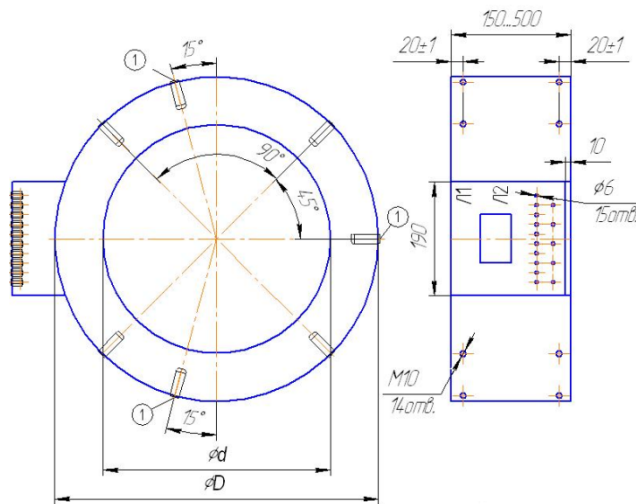


Annex A

Overall, installation, mounting dimensions, weight of TV-EK current transformer version M2.



Height, H	mm
A	150
B	200
C	250
D	300
E	350
F	400
G	450
H	500

① - extra pair of grommets available, for transformers with internal diameter (D, mm) or 1080 and more (agreed at order)

D mm	380		450		540		630		720	
d mm	240	240	290	290	380	380	470	470	560	560

D mm	1080		1150		1400	
d mm	720	840	840	920	920	1200

1 Basic technical requirements and technical characteristics in accordance with 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.



Electroshield-C°



ME65

CURRENT TRANSFORMER TV-EK (M2 version)

Operation Manual

EK.1.770.010 RE

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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 scrappage purposes, transformer is dismantled in compliance with relative safety measures, ferrous and non-ferrous metal components are separated. Polyurethane fragments should be transferred to a solid waste land field. This type of wastes belongs to the 5th hazard group (bio-testing protocol No. 157 dd December 28, 2009).

Ferrous and non-ferrous scrap metal should be transferred to a scrap recycling plant.

9 Current Transformer Conventions

An example of conventions of TV-EK current transformer for rated input voltage of 35 kV, M2 version, with overall dimensions of Dext=540 mm, dint=290 mm, h=150 mm (A) (to be chosen from Annex B), for rated primary current of 3000 A, rated secondary current of 5 A, with two secondary windings, for metering of accuracy class 0,2S – 15 VA and protection relay of accuracy class 10P – 20 VA, climatic version N, placement category 3, in documentation of another product:

Current transformer

TV-EK 35 M2A-0,5S/10P-3000/5 N3 (540x290x150)

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.

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 GOST2991
	under GOST 23216	under 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.

8.4 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.

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 M2 (hereinafter – “TV-EK”).

In addition to this Operation Manual, passport for EK.1.770.010 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. The transformers are designed to operate inside current-conducting wires and bus wires.

1.2 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.

1.3 The transformers have the climatic categories: “N” or “T”, placement categories 2 or 3 in accordance with GOST 15150 and GOST 15543.1.

1.4 Transformer position in space – any position.

2 Technical Data

2.1 TV-EK 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

- Current transformers with rated secondary burden of 40 VA are manufactured at the Customer's request.
- Current transformers with accuracy class of 10 are manufactured at Customer's request.
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 wound on each of the toroidal magnetic circuits. Transformer overview is given in Annex A.

4 Placement and Installation

4.1 The TV-EK current transformers are installed into power transformers or autotransformers, as well as on current-conducting wires, and are mounted in accordance with drawings for these units. The unit is fixed on the place of installation in accordance with engineering documentation recommendations.

4.2 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;
- lifting transformers at secondary terminals.

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; 4И1-4И2. Transformer rating plate carries a marking showing the sense of primary current Л1-Л2.

5.3 The transformer markings are resistant to transformer oil effects within the temperature ranges from minus 40°C to plus 105°C.

5.4 Shipper container markings comply with GOST 14192 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.

6.5 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.