



INSTRUCTION FOR INSTALLATION, USE AND MAINTENANCE FOR CURRENT TRANSFORMERS



Instruction for installation, use and maintenance for Current transformers

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

These instructions are valid for

Indoor current transformer type: TPU 4x.xx, TPU 5x.xx, TPU 6x.xx, TPU 7x.xx;
TTR 4x.., TTR 6x..; BB(O); KOKS

Outdoor current transformer type: TPO 6x.xx, TPO 7x.xx

1. Operating conditions

Indoor transformers

The transformers should be mounted in dry indoor conditions where the ambient air is not significantly polluted by dust, smoke, corrosive cases, vapours or salt.

The transformers are designed for standard ambient temperature between -5°C and $+40^{\circ}\text{C}$. The altitude for use should be lower than 1000 m above the sea level. The transformers may be used also in higher or in lower ambient temperatures and higher altitudes when agreed upon with the manufacturer.

Outdoor transformers

The transformers should be mounted in outdoor conditions where the ambient air may be polluted by dust, smoke, corrosive cases, vapours or salt.

The transformers are designed for standard ambient temperature between -40°C and $+40^{\circ}\text{C}$. The average value of the ambient temperature, measured over a period of 24 hours, should not exceed 35°C .

2. 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 the label

ABB		1234567890
		TPU 40.13
200-400/1/1 A		50 Hz
1S1-1S2	5VA cl. 0.5 FS 5	
1S1-1S3	10VA cl. 0.5 FS 5	
2S1-2S2	5VA cl. 5P15	
2S1-2S3	10VA cl. 5P15	
12/28/75 kV		50(1s)/125 kA
2002	IEC 60044-1	
E	TCM 212/95-2150	

Where:

1234567890

serial number

TPU 40.13

transformer type code

50Hz

rated frequency

200-400/1/1 A

rated transformer ratio

1S1-1S2

terminal marking for core number 1, first tap

1S1-1S3

terminal marking for core number 1, second tap

5VA

rated output (burden)

0.5, 5P

accuracy classes

FS5

instrument security factor

12/28/75 kV

highest voltage for equipment / power-frequency withstand

voltage / rated lightning-impulse voltage

IEC 60044-1

referred standard(s)

50(1s)/125kA

rated short time thermal current (thermal time) / rated

dynamic current

2002

year of production

E

temperature class

3. *Instruction for installation*

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 terminal of each secondary winding of the transformer. However, when the secondary of transformer is interconnected, there should be only one grounded point to prevent accidental paralleling with system grounding wire.
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.

4. Mounting

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 or M12 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 the mounting base with four screws M10 and washers or two U 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 M8 screws without removing already fitted primary conductors.

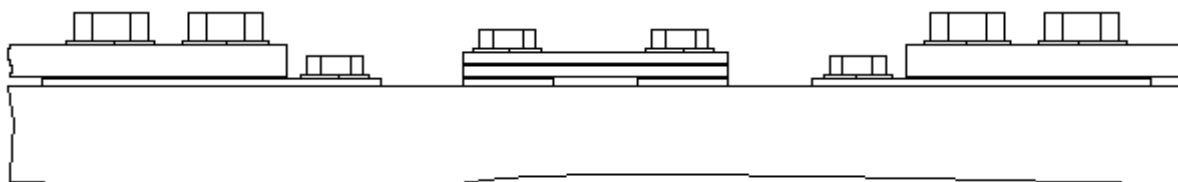
Maximum allowed torques for screw connections of current transformers:

Screw	Max. torque [Nm]	Min. torque [Nm]
M5	3.5	2.8
M8	20	16
M10	35	20
M12	70	56

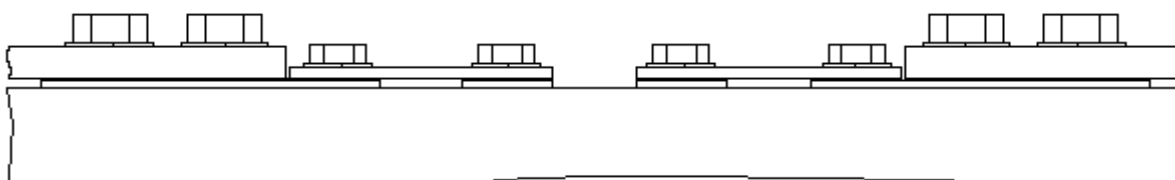
Maximum allowed cantilever strength is: Current transformers 5000 N

Primary reconnectable transformers PRIMARY CONNECTION

LOW RATIO



HIGH RATIO



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 indoor use is made from the plastic and provided with three detachable threaded inserts Pg16. The terminals are provided with M5 screws for secondary wiring connection and with through going holes for direct earthing of the secondary circuit by M5 screws. The terminal cover is seal able.

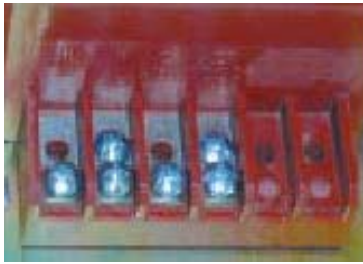
The secondary cover for outdoor CT is made of epoxy resin and provided with one insert Pg21.

Maximum allowed torques for secondary screw connections

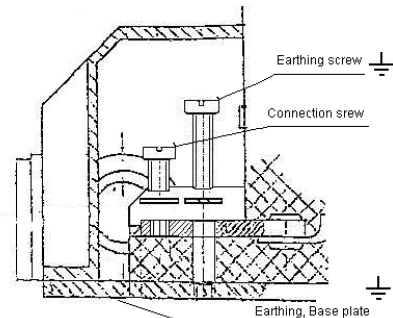
Screw	Max. torque [Nm]	Min. torque [Nm]
M5	3.5	2.8

Max. diameter of the cable or wire connected on one secondary terminal: 2x Ø2,5mm.

For terminal marking see appendix 1.



Details of the indoor current transformers cast terminal boxes (1 row, 2 rows)



Details of the outdoor CTs cast terminal

Cross section of secondary terminal box

5. Capacitive voltage indicator (“CD” divider)

The current transformer can be supplied with the capacitive voltage indicator on the request. There are two possible solutions:

- HR – Indicator complies with the IEC 61243-5 standard for high resistive voltage indicators
- 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

Ub (kV)	C1 (pF)	C2 (pF)
3 – 5,5	28 – 55	20 - 90
5,5 – 7,2	23 – 40	
10 – 13,8	19 – 33	
13,8 – 17,5	13 – 23	
20 – 24	10 - 18	

5. Instruction for use

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
- The use of instrument transformer for other purpose then described above is forbidden in not agreed with the producer.

Routine test report

Test report of the **current transformers** includes:

- a) verification of terminal markings
 - b) power-frequency withstand test on primary winding
 - c) partial discharge measurement
 - d) power-frequency withstand test on secondary windings
 - e) power-frequency withstand tests, between sections
 - f) inter-turn overvoltage test
 - g) determination of errors
- there are two rating plates with transformer (one plastered on the transformer and one free)

The following information can be included on the request. These are free of charge.

- theoretical current/voltage errors and phase displacement values
- theoretical excitation (magnetizing) curves

There are additional extra paid reports which can be supplied on request:

- accuracy test report
- excitation (magnetizing) curves
- additional labels (if more then 2)
- verification tests for metering cores (classes 0,2, 0,2 S, 0,5, 0,5 S)

6. *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.

7. *Transport and storage*

The permissible transport and storage temperature is from $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$. During transport and storage the transformers must be protected against direct sunshine. The transformers are delivered in wooden boxes or fastened to a transport pallets

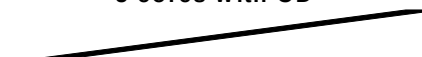
Appendix 1. Examples of secondary terminal marking for cast terminal box for current transformers

	One core	One core with CD																														
No tap	<table><tr><td>1s1</td><td>1s2</td><td></td><td></td><td></td><td></td></tr><tr><td colspan="6"></td></tr></table>	1s1	1s2											<table><tr><td>1s1</td><td>1s2</td><td></td><td></td><td>Ck</td><td>PE</td></tr><tr><td colspan="6"></td></tr></table>	1s1	1s2			Ck	PE												
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1s1	1s2	1s3	1s4	Ck	PE																											

	Two cores	Two cores with CD																																				
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	3 cores	3 cores with CD																																				
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	4 cores	4 cores with CD																																				
No tap	<table><tr><td>1s2</td><td>2s2</td><td>3s2</td><td>4s2</td><td></td><td></td></tr><tr><td>1s1</td><td>2s1</td><td>3s1</td><td>4s1</td><td></td><td></td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr></table>	1s2	2s2	3s2	4s2			1s1	2s1	3s1	4s1									<table><tr><td>1s2</td><td>2s2</td><td>3s2</td><td>4s2</td><td></td><td></td></tr><tr><td>1s1</td><td>2s1</td><td>3s1</td><td>4s1</td><td>Ck</td><td>PE</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr></table>	1s2	2s2	3s2	4s2			1s1	2s1	3s1	4s1	Ck	PE						
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1s1	2s1	2s2	3s1	4s1	4s2																																	

	5 cores						5 cores with CD
No tap	1s2	2s2	3s2	4s2	5s2		
	1s1	2s1	3s1	4s1	5s1		
							

	6 cores						6 cores with CD
No tap	1s2	2s2	3s2	4s2	5s2	6s2	
	1s1	2s1	3s1	4s1	5s1	6s1	
							

2nd line of terminal
1st line of terminal

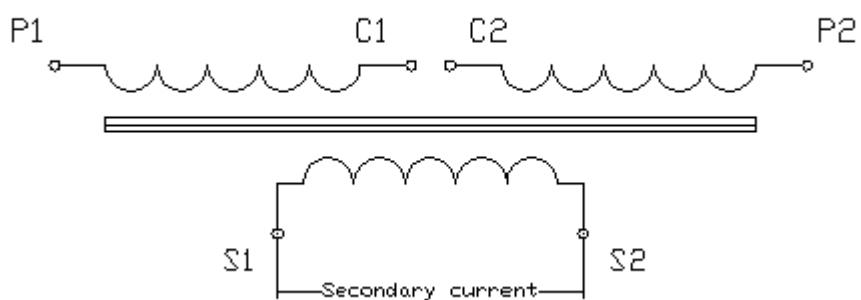
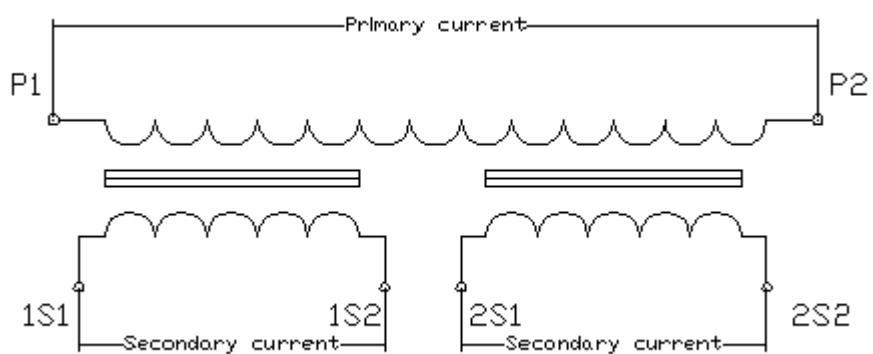
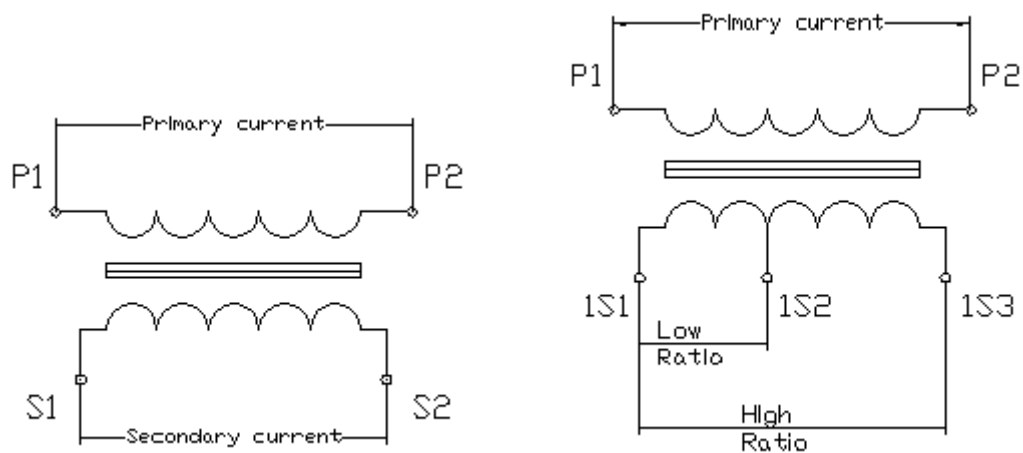


-terminal not earthed
-terminal earthed

Appendix 2.

Examples of wiring diagrams

Current transformers:



Examples of the current transformer connections

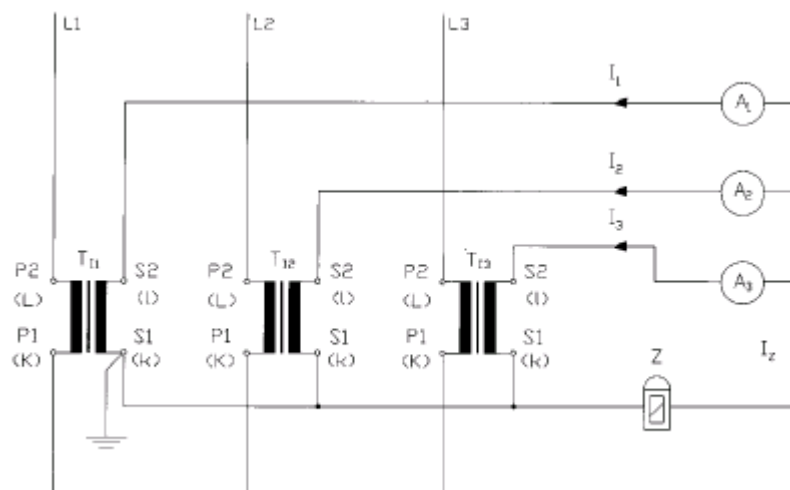
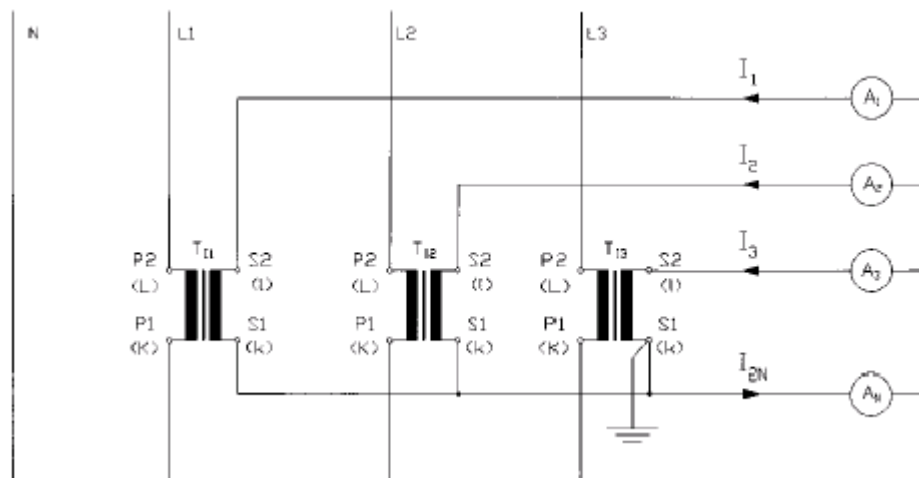


ABB s.r.o.
org.unit EJF
Videňská 117
619 00 Brno, Czech Republic
Tel.: +420 547 152 602
+420 547 152 604
Fax.: +420 547 152 626
E-mail: info.ejf@cz.abb.com
<http://www.abb.com>





Highest voltage for equipment	[kV]	36 ; 38.5 ; 40,5
Power frequency test voltage, 1 min.	[kV]	70 ; 80 ; 90
Lighting impulse test voltage	[kV]	170 ; 180 ; 200
Rated current	[A]	10 - 2500
Rated short-time thermal current	[kA]	up to 100
Burdens, classes	[VA/cl]	5-30 / 0.2-1 / 5P ; 10P (acc. to other param. - lth)
Reconnectible (primary till 600-1200 A)		prim. or sec.

Description

The transformers are cast in epoxi resin and designed for insulation voltages from 36 kV to 40.5 kV.

The transformers are designed as single-or-multiple turn transformers, with one transformer ratio, or with the possibility to be switched over on the secondary or primary side.

The number of secondary windings are from 1 to 8 (usually 2 secondary windings), depending on the combination of parameters (such as the accuracy class, short-circuit current, overcurrent factor...).

The secondary windings are used for measurement or protection purposes, or for special use (testing winding, "X" class windings ..). One terminal of each secondary winding used and one terminal of short-circuited and not used winding have to be earthed during the transformer operation.

The secondary windings are lead out into a casted secondary terminal board. The transformer can be mounted in any position. The transformer are fixed by four screws, the M8 bolted earthing clamp finds itself on the transformer base plate.

Rated primary currents are

10;15;20;25;30;40;50;60;75;100;150;200;300;400;500;600;750;1000;1250;1500; 2000;2500 A.

Other primary currents can be agreed with the manufacturer.

Rated secondary currents...5 A; 1 A (possibility to combine different values in one transformer)

Rated frequency ... 50 Hz; 60 Hz

The transformers are designed and manufactured in conformity with the following standards and recommendations:

IEC, ANSI, VDE, BS, GOST and CSN.

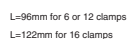
Cantilever strength: 5 kN

Permissible torques for screw connections

M5	max /Nm/ ...3,5	min /Nm/...2,8
M8	max /Nm/ ...20	min /Nm/...16
M12	max /Nm/ ...70	min /Nm/...56

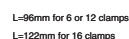
Dimensions

TPU 70.51 WEIGHT: appr. 49kg
TPU 73.51 CREP. DISTANCE: 400mm



Drawing n.	Polarity
44615730	P1 to secondary term.
44615740	P2 to secondary term.

TPU 70.52 WEIGHT: appr. 49kg
TPU 73.52 CREP. DISTANCE: 409mm

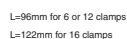


Drawing n.	Polarity
44615750	P1 to secondary term.
44615760	P2 to secondary term.

TPU 70.53

TPU 73.53

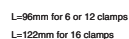
WEIGHT: appr. 49kg
CREP. DISTANCE: 397mm



Drawing n.	Polarity
44615650	P1 to secondary term.
44615660	P2 to secondary term.

TPU 70.54
TPU 73.54

WEIGHT: appr. 49kg
CREP. DISTANCE: 409mm

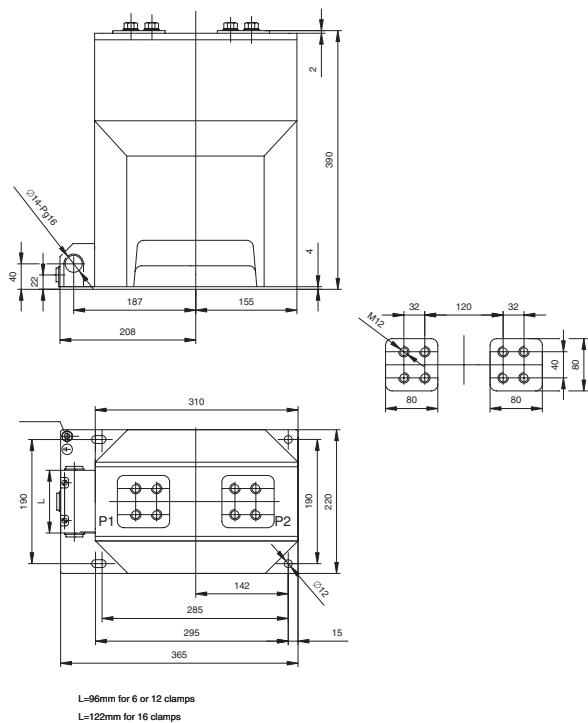


Drawing n.	Polarity
44615710	P1 to secondary term.
44615720	P2 to secondary term.

Dimensions

TPU 74.51
TPU 75.51
TPU 76.51

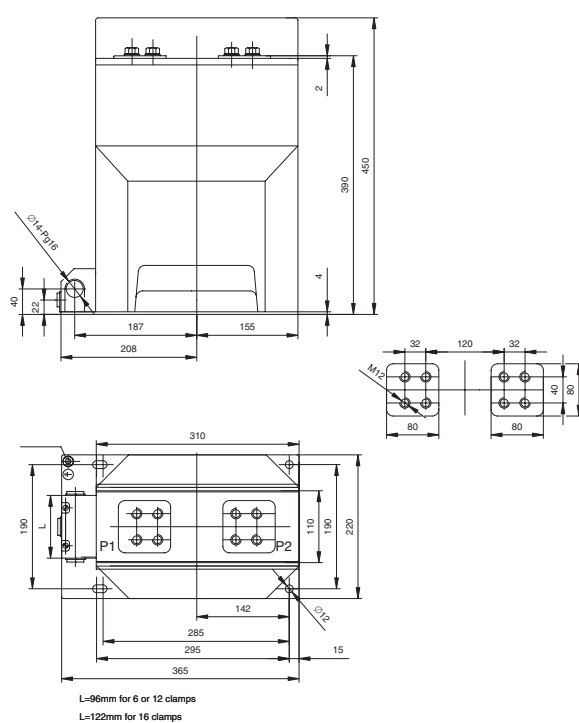
WEIGHT: appr. 49kg
CREP. DISTANCE: 386mm



Drawing n.	Polarity
44615690	P1 to secondary term.
44615700	P2 to secondary term.

TPU 74.53
TPU 75.53
TPU 76.53

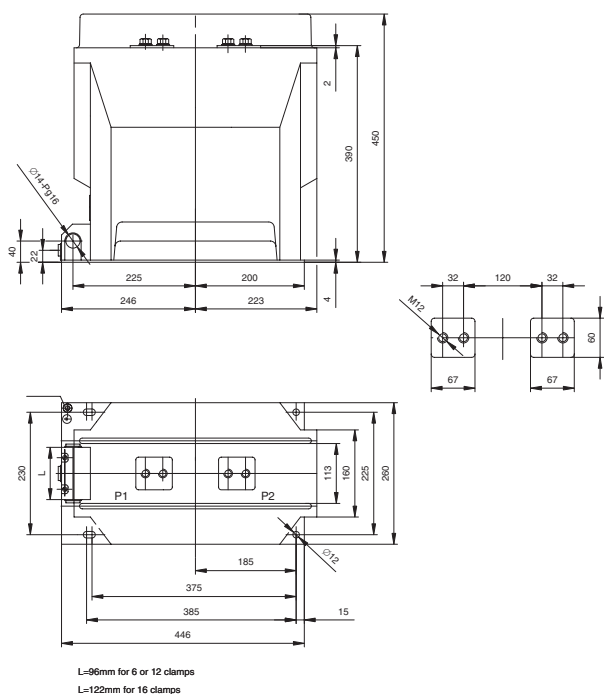
WEIGHT: appr. 49kg
CREP. DISTANCE: 386mm



Drawing n.	Polarity
44615670	P1 to secondary term.
44615680	P2 to secondary term.

TPU 70.63
TPU 73.63

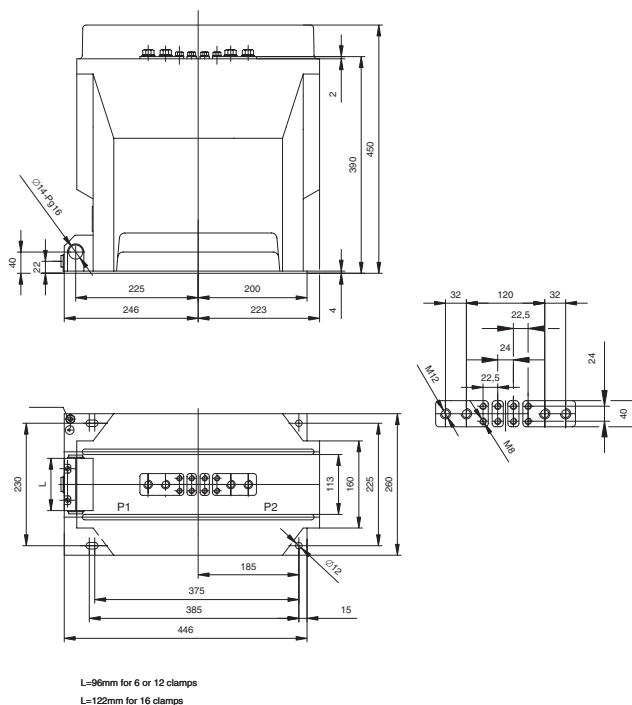
WEIGHT: appr. 78kg
CREP. DISTANCE: 463mm



Drawing n.	Polarity
44615570	P1 to secondary term.
44615580	P2 to secondary term.

TPU 70.64
TPU 73.64

WEIGHT: appr. 78kg
CREP. DISTANCE: 456mm

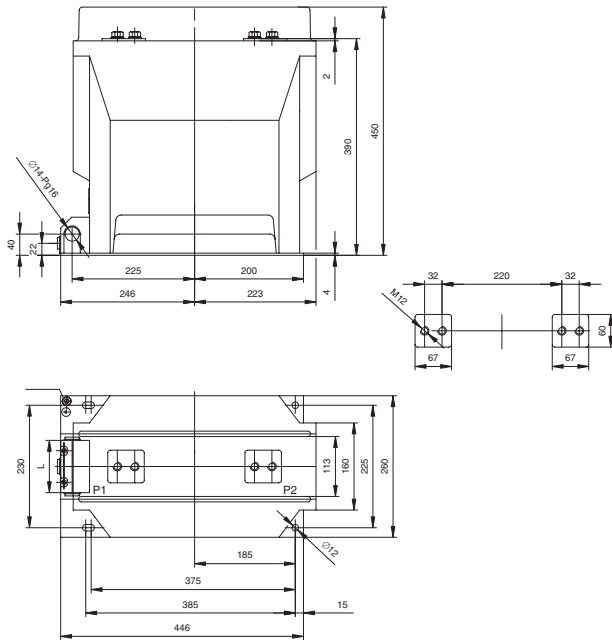


Drawing n.	Polarity
44615610	P1 to secondary term.
44615620	P2 to secondary term.

Dimensions

TPU 70.66
TPU 73.66

WEIGHT: appr. 78kg
CREP. DISTANCE: 413mm

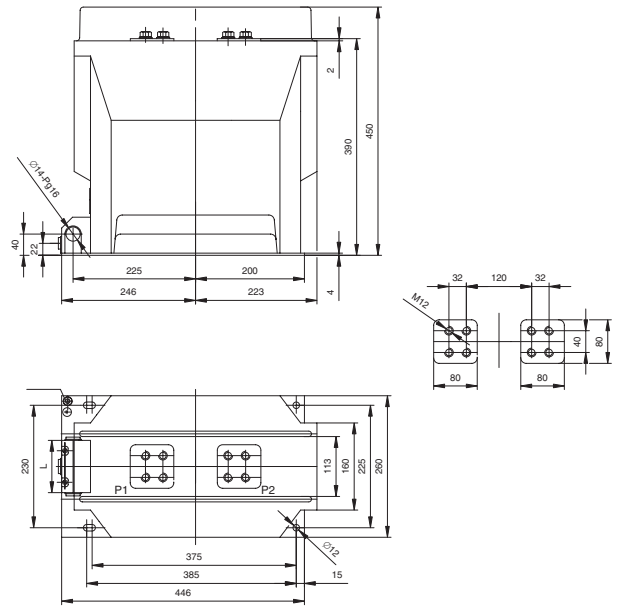


L=96mm for 6 or 12 clamps
L=122mm for 16 clamps

Drawing n.	Polarity
44615630	P1 to secondary term.
44615640	P2 to secondary term.

TPU 74.63
TPU 75.63
TPU 76.63

WEIGHT: appr. 78kg
CREP. DISTANCE: 463mm



L=96mm for 6 or 12 clamps
L=122mm for 16 clamps

Drawing n.	Polarity
44615590	P1 to secondary term.
44615600	P2 to secondary term.

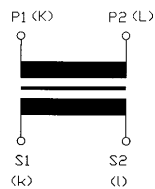
Code designation of TPU current transformers for 36 kV - 40,5 kV

TPU	x	x	.	x	x
	voltage	current		dimension	primary terminals
	7..up to 36 (40,5) kV	0... 5 A - 600 A multiturn 3...to 1250 A singleturn 4...to 1500 A singleturn 5...to 2000 A singleturn 6...to 2500 A singleturn		5..short, narrow 220mm 6..long, wide 260mm 7..short, narrow 220mm, base plate 260mm	1..no pr.rec., no ribs /40x80mm, 80x80mm/ 2..prim. rec., no ribs /40x80mm,/ 3..no pr.rec., with ribs /40x80mm, 60x67mm, 80x80mm/ 4..prim. rec., with ribs /40x80mm/ 5..no pr.rec., with ribs /80x80mm-6xM12/ 6..no pr.rec., with ribs /60x67mm/, distance220mm

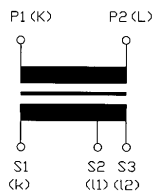


Secondary terminal box

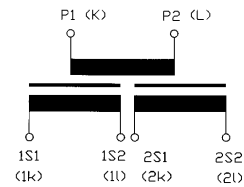
Marking of current transformer outlets



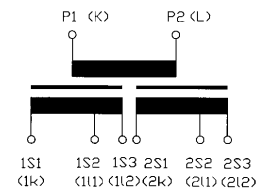
a)



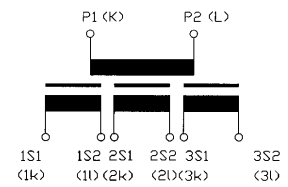
d)



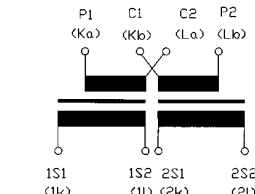
b)



e)



c)



f)

a) Single-core design

d) Single-core design,
reconnectable on the secondary side

b) Double-core design

e) Double-core design,
reconnectable on the secondary side

c) Three-core design

f) Double-core design,
reconnectable on the primary side

Standartized transformers

Type	Ithn [kA]	Ratio [A]	Burden [VA]	class	FS/ALF	Type	Ithn [kA]	Ratio [A]	Burden [VA]	class	FS/ALF
TPU 70.51	6,3/16	10//5	30	10P	5	TPU 70.51	31,5/80	60//5	30	5P	5
TPU 70.51	6,3/16	10//5	15	0,5	FS5	TPU 70.51	31,5/80	60//5/5	15/15	0,5/10P	FS5/10
TPU 70.51	6,3/16	10//5/5	10/15	0,5/10P	FS5/5	TPU 70.51	50/125	60//5	30	10P	5
TPU 70.51	6,3/16	10//5/5	15/15	3/10P	5/5	TPU 70.51	50/125	60//5/5	10/15	0,5/10P	FS5/5
TPU 70.51	10/25	10//5	15	10P	5	TPU 70.51	50/125	60//5/5	15/15	3/10P	10/5
TPU 70.51	10/25	10//5/5	5/10	0,5/10P	FS5/5	TPU 70.51	31,5/80	75//5	30	5P	10
TPU 70.51	10/25	10//5/5	15/10	3/10P	5/5	TPU 70.51	31,5/80	75//5/5	15/15	0,5/5P	FS5/10
TPU 70.51	10/25	15//5	15	10P	5	TPU 70.51	50/125	75//5	30	5P	5
TPU 70.51	10/25	15//5/5	10/15	0,5/10P	FS5/5	TPU 70.51	50/125	75//5/5	10/15	0,5/10P	FS5/5
TPU 70.51	10/25	15//5/5	15/15	3/10P	5/5	TPU 70.51	31,5/80	100//5	30	5P	5
TPU 70.51	16/40	15//5	15	10P	5	TPU 70.51	31,5/80	100//5/5	15/15	0,5/5P	FS5/10
TPU 70.51	16/40	15//5/5	5/10	0,5/10P	FS5/5	TPU 70.51	50/125	100//5	30	5P	10
TPU 70.51	16/40	15//5/5	15/10	3/10P	5/5	TPU 70.51	50/125	100//5/5	10/15	0,5/5P	FS5/10
TPU 70.51	16/40	20//5	30	10P	5	TPU 70.51	31,5/80	150//5	30	5P	10
TPU 70.51	16/40	20//5/5	10/15	0,5/10P	FS5/5	TPU 70.51	31,5/80	150//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	16/40	20//5/5	15/15	3/10P	5/5	TPU 70.51	50/125	150//5	30	5P	5
TPU 70.51	31,5/80	20//5	15	10P	5	TPU 70.51	50/125	150//5/5	10/15	0,5/5P	FS10/10
TPU 70.51	31,5/80	20//5/5	5/10	0,5/10P	FS5/5	TPU 70.51	50/125	200//5	30	5P	10
TPU 70.51	31,5/80	20//5/5	15/10	3/10P	5/5	TPU 70.51	50/125	200//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	20/50	25//5	30	10P	5	TPU 70.51	50/125	250//5	30	5P	10
TPU 70.51	20/50	25//5/5	10/15	0,5/10P	FS5/5	TPU 70.51	50/125	250//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	20/50	25//5/5	15/15	3/10P	5/5	TPU 70.51	50/125	300//5	30	5P	10
TPU 70.51	40/100	25//5	15	10P	5	TPU 70.51	50/125	300//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	40/100	25//5/5	5/10	0,5/10P	FS5/5	TPU 70.51	50/125	400//5	30	5P	10
TPU 70.51	40/100	25//5/5	15/10	3/10P	5/5	TPU 70.51	50/125	400//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	25/63	30//5	30	10P	5	TPU 70.51	50/125	500//5	30	5P	15
TPU 70.51	25/63	30//5/5	10/15	0,5/10P	FS5/5	TPU 70.51	50/125	500//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	25/63	30//5/5	15/15	3/10P	5/5	TPU 70.51	50/125	600//5	30	5P	15
TPU 70.51	31,5/80	30//5	30	10P	5	TPU 70.51	50/125	600//5/5	15/30	0,5/5P	FS10/10
TPU 70.51	31,5/80	30//5/5	15/15	3/10P	5/5	TPU 73.51	63/160	750//5	30	5P	10
TPU 70.51	40/100	30//5	15	10P	5	TPU 73.51	63/160	750//5/5	15/15	0,5/5P	FS10/10
TPU 70.51	40/100	30//5/5	5/10	0,5/10P	FS5/5	TPU 73.51	80/200	1000//5	30	5P	15
TPU 70.51	40/100	30//5/5	15/10	3/10P	5/5	TPU 73.51	80/200	1000//5/5	30/15	0,5/5P	FS5/10
TPU 70.51	31,5/80	40//5	30	5P	5	TPU 73.51	80/200	1250//5	30	5P	15
TPU 70.51	31,5/80	40//5/5	15/15	0,5/10P	FS5/5	TPU 73.51	80/200	1250//5/5	30/30	0,5/5P	FS10/10
TPU 70.51	50/125	40//5	15	10P	5/5	TPU 74.51	100/250	1500//5	30	5P	15
TPU 70.51	50/125	40//5/5	5/10	0,5/10P	FS5/5	TPU 74.51	100/250	1500//5/5	30/30	0,5/5P	FS10/10
TPU 70.51	50/125	40//5/5	15/10	3/10P	5/5	TPU 75.51	100/250	2000//5	60	5P	10
TPU 70.51	31,5/80	50//5	30	5P	5	TPU 75.51	100/250	2000//5/5	30/30	0,5/5P	FS10/10
TPU 70.51	31,5/80	50//5/5	15/15	0,5/10P	FS5/10	TPU 76.51	100/250	2500//5	30	5P	15
TPU 70.51	50/125	50//5	30	10P	5	TPU 76.51	100/250	2500//5/5	30/60	0,5/5P	FS10/10
TPU 70.51	50/125	50//5/5	10/15	0,5/10P	FS5/5	other on request					
TPU 70.51	50/125	50//5/5	15/15	3/10P	5/5						

Note:

Customer	Date
Address	Delivery required
Country	Tel.
Contact person	E-mail
	Fax.

Current transformers

Project ref.:		Date	Inquiry No.:	
			Offer No.:	
Um:	kV	Insulation level (BIL):	kV/ kV/ kV	
lth:	kA/1s			
	kA/3s			
freq.:	Hz	Routine test certificates Additional name plate Magnetisation curves		
ldyn.:	kA			
Indoor	☐	Remarks:		
Outdoor	☐			
Pos.:	ratio (A)	Pcs.:	Class	Burden (VA)
core 1:				ext 100%
core 2:				ext 120%
core 3:				ext 150%
core 4:				ext 200%
				reconnectable
				☐ Yes ☐ No
				☐ primary ☐ secondary
Supplier's remarks				
Type				
	Unit price			
	Total price			
Comment				
Pos.:	ratio	Pcs	Class	Burden
core 1:				ext 100%
core 2:				ext 120%
core 3:				ext 150%
core 4:				ext 200%
				reconnectable
				☐ Yes ☐ No
				☐ primary ☐ secondary
Supplier's remarks				
Type				
	Unit price			
	Total price			
Comment				



1VLC000513 - Rev -, en 2003.03.28

ABB s.r.o.

org. unit EJF

Videňská 117

619 00 Brno, Czech Republic

E-mail: info.ejf@cz.abb.com

http://www.abb.com

Tel.: +420 5 4715 2602

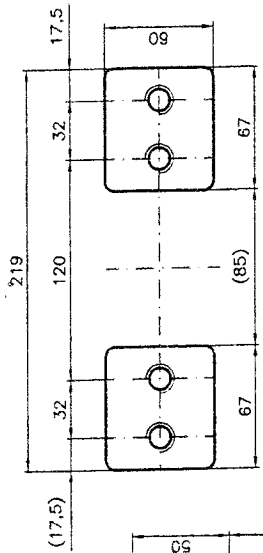
+420 5 4715 2604

Fax: +420 5 4715 2626

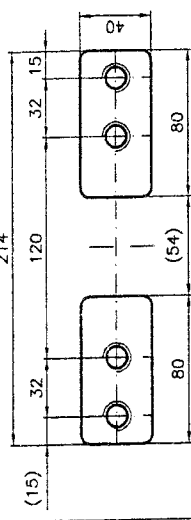
POŘADOVÁ ČÍSLO	POZNÁMKA	POVRŠÍ (mm²)

PRIMÁRNÍ SVORKY

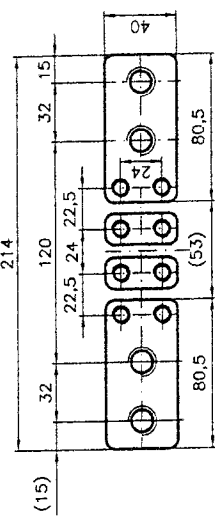
1) VINUTÝ PRIMÁR – KABEL MAX. 1250A
TPU 70.53, VÝKRES Č. 24608950



2) VINUTÝ PRIMÁR Z PÁSKU MAX. 600A – TPU 70.53
VÝKRES Č. 24608951



3) PRIMÁRNĚ PŘEPÍNATELNÉ (KABELOVÉ PŘEVODNÍK)
MAX. 600–1200A – TPU 70.54, VÝKRES Č. 24608952



6,7,8

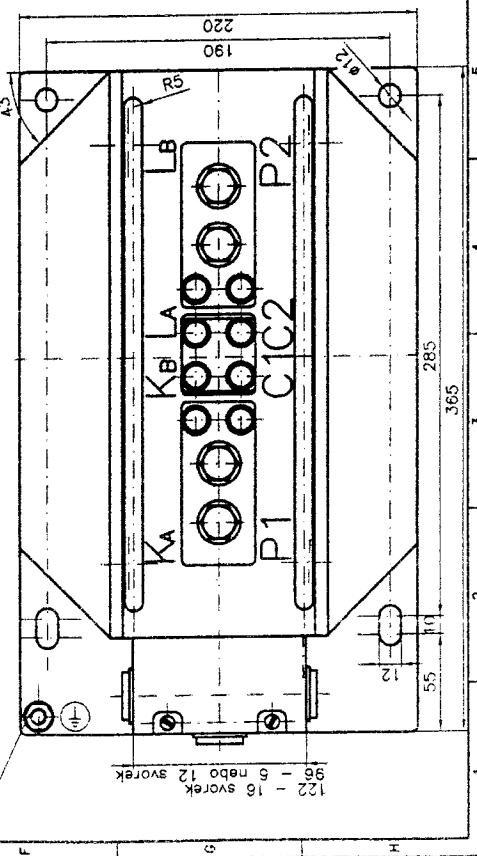
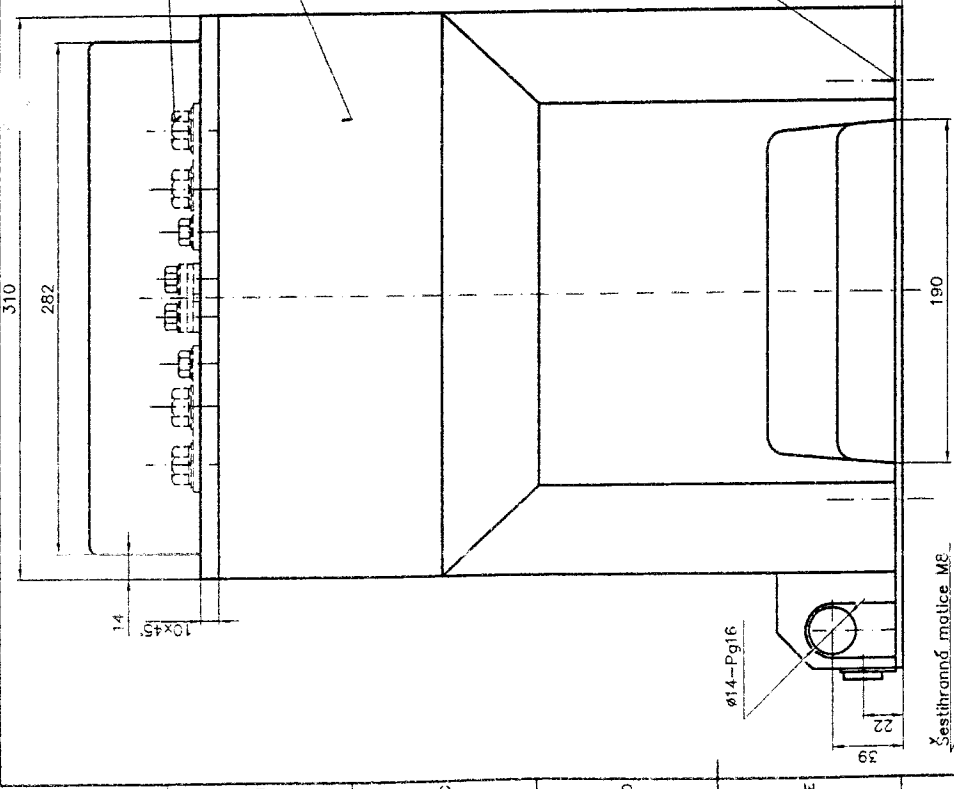
1

13

3

9

5



Výrob. tolerance podle ISO 2768-12	Symboly dle ISO 3144
Délky, šířky v rovině, zvláštní: střední, hrubé	Symboly dle ISO 3144
Rozevírací vřetovnice se k dýh: "E"	Symboly dle ISO 3144
Šířky dýh: "E"	Symboly dle ISO 3144
Symboly dle ISO 3144	Symboly dle ISO 3144
Výrob. tolerance podle ČSN 01 3144	Symboly dle ISO 3144
Výrob. tolerance podle ČSN 01 3144	Symboly dle ISO 3144
Výrob. tolerance podle ČSN 01 3144	Symboly dle ISO 3144
Výrob. tolerance podle ČSN 01 3144	Symboly dle ISO 3144

Číslo	Popis	Verze	Typ IPU	7x
1	1.2	1.2	1.2	1.2
TRANSFORMÁTOR				
ABB ABB s.r.o. opt. jednotka EBF				
1VL 2460895A				

