



Electroschild-C° OOO



ME65

CURRENT TRANSFORMER

TV-EK

(version **M3**)

Operation Manual

EK. 1.770.100 RE

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Introduction

The purpose of this Operation Manual is to provide guidance on construction design and technical features, and it as well contains information on transportation, storage, installation and operation, of TV-EK current transformers version M3 (hereinafter – “TV-EK”).

In addition to this Operation Manual, passport for EK.1.770.100 PS transformer should be used.

1 Correct Use

1.1 TV-EK Current Transformers are designed to transmit measuring information signals to measuring instruments and protection and control devices in alternating current units.

1.2 The transformers can be installed at input of any voltage class, provided that they ensure the set characteristics, do not disturb the operation and that the coupling sizes of the input allow installing them.

1.3 The transformers ensure:

- transformation of alternating current to the value acceptable for direct measurement of this current with the help of measuring instruments or for feeding protective relays;
- isolation of measuring instruments and relays from high-voltage.

1.4 The transformers have the climatic category “NF”, placement categories 1, 2 or 3 in accordance with GOST 15150 and GOST 15543.1.

1.5 Transformer position in space – any position.

2 Technical Data

2.1 Transformer basic technical data are given in Table 1.

Table 1

Parameter	Value
Rated input voltage, kV	0,66; 3; 6; 10; 15; 20; 24; 27; 35; 110; 150; 220; 330; 500; 750
Rated primary current, A	50; 75; 100; 125; 150; 175; 200; 225; 250; 275; 300; 375; 400; 450; 500; 550; 600; 650; 700; 750; 800; 900; 1000; 1050; 1100; 1150; 1200; 1250; 1300; 1400; 1500; 1550; 1600; 1650; 1700; 1750; 1800; 1900; 2000; 2500; 2550; 2600; 2650; 2700; 2750; 2800; 2900; 3000; 3100; 3200; 3250; 3300; 3500; 3550; 3600; 3650; 3700; 3750; 3800; 3900; 4000; 4100; 4200; 4250; 4300; 4500; 4550; 4600; 4650; 4700; 4750; 4800; 4900; 5000; 5500; 6000; 6500; 7000; 7500; 8000; 9000; 10000; 11000; 12000; 13000; 14000; 15000; 16000; 18000; 20000; 21000; 22000; 23000; 24000; 25000; 26000; 28000; 30000; 31000; 32000
Rated secondary current, A	1; 5
Rated secondary burden with power factor $\cos\varphi=0.8$ VA	from 1 to 100
Rated accuracy class: for measuring and recording; for protection.	0.2S; 0.2; 0.5S; 0.5; 1; 3; 5; 10 5P; 10P

Rated accuracy limit factor of secondary winding for protection ALF_{rat}	from 2 to 50
Rated instrument security factor of secondary winding for measurement FS_{rat}	from 3 to 50
Rated frequency, Hz	50 or 60
Weight (not more)	According to order

Notes:

1. Current transformers with rated secondary burden of 40 VA are manufactured at the Customer's request.
2. Current transformers with accuracy class of 10 are manufactured at Customer's request.
3. 3 Current transformers with rated primary current of 250; 1250; 1600; 2500; 3500; 9000; 15000; 18000 are manufactured at Customer's request for export.

3 Structure

3.1 The transformer represents toroidal magnetic circuits placed in the casted body, the secondary winding is evenly wined on each of the toroidal magnetic circuits. Transformer overview is given in Annex A.

3.2 The transformer primary winding is represented by high-voltage bushing of the circuit-breaker or power transformer.

3.3 The secondary terminals are closed with a protective cover.

4 Placement and Installation

4.1 The transformer should be mounted on a high-voltage bushing on supports included in the transformer packaging set and should be mounted in accordance with drawings for this equipment. After mounting, if required, cut off loose ends of M20 pins at a distance of 10 ...15 mm from the safety nut. **Maximum fixing torque is 30 N*m.**

For diagram of mounting the supports, please see **Annex B.**

4.2 ATTENTION! When mounting (dismounting), use tools preventing from insulation damage and transformer deformation.

4.3 Feed the cable to the secondary terminals and perform necessary electrical connections, having preliminary cleaned all contact areas off dirt and impurities.

4.4 Ground the transformer by connecting the earthing loop to the earthing terminal on the terminal block.

4.5 Close with the protective cover with a rubber sealing the terminal block of the secondary terminals.

4.6 The cover should be sealed after mounting the secondary connections by authorized personnel.

4.7 The following is expressly prohibited during loading and unloading operations:

- throwing packed and unpacked transformers;
- gripping and lifting transformers with wire ropes;
- one-point only gripping of transformers.

5 Markings

- 5.1 The transformer carries a rating plate in accordance with GOST 7746.
- 5.2 Secondary terminals are marked as 1И1-1И2, 2И1-2И2, 3И1-3И2.
- 5.3 The transformer case carries a marking showing the sense of primary current Л1-Л2.
- 5.4 Shipper container markings comply with GOST 14192 and are applied directly to the packaging.

6 Safety Measures

6.1 Transformer design, installation and operation must comply with safety requirements specified in GOST 12.2.007.3, GOST 7746, “Rules for technical maintenance of electric installations of consumers”, “Inter-Industry Rules On Occupational Health and Safety (Safety Rules) for the Operation of Electrical Installations” POT R M-016-2001 RD 153-34.0-03.150-00, “Requirements for Electrical Installations”, “Scope and Standards for Tests of Electrical Equipment” RD 34.45-51.300-97.

6.2 Testing and measuring shall be guided by safety requirements specified by GOST 8.217 and GOST 12.3.019.

6.3 Loading and unloading operations shall be guided by requirements of GOST 12.3.009.

6.4 Built-in current transformers have explosion- and fireproof design according to GOST 12.1.004.

Any switching over in the transformer secondary circuits is allowed only after having made sure that there is no current in the primary circuit. Possible opening of transformer secondary circuits during operation must be avoided.

7 Maintenance

7.1 Rules given in the Safety Measures section must be complied with during maintenance.

7.2 Transformer maintenance shall be performed within the timelines scheduled for the unit the transformer is built into.

7.3 Maintenance scope shall be as follows:

- transformer visual inspection for damages;
- exciting current test on secondary windings;
- measuring secondary windings direct current resistance.

7.4 Transformer verification is performed in accordance with Verification Methods for current transformers EK.1.770.000 PM5.

Reverification interval – 8 years.

7.5 The transformers do not require repair throughout the whole service life. In case of malfunctions preventing the transformer from further use, the transformer should be replaced.

8 Packaging, Transportation, Storage and Scrappage

8.1 Transformer packaging and documentation for transportation conditions and storage periods must comply with requirements of GOST 7746; GOST 23216, GOST 15150, TU 3414-009-52889537-08 and are stated in Table 2:

Table 2

Placement category	Transportation conditions		Storage conditions GOST 15150	Acceptable storage period before commissioning (packed) years	Inner packaging under GOST 23216	Shipper container under GOST 23216	Container type under GOST 2991
	GOST 23216	GOST 15150					
04	H	4	1	2	Depending on order	TM*	-
						TE-4	III-2

* In case of cooperation supplies in returnable containers, such containers shall be returned to the manufacturer immediately and the Customer shall ensure that the unit is stored under the specified conditions.

8.2 Transformer transportation and storage shall be performed in accordance with GOST 7746, GOST 15150, TU 3414-009-52889537-08.

8.3 Transportation conditions for transformers must comply with Table 2.

8.3 Storage conditions for transformers must comply with TU 3414-009-52889537-08.

8.5 Transformer unpacked transportation is acceptable within one city, provided that all necessary measures to prevent the transformer from damaging have been taken.

8.6 Lifting transformers with wire ropes, as well as gripping at one point, are strictly forbidden.

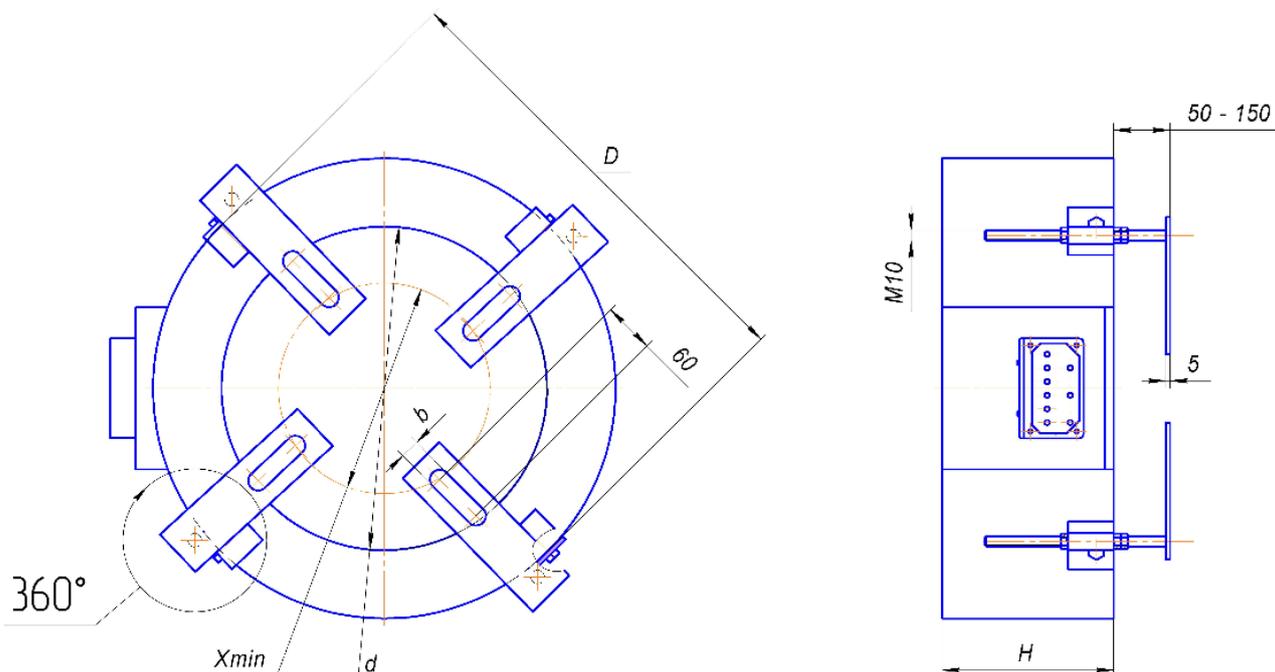
Transformers are scrapped either upon expiration of the service life or upon loss of function. For scrapping purposes, transformer is dismantled in compliance with relative safety measures, ferrous and non-ferrous metal components are separated. Case insulation fragments should be transferred to a solid waste land field. Ferrous and non-ferrous scrap metal should be transferred to a scrap recycling plant.

9 Current Transformer Conventions

An example of conventions of current transformer for rated input voltage of 10 kV, M1 version, with overall dimensions of $D_{ext}=630$ mm, $d_{int}=470$ mm, $H=100$ mm for rated primary current of 6000 A, rated secondary current of 5 A, accuracy class 0,2S – 15 VA with auxiliary taps: for current 1000A of accuracy class 0,5S – 20 VA and 2000 A of accuracy class 0,2 – 20 VA, climatic version NF, placement category 3, in documentation of another product:

Current transformer
TV-EK 10 M3-0,5S/0,2/0,2S-1000-2000-6000/5 NF3 (630x470x100)

Annex A
Overall, installation and mounting dimensions, weight of TV-EK current transformer
Version M3



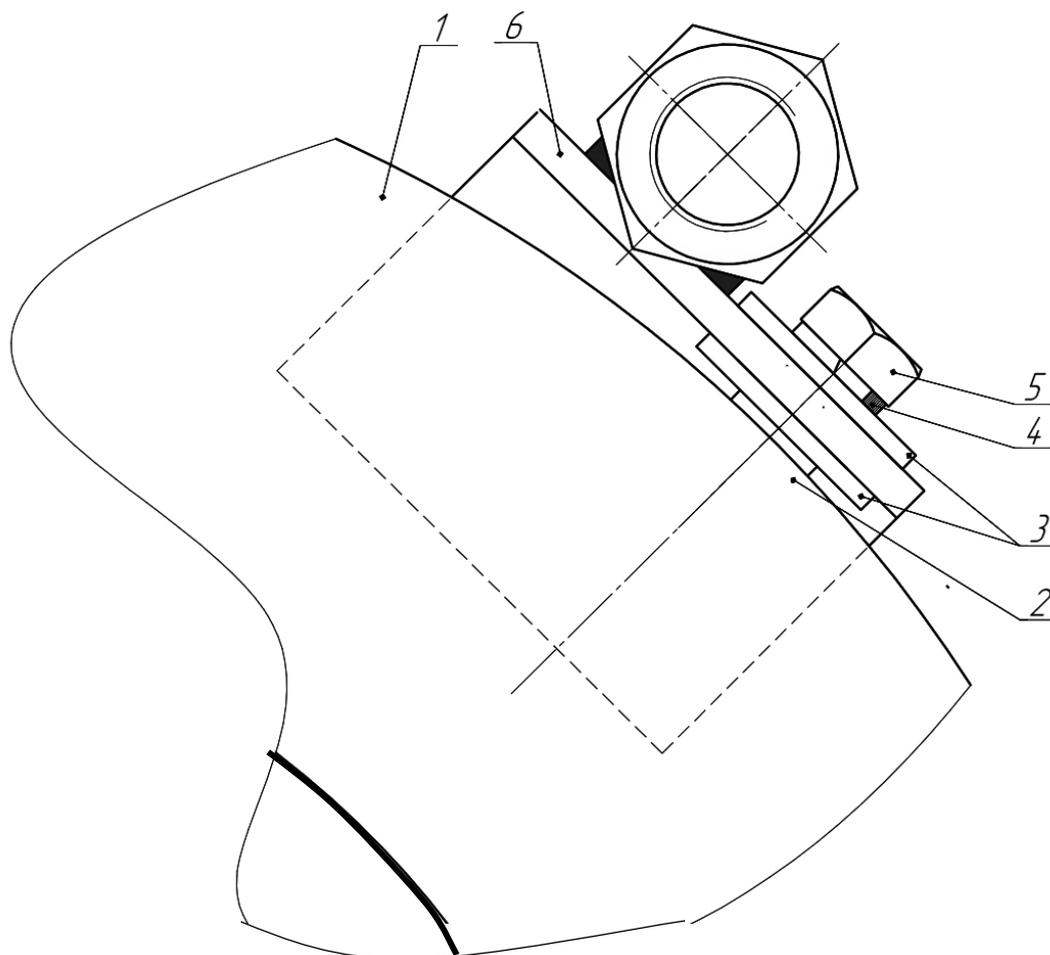
Rated operating voltage	b , mm
up to 35 kV	22
100kV and higher	32

D	380	450	540	630	720	1080	1150	1400							
d	240	240	290	290	380	380	470	470	560	720	840	840	920	920	1200
X_{min}	83	153	243	330	423	783	853	1103							

1. Basic technical requirements and characteristic according to TU 3414-009-52889537-08
2. Transformer dimensions and weight shall be defined after transformer designing based on the configuration data sheet filled in by the Customer.
3. Transformer ratio error and phase displacement shall be defined under all transformation ratios.

Annex B

Diagram for installing supports on TV-EK M3 current transformer



1. Current transformer TV-EK
2. Transformer grommet
3. Washer 10 GOST 6958-78
4. Washer 10 GOST 6402-74
5. Bolt M10 GOST7805-70
6. Support

When mounting the supports onto the current transformer TV-EK M, place the washer (3) between the transformer grommet (2) and support (6). Fix the support with the bolt (5).

Maximum fixing torque – 30 N*m