SIECAP™ LV Capacitors

Capacitor

SIEMENS SIECAP™ range of capacitor can withstand high inrush currents caused while individual switching operation (>100IR) as well while connected in parallel, i.e. as banks when the inrush current is increased to ≥150 · IR. The high inrush is because of the charging current comes from the power line as well as from other capacitors connected in parallel in the bank.

SIEMENS capacitor range broadly classified in two variants:

SIECAP™ ND
[Normal Duty]

SIECAP™ SHD
[Super Heavy Duty]

SIECAP™ range of capacitor is based MPP technology [Metalized of Zinc Al alloy over Polypropelyne dielectric] of film making with an impregnation of semi-dry biodegradable soft resin.

Special film-cutting technique (optimized combination of wavy and smooth cuts) & heavy edge and produces a maximum effective surface for the metal spraying or contacting process, Fig 3.

SIECAP™ capacitors are most compact and light in weight

Wavy cut design

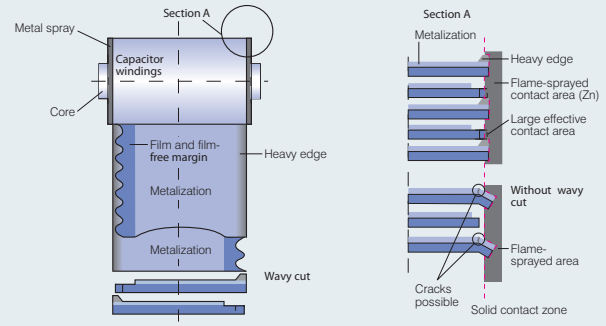
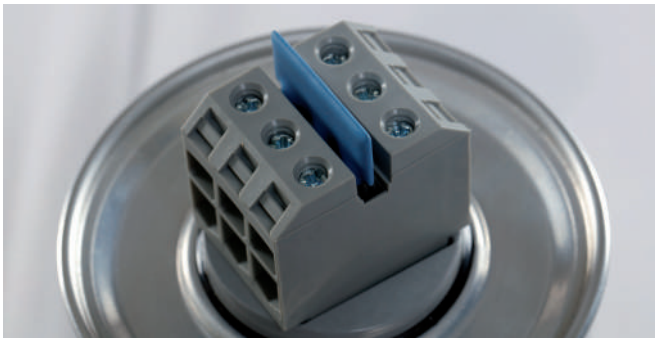
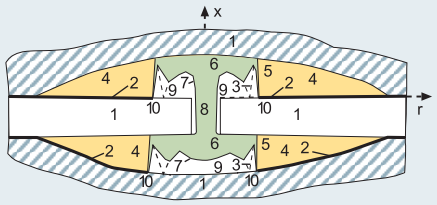


Fig 3



Self-healing properties

Self-healing



1 Dielectric
2 Metalized electrodes
3 Material displacing shock wave
4 Air gap with metal vapor
5,6 Plasma zone
7 Boundary layer between gas phase dielectric and plasma
8 Breakdown channel
9 Gas phase dielectric
10 Zone of displaced metalization and dielectric (isolating region)

Fig 4

In case of electrical overload the dielectric in the breakdown channel is broken down into highly compressed plasma that explodes out of the breakdown channel and pushes the dielectric layers apart. The discharge continues within the spreading plasma via the metal layers so that the metal surrounding the faulty area is completely burnt out. This produces perfect isolation of the faulty area within microseconds. The self-healing process results in negligible capacitance loss less than 100 pF per event. The capacitor remains fully functional during the entire process, Fig 4

Overpressure disconnector

Overpressure disconnector

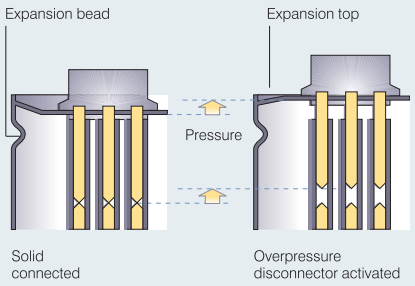


Fig 5

At the end of the capacitor's service life or when a high pressure forms inside the can, the overpressure disconnector is activated. The specially designed cover with an expansion bead moves upwards. Expansion beyond a certain degree will separate the wires and disconnect the capacitor safely from the line. The disconnector is separated at its breakpoint (small notch) and the flow of current to the capacitor windings is interrupted. Fig 5

Sigut terminals

SIECAP™ range of capacitor comes with SIGUT terminal strip with electric shock protection (IP2X),

These terminal provides figure touch protection for users

These as well ensures reliable connection

Overview

Low Voltage 3 phase Power Capacitors - SIECAP™ ND

As per IEC 60831–1/2 Edition 3.0 (2014), IS 13340–1/2

SIECAP™ ND capacitors is a series of MPP Metalized polypropylene) capacitors which have been used for PFC applications

The power range varies from 0.5 to 30.0 kVar for a three-phase capacitor design

The SIECAP™ ND capacitor is especially intended for power factor correction in industrial and commercial applications

The capacitors are manufactured using metalized polypropylene film as the dielectric and housed in a cylindrical aluminum case

Applications

- Power Factor Correction (PFC)
- Automatic capacitor banks
- Fixed PFC applications, e.g. motor compensation
- Detuned PFC systems
- Dynamic PFC systems

Key Features

- Compact design in cylindrical aluminum can with stud
- Stacked winding
- MPP technology
- Voltage range 415 ... 480 V
- Output range 0.5 ... 30 kvar

Electrical

- Up to 30 kvar per case for three-phase applications
- Long life expectancy of up to 100 000 hours
- High pulse current withstand capability (up to 200 · IR)

Mechanical and maintenance

- Reduced mounting costs, easy installation and connection
- Low weight and compact volume
- Maintenance-free

Safety

- Self-healing
- Overpressure disconnector
- Fast On & Shock hazard protected SIGUT- terminals

Technical specifications

Standards		IEC 60831–1/2 Edition 3.0 (2014), IS 13340–1/2 (2012)
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 ...1.5 • IR (A) (including combined effects of harmonics, overvoltages and capacitance tolerance) depending on the individual type
Inrush current	Is	≤ 200 IR (A)
Losses • Dielectric • Total [1]		 0.2 W/ kVar 0.5 W/ kVar
Rated frequency	f	50 / 60 Hz
Capacitance tolerance		–5 % / +10 %
Test voltage, terminal / terminal	V_{TT}	2.15 * V_N VAC / 50 Hz, 2s
Test voltage, terminal / case	V_{TC}	3600 VAC / 50 Hz, 2 s
Mean life expectancy	$T_{Ld(Co)}$	Upto 100 000 hours (temperature class –25/D)
Ambient temperature		Class -25/D: Max. short time: + 55°C, max. mean 24h: +45°C; max mean 1 year: +35°C; lowest temperature: - 25°C
Cooling		Natural or Forced air cooling
Humidity	H_{rel}	max. 95 %
Altitude		max. 4000 m above sea level
Mounting position		Upright
Mounting and grounding		Threaded M12 (10 Nm) for case size diam. > 53 mm M8 (4 Nm) for case size diam <= 53 mm
Safety		Self-healing technology, overpressure disconnector
Discharge module		Discharge module included
Case		Extruded aluminium cane
Enclosure		IP00 for plastic top – 1 to 5.5 kvar, indoor mounting IP20 for metal top – 5 to 30 kvar, indoor mounting
Dielectric		Polypropylene film
Impregnation		Biodegradable soft resin, semi-dry
Terminals		SIGUT screw terminals, max current 50 A, max. 16 mm2 cable cross-section or Fast-On terminals
Number of switching operations		5000 switching's per year

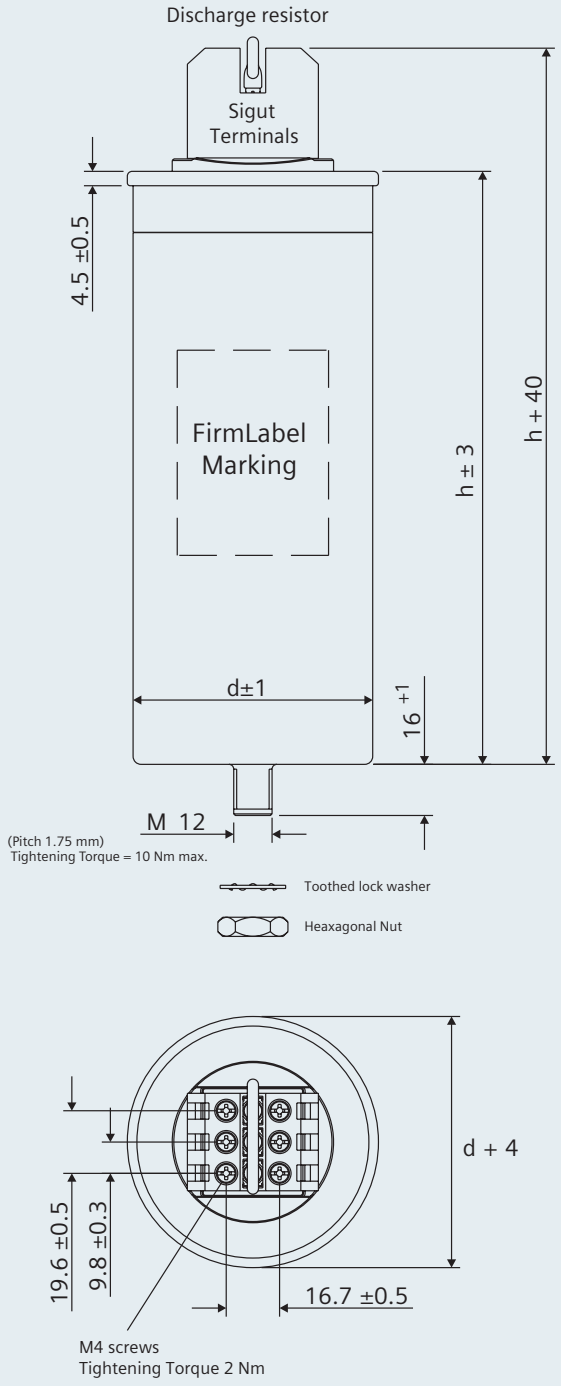
1) Without discharge resistor

Ordering details

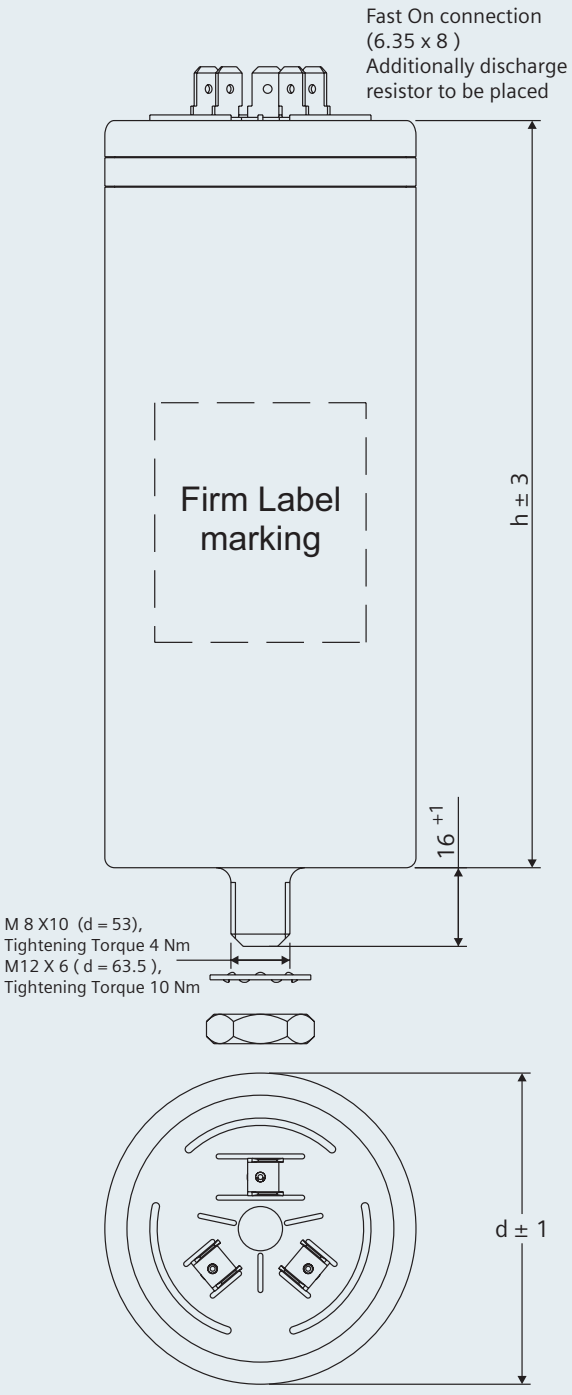
50 Hz Output in kVar	60 Hz Output in kVar	Capacity in uF 3 x	Terminal Type	Dimensions D * H mm Ø	Order No	PU Unit (s)	MOQ Unit (s)	Weight per PU Kg approx
Rated Voltage 440 V AC								
0.9	1.1	4.9	B	53 x 117	**4RB2008-3EE50-8K**	1	12	0.44
1	1.2	5.5	B	53 x 117	**4RB2010-3EE50-8K**	1	12	0.44
1.2	1.4	6.6	B	53 x 117	**4RB2012-3EE50-8K**	1	12	0.44
1.2	1.4	6.6	B	53 x 117	**4RB2012-3EE50-8K**	1	12	0.44
2.1	2.5	11.5	B	53 x 117	**4RB2021-3EE50-8K**	1	12	0.44
2.5	3	13.7	B	63.5 x 129	**4RB2025-3EE50-8K**	1	12	0.66
3	3.6	16.4	B	63.5 x 129	**4RB2030-3EE50-8K**	1	12	0.66
4.2	5	23	B	63.5 x 129	**4RB2042-3EE50-8K**	1	12	0.66
5	6	27.4	B	63.5 x 152	**4RB2050-3EE50-8K**	1	12	0.66
6	7.2	32.9	A	75x 195	**4RB2060-3EE50-8K**	1	6	1.32
7	8.4	38.4	A	75 x 195	**4RB2070-3EE50-8K**	1	6	1.32
7.5	9	41.1	A	75 x 195	**4RB2075-3EE50-8K**	1	6	1.32
8.3	10	45.5	A	75 x 195	**4RB2083-3EE50-8K**	1	6	1.32
9	10.8	49.3	A	75 x 195	**4RB2090-3EE50-8K**	1	6	1.32
10	12	54.8	A	85 x 195	**4RB2100-3EE50-8K**	1	4	1.65
12.5	15	68.5	A	85 x 270	**4RB2125-3EE50-8K**	1	4	1.98
15	18	82.2	A	85 x 270	**4RB2150-3EE50-8K**	1	4	1.98
16.7	20	91.5	A	85 x 348	**4RB2167-3EE50-8K**	1	4	2.64
20	24	109.6	A	85 x 348	**4RB2200-3EE50-8K**	1	4	2.64
20.8	25	114	A	85 x 348	**4RB2208-3EE50-8K**	1	4	2.64
25	30	137	A	90 x 348	**4RB2250-3EE50-8K**	1	4	2.75
28	–	153.4	A	90 x 348	**4RB2280-3EE50-8K**	1	4	2.75
30	–	164.4	A	90 x 348	**4RB2300-3EE50-8K**	1	4	2.75
Rated Voltage 480 V AC								
1	1.2	4.6	B	53 x 117	**4RB2010-3EJ50-8K**	1	12	0.44
1.5	1.8	6.9	B	63.5 x 129	**4RB2015-3EJ50-8K**	1	12	0.66
2	2.4	9.2	B	63.5 x 129	**4RB2020-3EJ50-8K**	1	12	0.66
2.5	3	11.5	B	63.5 x 129	**4RB2025-3EJ50-8K**	1	12	0.66
4.2	5	19.3	B	63.5 x 152	**4RB2042-3EJ50-8K**	1	12	0.66
5	6	23	A	75 x 195	**4RB2050-3EJ50-8K**	1	12	1.32
5.5	6.6	25.3	B	63.5 x 188	**4RB2055-3EJ50-8K**	1	12	0.66
8.3	10	38.2	A	75 x 270	**4RB2083-3EJ50-8K**	1	6	1.54
10.4	12.5	47.9	A	85 x 270	**4RB2104-3EJ50-8K**	1	4	1.98
11.1	13.3	51.1	A	85 x 270	**4RB2111-3EJ50-8K**	1	4	1.98
12.5	15	57.6	A	85 x 348	**4RB2125-3EJ50-8K**	1	4	2.64
13.8	16.6	63.5	A	85 x 270	**4RB2138-3EJ50-8K**	1	4	1.98
15	18	69.1	A	85 x 348	**4RB2150-3EJ50-8K**	1	4	2.64
16.7	20	76.9	A	85 x 348	**4RB2167-3EJ50-8K**	1	4	2.64
20.8	25	95.8	A	85 x 348	**4RB2208-3EJ50-8K**	1	4	2.64
25	30	115.1	A	90 x 348	**4RB2250-3EJ50-8K**	1	4	2.75
27.7	–	127.5	A	90 x 348	**4RB2277-3EJ50-8K**	1	4	2.75
30	–	138.1	A	90 x 348	**4RB2300-3EJ50-8K**	1	4	2.75

Dimension drawings

Terminal Type A



Terminal Type B



Overview

Low Voltage 3 Phase Power Capacitors SIECAP™ SHD

IEC 60831–1/2 Edition 3.0 (2014), IS 13340–1/2 (2012)

SIECAP™ SHD capacitors is a series of MPP Metalized polypropylene) capacitors which have been used for PFC applications

These are designed for commercial, heavy and light industrial application

The power range varies from 1 to 33.0 kvar for a three-phase capacitor desing

The SIECAP™SHD capacitor is especially intended for power factor correction in industrial and commercial applications

Especially designed to meet Heavy duty requirements The capacitors are manufactured using metalized polypropy lene film as the dielectric and housed in a Cylindrical aluminum case

Applications

- Power Factor Correction (PFC)
- Automatic capacitor banks
- Fixed PFC applications, e.g. motor compensation
- Detuned PFC systems
- Dynamic PFC systems
- Heavy Industries
- Most compact desing in cylindrical aluminum can with stud
- Stacked winding
- MPP technology
- Voltage range 415 ... 690 V
- Output range 1 ... 33 kvar
- Super heavy duty

Electrical

- Up to 33 kvar per case for three-phase applications
- Long life expectancy of up to 200 000 hours
- High pulse current withstand capability (up to 500 · IR)

Mechanical and maintenance

- Reduced mounting costs, easy installation and connection
- Low weight and compact volume
- Maintenance-free

Safety

- Self-healing
- Overpressure disconnector
- Shock hazard protected SIGUT- terminal

Technical specifications

Standards		IEC 60831–1/2 Edition 3.0 (2014), IS 13340–1/2 (2012)
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 1.6 ...2.0 • I_R (A) (including combined effects of harmonics, overvoltages and capacitance tolerance) depending on the individual type
Inrush current	Is	≤ 500 I_R (A)
Losses • Dielectric • Total [1]		 0.2 W/ kVar 0.45 W/ kVar
Rated frequency	f	50 / 60 Hz
Capacitance tolerance		–5 % / +5 %
Test voltage, terminal / terminal	V_{TT}	2.15 * V_N VAC / 50 Hz, 2s
Test voltage, terminal / case	V_{TC}	3600 VAC / 50 Hz, 2 s upto V_N = 525 VAC 6000 VAC / 50 Hz, 2 s above V_N = 525 VAC
Mean life expectancy	$T_{Ld(Co)}$	Upto 200 000 hours (temperature class –40/D)
Ambient temperature		Class -40/60: Max. short time: + 60°C, max. mean 24h: +45°C; max mean 1 year: +35°C; lowest temperature: - 40°C
Cooling		Natural or Forced air cooling
Humidity	H_{rel}	max. 95 %
Altitude		max. 4000 m above sea level
Mounting position		Upright / horizontal
Mounting and grounding		Threaded M12 (10 Nm) for case size diam. > 53 mm M8 (4 Nm) for case size diam <= 53 mm
Safety		Self-healing technology, overpressure disconnector
Discharge module		Discharge module included
Case		Extruded aluminium cane
Enclosure		IP00 for plastic top – 1 to 4 kvar, indoor mounting IP20 for metal top – 5 to 30 kvar, indoor mounting
Dielectric		Polypropylene film
Impregnation		Biodegradable soft resin, semi-dry
Terminals		SIGUT screw terminals, max current 80 A, max. 25 mm2 cable cross-section or Fast-On terminals
Number of switching operations		15000 switching's per year

1) Without discharge resistor

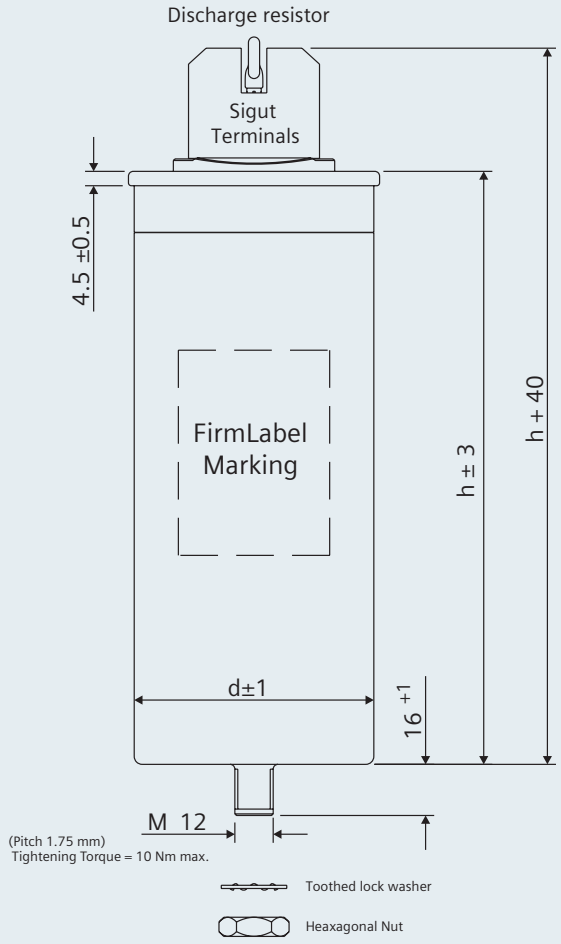
Ordering details

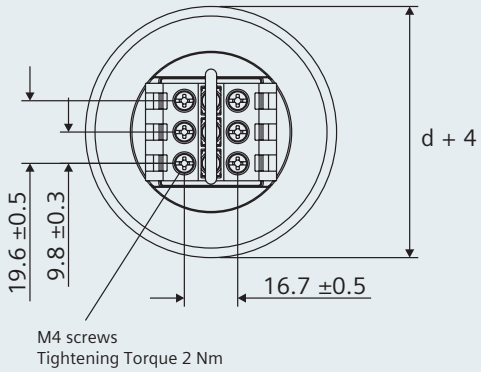
50 Hz Output in kVar	60 Hz Output in kVar	Capacity in uF 3 x	Terminal Type	Dimensions D * H mm Ø	Order No	PU Unit (s)	MOQ Unit (s)	Weight per PU Kg approx
Rated Voltage 415 V AC								
5	6	30.8	A	75 x 164	**4RB1050-3EB50-8K**	1	4	0.95
6.3	7.6	38.8	A	75 x 164	**4RB1063-3EB50-8K**	1	4	0.95
7.5	9	46.2	A	75 x 200	**4RB1075-3EB50-8K**	1	4	1.16
10.4	12.5	64.1	A	75 x 200	**4RB1104-3EB50-8K**	1	4	1.16
12.5	15	77	A	85 x 200	**4RB1125-3EB50-8K**	1	4	1.48
15	18	92.4	A	85 x 200	**4RB1150-3EB50-8K**	1	4	1.48
20	24	123.2	B	100 x 207	**4RB1200-3EB50-8K**	1	4	2.13
25	30	154	B	116 x 192	**4RB1250-3EB50-8K**	1	4	2.65
28.1	-	173.1	B	116 x 207	**4RB1281-3EB50-8K**	1	4	2.86
30	-	184.8	B	116 x 207	**4RB1300-3EB50-8K**	1	4	2.86
33	-	203.3	B	116 x 224	**4RB1330-3EB50-8K**	1	4	3.09
Rated Voltage 440 V AC								
1	1.2	5.5	E	53 x 117	**4RB1010-3EE50-8K**	1	4	0.44
2	2.4	11	E	53 x 129	**4RB1020-3EE50-8K**	1	4	0.44
3	3.6	16.4	E	53 x 129	**4RB1030-3EE50-8K**	1	4	0.44
4	4.8	21.9	E	63.5 x 152	**4RB1040-3EE50-8K**	1	4	0.66
5	6	27.4	A	75 x 164	**4RB1050-3EE50-8K**	1	4	0.95
7.5	9	41.1	A	75 x 200	**4RB1075-3EE50-8K**	1	4	1.16
10	12	54.8	A	75 x 200	**4RB1100-3EE50-8K**	1	4	1.16
10.4	12.5	57	A	85 x 200	**4RB1104-3EE50-8K**	1	4	1.48
12.5	15	68.5	A	85 x 200	**4RB1125-3EE50-8K**	1	4	1.48
15	18	82.2	A	85 x 218	**4RB1150-3EE50-8K**	1	4	1.62
16.7	20	91.5	B	100 x 207	**4RB1167-3EE50-8K**	1	4	2.13
20	24	109.6	B	100 x 207	**4RB1200-3EE50-8K**	1	4	2.13
25	30	137	B	116 x 192	**4RB1250-3EE50-8K**	1	4	2.65
28.1	-	154	B	116 x 207	**4RB1281-3EE50-8K**	1	4	2.86
30	-	164.4	B	125 x 192	**4RB1300-3EE50-8K**	1	4	3.09
33.1	-	181.4	B	116 x 224	**4RB1331-3EE50-8K**	1	4	3.09
Rated Voltage 480 V AC								
5	6	23	A	75 x 164	**4RB1050-3EJ50-8K**	1	4	0.95
6.3	7.6	29	A	75 x 164	**4RB1063-3EJ50-8K**	1	4	0.95
8.3	10	38.2	A	75 x 200	**4RB1083-3EJ50-8K**	1	4	1.16
10.4	12.5	47.9	A	75 x 200	**4RB1104-3EJ50-8K**	1	4	1.16
11	13.2	50.7	A	85 x 200	**4RB1111-3EJ50-8K**	1	4	1.48
12.5	15	57.6	A	85 x 200	**4RB1125-3EJ50-8K**	1	4	1.48
13.8	16.6	63.5	A	85 x 200	**4RB1138-3EJ50-8K**	1	4	1.48
15	18	69.1	B	100 x 207	**4RB1150-3EJ50-8K**	1	4	2.13
16.7	20	76.9	B	100 x 207	**4RB1167-3EJ50-8K**	1	4	2.13
18.7	22.4	86.1	B	100 x 207	**4RB1187-3EJ50-8K**	1	4	2.13
20	24	92.1	B	100 x 207	**4RB1200-3EJ50-8K**	1	4	2.13
22	26.4	101.3	B	116 x 207	**4RB1220-3EJ50-8K**	1	4	2.86
25	30	115.1	B	116 x 192	**4RB1250-3EJ50-8K**	1	4	2.65
28.1	-	129.4	B	116 x 207	**4RB1281-3EJ50-8K**	1	4	2.86
30	-	138.1	B	125 x 192	**4RB1300-3EJ50-8K**	1	4	3.09
31	-	142.7	B	116 x 224	**4RB1310-3EJ50-8K**	1	4	3.09
33	-	152	B	116 x 224	**4RB1330-3EJ50-8K**		4	3.09

50 Hz Output in kVar	60 Hz Output in kVar	Capacity in uF 3 x	Terminal Type	Dimensions D * H mm Ø	Order No	PU Unit (s)	MOQ Unit (s)	Weight per PU Kg approx
Rated Voltage 525 V AC								
5	6	19.2	A	75 x 164	**4RB1050-3FC50-8K**	1	6	0.95
6.3	7.6	24.2	A	75 x 164	**4RB1063-3FC50-8K**	1	6	0.95
8.3	10	31.9	A	75 x 200	**4RB1083-3FC50-8K**	1	6	1.16
10.4	12.5	40	A	85 x 185	**4RB1104-3FC50-8K**	1	9	1.37
12.5	15	48.1	A	85 x 200	**4RB1125-3FC50-8K**	1	9	1.48
13.2	15.8	50.8	A	85 x 200	**4RB1132-3FC50-8K**	1	9	1.48
15	18	57.7	A	85 x 218	**4RB1150-3FC50-8K**	1	4	1.62
16.7	20	64.3	B	100 x 207	**4RB1167-3FC50-8K**	1	6	2.13
20	24	77	B	100 x 224	**4RB1200-3FC50-8K**	1	4	2.3
25	30	96.2	B	116 x 207	**4RB1250-3FC50-8K**	1	4	2.86
26.5	31.8	102	B	116 x 207	**4RB1265-3FC50-8K**	1	4	2.86
30	-	115.5	B	125 x 207	**4RB1300-3FC50-8K**	1	4	3.1
33.1	-	127.4	B	136 x 192	**4RB1331-3FC50-8K**	1	4	3.65
Rated Voltage 690 V AC								
5.3	6.4	11.8	C	75 x 185	**4RB1053-3GK50-8K**	1	6	1.16
6.9	8.3	15.4	C	75 x 200	**4RB1068-3GK50-8K**	1	6	1.16
10.4	12.5	23.2	C	75 x 200	**4RB1104-3GK50-8K**	1	6	1.16
12.5	15	27.9	C	85 x 200	**4RB1125-3GK50-8K**	1	9	1.48
14.6	17.5	32.5	D	100 x 207	**4RB1146-3GK50-8K**	1	6	2.13
20	24	44.6	D	100 x 207	**4RB1200-3GK50-8K**	1	6	2.13
25	30	55.7	D	116 x 192	**4RB1250-3GK50-8K**	1	4	2.65

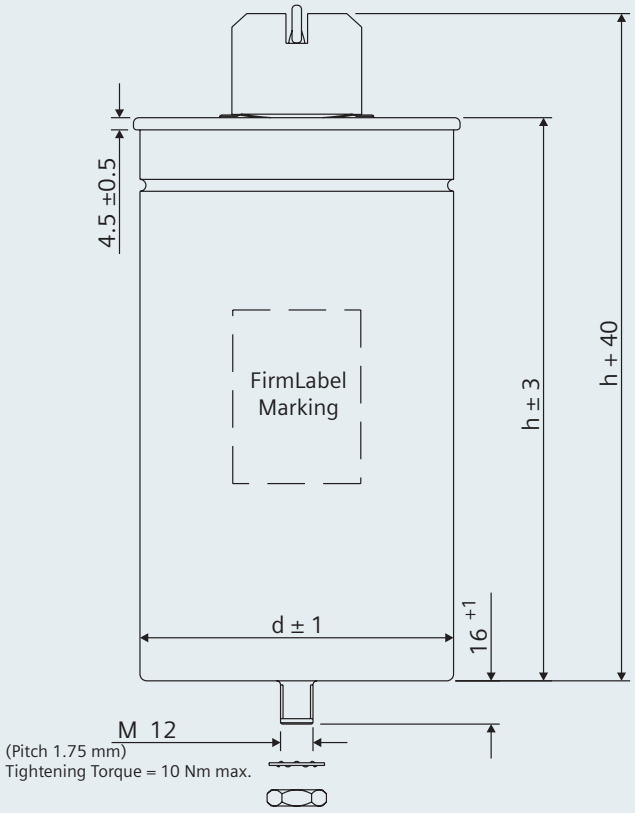
Dimension drawings

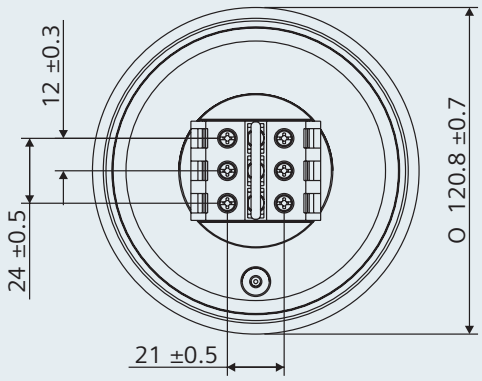
Terminal Type A



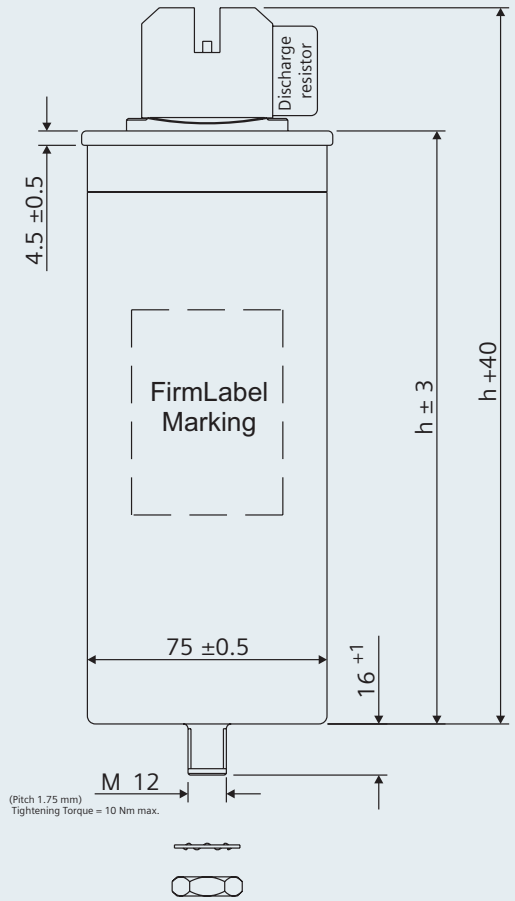


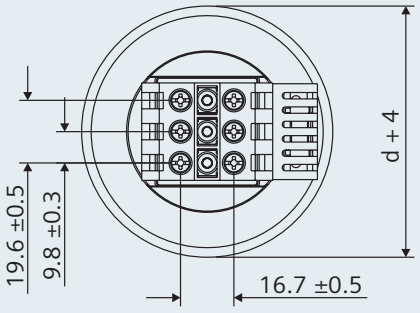
Terminal Type B



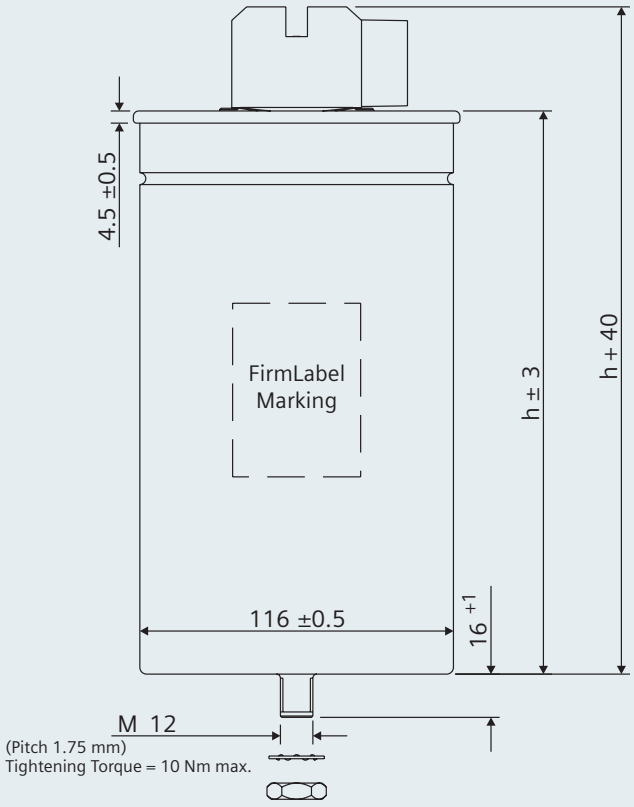


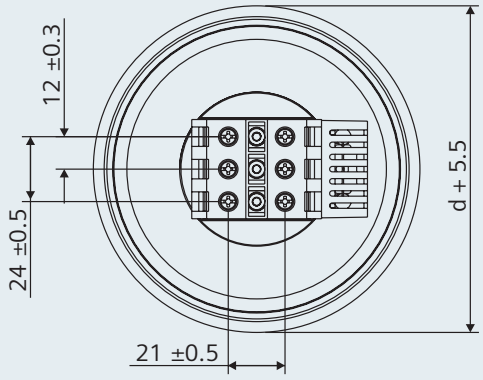
Terminal Type C



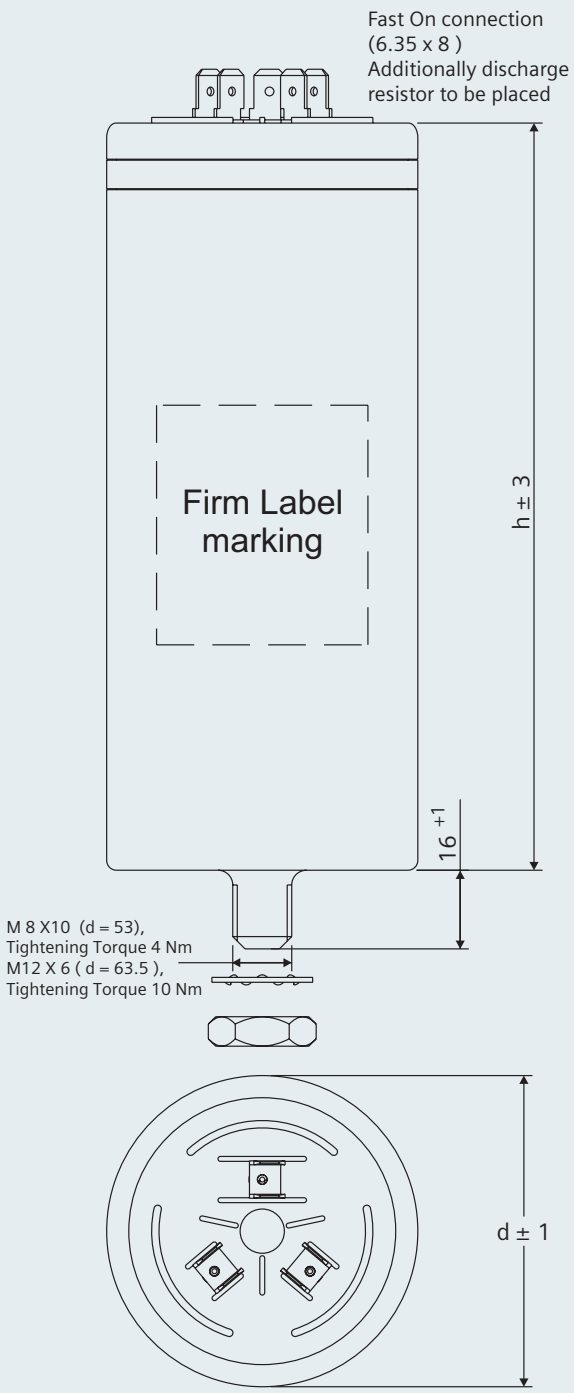


Terminal Type D





Terminal Type E



Detuned reactor

Overview

In past few years the use of power electronics equipment's like drives, SMPS, UPS etc has increased tremendously. These devices distort the pure sinusoidal waveform of power supply. These distortions can be called as harmonics. When a capacitor is used for power factor correction, it might create a resonating circuit with the feeding transformer. The resonance frequency is generally from 250Hz to 500Hz, that means 5th to 7th harmonics. This resonance is undesired condition and it might lead to

- Overloading of capacitors- reduce the life of capacitor
- Overloading of transformer, cables and other switchgear elements in the circuit- reduces life of all components
- Voltage distortion
- Increased power losses
- Nuisance tripping of protection equipment

This resonance can be avoided by putting a detuned reactor in series with the capacitor. The reactor shall be such that the tuning frequency with capacitor shall be less than the dominant harmonics. This combination of power factor correction capacitor and detuned reactors behaves inductively to frequencies above tuning frequency. Thus provide high impedance path to harmonics present in the system.

Detuning factor

Detuning factor can be defined by following formula:-

$$\frac{X_L}{X_C} * 100 = p\%$$

Where

X_L = Inductive reactance

X_C = Capacitive reactance

p = detuning factor in percentage

Tuning frequency of LC filtercan be calculated by below formula:-

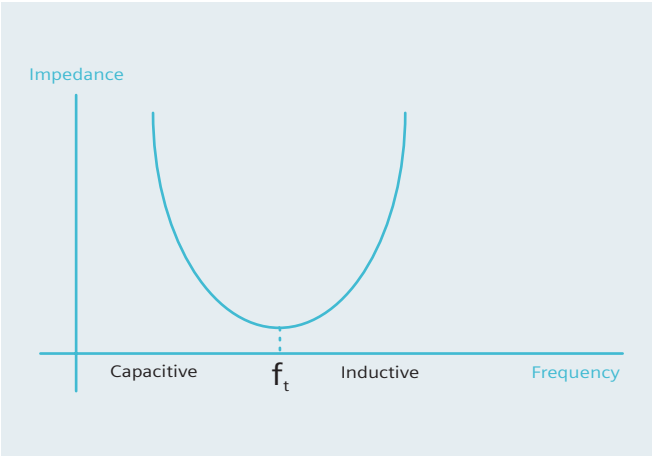
$$f_t = \frac{f_s}{\sqrt{\frac{p}{100}}}$$

Where

f_t = tuning frequency

f_s = supply frequency

p = detuning factor in percentage



This combination of detuned LC filter will act capacitive for frequency below ft and inductive for frequency above ft. Thus for base frequency of 50 or 60Hz this detune filter will act as capacitive and improves the power factor. This LC detuned filter is selected such that the tuning frequency is much less than the dominant harmonic frequency. Thus harmonics always seeshigher impedance and the condition of resonance with feeding transformeris avoided.

For example if the dominant harmonics is 5th harmonic and base frequency is 50Hz, a 7% detuned reactor shall be selected. The tuning frequency of this filter will be

$$f_t = \frac{f_s}{\sqrt{\frac{p}{100}}}$$

$$f_t = \frac{50}{\sqrt{\frac{7}{100}}} => 189 \text{ Hz}$$

189Hz, the tuning frequency in this case is lesser then 250Hz, the harmonic frequency. Hence there will not be a situation of resonance between the feeding transformer and capacitor.

Technical Specifications

7% Cu Reactor										
Technical Data										
De-tuning factor	%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50	75	100
Rated voltage VR	V	440								
Rated frequency	Hz	50								
Ambient temperature / Insulation class:		40 °C/H								
Capacitance C delta	µF	76.5	172	191	229.5	306	382.5	765	1147	1530
Inductivity L	mH	3 X 9.28	3 X 4.64	3 X 3.71	3 X 3.1	3 X 2.32	3 X 1.86	3 X 0.93	3 X 0.62	3 X 0.46
Linear up to	A	11.4	22.7	28.4	34	45.4	57	113.5	170.3	227
Effective current Irms	A	7.45	14.9	18.61	22.34	29.78	37.2	74.45	111.7	148.9
Temperature protection (NC)		yes								
Total losses P D	W	45	75	80	90	100	120	210	275	350
Total weight	kg	7	9	10	15	16	17	26	42	50
Connection										
Line		1U1-1V1-1W1								
Capacitors		1U2-1V2-1W2								
Temperature control:		1-2								
Dimension										
Length	mm	175	175	175	225	225	225	260	300	310
Height	mm	158	160	160	230	205	205	240	270	270
Width	mm	100	125	125	145	155	155	215	180	205

14%, Cu reactors										
Technical Data										
De-tuning factor	%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50	75	100
Rated voltage VR	V	440								
Rated frequency	Hz	50								
Ambient temperature / Insulation class:		40 °C/H								
Capacitance C delta	µF	70.7	141.5	176.8	212.2	282.9	356.7	707.4	1061	1061
Inductivity L	mH	3 X 20.06	3 X 10.03	3 X 8.03	3 X 6.69	3 X 5.02	3 X 4.01	3 X 2.01	3 X 1.34	3 X 1
Linear up to	A	9.38	18.76	23.45	28.15	37.53	46.91	93.82	140.7	187.6
Effective current Irms	A	7.01	14.03	17.53	21.04	28.05	35.07	70.13	105.2	140.3
Temperature protection (NC)		yes								
Total losses P D	W	80	105	120	150	180	210	270	375	500
Total weight	kg	9	15	16	18	26	27	45	75	84
Connection										
Line		1U1-1V1-1W1								
Capacitors		1U2-1V2-1W2								
Temperature control:		1-2								
Dimension										
Length	mm	175	225	225	225	260	260	310	378	378
Height	mm	156	205	205	205	232	240	270	300	300
Width	mm	125	150	155	155	210	208	204	225	225

Technical Specifications

5.67%, Cu reactors										
Technical Data										
De-tuning factor	%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50	75	100
Rated voltage VR	V	440								
Rated frequency	Hz	50								
Ambient temperature / Insulation class:		40 °C/H		5.67%						
Capacitance C delta	µF	77.6	155.2	191	232.8	310.4	387.9	775.9	1164	1552
Inductivity L	mH	3 X 7.41	3 X 3.7	3 X 2.96	3 X 2.47	3 X 1.85	3 X 1.48	3 X 0.74	3 X 0.49	3 X 0.37
Linear up to	A	13.65	27.3	34.12	40.94	54.59	68.23	136.5	204.7	272.9
Effective current Irms	A	8.37	16.74	20.93	25.11	33.48	41.85	83.71	125.6	167.4
Temperature protection (NC)		yes								
Total losses P D	W	45	75	80	90	100	120	210	275	350
Total weight	kg	7	9	10	15	16	17	26	42	50
Connection										
Line		1U1-1V1-1W1								
Capacitors		1U2-1V2-1W2								
Temperature control:		1-2								
Dimension										
Length	mm	175	175	190	225	225	225	260	310	330
Height	mm	158	160	160	230	205	205	240	270	270
Width	mm	95	124	124	145	155	155	208	180	180

7%, Al reactors										
Technical Data										
De-tuning factor	%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50	75	100
Rated voltage VR	V	440								
Rated frequency	Hz	50								
Ambient temperature / Insulation class:		40 °C/H								
Capacitance C delta	µF	76.5	172	191	229.5	306	382.5	765	1147	1530
Inductivity L	mH	3 X 9.28	3 X 4.64	3 X 3.71	3 X 3.1	3 X 2.32	3 X 1.86	3 X 0.93	3 X 0.62	3 X 0.46
Linear up to	A	11.4	22.7	28.4	34	45.4	57	113.5	170.3	227
Effective current Irms	A	7.45	14.9	18.61	22.34	29.78	37.2	74.45	111.7	148.9
Temperature protection (NC)		yes								
Total losses P D	W	50	83	85	100	110	130	240	285	380
Total weight	kg	7	9	10	15	16	17	26	42	50
Connection										
Line		1U1-1V1-1W1								
Capacitors		1U2-1V2-1W2								
Temperature control:		1-2								
Dimension										
Length	mm	175	175	175	225	225	225	275	310	335
Height	mm	158	160	160	230	205	205	238	270	270
Width	mm	100	125	125	155	175	175	230	180	185

Technical Specifications

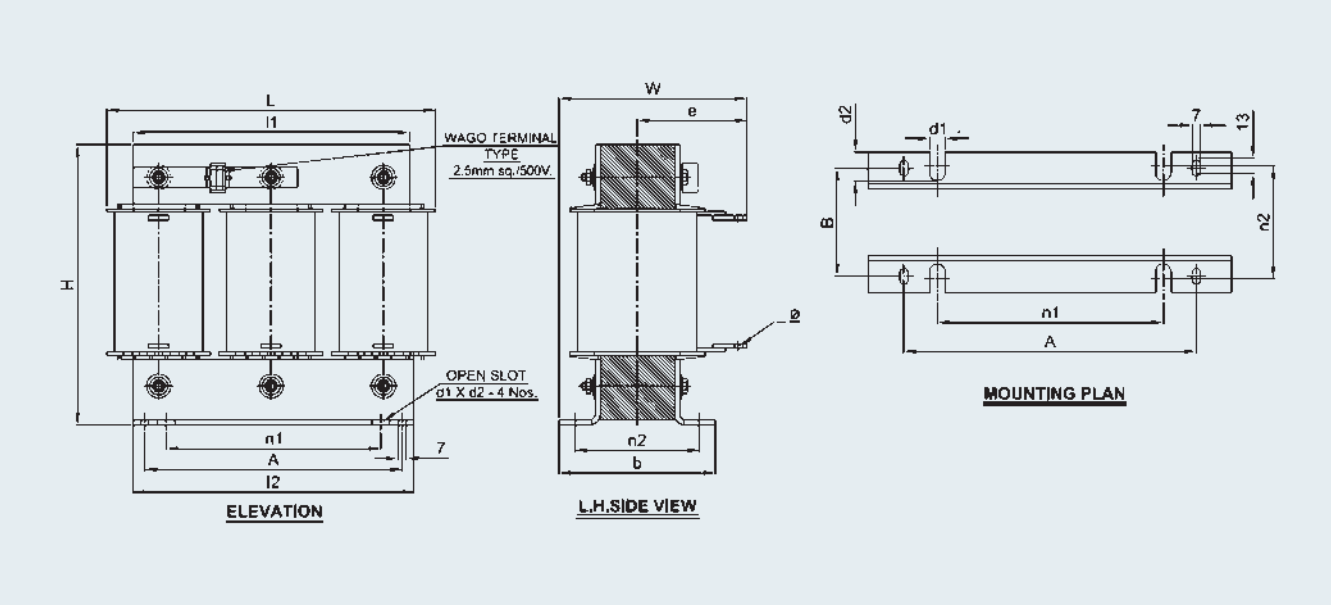
14%, Al reactors								
Technical Data								
De-tuning factor	%	14%	14%	14%	14%	14%	14%	14%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50
Rated voltage VR	V	440						
Rated frequency	Hz	50						
Ambient temperature / Insulation class:		40 °C/H						
Capacitance C delta	µF	70.7	176.8	176.8	212.2	282.9	353.7	707.4
Inductivity L	mH	3 X 20.06	3 X 10.03	3 X 8.03	3 X 6.69	3 X 5.02	3 X 4.01	3 X 2.01
Linear up to	A	9.38	18.76	23.45	28.15	37.53	46.91	93.82
Effective current Irms	A	7.01	14.03	17.53	21.04	28.05	35.07	70.13
Temperature protection (NC)		yes						
Total losses P D	W	80	105	120	150	200	210	380
Total weight	kg	9	15	16	18	25	28	42
Connection								
Line		1U1-1V1-1W1						
Capacitors		1U2-1V2-1W2						
Temperature control:		1-2						
Dimension								
Length	mm	175	225	225	225	285	285	335
Height	mm	156	205	205	205	210	230	270
Width	mm	125	150	155	155	188	188	190

5.67%, Al reactors										
Technical Data										
De-tuning factor	%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%	5.67%
Effective filter output QC	kVAr	5	10	12.5	15	20	25	50	75	100
Rated voltage VR	V	440								
Rated frequency	Hz	50								
Ambient temperature / Insulation class:		40 °C/H								
Capacitance C delta	µF	77.6	155.2	194	232.8	310.4	387.9	775.9	1164	1552
Inductivity L	mH	3 X 7.41	3 X 3.7	3 X 2.96	3 X 2.47	3 X 1.85	3 X 1.48	3 X 0.74	3 X 0.49	3 X 0.37
Linear up to	A	13.65	27.3	34.12	40.94	54.59	68.23	136.5	204.7	272.9
Effective current Irms	A	8.37	16.74	20.93	25.11	33.48	41.85	83.71	125.6	167.4
Temperature protection (NC)		yes								
Total losses P D	W	55	85	88	105	115	135	250	290	390
Total weight	kg	8	10	11	16	18	20	27	43	51
Connection										
Line		1U1-1V1-1W1								
Capacitors		1U2-1V2-1W2								
Temperature control:		1-2								
Dimension										
Length	mm	175	190	175	225	225	240	275	310	310
Height	mm	158	160	158	230	205	205	238	270	270
Width	mm	100	125	125	155	175	175	230	180	210

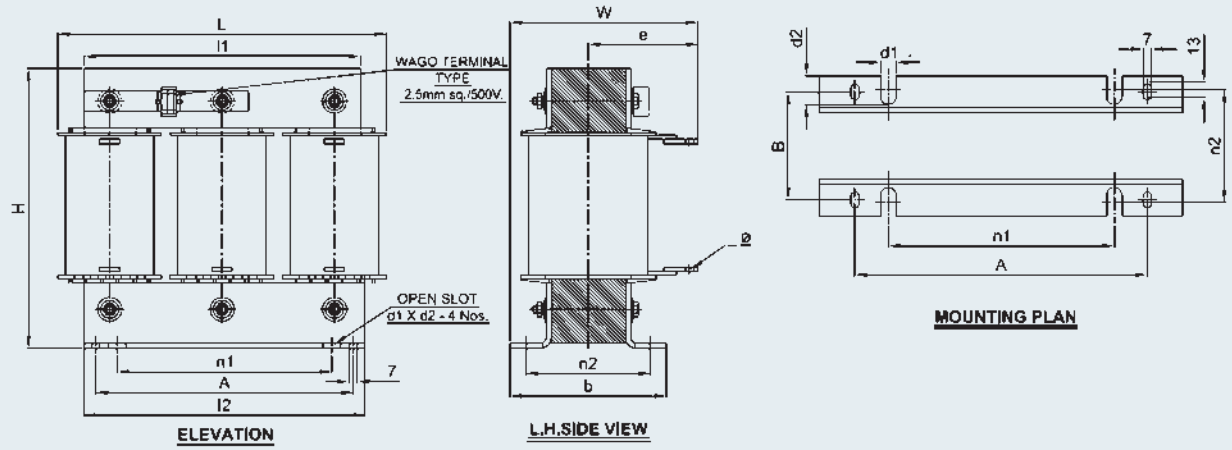
Ordering Information

Bank Size	Type	Detuning Factor	Voltage	Material
5kVAr	4KA1220-1AA01-0AA0	7%	440V AC	Cu
10kVAr	4KA1220-3AA01-0AA0	7%	440V AC	Cu
12.5kVAr	4KA1220-4AA01-0AA0	7%	440V AC	Cu
15kVAr	4KA1220-5AA01-0AA0	7%	440V AC	Cu
20kVAr	4KA1220-6AA01-0AA0	7%	440V AC	Cu
25kVAr	4KA1220-7AA01-0AA0	7%	440V AC	Cu
50kVAr	4KA1220-2BA01-0AA0	7%	440V AC	Cu
75kVAr	4KA1220-3BA03-0AA0	7%	440V AC	Cu
100kVAr	4KA1220-4BA03-0AA0	7%	440V AC	Cu
5kVAr	4KA1220-1AB01-0AA0	14%	440V AC	Cu
10kVAr	4KA1220-3AB01-0AA0	14%	440V AC	Cu
12.5kVAr	4KA1220-4AB01-0AA0	14%	440V AC	Cu
15kVAr	4KA1220-5AB01-0AA0	14%	440V AC	Cu
20kVAr	4KA1220-6AB01-0AA0	14%	440V AC	Cu
25kVAr	4KA1220-7AB01-0AA0	14%	440V AC	Cu
50kVAr	4KA1220-2BB01-0AA0	14%	440V AC	Cu
75kVAr	4KA1220-3BB03-0AA0	14%	440V AC	Cu
100kVAr	4KA1220-4BB03-0AA0	14%	440V AC	Cu
5kVAr	4KA1220-1AC01-0AA0	5.67%	440V AC	Cu
10kVAr	4KA1220-3AC01-0AA0	5.67%	440V AC	Cu
12.5kVAr	4KA1220-4AC01-0AA0	5.67%	440V AC	Cu
15kVAr	4KA1220-5AC01-0AA0	5.67%	440V AC	Cu
20kVAr	4KA1220-6AC01-0AA0	5.67%	440V AC	Cu
25kVAr	4KA1220-7AC01-0AA0	5.67%	440V AC	Cu
50kVAr	4KA1220-2BC01-0AA0	5.67%	440V AC	Cu
75kVAr	4KA1220-3BC03-0AA0	5.67%	440V AC	Cu
100kVAr	4KA1220-4BC03-0AA0	5.67%	440V AC	Cu
5kVAr	4KA1420-1AA01-0AA0	7%	440V AC	Al
10kVAr	4KA1420-3AA01-0AA0	7%	440V AC	Al
12.5kVAr	4KA1420-4AA01-0AA0	7%	440V AC	Al
15kVAr	4KA1420-5AA01-0AA0	7%	440V AC	Al
20kVAr	4KA1420-6AA01-0AA0	7%	440V AC	Al
25kVAr	4KA1420-7AA01-0AA0	7%	440V AC	Al
50kVAr	4KA1420-2BA01-0AA0	7%	440V AC	Al
75kVAr	4KA1420-3BA03-0AA0	7%	440V AC	Al
100kVAr	4KA1420-4BA03-0AA0	7%	440V AC	Al
5kVAr	4KA1420-1AB01-0AA0	14%	440V AC	Al
10kVAr	4KA1420-3AB01-0AA0	14%	440V AC	Al
12.5kVAr	4KA1420-4AB01-0AA0	14%	440V AC	Al
15kVAr	4KA1420-5AB01-0AA0	14%	440V AC	Al
20kVAr	4KA1420-6AB01-0AA0	14%	440V AC	Al
25kVAr	4KA1420-7AB01-0AA0	14%	440V AC	Al
50kVAr	4KA1420-2BB01-0AA0	14%	440V AC	Al
5kVAr	4KA1420-1AC01-0AA0	5.67%	440V AC	Al
10kVAr	4KA1420-3AC01-0AA0	5.67%	440V AC	Al
12.5kVAr	4KA1420-4AC01-0AA0	5.67%	440V AC	Al
15kVAr	4KA1420-5AC01-0AA0	5.67%	440V AC	Al
20kVAr	4KA1420-6AC01-0AA0	5.67%	440V AC	Al
25kVAr	4KA1420-7AC01-0AA0	5.67%	440V AC	Al
50kVAr	4KA1420-2BC01-0AA0	5.67%	440V AC	Al
75kVAr	4KA1420-3BC03-0AA0	5.67%	440V AC	Al
100kVAr	4KA1420-4BC03-0AA0	5.67%	440V AC	Al

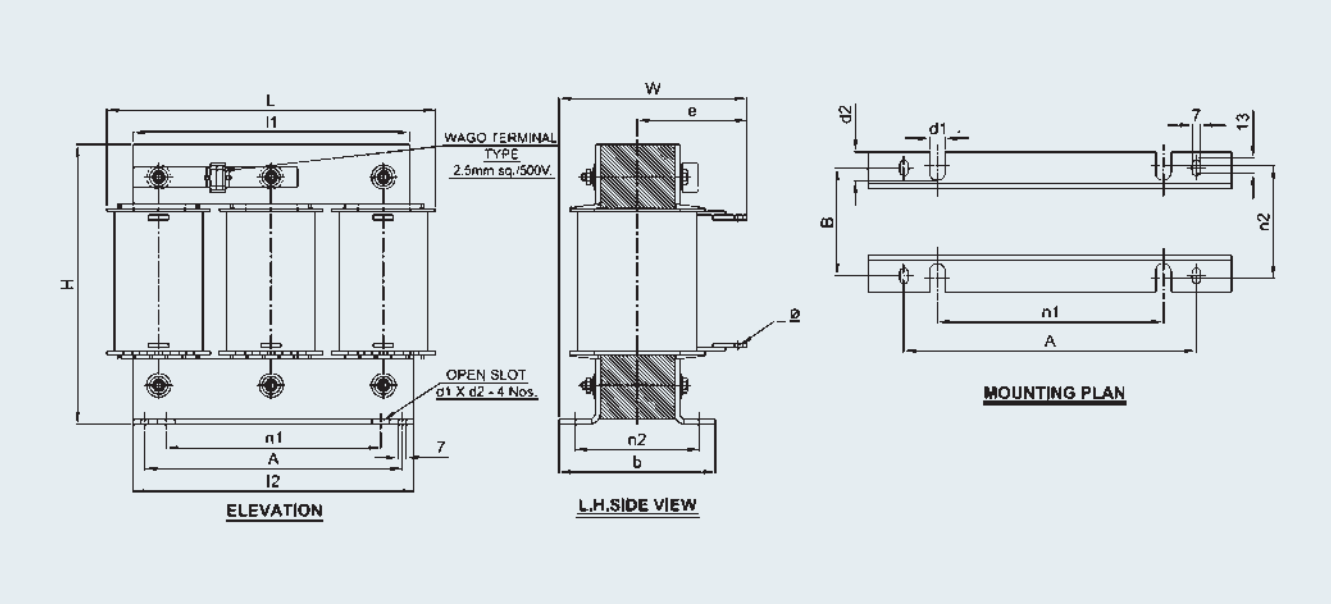
Dimension drawing



7% Cu detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1220-1AA01-0AA0**	175	158	100	150	150	100	62	78	62	10.8	15.5	125	58	6.5
10	**4KA1220-3AA01-0AA0**	175	160	125	150	150	100	83	98	76	10.8	15.5	125	58	6.5
12.5	**4KA1220-4AA01-0AA0**	175	160	125	150	150	100	83	98	76	10.8	15.5	125	58	6.5
15	**4KA1220-5AA01-0AA0**	225	230	145	190	190	150	73	90	97	10.8	15.5	175	71.5	8.5
20	**4KA1220-6AA01-0AA0**	225	205	155	190	190	150	98	112	100	10.8	15.5	175	95	8.5
25	**4KA1220-7AA01-0AA0**	225	205	155	190	190	150	98	112	100	10.8	15.5	175	95	8.5
50	**4KA1220-2BA01-0AA0**	260	240	215	220	220	150	168	185	118	10.8	15.5	175	165	8.5
75	**4KA1220-3BA03-0AA0**	300	270	180	250	250	150	136.5	150	97	10.8	15.5	175	132	10.5
100	**4KA1220-4BA03-0AA0**	310	270	205	265	265	150	162.5	178	110	10.8	15.5	175	159	10.5
7% Al detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1420-1AA01-0AA0**	175	158	100	150	150	100	61.5	78	62	10.8	15.5	125	58	6.5
10	**4KA1420-3AA01-0AA0**	175	160	125	150	150	100	82.5	98	76	10.8	15.5	125	58	6.5
12.5	**4KA1420-4AA01-0AA0**	175	160	125	150	150	100	82.5	98	76	10.8	15.5	125	78	6.5
15	**4KA1420-5AA01-0AA0**	225	230	155	190	190	150	73	90	105	10.8	15.5	175	71.5	8.5
20	**4KA1420-6AA01-0AA0**	225	205	175	190	190	150	97.8	112	115	10.8	15.5	175	95	8.5
25	**4KA1420-7AA01-0AA0**	225	205	175	190	190	150	97.8	112	115	10.8	15.5	175	95	8.5
50	**4KA1420-2BA01-0AA0**	275	238	230	235	235	150	168	185	135	10.8	15.5	175	165	8.5
75	**4KA1420-3BA03-0AA0**	310	270	180	265	265	150	135	150	99	10.8	15.5	175	132	10.5
100	**4KA1420-4BA03-0AA0**	335	270	185	285	285	150	136.5	150	97	10.8	15.5	175	132	10.5



14% Cu detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1220-1AB01-0AA0**	175	156	125	150	150	100	84	100	76	10.8	15.5	125	81	6.5
10	**4KA1220-3AB01-0AA0**	225	205	150	190	190	150	97.5	112	96	10.8	15.5	175	95	6.5
12.5	**4KA1220-4AB01-0AA0**	225	205	155	190	190	150	98	112	100	10.8	15.5	175	95	8.5
15	**4KA1220-5AB01-0AA0**	225	205	155	190	190	150	97.5	112	100	10.8	15.5	175	95	8.5
20	**4KA1220-6AB01-0AA0**	260	232	210	220	220	150	168	185	120	10.8	15.5	175	165	8.5
25	**4KA1220-7AB01-0AA0**	260	240	208	220	220	150	168	185	116	10.8	15.5	175	165	8.5
50	**4KA1220-2BB01-0AA0**	310	270	204	265	265	150	135	150	120	10.8	15.5	175	132	8.5
75	**4KA1220-3BB03-0AA0**	378	300	225	330	330	150	170	190	122	10.5	15.5	175	170	10.5
100	**4KA1220-4BB03-0AA0**	378	300	225	330	330	150	170	190	122	10.5	15.5	175	170	10.5
14% Al detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1420-1AB01-0AA0**	175	156	125	150	150	100	84	100	76	10.8	15.5	125	81	6.5
10	**4KA1420-3AB01-0AA0**	225	205	150	190	190	150	97.5	112	96	10.8	15.5	175	95	6.5
12.5	**4KA1420-4AB01-0AA0**	225	205	155	190	190	150	98	112	100	10.8	15.5	175	95	8.5
15	**4KA1420-5AB01-0AA0**	225	205	155	190	190	150	97.5	112	100	10.8	15.5	175	95	8.5
20	**4KA1420-6AB01-0AA0**	285	210	188	235	235	150	168	185	92	10.8	15.5	175	165	8.5
25	**4KA1420-7AB01-0AA0**	285	230	188	235	235	150	165	185	95	10.8	15.5	175	168	8.5
50	**4KA1420-2BB01-0AA0**	335	270	190	285	285	150	136	150	99	10.8	15.5	175	132	10.5



5.67% Cu detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1220-1AC01-0AA0**	175	158	95	150	150	100	56	73	60	10.8	15.5	125	56	6.5
10	**4KA1220-3AC01-0AA0**	175	160	124	150	150	100	78	95	75	10.8	15.5	125	78	6.5
12.5	**4KA1220-4AC01-0AA0**	190	160	124	165	165	60	80	98	75	10.8	15.5	85	80	6.5
15	**4KA1220-5AC01-0AA0**	225	230	145	190	190	150	73	90	97	10.8	15.5	175	71.5	8.5
20	**4KA1220-6AC01-0AA0**	225	205	155	190	190	150	95	112	100	10.8	15.5	175	95	8.5
25	**4KA1220-7AC01-0AA0**	225	205	155	190	190	150	95	112	100	10.8	15.5	175	95	8.5
50	**4KA1220-2BC01-0AA0**	260	240	208	220	220	150	165	185	116	10.8	15.5	175	165	8.5
75	**4KA1220-3BC03-0AA0**	310	270	180	265	265	150	132	150	97	10.8	15.5	175	132	10.5
100	**4KA1220-4BC03-0AA0**	330	270	180	285	285	150	132	155	97	10.8	15.5	175	132	10.5
5.67% Al detuned reactor (all dimensions in mm)															
kVAr	Type	L	H	W	l1	l2	n1	n2	b	e	d1	d2	A	B	Ø
5	**4KA1420-1AC01-0AA0**	175	158	100	150	150	100	61.5	78	62	10.8	15.5	125	58	6.5
10	**4KA1420-3AC01-0AA0**	190	160	125	165	165	60	78	98	76	10.8	15.5	85	76	6.5
12.5	**4KA1420-4AC01-0AA0**	175	160	125	150	150	100	82.5	98	76	10.8	15.5	125	78	6.5
15	**4KA1420-5AC01-0AA0**	225	230	155	190	190	150	73	90	105	10.8	15.5	175	71.5	8.5
20	**4KA1420-6AC01-0AA0**	225	205	175	190	190	150	97.8	112	115	10.8	15.5	175	95	8.5
25	**4KA1420-7AC01-0AA0**	240	205	175	205	205	150	98	112	115	10.8	15.5	175	95	8.5
50	**4KA1420-2BC01-0AA0**	275	238	230	235	235	150	168	185	135	10.8	15.5	175	165	8.5
75	**4KA1420-3BC03-0AA0**	310	270	180	265	265	150	135	150	99	10.8	15.5	175	132	10.5
100	**4KA1420-4BC03-0AA0**	310	270	210	265	265	150	160	175	110	10.8	15.5	175	160	10.5