Non-Self-Healing Shunt Power Capacitor

Film-foil type, oil impregnate

Series/Type:	APP
Ordering code:	AC*********
Date:	2025-08-08
Version:	0

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Preliminary data:

1. **Construction:**
   - Dielectric — Polypropylene film
   - Electrode — Aluminium foil (edge folded)
   - Impregnant — non-PCB oil
   - Container — CRCA/SS grade 409/304
   - Bushing — Ceramic/Porcelain, brown/grey
   - — Polymeric (Spl request for limited range)
   - Discharge device — Internal resistor
   - Paint — Liquid spray, light grey
   - Rating plate — Anodized Aluminium

2. **Features:**
   - Non-Self-healing technology
   - Oil impregnated
   - Naturally air cooled (or forced air cooling)
   - Optional terminal connector.

3. **Typical applications**
   - Shunt reactive power compensation (according to scope defined in IEC 60871)
   - Shunt passive harmonic filter
   - Indoor/Outdoor mounting

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Technical data & Specification		
Characteristics		
Reference standard	IEC 60871-1:2014, IS-13925, IEEE Std-18, NBR-5282	
Rated output, Qn (kVAr)	50 to 1100	
Rated Voltage, Un (kV)	1 to 40	
Rated frequency, fn (Hz)	50/60	
Phase, connection	1-Φ, 3-Φ	
Configuration	1-Φ/1B, 1-Φ/2B, 3-Φ/Δ/3B, 3Φ/Y/3B,3Φ/Y/4B	
Rated current, In (A)	5 to 300	
Capacitance, Cn, µF (-5/+10%)	0.1 to 450	Capacitance, Cn, µF (-5/+10%)
Tan delta	≤ 2 x 10-4	
Losses	≤0.2W/kVAR	
Creepage	180 up to 1320 mm	
Discharge time, Sec	300/600	
Residual voltage, Volt	50/75	
Basic Insulation Level (BIL)	60 up to 200 kVp	
Type of fuse	IF/EF/Fuseless	
Reference standard	IEC 60871-1:2014, IS-13925, IEEE Std-18, NBR-5282	
Rated output, Qn (kVAr)	50 to 1100	
Display / Monitoring	APFC Controller, Digital PF Meter, Voltmeter, Ammeter, MFM	
Ambient temperature	0° to 55°C	

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Maximum ratings	
Long duration voltages	1.00 x UN – Continuous
	1.10 x UN – 12 hours in every 24 hours
	1.15 x UN – 30 minutes in every 24 hours
	1.20 x UN – 5 minutes
	1.30 x UN – 1 minute
	1.40 x UN – 15 seconds
Short duration voltages	1.70 x UN – 1 second
	2.00 x UN – 0.25 second
	2.20 x UN – 0.1 second
	In case of non-sinusoidal waveform, consider voltage as peak voltage / $\sqrt{2}$.
	Over voltage above 1.15 UN occurs max. 200 times in capacitor life.
	Capacitor operation at simultaneous maximum voltage & maximum temperature to be restricted only in case of emergency and only for short duration.
Long duration currents	1.30 x IN – maximum continuous rms current.
	1.50 x IN – 5 minutes
	Overload currents should not exceed 1.30 x IN for more than 5 minutes.
	(including effect of harmonics and overvoltage but excluding transients)
Current harmonics	Odd harmonics limits (Isc/IL<20):
	h < 11 4.0%
	11 ≤ h ≤ 17 2.0%
	17 ≤ h ≤ 23 1.5%
	23 ≤ h ≤ 35 0.6%
	h > 35 0.3%
	Even harmonics limits: 25% of the odd harmonic limits above
	THD 5.0%
	DC offset not allowed.
Voltages harmonics	Individual voltage harmonic distortion: 3%
	Total voltage harmonic distortion: 5%
	Consider capacitor voltage as peak voltage of distorted waveform / $\sqrt{2}$.
Switching and transients	1) The residual voltage on a capacitor prior to energization should not exceed 10% of the rated voltage.
	2) The energization of capacitors should be done by a restrike free switching device.
	3) During energization, the first peak of transient voltage should not exceed $2\sqrt{2}$ times the rated rms voltage for a maximum duration of ½ cycle.
	4) Peak value of transient current should not exceed 100 times rated rms current.
	5) Number of switching / transients should not exceed 1000 times per year.
	For more frequent switching, value of overvoltage, duration and transient current should be limited to lower values.
	6) At the time of energization, temperature of impregnant in capacitor unit should be greater than 00 C, irrespective of any lower temperature limit for capacitor.
	1) The residual voltage on a capacitor prior to energization should not exceed 10% of the rated voltage.

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Environmental conditions			
Altitude	0-6000	m	Maximum above mean sea level
Ambient temperature	-40 to 0	^{0}C	Minimum (Refer specific Data Sheet as required)
	50/55	^{0}C	Maximum 1 hour / day
	40/45	^{0}C	Highest mean over any 24 hours
	30/35	^{0}C	Highest mean over any 1 year
			Rate of temperature change < 5 0C / 30 min.
			No exposure to radiated heat from objects that are hotter than ambient temperature.
			Sun radiation is acceptable for outdoor installation.
Transport temperature	-40 to +55	^{0}C	Pre-heating/cooling -20^{0}C to +55^{0}C before energization
Storage temperature	-40 to +55	^{0}C	Pre-heating/cooling -20^{0}C to +55^{0}C before energization
Operation temperature	-25 to +55	^{0}C	Pre-heating/cooling -20^{0}C to +55^{0}C before energization
Casing temperature	60	^{0}C	Maximum for capacitor units
	50	^{0}C	Maximum for panels
			Installation should not prevent adequate ventilation.
Pressure	195	Kg/m2	Should not be subjected to higher or lower pressure other than natural atmospheric air pressure.
Humidity	5	%	Minimum
	95	%	Maximum, non-condensing for indoor equipment
	100	%	Maximum for outdoor equipment.
Vibrations			Max. during transportation & handling.
			Nil during storage and operation.
			To be stored and installed on rigid, steady, level surface.
Seismic zone	0.24		Maximum, corresponding to seismic zone IV – severe
			0.15g (both horizontal & vertical direction)
Degree of pollution and external environment			Low for indoor installation, high for outdoor installation.
			No abrasive, corrosive, conducting or explosive dust, salt, & sand laden (suspension or sedimentation) or gases.
			No chemical fumes, vapors, halogens (F, Cl, Br, I) alkali metals (Li, Na, K), Sulphur, Phosphorus or their compounds, ammonia, nitrogen dioxides, ozone, etc. in surrounding air.
			No water in any form other than humidity in air (for outdoor installation, rain and condensation on outer exposed area is acceptable).
			Should not be exposed to nuclear radiation, X-ray, etc.
			Electronic parts & low voltage installation should not be exposed to EMI/EMC >limit specified for respective part.
Biological			Should be protected from mold, fungus, vermin, rodent, birds, snakes, etc. which may affect physical, electrical, mechanical or chemical properties of product and surrounding (e.g. electrical clearances).

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Mounting	
Fixing	Threaded bolt M12/M16
Max. torque (Stud)	12-15 Nm
Mounting position	Upright / Horizontal (upside down not allowed)

Routine/Acceptance Test	**Reference Standard**
Capacitance measurement	IEC 60871-1:2014
Measurement of the tangent of the loss angle (tan δ) of the capacitor	IEC 60871-1:2014
Voltage test between terminals	IEC 60871-1:2014
AC voltage test between terminals and container	IEC 60871-1:2014
Test of internal discharge device	IEC 60871-1:2014
Sealing test	IEC 60871-1:2014
Discharge test on internal fuses	IEC 60871-1:2014

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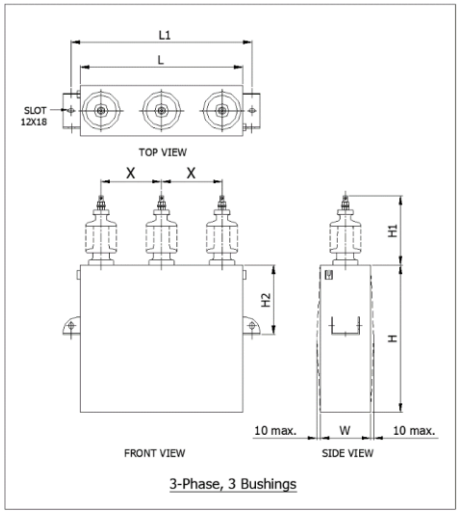
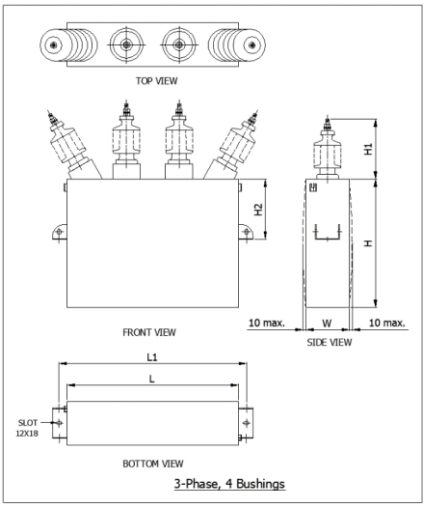
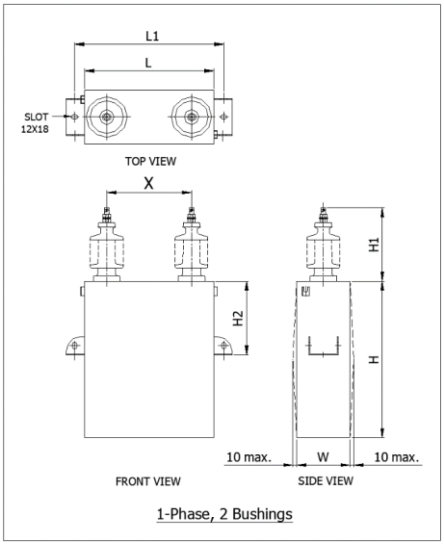
Dimensional drawings



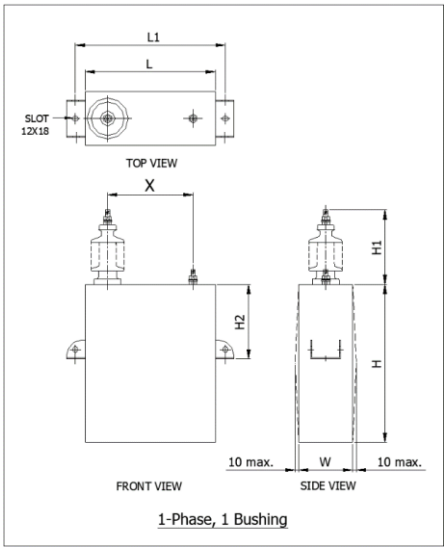
3-Phase, 3 Bushings



3-Phase, 4 Bushings



1-Phase, 2 Bushings



1-Phase, 1 Bushing

Note: - Please refer the specific data sheet for specific capacitors.

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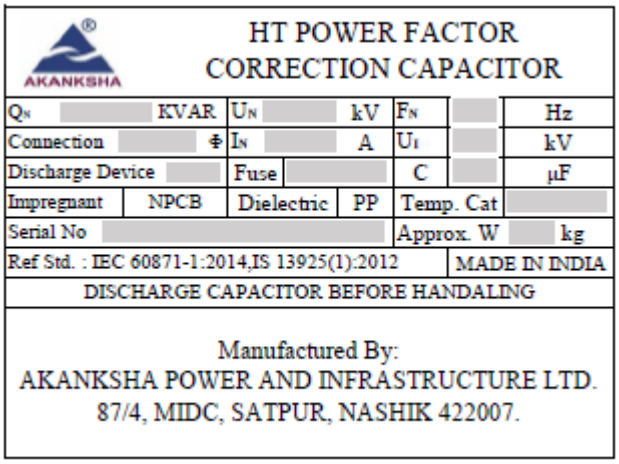
Rating Plate



HT POWER FACTOR CORRECTION CAPACITOR							
Q_N	KVAR	U_N	kV	F_N		Hz	
Connection	Φ	I_N	A	U_I		kV	
Discharge Device		Fuse		C		μF	
Impregnant	NPCB	Dielectric	PP	Temp. Cat			
Serial No				Approx. W		kg	
Ref Std. : IEC 60871-1:2014,IS 13925(1):2012				MADE IN INDIA			
DISCHARGE CAPACITOR BEFORE HANDALING							
Manufactured By: AKANKSHA POWER AND INFRASTRUCTURE LTD. 87/4, MIDC, SATPUR, NASHIK 422007.							

Cautions and warnings

- Capacitor unit to be used in fixed/switched capacitor bank in series with or without damping reactors up to 0.5% of bank rating. In case of using tuned/de-tuned reactors, please ensure Un & Qn are suitably loaded.
- Refer and follow IEC 60871-1:2014, clause 27 “Guide for installation and operation”
- Avoid mechanical stress on bushing and terminals.
- In case of dents of more than 2 mm depth on metallic container, abnormal bulging of container, chipping/ breakage of bushing or any other mechanical damage, capacitors must not be used at all.
- In case of oil leakages, capacitor must not be used. Seal the leaking point to avoid oil contamination and consult manufacturer.
- A minimum required electrical clearance must be kept around live terminals and live conductors.
- If clearance is less, adequate insulation, shroud or barrier should be provided.
- Adequate ventilation should be provided around capacitor to reduce capacitor temperature rise.
- Do not handle capacitor before it is discharged because it may be still in charged condition.
- Resonance cases must be avoided by appropriate application design in any case.
- Protect the capacitor properly against over current, short circuit and earth fault.
- Failure to follow cautions may result, worst case, in premature failures, bursting and fire.

Safety

Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor, impact of broken porcelain pieces having sharp edges or from expulsion of oil or melted or burning material due to mechanical disruption of the capacitor.

- The metal casing of the capacitor must be electrically connected to ground or defined potential
- Provide means of disconnecting and insulating a faulty component/bank.
- The terminals of capacitors connected bus bars and cables as well as other devices may also be energized. Discharge capacitors before touching any part electrically connected to capacitor terminals.

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