

# Instrument Transformers

## 600 V – Indoor Type

### Current and Voltage

Class 4210



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Merlin Gerin

Modicon

Square D

Telemecanique

Schneider Electric Brands

## Application and Features

### APPLICATION, FEATURES AND SELECTION CRITERIA

Square D 600 Volt rated current and voltage transformers are field-proven in well over a million installations where accuracy and longer, more dependable operation are essential.

In most cases, the information contained in this catalog should be sufficient for the proper selection of the instrument transformer best suited for your application. However, should you need additional assistance, please feel free to contact your nearest Square D Field Sales Office or contact our Nashville instrument transformers product marketing group.

#### Application

Instrument transformers are ideally suited in the following applications:

- Indoor
- Switchgear assemblies
- Motor controllers
- Over power transformer bushings
- Over circuit breaker bushings
- Metering
- Relaying
- Current sensing

*NOTE: Transformers listed in this catalog should not be applied to circuits having a phase-to-phase voltage greater than 600 volts, unless adequate additional insulation is applied between the primary and secondary windings. Square D assumes no responsibility for damage of equipment or personal injury caused by the transformers operated on circuits above their published ratings.*

#### Features

- High thermal ratings for short-time use.
- Most instrument transformers listed in this catalog are UL and CUL Recognized per Classification XODW2, File No. E100570.
- Manufactured according to rigid Square D quality control standards.
- Extremely wide range of ratios available.
- Wide range of window sizes from 1.13 in (28 mm) to 8.13 in (206 mm).
- Applicable standards are ANSI C57.13 and CSA C13.
- Models feature strong, molded thermo-plastic cases.
- Molded plastic core jacket ensures rugged core-to-winding insulation.
- Low energy loss, grain-oriented silicon steel annealed for optimum magnetic qualities.
- Most models feature permanent polarity marks molded into the case and large, easy to read ratios are clearly marked on the case.
- Rugged, corrosion-resistant mounting brackets are available as options.
- Most ratings are available from stock.

#### Selection Criteria

How to Select a Current Transformer

1. Determine that the *primary range* of the current transformer encompasses the application requirement. Lower or specialized ratios may be obtained by adding primary and secondary turns as shown on page 52.
2. Select the proper window size or slightly larger to fit your primary conductor. Refer to the table below.
3. Determine the usual application of current transformer that best suits the application for which it is intended. Refer to the table below. If the application requirements are not fully defined, refer to "Burden and Accuracy Information" on page 53.
4. After selecting a transformer, check its accuracy and burden capabilities by referring to the information page for that transformer.



## Selection Criteria and Selection Charts

### How to Select a Voltage Transformer

Square D offers three models of voltage transformers, each suited for a particular application. Model 450R is designed for applications requiring accurate voltage measurement within the 0.3% accuracy class. Model 450R is ideal for switchboard use with 1% instrumentation.

Model 460R is designed for voltage indication where accuracy is less critical or where burden requirements are low. Model 460R is ideally suited for use with transducers and panelboards, and other monitoring applications.

Model 470R is designed for extremely accurate voltage measurement where a very low burden is to be used. Examples of such applications include the input to PLC modules and other electronic devices with a high input impedance.

### Current Transformers Selection Chart

| Window Diameter |        | Usual Application |          |                              |                      | Primary Range in Amperes (5 A Secondary) | Multi Ratio (MR) | UL Recognized Product |
|-----------------|--------|-------------------|----------|------------------------------|----------------------|------------------------------------------|------------------|-----------------------|
| IN              | mm     | Model Number      | Metering | Metering or Control Relaying | High Output Relaying |                                          |                  |                       |
| 1.3             | 28     | 2NR               | •        |                              |                      | 50-300                                   |                  | YES                   |
| 1.56            | 40     | 5NR               | •        |                              |                      | 100-600                                  |                  | YES                   |
|                 |        | 54R               | •        |                              |                      | 100-600                                  |                  | YES                   |
| 1.94            | 49     | 64R               | •        |                              |                      | 100-750                                  |                  | YES                   |
|                 |        | 66R               |          | •                            |                      | 100-750                                  |                  | YES                   |
| 2.25            | 57     | 7RL               |          |                              |                      | 50-1500                                  |                  | YES                   |
|                 |        |                   |          |                              |                      | 50-1500                                  |                  |                       |
|                 |        | 7RT               |          |                              |                      | 150-1500<br>(w/ 1 A secondary)           |                  | YES                   |
| 2.34            | 59     | 74R               | •        |                              |                      | 200-1500                                 |                  | YES                   |
|                 |        | 76R               |          | •                            |                      | 200-1500                                 |                  | YES                   |
| 2.50            | 63     | 74RFT             |          |                              |                      |                                          |                  | YES                   |
|                 |        | 180R              |          | •                            |                      | 100-1500                                 |                  | YES                   |
|                 |        | 200R              |          | •                            |                      | 100-600                                  |                  | YES                   |
| 3.50            | 89     | 201R              |          | •                            |                      | 100-800                                  |                  | YES                   |
| 4.00            | 102    | 100R              |          | •                            |                      | 200-2000                                 |                  | YES                   |
|                 |        | 110R              |          | •                            |                      | 200-2000                                 |                  | YES                   |
| 4.25            | 108    | 170R              |          | •                            |                      | 200-2000                                 |                  | YES                   |
| 4.50            | 114    | 312R              |          |                              | •                    | 600-4000                                 | MR               | YES                   |
|                 |        | 202R              |          | •                            | •                    | 100-1000                                 |                  | YES                   |
| 5.25            | 133    | 203R              |          | •                            | •                    | 100-3000                                 |                  | YES                   |
| 5.75            | 146    | 120R              |          | •                            |                      | 200-3000                                 |                  | YES                   |
| 6.25            | 159    | 210R              |          | •                            | •                    | 200-3000                                 |                  | YES                   |
| 6.88            | 175    | 151R              |          |                              | •                    | 600-4000                                 | MR               | YES                   |
|                 |        | 152R              |          | •                            | •                    | 50-4000                                  |                  | YES                   |
| 8.13            | 206    | 140R              |          | •                            | •                    | 50-6000                                  |                  | YES                   |
| 2.12x4.25       | 54x108 | 260R              | •        |                              |                      | 100-4000                                 |                  | YES                   |
| 3.50x6.25       | 89x159 | 273               | •        |                              |                      | 200-4000                                 |                  | YES                   |
| 3.56x8.81       | 90x224 | 270R              | •        |                              |                      | 400-5000                                 |                  | YES                   |
| 7.45x3.75       | 189x95 | 560R              | •        |                              |                      | 400-5000                                 |                  | YES                   |

### Voltage Transformers Selection Chart

| Application  | Model Number | Accuracy/Burden and Thermal Rating | Primary Voltages (120 Volt Secondary) | UL Recognized Product | Product Data on Page No. |
|--------------|--------------|------------------------------------|---------------------------------------|-----------------------|--------------------------|
| Large Burden | 450R         | 0.3 W, X, M, Y; 500 VA Thermal     | 120 to 600 Volts                      | YES                   | 48                       |
| Small Burden | 460R         | 0.6 W, 1.2X; 150 VA Thermal        | 120 to 600 Volts                      | YES                   | 48                       |
| Small Burden | 470R         | 0.3W, 1.2X; 150 VA Thermal         | 120 to 600 Volts                      | YES                   | 48                       |

### Mounting Brackets

| Model | Bracket  | Model | Bracket | Model | Bracket | Model | Bracket  | Model | Bracket       |
|-------|----------|-------|---------|-------|---------|-------|----------|-------|---------------|
| 2NR   | MB-1     | 66R   | MB-12   | 110R  | MB-32   | 170R  | MB-30    | 203R  | Included      |
| 5NR   | MB-1     | 74R   | MB-16   | 120R  | MB-31   | 180R  | MB-9     | 210R  | MB-32         |
| 7RL   | MB-7     | 76R   | MB-18   | 140R  | MB-32   | 200R  | Included | 260R  | Not Available |
| 54R   | Included | 81X   | MB-81   | 151R  | MB-30   | 201R  | Included | 270R  | Not Available |
| 64R   | MB-10    | 100R  | MB-31   | 152R  | MB-30   | 202R  | Included | 273   | Not Available |

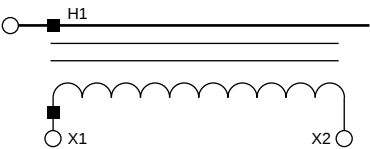


General Purpose Current Transformers
Models 2NR, 5NR, 54R, 7RL, and 7RT

DESCRIPTION

- These low cost, compact units offer good electrical performance in a general purpose transformer.
- UL and CUL Listed per Classification XODW2.
- Feature permanent polarity marks molded into the case.
- All models include two #16 AWG, 24" long secondary leads (white polarity X1 lead).
- Frequency: 50-400 Hz.
- Insulation: 10 kV BIL Full Wave (600 Volt class).
- Applicable Standard: ANSI C57.13.
- Mounts easily on the conductor. No mounting brackets necessary. Optional mounting brackets are available and shipped unassembled.
- Model 54R features mounting ears molded into the case for easy installation.
- Model 7RL is are designed for applications used with ammeters, wattmeters, small relays, and cross current compensation. Optional terminals are available. Order as 7RT.

Single Ratio Connection Diagram



Excitation curves for Model 2NR are not available. See the Square D Digest for pricing.

Optional Mounting Bracket MB-1

Mounting bracket MB-1 is for use with Model 5NR current transformer. The MB-1 bracket may also be applied to the Model 2NR, if bracket is required. Removable mounting ears are supplied on Model 54R only.

Dimensions

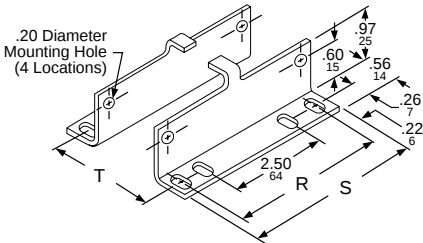
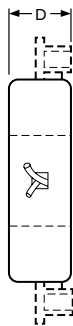
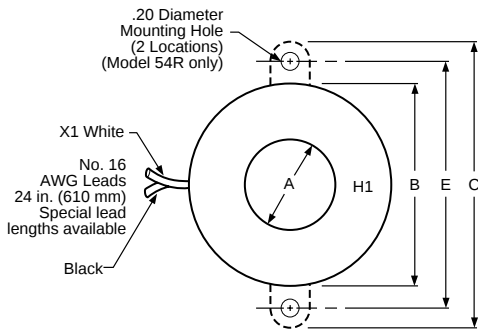


Table with 6 columns: Mounting Bracket, R (IN, mm), S (IN, mm), T (IN, mm). Rows include MB-1 and MB-7 with their respective dimensions.

Dual Dimensions inches/mm

Table with 12 columns: Model, A (IN, mm), B (IN, mm), C (IN, mm), D (IN, mm), E (IN, mm), Mounting Bracket. Rows include models 2NR, 5NR, 54R, 7RL, and 7RT.



Model 2NR

Designed for ammeter use, therefore, needs only one panel meter.



Model 5NR

Designed for ammeter and solid-state transducer applications.



Model 54R

Designed for ammeter and solid-state transducer applications.



Model 7RL

Designed for ammeter and solid-state transducer applications.



# General Purpose Current Transformers

## Models 2NR, 5NR, 54R, 7RL, and 7RT

### Model 2NR

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 2NR-500        | 50:5                        | 1.0      | 2.0       | ±2%                            | 0.0298                           | 0.5    | 0.2 |
| 2NR-600        | 60:5                        | 1.0      | 2.0       | ±2%                            | 0.0404                           | 0.5    | 0.2 |
| 2NR-750        | 75:5                        | 1.5      | 3.0       | ±2%                            | 0.0480                           | 0.5    | 0.2 |
| 2NR-800        | 80:5                        | 1.5      | 3.0       | ±2%                            | 0.0556                           | 0.5    | 0.2 |
| 2NR-101        | 100:5                       | 2.0      | 4.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-121        | 120:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-1250       | 125:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-151        | 150:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-201        | 200:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-251        | 250:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |
| 2NR-301        | 300:5                       | 2.5      | 5.0       | ±1%                            | —                                | 0.5    | 0.2 |

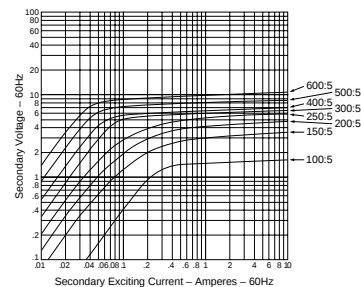
Rating Factor 30 °C Ambient Temp. = 1.0

### Model 5NR

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 5NR-101        | 100:5                       | 2.0      | 4.0       | ±1%                            | 0.0298                           | 1.0    | 0.5 |
| 5NR-151        | 150:5                       | 2.5      | 5.0       | ±1%                            | 0.0404                           | 1.0    | 0.5 |
| 5NR-201        | 200:5                       | 5.0      | 12.5      | ±1%                            | 0.0480                           | 1.0    | 0.5 |
| 5NR-251        | 250:5                       | 5.0      | 12.5      | ±1%                            | 0.0556                           | 1.0    | 0.5 |
| 5NR-301        | 300:5                       | 5.0      | 12.5      | ±1%                            | 0.0646                           | 1.0    | 0.5 |
| 5NR-401        | 400:5                       | 12.5     | 25.0      | ±1%                            | 0.0883                           | 1.0    | 0.5 |
| 5NR-501        | 500:5                       | 12.5     | 25.0      | ±1%                            | 0.1144                           | 1.0    | 0.5 |
| 5NR-601        | 600:5                       | 25.0     | 50.0      | ±1%                            | 0.1337                           | 1.0    | 0.5 |

Rating Factor 30 °C Ambient Temp. = 1.0

### Excitation Curves–5NR



### Model 7RL

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 7RL-500        | 50:5                        | 2.5      | 5.0       | ±1%                            | 0.0530                           | 3.0    | 1.4 |
| 7RL-101        | 100:5                       | 2.5      | 5.0       | ±1%                            | 0.0114                           | 3.0    | 1.4 |
| 7RL-151        | 150:5                       | 2.5      | 5.0       | ±1%                            | 0.0172                           | 3.1    | 1.4 |
| 7RL-201        | 200:5                       | 5.0      | 10.0      | ±1%                            | 0.0306                           | 3.2    | 1.5 |
| 7RL-251        | 250:5                       | 5.0      | 10.0      | ±1%                            | 0.0382                           | 3.3    | 1.5 |
| 7RL-301        | 300:5                       | 5.0      | 10.0      | ±1%                            | 0.0458                           | 3.3    | 1.5 |
| 7RL-401        | 400:5                       | 12.5     | 25.0      | ±1%                            | 0.0611                           | 3.4    | 1.5 |
| 7RL-501        | 500:5                       | 12.5     | 25.0      | ±1%                            | 0.0764                           | 3.6    | 1.6 |
| 7RL-601        | 600:5                       | 12.5     | 25.0      | ±1%                            | 0.0917                           | 3.6    | 1.6 |
| 7RL-751        | 750:5                       | 12.5     | 25.0      | ±1%                            | 0.0859                           | 3.6    | 1.6 |
| 7RL-801        | 800:5                       | 12.5     | 25.0      | ±1%                            | 0.0917                           | 3.3    | 1.5 |
| 7RL-102        | 1000:5                      | 25.0     | 50.0      | ±1%                            | 0.1146                           | 3.4    | 1.5 |
| 7RL-122        | 1200:5                      | 25.0     | 50.0      | ±1%                            | 0.1375                           | 3.5    | 1.6 |
| 7RL-152        | 1500:5                      | 25.0     | 50.0      | ±1%                            | 0.1530                           | 3.5    | 1.6 |

Rating Factor 30 °C Ambient Temp. = 1.5



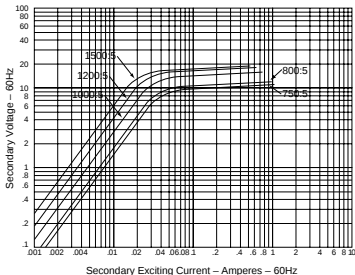
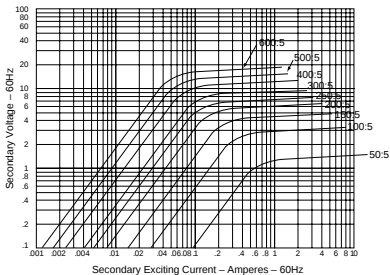
General Purpose Current Transformers  
Models 2NR, 5NR, 54R, 7RL, and 7RT

Model 7RT (5 Ampere Current Ratio)

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 7RT-500        | 50:5                        | 2.5      | 5.0       | 1.5%                           | 0.0053                           | 3.0    | 1.4 |
| 7RT-101        | 100:5                       | 2.5      | 5.0       | 1.0%                           | 0.0114                           | 3.0    | 1.4 |
| 7RT-151        | 150:5                       | 2.5      | 5.0       | 1.0%                           | 0.0172                           | 3.1    | 1.4 |
| 7RT-201        | 200:5                       | 2.5      | 5.0       | 0.6%                           | 0.0306                           | 3.2    | 1.5 |
|                |                             | 5.0      | 10.0      | 1.0%                           |                                  | 3.2    | 1.5 |
|                |                             | 12.5     | 25.0      | 2.0%                           |                                  | 3.2    | 1.5 |
| 7RT-251        | 250:5                       | 2.5      | 5.0       | 0.6%                           | 0.0382                           | 3.3    | 1.5 |
|                |                             | 5.0      | 10.0      | 0.6%                           |                                  | 3.3    | 1.5 |
|                |                             | 12.5     | 25.0      | 1.2%                           |                                  | 3.3    | 1.5 |
| 7RT-301        | 300:5                       | 2.5      | 5.0       | 0.3%                           | 0.0458                           | 3.3    | 1.5 |
|                |                             | 5.0      | 10.0      | 0.6%                           |                                  | 3.3    | 1.5 |
|                |                             | 12.5     | 25.0      | 1.0%                           |                                  | 3.3    | 1.5 |
| 7RT-401        | 400:5                       | 2.5      | 5.0       | 0.3%                           | 0.0611                           | 3.4    | 1.5 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.4    | 1.5 |
|                |                             | 12.5     | 25.0      | 0.6%                           |                                  | 3.4    | 1.5 |
|                |                             | 25.0     | 50.0      | 1.0%                           |                                  | 3.4    | 1.5 |
| 7RT-501        | 500:5                       | 2.5      | 5.0       | 0.3%                           | 0.0764                           | 3.6    | 1.6 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.6    | 1.6 |
|                |                             | 12.5     | 25.0      | 0.6%                           |                                  | 3.6    | 1.6 |
|                |                             | 25.0     | 50.0      | 1.0%                           |                                  | 3.6    | 1.6 |
| 7RT-601        | 600:5                       | 2.5      | 5.0       | 0.3%                           | 0.0917                           | 3.6    | 1.6 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.6    | 1.6 |
|                |                             | 12.5     | 25.0      | 0.6%                           |                                  | 3.6    | 1.6 |
|                |                             | 25.0     | 50.0      | 0.6%                           |                                  | 3.6    | 1.6 |
| 7RT-751        | 750:5                       | 2.5      | 5.0       | 0.3%                           | 0.0859                           | 3.6    | 1.6 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.6    | 1.6 |
|                |                             | 12.5     | 25.0      | 0.6%                           |                                  | 3.6    | 1.6 |
|                |                             | 25.0     | 50.0      | 1.0%                           |                                  | 3.6    | 1.6 |
| 7RT-801        | 800:5                       | 2.5      | 5.0       | 0.3%                           | 0.0917                           | 3.3    | 1.5 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.3    | 1.5 |
|                |                             | 12.5     | 25.0      | 0.6%                           |                                  | 3.3    | 1.5 |
|                |                             | 25.0     | 50.0      | 0.6%                           |                                  | 3.3    | 1.5 |
| 7RT-102        | 1000:5                      | 2.5      | 5.0       | 0.3%                           | 0.1146                           | 3.4    | 1.5 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.4    | 1.5 |
|                |                             | 12.5     | 25.0      | 0.3%                           |                                  | 3.4    | 1.5 |
|                |                             | 25.0     | 50.0      | 0.6%                           |                                  | 3.4    | 1.5 |
| 7RT-122        | 1200:5                      | 2.5      | 5.0       | 0.3%                           | 0.1375                           | 3.5    | 1.6 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.5    | 1.6 |
|                |                             | 12.5     | 25.0      | 0.3%                           |                                  | 3.5    | 1.6 |
|                |                             | 25.0     | 50.0      | 0.6%                           |                                  | 3.5    | 1.6 |
| 7RT-152        | 1500:5                      | 2.5      | 5.0       | 0.3%                           | 0.1530                           | 3.5    | 1.6 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.5    | 1.6 |
|                |                             | 12.5     | 25.0      | 0.3%                           |                                  | 3.5    | 1.6 |
|                |                             | 25.0     | 50.0      | 0.3%                           |                                  | 3.5    | 1.6 |

Rating Factor 30 °C Ambient Temp. = 1.5

Excitation Curves–Model 7RL and 7RT



# General Purpose Current Transformers

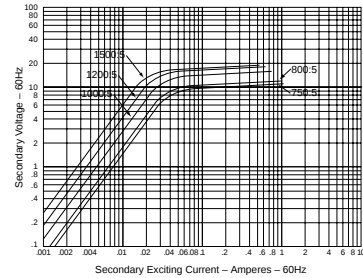
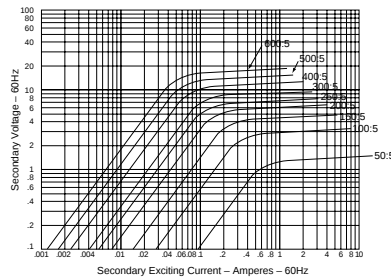
## Models 2NR, 5NR, 54R, 7RL, and 7RT

### Model 7RT (1 Ampere Current Ratio)

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 7RT-151-001    | 150:1                       | 1.0      | 2.0       | 0.3%                           | 0.4598                           | 2.8    | 1.3 |
|                |                             | 5.0      | 10.0      | 1.5%                           |                                  | 2.8    | 1.3 |
| 7RT-251-001    | 250:1                       | 1.0      | 2.0       | 0.3%                           | 0.7664                           | 3.0    | 1.4 |
|                |                             | 5.0      | 10.0      | 0.6%                           |                                  | 3.0    | 1.4 |
| 7RT-301-001    | 300:1                       | 1.0      | 2.0       | 0.3%                           | 0.9197                           | 3.0    | 1.4 |
|                |                             | 5.0      | 10.0      | 0.6%                           |                                  | 3.0    | 1.4 |
| 7RT-401-001    | 400:1                       | 1.0      | 2.0       | 0.3%                           | 1.2262                           | 3.0    | 1.4 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 3.0    | 1.4 |
| 7RT-501-001    | 500:1                       | 1.0      | 2.0       | 0.3%                           | 1.1496                           | 2.5    | 1.1 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 2.5    | 1.1 |
| 7RT-601-001    | 600:1                       | 1.0      | 2.0       | 0.3%                           | 1.3795                           | 2.5    | 1.1 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 2.5    | 1.1 |
| 7RT-102-001    | 1000:1                      | 1.0      | 2.0       | 0.3%                           | 2.4700                           | 2.0    | 0.9 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 2.0    | 0.9 |
|                |                             | 10.0     | 20.0      | 0.3%                           |                                  | 2.0    | 0.9 |
| 7RT-122-001    | 1200:1                      | 1.0      | 2.0       | 0.3%                           | 2.4564                           | 2.5    | 1.1 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 2.5    | 1.1 |
|                |                             | 10.0     | 20.0      | 0.3%                           |                                  | 2.5    | 1.1 |
|                |                             | 15.0     | 30.0      | 0.3%                           |                                  | 2.5    | 1.1 |
| 7RT-152-001    | 1500:1                      | 1.0      | 2.0       | 0.3%                           | 3.0706                           | 2.7    | 1.2 |
|                |                             | 5.0      | 10.0      | 0.3%                           |                                  | 2.7    | 1.2 |
|                |                             | 10.0     | 20.0      | 0.3%                           |                                  | 2.7    | 1.2 |
|                |                             | 15.0     | 30.0      | 0.3%                           |                                  | 2.7    | 1.2 |

Rating Factor 30 °C Ambient Temp. = 1.5

### Excitation Curves–Model 7RL and 7RT

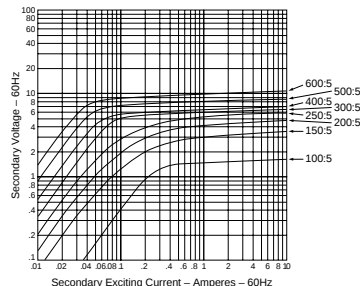


### Model 54R

| Catalog Number | Current Rating<br>(Amperes) | VA 60 Hz | VA 400 Hz | Accuracy<br>(at Rated Current) | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-----------------------------|----------|-----------|--------------------------------|----------------------------------|--------|-----|
|                |                             |          |           |                                |                                  | lb     | kg  |
| 54R-101        | 100:5                       | 2.0      | 4.0       | ±1%                            | 0.0298                           | 1.0    | 0.5 |
| 54R-151        | 150:5                       | 2.5      | 5.0       | ±1%                            | 0.0404                           | 1.0    | 0.5 |
| 54R-201        | 200:5                       | 5.0      | 12.5      | ±1%                            | 0.0480                           | 1.0    | 0.5 |
| 54R-251        | 250:5                       | 5.0      | 12.5      | ±1%                            | 0.0556                           | 1.0    | 0.5 |
| 54R-301        | 300:5                       | 5.0      | 12.5      | ±1%                            | 0.0646                           | 1.0    | 0.5 |
| 54R-401        | 400:5                       | 12.5     | 25.0      | ±1%                            | 0.0883                           | 1.0    | 0.5 |
| 54R-501        | 500:5                       | 12.5     | 25.0      | ±1%                            | 0.1144                           | 1.0    | 0.5 |
| 54R-601        | 600:5                       | 25.0     | 50.0      | ±1%                            | 0.1337                           | 1.0    | 0.5 |

Rating Factor 30 °C Ambient Temp. = 1.0

### Excitation Curves–Model 54R



# Toroidal Current Transformers (Single Ratio)

## Models 64R, 74R, and 74RFT



**Model 64R**  
Designed for metering applications.



**Model 74R**  
Designed for metering applications.

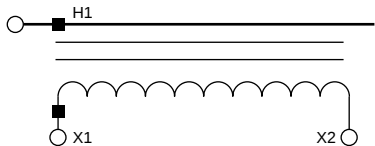


**Model 74RFT**  
Designed for metering applications.

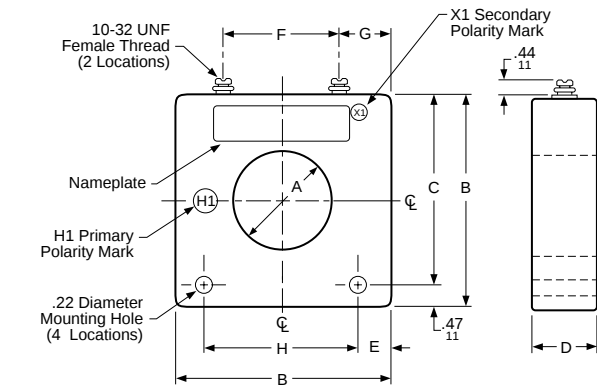
### DESCRIPTION

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Model 74RFT features molded mounting feet.
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL Full Wave (600 Volt class).
- Applicable Standard—ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

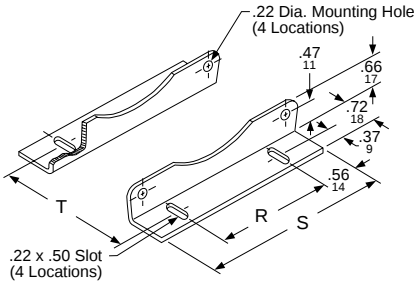
### Single Ratio Connection Diagram



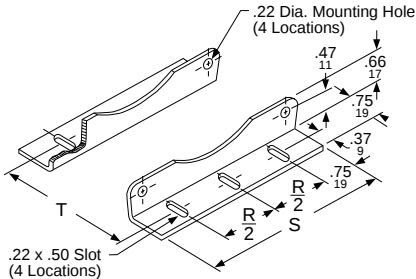
### Dimensions



| Mounting Bracket | Dimensions |    |      |     |      |    |
|------------------|------------|----|------|-----|------|----|
|                  | R          |    | S    |     | T    |    |
|                  | IN         | mm | IN   | mm  | IN   | mm |
| MB-10            | 2.50       | 64 | 3.62 | 92  | 2.38 | 60 |
| MB-16            | 2.76       | 70 | 4.00 | 102 | 2.50 | 64 |



**Mounting Bracket MB-10**



**Mounting Bracket MB-16**

Dual Dimensions inches  
mm

| Model | Dimensions |    |      |     |      |     |      |    |      |    |      |    |      |    |      | Mounting Bracket |       |
|-------|------------|----|------|-----|------|-----|------|----|------|----|------|----|------|----|------|------------------|-------|
|       | A          |    | B    |     | C    |     | D    |    | E    |    | F    |    | G    |    | H    |                  |       |
|       | IN         | mm | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm | IN   |                  | mm    |
| 64R   | 1.94       | 49 | 4.19 | 106 | 3.72 | 94  | 1.50 | 38 | 0.54 | 14 | 2.38 | 60 | 0.91 | 23 | 3.12 | 79               | MB-10 |
| 74R   | 2.34       | 59 | 4.69 | 119 | 4.22 | 107 | 1.62 | 41 | 0.60 | 15 | 2.50 | 64 | 1.10 | 28 | 3.50 | 89               | MB-16 |
| 74RFT | 2.5        | 63 | 4.69 | 119 | —    | —   | 2.62 | 67 | —    | —  | 2.88 | 73 | —    | —  | —    | —                | —     |



## Torroidal Current Transformers (Single Ratio) Models 64R, 74R, and 74RFT

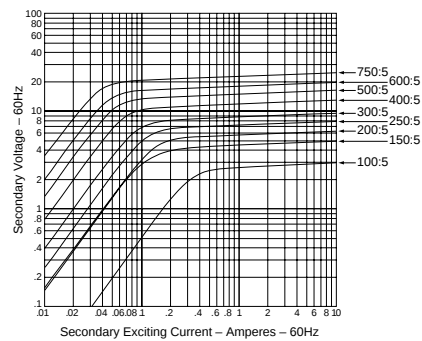
### Model 64RL

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 64R-101        | 100:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.0113                        | 1.9    | 0.89 |
| 64R-151        | 150:5                      | —           | 1.2                                | 1.2  | —    | —    | —    | 0.0268                        | 1.9    | 0.89 |
| 64R-201        | 200:5                      | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.0371                        | 1.9    | 0.89 |
| 64R-251        | 250:5                      | —           | 0.6                                | 0.6  | 1.2  | —    | —    | 0.0463                        | 2.0    | 0.90 |
| 64R-301        | 300:5                      | —           | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0556                        | 2.0    | 0.90 |
| 64R-401        | 400:5                      | —           | 0.3                                | 0.6  | 0.6  | 1.2  | —    | 0.0741                        | 2.0    | 0.90 |
| 64R-501        | 500:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | —    | 0.0926                        | 2.1    | 0.95 |
| 64R-601        | 600:5                      | —           | 0.3                                | 0.3  | 1.2  | 0.6  | 1.2  | 0.1173                        | 2.1    | 0.95 |
| 64R-751        | 750:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 0.6  | 0.1466                        | 2.1    | 0.95 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves—Model 64R



# Torroidal Current Transformers (Single Ratio)

## Models 64R, 74R, and 74RFT

### Model 74R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 74R-201        | 200:5                      | —           | 1.2                                | 1.2  | 0.6  | —    | —    | 0.0400                        | 2.6    | 1.2 |
| 74R-251        | 250:5                      | —           | 1.2                                | 1.2  | 0.6  | 1.2  | —    | 0.0501                        | 2.6    | 1.2 |
| 74R-301        | 300:5                      | —           | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0617                        | 2.6    | 1.2 |
| 74R-401        | 400:5                      | —           | 0.3                                | 0.3  | 0.6  | 1.2  | —    | 0.0823                        | 2.7    | 1.2 |
| 74R-501        | 500:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1029                        | 2.8    | 1.3 |
| 74R-601        | 600:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1234                        | 2.8    | 1.3 |
| 74R-751        | 750:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1422                        | 2.9    | 1.3 |
| 74R-801        | 800:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1517                        | 2.9    | 1.3 |
| 74R-102        | 1000:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1896                        | 2.6    | 1.2 |
| 74R-122        | 1200:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2275                        | 2.7    | 1.2 |
| *74R-152       | 1500:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2641                        | 2.9    | 1.3 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

\* 74R-152 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

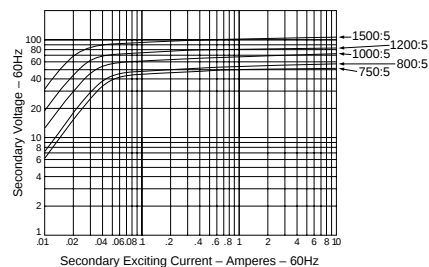
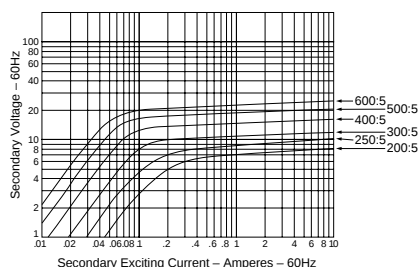
### Model 74RF

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 74RFT-201      | 200:5                      | —           | 1.2                                | 1.2  | 0.6  | —    | —    | 0.0400                        | 2.6    | 1.2 |
| 74RFT-251      | 250:5                      | —           | 1.2                                | 1.2  | 0.6  | 1.2  | —    | 0.0501                        | 2.6    | 1.2 |
| 74RFT-301      | 300:5                      | —           | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0617                        | 2.6    | 1.2 |
| 74RFT-401      | 400:5                      | —           | 0.3                                | 0.3  | 0.6  | 1.2  | —    | 0.0823                        | 2.7    | 1.2 |
| 74RFT-501      | 500:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1029                        | 2.8    | 1.3 |
| 74RFT-601      | 600:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1234                        | 2.8    | 1.3 |
| 74RFT-651      | 650:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | —    | 0.1297                        | 2.9    | 1.3 |
| 74RFT-751      | 750:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1422                        | 2.9    | 1.3 |
| 74RFT-801      | 800:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1517                        | 2.9    | 1.3 |
| 74RFT-102      | 1000:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1896                        | 2.6    | 1.2 |
| 74RFT-122      | 1200:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2275                        | 2.7    | 1.2 |

Rating Factor 30°C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves—Models 74R and 74RFT



**Torroidal Current Transformers (Single Ratio)**  
**Models 64R, 74R, and 74RFT**



# Toroidal Current Transformers (Single Ratio)

## Models 66R and 76R



**Model 66R**  
Designed for metering and control relaying applications

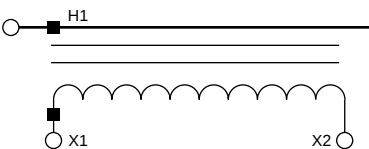


**Model 76R**  
Designed for metering and control relaying applications.

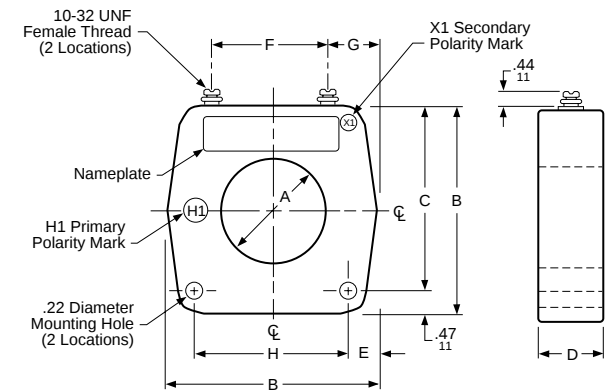
### DESCRIPTION

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz
- Insulation: 10 kV BIL Full Wave (600 Volt class)
- Applicable Standard—ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

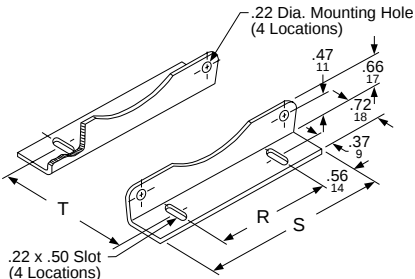
### Single Ratio Connection Diagram



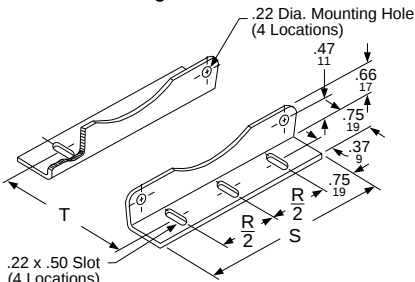
### Dimensions



| Mounting Bracket | Dimensions |    |      |     |      |     |
|------------------|------------|----|------|-----|------|-----|
|                  | R          |    | S    |     | T    |     |
|                  | IN         | mm | IN   | mm  | IN   | mm  |
| MB-12            | 2.50       | 64 | 3.62 | 92  | 3.94 | 100 |
| MB-18            | 2.76       | 70 | 4.00 | 102 | 4.12 | 105 |



**Mounting Bracket MB-12**



**Mounting Bracket MB-18**

Dual Dimensions inches  
mm

| Model | Dimensions |    |      |     |      |     |      |     |      |    |      |    |      |    |      |    | Mounting Bracket |
|-------|------------|----|------|-----|------|-----|------|-----|------|----|------|----|------|----|------|----|------------------|
|       | A          |    | B    |     | C    |     | D    |     | E    |    | F    |    | G    |    | H    |    |                  |
|       | IN         | mm | IN   | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm |                  |
| 66R   | 1.94       | 49 | 4.19 | 106 | 3.72 | 94  | 3.06 | 154 | 0.54 | 14 | 2.38 | 60 | 0.91 | 23 | 3.12 | 79 | MB-12            |
| 76R   | 2.34       | 59 | 4.69 | 119 | 4.22 | 107 | 3.25 | 83  | 0.60 | 15 | 2.50 | 64 | 1.10 | 28 | 3.50 | 89 | MB-18            |



## Torroidal Current Transformers (Single Ratio) Models 66R and 76R

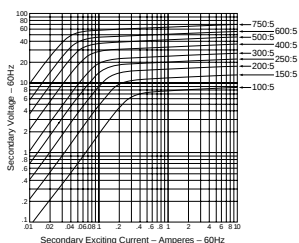
### Model 66R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | Rating Factor (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 66R-101        | 100:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.0232                        | 4.8    | 2.2 |
| 66R-151        | 150:5                      | —           | 0.6                                | 1.2  | 2.4  | 2.4  | —    | 0.0349                        | 4.8    | 2.2 |
| 66R-201        | 200:5                      | C10         | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0739                        | 4.8    | 2.2 |
| 66R-251        | 250:5                      | C10         | 0.3                                | 0.6  | 0.6  | 1.2  | 2.4  | 0.0923                        | 4.9    | 2.2 |
| 66R-301        | 300:5                      | C10         | 0.3                                | 0.3  | 0.6  | 1.2  | 2.4  | 0.1108                        | 5.0    | 2.3 |
| 66R-401        | 400:5                      | C10         | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1477                        | 5.1    | 2.3 |
| 66R-501        | 500:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.1846                        | 5.2    | 2.4 |
| 66R-601        | 600:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1136                        | 5.3    | 2.4 |
| 66R-751        | 750:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2851                        | 5.3    | 2.4 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves



### Model 76R

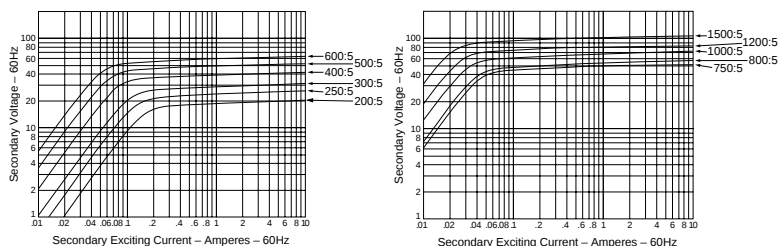
| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 76R-201        | 200:5                      | C10         | 0.6                                | 0.6  | 1.2  | 2.4  | 2.4  | 0.0782                        | 5.8    | 2.6 |
| 76R-251        | 250:5                      | C10         | 0.3                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.0977                        | 5.9    | 2.7 |
| 76R-301        | 300:5                      | C10         | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1173                        | 5.9    | 2.7 |
| 76R-401        | 400:5                      | C10         | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1563                        | 6.0    | 2.7 |
| 76R-501        | 500:5                      | C10         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1954                        | 6.1    | 2.8 |
| 76R-601        | 600:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2345                        | 6.3    | 2.9 |
| 76R-751        | 750:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2805                        | 6.5    | 3.0 |
| 76R-801        | 800:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2992                        | 6.5    | 3.0 |
| 76R-102        | 1000:5                     | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3740                        | 6.0    | 2.7 |
| 76R-122        | 1200:5                     | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4488                        | 6.2    | 2.8 |
| *76R-152       | 1500:5                     | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5507                        | 6.5    | 3.0 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

\* 76R-152 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves-Model 76R



# Toroidal Current Transformers (Single Ratio)

## Models 100R and 110R



**Model 100R**  
Designed for metering and control relaying applications.

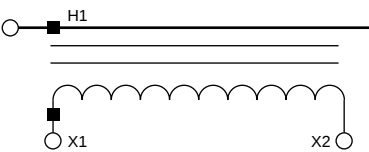


**Model 110R**  
Designed for metering and relaying applications.

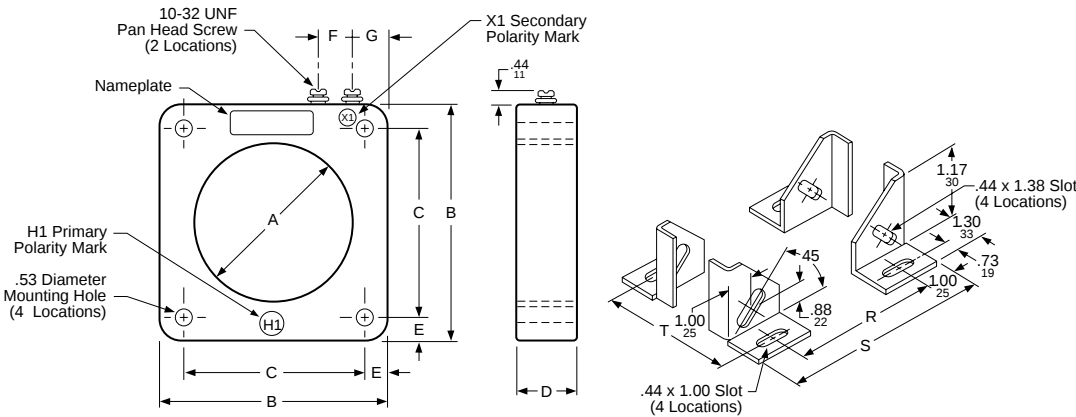
### DESCRIPTION

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Single Ratio Connection Diagram



### Dimensions



### Mounting Bracket MB-31 & 32

Dual Dimensions inches  
mm

| Model | Dimensions |     |      |     |      |     |      |    |      |    |      |    |      |    | Mounting Bracket |
|-------|------------|-----|------|-----|------|-----|------|----|------|----|------|----|------|----|------------------|
|       | A          |     | B    |     | C    |     | D    |    | E    |    | F    |    | G    |    |                  |
|       | IN         | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm |                  |
| 100R  | 4.00       | 102 | 7.00 | 178 | 5.75 | 146 | 2.12 | 54 | 0.62 | 16 | 1.00 | 25 | 1.25 | 32 | MB-31            |
| 110R  | 4.00       | 102 | 7.00 | 178 | 5.75 | 146 | 2.88 | 73 | 0.62 | 16 | 1.00 | 25 | 1.25 | 32 | MB-32            |

| Model | Mounting Bracket | Dimensions |     |      |     |      |     |
|-------|------------------|------------|-----|------|-----|------|-----|
|       |                  | R          |     | S    |     | T    |     |
|       |                  | IN         | mm  | IN   | mm  | IN   | mm  |
| 100R  | MB-31            | 5.00       | 127 | 7.16 | 182 | 3.75 | 95  |
| 110R  | MB-32            | 5.00       | 127 | 7.16 | 182 | 4.50 | 114 |



# Torroidal Current Transformers (Single Ratio) Models 100R and 110R

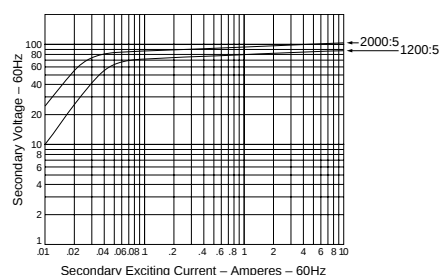
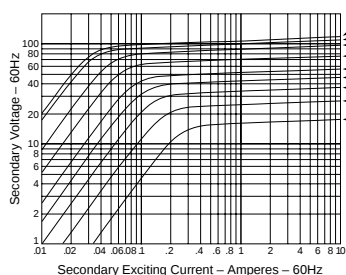
## Model 100R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 100R-201       | 200:5                      | C10         | 0.6                                | 1.2  | 2.4  | —    | —    | 0.0619                        | 9.2    | 4.2 |
| 100R-301       | 300:5                      | C10         | 0.3                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.0929                        | 9.2    | 4.2 |
| 100R-401       | 400:5                      | C20         | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1239                        | 9.3    | 4.2 |
| 100R-501       | 500:5                      | C20         | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1548                        | 9.4    | 4.3 |
| 100R-601       | 600:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.2331                        | 9.5    | 4.3 |
| 100R-801       | 800:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.3109                        | 9.7    | 4.4 |
| 100R-102       | 1000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3886                        | 9.9    | 4.5 |
| 100R-122       | 1200:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3589                        | 8.6    | 3.9 |
| 100R-152       | 1500:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4886                        | 8.7    | 3.9 |
| 100R-162       | 1600:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4453                        | 8.9    | 4.0 |
| 100R-202       | 2000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5623                        | 9.1    | 4.1 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves–Model 100R



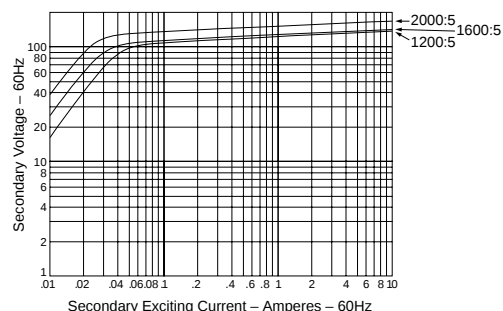
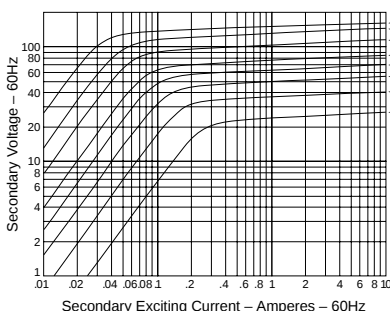
## Model 110R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 110R-201       | 200:5                      | C20         | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0619                        | 13.6   | 6.2 |
| 110R-301       | 300:5                      | C20         | 0.3                                | 0.3  | 0.6  | 1.2  | 2.4  | 0.0929                        | 13.6   | 6.2 |
| 110R-401       | 400:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1239                        | 13.8   | 6.2 |
| 110R-501       | 500:5                      | C50         | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.1548                        | 13.8   | 6.2 |
| 110R-601       | 600:5                      | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2331                        | 13.9   | 6.3 |
| 110R-801       | 800:5                      | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.3109                        | 14.2   | 6.4 |
| 110R-102       | 1000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3886                        | 14.4   | 6.5 |
| 110R-122       | 1200:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3589                        | 12.2   | 5.5 |
| 110R-152       | 1500:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4886                        | 12.6   | 5.7 |
| 110R-162       | 1600:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4453                        | 12.7   | 5.8 |
| 110R-202       | 2000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5623                        | 13.3   | 6.0 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves–Model 110R



# Toroidal Current Transformers (Single Ratio)

## Models 120R and 140R

### DESCRIPTION

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

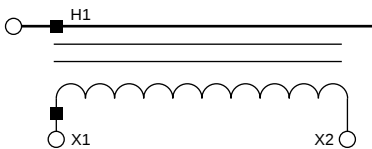


**Model 120R**  
Designed for metering and control relaying applications.

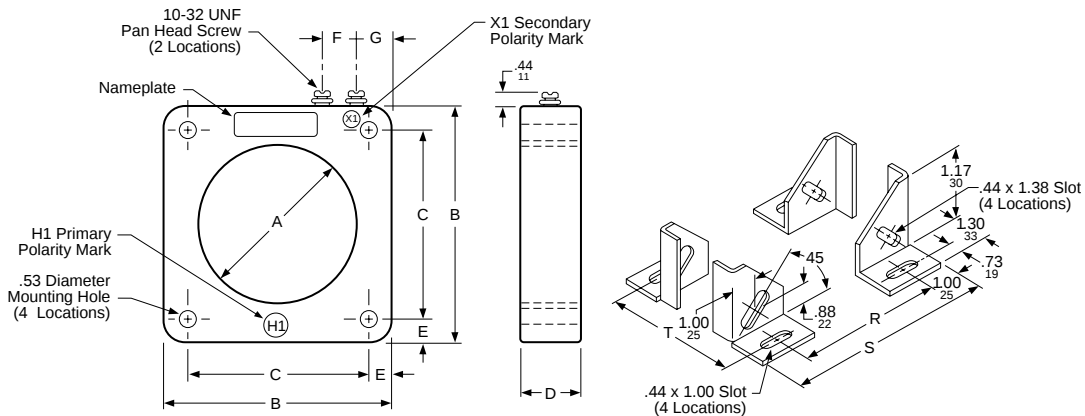


**Model 140R**  
Designed for metering and relaying applications.

### Single Ratio Connection Diagram



### Dimensions



**Mounting Bracket MB-31 & 32**

Dual Dimensions inches  
mm

| Model | Dimensions |     |       |     |      |     |      |    |      |    |      |    |      |    | Mounting Bracket |
|-------|------------|-----|-------|-----|------|-----|------|----|------|----|------|----|------|----|------------------|
|       | A          |     | B     |     | C    |     | D    |    | E    |    | F    |    | G    |    |                  |
|       | IN         | mm  | IN    | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm |                  |
| 120R  | 5.75       | 146 | 8.50  | 216 | 6.75 | 171 | 2.12 | 54 | 0.88 | 22 | 1.25 | 32 | 1.50 | 38 | MB-31            |
| 140R  | 8.13       | 206 | 11.00 | 279 | 8.50 | 216 | 3.00 | 76 | 1.25 | 32 | 1.00 | 25 | 2.25 | 57 | MB-32            |

| Model | Dimensions |     |       |     |      |     | Mounting Bracket |
|-------|------------|-----|-------|-----|------|-----|------------------|
|       | R          |     | S     |     | T    |     |                  |
|       | IN         | mm  | IN    | mm  | IN   | mm  |                  |
| 120R  | 6.50       | 165 | 8.66  | 220 | 3.75 | 95  | MB-31            |
| 140R  | 9.00       | 229 | 11.16 | 283 | 4.62 | 117 | MB-32            |



## Torroidal Current Transformers (Single Ratio) Models 120R and 140R

### Model 120R

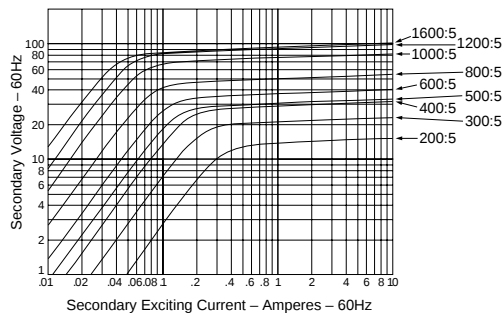
| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 120R-201       | 200:5                      | C10         | 1.2                                | 2.4  | 2.4  | —    | —    | 0.0463                        | 10.0   | 4.5 |
| 120R-301       | 300:5                      | C10         | 0.6                                | 1.2  | 2.4  | 2.4  | —    | 0.0695                        | 10.0   | 4.5 |
| 120R-401       | 400:5                      | C20         | 0.3                                | 0.6  | 1.2  | 1.2  | 1.2  | 0.0927                        | 10.1   | 4.6 |
| 120R-501       | 500:5                      | C20         | 0.3                                | 0.3  | 0.6  | 1.2  | 0.6  | 0.1046                        | 10.2   | 4.6 |
| 120R-601       | 600:5                      | C20         | 0.3                                | 0.3  | 0.6  | 0.6  | 0.6  | 0.1255                        | 10.3   | 4.7 |
| 120R-801       | 800:5                      | C20         | 0.3                                | 0.3  | 0.3  | 0.6  | 0.3  | 0.1673                        | 10.5   | 4.8 |
| 120R-102       | 1000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2317                        | 10.7   | 4.9 |
| 120R-122       | 1200:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2780                        | 10.9   | 4.9 |
| 120R-152       | 1500:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3571                        | 11.2   | 5.1 |
| 120R-162       | 1600:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4001                        | 11.2   | 5.1 |
| 120R-202       | 2000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4276                        | 9.8    | 4.4 |
| 120R-252       | 2500:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5064                        | 10.4   | 4.7 |
| 120R-302       | 3000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.6134                        | 10.9   | 4.9 |
| *120R-402      | 4000:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.8179                        | 10.9   | 4.9 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

\* 120R-402 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves—Model 120R



# Torroidal Current Transformers (Single Ratio)

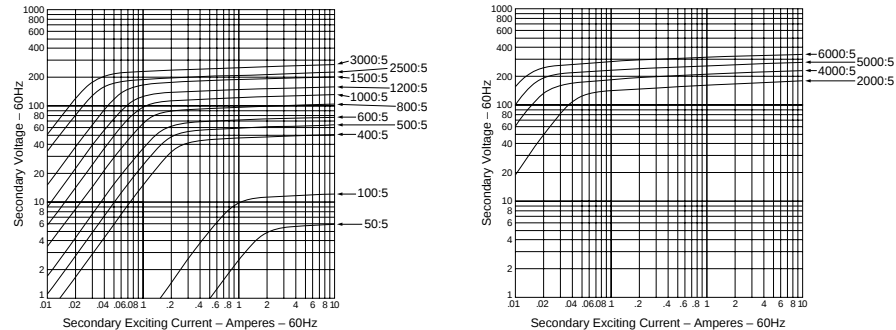
## Models 120R and 140R

Model 140R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 140R-500       | 50:5                       | —           | Ground Fault Sensing               |      |      |      | —    | 0.0078                        | 21.5   | 9.8  |
| 140R-101       | 100:5                      | —           |                                    |      |      |      | —    | 0.0157                        | 21.5   | 9.8  |
| 140R-401       | 400:5                      | C20         | 0.6                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.1572                        | 22.0   | 10.0 |
| 140R-501       | 500:5                      | C20         | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1966                        | 22.1   | 10.0 |
| 140R-601       | 600:5                      | C20         | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.2359                        | 22.2   | 10.0 |
| 140R-801       | 800:5                      | C50         | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.3149                        | 22.5   | 10.2 |
| 140R-102       | 1000:5                     | C50         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.3931                        | 22.7   | 10.3 |
| 140R-122       | 1200:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4717                        | 22.9   | 10.4 |
| 140R-152       | 1500:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4734                        | 23.5   | 10.2 |
| 140R-202       | 2000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5510                        | 23.9   | 10.9 |
| 140R-252       | 2500:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.7206                        | 18.9   | 8.6  |
| 140R-302       | 3000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.8647                        | 19.4   | 8.8  |
| 140R-402       | 4000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.0142                        | 20.5   | 9.3  |
| *140R-502      | 5000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.3450                        | 16.6   | 7.5  |
| *140R-602      | 6000:5                     | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.6139                        | 17.5   | 7.9  |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0  
 \* 140R-502 and 140R-602 Rating Factor 55 °C Ambient Temp. = 0.75  
 ▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

Excitation Curves–Model 140R



## **Torroidal Current Transformers (Single Ratio)** **Models 120R and 140R**



# Toroidal Current Transformers (Single Ratio)

## Model 151R



Model 151R

Designed for relaying and other current sensing applications.

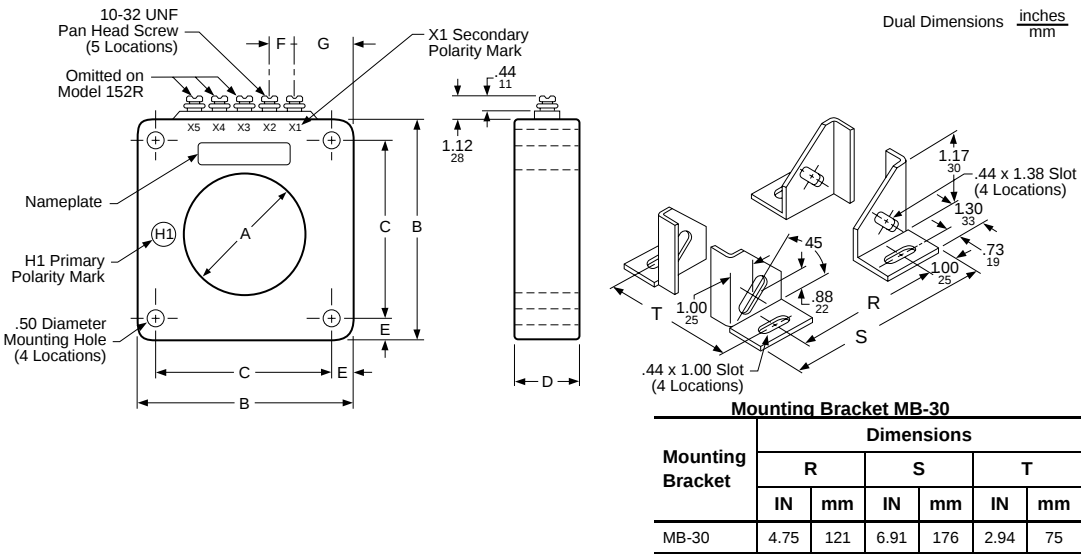
### Description

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Connections and Connection Diagrams

| Model 151R-601     |                                | Model 151R-122     |                                | Model 151R-202     |                                | Model 151R-302     |                                | Model 151R-402     |                                |
|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|
|                    |                                |                    |                                |                    |                                |                    |                                |                    |                                |
| Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections |
| 50:5               | X2-X3                          | 100:5              | X2-X3                          | 300:5              | X3-X4                          | 300:5              | X3-X4                          | 500:5              | X1-X2                          |
| 100:5              | X1-X2                          | 200:5              | X1-X2                          | 400:5              | X1-X2                          | 500:5              | X4-X5                          | 1000:5             | X3-X4                          |
| 150:5              | X1-X3                          | 300:5              | X1-X3                          | 500:5              | X4-X5                          | 800:5              | X3-X5                          | 1500:5             | X2-X3                          |
| 200:5              | X4-X5                          | 400:5              | X4-X5                          | 800:5              | X2-X3                          | 1000:5             | X1-X2                          | 2000:5             | X1-X3                          |
| 250:5              | X3-X4                          | 500:5              | X3-X4                          | 1100:5             | X2-X4                          | 1200:5             | X2-X3                          | 2500:5             | X2-X4                          |
| 300:5              | X2-X4                          | 600:5              | X2-X4                          | 1200:5             | X1-X3                          | 1500:5             | X2-X4                          | 3000:5             | X1-X4                          |
| 400:5              | X1-X4                          | 800:5              | X1-X4                          | 1500:5             | X1-X4                          | 2000:5             | X2-X5                          | 3500:5             | X2-X5                          |
| 450:5              | X3-X5                          | 1000:5             | X2-X5                          | 1600:5             | X2-X5                          | 2200:5             | X1-X3                          | 4000:5             | X1-X5                          |
| 500:5              | X4-X5                          | 1200:5             | X1-X5                          | 2000:5             | X1-X5                          | 2500:5             | X1-X4                          | –                  | –                              |
| 600:5              | X1-X5                          | –                  | –                              | –                  | –                              | 3000:5             | X1-X5                          | –                  | –                              |

### Dimensions



| Model | Dimensions |     |       |     |      |     |      |     |      |    |      |    |      |     |
|-------|------------|-----|-------|-----|------|-----|------|-----|------|----|------|----|------|-----|
|       | A          |     | B     |     | C    |     | D    |     | E    |    | F    |    | G    |     |
|       | IN         | mm  | IN    | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm  |
| 151R  | 6.88       | 175 | 12.25 | 311 | 9.50 | 241 | 4.12 | 105 | 1.38 | 35 | 1.00 | 25 | 4.62 | 117 |



# Torroidal Current Transformers (Single Ratio) Model 151R

## Model 151R-601

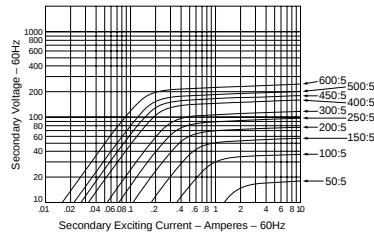
| Catalog Number | Current Rating▲ | Relay Accuracy Class* | DC Resistance (Ohms) | Weight (lb/kg) |    |
|----------------|-----------------|-----------------------|----------------------|----------------|----|
|                |                 |                       |                      | lbs            | kg |
| 151R-601       | 50:5            | —                     | 0.0245               | 63             | 29 |
|                | 100:5           | —                     | 0.0490               |                |    |
|                | 150:5           | —                     | 0.0735               |                |    |
|                | 200:5           | —                     | 0.0979               |                |    |
|                | 250:5           | —                     | 0.1224               |                |    |
|                | 300:5           | —                     | 0.1469               |                |    |
|                | 400:5           | —                     | 0.1959               |                |    |
|                | 450:5           | —                     | 0.2204               |                |    |
|                | 500:5           | —                     | 0.2449               |                |    |
|                | 600:5           | C200                  | 0.2940               |                |    |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Taps in accordance with ANSI Standard C57.13 and NEMA Rating SG-4.

## Excitation Curves–Model 151R-601



## Model 151R-122

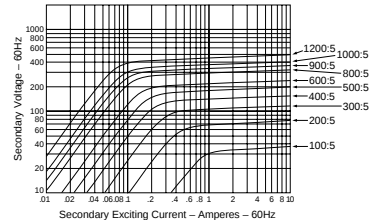
| Catalog Number | Current Rating▲ | Relay Accuracy Class* | DC Resistance (Ohms) at 25 °C | Weight (lb/kg) |    |
|----------------|-----------------|-----------------------|-------------------------------|----------------|----|
|                |                 |                       |                               | lbs            | kg |
| 151R-122       | 50:5            | —                     | 0.0490                        | 63             | 29 |
|                | 100:5           | —                     | 0.0979                        |                |    |
|                | 200:5           | —                     | 0.1469                        |                |    |
|                | 300:5           | —                     | 0.1959                        |                |    |
|                | 400:5           | —                     | 0.2449                        |                |    |
|                | 500:5           | —                     | 0.2938                        |                |    |
|                | 600:5           | —                     | 0.3918                        |                |    |
|                | 800:5           | —                     | 0.4408                        |                |    |
|                | 900:5           | —                     | 0.4897                        |                |    |
|                | 1000:5          | C400                  | 0.5879                        |                |    |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Taps in accordance with ANSI Standard C57.13 and NEMA Rating SG-4.

## Excitation Curves–Model 151R-122



# Torroidal Current Transformers (Single Ratio)

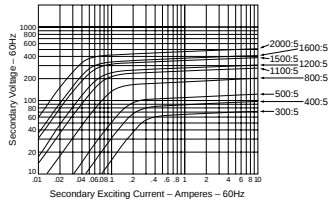
## Model 151R

Model 151R-202

| Catalog Number | Current Rating ▲ | Relay Accuracy Class* | DC Resistance (Ohms) at 25 °C | Weight (lb/kg) |    |
|----------------|------------------|-----------------------|-------------------------------|----------------|----|
|                |                  |                       |                               | lbs            | kg |
| 151R-202       | 300:5            | —                     | 0.1306                        | 63             | 29 |
|                | 400:5            | —                     | 0.1741                        |                |    |
|                | 500:5            | —                     | 0.2177                        |                |    |
|                | 800:5            | —                     | 0.3483                        |                |    |
|                | 1100:5           | —                     | 0.4789                        |                |    |
|                | 1200:5           | —                     | 0.5224                        |                |    |
|                | 1500:5           | —                     | 0.6530                        |                |    |
|                | 1600:5           | —                     | 0.6966                        |                |    |
|                | 2000:5           | C400                  | 0.8711                        |                |    |

\* Accuracy Class only applies to the nominal ratio  
 Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0  
 ▲ Taps in accordance with ANSI Standard C57.13 and NEMA Rating SG-4.

Excitation Curves–Model 151R-202

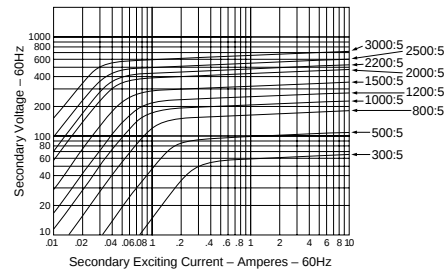


Model 151R-302

| Catalog Number | Current Rating ▲ | Relay Accuracy Class* | DC Resistance (Ohms) at 25 °C | Weight (lb/kg) |    |
|----------------|------------------|-----------------------|-------------------------------|----------------|----|
|                |                  |                       |                               | lbs            | kg |
| 151R-302       | 300:5            | —                     | 0.1239                        | 63             | 29 |
|                | 500:5            | —                     | 0.2064                        |                |    |
|                | 800:5            | —                     | 0.3303                        |                |    |
|                | 1000:5           | —                     | 0.4128                        |                |    |
|                | 1200:5           | —                     | 0.4954                        |                |    |
|                | 1500:5           | —                     | 0.6193                        |                |    |
|                | 2000:5           | —                     | 0.8257                        |                |    |
|                | 2200:5           | —                     | 0.9083                        |                |    |
|                | 2500:5           | —                     | 1.0321                        |                |    |
|                | 3000:5           | C400                  | 1.2391                        |                |    |

\* Accuracy Class only applies to the nominal ratio  
 Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0  
 ▲ Taps in accordance with ANSI Standard C57.13 and NEMA Rating SG-4.

Excitation Curves–Model 151R-302



## Torroidal Current Transformers (Single Ratio) Model 151R

### Model 151R-402

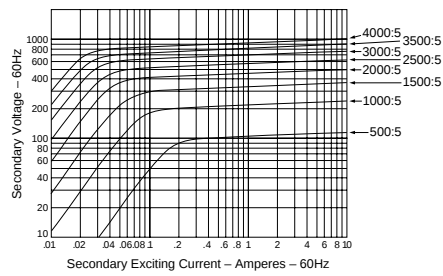
| Catalog Number | Current Rating▲ | Relay Accuracy Class* | DC Resistance (Ohms) | Weight (lb/kg) |    |
|----------------|-----------------|-----------------------|----------------------|----------------|----|
|                |                 |                       |                      | lbs            | kg |
| 151R-402       | 500:5           | —                     | 0.2191               | 63             | 29 |
|                | 1000:5          | —                     | 0.4382               |                |    |
|                | 1500:5          | —                     | 0.6573               |                |    |
|                | 2000:5          | —                     | 0.8764               |                |    |
|                | 2500:5          | —                     | 1.0955               |                |    |
|                | 3000:5          | —                     | 1.3146               |                |    |
|                | 3500:5          | —                     | 1.5337               |                |    |
|                | 4000:5          | C800                  | 1.7536               |                |    |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Taps in accordance with ANSI Standard C57.13 and NEMA Rating SG-4.

### Excitation Curves—Model 151R-402



# Toroidal Current Transformers (Single Ratio)

## Model 152R

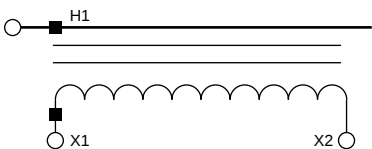


**Model 152R**  
Designed for metering, relaying and other current sensing applications.

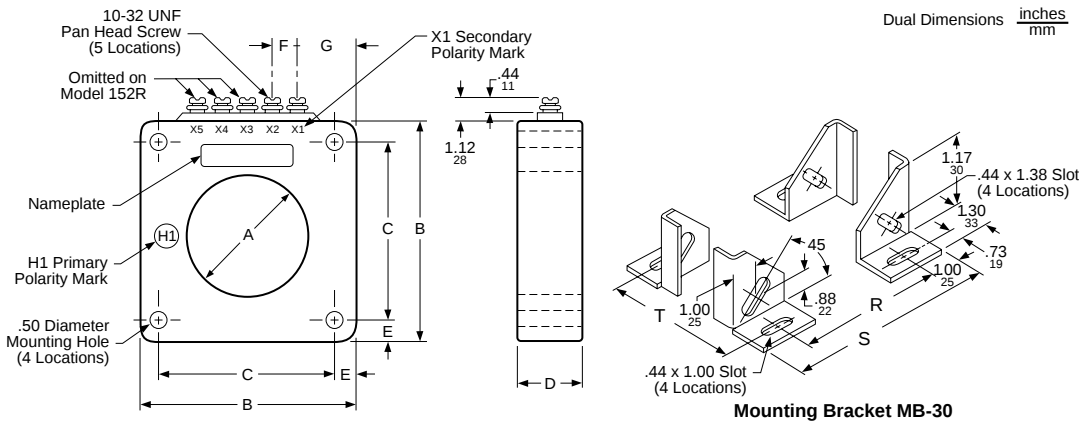
### DESCRIPTION

- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Single Ratio Connection Diagram



### Dimensions



| Mounting Bracket | Dimensions |     |      |     |      |    |
|------------------|------------|-----|------|-----|------|----|
|                  | R          |     | S    |     | T    |    |
|                  | IN         | mm  | IN   | mm  | IN   | mm |
| MB-30            | 4.75       | 121 | 6.91 | 176 | 2.94 | 75 |

| Model | Dimensions |     |       |     |      |     |      |     |      |    |      |    |      |     |
|-------|------------|-----|-------|-----|------|-----|------|-----|------|----|------|----|------|-----|
|       | A          |     | B     |     | C    |     | D    |     | E    |    | F    |    | G    |     |
|       | IN         | mm  | IN    | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm  |
| 152R  | 6.88       | 175 | 12.25 | 311 | 9.50 | 241 | 4.12 | 105 | 1.38 | 35 | 1.00 | 25 | 4.62 | 117 |



# Torroidal Current Transformers (Single Ratio) Model 152R

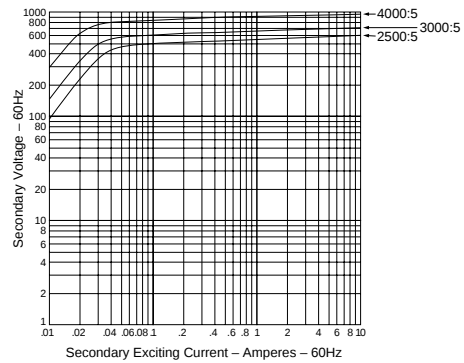
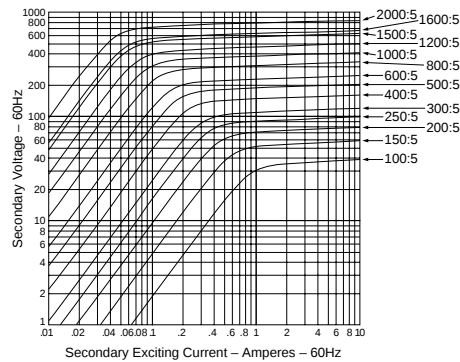
## Model 152R

| Catalog Number | Current Ratio ▲<br>(Amperes) | Relay Accuracy Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |    |
|----------------|------------------------------|----------------------|------------------------------------|------|------|------|------|-------------------------------|--------|----|
|                |                              |                      | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg |
| 152R-500       | 50:5                         | C10                  | 1.2                                | —    | —    | —    | —    | 0.0501                        | 62     | 28 |
| 152R-101       | 100:5                        | C20                  | 1.2                                | 2.4  | —    | —    | —    | 0.0751                        | 62     | 28 |
| 152R-151       | 150:5                        | C50                  | 0.6                                | 1.2  | 2.4  | —    | —    | 0.1002                        | 62     | 28 |
| 152R-201       | 200:5                        | C50                  | 0.6                                | 0.6  | 1.2  | 2.4  | 2.4  | 0.1252                        | 62     | 28 |
| 152R-251       | 250:5                        | C50                  | 0.3                                | 0.6  | 0.6  | 1.2  | 2.4  | 0.1502                        | 63     | 29 |
| 152R-301       | 300:5                        | C100                 | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.2003                        | 63     | 29 |
| 152R-401       | 400:5                        | C100                 | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.2504                        | 63     | 29 |
| 152R-501       | 500:5                        | C100                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.3005                        | 63     | 29 |
| 152R-601       | 600:5                        | C200                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.4006                        | 63     | 29 |
| 152R-801       | 800:5                        | C200                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5008                        | 64     | 29 |
| 152R-102       | 1000:5                       | C200                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.6009                        | 64     | 29 |
| 152R-122       | 1200:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.7511                        | 65     | 30 |
| 152R-152       | 1500:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.8012                        | 66     | 30 |
| 152R-162       | 1600:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.0187                        | 66     | 30 |
| 152R-202       | 2000:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.0501                        | 63     | 29 |
| 152R-252       | 2500:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.0335                        | 64     | 29 |
| 152R-302       | 3000:5                       | C400                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.2402                        | 65     | 30 |
| 152R-402       | 4000:5                       | C800                 | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.7586                        | 63     | 29 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ For a multi-ratio unit equivalent to Model 152R, refer to Model 151R.

## Excitation Curves-Model 152R



# Toroidal Current Transformers (Single Ratio)

## Models 170R and 180R

### DESCRIPTION

- Permanent polarity marks are molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL Full Wave (600 volt class)
- Applicable Standard —ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

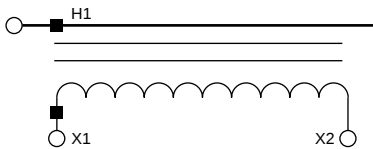


**Model 170R**  
Designed for metering and control relaying applications.

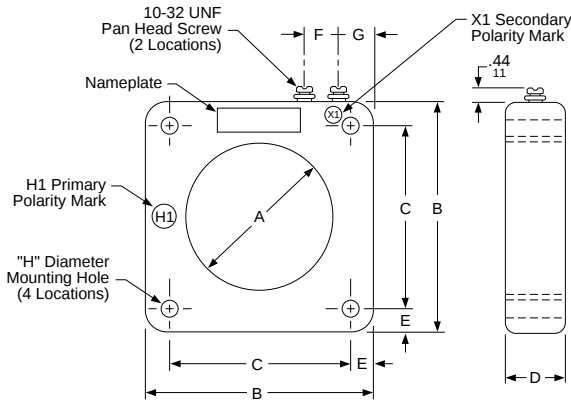


**Model 180R**  
Designed for metering and light-duty control relaying applications.

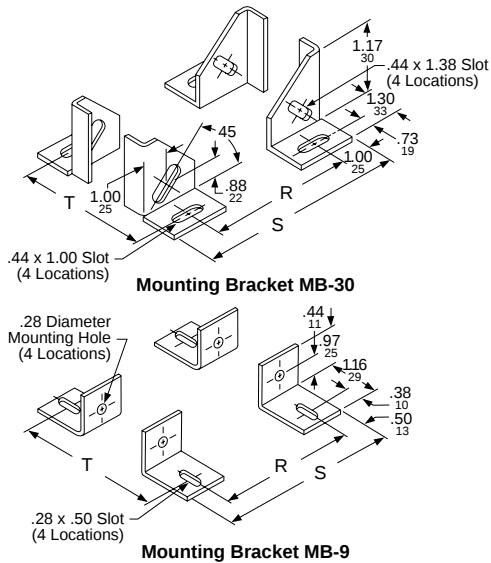
### Single Ratio Connection Diagram



### Dimensions



| Mounting Bracket | Dimensions |     |      |     |      |    |
|------------------|------------|-----|------|-----|------|----|
|                  | R          |     | S    |     | T    |    |
|                  | IN         | mm  | IN   | mm  | IN   | mm |
| MB-9             | 3.50       | 89  | 4.50 | 114 | 3.88 | 99 |
| MB-30            | 4.75       | 121 | 6.91 | 176 | 2.94 | 75 |



Dual Dimensions inches  
mm

| Model | Dimensions |     |      |     |      |     |      |    |      |    |      |    |      |    |      |    | Mounting Bracket |
|-------|------------|-----|------|-----|------|-----|------|----|------|----|------|----|------|----|------|----|------------------|
|       | A          |     | B    |     | C    |     | D    |    | E    |    | F    |    | G    |    | H    |    |                  |
|       | IN         | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm | IN   | mm |                  |
| 170R  | 4.25       | 108 | 6.75 | 171 | 5.41 | 137 | 1.31 | 33 | 0.67 | 17 | 0.78 | 20 | 1.12 | 28 | 0.44 | 11 | MB-30            |
| 180R  | 2.50       | 63  | 4.50 | 114 | 3.50 | 89  | 2.12 | 54 | 0.50 | 13 | 0.69 | 17 | 0.44 | 11 | 0.41 | 10 | MB-9             |



# Torroidal Current Transformers (Single Ratio) Models 170R and 180R

## Model 170R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 170R-201       | 200:5                      | —           | 1.2                                | 0.6  | 2.4  | —    | —    | 0.0298                        | 3.8    | 1.7 |
| 170R-251       | 250:5                      | —           | 0.6                                | 0.6  | 2.4  | —    | —    | 0.0430                        | 3.8    | 1.7 |
| 170R-301       | 300:5                      | —           | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0517                        | 3.8    | 1.7 |
| 170R-401       | 400:5                      | —           | 0.6                                | 0.6  | 0.6  | 1.2  | —    | 0.0488                        | 3.9    | 1.8 |
| 170R-501       | 500:5                      | —           | 0.3                                | 0.6  | 0.6  | 1.2  | —    | 0.0963                        | 4.0    | 1.8 |
| 170R-601       | 600:5                      | —           | 0.3                                | 0.3  | 0.6  | 1.2  | 2.4  | 0.1156                        | 4.0    | 1.8 |
| 170R-751       | 750:5                      | C10         | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1445                        | 4.0    | 1.8 |
| 170R-801       | 800:5                      | C10         | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1541                        | 4.1    | 1.9 |
| 170R-102       | 1000:5                     | C10         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1927                        | 4.1    | 1.9 |
| 170R-122       | 1200:5                     | C10         | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2312                        | 4.2    | 1.9 |
| 170R-152       | 1500:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2367                        | 4.6    | 2.1 |
| 170R-162       | 1600:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2525                        | 4.6    | 2.1 |
| 170R-202       | 2000:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3156                        | 2.8    | 1.3 |
| 170R-252       | 2500:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3885                        | 4.2    | 1.9 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or additional secondary turns.

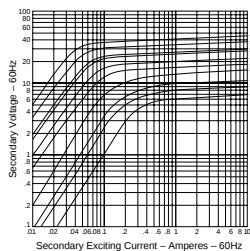
## Model 180R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 180R-101       | 100:5                      | —           | 2.4                                | 2.4  | —    | —    | —    | 0.0273                        | 3.0    | 1.4 |
| 180R-151       | 150:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.0409                        | 3.0    | 1.4 |
| 180R-201       | 200:5                      | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.0505                        | 3.1    | 1.4 |
| 180R-251       | 250:5                      | —           | 0.6                                | 1.2  | 2.4  | 2.4  | —    | 0.0631                        | 3.2    | 1.5 |
| 180R-301       | 300:5                      | —           | 0.6                                | 0.6  | 1.2  | 2.4  | —    | 0.0757                        | 3.3    | 1.5 |
| 180R-401       | 400:5                      | —           | 0.3                                | 0.3  | 0.6  | 1.2  | 2.4  | 0.1091                        | 3.3    | 1.5 |
| 180R-501       | 500:5                      | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1261                        | 3.4    | 1.5 |
| 180R-601       | 600:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1514                        | 3.6    | 1.6 |
| 180R-751       | 750:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1892                        | 3.6    | 1.6 |
| 180R-801       | 800:5                      | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1620                        | 3.6    | 1.6 |
| 180R-102       | 1000:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.1741                        | 3.3    | 1.5 |
| 180R-122       | 1200:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2089                        | 3.4    | 1.5 |
| 180R-152       | 1500:5                     | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2641                        | 3.5    | 1.6 |

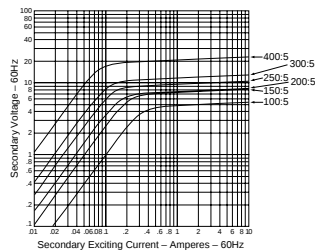
Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or additional secondary turns.

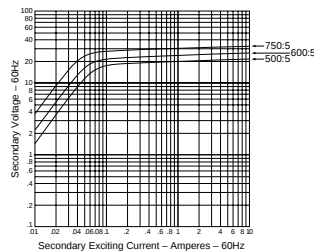
## Excitation Curves—Models 170R and 180R



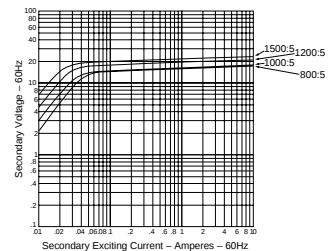
170R



180R



180R



180R



# Toroidal Current Transformers (Single Ratio)

## Models 200R and 201R



**Model 200R**  
Designed for metering and relaying applications.

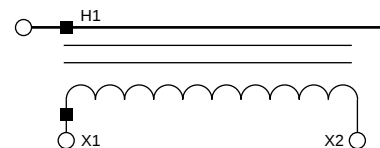


**Model 201R**  
Designed for metering and relaying applications

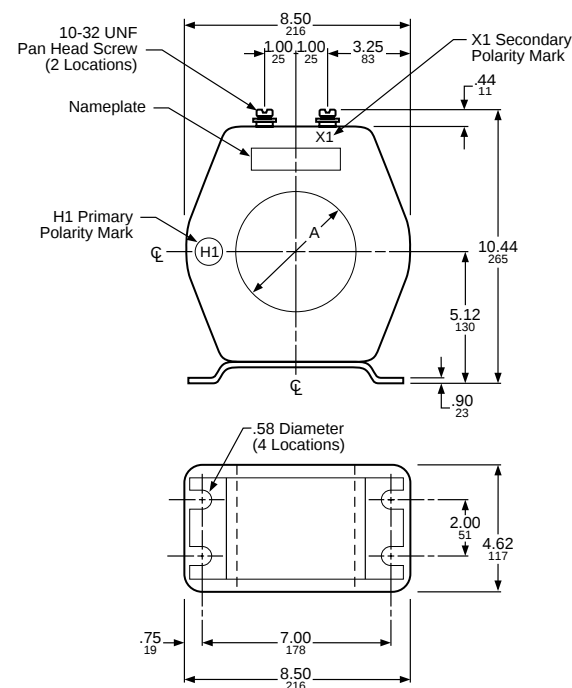
### DESCRIPTION

- High-burden capacity design in a choice of small to medium window sizes.
- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Standard models include a mounting base. If not required, please specify “Less Base.”
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Single Ratio Connection Diagram



### Dimensions



Dual Dimensions  $\frac{\text{inches}}{\text{mm}}$

| Model | Dimension A |     |
|-------|-------------|-----|
|       | IN          | mm  |
| 200R  | 2.50        | 63  |
| 201R  | 3.50        | 89  |
| 202R  | 4.50        | 114 |
| 203R  | 5.25        | 133 |



# Torroidal Current Transformers (Single Ratio) Models 200R and 201R

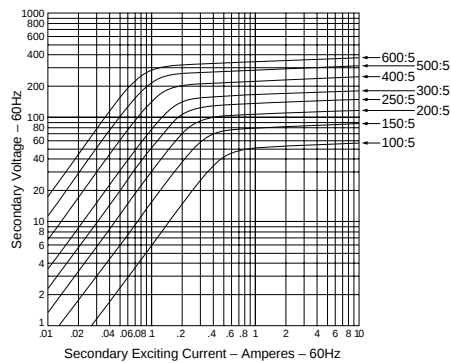
## Model 200R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 200R-101       | 100:5                      | C50         | 0.6                                | 1.2  | 1.2  | —    | —    | 0.0596                        | 51.2   | 23.2 |
| 200R-151       | 150:5                      | C50         | 0.3                                | 0.6  | 0.6  | 1.2  | 2.4  | 0.0894                        | 51.3   | 23.2 |
| 200R-201       | 200:5                      | C100        | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1191                        | 51.5   | 23.4 |
| 200R-251       | 250:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1489                        | 51.7   | 23.5 |
| 200R-301       | 300:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.1787                        | 51.8   | 23.5 |
| 200R-401       | 400:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2383                        | 52.1   | 23.7 |
| 200R-501       | 500:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2979                        | 52.4   | 23.8 |
| 200R-601       | 600:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3574                        | 52.7   | 23.9 |

Rating Factor 30 °C Ambient Temp. = 1.5

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves—Model 200R



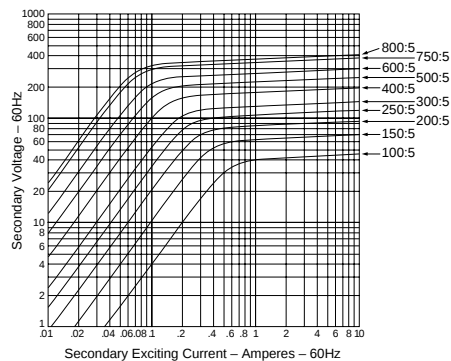
## Model 201R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 201R-101       | 100:5                      | C20         | 1.2                                | 1.2  | 2.4  | 2.4  | —    | 0.0551                        | 45.0   | 20.4 |
| 201R-151       | 150:5                      | C50         | 0.3                                | 0.6  | 1.2  | 2.4  | 2.4  | 0.0826                        | 45.2   | 20.5 |
| 201R-201       | 200:5                      | C50         | 0.3                                | 0.3  | 0.6  | 1.2  | 2.4  | 0.1101                        | 45.3   | 20.6 |
| 201R-251       | 250:5                      | C100        | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1377                        | 45.5   | 20.7 |
| 201R-301       | 300:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.6  | 1.2  | 0.1652                        | 45.6   | 20.7 |
| 201R-401       | 400:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2203                        | 45.9   | 20.8 |
| 201R-501       | 500:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2753                        | 46.2   | 21.0 |
| 201R-601       | 600:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3304                        | 46.5   | 21.1 |
| 201R-751       | 750:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4130                        | 47.0   | 21.3 |
| 201R-801       | 800:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4405                        | 47.2   | 21.4 |

Rating Factor 30 °C Ambient Temp. = 1.5

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves—Model 201R



# Toroidal Current Transformers (Single Ratio)

## Models 202R and 203R



**Model 202R**  
Designed for metering and control relaying applications.

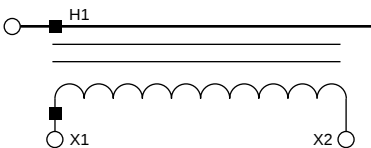


**Model 203R**  
Designed for metering and relaying applications.

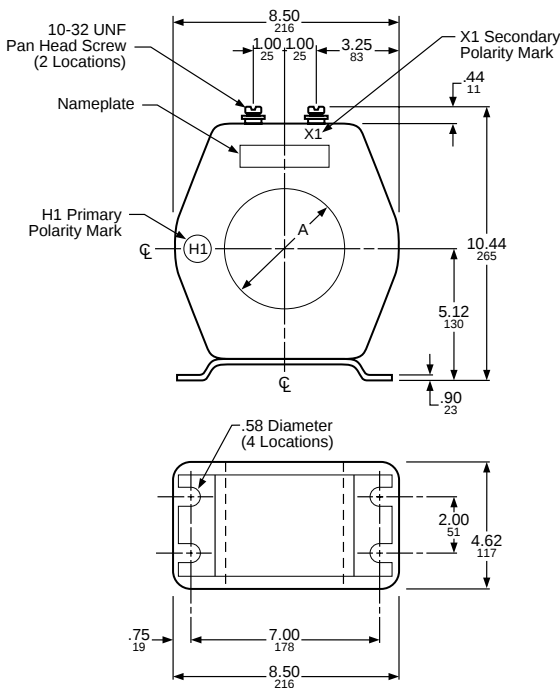
### DESCRIPTION

- High-burden capacity design in a choice of small to medium window sizes.
- Permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Standard modes include a mounting base. If not required, please specify “Less Base.”
- Frequency: 25-400 Hz.
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Single Ratio Connection Diagram



### Dimensions



Dual Dimensions  $\frac{\text{inches}}{\text{mm}}$

| Model | Dimension A |     |
|-------|-------------|-----|
|       | IN          | mm  |
| 202R  | 4.50        | 114 |
| 203R  | 5.25        | 133 |



# Torroidal Current Transformers (Single Ratio) Models 202R and 203R

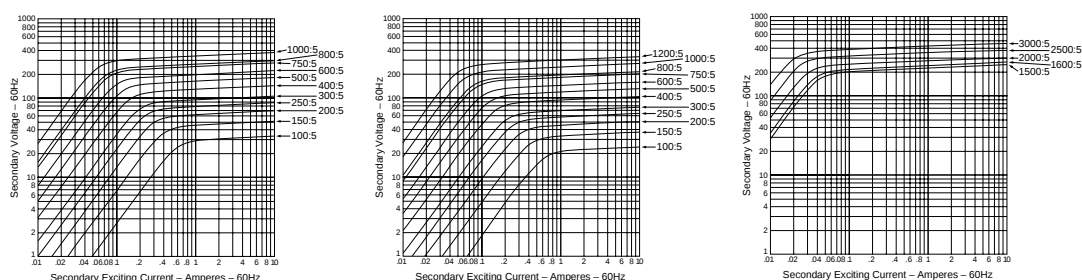
## Model 202R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 202R-101       | 100:5                      | C20         | 1.2                                | 2.4  | 2.4  | —    | —    | 0.0506                        | 36.8   | 16.7 |
| 202R-151       | 150:5                      | C20         | 1.2                                | 1.2  | 2.4  | 2.4  | —    | 0.0758                        | 37.1   | 16.8 |
| 202R-201       | 200:5                      | C50         | 0.3                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.1011                        | 37.3   | 16.9 |
| 202R-251       | 250:5                      | C50         | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1264                        | 37.5   | 17.0 |
| 202R-301       | 300:5                      | C50         | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1517                        | 37.7   | 17.1 |
| 202R-401       | 400:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.2023                        | 38.0   | 17.3 |
| 202R-501       | 500:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2528                        | 38.2   | 17.3 |
| 202R-601       | 600:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3034                        | 38.5   | 17.5 |
| 202R-751       | 750:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3792                        | 38.8   | 17.6 |
| 202R-801       | 800:5                      | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4045                        | 39.0   | 17.7 |
| 202R-102       | 1000:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5056                        | 39.5   | 17.9 |

Rating Factor 30 °C Ambient Temp. = 1.5

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves–Model 202R



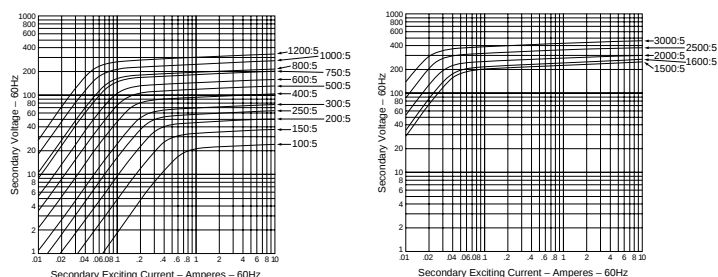
## Model 203R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 203R-101       | 100:5                      | C20         | 1.2                                | 2.4  | —    | —    | —    | 0.0475                        | 30.5   | 13.8 |
| 203R-102       | 1000:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.4751                        | 26.0   | 11.8 |
| 203R-122       | 1200:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.5701                        |        |      |
| 203R-151       | 150:5                      | C20         | 0.6                                | 1.2  | 2.4  | 2.4  | —    | 0.0713                        | 30.6   | 13.9 |
| 203R-152       | 1500:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.6622                        |        |      |
| 203R-162       | 1600:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.7063                        |        |      |
| 203R-201       | 200:5                      | C20         | 0.3                                | 0.6  | 1.2  | 2.4  | 2.4  | 0.0950                        | 30.7   | 13.9 |
| 203R-202       | 2000:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.8494                        |        |      |
| 203R-251       | 250:5                      | C20         | 0.3                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.1188                        | 30.8   | 14.0 |
| 203R-252       | 2500:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.0618                        |        |      |
| 203R-301       | 300:5                      | C50         | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.1425                        | 30.9   | 14.0 |
| 203R-302       | 3000:5                     | C200        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.3030                        |        |      |
| 203R-401       | 400:5                      | C50         | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.1900                        | 31.1   | 14.1 |
| 203R-501       | 500:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2375                        | 31.3   | 14.2 |
| 203R-601       | 600:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.2851                        | 31.5   | 14.3 |
| 203R-750       | 750:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.2563                        | 31.8   | 14.4 |
| 203R-801       | 800:5                      | C100        | 0.3                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.3801                        | 31.9   | 14.5 |

Rating Factor 30 °C Ambient Temp. = 1.5

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Excitation Curves–Model 203R



## Torroidal Current Transformers (Single Ratio) Models 210R



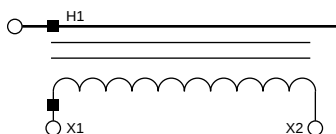
### Model 210R

Designed for metering and relaying applications.

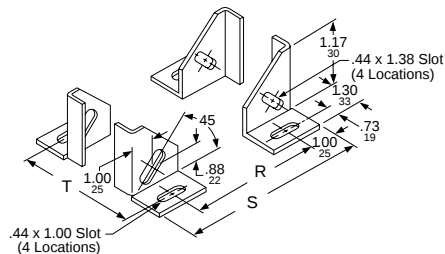
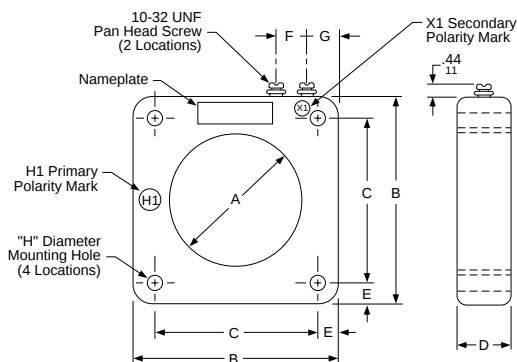
## DESCRIPTION

- Secondary terminals are easy-to-install #10-32 brass screws.
- Optional mounting brackets are shipped unassembled.
- Frequency: 25-400 Hz (Modes 210R and 260R).
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

### Single Ratio Connection Diagram



## Dimensions



## Mounting Bracket MB-31 and M

Dual Dimensions  $\frac{\text{inches}}{\text{mm}}$ 

| Mounting Bracket | Dimensions |     |      |     |      |     |
|------------------|------------|-----|------|-----|------|-----|
|                  | R          |     | S    |     | T    |     |
|                  | IN         | mm  | IN   | mm  | IN   | mm  |
| MB-31            | 7.50       | 191 | 9.19 | 233 | 4.50 | 114 |
| MB-32            | 7.50       | 191 | 9.19 | 233 | 4.50 | 114 |

| Model | Dimensions |     |      |     |      |     |      |    |      |    |      |    |      |    |      | Mounting<br>Bracket<br>MB-32 |    |
|-------|------------|-----|------|-----|------|-----|------|----|------|----|------|----|------|----|------|------------------------------|----|
|       | A          |     | B    |     | C    |     | D    |    | E    |    | F    |    | G    |    | H    |                              |    |
|       | IN         | mm  | IN   | mm  | IN   | mm  | IN   | mm | IN   | mm | IN   | mm | IN   | mm | IN   |                              | mm |
| 210R  | 6.25       | 159 | 9.50 | 241 | 7.75 | 197 | 2.87 | 73 | 0.87 | 22 | 1.25 | 32 | 1.50 | 38 | 0.53 | 13                           |    |

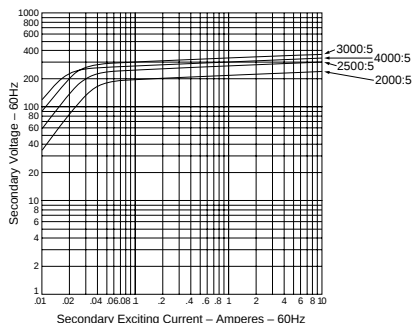
## Model 210R

| Catalog Number | Current Rating ▲<br>(Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance<br>(Ohms) at 25 °C | Weight |     |
|----------------|-------------------------------|-------------|------------------------------------|------|------|------|------|----------------------------------|--------|-----|
|                |                               |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                                  | lb     | kg  |
| 210R-122       | 1200:5                        | 100         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | —                                | 6.5    | 3.0 |
| 210R-162       | 1600:5                        | 100         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | —                                | —      | —   |
| 210R-202       | 2000:5                        | 100         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.7641                           | 17.6   | 8.0 |
| 210R-252       | 2500:5                        | 200         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.7645                           | 19.0   | 8.6 |
| 210R-302       | 3000:5                        | 200         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | 0.9095                           | 19.0   | 8.6 |
| 210R-402       | 4000:5                        | 200         | .03                                | 0.3  | 0.3  | 0.3  | 0.3  | 1.1517                           | 17.0   | 7.7 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0 (models 210R-302 and -402 = .075 at 55 °C)

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves–Model 210R



## Torroidal Current Transformers (Single Ratio) Models 210R



Toroidal Current Transformers (Single Ratio)  
Model 312R



Model 312R

Designed for relaying and other current sensing applications.

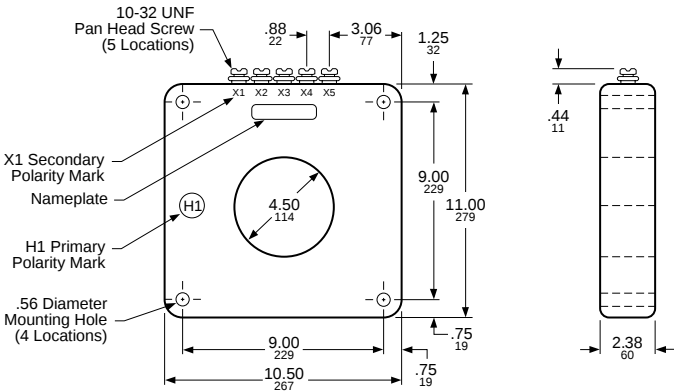
DESCRIPTION

- High-burden capacity design for installation over the ground shield in a current transformer pocket of a high voltage apparatus bushing.
- Permanent polarity marks are molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easier installation.
- Windings are completely distributed around the core on each tap, resulting in a low reactance on all taps.
- Mounting holes are provided for bolting the unit around a power transformer or circuit breaker bushing.
- Frequency: 60 Hz.
- Insulation: 10 kV BIL full wave (600 volt class)
- Applicable Standard — ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

Connections and Connection Diagrams

| Model 312R-601     |                                | Model 312R-122     |                                | Model 312R-202     |                                | Model 312R-302     |                                | Model 312R-402     |                                |
|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|--------------------|--------------------------------|
|                    |                                |                    |                                |                    |                                |                    |                                |                    |                                |
| Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections | Current Rating (A) | Secondary Terminal Connections |
| 50:5               | X2-X3                          | 100:5              | X2-X3                          | 300:5              | X3-X4                          | 300:5              | X3-X4                          | 500:5              | X1-X2                          |
| 100:5              | X1-X2                          | 200:5              | X1-X2                          | 400:5              | X1-X2                          | 500:5              | X4-X5                          | 1000:5             | X3-X4                          |
| 150:5              | X1-X3                          | 300:5              | X1-X3                          | 500:5              | X4-X5                          | 800:5              | X3-X5                          | 1500:5             | X2-X3                          |
| 200:5              | X4-X5                          | 400:5              | X4-X5                          | 800:5              | X2-X3                          | 1000:5             | X1-X2                          | 2000:5             | X1-X3                          |
| 250:5              | X3-X4                          | 500:5              | X3-X4                          | 1100:5             | X2-X4                          | 1200:5             | X2-X3                          | 2500:5             | X2-X4                          |
| 300:5              | X2-X4                          | 600:5              | X2-X4                          | 1200:5             | X1-X3                          | 1500:5             | X2-X4                          | 3000:5             | X1-X4                          |
| 400:5              | X1-X4                          | 800:5              | X1-X4                          | 1500:5             | X1-X4                          | 2000:5             | X2-X5                          | 3500:5             | X2-X5                          |
| 450:5              | X3-X5                          | 900:5              | X3-X5                          | 1600:5             | X2-X5                          | 2200:5             | X1-X3                          | 4000:5             | X1-X5                          |
| 500:5              | X2-X5                          | 1000:5             | X2-X5                          | 2000:5             | X1-X5                          | 2500:5             | X1-X4                          | —                  | —                              |
| 600:5              | X1-X5                          | 1200:5             | X1-X5                          | —                  | —                              | 3000:5             | X1-X5                          | —                  | —                              |

Dimensions



Note: Model 311R is supplied with four (4) mounting holes molded into case. Mounting brackets not required.

Dual Dimensions  $\frac{\text{inches}}{\text{mm}}$



# Torroidal Current Transformers (Single Ratio) Model 312R

## Model 312R-601

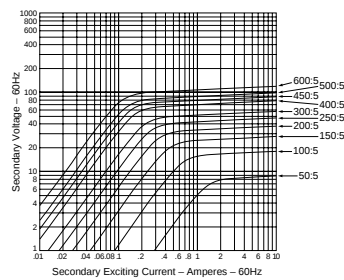
| Catalog Number | Current Ratio ▲ (Amperes) | Relay Accuracy Class* | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|---------------------------|-----------------------|-------------------------------|--------|------|
|                |                           |                       |                               | lb     | kg   |
| 312R-601       | 50:5                      | —                     | 0.0167                        | 27     | 12.3 |
|                | 100:5                     | —                     | 0.0335                        |        |      |
|                | 150:5                     | —                     | 0.0502                        |        |      |
|                | 200:5                     | —                     | 0.0669                        |        |      |
|                | 250:5                     | —                     | 0.0837                        |        |      |
|                | 300:5                     | —                     | 0.1004                        |        |      |
|                | 400:5                     | —                     | 0.1339                        |        |      |
|                | 450:5                     | —                     | 0.1506                        |        |      |
|                | 500:5                     | —                     | 0.1674                        |        |      |
|                | 600:5                     | C100                  | 0.2009                        |        |      |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.5, Rating Factor 55 °C Ambient Temp. = 1.33

▲ Taps in accordance with ANSI C57.13 and NEMA SG-4

## Excitation Curves–312R-601



## Model 312R-122

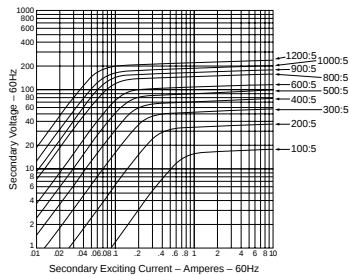
| Catalog Number | Current Ratio ▲ (Amperes) | Relay Accuracy Class | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|---------------------------|----------------------|-------------------------------|--------|------|
|                |                           |                      |                               | lb     | kg   |
| 312R-122       | 300:5                     | —                    | 0.0335                        | 28     | 12.7 |
|                | 400:5                     | —                    | 0.0669                        |        |      |
|                | 500:5                     | —                    | 0.1004                        |        |      |
|                | 800:5                     | —                    | 0.1339                        |        |      |
|                | 1100:5                    | —                    | 0.1674                        |        |      |
|                | 1200:5                    | —                    | 0.2008                        |        |      |
|                | 1500:5                    | —                    | 0.2678                        |        |      |
|                | 1600:5                    | —                    | 0.3013                        |        |      |
|                | 2000:5                    | C200                 | 0.3347                        |        |      |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.5, Rating Factor 55 °C Ambient Temp. = 1.33

▲ Taps in accordance with ANSI C57.13 and NEMA SG-4.

## Excitation Curves–Model 312R-122



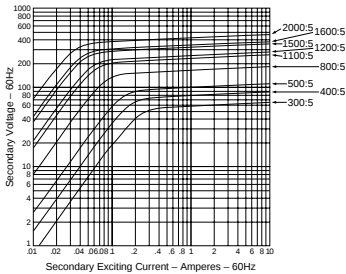
Torroidal Current Transformers (Single Ratio)  
Model 312R

Model 312R-202

| Catalog Number | Current Ratio ▲ (Amperes) | Relay Accuracy Class | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|---------------------------|----------------------|-------------------------------|--------|------|
|                |                           |                      |                               | lb     | kg   |
| 312R-202       | 300:5                     | —                    | 0.1103                        | 34     | 15.4 |
|                | 400:5                     | —                    | 0.1470                        |        |      |
|                | 500:5                     | —                    | 0.1838                        |        |      |
|                | 800:5                     | —                    | 0.2941                        |        |      |
|                | 1100:5                    | —                    | 0.4044                        |        |      |
|                | 1200:5                    | —                    | 0.4411                        |        |      |
|                | 1500:5                    | —                    | 0.5514                        |        |      |
|                | 1600:5                    | —                    | 0.5882                        |        |      |
|                | 2000:5                    | C400                 | 0.7356                        |        |      |

\* Accuracy Class only applies to the nominal ratio  
Rating Factor 30 °C Ambient Temp. = 1.5, Rating Factor 55 °C Ambient Temp. = 1.33  
▲ Taps in accordance with ANSI C57.13 and NEMA SG-4

.Excitation Curves–Model 312R-202

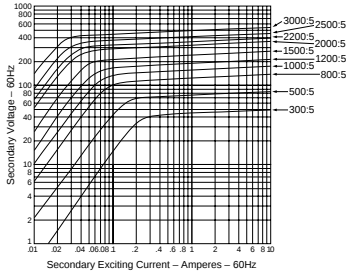


Model 312R-302

| Catalog Number | Current Ratio ▲ (Amperes) | Relay Accuracy Class | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|---------------------------|----------------------|-------------------------------|--------|------|
|                |                           |                      |                               | lb     | kg   |
| 312R-302       | 300:5                     | —                    | 0.1016                        | 33     | 15.0 |
|                | 500:5                     | —                    | 0.1693                        |        |      |
|                | 800:5                     | —                    | 0.2709                        |        |      |
|                | 1000:5                    | —                    | 0.3386                        |        |      |
|                | 1200:5                    | —                    | 0.4063                        |        |      |
|                | 1500:5                    | —                    | 0.5079                        |        |      |
|                | 2000:5                    | —                    | 0.6772                        |        |      |
|                | 2200:5                    | —                    | 0.7449                        |        |      |
|                | 2500:5                    | —                    | 0.8465                        |        |      |
|                | 3000:5                    | C400                 | 1.0162                        |        |      |

\* Accuracy Class only applies to the nominal ratio  
Rating Factor 30 °C Ambient Temp. = 1.5, Rating Factor 55 °C Ambient Temp. = 1.33  
▲ Taps in accordance with ANSI C57.13 and NEMA SG-4.

Excitation Curves–Model 312R-302



## Torroidal Current Transformers (Single Ratio) Model 312R

### Model 312R-402

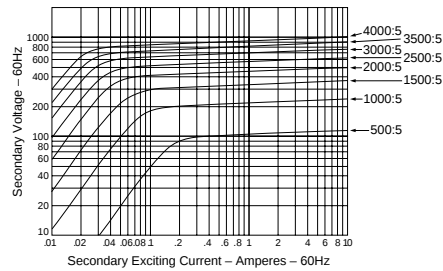
| Catalog Number | Current Ratio ▲ (Amperes) | Relay Accuracy Class | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|---------------------------|----------------------|-------------------------------|--------|------|
|                |                           |                      |                               | lb     | kg   |
| 312R-402       | 500:5                     | —                    | 0.1016                        | 30     | 13.6 |
|                | 1000:5                    | —                    | 0.1693                        |        |      |
|                | 1500:5                    | —                    | 0.2709                        |        |      |
|                | 2000:5                    | —                    | 0.3386                        |        |      |
|                | 2500:5                    | —                    | 0.4063                        |        |      |
|                | 3000:5                    | —                    | 0.5079                        |        |      |
|                | 3500:5                    | —                    | 0.6772                        |        |      |
|                | 4000:5                    | C400                 | 0.7449                        |        |      |

\* Accuracy Class only applies to the nominal ratio

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

▲ Taps in accordance with ANSI C57.13 and NEMA SG-4.

### Excitation Curves—Model 312R-402



Rectangular Window Current Transformers (Single Ratio)  
Models 260R and 560R



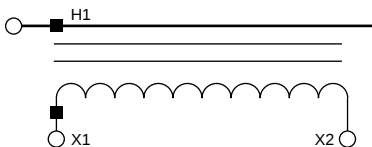
Model 260R

Designed for metering applications with minimum clearances.

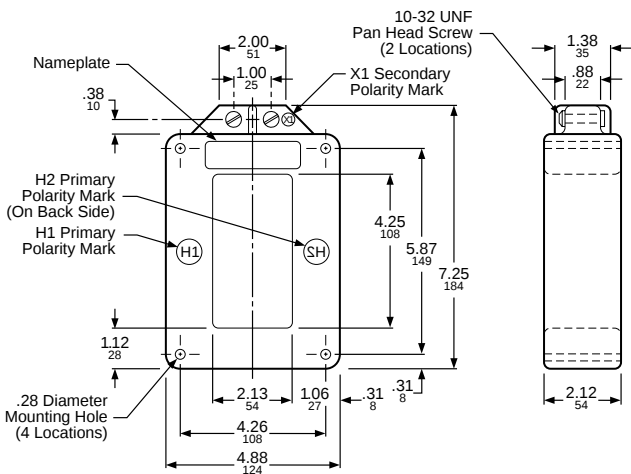
DESCRIPTION

- Features rectangular window for bus conductor applications with minimum clearance requirements.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Frequency: 25-400 Hz (Modes 210R and 260R).
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.

Single Ratio Connection Diagram



Dimensions–Model 260R



Note: Model 260R is supplied with four (4) mounting holes molded in case. Mounting brackets not required.

Dual Dimensions inches  
mm

Model 260R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 260R-101       | 100:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.0304                        | 7.5    | 3.4 |
| 260R-151       | 150:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.0193                        | 7.5    | 3.4 |
| 260R-201       | 200:5                      | —           | 1.2                                | 1.2  | —    | —    | —    | 0.0258                        | 7.5    | 3.4 |
| 260R-301       | 300:5                      | —           | 0.6                                | 0.6  | —    | —    | —    | 0.0290                        | 7.5    | 3.4 |
| 260R-401       | 400:5                      | —           | 0.6                                | 0.6  | —    | —    | —    | 0.0355                        | 7.5    | 3.4 |
| 260R-601       | 600:5                      | —           | 0.3                                | 0.3  | —    | —    | —    | 0.0548                        | 7.0    | 3.2 |
| 260R-801       | 800:5                      | —           | 0.3                                | 0.3  | —    | —    | —    | 1.663                         | 7.0    | 3.2 |
| 260R-122       | 1200:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 2.000                         | 6.5    | 3.0 |
| 260R-162       | 1600:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 2.442                         | 5.5    | 2.5 |
| 260R-202       | 2000:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 3.222                         | 6.0    | 3.4 |
| 260R-252       | 2500:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 5.429                         | 5.5    | 2.7 |
| 260R-302       | 3000:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 6.859                         | 5.5    | 2.7 |
| 260R-402       | 4000:5                     | —           | 0.3                                | 0.3  | —    | —    | —    | 1.193                         | 6.0    | 3.4 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

Models 260R-252, -302, and -402 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.



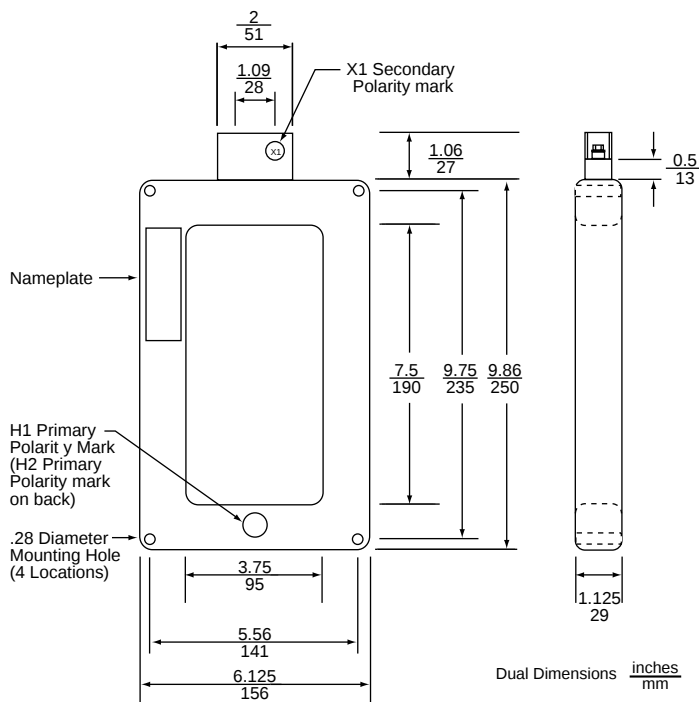
## Rectangular Window Current Transformers (Single Ratio)

### Models 260R and 560R

### Dimensions—Model 560R



**Model 560R**  
Designed for metering applications



## Model 560R

| Catalog Number | Current Rating ▲<br>(Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |      |
|----------------|-------------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|------|
|                |                               |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg   |
| 560R-401       | 400:5                         | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.0783                        | 4.25   | 1.95 |
| 560R-501       | 500:5                         | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.0987                        | 4.30   | 1.95 |
| 560R-601       | 600:5                         | —           | 0.6                                | 0.6  | 1.2  | 2.4  | 2.4  | 0.1174                        | 4.35   | 1.97 |
| 560R-751       | 750:5                         | —           | 0.6                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.1467                        | 4.42   | 2.00 |
| 560R-801       | 800:5                         | —           | 0.6                                | 0.6  | 1.2  | 1.2  | 2.4  | 0.1565                        | 4.45   | 2.02 |
| 560R-102       | 1000:5                        | —           | 0.3                                | 0.3  | 0.6  | 1.2  | 1.2  | 0.2348                        | 4.55   | 2.06 |
| 560R-122       | 1200:5                        | —           | 0.3                                | 0.3  | 0.6  | 0.6  | 1.2  | 0.2935                        | 4.65   | 2.11 |
| 560R-152       | 1500:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.3130                        | 4.80   | 2.18 |
| 560R-162       | 1600:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.2935                        | 4.85   | 2.20 |
| 560R-202       | 2000:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.6  | 0.6  | 0.3237                        | 3.69   | 1.67 |
| 560R-252       | 2500:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.4046                        | 3.90   | 1.77 |
| 560R-302       | 3000:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.4855                        | 4.10   | 1.86 |
| 560R-322       | 3200:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.5179                        | 4.19   | 1.90 |
| 560R-402       | 4000:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.3937                        | 2.46   | 1.11 |
| 560R-502       | 5000:5                        | —           | 0.3                                | 0.3  | 0.3  | 0.3  | 0.6  | 0.4921                        | 2.71   | 1.23 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

Models 260R-252, -302, and -402 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

## Split Core Current Transformers (Single Ratio)

### Models 270R and 273



**Model 270R**

Split core design for load surveying, ground fault relaying and metering applications.

#### DESCRIPTION

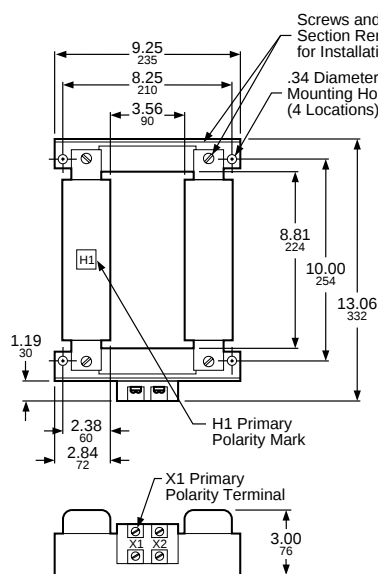
- Model 270R features a split core design for easy installation over an existing bus or cable conductor. Window length or width may be increased or decreased as an option.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easy installation.
- Mounting brackets provided with transformer.
- Frequency: 60 Hz (Model 270R and 273).
- Insulation: 10 kV BIL full wave (600 volt class).
- Applicable Standard – ANSI C57.13.
- UL and CUL recognized per Classification XODW2.



**Model 273**

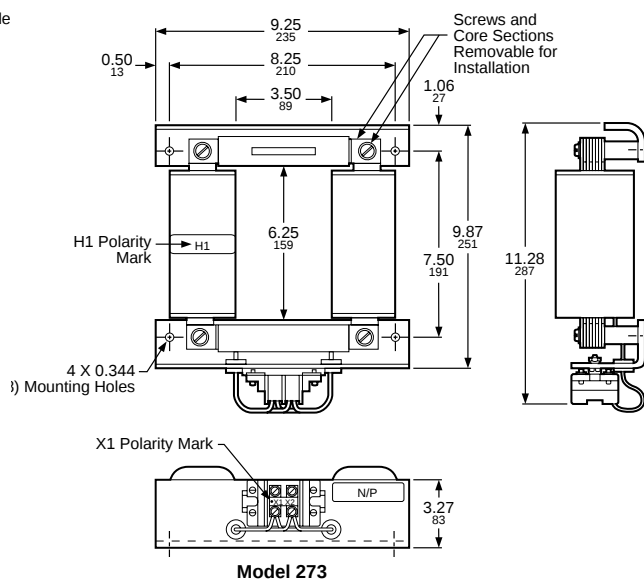
Designed for load surveying and current measurement on non-revenue metering and energy management applications.

#### Dimensions



**Note:** Model 270R is supplied with four (4) mounting holes in frame. Mounting brackets not required.

**Model 270R**



**Model 273**

Dual Dimensions  $\frac{\text{inches}}{\text{mm}}$



## Split Core Current Transformers (Single Ratio) Models 780R and 785R (Single Ratio)

### Model 270R

| Catalog Number | Current Rating ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |      |      |      |      | DC Resistance (Ohms) at 25 °C | Weight |     |
|----------------|----------------------------|-------------|------------------------------------|------|------|------|------|-------------------------------|--------|-----|
|                |                            |             | B0.1                               | B0.2 | B0.5 | B0.9 | B1.8 |                               | lb     | kg  |
| 270R-401       | 400:5                      | —           | —                                  | —    | —    | —    | —    | 0.08                          | 12.0   | 5.4 |
| 270R-501       | 500:5                      | —           | —                                  | —    | —    | —    | —    | 0.10                          | 12.0   | 5.4 |
| 270R-601       | 600:5                      | —           | —                                  | —    | —    | —    | —    | 0.12                          | 12.0   | 5.4 |
| 270R-801       | 800:5                      | —           | 1.2                                | 2.4  | —    | —    | —    | 0.16                          | 12.0   | 5.4 |
| 270R-102       | 1000:5                     | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.20                          | 12.1   | 5.4 |
| 270R-122       | 1200:5                     | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.24                          | 12.4   | 5.6 |
| 270R-152       | 1500:5                     | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.30                          | 12.8   | 5.8 |
| 270R-162       | 1600:5                     | —           | 1.2                                | 1.2  | 2.4  | —    | —    | 0.32                          | 12.9   | 5.9 |
| 270R-202       | 2000:5                     | —           | 1.2                                | 1.2  | 1.2  | 2.4  | —    | 0.40                          | 13.2   | 6.0 |
| 270R-252       | 2500:5                     | —           | 1.2                                | 1.2  | 1.2  | 2.4  | —    | 0.53                          | 14.0   | 6.4 |
| 270R-302       | 3000:5                     | —           | 1.2                                | 1.2  | 1.2  | 1.2  | 2.4  | 0.65                          | 14.4   | 6.5 |
| 270R-402       | 4000:5                     | —           | 1.2                                | 1.2  | 1.2  | 1.2  | 1.2  | 0.89                          | 15.6   | 7.1 |
| 270R-502       | 5000:5                     | —           | 1.2                                | 1.2  | 1.2  | 1.2  | 1.2  | 1.19                          | 16.7   | 7.6 |

Rating Factor 30 °C Ambient Temp. = 1.33, Rating Factor 55 °C Ambient Temp. = 1.0

Models 270R--302, -402, and -502 Rating Factor 30 °C Ambient Temp. = 1.0, Rating Factor 55 °C Ambient Temp. = 0.75

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Model 273R

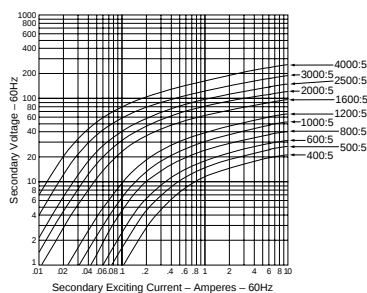
| Catalog Number | Current Ratio ▲ (Amperes) | Relay Class | ANSI Metering Accuracy Class-60 Hz |              |                 |                 |               | DC Resistance (Ohms) at 25 °C |
|----------------|---------------------------|-------------|------------------------------------|--------------|-----------------|-----------------|---------------|-------------------------------|
|                |                           |             | B0.1<br>2.5 VA                     | B0.2<br>5 VA | B0.5<br>12.5 VA | B0.9<br>22.5 Va | B1.8<br>45 VA |                               |
| 273-201        | 200:5                     | —           | —                                  | —            | —               | —               | —             | 0.04                          |
| 273-251        | 250:5                     | —           | —                                  | —            | —               | —               | —             | 0.045                         |
| 273-301        | 300:5                     | —           | 2.4                                | —            | —               | —               | —             | 0.055                         |
| 273-401        | 400:5                     | —           | 2.4                                | —            | —               | —               | —             | 0.075                         |
| 273-501        | 500:5                     | —           | 2.4                                | —            | —               | —               | —             | 0.095                         |
| 273-601        | 600:5                     | —           | 2.4                                | 2.4          | —               | —               | —             | 0.12                          |
| 273-801        | 800:5                     | —           | 1.2                                | 2.4          | —               | —               | —             | 0.16                          |
| 273-102        | 1000:5                    | —           | 1.2                                | 1.2          | 2.4             | —               | —             | 0.21                          |
| 273-122        | 1200:5                    | —           | 1.2                                | 1.2          | 2.4             | —               | —             | 0.25                          |
| 273-162        | 1600:5                    | —           | 1.2                                | 1.2          | 2.4             | —               | —             | 0.34                          |
| 273-202        | 2000:5                    | —           | 1.2                                | 1.2          | 1.2             | 2.4             | —             | 0.45                          |
| 273-252        | 2500:5                    | —           | 1.2                                | 1.2          | 1.2             | 2.4             | —             | 0.55                          |
| 273-302        | 3000:5                    | —           | 1.2                                | 1.2          | 1.2             | 1.2             | 2.4           | 0.69                          |
| 273-402        | 4000:5                    | —           | 1.2                                | 1.2          | 1.2             | 1.2             | 1.2           | 0.95                          |

Rating Factor 30 °C Ambient Temp. = 1.33

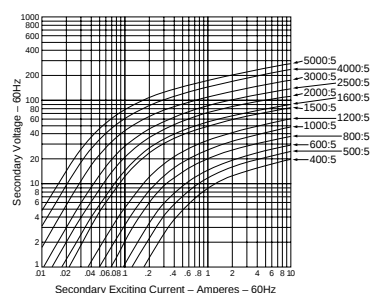
Models 273R--302 and -402 Rating Factor 30 °C Ambient Temp. = 1.0

▲ Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 52 for other ratios using multiple primary turns or secondary turns.

### Excitation Curves—Model 270R and 273R



**Model 270R**



**Model 273R**



## Bushing Current Transformers, 50–400Hz Models 780R and 785R (Single Ratio)

### Model 780R

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification - 60 Hz Metering Class |       |       |       |       |
|---------------------|----------------|--------------------|-------------|-----------------------------------------------------|-------|-------|-------|-------|
|                     |                |                    |             | B-0.1                                               | B-0.2 | B-0.5 | B-0.9 | B-1.8 |
| 6.5 in.<br>(165 mm) | 780R500        | 50:5               | —           | —                                                   | —     | —     | —     | —     |
|                     | 780R750        | 75:5               | C10         | 1.2                                                 | 2.4   | —     | —     | —     |
|                     | 780R101        | 100:5              | C10         | 2.4                                                 | 2.4   | —     | —     | —     |
|                     | 780R151        | 150:5              | C20         | 0.6                                                 | 1.2   | —     | —     | —     |
|                     | 780R201        | 200:5              | C20         | 0.6                                                 | 1.2   | 2.4   | —     | —     |
|                     | 780R251        | 250:5              | C20         | 0.6                                                 | 0.6   | 1.2   | 2.4   | —     |
|                     | 780R301        | 300:5              | C50         | 0.3                                                 | 0.6   | 1.2   | 1.2   | 2.4   |
|                     | 780R401        | 400:5              | C50         | 0.3                                                 | 0.3   | 0.6   | 1.2   | 1.2   |
|                     | 780R501        | 500:5              | C50         | 0.3                                                 | 0.3   | 0.6   | 0.6   | 0.6   |
|                     | 780R601        | 600:5              | C100        | 0.3                                                 | 0.3   | 0.3   | 0.6   | 0.6   |
|                     | 780R751        | 750:5              | C100        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.6   |
|                     | 780R801        | 800:5              | C100        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R102        | 1000:5             | C100        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R122        | 1200:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R152        | 1500:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R162        | 1600:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R202        | 2000:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R252        | 2500:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R302        | 3000:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |
|                     | 780R402        | 4000:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   |

Rating Factor 30 °C Ambient Temp. = 2.0, Model 780R402 Rating Factor 30 °C Ambient Temp. = 1.5

### Model 785

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification - 60 Hz Metering Class |       |       |       |       | Rating Factor 30 °C Ambient |
|---------------------|----------------|--------------------|-------------|-----------------------------------------------------|-------|-------|-------|-------|-----------------------------|
|                     |                |                    |             | B-0.1                                               | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                             |
| 6.5 in.<br>(165 mm) | 785R500        | 50:5               | C10         | 2.4                                                 | 2.4   | —     | —     | —     | 2.0                         |
|                     | 785R750        | 75:5               | C20         | 1.2                                                 | 1.2   | —     | —     | —     | 2.0                         |
|                     | 785R101        | 100:5              | C20         | 1.2                                                 | 1.2   | 2.4   | —     | —     | 2.0                         |
|                     | 785R151        | 150:5              | C50         | 0.6                                                 | 0.6   | 1.2   | 2.4   | —     | 2.0                         |
|                     | 785R201        | 200:5              | C50         | 0.6                                                 | 0.6   | 1.2   | 2.4   | 2.4   | 2.0                         |
|                     | 785R251        | 250:5              | C50         | 0.3                                                 | 0.6   | 1.2   | 1.2   | 2.4   | 2.0                         |
|                     | 785R301        | 300:5              | C100        | 0.3                                                 | 0.3   | 0.6   | 0.6   | 1.2   | 2.0                         |
|                     | 785R401        | 400:5              | C100        | 0.3                                                 | 0.3   | 0.3   | 0.6   | 1.2   | 2.0                         |
|                     | 785R501        | 500:5              | C100        | 0.3                                                 | 0.3   | 0.3   | 0.6   | 0.6   | 2.0                         |
|                     | 785R601        | 600:5              | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.6   | 2.0                         |
|                     | 785R751        | 750:5              | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R801        | 800:5              | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R102        | 1000:5             | C200        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R122        | 1200:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R152        | 1500:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R162        | 1600:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R202        | 2000:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R252        | 2500:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R302        | 3000:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 2.0                         |
|                     | 785R402        | 4000:5             | C400        | 0.3                                                 | 0.3   | 0.3   | 0.3   | 0.3   | 1.5                         |

Rating Factor 30 °C Ambient Temp. = 2.0, Model 785R402 Rating Factor 30 °C Ambient Temp. = 1.5



## Bushing Current Transformers, 50–400 Hz Models 780R and 785R (Single Ratio)

### Model 781R-122

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C | Rating Factor 30 °C Ambient |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|-----------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |                             |
| 6.5 in.<br>(165 mm) | 781R122        | 100:5              | C200        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.035                         | 2.0                         |
|                     |                | 200:5              |             |                                                      |       |       |       |       | 0.071                         |                             |
|                     |                | 300:5              |             |                                                      |       |       |       |       | 0.108                         |                             |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 0.141                         |                             |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.178                         |                             |
|                     |                | 600:5              |             |                                                      |       |       |       |       | 0.211                         |                             |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.282                         |                             |
|                     |                | 900:5              |             |                                                      |       |       |       |       | 0.317                         |                             |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.352                         |                             |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.035                         |                             |

### Model 781R-202

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C | Rating Factor 30 °C Ambient |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|-----------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |                             |
| 6.5 in.<br>(165 mm) | 781R202        | 300:5              | C200        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.091                         | 2.0                         |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 0.121                         |                             |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.151                         |                             |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.242                         |                             |
|                     |                | 1100:5             |             |                                                      |       |       |       |       | 0.335                         |                             |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.369                         |                             |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.470                         |                             |
|                     |                | 1600:5             |             |                                                      |       |       |       |       | 0.504                         |                             |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 0.837                         |                             |
|                     |                |                    |             |                                                      |       |       |       |       |                               |                             |

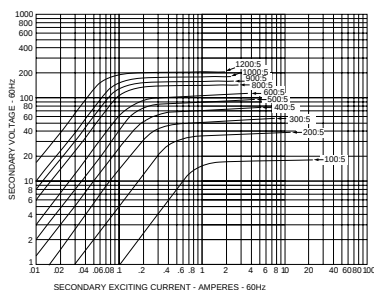
### Model 781R-302

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C | Rating Factor 30 °C Ambient |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|-----------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |                             |
| 6.5 in.<br>(165 mm) | 781R302        | 300:5              | C200        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.079                         | 2.0                         |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.131                         |                             |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.210                         |                             |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.262                         |                             |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.321                         |                             |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.410                         |                             |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 0.557                         |                             |
|                     |                | 2200:5             |             |                                                      |       |       |       |       | 0.623                         |                             |
|                     |                | 2500:5             |             |                                                      |       |       |       |       | 0.722                         |                             |
|                     |                |                    |             |                                                      |       |       |       |       |                               |                             |

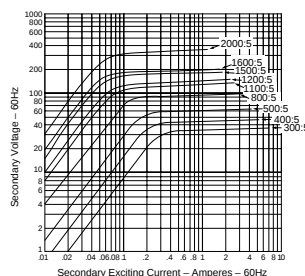
Model 781R-122, -202, -302, -601 Rating Factor 30 °C Ambient Temp. = 2.0

Model 781R-402 Rating Factor 30 °C Ambient Temp. = 1.5

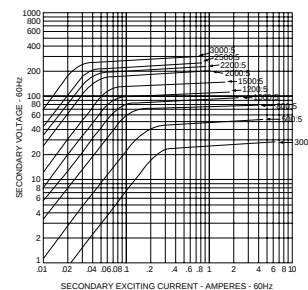
### Excitation Curves—Models 781R-122, 781R-202, and 781R-302 (left to right)



**Model 781R-122**



**Model 781R-202**



**Model 781R-302**



# Bushing Transformers

## Models 781R and 786R (Multi Ratio)

Model 781R-402

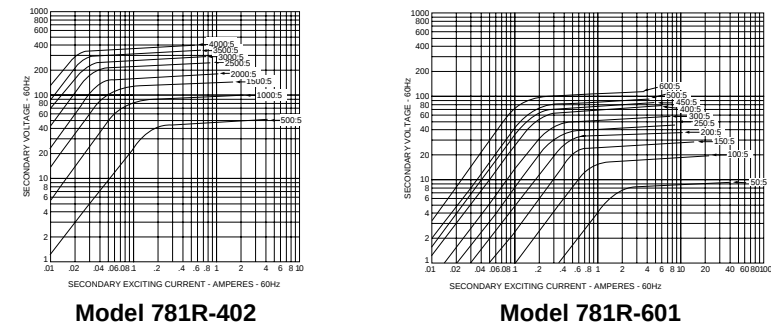
| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C | Rating Factor<br>30 °C Ambient |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|--------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |                                |
| 6.5 in.<br>(165 mm) | 781R402        | 500:5              | C200        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.184                         | 1.5                            |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.328                         |                                |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.510                         |                                |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 0.693                         |                                |
|                     |                | 2500:5             |             |                                                      |       |       |       |       | 0.895                         |                                |
|                     |                | 3000:5             |             |                                                      |       |       |       |       | 1.097                         |                                |
|                     |                | 3500:5             |             |                                                      |       |       |       |       | 1.336                         |                                |
|                     |                | 4000:5             |             |                                                      |       |       |       |       | 1.570                         |                                |

Model 781R-601

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C | Rating Factor<br>30 °C Ambient |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|--------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |                                |
| 6.5 in.<br>(165 mm) | 781R601        | 50:5               | C100        | 0.3                                                  | 0.3   | 0.3   | 0.6   | 0.6   | 0.018                         | 2.0                            |
|                     |                | 100:5              |             |                                                      |       |       |       |       | 0.035                         |                                |
|                     |                | 150:5              |             |                                                      |       |       |       |       | 0.053                         |                                |
|                     |                | 200:5              |             |                                                      |       |       |       |       | 0.071                         |                                |
|                     |                | 250:5              |             |                                                      |       |       |       |       | 0.088                         |                                |
|                     |                | 300:5              |             |                                                      |       |       |       |       | 0.106                         |                                |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 0.141                         |                                |
|                     |                | 450:5              |             |                                                      |       |       |       |       | 0.159                         |                                |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.178                         |                                |
|                     |                | 600:5              |             |                                                      |       |       |       |       | 0.211                         |                                |

Model 781R-122, -202, -302, -601 Rating Factor 30 °C Ambient Temp. = 2.0  
 Model 781R-402 Rating Factor 30 °C Ambient Temp. = 1.5

Excitation Curves–Models 781R-402 and 781R-601



## Bushing Transformers Models 781R and 786R (Multi Ratio)

### Model 786R-122

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |
| 6.5 in.<br>(165 mm) | 786R122        | 100:5              | C400        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.061                         |
|                     |                | 200:5              |             |                                                      |       |       |       |       | 0.121                         |
|                     |                | 300:5              |             |                                                      |       |       |       |       | 0.182                         |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 0.242                         |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.303                         |
|                     |                | 600:5              |             |                                                      |       |       |       |       | 0.384                         |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.485                         |
|                     |                | 900:5              |             |                                                      |       |       |       |       | 0.545                         |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.606                         |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.727                         |

Rating Factor 30 °C Ambient Temp. = 2.0

### Model 786R-202

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |
| 6.5 in.<br>(165 mm) | 786R202        | 300:5              | C400        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.145                         |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 0.194                         |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.242                         |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.388                         |
|                     |                | 1100:5             |             |                                                      |       |       |       |       | 0.536                         |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.588                         |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.744                         |
|                     |                | 1600:5             |             |                                                      |       |       |       |       | 0.796                         |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 1.003                         |

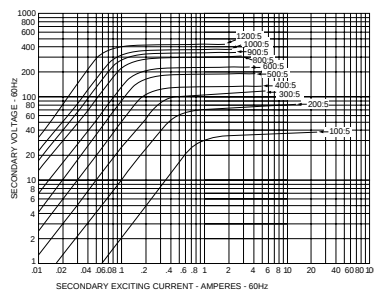
Rating Factor 30 °C Ambient Temp. = 2.0

### Model 786R-302

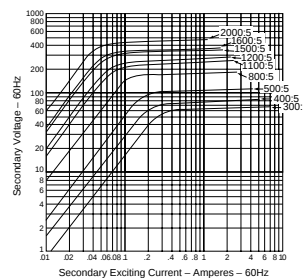
| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |
| 6.5 in.<br>(165 mm) | 786R302        | 300:5              | C400        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.145                         |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 0.242                         |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 0.388                         |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.485                         |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 0.588                         |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.743                         |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 1.003                         |
|                     |                | 2200:5             |             |                                                      |       |       |       |       | 1.113                         |
|                     |                | 2500:5             |             |                                                      |       |       |       |       | 1.278                         |
|                     |                | 3000:5             |             |                                                      |       |       |       |       | 1.550                         |

Rating Factor 30 °C Ambient Temp. = 2.0

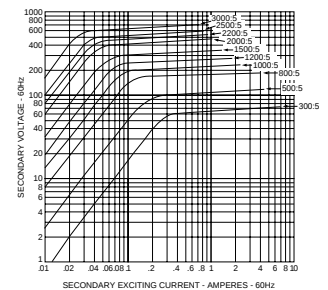
### Excitation Curves—Models 786R-122, 786R-202, and 786R-302



**Model 786R-122**



**Model 786R-202**



**Model 786R-302**



# Bushing Transformers

## Models 781R and 786R (Multi Ratio)

Model 786R-402

| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |
| 6.5 in.<br>(165 mm) | 786R402        | 500:5              | C400        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 0.305                         |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 0.609                         |
|                     |                | 1500:5             |             |                                                      |       |       |       |       | 0.932                         |
|                     |                | 2000:5             |             |                                                      |       |       |       |       | 1.258                         |
|                     |                | 2500:5             |             |                                                      |       |       |       |       | 1.598                         |
|                     |                | 3000:5             |             |                                                      |       |       |       |       | 1.941                         |
|                     |                | 3500:5             |             |                                                      |       |       |       |       | 2.321                         |
|                     |                | 4000:5             |             |                                                      |       |       |       |       | 2.702                         |

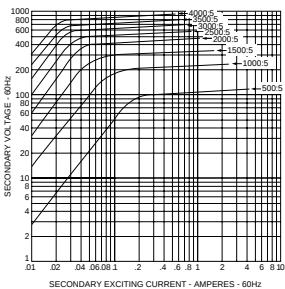
Rating Factor 30 °C Ambient Temp. = 1.5

Model 786R-601

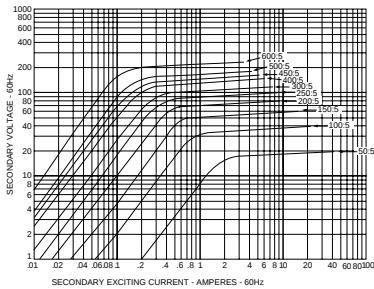
| Window Size         | Catalog Number | Current Rating (A) | Relay Class | ANSI Accuracy Classification<br>60 Hz Metering Class |       |       |       |       | DC Resistance (Ohms) at 25 °C |
|---------------------|----------------|--------------------|-------------|------------------------------------------------------|-------|-------|-------|-------|-------------------------------|
|                     |                |                    |             | B-0.1                                                | B-0.2 | B-0.5 | B-0.9 | B-1.8 |                               |
| 6.5 in.<br>(165 mm) | 786R601        | 100:5              | C200        | 0.3                                                  | 0.3   | 0.3   | 0.3   | 0.3   | 100:5                         |
|                     |                | 200:5              |             |                                                      |       |       |       |       | 200:5                         |
|                     |                | 300:5              |             |                                                      |       |       |       |       | 300:5                         |
|                     |                | 400:5              |             |                                                      |       |       |       |       | 400:5                         |
|                     |                | 500:5              |             |                                                      |       |       |       |       | 500:5                         |
|                     |                | 600:5              |             |                                                      |       |       |       |       | 600:5                         |
|                     |                | 800:5              |             |                                                      |       |       |       |       | 800:5                         |
|                     |                | 900:5              |             |                                                      |       |       |       |       | 900:5                         |
|                     |                | 1000:5             |             |                                                      |       |       |       |       | 1000:5                        |
|                     |                | 1200:5             |             |                                                      |       |       |       |       | 1200:5                        |

Rating Factor 30 °C Ambient Temp. = 2.0

Excitation Curves–Models786R-402 and 786R-601

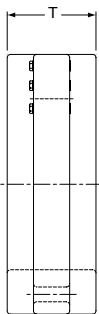
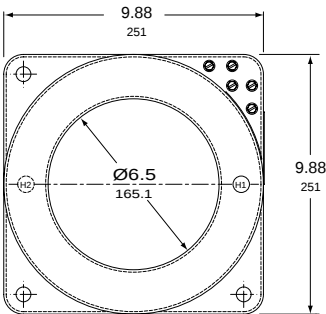


Model 786R-402



Model 786R-601

### Dimensions



| Model | T in (mm)  |
|-------|------------|
| 780R  | 3.38 (36)  |
| 781R  | 3.38 (36)  |
| 785R  | 6.75 (171) |
| 786R  | 6.75 (171) |



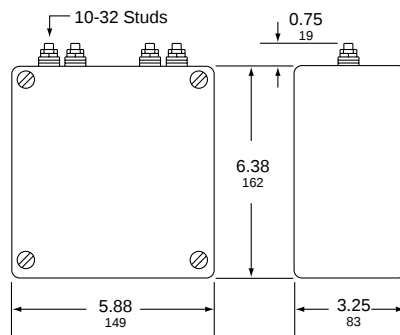
# Auxiliary Current Transformer Model 81X

## Model 81X Auxiliary Current Transformer Auxiliary Current Transformer

| Catalog Number<br>(without brackets) | Ratio  | ANSI Accuracy Classification - 60 Hz Metering Class |       |       |
|--------------------------------------|--------|-----------------------------------------------------|-------|-------|
|                                      |        | B-0.1                                               | B-0.2 | B-0.5 |
| 81X05000100                          | 5:1    | 0.3                                                 | 0.3   | 0.3   |
| 81X05000200                          | 5:2    | 0.3                                                 | 0.3   | 0.3   |
| 81X05000250                          | 5:2.5  | 0.3                                                 | 0.3   | 0.3   |
| 81X05000500                          | 5:5    | 0.3                                                 | 0.3   | 0.3   |
| 81X07500500                          | 7.5:5  | 0.3                                                 | 0.3   | 0.3   |
| 81X10000500                          | 10:5   | 0.3                                                 | 0.3   | 0.3   |
| 81X12500500                          | 12.5:5 | 0.3                                                 | 0.3   | 0.3   |
| 81X15000500                          | 15:5   | 0.3                                                 | 0.3   | 0.3   |

Rating Factor 30 °C Ambient Temp. = 1.5

### Dimensions



## Voltage Transformers

### Models 450R, 460R, and 470R

#### DESCRIPTION

- These voltage transformers are designed for line-to-line or line-to-ground connection on the primary voltage indicated. See the table below to determine the applicable configuration for proper system voltage indication.
- Model 450R is designed for switchboard use. This model features high accuracy and burden capacity for excellent performance in metering and indication.
- Model 460R is a compact, lightweight design, providing exceptional performance in electrical indicating and recording instrumentation.
- Model 470R is designed for extremely accurate voltage measurement where low burden is to be used.
- Permanent polarity marks are molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Primary and secondary terminals are fully insulated #10-32 threaded studs, complete with nuts and washers. Terminal covers and mounting base are also supplied.
- Frequency: 60 Hz.
- Insulation: 10 kV BIL full wave (600 volt class)
- Applicable Standard — ANSI C57.13.
- UL recognized per Classification XODW2.



**Model 450R**

Designed for a wide range of electrical indicating, recording instruments and protective relays in power systems.

#### Model 450R

| Catalog Number | Primary Voltage Rating (Volts) | Secondary Voltage Rating (Volts) | Voltage Ratio | System | Transformer Connections | Accuracy and Burden Rating | Thermal Burden Rating (VA) |               | Weight |      |
|----------------|--------------------------------|----------------------------------|---------------|--------|-------------------------|----------------------------|----------------------------|---------------|--------|------|
|                |                                |                                  |               |        |                         |                            | 30 °C Ambient              | 55 °C Ambient | lb     | kg   |
| 450R-120       | 120                            | 120                              | 1:1           | 208Y   | Ø - Ground              | 0.3Y, 1.2Z                 | 500                        | 300           | 23     | 10.5 |
|                |                                |                                  |               | 120Δ   | Ø - Ø                   |                            |                            |               |        |      |
| 450R-240       | 240                            | 120                              | 2:1           | 416Y   | Ø - Ground              |                            |                            |               |        |      |
|                |                                |                                  |               | 240Δ   | Ø - Ø                   |                            |                            |               |        |      |
| 450R-288       | 288                            | 120                              | 2.4:1         | 480Y   | Ø - Ground              |                            |                            |               |        |      |
| 450R-300       | 300                            | 120                              | 2.5:1         | 520Y   | Ø - Ground              |                            |                            |               |        |      |
| 450R-480       | 480                            | 120                              | 4:1           | 480Y   | Ø - Ø                   |                            |                            |               |        |      |
|                |                                |                                  |               | 480Δ   | Ø - Ø                   |                            |                            |               |        |      |
| 450R-600       | 600                            | 120                              | 5:1           | 600Y   | Ø - Ø                   |                            |                            |               |        |      |
|                |                                |                                  |               | 600Δ   | Ø - Ø                   |                            |                            |               |        |      |

- Use on 277/480 wye systems.
- ★ Use 480 V delta systems.

#### Model 460R



**Model 460R**

Designed for use with voltmeters, transducers and other types of electrical indicating and recording instrumentation.

| Catalog Number | Primary Voltage Rating (Volts) | Secondary Voltage Rating (Volts) | Voltage Ratio | System | Transformer Connections | Accuracy and Burden Rating | Thermal Burden Rating (VA) |               | Weight |     |
|----------------|--------------------------------|----------------------------------|---------------|--------|-------------------------|----------------------------|----------------------------|---------------|--------|-----|
|                |                                |                                  |               |        |                         |                            | 30 °C Ambient              | 55 °C Ambient | lb     | kg  |
| 460R-120       | 120                            | 120                              | 1:1           | 208Y   | Ø - Ground              | 0.6Y, 1.2X                 | 150                        | 100           | 8      | 3.6 |
|                |                                |                                  |               | 120Δ   | Ø - Ø                   |                            |                            |               |        |     |
| 460R-240       | 240                            | 120                              | 2:1           | 416Y   | Ø - Ground              |                            |                            |               |        |     |
|                |                                |                                  |               | 240Δ   | Ø - Ø                   |                            |                            |               |        |     |
| 460R-288       | 288                            | 120                              | 2.4:1         | 480Y   | Ø - Ground              |                            |                            |               |        |     |
| 460R-300       | 300                            | 120                              | 2.5:1         | 520Y   | Ø - Ground              |                            |                            |               |        |     |
| 460R-480       | 480                            | 120                              | 4:1           | 480Y   | Ø - Ø                   |                            |                            |               |        |     |
|                |                                |                                  |               | 480Δ   | Ø - Ø                   |                            |                            |               |        |     |
| 460R-600       | 600                            | 120                              | 5:1           | 600Y   | Ø - Ø                   |                            |                            |               |        |     |
|                |                                |                                  |               | 600Δ   | Ø - Ø                   |                            |                            |               |        |     |

- Use on 277/480 wye systems.
- ★ Use 480 V delta systems.



## Voltage Transformers Models 450R, 460R, and 470R



**Model 470R**

Ideal for applications such as input to PLC modules and other electronic devices with high input impedance.

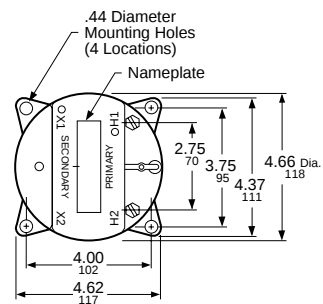
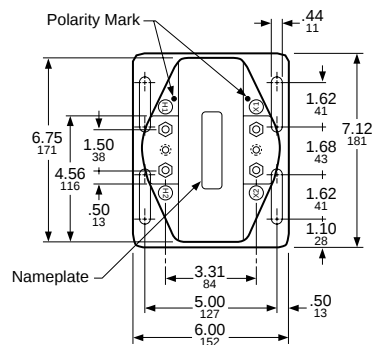
### Model 470R

| Catalog Number | Primary Voltage Rating (Volts) | Secondary Voltage Rating (Volts) | Voltage Ratio | System          | Transformer Connections | Accuracy and Burden Rating | Thermal Burden Rating (VA) |               | Weight |     |
|----------------|--------------------------------|----------------------------------|---------------|-----------------|-------------------------|----------------------------|----------------------------|---------------|--------|-----|
|                |                                |                                  |               |                 |                         |                            | 30 °C Ambient              | 55 °C Ambient | lb     | kg  |
| 470R-069       | 69                             | 120                              | 0.58:1        | 120Y            | Ø - Ground              | 0.3W                       | 150                        | 100           | 8      | 3.6 |
| 470R-120       | 120                            | 120                              | 1:1           | 208Y<br>120D Δ  | Ø - Ground<br>Ø - Ø     |                            |                            |               |        |     |
| 470R-208       | 120                            | 120                              | 1.73:1        | 360Y<br>208 Δ   | Ø - Ground<br>Ø - Ø     |                            |                            |               |        |     |
| 470R-240       | 240                            | 120                              | 2:1           | 416Y<br>240 Δ   | Ø - Ground<br>Ø - Ø     |                            |                            |               |        |     |
| 470R-288       | 288                            | 120                              | 2.4:1         | 480Y ●          | Ø - Ground              |                            |                            |               |        |     |
| 470R-300       | 300                            | 120                              | 2.5:1         | 520Y            | Ø - Ground              |                            |                            |               |        |     |
| 470R-380       | 220                            | 120                              | 3.17:1        | 380Y<br>380 Δ   | Ø - Ø<br>Ø - Ø          |                            |                            |               |        |     |
| 470R-480       | 480                            | 120                              | 4:1           | 480Y ★<br>480 Δ | Ø - Ø<br>Ø - Ø          |                            |                            |               |        |     |
| 470R-600       | 600                            | 120                              | 5:1           | 600Y<br>600 Δ   | Ø - Ø<br>Ø - Ø          |                            |                            |               |        |     |

● Use on 277/480 wye systems.

★ Use 480 V delta systems.

### Dimensions



Dual Dimensions inches  
mm



Voltage Transformers  
Models 450R, 460R, and 470R

VOLTAGE TRANSFORMER CIRCLE DIAGRAMS

Circle Diagram Accuracy Determination

Voltage Transformers (VT) Circle Diagrams are provided as an easy method for determining accuracy at any burden and power factor. The radial lines represent different power factors for the burdens and the concentric circles represent burden amount in Volt-Amperes.

VT accuracy at a specific burden may be determined by choosing the appropriate power factor line that represents the power factor of the actual burden, then extending outward in the radial direction to the appropriate volt-ampere level. Note that the concentric circles represent proportional Volt-Amperes that increase in value as you extend outward.

The Ratio Correction Factor and Phase Angle error for this Burden may be taken from the ordinate and abscissa of the circle diagram.

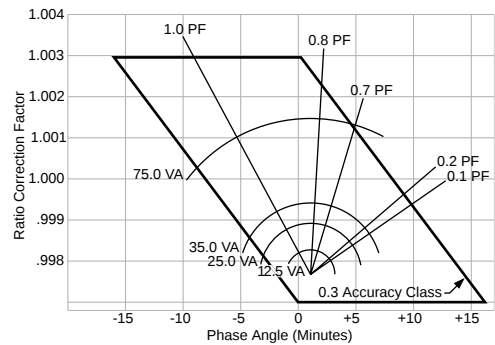
Example: Burden Volt-Amperes = 20 VA  
Burden Power Factor = .95

The Model 460R circle diagram provides an accuracy of operation:  
Ratio Correction Factor = 1.0017  
Phase Angle = +4.3 minutes

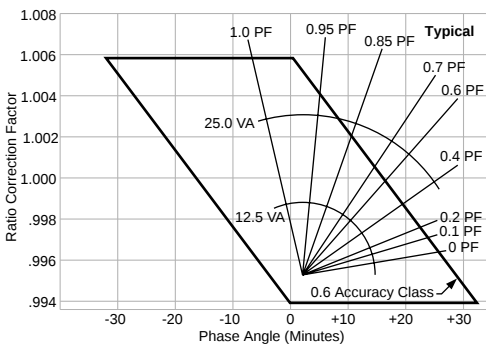
Standard Burdens for Voltage Transformers

| Burden | VA   | Power Factor |
|--------|------|--------------|
| W      | 12.5 | 0.1          |
| X      | 25   | 0.7          |
| M      | 35   | 0.2          |
| Y      | 75   | 0.85         |
| Z      | 200  | 0.85         |

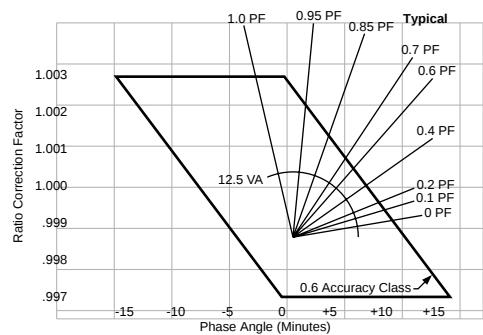
Model 450



Model 460



Model 470



## Glossary of Terms and Abbreviations

| Term or Abbreviation                              | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accuracy</b>                                   | Metering accuracy of current transformers. The accuracy class followed by a standard burden for which the accuracy class applies. The accuracy rating applies only over the specified current or voltage range and at the stated frequency. The burden of current transformers may be expressed in two ways: in volt-amperes (VA) or in ohms impedance, for example B-1.8 means a burden of 1.8 ohms at a specific power factor (See page 53). To convert, use formula: $VA = I^2Z$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Relaying accuracy of current transformers</b>  | A relaying accuracy class is designated by two symbols which effectively describe the capability of the transformer as follows:<br>"C" means the transformer ratio can be calculated, i.e. a window type current transformer with uniformly distributed windings. The C rating refers to a low-reactance design.<br>The secondary terminal voltage rating is the voltage which the transformer will deliver to a standard burden at 20 times normal secondary current without exceeding 10% ratio error. Furthermore, the ratio error must be limited to 10% at any current from 1 to 20 times rated current at any lesser burden. For example, relay accuracy class C100 means that the ratio can be calculated and that the ratio error will not exceed 10% at any current if the burden does not exceed 1.0 ohms (1 ohm x 5 amperes X 20 times normal current = 100 volts). Note: Previous standards used the term "10L" in place of "C", such as 10L100, 10L400, etc. CSA Standard C13 used the term "10L" in place of "C". |
| <b>Accuracy ratings of voltage transformers</b>   | Accuracy classes are based on the requirement that the transformer correction factor (TCF) is within specified limits when the power factor of the metered load has any value from 0.6 lag to 1.0, from zero burden to the specified standard burden (See page 54), and at any voltage from 90% to 110% of the rated transformer voltage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>AMB</b>                                        | Ambient                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>ANSI</b>                                       | American National Standard Institute (Successor to USASI, United States of America Standards Institute)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>B.I.L.</b>                                     | Basic insulation level, which is the withstand of a 1.2 x 50 full wave impulse of specified kV crest value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Burden</b>                                     | Burden of an instrument transformer is equivalent to the term "load" as applied to a power transformer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Compensated VA</b>                             | Transformer is compensated to provide maximum accuracy at that burden.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Rating Factor of window type transformers</b>  | The factor by which the nominal rated secondary current (usually 5 amperes) can be multiplied to obtain the maximum secondary current that can be carried continuously without exceeding the allowable temperature rise above a specified ambient temperature. The factor will also apply to the primary current if the primary conductor is of sufficient size to carry the current without exceeding the allowable temperature rise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Current Rating</b>                             | The ratio of the rated primary value to the rated secondary value as stated on the nameplate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hz —</b>                                       | Hertz = cycles per second.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Insulation Class of Instrument Transformer</b> | Denotes the maximum (Line-to-Line) voltage of the circuit on which it should be used. (NOTE: Voltage transformers may be limited by their primary voltage ratings to use at a lower voltage than that of their insulation class.) Conformity to the class means that the transformer is capable of withstanding low frequency insulation tests, and basic insulation level (BIL) tests as prescribed in ANSI C57.13.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>kV</b>                                         | Kilovolt or 1000 volts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Polarity</b>                                   | The relative instantaneous polarity of the leads or terminals is indicated by permanent marking, i.e. H1 and X1 are of the same polarity. They are identified by white dots, white wires, or the actual terminal designations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PRI.</b>                                       | Primary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>SEC.</b>                                       | Secondary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Ratio</b>                                      | Ratio of transformer, primary: secondary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>VA</b>                                         | Volt-amperes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>X1, X2</b>                                     | Secondary Terminals (See "Polarity").                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



Appendices

APPENDIX A

ADJUSTING CURRENT TRANSFORMER RATIO

Use the equations provided in this section to obtain special ratios from standard ratings.

Window type current transformers (CT) are rated on the basis of a single primary turn. Other ratios are obtainable by the use of multiple turns. Any window type current transformer listed herein may have its nominal ratio adjusted to a nonstandard ratio by the use of primary and secondary turns as follows:

Applying Turns to Adjust Ratio

**Primary Turns**—To provide a coarse adjustment to the ratio, the required number of primary turns should be applied as shown in Figure 1. An electrical turn is defined as one pass through the window.

$$\frac{\text{Nameplate Primary Amps}}{\text{Number of Turns}} = \text{New Primary Amps}$$

Example:

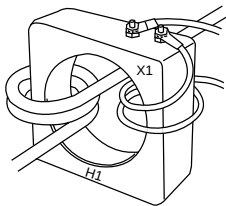
For 100:5 Ampere CT with 4 primary turns

$$\frac{100}{4} = 25 \text{ Primary}$$

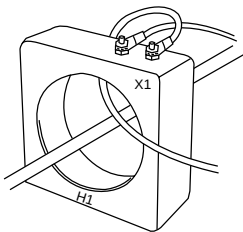
Thus the new ratio is 25:5.

**Secondary Turns**—For finer adjustment to the ratio, secondary turns may be added or subtracted by routing the X<sub>1</sub> lead in the proper direction. To **subtract** turns, take the X<sub>1</sub> lead and pass it through the window from H<sub>1</sub> to H<sub>2</sub> (see “Subtracting Turns” at top left). To **add** turns, the X<sub>1</sub> lead is passed through the window in the reverse direction (see “Adding Turns” at bottom left).

$$[\text{Nameplate Primary Amperes} \pm (\text{Extra secondary turns} \times 5 \text{ Amperes/turn})] : 5 = \text{New Ratio.}$$



Subtracting Turns:  
3 primary turns with  
2 secondary turns  
subtracted



Adding Turns:  
1 primary turn with  
1 secondary turn  
added

|          |                                                         |
|----------|---------------------------------------------------------|
| Example: | For 100:5 Amperes CT with 2 secondary turns added.      |
|          | $100 + (2 \times 5) = 110:5 \text{ Amperes Ratio}$      |
|          | For 150:5 Amperes CT with 3 secondary turns subtracted. |
|          | $150 - (3 \times 5) = 135:5 \text{ Ampere Ratio}$       |

**Primary and Secondary Turns**—The relationship of ratio to primary and secondary turns is expressed in the following formula:

$$K_a = \frac{K_n \pm N_{sa}}{N_p}$$

Where: K<sub>a</sub> = actual transformation ratio obtained =

$$\frac{\text{Desired Primary Amperes}}{\text{Secondary Amperes}}$$

K<sub>n</sub> = nameplate transformation ratio =

$$\frac{\text{Primary Amperes}}{\text{Secondary Amperes}}$$

N<sub>sa</sub> = Number of secondary turns added or subtracted.

N<sub>p</sub> = Number of primary turns.

Example: For 100:5 Amperes CT with 4 primary turns added, how many secondary turns are required to make a 30:5 CT ratio?

$$K_a = 6 = \frac{20 \pm N_{sa}}{4}$$

N<sub>sa</sub> = +4 turns (added)

## APPENDIX B

### PARALLELING CURRENT TRANSFORMERS

To parallel CT secondaries to combine currents from two or more feeders from the same phase, follow guidelines 1–7 below.

- All transformers, which have their secondaries paralleled, must be connected in the same phase of the primary circuit.
- All transformers must have the same nominal ratio regardless of the circuits in which they are connected.
- The secondaries must be paralleled at the meter, not at the CT.
- Use only one common ground point for all the secondaries of all transformers. This should be at their common point at the meter.
- Each CT must be capable of supporting “n” times the burden within the desired accuracy class, where n = number of CTs in parallel, (0.3 accuracy class for switchboard use).
- A common potential must be available for the meter.
- The meter must have sufficient current capacity to carry the sum of the currents from all the transformers to which it is connected.

## APPENDIX C

### BURDEN AND ACCURACY INFORMATION

In applying the burden and accuracy limits of instrument transformers, it is important to keep in mind that accuracy and burden are interdependent, the same as load and regulation are in power transformer terminology.

| Power Transformer |   | Instrument Transformer |
|-------------------|---|------------------------|
| Load              | = | Burden                 |
| Regulation        | = | Accuracy               |

All instrument transformers will have some small error. The metering accuracy classes are defined in the table below:

| Accuracy Class | Current Transformer Max. Error At Secondary Amps |         | Voltage Transformer Max. Error 90-110% Volts |
|----------------|--------------------------------------------------|---------|----------------------------------------------|
|                | 5.0 Amp                                          | 0.5 Amp |                                              |
| 0.3            | ±0.3%                                            | ±0.6%   | ±0.3%                                        |
| 0.6            | ±0.6%                                            | ±1.2%   | ±0.6%                                        |
| 1.2            | ±1.2%                                            | ±2.4%   | ±1.2%                                        |

#### Accuracy Determination

Recommended accuracy classes for metering and control relaying uses are shown below. Switchboard instruments are normally 1% rated meters, and panel meters are 2% or 3% rated.

|                                                                                          |      |      |      |
|------------------------------------------------------------------------------------------|------|------|------|
| Accuracy Class of Meter                                                                  | 1%   | 2%   | 3%   |
| Accuracy Class of CT or VT                                                               | 0.3% | 0.6% | 1.2% |
| Accuracy Class of CT or VT for Wattmeters, Watt-hourmeters, Varmeters, Transducers, etc. | 0.3% |      |      |
| Accuracy Class of CT or VT for Control Relay use.                                        | 1.2% |      |      |

The standard burden limits defined by ANSI C57.13 for current and voltage transformers are as follows:

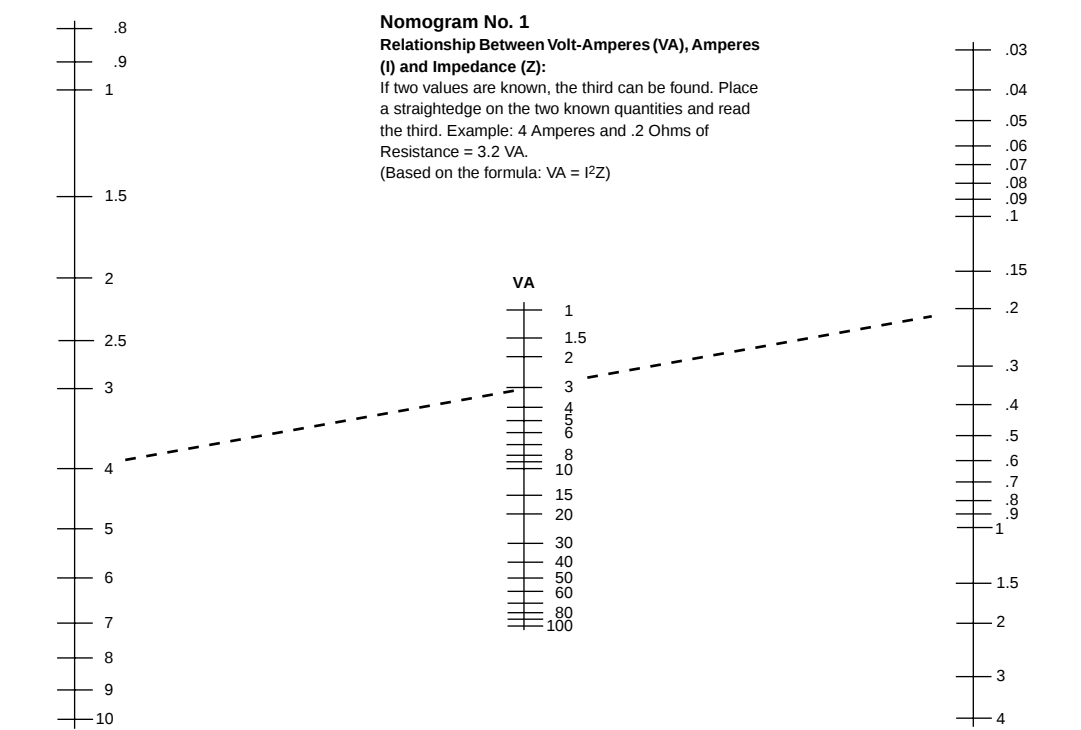
| Current Transformers |                |              |              |
|----------------------|----------------|--------------|--------------|
| Burden               | Impedance Ohms | Volt Amperes | Power Factor |
| B-0.1                | 0.1            | 2.5          | 0.9          |
| B-0.2                | 0.2            | 5.0          | 0.9          |
| B-0.5                | 0.5            | 12.5         | 0.9          |
| B-0.9                | 0.9            | 22.5         | 0.9          |
| B-1.8                | 1.8            | 45.0         | 0.9          |

| Voltage Transformers |              |              |
|----------------------|--------------|--------------|
| Burden               | Volt-Amperes | Power Factor |
| W                    | 12.5         | 0.1          |
| X                    | 25           | 0.7          |
| M                    | 35           | 0.2          |
| Y                    | 75           | 0.85         |
| Z                    | 200          | 0.85         |
| ZZ                   | 400          | 0.85         |



Burden Determination

The Burden consists of the sum total of the wiring and all connected devices. Determine the burden of the connected devices by referring to the nameplate or catalog data. If the burden is expressed in volt-amperes, add this directly for the Voltage Transformer, or convert to ohms impedance for the Current Transformer, using Nomogram No. 1.



## Determining Burden

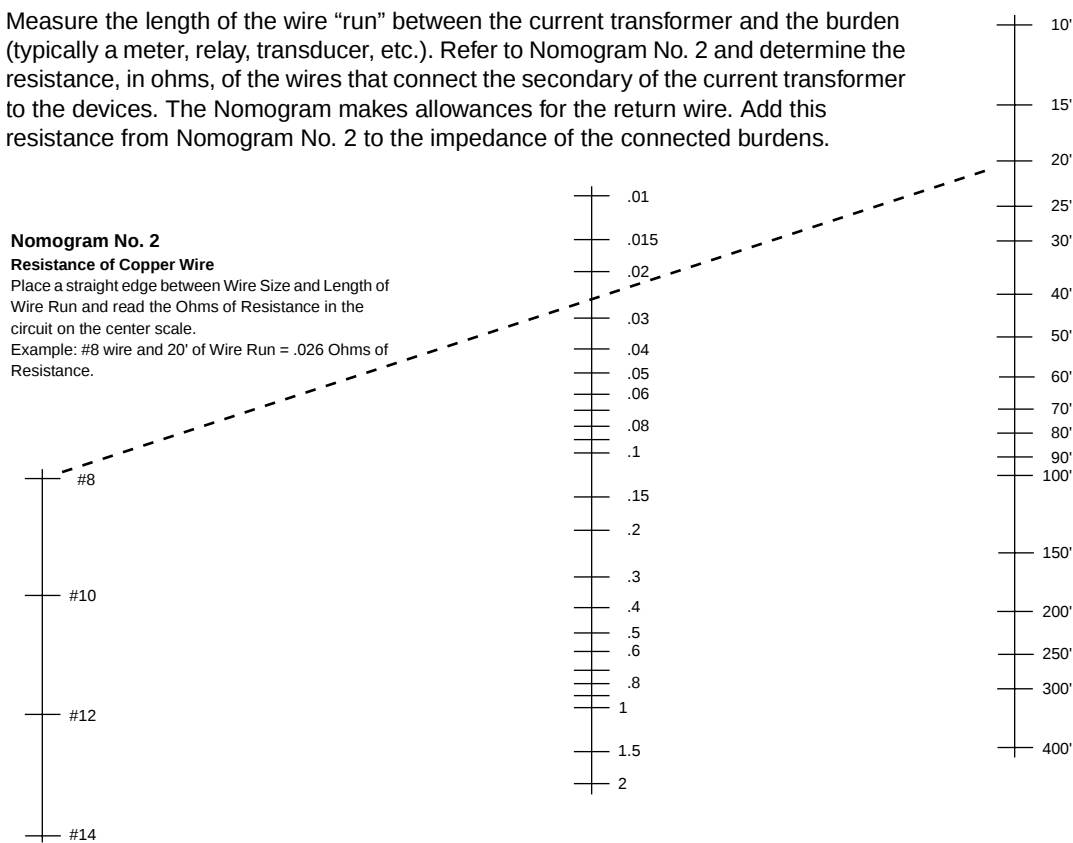
Measure the length of the wire “run” between the current transformer and the burden (typically a meter, relay, transducer, etc.). Refer to Nomogram No. 2 and determine the resistance, in ohms, of the wires that connect the secondary of the current transformer to the devices. The Nomogram makes allowances for the return wire. Add this resistance from Nomogram No. 2 to the impedance of the connected burdens.

### Nomogram No. 2

#### Resistance of Copper Wire

Place a straight edge between Wire Size and Length of Wire Run and read the Ohms of Resistance in the circuit on the center scale.

Example: #8 wire and 20' of Wire Run = .026 Ohms of Resistance.



## Excitation Data

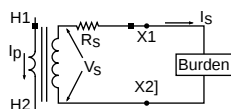
### Calculating CT Metering Accuracy from Excitation Curves

The accuracies shown in the Data Sheets for each CT are for standardized burdens and provide a quick approximation of the accuracy for most purposes. However, if a more precise value of accuracy is needed to refer to the Excitation Curves where the exciting current,  $I_e$ , is plotted against secondary voltage,  $V_s$ . The transformer ratio error expressed as a percentage becomes:

$$\% \text{ (RE)} = \frac{I_e \times 100}{I_s}$$

Where:  $I_s$  = Secondary Current

To use the curves to determine  $I_e$ , first calculate  $V_s$ .



**Typical CT Circuit Diagram**

By referring to a typical CT circuit as shown at left, it shows that the voltage  $V_s$  must force the secondary current  $I_s$  through the entire circuit consisting of the secondary winding and the burden, including the interconnecting leads.

The resistance of the secondary winding  $R_s$  is listed in this catalog for a given CT under the heading of “DC R – ohms”. “Z” is commonly referred to as “Burden” and must be obtained from the catalog information of the connected devices added to the resistance of the interconnection leads and  $R_s$ . Ohm’s Law gives us  $V_s = I_s Z$ . We may now refer to the Excitation Curve for the CT in question and determine  $I_e$ , the exciting current.

## Appendices

### Calculating Accuracy

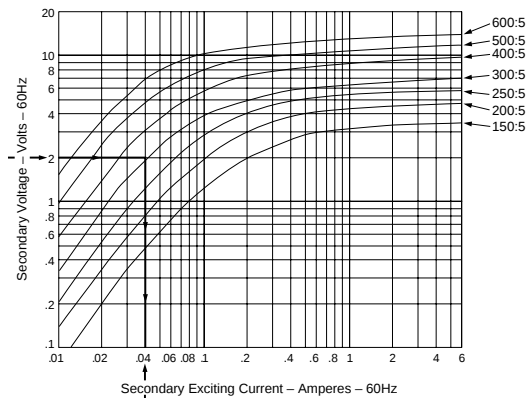
For example, a 300:5 ratio CT with a total burden of  $Z = .5$  ohm. With 240 amperes in the primary, the secondary current will be:

$$I_S = 240 \times \frac{5}{300} = 4 \text{ Amps}$$

$$V_S = I_S Z = 4 \text{ Amps} \times .5 \text{ ohms} = 2 \text{ Volts}$$

Referring to Figure 2, we see that at 2 secondary volts, the exciting current,  $I_e$ , is equal to .04 amperes. Thus, the percent error of the CT would be:

$$\% (\text{Ratio Error}) = \frac{I_e}{I_S} \times 100 = \frac{.04}{4} \times 100 = 1\%$$



Typical Excitation Curves  
Figure 2

### Relaying CT Accuracy

ANSI C57.13 defines relay accuracy in terms of the secondary terminal voltage that a current transformer will supply, with a standard burden connected and 20 times secondary current flowing, while not exceeding 10 percent ratio error. The excitation curves have as their ordinate, secondary voltage, which includes the CT internal voltage drop. In order to determine if the CT is adequate for a particular relay accuracy level, from the excitation curve, the total secondary voltage  $V_S$  must be calculated, which will include the internal voltage drop.

Since the CT will operate at an elevated temperature over Ambient of 30 °C, we must take into consideration the maximum temperature rise of 55 °C.

$R_C$  = Secondary winding resistance corrected to 85 °C (30 °C + 55 °C) = 1.2555 x  $R_S$  (secondary resistance).

$Z_t$  = Total Impedance of burden circuit =

$$\sqrt{\langle R_C = .5Z_b \rangle^2 + \langle .866Z_b \rangle^2}$$

Where:  $X_b = .866 Z_b$

$R_b = .5 Z_b$

$$Z_t = \sqrt{\langle 1.2555R_S + R_b \rangle^2 + \langle .866Z_b \rangle^2}$$

Obtain  $R_S$  from specific CT and ratio used, and determine  $Z_t$ , using the standard relay burden data indicated below.



## ANSI Standard Relay Burdens

| Relay Accuracy | R <sub>b</sub> (Ohms) | Z <sub>b</sub> (Ohms) | Relay Accuracy | R <sub>b</sub> (Ohms) | Z <sub>b</sub> (Ohms) |
|----------------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|
| C10            | 0.09                  | 0.1                   | C200           | 1.0                   | 2.0                   |
| C20            | 0.18                  | 0.2                   | C400           | 2.0                   | 4.0                   |
| C50            | 0.45                  | 0.5                   | C800           | 4.0                   | 8.0                   |
| C100           | 0.50                  | 1.0                   |                |                       |                       |

The formula to determine the secondary voltage, required from the current transformer, to maintain a certain relay accuracy is:

$$V_S = I_S \times Z_t$$

$$I_S = 20 \times 5 \text{ amperes} = 100 \text{ amperes for Fault considerations.}$$

$$V_S = 100 \text{ amperes} \times Z_t$$

$V_S$  = Minimum voltage required to meet the relay accuracy.

$V_{SC}$  = Secondary voltage at 10 ampere exciting current on CT curve.

The relay accuracy rating defines that the CT must not exceed 10% error at the  $V_S$  level. The 10% error level is represented by the 10 ampere excitation current line (based on 100 ampere total secondary current) on the CT excitation curve. Extending up the 10 ampere line to the ratio used, find  $V_{SC}$ . If  $V_{SC}$  is greater than, or equal to  $V_S$  calculated, then the CT is adequate for the relay accuracy.





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