

ژنراتور : Stamford

موتور دیزل : Doosan

Standby		Prime		دیزل ژنراتور
KW	KVA	KW	KVA	
550	440	500	400	



موتور دیزل

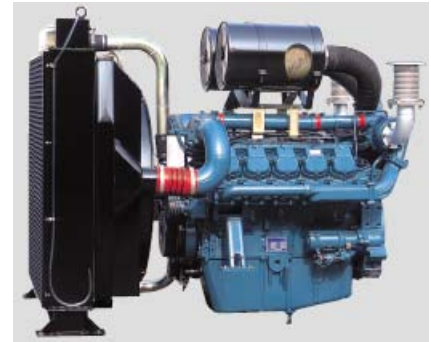
Manufacturer	Doosan	تولید کننده
Type	P180LE	تیپ
Number of cylinders	10	تعداد سیلندر ها
Cylinder arrangement	inline	آرایش سیلندر ها
Displacement , Liters	18.273	جا به جایی
Bore × Stroke , mm	128x142	قطر سیلندر × کورس پیستون
Compression Ratio	15 : 1	نسبت تراکم
Combustion System	Direct injection	سیستم احتراق
Rotation	CCVFF	چرخش
Exhaust gas temp.(after turbo) ,	580 °C	دمای گاز خروجی از اگزوز
Exhaust gas flow (after turbo) ,	97.9 m ³ /min	جریان هوای خروجی از اگزوز

ژنراتور

Manufacturer	Stamford	تولید کننده
Type	HCI544D	تیپ
Frequency, Hz	50	فرکانس
Speed, Rpm	1500	سرعت
Voltage, V	380	ولتاژ
Excitation	Brushless	سیستم تمریک
Stator windings	12	سیم پیچ استاتور
Rotor	with damping cage	روتور
Over speed, Rpm	2250	مداکثر سرعت مجاز
Insulation class	H	کلاس عایق
Protection class	IP 23	کلاس حفاظتی
Cooling air volume,m ³ / sec	0.486 m ³ /sec 1030 cfm	دبی هوای فنک کننده
Power factor	0.8	ضریب قدرت
Phase	3	فاز
Voltage Regulation, %	± 0.5 %	تنظیم ولتاژ
Short circuit current	2,400 Amps	جریان اتصال کوتاه
Cooling air volume,m ³ / sec	1.035	دبی هوای فنک کننده

◎ POWER RATING

Engine Speed rev/min	Type of Operation	Engine Power	
		kWm	Ps
1800	Prime Power	497	676
	Standby Power	540	734
1500	Prime Power	443	602
	Standby Power	496	674



-. The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271.

-. Ratings are based on ISO 8528. (If you need more information, contact the sales organization.)

→ **Prime power** is available for an unlimited number of hours per year in a variable load application.

The permissible average power output over 24 hours of operation shall not exceed 70% of the prime power rating.

→ **Standby power** is available in the event of a utility power outage or under test conditions for up to 200h of operation per year.

The permissible average power output over 24 hours of operation shall not exceed 70% of the standby power rating.

No overload is permitted.

◎ MECHANICAL SYSTEM

○ Engine Model	P180LE
○ Engine Type	V-type 4 cycle, water cooled Turbo charged & intercooled (air to air)
○ Combustion type	Direct injection
○ Cylinder Type	Replaceable wet liner
○ Number of cylinders	10
○ Bore x stroke	128(5.04) x 142(5.59) mm(in.)
○ Displacement	18.273(1,115.02) lit.(in3)
○ Compression ratio	15 : 1
○ Firing order	1-6-5-10-2-7-3-8-4-9
○ Injection timing	16° BTDC
○ Compression pressure	Above 28 kg/cm ² (398 psi) at 200rpm
○ Dry weight	Approx. 1,175 kg (2,590 lb)
○ Dimension (LxWxH)	1,557 x 1,389 x 1,248 mm (61.3 x 54.7 x 49.1 in.)
○ Rotation	Counter clockwise viewed from Flywheel
○ Fly wheel housing	SAE NO.1
○ Fly wheel	Clutch NO.14

◎ MECHANISM

○ Type	Over head valve
○ Number of valve	Intake 1, exhaust 1 per cylinder
○ Valve lashes at cold	Intake 0.25mm (0.0098 in.) Exhaust 0.35mm (0.0138 in.)

◎ VALVE TIMING

	Opening	Close
○ Intake valve	24 deg. BTDC	36 deg. ABDC
○ Exhaust valve	63 deg. BBDC	27 deg. ATDC

◎ FUEL CONSUMPTION

○ Prime Power (lit/hr)	1,500 rpm	1,800 rpm
25%	29.6	34.9
50%	54.8	63.3
75%	81.3	93.4
100%	111.6	128.2
○ Standby Power (lit/hr)	1,500 rpm	1,800 rpm
25%	33.1	38.0
50%	62.0	69.8
75%	93.5	104.8
100%	128.7	144.6

◎ FUEL SYSTEM

○ Injection pump	Bosch in-line "P" type
○ Governor	Electric type
○ Feed pump	Mechanical type
○ Injection nozzle	Multi hole type
○ Opening pressure	285 kg/cm ² (4,054 psi)
○ Fuel filter	Full flow, cartridge type
○ Used fuel	Diesel fuel oil

◎ LUBRICATION SYSTEM

○ Lub. Method	Fully forced pressure feed type
○ Oil pump	Gear type driven by crankshaft
○ Oil filter	Full flow, cartridge type
○ Oil pan capacity	High level 35 liters (9.2 gal.) Low level 28 liters (7.4 gal.)
○ Angularity limit	Front down 24 deg. Front up 20 deg. Side to side 15 deg.
○ Lub. Oil	Refer to Operation Manual

P180LE G-DRIVE

◎ COOLING SYSTEM

- Cooling method Fresh water forced circulation
- Water capacity 21 liters (5.54 gal.)
(engine only)
- Pressure system Max. 0.5 kg/cm² (7.11 psi)
- Water pump Centrifugal type driven by belt
- Water pump Capacity 410 liters (108.2 gal.)/min
at 1,800 rpm (engine)
- Thermostat Wax – pellet type
Opening temp. 71°C
Full open temp. 85°C
- Cooling fan Blower type, plastic
915 mm diameter, 7 blade

◎ ELECTRICAL SYSTEM

- Charging generator 24V x 45A alternator
- Voltage regulator Built-in type IC regulator
- Starting motor 24V x 7.0kW
- Battery Voltage 24V
- Battery Capacity 200 AH (recommended)
- Starting aid (Option) Block heater

◎ ENGINEERING DATA

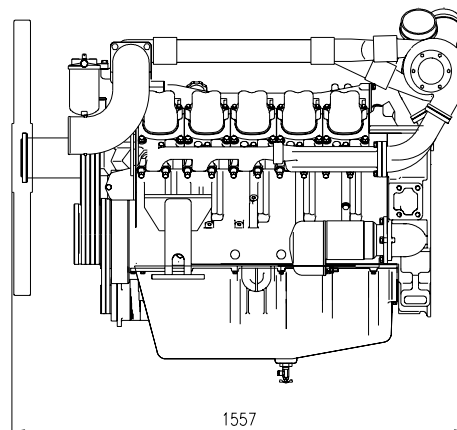
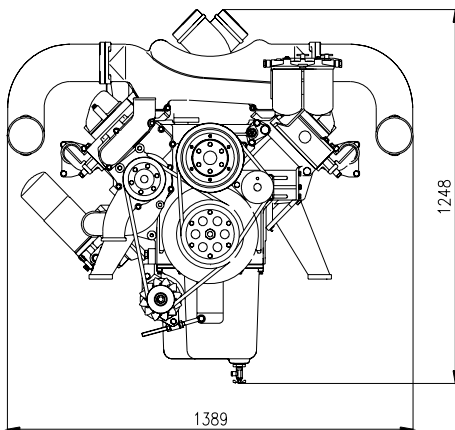
- Water flow 342 liters/min @1,500 rpm
- Heat rejection to coolant 43.8 kcal/sec @1,500 rpm
- Heat rejection to CAC 19.5 kcal/sec @1,500 rpm
- Air flow 31.6 m³/min @1,500 rpm
- Exhaust gas flow 97.9 m³/min @1,500 rpm
- Exhaust gas temp. 580 °C @1,500 rpm

- Water flow 410 liters/min @1,800 rpm
- Heat rejection to coolant 50.2 kcal/sec @1,800 rpm
- Heat rejection to CAC 23.3 kcal/sec @1,800 rpm
- Air flow 38.9 m³/min @1,800 rpm
- Exhaust gas flow 114.1 m³/min @1,800 rpm
- Exhaust gas temp. 606 °C @1,800 rpm

- Max. permissible restrictions
 - Intake system 220 mmH₂O initial
635 mmH₂O final
 - Exhaust system 600 mmH₂O max.
- Max. permissible altitude 1500 m

◆ CONVERSION TABLE

in. = mm x 0.0394	lb/ft = N.m x 0.737
PS = kW x 1.3596	U.S. gal = lit. x 0.264
psi = kg/cm ² x 14.2233	kW = 0.2388 kcal/s
in ³ = lit. x 61.02	lb/PS.h = g/kW.h x 0.00162
hp = PS x 0.98635	cfm = m ³ /min x 35.336
lb = kg x 2.20462	



Head office

7-11, Hwasu-Dong, Dong-Gu, Incheon, Korea
TEL : 82-32-211-2246, 2222 FAX : 82-32-761-2759

Seoul Office

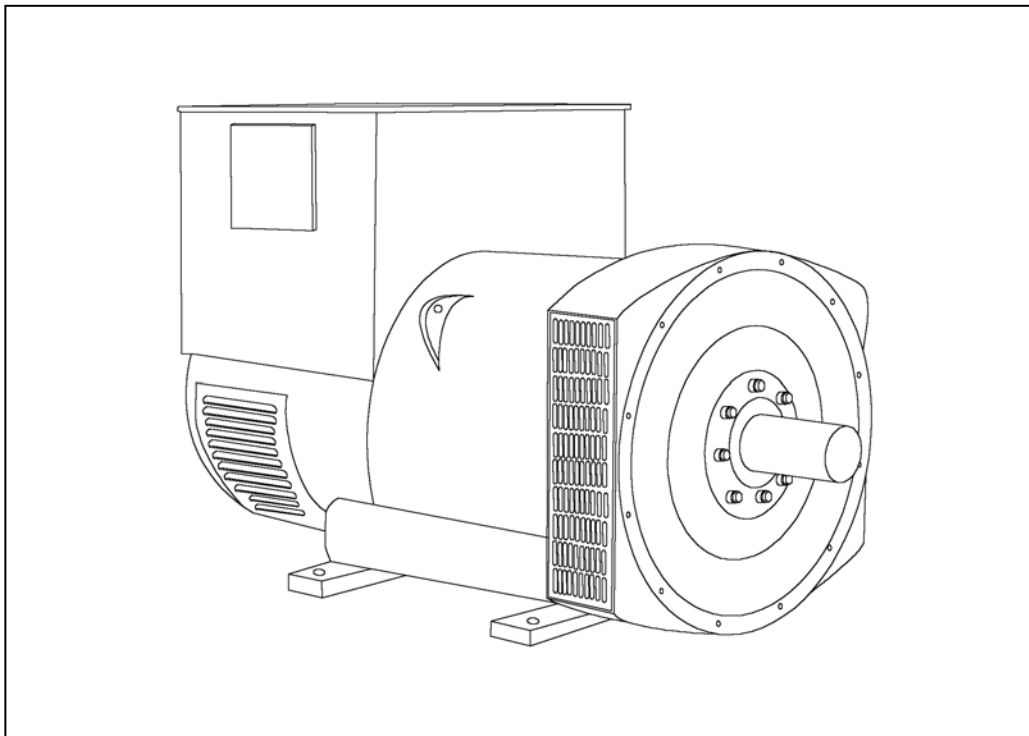
Doosan Infracore Co. Ltd.,
 22nd Floor, Doosan Tower, 18-12, Euljiro 6-ga, Jung-gu,
 Seoul, Korea.

TEL : 82-2-3398-8521~8535 FAX : 82-2-3398-8509

Web site : www.doosaninfracore.com

※ Specifications are subject to change without prior notice

HCI 534D/544D - Technical Data Sheet



HCI534D/544D

SPECIFICATIONS & OPTIONS



STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX440 AVR - STANDARD

With this self-excited system the main stator provides power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.

The SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

If 3-phase sensing is required with the self-excited system, the SX421 AVR must be used.

SX421 AVR

This AVR also operates in a self-excited system. It combines all the features of the SX440 with, additionally, three-phase rms sensing for improved regulation and performance. Over voltage protection is provided via a separate circuit breaker. An engine relief load acceptance feature is built in as standard.

MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

HCI534D/544D

WINDING 311

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321	MX341	
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

CONTROL SYSTEM	SELF EXCITED		
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	IP23		
RATED POWER FACTOR	0.8		
STATOR WINDING	DOUBLE LAYER LAP		
WINDING PITCH	TWO THIRDS		
WINDING LEADS	12		
STATOR WDG. RESISTANCE	0.005 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED		
ROTOR WDG. RESISTANCE	1.77 Ohms at 22°C		
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others		
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%		
MAXIMUM OVERSPEED	2250 Rev/Min		
BEARING DRIVE END	BALL. 6220 (ISO)		
BEARING NON-DRIVE END	BALL. 6314 (ISO)		

	1 BEARING	2 BEARING
WEIGHT COMP. GENERATOR	1393 kg	1395 kg
WEIGHT WOUND STATOR	657 kg	657 kg
WEIGHT WOUND ROTOR	563 kg	535 kg
WR ² INERTIA	8.0068 kgm ²	7.7289 kgm ²
SHIPPING WEIGHTS in a crate	1485 kg	1485 kg
PACKING CRATE SIZE	166 x 87 x 124(cm)	166 x 87 x 124(cm)
	50 Hz	60 Hz
TELEPHONE INTERFERENCE	THF<2%	TIF<50
COOLING AIR	1.035 m ³ /sec 2202 cfm	1.312 m ³ /sec 2780 cfm

	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE SERIES STAR								
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
KVA BASE RATING FOR REACTANCE VALUES	500	500	500	500	575	594	625	644
X _d DIR. AXIS SYNCHRONOUS	3.02	2.72	2.53	2.25	3.52	3.25	3.13	2.96
X' _d DIR. AXIS TRANSIENT	0.16	0.14	0.13	0.12	0.17	0.16	0.15	0.14
X'' _d DIR. AXIS SUBTRANSIENT	0.11	0.10	0.09	0.08	0.12	0.11	0.11	0.10
X _q QUAD. AXIS REACTANCE	2.48	2.24	2.08	1.85	2.87	2.65	2.55	2.41
X'' _q QUAD. AXIS SUBTRANSIENT	0.27	0.25	0.23	0.20	0.31	0.29	0.28	0.26
X _L LEAKAGE REACTANCE	0.05	0.04	0.04	0.04	0.06	0.06	0.05	0.05
X ₂ NEGATIVE SEQUENCE	0.19	0.17	0.16	0.14	0.22	0.20	0.20	0.19
X ₀ ZERO SEQUENCE	0.10	0.09	0.08	0.07	0.10	0.09	0.09	0.08

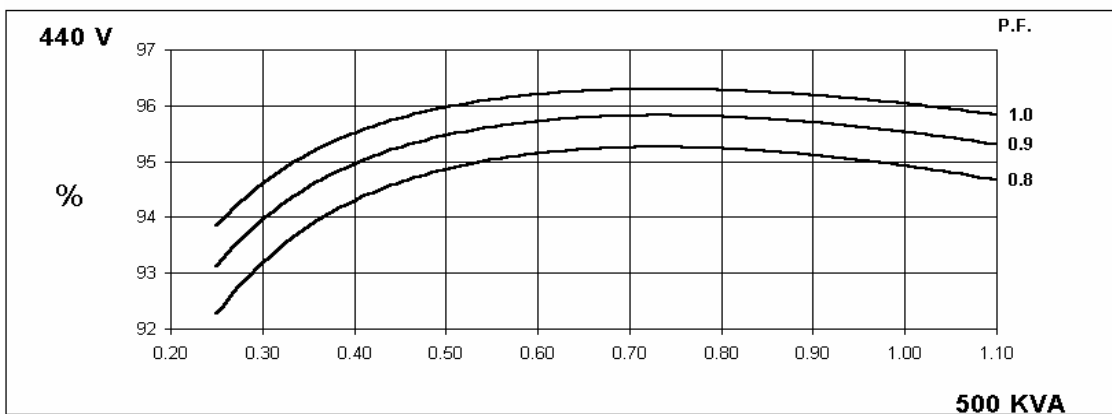
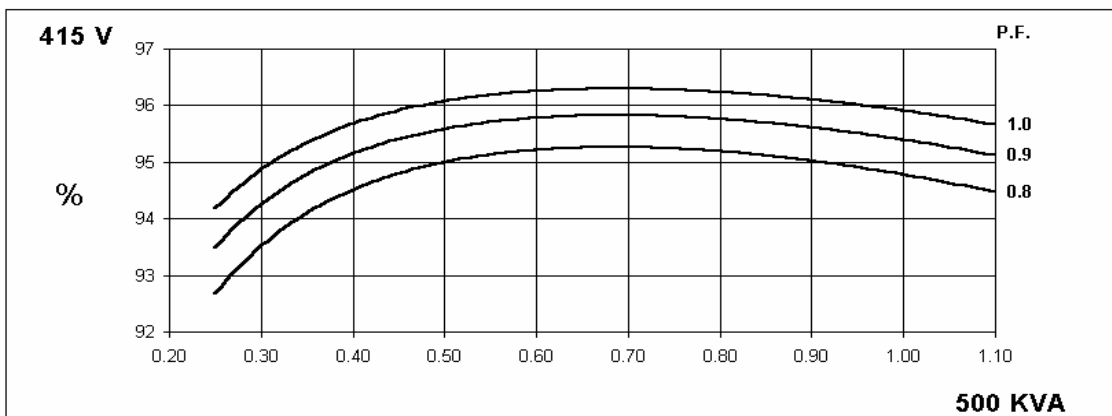
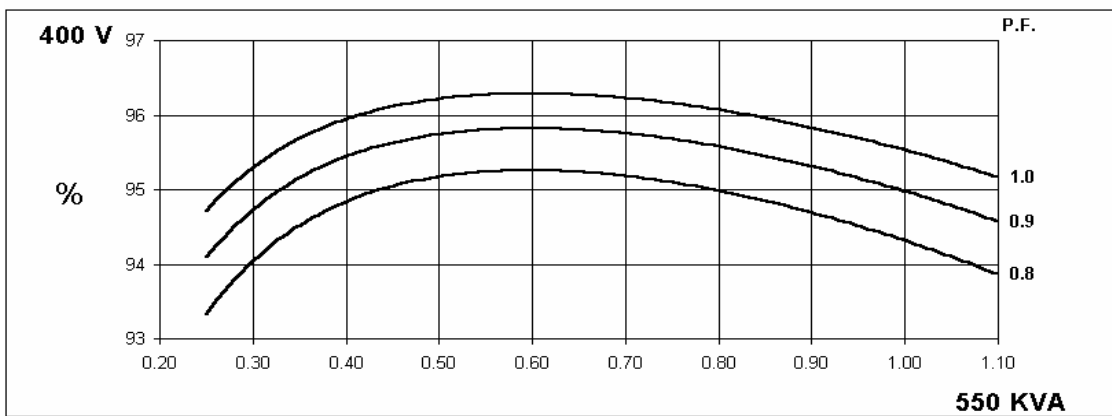
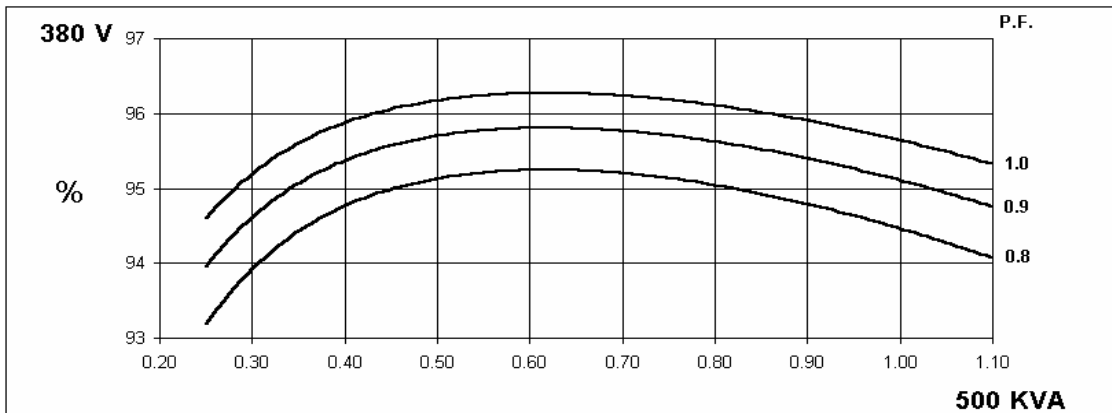
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED
T' _d TRANSIENT TIME CONST.	0.08s
T'' _d SUB-TRANSTIME CONST.	0.012s
T' _{do} O.C. FIELD TIME CONST.	2.2s
T _a ARMATURE TIME CONST.	0.018s
SHORT CIRCUIT RATIO	1/X _d

**50
Hz**

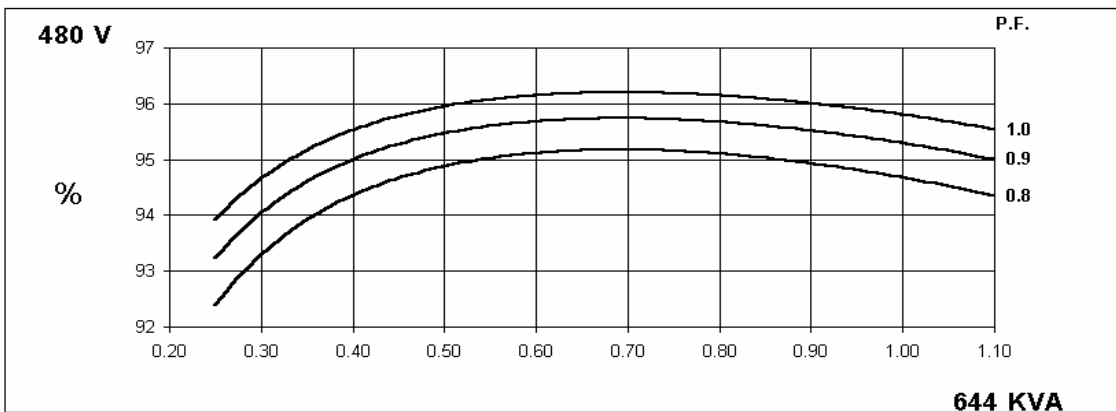
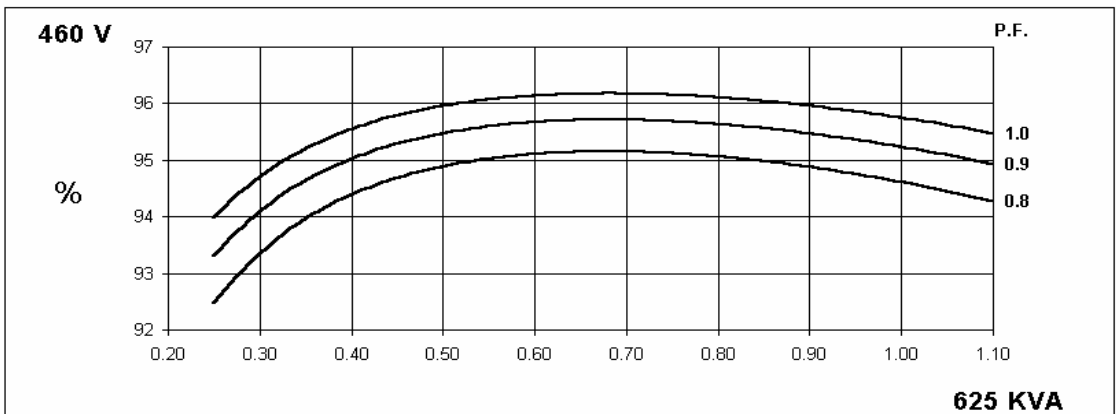
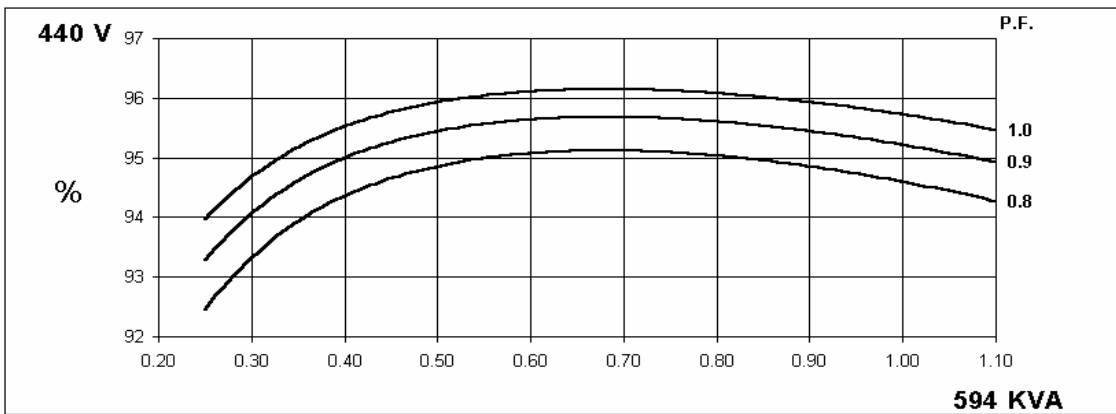
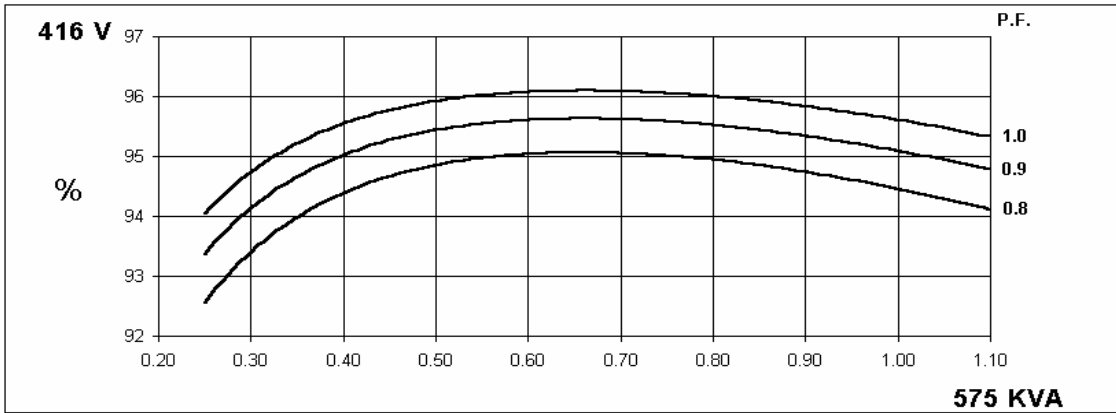
HCI534D/544D
Winding 311



THREE PHASE EFFICIENCY CURVES



THREE PHASE EFFICIENCY CURVES



HCI534D/544D

Winding 311

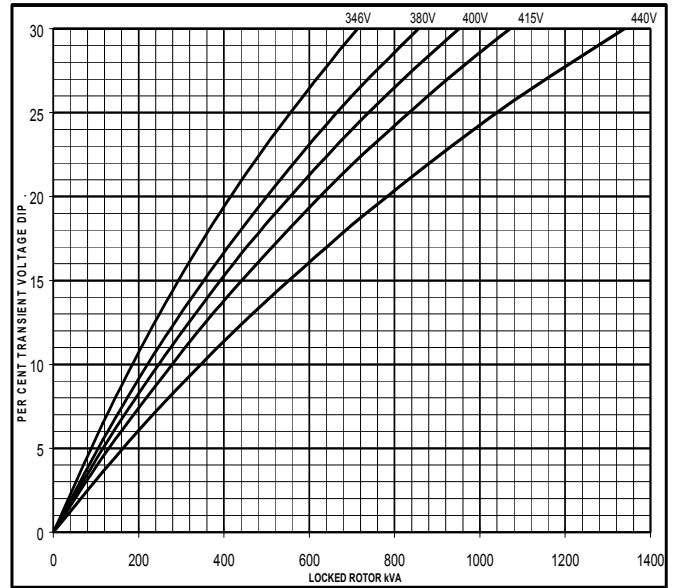
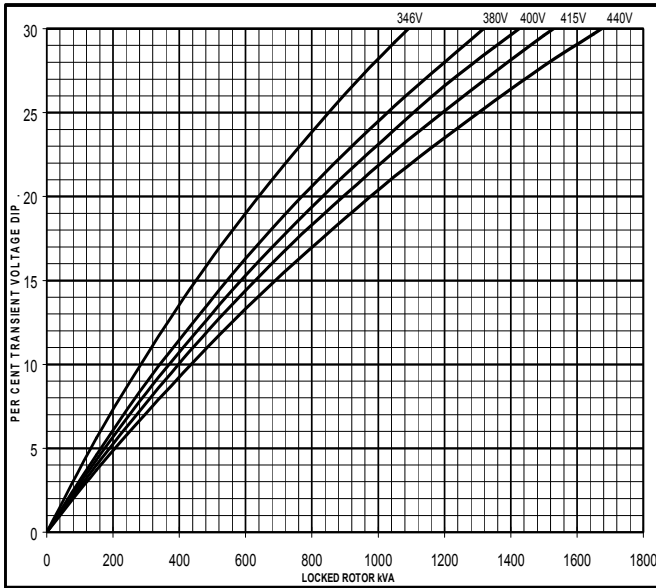


Locked Rotor Motor Starting Curve

**50
Hz**

MX

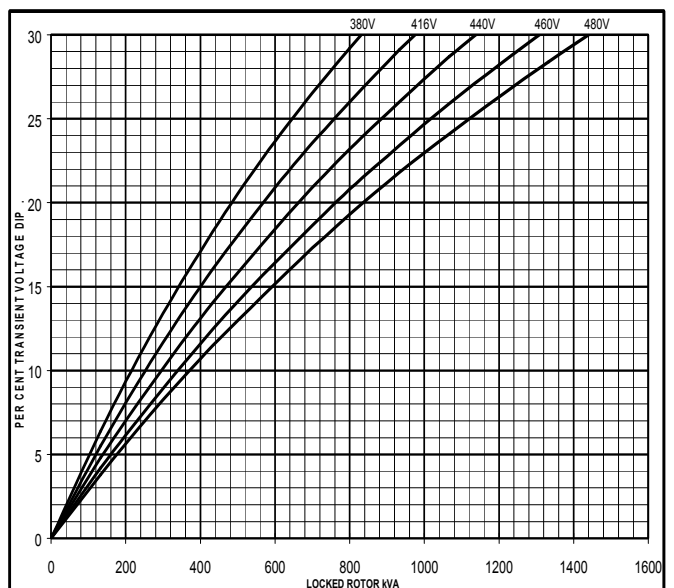
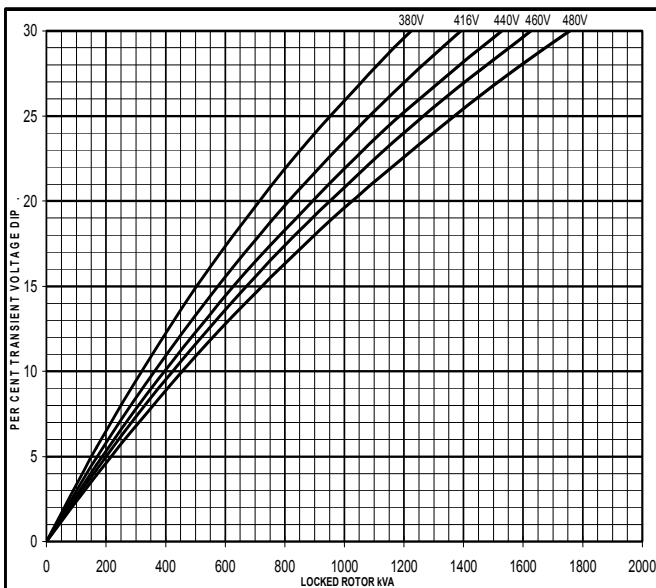
SX



**60
Hz**

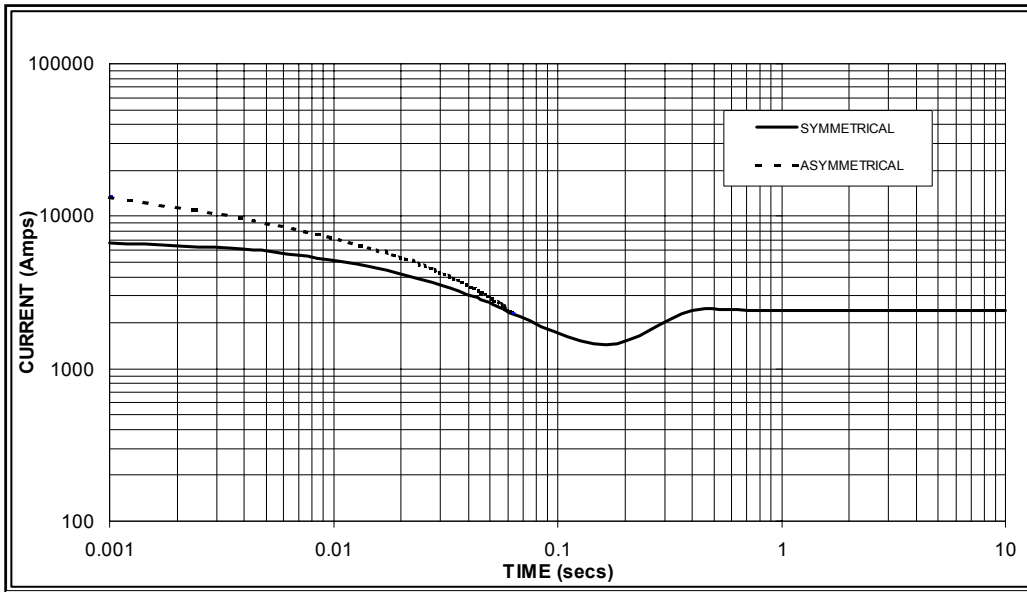
MX

SX



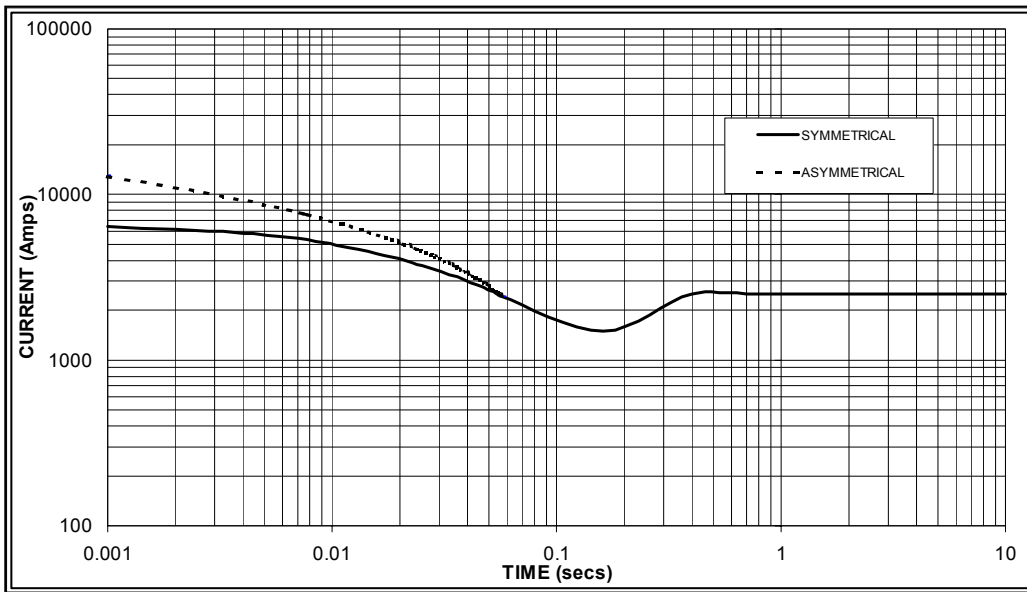
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

**50
Hz**



Sustained Short Circuit = 2,400 Amps

**60
Hz**



Sustained Short Circuit = 2,500 Amps

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 :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.06	440v	X 1.06
415v	X 1.09	460v	X 1.12
440v	X 1.12	480v	X 1.20

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor 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 Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

HCI534D/544D

Winding 311 0.8 Power Factor

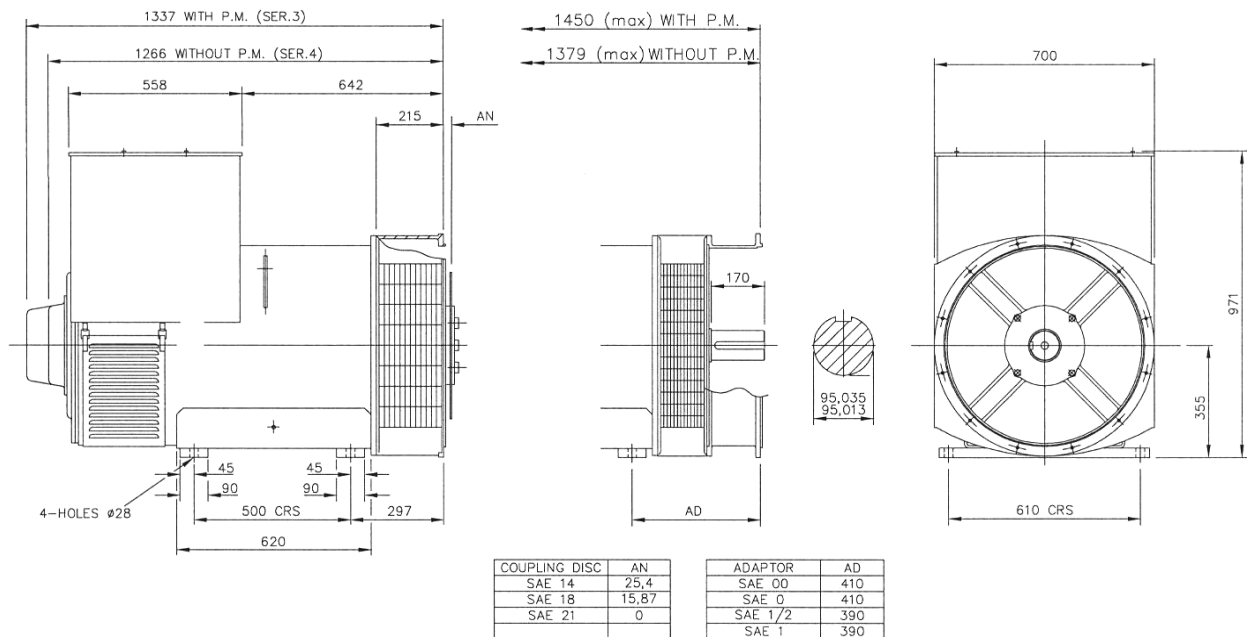


RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
kVA	450	495	450	450	500	550	500	500	515	575	515	515	530	590	530	530	
kW	360	396	360	360	400	440	400	400	412	460	412	412	424	472	424	424	
Efficiency (%)	94.8	94.7	95.0	95.1	94.5	94.3	94.8	94.9	94.4	94.1	94.7	94.9	94.2	94.0	94.6	94.8	
kW Input	380	418	379	379	423	467	422	421	436	489	435	434	450	502	448	447	

60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
kVA	519	538	563	588	575	594	625	644	588	625	655	675	606	644	673	694	
kW	415	430	450	470	460	475	500	515	470	500	524	540	485	515	538	555	
Efficiency (%)	94.7	94.8	94.9	94.9	94.5	94.6	94.6	94.7	94.4	94.4	94.5	94.5	94.3	94.3	94.4	94.4	
kW Input	438	454	475	496	487	502	529	544	498	530	554	571	514	546	570	588	

DIMENSIONS



PO Box 17 • Barnack Road • Stamford • Lincolnshire • PE9 2NB
Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100
Website: www.newage-avkseg.com