ESİTAŞ

M. V. INSTRUMENT TRANSFORMERS

ESİTAŞ
GROUP COMPANIES

TÜV
TÜV Rheinland Gruop

QUALITY POLICY

To assure our future by satisfying our customers and employees, we will deliver our goods and services to our customers on time and agreed-upon conditions.

ESİTAŞ ELEKTRİK A.Ş.

L.V. & M.V. Instrument transformers

L.V. & M.V. Cast resin insulators

Bushing current transformers

Indoor & outdoor ring type current transformers

LPCT

PT ESITAS PACIFIC

Located in Jakarta, Indonesia

L.V. & M.V. Instrument transformers

L.V. & M.V. Cast resin insulators

Bushing current transformers

Indoor & outdoor ring type current transformers

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 042821

TÜV Rheinland Cert GmbH certifies:

Certificate Holder:

ESİTAŞ ELEKTRİK San. ve Tic. A.Ş.

Hilal Mah, Paşaköy Cd., No: 31,
34791-SANCAKTEPE - ISTANBUL / TURKEY

Scope:

DESIGN, PRODUCTION and SALES of Low Voltage and Medium Voltage, Indoor and Outdoor Dry and Oil Type Current Transformers, Voltage Transformers, Power and Control Transformers, Indoor and Outdoor Post and Bushing Insulators, Insulated Bushings and Products Made of Organic Materials.

An audit was performed, Report No. 042821. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.
The due date for all future audits is 11-03.

Validity:

The certificate is valid from 2010-06-17 until 2013-03-10
First certification 2004

Istanbul, 2010-06-17

TÜV Rheinland Cert GmbH *)
Am Grauen Stein · 51105 Köln

TGA-ZM-58-95-00

*) Member of

www.tuv.com

TÜVRheinland®
Precisely Right.

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 042987

TÜV Rheinland Cert GmbH certifies:

Certificate Holder: **PT. ESITAS PACIFIC**

Kawasan Industri Jababeka Tahap 1,
JL. JABABEKA IX A Blok P-2F
Cikarang - BEKASI 17530 , INDONESIA

Scope: **PRODUCTION and SALES of Low Voltage and Medium Voltage, indoor and outdoor dry and oil type Current Transformers, Voltage Transformers, Power and Control Transformers, indoor and outdoor Post and Bushing Insulators, Insulated Bushings and products made of Organic Material Products**

An audit was performed, Report No. 042987. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.
The due date for all future audits is 09-12.

Validity: The certificate is valid from 2010-01-13 until 2013-01-12
First certification 2010

Istanbul, 13.01.2010

TÜV Rheinland Cert GmbH *)
Am Grauen Stein · 51105 Köln

TGA-ZM-58-95-00

*) Member of

www.tuv.com

TÜVRheinland®
Precisely Right.


ESİTAŞ
GROUP COMPANIES
Youn pa
2200/110
transform


rtner in
er market

GENERAL INFORMATION ABOUT ESİTAŞ GROUP COMPANIES

Mission Statement :

"As Esitas Group, we aim to be the main supplier of the market leaders in the world transformer industry and to be a permanent player in the developing countries; by keeping our leader position in domestic market in instrument transformers and increasing awareness of our products in the global market, together with continuously improving our existent quality and introducing innovations in order to increase efficiency for ourselves and our customers".

Group Companies :

Esitaş brand has been in the transformer industry for 20 years. Esitaş Group companies have been producing and serving in the electrical products and contracting businesses with four companies specializing in their segments.

Esitaş Elektrik A.Ş. produces and sells Low and Medium Voltage Instrument Transformers (both Current/Voltage and Indoor/Outdoor Types), Low and Medium Voltage Insulators and LPCT's. Esitaş Elektrik is in the preferred suppliers list of Turkish Electric Authority, has been selling to many foreign electricity authorities and to various branches of multinational market leaders in the industry like ABB, Areva, Schneider, Siemens and others.

PT Esitas Pacific is the Group's production plant located in Jakarta produces and sells Low and Medium Voltage Instrument Transformers (both Current/Voltage and Indoor/Outdoor Types), Low and Medium Voltage Insulators, Indonesia founded to serve the customers more conveniently in Asia Pacific zone and to further furnish its existence in the world market.

With its mission of "...continuously improving our existent quality and introducing innovations in order to increase efficiency for ourselves and our customers", Esitaş is your partner in world transformer market.

M.V. CURRENT TRANSFORMERS

GENERAL DEFINITIONS
General definitions have been given according to International Standards IEC 60044.

Instrument Transformer
A transformer intended to supply measuring instruments meters, protection relays and other similar apparatus.

Applicable Standards
Our transformers comply with applicable national and international standards.

CURRENT TRANSFORMERS
An instrument transformer in which the secondary current, in normal conditions of use, is substantially proportional to the primary current and differs in phase from it by angle which is approximately zero for an appropriate direction of the connections.
It isolates the instrument and protection circuit from the primary side and protect the devices against overload according to the overcurrent characteristics of the transformer. Current transformers can have several secondary windings with cores of identical of different characteristics completely isolated from each other.

Measuring Current Transformer
A current transformer intended to supply indicating instruments, integrating meters and similar apparatus.

Protective Current Transformer
A current transformer intended to supply protective relays.

Primary Winding
The winding through which flows the current to be transformed.

Secondary Winding
The winding, which supplies the current circuits of measuring instruments, meters, relays or similar devices.

Secondary Circuit
The external circuit supplied by the secondary winding of a transformer.

Rated Primary Current
The value of the primary current on which the performance of the transformer is based.

Rated Secondary Current
The value of the secondary current on which the performance of the transformer is based.

Rated Transformation Ratio
The ratio of rated primary current to the rated secondary current (I1N/I2N - i.e.100/5 A).

Current Error (Ratio Error)
The error which a transformer introduces into the measurement of a current and which arises from the fact that the actual transformation ratio is not equal to the rated transformation ratio.
The current error expressed in per cent is given by formula:

$$\text{Current Error \%} = \frac{(Kn\ Is - Ip)}{Ip} \times 100$$

Where
Kn is the rated transformation ratio;
Ip is the actual primary current
Is is the actual secondary current when Ip is flowing, under the conditions of measurement.

Accuracy Class
A designation assigned to a current transformer errors of which remain within specified limits under prescribed conditions of use.

Burden
The impedance of the secondary circuit in ohms and power-factor. The burden is usually expressed as the apparent power in voltamperes absorbed at a specified power-factor and at the rated secondary current.

M.V. CURRENT TRANSFORMERS

Rated Burden
The value of the burden on which the accuracy requirements are based on.

Rated Output
The value of the apparent power (in voltamperes at a specified power-factor) which the transformer is intended to supply to the secondary circuit at the rated secondary current and with rated burden connected to it.

Rated Insulation Level
The combination of voltage values which characterizes the insulation of a transformer with regard to its capability to withstand dielectric stresses.

Rated Frequency
This is the frequency for which the transformer is designed and given in Hz on the rating plate.

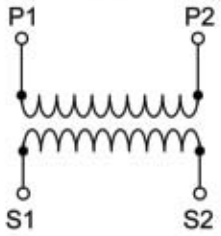
Rated Short-Time Thermal Current (Ith)
The r.m.s. value of the primary current which a transformer will withstand for one second without suffering harmful effects, the secondary winding being short-circuited.

Rated Dynamic Current (Idyn)
The peak value of the primary current which a transformer will withstand, without being damaged electrically or mechanically by the resulting electromagnetic forces, the secondary winding being short-circuited.

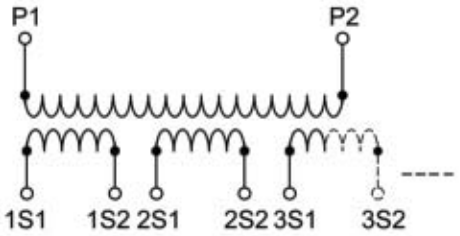
Rated Continuous Thermal Current
The value of the current which can be permitted to flow continuously in the primary winding, the secondary winding being connected to the rated burden, without temperature rise exceeding the values specified.

Connection Diagrams

Single Ratio Current Transformers



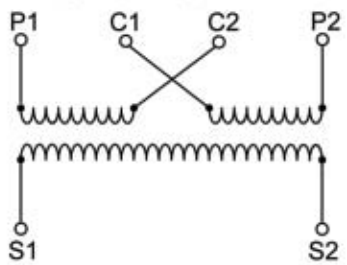
single core



multi cores

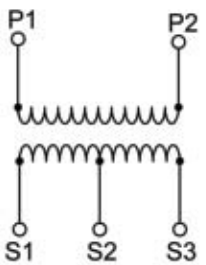
Reconnection of Current Transformer
In case of changeable ratios, it is possible to design the transformer with primary reconnection or secondary tapping;

Primary Reconnection
Changeover will be done at the primary side by using joint bars.
Can be used only for primary currents up to 2 x 600A.



C1 - C2 short circuited: low rated current
P1 - C1 and P2 - C2 short circuited: high rated current
(It can be required for multi cores.)

Secondary Tapping
Changeover will be done at the secondary side.



S1 - S2 low rated current
S1 - S3 high rated current
(It can be required for multi cores and changeable ratios.

M.V. CURRENT TRANSFORMERS

Safety Operation Conditions for Current Transformers

- When the Secondary terminals are connected to the measuring or protection devices, one of the terminals should be earthed for safety, as seen in Diagram-1.

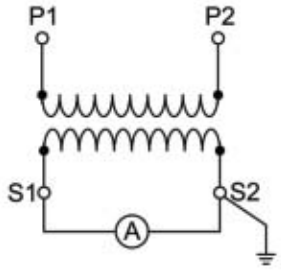


Diagram-1

- The Secondary circuit of a current transformer must not be operated with an open-circuit.
- The Secondary winding of a current transformer which will not be used must be short-circuited and earthed as seen in Diagram-2.

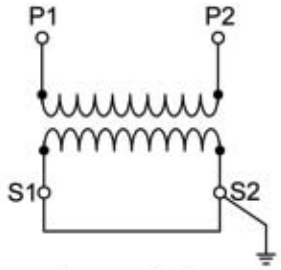


Diagram-2

- For the transformer with reconnectable and/or tapped secondaries, unused terminals must be left open as seen in Diagram-3.

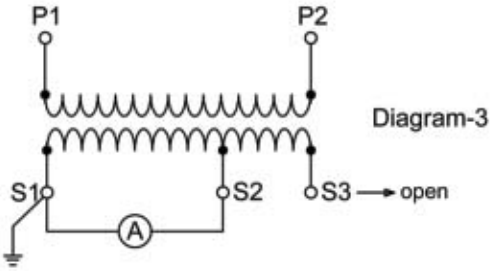


Diagram-3

- The current transformers which have capacitive divider tap (Ck) must be connected to the indicator, if the tap will not be used then it must be earthed.

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=3,6kV.....12kV BLOCK TYPES)

Types : ATB 10-B
ATB 10-B2
ATB 10-B3
ATB 10-2

- Up to 3 cores*
- On request with capacitive layer
- On request with barrier

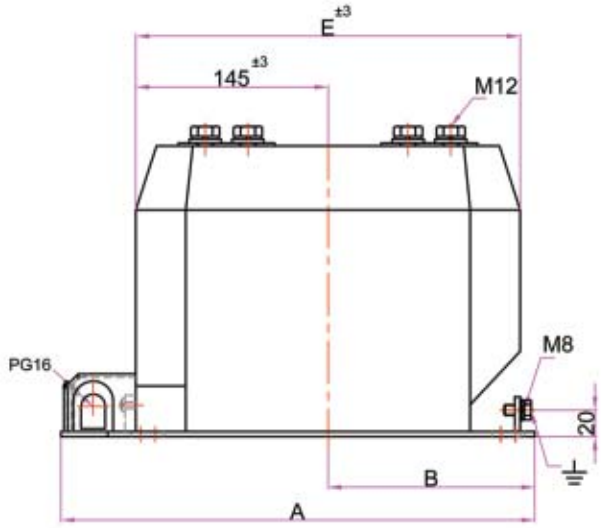
Technical Data

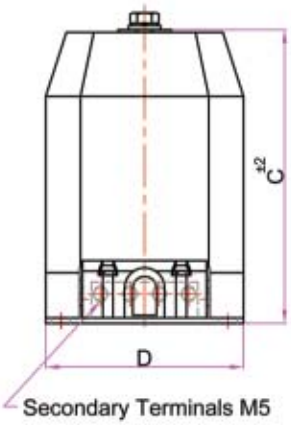
TYPES		ATB 10-B	ATB 10-B2	ATB 10-B3	ATB 10-2
Operating voltage, Um	(kV)	3,6	7,2	12	
Rated power-frequency withstand voltage (1 minute)	(kV)	10	20	28	
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40	60	75	
Rated frequency	(Hz)	50 - 60			
Primary rated current	(A)	5 - 2500 (On request 3000A 1.0 In Cont.& Insulation class B at ATB 10-2 type)			
Primary reconnection	(A)	2x5 - 2x600			
Secondary rated current	(A)	1 - 5			
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1			
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1			
Rated short-time thermal current (Ith) (1s)	(kA)	max.75, (max. 1000 x In)			
Rated dynamic current (Idyn)	(kA)	max.100, (2,5 x Ith)			
Short-time load (mechanical)	(N)	5000			
Insulation class		E			
Ambient temperature	(°C)	-5 ..... +40			
Altitude	(m)	1000			
Standard		According to the customer requirements			
Weight (approx.)	(kg)	20-25	28-33	33-36	36

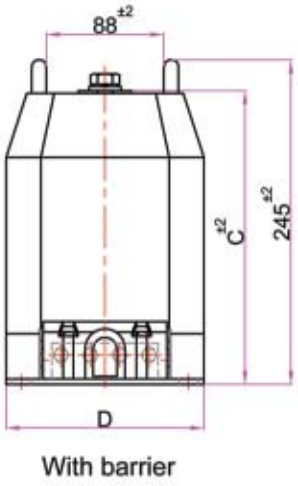
On request operating voltage of 17,5 kV is available.
** For more cores please contact with ESİTAŞ for feasibility.*

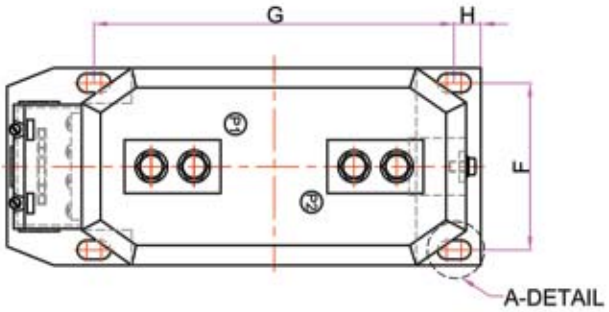
INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

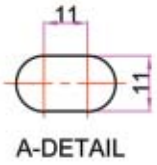
(Um=3,6kV .....12kV BLOCK TYPES)



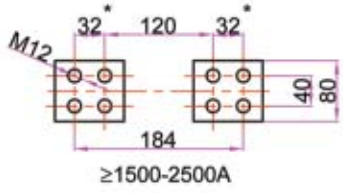




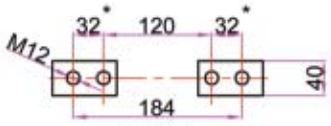




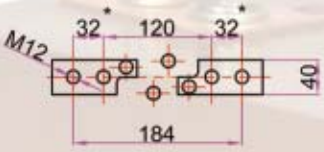
Primary Connection Bars



≥1500-2500A



<1500A



≤ 2x600A

*On request 40 mm or 24mm.

TYPES	A	B	C	D	E	F	G	H
ATB 10-B	355	155	220	148	290	125	270	20
ATB 10-B2	395	195	220	148	330	125	310	20
ATB 10-B3	455	255	220	148	390	125	370	20
ATB 10-2	385	170	220	175	290	150	300	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

*** All dimensions are in mm.*

*** Tolerances are according to DIN 7168-g when not specified.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=3,6kV.....12kV NARROW BLOCK TYPES)

Types : ATB 10-10
ATB 10-15

- ATB 10-10, up to 1 core.*
- ATB 10-15, up to 2 cores.*
- On request with capacitive layer.
- On request with barrier.

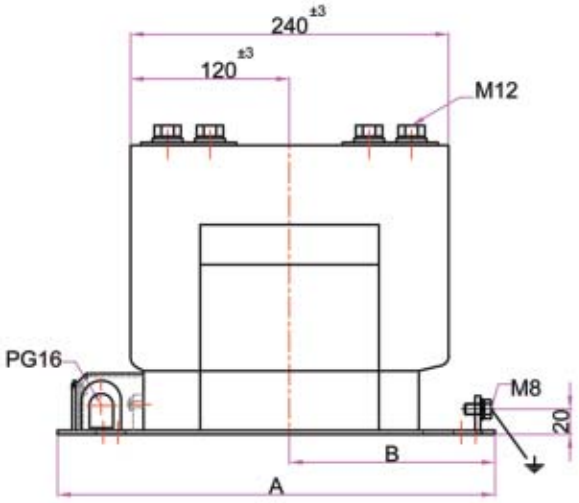
Technical Data

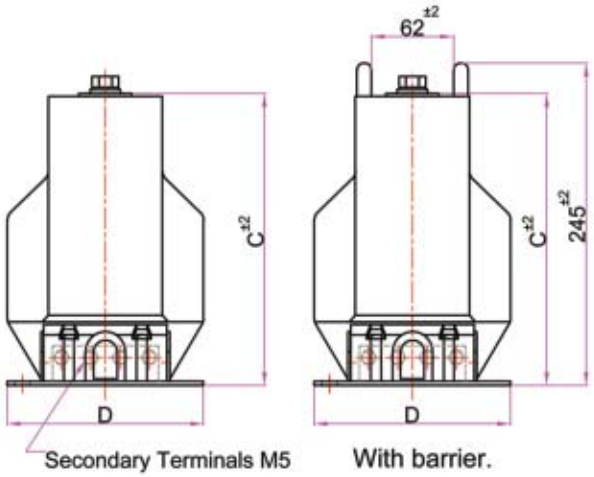
TYPES		ATB 10-10		ATB 10-15
Operating voltage, Um	(kV)	3,6	7,2	12
Rated power-frequency withstand voltage (1 minute)	(kV)	10	20	28
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40	60	75
Rated frequency	(Hz)	50 - 60		
Primary rated current	(A)	5 - up to 1250		
Primary reconnection	(A)	2x5 - 2x600		
Secondary rated current	(A)	1 - 5		
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1		
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1		
Rated short-time thermal current (Ith) (1s)	(kA)	(max. 200 x In)**		
Rated dynamic current (Idyn)	(kA)	(2,5 x Ith)		
Short-time load (mechanical)	(N)	5000		
Insulation class		E		
Ambient temperature	(°C)	-5 ..... +40		
Altitude	(m)	1000		
Standard		According to the customer requirements		
Weight (approx.)	(kg)	12		17

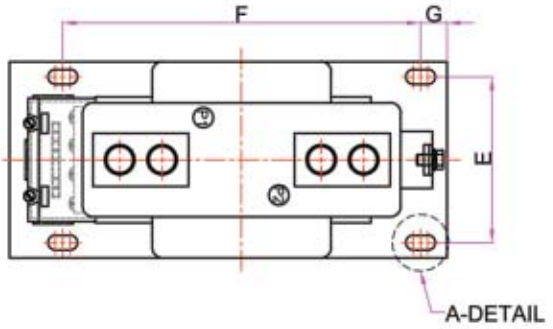
On request operating voltage of 17,5 kV is available.
** For more cores please contact with ESİTAŞ for feasibility.*
*** May vary according to requested primary current and core values.*

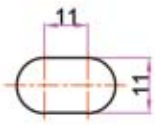
INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

(Um=3,6kV .....12kV NARROW BLOCK TYPES)



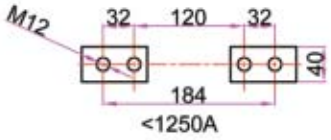




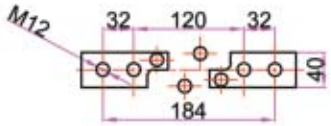


A-DETAIL

Primary Connection Bars



<1250A



≤2x600A

TYPES	A	B	C	D	E	F	G
ATB 10-10	330	155	220	148	125	270	20
ATB 10-15	330	155	220	148	125	270	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

*** All dimensions are in mm.*

*** Tolerances are according to DIN 7168-g when not specified.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=17,5kV.....24kV BLOCK TYPES)

Types : ATB 20-B
ATB 20-B2
ATB 20-B4
ATB 20-3
ATB 20-3B
ATB 20-3K

- Up to 3 cores *
- On request with capacitive layer
- On request with barrier

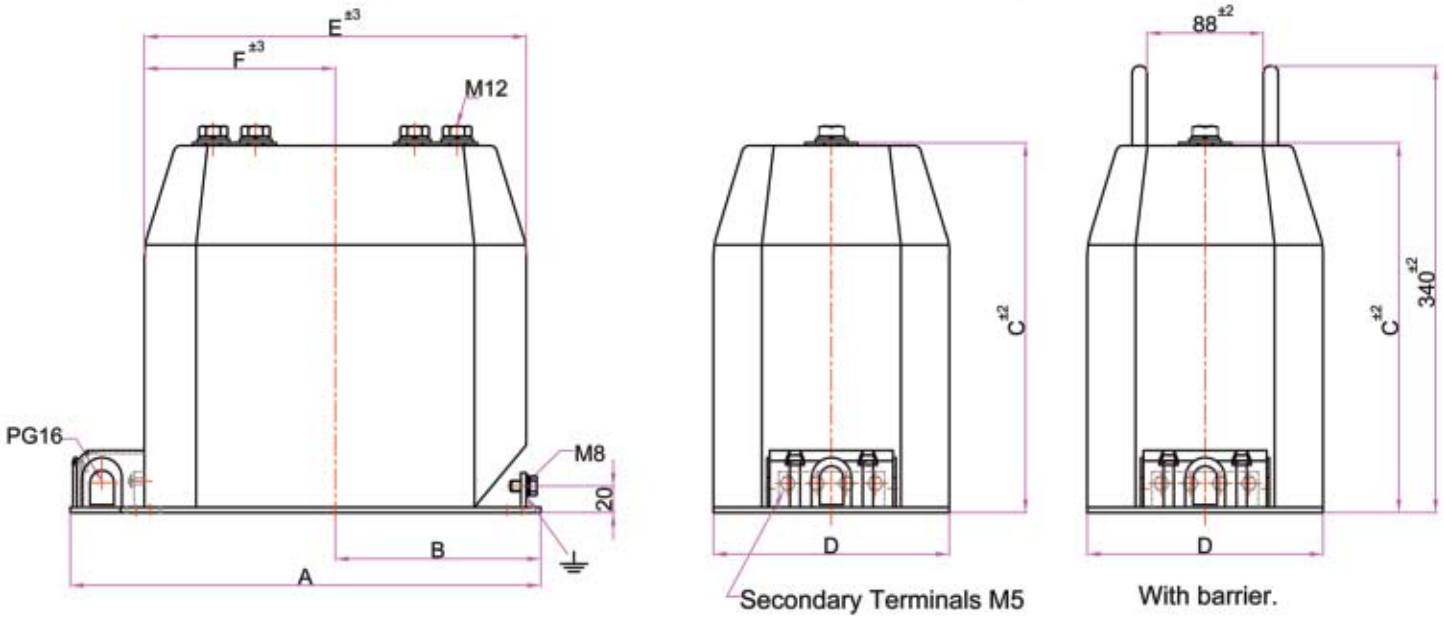
Technical Data

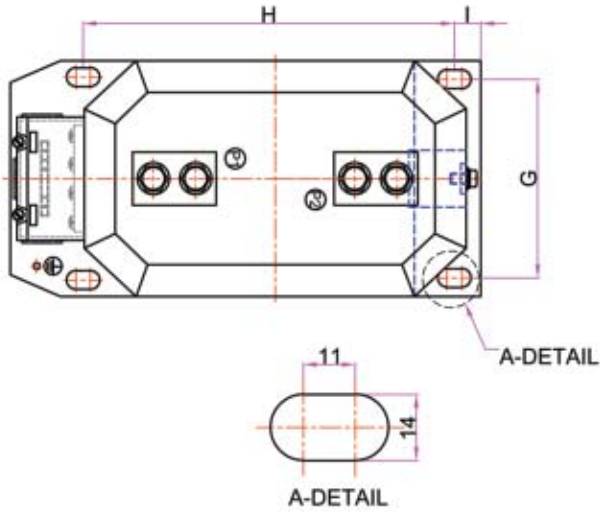
TYPES		ATB 20-B	ATB 20-B2	ATB 20-B4	ATB 20-3	ATB 20-3B	ATB 20-3K
Operating voltage, Um	(kV)	17,5			24		
Rated power-frequency withstand voltage (1 minute)	(kV)	38			50		
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	95			125		
Rated frequency	(Hz)	50 - 60					
Primary rated current	(A)	5 - 2500 (On request 3000A 1.0 In Cont.& Insulation class B)					
Primary reconnection	(A)	2x5 - 2x600					
Secondary rated current	(A)	1 - 5					
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1					
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1					
Rated short-time thermal current (Ith) (1s)	(kA)	max.75, (max. 1000 x In)					
Rated dynamic current (Idyn)	(kA)	max.100, (2,5 x Ith)					
Short-time load (mechanical)	(N)	5000					
Insulation class		E					
Ambient temperature	(°C)	-5 ..... +40					
Altitude	(m)	1000					
Standard		According to the customer requirements					
Weight (approx.)	(kg)	30	42	44	44	55	70

** For more cores please contact with ESİTAS for feasibility.*

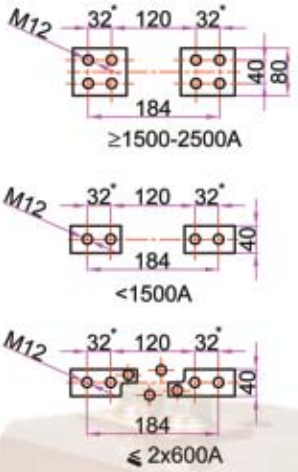
INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

(Um=17,5kV .....24kV BLOCK TYPES)





Primary Connection Bars



*On request 40mm or 24mm.

TYPES	A	B	C	D	E	F	G	H	I
ATB 20-B	355	155	280	178	290	145	150	280	20
ATB 20-B2	355	155	280	205	290	145	180	280	17
ATB 20-B4	355	155	280	218	290	145	190	280	17
ATB 20-3	455	197	280	178	390	195	150	375	22
ATB 20-3B	455	197	280	205	390	195	180	375	22
ATB 20-3K	455	197	280	218	390	195	190	375	22

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

** *All dimensions are in mm.*
** *Tolerances are according to DIN 7168-g when not specified.*
** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
** *Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=17,5kV.....24kV NARROW BLOCK TYPES)

Types : ATB 20-10
ATB 20-15

- ATB 20-10, up to 1 core.*
- ATB 20-15, up to 2 cores.*
- On request with capacitive layer.
- On request with barrier.

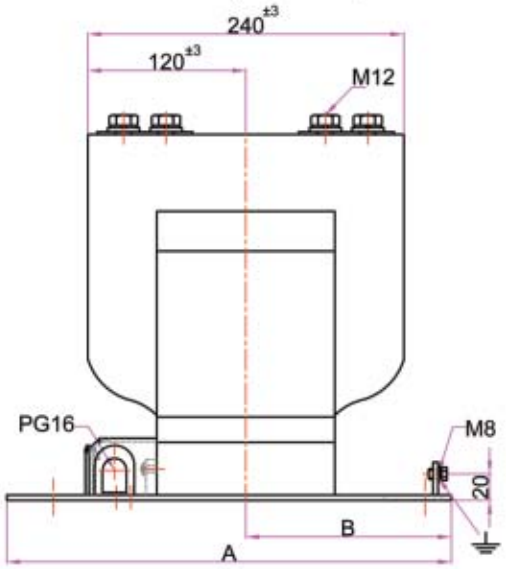
Technical Data

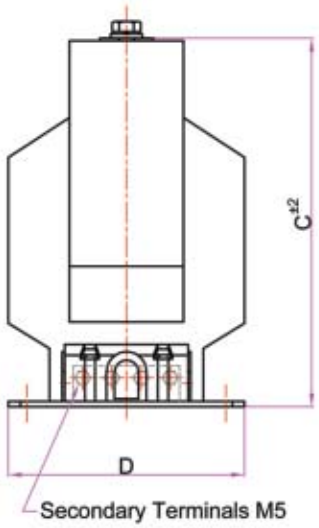
TYPES		ATB 20-10	ATB 20-15
Operating voltage, Um	(kV)	17,5	24
Rated power-frequency withstand voltage (1 minute)	(kV)	38	50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	95	125
Rated frequency	(Hz)	50 - 60	
Primary rated current	(A)	5 - up to 1250	
Primary reconnection	(A)	2x5 - 2x600	
Secondary rated current	(A)	1 - 5	
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1	
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1	
Rated short-time thermal current (Ith) (1s)	(kA)	(max. 300 x In)**	
Rated dynamic current (Idyn)	(kA)	(2,5 x Ith)	
Short-time load (mechanical)	(N)	5000	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	22	30

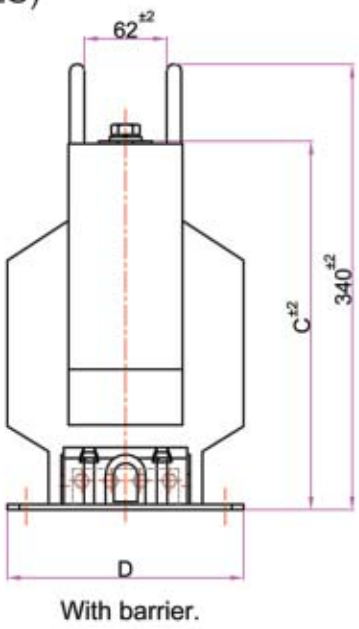
** For more cores please contact with ESİTAŞ for feasibility.*
*** May vary according to requested primary current and core values.*

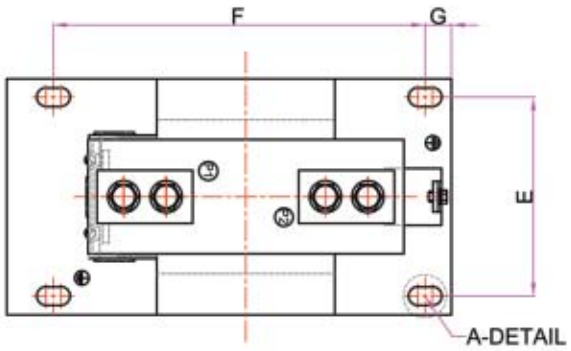
INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

(Um=17,5kV .....24kV NARROW BLOCK TYPES)

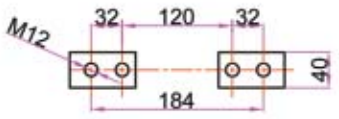




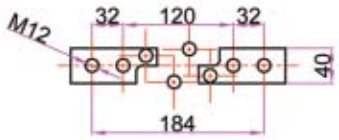




Primary Connection Bars



<1250A



2x600A

A-DETAIL

TYPES	A	B	C	D	E	F	G
ATB 20-10	335	155	280	178	150	280	20
ATB 20-15	335	155	280	178	150	280	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=36kV BLOCK TYPES)

Types : ATB 30-S
ATB 30-S1
ATB 30-1
ATB 30-2
ATB 30-3

- Up to 3 cores*
- On request with capacitive layer
- On request with barrier

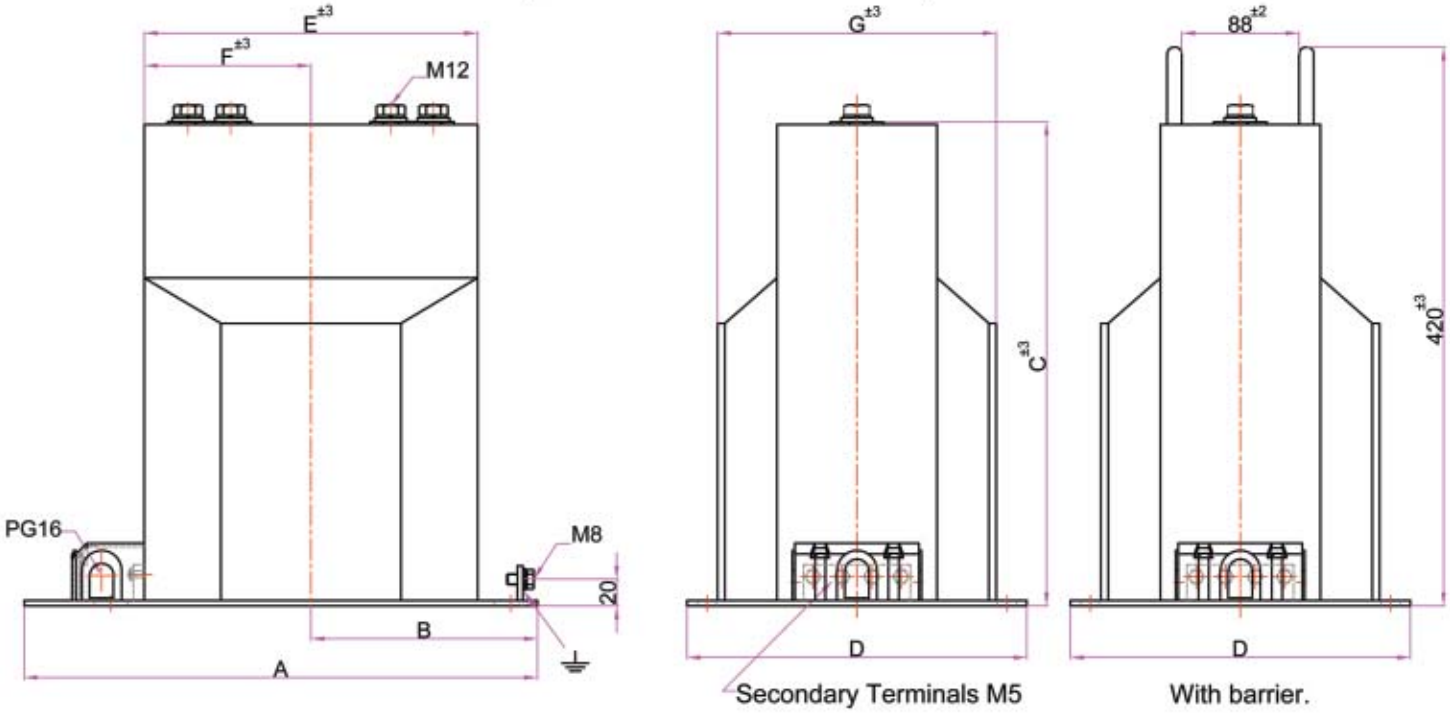
Technical Data

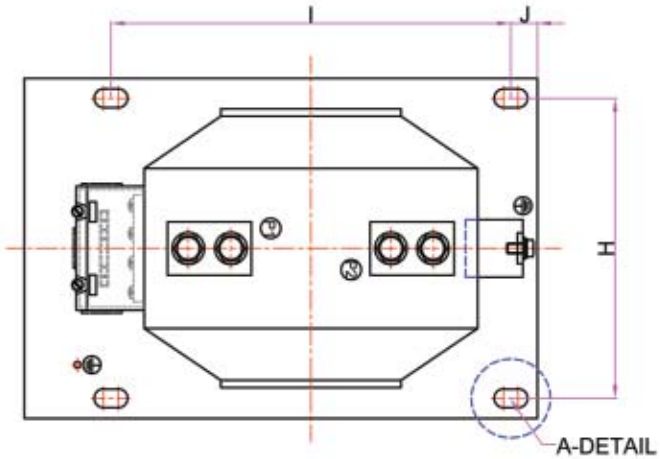
TYPES		ATB 30-S	ATB 30-S1	ATB 30-1	ATB 30-2	ATB 30-3
Operating voltage, Um	(kV)	36				
Rated power-frequency withstand voltage (1 minute)	(kV)	70				
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	170				
Rated frequency	(Hz)	50 - 60				
Primary rated current	(A)	5 - 2500 (On request 3000A 1.0 In Cont.& Insulation class B)				
Primary reconnection	(A)	2x5 - 2x600				
Secondary rated current	(A)	1 - 5				
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1				
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1				
Rated short-time thermal current (Ith) (1s)	(kA)	max. 75, (max.1000 x In)				
Rated dynamic current (Idyn)	(kA)	max. 100, (2,5 x Ith)				
Short-time load (mechanical)	(N)	5000				
Insulation class		E				
Ambient temperature	(°C)	-5 ..... +40				
Altitude	(m)	1000				
Standard		According to the customer requirements				
Weight (approx.)	(kg)	35	37	40	46	51

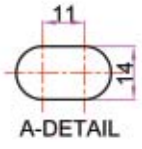
** For more cores please contact with ESİTAŞ for feasibility.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

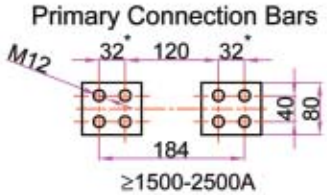
(Um=36kV BLOCK TYPES)



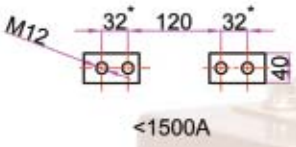




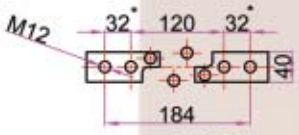
Primary Connection Bars



≥1500-2500A



<1500A



⩽ 2x600A

*On request ,40 mm or 24mm.

TYPES	A	B	C	D	E	F	G	H	I	J
ATB 30-S	385	170	360	255	250	125	210	225	300	20
ATB 30-S1	385	170	360	255	270	135	210	225	300	20
ATB 30-1	385	170	360	255	270	135	220	225	300	20
ATB 30-2	385	170	360	255	310	155	240	225	300	20
ATB 30-3	455	210	365	255	390	195	250	225	375	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

** *All dimensions are in mm.*

** *Tolerances are according to DIN 7168-g when not specified.*

** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

** *Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=36kV NORROW BLOCK TYPES)

Types : ATB 30-10
ATB 30-15

- ATB 30-10, up to 1 core.*
- ATB 30-15, up to 2 cores.*
- On request with capacitive layer.
- On request with barrier.

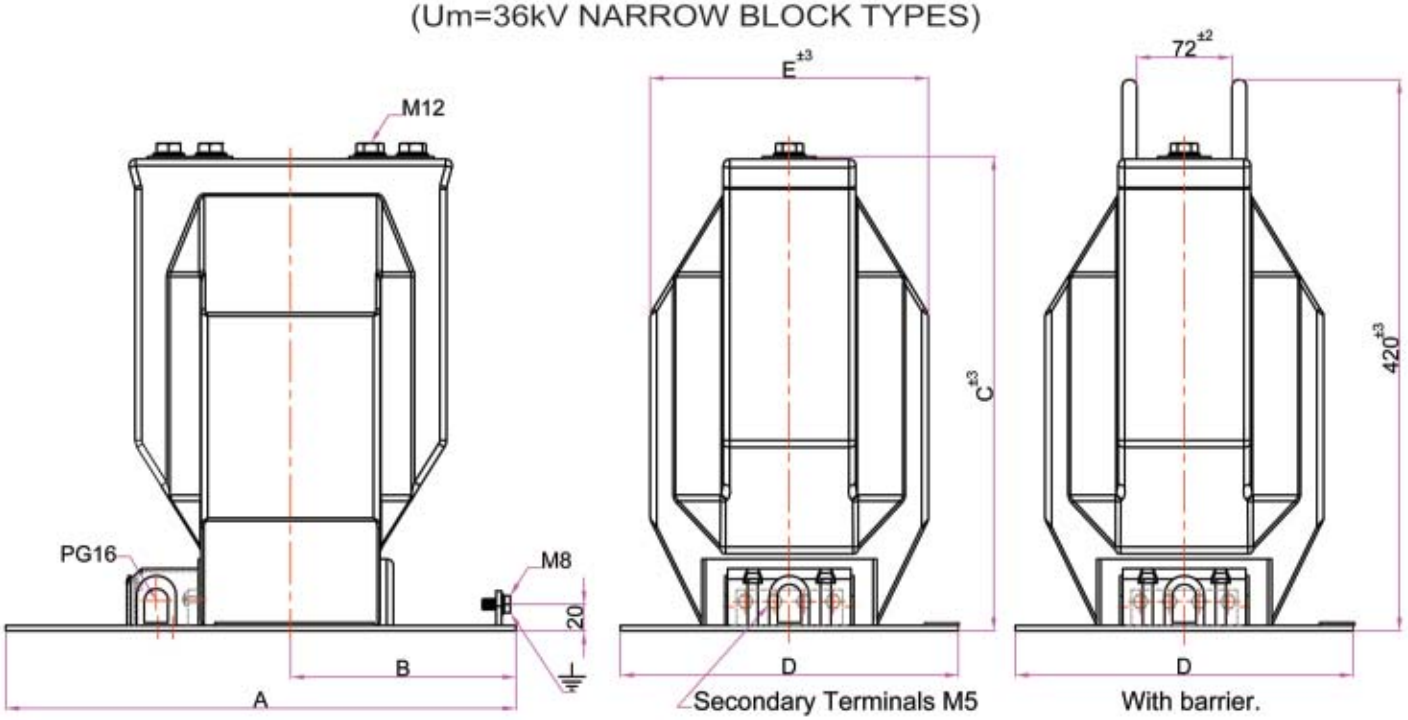
Technical Data

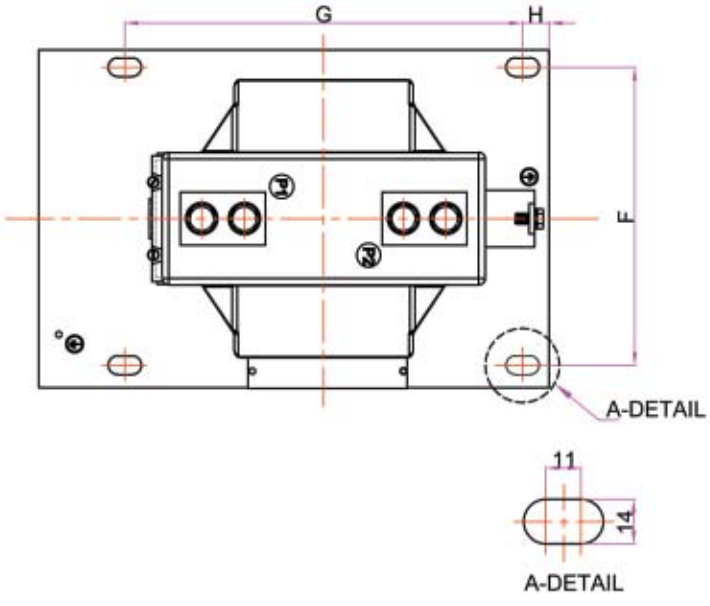
TYPES		ATB 30-10	ATB 30-15
Operating voltage, Um	(kV)	36	
Rated power-frequency withstand voltage (1 minute)	(kV)	70	
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	170	
Rated frequency	(Hz)	50 - 60	
Primary rated current	(A)	5 - up to 1250	
Primary reconnection	(A)	2x5 - 2x600	
Secondary rated current	(A)	1 - 5	
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1	
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1	
Rated short-time thermal current (Ith) (1s)	(kA)	max 700In (1measurement core);** max 200In (2cores)**	
Rated dynamic current (Idyn)	(kA)	(2,5 x Ith)	
Short-time load (mechanical)	(N)	5000	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	25	35

** For more cores please contact with ESİTAŞ for feasibility.*
*** May vary according to requested primary current and core values.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

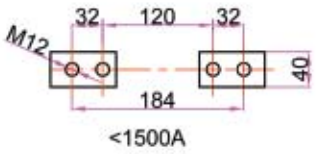
(Um=36kV NARROW BLOCK TYPES)



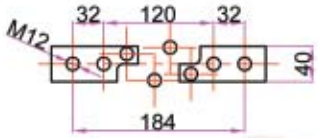


A-DETAIL

Primary Connection Bars



<1500A



2x600A

TYPES	A	B	C	D	E	F	G	H
ATB 30-10	385	170	360	255	210	225	300	20
ATB 30-15	385	170	360	255	210	225	300	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

*** All dimensions are in mm.*

*** Tolerances are according to DIN 7168-g when not specified.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

INDOOR POST BUSBAR TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=36kV .....24kV)

Types : ATN 17
ESO 17 C
ATD 10
ATD 20

- ATN 17, ESO 17 C up to 3 cores.*
- ATD 10, ATD 20 up to 2 cores.*

Technical Data

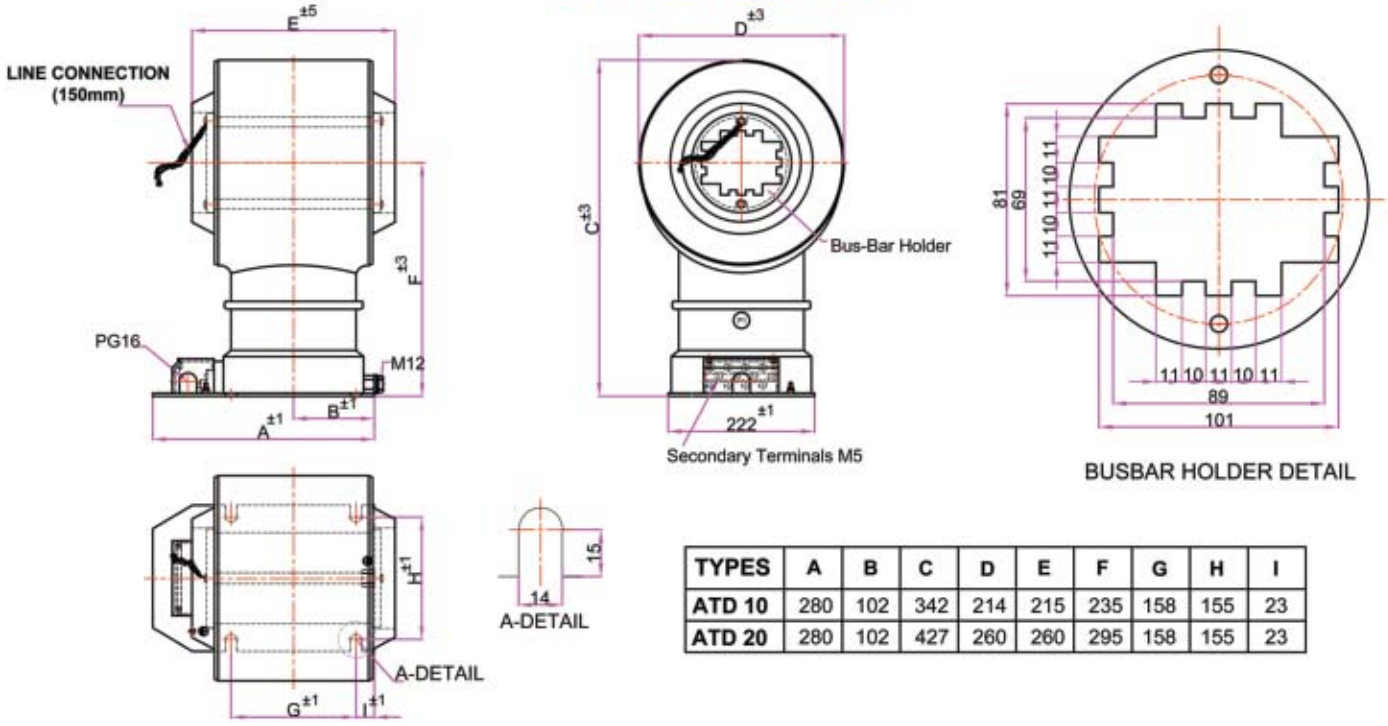
TYPES		ATN 17	ESO 17 C	ATD 10	ATD 20
Operating voltage (Um)	(kV)	3,6 7,2 12 17,5		3,6 7,2 12	17,5 24
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28 38		10 20 28	38 50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75 95		40 60 75	95 125
Rated frequency	(Hz)	50 - 60			
Primary rated current	(A)	800-4000		800-3000	800-4000
Secondary rated current	(A)	1 - 5			
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1			
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1			
Rated short-time thermal current (Ith) (1s)	(kA)	max. 100			
Rated dynamic current (Idyn)	(kA)	Practically unlimited			
Short-time load (mechanical)	(N)	3000			
Insulation class		E			
Ambient temperature	(°C)	-5 ..... +40			
Altitude	(m)	1000			
Standard		According to the customer requirements			
Weight (approx.)	(kg)	35	40	19	34

** For more cores please contact with ESİTAŞ for feasibility.*

INDOOR POST BUSBAR TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

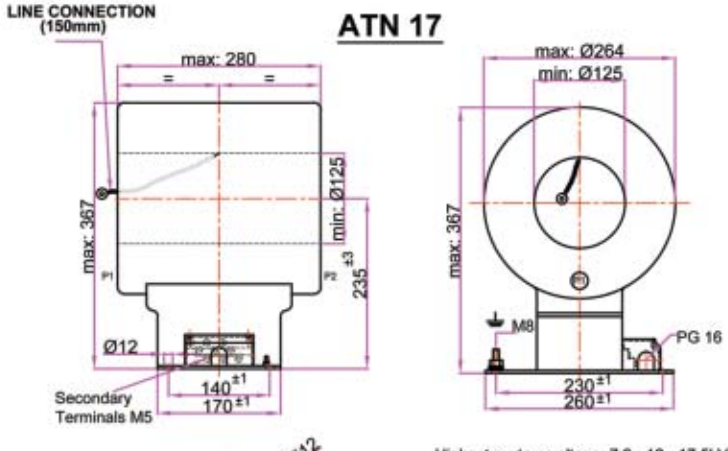
(Um=36kV .....24kV)

ATD 10; ATD 20 TYPES

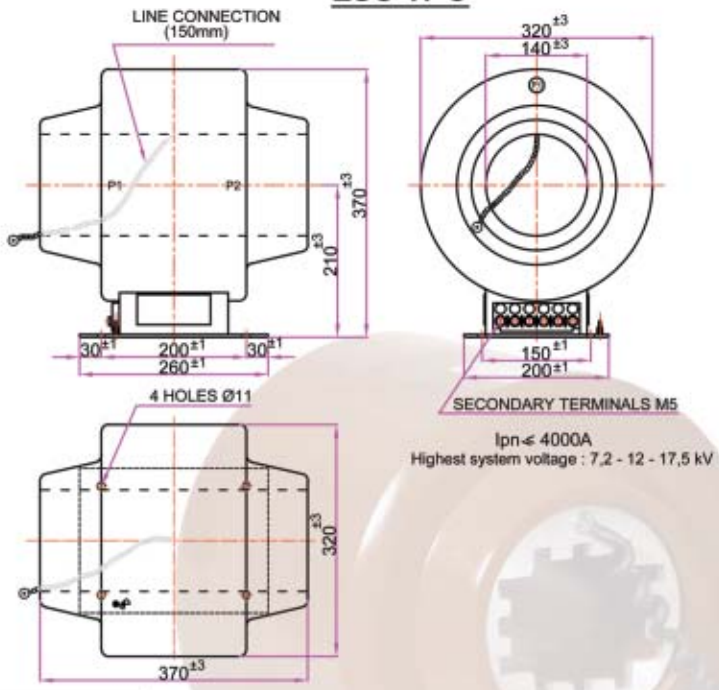


TYPES	A	B	C	D	E	F	G	H	I
ATD 10	280	102	342	214	215	235	158	155	23
ATD 20	280	102	427	260	260	295	158	155	23

ATN 17



ESO 17 C



TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5

*** All dimensions are in mm.*

*** Tolerance is DIN 7168-g.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=3,6kV .....12kV)

Types : ATB 10-SB
ATB 10-ST

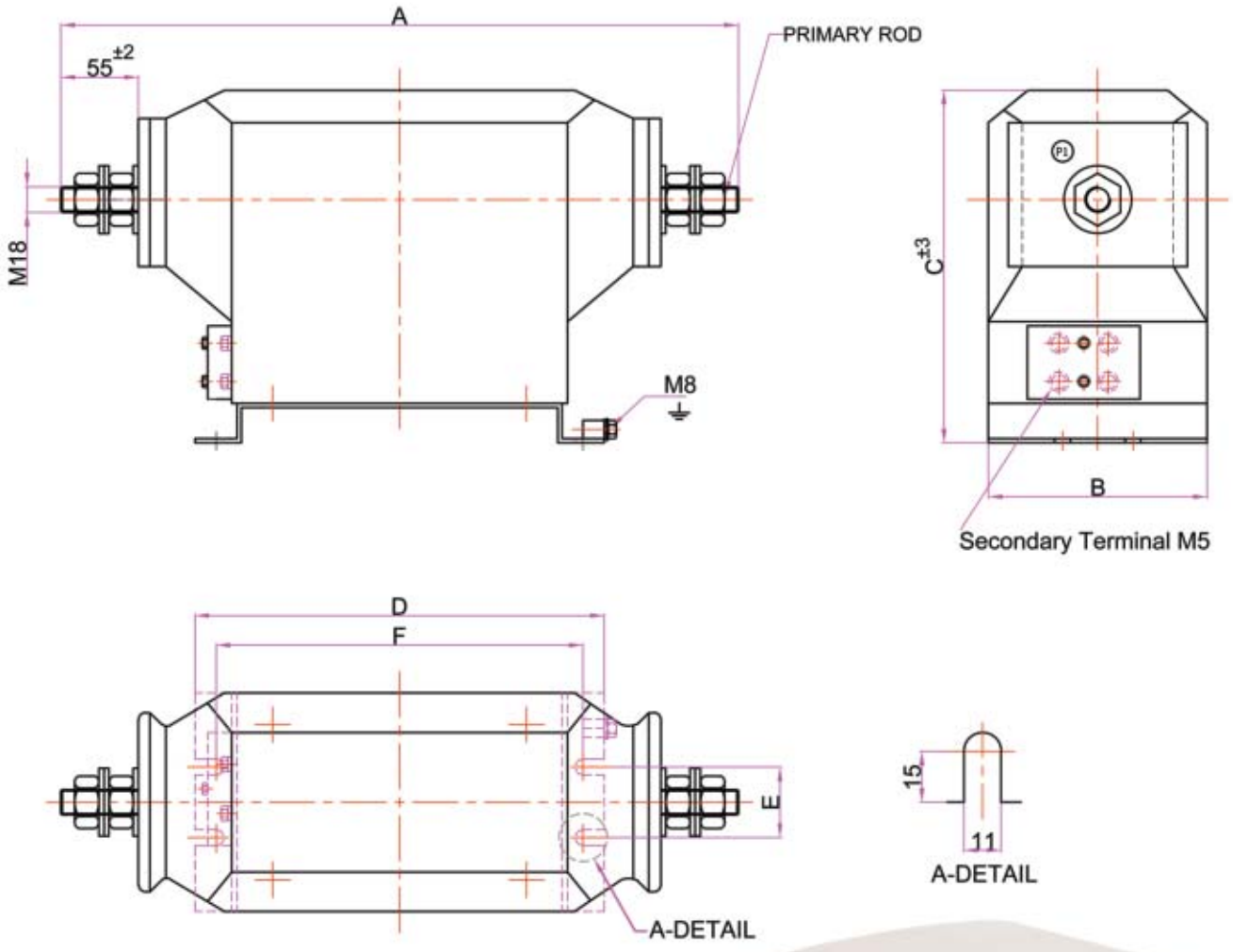
- ATB 10-SB, up to 1 core.*
- ATB 10-ST, up to 2 cores.*

Technical Data

TYPES		ATB 10-SB	ATB 10-ST
Operating voltage (Um)	(kV)	3,6 7,2 12 12	
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28 34	
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75 95	
Rated frequency	(Hz)	50 - 60	
Primary rated current	(A)	50 800	
Secondary rated current	(A)	1 - 5	
Rated short-time thermal current (Ith) (1s)	(kA)	(max.1000 x In)	
Rated dynamic current (Idyn)	(kA)	(2,5 x Ith)	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	20	25

*** For more cores please contact with ESİTAŞ for feasibility.*

INDOOR SUPPORT TYPE CAST RESIN INSULATED
C.T.'S TECHNICAL DRAWING
(Um=3,6kV .....12kV)



TYPES	A	B	C	D	E	F
ATB 10-SB	480	155	250	290	50	260
ATB 10-ST	380	155	250	200	50	170

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

OUTDOOR DRY TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=3,6kV .....24kV)

Types : ATH 20
ATH 21
ATH 22

- ATH 20, up to 1 core. *
- ATH 21, up to 2 cores.*
- ATH 22, up to 3 cores.*

For the connection
of aluminium conductors
steel reinforced

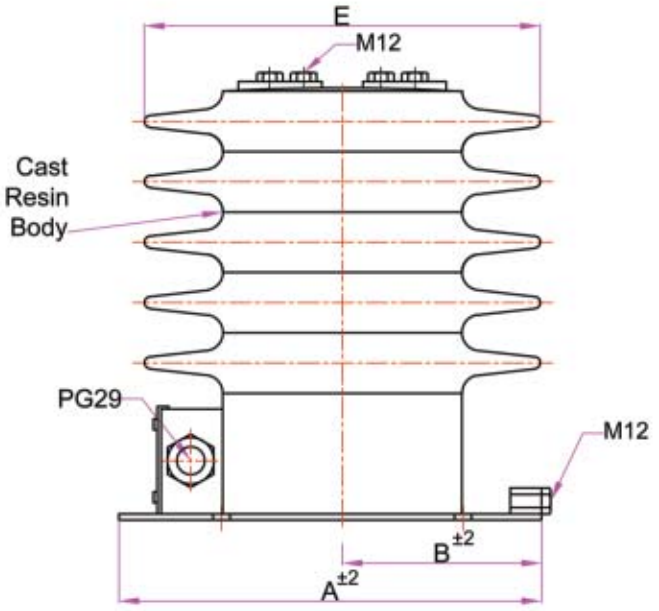
Technical Data

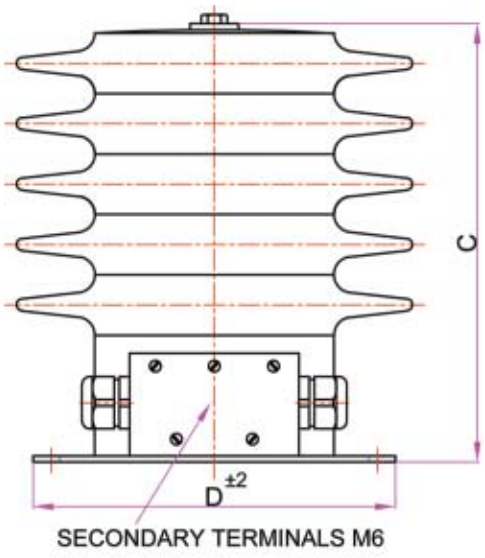
TYPES		ATH 20	ATH 21	ATH 22
Operating voltage, Um	(kV)	3,6 7,2	12 17,5	24
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20	28 38	50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60	75 95	125
Rated frequency	(Hz)	50 - 60		
Primary rated current	(A)	5 - 1250	5 - 2500	
Primary reconnection	(A)	2x5 - 2x600		
Secondary rated current	(A)	1 - 5		
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1		
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1		
Rated short-time thermal current (Ith) (1s)	(kA)	max 40, (max. 1000 x In)		
Rated dynamic current (Idyn)	(kA)	max 100, (2,5 x Ith)		
Short-time load (mechanical)	(N)	2400		
Insulation class		E		
Min. creepage distance	(mm)	560	825	770
Altitude	(m)	According to the customer requirements		
Standard		According to the customer requirements		
Weight (approx.)	(kg)	24	35	78

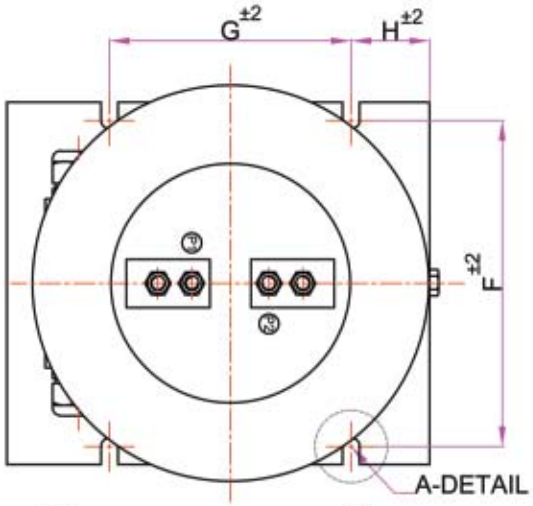
** For more cores please contact with ESİTAŞ for feasibility.*

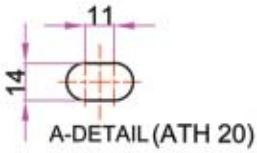
OUTDOOR DRY TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

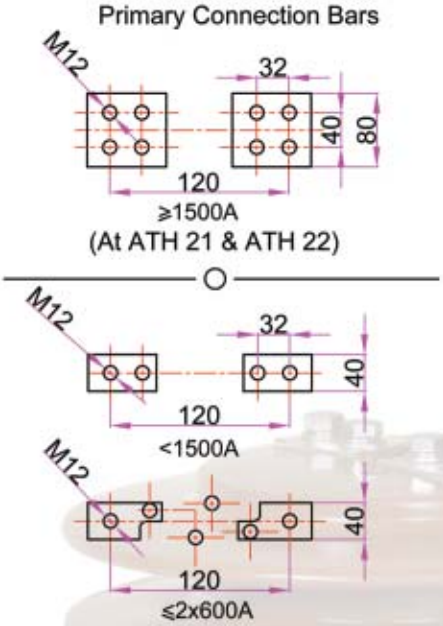
(Um=3,6kV .....24kV)











TYPES	A	B	C	D	E	F	G	H
ATH 20	245	105	max 345	220	max Ø223	178	175	20
ATH 21	350	165	max 365	300	max Ø340	270	200	65
ATH 22	400	195	max 380	370	max Ø415	340	250	70

TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	5
M12 (Primary and Ground Terminal)	60	70

*** All dimensions are in mm.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

OUTDOOR DRY TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=36kV)

Types : ATH 30
ATH 32

- ATH 30, up to 2 cores.*
- ATH 32, up to 3 cores.*

For the connection
of aluminium conductors
steel reinforced

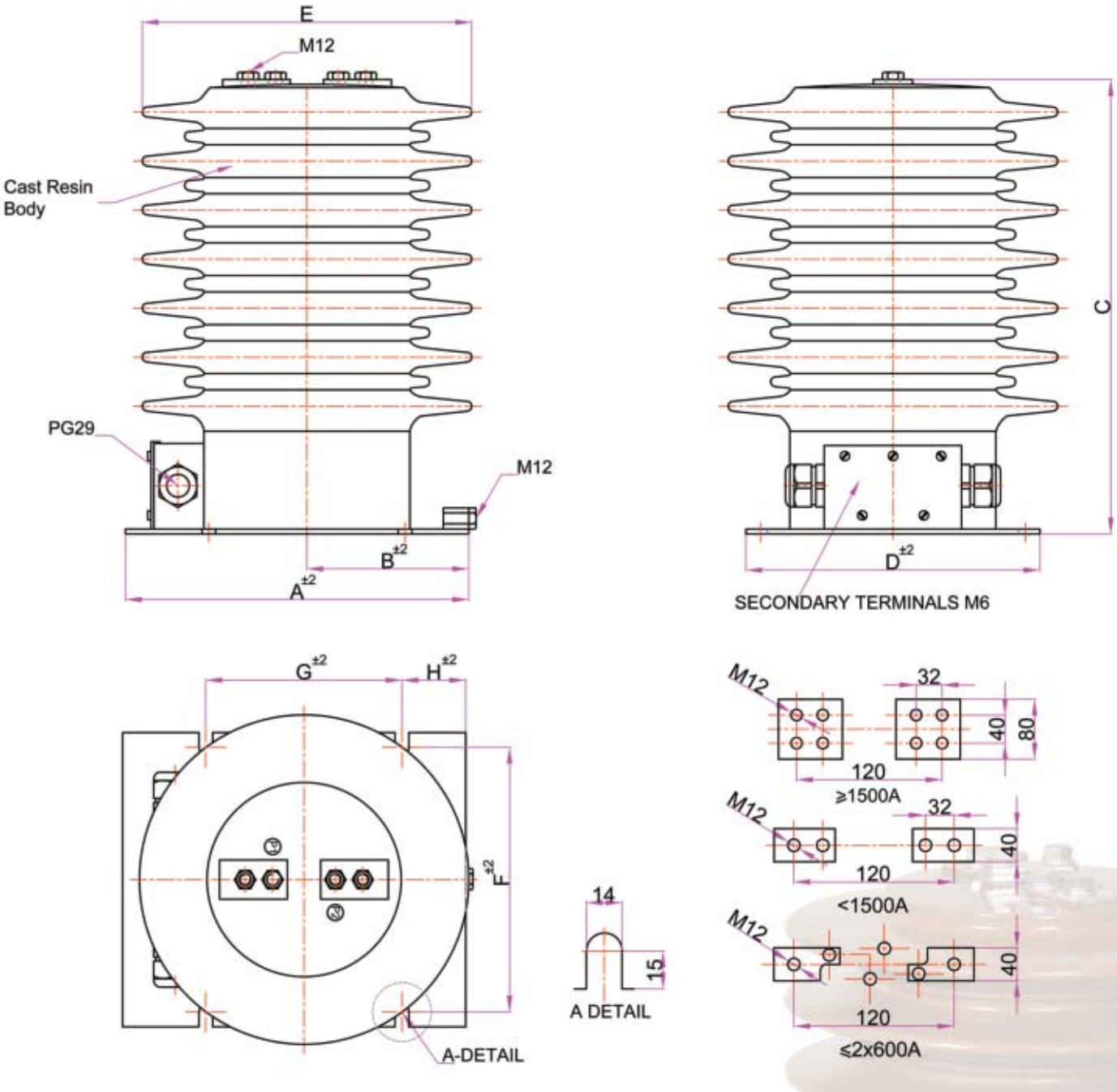
Technical Data

TYPES		ATH 30	ATH 32
Operating voltage, Um	(kV)	36	
Rated power-frequency withstand voltage (1 minute)	(kV)	70	
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	170	
Rated frequency	(Hz)	50 - 60	
Primary rated current	(A)	5 - 2500	
Primary reconnection	(A)	2x5 - 2x600	
Secondary rated current	(A)	1 - 5	
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1	
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1	
Rated short-time thermal current (Ith) (1s)	(kA)	max 40, (max. 1000 x In)	
Rated dynamic current (Idyn)	(kA)	max 100, (2,5 x Ith)	
Short-time load (mechanical)	(N)	2000 / 2500	
Min. creepage distance	(mm)	1140	
Altitude	(m)	According to the customer requirements	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	47	85

** For more cores please contact with ESİTAŞ for feasibility.*

OUTDOOR DRY TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

(Um=36kV)



TYPES	A	B	C	D	E	F	G	H
ATH 30	350	165	max 465	300	max Ø340	270	200	65
ATH 32	390	190	max 477	350	max Ø403	320	250	65

TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	5
M12 (Primary and Ground Terminal)	60	70

** *All dimensions are in mm.*
** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
** *Customer designed products are also available.*

OUTDOOR DRY TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS

(Um=52kV)

Types : ATH 52

- Up to 2 cores.*

For the connection
of aluminium conductors
steel reinforced

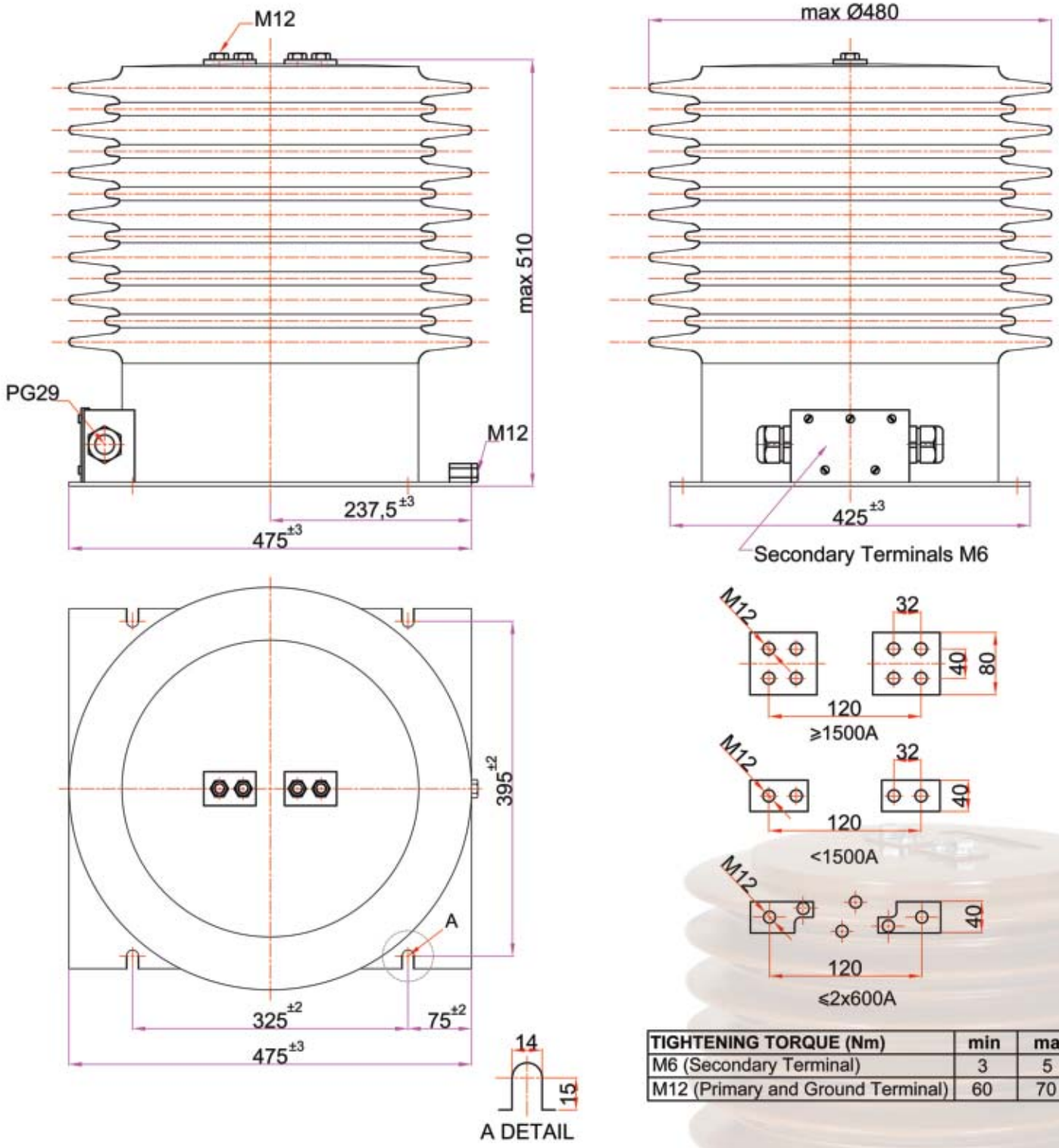
Technical Data

TYPES		ATH 52
Operating voltage, Um	(kV)	52
Rated power-frequency withstand voltage (1 minute)	(kV)	95
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	250
Rated frequency	(Hz)	50 - 60
Primary rated current	(A)	5 - 2500
Primary reconnection	(A)	2x5 - 2x600
Secondary rated current	(A)	1 - 5
Metering classes		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1
Protection classes		5P - 10P ; Cl:PX Acc. to IEC 44-1
Rated short-time thermal current (Ith) (1s)	(kA)	max 40, (max. 1000 x In)
Rated dynamic current (Idyn)	(kA)	max 100, (2,5 x Ith)
Short-time load (mechanical)	(N)	2000
Insulation class		E
Min. creepage distance	(mm)	1300
Altitude	(m)	According to the customer requirements
Standard		According to the customer requirements
Weight (approx.)	(kg)	140

** For more cores please contact with ESİTAŞ for feasibility.*

OUTDOOR DRY TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING

(Um=52kV)



TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	5
M12 (Primary and Ground Terminal)	60	70

** *All dimensions are in mm.*

** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

** *Customer designed products are also available.*

INDOOR KAP TYPE (CABLE TYPE) CAST RESIN INSULATED AND ENCLOSED BY PLASTIC COVER CURRENT TRANSFORMERS

(Um=0,72kV)

Types : KAP

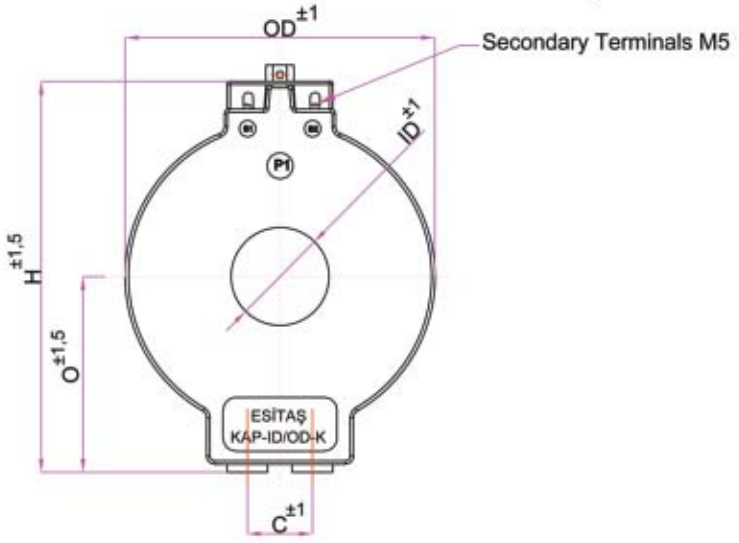
Width 35, 55mm up to 1 core.*
Width 95, 115mm up to 2 cores.*

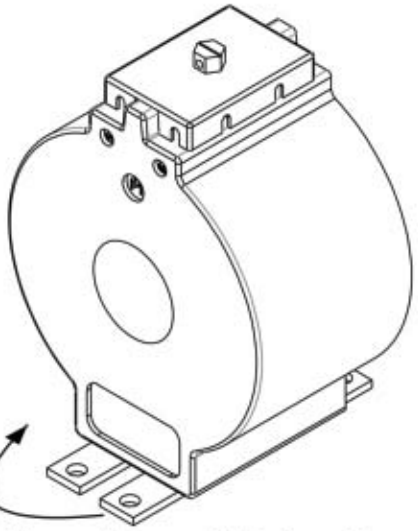
Technical Data

TYPES		KAP
Operating voltage, Um	(kV)	0,72
Rated power-frequency withstand voltage (1 minute)	(kV)	3
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	—
Rated frequency	(Hz)	50 - 60
Primary rated current *	(A)	40 3000
Secondary rated current	(A)	1 - 5
Metering classes *		0,2 - 0,2S - 0,5 - 0,5S - 1 - 3 - 5 Acc. to IEC 44-1
Protection classes *		5P - 10P Acc. to IEC 44-1
Rated short-time thermal current (Ith) (1s)	(kA)	max.100
Rated dynamic current (Idyn)	(kA)	Practically unlimited
Insulation class		E
Ambient temperature	(°C)	-5 ..... +40
Altitude	(m)	1000
Standard		According to the customer requirements

INDOOR KAP TYPE (CABLE TYPE) CAST RESIN INSULATED AND ENCLOSED BY PLASTIC COVER C.T.'S TECHNICAL DRAWING

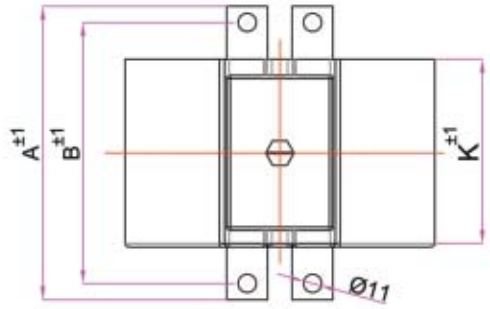
(Um=0,72kV)





NOTE: Base plates can be assemblied other side according to the request for the transformers width 55, 95 and 115mm.

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5



***As can be seen in the below table there are various dimensions of KAP Types. Please contact with ESİTAŞ for feasibility of required transformer's which have different ratio, class, burden and dimensions.**

KAP TYPES (DIMENSIONS)*

NO	TYPE	ID	OD	H	K	O	A	B	C
1	KAP-40/190-35	40	190	241	35	119	150	130	40
2	KAP-40/190-55	40	190	241	55	119	150	130	25
3	KAP-40/190-95	40	190	241	95	119	150	130	40
4	KAP-40/190-115	40	190	241	115	119	170	150	40
5	KAP-60/190-35	60	190	241	35	119	150	130	40
6	KAP-60/190-55	60	190	241	55	119	150	130	25
7	KAP-60/190-95	60	190	241	95	119	150	130	40
8	KAP-60/190-115	60	190	241	115	119	170	150	40
9	KAP-80/190-35	80	190	241	35	119	150	130	40
10	KAP-80/190-55	80	190	241	55	119	150	130	25
11	KAP-80/190-95	80	190	241	95	119	150	130	40
12	KAP-80/190-115	80	190	241	115	119	170	150	40

NO	TYPE	ID	OD	H	K	O	A	B	C
25	KAP-40/250-35	40	250	301	35	149	150	130	40
26	KAP-40/250-55	40	250	301	55	149	150	130	25
27	KAP-40/250-95	40	250	301	95	149	150	130	40
28	KAP-40/250-115	40	250	301	115	149	170	150	40
29	KAP-60/250-35	60	250	301	35	149	150	130	40
30	KAP-60/250-55	60	250	301	55	149	150	130	25
31	KAP-60/250-95	60	250	301	95	149	150	130	40
32	KAP-60/250-115	60	250	301	115	149	170	150	40
33	KAP-80/250-35	80	250	301	35	149	150	130	40
34	KAP-80/250-55	80	250	301	55	149	150	130	25
35	KAP-80/250-95	80	250	301	95	149	150	130	40
36	KAP-80/250-115	80	250	301	115	149	170	150	40

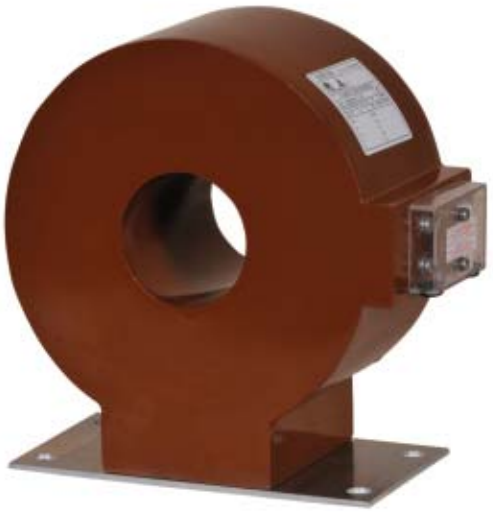
NO	TYPE	ID	OD	H	K	O	A	B	C
13	KAP-40/210-35	40	210	261	35	129	150	130	40
14	KAP-40/210-55	40	210	261	55	129	150	130	25
15	KAP-40/210-95	40	210	261	95	129	150	130	40
16	KAP-40/210-115	40	210	261	115	129	170	150	40
17	KAP-60/210-35	60	210	261	35	129	150	130	40
18	KAP-60/210-55	60	210	261	55	129	150	130	25
19	KAP-60/210-95	60	210	261	95	129	150	130	40
20	KAP-60/210-115	60	210	261	115	129	170	150	40
21	KAP-80/210-35	80	210	261	35	129	150	130	40
22	KAP-80/210-55	80	210	261	55	129	150	130	25
23	KAP-80/210-95	80	210	261	95	129	150	130	40
24	KAP-80/210-115	80	210	261	115	129	170	150	40

NO	TYPE	ID	OD	H	K	O	A	B	C
37	KAP-100/250-35	100	250	301	35	149	150	130	40
38	KAP-100/250-55	100	250	301	55	149	150	130	25
39	KAP-100/250-95	100	250	301	95	149	150	130	40
40	KAP-100/250-115	100	250	301	115	149	170	150	40
41	KAP-120/250-55	120	250	301	55	149	150	130	25
42	KAP-120/250-95	120	250	301	95	149	150	130	40
43	KAP-120/250-115	120	250	301	115	149	170	150	40
44	KAP-150/250-55	150	250	301	55	149	150	130	25
45	KAP-150/250-95	150	250	301	95	149	150	130	40
46	KAP-150/250-115	150	250	301	115	149	170	150	40

- All dimensions are in mm.

RING TYPE CURRENT TRANSFORMERS
(Um=0,72kV)

INDOOR RING TYPES



- Cable type.
- Insulated by cast resin.
- Applicable for measurement and protection purposes.

OUTDOOR RING TYPES

- Cable type.
- Insulated by cast resin.
- Applicable for measurement and protection purposes.

BUSHING TYPES

- For power transformers.
- Suitable for operation under oil continuous 130°C.
- Insulated by Insulation paper or Polyester tape.
- Applicable for measurement and protection purposes.

* Dimensions : According to the customer requirements.
* Standards : According to the customer requirements.
* Please contact with ESİTAŞ for feasibility of required transformer's which have different ratio, class, burden and dimensions.

INDOOR TYPE LPCT
(Low Power Current Transformer) (Cable Type)
(Um=0,72kV)

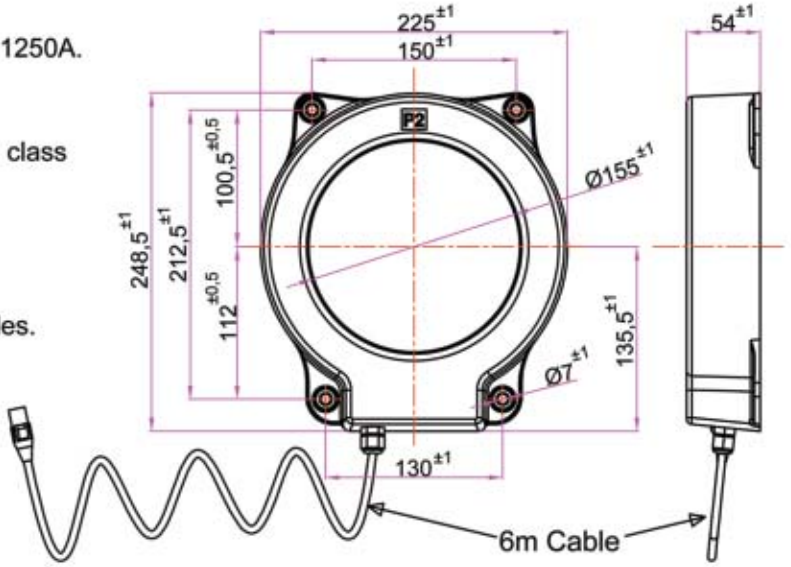
Type : LPCT 160

- LPCT 160 is defining low power current transformer with voltage output in compliance with IEC 60044-8.
- It is designed for measuring nominal currents of 5A to 1250A with ratio 100A / 22,5mV. Thus it should be used a digital relay which have 100A / 22,5mV input with LPCT.
- Esitas LPCT Set is composed of three LPCT and one digital relay. In case of preffered set without relay, Esitas has to be informed about the relay that will be used.
- The sensor is delivered with 6m of Cable.

Advantages :
- Same transformer is usable for nominal currents of 5A to 1250A.
- Accurracy warranty throughout the range :
  - Protection : 5A-40kA ; class 5P
  - Measuring : 100A-1250A ; class 0,5 (class 0,75 for 20A, class 1,5 for 5A).

Simple Assembly :
- Ready for connection secondary cables.
- Simple connection with insulated cable for all types cubicles.

Safety Operation :
- Openable secondary circuit under load.



Technical Data

TYPE		LPCT 160
Standard		IEC 60044-8
Minimum primary current	(A)	5
Rated primary current	(A)	100
Rated secondary voltage	(mV)	22,5
Rated maximum primary current	(A)	1250
Class of measuring		0.5 (100A-1250A), 0.75 (20A), 1.5 (5A)
Class of protection		5P
Accuracy limit factor (Kalf)		400
Rated short-time current	(kA/1s)	40
Insulation level	(kV)	0,72 / 3 / -
Frequency	(Hz)	50 - 60
Burden (Rbr)	(kΩ)	2

M.V. VOLTAGE TRANSFORMERS

VOLTAGE TRANSFORMERS

An instrument transformer in which the secondary voltage, in normal conditions of use, is substantially proportional to the primary voltage and differs in phase from it by an angle which is approximately zero for an appropriate direction of the connections.
It isolates the primary side rated voltage from the connected instruments and protection circuits and convert the primary voltage into a measurable secondary voltage, which is true in magnitude and phase.

Primary Winding

The winding to which the voltage to be transformed is applied.

Secondary Winding

The winding, which supplies the voltage circuits of measuring instruments, meters, relays or similar apparatus.

Rated Primary Voltage

The value of the primary voltage, which appears in the designation of the transformer and on which its performance is based.

Rated Secondary Voltage

The value of the secondary voltage, which appears in the designation of the transformer and on which its performance is based.

Rated Transformation Ratio

The ratio of the rated primary to the rated secondary voltage.

Voltage Error (Ratio Error)

The error which a transformer introduces into the measurement of a voltage and which arises when the actual transformation ratio is not equal to the transformation ratio.
The voltage error, expressed in per cent, is given by the formula:

$$\text{Voltage Error } \% = \frac{Kn\ Us - Up}{Up} \times 100$$

Where
Kn is the rated transformation ratio;
Up is the actual primary voltage;
Us is the actual secondary voltage when Up is applied under the conditions of measurement.

Accuracy Class

A designation assigned to a voltage transformer, the errors of which remain within specified limits under prescribed conditions of use.

Burden

The admittance of the secondary circuit expressed in siemens and power factor (lagging or leading).

Rated Burden

The value of the burden on which the accuracy requirements are based on.

Rated Output

The value of apparent power (in voltamperes at a specified power-factor), which the transformer is intended to supply to the secondary circuit at the rated secondary voltage and with rated burden, connected to it.

Rated Insulation Level

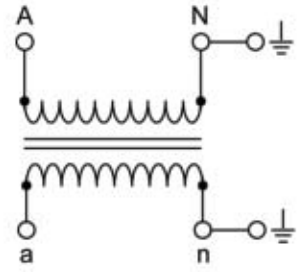
The combination of voltage values which characterizes the isolation of a transformer with regard to its capability to withstand dielectric stresses.

Rated Voltage Factor

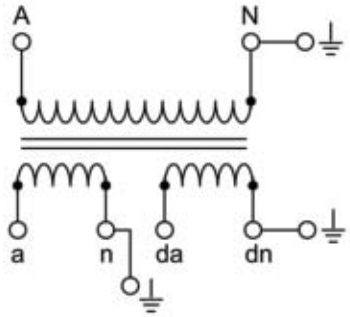
The multiplying factor to be applied to the rated primary voltage to determine the maximum voltage at which a transformer must comply with the relevant thermal requirements for a specified time and with the relevant accuracy requirements.

M.V. VOLTAGE TRANSFORMERS

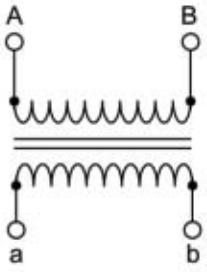
Connection Diagrams



Single pole insulated
voltage transformer
(e.g 11000/√3 : 100/√3 V)



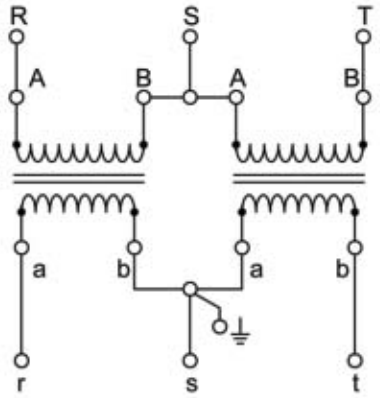
Single pole insulated
voltage transformer with
an open delta winding
(e.g 11000/√3 : 100/√3 - 100/3 V)



Double pole insulated
voltage transformer
(e.g 11000 : 100 V)

It can be required for multi secondary winding and changeable ratios.

V-Connection of Two Double Pole Insulated Voltage Transformers



Safety Operation Conditions for Voltage Transformers

- When the Secondary terminals are connected to the measuring or protection devices, one of the terminals should be earthed for safety as seen in Diagram-4.

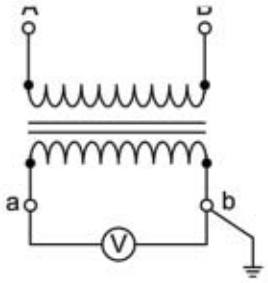


Diagram-4

M.V. VOLTAGE TRANSFORMERS

- The base plate must be earthed.
- The Secondary circuits must not be short-circuited during operation. Otherwise the voltage transformers will be thermally destroyed.
- If any of the Secondary windings of a voltage transformer will not be used, then it must be left open with one of the terminals connected to the earth as seen in Diagram-5.

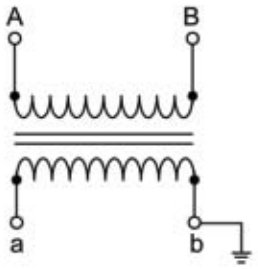


Diagram-5

- For single phase transformers, the neutral terminal of the primary "N" must be earthed in the earthed (neutral) systems as seen in Diagram-6.

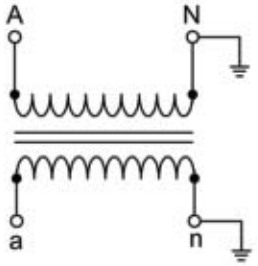


Diagram-6

Other Important points and notes

When using single pole insulated inductive voltage transformers it is very important to understand that, when a circuit is being closed or during the decaying period of an earth fault ferroresonance may occur.
Ferroresonance can lead to the overheating and thermal destruction of the voltage transformer or high levels of voltages may be induced. In general, ferroresonance can be eliminated by the use of an appropriate resistor placed as a burden in open-delta circuit formed by three voltage transformers open-delta windings. The open-delta circuit must always be earthed only at one point as seen in Diagram-7. The open-delta connection can also be used for earth-fault monitoring with appropriate devices.

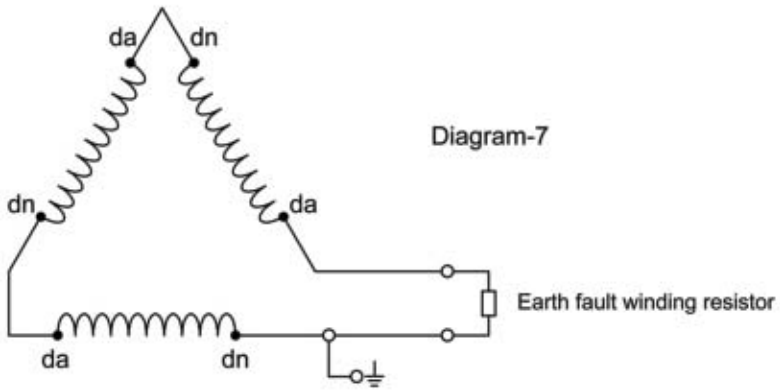
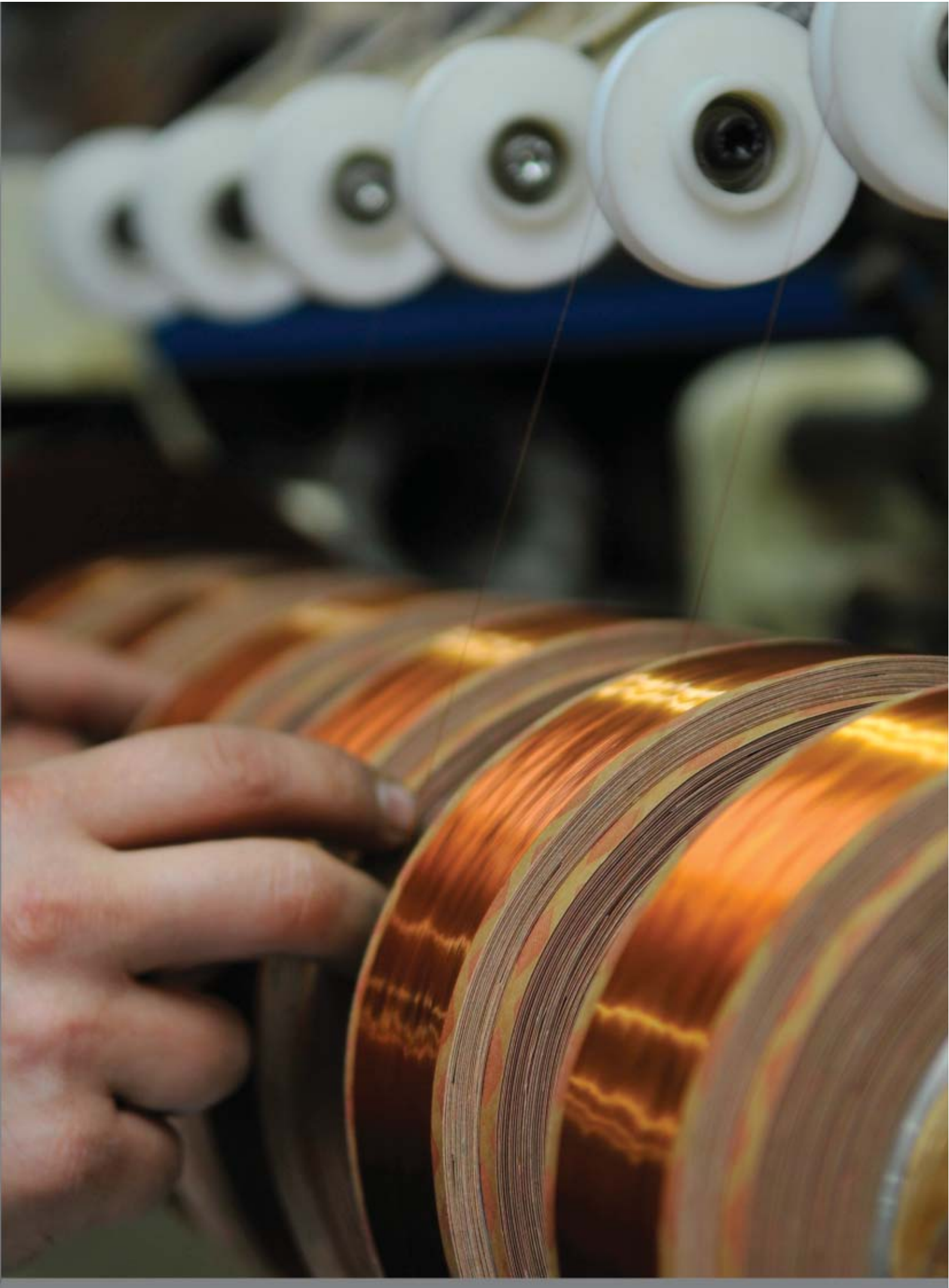


Diagram-7

As the number of cable systems is increasing in the energy distribution systems, the protection of voltage transformers have become very important for the uninterrupted operation of the system without any failure and/or down time. For that reason, ESİTAŞ is always recommending the use of open-delta windings in single phase inductive voltage transformers.



INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED VOLTAGE TRANSFORMERS
(Um=3,6kV .....24kV BLOCK TYPES)

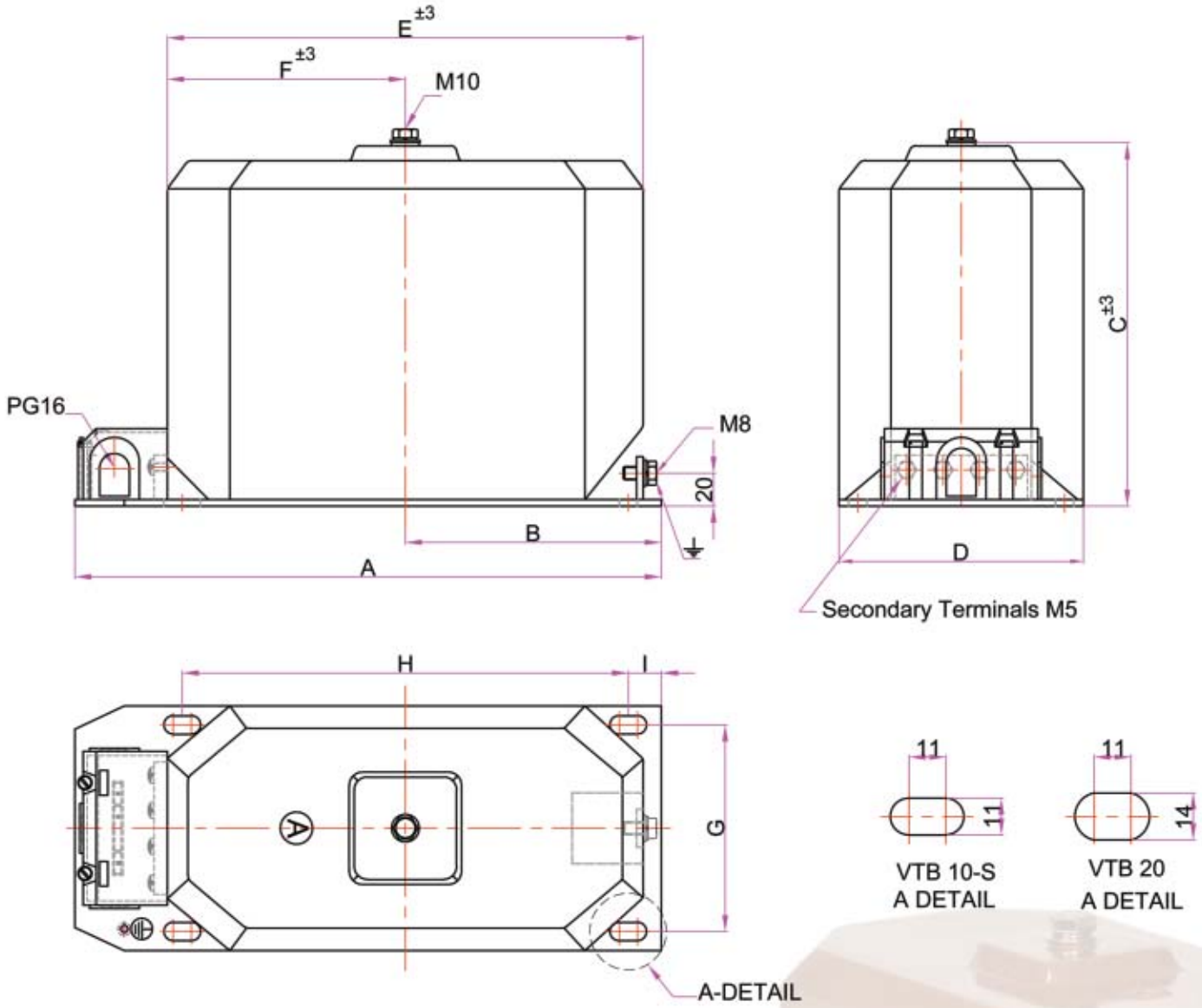
Types : VTB 10-S
VTB 20

Technical Data

TYPES		VTB 10-S	VTB 20
Operating voltage, Um	(kV)	3,6 7,2 12	17,5 24
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28	38 50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75	95 125
Rated frequency	(Hz)	50 - 60	
Rated primary voltage (max.)	(kV)	12/√3	24/√3
Secondary voltage	(V)	100/√3 110/√3	120/√3
Rated burden (max.) in class 0,2	[VA]	25	30
Rated burden (max.) in class 0,5	[VA]	75	100
Rated burden (max.) in class 1	[VA]	150	200
Rated burden for protection purpose in class 3P	[VA]	100	
Rated voltage factor (30sec. or 8h)	[Un]	1,9	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	27	40

INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

(Um=3,6kV .....24kV BLOCK TYPES)



TYPES	A	B	C	D	E	F	G	H	I
VTB 10-S	355	155	220	148	290	145	125	270	20
VTB 20	355	155	280	178	295	147,5	150	280	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

** *All dimensions are in mm.*
** *Tolerances are according to DIN 7168-g when not specified.*
** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
** *Customer designed products are also available.*

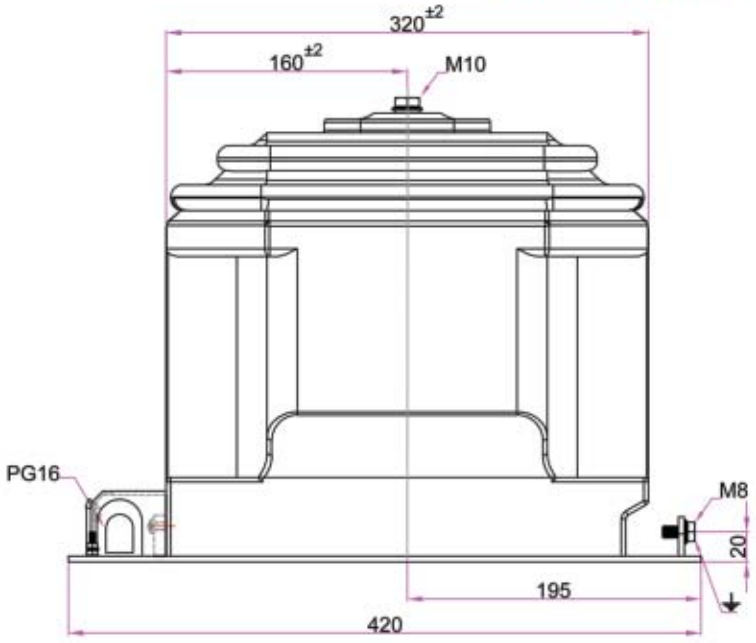
INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED
VOLTAGE TRANSFORMERS
(Um=36kV BLOCK TYPES)

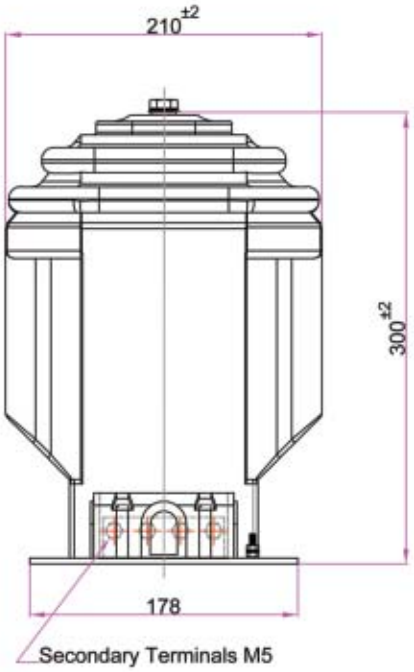
Type : VTB 30-K

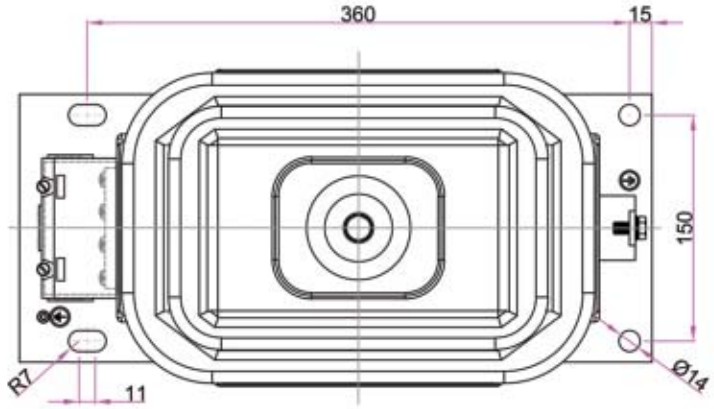
Technical Data

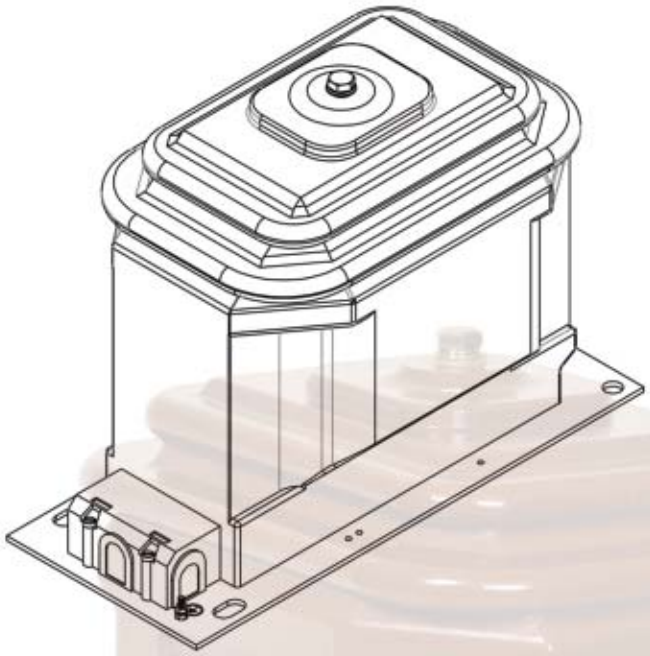
TYPE		VTB 30-K		
Operating voltage, Um	(kV)	36		
Rated power-frequency withstand voltage (1 minute)	(kV)	70		
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	170		
Rated frequency	(Hz)	50 - 60		
Rated primary voltage (max.)	(kV)	36/√3		
Secondary voltage	(V)	100/√3	110/√3	120/√3
Rated burden (max.) in class 0,2	[VA]	30		
Rated burden (max.) in class 0,5	[VA]	100		
Rated burden (max.) in class 1	[VA]	150		
Rated burden for protection purpose in class 3P	[VA]	60		
Rated voltage factor (30sec. or 8h)	[Un]	1,9		
Insulation class		E		
Ambient temperature	(°C)	-5 ..... +40		
Altitude	(m)	1000		
Standard		According to the customer requirements		
Weight (approx.)	(kg)	44		

INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING (Um=36kV BLOCK TYPES)









TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED VOLTAGE TRANSFORMERS
(Um=24kV & 36kV LARGE TYPES)

Types : VT 20-B
VTB 30

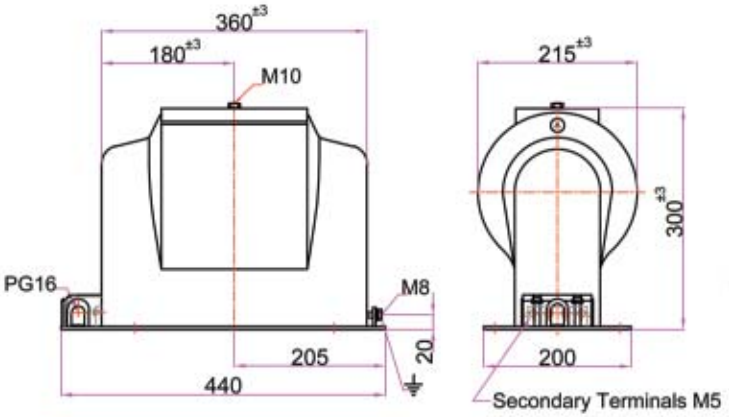
Technical Data

TYPE		VT 20-B	VTB 30
Operating voltage, Um	(kV)	17,5 24	36
Rated power-frequency withstand voltage (1 minute)	(kV)	38 50	70
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	95 125	170
Rated frequency	(Hz)	50 - 60	
Rated primary voltage (max.)	(kV)	17,5/√3 24/√3	36/√3
Secondary voltage	(V)	100/√3, 110/√3, 120/√3 & suitable for 220V winding.	
Rated burden (max.) in class 0,2	[VA]	50	
Rated burden (max.) in class 0,5	[VA]	150	
Rated burden (max.) in class 1	[VA]	250	
Rated burden for protection purpose in class 3P	[VA]	100	
Rated burden for 220V winding	[VA]	800	
Rated voltage factor (30sec. or 8h)	[Un]	1,9	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements.	
Weight (approx.)	(kg)	45	50-55

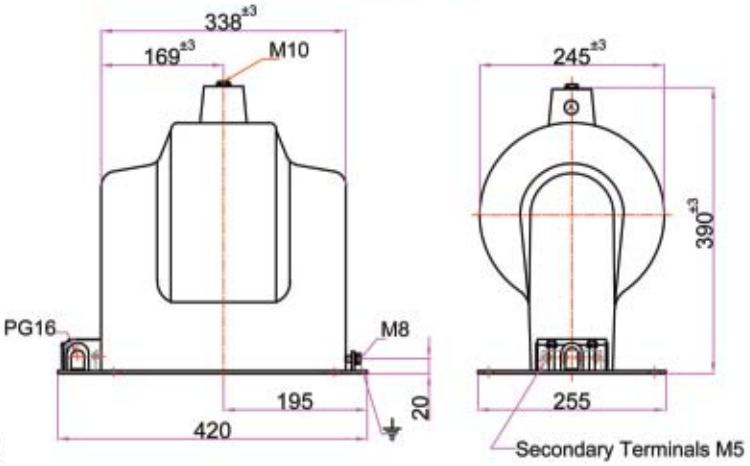
INDOOR SINGLE PHASE SUPPORT TYPE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

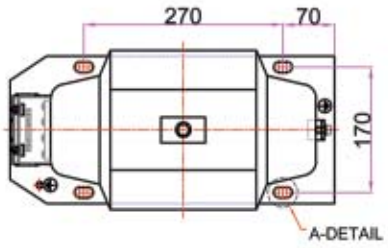
(Um=24kV & 36kV LARGE TYPES)

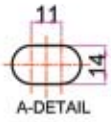
VT 20-B

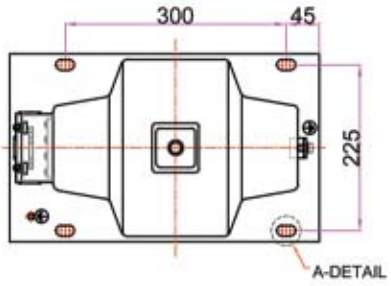


VTB 30









TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

*** All dimensions are in mm.*

*** Tolerances are according to DIN 7168-g when not specified.*

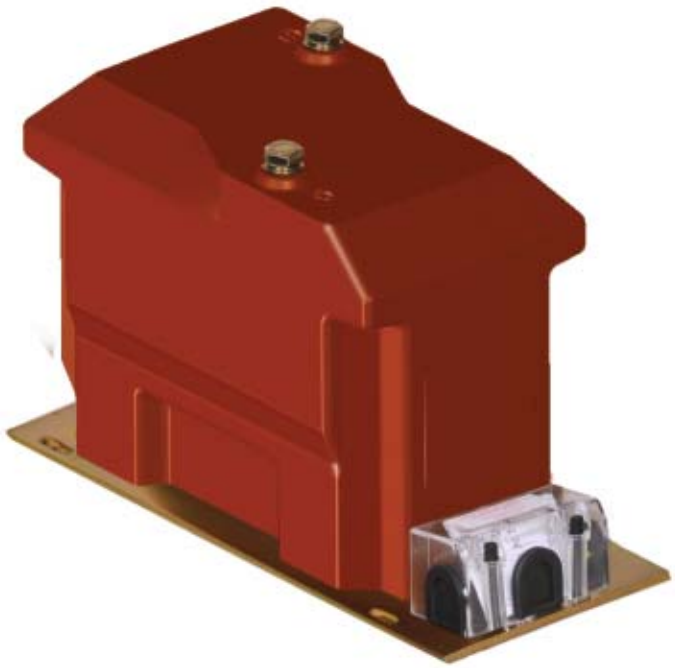
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

INDOOR PHASE TO PHASE SUPPORT TYPE CAST RESIN INSULATED VOLTAGE TRANSFORMERS

(Um=3,6kV .....24kV BLOCK TYPES)

Types : 2VTB 10
2VTB 20

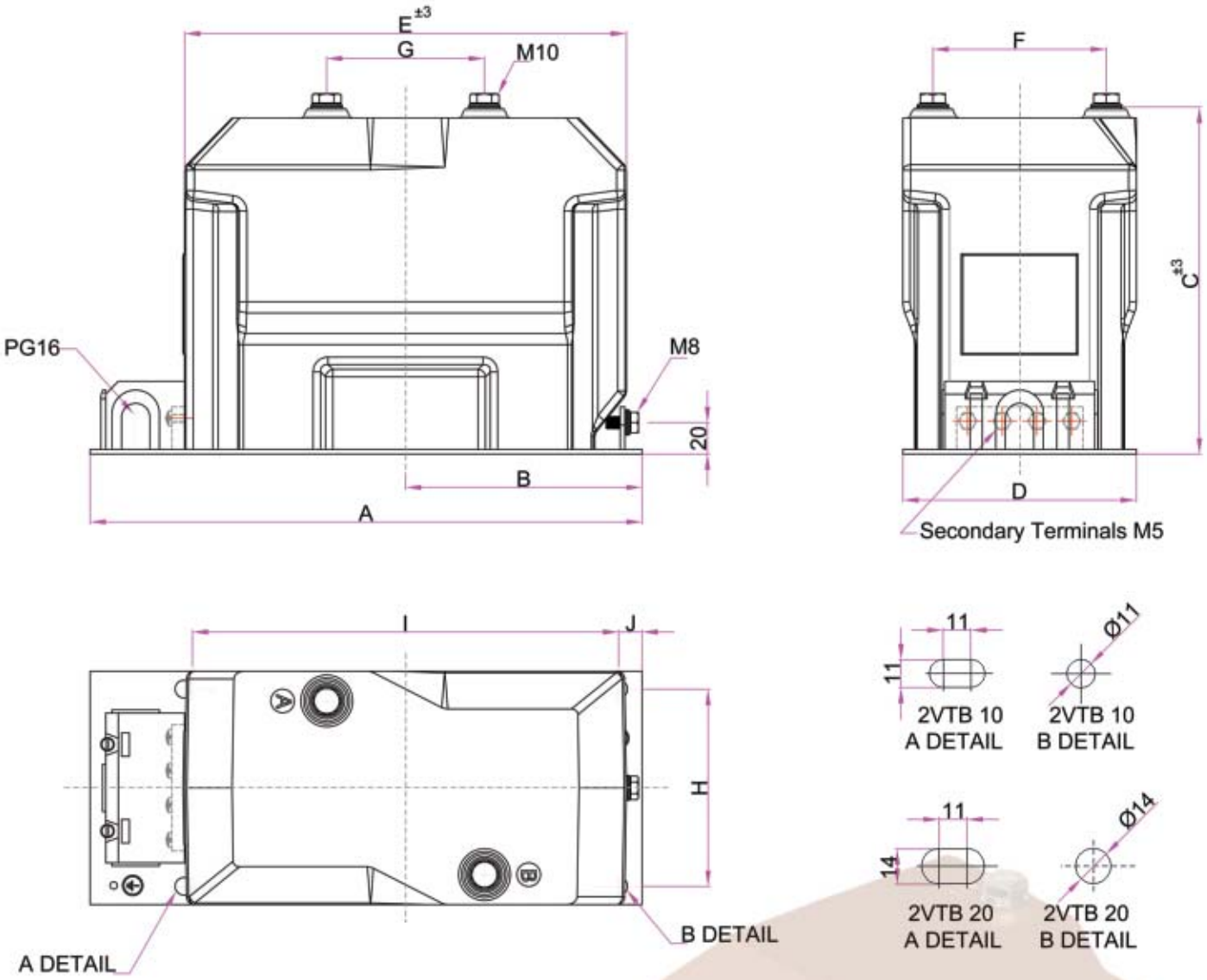


Technical Data

TYPES		2VTB 10			2VTB 20	
Operating voltage, Um	(kV)	3,6	7,2	12	17,5	24
Rated power-frequency withstand voltage (1 minute)	(kV)	10	20	28	38	50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40	60	75	95	125
Rated frequency	(Hz)	50 - 60				
Rated primary voltage (max.)	(kV)	12			24	
Secondary voltage	(V)	100		110		120
Rated burden (max.) in class 0,2	[VA]	15				
Rated burden (max.) in class 0,5	[VA]	60				
Rated burden (max.) in class 1	[VA]	100				
Rated voltage factor (Cont.)	[Un]	1,2				
Insulation class		E				
Ambient temperature	(°C)	-5 ..... +40				
Altitude	(m)	1000				
Standard		According to the customer requirements				
Weight (approx.)	(kg)	30			42	

INDOOR PHASE TO PHASE SUPPORT TYPE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

(Um=3,6kV .....24kV BLOCK TYPES)



TYPES	A	B	C	D	E	F	G	H	I	J
2VTB 10	350	150	220	148	280	110	100	125	270	15
2VTB 20	355	155	280	178	290	130	165	150	280	15

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

** *All dimensions are in mm.*
** *Tolerances are according to DIN 7168-g when not specified.*
** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
** *Customer designed products are also available.*

INDOOR PHASE TO PHASE SUPPORT TYPE CAST RESIN INSULATED VOLTAGE TRANSFORMERS

(Um=3,6kV .....36kV LARGE TYPES)

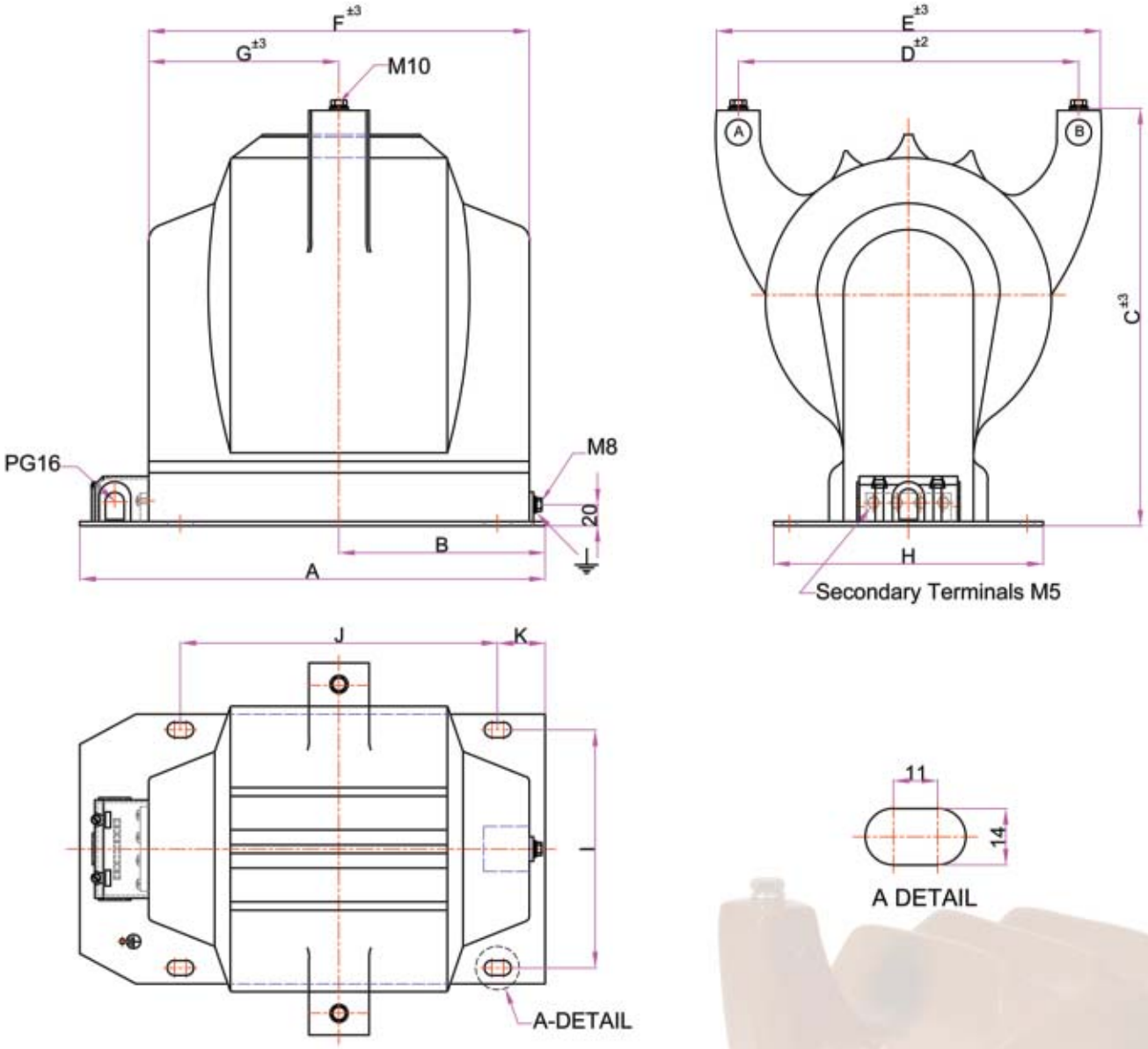
Types : 2VT 10
2VT 20-B
2VTB 30

Technical Data

TYPES		2VT 10	2VT 20-B	2VTB 30
Operating voltage, Um	(kV)	3,6 7,2 12	17,5 24	36
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28	38 50	70
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75	95 125	170
Rated frequency	(Hz)	50 - 60		
Rated primary voltage (max.)	(kV)	12	24	36
Secondary voltage	(V)	100-110-120 & 2VT 20-B and 2VTB 30 types are suitable for 220V winding		
Rated burden (max.) in class 0,2	[VA]	25	40	40
Rated burden (max.) in class 0,5	[VA]	100	120	120
Rated burden (max.) in class 1	[VA]	150	200	200
Rated burden for 220V winding	[VA]	800		
Rated voltage factor (Cont.)	[Un]	1,2		
Insulation class		E		
Ambient temperature	(°C)	-5 ..... +40		
Altitude	(m)	1000		
Standard		According to the customer requirements		
Weight (approx.)	(kg)	35	45	65

INDOOR PHASE TO PHASE SUPPORT TYPE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

(Um=3,6kV .....36kV LARGE TYPES)



TYPES	A	B	C	D	E	F	G	H	I	J	K
2VT 10	400	190	255	150	178	290	145	170	140	260	60
2VT 20-B	440	205	300	210	250	360	180	200	170	270	70
2VTB 30	440	195	395	320	363	360	180	255	225	300	45

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

INDOOR SINGLE PHASE CAST RESIN INSULATED
BUILT-IN FUSE FIXED TYPE
VOLTAGE TRANSFORMERS
(Um=3,6kV .....24kV)

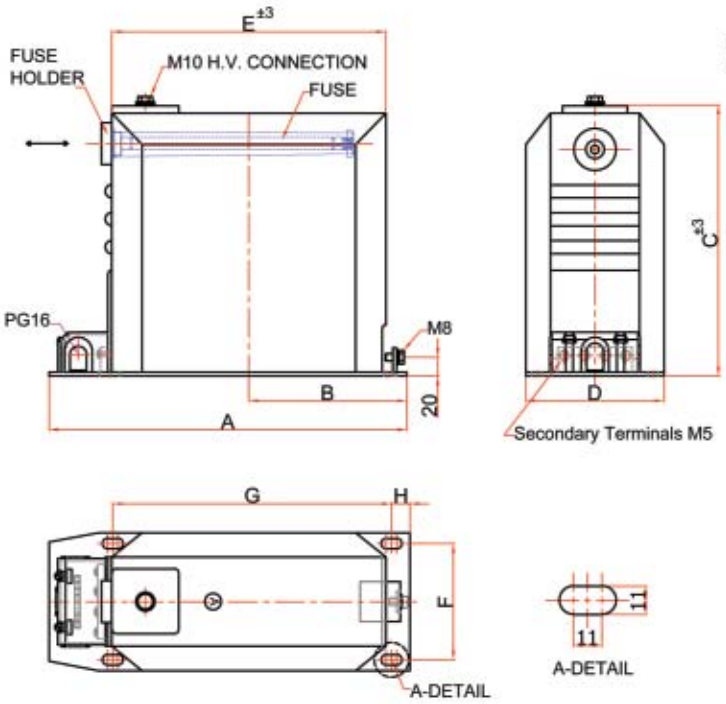
Types : VTB 10-SF
VTB 10-EF
VTB 20-F1
VTB 20-F2

Technical Data

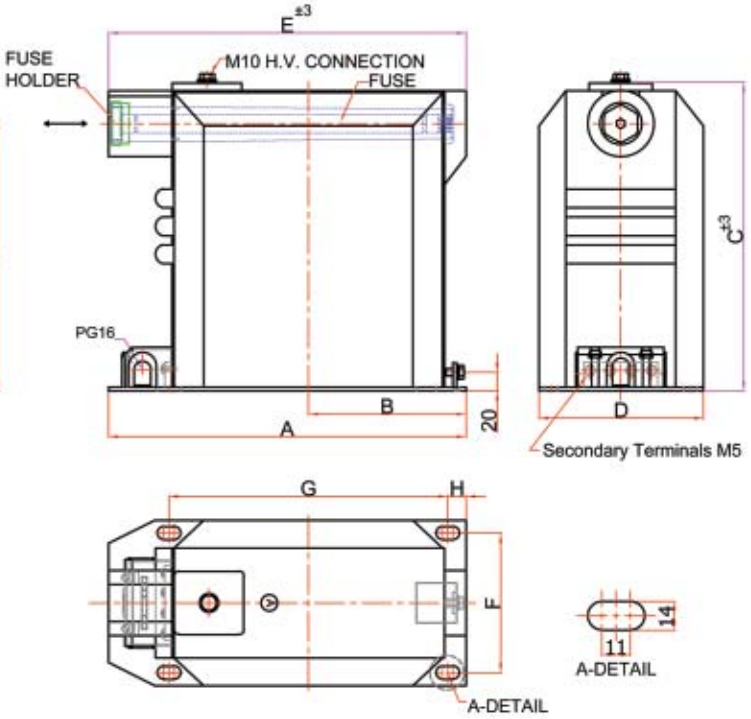
TYPES		VTB 10-SF	VTB 10-EF	VTB 20-E1	VTB 20-E2
Operating voltage, Um	(kV)	3,6 7,2 12		17,5 24	
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28		38 50	
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75		95 125	
Rated frequency	(Hz)	50 - 60			
Rated primary voltage (max.)	(kV)	12/√3		24/√3	
Secondary voltage	(V)	100/√3 110/√3 120/√3			
Rated burden (max.) in class 0,2	[VA]	25	30	50	30
Rated burden (max.) in class 0,5	[VA]	75	100	150	100
Rated burden (max.) in class 1	[VA]	150	200	250	200
Rated burden for protection purpose in class 3P	[VA]	100		100	
Rated voltage factor (30sec. or 8h)	[Un]	1,9			
Insulation class		E			
Ambient temperature	(°C)	-5 ..... +40			
Altitude	(m)	1000			
Standard		According to the customer requirements			
Weight (approx.)	(kg)	34	40	70	45

INDOOR SINGLE PHASE CAST RESIN INSULATED
BUILT-IN FUSE FIXED TYPE
V.T.'S TECHNICAL DRAWING
(Um=3,6kV .....24kV)

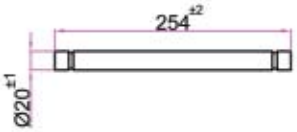
VTB 10-SF , VTB 10-EF



VTB 20-F1 , VTB 20-F2

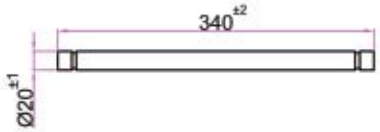


Protection Fuses For Voltage Transformer



Rated voltage= 12kV
Rated current= 0,63; 1; 2; 3,15A

Protection Fuses For Voltage Transformer



Rated voltage= 24; 25,5kV
Rated current= 0,63; 1; 2A

TYPES	A	B	C	D	E	F	G	H
VTB 10-SF	385	170	290	148	290	125	300	20
VTB 10-EF	385	170	290	162	290	132	300	20
VTB 20-F1	385	170	365	240	385	210	300	20
VTB 20-F2	385	170	325	178	385	150	300	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M10 (Primary Terminal)	30	40

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

INDOOR SINGLE PHASE CAST RESIN INSULATED
BUILT-IN FUSE WITHDRAWABLE TYPE
VOLTAGE TRANSFORMERS
(Um=3,6kV .....24kV)

Types : ES 12 VR-F
ES 24 V2-F

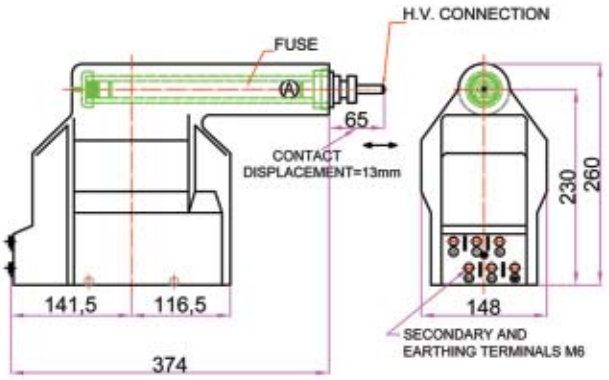
Technical Data

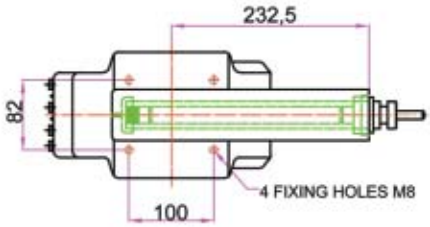
TYPES		ES 12 VR-F	ES 24 V2-F
Operating voltage, Um	(kV)	3,6 7,2 12	17,5 24
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28	38 50
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75	95 125
Rated frequency	(Hz)	50 - 60	
Rated primary voltage (max.)	(kV)	12/√3	24/√3
Secondary voltage	(V)	100/√3 110/√3 120/√3	
Rated burden (max.) in class 0,2	[VA]	20	
Rated burden (max.) in class 0,5	[VA]	60	
Rated burden (max.) in class 1	[VA]	120	
Rated burden for protection purpose in class 3P	[VA]	60	
Rated voltage factor (30sec. or 8h)	[Un]	1,9	
Insulation class		E	
Ambient temperature	(°C)	-5 ..... +40	
Altitude	(m)	1000	
Standard		According to the customer requirements	
Weight (approx.)	(kg)	21	29

INDOOR SINGLE PHASE CAST RESIN INSULATED BUILT-IN FUSE WITHDRAWABLE TYPE V.T.'S TECHNICAL DRAWING

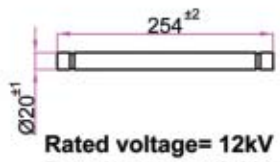
(Um=3,6kV .....24kV)

ES 12 VR-F



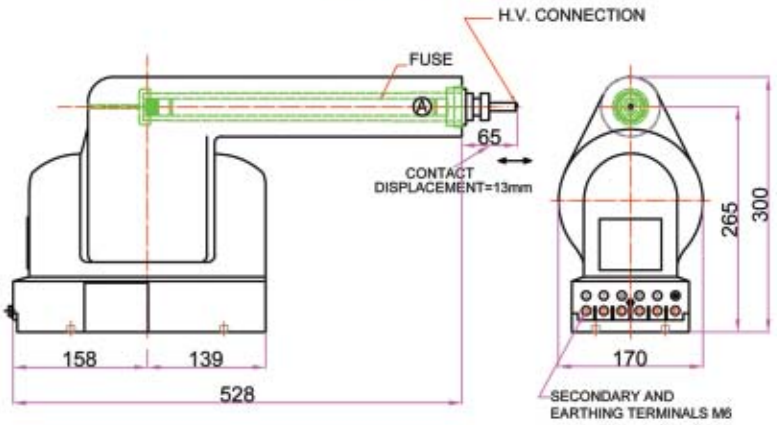


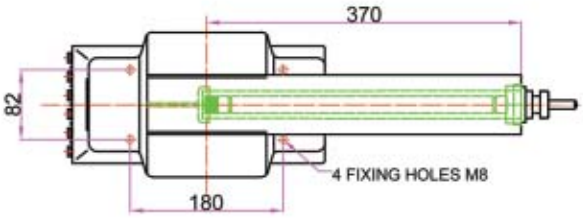
Protection Fuses For Voltage Transformer



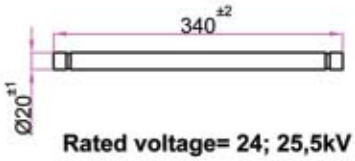
Rated voltage= 12kV
Rated current= 0,63; 1; 2; 3,15A

ES 24 V2-F





Protection Fuses For Voltage Transformer



Rated voltage= 24; 25,5kV
Rated current= 0,63; 1; 2A

TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	4

*** All dimensions are in mm.*
*** Tolerances are according to DIN 7168-g when not specified.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

INDOOR SINGLE PHASE CAST RESIN INSULATED
BUILT-IN FUSE WITHDRAWABLE TYPE
VOLTAGE TRANSFORMERS
(Um=36kV)

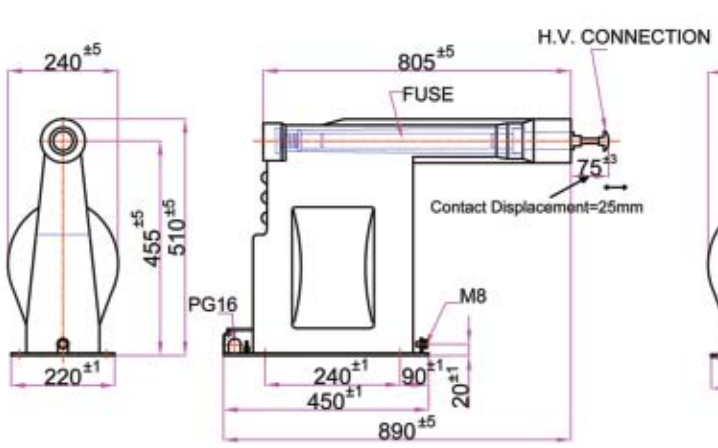
Types : VTB 30-F1
VTB 30-F1B

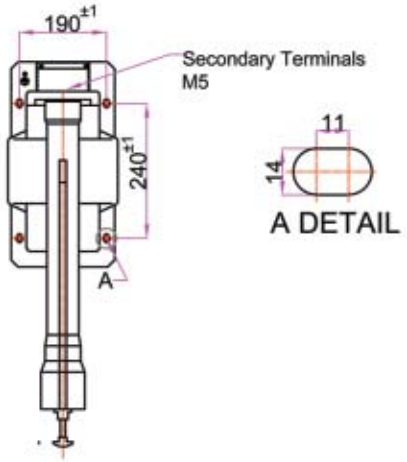
Technical Data

TYPES		VTB 30-F1		VTB 30-F1B
Operating voltage, Um	(kV)	36		
Rated power-frequency withstand voltage (1 minute)	(kV)	70		
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	170		
Rated frequency	(Hz)	50 - 60		
Rated primary voltage (max.)	(kV)	36/√3		
Secondary voltage	(V)	100/√3	110/√3	120/√3
Rated burden (max.) in class 0,2	[VA]	50		
Rated burden (max.) in class 0,5	[VA]	150		
Rated burden (max.) in class 1	[VA]	250		
Rated burden for protection purpose in class 3P	[VA]	100		
Rated voltage factor (30sec. or 8h)	[Un]	1,9		
Insulation class		E		
Ambient temperature	(°C)	-5 ..... +40		
Altitude	(m)	1000		
Standard		According to the customer requirements		
Weight (approx.)	(kg)	70		

INDOOR SINGLE PHASE CAST RESIN INSULATED
BUILT-IN FUSE WITHDRAWABLE TYPE
V.T.'S TECHNICAL DRAWING
(Um=36kV)

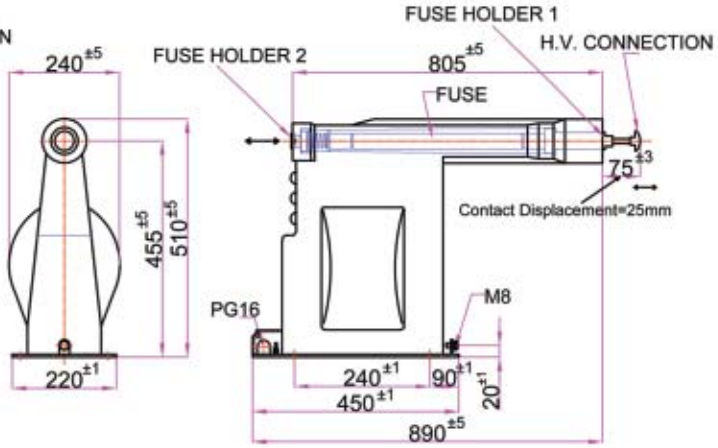
VTB 30-F1

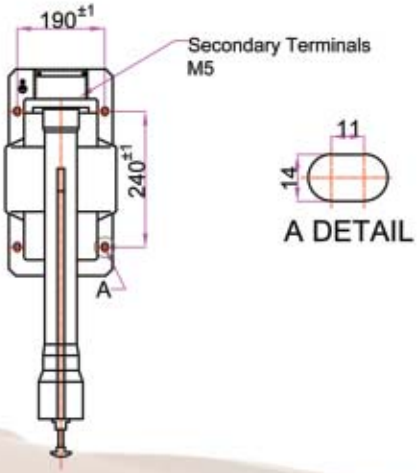




A DETAIL

VTB 30-F1B





A DETAIL

Rated Voltage = 36kV
Rated Current = 2A

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20

*** All dimensions are in mm.*
*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
*** Customer designed products are also available.*

OUTDOOR DRY TYPE SINGLE PHASE CAST RESIN INSULATED VOLTAGE TRANSFORMERS

(Um=3,6kV ..... 36kV)

Types : VTH 20
VTH 30

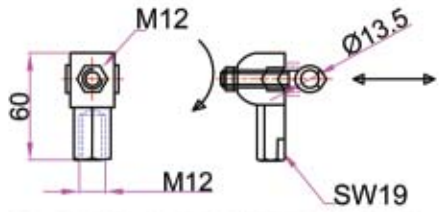
Clamp type terminal
for high voltage connection

Technical Data

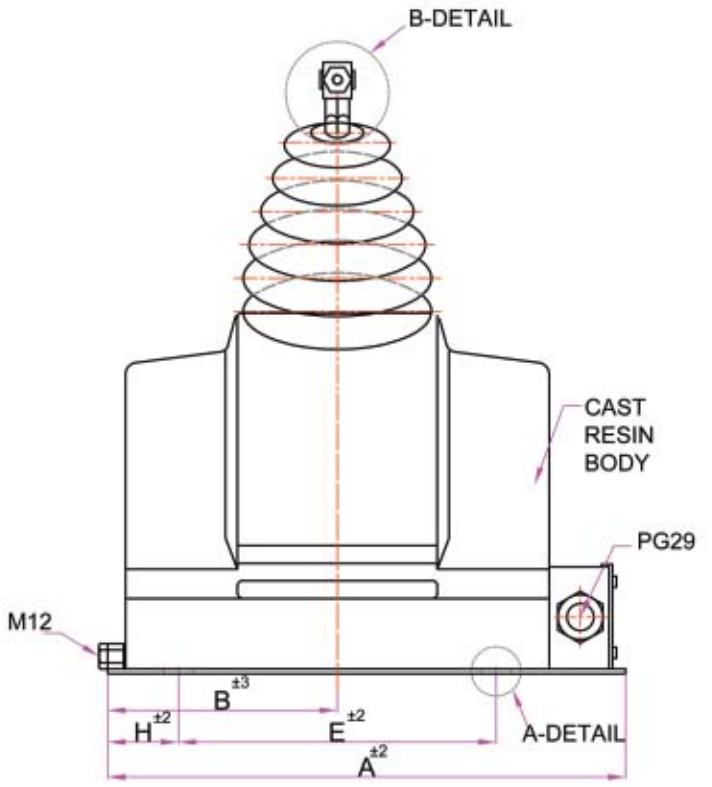
TYPES		VTH 20	VTH 30
Operating voltage, Um	(kV)	3,6 7,2 12 17,5 24	36
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28 38 50	70
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75 95 125	170
Rated frequency	(Hz)	50 - 60	
Rated primary voltage (max.)	(kV)	24/√3	36/√3
Secondary voltage	(V)	100/√3, 110/√3, 120/√3 & suitable for 220V winding.	
Rated burden (max.) in class 0,2	[VA]	40	50
Rated burden (max.) in class 0,5	[VA]	120	150
Rated burden (max.) in class 1	[VA]	240	250
Rated burden for protection purpose in class 3P	[VA]	100	
Rated burden for 220V winding	[VA]	800	
Rated voltage factor (30sec. or 8h)	[Un]	1,9	
Short time load (mechanical)	(N)	3750	
Altitude	(m)	According to the customer requirements.	
Standard		According to the customer requirements.	
Weight (approx.)	(kg)	50	65

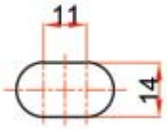
OUTDOOR DRY TYPE SINGLE PHASE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

(Um=3,6kV ..... 36kV)

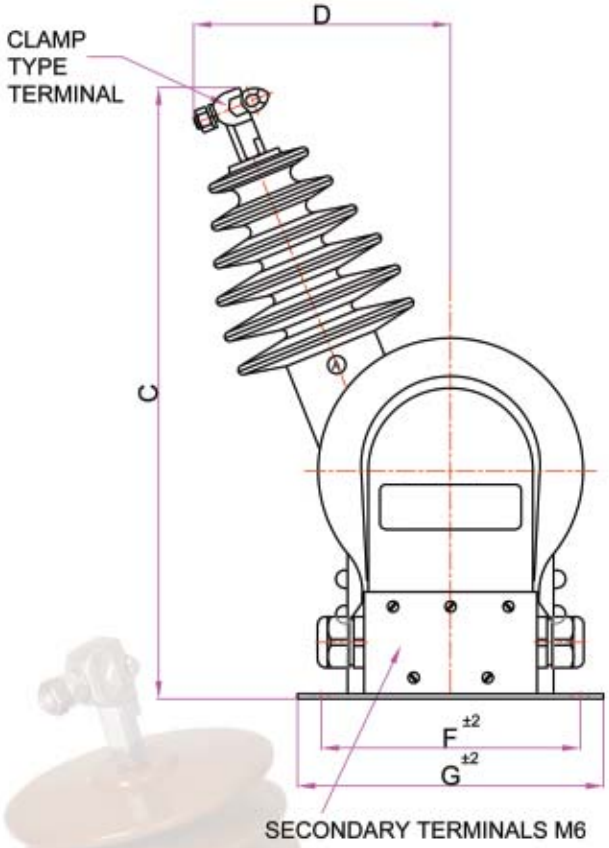


B-DETAIL CLAMP TYPE TERMINAL





A-DETAIL



TYPES	A	B	C	D	E	F	G	H
VTH 20	440	195	max 535	max 235	270	220	260	60
VTH 30	450	200	max 625	max 295	270	190	220	70

TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	5
M12 (Primary and Ground Terminal)	60	70

*** All dimensions are in mm.*

*** Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*

*** Customer designed products are also available.*

OUTDOOR DRY TYPE PHASE TO PHASE CAST RESIN INSULATED VOLTAGE TRANSFORMERS

(Um=3,6kV ..... 36kV)

Types : 2VTH 20
2VTH 30

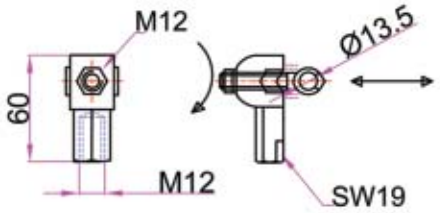
Clamp type terminal
for high voltage connection

Technical Data

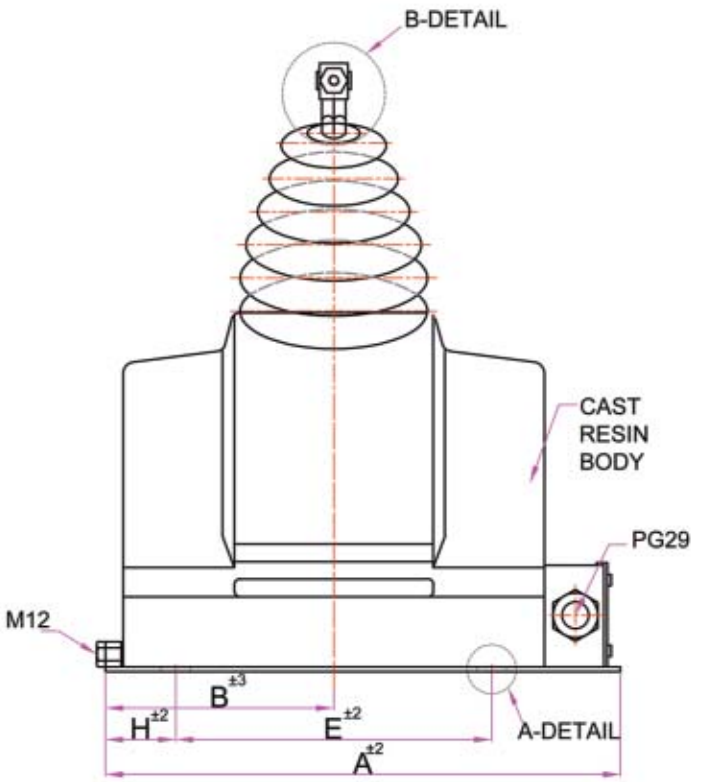
TYPES		2VTH 20	2VTH 30
Operating voltage, Um	(kV)	3,6 7,2 12 17,5 24	36
Rated power-frequency withstand voltage (1 minute)	(kV)	10 20 28 38 50	70
Rated impulse test voltage (1,2 / 50 µs) full wave	(kV)	40 60 75 95 125	170
Rated frequency	(Hz)	50 - 60	
Rated primary voltage (max.)	(kV)	24	36
Secondary voltage	(V)	100, 110, 120 & suitable for 220V winding.	
Rated burden (max.) in class 0,2	[VA]	30	40
Rated burden (max.) in class 0,5	[VA]	100	120
Rated burden (max.) in class 1	[VA]	200	200
Rated burden for 220V winding	[VA]	800	
Rated voltage factor (Cont.)	[Un]	1,2	
Short time load (mechanical)	(N)	3750	
Altitude	(m)	According to the customer requirements.	
Standard		According to the customer requirements.	
Weight (approx.)	(kg)	60	70

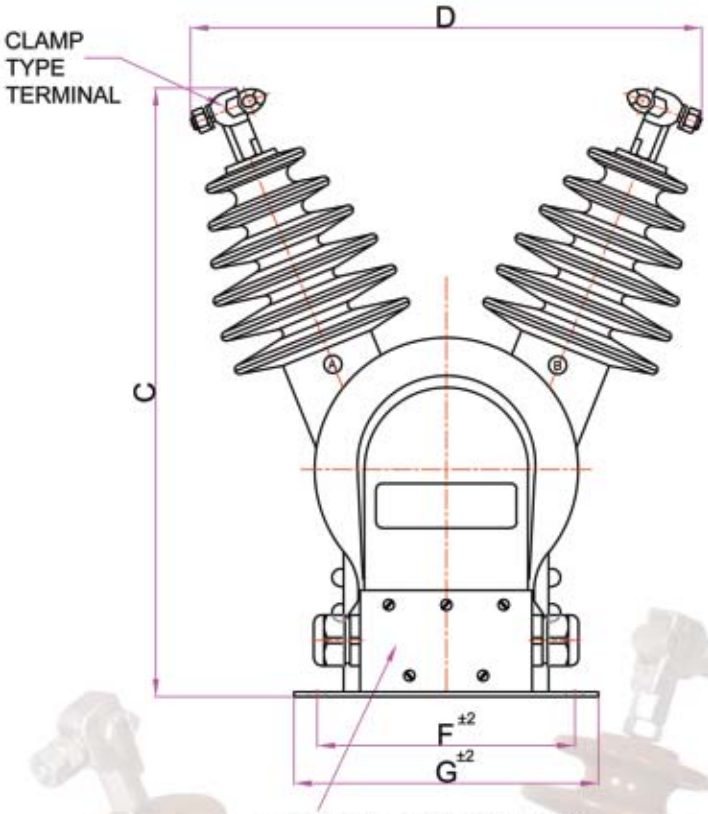
OUTDOOR DRY TYPE PHASE TO PHASE CAST RESIN INSULATED V.T.'S TECHNICAL DRAWING

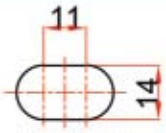
(Um=3,6kV ..... 36kV)



B-DETAIL CLAMP TYPE TERMINAL







A-DETAIL

TYPES	A	B	C	D	E	F	G	H
2VTH 20	440	195	max 535	max 460	270	220	260	60
2VTH 30	450	200	max 625	max 580	270	190	220	70

TIGHTENING TORQUE (Nm)	min	max
M6 (Secondary Terminal)	3	5
M12 (Primary and Ground Terminal)	60	70

** *All dimensions are in mm.*
** *Esitaş reserves the right to change the specifications and the dimensions of the goods. Please ask for updated information.*
** *Customer designed products are also available.*

Screwable Bushing

M.V. Indoor-Indoor and Outdoor-Indoor
Bushing Insulators up to 1250 A

NOTE: Please contact with ESİTAŞ for more information

Outdoor Post Busbar Type
Current Transformer up to 52 kV

Outdoor Oil-Immersed Type
Current and Voltage Transformers
up to 36 kV

NOTE: Please contact with ESİTAŞ for more information

ESİTAŞ Elektrik San. ve Tic. A.Ş.

Hilal Mah. Paşaköy Cd. No: 31
34791 - SANCAKTEPE - ISTANBUL / TURKEY
Tel: +90 216 304 32 70 (Pbx)
Faks: +90 216 304 32 82
e-mail: info@esitas.com

PT. ESITAS PACIFIC

Kawasan Industri Jababeka Tahap 1
JL. JABABEKA IX A Blok P-2F
Cikarang - BEKASI 17530, INDONESIA
Tel: +62 21 893 61 75 (Pbx)
Fax: +62 21 893 61 79
e-mail: info@esitas.com

www.esitas.com