



**WPG2500B7**

**DCP 2250kVA/1800kW**

**@230/400V 50Hz**

# WPG2500\*7

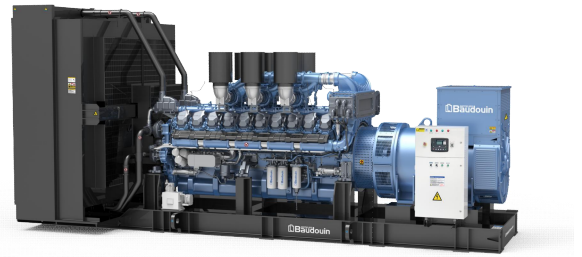
## DIESEL GENERATOR SET

### 50 Hz – Non Emission

#### GENERATING SET RATINGS

50Hz – 1500rpm @ 0.8p.f

NET	DCP		PRP		ESP	
Voltage	kVA	kWe	kVA	kWe	kVA	kWe
415/240	2250	1800	2250	1800	2500	2000
400/230	2250	1800	2250	1800	2500	2000
380/220	2250	1800	2250	1800	2500	2000



#### PRODUCT STANDARD FEATURES

##### Engine and Block

- Cast iron cylinder block with inspection door per cylinder
- Cast iron cylinder liners, wet type and replaceable valves guides and seats
- Separate cast iron cylinder heads with 4 valves
- Hardened steel forged crankshaft with induction hardened journals, crankpins and radius

##### Cooling System

- Two separate circuits
- High temperature circuit equipped with thermostatically-controlled system with two gear driven coolant pumps
- Low temperature circuit equipped with belt driven coolant pump

##### Fuel System

- Super-high pressure common-rail fuel system for more peak fire pressure
- Pre-filter and main filters with electric fuel pump

##### Lubrication System

- Full flow screw able oil filters
- Lube oil purifier with replaceable cartridge
- Water cooled lube oil cooler

##### Electrical System

- Standard starting system comes with 2 x 24 Vdc electric starter motors and 1 x battery charging alternator
- Redundant dual starting system available as an option.

##### Air Intake and Exhaust System

- 6 single-stage turbochargers
- Silencer available as an option
- Exhaust manifold and turbocharger shield for heat isolating


##### Alternator

- High Efficiency Brushless, 4 Pole, IP23 drip-proof revolving field design built with Class H insulation/Class F Temperature rise
- Low reactance with 2/3 pitch windings on the stator
- Direct-coupled by high-elasticated coupling
- Sustained overcurrent >300% in 10 sec
- Direct drive centrifugal blower fan cooling
- Excitation by PMG

##### Genset Controller

- Baudouin's Genset controller is ideal for a wide range of applications
- Display status message Provide protection Auto shutdown at fault detection
- See individual spec sheet for detailed specifications

- 1) All ratings are based on operating conditions under ISO 8528-1, ISO 3046, DIN6271. Performance tolerance of  $\pm 5\%$ .
- 2) 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.
- 3) Power output curves are based on the engine operating with a fuel system, water pump, and lubricating oil pump; not included are the battery charging alternator, fan, and optional equipment.

GENERATOR SET SPECIFICATIONS		
Governor and regulation class		In accordance with ISO 8528-5 Class G3 performance
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		≤± 1%
Steady-state frequency band		≤ 0.5%
ENGINE		
Brand / Model		Baudouin / 20M33G2500/5
Gross Power	kWm	ESP – 2210/ PRP - 2010
Cylinder / Type / Aspiration		20 / Vee Type, Turbocharged and Aftercooled
Bore x Stroke	mm	150 x 185
Displacement	L	65.4
Compression ratio		15:1
Brake Mean Effective Pressure	kPa	ESP – 2703
** See engine data sheet for detailed specification		
ALTERNATOR		
Coupling / No. of Bearing		Direct / Single
Winding Pitch		2/3
Type of Excitation		PMG
Cooling type		Air
Voltage regulation method		AVR
Winding temperature sensor		PT100
Bearing temperature sensor		PT100
Anti-condensation heater voltage		AC230V
Insulation		Class H
Protection Grade		IP23
** See alternator data sheet for detailed specification		
COOLING SYSTEM		
Type of Coolant		Liquid( water + 50% antifreeze)
Max coolant temperature – shutdown	°C	108
Cooling Fan Airflow	m3/min	2400
** See radiator data sheet for detailed specification		
EXHAUST SYSTEM		
Exhaust Gas temperature after the turbocharger	°C	600
Exhaust Gas flow	m3/min	ESP – 499 PRP –453.6
Max Exhaust back pressure	mBar	75
FUEL CONSUMPTION (Tolerance +3%)		
100% ESP	L/hr	536.7
100% PRP	L/hr	478.6
75% PRP	L/hr	343.2
50% PRP	L/hr	231.2
25% PRP	L/hr	124.7
GENSET CONTROLLER		
<p>Baudouin's Genset controller is designed for manual/auto parallel systems.</p> <p>The controller is an easy to use Synchronising Auto Mains (Utility) Failure Control Module suitable for paralleling single gensets (diesel or gas) with the mains (utility).</p> <p><b>Key Benefits</b></p> <ul style="list-style-type: none"> <li>• Real-time clock provides accurate event logging</li> <li>• Ethernet communication, provides built in advanced remote monitoring.</li> <li>• Can be integrated into building management systems (BMS) and programmable logic control (PLC)</li> </ul>		
		

## OPTIONS

### Engine

- Coolant heater
- Fuel / Water separator
- Remote radiator / heat exchanger
- Redundant dual starting system
- Exhaust ~25dBA reduction muffler
- Exhaust Y-connection pipe
- Lube oil automatic replenishment system

### Alternator

- Class H or B temperature rise
- Oversized terminal box
- Mounting differentiates CT
- Infrared view port
- Winding protections for harsh environments and relative humidity greater than 95%

## Ratings definitions

### Emergency standby power (ESP):

ESP 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.

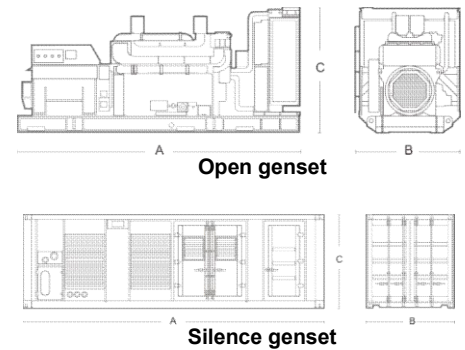
Typical operational hours of the engine are 200 hours per year, with maximum usage of 500 hours per year. This includes an annual maximum of 25 hours per year at the ESP power rating. No overload capability is allowed. The engine is not to be used for sustained utility paralleling applications.

### Prime power (PRP):

PRP 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 for 1 hour within every 12-hour period.

### Data Center power (DCP):

DCP is the maximum power that an engine is capable of delivering while supplying a variable or continuous load and during unlimited run hours. An overload capability of 10% is available for 1 hour within every 12-hour period.



This outline drawing is to provide representative configuration details for Model series only. See respective model data sheet for specific model outline drawing number.


Do not use for installation design

## Dimension and Weight

Structure	Model	Dim "A" mm	Dim "B" mm	Dim "C" mm	Dry wt. kg
Open	WPG2500B7	7300	2680	2960	18600
Silence	Customise design	Please check with your distributor			

\* Note: Sizes and weights represent a set with standard 400V features. See the outline drawings for the detailed configurations of sizes and weights.

## 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.
	The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.	NFPA 110	The genset can comply to a single step in accordance with NFPA 110

The generator set is designed and manufactured in facilities certified to standards ISO9001:2015 and ISO14001:2015. The generator set is prototype-tested, factory-built and production tested and is in compliance with the relevant standards:

- ISO 8528-13, ISO 3046, DIN627
- EN 60034-1, EN 60204-1
- Machinery Directive 2006/42/EC/LVD 2014/35/EU

Data and specifications are subject to change without notice.


### Contact information:

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## **Engine data sheet**

	Model :	<b>20M33G2500/5</b>	Rev :	04
	<b>PowerKit Engine Datasheet</b>		Page :	1 / 4

## Ratings

RPM	Gross Engine Output			Net Engine Output *		
	PRP	DCP	ESP	PRP	DCP	ESP
	kWm	kWm	kWm	kWm	kWm	kWm
1500	2010	2010	2210	2008.4	2008.4	2208.4


1 kWm = 1,34 BHP

\* This data is calculated without radiator.

## Basic data

Engine model	.....	20M33G2500/5
N° of Cylinders / Valves	.....	20 / 80
Cylinders arrangement	.....	At Vee
Bore x Stroke (mm)	.....	150 x 185
Displacement (L)	.....	65.4
Thermodynamic Cycle	.....	Diesel 4 stroke
Mean Piston Speed (m/s)	.....	9.25
BMEP @ ESP (Bar)	.....	27.03
Cooling System	.....	Liquid (water + 50% antifreeze)
Injection System	.....	Direct
Fuel System	.....	High Pressure Common Rail
Aspiration	.....	Turbocharged and Aftercooled
Compression ratio	.....	15 : 1
Flywheel housing	.....	SAE 00
Flywheel	.....	21"
N° of teeth on flywheel ring gear	.....	159
Inertia of flywheel (kg•m <sup>2</sup> )	.....	8.64
Inertia of crankshaft (kg•m <sup>2</sup> )	.....	16.24
Emission standard	.....	N/A
Overall Dimensions without radiator (Length x Width x Height) (mm)	.....	3278 ×1633×2144
Engine dry weight without radiator and without radiator pipes (kg)	.....	6650

DPK-TDS-20M33-5001-22-11-17 Moteurs Baudouin reserve the right to modify these specifications, without notice. Document not contractual

	Model :	<b>20M33G2500/5</b>	Rev :	04
	<b>PowerKit Engine Datasheet</b>		Page :	2 / 4

### Air intake system

Air intake temperature rise (°C) .....	≤ 5
Air intake restriction clean filter (mBar) .....	≤ 30
Air intake restriction dirty filter (mBar) .....	≤ 75
Recommended air flow @ PRP (m³/min) .....	142.7
Recommended air flow @ ESP (m³/min) .....	157
Min. diameter of intake pipe (mm) .....	140

### Aftercooling system

Aftercooler system type .....	Air to Water
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).....	80

### Lubrication system


Oil capacity Low / High (L) .....	210/240
Oil pressure in normal condition idle speed (Bar) .....	≥ 2
Oil pressure in normal condition at 1500 Rpm @ PRP (Bar) .....	4 - 6.5
Lowest oil pressure alarm (shutdown) (Bar) .....	2
Max. oil temperature (°C) .....	105
Oil flow at 1500 Rpm (L/min) .....	≥ 640
Oil fuel consumption ratio based on engine fuel consumption data .....	≤ 0.3 %
Total system capacity (including filters) (L) .....	319

### Heat balance test data (with ambient temperature 18.6 °C)

Total heat dissipation @ ESP (kJ/s) .....	3349.3
- Heat Rejection to HT Circuit @ ESP (kJ/s) .....	815.3
- Heat Rejection to LT Circuit @ ESP (kJ/s) .....	545.7
- Radiated Heat to Ambient @ ESP (kJ/s) .....	266.3
- Heat Rejected to Exhaust @ ESP (kJ/s) .....	1722

### Exhaust system

Max. exhaust back pressure (mBar) .....	75
Max. exhaust temperature before turbocharger (°C) .....	750
Max. exhaust temperature after turbocharger (°C) .....	600
Exhaust flow @ PRP (m³/min) .....	453.6
Exhaust flow @ ESP (m³/min) .....	499
Min. diameter of exhaust pipe (mm) .....	200
Max. bending moment of exhaust gas exit flange (Nm) .....	10

	Model :	<b>20M33G2500/5</b>	Rev :	04
	<b>PowerKit Engine Datasheet</b>		Page :	3 / 4

### Cooling system

Min. inside diameter of coolant outlet pipe LT/HT(mm) .....	60 / 80
Coolant alarm (shutdown) temperature (°C) .....	108
Thermostat opening temperature / full open temperature (°C) .....	80 / 92
Coolant capacity of the engine (L) .....	140
Max. additional restriction for external cooling circuit (Bar) .....	0.34
Max additional restriction - Duct allowance (Pa) .....	150

### Fuel system


Governor .....	ECU
Governor steady state speed stability at constant load (ISO 8528-5 Class G3) <sup>1</sup> .....	≤ +/- 0.5 %
Max. restriction at fuel inlet (Bar) .....	0.5
Max. pressure at fuel inlet (Bar) .....	1
Max. fuel return restriction (Bar) .....	1
Max. fuel inlet temperature (°C) .....	70
Fuel supply flow (L/hr) .....	2900
Min. internal diameter of inlet pipe (mm) .....	19
Min. internal diameter of return pipe (mm) .....	19

### Electrical system

Electrical system voltage (negative to ground) (Vdc) .....	24
Starter power (kW) .....	2 x 10
Battery charger current (A) .....	55
Battery charger absorbed power (kW) .....	1.6
Battery discharge current requirement at -18°C (CCA) .....	1800 - 2800
Max. electric resistance of starting circuit (Ω) .....	0.008
Min. sectional area of wire (mm <sup>2</sup> ) .....	95
Min. ambient cold start temperature without auxiliary starting device (°C) <sup>2</sup> .....	- 10
Min. ambient cold start temperature with auxiliary starting device (°C) <sup>2</sup> .....	- 25

<sup>1</sup> 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.

<sup>2</sup> Engines used in emergency standby application or applications that require immediate start under load, they must be equipped with coolant heaters. Baudouin 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.

	Model :	<b>20M33G2500/5</b>	Rev :	04
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## Noise

Diesel engine noise (Acoustic power level) (dB(A)) .....	122.2
Noise - upper side (dB(A)) .....	106.6
Noise - right side (view from flywheel) (dB(A)) .....	100.9
Noise - left side (view from flywheel) (dB(A)) .....	106.1
Noise – front (radiator) side (dB(A)) .....	97.9
Noise – rear (flywheel) side (dB(A)) .....	99.5

### 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	204.0	536.7
100% PRP	199.0	478.6
75% PRP	190.3	343.2
50% PRP	192.3	231.2
25% PRP	207.5	124.7
Fuel consumption tolerance + 3 %		

## Ratings definitions

### Emergency Standby Power (ESP)

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 is 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)

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, however, this is limited to 1 hour within every 12 hour period.

### Data Centre Power (DCP)

Data Centre Power is defined as being the maximum power which a generating set is capable of delivering while supplying a variable or continuous electrical load and during unlimited run hours. Depending on the sites to supply and the availability of reliable utility, the generating set manufacturer is responsible to define what power level he is able to supply to fulfil that requirement including hardware or software or maintenance plan adaptation.

Note : The engine driven alternating current generating set is a reliable source of power for the data centre and it can be also used to back up a reliable utility. Prolonged operation at load in parallel with a utility is not permitted.

- 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.



**WPG2500B7**  
**Radiator Technical Data Sheet**

## Radiator Technical Data Sheet

Application: Radiators

Engine Data: 20M33G2500/5

### Application Data:

	Hot water radiator	Low temperature intercooler
Required Ambient Temp, °C	50	
Cooling Air Inlet Temp, °C	62.1	50
Cooling Air Outlet Temp, °C	80.2	62.1
Heat Rejection, Kj/S	815.3	545.7
Overload, %	10%	10%
Flow Rate, L/min	1755	703.3
Coolant Inlet Temp, °C	103	82.8
Coolant Outlet Temp, °C	95.4	70
Fluid	50/50	50/50
Cooler Data		
Radiator Model	1002915425	
Radiator Size, WxHxT,mm	W2496×H2798×T2384	
Radiator dry weight, kg	3200	
Radiator water capacity, L	330	
Core Type/Construction	CU	CU
Passes	1	1
Air Flow Required, m <sup>3</sup> /min	2400	
Air-Side Press Drop, Pa	430	430
Water-Side Pressure Drop, kPa	58	20
Fan&Motor Data		
Fan Diameter, mm	1981	
Fan noise, dBA @ 1m	103	
Fan speed, RPM	1000	
Fan Absorb Power, Kw	89.4	
Number of blades	10	



Structure Parameters of water High Parameters Radiator		Structure Parameters of water Low Parameters Radiator	
Core	Width(mm)	2381	2381
	Height(mm)	2100	2100
Cooling Tube	Thickness(mm)	90	90
	Frontal Area(m <sup>2</sup> )	5	5
	Cooling Area(m <sup>2</sup> )	528	528
	Shape(mm)	2.5x14	2.5x14
	Wall thickness(mm)	0.15	0.15
Fins	Number	1130	1130
	Perimeter(mm )	31	31
	Cooling Area(m <sup>2</sup> )	62.5	62.5
	Material	GH65F-Q371700HTB008-2014	GH65F-Q371700HTB008-2014
Core	Wave Height(mm)	8	8
	Wave Distance(mm)	3.5	3.5
	Number	227	227
	Thickness(mm)	0.04	0.04
	Material	GR01AQ/371700HTB005- 2014	GR01AQ/371700HTB005- 2014
	Cooling Area(m <sup>2</sup> )	465.5	465.5
	Fin Type	open	open

Coolant inlet temperature during test			Ambient temperature during test				92°C		45°C	
Water flow	Wind speed	Standard heat dissipation	Water resistance	Wind resistance	Coolant inlet temperature	Coolant outlet temperature	Cooling air inlet temperature	Cooling air outlet temperature		
L/min	m/s	kw	kPa	Pa	°C	°C	°C	°C	°C	°C
1075	5	837	26	260	92	79.2	45	74.5		
	6	908	26	325	92	78.1	45	71.7		
	7	965	26	400	92	77.2	45	69.3		
	8	1020	26	480	92	76.4	45	67.5		
1250	5	855	30	260	92	80.8	45	75.2		
	6	930	30	325	92	79.8	45	72.3		
	7	995	30	325	92	78.9	45	70.1		
	8	1050	30	480	92	78.2	45	68.2		
1425	5	872	36	260	92	82	45	75.8		
	6	951	36	325	92	81	45	73		
	7	1017	36	310	92	80.3	45	70.6		
	8	1090	36	480	92	79.5	45	68.8		
1600	5	887	45	260	92	82.9	45	76.3		
	6	968	45	235	92	82.1	45	73.5		
	7	1035	45	310	92	81.4	45	71.1		
	8	1100	45	480	92	80.7	45	69.3		



## **Alternator data sheet**

## ALTERNATOR TECHNICAL DESCRIPTION

### WHA 52.3 UL16

Date: 07-11-2023

197 A,Fushou East Street,High-Tech Development Zone, Weifang,China

#### Main data

C

Generator type:	<b>WHA 52.3 UL16</b>		
Power:	2 250 kVA	1 800 kWe	1 874 kWm
Voltage:	400 V	Star serial	
Rated voltage range:	+5/-5%		
Power factor - Lagging:	0,8		
Frequency:	50 Hz		
Speed:	1 500 rpm		
Nominal current:	3 248 A		
Winding type:	p2/3		
Classes (Insulation / Temperature Rise):	H / F		
Ambient temperature:	45 °C		
Altitude:	1 000 m		

#### Installation

IEC

Quantity

1

Prime mover:	Reciprocating engine
Manufacturer:	-
Type:	-
Duty:	Base Rating

#### Mechanical construction

IM1101

Type of construction:	Two bearing
Mounting arrangement:	Horizontal Axis
Direction of rotation:	Clockwise (seen when facing the drive end - DE)
Bearing type:	Anti-friction
Bearing Lubrication:	Regreasable
Bearing insulation:	Not insulated
Shaft end type:	Cylindrical with keyway
Balancing - Class (ISO 21940-11):	Half key - G2,5 (std)
Flange:	None / without
Shaft height:	500 mm
Width:	750 mm

#### Additional specificities

Stabilized Runaway speed:	1 800 rpm - 2 min.
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#### Cooling Method

IC01

Degree of protection:	IP23
Coolant:	Air / Temperature: 45 °C
Air quality:	Clean
Ventilation (internal):	Self-ventilated
Filters:	Without
Ducting for air inlet:	No
Ducting for air outlet:	No

## ALTERNATOR TECHNICAL DESCRIPTION WHA 52.3 UL16

Date: 07-11-2023

### Connection, Excitation & Regulation

Parallel operation:	Island mode (0F) - no droop CT
Excitation:	Self-excited - Brushless - Type: AREP + PMI
Sustained 3-phase Isc:	> 3 x FLC for 10s.
AVR type:	D550 - Digital
AVR location:	In terminal box
Alternator Voltage sensing:	In terminal box

### Terminal box

Power connection:	4 connectors (brought out neutral)
Main terminal box location:	1 terminal box on the top
Line side outlet:	Left hand side (seen when facing the drive end - D)
Gland plate:	Non magnetic, Undrilled
Auxiliaries	In main terminal box

### Protection and measurement accessories

#### Temperature detection

Stator windings:	6 x PT100 RTDs (3 wires)
Combined guide and thrust bearing - DE:	1 x PT100 RTD (3 wires)
Guide bearing - NDE:	1 x PT100 RTD (3 wires)

#### Anti-condensation heating

Voltage: 230 V - 1Ph / Power: 500 W

### Various items

Paint:	PE - Primary - RAL 7032
Documentation:	PDF manual
Documentation Language:	English

### Controls

QUAL/INES/006 001 => 101	Measurement of winding resistance
QUAL/INES/006 021 => 128	Insulation check on sensors (when fitted)
QUAL/INES/006 002 => 102&103	Voltage balance and phase order check
QUAL/INES/006 007 => 109	Overspeed test (according to test bench limitation)
QUAL/INES/006 009 => 111	High potential test
QUAL/INES/006 010 => 112	Insulation resistance measurement

## ALTERNATOR ELECTRICAL DATA WHA 52.3 UL16

Date: 07-11-2023

### Main data:

<b>Power:</b>	<b>2 250</b> kVA	<b>1 800</b> kWe	<b>1 874</b> kWm	1
<b>Voltage:</b>	<b>400</b> V	<b>Frequency:</b>	<b>50</b> Hz	1
<b>Rated voltage range:</b>	+5% / -5%	<b>Speed:</b>	<b>1500</b> rpm	1
<b>Power factor - Lagging:</b>	<b>0,8</b>	<b>Phases</b>	<b>3</b>	1
<b>Nominal current:</b>	<b>3 248</b> A	<b>Connexion</b>	<b>Star serial</b>	1
<b>Insulation / Temperature rise:</b>	<b>H / F</b>	<b>Winding type:</b>	<b>p2/3</b>	1
<b>Cooling:</b>	<b>IC01</b>	<b>Winding:</b>	<b>- 6 Wires</b>	1
<b>Ambient temperature:</b>	<b>45</b> °C	<b>Overspeed (rpm)</b>	<b>1800</b>	1
<b>Altitude:</b>	<b>1000</b> m	<b>Total Harmonic Distortion (THD)</b>	<b>&lt; 3,5%</b>	1
<b>Duty: Base Rating</b>				

### Efficiency ( Base 1800 kWe )

	25%	50%	75%	<b>100%</b>	110%	
<b>Power factor - Lagging: 0,8</b>	93,24	95,67	96,11	<b>96,07</b>	96,00	1
<b>Power factor - Lagging: 1</b>	93,76	96,34	96,95	<b>97,08</b>	97,07	1

### Reactances (%) - ( Base 2250 kVA )

Unitary impedance ( 1 per unit ) = 0,071111 ohms

	<i>Unsaturated</i>		<i>Saturated</i>		<i>Unsaturated</i>		<i>Saturated</i>	
	Direct axis				Quadrature axis			
Synchronous reactance	Xd	218	160	Xq	111	82		1
Transient reactance	X'd	19,6	16,6	X'q	111	82		1
Subtransient reactance	X''d	10,1	8,6	X''q	10,4	8,8		1
Negative sequence reactance	X2	10,2	8,7					
X0	2,1	Zero sequence reactance						1
XI	5,0	Stator leakage reactance						
Xr	15,6	Rotor leakage reactance						
Kc	<b>0,62</b>	Short-circuit ratio						1

### Time constants (s)

	Direct axis		Quadrature axis		
Open circuit transient time constant	T'do	2,92	T'qo	NA	1
Short-circuit transient time constant	T'd	0,261	T'q	NA	1
Open circuit subtransient time constant	T''do	0,027	T''qo	0,135	1
Subtransient time constant	T''d	0,014	T''q	0,013	1
Ta	0,030	Armature winding short circuit time constant			1

### Resistances (%)

Ra	1,1	Armature resistance	R0	0,7	Zero sequence resistance	1
X/R	7,9	X/R ratio (without unit)	R2	2,0	Negative sequence resistance	

Voltage accuracy: 0,25%

Maximum inrush current for a voltage dip of 15%: 2256 kVA

when starting an AC motor having a starting power factor between 0 and 0.4

Rating is provided for the specified temperature rise, by resistance measurement according to IEC60034-1

According to: I.E.C. 60034.1 - 60034.2 - NEMA MG 1-32

Products and materials shown in this catalogue may, at any time, be modified in order to follow the latest technological developments.

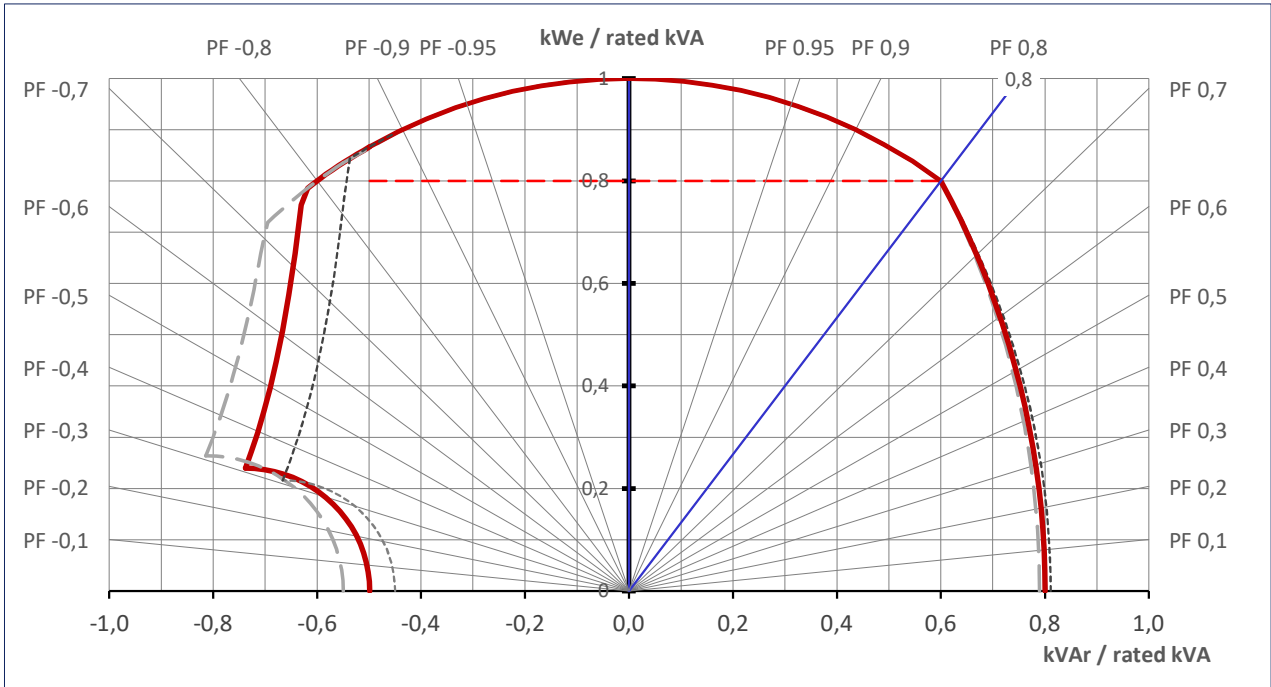
**ALTERNATOR MAIN CURVES**  
**WHA 52.3 UL16**

Date: 07-11-2023

**2250kVA - 400V - 50 Hz**

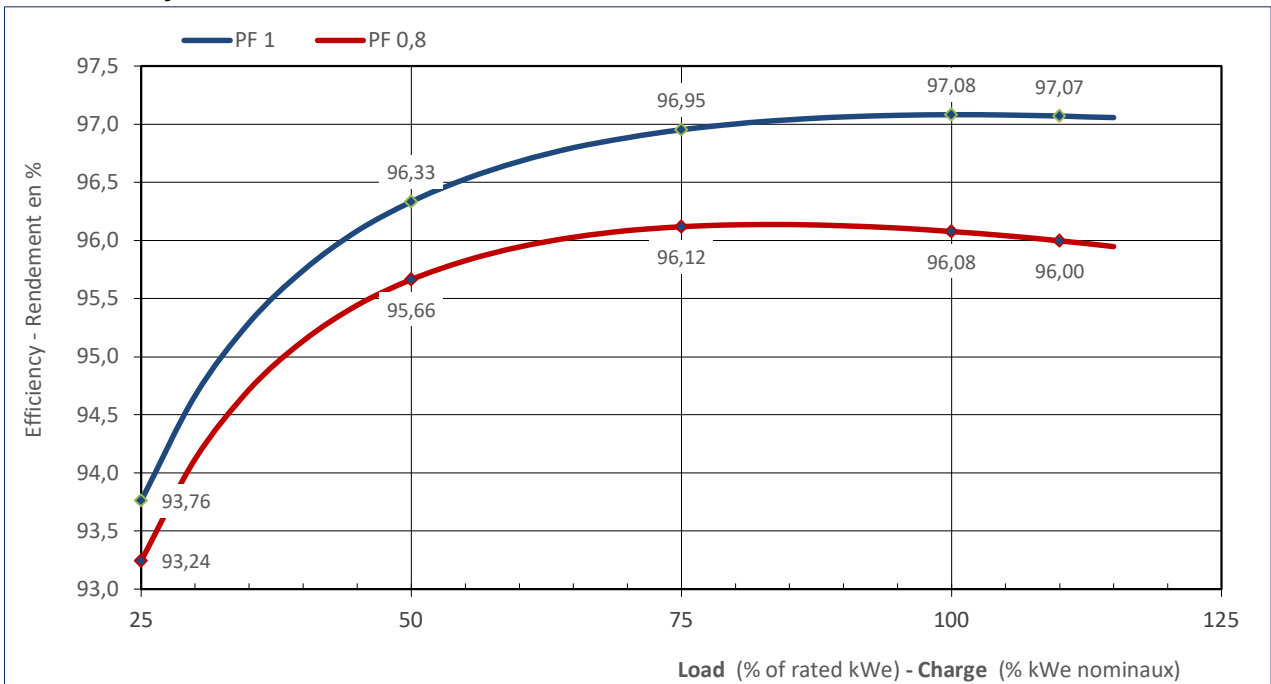
**Capability Curve**

---	Umax	+ 5%	420	V
—	Un		<b>400</b>	V
- - -	Umin	- 5%	380	V



**Efficiency Curves**

According to: IEC





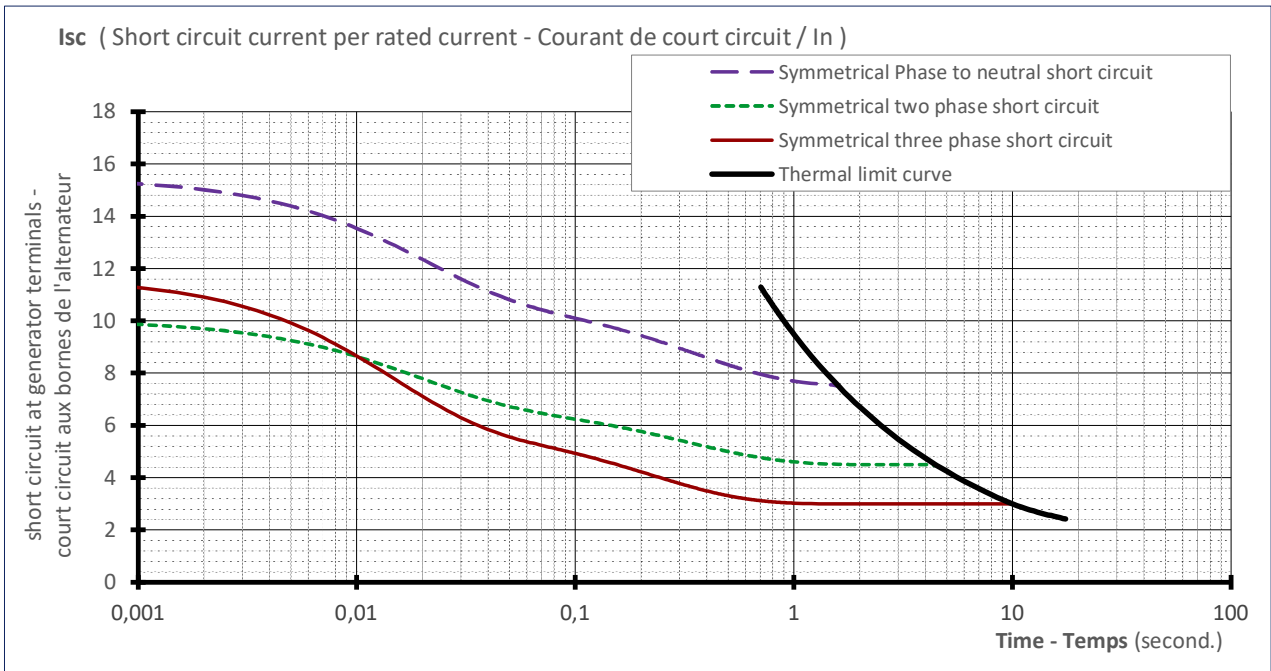
**ALTERNATOR MAIN CURVES**  
**WHA 52.3 UL16**

Date: 07-11-2023

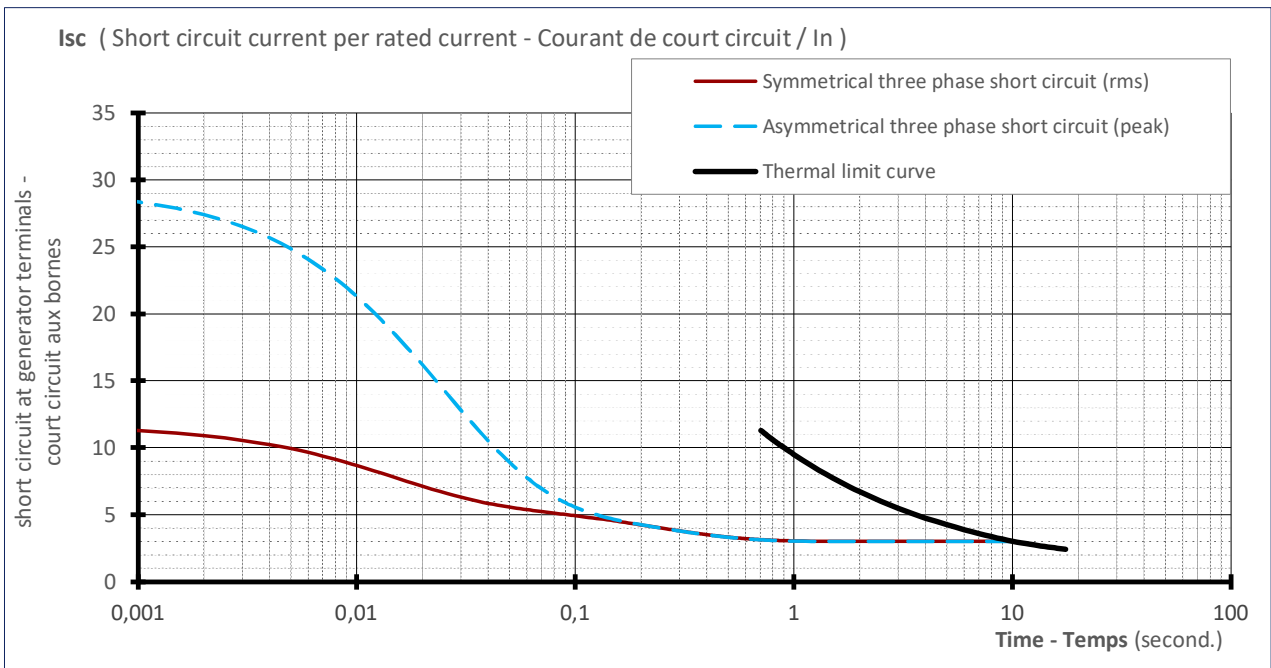
**2250kVA - 400V - 50 Hz**

**Stator Current decrement curves**

Symmetrical phase to neutral short-circ		initial	49 511 A	15,2 x In	
Symmetrical two phase short-circuit		max	32 049 A	9,9 x In	In = 3248 A
Symmetrical three phase short-circuit		value	36 656 A	11,3 x In	
Thermal Limit					



Asymmetrical three phase short-circuit IP 91 347 A 28,1 x In

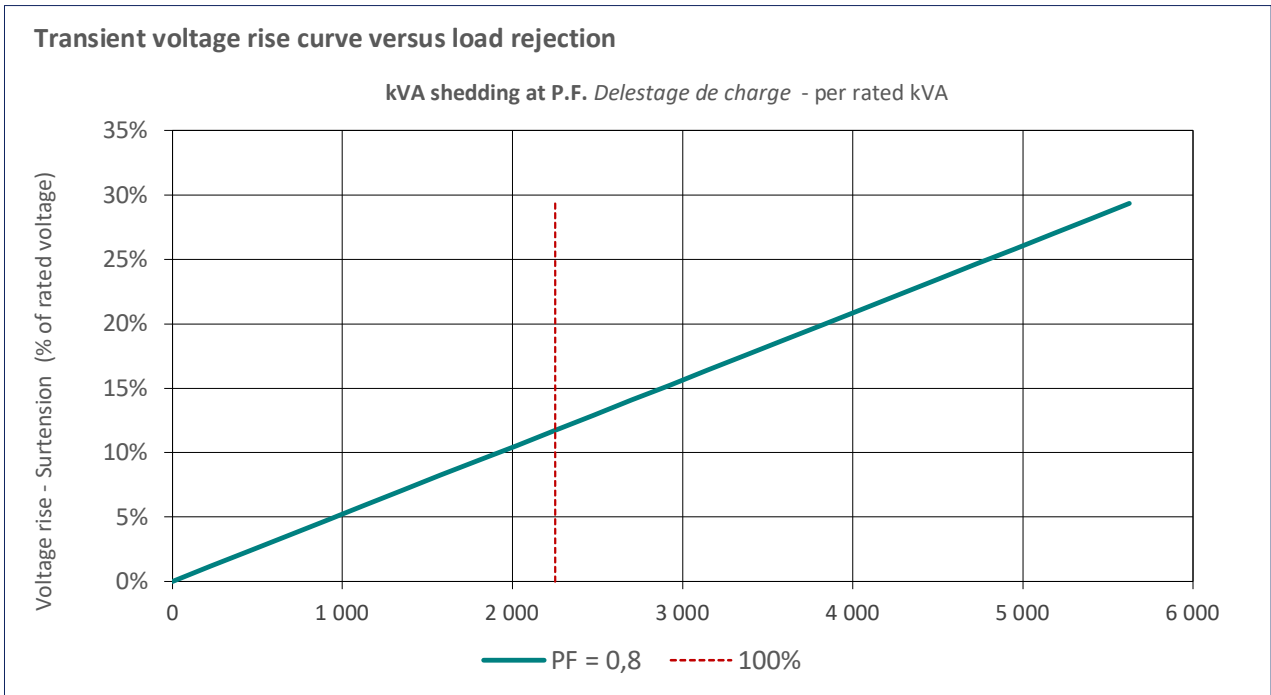
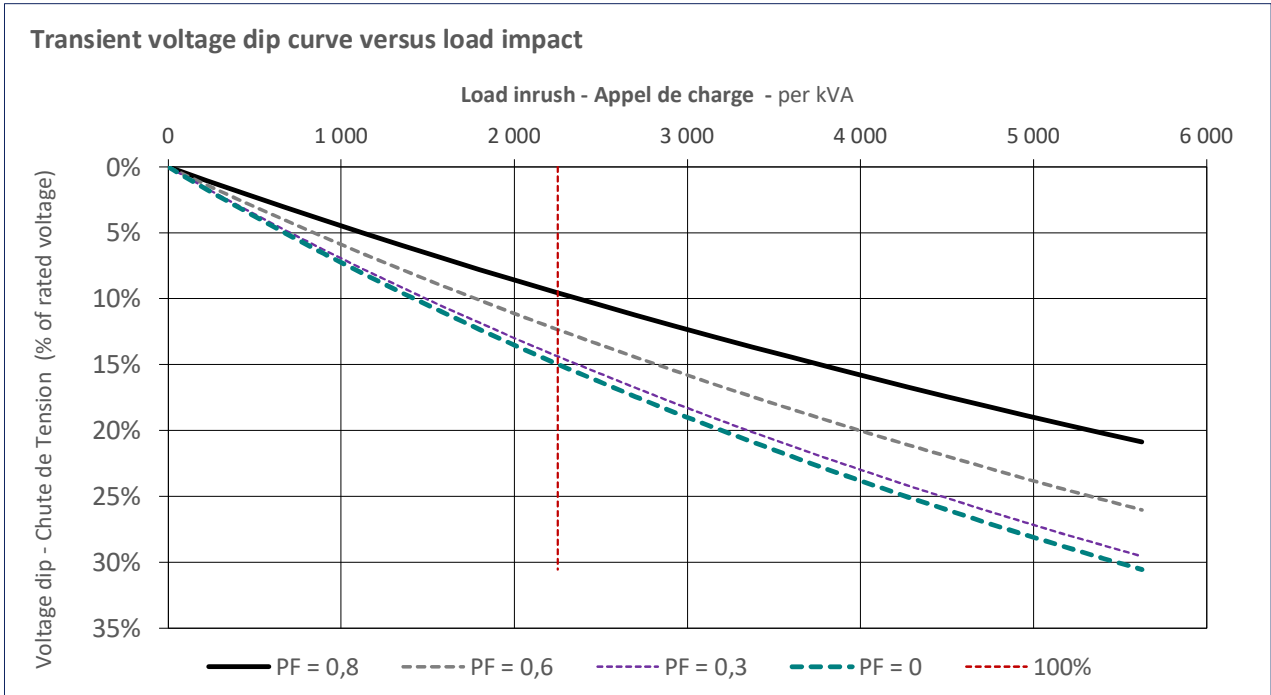


**ALTERNATOR MAIN CURVES**  
**WHA 52.3 UL16**

Date: 07-11-2023

**2250kVA - 400V - 50 Hz**

**Transient Voltage Variation**

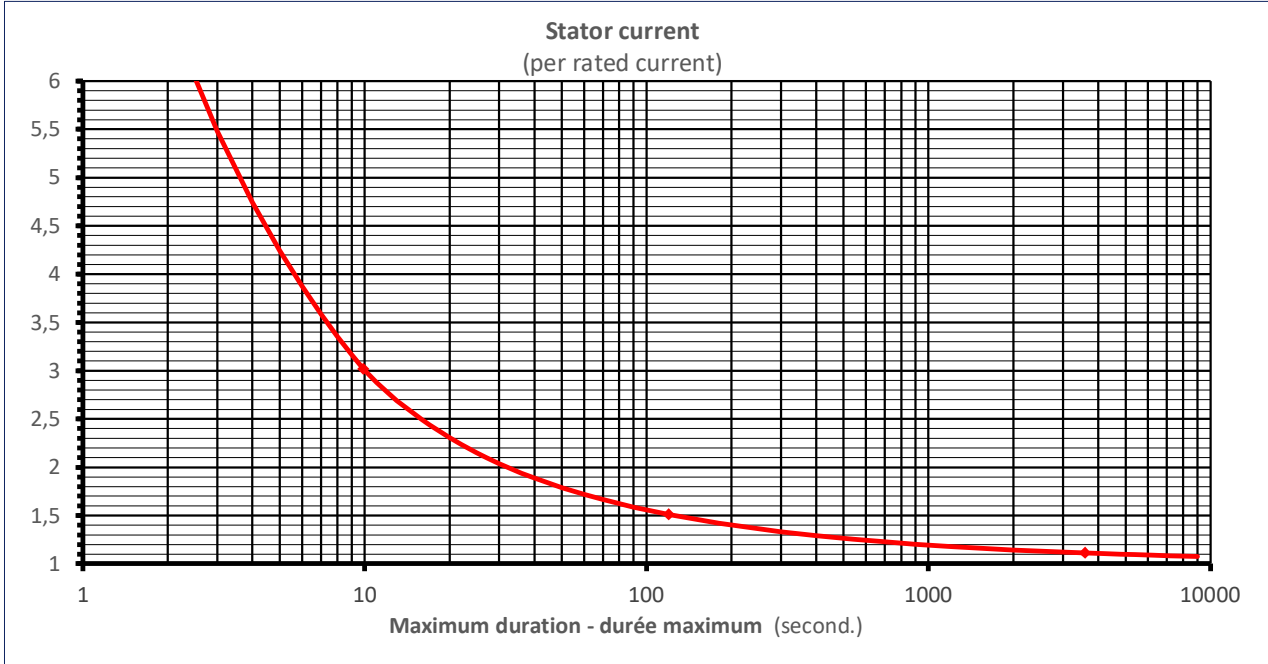


**ALTERNATOR MAIN CURVES  
WHA 52.3 UL16**

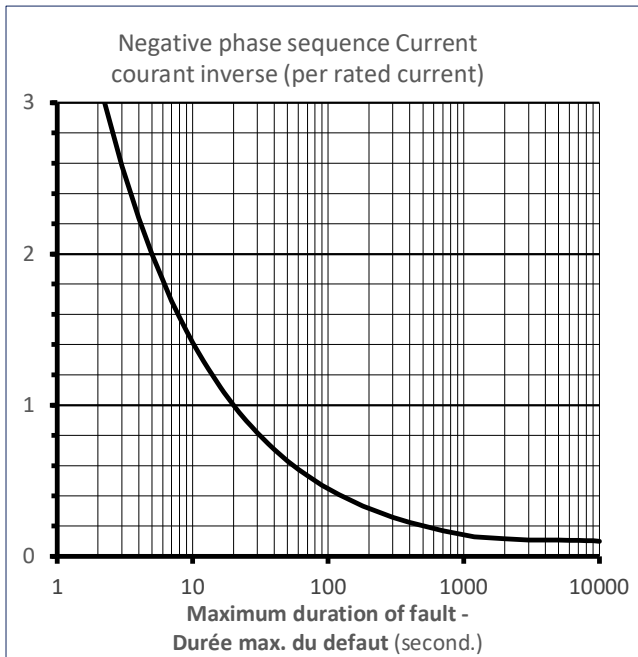
Date: 07-11-2023

**2250kVA - 400V - 50 Hz**

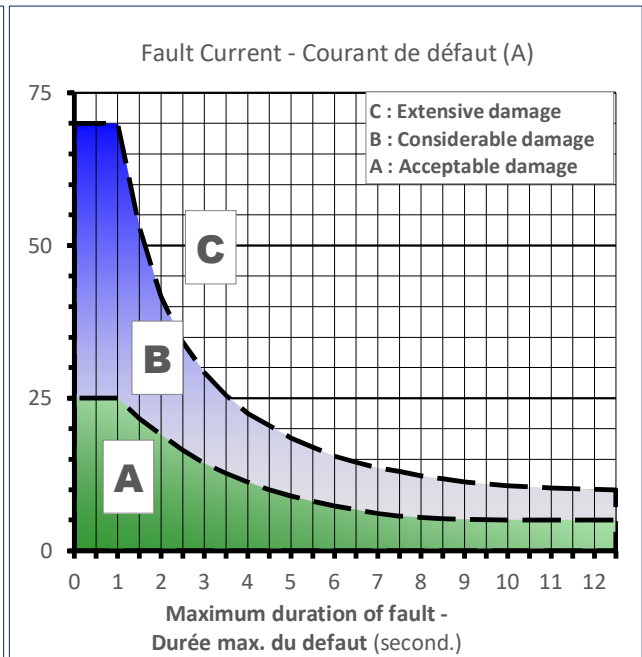
**Thermal Damage Curve**



**Unbalance Load Curve**



**Stator Earth Fault Current**





## **Controller data sheet**

# WHC 8620 MKII

## SYNCHRONISING AUTO MAINS (UTILITY) FAILURE LOAD SHARE CONTROL MODULE



Module can be configured to function as a WHC8610 MKII Synchronising and Load Sharing Control Module

Refer to WHC8610 MKII Data Sheet for product features.

### KEY FEATURES

- Comprehensive synchronising & loadsharing capabilities
- Built in governor and AVR control
- Base load (kW export) control
- Positive & negative kVAr export control
- Mains (Utility) decoupling protection
- Mains (Utility) failure detection
- Mains (Utility) power (kW, kV Ar, kV A & pf) monitoring
- Mains (Utility) de-coupling protection
- Mains (Utility) kW export protection
- Peak lopping & shaving functionality
- 4-Line back-lit LCD text display
- Multiple Display Languages
- Five key menu navigation
- LCD alarm indication
- Heated display option available
- Customisable power-up text and images
- WHCNet® expansion compatibility
- Data logging & trending facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB, RS232, RS485 & Ethernet communication
- Front panel configuration with PIN protection
- Power save mode
- 3 phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf)
- kW and kvar overload alarms
- Reverse power alarms
- Over current protection
- Unbalanced load protection
- Independent earth fault protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN
- 8 configurable DC outputs
- 2 configurable volt-free relay outputs
- 4 configurable analogue/digital inputs
- Built in sensors to support 0 V to 10 V & 4 mA to 20 mA
- 12 configurable digital inputs
- Configurable 5 stage dummy load and load shedding outputs
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Manual and automatic fuel pump control
- Engine run-time scheduler
- Fuel usage monitor and low fuel level alarms
- Simultaneous use of all communication ports
- Remote SCADA monitoring via various WHC software applications
- MODBUS RTU & TCP support with configurable MODBUS pages for integration into building management systems (BMS)
- 3 configurable maintenance alarms
- Compatible with a wide range of CAN engines, including tier 4 engine support
- Uses WHC Configuration Suite PC Software for simplified configuration

### KEY BENEFITS

- Can be configured for use as a WHC8610 MKII
- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Ethernet communication, provides built in advanced remote monitoring.
- Can be integrated into building management systems (BMS) and programmable logic control (PLC)
- Increased input and output expansion capability via DSENet®
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- Extended internal PLC editor allows user configurable functions to meet specific application requirements.

### EXPANSION DEVICES

- WHC124 CAN/MSX Extender
- WHC2130 Input Expansion Module
- WHC2131 Ratio-metric Input Expansion Module
- WHC2133 RTD & Thermo-couple Expansion Module
- WHC2152 Ratio-metric Output Expansion Module
- WHC2157 Output Expansion Module
- WHC2548 LED Expansion

### RELATED MATERIALS

TITLE	PART NO.
WHC8620 MKII Installation Instructions	053-183
WHC8620 MKII Operator Manual	057-254
WHC8620 MKII PC Configuration Suite Manual	057-238
WHC8610 MKII Data Sheet	055-204

### SPECIFICATIONS

#### DC SUPPLY

**CONTINUOUS VOLTAGE RATING**  
5 V to 35 V Continuous

#### CRANKING DROPOUTS

Able to survive 0 V for 100 ms, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

#### MAXIMUM OPERATING CURRENT

530 mA at 12 V, 280 mA at 24 V

#### MAXIMUM STANDBY CURRENT

320 mA at 12 V, 160 mA at 24 V

#### CHARGE FAIL/EXCITATION RANGE

0 V to 35 V

#### GENERATOR & MAINS (UTILITY)

**VOLTAGE RANGE**  
15 V to 415 V AC (Ph to N)  
26 V to 719 V AC (Ph to Ph)

#### FREQUENCY RANGE

3.5 Hz to 75 Hz

#### MAGNETIC PICKUP

**VOLTAGE RANGE**  
+/- 0.5 V to 70 V

#### FREQUENCY RANGE

10,000 Hz (max)

#### INPUTS

**DIGITAL INPUTS A TO L**  
Negative switching

#### ANALOGUE INPUTS A TO D

Configurable as:  
Negative switching digital input  
0 V to 10 V sensor  
4 mA to 20 mA sensor  
0 Ω to 480 Ω sensor

#### OUTPUTS

**OUTPUT A & B (FUEL & START)**  
15 A DC at supply voltage

#### OUTPUTS C & D

8 A AC at 250 V AC (Volt-free)

#### AUXILIARY OUTPUTS E TO L

2 A DC at supply voltage

#### BUILT IN AVR GOVERNOR CONTROL

**MINIMUM LOAD IMPEDANCE**  
500 Ω  
Fully isolated

#### GAIN VOLTAGE

0 V to 10 V DC  
Fully isolated

#### OFFSET VOLTAGE

0 V to 10 V DC  
Fully isolated

#### DIMENSIONS

**OVERALL**  
245 mm x 184 mm x 51 mm  
9.6" x 7.2" x 2.0"

#### PANEL CUT-OUT

220 mm x 160 mm  
8.7" x 6.3"

#### MAXIMUM PANEL THICKNESS

8 mm  
0.3"

#### STORAGE TEMPERATURE RANGE

-40 °C to +85 °C  
-40 °F to +185 °F

#### OPERATING TEMPERATURE RANGE

-30 °C to +70 °C  
-40 °F to +185 °F

#### HEATED DISPLAY VARIANT

-40 °C to +70 °C  
-40 °F to +158 °F

# WHC8620 MKII

## SYNCHRONISING AUTO MAINS (UTILITY) FAILURE LOAD SHARE CONTROL MODULE

The WHC8620 MKII is an easy to use Synchronising Auto Mains (Utility) Failure Control Module suitable for paralleling single gensets (diesel or gas) with the mains (utility) supply. The controller can be configured for use as a WHC8610 MKII Auto Start Control Module. When converted for use as a WHC8610 MKII the unit provides generator to generator load share.

Designed to synchronise a single genset with a single mains (utility) supply the WHC8620 MKII will automatically control the change over from mains (utility) to generator supply or run the generator in synchronisation with the mains (utility) to provide no break, peak lopping and peak shaving power solutions.

System alarms are annunciated on the LCD screen (multiple language options available), illuminated LED and audible sounder.

Comprehensive communications are also available via RS232, RS485 and Ethernet for remote PC control and monitoring and integration into building management systems

The event log will record 250 events to facilitate easy maintenance, and an extensive number of fixed and flexible monitoring, metering and protection features are included.

Designed to offer increased built in support for active sensors for 0 V to 10 V & 4 mA to 20 mA. Comprehensive communication and system expansion options are available.

Using the WHC PC Configuration Suite Software allows easy alteration of the operational sequences, timers and alarms. With all communication ports capable of being active at the same time, the WHC8620 MKII is ideal for a

wide variety of demanding load share applications.

### KEY LOAD SHARE FEATURES:

- Peak lopping/sharing (with appropriate WHC mains (utility) controller
- Manual voltage/frequency adjustment
- R.O.C.O.F. and vector shift protection
- Mains (Utility) decoupling
- Mains (Utility) decoupling test mode
- Direct governor and AVR control
- Volts and frequency matching
- kW and kvar load sharing

### ENVIRONMENTAL TESTING STANDARDS

#### ELECTRO MAGNETIC COMPATIBILITY

BS EN 61000-6-2  
EMC Generic Immunity Standard for the Industrial Environment  
BS EN 61000-6-4  
EMC Generic Emission Standard for the Industrial Environment

#### ELECTRICAL SAFETY

BS EN 60950  
Safety of Information Technology Equipment, including Electrical Business Equipment

#### TEMPERATURE

BS EN 60068-2-1  
Ab/Ae Cold Test -30 °C  
BS EN 60068-2-2  
Bb/Be Dry Heat +70 °C

#### VIBRATION

BS EN 60068-2-6  
Ten sweeps in each of three major axes  
5 Hz to 8 Hz at +/-7.5 mm, 8 Hz to 500 Hz at 2 gn

#### HUMIDITY

BS EN 60068-2-30  
Db Damp Heat Cyclic 20/55 °C at 95% RH  
48 Hours  
BS EN 60068-2-78  
Cab Damp Heat Static 40 °C at 93% RH  
48 Hours

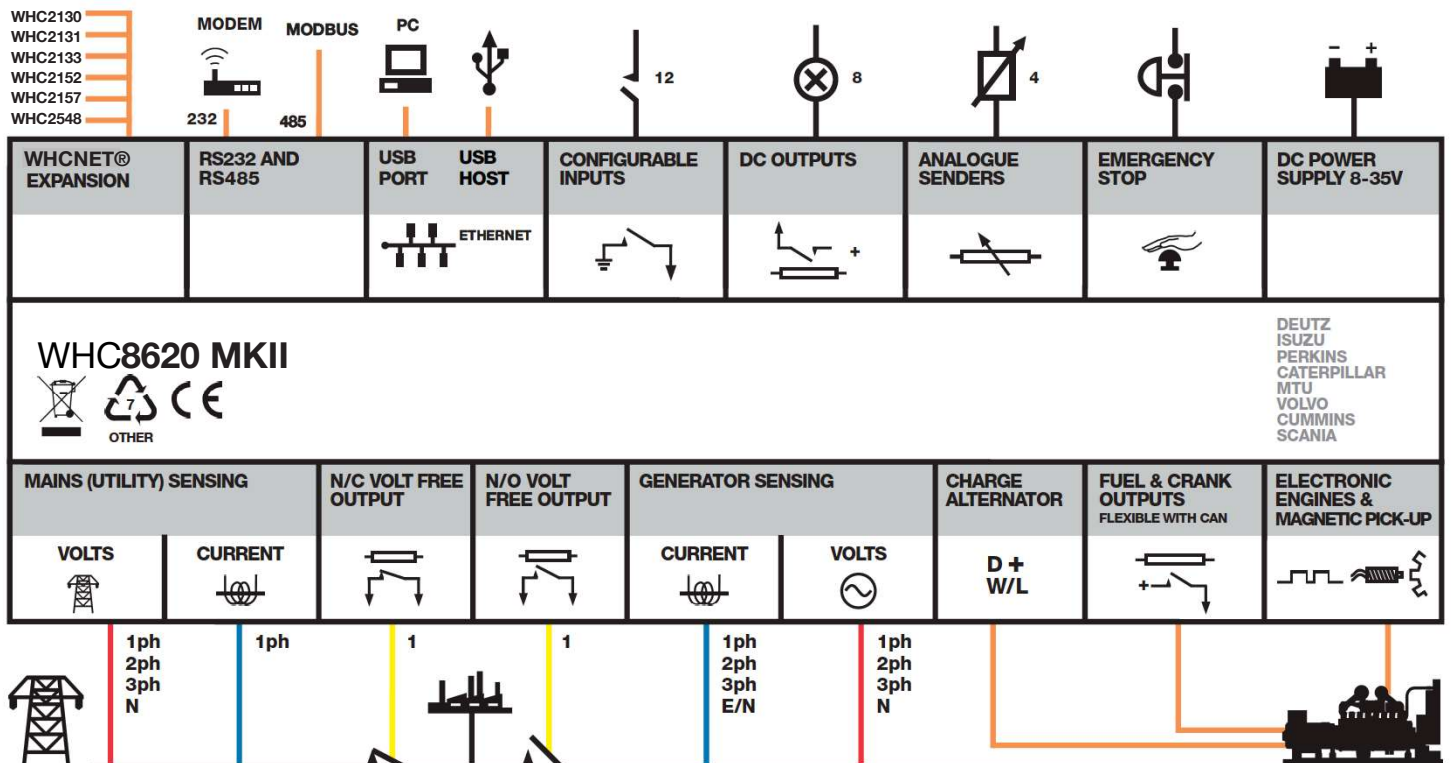
#### SHOCK

BS EN 60068-2-27  
Three shocks in each of three major axes  
15 gn in 11 ms

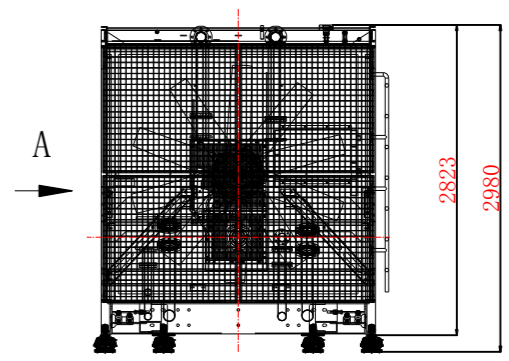
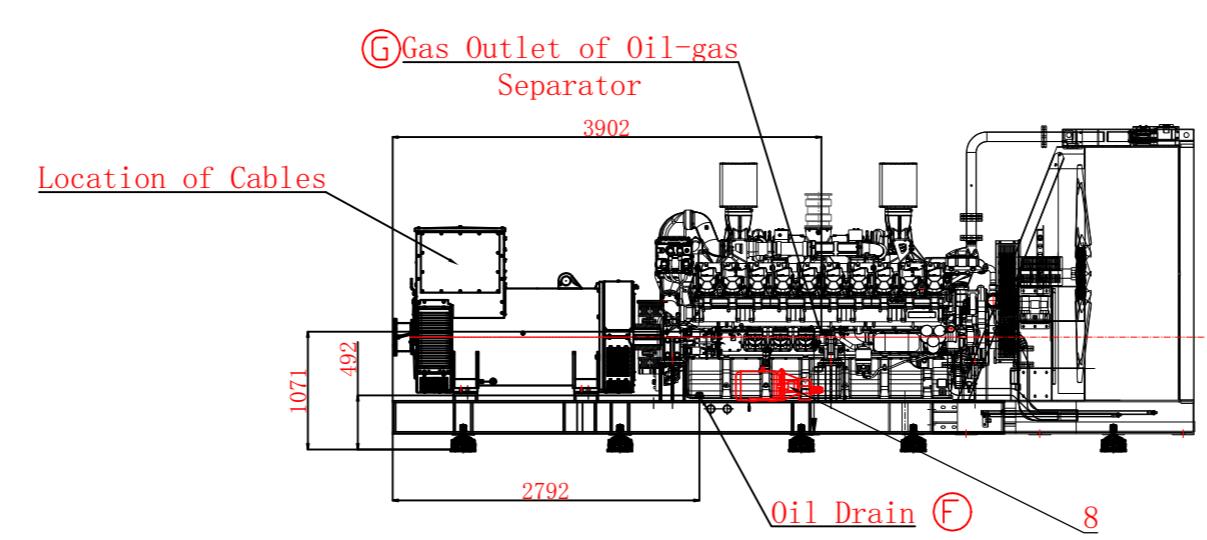
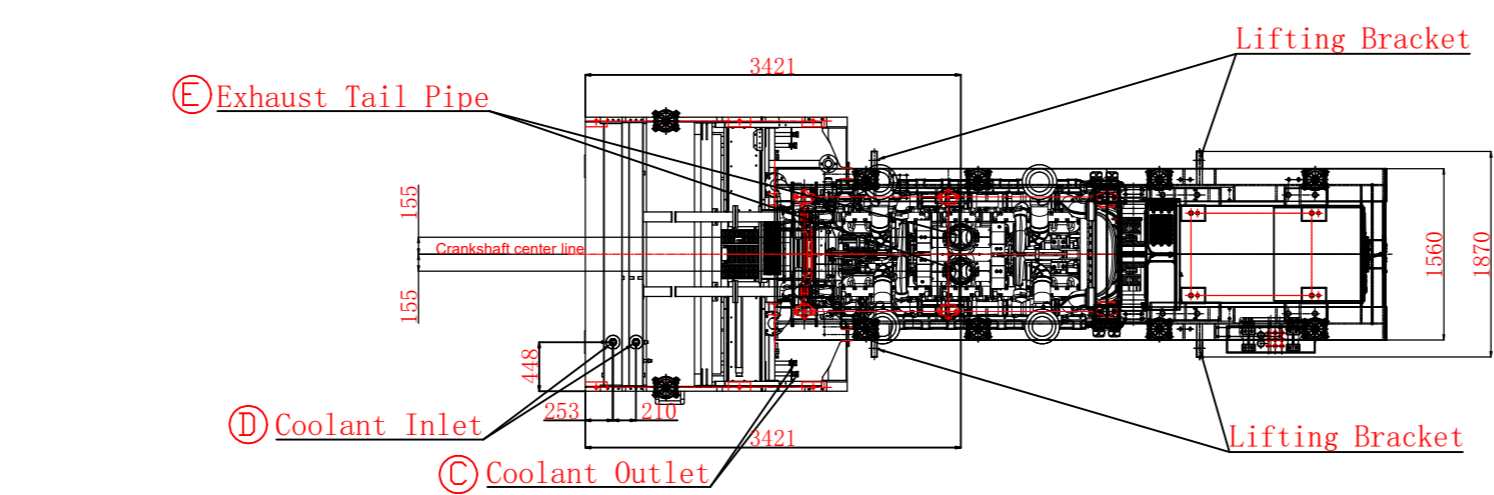
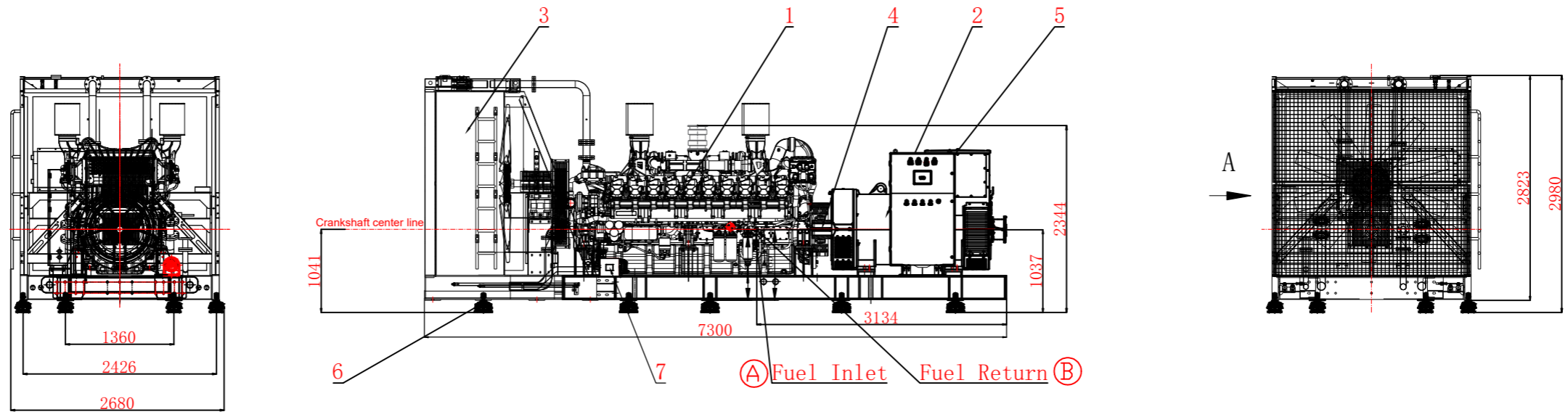
#### DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529  
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

## COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF LOAD SHARE APPLICATIONS







**NOTICE**

- 1.The appearance size and weight are for reference only.
- 2.The position of vibration isolator in the figure is only schematic. Please consult in advance for detailed data.
- 3.This GA drawing is applicable to 400V-50Hz Generator set.
- 4.The gas outlet of oil-gas separator suggests being placed on the air outlet side of the radiator.

- (G) Gas Outlet of Oil-gas Separator 5:1
- (F) Oil Drain 5:1
- (E) Exhaust Flange 5: 1
- (D) Coolant Inlet 5: 1
- (C) Coolant Outlet 5: 1
- (B) Fuel Return 5:1
- (A) Fuel Inlet 5: 1

Main External Interface Dimensions

Index	Name	Quan.	Comments
8	Lub. Oil Pre-supplying Pump	1	
7	Coolant heater	1	
6	Vibration isolator		
5	Control Panel	1	
4	Coupling	1	
3	Radiator	1	1002915425
2	Alternator	1	WHA 52.3 UL16
1	Engine	1	20M33G4D2/5 or 20M33G2500/5

Title	WPG2500B7 GA DRAWING
Drawing NO.	1015862611

2023/12/11	First Issue.	/	/	Designed by:	Zhu Mengnan	Scale :1/1	Page : 1/1
				Checked by:	Wu Wei	Format : A2	Weight:18600kg
				Approved by:	Zeng Liang		
Data	Description	Ref. Modification	Items	Projection Method			