

JY 型有载分接开关在线净油装置
Oil Filter-Unit of On-Load Tap-Changer Type JY

使用说明书

Operating Instructions

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1 BRIEF INTRODUCTION

This product is mainly used for circulating filtration of insulation oil in transformer on-load tap-changers oil compartment.

During the normal operating of a transformer, the On-line Oil Filter of JY Series On-Load Tap-Changer can be used to effectively remove free carbon; metal particles of the insulation oil in the on load tap changer oil compartment etc. other impurities and reduce trace moisture to make the cleanliness of insulation oil reach to Level NAS3-4. Thus it can reduce the abrasion of parts in on-load tap-changer oil compartment, increase the insulation level of the insulation oil and relevant insulation components, reduce the interruption maintenance times and improve the operation reliability of the on-load tap-changer.

The insulation oil on-line oil filter of JY-A on load tap changer adopts Siemens control technologies and elements, it has three operating ways: automatic, manual and timing start; the work time can be set optionally, and its operating parameters can be recorded and indicated; this product is provided with a reliable filter element failure alarm sensor which can automatically stop the system after filter element failure; an automatic constant temperature control heater is installed in the box ensures to remove the moisture so that can ensure the product can work normally under the high and low temperature conditions; the filter element is produced by Italy FILTRECSRL Group and meets related seven international standards.

2 TECHNICAL DATA

| | | | |
|--|--|---------------------------------|-------------------------------------|
| Rated service pressure | 0.5MPa | Rated service flow | 10L/min |
| Motor power | 0.18kW | Power supply | Three-phase 380V/50Hz/5A |
| Accuracy of impurity filter element | 1 μ m β 1 (C) \geq 1000 | Water content in insulation oil | \leq 20ppm (\leq 20mg/L) |
| Heater power | 50W | Medium temperature | -45 $^{\circ}$ C ~ 115 $^{\circ}$ C |
| Oil inlet and outlet | DN15 | Overall dimension (mm) | 225 \times 500 \times 730 |
| Protection degree | IP55 | Total weight | 85kg |

3. INSTALLATION AND DEBUGGING

3.1 Preparations before installation

(1) Connection tube: determine the length and geometric curvature of the connection tube

based on specific location of the site.

(2) Pre-embedding wire: power wire BVV1.5mm²×10.

(3) Fixed base: make the fixed base on the back of the on line oil filter of on load tap changer, and the specific size is in Appendix C Structural Diagram.

3.2 Installation

(1) Fix the equipment on the base firmly, oil inlet and outlet port on the equipment respectively connected with the oil outlet and inlet port of the on load tap changer. Make sure it must be cleaned after connection tube welded, and do not confuse the oil inlet and outlet port.

(2) Contacts 1,2,3,4 of terminal X1 are connected with external three phase power supply L1, L2, L3 in turn; contacts 5 (AC/220V5A) and 6 of terminal X1 are connected with the contacts of oil filter in the control mechanism; contacts 7 and 8 of terminal X1 output the operation signals of the oil filter (normally closed in operation); contacts 9 and 10 of terminal X1 output failure alarm signals of filter element (normally closed in failure). The output signals by contacts 7, 8, 9, 10 of Terminal X1 are connected with other devices in the control room to indicate the operation status and filter element failure alarm.

Description of Terminal X1

| | | | |
|----------------------------|--|---|--|
| Contact No. of Terminal X1 | 1, 2, 3 | 4 | 5, 6 |
| Content | Three-phase power supply input 380v/50Hz, 5A | Neutral line | Contacts of oil filter in motor drive mechanism are connected. |
| Contact No. of Terminal X1 | 7,8 | 9,10 | Notes: 1. The neutral line of Contact 4 of the connector must be connected reliably. 2. Contact 5 of on-line oil filter is powered with AC220V voltage. |
| Content | Output: operating signals of oil filter | Output: filter element failure alarm signal | |

3.3 Operate and start operation program

(1) Start the operation program: close the oil filter pump circuit breaker-Q1 and air switch of "control power supply"; the PHE indicator light of phase reversal relay will show green and red, which means the power supply is correct; at this time LOGO! will run the duplication program, means the program starts normally. The screen displays:

| |
|---|
| Current equipment status: _____operating status! |
| Total operation times: h m |

(2) Set clock: set the LOGO! clock after the equipment starts, otherwise the timing operation way will not work. Press keys ▼ and ESC on LOGO!. The screen displays:

| |
|----------------|
| Stop |
| Set parameters |
| → Set. . |
| Program name |

Press key ▼ or ▲ on LOGO!, so that the “→” on LOGO! screen can point to the instruction of "Setup. . ", then press the key of OK on LOGO! to make sure opening the instruction of "Setup. . ", choose the "Clock" instruction and press the key of OK on LOGO! for confirmation, then the clock setting mode will appear:

| |
|------------|
| Set clock |
| Mo 15: 30 |
| YYYY-MM-DD |
| 2008-01-27 |

Press ▼ and ▲ on LOGO! to choose weeks, press ◀, ▶ to move the cursor to the next location; press ▼ and ▲ on LOGO! to set and change the time and date; finally press the key of OK on LOGO! for confirmation, press ESC twice to quit the program, and press the ▲ to return to the state of display page.

(3) Debugging and commissioning: select the manual operation way; connect the PVC hose to the outlets of valves 5 and 6 respectively according to the requirement of installation diagram, insert the other end of the hose into a spare transformer oil barrel, shut off valves 3 and 4 on the inlet and outlet ports of on load tap changer, open valves 5, 6, 1 and 2, press the manual operation button to start the conveyance pump, meanwhile open the air bleeding plug on the filter seat till transformer oil overflows, then screw up the air bleeding plug, remove the gas in the equipment after ten minutes operation, press the system stop button to stop the conveyance pump, after shut off vales 5 and 6, open valves 3, 4 on the inlet and outlet ports of on load tap changer to keep the system in standby status.

It is forbidden to start the equipment while the stop valves of oil inlet and outlet ports are closing, otherwise it will cause the overflow of transformer oil and equipment damage.

Put the equipment into operation only after bleed the air in the equipment, otherwise the gas entering the on load tap changer may cause the gas relay in the on load tap changer alarming.

4 ELECTRIC CONTROL INSTRUCTIONS

The equipment has three operating ways: timing operation, manual operation and automatic operation, and only one operation way can be selected in equipment operation. The three operation ways can be converted by turning "Operation way" knob on the control panel.

4.1 Timing operation: turn the operation knob to select the timing operation way, at the time the screen will display:

| |
|---|
| Current equipment status: Timing operating status! Total running: times h m |
|---|

The equipment is set to operate at 9: 00-11:00 every morning when leave the factory, it will be automatically started and stopped during this time, the timing operation will stop immediately and will operate after 60s if the on load tap changer performing the voltage regulation in this period.

The manual operation button is failure when the timing operation, the system can be stopped at any time by the system stop button.

4.2 Manual operation: turn the operation knob to select the manual operation way, and then the screen will display:

| |
|---|
| Current equipment status: Manual operation status! Total running: times h m |
|---|

Press the manual operation button and the system will run; if the on load tap changer is performing voltage regulation, the manual operation will stop immediately and continue to run after 60 seconds. The system can be stopped at any time by the system stop button. The maximum manual operation time is 2 hours in order to ensure the safety operation.

4.3 Automatic operation: turn the operation knob to select the automatic operating way, and then the screen will display:

| |
|---|
| Current equipment status: Automatic operating status! Total running: times: h m |
|---|

The automatic operation program will start after the on-load tap-changer performs voltage regulation for 60 seconds, then stop after running for 30 minutes (when the equipment is delivered, the automatic operation time was set for 30 minutes). If the on load tap changer performs the voltage regulation again during automatic operation of the system, the automatic operation will stop immediately, it will be restarted after 60 seconds and then stop after a total operation time of 30 minutes.

The manual operation button is failure when the automatic operation, and the system can be stopped at any time by the system stop button.

Special notes: if the equipped on load tap changer is not provided with independent motor drive mechanism, or cannot provide a pair of passive normally open contacts for on load tap changer action, the "automatic" way of on-line oil filter will not work.

4.4 Check operation parameters: the LOGO! screen will display:

```
Current equipment status:
Automatic operating status!
Total running:      times
                  h  m
```

Press ▼ and ESC on LOGO!, and the screen will display:

```
Stop
→Set parameters
Set. .
Program name
```

Press ▼ on LOGO!, so that the “→” on LOGO! screen can point to the instruction of "Set parameters", then press OK on LOGO! to confirm, the screen shows the parameters set by the system, and press ▲, ▼ to flip and find the parameter address block; for example, the screen will display as following:

```
B36
TH=02: 00h
TL=00: 00S
Ta=00: 00
```

Function Block B36 shows the total length of time set for timing operation; press ◀, ▶ to select the parameters to be changed after press OK; press ▲, ▼ to change the numbers in TH=02: 00h so as to change the time of timing operation.

```
B06
T=02: 00h

Ta=00: 00h
```

Function Block B06 shows the time set for manual operation; press ◀, ▶ to select the parameters to be changed after press OK; press ▲, ▼ to change numbers in T=02: 00h so as to change the time of manual operation.

```
B10
T=30: 00m

Ta=00: 00
```

Function Block B10 shows the time set for automatic operation; press ◀, ▶ to select the parameters to be changed after press OK; press ▲, ▼ to change numbers in T= 30: 00m so as to change the time of automatic operation.

| |
|------------|
| B40 |
| on=1 |
| off=100000 |
| Cnt=0 |

Function Block B40 shows that under the automatic operation mode, the switch voltage regulation operates for n times, and the oil filter operates for one time, press ◀, ▶ to select the parameter to be revised after press OK, and press ▲, ▼ to revise the number on=1(which is set as the switch voltage regulation operates for one times, and the oil filter operates for one time when the product leaves the factory) that the switch voltage regulation for n time, the oil filter operates 1 time can be changed when it performs the automatic operation! The Off and Cnt parameters can not be revised.

| |
|------------|
| B34 |
| D=MTWTFSS |
| ON=09: 00 |
| Off=09: 01 |

Function Block B34 shows the setup of timing operation time, press ◀, ▶ to select the parameter to be revised after press OK, and press ▲, ▼ to delete or restore the character of MTWTFSS on D=MTWTFSS (MTWTFSS are the initial characters from Monday to Sunday), so as to determine on which day it shall operate in the week. ON stands for the starting time of timing operation, and the set time of “Off” must be longer than the set time of “On” for one minute. Any of the above set can be confirmed by pressing the OK key and restored by pressing the ESC key for two times and pressing the ▲ key.

5 FAILURE OF FILTER ELEMENT

The two level filter elements of the equipment are both equipped with differential pressure transmitter, when the filter element fails, the differential pressure transmitter will automatically send out a signal to LOGO!, the filter element failure procedure stored in LOGO! will stop all the operation modes. the impurity filter element or dewater filter element alarms after failure, the screen displays as follows:

Attention:
The impurity filter element is failed!
Please change the impurity filter element!
Now the equipment is stopped!

Or

Attention:
The dewater filter element is failed!
Please change the water filter element!
Now the equipment is stopped!

Or

Attention:
The impurity and dewater filter elements are both failed!
Please change the filter element!
Now the equipment is stopped!

At the same time the corresponding impurity filter element alarming or the indicator of dewater filter element is on which are on the control panel. The No. 9 and 10 contacts inside the X1 terminal will output the filter element failure alarming signal to the central control room for warning the user to stop the operation program and change the impurity or moisture filter element. After the filter element is changed, press the manual operation button and system stop button at the same time to unlock internal stored system lock program of LOGO! to restore the procedure.

6. MAINTENANCE

6.1 Equipment Maintenance: In order to ensure the service life and safety operation of the equipment, check the equipment everyday in the first ten days of operation, and after the initial ten days' operation, regular check shall be carried out once a week. If there's any operation noise or leakage is detected in the check, the equipment shall be stopped immediately for treatment. When the equipment is operated for rather a long time, the relevant filter element shall be replaced while the differential pressure alarming occurs.

6.2 The operation of oil sampling: First select the mode of manual operation, and then take the oil sample from the sampling valve of oil filter.

6.3 Oil Supplement Operation: First select the mode of manual operation, close the valve 3 and valve 4 of the oil inlet and outlet ports of on load tap changer according to the mounting diagram, use PVC tubes to connect the outlet port of valve 5 and valve 6, and put the other end of these two tubes into the spare use and qualified transformer oil tank, open the valve 5 and valve 6, select the manual operation mode to bleed the air in the PVC tube and equipment, open the valve 3 and then close valve 5 to carry out the oil supplement operation, after the oil supplement is finished, open the valve 4 and close the valve 6, and

then remove the PVC tube.

6.4 Filter Element Replacement: The system program will automatically closed and warn the user to dispose after the filter element failure. First select the manual operation mode to quit the procedure and cut off the power, close the stop valve on the inlet and outlet pipelines as well as valve 1 and valve 2 inside the oil filter, and then replace the filter element which needs to be replaced according to the alarming indication. It's better to perform the installation when the new filter element is filled with qualified transformer oil, finally switch on the power to start the program per the requirements of 3.3. The new filter element shall undergo 4 hours' drying treatment under the temperature of $90 \pm 5 \text{ }^\circ\text{C}$, especially for the dewater filter element.

Note: When the system pressure remains above 0.5Mpa or the water content of oil keeps high, even the system does not alarm, it also needs to find out the reason and eliminate the fault immediately, and the impurity filter element or the dewater filter element shall be replaced under necessary condition.

6.5 Temperature and Humidity Control: In order to ensure that the equipment operates under a constant temperature, prevent the condition of condensation, the equipment is installed with temperature and moisture control device. After the air switch of temperature control is closed, the constant temperature controller starts to work. The starting control point of temperature is 5°C and reset at 10°C , and the starting control point of condensation is $<93\%\text{RH}$.

7 FAULTS ANALYSIS

| Faults | Description | Recovering Measures |
|--|--|--|
| Operating button is failure | Operating program is closed Not selecting manual operation mode | Start operating program Select manual operation mode |
| Impurity and dewater filter alarms | The filter element is jammed The oil temperature is low Air is deposited in the filter element | Replace the filter element To naturally disappear due to oil temperature raising Bleed the gas by opening the relevant air valve |
| The equipment stops operating after being started The filter element alarms | The filter element is jammed | Replace the filter element |
| Vibrating, Noise | Close the stop valve on the pipeline The filter is jammed The oil temperature is low | Open all the stop valves on the pipeline Replace the filter element To naturally disappear due to oil |

| | | |
|---|--|---|
| | The system is over pressure | temperature raising Check whether the pipe is unblocked or not |
| Heavy gas operation of the equipped on load tap changer | Failed filter element in the tap-changer is blocked or the arrangement of steam pipe which close to the failed pipeline is improper so that lead to turbulent flow | Check the tap-changer Change the filter element Bleed air from the air relay of tap-changer Check the pipeline Set the operation mode as "Timing" |

8. NOTICE FOR USER

The user is under the condition of complying with the rules of keeping and operation, the equipment is damaged or can't work normally because of the quality problem, the manufacturer will replace or repair the equipment for free within 12 months from the date of installation or not exceeding a term of 18 months after it is delivered to the user from manufacturing factory

Note: Non-professionals are strictly prohibited to dismantle the equipment, if there's any problem, please contact with the manufacturing factory.

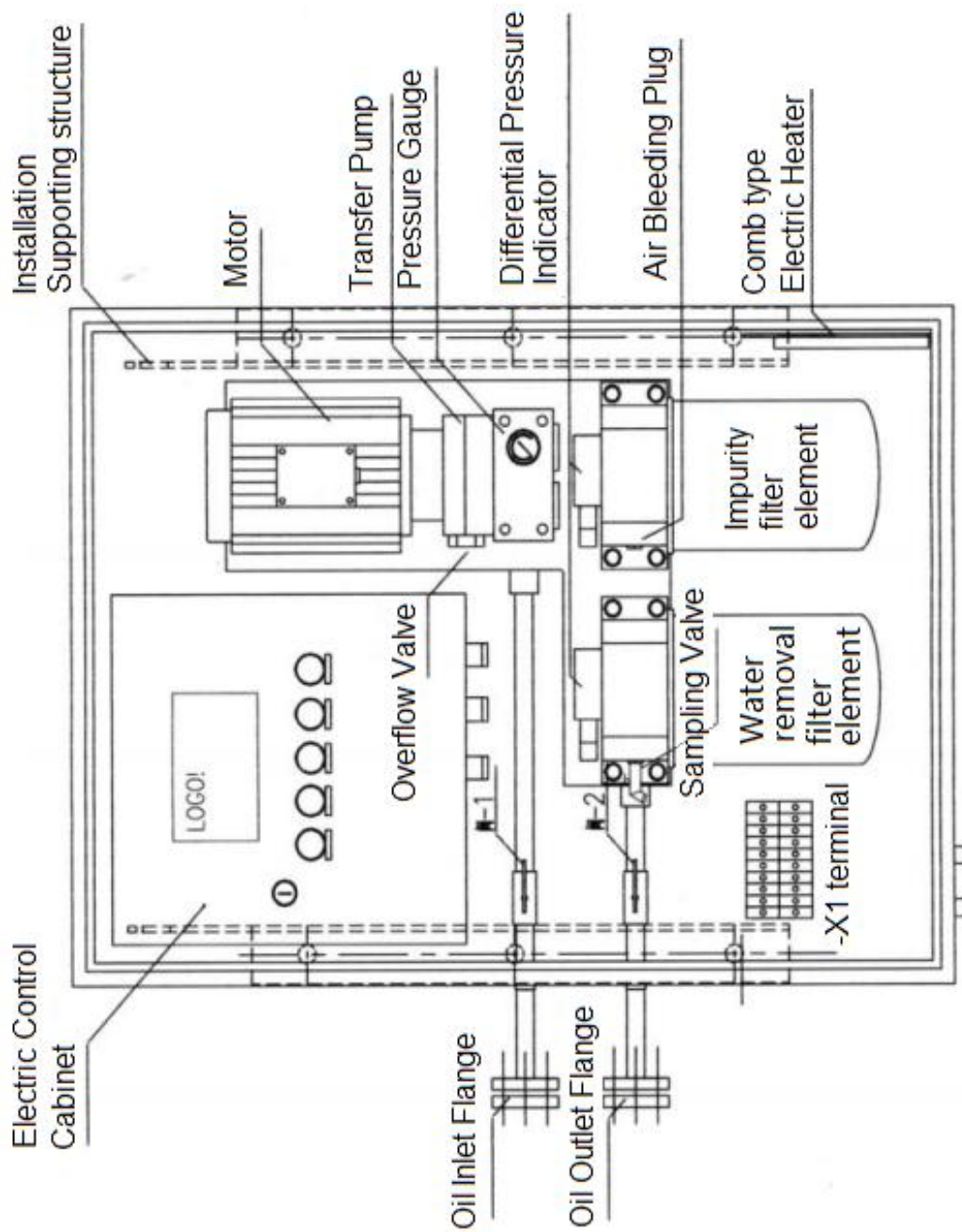
9 APPENDIXES

9.1 Appendix A Structural Diagram

9.2 Appendix B Installation Diagram

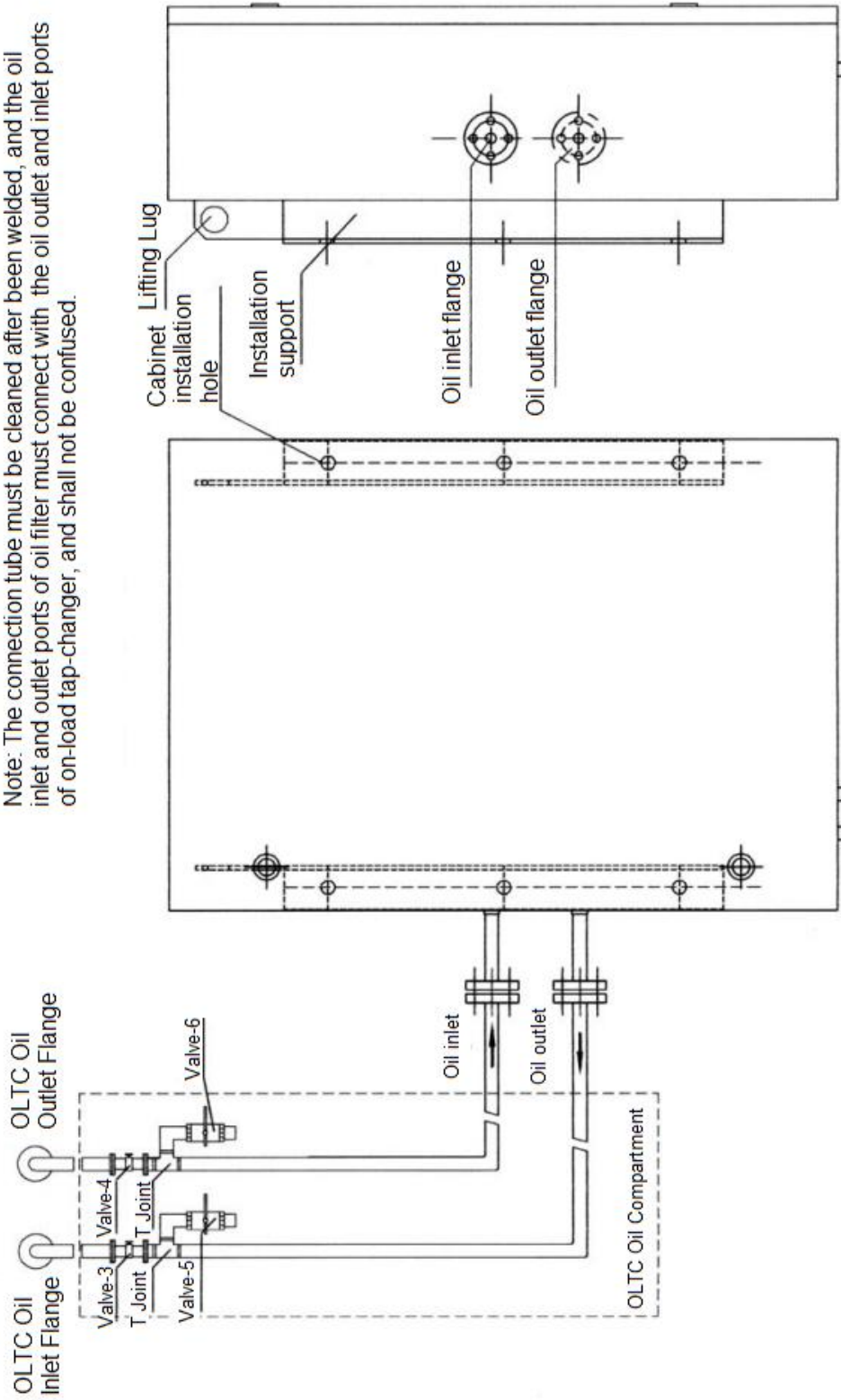
9.3 Appendix C Outline and Installation Dimensional Drawing

9.4 Appendix D Circuit principle Diagram

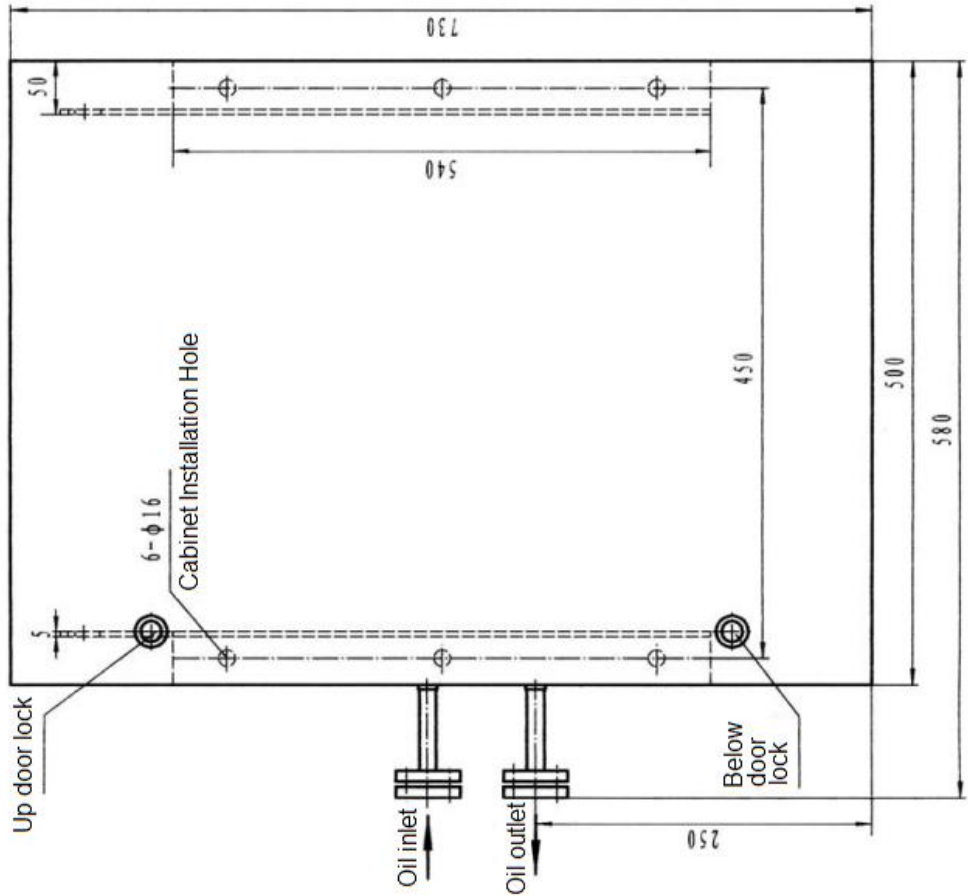
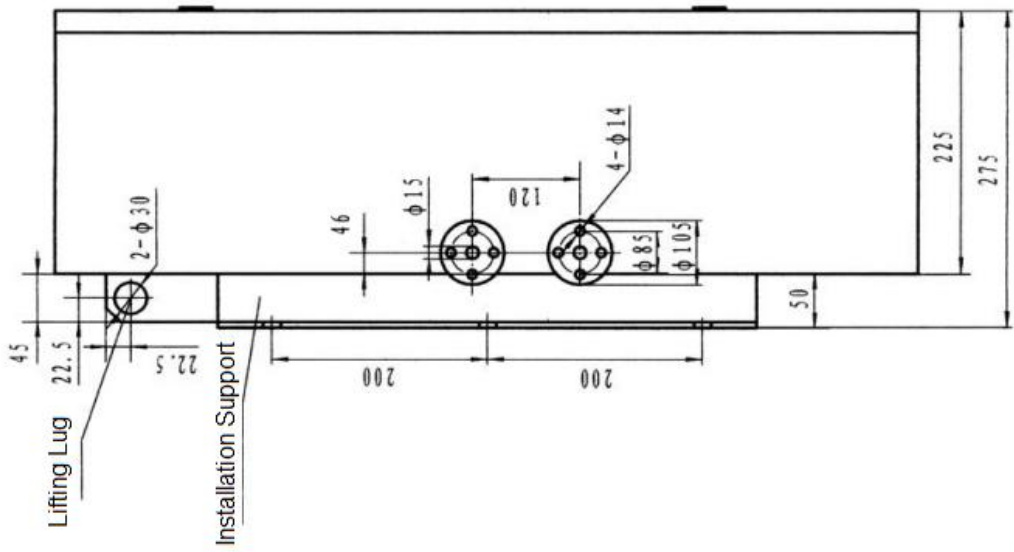


Appendix A: Structural Diagram

Note: The connection tube must be cleaned after been welded, and the oil inlet and outlet ports of oil filter must connect with the oil outlet and inlet ports of on-load tap-changer, and shall not be confused.



Appendix B Installation Diagram



Appendix C Outline and Installation Dimension Drawing

贵州长征电气有限公司

GUIZHOU CHANGZHENG ELECTRIC CO., LTD.

通讯地址：贵州省遵义市汇川区武汉路临1号

Address: 1# Wuhan Road, Huichuan District, Zunyi City, Guizhou Province

邮政编码：563002

Zip Code: 563002

电 话：0851-28623327 28626552 28623251

Tel: 0851-28623327 28626552 28623251

传 真：0851-28637558 28620567

Fax: 0851-28637558 28620567

电子信箱：czdqgyxs@126.com

Email: czdqgyxs@126.com

网站(Web): [Http: //www.gzcz.net.cn](http://www.gzcz.net.cn)