

金立公司

WSLD 型

无励磁分接开关

使用说明书

Non-excitative Tap-changer

Installation and Operation Instructions

辽宁金立电力电器有限公司

Liaoning Jinli Electric Power Electrical Appliance Co., Ltd.

欢迎您使用本公司的无励磁分接开关。

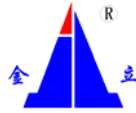
在使用您所购置的无励磁分接开关之前，请务必仔细阅读我公司的使用说明书。
并妥善保管，以备使用中查阅。

谢谢！

You are welcome to use the non-excitative tap-changer produced by our company.

Before using the non-excitative tap-changer, which you have bought, please be sure to read these instructions given by our company carefully for you to refer to in course of using the product.

Thanks!



注 意 Precautions

本开关属无励磁分接开关，无励磁分接开关严禁带电切换。

需要变换无励磁分接开关位置时，必须首先确认变压器已经断电。

This switch belongs to the non-excitative tap-changer, therefore strictly forbid live-line switching. If need to change the position of the non-excitative changer, first must confirm that the power supply for the transformer has been cut off.

为确保变压器的安全运行，控制器在使用中必须与变压器高压断路器组成连锁，连锁接线柱 X1、X2 与高压断路器常闭接点串联，Y1、Y2 与高压断路器合闸线圈的控制接触器线圈串联。

In order to ensure the safe operation of the transformer, the controller during the using must form interlocking with the primary cut-off of the transformer, the interlocking wiring terminals X1, X2 should be connected in series with the normally closed contact of the primary cut-out, Y1, Y2 should be connected in series with the coil of the control contactor of the closing coil of the primary cut-out.

*** 接线示意图详见控制器使用说明书.**

一：概述 General Description

WSLD 系列无励磁分接开关为笼型结构，不带油室，可直接垂直安装在变压器油箱内。

WSLD Series Non-excitative tap-changer belongs to a cage-like structure without oil container, which can be directly installed in the oil tank of the transformer.

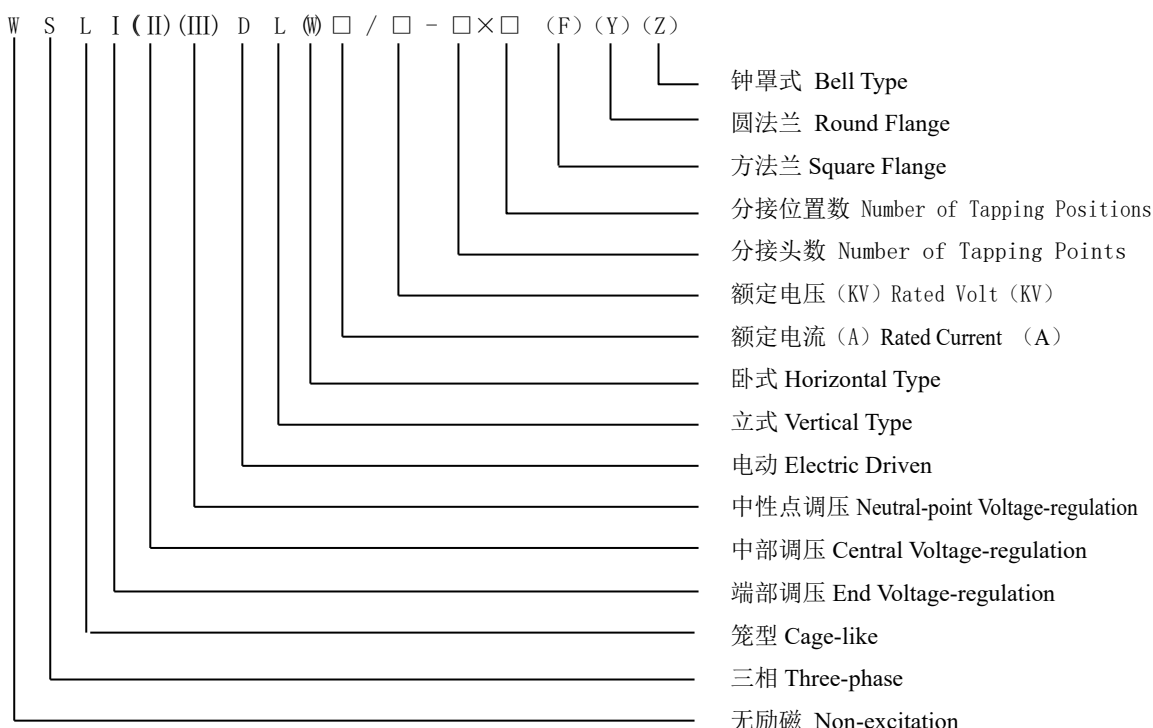
按照其外形结构的不同，开关可分为立式、钟罩式、卧式三种。

According the different outline structures, the switch can be divided into vertical, bell and horizontal types.

本说明书包括了电动机构式无载开关的使用及安装所需的全部资料。

This service manual includes all the information needed for installing and operating the electric-driven organ type no-load switch.

1.1 型号含义如下：The meanings of the types are as follows:



1.2 开关用途和适用范围 Use and Applicable Range of Switch

开关适用于最大电流为 200A、300A、400A、630A、800、1000A，额定电压为 10kv、35kv 的油浸式电炉变压器。在无励磁状态下分接调换，可电动操作，也可手动操作。

The switch is suitable for the oil immersed electric furnace transformer with the maximum electric current of 200A, 300A, 400A, 630A, 800A, 1000A and the rated voltage of 10kv, 35kv. It can carry out the tap-changing, can operated with motor or hand and the condition of non- excitation.

1.3 开关额定使用条件 The rated service condition

开关在油中使用温度不高于 100℃，不低于-25℃；

开关在空气中存放，周围温度不高于 40℃，不低于-25℃，且不能受潮；

开关安装倾斜度在变压器上不超过 2%；

开关使用场所应无腐蚀性、爆炸性气体。

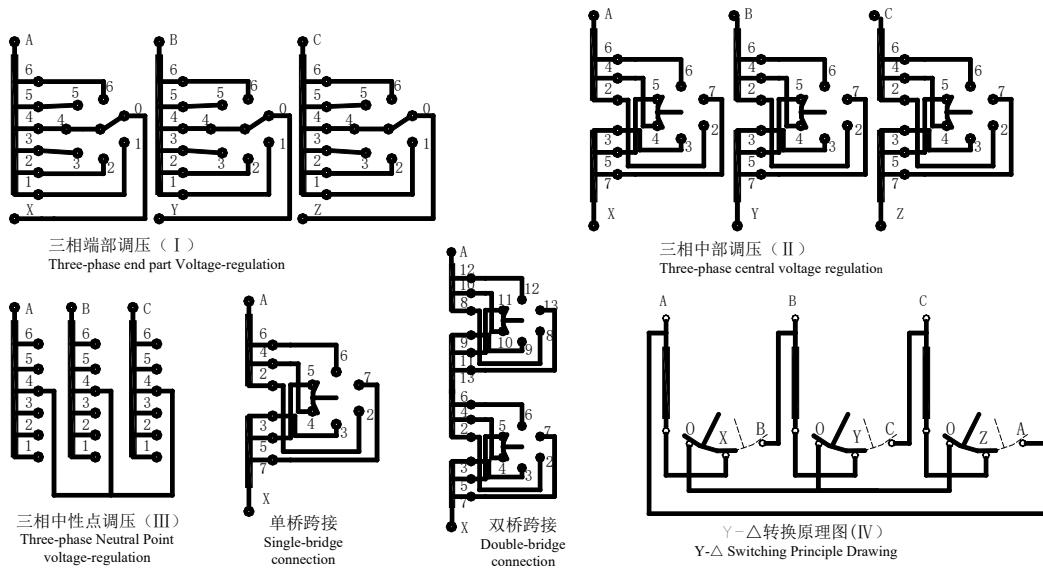
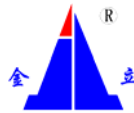
When the switch is used in the oil, the temperature shall be not higher than 100℃ and not lower than -25℃；

When the switch is stored in the air, the ambient temperature shall not higher than 40℃ and not lower than -25℃ and shall be away from humidity.

The mounting declivity of the switch on the transformer shall not be over 2%；

The switch should be used where there is no corrosive or explosive gas.

二：开关工作原理及常规基本接线图 Working Principle and Conventional Basic Wiring Diagram of the Switch



三：开关技术要求 The technical requirement of the switch

- 3.1 电动无载开关与电动机构连接后进行 500 次操作循环实验，无任何机构故障；
 - 3.2 分接开关法兰装配好后，应进行密封实验，在 $2 \times 10^5 \text{Pa}$ 压力下不渗漏；
 - 3.3 无励磁分接开关的额定耐压。
- 3.1 Connect the electric driven no-load switch with the motor device, then carry out the cyclic experiment of operating for 500 times and there should be no organic failure;
 - 3.2 Having installed the flange for the tap-changer, should carry out the seal experiment and there should be no leakage at the pressure of $2 \times 10^5 \text{Pa}$;
 - 3.3 The rated voltage of the non-excitative tap-changer.

注：在绝缘强度 35KV 变压器油中 Note: in the transformer oil at the insulating strength of 35KV contact

额定电压 Rated Voltage KV	接线方式 Wiring Method	工频耐受电压 1min Power frequency withstand Voltage 1min			触头接触电阻 $\mu\Omega$ Contact contacting resistance $\mu\Omega$
		对地 To earth	相间 Interphase	触头间 Between Contacts	
10	Y 接	42	10	10	$\leq 350\mu\Omega$
	Δ 接	42	42	18	$\leq 350\mu\Omega$
35	Y 接	95	35	12	$\leq 350\mu\Omega$
	Δ 接	95	95	30	$\leq 350\mu\Omega$

四：开关主要规格和技术数据 Main Specification and Technical Data of Switch

4.1 立式开关方法兰外形结构图及安装尺寸 (如图 - 表)

Outline-structural Drawing and Mounting Dimension of the Square Flange of the Vertical Type Switch

图 1.

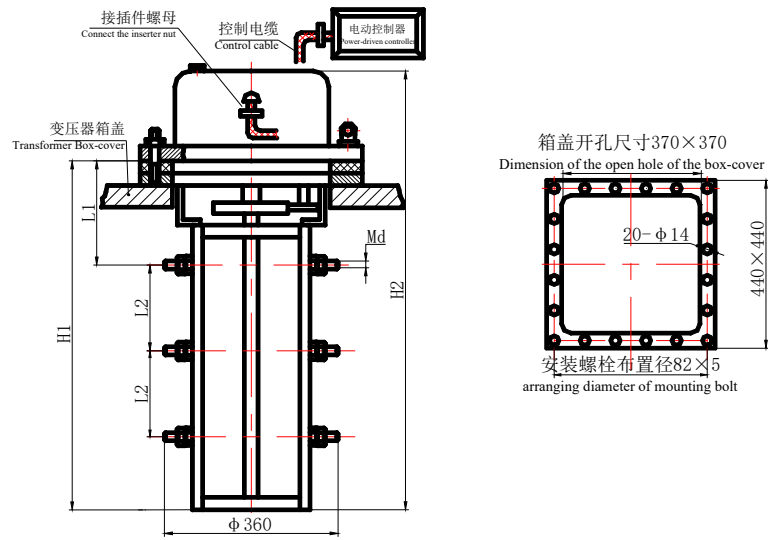
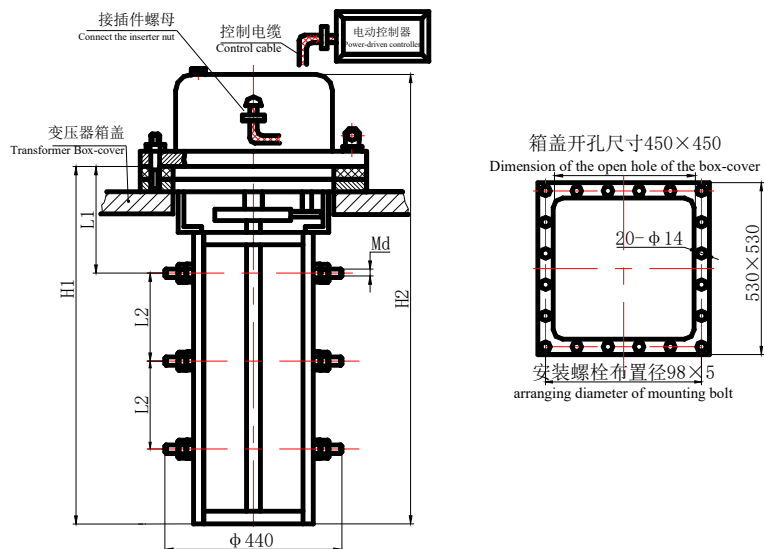


表 1

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安 装 尺 寸 Installation Dimension			
			L1	L2	H1	H2
WSL II DL200~400/10-6×5~10×9 F	10	中部 Centralpart	210	110	540	720
WSL III DL200~400/10-5×5~10×10 F	10	中性点 Neutral Point	210	110	540	720
WSL II DL630~800/10-6×5~10×9 F	10	中部 Centralpart	230	130	610	790
WSL III DL630~800/10-5×5~10×10 F	10	中性点 Neutral Point	230	130	610	790
WSL II DL200~400/35-6×5~10×9 F	35	中部 Centralpart	275	170	710	890
WSL III DL200~400/35-5×5~10×10 F	35	中性点 Neutral Point	275	170	710	890
WSL II DL630~800/35-6×5~10×9 F	35	中部 Centralpart	300	195	810	990
WSL III DL630~800/35-5×5~10×10 F	35	中性点 Neutral Point	310	200	815	990

图 2



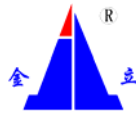


表 2

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL II DL200~400/10-11×10~14×13 F	10	中部 Centralpart	210	110	540	720
WSLIIIDL200~400/10-11×11~14×14 F	10	中性点 Neutral Point	210	110	540	720
WSL II DL630~800/10-11×10~12×11 F	10	中部 Centralpart	230	130	610	790
WSLIIIDL630~800/10-11×11~12×12 F	10	中性点 Neutral Point	230	130	610	790
WSL II DL200~400/35-11×10~14×13 F	35	中部 Centralpart	275	170	710	890
WSLIIIDL200~400/35-11×11~14×14 F	35	中性点 Neutral Point	275	170	710	890
WSL II DL630~800/35-11×10~12×11 F	35	中部 Centralpart	300	195	810	990
WSLIIIDL630~800/35-11×11~12×12 F	35	中性点 Neutral Point	310	200	815	990

4. 2 立式开关圆法兰外形结构图及安装尺寸
Outline Structural Drawing and Mounting Dimension of Round Flange of Vertical Type Switch

图 3

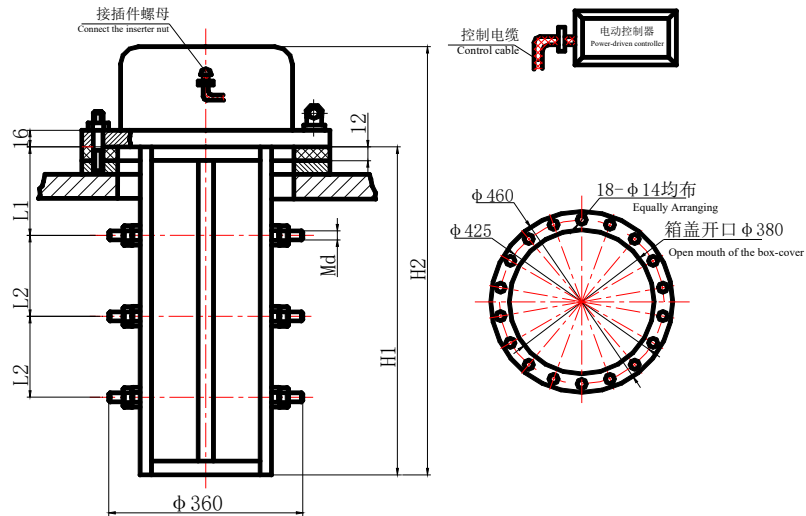


表 3

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL II DL200~630/10-4×3~10×9 Y	10	中部 Centralpart	150	110	480	716
WSLIIIDL200~630/10-5×5~10×10 Y	10	中性点 Neutral Point	150	110	480	716
WSL II DL800/10-6×5~10×9 Y	10	中部 Centralpart	170	130	550	786
WSLIIIDL800/10-5×5~10×10 Y	10	中性点 Neutral Point	170	130	550	786
WSL II DL200~630/35-6×5~10×9 Y	35	中部 Centralpart	210	170	650	886
WSLIIIDL200~630/35-5×5~10×10 Y	35	中性点 Neutral Point	210	170	650	886
WSL II DL800/35-6×5~10×9 Y	35	中部 Centralpart	240	195	750	986
WSLIIIDL800/35-5×5~10×10 Y	35	中性点 Neutral Point	240	195	750	986

图 4

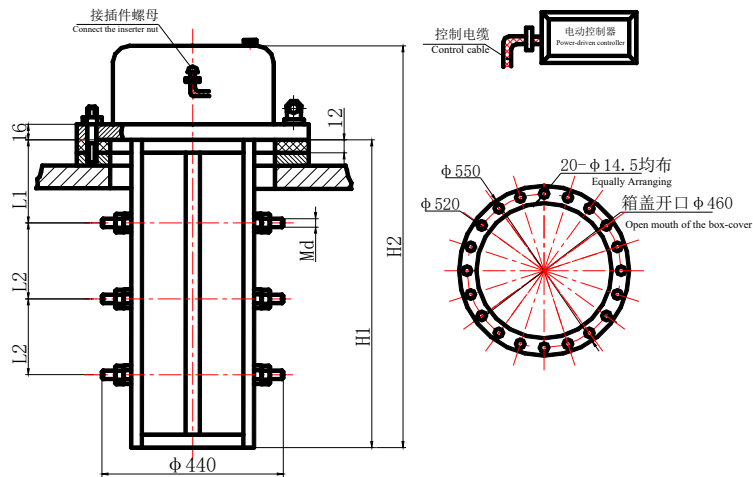


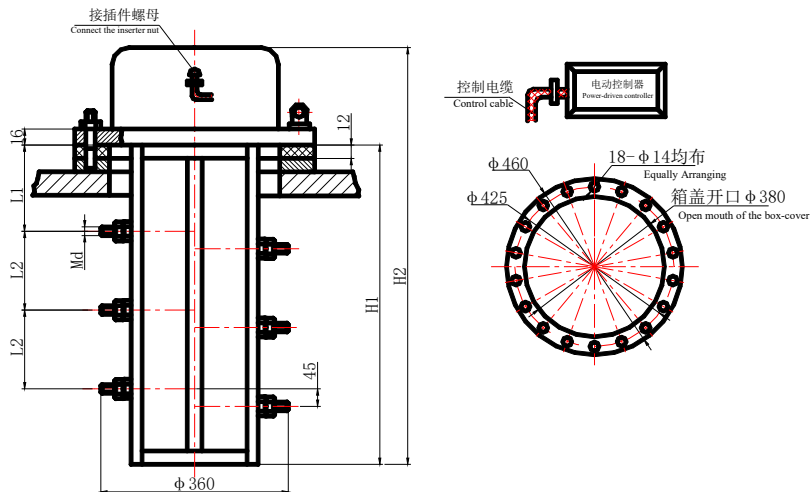
表 4

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL II DL200~630/10-11×10~14×13 Y	10	中部 Centralpart	150	110	480	716
WSL III DL200~630/10-11×11~14×14 Y	10	中性点 Neutral Point	150	110	480	716
WSL II DL800/10-11×10~12×11 Y	10	中部 Centralpart	170	130	550	786
WSL III DL800/10-11×11~12×12 Y	10	中性点 Neutral Point	170	130	550	786
WSL II DL200~630/35-11×10~14×13 Y	35	中部 Centralpart	210	170	650	886
WSL III DL200~630/35-11×11~14×14 Y	35	中性点 Neutral Point	210	170	650	886
WSL II DL800/35-11×10~12×11 Y	35	中部 Centralpart	240	195	750	986
WSL III DL800/35-11×11~12×12 Y	35	中性点 Neutral Point	240	195	750	986

WSDL I (端部) 立式笼形分接开关

WSDL I (End Part) Vertical Type Cage-like Tap-changer

图 5



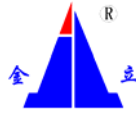


表 5

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL I DL 125~630/10-5×5~8×8 Y	10	端部 End Part	150	110	480	716
WSL I DL 125~630/10-9×9~11×11 Y	10	端部 End Part	150	150	600	836
WSL I DL 125~630/35-5×5~8×8 Y	35	端部 End Part	210	170	650	886
WSL I DL 125~630/35-9×9 Y	35	端部 End Part	210	210	780	1016

图 6

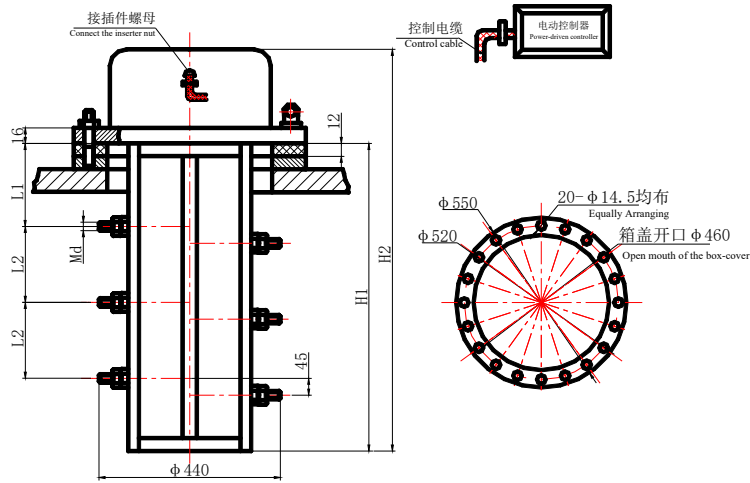


表 6

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL I DL 200~630/10-10×10~13×13 Y	10	端部 End Part	150	150	600	836
WSL I DL 630/10-10×10~13×13 Y	10	端部 End Part	150	150	600	836
WSL I DL 200~400/35-10×10~13×13 Y	35	端部 End Part	210	210	780	1016
WSL I DL 630/35-10×10~11×11 Y	35	端部 End Part	210	210	780	1016

WSLD IV (Y-△转换) 立式笼形分接开关

WSLD IV (Y-△ Switching) Vertical Type Cage-like Tap-changer

图 7

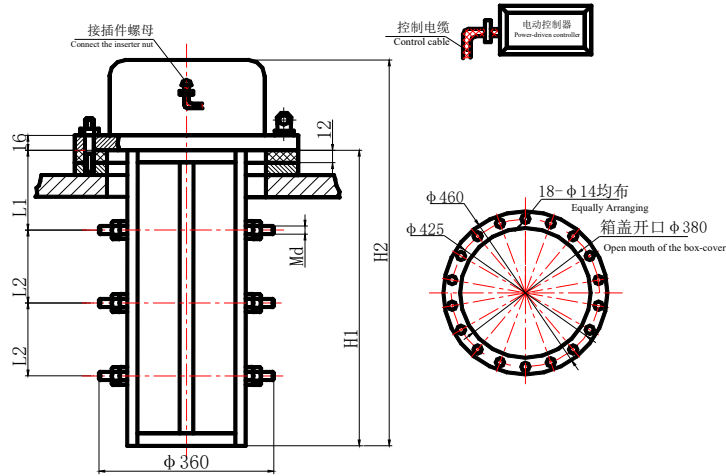


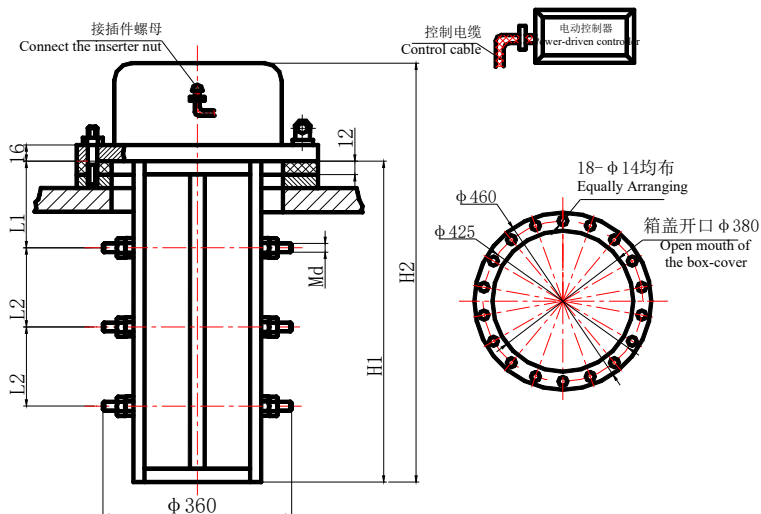
表 7

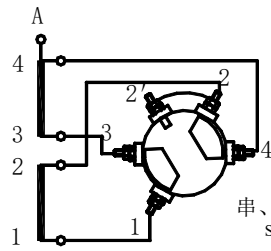
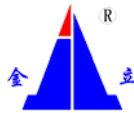
开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSLIVDL200~630/10-2×2 Y	10	Y-△	150	110	480	716
WSLIVDL800/10-2×2 Y	10	Y-△	170	130	550	786
WSLIVDL200~630/35-2×2 Y	35	Y-△	210	170	650	886
WSLIVDL800/35-2×2 Y	35	Y-△	240	195	750	986

WSLD V (串-并联) 立式笼形分接开关

WSLD V (Series-parallel) Vertical Type Cage-like Tap-changer

图 8





串、并连接线原理图（以A相为例）
Series-Parallel Wiring Principle Drawing
(Take A-phase as an example)

表 8

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H1	H2
WSL V DL200~630/10-4×2 Y	10	串-并联 Series-Parallel	150	110	480	716
WSL V DL800/10-4×2 Y	10	串-并联 Series-Parallel	170	130	550	786
WSL V DL200~630/35-4×2 Y	35	串-并联 Series-Parallel	210	170	650	886
WSL V DL800/35-4×2 Y	35	串-并联 Series-Parallel	240	195	750	986

钟罩式电动笼形开关外形结构图及安装尺寸

Outline Structural Drawing and Mounting Dimension of Bell-Type Power-Operated Cage-like Switch

图 9

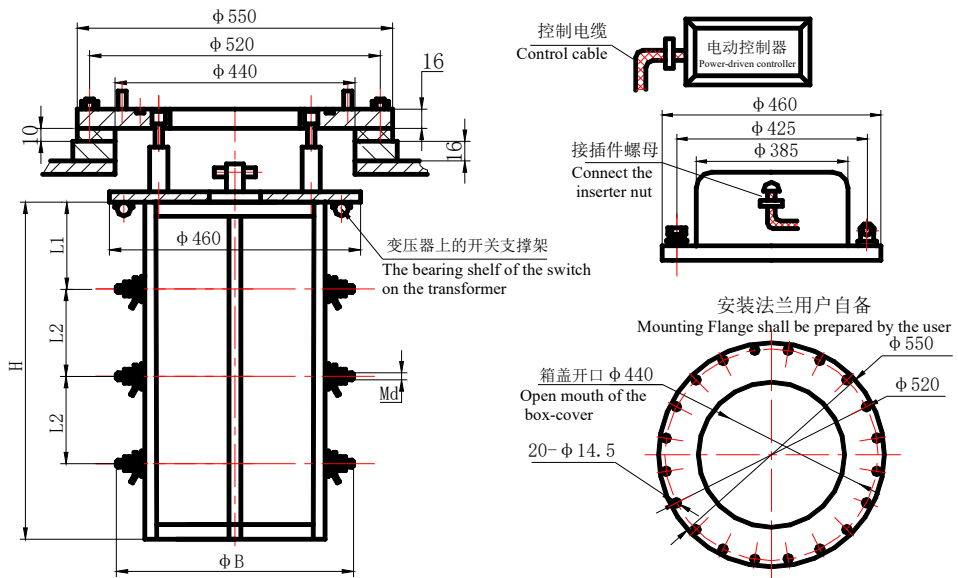


表 9

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H	B
WSL II DL200~630/10-6×5~12×11 Z	10	中部 Centralpart	150	110	480	360
WSL II DL200~630/10-13×12~14×13 Z	10	中部 Centralpart	150	110	480	440
WSL III DL200~630/10-5×5~12×12 Z	10	中性点 Neutral Point	150	110	480	360
WSL III DL200~630/10-13×13~14×14 Z	10	中性点 Neutral Point	150	110	480	440
WSL II DL200~630/35-6×5~10×9 Z	35	中部 Centralpart	210	170	650	360
WSL II DL200~630/35-13×12~14×13 Z	35	中部 Centralpart	210	170	650	440

续表 9

开关型号 Switch type	额定电压 Rated Voltage KV	调压部位 Position of Voltage-regulation	安装尺寸 Installation Dimension			
			L1	L2	H	B
WSLIII DL200~630/35-5×5~12×12 Z	35	中性点 Neutral Point	210	170	650	360
WSLIII DL200~630/35-13×13~14×14 Z	35	中部 Centralpart	210	170	650	440

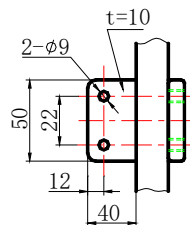
以上图示中 In the above figures

250A 以下 (含 250A) Md=M12

400A Md=M16

630A Md=M18

800A~1000A 开关接线端子



五：开关出厂附如下文件及配件 The switch leaves the factory, attached the following documents and fittings:

- 5.1 产品合格证、产品装箱单、开关使用说明书、控制器使用说明书；
- 5.2 电缆线（15 米）、控制器电源线、手柄、法兰密封垫，以装箱单为准。
- 5.1 Product Qualification Certificate, product packing list, switch service manual, controller service manual;
- 5.2 Cable wire (15m), Controller Power-Wire, handle, flange seal, taking the packing list as standard.

六：安装方法 Installation Method

6.1 安装前的检查：

- 6.1.1 检查开关的规格与变压器设计要求是否相符，随机送达的合格证、使用说明书、装箱单等技术文件是否齐全；
- 6.1.2 检查开关各部件有无缺损和变形；
- 6.1.3 分接开关出厂时都置于中间档的位置，接上电源后，看一下数码块显示与开关的档位是否相符；
- 6.1.4 操作一个循环，检查机构有无卡滞和损伤现象，触头工作位置是否与位置指示装置所指示的位置相同；

6.1 Inspection before the installation

- 6.1.1 Check the switch specification to see if it is in accordance with the design requirement of the transformer or not; if the qualification certificate service manual and packing list attached to the machine are all available or not;
- 6.1.2 Check all the parts of the switch to see if there is lack or damage or deformation with them or not;
- 6.1.3 When the tap-changers leaving the factory, they are all in the neutral position; when switching on the power supply, please take a look at the digit display to see if it is in accordance with the switch grade-position or not;
- 6.1.4 Having operated a cycle, please check the device to see if there is any obstruction or damage, if the working position of the contact is the same as the position indicating device indicates or not;

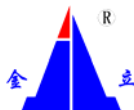
6.2 开关在变压器上的安装：

6.2.1 立式开关安装方法

安装前应清洁所有的密封表面，并在变压器安装法兰上放置耐油密封垫，然后将开关缓慢吊入变压器箱体中，整个吊装过程中，应避免损坏开关接线端子，在确认开关的安装位置正确无误后，才可将开关固定在变压器安装法兰上。

6.2.2 卧式开关安装方法

- a) 安装前应清洁所有的密封表面；



- b) 依次拆下开关连接法兰上的圆螺母、垫圈，将开关连接法兰穿过变压器箱盖开孔 $\phi 61$ 处 (O 型密封圈在箱下)，调整好位置后回装所有拆件，然后将开关本体尾部的弯板，与变压器的焊接螺栓 $M12 \times 120$ mm 连接固定；
- c) 开关传动部分与开关本体的位置调整后，将传动部分的连接套与开关本体上的传动轴连接固定，最后将传动底盘的四个支柱按正确位置焊于变压器上部。

6.2 The installation of the switch on the transformer;

6.2.1 The mounting method of the vertical-type switch

Before installing, should clean all the seal surfaces, and put the oil-resistant packing seal on the transformer mounting flange, then slowly suspend the switch into the transformer box, in the course suspending and mounting the switch, should avoid damaging the connecting terminal of the switch; Only when you have confirmed that the mounting position is all right, can you fix the switch on the mounting flange of the transformer.

6.2.2 The Installation Method of Horizontal-type Switch:

- a) Before in stalling, should clean all the sealed surfaces;
- b) Successively remove the round nut, spacing ring from connecting flange of the switch, let the connecting flange of the switch go through the position of $\phi 61$ (O Type spacing ring is under the box-cover) of the open hole of the transformer box-cover; having regulated the position well, re-install all removed parts, then connect and fix the bent plate of the tail of the switch-body with the transformer welding bolt $M12 \times 120$ mm;
- c) Having adjusted the position of the switch driving part and the switch body well, connect and fix the connecting sleeve of the driving part with the driving axle on the switch body, at last, weld the four supporting pillar of the driving chassis onto the upper part of the transformer according to the correct position.

6.2.3 钟罩式开关安装方法

- a) 将开关垂直放置，拆去顶盖法兰；
- b) 拆下连接中间法兰与支撑法兰的螺钉，取下中间法兰，注意保存好拆下的零部件；
- c) 将开关吊起，支撑法兰放置在变压器的支撑架上，调整支撑法兰与顶盖法兰的相对位置，加以固定；
- d) 起吊钟罩式箱盖，罩住变压器，清洁密封面，装好密封垫，将中间法兰固定在变压器的安装法兰上；
- e) 清洁中间法兰密封面，装好密封垫，最后装上顶盖法兰。

6.3 电源线的连接由无励磁电动开关控制器说明书提供，

电缆线的航空插头（12 档及以下用二十针、以上用 26 针）与开关连接，另一端与控制器连接。

6.2.3 The Installation Method of Bell-type Switch

- a) Put the switch vertically, remove the top-cap flange;
- b) Remove the screw nail connecting the middle flange with the supporting flange, remove the middle flange, take care to look after the removed components;
- c) Suspend the switch up, put the supporting flange on the supporting shelf or the transformer, adjust the relative position of the supporting flange and the top-cap flange well and then fix them.
- d) Suspend the bell-type box-cover to make it cover the transformer, clean the sealed surfaces, install the packing seal, fix the middle flange onto the mounting flange of the transformer;
- e) Clean the sealed surface of the middle flange, install the packing seal an at last mount the top-cap flange.

6.3 The connection method of the power source wire shall be provided in the service manual of the non-excitative tap-changer controller, the cable of the air plug (use the 20 needle for the stage-positions under Grade 12 and use the 26 needle for the stage-positions up Grade 12) shall be connected to the switch at one end, and to the controller at the other end

七：维护 Maintenance

7.1 各润滑部分应保证良好，特别是当开关干燥后，应将开关本体部分及时浸入变压器油。

在开关的头部即传动部分的蜗轮蜗杆处，拨槽盘与拨槽件接触处应涂上 甘油润滑脂。

7.2 转动部位经常保证转动灵活。

7.3 密封处应密封良好，不得有渗油现象。

7.4 保持传动机构内部清洁。

7.1 All the oil sides should be kept fine, especially when the switch is getting dry, should inject oil into it in time.

- 7.2 The rotating parts should be dept running smooth.
- 7.3 The sealed places are kept sealed well without leaking.
- 7.4 Keep the inside of the driving device clean.

八：检修 Checking and Repairing

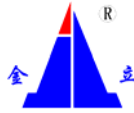
- 8.1 无励磁分接开关与变压器检修周期相同。
- 8.2 对分接开关的分接准确性、转动灵活性检查。
- 8.3 对触头间接触良好检查。
- 8.4 对各密封件的密封检查及更换。
- 8.1 The non-excitative tap-changer and the transformer have the same period of checking and repairing.
- 8.2 Check the accuracy of the tap-changer and the rotating flexibility of it.
- 8.3 Check the contacting between the contacts to see if it is all right or not
- 8.4 Check the seal of each sealing parts, and replace them in time.

九：故障分析与排除 Analysis and Resolution of the failure

故障现象 Phenomenon of Failure	原因分析 Analyzing the reason	排除方法 Method of Resolution
指示灯不亮，开关不运行 The indicating lamp does not light, the switch does not work.	1. 电源线没接好； 2. 开关不在档位上； 3. 控制器保险丝是否熔断。 4. 控制器损坏。 1. The Power line is not connected well; 2. The switch is not in the right stage-position; 3. The fuse of the controller may be broken. 4. The controller is broken.	1. 接好电源线； 2. 调整档位； 3. 更换保险丝。 4. 更换控制器。 1. Re-connect the power line; 2. Adjust the stage-position; 3. Replace the broken fuse. 4. Replace the controller.
指示灯亮，开关不运行 The indicating lamp lights, but the switch does not work.	1. 电缆线接口是否松动； 2. 控制器是否有问题。 3. 检查开关内航插是否松动,航插两端对应的控制连线是否导通。 1. The interface of the cable may have got loose; 2. The controller is broken. 3. check the switch to see if the inside air-socket has any loosenss;whether the connecting wire of the cottesponding number of air-socket conducts	1. 接好电缆线； 2. 更换控制器。 3. 接好连线。 1. Connect the cable well; 2. Replace the controller. 3. Connect the cable well;

十： 开关使用注意事项: Matters Needing Attention on Using the Switch

- 10.1 为确保变压器的安全运行，控制器在使用中必须与变压器高压断路器组成连锁，连锁接线柱 X1、X2 与高压断路器常闭触点串联，Y1、Y2 与高压断路器合闸线圈的控制接触器线圈串联；
- 10.2 使用环境温度:空气中-25℃~40℃,油中-25℃~100℃；
- 10.3 安装场所应无爆炸与腐蚀性气体；
- 10.4 分接开关组装前，一定要检查分接开关是否符合变压器型号要求，以免造成不应有的损失；
- 10.5 分接开关端子引线不得使分接开关受力变形，且引线与运动部件留有间隙（一般为 10 mm）以免运动阻滞；
- 10.6 分接开关应随同变压器同时进行干燥处理，干燥后必须检查紧固件是否松动，若发现松动时，必须重新紧固及止退防松；
- 10.7 干燥后，必须将触点滴上变压器油后方可运行,否则会破坏镀银层；
- 10.8 当防护罩上的航空插头不使用时，请将航插保护罩安装好，防止其受潮，使航插损坏。
- 10.9 开关随变压器出厂及用户使用时，务必将防护罩及航插防护罩安装好，防止进水，使开关电气部分受潮。
- 10.1 In order to guarantee the safe operation of the transformer, the controller in using must form the interlock with the primary cut-out of the transformer, the terminal stub of the interlockX1, X2 should connect in series with the normally closed contact of the primary cut-out, Y1, Y2 should connect in series with the controlling contactor coil of the closing coil of the primary cut-out.
- 10.2 The using ambient temperature: in the air: -25℃~40℃, in the oil: -25℃~100℃；
- 10.3 There should be no explosive or corrosive gas in the installation place;
- 10.4 Before assembling the switch, you have to check the tap-changer to see if it is in accordance with the requirement of the transformer type so as to avoid causing the loss that should not happen;



- 10.5 The terminal leading wire of the tap-changer may not make the tap-changer get stressed and deformed, and there should be a gap between the leading wire and the moving part (usually it is 10mm) so as to avoid blocking the movement.
- 10.6 The dry treatment of the tap-changer and the transformer should be taken at the same time; having finished the dry, treatment, must check to see if the fastening parts are loose or not ; if so, must re-fasten them and protect them from regressing in order to resist them getting loose.
- 10.7 After drying, must drop some transformer oil on the contacting points, otherwise you may not let the tap-changer operate.
- 10.8 When the air socket on the protective shelter is not used, please install the protective shelter of the air socket well to protect it from getting wet.
- 10.9 When the switch leaves the factory together with the transformer, be sure to install the protective shelter and the protective shelter of the air socket well in order to avoid water entering and causing the electric part to be getting wet.

十一：开关操作方法 Operating Method of Switch

需要变换电动无励磁开关分接位置时，必须首先确认变压器已经断电。

我公司无励磁开关的控制器设有接线端子，该接线端子与变压器断路器的辅助接点相连接，当断路器处于闭合位置时，电动机构不能操作。

11.1 电动操作

确认变压器断电后，按动控制器的升压或降压按钮，开关就能从一个分接位置变换到下一个分接位置，完成一次分接变换。

11.2 手动操作

- a) 立式开关：确认变压器断电后，旋出防护罩上升、下降指示盘下面的螺塞，插入手柄后按指示转动完成升压降压，当档位指示箭头与档位数字盘上的中心相对应时，则停止转动手柄。抽出手柄，旋入螺塞，完成一次分接变换。
- b) 卧式开关：确认变压器断电后，将防护罩拆去，插入手柄后转动完成升压降压，当档位指示箭头与档位数字盘上的中心相对应时，则停止转动手柄。抽出手柄，回装防护罩，完成一次分接变换。

When you want to change the tap-changing position of the non-excitative switch, first must confirm that the power supply of the transformer has been cut off.

The controller of the non-excitative switch produced by our company has the connecting terminal, which connects with the auxiliary contacting point of the circuit breaker of the transformer, when the circuit breaker is in the closing position, the power-driven device can not operate.

11.1 Power-driven Operation

Having confirmed that the power supply has been cut off, push the voltage-rising or voltage falling button, the switch can transfer from one tap-changing position to another one, so you have completed one tap-changing procedure.

11.2 Manual Operation

a) Vertical-type Switch:

Having confirmed that the power supply of the transformer has been cut off, unscrew the screw-plug under the rising, falling indicating board of the protective shelter; put in the handle and then, according to the indication, turn it to complete voltage rising or falling; when the indicating arrow of the stage-position and the center of the digit board of the stage-position are corresponding to each other, should stop turning the handle. Pull out the handle and screw the screw-plug, so you have completed one tap-changing procedure.

b) Horizontal-type Switch:

Having confirmed that the power supply of the transformer has been cut off, remove the protective shelter, put in the handle and then turn it to complete voltage rising or falling; when the indicating arrow of the stage-position and the center of the indicating board of the stage-position are corresponding to each other, stop turning the handle. Pull out the handle. Re-install the protective shelter, so you have completed one tap-changing procedure.

使用和订货须知 Rules for Using and Ordering

用户应对运行及维修情况做好记录，如有特殊情况，请随时与我厂联系，以便于互相交流运行和维修的经验。

用户在遵守保管及使用规则下，由于制造质量的原因而发生损坏或不能正常工作的情况，制造厂可无偿的为用户进行修理。

控制器的电缆线一般为 15 米，有特殊要求，在订货时向我公司提出。

我公司将以优质的产品、优良的服务、优惠的价格，竭诚为用户服务。

The user should record the condition of the operation and repairing, if there is anything special, please contact our factory at any time, so that we can exchange experiences on operation and maintenance.

If the user has obeyed the protective and using rules, the switch has been broken or can not work normally because of the problem of the product quality, the manufactory will repair it for the user without pay.

The cable of the controller is 15m normally; if you have a special requirement, please inform our company when ordering the goods.

Our company will whole-heartedly serve the user with our high-quality product, favorable price and complete after-sale service.

如有订货及特殊要求请与我公司技术部联系！

If you want to order the goods and have special requirement, please contact the Technical Department of our company!

辽宁金立电力电器有限公司

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