Outdoor current transformers types: KOKU, IHDA, KODI, IMT

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Cable current transformers type KOKU

KOKU_ current transformers are suitable for measuring phase currents. A busbar or cable serves as the primary conductor. Series KOKM current transformers can also be used for measuring the phase current at voltages higher than 0.72 kV (for KOKU 072) or 1.2 kV (for KOKU 1), if the insulation of the primary conductor satisfies the requirements of the respective standards for the operating voltage. The secondary winding and ring shaped iron core are cast in resin which has good electrical and mechanical properties.

Special type KOKU current transformer is KOKU 072 G_. It is dedicated to work with the SF6-insulated pole mounted switch disconnector type SECTOS. The dimensions of the KOKU 072 G_ are adjusted to the size of the SECTOS bushings. All transformers meet the requirements of the relevant standard i.e. the IEC 60044-1.

Ordering data

The order should contain the following data:
– Type of current transformer
– Rated primary current/rated secondary current [A/A]
– Rated burden and accuracy class for each winding [VA]
– Short-time thermal current Ith
– Dimension of the window [mm]
– Standard
– Quantity

Order example

KOKU 1 FC 8; 600/5 A/A; 10 VA; 0.5; Ith = 60xIpn/1s; IEC 60044-1; 9 Pcs

Table 1. Technical data

Transformer type			KOKU 072 G	KOKU 1
Rated voltage	U_m	[kV]	0.72 [1)]	1.2[1)]
Power frequency test voltage	U_p (1 min)	[kV]	3	6
Lighting test voltage	U_{pp}	[kV]	-	-
Frequency	f_n	[Hz]	50 or 60	
Max. primary current	I_{pn}	[A]	50 ÷ 800	50 ÷ 10 000
Rated secondary current	I_{sn}	[A]	1 or 5	
Rated thermal current[2)]	I_{cont}	[A]	Table 2	1,2 x I_{pn}[2)]
Short-time withstand current	I_{th} (1 s)	[kA]	Table 2	60 x I_{pn} (Max. 100 kA)
Peak withstand current	I_{dyn}	[kA]	2,5 x I_{th} (Max. 250 kA)	
Secondary terminals			for 6 mm^2 conductor	
Operating temperature range		[°C]	-35 … +40	
Transport and storage		[°C]	-65 … +55	
Electrical standards			PN-EN, IEC, VDE, ANSI, BS, AS, CAN	

[1)] The insulation level of the primary conductor determines the maximum operating voltage.
[2)] Max. I_{cont} for KOKU 072 G I_{cont} = 1000 A, for KOKU 1 I_{cont}= 10 000 A.

Table 2. Standard parameters for KOKU 072 G_

Type	Window diameter	Total height	Hole center height	Ratio	Accuracy class	Burden	Short circuit current I_{th}	Rated thermal current I_{cont}
	[mm]	[mm]	[mm]	[A]		[VA]	[kA]	ext [%]
KOKU 072 G3	Ø135	230	125	400/0,1	0,5/10P25	0,9	20 (1s)	200
KOKU 072 G4	Ø135	230	125	200/1	5P10	1,5	25 (1s)	120
KOKU 072 G4	Ø135	230	125	400/1	5P10	3	25 (1s)	120
KOKU 072 G4	Ø135	230	125	600/1	5P10	3	25 (3s)	120
KOKU 072 G4	Ø135	230	125	630/1	5P10	3	25 (3s)	120
KOKU 072 G5	Ø150	50	75	500/1	0,2 FS5	1	25 (1s)	120

If other electrical parameters other than those given in the tables are required please contact our sales department.

Table 3. KOKU 1_

Outer diameter [mm]		Hole diameter [mm]																Drawing	Casting height [mm]	Total height [mm]	Hole center height [mm]
		A	B	D	E	F	G	H	K	N	R	S	U	W	X	Y	Z				
		33	42	60	70	85	90	100	120	155	180	200	250	350	400	450	500				
C	148	60 160	60 160	60 160	60 160	60 160												KOKU 1_C_	183	249	112
F	186	80 160	80 160	80 160	80 160	80 160	80 160	80 160										KOKU 1_F_	213	279	131
H	200	80 180	80 180	80 180	80 180	80 180	80 180	80 180	80 180									KOKU 1_H_	235	301	138
J	235	80 300	80 300	80 300	80 300	80 300	80 300	80 300	80 300									KOKU 1_J_	265	331	158
K	250	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200								KOKU 1_K_	275	341	158
L	270	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200						KOKU 1_L_	297	363	158
M	280	80 240	80 240	80 240	80 240	80 240	80 240	80 240	80 240	80 240	80 240	80 240						KOKU 1_M_	297	363	158
P	340		80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200					KOKU 1_P_	379	445	204
T	450					80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200				KOKU 1_T_	465	513	225
W	590						80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	80 200	KOKU 1_W_	605	653	300

Range of transformer width

Example

KOKU 1 KL 12

Transformers width
12 – 120 mm (possibility – 8, 10, 12, 14, 16, 18, 20, 22, 24, ...30)

Outer diameter
L = 270 mm

Hole diameter
K = 120 mm

Rate voltage
1 = 1,2 kV

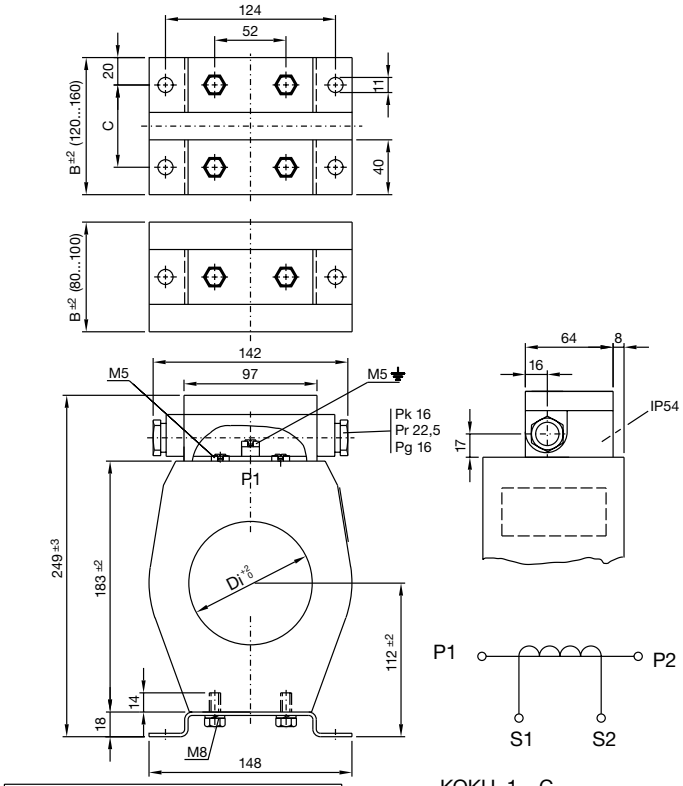
Type KOKU – outdoor use

Warranty

The producer gives a 24-month warranty for the purchased current transformers; the time is counted from the day of commissioning. However, the warranty shall not be longer than 30 months from the delivery date. The producer is not responsible for faults and damages resulting from:

– incorrect transport after the receipt of the transformers by the buyer,
– incorrect storage, installation and operation of transformers,
– inappropriate selection of transformers for a specific electric system.

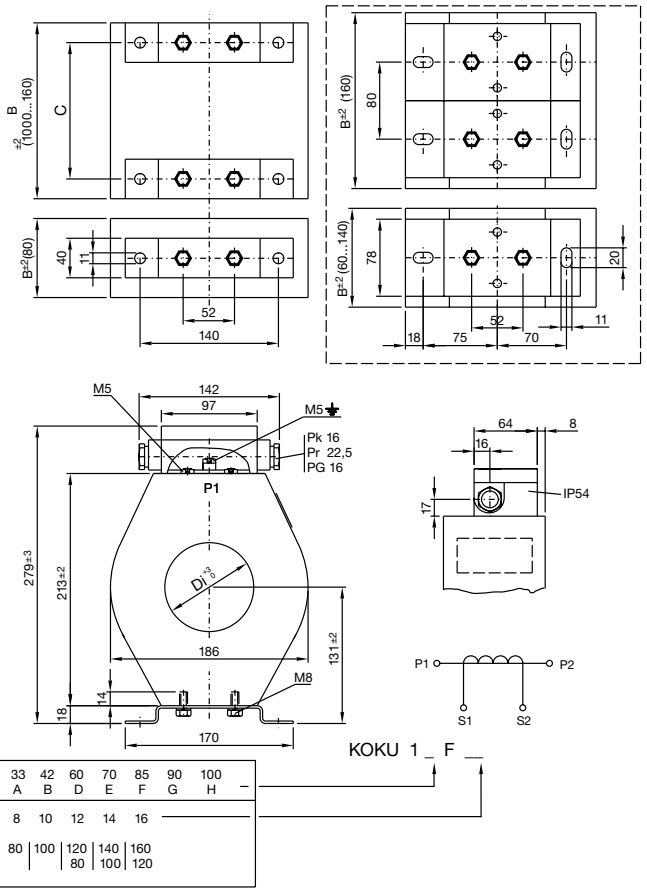
KOKU 1_C_



KOKU 1 _ C __

Di =	33 A	42 B	60 D	70 E	85 F
	8	10	12	14	16
B =	80	100	120	140	160
C =			80	100	120

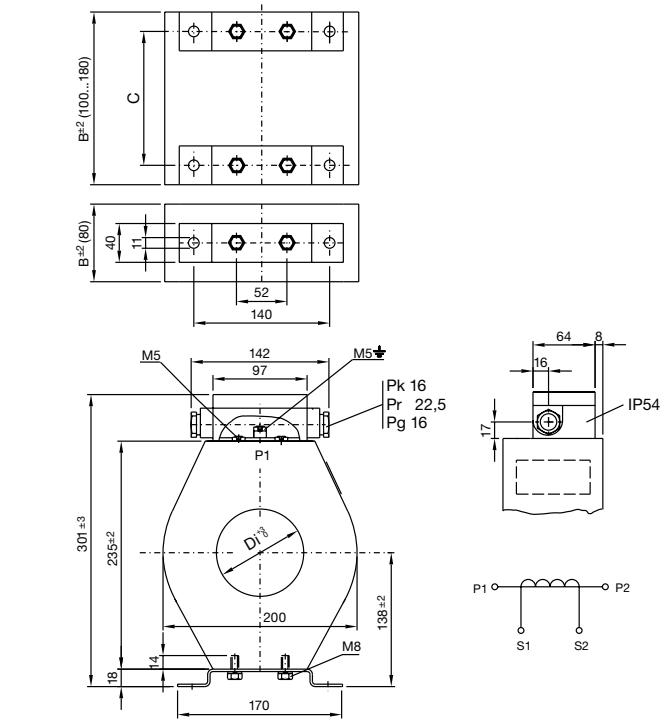
KOKU 1_F_



KOKU 1 _ F __

Di =	33 A	42 B	60 D	70 E	85 F	90 G	100 H
	8	10	12	14	16		
B =	80	100	120	140	160		
C =			80	100	120		

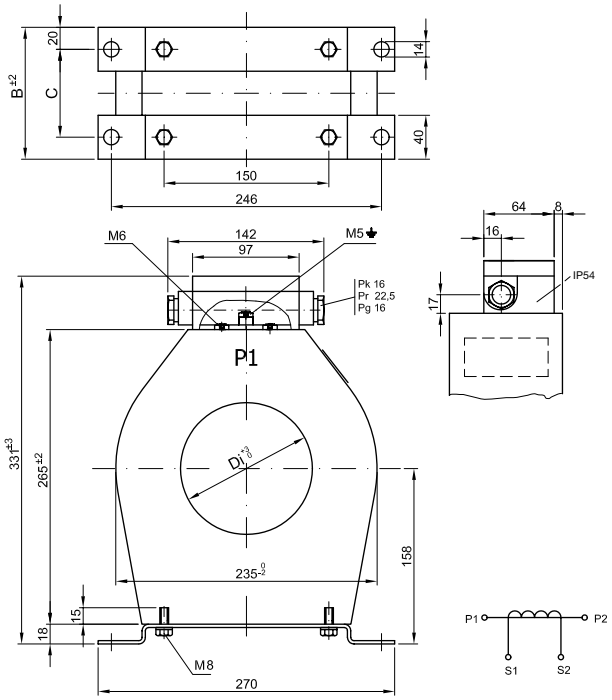
KOKU 1_H_



KOKU 1 _ H __

Di =	33 A	42 B	60 D	70 E	85 F	90 G	100 H	120 K
	8	10	12	14	16	18		
B =	80	100	120	140	160	180		
C =		60	80	100	120	140		

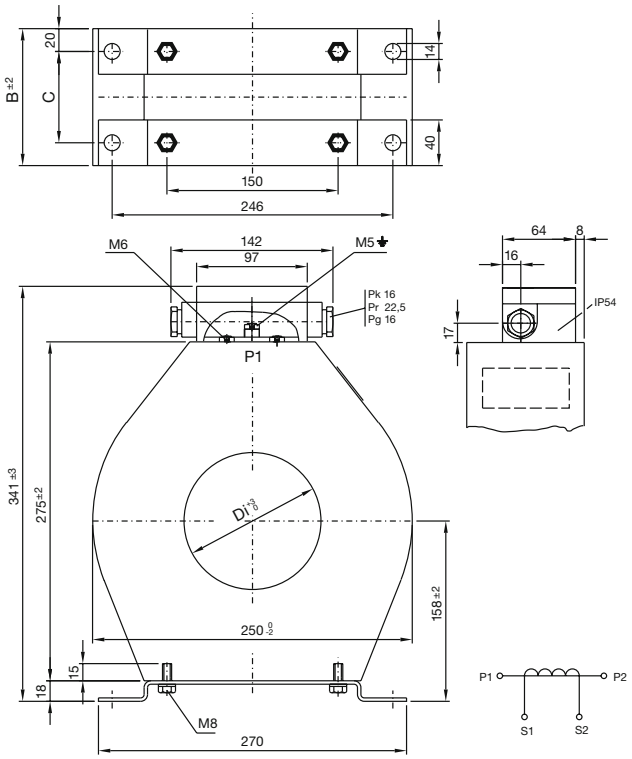
KOKU 1_J_



KOKU 1 _ J __

Di =	33 A	42 B	60 D	70 E	85 F	90 G	100 H	120 K
	8	10	12	14	16	18	20	22	24	26	28	30
B =	80	100	120	140	160	180	200	220	240	260	280	300
C =	40	60	80	100	120	140	160	180	200	220	240	260

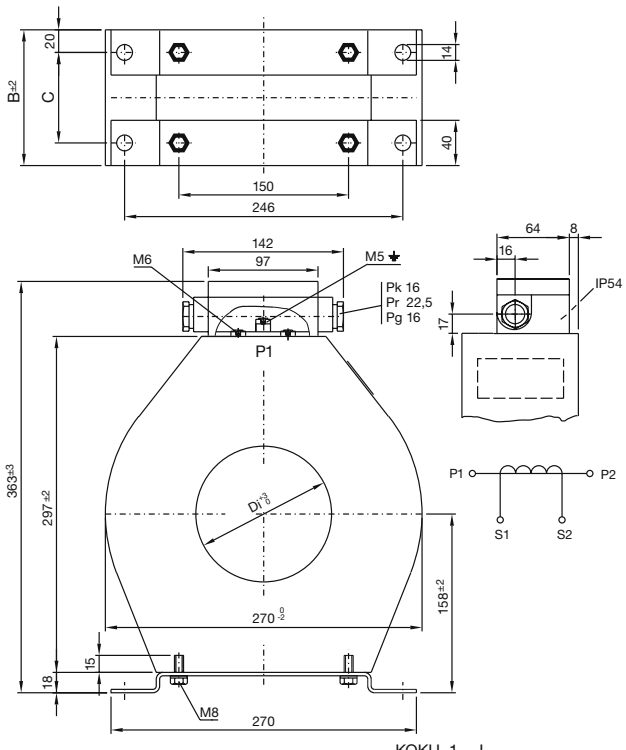
KOKU 1_K_



Di =	33	42	60	70	85	90	100	120	155
	A	B	D	E	F	G	H	K	N
	8	10	12	14	16	18	20		
B =	80	100	120	140	160	180	200		
C =	40	60	80	100	120	140	160		

KOKU 1 _ K _

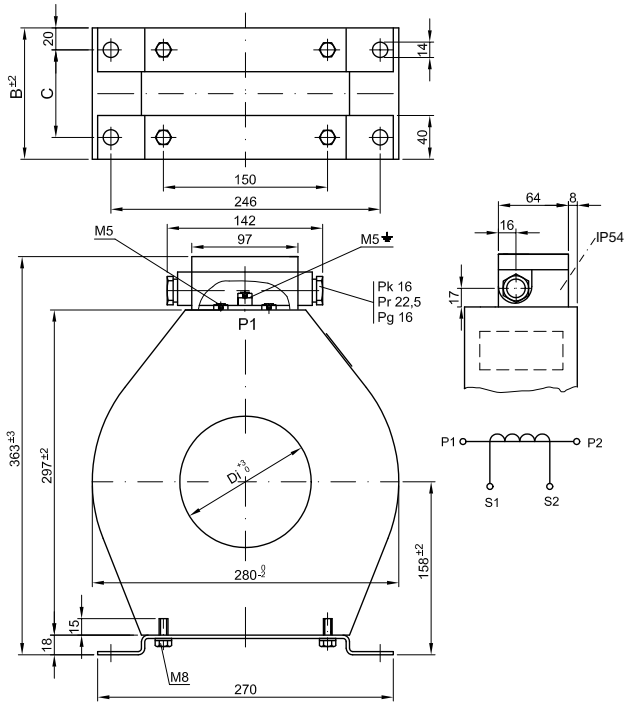
KOKU 1_L_



Di =	33	42	60	70	85	90	100	120	155	180	200
	A	B	D	E	F	G	H	K	N	R	S
	8	10	12	14	16	18	20				
B =	80	100	120	140	160	180	200				
C =	40	60	80	100	120	140	160				

KOKU 1 _ L _

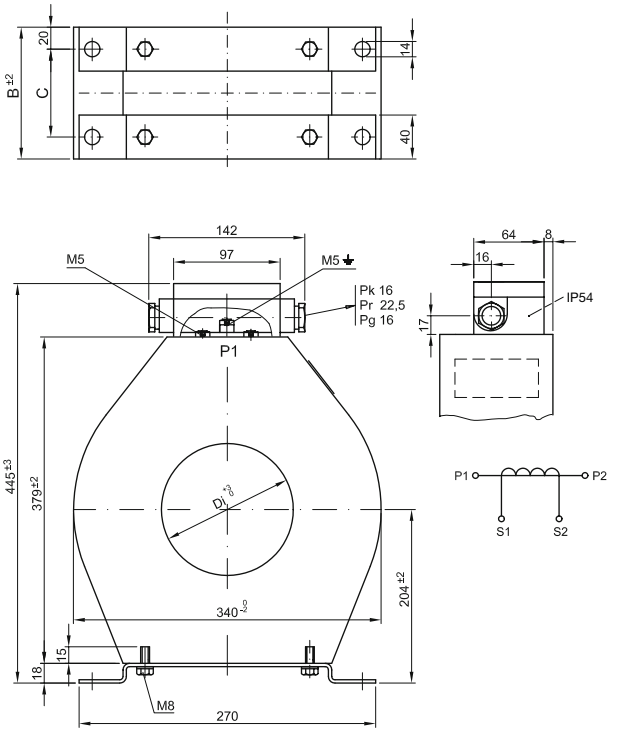
KOKU 1_M_



DI =	33	42	60	70	85	90	100	120	155	180	200
	A	B	D	E	F	G	H	K	N	R	S
	8	10	12	14	16	18	20	22	24		
B =	80	100	120	140	160	180	200	220	240		
C =	40	60	80	100	120	140	160	180	200		

KOKU 1 _ M

KOKU 1_P_

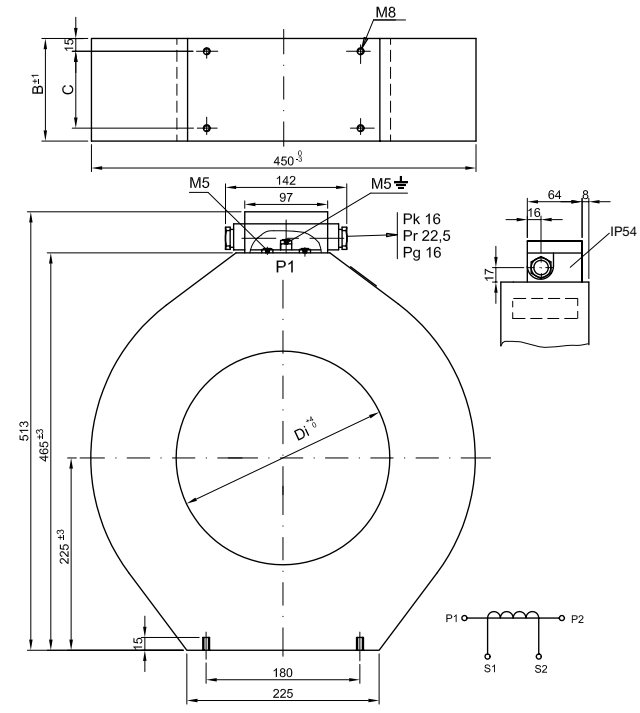


Di =	42	60	70	85	90	100	120	155	180	200	250
	B	D	E	F	G	H	K	N	R	S	U
	8	10	12	14	16	18	20				
B =	80	100	120	140	160	180	200				
C =	40	60	80	100	120	140	160				

KOKU 1 _ P

Dimensional drawings

KOKU 1_T_

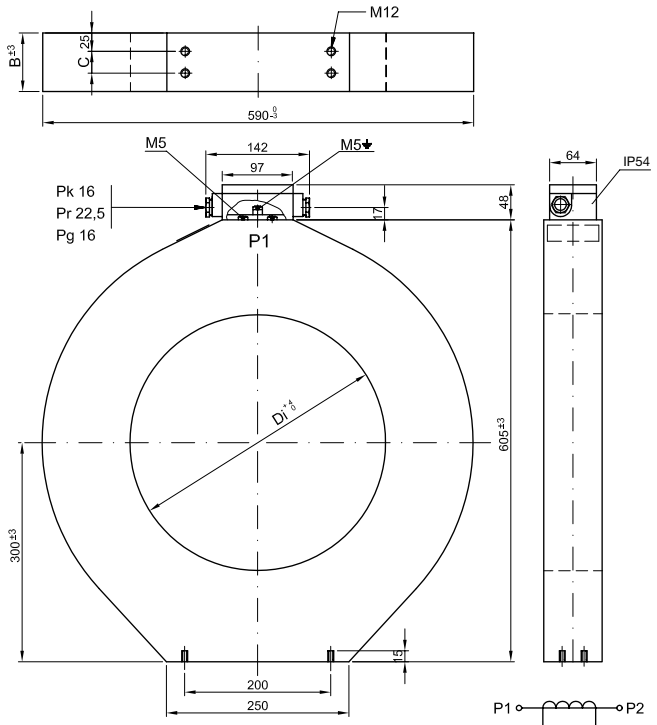


Di =	85 F	90 G	100 H	120 K	155 N	180 R	200 S	250 U	350 W
	8	10	12	14	16	18	20		
B =	80	100	120	140	160	180	200		
C =	50	70	90	110	130	150	170		

KOKU 1 _ T _

Note:
Without fixing base. Fix directly to floor.

KOKU 1_W_

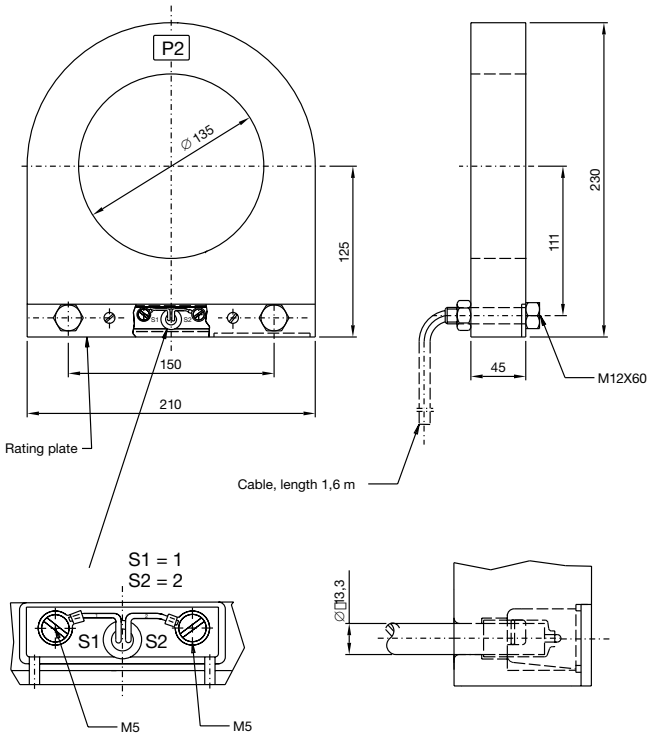


Di =	90 G	100 H	120 K	155 N	180 R	200 S	250 U	350 W	400 X	450 Y	500 Z
	8	10	12	14	16	18	20				
B =	80	100	120	140	160	180	200				
C =	30	50	70	90	110	130	150				

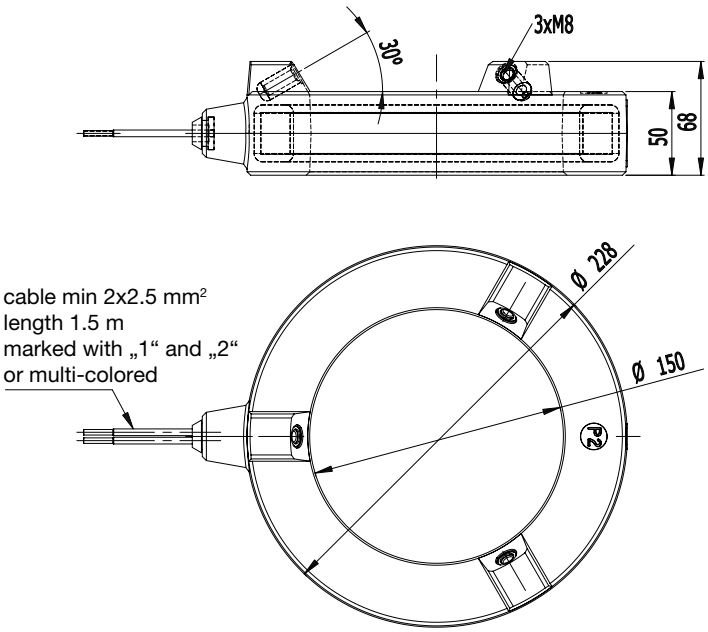
KOKU _1 _ W

Note:
Without fixing base. Fix directly to floor.

KOKU 072 G3 (G4)



KOKU 072 G5



Cable current transformers type IHDA 05

IHDA current transformers are suitable for measuring phase currents in low voltage switchgears. A busbar or cable serves as the primary conductor. Series IHDA current transformers can also be used for measuring the phase current at voltages higher than 0.72 kV if the insulation of the primary conductor satisfies the requirements of the respective standards for the operating voltage.

Table 4. Technical data

Rated voltage U_m	0,72 kV[1)]
Power frequency test voltage 50 Hz (1min) U_p	3 kV
Frequency f_n	50 Hz (60 Hz)
Rated thermal current I_{cont}	1,2 x I_{pn}
Short-time withstand current I_{th} (1 s)	60 x I_{pn}
Peak withstand current I_{dyn}	2,5 x I_{th}
Secondary terminals	for 6 mm^2 conductor
Operating temperature range	-5 ... +40°C
Electrical standards	IEC 60044-1, PN-EN 60044-1

[1)] The insulation level of the primary conductor determines the maximum operating voltage.

Table 5. Standard parameters for IHDA. Secondary current I_{sn} = 1 A

Type IHDA	Window diameter [mm]	Primary current [A]	Burden [VA] Accuracy class and FS, ALF								Weight [kg]
			0,5	Fs	1	Fs	3	Fs	10P	ALF	
05C1-400/1	58	400	15	10	30	5	60	5	7	10	
05C1-500/1	58	500	20	10	40	5	80	5	10	10	
05C1-600/1	58	600	40	5	80	5	80	5	12	10	2,5
05C1-800/1	58	800	50	5	80	5	80	5	10	10	
05C1-1000/1	58	1000	60	5	80	5	80	5	8	10	

Table 6. Standard parameters for IHDA. Secondary current I_{sn} = 5 A

Type IHDA	Window diameter [mm]	Primary current [A]	Burden [VA] Accuracy class and FS, ALF								Weight [kg]
			0,5	Fs	1	Fs	3	Fs	10P	ALF	
05C1-400/5	58	400	15	10	30	5	60	5	7	10	
05C1-500/5	58	500	20	10	40	5	80	5	10	10	
05C1-600/5	58	600	40	5	80	5	80	5	12	10	
05C1-800/5	58	800	50	5	80	5	80	5	10	10	
05C1-1000/5	58	1000	60	5	80	5	80	5	8	10	2,5
05C1-1200/5	58	1200	60	5	80	5	80	5	10	10	
05C1-1500/5	58	1500	60	5	80	5	80	5	10	10	
05C1-1600/5	58	1600	60	5	80	5	100	5	12	10	

FS – security factor
ALF – standard accuracy limit factor

Accessories

The order should contain
– type
– quantity

Table 7. Selection of accessories for IHDA

Type	Description of accessory
KOK-ZAX 13	Fixing base *
KOK-ZAX 14	Secondary terminal cover **

* Fixing base shall be mounted to the lower clamp nut in the transformer with screws fitted with washers that are included in the package. Fixing base can be mounted either parallel to the transformer, or perpendicular
** Secondary terminal cover can be installed at the secondary terminals. In the cover there are two alternative openings for the exit of the cables. The cover can be sealed..

Warranty

The producer gives a 24-month warranty for the purchased current transformers; the time is counted from the day of commissioning. However, the warranty shall not be longer than 30 months from the delivery date. The producer is not responsible for faults and damages resulting from:
– incorrect transport after the receipt of the transformers by the buyer,
– incorrect storage, installation and operation of transformers,
– inappropriate selection of transformers for a specific electric system.

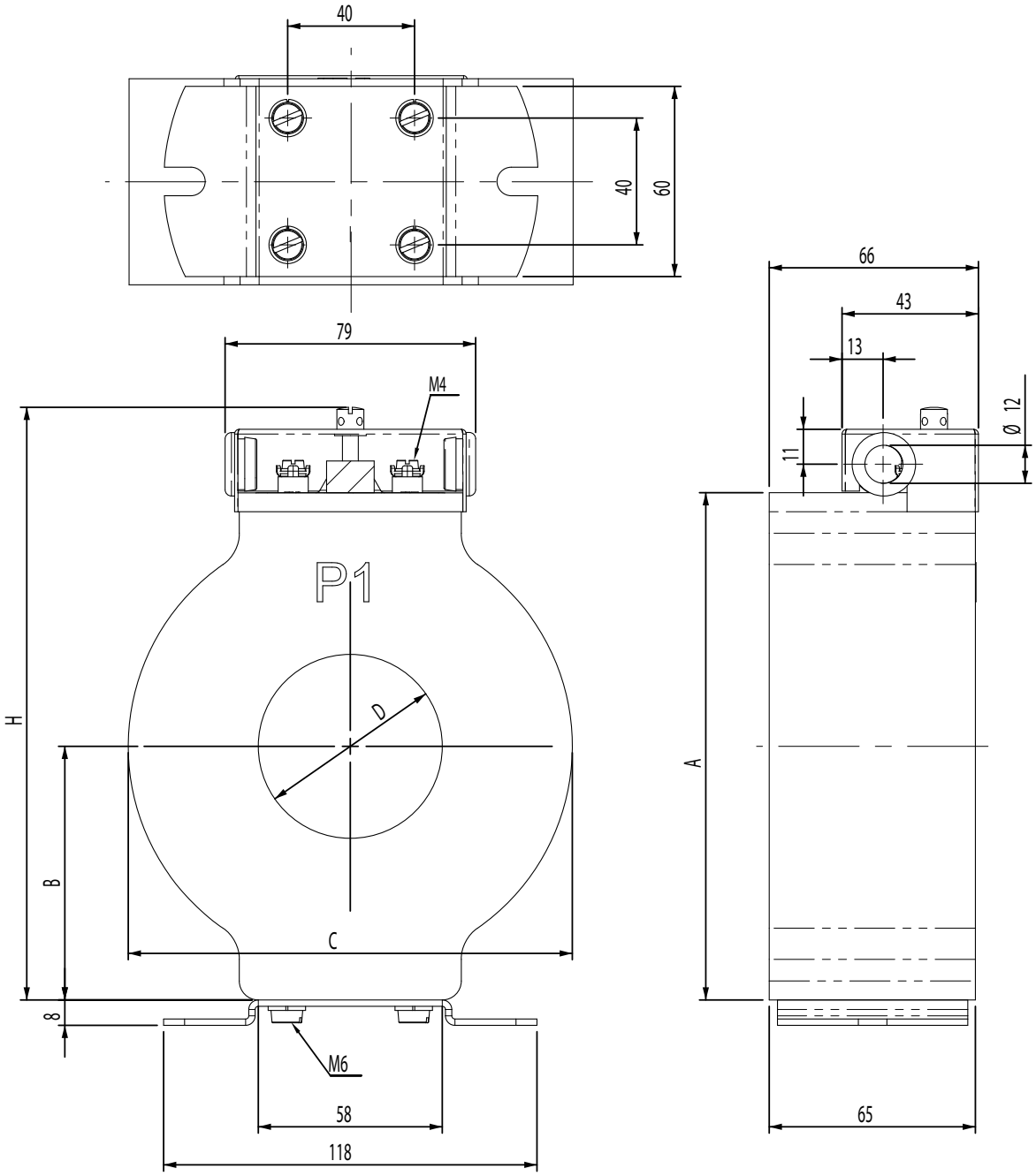
Ordering data

The order should contain the following data:
– Type of current transformer
– Rated primary current/rated secondary current [A/A]
– Rated burden [VA]
– Accuracy class
– Quantity

Order example

IHDA 05 C1 400/5; 15 VA; class 0,5; 9 pcs

IIHDA 05 C1 complete with fixing base KOK-ZAX 13 and terminal cover KOK-ZAX14

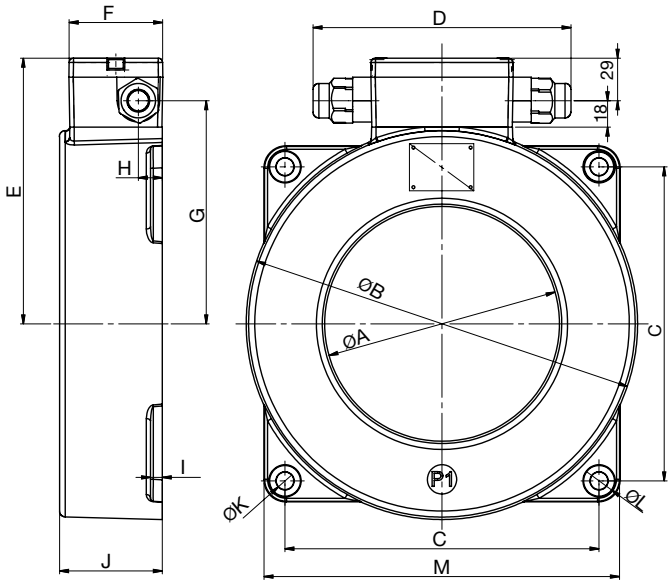


Special current transformers
type KODI

KODI – bushing current transformer type KODI, is predicted for supplying metering appliances as well as protection devices, at the maximum nominal voltage 0,72 kV and nominal frequency 50 or 60 Hz. Transformer can be mounted in outdoor conditions on the top of distribution transformers straight on the bushing.

The nominal temperature of transport and storage for that outdoor transformer is in the range -35ºC, +40ºC. Secondary circuits should be mounted using copper wires with the cross section at least 2,5 mm^2.Connecting schemes for current and energy measurement are shown on the next page.

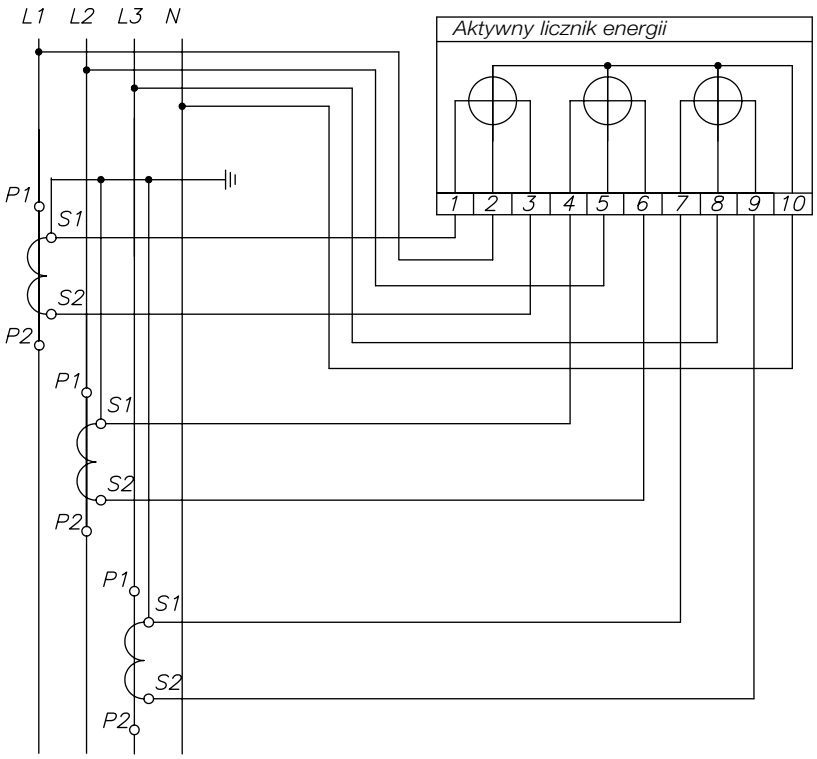
Dimensional drawings



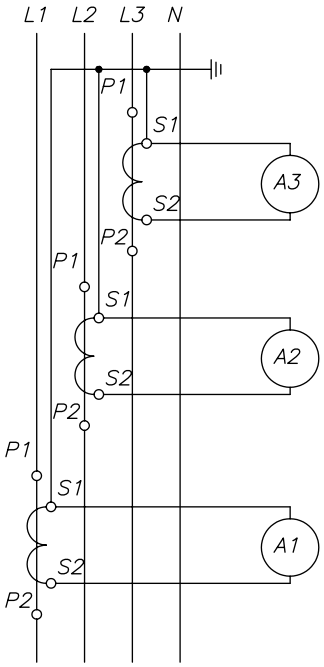
Type of CT/diameter	KODI 1 PU 7	KODI 1 MN 7	KODI 1 KK 7	KODI 1 HH 7	KODI 1FG 7
A	160	140	120	100	80
B	266	246	226	206	186
C	214	197	181	164	152
D	176	176	176	176	176
E	181	171	161	151	141
F	64	64	64	64	64
G	152	142	132	122	112
H	16	16	16	16	16
I	8	8	8	8	8
J	70	70	70	70	70
K	12	12	12	12	12
L	21	21	17	17	17
M	242	227	206	191	178

Connection diagram

Energy measurement diagram



Current measurement diagram



Special current transformers type IMT

IMT current transformer is used to supply current circuits in power equipment measuring systems with rated voltage of 0.72 kV and rated frequency of 50 Hz.
The transformers are built for the primary current range of 75 A–1000 A and the secondary current of 5 A. The IMT transformers are dedicated to power balance systems which use the current transformer to measure current on the low voltage side of the transformer. The dimensions of the current transformer are adjusted to the size of the low voltage bushings and the distance between them.
Burden and class are given at the ends of the cables.

Operating conditions

The current transformer is adapted for operation in the outdoor conditions of the temperate climate. The rated long duration thermal current and the error limits of the current transformer correspond to the extended current range for 120% Ipn in the ambient temperatures of -35°C to +40°C. Protection class IP 44. Unlike the conventional transformers, power and class are provided at the ends of the wires. This means that there is no need to include of losses on the connecting wires.

Construction

The IMT current transformer is a single phase low power transformer, operating in conditions approximate to short-circuit conditions, transforming current in the primary circuit into current in the secondary circuit, while maintaining the requirements given in standards concerning the transformation accuracy.
The secondary winding of the current transformer is cast in HCEP* resin resistant to outside weather conditions. Each transformer has the secondary side terminals in the shape of two 4-metre-long (standard version) 2.5 mm^2 cables designated with digits 1 and 2 or multi-colored.

*Hydrophobic Cycloaliphatic Epoxy

Fixing

The IMT current transformer may be placed on a transformer in such a way that the low voltage bushing can be located centrally in the current transformer window. When the distance between the bushings is small it is allowed to arrange the transformers one on the other in a so called pyramid. The M6 threaded hole in the cable lead part makes it possible to protect the current transformer from shifting. We suggest using an M6 bolt and a straight flat bar in order to immobilize the current transformers when they are placed next to one another (fig. 1) or a trapezoid flat bar when they are arranged in a „pyramid" (fig. 2).

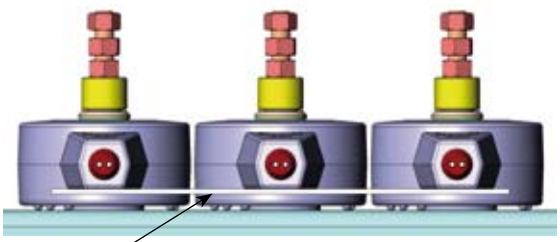


Fig. 1. Flat bar

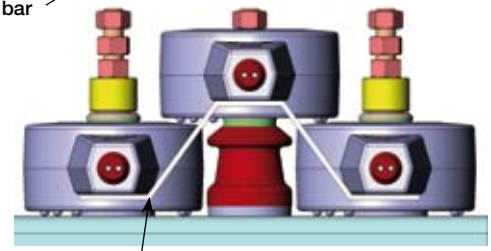


Fig. 2. Trapezoid flat bar

Packing, transport, storage

Current transformers transported at a long distance should be packed in wooden crates protecting the apparatus from damage. Transformers transported on small distances can by transported by truck without packing, but should be protected from damage by separating them from other products. During loading and unloading, crates with transformers cannot be thrown or turned over. The wooden crates must be properly marked, according to the requirements concerning transportation of goods sensitive to mechanical damage. The transformers must be stored in dry and clean rooms with temperature close to +20°C. It is inadvisable to store the transformers in wooden crates outdoors.

Spare parts

The IMT current transformer is an unreparable apparatus.
No spare parts are provided.

Compliance with standards

PN-EN 60044-1,
IEC 60044-1.
Transformers have IEN certificate.

Warranty

The producer gives a 24-month warranty for the purchased current transformers; the time is counted from the day of commissioning. However, the warranty shall not be longer than 30 months from the delivery date. The producer is not responsible for faults and damages resulting from:

– incorrect transport after the receipt of the transformers by the buyer,
– incorrect storage, installation and operation of transformers,
– inappropriate selection of transformers for a specific electric system.

Proceeding with used product

Considering the raw materials used and the production technology, the transformers do not constitute a hazard to the environment. The product which is used or faulty must be dismantled, the parts must be segregated and recycled or disposed by appropriate companies.

Example of order

Low voltage current transformer type
IMT 250/5; 1 VA – 0.5; FS 5; 30 items.

Table 1. Technical data

Type	Class**	Current		Burden**	Security factor FS	Rated short-time thermal current	Rated dynamic-current	Maximum permissible voltage	Rated test voltage	Weight (approx.)	Dimensions			
		Primary	Secondary								Inner diameter	Outer diameter	Height	Cable length* 2 x 2.5 mm²
		I_{pn}	I_{sn}			I_{th} (1s)	I_{dyn}	U_m	U_p					
		[A]	[A]	[VA]		[A]	[A]	[kV]	[kV]	[kg]	[mm]	[mm]	[mm]	[m]
IMT	0.5	75	5	1	5	60 x I_{pn}	2.5 x I_{th}	0.72	3	1.4	53	106	55	4
		100		1										
		150		1										
		200		1; 2.5										
	0.5	250		1; 2.5						1.6	73	136	45	
	0.5S	400		1; 2.5										
		500		1; 2.5	5									
		600		1; 2.5										
		800	5	1; 2.5						2.0	95	160	45	
		1000		1; 2.5										

It is possible to order transformers of other parameters after prior arrangement with the manufacturer.
* 6 m cable length is possible for Ipn 75 A and 100 A with burden 1 VA and for Ipn from 150 A to 1000 A with maximum 2 VA burden. A longer cable may be cross-section 2 x 4 mm².
** Burden and class are given at the ends of the cables. Taking in to consideration losses on connecting terminal, 1VA is sufficient to feed electronic measurement devices.

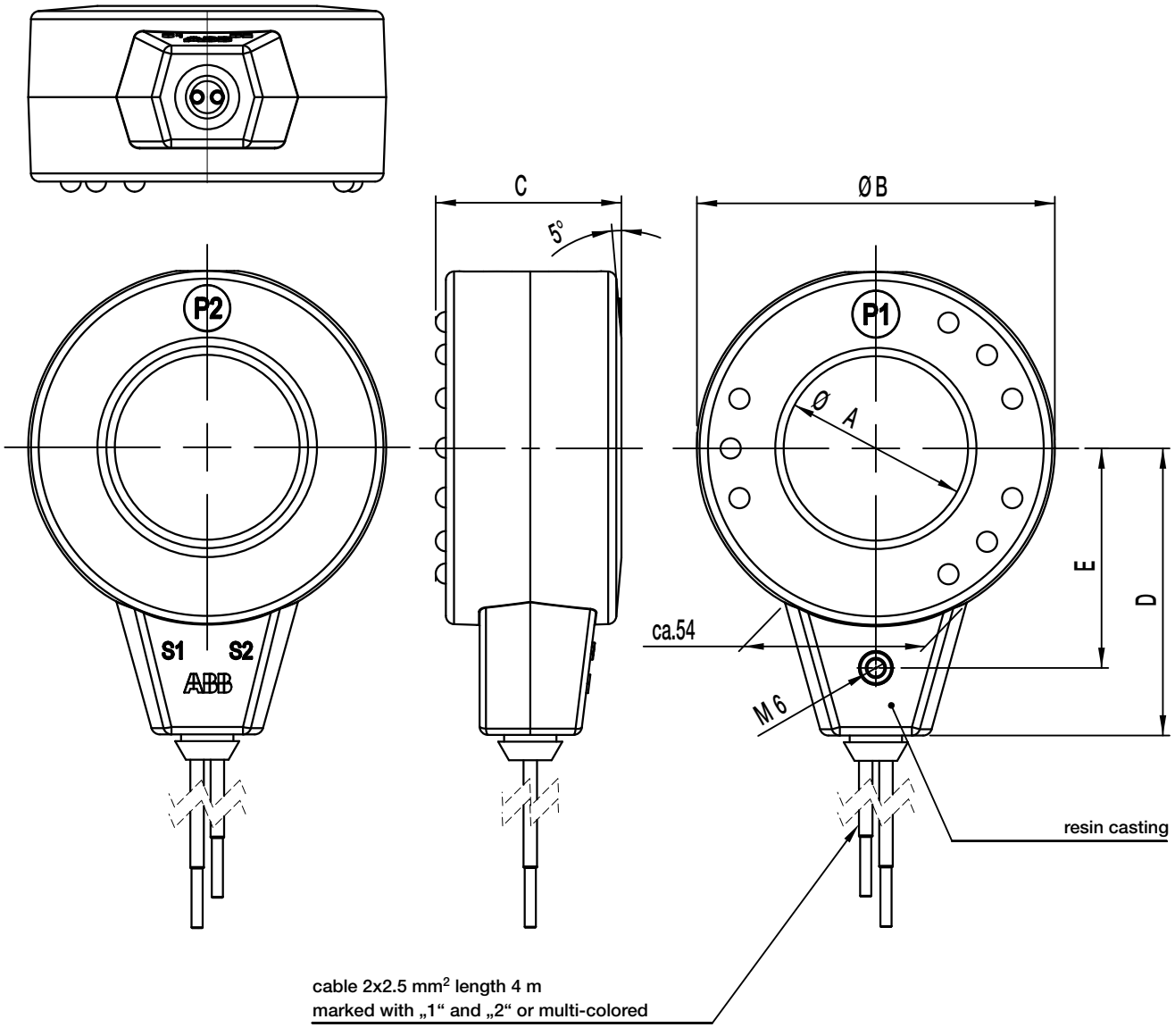
Table 2. Sizing the IMT current transformer to a transformer

Transformer			Current transformer
Power rating	DN insulator		IMT
	Type	Diameter	
[kVA]		[mm]	A/A
25	DT1/250	50	75/5
40			
63			
100			150/5
160			250/5
250	DT1/630	70	500/5
400			
630	DT1/1000	90	1000/5

The data are presented for information only.

Dimensional drawing

I_{pn}	A	B	C	D	E
75 – 250	53	106	55	85	65
400 – 600	73	136	45	100	80
800 – 1000	95	160	45	112	92



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