# QES 50 | 220 V | 60Hz

## Technical specifications

**Diesel Generator Set**

Frequency: 60Hz

# QES 50

Voltage: 220 V

Frequency: 60Hz

Genset Image for illustration purposes only

### TECHNICAL INFORMATION

| | | |
|---|---|---|
| **Standby Power (ESP)** | kVA | 52,6 |
| | kW | 42,1 |
| **Prime Power (PRP)** | kVA | 48,4 |
| | kW | 38,7 |
| **Rated current 3ph (PRP)** | A | 127 |
| **Mechanical structure** | | Soundproofed |
| **Engine** | | KUBOTA V3800DI-T-E2BG |
| **Alternator** | | ATLASCOPCO ACA180G |
| **Control card** | | DEEP SEA 4620 |
| **Measures (L x W x H) mm 2.220** | mm | 2.225 x 0.970 x 1.185 |
| **Empty weight** | kg | 905 |
| **Fuel tank** | L | 116 |
| **Acoustic pressure, LpA** | dB(A) @ 7m | 69 |
| **Acoustic power LwA** | dB(A) | 92 |

| Voltages | Prime Power (PRP) | | | Standby Power (ESP) | |
|---|---|---|---|---|---|
| | (kVA) | (kW) | (A) | (kVA) | (kW) |
| **208** | 47,2 | 37,8 | 131,8 | 50,4 | 40,3 |
| **220** | **48,4** | **38,7** | **127** | 52,6 | 42,1 |
| **380 / 220** | 47,4 | 37,9 | 72,2 | 51,3 | 41,1 |
| **440 / 254** | 48 | 38,4 | 53,5 | 52,6 | 42,1 |
| **480 / 277** | 48,2 | 38,6 | 58,2 | 52,4 | 41,9 |

**Notes:**

PRIME POWER: Electrical power data available at a variable load without limits of hours per year. An overload of 10 % is allowed for 1 hour of every 12. In accordance with ISO 8528/1 (2005) – PRP

STANDBY POWER: Electrical power data at variable load in an emergency in accordance with standard ISO 8528/1 (2005) – ESP. Overloads of emergency power are not allowed.

The standard reference conditions are: 25 ºC, 100 kPa and 30% relative humidity. Diesel density: 0.835 g/cm3.

## General description

Specifically developed for the industrial applications, this soundproof generator set is easy to use and straightforward to maintain. The available features & options are designed to fully meet the requirements of all industrial applications. The generator set will automatically start on mains failure and cool down and stop as soon as the mains come back. The generator set also controls the load transfer between mains (utility) and generator set. It can also be start-up by means of an external signal.
It's your solution for Predictable Power.

## Engine

3800DI-T-E2BG Kubota diesel 4 stroke engine, with a turbo, with direct injection and electronic regulation of the engine speed.

| | | | |
|---|---|---|---|
| **Engine brand** | KUBOTA | **Engine Capacity (l)** | 3,32 |
| **Model** | 3800DI-T-E2BG | **Bore (mm)** | 100 |
| **R.P.M.** | 1800 | **Stroke (mm)** | 120 |
| **Fuel** | Diesel | **Compression ratio** | 19:1 |
| **No. of cylinders** | 4 L | **Type of regulation** | Electronic |

## Cooling System

Cooling of the sleeves using cooling fluid comprised of water and glycol at 50% in a closed circuit driven by the engine pump.
The circuit is completed with a blower fan driven by the engine, radiator, expansion tank, cooling fluid purge system towards the outside of the bedplate and protections of all the running surfaces.

| | | | |
|---|---|---|---|
| **Cooling type** | Water | **Limit ambient temperature (ºc)** | 40 |
| **Coolant capacity (l)** | 9 | | |

Coolant heater with heating element is available as an option. An adjustable thermostat is included to maintain the temperature at optimum range and facilitate the starting of the engine.

| | | |
|---|---|---|
| **Coolant heater power (W)** | 1 x 1000W | |

### *Lubrication System*

The lubrication system of this diesel engine comprises the oil pan, oil filter, oil switch and gear oil pump driven by the engine. All the components are original from the engine manufacturer.
It can be completed by an optional manual oil sump drain pump.

| | | |
|---|---|---|
| **Oil capacity (l)** | 13,2 | |

### *Air intake system*

Air intake system for combustion with filtering device and filter change indicator; originals from the engine manufacturer. Intake air cooling after the turbo by means of an air/air exchanger.

| | | |
|---|---|---|
| **Intake air flow ($m^3$/min)** | 3,6 | |

## Exhaust System

The exhaust system consists of pipes, bellow, interior and exterior aluminized steel exhaust silencer that is highly resistant to corrosion, rain cap and hot part protections.

| | | | |
|---|---|---|---|
| **Tª gas emission (ºC)** | TBD | **Engine Capacity (c.c.)** | 3,8 |
| **Gas flow (m3/min)** | 7,96 | **Outlet diameter (")** | |
| **Number of exhaust** | 1 | | |

## *Start System*

Start system that uses an electrical motor, battery and battery charge alternator that is driven by the engine itself.
The start motor and the battery charge alternator are originals from the engine manufacturer.

| | | | |
|---|---|---|---|
| **Starter voltage system (V)** | 12 | **Battery type** | 1 x 12V 100Ah |

## *Fuel supply system*

The fuel system consists of a fuel tank, feed pump, water separator fuel filter including 30 microns filtering element, injection pump and injection nozzles.
The fuel tank is made from plastic to prevent rust and includes a filling connection with cap and key, a cleaning hatch and draining plug for easier maintenance. The fuel level is controlled thanks to a fuel level sensor with an analogue gauge mounted in the control cubicle.

| | | | |
|---|---|---|---|
| **Fuel tank capacity (L)** | 116 | | |

## *Fuel consumption panel*

(range according to the standard configuration)

| Load | Prime Power (PRP) | | Standby Power (ESP) | |
|---|---|---|---|---|
| | (l/h) | Range (h) | (l/h) | Range (h) |
| **0%** | 2,5 | 46 | 3,0 | 39 |
| **50%** | 6,3 | 18 | 8,2 | 14 |
| **75%** | 9,2 | 13 | 11,8 | 10 |
| **100%** | 11,8 | 10 | 15,3 | 8 |

## Alternator

Atlas Copco alternator with 4 poles, with a lifetime lasting greased bearing, H class insulation, without brushes, 2/3 pitch and AVR (Automatic Voltage Regulator)

Protection of all the windings by means of 2-part high quality polyester resin impregnation. The stator windings receive a double impregnation. Final finish with a coat of EG43 varnish.

Shunt excitation system that provides overload of 1,6 times the nominal current. The auxiliary winding as optional with overload capacity 3 times the nominal current for 20 s.

Joining of engine and alternator through flexible disc coupling.

**Regulations:**

- IEC 34-1
- GB 755
- EN 60034
- VDE 0530
- BS 5000
- NEMA MG1-22
- ISO 8528:3

**Low wave distribution:**

- THC < 5%
- THD < 5%
- THF (IEC) < 2%
- TIF (NEMA) < 50

Incorporates electromagnetic emissions suppressor in accordance with standard VDE 0875, class K.

| | | | |
|---|---|---|---|
| **Engine brand** | Atlas Copco | **Voltage Stability** | ±1% |
| **Model** | ACA180G | **Performance at 75% p.f. 0.8 (%)** | 88 |
| **Alternator Power (kVA)** | 42,5 | **Performance at 100% p.f. 0.8 (%)** | 86 |
| **Number of wires** | 12 | **Direct subtransient reactance X"d (%)** | 11 |
| **IP Alternator** | IP 23 | **Subtransient time constant, T"d (ms)** | 16 |
| **Excitation system** | SHUNT | **Zero sequence reactance, Xo (%)** | 3 |
| **AVR model** | SX460 | **Short-circuit ratio, Kcc** | 0,49 |

## Bed plate

The engine-alternator set is coupled to the bedplate by means of anti-vibration shock mounts that absorb almost all the vibrations.
The base frame is able to hold 100% of the liquids of the genset, reducing any potential environmental impact. It has a drainage plug.

## Sound proofed canopy

The canopy includes an external access to the lifting beam and push to close latches with key. The lifting beam is available as an option.
It is lined inside with a noise-absorbing material of polyurethane foam with a 30 mm thick waterproof protector veil with a density of 25 kg/m3.
It also has an emergency shutdown pushbutton that is accessible from the outside.

## Electric panel

Easily accessed control cubicle integrated in the generator set with digital controller providing advanced engine monitoring and protection features. Performance and maintenance requirements can also be observed. The cubicle includes multi-poles thermal-magnetic protection circuit breaker against overloads and short-circuits.
Has a circuit breaker, manually actuated, with thermal-magnetic protection against overloads and short-circuits.

| | | | |
|---|---|---|---|
| **Circuit Breaker rated current (A)** | 140A 4P R | **Battery charger** | DSE 9150 - 12V 3A |

Has a DEEP SEA battery charge maintainer, designed to be permanently connected to the battery and maintains it charged to its maximum capacity.
Has no moving parts. The charger switches to floating mode when the charge is complete

## Control Card

DEEP SEA control plate, DSE 4510 (Qc1112) monitors the generator set start-up and shutdown process as well as the proper operation of all the components. The generator set can also be start-up by means of an external signal. It also starts-up the generator set using an external signal.

Also, control plate DSE 4620 checks a large number of parameters of the generator set which allows it to display information, statuses and alarms. If required, it will shutdown the generator set: Due to high coolant fluid temperature, low oil pressure, low coolant fluid level, etc.

Includes a LCD screen with lighting, 2 navigation menubuttons, independent operational mode buttons, and alarms and status indicating LEDs.
Communications via USB, and Completely configurable using a PC in Windows environment and free Scada type software in real time.

Includes reading and displaying of parameters with RMS values, real time clock, events history log up to 15 events and programming of alarms, events, start-ups and shutdowns.

Operating modes: START-UP, SHUTDOWN, AUTO, MANUAL AND TEST.

### Generator

- Generator voltage (L-N)
- Generator voltage (L-L)
- Generator frequency
- Generator current
- kW
- kVA
- kWh
- kVAh
- Power factor

### Engine

- Turn speed
- Cooling fluid temperature
- Oil pressure
- Hour meter
- Battery voltage
- No. of start-ups
- Fuel level

### Protections

- Start-up fault (generator set shutdown)
- High coolant temperature (alarm and generator set shutdown)
- Low oil pressure (alarm and generator set shutdown)
- Low fuel level (alarm)
- Low cooling fluid level (generator set shutdown)
- Overload (alarm and generator set shutdown)
- Battery voltage high (alarm)
- Battery voltage low (alarm)
- Battery charge alternator failure (alarm)
- Generator low frequency (alarm and shutdown)
- Generator high frequency (alarm and shutdown)
- Generator low voltage (alarm and shutdown)
- Generator high voltage (alarm and shutdown)
- External emergency shutdown (shutdown)
- Engine overspeed (shutdown)
- Maintenance interval (alarm)

## PTB

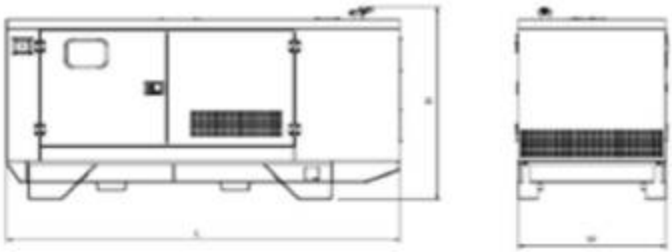
Optional Cabinet for switching between the grid and the generator set by means of Schneider brand contactors with an integrated mechanical and electrical interlocking device.

Controlled by free voltage contacts and based on contactors technology, this PTB allow the load transference between two sources (mains-generator). Mechanical and electrical interlocking systems guarantee the safety of the transference..

| | | |
|---|---|---|
| **PTB** | PTB 4P 160A 160-333V L-N 50-60Hz | |

## Dimensions and weight

| Fuel Tank Capacity | 8h | 24h | 48h |
|---|---|---|---|
| **Lenght, L (mm)** | 2225 | 2225 | 2225 |
| **Width, A (mm)** | 970 | 970 | 970 |
| **Height, H (mm)** | 1185 | 1408 | 1741 |
| **Net Weight (kg)** | 896 | 1250 | 1300 |
| **Capacity Fuel Tank (l)** | 116 | 303 | 604 |



## Performance class

Execution class in accordance with ISO 8528/5 (2005) taking into account the behaviour of the generator set in a permanent mode of operation with different load levels, as well as in a temporary mode of operation due to shocks in the load.

| | | |
|---|---|---|
| **Performance class** | G2 | |

## Applicable international regulations:

- ISO 8528
- ISO 3046
- BS 5000
- IEC 60034