

VOLVO PENTA GENSET ENGINE

TAD1344GE

NEW!

399 kW (543 hp) at 1500 rpm, 449 kW (611 hp) at 1800 rpm, acc. ISO 3046

The TAD1344GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable Volvo in-line six concept.

Durability & low noise

Designed for easy, fast and economical installation. Field tested to ensure highest standard of durability and long life. Well-balanced to produce smooth and vibration-free operation with low noise level.

To maintain a controlled working temperature in cylinders and combustion chambers, the engine is equipped with piston cooling. The engine is also fitted with replaceable cylinder liners and valve seats/guides to ensure maximum durability and service life of the engine.

Low exhaust & noise emission

The state of the art, high-tech injection and highly efficient charge air system with low internal losses contributes to excellent combustion and low fuel consumption.

The TAD1344GE is EU Stage 2 emission certified. An electronically controlled viscous fan drive is available giving substantially lower noise and fuel consumption.

Easy service & maintenance

Easily accessible service and maintenance points contribute to the ease of service of the engine.

Technical description

Engine and block

- Cast iron cylinder block with optimum distribution of forces without the block being unnecessarily heavy.
- Wet, replaceable cylinder liners
- Piston cooling for low piston temperature and reduced ring temperature
- Tapered connecting rods for increased piston lifetime
- Crankshaft induction hardened bearing surfaces and fillets with seven bearings for moderate load on main and high-end bearings
- Case hardened and Nitrocarburized transmission gears for heavy duty operation
- Keystone top compression rings for long service life
- Viscous type crankshaft vibration dampers to withstand single bearing alternator torsional vibrations
- Replaceable valve guides and valve seats
- Over head camshaft and four valves per cylinder



Features

- Excellent load acceptance
- Highly efficient cooling system
- Dual Speed 1500 / 1800 rpm
- EMS 2
- EU Stage 2 emission certified
- Wide range of optional equipment including visco fan.

Lubrication system

- Full flow oil cooler
- Full flow disposable spin-on oil filter, for extra high filtration
- The lubricating oil level can be measured during operation
- Gear type lubricating oil pump, gear driven by the transmission

Fuel system

- Electronic high pressure unit injectors
- Fuel prefilter with water separator and water-in-fuel indicator / alarm
- Gear driven low-pressure fuel pump
- Fine fuel filter with manual feed pump and fuel pressure switch

Cooling system

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block. Reliable sleeve thermostat with minimum pressure drop
- Belt driven coolant pump with high degree of efficiency
- Electronically controlled viscous fan drive provides lower noise and fuel consumption (optional).
- Coolant filter as standard

Turbo charger

- Efficient and reliable turbo charger
- Electronically controlled Waste-gate
- Extra oil filter for the turbo charger

Electrical system

- Engine Management System 2 (EMS 2), an electronically controlled processing system which optimizes engine performance. It also includes advanced facilities for diagnostics and fault tracing.
- Possibility to perform a start battery test according to the NCPA requirements via CAN bus signals.
- The instruments and controls connect to the engine via the CAN SAE J1939 interface, either through the Control Interface Unit (CIU) or the Digital Control Unit (DCU). The CIU converts the digital CAN bus signal to an analog signal, making it possible to connect a variety of instruments. The DCU is a control panel with display, engine control, monitoring, alarm, parameter setting and diagnostic functions. The DCU also presents error codes in clear text.
- Sensors for oil pressure, oil temp, boost pressure, boost temp, coolant temp, fuel temp, water in fuel, fuel pressure and two speed sensors.

**VOLVO
PENTA**

TAD1344GE

Technical Data

General

Engine designation	TAD1344GE	
No. of cylinders and configuration	in-line 6	
Method of operation	4-stroke	
Bore, mm (in.)	131 (5.16)	
Stroke, mm (in.)	158 (6.22)	
Displacement, l (in³)	12.78 (780)	
Compression ratio	18.1:1	
Wet weight, engine only, kg (lb)	1325 (2921)	
Wet weight with Gen Pac, kg (lb)	1790 (3946)	

Performance

	1500 rpm	1800 rpm
with fan, kW (hp) at:		
Prime Power	354 (481)	392 (533)
Standby Power	389 (529)	431 (586)

Lubrication system

	1500 rpm	1800 rpm
Oil consumption, liter/h (US gal/h) at:		
Prime Power	0.04 (0.011)	0.05 (0.013)
Standby Power	0.04 (0.011)	0.05 (0.013)
Oil system capacity incl filters, liter	36	

Fuel system

	1500 rpm	1800 rpm
Specific fuel consumption at:		
Prime Power, g/kWh (lb/hph)		
25 %	219 (0.355)	229 (0.371)
50 %	200 (0.324)	205 (0.332)
75 %	197 (0.319)	200 (0.324)
100 %	194 (0.314)	201 (0.326)
Standby Power, g/kWh (lb/hph)		
25 %	215 (0.349)	225 (0.365)
50 %	199 (0.323)	204 (0.331)
75 %	198 (0.321)	201 (0.326)
100 %	195 (0.316)	202 (0.327)

Intake and exhaust system

	1500 rpm	1800 rpm
Air consumption, m³/min (cfm) at:		
Prime Power	27 (954)	33 (1165)
Standby Power	28 (989)	33 (1165)

Max allowable air intake restriction, kPa (PSI)	5 (0.7)
Exhaust gas temperature after turbine, °C (°F) at:	
Prime Power	440 (824)
Standby Power	465 (869)
Max allowable back-pressure in exhaust line, kPa (PSI)	10 (1.5)
Exhaust gas flow, m³/min (cfm) at:	

Prime power	63.5 (2243)	77.0 (2719)
Standby Power	67.5 (2384)	82.0 (2896)

Cooling system

	1500 rpm	1800 rpm
Fan power consumption, std ratio, kW (hp) 10 (14)		

Cooling performance

	1500 rpm	1800 rpm
AOT at max cooling air flow, °C (°F):		
Prime Power	63 (145)	63 (145)
Standby Power	59 (138)	60 (140)

Max cooling air flow, m³/s (cfs)

6.7 (237) 8.2 (290)

Standard equipment

Engine

Automatic belt tensioner

• •

Lift eyelets

• •

Flywheel

Flywheel housing with conn. acc. to SAE 1

• •

Flywheel

Flywheel for 14" flex. plate and flexible coupling

• •

Engine suspension

Fixed front suspension

• •

Lubrication system

Oil dipstick

• •

Full-flow oil filter of spin-on type

• •

By-pass oil filter of spin-on type

• •

Oil cooler, side mounted

• •

Low noise oil sump

• •

Fuel system

Fuel filters of disposable type

• •

Electronic unit injectors

• •

Pre-filter with water separator

• •

Intake and exhaust system

Air filter with replaceable paper insert

• •

Air restriction indicator

• •

Air cooled exhaust manifold

• •

Connecting flange for exhaust pipe

• •

Exhaust flange

• •

Turbo charger, low right side

• •

Cooling system

Radiator incl intercooler

• •

Coolant pump

• •

Fan hub

• •

Thrust fan

• •

Fan guard

— —

Belt guard

— —

Control system

Engine Management System (EMS) with CAN-bus interface SAE J1939

• •

Alternator

Alternator 80 A

• •

Starting system

Starter motor

• •

Connection facility for extra starter motor

• •

Instruments and senders

Temp.- and oil pressure for automatic stop/alarm

• •

Other equipment

Expandable base frame

— —

Engine Packing

Plastic wrapping

• •

¹⁾must be ordered, see order specification

²⁾Available later

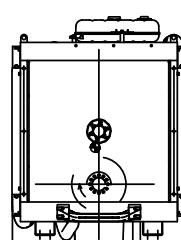
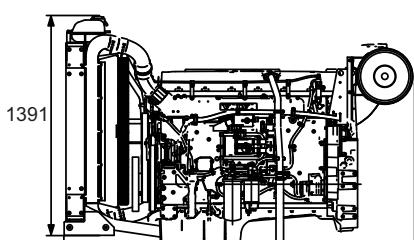
— optional equipment or not applicable

• included in standard specification

For our wide range of optional equipment, please see Order specification.

Dimensions TAD1344GE

Not for installation



Note! Not all models, standard equipment and accessories are available in all countries.
All specifications are subject to change without notice.

The engine illustrated may not be entirely identical to production standard engines.

Power Standards

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. The technical data applies to an engine without cooling fan and operating on a fuel with calorific value of 42.7 MJ / kg (18360 BTU/lb) and a density of 0.84 kg/liter (7.01 lb/US gal), also where this involves a deviation from the standards. Power output guaranteed within 0 to +2% at rated ambient conditions at delivery. Ratings are based on ISO 8528. Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO 8528-5 class G3

Exhaust emissions

The engine complies with EU stage 2 emission legislation according to the Non Road Directive EU 97/68/EEC. The engine also complies with TA-luft -50% exhaust emission regulations.

Rating Guidelines

PRIME POWER rating corresponds to ISO Standard Power for continuous operation. It is applicable for supplying electrical power at variable load for an unlimited number of hours instead of commercially purchased power. A10 % overload capability for governing purpose is available for this rating.

STANDBY POWER rating corresponds to ISO Standard Fuel Stop Power. It is applicable for supplying standby electrical power at variable load in areas with well established electrical networks in the event of normal utility power failure. No overload capability is available for this rating.

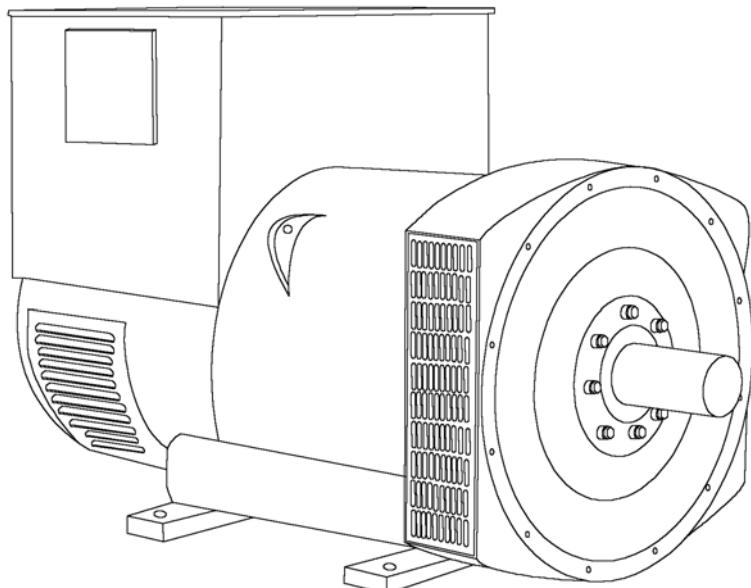
1 hp = 1 kW x 1.36

VOLVO
PENTA

AB Volvo Penta
SE-405 08 Göteborg, Sweden
www.volvolpenta.com

STAMFORD®

HCI 434F/444F - Technical Data Sheet



HC1434F/444F

SPECIFICATIONS & OPTIONS

STAMFORD

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

AS440 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 AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

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.

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.	AS440														
VOLTAGE REGULATION	± 1.0 %	With 4% ENGINE GOVERNING													
SUSTAINED SHORT CIRCUIT	WILL NOT SUSTAIN A SHORT CIRCUIT														
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	0.0073 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED														
ROTOR WDG. RESISTANCE	1.37 Ohms at 22°C														
EXCITER STATOR RESISTANCE	18 Ohms at 22°C														
EXCITER ROTOR RESISTANCE	0.068 Ohms PER PHASE 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. 6317 (ISO)														
BEARING NON-DRIVE END	BALL. 6314 (ISO)														
	1 BEARING			2 BEARING											
WEIGHT COMP. GENERATOR	1160 kg			1160 kg											
WEIGHT WOUND STATOR	535 kg			535 kg											
WEIGHT WOUND ROTOR	463 kg			440 kg											
WR ² INERTIA	5.4292 kgm ²			5.2304 kgm ²											
SHIPPING WEIGHTS in a crate	1230 kg			1230 kg											
PACKING CRATE SIZE	155 x 87 x 107(cm)			155 x 87 x 107(cm)											
	50 Hz			60 Hz											
TELEPHONE INTERFERENCE	THF<2%			TIF<50											
COOLING AIR	0.8 m ³ /sec 1700 cfm			0.99 m ³ /sec 2100 cfm											
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277							
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	400	400	400	400	455	480	500	500							
X _d DIR. AXIS SYNCHRONOUS	2.72	2.45	2.28	2.03	3.28	3.09	2.95	2.71							
X' _d DIR. AXIS TRANSIENT	0.18	0.16	0.15	0.13	0.18	0.17	0.16	0.15							
X" _d DIR. AXIS SUBTRANSIENT	0.13	0.12	0.11	0.10	0.13	0.12	0.12	0.11							
X _q QUAD. AXIS REACTANCE	2.35	2.12	1.97	1.75	2.90	2.73	2.61	2.39							
X" _q QUAD. AXIS SUBTRANSIENT	0.31	0.28	0.26	0.23	0.43	0.41	0.39	0.35							
X _L LEAKAGE REACTANCE	0.06	0.05	0.05	0.04	0.07	0.07	0.06	0.06							
X ₂ NEGATIVE SEQUENCE	0.23	0.20	0.19	0.17	0.29	0.27	0.26	0.24							
X ₀ ZERO SEQUENCE	0.08	0.08	0.07	0.06	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.	0.019s														
T' _{do} O.C. FIELD TIME CONST.	1.7s														
T _a ARMATURE TIME CONST.	0.018s														
SHORT CIRCUIT RATIO	1/X _d														

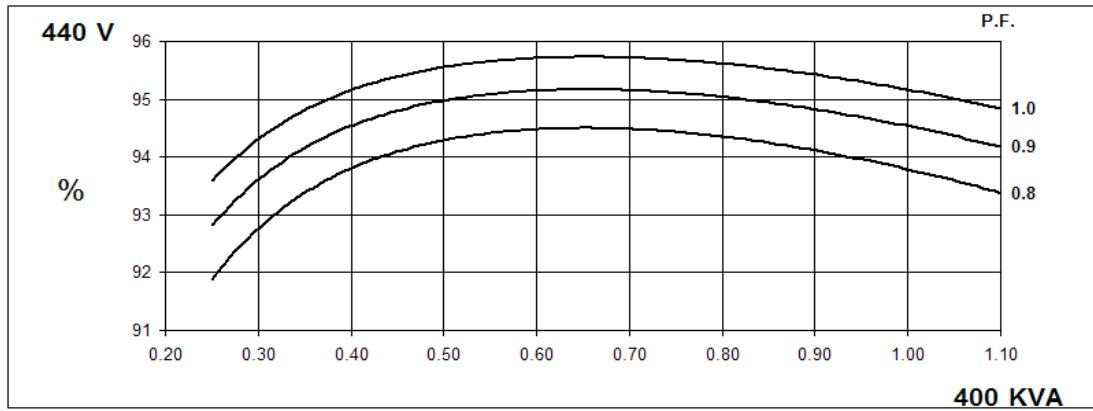
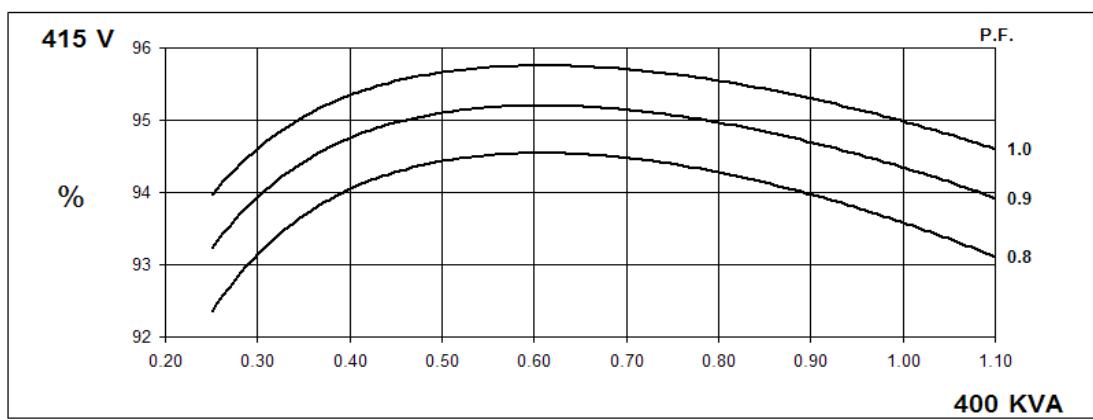
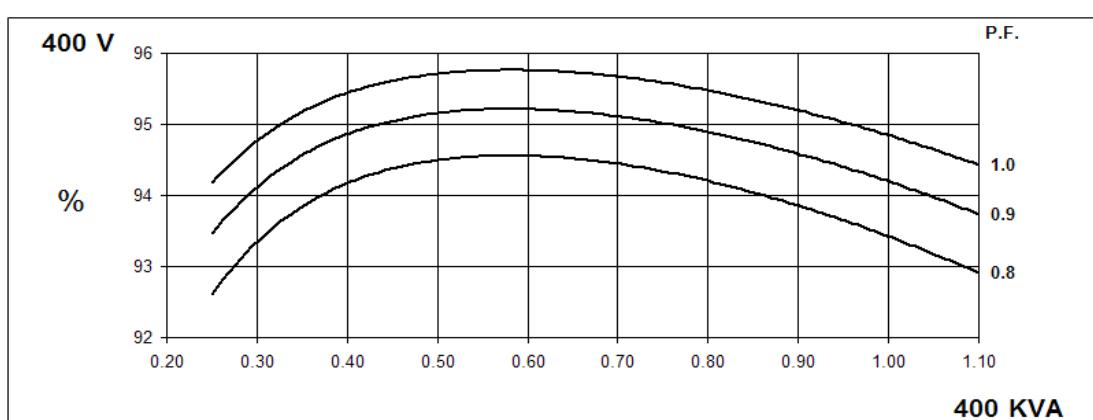
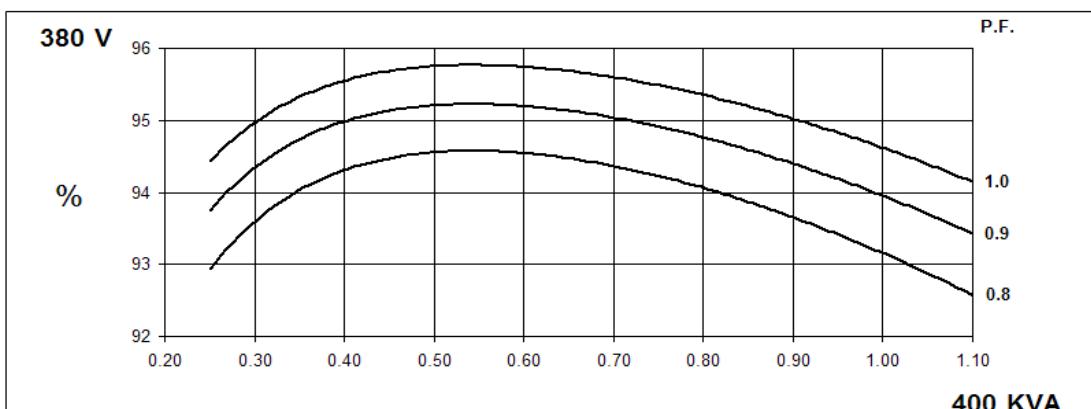
50
Hz

HCI434F/444F

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Winding 311

THREE PHASE EFFICIENCY CURVES



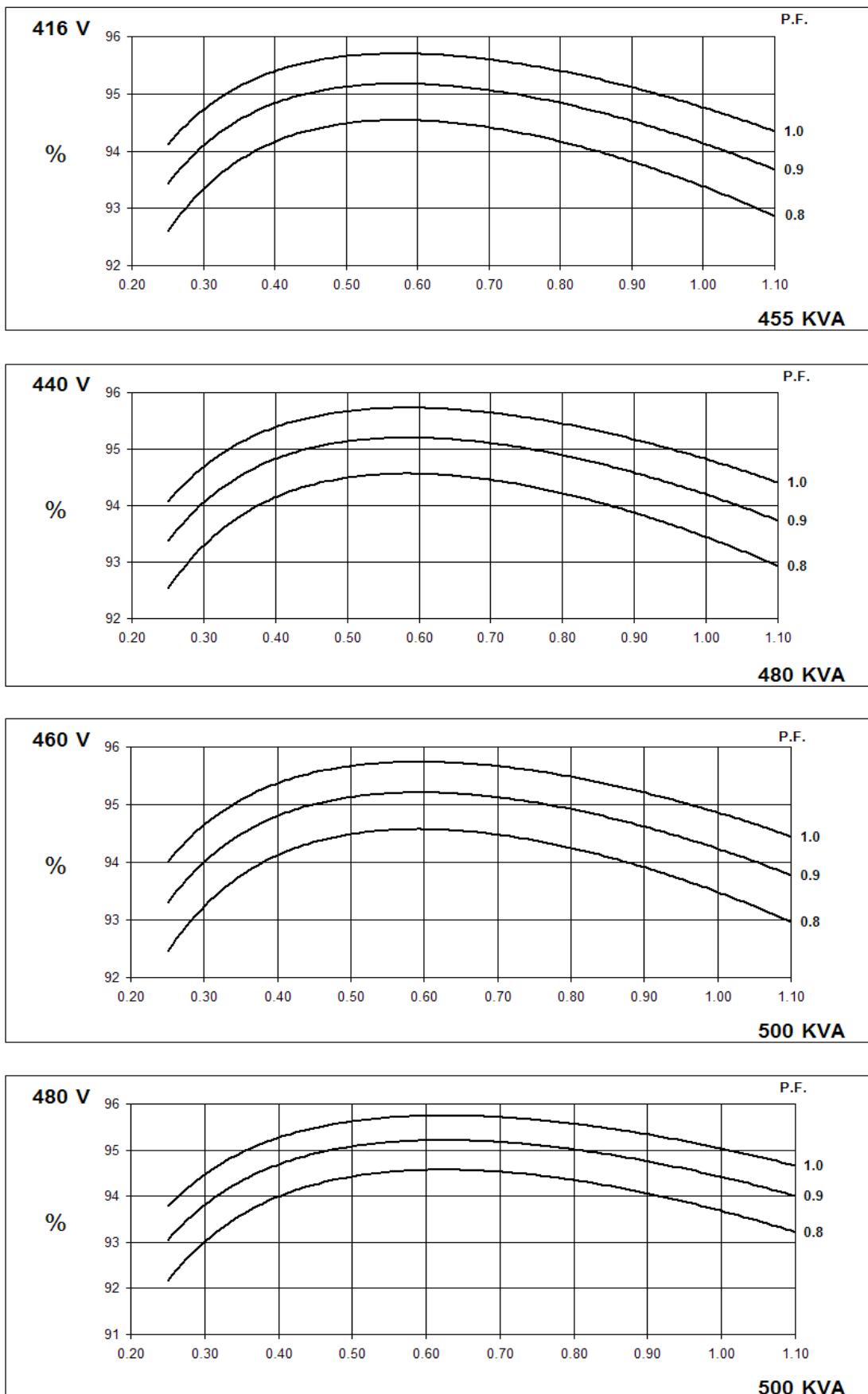
60
Hz

HCI434F/444F

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Winding 311

THREE PHASE EFFICIENCY CURVES

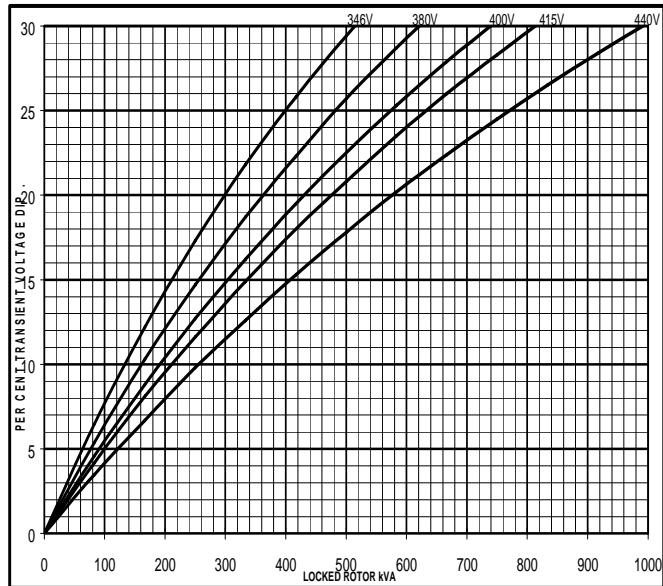
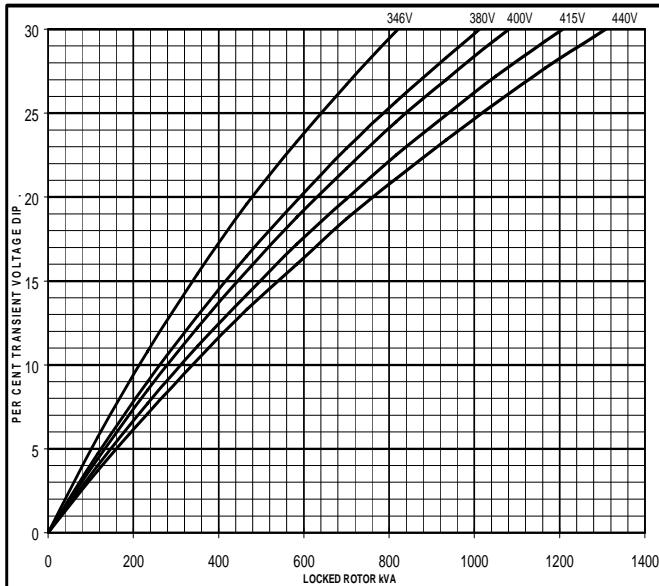


Locked Rotor Motor Starting Curve

MX

50
Hz

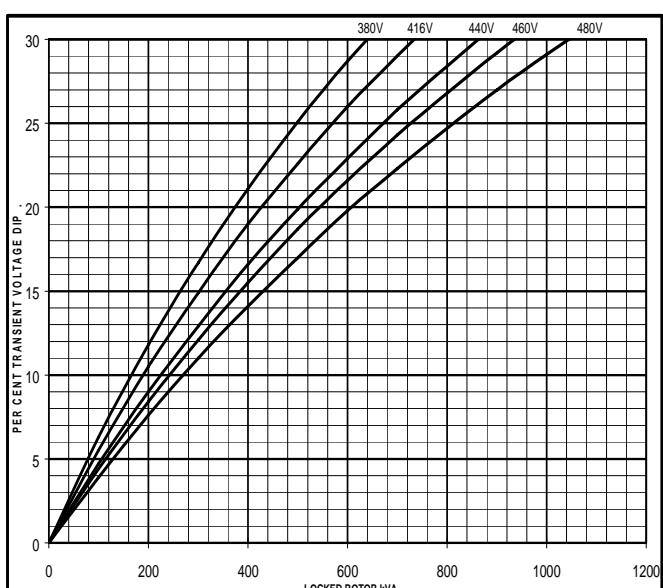
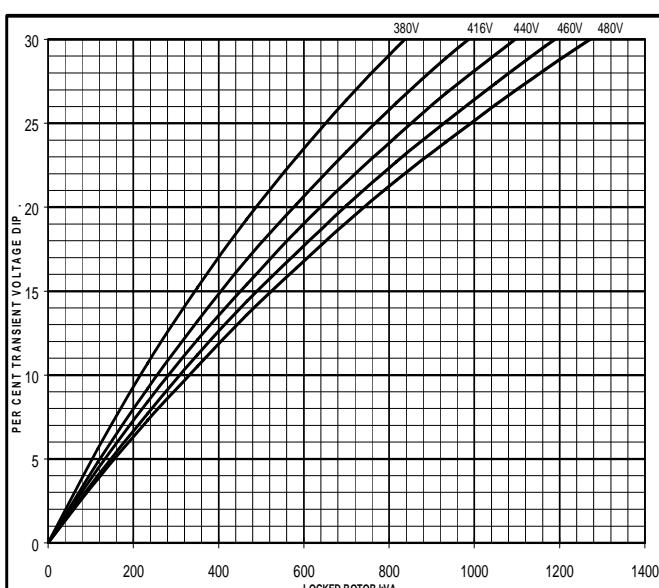
SX



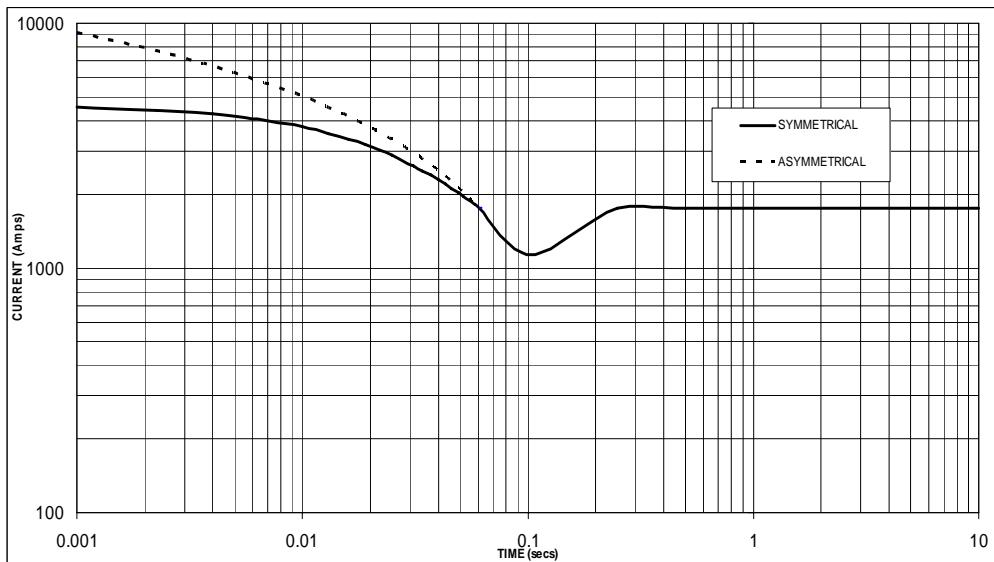
MX

60
Hz

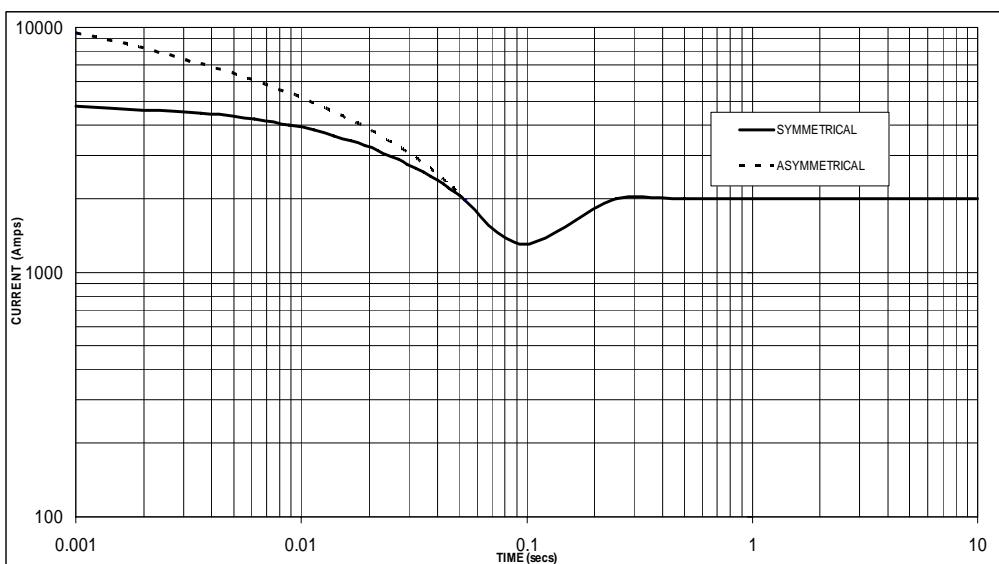
SX



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

50
Hz

Sustained Short Circuit = 1,750 Amps

60
Hz

Sustained Short Circuit = 2,000 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 1.05	440v	X 1.06
415v	X 1.09	460v	X 1.10
440v	X 1.16	480v	X 1.15

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

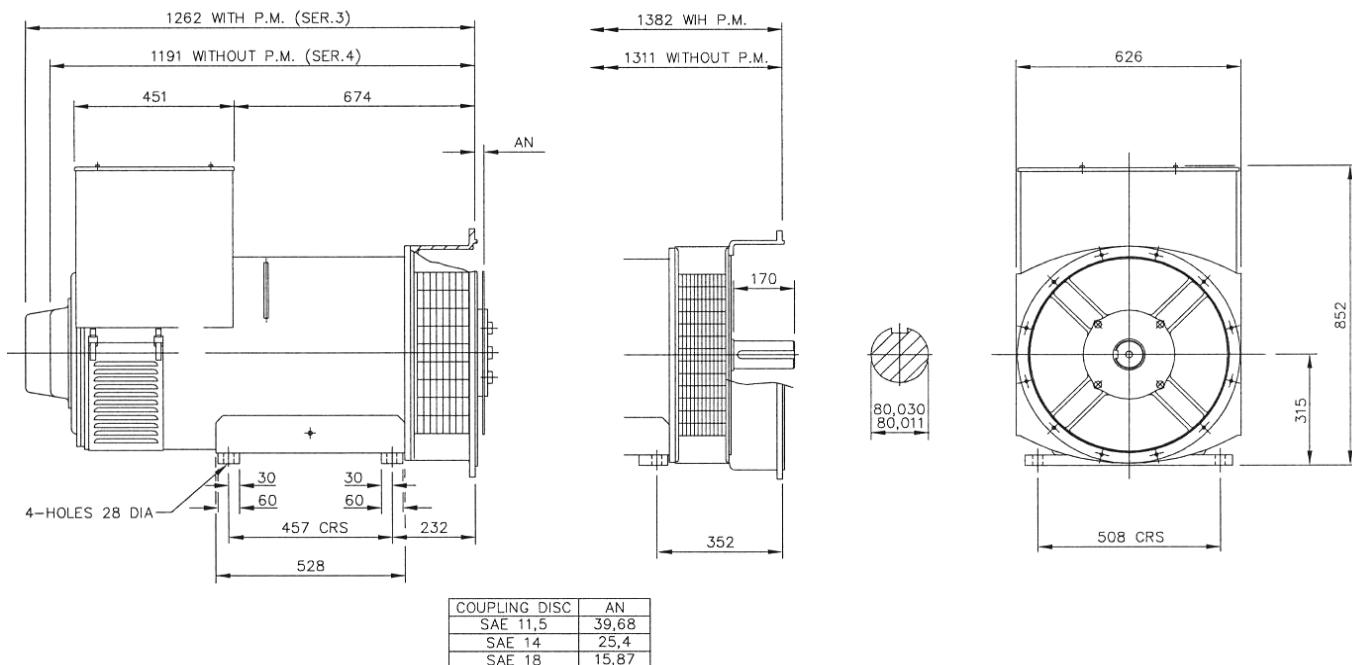
HC1434F/444F
Winding 311 / 0.8 Power Factor

STAMFORD

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	370	370	370	370	400	400	400	400	415	430	430	430	425	450	440	440
	kW	296	296	296	296	320	320	320	320	332	344	344	344	340	360	352	352
	Efficiency (%)	93.5	93.8	93.9	94.0	93.2	93.4	93.6	93.8	92.9	93.0	93.2	93.5	92.8	92.8	93.1	93.4
	kW Input	317	316	315	315	343	343	342	341	357	370	369	368	366	388	378	377
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
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	420	445	465	465	455	480	500	500	485	515	535	535	500	530	550	550
	kW	336	356	372	372	364	384	400	400	388	412	428	428	400	424	440	440
	Efficiency (%)	93.7	93.8	93.8	94.0	93.4	93.4	93.5	93.7	93.1	93.1	93.1	93.4	92.9	92.9	93.0	93.2
	kW Input	359	380	397	396	390	411	428	427	417	443	460	458	431	456	473	472

DIMENSIONS



STAMFORD
Barnack Road • Stamford • Lincolnshire • PE9 2NB
Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100