

Please read the instruction manual carefully before using the product !



35kV Current Transformer

Instructions for transportation, installation and maintenance

Taikai Group

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Contents

1. Overview.....	3
1.1 Scope of application.....	3
1.2 Executive standard.....	3
1.3 Verification procedures.....	3
2 Product descriptions.....	3
2.1 Working conditions and environment.....	3
2.1.1 Ambient temperature.....	3
2.1.2 Atmospheric conditions.....	3
2.1.3 Monthly average maximum relative humidity.....	3
2.1.4 Maximum wind speed.....	3
2.1.5 Installation site.....	3
2.1.6 Earthquake resistance.....	3
2.2 Main technical parameters.....	3
2.2.1 Product model meaning.....	3
2.2.2 Polarity.....	4
2.2.3 Rated voltage.....	4
2.2.4 Rated frequency.....	4
2.2.5 Rated primary current.....	4
2.2.6 Rated secondary current.....	4
2.2.7 Secondary winding combination.....	4
2.2.8 Rated output.....	4
2.3 Product structure and working principle.....	5
2.3.1 Product structure.....	5
2.3.2 Schematic diagram.....	5
2.4 Secondary wiring terminal.....	5
3. Transportation.....	5
3.1 Unpacking.....	6
3.2 On-site.....	6
3.3 Storage.....	6
4. Lifting and installation.....	6

4.1 Lifting.....	6
4.2 Installation.....	6
4.3 Grounding.....	6
4.4 Primary terminal connection.....	7
4.5 Secondary wiring terminal.....	7
5. Commissioning and maintenance.....	7
5.1 Inspection before putting into operation.....	7
5.2 Inspection and maintenance.....	7
6. Spare parts.....	9
7. Accompanying documents.....	9
8. Ordering instructions.....	9

1. Overview

1.1 Scope of application

This instruction manual is suitable for 35kV outdoor current transformers, the model of LZZBJ9-40.5W; the manual provides the usage, working environment, basic performance of the above products, as well as the transportation, use, maintenance and precautions of the products.

1.2 Executive standard

GB20840.1 "Instrument Transformer Part 1: General Technical Requirements"

GB20840.2 "Instrument Transformers Part 2: Supplementary Technical Requirements for Current Transformers"

1.3 Verification procedures.

JJG313-2010 "Current Transformer for Measurement"

2. Product descriptions

2.1 Working conditions and environment

2.1.1 Ambient temperature

Maximum temperature: +45°C

The average daily temperature does not exceed: +35°C

Minimum temperature: -25°C

2.1.2 Atmospheric conditions

There is no dirty, corrosive and explosive medium in the atmosphere that seriously affects the insulation of the transformer.

2.1.3 Monthly average maximum relative humidity: 95% (at 25°C).

2.1.4 Maximum wind speed: 35 m/s.

2.1.5 Installation site: Outdoor

2.1.6 Earthquake resistance:

The horizontal acceleration of the earthquake is 0.25 g, the vertical acceleration is 0.125 g, the sine cycle is 5 times, the safety factor is 1.67, and the fortification intensity is 8 degrees.

2.2 Main technical parameters

2.2.1 Product model meaning

LZZBJ9-40.5W

L — current transformer

Z—casting insulation

Z—post type

B — with protection level

J—reinforced type

9—design number

40.5—highest voltage for equipment (kV)

W—outdoor equipment

2.2.2 Polarity: subtractive polarity

2.2.3 Rated voltage: 35kV

2.2.4 Rated frequency: 50Hz

2.2.5 Rated primary current: 50A~2000A

2.2.6 Rated secondary current: 5A or 1A

2.2.7 Secondary winding combination: Can be any combination of 1 to 4 levels by 5P, 10P, 0.5, 0.2, 0.5S, 0.2S, etc.

2.2.8 Rated output: 10~30 VA or according to user requirements.

2.2.9 Measurement level instrument security factor: $FS \leq 5$ or $FS \leq 10$

2.2.10 Short-term thermal current (rms)/duration: 25kA/1s, 31.5kA/1s, 40kA/1s

2.2.11 Rated dynamic current (peak)

Rated dynamic stable current = 2.5 times the short-term thermal current

Under the rated continuous thermal current, the temperature rise of each part of the product does not exceed the value in Table 1.

Table 1

Product parts	Temperature rise limit, K	Measurement methods
Winding	60	Resistance method or thermocouple method
Outlet and connection of primary winding	55	Thermometer method or thermocouple method
Iron core and other metal surfaces	Does not exceed the limit near the material	Thermometer method or thermocouple method

2.2.12 Insulation requirements

1) Insulation resistance: the insulation resistance of the primary winding to the secondary winding and the ground, between the secondary windings and the secondary winding to the ground at room temperature is not less than 1000MΩ.

2) Power frequency withstands voltage for 1 minute:

Primary winding to secondary winding and ground: 95kV

Between secondary windings and to ground: 3kV

The dielectric strength of inter-turns is 4.5kV (peak).

3) Lightning impulse full wave withstand voltage (internal and external insulation):

The primary winding to the secondary winding and the ground should be able to withstand the lightning full-wave impulse voltage of 185kV (peak) with positive and

negative polarity 15 times each without breakdown and flashover. And it should be able to withstand the chopped lightning impulse voltage of 220kV (peak) negative polarity for two times.

2.12 Partial discharge level

After the power frequency withstand voltage test, when the voltage is reduced to $1.2U_m$, the measurement is performed within 30s, and the measured partial discharge does not exceed 50pC. When the voltage is reduced to $1.2U_m/\sqrt{3}$, the measurement is performed within 30s. The measured partial discharge volume does not exceed 20pC.

2.2.14 Visible corona and radio interference levels

Under $1.1U_m/\sqrt{3}$, there should be no visible corona in outdoor fine day and night; Under $1.1U_m/\sqrt{3}$, the RIV should not be greater than $500\mu v$.

2.2.15 External insulation creepage distance

The creepage distance is not less than 1085mm in Class IV polluted area.

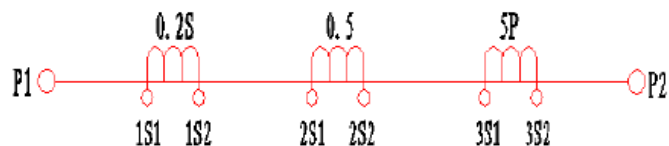
2.3 Product structure and working principle

2.3.1 Product structure

LZZBJ9-40.5W current transformer products mainly consist of primary wiring board, casting body and secondary wiring terminals (see Figure 1).

This product is a single-phase, epoxy resin cast insulation current transformer, and the product is grounded through the mounting plate. The primary wiring board of the product adopts tin-plated copper plate. The whole epoxy resin casting body is covered with a silicone rubber shed, and lead out from the outlet box at the lower part of the secondary winding product. Epoxy resin is used as the main insulation, and the insulation strength is high. The whole is covered with silicone rubber to meet the requirements of outdoor service.

2.3.2 Schematic diagram



2.4 Secondary wiring terminal

The secondary wiring terminals and fixing screws are made of brass and are located in the sealed junction box at the lower part of the transformer. The maximum torque corresponding to the bolt-tightened secondary terminal is 4.5Nm.

Safety warning: The secondary winding of the current transformer that is not used must be short-circuited. If 5P winding is not used, the 3S1-3S2 terminals should be

short-circuited. The secondary winding used must be grounded at a single point to prevent the safety of personnel and equipment from being damaged after the high voltage enters the secondary side.

3. Transportation

The product is transported vertically, and the transportation method used (such as: railway transportation, sea/river transportation, road transportation, air transportation, etc.) depends on the distance and scope of the product transportation. The product packaging during transportation must ensure the necessary supports and cushions to prevent damage during transportation.

Read carefully all shipping marks on the box.

3.1 Unpacking

Check the packaging box and the products in it immediately after the goods arrive at the installation site.

Possible damages include:

- Damage caused by vibration (including appearance damage, etc.)
- Bending of metal parts (such as terminals, terminal posts, etc.)

If damage is found during the inspection, the following measures should be taken:

- Notify the insurer immediately
- Indicate the carrier's responsibilities on the receipt
- In order to prevent the claim period from being exceeded, a registered letter should be sent to notify the carrier of its responsibilities
- If the company bears the transportation risk, the company (sales department) should be notified of the damage as soon as possible.

3.2 On-site

If no damage is found, the same precautions as during transportation should be used in subsequent on-site handling. If long-distance transportation is required, it is recommended not to open the original packaging of the transformer or repack it in the original form.

If the transformer will be placed for a period of time before it is put into operation, the following measures should be taken:

- Store the transformer in a safe, well-ventilated environment and will not overturn it, with or without boxing.
- Under any circumstances, the transformer is not allowed to lie down.

3.3 Storage

The product storage place should be free of corrosive gases and media, and should not be directly exposed to sunlight and rain, and the temperature should not be

lower than -20°C . Long-term storage should be packed. In addition, the packaging box is protected from corrosion.

The insulation resistance and insulation of the winding must be checked before the product is used again after storage or long-term use. If it does not meet the requirements, it should be processed again.

4. Lifting and installation

4.1 Lifting

The product can be lifted directly by the terminal block. The weight of the transformer can be found on the nameplate. The crane should be able to bear the weight of the transformer. Avoid jerky movements of the crane. When moving the transformer horizontally, prevent the transformer from swinging back and forth.

4.2 Installation

The transformer must be installed on a horizontal platform, and the product must be fixed with bolts.

4.3 Grounding

There must be a low resistance path between the ground terminal of the transformer and the system ground potential. The mechanical strength of the grounding terminal must be sufficient to withstand the short-circuit current of the system.

In addition, in the case of incomplete or improper grounding, the monitoring function of the transformer cannot be guaranteed.

Safety matters: Incomplete or improper grounding will threaten personal safety.

4.4 Primary terminal connection

Before connecting with the primary terminal, clean the contact surfaces to ensure good electrical contact performance. The connecting piece is made of stainless steel or hot-dip galvanized material. In order to ensure long-term effective contact pressure, all bolt connections must use padded spring washers.

Contact between aluminum and copper parts should be avoided, unless special precautions are taken. For such connectors, use corrosion-resistant coating at the contact points or surfaces or separate them with copper-aluminum joint composite plates, and coat them with power composites grease.

4.5 Secondary wiring terminal

Before handling the secondary wiring terminals, make sure that the system is in an unpowered state, and warn of free electromagnetic fields caused by nearby equipment.

Follow the diagram on the product nameplate or instruction plate to connect the secondary terminals. The size of the secondary wiring terminal should be fully considered, and the contact resistance should be minimized to ensure the accuracy

or accuracy of the transformer.

Safety precautions: Short-circuit the unused secondary windings (terminals) in the current transformer. If there are multiple sets of transformation ratios at the same time, the terminal corresponding to the largest transformation ratio must be short-circuited.

5. Commissioning and maintenance

5.1 Inspection before putting into operation

— Read all the internal rules and regulations and user manuals related to the commissioning of transformers

— Check the appearance of the transformer and there should be no damage such as bumps, scratches, breakages, etc.

— Check the appearance of the transformer and there should be no external pollution and defects

— Check the secondary wiring to ensure that there is no winding connection failure. Make sure that each contact point is in good contact. The grounding terminal is connected firmly.

— Measure the insulation resistance between the windings and to the ground. Use a 2.5kV megger to measure at room temperature. The measured value should have no actual difference with the factory value.

— All secondary windings of the transformer are not allowed to be open-circuited.

5.2 Inspection and maintenance

Due to reasonable electrical and mechanical design, and completely isolated from the air, this type of current transformer is trouble-free for a long time and can operate without maintenance.

In order to make the product run better, we suggest checking the items and time in Table 2 and checking the checklist in Table 3 and filling in the records when inspecting the transformer.

Table 2

	After the transformer is moved, before energizing	Routine inspection (approximately every other year)	After every 10 years of operation (approximately)	occurs, or the position of the expander of the current transformer on each phase of the same power line is	After changing the load connector, before energizing	After being subjected to excessive mechanical stress (due to a fall, earthquake or typhoon, etc.)	Questioned the secondary current reading
Check the grounding condition	✓		✓		✓		
Check whether all ground connections are firm	✓		✓		✓	✓	✓
Ensure that the secondary winding of the current transformer is not open	✓				✓		✓
Measure the secondary current and compare with the specified value	✓			✓	✓		✓
Check the transformer appearance for abnormalities such as chalking, cracking, etc.	✓	✓	✓		✓	✓	
Check the shape of the transformer and clean it if necessary	✓	✓	✓				
Comprehensive inspection of the corrosion status of all metal parts and components			✓	✓			

Table 3 Checklist

Items	Check content	Result
Check the grounding condition	<p>Check whether the connection of the grounding bolt is firm.</p> <p>When the transformer is in operation, its mounting plate must always be grounded.</p> <p>Each secondary winding cannot be grounded more than twice (that is, it cannot be grounded more than twice at the same point)</p>	

Check whether all ground connections are firm	All connections, including bolt connections, must be firm and have low contact resistance. And they must all be corrosion resistant.	
Ensure that the secondary winding of the current transformer is not open	The load (including line impedance) connected to the secondary winding must not exceed the rated value (see nameplate data). The unused secondary winding must be short-circuited at the terminal. Failure to follow this code may damage the secondary insulation. The open circuit voltage of the secondary terminal will exceed 10 kV.	
Measure the secondary current and compare with the specified value	The rated frequency is added to the primary end, and the current is 5% of the rated value to measure the transformation ratio. During this test, disconnect the primary terminal from the high-voltage line. Connect a low-resistance ammeter to the corresponding set of secondary terminals. At the same time, short-circuit other secondary windings. The transformation ratio measured by the test should not be too different from the rated value. If there is a big difference between the two, it should be suspected that the transformer is damaged and cannot be put into operation before further testing.	
Check the transformer appearance	Look for abnormalities such as chalking, cracks, etc. in each part of the transformer.	
Check the shape of the transformer and clean it if necessary	When the surface of the transformer is heavily polluted and accompanied by moisture, different phenomena from surface corona discharge to flashover will occur. The porcelain sleeve should be cleaned according to the different experiences of various places. Appropriate rules should be followed when cleaning (see IEC 815).	
Comprehensive inspection of the corrosion status of all metal parts and components	Check the corrosion status of all connections, especially the contact parts of different metals. If it is necessary to paint the metal part to enhance the corrosion resistance.	
Check temperature	Internal damage will cause the temperature to rise and exceed the ambient temperature by 60°C. The temperature reached a stable value after 24 hours of electrification. The test should be performed approximately 5 minutes after	

	disconnection. Excessive temperature (greater than 100°C) can be checked by spraying water droplets on the shell using a sprayer. It is recommended to use a non-contact thermal visual temperature measurement method.	
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6. Spare parts

No.

7. Accompanying documents

Product certificate (including factory test record), 1 pc.

Instruction manual, 1 pc.

Packing list, 1 pc.

8. Ordering instructions

When ordering, please indicate the product model, equipment type, rated voltage, accuracy level combination, frequency, rated load and other technical requirements. For products with special requirements, please consult with our technical department.

Note: The technical parameters listed in this manual are only our company's conventional products, and special order products are subject to the transformer nameplate data.