

WPG550*8

DIESEL GENERATING SET

GENERATING SET RATINGS

3Phase - 50Hz - 1500rpm @ 0.8p.f.

Voltage	PRP		ESP	
	kVA	kWe	kVA	kWe
415/240	500	400	550	440
400/230	500	400	550	440
380/220	500	400	550	440

PRODUCT FEATURES

Engine

- Cast iron frame style body structure
- One-piece forged crankshaft
- Split-cap forged steel connecting rods
- Separate cast iron cylinder heads with 4 valves
- Replaceable dry cylinder liners
- Aluminum alloy pistons with oil cooling gallery
- SAE 1 flywheel housing and 14" flywheel

Cooling system

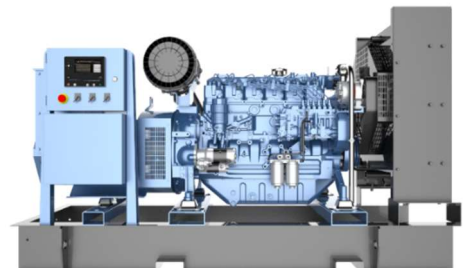
- Radiator and hoses: Standard integral set-mounted, designed and tested for 50°C ambient temperature
- Thermostatically-controlled system with belt driven coolant pump and pusher fan

Fuel system

- High pressure Common Rail injection system
- Duplex fine filter and water separation filter assembly with transparent cup for better efficiency, easy to replace

Lubrication system

- Flat bottom large capacity oil pan
- Spin-on full-flow lube oil filter easy to replace



Electrical system

- 24 Vdc electric starter motor and battery charging alternator
- LOP + HWT sensors

Air intake and exhaust system

- Mid-position and below inlet turbocharger optimized for genset application
- Special rear mounted air filter dry type easy to replace with restriction indicator
- Exhaust manifold shield for heat isolating

Alternator

- Brushless, 4 Pole, IP23 drip-proof revolving field design, Self-excitation
- Class H insulation and Class H temperature rise
- Low reactance with 2/3 pitch windings on the stator
- Direct-coupled by flexible disc
- Sustained overcurrent >300% in 10 sec
- Direct drive centrifugal blower fan cooling

Control module

- WEICHAI control module is ideal for a wide control range to manage, monitor, and diagnose quickly and easily.
- Display status message Provide protection Auto shutdown at fault detection



GENERATING SET SPECIFICATIONS	
Brand	WEICHAI
Model	WPG550F8 (Open) / WPG550L8 (Enclosure)
Governor and regulation class	In accordance to ISO 8528-5 Class G2 performance Compliance to 100% step load less than 10 sec
Phase number and connection	3 phase, 4 wires, Y-type
Cooling method	Closed looped water-cooled
Starting method	DC 24V Electric starter
Steady-state voltage deviation	$\leq \pm 1\%$
Steady-state frequency band	$\leq \pm 0.5\%$

ENGINE	
Brand	WEICHAI
Model	WP13D490E310
Gross Power	kWm ESP - 490 / PRP - 450
Cylinder / Type / Aspiration	6 / In-line / Turbocharged and Aftercooled
Bore x Stroke	mm 127 x 165
Displacement	L 12.54
Compression ratio	15.2:1
Brake Mean Effective Pressure	kPa ESP – 3126
Governor	Electronic

EXHAUST SYSTEM		
Exhaust Gas temperature after the turbocharger	°C	580
Exhaust Gas flow	m ³ /min	ESP – 114.8/ PRP – 102.3
Max. Exhaust back pressure	mBar	120

COOLING SYSTEM		
Type of Coolant		Liquid (water + 50% antifreeze)
Total Cooling System Capacity (with Radiator)	L	62
Max coolant temperature – shutdown	°C	105
Cooling Fan Airflow	m ³ /min	474

LUBRICATION SYSTEM		
Operating Temperature range before Engine	°C	78 -105
Oil fuel consumption ratio based on engine fuel consumption data	g/kW.hr	$\leq 0.2\%$
Total system capacity (including filters)	L	38
Type of oil filter		Spin-on full flow filter



FUEL SYSTEM		
Type of fuel filter		Spin-on fuel filter
Min. internal diameter of the supply pipe	mm	14
Min. internal diameter of the return pipe	mm	14
Max. fuel return restriction	Bar	0.5
Max. fuel inlet temperature	°C	50
Fuel supply flow	L/hr	400
Fuel Consumption (Tolerance +3%)		
	Rating	
		gr/kWh
		L/hr
	100%ESP	211
	100%PRP	204.3
	75% PRP	187.3
	50% PRP	190.5
	25% PRP	207.5

ALTERNATOR	
Brand	WEICHAI
Model	WHA-500-4/0.4
Rated Current	722A
Coupling / No. of Bearing	Direct / Single
Phase / Poles	3-Phase / 4-Pole
Type of Excitation	Self-excitation
Cooling type	Air
Voltage regulation method	AVR
Insurance	Class H
Temperature rise	Class H
Protection Grade	IP23
Efficiency at 0.8p.f.@100% load	94.4%

CONTROL MODULE	
<p>The WEICHAI controller model WHC9510N is easy to use multi-generator load share system, LCD display with backlight</p> <ul style="list-style-type: none"> • Two RS485 communication ports enable remote control, remote measuring, remote communication via MODBUS protocol. Fitted with CANBUS port and can communicate with ECU equipped with J1939 • Collects and shows 3-phase voltage of Bus/Gen, Bus/Gen frequency, Gen 3-phase current, Gen power and Gen voltage harmonic parameters • Synchronization parameters: voltage difference between bus and gen, frequency difference between bus and gen, phase angle difference between bus and gen. • Precisely collect various engine parameters, including temperature, engine oil pressure, fuel level, speed, battery voltage, charger voltage, accumulated running time and accumulated start times etc. 	

Ratings definitions

Emergency Standby Power (ESP):

According to ISO 8528-1:2018, Emergency Standby Power is the maximum power available for a varying load for the duration of a main power network failure. The average load factor over 24 hours of operation should not exceed 70% of the engine's ESP power rating.

Typical operational hours of the engine are 200 hours per year, with a maximum usage of 500 hours per year. This includes an annual maximum of 25 hours per year at the ESP power rating. No overload capability is allowed. The engine is not to be used for sustained utility paralleling applications.

Prime power (PRP):

According to ISO 8528-1:2018, Prime Power is the maximum power available for unlimited hours of usage in a variable load application. The average load factor should not exceed 70% of the engine's PRP power rating during any 24 hour period. An overload capability of 10% is available in accordance with ISO 3046; however, this is limited to 1 hour within every 12 hour period.

Dimension and Weight

Structure	Model	Dim "A" mm	Dim "B" mm	Dim "C" mm	Dry wt.* kg	Fuel tank L
Open	WPG550F8	3200	1396	2024	3280	870
Enclosure	WPG550L8	5030	1550	2150	4000	890

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

ISO 9001	This generator set is designed and manufactured in facilities certified to ISO 9001.	ISO 8528	This generator set has been designed to comply with ISO 8528 regulation.
ISO14001	This generator set is designed and manufactured in facilities certified to environment management system ISO 14001.	CE	The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
ISO45001	This generator set is designed and manufactured in facilities certified to OHSMS management system ISO 45001	TLC	This generator set has been certified according to YD/T502-2020 standard

Specifications are subject to change without notice.

For more information contact your local Weichai distributor or visit www.weichai.com

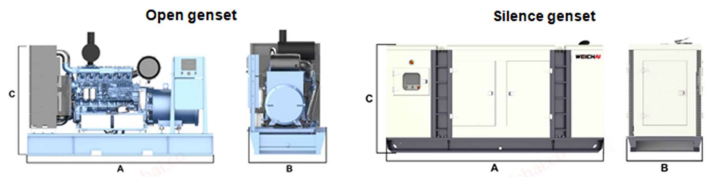
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Standard version

- Antivibration shock absorber
- Chassis with integrated fuel tank
- Fuel level gauge
- 12/ 24 Vdc maintenance free starter battery and Battery charger connecting cables.
- Main line 3P circuit breaker
- Emergency stop push button is installed outside of the canopy
- Sound attenuated canopy made of high quality steel metal, Powder coating
- High mechanical strength, Low noise level
- Easy access for service maintenance
- Reinforced lifting eye to lift by crane
- Exhaust silencer is protected against environment influences
- IP23 canopies have been designed to prevent the ingress of water.
- Operation & Maintenance manual & Wiring diagrams.

WEICHAI	Model :	WP13D490E310	Date :	06/23
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Ratings

RPM	Gross Engine Output				Net Engine Output			
	PRP		ESP		PRP		ESP	
	kWm	BHP	kWm	BHP	kWm	BHP	kWm	BHP
1500	450	604	490	657	436	585	476	638

1 kWm = 1,34102 BHP

Basic data

Engine model	..... WP13D490E310
N° of Cylinders / Valves	..... 6 / 24
Cylinders arrangement	..... In line
Bore x Stroke (mm)	..... 127 x 165
Displacement (L)	..... 12.54
Thermodynamic Cycle	..... Diesel 4 stroke
Mean Piston Speed (m/s)	..... 8.25
BMEP @ ESP (Bar)	..... 31.26
Cooling System	..... Liquid (water + 50% antifreeze)
Injection System	..... Direct
Fuel System	..... High Pressure Common Rail
Aspiration	..... Turbocharged and Aftercooled
Compression ratio	..... 15.2 : 1
Flywheel housing	..... SAE 1
Flywheel	..... 14"
N° of teeth on flywheel ring gear	..... 136
Inertia of flywheel (kg•m ²)	..... 2.32
Inertia of crankshaft (kg•m ²)	..... 0.574
Emission standard	..... N/A
Overall Dimensions with radiator (Length x Width x Height) (mm)	..... 2032 x 1232 x 1490
Engine dry weight without radiator and without radiator pipes (kg)	..... 1000
Engine dry weight with radiator and radiator pipes (kg) 1190
Engine wet weight with radiator (includes oil, coolant) (kg) 1288

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Air intake system

Air intake temperature rise (°C)	≤ 15
Air intake restriction clean filter (mBar)	≤ 35
Air intake restriction dirty filter (mBar)	≤ 70
Recommended air flow @ PRP (m³/min)	33
Recommended air flow @ ESP (m³/min)	34,8
Min. diameter of intake pipe (mm)	100

Aftercooling system

Aftercooler system type	Air to Air
Max. intake temperature @ 25°C ambient temperature (°C)	55
Max. difference between intake temperature and ambient temperature (°C)	30
Max. intake pressure drop of aftercooler (mBar)	120

Lubrication system

Oil capacity Low / High (L)	30 / 34
Oil pressure in normal condition idle speed (Bar)	1.3 - 2.5
Oil pressure in normal condition at 1500 Rpm @ PRP (Bar)	3.5 - 5.5
Lowest oil pressure alarm (shutdown) (Bar)	1
Max. oil temperature (°C)	105
Oil flow at 1500 Rpm (L/min)	≥ 180
Oil fuel consumption ratio based on engine fuel consumption data	≤ 0.2 %
Total system capacity (including filters) (L)	40

Heat balance test data (with ambient temperature 30 °C)

Total heat dissipation @ ESP (kJ/s)	770.4
- Heat Rejection to Jacket Water @ ESP (kJ/s)	187.8
- Heat Rejection to AfterCooler @ ESP (kJ/s)	134.1
- Radiated Heat to Ambient @ ESP (kJ/s)	62.1
- Heat Rejected to Exhaust @ ESP (kJ/s)	386.4

Exhaust system

Max. exhaust back pressure (mBar)	120
Max. exhaust temperature before turbocharger (°C)	740
Max. exhaust temperature after turbocharger (°C)	580
Exhaust flow @ PRP (m³/min)	102.3
Exhaust flow @ ESP (m³/min)	114.8
Min. diameter of exhaust pipe (mm)	100
Max. bending moment of exhaust gas exit flange (Nm)	19

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Cooling system with standard radiator version 2021

System designed for ambient temperature up to (°C) ¹	50
Radiator type	Mechanical
Fan type	Belt driven pusher
Min. inside diameter of coolant outlet pipe (mm)	75
Coolant capacity of radiator and pipes (L)	37
Coolant alarm (shutdown) temperature (°C)	105
Thermostat opening temperature / full open temperature (°C)	76 / 88
Max. additional restriction for external cooling circuit (Bar)	0.23
Coolant capacity of the engine (L)	25
Cooling fan airflow (m ³ /min)	474
Fan absorbed power (kW)	12
Additional restriction (for reference) - Duct allowance (Pa)	75

Fuel system

Governor	ECU
Governor steady state speed stability at constant load (ISO 8528-5 Class G3) ²	≤ +/- 0.5 %
Max. restriction at fuel inlet (Bar)	0.5
Max. pressure at fuel inlet (Bar)	1.3
Max. fuel return restriction (Bar)	0.5
Max. fuel inlet temperature (°C)	50
Fuel supply flow (L/hr)	400
Min. internal diameter of inlet pipe (mm)	14
Min. internal diameter of return pipe (mm)	14

Electrical system

Electrical system voltage (negative to ground) (Vdc)	24
Starter power (kW)	8.5
Battery charger current (A)	70
Battery charger absorbed power (kW)	1.96
Max. electric resistance of starting circuit (Ω)	0.002
Min. sectional area of wire (mm ²)	70
Min. cold start temperature without auxiliary starting device (°C) ³	- 10
Min. cold start temperature with auxiliary starting device (°C) ³	- 30

¹ The indicated value is based on the AOT value of 55°C for an engine tested at 100% of the ESP Power, reflecting temperature in an open condition, without an enclosure or container, without any airflow obstruction in the front of the radiator, without air recirculation, with free exhaust gas exit and with the engine thermostatic valve in its full open condition, without a closing plate present. The reference air restriction is equal to 50Pa. For the equivalent ATB (Air-to-Boil) performance in a customer or project basis, please consult Weichai Application Engineering.

² This refers only to the frequency response of the engine and should not be confused with the performance class of the Generator Set, which is subject to additional contributing factors such as alternator selection and control settings.

³ Engines used in emergency standby application or applications that require immediate start under load, they must be equipped with coolant heaters. Weichai recommend heaters installation to be executed by providing constant coolant circulation across all the engine components. Two heaters are required for V-type engines, one per each side.

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Noise

Diesel engine noise (Acoustic power level) (dB(A))	113.6
Noise - upper side (dB(A))	96.9
Noise - right side (view from flywheel) (dB(A))	97.3
Noise - left side (view from flywheel) (dB(A))	99.1
Noise – front (radiator) side (dB(A))	97.8
Noise – rear (flywheel) side (dB(A))	94.5

Notes :

- Noise test made at 100% of the ESP power, at 1 mt. distance, on engine without radiator, without cooling fan and without silencer.
- Noise test refers to GB/T 1859 norm : "Reciprocating internal combustion engines. Measurement of emitted airborne noise. Engineering method and survey method".

Fuel consumption

Rating	gr/kWh	L/hr
100% ESP	211	123.1
100% PRP	204.3	109.5
75% PRP	187.3	75.3
50% PRP	190.5	51
25% PRP	207.5	27.8
Fuel consumption tolerance + 3 %		

Ratings definitions

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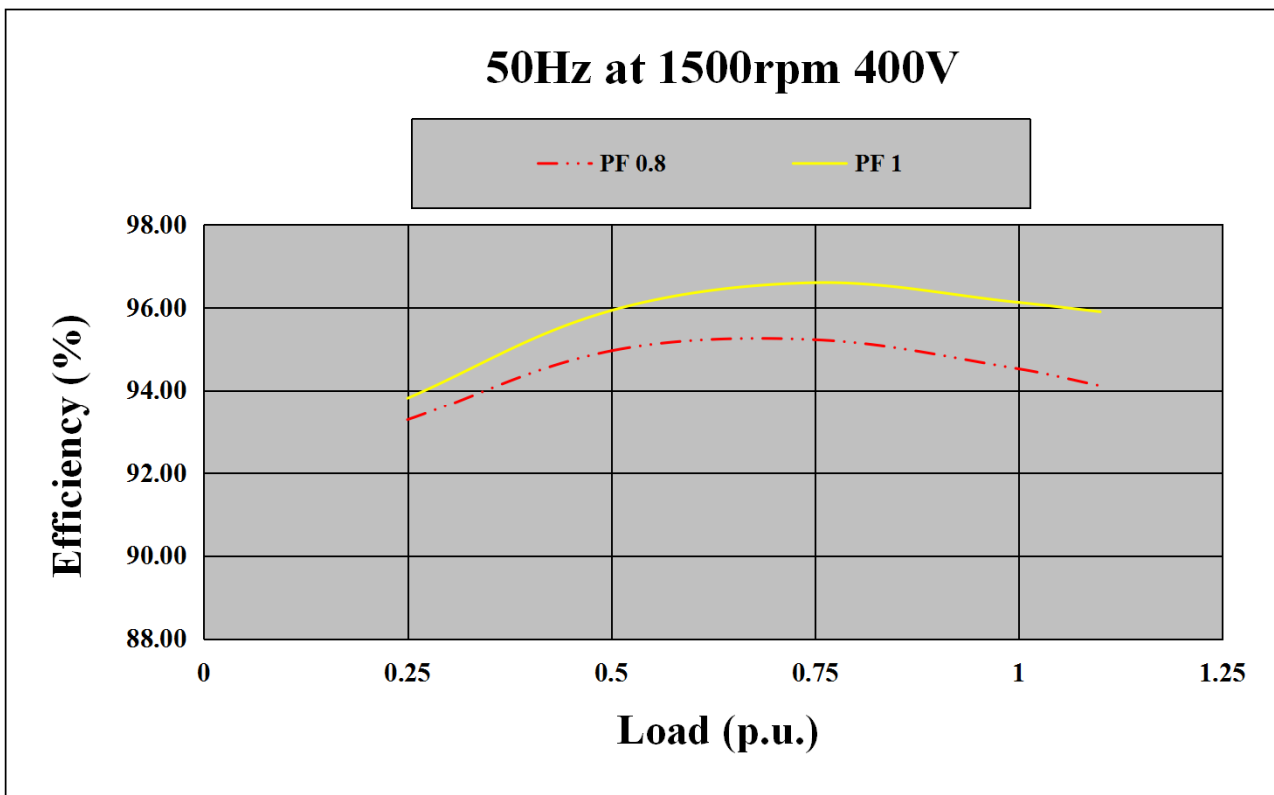
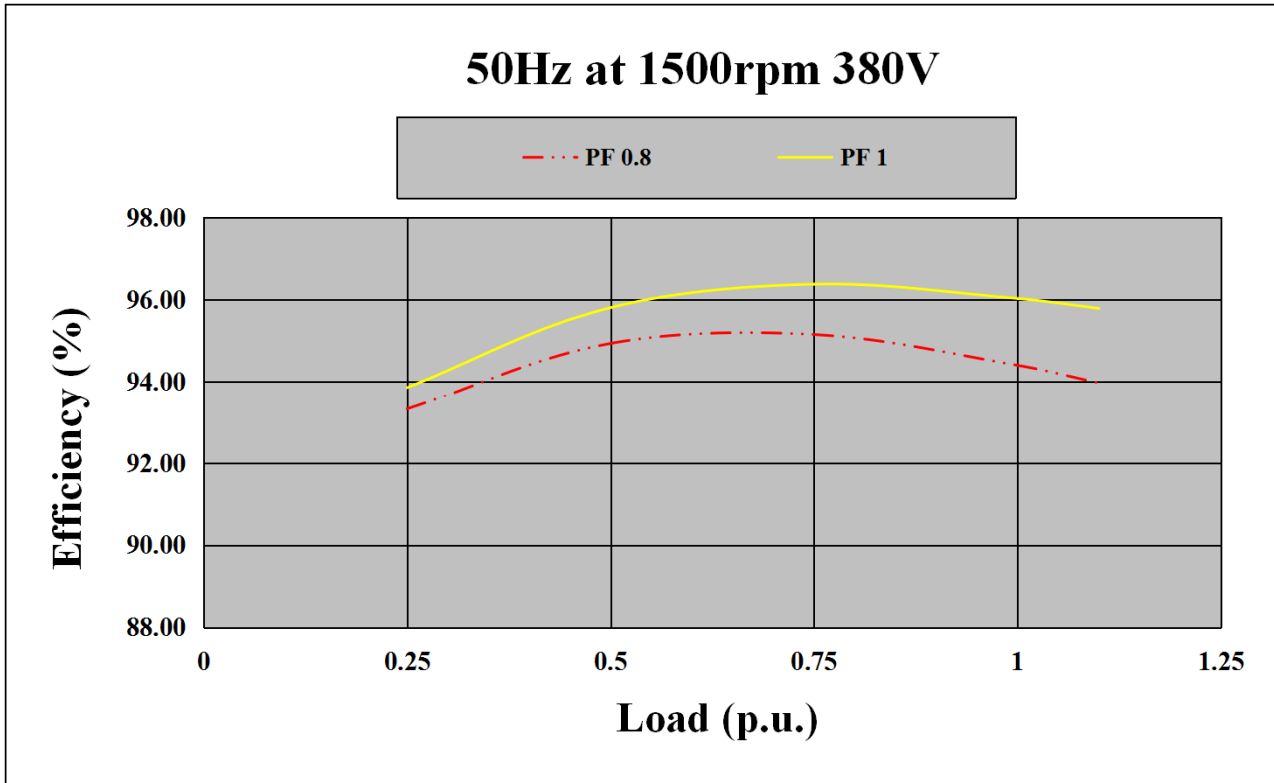
- All ratings are based on operating conditions under ISO 8528-1, ISO 3046, DIN6271. Performance tolerance of $\pm 5\%$.
- Test conditions : 100 kPa, 25°C air inlet temperature, relative humidity of 30%, with fuel density 0.84 kg/L. Derating may be required for conditions outside these; please contact the factory for details.
- 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 and optional equipment.

WHA-500-4/0.4

Frequency	Hz	50			60					
Rated capacity (kVA)	S	500	500	500	505	550	590	610	630	
Rated power (kW)	P	400	400	400	404	440	472	488	504	
Voltage (V)	U	380	400	415	380	416	440	460	480	
Short-circuit ratio	Kcc	0.3	0.36	0.418	0.227	0.276	0.276	0.304	0.343	
Reactance										
Direct axis synchronous reactance	Xd	4.057	3.661	3.401	4.917	4.284	4.284	4.053	3.844	
Direct axis transient reactance saturated	X'd	0.141	0.127	0.118	0.17	0.149	0.149	0.14	0.133	
Direct axis subtransient reactance saturated	X''d	0.127	0.115	0.107	0.154	0.135	0.135	0.127	0.121	
Quadrature axis synchronous reactance	Xq	1.8	1.624	1.509	2.181	1.901	1.901	1.798	1.706	
Quadrature axis subtransient reactance	X''q	0.187	0.169	0.157	0.227	0.198	0.198	0.187	0.177	
Negative sequence reactance saturated	X2	0.16	0.14	0.13	0.19	0.17	0.17	0.16	0.15	
Zero sequence reactance unsaturated	X0	0.048	0.044	0.04	0.058	0.051	0.051	0.048	0.046	
Time constant										
Open circuit time constant	T'd0	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	
Short-circuit transient time constant	T'd	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085	
Subtransient time constant	T''d	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Armature time constant	Ta	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
No load losses	W	3949	4183	4366	5009	5391	5664	5904	6155	
Heat dissipation at full load at Class H	W	23760	23191	22882	25696	26333	27277	27489	27807	
Efficiency										
PF=0.8 Efficiency of 25% load	%	93.31	93.28	93.22	92.84	92.97	93.01	93.03	93.02	
50% load	%	94.93	94.95	94.95	94.61	94.78	94.86	94.92	94.95	
75% load	%	95.14	95.22	95.25	94.82	95.06	95.20	95.29	95.35	
100% load	%	94.39	94.52	94.59	94.02	94.35	94.54	94.67	94.77	
110% load	%	93.96	94.11	94.19	93.56	93.93	94.14	94.29	94.41	
PF=1 Efficiency of 25% load	%	93.85	93.81	93.76	93.34	93.44	93.48	93.49	93.49	
50% load	%	95.80	95.92	95.82	95.46	95.59	95.65	95.69	95.71	
75% load	%	96.37	96.59	96.46	96.06	96.23	96.32	96.38	96.43	
100% load	%	96.02	96.12	96.17	95.68	95.91	96.04	96.13	96.21	
110% load	%	95.78	95.89	95.96	95.42	95.68	95.83	95.93	96.02	
No load excitation current	io(A)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Full load excitation current	ic(A)	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	
Full load excitation voltage	uc(V)	62	62	62	62	62	62	62	62	
Recovery time	Tr	1 s								
Waveform : TIF		<50								
Waveform : THD		No load <3% Non-Distorting Balanced Linear Load <5%								
Waveform : THF		<2%								
Winding pitch		2/3								
Steady state voltage regulation		+/- 1%								
A.V.R. model		EVC600								
Duty		Continuous								
Number of poles		4								
Class of insulation		H								
Altitude		≤1000m								
Rated power factor		0.8								
Excitation		Brushless								
Stator winding		6ends								
Rotor		With damping cage								
Overload	%	110% rated load for 1 hour								
Stator winding resistance (20°C)	ohm	0.00623								
Rotor winding resistance (20°C)	ohm	0.7858								
Exciter Stator resistance (20°C)	ohm	10.2								
Exciter Rotor resistance (20°C)	ohm	0.0506								
Cooling air requirement	m3/min	54.8			65.8					
Method of cooling		IC 01								
Ambient temperature		40°C								
Sense of rotation		Clockwise-DE								
Type of construction		1 Bearing or 2 Bearings								
Degree of protection / enclosure		IP21 or IP23								
Maximum overspeed		2250 rpm 2minutes								

THREE-PHASE SYNCHRONOUS GENERATOR

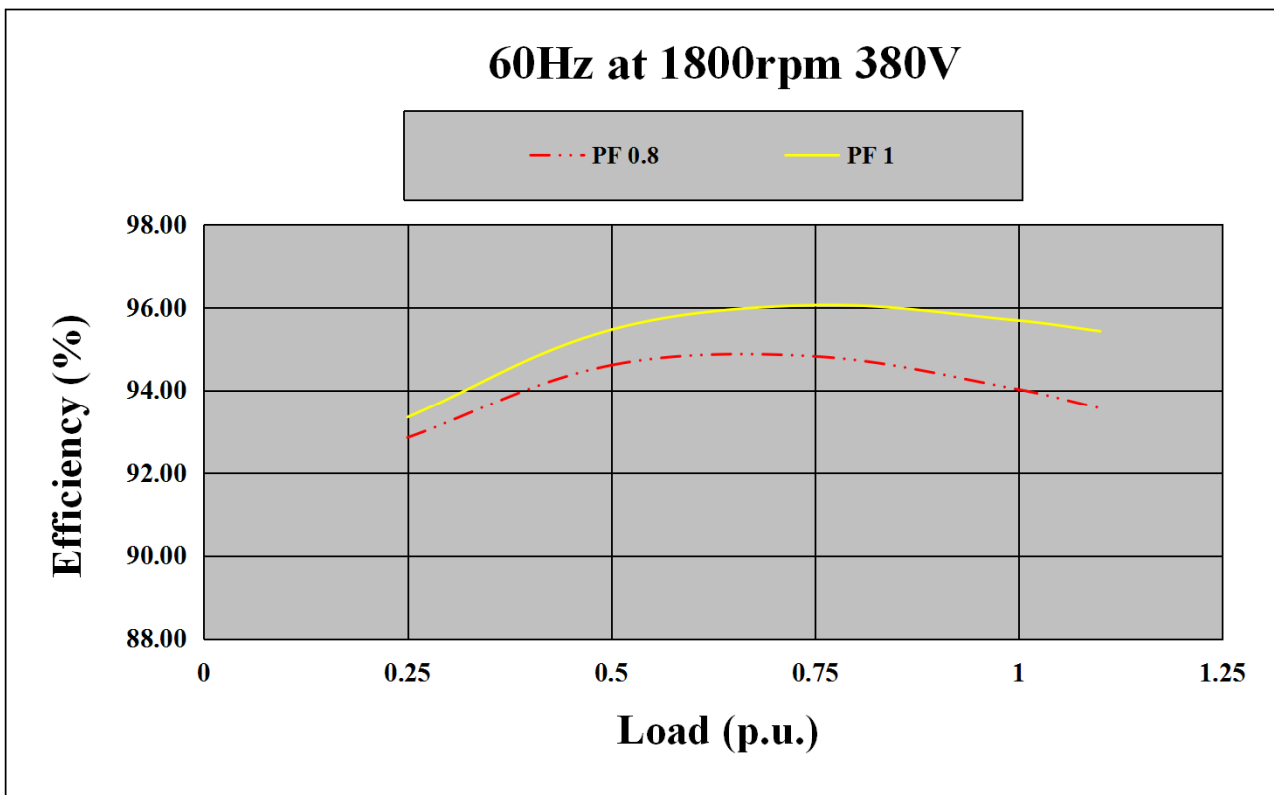
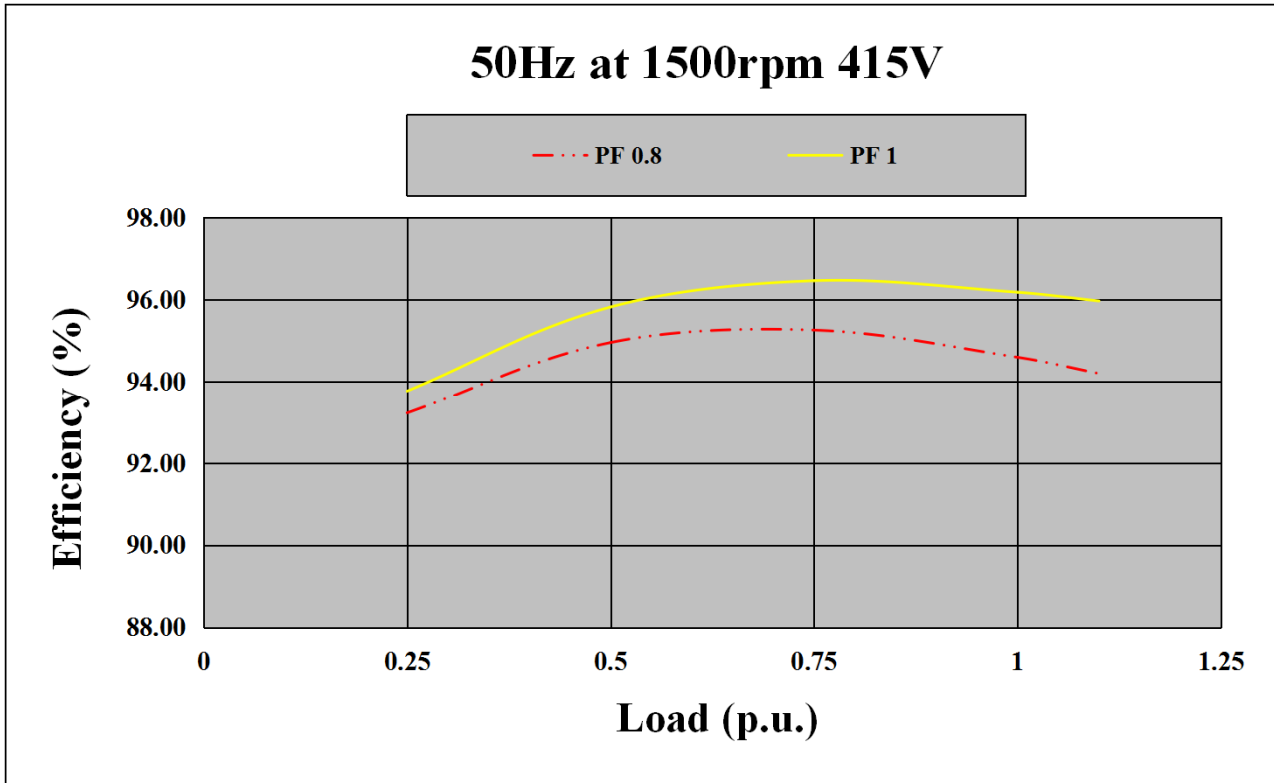
THREE PHASE EFFICIENCY CURVES



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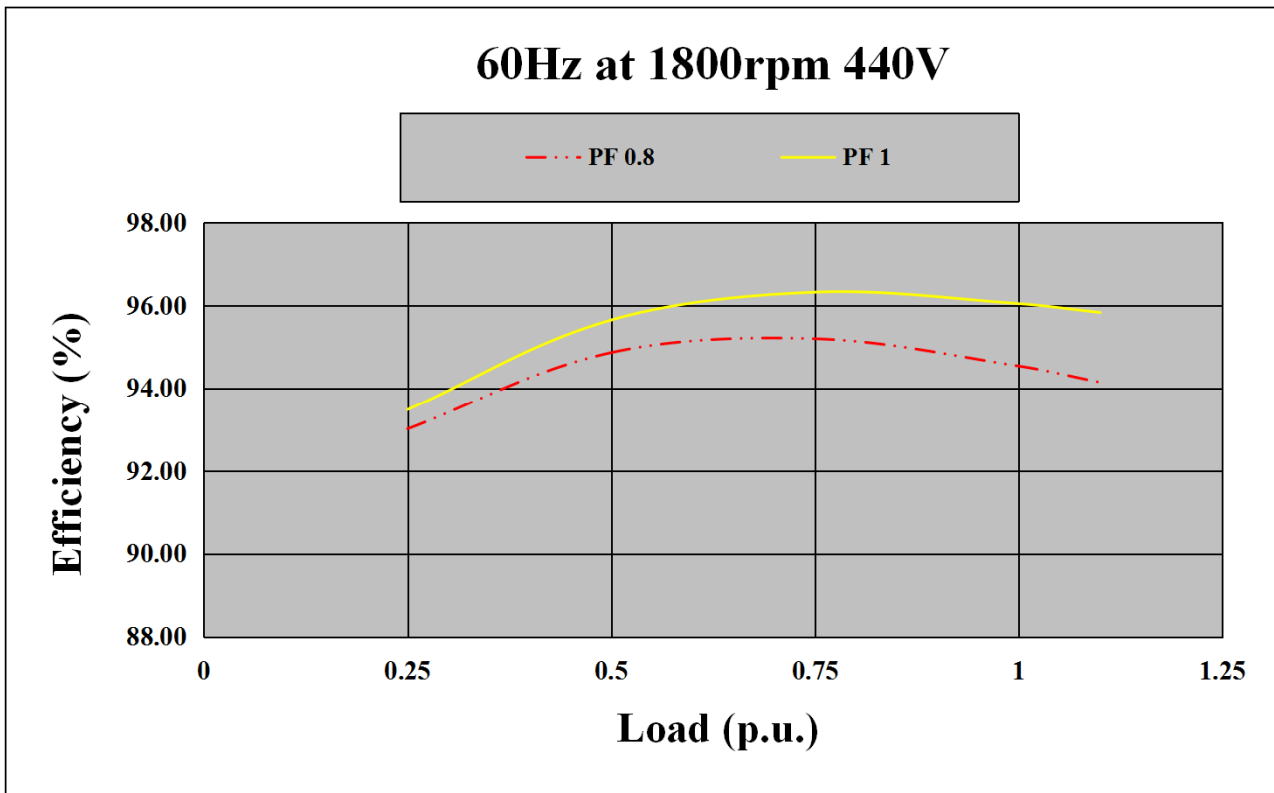
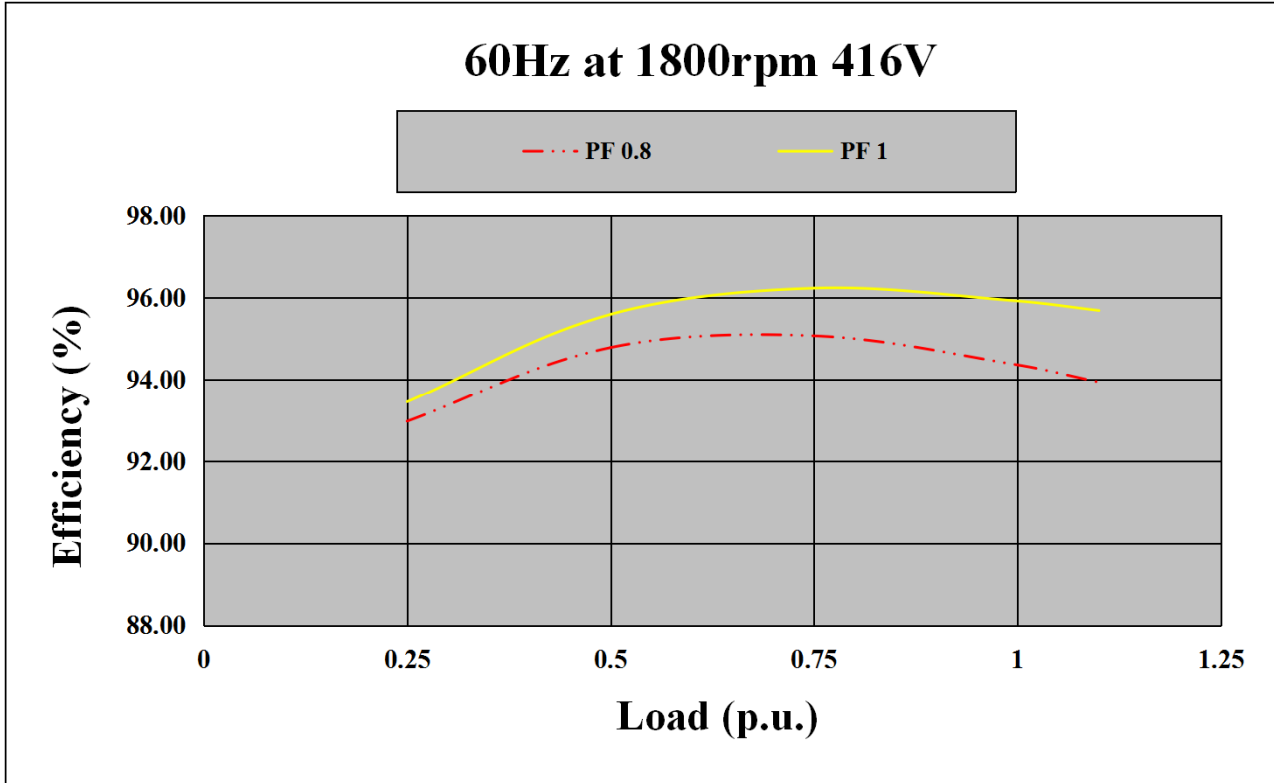
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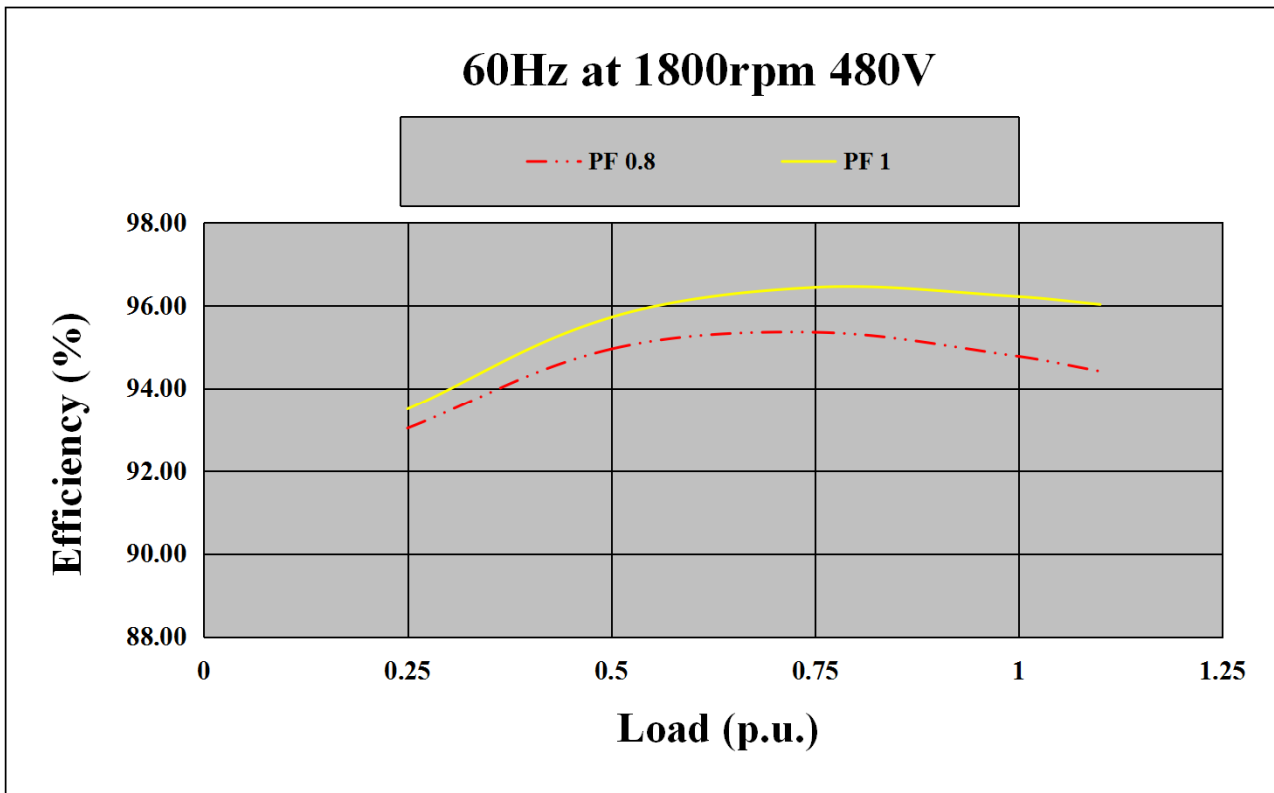
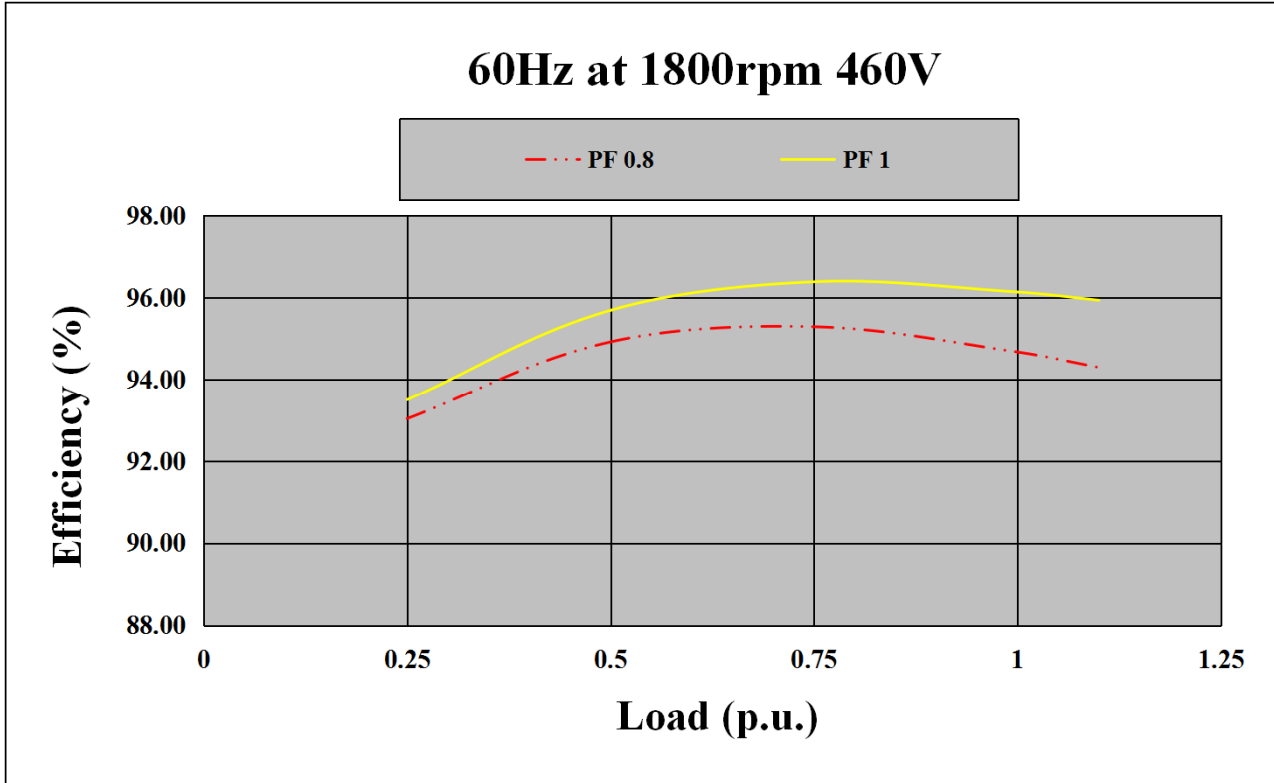
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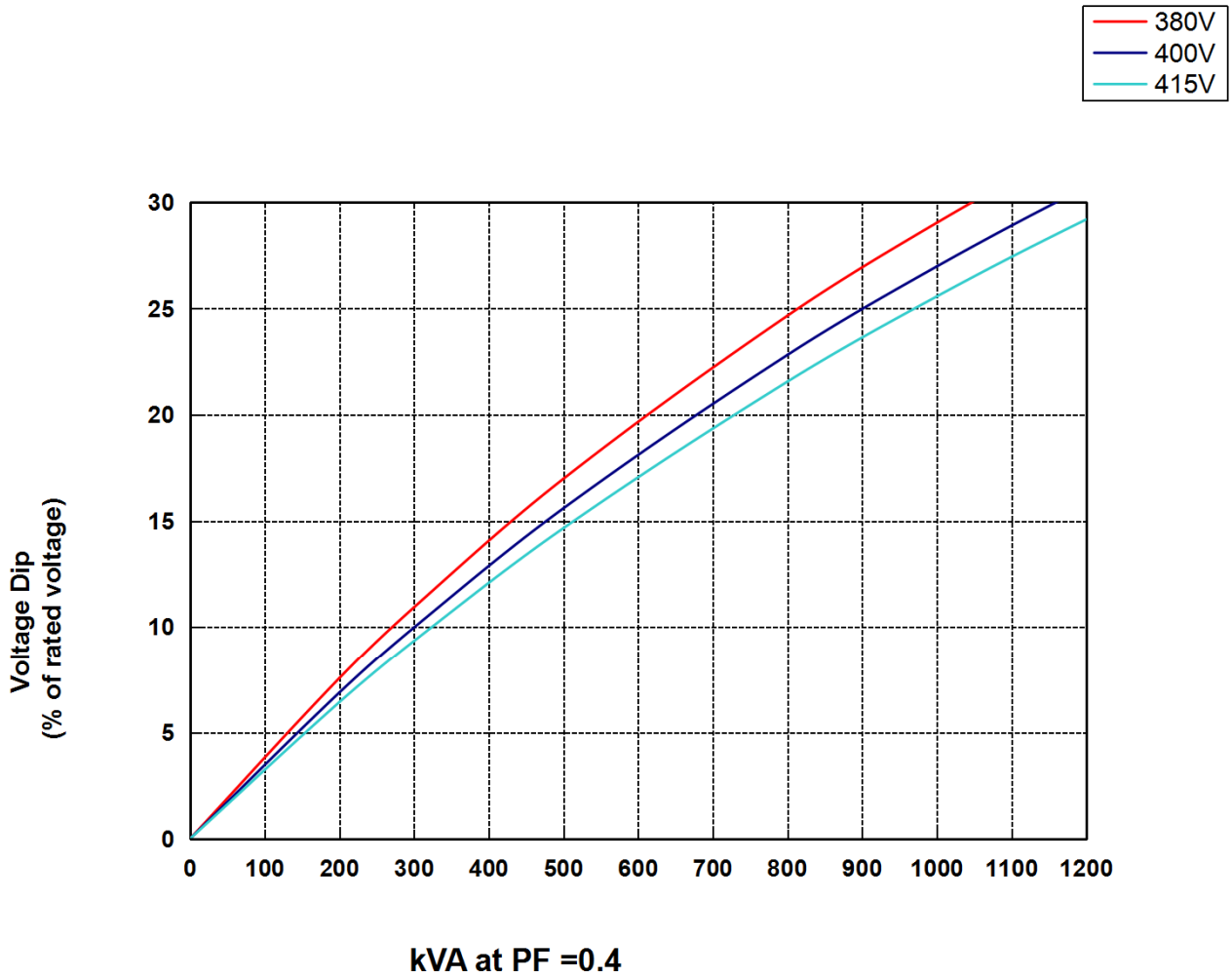


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THREE PHASE SYNCHRONOUS GENERATOR

WHA-500-4/0.4

MOTOR STARTING CURVES (50Hz)



THREE PHASE SYNCHRONOUS GENERATOR

WHA-500-4/0.4

MOTOR STARTING CURVES (60Hz)

