correct number of the appropriate power capacitor as per standards for each individual harmonic filter reactor. If this requirement is not adhered to, the resulting series resonance frequency can under certain circumstances move in to critical range, possibly overloading the installed components.



Viz Capacitor Duty Contactors for Switching

During switching of a capacitor, transient currents to the order of 200 times the rated current can flow stressing the capacitor and the switching contacts immensely. This can lead to damage or welding of contacts of the contactors. The modern Power Factor Correction systems use new generation Viz Contactors designed to switch the capacitor first through contact block of three early make auxiliary contacts in series with current limiting resistors (also called pre charging resistor) to limit inrush current to the value within contactor rated capacity. Normal rated capacitor current is carried by main contacts which after closing after about 5 milliseconds, effectively bypass the damping resistor. The leading contacts then open up and no current flows through them.

Range

- ♦ 7 kVAr to 100kVAr
- ♦ 230V to 690V
- ♦ Frequency – 50 / 60 Hz
- ♦ Contactors come with inbuilt NO+NC contacts



Benefits of Viz Capacitor Duty Contactor:

- ♦ Saves cost of expensive replacement
- ♦ Minimizes the effects of inrush current
- ♦ Saves energy, reduced watt loss during ON conditions
- ♦ Operator safety through IP 20 design
- ♦ Higher safety in operations
- ♦ Switching of capacitor banks in parallel without de-rating
- ♦ Less maintenance and downtime
- ♦ Higher electrical life



How to correct Power factor?

By installing a capacitor bank it is possible to reduce the reactive power absorbed by the inductive loads in the system and consequently to improve power factor. It is suitable to have $\cos\theta$ a little in excess of 0.9 to avoid paying the penalties provided for by the law. $\cos\theta$ must not be too close to unity, to avoid the leading currents in the electrical system.

The choice of the correct power factor correction equipment depends on the type of loads present and by their way of working.

The choice is between CENTRAL COMPENSATION and INDIVIDUAL COMPENSATION.

Individual compensation: power factor correction is wired at each single load (i.e. motor terminals)

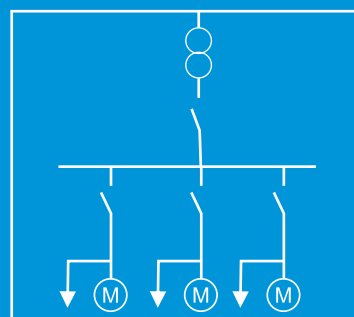
Central compensation: there is only one bank of capacitors on the main power distribution switch board or substation.

The individual compensation is a simple technical solution, the capacitor and the user equipment follow the same starts during the daily work, so the regulation of the $\cos\theta$ becomes systematic and closely linked to the load. Another great advantage of this type of power factor correction is the simple installation with low costs.

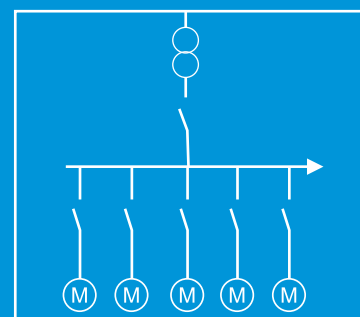
The daily trend of the loads has a fundamental importance for the choice of most suitable power factor correction. In many systems, not all the loads work in the same time and some of them work only a few hours per day. It is clear that the solution of the individual compensation becomes too expensive for the high number of capacitors that have to be installed. Most of these capacitors will not be used for long period of time.

The individual compensation is more effective if the majority of the reactive power is concentrated on a few loads that work over a long period of time.

Central compensation is best suited for systems where the load fluctuates throughout the day. If the absorption of reactive power is very variable, it is advisable to use automatic regulation in preference to fixed capacitor.



Individual Compensation



Central Compensation

Calculation Table for Reactive Power Demand (Qc)

Current (ACTUAL) tanφ									TARGET				
									cosφ=0.96				
	cosφ	Achievable (TARGET) cosφ							Qc	cosφ≤1			
		0.80	0.82	0.85	0.88	0.90	0.92	0.94		Qc = P _{mot} · F(0.96)=...[kvar] 100 · 1.01=101.0 kvar			
									0.96	0.98	1.00		
		Faktor F											
3.18	0.30	2.43	2.48	2.56	2.64	2.70	2.75	2.82	2.89	2.98	3.18		
2.96	0.32	2.21	2.26	2.34	2.42	2.48	2.53	2.60	2.67	2.76	2.96		
2.77	0.34	2.02	2.07	2.15	2.23	2.28	2.34	2.41	2.48	2.56	2.77		
2.59	0.36	1.84	1.89	1.97	2.05	2.10	2.17	2.23	2.30	2.39	2.59		
2.43	0.38	1.68	1.73	1.81	1.89	1.95	2.01	2.07	2.14	2.23	2.43		
2.29	0.40	1.54	1.59	1.67	1.75	1.81	1.87	1.93	2.00	2.09	2.29		
2.16	0.42	1.41	1.46	1.54	1.62	1.68	1.73	1.80	1.87	1.96	2.16		
2.04	0.44	1.29	1.34	1.42	1.50	1.56	1.61	1.68	1.75	1.84	2.04		
1.93	0.46	1.18	1.23	1.31	1.39	1.45	1.50	1.57	1.64	1.73	1.93		
1.83	0.48	1.08	1.13	1.21	1.29	1.34	1.40	1.47	1.54	1.62	1.83		
1.73	0.50	0.98	1.03	1.11	1.19	1.25	1.31	1.37	1.45	1.63	1.73		
1.64	0.52	0.89	0.94	1.02	1.10	1.16	1.22	1.28	1.35	1.44	1.64		
1.56	0.54	0.81	0.86	0.94	1.02	1.07	1.13	1.20	1.27	1.36	1.56		
1.48	0.56	0.73	0.78	0.86	0.94	1.00	1.05	1.12	1.19	1.28	1.48		
1.40	0.58	0.65	0.70	0.78	0.86	0.92	0.98	1.04	1.11	1.20	1.40		
1.33	0.60	0.58	0.63	0.71	0.79	0.85	0.91	0.97	1.04	1.13	1.33		
1.30	0.61	0.55	0.60	0.68	0.76	0.81	0.87	0.94	1.01	1.10	1.30		
1.27	0.62	0.52	0.57	0.65	0.73	0.78	0.84	0.91	0.99	1.06	1.27		
1.23	0.63	0.48	0.53	0.61	0.69	0.75	0.81	0.87	0.94	1.03	1.23		
1.20	0.64	0.45	0.50	0.58	0.66	0.72	0.77	0.84	0.91	1.00	1.20		
1.17	0.65	0.42	0.47	0.55	0.63	0.68	0.74	0.81	0.88	0.97	1.17		
1.14	0.66	0.39	0.44	0.52	0.60	0.65	0.71	0.78	0.85	0.94	1.14		
1.11	0.67	0.36	0.41	0.49	0.57	0.63	0.68	0.75	0.82	0.90	1.11		
1.08	0.68	0.33	0.38	0.46	0.54	0.59	0.65	0.72	0.79	0.88	1.08		
1.05	0.69	0.30	0.35	0.43	0.51	0.56	0.62	0.69	0.76	0.85	1.05		
1.02	0.70	0.27	0.32	0.40	0.48	0.54	0.59	0.66	0.73	0.82	1.02		
0.99	0.71	0.24	0.29	0.37	0.45	0.51	0.57	0.63	0.70	0.79	0.99		
0.96	0.72	0.21	0.26	0.34	0.42	0.48	0.54	0.60	0.67	0.76	0.96		
0.94	0.73	0.19	0.24	0.32	0.40	0.45	0.51	0.58	0.65	0.73	0.94		
0.91	0.74	0.16	0.21	0.29	0.37	0.42	0.48	0.55	0.62	0.71	0.91		
0.88	0.75	0.13	0.18	0.26	0.34	0.40	0.46	0.52	0.59	0.68	0.88		
0.86	0.76	0.11	0.16	0.24	0.32	0.37	0.43	0.50	0.57	0.65	0.86		
0.83	0.77	0.08	0.13	0.21	0.29	0.34	0.40	0.47	0.54	0.63	0.83		
0.80	0.78	0.05	0.10	0.18	0.26	0.32	0.38	0.44	0.51	0.60	0.80		
0.78	0.79	0.03	0.08	0.16	0.24	0.29	0.35	0.42	0.49	0.57	0.78		
0.75	0.80		0.05	0.13	0.21	0.27	0.32	0.39	0.46	0.55	0.75		
0.72	0.81			0.10	0.18	0.24	0.30	0.36	0.43	0.52	0.72		
0.70	0.82			0.08	0.16	0.21	0.27	0.34	0.41	0.49	0.70		
0.67	0.83			0.05	0.13	0.19	0.25	0.31	0.38	0.47	0.67		
0.65	0.84			0.03	0.11	0.16	0.22	0.29	0.36	0.44	0.65		
0.62	0.85				0.08	0.14	0.19	0.26	0.33	0.42	0.62		
0.59	0.86				0.05	0.11	0.17	0.23	0.30	0.39	0.59		
0.57	0.87					0.08	0.14	0.21	0.28	0.36	0.57		
0.54	0.88					0.06	0.11	0.18	0.25	0.34	0.54		
0.51	0.89					0.03	0.09	0.15	0.22	0.31	0.51		
0.48	0.90						0.06	0.12	0.19	0.28	0.48		
0.46	0.91						0.03	0.10	0.17	0.25	0.46		
0.43	0.92							0.07	0.14	0.22	0.43		
0.40	0.93							0.04	0.11	0.19	0.40		
0.36	0.94								0.07	0.16	0.36		
0.33	0.95									0.13	0.33		

$$Q_c = P_A \cdot (\tan \varphi_1 - \tan \varphi_2)$$

$$Q_c [\text{kvar}] = P_A \cdot F = \text{active power [kW]} \cdot \text{factor "F"}$$

$$P_A = S \cdot \cos \varphi = \text{apparent power} \cdot \cos \varphi$$

tan 1+φ2 according to cosφ values ref. table

Example:

Actual motor power P=100 kW

ACTUAL cos φ 0.61

TARGET cos φ 0.96

Factor F from table 1.01

Capacitor reactive power Qc

$$Q_c = 100 \cdot 1.01 = 101.0 \text{ kvar}$$

Standard Values: Selection Tables for Cables, Cable Cross Sections and Fuses

SELECTION TABLE

Rated voltage 230 V, 60 Hz				Rated voltage 400 V, 50 Hz			
Power Kvar	Current A	Selection mm ²	Fuse A	Power Kvar	Current A	Selection mm ²	Fuse A
2.5	6.3	1.5	10	2.5	3.6	1.5	10
5.0	12.6	4.0	25	5.0	7.2	2.5	16
7.5	18.8	6.0	35	7.5	10.8	2.5	16
10.0	25.1	10.0	50	10.0	14.4	4.0	25
12.5	31.4	16.0	50	12.5	18.0	6.0	35
15.0	37.7	16.0	63	15.0	21.6	6.0	35
20.0	50.2	25.0	80	20.0	28.8	10.0	50
25.0	62.8	35.0	100	25.0	36.0	16.0	63
30.0	75.3	50.0	125	30.0	43.2	25.0	80
40.0	100.4	70.0	160	40.0	57.6	35.0	100
50.0	125.5	95.0	200	50.0	72.0	50.0	125
75.0	188.3	185.0	315	75.0	108.3	70.0	160
100.0	251.0	2 x 120.0	400	100.0	144.3	120.0	250
125.0	–	–	–	125.0	180.3	185.0	315
150.0	–	–	–	150.0	216.5	2 x 95.0	350
175.0	–	–	–	175.0	252.6	2 x 95.0	400
200.0	–	–	–	200.0	288.0	2 x 120.0	500

Rated voltage 440 V, 60 Hz				Rated voltage 480 V, 60 Hz			
Power Kvar	Current A	Selection mm ²	Fuse A	Power Kvar	Current A	Selection mm ²	Fuse A
2.5	3.3	1.5	10	2.5	3.0	1.5	10
5.0	6.6	2.5	16	5.0	6.0	2.5	16
7.5	10.0	2.5	16	7.5	9.0	2.5	16
10.0	13.2	4.0	25	10.0	12.0	4.0	25
12.5	16.8	4.0	25	12.5	18.0	6.0	35
15.0	19.8	6.0	35	15.0	21.0	6.0	35
20.0	26.4	10.0	50	20.0	24.0	10.0	50
25.0	33.0	16.0	63	25.0	30.0	10.0	50
30.0	39.6	25.0	80	30.0	36.0	16.0	63
40.0	52.8	35.0	100	40.0	48.0	25.0	80
50.0	66.0	50.0	125	50.0	60.0	35.0	100
75.0	99.0	70.0	160	75.0	90.0	70.0	160
100.0	132.0	95.0	200	100.0	120.0	95.0	200
125.0	165.0	185.0	315	125.0	150.0	120.0	250
150.0	198.0	2 x 95.0	350	150.0	180.0	185.0	315
175.0	231.0	2 x 95.0	400	175.0	210.0	2 x 95.0	350
200.0	264.0	2 x 120.0	500	200.0	240.0	2 x 95.0	400

Rated voltage 525 V, 50 Hz				Rated voltage 690 V, 50 Hz			
Power Kvar	Current A	Selection mm ²	Fuse A	Power Kvar	Current A	Selection mm ²	Fuse A
2.5	2.7	1.5	10	2.5	2.1	1.5	10
5.0	5.5	1.5	10	5.0	4.2	1.5	10
7.5	6.9	2.5	16	7.5	6.3	1.5	10
10.0	11.0	2.5	16	10.0	8.4	2.5	16
12.5	13.7	4.0	25	12.5	10.5	2.5	16
15.0	16.5	4.0	25	15.0	12.6	4.0	25
20.0	22.0	6.0	35	20.0	16.7	4.0	25
25.0	27.5	10.0	50	25.0	20.9	6.0	35
30.0	33.0	16.0	63	30.0	25.1	10.0	50
40.0	44.0	25.0	80	40.0	33.5	16.0	63
50.0	55.0	35.0	100	50.0	41.8	25.0	80
75.0	82.5	70.0	160	75.0	62.8	50.0	125
100.0	110.0	95.0	200	100.0	83.7	70.0	160
125.0	137.5	95.0	200	125.0	105.0	70.0	160
150.0	165.0	185.0	300	150.0	126.0	95.0	200
175.0	193.0	2 x 95.0	350	175.0	146.0	120.0	250
200.0	220.0	2 x 95.0	350	200.0	167.0	128.5	315

The above mentioned values are guidelines for operation in normal conditions at ambient temperatures up to 35 °C. Upgrade according to conditions, e.g. temperature or harmonics differ. The internal wiring of a capacitor bank is sometimes possible with a smaller cross section. Various parameters such as temperature inside the cabinet, cable quality, maximum cable insulation temperature, single or multi core cable, cable length and laying system have to be considered for a proper selection. The local panel builder/installer is responsible for proper fuses according to the valid regulations and standards in the specific country where the PFC panels are installed.

Individual PFC for Motors

Approximate values (specified by the German Electricity Association VDEW) for fixed PFC of motors			
Motor nominal rating kW	Capacitor power rating (1500 r.p.m.*) kvar	Capacitor power rating (1000 r.p.m.*) kvar	Capacitor power rating (750 r.p.m.*) kvar
1 ... 1.9	0.5	0.5	0.6
2 ... 2.9	1	1.1	1.2
3 ... 3.9	1.5	1.6	1.7
4 ... 4.9	2	2.1	2.3
5 ... 5.9	2.5	2.6	2.9
6 ... 7.9	3	3.2	3.5
8 ... 10.9	4	4.2	4.6
11 ... 13.9	5	5.3	5.8
14 ... 17.9	6	6.3	6.9
18 ... 21.9	7.5	8.0	8.6
22 ... 29.9	10	10.5	11.5
30 ... 39.9	approx. 40% of the motor power		
40 and above	approx. 35% of the motor power		

The capacitor output should be approx. 90% of the apparent power of the motor when idle.

This means a power factor of 0.9% at full load and 0.95 ... 0.98 during idling. Important: The capacitor output must not be rated too high for individual compensated machines where the capacitor is directly connected with the motor clamp. This especially applies when the machine has a big oscillating weight and still continues to rotate after switching off. The capacitor placed in parallel may act as generator for the motor which will cause serious over voltages. The consequence could be heavy damage to the capacitor as well as to the motor.

Individual PFC for Transformers

Standard values for transformer power factor correction		
Rated apparent power of transformer kVA	Rated capacitor power for oil immersed transformers kvar	Rated capacitor power for cast resin transformers kvar
10	1.0	1.5
20	2.0	1.7
50	4.0	2.0
75	5.0	2.5
100	5.0	2.5
160	7.0	4.0
200	7.5	5.0
250	8.0	7.5
315	10.0	8.0
400	12.5	8.5
500	15.0	10.0
630	17.5	12.5
800	20.0	15.0
1000	25.0	16.7
1250	30.0	20.0
1600	35.0	22.0
2000	40.0	25.0
2500	50.0	35.0
3150	60.0	50.0

For an exact calculation of the right capacitor value, following formula can be used:

$$Q_C = 10\% \cdot \frac{A_N}{100}$$

Q_C = needed capacitor (kvar)

10% = magnetising current of the transformer (AS%)

A_N = apparent rated power of the transformer in kVA

There are regional differences in the guidelines of power suppliers concerning the admissible size of capacitors directly connected with a transformer. Therefore a consultation with the respective power supplier is recommended before installation of a compensation bank. Modern transformers have laminations which only need low capacity to reverse the magnetism. In case the capacitor output is too high, stress increase may occur during idling.

Quality

Viz is an ISO 9001:2008 certified manufacturer, whereby strong systems are in place for manufacture of consistent quality of capacitors. Also, we have gone through the extensive process of licensing by the Bureau of Indian Standards for our LT Shunt Capacitors, and have been granted the license to use the ISI mark on our range of Shunt Capacitors, vide license no. CM/L 6700260.

Over and above our stringent in house testing, our capacitors are periodically tested for the highest quality standards at Electrical Research and Development Association (ERDA), Vadodara, India and Central Power Research Institute (CPRI) Bengaluru

Our Capacitors are CE marked, and RoHS Compliant confirmed by TUV India.

CENTRAL POWER RESEARCH INSTITUTE
CPRI

TEST REPORT

Test Report Number: PCD-4088 (A) Date: 16.02.2015

Name & Address of the Customer: M/s Viz Technologies Pvt. Ltd., D-143 & D-143, Phase-III, IDA Jeedimetla, Hyderabad-500 055

Name & Address of the Manufacturer: M/s Viz Technologies Pvt. Ltd., D-143 & D-143, Phase-III, IDA Jeedimetla, Hyderabad-500 055

Particulars of sample tested: 36.0 kvar, 400V, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor

Condition of sample on Receipt: Good & New

Test Results: 36.0 kvar, 400V, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor. Test Results: 36.0 kvar, 400V, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor. Test Results: 36.0 kvar, 400V, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor.

Discharge capacitor before handling: 1. CAPACITANCE 2. GRADIENT

Serial Number: Two

Number of samples tested: Two

Date of Test: 17.02.2015 to 18.02.2015

(V. VEDYANATHAN) TEST ENGINEER (Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Sheet 1 of 16

Attachment No. CML-4700260

TEST REPORT

TEST NO. 4700260

NAME OF THE CUSTOMER: M/s Viz Technologies Pvt. Ltd.

NAME OF THE PRODUCT: Power capacitors for the self-healing type for 33 kV, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor

ENDORSEMENT NO. DATED: 16.02.2015

Removal for a further period of one year from First May, Two Thousand and Twelve to Fourth April, Two Thousand and Twelve

Other terms and conditions of the license remain the same.

(Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Declaration of Conformity

We, Viz Technologies Pvt. Ltd., D-143 & D-143, Phase-III, IDA Jeedimetla, Hyderabad-500 055, India, do hereby declare that the product is in conformity with the requirements of the Indian Standard IS: 13124-1993 for 33 kV, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor.

Based on the design and type, as brought into the market, we declare that the product is in conformity with the requirements of the Indian Standard IS: 13124-1993 for 33 kV, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor.

Signature of the Manufacturer: (Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Date: 27th February 2015

VIZ TECHNOLOGIES PVT. LTD.
An ISO 9001:2008 COMPANY

Statement of Confirmation

No. CE-16/17-770-00

Client's reference - Technical File Number: VZ-CE-01-00

Name & Address of the Manufacturer: Viz Technologies Pvt. Ltd., D-143 & D-143, Phase-III, IDA Jeedimetla, Hyderabad-500 055

Product Name/Description: Short Power capacitors for AC power systems (Power Factor Correction Capacitors)

Type/Model: 36.0 kvar, 400V, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor

Review Results/Remarks: The Technical File referenced above submitted by the manufacturer has been reviewed for its conformity with the requirements of the European Standard EN 60381-1:2001 and EN 60381-2:2001.

Document issued by the Manufacturer: Declaration of Conformity

Marking on the Product: CE

Date of Review: 17th Nov 2015

(Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Certificate No.: IN00030

Certificate of Approval

This is to certify that the Quality Management System of

Viz Technologies Pvt. Ltd.
Plot No. D-143, Phase - III, IDA Jeedimetla, Qutubullapur (M), Rangareddy District, Hyderabad - 500 055, Telangana, India

has been examined by Assessors of QMS Certification Services Pvt. Ltd. and found to be conforming to the requirements of

ISO 9001:2008

In respect of the following activities:
Design, Development, Manufacture & Supply of Electronic Plastic Film Capacitors

This certificate is valid from 05/12/2015 to 15/09/2018*
Original Certification 22/11/2008

(Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Declaration of Conformity

We, Viz Technologies Pvt. Ltd., D-143 & D-143, Phase-III, IDA Jeedimetla, Hyderabad-500 055, India, do hereby declare that the product is in conformity with the requirements of the Indian Standard IS: 13124-1993 for 33 kV, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor.

Based on the design and type, as brought into the market, we declare that the product is in conformity with the requirements of the Indian Standard IS: 13124-1993 for 33 kV, 50 Hz, 3-phase, 3-wire, 3-φ LT Capacitor.

Signature of the Manufacturer: (Dr. T. BHASKAR SUNDAR) JOINT DIRECTOR

Date: 27th February 2015

VIZ TECHNOLOGIES PVT. LTD.
An ISO 9001:2008 COMPANY





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