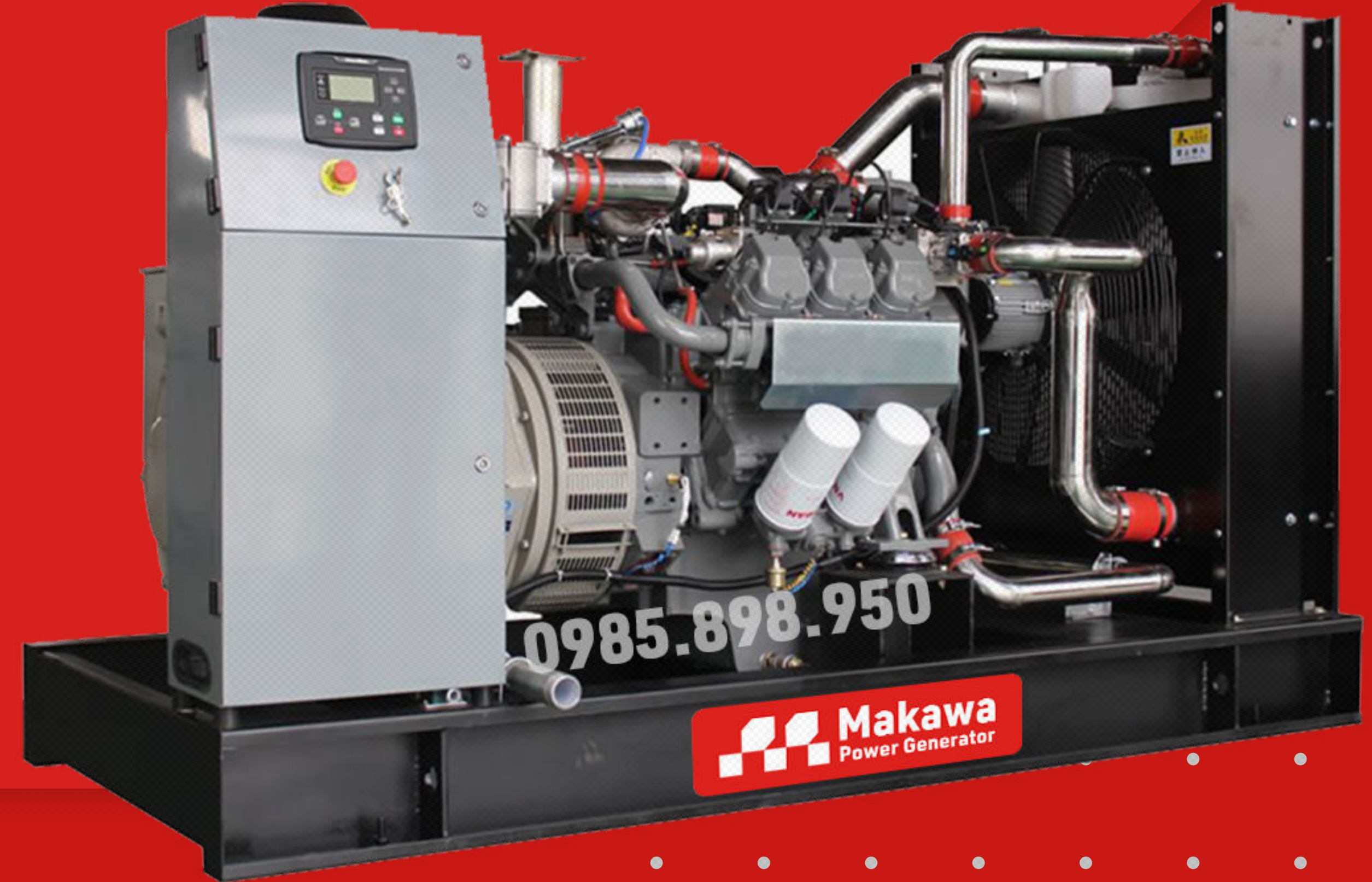




MAKAWA POWER GENERATION

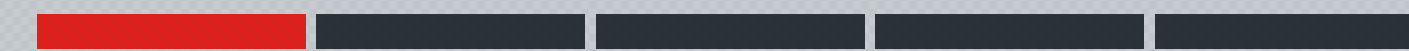
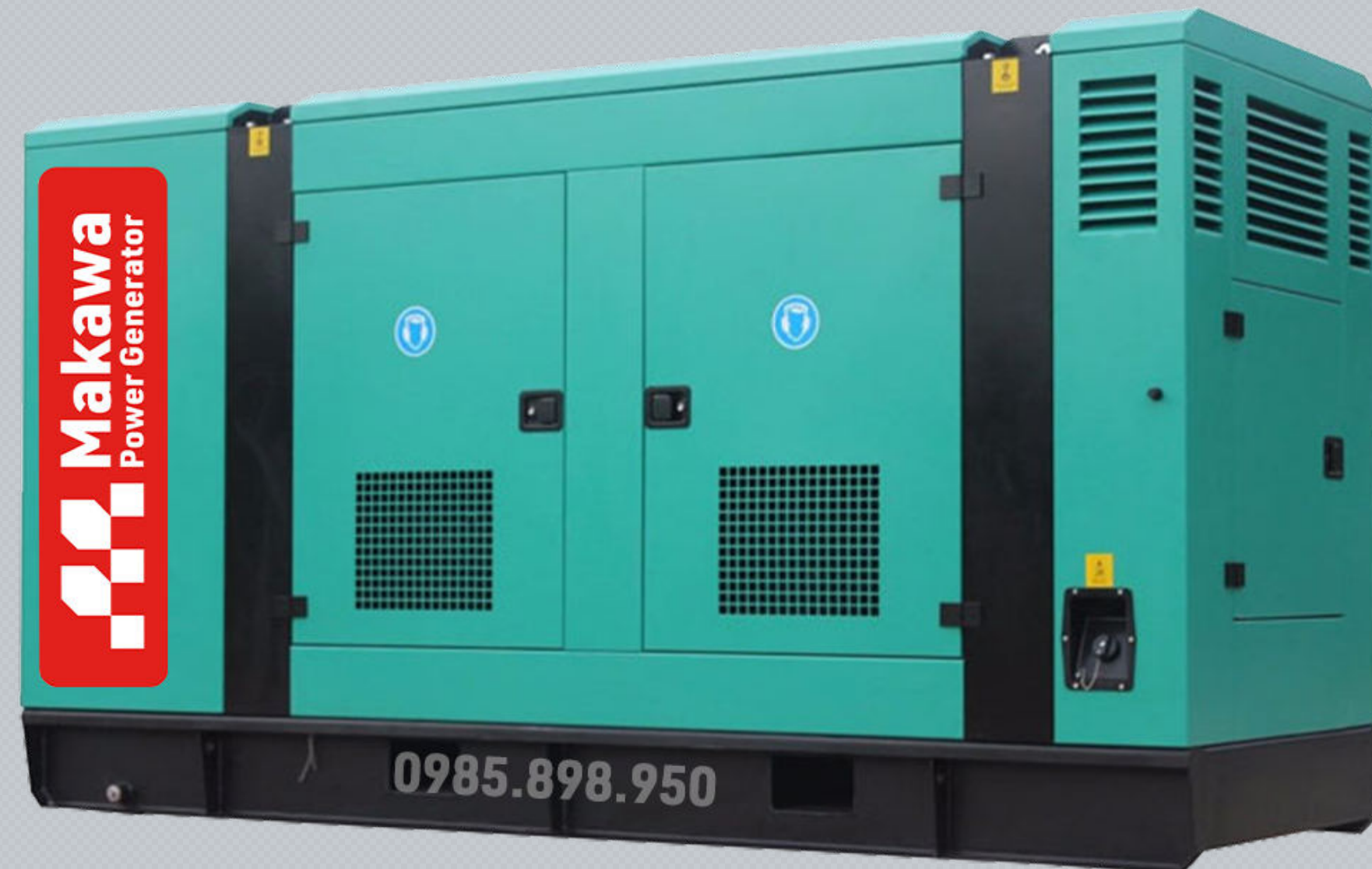


MODEL: MKW-160SCM



MAKAWA Series Diesel Generator Sets

| | | |
|----------|-----|-----|
| Stand by | kVA | 176 |
| | kW | 141 |
| Prime | kVA | 160 |
| | kW | 128 |



- 

Water Cooled
- 

Modular type sound-proof canopy
- 

Easy maintenance
- 

50 Hz
- 

Remote control system
- 

Diesel
- 

Warning system for decreasing fuel with electronic fuel level sender
- 

3 phase

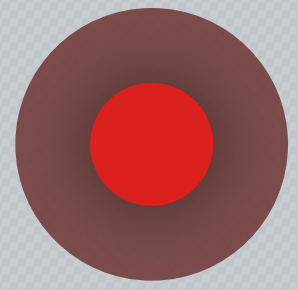
Standby Rating for a standby engine should be sized for a maximum of 70% average load factor and roughly 200 hours per year. Standby power ratings should never be applied except in true emergency outage situations. With standby rated generators there is no overload capability built into the units.

Prime Power is the maximum power accessible at the variable load for an unlimited number of hours per year in a variable load setting. It is not advisable that the variable load exceed 70% average of the prime power rating during any operational period. If the engine is running at 100% prime power, yearly hours should not exceed 500. Overload situations should be avoided however a 10% overload capability is available for a 1 hour period within a 12 hour cycle of operation.

Continuous Power is used in applications where supplying power is at a constant 100% load for an unlimited number of hours each year. Continuous power rated units are most widely used in applications where the power grid is unreachable.

Makawa reserves the right to make changes in model, technical specifications, color, equipment & accessories without prior notice.

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ENGINE SPECIFICATIONS

- Flexible fuel pipe
- Oil discharge valve and extension pipe
- Industrial type silencer, exhaust spiral or compensator
- Engine block water heater (in automatic models)
- Diesel gen-set maintenance and operating instructions and electrical circuit diagram
- MAKAWA series heavy duty diesel engine
- 4 cycle, water cooling system, turbocharged aftercooler induction
- Electronic governor system
- 12/24 volt self-starter and charger alternator
- Changeable air, fuel and oil filter
- Maintenance free battery

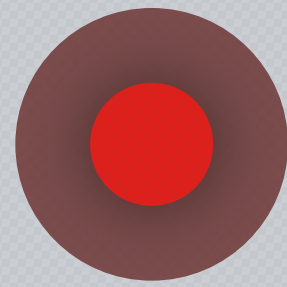
| | | |
|-------------------------------|------------------------------|-----|
| MODEL | MAKAWA POWER / 6MKW6.4-151EN | |
| POWER | STAND BY (kW) | 166 |
| | PRIME (kW) | 151 |
| SPEED (rpm) | 1500 | |
| CYCLE | 4 | |
| DISPLACEMENT (lt) | 6,4 | |
| NUMBER OF CYLINDERS | 6, in line | |
| BORE AND STROKE (mm) | 105 x 124 | |
| COMPRESSION RATIO | 16:1 | |

| | | |
|---|----------------------------|------|
| GOVERNOR TYPE | Electronic | |
| INDUCTION | TURBOCHARGED - AFTERCOOLER | |
| COMBUSTION SYSTEM | DIRECT | |
| COOLING SYSTEM | WATER | |
| FUEL CONSUMPTION (lt/h) | 100% OF PRIME POWER | 35,5 |
| | 75% OF PRIME POWER | 26,8 |
| | 50% OF PRIME POWER | 17,8 |
| TOTAL LUBRICATION SYSTEM CAPACITY (lt) | 18 | |
| TOTAL COOLANT CAPACITY (lt) | 80 | |

MAKAWA POWER GENERATION
MODEL: MKW-160SCM

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ALTERNATOR SPECIFICATIONS

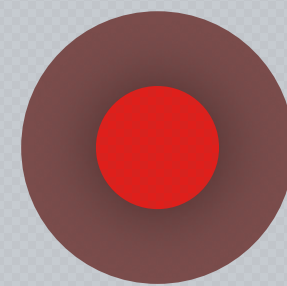
- Stator 2/3 step for harmonic failure
- The alternator windings are protected by insulating varnish against oil and acid
- Brushless, single bearing, flexible disc 4 poles alternator for harmonic failure
- H type isolation class
- IP 21-23 protection class
- Self exciter
- Electronic automatic voltage regulator

| | |
|-----------------|-------------------|
| BRAND | MAKAWA POWER |
| MODEL | MKW160AL |
| FREQUENCY (HZ) | 50 |
| SPEED (RPM) | 1500 |
| DESIGN | 4 pole, brushless |
| CONNECTION TYPE | STAR |
| VOLTAGE (V) | 400 |

| | |
|--------------------------|---------|
| PHASE | 3 |
| Stand by (kVA) | 176 |
| Prime (kVA) | 160 |
| VOLTAGE REGULATION (+/-) | ± 1% |
| INSULATION SYSTEM | Class H |
| PROTECTION | IP23 |
| RATED POWER FACTOR | 0,8 |



FEATURE



GENSET CONTROLLERS DATAKOM/DEEPSEA

D300/D500



DSE6020

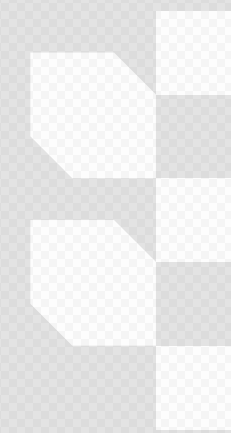


- Diesel and gas genset support
- 400Hz operation support
- 400 event logs, full snapshot
- All parameters front panel editable
- 3 level configuration password
- 128x64 graphical LCD display
- Downloadable languages
- Waveform display of V & I
- Harmonic analysis of V & I
- 16Amp MCB & GCB outputs
- 8 configurable digital inputs
- Inputs expandable to 40
- 6 configurable digital outputs
- Outputs expandable to 38
- 3 configurable analog inputs
- Both CANBUS-J1939 & MPU
- 3 configurable service alarms
- Multiple automatic exerciser
- Weekly operation schedule
- Dual mutual standby with equal aging of gensets
- Manual "speed fine adjust" on selected ECUs
- Automatic fuel pump control
- Disable protections feature
- Excess power protection
- Reverse power protection
- Overload IDMT protection
- Load shedding, dummy load
- Multiple load management
- Current unbalance protection
- Voltage unbalance protection
- Fuel filling & fuel theft alarms
- Battery back-up real time clock
- Idle speed control
- Battery charge run enabled
- Combat mode support
- Multiple nominal conditions
- Tactor & MCB drive
- 4 quadrant genset power counters
- Mains power counters
- Fuel filling counter
- Fuel consumption counter
- Modem diagnostics display
- Configurable through USB, RS-485 and GPRS
- Free configuration program
- Allows SMS controls
- Ready for central monitoring
- Mobile genset support
- Automatic GSM geo-location
- GPS connectivity (RS232)
- Easy USB firmware upgrade
- IP65 rating with standard gasket

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GENSET CONTROLLERS DATAKOM/ DEEPSEA



**MAKAWA POWER
GENERATION**
MODEL: MKW-160SCM

MEASUREMENTS

- Mains & genset PN/PP voltages Mains & genset frequency
- Mains & genset phase currents Mains & genset neutral currents Mains & genset, phase & total, kW, kVA, kVAr, pf
- Engine speed Battery voltage

COMMUNICATIONS

- 4-band GPRS modem (optional)
- USB Device
- RS-485 (2400-115200baud)
- RS-232 (2400-115200baud)
- J1939-CANBUS
- Geo-locating through GSM
- GPS support (RS-232)
- Internet Central Monitoring
- SMS message sending
- E-mail sending
- Free PC software: Rainbow Plus
- Modbus RTU

FUNCTIONALITIES

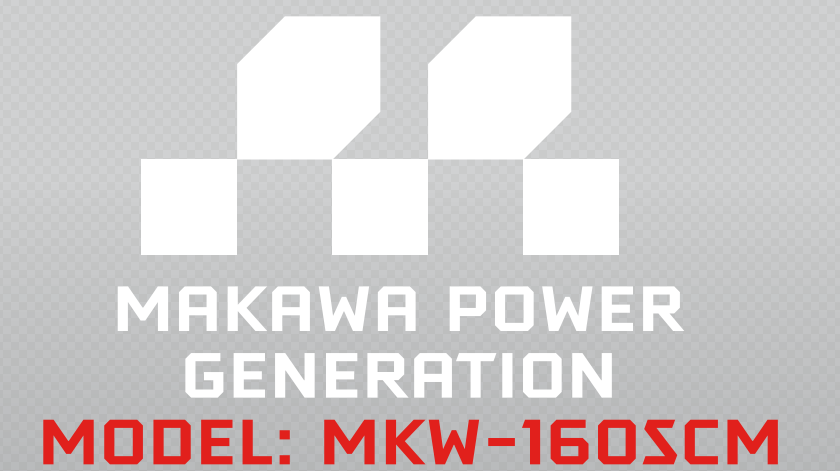
- AMF unit
- ATS unit
- Remote start controller
- Manual start controller
- Engine controller
- Remote display panel
- Harmonic analysis of V & I
- Internal battery (optional)

TOPOLOGIES

- 3 ph 4 w, star & delta
- 3 ph 3 w, 2 CTs
- 2 ph 3 w
- 1 phase 2 wires

OPTIONAL

OPTIONAL GENSET CONTROLLERS



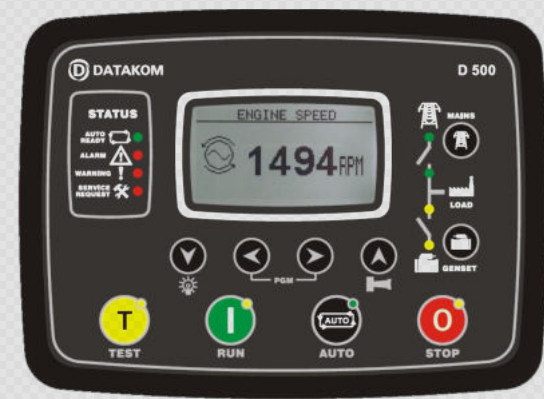
Next generation single gen-set controllers for Stand-by and Primepower applications combining multi-functionality and wide communication with EFI engines.



DATAKOM SMART 200



DATAKOM D500



DATAKOM D500-GSM



DEEPSEA 6120



DEEPSEA 7320



COMAP AMF25

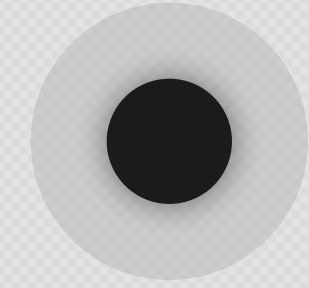
| | Datakom SMART 200 | Datakom SMART500-MK2 | Datakom D500 | Datakom D500-GSM | DEEPSEA 6120 | DEEPSEA 7320 | ComAp AMF25 |
|--|-------------------|----------------------|--------------|------------------|--------------|--------------|-------------|
| AUTOMATIC MAINS MONITORING | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MANUEL START | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| REMOTE START | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| REMOTE MONITORING WITH SIM CARD | Optional | Optional | Optional | ✓ | ✗ | Optional | Optional |
| 1 ADDITIONAL OPTION (HORN, OIL-FUEL HEATER ETC.) | ✗ | Optional | Optional | Optional | Optional | Optional | Optional |
| LIGHT WARNING AND MIMIC DIAGRAM | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| BATTERY CHARGER | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| RS-485 COMMUNICATION | Optional | Optional | ✓ | ✓ | | ✓ | Optional |
| ETHERNET (TCP-IP) COMMUNICATION | ✗ | ✓ | ✓ | ✓ | ✗ | Optional | Optional |



GENSET CONTROLLERS FOR SYNCHRONIZATION SYSTEMS

Next generation synchronizing genset controller capable of every communication and functionality.

OPTIONAL



DEEPSEA 8610



DEEPSEA 8620



DEEPSEA 8660

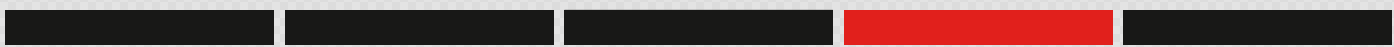


COMAP INTELIGEN
BASEBOX



COMAP INTELIGEN 200

MAKAWA POWER GENERATION
MODEL: MKW-160SCM



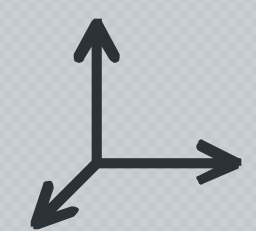
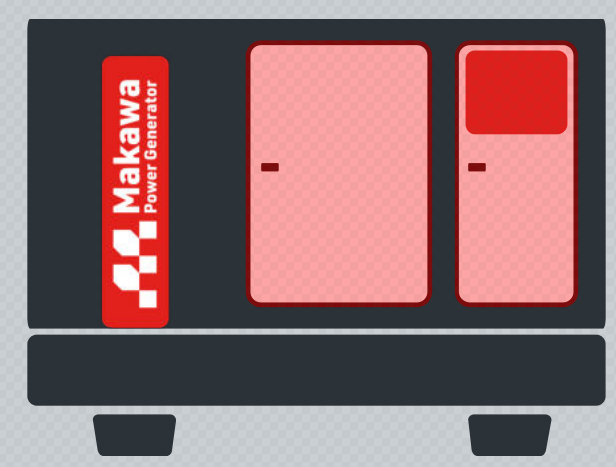
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CANOPY

- Modular type sound-proof canopy
 - Canopy installation executed with screw and nut, without welding process
 - Epoxy and polyester powder painted canopy
 - Weatherproof canopy rating is IP 23
 - Canopy designed for easy maintenance
-
- Lockable doors on both sides of canopy
 - Emergency stop button
 - Transparent panel inspection window
 - Insulation details: Non-flammable acoustic foam
 - Nano tech cleaning system
 - Container optional



Dimensions
(W x L x H) mm

1100 x 3200 x 1900

950 x 2450 x 1700



Weight
(Kg)

1.850

1.500



Fuel tank capacity
(lt)

350

350

SILENCER OPTIONS

- Standard industrial type
- Critical type
- Hospital type

CANOPY OPTIONS

- Standard canopy
- Super silent canopy
- Extra süper silent canopy (thicker insulation)

GEN-SET SAFETY PROTECTION & ALARMS

- High water temperature
- Low oil pressure
- High & low engine speed
- Low radiator water level
- Over current load
- High & low genset voltage
- Start/stop failure

OPTIONAL EQUIPMENTS

- Charge ammeter
- Moulded case circuit braker (in automatic models)
- Hospital/Critical type silencer
- Modular type sound-proof canopy
- Mobile - trailer
- Synchronization control panel for 2-16 gensets
- 3 pole/4 pole automatic transfer panel (A.T.S.)
- Fuel and oil heater
- Alternator heater
- Automatic fuel filling system
- Fuel-water seperator filter
- PMG warning system

MAKAWA POWER GENERATION
MODEL: MKW-160SCM

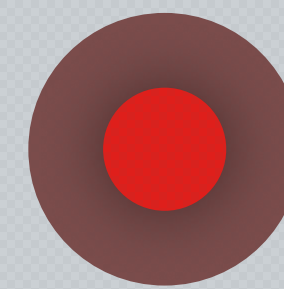
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MAKAWA POWER GENERATION

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