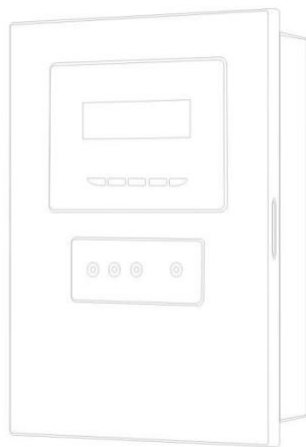


Temperatuer Controller of Dry Transformer

BWDK-3206H | Series manual |



Safety Guidance

Please read the instructions carefully before installing and operating the controller, and proper keeping.

Warning

- ◆ Please read the instructions and wiring diagram carefully before using the controller.
- ◆ The controller monitors dangerous power transformers. If users do not obey a prescribed procedure to operate, that will lead to property damage or serious injury or even death.
- ◆ Only qualified technical personnel are allowed to operate the controller, and all safety instructions, installation, operation and maintenance procedures in the manual should be known before operating.
- ◆ Make sure that all electrical connections are correct and secure. The controller must be grounded reliably.
- ◆ After the controller is powered on, some terminals are energized, please be careful.
- ◆ **The sensor cable plug and the power cord should be separated from the controller before the transformer voltage test, so as not to damage the controller!**

Attention

- ◆ The controller may only be used for the purpose specified by our company, and unauthorized modifications may cause the controller to malfunction or even fail.
- ◆ Please note the use conditions of the controller, especially the humid environment.
- ◆ The controller is avoided to be used in the atmosphere contains sulfur dioxide, hydrogen sulfide and other corrosive gases using, otherwise it will be damaged.
- ◆ Do not apply a voltage or current that is greater than the rated value on the output terminals.
- ◆ Do not use a lighter to grill the sensor, otherwise the sensor will fail.
- ◆ Undefined terminals are not allowed to use.
- ◆ Please put the instructions in an easy place and give it to all users.

Special Product Description:

If the contents of the instruction do not conform to the product, the wiring diagram of the actual product shall prevail.

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01 The Description and Type Selection of General Functions

Product overview

BWDK-3206H series dry type transformer integrated controller is newly designed based on the combination of customer requirements, structural design and performance reliability. It not only has dry-type transformer temperature monitoring function, but also integrates inductive high-voltage live display device, terminal box and other extended functions. It is an integrated innovative product that fully embodies the "customer-centric".

Functional features

Temperature monitoring of dry-type transformer: three-phase circuit measurements and display; the maximum display; input open circuit and failure self-inspection display and output; cooling draught fan manual/automatic start-stop display and output; over-temperature alarms, over-temperature trip display and output; displayed value compensation of all channels; "black box"; control for timing start-stop of the draught fan; Temperature simulation. The full series uses the principle of number uniqueness to define input& output terminal functions, in order to facilitate the client drawing design, field wiring and control box change. Communication/simulation current is output from the terminals, no need to the intermediate conversion terminal. For the sensor cable interface, the front-end installation method is adopted to provide easy installation for clients.

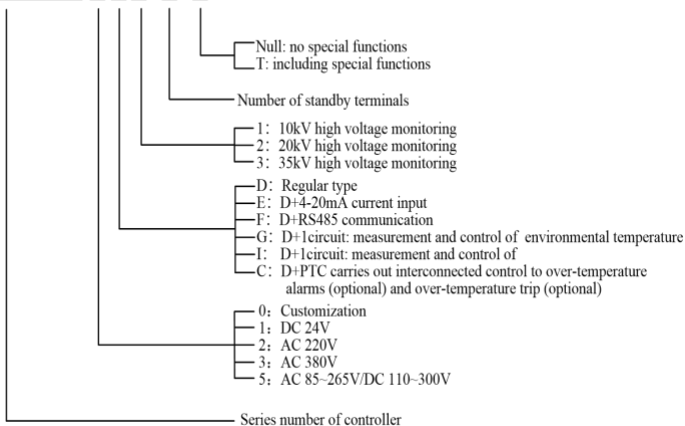
Inductive high voltage charged display device is a new non-contact high-voltage electrification detection device. It do not directly connect with high voltage live body. It can sense the electric field signal and accurately reflect the live condition of the high voltage live body and use microprocessors for signal processing and latching control outputs. It has features such as live no-power display, self-check, and start of forced lockout loops. The product meets the requirements of DL/T 538-2006 standard and is the preferred device used in high-voltage electrical equipment in the house to prevent entering into charged spacing and electrical appliance misoperation.

Terminal box: Air switches and a certain number of terminals will be added and sufficient space will be reserved for wiring, in order to achieve the functions of the terminal box.

Extended functions: Monitor and control the ambient temperature and humidity as well as carry out relevant functional expansion based on client demands.

Type selection (any combination between E, F, G, I and C)

BWDK-3206H X X X -X /T



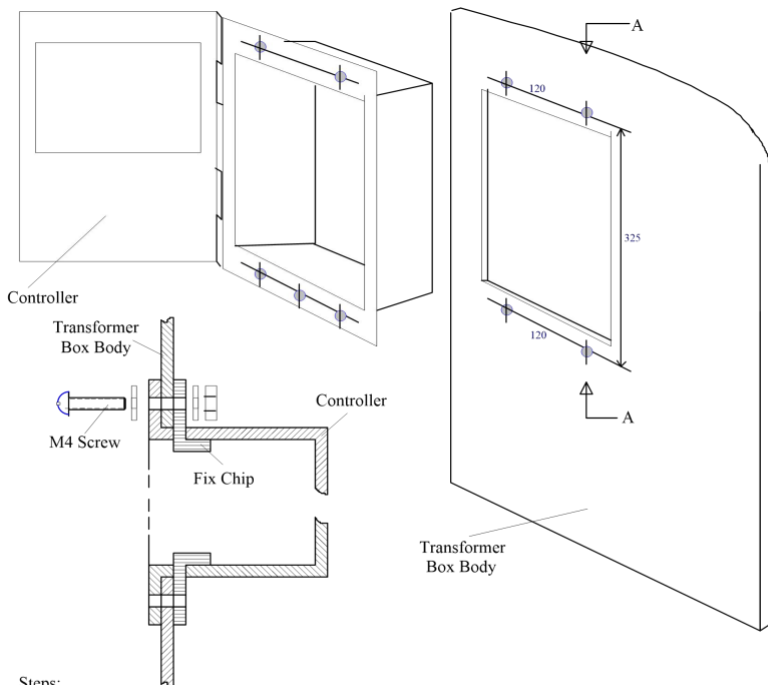
02 Technical Parameters

Basic technical parameters

Ambient temperature (°C)	Relative humidity (%RH)	Measurement range(°C)	Sensor type
-20 ~ 55	< 95 (25°C)	-30.0 ~ 240.0	Pt100 (Three-wire)
Power frequency (Hz)	Power voltage (V)	Power consumption of controller (W)	Resolution(°C)
50/60(±2)	AC220 (-15%, +10%)	≤8	0.1
Contact capacity		Accuracy grade	
Fan: 6A 250VAC (cosφ=0.4) Other: 5A 250VAC/5A 30VDC (resistive)		Grade 1 (controller: grade 0.5; sensor: grade B)	

Conforming to the relevant standards	Dimension (mm)
JB/T7631-2016, ISO9001:2008, IEC61000-4:2002, GB/T17626-2008	Opening $222^{+1} \times 312^{+1}$ Appearance $240 \times 345 \times 95$

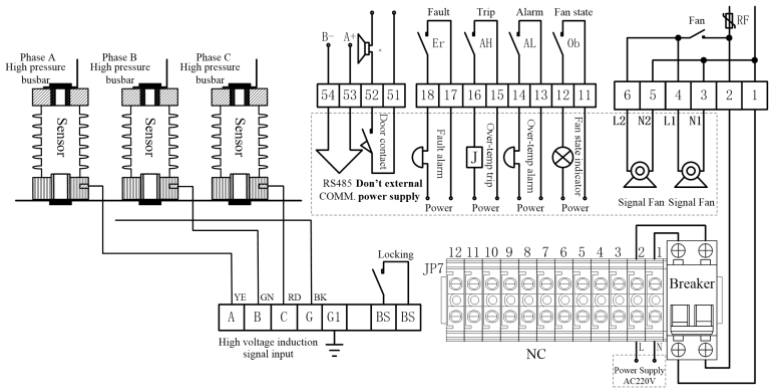
03 Installation Instructions



Steps:

- ① An inlaid hole and four retaining holes are tapped on the transformer box body as shown in the installation dimension figure.
- ② The temperature controller door is opened and the temperature controller is inserted into the inlaid hole.
- ③ Temperature controller is fixed properly with M6 screws and Fixed film.

04 Wiring Diagram Example and Instructions



Notes: The terminal with "JP7" and without cables is a standby terminal. There is no definition for the standby terminal.

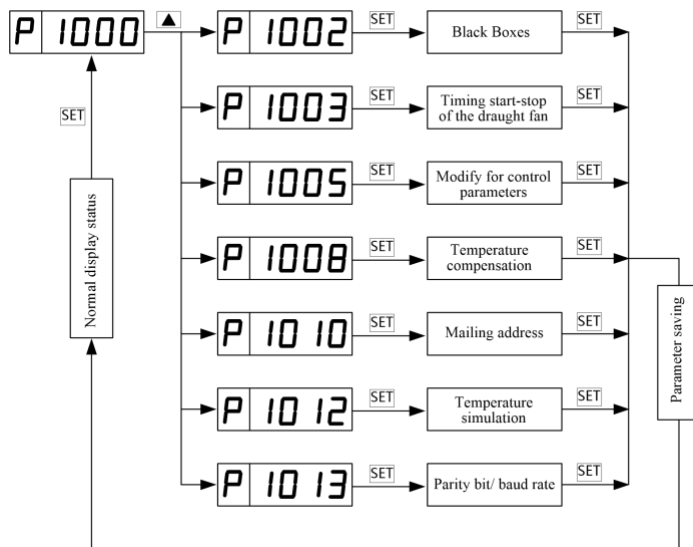
- Terminal 1 and 2 are controller working power supply and connected to AC220V (please indicate in orders if any special things exist).
- Terminal 3, 4, 5 and 6 are draught fan active output. Users cannot use outer power supply when connecting the draught fan.
- Terminal 11 and 12 are signal output of fan remote transmission (passive contact).
- Terminal 13 and 14 are over-temperature alarm output (passive contact).
- Terminal 15 and 16 are over-temperature trip output (passive contact).
- Terminal 17 and 18 are fault alarm output (passive contact).
- Terminal 51 and 52 are door contact signals input (do not use the outer power supply because of internal power supply).
- Terminal 53 and 54 are RS485 communications (F-type functions).
- Terminal A,B,C&G are high-voltage sensing signal inputs of phase A, phase B, and phase C respectively. (Line colors yellow, green and red correspond to phase A, phase B, and phase C)
- Terminal G1 should be directly grounded.
- Terminal BS is high voltage latching output.
- The model and number of standby terminals are remarked when users order goods.

05 Human Machine Interface

Key instructions

Buttons	Functions	Instructions
SET	Setup key	Make sure and enter into the next step.
▲	Added key/manual key	Functions 1: Set plus 1 for parameters, which could be done rapidly by long pressing. Functions 2: Start and stop the draught fan by hands (when the temperature display interface and draught fan are not started automatically).
▼	Reduced key/maximum key	Functions 1: Set cut 1 for parameters, which could be done rapidly by long pressing. Functions 2: Always display the highest temperature in all phases.
Fn+ESC	Reset button	Press this button for over 1 second to reset the controller.

Common function codes diagram



Note 1: When displaying the function prompts, press SET key to enter into the corresponding data display window; and with multiple function parameters, repeat pressing the SET key to set up from the larger numbers from the lower serial number.

Note 2: The following parameters are conventional default values. Details are subject to the controller certification or the wiring figure.

Black box (P1002)

No.	Display	Instructions	Remarks
1	P-EE-	Power failure records	Display the temperature during the power failure, and press the ▲ key to check the temperature of all phases during the power failure.

Timing Start-Stop of the Draught Fan (P1003)

No.	Display	Instructions	Default (h)	Range (h)
1	P-00-	Timing start-stop setting of the Draught Fan	0	0-150

Modification of Control Parameters (P1005)

● Setting of Conventional Control Parameters

No.	Display	Instructions	Default (°C)	Range (°C)
1	P-Ob-	Start-stop target values of Fan	90.0	-30.0-240.0
2	P-dF-	Start-stop return differences of Fan	10.0	0.0-15.0
3	P-AH-	Over-temperature trip target values	150.0	-30.0-240.0
4	P-AL-	Over-temperature alarm target values	130.0	-30.0-240.0

● G-type control parameter setting (following the conventional control parameter setting serial number 4)

No.	Display	Instructions	Default (°C)	Range (°C)
5	P-Obj	Start-stop target values of room fan	35.0	-30.0-240.0
6	P-dFJ	Start-stop return differences of room fan	2.5	0.0-15.0

7	P-AHJ	Target values of room trip	70.0	-30.0-240.0
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- I-type control parameter setting (following the conventional control parameter setting serial number 4)

No.	Display	Instructions	Default (°C)	Range (°C)
5	P-ALJ	Target values of iron core alarm	130.0	-30.0-240.0

Notes: The default value of the target value return difference is 0.3°C unless otherwise indicated; When the corresponding temperature is higher than the total values of target values and return differences, its corresponding functions are output.

Temperature Compensation (P1008)

No.	Display	Instructions	Default (°C)	Range (°C)
1	A-Ad-	Temperature compensation entering the phase A	0.0	-19.9-19.9
2	b-Ad-	Temperature compensation entering the phase b		
3	C-Ad-	Temperature compensation entering the phase C		
4	d-Ad-	Temperature compensation entering the phase d		

Mailing Address Setting (P1010)

No.	Display	Instructions	Default	Range
1	P-dd-	Mailing address setting	1	1-247

Temperature Simulation (P1012)

No.	Display	Instructions	Simulation Range (°C)
1	A-AA-	Entering the temperature simulation	-30.5-240.5

Notes: The simulation temperature is not involved in controlling over-temperature trip!

Setting of Parity Bit and Baud Rate (P1013)

No.	Display	Instructions	Default	Range
1	P-PC-	Parity bit setting	0 (No parity)	0-2
2	P-bL-	Baud rate setting	3 (9600)	0-4

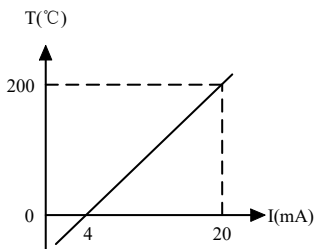
Note 1: Parity bit: 0: No parity (N) 1: Even parity (E) 2: Odd parity (O)

Note 2: Baud rate: 0:1200 1:2400 2:4800 3:9600 4:19200

06 4-20mA Current Output (E Type)

Technical requirements for current output

- Load resistance: $R \leq 500\Omega$; Output accuracy: $\pm 1\%$
- The corresponding curve and relation expression between measured temperature and output current of the controller:



Relation expression of temperature and current: $I = (16T/200) + 4$

Therein: T is the temperature value of one phase ($^{\circ}\text{C}$)

I refers to the current value corresponding to the temperature of this phase (mA)

Functional features

There is a co-linearity relation between 4-20mA current signals and the detected temperature values (0.0-200.0 $^{\circ}\text{C}$), and one circuit temperature corresponds to one circuit current. If users have special requirements for current signals, please explain them when placing orders.

07 Instructions of RS485 Communication Protocol (FType)

Data Frame Format

Start Bit	Data Length	Parity Bit	Stop Bits
1 bit	8 bits	0 or 1 bit (settable)	1 bit

The Upper Computer Message Format (Example)

Message Format	Instrument Address	Function Code	Reading Register Start Address	Number of Reading Data	CRC Check Code
Telemetry (three routes)	0x01	0x03	0x0000	0x0003	0x05CB
Telemetry (four routes)	0x01	0x03	0x0000	0x0004	0x4409
Remote Communication	0x01	0x04	0x0000	0x0001	0x31CA

Notes: The number of start addresses and reading data can be changed according to actual conditions.

Controller Return Message format (Example)

Message Format	Instrument Address	Function Code	Number of Reading Bytes	Data Reading	CRC Check Code
Telemetry (three routes)	0x01	0x03	0x06	Temperature data of each phase	####
Telemetry (four routes)	0x01	0x03	0x08	Temperature data of each phase	####
Remote Communication	0x01	0x04	0x02	Relay status data	####

The Address Definition and Data Analysis of the Register

- The Address and Data Instructions of Telemetry Register

Attribute Description	Register Address	Data Type	Proportionality Factor	Data Range
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Temperature data of phase A	0x0000	int16	0.1	-300~2400
Temperature data of phase b	0x0001	int16	0.1	-300~2400
Temperature data of phase C	0x0002	int16	0.1	-300~2400
Temperature data of d circuit	0x0003	int16	0.1	-300~2400

● The Instructions of Special Telemetry Data

Temperature Data	Failure Status of the Controller	Instructions
0x7000	-OP-	Open circuit
0x8000	-OL-	Beyond the lower limit
0x6000	-OH-	Beyond the upper limit

● The Address and Data Instructions of Remote Communication Register

Attribute Description	Register Address	Data Type	Remarks
Relay status data	0x0000	uint16	One bit stands for the status of one relay.

● The definition of relay status data low eight bits (Bit 0 stands for no actions, while bit 1 stands for actions)

Bit Number	bit7	bit6	bit5	bit4
Functions	Door contact status	Heating and dehumidification	Fan faults	
Bit Number	bit3	bit2	bit1	bit0
Functions	Fault alarm	Over-temperature alarm	Over-temperature trip	Draught fan running

Three-circuit Temperature Measurement (D/E/F)

Bit Number	bit7	bit6	bit5	bit4
Functions	Door contact status	Heating and dehumidification	Fan faults	Fault alarm

Bit Number	bit3	bit2	bit1	bit0
Functions	Iron core alarms or machine room fans	Over-temperature alarm	Over-temperature trip	Draught fan running

Four-circuit Temperature Measurements (G/I)

Notes: Door contact status, heating and dehumidification and Fan faults are used in case of the special function requirement

Remote control (special function, which is put forward during goods ordering)

- The Instructions on the Address Definition of the Remote Control Register

The telecontrol relay address corresponds to the definition of relay status bit in the remote communication function. For example, bit0 corresponds to 0x0000, which is the address of the remote control draught fan relay. By analogy, bit0-bit7 corresponds to 0x0000-0x0007. For details, refer to the definition of the relay status data low eight bits; However, in order to avoid mistrip, the upper computer cannot remotely control the over-temperature trip relay contact.

- Remote Control Draught Fan Message (Example)

Message Format	Instrument Address	Function Code	Address of Telecontrol Delay	Control Commands	CRC Check Code
Remote Control Draught Fan (Start)	0x01	0x05	0x0000	0xFF00	0x8C3A
Remote Control Draught Fan (Stop)	0x01	0x05	0x0000	0x0000	0xCDA

Notes: In event of normal communications, the upper computer message is consistent with the controller return message.

08 Inductive high-voltage monitoring

Function description

- When the power supply of inductive high-voltage monitor is powered by battery, the indicator light flashes and the relay is locked.

Note:

- The grounding wire should be directly led to the nearest grounding point and directly grounded
- Ensure that continuity of shielded wires between sensors and inductive high-voltage monitor. The shielded wire cannot be disconnected from the middle or through the middle terminal.
- Shielding wire should be kept away from strong electricity.
- Note: inductive high-voltage monitor alone is not enough to prove that the system is not powered. If there is any doubt or influence of the prescribed operating procedures, an electroscopes that meets the requirements of DL 740 should be used.

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The contents listed in this manual are for reference and the manufacturer reserves the right to change the contents