

LOW VOLTAGE CURRENT TRANSFORMERS



L.V. Current Transformers



FAT - 30B



FAT - 30



FAT - 40



FAT - 40L



FAT - 60



FAT - 100



FAT - 100L



FAT - 130



FAT - 130L

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GENERAL and TECHNICAL INFORMATION ABOUT LOW VOLTAGE CURRENT TRANSFORMERS

General :

Current transformer is a very useful device because it converts high AC current to small easily manageable values. Current transformers consist of primary winding, secondary winding, magnetic core and insulated body. If current transformers have no bus bar, they are manufactured without primary winding. Instead of this, it is possible to constitute primary winding by passing conductor or busbar inside toroidal core of transformer.

Federal current transformers are produced according to IEC 185 and IEC 60044-1 standards and CE certificate. Furthermore, the secondary terminals are under a transparent sealable cover. Low voltage current transformers are manufactured as of two types for measuring and protection.

Measuring current transformers :

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 current transformers :

Protection current transformers are constructed to feed the protection relay. These type of current transformers are mainly used class 3. (Customer supplied when required.)

Current errors and phase shift in measuring current transformers

Accuracy class	permissible ratio error \pm at various percentage of rated secondary current				\pm phase shift in various percentages of rated secondary current							
					Minute				Centiradian			
	% 5	% 20	% 100	% 120	% 5	% 20	% 100	% 120	% 5	% 20	% 100	% 120
0,1	0,4	0,2	0,1	0,1	15	8	5	5	0,45	0,24	0,15	0,15
0,2	0,75	0,35	0,2	0,2	30	15	10	10	0,9	0,45	0,3	0,3
0,5	1,5	0,75	0,5	0,5	90	45	30	30	2,7	1,35	0,9	0,9
1,0	3,0	1,5	1,0	1,0	180	90	60	60	5,4	2,7	1,8	1,8

Current errors and phase shift in protection current transformers: (Fault conditions)

Accuracy class	permissible ratio error \pm at various percentage of rated secondary current	\pm phase shift in various percentages of rated secondary current		Compound error for rated current %
		Minute	Centiradian	
5P	± 1	± 60	± 18	5
10P	± 3	—	—	10

Current errors and phase shift in measuring current transformers :

Accuracy class	\pm percentage ratio of current error for rated current percentage	
	%50	%120
3	3	3
5	5	5

Technical characteristics :

- Maximum rated voltage : 720 V
- Typical application : Indoor
- Continuous operating current : 1,2xIn
- Test voltage per minute : 3 kV
- Security coefficient : <5
- Rated primary current (In) : 30A....3000A
- Rated secondary current : 5 A
- Operating frequency : 50-60 Hz
- Operating temperature : -5/+45°C
- Thermal rated current : lth= 100xIn
(for FAT-30B type lth=60xIn)
- Dynamic rated current : Idyn= 2,5xIth

Ratio error of current transformers can be guaranteed between 100% and 120% of rated current.
 Error class can be 2-3 folding, especially the value of the under half rated current at the application, load current can be taken into consideration between In-1,2In.

The matters which should be taken into consideration during the mounting of current transformer :

- Do not open the secondary circuit, when a current is available in primary.
- Current transformers are produced as singlephase
- Resistance of current transformer is very low, so that secondary winding of current transformer can be operated as a short-circuit, when required in test operation. Otherwise, this condition causes high voltage and can be dangerous during usage.

Device power which are connected to current transformers :

Devices	Power (VA)
Ammeter	0,7 ... 1,5
Wattmeter	0,2 ... 5,0
Cosφ meter	2,0 ... 6,0
kWh-meter (active and reactive)	0,4 ... 1,0
Reactive power control units	0,5 ... 1,0
Overload relays	0,2 ... 6,0
Inverse current relays	2,0
Secondary thermal relays	7,2 ... 9,0

Additional load due to copper cables:

Power losses (VA) at secondary current 5A.

Cable (Cu)	2,5 mm ²	4,0 mm ²	6,0 mm ²	10,0 mm ²
1 m.	0,36	0,22	0,15	0,09
2 m.	0,71	0,45	0,30	0,18
3 m.	1,07	0,67	0,45	0,27
4 m.	1,43	0,89	0,60	0,36
5 m.	1,78	1,12	0,74	0,44
6 m.	2,14	1,34	0,89	0,54
7 m.	2,50	1,56	1,04	0,63
8 m.	2,86	1,79	1,19	0,71
9 m.	3,21	2,01	1,34	0,80
10 m.	3,57	2,24	1,49	0,89

Power losses calculation of cable:

$$P = \frac{I_{sn}^2 \times 2\ell}{S \times 56} \text{ (VA)}$$

ℓ = cable length of secondary side (m)

I_{sn} = seconder rated current (A)

S = cross section of copper cable (mm²)

P = power losses (VA)

Example: Load connected to current transformer is one active and reactive kWh-meter with 4 m and 2,5 mm² cable is 1+1,43 = 3,43 VA. So it is necessary to use 5 VA current transformer.

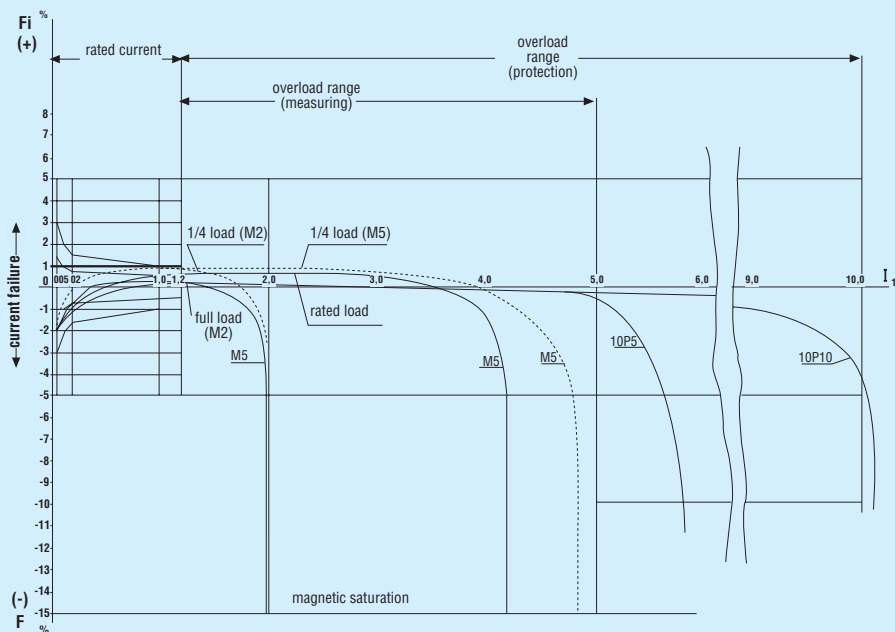


Fig-1 Showing ratio error for measuring and protection current transformer at multiples rated current

TECHNICAL CHARACTERISTICS of LOW VOLTAGE CURRENT TRANSFORMERS

FAT - 30B



WITH BUSBAR

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1		
FAT-30B 30/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0030
FAT-30B 40/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0040
FAT-30B 50/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0050
FAT-30B 60/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0060
FAT-30B 75/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0075
FAT-30B 80/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0080
FAT-30B 100/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0100
FAT-30B 125/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0125
FAT-30B 150/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0150
FAT-30B 200/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0200
FAT-30B 250/5	5, 10	5, 10	5, 10	0,60	9GA-□00Δ5-0250

FAT - 30



WINDOWS TYPE

Busbar Dimensions: 30 x 10 mm.

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Cable (max) mm.	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1			
FAT-30 100/5	-	5	0,60	Ø23	9GB-□00Δ5-0100	
FAT-30 150/5	-	5, 10	0,60	Ø23	9GB-□00Δ5-0150	
FAT-30 200/5	5, 10	5, 10	0,60	Ø23	9GB-□00Δ5-0200	
FAT-30 250/5	5, 10	5, 10	0,60	Ø23	9GB-□00Δ5-0250	

FAT - 40



FAT - 40L



WINDOWS TYPE

Busbar Dimensions: 40 x 10 mm.

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Cable (max) mm.	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1			
FAT-40 300/5	5, 10	5, 10	0,38	Ø30	9GC-□00Δ5-0300	
FAT-40 400/5	5, 10	5, 10	0,38	Ø30	9GC-□00Δ5-0400	
FAT-40 500/5	5, 10	5, 10	0,38	Ø30	9GC-□00Δ5-0500	
FAT-40L 200/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0200	
FAT-40L 250/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0250	
FAT-40L 300/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0300	
FAT-40L 400/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0400	
FAT-40L 500/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0500	
FAT-40L 600/5	5, 10	5, 10	0,60	Ø35	9GK-□00Δ5-0600	

FAT - 60



WINDOWS TYPE

Busbar Dimensions: 60 x 20 mm.

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Cable (max) mm.	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1			
FAT-60 600/5	10, 15	10, 15	0,60	Ø40	9GD-□00Δ5-0600	
FAT-60 750/5	10, 15	10, 15	0,60	Ø40	9GD-□00Δ5-0750	
FAT-60 800/5	10, 15	10, 15	0,60	Ø40	9GD-□00Δ5-0800	
FAT-60 1000/5	15	15	0,60	Ø40	9GD-□00Δ5-1000	

FAT - 100



FAT - 100L



WINDOWS TYPE

Busbar Dimensions: 80 x 30, 100 x 10 mm. for FAT100
80 x 30, 100 x 20 mm. for FAT 100L

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Cable (max) mm.	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1			
FAT-100 1200/5	15	15	0,70	Ø60	9GE-□00Δ5-1200	
FAT-100 1250/5	15	15	0,72	Ø60	9GE-□00Δ5-1250	
FAT-100 1500/5	15	15	0,80	Ø60	9GE-□00Δ5-1500	
FAT-100 1600/5	15	15	0,83	Ø60	9GE-□00Δ5-1600	
FAT-100 2000/5	15	15	0,94	Ø60	9GE-□00Δ5-2000	
FAT-100 2500/5	15	15	1,10	Ø60	9GE-□00Δ5-2500	
FAT-100 3000/5	15	15	1,16	Ø60	9GE-□00Δ5-3000	
FAT-100L 500/5	10	10	0,90	Ø80	9GL-□00Δ5-0500	
FAT-100L 600/5	10	10	0,90	Ø80	9GL-□00Δ5-0600	
FAT-100L 750/5	10	10	0,90	Ø80	9GL-□00Δ5-0750	
FAT-100L 800/5	10	10	0,90	Ø80	9GL-□00Δ5-0800	
FAT-100L 1000/5	10	10	1,00	Ø80	9GL-□00Δ5-1000	
FAT-100L 1500/5	10	10	1,00	Ø80	9GL-□00Δ5-1500	

FAT - 130



FAT - 130L



WINDOWS TYPE

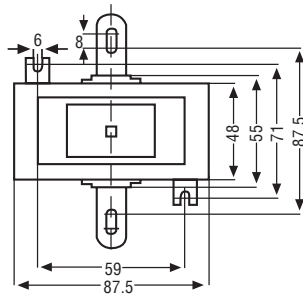
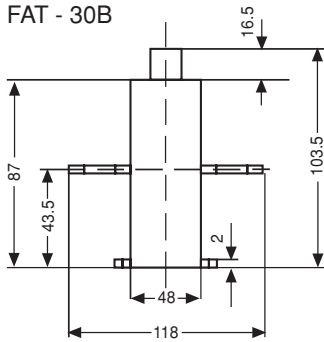
Busbar Dimensions: 110 x 60 ; 2(110 x 20) mm.
for FAT130 135 x 40 mm. for FAT 130L

Type	Rated current (A)	Rated power (VA)		Weight (kg)	Cable (max) mm.	Order codes □ For class 0.5: A For class 1 : B For 5VA : 2 For 10 VA : 4 For 15 VA : 5
		Class:0,5	Class:1			
FAT-130 1500/5	10	10	1,50	Ø105	9GN-□00Δ5-1500	
FAT-130 2000/5	10	10	1,50	Ø105	9GN-□00Δ5-2000	
FAT-130 2500/5	10	10	1,50	Ø105	9GN-□00Δ5-2500	
FAT-130 3000/5	10	10	1,50	Ø135	9GN-□00Δ5-3000	
FAT-130 4000/5	10	10	1,50	Ø135	9GN-□00Δ5-4000	
FAT-130L 1500/5	10	10	1,50	Ø135	9GM-□00Δ5-1500	
FAT-130L 2000/5	10	10	1,50	Ø135	9GM-□00Δ5-2000	
FAT-130L 2500/5	10	10	1,50	Ø135	9GM-□00Δ5-2500	
FAT-130L 3000/5	10	10	1,50	Ø135	9GM-□00Δ5-3000	
FAT-130L 4000/5	10	10	1,50	Ø135	9GM-□00Δ5-4000	

Note : Federal mark LV current transformers have a sealing feature.

DIMENSIONS of LOW VOLTAGE CURRENT TRANSFORMERS

FAT - 30B

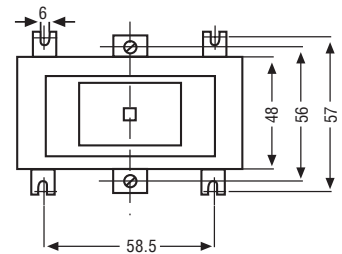
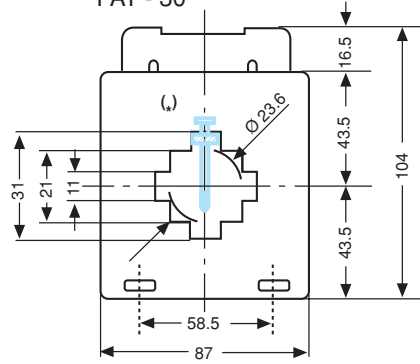


With bar:

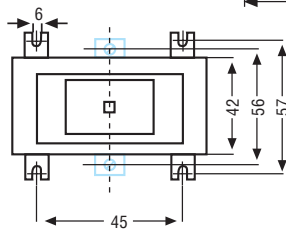
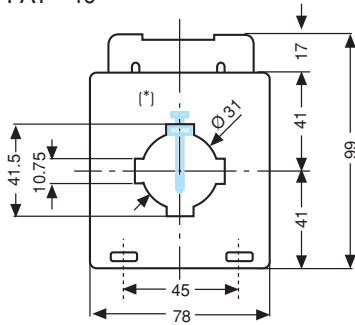
Installation screws (M8x20) which are used on the busbar are delivered with the current transformers.

(*) Busbar connection apparatus is delivered in the box.

FAT - 30

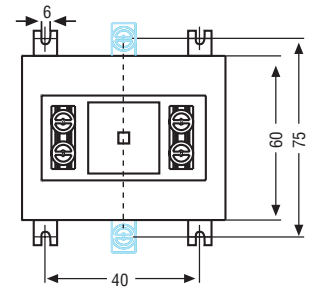
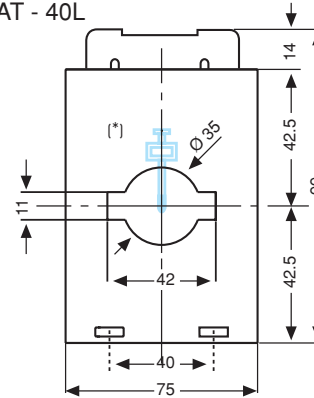


FAT - 40



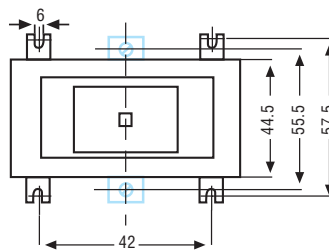
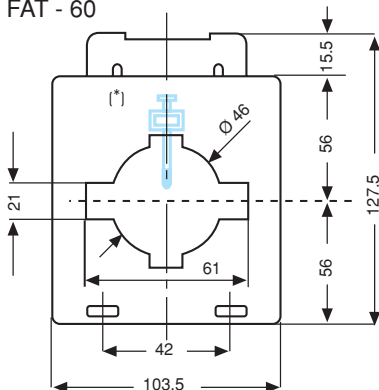
(*) Busbar connection apparatus is delivered in the box.

FAT - 40L



(*) Busbar connection apparatus is delivered in the box.

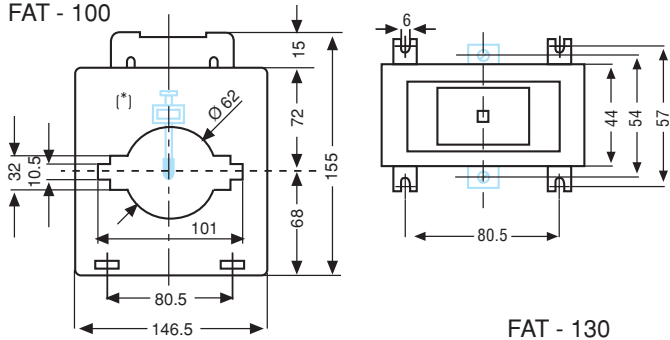
FAT - 60



(*) Busbar connection apparatus is delivered in the box.

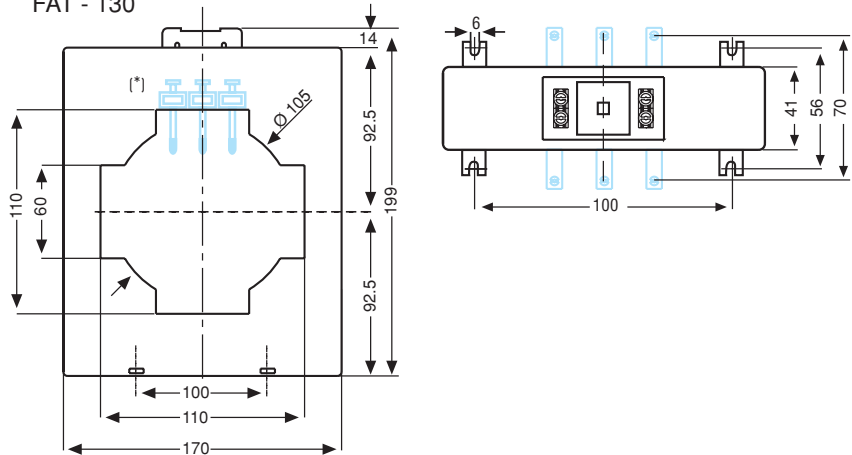
DIMENSIONS of LOW VOLTAGE CURRENT TRANSFORMERS

FAT - 100



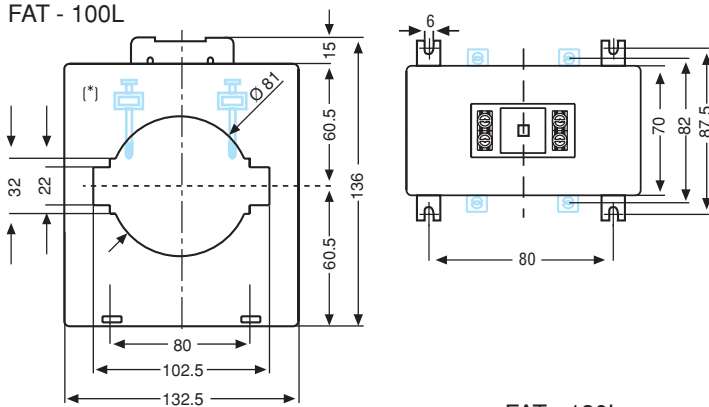
(*) Busbar connection apparatus is delivered in the box.

FAT - 130



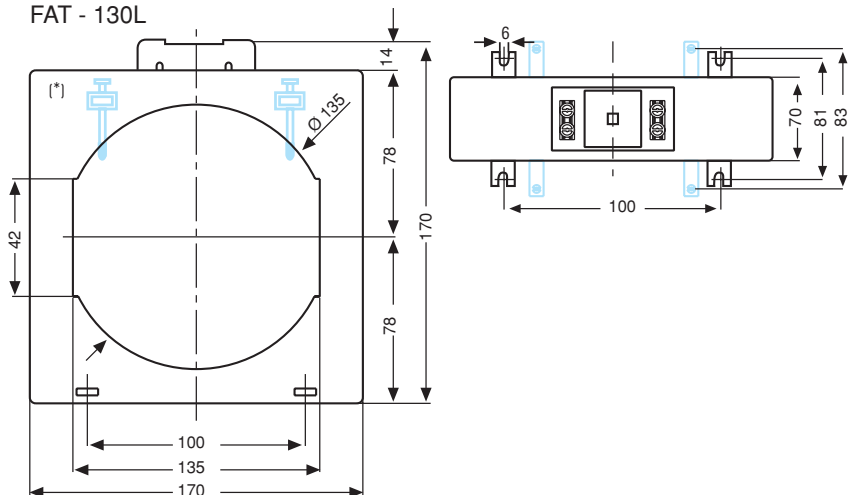
(*) Busbar connection apparatus is delivered in the box.

FAT - 100L



(*) Busbar connection apparatus is delivered in the box.

FAT - 130L



(*) Busbar connection apparatus is delivered in the box.