中堅
BACKBONE

BWY(WTYK)—802、803

系列变压器温度控制器使用说明书

SERIES TRANSFORMER TEMPERATURE CONTROLLER

DESCRIPTION & OPERATION INSTRUCTIONS

感谢您使用本厂产品

使用前请认真阅读产品使用说明书

THANKS FOR USING OUR PRODUCTS

PLEASE READ THE DIRECTIONS BEFORE USE

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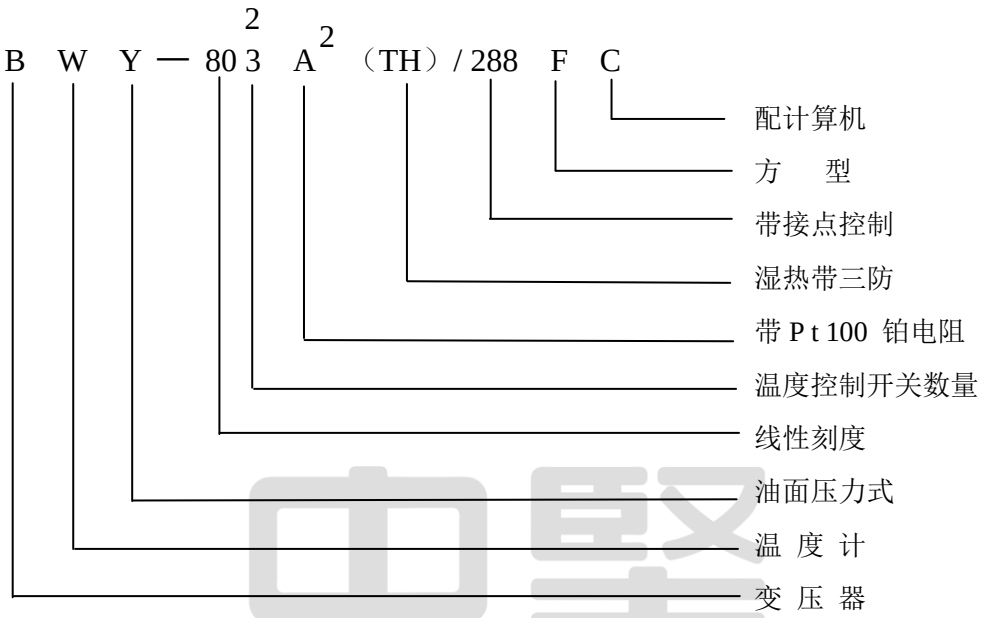
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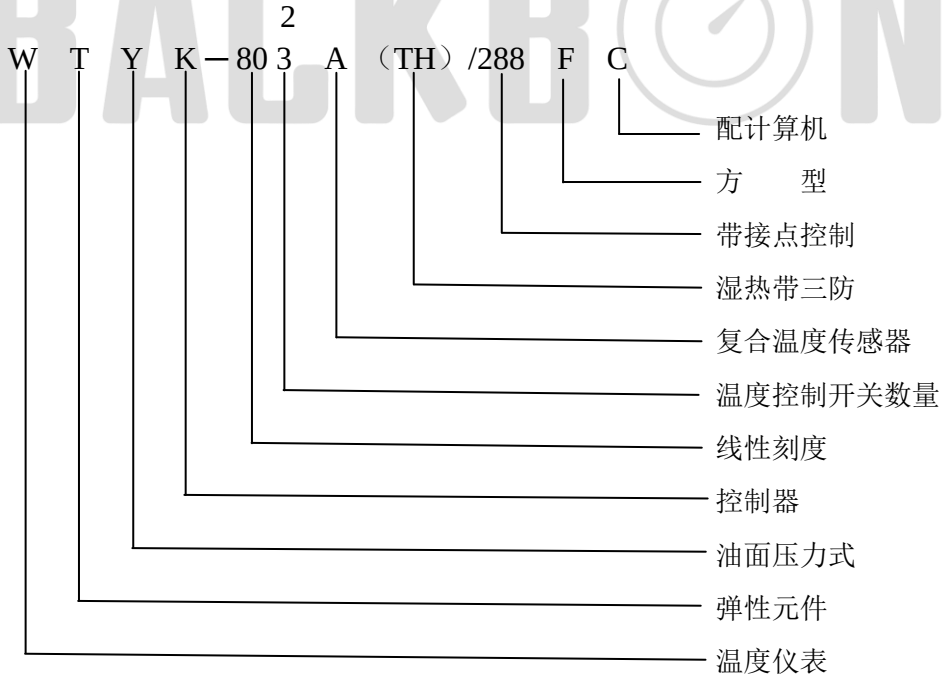
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一、概　　况

1、温度控制器根据沈阳变压器研究所制订的 JB/T6302-92《变压器用压力式温度计》标准的命名如下：

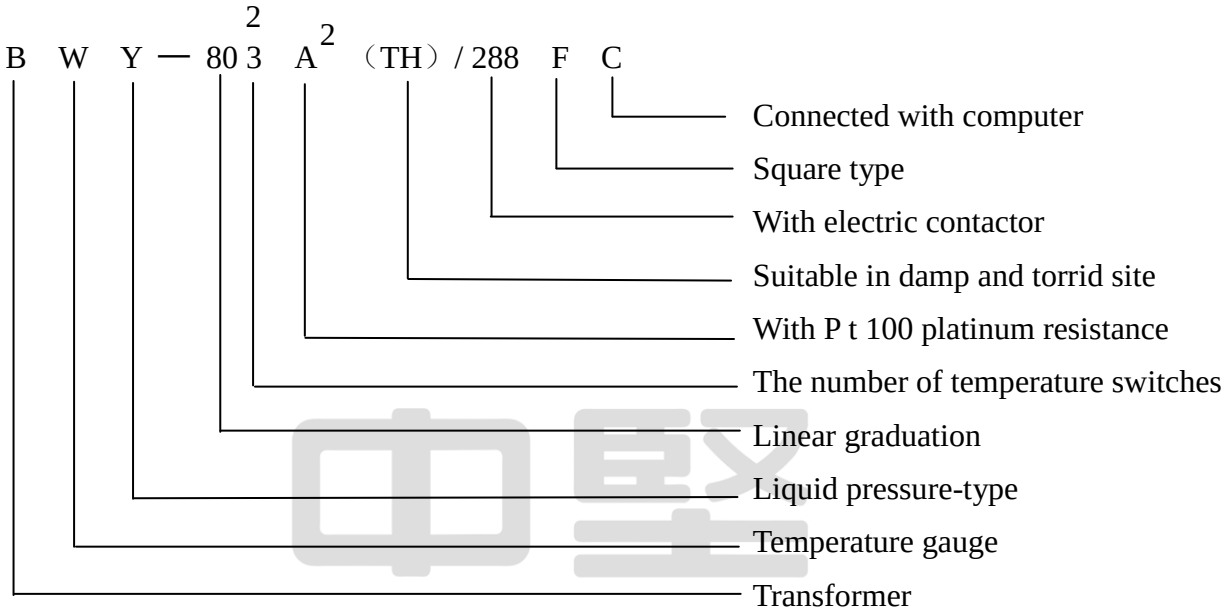


2、温度控制器根据 JB/T 9236-1999《工业自动化仪表产品型号编制原则》的要求产品命名如下：

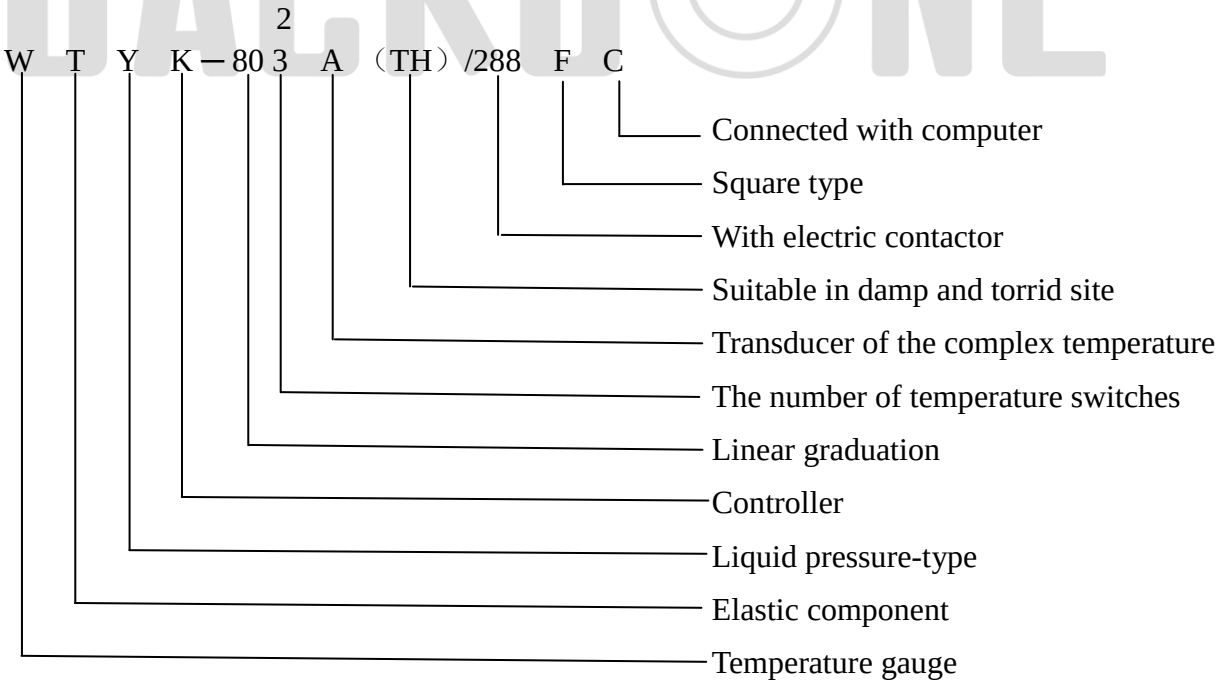


Ⅰ、General Survey

1. The type of temperature controller is defined in accordance with the standard named "Transformer Pressure-type Thermometer" formulated by the Transformer Research Institute in ShenYang.



2. The type of temperature controller is defined in accordance with the standard named "The Principle of Type Organization of Industrial Automatic Instrument"

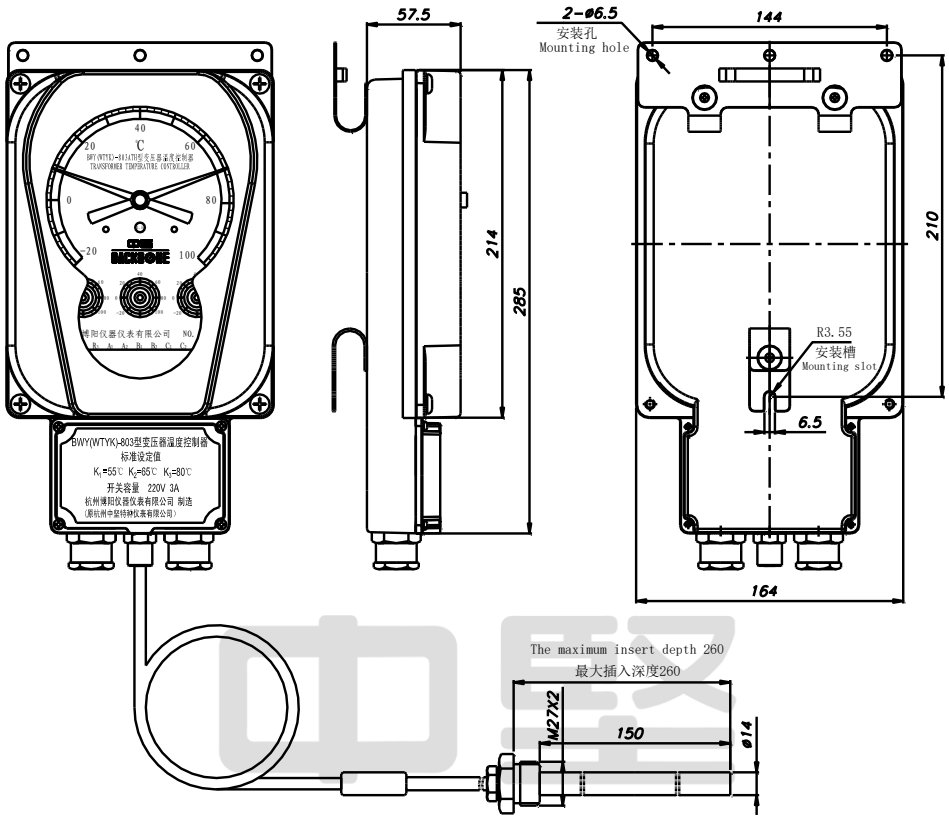


BWY (WTYK)-802、803 系列控制器的成套性和适用性

序号	型号和名称	主要用途	适用场合	备 注
1	BWY(WTYK)-802、803 变压器温度控制器	测量变压器顶层油温并当温度超过设定值时启动冷却器驱动电机和警报装置（参阅图一）	1000kVA 以上变压器	
2	BWY(WTYK)-802、803（TH） 变压器温度控制器	同 1。 适用于湿热带场合。	1000kVA 以上变压器	
3	BWY(WTYK)-802、 803A（TH） 变压器温度控制器	同 2。 采用复合温度传感器技术，能同时输出 Pt100 铂电阻信号。	8000kVA 以上变压器	
4	XMT-288F 数显温控仪	与 BWY（WTYK）-802A、803A（TH）配套，实现油温遥测遥控（参阅图二）。方式嵌装式，安装尺寸同 XCT。	8000kVA 以上变压器	
5	XMT-288C 数显温控仪	与 BWY（WTYK）-802、803A 配套，实现油温遥测遥控外，还能输出和计算机联网的直流标准信号 0～5V、1～5V 或 4～20mA。	8000kVA 以上变压器	
6	BWY（WTYK）802A、 803（TH）/288F 成套变压器温度控制器	同 3、4 等。 可同时代替 I）WTZK-02 温控器 II）电阻温度计 III）转换开关	8000kVA 以上变压器	
7	BWY（WTYK）-802A、 803A（TH）/288FC 成套变压器温度控制器	同 3、5 等。 可同时代替 I）WTZK-02 温控器 II）电阻温度计 III）转换开关 IV）XCT 动圈温度计 V）信号转换的变送器	8000kVA 以上变压器 无人值班电站	

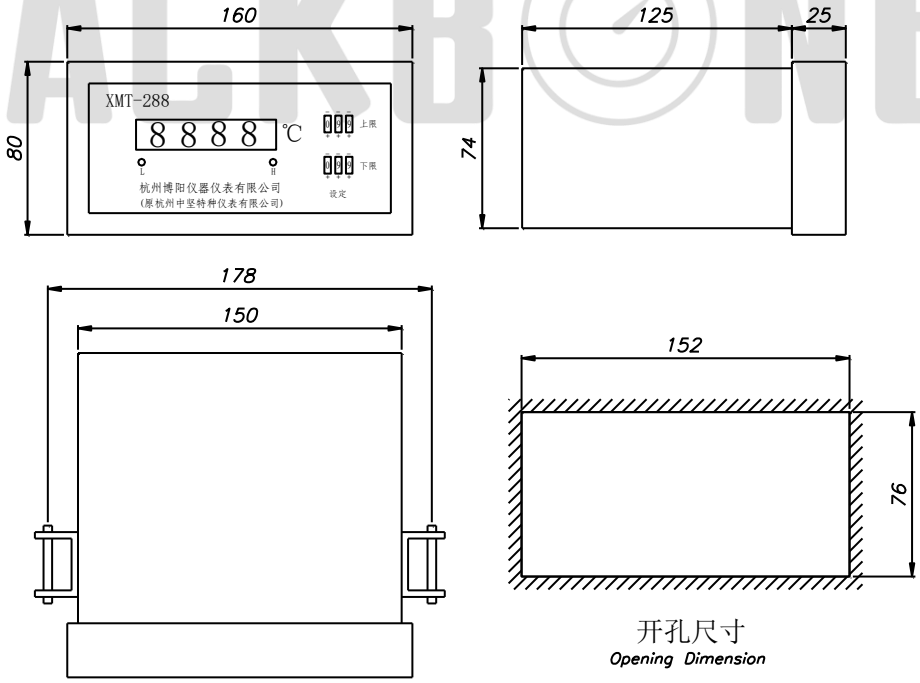
BWY（WTYK）-802，803 SERIES TEMPERATURE CONTROLLER COMPLETE SETS AND ITS APPLICATION

No	TYPE & NAME	MAIN USEAGE	SUITABLE SITE	REEE
1	BWY(WTYK)-802，803 Transformer Temperature Controller	Measuring the oil temperature on the top of transformer and switch on the motor of cooler and alarm when temperature is over the preset value (refer to Fig. 1)	For transformer capacity more than 1000k VA	
2	BWY(WTYK)-802,803(TH) Transformer Temperature Controller	Same as No l and is available in damp and hot site	For transformer capacity more than 1000kVA	
3	BWY(WTYK)-802,803A(TH) Transformer Temperature Controller	Same as No 2 Adopting the technical in transducer of complex temperature and can simultaneously send out the signal of Pt100 platinum thermal resistor	For transformer capacity more than 8000kVA	
4	XMT-288F Numerical Temperature Control Instrument	Form a complete set with BWY(WTYK)-802A,803A(TH) to attain telemeter temperature and remote control (refer to fig. 2) Square inlaid panel type The mounting dimension is same as XCT	For transformer capacity more than 8000kVA	
5	XMT-288FC Numerical Temperature Control Instrument	Form a complete set with BWY(YTYK)-802A,803A(TH) to attain telemeter temperature and remote control and also can output direct current standard signal of 0～5V 1～5V or 4～20mA for computer	For transformer capacity more than 8000kVA	
6	BWY(WTYK)-802,803A(TH) /288F transformer temperature control instrument set	Same as No3, 4 can simultaneously replace 1)WTZK-02 temperature controller 2)Resistance thermometer 3)Change-over switch	For transformer capacity more than 8000kVA	
7	BWY(WTYK)-802,803A(TH) /288FC transformer temperature control instrument set	Same as No3, 5 can simultaneously replace 1) WTZK-02 temperature controller 2)Resistance thermometer 3)Change-over switch 4)XCT movable coil thermometer 5)The transformer of signal	For transformer capacity more than 8000kVA of selr-serice power station	



图一 BWY（WTYK）系列温度控制器外形及安装尺寸

Fig. 1 BWY(WTYK)Series temperature controller Outside View and Mounting Size



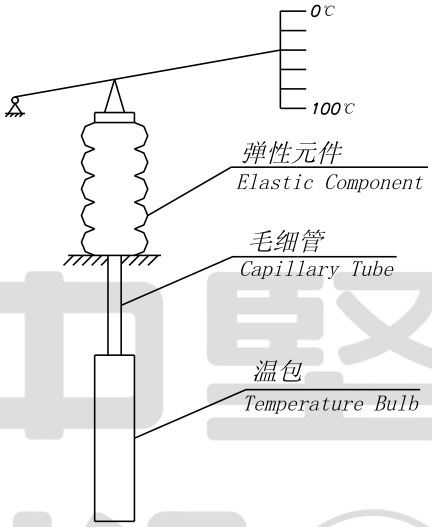
图二 XMT-288F、XMT-288FC 外形图

Fig. 2 XMT-288F, XMT-288FC Outside View

二、工作原理

变压器温度控制器（以下简称温控器），主要由弹性元件，毛细管、温包和微动开关组成。当温包受热时，温包内感温介质受热膨胀所产生的体积增量，通过毛细管传递到弹性元件上，使弹性元件产生一个位移，这个位移经机构放大后指示出被测温度并带动微动开关工作，从而控制冷却系统的投入或退出。

BWY(WTYK)-802A、803A 温控器采用复合传感器技术，即仪表温包推动弹性元件的同时，能同步输出 Pt100 铂电阻信号，此信号可远传到数百米以外的控制室，通过 XMT 数显温控仪同步显示并控制变压器油温。也可通过数显仪表，将 Pt100 铂电阻信号转换成与计算机联网的直流标准信号（0~5V、1~5V 或 4~20mA）输出。



图三　压力式温度计工作原理图

Fig. 3　Pressure-type thermometer Working Drawing

Ⅱ、Working Principal

The transformer temperature controller (which is referred as temperature controller bellow) is consisting of elastic component, capillary tube and temperature bulb. It is a sealed system filled with temperature-sensing medium. When the measured temperature changes the volume of actuating medium in the temperature bulb will be changed along with linear graduation. This volume increment is transmitted by capillary tube so as to take a corresponding linear displacement. After magnifying the linear displacement by a special amplifier, the measured temperature can be indicated and switch on a micro switch to send out an electric signal to power on or off the cooler system.

The BWY (WTYK)-802A,803A temperature controllers adopt the technology of complex transfusing which can output the signal of Pt100 platinum thermal resistor simultaneously. This signal can be transmitted to a controller room more than hundreds of meters away. By the series

XMT digital display thermometer, the temperature of transformer will be displayed and adjusted at the same time. The signal also can be translated to computer typical signal (0~5V 1~5V or 4~20mA) by a digital thermometer.

三、主要技术指标

（一）BWY（WTYK）-802、803 型：

1、正常工作条件： －30~+55℃

2、测量范围：－20~+80℃；0~+100℃；0~+120℃；0~+150℃

3、指示精确度： 1.5 级

4、控制性能： ①设定范围：全量程可调

②设定精确度：±3℃

③开关差：6±2℃

④接点容量：AC 220V/3A

⑤标准设定值：802：K1=55℃；K2=80℃

803：K1=55℃；K2=65℃ K3=80℃

5、仪表安装尺寸：详见外形及安装尺寸图

（二）BWY（WTYK）-802A、803A 型

1~5 条同上。

6、输出 Pt100 铂电阻信号（附分度值）。

（三）XMT-288F 数显温控仪，另附说明书。

（四）XMT-288FC 数显温控仪，另附说明书。

Ⅲ、Principle Technical Specification

(1) WTYK-802.803:

1.Normal working condition: －10~+ 55℃

2.Measuring scope: －20~+ 80℃；0~+100℃；0~+120℃；0~+150℃

3. Indicative accuracy: 1.5 grades

4.Technical data of switch: Preset Scope：Range of 0~100℃

Preset Accuracy：±3℃

Switch Shift Deferential: 6±2℃

Contact capacity: AC 220V/ 3A

Standard Preset Value: 802:K1=55℃ K2=80℃

803:K1=55℃ K2=65℃ K3=80℃

5. Installing Dimension of Gauge: refer to Fig. 1

(2) WTYK-802A, 803A :

The items from 1 to 5 are same as the BWY (WTYK) -802, 803.

6. Output Signal of Pt100 Platinum Thermal Resistor (refer as appendix table).

(3) XMT-288F Digital Display Thermometer (for details see the additional instruction).

(4) XMT-288FC Digital Display Thermometer (for details see the additional instruction).

四、温控器开关的设定

开关设定：

1、BWY（WTYK）-802 出厂时的标准设定值为 K1=55℃；K2=80℃。

2、BWY（WTYK）-803 出厂时的标准设定值为 K1=55℃；K2=65℃；K3=80℃。

温控器的开关在出厂前均已调到标准设定点，用户如需改变开关设定值，应先开启表盖，再对照设定刻度，旋转旋钮，使旋钮刻度盘上的黑线对准所需要温度即可，最后按原样合紧表盖。

IV、Preset the Thermoregulatory Switch

Preset the Switch:

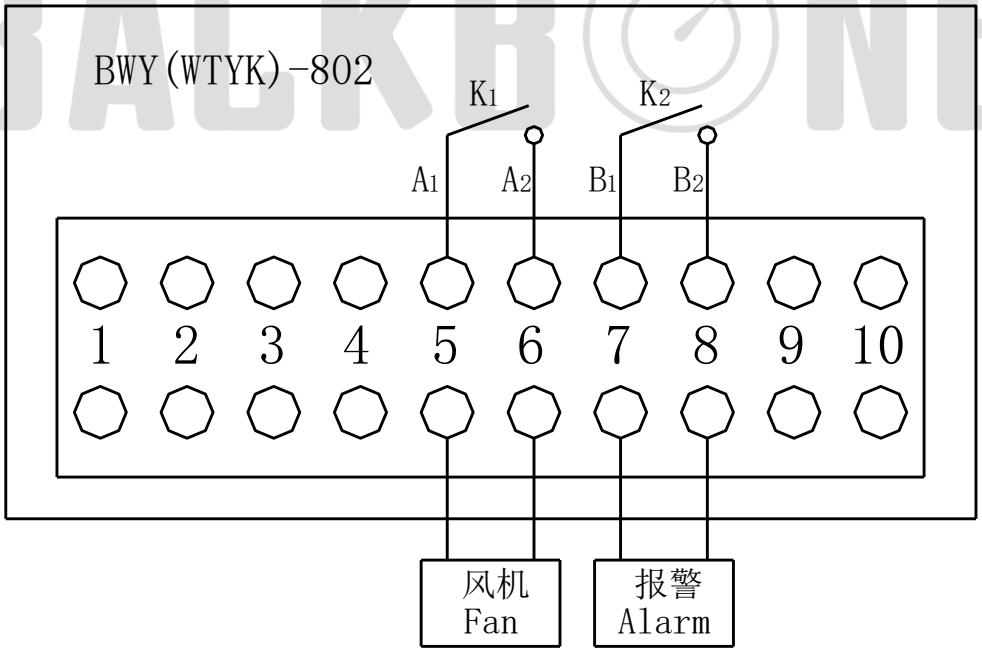
The default values of two switches of BWY(WTYK)-802 are：K1=55℃ K2=80℃ while the three of BWY(WTYK)-803 are：K1=55℃ K3=65℃ K3=80℃.

Before the gauges leave the factory, the standard values of switches have been preset. Preset the switch position when needed. First, open the cover of gauge, then turn the knob according to the setting scale so that the black scale lines point the required temperature. At last, close the gauge cover.

五、温控器的接线

802 型温控器接线使用 KVV4×1.5 电缆线，803 型温控器接线使用 KVV4×1.5，将电缆线从引线接头处穿入，按图四要求接线。

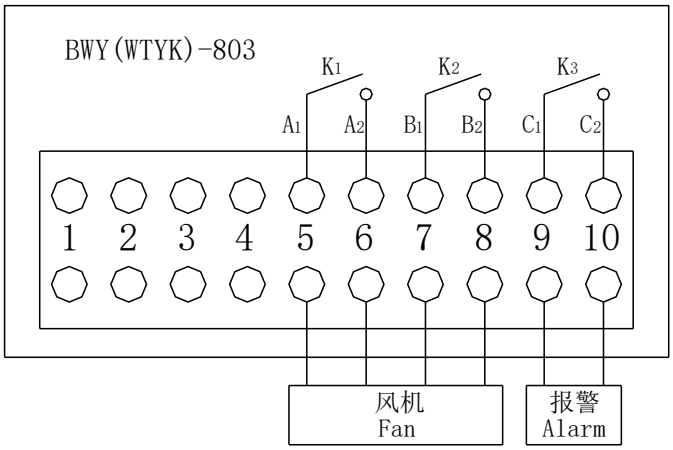
1、 BWY(WTYK)-802 型温控器接线见图四。



图四 BWY(WTYK)-802 温度控制器接线图

Fig. 4 BWY(WTYK)-802 Connection Diagram

2、BWY(WTYK)-803 型温控器接线见图五。

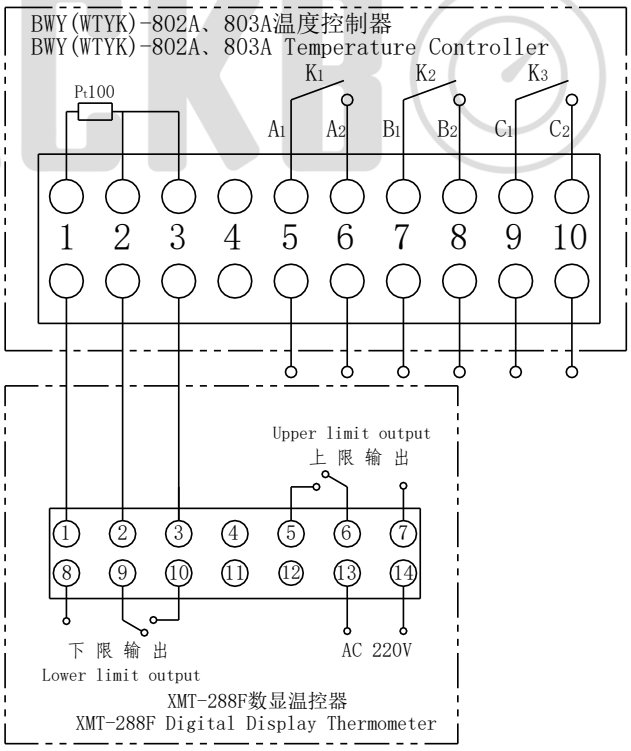


图五 BWY(WTYK)-803 温度控制器接线图

Fig. 5 BWY(WTYK)-803 Connection Diagram

3、BWY（WTYK）-802A、803A/288F 型

BWY（WTYK）-802、803A 温度控制器是在 BWY（WTYK）-802、803 基础上增设一套温度遥测装置构成，温度遥测装置由 XMT 数显温度计和 Pt100 铂电阻组成。Pt100 铂电阻从 BWY（WTYK）-802A、803A 型的接线端子上引出（参见图六），通过 KVV3×1.5 控制电缆将温度信号远传到变电站控制机房的 XMT 数显温度计上，从而实现遥测变压器油面温度的目的。总接线见图六。

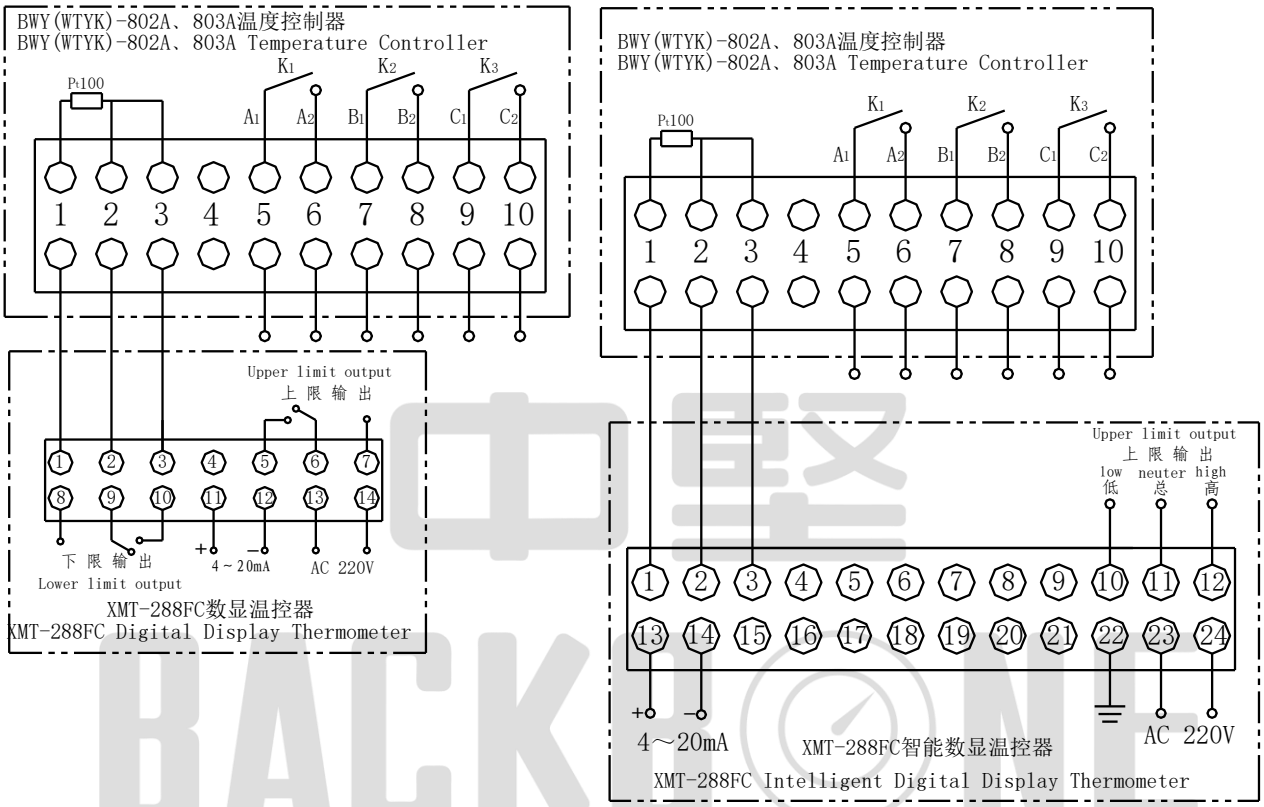


图六 BWY（WTYK）-802A、803A/288F 接线图

Fig. 6 BWY(WTYK)-802,803A/288F Connection Diagram

4、BWY（WTYK）802A、803A/288FC 型

XMT-288FC 数显仪表能将 BWY（WTYK）-802A，803A 型温控器输送过来的 Pt100 铂电阻信号转换成 0~5V（直流）或 4~20mA（直流）信号，进入计算机联网。在无人值班的机房直接配套使用，达到电脑监控温度的目的。总接线图见图七，其余和 BWY（WTYK）802A、803A/288F 型相同。



图七 BWY（WTYK）-802A、803A/288FC 接线图

Fig. 7 BWY(WTYK)-802,803A/288FC Connection Diagram

Ⅴ、Wiring the Thermoregulatory

BWY(WTYK)-802 wiring use the wire KWV4×1.5.BWY(WTYK)-803 wiring use the wire KWV6×1.5. Reeve the 1.5mm2 wire through the 1.5mm2 cable guiding hole and connect according to the Fig. 4.

1. Wiring BWY(WTYK)-802 please view Fig. 4.

2. Wiring BWY(WTYK)-802 please view Fig. 5.

3. BWY(WTYK)-802,803A/288F:

BWY(WTYK)-802,803A (TH) temperature controller is constituent on base of BWY(WTYK)-802,803(TH) and get a additional case of remote temperature measuring instrument which is consist of XMT digital display thermometer and Pt100 platinum resistor. The signal of Pt100 platinum resistor is Transmitted to the far control room of the substation by the KVV4×1.5 control cable which connected with terminal wiring board as figure 6. So that to realize the remote measuring of the transformer oil (All connection refer as Fig. 6).

4. BWY(WTYK)-802,803A/288FC:

The installing & operation of BWY(WTYK)-802,803A/288FC are just same as BWY(WTYK)-802,803/288F In addition, XMT-288FC digital display thermometer can translate the signal of Pt100 platinum resistor to typical signal of 0~5V or 4~20mA which can be inputted into the computer of self-service power station (All connection refer as Fig.7).

六、温控器的安装

温控器的安装按如下步骤进行：

1、M6 六角螺栓旋入变压器安装底板的下方螺孔中；

2、把温控器背面下方的安装槽插入 M6 螺栓中；

3、旋入温控器背面上方的两颗 M6 螺栓，再用呆扳手将全部三颗螺栓拧紧，最后如订购雨篷的按图示插入雨蓬。（见图八）

Ⅵ、Installation the Thermoregulatory

Install the Thermoregulatory according to the following step:

1、Screw one M6 hex bolt in the mounting board of transformer.

2、Fit the hex bolt into the mounting slot underneath the back of controller

3、Screw two M6 hex bolts in the mounting holes above the back of controller, then tighten up all the three screws with a solid wrench, finally if book a rainproof, please insert the rainproof cover into the controller (View Fig. 8).

七、注意事项

1、温控器检验时必须按照压力式温度计的检定规程(JJG310-2002)进行。即温包必须全部浸入在恒温槽内，表头必须垂直安装。若在常温空气中。就不能严格按 1.5 级精密度来判断。

2、温控器接线和安装过程中均应小心轻放，请严格按说明书要求进行。

3、打开表盖时，请使用梅花扳手。合盖时四点均匀对称拧紧，以免影响仪表密封性。

4、安装时，多余毛细管应盘为直径 150 毫米以上环圆状。每隔 300 毫米应对护套毛细管做适当的固定(如用细铜丝扎结等)。

5、数显温度计的检验可根据 Pt 100 分度值采用标准电阻箱作为信号输入也可与 802A、803A 连接后在恒温槽内进行。

6、现场安装时，必须注意温包应全部插入有油的套管内，温包进入有油的套管内深度至少不应小于 150 毫米。

Ⅶ、POINTS FOR ATTENTION

1. The examination of temperature should be according to the checking up regulation of JJG310-83 of liquid spontaneously measurement thermometer. The temperature bulb should be inserted entirely into the constant temperature oil box, and the temperature controller should be installed perpendicularly. It can not get the precision of 1.5 degree in normal temperature air.

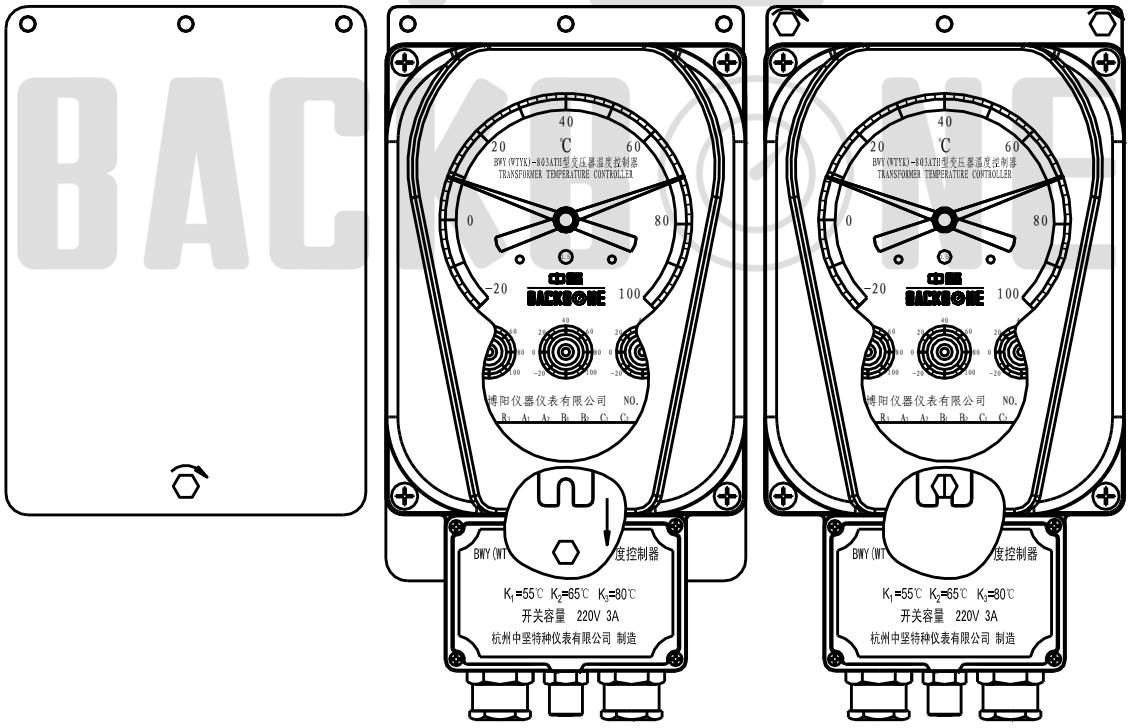
2. In the course of installing, connection of temperature controller, handle with care and operate it strictly as technical requirements.

3. Pick out a box wrench to open the gauge cover. When closing cover, four locators should be screwed up symmetrically, so as not to affect the airtight ness of gauge.

4. In the first mounting instance, the superfluous capillary tube should be twined in a circle of diameter more than 150mm. At each 300mm interval, the guard of capillary tube should be properly fixed (for example bind round with soft fine line of copper).

5. When testing the digital display thermometer, according to the Pt 100 scale value, can use standard measuring resistor as the inlet signal to measure temperature or connect of 802A, 803A in a constant temperature trough to test its resistance.

6. It should be attention that the temperature bulb must be inserted into the tube fill with oil when spot installing. The depth should be more than 150mm.



图八 BWY（WTYK）系列温度控制器安装步骤

Fig.8 BWY(WTYK) install step

八、附录 Pt100 工业铂电阻分度值表（按国际温标 IPS-90）

Ⅷ、Appendix: Pt100 Industrial platinum temperature resistance scale value (As to international temperature scale IPS-90)

-10℃	96.09Ω	31℃	112.06Ω	72℃	127.84Ω	113℃	143.42Ω
-9	96.48	32	112.45	73	128.22	114	143.80
-8	96.87	33	112.83	74	128.60	115	144.17
-7	97.26	34	113.22	75	128.98	116	144.55
-6	97.65	35	113.61	76	129.34	117	144.93
-5	98.04	36	113.99	77	129.75	118	145.31
-4	98.44	37	114.38	78	130.13	119	145.68
-3	98.83	38	114.77	79	130.51	120	146.06
-2	99.22	39	115.15	80	130.89	121	146.44
-1	99.61	40	115.54	81	131.27	122	146.81
0	100.00	41	115.93	82	131.66	123	147.19
1	100.39	42	116.31	83	132.04	124	147.57
2	100.78	43	116.70	84	132.42	125	147.94
3	101.17	44	117.08	85	132.80	126	148.32
4	101.56	45	117.47	86	133.18	127	148.70
5	101.95	46	117.85	87	133.56	128	149.07
6	102.34	47	118.24	88	133.94	129	149.45
7	102.73	48	118.62	89	134.32	130	149.82
8	103.12	49	119.01	90	134.70	131	150.20
9	103.51	50	119.40	91	135.08	132	150.57
10	103.90	51	119.78	92	135.46	133	150.95
11	104.29	52	120.16	93	135.84	134	151.33
12	104.68	53	120.55	94	136.22	135	151.70
13	105.07	54	120.93	95	136.60	136	152.08
14	105.46	55	121.32	96	136.98	137	152.45
15	105.85	56	121.70	97	137.36	138	152.83
16	106.24	57	122.09	98	137.74	139	153.20
17	106.63	58	122.47	99	138.12	140	153.58
18	107.20	59	122.86	100	138.50	141	153.95
19	107.40	60	123.24	101	138.88	142	154.32
20	107.79	61	123.62	102	139.26	143	154.70
21	108.18	62	124.01	103	139.64	144	155.07
22	108.57	63	124.39	104	140.02	145	155.45
23	108.96	64	124.77	105	140.39	146	155.82
24	109.35	65	125.16	106	140.77	147	156.19
25	109.73	66	125.54	107	141.15	148	156.57
26	110.12	67	125.92	108	141.53	149	156.94
27	110.51	68	126.31	109	141.91	150	157.31
28	110.90	69	126.69	110	142.29		
29	111.28	70	127.07	111	142.66		
30	111.67	71	127.45	112	143.04		

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