Power Generation

Recommended Generator Report - 400DFEH*

Project - Village of Lombard - Civic Center

Comments -

Project Requirements

Frequency, Hz	: 60.0	**Generators Running in Parallel**	: 1
Duty	: Standby	**Site Altitude, ft(m)**	: 720(219)
Voltage	: 277/480, Series Wye	**Site Temperature, °C**	: 25
Phase	: 3	**Max. Altr Temp Rise, °C**	: 125
Fuel	: Diesel	**Project Voltage Distortion Limit, %**	:
Emissions	: EPA, stationary emergency application		

Calculated Individual Generator Set Load Running and Peak Requirements

Running kW	: 344.6	**Max. Step kW**	: 143.4 In Step 1	**Cumulative Step kW**	: 411.8
Running kVA	: 382.9	**Max. Step kVA**	: 295.0 In Step 3	**Cumulative Step kVA**	: 631.4
Running PF	: 0.9	**Peak kW**	: None	**Cumulative Peak kW**	: None
Running NLL kVA	: 0.0	**Peak kVA**	: None	**Cumulative Peak kVA**	: None
				Pct Rated Capacity	: 86.2

Generator Set Configuration

Alternator	: HC5E	**Engine**	: QSX15-G9 Nonroad 2
BCode	: B259	**Fuel**	: Diesel
Excitation	: PMG	**Displacement, cu in. (Litre)**	: 912(15)
Voltage Range	: ER 190-240/380-480	**Cylinders**	: 6
Number of Leads	: 12	**Altitude Knee, ft(m)**	: 8530(2600)
Reconnectable	: Yes	**Altitude Slope, % per 1000ft(304.8m)**	: 6
Full Single Phase Output	: No	**Temperature Knee, °F(°C)**	: 104(40)
Increased Motor Starting	: No	**Temperature Slope, % per 10°F(5.56°C)**	: 6
Extended Stack	: No	**Emissions**	: EPA Tier 2

Set Performance

Running At	: 86.2% Rated Capacity
Max. Step Voltage Dip, %	: 6
Max. Step Frequency Dip, %	: 3
Peak Voltage Dip, %	:
Peak Frequency Dip, %	:
Site Rated Standby kW/kVA	: 400 / 500
Site Rated Max. SkW	: 518
Max. SkVA	: 1766
Temp Rise at Full Load, °C	: 105
Voltage Distortion	:

Load Requirements

Max. Allowed Step Voltage Dip	: 20 In Step 1
Max. Allowed Step Frequency Dip	: 10 In Step 1
Peak Voltage Dip Limit %	: 20.0
Peak Frequency Dip Limit %	: 10
Running kW	: 344.6
Running kVA	: 382.9
Effective Step kW	: 354.1
Effective Step kVA	: 631.4
Percent Non-Linear Load	: 0.0
Voltage Distortion Limit	:

*Note: Higher temperature rise at full rated load.

Note: All generator set power derates are based on open generator sets.

Power Generation

Loads and Steps Detail Report

Project - Village of Lombard - Civic Center

Comments -

Project Requirements

Frequency, Hz	: 60.0	**Generators Running in Parallel**	: 1
Duty	: Standby	**Site Altitude, ft(m)**	: 720(219)
Voltage	: 277/480, Series Wye	**Site Temperature, °C**	: 25
Phase	: 3	**Max. Altr Temp Rise, °C**	: 125
Fuel	: Diesel	**Project Voltage Distortion Limit, %**	:
Emissions	: EPA, stationary emergency application		

Calculated Individual Generator Set Load Running and Peak Requirements

Running kW	: 344.6	**Max. Step kW**	: 143.4 In Step 1	**Cumulative Step kW**	: 411.8
Running kVA	: 382.9	**Max. Step kVA**	: 295.0 In Step 3	**Cumulative Step kVA**	: 631.4
Running PF	: 0.9	**Peak kW**	: None	**Cumulative Peak kW**	: None
Running NLL kVA	: None	**Peak kVA**	: None	**Cumulative Peak kVA**	: None

Step1

Calculated Individual Generator Set Step Load Requirements

Running kW	: 143.0	**Starting kW**	: 143.0	**Cumulative Step kW**	: 143.0
Running kVA	: 159.0	**Starting kVA**	: 159.0	**Cumulative Step kVA**	: 159.0
Running Amps	: 192.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				
Voltage Distortion Limit for step	: 0				

Misc. Three Phase Quantity : 1 In this Step

Category : General Receptacle

Running kW	: 143.44	**Starting kW**	: 143.44	**Peak kW**	: None
Running kVA	: 159.38	**Starting kVA**	: 159.38	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.9	**Cyclic**	: No
Running Amps	: 191.93	**Max. % Voltage Dip**	: 20.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Step2

Calculated Individual Generator Set Step Load Requirements

Running kW	: 34.0	**Starting kW**	: 90.0	**Cumulative Step kW**	: 233.0
Running kVA	: 37.0	**Starting kVA**	: 236.0	**Cumulative Step kVA**	: 395.0
Running Amps	: 45.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				

Voltage Distortion Limit for step	: 0				

Well Pump #10 Three Phase Quantity : 1 In this Step

Category : Motor

Running kW	: 33.53	**Starting kW**	: 89.68	**Peak kW**	: None
Running kVA	: 37.26	**Starting kVA**	: 236.0	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.38	**Cyclic**	: No
Running Amps	: 44.87	**Max. % Voltage Dip**	: 35.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Shaft Hp	: 40.0	**Method**	: Across the line
Shaft kW	: 29.84	**Low Inertia**	: No
Efficiency (%)	: 0.89	**LRkVA Factor**	: 5.9
Design	: Standard NEMA Design B,C or D	**LRkVA Code**	: G

Step3

Calculated Individual Generator Set Step Load Requirements

Running kW	: 42.0	**Starting kW**	: 109.0	**Cumulative Step kW**	: 286.0
Running kVA	: 47.0	**Starting kVA**	: 295.0	**Cumulative Step kVA**	: 492.0
Running Amps	: 56.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				
Voltage Distortion Limit for step	: 0				

Res. Pump Three Phase Quantity : 1 In this Step

Category : Motor

Running kW	: 41.91	**Starting kW**	: 109.15	**Peak kW**	: None
Running kVA	: 46.57	**Starting kVA**	: 295.0	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.37	**Cyclic**	: No
Running Amps	: 56.08	**Max. % Voltage Dip**	: 35.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Shaft Hp	: 50.0	**Method**	: Across the line
Shaft kW	: 37.3	**Low Inertia**	: No
Efficiency (%)	: 0.89	**LRkVA Factor**	: 5.9
Design	: Standard NEMA Design B,C or D	**LRkVA Code**	: G

Step4

Calculated Individual Generator Set Step Load Requirements

Running kW	: 42.0	**Starting kW**	: 109.0	**Cumulative Step kW**	: 328.0
Running kVA	: 47.0	**Starting kVA**	: 295.0	**Cumulative Step kVA**	: 538.0
Running Amps	: 56.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				
Voltage Distortion Limit for step	: 0				

Res. Pump Three Phase Quantity : 1 In this Step

Category : Motor

Running kW	: 41.91	**Starting kW**	: 109.15	**Peak kW**	: None
Running kVA	: 46.57	**Starting kVA**	: 295.0	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.37	**Cyclic**	: No
Running Amps	: 56.08	**Max. % Voltage Dip**	: 35.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Shaft Hp	: 50.0	**Method**	: Across the line
Shaft kW	: 37.3	**Low Inertia**	: No
Efficiency (%)	: 0.89	**LRkVA Factor**	: 5.9
Design	: Standard NEMA Design B,C or D	**LRkVA Code**	: G

Step5

Calculated Individual Generator Set Step Load Requirements

Running kW	: 42.0	**Starting kW**	: 109.0	**Cumulative Step kW**	: 370.0
Running kVA	: 47.0	**Starting kVA**	: 295.0	**Cumulative Step kVA**	: 585.0
Running Amps	: 56.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				
Voltage Distortion Limit for step	: 0				

Res. Pump	Three Phase	Quantity	: 1 In this Step
Category	: Motor		

Running kW	: 41.91	**Starting kW**	: 109.15	**Peak kW**	: None
Running kVA	: 46.57	**Starting kVA**	: 295.0	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.37	**Cyclic**	: No
Running Amps	: 56.08	**Max. % Voltage Dip**	: 35.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Shaft Hp	: 50.0	**Method**	: Across the line
Shaft kW	: 37.3	**Low Inertia**	: No
Efficiency (%)	: 0.89	**LRkVA Factor**	: 5.9
Design	: Standard NEMA Design B,C or D	**LRkVA Code**	: G

Step6

Calculated Individual Generator Set Step Load Requirements

Running kW	: 42.0	**Starting kW**	: 109.0	**Cumulative Step kW**	: 412.0
Running kVA	: 47.0	**Starting kVA**	: 295.0	**Cumulative Step kVA**	: 631.0
Running Amps	: 56.0	**Starting Non-linear kVA**	: 0.0		
Running Non-linear kVA	: 0.0				
Voltage Distortion Limit for step	: 0				

Res. Pump	Three Phase	Quantity	: 1 In this Step
Category	: Motor		

Running kW	: 41.91	**Starting kW**	: 109.15	**Peak kW**	: None
Running kVA	: 46.57	**Starting kVA**	: 295.0	**Peak kVA**	: None
Running PF	: 0.9	**Starting PF**	: 0.37	**Cyclic**	: No
Running Amps	: 56.08	**Max. % Voltage Dip**	: 35.0	**Max. % Frequency Dip**	: 10.0
				Voltage	: 480

Shaft Hp	: 50.0	**Method**	: Across the line
Shaft kW	: 37.3	**Low Inertia**	: No
Efficiency (%)	: 0.89	**LRkVA Factor**	: 5.9
Design	: Standard NEMA Design B,C or D	**LRkVA Code**	: G

Power Generation

Steps and Dips Details Report

Project - Village of Lombard - Civic Center

Project Requirements

Frequency, Hz	: 60.0	**Generators Running in Parallel**	: 1
Duty	: Standby	**Site Altitude, ft(m)**	: 720(219)
Voltage	: 277/480, Series Wye	**Site Temperature, °C**	: 25
Phase	: 3	**Max. Altr Temp Rise, °C**	: 125
Fuel	: Diesel	**Project Voltage Distortion Limit, %**	:
Emissions	: EPA, stationary emergency application		

Calculated Individual Generator Set Load Running and Peak Requirements

Running kW	: 344.6	**Max. Step kW**	: 143.4 In Step 1	**Cumulative Step kW**	: 411.8
Running kVA	: 382.9	**Max. Step kVA**	: 295.0 In Step 3	**Cumulative Step kVA**	: 631.4
Running PF	: 0.9	**Peak kW**	: None	**Cumulative Peak kW**	: None
Running NLL kVA	: 0.0	**Peak kVA**	: None	**Cumulative Peak kVA**	: None

Generator Set Configuration

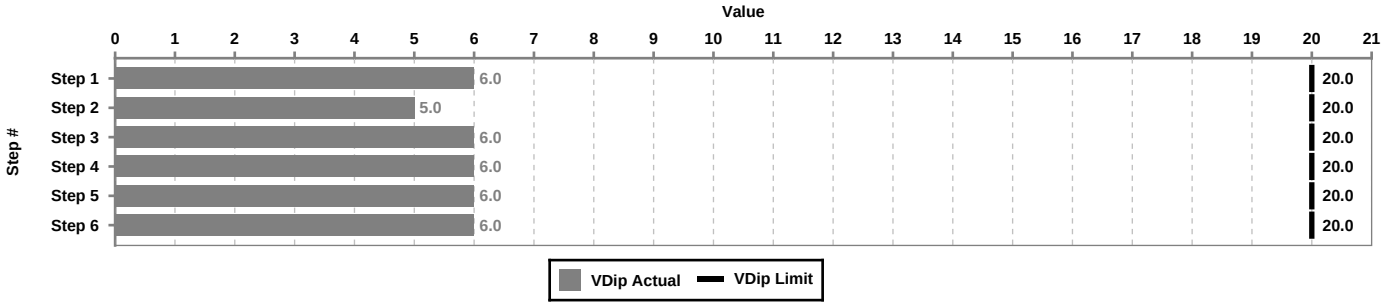
Model	: 400DFEH*	**Alternator**	: HC5E
Engine Model	: QSX15-G9 Nonroad 2	**Excitation**	: PMG
Fuel	: Diesel		

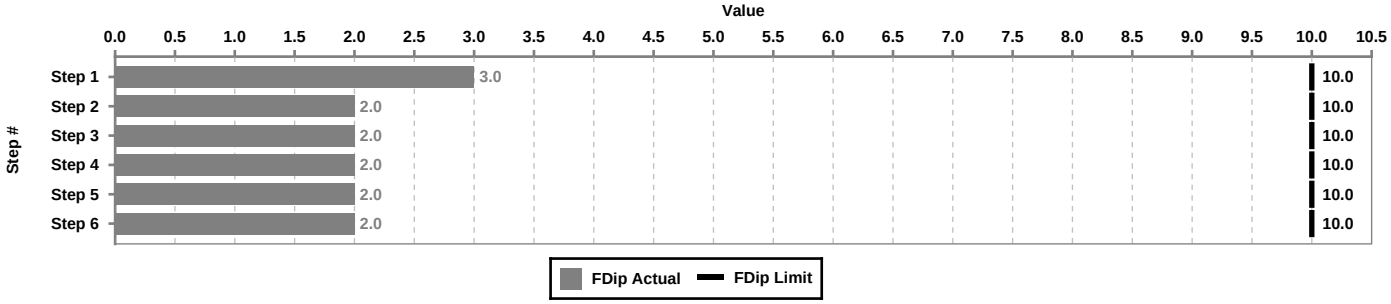
Step Level Dips Summary

Step #	Voltage Dip Limit (%)	Expected Step Voltage Dip (%)	Voltage Recovery Time (s)	Frequency Dip Limit (%)	Expected Frequency Dip (%)	Frequency recovery Time (s)
1	20	6	0.7	10	3	1.0
2	20	5	0.4	10	2	0.7
3	20	6	0.5	10	2	0.9
4	20	6	0.5	10	2	0.9
5	20	6	0.5	10	2	0.9
6	20	6	0.5	10	2	0.9

Note: Please refer to the model Spec. sheet for bandwidths used to report recovery times. For products manufactured in the United Kingdom it may be assumed that recovery times are based on ISO8528-5 G2 class bandwidths.

*Caution: The starting PF for this step exceeds 0.9 lagging. The actual transient performance of the generator for these steps may vary compared to the results predicted by GenSize.


Value
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Step #
Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
6.0
5.0
6.0
6.0
6.0
6.0
20.0
20.0
20.0
20.0
20.0
20.0
VDip Actual
VDip Limit


Value
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5
Step #
Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
3.0
2.0
2.0
2.0
2.0
2.0
10.0
10.0
10.0
10.0
10.0
10.0
FDip Actual
FDip Limit