

This document gives a complete list of technical data with some detailed explanations of the main systems, subsystems and performance of our generators, in order to support local sales documentation, tenders or even technical doubts.

While every effort has been made to ensure that the information in this manual is correct Atlas Copco does not assume responsibility for possible errors. Atlas Copco reserves the right to make changes without prior notice.



Standard Model Scope

Applying insights gained from industrial customers, rental companies, public utilities and other end users QAS generators are designed to withstand the most demanding on-site conditions and environments.

Considering their impressive performance at full capacity, the QAS line of generators includes excellent features for noise reduction and environmental protection.

QAS generators are purpose built for quick, easy and safe transport and on-site handling. Built to last, a QAS generator will provide years of dependable service for your electrical power generation needs.

All members of the widely appreciated QAS family are intelligent multi-task units managing to power a wide range of electrical equipment in different applications.

Their superior component configuration offers a wide range of control modules, electrical settings and mechanical options, in order to guarantee superior quality at efficient operating costs.

Conceived for 100% prime power operation in the most severe outdoor conditions, ready to work in sensitive areas, QAS generators are designed and configured for safe operation with minimal downtime under any circumstance.

Features

- Carefully selected components, accurately developed and tested configuration
- Superior standard configuration and extensive option list
- 500 hours service interval and superior accessibility to all service points
- Compact and safe concept and sturdy design
- Designed and built to last

Benefits

- Accurate and stable power regardless of the conditions
- Ability to power a wide range of applications
- Service efficiency: increased up-time
- Increased transport efficiency
- Superior resale value / longer life time

Manufacturing and Environmental Standards

The QAS range is manufactured following stringent ISO 9001 regulations, and by a fully implemented Environmental Management System fulfilling ISO 14001 requirements.

Attention has been given to ensure minimum negative impact to the environment. The QAS range complies with the latest noise emission directives.

Declaration of Conformity

Our QAS EC falls under the provisions of the article 12.2 of the EC Directive 2005/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with, the relevant Essential Health and Safety Requirements of this directive:

MACHINERY SAFETY (2006/42/EC): EN ISO 12100-1, EN ISO 12100-2, UNE EN 12601

ELECTROMAGNETIC COMPATIBILITY (2004/108/EC): EN 61000-6-5, EN 61000-6-4

LOW VOLTAGE EQUIPMENT (2006/95/EC): EN 60034, EN60204-1, EN 60439

OUTDOOR NOISE EMISSION (2000/14/EC): ISO 3744

ISO 8528: QAS generators are design to comply with ISO 8528 regulation



1. Performance Data

Generator		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
Rated speed	rpm	1500	1800	1500	1800
Rated power factor (lagging)		0,8	0,8	0,8	0,8
Rated Prime Power, PRP	kVA	500	571	500	571
	kW	400,0	456,8	400,0	456,8
Limited Time Power, ESP (Stand-by)	kVA	550,0	628,1	550,0	628,1
	kW	440	502,5	440	502,5
Continuous Operation Power, COP (Continuous)	kVA	350,0	399,7	350,0	399,7
	kW	280,0	319,8	280,0	319,8
Rated voltage (3ph. line to line)	V	400	480	400	480
Rated voltage (1ph. line to neutral)	V	230	277	230	277
Rated current 3ph. (PRP)	A	721,7	686,8	721,7	686,8
Rated current 3ph. (ESP)	A	793,9	755,5	793,9	755,5
Maximum sound power level (LWA) complies with 2000/14/EC	dB(A)	97	100	97	100
Maximum sound pressure level (LPA) at 7 m	dB(A)	69	72	69	72
Coupling engine/alternator		Direct		Direct	
Capacity fuel tank (total)	l	970		970	
Fuel tank specifications		Metal		Metal	
Fuel Autonomy at full load (Considering full capacity)	h	9,5	8,2	10,1	8,3
Single step load acceptance (within G2, acc. ISO 8528-5:1993)	%	62	68	62	68
Frequency drop (lower than % isochronous)	%	≤0,25	≤0,25	≤0,25	≤0,25
Maxim oil consumption 100% load	l/h	0,1	0,12	0,1	0,12

Derating Table (%)

	0°C	5 °C	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C
0 m	100	100	100	100	100	100	100	100	100	90	80
500 m	100	100	100	100	100	100	100	100	100	90	80
1000 m	100	100	100	100	100	100	100	100	100	90	80
1500 m	100	100	100	100	100	100	95	95	95	90	80
2000 m	95	95	95	95	95	95	90	90	90	90	80
2500 m	90	90	90	90	90	90	85	85	85	NA	NA
3000 m	85	85	85	85	85	85	85	85	85	NA	NA
3500 m	80	80	80	80	80	80	80	NA	NA	NA	NA
4000 m	75	75	75	75	75	75	75	NA	NA	NA	NA

Limitations		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
Maximum ambient temperature	°C	50		50	
Altitude capability	m	4000		4000	
Relative air humidity maximum	%	85		85	
Minimum running temperature	°C	-15		-15	
Minimum running temperature, with coldstart equipment and opened breather*	°C	-25		-25	

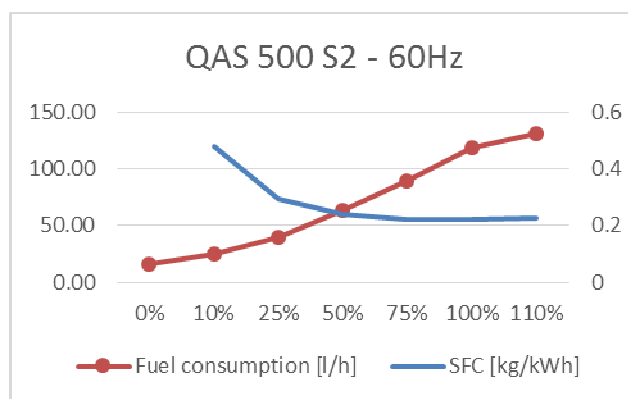
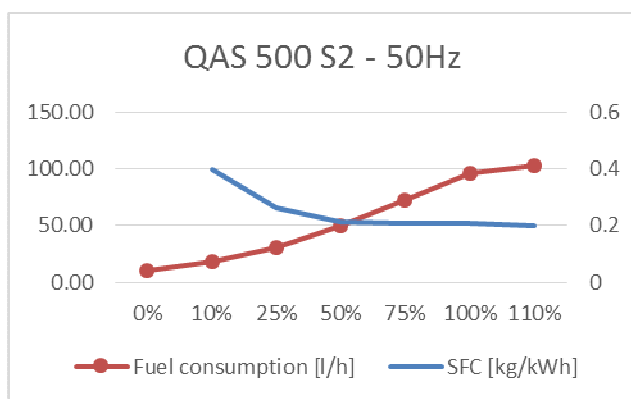
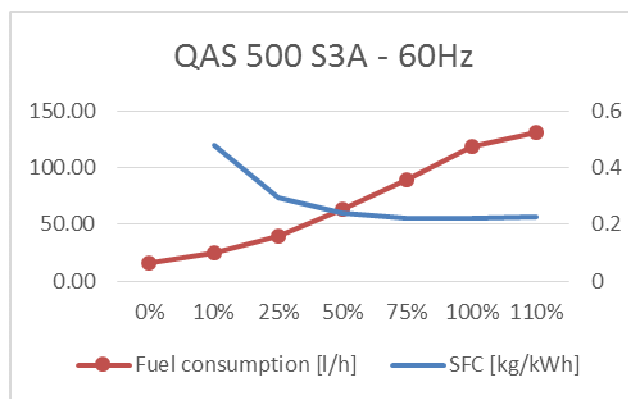
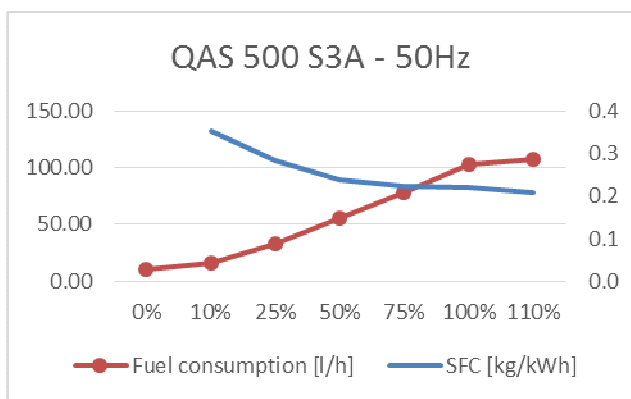
* on high humidity regions freezing may occur on the *breather pipes*

Application Data		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
Mode of operation		PRP		PRP	
Max. Inclination		+/- 30°		+/- 30°	
Operation		single / parallel		single / parallel	
Start-up and control mode		manual / auto		manual / auto	
Climatic exposure		open air		open air	



	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Fuel Consumption at*:					
0% Load	l/h	10,99	15,77	10,30	15,29
10% Load	l/h	16,39	25,31	18,45	23,36
25% Load	l/h	32,94	39,07	30,33	37,71
50% Load	l/h	55,63	63,02	49,74	61,84
75% Load	l/h	78,41	88,79	72,80	85,72
100% Load	l/h	102,60	118,58	96,26	116,71
110% Load	l/h	106,99	131,22	102,52	128,80
Specific Fuel Consumption at:					
0% Load	kg/kWh	NA	NA	NA	NA
10% Load	kg/kWh	0,352	0,476	0,397	0,440
25% Load	kg/kWh	0,283	0,294	0,261	0,284
50% Load	kg/kWh	0,239	0,237	0,214	0,233
75% Load	kg/kWh	0,225	0,223	0,209	0,215
100% Load	kg/kWh	0,221	0,223	0,207	0,220
110% Load	kg/kWh	0,209	0,225	0,200	0,220

*Diesel fuel type No. 2 diesel or a fuel corresponding to ASTM D2. Density: 0,86 kg/l



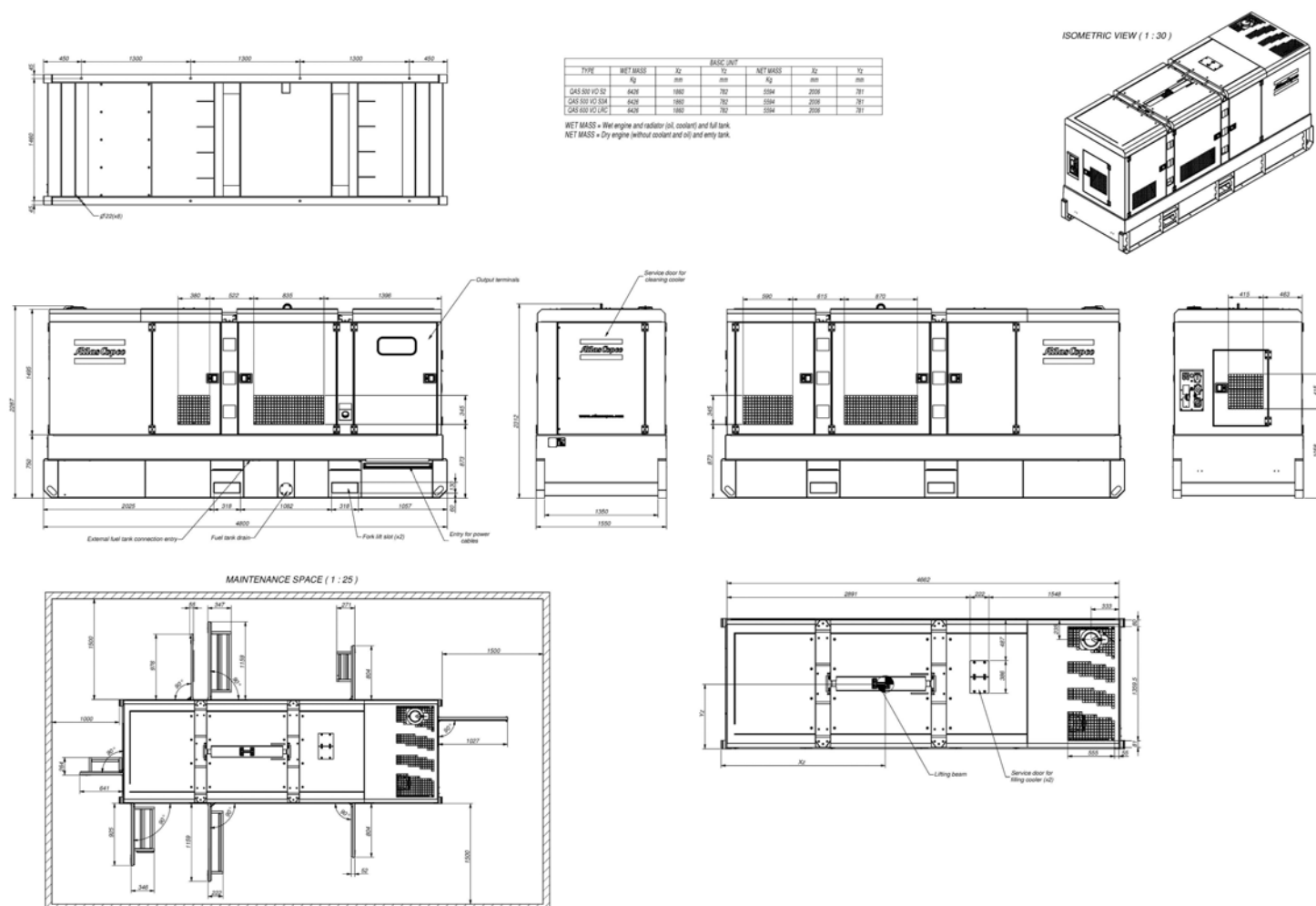
(Reference conditions at 25°C Air Inlet Temperature, 60% Relative Humidity, 1bar Absolute inlet pressure, for different conditions or limitations contact Atlas Copco technical support).



2. Box

	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Dimensions (L x W x H)	m	4,8 x 1,55 x 2,29		4,8 x 1,55 x 2,29	
Weight					
Net mass	Kg	5594		5594	
Wet mass	Kg	6426		6426	
Capacity of spillage free frame	l	1156,1		1156,1	
Dimensions Long autonomy Fuel tank		NA		NA	
Weight					
Net mass	Kg				
Wet mass	Kg				
Foam silencer					
Thickness	mm	50		50	
Temperature	°C	Min -30 Max 120		Min -30 Max 120	

Our canopies are made from galvanized steel and painted with powder coating paint. To improve the protection in the most exposed parts as frame and lifting beam, it is also primed with a special paint before coating.



3. Engine

	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
General					
Manufacturer		Volvo		Volvo	
Model		TAD1651 GE		TAD1641 GE	
Standard		ISO 3046 / ISO 8528-2		ISO 3046 / ISO 8528-2	
Number of cylinders	u.	6		6	
Configuration		6 in line		6 in line	
Aspiration		Turbocharged		Turbocharged	
Speed governor		Volvo Penta EMS-2		Volvo Penta EMS-2	
Bore	mm	144		144	
Stroke	mm	165		165	
Electrical system (DC)	V	24		24	
Compression ratio		16,5:1		16,5:1	
Displacement (swept volume)	l	16,12		16,12	
Piston speed	m/s	8,3	9,9	8,3	9,9
Combustion system		Direct injection		Direct injection	
Charged air cooling system		Intercooled		Intercooled	
Maximum permissible load factor of PRP during 24h	%	70		70	
Lubrication system					
Type		PAROIL E (Mineral)		PAROIL E (Mineral)	
Capacity of oil system (including filters + sump)	l	48		48	
Oil pressure at rated speed	kPa	300 - 650		300 - 650	
Maximum Lubrication oil temperature	°C	130		130	
Air intake system					
Air consumption 25°C (PRP)	m³/min	30	41	35,5	44
Air consumption 25°C (ESP)	m³/min	32	42	38	45,8
Max allowable air intake restriction	kPa	5		5	
Air filter cleaning efficiency	%	99,85%		99,85%	
Air filter capacity	m³/min	18 - 25		18 - 25	
Cooling system					
Coolant		Parcool		Parcool	
Capacity of engine	l	33		33	
Total capacity (radiator, hoses...)	l	60		60	
Fan power consumption at nominal speed	kW	11	19	11	19
Fan material		Plastic		Plastic	
Coolant flow	l/s	6.4	7.7	6.4	7.7
Air mass flow (40°C)	m³/s	5,4	6,8	4,2	5
(60°C)	m³/s	8,6	10,7	8,4	10,3
Fuel filter					
		Water Separator		Water Separator	
Max pressure	bar	1,8		1,8	
Temperature	°C	-40 to 121		-40 to 121	
Volume	l	2,6		2,6	
Flow Rate	l/h	341		341	
Emission compliance					
		EU STAGE 3A	EU STAGE 3A	EU STAGE 2	EU STAGE 2
No X + HC	g/kWh	3,49 + 0,135	5,63 + 0,153	5,34 + 0,12	5,19 + 0,16
CO	g/kWh	0,77	0,39	1,15	0,69
PM	g/kWh	0,136	0,073	0,086	0,096
SO2	g/kWh	NA	NA	NA	NA
CO2 (at optimal working point)	%	8,25	7,46	7,74	6,94

*These values are extracted from official engine datasheet.



4. Alternator

		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
General					
Manufacturer		Leroy Somer		Leroy Somer	
Model		LSA 47.2 M7		LSA 47.2 M7	
Standard		IEC 34-1 / ISO 8528-3		IEC 34-1 / ISO 8528-3	
Rated net power (ESP: 50Hz 27°C / 60 Hz 40°C)	kVA	570	680	570	680
Number of bearings		1		1	
Number of wires		12		12	
Voltage regulator accuracy		+/- 0.5%		+/- 0.5%	
Degree of protection / Insulation class		IP 23/H		IP 23/H	
Environment Protection		System 2 (Humid atmosphere)		System 2 (Humid atmosphere)	
Number of poles		4		4	
Number phases		3		3	
Over speed	rpm	2250		2250	
Air flow	m³/s	0,9	1,1	0,9	1,1
Total Harmonic Distortion THD		no load < 1,5%-linear load < 2%		no load < 1,5%-linear load < 2%	
Waveform: NEMA = TIF		< 50		< 50	
Xd Direct axis synchro reactance unsaturated	%	307	319	307	319
X'd Direct axis transient reactance saturated	%	15,9	16,5	15,9	16,5
X''d Direct axis subtransient reactance saturated	%	11,1	11,6	11,1	11,6
Excitation system		PMG		PMG	
Sustained short-circuit current	%	300% (3x In)		300% (3x In)	
Time sustained short-circuit current	s	10		10	
AVR					
Model		R 450 M		R 450 M	
Sensing		1 phase		1 phase	
Voltage regulation	%	±0.5		±0.5	
Voltage sensing	V	≤530		≤530	

The Leroy Somer LSA alternators are designed for heavy duty continuous applications:

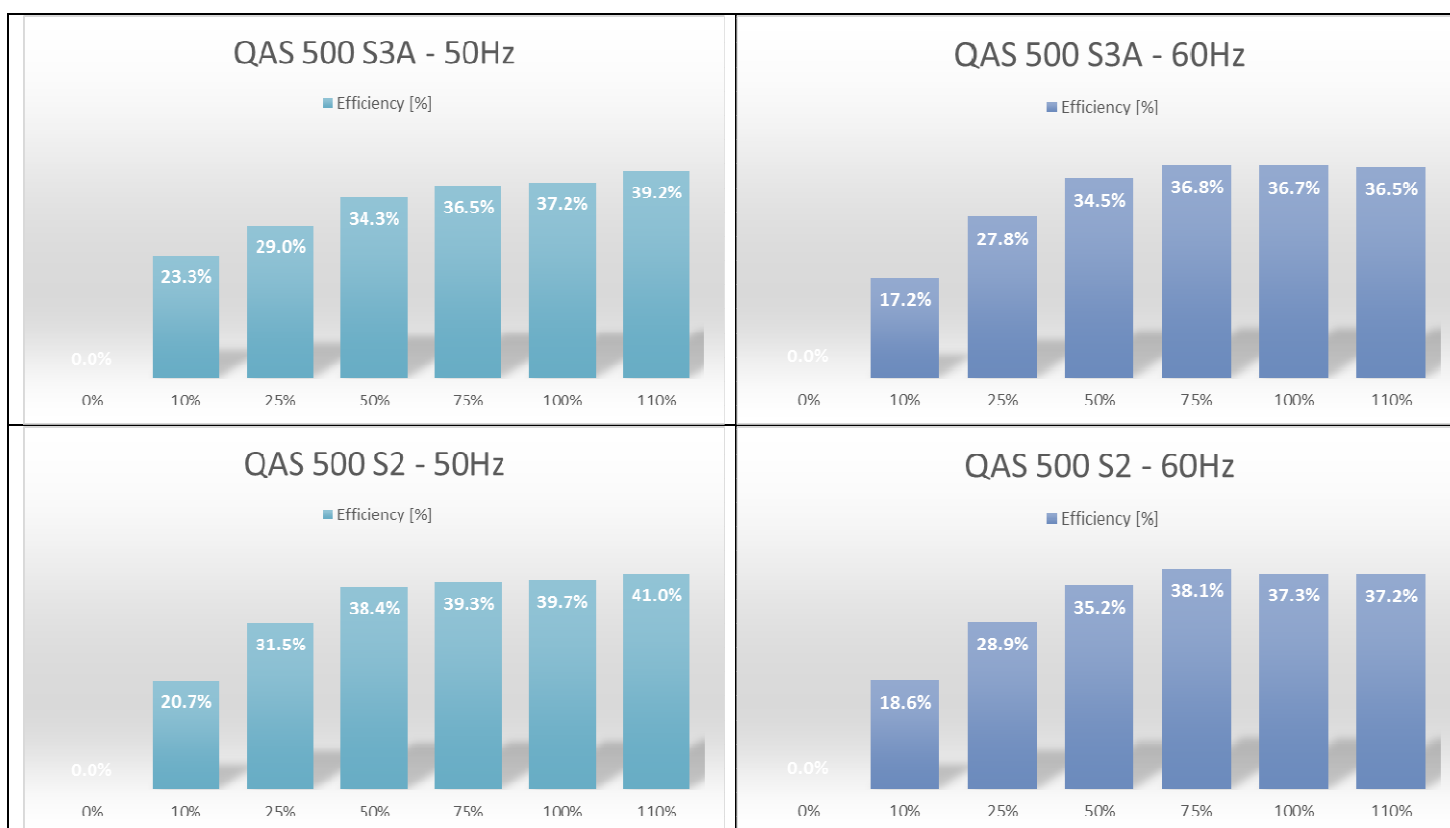
- System 2 protection (relative humidity >95%) for tropical environment (except coastal areas). With high performance dielectric varnish and reinforced over-coating on main stator and rotor
- 4 pole brushless design with single bearing, Class H insulation and IP23 rating
- Voltage regulation +/- 0.5%
- Full Load acceptance of prime power rating
- Standard excitation system is SHUNT (Self excited). As option (check Electrical options) you can have additional excitation system as:
 - PMG
 - Auxiliary winding



5. Generator

	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Energy Balance					
Engine					
Heat rejection to exhaust	kW	317	371	326	373
Heat rejection to coolant	kW	193	202	170	212
Heat rejection to radiation	kW	21	25	18	22
Alternator					
Efficiency at full load	%	94,50%		94,50%	

Genset Efficiency



Exhaust System					
Flow (PRP)	m ³ /min	76	94	85	110,6
Flow (ESP)	m ³ /min	82	105	92	110,4
Exhaust gas temperature "after turbine" (PRP)	°C	492	437	443	436
Exhaust gas temperature "after turbine" (ESP)	°C	523	487	455	479
Max. Backpressure (Without / with spark arrestor)	kPa	8 / TBD	8 / TBD	10 / TBD	10 / TBD
Output pipe diameter	mm	150		150	
Battery					
Quantity		2		2	
Voltage	V	12		12	
Capacity	Ah	143		143	
Connection		Serie		Serie	
Dimensions (L x W x H)	mm	514x218x210		514x218x210	



	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Cold cranking current	A(EN) / A(DIN)	1000 / 540		1000 / 540	
Starting power	kW	7,5		7,5	
Weight (wet)	kg	43,4		43,4	
Sensor					
Oil (temp, pressure & level)		STD		STD	
Coolant (temp & level)		STD		STD	
Fuel (feed pressure)		STD		STD	
Charge air (temp & pressure)		STD		STD	
Fuel Level		STD		STD	
Water in Fuel		STD		STD	
Generator Voltage		STD		STD	
Mains Voltage		OP		OP	
Generator Current transformer		STD		STD	
Transformer Maintenance Changeover feedback		OP		OP	
Reply: Mains CB opened/closed		OP		OP	
Reply: Generator CB opened/closed		OP		OP	
Air Inlet Pressure Switch		STD		STD	
Low Coolant Level Shutdown/Warning		STD		STD	

6. Power Output

	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Circuit Breaker					
Brand		Schneider		Schneider	
Model		NS800N		NS800N	
Poles		4		4	
Rated current (In)	A	320-800		320-800	
Thermal release, regulated (It)	A	720		720	
CB tripping point	A	721,7	686,8	721,7	686,8
Overload protection (Ir)	A	4 x In		4 x In	
Fault current protection, residual current release (I _{dn})	A	0,03-30		0,03-30	
Motor Driven DC voltage	V	24		24	
Motorized		Standard with Qc4003		STD with Qc4003	
Life operating cycles without maintenance		10000		10000	
Terminal Board					
Bolts diameter	mm	14		14	
Terminal type		Platen		Platen	
Sockets Available*					
Sockets 1 Phase					
PIN Domestic (1x) 2p + E 16 A/230 V		OP		OP	
RIN Domestic (1x) 2p + E 16 A/230 V		OP		OP	
CE Domestic (1x) 2p + E 16 A/230 V		OP		OP	
Sockets 3 Phase					
		OP		OP	
Configuration Remarks**		CEE form 3p + N + PE 16 A/400 V CEE form 3p + N + PE 32 A/400 V CEE form 3p + N + PE 63 A/400 V CEE form 3p + N + PE 125 A/400 V		CEE form 3p + N + PE 16 A/400 V CEE form 3p + N + PE 32 A/400 V CEE form 3p + N + PE 63 A/400 V CEE form 3p + N + PE 125 A/400 V	

*Sockets are enable for 50Hz and disable for 60Hz

**For a different configuration/scope contact Atlas Copco support

STD – Standard; OP – Option; NA – Not Available



7. Options

		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
	rpm				
Mechanical Options					
Special Equipment					
Spark arrestor			OP		OP
Material			S235 JR G2		S235 JR G2
Inlet shutdown valve			OP		OP
Design pressure		bar	13.8		13.8
Max/Min Temperature		°C	-25 to 80		-25 to 80

Spark arrestor is a device that is designed to trap any exhaust particles or combustible materials, such as sparks or other flaming debris, from escaping into hazardous areas where they might cause fires. Exhaust particles are centrifuged in the spark arrestor, then collected and stored in a reservoir until emptied by an operator. An air shut-off valve serves to stop the engine by closing the air intake once the controller detects an over speed in the engine.

		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Fuel System					
External fuel tank connection			STD		STD
Material			Brass 0011 5204 03		Brass 0011 5204 03
Test pressure		bar	1		1
Overpressure		bar	2		2
Open pressure		bar	1±0,1		1±0,1
Max/Min Temperature		°C	-30 to +80		-30 to +80
External fuel tank connection with quick coupling			OP		OP

The EFT enable the generator to run for long periods of time on an external fuel supply without having to refuel. We can also provide quick couplings to enable easy and fast connection to the fuel tank

		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
AFT Automatic fuel transfer			NA		NA
Additional fuel filter			OP		OP
Design pressure		bar	1,2		1,2
Test pressure		bar	1,8		1,8
Volume		l	2,6		2,6
Max/Min Temperature		°C	-40 to 121		-40 to 121
Max flow rate		g/h	90		90
Skid fuel tank (long autonomy)			NA		NA
Capacity		l			
Material					
Fuel level sender (*Changes automatically for different fuel tank)			STD		STD
Oil level maintainer			NA		NA
Capacity of oil tank			-		-
Cold start synthetic first oil filling			STD		STD
Type			PAROIL Extra		PAROIL Extra
Temperature (min / max)		°C	-15 to 40°C		-15 to 40°C
Density (Ambient temperature)		g / cc	0,86 (15°C)		0,86 (15°C)
Cold flow			Antifreeze fuel additives in 0,2% composition		



	rpm	QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
Mechanical Options					
Undercarriage option					
Undercarriage adjustable towbar with brakes			NA		NA
Number of axles					
Permissible mass on each axle	kg				
Maximum speed	km/h				
Dimensions (L x W x H)	mm				
Brake connections					
Wheel	r				
Loose ball coupling			NA		NA
Adapter 24V road signalization			NA		NA
Towing eye					
Towing eye DIN			NA		NA
Towing eye NATO			NA		NA
Towing eye BALL coupling			NA		NA
Towing eye ITA			NA		NA
Towing eye AFR			NA		NA

Depending on the size, units have a two-wheeled, single axle trailer, or a double axel with 4 wheels. Both types of trailer have an adjustable towbar and road signalization.

Special options					
Special color undercarriage			NA		NA
Special color wheels			NA		NA
Special color canopy			OP		OP
Special color frame			OP		OP
Witness test			OP		OP

Guided and face to face testing of the machine. Including Transient test and Heat Run Test.

Electrical Options

		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
Coolant Heater					
Electric driven coolant heater			OP		OP
Voltage	V		240		240
Power	kW		2		2
Current	A		8.3		8.3
Thermostat Range	°C		38 / 49		38 / 49
Fuel driven coolant heater			OP		OP
Electrical power	W		12		12
Rated voltage	V		24		24
Operating pressure	bar		2,5		2,5
Flow rate at 0,1 bar	l/h		950		950

Its main mission is heat the coolant so that the temperature of the engine is always high enough to start straight away, even in temperatures as low as minus 25 degrees Celsius. Not for all models but a fuel powered version is available, which is ideal for remote areas without mains supply.

Frequency and Voltage configuration					
Frequency/Voltage/Phases		50 Hz / 400V / 3ph		NA	
Dual frequency switch		50Hz-60Hz		STD	
*If the unit is dual frequency, DV and MV versions are NA					
Dedicated frequency		50 Hz	230V	1ph	
Dual voltage		50 Hz	400 V	3ph - 230V	3ph (Norway)
Dual voltage		50 Hz	400	3ph - 230V	1ph



		QAS 500 Vod Stage 3A		QAS 500 Vod Stage 2	
		1500	1800	1500	1800
	rpm				
Electrical Options					
Battery					
Battery charger*		OP		OP	
Temperature	°C	-20 to 70		-20 to 70	
Input frequency	Hz	47.....63		47.....63	
Output voltage	V	24		24	
Output current	A	10		10	
Output power	W	240		240	
Dimensions (L x W x H)	mm	205 x 123 x 86		205 x 123 x 86	
<i>Recommendable with Qc2103 and Qc4003</i>					
Battery cut off switch		STD		STD	
Operations	V / A	24 / 1500		24 / 1500	

Battery charger is necessary for stand-by applications because the controller is always on, ready to start at any time. Battery cut off switch allows the battery to be disconnected when storing the unit, thus preventing the battery from becoming drained.

		STD	STD
Electronic speed regulator (Governor)			
Model		Engine Management System (EMS 2)	Engine Management System (EMS 2)
Connection to engine		CAN SAE J1939	CAN SAE J1939
Sensors/Switch	°C and kPa	Lubrication, cooling and fuel system	Lubrication, cooling and fuel system

Earth Protection			
Neutral TNS		STD	STD
Neutral EDF (TT)		OP	OP
Neutral IT		NA	NA
Earth leakage detection Relay (ELR)		STD	STD
	mA	30	30
Insulation Monitoring Relay		OP	OP
Earth PIN		STD	STD
Length	mm	950	950

Alternator excitation system					
Permanent magnet (PMG)		STD		STD	
AVR		-		-	
Sustained short-circuit current	%	300% (3x In)		300% (3x In)	
Time sustained short-circuit current	s	10		10	
Operating temperature	°C	-20°C to +70°C		-20°C to +70°C	
No load voltage	V	125	150	125	150
Stator Phase/Phase resistance (20°C)	Ω	2,1		2,1	
Auxiliary winding		NA		NA	
AVR					
Sustained short-circuit current	%				
Time sustained short-circuit current	s				

The PMG or Permanent Magnet Generator is a separate device to power the AVR and is ideal for motor starting and distorted loads as provides the generator 3 times its nominal current during 10 seconds. Auxiliary winding system is an extra winding layer in the alternator that provides same benefits than the PMG.

Controllers			
Qc1103		STD	STD
Qc2103		OP	OP
Qc4003*		OP	OP

*with Qc4003+ PMS Atlas Copco recommends: Battery charger + Coolant heater

*Just 1 ph socket available

*Qc4003 includes always communication cables and needed adaptors

Qc1103: is the controller dedicated for island operation or remote start

Qc2103: has in addition the possibility of detect a mains failure

Qc4003: is the high spec controller prepared to work synchronized with several units (IPP) and/or the mains



CONTROLLERS KEY FEATURES QC 1103 & 2103 CONTROLLERS

Auto start or automatic mains failure applications

Monitoring of electronic or non-electronic engines

J1939 as standard

Gen-set and busbar control & protection

Improved inputs/outputs

Up to 11 digital inputs, 5 analogue inputs and 8 relay outputs

Modbus communication rs485

Configurable for other applications

PARUS configurable

Graphical display

Multi-language



CONTROLLERS KEY FEATURES QC 4003 CONTROLLER

Controllers key features Qc 4003

Paralleling between generators and mains power supply

Full engine monitoring

CAN communication J1939

Gen-set and busbar control & protection

Multiple configurable inputs/outputs

Modbus communication RTU/RS485

Easy software with m-logic

programation

PARUS 3

PARALLELING APPLICATIONS

Load Take Over, Mains Export/Import, AMF, Peak Shaving, Transformer Maintenance, Fix power and PMS (CAN)

