VD01L
Lube Oil Design

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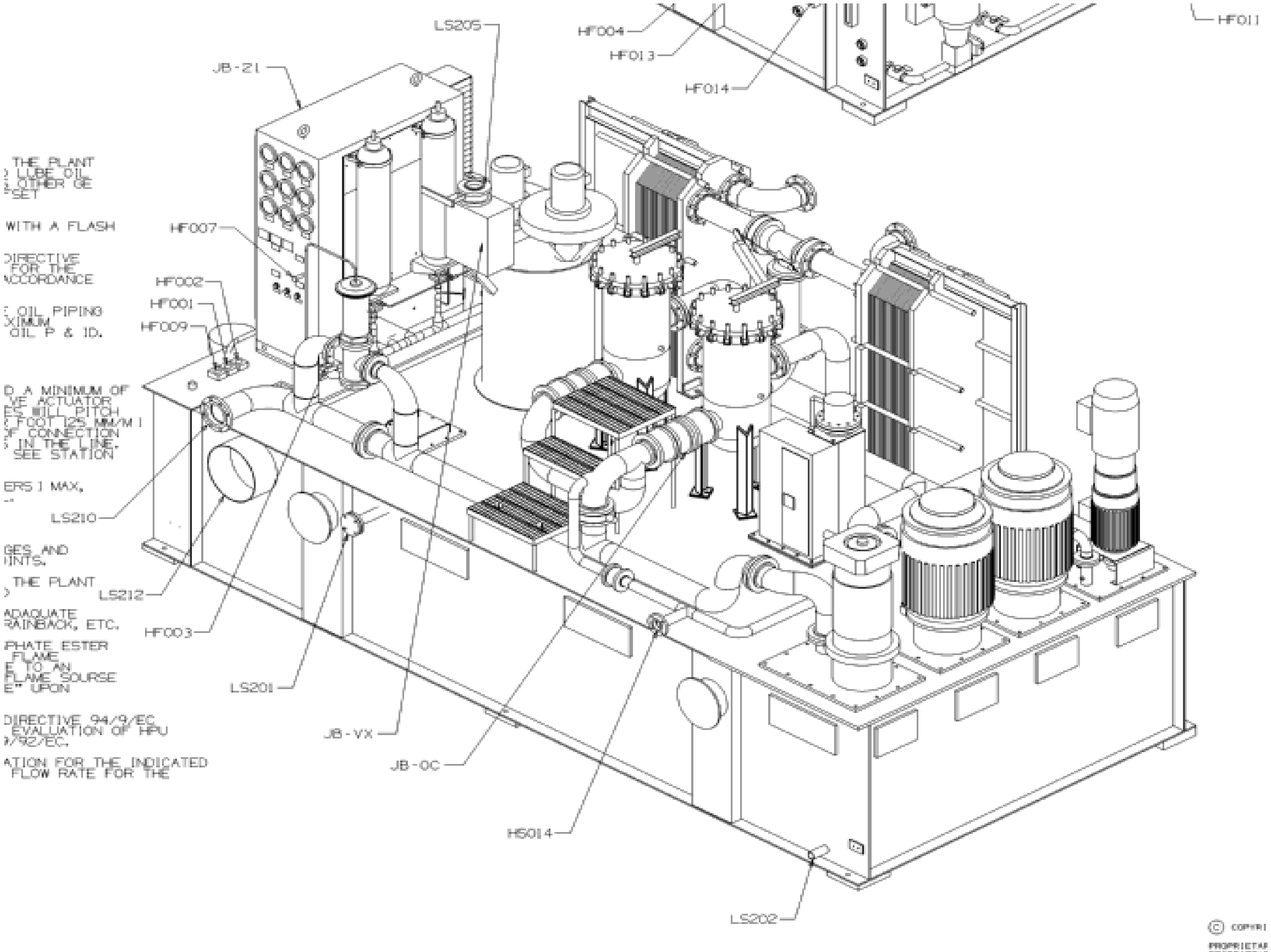
Isometric View



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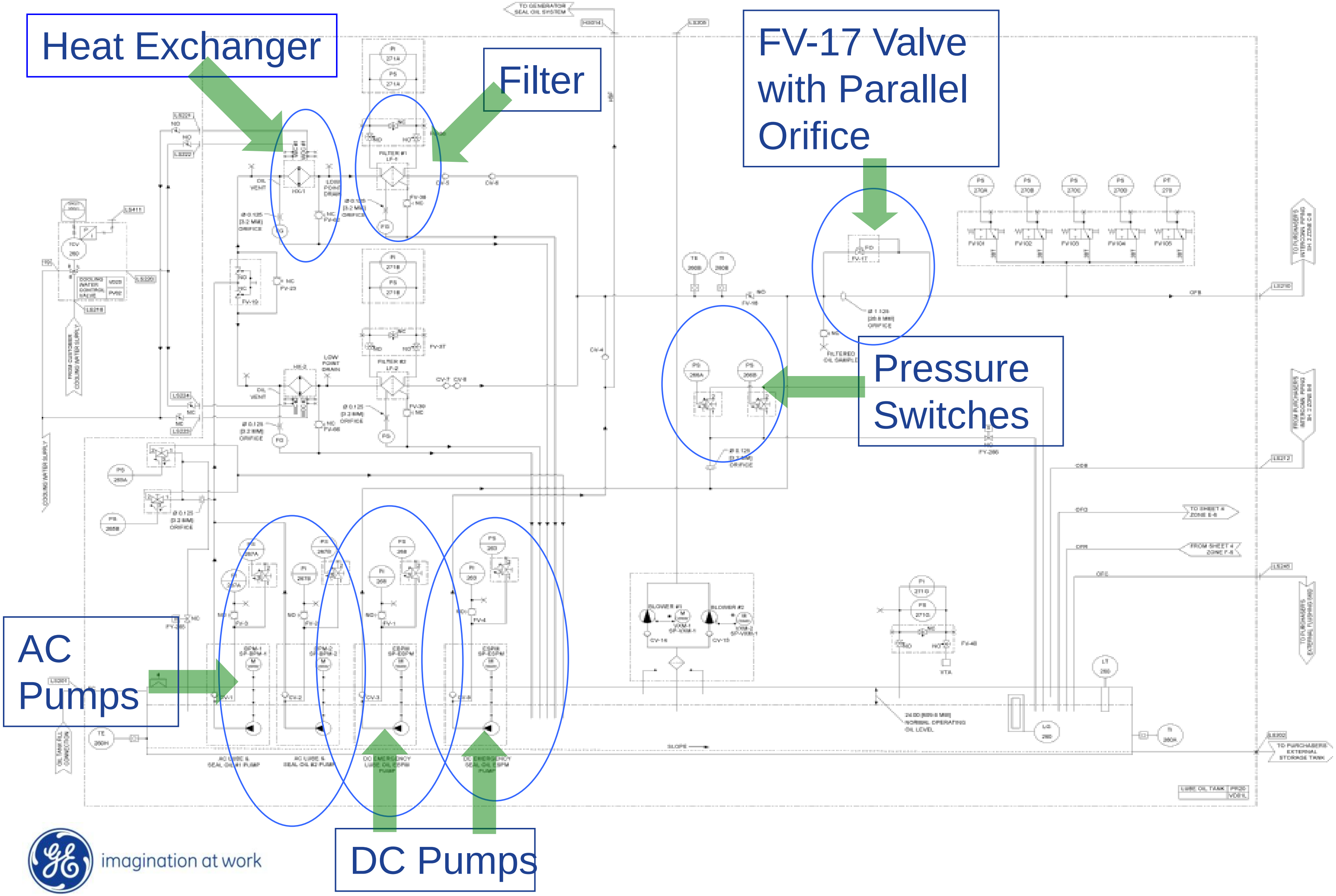
P & ID Example



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Design Input/Purchased Equipment

- LF01 from PEGASUS
- Pump Spec. from e-BOM
- Heat Exchanger Spec. from e-BOM
- Filter Spec. from e-BOM
- Pressure Regulating Valve Spec. from e-BOM

LF01

- Enter PEGASUS
- Enter open project
- Click search and enter Order No. (ex. 270T670)
- Click Steam Turbine Design
- Enter Engineering/Drafting Instructions
- Remove Initials if any
- Change Status to View and Close
- Enter Activity as LF01 and press enter
- Find required inputs/information

Pump Specs

- Enter e-BOM
- Go to search By BOM
- Enter Unit No. (ex. MPL-270T670)
- Enter MLI as PR20 and press Search tab
- Open PR20 Ordering drawing Hyd & LO
- Enter Oil/Hydraulic tank (hardware)
- Enter Lube Oil
- Open Main Lube Oil Pump#1 & #2 Spec. in DART
- Open Pump DC Lube Oil emergency Spec. in DART
- Open Pump DC Seal Oil emergency Spec. in DART

Heat Exchanger Spec

- Enter e-BOM
- Go to search By BOM
- Enter Unit No. (ex. MPL-270T670)
- Enter MLI as PR20 and press Search tab
- Open PR20 Ordering drawing Hyd & LO
- Enter Oil/Hydraulic tank (hardware)
- Enter Lube Oil
- Open Lube Oil Heat Exchanger 1 &2 Spec. in DART

Filter Spec

- Enter e-BOM
- Go to search By BOM
- Enter Unit No. (ex. MPL-270T670)
- Enter MLI as PR20 and press Search tab
- Open PR20 Ordering drawing Hyd & LO
- Enter Oil/Hydraulic tank (hardware)
- Enter Lube Oil
- Open Filter Housing Lube Oil Spec. in DART

Pressure Regulating Valve FV-17

- Enter e-BOM
- Go to search By BOM
- Enter Unit No. (ex. MPL-270T670)
- Enter MLI as PR20 and press Search tab
- Open PR20 Ordering drawing Hyd & LO
- Enter Oil/Hydraulic tank (hardware)
- Enter Lube Oil
- Open Valve Pressure Regulating Spec. in DART

Pressure Switches Spec

- Enter e-BOM
- Go to search By BOM
- Enter Unit No. (ex. MPL-270T670)
- Enter MLI as PR20 and press Search tab
- Open PR20 Ordering drawing Hyd & LO
- Enter Oil/Hydraulic tank (hardware)
- Enter Lube Oil
- Open Pressure Switches Spec. in DART

  In general w/Seal Oil PS 266A/B are at 95 decreasing

  w/o Seal Oil PS 266A/B are at 50 decreasing

Analysis

- Check pump flow:
  Pump Spec. Vs LF01
- Check HE flow:
  Heat Exchanger Spec Vs LF01
- Check Filter Flow:
  Filter Spec Vs LF01
- Check Orifice size with Heat Exchanger in Parallel and pressure drop across orifice:
  Require calculation

270T670

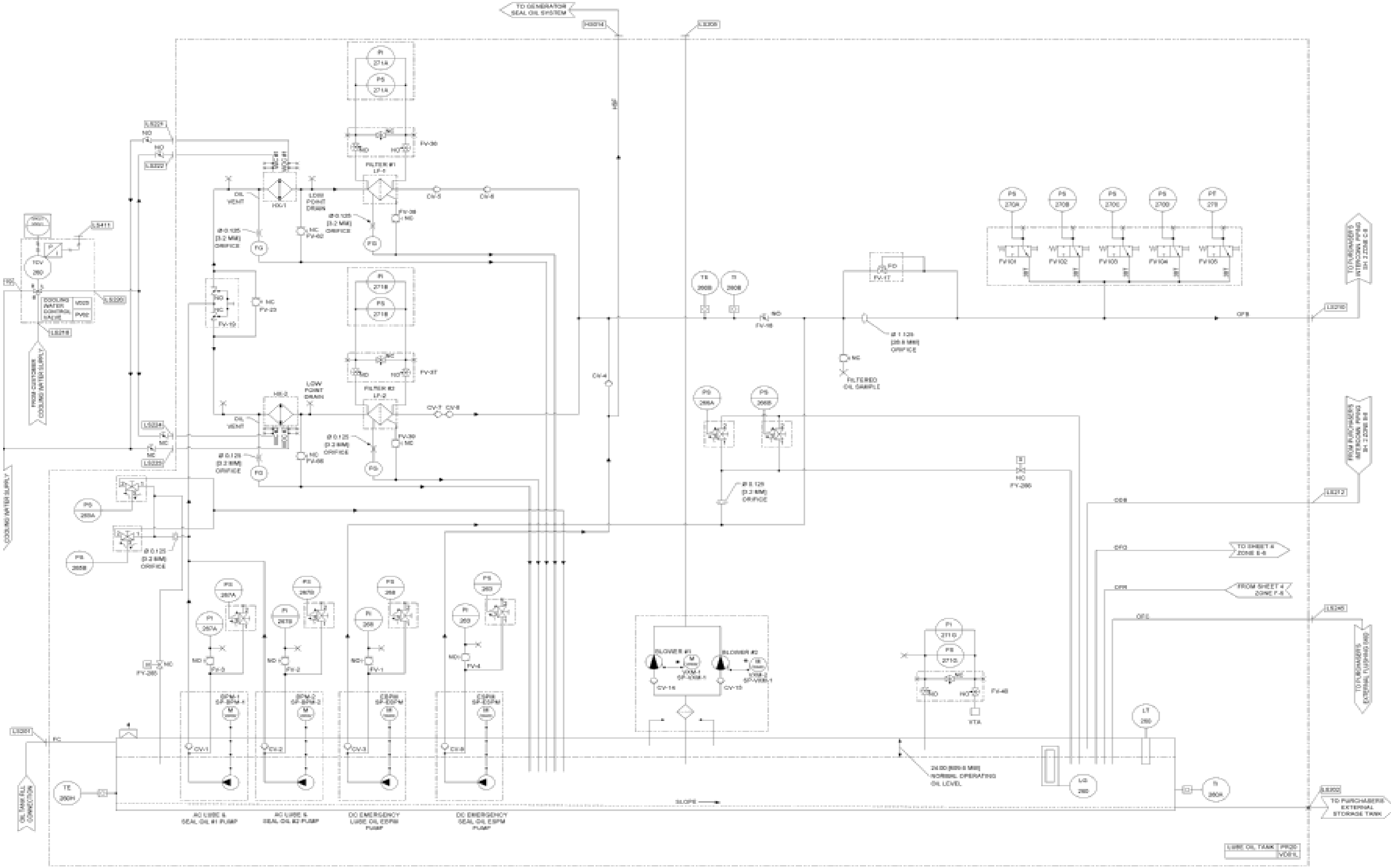
PAC Case

- One AC Pump running
- EBOP & ESOP started automatically
- Low Seal Oil pressure
- Low LO header before bearing header pressure regulator
- Low pressure at Front End Standard
- FV-17 Pressure Regulating Valve 100% open

Control Factors

- FV Valve **100%** open
- Orifice parallel to FV-17 Valve is 1.125 in. dia
- Pressure drop across HE is 18 psig @ actual flow
- Total flow from A.C pump is 1033 GPM
- Max designed dp across HE is 12 psig @ rated flow
- Max designed dp across Filter is 15 psig @ rated flow
- Designed Seal Oil flow is 103 GMP
- Designed Lube Oil flow is 930 GPM
- Min. required Pressure at front end standard is 25 psi during AC pump operation & 12 psi during DC pump operation

P & ID



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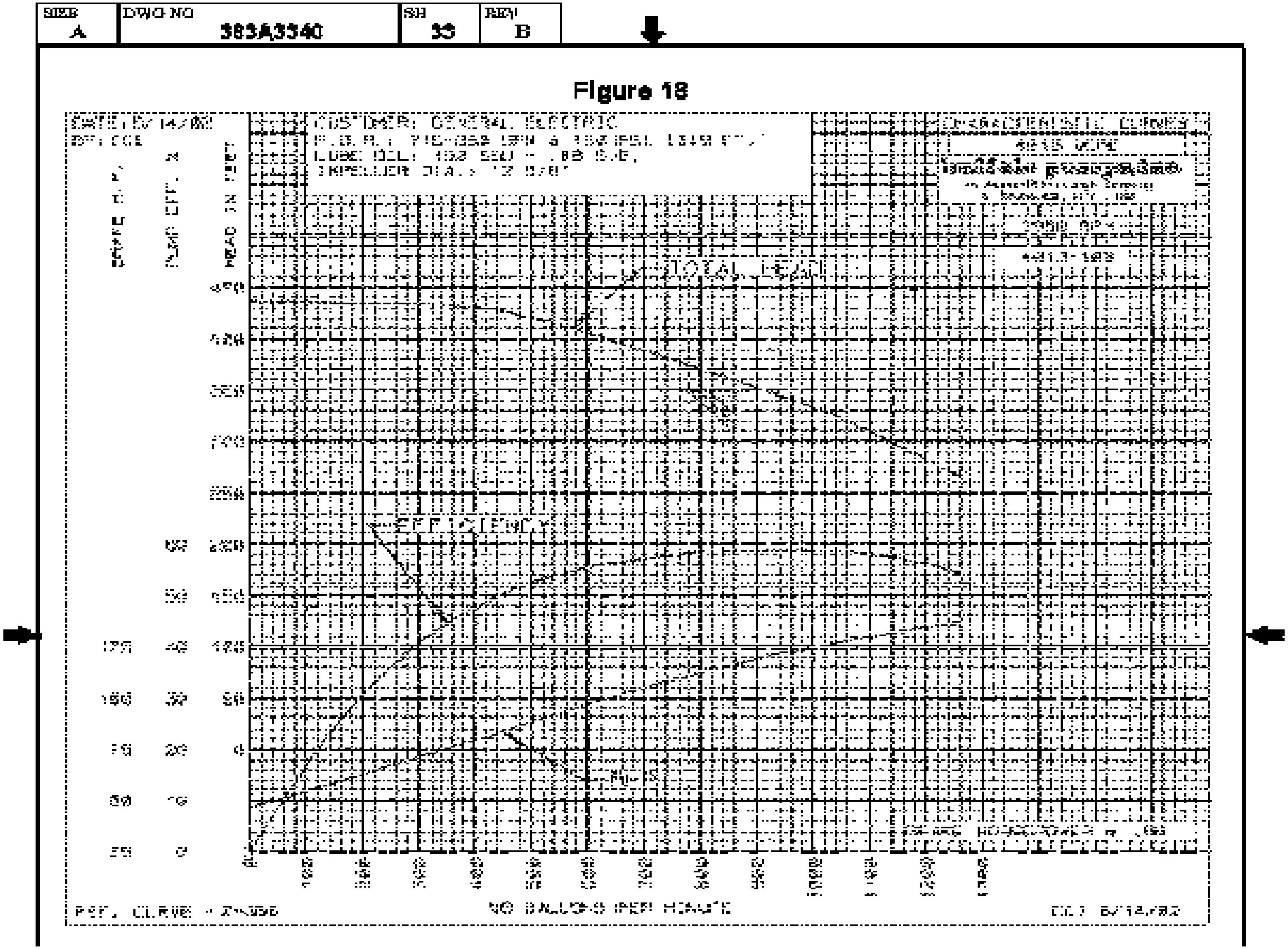
Pump Curve


SIZE
A
DWG NO
383A3340
SH
33
REV
B
Figure 18
CUSTOMER: GENERAL ELECTRIC
TOTAL HEAD
EFFICIENCY
HEAD IN FEET

Pump Data Sheet

GE Part Number	383A3340P0031	383A3340P0032	383A3340P0033	383A3340P0034	383A3340P0035	383A3340P0036
Nominal H2 gas pressure supplied	60	60	60	60	60	60
GPM	400-550	551-715	716-850	400-550	551-715	716-850
PSI	130	130	130	130	130	130
Motor Speed (RPM)	2950	2950	2950	2950	2950	2950
Motor HP	100	100	125	100	100	125
Motor Frequency (Hz)	50	50	50	50	50	50
Space Heater Voltage (VAC)	110	110	110	220	220	220
Impeller Diameter (inches)	11 7/8	12 1/4	12 5/8	11 7/8	12 1/4	12 5/8
Pump Curve	4013-110 (Figure 16)	4013-108 (Figure 17)	4013-109 (Figure 18)	4013-110 (Figure 16)	4013-108 (Figure 17)	4013-109 (Figure 18)
Buffalo Pump Outline	CC16047-147	CC16047-147	CC16047-147	CC16047-147	CC16047-147	CC16047-147
Motor Model #	5KS405ST199 BP	5KS405ST199 BP	LATER	5KS405ST199 BP	5KS405ST199 BP	LATER

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LF01

DETERMINE THE TOTAL FLOW RATE OF THE SYSTEM

For AC Pumps	GPM
FLOW W/O SEAL OIL	846
SEAL OIL FLOW	103.1
COMBINED FLOW	949.1
FLOW W/ 10% NO SEAL	930.6
FLOW W/ 10% + SEAL	1033.7

For DC Pumps	GPM
DC EMERGENCY FLOW	617.58
DC EMG + 10%	679.338
DC EMG + 10% + DCseal	823.038

Heat load	BTU/hr
HEAT LOAD (BTU/HR)	6748435.2
HEAT LOAD WITH MARGIN	7423278.72
MARGIN :	10

Pressure Requirements	P (psig)
H2 Gas pressure	60
Seal oil Differential pressure	5
Height from pump to centerline	15
HSF supply pipe losses	5
Margin	10
For DC situation:	95
Cooler loss	12
Filter loss	15
Pressure Control Valve	4
Check valves	4
For AC situation	130

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Heat Exchanger Data Sheet

SIZE	DWG NO	SH	REV
A	364A7110	16	C

8.2 Ordering Information

Max. Coolant temperature = 105F

GE Part Number	Alfa Laval Part Number	Alfa Laval Model	Number of Plates in Heat Exchanger	Oil Flow (GPM)	Heat Load (KBTU/HR)	Required Coolant Flow (GPM)	Notched Carrying Bar Required
364A7110P0003	GE-MOT-650-003	M15M	84	400-450	2100-2850	512	NO
364A7110P0007	GE-MOT-650-007	M15M	110	400-450	2860-3600	665	YES
364A7110P0006	GE-MOT-650-006	M15M	104	451-500	2600-3500	636	YES
364A7110P0007	GE-MOT-650-007	M15M	110	501-550	2600-3600	629	YES
364A7110P0008	GE-MOT-650-008	M15M	118	551-600	3000-4000	717	YES
364A7110P0009	GE-MOT-650-009	M15M	132	601-650	3400-4400	772	YES
364A7110P0010	GE-MOT-650-010	M15M	142	651-715	3800-4800	850	YES
364A7110P0011	GE-MOT-650-011	M15B	177	716-800	4200-5200	812	YES
364A7110P0012	GE-MOT-650-012	M15B	199	801-850	5100-6100	973	YES

Filter Data Sheet

3.1 Design Requirements

TABLE 1

Part Number	368A9312P001
Design operating pressure (psig)	150 psig
Flow range (gpm)	0 - 750 gpm
Max. vessel pressure drop (vessel only w/ 20 centipoise, 125 F)	3 psid at 750 gpm
Piping connections (two places)	6.00"-150# RF
Internal style	12 cartridges vertically mounted
Filter Cartridge	368A9313P001
Cleaning Instructions (Interior and Exterior)	P4A-AL-1801; SP 6
Painting Instructions (Exterior surfaces)	P6A-AL-0011
Outline (DIS-130)	See tabulation 8.2

Orifice Calculating Sheet

	ORIFICE PLATE SIZING FOR LIQUID FLOW								
	Tung and Mikasinovic, Chemical Engineering, Dec 12, 1983 p 69								
	K vs beta correlation by JNS								
			Find orifice size				Find pressure drop		
	Input Data								
		Flow rate	USgpm	173		Flow rate	USgpm	1270	
		Fluid SG		0.86		Fluid SG		0.86	
		Pipe ID	in	4		Pipe ID	in	8	
		Press. drop	psi	43		Orifice dia	in	6.22	
	Result								
		Orifice dia	in	1.126		Press. drop	psi	2	
	Calcs	Vel	fps	4.405		Vel	fps	8.085	
		Density	pcf	53.66		Density	pcf	53.66	
		Press drop	psf	6192		beta		0.778	
		K		383		k		5	
		beta		0.282		Press drop	psf	265	

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Control Valve Calc.

Table 27. Design ED, Class 125-600, Linear Cage

Linear — Linear Characteristic

Valve Size, Inches	Port Diameter mm	Port Diameter Inches	Maximum Travel[2] mm	Maximum Travel[2] Inches	Flow Coefficient	10	20	30	40	50	60	70	80	90	100	F_L[1]
						Valve Opening—Percent of Total Travel										
1 & 1.25	33.3	1.3125	19	0.75	C_v	3.21	5.50	8.18	10.9	13.2	15.0	16.9	18.6	19.9	20.6	0.84
					K_v	2.78	4.76	7.08	9.43	11.4	13.0	14.6	16.1	17.2	17.8	---
					X_T	0.340	0.644	0.494	0.509	0.532	0.580	0.610	0.629	0.628	0.636	---
1.5	47.6	1.875	19	0.75	C_v	4.23	7.84	11.8	15.8	20.4	25.3	30.3	34.7	37.2	39.2	0.82
					K_v	3.66	6.78	10.2	13.7	17.6	21.9	26.2	30.0	32.2	33.9	---
					X_T	0.656	0.709	0.758	0.799	0.738	0.729	0.708	0.686	0.683	0.656	---
					F_d	0.30	0.37	0.41	0.44	0.44	0.41	0.38	0.35	0.34	0.34	---
	33.3 (3)	1.3125 (3)	19	0.75	C_v	2.92	5.70	9.05	12.5	15.6	18.5	21.1	23.9	26.8	29.2	0.91
					K_v	2.53	4.93	7.83	10.8	13.5	16.0	18.3	20.7	23.2	25.3	---
					X_T	0.690	0.651	0.633	0.634	0.650	0.666	0.708	0.718	0.737	0.733	---
2	58.7	2.3125	29	1.125	C_v	7.87	16.0	24.9	33.4	42.1	51.8	62.0	68.1	70.6	72.9	0.77
					K_v	6.81	13.8	21.5	28.9	36.4	44.8	53.6	58.9	61.1	63.1	---
					X_T	0.641	0.720	0.728	0.767	0.793	0.754	0.683	0.658	0.652	0.638	---
					F_d	0.30	0.35	0.36	0.37	0.37	0.36	0.35	0.35	0.34	0.33	---
	33.3 (3)	1.3125 (3)	19	0.75	C_v	3.53	6.36	9.92	13.3	16.5	19.7	22.7	25.6	29.3	33.3	0.87
					K_v	3.05	5.50	8.58	11.5	14.3	17.0	19.6	22.1	25.3	28.8	---
					X_T	0.456	0.529	0.549	0.582	0.611	0.633	0.671	0.723	0.727	0.694	---
2.5	73.0	2.875	38	1.5	C_v	9.34	21.6	35.5	49.5	62.7	74.1	83.6	93.5	102	108	0.81
					K_v	8.08	18.7	30.7	42.8	54.2	64.1	72.3	80.9	88.2	93.4	---
					X_T	0.680	0.660	0.644	0.669	0.674	0.706	0.716	0.687	0.658	0.641	---
					F_d	0.27	0.33	0.35	0.36	0.35	0.34	0.32	0.29	0.27	0.27	---
	47.6 (3)	1.875 (3)	19	0.75	C_v	4.10	8.09	12.3	16.7	21.1	26.8	33.7	41.3	49.2	57.0	0.84
					K_v	3.55	7.00	10.6	14.4	18.3	23.2	29.2	35.7	42.6	49.3	---
					X_T	0.668	0.646	0.684	0.688	0.698	0.694	0.678	0.668	0.669	0.666	---
3	87.3	3.4375	38	1.5	C_v	14.5	32.9	52.1	70.4	88.5	105	118	133	142	148	0.82
					K_v	12.5	28.5	45.1	60.9	76.6	90.8	102	115	123	128	---
					X_T	0.671	0.699	0.697	0.720	0.733	0.718	0.707	0.650	0.630	0.620	---
					F_d	0.25	0.32	0.35	0.36	0.36	0.36	0.36	0.28	0.29	0.30	---
	58.7 (3)	2.3125 (3)	29	1.125	C_v	8.06	16.9	26.7	37.5	49.0	61.4	73.8	85.3	94.7	102	0.85
					K_v	6.97	14.6	23.1	32.4	42.4	53.1	63.8	73.8	81.9	88.2	---
					X_T	0.592	0.614	0.662	0.672	0.674	0.676	0.694	0.722	0.736	0.732	---
4	111.1	4.375	51	2	C_v	23.3	50.3	78.1	105	127	152	181	203	223	236	0.82
					K_v	20.2	43.5	67.6	90.8	110	131	157	176	193	204	---
					X_T	0.691	0.714	0.720	0.731	0.764	0.757	0.748	0.762	0.732	0.688	---
					F_d	0.31	0.36	0.38	0.38	0.37	0.35	0.32	0.30	0.27	0.28	---
	73.0 (3)	2.875 (3)	38	1.5	C_v	9.77	22.6	37.2	51.8	65.7	77.5	87.5	97.9	107	113	0.84
					K_v	8.45	19.5	32.2	44.8	56.8	67.0	75.7	84.7	92.6	97.7	---
					X_T	0.926	0.899	0.873	0.904	0.919	0.962	0.972	0.937	0.891	0.872	---

1. At 100% travel.
2. If coefficients listed above for the 4-inch linear cage with 51 mm (2-inch) travel are not sufficient for your application, consider using the quick opening cage. The 4-inch quick opening cage with 51 mm (2-inch) travel has approximately a linear characteristic.
3. Restricted trim.

Calculations

- HE rated flow range is 801 to 850 GPM
- Filter rated flow range is 0 to 750 GPM
- AC pump # 1 discharge pressure @ 1033 GPM= 335 ft or 125 psi
- Pressure after Filter #1 = 125 – 18 –15 – 4 = 88 psi
- Upstream pressure of FV-17 = 88 psi
- Required Downstream pressure of FV-17 = 25 + 15 + 5 = 45 psi
- Pressure drop across FV-17 Valve = 88 – 45 = 43 psi
- Calculated flow through Orifice @ 43 psi = 173 GPM
- Flow through FV-17 Valve @ = 930 – 173 = 757 GPM

Calculations

- **Cv = Q/ SQRT(dp/G)**
- Cv = Flow Coefficient
- Q = Flow rate GPM
- dp = Pressure drop across FV-17 psi
- G = Specific Gravity of Oil
- Cv of 4 in. FV-17 Valve = 107
- % of FV-17 Valve open = 90%

Conclusion

- Pump, HE and Filter are not rated for the actual flow
- Check Pressure Setting of PS266A/B

Revised Calculations-1

- AC pump # 1 discharge pressure @ 1033 GPM= 335 ft or 125 psi
- Pressure after Filter # 1 = 125 – **12** –15 – 4 = 94 psi
- Upstream pressure of FV-17 = 94 psi
- Required downstream pressure of FV-17 = 25 + 15 + 5 = 45 psi
- Pressure drop across FV-17 Valve = 94 – 45 = 49 psi
- Lube Oil Flow = 930 GPM
- Flow through Orifice = 0.5* 930 = 465 GPM
  - Assume 50%- 50% flow split among orifice and FV-17 Valve (can be between 40% - 60%)
- Calculated Orifice dia. @ 49 psi = 1.73 in.
- Flow through FV-17 Valve @ 49 psi = 930 – 465 = 465

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Revised Calculations-1

- **Cv = Q/ SQRT(dp/G)**
- Cv = Flow Coefficient
- Q = Flow rate GPM
- dp = Pressure drop across FV-17 psi
- G = Specific Gravity of Oil
- Cv of 4 in. FV-17 Valve @ = 62
- % of FV-17 Valve open @ = 45.5%

Conclusion

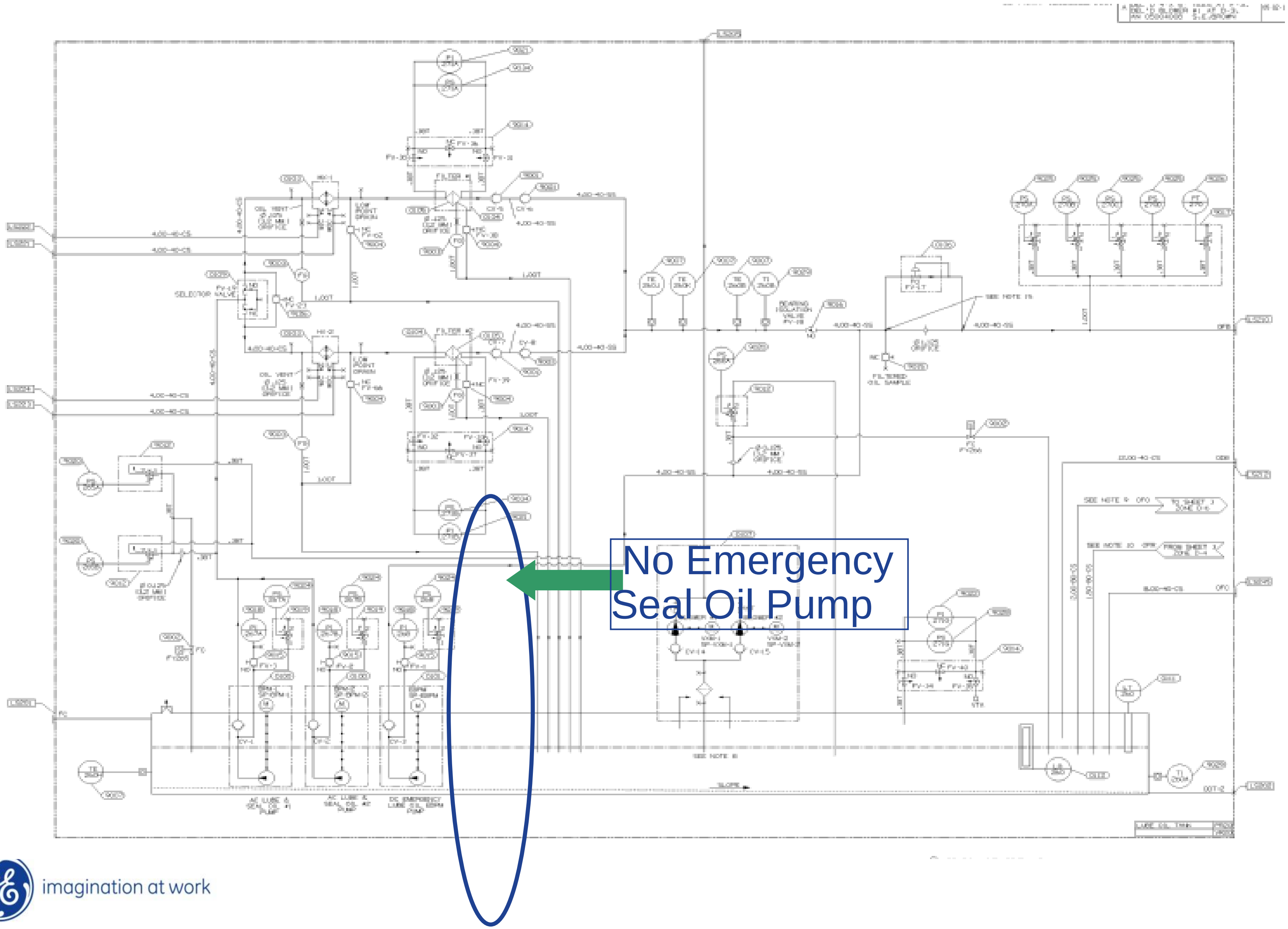
- Change the Orifice dia.
- Increase HE Plates
- Change pressure settings for PS 266A/B or change pressure switch of lo
  dead band.

270T691

PAC Case

- Total designed flow from A.C pump is 315 GPM
- Following observation were made on TG @ 80-85 deg F Oil
- FV Valve **100%** open
- AC Pump # 1 : 22 psig @ Front End Standard & 39 psig @ PT-270
- AC Pump # 1 & 2 : 28 psig @ Front End Standard & 47 psig @ PT-270
- DC Pump : 11 psig @ Front End Standard & 25 psig @ PT-270
- Bearing # 1 Orifice size: not available
- Bearing # 2 Orifice size : 0.813 X 3
- Bearing # 3 Orifice size : 0.266 X 5
- Bearing # 4 Orifice size : 0.266 X 5

P & ID



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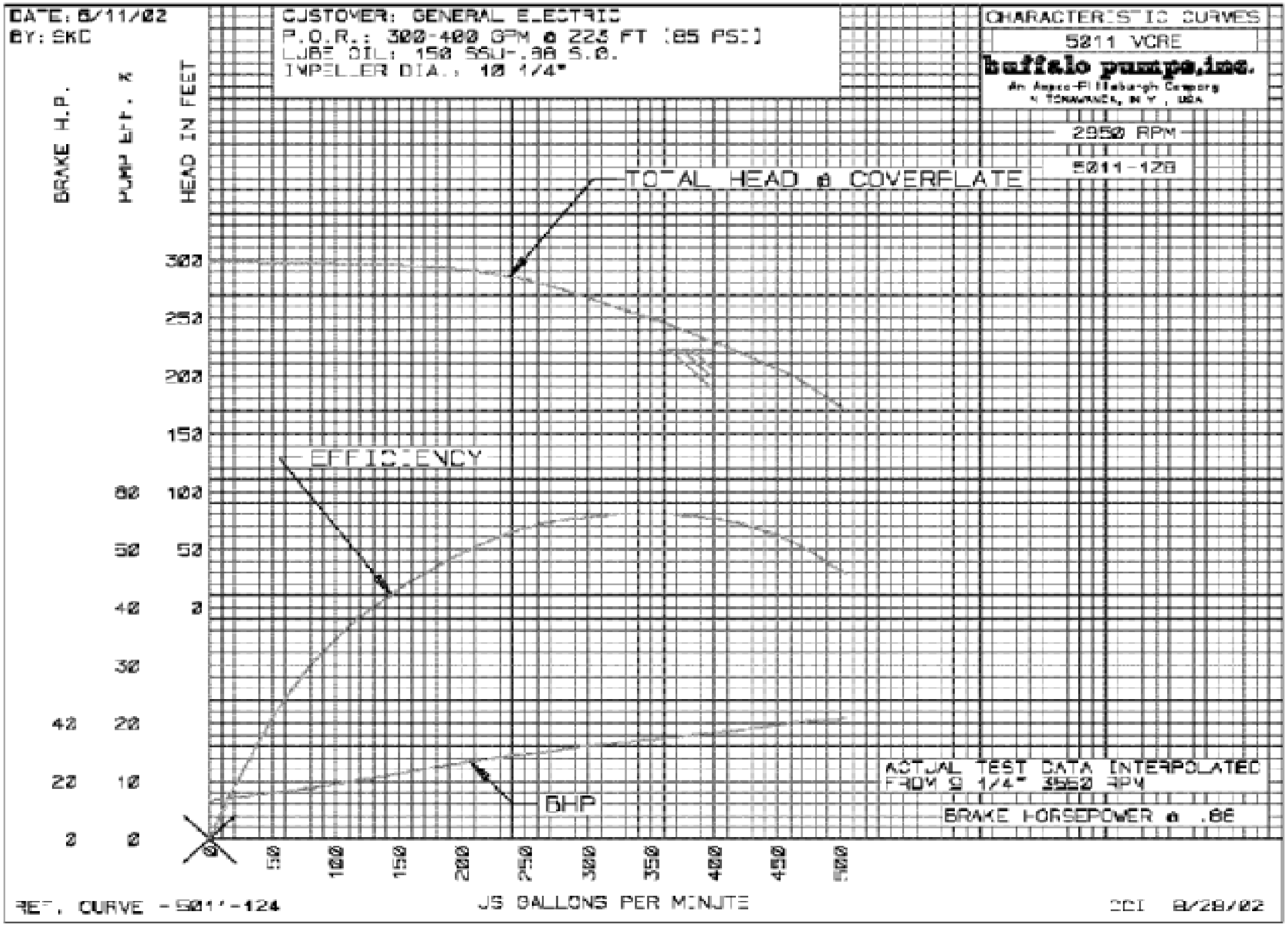
Pump Curve

Figure 4



Pump Data Sheet

380 VAC APPLICATIONS

GE Part Number	383A3360P0013	383A3360P0014	383A3360P0015	383A3360P0016	383A3360P0017	383A3360P0018
Nominal H2 gas pressure supplied	N/A (Air cooled)	30/45	60	N/A (Air cooled)	30/45	60
GPM	300-400	300-400	300-400	300-400	300-400	300-400
PSI	85	115	130	85	115	130
Motor Speed (RPM)	2950	2950	2950	2950	2950	2950
Motor HP	60	75	75	60	75	75
Motor Frequency (Hz)	50	50	50	50	50	50
Space Heater Voltage (VAC)	110	110	110	220	220	220
Impeller Diameter (inches)	10 1/4	10 5/8	11 1/8	10 1/4	10 5/8	11 1/8
Pump Curve	5011-128 (Figure 4)	3013-125 (Figure 5)	3013-126 (Figure 6)	5011-128 (Figure 4)	3013-125 (Figure 5)	3013-126 (Figure 6)
Buffalo Pump Outline						
Motor Model #						

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LF01

DETERMINE THE TOTAL FLOW RATE OF THE SYSTEM

For AC Pumps	GPM
FLOW W/O SEAL OIL	287
SEAL OIL FLOW	0
COMBINED FLOW	287
FLOW W/ 10% NO SEAL	315.7
FLOW W/ 10% + SEAL	315.7

For DC Pumps	GPM
DC EMERGENCY FLOW	209.51
DC EMG + 10%	230.461
DC EMG + 10% + DCseal	230.461

Heat load	BTU/hr
HEAT LOAD (BTU/HR)	2124254.4
HEAT LOAD WITH MARGIN	2336679.84
MARGIN :	10

AIR COOLED GENERATOR

Pressure Requirements	P (psig)
Bearing Header pressure	25
Height from pump to centerline	15
Margin	10
For DC situation:	50
Cooler loss	12
Filter loss	15
Pressure Control Valve	4
Check valve losses	4
For AC situation	85

Orifice Calculating Sheet

	ORIFICE PLATE SIZING FOR LIQUID FLOW								
	Tung and Mikasinovic, Chemical Engineering, Dec 12, 1983 p 69								
	K vs beta correlation by JNS								
			Find orifice size				Find pressure drop		
	Input Data								
		Flow rate	USgpm	83		Flow rate	USgpm	1270	
		Fluid SG		0.86		Fluid SG		0.86	
		Pipe ID	in	4		Pipe ID	in	8	
		Press. drop	psi	10		Orifice dia	in	6.22	
	Result								
		Orifice dia	in	1.124		Press. drop	psi	2	
	Calcs	Vel	fps	2.114		Vel	fps	8.085	
		Density	pcf	53.66		Density	pcf	53.66	
		Press drop	psf	1440		beta		0.778	
		K		387		k		5	
		beta		0.281		Press drop	psf	265	

Control Valve Calc

Table 27. Design ED, Class 125-600, Linear Cage

Linear — Linear Characteristic

Valve Size, Inches	Port Diameter mm	Port Diameter Inches	Maximum Travel[2] mm	Maximum Travel[2] Inches	Flow Coefficient	10	20	30	40	50	60	70	80	90	100	F_L[1]
1 & 1.25	33.3	1.3125	19	0.75	C_v	3.21	5.50	8.18	10.9	13.2	15.0	16.9	18.6	19.9	20.6	0.84
					K_v	2.78	4.76	7.08	9.43	11.4	13.0	14.6	16.1	17.2	17.8	---
					X_T	0.340	0.644	0.494	0.509	0.532	0.580	0.610	0.629	0.628	0.636	---
1.5	47.6	1.875	19	0.75	C_v	4.23	7.84	11.8	15.8	20.4	25.3	30.3	34.7	37.2	39.2	0.82
					K_v	3.66	6.78	10.2	13.7	17.6	21.9	26.2	30.0	32.2	33.9	---
					X_T	0.656	0.709	0.758	0.799	0.738	0.729	0.708	0.686	0.683	0.656	---
					F_d	0.30	0.37	0.41	0.44	0.44	0.41	0.38	0.35	0.34	0.34	---
	33.3 (3)	1.3125 (3)	19	0.75	C_v	2.92	5.70	9.05	12.5	15.6	18.5	21.1	23.9	26.8	29.2	0.91
					K_v	2.53	4.93	7.83	10.8	13.6	16.0	18.3	20.7	23.2	25.3	---
					X_T	0.690	0.651	0.633	0.634	0.650	0.666	0.708	0.718	0.737	0.733	---
2	58.7	2.3125	29	1.125	C_v	7.87	16.0	24.9	33.4	42.1	51.8	62.0	68.1	70.6	72.9	0.77
					K_v	6.81	13.8	21.5	28.9	36.4	44.8	53.6	58.9	61.1	63.1	---
					X_T	0.641	0.720	0.728	0.767	0.793	0.754	0.683	0.658	0.652	0.638	---
					F_d	0.30	0.35	0.36	0.37	0.37	0.36	0.35	0.35	0.34	0.33	---
	33.3 (3)	1.3125 (3)	19	0.75	C_v	3.53	6.36	9.92	13.3	16.5	19.7	22.7	25.6	29.3	33.3	0.87
					K_v	3.05	5.50	8.58	11.5	14.3	17.0	19.6	22.1	25.3	28.8	---
					X_T	0.456	0.529	0.549	0.582	0.611	0.633	0.671	0.723	0.727	0.694	---
2.5	73.0	2.875	38	1.5	C_v	9.34	21.6	35.5	49.5	62.7	74.1	83.6	93.5	102	108	0.81
					K_v	8.08	18.7	30.7	42.8	54.2	64.1	72.3	80.9	88.2	93.4	---
					X_T	0.680	0.660	0.644	0.669	0.674	0.706	0.716	0.687	0.658	0.641	---
					F_d	0.27	0.33	0.35	0.36	0.35	0.34	0.32	0.29	0.27	0.27	---
	47.6 (3)	1.875 (3)	19	0.75	C_v	4.10	8.09	12.3	16.7	21.1	26.8	33.7	41.3	49.2	57.0	0.84
					K_v	3.55	7.00	10.6	14.4	18.3	23.2	29.2	35.7	42.6	49.3	---
					X_T	0.668	0.646	0.684	0.688	0.698	0.694	0.678	0.668	0.669	0.666	---
3	87.3	3.4375	38	1.5	C_v	14.5	32.9	52.1	70.4	88.5	105	118	133	142	148	0.82
					K_v	12.5	28.5	45.1	60.9	76.6	90.8	102	115	123	128	---
					X_T	0.671	0.699	0.697	0.720	0.733	0.718	0.707	0.650	0.630	0.620	---
					F_d	0.25	0.32	0.35	0.36	0.36	0.36	0.36	0.28	0.29	0.30	---
	58.7 (3)	2.3125 (3)	29	1.125	C_v	8.06	16.9	26.7	37.5	49.0	61.4	73.8	85.3	94.7	102	0.86
					K_v	6.97	14.6	23.1	32.4	42.4	53.1	63.8	73.8	81.9	88.2	---
					X_T	0.592	0.614	0.662	0.672	0.674	0.676	0.694	0.722	0.736	0.732	---
4	111.1	4.375	51	2	C_v	23.3	50.3	78.1	105	127	152	181	[illegible]	223	236	0.82
					K_v	20.2	43.5	67.6	90.8	110	131	157	176	193	204	---
					X_T	0.691	0.714	0.720	0.731	0.764	0.757	0.748	0.762	0.732	0.688	---
					F_d	0.31	0.36	0.38	0.38	0.37	0.35	0.32	0.30	0.27	0.28	---
	73.0 (3)	2.875 (3)	38	1.5	C_v	9.77	22.6	37.2	51.8	65.7	77.5	87.5	97.9	107	113	0.84
					K_v	8.45	19.5	32.2	44.8	56.8	67.0	75.7	84.7	92.5	97.7	---
					X_T	0.926	0.899	0.873	0.904	0.919	0.962	0.972	0.937	0.891	0.872	---

1. At 100% travel.
2. If coefficients listed above for the 8-inch linear cage with 51 mm (2-inch) travel are not sufficient for your application, consider using the quick opening cage. The 8-inch quick opening cage with 51 mm (2-inch) travel has approximately a linear characteristic.
3. Restricted trim.

Control Factors

- AC Pump flow is 315 GPM
- Seal Oil flow is 0 GPM
- Orifice parallel to FV-17 Valve dia is 1.125 in.
- Max designed dp across HE is 12 psi @ rated flow
- Max designed dp across Filter is 15 psi @ rated flow
- Max designed dp across Check Valves is 4 psi
- Min. required Pressure at Front End Standard is 25 psi during AC Pump operation & 12 psi during DC Pump operation

Calculations

- HE flow range is 651 to 715 GPM
- Filter flow range is 0 to 700 GPM
- AC Pump discharge pressure is 86 psi.
- Upstream pressure of FV-17 = 86 - 12 - 15 – 4 = 55 psi.
- Required downstream pressure of FV-17 = 25 + 5 + 15 = 45 psi
- Downstream pressure of FV-17 = 45 psi
- Pressure drop across FV-17 = 55 – 45 = 10 psi
- Flow through Orifice @ 10 psi = 83 GPM
- Flow through FV-17 = 315 – 79 = 232 GPM

imagination at work

Calculations

- Cv = Q/ SQRT(dp/G)
- Cv = Flow Coefficient
- Q = Flow rate GPM
- dp = Pressure drop across FV-17 psi
- G = Specific Gravity of Oil
- Cv of 4 in. FV-17 @ 232 GPM = 68
- % of FV-17 Valve open @ 232 GPM = 53 %

Conclusion

- Pump is good
- Heat Exchanger is good
- Filter is good
- Orifice dia. is good
- LUBE OIL system is good
- Problem is not on our skid (Orifice in Bearing # 1 missing)