

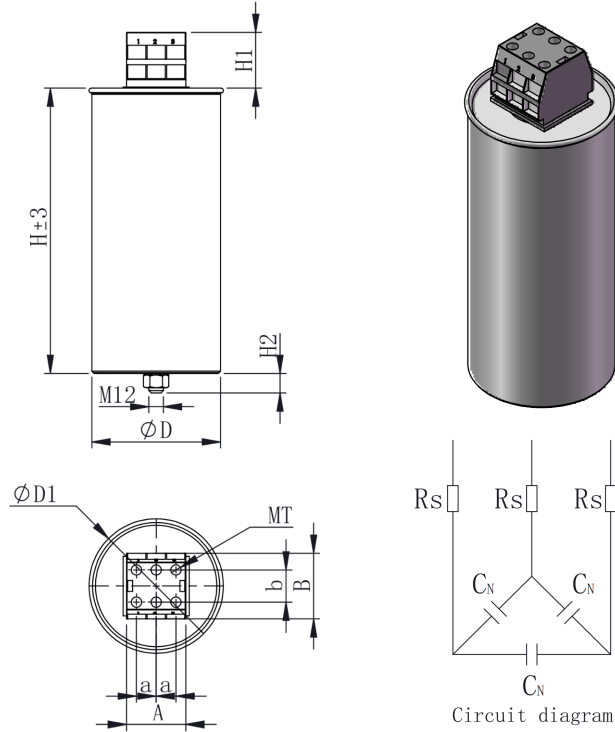
C6S

干式无功功率补偿电容器

Dry type power factor correction capacitors

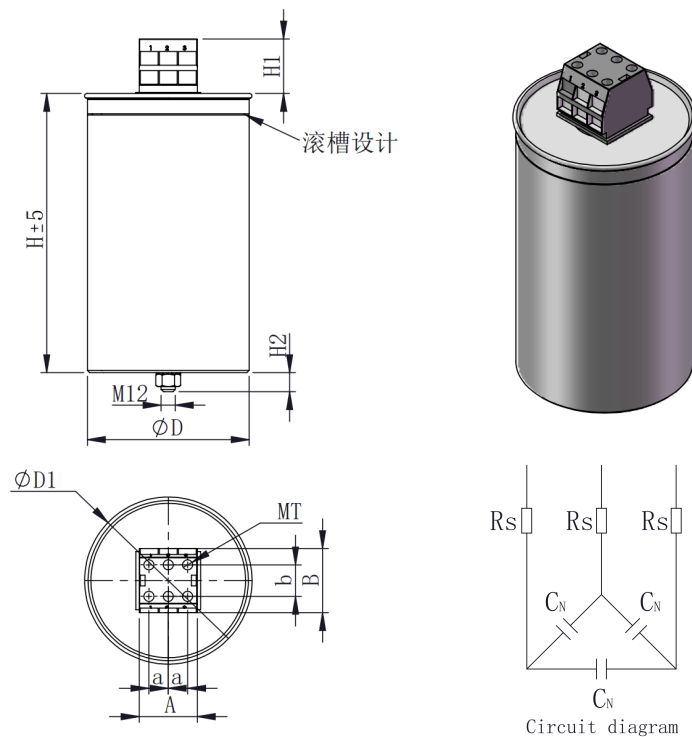
■ 外形图 Outline Drawing

帽式设计, Δ 接法(无滚槽设计, $D=76\sim 106$) Cap type design, delta connection(Without channeling)

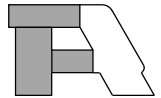


$D \pm 1$	76~106
$a \pm 0.5$	15
$b \pm 0.5$	19.4
$A \pm 1$	43.5
$B \pm 1$	44.5
$H1 \pm 2$	35
$H2 \pm 1$	16
MT	M5

帽式设计, Δ 接法(带滚槽设计, $D=116\sim 136$) Cap type design, delta connection(Channeling)

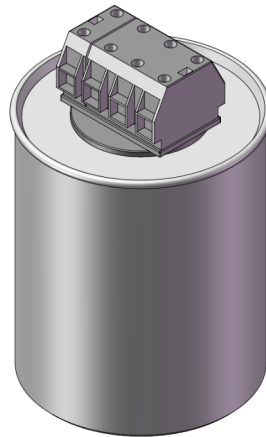
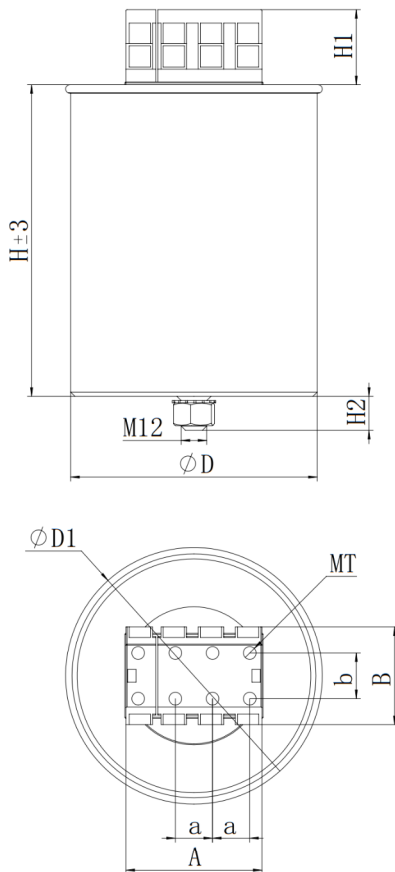


$D \pm 1$	116	136
$a \pm 0.5$	15	16.5
$b \pm 0.5$	19.4	25
$A \pm 1$	43.5	49
$B \pm 1$	44.5	54.5
$H1 \pm 2$	35	45
$H2 \pm 1$	16	18
MT	M5	M6

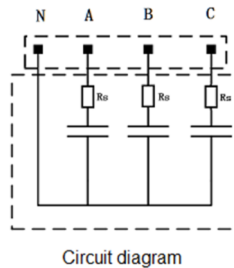


帽式设计, Y接法(无滚槽设计, D=116~136)

Cap type design, star connection, neutral brought out(Without channeling)



D±1	116~136
a±0.5	15.0
b±0.5	19.4
A1±1	58.4
B1±1	44.5
H1±2	35
H2±1	16
MT	M5

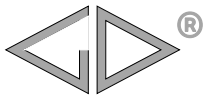


■ 特点

- 金属化聚丙烯膜设计, 自愈性优良
- 防爆设计, 过压力保护更安全
- 干式树脂填充, 树脂阻燃等级 **UL94 V-0**
- 干式结构, 无漏液风险, 安装方向更灵活
- 适用于交流电力系统的功率因数校正, 提高低压电网的功率因素, 广泛用于工厂、住宅楼等场合的无功功率补偿柜

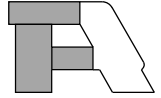
■ Features

- Metallized polypropylene film design, excellent self-healing property
- Anti-explosion design, overpressure tear-off fuse more safety
- Dry resin filling, flame retardant grade **UL94 V-0**
- Dry type structure, no leakage risk, more flexible installation direction
- Suitable for AC power system power factor correction, improve the power factor of low voltage grid, widely used in factories, houses and other occasions reactive power compensation cabinet



■ 技术要求 Specifications

引用标准 Reference Standard	GB/T 12747.1/2 (IEC 60831-1/2)	
额定电压 Rated Voltage (U_N)	440Vac ~ 525Vac (可根据客户要求定制 $U_N \leq 690$ Vac 的设计) (The design of $U_N \leq 690$ Vac can be customized according to customer requirements)	
最高允许电压 Maximum permissible voltage	1.00 U_N , 连续 Continuous 1.10 U_N , 每 24h 中 8h 8 h in every 24 h 1.15 U_N , 每 24h 中 30min 30 min in every 24 h 1.20 U_N , 5min 1.30 U_N , 1min 注: 高于 1.15 U_N 的过电压在电容器的整个使用寿命期间总共不超过 200 次。 Note: The overvoltages higher than 1.15 U_N does not exceed a total of 200 times in the lifetime of the capacitor.	
额定频率 Rated Frequency (f_N)	50Hz/60Hz	
额定容量 Rated output (Q_N)	5kvar ~ 50kvar	
额定电容 Rated capacitance (C_N)	50 μ F ~ 500 μ F	
最大允许电流 Maximum permissible current	$\leq 1.43I_N$ (I_N 是额定交流电流方均根值) (I_N is the rated r.m.s. value of the alternating current)	
电容容量偏差 Capacitance Tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K), $-5\% \sim +10\%$ (6)	
电容内部连接方式 Capacitor internal connection	三角形接法 (Δ)或星型接法, 中性点引出(Υ) Delta connection (Δ)or star connection, neutral brought out(Υ)	
极间耐电压 Test voltage between Terminals(U_{T-T})	2.15 U_N (50Hz/60Hz), 10s	
极壳耐电压 Test voltage between terminals to case(U_{T-C})	3 000Vac(50Hz/60Hz), 10s	
绝缘电阻 Insulation Resistance($IR \times C_N$)	$\geq 10\,000s$ (20 $^{\circ}$ C, 500V, 1min)	
介质损耗角正切 Dielectric dissipation factor ($\tan \delta_d$)	2×10^{-4}	
环境空气温度类别 Ambient air temperature categories	-40/D	
可运行温度范围(热点温度) Operating temperature range(θ_{hs})	-40 $^{\circ}$ C~85 $^{\circ}$ C	
贮存温度范围 Storage Temperature range(θ_s)	-40 $^{\circ}$ C~70 $^{\circ}$ C	
预期寿命 Expected lifetime	$ \Delta C/C \leq 5\%$ after 30 000h @ U_N , $\theta_{hs} \leq 70^{\circ}$ C	
防爆装置 Explosion-proof device	过压力防护装置 Overpressure disconnector	
内部填充料 Internal stuffing	干式聚氨酯 (PU)Polyurethane	
冷却方式 Cooling	自然空气或强制冷却 Naturally air-cooled or force cooled	
是否有放电电阻 Whether has the discharge resistor	配电阻, 已预安装 Yes, resistor pre-installed	
安装 Installation	位置 Position	任意方向 Any direction
	引出端形式 Terminal form	帽式(插头螺栓 M5 或 M6) Cap type (Plug bolt M5 or M6)
	安装形式 Fix style	底部螺栓 M12 Bottom-bolt M12
电极最大扭矩 Max. Torque of terminals	2N·m (M5); 3N·m (M6)	
最大安装扭矩 Max. Torque of Installation	10N·m (M12)	
最高使用海拔 Max. altitude	2 000m	



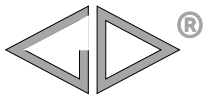
■ 产品编码说明 Part number system

15 位产品代码如下:

The 15 digits part number is formed as follow:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	6	S												

第 1~3 位	型号代码	Digit 1 to 3	Series code
	C6S		C6S
第 4~5 位	额定电压	Digit 4 to 5	Rated voltage
	S1=440Vac S3=480Vac T6=525Vac		S1=440Vac S3=480Vac T6=525Vac
第 6~8 位	标称容量	Digit 6 to 8	Rated capacitance value
	A to H & J 表示 0.1 to 0.9		A to H & J:0.1 to 0.9
	举例: 506=50×106pF= 50μF		for example: 506=50×106 pF= 50μF
	26E=26.5μF		26E=26.5μF
第 9 位	容量偏差	Digit 9	Capacitance tolerance
	J=±5%, K=±10%, 6=-5%~+10%		J=±5%, K=±10%, 6=-5%~+10%
第 10 位	产品特征码	Digit 10	Product characteristic code
	J:△接法, M: Y 接法		J:△connection, M: Y connection
第 11~15 位	内部特征码	Digit 11 to 15	Internal use



C6S

■ 技术参数 Technical data

U _N =440Vac/50Hz									
Q _N (kvar)	C _N (μF)	连接 方式	D±1 (mm)	D1 _{max} (mm)	H (mm)	I _N (A)	I _s (kA)	M (kg)	Part number
15	3×82	△	86	90	230	3×20	2.1	1.5	C6SS1136-J*****
20	3×111	△	96	100	230	3×27	3.3	1.9	C6SS1040-J*****
25	3×137	△	106	111	230	3×33	4.2	2.3	C6SS1056-J*****
30	3×165	△	116	121	235	3×39	4.8	2.7	C6SS1057-J*****
40	3×220	△	116	121	280	3×53	5.1	3.3	C6SS1227-J*****
15	3×250	Y	116	121	180	3×20	4.0	2.2	C6SS1257-M*****
20	3×330	Y	116	121	210	3×26	4.0	2.6	C6SS1337-M*****
25	3×410	Y	116	121	240	3×36	5.0	2.9	C6SS1417-M*****

U _N =480Vac/50Hz									
Q _N (kvar)	C _N (μF)	连接 方式	D±1 (mm)	D1 _{max} (mm)	H (mm)	I _N (A)	I _s (kA)	M (kg)	Part number
20	3×92	△	96	100	230	3×24	3.0	1.8	C6SS3926-J*****
25	3×115	△	106	111	230	3×30	3.6	2.2	C6SS3127-J*****
30	3×138	△	116	121	235	3×36	4.5	2.7	C6SS3056-J*****
20	3×270	Y	96	100	240	3×24	3.3	2.0	C6SS3277-M*****
25	3×340	Y	106	111	240	3×30	4.1	2.4	C6SS3347-M*****
30	3×410	Y	116	121	240	3×36	5.0	2.9	C6SS3417-M*****

U _N =525Vac/50Hz									
Q _N (kvar)	C _N (μF)	连接 方式	D±1 (mm)	D1 _{max} (mm)	H (mm)	I _N (A)	I _s (kA)	M (kg)	Part number
20	3×77	△	96	100	230	3×22	2.7	1.8	C6ST6776-J*****
25	3×96	△	106	111	230	3×27	3.3	2.2	C6ST6966-J*****
30	3×115	△	116	121	235	3×33	3.9	2.7	C6ST6127-J*****
20	3×230	Y	96	100	240	3×22	3.0	2.0	C6ST6237-M*****
25	3×290	Y	106	111	240	3×28	3.8	2.4	C6ST6297-M*****
30	3×350	Y	116	121	240	3×33	4.5	2.9	C6ST6357-M*****

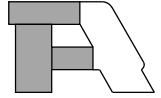
备注 Note: 1. “-”表示容量偏差。“-”=capacitance tolerance code.

2. “*****”表示内部特征码, 请联系技术工程师确认完整代码。

“*****” = Internal use, please contact the technical engineer to confirm the complete code.

3. “I_N”表示线电流。“I_N” stands for line current.

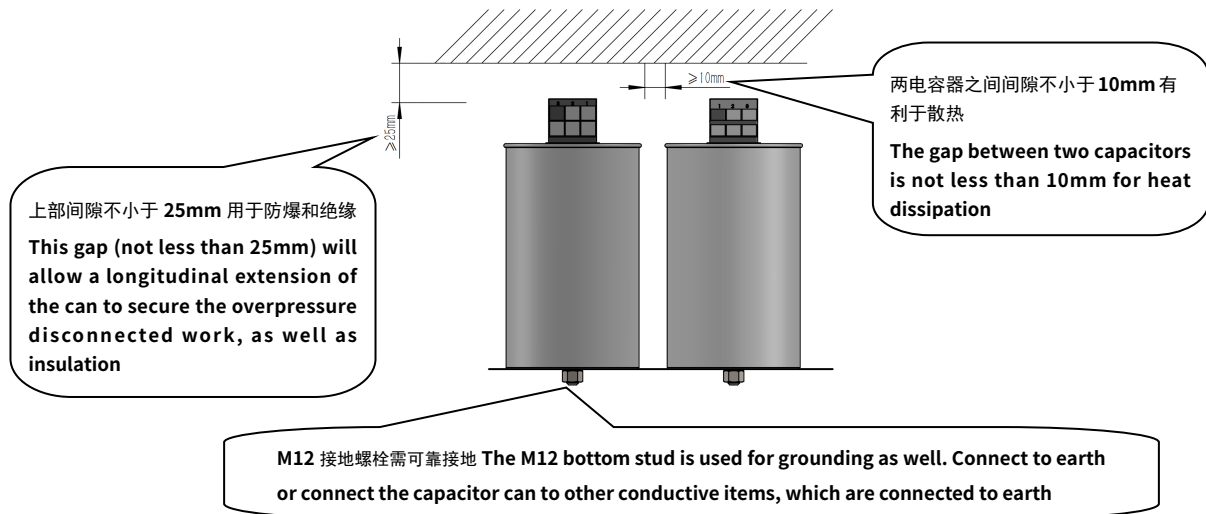
4. 如需其它电压、容量产品, 请联系技术工程师。 If need the other design, please contact our technical engineer.



■ **安装空间要求(以帽式设计为例) Installation space requirements (Take cap type design as an example)**

电容要安装在阴凉、通风良好的位置，且其周围不能有热辐射的物体，如滤波电路电抗器、太阳直射。

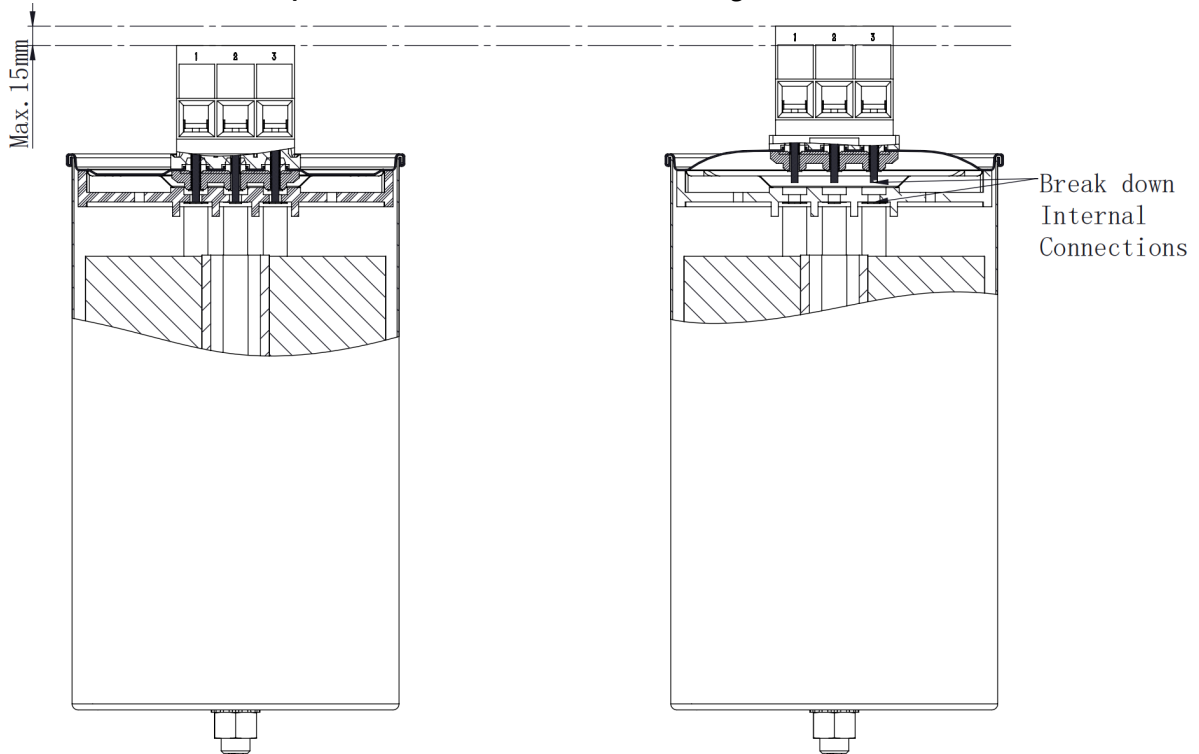
The capacitor is to be installed at a cool and well-ventilated place, and must not be installed within the range of heat radiating objects, e.g. filter circuit reactors, direct sun radiation.

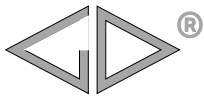


电容主要是通过底部螺栓安装固定，若需要其它安装固定方式，请联系我司技术人员确认。

The capacitor is mainly installed by bolts at the bottom. If you need other installation methods, please contact our technical staff to check.

电容的过压力防护装置需要通过盖面鼓起动作，所以盖面到引出端顶部间不能安装影响防爆动作的其它配件，装置动作前后如下图所示。
The overpressure disconnecter of the capacitor is triggered by the cover bulge, so no other components can be installed between the cover and the top of the terminal end that affect the overpressure disconnecter action. Before and after the action of the overpressure disconnecter is shown in the figure below.





C6S

■ 连接电缆(以帽式设计为例) Connection of the supply cable(Take cap type design as an example)

产品本体（参考外形图的 $\phi D \times H$ ）上部必须保持足够的空间（参考安装空间要求），该空间内不能安装其它组件。

Keep enough space (refer to the outline drawing $\phi D \times H$) on the top of the capacitors (refer to installation space requirements) and no other components can be installed in this space.

连接电缆应使用软性电线并保持松弛，不要用硬芯电缆，若使用母排等连接方式，请联系我司技术人员确认。

The connection cable shall be of flexible type and keep slack, do not use hard core cable. If using busbar connection or other methods, please contact our technical staff to check.

对于帽式设计，可安装的最大引线截面积为 $16\text{mm}^2(\text{M5})/25\text{mm}^2(\text{M6})$ ，可根据实际电流值来选择合适的电缆。

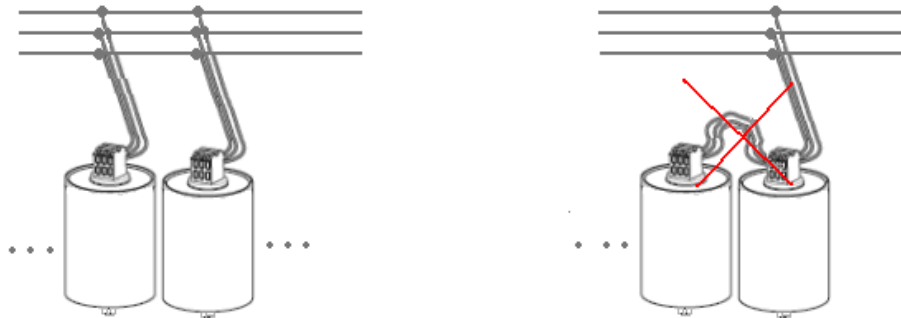
For the cap type design, maximum cable cross section is $16\text{mm}^2(\text{M5})/25\text{mm}^2(\text{M6})$, according to actual result to choose the appropriate cable.

对于螺栓式设计，根据实际电流值来选择合适的电缆。

For the bolt type design, according to actual result to choose the appropriate cable.

以帽式设计为例，对于多个电容器并联，每个电容器采用直接连接到母线上方式，若有其它连接方式请联系我们。

Take cap type design as an example, for capacitors connected in parallel, each capacitor should use independent lead wires, if you have any other connection way please contact us.



■ 安装注意事项 Installation cautions

操作前注意电容器必须充分放电。

Discharge the capacitor completely before operation.

注意端子最大可承受电流，端子总电流不得超出规定的最大值：

Pay attention to the Max. Current on the terminals, the total current on terminals must not go beyond the Max. current by specified:

● M6 插头螺栓的引出端子最大电流为 60A。

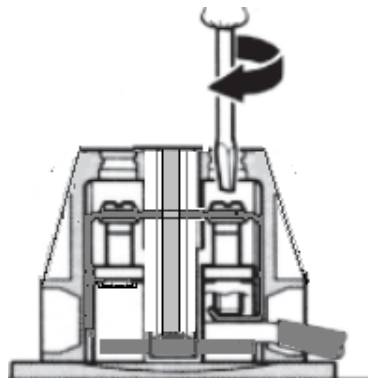
The maximum current of M6 plug bolt is 60A.

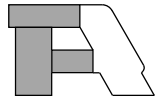
● M5 插头螺栓的引出端子最大电流为 45A。

The maximum current of M5 plug bolt is 45A.

对于帽式设计，安装引出端子推荐使用一字螺丝刀，刀腿的直径小于防护盖孔以方便插入防护盖上的孔。

For the cap type design, recommend to using a slotted screwdriver to install the terminals.





以帽式设计为例，电容器均只能作为一个独立的分支，不能在电容器的一端连接负载（放电电阻除外）。

Take cap type design as an example, each capacitor is only used as an independent subfield, and not connected the load in the terminals(Except discharge resistors).



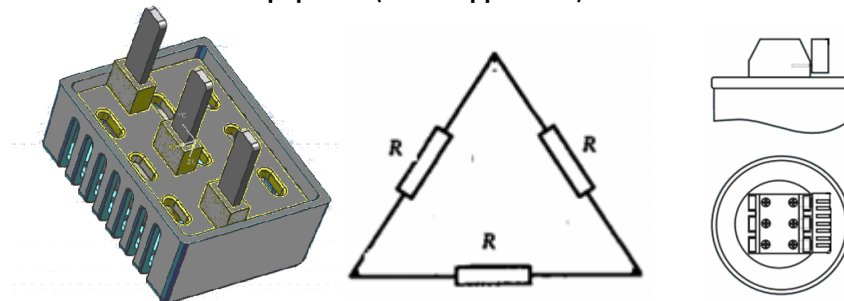
■ 放电电阻连接 Connection of the discharge resistors

当用户有需求时，应提供将每一电容器单元或电容器组在 10min 之内从工作电压放电到 75V 或更低电压的装置。

When required by the user, each capacitor unit or bank shall be provided with means for discharging each unit in 10 min to 75 V or less, from a working voltage U_N .

放电电阻用于对电容器进行放电以保护人免受电击的危险，同时也在自动 PFC 装置内电容器进行切换时放电。

Discharge resistors are required for discharging capacitor for protection of human being (Electric shock risk), and for re-switching capacitors in automatic PFC equipment (Phase opposition).



C6S 帽式设计电容器系列有可选配的放电电阻，其配套的放电电阻能满足在 3min 内使电容器放电到 75V 或更低电压，放电电阻值的计算可以按如下公式：

Capacitors of the C6S series (cap type design) are fitted with discharge resistors for a discharge <75V within <180s, the resistors to be used can be calculated with the following formula:

$$R \leq \frac{T}{k \times C \times I_n \frac{U_N \times \sqrt{2}}{U}}$$

T: 放电时间 Discharge time

C: 每一相的容量 Capacitance of one phase

U_w : 实际工作电压 Operating voltage

U: 最大允许的残留电压

Maximum permissible voltage after discharging

k: 系数，内部使用△接法，k=1；内部使用Y接法，k=1/3。

Coefficient, if delta connection, k=1; if star connection, k=1/3.

■ 环境温度 Ambient temperature

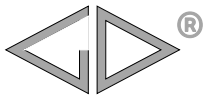
该电容的环境空气温度类别是 -40/D，表示环境空气温度最高可达 55°C。温度对于聚丙烯膜式电容器来讲是影响损耗的一大因素，这会影响到产品的使用寿命。

The ambient temperature category is -40/D, means ambient temperature up to max. 55°C. Temperature is one of the main stress factors for polypropylene type capacitors, means it has a major influence on the life cycle of the capacitor.

■ 过电流 Overload currents

电容器决不可在电流超过最大允许电流下运行。

Capacitors should never be operated with currents exceeding the maximum permissible value.



在将电容器接入电路时，可能产生高幅值和高频率的瞬态过电流。在将电容器分组接入已通电的另一分组相并联时，也有可能产生这种瞬态效应，但不可超过电容器的浪涌峰值电流 \hat{I}_s 。

Transient overcurrents of high amplitude and frequency may occur when capacitors are switched into circuit. Such transient effects are to be expected when a section of a capacitor bank is switched in parallel with other sections that are already energized, don't exceed the peak surge current (\hat{I}_s) of the capacitor.

为将这些瞬态过电流降低到电容器与设备能承受的值，可能需要通过电阻器来投电容器（电阻合闸），或在电容器组的每一分组的电源电路接入电抗器。

It may be necessary to reduce these transient overcurrents to acceptable values in relation to the capacitor and to the equipment by switching on the capacitors through a resistor (resistance switching), or by the insertion of reactors in the supply circuit to each section of the bank.

如果电容器上配有熔断器，则由开关操作引起的过电流峰值应限制到 $100 I_N$ (方均根值) 及以下。

If the capacitors are provided with fuses, the peak value of the overcurrents due to switching operations shall be limited to a maximum of $100 I_N$ (r.m.s. value).

■ 谐波 Harmonics

主要的谐波源是整流器、电力电子设备及饱和的变压器铁心。

The chief sources of harmonics are rectifiers, power electronics, and saturated transformer cores.

如果电容器电流超过最大允许电流，而电压仍在 $1.1U_N$ 之内，则应测出主要谐波，以便找到最佳的解决办法。

If the capacitor current exceeds the maximum permissible value, while the voltage is within the permissible limit of $1.1U_N$, the predominant harmonic should be determined in order to find the best remedy.

下列解决办法应予考虑：

The following remedies should be considered:

将一部分或全部电容器移到系统的其它部位。

Moving some or all of the capacitors to other parts of the system.

接入与电容器串联的电抗器，将电路的谐振频率降低到干扰的谐波频率值以下。

Connection of a reactor in series with the capacitor, to lower the resonant frequency of the circuit to a value below that of the disturbing harmonic.

当电容器附近有电力半导体设备时，增加电容器的电容值。

Increase of the capacitance value when the capacitor is connected close to power semiconductors.

建议检查输入线的电流总谐波畸变率 THD_i ，要求 $THD_i \leq 50\%$ 。

We would propose to check the total harmonic current distortion (THD_i) of the input terminals, the THD_i must not exceed 50%.

$$THD_i = \frac{\sqrt{\sum_{n=1}^{\infty} I_n^2}}{I_0} \times 100(\%)$$

(THD_i : 电流总谐波畸变率; I_0 : 实际工作的基波电流; I_n : 实际工作的谐波电流)

(THD_i : Total current harmonic distortion; I_0 : Actual working fundamental current;

I_n : Actual working harmonic current)

■ 安全注意事项 Safety

电容器外壳保持良好和可靠接地。

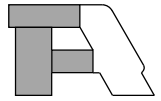
Maintain good and effective earthing for enclosures of capacitors.

拆装电容器时要确保电容器已放电干净。

Handle capacitor to ensure capacitor has discharge clean.

遵循良好的工程规范。

Follow good engineering practices.



■ 维护 Maintenance

检查连接线与端子螺丝是否打紧。

Check tightness of Connections/terminals periodically.

定期清理引出端子避免因灰尘或其它可导电的垃圾引起短路。

Clean the terminals periodically to avoid dust or other conductive garbage can cause a short-circuit.

检查短路保护保险丝。

Check short circuit protection fuses.

每半年使用电流钳表或其它在线测电流的工具测量电容器电流。

Every half a year use current clamp table or other on-line measuring tools of current measurement capacitor current.

检查放电电阻是否正常工作，可以通过电容器先上电后断开 3min 后测量电容器的电压是否降至 75V 以下来进行判断。

To check whether the discharge resistance is working normally, it can be judged by measuring whether the voltage of the capacitor drops to 75V after the capacitor is turned on first and disconnected for 3 minutes.

■ 安装与调试步骤 Installation & commissioning procedures

1、打开包装箱取出电容

Unpack Capacitor

取电容时请勿直接抓取端子

Do not touch capacitor terminals by hand directly while taking them

2、检查电容器外观（是否有机械损伤）

Check Physically

3、固定好电容器

Fixed capacitors

4、确保使用电容器场合的电压、频率、温度在电容器额定值以下

Ensure for correctness of supply voltage, frequency, temperature

5、连接好电容器

Connect Capacitor

6、打开电源开关

Switch on supply

7、检查主回路的电压与电流是否正常

Check main supply Voltage & current

8、电容器正常运行

Capacitor is commissioned



■ 预期寿命 Expected lifetime

电容器的应用中，有多种因素会影响到电容器的使用寿命，比如电压、温度、电流、电网谐波、湿度、光照或辐射以及其它一些未知的因素。预期寿命仅考虑电压、温度的关系，基于长期耐久性试验的合格结果，再通过预期寿命理论计算公式计算该电容在不同工况下的预期寿命。因此，预期寿命仅作为选型参考，而不代表电容器的实际使用寿命，也不代表质保要求。

For capacitors application, various factors will affect the expected lifetime of capacitors, such as voltage, temperature, current, network harmonics, humidity, lighting or radiation and other unknown factors. The lifetime only considers the effects of voltage and temperature. Based on the qualified results of long-term durability test, the lifetime curve of the capacitor under different working conditions is calculated by using the theoretical calculation formula of lifetime. Therefore, the lifetime is only used as a reference for selection, and does not represent the actual service life of the capacitor, nor does it represent the quality assurance requirements.