

## Model: P400D5

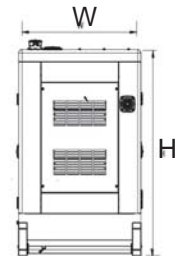
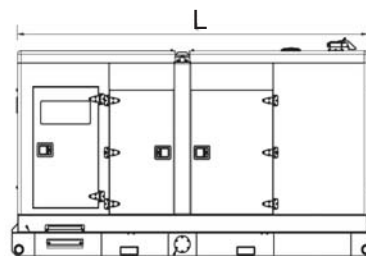
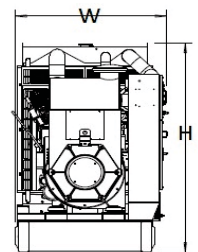
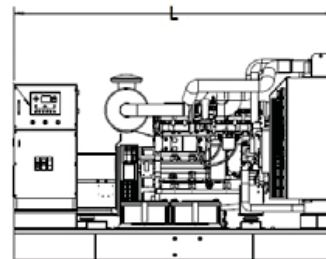
Powered by PERKINS

### Output Rating

| MODEL  |           | Power rating |            | Voltage available |          |          |
|--------|-----------|--------------|------------|-------------------|----------|----------|
|        |           | PRIME(1)     | STANDBY(2) |                   |          |          |
| P400D5 | 400V/50HZ | 280KW        | 320KW      | 380/220V          | 400/230V | 415/240V |
|        | PF:0.8    | 350KVA       | 400KVA     |                   |          |          |

### General Information

|                        |                  |    |
|------------------------|------------------|----|
| Model                  | P400D5           |    |
| Engine                 | 2206A-E13TAG2    |    |
| Speed control type     | Electronic       |    |
| Phase                  | 3                |    |
| Control System         | Digital          |    |
| System voltage         | 24V              |    |
| Frequency              | 50HZ             |    |
| Engine Speed(RPM)      | 1500             |    |
| Fuel Consumption (L/H) | Standby power(2) | 80 |
|                        | Prime Power(1)   | 71 |
|                        | 75% prime power  | 54 |
|                        | 50% prime power  | 37 |



### Dimension and Weight

| Dimension  | Open   | Silent |
|------------|--------|--------|
| Length (L) | 3180mm | 4350mm |
| Width (W)  | 1150mm | 1400mm |
| Height (H) | 1960mm | 2440mm |
| Net Weight | 3500KG | 4450KG |

AGG POWER gensets are compliant with EC mark which include the following directives:

- \* 2006/42/EC Machinery safety.
- \* 2006/95/EC Low voltage
- \* EN 60204-1: 2006+A1:2009, EN ISO 12100:2010, EN ISO 13849-1: 2008, EN 12601: 2010

#### (1) Prime Power (PRP):

According to ISO 8528-1:2005, Prime power is the maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operation conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer. The permissible average power output (Ppp) over 24h of operation shall not exceed 70% of the PRP.

#### (2) Standby Power (ESP):

According to ISO 8528-1:2005, standby power is the maximum power available during a variable electrical power sequence, under the stated operation conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200h of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output over 24h of operation shall not exceed 70% of the ESP.



## Engine Specification

### Basic technical data

Number of cylinders... 6  
 Cylinder arrangement... vertical in-line  
 Cycle... 4 stroke  
 Induction system... turbocharged, air-to-air charge cooling  
 Combustion system... direct injection diesel  
 Compression ratio... 16,3:1  
 Bore... 130 mm  
 Stroke... 157 mm  
 Cubic capacity... 12,5 litres  
 Direction of rotation... anticlockwise when viewed from flywheel  
 Firing order (number 1 cylinder furthest from flywheel) 1-5-3-6-2-4  
 Estimated total weight of Electropak (dry) ... 1478 kg  
 Estimated total weight of Electropak (wet) ... 1582 kg

### Lubrication system

Maximum total system oil capacity ... 40 litres  
 Minimum oil capacity in sump ... 32,5 litres  
 Maximum oil capacity in sump ... 38 litres  
 Maximum engine operating angles -  
 front up, front down, right side, left side ... 7 °

### Exhaust system

#### Maximum back pressure

-1800 rev/min ... 10,0 kPa  
 Exhaust outlet, internal diameter... 123 mm

### Electrical system

-type ... 24 Volt negative earth  
 Alternator type ... 22SI  
 -alternator voltage ... 24V

### Cooling system

#### Radiator

Face area ... 1,238 m<sup>2</sup>  
 Number of rows and materials ... 1 rows, aluminium  
 Matrix density and material ... 12 fins per inch, aluminium  
 Width of matrix ... 1048 mm  
 Height of matrix ... 1100 mm  
 Weight of radiator (dry) ... 132 kg  
 Pressure cap setting (min) ... 70 kPa

#### Charge cooler

Face area... 1,006 m<sup>2</sup>  
 Number of rows and materials ... 1 rows, aluminium  
 Matrix density and material ... 12 fins per inch, aluminium  
 Width of matrix ... 915 mm  
 Height of matrix ... 1100 mm

#### Coolant pump

Speed @ 1500 rev/min ... 2056 rev/min  
 Speed @ 1800 rev/min ... 2468 rev/min  
 Drive method... Gear

#### Coolant

Total system capacity ... 51,4 litres  
 Max. top tank temperature ... 104 °C  
 Temperature rise across engine ... 10 °C  
 Max. pressure in engine cooling circuit ... 70 kPa  
 Max. permissible external system resistance ... 30 kPa  
 Max. static pressure head on pump ... 30 kPa  
 Coolant flow (min) against 30 kPa restriction  
 @ 1500 rev/min ... 5,3 litres/sec  
 @ 1800 rev/min ... 6,7 litres/sec

### General installation

| Designation                                    | Units               | Prime               | Standby | Prime               | Standby |
|--|---------------------|---------------------|---------|---------------------|---------|
|  |                     | 50Hz @ 1500 rev/min |         | 60Hz @ 1800 rev/min |         |
| Gross engine power                             | kWb                 | 324,2               | 368,4   | 373,4               | 406,5   |
| Brake mean effective pressure                  | kPa                 | 2061                | 2355    | 1984                | 2171    |
| Combustion air flow (at rated speed)           | m <sup>3</sup> /min | 21,3                | 23,6    | 27,4                | 29,0    |
| Exhaust gas flow (Max.)                        | m <sup>3</sup> /min | 56,6                | 64,8    | 67,5                | 73,5    |
| Exhaust gas mass flow                          | kg/min              | 25,1                | 27,8    | 32,6                | 34,5    |
| Exhaust gas temperature (turbocharger outlet)  | °C                  | 630                 | 630     | 630                 | 660     |
| Boost pressure ratio                           |                     | 2,8                 | 3,2     | 3,1                 | 3,4     |
| Overall thermal efficiency (nett)              | %                   | 41,3                | 40,8    | 40,7                | 40,3    |
| Typical genset electrical output (0.8pf 25 °C) | kWe                 | 280                 | 320     | 320                 | 350     |
|  | kVA                 | 350                 | 400     | 400                 | 438     |
| Assumed alternator efficiency                  | %                   | 92                  |         | 92                  |         |
| <b>Energy balance</b>                          |                     |                     |         |                     |         |
| Energy in fuel                                 | kWt                 | 739,9               | 854,1   | 857,0               | 945,7   |
| Energy in power output (gross)                 | kWb                 | 324,2               | 368,4   | 373,4               | 406,5   |
| Energy to additional losses                    | kWb                 | 4,9                 | 5,5     | 5,6                 | 6,1     |
| Energy to cooling fan                          | kWm                 | 14                  |         | 19                  |         |
| Energy in power output (nett)                  | kWt                 | 305,3               | 348,9   | 348,8               | 381,4   |
| Energy to exhaust                              | kWt                 | 213,2               | 245,3   | 244,7               | 273,7   |
| Energy to coolant and lubricating oil          | kWt                 | 113,5               | 128,5   | 130,2               | 139,5   |
| Energy to charge cooler                        | kWt                 | 64,8                | 79,7    | 68,4                | 76,5    |
| Energy to radiation                            | kWt                 | 24,1                | 32,2    | 40,3                | 49,5    |



## ▪ Alternator

| Alternator                     |       |                                |
|--------------------------------|-------|--------------------------------|
| Poles                          | Num   | 4                              |
| Winding Connections (standard) |       | Star-serie                     |
| Insulation                     | Class | H class                        |
| Enclosure (according IEC-34-5) |       | IP23                           |
| Exciter System                 |       | Brushless                      |
| Voltage Regulator              |       | A.V.R.                         |
| Bearing                        |       | Single bearing                 |
| Coupling                       |       | Flexible disc                  |
| Coating type                   |       | Standard (Vacuum impregnation) |

## ▪ Options

| Engine  | Alternator   | Generator Sets   | Fuel System   | Canopy   |
|---|--|--|---|--|
| <ul style="list-style-type: none"> <li>•Water Jacket Preheater</li> <li>•Oil Preheater</li> </ul> | <ul style="list-style-type: none"> <li>•Winding Temperature measuring Instrument</li> <li>•Alternator Preheater</li> <li>•PMG</li> <li>•Anti-damp and anti-corrosion treatment</li> <li>•Anti-condensation heater</li> </ul> | <ul style="list-style-type: none"> <li>•Tools with the machine</li> </ul>                            | <ul style="list-style-type: none"> <li>• Low fuel level alarm</li> <li>•Automatic fuel feeding system</li> <li>•Fuel T-valves</li> </ul>                | <ul style="list-style-type: none"> <li>•Rental Type Canopy</li> <li>•Trailer</li> </ul>  |
| Lubricating System  | Exhaust System   | Cooling System   | Control Panel   | Voltages   |
| <ul style="list-style-type: none"> <li>•Oil with the machine</li> </ul>                           | <ul style="list-style-type: none"> <li>•Protection board from hotness</li> </ul>   | <ul style="list-style-type: none"> <li>• Front heat protection</li> <li>• Coolant (-30°C)</li> </ul> | <ul style="list-style-type: none"> <li>•Remote control panel</li> <li>• ATS</li> <li>• Remote controller</li> <li>• Synchronizing controller</li> </ul> | <ul style="list-style-type: none"> <li>• 415/240V</li> <li>• 380/220V</li> <li>• 220/127V</li> <li>• 220/127V</li> <li>• 200-115V</li> </ul> |



## Control Panel



## Product description

- Single gen-set controller for Stand-by and Prime-power applications
- Direct communication with EFI engines
- Total remote monitoring and control

## Key features

- Easy to install, configure and use
- Wide range of communication capabilities including:
  - connection via RS232, RS485, CAN and on board USB
  - internet access using Ethernet or GPRS
  - support for Modbus and SNMP protocols
- Cloud-based monitoring and control
- Active SMS and emails in different languages
- 2x 5 A binary outputs for cranking and fuel solenoid
- Option for up to 16 additional binary inputs/outputs
- Flexible event based history with up to 350 events
- Load shedding, dummy load capability
- Automatic temperature based cooling/heating
- Comprehensive gen-set protections
- Multipurpose flexible timers
- True RMS measurement

## Available extension modules

| Product      | Description                        | Order code  |
|--------------|------------------------------------|-------------|
| CM-Ethernet  | Ethernet interface                 | CM2ETHERXBX |
| CM-GPRS      | GSM modem / wireless internet      | CM2GPRSXXBX |
| CM-RS232-485 | Dual port interface                | CM223248XBX |
| EM-BIO8-EFCP | 8 additional binary inputs/outputs | EM2BIO8EXBX |

## Functions and protections

| Description                            | ANSI code | Description         | ANSI code |
|--|-----------|---------------------|-----------|
| Over voltage                           | 59        | Load shedding       | 32P       |
| Under voltage                          | 27        | Overload            | 32        |
| Voltage asymmetry and Phase rotation** | 47        | Power factor        | 55        |
| Over frequency                         | 81H       | Temperature         | 49T       |
| Under frequency                        | 81L       | Gas (fuel) level    | 71        |
| Over current*                          | 50 + 51   | Earth fault current | 50N + 64  |
| Current unbalance                      | 46        |                     |           |

\* Short current only

\*\* Fixed setting

