LVB Oil-immersed Inverted Current Transformer

Installation and Operation Instruction

Shandong Taikai Instrument Transformer Co., Ltd

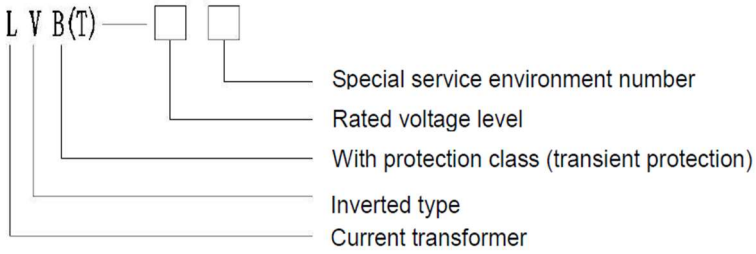
Contents

1 Product description

1.1 Product application

Current transformer of LVB series, oil-immersed inverted type, is used to transform the current value on primary line to standard current value (1A or 5A) in the required proportion and transmit an information signal to measuring instruments, meters and protective or control device in the power system with rated voltage of 35kV to 550kV, rated frequency 50Hz.

1.2 Model designation



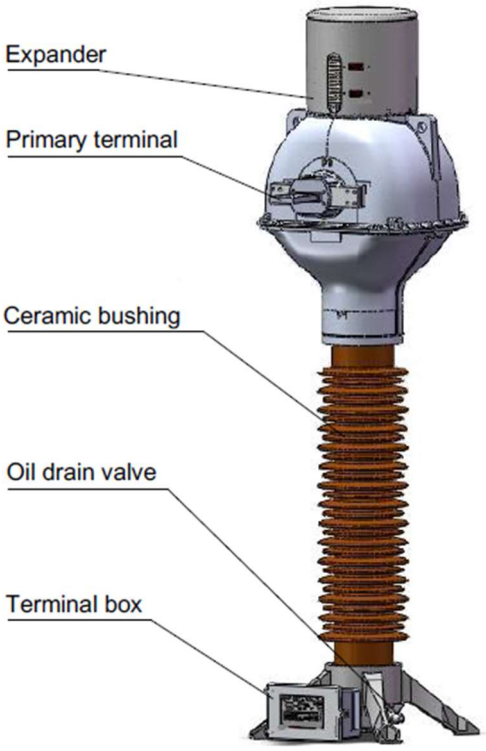
1.3 Product construction

1) The product is composed of expander, oil tank, primary winding, core and winding parts, ceramic bushing, pedestal and terminal box. Secondary windings are assembled into the iron core housing. The main insulation adopts oil-paper capacitive insulation structure;

2) Expander with oil level indicator can adjust the oil volume change due to temperature change;

3) Earthing block and oil drain valve for sampling are designed on the low section of the product;

4) Connecting terminals in the terminal box is applied to secondary connecting and end shield earthing.



2 Service condition

Maximum temperature: +40℃

The daily mean temperature not exceeding: +35℃

Minimum temperature:-40℃

Monthly Max.relative humidity: 95% (at 25℃)

Maximum wind velocity: 34 m/s

There is no contamination and corrosive and explosive media in the atmosphere that seriously affect the insulation of the product.

The product is used in areas where the seismic intensity is not greater than 8 degrees.

3 Storage and transportation

3.1 Storage

1) The product shall be stored in ventilated condition. Without flammable, explosive and corrosive gases.

2) After unpacked, it is recommended to store it in a vertical state to avoid damage to the product.

3.2 Transportation

The product should be packaged in good condition during transportation, to prevent the damage and other mechanical damage.

On-site transportation should adopt the protective measures required for transportation. If long-distance transportation is required, it is recommended to keep the original packaging of the product or repackage it in the original form.

4 Installations

4.1 Check before installation

1) Check the shipping list whether the product, accessories and the documents are complete. The accessories include one set of filling device; the documents include Installation and Instruction Manual and the qualification certificate.

2) Check whether the package is intact, without damage and oil leakage.

3) Check whether the product appearance is intact without damage and oil leakage.

4) For any question, please contact the service department of the manufacturer.

4.2 Erecting

After unpacking, hoist the product and erect in accordance with the sequence of figure 1 to figure 3. The weight is indicated on the nameplate.

Both two hoisting lugs shall be used at the same time when hoisting or erecting. **No other parts can be hosted except for the two lugs**. When the products need laid horizontally, the terminal box shall face upward, and appropriate supporting shall be provided to the product (See figure1).

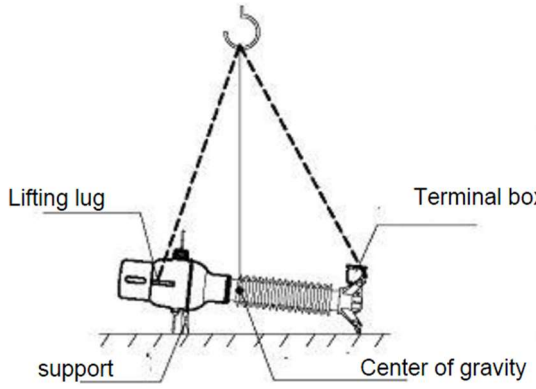


Figure 1 Horizontal

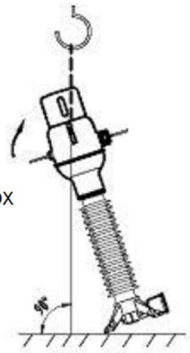


Figure2 Erecting

Firguer3.Vertical

Note: Center of gravity of the product is located at the center of the first or the second shed below the oil tank. When lifting, the angle formed by string and ground shall be 90°.

4.3 Removal of the protective baffle

Remove the protective baffle in the expander housing. See figure 4.

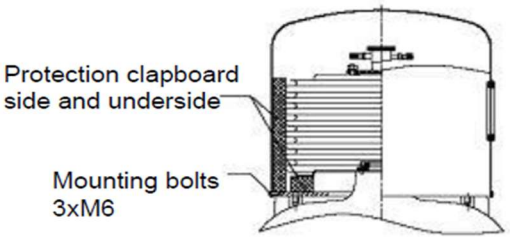


Figure 4 the protection clapboard

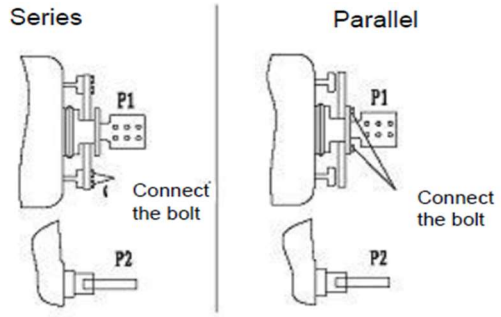


Figure 5 Series-parallel connection change1

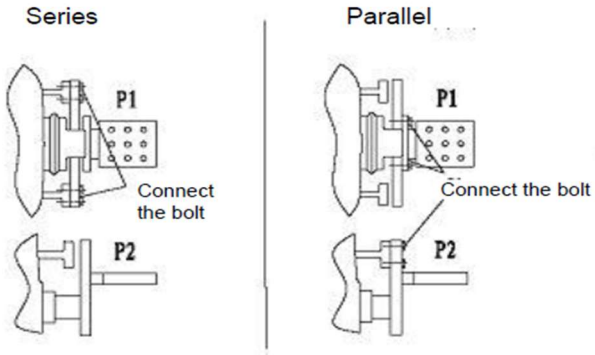


Figure 5 Series-parallel connection change 2

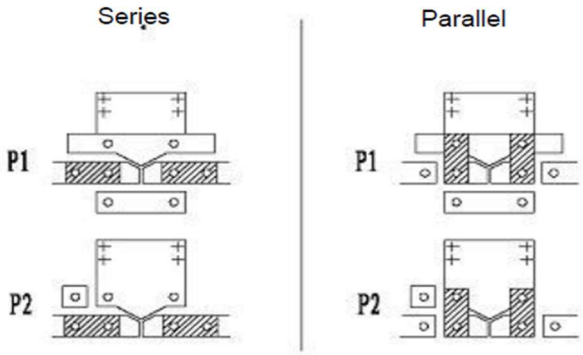


Figure 5 Series-parallel connection change3

4.4 Series-parallel switching

Unless otherwise specified, the primary connection is in series when leave factory. Before operation, choose the corresponding connection method as requirement. If necessary, change the series-parallel connection on primary side as figure. 5.

Note: If the site products need to be connected in series and parallel, ensure that the minimum air insulation distance between the connecting plates meets the requirements of Figure 5. Tighten the bolts according to the torque value of 50N.m, and polish each contact surface. The contact surface is required to be clean, flat and free of sharp corners and burrs.

4.5 Product installation

1) The product must be installed vertically on a horizontal and flat surface.

2) The earthing plate on the base must be earthed effectively. It is recommended to tighten the bolts with a torque value of 50N•m.

3) The base and on-site installation must be connected reliably. When using M20 bolts for connection, it is recommended to tighten the bolts according to the torque value of 220N•m.

4.6 Primary wiring

Dirt part and oxide layer shall be cleaned up before the wiring connected with primary terminal to ensure the good electrical contact. When using M16 bolts for connection, it is recommended to tighten the bolts with a torque value of 120N•m.

Precautions: The tensile force of the primary terminal should be within the static load range which it can bear.

Note: See Table 1 for bolt type and tightening torque.

Table 1 Recommended tightening torque value.

Specification of the bolt, mm.	the recommended value	
	N*m	kgf*m
M12	50±10	5±1
M16	120±20	12±1
M20	220±20	22±2
M24	300±20	30±2

4.7 Secondary wiring

1) The secondary connection shall be as the nameplate shown

Note: Terminal "⏚" is the earthing terminal of end shielding and shall be earthed separately. No open-circuit on secondary terminal.

5 Oil sampling

5.1 Construction of oil drain valve and oil sampling tool.

See figure 7 for structure of oil drain valve.

See figure 8 for structure of oil sampling.

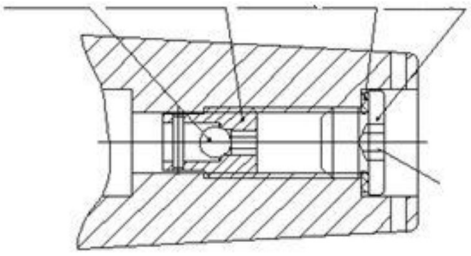


Figure 7 Oil drain structure

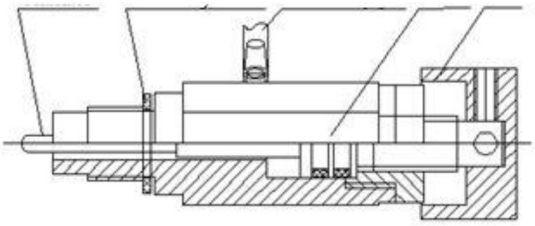


Figure 8 Oil sampling tool structure

5.2 Procedure for oil sampling

See figure 9 for oil sampling

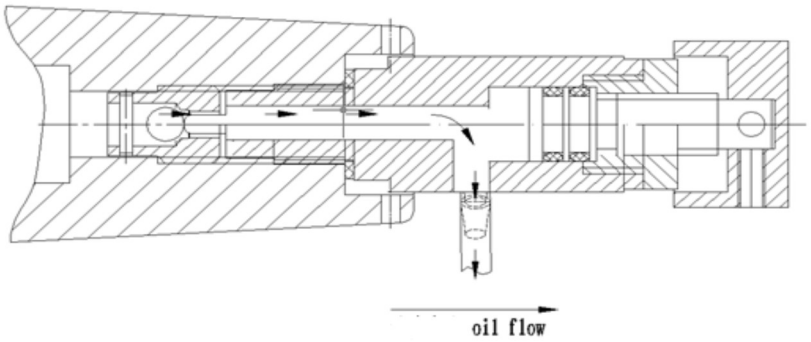


Figure 9 Schematic of oil sampling

1) Contrarotate the nut of the oil sampling tool anticlockwise to its limits:

2) Take the oil plug down with socket head screw wrench as figure 7 shown, do not take down the valve element;

3) As indicated by Figure 9, mount oil sampling valve to oil drain valve and fix well

4) Rotate the nut of the oil sampling tool clockwise till the transformer oil flow from oil pipe. The oil flow can be controlled by screwing the nuts

5) After sampling finished, rotate the nut anticlockwise to the limit, take the oil sampling too down when no oil draining out of the transformer, then, fasten the oil plug. Check whether there is oil leakage around the oil plug after wiping out the oil trace on the oil drain valve.

5.3 Other notes

1) Avoid exerting force over and excessively fast when rotate the oil sampling tool. Rough handling is prohibited if there is difficulty mounting. Retreat the oil sampling tool and check the thread damaged or not for fear that there is leakage due to bad sealing which is caused by the damaged thread.

2) Considering the fact that the product is with less oil, on-site oil extraction is not recommended. If necessary, extract the oil following related procedure; check the oil level after extraction. If the oil level is below the minimum indication level, refill the oil without delay. The filled oil shall be the same type and quality as the oil in the product.

Table 2-Recommended oil sampling quantity, cycle and maximum oil quantity

Nos. of oil sampling	Oil sampling time	Test items	Oil sampling quantity
First time	3-12 months after commissioning	Chromatographic analysis test	80~100mL
Second time	Every other year within 3 years	Chromatographic analysis test	80~100mL
Future	Every 3 years	Chromatographic analysis test	80~100mL
	10 years after commissioning	All tests	≤550mL
Maximum	35kV oil-immersed inverted current transformer allows the maximum amount of		

oil sampling quantity	oil sampling to be 1200mL.
	66kV and 110kV oil-immersed inverted current transformers allow the maximum amount of oil sampling to be 1000mL.
	220kV and above oil-immersed inverted current transformer allows maximum amount of oil sampling to be 800mL.

6 Precautions for storage, installation and testing

Table 3-Precautions list for storage, installation and testing

No.	Operation name	Precautions
1	Product storage	Store the product in a safe, well-ventilated environment that will not overturn it. The product is not allowed to be stored lying down.
2	Product hoisting	In the process of product transfer and installation, when the product needs to be hoisted, it must be hoisted using the lifting hole on the product oil conservator, and it must not be hoisted with the help of primary wiring terminals, porcelain sleeves and other parts.
3	Product installation	Before installing the product, open the cover of the expander and take out the protective cardboard for transportation.
4	Product series-parallel conversion	Before serial and parallel switching, the connecting surface needs to be polished to remove the surface oxide layer and sharp burrs; when switching, tighten the connecting bolts according to the recommended torque on the switching instructions.
5	DC resistance test	The test wiring position is consistent, and the oxide layer of the clamping part is cleaned.
6	End shield lead	The terminal with the symbol "⏚" in the secondary junction box is the lead-out terminal of the end shield. Before the product is operated, check whether it is reliably connected to the box.
7	Capacitance and dielectric loss test	The products installed on the bracket should be tested by the method of entering the bridge at the end of the screen. During the test, ensure that the junction box is dry and tidy.
8	Transformation ratio test	When testing, except for the winding being tested, the other windings should be short-circuited
9	Expander oil level	Observe the product oil level before putting the product into operation, and record the ambient temperature.

7 Handling of common exception

Table 4-Common exceptions handling table

No.	Description	Treatment	Measures
1	Current transformer oil seepage	Handling on site	Check the leakage point, block and refill oil.
2	The oil level can be seen that the oil level exceeds the upper limit before being put into operation	Handling on site	Oil drained to suitable level
3	Abnormal sound in the transformer	Handling on site	Check secondary wiring to ensure no open-circuit and virtual connection on secondary wiring.
4	Abnormal DC resistance	Handling on site	Check the testing wiring connection clean the oxide layer of the clamping part. Then check again
5	Abnormal current ratio test	Handling on site	Check the primary series and parallel. Check testing connection, raise test current.
6	Expander (cover) bulging	Handling on site	Stop the operation immediately.
7	Other abnormalities	Replace the unit	Please contact the manufacturer's after-sales service department.

Address: High-tech Industry Development Zone (South) Tai'an City, Shandong Province.

Post Code：271000

Service Department Tel：0538-8932560

Technical Department Tel：0538-8933806

Fax：0538-8932538

Website：**www**.tkhgq.cn

E-mail：tkhgq@163.com

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