



Enriching Lives

Kirloskar Green Gensets

SL Series

Liquid Cooled Silent Gensets



180 to 250 kVA



Salient Features of Genset

■ Customized Product Range

- Ready to use gensets in SL Series are available in the range from 180 to 250 kVA.
- SL Series gensets are powered by most efficient liquid cooled engines.
- SL Series gensets in multiples are available for synchronization to run in parallel operation to ensure optimum usage of generator set capacity in varying load patterns in place of single larger genset.
- Custom built to ensure your exact power needs.
- SL Series engines are governed by electronic governing for fuel efficiency and optimum performance.

■ Smart Aesthetics

- State - of - the - art competitive design.
- Compact in size with smaller footprint.
- Saves money on installation / space.
- Aesthetically superior and fully integrated weather proof acoustic enclosure.
- Dynamic design with highest quality workmanship acoustics with PU based UV resistant powder coating for superior finish and durability.

■ Highest Reliability

- Superior reliability ensuring un-interrupted, continuous quality power for smooth operation.
- Electronic governor with isochronous and synchronous governing for reliable, stable and paralleling operations.
- Exceedingly rugged and durable design.
- Lower lifecycle cost of ownership.
- Safety against low lub oil, high coolant temperature, over speed, low fuel level and weak battery.
- State-of-the-art technology for trouble free operations in low / high ambient temperature, high humidity and high altitudes.
- State - of - the - art – compact – Micro-processor based fully configurable genset controller suitable for AMF operations with LCD display and event logging.

■ Unmatched Performance

- Low fuel and lub oil consumption ensuring excellent fuel economy and lowest operating cost.
- Low noise and vibration levels.
- High fuel efficiency at part operating loads.
- Long operating life K-cool super plus coolant for better engine cooling/ corrosion free coolant galleries.
- K-oil super for best lubrication performance and engine life.

■ Environment Friendly

- The power to preserve, save environment and the earth – Kirloskar Green Power Ideas.
- Gensets conforms to lowest noise pollution norms as laid down by MOEF / CPCB.
- Genset engine conforms with the latest stringent MOEF exhaust emission norms.
- 100% Bio-diesel compatibility with 100% power as option.

■ Maintenance friendly design and Ease of Operation

- Ready to use – plug and use product.
- Dynamic, high performance and weather proof modular design ensuring lowest maintenance cost.
- Easy serviceability for routine, preventive, predictive maintenance, replacement and overhauls.
- Ensures longer maintenance intervals in its class.
- Easy availability of spare parts and service network across the nation.
- Minimum cost for maintenance, spares & services, ensuring lowest operating cost.
- Smart genset monitoring and control system for closely monitoring, metering and protection of the engine and genset performance.
- Competitive Annual Maintenance Contracts through nationwide network of authorised service dealerships.
- Across the Nation CRM network for before in time services.
- Single window services for complete genset.
- Pan India single point AMC options.



KIRLOSKAR
GREEN
POWER IDEAS

Standard Features

■ Engine



- Efficient liquid cooled technology
- Offering a comprehensive range with power output covering from 180 to 250 kVA
- 6 cylinder compact configurations
- Most compact, extremely robust and rugged design
- 500 Hours of longer lub-oil change period
- Lowest fuel consumption in it's class
- Complies with latest emission norms of MOEF
- 100% Bio-diesel compatibility option with 100% power for lower emissions

■ Alternator



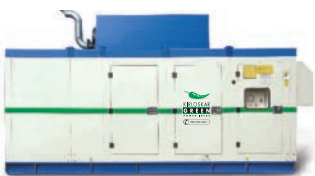
- Most efficient CE certified Kirloskar Green Alternator
- Compact design with sealed bearings for longer life and lesser maintenance
- Best in class efficiency
- Positive voltage build-up
- Special windings to reduce harmonics
- Electronic AVR
- High short circuit current capacity upto 300%, ensuring controlled regulation even at variable loads
- Well balanced rotating components and lowest vibration levels
- Epoxy gel coating to suit various environment conditions
- CT fitted alternators for better performance and safety

■ KG 545 Genset Controller



- State-of-the-art, compact Micro-processor based fully configurable genset operating, monitoring, metering and protection control system with LCD display
- Complete safety for gensets on operating faults
- Real time and 100 event logging facility for performance monitoring
- AMF option in the controller as standard scope with control for Mains and DG set circuit breakers
- User friendly operating systems on manual, auto and test modes with soft touch buttons
- Provision for additional 3 digital inputs and 2 digital outputs
- Compatibility for remote monitoring, remote start-stop and BMS options

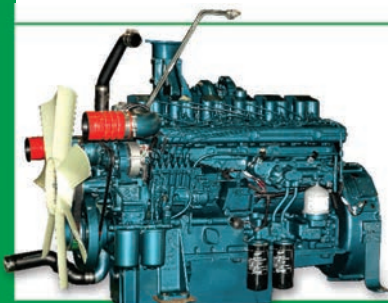
■ Acoustic Enclosure



- Smart, standardized and dynamic Kirloskar Green Power Ideas modular design for optimum performance and ease of serviceability
- Aesthetically designed weather proof, sound proof acoustic enclosure meeting stringent and latest MOEF noise pollution norms
- PU based powder-coated enclosure, manufactured on high-tech special purpose CNC machines to ensure highest quality on fit-form-finish-function and durability
- Specially designed with adequate air flow to operate at full load, even at 50 deg. C air inlet temperature
- Noise and thermal Insulation material conforms to UL94, HF1 class for flammability
- Green passivated / black ionized corrosion / rust resistant hardware for manufacturing to withstand salt spray and corrosion test as per ASTM B-117
- Designed for low noise, high reliability, lowest vibrations and user friendly ready to use installations

■ Optionals

- Remote monitoring and BMS
- Auto mains failure panel
- Cold starting aid
- Synchronization and Parallel operations of multiple gensets
- Bio-diesel compatibility
- Special air filtration system for dusty atmosphere
- Facility for external agency inspection as per custom and IS standards
- PMG for non-linear load conditions
- Power house design support for varying load pattern



Overall Specifications of SL Series Genset

180 to 250 kVA

DG Set Specifications

| Parameters | Unit | Genset Model | | |
|--|----------|--------------------|--------------------|--------------------|
| | | KG180WS2 | KG200WS2 | KG250WS1 |
| Prime Rating at 0.8 pf | kVA (kW) | 180 (144) | 200 (160) | 250 (200) |
| Voltage | V | 415 | 415 | 415 |
| Frequency | Hz | 50 | 50 | 50 |
| Overall Dimensions with canopy (L x W x H) | mm | 4940 x 1700 x 2050 | 4940 x 1700 x 2050 | 4940 x 1700 x 2050 |
| Dry Weight of genset with canopy (Aprox) | kg | 3870 | 3950 | 4660 |
| Electrical starting system | Volt-DC | 24 (2 x 12 V) | 24 (2 x 12 V) | 24 (2 x 12 V) |
| Battery Capacity | Ah | 2 x 160 | 2 x 160 | 2 x 180 |
| DG set Noise level as per CPCB Norms | dBA | < 75 | < 75 | < 75 |

Engine Specifications

| Parameters | Unit | Engine Model | | |
|---|-----------|---------------|---------------|---------------|
| | | 6SL1500TA SR1 | 6SL1500TA SR2 | 6SL8800TA |
| Rated output (Prime rating as per ISO 3046) | kW (hp) | 164.8 (224) | 184 (250) | 228 (310) |
| No. of cylinders | Nos | 6 | 6 | 6 |
| Bore x Stroke | mm | 118 x 135 | 118 x 135 | 118 x 135 |
| Aspiration | | TA | TA | TA |
| Governing Class | | Electronic A0 | Electronic A0 | Electronic A0 |
| SFC at 75% load* | (g/HP-hr) | 148 | 148 | 150 |
| SFC at 100% load* | (g/HP-hr) | 149 | 149 | 153 |
| Lub oil Consumption | LPH | 0.11 | 0.11 | 0.14 |
| Lub oil change period** | hrs | 500 | 500 | 500 |
| Lub oil Sump capacity | Ltrs | 24 | 24 | 24 |
| Engine coolant capacity | Ltrs | 43 | 43 | 43 |

Alternator Specifications

| Parameters | Unit | Alternator Model | | |
|---|------|--------------------------------|--------------------------------|--------------------------------|
| | | KG 254 M0 | KG 254 M1 | KG 284 L1 |
| Rating | kVA | 180 | 200 | 250 |
| Insulation Class | | H | H | H |
| Protection | | IP23 | IP23 | IP23 |
| Time to built up rated voltage at rated RPM | sec | ≤ 5 | ≤ 5 | ≤ 5 |
| Alternator Efficiency at 75% load | % | 93.6 | 93.9 | 93.9 |
| Alternator Efficiency at 100% load | % | 93 | 93.5 | 93.6 |
| Voltage regulation | % | 1% with 4% Engine Governing | 1% with 4% Engine Governing | 1% with 4% Engine Governing |
| Wave form Distortion at No load & at Non-distorting balance linear Load | % | < 1.8 & < 4 | < 1.8 & < 4 | < 1.8 & < 4 |
| Permissible transient voltage dip at full load 0.8 pf lag*** | % | < 18 | < 18 | < 18 |

In view of continuous product updation and design changes, all above specifications and dimensions are subject to change without prior notice.

Notes :

- Genset ratings as per ISO 8528 performance class is G3.
- Prime Power Rating is the maximum power available continuously for a variable electrical load for unlimited number of hours per year, under standard operating conditions.
- For the site conditions other than standard operating conditions, consult KOEL for available prime power.
- *+5 % tolerance as per ISO 3046. For LPH calculation specific gravity of diesel is considered as 0.845.
- All canopy dimensions have tolerance of ± 50 mm.
- ** First oil change at 50 hours.
- ***Permissible transient % voltage dip at full load 0.8 pf lag (alternator tested alone) as per IS 4722.



SCOPE OF SUPPLY:

Factory assembled Unpacked "KOEL GREEN SILENT DG SET" comprising of Kirloskar Make above model Diesel Engine directly coupled To "KIRLOSKAR GREEN" make Alternator mounted on Common Base Frame fitted with AVM Pads complete with Fuel Tank, Standard Control Panel, Battery with leads and Acoustic Enclosure (C A N O P Y) as per CPCB Norms along with K-Oil & K-Cool (Coolant).

Note: These prices are governed by Commercial Terms & Conditions given in Annexure-"II".

- After First Oil Change Next LUB Oil Change Period is 500 hrs/3 Months whichever is earlier
- Free 1+3 Service Check (CSP Check) as per KOEL Policy

COMMERCIAL TERMS & CONDITIONS

| | |
|----------------------------|--|
| <u>WARRANTEE</u> | The Warranty of the offered DG Set is applicable as per KOEL Policy. However The DG Set comprising of Engine & Alternator carries a warranty against defective material Manufacturing defects for a period of 24 months from the date of supply or 5000Hrs whichever occurs earlier. The terms of KOEL warranty policy will have precedence under all circumstances & the Warrantee Will Be applicable if customer sources K-Oil Super, Cool Super and avail the services from authorized service dealers. |
| <u>INSTALLATION</u> | Unloading of "D G" and installation work like Exhaust Piping, Earthing, Cabling, Change Over Switch initial Battery Charging, Diesel Oil has to be arranged by Customer. |
| <u>INSURANCE</u> | Extra at cost, if required. |
| Note | If the order is cancelled after one month, for whatever reason may be the advance amount will not be refunded |

COMMISSIONING

Commissioning of DG Set shall be done by our service engineer (will visit once for commissioning) Extra visit will be on chargeable basis.

*TECHNICAL SPECIFICATION OF KOEL GREEN WATER COOLED DG SETS***DIESEL ENGINE:**

"KOEL GREEN" make diesel engine rated at 1500 rpm, Water Cooled, Four Stroke Electric Start Six Cylinders Diesel Engine conforming to BS 5514 with capacity Of 10% over loading for one hour in twelve hours duration having following accessories As scope of supply:

AIR INTAKE SYSTEM

- *Air intake manifold
- *Vacuum indicator.
- *Dry type air cleaner.

EXHAUST SYSTEM

- *Turbo-charged After cooled
- *Exhaust manifold
- *Expansion bellow.
- *Exhaust silencer.

COOLING SYSTEM

- *Engine water pump.
- *Coolant.
- *Radiator with pusher type fan and mounting.

LUBRICATING SYSTEM

- *Lube oil cooler
- * Centrifuge filter
- *Lube oil filter "Spin-on" type as well as bypass type

FUEL SYSTEM

- *Fuel Filter
- *Inline mono-block fuel injection pump. And Fuel Feed Pump.
- *Governor – Electronic / Mechanical
- *Replaceable fuel filter
- *24 DC solenoid coil.

STARTING SYSTEM

- * 160 KVA 12 Volt Starter
- * 180 KVA & Above 24-Volt Starter
- *12 Volt DC solenoid coil & 12 Volt DC Battery charging Alternator
- *24 Volt DC solenoid coil & 24 Volt DC Battery charging Alternator

ELECTRIC INSTRUMENT PANEL

- *Start / stop key switch.
- *Water temperature indication.
- *Engine hour indication.
- *High water temperature trip indication.
- *Lube oil pressure indication.
- *RPM indication.
- *Low lube oil trip indication.
- *Battery charging indication.

SAFTY CONTROLS

- *Low lube oil pressure trip.
- *High water temp.

OTHERS

- AVM pad.
- Engine suitable for closed couple alternator
- Front and rear engine-mounting supports.

ALTERNATOR:

Synchronous alternator of "KIRLOSKAR GREEN" make suitable for Continuous operation at 1500 PM generating 415 volts at 0.8 p. f (lag) suitable for 50 Hz, three phase, 4 wire system. The alternator shall be brushless, self excited & self regulated with an AVR .The alternator will be suitable for tropical climate and shall generally conform to IS: 4722. The silent feature of the alternator are:

- +-1% voltage regulation (max) in static conditions.
- IP: 23 protections with class 'H' insulation.
- Permanent lubricating bearing.
- Permissible overload of 10% for one hour in 12 hours of operation.

CONTROL PANEL:**SPECIFICATION FOR STANDARD MANUAL CONTROL PANEL****SCOPE OF SUPPLY:**

The standard control panel is fabricated from 16 SWG sheet and powder coated after seven tank treatment process. The panel is equipped with:

- (A) Digital Genset Control Unit ,
Digital Control Unit is Special Deigned to Standardize most of control Panels components in Single Unit.

Salient Features of Controller

| Gen –set Display Parameters | Engine Display parameters | Electrical safeties (along with display) | Mechanical safeties (along with Display) |
|------------------------------------|--|---|---|
| 1) Phase Voltage | 1) Oil Pressure | 1) Genset Under / Over voltage | 1) Under/Over speed |
| 2) Line current | 2) Engine coolant Temperature | 2) Battery Under/Over voltage | 2) Low Lube oil pressure |
| 3) Frequency | 3) Fuel Status | 3) Under/Over frequency | 3) High Lube oil Temperature (optional) |
| 4) Average Voltage | 4) Engine Speed | 4) Phase Failure | 4) High engine coolant temperature |
| 5) Average Current | 5) Oil Temperature (optional) | 5) Phase sequence reverse | 5) Charging Alternator fail |
| 6) Phase kW & Total kW | 6) Canopy Temperature | 6) Over Current | 6) Low coolant level |
| 7) Kwh & PF | 7) Engine run Hours | 7) Over kW | 7) Low fuel level |
| 8) KVA / KVA r | 8) Total starts | 8) High Earth Current | 8)High canopy temperature |
| 9) Earth Leakage Current | 9) Battery Voltage Minimum Battery Voltage required | 9) short circuit | 9) Start / Stop fail |

(B) The Control Panel is equipped with MCB/MCCB of Suitable rating

(C) The Control Panel consists with CT, PT along with Aluminum bus bars & wires.

D). Set of Push Buttons

- (a) Engine start/stop,
- (b) Emergency Stop

BASE FRAME:

Engine and alternator are mounted coupled and aligned on a common channel Iron fabricated base frame with pre-drilled holes.

FUEL TANK:

Daily service fuel tank of 8 hours of continuous operation, fabricated form 14 SWG sheet metal complete with drain valve, inlet and outlet connection.

BATTERIES:

1 No in case of 160 KVA -2 Nos in case of 180 KVA & above Exide / Tata make batteries of 12 V 180 AH capacities in charged condition with its leads.

DOCUMENTATION:

One set of following documents shall be provided with each set.

- O & M Manual of Diesel Engine.
- Packing list of D. G. Set.
- Test certificate of diesel engine.
- Test certificate of alternator.
- Test certificate of D. G set.
- Test certificate of CPCB.

SALIENT FEATURES OF KOEL GREEN DG SETS

- Low ownership costs due to competitive upfront investment, optimal fuel, and Lube Oil & parts consumption.
- The best Lube oil Change interval in its class
- Diesel Engines meeting the CPCB norms for emission.
- Branded Sound-Proof Enclosures with standard warranty & serviced by company service dealer.
- The only DG set brand to offer consistent deliverables (all DG plants & most Service Dealers are ISO 9001 certified)
- The most extensive After Sales Service Network rated the best in the industry (according to a survey* conducted by AC Nielsen) with:
 - 65 Service Dealers & 195 locations. (41- cities 24*7 service)
 - Complement of trained engineers.
 - Easy parts availability with first pick at above 95 % level
 - Specially formulated Lube, the K-Oil for longer Change intervals.
 - Single Window Support for providing support Engine, Alternator and acoustic enclosure, another unique KGPI advantage.
 - Value added Services like Annual Maintenance Contracts, Stand-by DG sets, Customer training programme – to name a few

Industry best Warranty.

* The Customer Satisfaction Survey conducted by AC Nielsen, an independent market research firm of international repute has placed KOEL at the top of the charts consecutively for 2 years in a row. Our Customer Satisfaction Index (CSI) is one of the best in the world in manufacturing sector.

Specifications of KOEL GREEN Canopy Construction

ACOUSTIC ENCLOSURE:

KOEL GREEN Acoustic enclosure shall be powder coated and fabricated out of 16 SWG CRCA MS sheet. The silent canopy shall be of nut bolt type construction. Critical processes of punching is done on CNC machines to maintain dimensional accuracy of holes within 0.1 mm. Powder coating is done after seven-tank surface preparation process of sheet metal. Canopy panel and doors shall have inside lining of FIRE-RETARDANT foam as acoustic material up to 200 KVA & Rock wool for high ratings four hinged doors shall be provided to canopy, one door shall have glass window for control panel.

BASE FRAME:

Base frame is fabricated either in ISMC channel or in sheet metal. The base frame will be primer coated and painted. The base frame is rugged in construction and designed for mounting KOEL engine and KG alternator close coupled, with cross members mounted on AVM. The base frame shall have provision for mounting of acoustic enclosure & control panel on it. The base frame is having provision of lifting hook for convenient lifting of complete set, i.e. along with canopy, engine and alternator.

Color scheme

The base plate and top is painted with OXFORD BLUE/PEPSI BLUE, the canopy is powder coated with IVORY color.

Performance Parameters

- The average sound level, when measured in green field condition (ISO 3744 OR 8528 PT 10) at 1-meter distance from all four sides shall be less than 75-dBA averages or as per CPCB norms.
- The average stabilized hot air temperature rise with in the canopy is maintained with in 10° C over and above ambient temperature.

KOEL GREEN SILENT CANOPY FEATURES

- RTU canopy kits, which can be assembled on site within a time period of 90 minutes.
- Canopy fabricated on machines with dimensional accuracy of 0.1mm.
- Canopy is powder coated after passing through seven tank processes.
- Canopy is lined with acoustic foam, which is non-igniting /Fire Retardant (confirming to BS 4735/BIS 7888).
- No grouting required on the ground, only a level surfaces capable of withstanding the DG weight.
- Designed for installation in open-air conditions.
- Lockable doors provided.
- Lockable fuel filling arrangement provided external to the canopy.
- Residential Silencer is housed in the canopy.
- Externally accessible emergency stops button.
- The exhaust gases shall be taken out through a suitable flexible pipe to prevent any back pressure on the engine.