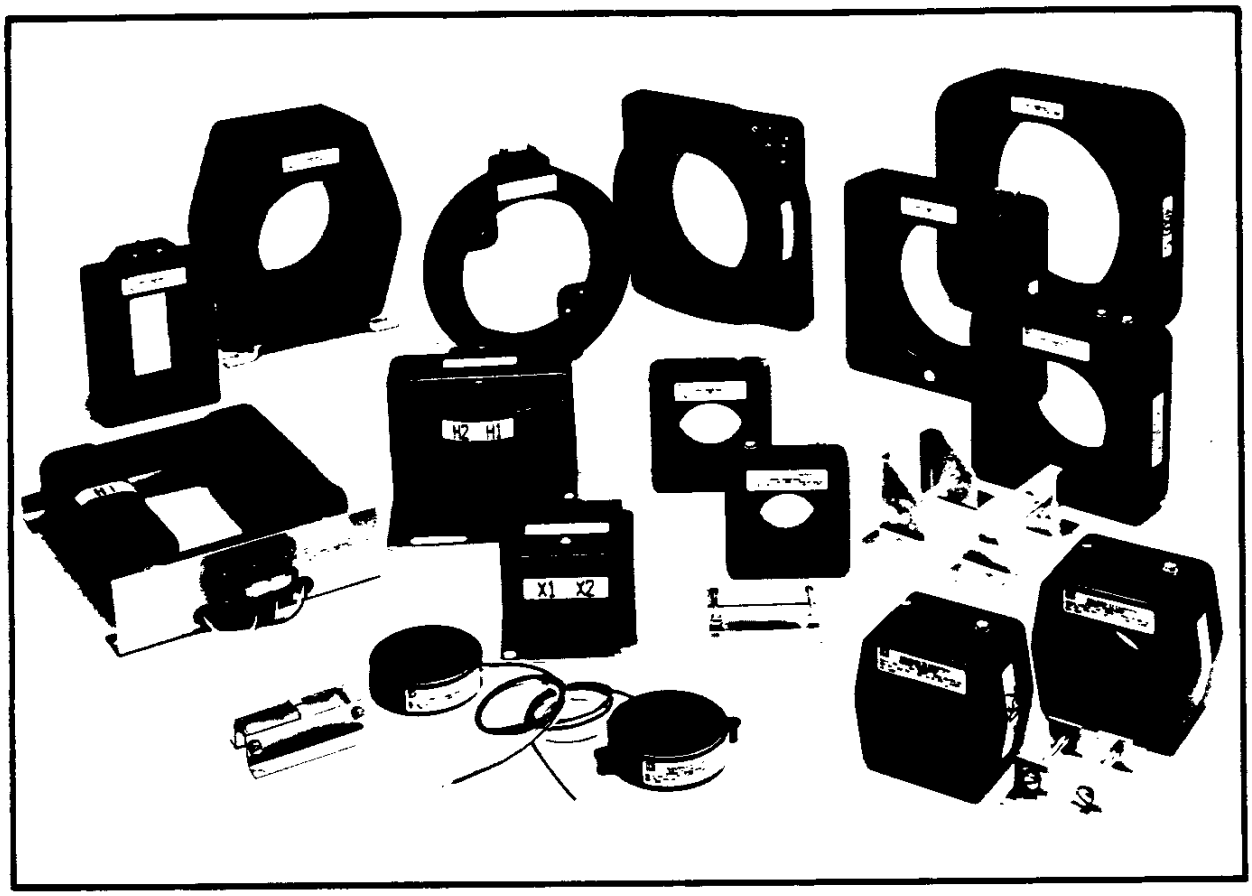


Instrument Transformers
600 Volt — Indoor Type
CURRENT AND VOLTAGE TRANSFORMERS

CONTENTS

ELECTROMAGNETIC INDUSTRIES

SQUARE D COMPANY

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

SQUARE D QUALITY IN INSTRUMENT TRANSFORMERS

SQUARE D 600 Volt rated Current and Voltage Transformers are field-proven in well over a million installations where accuracy and longer, more dependable life are essential.

In most cases, the information contained herein 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 COMPANY Field Office, or contact our headquarters in Florida:

SQUARE D COMPANY
Attn: Marketing Department
P.O. Box 6440
Clearwater, FL 33518
(813) 447-2511

APPLICATIONS

- Indoor
- Switchgear Assemblies
- Motor Controllers
- Over Power Transformer Bushings
- Over Circuit Breaker Bushings
- Metering
- Relaying
- Current Sensing

FEATURES

- High thermal ratings for short-time use

CURRENT TRANSFORMER MODEL NUMBERS	1 SECOND RATING IN MULTIPLES OF NAMEPLATE RATING*
2NR & 5NR	37 X
60R & 70R Series	40 X
100R Series	50 X
200R Series (Except 270R)	63 X
270R	50 X

* For ratings at other than 1 second, divide the 1 second rating by the square root of the time in seconds.

- Most Instrument Transformers listed in this Catalog are U.L. Recognized per Classification X0DW2.
- Manufactured to rigid SQUARE D Quality Control standards.
- Extremely wide range of ratios available.
- Wide range of Window I.D. sizes from 1-1/8" to 8-1/8".
- Applicable Standards are ANSI C57.13 and CSA C13.
- Models 2NR, 5NR and 54R feature strong, molded thermo-plastic cases.
- All other toroidal models are compression-molded fiberglass-reinforced polyester or thermo-plastic material for high impact and dielectric strength.
- Molded plastic core jacket assures rugged core-to-winding insulation.
- Low-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 clearly marked on the case.
- Rugged, corrosion-resistant mounting brackets are available as options.
- Most ratings are available from stock.

CAUTION

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 responsiblity for damage of equipment or personal injury caused by the transformers on circuits above their published ratings.

SELECTION CRITERIA

How To Select Current Transformers

1. Select the proper Window size, or slightly larger, to fit the user-applied primary conductor by refering to the chart on Page 3.
2. Determine that the C.T.'s USUAL APPLICATION listing shown on the chart best suits the application for which it is intended. If the application requirements are not fully defined, refer to the ACCURACY/BURDEN information on Pages 26 and 27.
3. Determine that the C.T.'s PRIMARY RANGE encompasses the application requirement. Lower, or specialized ratios may be obtained by using primary and/or secondary turns addition as shown on Page 25.
4. Check proper performance of the selected transformer accuracy and burden capability on the specific DATA PAGE No.

How To Select Voltage Transformers

1. Model 450R is designed for applications requiring accurate voltage measurement within the 0.3% accuracy class. It is ideal for Switchboard use with 1% instrumentation.
2. Model 460R is designed for voltage indication where accuracy is less critical, or where burden requirements are low. It is ideally suited for use with transducers and in panelboards.

INSTRUMENT TRANSFORMER SELECTION CHART

CURRENT TRANSFORMERS

WINDOW DIA. INCHES	MODEL	USUAL APPLICATION			PRIMARY RANGE IN AMPERES (5 Amp Secondary)	MULTI RATIO MR	U.L. RECOGNIZED PRODUCT	DATA PAGE NO.
		METERING	METERING or CONTROL RELAYING	HIGH OUTPUT RELAYING				
1-1/8	2NR	•			50- 300		✓	4- 5
1-9/16	5NR	•			100- 600		✓	4- 5
	54R	•			100- 600		✓	4- 5
1-15/16	64R	•			100- 750		✓	6- 7
	66R		•		100- 750		✓	6- 7
2-11/32	74R	•			200-1500		✓	6- 7
	76R		•		200-1500		✓	6- 7
2-1/2	180R		•		100-1500		✓	12-13
	200R		•	•	100- 600		✓	16-17
3-1/2	201R		•	•	100- 800		✓	16-17
4	100R		•		200-2000		✓	8- 9
	110R		•	•	200-2000		✓	8- 9
4-1/4	170R		•		200-2000		✓	12-13
4-1/2	311R			•	600-4000	MR	✓	20
	202R		•	•	100-1000		✓	16-17
5-1/4	203R		•	•	100-3000		✓	16-17
5-3/4	120R		•		200-3000		✓	8- 9
6-1/8	190			•	150-4000	MR		14-15
	191			•	150-3000	MR		14-15
6-1/4	210R		•	•	2000-4000		✓	18-19
6-7/8	151R			•	600-4000	MR	✓	10-11
	152R		•	•	50-4000		✓	10-11
	155			•	600-5000	MR		10-11
8-1/8	140R		•	•	50-6000		✓	8- 9
Special 3-1/2	350R	•			100-2000		✓	21
Special 6-3/8	360R	•			2500-4000		✓	21
2-1/8x4-1/4	260R	•			100-4000		✓	18-19
3-9/16x8-13/16	270R	•			400-5000		✓	18-19

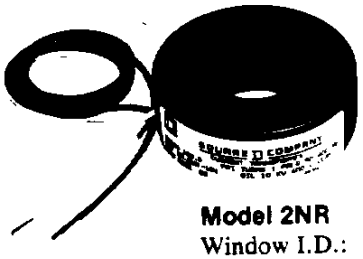
VOLTAGE TRANSFORMERS

APPLICATION	MODEL	ACCURACY/BURDEN and THERMAL RATING	PRIMARY VOLTAGES (120 Volt Secondary)	U.L. RECOGNIZED PRODUCT	DATA PAGE NO.
Large Burden	450R	0.3 W, X, M, Y; 500 VA Thermal	120 to 600 Volts	✓	22-23
Small Burden	460R	0.6W, 1.2X; 150 VA Thermal	120 to 600 Volts	✓	22-23

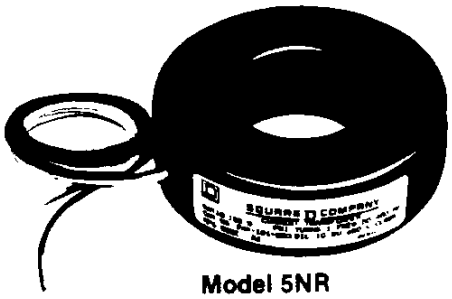
APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMERS
Models 2NR, 5NR and 54R

FOR USE ON CABLE CONDUCTOR APPLICATIONS.



Model 2NR
Window I.D.:
1-1/8".
Designed for ammeter use . . . one panel meter only.



Model 5NR
Window I.D.:
1-9/16".
Designed for ammeters and solid-state transducer applications.

Model 54R
Window I.D.:
1-9/16".
Designed for ammeters and solid-state transducer applications.

- These low-cost, compact units offer good electrical performance in a general purpose transformer.
- U.L. recognized per Classification X0DW2.
- Feature permanent polarity marks molded into the case.
- Model 2NR is so light it is easily mounted on the conductor without need of mounting bracket. MB-1 mounting brackets are available as an option for both the Model 2NR and 5NR as needed . . . shipped unassembled.
- Model 54R features mounting ears molded into the case for easy installation.
- All models include two #16 AWG, 24"-long secondary leads (white polarity X1 lead).
- Frequency: 50-400Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

SINGLE RATIO CONNECTION DIAGRAM

NOTES:

1. Excitation Curves and Outline Dimensions are shown on pages 30 and 46 respectively. Excitation Curves for the Model 2NR are not available.
2. Also listed in Square D Digest as Class 4210.

CURRENT TRANSFORMERS
Models 2NR, 5NR and 54R

FOR USE ON CABLE CONDUCTOR APPLICATIONS.

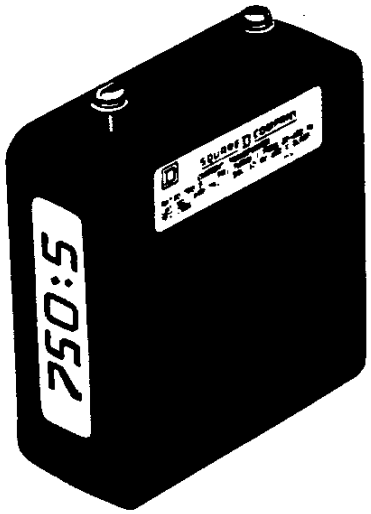
CATALOG NUMBER (without brackets)	CURRENT RATING* (amperes)	VA 60Hz	VA 400Hz	ACCURACY (at rated current)	RATING FACTOR 30°C Amb.	Wt. (lbs.)
2NR-500	50:5	1.0	2.0	±2%	1.0	.5
2NR-600	60:5	1.0	2.0	±2%	1.0	.5
2NR-750	75:5	1.5	3.0	±2%	1.0	.5
2NR-800	80:5	1.5	3.0	±2%	1.0	.5
2NR-101	100:5	2.0	4.0	±1%	1.0	.5
2NR-121	120:5	2.5	5.0	±1%	1.0	.5
2NR-1250	125:5	2.5	5.0	±1%	1.0	.5
2NR-151	150:5	2.5	5.0	±1%	1.0	.5
2NR-201	200:5	2.5	5.0	±1%	1.0	.5
2NR-251	250:5	2.5	5.0	±1%	1.0	.5
2NR-301	300:5	2.5	5.0	±1%	1.0	.5
5NR-101	100:5	2.0	4.0	±1%	1.0	1.0
5NR-151	150:5	2.5	5.0	±1%	1.0	1.0
5NR-201	200:5	5.0	12.5	±1%	1.0	1.0
5NR-251	250:5	5.0	12.5	±1%	1.0	1.0
5NR-301	300:5	5.0	12.5	±1%	1.0	1.0
5NR-401	400:5	12.5	25.0	±1%	1.0	1.0
5NR-501	500:5	12.5	25.0	±1%	1.0	1.0
5NR-601	600:5	25.0	50.0	±1%	1.0	1.0
54R-101	100:5	2.0	4.0	±1%	1.0	1.0
54R-151	150:5	2.5	5.0	±1%	1.0	1.0
54R-201	200:5	5.0	12.5	±1%	1.0	1.0
54R-251	250:5	5.0	12.5	±1%	1.0	1.0
54R-301	300:5	5.0	12.5	±1%	1.0	1.0
54R-401	400:5	12.5	25.0	±1%	1.0	1.0
54R-501	500:5	12.5	25.0	±1%	1.0	1.0
54R-601	600:5	25.0	50.0	±1%	1.0	1.0

*Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

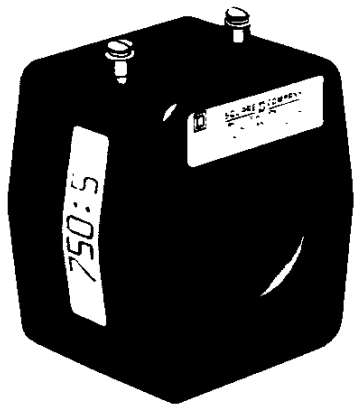
CURRENT TRANSFORMERS
Models 64R, 66R, 74R and 76R

FOR USE ON CABLE OR SMALL BUS CONDUCTOR APPLICATIONS.

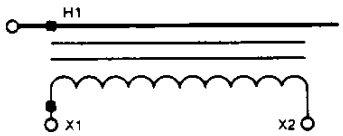


- U.L. recognized per Classification X0DW2.
- Feature permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easier installation.
- Mounting brackets are available as an option as follows:
  Model 64R — MB-10; Model 66R — MB-12; Model 74R — MB-16; Model 76R — MB-18 . . . shipped unassembled.
- Frequency: 25-400Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

Model 64R
Window I.D.:
1-15/16".
Designed for metering applications.

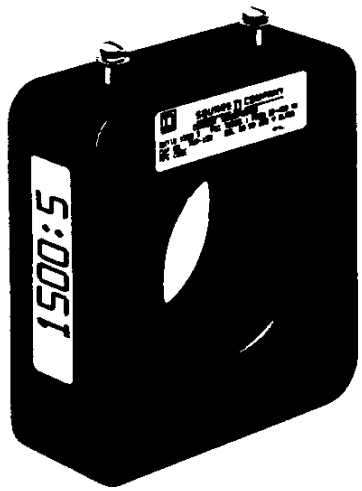


SINGLE RATIO CONNECTION DIAGRAM

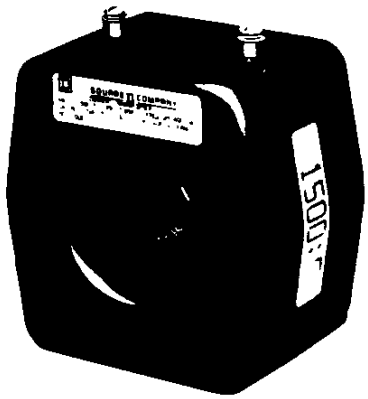


Model 66R
Window I.D.:
1-15/16".
Designed for metering and control relaying applications.

NOTES:
1. Excitation Curves and Outline Dimensions are shown on pages 30, 31 and 46, 47 respectively.
2. Also listed in Square D Digest as Class 4210.



Model 74R
Window I.D.:
2-11/32".
Designed for metering applications.



Model 76R
Window I.D.:
2-11/32".
Designed for metering and control relaying applications.

CURRENT TRANSFORMERS
Models 64R, 66R, 74R and 76R

FOR USE ON CABLE OR SMALL BUS CONDUCTOR APPLICATIONS.

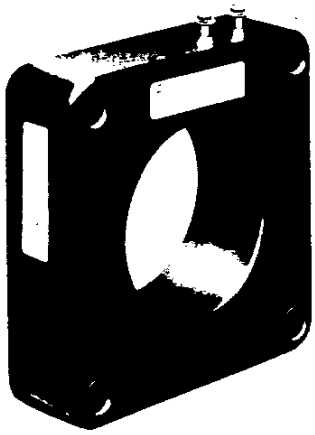
CATALOG NUMBER (without brackets)	CURRENT RATING* (amperes)	RELAY CLASS	ANSI ACCURACY CLASSIFICATION — 60Hz METERING CLASS					RATING FACTOR		WT. (Lbs.)
			B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	30°C AMB.	55°C AMB.	
64R-101	100:5	—	1.2	2.4	—	—	—	1.33	1.0	1.9
64R-151	150:5	—	1.2	1.2	—	—	—	1.33	1.0	1.9
64R-201	200:5	—	1.2	1.2	2.4	—	—	1.33	1.0	1.9
64R-251	250:5	—	0.6	0.6	1.2	—	—	1.33	1.0	2.0
64R-301	300:5	—	0.6	0.6	1.2	2.4	—	1.33	1.0	2.0
64R-401	400:5	—	0.3	0.6	0.6	1.2	—	1.33	1.0	2.0
64R-501	500:5	—	0.3	0.3	0.6	0.6	—	1.33	1.0	2.1
64R-601	600:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	2.1
64R-751	750:5	—	0.3	0.3	0.3	0.6	0.6	1.33	1.0	2.1
66R-101	100:5	—	1.2	2.4	—	—	—	1.33	1.0	4.8
66R-151	150:5	—	0.6	1.2	2.4	2.4	—	1.33	1.0	4.8
66R-201	200:5	C10	0.6	0.6	1.2	2.4	—	1.33	1.0	4.9
66R-251	250:5	C10	0.3	0.6	0.6	1.2	2.4	1.33	1.0	4.9
66R-301	300:5	C10	0.3	0.3	0.6	1.2	2.4	1.33	1.0	5.0
66R-401	400:5	C10	0.3	0.3	0.3	0.6	1.2	1.33	1.0	5.1
66R-501	500:5	C20	0.3	0.3	0.3	0.6	0.6	1.33	1.0	5.2
66R-601	600:5	C20	0.3	0.3	0.3	0.3	0.6	1.33	1.0	5.3
66R-751	750:5	C20	0.3	0.3	0.3	0.3	0.3	1.33	1.0	5.3
74R-201	200:5	—	1.2	1.2	0.6	—	—	1.33	1.0	2.6
74R-251	250:5	—	1.2	1.2	0.6	1.2	—	1.33	1.0	2.6
74R-301	300:5	—	0.6	0.6	1.2	2.4	—	1.33	1.0	2.6
74R-401	400:5	—	0.3	0.3	0.6	1.2	—	1.33	1.0	2.7
74R-501	500:5	—	0.3	0.3	0.6	0.6	1.2	1.33	1.0	2.8
74R-601	600:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	2.8
74R-751	750:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	2.9
74R-801	800:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	2.9
74R-102	1000:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	2.6
74R-122	1200:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	2.7
74R-152	1500:5	—	0.3	0.3	0.3	0.3	0.6	1.0	.75	2.9
76R-201	200:5	C10	0.6	0.6	1.2	2.4	2.4	1.33	1.0	5.8
76R-251	250:5	C10	0.3	0.6	1.2	1.2	2.4	1.33	1.0	5.9
76R-301	300:5	C10	0.3	0.3	0.6	1.2	1.2	1.33	1.0	5.9
76R-401	400:5	C10	0.3	0.3	0.3	0.6	1.2	1.33	1.0	6.0
76R-501	500:5	C10	0.3	0.3	0.3	0.3	0.6	1.33	1.0	6.1
76R-601	600:5	C20	0.3	0.3	0.3	0.3	0.6	1.33	1.0	6.3
76R-751	750:5	C20	0.3	0.3	0.3	0.3	0.6	1.33	1.0	6.5
76R-801	800:5	C20	0.3	0.3	0.3	0.3	0.3	1.33	1.0	6.5
76R-102	1000:5	C20	0.3	0.3	0.3	0.3	0.3	1.33	1.0	6.0
76R-122	1200:5	C20	0.3	0.3	0.3	0.3	0.3	1.33	1.0	6.2
76R-152	1500:5	C20	0.3	0.3	0.3	0.3	0.3	1.0	.75	6.5

*Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

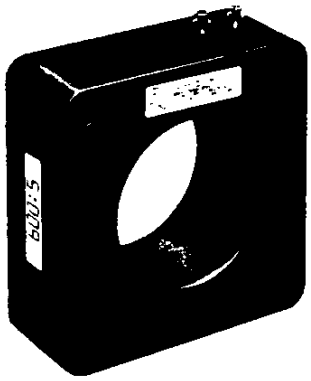
APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMERS
Models 100R, 110R, 120R and 140R

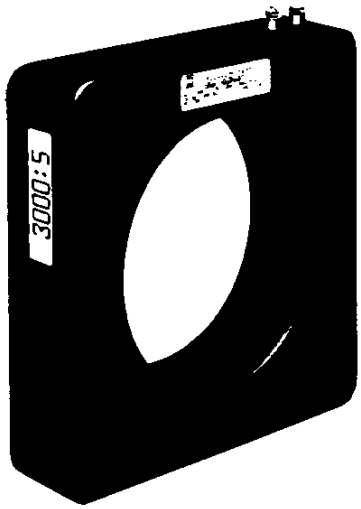
FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.



Model 100R
Window I.D.: 4".
Designed for metering and control relaying applications.



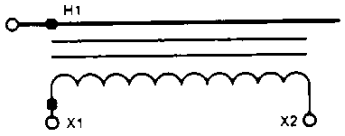
Model 110R
Window I.D.: 4".
Designed for metering and relaying applications.



Model 120R
Window I.D.: 5-3/4".
Designed for metering and control relaying applications.

- U.L. recognized per Classification X0DW2.
- Feature 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 easier installation.
- Mounting brackets are available as an option as follows:
  Model 100R — MB-31; Model 110R — MB-32; Model 120R — MB-31; Model 140R — MB-32 . . . shipped unassembled.
- Frequency: 25-400Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

SINGLE RATIO CONNECTION DIAGRAM



NOTES:
1. Excitation Curves and Outline Dimensions are shown on pages 32, 33 and 47 respectively.
2. Also listed in Square D Digest as Class 4210.

Model 140R
Window I.D.: 8-1/8".
Designed for metering and relaying applications.

CURRENT TRANSFORMERS

Models 100R, 110R, 120R and 140R

FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.

CATALOG NUMBER (without brackets)	CURRENT RATING* (amperes)	RELAY CLASS	ANSI ACCURACY CLASSIFICATION — 60Hz METERING CLASS					RATING FACTOR		WT. (Lbs.)
			B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	30°C AMB.	55°C AMB.	
100R-201	200:5	C10	0.6	1.2	2.4	—	—	1.33	1.0	9.2
100R-301	300:5	C10	0.3	0.6	1.2	1.2	2.4	1.33	1.0	9.2
100R-401	400:5	C20	0.3	0.3	0.6	1.2	1.2	1.33	1.0	9.3
100R-501	500:5	C20	0.3	0.3	0.6	0.6	1.2	1.33	1.0	9.4
100R-601	600:5	C20	0.3	0.3	0.3	0.6	0.6	1.33	1.0	9.5
100R-801	800:5	C20	0.3	0.3	0.3	0.3	0.6	1.33	1.0	9.7
100R-102	1000:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	9.9
100R-122	1200:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	8.6
100R-152	1500:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	8.6
100R-162	1600:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	8.7
100R-202	2000:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	9.1
110R-201	200:5	C20	0.6	0.6	1.2	2.4	—	1.33	1.0	13 6
110R-301	300:5	C20	0.3	0.3	0.6	1.2	2.4	1.33	1.0	13.6
110R-401	400:5	C20	0.3	0.3	0.3	0.6	1.2	1.33	1.0	13.8
110R-501	500:5	C50	0.3	0.3	0.3	0.6	0.6	1.33	1.0	13.8
110R-601	600:5	C50	0.3	0.3	0.3	0.3	0.6	1.33	1.0	13.9
110R-801	800:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	14.2
110R-102	1000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	14.4
110R-122	1200:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	12.2
110R-152	1500:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	12.6
110R-162	1600:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	12.7
110R-202	2000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	13.3
120R-201	200:5	C10	1.2	2.4	2.4	—	—	1.33	1.0	10.0
120R-301	300:5	C10	0.6	1.2	2.4	2.4	—	1.33	1.0	10.0
120R-401	400:5	C20	0.3	0 6	1.2	1.2	2.4	1.33	1.0	10 1
120R-501	500:5	C20	0.3	0.3	0.6	1.2	2.4	1.33	1.0	10.2
120R-601	600:5	C20	0.3	0.3	0.6	0.6	1.2	1.33	1.0	10.3
120R-801	800:5	C20	0.3	0.3	0.3	0.6	0.6	1.33	1.0	10.5
120R-102	1000:5	C50	0.3	0.3	0.3	0.3	0.6	1.33	1.0	10.7
120R-122	1200:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	10.9
120R-152	1500:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	11.2
120R-162	1600:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	11.2
120R-202	2000:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	9.8
120R-252	2500:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	10.4
120R-302	3000:5	C50	0.3	0.3	0.3	0.3	0.3	1.33	1.0	10.9
140R-500	50:5	—	For Ground Fault Sensing			—	—	1.33	1.0	21.5
140R-101	100:5	—				—	—	1.33	1.0	21.5
140R-401	400:5	C20	0.6	0.6	1.2	1.2	2.4	1.33	1.0	22.0
140R-501	500:5	C20	0.3	0.3	0.6	1.2	1.2	1.33	1.0	22.1
140R-601	600:5	C20	0.3	0.3	0.6	0.6	1.2	1.33	1.0	22.2
140R-801	800:5	C50	0.3	0.3	0.3	0.6	0.6	1.33	1.0	22.5
140R-102	1000:5	C50	0.3	0.3	0.3	0.3	0.6	1.33	1.0	22.7
140R-122	1200:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	22.9
140R-152	1500:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	23.5
140R-202	2000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	23.9
140R-252	2500:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	18.9
140R-302	3000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	19.4
140R-402	4000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	20.5
140R-502	5000:5	C100	0.3	0.3	0.3	0.3	0.3	1.0	.75	16.6
140R-602	6000:5	C100	0.3	0.3	0.3	0.3	0.3	1.0	.75	17.5

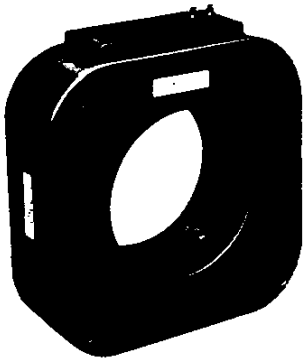
*Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

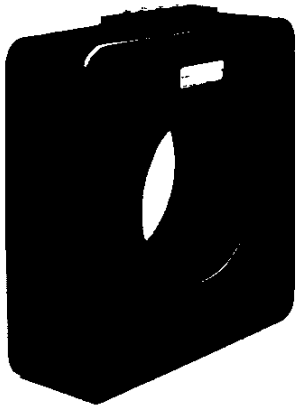
BUSHING CURRENT TRANSFORMERS
Models 151R, 152R and 155

FOR USE ON CABLE, LARGE BUS CONDUCTOR OR BUSHING APPLICATIONS.

Model 151R
Window I.D.: 6-7/8". Designed for relaying and other current sensing applications.



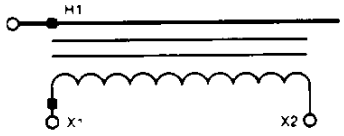
Model 152R
Window I.D.: 6-7/8". Designed for metering, relaying and other current sensing applications.



Model 155
Window I.D.: 6-7/8". Designed for relaying and other current sensing applications.

- These high burden capacity units are designed for installation around the shank or over the ground shield in the C.T. pocket of a high voltage apparatus bushing.
- Models 151R and 152R are U.L. recognized per Classification X0DW2.
- Feature permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- The windings are completely distributed around the core on each tap, providing a low reactance on all taps.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easier installation.
- Mounting holes are provided for bolting these units around the power transformer or circuit breaker bushing.
- Frequency: 60Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standards - ANSI C57.13.

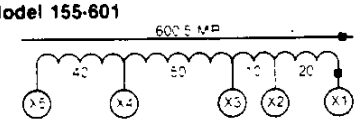
Model 152R
SINGLE RATIO
CONNECTION DIAGRAM



NOTE:
1 Excitation Curves and Outline Dimensions are shown on pages 34 through 37 and 48 respectively.

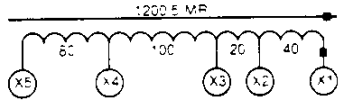
CONNECTIONS AND DIAGRAMS

Model 151R-601
Model 155-601



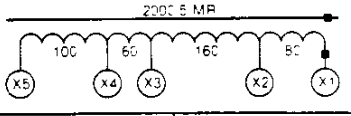
CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
50:5	X2-X3	300:5	X2-X4
100:5	X1-X2	400:5	X1-X4
150:5	X1-X3	450:5	X3-X5
200:5	X4-X5	500:5	X2-X5
250:5	X3-X4	600:5	X1-X5

Model 151R-122
Model 155-122



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
100:5	X2-X3	600:5	X2-X4
200:5	X1-X2	800:5	X1-X4
300:5	X1-X3	900:5	X3-X5
400:5	X4-X5	1000:5	X2-X5
500:5	X3-X4	1200:5	X1-X5

Model 151R-202
Model 155-202



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1200:5	X1-X3
400:5	X1-X2	1500:5	X1-X4
500:5	X4-X5	1600:5	X2-X5
800:5	X2-X3	2000:5	X1-X5
1100:5	X2-X4		

BUSHING CURRENT TRANSFORMERS
Models 151R, 152R and 155

FOR USE ON CABLE, LARGE BUS CONDUCTOR OR BUSHING APPLICATIONS.

CATALOG NUMBER MODEL 151R	CATALOG NUMBER MODEL 155	CURRENT RATING*	RELAY ACCURACY CLASS	RATING FACTOR 30°C Amb.	RATING FACTOR 55°C Amb.	WT. (LBS.) MODEL 151R	WT. (LBS.) MODEL 155
151R-601	155-601	600/500/450/400/300/250/200/150/100/50:5	C200	1.33	1.0	63	69
151R-122	155-122	1200/1000/900/800/600/500/400/300/200/100:5	C400	1.33	1.0	63	69
151R-202	155-202	2000/1600/1500/1200/1100/800/500/400/300:5	C400	1.33	1.0	63	53
151R-302	155-302	3000/2500/2200/2000/1500/1200/1000/800/500/300:5	C400	1.33	1.0	63	49
151R-402	155-402	4000/3500/3000/2500/2000/1500/1000/500:5	C800	1.33	1.0	63	49
	155-502	5000/4000/3500/3000/2500/2000/1500/1000/500:5	C800	1.33	1.0		38

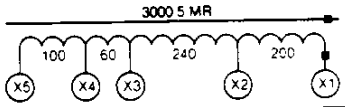
*Taps in accordance with ANSI C57.13 and NEMA SG-4.

CATALOG NUMBER	CURRENT RATIO**	ANSI ACCURACY CLASSIFICATION — 60Hz METERING CLASS WITH ANSI BURDENS B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	RELAY ACCURACY CLASS	RATING FACTOR 30°C Amb.	RATING FACTOR 55°C Amb.	WT. (Lbs.)
152R-500	50:5	1.2					C10	1.33	1.0	62
152R-101	100:5	1.2	2.4				C20	1.33	1.0	62
152R-151	150:5	0.6	1.2	2.4			C50	1.33	1.0	62
152R-201	200:5	0.6	0.6	1.2	2.4	2.4	C50	1.33	1.0	62
152R-251	250:5	0.3	0.6	0.6	1.2	2.4	C50	1.33	1.0	62
152R-301	300:5	0.3	0.3	0.6	1.2	1.2	C100	1.33	1.0	63
152R-401	400:5	0.3	0.3	0.3	0.6	1.2	C100	1.33	1.0	63
152R-501	500:5	0.3	0.3	0.3	0.3	0.6	C100	1.33	1.0	63
152R-601	600:5	0.3	0.3	0.3	0.3	0.6	C200	1.33	1.0	63
152R-801	800:5	0.3	0.3	0.3	0.3	0.3	C200	1.33	1.0	64
152R-102	1000:5	0.3	0.3	0.3	0.3	0.3	C200	1.33	1.0	64
152R-122	1200:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	65
152R-152	1500:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	66
152R-162	1600:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	66
152R-202	2000:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	63
152R-252	2500:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	64
152R-302	3000:5	0.3	0.3	0.3	0.3	0.3	C400	1.33	1.0	65
152R-402	4000:5	0.3	0.3	0.3	0.3	0.3	C800	1.33	1.0	63

** For a multi-ratio unit equivalent to the Model 152R, refer to the Model 151R

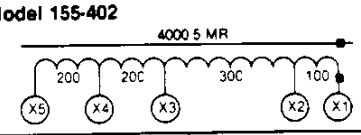
CONNECTIONS AND DIAGRAMS

Model 151R-302
Model 155-302



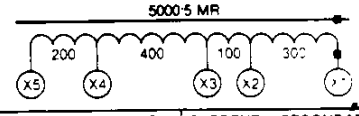
CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1500:5	X2-X4
500:5	X4-X5	2000:5	X2-X5
800:5	X3-X5	2200:5	X1-X3
1000:5	X1-X2	2500:5	X1-X4
1200:5	X2-X3	3000:5	X1-X5

Model 151R-402
Model 155-402



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
500:5	X1-X2	2500:5	X2-X4
1000:5	X3-X4	3000:5	X1-X4
1500:5	X2-X3	3500:5	X2-X5
2000:5	X1-X3	4000:5	X1-X5

Model 155-502

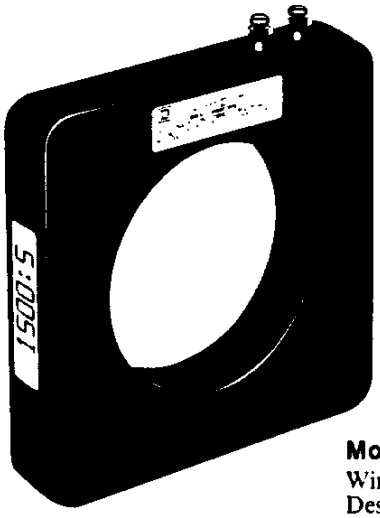


CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
500:5	X2-X3	3000:5	X3-X5
1000:5	X4-X5	3500:5	X2-X5
1500:5	X1-X2	4000:5	X1-X4
2000:5	X3-X4	5000:5	X1-X5
2500:5	X2-X4		

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMERS
Models 170R and 180R

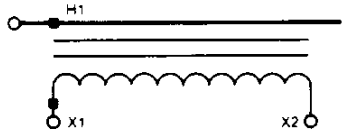
FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.

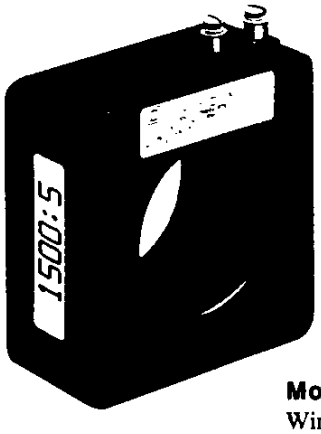


Model 170R
Window I.D.: 4-1/4". Designed for metering and control relaying applications.

- U.L. recognized per Classification X0DW2.
- Feature 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 easier installation.
- Type MB-30 (Model 170R) and Type MB-9 (Model 180R) mounting brackets are available as an option . . . shipped unassembled.
- Frequency: 25-400Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

SINGLE RATIO CONNECTION DIAGRAM





Model 180R
Window I.D.: 2-1/2". Designed for metering and light-duty control relaying applications.

NOTES:
1. Excitation Curves and Outline Dimensions are shown on pages 37, 38 and 48 respectively.
2. Also listed in Square D Digest as Class 4210.

CURRENT TRANSFORMERS
Models 170R and 180R

FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.

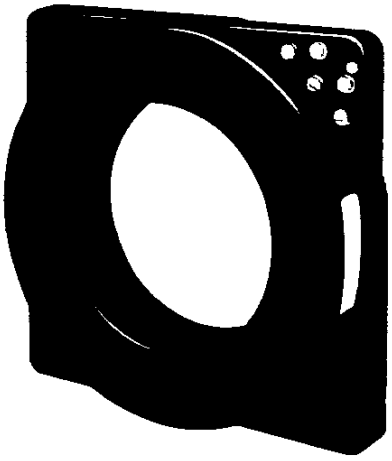
CATALOG NUMBER (without brackets)	CURRENT RATING* (amperes)	RELAY CLASS	ANSI ACCURACY CLASSIFICATION — 60Hz METERING CLASS					RATING FACTOR		WT. (Lbs.)
			B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	30°C AMB.	55°C AMB.	
170R-201	200:5	—	1.2	0.6	2.4	—	—	1.33	1.0	3.8
170R-251	250:5	—	0.6	0.6	2.4	—	—	1.33	1.0	3.8
170R-301	300:5	—	0.6	0.6	1.2	2.4	—	1.33	1.0	3.8
170R-401	400:5	—	0.6	0.6	0.6	1.2	—	1.33	1.0	3.9
170R-501	500:5	—	0.3	0.6	0.6	1.2	—	1.33	1.0	4.0
170R-601	600:5	—	0.3	0.3	0.6	1.2	2.4	1.33	1.0	4.0
170R-751	750:5	C10	0.3	0.3	0.6	0.6	1.2	1.33	1.0	4.0
170R-801	800:5	C10	0.3	0.3	0.3	0.6	1.2	1.33	1.0	4.1
170R-102	1000:5	C10	0.3	0.3	0.3	0.3	0.6	1.33	1.0	4.1
170R-122	1200:5	C10	0.3	0.3	0.3	0.3	0.6	1.33	1.0	4.2
170R-152	1500:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	4.6
170R-162	1600:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	4.6
170R-202	2000:5	—	0.3	0.3	0.3	0.3	0.3	1.33	1.0	2 8
180R-101	100:5	—	2.4	2.4	—	—	—	1.33	1.0	3
180R-151	150:5	—	1.2	2.4	—	—	—	1.33	1.0	3
180R-201	200:5	—	1.2	1.2	2.4	—	—	1.33	1.0	3.1
180R-251	250:5	—	0.6	1.2	2.4	2.4	—	1.33	1.0	3.2
180R-301	300:5	—	0.6	0.6	1.2	2.4	—	1.33	1.0	3.3
180R-401	400:5	—	0.3	0.3	0.6	1.2	2.4	1.33	1.0	3.3
180R-501	500:5	—	0.3	0.3	0.6	0.6	1.2	1.33	1.0	3.4
180R-601	600:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	3.6
180R-751	750:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	3.6
180R-801	800:5	—	0.3	0.3	0.3	0.6	1.2	1.33	1.0	3.6
180R-102	1000:5	—	0.3	0.3	0 3	0.6	0.6	1.33	1.0	3.3
180R-122	1200:5	—	0.3	0.3	0.3	0.3	0.6	1.33	1.0	3.4
180R-152	1500:5	—	0.3	0.3	0 3	0.3	0.3	1.33	1.0	3.5

*Ratios are based on one primary turn, w.th user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

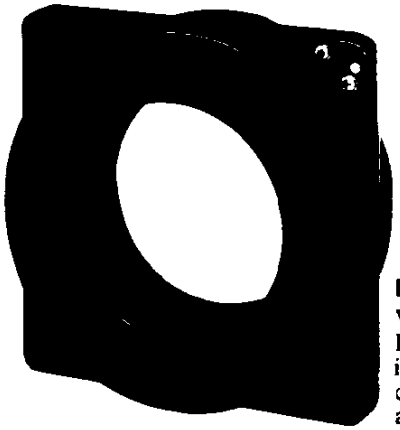
BUSHING CURRENT TRANSFORMERS
Models 190 and 191

FOR USE ON CABLE, LARGE BUS CONDUCTOR OR BUSHING APPLICATIONS.



Model 190
Window I.D.: 6-1/8". Designed for metering, relaying and other current sensing applications.

- These units are of single or multi-ratio design for installation around the shank or over the ground shield in the C.T. pocket of a high voltage apparatus bushing.
- Feature 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 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 these models around a power transformer or circuit breaker bushing.
- Frequency: 60Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.



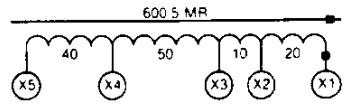
Model 191
Window I.D.: 6-1/8". Designed for metering, relaying and other current sensing applications.

SINGLE RATIO CONNECTION DIAGRAM

NOTE:
1. Excitation Curves and Outline Dimensions are shown on pages 39 through 41 and 49 respectively.

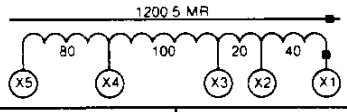
CONNECTIONS AND DIAGRAMS

Model 190-601MR
Model 191-601MR



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
50:5	X2-X3	300:5	X2-X4
100:5	X1-X2	400:5	X1-X4
150:5	X1-X3	450:5	X3-X5
200:5	X4-X5	500:5	X2-X5
250:5	X3-X4	600:5	X1-X5

Model 190-122MR
Model 191-122MR



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
100:5	X2-X3	600:5	X2-X4
200:5	X1-X2	800:5	X1-X4
300:5	X1-X3	900:5	X3-X5
400:5	X4-X5	1000:5	X2-X5
500:5	X3-X4	1200:5	X1-X5

BUSHING CURRENT TRANSFORMERS
Models 190 and 191

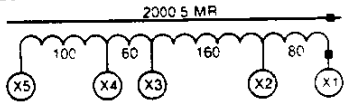
FOR USE ON CABLE, LARGE BUS CONDUCTOR OR BUSHING APPLICATIONS.

CATALOG NUMBER		CURRENT RATIO	ANSI ACCURACY CLASSIFICATION METERING — 60Hz			RELAY ACCURACY CLASS	RATING FACTOR		WT. (lbs.)
SINGLE RATIO	MULTI RATIO		B-0.1	B-0.5	B-1.8		30°C Amb.	55°C Amb.	
190-500	—	50:5	2.4			C10	1.33	1.0	42.0
190-750	—	75:5	1.2			C20	1.33	1.0	42.5
190-101	—	100:5	1.2			C20	1.33	1.0	37.0
190-151	—	150:5	0.6	2.4		C20	1.33	1.0	30.0
190-201	—	200:5	0.6	2.4		C20	1.33	1.0	21.0
190-301	—	300:5	0.6	1.2	2.4	C20	1.33	1.0	30.0
190-401	—	400:5	0.3	0.6	2.4	C50	1.33	1.0	30.0
190-601	190-601MR*	600:5	0.3	0.3	1.2	C50	1.33	1.0	19.0
190-801	—	800:5	0.3	0.3	0.6	C50	1.33	1.0	17.5
190-102	—	1000:5	0.3	0.3	0.6	C50	1.33	1.0	16.0
190-122	190-122MR*	1200:5	0.3	0.3	0.3	C100	1.33	1.0	18.0
190-152	—	1500:5	0.3	0.3	0.3	C100	1.33	1.0	16.3
190-202	190-202MR*	2000:5	0.3	0.3	0.3	C100	1.33	1.0	15.3
190-302	190-302MR*	3000:5	0.3	0.3	0.3	C100	1.0	.75	15.0
190-402	—	4000:5	0.3	0.3	0.3	C100	1.0	.75	13.5
191-151	—	150:5	0.6	1.2		C50	1.33	1.0	61.0
191-201	—	200:5	0.6	1.2		C50	1.33	1.0	41.0
191-301	—	300:5	0.3	0.6	2.4	C50	1.33	1.0	33.0
191-401	—	400:5	0.3	0.3	1.2	C100	1.33	1.0	39.3
191-601	191-601MR*	600:5	0.3	0.3	0.6	C100	1.33	1.0	29.0
191-801	—	800:5	0.3	0.3	0.6	C100	1.33	1.0	25.5
191-122	191-122MR*	1200:5	0.3	0.3	0.3	C200	1.33	1.0	28.5
191-202	191-202MR*	2000:5	0.3	0.3	0.3	C200	1.33	1.0	23.5
191-302	191-302MR*	3000:5	0.3	0.3	0.3	C200	1.0	.75	21.0

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

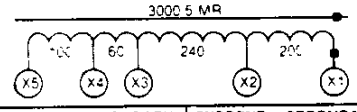
CONNECTIONS AND DIAGRAMS

Model 190-202MR
Model 191-202MR



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1200:5	X1-X3
400:5	X1-X2	1500:5	X1-X4
500:5	X4-X5	1600:5	X2-X5
800:5	X2-X3	2000:5	X1-X5
1100:5	X2-X4		

Model 190-302MR
Model 191-302MR

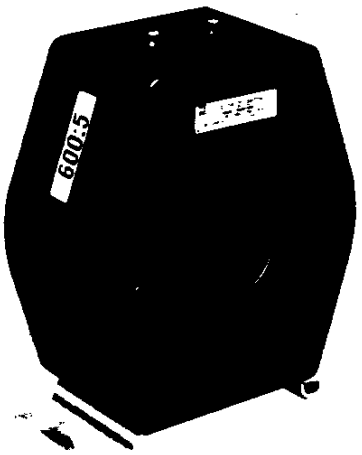


CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1500:5	X2-X4
500:5	X4-X5	2000:5	X2-X5
800:5	X3-X5	2200:5	X1-X3
1000:5	X1-X2	2500:5	X1-X4
1200:5	X2-X3	3000:5	X1-X5

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

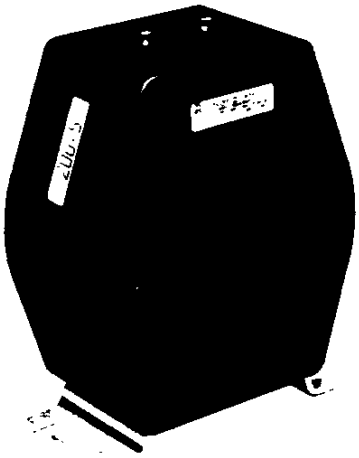
CURRENT TRANSFORMERS
Models 200R, 201R, 202R and 203R

FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.



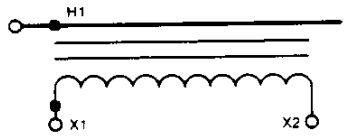
Model 200R
Window I.D.: 2-1/2". Designed for metering and relaying applications.

- A high-burden capacity design in a choice of small to medium window sizes.
- U.L. recognized per Classification X0DW2.
- Feature 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 easier installation.
- Standard models include a mounting base. If not required, please specify "Less Base."
- Frequency: 25-400Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

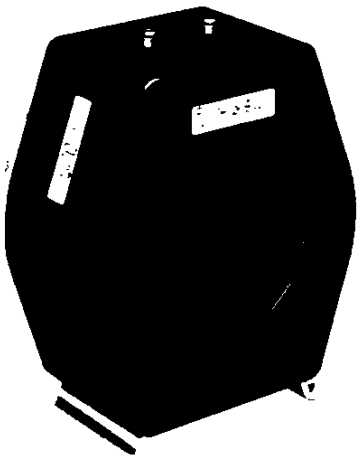


Model 201R
Window I.D.: 3-1/2". Designed for metering and relaying applications.

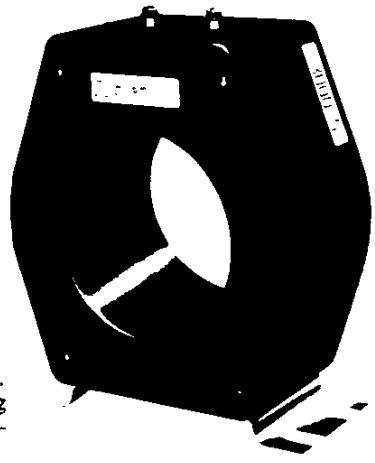
SINGLE RATIO CONNECTION DIAGRAM



NOTE:
1. Excitation Curves and Outline Dimensions are shown on pages 42, 43 and 49 respectively.



Model 202R
Window I.D.: 4-1/2". Designed for metering and relaying applications.



Model 203R
Window I.D.: 5-1/4". Designed for metering and relaying applications.

CURRENT TRANSFORMERS
Models 200R, 201R, 202R and 203R

FOR USE ON CABLE OR BUS CONDUCTOR APPLICATIONS.

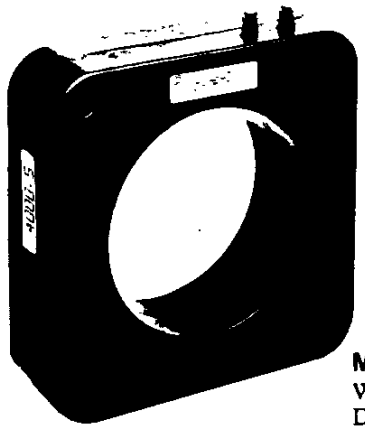
CATALOG NUMBER	CURRENT RATING* (amperes)	RELAY CLASS	ANSI ACCURACY CLASSIFICATION — 60 Hz METERING CLASS					RATING FACTOR 30°C Amb.	WT. (Lbs.)
			B-0.1	B-0.2	B-0.5	B-0.9	B-1.8		
200R-101	100:5	C50	0.6	1.2	1.2	—	—	1.5	51.2
200R-151	150:5	C50	0.3	0.6	0.6	1.2	2.4	1.5	51.3
200R-201	200:5	C100	0.3	0.3	0.6	1.2	1.2	1.5	51.5
200R-251	250:5	C100	0.3	0.3	0.3	0.6	1.2	1.5	51.7
200R-301	300:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	51.8
200R-401	400:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	52.1
200R-501	500:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	52.4
200R-601	600:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	52.7
201R-101	100:5	C20	1.2	1.2	2.4	2.4	—	1.5	45.0
201R-151	150:5	C50	0.3	0.6	1.2	2.4	2.4	1.5	45.2
201R-201	200:5	C50	0.3	0.3	0.6	1.2	2.4	1.5	45.3
201R-251	250:5	C100	0.3	0.3	0.6	1.2	1.2	1.5	45.5
201R-301	300:5	C100	0.3	0.3	0.3	0.6	1.2	1.5	45.6
201R-401	400:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	45.9
201R-501	500:5	C200	0.3	0.3	0.3	0.3	0.3	1 5	46.2
201R-601	600:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	46.5
201R-751	750:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	47 0
201R-801	800:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	47.2
202R-101	100:5	C20	1.2	2.4	2.4	—	—	1.5	36.8
202R-151	150:5	C20	1.2	1.2	2.4	2.4	—	1.5	37.1
202R-201	200:5	C50	0.3	0.6	1.2	1.2	2.4	1.5	37.3
202R-251	250:5	C50	0.3	0 3	0.6	1.2	1.2	1.5	37.5
202R-301	300:5	C50	0.3	0.3	0.6	0.6	1.2	1.5	37.7
202R-401	400:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	38.0
202R-501	500:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	38.2
202R-601	600:5	C100	0.3	0.3	0.3	0.3	0.3	1.5	38.5
202R-751	750:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	38.8
202R-801	800:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	39.0
202R-102	1000:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	39.5
203R-101	100:5	C20	1.2	2.4	—	—	—	1.5	30.5
203R-151	150:5	C20	0.6	1.2	2.4	2.4	—	1.5	30.6
203R-201	200:5	C20	0.3	0.6	1.2	2.4	2.4	1.5	30.7
203R-251	250:5	C20	0.3	0.6	1.2	1.2	2.4	1.5	30.8
203R-301	300:5	C50	0.3	0.3	0.6	1.2	1.2	1.5	30.9
203R-401	400:5	C50	0.3	0.3	0.6	0.6	1.2	1.5	31.1
203R-501	500:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	31.3
203R-601	600:5	C100	0.3	0.3	0.3	0.3	0.6	1.5	31.5
203R-751	750:5	C100	0.3	0.3	0.3	0.3	0.3	1.5	31.8
203R-801	800:5	C100	0.3	0.3	0.3	0.3	0.3	1.5	31.9
203R-102	1000:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	32.3
203R-122	1200:5	C200	0.3	0.3	0.3	0.3	0.3	1.5	32.7
203R-152	1500:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	32.8
203R-162	1600:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	32.4
203R-202	2000:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	25.2
203R-252	2500:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	26 1
203R-302	3000:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	26.0

*Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

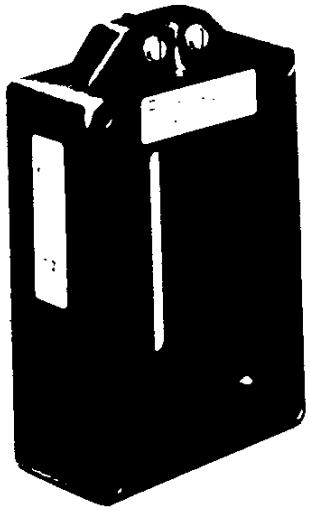
APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMERS
Models 210R, 260R and 270R

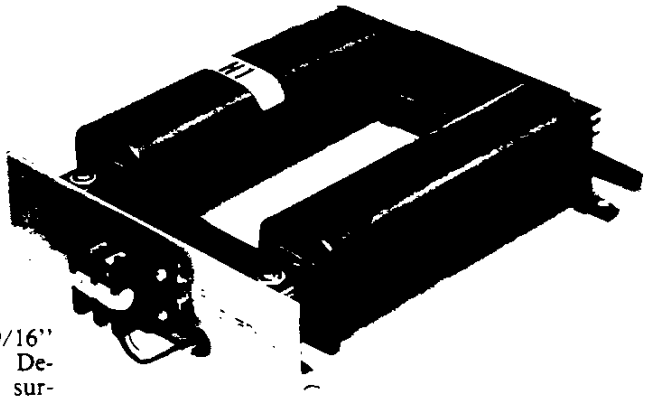
FOR USE ON CABLE, BUS OR LARGE BUS CONDUCTOR APPLICATIONS.



Model 210R
Window I.D.: 6-1/4". Designed for metering and relaying applications.



Model 260R
Window Size: 2-1/8" x 4-1/4". Designed for metering applications with minimum clearances.



Model 270R
Window Size: 3-9/16" x 8-13/16" std. Designed for load surveying, ground fault relaying and metering applications. Split-core design.

- Model 260R features 2-1/8" x 4-1/4" rectangular window for bus conductor applications with minimum clearance requirements.
- Model 270R features a split core design for easier installation over existing bus or cable conductor. Window length or width may be increased or decreased as an option.
- U.L. recognized per Classification X0DW2.
- 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.
- Mountings:
  - **Model 210R** — MB-32 mounting brackets are available as an option . . . shipped unassembled.
  - **Model 260R** — Mounting holes are provided for positioning unit.
  - **Model 270R** — Provided with transformer.
- Frequency: 25-400Hz (Models 210R and 260R): 60Hz (Model 270R)
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

SINGLE RATIO CONNECTION DIAGRAM

NOTE:
1. Excitation Curves and Outline Dimensions are shown on pages 43 and 48, 50 respectively. Excitation Curves for the Model 260R are not available.

CURRENT TRANSFORMERS
Models 210R, 260R and 270R

FOR USE ON CABLE, BUS OR LARGE BUS CONDUCTOR APPLICATIONS.

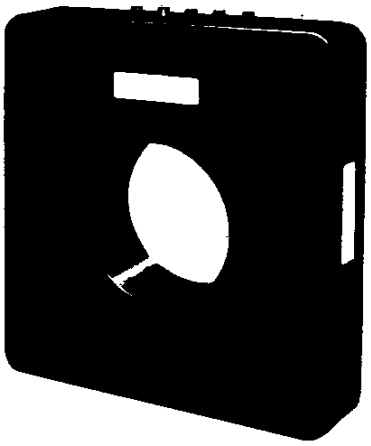
CATALOG NUMBER (without brackets)	CURRENT RATING* (amperes)	RELAY CLASS	ANSI ACCURACY CLASSIFICATION — 60Hz METERING CLASS					RATING FACTOR		WT. (Lbs.)
			B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	30°C AMB.	55°C AMB.	
210R-202	2000:5	C100	0.3	0.3	0.3	0.3	0.3	1.33	1.0	17.6
210R-252	2500:5	C200	0.3	0.3	0.3	0.3	0.3	1.33	1.0	19.0
210R-302	3000:5	C200	0.3	0.3	0.3	0.3	0.3	1.0	.75	19.0
210R-402	4000:5	C200	0.3	0.3	0.3	0.3	0.3	1.0	.75	17.0
260R-101	100:5	—	1.2	2.4	—	—	—	1.33	1.0	7.5
260R-151	150:5	—	1.2	2.4	—	—	—	1.33	1.0	7.5
260R-201	200:5	—	1.2	1.2	—	—	—	1.33	1.0	7.5
260R-301	300:5	—	0.6	0.6	—	—	—	1.33	1.0	7.5
260R-401	400:5	—	0.6	0.6	—	—	—	1.33	1.0	7.5
260R-601	600:5	—	0.3	0.3	—	—	—	1.33	1.0	7.0
260R-801	800:5	—	0.3	0.3	—	—	—	1.33	1.0	7.0
260R-122	1200:5	—	0.3	0.3	—	—	—	1.33	1.0	6.5
260R-162	1600:5	—	0.3	0.3	—	—	—	1.33	1.0	5 5
260R-202	2000:5	—	0.3	0.3	—	—	—	1.33	1.0	6.0
260R-252	2500:5	—	0.3	0.3	—	—	—	1.0	.75	5.5
260R-302	3000:5	—	0.3	0.3	—	—	—	1.0	.75	5.5
260R-402	4000:5	—	0.3	0.3	—	—	—	1.0	.75	6.0
270R-401	400:5	—	—	—	—	—	—	1.33	1.0	12.0
270R-501	500:5	—	—	—	—	—	—	1.33	1.0	12.0
270R-601	600:5	—	—	—	—	—	—	1.33	1.0	12 0
270R-801	800:5	—	1.2	2.4	—	—	—	1.33	1 0	12.0
270R-102	1000:5	—	1.2	1.2	2.4	—	—	1.33	1 0	12.1
270R-122	1200:5	—	1.2	1.2	2.4	—	—	1.33	1.0	12.4
270R-152	1500:5	—	1.2	1.2	2.4	—	—	1.33	1 0	12.8
270R-162	1600:5	—	1.2	1.2	2.4	—	—	1.33	1.0	12.9
270R-202	2000:5	—	1.2	1.2	1.2	2.4	—	1.33	1.0	13.2
270R-252	2500:5	—	1.2	1.2	1.2	2.4	—	1.33	1.0	14.0
270R-302	3000:5	—	1.2	1.2	1.2	1.2	2.4	1.0	.75	14 4
270R-402	4000:5	—	1.2	1.2	1.2	1.2	1.2	1.0	.75	15.6
270R-502	5000:5	—	1.2	1.2	1.2	1.2	1.2	1.0	.75	16.7

*Ratios are based on one primary turn, with user-applied primary conductor. Refer to page 25 for other ratios via multiple primary turns and/or additional secondary turns.

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

BUSHING CURRENT TRANSFORMER
Model 311R

FOR USE ON CABLE, BUS CONDUCTOR OR BUSHING APPLICATIONS.



Model 311R
Window I.D.: 4-1/2". Designed for relaying and other current sensing applications.

NOTE:
1 Excitation Curves and Outline Dimensions are shown on pages 44, 45 and 51 respectively.

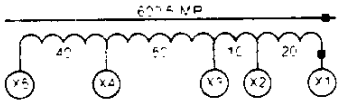
- A high-burden capacity design for installation over the ground shield in a C.T. pocket of a high-voltage apparatus bushing.
- U.L. recognized per Classification X0DW2.
- Features permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for 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 installation around a power transformer or circuit breaker bushing.
- Frequency: 60Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

CATALOG NUMBER	CURRENT RATING*	RELAY ACCURACY CLASS	RATING FACTOR 30°C Amb.	RATING FACTOR 55°C Amb.	WT. (Lbs.)
311R-601	600/500/450/400/300/250/200/150/100/50:5	C100	1.33	1.0	27
311R-122	1200/1000/900/800/600/500/400/300/200/100:5	C200	1.33	1.0	28
311R-202	2000/1600/1500/1200/1100/800/500/400/300:5	C400	1.33	1.0	34
311R-302	3000/2500/2200/2000/1500/1200/1000/800/500/300:5	C400	1.33	1.0	33
311R-402	4000/3500/3000/2500/2000/1500/1000/500:5	C400	1.0	.75	30

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

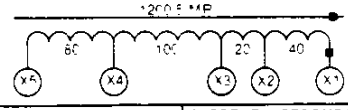
CONNECTIONS AND DIAGRAMS

Model 311R-601



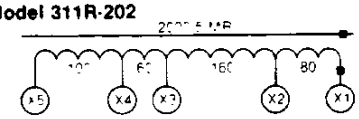
CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
50:5	X2-X3	300:5	X2-X4
100:5	X1-X2	400:5	X1-X4
150:5	X1-X3	450:5	X3-X5
200:5	X4-X5	500:5	X2-X5
250:5	X3-X4	600:5	X1-X5

Model 311R-122



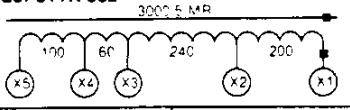
CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
100:5	X2-X3	600:5	X2-X4
200:5	X1-X2	800:5	X1-X4
300:5	X1-X3	900:5	X3-X5
400:5	X4-X5	1000:5	X2-X5
500:5	X3-X4	1200:5	X1-X5

Model 311R-202



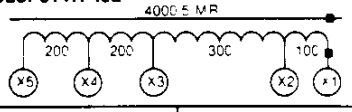
CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1200:5	X1-X3
400:5	X1-X2	1500:5	X1-X4
500:5	X4-X5	1600:5	X2-X5
800:5	X2-X3	2000:5	X1-X5
1100:5	X2-X4		

Model 311R-302



CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
300:5	X3-X4	1500:5	X2-X4
500:5	X4-X5	2000:5	X2-X5
800:5	X3-X5	2200:5	X1-X3
1000:5	X1-X2	2500:5	X1-X4
1200:5	X2-X3	3000:5	X1-X5

Model 311R-402

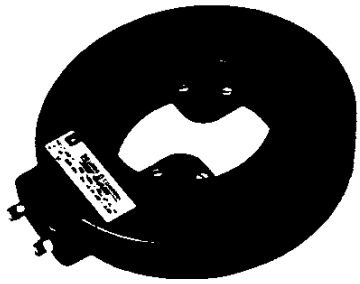


CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS	CURRENT RATING (amperes)	SECONDARY TERMINAL CONNECTIONS
500:5	X1-X2	2500:5	X2-X4
1000:5	X3-X4	3000:5	X1-X4
1500:5	X2-X3	3500:5	X2-X5
2000:5	X1-X3	4000:5	X1-X5

CURRENT TRANSFORMERS
Models 350R and 360R

FOR USE ON SMALL AND LARGE BUS CONDUCTOR APPLICATIONS.

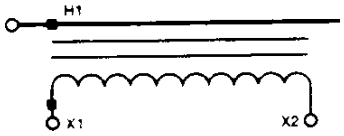
- U.L. recognized per Classification X0DW2.
- Feature permanent polarity marks molded into the case.
- Large, easy-to-read ratios are clearly marked on the case.
- Secondary terminals are #10-32 brass screws and include flat washers and bronze lockwashers for easier installation.
- Special mounting tabs are included in the inside of the window. (See Outline Drawing for detail.)
- Frequency: 25-60Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.



Model 350R
Window I.D.: 3-1/2". Designed to fit over bus behind Westinghouse DS breaker for metering.

Model 360R
Window I.D.: 6-3/8". Designed to fit over bus behind Westinghouse DS breaker for metering.

SINGLE RATIO CONNECTION DIAGRAM

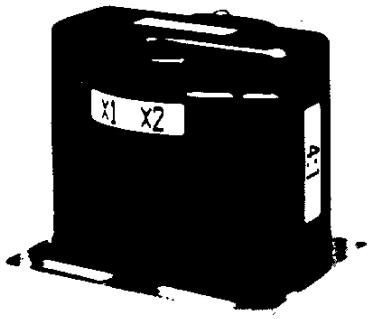


NOTE:
1. Excitation Curves and Outline Dimensions are shown on pages 45 and 51 respectively.

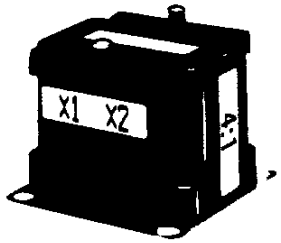
CATALOG NUMBER	CURRENT RATING (amperes)	ANSI ACCURACY CLASSIFICATION 60Hz		RATING FACTOR		WT. (Lbs.)
		B-0.1	B-0.2	30°C Amb.	55°C Amb.	
350R-101	100:5	1.2	—	1.33	1.0	5.5
350R-151	150:5	1.2	2.4	1.33	1.0	5.5
350R-201	200:5	1.2	1.2	1.33	1.0	5.5
350R-301	300:5	0.6	0.6	1.33	1.0	5.5
350R-401	400:5	0.3	0.6	1.33	1.0	5.5
350R-501	500:5	0.3	0.3	1.33	1.0	5.5
350R-601	600:5	0.3	0.3	1.33	1.0	5.5
350R-801	800:5	0.3	0.3	1.33	1.0	5.5
350R-102	1000:5	0.3	0.3	1.33	1.0	5.5
350R-122	1200:5	0.3	0.3	1.33	1.0	5.5
350R-152	1500:5	0.3	0.3	1.33	1.0	5.5
350R-162	1600:5	0.3	0.3	1.33	1.0	5.5
350R-202	2000:5	0.3	0.3	1.33	1.0	5.5
360R-252	2500:5	0.3	0.3	1.33	1.0	3.0
360R-302	3000:5	0.3	0.3	1.33	1.0	3.0
360R-402	4000:5	0.3	0.3	1.33	1.0	3.0

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

VOLTAGE TRANSFORMERS
Models 450R and 460R



Model 450R
Designed for a wide range of electrical indicating, recording instruments and protective relays in power systems.



Model 460R
Designed for use with voltmeters, transducers and other types of electrical indicating and recording instrumentation.

- These Voltage Transformers are designed for line-to-line or line-to-ground connection on the primary voltage indicated. See the System/Connection data below to determine the applicable configuration for proper system voltage indication.
- Model 450R is designed for Switchboard use. It features high-accuracy and burden capacity for excellent performance in metering and indication.
- Model 460R is a compact, lightweight design, providing acceptable performance in indicating applications.
- U.L. recognized per Classification X0DW2.
- Feature permanent polarity marks 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: 60Hz
- Insulation: 10kV BIL Full Wave (600 Volt class)
- Applicable Standard - ANSI C57.13.

CATALOG NUMBER	PRIMARY VOLTAGE RATING (Volts)	SECONDARY VOLTAGE RATING (Volts)	VOLTAGE RATIO	SYSTEM	TRANSFORMER CONNECTIONS	ACCURACY AND BURDEN RATING	THERMAL BURDEN RATING (VA)		WT. (Lbs.)
							30°C	55°C	
450R-120	120	120	1:1	208Y 120Δ	ϕ - Gnd. ϕ - ϕ	0.3Y,1.2Z	500	300	23
450R-240	240	120	2:1	416Y 240Δ	ϕ - Gnd. ϕ - ϕ	0.3Y,1.2Z	500	300	23
450R-288	288	120	2.4:1	480Y	ϕ - Gnd.	0.3Y,1.2Z	500	300	23
450R-300	300	120	2.5:1	520Y	ϕ - Gnd.	0.3Y,1.2Z	500	300	23
450R-480	480	120	4:1	480Y 480Δ	ϕ - ϕ ϕ - ϕ	0.3Y,1.2Z	500	300	23
450R-600	600	120	5:1	600Y 600Δ	ϕ - ϕ ϕ - ϕ	0.3Y,1.2Z	500	300	23
460R-120	120	120	1:1	208Y 120Δ	ϕ - Gnd. ϕ - ϕ	0.6W,1.2X	150	100	8
460R-240	240	120	2:1	416Y 240Δ	ϕ - Gnd. ϕ - ϕ	0.6W,1.2X	150	100	8
460R-288	288	120	2.4:1	480Y	ϕ - Gnd.	0.6W,1.2X	150	100	8
460R-300	300	120	2.5:1	520Y	ϕ - Gnd.	0.6W,1.2X	150	100	8
460R-480	480	120	4:1	480Y 480Δ	ϕ - ϕ ϕ - ϕ	0.6W,1.2X	150	100	8
460R-600	600	120	5:1	600Y 600Δ	ϕ - ϕ ϕ - ϕ	0.6W,1.2X	150	100	8

NOTES:
1. Circle Diagrams and Outline Dimensions are shown on pages 23 and 52 respectively.
2. Also listed in Square D Digest as Class 4210.

VOLTAGE TRANSFORMER CIRCLE DIAGRAMS
Circle Diagram Accuracy Determination

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.

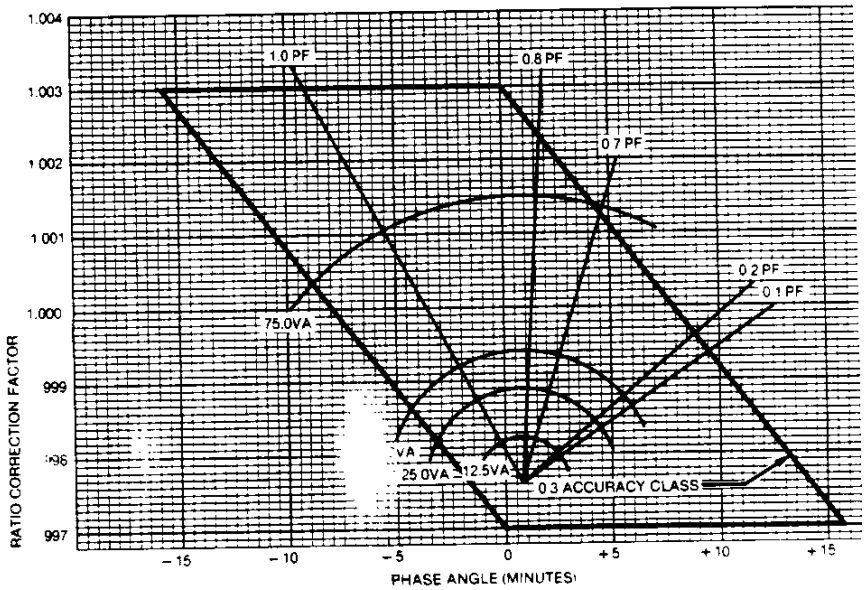
Example: Burden Volt-Amperes = 20 VA
Burden Power Factor = .95

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

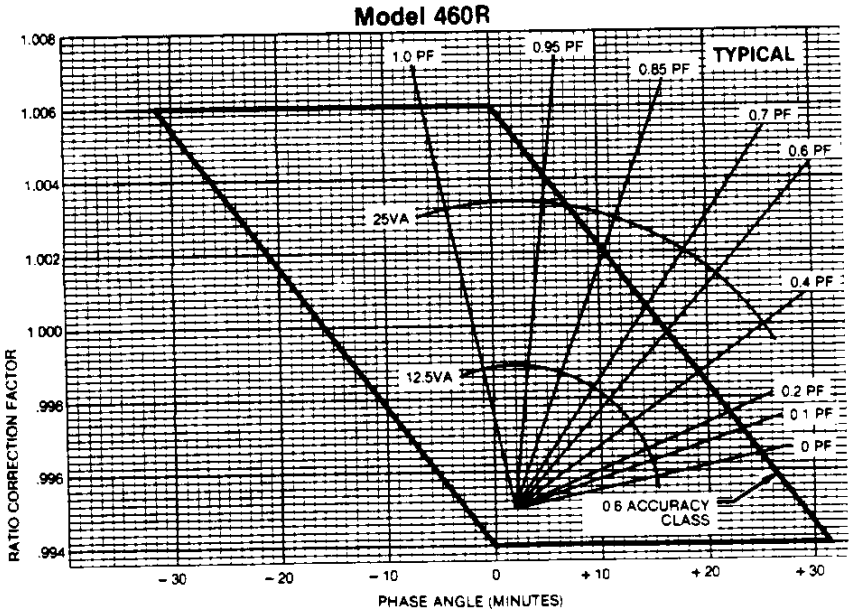
Standard Burdens For Voltage Transformers

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 450R



Model 460R



APRIL 1986
(Supersedes Catalog Section A1, June 1981)

GLOSSARY OF TERMS AND ABBREVIATIONS USED

ACCURACY — 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, e.g. B-1.8 means a burden of 1.8 ohms at a specific power factor (See Page 26). To convert, use formula: $VA = I^2Z$.

Relaying accuracy of current transformers — A relaying accuracy class is designated by two symbols which effectively describe the capability of the transformer as follows:

1. 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.
2. 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 from 1 to 20 times nominal secondary current if the burden does not exceed 1.0 ohms (1 ohm X 5 amp. X 20 times normal current = 100 volts). Note: Previous standards used the term "10L" in place of "C", e.g. 10L100, 10L400, etc. CSA Standard C13 used term "10L" in place of "C".

Accuracy ratings of voltage transformers — 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 26), and at any voltage from 90% to 110% of the rated transformer voltage.

AMB — Ambient.

ANSI — American National Standard Institute (Successor to USASI, United States of America Standards Institute).

B.I.L. — Basic insulation level which is defined as a withstand of a 1.2 x 50 full wave impulse of specified kV crest value.

BURDEN — Burden of an instrument transformer is equivalent to the term "load" as applied to a power transformer.

COMPENSATED VA — Transformer is compensated to provide maximum accuracy at that burden.

RATING FACTOR of window type transformers — 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 apply to the primary current as well, provided that the primary conductor is of sufficient size to carry the current without exceeding the allowable temperature rise.

CURRENT RATING — The ratio of the rated primary value to the rated secondary value as stated on the name plate.

Hz — Hertz = cycles per second.

INSULATION CLASS OF INSTRUMENT TRANSFORMER — 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.

CAUTION: 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 use of transformers on circuits above their published ratings.

kV — Kilovolt or 1000 volts.

POLARITY — 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.

PRI. — Primary.

SEC. — Secondary.

RATIO — Ratio of transformer, primary : secondary.

VA — Volt-amperes.

X1, X2 — Secondary Teminals (See "Polarity").

CURRENT TRANSFORMER RATIO ADJUSTMENT (To Obtain Special Ratios from Standard Ratings)

Window type current transformers 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 Amp. CT with 4 primary turns

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

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_1 lead in the proper direction. To **subtract** turns, take the X_1 lead and pass it through the window from H_1 to H_2 as shown in Figure 1. To **add** turns, the X_1 lead is passed through the window in the reverse direction as shown in Figure 2.

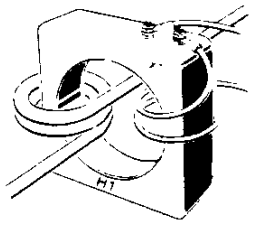


Figure 1

3 Primary Turns With
2 Secondary Turns Subtracted

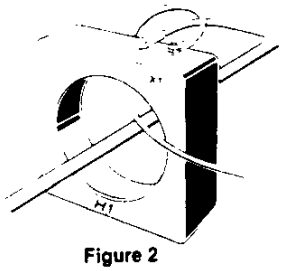


Figure 2

1 Primary Turn With
1 Secondary Turn Added

[Nameplate Primary Amps ± (Extra secondary turns x 5 Amps/turn)] :5 = New Ratio.

Example:
For 100:5 Amp. CT with 2 secondary turns added.
100 + (2 x 5) = 110:5 Amp Ratio

For 150:5 Amp CT with 3 secondary turns subtracted.
150 − (3 x 5) = 135:5 Amp 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_a = actual transformation ratio obtained = $\frac{\text{Desired Primary Amp.}}{\text{Secondary Amp.}}$

K_n = nameplate transformation ratio = $\frac{\text{Primary Amps}}{\text{Secondary Amps}}$

N_{sa} = Number of secondary turns added or subtracted.

N_p = Number of primary turns.

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

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

N_{sa} = +4 turns (added)

For further information on applying turns, refer to SQUARE D Company Product Data EIP-10.

PARALLELING CURRENT TRANFORMERS (How to Parallel CT Secondaries to Totalize Currents from Two or More Feeders From the Same Phase)

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

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

ACCURACY AND BURDEN 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
	5.0 Amp	0.5 AMP	90-110% VOLTS
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 Panelmeters 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

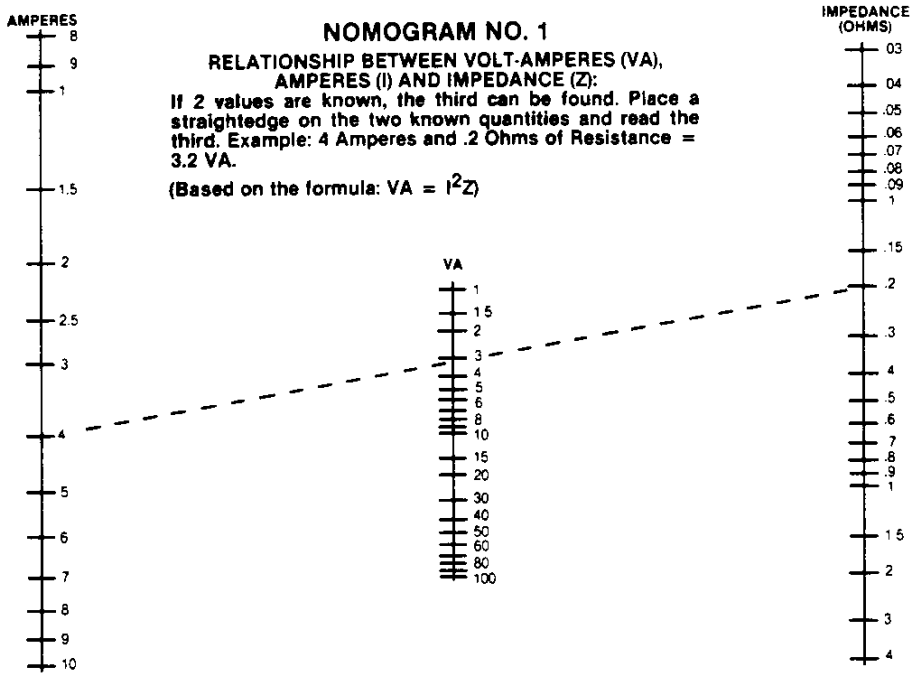
The Burden consists of the sum total of the wiring and all connected devices. Determine the burden of the connected devices by referring to the nameplate or catalog data. If the burden is expressed in volt-amperes, add this directly for the V.T., or convert to ohms impedance for the C.T., using Nomogram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

NOMOGRAM NO. 1

RELATIONSHIP BETWEEN VOLT-AMPERES (VA), AMPERES (I) AND IMPEDANCE (Z):

If 2 values are known, the third can be found. Place a straightedge on the two known quantities and read the third. Example: 4 Amperes and .2 Ohms of Resistance = 3.2 VA.

(Based on the formula: $VA = I^2Z$)



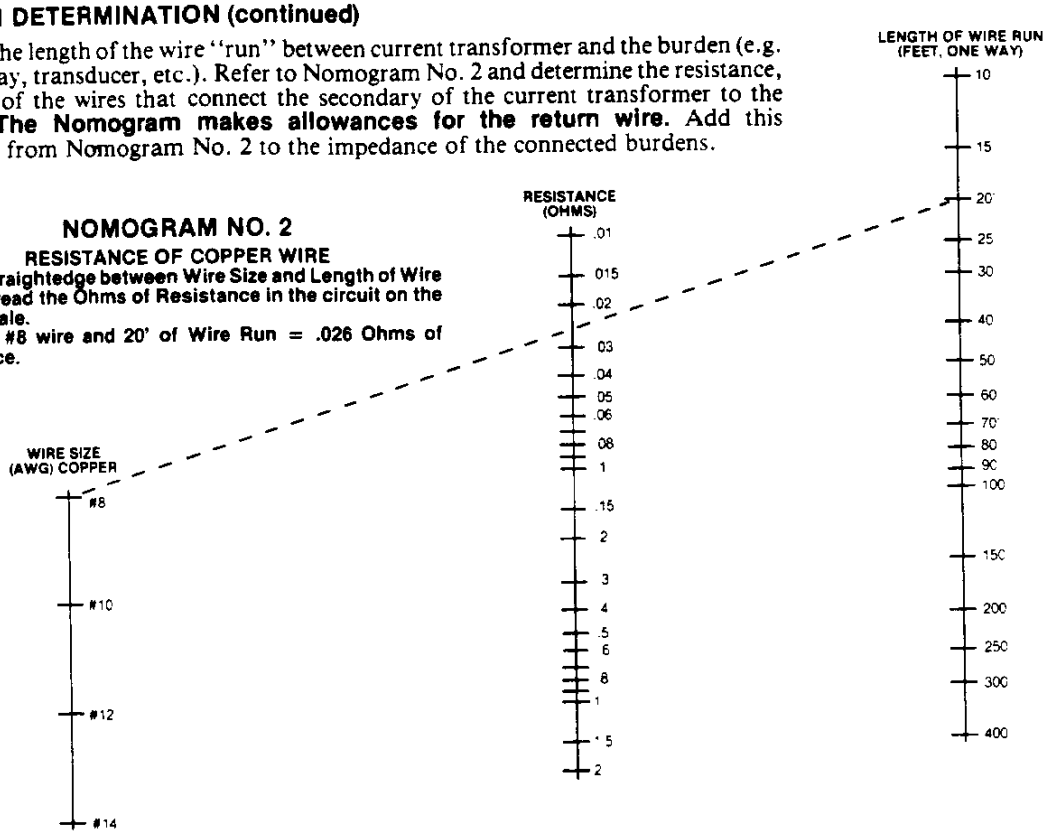
BURDEN DETERMINATION (continued)

Measure the length of the wire "run" between current transformer and the burden (e.g. 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 straightedge 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.



DEMAGNETIZING CURRENT TRANSFORMERS

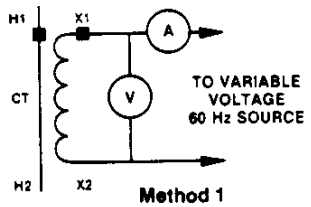
Any tests, such as continuity test or a polarity test (by the inductive kick method), that circulate direct current in the winding(s) will leave a residual flux in the core and must be demagnetized before going into service. Also, whenever a current transformer has been driven into saturation from over-current and/or a high impedance burden, or an open-circuited secondary, the transformer should be demagnetized in accordance with the following.

Demagnetization requires the establishment of a voltage across the secondary winding sufficient to produce saturation of the core, then gradually reducing the voltage (and flux) to zero.

Any of the following methods will demagnetize a core. Select the method most applicable to the situation.

METHOD 1

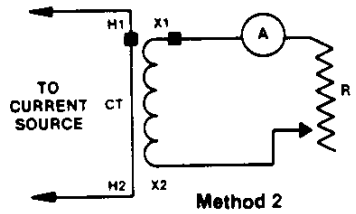
With the primary open-circuited, circulate current in the secondary by controlling the applied voltage. Increase current to the saturation point (as determined by the meter readings) or to rated secondary current, whichever occurs first. Slowly reduce the current to zero.



Method 1

METHOD 2

Circulate rated current in the primary winding with a variable resistance connected across the secondary terminals. Increase the resistance slowly until the core is saturated which will be indicated by a reduction in current in the ammeter. Slowly decrease the resistance to zero taking care not to open the secondary circuit. Then open the primary circuit before opening the secondary circuit.



Method 2

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

INSTALLATION INFORMATION

1. When installing Instrument Transformers, **observe proper polarity:** Window type CT's should be mounted with the H_1 side of the window towards the current source. The X_1 secondary terminal is the polarity terminal (Figure A).

   VT's primary H_1 is the polarity terminal; the H_2 is the common, or nonpolarity terminal. The X_1 secondary is the polarity terminal (Figure B).

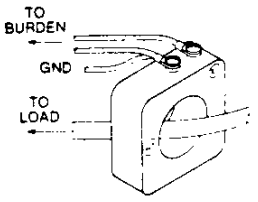


Figure A

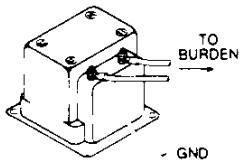


Figure B

2. **Never open-circuit a Current Transformer secondary** while the primary is energized. High crest voltages may occur across the open secondary circuit. To avoid personnel injury or equipment damage, the secondary must **always** be short-circuited or connected to a burden.

3. **The secondary terminals of a Voltage Transformer should never be short-circuited.** A short-circuited secondary would cause the unit to overheat and would be hazardous to personnel and equipment.

4. **Apply proper grounding for each secondary winding close to the transformer** and, in the case of a 3-phase application, take only one ground lead for the CT's and one ground lead for the VT's back to the burden.

5. If a CT selector switch is used for reading all 3-phase currents with one ammeter, the switch must have a "make-before-break" contact pattern to assure that the CT is not open-circuited during transition. The VT selector switch must be a "break-before-make" type to avoid shorting the VT secondary.

6. 600 Volt Instrument Transformers should not be applied to circuits having a phase-to-phase nominal voltage greater than 600 Volts unless adequate additional insulation is applied between the primary and secondary windings. SQUARE D Company assumes no responsibility for equipment damage or personnel injury caused by the use of transformers on circuits above their published ratings. If a window-type CT is used over fully insulated cable with a current carrying sheath or concentric neutral, the sheath ground wire or neutral should be taken back through the CT window prior to grounding (as shown in Figure C). Otherwise, the CT would sense current in the neutral or sheath, and grounding of the neutral on both sides of the CT would constitute a shorted turn and would affect CT performance.

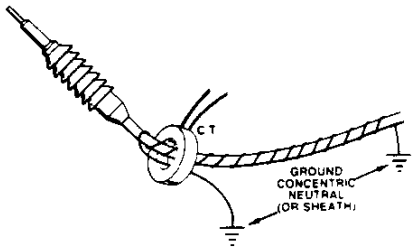


Figure C

7. The primary conductors need not be centered in the window of toroidal transformers.

8. Check your work before leaving the installation. Make sure all connections are tight and installation has been made in a neat and workmanlike manner. **The life you save may be your own!**

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, it is necessary 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:

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

Where: I_S = Secondary Current

In order to use the curves to determine I_e, it is first necessary to calculate V_S.

Referring to a typical CT circuit, Figure 1, it is obvious 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.

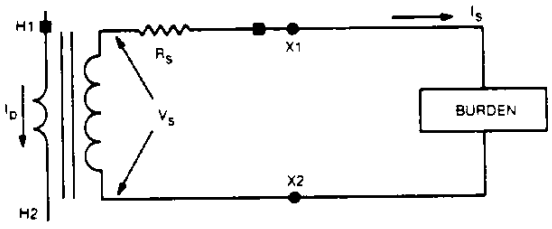


Figure 1

The resistance of the secondary winding R_S is listed in the Catalog for a given CT under the heading of "DC R - ohms". Z is commonly refered 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.

To calculate the accuracy:

For example, a 300:5 ratio CT with a total burden of Z = .5 ohm.

With 240 Amps. 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 Amps.

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

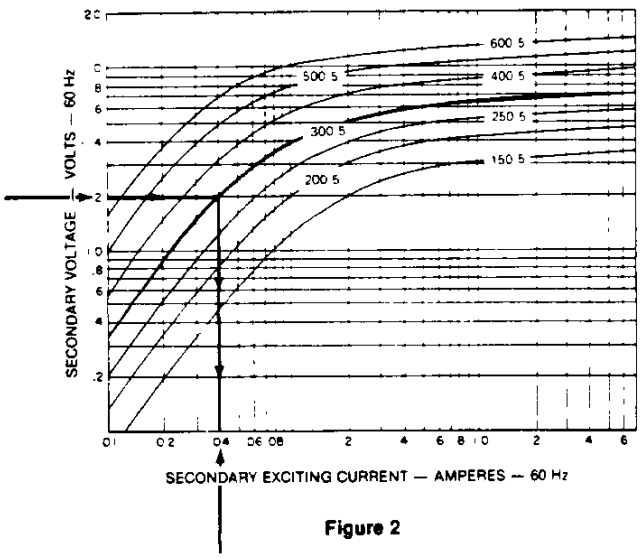


Figure 2

For further information on accuracy determination, refer to SQUARE D Company Product Data EIP-9.

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 a 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 = $\sqrt{(R_c + .5Z_b)^2 + (.866Z_b)^2}$
Where: $X_b = .866\ Z_b$
$R_b = .5\ Z_b$

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

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_b (ohms)	Z_b (ohms)	Relay Accuracy	R_b (ohms)	Z_b (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 x 5 Amps = 100 Amps for Fault considerations.

V_S = 100 Amps x Z_t

V_S = Minimum voltage required to meet the relay accuracy.

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

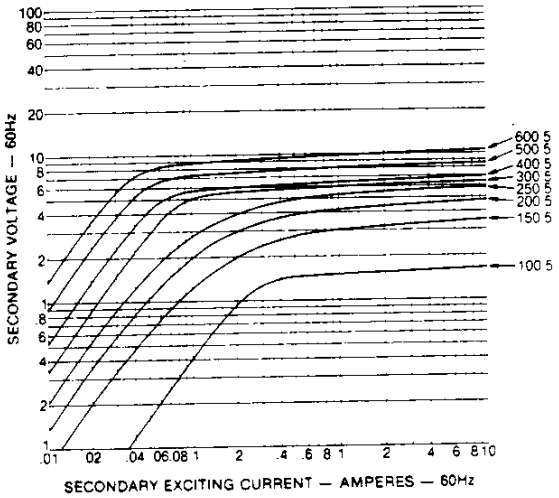
The relay accuracy rating defines that the CT must not exceed 10% error at the V_S level. The 10% error level is represented by the 10 Amp excitation current line (based on 100 Amp total secondary current) on the CT excitation curve. Extending up the 10 Amp line to the ratio used, find V_{SC}. If V_{SC}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

APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

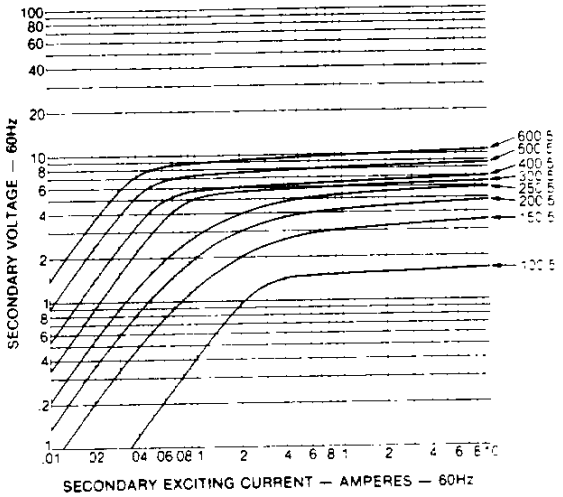
MODEL 5NR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0298	300:5	.0646
150:5	.0404	400:5	.0883
200:5	.0480	500:5	.1144
250:5	.0556	600:5	.1337



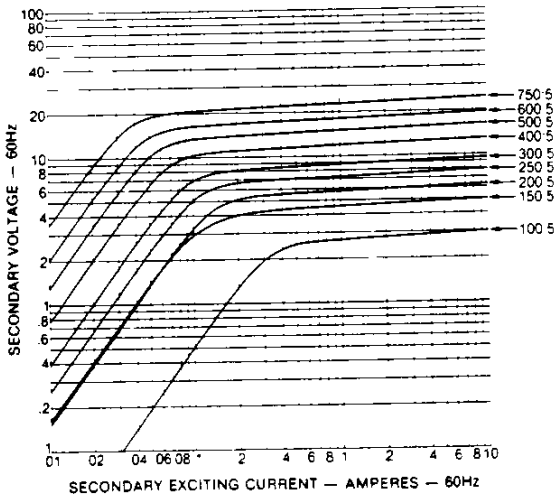
MODEL 54R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0298	300:5	.0646
150:5	.0404	400:5	.0883
200:5	.0480	500:5	.1144
250:5	.0556	600:5	.1337



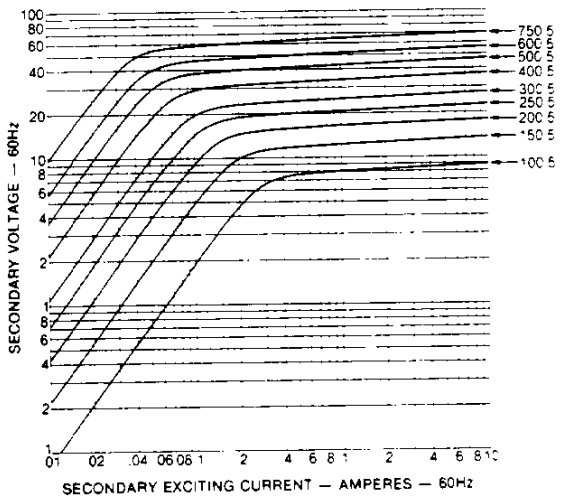
MODEL 64R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0113	400:5	.0741
150:5	.0268	500:5	.0926
200:5	.0371	600:5	.1173
250:5	.0463	750:5	.1466
300:5	.0556		



MODEL 66R

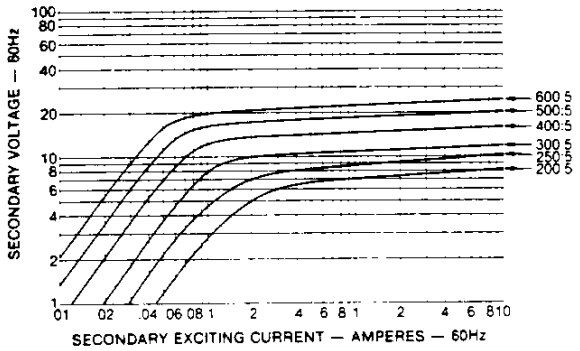
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0232	400:5	.1477
150:5	.0349	500:5	.1846
200:5	.0739	600:5	.1136
250:5	.0923	750:5	.2851
300:5	.1108		



CURRENT TRANSFORMER EXCITATION CURVES

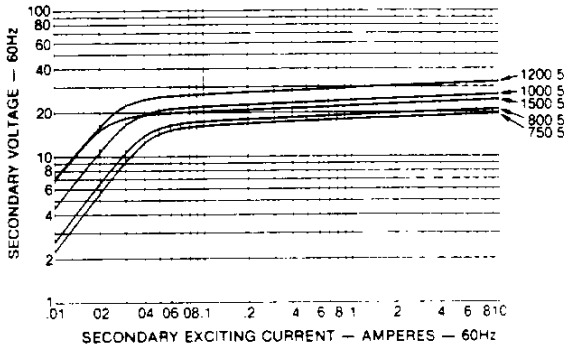
MODEL 74R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0400	400:5	.0823
250:5	.0501	500:5	.1029
300:5	.0617	600:5	.1234



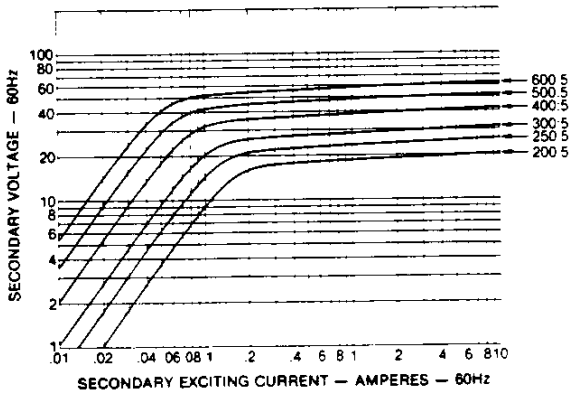
MODEL 74R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
750:5	.1422	1000:5	.1896
800:5	.1517	1200:5	.2275
		1500:5	.2641



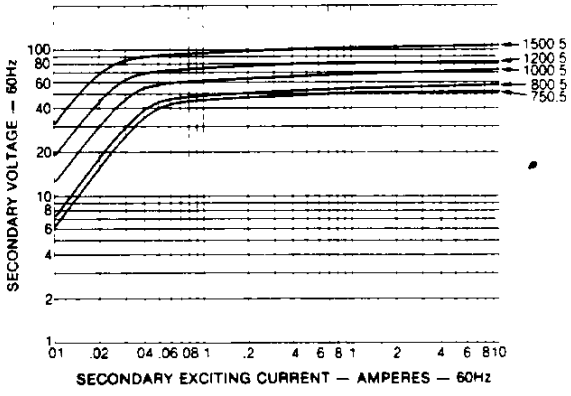
MODEL 76R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0782	400:5	.1563
250:5	.0977	500:5	.1954
300:5	.1173	600:5	.2345



MODEL 76R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
750:5	.2805	1000:5	.3740
800:5	.2992	1200:5	.4488
		1500:5	.5507



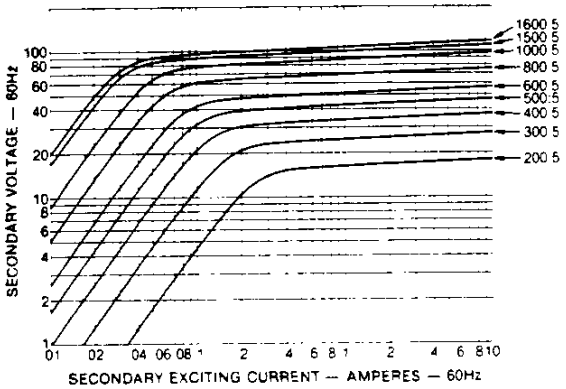
APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

MODEL 100R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0605	800:5	.2418
300:5	.0907	1000:5	.3023
400:5	.1209	1200:5	*
500:5	.1511	1500:5	.3459
600:5	.1814	1600:5	.3689

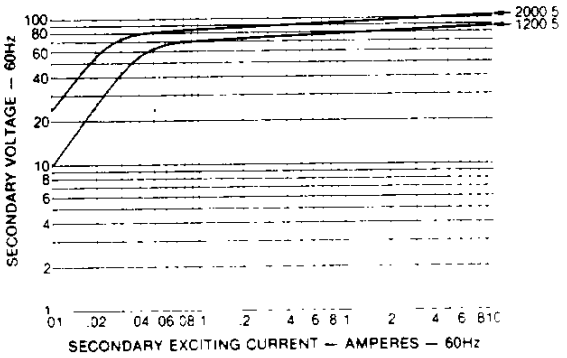
* Listed in next table.



MODEL 100R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1200:5	.2734	1600:5	* *
1500:5	* *	2000:5	.4271

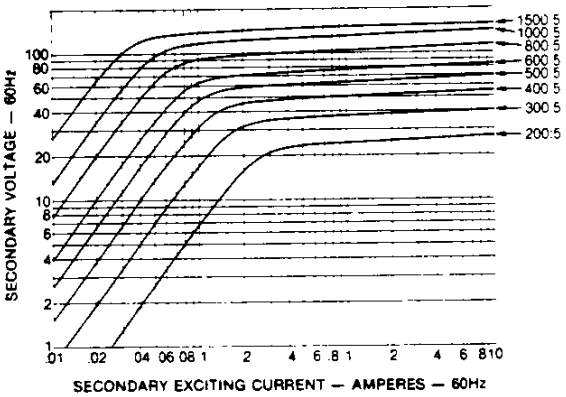
* * Listed in previous table.



MODEL 110R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0619	1000:5	.3886
300:5	.0929	1200:5	*
400:5	.1239	1500:5	.4486
500:5	.1548	1600:5	*
600:5	.2331	2000:5	*
800:5	.3109		

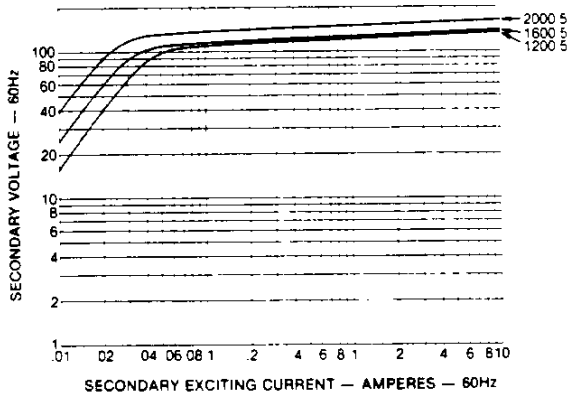
* Listed in next table.



MODEL 110R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1200:5	.3589	1600:5	.4453
1500:5	* *	2000:5	.5623

* * Listed in previous table.

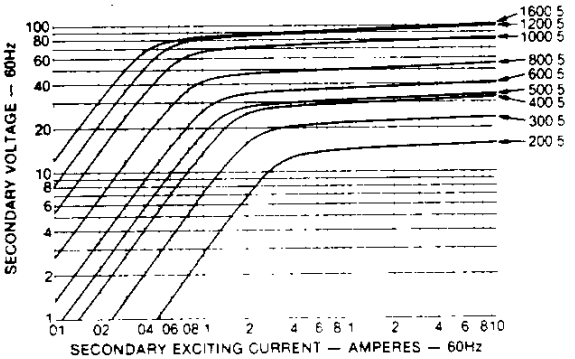


CURRENT TRANSFORMER EXCITATION CURVES

MODEL 120R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0463	800:5	.1673
300:5	.0695	1000:5	.2317
400:5	.0927	1200:5	.2780
500:5	.1046	1500:5	*
600:5	.1255	1600:5	.4001

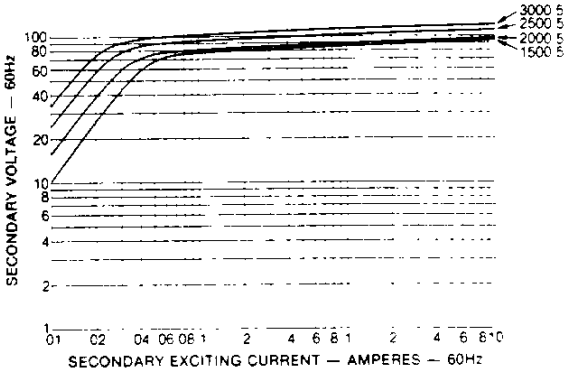
* Listed in next table.



MODEL 120R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1500:5	.3751	2500:5	.5064
1600:5	* *	3000:5	.6134
2000:5	.4276		

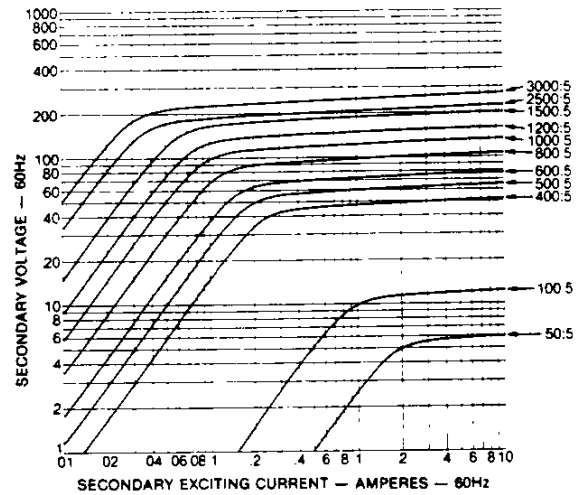
* * Listed in previous table.



MODEL 140R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.0078	1000:5	.3931
100:5	.0157	1200:5	.4717
400:5	.1572	1500:5	4734
500:5	.1966	2000:5	*
600:5	.2359	2500:5	.7206
800:5	.3149	3000:5	.8647

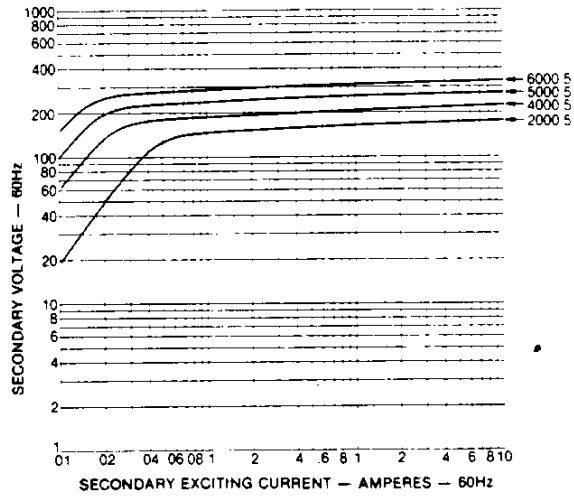
* Listed in next table.



MODEL 140R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
2000:5	.5510	4000:5	1.0142
2500:5	* *	5000:5	1.3450
3000:5	* *	6000:5	1.6139

* * Listed in previous table.

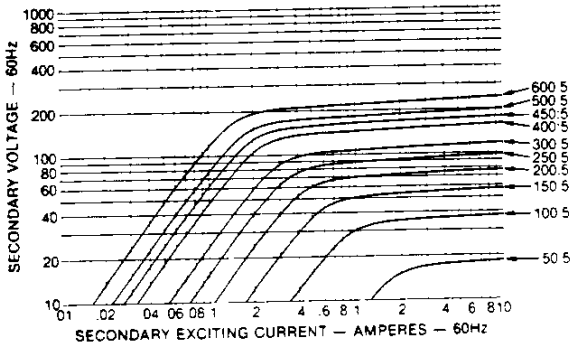


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

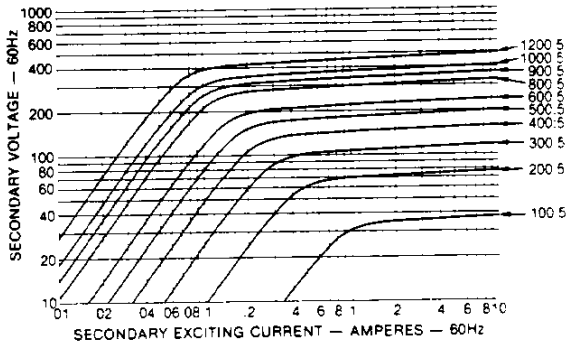
MODEL 151R-601

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.0245	300:5	.1469
100:5	.0490	400:5	.1959
150:5	.0735	450:5	.2204
200:5	.0979	500:5	.2449
250:5	.1224	600:5	.2940



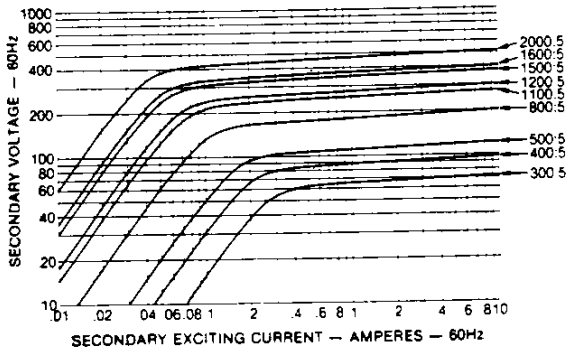
MODEL 151R-122

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0490	600:5	.2938
200:5	.0979	800:5	.3918
300:5	.1469	900:5	.4408
400:5	.1959	1000:5	.4897
500:5	.2449	1200:5	.5879



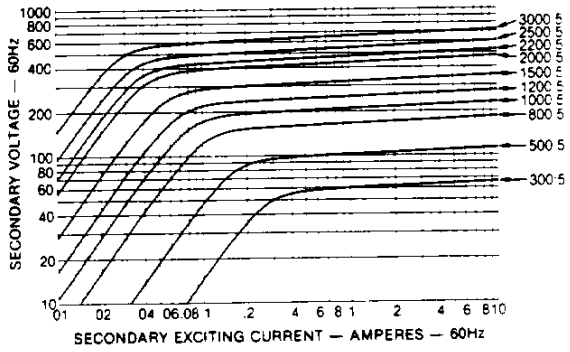
MODEL 151R-202

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1306	1200:5	.5224
400:5	.1741	1500:5	.6530
500:5	.2177	1600:5	.6966
800:5	.3483	2000:5	.8711
1100:5	.4789		



MODEL 151R-302

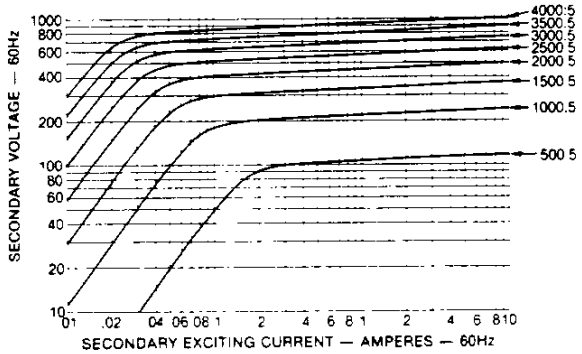
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1239	1500:5	.6193
500:5	.2064	2000:5	.8257
800:5	.3303	2200:5	.9083
1000:5	.4128	2500:5	1.0321
1200:5	.4954	3000:5	1.2391



CURRENT TRANSFORMER EXCITATION CURVES

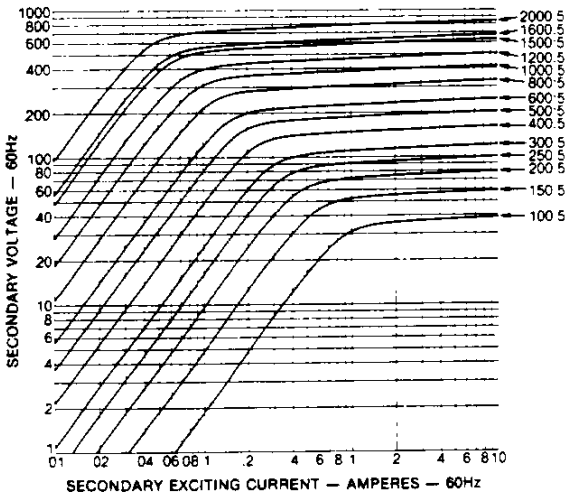
MODEL 151R-402

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
500:5	.2191	2500:5	1.0955
1000:5	.4382	3000:5	1.3146
1500:5	.6573	3500:5	1.5337
2000:5	.8764	4000:5	1.7536



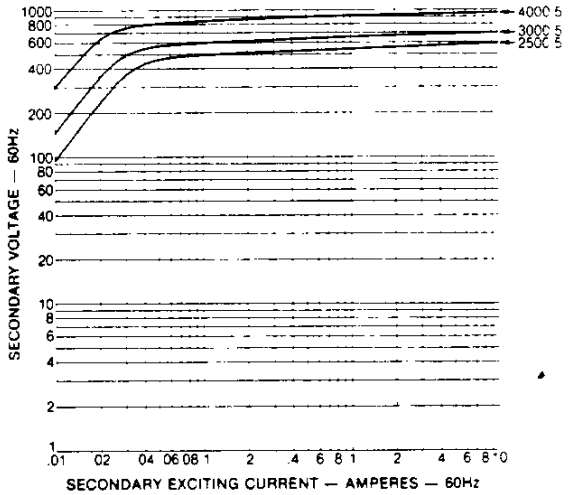
MODEL 152R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0501	600:5	.3005
150:5	.0751	800:5	.4006
200:5	.1002	1000:5	.5008
250:5	.1252	1200:5	.6009
300:5	.1502	1500:5	.7511
400:5	.2003	1600:5	.8012
500:5	.2504	2000:5	1.0187



MODEL 152R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
2500:5	1.0335	4000:5	1.7586
3000:5	1.2402		

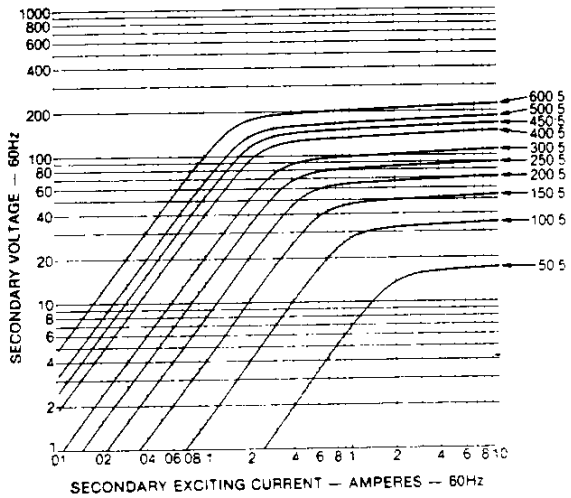


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

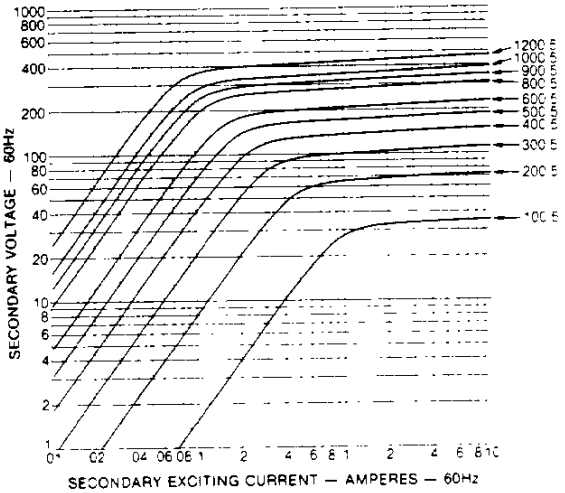
MODEL 155-601

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.023	300:5	.138
100:5	.046	400:5	.184
150:5	.069	450:5	.207
200:5	.092	500:5	.230
250:5	.115	600:5	.276



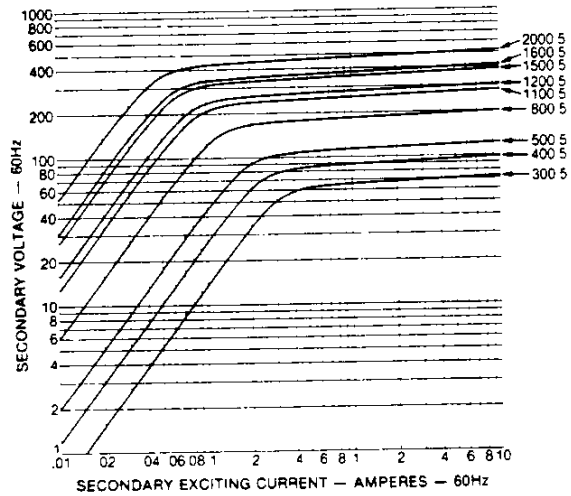
MODEL 155-122

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0463	600:5	.2778
200:5	.0926	800:5	.3705
300:5	.1389	900:5	.4168
400:5	.1852	1000:5	.4631
500:5	.2315	1200:5	.5557



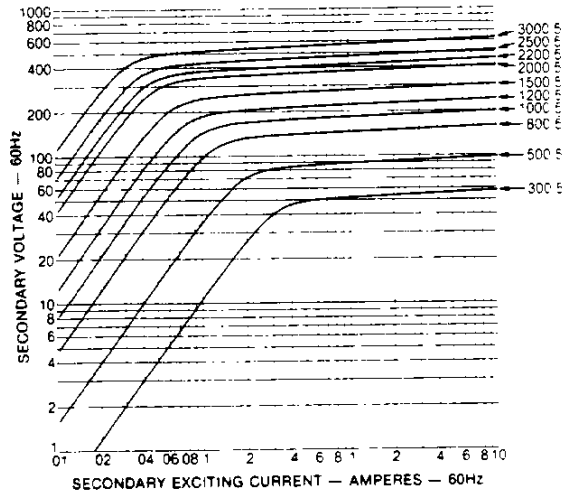
MODEL 155-202

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1167	1200:5	.4670
400:5	.1557	1500:5	.5837
500:5	.1946	1600:5	.6227
800:5	.3113	2000:5	.7783
1100:5	.4281		



MODEL 155-302

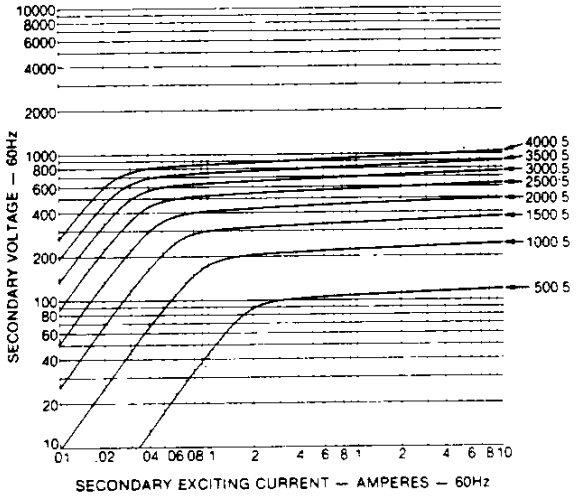
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1095	1500:5	.5476
500:5	.1825	2000:5	.7301
800:5	.2920	2200:5	.8031
1000:5	.3650	2500:5	.9126
1200:5	.4380	3000:5	1.0951



CURRENT TRANSFORMER EXCITATION CURVES

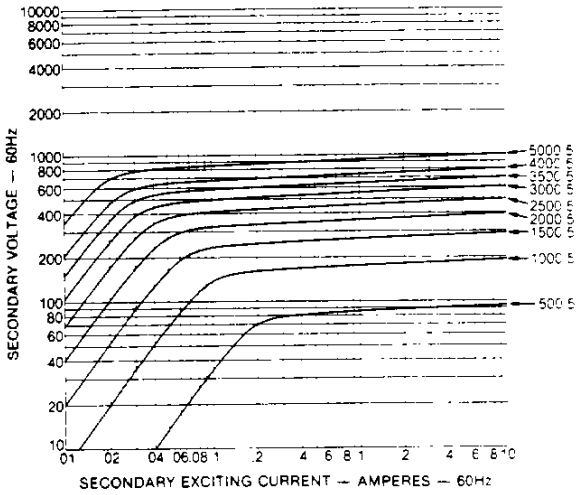
MODEL 155-402

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
500:5	.2010	2500:5	1.0048
1000:5	.4019	3000:5	1.2058
1500:5	.6029	3500:5	1.4068
2000:5	.8034	4000:5	1.6077



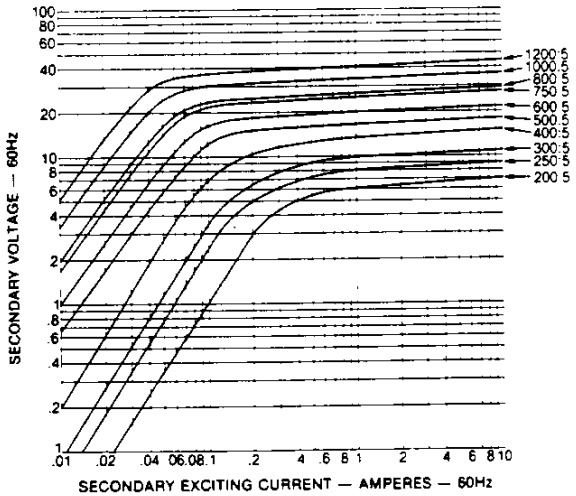
MODEL 155-502

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
500:5	.1848	3000:5	1.1091
1000:5	.3697	3500:5	1.2939
1500:5	.5545	4000:5	1.4788
2000:5	.7394	5000:5	1.8484
2500:5	.9242		



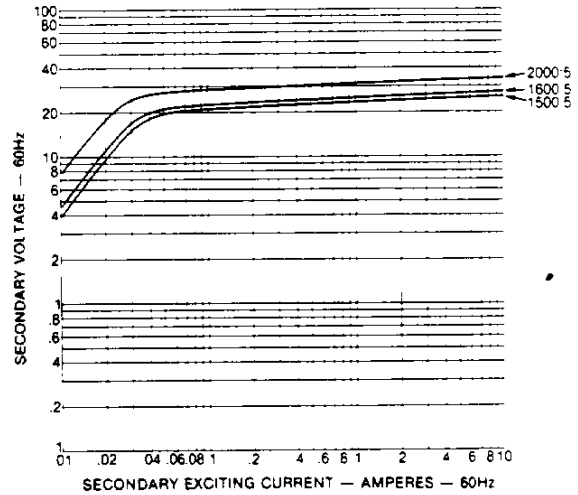
MODEL 170R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
200:5	.0298	600:5	.1156
250:5	.0430	750:5	.1445
300:5	.0517	800:5	.1541
400:5	.0488	1000:5	.1927
500:5	.0963	1200:5	.2312



MODEL 170R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1500:5	.2367	2000:5	.3156
1600:5	.2525		

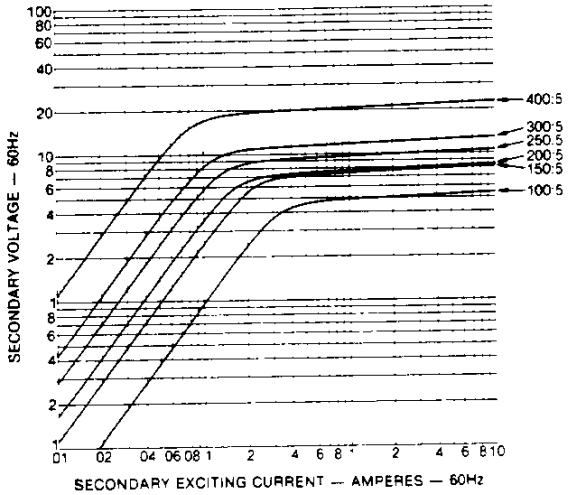


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

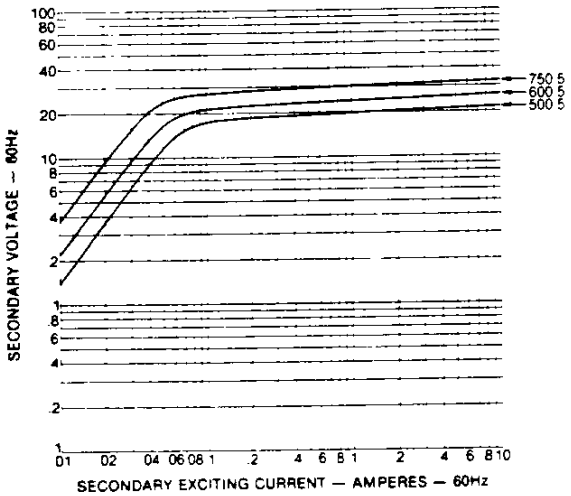
MODEL 180R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0273	250:5	.0631
150:5	.0409	300:5	.0757
200:5	.0505	400:5	.1091



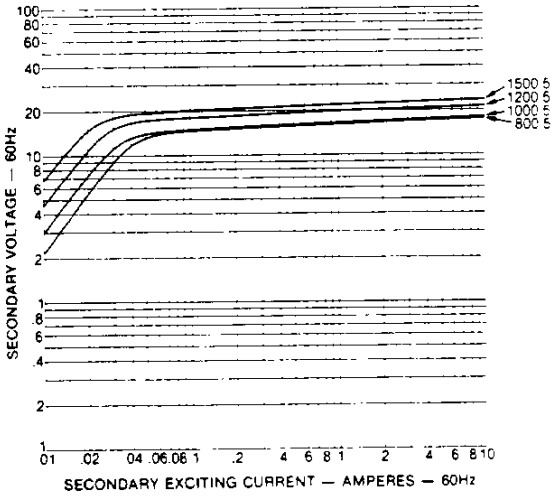
MODEL 180R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
500:5	.1261	750:5	.1892
600:5	.1514		



MODEL 180R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
800:5	.1620	1200:5	.2089
1000:5	.1741	1500:5	.2641

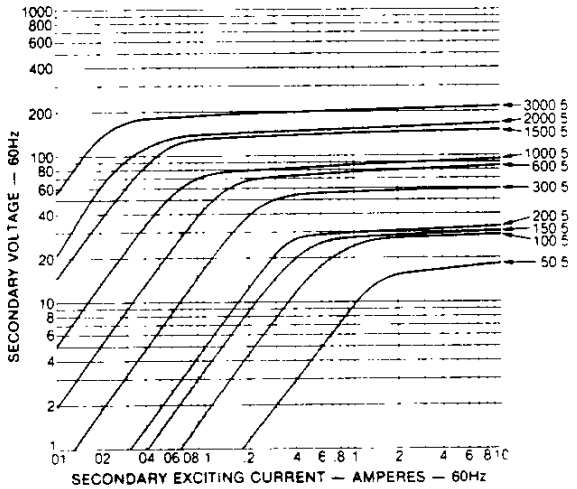


CURRENT TRANSFORMER EXCITATION CURVES

MODEL 190

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.0177	600:5	.2042
75:5	*	800:5	*
100:5	.0518	1000:5	.2972
150:5	.0658	1200:5	*
200:5	.0740	1500:5	.4740
300:5	.1260	2000:5	.5801
400:5	*	3000:5	.8500

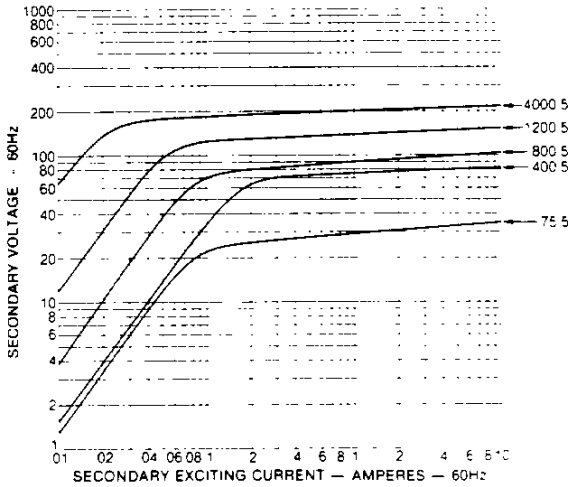
* Listed in next table.



MODEL 190 (continued)

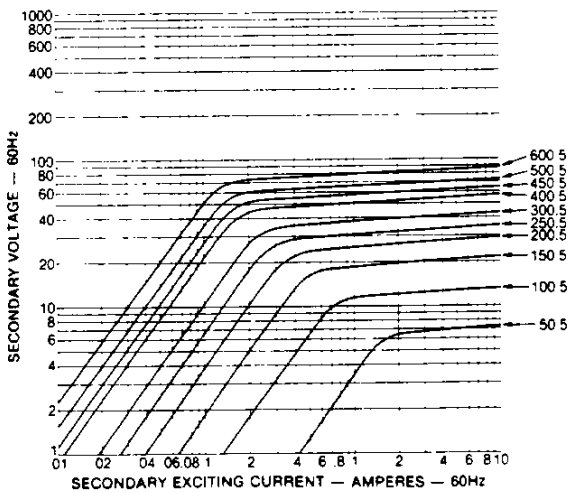
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
75:5	.0460	800:5	.2580
100:5	* *	1000:5	* *
150:5	* *	1200:5	.4110
200:5	* *	1500:5	* *
300:5	* *	2000:5	* *
400:5	.1799	3000:5	* *
600:5	* *	4000:5	.9500

* * Listed in previous table.



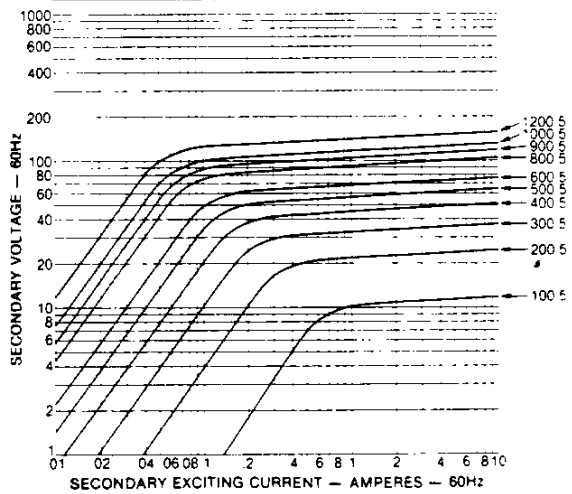
MODEL 190-601MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.0171	300:5	.1117
100:5	.0359	400:5	.1487
150:5	.0554	450:5	.1668
200:5	.0734	500:5	.1860
250:5	.0922	600:5	.2242



MODEL 190-122MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.035	600:5	.206
200:5	.069	800:5	.273
300:5	.102	900:5	.310
400:5	.139	1000:5	.344
500:5	.172	1200:5	.411

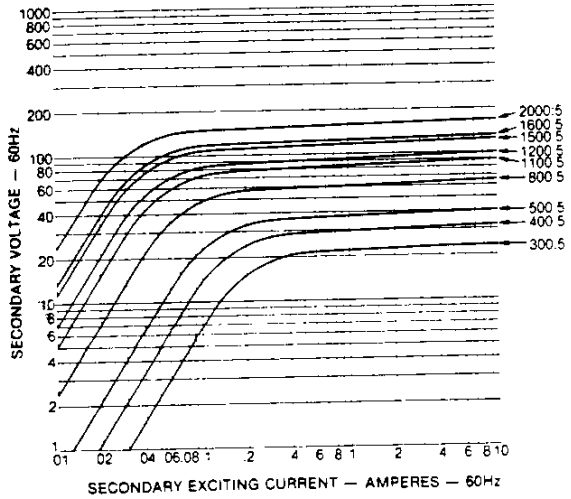


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

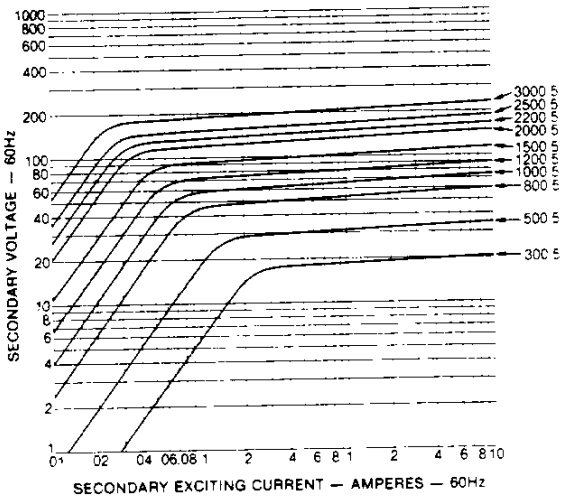
MODEL 190-202MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.0886	1200:5	.3658
400:5	.1128	1500:5	.4359
500:5	.1560	1600:5	.4661
800:5	.2266	2000:5	.5794
1100:5	.3157		



MODEL 190-302MR

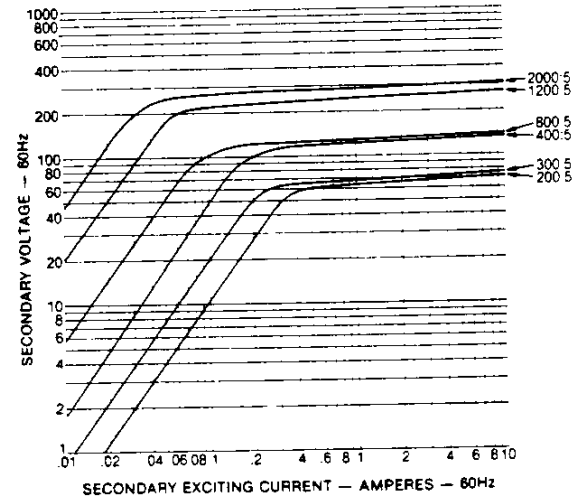
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.0904	1500:5	.4318
500:5	.1509	2000:5	.5840
800:5	.2273	2200:5	.6076
1000:5	.2655	2500:5	.6990
1200:5	.3410	3000:5	.8503



MODEL 191

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
150:5	*	800:5	.319
200:5	.127	1200:5	.567
300:5	.140	2000:5	.749
400:5	.225	3000:5	*
600:5	*		

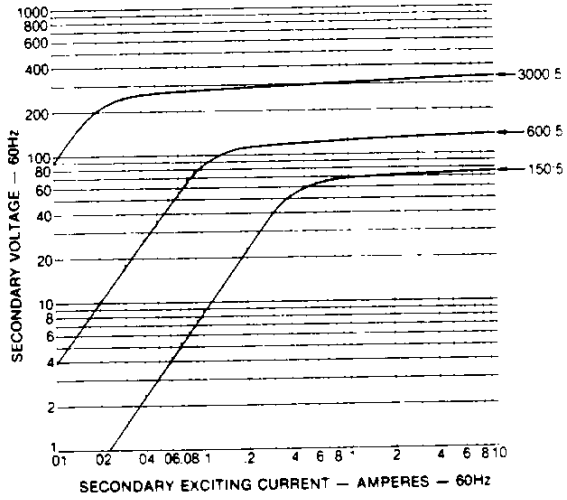
* Listed in next table.



MODEL 191 (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
150:5	.122	800:5	* *
200:5	* *	1200:5	* *
300:5	* *	2000:5	* *
400:5	* *	3000:5	.998
600:5	.281		

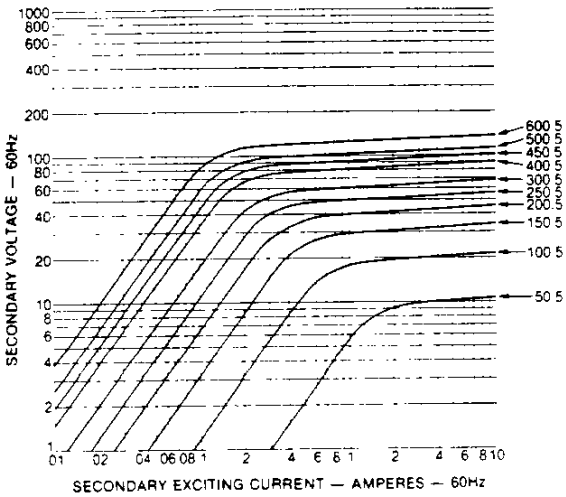
* * Listed in previous table.



CURRENT TRANSFORMER EXCITATION CURVES

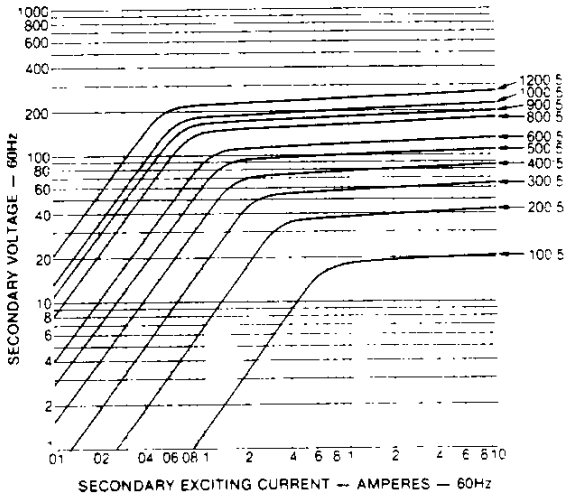
MODEL 191-601MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.025	300:5	.142
100:5	.049	400:5	.188
150:5	.073	450:5	.211
200:5	.095	500:5	.235
250:5	.118	600:5	.281



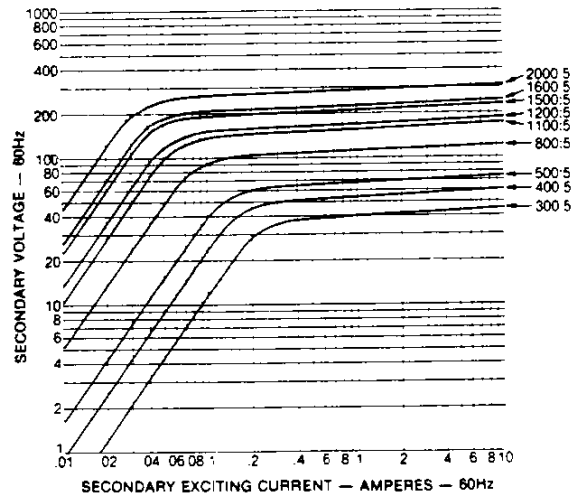
MODEL 191-122MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0579	600:5	.2849
200:5	.1055	800:5	.3771
300:5	.1593	900:5	.4264
400:5	.1919	1000:5	.4736
500:5	.2389	1200:5	.5671



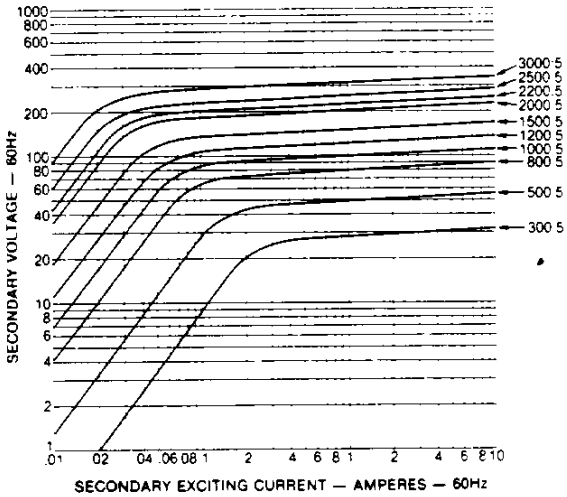
MODEL 191-202MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.115	1200:5	.443
400:5	.147	1500:5	.556
500:5	.194	1600:5	.603
800:5	.296	2000:5	.749
1100:5	.410		



MODEL 191-302MR

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.106	1500:5	.506
500:5	.176	2000:5	.681
800:5	.281	2200:5	.718
1000:5	.318	2500:5	.823
1200:5	.401	3000:5	.998

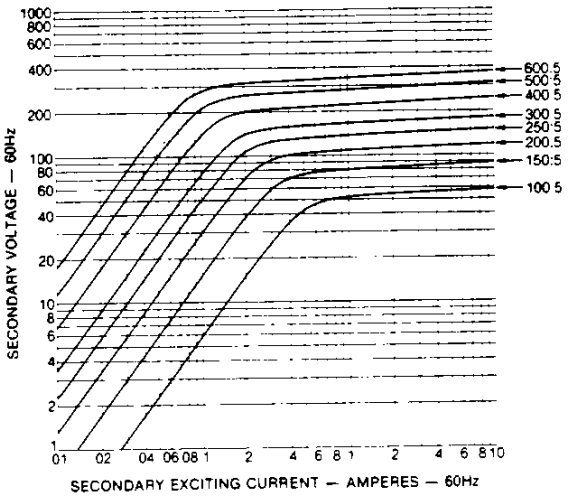


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

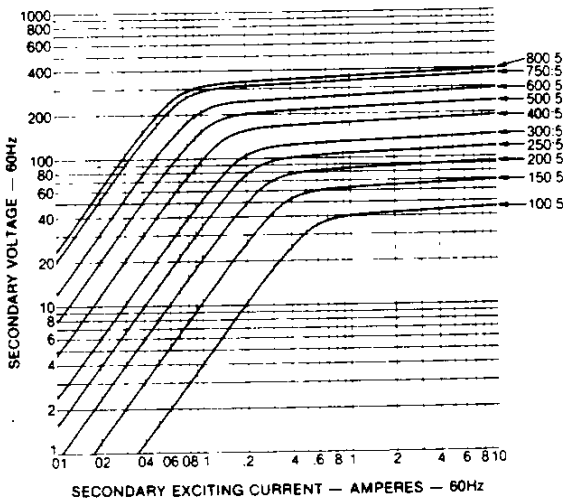
MODEL 200R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0596	300:5	.1787
150:5	.0894	400:5	.2383
200:5	.1191	500:5	.2979
250:5	.1489	600:5	.3574



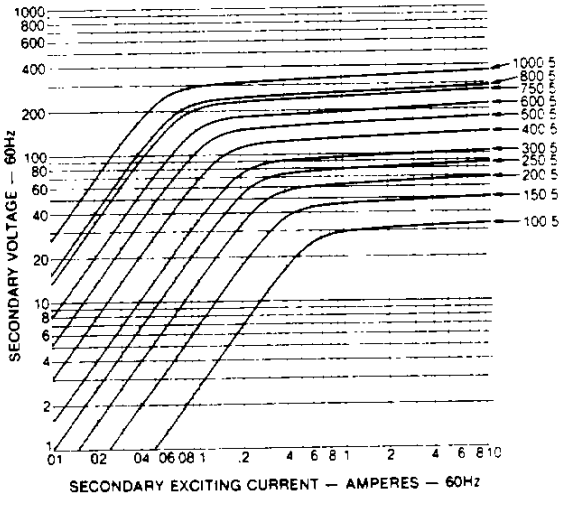
MODEL 201R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0551	400:5	.2203
150:5	.0826	500:5	.2753
200:5	.1101	600:5	.3304
250:5	.1377	750:5	.4130
300:5	.1652	800:5	.4405



MODEL 202R

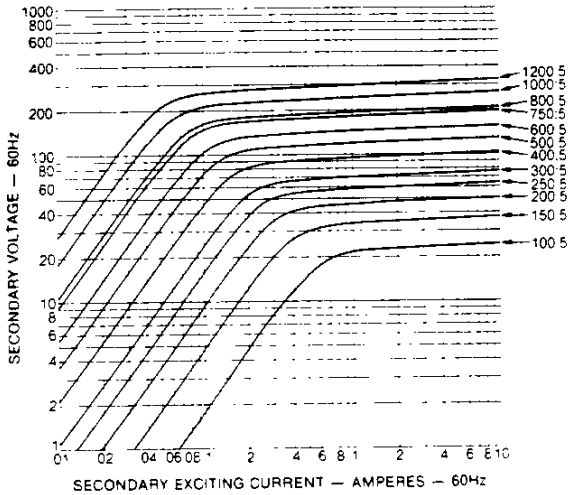
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0506	500:5	.2528
150:5	.0758	600:5	.3034
200:5	.1011	750:5	.3792
250:5	.1264	800:5	.4045
300:5	.1517	1000:5	.5056
400:5	.2023		



CURRENT TRANSFORMER EXCITATION CURVES

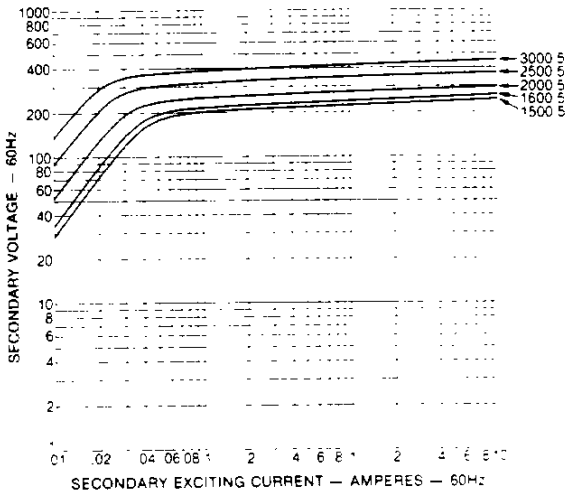
MODEL 203R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0475	500:5	.2375
150:5	0713	600:5	.2851
200:5	.0950	750:5	.2563
250:5	.1188	800:5	.3801
300:5	.1425	1000:5	.4751
400:5	.1900	1200:5	.5701



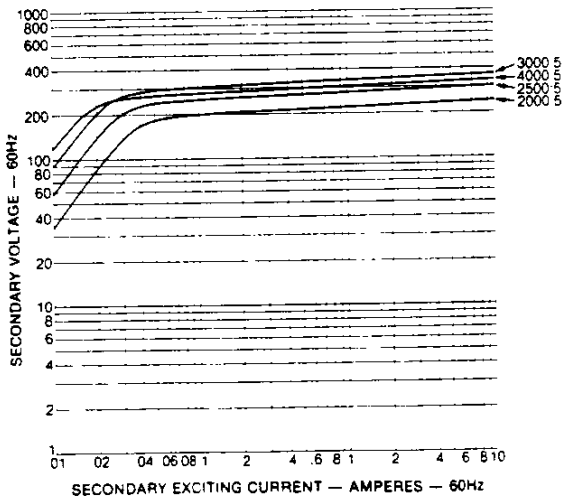
MODEL 203R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1500:5	.6622	2500:5	1.0618
1600:5	.7063	3000:5	1.3030
2000:5	.8494		



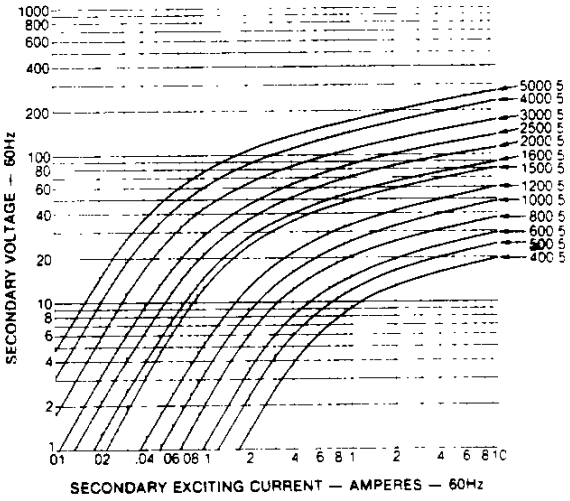
MODEL 210R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
2000:5	.7641	3000:5	.9095
2500:5	.7645	4000:5	1.1517



MODEL 270R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
400:5	.08	1600:5	.32
500:5	.10	2000:5	.40
600:5	.12	2500:5	.53
800:5	.16	3000:5	.65
1000:5	.20	4000:5	.89
1200:5	.24	5000:5	1.19
1500:5	.30		

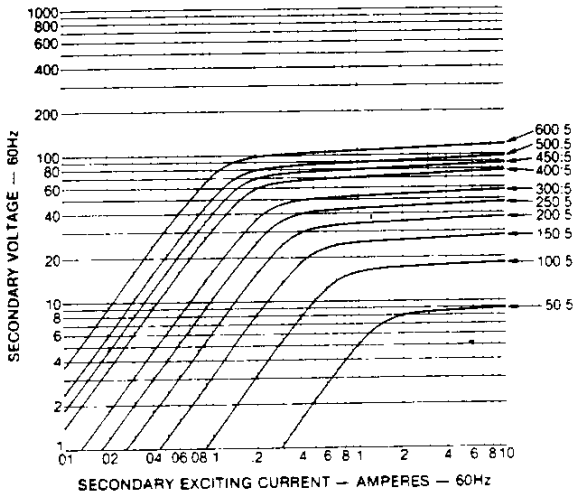


APRIL 1986
(Supersedes Catalog Section A1, June 1981)

CURRENT TRANSFORMER EXCITATION CURVES

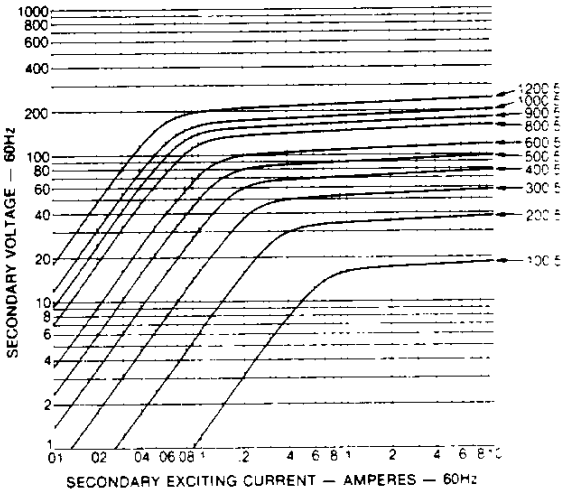
MODEL 311R-601

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
50:5	.0167	300:5	.1004
100:5	.0335	400:5	.1339
150:5	.0502	450:5	.1506
200:5	.0669	500:5	.1674
250:5	.0837	600:5	.2009



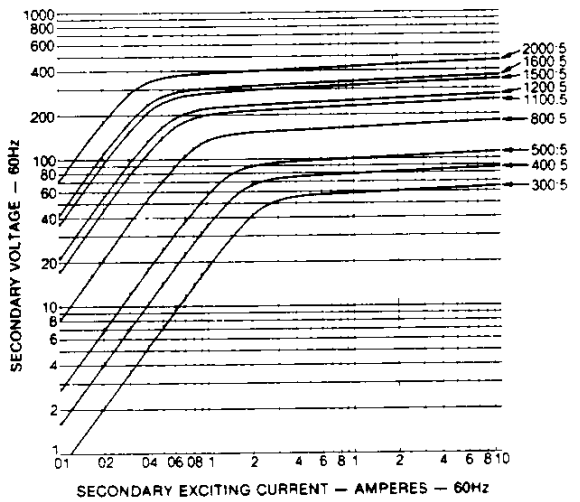
MODEL 311R-122

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0335	600:5	.2008
200:5	.0669	800:5	.2678
300:5	.1004	900:5	.3013
400:5	.1339	1000:5	.3347
500:5	.1674	1200:5	.4019



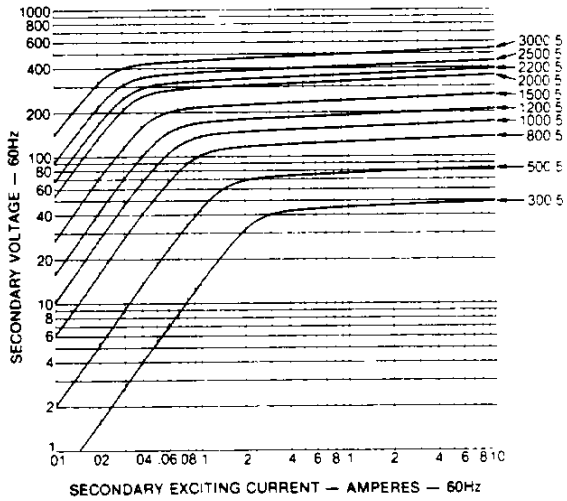
MODEL 311R-202

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1103	1200:5	.4411
400:5	.1470	1500:5	.5514
500:5	.1838	1600:5	.5882
800:5	.2941	2000:5	.7356
1100:5	.4044		



MODEL 311R-302

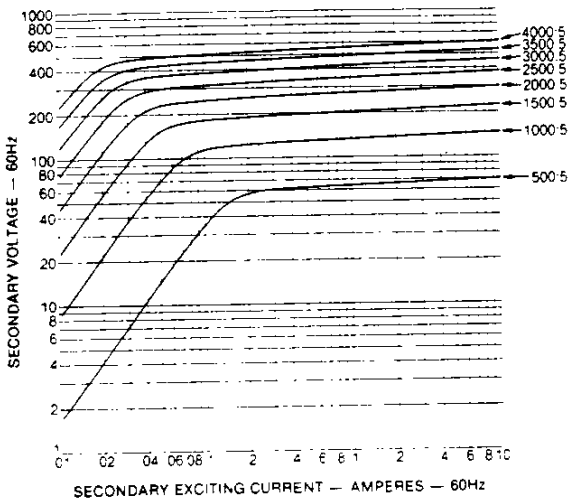
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
300:5	.1016	1500:5	.5079
500:5	.1693	2000:5	.6772
800:5	.2709	2200:5	.7449
1000:5	.3386	2500:5	.8465
1200:5	.4063	3000:5	1.0162



CURRENT TRANSFORMER EXCITATION CURVES

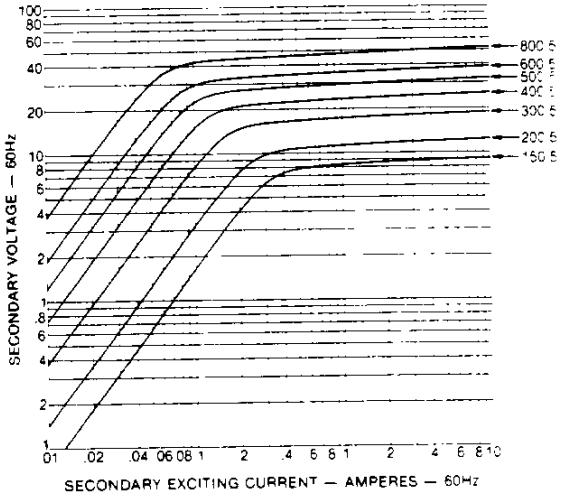
MODEL 311R-402

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
500:5	.1646	2500:5	.8231
1000:5	.3292	3000:5	.9877
1500:5	.4939	3500:5	1.1524
2000:5	.6585	4000:5	1.3176



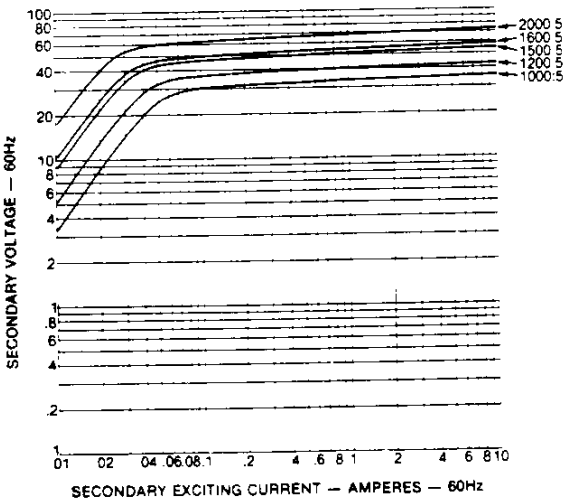
MODEL 350R

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
100:5	.0200	400:5	.1009
150:5	.0378	500:5	.1261
200:5	.0504	600:5	.1513
300:5	.0757	800:5	.2018



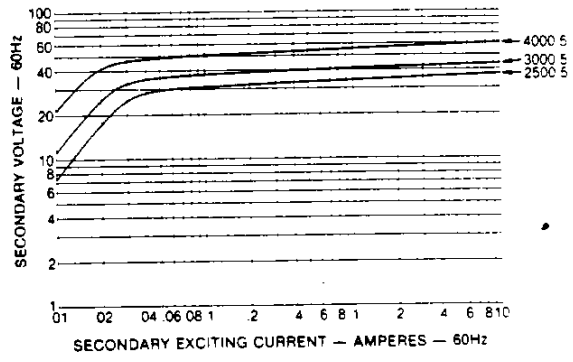
MODEL 350R (continued)

DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
1000:5	.1923	1600:5	.3353
1200:5	.2514	2000:5	.4191
1500:5	.3143		



MODEL 360R

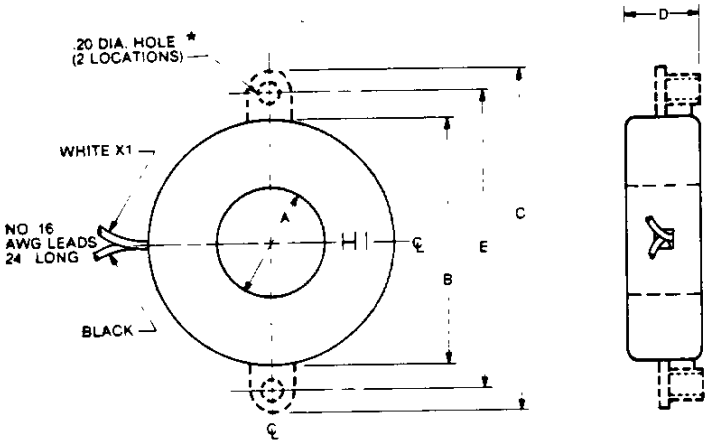
DC RESISTANCE @ 25°C			
RATIO	OHMS	RATIO	OHMS
2500:5	.3055	4000:5	.5596
3000:5	.3666		



APRIL 1986
(Supersedes Catalog Section A1, March 1982)

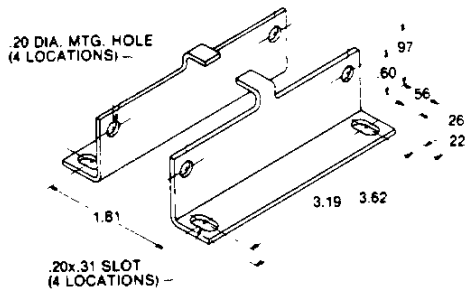
CURRENT TRANSFORMER OUTLINE DIMENSIONS

Models 2NR, 5NR and 54R



MODEL	DIMENSIONS (inches)					MOUNTING BRACKET
	A	B	C*	D	E*	
2NR	1.12	2.38	———	.94	———	MB-1
5NR	1.56	3.50	———	1.06	———	MB-1
54R	1.56	3.50	4.56	1.06	4.00	———

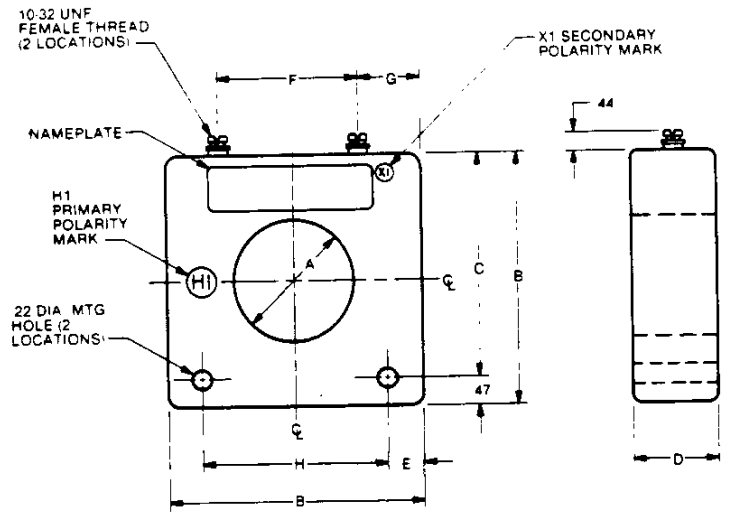
*Removable mounting ears supplied on Model 54R only.



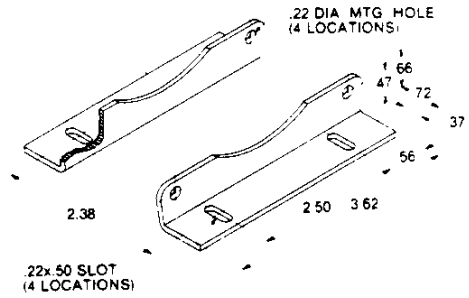
Mounting Bracket MB-1

NOTE: Mounting bracket MB-1 is for use with Model 5NR current transformer. May also be applied to the Model 2NR, if mounting bracket is required.

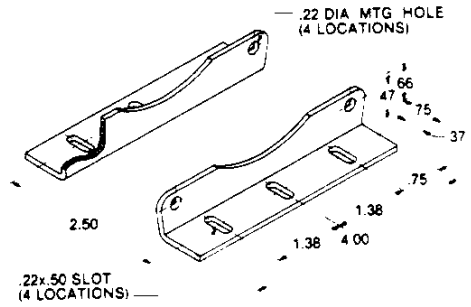
Models 64R and 74R



MODEL	DIMENSIONS (inches)								MOUNTING BRACKET
	A	B	C	D	E	F	G	H	
64R	1.94	4.19	3.72	1.50	.54	2.38	.91	3.12	MB-10
74R	2.34	4.69	4.22	1.62	.60	2.50	1.10	3.50	MB-16



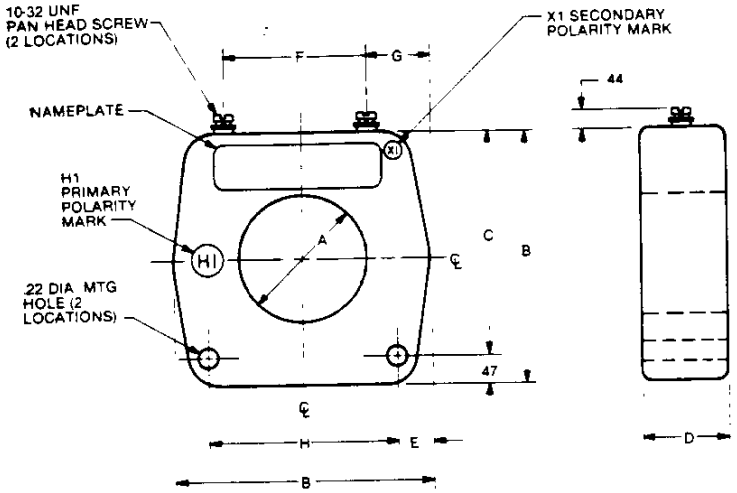
Mounting Bracket MB-10



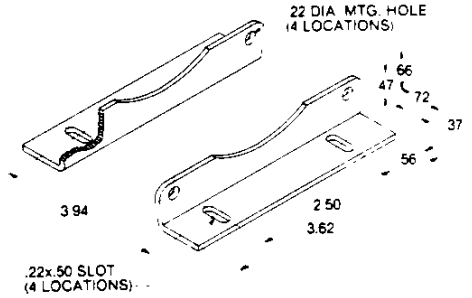
Mounting Bracket MB-16

CURRENT TRANSFORMER OUTLINE DIMENSIONS

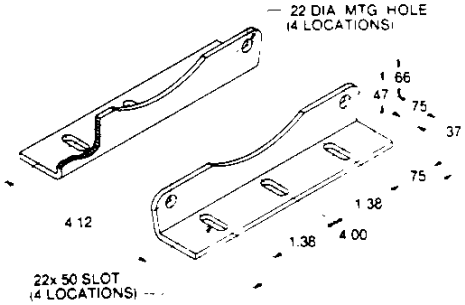
Models 66R and 76R



MODEL	DIMENSIONS (inches)								MOUNTING BRACKET
	A	B	C	D	E	F	G	H	
66R	1.94	4.19	3.72	3.06	.54	2.38	.91	3.12	MB-12
76R	2.34	4.69	4.22	3.25	.60	2.50	1.10	3.50	MB-18

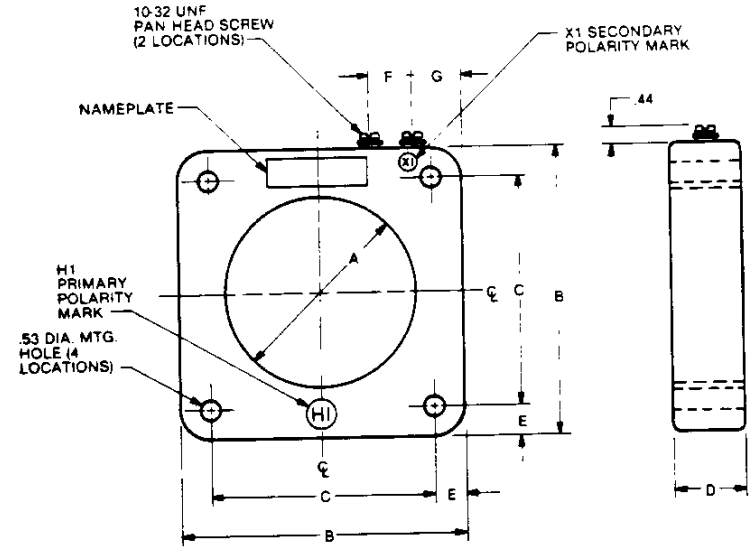


Mounting Bracket MB-12

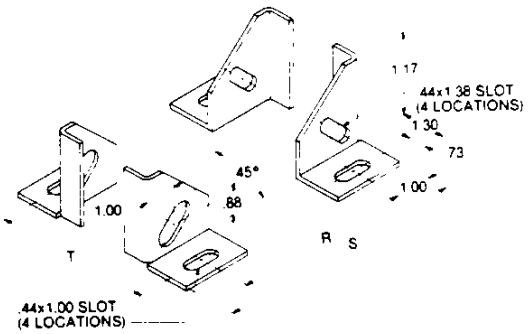


Mounting Bracket MB-18

Models 100R, 110R, 120R and 140R



MODEL	DIMENSIONS (inches)							MOUNTING BRACKET
	A	B	C	D	E	F	G	
100R	4.00	7.00	5.75	2.12	.62	1.00	1.25	MB-31
110R	4.00	7.00	5.75	2.88	.62	1.00	1.25	MB-32
120R	5.75	8.50	6.75	2.12	.88	1.25	1.50	MB-31
140R	8.12	11.00	8.50	3.00	1.25	1.00	2.25	MB-32



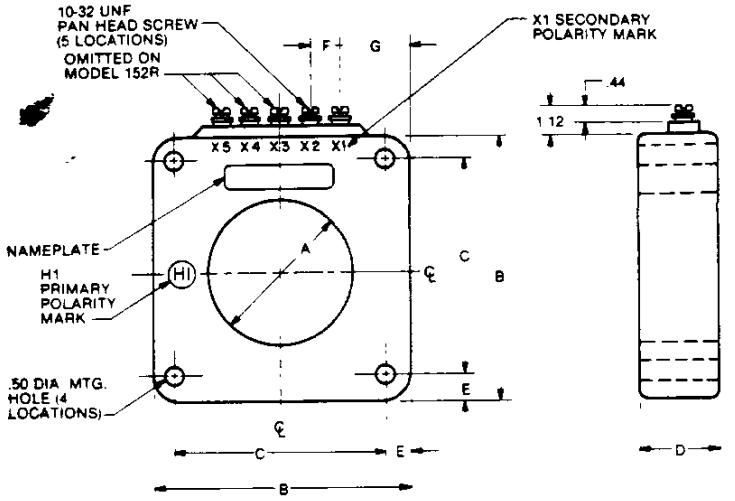
Mounting Brackets MB-31 and MB-32

MODEL	MOUNTING BRACKET	DIMENSIONS		
		R	S	T
100R	MB-31	5.00	7.16	3.75
110R	MB-32	5.00	7.16	4.50
120R	MB-31	6.50	8.66	3.75
140R	MB-32	9.00	11.16	4.62

APRIL 1986
(Supersedes Catalog Section A1, November 1980)

CURRENT TRANSFORMER OUTLINE DIMENSIONS

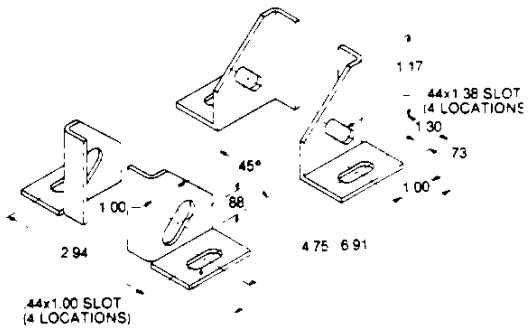
Models 151R, 152R and 155



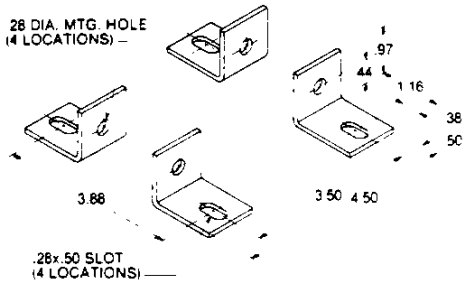
MODEL	DIMENSIONS (inches)						
	A	B	C	D	E	F	G
151R	6.88	12.25	9.50	4.12	1.38	1.00	4.62
152R	6.88	12.25	9.50	4.12	1.38	1.00	4.62
155	6.88	13.25	11.25	3.44*	1.00	1.00	4.62

*Dimension "D" is 3.00 for 4000A and 5000A model.

NOTE: Models 151R, 152R and 155 are supplied with four (4) mounting holes molded into case Mounting brackets not required.

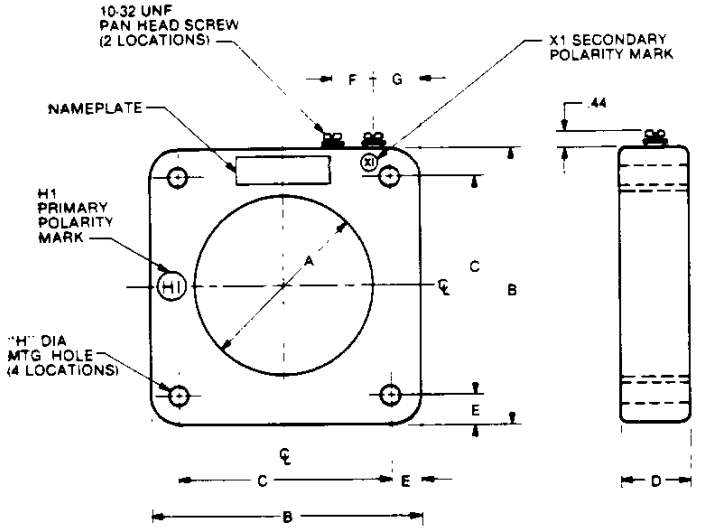


Mounting Bracket MB-30

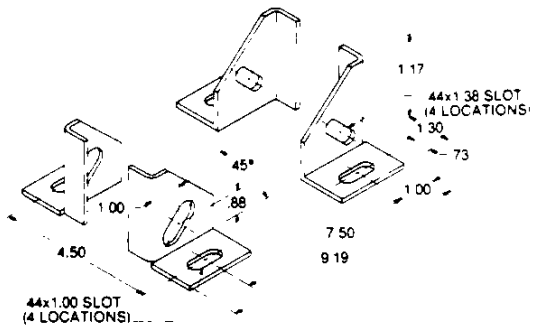


Mounting Bracket MB-9

Models 170R, 180R and 210R



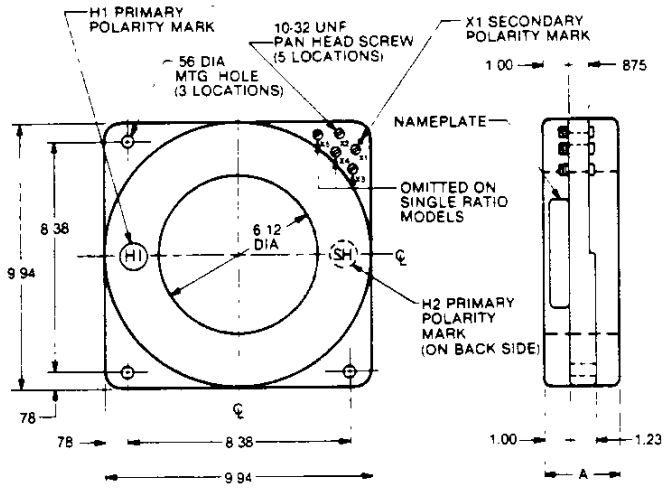
MODEL	DIMENSIONS (inches)								MOUNTING BRACKET
	A	B	C	D	E	F	G	H	
170R	4.25	6.75	5.41	1.31	.67	.78	1.12	.44	MB-30
180R	2.50	4.50	3.50	2.12	.50	.69	.44	.41	MB-9
210R	6.25	9.50	7.75	2.87	.87	1.25	1.50	.53	MB-32



Mounting Bracket MB-32

CURRENT TRANSFORMER OUTLINE DIMENSIONS

Models 190 and 191

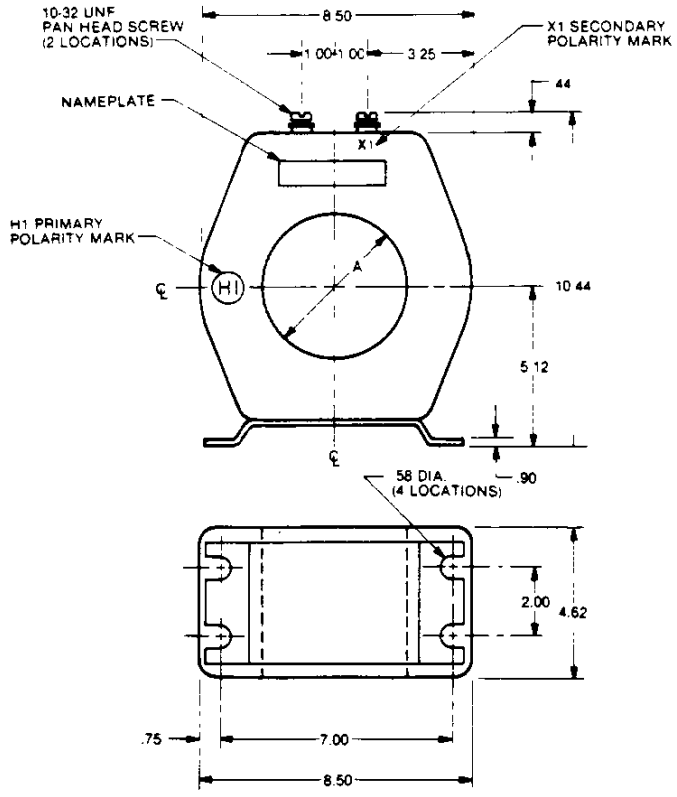


RATIO	DIMENSION A	
	MODEL 190	MODEL 191
50:5	4.62	— — —
75:5	4.62	— — —
100:5	4.62	— — —
150:5	3.25	6.50
200:5	2.25	4.62
300:5	3.25	3.50
400:5	3.25	4.62
600:5*	2.25	3.25
800:5	2.25	3.25
1000:5	2.25	— — —
1200:5*	2.25	3.50
1500:5	2.25	— — —
2000:5*	2.25	3.25
3000:5*	2.25	3.25
4000:5	2.25	— — —

*Multi ratio units conform to same "A" dimensions.

NOTE: Models 190 and 191 are supplied with three (3) mounting holes molded into case. Mounting brackets not required.

Models 200R, 201R, 202R and 203R



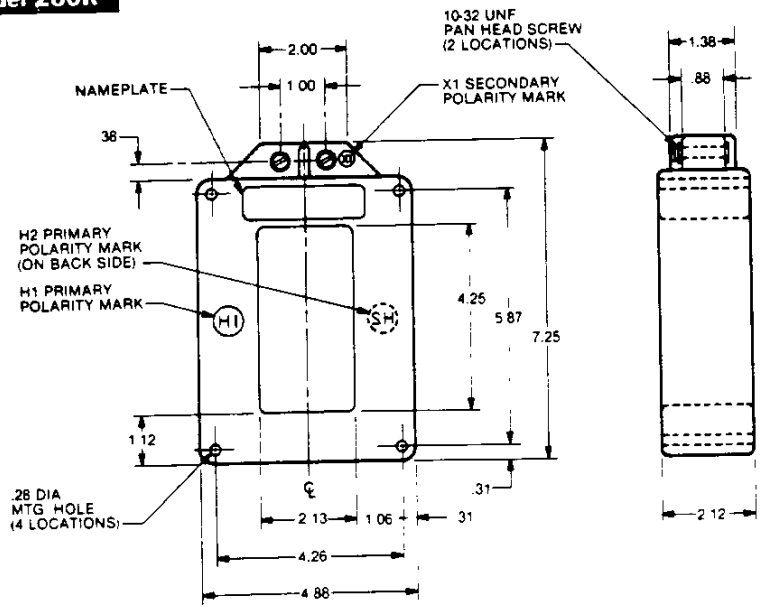
MODEL	DIMENSION A
200R	2.50
201R	3.50
202R	4.50
203R	5.25

NOTE: Mounting bracket is included with Model 200R 201R, 202R and 203R current transformers. If mounting bracket is not required, specify and consult price bulletin PA1 for price deduct.

APRIL 1986
(Supersedes Catalog Section A1, February 1978)

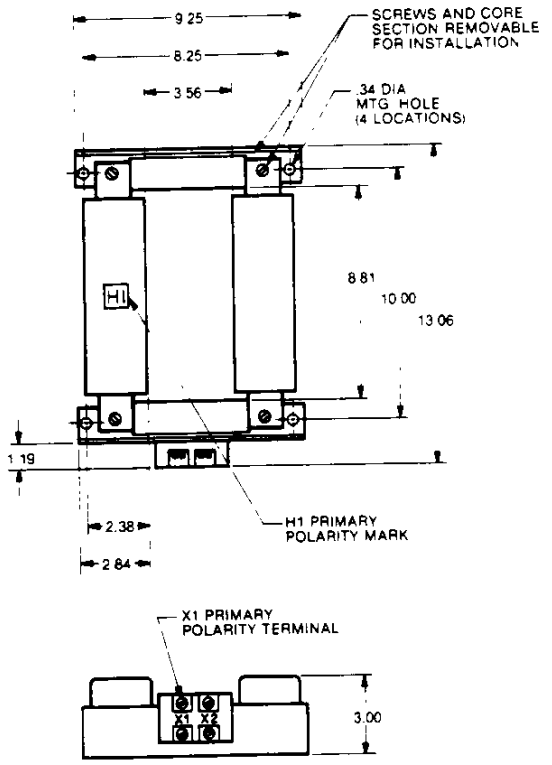
CURRENT TRANSFORMER OUTLINE DIMENSIONS

Model 260R



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

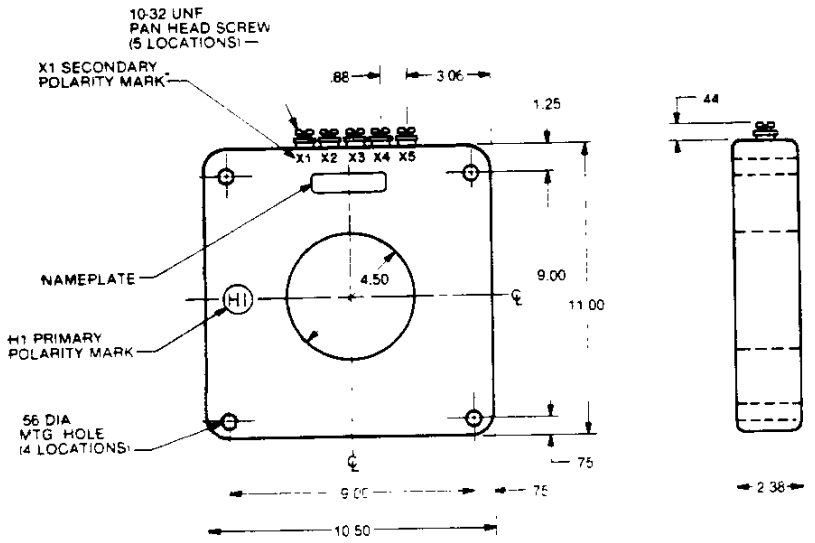
Model 270R



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

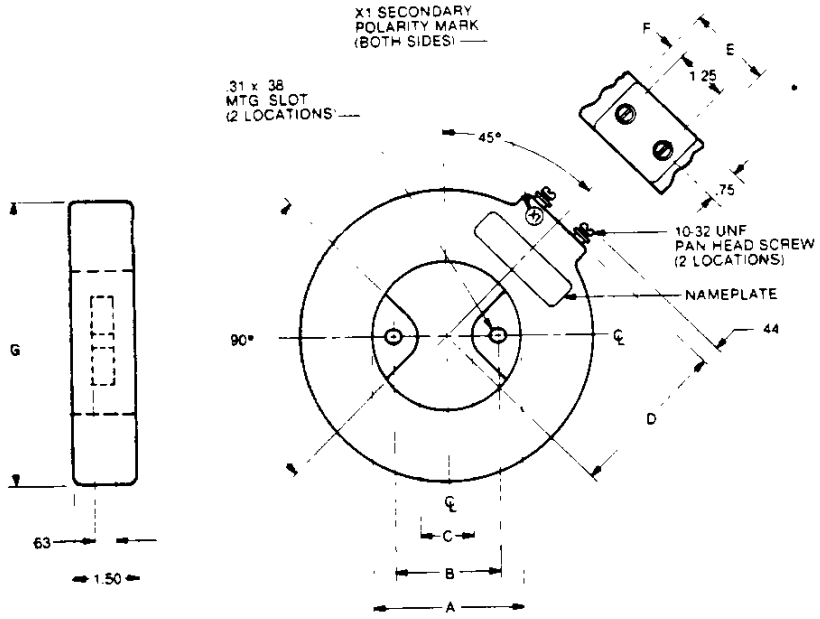
CURRENT TRANSFORMER OUTLINE DIMENSIONS

Model 311R



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

Models 350R and 360R



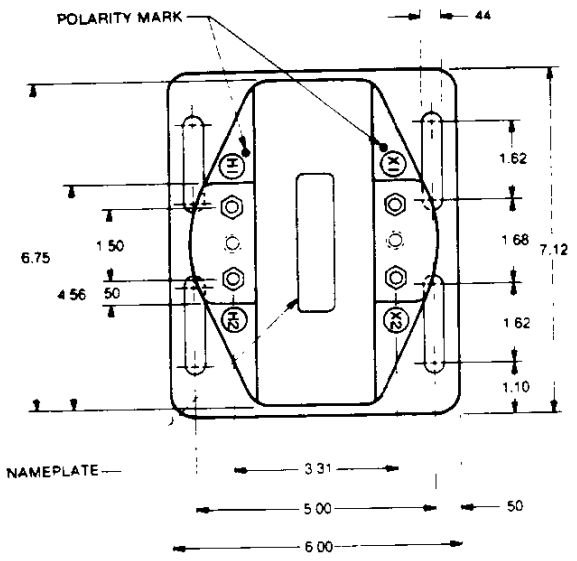
NOTE: Models 350R and 360R are supplied with two (2) mounting holes molded into case I.D. Mounting brackets not required.

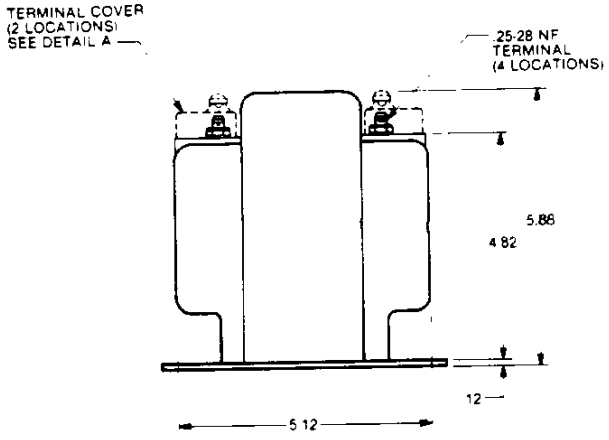
MODEL	DIMENSIONS (inches)						
	A	B	C	D	E	F	G
350R	3.50	2.50	1.26	4.25	2.00	.38	7.00
360R	6.38	5.38	4.14	5.30	2.25	.50	9.00

APRIL 1986
(Supersedes Catalog Section A1, March 1982)

VOLTAGE TRANSFORMER OUTLINE DIMENSIONS

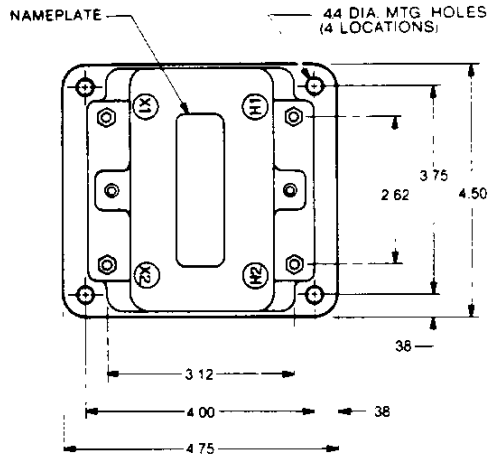
Model 450R

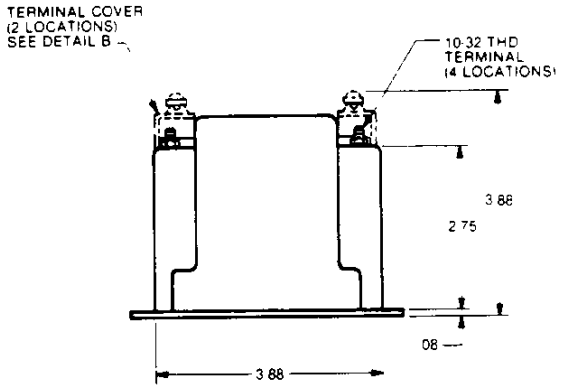




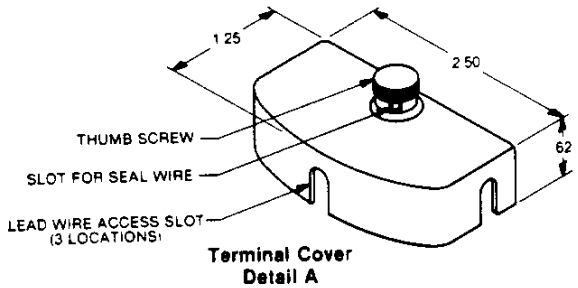
Model 450R

Model 460R

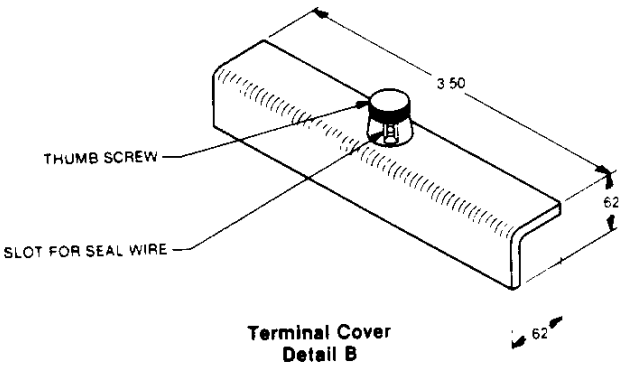




Model 460R



Terminal Cover
Detail A



Terminal Cover
Detail B