



树脂绝缘干式铁心启动电抗器安装使用说明书

Installation Operation and Maintenance Manual Dry-type Steel Core Starting Reactor

QK2500SM

顺特电气设备有限公司
SUNTEN ELECTRIC EQUIPMENT CO.,LTD.

地址(Address): 广东省佛山市顺德大良红岗工业区 (528300)
Honggang Industrial Zone,Daliang Town,Shunde,
Foshan City,Guangdong P.R.China 528300

总机(Tel): +86-757-22666888

传真(Fax): +86-757-22635597

销售热线(Sales Hotline): +86-757-22666666

服务热线(Service Hotline): +86-757-22338222

网址(Website): www.sunten.com.cn

说明: 本资料所示内容,因公司改良会有所变更,敬请谅解。
警告: 本样本及知识产权属顺特电气设备有限公司所有,未经许可,翻印必究。

Notice: The information provided in this catalog is subject to change without notice.

Warning: The copyright and intellectual property of this catalog are belong to SUNTEN Electric Equipment Co.,Ltd. All rights reserved.

2010年10月版

顺特电气设备有限公司
SUNTEN ELECTRIC EQUIPMENT CO.,LTD.

本说明书适用于额定容量 7000kvar 及以下、电压等级 35kV 及以下环氧浇注薄绝缘干式铁心启动电抗器的安装和使用。

This manual is applicable to the installation and application of dry-type steel core starting reactor with rated capacity equal to 7000kvar and below and voltage class equal to 35kV and below.

一、产品特点 Product Features

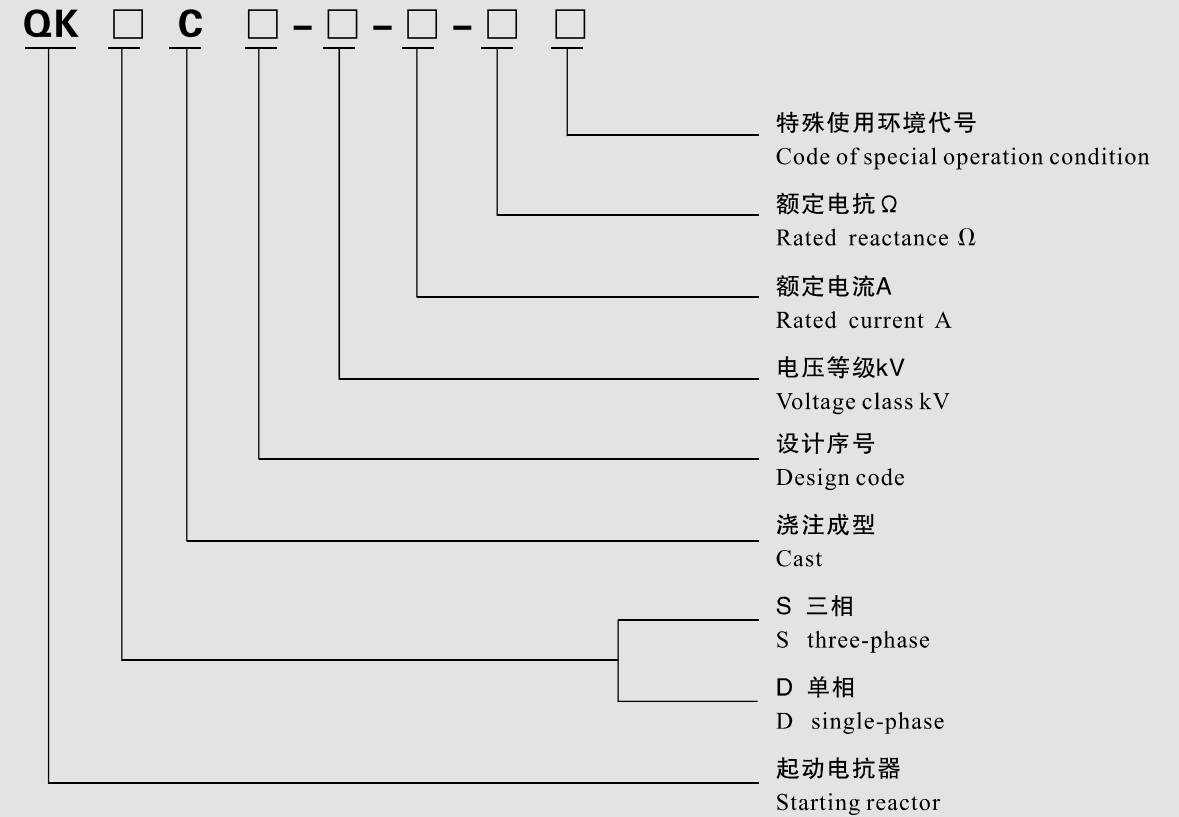
启动电抗器用于高压交流电动机的启动，通常串联于电动机的启动回路中，可限制电动机的启动电流、减小系统电压波动、避免系统误跳闸、提高电力系统运行的安全性和可靠性。产品完全符合 GB10229《电抗器》、IEC60076-6《电抗器》等标准的要求。

Starting reactor is used in the starting process of high voltage AC motor. It is usually in series with the starting circuit of motor. It can restrict the starting current, decrease the system voltage fluctuation, avoid the system mis-trip, and improve the safety and reliability of the power system. The product complies with standards of GB10229 Reactor and IEC60076-6 Reactor, etc.

该产品应用引进的树脂绝缘干式电力变压器的设计技术、工艺技术和引进的生产设备及检验设备进行产品设计、生产和检验。该产品具有绝缘强度高、机械强度高、电感线性度好、体积小、重量轻、防潮、阻燃、噪音低、可靠性高、免维护等优点，可广泛应用于冶金、化工、电气铁道、供水工程等领域，特别是安装空间有限和具有特殊防火要求的场所，更能充分发挥其体积小、阻燃的优越性。

The product is designed based on the design technology and process technology of cast resin dry-type transformer and is produced and tested with imported production equipment and test equipment. The product has advantages of good insulating strength, high mechanical strength, good inductance linearity, small size, light weight, damp-proof, fire resistance, low noise, high reliability and maintenance free, etc, and can be widely applied to metallurgy, chemical industry, electric railway, waterworks, etc, especially in the place with limited installation space and special fire prevention requirements, where its advantages of small size and fire resistance can be fully played.

二、产品型号说明 Product Type Specification



三、使用条件 Operation Condition

- 3.1 安装地点：户内。
Installation location: indoor.
- 3.2 冷却方式：空气自冷(AN)式。
Type of cooling : natural air cooling (AN).
- 3.3 保护等级：IP00、IP20、IP23等型式。
Protective level: IP00, IP20 and IP23, etc.
- 3.4 环境温度：-10℃ ~ +40℃。
Ambient temperature: -10℃~+40℃.
- 3.5 海拔高度：不超过1000m。
Altitude: not more than 1000m.
- 3.6 工作方式：间隔短时工作制。
Working mode: interval and short time.

3.7 绝缘等级: F级, 2分钟运行温度极限为200°C。

Insulation class: F, the limited temperature for 2 min operation is 200°C;

3.8 本产品一般为户内式, 应安装在场地清洁、通风良好和具有合适的大气条件的户内场所。如果起动电抗器安装在地下室或开关柜等空间受限制的地方时, 应有足够的通风, 一般每1kW损耗应有 ≥ 2 米³/分钟的空气通风。

This product is generally indoor type and should be installed in clean indoor areas with good ventilation and suitable atmospheric conditions. If the starting reactor is installed in underground room or switch cabinet where space is limited, adequate ventilation is necessary. Generally, 1kW loss requires no less than 2 m³/min ventilation.

四、产品运输 Product Transportation

4.1 产品运输过程中, 如无包装或仅有简易包装, 应注意天气, 如遇下雨下雪, 应采取措施, 避免雨雪侵入其内。

Weather should be noticed during transportation of non-packed products or products with simple packages. Measures should be taken in the event of rain or snow in order to prevent rain or snow entering into products.

4.2 产品运输过程中, 其倾斜度不得大于30°。

Inclination of products can't be greater than 30° during transportation.

4.3 对于有小车的产品, 为防产品在运输过程中的位置移动, 一般应卸掉小车轮。

For products with trolley, the trolley should be normally removed in order to avoid movement of products during transportation.

4.4 起吊起动电抗器时, 如有包装箱, 应在包装箱的四下角垫木处挂钢丝绳起吊。如没有包装箱或起动电抗器从包装箱中吊出时, 应同时使用器身上的所有吊板起吊, 且起吊钢丝绳之间的夹角不得大于60°。

While hoisting the starting reactor with packing box, wire ropes shall be hooked on the wood block of four bottom corners of packing box. If the starting reactor has no packing box or starting reactor has been hoisted from packing box, all lifting plates on reactor shall be used, moreover, the included angle between hoisting wire ropes can't be greater than 60°.

五、检查验收 Check and Acceptance

用户收到起动电抗器后, 应立即进行检查。

Please check the reactor as soon as receive it.

5.1 检查产品的铭牌数据与订货合同是否相符, 如产品型号、额定电压、额定电流、额定电抗等。

Check whether the data on the nameplate are consistent with those on the purchase order, such as model, rated voltage, rated current and rated reactance, etc.

5.2 检查出厂文件是否齐全。

Check whether the delivery documents are complete.

5.3 检查包装箱内零部件是否与装箱单相符。

Check if parts and components in packing box conform to packing list.

5.4 检查产品运输过程中有无损伤, 产品的零部件是否损伤和移位, 接线是否松动、断裂, 绝缘是否有破损, 是否有脏物或异物等。同时, 如有运输所使用的垫木等物, 必须把它们挪开。

Check if products are damaged, parts and components of product are damaged or displaced, wiring is loose or ruptured and insulation is damaged or if there are dirty matters or foreign matters. Meanwhile, wood blocks for transportation must be removed.

5.5 产品开箱检查完毕, 如不立即投入运行, 则必须重新包装好, 并把它放在户内安全的地方, 以防损防盗。

After checking, the products must be re-packed and put in indoor safe place if they are not put into operation in a moment in order to prevent damage and theft.

六、运行前试验 Test before Operation

6.1 绕组直流电阻的测试。

Test DC resistance of the windings.

6.2 检查电抗器的铁心是否真正地接地, 检查穿心螺杆的绝缘是否良好。

Check if the steel-core of reactor is completely grounded and check if insulation of through screw is good.

6.3 绝缘电阻测试。一般情况下, 绕组绝缘电阻可满足如下值:

Measurement of insulation resistance; in normal conditions, insulation resistance of winding can meet following value:

相一地 $\geq 100M\Omega$ 。

Phase-ground $\geq 100M\Omega$

如果是在比较潮湿的环境条件下, 起动电抗器的绝缘电阻值会有所下降。一般地, 若每1000V额定电压, 其绝缘电阻值不小于2M Ω (一分钟25°C时的读数), 就能满足运行要求。但是, 如果电抗器遭受异常潮湿发生凝露现象, 则无论其绝缘电阻如何, 在其进行耐压试验或投入运行前, 必须进行干燥处理。

Under humid conditions, insulation resistance of reactor will drop slightly. Generally, operation requirements can be met if insulation resistance is not less than 2M Ω (reading in one minute under 25°C) per 1000V rated voltage.

However, if dew appears due to abnormal moisture, drying treatment is required prior to withstand voltage test or putting into operation no matter how the insulation resistance of reactor is.

6.4 外施工频耐压试验。试验电压为出厂试验电压的85%, 历时5分钟。

Applied power frequency withstand voltage test; test voltage is 85% of ex-factory voltage and time is five minutes.

七、安装与运行 Installation and Operation

7.1 将起动电抗器安装于预置有地脚螺栓的平面基础上, 地脚螺栓数量不得少于四只, 螺母紧固后应采取防松措施。

The starting reactor shall be installed on the flat foundation where foot screws are pre-laid. Number of foot screws can't be less than 4 and looseness prevention shall be taken after screw nuts are fixed.

7.2 将起动电抗器底座上的接地螺栓与接地母排可靠连接。

Grounding bolt on base of starting reactor shall be reliably connected with grounding bus-bar.

7.3 选择需要的运行分接, 将分接头按规定要求调到相应的位置。

Choose operating tap, the tap shall be adjusted to the relevant position.

7.4 将起动电抗器端子按控制系统设计要求连接于控制柜主回路中。

Connect the terminals of starting reactor to the main circuit of control cabinet according to the design requirements of control system.

7.5 起动电抗器为间歇短时运行工作方式，每次起动的连续运行时间为60秒，允许连续启动次数为2次，连续启动2次后应间隔120分钟后方可再次启动。起动电抗器控制系统应按此设定整定时间，并须经空载试运行合格。

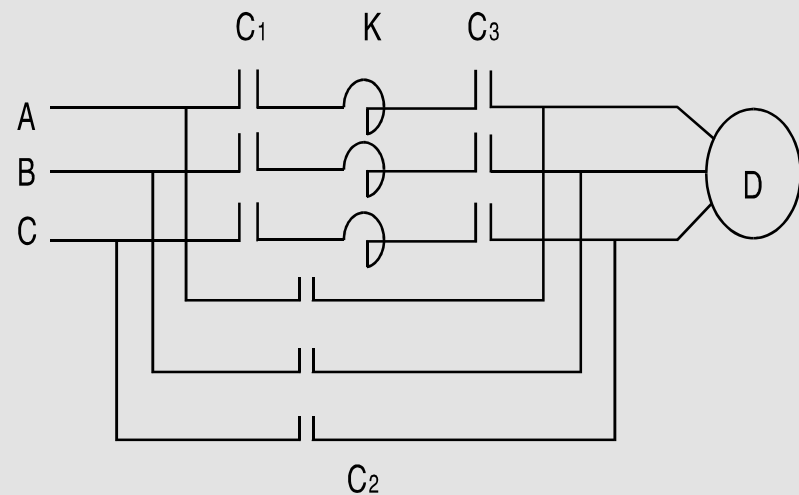
The working mode of the starting reactor is interval and short time, the continuous operating time is 60 sec for each time of starting. 2 times of continuous starting is allowed. Another starting is allowed after these two times in 120 min. The controlling system of starting reactor shall be set time according to this principle and shall be qualified with the no load trial operation.

7.6 检查上述操作完全正确、起动电抗器整体无任何异常、所有异物均彻底清除后，起动电抗器可投入试运行。

The starting reactor can be put into operation after checking and confirming that above operations are perfectly correct, there is no any abnormality for starting reactor and all foreign matters are completely removed.

7.7 电动机启动完成后，必须将电抗器脱离运行状态。否则将导致烧毁电抗器线圈的严重后果。建议采用如下线路连接电抗器，启动结束后，C2闭合，C1、C3断开。

When the starting process of the motor is finished, the reactor must be divorced from the condition of operating. Otherwise, it will cause serious consequence (the coil of the reactor will be burnout). The circuit below is recommended to be adopted to connect the reactor, after the starting process is finished, close C2 and cut off C1 and C3.



八、维护与保养 Maintenance

为了保证起动电抗器能正常运行，需对它进行定期检查和保养。

In order to ensure normal operation of starting reactor, periodical maintenance is required.

8.1 一般地，在干燥清洁的场所，每年或更长一点时间进行一次检查；在其它场所，例如可能有灰尘或化学烟雾污染的空气进入时，每三至六个月应进行一次检查。

Generally, inspection shall be carried out in each year or even longer in dry and clean locations; inspection shall be carried out every 3~6 month in other locations with dust or chemical smoke pollution.

8.2 检查时，如发现有过多的灰尘聚集，则必须清除，以保证空气流通和防止绝缘击穿，特别要注意清洁起动电抗器的绝缘子、绝缘垫块、绕组装配的顶部和底部。对通风道中的灰尘，可使用压缩空气吹净。

During inspection, cleaning is required if excessive dust gathering is found in order to assure air circulation and avoid insulation breakdown, especially insulators, insulation blocks and top and bottom of windings of starting reactor. Dust in air ducts can be blown off with compressed air.

8.3 检查紧固件、连接件是否松动，导电零部件及其它零部件有无生锈、腐蚀的痕迹，还要观察绝缘表面有无爬电和碳化现象，必要时应采取相应的措施进行处理。

Check the looseness of fasteners and connectors, rust and corrosion of conductive parts and other parts; moreover, observe creepage and carbonization on insulation surface. Corresponding measures shall be taken if necessary.

九、安全注意事项 Safety Precautions

9.1 起动电抗器安装完毕投入运行之前，对于无外壳的起动电抗器，一般应在起动电抗器的周围安装隔离栅栏，以避免人或物进入发生意外事故。

For starting reactor without enclosure, isolating barrier is usually mounted around it after completing installation and prior to putting into operation in order to avoid occurrence of accidents.

9.2 起动电抗器投入运行以后，禁止触摸起动电抗器主体，以防事故发生。

After putting starting reactor into operation, touching the body of starting reactor is strictly prohibited in order to avoid occurrence of accidents.

9.3 起动电抗器必须在铭牌所标明的允许运行时间内运行。起动电抗器连续运行时间最长不得大于2分钟，连续运行时间达到2分钟或电动机启动结束，须立即切断起动电抗器的电源。

Starting reactor must be operated within the set time which indicated on the nameplate. The maximum continuous operating time of the starting reactor shall be no more than 2 min. Power supply shall be cut off when the starting reactor is operating for 2 min or the starting process of the motor is finished.

9.4 起动电抗器如安装于开关柜内，应按其电压等级留足对地安全距离，并应满足通风要求。

If the starting reactor is installed in switch cabinet, safety distance to ground shall be sufficiently reserved according to its voltage class; moreover, ventilation requirements also shall be met.