



# 树脂绝缘干式铁心消弧线圈安装使用说明书

## Installation Operation and Maintenance Manual Dry-type Steel Core Arc-suppression Reactor

X2100SM

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SUNTEN ELECTRIC EQUIPMENT CO.,LTD.

## 警告！

- 一、对两柱绕组并联的产品，其两柱绕组上的分接位置必须在同一个分接位置。
- 二、对两柱绕组串联的产品，其两柱绕组上的分接必须按接线说明接线
- 三、对短时运行的分接，必须在铭牌所标明的允许运行时间内运行。

## Warning!

- I For products with two parallel windings, the tap positions must be the same.
- II For products with two series windings, their taps must be connected according to the connection instructions.
- III Tap for short time operation must be operated within the allowable running time indicated on the nameplate.

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本说明书适用于额定容量7000kVA及以下、电压等级35kV及以下环氧浇注薄绝缘干式铁心消弧线圈的安装和使用。

This manual applies to the installation and application of dry-type steel core arc-suppression reactor with rated capacity 7000kVA and below and voltage class 35kV and below.

## 一、产品特点 Product Features

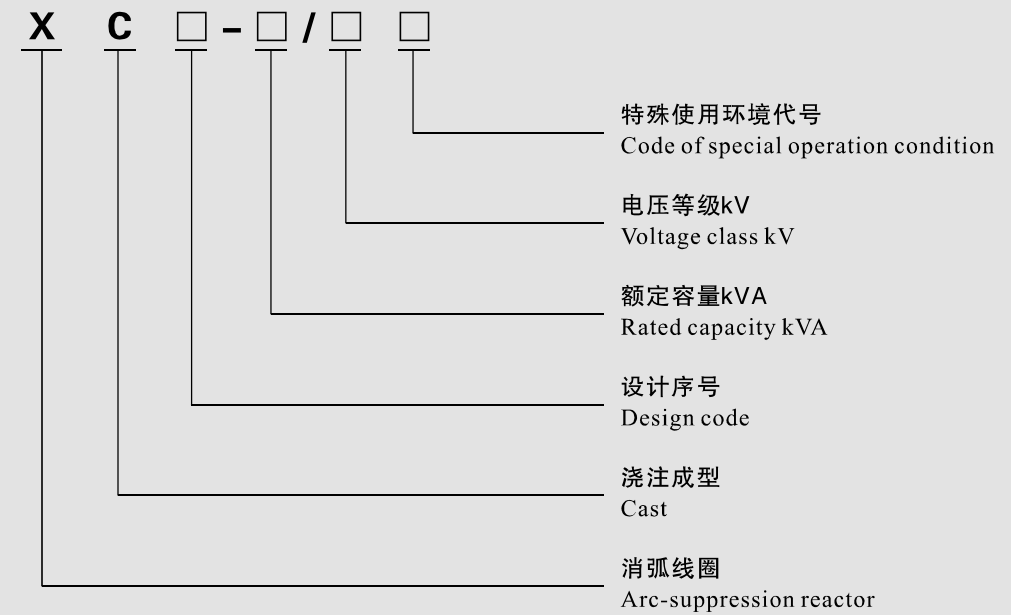
消弧线圈通常连接于接地变压器中性点或大型发电机中性点与大地之间，用于补偿中性点绝缘的系统发生弧光接地故障时产生的容性线对地电流，可降低流过故障点的残流，达到灭弧和消除故障的目的，提高电力系统的运行可靠性。产品符合GB10229《电抗器》、IEC60076-6《电抗器》、JB/DQ2126《消弧线圈》等标准的要求。

Arc-suppression reactor is generally connected between the neutral point of grounding transformer or high-rating generator and ground. It is a single-phase reactor which can compensate the capacitive line-to-ground current caused by the arcing ground fault of isolated neutral system. It can reduce the residual current passing through the fault point, achieve the goals of arc extinction and fault elimination and increase the operating reliability of the power system. The product complies with the standards of GB10229 Reactor, IEC60076-6 Reactor and JB/DQ2126 Arc-suppression Reactor.

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、局放小、机械强度高、节能、体积小、重量轻、防潮、阻燃、噪音低、可靠性高等优点，可广泛应用于输变电系统、电气铁道、冶金等领域，特别是安装空间有限和具有特殊防火要求的城网变电站及地下变电站等场所，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, little partial discharge, high mechanical strength, energy saving, small size, light weight, damp-proof, fire resistance, low noise, high reliability and etc, and can be widely applied to power transmission and distribution system, electric railway, metallurgy, etc, especially to urban network substation and underground substation with limited installation space and special fire prevention requirements, where its advantages of small size, fire resistance can be fully played.

## 二、产品型号说明 Product Type Specification



## 三、使用条件 Operation Conditions

- 3.1 安装地点：户内。  
Installation location: indoors
- 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 1 000m

### 3.6 绝缘等级: F级, 2小时运行温度极限为190°C。

Insulation class: F, the limited temperature for 2 hours operation is 190°C.

### 3.7 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。如果消弧线圈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 $\geq 4\text{米}^3$ /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 arc-suppression reactor is installed in underground room or switch cabinet where space is limited, adequate ventilation is necessary. Generally, 1kW loss requires no less than 4 m<sup>3</sup>/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 起吊消弧线圈时, 如有包装箱, 应在包装箱的四下角垫木处挂钢丝绳起吊。如没有包装箱或消弧线圈从包装箱中吊出时, 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 arc-suppression reactor with packing box, wire ropes shall be hooked on the wood block of four bottom corners of packing box. If the arc-suppression reactor has no packing box or arc-suppression 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

用户收到消弧线圈后, 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、额定容量、额定电压、额定电流等。

Check whether the data on the nameplate are consistent with those on the purchase order, such as product model, rated capacity, rated voltage and rated current, 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 whether 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 whether products are damaged, parts and components of product are damaged or displaced, wiring is loose or ruptured and insulation is damaged or whether 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 检查消弧线圈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 arc-suppression reactor is completely grounded and check if the insulation of through screw is good.

### 6.3 绝缘电阻测试。一般情况下, 主绕组绝缘电阻可满足如下值:

Measurement of insulation resistance; in normal conditions, insulation resistance of the main winding can meet the 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，消弧线圈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 $2M\Omega$ （一分钟 $25^{\circ}C$ 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  $2M\Omega$  (reading in one minute under  $25^{\circ}C$ ) 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。外施工频耐压须按不同绕组的耐压水平分别进行，试验电压为出厂试验电压的85%，历时5分钟。当主绕组接地端连接有互感器时，应先拆除连接线，再分别进行试验。

Applied power frequency withstand voltage test. Applied power frequency withstand voltage shall comply with the withstand voltage of windings. Test voltage is 85% of ex-factory test voltage and time is five minutes. If any instrument transformer is connected with the earth terminal of main windings, dismantle their connection before test.

6.5 变压比测量。

Measurement of transformer ratio.

## 七、安装与运行 Installation and Operation

7.1 将消弧线圈安装于预置有地脚螺栓的平面基础上，地脚螺栓不得少于四只，螺母紧固后应采取防松措施。

Arc-suppression 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 nuts are fixed.

7.2 将消弧线圈底座上的接地螺栓与接地母排可靠连接。

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

7.3 将主绕组首端与变压器或发电机的中性点连接，主绕组接地端可靠接地。若消弧线圈带有二次绕组，则二次绕组应接于相应位置。

Connect the first end of the main winding with the neutral point of the transformer or generator and its grounding end shall be grounded reliably. In case of arc-suppression reactor with secondary winding, the secondary winding shall be connected to corresponding position.

7.4 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.

7.5 将辅助绕组和互感器的输出端子与相应控制电缆连接好。

Connect the output terminals of the auxiliary winding and instrument transformer with the corresponding control cables.

7.6 检查上述操作完全正确、消弧线圈整体无任何异常、所有异物均彻底清除后，消弧线圈可投入试运行。

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

7.7 试运行30分钟无异常后，消弧线圈可投入正式运行。

The arc-suppression reactor can be put into formal operation if there is no abnormality after 30-minute trial operation..

## 八、维护与保养 Maintenance

为了保证消弧线圈能正常运行，需对它进行定期检查和维护。

In order to ensure normal operation of arc-suppression 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，特别要注意清洁消弧线圈的绝缘子、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 arc-suppression 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，导电零部件以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 消弧线圈安装完毕投入运行之前，对于无外壳的消弧线圈，一般应在消弧线圈的周围安装隔离栅栏，以避免人或物进入发生意外事故。

For arc-suppression 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 消弧线圈投入运行以后，禁止触摸消弧线圈主体，以防事故发生。

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

9.3 对两柱绕组并联的产品，其两柱绕组上的分接位置必须在同一个分接位置。对两柱绕组串联的产品，其两柱绕组上的分接必须按接线说明接线。

For products with two parallel windings, the tap positions must be the same. For products with two series windings, their taps must be connected according to the connection instruction.

9.4 对短时运行的分接，必须在铭牌所标明的允许运行时间内运行。

Tap for short time operation must be operated within the allowable running time indicated on the nameplate.

9.5 消弧线圈如安装于开关柜内，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 arc-suppression 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.