BENEFO® 百利®

For   Q/12YJ4290

GB/T14048.11

TQ30V(D) series Automatic Transfer Switch
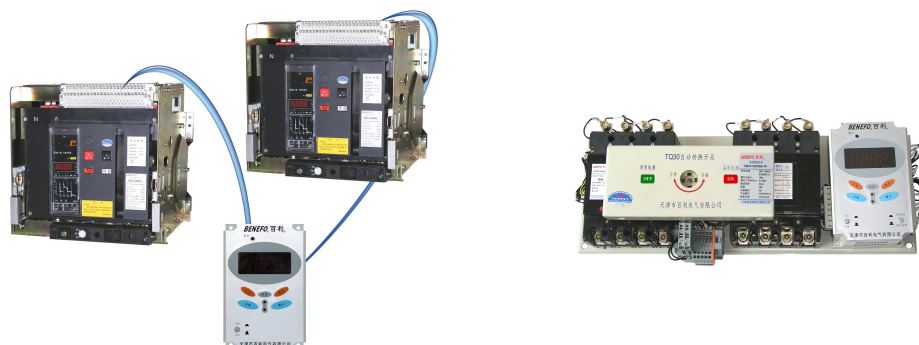
USER MANUAL

ISO9001 Certificate

Chinese CQC Certificate

CHINA·TIANJIN BENEFO ELECTRIC CO.LTD.

1.Application ATS (hereinafter short as switch) is used to double power supply system,both of which has the rated working voltage of AC400V,50Hz .The switch can finish auto transition function without manual operation.This product performs the standards of GB/T14048.11-2002 and IEC60947-6-1:1998(1 2 verion) low-voltage swichgear and controlgear Part 6-Automatic transfer switching equipment and following articles.

Actuating system has reliable electrical interlocking and mechanical interlocking. In order to avoid making the double power supply .

The switch transfer the load from the nomal power supply to the standby power supply in the target time,when the nomal power supply has phase failure and under-voltage failure .If the nomal power supply come back , the load will be transfered from the standby power supply to the nomal power supply.

According to the your requires you can set the value of the over-voltage and the under-voltage.

2.Products Essentials

TQ30V(D) series ATS is the V new products which base on many years design experience and the latest technology.The product combine the controller which has the microchip micro-controller with the innovated software program control method and the newly operating device with several patents perfectly.Intelligent controller adopt LED display ,which can supply a favorable interlocutory interface for the costumers.The switch operated easily is an ideally incorporate ATSE.As the same time, the series inaugurate epoch of ATS directs to intelligent , modularization,network.It is the firse choise from domestic same products.

 Small volume,mechanism simple,novel appearance.

Specifies from 1A -6300A.2,3,4 poles are all supplied.

ATS transfer reposefully drive by AC motor without noise.

The controller can protect motor effectively,improve security of power supply.

Transfer system has relliable electrical and mechanical interlocking, in order to avoid making the double power supply .

Three steady working states:nomal power supply closing and standby power supply opening; power supply opening and standby power supply closing;power supply opening and standby power supply opening;

Two installation types :

Control loop adopts connecting terminal ,convenient installation and safty.

The operation circuit-breaker of TQ30V(D) series ATS under frame circuit 2000A are TM30 series MCCB.ATS can be transfered by special handle. over frame-circuit 2000A,its operation circuit-breaker is TW30 series ACB.

The virtual value of 6 interphase voltage cycle display, state display,network failure display.

The nomal power supply and the standby power supply can be interconverted according to the customers' require .

The under-voltage value are adjustable for users , 8 grades :180V,185V,190V,195V,200,205V, 210V,215V.

The over-voltage value are adjustable for users , 12 grades :235V,240V,245V,250V,255V, 260V,265V,270V,275V,280V,285V,290V.

T1 and T2 are adjustable for users, 24 grades :0.2S,0.4S,0.6S,0.8S,1S,2S,4S,6S,8S,10S,15S, 18S,20S,25S,30S,35S,40S,45S,50S,55S,60S,80S,100S,120S.

Communication function , long-distance communication ,telecontrol, long-distance debugging ,long-distance testing can come true.

Fire protection function, when the control center for fire protection send control signal to controller,both of the double circuit-breaker will be opening .

Press the manual key to choice the state of the ATS.

When the standby power supply is dynamotor and the nomal power supply has error, auto-startup the dynamotor.

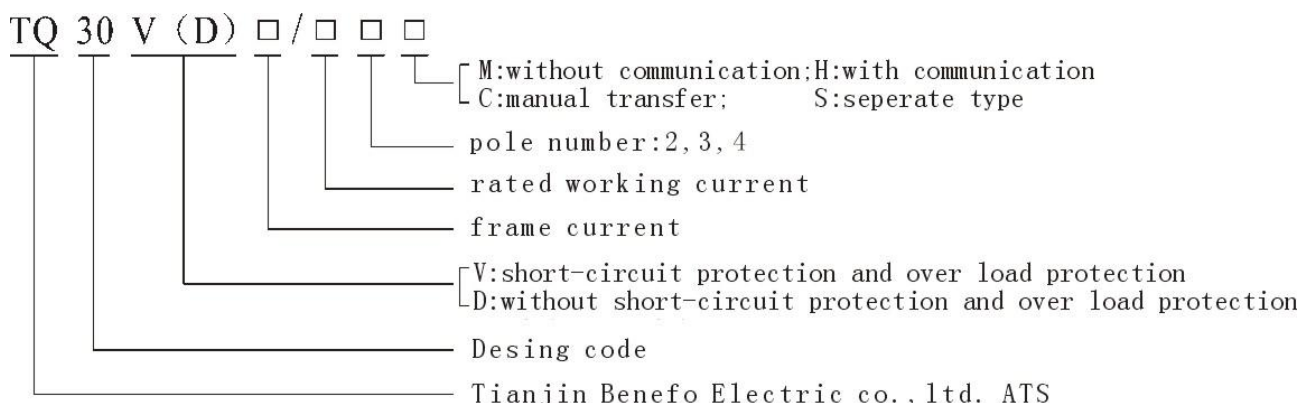### 3.Normal working condition

The elevation isn't above 2000m

The ambient temperature is -5   ~+40   ;if the ambient temperature is above the range , please contact us.

The relative humidity of the air isn't above 50   at the max,temperature of +40   ,it may be higher at the lower temperature .At the same time the lowest average temperature value within this month is+25   ,dew on the switch due to temperature alteration should be removed.

Pollute protection:grade 3

4.Type and meaning

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TQ 30 V (D) □/□ □ □
                     ┌M:without communication;H:with communication
                     └C:manual transfer;      S:seperate type
                     pole number:2,3,4
                     rated working current
                     frame current
                     ┌V:short-circuit protection and over load protection
                     └D:without short-circuit protection and over load protection
                     Desing code
                     Tianjin Benefo Electric co.,ltd. ATS
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5. Structure and performance

5.1 Structure

TQ30V(D) series ATS is composed of   two circuit-breaker,mechanical interlocking and

intelligent controller.whole type and seperate type are two structure.whole type means that controller and processing part install on the same base; seperate type means that controller installs cabinet panel,put processing part installed on the base cabinet inside .the cable 2.0m in length is used to link the two parts.Installration of whole type is divided into fixed type and orbit type.

Between the two circuit-breaker , ATS has reliable electrical interlocking and mechanical interlocking. In order to avoid making the double power supply .

5.2 Controller type

M:LED display and button setting ,long-time delay protection,instantanious protection , the virtual value of 6 interphase voltage cycle display,under-voltage value   over-voltage value   T1,T2 are adjustable,fault memory function,besides you can press button to finish three steady states, automatic transfer and restoration,automatic transfer and without restoration function.because of high precision,steady working performance,So it is widely used in power supply system.

H:besides of M function,controller can realize long-distance communication ,telecontrol, long-distance debugging ,long-distance testing through network card and interface .computer can centralize control and inspect.

5.3 Performance

The controller ceaselessly test the virtual value of interphase voltage,if the value is above 105 ~130   the rated voltage of the power supply (adjustable to users),the controller will cognizance that the power supply has over-voltage fault;if the value is below 80   ~95   the rated voltage of the power supply (adjustable to users),the controller will cognizance that the power supply has under-voltage fault;if the power supply keep the fault state ,the controller will drive the processing part to finish opening and closing in a preconcerted time (adjustable to users).

Working states show in the table 1   2

table 1 automatic transfer and restoration

Normal power supply N	Standby power supply R	Working states
Normal	Normal	Normal power supply N, $Q_N$closing,$Q_R$opening
Normal	Abnormal	Normal power supply N, $Q_N$closing,$Q_R$opening.R abnormally displays
Abnormal	Normal	After T1 delay time,$Q_N$opening,$Q_R$closing.standby power supply . N abnormally displays
Normal	Abnormal	After T1 delay time,$Q_N$opening,$Q_R$opening.
Restore normal	Normal	After T2 delay time,$Q_R$opening,$Q_N$closing,restore normal power supply

table 2 automatic transfer and without restoration

Normal power supply N	Standby power supply R	Working states
Normal	Normal	Normal power supply N, $Q_N$closing,$Q_R$opening
Normal	Abnormal	Normal power supply N, $Q_N$closing,$Q_R$opening.R abnormally displays
Abnormal	Normal	After T1 delay time,$Q_N$opening,$Q_R$closing.standby power supply . N abnormally displays
Abnormal	Abnormal	After T1 delay time,$Q_N$opening,$Q_R$opening.
Restore normal	Normal	Standby power supply

Notes:Q_N indicates the circuit-breaker controls normal power supply

Q_R indicates the circuit-breaker controls standby power supply

T1 indicates the delay time transfer from norml power supply to standby power supply

T2 indicates the delay time transfer from standby power supply to normal power supply

5.4 Control methods

Intelligent controller has three control methods,press the button on the panel to choose:manual control   autocontrol,if customers need ,far-away communication control also can be realised.

5.4.1 Manual control method

Manual control has three methods:normal closing,standby closing,all opening

Both opening: open normal power supply and standby power supply(cycle displayThe virtual value of 6 interphase voltage)

Normal closing: normal power supply is making forcibly(cycle displayThe virtual value of 6 interphase voltage)

Standby closing:standby power supply is making forcibly(cycle displayThe virtual value of 6 interphase voltage)

Notes:when trips anyone,manual function invalid

5.4.2 Auto- control method

At the state of auto-control,compare the virtual value with setting value(over-voltage under-voltage),if any interphase voltage is abnormal,controller judges power error and shows on the LED screen.after the setting delay time,drive operating device transfer from the error one to the normal one.when operating device is abnormal,operation stop.At usual time , controller can choose the power adjacent to rated voltage as driven power.

5.4.3 Communication control method

Control method with ModBus protocol is forcible control method.Customer can modify

many parameters at terminal.according to the information of power net and self-test ,ATS close normal power supply forcibly;close standby power supply forcibly;open normal power supply and standby power supply,At the state,we can see the virtual state of ATS,power net information and self-test information .

Warning:if you want to exit from this state ,you must release or system reset.

5.5 Display

  Panel display of intelligent controller includes four bits LED display   fault and state display.

   LED is used to display virtual value of six interhase voltage and the setting value of over-voltage   under-voltage   baud rate and delay time.State display includes clonsing   opening state,current voltage is which.Fault includes trip   if the current voltage is over or lower rated voltage.

   Without any button operation,controller normally display.

On the screen   light at the same time,indicate normal power supply is making .

                            light at the same time,indicate standby power supply is making .

                               light at the same time,indicate normal power supply and standby power supply are breaking.

           V   and anyone of   A   B   C   light at the same time, indicate normal power supply,and the value displaying on LED is the virtual value of current interphase voltage.

           V   and anyone of   A   B   C   light at the same time, indicate standby power supply,and the value displaying on LED is the virtual value of current interphase voltage.

           or   and V   and anyone of   A   B   C   light at the same time   indicate over-voltage fault of normal or standby power supply.and the value displaying on LED is the fault value of over-voltage.

           or   and V   and anyone of   A   B   C   light at the same time   indicate over-voltage fault of normal or standby power supply.and the value displaying on LED is the fault value of over-voltage.

           V   light at the same time   the value displaying on LED is the setting value of over-voltage.

           V   light at the same time   the value displaying on LED is the setting value of under-voltage.

        T1   or   T2   and   S   light at the same time   the value displaying on LED is the setting value of delay time.

5.6 Setting

   Setting values at the time of leaving factory as follows:

displaying voltage:220V

over-voltage:290V

under-voltage:180V

T1   :4S

T2   :4S

According to your need ,you can modify parameters.

6 Panel shows of controller

1:Reset:used for system reset state

2:Address indicater light:when you are adjusting the value of address,this light is lighting all over.

3:Baud rate indicater light:when you are adjusting the value of baud rate,this light is lighting all over.

4:Normal closing:at the state of manual,press this button ,operation device will open standby loop,close normal loop.

5:Function button:press this button,you can set six kinds of function on the panel.

a.Press this button,   light.you can adjust parameter through 11 and 13 button,after setting,you must press 12 button ,the setting value can be saved. return to normal display.

b.Press this button two times continuously,   light   you can adjust parameter through 11 and 13 button,after setting,you must press 12 button ,the setting value can be saved. return to normal display.

c.Press this button three times continuously,   T1   light,you can adjust parameter through 11 and 13 button,after setting,you must press 12 button ,the setting value can be saved. return to normal display.

d.Press this button four times continuously,   T2   light,you can adjust parameter through 11 and 13 button,after setting,you must press 12 button ,the setting value can be saved. return to normal display.

e.Press this button five times continuously, address light 2 lighting on the panel.you can adjust parameter   through 11 and 13 button,after setting,you must press 12 button ,the setting value can be saved. return to normal display.

f.Press this button six times continuously, baud rate light 3 lighting on the panel.you can adjust parameter through 11 and 13 button,(2400bps,4800bps,9600bps) three grades adjustable.after
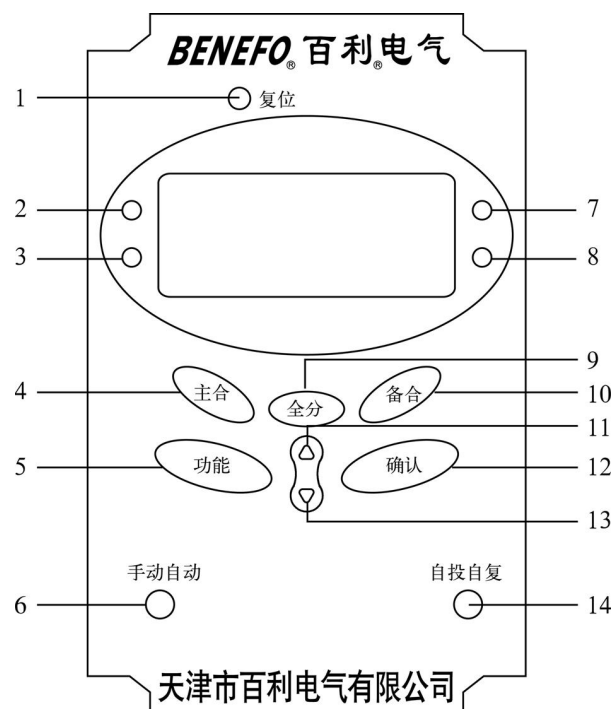
setting,you must press 12 button ,the setting value can be saved. return to normal display.

6:Manual   automatic button to choose.press this button ATS will be manual state.the function of button 4,9 and 10 need users to operate;release this button as automatic state.according to the settings ,the controller run by itself.

7:The indicator light of data receiving ,after ATS receive the data from RTU ,the light will be flashing until finish data receiving.

8:The indicator light of data sending ,after ATS receive the data from RTU ,the light will be flashing until finish data sending.

9:Both opening button:at manual state ,press this button processing part will open the two loops.

10:Standby closing:at manual state ,press this button press this button processing part will open normal loop,   close standby loop.

11:Up button:at the adjustable state,customers can adjust the setting value.

12:Enter button,after setting the parameter ,press this button controller will update setting and return normal display.

13:Down button,at the adjustable state,customers can adjust the setting value.

14:Automatic transfer and restoration,automatic transfer and without restoration button to choose. press this button as the state of automatic transfer and restoration,release this button as the state of automatic transfer and without restoration.

Notes: At the state of manual ,button 14 is disable.at the state of automatic and automatic transfer and without restoration,if the normal power supply is no fault,ATS WILL close normal loop,at the power-on moment.

7. Working principle

When both of QN and QR are at opening state ,so long as the controller send a closing instruction to close QN, relay is making ,drive the relevant processing part to close QN.when the QN has closed ,its accessorial signal wire 11,12 will open .The signal return to the controller , then stop the drive signal. If in the protecting time 11,12 havn't opened ,the controller also send instruction to stop the drive signal ,in order to protect the component.Here you must reset the controller to cancel the function.

When the controller send a closing instruction to open QN, relay is making ,drive the relevant processing part to openQN.When the QN has opened ,its accessorial signal wire 11,12 will close . The signal return to the controller ,then stop the drive signal. If in the protecting time 11,12 havn't closed ,the controller also send instruction to stop the drive signal ,in order to protect the component.Here you must reset the controller to cancel the function.

8.Installration and debugging

The whole style of ATSE is that controller and processing part are installed on the same board, see the external dimension and mounting dimension at Fig1,table3;the separate style is that the

processing part is installed on the board,but you should choice area of appropriate lead to connect the input and output terminal of the circuit-breaker according to the rated current;the controller should be installed in the door of the chest safely,conect the body and the controller with cable. See the aperture dimension of the mounting plate for separate style on Fig2,see the external dimension and mounting dimension for the processing part of under TQ30V(D)-2000A frame on the Fig3,table4,see wiring diagram on Fig.4.The processing part's external of upwards TQ30V (D)-2000A separate style seen Fig5,mounting dimension seen the handbook of TW30 series ACB, wiring diagram seen Fig6.
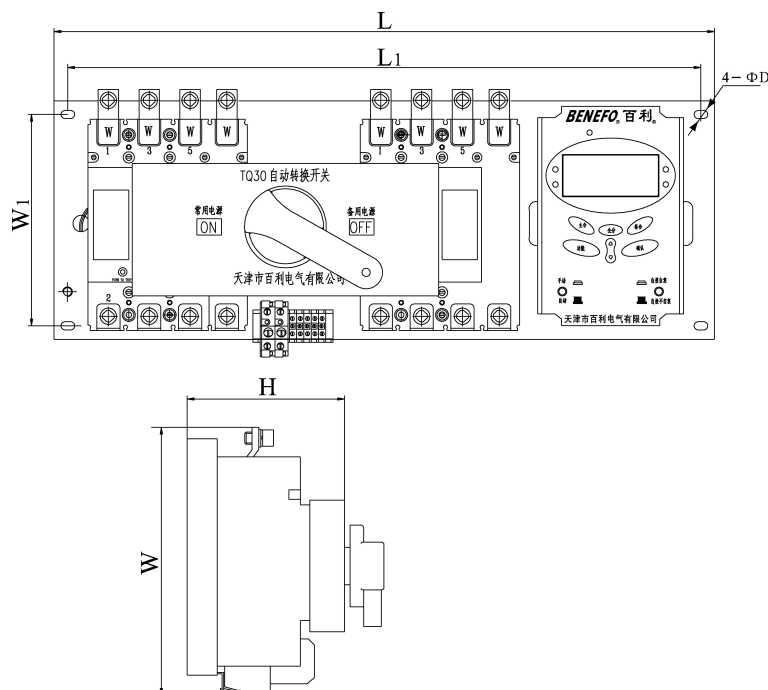
Table 3   Unit:mm

dimension specification	L39/49	L_1 39/49	W	W_1	H	D
TQ30V(D)-63	287/325	273/308	160	83	116	7
TQ30V(D)-100	485	465	175	155	118.5	9
TQ30V(D)-225	545	520	187	154	136(153)	9
TQ30V(D)-400	658	628	345	250	191	9
TQ30V(D)-630 (800)	720/830	700/810	450	275	190	10

Table 4   Unit:mm

dimension specification	L39/49	L_1 39/49	W	W_1	H	D
TQ30V(D)-100	385	365	175	155	118.5	9
TQ30V(D)-225	445	420	187	154	153	9
TQ30V(D)-400	558	528	345	250	190	10
TQ30V(D)-630/800	620/735	600/710	450	275	190	10

Fig1
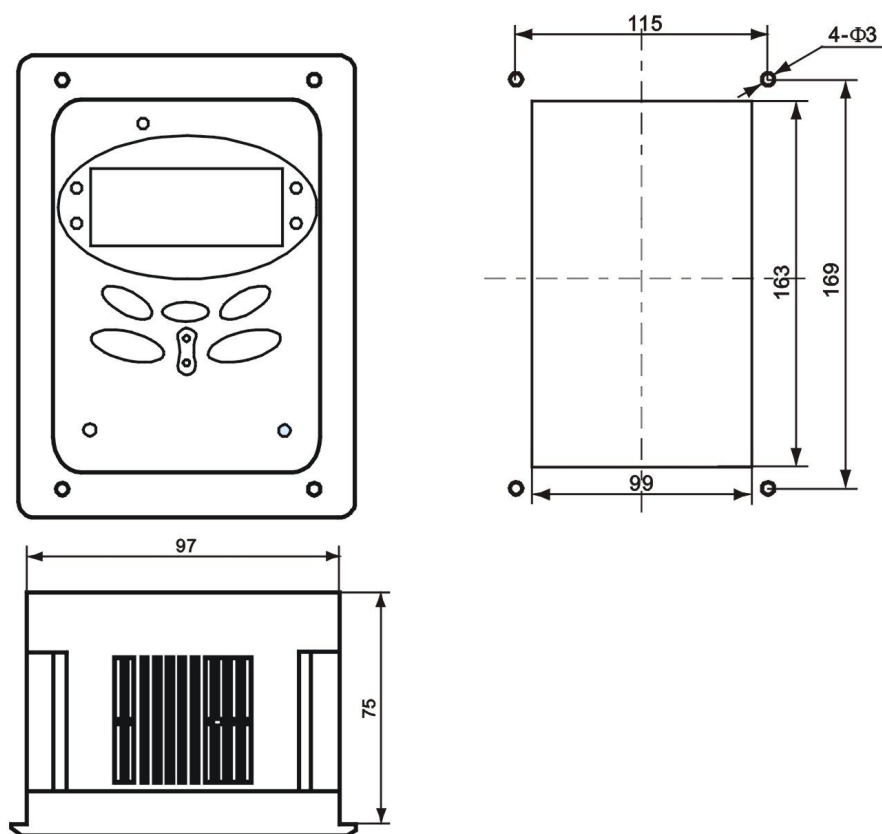
Fig2 hole dimension on the panel of separate style

Fig3

Using the switch with three poles,you must connect neutral N of the two switches to the special terminal.poles,you must connect neutral N of the two switches to the special terminal.

H1 — Normal power supply closing
H2 — Standby power supply closing
H3 — Normal power supply tripping
H4 — Standby power supply tripping

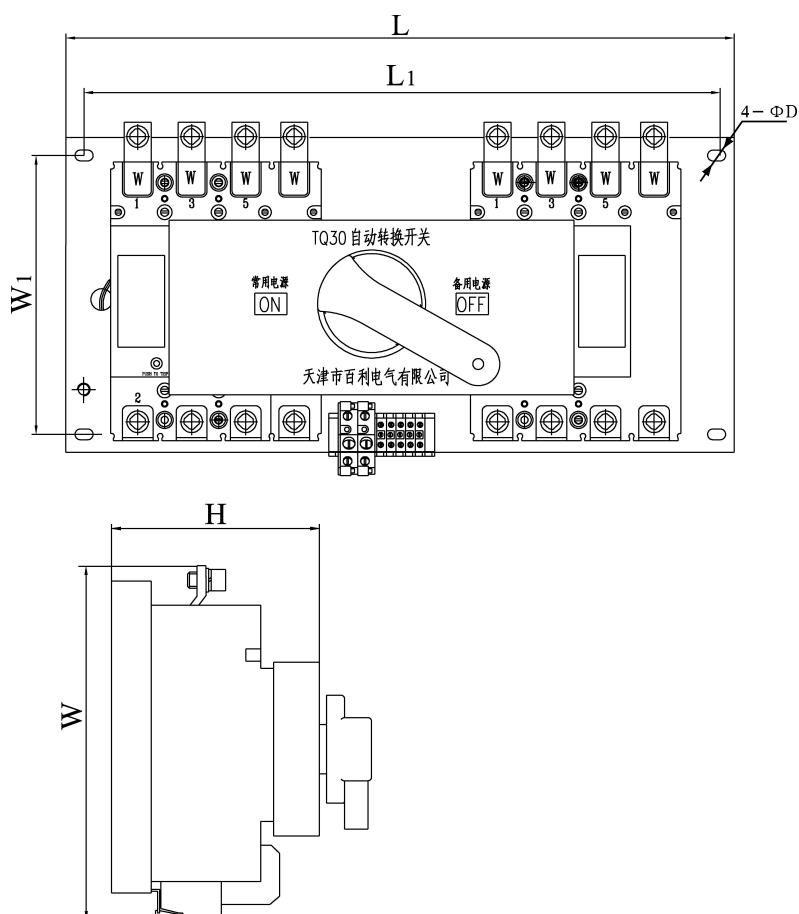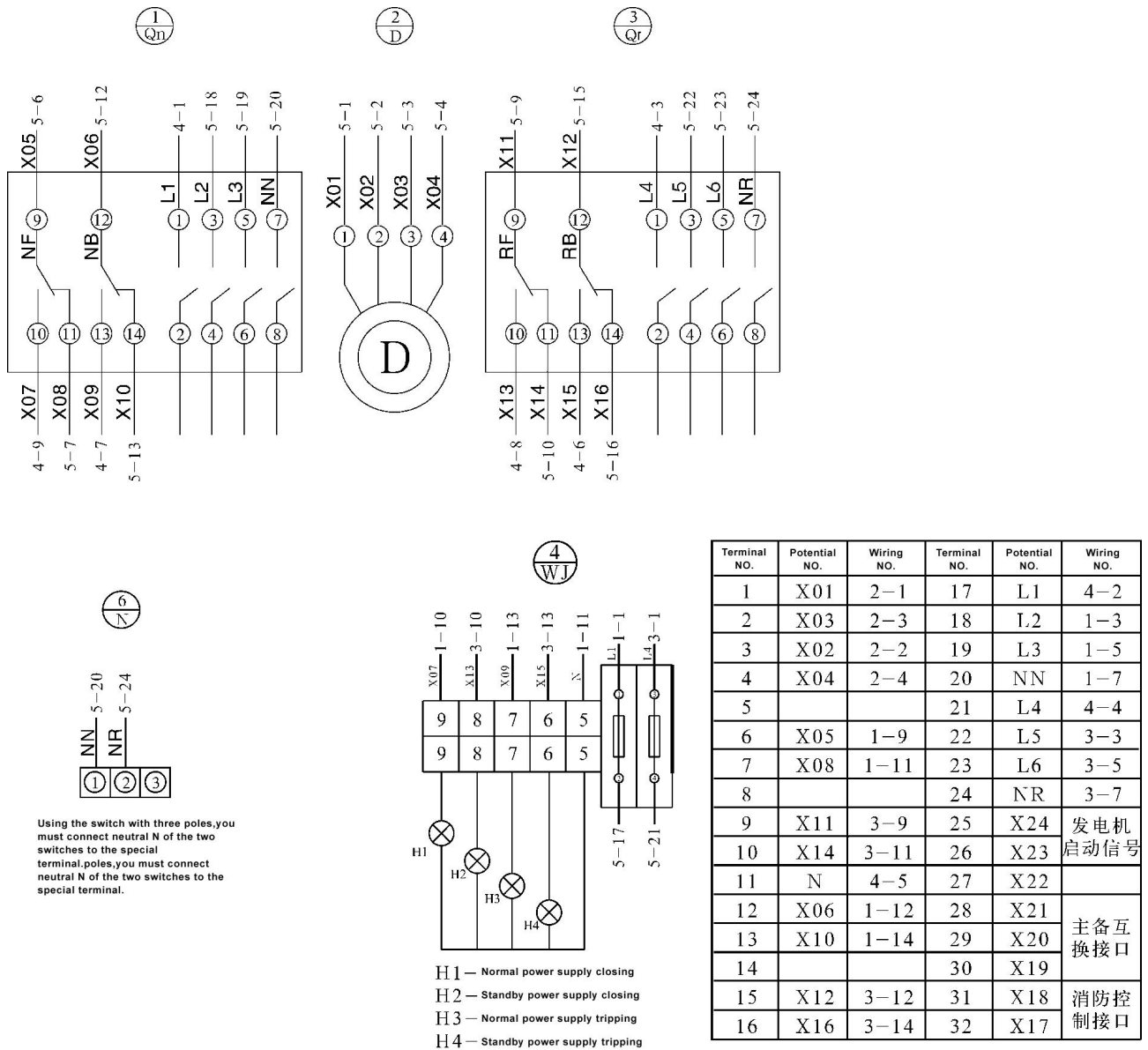| Terminal NO.	Potential NO.	Wiring NO.	Terminal NO.	Potential NO.	Wiring NO.
1	X01	2−1	17	L1	4−2
2	X03	2−3	18	L2	1−3
3	X02	2−2	19	L3	1−5
4	X04	2−4	20	NN	1−7
5			21	L4	4−4
6	X05	1−9	22	L5	3−3
7	X08	1−11	23	L6	3−5
8			24	NR	3−7
9	X11	3−9	25	X24	发电机
10	X14	3−11	26	X23	启动信号
11	N	4−5	27	X22	
12	X06	1−12	28	X21	主备互
13	X10	1−14	29	X20	换接口
14			30	X19	
15	X12	3−12	31	X18	消防控
16	X16	3−14	32	X17	制接口

Fig4 TQ30V(D) under frame 2000 not including frame 63 wiring of controller

ATS apply to 3 phase 4 wire,so the circuit-breaker with 3 phase ,the two N must be connected to the special terminal,else ATS can't work normally.

Warning:

1   number 4 in the Fifure is the output terminal and it has power itself,forbid connecting to other power,else ATS will be short.

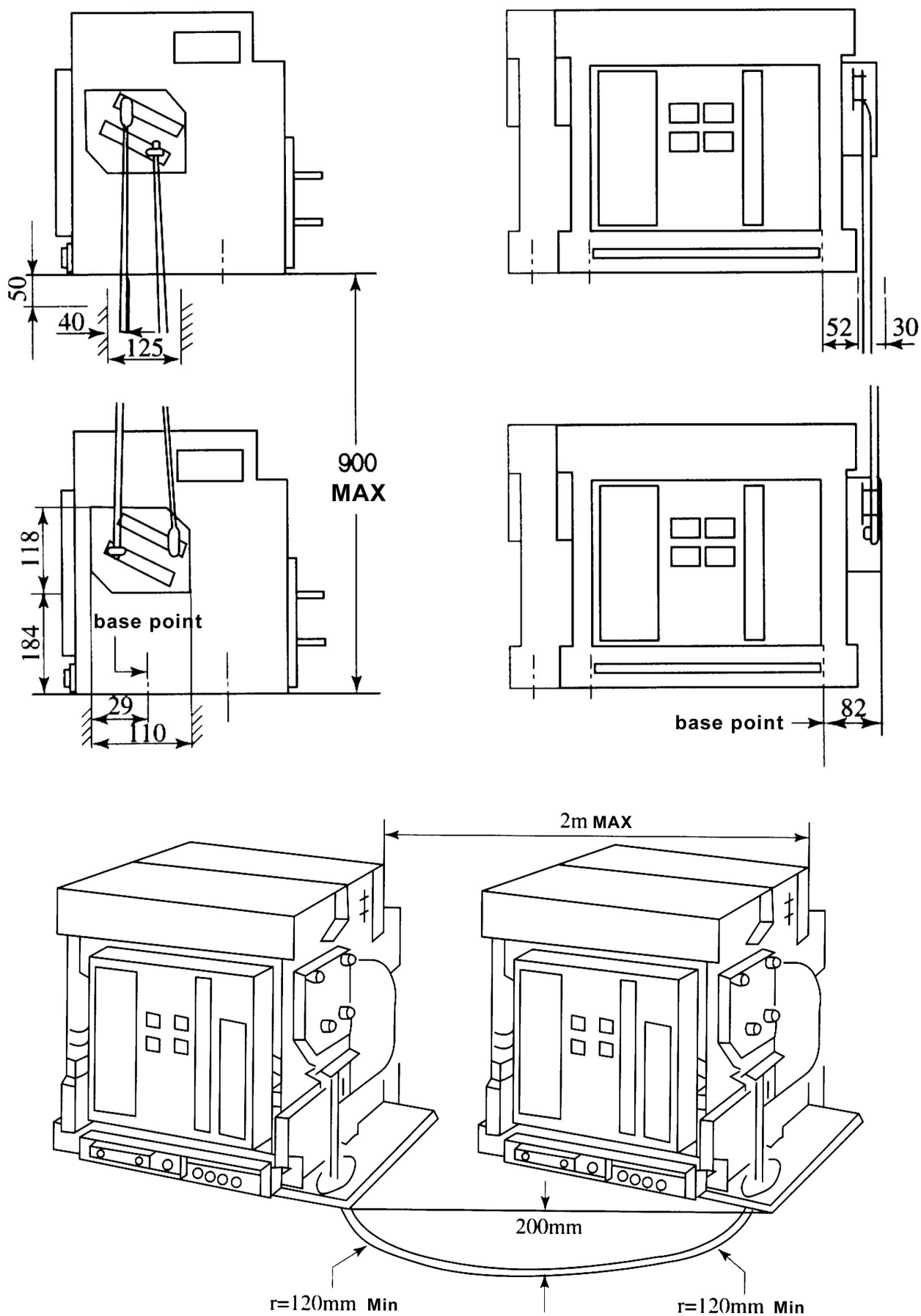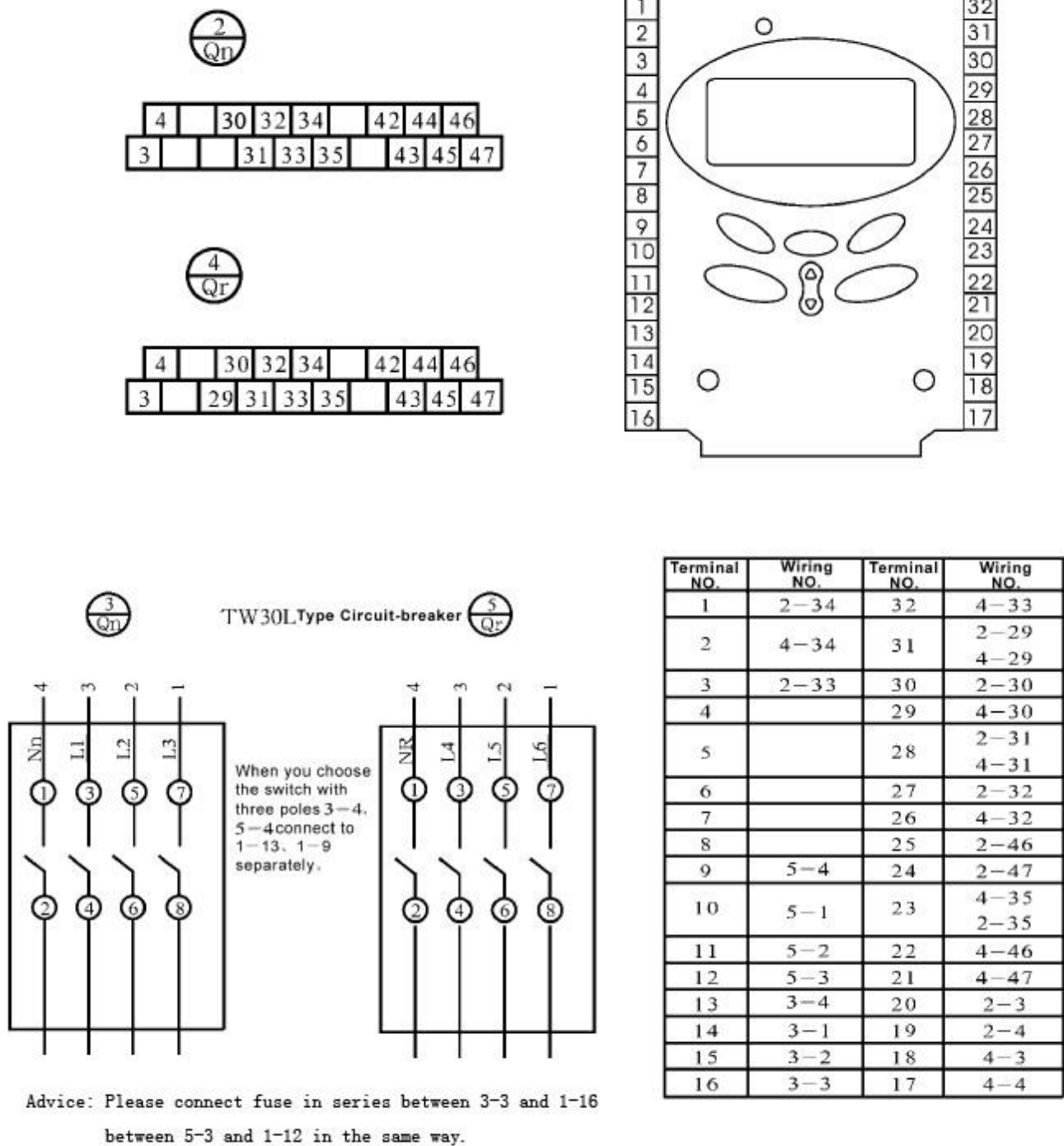2   When you want to use fire protection control,the controlling node signal from outside is no power.

Fig5

TQ30V－2000A and upper frame $\frac{1}{X}$

$\frac{2}{Qn}$

4		30	32	34		42	44	46
3			31	33	35		43	45	47

$\frac{4}{Qr}$

4		30	32	34		42	44	46
3	29	31	33	35		43	45	47

$\frac{3}{Qn}$ TW30L Type Circuit-breaker $\frac{5}{Qr}$

When you choose the switch with three poles 3－4, 5－4 connect to 1－13. 1－9 separately.

Advice: Please connect fuse in series between 3-3 and 1-16
between 5-3 and 1-12 in the same way.

Terminal NO.	Wiring NO.	Terminal NO.	Wiring NO.
1	2－34	32	4－33
2	4－34	31	2－29 / 4－29
3	2－33	30	2－30
4		29	4－30
5		28	2－31 / 4－31
6		27	2－32
7		26	4－32
8		25	2－46
9	5－4	24	2－47
10	5－1	23	4－35 / 2－35
11	5－2	22	4－46
12	5－3	21	4－47
13	3－4	20	2－3
14	3－1	19	2－4
15	3－2	18	4－3
16	3－3	17	4－4

Fig6 :TQ30V(D)-2000A and upper frame controller wiring

8.2 Debug(without load)

8.2.1 Manual mechanism debug :please install the mechanical interlocking that the leading MCCB tote in order to mechanical interlocking

8.2.2 manual control debug

For example ,both of the MCCB are opening state.when automatic and manual button is at "

manual"state,as long as close the control power,the controller will be at normal working state, at the same time the LED display the virtual value of 6 interphase voltage circularly.press the " normal closing"button,the processing part will close the main loop, at the same time the main and standby MCCB is closing and opening state respectively.press the "standby closing"button,the processing part will open the main loop, then close the standby loop,at the same time the main and standby MCCB is opening and closing state respectively.press the "both opening"button,the processing part will open the standby loop, at the same time both of the loop are opening again. during the debugging the state indicator light should light or go out correctly.

8.2.3 Automatic control debug

Automatic and manual button is at automatic state,the controller will close the no fault power automatically, according to the current information,thus debug over

9.Maintenance and usage

Usage

Operate the following process,before run the switch

Please read the handbook carefully

The switch must be usted under normal operation condition

Use the manual function to transfer the switch 2-3 times, in order to ensure the switch at normally running state.

The switch long time no use ,firstly clean before operation.necessarily you should wipe the interface with tampon dipping industrial ethanol.after this,you should check the insulation resistance of the switch,if you find the switch is affected with damp,you should desiccative it , especially ARC chute cover,in order to ensure nicer insulation.After check out,you can run it.

maintenance

All moving or turning parts shall be lubricated periodically during service.

Dust should be cleaned to keep the insulation of the circuit in good condition

Contact system is used long time ,if you find the interface has small stingor small slug and so on ,you should clean to ensure nicer contact.

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For   Q/12YJ4290
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TQ30V(D)-63 series Automatic Transfer Switch
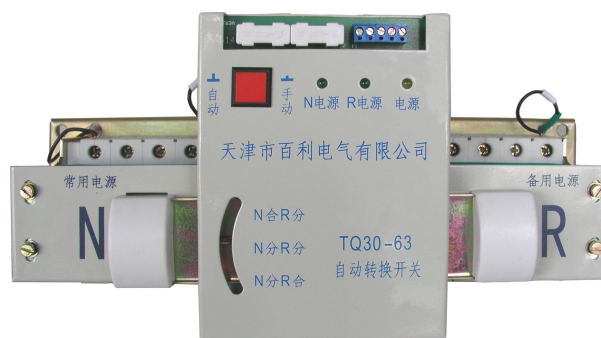
USER MANUAL

获ISO9001质量体系认证

采用国际标准产品标志

获天津名牌产品

获中国CQC标志认证

CHINA·TIANJIN BENEFO ELECTRIC CO.LTD.

Respectable users:

Thank you for trusting in Benefo corporation. Welcome use TQ30 series ATS .Please read this instrution carefully,before installing,wiring,operating and repairing.For the sake of using exactly,please know very well the noticeand warning .

1.0 Notice for security

Warning

In order to avoid to make momentousness serious accident, please operate according to the relative demands.

Notice

In order to avoid to make serious accident or destroy our product , please operate according to the relative demands.

Warning

Please install our products on fireproof objects metals and so on.

Don't install our product in the volatile air , or else there may be take place exploding.

Please install our product in very wet condition

Notice

Don't install our product in magnetic field whose idensity is stronger than the earth 5 times ,or else the ATS will not run normally

Don't install our product in the condition where the vibration is greater than 5g.

Don't install our product in the condition where the air can eat off metal and destroy insulator.

Warning

None but expert technician can wire.

Entrue power supply is shut down before wire.

Warning

.Don't use wet hands to operate the switch,or there maybe happen accident

Notice

Don't operate ATS frequently ,or else release the life of the ATS.

1.2 Inspecting, maintance and renew the parts.

 Warning

Inspection and maintance must be done by the exert technician.

If the users refit the switch by themselves,We don't see after.

2.0 Notice for usage.

2.1 open the box to inspect

When you receive the TQ30 ATS what you speak for,please open the box to inspect

2.1.1 Check the   outside of the switch,if there is some breakage during transportation for exable the shell was destroyed.

2.1.2There are a switch,a handbook ,a ensure book,and some relative accessory in the package box.

2.2 See the storage condition in the following table

2.2.1 the storage condition

item	range
ambient temperature	-25 +55
relative humidity	(ambient temperature=25) 95%

2.2.2 operation condition

Item	Range
ambient temperature	-5 +40 , the average value 35
relative humidity	(at +40)not over 50%, the lowest temperature +25 in the most wet month , and the most average relative humidity 90% in this month , and please consider the dewdrop on the product because of the temperature variety.
elevation	2000m
pollution degree	3 degree

3.0 Wiring sketch map

Please pay attention to the following point when the users want to wire

a.The phase order of the main loop must accord; both of the neutral wire N must be connected correctly,else the
    switch can't work normally.

b. When you choose 3 poles switch ,both of the neutral wire N must be connected to the right position of the
    controller or the special N terminal;but if you choose 4 poles switch,both of neutral wire N must be
    connected to the right position of the two switches.

c. During the wiring ,you scarcely leave out,short the control wire input the switch.else the switch can't work
    normally.
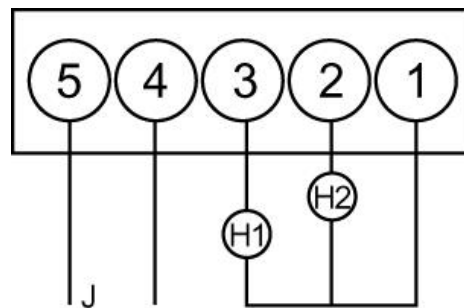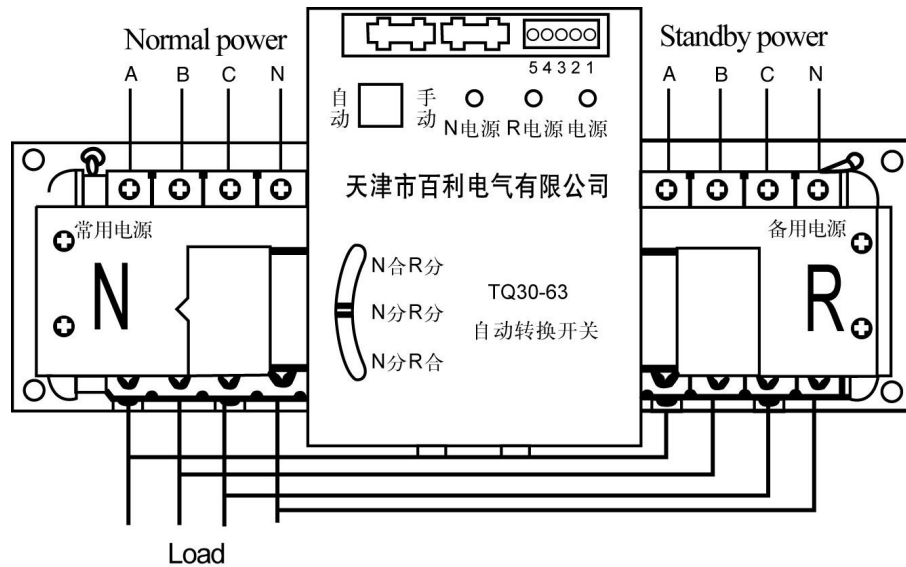
3.1

Fig-1:Wiring sketch map

Fig-2:Wiring sketch map of external terminal.

Otherwise the external terminal is as external power for indicator light connecting to controller.you don't connect to other power,else there is short danger.Number 1,2 indicate the standby power close,Number 1,3 indicate the normal power close.The type of indicator light is AD11,AC220V.When you choose the switch used to electric net -generator,you can connect the contact used to start generator to the start loop;When you choose 3 poles switch ,both of the neutral wire N must be connected to the right position of the controller or the special N terminal;but if you choose 4 poles switch,both of neutral wire N must be connected to the right position of the two switches.

4.0 Running

4.1 Preparation and check before running.

a. Check the wiring whether is connected currently or not .

b. If you test withstand voltage, pull out the plug first and the control wire from the switch,else controller can be destroyed.After test ,all the wire must be restored.

4.2 Running

a. Please set manual-automatic button as manual state.circumrotate handle deasil to make Q_N close.circumrotate

handle anticlockwise to makeQ_R close.relevant indicator light lights.

b. Please set manual-automatic button as automatic state.when the normal power supply is no fault,Q_N close automatically,else Q_N open,Q_R close.If the normal power supply restores ,Q_R close,Q_N open automatically.