

YDJ series portable High Voltage Testing Transformer

Operating manual



Shanghai Yebao Enterprise Development Co.,Ltd

Catalog

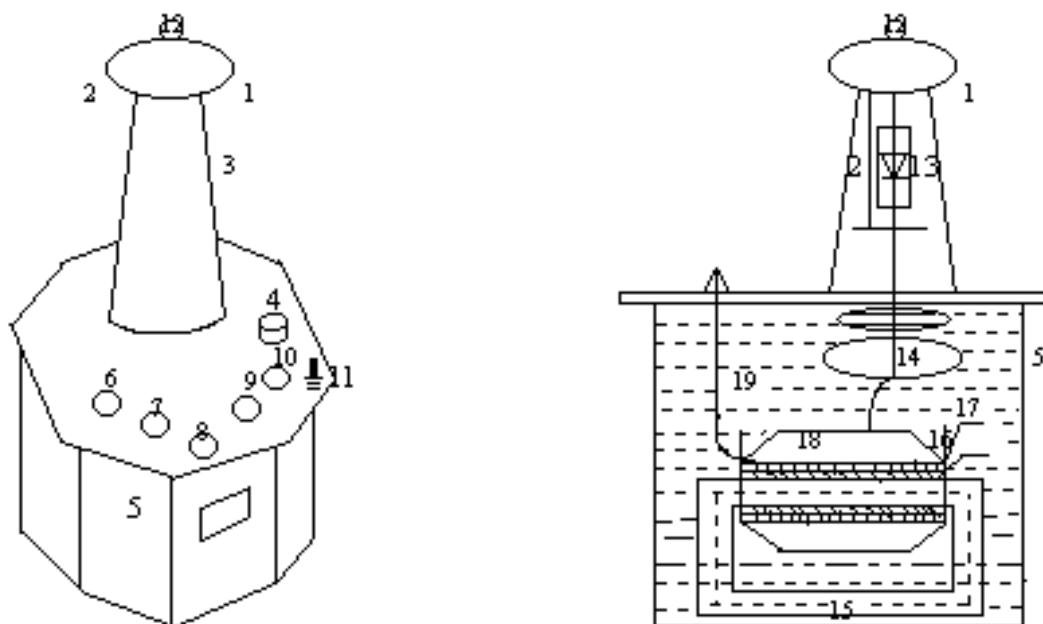
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1. Instruction

YDJ Series Portable AC/DC high voltage testing transformers are new type testing transformers which have small volume, light weight, tight structure, multi-function and easy operation. It is widely used in the field of Electricity, Mining and R&D department. It is the key instrument for the experiment of withstanding high voltage and measuring leaking current.

2. Structure

YDJ series portable high voltage transformer iron core is single frame style. The coil uses same core cylinder structure. Primary low-voltage winding rolls on the iron core. Second high-voltage winding rolls on the outside of primary low-voltage winding. This coaxial arrangement reduces the coupling loss between the windings. High voltage silicon rectifier stack is packaging in the HV bushing, the shell of product and iron core winding forms a better octangle structure. Product looks more beautiful. The pictures of inside and outside are in the following table.



Picture 1: YDJ testing transformer inside and outside structure

1-Equipotential ball; 2-Silicon stack short; 3-HV bushing; 4-oil vial; 5-shell;

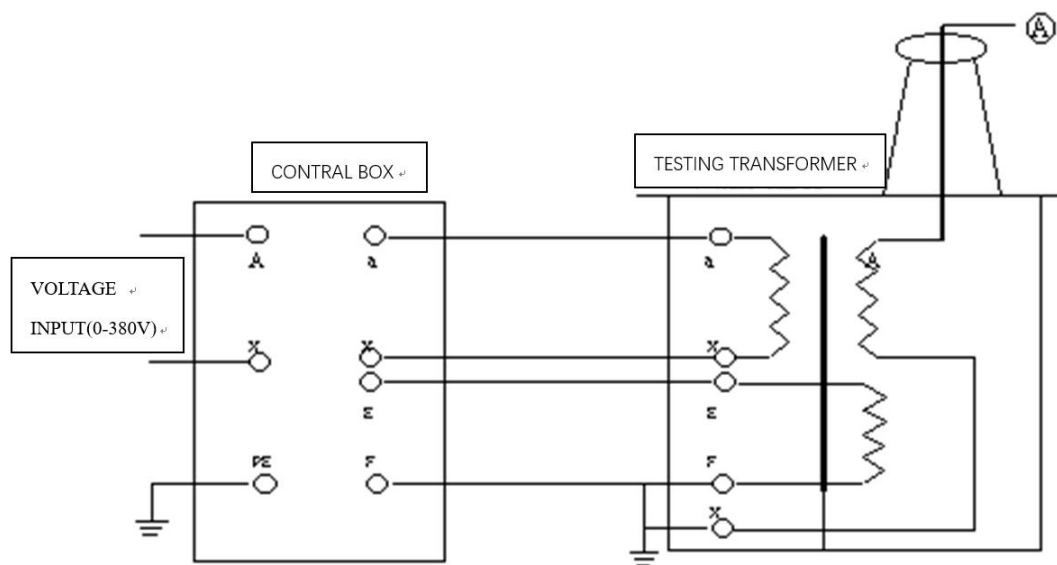
6、 7-Low Voltage input(Range 0-380V):Terminal a & x;

8、 9-Terminal E&F for Voltage Meter(show the output Voltage RATIO:1500);

10-High Voltage side X (connect with the ground); 11-Shell ground terminal; 12-High Voltage output side A; 13-High rectification silicon stack; 14-Inside Equipotential Loop; 15-Transformer iron core; 16-Primary Low-Voltage Winding; 17-Voltage Tester winding; 18-Secondary High-Voltage Winding; 19-Oil.

3. Working principle

- YDJ series portable high voltage testing transformers are single phase transformer, jointing mark NO. II. The single high voltage transformer working process: AC 220V(Capacity>10KVA, using 380V) input power control box, through the regulator of power control box, output the voltage between 0~200V(Capacity>10KVA,0~400V) to the primary winding of the transformer. According to the electromagnetic induction principle, the high voltage winding side of testing transformer can have the high voltage we need in the experiment. The working principle shows in the picture 2.



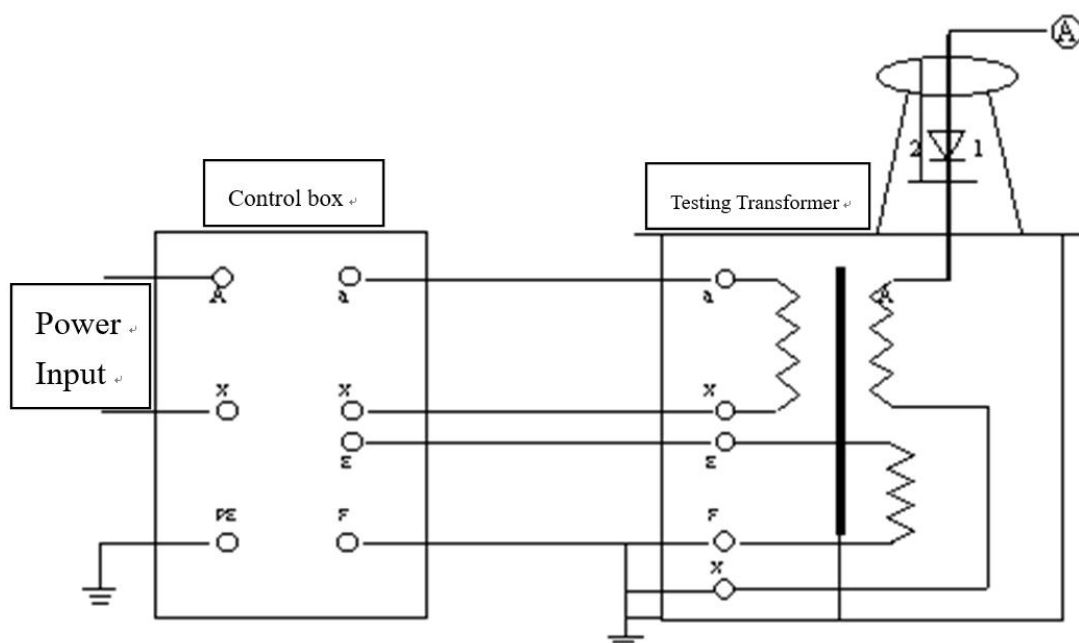
Picture 2: Single YDJ high voltage testing transformer working principle

Low Voltage input(Range 0-380V):Terminal a & x; Terminal E&F for Voltage Meter(show the output Voltage RATIO:1000); High Voltage side X (connect with the ground); High Voltage output side A;

- Single AC/DC type high voltage transformer working principle shows in Picture 3. The picture shows: HV bushing has rectification silicon stack, the silicon stack tandem connect with the high voltage loop as high voltage rectification to get DC

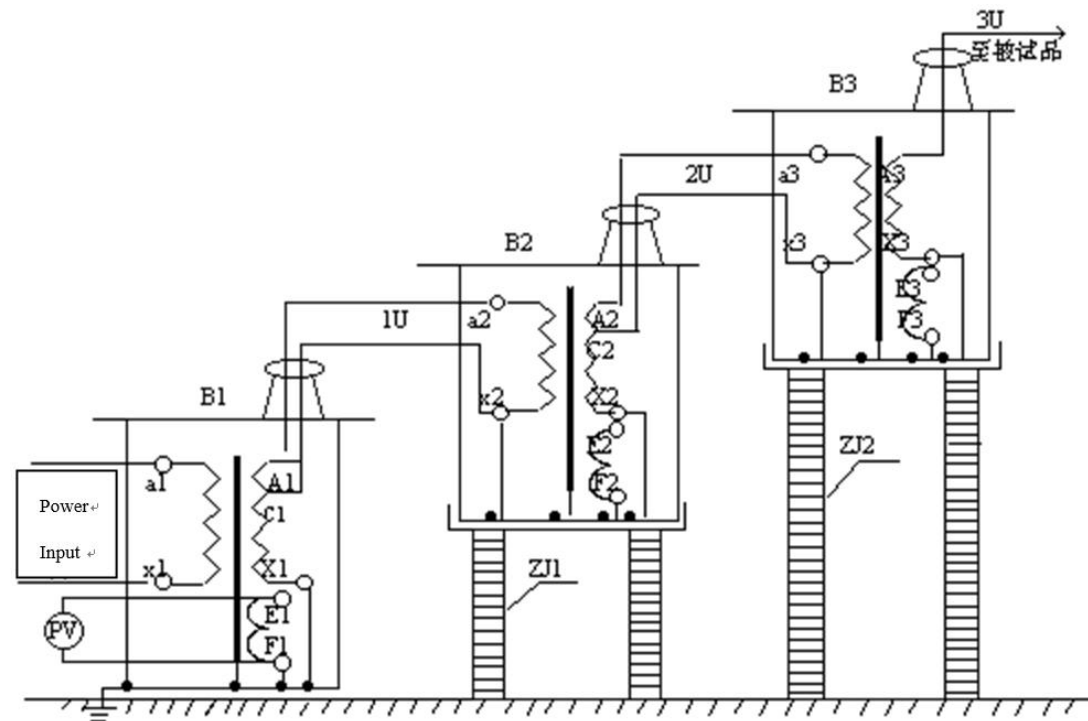
high voltage. When the high voltage silicon stack shorted by the short out bar, the transformer can get AC high voltage. Without the short out bar, the transformer gets DC high voltage.

- Three high voltage testing transformers series excitation can achieve higher voltage shows in the Picture 4, Series excitation high voltage testing transformer have great priority, because the whole test set is made of several single testing transformers. The single testing transformer has small volume, light weight, easy moving. It can either tandem connect to get higher voltage or using separately. The whole sets are cheap and durable. Picture 3 show: In the series excitation of three single testing transformers, the output voltage of single testing transformer is U , the first, second level of testing transformer has exciting winding. They are $A1, C1$ and $A2, C2$. When the control voltage connect with the primary winding $a1, x1$ of first level testing transformer $B1$, the output voltage of exciting winding $A1, C1$ will be the input voltage of primary winding in testing transformer $B2$. The output voltage of exciting $A2, C2$ in the second level testing transformer $B2$ can be the input voltage of the primary winding in testing transformer $B3$. Due to the shell of first level testing transformer $B1$ connected with ground and the second and third testing transformer have the insulating support from the ground, the output voltage of testing transformer $B1, B2$ and $B3$ versus ground is $U, 2U$ and $3U$.



Picture 3: Single YDJ AC/DC high voltage testing transformer working principle

In the testing transformer: a, x is low voltage input side; A, X is high voltage output side; E, F is the voltage meter terminal. 1- high voltage rectifying silicon stack; 2-Silicon short out bar.



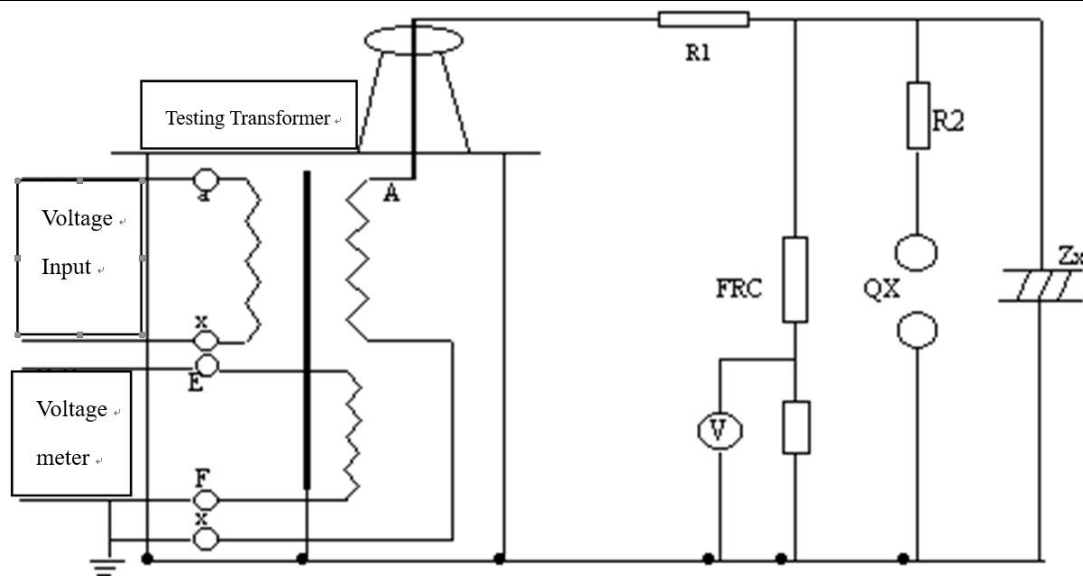
Picture 4: 3 single high voltage testing transformer series excitation working principle

B1,B2,B3-Series excitation high voltage transformers; U,2U,3U-the voltage versus ground;

PV- high voltage meter(KV); ZJ1,ZJ2- insulating support.

4. Operating method and Announcement

1. The connecting method of YDJ high voltage testing transformer shows in picture 5. Before withstanding voltage test under the industrial frequency, we should choose the value of current-limiting resistance according to the power capacity, adjust the distance between discharging ball according to the needed high voltage of sample. We should insert FRC resistance capacitance divider on the high voltage side to test voltage to improve the testing accuracy of testing sample.



Picture 5: Connecting method under Industrial Frequency

R1,R2-Current-Limiting resistance; Qx-distance between discharging ball; Zx- Testing sample

FRC-RC divider; V-divider high voltage meter

Connect the industrial frequency testing set according to Picture 5 and Picture 2, Terminal X of high voltage winding in the testing transformer, Terminal F of voltage meter winding, the shell of testing transformer and the power control box must connect with ground.

When three testing transformers do the series excitation experiment, the Terminal X of primary winding, terminal F of voltage meter and terminal X of high voltage winding in the second, third level testing transformer must connect with the shell of own testing transformer. The shell of second, third level must on the insulating support. Except the first level, the shell of second, third level testing transformer don't connect with the ground. The connect method shows in the Picture 4.

Before Power ON, The regulator of power control box must reduce to 0. After power ON, The green indicator lights up, Press the start up button, the red indicator lights up to show testing transformer has electricity and you can boost voltage.

Clockwise rotate the voltage regulator in a constant speed from 0.

Announcement

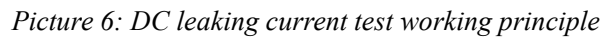
1. The employee should separate their duty, set the safe distance , check the sample carefully and the conditions of connecting ground. The whole process should be

monitored.

2. The testing sample should be cleared and keep dry to avoid damaging the sample and the error of experiment.
3. Focus on the large instrument experiment, the testing transformer should do the No-load experiment to recalculate the precision of voltage meter and adjust the distance of discharging ball.
4. The voltage increasing speed should be slow and prevent increasing voltage suddenly, such as switch on if the voltage regulator is not in 0 and don't switch off suddenly, we usually switch off when the regulator reduce to 0.
5. During the experiment of increasing voltage or withstanding the voltage, the following circumstance appears: 1. the indicator of voltage meter and ampere meter changes great. 2. Abnormality noise appears. 3. Fire and smoking appears. We should stop the experiment.

2.

The connecting method of doing DC withstanding high voltage test and leaking current test with the YDJ AC/DC high voltage testing transformer shows in Picture 6. Because this testing transformer is AC/DC high voltage testing transformer, we should take out the silicon stack to change the current to DC current. Before doing DC leaking test, we should chose the value of the current-limiting resistance first to ensure the breaking current in the current leaking test is smaller than the current in the silicon stack, then chose the value of high voltage filter capacitor according to the request of wave shape from sample. To improve the testing accuracy for sample under the voltage, we should insert the FRC Resistance capacitance divider on the high voltage side.



G-silicon stack short out bar; FRC-Resistance capacitance divider; V- voltage meter;

Connect the industrial frequency testing set according to Picture 6 and Picture 3, Terminal X of high voltage winding in the testing transformer, Terminal F of voltage meter winding, the shell of testing transformer and the power control box must connect with ground.

Before Power ON, The regulator of power control box must reduce to 0. After power ON, The green indicator lights up, Press the start up button, the red indicator lights up to show testing transformer has electricity and you can boost voltage.

Clockwise rotate the voltage regulator in a constant speed from 0.

1. The employee should separate their duty, set the safe distance , check the sample carefully and the conditions of connecting ground. The whole process should be monitored.
2. The testing sample should be cleared and keep dry to avoid damaging the sample and the error of experiment.

3. Focus on the large instrument experiment, the testing transformer should do the No-load experiment to recalculate the precision of voltage meter and adjust the distance of discharging ball.
4. The voltage increasing speed should be slow and prevent increasing voltage suddenly, such as switch on if the voltage regulator is not in 0 and don't switch off suddenly, we usually switch off when the regulator reduce to 0.
5. During the experiment of increasing voltage or withstanding the voltage, the following circumstance appears: 1. the indicator of voltage meter and ampere meter changes great. 2. Abnormality noise appears. 3. Fire and smoking appears. We should stop the experiment.

Relative Product

The following product should pay extra money if you order it

1. XZC series Power control box Capacity: 1KVA~5KVA, Input voltage: 220V
2. XZC series Power control table Capacity: 10KVA~300KVA, Input voltage 220 or 380V
3. Digital Micro-Ampere Meter: SWB – I
4. High voltage filter capacitor: 0.01uF, 40~100KV
5. High voltage DC discharging rod: ZF—70KV
6. Discharging Ball: Q---50, 100, 150, 200, 250, 500
7. Standard Oil tester: 400ml
8. Folding type trolley
9. RC divider: FRC—(50, 100, 150, 200)KV
10. Insulating support: (50, 100, 200, 250, 500)KV
11. High voltage silicon stack: 2DL(150, 300, 450)KV
12. Resistance: 50, 100 Ω

5. Main instrument calculation

1. Testing transformer

The rated voltage of high voltage side should be smaller than the maximum testing voltage of the sample, the rated current should be smaller than the maximum capacitance current. The calculating method of the capacity about the sample's capacitance and current shows in the following:

$$I =$$

I – current of sample's capacitor, A; f – Power frequency, Hz;

C_x – sample capacitance, μF ; U – the effective value of the testing voltage, V;

S_e – Rated capacity of the testing transformer, KVA

The capacitance C_x of the sample can be measured by the AC bridge.

The following table is the common sample's capacitance

Table 1

Line insulation	0~50	Capacitor Transformer	3000~5000
HV bushing	50~600	Cables (per meter)	150~400
HV breaker	100~1000	Electronical Transformer	500~1000
Current inductor			1000~6000
Electromagnetic Transformer			6000~10000

2. Voltage Regulator

(1) Self voltage regulator. It has the function of wide voltage range, low power loss, little wave deformation. The capacity of the voltage regulator should be 0.75~1 fold of the testing transformer. It is widely used in the testing transformer which the capacity is under 100KVA.

(2) Induction regulator. The voltage range is wide, little wave deformation, however the structure is complicated and the price is expensive. It is widely used in the testing transformer which the capacity is over 100KVA.

3. Current-limiting resistance

The function of the current-limiting resistance is to restrict the breaking current to protect the testing transformer and prevent the damage. The value should be $0.5 \sim 1 \Omega / V$ according to the highest voltage of the testing transformer. The current-limiting resistance can be water resistance. Attention: the water cannot be full of the glass pipe to prevent explode.

4. Discharging ball

The way of arranging discharging ball have vertical and horizontal type, the distance between balls: s and the diameter of the ball: D , we should keep $0.05D \leq s \leq 0.5D$.

6. Technical parameters

1. Working conditions

Environment temperature should below 40℃ and over -20℃ ;

Relative air humidity should below 90%

The altitude should below 2000 meters.

2. Working voltage

Input voltage of power control box is 50Hz 0~220V or 380V, relative error should below $\pm 10\%$;

3. YDJ series AC/DC testing transformers rated parameters;

Type NO.	Capacity	HV Output KV		HV Output mA		Low voltage Input		Meter V	Ratio
	KVA	AC	DC	AC	DC	V	A	AC	
YDJ(Z)-1.5/50	1.5	50	70	30	15	200	7.5	100	500
YDJ(Z)-3/50	3	50	70	60	15	200	15	100	500
YDJ(Z)-5/50	5	50	70	100	15	200	25	100	500
YDJ(Z)-10/50	10	50	70	200	50	200	50	100	500
YDJ(Z)-20/50	20	50	70	400	100	380	53	100	500
YDJ(Z)-30/50	30	50	70	600	100	380	79	100	500
YDJ(Z)-5/100	5	100	140	50	15	380	13	100	1000
YDJ(Z)-10/100	10	100	140	100	50	380	26	100	1000
YDJ(Z)-20/100	20	100	140	200	100	380	53	100	1000
YDJ(Z)-30/100	30	100	140	300	100	380	79	100	1000
YDJ(Z)-20/150	20	150	210	130	50	380	53	150	1000
YDJ(Z)-30/150	30	150	210	200	100	380	79	150	1000

7. Ordering Instruction

Please make sure the name, type, quantity of the testing transformer and relevant product.

If you have specific requirements about the product, please provide detailed documents.

So we can provide faster, better service for you.

8. Packing list

YDJ series testing transformer operating manual	1 piece
Test report	1 piece
Product certificate	1 piece
Packing list	1 piece

YDJ Series AC Testing Transformer Parameters

Product Type	Capacity	High Voltage Output		Low Voltage Input		Ratio	Temperature Rise in 30mins
	KVA	KV	mA	V	A		
YDJ-1.5/50	1.5	50	30	200	7.5	500	10℃
YDJ-3/50	3	50	60	200	15	500	10℃
YDJ-5/50	5	50	100	200	25	500	10℃
YDJ-10/50	10	50	200	200	50	500	10℃
YDJ-20/50	20	50	400	380	53	500	10℃
YDJ-30/50	30	50	600	380	79	500	10℃
YDJ-50/50	50	50	1000	380	120	500	10℃
YDJ-5/100	5	100	50	380	13	1000	10℃
YDJ-10/100	10	100	100	380	26	1000	10℃
YDJ-20/100	20	100	200	380	53	1000	10℃
YDJ-30/100	30	100	300	380	79	1000	10℃
YDJ-50/100	50	100	500	380	132	1000	10℃
YDJ-100/100	100	100	1000	380	263	1000	10℃
YDJ-20/150	20	150	130	380	53	1000	10℃
YDJ-30/150	30	150	200	380	79	1000	10℃
YDJ-50/150	50	150	330	380	132	1000	10℃
YDJ-100/150	100	150	665	380	263	1000	10℃
YDJ-50/200	50	200	250	380	132	1000	10℃
YDJ-100/200	100	200	500	380	263	1000	10℃
YDJ-200/200	200	200	1000	380	526	1000	10℃
YDJ-300/200	300	200	1500	380	790	1000	10℃
YDJ-100/300	100	300	330	380	263	1000	10℃
YDJ-200/300	200	300	665	380	526	1000	10℃
YDJ-300/300	300	300	3000	380	790	1000	10℃

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