



● GENERAL

Current Transformer (C.T.) is used to transform the high AC current to small easily manageable values. They're connected with the Panel Meter or Relay and they can help to measure the current or protect the equipments. Low voltage current transformers are manufactured as of two types for measuring CT and protection CT.

● MEASURING CT

Measuring current transformers are constructed to feed on other low voltage apparatus such as measuring instruments, relays, watt-hour meters (kW meter) and these type of current transformers are mainly used 0.5 and 1 class to transfer the current from highest rated current to rated secondary current.

● PROTECTION CT

Protection current transformers are constructed to feed the protection relay. These type of current transformers are mainly used 5P. (Customer supplied when required.)

● REFERENCE STANDARDS

IEC60044-1, VDE0414-44-1, DIN57414, BS3938, BS7626, EN60044-1, GB1208-2009

● SECURITY FACTOR

$FS < 5$

● MAXIMUM SYSTEM VOLTAGE

720V AC

● TEST VOLTAGE

3kV AC(1 min.)

● FREQUENCY

50/60Hz

● RATED SHORT-TIME THERMAL CURRENT

$I_{th} = 60 \times I_n$

I_{th} limited by cable sizes or primary bus-bar for other case

● RATED DYNAMIC CURRENT

$I_{dyn} = 2.5 \times I_{th}$

● CONTINUOUS OVERLOAD

$1.2 \times I_n$

● OPERATING TEMPERATURE

-25°C ~ +50°C

● ACCURACY

Measuring 0.5; 1.0; 3.0 (Special accuracy upon request)

Protection 5P; 10P

● BURDEN

Ranging from 1.5-30VA

● RATED SECONDARY CURRENT

x/5A (x/1A upon request)

● RATED PRIMARY CURRENT

Ranging up to 6000A

● INSULATION

Class B for Casing type CT

Class A for Taping type CT

● CASING

Non-flammable, polycarbonate self extinguishing ABS/PC

● TERMINAL MARKS

VO to UL94

Primary P1 & P2(K & L)

Secondary S1 & S2(K & L)

● SELECTION OF THE CURRENT TRANSFORMER

To select the Current Transformer correctly, the following points should be clarified:

- The application(for measuring or protection)
- The features of the working environment (indoor or outdoor, operating temperature, air humidity etc...)
- Operation voltage and frequency
- Range of the primary current (maximum and minimum of the current to be measured)
- Dimension of the cable or bus bar
- Data of the overload
- Short circuit current
- Specification of the measuring device associated with the Current Transformer (accuracy, rated current, consumption etc...)
- The diameter and length of the cable, the cable which is used to connect the Current Transformer and associated measuring device

● POWER LOSSES OF THE CT

In the practical application, the power generated by the primary current should be equal or bigger than the power requirement of the associated measuring device plus the consumption of the connecting line.

Losses in the line, PL:

This is the power lost, through heat, generated by current through the resistance RL in the cables, in the transformer's secondary circuit.

Factors to be taken into account:

Secondary current: $PL = RL \cdot I^2$

Cable diameter: RL is inversely proportional to the square of the diameter



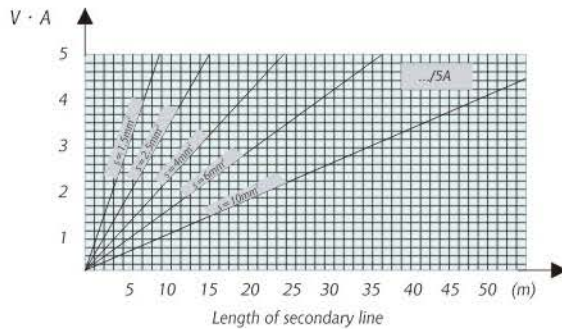
Cable length: RL is proportional to the length of cabling (there and back)

Power:

The nominal apparent power ($V \cdot A$) with a specified power factor, which was supplied by the Current Transformer, to the secondary current with

the assigned current when it is connected to its nominal load, $S_c(V \cdot A) = Z_c \cdot (I_n)^2$ According to Standards, for apparent power greater than or equal to 5 VA, the power factor is 0.8 inductive. For apparent power less than 5 VA the power factor is considered to be one (unity).

• TABLE OF LOSSES IN THE SECONDARY LINE



• ACCURACY OF A CURRENT TRANSFORMER

The percentage of error, produced in a transformer, is established by IEC60044-1. In measurement transformers: 25 % and 100 % of nominal power. In protection transformers: 100 % of nominal power.

Note: With.../1A transformers losses are reduced 25 times

• ERROR LIMITS. ACCURACY CLASSES OF MEASURING CT

Accuracy Classes	± % Error for % I_n				Phase Difference ± for % I_n							
	5	20	100	120	Minutes				Centiradians			
					5	20	100	120	5	20	100	120
0,1	0.40	0.20	0.10	0.10	15	8	5	5	0.45	0.24	0.15	0.15
0,2	0.75	0.35	0.20	0.20	30	15	10	10	0.9	0.45	0.30	0.30
0,5	1.50	0.75	0.50	0.50	90	45	30	30	2.7	1.35	0.90	0.90
1,0	3.00	1.50	1.00	1.00	180	90	60	60	5.4	2.70	1.80	1.80

Accuracy Classes	± % Error for % I_n					Phase Difference ± for % I_n									
	1	5	20	100	120	Minutes					Centiradians				
						1	5	20	100	120	1	5	20	100	120
0,25	0.75	0.35	0.20	0.20	0.20	30	15	10	10	10	0.90	0.45	0.30	0.30	0.30
0,55	1.50	0.75	0.50	0.50	0.50	90	45	30	30	30	2.70	1.35	0.90	0.90	0.90

Accuracy Classes	± % Error for % I_n	
% I_n	50	120
3	3	3
5	5	5

No. phase error

● **ERROR LIMITS. ACCURACY CLASSES OF PROTECTION CT**

Accuracy Classes	± % Error for % I _n	Phase Difference ± for % I _n		Composite Error
		Minutes	Centiradians	
5P	± 1	± 60	± 1.8	5
10P	± 3	--	--	10

● **SATURATED CONDITION OF CT**

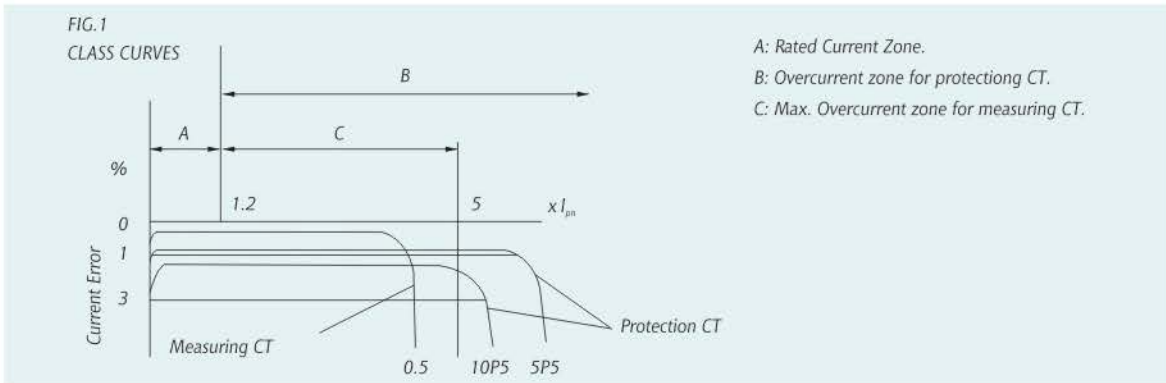
The current transformer is saturated if the primary current, passing through the CT, is greater than the nominal rating of the CT.

The linearity of CT, between the primary and secondary sides decreases, so error increases. The saturation of the CT is inversely proportional to the load (Fig. 1).

The difference between measuring and protection current transformers is their behavior when an overload occurs on the primary side. Measuring CT is saturated when there is a primary current overload. In order to protect the equipment,

on the secondary side, protection CT will not saturate until there is a very high current on the primary side. A Class 5P15 protection transformer indicates that it has an accuracy rating of ± 1% that it does not become saturated until the primary current reaches 15 times the nominal current rating of the CT.

In measuring transformers, the SAFETY FACTOR "FS" parameter indicates the excessive amperage on the primary side current in relation to the current sent to the measuring device on the secondary side.

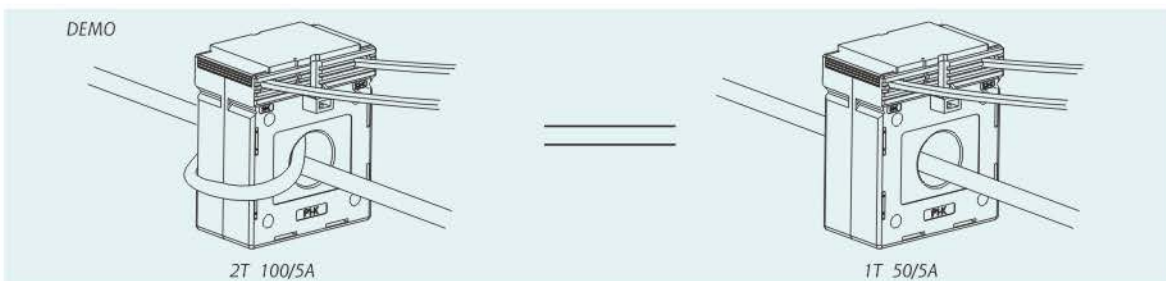


Instrument	Burden Consumed
Moving iron instruments	0.3-15VA
Moving coil instruments	0.5VA
Analogue power meter	0.2-2.5VA
Maximum Demand Ammeter	2.5-5.0VA
Digital Meter	0.5-1.0VA
Energy Meter	1.0-1.5VA
Recording Instruments	2.0-5.0VA

● **APPLICATION NOTE**

If the primary current is too small, to keep the same accuracy and output, we can add primary winding, but the rated turns ratio should be the same. For example, if the primary current is 50A, we can use 100/5A Current

Transformer with the primary current be turned twice which help to keep the same rated turns ratio (1:50 = 2:100).





MSQ Series Current Transformer

Type	Ratio(A)	Burden(VA)	Turns through core	Dimension(mm)
	30/5	1.5	1	
	40/5	1.5	1	
	50/5	1.5	1	
	60/5	1.5	1	
	75/5	1.5	1	
	80/5	1.5	1	
	100/5	1.5	1	
	150/5	1.5	1	
	200/5	1.5	1	
	250/5	1.5	1	
	100/5	1.5	1	
	150/5	1.5	1	
	200/5	1.5	1	
	250/5	1.5	1	
	300/5	1.5	1	
	400/5	1.5	1	
	250/5	1.5	1	
	300/5	1.5	1	
	400/5	1.5	1	
	500/5	1.5	1	
	600/5	1.5	1	
	750/5	1.5	1	
	800/5	1.5	1	
	1000/5	1.5	1	
	1500/5	1.5	1	
	1600/5	1.5	1	
	2000/5	1.5	1	
	2250/5	1.5	1	
	2500/5	1.5	1	
3000/5	1.5	1		