



POWERED BY HANMA  
DIESEL GENERATOR SET

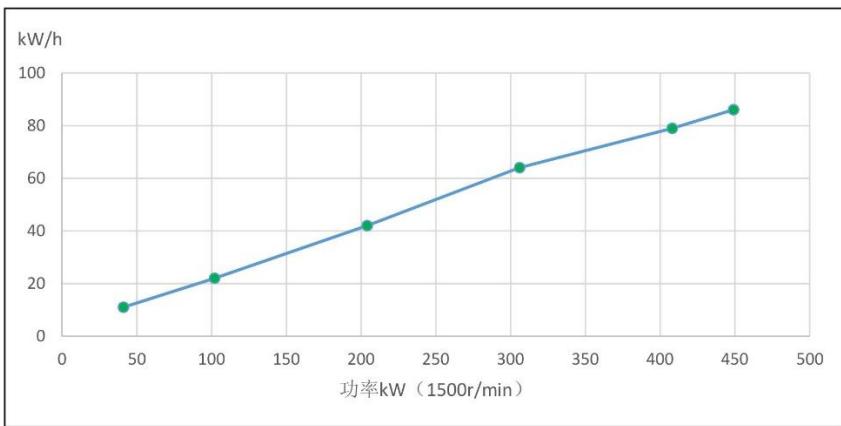
Model: MD 400  
INDUSTRIAL RANGE  
POWERD BY HANMA



**GENERATING RATE**

POWER RATING		PRIME	STANDBY
POWER	KVA	450	510
	KW	360	408
Rated Speed	r.p.m	1500	
Standard Voltage	V	400	
Available Voltages	v	400/230-230/132-230 V	
Rated at Power Factor	Cos Phi		

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Engine model	manufacturer	emission standard														
CM6D30F.408 30	Anhui Hualing Automobile Co., Ltd Company Engine Branch	Non road three-stage GB20891—2014														
<b>engine performance curve</b>																
<b>Displacement: 12.82L</b>	operating condition	power														
<b>Power: 408KW</b>		fuel consumption														
<b>Cylinder diameter: 130mm</b>		kg/h														
<b>Travel distance: 161mm</b>	Commonly used 100%	79														
<b>Compression ratio: 17:1</b>	75%	64														
<b>Speed: 1500@50Hz</b>	50%	42														
<b>Inhalation method: Boosting, Air to Air</b>	25%	22														
<b>Cooling</b>	10%	11														
<b>Fuel system: High pressure common rail (1600bar)</b>																
<b>Engine type: inline, six cylinder, four stroke</b>																
 <table border="1"> <caption>Data from engine performance curve graph</caption> <thead> <tr> <th>Power kW (1500r/min)</th> <th>Fuel consumption kg/h</th> </tr> </thead> <tbody> <tr><td>50</td><td>10</td></tr> <tr><td>100</td><td>20</td></tr> <tr><td>200</td><td>40</td></tr> <tr><td>300</td><td>65</td></tr> <tr><td>400</td><td>80</td></tr> <tr><td>450</td><td>85</td></tr> </tbody> </table>			Power kW (1500r/min)	Fuel consumption kg/h	50	10	100	20	200	40	300	65	400	80	450	85
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CM6D30F.408 30	Anhui Hualing Automobile Co., Ltd Si Engine Branch	Non road three-stage GB20891—2014														
<b>Main technical parameters of the engine</b>																
<b>Whole machine data</b>																
<b>type</b>	Straight, six cylinder, four valve, four stroke															
<b>Air Intake method</b>	Boosting, air to air intercooling															
<b>Cylinder diameter X stroke</b>	130mmX161mm															
<b>displacement</b>	12.82L															
<b>compression ratio</b>	17:1															

<b>Firing Order</b>	1-5-3-6-2-4		
<b>Cylinder distance</b>	162mm		
<b>Combustion chamber type</b>	ω type		
<b>Engine dimensions (length X width X height)</b>	2000x946x1549mm		
<b>Engine weight (including flywheel, excluding generator)</b>	1183kg		
<b>Flywheel moment of inertia</b>	2.9Kgm 2		
<b>Intake and exhaust system</b>			
<b>Rated point exhaust back pressure</b>	15KPa		
<b>exhaust gas temperature</b>	566°C		
<b>Exhaust flow rate</b>	1950Kg/h		
<b>intake flow</b>	1870Kg/h		
<b>Maximum allowable intake resistance (clean filter element)</b>	3.5KPa		
<b>Maximum allowable intake resistance (dirty filter element)</b>	6.5KPa		
<b>Air intake resistance alarm value</b>	6.3KPa		
<b>cooling system</b>			
<b>Main content of coolant</b>	50:50 (ethylene glycol: water)		
<b>Coolant outlet temperature</b>	95°C		
<b>Temperature difference between coolant inlet and outlet</b>	5.2°C		
<b>The heat dissipation capacity of the radiator</b>	140KW		
<b>Flow rate of radiator</b>	446L/min		
<b>Alarm temperature</b>	104°C		
<b>Air intake type</b>	Empty air cold		
<b>Allowable pressure drop of intercooler</b>	11-13KPa		
<b>Heat dissipation of intercooler</b>	62KW		
<b>Allowable intake temperature of intercooler</b>	190°C		
<b>Maximum intake volume of intercooler</b>	1900Kg/h		
<b>Engine model</b>	manufacturer	emission standard	
CM6D30F.408 30	Anhui Hualing Automobile Co., Ltd Si Engine Branch	Non road three-stage GB20891—2014	
<b>Main technical parameters of the engine</b>			
<b>lubrication system</b>			
<b>Oil pressure @ idle speed</b>	130KPa		
<b>Oil pressure @ rated point</b>	500KPa		
<b>Maximum allowable oil temperature</b>	120°C		
<b>Oil pan capacity low</b>	33L		
<b>Oil pan capacity high</b>	41L		
<b>Allowable tilt angle of oil pan @ forward tilt</b>	30°		
<b>Allowable tilt angle of oil pan @ rearward tilt</b>	30°		
<b>Allowable inclination angle of oil pan @ fuel pump side elevation angle</b>	30°		
<b>Allowable inclination angle of oil pan @ exhaust side elevation angle</b>	30°		
<b>fuel system</b>			



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Type of pump oil system	high-pressure common rail
Injector injection pressure	1600bar
fuel temperature	38±5°C
Maximum allowable resistance of fuel pump inlet pipe (clean filter element)	10KPa
Maximum allowable resistance of fuel pump inlet pipe (dirty filter element)	24.7KPa
Electric control starting system	
Standard starter starting voltage	24V
Minimum average starting speed without auxiliary cold start	130r/min
Minimum temperature without auxiliary cold start	-15°C
All data is based on:	
--Obtained when the engine is running with fuel system, water pump, oil pump, fan, and filter; But it does not include AC generators, selection	
Use equipment and driven components.	
--The engine operation complies with the non road three-stage (GB20891-2014) standard.	
--Standard reference conditions: atmospheric pressure of 100kPa, intake temperature of 25 °C, relative humidity of 50%. The deviation range of the data is+/- 4%.	
--Altitude and temperature correction:	
The engine can operate under the following conditions: 1500r/min below 3000m and below 40 °C without correction.	

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**PDL-354C**

**Type: Brushless Synchronous Alternator**

**Rated Voltage: 120V - 690V**

**Rated Capacity: 450 kVA**

**Rated Power: 360 kW**

### Universal Parameters

<b>Brand</b>	PUDELI
<b>Control System</b>	Self-excited
<b>Automatic Voltage Regulator</b>	Default: MC392 SX440 Optional: AS440
<b>Stable Voltage Regulation</b>	± 1.0 %
<b>Transient Voltage Regulation</b>	-18% ~ +20%
<b>Steady State Short Circuit</b>	The self-excitation device does not maintain a short-circuit current
<b>Insulation Class</b>	Class H
<b>Protection Class</b>	IP23
<b>Rated Power Factor</b>	0.8/1.0
<b>Stator Winding</b>	Double-layer Winding
<b>Winding Pitch</b>	2/3
<b>Winding Outlets</b>	12
<b>Main Stator Resistance</b>	0.0065 Ω/phase (Y series connection, 22°C)
<b>Main Rotor Resistance</b>	1.55 Ω (22°C)
<b>Exciter Stator Resistance</b>	17 Ω (22°C)
<b>Exciter Rotor Resistance</b>	0.092 Ω/phase (22°C)
<b>Waveform Distortion</b>	No load ≤ 2.0%, non-distorted linear load balance ≤ 5.0%
<b>Maximum Overspeed</b>	2250 RPM
<b>Drive End Bearing</b>	BALL. 6220 - 2RS. (ISO)
<b>Non-Drive End Bearing</b>	BALL. 6314 - 2RS. (ISO)
<b>Telephone Interference</b>	THF ≤ 2%, TIF ≤ 50



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## Weights & Dimensions

Bearing	Single Bearing	Double Bearing
Alternator Net Weight	1150 kg	1200 kg
Stator Weight	534 kg	534 kg
Rotor Weight	432 kg	452 kg
Wooden Case Included Weight	1205 kg	1215 kg
Wooden Case Dimensions	166 x 87 x 124 (cm)	166 x 87 x 124 (cm)

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## **Control Panel Technical Specifications:**

### Control Panel- SMARTGEN 6110/6120

The base mounted control panel in a vibration isolated sheet steel enclosure. The control panel is equipped as follows:

- a) Instruments: Analogue Voltmeter, Hours Run Meter. Water pressure Meter.
- b) Controls: Emergency Stop Pushbutton, Voltmeter Phase Selector Switch.
- c) Control module: Standard collocation is SmartGen Auto start with AMF.

### **Main Features:**

- Automatic mains failure
- Engine control, Generator protection
- Built-in alarms and warnings
- Remote Start operation available
- Fuel pump control
- Mains simulation
- Block heater control
- Field adjustable parameters
- Free MS-Windows Remote monitoring
- LED displays
- Configurable analogue inputs
- I/O expansion capability



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## SmartGen



### Protection Circuits

#### WARNING

- Battery charge failure
- Low battery voltage
- SHUT DOWNS**
- Fail to start
- Emergency stop
- Low oil pressure
- High engine temperature
- Over /Under speed
- Under/over generator frequency
- Failed to reach loading voltage
- Electrical trip
- Generator over current

### Instruments

- ENGINE**
- Engine speed
- Oil pressure
- Coolant temperature
- Run time
- Battery volts
- TOR
- Voltage (L-N)
- Current (L1-L2-L3)
- Frequency
- Mains Voltage (L-L, L-N)

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## **Generating Sets Standard Features:**

Three phase four wire, output voltage 400V/230V, 50HZ, between 0.8 lagging, protection capability according with the standard of NAME1 and IP23.

### **General Features:**

- Oil and fuel filter fitted, water separator
- Lube-oil drain valve fitted
- Electric Starter Charge motor 24 V.D.C
- Water-cooled
- 8-hours operation base tank/Fuel Tank Capacity 1000L
- Auto start
- Optional soundproof and weatherproof canopy
- 3 pole MCCB Delixi breaker
- Operation & Maintenance manual
- Special Integrated Steel Base tank and sprayed overall in gloss enamel paint

### **Voltage Regulation:**

Voltage regulation maintained within  $\pm 0.5\%$

Between 0.8 and 1.0 lagging and unity

From no load to full load

At speed droop variation up to 4.5%

### **Frequency Adjustable Ratio:**

Change load from 0-100%, within 1.0% (electric speed regulator), within 4.5% (mechanical speed regulator)

### **Frequency Undulation:**

load from 0-100%, frequency undulation within 0.25%

No load wire volts max undulation ration\ within

Three Phrase balanced load in the order of 5%

Effect factor of Telecom TIF better than 50

THF to IEC60034 Part 40 better than 2% 1.8

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### Soundproofed Version Features:

#### Robust Corrosion Resistant Construction

- Black finish stainless-steel lock and hinges
- Body made from steel components treated with polyester powder coating

#### Excellent Access for Maintenance

- Two large doors on each side
- Radiator fill access plate
- lube oil and cooling water drains pipes to exterior of the enclosure

#### Security and Safety

- Control panel viewing window in a lockable access door
- Emergency stop push button (red) mounted on enclosure interior
- Cooling fan and battery charging alternator fully guarded
- Exhaust silencing totally enclosed for operator safely





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### **Generating Sets other Features**

#### **Generating Sets Optional Features**

- Low fuel level alarm shutdown
- Automatic Fuel Filling System
- Engine oil feeding and drain pump
- Auto Transfer Switch (ATS)
- Parallel control panels
- Circuit Breaker MCCB & ACB
- Remote Control Panel
- weatherproof/soundproof Canopy
- Trailer type Gensets

#### **Quality Standards**

ISO9001:2000, ISO14000, ISO3046  
ISO8528 BS4999  
BS5514, AS1359, ICE34  
CE Compliance

#### **Gensets Dimensions & Weight**

Open type:LxWxH (mm) Net Weight Kgs  
3600\*1400\*2100, 4300Kgs  
Silent type:LxWxH (mm) Net Weight Kgs  
4600\*1900\*2300, 5000Kgs