ESiTAS

Instrument Transformers

%100 Approved Quality

ESITAS GROUP

Esitas Brand has been in the transformer industry more than 30 years. Esitas Group Companies have been producing and serving the electrical products and contacting businesses with two factories specializing in their markets.

ESITAS ELEKTRIK is the parent company of the group located in Istanbul, Turkey produces and sells Low and Medium Voltage Instrument Transformers (both Current -Voltage and Indoor-Outdoor Types), Low and Medium Voltage Insulators and LPCT's.

ESITAS 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.

PT ESITAS PACIFIC is the Group's production plant located in Indonesia 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.

Mission

Create a quality and reliable manufacturer profile with respect to Instrument Transformer and Insulated Products in domestic and international markets. With Esitas brand, to ensure satisfaction, sincerity, trust and quality.

Vision:

Be an enterprise that is renewed constantly, moving, established the responsibility and pragmatism approach, has a team acting in the same goals with the company, aware of its responsibilites in relation with its stakeholders, benefit to the company and country economy.

M.V. CURRENT TRANSFORMERS

M.V. CURRENT TRANSFORMERS

ESITAS
Instrument Transformers

General Definitions

General definitions have been given according to International Standarts IEC 61869

Instrument Transformer

A transformer intended to supply measuring instruments meters, protection relays and other similiar 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 similiar 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 similiar devices.

Secondary Circuit

The externa! 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 (11 N/12N-i.e. 100/5A)

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:

$$\text{Current Error } D/o = \frac{Kn\ Is - Ip}{Ip} \times 100$$

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 measurements.

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.

Rated Burden

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

Rated Dutput

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 whitstand 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 [1th)

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.

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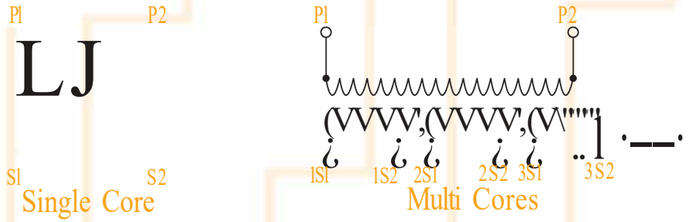
CONNECTION DIAGRAMS
Single Ratio Current Transformers

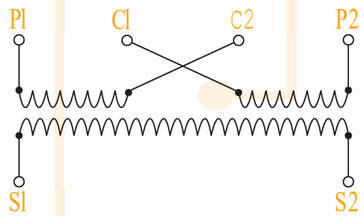


Reconnection of Current Transformer

In case of changeable ratios, it is possible to design the transfarmer with primary reconnection ar secondary tapping;

Primary Reconnection

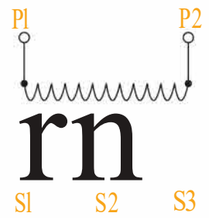
Changeover will be done at the primary side by using joint bars.
Can be used only far primary currents up to 2 x BODA



Cl -C2 short circuited: low rated current
Pl - Cl and P2 - C2 short circuited: high rated current

Secondary Tapping

Changeover will be done at the secondary side.

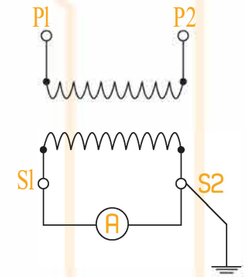


Sl -S2 low rated current
Sl - S3 high rated current

Safety Operation Conditions far Current Transformers

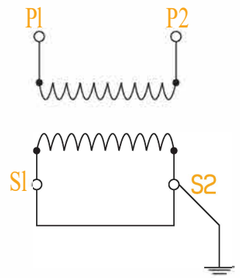
- When the secondary terminals are connected to the measuring ar protection devices, □ne of the terminals should be earthed far safety, as seen in Diagram-1 .

Diagram-1



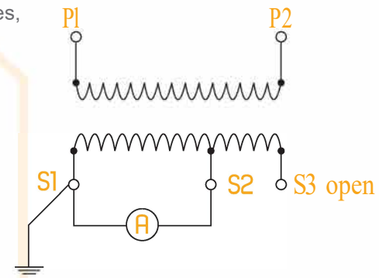
- The secondary circuit of a current transfarmer must not be operated with an open - circuit.
- The secondary winding of a current transfarmer which will not be used must be short - circuited and earthed as seen in Diagram-2

Diagram-2



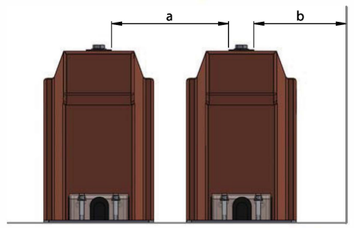
- Far the transfarmer with reconnectable and - ar tapped secondaries, unused terminals must be left open as seen in Diagram-3.

Diagram-3



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

M.V. CURRENT TRANSFORMERS CONNECTION CLEARENCES



INSULATION LEVEL	a minimum	b minimum
12kV	100mm	110mm
24kV	190mm	210mm
36kV	305mm	325mm

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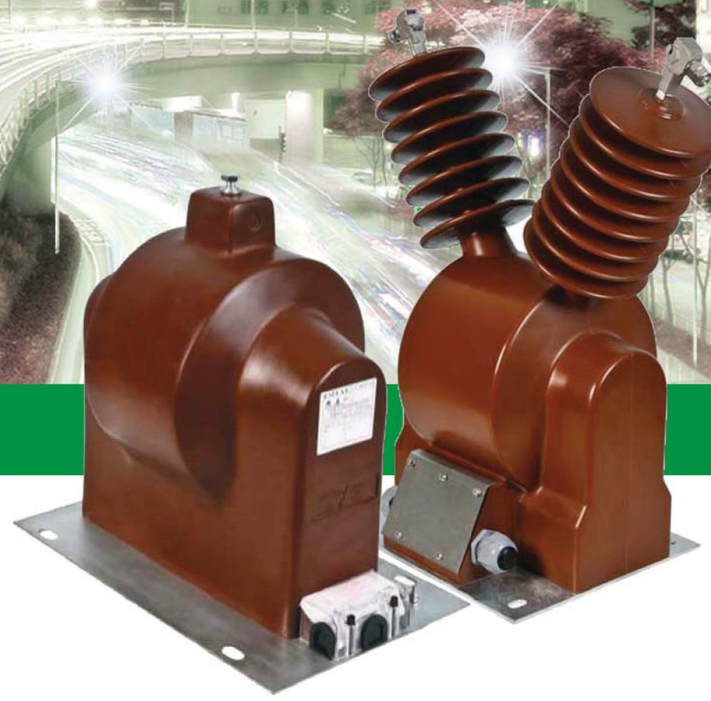
M.V. VOLTAGE TRANSFORMERS



ESITAŞ
Instrument Transformers

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;

Lis 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 leadingJ

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.

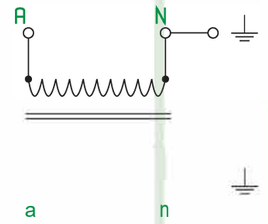
Rated Insulation Level

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

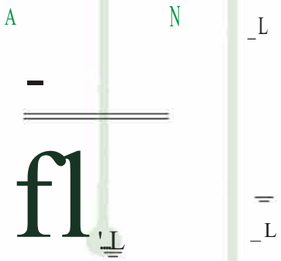
Rated Voltage Factor

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.

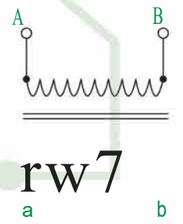
CONNECTION DIAGRAMS



Single Pole insulated voltage transformer (eg. II000Iv'3: I00/v'3U)



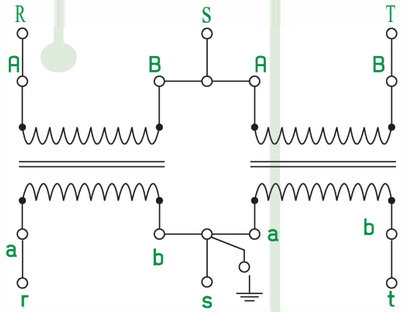
Single Pole insulated voltage transformer with an open delta winding (eg. 11000/../3: I00/../3IJ - I00/3IJ)



Double pole insulated voltage transformer (e.g. 11000: IO0IJ)

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

V-Connection of Two Double Pole Insulated Voltage Transformers



Safety Operation Conditions far Voltage Transformers

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

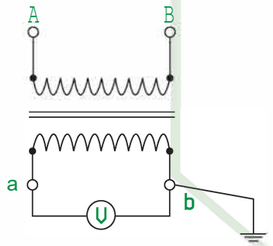


Diagram-1

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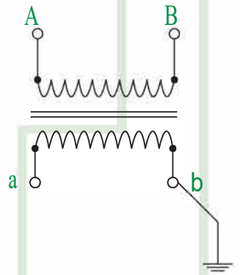
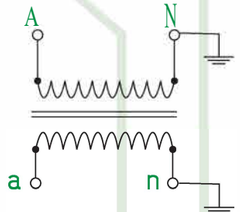
- The base plate must be earthed
- The secondary circuits must not be short-circuited during operation. Otherwise the voltage transfarmers will be thermally destroyed.
- If any of the secondary windings of a voltage transfarmer will not be used, then it must be left open with one of the terminals connected to the earth as seen in Oiagram-2.

Diagram-2



- Far the single phase transfarmers, the neutral terminal of the primary "N" must be earthed in the earthed (neutral) systems as seen in Diagram-3.

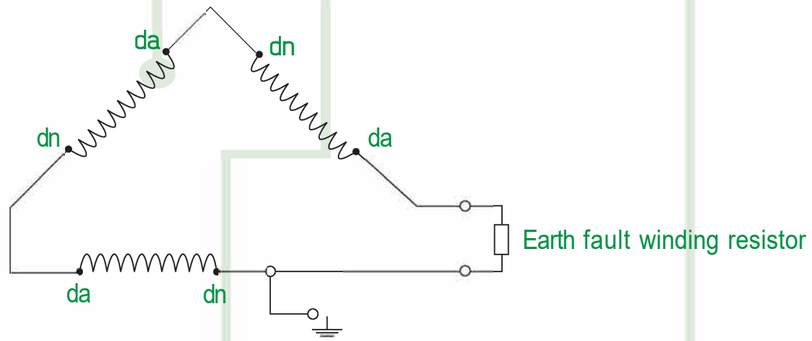
Diagram-3



Dther Important Points and Notes

When using single pole insulated inductive voltage transfarmers it is very important to understand that, when a circuit is being closed ar during the decaying period of an earth fault ferroresonance may occur. Ferroresonance can lead to the overheating and thermal destruction of the voltage transfarmer ar 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 farmed by three voltage transfarmers open-delta windings. The open-delta circuit must always be earthed only at □ne point as seen in Diagram-4. The open-delta connection can also be used far earth-fault monitoring with appropriate devices.

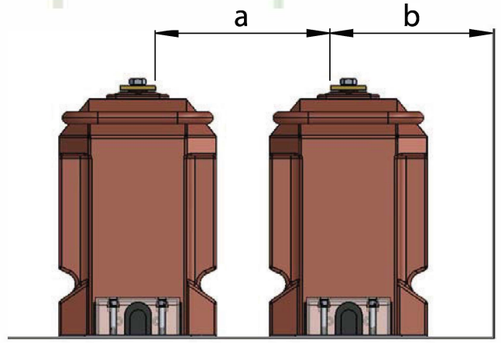
Diagram-ll



As the number of cable systems is increasing in the energy distribution systems, the protection of voltage transfarmers have become very important far the uninterrupted operation of the system without any failure and/or down time. Far that reason, ESITAS is always recommending the use of open-delta windings in single ohase inductive voltaqe transfarmers.

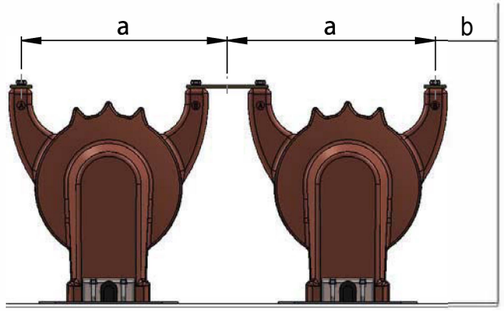
M.V. VOLTAGE TRANSFORMERS CONNECTION CLEARENCES

SINGLE PHASE VOLTAGE TRANSFORMERS



INSULATION LEVEL	a minimum	b minimum
12kV	100mm	110mm
24kV	190mm	210mm
36kV	305mm	325mm

PHASE TO PHASE VOLTAGE TRANSFORMERS



INSULATIDN LEVEL	a minimum	b minimum
12kV	185mm	120mm
24kV	240mm	220mm
36kV	340mm	325mm

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INSULATORS

ESITAS
Instrument Transformers

INSULATORS

Insulators are insulating and supporting components of the power transmission lines and busbars (distribution centers, switchgearsl where they are fixed.

Insulators are intended to be used far 2 reason:
-Separating conductors from the earth in regards to electricity
-Supporting the weight of conductors and additional loads

Esitas Insulators are epoxy cast resin insulated with interna! metal fittings.

The insulators are particularly suitable to be used as single support ar voltage control.

Esitas MV Insulators are designed far indoor-indoor and outdoor-indoor applications
(from 3,6kV to 36kVJ:

- Bushing Insulators
- Post Insulators
- Capacitive Insulators(voltage dividerl

Post insulators for indoor installation

General characteristics
Epoxy resin post insulators, far indoor application, with interna! metal fitting.
These insulators are particularly suitable to be used as single supports far conductors, far fuses and far other equipment (as switchgearsl.

Application
Far indoor installation with working condition at T° max. 85 °C.

Service voltage
Up to 36 kV (40,5 kV available on requestl

Routine Tests
Visual inspection
Testing of conductive connection of fixing inserts far post insulators
Dry power-frequency withstand voltage
Partial discharge extinction voltage test

Standards
IEC 60273 (CEI 36/121 - CENELEC HD 578 S1
IEC 60660

General characteristics
Epoxy resin post insulators with capacitive divider far the reading of the voltage.
Manufactured with interna! metal fitting, they can be equipped with couplings and low voltage light signal box.
These insulators are mainly suitable to be used as insulated supports of equipment, bus bar ar fuses.

Application
Max working temperature of 85 °C.

Routine Tests
Visual inspection
Testing of conductive connection of fixing inserts far post insulators
Dry power-frequency withstand voltage
Partial discharge extinction voltage test (connected to the voltage indicatorl

Service voltage
Up to 36 kV (40,5 available on requestl

Standards
IEC 60660

Bushing Insulators for indoor-indoor / outdoor-indoor

General characteristics
12 - 36 kV epoxy resin bushing insulators. The insulators can be fitted with copper bars designed from 250 up to 1250 A.
They are equipped with interna! metal fittings far installation on the relevant trame and with brass nuts and washers far fastening of phase connectors.

Application
Indoor/outdoor installation at max working temperature of 85 ºC.

Service voltage
Up to 36 kV.

Routine Tests
Visual inspection
Dry power-frequency withstand voltage
Measurement of partial discharge quantity

Standards
IEC 60137

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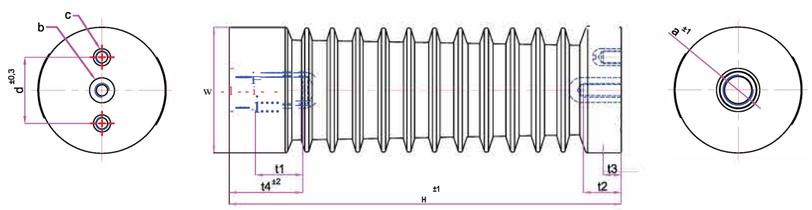
INDOOR POST INSULATORS UP TO 36kV



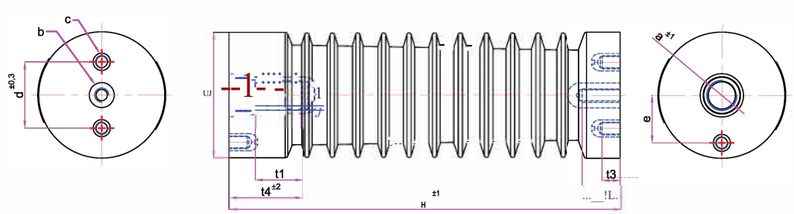
Material Type: Epoxy Resin

According to IEC 60273 C1990J, IEC 60660 (1999)

TYPES	Um [kVJ	Power-frequency withstand voltage, dry [kVJ	Falling load bending [NJ	Weight app. [kgl	Dimensions [mml a	b	e	d	E	H	t1	t2	t3	t4	Min. Creepage Distance [mml	Number of ribs
J04-75 [10N500J	12	38	4000	0,60	M16	M12	M6	36	061	130	25	18	10	37	170	5
J010-125 C20N1 0OOJ	12/24	38/50	10000	0,97	M20	M16	M10	46	086	210	27	24	12	42	210	8
J010–125 [20N1000 EGYJ	24	50	8000	1,80	M16	M10	M6	36	090	210	45	40	16	63	440	g
J010–75 (1 0N1 OOOJ	12	38	10000	0,85	M20	M16	M10	46	072	130	27	24	12	42	190	5
J010–75 (1ON1000 EGYJ	12	38	5000	0,75	M16	M10	M6	36	071	130	40	20	10	50	240	7
J04-95 C15N500J	17,5	50	4000	0,95	M16	M12	M6	36	070	175	25	18	10	40	250	6
J010–95C15N1 OOOJ	17,5	50	10000	1,7	M20	M16	M10	46	090	175	27	24	12	42	270	6
J04-125 C20N500J	24	50	4000	1,30	M16	M12	M6	36	075	210	25	18	10	40	320	8
J010–125 [B20N1 OOOJ	24	50	7500	1,6	M16	M12	-	-	085	225	40	32	-	60	425	13
J04-170 C30N500J	36	70	4000	1,9	M16	M12	M6	36	080	300	25	26	12	48	510	11
J010–170 [30N1000J	36	70	10000	3,00	M24	M16	M10	46	096	300	38	28	12	56	460	11
J010–170 [30N1000 ABBI	36	70	10000	3,9	M24	-	M12	32	096	390	38	-	18	56	550	11

Tolerance-+ CDimensions x 0,01 + 0,21 mm

INDOOR CAPACITIVE POST INSULATORS UP TO 36kV



TYPES	Um [kVJ	Power-frequency withstand voltage, dry [kVI	Falling load bending [NJ	Weight app. (kgl	Dimensions [mml a	b	e	d	e	E	H	t1	t2	t3	t4	Min. Creepage Distance [mml	Number of ribs
10N1000K	12	38	10000	0,95	M20	M16	M10	46	30	077	130	27	24	12	42	190	5
15N1000K	17,5	50	10000	1,70	M20	M16	M10	46	30	090	175	27	24	12	42	270	6
20N500K	24	50	4000	1,30	M16	M12	M6	36	30	075	210	25	18	10	40	320	8
20N1000K	24	50	10000	1,90	M20	M16	M10	46	30	095	210	27	24	12	42	330	8
30N500K	36	70	4000	2,00	M16	M12	M6	36	30	080	300	25	26	12	48	510	11
30N1000K	36	70	10000	3,10	M24	M16	M10	46	34	096	300	38	28	12	56	460	11
6 KN	12	38	6000	0,95	M16	M4	M8	36	20	075	154	30	5	12	42	255	7
4 KN	36	70	4000	2,50	M12	M10	M6	-	-	-	349	-	-	-	-	640	13

Tolerance + CDimensions x 0,01 + 0,21 mm

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ESITAS
Instrument Transformers

ESITAS TURKEY

Hilal Mahallesi Pa akoy Caddesi No: 28
34791 Sancaktepe - iSTANBUL- TURKEY
Phone : + 90 216 304 32 70 (PBX)
Fax : +902163043282
E-mail: info@esitas.com

PT ESITAS PACIFIC

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