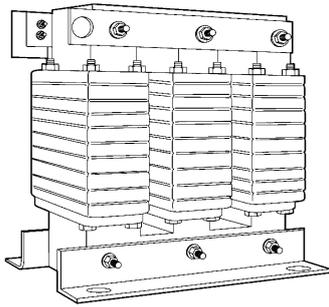


Detuned Reactor

PHA45827-01



PHA45827-01



schneider-electric.com/contact



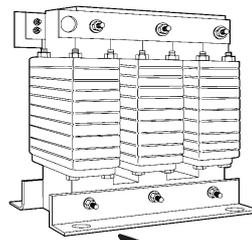
Reference standards

IEC 61439 - 1 & 2
IEC60076

Schneider
Electric

1

Box Contents



2

Safety Precautions

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. For details, see NFPA 70E, CSA Z462, NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by the qualified electrical personnel.
- Turn off all the power supplying this equipment before working on or inside the panel.
- As detuned reactor will be used with capacitor, after isolating power supply, wait for 5 minutes to allow the capacitor to de-energies before handling, opening the panel door or removing the panel cover, in the meantime please avoid any physical contact with detuned reactor.
- Always use a properly rated voltage sensing device to confirm power is off.

Failure to follow these instructions will result in death or serious injury.

NOTICE

HAZARD OF EQUIPMENT DAMAGE

If you have received a damage product, contact Schneider Electric customer care before using it.

Before installation, check the following:

- Damage to winding
- Damage to terminals
- Damage to core
- Loose core or Loose winding
- Connection of thermal switch

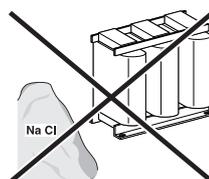
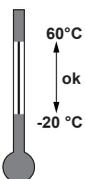
Avoid shock and distortion on detuned reactor.

Failure to follow these instructions can result in equipment damage.

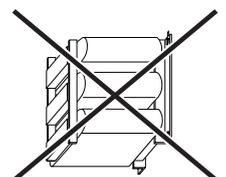
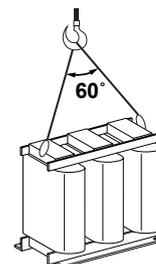
3

Storage and Handling

3.1 Storage



3.2 Handling

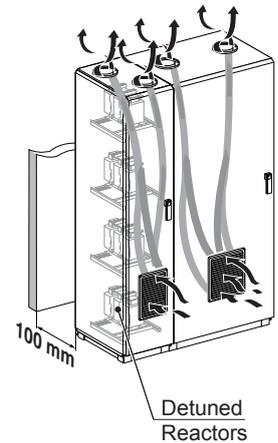


- Use appropriate handling and lifting tools like fork lift, lifting crane for handling for detuned reactor above 25 Kvar or weighing more than 10 kg.
- During lifting and handling make sure to keep the detuned reactor always in upright position.

4 Ventilation

For effective thermal management and heat dissipation, ensure the following parameters are maintained:

- Forced ventilation is mandatory for capacitor bank with detuned reactor.
- The detuned reactor should be mounted in a Zig-Zag manner for effective ventilation..
- The part of the enclosure containing the detuned reactors must be ventilated according to the dissipated heat.
- While installing the detuned reactor in panels, please ensure that thermal switch for every detuned reactor to be connected in series with switching devices to ensure thermal over protection.
- Detuned reactors generate heat, hence adequate ventilation must be provided to ensure the temperature does not exceed 55 °C inside the panel.
- Installing detuned reactors near to capacitors can reduce the life expectancy of capacitor.
- The temperature around the detuned reactor, should be maintained < 55 °C, to which it is designed (operating temperature of panel) through proper ventilation.



Capacitor temperature to be maintained inside the panel as per IEC 60831-1.

Temperature class	Ambient Temperature °C		
	Maximum	Highest mean over any period of	
		24 Hour	1 Year
A	40	30	20
B	45	35	25
C	50	40	30
D	55	45	35

5 Electrical Connection



ISO metric method	Iron screw 8.8	Kvar Rating
M6	9 N.m	6,5 - 50 Kvar
M8	18 N.m	> 50 Kvar

Grounding

- Earthing must be provided for detuned reactors.
- Detuned reactor should be electrically grounded, while installing please make sure to bolt the earthing hole marked in detuned reactor with metallic support and connected to panel ground.
- After grounding please make sure to check the Earthing continuity.

Thermal Protection

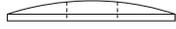
- It is imperative that the normally closed dry contact is used to disconnect the step to the event of overheating.
- The electrical connection shall be carried out with 2x2,5 mm² cables.

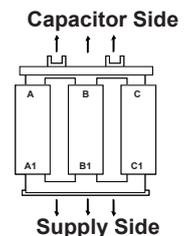
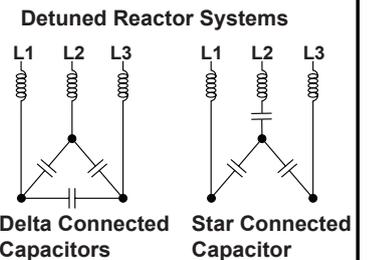
Terminal Connection

Schneider Electric recommendation for connections all in class 8.8 :

Terminal hole diameter 7 mm	Washer serrated conical spring M6x14x1,3 steel Machine screw hexagonal M6x25 steel Nut ISO 4032 M6 steel 8 ZN5CR3
Terminal hole diameter 9 mm	Washer serrated conical spring M8x18x1,4 steel Machine screw hexagonal M8x25 steel Nut ISO 4032 M8 steel 8 ZN8CR3

See information in the technical guide for installation of an electrical switchboard.

Serrated conical washer also called a contact washer		Recommended by Schneider Electric for electrical assemblies	<ul style="list-style-type: none"> • Spring lock washer: ensures excellent mechanical resistance of the fastened item by pushing into the item and the nut. • Contact pressure better disturbed because of their elasticity. • Works by deforming plastic: it must therefore be replaced with a new washer if it comes loose or is dismantled.
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6 Installation

- Detuned reactor shall be installed in dry and non-dusty atmosphere for indoor application only.
- Ensure proper PPE while handling the product as detuned reactors are No IP product.
- Detuned reactor can be mounted together in a well ventilated area with proper installation distance, please refer the image shown in section 6.2 installation distance for minimum installation distance requirement.

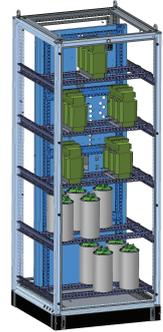
Reference:

- For more details on selection of fans and ventilation, refer "Guide for the Design and Production of LV Power Factor Correction Cubicles" document number PFCED111008EN, Released date 07/2017.

Installation Rules:

- Detuned reactor are heat generating device and it should be installed away from any heat sensitive devices like capacitor and thyristor switches.
- Use appropriate torque mentioned in the section 5 for tightening the terminals.
- Connection should be made in such a way that there is no over tightening and twisting of the cables with detuned reactor terminals.
- While designing the panel and ventilation system, natural circulation of the air must be allowed to the areas where detuned reactor are mounted. Further please refer "Guide for the design and production of LV power factor Correction Cubicles".
- Minimum clearance of 30 mm must be kept while installing the detuned reactors next to each other. Further the detuned reactor should be installed in zig-zag fashion. Please refer the image shown in example.
- It is not desired to mount detuned reactors and capacitors in the same column, please adhere to the top down approach as illustrated in the example, here detuned reactors are mount in the top to ensure that the heat generated by detuned reactor will not affect the capacitors which are installed at the bottom.
- While designing the ventilation system, ensure that the average temperature of the panel does not exceed the temperature mentioned below.

Min. - 10 °C
 Max. - 40 °C(30+10 °C ΔT)
 Annual Avg. 35 °C(25+10 °CΔT)



Example: Capacitor bank with detuned reactors where detuned reactors are in the separate column than capacitor.

6.1 Mounting

NOTICE

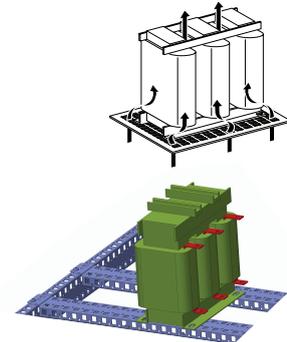
HAZARD OF EQUIPMENT DAMAGE

Detuned reactor should be mounted :

- Vertically, please refer to the image shown.
 - On a steel mounting rails with sections which allows adequate air flow.
- Failure to follow these instructions can result in equipment damage.**

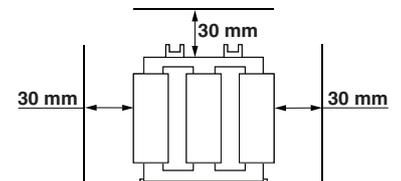
NOTE: Detuned reactor should not be :

- Mounted in a closed chamber with no air flow.
- In the same section as capacitor, please make sure to mount them in a separate compartment or with a barrier.

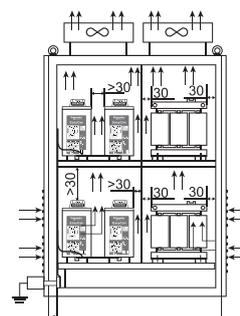


6.2 Installation Distance

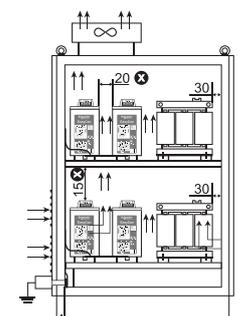
- While mounting the detuned reactor, the minimum distance as illustrated must be observed for insulation purposes and to prevent detuned reactor over heating.
- Detuned reactor to be mounted such that the electrical clearances are ≥ 30 mm between phases and phase to earth.



Distance in mm



Distance in mm

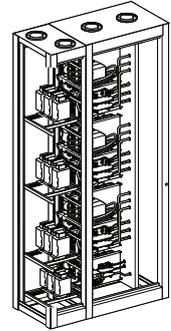


7 Harmonics

- The detuned reactor shall be used for the spectrum defined in IEEE 519-2014. For any use above the voltage spectrum, the detuned reactor will self amplify the resonance and cause the damage to the detuned reactor and associated capacitor.
- For any use above the voltage designed spectrum, the detuned reactor and capacitor combination can malfunction which can lead to equipment damage.
- Users are advised to mitigate harmonics with active filter, if the harmonics limit exceeds IEEE 519-2014.

8 Temperature Rise

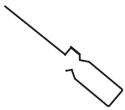
- Detuned reactor operate at very high temperature compared to standard operating temperature of capacitors.
- The temperature around the detuned reactor, should be maintained $< 55\text{ }^{\circ}\text{C}$, which is the operating temperature limit of the capacitor bank.
- The preferred architecture of a PFC switch board with detuned reactors is with a separate column, specifically reserved for the detuned reactors (For details, refer to the image as shown in example).



Example: Capacitor bank with detuned reactors where detuned reactors are in a separate column.

9 Limits of Warranty

9.1 Maintenance



Protection of People

- Before carrying out any maintenance work on the detuned reactor de-energise it and disconnect it from the power supply.
- No maintenance work should be done in detuned reactor in Live condition.

Checks

One month after energizing, check the following:

- The detuned reactor terminals for tightness along with Cables.
- Electrical connection of thermal switch

Once in a year, check the following:

- The detuned reactor for cleanliness (clean as required).
- The electrical connection terminals for tightness.
- The condition of detuned reactor.
- The temperature of the area where the detuned reactor is located.

9.2 Warranty

Our products are checked at the factory. Unauthorized changes to the equipment will void the warranty.

9.3 Reception of the Equipment



- Check that the electrical characteristics on the identification plate match the information on the order form.
- For any observed non-conformity, please contact Schneider Electric customer care.

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