

Power Circuit Breakers

Type OE Bushing Current Transformers Installation and Maintenance Instruction

S290-80-2

Service Information

GENERAL

Service Information S290-80-2 pertains specifically to McGraw-Edison Type OE bushing current transformers (Figure 1) for use in relay operation. Provided only a general indication of values is satisfactory, Type OE bushing current transformers are also suitable for use with indicating meters or for nonrevenue metering purposes.

Type OE bushing current transformers conform to both NEMA and ANSI standards for relaying accuracy current transformers.

When installing or performing maintenance work on a Type OE bushing current transformer, the latest revision of the oil circuit breaker instructions—copy of which accompanies each breaker—must be followed.

SHIPPING

Except when ordered as replacement parts, Type OE bushing current transformers are shipped installed in the equipment for which they are required. When supplied separately, bushing current transformers are crated for shipping.

INITIAL INSPECTION

Immediately upon receipt—preferably before unloading—thoroughly inspect the current transformer for evidence of rough handling or damage in transit. Should there be evidence of rough handling or damage in transit, notify—and file a claim with—the carrier at once. Also notify McGraw-Edison Power Systems Division, Canonsburg, Pa. 15317.

IDENTIFICATION

Amp Ratings

McGraw-Edison Type OE bushing current transformers are identified by amp rating: an OE-6 transformer is rated at 600 amps; an OE-12 transformer is rated at 1200 amps, etc.

Leads

Refer to the wiring diagram and ratio tables that accompany the circuit breaker for winding and lead data for the specific equipment.

Standard NEMA markings are used to identify secondary leads and polarity. Leads are marked X1, X2, X3, X4, and X5. When two current transformers are used around a single entrance bushing, the leads from the second current transformer are lettered Y1, Y2, etc., at the terminal block—although the actual leads on the transformers have the X markings. Polarity for current transformers is indicated by a white paint mark on the X1 lead. The top of the current transformer is indicated by a white mark or an H1 mark. This mark (white or H1) must be placed upward when the current transformer is installed.

NOTE: If the X1 lead is not used as a tap, the lead that is numerically closest to X1 will have the same polarity as the X1 lead.

HANDLING

When handling a bushing current transformer, take special care to prevent deforming its shape. Deformation could result in an increase in excitation current and a reduction in ratio accuracy.

STORAGE

If a bushing current transformer is not to be placed in service immediately upon receipt, it must be stored indoors in a dry, protected location. Under no circumstances should a bushing current transformer be left outdoors, exposed to the weather.

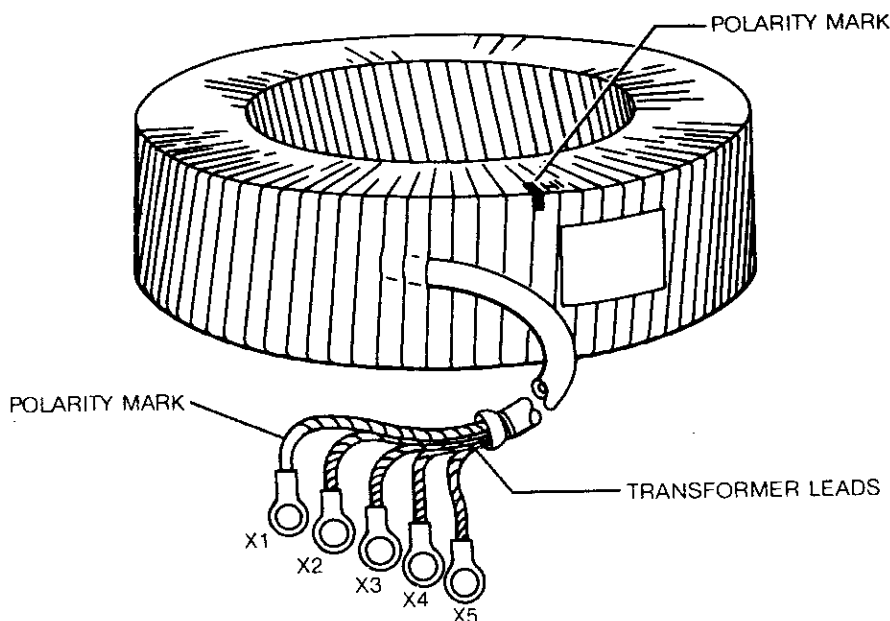


Figure 1.
Typical Type OE bushing current transformer.

These instructions do not claim to cover all details or variations in the equipment, procedure, or process described, nor to provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, please contact your McGraw-Edison Power Systems Group sales engineer.

INSTALLATION

To replace a bushing current transformer, refer to—and follow—applicable portions of the circuit breaker instructions.

For bushing current transformer connections, refer to the wiring diagram supplied with the equipment on which the current transformer is installed. For transformer ratios, refer to the nameplate located near the transformer terminal block.

Before installing a bushing current transformer:

1. Check to be sure the current transformer is free from moisture.
2. If moisture is present, heat the current transformer with dry, warm air—not to exceed 150 F (66 C)—until all traces of moisture are gone.

CAUTION:

Type OE bushing current transformers are wound for subtractive polarity (Figure 2). To retain this polarity, it is imperative that the current transformer be installed with the polarity mark (the white mark or the H1 mark) upward.

WIRING AND CONNECTIONS

Wiring to the control cabinet terminal block is completed at the factory. If bushing current transformers are installed in the field, connections to the terminal blocks and from the terminal blocks to the relays or the instruments of the burden circuit must be made in such a manner as to assure low resistance.

SAFETY PRECAUTION:

At no time should a bushing current transformer operate with an open circuit. The current transformer must either be connected to a burden or be short-circuited.

SHORT CIRCUITING A BUSHING CURRENT TRANSFORMER AT THE TERMINAL BLOCK

The terminal blocks are provided with shorting screws for short circuiting the current transformer when no burden is connected (Figure 3).

To disconnect the burden and assure that the bushing current transformer circuit is not opened:

1. Short circuit the current transformer by inserting the shorting screws—

stored in the holes in the ends of each terminal block—in the terminals that are connected to the current transformer.

2. Remove the burden.

To connect the burden:

1. Make sure the burden circuit is closed.
2. Connect the leads to the terminal blocks.
3. Remove the shorting screws.

NOTE: Immediately upon removing the shorting screws, store them in the holes in the ends of each terminal block.

It is recommended that the entire bushing current transformer winding be short circuited even though only part of it is used to supply the burden. Therefore, although the bushing current transformer may be connected by the X1 and the X3 taps:

4. Firmly insert the shorting screws into the holes adjacent to the X1 and the X5 terminals.

Do not remove the shorting screws until the burden is connected.

Insert the shorting screws before the burden is disconnected.

NOTE: The terminal blocks also contain a ground terminal that is usually connected to a grounded portion of the cabinet or directly to a ground grid.

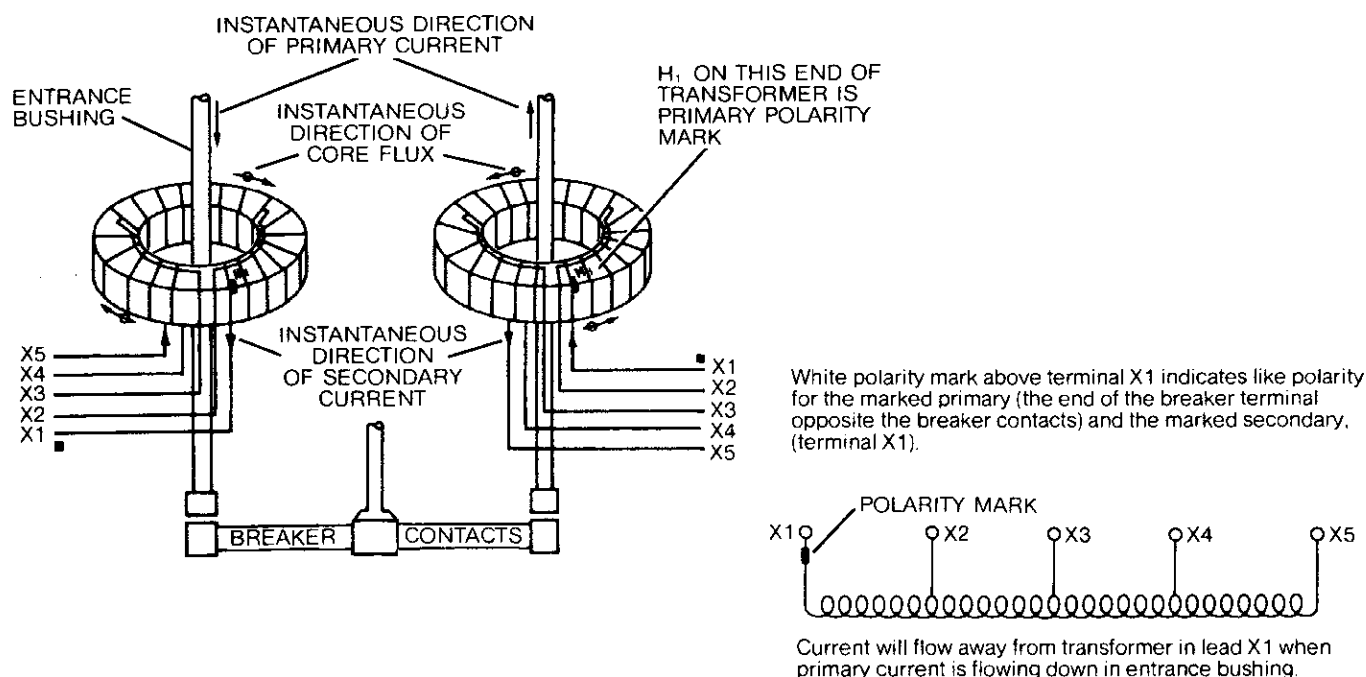


Figure 2.
Typical transformer arrangement and polarity.

INSULATION TEST

Bushing current transformers are not subjected to line potential, but they are subjected to a moderate, induced voltage. After installation, each bushing current transformer should be subjected to a one-minute potential test at 2500 volts rms between the shorted secondary winding and ground, including leads.

NOTE: If a potential test is conducted as a routine check, it should be made at a reduced voltage of approximately 1500 volts rms.

INSULATION CHECK

After a bushing current transformer has been installed and all connections have been made, it should be checked for:

1. Accidental ground.
2. Proper connections.
3. Correct polarity.

To check the current transformer for accidental grounding or low-leakage resistance, use a 500 or 1000 volt megger:

1. Short circuit the terminal blocks and megger the resistance between the secondary winding and the circuit breaker frame. This resistance should have a value in megohm range.
2. If the resistance is unusually low, the bushing current transformer and secondary leads should be inspected for accidental grounding or moisture.

MAINTENANCE

Type OE bushing current transformers generally do not require attention beyond an occasional check to make sure that leads have not been damaged or shorted and that connections are tight.

SAFETY PRECAUTION:

If the secondary of the bushing current transformer has been accidentally opened when line current is flowing in the primary (entrance bushing), a dangerous, excessive peak voltage that could damage the insulation may develop in the secondary. A ratio test should be made on the installed bushing current transformer if symptoms indicate a short-circuit condition in the bushing current transformer winding.

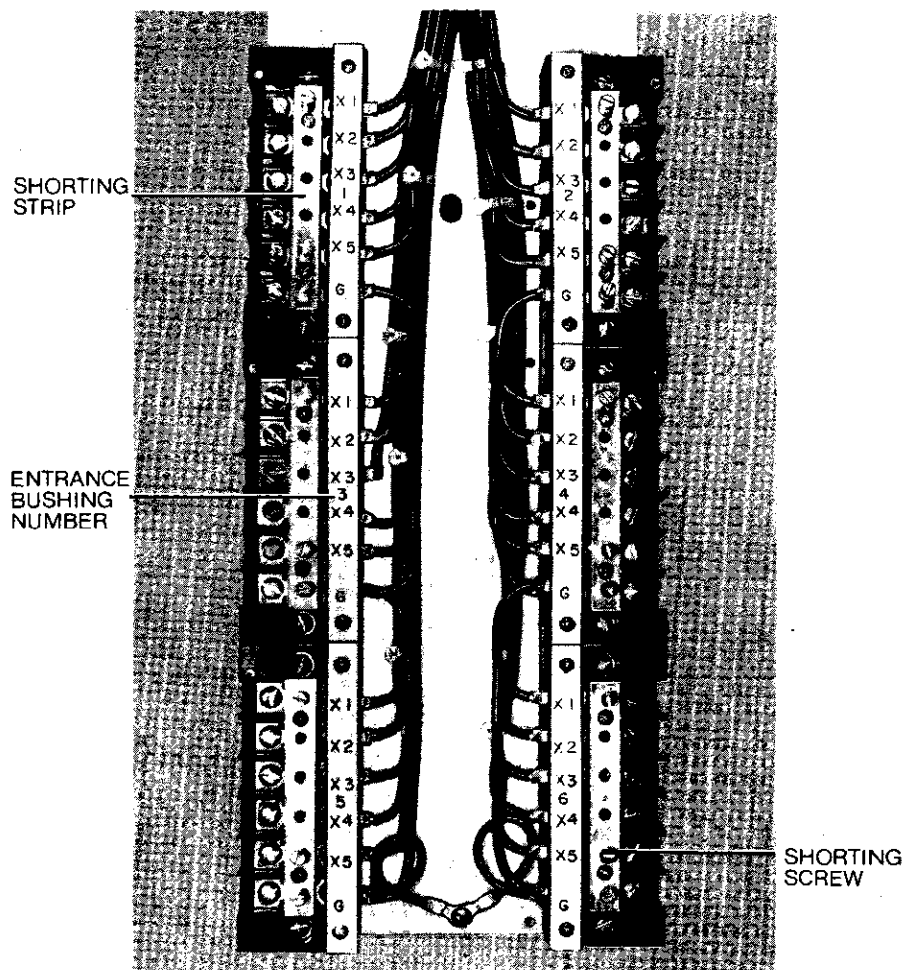


Figure 3.
Short-circuit terminal blocks.

McGRAW-EDISON

**Power Systems Group
McGraw-Edison Company
Post Office Box 2850
Pittsburgh, PA 15230**




SCB03294A

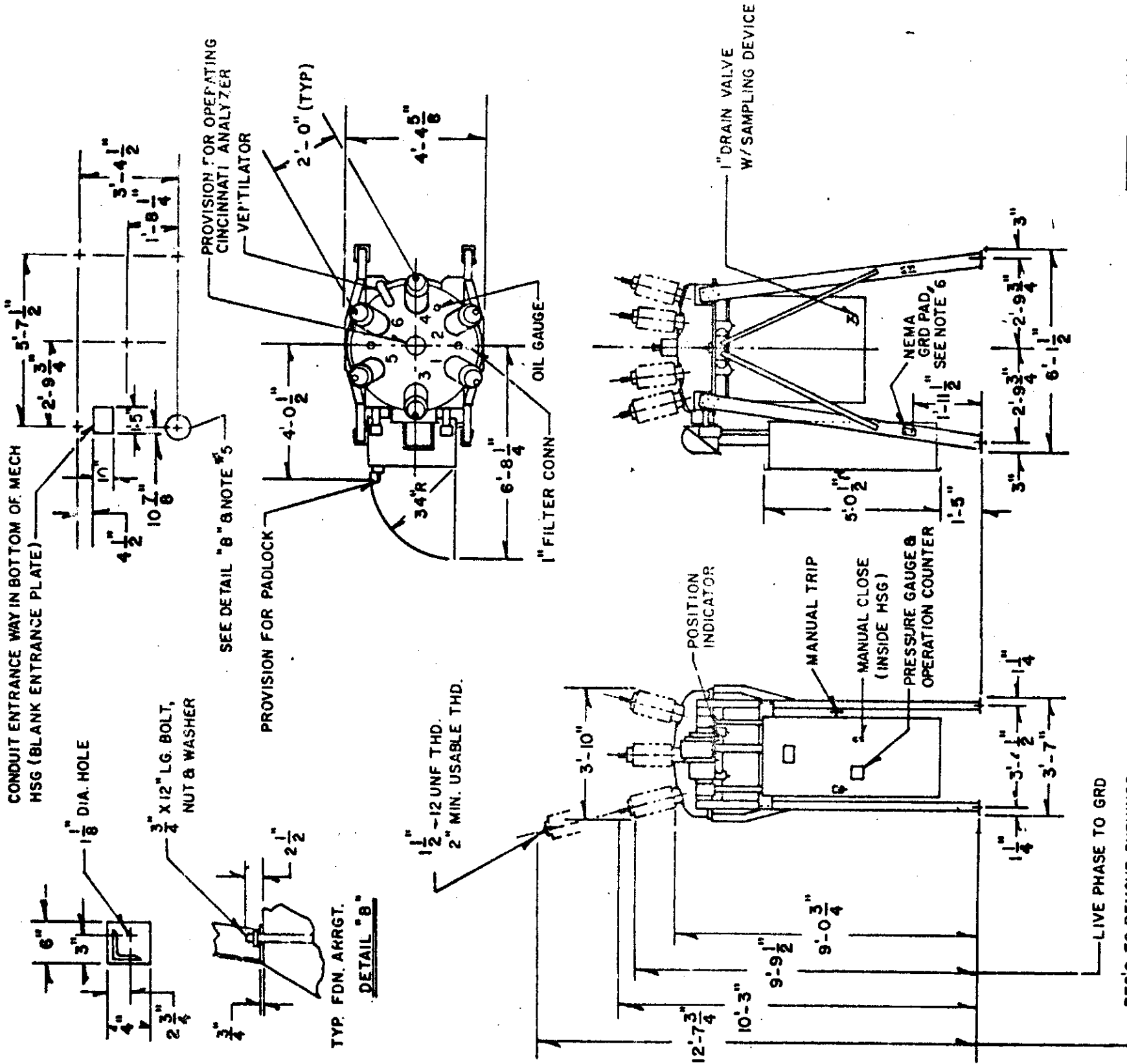
WEIGHT IN POUNDS	REFERENCE ONLY
3- POLE O C B COMPLETE W/ENT BUSHINGS & CT'S BUT LESS OIL.	220 GAL'S OF OIL AT 7.5LB PER GAL.
3,404	1,650
	5,054

GENERAL NOTES

1. DRAIN VALVE MAY BE MOUNTED ON EITHER SIDE BY ROTATING TANK 180°. WHEN INSTALLED PRESSURE MUST BE ON UNDERSIDE OF VALVE DISC.
2. FOR COMPLEMENT OF CURRENT TRANSFORMERS, TERMINALS AND TANK HOIST FURNISHED WITH ORDER REFER TO MASTER DRAWING LIST.
3. TO REMOVE THE TANK BREAKER MUST BE IN CLOSED POSITION. IF FORK LIFT IS USED, REMOVE ONE SIDE BRACE.
4. TOTAL FORCE ON FOUNDATION AT 3-PHASE INTERRUPTING RATING PER NAMEPLATE IS AS FOLLOWS: MAX NET UPLIFT - 1X WEIGHT OF OCB, DOWNWARD FORCE (INCLUDING DEAD WEIGHT OF 3-POLE BREAKER) 2X WEIGHT OF OCB.
5. ALL FOUNDATION MATERIAL TO BE FURNISHED BY PURCHASER DESIGN OF FOUNDATION TO SUIT CONDITION OF SOIL.
6. BREAKER FURNISHED WITH TWO GROUND PADS MOUNTED ON DIAGONALLY OPPOSITE FRAME LEGS.
7. ENTRANCE BUSHING, CIRCUIT BREAKER ONLY BUSHINGS
8. COMPONENTS IN MECH. HSG. ARE MOUNTED AT A MINIMUM OF TWO(2) FEET ABOVE GRD. LEVEL.

C-03704-4 ITEM 2

	McGRAW-EDISON COMPANY			
	Power Systems Division			
	CANONSBURG, PA. 15317 • U.S.A.			
SWA.	M.D.	DATE	11-15-30	CONFIDENTIAL
CKD.		DATE		MUST NOT BE USED IN ANY WAY DETRIMENTAL TO MCGRAW-EDISON CO.
APPD.		DATE	11-17-30	DESIGN
		REF.	FS-	
DESCRIPTION CG-38 38 KV 40KA 1200AMP				
OA-3 MECH. OCB ONLY BUSHING				
TITLE				
OCB OUTLINE				
REV.				
SCB03294A A				



A	1-23-81	M.D.	PER CUST. MARKED PRINT
SYN.	DATE	BY	REVISION

EAF INSULATOR CO. INC.

REV. 6 - 2 - 70

TITLE 34.5 KV 1200 AMP PRC BUSHING, ANSI STANDARD

DWG. NO.

CAT. NO.

GLAZE

REV. 7 - 26 - 73

SDB 81315

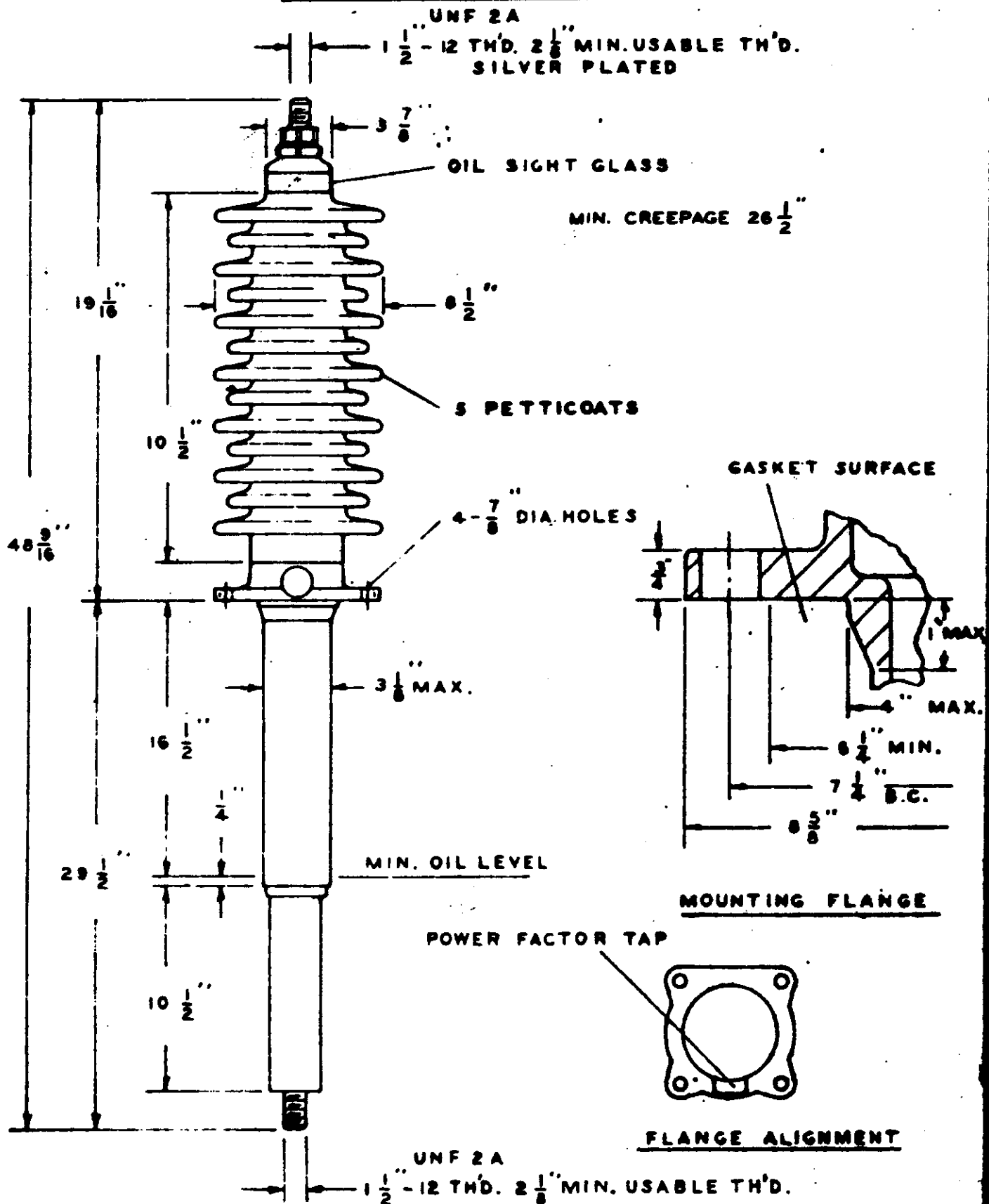
B 81315

CHOCOLATE

SDB 81315-70

B 81315-70

LT. GRAY NO. 70



McGRAW-EDISON POWER SYSTEMS DIVISION

BTCT RATIO CORRECTION FACTOR CURVES

ASA STANDARD B-4 (40HMS, 50 PERCENT PF LAG) SEC BURDEN

MARKED RATIO	SEC. TURNS	SEC. TAPS
100/5	20	X2-X3
200/5	40	X1-X2
300/5	60	X1-X3
400/5	80	X4-X5
500/5	100	X3-X4
600/5	120	X2-X4
800/5	160	X1-X4
900/5	180	X3-X5
1000/5	200	X2-X5
1200/5	240	X1-X5

TYPE OE-12

DWG. NO. A243474

OCB TYPE-

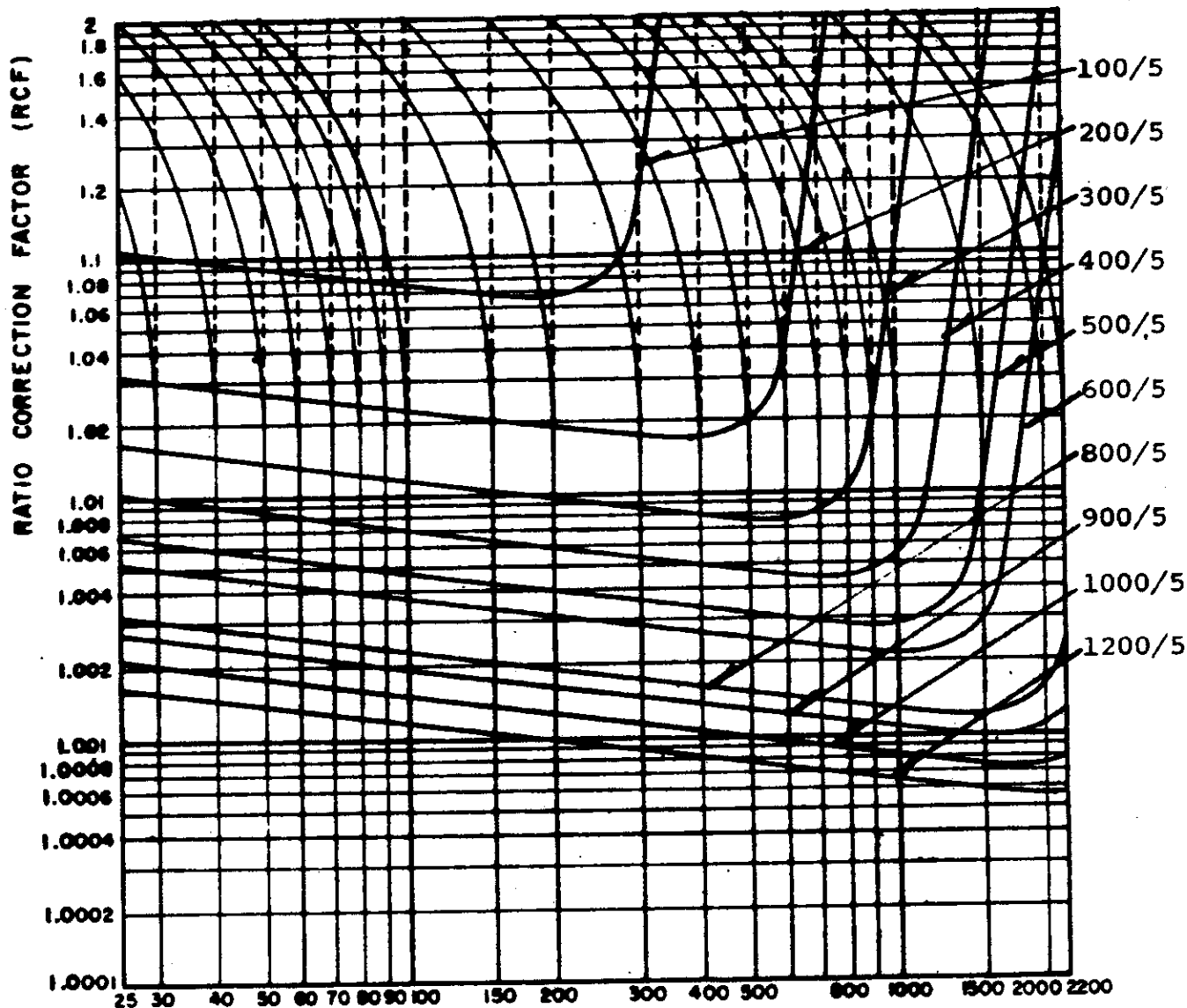
FREQUENCY 60 CYCLES

MAXIMUM RATIO 1200/5

TOTAL SEC. TURNS 240

SEC. RES. 0.025 OHMS/TURN at 75°C

ASA ACCURACY 10L400



PERCENT RATED CURRENT DWG. NO. RCF243474-4C

DOTTED LINE - SECONDARY COORDINATE

SOLID LINE - PRIMARY COORDINATE

McGraw-Edison

POWER SYSTEMS DIVISION

BTCT EXCITING CURRENT CURVES

TYPE OE-12

DWG. NO. A243474

OCB TYPE -

FREQUENCY 60 CYCLES

MAXIMUM RATIO 1200/5

TOTAL SEC. TURNS 240

SEC. RES. .0025 OHMS/TURN at 75°C

ASA ACCURACY - 10/100

MARKED RATIO	SEC. TURNS	SEC. TAPS
100/5	20	X2-X3
200/5	40	X1-X2
300/5	60	X1-X3
400/5	80	X4-X5
500/5	100	X3-X4
600/5	120	X2-X4
800/5	160	X1-X4
900/5	180	X3-X5
1000/5	200	X2-X5
1200/5	240	X1-X5

