

ESICAP CAPACITORS

Esicap 功率因数校正电容器

操作手册

Operation manual



电容器简介

电气设备应该让有资格的专业人员进行安装、操作、使用、维护。本说明书是针对经过培训的专业人员使用的操作手册，未按使用说明而造成不良后果，公司将不负任何责任。

安全预防



注意

电击、燃烧和爆炸的危险

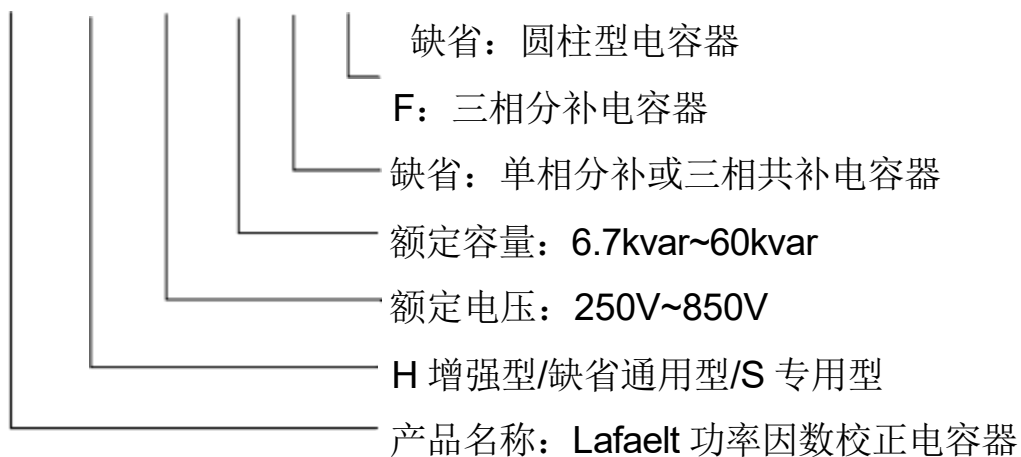
- 只有专业人员才能安装这个设备，并且要在完整通读使用说明书之后。
- 不要单独工作。
- 对此设备做检查、测试和维护之前，先要断开所有电源连接。
- 对电源系统的设计要特别注意，考虑所有的电源，包括反送电的可能性。
- 要使用正确调整电压的检测设备来确定所有的电源都已断开。
- 当心潜在的危險，做好个人防护，仔细检查设备内的工作区域看是否有工具和其它遗留物体。
- 当移除或安装面板时注意不要碰到带电母线，以免造成个人伤害。
- 这个设备的成功运行依赖于正确的处理，安装的操作。忽略基本的安装要求可能造成个人的伤害，也可能损坏电气设备或者其它物体。
- 对设备作介电强度和绝缘测试时，应断开所有与其连接的输入或输出线。高压试验可能损坏本设备。
- 设备运行中应保持其表面清洁，各接线端子紧固良好。

功率因数校正电容器的主要作用

提高系统功率因数，改善供电质量，降低线路损耗。

型号说明

LCP □ 480-25-□-□



产品规格尺寸

单相分补电容器

序号	型号规格	额定容量 (kvar)	额定电流 (A)	额定电容 (μ F)	外形尺寸 (mm)			
					外径×壳高 (D×H)	端子间距 (S)	端子外径 (Md)	底部螺栓 (Mz×L)
1	LCP.250-6.7	6.7	26.7	340	76×245	30	2-M8	M12×16
2	LCP.250-8.3	8.3	33.2	423	90×245	30	2-M8	M12×16
3	LCP.250-10	10	40.0	510	90×245	30	2-M8	M12×16
4	LCP.250-13.4	13.4	53.6	682	106×245	30	2-M8	M16×25
5	LCP.250-15	15	60.0	764	106×245	30	2-M8	M16×25
6	LCP.250-16.7	16.7	66.8	851	116×245	30	2-M8	M16×25
7	LCP.250-20	20	80.0	1019	116×290	30	2-M8	M16×25
8	LCP.280-6.7	6.7	23.9	272	76×245	30	2-M8	M12×16
9	LCP.280-8.3	8.3	29.6	338	90×245	30	2-M8	M12×16
10	LCP.280-10	10	35.7	406	90×245	30	2-M8	M12×16
11	LCP.280-13.4	13.4	47.8	544	106×245	30	2-M8	M16×25
12	LCP.280-15	15	53.6	609	106×245	30	2-M8	M16×25
13	LCP.280-16.7	16.7	59.6	678	116×245	30	2-M8	M16×25
14	LCP.280-20	20	71.4	812	116×290	30	2-M8	M16×25
15	LCP.300-6.7	6.7	22.3	237	76×245	30	2-M8	M12×16
16	LCP.300-8.3	8.3	27.7	294	90×245	30	2-M8	M12×16
17	LCP.300-10	10	33.3	354	90×245	30	2-M8	M12×16
18	LCP.300-13.4	13.4	44.6	474	106×245	30	2-M8	M16×25
19	LCP.300-15	15	50.0	531	106×245	30	2-M8	M16×25
20	LCP.300-16.7	16.7	55.7	591	116×245	30	2-M8	M16×25
21	LCP.300-20	20	66.7	708	116×290	30	2-M8	M16×25

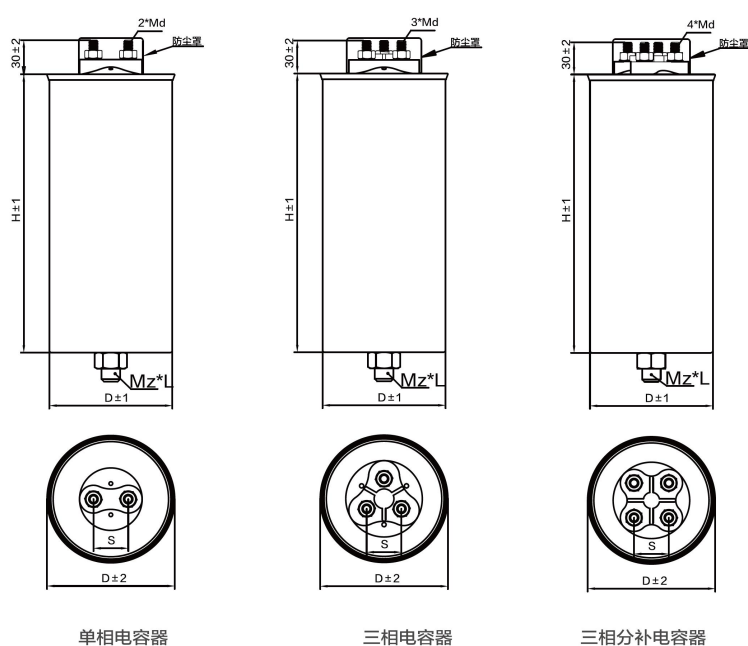
三相分补电容器

序号	型号规格	额定容量 (kvar)	额定电流 (A)	额定电容 (μ F)	外形尺寸 (mm)			
					外径×壳高 (D×H)	端子间距 (S)	端子外径 (Md)	底部螺栓 (Mz×L)
1	LCP.250-20-F	20	26.7	1019	116×290	30	4-M8	M16×25
2	LCP.250-25-F	25	33.3	1274	116×290	30	4-M8	M16×25
3	LCP.250-30-F	30	40.0	1529	136×290	30	4-M8	M16×25
4	LCP.280-20-F	20	23.8	812	116×290	30	4-M8	M16×25
5	LCP.280-25-F	25	29.8	1016	116×290	30	4-M8	M16×25
6	LCP.280-30-F	30	35.7	1219	136×290	30	4-M8	M16×25
7	LCP.300-20-F	20	22.2	708	116×290	30	4-M8	M16×25
8	LCP.300-25-F	25	27.8	885	116×290	30	4-M8	M16×25
9	LCP.300-30-F	30	33.3	1062	136×290	30	4-M8	M16×25

三相共补电容器

序号	型号规格	额定容量 (kvar)	额定电流 (A)	额定电容 (μ F)	外形尺寸 (mm)			
					外径×壳高 (D×H)	端子间距 (S)	端子外径 (Md)	底部螺栓 (Mz×L)
1	LCP.440-15	15	19.7	247	106×245	35	3-M8	M16×25
2	LCP.440-20	20	26.2	329	116×245	35	3-M8	M16×25
3	LCP.440-25	25	32.8	411	116×290	35	3-M8	M16×25
4	LCP.440-30	30	39.4	493	116×290	35	3-M8	M16×25
5	LCP.480-10	10	12.0	138	90×245	35	3-M8	M12×16
6	LCP.480-15	15	18.0	207	106×245	35	3-M8	M16×25
7	LCP.480-20	20	24.1	276	106×245	35	3-M8	M16×25
8	LCP.480-25	25	30.1	346	106×290	35	3-M8	M16×25
9	LCP.480-30	30	36.1	415	116×290	35	3-M8	M16×25
10	LCP.480-33.4	33.4	40.2	461	136×290	35	3-M8	M16×25
11	LCP.480-40	40	48.1	553	136×290	35	3-M8	M16×25
12	LCP.525-15	15	16.5	173	106×245	35	3-M8	M16×25
13	LCP.525-20	20	22.0	231	116×245	35	3-M8	M16×25
14	LCP.525-25	25	27.5	289	116×290	35	3-M8	M16×25
15	LCP.525-30	30	33.0	347	116×290	35	3-M8	M16×25
16	LCP.525-40	40	44.0	462	136×290	35	3-M8	M16×25
17	LCP.850-15	15	10.2	66	106×245	35	3-M8	M16×25
18	LCP.850-20	20	13.6	88	116×245	35	3-M8	M16×25
19	LCP.850-25	25	17.0	110	116×290	35	3-M8	M16×25
20	LCP.850-30	30	20.4	132	116×290	35	3-M8	M16×25

尺寸图



产品验收

- 我们不承担任何因为承运公司造成的货物遗失或损坏的责任，任何投诉请向承运公司交涉。
- 在安装地点打开产品包装。
- 确保产品没有受到冲击或变形。
- 检查产品没有缺件，检查该产品没有受到过可能损坏绝缘或造成产品不正常运行的碰撞。
- 检查产品标签上的电气参数与订货产品一致。
- 如有不符，请附上说明反馈给我们。

储存

- 产品应存储在干燥，通风良好的环境，防止雨淋，水浇，无化学物质和灰尘。
- 包裹或覆盖产品，以提供有效保护，防止灰尘，碎片，油漆等。
- 储存温度：-20℃~60℃。
- 储存后需要检验电容器。

警告

- 电容器不能安装在有可能被水淹的地方。
- 不需要特殊的措施，产品包装提供了一般情况的必要防护，因为产品不含液体电解质，不会因受热或受冷而损坏，没有特殊的防火要求。

通风

适用范围：配电柜周围的环境温度满足 IEC60439-1

- 最高温度：40℃
- 24 小时平均温度：35℃
- 年平均温度：25℃

安装要求

- 电容器在安装时应保证有良好的通风环境，防止温度过高，如安装在通风不好的场所，应用风扇进行强制通风；安装时电容器之间应留有不小于 30mm 的距离，底部固定螺栓安装扭力矩 4—6N.m，接线端子安装扭力矩 8—10N.m。电容器顶部确保产品失效防爆变形空间不小于 50mm。
- 由于内部灌入的绝缘介质，电容器必须竖直安装，禁止侧立与倒立安装。
- 电容器端子上的连接导线建议使用软导线连接，连接导线建议压接相应规格的预绝缘端子，保证接触良好；应在首次运行前及首次运行 24 小时后检查连接线牢固程度，定期维护。电容器多台并联时，产品间应采用软连接方式，以保证防爆效果。



电流计算方式：

三相电容器 $I=Q/\sqrt{3}U$

单相电容器 $I=Q/U$

例 480-30-3 的产品，额定电流是 $I=30/(0.48 \times \sqrt{3})=36A$

例 250-15-1 的产品，额定电流是 $I=15/0.25=60A$

- 建议使用适当的过电流继电器作电容器的过流保护，过流继电器额定值控制在最大电流 1.3 I_n 内。
- 考虑到电容器接入电网后会引电压升高，选用电容器的额定电压不低于该电容器所接入网络的最高运行电压。
- 安装电容器前后应测量电压波形和网络特性，如果存在谐波源，则应考虑在电容器上串联适当的电抗器。
- 在电容器电路中任何接触不良都会产生电弧而形成高频振荡，使电容器过热和过应力。因此，用户应对电容器补偿装置的所有触点进行定期检查。

电气接线

- 电力线路的连接的所有端子连接前，应熟悉试验报告及铭牌上的连接图，连接要正确。
- 电缆或母排组成的连接线必须符合电容器运行规程及电气安装规程的规定，选择合适截面的电缆和母线排。
- 连接线不得在接线端子上产生过高的机械拉力和力矩
- 螺栓联接必须保证足够的接触度压力，可使用蝶型垫圈或弹簧垫圈。
- 使用最低耐受温度为 105℃ 的软电线。
- 并联连接该电容器

该指示适用于所有电容器的各种类型的端子。

维护

- 人身防护

进行任何设备维护工作之前，必须切除电源。

- 检查

使用一个月后，请检查电容器端子的紧固情况。

每年一次，检查下列事项：

1. 一般的产品清洁。
2. 通风系统和过滤系统。
3. 电气接线端子的紧固。
4. 电容器的状况。
5. 安装地点的环境温湿度。

售后服务

本公司产品保修 1 年，保修期从产品售出之日算起。若保修期内产品出现故障或零件损坏，经本公司技术人员鉴定属于正常使用下所发生的，本公司将提供免费维修。

如下情形，将收取材料成本及维修工时费用：

- 未按使用手册中的规定所导致的损坏状况；
- 擅自拆焊零件或修改而导致的损坏状况；
- 运行超过“三包”期限。

本着优质的服务宗旨，未尽事宜，本公司将与用户协商解决，当双方无法协商解决时，则共同以《中华人民共和国消费者权益保护法》作为解决问题的依据。

Esicap Power Factor Correction Capacitor

Brief introduction of the capacitors

Electrical equipment should be installed, operated, used and maintained by qualified professionals. This manual is an operation manual for trained professionals, our company will not be responsible for any adverse consequences caused by failure to follow the instructions

Safety precautions



Caution

Risk of electric shock, burning and explosion

- Only qualified professionals can install this device, after reading this manual.
- Not work alone.
- Power off all electrical connection before checking, testing and maintaining this device.
- Special attention should be paid to the design of the power system, considering all power sources, including the possibility of reverse power transmission.
- Use properly regulated voltage test device to make sure all the power resources have been cut off.
- Beware of the potential dangers, take personal protection, and carefully check the working area inside the device to ensure no tools and other objects left behind.
- Be careful not to touch live busbars when moving or installing panels to avoid personal injury.
- The successful operation of this device depends on proper installation and operation. Neglect of basic installation requirements may result in

Esicap Power Factor Correction Capacitor

personal injury, as well as damage to electrical device or other objects.

- When performing dielectric strength and insulation tests on the device, all input and output wires connected to it should be disconnected. High voltage test may damage this device.
- During the operation of the device, the surface should be kept clean, and the terminals should be well fastened.

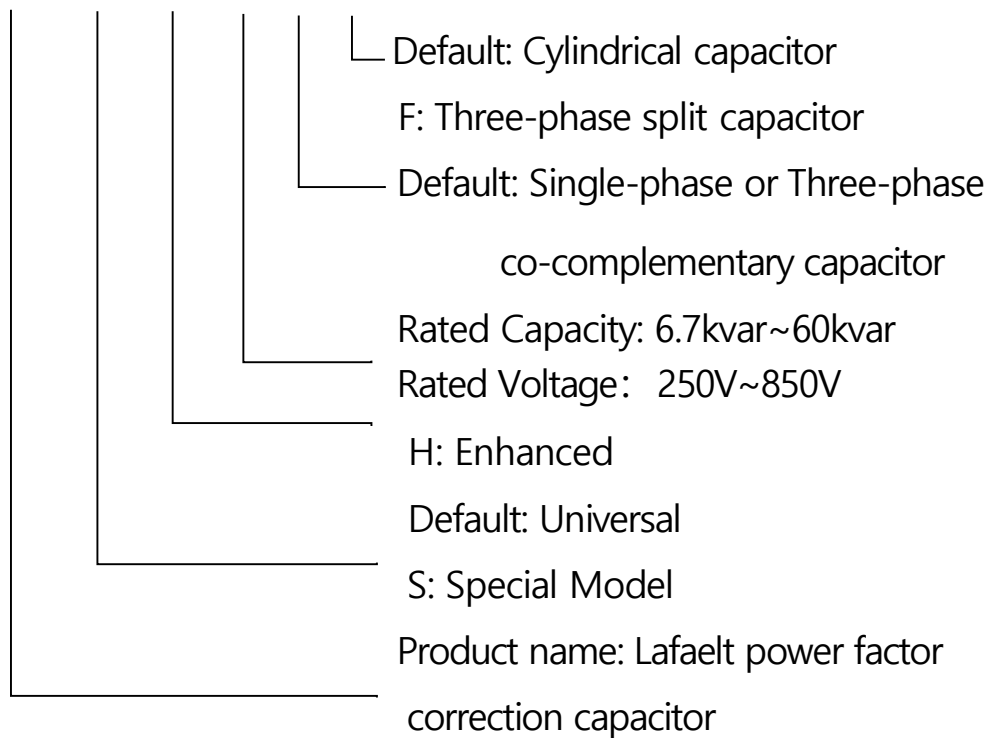
Esicap Power Factor Correction Capacitor

Main functions of power factor correction capacitors

Increase the power factor of the system, improve the power supply quality, and decrease the line loss.

Model Description

LCP □ **480-25** - □ - □



Esicap Power Factor Correction Capacitor

Single-phase split compensation capacitor

No.	Model Specification	Rated Capacity (kvar)	Rated Current (A)	Rated capacitance(μF)	Dimension (mm)			
					Outer Diameter×Shell Height (D×H)	Terminals (Mx)	Bottom Bolt (Md×L)	Terminal pitch (S)
1	LCP.250-6.7	6.7	26.7	340	76×245	30	2-M8	M12×16
2	LCP.250-8.3	8.3	33.2	423	90×245	30	2-M8	M12×16
3	LCP.250-10	10	40.0	510	90×245	30	2-M8	M12×16
4	LCP.250-13.4	13.4	53.6	682	106×245	30	2-M8	M16×25
5	LCP.250-15	15	60.0	764	106×245	30	2-M8	M16×25
6	LCP.250-16.7	16.7	66.8	851	116×245	30	2-M8	M16×25
7	LCP.250-20	20	80.0	1019	116×290	30	2-M8	M16×25
8	LCP.280-6.7	6.7	23.9	272	76×245	30	2-M8	M12×16
9	LCP.280-8.3	8.3	29.6	338	90×245	30	2-M8	M12×16
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12	LCP.280-15	15	53.6	609	106×245	30	2-M8	M16×25
13	LCP.280-16.7	16.7	59.6	678	116×245	30	2-M8	M16×25
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16	LCP.300-8.3	8.3	27.7	294	90×245	30	2-M8	M12×16
17	LCP.300-10	10	33.3	354	90×245	30	2-M8	M12×16
18	LCP.300-13.4	13.4	44.6	474	106×245	30	2-M8	M16×25
19	LCP.300-15	15	50.0	531	106×245	30	2-M8	M16×25
20	LCP.300-16.7	16.7	55.7	591	116×245	30	2-M8	M16×25
21	LCP.300-20	20	66.7	708	116×290	30	2-M8	M16×25

Esicap Power Factor Correction Capacitor

Three-phase split compensation capacitor

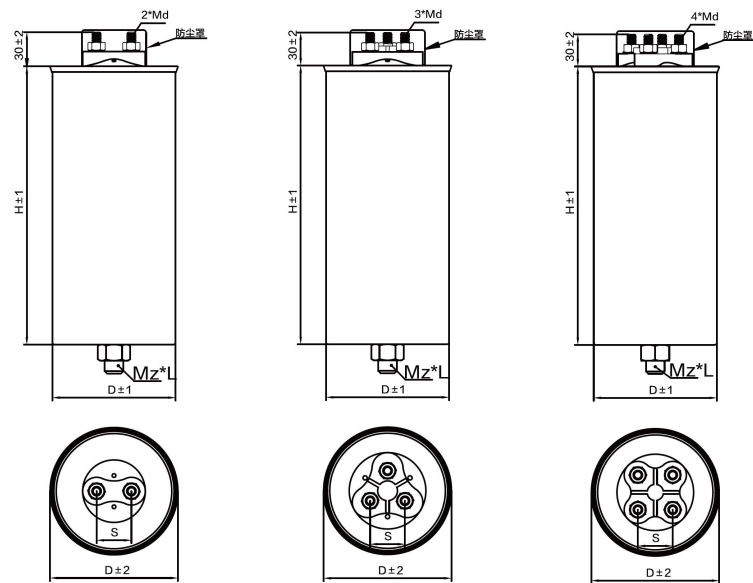
No.	Model Specification	Rated Capacity (kvar)	Rated Current (A)	Rated capacitance(μF)	Dimension (mm)			
					Outer Diameter×Shell Height (D×H)	Terminals (Mx)	Bottom Bolt (Md×L)	Terminal pitch (S)
1	LCP.250-20-F	20	26.7	1019	116×290	30	4-M8	M16×25
2	LCP.250-25-F	25	33.3	1274	116×290	30	4-M8	M16×25
3	LCP.250-30-F	30	40.0	1529	136×290	30	4-M8	M16×25
4	LCP.280-20-F	20	23.8	812	116×290	30	4-M8	M16×25
5	LCP.280-25-F	25	29.8	1016	116×290	30	4-M8	M16×25
6	LCP.280-30-F	30	35.7	1219	136×290	30	4-M8	M16×25
7	LCP.300-20-F	20	22.2	708	116×290	30	4-M8	M16×25
8	LCP.300-25-F	25	27.8	885	116×290	30	4-M8	M16×25
9	LCP.300-30-F	30	33.3	1062	136×290	30	4-M8	M16×25

Three-phase common compensation capacitor

No.	Model Specification	Rated Capacity (kvar)	Rated Current (A)	Rated capacitance(μF)	Dimension (mm)			
					Outer Diameter×Shell Height (D×H)	Terminals (Mx)	Bottom Bolt (Md×L)	Terminal pitch (S)
1	LCP.440-15	15	19.7	247	106×245	35	3-M8	M16×25
2	LCP.440-20	20	26.2	329	116×245	35	3-M8	M16×25
3	LCP.440-25	25	32.8	411	116×290	35	3-M8	M16×25
4	LCP.440-30	30	39.4	493	116×290	35	3-M8	M16×25
5	LCP.480-10	10	12.0	138	90×245	35	3-M8	M12×16
6	LCP.480-15	15	18.0	207	106×245	35	3-M8	M16×25
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13	LCP.525-20	20	22.0	231	116×245	35	3-M8	M16×25
14	LCP.525-25	25	27.5	289	116×290	35	3-M8	M16×25
15	LCP.525-30	30	33.0	347	116×290	35	3-M8	M16×25
16	LCP.525-40	40	44.0	462	136×290	35	3-M8	M16×25
17	LCP.850-15	15	10.2	66	106×245	35	3-M8	M16×25
18	LCP.850-20	20	13.6	88	116×245	35	3-M8	M16×25
19	LCP.850-25	25	17.0	110	116×290	35	3-M8	M16×25
20	LCP.850-30	30	20.4	132	116×290	35	3-M8	M16×25

Esicap Power Factor Correction Capacitor

Size diagram



Product Acceptance

- We do not assume any responsibility for the loss or damage of the goods caused by the carrier, please negotiate with the carrier for any complaints.
- Unpack the product at the installation site.
- Make sure that the product is not subject to impact or deformation.
- Check that there are no missing parts in the product, and that the product has not been subjected to impacts that could cause damage insulation or malfunction.
- Check that the electrical parameters on the product label are consistent with the ordered product.
- If there is any discrepancy, please attach a description to feed back to us.

Storage

- The products should be stored in a dry and well-ventilated environment, protected from rain, water, free of chemicals and dust.
- Wrap or cover the product to provide effective protection from dust, debris, paints, etc.
- The storage temperature: -20°C ~60°C.
- The capacitors need to be inspected after storage.

Warning

- Capacitors cannot be installed in places that may be flooded.
- No special protection measures are required; the product packaging has provided the necessary protection in general, since the product does not contain liquid electrolytes, will not be damaged by

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heat or cold, and has no special fire protection requirements.

Ventilation

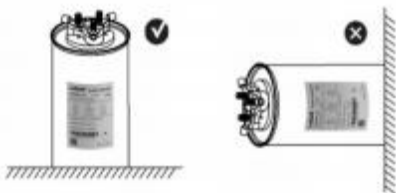
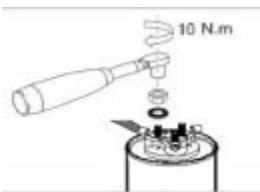
Application scope: the ambient temperature around the power distribution cabinet meets the requirement of IEC60439-1

- Maximum temperature: 40°C
- Average temperature of 24 hours: 35°C ■

Annual average temperature: 25°C

Installation Requirements

- Capacitors should be installed in a well-ventilated environment to prevent overheating, if installed in a place with poor ventilation, use a fan for force ventilation. When installing, there should be a distance of not less than 30mm between the capacitors, the installation torque of the bottom fixing bolt is 4 ~ 6N.m, and the installation torque of the terminal is 8 ~ 10N.m. The top of the capacitor ensures that the product failure explosion-proof deformation space is not less than 50mm.
- Due to the insulating medium poured inside, the capacitor must be installed vertically, sideways or upside down is forbidden.
- The connecting wires on the capacitor terminals are recommended to use flexible wires, and the connecting wires are recommended to be crimped with pre-insulated terminals of corresponding specifications to ensure good contact. The firmness of the connecting wire should be checked after the first operation and 24 hours after the first operation, and give regular maintenance. When multiple capacitors



are connected in parallel, the products should be soft connection to ensure the explore-proof effect.

Current Calculation Method:

Three-phase capacitor $I=Q/\sqrt{3}U$ For example: The product of 480-30-3, the rated current is $I=30/(0.48\times\sqrt{3})=36A$

Single-phase capacitor $I=Q/U$ For example: The product of 250-15-1, the rated current is $I=15/0.25=60A$

- It is recommended to use appropriate over-current relay as the overcurrent protection of capacitors. The rated value of the over-current relay is controlled in the maximum current $1.3I_n$.
- Considering that it will increase the voltage when the capacitor is connecting to the grid, so the rated voltage of the chosen capacitor cannot be lower than the maximum operation voltage of the network which the capacitor connected to.
- The voltage waveform and network characteristics should be measured before and after installing the capacitor. If there is a harmonic source, the appropriate electric antibody should be considered to be connected in series on the capacitor.
- In the capacitor circuit, any poor contact will generate an arc to form a high-frequency oscillation, which makes the capacitors overheating and excessive stress. Therefore, users should conduct regular inspections of all contacts of the capacitor compensation device.

Electrical Wiring

- Before connecting all terminals of the power line connection, you should be familiar with the test report and the connection diagram on the nameplate, and the connection must be correct.
- The connection wire composed of cables or busbars must comply with the requirements of reactor operation regulations and electrical installation regulations, and the cables and busbars with appropriate cross-selections should be selected.
- Connecting wires must not create excessive mechanical tension and moments on the terminals.
- The bolt connection must ensure sufficient contact pressure and butterfly washers or spring washers can be used.
- Use flexible wires with a minimum temperature resistance of 105°C.
- Connect the capacitors in parallel.

This instruction applies to all types of terminals for all capacitors.

Maintenance

■ Personal Protection

Power must be cut off before any maintenance work on the device.

■ Check

Please check the tightness situation of the reactor terminal after one month of use.

Once a year, check the following:

1. General product cleaning
2. Ventilation and filtration system
3. Tightness of electrical wire terminals
4. Capacitor status

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5. Ambient temperature and humidity at the installation site

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After-sale Service

The products of our company are guaranteed for 1 year, and the warranty period starts from the date of product sale. If the product faults or the parts are damaged during the warranty period, our company will provide free maintenance after it is identified by our technicians as occurring under normal use.

In the following cases, material costs and maintenance man-hours will be charged:

- Damage caused by not following the instructions in the manual
- Damage caused by unauthorized desoldering of parts or modification
- The operation exceeds the "Three Guarantees" period



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