IMPORTANT NOTE

BID DOCUMENT HAS BEEN DISPLAYED BELOW TO UNDERSTAND THE REQUIREMENT ONLY. PARTIES INTERESTED TO PARTICIPATE AGAINST THIS TENDER SHALL HAVE TO PURCHASE THE TENDER DOCUMENT FROM ANY OF OIL'S DESIGNATED OFFICES MENTIONED IN THE TENDER NOTIFICATION. PROOF OF PURCHASE OF TENDER DOCUMENT MUST BE SUBMITTED ALONG WITH THE OFFER FAILING WHICH OFFERS SHALL BE TREATED AS UNSOLICITED.

OIL INDIA LIMITED
(A Govt. of India Enterprise)
4, India Exchange Place,
Kolkata – 700 001.

OIL INDIA LIMITED *(OIL) invites sealed tenders for supply of the following items :-*

Srl. No.	***Tender No. (Bid Closing Date)***	***Materials Description***	***Single Order Value in (Rs. Lakhs)***	***Annual Turnover in (Rs. Lakhs)***
1.	***KID6200P10/09 (05-02-2010)***	***4D Ultrasonography Machine – 1 No.***	***25***	***50***
2.	***KID6193P10/08 (05-02-2010)***	***Diesel Engine Driven Drenching Pump set – 1 No.***	***07***	***15***
3.	***KID6201P10/02 (05-02-2010)***	***Float – cum – Boost Charger with Spares.***	***30***	***60***
4.	***KID6194P10/01 (05-02-2010)***	***Tent – 72 sets.***	***16***	***33***
5.	***KIS6202P10/03 (05-02-2010)***	***250 KVA DG set – 2 Nos.***	***19***	***39***

2.0 *Bid documents (Non transferable) can be purchased from* ***29-12-2009*** *till one day prior to the respective Bid Closing Dates on payment of tender fee of Rs. 1000.00 each through Crossed Demand Draft in favour of M/s. Oil India Limited payable at the place of purchase (excepting for PSUs and SSI units registered with NSIC/Directorate of Industries for the item) from (A) Head (Calcutta Branch), Oil India Limited, 4,India Exchange Place, Kolkata - 700001 (B) Head Materials, Oil India Limited, P.O. Duliajan, Assam - 786602 (C) Sr. Adviser (Contract & Purchase), Oil India Limited, Plot No. 19,Sector-16A, Noida – 201301 (D), Sr. Materials Manager (Pipeline), Oil India Limited, P.O: Udayan Vihar, Guwahati - 781171.*

3.0 *To be eligible for issue of tender documents, the applicant must meet the following qualifying criteria (documentary evidence to be provided) :*

(i) Successful execution of a single order of value not less than the amount shown above for supply of similar items during last five years.

(ii) Annual turnover of the firm in any of the last three financial years or current financial year should be more than the amount shown above.

4.0 *Bidders may visit OIL's website* ***www.oil-india.com*** *for further details on the above tenders.*

CORRIGENDUM

1. ***The Bid Closing Date against Tender No. KID5568P10/03 dt. 23.10.09 for Auto Evacuation System for LPG Cylinder – 1 No. has been extended to 12-01.2010 (14.00 Hrs).***
2. ***The Bid Closing Date against Tender No. KID5645P10/08 dt. 28.10.09 for FLP Electric Motor Driven Screw Pump – 2 Nos. has been extended to 12-01.2010 (14.00 Hrs).***
3. ***The Bid Closing Date against Tender No. KID5599P10/02 dt. 26.10.09 for Flow Metering System for LPG Tankers – 2 items has been extended to 12-01.2010 (14.00 Hrs).***
4. ***The quantity against Tender No. KIS6054P10/01 dt. 30.11.09 for Bitumen felt, due on 15.01.2010, has been increased from 4200 Rolls to 5200 Rolls. The additional requirement of 1000 Rolls is for Guwahati, Assam.***

*** * ***

OIL INDIA LIMITED
(A Govt. Of India Enterprise) Tel :033 2230 1657, 1658
4, India Exchange Place, Fax :91 33 2230 2596
Kolkata-700001 E-mail :oilcalmn@cal2.vsnl.net.in

Tender No. & Date : KID6202P10/03 15.12.2009

Bid Security Amount : INR 98,000.00 OR USD 0.00
(or equivalent Amount in any currency)

Bidding Type : Single Bid (Composite Bid)

Bid Closing On : 05.02.2010 at 14:00 hrs. (IST)
Bid Opening On : 05.02.2010 at 14:00 hrs. (IST)

Performance Guarantee : Applicable

OIL INDIA LIMITED invites Limited tenders for items detailed below:

Item No./ Mat. Code	Material Description	Quantity	UOM
10 0C000115	250 KVA DG SET **FOR SCOPE OF SUPPLY AND DETAILED SPECIFICATION PLEASE REFERS ANNEXURE - A AND ANNEXURE-B (ENCLOSED).**	2	NO
	INSTALLATION & COMMISSIONING		
10	INSTALLATION AND COMMISSIONING	1	AU

Special Notes : 1. The bidder must submit technical literature / catalogue of the offered product in duplicate along with the offer, failing which offer may be liable for rejection.
2. Bidder must fill the technical checklist enclosed in Annexure-A.
3. Payment : 70% payment will be released against submission of bills/ despatch documents and balance 30% payment on successful installation and commissioning of the material at OIL's site.

ANNEXURE A

KID6202P10/03 15TH DECEMBER, 2009

250 KVA DG SET

1.0 SCOPE OF SUPPLY

The scope of supply by the bidder shall be two Nos. 250KVA, 415 volts, 3 phases, 50Hz Industrial Type, Diesel Engine driven Generating Sets (all accessories housed in an acoustic enclosure)

The generating set shall be the primary source for providing power for equipments pertaining to Drilling Rig. Engine and Alternator shall be:

i) Compatible to power and torque trend (varying loading pattern), responsive to instantaneous load and torque changes. The engine is to be suitable for varying load including no load

ii) Easily serviceable both at site and at workshop.

iii) Of up-to-date technology.

iv) Of heavy-duty construction for designed for drilling rig applications, which require heavy duty motor starting (60hp motor with direct on line starter) and predominantly non-linear loads.

vi) Shall be able to withstand the shock and vibration associated with the frequent relocation of drilling rigs, as also to withstand severe environmental conditions including heat and high humidity. The alternator Rotors shall be dynamically balanced and engineered to withstand 125% over nominal speed.

vii) Technical specifications of Engine and Alternator are detailed below:

viii) Genset should be mounted on an oil field type skid.

2.0 ENGINE

The engine should be a four stroke, direct injection , turbo charged, after cooled, having counter clockwise rotation diesel engine, rated for continuous power and capable of developing a net minimum BHP of 295 at 1500 rpm at the site conditions given below #

Maximum ambient Temperature : 45° C
Minimum ambient Temperature : 5° C
Maximum Relative Humidity at 35° C : 95%
Maximum Altitude above mean sea level : 150 M
With HSD conforming to IS: 1593:1982 and having the following specification:
Cetane number : 42.5
Gross calorific value : 19480 BTU /CFT

2.1. **The bidder should specify the following information along with relevant performance rating curves & conditions**:

" Gross horse power developed at rated RPM.
" Deduction for altitude, temperature etc.
" Deduction for fan & ancillary equipment.
" Net HP available at rated RPM & site conditions.
" Specific fuel consumption at rated speed & power and at 110 %, 75%, 50% and 25% of full loads.
" Characteristic Curves of the Engine to be supplied

2.2. The noise level produced by the engine while delivering the rated output shall not exceed 75 dB from 1 meter from the source

2.3 The engine will be used as prime mover for 250 KVA AC Generator of drilling Rig.

2.4 The engine offered should be complete in all respect with the following components mounted on it.

2.5 AIR INTAKE SYSTEM comprising of

Air intake manifold
After Cooler water circuit should be separate water circuit
Dry type Air cleaner, regular duty, Indicators, turbocharger,
Inlet and Exhaust Valve: Two intakes and two exhaust valve in each cylinder, each valve has a rotator which moves the valve face 3 degree relative to the valve seat during one complete cycle of the engine for less wear and tear.

2.6 COOLING SYSTEM comprising of

Jacket water pump gear driven,
Blower fan
Heavy duty industrial radiator
After-cooler fresh water cooling pump, Centrifugal, gear driven.

2.7 STARTING SYSTEM comprising of

24V DC electric starter (Make LUCAS TVS /DELCO REMY)
24V DC battery charging alternator (Make LUCAS TVS/DELCO REMY)
Two Nos. Standard-Furukawa/reputed make batteries of 12V, 180AH capacity in dry and uncharged condition with its leads.

2.8 EXHASUT SYSTEM comprising of

Turbocharger
Flexible connection
Exhaust silencer Residential type with spark arrestor silencer

2.9 FUEL SYSTEM comprising of

Fuel Pump
Primary Fuel Filter
Fuel Injection & Injection System
Fuel Filter
Fuel transfer pump
Fuel Priming Pump

Flexible Fuel Lines
Daily service fuel tank fabricated out of 14 SWG sheet metal, built within the base frame & complete with drain valve, air vent, inlet and outlet connection.

NB: The fuel tank should be large enough to hold fuel for at least 16 hours continuous operation of the engine on full load.

2.10 LUBRICATING SYSTEM comprising of

Oil sump
Engine mounted lube oil pump & cooler
Spin-on combo lube oil filter with built-in by-pass filter
Oil level dipstick
Crankcase breather

2.11 ENGINE CONTROL PANEL comprising of

Starting switch
Digital/Analog tachometer
Digital/Analog Lube oil pressure gauges
Engine oil temperature
Engine control switch for
  Auto, Start / run, off / reset, Stop
Oil filter differential pressure
Digital/Analog Water temperature gauges
Exhaust Temperature
Digital hour meter
Ammeter for battery voltage indication
Emergency shut off switch
Shutoffs with visual indicators for:
Air inlet (Vacuum) restriction
Low oil pressure
High water temperature
Overspeed
Low coolant level

2.12 CONTROL SYSTEM:
The engine should be with full range hydraulically assisted governor. The governor flyweights responding to load variations cause the governor control valve to move which in turn causes the fuel pump rack to move, either increasing or decreasing the amount of fuel to the engine.

2.13 SAFETY CONTROLS

Low lube oil pressure trip
High water temperature trip
Over speed trip

2.14 OTHER FEATURES

Vibration damper
Flywheel
Lifting eyes
Standard painting
SAE standard rotation
Suitable hand throttle control
Non sparking guards over transmission couplings
Non sparking guards over blower fan belt drive, water pump belt drive and charging alternator belt drive.

2. 15 TOOL KIT FOR ENGINE

i) 2 sets of standard tool kit as per ANNEXURE-B (in the attached list) for carrying out normal maintenance of engine should be supplied in a conventional tool box.

3.0 ALTERNATOR:

Brushless alternator of 250 KVA rating when coupled to engine will develop 250 KVA at 3 phases, 415 Volt, 0.8 power factors, when running at 1500 rpm under NTP conditions.

The brushless alternator shall be composed of 3 phase AC exciter with rotating diodes, surge suppressor, static voltage regulator with voltage adjuster potentiometer, main field windings and stator windings. PIV of exciter diodes must be minimum 6 times the maximum exciter armature operating voltage or 1200 V whichever is higher. All windings should be made from electrolytic grade copper of high purity.

The alternator shall be of the following makes as per OIL's standardized items list: Kirloskar, NGEF, Crompton Greaves, AVK-SEGC (as per specialized items list, Sl. No. 11 of Annexure B).

A. TECHNICAL SPECIFICATIONS OF ALTERNATOR:

1. Rated Output : 250 kVA continuous rating at 0.8 PF at specified ambient
2. Rated Voltage : 415 Volts
3. Phase : 3, (4 wire), neutral point has to be brought out to terminal box
4. Type : Brushless
5. Frequency rated / cycle : 50 Hz
6. Rated power factor : 0.8 lagging
7. No. of Poles : 4
8. Class of insulation : Class F/H
9. RPM : 1500
10. Phase sequence : UVW
11. Conforming to : IS: 4722, 13364 with latest amendments.
12. Rating : Continuous suitable for Motor loads.
13. Connection : Y (Star)
14. Ambient : 45 °C max, RH 98%
15. Alternator Enclosure Protection: IP 23 (minimum)
16. Alternator Terminal Box Protection: IP 23 (minimum)
17. Amplitude of vibration: Should be as per IS-12075.
18. Excitation system: Brushless, self excited and self regulated with solid state AVR
19. Mounting: Foot mounted
20. Permissible voltage variation: +/-2 % at rated speed, load and power factor
21. Permissible frequency variation: +/-2 % at rated load and power factor
22. Frame size: Bidder to confirm
23. Motor starting ability: 200 % of FLC for 10 sec with max. Voltage dips of 20%.
24. Unbalanced current carrying capacity : 25 % of FLC continuously, with none of the phase currents exceeding the rated current
25. Short circuit current withstand capacity: shall not exceed 15 times the peak value or 21 times the RMS value of the rated current in the case of short circuit on all phases during operation at rated voltage
26. No. of alternator bearings: The alternator shaft should be supported on rolling element bearings at DE and NDE.

27. Voltage swing (Transient response) : Maximum 10 % with 0.2 to 0.7 sec (recovery time), when rated load is suddenly switched on
28. Automatic voltage regulation: ± 0.5 % to ± 1.0 % from no load to full load
29. The alternator should be capable of sustaining a 10 % over load for one hour in any 12 hours operation.
30. The alternator shall be designed to withstand a speed of 1.2 times the rated speed.
31. The alternator should be capable of continuous operation over a range of 110 % of rated voltage.
32. Total harmonic distortion factor should be less than 3 % between phases at no load.
33. Bidder shall mention efficiency of the alternator at 25 %, 50 %, 80 % load at 0.8 pf.

Technical Details:

1. Alternator stator winding terminals are to be connected to 4 nos. of suitably rated terminals supported on sheet molding compound (SMC) supports inside the alternator terminal box.

2. The alternator terminal box should be suitable and should have sufficient space for terminating one no. 3½ core suitably sized, 1100V grade PVC insulated and PVC sheathed, armoured, multi-strand copper cable. Separate cable box shall be provided for supporting power cable. Suitable size of cable gland should be fitted in the terminal box. Cable gland and entry hole shall also be provided in the TB for AVR cables as AVR shall be mounted in the control panel.

3. Neutral point of each alternator shall be connected to 2 (two) nos. heavy duty PVC insulated, PVC sheathed, flexible, single core, IS approved copper cables of 70 sq mm size and of sufficient length (minimum 5.0 m) for earth connection (to separate earth electrodes near the skid). The free ends of cables are to be terminated with heavy duty, tinned copper tubular lugs. Earth cable shall be protected to avoid any damage and to be run in galvanized,

flexible MS conduit. Entry holes shall be provided in the alternator TB for entry of earthing cables. Cable make: Nicco/Universal/ Havells/CCI.

4. 2 nos. of earth studs are to be provided on both sides of the alternator for body earthing.

5. Lifting hooks are to be provided for lifting the alternator.

6. Automatic voltage regulator should be mounted in the control panel with approved rubber bushes under AVR mounting holes to reduce vibration. AVR should have under speed, over excitation protection features with LED display.

7. Alternator windings and AVR should be suitable for humid atmosphere as per ambient conditions mentioned above in the technical specifications. AVR should be suitable for motor load duty.

8. Alternator frame should be made from MS or Cast steel.

B. SPECIFICATIONS OF CONTROL PANEL:

Alternator terminals shall be directly connected to the alternator control panel busbars through suitably rated cable.

Sheet steel clad, self supporting, floor mounting, cubicle type, dust and vermin proof generating set control panel made of 2 mm thick MS CRCA sheet and built upon rigid framework, having front and rear hinged doors with danger plate fitted on both sides, lifting lugs on top, ventilation louvers on both sides, bottom detachable gland plates, double earthing studs on two sides, complete with suitably sized zinc passivated hardware with heavy plain and spring washers. The panel doors should have neoprene rubber gasket. The panel should be designed and manufactured as per IS-8623. The panel enclosure will be as per IP54 except for the open part of cooling louvers at top and bottom of the panel sides. Suitable wire mesh should be provided on the inner side of the louvers to prevent entry of insects.

The metal surface of the panel should be given seven-tank anti corrosion treatment and then powder coated. Panel shall be supported on a frame of suitably sized rigid M.S. angle iron / M.S. channel frame work to have sufficient strength. The frame should be able to withstand the stress and vibration during transportation.

The salient points of the panel are as described below:

1. AVR of the alternator shall be mounted inside the control panel with vibration proof supports.

2. The control panel shall be fitted with a suitably rated MCCB as out going isolating device. MCCB should trip on the following electrical fault:

i) Earth leakage
ii) Over load & short circuit
iii) Generator under voltage and over voltage
iv) Hooter/alarm shall be provided for audio warning in case of tripping of the Alternator and engine on fault.

3. Panel shall be fitted with an electronic timer to prevent tripping due to LLOP during starting when lube oil pressure is low.

B.1 INSTRUMENTS AND SWITCHES: (Mounted on front hinged door)

" 1 No. M.I. Voltmeter, 1.0% accuracy, 96 sq. mm, 0 - 500 V (AEL/Rishabh make)
" 1 No. Voltmeter selector switch (Kaycee/ L&T make)
" 1 No. M.I. Ammeter, 1.0% accuracy, 96 sq. mm, 0-500 Amps, C.T. operated (AEL/Rishabh make)
" 1 No. Ammeter selector switch (Kaycee/ L&T make)
" 1 No. Digital frequency meter , 48 X 96 mm , scaled 0-100 Hz , suitable for 240 V AC operation, with a single pole ON / OFF switch (AEL/ Rishabh make)
" 1 No. M. I. KW meter, Dynamometer type, 3 ph, 3 element, 96 sq. mm, 1.0% accuracy, 0 -300KW (AEL/Rishabh make)
" 1 No. Hour meter to indicate engine run hours (AEL / Rishabh make)
" 1 No. DC Ammeter for Battery Charger , 0 - 10 Amps (AEL/ Rishabh make or equivalent reputed make)

" 1 No. DC Voltmeter , 0 - 30 Volts for Battery Charger (AEL/ Rishabh make or equivalent reputed make)
" 1 No. Battery Charger current selector switch - trickle/ boost (Kaycee / L&T make)
" 1 No. Toggle switch for battery charger ON/ OFF (Kaycee / L&T make)
" The panel should have push buttons for (i) Engine Stop (ii) Alarm Accept (iii) Alarm Reset (iv) Lamp Test.

B.2 MAIN COMPONENTS: (Mounted Inside the Panel)

"Panel should have one set of TP & N electrolytic grade , high conductivity , tinned copper bus-bars as per IS: 5082, rated 1000 Amps (500 Amps for neutral bus) and supported at required intervals to withstand short circuit fault levels up to 25 KA. Bus-bar support shall be non- hygroscope SMC / FRP. Bus bars shall be insulated with heat shrinkable PVC sleeves. Incoming and outgoing power cable shall terminate on tinned copper bus bar links rated for 400 Amps.
" Cables from alternator TB shall be connected directly to the panel bus-bars.

" 1 No. 1000 Amps 4 pole MCCB, 50 kA breaking capacity shall be used as outgoing isolating device. Incoming of the MCCB shall be from the panel Bus bars through suitable bus-bar links. The MCCB shall have in-built electronic type adjustable overload & short circuit protection. 24 V DC shunt trip coil is required for external tripping. Front Drive kit with door inter lock facility to ensure that the door can be opened only when the MCCB is in the OFF position is to be provided. Overload should be adjustable from 50% to 100% and short circuit setting should be also adjustable from 1.5% to 5%. Make: Legrand / Merlin-Gerin.

" The outgoing side of the MCCB shall be connected to 2 (two) nos. 125 Amps 5 pin (3 phase + 1 neutral + 1 earth) sockets, which will be used as outgoing. The sockets will be mounted on a hylam socket board, fitted at a convenient position on the wall nearest to the control panel. Connection to the sockets from the bus-bars will be through suitably sized 3.5 core copper flexible cable. Matching pair of plugs will be provided with the sockets. Make of Plugs-Sockets: BCH, DS-9 type

" 1 No. CBCT along with Earth leakage relay for protection against earth leakage should be provided. Relay adjustable settings: 0.1 - 0.3- 1.0-3.0-10.0-30.0 Amps & 0.06-0.1-0.3-1.0- 5.0 sec in steps. During earth leakage relay should trip the MCCB through shunt trip coil. The CBCT (ID 110mm) size should be such that relay should not trip during short circuit due to saturation. Similar to Cat No. (26094+ 26091) of Legrand. (Make: Legrand/ Merlin Gerin).

" 1 No. KWH meter integrating, electronic type suitable for balanced and unbalanced loads, C.T. operated, 3 ph, 4 wire. (An aperture fitted with glass shall be provided on door to facilitate reading of energy units from outside) (Alstom/L&T make)

" 6 Nos. Bar Primary Resin cast CT of 500/5 ratio , 15 VA , class-1 conforming to IS 2705 (3 nos. for ammeter and KW meter, 3 nos. for KWH meter (AEL / Kappa make)

" Auxiliary Relay / Contactor 24 VDC with some spare contacts. Quantity should be as per the control circuit requirement. (L&T /Siemens/ Schneider make)

" Auxiliary Relay / Contactor 240 VAC with some spare contacts. Quantity should be as per the control circuit requirement. (L&T /Siemens/ Schneider make)

" 1 No. 24 VDC Battery Charging unit, maximum charging capacity 10 Amps with fuse protection & MCB (10 Amps, C curve) on input and output sides. Charger will charge the 24 V battery used for engine start & protection circuit.

" HRC instrument fuse holders NS type phenol moulded with suitable fuses & links for different circuits. Separate fuses and neutral links should be provided for control circuit indicating system lamps, instruments, enclosure illumination and tripping circuit (GE make).

" Terminal strips for terminating the control connection from the engine and AVR cable from Alternator.

B.3 WIRING/ CABLE SCHEME:

All cables and wires interconnecting alternator to control panel and from control panel to sockets are to be supplied by the bidder.

" Control system will work on 240 VAC. Control panel wiring shall be done with 2.5 sq mm, flexible multi-stranded copper, 1100 V grade PVC insulated wires approved by ISI, Tariff Advisory Committee and Fire Insurance

Authority. All wiring will have copper lugs & terminal blocks as required. Wiring for lighting circuit MCB, power outlet and wiring for CT will be done with 2.5 sq mm, flexible copper, 1100 V grade PVC insulated wires approved by ISI, TAC & FIA & have ring type lugs. Wires shall be colour coded, with numbered ferrules. Make: Finolex/ Havells.

" Output from the Alternator terminal box should be connected to control panel with heavy duty 3 ½ core suitably sized, 1100 V grade, PVC insulated and PVC sheathed, armoured, stranded copper cable approved by IS. This cable is to be supplied & connected by the bidder. Make: NICCO/ CCI/ Universal/ Havells.

" AVR shall also be wired from alternator to control panel by the supplier using heavy duty PVC insulated and PVC sheathed, 1100 V grade armoured, stranded, ISI approved copper cable of suitable size. Cable to be supplied by the bidder.

Make: NICCO/CCI/ Finolex/ Havells.

" Heavy duty Single Compression Cable Glands shall be provided at all cable entries for power and control cables. Cable Glands shall also be provided for the outgoing power cable. All cable glands to be supplied by the party. Make: Baliga/ GMI/Dowells.

" All power and control cable terminal ends will have suitable crimping lugs. All lugs supplied by the party. Make: Dowells/3D

" Alternator to panel power cable, AVR cable and engine protection cable conduit shall be protected in their run from unit to control panel. Suitable provision shall be made for safe routing of output cable from panel to outside of the unit.

C. EARTHING:

1. The earthing scheme for the unit should be as per IS-3043.
2. Two nos. 50 x 5 mm GI straps shall be suitably fixed near the unit skid. Galvanisation thickness should be min. 85 micron and as per IS. Output from neutral switch (two cables for neutral earthing), Alternator earth terminals, control panel earth terminals, enclosure and truck chassis shall each be connected with two nos. separate cables to both the straps with independent connections at separate

points. Heavy duty PVC insulated, PVC sheathed, stranded, single core copper cables of 50 sq. mm size shall be used for each earth connection. The cables to be terminated with lugs and suitably protected against mechanical damage.

3. Both the straps shall extend up to the back side of the enclosure and each strap will have two nos. of zinc coated terminal studs, 15 mm dia are to be provided at end of the straps for connection to system earth. Two nos. of earthing cables of size & type mentioned in point no.2 above and individual length 5.0 metre shall be provided and connected to these two straps for external earthing. The free ends of these cables shall be crimped with heavy duty, tinned copper tubular lugs. Suitable opening with hinged cover shall be provided in the rear side of the unit to facilitate the entry of outgoing power cable and earth leads.

NOTES (Alternator and Control Panel):

a) Offered alternator should be of proven design / model. The model shall be in regular production range.

b) Alternators, control panels and other electrical items must be new and in unused condition. No reconstructed/ rebuilt item will be acceptable.

c) Bidder shall submit the following information along with the offer failing which offer is liable for rejection:

" Frame size of the offered alternator

" Detailed dimensional/GA drawings of the offered alternator, control panel and COS panel

" Electrical Schematic and Indicative power and control wiring diagram

" Component layout diagram

" Bill of Materials, catalogue and datasheets of all the components used

d) In case of the successful bidder, OIL shall study the submitted drawings and incorporate modifications/ corrections if required, which shall be conveyed to the bidder. The bidder shall incorporate the modifications/ corrections in the revised drawings and submit the same to OIL for approval. Only after getting due approval of final revised drawings from OIL, the bidder/ manufacturer shall proceed for manufacturing/assembly of the panels.

e) After successful commissioning, supplier/ bidder shall submit electrical drawings of the panels and all electrical power and control wiring diagram inside the skid which shall be corrected and final drawings after installation and commissioning, 6 (six) sets as hard copy. Also drawings shall be fixed on the panel door for each panel.
f) Bidder/ supplier may offer better/alternative scheme for generator and control panel wiring and component layout scheme, with justification.

4.0 GENERAL NOTES

a. The engine should conform to either ISO 3046/BS 5514 /IS 10000 specifications and should be rated for continuous power with an over load power rating of 110% of the continuous power corresponding to engine application for a period 1 hr. within a period of 12 hrs. of operation.

b. A suitably selected flexible coupling should be incorporated to transfer power from the Engine to the Alternator. The bidder has to mention the same in their offer.

c. The Generating Set should be suitable for operation at the site conditions mentioned earlier.

d. The Engine and Alternator are to be coupled, aligned and mounted through AVM pads on common "Base Frame".

e. The Generating Set inclusive of the Control Panel and all accessories should be housed within an acoustic enclosure be ready for operation after carrying out initial servicing and making provisions for fuel.

f. Bidders must submit filled in data sheet and technical check list enclosed with the enquiry and deviations if any should be separately indicated.

g. Bidders must undertake that the equipment to be supplied are not going to be obsolete for next 10 years and provision for supplying spares of the equipment shall be continued.

5.0 ACOUSTIC ENCLOSURE

The engine and alternator are to be covered by acoustic enclosure. Acoustic enclosures shall be comprised of absorptive acoustic sliding perforated panels (100 mm thickness) and should be free standing, floor mounted, factory built and modular in construction to facilitate easy installation and dismantle of enclosure such that easy maintenance /repair of engine and alternator at work site can be done. It shall consist of acoustically treated panels housed in sheet metal housing. Acoustically treated sliding doors on two sides should be provided for easy access for maintenance, repairs and operation.

The acoustic enclosure should be designed and manufactured to suit the most stringent noise specifications offering attenuation to a minimum of 75 dBA at 1 meter. Sound proofing of the enclosure should be done with high quality rock wool / mineral wool conforming to IS; 8183 of 50 MM thickness and density of 96 Kg/m3. The rock wool should be further covered with fiberglass cloth and perforated powder coated sheet.

The acoustic enclosure shall comply with the provisions of the Environment (Protection) second Amendment Rules 2002, vide notification GSR No.371 (E) dated 17th May 2002 and as amended vide GSR No. 520 (E) dated 1st July 2003 issued by the Ministry of Environment & Forest, Government of India. It should further be approved by National Physical Laboratory, New Delhi or alternatively should meet norms specified by Central Pollution Control Board.

Specially designed attenuators should be provided to control sound at air entry to and exit from the container. There should be carefully designed inlet and outlet baffles /attenuators with corresponding weather louvers and bird mesh allowing sufficient air flow, for the set to operate even under the harshest ambient conditions whilst maintaining specified noise levels.

The enclosure should be fabricated out of CRCA sheet of 12 SWG Corrosion resistant sheet steel duly surface treated and lined with sound absorbing materials retained by powder coated perforated zinc sheet. The sheet metal components should be pretreated and to ensure prolonged life of the

enclosure, it should be pure polyester based powder coated (inside as well as outside) and all nuts and bolts / hardware should be Zinc coated.

Each canopy should have a pitched roof, guttering and a panel viewing window. Readings of indicating meters must be visible from outside. Side opening access doors should be provided on either side with lockable recessed handles to facilitate maintenance operations. The doors should be lined with high quality EPDM gaskets to avoid leakage of sound. Cable glands should be provided to avoid necessity of cutting into the canopy. The enclosure should have sufficient space around the generating set, so that operating personnel can carry out inspection of the same. There should also be provisions for taking out the generating set or the panel for maintenance / overhauling jobs.

The residential type silencer and spark arrestor should be roof mounted with all internal pipe work including flexible bellows already connected. The silencer should be designed to give minimum back pressure and high sound attenuation.

The canopy should be finished in synthetic enamel paint incorporating rust inhibitors and aluminum sprayed silencers and spark arrestors to guarantee a superior and long lasting finish.

Adequate ventilation should be provided to meet air requirement for combustion and heat removal. If required, a thermostatically controlled blower should be used to meet total air requirement and air changes. Temperature of enclosure should not exceed beyond 5 deg.C of ambient temp.

The fuel tank at the base of silent DG set should be provided with an air breather and drain plug. The fuel level should also be indicated with the help of fuel gauge.

There should be provision for filling the fuel from outside as in the case of automobiles with locking arrangement. There should also be provision of drain plugs for drawing lube oil and diesel. Also, the batteries should be accommodated in a separate tray within the enclosure.

There should be provision of emergency shut down of the engine from outside the enclosure.

There must be two numbers of earthing points on both sides for connecting the enclosure to the ground.

The enclosure should have the sufficient space in and around the generating set to facilitate maintenance and operation of the set

Blower of suitable size should be provided to control the inside temperature of the Acoustic Enclosure.

The enclosure should be provided with internal wiring for illumination. There should be one number 15 amps MCB, one number switchboard with 5 amps / 15 amps combined switch / socket, 2 numbers 20 watt tube light fitting with lamp for lighting circuit. Wiring of lighting circuit should through the PVC conduit. Main switch, changeover switch, control panel and alternator should be interconnected with 25 mm x 6 mm G-I strip.

5.1 **ENCLOSURE ILLUMINATION AND POWER OUTLET**:

Each genset enclosure will have one no. of Bulkhead type luminaire mounted on enclosure wall/ roof and wired with heavy duty PVC insulated and PVC sheathed armoured, stranded copper cable. Light will be operated from individual MCB rated 6 Amps, mounted on individual control panel cover. One no. industrial type metal clad plug socket of 10 Amps rating with 10 Amps SP MCB as switch (also mounted on control panel) should also be provided inside/ near the enclosure. Power for lighting circuit and socket outlet should be taken from the main bus through back-up HRC fuses of 16 Amps rating and neutral link.
Make: Philips/GE for luminaire & Legrand/ Merlin-Gerin for MCB/ Metallic plug socket.

5.2 **Size of the Acoustic Enclosure** :

Acoustic Enclosure's base frame should be fabricated from ISMB 300 and incorporate necessary facilities for handling and inter location transfer through oil field trucks and its overall dimension should not exceed 6.0 M x 2.5 M x 2.75 M (Length x Width x Height).

6.0 **INSPECTION & TESTING**:

The generating sets including the power control panel shall inspected and tested at manufacturers works / factory by OIL Engineer, as per relevant IS norms, prior to dispatch. Such inspection however shall not relieve the supplier of his responsibility to ensure that the equipment supplied is free from all manufacturing defects and conforms to correct specification. Intimation must be sent to OIL at least 30 days in advance for inspecting the generating sets at manufacturer's premises.

The supplier shall submit detailed records and all relevant test certificates along with the delivery of the generating sets. The certificates should be forwarded in quadruplicate and those for electrical equipment should be endorsed "Suitable for use in the climatic conditions specified".

Inspection /testing charges, if any, shall be quoted separately which shall be considered for evaluation of the offers. The to and fro fares, boarding/ lodging and other en route expenses of Oil's Inspection Engineers for carrying our inspection shall be borne by OIL. Dispatch clearance will not be given unless OIL is fully satisfied as regards manufacturing to order specifications and successful testing.

7.0 **INSTALLATION & COMMISSIONING**

Installation and Commissioning of the 250 KVA DG Sets and its power control panel shall be carried out by the bidder in the presence of OIL representatives at its fields at Duliajan, Assam (India). Services of qualified and competent personnel from equipment manufacturer is essential during installation and commissioning of the generating sets. Persons engaged for installation, testing and commissioning of the generating sets should have valid electrical license. A person who is authorized for supervision of all electrical works should have supervisory license.

Installation / commissioning charges should be quoted separately which shall be considered for evaluation of the offers. These charges should included amongst others to an from fares, boarding/ lodging and other expenses of the

commissioning engineers during their stay at Duliajan, Assam (India). All Personal, Income and Service Tax etc. towards the services provided by the supplier shall be borne by the supplier and will be deducted at source. Bidders should also confirm about installation/commissioning in the Technical Bid.

Note :

I. Once commissioned at designated sites the generating sets will be subjected to a trial run on available load for a minimum period of 72 hrs continuously and on satisfactory performance shall be subsequently handed over to OIL.

II. Any offer not quoting the installation/ commissioning and Inspection/ testing charges shall be loaded with a maximum charges for the same received against the tender for the evaluation purposes. Moreover bidders should categorically confirm about the Service/ Income Taxes for evaluation purpose.

8.0 **DOCUMENTATION:**

2 Sets of the following documents /drawings should be supplied with the generating set #
GA Drawing, O & M manual of diesel engine, alternator and control panel

Spare parts catalogue of diesel engine, alternator and control panel
Test certificate of diesel engine
Test certificate of alternator
Test certificate of D.G. set
Test certificate of control panel
One set of drawing showing installation details of the generating set, wiring diagram for the control panel and wiring drawing between the alternator and control panel.

9.0 **SPARE PARTS:**

List of spares/ Bill of Materials along with their cost and part numbers that shall be required for normal operation and maintenance of the generating sets and accessories for a period of two years should be submitted
along with the offer. Spare parts should be available for minimum 10 years from the date of delivery of materials.

Spare parts list for alternator, control panel and light fittings etc. shall be submitted separately.

In addition, commissioning spares for the complete genset shall be offered along with the main offer. Cost of these shall be considered for evaluation of the tender. The items shall be handed over to OIL after commissioning, if unused.
The following items shall be offered as MANDATORY SPARES along with the alternator unit. Cost of these items shall be considered for evaluation of the tender.
- Mandatory minimum electrical spares per genset [Bidder may include any other items along with the above, if deemed necessary]:
i) Automatic voltage regulator unit (along with any other component used with AVR)- 01 set
ii) Standard (forward) diode for rotating rectifier assembly- 06 nos.
iii) Reverse diode for rotating rectifier assembly- 06 nos.
iv) Varistor/ surge protector -03 nos.
Item wise break up of prices of these spares should also be provided.

10.0. **GENERAL NOTES FOR ELECTRICAL ITEMS AND WORKS:**

1. Bidder to give an undertaking that their offer fully meets all the specifications mentioned in the tender document (except the deviations mentioned as per point no.2 below).
2. Bidder to mention specific deviations of their offer from tender specifications. In case of an order the complete tender specification shall be mentioned in the order. However, deviations from tender specifications, as mentioned by bidder in their offer and subject to acceptance of OIL shall be mentioned in the order.
3. Bidder must submit the undertakings from the manufacturers of generator and control panel stating that they have read and understood the complete specification

and in the event of an order on the bidder the respective equipment supplied by them through the bidder will fully meet the tender specifications for rating and performance.

4. In the event of an order the bidder will prepare detailed wiring diagram, earthing scheme with drawing, detailed drawings for control panel along with as to be built dimensional drawing, layout plan of the unit showing all parts, power, control cable, earth strap routes, bill of materials. The drawing should clearly indicate the arrangements for protection of cables and earth straps against mechanical damage. Bidder should submit with the above documents the confirmation from alternator and control panel manufacturer that the offered alternator and control meets all the features mentioned in the order specifications. Categorical confirmation against each point of alternator's and control panel's specification is required. Suitable documentary evidence and catalogues shall be submitted. All the above mentioned drawing and documents will be submitted to OIL for approval within one month after placement of order. The manufacture of the unit is to be started only after written approval of the drawings by OIL.

5. In case the bidder cannot meet any of the points mentioned in the order while submitting details mentioned in point no. 4 above then the order will be cancelled without any obligation on part of OIL. IN CASE OF SUCH CANCELLATION OIL MAY RECOVER FROM THE BIDDER THE COST INCURRED BY OIL IN PROCESSING THE TENDER TILL THE TIME OF CANCELLATION.

6. Bidder must mention their detailed comments point-wise against each point of tender specifications in their offer. Specific type and make of components should be mentioned.

7. Four sets of complete electrical drawings and layout details and operation, maintenance manual of generator, catalogue of major component of control panel and guarantee certificate are required along with the supply.

11.0 WARRANTY:

The warranty period for the engine, alternator, control panels and all other accessories should be a minimum of 12 months from the date of commissioning or 18 months from the date of dispatch. The relevant warranty certificate should be submitted at the time of delivery of the generating sets.

12.0 PACKING:

The packing shall be sufficiently robust to withstand rough handling/ transit damage. Boxes/ packing cases containing electrical equipment shall be water proof lined. Control panels and electrical items in particular should be packed with sufficient care (with shock/ vibration proof lining) to prevent transit damage. Loose components shall be packed separately.

13.0 Any items/ points not included in the specifications but necessary for efficient control and operation of the alternator shall be stated by the bidder.

14.0 AFTER SALES SERVICE:

The nature of after sales service, which the supplier can provide during initial commissioning and also subsequently should be clearly stated. Confirmation that all spares related to the equipment supplied shall be available for a period of at least 10 years after delivery should be provided. Bidders should also indicate their nearest authorized service center.

15.0 BID EVALUATION CRITERIA (TECHNICAL):

The bids must conform to the specifications and terms ad conditions given in the enquiry. Bid shall be rejected in case the items(s) offered do not conform to the required minimum / maximum parameters stipulated in the technical specifications and to the respective international /national standards wherever stipulated. Notwithstanding the general conformity of the bids to the stipulated specifications and terms and conditions, the following requirement shall have to be particularly met by the bidders, without which the offer will be considered as non-responsive and rejected.

i. The offered engine should be a four stroke, direct injection turbo charged, after cooled, diesel engine, rated for continuous power and capable of developing a net minimum HP of 295 at 1500 rpm at site conditions

ii. The engine must conform to ISO:3046/BS 5514/IS 10000 specifications and must be rated for continuous power with an over load power rating of 110% of the continuous power

corresponding to engine application for a period of 1 hr. within a period of 12 hrs. of operation.

iii) The Engine should have two intake and two exhaust valves in each cylinder, each valve has a rotator which moves the valve face 3 degree relative to the valve seat during one complete cycle of the engine for less wear and tear.

iv. The acoustic enclosure should be designed and manufactured to suit the most stringent noise specification offering attenuation to a minimum of 75dBA at 1 meter.

v. Bidders should have the experience of successfully completing at least 1 (one) order in the last 10 (ten) years before the bid closing date of this enquiry against supply, installation, commissioning and testing of Diesel Engine driven generating sets of capacity 125 KVA or above along with the Control Panels and accessories in PSUs, Central Govt. or any other reputed Company Documentary evidence in this regard must be provided along with the quotation failing which their offer will be rejected.

vi. Bidder should be an OEM or authorized dealer of engine, alternator or alternatively an OEM approved assembler of the complete generating set or their authorized representative.

vii. If the bidder is an OEM of engine or their authorized dealer then the must purchase the alternator from OEM of alternator of their authorized dealer and vice versa and necessary documentary certificates from the OEM must be submitted along with the offer.

viii. If the bidder is an OEM approved assembler of generating sets or their authorized representative, he must purchase the engine and the alternator from OEM or their authorized dealers. Documentary evidence in this regard must be enclosed with the offer failing which offer will be rejected.

TECHNICAL CHECK LIST:

The following check list must be completed and returned with the offer. Please ensure that all these points are covered in your offer. These will ensure that your offer is properly evaluated. Please tick mark Yes or No. to the following question, in the right hand column

1. WHETHER QUOTED AS OEM OF ENGINE AND WHETHER DOCUMENTARY EVIDENCES SUBMITTED? YES/NO
2. WHETHER QUOTED AS OEM OF ALTERNATOR AND WHETHER DOCUMENTARY EVIDENCES SUBMITTED? YES/NO
3. WHETHER QUOTED AS AUTHORISED DEALER OF OEM (ENGINE/ ALTERNATOR) AND WHETHER DOCUMENTARY EVIDENCES SUBMITTED? YES/NO
4. WHETHER QUOTED AS OEM APPROVED ASSEMBLER OR HIS AUTHORISED REPRESENTATIVE? YES/NO
5. WHETHER SEPARATELY HIGHLIGHTED DEVIATION FROM THE TECHNICAL SPCIFICATION? YES/NO
6. WHETHER DETAILED SPECIFICATIONS OF ENGINE, ALTERNATOR WITH MANUFACTURER'S TECHNICAL LITERATURE / CATALOGUE ENCLOSED? YES/NO
7. WHETHER TEST CERTIFICATE OF ENGINE, ALTERNATOR & CONTROL PANEL WILL BE SUBMITED? YES/NO
8. WHETHER INSTALLATION / COMMISSION, MAINTENANCE MANUAL SHALL BE SUBMITTED FOR THE GENERATING SET? YES/NO
9. WHETHER SPARE PARTS FOR 10 YEARS SHALL BE AVAILABLE? YES/NO
10. WHETHER INDICATIVE POWER AND WIRING DIAGRAM OF ALTERNATOR, CONTROL PANEL SUBMITTED? YES/NO
11. WHETHER GA DRAWING OF CONTROL PANEL SUBMITTED? YES/NO
12. WHETHER CONFIRMED CONTROL PANEL DRAWING SHALL BE APPROVED BY OIL BEFORE MANUFACTURING IN THE EVENT OF PLACEMENT OF ORDER? YES/NO
13. WHETHER OFFERED ENGINE IS RATED FOR CONTINUOUS POWER? YES/ NO
14. WHETHER NET HP OF THE OFFERED ENGINE IS AT LEAST 295 HP? YES/NO
15. WHETHER THE ASPIRATION OF THE ENGINE IS TURBO CHARGED? YES/NO
16. WHETHER THE NOISE ATTENUATION SHALL BE MINIMUM OF 75dBA ONE METER FROM ACOUSTIC ENCLOSURE WHEN THE GENERATING SET IN THE OPERATION? YES/NO
17. WHETHER THE OFFER ENGINE CONFROM EITHER TO ISO3046 /BS5514/IS 1000 SPECIFICATION/YES/NO

18. WHETHER THE OFFERED ENGINE HAVE TWO INTAKE AND TWO EXHAUST VALVES IN EACH CYLINDER, EACH VALVE HAS A ROTATOR WHICH MOVES THE VALVE FACE 3 DEGREE RELATIVE TO THE VALVE SEAT DURING ONE COMPLETE CYCLE OF THE ENGINE FOR LESS WEAR AND TEAR. ? YES/NO

ANNEXURE:I

TOOL KIT CONSISTS OF FOLLOWING TOOLS

1.1 OPEN JAW DOUBLE ENDED SPANER IN MM SIZES: 6 X 7 , 8 X 9 , 10 X 11, 12 X 13 , 14 X 15 , 16 X 17 , 18 X 19 , 20 X 22 , 21 X 23 , 24 X 26 , 25 X 27 , 28 X 30 , 30 X 32 (TOTAL13 NOS)
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.2 DOUBLE ENDED RING SPANNER IN MM SIZES: 6 X 7 , 8 X 9 , 10 X 11, 12 X 13 , 14 X15 , 16 X 17 , 18 X 19 , 20 X 22 , 21 X 23 , 24 X 26 , 25 X 27 , 28 X 30 , 30 X 32 (TOTAL 13NOS)
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.3 HEAVY DUTY DOUBLE HEX. STD. SOCKETS IN 1/2" SQ. DRIVE IN MM SIZES:8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29 ,30,31,32 & 34 (26 NOS)
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.4 REVERSIBLE RATCHET IN 1/2"SQ.DRIVE, OVERALL LENGTH: 260 MM.3/8" sq
universal socket 3/8",1/2",9/16"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.5 SLIDING T-HANDLE IN 1/2"SQ.DRIVE, OVERALL LENGTH: 300 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.6 EXTENSION BAR IN 1/2"SQ.DRIVE ,OVERALL LENGTH :75 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.7 EXTENSION BAR IN 1/2"SQ.DRIVE ,OVERALL LENGTH :125 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.8 EXTENSION BAR IN 1/2"SQ.DRIVE ,OVERALL LENGTH :300 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.9 UNIVERSAL JOINT IN 1/2"SQ.DRIVE ,OVERALL LENGTH :78 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.10 SWIVEL HANDLE IN 1/2"SQ.DRIVE ,OVERALL LENGTH :380 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.11 L-HANDLE IN 1/2"SQ.DRIVE ,OVERALL LENGTH :210 MM.
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.12 ADAPTER 3/4"F X 1/2"M
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.13 ADAPTER 3/4"M X 1/2"F
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.14 UNIVERSAL SOCKET WRENCH ,1/2" DRIVE
SIZE: 1/4" , 3/8", 1/2" 9/16" , 5/8"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.15 TORQUE WRENCH
CAPACITY: 0-250 LBF-FT
CAPACITY: 0-1000 LBF-FT
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.16 SCREW DRIVER ENGINEER PATTERN: 200 X 10
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.17 SCREW DRIVER PHILLIPS PATTERN : 8 X 150
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.18 ADJUSTABLE WRENCH:8"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.19 ADJUSTABLE WRENCH:12"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.20 ALLEN KEY SET 1.5 MM TO 10 MM
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.21 COMBINATION PLIER: 6"
MAKE: GRIPHOLD/MEKASTER/TAPARIA/EVEREST.

1.22 LONG NOSE PLIER :160 MM
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.23 CIRCLIP PLIER -INTERNAL :175 MM
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.24 CIRCLIP PLIER -EXTERNAL :175 MM
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.25 CENTRE PUNCH:4"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.26 BALL PIEN HAMMER: 200 GMS
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.27 PLASTIC TIP HAMMER :25 MM DIA
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.28 FEELER GAUGE-300 MM (26 BLADES) INCH AND MM COMBINED
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.29 FOOT RULE:12" (SS)
MAKE:KRISTEEL

1.30 MEASURING TAPE : 3 MTS (METALLIC)
MAKE:FREEMAN

1.31 DIAGONAL CUTTING PLIER : 160 MM
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.32 THREAD GAUGE:BSW , METRIC , UNC
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.33 OUTSIDE CALIPER 6"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.34 INSIDE CALIPER 6"
MAKE: GRIPHOLD/MEKASTER/STANLEY

1.35 SCREW EXTRACTOR SET (HEXAGONAL)CONTAINING DRILL SIZE IN INCHES :1/4",3/16",3/8",5/16",7/16",9/16",1/2",5/8",3/4",11/16",1/8",13/16", 7/8" (13 NOS)
MAKE:SNAP ON

1.36 SPRIT LEVEL 30 CM (12")

1.37 ULTRA LOW FLAT JACK REMOTE CONTROL COMPLETE WITH HYDRAULIC HAND PUMP,PRESSURE RELIEF VALVE , PRESSURE GAUGE AND 2.5 TO 3 MTS HYDRAULIC HOSE .
CAPACITY: 10 TON , CLOSED HEIGHT : 40-43 MM , STROKE: 10-12 MM , RAM DIA: 34-38
MM , WEIGHT OF THE JACK: 2 TO 4 KG.
MAKE: GRIPHOLD/MEKASTER/STANLEY

SINGLE LINE POWER SUPPLY DIAGRAM OF MCC PANEL