ottomotores

CUMMINS SERIE QSL

Energía que Mueve al Mundo

Definiciónes

Potencia Prime
Estos valores son aplicables para el suministro de energía eléctrica continua (a carga variable) en lugar de la red comercial + 10% sobrecarga

Potencia Stand by
Estos valores son aplicables para el suministro de energía eléctrica continua (con carga variable) en caso de falla de la red comercial. No se permite sobre-carga sobre estos valores.

Tabla de Potencias

Modelo	Voltaje	kVA Prime	kWe Prime	kVA Stand-by	kWe Stand-by
CNY250	220-440V	281	225	313	250
CNY300	220-440V	326	261	375	300

0.8 Factor de potencia

Información Técnica

Datos Técnicos	CNY250	CNY300
Frecuencia:	60 Hz	60 Hz
Marca / Modelo	QSL9G3	QSL9G5
Generador Modelo:	Stamford UCI274K	Stamford HCI434D
Número de Cilindros:	6 en linea	6 en linea
Diametro por Carrera :in (mm)	4.49X5.69 (114X145)	4.49X5.69 (114X145)
Relación de Compresión:	16.8 : 1	16.8 : 1
Aspiración:	Turbo y Postenfriado	Turbo y Postenfriado
Velocidad:	1800 RPM	1800 RPM
Potencia: BHP(kWm)	399 (298)	476 (355)
Presion Efectiva: psi (kPA)	325 (2241)	387 (2668)
Velocidad dePiston: ft/min (m/s)	1707 (8.7)	1707 (8.7)
Consumo a plena carga: lt / hr - 100%	77	89
Calor Expulsado en el Sistema de Escape: BTU/min (kWm)	16015 (285)	17175 (305)
Calor Expulsado en el Sistema de Enfriamiento: BTU/min (kWm)	3600 (65)	7705 (140)
Temperatura de Escape: ºF (ºC)	1105 (595)	1070 (580)
Flujo de Enfriamiento en el Radiador m³/seg - FPM	llame a fabrica	llame a fabrica
Flujo de Escape: cfm	2165 (1020)	1355 (640)

Nota: Imagen de carácter ilustrativa ya que los equipos en foto pudieran incluir accesorios opcionales

Como leer nuestro codigo: Ejem: **CNY250**

C=Motor Cummins
N=Generador Newage Stamford
Y=60Hz-1800 RPM
250= Potencia del Equipo.

Ottomotores, S.A de C.V.
Calz. San Lorenzo No.1150
Col. Cerro de la estrella, C.P. 09860
Delg. Iztapalapa México, D.F.
Tels:52-55-5624-5600
Fax: 52-55-5426-5521 / 52-55-5426-5581
email: **ventas@ottomotores.com.mx**
sitio web: **www.ottomotores.com.mx**

Dimensiones

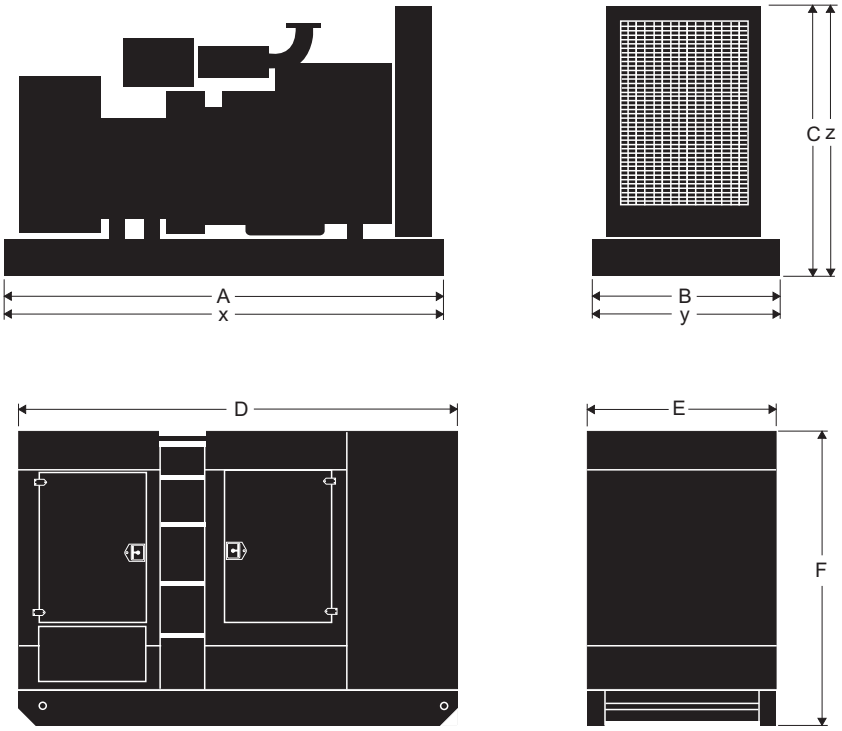

Tabla de Dimensiones

Modelo	Equipo con Base Estructural			Equipo con Base Tanque			Equipo con Caseta Acústica*		
	A	B	C	x	y	z	D	E	F
CNY250	290,00	110,00	181,00	320,00	145,00	184,00	400,00	145,00	205,00
	Peso: 1866,00 kgs			Peso: 2522,00 kgs					
CNY300	290,00	110,00	181,00	320,00	145,00	184,00			
	Peso: 2080,00 kgs			Peso: 2805,00 kgs			Peso: 3328,00kgs		

[*] Equipo opcional

Información Técnica

Nota: las condiciones de referencia estándar son de 25 ºC (77 º F) temperatura de entrada de aire. Todos los datos de desempeño de motores son basados en la potencia mencionada arriba.

Datos de consumo de combustible a plena carga con combustible diesel tienen una gravedad específica de 0,85.

Comercializado por:

Módulos de Control

Ottomotores tiene una posición única en la fabricación de grupos electrógenos utilizando en ellos módulos de control que cumplen con todos los niveles de requerimiento del mercado nacional y de exportación.

Las diferentes soluciones de controles que se tienen para nuestra gama de plantas generadoras, permite una operación simple en modo manual y automático, asi mismo permiten desarrollar proyectos de sincronía entre plantas generadoras o con la red de energía eléctrica.

La familia de módulos de control en transición abierta (DALE 3200) permite tener control en forma automática de la unidad de transferencia, asi como elmonitoreo del grupo generador.

Nuestro modulos de control cuentan con puerto de comunicación RS485 para la comunicación remota con el grupo generador.

Los módulos pueden ser monitoreados através de un exelente software para observar parámetros del equipo de manera facíl y rapida.

La familia de módulos de control para la sincronía (6100, 6050 y 6300),incorporan un amplio sistema de monitoreos ademas de conexion a Internet (LAN) o mensaje SMS via celular, o usando los puertos de comunicación RS485 a través de ModBus

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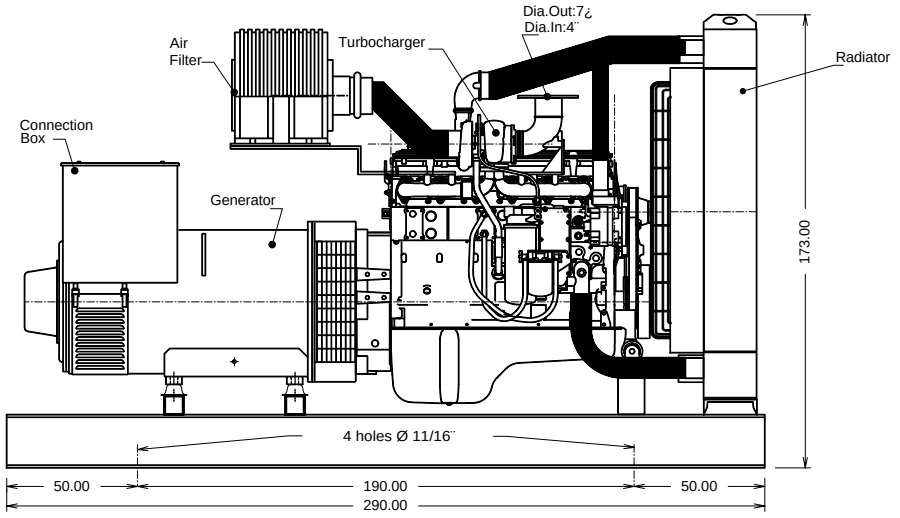
Calz. San Lorenzo No.1150
Col. Cerro de la Estrella, C.P.09860
Delegación Iztapalapa México D.F.
Tels: 52-55-5624-5600
Fax.52-55-5426-55-21 / 52-55-54265581

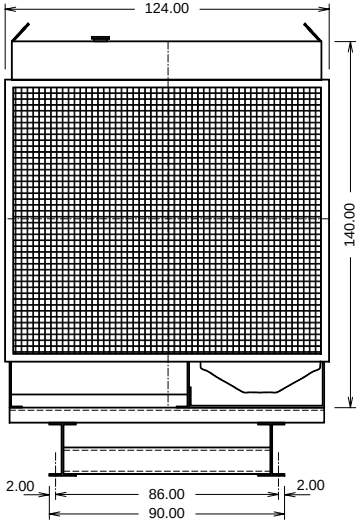
E-mail **ventas1@ottomotores.com.mx**
ventas2@ottomotores.com.mx

Web site. **www.ottomotores.com.mx**

MODELS
CNY220
CNY250
CNY300
CNE261
CNE290
CNE350

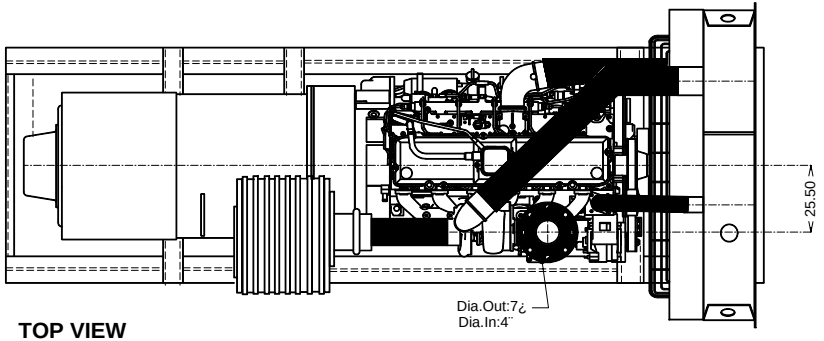


SIDE VIEW



FRONT VIEW

DESCRIPTION	
RADIATOR:	CM07 TM PAQ G5 300
ENGINE:	QSL9G2/G3/G5
AIR: FILTER	AH1135
BASE FRAME:	BP-QSL9G5-STF
# SPRING AVMS:	4 PZS



TOP VIEW

-THE GENSET DIMENSIONS ARE THE SAME BY FAMILY MODEL, THERE COULD BE ONLY DIFFERENCES ON THE ALTERNATOR LENGHT SEE SPECIFIC GENERAL ARRAGEMENT DRAWING OF CERTEIN MODEL

-TOTAL WEIGHT COULD VARY CHECK RATING CHART FOR EACH MODEL

Customer: S/O:

Rev.	Description	Date	Certificated
	Reviews		

Title: *CUMMINS ENGINE QSL9G2/G3/G5 - STAMFORD ALTERNATOR*

Draw: R.G.C.	Revised: F.H.M.	Certificated: F.H.M.	Code: **CNE/Y-21**
Date: JAN 05th 2005	Date: JAN 05th 2005	Date: JAN 05th 2005	Dept.: Engineering

Marks: cms | Scale: s/e | Draw: | Of:

Ottomotores keeps the right to change the information with out prior notice

FO 023-0

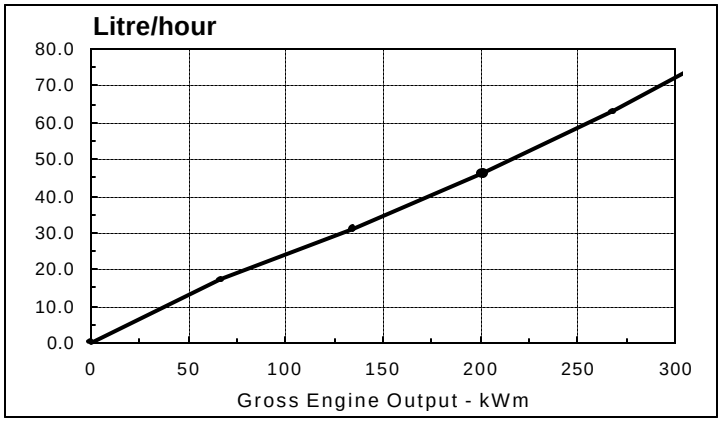
Cummins Inc.	Basic Engine Model: QSL9-G5	Curve Number: FR-91545	G-DRIVE QSL 1
Columbus, Indiana 47201	Engine Critical Parts List: CPL: 8693	Date: 15Aug05	
Engine Data Sheet			

Displacement : **8.8** litre (**543** in^3)	Bore : **114** mm (**4.49** in.) Stroke : **145** mm (**5.69** in.)
No. of Cylinders : **6**	Aspiration : **Turbocharged and Charge Air Cooled**

Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	310	415	268	359	228	305
1800	355	476	307	412	261	350

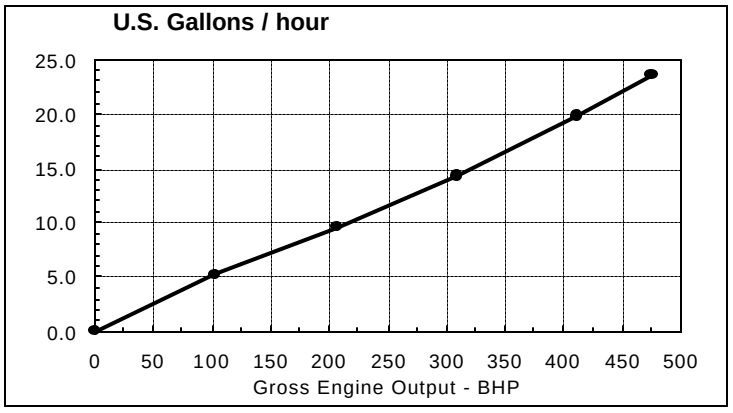
Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	310	415	0.206	0.338	75	19.8
PRIME POWER						
100	268	359	0.199	0.328	63	16.6
75	201	269	0.194	0.319	46	12.1
50	134	180	0.196	0.323	31	8.2
25	67	90	0.213	0.351	17	4.4
CONTINUOUS POWER						
100	228	305	0.196	0.323	53	13.9



Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	355	476	0.214	0.352	89	23.6
PRIME POWER						
100	307	412	0.208	0.342	75	19.9
75	231	309	0.201	0.331	55	14.4
50	154	206	0.202	0.332	36	9.6
25	77	103	0.221	0.363	20	5.3
CONTINUOUS POWER						
100	261	350	0.204	0.335	63	16.5



CONVERSIONS:(litres = U.S. Gal x 3.785) (U.S.Gal = litres x 0.2642)

Data Subject to Change Without Notice

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. **PRIME POWER RATING:** Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:**UNLIMITED TIME RUNNING PRIME POWER:** Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year. **LIMITED TIME RUNNING PRIME POWER:** Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.**CONTINUOUS POWER RATING** : Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

Reference AEB 10.47 for determining Electrical Output.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.
Derates shown are based on 15 in H_20 air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

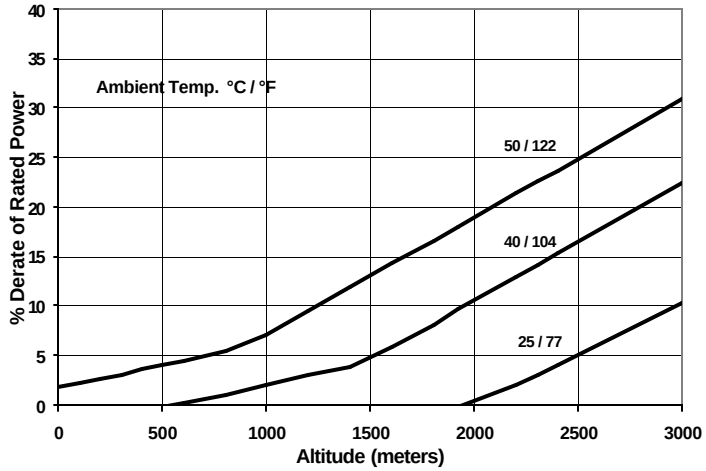
Data Status: --Limited Production--

Data Tolerance: ± 5%

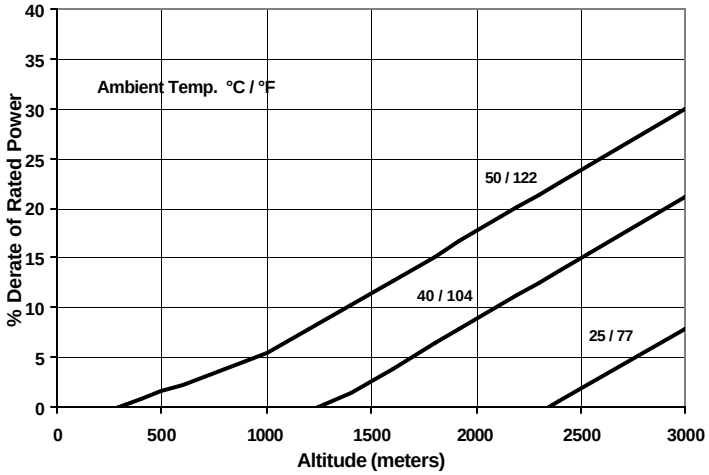
Chief Engineer:

1500 RPM Derate Curves

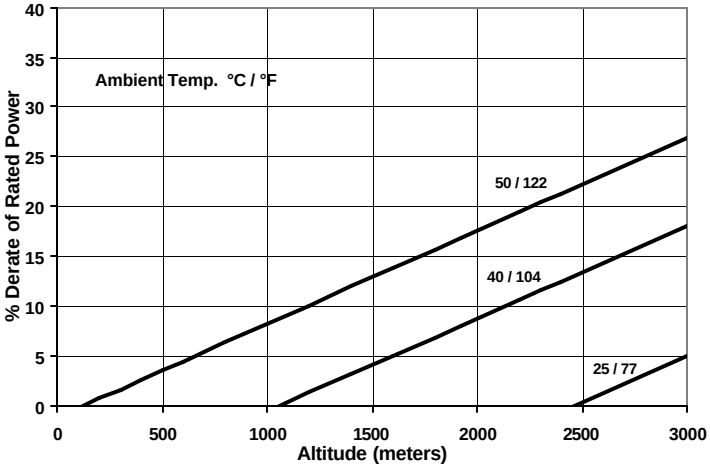
Standby



Prime



Continuous



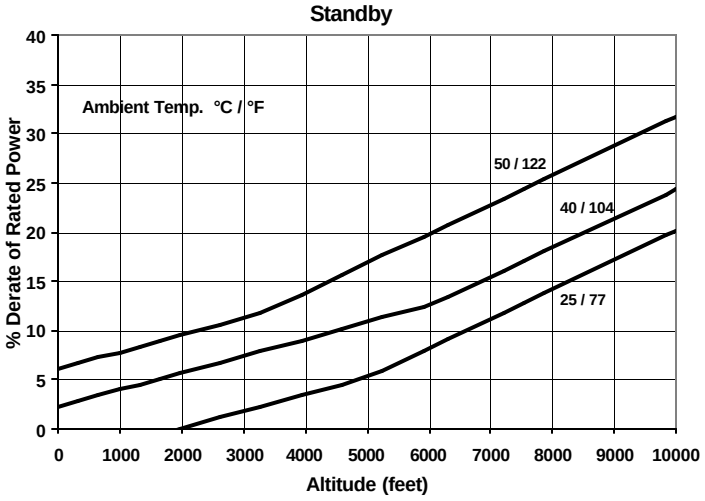
Operation At Elevated Temperature And Altitude:

For **Standby operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 4% per 10° C (18° F).

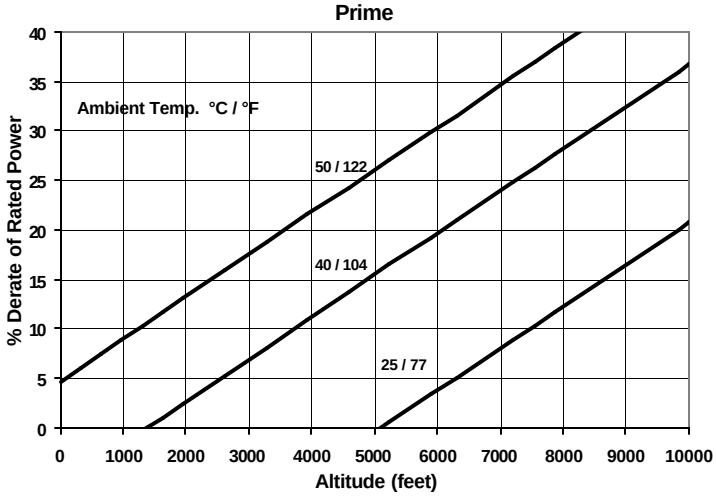
For **Prime operation** above these conditions, derate by an additional 5% per 300 m (1000 ft), and 8% per 10° C (18° F).

1800 RPM Derate Curves

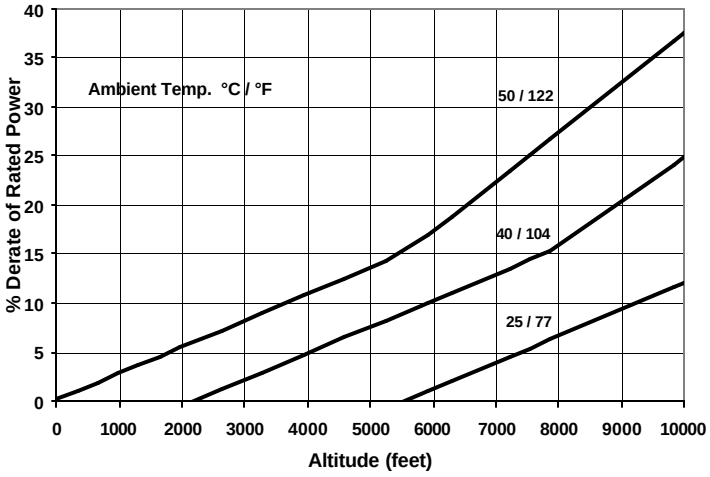
Standby



Prime



Continuous



Operation At Elevated Temperature And Altitude:

For **Standby operation** above these conditions, derate by an additional 3.0% per 300 m (1000 ft), and 5% per 10° C (18° F).

For **Prime operation** above these conditions, derate by an additional 5.0% per 300 m (1000 ft), and 10% per 10° C (18° F).

Cummins Inc.
Engine Data Sheet

ENGINE MODEL : QSL9-G5 **CONFIGURATION NUMBER :** D563007GX03 **DATA SHEET :** DS91545
DATE :15Aug05
PERFORMANCE CURVE : FR-91545

INSTALLATION DIAGRAM
• Fan to Flywheel : xxxxxxx

CPL NUMBER
• Engine Critical Parts List : 8693

GENERAL ENGINE DATA

Type		4-Cycle; In-line; 6-Cylinder Diesel	
Aspiration		Turbocharged and Charge Air Cooled	
Bore x Stroke	— in x in (mm x mm)	4.49 x 5.69 (114 x 145)	
Displacement	— in^3 (litre)	543 (8.8)	
Compression Ratio		16.8 : 1	
Dry Weight			
Fan to Flywheel Engine	— lb (kg)	1575	(714)
Wet Weight			
Fan to Flywheel Engine	— lb (kg)	1627	(738)
Moment of Inertia of Rotating Components			
• with FW 9520 Flywheel	— $lb_m \cdot ft^2$ ($kg \cdot m^2$)	TBD	(TBD)
• with FW 9525 Flywheel	— $lb_m \cdot ft^2$ ($kg \cdot m^2$)	TBD	(TBD)
Center of Gravity from Rear Face of Block	— in (mm)	16.89	(429)
Center of Gravity Above Crankshaft Centerline	— in (mm)	8.35	(212)
Maximum Static Loading at Rear Main Bearing	— lb (kg)	N.A.	N.A.

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m)	1000	(1356)

EXHAUST SYSTEM

Maximum Back Pressure	— in Hg (mm Hg)	3	(76)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction			
• with Dirty Filter Element	— in H_2O (mm H_2O)	25	(635)
• with Clean Filter Element	— in H_2O (mm H_2O)	15	(381)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity — Engine Only	— US gal (litre)	2.9	(11)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m)	60	(18.3)
Standard Thermostat (Modulating) Range	— °F (°C)	180 - 199	(82 - 93)
Minimum Pressure Cap	— psi (kPa)	15	(103)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C)	230 / 219	(110 / 104)
Maximum Coolant Friction Head External to Engine — 1800 rpm	— psi (kPa)	5	(35)
— 1500 rpm	— psi (kPa)	4	(28)

Air-to-Air Core Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold	— °F (°C)	45	(25)
Maximum Air Pressure Crop from Turbo Air outlet to Intake Manifold — 1800 rpm	— in Hg (mm Hg)	4	(102)
— 1500 rpm	— in Hg (mm Hg)	2.5	(63.5)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— psi (kPa)	15	(103)
@ Governed Speed	— psi (kPa)	40 - 60	(276 - 414)
Maximum Oil Temperature	— °F (°C)	250	(121)
Oil Capacity with OP 9451 Oil Pan : High - Low	— US gal (litre)	6	(22.7)
Total System Capacity (Including Combo Filter)	— US gal (litre)	7	(26.5)
Angularity of OP 9451 Oil Pan — Front Down		45°	
— Front Up		45°	
— Side to Side		45°	

FUEL SYSTEM

Type Injection System	Bosch HPCR	
Maximum Restriction at Lift Pump — in Hg (mm Hg)	6	(152)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — in Hg (mm Hg)	10	(254)
Maximum Fuel Flow to Injection Pump — US gph (litre / hr)	43	(165)
Maximum Fuel Return Flow — US gph (litre / hr)	8	(30)
Maximum Fuel Inlet Temperature — °F (°C)	160	(70)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement) — volt	12	24
Battery Charging System, Negative Ground — ampere	100	70
Maximum Allowable Resistance of Cranking Circuit — ohm	0.001	0.002
Minimum Recommended Battery Capacity		
Cold Soak @ 50-F (10-C) and Above — 0°F CCA	TBD	(TBD)
Cold Soak @ 32 to 50-F (0 to10-C) — 0°F CCA	TBD	(TBD)
Cold Soak @ 0 to 32-F (-18 to 0-C) — 0°F CCA	1500	(750)

COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds — °F (°C)	TBD.	(TBD)
Minimum Ambient Temperature for Unaided Cold Start — °F (°C)	10	(-12)

PERFORMANCE DATA

All data is based on:

- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

  Barometric Pressure : 100 kPa (29.53 in Hg) Air Temperature : 25 °C (77 °F)
  Altitude : 110 m (361 ft) Relative Humidity : 30%

Steady State Stability Band at Any Constant Load — %	+/- 0.25
Exhaust Noise at 1m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45° --- dBA	TBD

	STANDBY				**PRIME POWER**			
	60 hz		***50 hz***		***60 hz***		***50 hz***	
Governed Engine Speed — rpm	1800		1500		1800		1500	
Engine Idle Speed — rpm	700 - 900		700 - 900		700 - 900		700 - 900	
Gross Engine Power Output — BHP (kW_m)	476	(355	415	(310)	412	(307)	359	(268)
Brake Mean Effective Pressure — psi (kPa)	387	(2668)	404	(2785)	335	(2309	350	(2413)
Piston Speed — ft / min (m / s)	1707	(8.7)	1422	(7.2)	1707	(8.7)	1422	(7.2)
Friction Horsepower — HP (kW_m)	47	(35)	35	(26)	47	(35)	35	(26)
Engine Water Flow at Stated Friction Head External to Engine:								
• 2.5 psi Friction Head — US gpm (litre / s)	64	(242)	52	(195)	64	(242)	52	(195)
• Maximum Friction Head — US gpm (litre / s)	60	(227)	47	(178)	60	(227)	47	(178)
Engine Data with Dry Type Exhaust Manifold								
Intake Air Flow — cfm (litre / s)	870	(410)	715	(340)	820	(390)	660	(310)
Exhaust Gas Temperature — °F (°C)	1070	(580)	1040	(560)	945	(500)	930	(500)
Exhaust Gas Flow — cfm (litre / s)	1355	(640)	1100	(520)	1270	(600)	1030	(490)
Air to Fuel Ratio — air : fuel	22.1 : 1		21.7:1		24.8 : 1		23.8:1	
Radiated Heat to Ambient — BTU / min (kW_m)	2070	(40)	1720	(35)	1745	(35)	1455	(30)
Heat Rejection to Jacket Coolant — BTU / min (kW_m)	7705	(140)	6610	(120)	6425	(115)	5550	(100)
Heat Rejection to Exhaust — BTU / min (kW_m)	17175	(305)	13385	(240)	14120	(250)	11125	(200)
Heat Rejection to Fuel — BTU / min (kW_m)	N/A		N/A		N/A		N/A	
Heat Rejected to Aftercooler — BTU / min (kW_m)	4535	(80)	3580	(65)	3765	(70)	2865	(55)
Charge Air Flow — lb / min (kg / min)	60	(27)	51	(23)	57	(26)	46	(21)
Turbocharger Compressor Outlet Pressure — in Hg (mm Hg)	75	(2006)	77	(1950)	71	(1815)	63	(1600)
Turbocharger Compressor Outlet Temperature — °F (°C)	437	(225)	426	(219)	401	(205)	381	(194)

N.A. - Not Available
N/A - Not Applicable to this Engine
TBD - To Be Determined

FRAME HC434D/444D HCK434D/444D

WINDING 311

RATINGS	REFER TO RATINGS BOOK
OVERLOAD	REFER TO RATINGS BOOK
ALTITUDE	REFER TO RATINGS BOOK
AMBIENT TEMP.	REFER TO RATINGS BOOK

CONTROL SYSTEM SER. 3	SEPARATELY EXCITED BY P.M.G. FRAME DESIGNATION HC434		
A.V.R.	MX341	MX321	
VOLTAGE REGULATION	± 1.0%	± 0.5%	WITH 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES OF THIS SECTION		

CONTROL SYSTEM SER. 4	SELF EXCITED FRAME DESIGNATION HC444		
A.V.R.	SX440	SX421	
VOLTAGE REGULATION	± 1.0%	± 0.5%	WITH 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT		

INSULATION SYSTEM	CLASS H	
PROTECTION	IP22 STANDARD - IP23 OPTIONAL (5% DERATE)	
RATED POWER FACTOR	0.8	
STATOR WINDING	DOUBLE LAYER LAP	
WINDING PITCH	TWO THIRDS	
WINDING LEADS	12	
STATOR WDG. RESISTANCE	0.014 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED	
ROTOR WDG. RESISTANCE	1.04 Ohms at 22°C	
R.F.I. SUPPRESSION	BS EN 50081/2-1/2 VDE 0875G VDE 0875N For other standards apply to the factory	
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%	
MAXIMUM OVERSPEED	2250 Rev/Min	
BEARING DRIVE END **HC ONLY**	BALL. 6317 (ISO)	
BEARING NON-DRIVE	BALL. 6314 (ISO)	
EFFICIENCY	REFER TO EFFICIENCY CURVES OF THIS SECTION	
	1 BEARING	2 BEARING **HC ONLY**
WEIGHT COMP. GENERATOR	950 kg	950 kg
WEIGHT WOUND STATOR	415 kg	415 kg
WEIGHT WOUND ROTOR	371 kg	338 kg
WR^2 INERTIA	4.18 kgm^2	3.88 kgm^2

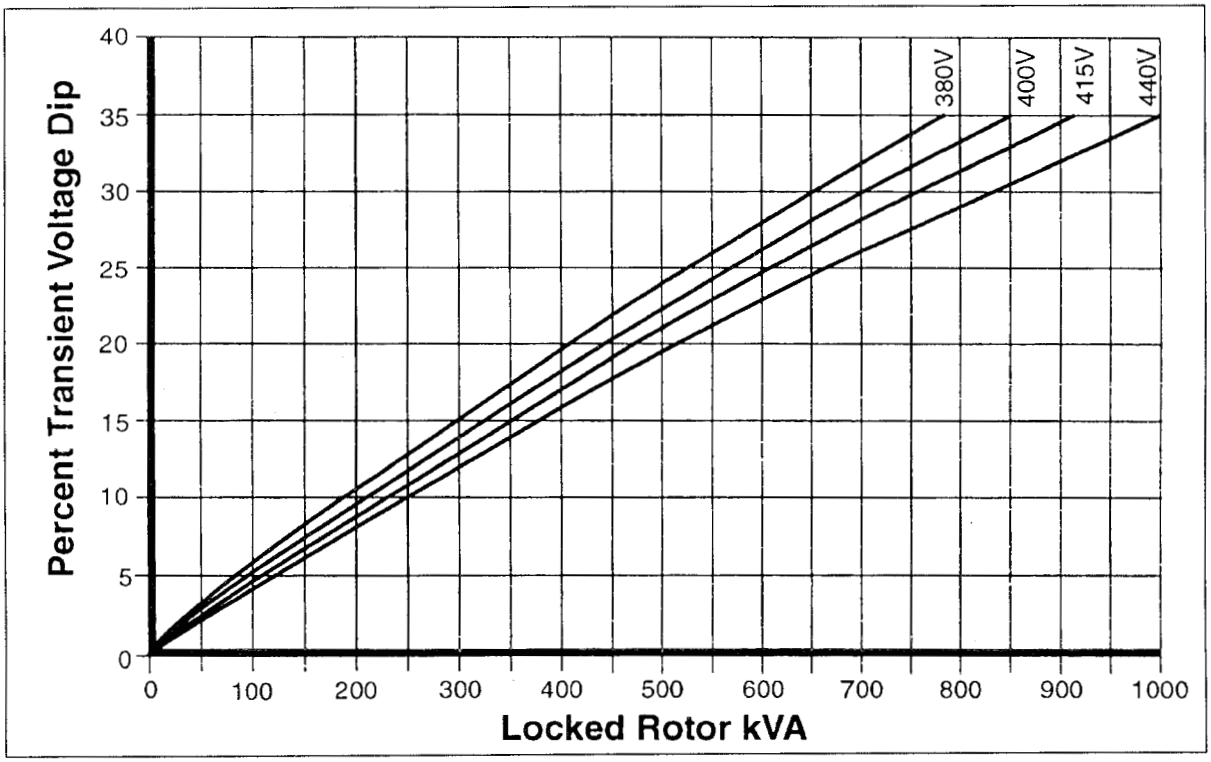
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF< 2%				TIF< 50			
COOLING AIR **FOR HC**	0.486 m^3/sec 1030 cfm				0.58 m^3/sec 1240 cfm			
COOLING AIR **FOR HCK**	0.68 m^3/sec 1450 cfm				0.83 m^3/sec 1760 cfm			
VOLTAGE SERIES STAR (Y)	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR (Y)	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE EDISON DELTA (Δ)	220/110	230/115	240/120	250/125	240/120	254/127	266/133	277/138
kVA BASE RATING FOR REACTANCE VALUES	295	295	295	280	338	350	363	375
Xd DIR. AXIS SYNCHRONOUS	3.11	2.81	2.61	2.20	3.54	3.28	3.12	2.96
X'd DIR. AXIS TRANSIENT	0.19	0.18	0.17	0.14	0.22	0.19	0.19	0.18
X"d DIR. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.10	0.15	0.14	0.14	0.13
Xq QUAD. AXIS REACTANCE	2.62	2.36	2.19	1.85	3.03	2.82	2.68	2.54
X"q QUAD. AXIS SUBTRANSIENT	0.39	0.34	0.32	0.27	0.40	0.38	0.35	0.34
XL LEAKAGE REACTANCE	0.08	0.07	0.06	0.06	0.09	0.08	0.08	0.07
X_2 NEGATIVE SEQUENCE	0.26	0.24	0.22	0.19	0.28	0.26	0.24	0.22
X_0 ZERO SEQUENCE	0.10	0.09	0.08	0.08	0.10	0.09	0.09	0.08
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							

T'd TRANSIENT TIME CONST.	0.080 sec
T"d SUB-TRANSTIME CONST.	0.019 sec
T'do O.C. FIELD TIME CONST.	1.700 sec
Ta ARMATURE TIME CONST.	0.018 sec
SHORT CIRCUIT RATIO	1/Xd

ISSUE 8

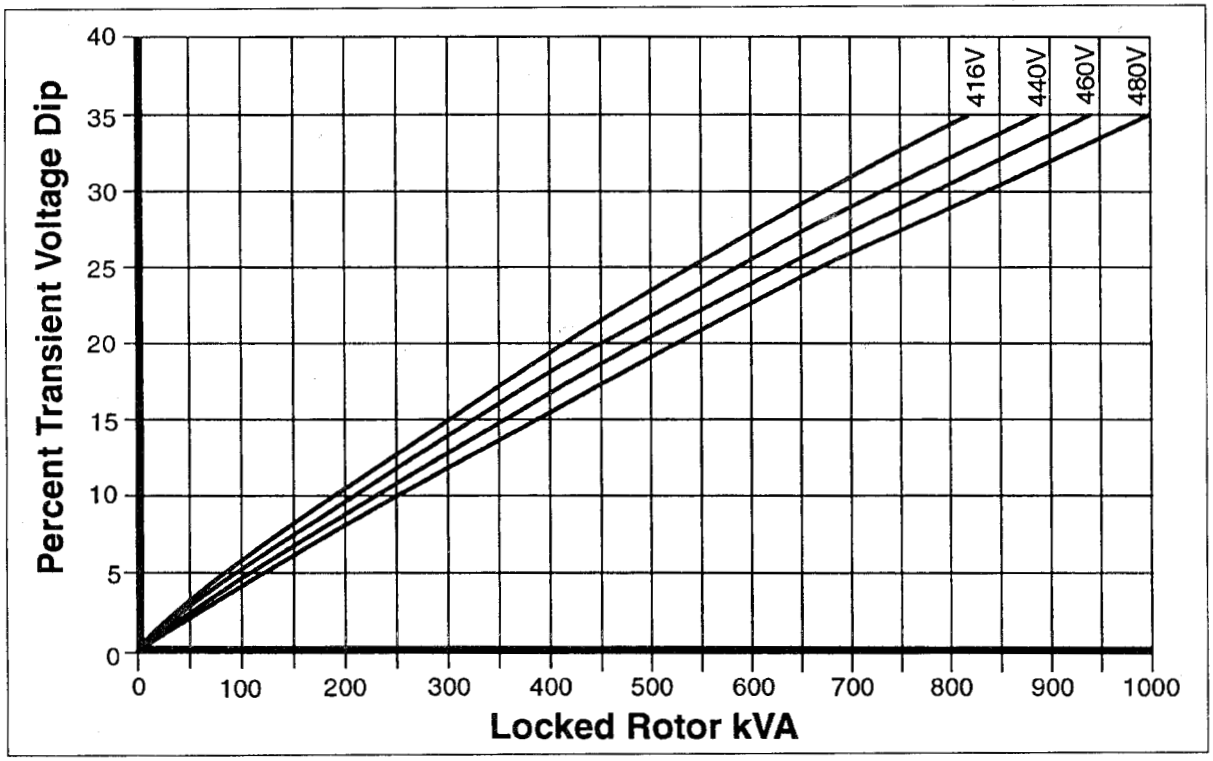
FRAME HC434D HCK434D 50 Hz

SERIES 3 WINDING 311
LOCKED ROTOR MOTOR STARTING CURVE



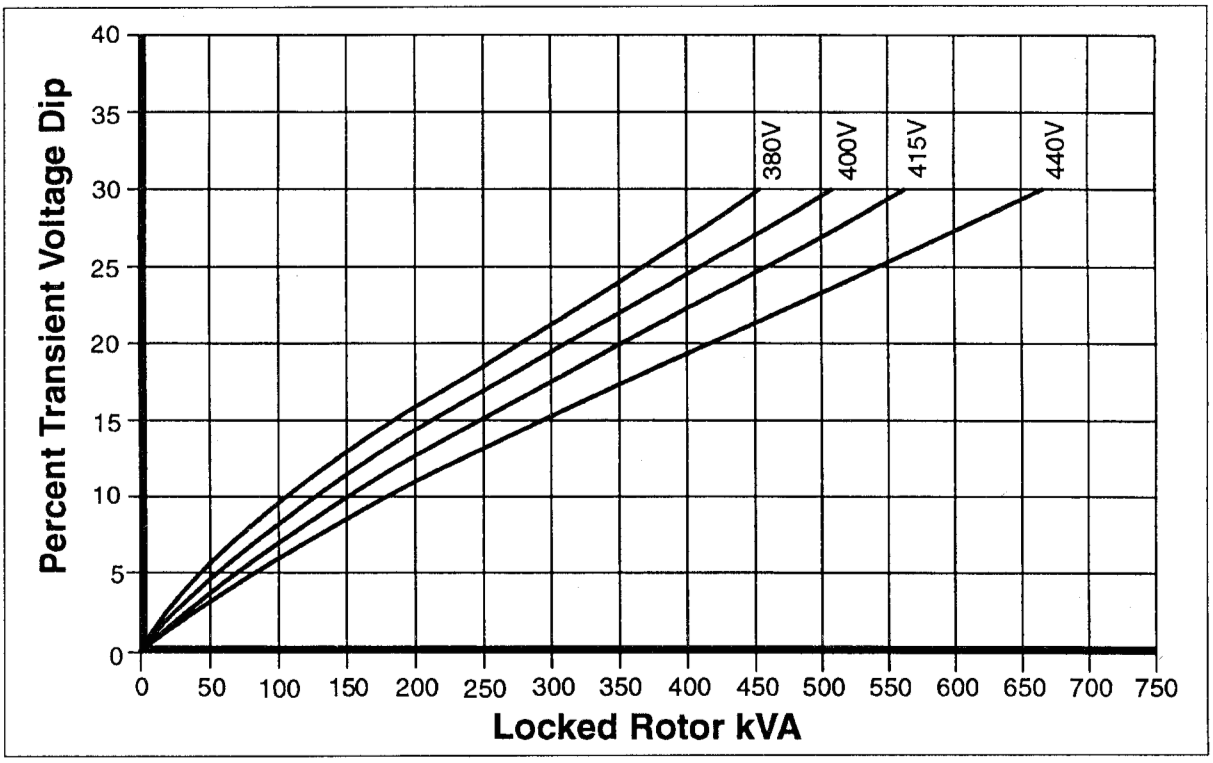
FRAME HC434D HCK434D 60 Hz

SERIES 3 WINDING 311
LOCKED ROTOR MOTOR STARTING CURVE



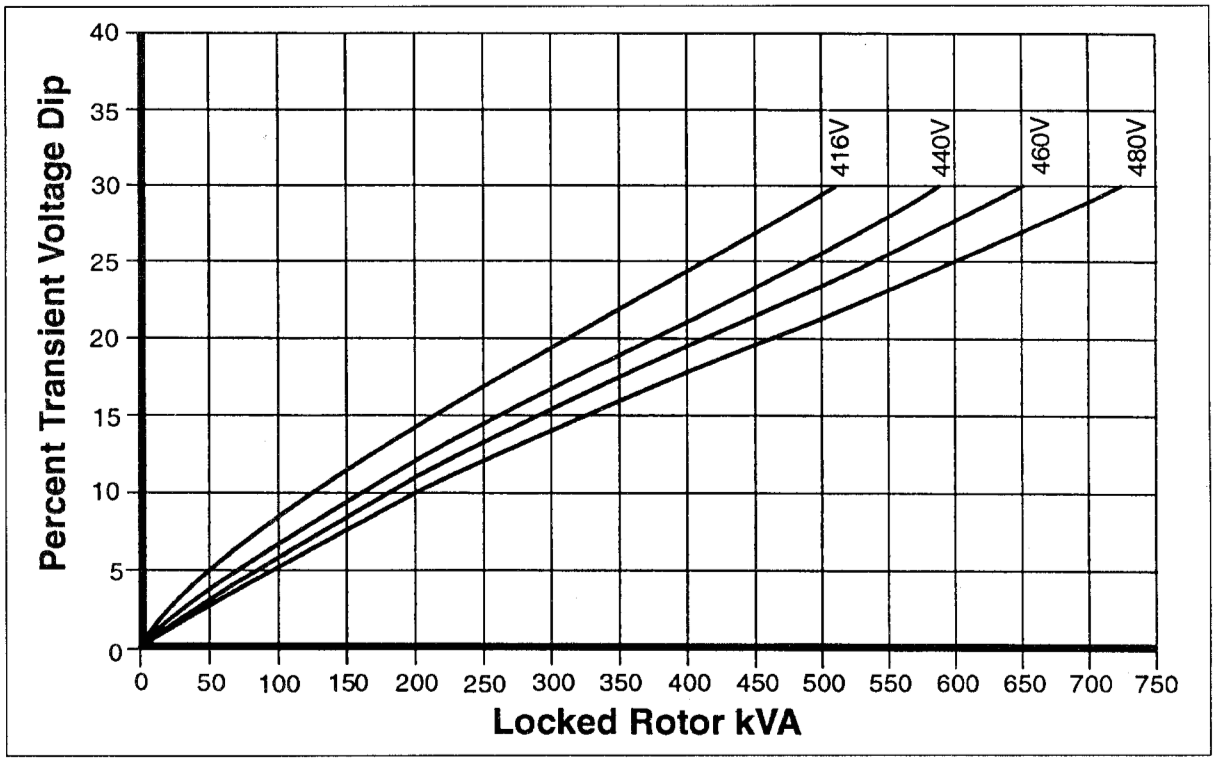
FRAME HC444D HCK444D 50 Hz

SERIES 4 WINDING 311
LOCKED ROTOR MOTOR STARTING CURVE

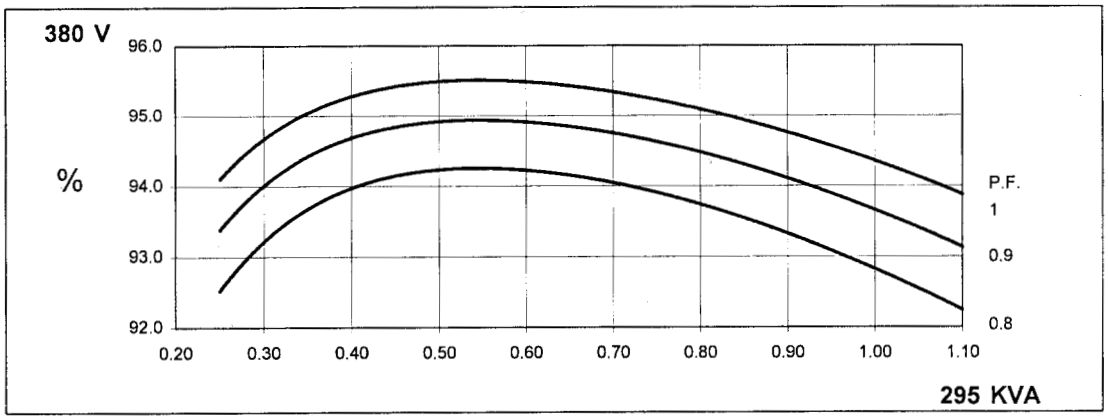


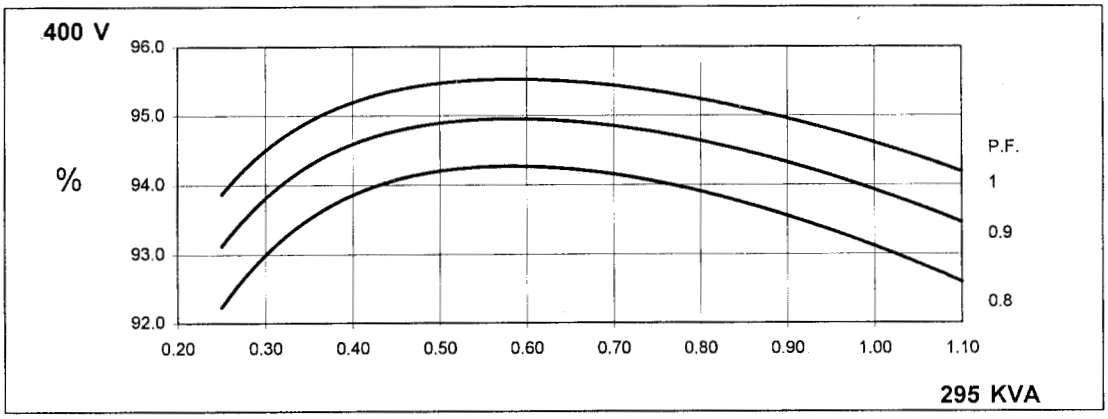
FRAME HC444D HCK444D 60 Hz

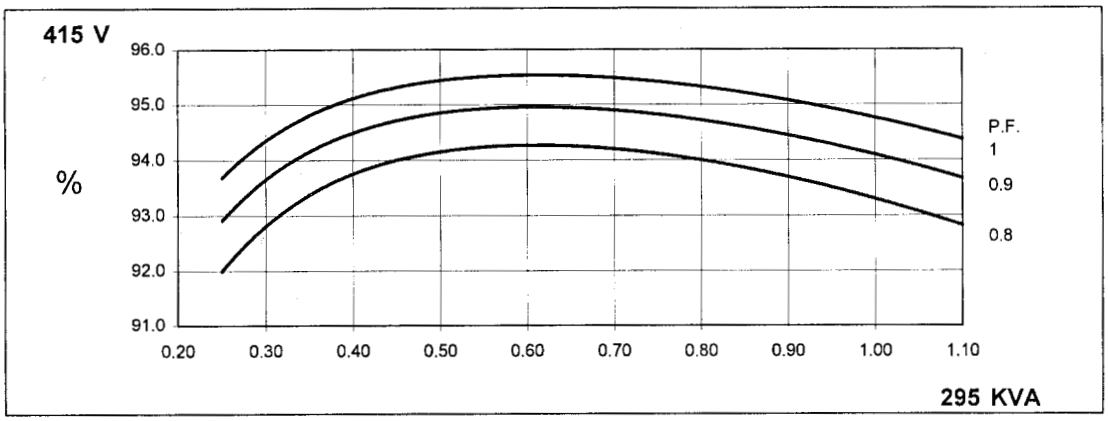
SERIES 4 WINDING 311
LOCKED ROTOR MOTOR STARTING CURVE

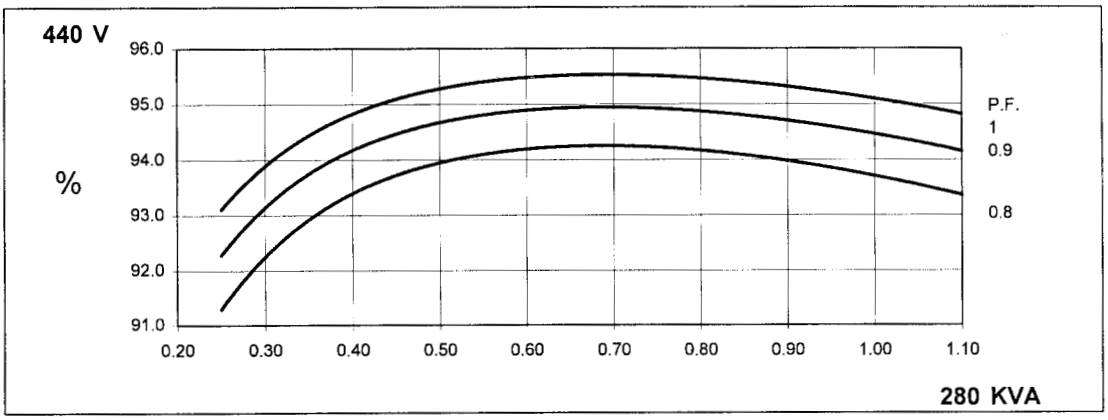


THREE PHASE EFFICIENCY CURVES

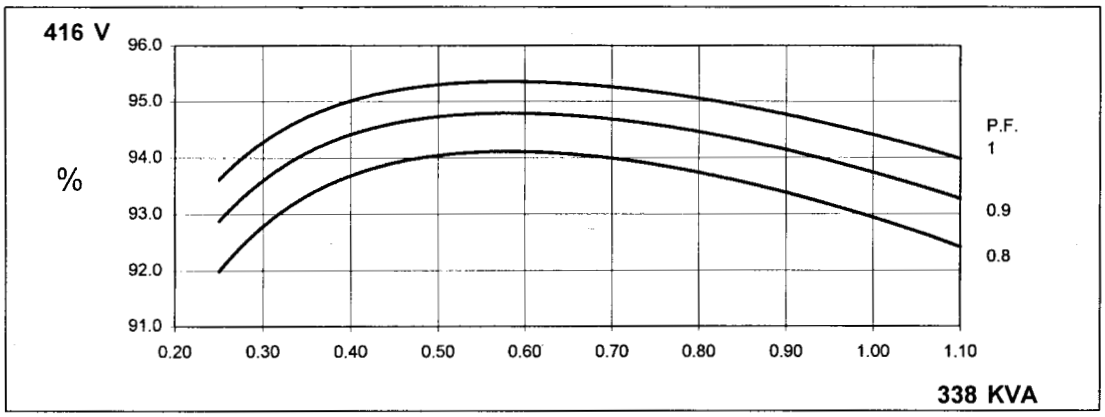


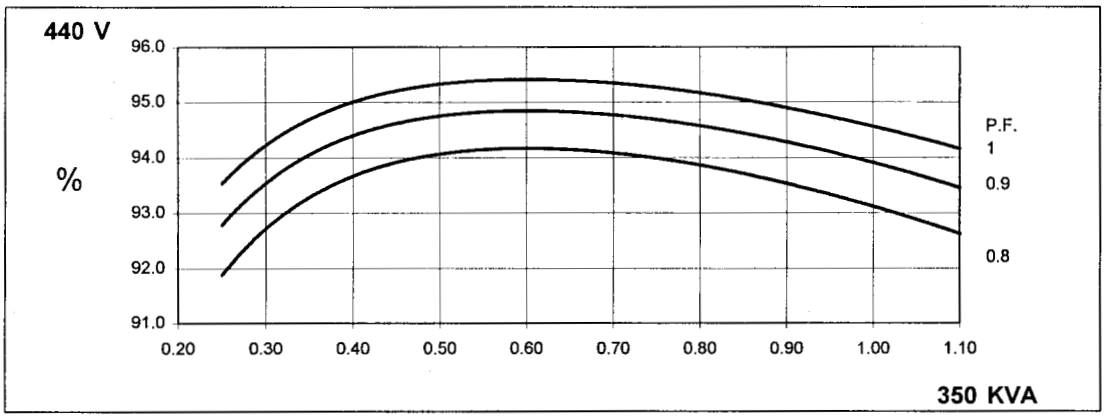


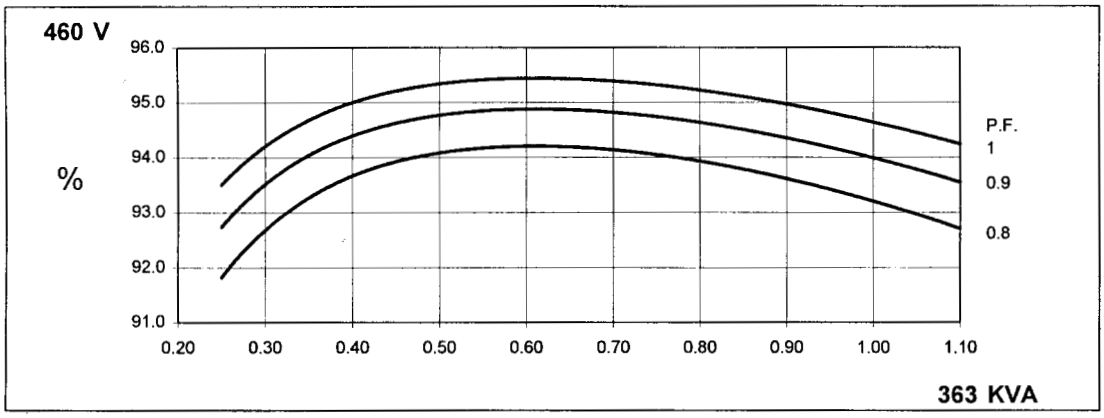


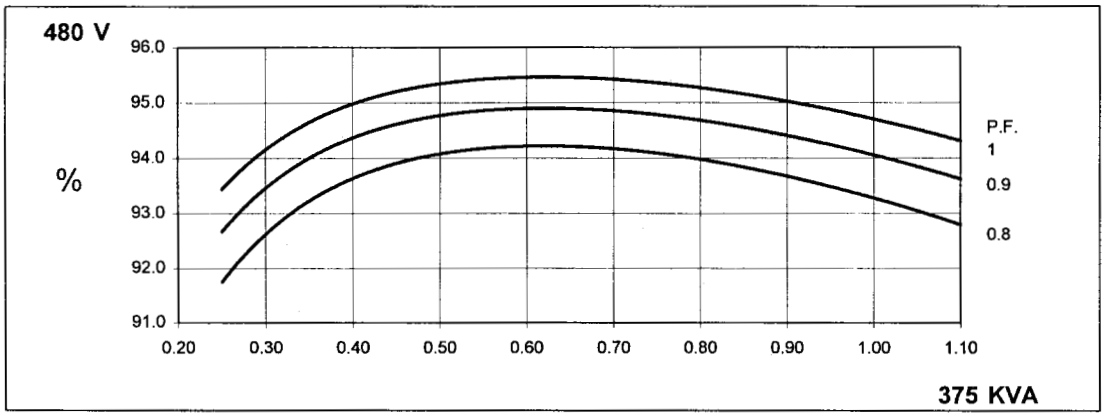


THREE PHASE EFFICIENCY CURVES







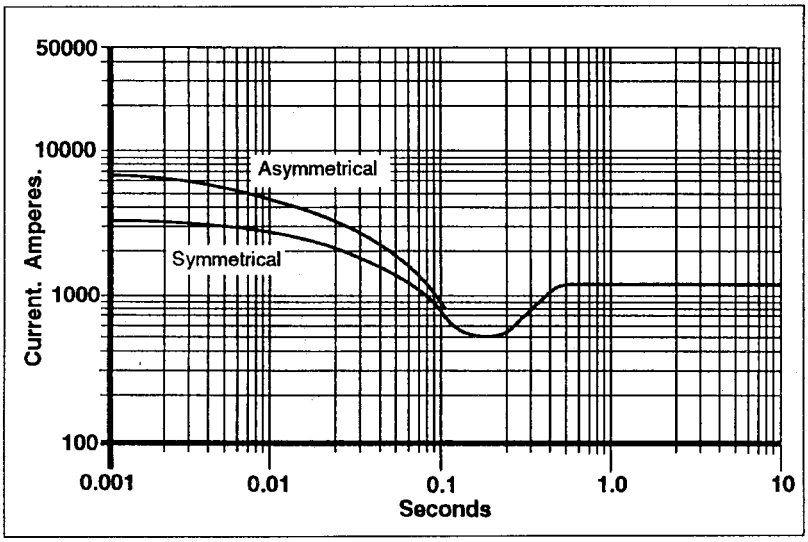


FRAME HC434D HCK434D 50 Hz

SERIES THREE

Three Phase Short Circuit Decrement Curve
No-load Excitation at Rated Speed

Based on series star (wye) connection



Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

VOLTAGE	FACTOR
380 V	X 1.0
400 V	X 1.07
415 V	X 1.12
440 V	X 1.18

The sustained current value is constant irrespective of voltage level.

Note 2

The following multiplication factors should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3 PHASE	2 PHASE L-L	1 PHASE L-N
Instantaneous	X 1.00	X 0.87	X 1.30
Minimum	X 1.00	X 1.80	X 3.20
Sustained	X 1.00	X 1.50	X 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged.

Note 3

Curves are drawn for Series Star (Wye) connected machines. For other connections the following multipliers should be applied to current values shown :

Parallel Star (Wye) Curve current value X 2
Series Delta (Δ) Curve current value X 1.732

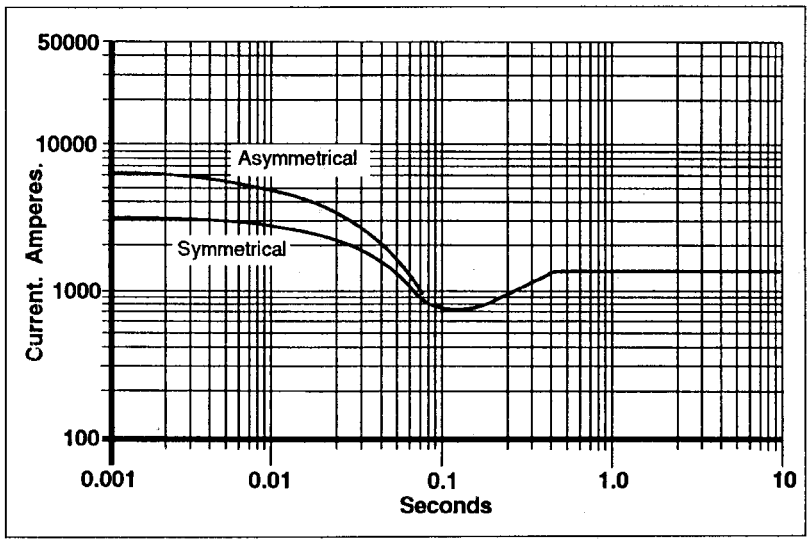
Times are unchanged.

FRAME HC434D HCK434D 60 Hz

SERIES THREE

Three Phase Short Circuit Decrement Curve
No-load Excitation at Rated Speed

Based on series star (wye) connection



Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

VOLTAGE	FACTOR
416 V	X 1.0
440 V	X 1.05
460 V	X 1.08
480 V	X 1.12

The sustained current value is constant irrespective of voltage level.

Note 2

The following multiplication factors should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3 PHASE	2 PHASE L-L	1 PHASE L-N
Instantaneous	X 1.00	X 0.87	X 1.30
Minimum	X 1.00	X 1.80	X 3.20
Sustained	X 1.00	X 1.50	X 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged.

Note 3

Curves are drawn for Series Star (Wye) connected machines. For other connections the following multipliers should be applied to current values shown :

Parallel Star (Wye) Curve current value X 2
Series Delta (Δ) Curve current value X 1.732

Times are unchanged.

NEWAGE
INTERNATIONAL

NEWAGE INTERNATIONAL LIMITED
PO Box 17, Barnack Road, Stamford, Lincolnshire PE9 2NB, England.
Telephone 44 (0) 1780 484000
Telex 32268 Cables Newage Stamford Fax 44 (0) 1780 484100