

## SECTION 1

### GENERAL TURBINE INFORMATION

**TURBINE TYPE:** LAND BASED TURBINE-GENERATOR (Direct Drive)

**RATING:** 26,500 KW **RATED SPEED** 3600 RPM

**GOVERNING SYSTEM:** WOODWARD 505E DIGITAL CONTROL SYSTEM

**STEAM CONDITIONS:**

**INLET PRESSURE / TEMPERATURE**..... 900 PSIG / 900°F  
**1ST CONTROLLED EXTRACTION PRESSURE**..... 210 PSIG  
**EXHAUST PRESSURE**..... 1.5" HGA

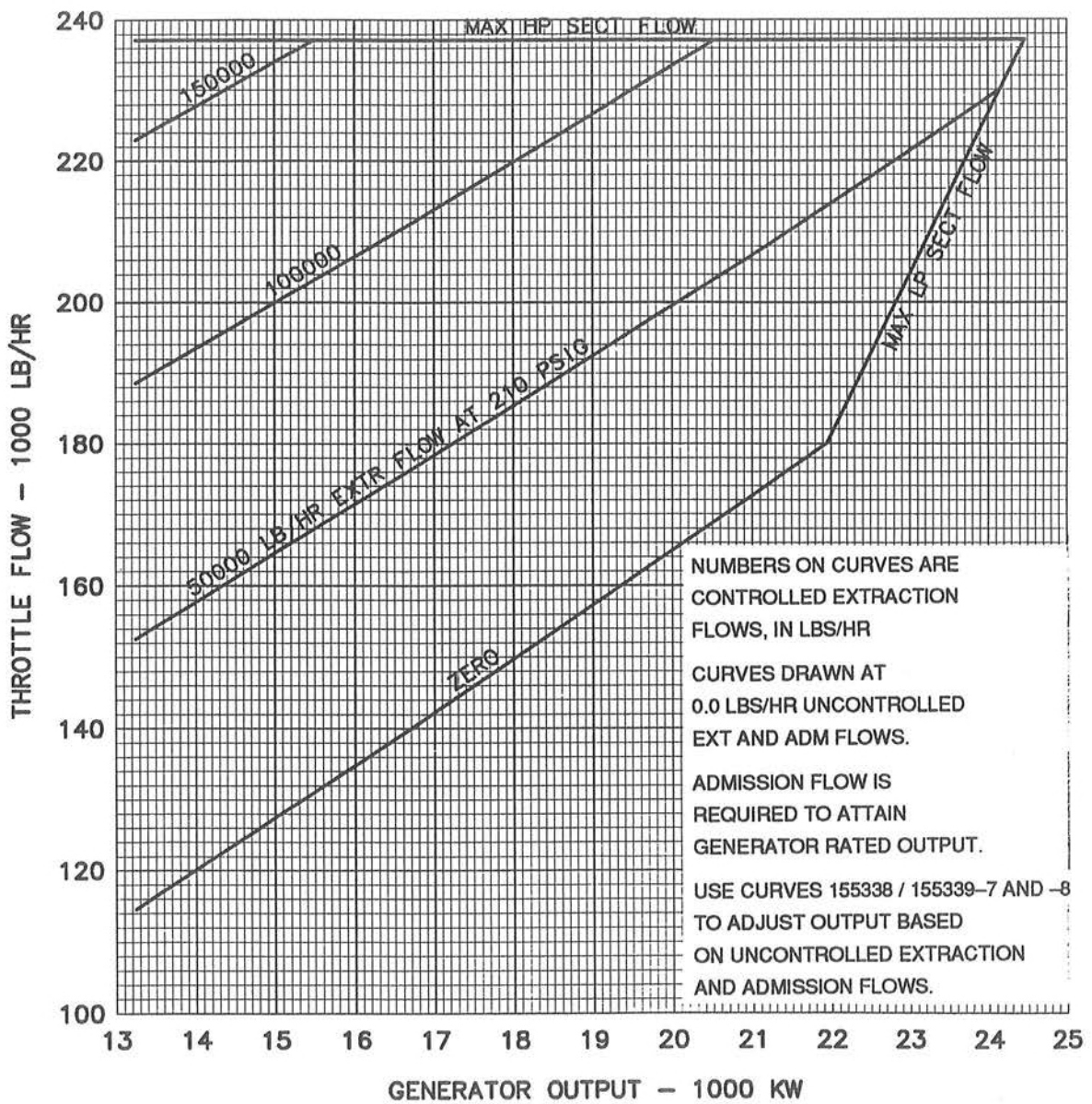
#### ALARM & TRIP CONDITIONS

(See Bill Of Material, Fig. A23, for complete setting information)

ITEM	ALARM SETTING	TRIP SETTING
HIGH VIBRATION (TURBINE)	3.0 MILS	6.0 MILS
ROTOR AXIAL POSITION	10 MILS	20 MILS
LOW LUBE OIL PRESSURE	12 PSIG DECR PRESS	10 PSIG DECR PRESS
DIFF. PRESS. ACROSS LUBE FILTER	12 PSIG INCR Δ P	---
DIFF. PRESS ACROSS CONTROL FILTER	12 PSI INCR Δ P	
LOW CONTROL PRESS	50 PSIG (BELOW NORM) DECR PRESS	
HIGH - LOW TANK OIL LEVEL	SEE BOM (FIG. A23)	---
HIGH BACK PRESSURE	6" HG (A) INCR PRESS	8.5" HA (A) INCR PRESS
HIGH EXHAUST TEMP	175°F INCR TEMP	
EMERGENCY OVERSPEED (ELECTRICAL)		3960 RPM
MECHANICAL OVERSPEED BOLT		3996 - 4068
FOR RTD ALARM & TRIP SETTINGS, SEE BILL OF MATERIAL (Fig. A23)		
MANUAL TRIP BUTTON (Located at Turbine Front Standard)		

# THROTTLE FLOW VS GENERATOR OUTPUT

INLET ENTHALPY 1418.9 BTU/LB - 1.5 IN. HG.  
 AE AT 210 PSIG  
 3600 RPM  
 LOCUS OF VALVE POINT PERFORMANCE





GD 99927  
 Generator: 316X903  
 December 1992

# GE Generator

## Generator Data

### Nameplate Data

2 Poles, 3 Phase, WYE Connected, 60 Hertz, 3600 RPM

Total Temperature at Rating Guaranteed not to Exceed: 110°C on Armature by Detector  
 125°C on Field by Resistance

Maximum Cold Gas/Air Temperature 35°C.

	<b>Rating</b>
kVA (0 ft) .....	31,177
Armature Amps .....	1,304
Armature Volts .....	13,800
Field Amps .....	453
Exciter Volts .....	250
Power Factor .....	0.85

### Design Data

Voltage Range at 60 Hertz ..... ±5 Percent

### Brush Data

Shaft Grounding Brushes, 2 per set ..... Recommended Grade, National Carbon 634

### Gas Cooler Data

Inlet Water Temperature ..... 85°F  
 Water Flow at Rated Load ..... 600 GPM  
 Head Loss Through Cooler ..... 11 ft  
 Air or Gas Flow Through Generator ..... 26,094 CFM

*These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the GE Company.*

## ESTIMATED GENERATOR DATA

## Reactance Data (Per Unit)

	Direct Axis	Quadrature Axis
Saturated Synchronous	(X <sub>dv</sub> ) 1.943	(X <sub>qv</sub> ) 1.807
Unsaturated Synchronous	(X <sub>di</sub> ) 1.943	(X <sub>qi</sub> ) 1.807
Saturated Transient	(X' <sub>dv</sub> ) 0.213	(X' <sub>q</sub> ) 0.480
Unsaturated Transient	(X' <sub>di</sub> ) 0.277	
Saturated Subtransient	(X'' <sub>dv</sub> ) 0.145	(X'' <sub>qv</sub> ) 0.141
Unsaturated Subtransient	(X'' <sub>di</sub> ) 0.190	(X'' <sub>qi</sub> ) 0.188
Saturated Negative Sequence	(X <sub>2v</sub> ) 0.138	
Unsaturated Negative Sequence	(X <sub>2i</sub> ) 0.181	
Saturated Zero Sequence	(X <sub>0v</sub> ) 0.086	
Unsaturated Zero Sequence	(X <sub>0i</sub> ) 0.101	
Leakage Reactance, Overexcited	(X <sub>LM,OEX</sub> ) 0.160	
Leakage Reactance, Underexcited	(X <sub>LM,UEX</sub> ) 0.160	

## Field Time Constant Data (Sec. at 125°C)

Open Circuit	(T' <sub>do</sub> ) 4.011	(T' <sub>qo</sub> ) 0.407
Three Phase Short Circuit Transient	(T' <sub>d3</sub> ) 0.440	(T' <sub>q</sub> ) 0.407
Line to Line Short Circuit Transient	(T' <sub>d2</sub> ) 0.677	
Line to Neutral Short Circuit Transient	(T' <sub>d1</sub> ) 0.810	
Short Circuit Subtransient	(T'' <sub>d</sub> ) 0.015	(T'' <sub>q</sub> ) 0.015
Open Circuit Subtransient	(T'' <sub>do</sub> ) 0.022	(T'' <sub>qo</sub> ) 0.051

## Armature DC Component Time Constant Data (Sec. at 100°C)

Three Phase Short Circuit	(T <sub>a3</sub> ) 0.271
Line to Line Short Circuit	(T <sub>a2</sub> ) 0.271
Line to Neutral Short Circuit	(T <sub>a1</sub> ) 0.237

## Armature Winding Sequence Resistance Data (Per Unit)

Positive	(R <sub>1</sub> ) 0.004
Negative	(R <sub>2</sub> ) 0.016
Zero	(R <sub>0</sub> ) 0.009

Rotor Short-Time Thermal Capacity, (I <sub>2</sub> ) <sup>2</sup> t	10
Turbine-Generator Combined Inertia Constant, H	3.56 kW SEC/kVA
Three Phase Armature Winding Capacitance	0.322 Microfarads
Armature Winding DC Resistance (Per Phase)	0.00828 Ohms at 100°C
Field Winding DC Resistance	0.400 Ohms at 125°C
Field Current at Rated kVA, Armature Voltage and PF	448.7 Amperes
Field Current at Rated kVA and Armature Voltage, 0 PF Lagging	529.2 Amperes

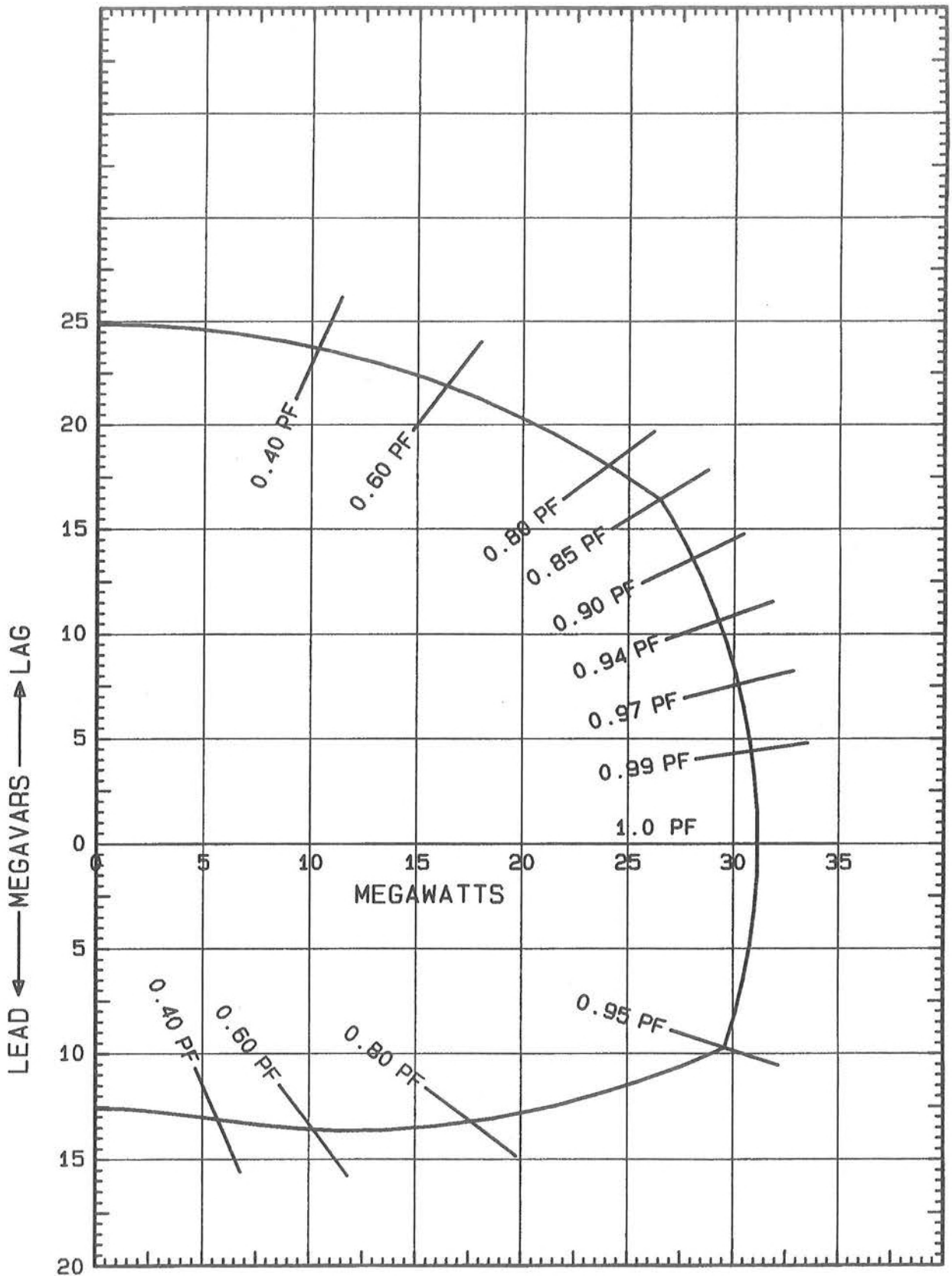
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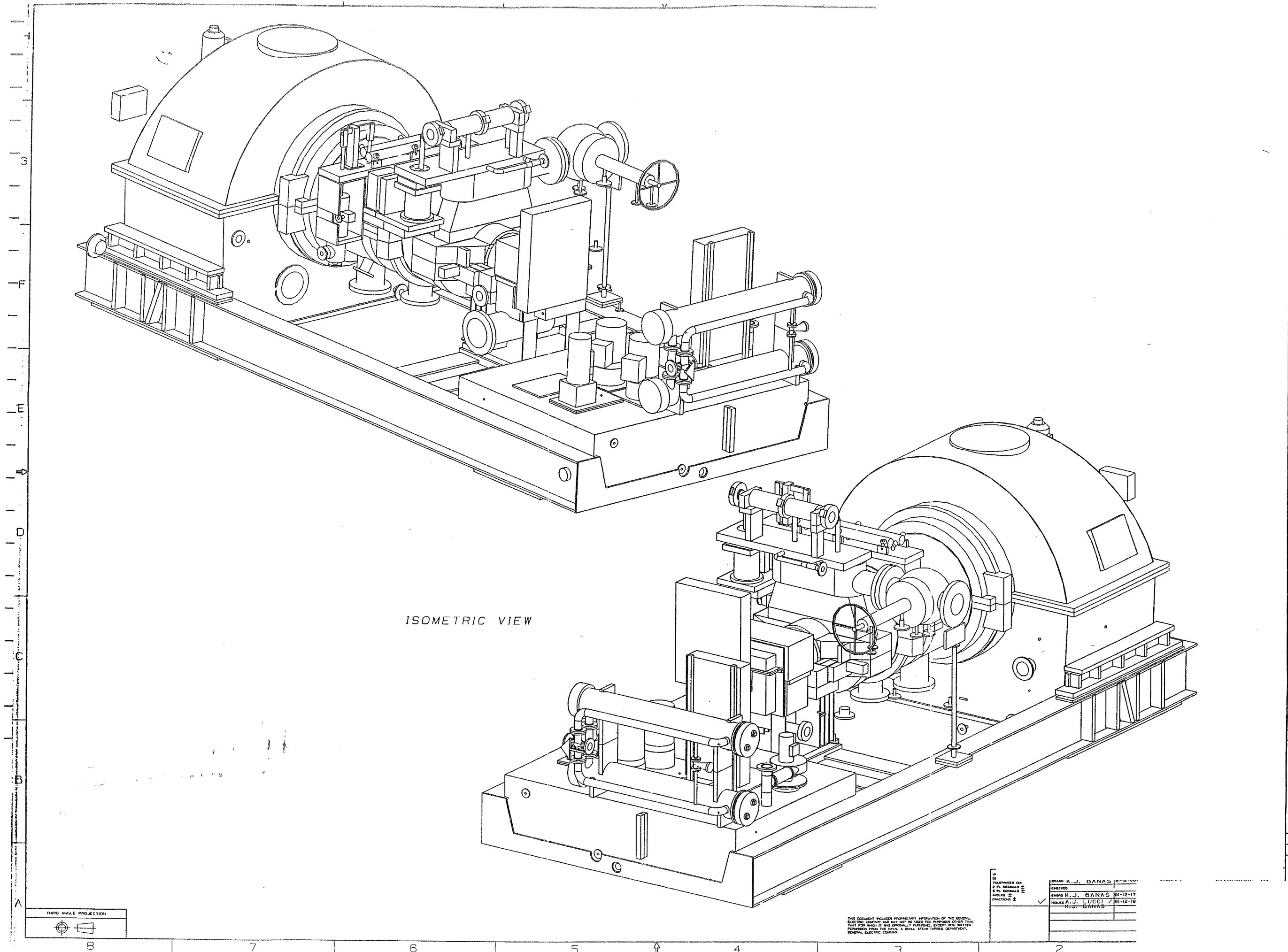
**GE Generator**

General Electric Company  
 One River Road, Schenectady, NY 12345  
 518 • 385 • 2211 TX: 145354

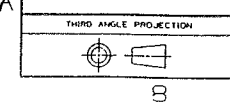
# ESTIMATED REACTIVE CAPABILITY CURVES

31177 KVA - 3600 RPM - 13800 VOLTS - 0.85 PF  
0.55 SCR - 0 FT ALT - 250 FIELD VOLTS





ISOMETRIC VIEW



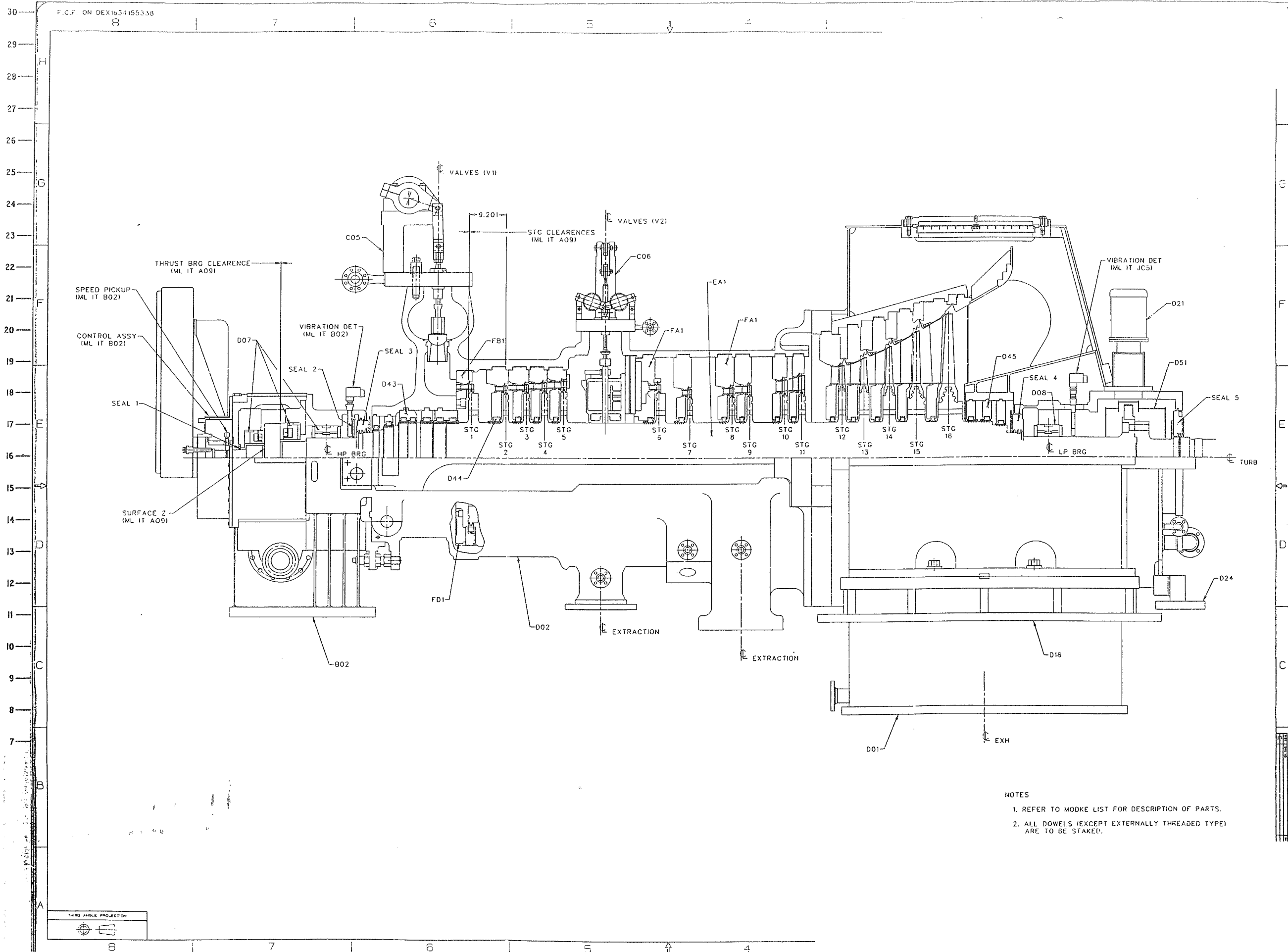
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BY	EDISON R. J. BANAS
DESIGNED BY	EDISON R. J. BANAS
CHECKED BY	EDISON R. J. BANAS
APPROVED BY	EDISON R. J. BANAS
DATE	01-12-17
ISSUED BY	EDISON R. J. BANAS
REVISION	
REVISION	
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- NOTES
1. REFER TO MODKE LIST FOR DESCRIPTION OF PARTS.
  2. ALL DOWELS (EXCEPT EXTERNALLY THREADED TYPE) ARE TO BE STAKED.

THIRD ANGLE PROJECTION

GENERAL INFORMATION

1. FLEXIBILITY MUST BE PROVIDED IN ALL CONNECTIONS TO PREVENT TRANSMISSION OF EXCESSIVE STRAINS TO TURBINE PIPING ALLOWABLE FORCES & MOMENTS PER TABLE ON SHEET 7.
2. MINIMUM PIPE SIZES RECOMMENDED FOR SHORT DIRECT RUNS OF PIPE ARE: STEAM INLET 10 INCHES DIA; STEAM EXHAUST 72.00 X 130.00 INCHES; EXACT SIZES TO MAINTAIN CONTRACT CONDITIONS AT THE TURBINE CONNECTIONS TO BE DETERMINED BY CUSTOMER.
3. CUSTOMER TO CHECK RATING, STEAM INFORMATION, ROTATION AND DIRECTION OF EXHAUST.
  - A. TTV ABOVE SEAT DRAIN SHOULD BE RUN THROUGH INDEPENDENT PIPE LINE AND CONNECTED TO ATMOSPHERE INDEPENDENT OF ALL OTHER PIPING WITH A SHUT OFF VALVE IN EACH LINE.
  - B. TTV BELOW SEAT DRAIN SHOULD BE RUN THROUGH AN INDEPENDENT PIPE LINE AND CONNECTED TO MAIN CONDENSER INDEPENDENT OF ALL OTHER PIPING WITH A SHUT OFF VALVE IN THE LINE.
  - C. ALL OTHER DRAINS SHOULD BE INDEPENDENTLY RUN AND SHOULD BE CONNECTED TO CONDENSER WITH A SHUT OFF VALVE IN LINE.

5. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES.
6. CUSTOMER PIPING CONNECTION LOCATIONS ARE WITHIN ±.00 INCH, UNLESS OTHERWISE SPECIFIED.
7. OPTICAL ALIGNMENT PADS ARE PROVIDED ON THE TOP RAIL OF THE BASE FOR INSTALLATION, LEVELING AND ALIGNMENT. SEE INSTRUCTION BOOK FOR DETAILS.
8. THE LUBRICATION AND HYDRAULIC OIL REQUIRED IS A PREMIUM GRADE MINERAL BASED INHIBITED LIGHT TURBINE OIL, 150 SSU @ 100°F. SEE INSTRUCTION BOOK FOR DETAILS.
9. OIL TANK CAPACITY IS APPROXIMATELY 1000 GALLONS.
10. IF THIS OUTLINE IS COMBINED WITH OTHER DRAWINGS ALL NOTES MUST BE INCLUDED ON COMBINED DRAWINGS AS THESE COMMENTS ARE VITAL TO THE PROPER AND SAFE OPERATION OF THE TURBINE AND DRIVEN EQUIPMENT.

II. FOR ADDITIONAL DATA, REFERENCE THE FOLLOWING DRAWINGS:

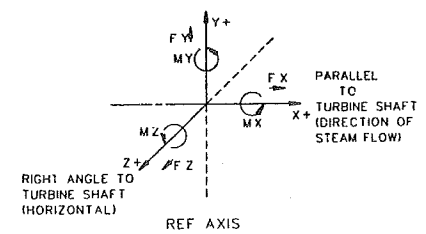
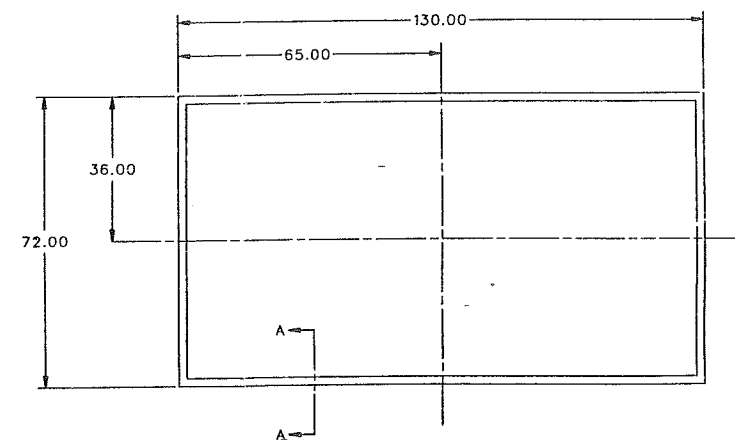
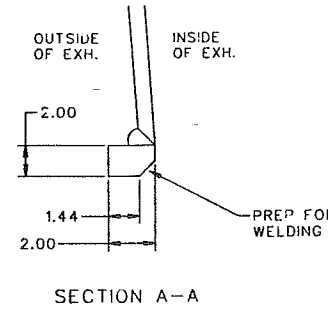
GENERATOR ELECTRICAL OUTLINE	I04E2957
GENERATOR OUTLINE	I04E2951
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BILL OF MATERIAL	B777A23A155338
ELECTRICAL OUTLINE TURBINE	B777A37E155338
LIFTING ARRANGEMENT	509E3HCD
GLAND CONDENSER OUTLINE	70A20A12060
NON-RETURN VALVES	I6485-01 & LATER

12. DOWEL HOLES SHOULD BE REAMED AND ALIGNMENT DOWELS FITTED AFTER FINAL ALIGNMENT (WHERE APPLICABLE).
  13. GE TO FURNISH SHIMS, HOLD DOWN BOLTS, DOWELS AND JACKING SCREWS FOR HORIZONTAL AND VERTICAL POSITIONING OF THE TURBINE ON THE BASEPLATE.
  14. THE NOTES FOR CONSTRUCTION OF FOUNDATION ARE GE'S STANDARD RECOMMENDATION FOR FOUNDATION CONSTRUCTION. IT IS THE PURCHASER'S RESPONSIBILITY TO ASSURE ADEQUACY OF DESIGN.
  15. PURCHASER TO PROVIDE THE FOLLOWING:
    - A. A RIGID AND SUBSTANTIAL FOUNDATION, FOUNDATION BOLTS AND NUTS.
    - B. ALL PIPING, VALVES, FITTINGS, BOLTS, STUDS, NUTS, GASKETS AND FLANGES TO CONNECTIONS SHOWN WITH ALL DRAIN PIPING ARRANGED TO AVOID FORMATION OF POCKETS OR WATER LEGS.
    - C. (CONTROLLED EXTRACTATIONS)
      1. THE NON RETURN VALVE MUST BE INSTALLED IN THE CUSTOMER'S PIPING IN A HORIZONTAL POSITION LOCATED WITHIN 15 FEET OF THE TURBINE EXTRACTION FLANGE.
    - D. THE ATMOSPHERIC RELIEF DIAPHRAGM WILL RUPTURE AT 5 PSIG AND GIVE FULL RELIEF PASSING 253460 LB/HR STEAM AT A PRESSURE NOT EXCEEDING 10 @ 259 DEG. F PSIG.
    - E. AN EXTRACTION RELIEF VALVE ADJUSTED TO START RELIEVING AT NOT MORE THAN 254 PSIG. AND GIVE FULL RELIEF TO 235400 LBS. PER HOUR AT NOT MORE THAN 277 @ 651 DEG. F PSIG. THIS VALVE MUST BE INSTALLED BETWEEN THE TURBINE AND THE FIRST SHUT OFF VALVE OR NON RETURN VALVE IN THE EXTRACTION LINE. (NO EXTRACTION RELIEF VALVE FURNISHED).
    - F. ACCESS HOLES CUT IN THE NEMA 4 ELECTRICAL BOXES FOR CUSTOMER RUN WIRING, CONDUIT AND FITTINGS.
    - G. UNCONTROLLED EXTRACTIONS:
      1. TWO NON RETURN VALVES MUST BE INSTALLED IN SERIES IN THE CUSTOMER'S PIPING TO OPEN FEED WATER HEATER DEAERATOR OR PROCESS. THE FIRST NON RETURN VALVE MUST BE INSTALLED IN A HORIZONTAL POSITION LOCATED WITHIN 15 FT OF THE TURBINE EXTRACTION FLANGE. THE SECOND NON RETURN VALVE MUST BE LOCATED NO MORE THAN 3 FT. DOWNSTREAM OF THE FIRST.
    - H. HEAT RETENTION MATERIAL (BLANKET TYPE) IS SUPPLIED FOR THE TURBINE CASING (EXCLUDING THE EXHAUST) ONLY. INSULATION IS NOT PROVIDED FOR TTV, NRV, STEAM SEAL OR DRAIN PIPING.
    - I. STEAM ADMISSION:
      1. THE ADMISSION TRIP VALVE AND INDUCTION VALVE (QTY 1 EACH) MUST BE INSTALLED IN THE CUSTOMER'S PIPING WITHIN 25 EQUIVALENT FEET OF PIPE RUN FROM THE TURBINE ADMISSION NOZZLE. THE VALVES MUST BE INSTALLED IN A HORIZONTAL RUN OF PIPING.
      2. THE TRIP VALVES ARE TO BE INSTALLED SO TO PROVIDE POSITIVE DRAINING FROM THE HYDRAULIC TRIP CYLINDER BACK TO THE OIL TANK.
- UNLESS OTHERWISE SPECIFIED, ALL PIPING BETWEEN THE TURBINE AND GENERATOR WILL REQUIRE A FIELD FIT.

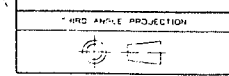
TURBINE WEIGHTS		
		POUNDS
SHIPPED WEIGHTS	TOTAL WEIGHT OF ASSEMBLED TURBINE: INCLUDING -- CASINGS, DIAPHRAGMS, ROTOR, FRONT STANDARD, VALVE GEAR, PIPING, BASE, OIL TANK	160300
	STOP/TRIP THROTTLE VALVE	3400
FOR MAINTENANCE PURPOSES	UPPER HALF, H.P. HEAD, EXHAUST CASING, INCLUDING DIAPHRAGMS, VALVE GEAR(S)	40175
	ROTOR	23527

TURBINE STEAM INFORMATION	
LOAD (KW)	26500.0
INLET PRESSURE (PSIG)	900.0
INLET TEMPERATURE (°F)	900.0
EXHAUST PRESSURE ("HGA)	1.5
R.P.M.	3600.0
FIRST EXTR PRESSURE (CONN AF) (PSIG)	210.0

	TABLE OF FREE TURBINE EXPANSION		
	X	Y	Z
L.P. SHAFT STEADY STATE	0.076	0.006	0.000
TRANSIENT	-0.070 TO 0.337	0.000 TO 0.000	0.000 TO 0.000
INLET (CONN AA)	-0.559	0.169	0.488
EXHAUST (CONN AB)	0.000	-0.021	0.000
1ST EXTRACTION (CONN AF)	-0.315	-0.208	0.000
2ND EXTR (CONN AG)	-0.190	-0.129	0.00
1ST ADM (CONN AC)	-0.127	-0.125	0.00



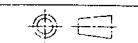
APPROVED			
ADD TURBINE EXPANSION			
B	P.P. MANN (FINAL) IN TITLE WAS (ADVANCE)	92-03-25	K.J.B.
C	P.P. MANN ADDED DWG NUMBERS TO NOTE 11.	92-04-03	K.J.B.
D	J.P. DOMBEK ADDED NOTE 15D. ADDED NUMERICAL VALUES TO NOTE 15E.	92-05-04	K.J.B.
F	K.J. BANAS UPDATE REV STATUS BLOCK. ADD GLAND CONDENSER OUTLINE NO. CHG NOTE 15.D.	92-06-23	K.J.B.
F	K.J. BANAS UPDATE REV STATUS BLOCK. ADD NOTE 15.J.	92-10-26	K.J.B.
G	P.P. MANN UPDATED REV STATUS BLOCK. THIS CHANGE SHT 1, 2, 3, 4 & 6.	92-10-08	F.H.H.
H	P.P. MANN UPDATED REV STATUS BLOCK. THIS CHANGE SHT 2.	92/11/20	F.H.H.



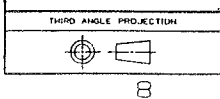
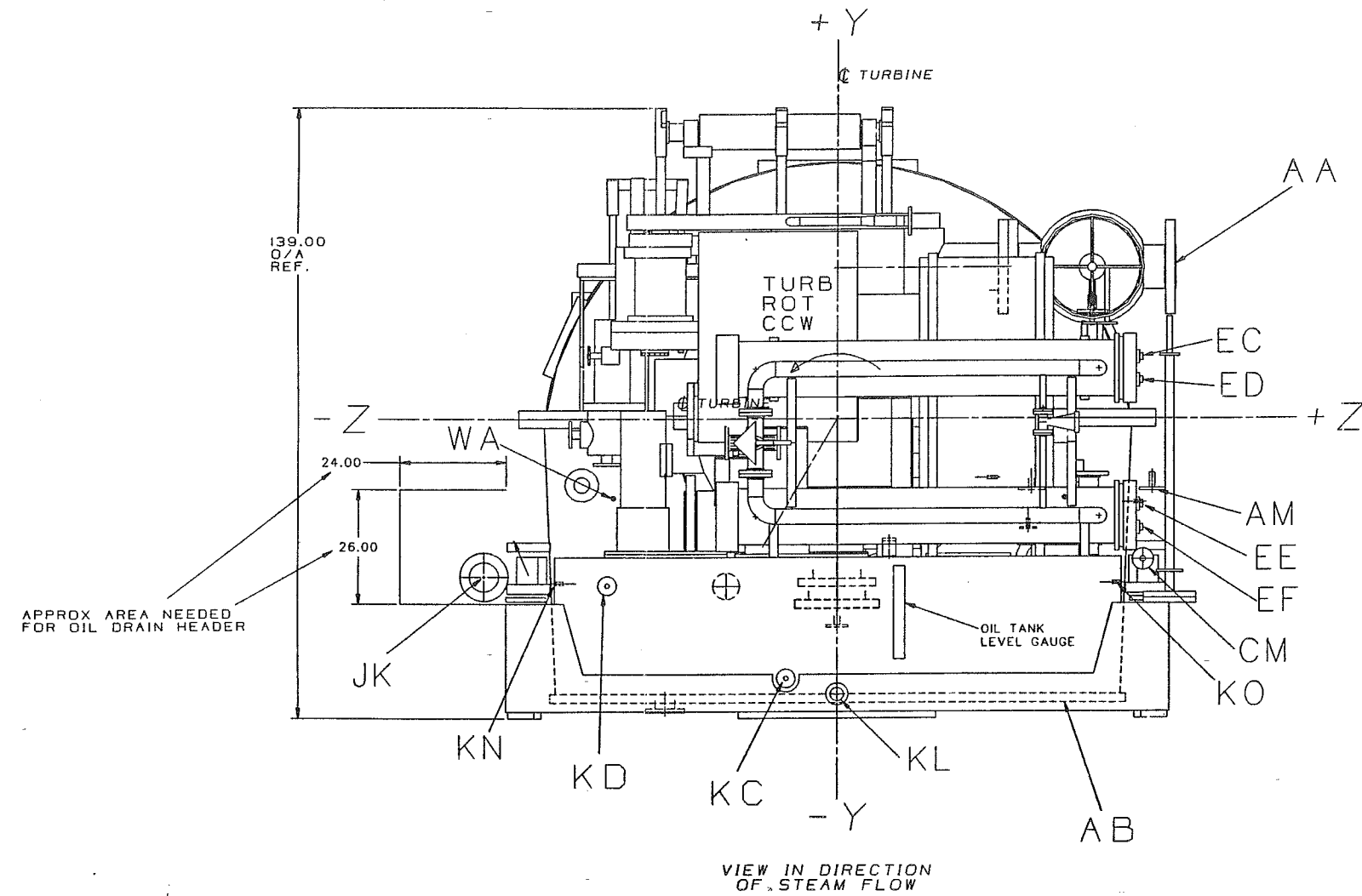


CUSTOMER CONNECTIONS				LOCATION OF CONNECTIONS			REMARKS
STEAM	NPT	FLG SIZE	ANSI LBS	X	Y	Z	
AA	STOP VALVE INLET	10.0	900	-136.56	34.38	76.38	
AB	EXHAUST	90.0		0.00	-64.50	0.00	72.00 X 130.00
AC	FIRST ADMISSION	12.0	150	-61.19	-43.00	0.00	
AF	FIRST EXTRACTION	10.0	300	-95.88	-38.00	0.00	
AG	SECOND EXTRACTION	4.0	300	-74.44	-28.47	-16.44	ROT 30° -Z DIR
AK	STOP VALVE HP STEM LEAKOFF	1.5	1500	-153.13	23.88	57.38	
AM	STOP VALVE ABOVE SEAT DRAIN	1.0	1500	-134.06	-16.38	59.13	
AN	STOP VALVE BELOW SEAT DRAIN	1.0	1500	-139.06	-16.38	43.63	
CF	FIRST STAGE CASING DRAIN	1.0	600	-129.31	-47.31	0.00	
CM	STEAM SEAL SUPPLY/MAKEUP	1.0	300	-121.56	-32.00	69.00	
DA	STEAM SEAL PIPING TO GLAND CONDENSER	4.0	150	-60.00	-66.69	-39.00	
WA	EXHAUST PRESSURE BASKET TAP	1.00		-34.00	-18.00	-51.00	
WB	EXHAUST PRESSURE BASKET TAP	1.00		-34.00	-18.00	51.00	
OIL							
JE	CONTROL (HYDRAULIC) OIL TRIP HEADER SUPPLY	0.5	300	-184.50	-25.19	42.88	
JJ	GENERATOR LUBE OIL SUPPLY	2.0	150	49.50	-38.00	-25.00	
JK	GENERATOR DRAIN	6.0	150	37.94	-35.84	-80.00	
JO	ADM & INDUCTION OIL DRAIN	8.0	150	-196.50	-39.31	51.00	
KC	CONDITIONER/PURIFIER SUPPLY	1.0	150	-293.69	-56.31	-11.50	TANK FLANGE
KD	CONDITIONER/PURIFIER RETURN	1.0	150	-293.56	-37.88	-54.00	TANK FLANGE
KK	TANK FILL	3.00		-260.43	-27.19	11.75	
KL	TANK DRAIN	3.00		-293.68	-62.56	0.00	
KN	CO2 PURGE	0.75		-215.68	-37.31	-64.00	
KO	CO2 PURGE	0.75		-276.68	-37.31	64.00	
AIR							
GD	TRIP SIGNAL TO NON-RETURN VALVES	0.75		-182.06	-13.50	35.86	
GL	SUPPLY TO TRIP RELAY	0.75		-182.06	-13.50	35.86	
GM	SUPPLY TO STEAM SEAL SUPPLY AND DUMP VALVE	0.75		-117.42	-19.00	69.00	
GN	OIL TANK VAPOR EXTRACTOR (SEE P & ID NOTES)	4.0	150	-257.87	-12.25	56.56	
WATER							
EC	OIL COOLER COOLING WATER INLET	3.00		-285.06	18.06	67.50	
ED	OIL COOLER COOLING WATER OUTLET	3.00		-289.31	13.81	67.50	
EE	OIL COOLER COOLING WATER INLET	3.00		-285.06	-17.94	67.50	
EF	OIL COOLER COOLING WATER OUTLET	3.00		-289.31	-22.19	67.50	
ELECTRICAL ±12.00							
MA	MAIN OIL PUMP (MOP A)			-254.87	-14.81	-23.75	
MR	AUXILIARY OIL PUMP (MOP B)			-232.43	-14.81	-23.75	
MC	EMERGENCY OIL PUMP			-242.31	-8.56	-39.11	
MO	VAPOR EXTRACTOR BLOWER, OIL TANK			-232.62	-15.50	56.00	
MS	OIL TANK HEATER	1.50		-280.31	-37.88	-54.00	
MT	OIL TANK TERMINAL BOX			SEE SHEET 3 THRU 5 FOR DIM'S			
PV	EXHAUST END TERMINAL BOX			45.00	25.00	37.75	
PW-1	MAIN TERMINAL BOX			-204.00	-5.50	-19.38	
PW-2	MAIN TERMINAL BOX			-204.00	-5.50	0.00	
SC	TURNING GEAR MOTOR			45.00	41.00	-1.25	
SG	TURNING GEAR AND LP END ACCESSORIES			51.00	17.00	-52.75	

THIRD ANGLE PROJECTION

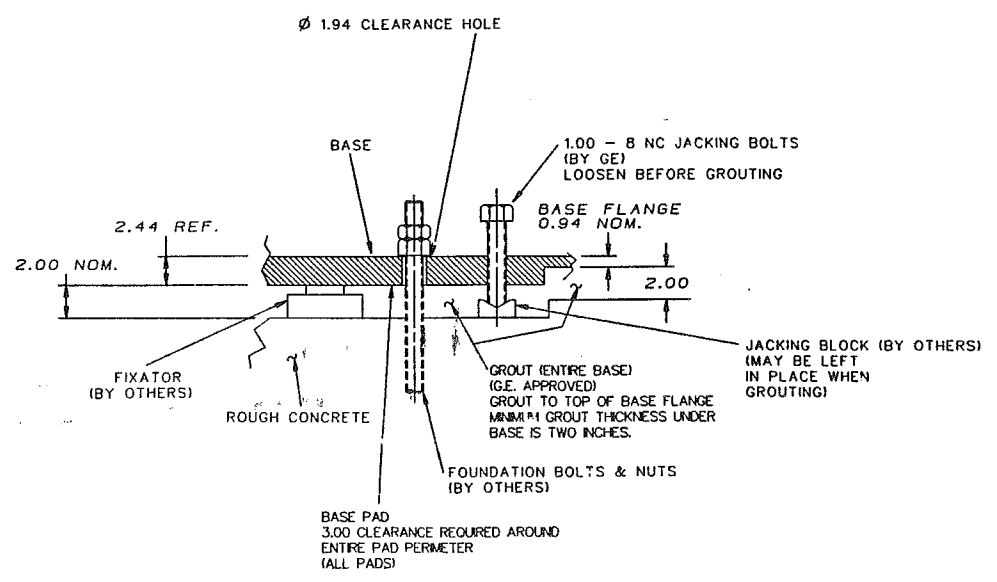
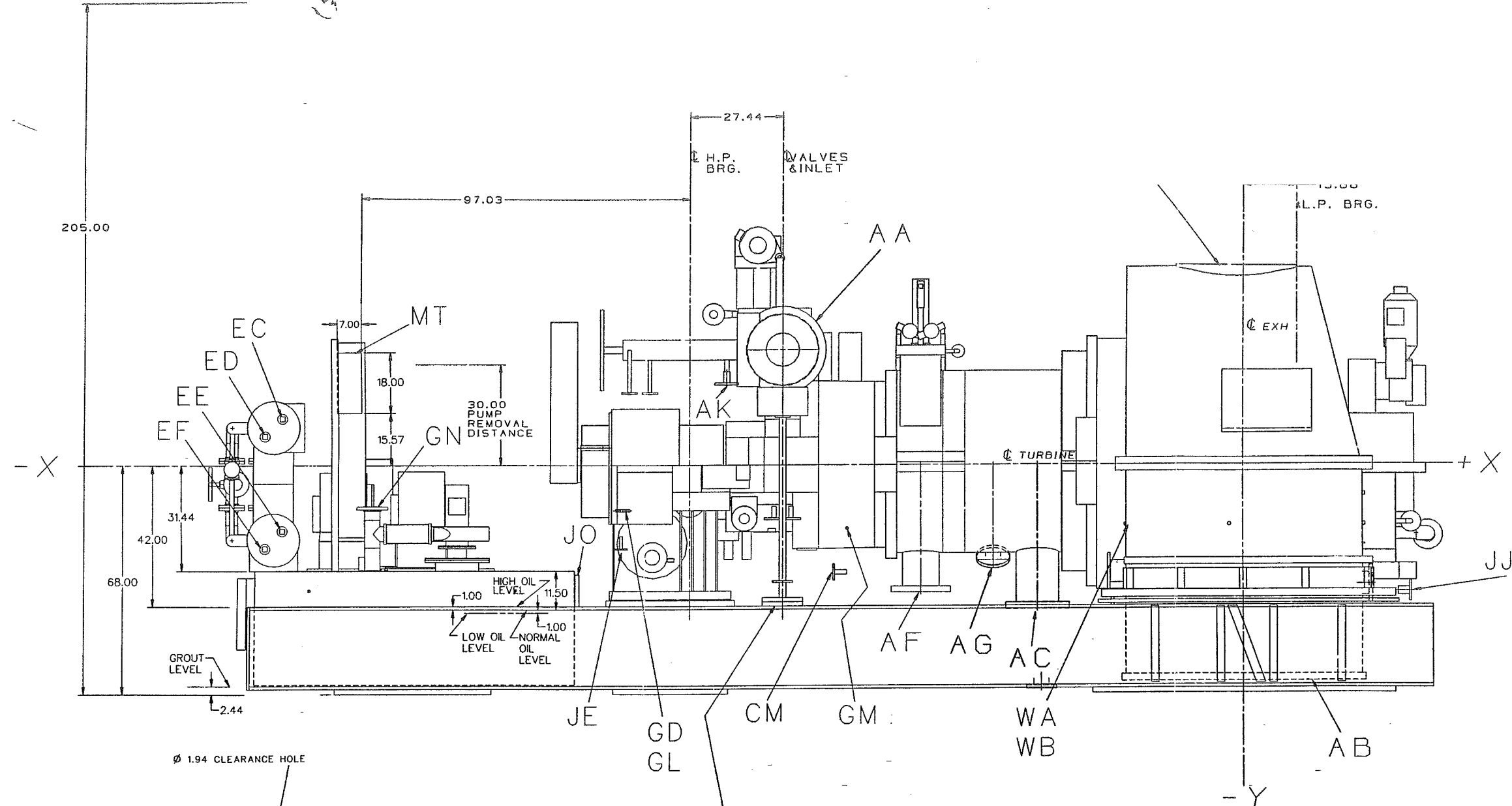


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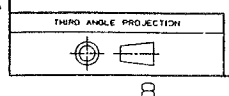
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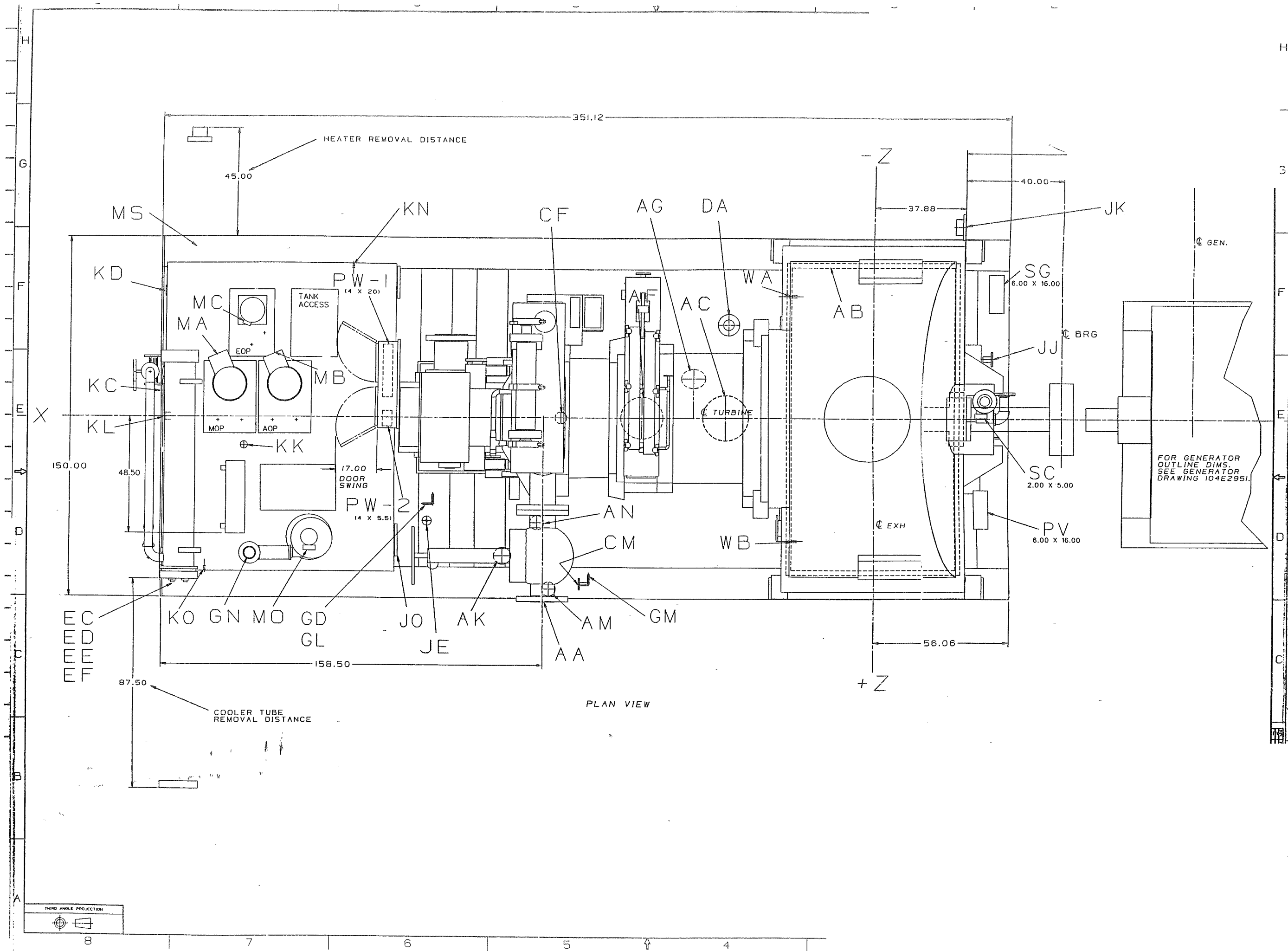
APPROX HEIGHT REQUIRED TO REMOVE UPPER HALF OF TURBINE.

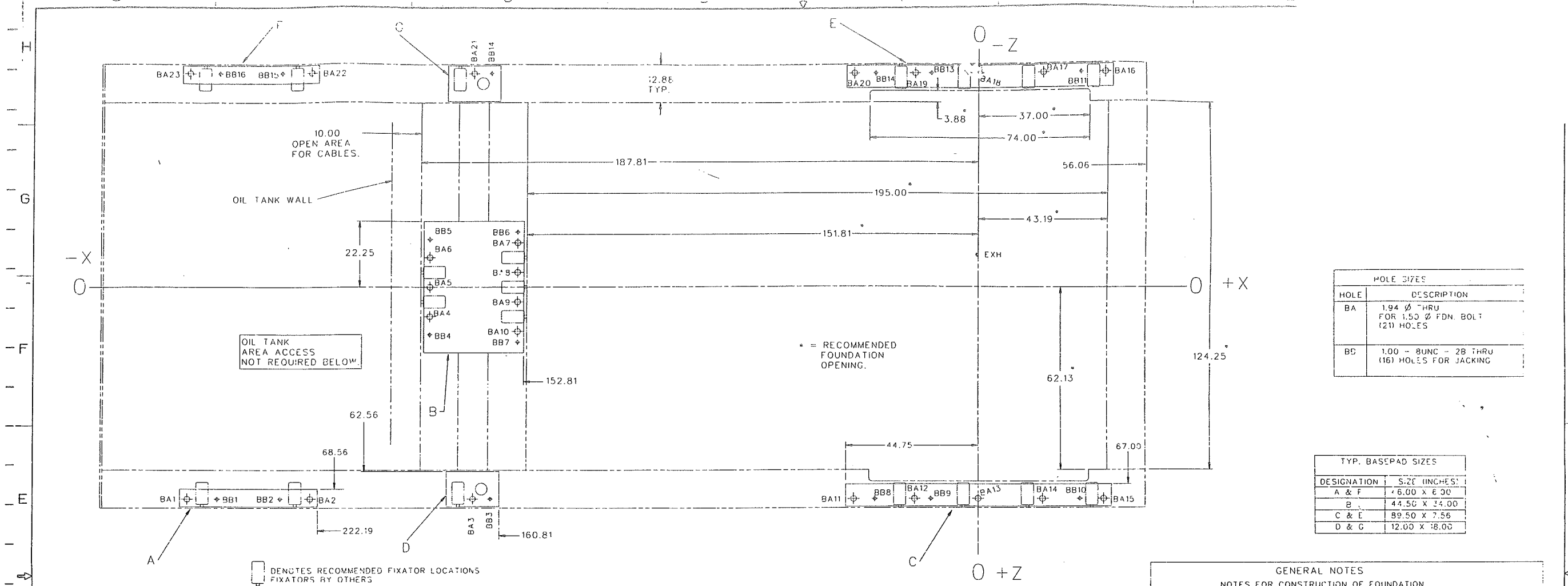


ADJUST THE TTV SPRING SUPPORT HEIGHT USING THE FOUR SPRING SUPPORT JACK BOLTS TO MEET THE BOTTOM OF THE TTV (COLD CONDITION). PROCEED TO PRELOAD THE SPRING 0.31 INCHES USING THE FOUR JACK BOLTS. THIS WILL SUPPORT THE TTV WEIGHT OF 3400 LBS. IN THE HOT CONDITION CONSIDERING A FREE TURBINE EXPANSION AT THE INLET CONNECTION "AA" OF .169 INCHES UPWARD.

RIGHT SIDE ELEVATION







HOLE SIZES	
HOLE	DESCRIPTION
BA	1.94 Ø THRU FOR 1.50 Ø FDN. BOLT (21) HOLES
BS	1.00 - BUNC - 2B THRU (16) HOLES FOR JACKING

TYP. BASEPAD SIZES	
DESIGNATION	SIZE (INCHES)
A & F	6.00 X 6.00
B	44.50 X 24.00
C & E	89.50 X 7.56
D & G	12.00 X 18.00

PLAN VIEW - BASE PAD ARRANGEMENT

FORCES AND MOMENTS ON MAJOR CONNECTIONS

1. A. MAXIMUM ALLOWABLE PIPING FORCES (LBS) AND MOMENTS (FT-LBS) LIMIT FOR THE TOTAL OF ALL FORCES AND MOMENTS RESOLVED TO THE HIGH PRESSURE BEARING CENTERLINE, AND LIMIT FOR EFFECT OF FORCES AND MOMENTS OF ANY INDIVIDUAL CONNECTION RESOLVED TO THE HIGH PRESSURE BEARING CENTERLINE.

FX TOTAL AXIAL FORCES 8300 LBS  
 FY TOTAL VERTICAL FORCES 6400 LBS  
 FZ TOTAL TRANSVERSE FORCES 6400 LBS  
 MX TOTAL MOMENT ABOUT THE X AXIS 10400 FT-LBS  
 MY TOTAL MOMENT ABOUT THE Y AXIS 11900 FT-LBS  
 MZ TOTAL MOMENT ABOUT THE Z AXIS 83300 FT-LBS

THE ABOVE FORCES CAN ACT IN EITHER A POSITIVE OR NEGATIVE DIRECTION. THE ORIGIN IS LOCATED AT THE CENTERLINE OF THE HIGH PRESSURE BEARING.

B. AT ANY CONNECTION THE RESULTANT FORCE, FR, IS DEFINED AS  
 $\sqrt{FR} = \sqrt{FX^2 + FY^2 + FZ^2}$   
 AT ANY CONNECTION THE RESULTANT MOMENT, MR, IS DEFINED AS  
 $\sqrt{MR} = \sqrt{MX^2 + MY^2 + MZ^2}$

C. MAXIMUM ALLOWABLE FORCES AND MOMENTS AT THE INLET CONNECTION (AA) ARE:  
 $FR + MR/3 < 5800$

(THE INLET CONNECTION IS CONSIDERED TO BE THE FLANGE ON THE STOP VALVE).

D. MAXIMUM ALLOWABLE FORCES AND MOMENTS AT REMAINING CONNS. FOR THE CONNS. LISTED BELOW, THE SUM OF THE RESULTANT FORCES AND MOMENTS MUST NOT EXCEED THE TABULATED LIMITS

CONN. SIZE	LIMIT (FR + MR)
AF	6000
AC	30000
AG	15000

E. MAXIMUM ALLOWABLE FORCES AND MOMENTS AT EXHAUST CONN. "AB" ARE:  
 $FR + MR/3 < 18500$

NAME	X	Z
BA1	-265.69	71.94
BA2	-224.69	71.94
BA3	-169.81	71.94
BA4	-184.75	10.00
BA5	-184.75	0.00
BA6	-184.75	-10.00
BA7	-154.88	-15.00
BA8	-154.88	-5.00
BA9	-154.88	5.00
BA10	-154.88	15.00
BA11	-42.13	71.94
BA12	-21.50	71.94
BA13	0.00	71.94
BA14	21.50	71.94
BA15	42.12	71.94
BA16	42.12	-71.94
BA17	21.50	-71.94
BA18	0.00	-71.94
BA19	-21.50	-71.94
BA20	-42.13	-71.94
BA21	-169.81	-71.94
BA22	-224.69	-71.94
BA23	-265.69	-71.94

NAME	X	Z
BB1	-255.69	71.94
BB2	-234.69	71.94
BB3	-163.81	71.94
BB4	-184.75	16.13
BB5	-184.75	-16.13
BB6	-154.88	-18.63
BB7	-154.88	18.63
BB8	-35.00	71.94
BB9	-16.00	71.94
BB10	34.00	71.94
BB11	34.00	-71.94
BB12	-16.00	-71.94
BB13	-35.00	-71.94
BB14	-163.81	-71.94
BB15	-234.69	-71.94
BB16	-255.69	-71.94

LOAD DESCRIPTION	AXIAL REACTIONS (X - DIRECTION)						
	LOAD LOCATION AT PAD (SEE OUTLINE)						
(FORCE IN POUNDS)	A	B	C	D	E	F	G
DEAD WEIGHT	---	---	---	---	---	---	---
IMPACT & DYNAMIC	---	---	---	---	---	---	---
THERMAL EXPANSION	---	10800	6400	---	6400	---	---
PIPING	---	---	4200	---	4200	---	---
TOTAL	---	10800	10600	---	10600	---	---

LOAD DESCRIPTION	VERTICAL REACTIONS (Y - DIRECTION)						
	LOAD LOCATION AT PAD (SEE OUTLINE)						
(FORCE IN POUNDS)	A	B	C	D	E	F	G
DEAD WEIGHT	12300	54600	38450	4600	38450	12300	4600
IMPACT & DYNAMIC	6200	27300	19250	2300	19250	6200	2300
TORQUE	---	---	21400	---	21400	---	---
PIPING	---	12800	4100	---	4100	---	---
CONDENSER	---	---	63800	---	63800	---	---
TOTAL	18500	94700	147000	6900	147000	18500	6900

LOAD DESCRIPTION	TRANSVERSE REACTIONS (Z - DIRECTION)						
	LOAD LOCATION AT PAD (SEE OUTLINE)						
(FORCE IN POUNDS)	A	B	C	D	E	F	G
DEAD WEIGHT	---	---	---	---	---	---	---
IMPACT & DYNAMIC	---	9700	6950	---	6950	---	---
THERMAL EXPANSION	---	8400	32700	---	32700	---	---
PIPING	---	12800	3200	---	3200	---	---
TOTAL	---	30900	42850	---	42850	---	---

NOTES: 1) THE VERTICAL STEADY STATE LOADS ARE A SUMMATION OF DEAD WEIGHTS, STEADY STATE TORQUE, PIPING, AND VACUUM LOADS. TRANSVERSE AND AXIAL STEADY STATE LOADS ARE SUMMATION OF FRICTION AND PIPING LOADS. DYNAMIC LOADS ARE DUE TO POTENTIAL UNBALANCES, AND ARE AT A FREQUENCY OF 60 HZ ON ALL PADS. IMPACT LOADS ARE THOSE IMPOSED AT MAXIMUM POTENTIAL PEAK TORQUE CONDITIONS. ALL ABOVE LOADS ARE MAXIMUM EXPECTED VALUES.

2) IMPACT LOADS ON PAD B ARE POSITIVE (DOWNWARD FORCE) ON THE F.G. & E SIDE AND NEGATIVE (UPWARD FORCE) ON THE A.D. & C SIDE. IMPACT LOADS ON PADS E, F & G ARE POSITIVE. IMPACT LOADS ON PADS A, C & D ARE NEGATIVE. TOTAL PAD LOADS DO NOT INCLUDE NEGATIVE VALUE LOADS. THEY REFLECT DOWNWARD LOADS ONLY TO SHOW MAXIMUM DOWNWARD FORCES. UPWARD FORCES MUST BE ADDED SEPARATELY.

GENERAL NOTES  
 NOTES FOR CONSTRUCTION OF FOUNDATION

A) THE PROPER QUALITY OF CONCRETE FOR THIS WORK HAS TO BE USED

B) STEEL REINFORCEMENT BURED IN CONCRETE MUST BE PROVIDED IN ACCORDANCE WITH REINFORCED CONCRETE PRACTICE.

C) THE FOUNDATION SHOULD BE SUFFICIENTLY STIFF SO THAT THE MACHINE ERECTION MAY BE EXPEDITIOUSLY AND SATISFACTORILY PERFORMED, AND THE MACHINE ALIGNMENT PERMANENTLY HELD WITHOUT PEAK RESONANT VIBRATION AT OPERATING SPEED. THIS REQUIRES CONSIDERATION OF THE DEFLECTION OF THE FOUNDATION IN THE VERTICAL AND HORIZONTAL DIRECTIONS, AS WELL AS THE STRESSES IN THE MATERIALS. THE FOUNDATION SHOULD HAVE SUFFICIENT RIGIDITY TO MINIMIZE THE POSSIBILITY OF LOCAL SETTLEMENT, LOCAL SETTLEMENT OF ANY PART OF THE FOUNDATION THAT PRODUCES A WARP IN THE TURBINE BASE MAY SERIOUSLY EFFECT THE OPERATION AND MAINTENANCE OF THE MACHINE.

GENERAL ELECTRIC CO. NAVAL & DRIVE TURBINE SYSTEMS DEPT. DOES NOT IMPOSE ANY SPECIFIC DESIGN CRITERIA FOR FOUNDATIONS. GENERAL ELECTRIC CO. INSTRUCTION, "FOUNDATION DESIGN & CONSTRUCTION RECOMMENDATIONS" GEK-19331, ISSUED BY THE MEDIUM STEAM TURBINE DEPT. MAY BE USED AS A GUIDELINE AS IT COVERS THE REQUIREMENTS FOR FOUNDATION DESIGN INCLUDING CRITERIA FOR FOUNDATION STIFFNESS, DEFLECTIONS, RESONANCE AND OTHER DESIGN CONSIDERATIONS.

RESONANT VIBRATION OF THE FOUNDATION AS A WHOLE OR ANY OF ITS PARTS SHOULD BE AVOIDED AS FAR AS POSSIBLE TO PREVENT DAMAGE TO THE STRUCTURE OR EQUIPMENT AND LOSS OF OPERATING EFFICIENCY.

D) THE DEPTH OF EXCAVATION FOR THE FOUNDATION BLOCK MUST BE DECIDED IN RELATION OF THE SOIL CHARACTERISTICS. THE BLOCK MUST BE UPON GROUND SUITABLE FOR FOUNDATION.

E) THE FOUNDATION BLOCK MUST NOT BE JOINED TO ANY OTHER STRUCTURE. THIS IS TO AVOID VIBRATION TRANSMISSION.

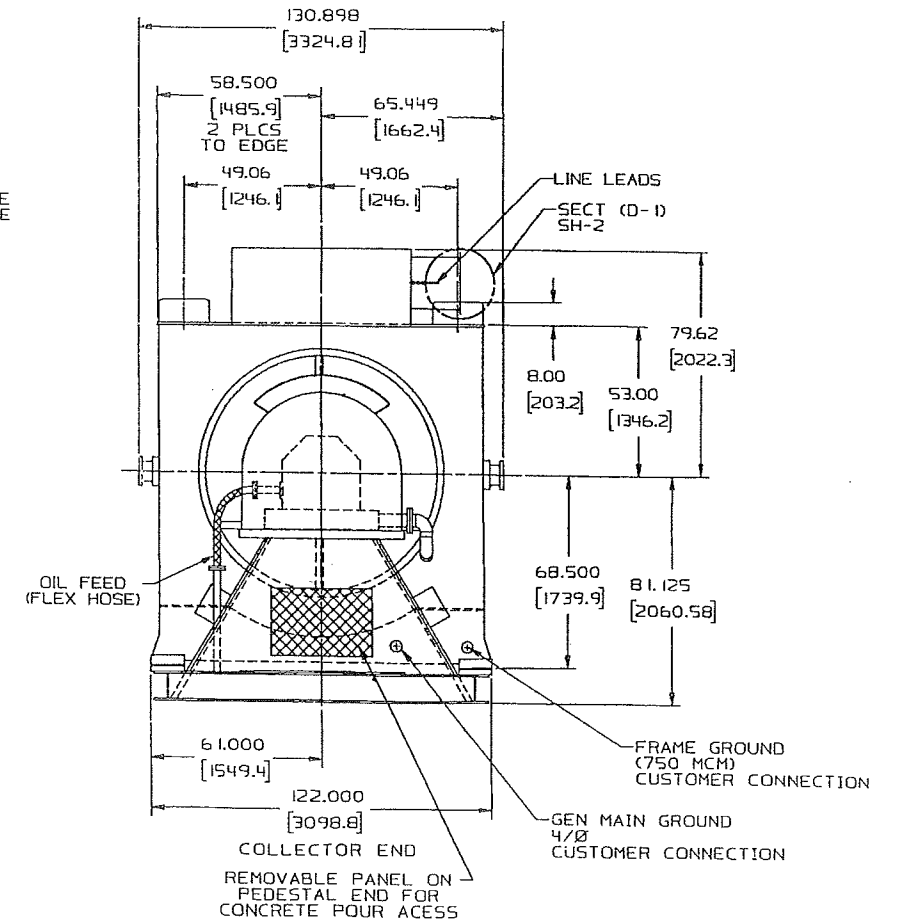
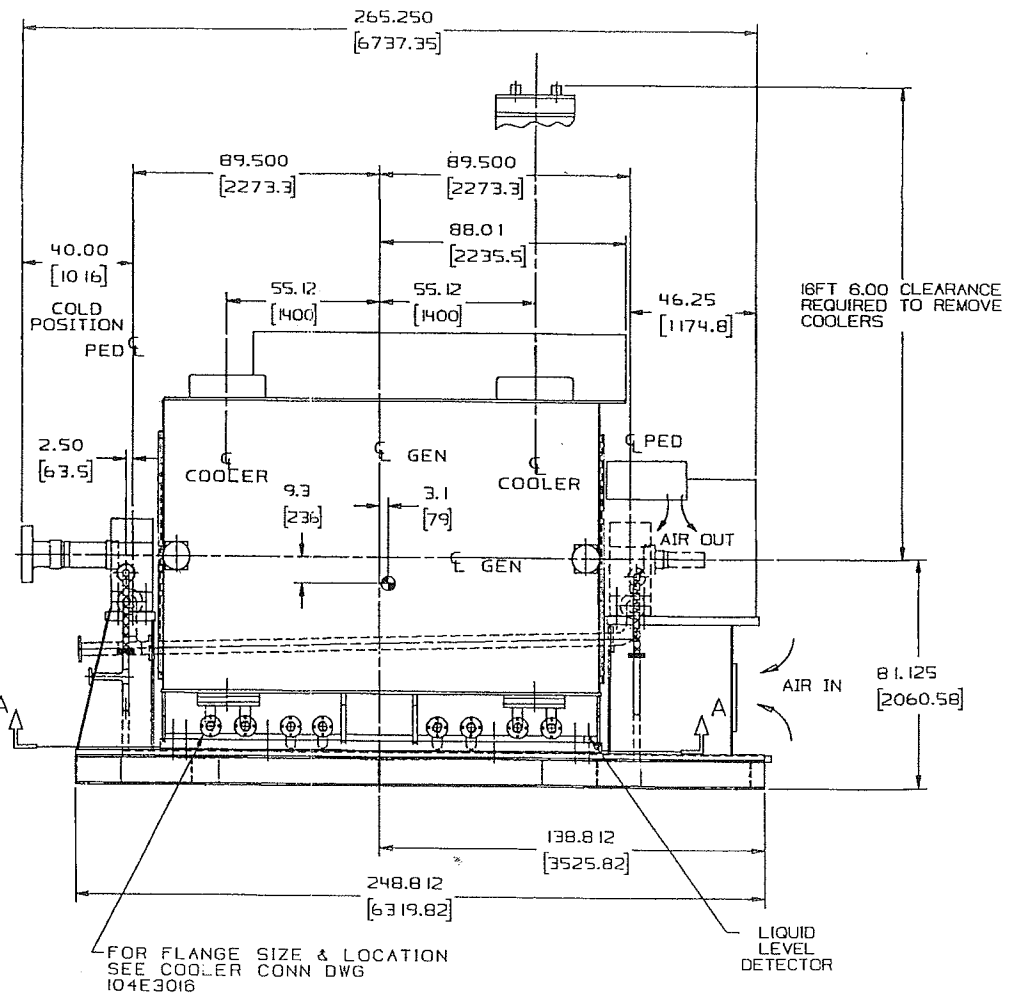
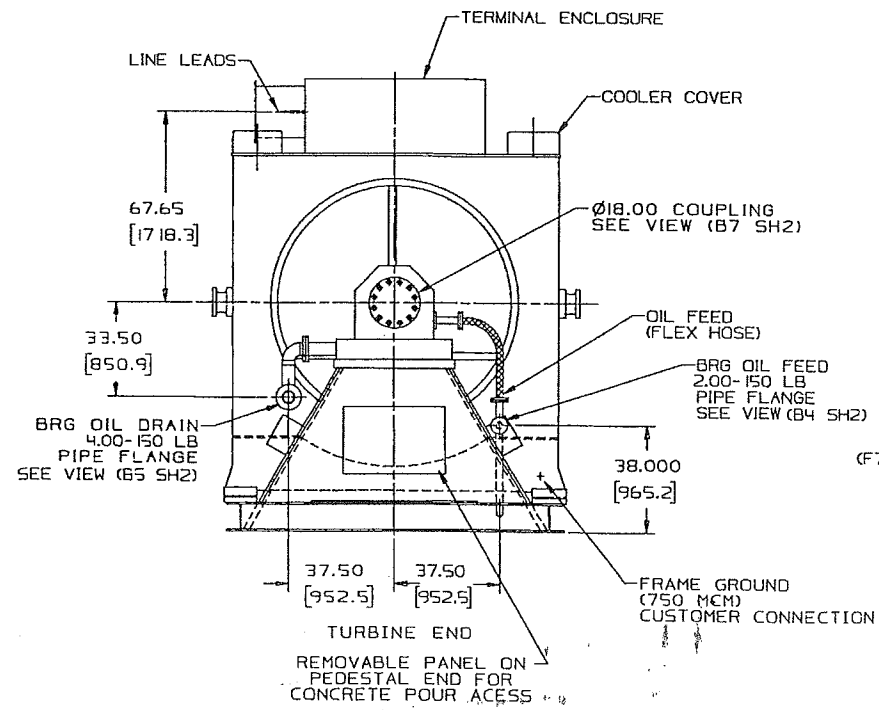
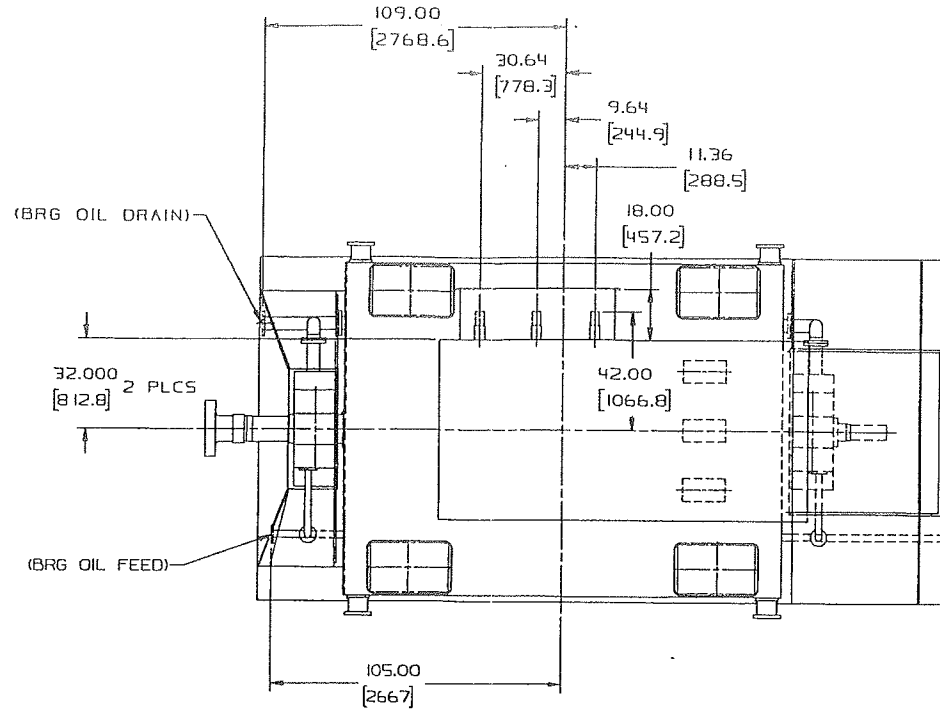
F) ADEQUATE FOUNDATION SUPPORT MUST BE PROVIDED UNDER ALL BASEPLATE PADS.

G) A C.E. APPROVED NON-SHRINKING GROUT TO BE POURED AFTER PLACEMENT OF ALL SUPPORTED MACHINERY.

H) 1.00 JACKING BOLTS ARE INTENDED TO AID IN BASE PLACEMENT. THESE BOLTS SHOULD NEVER BE USED TO SUPPORT THE TOTAL UNIT WEIGHT.

I) FIXATOR LOAD LIMIT IS 15000 LBS. PER FIXATOR.

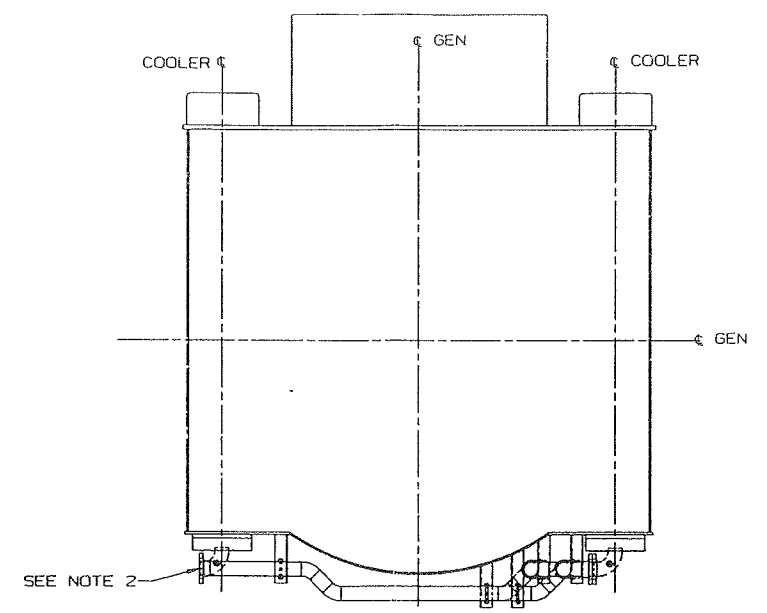
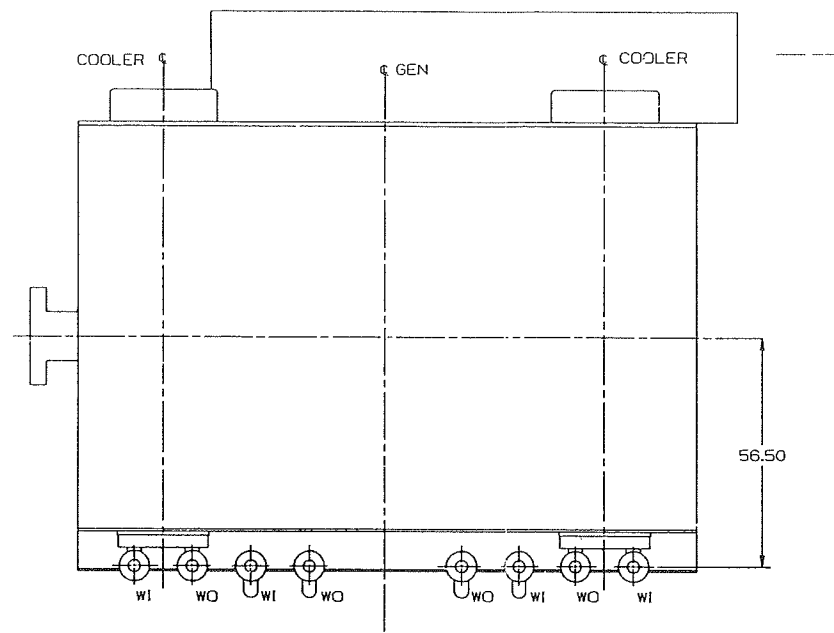
- NOTES:
- 1 FOR COOLING WATER FLANGE CONNECTION LOCATIONS & SIZE, REFER TO CONNECTION OUTLINE 104E3016
  - 2 MOUNTING AND JACKING HOLES FOR FRAME TO BASE
  - 3 FOR FOUNDATION INSTALLATION INSTRUCTIONS SEE GEK-
  - 4 NOTE PRESENCE OF 1 INCH GROUT BARS UNDER BASE I-BEAMS. REFERENCE SHEET 3, ZONES D7 AND E5



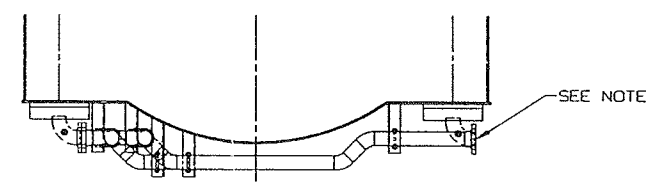
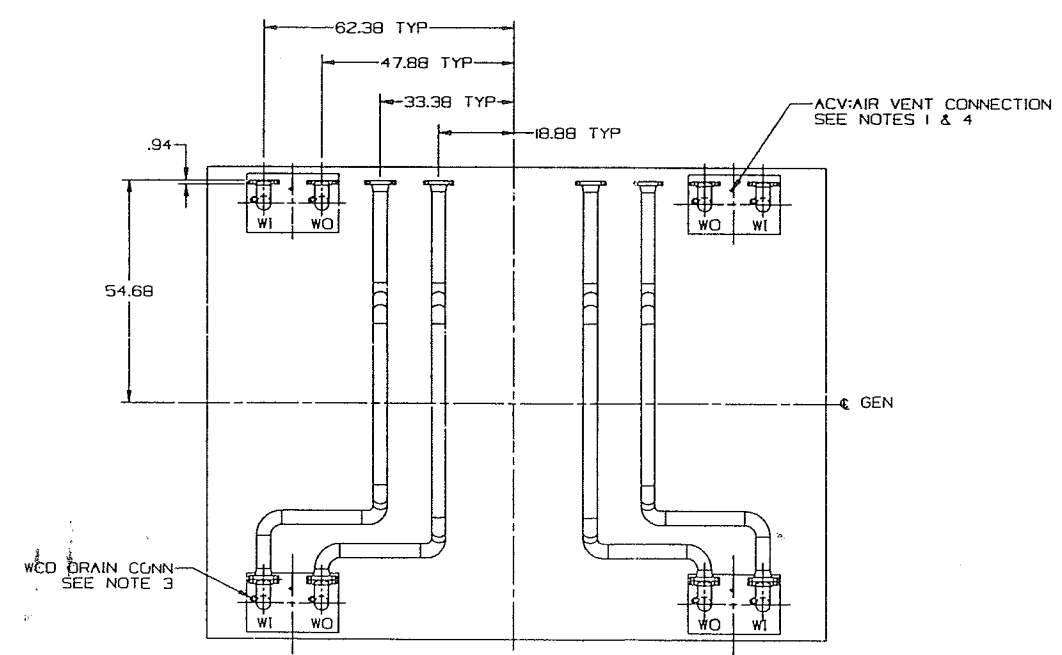
- NOTES
- 1 TO AVOID AIR BINDING CONNECT AVC FROM EACH COOLER SECTION TO VENT LINE AND VALVE TO PERMIT CONTINUOUS DISCHARGE INTO A VISIBLE DRAIN, SUCH AS FUNNEL OR SIGHT FLOW DEVICE
  - 2 PIPING LOAD SHOULD NOT EXCEED 500 LB PER FLANGE. CUSTOMER SHOULD MAKE ALLOWANCES IN PIPING FOR EXPANSION OF .12 INCH
  - 3 WDC: CONNECTION FOR COOLER DRAINS OR TEMP DEVICE, ONE IN EACH INLET AND OUTLET PIPE
  - 4 ACV: AIR VENT CONNECTION. ONE PER COOLER, LOCATION IS APPROX. INSTALL PIPING TO SUIT

COOLER CONNECTION DATA				SYMBOL	DESCRIPTION
H2O CONN	FLANGE	DESIGN H2O	CUST VALVE	WI	WATER INLET
INLET	R.F.	125 PSIG	SHUT OFF	WO	WATER OUTLET
OUTLET	R.F.	125 PSIG	THROTTLING		
DRAINS	.750 NPS	---	SHUT OFF		
AIR VENT	.250 NPS	---	THROTTLING		

PT NO	COOLER WEIGHTS-POUNDS		
	OUTLINE NO	1 EMPTY	4 FULL
1	104E3017	1675	7600



(P01) COOLER EXIT LEFT



(P02) COOLER EXIT RIGHT

WATER FLANGE SPECS

WATER PIPE Ø	3.00
FLANGE OD	7.50
NO OF BOLT HOLES	4
BOLT HOLE Ø	.76
BOLT CIRCLE Ø	6.00
LOCATED AT 45° FROM Ø	