

ADVERTISEMENT FOR BIDS
FOR
Substation Transformer Maintenance and Testing Services

Sealed bids will be received at the **Office of the City Clerk, 100 East First Street, Grand Island, NE 68801, until 2:00 pm. (Local Time), September 24, 2013** for Substation Transformer Maintenance and Testing Services, FOB the City of Grand Island. Quotes will be publicly opened at this time at the Office of the City Clerk, 100 East First Street, Grand Island, NE. Bids received after the specified time will be returned unopened to sender.

Specifications are on file in the office of the Purchasing Division. Bids shall be submitted on forms that will be furnished by the City.

Each bidder shall submit with their bid a certified check, cashiers check, or bid bond payable to the City Treasurer in an amount not less than five percent (5%) of the bid price which shall guarantee good faith on the part of the bidder and the entering into a contract within fourteen (14) days, at the bid price, if accepted by the City. **Your certified check, cashiers check or bid bond must be submitted in a separate envelope attached to the outside of the envelope containing the bid.** Each envelope must be clearly marked indicating its contents. Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened or considered. Bid bonds must be issued by surety companies authorized to do business in the State of Nebraska.

Bids will be evaluated by the purchaser based on price, delivery, quality, and adherence to specifications. Each bidder shall supply three (3) copies of the bid and equipment specifications. Failure to provide the correct number of copies will result in the bid being deemed nonconforming and not considered. The Purchaser reserves the right to reject any or all bids, to waive technicalities, and to accept whichever bid that may be in the best interest of the City.

No Company may withdraw its bid for a period of thirty (30) days after date of bid opening.

RaNae Edwards,
City Clerk

Issue Date: _____

GENERAL SPECIFICATIONS AND BID SHEET FOR
Substation Transformer Maintenance and Testing Services
CITY OF GRAND ISLAND, NEBRASKA

Sealed bids will be **received at the office of the City Clerk**, 100 East First St., Grand Island, NE 68801 or P. O. Box 1968, Grand Island, Nebraska, until 2:00 pm (Local Time) on September 24th, 2013, for Substation Transformer Maintenance and Testing Services as specified in these bidding documents, FOB Grand Island, NE.

Exceptions to Specifications - Any bidder who has exceptions to any specifications and requirements listed in the bidding documents must so state in the space provided below. Exceptions should also be noted in the blanks provided in the detailed specifications. It is the bidder's responsibility to clearly outline any exceptions. Failure by bidder to outline exceptions will require the successful bidder to comply with the specifications.

Exceptions to specifications:

Attached are detailed minimum specifications. The following general specifications also apply to this bid.

Bid Bond Each bidder shall submit with their bid a certified check, cashiers check or bid bond payable to the City Treasurer in an amount not less than five percent (5%) of the bid price which shall guarantee good faith on the part of the bidder and the entering into a contract within fourteen (14) days, at the bid price, if accepted by the City. **Your certified check, cashiers check or bid bond must be submitted in a separate envelope attached to the outside of the envelope containing the bid.** Each envelope must be clearly marked indicating its contents. **Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened or considered.** Bid bonds must be issued by surety companies authorized to do business in the State of Nebraska.

Bid Submittal All envelopes submitted by Bidder must state "Substation Transformer Maintenance and Testing, Opening September 24th" on the face of envelope. A minimum of three (3) copies of the bid should be included. Failure to submit the correct number of copies will result in the bid being deemed nonconforming and not considered.

Optional Testing The general and detailed specifications are the minimum requirements. Bidder may include optional testing if desired. Optional testing should be noted as such.

OSHA & ANSI Requirements In addition to other specified requirements, the equipment shall meet all current Occupational Safety and Health Administration and American National Standards Institute requirement specifications.

Award Upon approval by the Grand Island City Council, a City of Grand Island Utilities Department Purchase Order shall be issued to the successful bidder.

Testing Date Each bidder shall state in their bid a realistic maintenance date for this equipment. Award winning bidder must deliver within quoted delivery time.

- Payment** The invoice will be paid after approval at the next regularly scheduled Council meeting occurring after departmental approval of invoice; the City Council typically meets the second and fourth Tuesday of each month. Invoices must be received well in advance of Council date to allow evaluation and processing time.
- Fair Employment Practices** Each bidder agrees that he/she will not discriminate against any employee or applicant for employment because of age, race, color, religious creed, ancestry, handicap, sex or political affiliation.
- Fair Labor Practices** Each bidder agrees to file a statement with the City, if not already on file, that they are complying with, and will continue to comply with, fair labor standards in the pursuit of their business and also comply with such in the execution of the contract on which they are bidding.
- Data Privacy** Bidder agrees to abide by all applicable Local, State, and Federal laws and regulations concerning the handling and disclosure of private and confidential information concerning individuals and corporations as to inventions, patents and patent rights. The bidder agrees to hold the City harmless from any claims resulting from the bidder's unlawful disclosure or use of private or confidential information.
- Independent Price Determination** By signing and submitting bid, the bidder certifies that the prices in the bid have been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.
- Clarification of Specification Documents** Vendors shall promptly notify Travis Spiehs at (308) 385-5462 of any ambiguity, inconsistency or error that they may discover upon examination of the specifications. Interpretations, corrections and changes made to the specifications will be made by written addenda. Oral interpretations or changes to the specifications made in any other manner will not be binding on the City; and bidders shall not rely upon such interpretations or changes.
- Gratuities and Kickbacks** City Code states that it is unethical for any person to offer, give, or agree to give any City employee or former City employee, or for any City employee or former City employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated there within, as an inducement for the award of a subcontract or order.

INSURANCE

The Contractor shall purchase and maintain at their expense as a minimum insurance coverage of such types and in such amounts as are specified herein to protect Contractor and the interest of Owner and others from claims which may arise out of or result from Contractor's operations under the Contract Documents, whether such operations be by Contractor or by any subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable. Failure of Contractor to maintain proper insurance coverage shall not relieve him of any contractual responsibility or obligation.

1. WORKERS COMPENSATION AND EMPLOYER'S LIABILITY

This insurance shall protect the Bidder against all claims under applicable State workers compensation laws. This insurance shall provide coverage in every state in which work for this project might be conducted. The liability limits shall not be less than the following:

Workers Compensation	Statutory Limits
Employers Liability	\$100,000 each accident
\$100,000 each employee	
\$500,000 policy limit	

2. BUSINESS AUTOMOBILE LIABILITY

This insurance shall be written in comprehensive form and shall protect the Bidder, Bidder's employees, or subcontractors from claims due to the ownership, maintenance, or use of a motor vehicle. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	\$ 500,000 Combined Single Limit
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3. COMPREHENSIVE GENERAL LIABILITY

The comprehensive general liability coverage shall contain no exclusion relative to explosion, collapse, or underground property. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	\$ 500,000 each occurrence
\$1,000,000 aggregate	

4. UMBRELLA LIABILITY INSURANCE

This insurance shall protect the Bidder against claims in excess of the limits provided under employer's liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits shall not be less than the following:

Bodily Injury & Property Damage	\$1,000,000 each occurrence
\$1,000,000 general aggregate	

5. ADDITIONAL REQUIREMENTS

The City may require insurance covering a Bidder or subcontractor more or less than the standard requirements set forth herein depending upon the character and extent of the work to be performed by such Bidder or subcontractor.

Insurance as herein required shall be maintained in force until the City releases the Bidder of all obligations under the Contract.

The Bidder shall provide and carry any additional insurance as may be required by special provisions of these specifications.

6. CERTIFICATE OF INSURANCE

Satisfactory certificates of insurance shall be filed with the City prior to starting any work on this Contract. **The certificates shall show the City as an additional insured on all coverage except Workers Compensation. The certificate shall state that thirty (30) days written notice shall be given to the City before any policy is cancelled (strike the "endeavor to" wording often shown on certificate forms). If the bidder cannot have the "endeavor to" language stricken, the bidder may elect to provide a new certificate of insurance every 30 days during the contract. Bidder shall immediately notify the City if there is any reduction of coverage because of revised limits or claims paid which affect the aggregate of any policy.**

BID FORM
CITY OF GRAND ISLAND, NEBRASKA
(All bids must be submitted on this form)

TO THE CITY COUNCIL, CITY OF GRAND ISLAND, GRAND ISLAND, NE

The Undersigned bidder, having examined all specifications and other bidding documents, and all addenda thereto, and being acquainted with and fully understanding all conditions relative to the furnishing of the specified equipment to the City of Grand Island, NE hereby proposes to furnish and deliver such services FOB Grand Island, NE, at the following price:

<u>ITEM DESCRIPTION:</u>	<u>COST</u>
Total Base Bid:	\$ _____
7% Nebraska Sales Tax	\$ _____
TOTAL BID PRICE *	\$ _____

The City of Grand Island, Utilities Department ***does*** pay sales tax. If bidder fails to include sales tax in the bid price or takes exception to including sales tax in the bid price, the City will add a 7% figure to the bid price for evaluation purposes; however, the City will only pay actual sales tax due.

If awarded the contract, the undersigned bidder agrees to test the specified equipment within _____ days from date of order.

To allow for City processing time, terms shall be Net 30.
Bidder acknowledges receipt of Addendum Number(s) _____ and has considered addendum information in bid preparation.

Attached to the bid is all supplementary information requested in the bidding documents.

Bidder Company Name _____ Date _____

Company Address _____

Name of Person Completing Bid (please print)/Signature _____

Telephone #: _____ Fax #: _____

CITY OF GRAND ISLAND RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS.

Note: Any exceptions to specifications must be noted in the space provided on Page 1 of General Specifications.

Substation Transformer Maintenance and Testing Services

DETAILED SPECIFICATIONS

SCOPE

The Grand Island Electric Department is soliciting Bids for the maintenance and repair of several substation transformers. Detailed descriptions and pictures of each transformer follow this specification.

The contractor will be responsible for supplying all gaskets, minor hardware, cleaning supplies, etc. that may be needed during the execution of this project. The City of Grand Island will be responsible for de-energizing equipment but the contractor should provide all personnel equipment, and tooling required for repairs.

In addition, one substation transformer is in need of replacement. The transport and swap of a spare substation transformer will also be part of this project.

OVERVIEW

The Grand Island Electric Department is a municipally owned electric utility, with a summer peak demand in excess of 170 MW. The Electric Department serves its load with local generation and distribution substations on a 115 kV transmission loop. A single-line drawing of the electric system Power Supply is included with these specifications. The most pertinent transformer nameplate information is also included. All transformer oil is PCB free (<50 PPM). DGA and PCB test results are available at the bidder's request.

The Electric Department intends to perform the required maintenance on as many transformers as possible in a single, uninterrupted sequential, project. Any additional trips that are necessary due to weather or scheduling conflicts by the contractor shall be at the contractor's expense.

The contractor shall provide a tentative schedule of transformer maintenance. This schedule will be reviewed by The City of Grand Island and any modifications or clarifications shall be discussed. Once an agreeable schedule is developed, The City of Grand Island shall work with the contractor to accommodate the schedule. The contractor shall provide a quotation including multiple mobilizations to Grand Island if necessary.

PROJECT DETAILS

Maintenance Activities

Table 1 lists the maintenance activities that are to be performed by the contractor. Included in this specification are photos of each transformer and the problems areas if applicable as well as materials that are to be supplied by the City. Additional high resolution photos are available upon request. To execute the repairs, each transformer should be drained to an appropriate level and the oil processed to manufacturers' standards at an appropriate processing temperature. Processing should include degasification, oil dehydration, and thermal cleaning. The contractor shall be responsible for testing each unit for dissolved gases, moisture, and

PCBs after work is completed.

Transformer Relocation and Swap

In addition to the maintenance activities listed above, one substation transformer is in need of replacement. A price shall be included that addresses the following:

- 1) Recommended pre-move electrical tests.
- 2) Drain, disassemble and prepare the spare substation transformer for transport.
- 3) Transportation of the spare transformer approximately 6.4 miles to the replacement site.
- 4) Removal of the existing failed transformer to a temporary pad adjacent to its current location.
- 5) Removal of an adjacent grounding transformer from its current location to a storage yard nearby.
- 6) Placement of the spare transformer on the existing foundation.
- 7) Assembly and oil filling of spare transformer. Bushing and radiator gaskets shall be replaced. Oil shall be processed per manufacturer's recommendations prior to filling.
- 8) Recommended post-move electrical tests.
- 9) Drain, disassemble and prepare failed transformer for transport. All disassembled components shall be crated for long-term storage.
- 10) Transportation of the failed transformer approximately 6.4 miles to the spare transformer pad.
- 11) The failed transformer shall be left with all openings sealed and a nitrogen blanket inside.

All electrical disconnections and connections shall be made by City personnel. The contractor is responsible for all necessary permits. Both transformers are surrounded by an oil retention berm. The crane shall be sized sufficiently to allow moving of the transformers without damage to the berm. The contractor shall take possession of the oil contained within the failed transformer main tank. Nameplate data and outline drawings are included for the failed transformer, spare transformer and grounding transformer. Aerial photos are also included. In addition, a map showing the location of both transformers is included.

A site visit is suggested in order to determine the extent of labor and equipment required to perform the various activities. Please contact Travis Spiehs at (308) 385-5462 x144 to set up an appointment.

BIDDING NOTES

Bids should be submitted with a set mobilization cost and separate prices for each transformer repair. Thus the submittal should include eight (8) separate prices. In addition, a price shall be included for the removal and swap of the substation transformer. Any credit for the oil from the failed transformer shall be clearly shown.

PROJECT EXECUTION

The project shall be completed as early as possible to avoid winter weather. Quotation should include a lead time and a completion time. The City of Grand Island will be responsible for removing from service and disconnecting each transformer prior to repair. A maximum of four

hours may be required to completely remove from service any given transformer. Only one load serving transformer shall be out of service at any given time. Normal working hours are Monday through Friday, 8:00 am to 5:00 pm. Any switching activities shall be completed during normal working hours.

Switching of substation transformers will be coordinated through Travis Spiels at Phelps Control Center, (308) 385-5462. A trailer mounted 750 gallon oil tank and a Velcon Model MCP5E two stage oil filtration system will also be available for use by the Contractor.

The contractor shall be responsible for any oil spills, cleanup and disposal of cleaning supplies.

QUALIFICATIONS

The contractor shall have education, training and experience in the maintenance, testing, inspection and moving of power transformers as described in these specifications. Identification of the primary personnel (those who will be performing the maintenance) and a statement of their qualifications shall be included with the proposal.

Item	Name	Mfr.	Rating	Gallons of Oil	Serial No.	Maintenance Required
1	Sub A	GE	22.5 MVA	6160	F-961693C	LTC maintenance
2	Sub B South	Westinghouse	22.5 MVA	6160	RDP-19801	Radiator gaskets (2), drain valve
3	Sub C West	Westinghouse	22.5 MVA	7835	RDP-19802	LTC seal leak, valve leaks, radiator leak
4	Sub E West	Siemens	22.5 MVA	4775	TP733	LTC valve, LTC maintenance
5	Sub F South	Waukesha	22.5 MVA	5550	GM971410	LTC door leak, drain valve leaks
6	Sub H North	GE	22.5 MVA	6160	171484-009	LTC leaks, LTC maintenance, main tank seam leak
7	Sub H South	GE	22.5 MVA	6160	F-961693B	LTC Drain Valve
8	Spare	McGraw Edison	22.5 MVA	6935	0-07064-5-2	No Load Tap Changer, LTC tank seam leak, Main tank seam leak

Table 1.

1. Substation A Transformer



Items to be repaired:

LTC Maintenance (see attached maintenance record form)

- Replace arcing contacts

- Inspect and clean compartment and mechanism

- Hand crank mechanism and verify free movement

- Test motor mechanism including tap limit switches

- Hi-pot test oil

- Filter oil and refill

Notes:

Grand Island will provide arcing contacts.

2. Substation B South Transformer



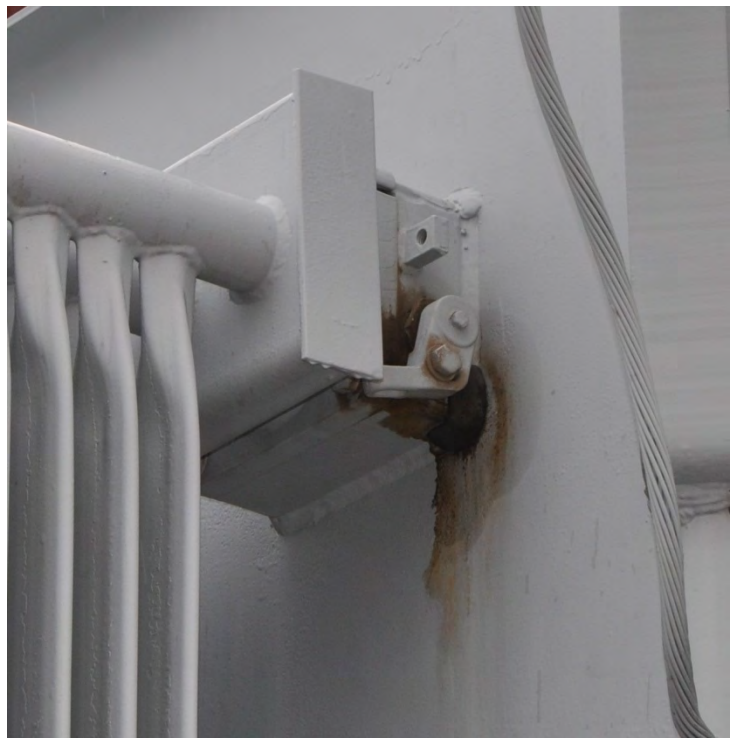
Items to be repaired:

Upper and Lower radiator gasket (2) leaks
Drain valve leak

Notes:

Grand Island will provide a replacement valve.

3. Substation C West Transformer



Items to be repaired:

- LTC seal leak
- External Valve (2) leaks
- Radiator leak

Notes:

Grand Island will provide replacement valves.

4. Substation E West Transformer



Items to be repaired:

LTC Valve leak

LTC Maintenance (see attached maintenance record form)

- Inspect and clean compartment and mechanism
- Hand crank mechanism and verify free movement
- Test motor mechanism including tap limit switches
- Hi-pot test oil
- Filter oil and refill

Notes:

Grand Island will provide replacement valve.

5. Substation F South Transformer



Items to be repaired:

LTC door leak

Drain valve leak (2)

Notes:

Grand Island will provide replacement valves.

6. Substation H North Transformer



Items to be repaired:

- LTC Maintenance (see attached maintenance record form)
 - Replace arcing contacts
 - Inspect and clean compartment and mechanism
 - Hand crank mechanism and verify free movement
 - Test motor mechanism including tap limit switches
 - Hi-pot test oil
 - Filter oil and refill

LTC leaks (3) - Door gasket, Valve, Seam
Main tank seam leak

Notes:

Grand Island will provide a replacement valve and arcing contacts.

7. Substation H South Transformer



Items to be replaced:

Drain valve and gasket(s) if needed

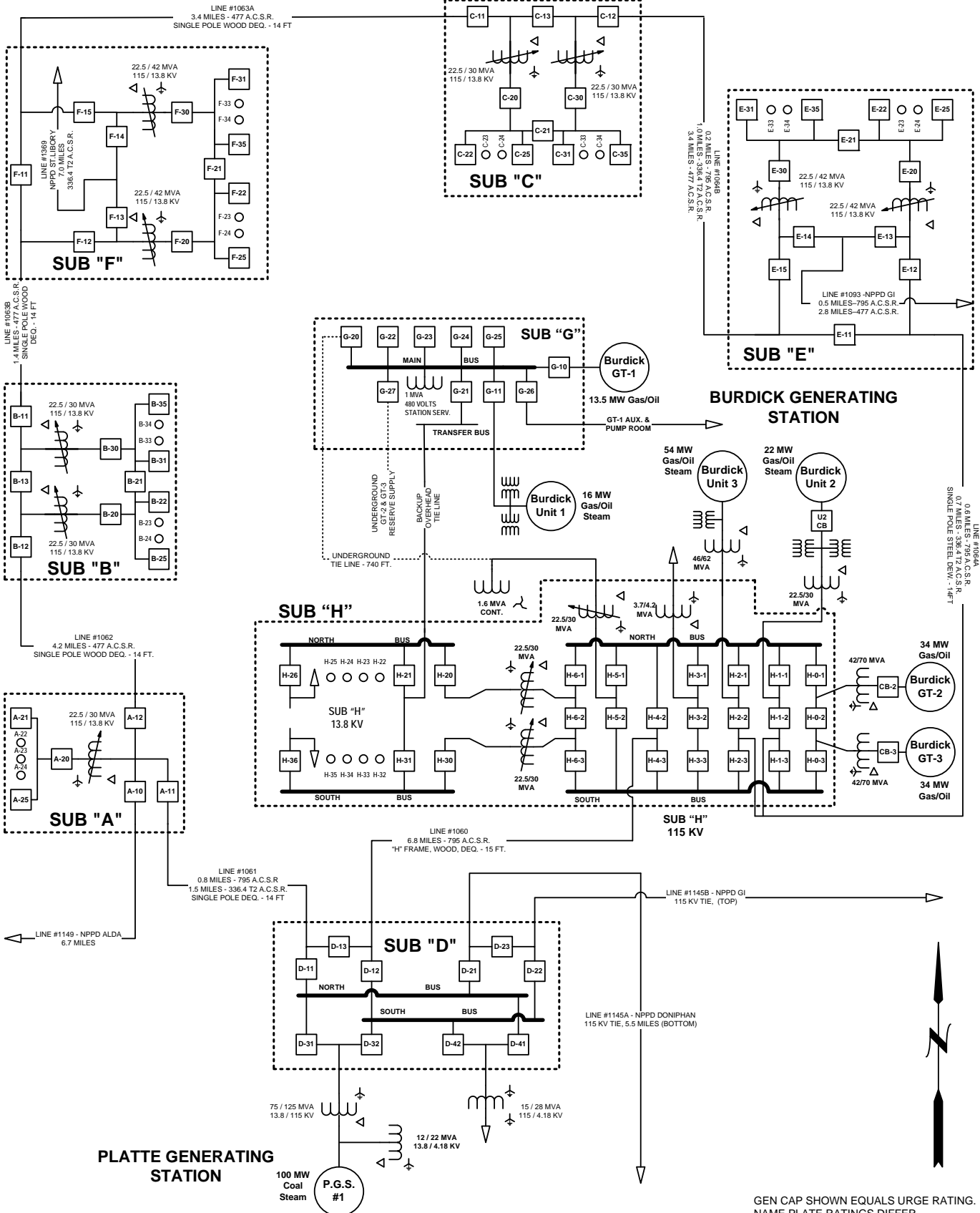
Notes:

Grand Island will provide a replacement valve.

8. Spare Transformer



Items to be repaired:
No Load Tap Changer leak
LTC tank seam leak
Main tank seam leak



GEN CAP SHOWN EQUALS URGE RATING.
NAME PLATE RATINGS DIFFER.

Transformer/LTC Maintenance Form

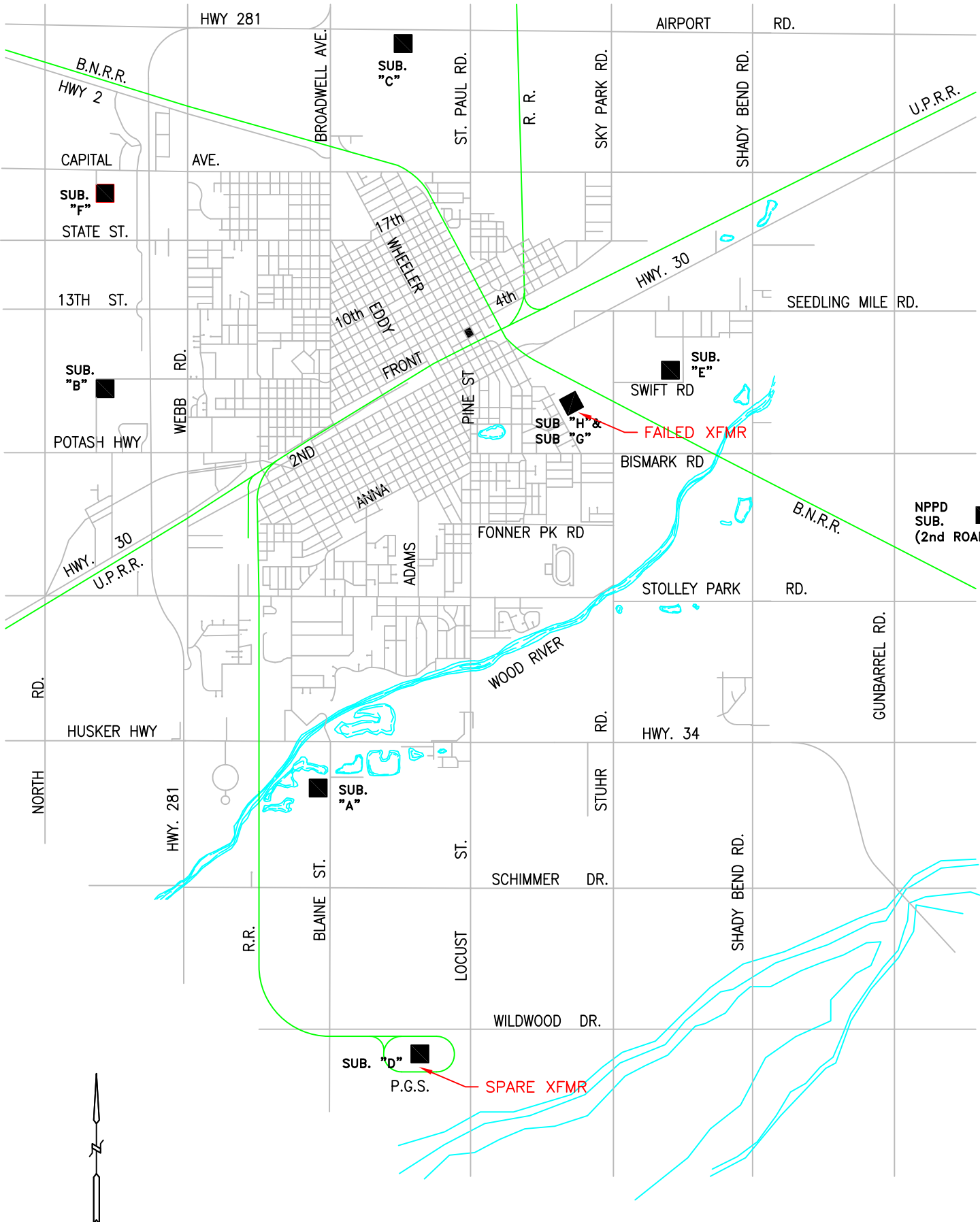
Date	Transformer Number:
Location	Transformer Name

Tests Performed/ Results	

Repairs Performed	

Other Notes	

Name: _____ Date: _____



**SITE LOCATIONS
 CITY SUBSTATION
 AND POWER PLANTS**

DRN. BY :	P.S.L.
DATE :	2/26/98
SCALE :	NONE
SHEET	1 OF 1

SPARE TRANSFORMER NAME PLATE



**3 PHASE, 60 HERTZ
LOAD TAP CHANGING
TRANSFORMER
CLASS OA / FA
FULL LOAD CONTINUOUSLY
22500 / 30000 KVA 55° C. RISE
25200 / 33600 KVA 65° C. RISE
115000 - 13800Y / 7967 VOLTS**



**McGRAW-EDISON
POWER SYSTEMS**

Canonsburg, PA 15317 USA

SPEC. 18214

SERIAL 0 - 07064 - 5 - 2

DATE OF MFG. 9 - 88



READ INSTRUCTION BOOK BEFORE INSTALLING OR OPERATING.

LIQUID LEVEL BELOW TOP SURFACE OF HIGHEST POINT OF MANHOLE FLANGE AT 25°C. **12.63** INCHES ± 0.3"

LIQUID LEVEL CHANGE PER 10°C. LIQUID TEMPERATURE CHANGE. **1.14** INCHES

CAUTION: HIGH VOLTAGE TAP CHANGER FOR DE - ENERGIZED OPERATION

POSITION	CONNECTS ON EACH PHASE	VOLTS	AMPS AT MAXIMUM RATING
A	11 TO 12	121000	160
B	12 TO 13	118000	164
C	13 TO 14	115000	169
D	14 TO 15	112000	173
E	15 TO 16	109000	178

APPROXIMATE WEIGHT IN POUNDS

CORE AND COILS	49350
TANK AND FITTINGS	42700
TYPE V2A LTC MECHANISM	1600
LIQUID 6455 GALLONS IN MAIN TANK	48400
LIQUID 480 GALLONS IN LTC COMPARTMENT	3600
TOTAL WEIGHT	145650
UNTANKING WEIGHT (HEAVIEST PIECE)	49350

MAXIMUM OPERATING PRESSURE OF LIQUID PRESERVATION SYSTEM, 6.5 PSI POSITIVE TO 6.5 PSI NEGATIVE MAIN TANK DESIGNED FOR 15 PSI VACUUM FILLING. SEE INSTRUCTIONS FOR RATINGS OF OTHER PARTS. TRANSFORMER IS FILLED WITH MINERAL OIL.

THE INSULATING LIQUID IN THIS EQUIPMENT CONTAINS NO PCB'S AS OF DATE OF MANUFACTURE

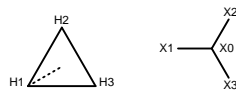
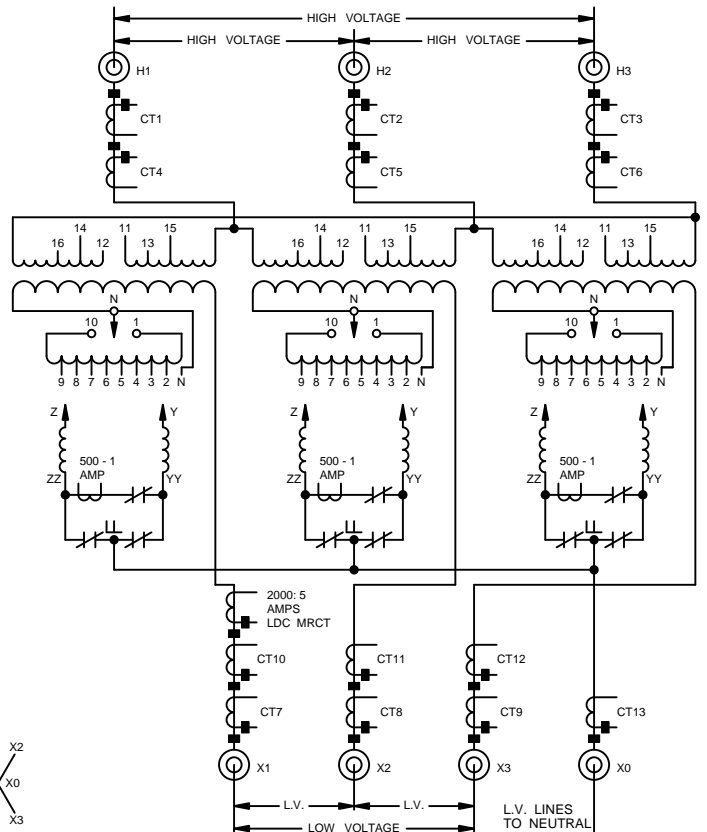
ACCESSORY SCHEMATIC DRAWING **PTC00240N**

ON LOAD TAP CHANGER LOW VOLTAGE

POSITION	CONNECTS ON EACH PHASE			VOLTS	AMPS AT MAXIMUM RATING	
	Y TO Z	Z TO N	N TO Y			
RAISE	16	9	9	1	15180	1278
	15	8	9	1	15094	1285
	14	8	8	1	15008	1293
	13	7	8	1	14921	1300
	12	7	7	1	14835	1308
	11	6	7	1	14749	1315
	10	6	6	1	14663	1323
	9	5	6	1	14576	1331
	8	5	5	1	14490	1339
	7	4	5	1	14404	1347
	6	4	4	1	14318	1355
	5	3	4	1	14231	1363
	4	3	3	1	14145	1371
	3	2	3	1	14059	1380
	2	2	2	1	13973	1388
	1	N	2	1	13886	1397
LOWER	N	N	N	10	13800	1406
	1	9	N	10	13714	1415
	2	9	9	10	13628	1424
	3	8	9	10	13541	1433
	4	8	8	10	13455	1442
	5	7	8	10	13369	1451
	6	7	7	10	13283	1460
	7	6	7	10	13196	1470
	8	6	6	10	13110	1480
	9	5	6	10	13024	1490
	10	5	5	10	12938	1499
	11	4	5	10	12851	1510
	12	4	4	10	12765	1520
	13	3	4	10	12679	1530
	14	3	3	10	12593	1541
	15	2	3	10	12506	1551
16	2	2	10	12420	1562	

FULL WAVE IMPULSE LEVEL :
HIGH VOLTAGE 550 KV
LOW VOLTAGE 110 KV

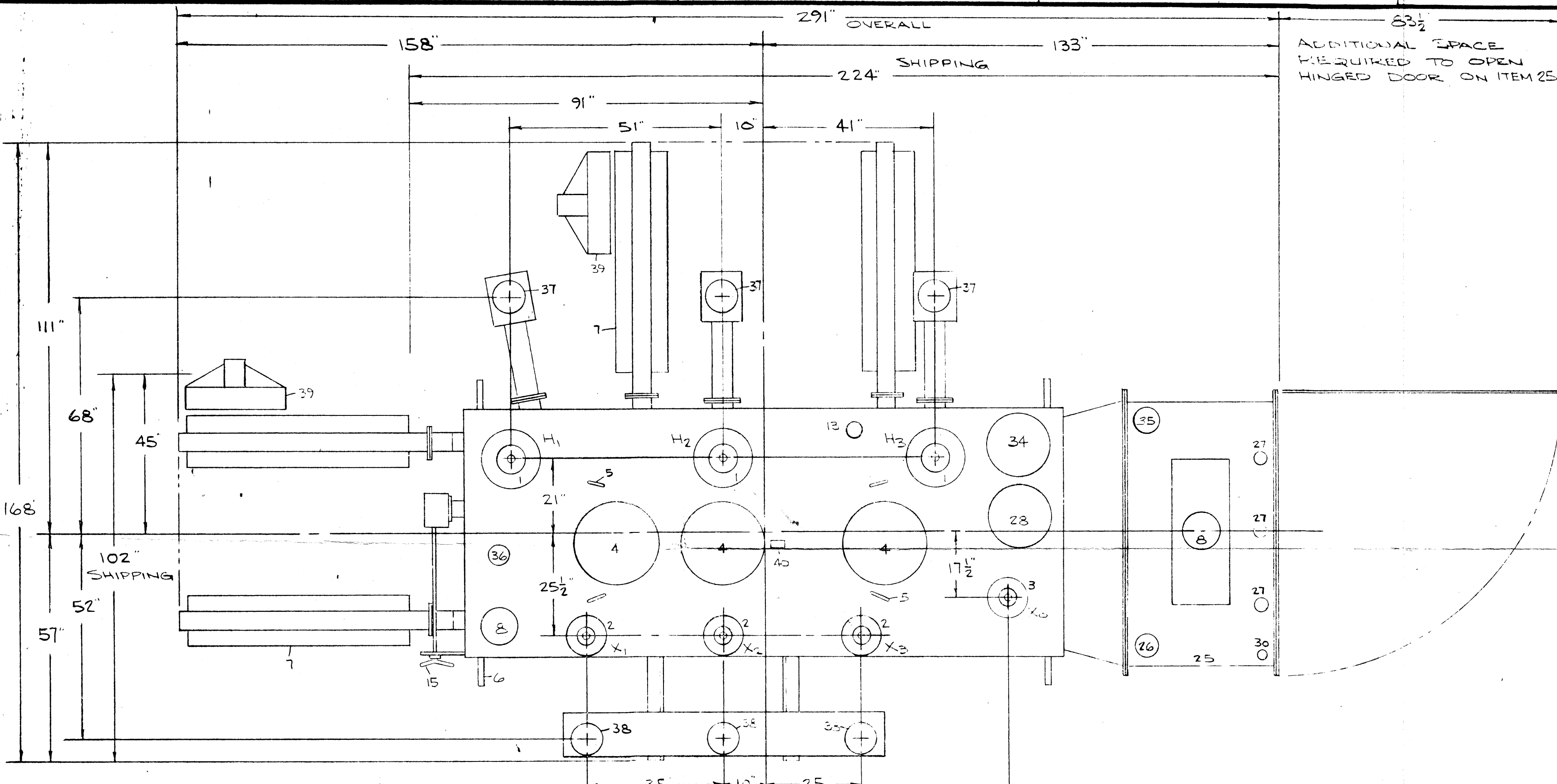
WINDING MATERIAL :
H.V. COPPER
L.V. COPPER
A.V. COPPER



PHASOR DIAGRAM

PLAN VIEW FACING LOW VOLTAGE





ADDITIONAL SPACE REQUIRED TO OPEN HINGED DOOR ON ITEM 25

APPROXIMATE WEIGHT IN POUNDS

CORE AND COILS	49,350#
TANK AND FITTINGS	42,700
LTC MECHANISM	1,600
OIL (645 GALS) IN MAIN TANK & RADIATORS	48,400
OIL (480 GALS) IN LTC COMPARTMENT	3,600
TOTAL	145,650#
UNTANKING WEIGHT (HEAVIEST PIECE)	49,350#
SHIPPING WEIGHT (WITH OIL)	120,600#

MAXIMUM OPERATING PRESSURE RANGE OF OIL PRESERVATION SYSTEM: 6.5 PSI POSITIVE - - - - -6.5 PSI NEGATIVE

MAIN TANK DESIGNED FOR 15 PSI VACUUM FILLING

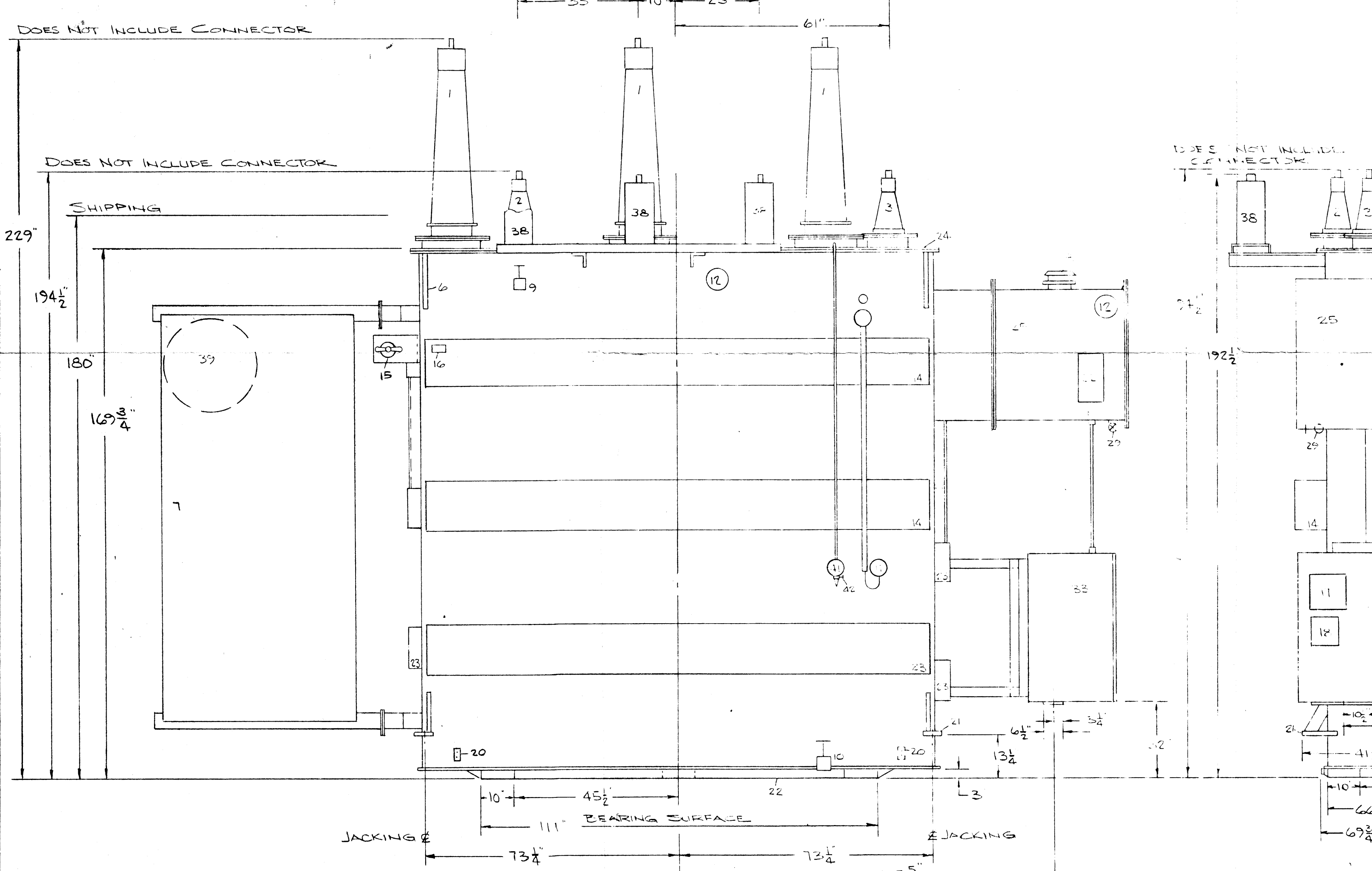
TRANSFORMER SHIPPED FILLED WITH OIL

TRANSFORMER FINISH PAINT COAT LIGHT GRAY ANSI #70

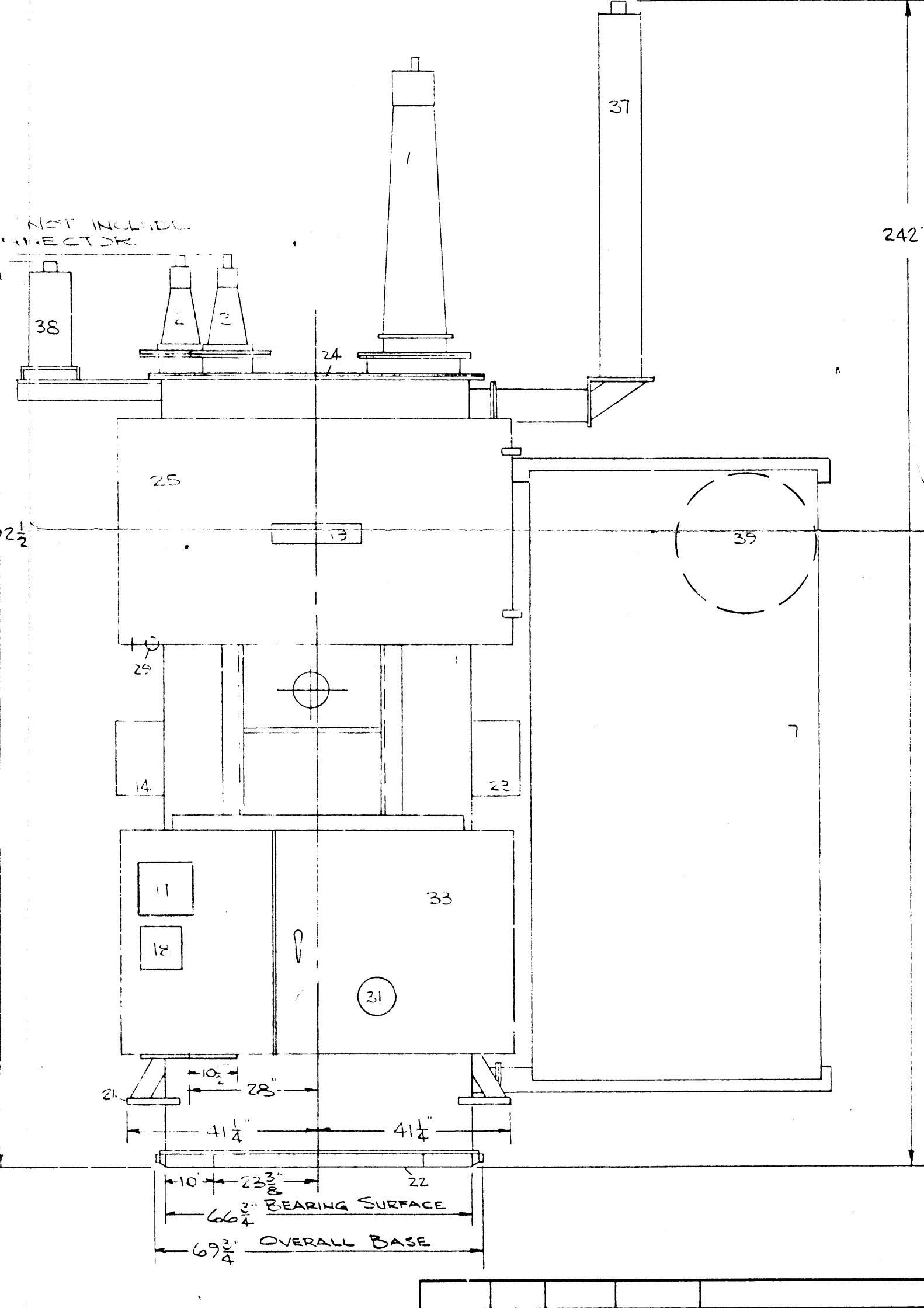
ALL BUSHING AND ARRESTER PORCELAINS LIGHT GRAY ANSI #70

ALL BUSHINGS FURNISHED WITH SPADE TYPE CONNECTOR HAVING FOUR (4) 9/16" DIA HOLES ON 1 3/4" CENTERS

- 1 - HV BUSHING, 115 KV, 800 AMPS, OIL FILLED, INTERCHANGEABLE TYPE, MCGRAW EDISON CAT 537-AA-731 WITH 1 1/2"-12 THREADED STUD TOP TERMINAL. EACH BUSHING EQUIPPED WITH TWO (2) 1200/5 AMP MULTI-RATIO BUSHING TYPE CURRENT TRANSFORMER
- 2 - LV BUSHING, 25 KV, 2000 AMP, OIL FILLED, MCGRAW EDISON CAT 509-AA-000 WITH 2"-12-2A THREADED STUD TOP TERMINAL. EACH BUSHING EQUIPPED WITH TWO (2) 2000/5 AMP MULTI-RATIO BUSHING TYPE CURRENT TRANSFORMER. X1 BUSHING EQUIPPED WITH ONE (1) 2000/5 AMP LDC CURRENT TRANSFORMER
- 3 - LV NEUTRAL BUSHING, 25 KV, 2000 AMP, OIL FILLED, MCGRAW EDISON CAT 509-AA-000 WITH 2"-12-2A THREADED STUD TOP TERMINAL. BUSHING EQUIPPED WITH ONE (1) 600/5 AMP MULTI-RATIO BUSHING TYPE CURRENT TRANSFORMER
- 4 - MANHOLE WITH 17" INSIDE DIAMETER
- 5 - LIFT LUGS FOR LIFTING COVER ONLY
- 6 - LIFT LUGS FOR LIFTING TRANSFORMER COMPLETE WITH OIL
- 7 - DETACHABLE RADIATORS WITH TOP & BOTTOM SHUT OFF VALVES AND WITH TOP VENT AND BOTTOM DRAIN PLUG
- 8 - MECHANICAL PRESSURE RELIEF DEVICE WITH ALARM CONTACTS
- 9 - TOP FILTER VALVE - 1" GLOBE - WITH PIPE PLUG
- 10 - COMPLETE BOTTOM DRAIN & FILTER VALVE WITH SIDE SAMPLING DEVICE - 2" GLOBE - WITH PIPE PLUG
- 11 - DIAL TYPE THERMOMETER - INSTALLED IN WELL - HOT OIL - WITH CONTACTS FOR ALARM AND COOLING
- 12 - MAGNETIC OIL LIQUID LEVEL GAUGE WITH ALARM CONTACTS
- 13 - 2" NPT TANK FLANGE WITH PIPE PLUG - FOR VACUUM CONNECTION
- 14 - HORIZONTAL REINFORCING BRACES (ALSO USED FOR AUXILIARY GAS SPACE)
- 15 - HV TAP CHANGER FOR DE-ENERGIZED MANUAL OPERATION WITH PROVISIONS FOR PADLOCKING IN ANY POSITION
- 16 - STAINLESS STEEL INSTRUCTION NAMEPLATE (TAP CHANGER)
- 17 - STAINLESS STEEL CONNECTION DIAGRAM NAMEPLATE
- 18 - STAINLESS STEEL INSTRUCTION NAMEPLATE (SEALED TANK)
- 19 - MCGRAW-EDISON POWER SYSTEMS DIVISION EMBLEM
- 20 - COPPER FACED GROUNDING PAD WITH TWO (2) 1/2"-13NC TAPPED HOLES ON 1 3/4" CENTERS (ON DIAGONALLY OPPOSITE CORNERS OF LOWER HV AND LV TANK WALL)
- 21 - JACK PADS WITH PROVISIONS FOR PULLING IN EITHER DIRECTION
- 22 - STRUCTURAL STEEL BASE SUITABLE FOR SKIDDING IN EITHER DIRECTION
- 23 - HORIZONTAL REINFORCING BRACES
- 24 - WELDED ON COVER
- 25 - WEATHERPROOF COMPARTMENT FOR LOAD TAP CHANGER INTERRUPTER AND SELECTOR WITH HINGED REMOVABLE FRONT DOOR
- 26 - WEATHERPROOF COVER TYPE TERMINAL BOX FOR BRINGING OUT CURRENT TRANSFORMER SECONDARY LEADS FOR DETECTING FAULTY VACUUM BOTTLES
- 27 - WEAR INDICATORS FOR LTC INTERRUPTER
- 28 - WEATHERPROOF COVER TYPE TERMINAL BOX FOR BRINGING LV, XO BUSHING TYPE AND LDC CURRENT TRANSFORMER LEADS THROUGH COVER
- 29 - 1" FLANGED GLOBE VALVE WITH PIPE PLUG & WITH SIDE SAMPLING DEVICE FOR COMPLETE DRAIN OF ITEM 25
- 30 - 3/4" NIPPLE AND CAP FOR VENTING
- 31 - POSITION INDICATOR WINDOW
- 32 - HAND CRANK BOX
- 33 - WEATHERPROOF CONTROL CABINET FOR LOAD TAP CHANGER DRIVE MECHANISM, COOLING EQUIPMENT CONTROLS, CURRENT TRANSFORMER SECONDARY LEAD TERMINAL BLOCKS AND ALL ALARM TERMINATIONS. BOTTOM OF CABINET IS EQUIPPED WITH AN UNDRILLED REMOVABLE PLATE. SIZE OF OPENING IN CABINET IS 6 1/2" X 21" LG
- 34 - WEATHERPROOF COVER TYPE TERMINAL BOX FOR BRINGING HV BUSHING TYPE CURRENT TRANSFORMER SECONDARY LEADS THROUGH COVER
- 35 - 3" FLANGE AND COVER FOR VACUUM CONNECTION
- 36 - QUALITROL RAPID PRESSURE RISE RELAY WITH ALARM CONTACTS
- 37 - HV LIGHTNING ARRESTER - 108 KV, STATION TYPE, MEPS CAT ATZ11A108 WITH PROVISIONS FOR GROUNDING TO ITEM 20 WITH #4/0 GROUND CABLE
- 38 - LV LIGHTNING ARRESTER - 12 KV, STATION TYPE, MEPS CAT ATZ11A12 WITH PROVISIONS FOR GROUNDING TO ITEM 20 WITH #4/0 GROUND CABLE
- 39 - COOLING FANS, 26 1/2" DIA, 240 VOLT, 1 PHASE, 60 CYCLES, 1140 RPM, 1/4 HP MOTOR
- 40 - STAINLESS STEEL NAMEPLATE INDICATING CORE GROUND ACCESSIBLE THRU ADJACENT MANHOLE
- 41 - PRESSURE VACUUM GAUGE
- 42 - PRESSURE VACUUM BLEEDER DEVICE WITH SAMPLING AND PURGING VALVE EQUIPPED WITH A HOSE FITTING FOR OBTAINING GAS SAMPLES



DOES NOT INCLUDE CONNECTOR



Spare Transformer Outline Drawing

PRINTS TO

ASSEMBLY	
CARPENTER	
COPE BLDG.	
INSULATION	
MACHINE	
STOREROOM	
TRAFFIC	
TANK SHOP	
ELEC. FIN.	
CON. APPARATUS	
MASTER	
INSPECTION	
OFFICE	
COIL TREAT	
MFG. ENG.	
CU. FAB.	
ACCOUNTING	
SERVICE	
RAD SHOP	
MECH. DESIGN BY	

ITEM	REQ.	NAME	DRAWING NUMBER OR DESCRIPTION	DEPT.
NO. UNITS ORDERED	Two (2)			
DRAWN	AAA	3-12-88	McGRAW-EDISON POWER SYSTEMS Canonsburg, PA 15317 USA	
CHECKED				
APPROVED				
DESIGN REFERENCE				
NOT TO SCALE			CUSTOMER: CITY OF GRAND ISLAND	
CONFIDENTIAL			CUSTOMER'S ORDER 87-T-1 (1/19/88)	
			VOLTS: 115000-13800V/7967	

CC-484085

Spare Transformer Location



GENERAL ELECTRIC



TRANSFORMER

NO. F-961692 CLASS OA/FA THREE PHASE 60 CYCL

VOLTAGE RATING 115000GRDY/66400 - 13800
 KVA RATING 22500 CONTINUOUS 55 C RISE SELF COOLED
 KVA RATING 30000 CONTINUOUS 55 C RISE FORCED AIR
 KVA RATING 33600 CONTINUOUS 65 C RISE FORCED AIR

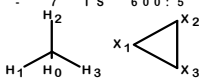
IMPEDANCE VOLTS 7.98 % 115000GRDY - 13800 VOLTS AT 22500 KVA

H V WINDING CONNECTIONS			
VOLTS		AMP 33600 KVA	DIAL POS
L-L	L-N		
120750	69720	161	1
117875	68060	165	2
115000	66400	169	3
112120	64730	173	4
109245	63070	176	5

BASIC IMPULSE INSULATION LEVELS				
ITEM				KV
H ₁	H ₂	H ₃		550
X ₁	X ₂	X ₃		110
	H ₀			110

APPROXIMATE WEIGHTS IN POUNDS
 TOTAL 147600
 UNTANKING 65800
 TANK AND FITTINGS 37300
 MAIN TANK 10C OIL 5035 GAL. 37500
 LTC HSG 10C OIL 430 GAL. 3200
 RADIATORS 10C OIL 515 GAL. 3800

CTS - 1, 2, 3, 4, 5
 CT - 7, 8, 9, 10, 11, 12
 IS 600:5

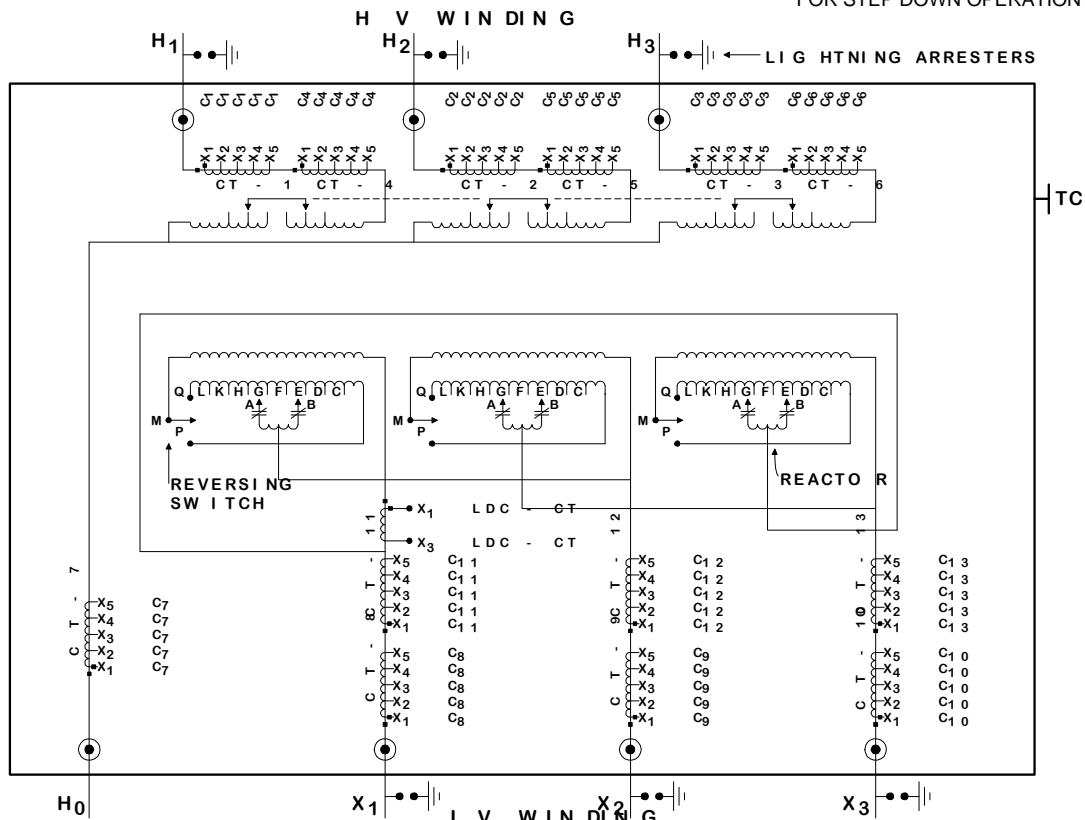


LIQUID LEVEL CHANGES .94 INCH PER 10C CHANGE IN LIQUID TEMPERATURE.
 LIQUID LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF HIGHEST MANHOLE FLANGE AT 25 C IS 12 INCHES.
 MAXIMUM OPERATING PRESSURES OF LIQUID PRESERVATION SYSTEM 7.5 POUNDS POSITIVE TO 5 POUNDS NEGATIVE.
 TANK SUITABLE FOR 14.7 POUNDS VACUUM FILLING.
 LDC-CT IS 600:0.2 AMP FOR USE WITH LOAD TAP CHANGER.
 ■ = POLARITY MARK
 SUITABLE FOR OPERATION WITH THE NEUTRAL EITHER SOLIDLY GROUNDED OR GROUNDED THROUGH AN IMPEDANCE WHICH WILL LIMIT THE LOW FREQUENCY AND IMPULSE VOLTAGES FROM NEUTRAL TO GROUND TO VALUES CONSISTENT WITH THE INSULATION LEVELS SHOWN ON THIS NAMEPLATE.

VOLTS	AMP 33600 KVA	MECHANISM		REVERSING G SWITCH CONNECTS
		DIAL POS	CONNECTS	
			A TO B TO	
15180	1278	16	L L	M TO P
15094	1285	15	L K	
15007	1293	14	K K	
14921	1300	13	K H	
14835	1308	12	H H	
14749	1315	11	H G	
14662	1323	10	G G	
14576	1331	9	G F	
14490	1339	8	F F	
14404	1347	7	F E	
14317	1355	6	E E	
14231	1363	5	E D	
14145	1371	4	D D	
14059	1380	3	D C	
13972	1388	2	C C	
13886	1397	1	C M	
13800		N	M M	OPEN
13714		1	M L	M TO Q
13627		2	L L	
13541		3	L K	
13455		4	K K	
13369		5	K H	
13282		6	H H	
13196		7	H G	
13110	1406	8	G G	
13024		9	G F	
12937		10	F F	
12851		11	F E	
12765		12	E E	
12679		13	E D	
12592		14	D D	
12506		15	D C	
12420		16	C C	

FOR STEP DOWN OPERATION

SUB - G to SUB - H (Underground Connection) TRANSFORMER NAME PLATE



NP 138C7408

CAUTION! BEFORE INSTALLING OR OPERATING READ INSTRUCTIONS GEK - 18647

ROME, GEORGIA

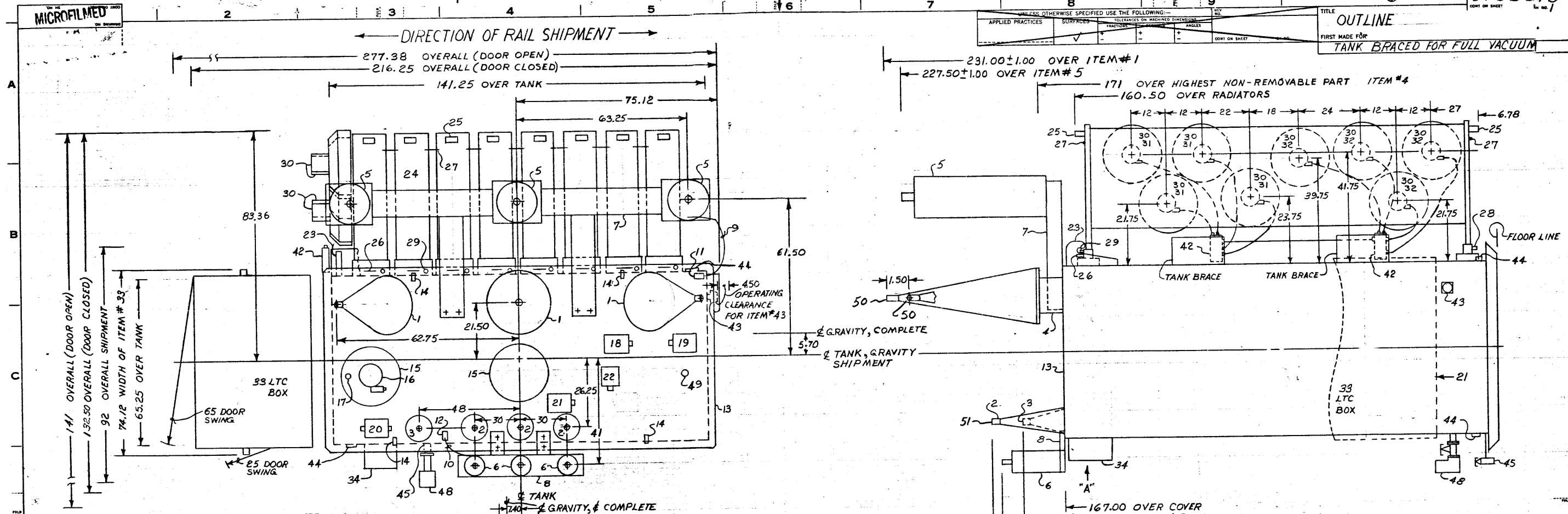
MADE IN U.S.A.

Failed Transformer Outline Drawing

GENERAL ELECTRIC 976D616

TITLE: **OUTLINE**
FIRST MADE FOR: **TANK BRACED FOR FULL VACUUM**

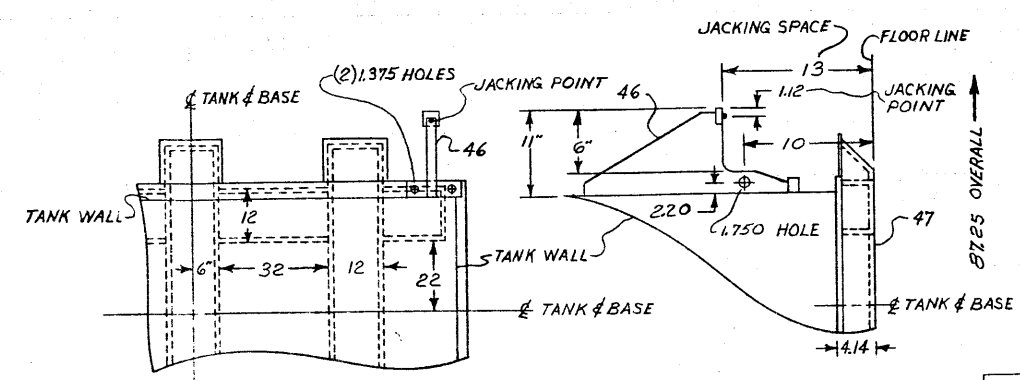
APPLIED PRACTICES	SURFACES	FUNCTIONS	TOLERANCES OR SPECIFIED DIMENSIONS	ANGLES	REV
✓	✓	✓	✓	✓	NO



1. BUSH FOR HV WDG., TYPE "U" CAT. #118572BB WITH A 1.500-12 X 2.12 STUD
2. BUSH FOR LV WDG., TYPE "U" CAT. #785508B WITH A 2.000-12 X 2.88 STUD
3. NEUTRAL BUSH FOR HV WDG., TYPE "A" CAT. #157A95167 WITH A 1.125-12 X 2.38 STUD
4. ADAPTER FOR ITEM #1 (NON-REMOVABLE)
5. L.A. FOR HV (REMOVABLE) STATION TYPE, CAT. #9L1118A002 (SEE OUTLINE 3125D1180L004)
6. L.A. FOR LV (REMOVABLE) STATION TYPE, CAT. #9L1118A012 (SEE OUTLINE 3125D1180L003)
7. SUPPORT FOR ITEM #5 (REMOVABLE)
8. SUPPORT FOR ITEM #6 (REMOVABLE)
9. GROUND CABLE FOR ITEM #5
10. GROUND CABLE FOR ITEM #6
11. GROUND BLOCK FOR ITEM #5
12. GROUND BLOCK FOR ITEM #6
13. COVER (WELDED)
14. LIFTING LOOP FOR LIFTING COVER ONLY (1.750 OPENING)
15. MANHOLE 18.50 DIA. OPENING
16. PRESSURE RELIEF (REMOVABLE) WITH MECH (VISUAL) ALARM AND ELECTRICAL ALARM CONTACTS
17. PRESSURE VACUUM BLEEDER
18. OUTLET HOUSING #1 (REMOVABLE) FOR CURRENT TRANSFORMER LEADS
19. OUTLET HOUSING #2 (REMOVABLE) FOR CURRENT TRANSFORMER LEADS
20. OUTLET HOUSING #3 (REMOVABLE) FOR CURRENT TRANSFORMER LEADS
21. OUTLET HOUSING #4 (REMOVABLE) FOR CURRENT TRANSFORMER LEADS
22. OUTLET HOUSING #5 (REMOVABLE) FOR CURRENT TRANSFORMER LEADS
23. LIFTING LUG FOR LIFTING COMPLETELY FILLED TRANSFORMER (QUANTITY = 4)
24. RADIATORS (REMOVABLE) WITH SHUT-OFF VALVE ON TANK WALL
25. LIFTING LOOP FOR LIFTING ITEM #24
26. LIFTING EYE FOR LIFTING ITEM #24
27. BRACE FOR ITEM #24 (REMOVABLE)
28. DRAIN PLUG FOR ITEM #24
29. VENT PLUG FOR ITEM #24
30. FAN .60 KVA (INPUT) SINGLE PHASE, 60 CYCLE 230 VOLTS, CAT. #318L999EB G4 (QUANTITY = 5)
31. FAN BANK #1; 4 FANS, ITEM #30
32. FAN BANK #2; 4 FANS, ITEM #30
33. LOAD TAP CHANGER & CONTROL CENTER (ACCESSORIES ARE SHOWN ON OUTLINE 131C1118BA)
34. CONTROL CENTER
- 35.
36. TOP FILTER PRESS VALVE-GLOBE TYPE 1" NPT FEMALE
37. PRESSURE TEST VALVE WITH CONNECTION FOR .25 I.D. TUBING
38. LIQUID LEVEL GAGE WITH ALARM CONTACTS
39. PRESSURE VACUUM GAGE
40. LIQUID TEMPERATURE INDICATOR WITH FAN & ALARM CONTACTS
41. JUNCTION BOX (REMOVABLE) FOR FAN & ALARM LEADS
42. TAP CHANGER OPERATING MECHANISM FOR HV WINDING
43. GROUND BLOCK (2) .500-13 TAPS, .50 DEEP, 1.75 BETWEEN CENTERS IN A 2 X 3.50 CONTACT SURFACE
44. DRAIN AND FILTER PRESS VALVE-GLOBE TYPE 2" NPT FEMALE WITH .375 SAMPLER
45. JACK BOSS (SEE FIG. #47) QUANTITY = 4
46. BASE (SEE FIG. #47) SUITABLE FOR SKIDDING TRANSFORMER IN EITHER DIRECTION
47. FAULT PRESSURE RELAY-TYPE J-1 (REMOVABLE) WITH ALARM CONTACTS & SHUT-OFF VALVE ON TANK WALL
48. VACUUM FILLING CONNECTION (1" NPT MALE)
49. HV BUSH TERMINAL VERTICAL TAKE-OFF ANDERSON CAT. #DSATL-1424-G-12
50. LV BUSH TERMINAL VERTICAL TAKE-OFF ANDERSON CAT. #DSTL-2020-G-12
- 51.

APPROXIMATE WEIGHT IN LBS

UNTANKING	65800
TANK & FITTINGS	28200
OIL (MAIN) 5030 GAL	37500
OIL (RADIATORS) 540 GAL	3800
OIL (LTC) 430 GAL	3200
RADIATORS	9700
TOTAL	147600



← DIRECTION OF RAIL SHIPMENT →
FIG #47

DESCRIPTION OF CHANGES	REVISIONS	PRINTS TO
1. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		1
2. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
3. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
4. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
5. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
6. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
7. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
8. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
9. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		
10. REVISED TO SHOW TANK BRACING FOR FULL VACUUM		

APPROVALS: [Signature] DATE: JUN 8 1969
 MADE BY: [Signature] DATE: JUN 21 1969
 DIV. OR DEPT.: ROME
 LOCATION: COMT ON SHEET
 976D616
 9JN66961632

Failed Transformer Location - Shown in Red

Grounding Transformer Location - Shown in Green



Westinghouse



KVA
 3000 Z Z VOLTS
 50 HERTZ
 SPEEDRANGE **49.9** %
 AT MISC. RATINGS
 SPEC. 966865

THREE PHASE
 TYPE SL
 GROUNDING
 TRANSFORMER
 CLASS OA
 INSULATOR INSULATION

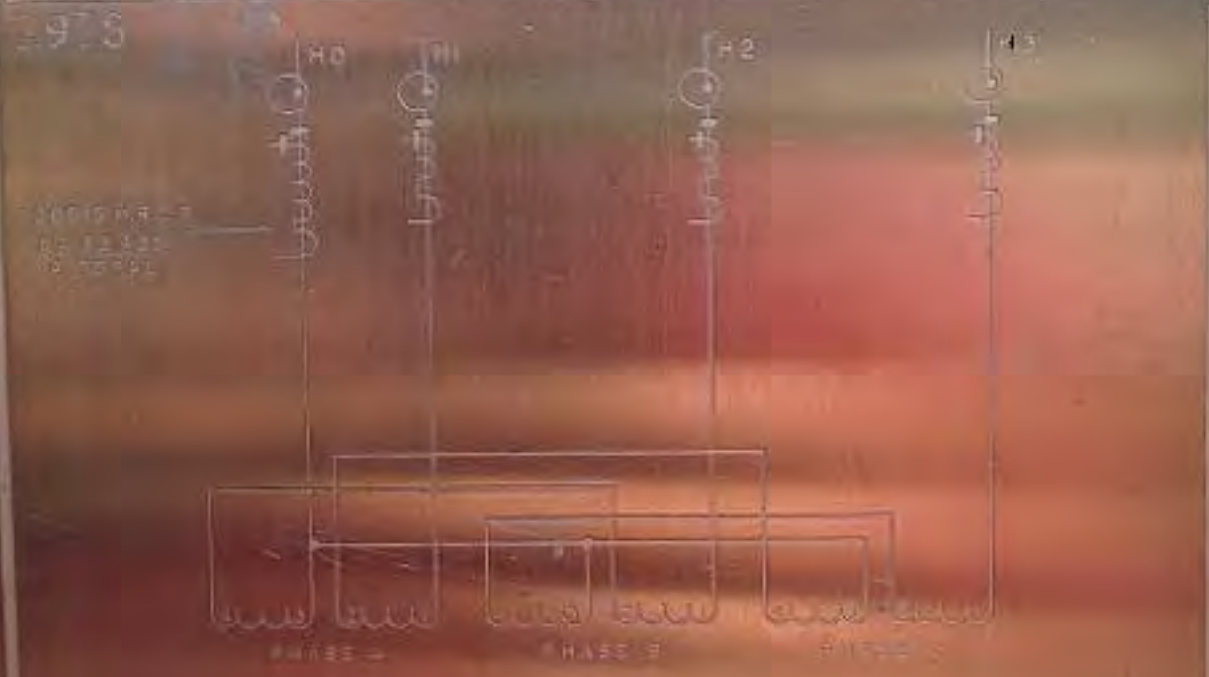
100% LOAD IN SECONDS
 SAFE RISE
 FOLLOWER RISE
 CONTINUOUSLY 55° C. RISE
 GALLONS OIL **1610**
 SERIAL
ZNS7925-1

INSTRUCTION BOOK **ZNS7925**

WILL HAVE IMPULSE TEST LEVEL: HIGH VOLTAGE 110 KV., LOW VOLTAGE 110 KV.

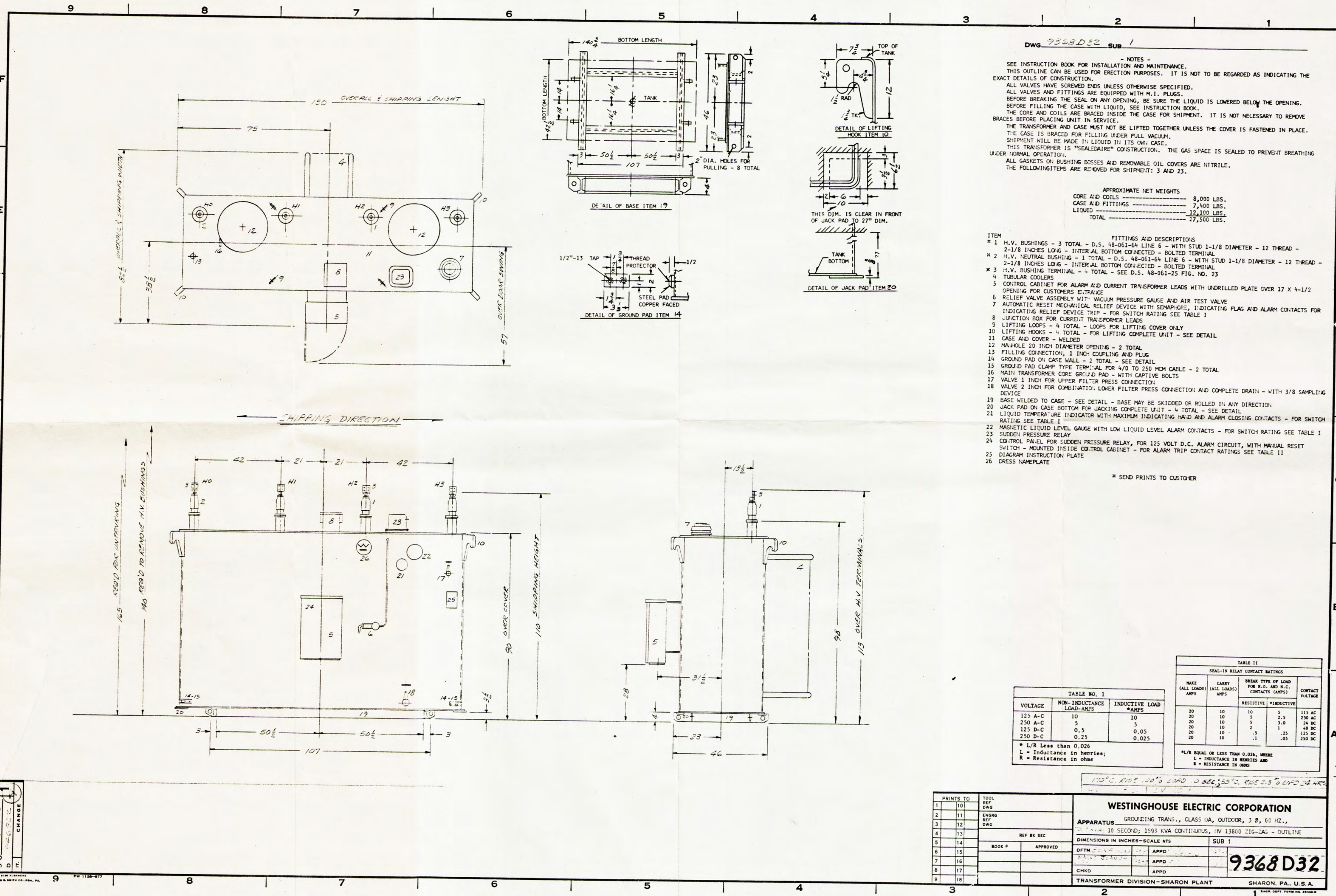
APPROX. WGT. LBS. **8000** CASE **7400** COIL **12075** TOTAL **27475**

WESTINGHOUSE ELECTRIC CORPORATION 222P158H01A



SEE INSTRUCTIONS FOR CONNECTIONS OF THIS TRANSFORMER TO THE SYSTEM TO WHICH IT IS TO BE USED.
 THE TRANSFORMER SHOULD BE KEPT CLEAN AND DRY AT ALL TIMES.
 THE WESTINGHOUSE COMPANY, PITTSBURGH, PA. U.S.A.
 THIS TRANSFORMER WAS MADE IN PITTSBURGH, PA. U.S.A.
 MADE IN U.S.A.

Grounding Transformer Outline Drawing



DWG 9368D32 SUB 1

NOTES
 SEE INSTRUCTION BOOK FOR INSTALLATION AND MAINTENANCE.
 THIS OUTLINE CAN BE USED FOR ERECTION PURPOSES. IT IS NOT TO BE REGARDED AS INDICATING THE EXACT DETAILS OF CONSTRUCTION.
 ALL VALVES HAVE SCREWED ENDS UNLESS OTHERWISE SPECIFIED.
 ALL VALVES AND FITTINGS ARE EQUIPPED WITH M.I. PLUGS.
 BEFORE BREAKING THE SEAL ON ANY OPENING, BE SURE THE LIQUID IS LOWERED BELOW THE OPENING.
 BEFORE FILLING THE CASE WITH LIQUID, SEE INSTRUCTION BOOK.
 THE CORE AND COILS ARE BRACED INSIDE THE CASE FOR SHIPMENT. IT IS NOT NECESSARY TO REMOVE BRACES BEFORE PLACING UNIT IN SERVICE.
 THE TRANSFORMER AND CASE MUST NOT BE LIFTED TOGETHER UNLESS THE COVER IS FASTENED IN PLACE.
 THE CASE IS BRACED FOR FILLING UNDER FULL VACUUM.
 SHIPMENT WILL BE MADE IN LIQUID IN ITS OWN CASE.
 THIS TRANSFORMER IS "SEALED-AIR" CONSTRUCTION. THE GAS SPACE IS SEALED TO PREVENT BREATHING UNDER NORMAL OPERATION.
 ALL GASKETS ON BUSHING BOSSES AND REMOVABLE OIL COVERS ARE NITRILE.
 THE FOLLOWING ITEMS ARE REMOVED FOR SHIPMENT: 3 AND 23.

APPROXIMATE NET WEIGHTS

CORE AND COILS	8,000 LBS.
CASE AND FITTINGS	7,400 LBS.
LIQUID	12,100 LBS.
TOTAL	27,500 LBS.

- ITEMS AND DESCRIPTIONS**
- * 1 H.V. BUSHINGS - 3 TOTAL - D.S. 48-061-64 LINE 6 - WITH STUD 1-1/8 DIAMETER - 12 THREAD - 2-1/8 INCHES LONG - INTERNAL BOTTOM CONNECTED - BOLTED TERMINAL
 - * 2 H.V. NEUTRAL BUSHING - 1 TOTAL - D.S. 48-061-64 LINE 6 - WITH STUD 1-1/8 DIAMETER - 12 THREAD - 2-1/8 INCHES LONG - INTERNAL BOTTOM CONNECTED - BOLTED TERMINAL
 - * 3 H.V. BUSHING TERMINAL - 4 TOTAL - SEE D.S. 48-061-25 FIG. NO. 23
 - 4 TUBULAR COOLERS
 - 5 CONTROL CABINET FOR ALARM AND CURRENT TRANSFORMER LEADS WITH UNDRILLED PLATE OVER 17 X 4-1/2 OPENING FOR CUSTOMERS ENTRANCE
 - 6 RELIEF VALVE ASSEMBLY WITH VACUUM PRESSURE GAUGE AND AIR TEST VALVE
 - 7 AUTOMATIC RESET MECHANICAL RELIEF DEVICE WITH SEMAPHORE, INDICATING FLAG AND ALARM CONTACTS FOR INDICATING RELIEF DEVICE TRIP - FOR SWITCH RATING SEE TABLE I
 - 8 JUNCTION BOX FOR CURRENT TRANSFORMER LEADS
 - 9 LIFTING LOOPS - 4 TOTAL - LOOPS FOR LIFTING COVER ONLY
 - 10 LIFTING HOOKS - 4 TOTAL - FOR LIFTING COMPLETE UNIT - SEE DETAIL
 - 11 CASE AND COVER - WELDED
 - 12 MAX HOLE 20 INCH DIAMETER OPENING - 2 TOTAL
 - 13 FILLING CONNECTION, 1 INCH COUPLING AND PLUG
 - 14 GROUND PAD ON CASE WALL - 2 TOTAL - SEE DETAIL
 - 15 GROUND PAD CLAMP TYPE TERMINAL FOR 4/0 TO 250 MCM CABLE - 2 TOTAL
 - 16 MAIN TRANSFORMER CORE GROUND PAD - WITH CAPTIVE BOLTS
 - 17 VALVE 1 INCH FOR UPPER FILTER PRESS CONNECTION
 - 18 VALVE 2 INCH FOR COMBINATION LOWER FILTER PRESS CONNECTION AND COMPLETE DRAIN - WITH 3/8 SAMPLING DEVICE
 - 19 BASE WELDED TO CASE - SEE DETAIL - BASE MAY BE SKIDDED OR ROLLED IN ANY DIRECTION
 - 20 JACK PAD ON CASE BOTTOM FOR JACKING COMPLETE UNIT - 4 TOTAL - SEE DETAIL
 - 21 LIQUID TEMPERATURE INDICATOR WITH MAXIMUM INDICATING HAND AND ALARM CLOSING CONTACTS - FOR SWITCH RATING SEE TABLE I
 - 22 MAGNETIC LIQUID LEVEL GAUGE WITH LOW LIQUID LEVEL ALARM CONTACTS - FOR SWITCH RATING SEE TABLE I
 - 23 SUDDEN PRESSURE RELAY
 - 24 CONTROL PANEL FOR SUDDEN PRESSURE RELAY, FOR 125 VOLT D.C. ALARM CIRCUIT, WITH MANUAL RESET SWITCH - MOUNTED INSIDE CONTROL CABINET - FOR ALARM TRIP CONTACT RATINGS SEE TABLE II
 - 25 DIAGRAM INSTRUCTION PLATE
 - 26 DRESS NAMEPLATE

* SEND PRINTS TO CUSTOMER

TABLE NO. 1

VOLTAGE	NON-INDUCTIVE LOAD-AMPS		INDUCTIVE LOAD *AMPS
	RESISTIVE	*INDUCTIVE	
125 A-C	10	5	10
250 A-C	5	2.5	5
125 D-C	0.5	0.05	0.05
250 D-C	0.25	0.025	0.025

* 1/8 Less than 0.026
 * I = Inductance in henries;
 L = Inductance in henries and
 R = Resistance in ohms

TABLE II

SEAL-IN RELAY CONTACT RATINGS

RATED (ALL LOADS) AMPS	CARRY (ALL LOADS) AMPS	BREAK TYPE OF LOAD FOR R.D. AND R.C. CONTACTS (AMPS)		CONTACT VOLTAGE
		RESISTIVE	*INDUCTIVE	
20	10	10	5	115 AC
20	10	5	2.5	250 AC
20	10	5	1	48 DC
20	10	2	1	125 DC
20	10	.5	.25	250 DC

* I/R EQUAL OR LESS THAN 0.026, WHERE
 I = INDUCTANCE IN HENRIES AND
 R = RESISTANCE IN OHMS

PRINTS TO	TOOL REF	WESTINGHOUSE ELECTRIC CORPORATION APPARATUS: GROUNDING TRANS., CLASS 0A, OUTDOOR, 3 Ø, 60 HZ., 10 SECOND; 1593 KVA CONTINUOUS, IN 13800 216-246 - OUTLINE DIMENSIONS IN INCHES - SCALE NTS SUB 1 9368D32 TRANSFORMER DIVISION - SHARON PLANT SHARON, PA. U.S.A.
1 10	DWG	
2 11	ENGRG	
3 12	REF DWG	
4 13	REF BK SEC	
5 14	BOOK #	
6 15	APPROVED	
7 16	APPD	
8 17	APPD	

11
 CHANGE

GENERAL ELECTRIC

TRANSFORMER

NO. F-961693C CLASS OA/FA THREE PHASE 60 CYCLE

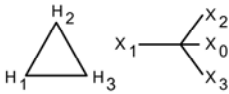
VOLTAGE RATING 115000 - 13800Y/7970
 KVA RATING 22500 CONTINUOUS 55 C RISE SELF COOLED
 KVA RATING 30000 CONTINUOUS 55 C RISE FORCED AIR
 KVA RATING 33600 CONTINUOUS 65 C RISE FORCED AIR

IMPEDANCE VOLTS 8.21 % 115000 - 13800Y VOLTS AT 22500 KVA

H V WINDING CONNECTIONS		
VOLTS	AMP 33600 KVA	DIAL POS
120750	161	1
117875	165	2
115000	169	3
112120	173	4
109245	178	5

BASIC IMPULSE INSULATION LEVELS			
ITEM		KV	
H ₁	H ₂	H ₃	550
X ₀	X ₁	X ₂	110

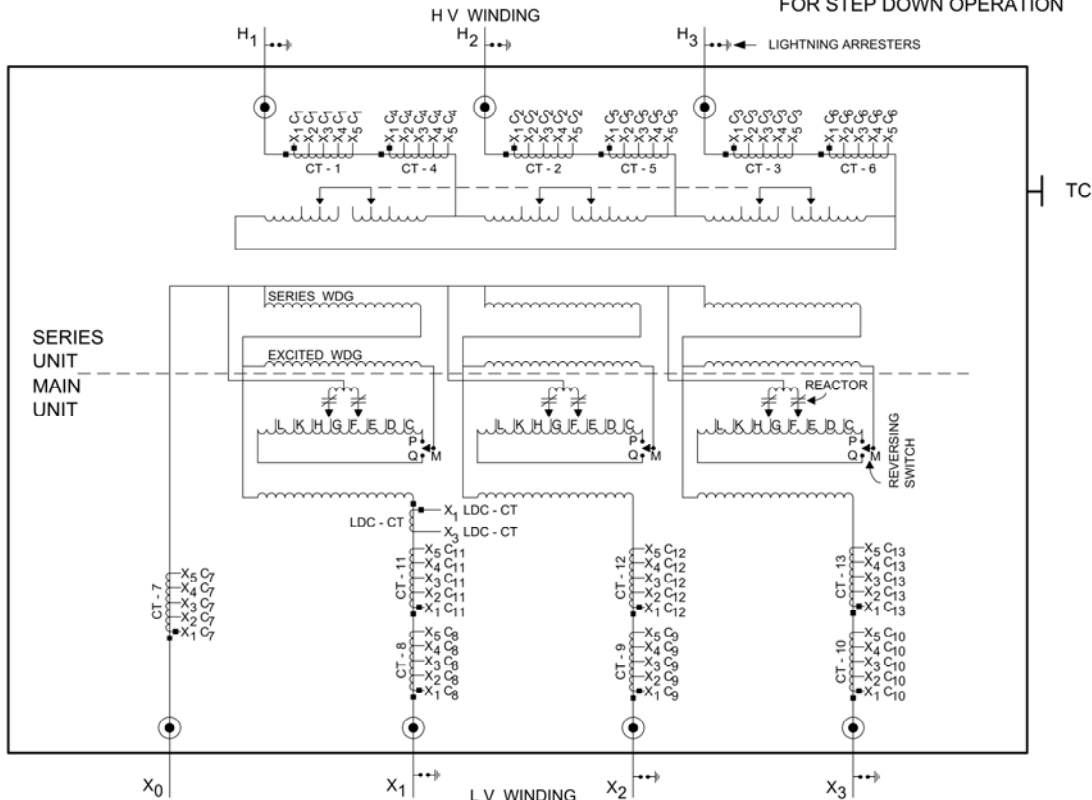
APPROXIMATE WEIGHTS IN POUNDS
 TOTAL 172700
 UNTANKING 77000
 TANK AND FITTINGS 42900
 MAIN TANK 10C OIL 6160 GAL. 45900
 LTC HSG 10C OIL 430 GAL. 3200
 RADIATORS 10C OIL 490 GAL. 3700



LIQUID LEVEL CHANGES .91 INCH PER 10C CHANGE IN LIQUID TEMPERATURE.
 LIQUID LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF HIGHEST MANHOLE FLANGE AT 25 C IS 12 INCHES.
 MAXIMUM OPERATING PRESSURES OF LIQUID PRESERVATION SYSTEM 7.5 POUNDS POSITIVE TO 5 POUNDS NEGATIVE.
 TANK SUITABLE FOR 14.7 POUNDS VACUUM FILLING.
 LDC-CT IS 1200:0.2 AMP FOR USE WITH LOAD TAP CHANGER.
 ■ = POLARITY MARK
 CT'S - 1, 2, 3, 4, 5, 6 ARE 1200:5 AMP
 CT'S - 8, 9, 10, 11, 12, 13 ARE 2000:5 AMP
 CT-7 IS 600:5 AMP

L V WINDING CONNECTIONS					
VOLTS		AMP 33600 KVA	MECHANISM		REVERSING SWITCH
L - L	L - N		DIAL POS	CONNECTS	CONNECTS
15180	8764	1278	16	L L	M TO P
15094	8714	1285	15	L K	
15007	8665	1293	14	K K	
14921	8615	1300	13	K H	
14835	8565	1308	12	H H	
14749	8515	1315	11	H G	
14662	8465	1323	10	G G	
14576	8416	1331	9	G F	
14490	8366	1339	8	F F	
14404	8316	1347	7	F E	
14317	8266	1355	6	E E	
14231	8216	1363	5	E D	
14145	8167	1371	4	D D	
14059	8117	1380	3	D C	
13972	8067	1388	2	C C	
13886	8017	1397	1	C M	
13800	7967		N	M M	
13714	7918		1	M L	
13627	7868		2	L L	
13541	7818		3	L K	
13455	7768		4	K K	
13369	7718		5	K H	
13282	7669		6	H H	
13196	7619		7	H G	
13110	7569		8	G G	
13024	7519		9	G F	
12937	7469		10	F F	
12851	7420		11	F E	
12765	7370		12	E E	
12679	7320		13	E D	
12592	7270		14	D D	
12506	7220		15	D C	
12420	7171		16	C C	

FOR STEP DOWN OPERATION



NP 138C4899

CAUTION! BEFORE INSTALLING OR OPERATING READ INSTRUCTIONS GEK - 18634

ROME, GEORGIA

MADE IN U.S.A.

SUB - A TRANSFORMER NAME PLATE

Westinghouse



115000-
13800 GRD.Y/7967 VOLTS

60 HERTZ
L SPEC 936777

SERIAL
RDP - 19801

THREE PHASE
TYPE SL
LOAD TAP CHANGING
TRANSFORMER
CLASS 0A/FA
INSULDUR INSULATION

FULL LOAD CONTINUOUSLY
22500/30000 KVA-55°C. RISE
25200/33600 KVA-65°C. RISE

GALLONS OIL

LTC COMPART

360

TRANS. TANK

7835

INSTRUCTION BOOK

RDP - 1980

BIL.

H. V. WDG. 550 KV,
L. V. WDG. NEUT. 110 KV.,

L. V. WDG. 110 KV.,
L. V. NEUT. BUSH. 110 KV.

IMPEDANCE 8.6

% AT 22500 KVA 115000 TO 13800 VOLTS

APPROX. WEIGHT IN LBS
CORE AND COILS

59600

CASE 48100

OIL 61500

TOTAL 169200

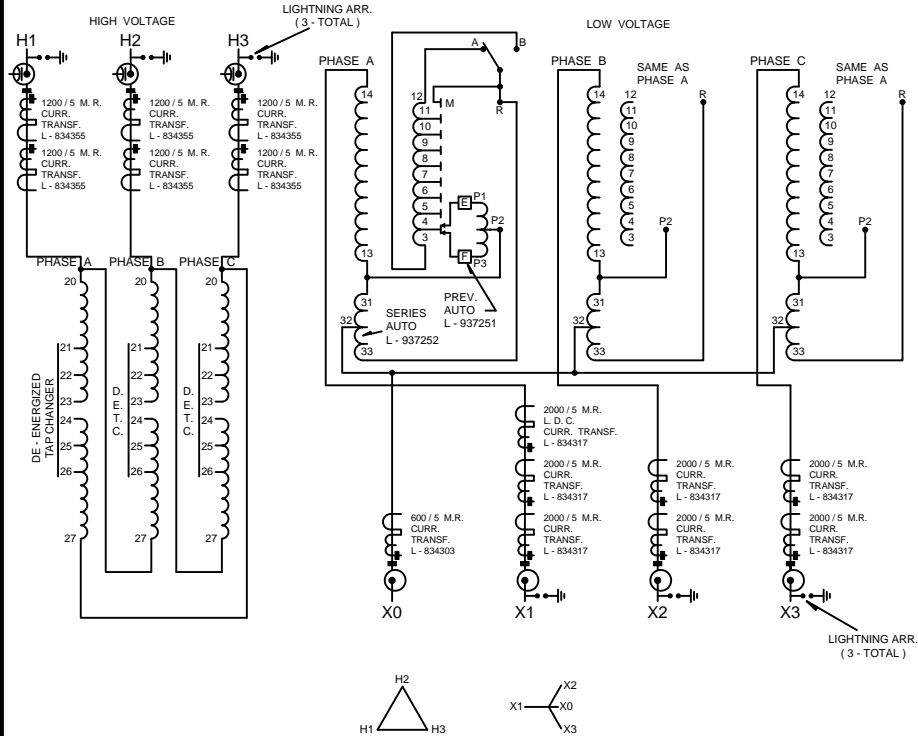
MADE IN U.S.A.

1976

WESTINGHOUSE ELECTRIC CORPORATION

220P078H01C

SUB - B (SOUTH) TRANSFORMER NAME PLATE



		CONNECTIONS							
WINDING	VOLTS	30000 KVA AMPERES	DE-ENERGIZED TAP CHANGER			LOAD TAP CHANGER CONNECTS			
			POS.	CONNECTS		POS.	P1 ON	P3 ON	R ON
HIGH VOLTAGE DELTA	121000	143.1	1	23	24				
	118000	146.8	2	22	24				
	115000	150.6	3	22	25				
	112000	154.6	4	21	25				
	109000	158.9	5	21	26				
LOW VOLTAGE WYE	12420	1394				16	4	4	A
	12592	1375				14	5	5	A
	12765	1357				12	6	6	A
	12938	1339				10	7	7	A
	13110	1321				8	8	8	A
	13282	1304				6	9	9	A
	13455	1287				4	10	10	A
	13628	1271				2	11	11	A
	13800	1255				N	M	M	A
	13972	1240				2	4	4	B
	14145	1224				4	5	5	B
	14318	1210				6	6	6	B
	14490	1195				8	7	7	B
	14662	1181				10	8	8	B
	14835	1167				12	9	9	B
15008	1154				14	10	10	B	
15180	1141				16	11	11	B	

TRANSFORMER MAY BE OPERATED AT 110% OF RATED INPUT VOLTAGE AT FULL LOAD KVA.
NEUTRAL MUST BE PERMANENTLY AND SOLIDLY GROUNDING.
VOLTAGE AND CURRENT RATINGS FOR ODD NUMBERED POSITIONS OF LOAD TAP CHANGER ARE MIDWAY BETWEEN THOSE LISTED ABOVE.
THE 25% LIQUID LEVEL IS 15.813 INCHES BELOW TOP OF HIGHEST MANHOLE FLANGE.
LIQUID LEVEL CHANGES 1.010 INCHES FOR EACH 10°C. CHANGE IN AVERAGE LIQUID TEMPERATURE.
THE TRANSFORMER MUST NOT BE ENERGIZED FROM ANY VOLTAGE SOURCE WHEN DE-ENERGIZED TAP CHANGERS ARE OPERATED.
THE TRANSFORMER IS DESIGNED FOR OPERATION BETWEEN PRESSURE LIMITS OF 6.5 POUNDS PER SQUARE INCH POSITIVE AND 0.5 POUNDS PER SQUARE INCH POSITIVE.
THE TRANSFORMER TANK AND THE LOAD TAP CHANGER TANK ARE DESIGNED TO WITHSTAND COMPLETE VACUUM EITHER INDIVIDUALLY OR TOGETHER.
WHILE VACUUM IS APPLIED TO EITHER ONE ALONE, THE PRESSURE IN THE OTHER MUST NOT BE GREATER THAN ATMOSPHERIC PRESSURE.
UNTANKING WEIGHT (HEAVIEST PIECE) 51300 LBS. CONDUCTOR MATERIALS: H. V. AL., L. V. CU.

Westinghouse



115000 -
13800 GRD.Y/7967 VOLTS

60 HERTZ
L SPEC 936777

SERIAL
RDP - 19802

THREE PHASE
TYPE SL
LOAD TAP CHANGING
TRANSFORMER
CLASS OA/FA
INSULDUR INSULATION

FULL LOAD CONTINUOUSLY
22500/30000 KVA-55°C. RISE
25200/33600 KVA-65°C. RISE

GALLONS OIL

LTC COMPART	360
TRANS. TANK	7835

SUB - C (WEST) TRANSFORMER NAME PLATE

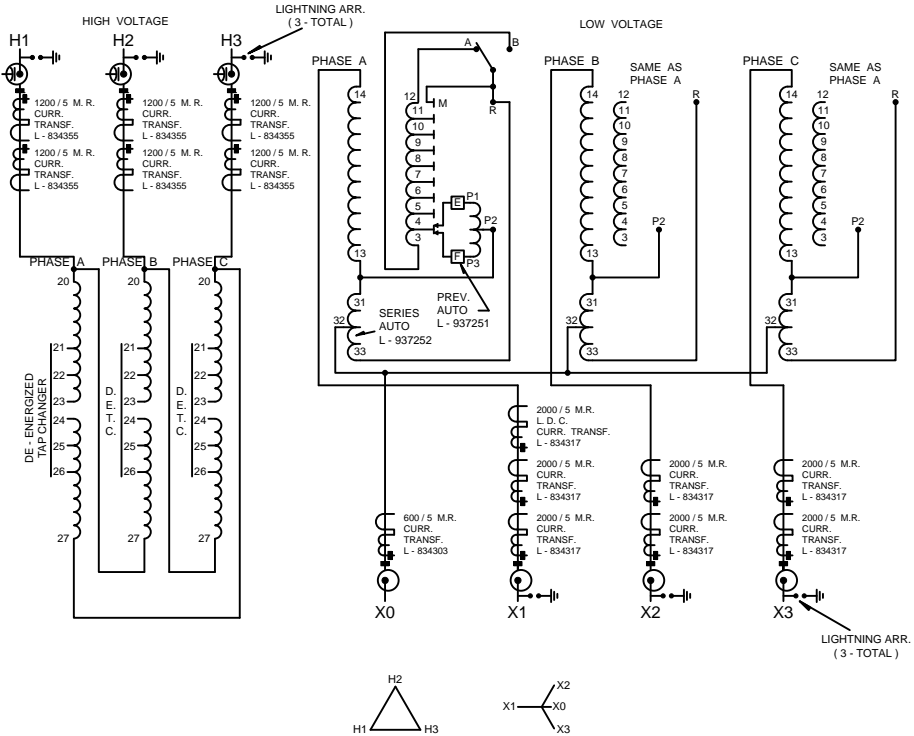
INSTRUCTION BOOK RDP - 1980

BIL. H. V. WDG. 560 KV., L. V. WDG. 110 KV., L. V. WDG. NEUT. 110 KV., L. V. NEUT. BUSH. 110 KV.

IMPEDANCE 8.6 % AT 22500 KVA 115000 TO 13800 VOLTS

APPROX. WEIGHT IN LBS. CORE AND COILS 59600 CASE 48100 OIL 61500 TOTAL 169200

MADE IN U.S.A. 1976 WESTINGHOUSE ELECTRIC CORPORATION 220P078H01C



CONNECTIONS									
WINDING	VOLTS	30000 KVA AMPERES	DE-ENERGIZED TAP CHANGER			LOAD TAP CHANGER			
			POS.	CONNECTS		POS.	P1 ON	P3 ON	R ON
HIGH VOLTAGE DELTA	121000	143.1	1	23	24				
	118000	146.8	2	22	24				
	115000	150.6	3	22	25				
	112000	154.6	4	21	25				
	109000	158.9	5	21	26				
LOW VOLTAGE WYE	12420	1394				16	4	4	A
	12592	1375				14	5	5	A
	12765	1357				12	6	6	A
	12938	1339				10	7	7	A
	13110	1321				8	8	8	A
	13282	1304				6	9	9	A
	13455	1287				4	10	10	A
	13628	1271				2	11	11	A
	13800	1255				N	M	M	A
	13972	1240				2	4	4	B
	14145	1224				4	5	5	B
	14318	1210				6	6	6	B
	14490	1195				8	7	7	B
	14662	1181				10	8	8	B
	14835	1167				12	9	9	B
15008	1154				14	10	10	B	
15180	1141				16	11	11	B	

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UNTANKING WEIGHT (HEAVIEST PIECE) 51300 LBS. CONDUCTOR MATERIALS: H. V. AL., L. V. CU.



WAUKESHA ELECTRIC SYSTEMS

A UNIT OF GENERAL SIGNAL
PO BOX 268 - GOLDSBORO NC 27533

ISO 9001
CERTIFIED

WAUKESHA LOAD TAP CHANGING POWER TRANSFORMER

CLASS DA/FA /FA 3-PHASE 60 HZ SER. NO. GM 971411
 MVA 22.5/30.0/37.5 CONT. TEMP. RISE 55° C
 MVA 25.2/33.6/42.0 CONT. TEMP. RISE 65° C
 HV 115000 DELTA VOLTS BIL 550 KV
 LV 13800GRDY/7967 VOLTS BIL 110 KV
 LV NEUTRAL BIL 110 KV
 IMPEDANCE % AT 115000-13800 VOLTS AND 22.5 MVA

BUSHING CURRENT TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:A,B,C,D,E,F

CURRENT RATIO	TAP	CURRENT RATIO	TAP
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 TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:G

CURRENT RATIO	TAP	CURRENT RATIO	TAP
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

BUSHING CURRENT TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:H,J,K,L,M,N

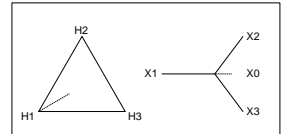
CURRENT RATIO	TAP	CURRENT RATIO	TAP
300:5	X3 - X4	1200:5	X1 - X3
400:5	X1 - X2	1500:5	X1 - X4
500:5	X4 - X5	1600:5	X2 - X5
800:5	X2 - X3	2000:5	X1 - X5
1100:5	X2 - X4		

BUSHING CURRENT TRANSFORMER
ACCURACY CLASS 1.2B1.0
CT:U FOR LDC CONTROL
2400:5 RATIO
CONNECTED X1 - X3 (2000:5)

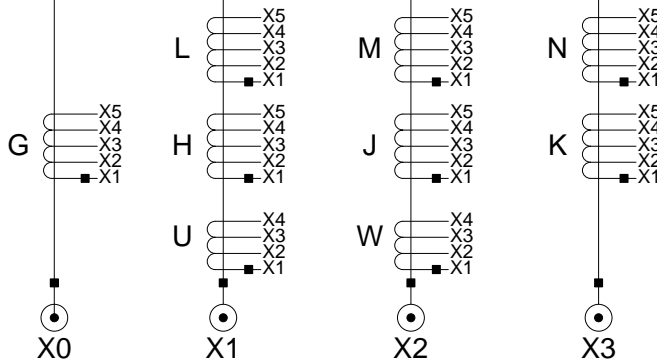
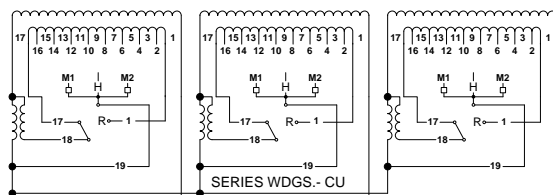
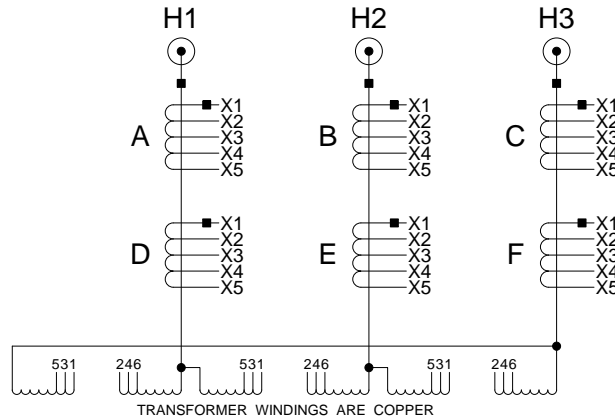
BUSHING CURRENT TRANSFORMER
ACCURACY CLASS C50
CT:W FOR WINDING TEMP. EQUIP.
2400:5 RATIO
CONNECTED X1 - X3 (2000:5)

HIGH VOLTAGE TAPCHANGER
DE-ENERGIZED OPERATION

VOLTS L-L	AMPS AT 42.0 MVA	POS	CONNECTS
120750	201	1	1 - 2
117875	206	2	2 - 3
115000	211	3	3 - 4
112125	216	4	4 - 5
109250	222	5	5 - 6



SUB - E (WEST) TRANSFORMER NAME PLATE



LOW VOLTAGE											
VOLTS L-L	AMPS AT 42.0 MVA	TYPE UZD LOAD TAP CHANGER 600 AMP RATING					VOLTS L-L	RATED AMPS	TYPE UZD LOAD TAP CHANGER 600 AMP RATING		
		POS	R CONNECTS AT DIRECTION		H CONNECTS	POS			R CONNECTS AT DIRECTION		H CONNECTS
			RAISE	LOWER					RAISE	LOWER	
15180	1597	16R	18-1	18-1	17-19	13800	1757	N	18-17	18-1	18-19
15094	1607	15R	18-1	18-1	16-19	13800		LN	18-17	18-17	17-19
15008	1616	14R	18-1	18-1	15-19	13714		1L	18-17	18-17	16-19
14921	1625	13R	18-1	18-1	14-19	13628		2L	18-17	18-17	15-19
14835	1635	12R	18-1	18-1	13-19	13541		3L	18-17	18-17	14-19
14749	1644	11R	18-1	18-1	12-19	13455		4L	18-17	18-17	13-19
14663	1654	10R	18-1	18-1	11-19	13369		5L	18-17	18-17	12-19
14576	1664	9R	18-1	18-1	10-19	13283		6L	18-17	18-17	11-19
14490	1673	8R	18-1	18-1	9-19	13196		7L	18-17	18-17	10-19
14404	1683	7R	18-1	18-1	8-19	13110		8L	18-17	18-17	9-19
14318	1694	6R	18-1	18-1	7-19	13024		9L	18-17	18-17	8-19
14231	1704	5R	18-1	18-1	6-19	12938		10L	18-17	18-17	7-19
14145	1714	4R	18-1	18-1	5-19	12851		11L	18-17	18-17	6-19
14059	1725	3R	18-1	18-1	4-19	12765		12L	18-17	18-17	5-19
13973	1735	2R	18-1	18-1	3-19	12679		13L	18-17	18-17	4-19
13886	1746	1R	18-1	18-1	2-19	12593		14L	18-17	18-17	3-19
13800	1757	RN	18-1	18-1	1-19	12506		15L	18-17	18-17	2-19
13800	1757	N	18-17	18-1	18-19	12420		16L	18-17	18-17	1-19

FOR STEP DOWN OPERATION

OIL LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF THE HIGHEST MANHOLE FLANGE AT 25°C IS 17.5 INCHES.

OIL LEVEL CHANGES 0.66 INCHES PER 10°C CHANGE IN OIL TEMPERATURE.

OPERATING PRESSURE OF OIL PRESERVATION SYSTEM IS 5 LBF/IN² POSITIVE TO 0.5 LBF/IN² POSITIVE.

TANK DESIGNED FOR 10 LBF/IN² POSITIVE AND FULL VACUUM FILLING.

ALTITUDE 3300 FEET ABOVE SEA LEVEL

INSTRUCTION BOOK NO: 9300

APPROXIMATE WEIGHTS		LBS.
CORE & COIL (UNTANKING WEIGHT)		80625
TANK, FITTINGS & RADIATORS		36200
RADS. (BOLT ON)		7756 LBS.
OIL - MAIN TANK		5217 GALS
OIL - TAPCHANGER COMPARTMENT		100 GALS
OIL - RADIATORS		333 GALS
OIL - TOTAL		5650 GALS
TOTAL WEIGHT		42375
		159200

DESIGN NO. 5174346T00

DATE OF MANUFACTURE:



WAUKESHA ELECTRIC SYSTEMS

A UNIT OF GENERAL SIGNAL
PO BOX 268 - GOLDSBORO NC 27533

ISO 9001
CERTIFIED

WAUKESHA LOAD TAP CHANGING POWER TRANSFORMER

CLASS DA/FA /FA 3-PHASE 60 HZ SER. NO. GM 971410
 MVA 22.5/30.0/37.5 CONT. TEMP. RISE 55° C
 MVA 25.2/33.6/42.0 CONT. TEMP. RISE 65° C
 HV 115000 DELTA VOLTS BIL 550 KV
 LV 13800GRDY/7967 VOLTS BIL 110 KV
 LV NEUTRAL BIL 110 KV
 IMPEDANCE % AT 115000-13800 VOLTS AND 22.5 MVA

BUSHING CURRENT TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:A,B,C,D,E,F

CURRENT RATIO	TAP	CURRENT RATIO	TAP
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 TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:G

CURRENT RATIO	TAP	CURRENT RATIO	TAP
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

BUSHING CURRENT TRANSFORMER
MULTI-RATIO RELAYING
ACCURACY CLASS C800
CT:H,J,K,L,M,N

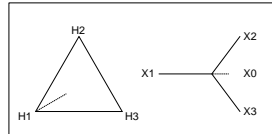
CURRENT RATIO	TAP	CURRENT RATIO	TAP
300:5	X3 - X4	1200:5	X1 - X3
400:5	X1 - X2	1500:5	X1 - X4
500:5	X4 - X5	1600:5	X2 - X5
800:5	X2 - X3	2000:5	X1 - X5
1100:5	X2 - X4		

BUSHING CURRENT TRANSFORMER
ACCURACY CLASS 1.2B1.0
CT:U FOR LDC CONTROL
2400:5 RATIO
CONNECTED X1 - X3 (2000:5)

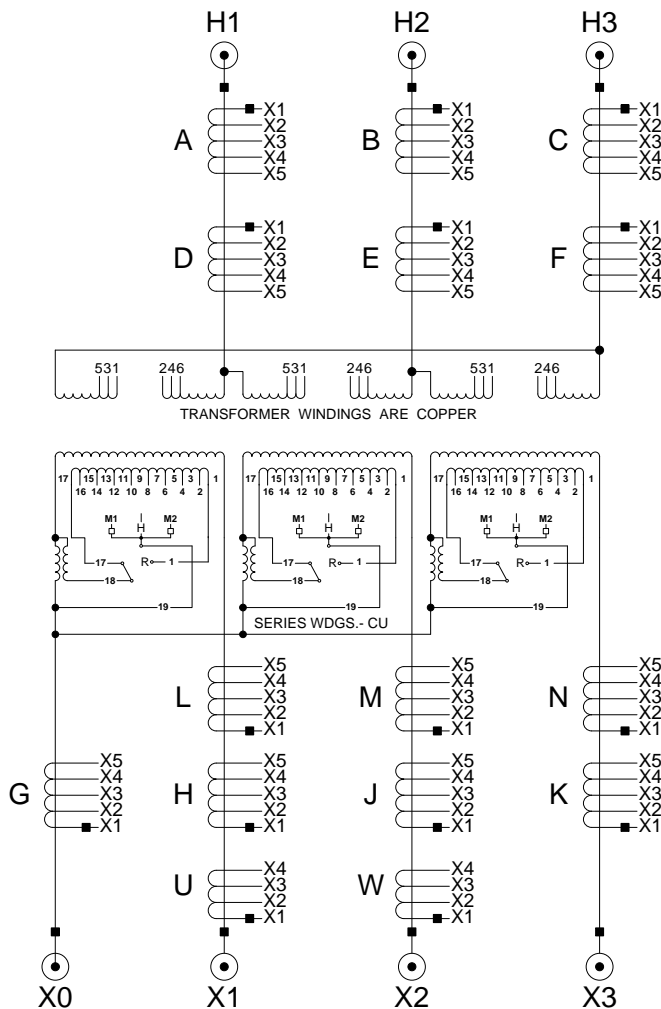
BUSHING CURRENT TRANSFORMER
ACCURACY CLASS C50
CT:W FOR WINDING TEMP. EQUIP.
2400:5 RATIO
CONNECTED X1 - X3 (2000:5)

HIGH VOLTAGE TAPCHANGER
DE-ENERGIZED OPERATION

VOLTS L-L	AMPS AT 42.0 MVA	POS	CONNECTS
120750	201	1	1 - 2
117875	206	2	2 - 3
115000	211	3	3 - 4
112125	216	4	4 - 5
109250	222	5	5 - 6



SUB - F (SOUTH) TRANSFORMER NAME PLATE



LOW VOLTAGE													
VOLTS L-L	AMPS AT 42.0 MVA	TYPE UZD LOAD TAP CHANGER 600 AMP RATING					VOLTS L-L	RATED AMPS	TYPE UZD LOAD TAP CHANGER 600 AMP RATING				
		POS	R CONNECTS AT DIRECTION		H CONNECTS	POS			R CONNECTS AT DIRECTION		H CONNECTS		
			RAISE	LOWER					RAISE	LOWER			
15180	1597	16R	18-1	18-1	17-19	13800	1757	N	18-17	18-1	18-19		
15094	1607	15R	18-1	18-1	16-19	13800		LN	18-17	18-17	17-19		
15008	1616	14R	18-1	18-1	15-19	13714		1L	18-17	18-17	16-19		
14921	1625	13R	18-1	18-1	14-19	13628		2L	18-17	18-17	15-19		
14835	1635	12R	18-1	18-1	13-19	13541		3L	18-17	18-17	14-19		
14749	1644	11R	18-1	18-1	12-19	13455		4L	18-17	18-17	13-19		
14663	1654	10R	18-1	18-1	11-19	13369		5L	18-17	18-17	12-19		
14576	1664	9R	18-1	18-1	10-19	13283		6L	18-17	18-17	11-19		
14490	1673	8R	18-1	18-1	9-19	13196		7L	18-17	18-17	10-19		
14404	1683	7R	18-1	18-1	8-19	13110		8L	18-17	18-17	9-19		
14318	1694	6R	18-1	18-1	7-19	13024		9L	18-17	18-17	8-19		
14231	1704	5R	18-1	18-1	6-19	12938		10L	18-17	18-17	7-19		
14145	1714	4R	18-1	18-1	5-19	12851		11L	18-17	18-17	6-19		
14059	1725	3R	18-1	18-1	4-19	12765		12L	18-17	18-17	5-19		
13973	1735	2R	18-1	18-1	3-19	12679		13L	18-17	18-17	4-19		
13886	1746	1R	18-1	18-1	2-19	12593		14L	18-17	18-17	3-19		
13800	1757	RN	18-1	18-1	1-19	12506		15L	18-17	18-17	2-19		
13800	1757	N	18-17	18-1	18-19	12420		16L	18-17	18-17	1-19		

FOR STEP DOWN OPERATION

OIL LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF THE HIGHEST MANHOLE FLANGE AT 25°C IS 17.5 INCHES.

OIL LEVEL CHANGES 0.66 INCHES PER 10°C CHANGE IN OIL TEMPERATURE.

OPERATING PRESSURE OF OIL PRESERVATION SYSTEM IS 5 LBF/IN² POSITIVE TO 0.5 LBF/IN² POSITIVE.

TANK DESIGNED FOR 10 LBF/IN² POSITIVE AND FULL VACUUM FILLING.

ALTITUDE 3300 FEET ABOVE SEA LEVEL

INSTRUCTION BOOK NO: 9300

APPROXIMATE WEIGHTS		LBS.
CORE & COIL (UNTANKING WEIGHT)		80625
TANK, FITTINGS & RADIATORS		36200
RADS. (BOLT ON)		7756 LBS.
OIL - MAIN TANK		5217 GALS
OIL - TAPCHANGER COMPARTMENT		100 GALS
OIL - RADIATORS		333 GALS
OIL - TOTAL		5650 GALS
TOTAL WEIGHT		42375
		159200

DESIGN NO. 5174346T00
 DATE OF MANUFACTURE:

GENERAL ELECTRIC

TRANSFORMER

NO. F-961693A CLASS OA/FA THREE PHASE 60 CYCLE

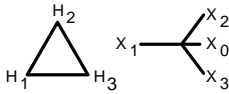
VOLTAGE RATING 115000 - 13800Y/7970
 KVA RATING 22500 CONTINUOUS 55 C RISE SELF COOLED
 KVA RATING 30000 CONTINUOUS 55 C RISE FORCED AIR
 KVA RATING 33600 CONTINUOUS 65 C RISE FORCED AIR

IMPEDANCE VOLTS 8.83 % 115000 - 13800Y VOLTS AT 22500 KVA

H V WINDING CONNECTIONS		
VOLTS	AMP 33600 KVA	DIAL POS
120750	161	1
117875	165	2
115000	169	3
112120	173	4
109245	178	5

BASIC IMPULSE INSULATION LEVELS			
ITEM		KV	
H ₁	H ₂	H ₃	550
X ₀	X ₁	X ₂	110

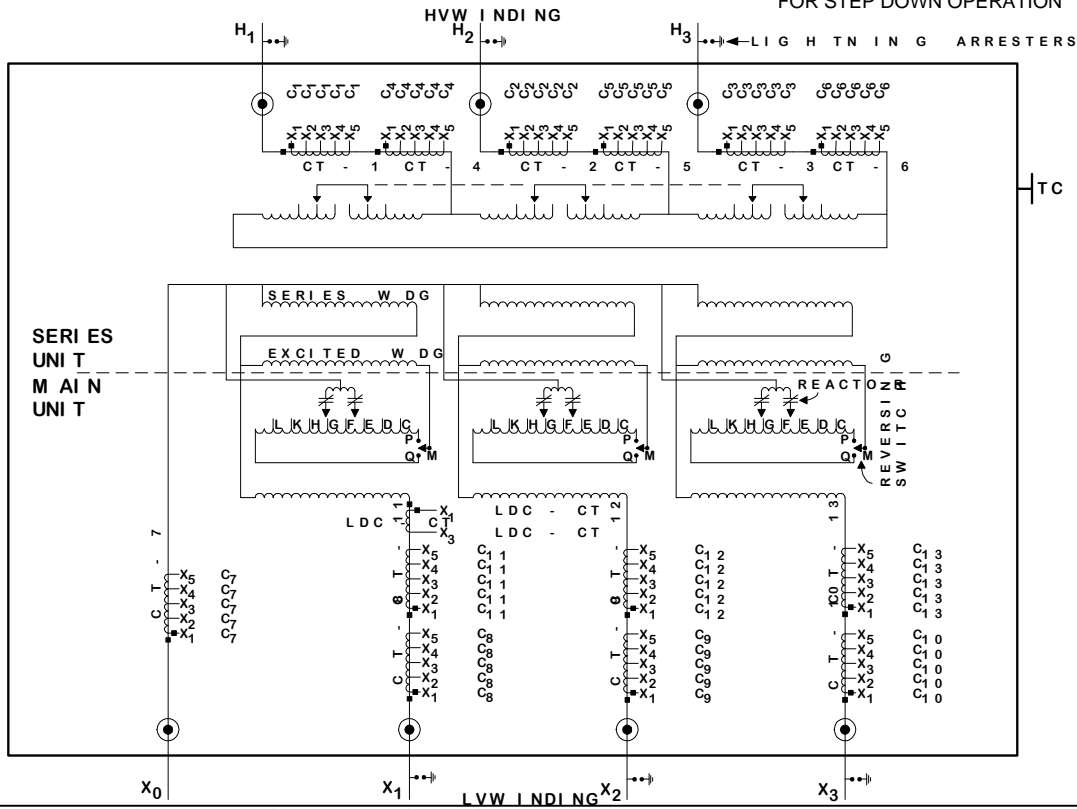
APPROXIMATE WEIGHTS IN POUNDS
 TOTAL 172700
 UNTANKING 77000
 TANK AND FITTINGS 42900
 MAIN TANK 10C OIL 6160 GAL. 45900
 LTC HSG 10C OIL 430 GAL. 3200
 RADIATORS 10C OIL 490 GAL. 3700



LIQUID LEVEL CHANGES .91 INCH PER 10C CHANGE IN LIQUID TEMPERATURE.
 LIQUID LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF HIGHEST MANHOLE FLANGE AT 25 C IS 12 INCHES.
 MAXIMUM OPERATING PRESSURES OF LIQUID PRESERVATION SYSTEM 7.5 POUNDS POSITIVE TO 5 POUNDS NEGATIVE.
 TANK SUITABLE FOR 14.7 POUNDS VACUUM FILLING.
 LDC-CT IS 1200:0.2 AMP FOR USE WITH LOAD TAP CHANGER.
 ■ = POLARITY MARK
 CTS - 1, 2, 3, 4, 5, 6 ARE 1200:5 AMP
 CTS - 8, 9, 10, 11, 12, 13 ARE 2000:5 AMP
 CT-7 IS 600:5 AMP

L V WINDING CONNECTIONS					
VOLTS		AMP 33600 KVA	MECHANISM		REVERSING SWITCH
L - L	L - N		DIAL POS	CONNECTS	CONNECTS
15180	8764	1278	16	L L	M TO P
15094	8714	1285	15	L K	
15007	8665	1293	14	K K	
14921	8615	1300	13	K H	
14835	8565	1308	12	H H	
14749	8515	1315	11	H G	
14662	8465	1323	10	G G	
14576	8416	1331	9	G F	
14490	8366	1339	8	F F	
14404	8316	1347	7	F E	
14317	8266	1355	6	E E	
14231	8216	1363	5	E D	
14145	8167	1371	4	D D	
14059	8117	1380	3	D C	
13972	8067	1388	2	C C	
13886	8017	1397	1	C M	
13800	7967		N	M M	M TO Q
13714	7918		1	M L	
13627	7868		2	L L	
13541	7818		3	L K	
13455	7768		4	K K	
13369	7718		5	K H	
13282	7669		6	H H	
13196	7619		7	H G	
13110	7569		8	G G	
13024	7519		9	G F	
12937	7469		10	F F	
12851	7420		11	F E	
12765	7370		12	E E	
12679	7320		13	E D	
12592	7270		14	D D	
12506	7220		15	D C	
12420	7171		16	C C	

SUB - H (NORTH) TRANSFORMER NAME PLATE



NP 138C4899

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ROME, GEORGIA

MADE IN U.S.A.

GENERAL ELECTRIC

TRANSFORMER

NO. F-961693B CLASS OA/FA THREE PHASE 60 CYCLE

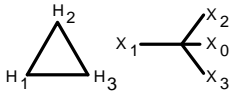
VOLTAGE RATING 115000 - 13800Y/7970
 KVA RATING 22500 CONTINUOUS 55 C RISE SELF COOLED
 KVA RATING 30000 CONTINUOUS 55 C RISE FORCED AIR
 KVA RATING 33600 CONTINUOUS 65 C RISE FORCED AIR

IMPEDANCE VOLTS 8.77 % 115000 - 13800Y VOLTS AT 22500 KVA

H V WINDING CONNECTIONS		
VOLTS	AMP 33600 KVA	DIAL POS
120750	161	1
117875	165	2
115000	169	3
112120	173	4
109245	178	5

BASIC IMPULSE INSULATION LEVELS			
ITEM		KV	
H ₁	H ₂	H ₃	550
X ₀	X ₁	X ₂	110

APPROXIMATE WEIGHTS IN POUNDS
 TOTAL 172700
 UNTANKING 77000
 TANK AND FITTINGS 42900
 MAIN TANK 10C OIL 6160 GAL. 45900
 LTC HSG 10C OIL 430 GAL. 3200
 RADIATORS 10C OIL 490 GAL. 3700

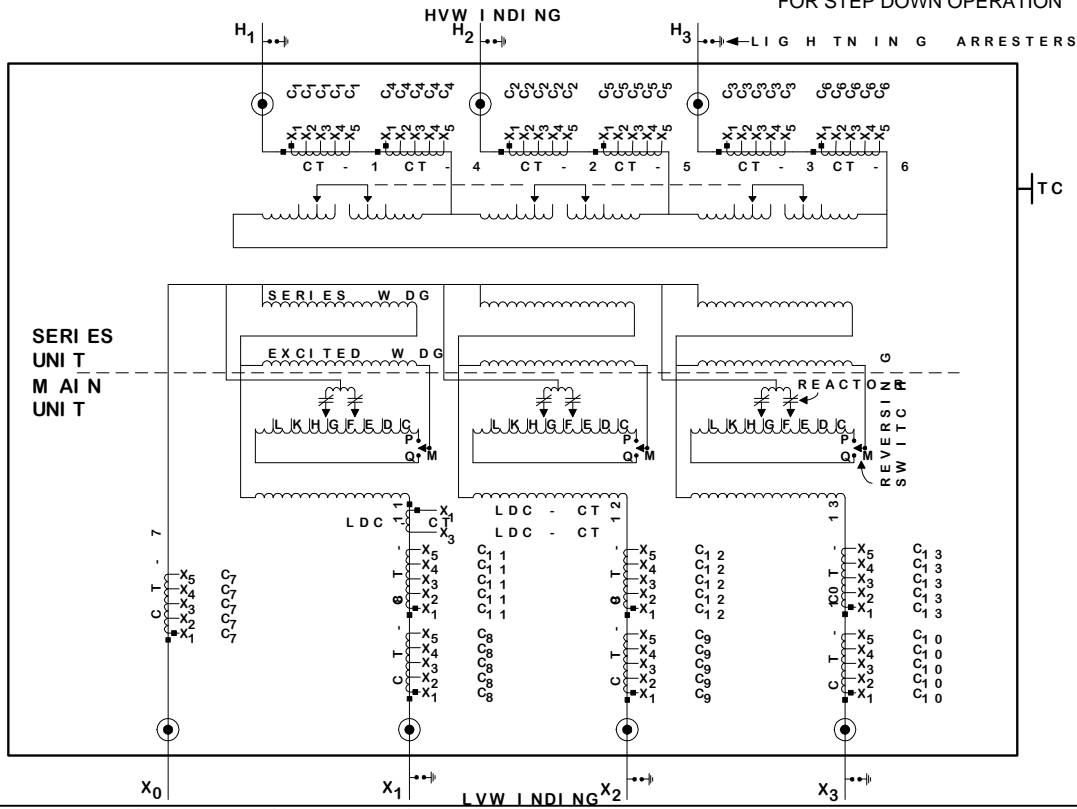


LIQUID LEVEL CHANGES .91 INCH PER 10C CHANGE IN LIQUID TEMPERATURE.
 LIQUID LEVEL BELOW TOP SURFACE OF THE HIGHEST POINT OF HIGHEST MANHOLE FLANGE AT 25 C IS 12 INCHES.
 MAXIMUM OPERATING PRESSURES OF LIQUID PRESERVATION SYSTEM 7.5 POUNDS POSITIVE TO 5 POUNDS NEGATIVE.
 TANK SUITABLE FOR 14.7 POUNDS VACUUM FILLING.
 LDC-CT IS 1200:0.2 AMP FOR USE WITH LOAD TAP CHANGER.
 ■ = POLARITY MARK
 CTS - 1, 2, 3, 4, 5, 6 ARE 1200:5 AMP
 CTS - 8, 9, 10, 11, 12, 13 ARE 2000:5 AMP
 CT-7 IS 600:5 AMP

L V WINDING CONNECTIONS					
VOLTS		AMP 33600 KVA	MECHANISM		REVERSING SWITCH
L - L	L - N		DIAL POS	CONNECTS	CONNECTS
15180	8764	1278	16	L L	
15094	8714	1285	15	L K	
15007	8665	1293	14	K K	
14921	8615	1300	13	K H	
14835	8565	1308	12	H H	
14749	8515	1315	11	H G	
14662	8465	1323	10	G G	
14576	8416	1331	9	G F	
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13369	7718		5	K H	
13282	7669		6	H H	
13196	7619		7	H G	
13110	7569		8	G G	
13024	7519		9	G F	
12937	7469		10	F F	
12851	7420		11	F E	
12765	7370		12	E E	
12679	7320		13	E D	
12592	7270		14	D D	
12506	7220		15	D C	
12420	7171		16	C C	

SUB - H (SOUTH) TRANSFORMER NAME PLATE

FOR STEP DOWN OPERATION



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