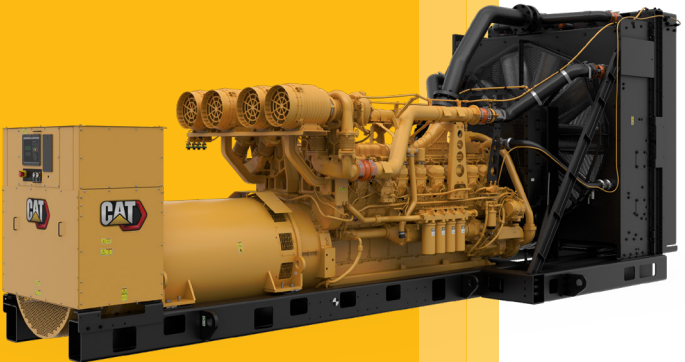




ELECTRIC POWER RATINGS GUIDE





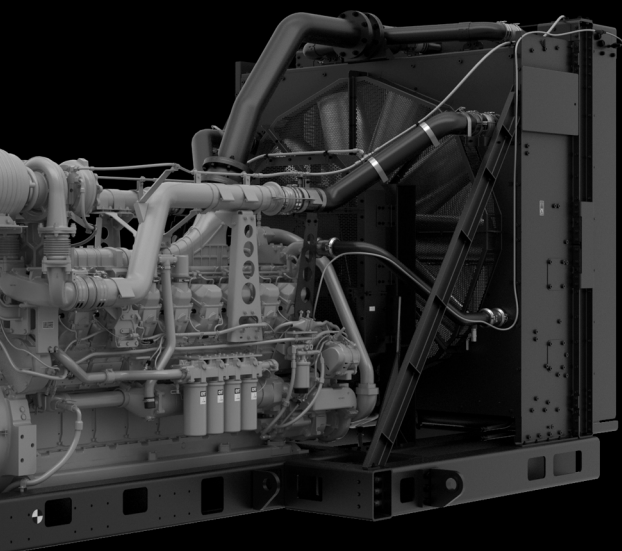
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3516E

DIESEL GENERATOR SETS



DIESEL

50 Hz, 6.8 – 250 kVA RATINGS

kVA		Generator Set Model	Engine	Configuration
Standby	Prime			
Single Phase Output* 1500 rpm				
7.5	6.8	DE7.5E3S	C1.1	R96/EU Stage IIIA Equivalent
11	10	DE11E3S	C1.5	R96/EU Stage IIIA Equivalent
12	11	DE12E0S	C1.5	Low BSFC
14	13	DE14E3S	C2.2	R96/EU Stage IIIA Equivalent
16.5	15	DE16E3S	C2.2	R96/EU Stage IIIA Equivalent
26	24	DE26E0S	C3.3	Low BSFC
26	24	DE26E3S	C3.3	R96/EU Stage IIIA Equivalent
40	36	DE40E0S	C3.3	Low BSFC
40	36	DE40E2S	C3.3	R96/EU Stage II Equivalent
50	45	DE50E0S	C3.3	Low BSFC
55	50	DE55E3S	C4.4	EU Stage IIIA
90	82	DE90E2S	C4.4	R96/EU Stage II Equivalent
90	82	DE90E3S	C4.4	EU Stage IIIA
Three Phase Output** 1500 rpm				
9.5	8.5	DE9.5E3	C1.1	R96/EU Stage IIIA Equivalent
13.5	12.5	DE13.5E3	C1.5	R96/EU Stage IIIA Equivalent
16	14.5	DE16E0	C1.5	Low BSFC
18	16.5	DE18E3	C2.2	R96/EU Stage IIIA Equivalent
22	20	DE22E3	C2.2	R96/EU Stage IIIA Equivalent
33	30	DE33E0	C3.3	Low BSFC
33	30	DE33E3	C3.3	R96/EU Stage IIIA Equivalent
50	45	DE50E0	C3.3	Low BSFC
50	45	DE50E2	C3.3	R96/EU Stage II Equivalent
55	50	DE55E0	C3.3	Low BSFC
55	50	DE55E2	C4.4	R96/EU Stage II Equivalent
65	60	DE65E0	C3.3	Low BSFC
65	60	DE65E3	C4.4	EU Stage IIIA
88	80	DE88E0	C4.4	Low BSFC
88	80	DE88E3	C4.4	EU Stage IIIA
110	100	DE110E2	C4.4	R96/EU Stage II Equivalent
110	100	DE110E3	C4.4	EU Stage IIIA
150	135	DE150E0	C7.1	Low BSFC
165	150	DE165E0	C7.1	Low BSFC
165	150	DE165E3	C7.1	R96/EU Stage IIIA Equivalent
175	160	DE175E3	C7.1	R96/EU Stage IIIA Equivalent
200	180	DE200E0	C7.1	Low BSFC
200	180	DE200E3	C7.1	R96/EU Stage IIIA Equivalent
250	230	DE250E0	C9	Low BSFC

*All ratings at 1.0 pf. **All ratings at 0.8 pf.

50 Hz, 250 – 850 kVA RATINGS

kVA		Generator Set Model	Engine	Configuration
Standby	Prime			
Three Phase Output* 1500 rpm				
275	250	DE275E0	C9	Low BSFC
275	250	DE275E3	C9	R96/EU Stage IIIA Equivalent
300	275	DE300E0	C9	Low BSFC
300	275	DE300E3	C9	R96/EU Stage IIIA Equivalent
330	300	DE330E0	C9	Low BSFC
—	350	DE350C3	C13	China Non-Road Stage III
—	400	DE400C3	C13	China Non-Road Stage III
400	350	DE400E0	C13	Low BSFC
450	400	DE450E0	C13	Low BSFC
450	400	DE450E3	C13	R96/EU Stage IIIA Equivalent
450	400	—	C15	Low BSFC
—	450	DE450C3	C15	China Non-Road Stage III
—	500	DE500C3	C15	China Non-Road Stage III
500	455	DE500E0	C15	Low BSFC
550	500	DE550E0	C15	Low BSFC
550	500	DE550E3	C15	R96/EU Stage IIIA Equivalent
605	550	DE605E0	C18	Low BSFC
—	600	DE600C3	C18	China Non-Road Stage III
660	600	DE660E0	C18	Low BSFC
700	635	—	C18	Low BSFC
715	650	DE715E0	C18	Low BSFC
780	706	DE780E0	C18	Low BSFC
850	770	DE850E0	C18	Low BSFC

*All ratings at 0.8 pf.

DIESEL

50 Hz, 680 – 2250 kVA RATINGS

Standby	kVA			Generator Set Model	Configuration
	Mission Critical	Prime	Continuous		
1500 rpm					
750	—	680	—	3412C	Low BSFC
800	—	725	—	3412C	Low BSFC
900	—	810	—	3412C	Low BSFC
1100	1100	1000	910	C32	Low BSFC, Low Emissions
1250	1250	1100	—	C32	Low BSFC
1250	1250	1150	1000	3512	Low BSFC
1400	1400	1275	—	C32	Low BSFC
1400	1400	1275	1206	3512	Low BSFC
1500	1500	1375	—	C32	Low BSFC
1500	1500	1360	—	3512B	Low BSFC, Low Emissions
1600	1600	1500	1320	3512B	Low BSFC, Low Emissions
1750	1750	1600	—	3512B	Low BSFC, Low Emissions
1875	1875	1700	1500	3512B	Low BSFC, Low Emissions
2000	2000	1825	1600	3516	Low BSFC
2250	2250	2045	—	3516C	< 2000 mg NO _x , EPA Tier 2
2250	2250	2000	1750	3516B	Low BSFC, Low Emissions

50 Hz, 2275 – 7150 kVA RATINGS

kVA				Generator Set Model	Configuration
Standby	Mission Critical	Prime	Continuous		
1500 rpm					
2500	2500	2275	—	3516C	< 2000 mg NOx, EPA Tier 2
2500	2500	2275	2000	3516B	Low BSFC, Low Emissions
2750	2750	2500	—	3516C	< 2000 mg NOx, EPA Tier 2
2750	2750	2500	—	3516C	Low BSFC, EPA Tier 2
3000	3000	2750	—	3516E	Low BSFC
3000	3000	2725	—	3516E	< 2000 mg NOx, EPA Tier 2
3000	3000	2725	2500	C175-16	Low BSFC, Low Emissions
3250	3250	2950	—	3516E	< 2000 mg NOx, EPA Tier 2
3500	3500	3175	—	3516E	EPA Tier 2
3900	3900	3500	3150	C175-20	Low BSFC, Low Emissions
4000*	4000*	3600*	3250*	C175-20	Low BSFC, Low Emissions
1000 rpm					
2688	—	2425	2200	3606	Low BSFC
3575	—	3250	2938	3608	Low BSFC
—	—	3250	2938	C280-08	IMO/U.S. EPA Tier 2
5375	—	4850	4400	3612	Low BSFC
—	—	4850	4400	C280-12	IMO/EPA Tier 2
7150	—	6500	5875	3616	Low BSFC
—	—	6500	5875	C280-16	IMO/EPA Tier 2
750 rpm					
1963	—	1963	—	3606	Low BSFC
2600	—	2600	—	3608	Low BSFC
3925	—	3925	—	3612	Low BSFC
5200	—	5200	—	3616	Low BSFC

*Rating does not include package mounted radiator.

DIESEL

50 Hz, 2000 – 5400 kVA RATINGS — HEAVY FUEL

Continuous		Generator Set Model*	Configuration
kVA	bkW		
1000 rpm			
2000	1680	3606	Low BSFC
2700	2240	3608	Low BSFC
4050	3360	3612	Low BSFC
5400	4480	3616	Low BSFC

*Special rating request required.

50 Hz, 1100 – 16400 ekW RATINGS — HEAVY FUEL

ekW*			Generator Set Model	Configuration
Standby	Prime	Contin.		
1000 rpm				
1150	1100	1100	6CM20C	World Bank acc IFC-2008
1500	1465	1465	8CM20C	World Bank acc IFC-2008
1700	1650	1650	9CM20C	World Bank acc IFC-2008
750 rpm				
2000	1940	1940	6CM25E	World Bank acc IFC-2008
2700	2585	2585	8CM25E	World Bank acc IFC-2008
3000	2910	2910	9CM25E	World Bank acc IFC-2008
3400	3085	3085	6CM32E	World Bank acc IFC-2008
4500	4115	4115	8CM32E	World Bank acc IFC-2008
5100	4630	4630	9CM32E	World Bank acc IFC-2008
6500	6150	6150	12CM32E	World Bank acc IFC-2008
8700	8200	8200	16CM32E	World Bank acc IFC-2008
600 rpm				
2800	2780	2780	6CM32C	World Bank acc IFC-2008
3800	3700	3700	8CM32C	World Bank acc IFC-2008
4300	4170	4170	9CM32C	World Bank acc IFC-2008
500 rpm				
6100	5600	5600	6CM43C	World Bank acc IFC-2008
7100	6400	6400	7CM43C	World Bank acc IFC-2008
8100	7450	7450	8CM43C2	World Bank acc IFC-2008
9200	8300	8300	9CM43C	World Bank acc IFC-2008
12300	11200	11200	12CM43C	World Bank acc IFC-2008
16400	14900	14900	16CM43C2	World Bank acc IFC-2008

*Electric output depends on final generator specification.

60 Hz, 8 – 750 kW RATINGS

ekW		Generator Set Model	Engine	Configuration
Standby	Prime			
Single Phase Output* 1800 rpm				
8.8	8	DE7.5E3S	C1.1	R96/EU Stage IIIA Equivalent
13	12	DE11E3S	C1.5	R96/EU Stage IIIA Equivalent
17	15.5	DE14E3S	C2.2	R96/EU Stage IIIA Equivalent
19.4	17.6	DE16E3S	C2.2	R96/EU Stage IIIA Equivalent
45	40	DE40E0S	C3.3	Low BSFC
60	55	DE50E0S	C3.3	Low BSFC
99.5	90	DE90E2S	C4.4	R96/EU Stage II Equivalent
Three Phase Output** 1800 rpm				
8.8	8	DE9.5E3	C1.1	R96/EU Stage IIIA Equivalent
13.2	12	DE13.5E3	C1.5	R96/EU Stage IIIA Equivalent
17.6	16	DE18E3	C2.2	R96/EU Stage IIIA Equivalent
20	18	DE22E3	C2.2	R96/EU Stage IIIA Equivalent
30	27	DE33E0	C3.3	Low BSFC
45	40	DE50E0	C3.3	Low BSFC
50	45	DE55E0	C3.3	Low BSFC
60	55	DE65E0	C3.3	Low BSFC
80	72	DE88E0	C4.4	Low BSFC
100	90.4	DE110E2	C4.4	R96/EU Stage II Equivalent
132	120	DE150E0	C7.1	Low BSFC
150	135	DE165E0	C7.1	Low BSFC
175	160	DE200E0	C7.1	Low BSFC
200	180	DE200SE0	C9	Low BSFC
250	225	DE250SE0	C9	Low BSFC
275	250	DE275SE0	C9	Low BSFC
300	270	DE300SE0	C9	Low BSFC
300	275	DE300SE3	C9	R96/EU Stage IIIA Equivalent
350	320	DE350SE0	C13	Low BSFC
400	350	DE400SE0	C13	Low BSFC
450	410	DE450SE0	C15	Low BSFC
500	455	DE500SE0	C15	Low BSFC
550	500	DE550SE0	C18	Low BSFC
600	545	DE600SE0	C18	Low BSFC
716	650	DE715SE0	C18	Low BSFC
750	680	DE750SE0	C18	Low BSFC

*All ratings at 1.0 pf.

**All ratings at 0.8 pf.

ESE = "EPA Stationary Emergency".

DIESEL

60 Hz, 8 – 200 kW RATINGS

EPA Stationary Emergency – North America.

kW		Generator Set Model	Engine	Configuration
Standby	Prime			
Single Phase Output* 1800 rpm				
8.8	8	DE7.5E3S	C1.1	ESE
13	12	DE11E3S	C1.5	ESE
17	15.5	DE14E3S	C2.2	ESE
19.4	17.6	DE16E3S	C2.2	ESE
40	36	D40S	C4.4	ESE
50	45	D50S	C4.4	ESE
60	55	D60S	C4.4	ESE
80	72	D80S	C4.4	ESE
100	90	D100S	C4.4	ESE
Three Phase Output** 1800 rpm				
8.8	8	DE9.5E3	C1.1	ESE
13.2	12	DE13.5E3	C1.5	ESE
17.6	16	DE18E3	C2.2	ESE
20	18	DE22E3	C2.2	ESE
40	36	D40	C4.4	ESE
50	45	D50	C4.4	ESE
60	55	D60	C4.4	ESE
80	72	D80	C4.4	ESE
100	90	D100	C4.4	ESE
125	114	D125	C7.1	ESE
150	136	D150	C7.1	ESE
175	158	D175	C7.1	ESE
200	—	D200	C7.1	ESE

*All ratings at 1.0 pf.

**All ratings at 0.8 pf.

ESE = "EPA Stationary Emergency".

60 Hz, 180 – 4000 ekW RATINGS

ekW				Generator Set Model	Configuration
Standby	Mission Critical	Prime	Continuous		
Three Phase Output* 1800 rpm					
200	—	180	—	C9	ESE
250	—	225	—	C9	ESE
300	—	275	—	C9	ESE
350	—	320	—	C13	ESE
400	—	350	—	C13	ESE
450	—	410	—	C15	ESE
500	—	455	—	C15	ESE
500	—	455	—	C18	EPA Tier 4 Final
550	—	500	—	C18	ESE, Low BSFC
600	—	545	—	C18	ESE, Low BSFC
650	—	600	—	C18	ESE, Low BSFC
700	—	635	—	C18	ESE, Low BSFC
700	—	635	—	3412C	Low BSFC
750	—	680	—	C18	ESE, Low BSFC
750	—	680	—	C27	ESE, Low BSFC
750	—	680	—	3412C	Low BSFC
800	800	725	—	C27	ESE, Low BSFC
800	—	725	—	3412C	Low BSFC
1000	1000	910	830	C32	ESE, Low BSFC
1100	1100	1000	890	3512	Low BSFC
1100	1100	1000	—	C32	ESE, Low BSFC
1250	1250	1136	—	C32	ESE, Low BSFC
1250	1250	1135	1010	3512	Low BSFC
1400	1400	1275	—	3512B	Low BSFC, Low Emissions
1500	1500	1360	1230	3512B	Low BSFC, Low Emissions
1500	1500	1360	1230	3512C	ESE
1750	1750	1600	—	3512C	ESE
1750	1750	1600	1450	3516	Low BSFC
2000	2000	1825	1640	3516B	Low BSFC, Low Emissions
2000	2000	1825	1650	3516C	EPA Tier 4 Final, ESE
2250	2250	2000	—	3516B	Low BSFC
2500	2500	2250	2050	3516C	EPA Tier 4 Final, ESE
2750	2750	2500	—	3516E	ESE
3000	3000	2725	—	3516E	ESE
3000	3000	2725	2500	C175-16	EPA Tier 4 Final, ESE, Low BSFC
3900	3900	3500	3150	C175-20	ESE, Low BSFC
4000*	4000*	3600*	3250**	C175-20	ESE, Low BSFC

ESE = "EPA Stationary Emergency". *All ratings at 0.8 pf.

**Rating does not include package mounted radiator.

DIESEL

60 Hz, 1525 – 5320 kW RATINGS

kW			Generator Set Model	Configuration
Standby	Prime	Continuous		
900 rpm				
2000	1820	1650	3606	Low BSFC
2660	2420	2200	3608	Low BSFC
—	2420	2200	C280-8*	EPA Tier 4 Final
4000	3640	3300	3612	Low BSFC
—	3640	3300	C280-12*	EPA Tier 4 Final
5320	4840	4400	3616	Low BSFC
—	4840	4400	C280-16*	EPA Tier 4 Final
720 rpm				
—	1525	—	3606	Low BSFC
—	2020	—	3608	Low BSFC
—	3050	—	3612	Low BSFC
—	4040	—	3616	Low BSFC

*Tier 4 Final is met using AVERAGE, BANKING, and TRADING PROGRAM.

60 Hz, 250 – 600 ekW RATINGS — GC NORTH AMERICA

ekW		Generator Set Model	Engine	Configuration
Standby	Prime			
Three Phase Output* 1800 rpm				
250	—	D250GC	C9	ESE
300	—	D300GC	C9	ESE
350	—	D350GC	C13	ESE
400	—	D400GC	C13	ESE
450	—	D450GC	C15	ESE
500	—	D500GC	C15	ESE
550	—	D550GC	C18	ESE
600	—	D600GC	C18	ESE

*All ratings at 0.8 pf.

ESE = "EPA Stationary Emergency".

DIESEL

60 Hz, 1500 – 4000 ekW RATINGS — HEAVY FUEL

Continuous		Generator Set Model*	Configuration
ekW	bkW		
900 rpm			
1500	1570	3606	Low BSFC
2000	2090	3608	Low BSFC
3000	3140	3612	Low BSFC
4000	4180	3616	Low BSFC

*Special rating request required.

60 Hz, 985 – 16400 ekW RATINGS — HEAVY FUEL

ekW*			Generator Set Model	Configuration
Standby	Prime	Contin.		
900 rpm				
1040	985	985	6CM20C	World Bank acc IFC-2008
1380	1310	1310	8CM20C	World Bank acc IFC-2008
1500	1475	1475	9CM20C	World Bank acc IFC-2008
720 rpm				
2000	1940	1940	6CM25E	World Bank acc IFC-2008
2700	2585	2585	8CM25E	World Bank acc IFC-2008
3000	2910	2910	9CM25E	World Bank acc IFC-2008
3400	3085	3085	6CM32E	World Bank acc IFC-2008
4500	4115	4115	8CM32E	World Bank acc IFC-2008
5100	4630	4630	9CM32E	World Bank acc IFC-2008
6500	6150	6150	12CM32E	World Bank acc IFC-2008
8700	8200	8200	16CM32E	World Bank acc IFC-2008
600 rpm				
2800	2780	2780	6CM32C	World Bank acc IFC-2008
3800	3700	3700	8CM32C	World Bank acc IFC-2008
4300	4170	4170	9CM32C	World Bank acc IFC-2008
514 rpm				
6100	5600	5600	6CM43C	World Bank acc IFC-2008
7100	6400	6400	7CM43C	World Bank acc IFC-2008
8100	7450	7450	8CM43C2	World Bank acc IFC-2008
9200	8300	8300	9CM43C	World Bank acc IFC-2008
12300	11200	11200	12CM43C	World Bank acc IFC-2008
16400	14900	14900	16CM43C2	World Bank acc IFC-2008

*Electric output depends on final generator specification.

50 Hz, 30 – 2000 kVA RATINGS — RENTAL POWER

kVA			Generator Set Model	Configuration
Standby	Prime	Continuous		
1500 rpm				
33	30	—	XQP30	R96/EU Stage IIIA Equivalent and Low BSFC
65	60	—	XQP60	R96/EU Stage IIIA Equivalent
110	100	—	XQP100	R96/EU Stage IIIA Equivalent and Low BSFC
165	150	—	XQP150	R96/EU Stage IIIA Equivalent and Low BSFC
300	275	—	XQP275	R96/EU Stage IIIA Equivalent
330	300	—	XQP300	Low BSFC
550	500	—	XQP500	R96/EU Stage IIIA Equivalent and Low BSFC
1210	1100	—	XQP1100	Low BSFC
—	—	1438	XQC1200	Low BSFC / Low Emissions
—	—	1893	XQC1600	Low BSFC / Low Emissions

DIESEL

60 Hz, 28 – 1705 ekW AND 34 – 625 kVA RATINGS — RENTAL POWER

ekW			Generator Set Model	Configuration
Standby	Prime	Continuous		
1800 rpm				
31	28	—	XQP30	R96/EU Stage IIIA Equivalent and Low BSFC
60	55	—	XQP60	R96/EU Stage IIIA Equivalent
88	80	—	XQP100	R96/EU Stage IIIA Equivalent and Low BSFC
149	135	—	XQP150	R96/EU Stage IIIA Equivalent and Low BSFC
302	275	—	XQP300	Low BSFC
460	420	—	XQP500	R96/EU Stage IIIA Equivalent and Low BSFC
1067	970	—	XQP1100	Low BSFC
—	—	1260	XQC1200	Low BSFC, Low Emissions
—	—	1705	XQC1600	Low BSFC, Low Emissions
kVA			Generator Set Model	Configuration
Standby	Prime	Continuous		
1800 rpm				
38	34	—	XQ35	EPA Tier 4 Final
—	59	—	XQ60	EPA Tier 4 Final
138	125	—	XQ125	EPA Tier 4 Final
250	225	—	XQ230	EPA Tier 4 Final
469	425	—	XQ425	EPA Tier 4 Final
625	568	—	XQ570	EPA Tier 4 Final

DEFINITIONS

Standby Power

Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Mission Critical

Output available with varying load for the duration of the interruption of the normal source power. Average power output is 85% of the mission critical power rating. Typical peak demand up to 100% of rated power for up to 5% of the operating time. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Prime Power

Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand of 100% of prime-rated kW with 10% of overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

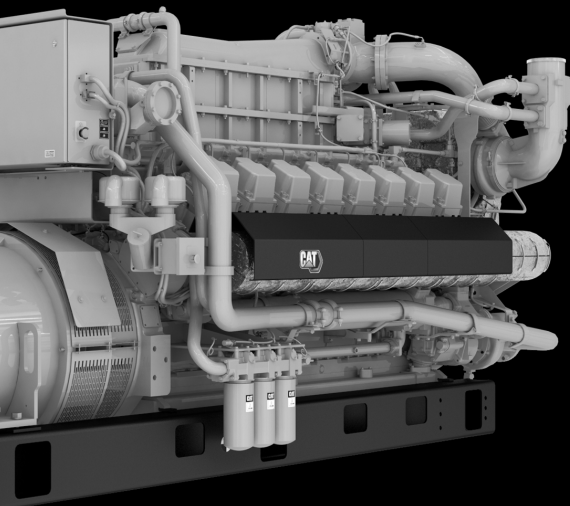
Continuous Power

Output available without varying load for an unlimited time. Average power output is 70 – 100% of the continuous power rating. Typical peak demand is 100% of continuous rated kW for 100% of operating hours.



G3516C

GAS GENERATOR SETS



GAS

50 Hz, 158 – 400 kVA RATINGS — NATURAL GAS

kVA		Generator Set Model	Engine
Standby	Prime		
Three Phase Output* 1500 rpm			
175	158	DG175-1 GC	14.2
200	180	DG200-1 GC	14.2
230	207	DG230-1 GC	14.2
250	225	DG250-1 GC	14.2
275	248	DG275-1 GC	14.2
300	270	DG300-1 GC	14.2
350	315	DG350-1 GC	21.9
400	360	DG400-1 GC	21.9

*All ratings at 0.8 pf.

50 Hz, 280 – 2500 kW RATINGS — NATURAL GAS

ekW Continuous*	Generator Set Model
1500 rpm	
280	G3412TA
400	CG132B-8
600	CG132B-12
800	CG132B-16
975	G3516
1000	CG132B-16
1000	CG170-12
1000	G3512E
1030	G3516
1125	CG170-12
1200	CG170-12
1200	G3512E
1500	G3512H
1500	CG170-16
1560	CG170-16
1590	G3516C
1972	G3520C
2000	G3516H
2020	G3520E
2000	CG170-20
2300	CG170B-20
2500	G3520H

*All ratings at 0.8 pf. *Electric output depends on final generator specification.

50 Hz, 3333 – 10300 ekW RATINGS — NATURAL GAS

ekW Continuous*	Generator Set Model
1000 rpm	
3333	CG260-12
4300	CG260-16
4500	CG260-16
750 rpm	
6600	G16CM34**
10300	G20CM34**

*All ratings at 0.8 pf. Electric output depends on final generator specification.

**<250 mg NO_x/Nm³ at an oxygen content of 5% O₂.

50 Hz, 163 – 3770 ekW RATINGS — BIOGAS

ekW Continuous*	Generator Set Model
1500 rpm	
163	G3412
400	CG132B-8
600	CG132B-12
800	CG132B-16
1000	CG170-12
1000	G3516
1085	G3516+
1200	CG170-12
1560	CG170-16
1966	G3520C
2000	CG170-20
2300	CG170B-20
1000 rpm	
3770	CG260-16

*All ratings at 0.8 pf.

GAS

60 Hz, 50 – 150 ekW RATINGS — NATURAL GAS

ekW	Generator Set Model	Engine	Configuration
Standby			
Single Phase Output* 1800 rpm			
50	DG50-2S	5.7	ESE
50	DG50-4S	5.7	SCAQMD
60	DG60-2S	5.7	ESE
60	DG60-4S	5.7	SCAQMD
80	DG80-2S	5.7	ESE
100	DG100-2S	5.7	ESE
Three Phase Output** 1800 rpm			
50	DG50-2	5.7	ESE
50	DG50-4	5.7	SCAQMD
60	DG60-2	5.7	ESE
60	DG60-4	5.7	SCAQMD
80	DG80-2	5.7	ESE
100	DG100-2	5.7	ESE
125	DG125-2	8.8	ESE
150	DG150-2	8.8	ESE

*All ratings at 1.0 pf.

**All ratings at 0.8 pf.

ESE = "EPA Stationary Emergency".

SCAQMD = "South Coast Air Quality Management District".

60 Hz, 175 – 2500 ekW RATINGS — NATURAL GAS

ekW	Generator Set	Engine	Configuration
Standby	Model		
Three Phase Output* 1800 rpm			
175	DG175-2 GC	14.2	ESE
175	DG175-1 GC	14.2	—
200	DG200-2 GC	14.2	ESE
200	DG200-1 GC	14.2	—
230	DG230-2 GC	14.2	ESE
230	DG230-1 GC	14.2	—
250	DG250-2 GC	14.2	ESE
250	DG250-1 GC	14.2	—
275	DG275-2 GC	14.2	ESE
275	DG275-1 GC	14.2	—
300	DG300-2 GC	14.2	ESE
300	DG300-1 GC	14.2	—
350	DG350-2 GC	21.9	ESE
350	DG350-1 GC	21.9	—
400	DG400-2 GC	21.9	ESE
400	DG400-1 GC	21.9	—
450	DG450-2 GC	21.9	ESE
450	DG450-1 GC	21.9	—
423	G3412C	G3412C	—
500	G3412C	G3412C	—
750	G3512	G3512	EPA Factory Certified
1000	G3512	G3512	EPA Factory Certified
2000	G3520	G3520	EPA Factory Certified
2500	G3520	G3520	EPA Factory Certified

*All ratings at 0.8 pf.

The following Certifications are applicable for US Sales:

ESE = "EPA Stationary Emergency".

SCAQMD = "South Coast Air Quality Management District".

EPA = "EPA Non-Emergency".

GAS

60 Hz, 350 – 9830 eKW RATINGS — NATURAL GAS

eKW Continuous*	Generator Set Model
1800 rpm	
350	G3412TA
375	G3412C LE
400	CG132B-8
423	G3412
453	G3412C
600	CG132B-12
800	CG132B-16
1040	G3516
1300	G3516B
1660	G3516C
2050	G3520C
1500 rpm	
1125	CG170-12
1200	CG170-12
1490	G3512H
1500	CG170-16
1560	CG170-16
2000	CG170-20
1982	G3516H
2483	G3520H
900 rpm	
3000	CG260-12
4000	CG260-16
4050	CG260-16
720 rpm	
6600	G16CM34**
9830	G20CM34**

*All ratings at 0.8 pf. Electric output depends on final generator specification.

**<250 mg NO_x/Nm³ at an oxygen content of 5% O₂.

60 Hz, 177 – 3510 ekW RATINGS — BIOGAS

ekW Continuous	Generator Set Model
Three Phase Output* 1800 rpm	
177	G3412
400	CG132B-8
600	CG132B-12
800	CG132B-16
800	G3516
1000	G3516+
1600	G3520C
1500 rpm	
1200	CG170-12
1560	CG170-16
1950	G3520C
2000	CG170-20
900 rpm	
3510	CG260-16

*All ratings at 0.8 pf.

60 Hz, 50 – 140 ekW RATINGS — PROPANE GAS

ekW Standby	Generator Set Model	Engine	Configuration
Single Phase Output* 1800 rpm			
50	DG50-2S	5.7	ESE
50	DG50-4S	5.7	SCAQMD
57	DG60-2S	5.7	ESE
57	DG60-4S	5.7	SCAQMD
90	DG100-2S	5.7	ESE
Three Phase Output** 1800 rpm			
50	DG50-2	5.7	ESE
50	DG50-4	5.7	SCAQMD
57	DG60-2	5.7	ESE
57	DG60-4	5.7	SCAQMD
92	DG100-2	5.7	ESE
140	DG150-2	8.8	ESE

*All ratings at 0.8 pf.

**All ratings at 1.0 pf.

The following Certifications are applicable for US Sales:

ESE = "EPA Stationary Emergency".

SCAQMD = "South Coast Air Quality Management District".

GAS

50 – 60 Hz, 135 – 1900 ekW RATINGS — RENTAL POWER

ekW	Generator Set Model	Configuration
Continuous		
1800 rpm		
135	XG135	Factory certified US EPA Nonroad and Stationary SI Engine
400	XG400	Factory certified US EPA Nonroad SI Engine
1500 – 1800 rpm		
1475	XQ1475G	US EPA NSPS SI Capable
1500 rpm		
1900	XGC1900	500mg NO _x /Nm ³ *

*At an oxygen content of 5% O₂.

DEFINITIONS

Standby Power Rating

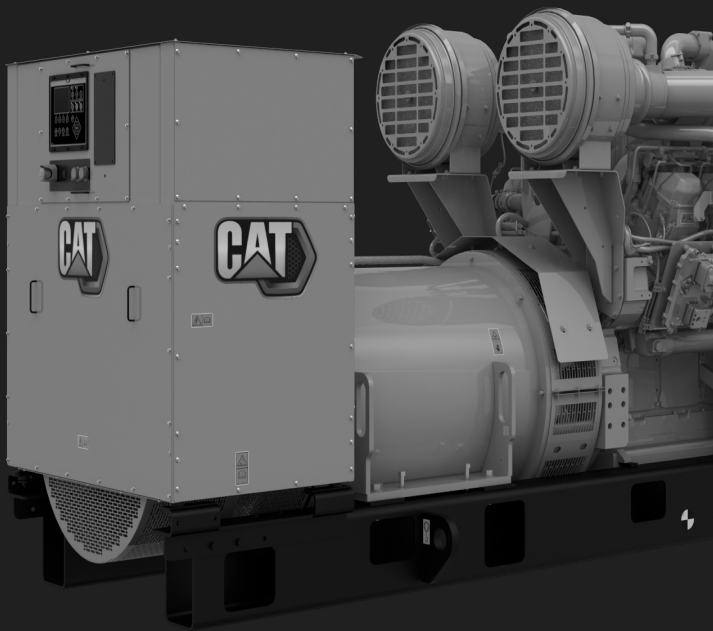
Output available with varying load for the duration of an emergency outage. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Prime Power

Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand of 100% of prime-rated kW with 10% of overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

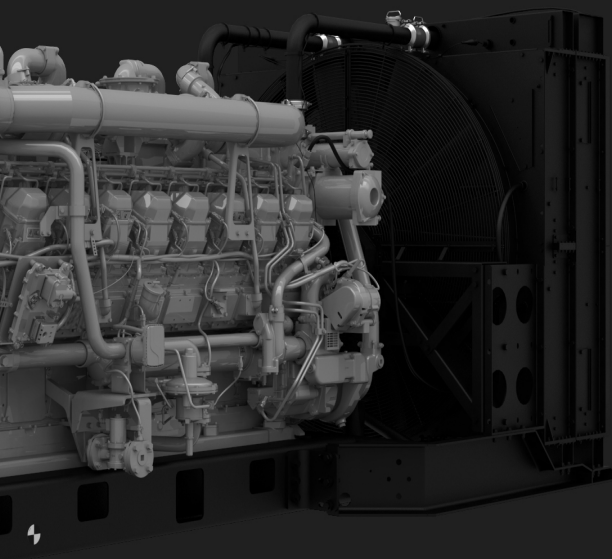
Continuous Power Rating

Output available with non-varying load for an unlimited time. Average power output is 70-100% of the continuous power rating. Typical peak demand is 100% of continuous rated kW for 100% of operating hours.



3516B DGB

DUAL FUEL



DUAL FUEL

50 Hz, 1750 – 15100 kVA / ekW RATINGS — DUAL FUEL

kVA / ekW*			Generator Set Model	Configuration
Standby	Prime	Contin.		
1500 rpm (Values are kVA)				
—	2000	1750	3516B DGB	Low BSFC
—	2275	2000	3516B DGB	Low BSFC
500 rpm (Values are ekW*)				
5600	5300	5300	6CM46DF	World Bank acc IFC-2008
6600	6150	6150	7CM46DF	World Bank acc IFC-2008
7500	7050	7050	8CM46DF	World Bank acc IFC-2008
8500	7950	7950	9CM46DF	World Bank acc IFC-2008
11300	10600	10600	12CM46DF	World Bank acc IFC-2008
15100	14100	14100	16CM46DF	World Bank acc IFC-2008

*Electric output depends on final generator specification.

60 Hz, 1640 – 15100 ekW RATINGS — DUAL FUEL

ekW*			Generator Set Model	Configuration
Standby	Prime	Contin.		
1800 rpm				
—	1825	1640	3516B DGB	Low BSFC
514 rpm				
5600	5300	5300	6CM46DF	World Bank acc IFC-2008
6600	6150	6150	7CM46DF	World Bank acc IFC-2008
7500	7050	7050	8CM46DF	World Bank acc IFC-2008
8500	7950	7950	9CM46DF	World Bank acc IFC-2008
11300	10600	10600	12CM46DF	World Bank acc IFC-2008
15100	14100	14100	16CM46DF	World Bank acc IFC-2008

*Electric output depends on final generator specification.

DEFINITIONS

Standby Power Rating

Output available with varying load for the duration of an emergency outage. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Prime Power

Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand of 100% of prime-rated kW with 10% of overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Continuous Power Rating

Output available with non-varying load for an unlimited time. Average power output is 70-100% of the continuous power rating. Typical peak demand is 100% of continuous rated kW for 100% of operating hours.



RENEWABLE HYBRID ENERGY SOLUTIONS



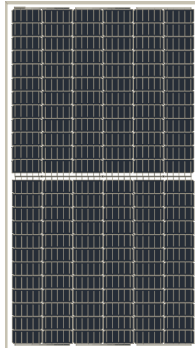
RENEWABLE HYBRID SOLUTIONS

Photovoltaic (PV) Module

Model	Power Output per Panel	Type
PVC415 MP02	415 watt	Monocrystalline PERC

Model	Power Output per Panel	Type
PVC375 MP03 H	375 watt	Monocrystalline PERC Half-cut
PVC380 MP03 H	380 watt	Monocrystalline PERC Half-cut
PVC385 MP03 H	385 watt	Monocrystalline PERC Half-cut
PVC430 MP03 H	430 watt	Monocrystalline PERC Half-cut
PVC435 MP03 H	435 watt	Monocrystalline PERC Half-cut

Note: Check with local dealer for product availability which varies by region and delivery date.



RENEWABLE HYBRID SOLUTIONS

Inverter Options – CE Mark

Output	Voltage	Frequency
3 kW	220V – 240V, 1 Phase	50 – 60 Hz
3.6 kW	220V – 240V, 1 Phase	50 – 60 Hz
4 kW	220V – 240V, 1 Phase	50 – 60 Hz
5 kW	220V – 240V, 1 Phase	50 – 60 Hz
6 kW	220V – 240V, 1 Phase	50 – 60 Hz
5 kW	380V – 415V, 3 Phase	50 – 60 Hz
6 kW	380V – 415V, 3 Phase	50 – 60 Hz
8 kW	380V – 415V, 3 Phase	50 – 60 Hz
10 kW	380V – 415V, 3 Phase	50 – 60 Hz
15 kW	380V – 415V, 3 Phase	50 – 60 Hz
20 kW	380V – 415V, 3 Phase	50 – 60 Hz
25 kW	380V – 415V, 3 Phase	50 – 60 Hz
50 kW	380V – 415V, 3 Phase	50 – 60 Hz
100 kW	380V – 415V, 3 Phase	50 – 60 Hz
150 kW	380V – 415V, 3 Phase	50 – 60 Hz

Inverter Options – UL Listed

Output	Voltage	Frequency
3 kW	208V – 240V, 1 Phase	60 Hz
3.8 kW	208V – 240V, 1 Phase	60 Hz
5 kW	208V – 240V, 1 Phase	60 Hz
6 kW	208V – 240V, 1 Phase	60 Hz
7 kW	208V – 240V, 1 Phase	60 Hz
7.7 kW	208V – 240V, 1 Phase	60 Hz
33.3 kW	480V, 3 Phase	60 Hz
50 kW	480V, 3 Phase	60 Hz
62.5 kW	480V, 3 Phase	60 Hz
125 kW	480V, 3 Phase	60 Hz
150 kW	480V, 3 Phase	60 Hz

Note 1: Inverter products are not Cat branded.

Note 2: Check with local dealer for product availability which varies by region and delivery date.

RENEWABLE HYBRID SOLUTIONS

WEATHER STATIONS

Weather Stations provide a pre-engineered system that cost-effectively scales to Microgrid Solution size and complexity. The Weather station delivers best-practice PV performance tracking and correlation technology.

Basic Features	Class A	Class B	Class C
Plane of Array	•	•	•
Back of Module Temperature	•	•	•
Air Temperature	•	•	•
Relative Humidity	•	•	
Wind Speed	•	•	
Wind Direction	•	•	
Barometric Pressure	•	•	
Global Horizontal Irradiance	•		



RENEWABLE HYBRID SOLUTIONS

ENERGY STORAGE SYSTEMS

Grid Stability Modules

Grid Stability modules provide a pre-engineered solution to energy storage needs. The modules integrate with diesel or gas generator sets, photovoltaic (PV), or other renewable systems to provide short duration power. The module holds closely regulated system voltage and frequency during periods of rapid load addition or removal, or during periods of intermittent output from the renewables.

Model	Nameplate Energy	15 Minute Output	10 Second Output
PGS125	73 kWh	125 kW	125 kW
PGS500	290 kWh	375 kW	500 kW
PGS830	435 kWh	750 kW	830 kW
PGS1100	580 kWh	750 kW	1100 kW
PGS1225	653 kWh	1125 kW	1225 kW
PGS1400	870 kWh	1125 kW	1400 kW
PGS2130	1160 kWh	1500 kW	2130 kW
PGS2500	1450 kWh	1875 kW	2500 kW

Energy Time Shift Module

Energy Shift modules provide a pre-engineered solution to energy storage needs. The scalable system integrates with photovoltaic (PV) or other renewable systems to store energy from renewables, generator sets, or the grid for use at a later time.

Model	Nameplate Energy	Continuous Output	10 Second Output
ES287H250	287 kWh	272 kW	272 kW
ES1.0H312	1005 kWh	312 kW	600 kW
ES1.6H312	1650 kWh	312 kW	600 kW
ES2.3H312	2290 kWh	312 kW	600 kW
ES1.4H1.0	1435 kWh	1250 kW	1360 kW



RENEWABLE HYBRID SOLUTIONS

MICROGRID MASTER CONTROLLERS (MMC)

MMC-S

The MMC-S is designed for applications with a limited number of power generation assets. It integrates the photovoltaic (PV) system, generator set, and energy storage system. It provides basic controls functionality.

MMC-M

The MMC-M is designed for applications with a moderate number of power generation assets. It integrates with the photovoltaic (PV) system, generator set, and energy storage system. The MMC-M provides intermediate controls functionality.

MMC-Custom

The MMC-Custom is designed for applications with a high number of power generation assets. It integrates with the photovoltaic (PV) system, generator set, and energy storage system. The MMC-Custom provides advanced or specialized controls functionality.





EMCP 4

CAT

The control panel features a large central screen. To the right of the screen are buttons for ACK, RESET, and EVENT LOG. Below the screen are four function buttons labeled F1, F2, F3, and F4, with icons for CONTROL, AC, ENGINE, and MAIN MENU. A central navigation pad includes a circular arrow button and a diamond-shaped OK button. The model number EMCP 4.4 is printed at the bottom left of the panel.

The indicator panel contains a grid of status lights with corresponding labels: FREQUENCY FOP, OVERLOAD, LOW COOLANT TEMPERATURE, HIGH COOLANT TEMPERATURE, LOW OIL PRESSURE, OVERHEAT, LOW COOLANT LEVEL, LOW FUEL LEVEL, LOW BATTERY FUEL, LOW BATTERY FUEL, BATTERY CHARGER AC FUEL, LOW COOLANT OIL PRESSURE, AIR SUCTORING DAMPER, and DIM. A LAMP TEST button is also present.

This section includes a large volume knob, a selector switch with a light bulb icon, an AUTO button, a Hz knob, and a voltage selector switch with a ~V symbol.



EMCP 4

EMCP 4.1

The EMCP 4.1 provides basic engine controls – stop/run/auto push button controls, cycle crank, and cool down timer. The 3.8 inch graphical display supports multiple languages, including character languages such as Chinese, Arabic, Russian, and Japanese. The EMCP 4.1 provides monitoring of generator electrical output, including AC voltage, current, frequency, and mechanical information such as oil pressure, coolant temperature, engine speed, and battery voltage along with fuel level if a sensor is provided. It also provides a number of protective functions, such as warnings and shutdowns for over/under voltage, over/under frequency, low oil pressure, high coolant temperature, low coolant level, failure to start, and overspeed.

EMCP 4.2

The EMCP 4.2 builds on the features of the EMCP 4.1 controller, offering expanded engine monitoring based on information available from the engine ECM, along with expanded generator set protection and monitoring, such as generator kW, kVA, and kWh.

Flexibility is also increased with the addition of a modbus RTU communication port, remote annunciator modules, and expansion I/O modules to allow the EMCP 4 system to be configured to meet site specific design requirements.

With the additional monitoring and expansion modules available, the EMCP 4.2 is designed to provide control and protection for critical installations, such as NFPA-110 Level 1 applications.

EMCP 4.2B

The EMCP 4.2B adds advanced features to the EMCP 4.2 controller, offering expanded generator set protection and monitoring, such as additional overcurrent protection curve selection, real (kW) load histogram, trip kWh and trip kVAh. Display screens are configurable for customer desired parameters.

An integrated basic programmable logic control (PLC) function to read controller inputs and drive controller outputs is also provided with the EMCP 4.2B.

EMCP 4.3

The EMCP 4.3 further expands the EMCP 4 product line with the addition of 5.5 inch graphical display and additional context specific navigation keys.

With the addition of a Modbus TCP port, the EMCP 4.3 controller can be easily integrated into complex systems requiring complete generator set monitoring.

EMCP 4.4

The EMCP 4.4 builds on the EMCP 4.3 functionality with the addition of fully automatic multi generator set paralleling. The EMCP 4.4 provides all of the functions required to automatically parallel generator sets, including dead bus arbitration, automatic or manual modes of operation, and load sharing (real and reactive). Optional provisions allow for extended parallel operation of a single generator with Utility for Base Load/Import/Export capability.



SECTION 1
400
4000000



SEL

1	2	3	4	5	6	7	8	9	0
1	2	3	4	5	6	7	8	9	0

SPACE



⚠ DANGER

WARNING: HIGH VOLTAGE

CAUTION: OPEN PANELS



NOTICE

READ THE INSTRUCTIONS

BEFORE OPERATING

⚠ DANGER

WARNING: HIGH VOLTAGE

CAUTION: OPEN PANELS

NOTICE

READ THE INSTRUCTIONS

BEFORE OPERATING

NOTICE

READ THE INSTRUCTIONS

BEFORE OPERATING

NOTICE

READ THE INSTRUCTIONS

BEFORE OPERATING

NOTICE

READ THE INSTRUCTIONS

BEFORE OPERATING

TAP BOX



SYSTEMS PRODUCTS



SYSTEMS PRODUCTS

PRODUCT FEATURE COMPARISON

Description	EMCP 4.4		EMCP 4.4 SCP	EMCP 4.4 Master		
		(1G1U)		(EGP)	(XLM)	
Operating Modes						
Emergency Standby / Island Mode	•	•	•	•	•	
Utility Paralleling	–	•	–	–	•	
System Capacity						
Number of Units	8 – Hardwired 16 – MGDL	1	16	8 (Standard)	8 (Standard)	
Voltages						
Voltage	•	•	•	•	•	
(208V - 15 kV)						
Generator Paralleling Functions						
Dead Bus Arbitration	•	•	(Note 2)	•	•	
Synchronization	•	•		(Note 2)	(Note 2)	
Load Sharing	•	–		•	•	
Load Sense / Load Demand (LS / LD)	•	–		•	•	
LS / LD – Engine Hours Balancing	•	–		•	•	
Load Shed / Load Add Stages	Up to 4 (Note 1)	•	16	8	8	
Utility Paralleling Functions						
Base Load Control	•	•	–	–	•	
Load Management / Peak Shaving (Utility)	–	•	–	–	•	
Utility Transfer / Control	–	•	–	–	•	
Utility Protection Relaying (Industrial Grade)	–	•	–	–	•	

Notes:

- (1) Includes 1 fully featured load shed stage (feeder breaker control) plus 3 programmable generator set kW-based load shed stages.
- (2) Function included as part of the system – performed by the EMCP 4.4 Generator Set Controller.

Other: Multi-Gen Data Link (MGDL).

KEY

- Standard
- Not Available

SYSTEMS PRODUCTS

	EXL	EPIC	Configurable Switchgear	Custom Switchgear
	Single Generator to Utility Paralleling with Optional Switchgear	Modular Control Panels Ideal for Adding Additional Generation Capacity	Configurable Controls and Switchgear with Standardized Sequence of Operations	Design to Order Switchgear with Customizable Sequence of Operations
	•	•	•	•
	•	•	•	•
	1	≤12	≤12	Unlimited
	•	•	•	•
	(208V – 38 kV)			
	•	•	•	•
	•	•	•	•
	–	•	•	•
	–	•	•	•
	–	–	–	–
	–	•	•	•
	–	–	–	–
	•	•	•	•
	•	•	•	•
	•	–	•	•

SYSTEMS PRODUCTS

ATS

Operating Modes:

- Open Transition
- Closed Transition
- Delayed Transition
- Bypass Isolation

ATC Line

Amp Rating	Poles	Type
40 – 3000	2,3,4	Contactors
30 – 1000	2,3,4	MCCB
200 – 5000	2,3,4	Power Breaker



SYSTEMS PRODUCTS

MX Line

Product	Amp Range	Enclosures	Controllers
CTX	40A – 400A	NEMA1, 3R	MX60
CTG	40A – 3000A	NEMA1, 3R, 4,4X 12	MX150
CTGD	40A – 3000A	NEMA1, 3R, 4,4X 12	MX150
CTGSE	40A – 3000A	NEMA1, 3R, 12	MX150
CTS	40A – 4000A	NEMA1, 3R, 4,4X 12	MX150
CTSD	40A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CTSCT	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CBTS/D	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CBTSCT	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CTE	40A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CTED	40A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CTECT	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CBTE/D	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CBTECT	100A – 4000A	NEMA1, 3R, 4,4X 12	MX250
CT30D/CT	1600A – 3000A	NEMA1, 3R	MX250, MX350



7/24/2017 1:04:03 P

LOW COST MOD

LOAD

(P) 437 kW

 $\frac{4}{4}$ 

(Q) 137 kVAr

 $\frac{4}{4}$

(PF) 0.95

437 kW



6.7 MW

153.1 M

480 v

60 Hz

5 kW



GEN

(P) 5 kW

 $\frac{1}{3}$ 

(Q) 136 kVAr

(PF) 0.03 MMC in Control

PV

(P) 451 kW $\frac{20}{20}$ (Q) 0 kVAr $\frac{20}{20}$

(PF) 1

CAT[®] CONNECT AND PRODUCT SUPPORT

04:03 PM

T MODE



HIGH VOLTAGE

451 kW

477 kW

-17 kW

0



ESS

(P) -17 kW

(Q) 1 kVAr

(PF) -1



85 %



87 %

CAT CONNECT

TECHNOLOGIES AND SERVICES

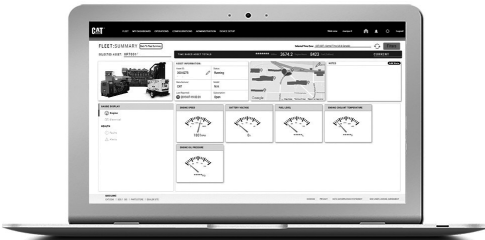
Caterpillar's connectivity solution of Remote Asset Monitoring with Cat® Connect turns data into insights and insights into profits.

Customer Benefits:

- Decreasing Owning & Operating costs
- Minimizing downtime
- Peace of mind with Ready to Run
- Real time streaming data & insights

Key Features:

- Manage Maintenance
- Customized alerts
- Monitor run status, location, fuel level, battery voltage, kilowatt hours, and 2K+ more parameters!
- Customizable Dashboards, see your data your way through
- Geo-Fencing, customized for your site
- Insights on the go, with the new Cat RAM app
- Fleet View, see and compare all your assets on one screen
- Fleet Performance enabled by reports & analytics



CAT CONNECT

Customers log into My.Cat.Com as the single portal to view all digital services including their connectivity data. These digital services can include:

- Inspections
- Scheduled Oil Sampling
- Operation & Maintenance manuals
- Ordering Parts
- Requesting Service
- Connectivity Data with Remote Asset Monitoring

Signup and log in today to learn more!



PRODUCT SUPPORT

PRODUCT SUPPORT DEFINITIONS

Extended Service Coverage (ESC)

Depending on the model and application, Silver, Gold, Platinum and Platinum Plus coverage levels are available from Caterpillar with terms to meet most applications, whether prime or standby.

Platinum and Platinum Plus provide additional allowances for overtime, emergency freight, rental, crane and rigging support. Please see the registration contract for details.

Equipment	Coverage Option
New Product	New ESC
Existing Product	Advantage ESC
Overhauls	OPC*

Electric Power ESC reimburses covered parts at customer list price, labor at selling rates and travel and mileage charges (less any deductibles) for covered repairs.

Available worldwide for all Cat Electric Power Products, ESC provides usual and customary parts and labor costs for covered system failures due to defects in materials and workmanship on components over the duration of the covered period.

This is a brief description of Extended Coverage. See your Cat dealer for more information. The Extended Coverage contract will govern.

*Overhaul Protection Coverage.

CUSTOMER VALUE AGREEMENTS

WHAT IS A CUSTOMER VALUE AGREEMENT?

A CVA is any arrangement between you and your Cat dealer that helps you control your maintenance cost. Agreements are tailored to fit your business needs and can range from simple Preventive Maintenance Kits to sophisticated Total Maintenance & Repair contracts. No matter which option you choose, you can be assured that your Cat dealer will provide you with careful planning and ongoing attention that will help you succeed.

When you have a CVA with your Cat dealer, you have more time to do what you do best – run your business. Trained dealer technicians assist you by maintaining your equipment and driving down operating costs. In the end, everyone's goal is the same: helping you get more work done at a lower cost.

WHAT ARE THE BENEFITS OF A CUSTOMER VALUE AGREEMENT?

Agreement Flexibility – adapt to level of support to meet your requirements.

All maintenance parts and tools – Cat maintenance parts/tools for routine services.

Accurate, professional testing – Caterpillar trained technicians have the specialist knowledge, technology, and global backup to check your equipment.

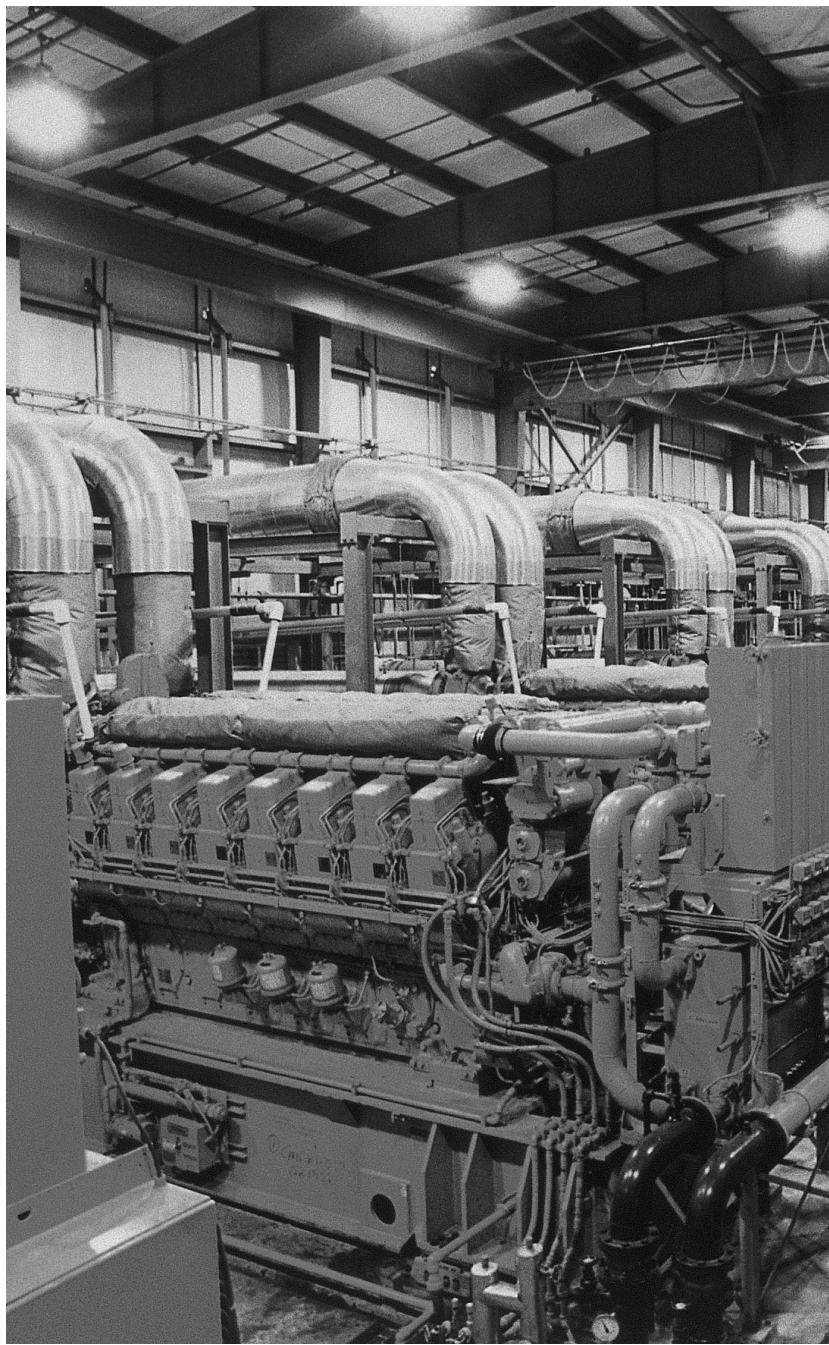
Early Warning – advanced diagnostics to identify problems and schedule repairs before a failure.

Plan ahead with greater confidence – improved reliability enables tighter scheduling of maintenance intervals.

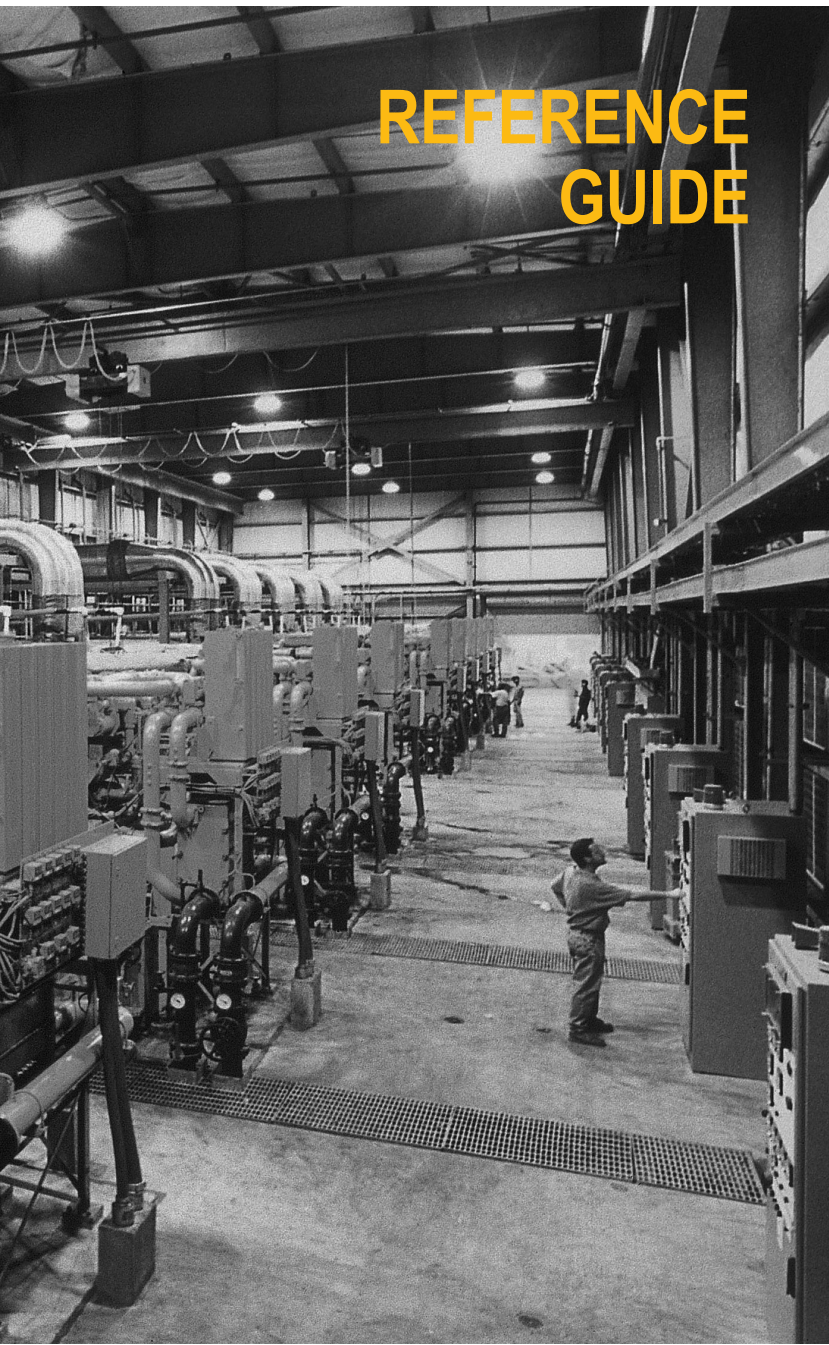
Increased uptime – engines run longer and more efficiently, improving profitability

HOW DOES A CVA WORK?

A CVA is an individualized plan for all your equipment, regardless of age or application, with no pre-set requirements. Depending on your needs, your costs can be a flat monthly fee or based on production hours. Your agreement can cover one piece of equipment, systems, or entire fleets. Your Cat dealer will help you get more work done at a lower cost for your Cat and non-Cat equipment.



REFERENCE GUIDE



REFERENCE GUIDE

ELECTRICAL TABLES

To Obtain	Alternating Current		Direct Current
	Single-Phase	Three-Phase	
kW	$\frac{V \times I \times P.F.}{1000}$	$\frac{1.732 \times V \times I \times P.F.}{1000}$	$\frac{V \times I}{1000}$
kVA	$\frac{V \times I}{1000}$	$\frac{1.732 \times V \times I}{1000}$	—
Horsepower required when kW known (Generator)	$\frac{kW}{.746 \times \text{EFF. (Gen)}}$	$\frac{kW}{.746 \times \text{EFF. (Gen)}}$	$\frac{kW}{.746 \times \text{EFF. (Gen)}}$
kW input when HP known (Motor)	$\frac{HP \times .746}{\text{EFF. (Mot.)}}$	$\frac{HP \times .746}{\text{EFF. (Mot.)}}$	$\frac{HP \times .746}{\text{EFF. (Mot.)}}$
Amperes when HP known	$\frac{HP \times .746}{V \times P.F. \times \text{EFF.}}$	$\frac{HP \times .746}{1.732 \times V \times \text{EFF.} \times P.F.}$	$\frac{HP \times .746}{V \times \text{EFF.}}$
Amperes when kW known	$\frac{kW \times 1000}{V \times P.F.}$	$\frac{kW \times 1000}{1.732 \times V \times P.F.}$	$\frac{kW \times 1000}{V}$
Amperes when kVA known	$\frac{kVA \times 1000}{V}$	$\frac{kVA \times 1000}{1.732 \times V}$	—
Frequency Hz	$\frac{\text{Poles} \times \text{RPM}}{120}$	$\frac{\text{Poles} \times \text{RPM}}{120}$	—
Reactive kVA (kVA _r)	$\frac{V \times I \times \sqrt{1-(P.F.)^2}}{1000}$	$\frac{1.732 \times V \times I \times \sqrt{1-(P.F.)^2}}{1000}$	—
% Voltage Regulation	$\frac{100 (V_{NL} - V_{FL})}{V_{FL}}$	$\frac{100 (V_{NL} - V_{FL})}{V_{FL}}$	$\frac{100 (V_{NL} - V_{FL})}{V_{FL}}$

ELECTRICAL TABLE ABBREVIATIONS:

V – voltage in volts

I – current in amperes

kW – power in kilowatts (actual power)

kVA – kilovolt-amperes (apparent power)

HP – horsepower

RPM – revolutions per minute

kVA_r – reactive kilovolt-amperes

EFF. – efficiency as a decimal factor

NL – no load

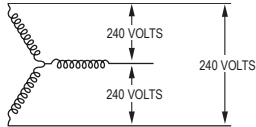
FL – full load

P.F. – power factor

Note: DC kW = DC kVA

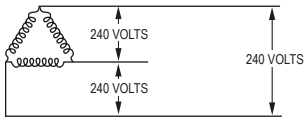
REFERENCE GUIDE

THREE-PHASE CONNECTION SYSTEMS



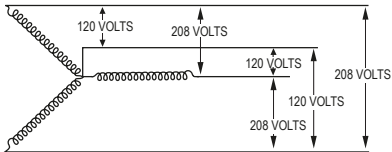
THREE-PHASE, THREE-WIRE (WYE)

A



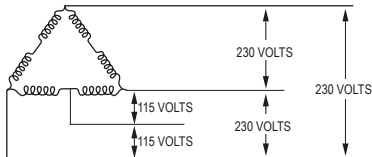
THREE-PHASE, THREE-WIRE (DELTA)

B



THREE-PHASE, FOUR-WIRE (WYE)

C



THREE-PHASE, FOUR-WIRE (DELTA)

D

REFERENCE

Energy Units

1 Kilowatt-hour (kWh) = 3.6×10^6 J

1 Kilowatt-hour (kWh) = 3412 Btu (IT)

1 Therm = 100,000 Btu

Units of Power

1 Watt (W) = 1 J/sec

1 Horsepower = 746 W



For additional information or to find your nearest dealer go to:

www.cat.com/electricpower

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