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INTRO TO TRANSFORMER RATED METERING



PREA

March 5, 2024

Rob Reese, TESCO



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SELF-CONTAINED VS. TRANSFORMER-RATED

1S 14S 39S 17S

3S 12S 2S 35S

76S 46S 10S 25S

45S 66S

5S 26S 11S 32S

15S 9S 6S 16S

24S 13S 56S



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SELF-CONTAINED VS. TRANSFORMER-RATED

SELF-CONTAINED			TRANSFORMER RATED		
1S	14S	12S	39S	36S	7S
2S			3S	29S	
	25S		76S		
			5S	35S	
	16S		4S	46S	
17S			8S	26S	
			11S		
			6S	66S	45S
15S	13S			9S	
		32S	10S		
			56S	24S	

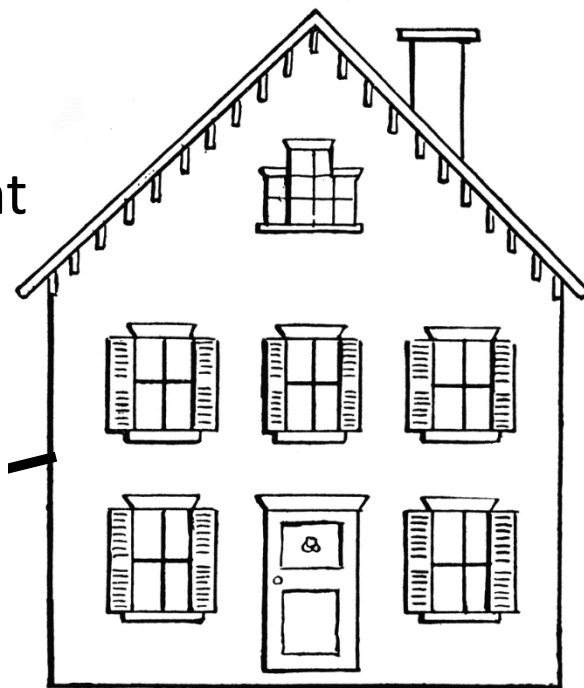
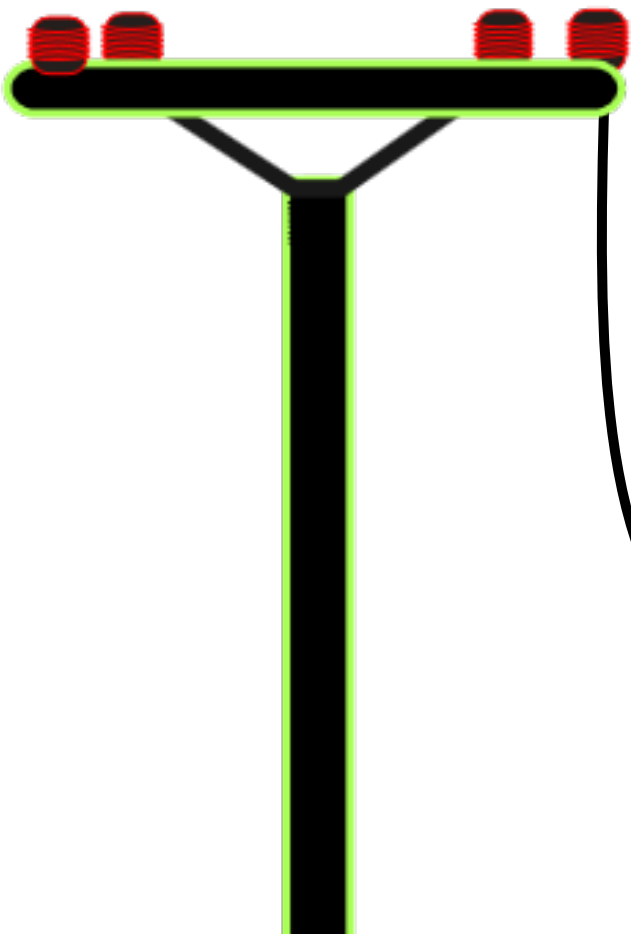


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SELF-CONTAINED METERING

Primarily Residential
(1S, 2S, 12S)

Relatively Low Current
Example: 100A

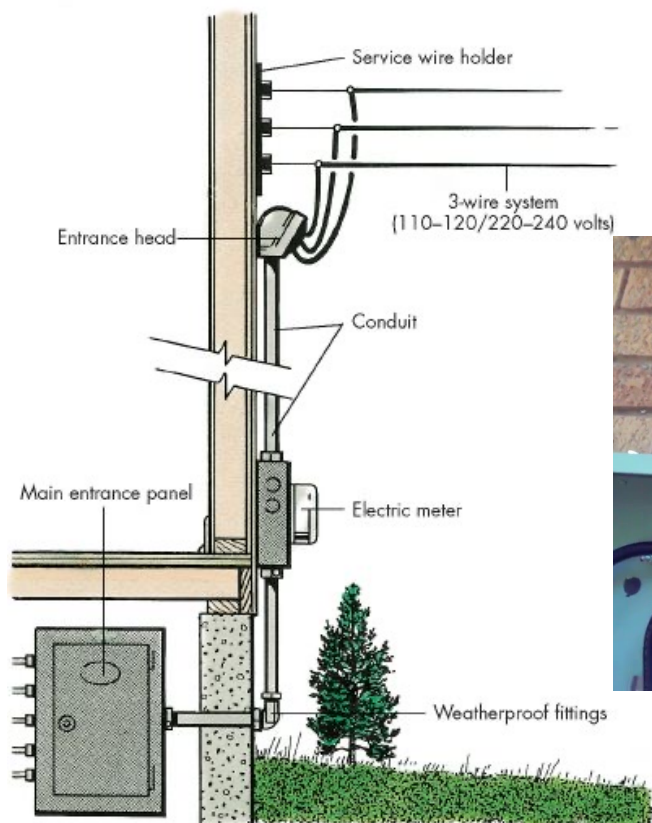




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SELF-CONTAINED METERING

Primarily Residential (1S, 2S, 12S)



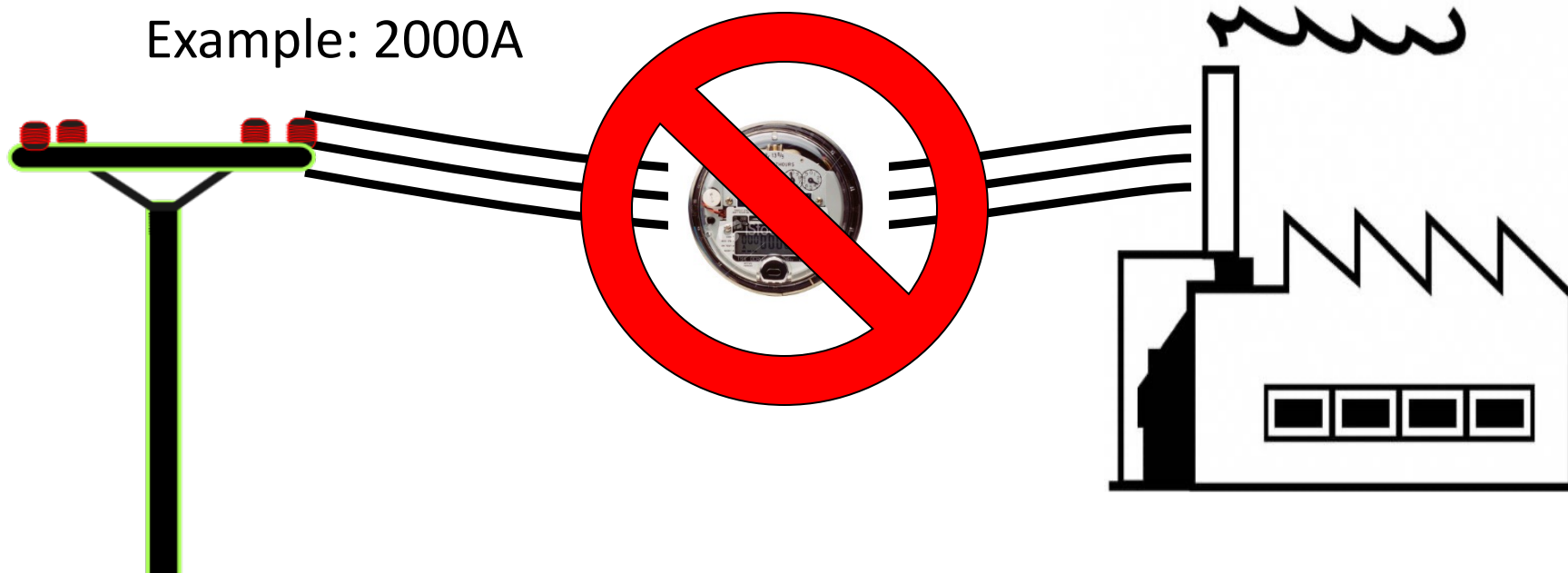


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TRANSFORMER-RATED METERING

Primarily Commercial/Industrial
(9S)

Relatively High Current
Example: 2000A

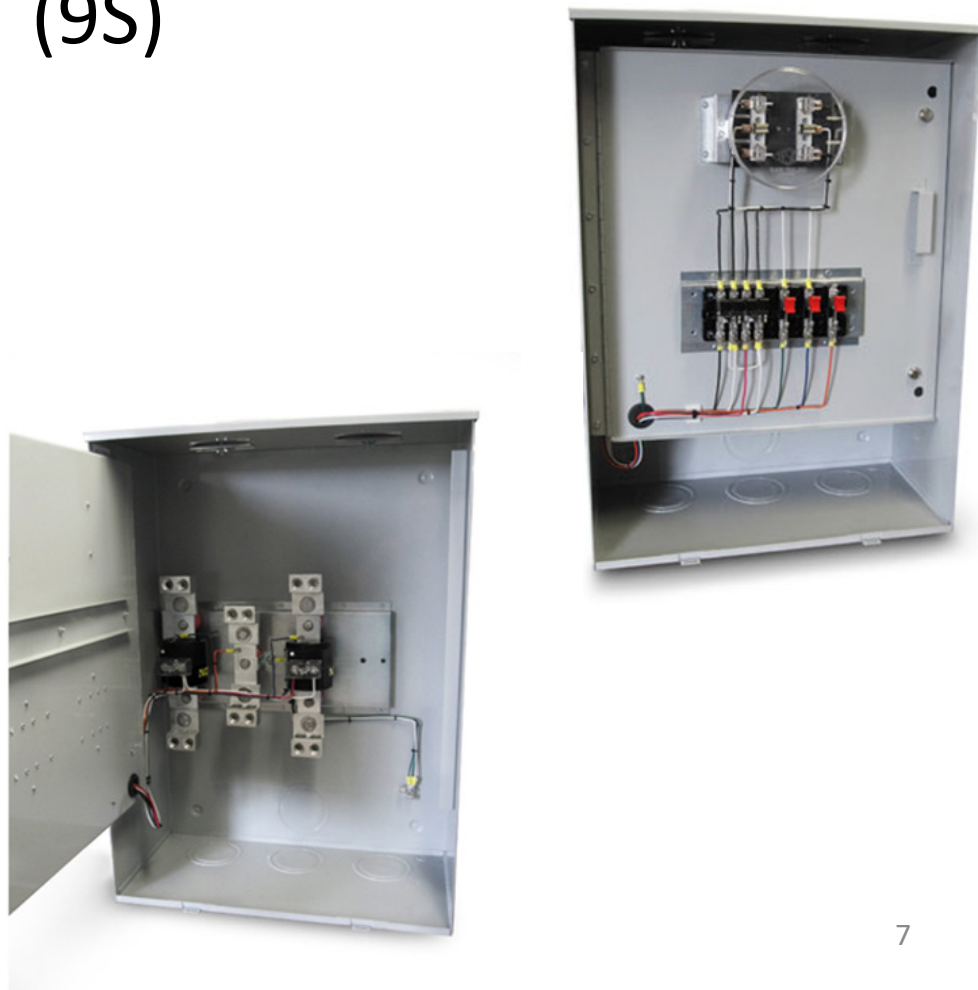
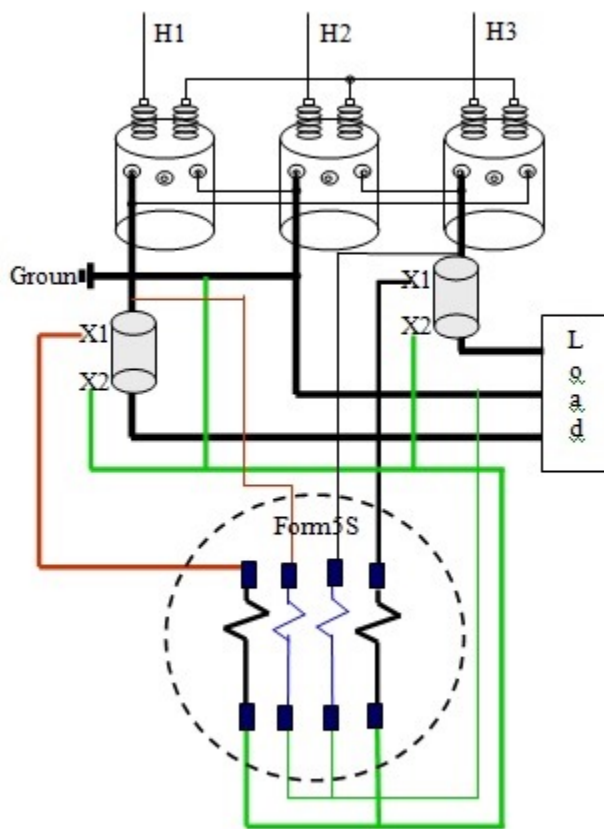




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TRANSFORMER-RATED METERING

Primarily Commercial/Industrial
(9S)

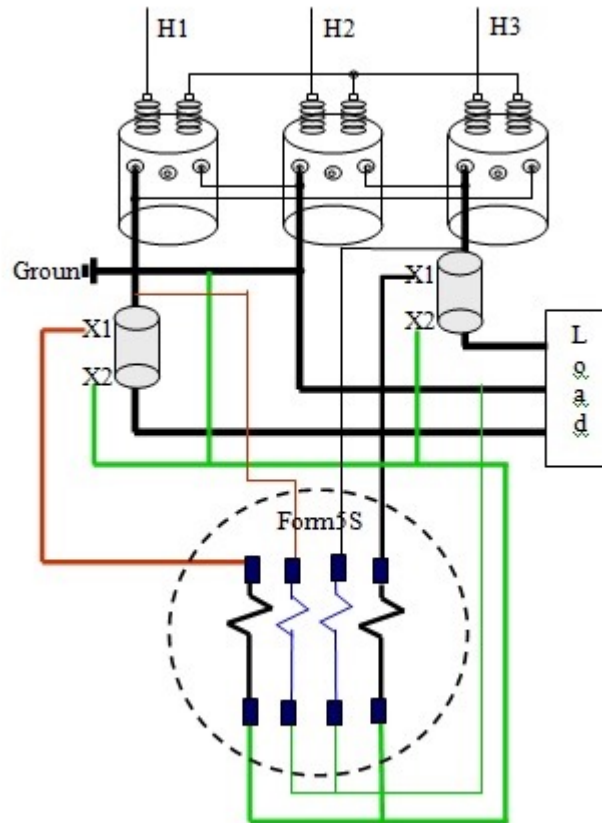




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TRANSFORMER-RATED METERING

Typical Components of an Installation

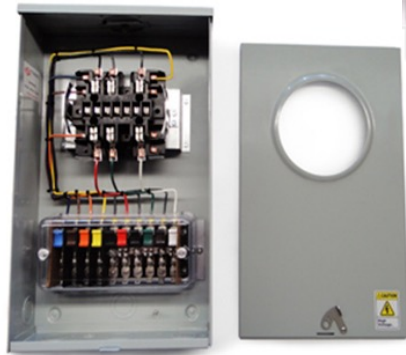
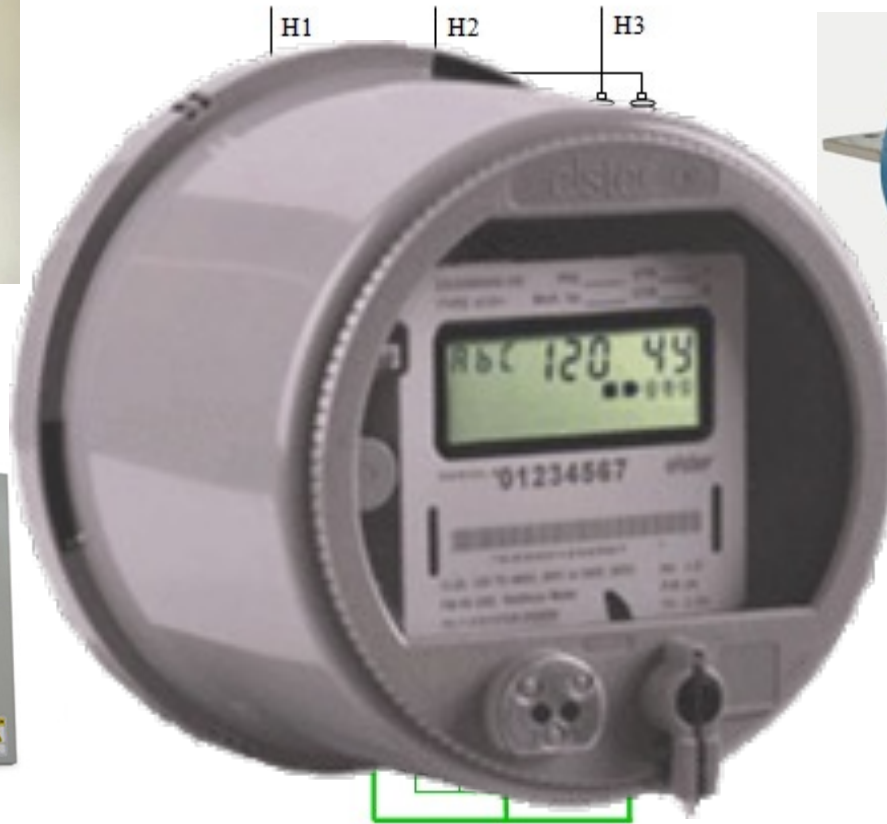




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TRANSFORMER-RATED METERING

Meter

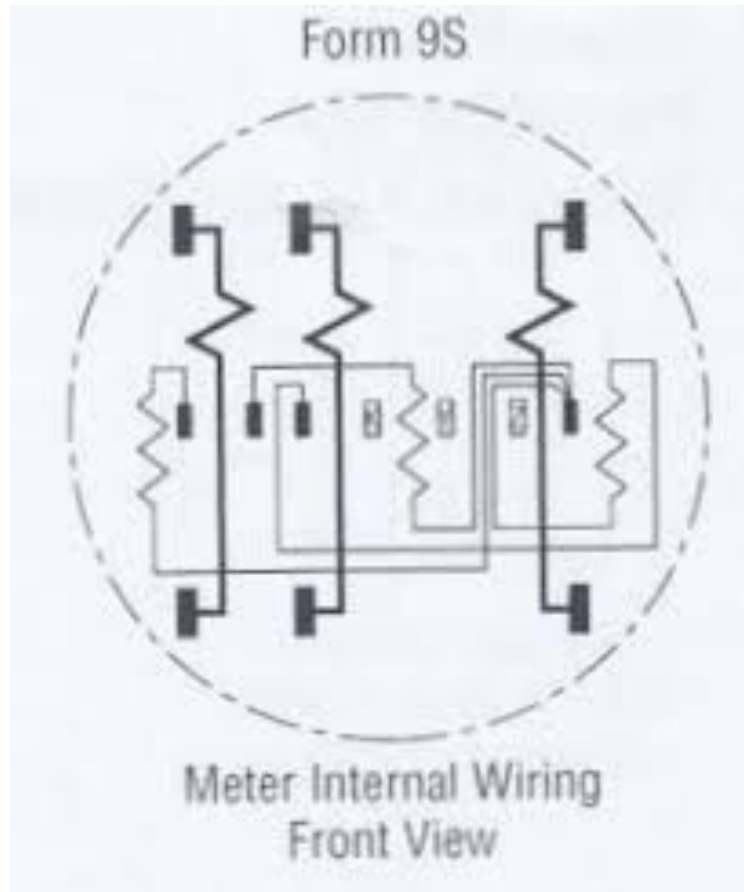




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TRANSFORMER-RATED METERING

Meter

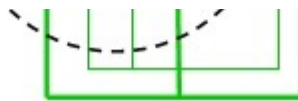




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TRANSFORMER-RATED METERING

Enclosure, Socket, Test Switch





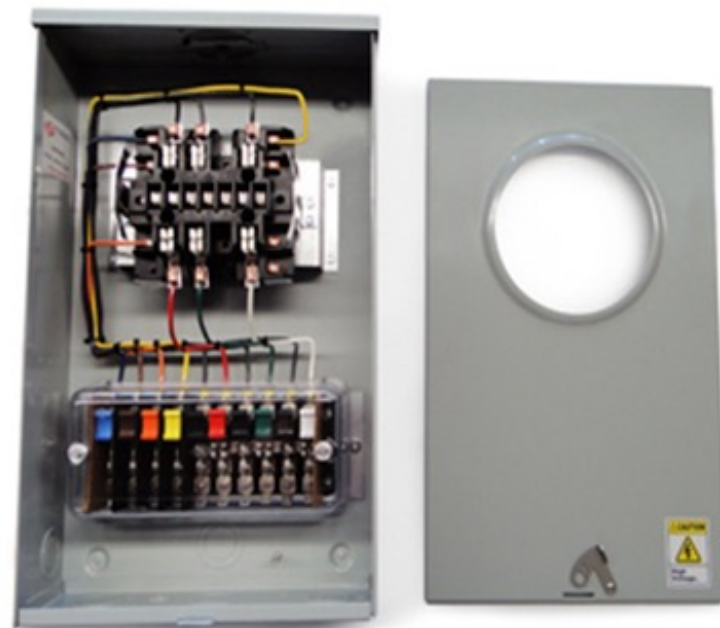
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TRANSFORMER-RATED METERING

Enclosure, Socket, Test Switch

Enclosure

- Painted Steel or Aluminum
 - One or Two Piece Lid
- Many, Many Configurations





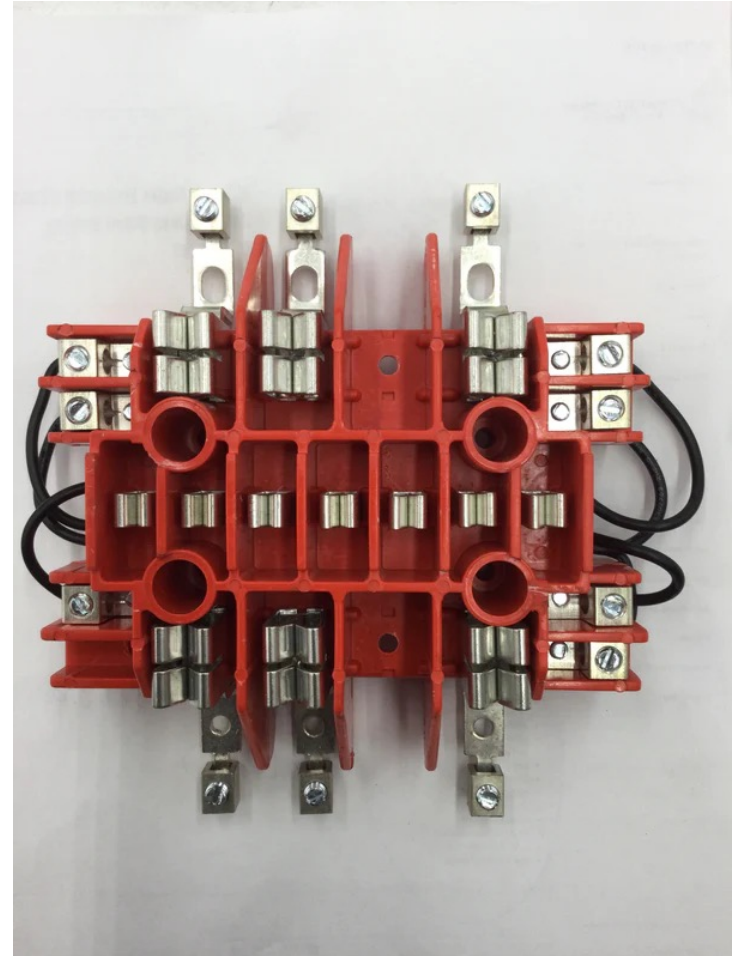
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TRANSFORMER-RATED METERING

Enclosure, Socket, Test Switch

Socket

- Configured for Specific Form



Enclosure, Socket, Test Switch

Test Switch

- Upmost Safety
 - Shuts the CT
- Isolates the Meter from the Service During Testing

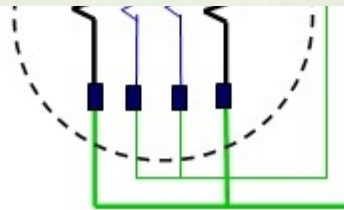
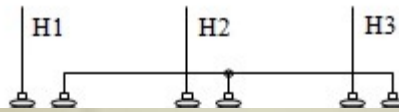




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TRANSFORMER-RATED METERING

PT/VT –Voltage Transformer





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TRANSFORMER-RATED METERING

PT/VT –Voltage Transformer

PT/VT

- Scales Down the Voltage
 - 4:1
 - 480V:120V

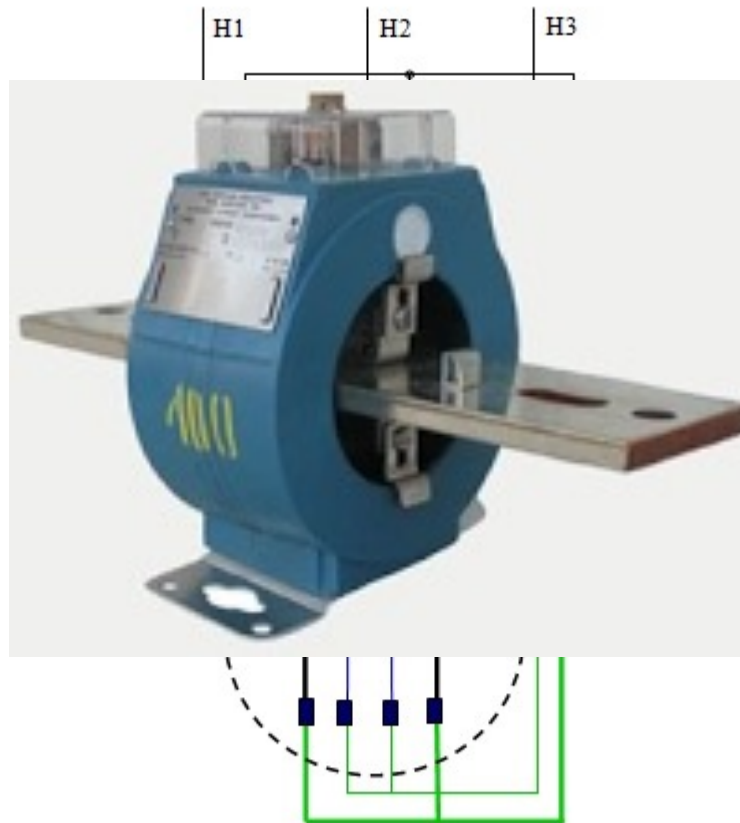
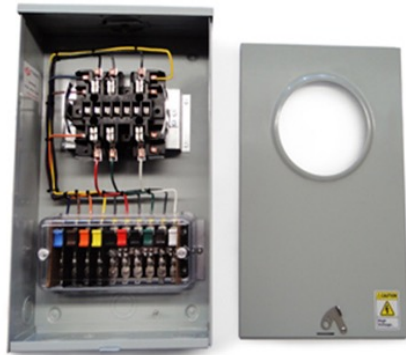




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TRANSFORMER-RATED METERING

CT – Current Transformer





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TRANSFORMER-RATED METERING

CT – Current Transformer

CT

- Scales Down the Current
 - 400:5
 - 800A:10A





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FACEPLATE SPECIFICATIONS

ALSTOM

OUTDOOR CURRENT TRANSFORMER **115** kV

TYPE: OIL FILLED	SECONDARY CONNECTION	RATIO
HZ = 60	X1 - X3	300 : 5A
BIL: 550 kV	X2 - X3	150 : 5A
PRIMARY: 150/300 AMPS		
SECONDARY: 5 AMPS		
RATIO: 30/60 :1		
RATING FACTOR: 1.5		
ACCURACY: 0.3% B0.1 TO B1.8		
SERIAL NO. 1FD-0256 MFG. DATE: 4/00		
CATALOG NO.: CTH3-115-0300		
CUSTOMER P.O. # P000579-00		F.O. # F3657

300 WEST ANTELOPE ROAD, MEDFORD OREGON 97503-1089 USA



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FACEPLATE SPECIFICATIONS

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HZ = 60
BIL: **550** kV
PRIMARY: **150/300** AMPS
SECONDARY: **5** AMPS
RATIO: **30/60** :1
RATING FACTOR: **1.5**
ACCURACY: **0.3% B0.1 TO B1.8**
SERIAL NO. **IFD-0256** MFG. DATE: **4/00**
CATALOG NO.: **CTH3-115-0300**
CUSTOMER P.O. # **P000579-00**
F.O. # **F3657**
300 WEST ANTELOPE ROAD, MEDFORD OREGON 97503-1089 USA

SECONDARY CONNECTION

	RATIO
X1 - X3	300 : 5A
X2 - X3	150 : 5A

Winding diagram showing H1, H2, X1, X2, and X3 terminals. The diagram illustrates a center-tapped secondary winding where X2 is the center tap.

Ratio



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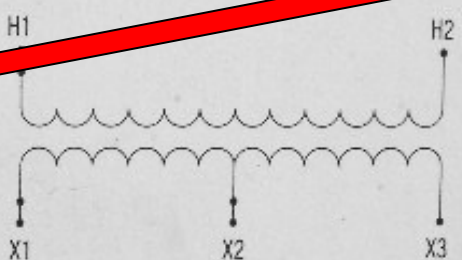
FACEPLATE SPECIFICATIONS

ALSTOM

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Thermal
factor

Thermal Rating factor

A value representing the amount by which the primary current can be increased without exceeding the allowable temperature rise.

For instance, a RF of 4.0 at 30° ambient on a 400:5 ratio CT would allow for a primary current up to 1600A.



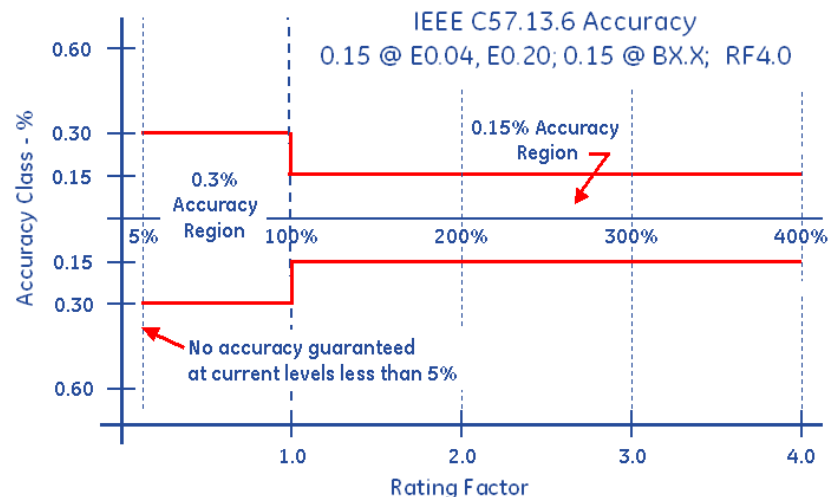
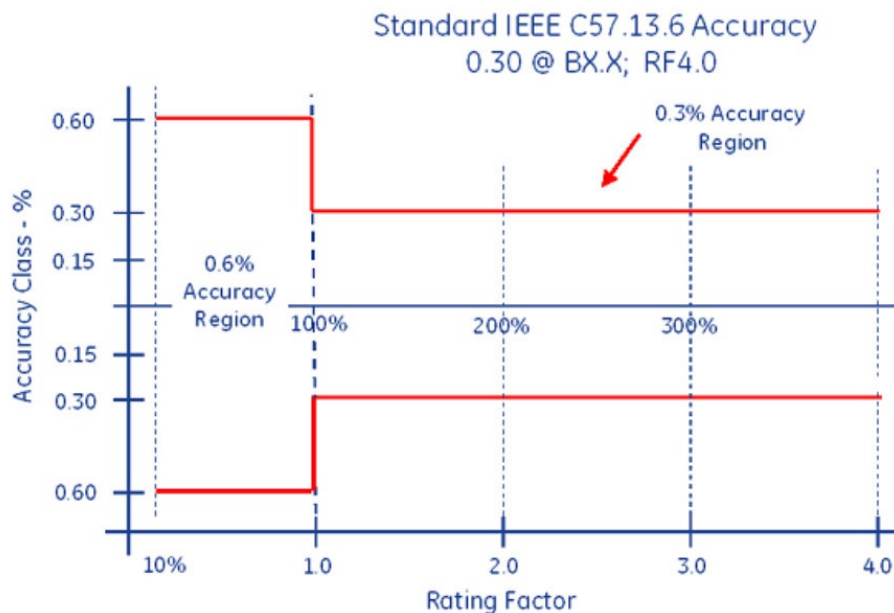
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FACEPLATE SPECIFICATIONS

Accuracy Classifications

All CT's fall within an accuracy class.

IEEE Standards have defined accuracy classes.





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FACEPLATE SPECIFICATIONS

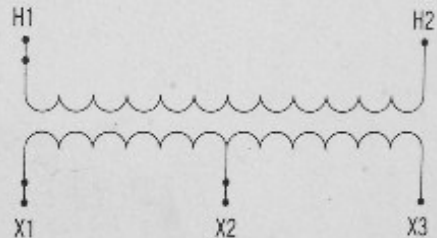
Burden
Rating

ALSTOM

OUTDOOR CURRENT TRANSFORMER **115** kV

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HZ = 60	X1 - X3	300 : 5A
BIL: 550 kV	X2 - X3	150 : 5A
PRIMARY: 150/300 AMPS		
SECONDARY: 5 AMPS		
RATIO: 30/60 :1		
RATING FACTOR: 1.0		
ACCURACY: 0.3% B0.1 TO B1.8		
SERIAL NO. IFD-0256 MFG. DATE: 4/00		
CATALOG NO.: CTH3-115-0300		
CUSTOMER P.O. # F000579-00		F.O. # F3657

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BURDEN RATING

.3@B0.1,B0.2

The burden range, present in the secondary circuit, that the manufacturer will guarantee their CT's will still accurately function, in regards to the ratio specification.



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