This installation, use and maintenance guide is valid for current operating in outdoor or indoor conditions.

These instructions are valid for current transformer type: TPO, KOHU, TPU, IBZ, IPZ, ISZ, IMT, KOKU, KODI, IP 24

Indoor transformers
The transformers should be mounted in dry indoor conditions where the ambient air is not significantly polluted by dust, smoke, corrosive gases, vapors or salt. The transformers are designed for standard ambient temperature between –5°C and +40°C. The transformers may be used also in higher or lower ambient temperatures and higher altitudes when agreed between the manufacturer and purchaser.

Outdoor transformers
The transformers should be mounted in outdoor conditions where the ambient air may be polluted by dust, smoke, corrosive cases, vapors or salt. The transformers are designed for standard ambient temperature between –60°C and +55°C. The average value of the ambient temperature, measured over a period of 24 hours, should not exceed 35°C.
Index

Instruction for installation ........................................ 3
Safety instructions .................................................. 4
Technical details ..................................................... 5
Primary reconnectable transformers ......................... 6
Capacitive voltage indicator (divider) ....................... 8
Indicative power losses on the secondary circuit cables . . . 8
Instruction for use ................................................... 8
Instruction for maintenance ...................................... 8
Package, transport and storage ................................. 8
Disposal ................................................................ 9
Spare parts ............................................................. 9
Warranty .................................................................. 9
Handling with the transformers ................................. 9
Normative references ................................................. 10
Wiring diagram examples ......................................... 11
Dimensions drawing ............................................... 12
  TPO 6x. xx .......................................................... 12
  TPO 7x. xx .......................................................... 16
  KOHU 24 A1 (A2) .................................................. 19
  TPU 4x. xx .......................................................... 20
  TPU 5x. xx .......................................................... 23
  TPU 6x. xx .......................................................... 25
  IP 24 .................................................................. 28
  IPZ ................................................................... 29
  ISZ 10 ................................................................. 30
  ISZ 17 (160 mm) ..................................................... 31
  ISZ 17 (260 mm) ..................................................... 32
  KODI ................................................................. 33
  KOKU 072 G3 (G4) ............................................... 34
  KOKU 072 G5 ....................................................... 35
  KOKU ................................................................. 36
  IMT ................................................................. 46

Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
Instruction for installation

General information
Instrument transformer is electrical equipment and the electrical installation shall be done by skilled person only. National legislation can set down the minimum age and the criteria for competence of skilled persons working on, with, or near an electrical installation. Where is not the national legislation requirements for competence, the criteria shall be used at least according to EN 50110-1.

Activities before installing of current transformers:
1. visual inspection,
2. electric withstand of insulation test under the test voltage in accordance with requirements of standard specifications given in catalogue cards, but value of supplied voltage can not exceed 90% of the test voltage,
3. electric withstand test of insulation of secondary windings of the transformer under the test voltage 50 Hz Up = 2 kV during 1 minute,
4. the measurement of insulation resistance of secondary winding or windings (towards the ground) using a varindor ohmmeter of the voltage 1000V. The value of resistance can not be less than 50 MΩ.

Activities after the installing of the transformer and before bringing it into operation:
1. visual inspection,
2. checking of proper installing (use of all holes for fixing, proper holding down of fixing bolts),
3. checking of distances between primary terminals of current transformers and the closest brackets of connecting bars (if the distances or a breaking force are not given in the catalogue card of the current transformer it should be determined, treating the current transformer as a stand-off),
4. checking of proper grounding of terminals,
5. checking of the legalization leaden seal (it applies to the transformers supplying electricity meters).

Activities during operating of the transformer
During operating of the transformer one should do:
1. live visual inspections,
2. inspections in no voltage state.

Live inspection
The inspection should be done at least once a month. During the live inspection one should pay attention to:
1. condition of the main insulation of the transformer,
2. condition of the primary terminals,
3. condition of the supporting structures.

NOTE: Live inspections do not apply to the transformers installed in the cubicles.

No voltage inspection
Inspection should be done periodically, depending on local conditions, but at least twice a year. These inspection include:
1. measurement of the resistance of the winding insulation or secondary windings together with secondary circuits, which value can not be less than 10 MΩ (megaohms),
2. cleaning of the external surfaces of the transformer,
3. complement of the coat,
4. checking of holding-down of the fixing, terminal and grounding bolts.

NOTES
a) All electrical tests listed in these instructions should be done in accommodations meeting the requirements given in the catalogue card in consideration of the ambient temperature and the humidity.
b) Maintenance of the transformers should be done in accordance with the safety and occupational hygiene requirements contained in Heavy Current Engineering Equipment Operating Rules.
Safety instructions

1. Always consider transformer as a part of the circuit to which it is connected, and do not touch the leads and terminals or other parts of the transformer unless they are known to be grounded.

2. Always ground the metallic bases of instrument transformer.

3. Always ground one secondary terminal of the transformer. When the secondary of transformer is interconnected, there should be only one grounded point to prevent accidental paralleling with system grounding wire. In case of disconnection from the ground, the grounding screw has to be removed from the secondary terminal.

   One should earth:
   a) the star point of the scheme of connections „Y”,
   b) the joint point of two transformers of the scheme of connections „V”,
   c) one of two joint points of Holmgren’s scheme,
   d) start point of both „Y” in the differential longitudinal scheme.

   If the transformers supply electricity meters it is recommended that the earthing point should be from the side of the flow of the electric energy. Ground terminal can be optionally chosen from each secondary winding in compliance with principles of scheme of connection. This connection can be done by screwing in the ground screw into an optional whole of the winding terminal (if it is possible).

4. Always short-circuit the secondary of the current transformer, which is not currently in use to prevent secondary voltages which may be hazardous to personnel or damaging to the transformer’s secondary. The secondary like this must be additionally grounded.

5. In case of the current transformer with voltage indication (coupling electrode included) is secondary terminal box equipped with PE terminal, which is connected with earthing screw to the base plate, which must be generally earthed. Connection between secondary terminal and base plate is shown on the picture “Crosssection of single line terminal box”.

   **Attention:** Terminal PE must be always earthed, this is hold generally, even if the base plate is removed. In case of disassembling the base plate, producer doesn’t warranting the earthing.
Technical details

The technical details for each individual transformer are mentioned on the rating plate fastened on the transformer. Values mentioned on the rating plate must not be exceeded. Markings used on the rating plate are as follows:

Example of outdoor current transformer label  74x62 mm

Mounting

Following information is general and some details can differentiate according to type and variants of transformers. It is necessary to combine it with other technical and marketing specifications like catalogues, dimensional drawings and rating plate for specific transformer type.

Indoor current transformers

The mounting position of the indoor transformer can be freely chosen. The transformer is fixed using the mounting base with four screws M10 and washers. Fastening must be done on a smooth surface.

There is a M8 screw for earthing the transformer on the base plate.

Outdoor current transformers

The mounting position of the outdoor transformer is only horizontal. The other position can be agreed with the supplier. The transformer is fixed using two profiles with M12 screws. Fastening must be done on a smooth surface.

There is a M12 screw for grounding of current transformer.

Primary connection

Primary terminals of the current transformer are made of cooper and they are silver or tin plated. There are M12 screws used for fastening of primary conductor to the terminal. For primary reconnectable transformers the ratio can be reconnected by changing position of the links fixed by M12 (outdoor) or M8 (indoor) screws without removing already fitted primary conductors.

Maximum allowed torques for screw connections of current transformers:

<table>
<thead>
<tr>
<th>Screw</th>
<th>Max. torque [Nm]</th>
<th>Min. torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>3.5</td>
<td>2.8</td>
</tr>
<tr>
<td>M6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>M8</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>M10</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>M12</td>
<td>70</td>
<td>56</td>
</tr>
</tbody>
</table>

Maximum allowed cantilever strength is: Current transformers 5000 N.

Where:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1YMP011TPO00005</td>
<td>serial number</td>
</tr>
<tr>
<td>340056#10</td>
<td>order number</td>
</tr>
<tr>
<td>TPO 73.11</td>
<td>transformer type code</td>
</tr>
<tr>
<td>50 Hz</td>
<td>rated frequency</td>
</tr>
<tr>
<td>40°C</td>
<td>ambient temperature</td>
</tr>
<tr>
<td>1250/1/1/1/1 A</td>
<td>rated transformation ratio</td>
</tr>
<tr>
<td>120%</td>
<td>extended primary current</td>
</tr>
<tr>
<td>1S1-1S2</td>
<td>terminal marking for core number 1</td>
</tr>
<tr>
<td>2S1-2S2</td>
<td>terminal marking for core number 2</td>
</tr>
<tr>
<td>3S1-3S2</td>
<td>terminal marking for core number 3</td>
</tr>
<tr>
<td>4S1-4S2</td>
<td>terminal marking for core number 4</td>
</tr>
<tr>
<td>10 VA, 15 VA</td>
<td>rated output</td>
</tr>
<tr>
<td>0.2S, 10P, PX</td>
<td>accuracy classes</td>
</tr>
<tr>
<td>FS5, 10</td>
<td>instrument security factor (FS), accuracy limit factor (ALF)</td>
</tr>
<tr>
<td>36/70/170 kV</td>
<td>rated insulation level (highest voltage for equipment / power-frequency withstand voltage / rated lightning-impulse voltage)</td>
</tr>
<tr>
<td>IEC 60044-1</td>
<td>referred standard(s)</td>
</tr>
<tr>
<td>16 kA/3 s 40 kA</td>
<td>rated short-time thermal current (thermal time) / rated dynamic current</td>
</tr>
<tr>
<td>2011</td>
<td>year of production</td>
</tr>
<tr>
<td>E</td>
<td>temperature class</td>
</tr>
</tbody>
</table>
Primary reconnectable transformers

Primary Connection

High ratio
\[ I_{pn} = 2 \times I_p \]
P1 connected to C1 and P2 connected to C2

Low ratio
\[ I_{pn} = I_p \]
C1 connected to C2

In case of Bus CT, there must be always connected CT shielding to the primary bar. Connection must be done via wire 2.5 mm². One example of ISZ 17 shielding connection is described on the picture.
Secondary connections
The terminals, screws, nuts and washers are made of stainless steel. Secondary grounding screws and secondary terminal fastening screws are made of nickel-plated brass. The secondary terminal cover box for outdoor CT is made of epoxy resin and provided with one insert Pg21. The secondary terminal cover box for indoor CT is made from the plastic and provided with three detachable threaded inserts Pg16.

The terminals are provided with M6 or M5 screws for secondary wiring connection and with through going holes for direct earthing of the secondary circuit by M6 or M5 screws. The terminal cover is seal able.

Degrees of IP protection
Outdoor transformers: IP54
Indoor transformers: IP40

Example of current transformers terminal boxes
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Instruction for use

Current instrument transformers are used:
- to convert large currents in the primary circuit to an appropriate level for secondary circuit equipment (relays and meters)
- to insulate primary and secondary circuit from each other to protect the secondary equipment from the harmful effects of large current appearing during the operation (short circuits)

The use of current transformer for other purpose then described above is forbidden if not agreed with the producer.

Routine test report

Together with instrument transformer are delivered:
- routine test report
- two rating plates (one plastered on the transformer and one free)

The following information can be included on the request. These are free of charge.
- theoretical current errors and phase displacement values
- theoretical excitation curves

There are additional extra paid reports which can be supplied on request:
- accuracy test report
- magnetizing curve
- additional labels (if more then 2)
- verification tests

Instruction for maintenance

Excessive dust or other kind of pollution must be brushed off the transformer. Polluted transformers can be cleaned with spirit, petrol or toluene. Traces of arcs and minor surface damages can be easily removed with sandpaper after which the surface is to be treated by applying a thin layer of silicone paste on it. Instruction for repairing greater surface damages must be requested from the manufacturer.

Package, transport and storage

The permissible transport and storage temperature is from –40°C to +70 °C. During transport and storage the transformers must be protected against direct sunshine. Transformers assigned for export are packed in wooden cases. During the transport of transformers one should pay attention to proper position of wooden cases in accordance with inscriptions and marks given on them and their protection against the influence of weather conditions. Transformer should be stored in dry and clean accommodations, protecting direct influence of precipitation and frost.

Capacitive voltage indicator (divider)

The transformer can be supplied with the capacitive voltage indicator on the request.

There are two possible solutions:
- a. HR – Indicator complies with the IEC 61234-5 standard for high resistive voltage indicators
- b. CE – Where the values of capacity C1 and C2 are measured. C1 is the capacitance between primary winding and Ck terminal and C2 is the capacitance between grounded parts and Ck terminal.

These values are mentioned on the rating plate.

CE capacity according to nominal voltage

<table>
<thead>
<tr>
<th>Ub [kV]</th>
<th>C1 [pF]</th>
<th>C2 [pF]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 5.5</td>
<td>28 – 55</td>
<td></td>
</tr>
<tr>
<td>5.5 – 7.2</td>
<td>23 – 40</td>
<td></td>
</tr>
<tr>
<td>10 – 13.8</td>
<td>19 – 33</td>
<td>20 – 90</td>
</tr>
<tr>
<td>13.8 – 17.5</td>
<td>13 – 23</td>
<td></td>
</tr>
<tr>
<td>20 – 24</td>
<td>10 – 18</td>
<td></td>
</tr>
</tbody>
</table>

Indicative power losses on the secondary circuit cables.

The sum of power losses on the cables is dependent on the resistance of the cables.

Knowing the cross-section and length of individual sections of cable, we can calculate the resistance Rp of cables.

\[
R_p = \frac{1}{A_{Cu}} = \frac{1}{A_{Cu}} \cdot \frac{1}{56}
\]

<table>
<thead>
<tr>
<th>A_{Cu} Cables [mm²]</th>
<th>Cu cable resistance Rp [mΩ]</th>
<th>Consumption [VA/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>length 10 mb</td>
<td>1A</td>
</tr>
<tr>
<td>1.5</td>
<td>119</td>
<td>0.0119</td>
</tr>
<tr>
<td>2.5</td>
<td>71</td>
<td>0.0071</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>0.0044</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>0.0030</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>0.0020</td>
</tr>
</tbody>
</table>

The sum of power losses at the terminals on the secondary circuits.

Contact resistance is not constant at time due on the oxidation of the contact surface and the layer thickens powdery deposits.

Generally you can take the following values for one contact:
- Rz = 10 mΩ – for the devices connected to the outdoor instrument transformers.
- Rz = 5 mΩ – for the devices connected to the indoor instrument transformers.

<table>
<thead>
<tr>
<th>No. points of contact</th>
<th>Consumption [VA] Outdoor</th>
<th>Consumption [VA] Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1A</td>
<td>5A</td>
</tr>
<tr>
<td>4</td>
<td>0.04</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>0.06</td>
<td>1.5</td>
</tr>
<tr>
<td>8</td>
<td>0.08</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>0.10</td>
<td>2.5</td>
</tr>
<tr>
<td>12</td>
<td>0.12</td>
<td>3</td>
</tr>
</tbody>
</table>
Disposal

Materials used in instrument transformers are considered as materials without dangerous environmental impact and materials are not toxic. Disposal of instrument transformers is controlled by national legislation of communal waste.

Spare parts

The construction of cast resin insulated current transformers does not consider spare parts.

Warranty

The factory grants 24 months of warranty from the day of put to use of the transformer, but no longer than 30 months from the day of sell.

The warranty concerns only manufacturing defects and does not include defects arose because of:
- improper transport,
- improper storage,
- not abiding of the instruction before installing and during operating of the transformers,
- improper selection of the transformer for the electric power system.

Handling with the transformers

Manual handling.

Transformers are possible to handle by hands in case if the weight of the transformer is not higher than 25kg. Always use the gloves in case of manual handling. For grasp of the transformers always use handling grip (see the picture), or the base of the transformer.

Handling by the belt

Transformers where it is possible, from safety reasons, can be handling by hanging on the belts. Than the handling can be done by hanging of the transformer on the crane.

Note: This system is recommended for types: ISZ 17, IPZ, KOKU. Hanging systems for those types are visualized on pictures.

Safety warning!

Lifting capacity of the belts and the crane has to be 200kg at least. Always make sure that the belts hold safely on the crane and on the transformer.

Handling by the self-locking hooks.

With transformers which are equipped with handling grips is possible to handle by self-locking hooks hanging on the crane. With transformer without these handling grips is possible to grip the hooks under the base of the transformer.

Note. This system is recommended for types: TPU, TJC.

Safety warning!

Lifting capacity of the hooks and the crane has to be 200kg at least. Always make sure that the hooks hold safely on the crane and on the transformer.
Handling by the self-locking hooks under primary screws.
In case of indoor current transformers, which are equipped with primary terminal screws M12, there is possible to hanging the transformer on with self-locking hooks holding under primary. The handling can be done by hanging of the hooks on the crane.

Note. This system is recommended for types: TPU, IMZ, IBZ.

Safety warning!
Lifting capacity of the hooks and the crane has to be 200kg at least. Always make sure that the hooks hold safely on the crane and on the transformer.

Handling by the chain and crane.
All transformers which are equipped with the two U profiles and hanging screws are possible to handle by using chains and crane. Screw hanging screws M12 into the U profiles and hang on the crane by chains as it is shown on the picture.

Note. This system is recommended for most transformers with weight more than 40kg mainly for types: TPO.

SAFETY WARNING: During the manipulation with transformer is necessary to follow safety work instructions. Never stay under the freight. Always make sure that the freight is safely locked on the crane and make sure that there is no risk of unexpected release or turnover of the freight.

Note: Holding jigs, described in these chapters, are not a part of delivery.

Normative references
Current transformers are designed, tested and produced according to international or national standards required by customers and agreed by producer. Specific standard is always mentioned on the Rating plate of transformer.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60044-1</td>
<td>Instrument transformers – Current transformers</td>
</tr>
<tr>
<td>IEC 60529</td>
<td>Degrees of protection provided by enclosures (IP Code)</td>
</tr>
<tr>
<td>ISO 12100</td>
<td>Safety of machinery — Basic concepts, general principles for design</td>
</tr>
<tr>
<td>EN 50110-1</td>
<td>Operation of electrical installations</td>
</tr>
</tbody>
</table>

For example these standards:
IEC 60044-1; IEC 60044-6
GOST 1516.3-96; GOST 7746-2001
PN EN 60044-1; PN EN 60044-6
AS 60044-1;
AS 1675-1986
IEEE Std C57.13.6-2005
ANSI C57.13-1978
CSA Std CAN3-C13-M83
BS 3939:1973; BS EN 60044-1

If it is agreed between customer and producer is possible to deliver also other standard or standards which are mention above with different revision.

Safety warning!
Lifting capacity of the chains, loops and the crane has to be 200kg at least. Always make sure that the loops and chains hold safely on.
Wiring diagram examples

Current transformers not reconnectable

I core:

II cores:

III cores:

VI cores:

I core:

II cores:

III cores:

Current transformers reconnectable by secondary side

I core and one tap:

II cores and one tap:

Note.
The number of secondary windings (from 1 to 4 - up to 12 secondary terminals), depends on the combination of technical parameters, such as the accuracy class, burden, short-circuit current, short-thermal current and size of the transformer.
Dimensions drawing

TPO 60.11

Weight: appr. 62 kg
Creepage distance: 1100 mm

Drawing no. 44615820

Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Weight: appr. 62 kg
Creepage distance: 1100 mm

Drawing no. 44615830
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Weight: appr. 62 kg
Creepage distance: 1100 mm

Drawing no. 44615840
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Weight: appr. 90 kg
Creepage distance: 1600 mm

Drawing no. 44615790
Weight: appr. 90 kg
Creepage distance: 1600 mm

Drawing no. 44615800

Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
KOHU 24 A1 (A2)

Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

TPU 40.11
TPU 43.11

Weight: 20-24 kg

Masa: 20–24 kg

Nr rysunku Biegunowość
P1 od strony puszki zaciskowej
P2 od strony puszki zaciskowej

Drawing no. Polarity
44614000 P1 to secondary terminal
44614010 P2 to secondary terminal

Drawing no. Polarity
44614020 P1 to secondary terminal
44614030 P2 to secondary terminal

Weight: 20-24 kg
**TPU 40.13**

Weight: 20-24 kg

**TPU 43.13**

**TPU 40.14**

Weight: 20-24 kg

---

<table>
<thead>
<tr>
<th>Drawing no.</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>44614040</td>
<td>P1 to secondary terminal</td>
</tr>
<tr>
<td>44614050</td>
<td>P2 to secondary terminal</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Drawing no.</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>44614060</td>
<td>P1 to secondary terminal</td>
</tr>
<tr>
<td>44614070</td>
<td>P2 to secondary terminal</td>
</tr>
</tbody>
</table>
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

<table>
<thead>
<tr>
<th>Drawing no.</th>
<th>Polarity</th>
<th>Drawing no.</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>44614240</td>
<td>P1 to secondary terminal</td>
<td>44614260</td>
<td>P1 to secondary terminal</td>
</tr>
<tr>
<td>44614250</td>
<td>P2 to secondary terminal</td>
<td>44614270</td>
<td>P2 to secondary terminal</td>
</tr>
</tbody>
</table>

Weight: 25-28 kg
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

TPU 50.11
TPU 53.11

Weight: 20-24 kg

Masa: 20–24 kg

Nr rysunku Biegunowość
P1 od strony puszki zaciskowej
P2 od strony puszki zaciskowej

Drawing no. Polarity
44614550 P1 to secondary terminal
44614560 P2 to secondary terminal

Drawing no. Polarity
44614570 P1 to secondary terminal
44614580 P2 to secondary terminal
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

TPU 50.13
TPU 53.13

TPU 50.14

Masa: 20–24 kg

Drawing no. Polarity
44614590    P1 to secondary terminal
44614600    P2 to secondary terminal

Drawing no. Polarity
44614610    P1 to secondary terminal
44614620    P2 to secondary terminal
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP

**Drawing no.** | **Polarity** |
---|---|
44615000 | P1 to secondary terminal |
44615010 | P2 to secondary terminal |
44615020 | P1 to secondary terminal |
44615030 | P2 to secondary terminal |
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

- **TPU 60.13**
- **TPU 63.13**
- **TPU 60.14**

Drawing no. | Polarity
---|---
44615040 | P1 to secondary terminal
44615050 | P2 to secondary terminal
44615060 | P1 to secondary terminal
44615070 | P2 to secondary terminal
TPU 60.15  
TPU 63.15

Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Weight: 31-35 kg
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
### IPZ

**Note:**

1. Seal wires: Cu – Ag 12 μm
2. Standardized machine elements: cup washers: Fe – (Cu 3 μm + Sn 10 μm) other elements: brass – No 10μm
4. 4 holes fro screw M12

- Deviation of non-toleranced dimensions are maximum ±3%.
- Manufacturer reserves for himself the right to train the changes issued from the technological progress.

#### Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

### Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Usage Voltage</th>
<th>Current Ranges</th>
<th>Weight (approx) [kg]</th>
<th>Dimensions [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPZ 10-2A</td>
<td>Uₘ=12 kV</td>
<td>200 + 800</td>
<td>21</td>
<td>I₁ = 510</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 + 2000</td>
<td>26</td>
<td>I₂ = 35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 + 800</td>
<td>25</td>
<td>I₃ = 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 + 2000</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>IPZ 10-3A</td>
<td>Uₘ=24 kV</td>
<td>200 + 800</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 + 2000</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>IPZ 20-2A</td>
<td></td>
<td>200 + 800</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 + 2000</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>IPZ 20-3A</td>
<td></td>
<td>200 + 800</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 + 2000</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP

**Note:**
1) Aluminium insert (2 pcs – shown shape for I1n=3000 A)
2) Secondary terminals: brass – Ni 10 μm
3) Standardized machine elements M6:
   - spring washer: Fe μm (Cu 3 μm + Sn 10 μm)
   - other elements: brass – Ni 10 μm
4) Metallic cap
5) Diamagnetic plate
6) Mounting elements – see “Equipment”
   - Deviation of non-toleranced dimensions are maximum ±3%.

<table>
<thead>
<tr>
<th>I1n (A)</th>
<th>Kind of insert</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(acc. PBUE – brochure 10, tab. 24)</td>
<td>a</td>
</tr>
<tr>
<td>1500*</td>
<td>2 x AP – 80 x 10</td>
<td>290</td>
</tr>
<tr>
<td>2000</td>
<td>3 x AP – 100 x 10</td>
<td>330</td>
</tr>
</tbody>
</table>

*version not standard
Note:
1) Nut M4 – Shield of high potential must be always connected to the primary bar, by the wire min. 2.5mm²
ISZ 17 (260 mm)

Note:
1) Nut M4 - Shield of high potential must be always connected to the primary bar, by the wire min. 2.5mm²
<table>
<thead>
<tr>
<th>Diameter / Type</th>
<th>KODI 1 PU 7</th>
<th>KODI 1 MN 7</th>
<th>KODI 1 KK 7</th>
<th>KODI 1 HH 7</th>
<th>KODI 1 FG 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>160</td>
<td>140</td>
<td>120</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>B</td>
<td>266</td>
<td>246</td>
<td>226</td>
<td>206</td>
<td>186</td>
</tr>
<tr>
<td>C</td>
<td>214</td>
<td>197</td>
<td>181</td>
<td>164</td>
<td>152</td>
</tr>
<tr>
<td>D</td>
<td>176</td>
<td>176</td>
<td>176</td>
<td>176</td>
<td>176</td>
</tr>
<tr>
<td>E</td>
<td>181</td>
<td>171</td>
<td>161</td>
<td>151</td>
<td>141</td>
</tr>
<tr>
<td>F</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>G</td>
<td>152</td>
<td>142</td>
<td>132</td>
<td>122</td>
<td>112</td>
</tr>
<tr>
<td>H</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>I</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>J</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>K</td>
<td>12</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>L</td>
<td>21</td>
<td>21</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>M</td>
<td>242</td>
<td>227</td>
<td>206</td>
<td>191</td>
<td>178</td>
</tr>
</tbody>
</table>
KOKU 072 G3 (G4)

Cable, length 1.6 m

S1 = 1
S2 = 2

Rating plate

M5

Ø13.5

210

150

125

230

111

45

M12X60

Ø13.3

S1

S2

M5

M5

Note:
1) Wire 2x2.5mm² or 2x4mm², color black marked with numerals "1" and "2"
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP

KOKU 1_H_
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP

<table>
<thead>
<tr>
<th>Di</th>
<th>33</th>
<th>42</th>
<th>60</th>
<th>70</th>
<th>85</th>
<th>90</th>
<th>100</th>
<th>120</th>
<th>155</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>K</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B = 80</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>160</td>
<td>180</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = 40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>160</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KOKU 1_K_
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

<table>
<thead>
<tr>
<th>Di</th>
<th>33</th>
<th>42</th>
<th>60</th>
<th>70</th>
<th>85</th>
<th>90</th>
<th>100</th>
<th>120</th>
<th>155</th>
<th>180</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>K</td>
<td>N</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B = 80  100  120  140  160  180  200
C = 40  60   80   100  120  140  160
Note:
Without fixing base.
Fix directly to floor
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

Note:
Without fixing base.
Fix directly to floor

Table:

<table>
<thead>
<tr>
<th>Di</th>
<th>90</th>
<th>100</th>
<th>120</th>
<th>155</th>
<th>180</th>
<th>200</th>
<th>250</th>
<th>350</th>
<th>400</th>
<th>450</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>80</th>
<th>100</th>
<th>120</th>
<th>140</th>
<th>160</th>
<th>180</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>90</td>
<td>110</td>
<td>130</td>
<td>150</td>
</tr>
</tbody>
</table>

KOKU 1_W_
Current transformers Type: TPO, TPU, IBZ, IPZ, ISZ, KOHU, KOKU, KODI, IMT, IP 24

<table>
<thead>
<tr>
<th>Ratio</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>75/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150/5</td>
<td>53</td>
<td>106</td>
<td>55</td>
<td>85</td>
<td>70</td>
</tr>
<tr>
<td>250/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500/5</td>
<td>73</td>
<td>136</td>
<td>45</td>
<td>100</td>
<td>85</td>
</tr>
<tr>
<td>1000/5</td>
<td>95</td>
<td>160</td>
<td>45</td>
<td>112</td>
<td>97</td>
</tr>
</tbody>
</table>

wire 2 x 2.5 mm² with a length of 4 m, marked with number "1" and "2"