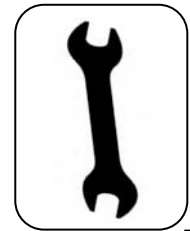


OPERATION AND MAINTENANCE MANUAL

3G11, 4G11 and 6G11 Series of engines



GREAVES COTTON LTD.

Diesel Engines Unit,
Chinchwad, Pune 411019, India,
Tel: (91) – 20 – 27473564, 267308200
Fax: (91) – 20 – 27472276
Mail-ID: gensetcare@greavescotton.com
Visit us: - www.greavescotton.com

Operation and Maintenance Manual For 3G11, 4G11 and 6G11 Series Engines



3G11 Series Engine



4G11 Series Engine



6G11 Series Engine

Operational and Maintenance Manual for G11 Series Engines

Foreword

We thank you for choosing Greaves G11 series engine for your application. G11 series engines are water-cooled, four-stroke, multi-cylinder, direct injection compression ignition engines. The engines are designed using modern concepts. The engines are suitable for various off-road applications. In addition to the performance parameters the engine designers have paid special attention to ease of maintenance, ease of assembly and disassembly, reliability and standardization.

The engines are compatible with existing emission norms and are capable of achieving the future emission norms. The rigid construction of engine has reduced the noise and vibration to a very low level. This manual describes the operating instruction and maintenance schedules of the engine. It is necessary that manual needs to be read carefully before putting the engine into operation.

Good installation, clean water, air, lube oil, fuel and timely maintenance will enhance the life of your engine, reduce your running cost and reduce the down time. We would like to emphasize the use of only genuine spare parts for the engine. Use the services of only authorized service dealer for maintenance. Use only listed lube oils, water additives. Training facility is also available with Greaves where technicians can be trained.

Continuous improvement may cause changes in this manual. In case the change is important, we make it a point to inform the owners of the engine. This manual is regularly updated to include these changes. In case of any queries, problems do not hesitate to contact our service dealer, regional office.

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Operational and Maintenance Manual for G11 Series Engines

Warranty Policy

Warranty Policy for Diesel Engine

A. Warranty Policy (Diesel engines)

Greaves Cotton Ltd. warranty for the machinery is limited to its faulty design, defective materials/ components and/or workman-ship and is valid until a period of 15 months from the date of dispatch of machinery from its Works/Warehouse or one year from the date of commissioning or completion of 3500 hours of operation, whichever event shall occur first.

OR

Greaves Cotton Ltd. warranty for the machinery is limited to its faulty design, defective materials/ components and/or workman-ship and is valid until a period of 24 months from the date of dispatch of machinery from its Works/Warehouse or 18 months from the date of commissioning or completion of 5000 hours of operation, whichever event shall occur first provided the user of the machinery uses recommended genuine spare parts including "Greaves Maxtherm" Lube Oil & Coolant wherever applicable and use of genuine Air Filter element and Lube Oil Filter element purchased only from Authorized Dealers of Greaves Cotton Ltd.

The foregoing warranty is not applicable in the event, interalia, if:

- If the D G set is installed and is in use without approved acoustic enclosure (canopy).
- The machinery has not been installed strictly as per the recommendations of Greaves Cotton Ltd. and operated in accordance with the instructions contained in the Greaves Cotton Ltd. operational manual.
- The defective/improper fuel, lubricants, coolants and any of their associated systems are utilized
- Unauthorized person carries out repairs and alterations.
- The maintenance of the machinery is not strictly done as per the procedure detailed in Greaves Cotton Ltd. operator's handbook/instruction manual.
- Improper tools and equipments are utilized at any stage during erection, commissioning and maintenance.
- During operation, the engine is improperly shut down or happened to over speeding or is subjected to misuse, negligence or accident.
- Failure in any way results from use of components / parts not manufactured or not authorized by us for use on our engine.
- If the engine is improperly stored beyond period of six months without recommended long storage treatment and used without recommended de-preservation.
- The warranty shall not apply to fair wear and tear of the individual components or damages due to the negligence or improper handling by the purchaser or his employees or agents or due to damage by any cause beyond our control.
- The warranty does not apply to defect arising due to default in periodic preventive maintenance and lapse in the use of
- The machinery has been stored improperly and not protected from adverse weather conditions of any nature.
- Assembly of the Gen set is not carried out as per the recommendation.
- Canopy manufactured and supplied along with the D G Set is not as per the CPCB approved drawings.
- If GOEM has his own approved design through authorized agencies and is adversely affecting performance of engine.

Operational and Maintenance Manual for G11 Series Engines

recommended spare parts including Lube Oil & Coolant wherever applicable.

complete unit under any circumstances. In case of any warranty claim, the responsibility of Greaves Cotton Ltd. shall be limited to the defective parts.

B. Terms of warranty

- The components having shelf life like rubber components, belts, hoses and replacement filters / consumables which are normally maintenance spares are not covered within the scope of this warranty.
- In cases of complaints on proprietary bought out items, our warranty is limited to the extent of warranty of the manufacture.
- All goods are supplied on the condition that under no circumstances we undertake liability for the indirect or consequential loss or damage of any nature.
- Warranty in respect of following items will be restricted to 1000 hours of operation or Three months, whichever shall occur first.
- Meters, battery charging alternator components & indicating instruments, Protection relays and control fuses
- Claim under warranty shall be summarily rejected if the defects are not notified within warranty period specified above and lodged within 3 days of the expiry of the warranty period.
- The new or repaired part of parts will be delivered free of cost Ex-works Chinchwad Pune. Any additional delivery cost to be borne by the purchaser.
- In respect of any warranty claim accepted by us, we shall arrange to replace or repair relevant and respective parts free of cost to the customer. If parts are replaced, the defective part shall be property of Greaves Cotton Ltd. In any case, wherever the parts are supplied with free charges, Greaves Cotton Ltd. shall not be liable for any fitment and / or other charges.
- Greaves Cotton Ltd. shall not be responsible for replacement of the

	Page No.
Preface	i
Warranty policy	ii
Modification summary	iii
Table of contents	iii
 Section 1.General	 1
1.1 Safety	1
1.2 Operation Guidelines	1
1.3 Maintenance Guidelines	1
 Section 2. Engine Description	 2
2.1 Engine Orientation of 3G11 Series Engine	2
2.2 Cylinder Nomenclature	2
2.3 Engine Orientation of 4G11 Series Engine	2
2.4 Cylinder Nomenclature for 4G11 engine	2
2.5 Engine Orientation of 6G11 Series Engine	2
2.6 Cylinder Nomenclature for 6G11 engine	2
2.7 Engine Nameplate	3
2.8 Location of the Nameplate	3
2.9 Engine nomenclature system	3
2.10 Engine Technical Specification	4
2.11 Engine Illustrations for 3G11 Series Engine	6
2.12 Engine Illustrations for 4G11 Series Engine	7
2.13 Engine Illustrations for 6G11 Series Engine	9
2.13.1 Engine Illustrations for 6G11 Series Engine	10
2.14 Dimensions and weight – 3G11 Series Engine	11
2.15 Dimensions and weight – 4G11 Series Engine	11
2.16 Dimensions and weight – 6G11 NAX	11
2.17 Engine Lifting Instructions	11
2.18 Transport, packing and storage	12
2.18.1 Safety notes for transport	12
2.18.2 Transport inspection	12
 Section 3. Systems	 13
3.1 Lubrication System	13
3.1.1 Engines lubrication system	13
3.1.2 Permissible engine inclination	14
3.2 Engine Cooling Systems	15
3.2.1 G11 – Series Engine Cooling System	15
3.2.2 G11 – Series Cooling System Data	16
3.2.3 Water Specification	16
3.2.4 Coolant Additives Specification	16
3.2.5 Filling Up Coolant on A New Installation	16
3.2.6 Topping up Coolant In An Already Installed Engine	16
3.2.7 Draining the System	17
3.2.8 Thermostat Element Replacement	17
3.2.9 Water Pump	18
3.2.10 Cleaning Radiator / CAC	18
 Section 4. Fuel System	 19
4.1 G11 – Series Engine Fuel System	19
4.2 Trapped Air Removal from the System	20
 Section 5. Electrical Systems	 21

Table of Contents, continued

5.1 Starter / Alternator	21
5.2 Electrical Control Panel	21
5.3 Battery	21
5.4 Alternator	22
5.5 Alternator regulator	22
5.6 Operating conditions	22
5.7 Danger and cause of failure	23
Section 6. Engine Operation	24
6.1 Standard and Typical Operating Conditions	24
6.2 Starting the Engine	25
6.2.1 Safety Instructions	25
6.2.2 First time start after installation	25
6.2.3 In case of key start	26
6.2.4 In case of push button start	27
6.2.5 AMF operation start up	27
6.3 Stopping the engine	27
6.4 Safety stop	27
6.5 Running in	28
Section 7. Service and Maintenance	29
7.1 Maintenance of Lube oil system	29
7.1.1 General	29
7.1.2 Changing Lube Oil	30
7.1.3 Checking Oil Level	30
7.1.4 Changing Oil Filter with oil	31
7.2 Maintenance of Fuel System	31
7.2.1 Fuel Filter	31
7.2.2 Fuel Strainer	32
7.2.3 Fuel Injection Pump	32
7.2.4 Injector NOP Adjustment	33
7.2.5 Dry Type Air Cleaner	33
7.3 Inspection and Checking of V Belt Tension	33
7.4 Checking and Adjustment of Valve Clearance	33
7.5 Flywheel Run out	33
7.6 Timing Gear	33
7.7 Maintenance of Cooling System	33
7.8 Battery Checking Instructions	33
7.9 Electronic Governor and Actuator Fitment	34
7.10 Maintenance Schedule	35
Section 8. Engine Preservation	40
8.1 Engine preservation during prolonged period of non-usage	40
8.2 Putting a preserved engine back into operation	41
Section 9. Installation Do's and Don'ts	42
9.1 Do's	42
9.2 Don'ts	42
Section 10. GCL Regional office and dealer addresses	43
Section 11. Index	70

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Operational and Maintenance Manual G Series

1. GENERAL

1.1 Safety



Safety of your personnel, property and equipment should be the first priority during installation, operation, maintenance of your engine and equipment.

The engine can cause harm in the following ways against which your personnel have to guard.

Sr. No	Hazard	Example
1.	Rotating parts	Flywheel, pulleys, radiator fan
2.	High temperature	Exhaust related parts, exhaust gases, water, oil
3.	Hot or hazardous sprays	Fuel, lube oil, water, exhaust leaks or hose/pipe bursts
4.	Electrical shocks/sparks	Alternators, starters, control panels, battery wirings
5.	Loose objects	Loose parts flying out (likelihood especially after maintenance)
6.	Poison	Additives, diesel, lube oil, exhaust gases can cause damage if consumed or inhaled

- Never get near the engine while it is running wearing loose items like tie, long chains, scarf, long loose clothes, tags with mobile phones etc.
- Display safety instruction clearly in the operating area.
- Make the operating persons aware of the safety related issues.
- Provide necessary safety equipment to the operating persons.

Follow all applicable safety related regulations and laws.

1.2 Operation Guidelines

1. It is assumed that the reader and the user of these operating instruction is familiar with the basic mode of operation of four stroke combustion engine and is able to follow technical issues reasonably well. The text has been kept therefore as short as possible for clarity and is backed by photographs and sketches.
2. Read the instructions carefully before installation of the engine or equipment.
3. In case of any doubt or difficulty, seek help from authorized service dealers.
4. Your engine needs clean air, clean fuel, clean lube oil and clean coolant.
5. Giving attention to these factors improves the life of your equipment, reduces the running costs, and also increases the mean time between failures.

1.3 Maintenance Guidelines

1. Please read the maintenance instructions. Seek services of authorized service. Dealers if needed.
2. Follow maintenance schedules.
3. Plan your maintenance.
4. Always use genuine spare parts, listed lube oil, listed additives and unadulterated fuel from reputed agency.
5. Always use correct tools.
6. Always carry out maintenance in a clean area.

Follow good engineering practices during maintenance.

Operational and Maintenance Manual G Series

2. ENGINE DESCRIPTION

2.1 Engine Orientation of 3G11 Series Engine



Fig. 1 Engine Orientation

2.2 Cylinder Nomenclature

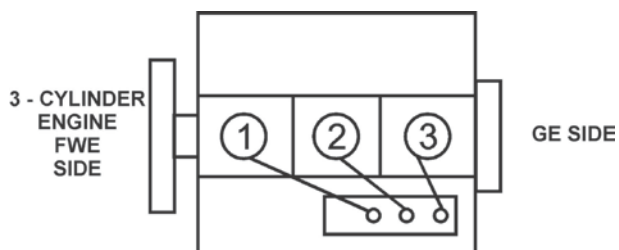


Fig. 4 Cylinder Nomenclature

2.3 Engine Orientation of 4G11 Series Engine



Fig. 5 Engine Orientation

2.4 Cylinder Nomenclature for 4G11 engine

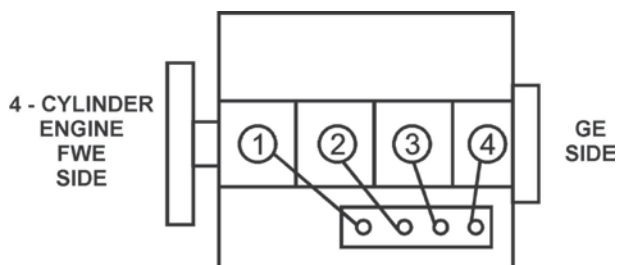


Fig. 6 Cylinder Nomenclature

2.5 Engine Orientation of 6G11 Series Engine



Fig. 7 Engine Orientation

2.6 Cylinder Nomenclature for 6G11 engine

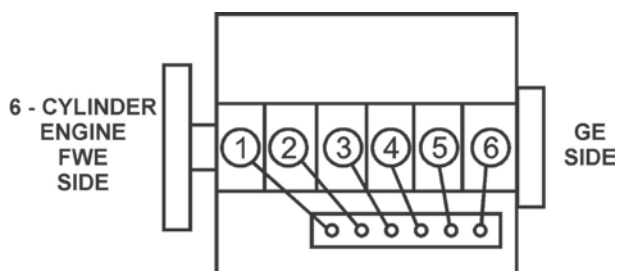


Fig. 8 Cylinder Nomenclature

Operational and Maintenance Manual G Series

2.7 Engine Nameplate



Fig.2 Engine Name Plate

2.8 Location of the Nameplate

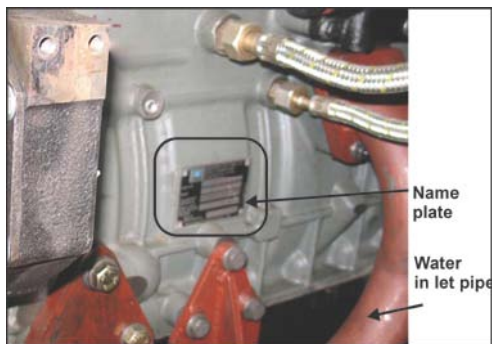


Fig.3 Location of Nameplate

2.9 Engine nomenclature system

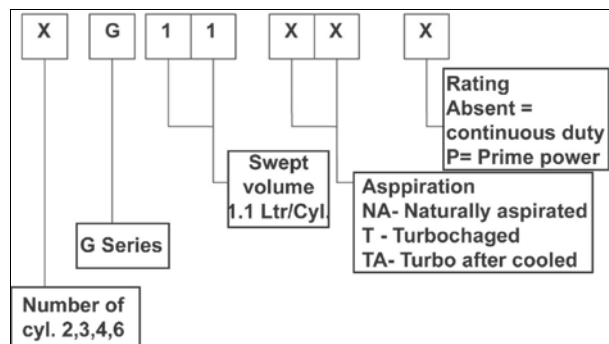


Fig. 9 Engine nomenclature

Example –

- 4G11TAG1 : Four cylinder turbocharged COP rating
 - 4G11TAG2 : Four cylinder turbocharged COP rating
 - 4G11TAG3 : Four cylinder turbocharged COP rating
 - 4G11 TP : Four cylinder turbocharged PRP rating
 - 4G11 NA : Four cylinders COP rating naturally aspirated 4G11Tx -
- x-Represents model G1 – 4G11T , G2 – 4G11T

2.10 Engine Technical Specification - Genset Application 50Hz (CPCB Stage I)

Sr.No	Parameter	Unit	Details															
1	Engine Model	-	3G11NAG1	3G11NAG2	3G11TG4	3G11TG1	3G11TG2	3G11TG3	4G11TG1	4G11TG2	4G11TAG1	4G11TW1	4G11TAG2	4G11TAG3	6G11TAG1	6G11TAG2	6G11TAG3	6G11TAG4
2	Genset kVA Rating Prime	-	25	30	35	40	45	50	62.5	75	82.5	82.5	100	125	140	160	180	200
3	Alternator efficiency (%)	-	86.9	88.9	88.35	88.7	89	88.5	90.85	90.9	90.5	90.5	90.6	92.5	92.3	92.5	92.9	93.1
4	kWe	-	20	24	28	32	36	40	50	60	66	66	80	100	112	128	144	160
5	kWm rated net	-	23.01	27.00	31.69	36.08	40.45	45.20	55.0	66.0	72.9	72.9	88.3	108.1	121.3	138.4	155.0	171.9
6	kWm rated gross	-	24.3	28.0	33.1	38.2	43.4	47	61.0	69.1	77.2	77.2	93.4	114.0	127.2	144.5	163.0	178.8
7	Rated speed	RPM	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
8	Bore X Stroke	mm	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130	105x130
9	Engine Configuration	-	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline	Inline
10	Working principle	-	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke	4-Stroke
11	No. of cylinders	-	3	3	3	3	3	3	4	4	4	4	4	4	4	6	6	6
12	Total swept Volume	Ltr	3.375	3.375	3.375	3.375	3.375	3.375	4.5	4.5	4.5	4.5	4.5	4.5	6.75	6.75	6.75	6.75
13	BMEP (At rated Power)	Bar	5.76	6.64	5.88	6.79	7.71	8.35	10.84	12.28	13.72	13.72	16.60	20.26	15.07	17.1	19.3	21.19
14	Combustion type: DI / IDI	-	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI
15	Cooling	-	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled
16	Compression ratio	-	18	18	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
17	No. of valves / cyl.	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	Aspiration	-	Naturally Aspirated	Naturally Aspirated	Turbo Charged	Turbo Charged	Turbo Charged	Turbo Charged	Turbo Charged	Turbo Charged	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled	Turbo Charged after cooled
19	Governing type	-	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
20	Governing	-	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1
21	Direction of rotation (From flywheel side)	-	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise
22	SFC at rated power *	gm/kW.h	230	230	225	225	225	223	217	217	208	208	206	199.8	202	202	202	202
23	SFC at 75 % power *	gm/kW.h	221	221	231	231	231	222	220	220	208	208	204	196.6	200	200	200	200
24	SFC at 50 % power *	gm/kW.h	235	235	235	235	235	230	231	231	220	220	211	199.1	206	206	206	206
25	Weight (Dry)	kg	380	380	390	390	390	390	465	465	485	485	485	485	650	650	650	650
26	Flywheel housing/Flywheel	-	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 3/11.5"	SAE 1/14"	SAE 1/14"	SAE 1/14"	SAE 1/14"
27	Emission compliance	-	Compliant to CPCB Stage I, Upgradable to CPCB Stage II															
	Components																	
28	FIP type	-	Mechanical															
29	Injector	-	P type															
30	Water pump	-	Centrifugal - Gear driven															
31	Lub oil pump	-	G rotor - Gear driven															
32	Cylinder head	-	Unit cylinder head															
33	Crank shaft	-	Forged - induction hardened															
34	Fan drive	-	Independent fan drive arrangement Vee belt															
35	Lub oil cooler	-	NA	NA	Plate type water cooled													
36	Air Cleaner	-	Dry Type															
37	Engine Starting System	-	12/24V DC															
38	Lub oil filter	-	Single element - spin on type															
39	Fuel filter	-	Single element			Twin element- coarse + fine												
	Fuel circuit																	
40	Fuel to be used	-	IS-1460 2005 cetane 51 S 0.015% Density 0.825															
41	Fuel filtration	micron	10															
42	Max suction lift by feed pump	meter	1															
43	Fuel feed pump pressure	Bar	1.5															
44	Nozzle opening pressure	Bar	250 +/-10															
	Lub oil circuit	-																
45	Lub oil grade	-	GREAVES MAXTHERM APICF4 15W40															
46	Lub oil sump capacity	Ltrs	6	6	8	8	8	8	10	10	10	10	10	10	17	17	17	17
47	Lub oil change period	Hrs	500 hrs															

As per IS:1462 2005 with 5% tolerance & SFC fig. are for a well-run in Engine

Operational and Maintenance Manual G11 Series

2.11 Engine Illustrations for 3G11 Series Engine

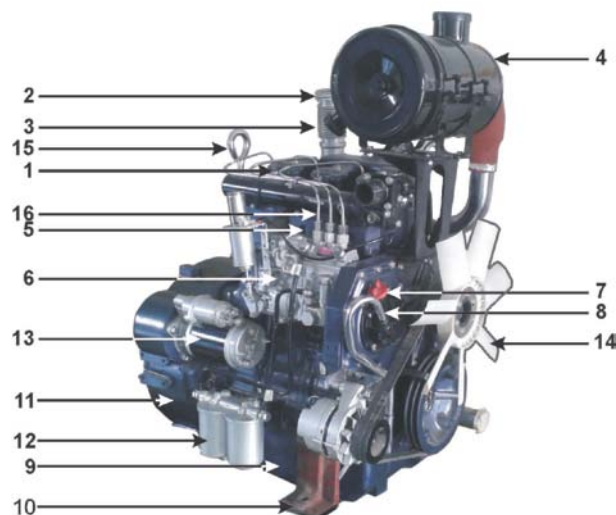


Fig. 10 3G11 Series engine

1.	Rocker cover
2.	Exhaust out
3.	Exhaust bellow
4.	Air filter
5.	Cylinder head
6.	Fuel pump
7.	Oil filler cap
8.	Blow by pipe
9.	Oil sump
10.	Engine foot
11.	Flywheel housing
12.	Fuel filter
13.	Starter
14.	Fan
15.	Lifting hook
16.	Fuel pipe

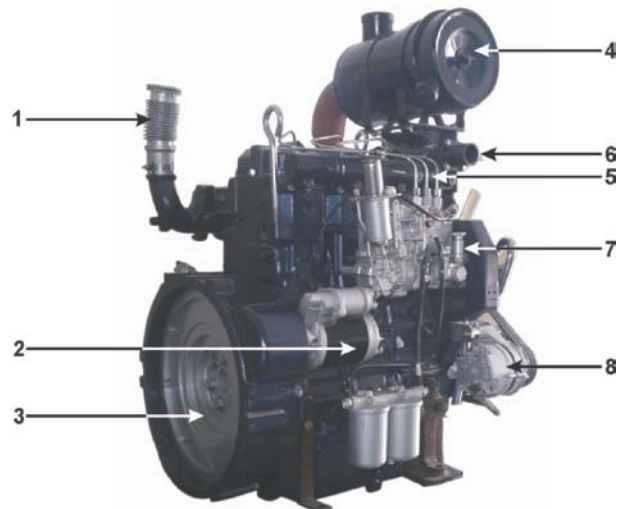


Fig. 11 3G11 Series engine

1.	Exhaust bellow
2.	Starter
3.	Engine flywheel
4.	Air cleaner
5.	High pressure fuel line
6.	Water outlet to Radiator/ Heat Exchanger
7.	Feed pump
8.	Alternator

Operational and Maintenance Manual G11 Series

2.12 Engine Illustrations for 4G11 Series Engine

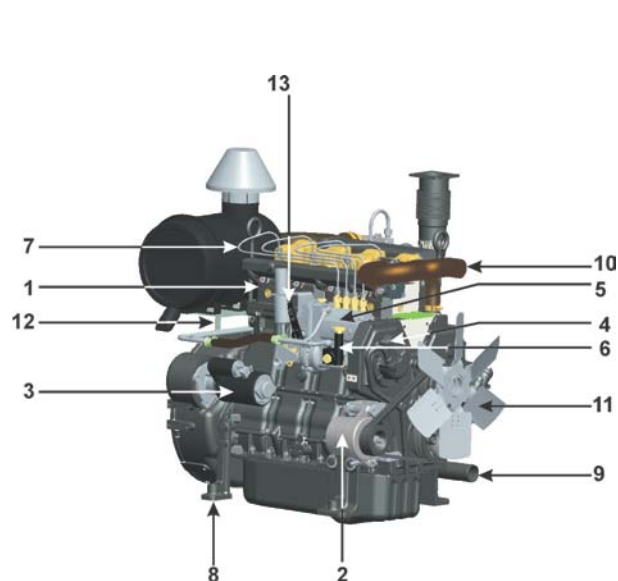


Fig. 12 4G11 Series engine

1.	Cylinder head
2.	Battery charging alternator
3.	Starter
4.	Oil filler cap
5.	Fuel pump
6.	Fuel feed pump
7.	High pressure pipe
8.	Engine foot
9.	Water in
10.	Water out
11.	Fan
12.	Air filter bracket
13.	Stop lever

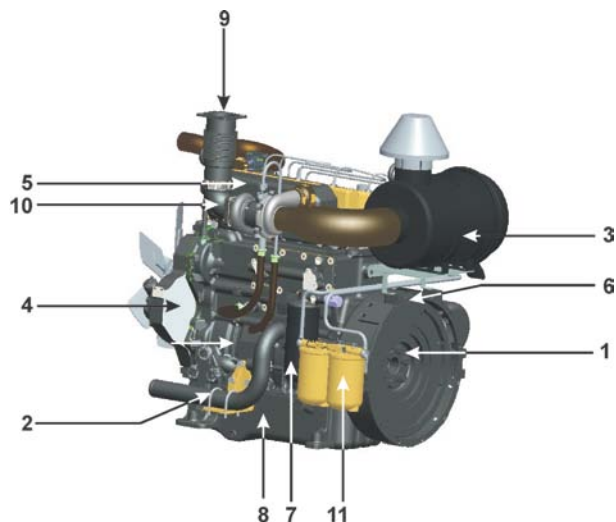


Fig. 13 4G11 Series engine

1.	Flywheel
2.	U clamp
3.	Air filter
4.	Gear end casing
5.	Air intake manifold
6.	Flywheel housing
7.	Lub. oil filter
8.	Oil sump
9.	Exhaust out let
10.	Exhaust bend
11.	Fuel Filter

Operational and Maintenance Manual G11 Series

Notes

Operational and Maintenance Manual G11 Series

2.13 Engine Illustrations for 6G11 Series Engine

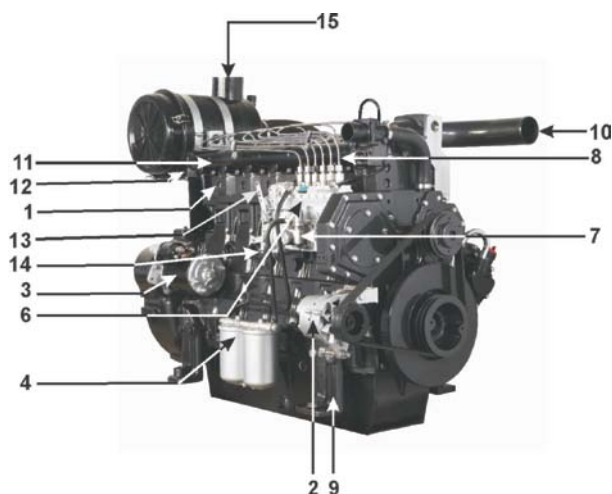


Fig. 16 6G11 Series engine



Fig. 17 6G11 Series engine

1.	Cylinder head
2.	Battery charging alternator
3.	Starter
4.	Fuel filter
5.	Oil filler cap
6.	Fuel pump
7.	Fuel feed pump
8.	High pressure pipe
9.	Engine foot
10.	Water out
11.	Water inlet manifold
12.	Air filter bracket
13.	Stop lever
14.	Throttle lever
15.	Air inlet pipe

1.	Flywheel
2.	Sensor
3.	U clamp
4.	Air filter
5.	Gear end casing
6.	Air intake manifold
7.	Flywheel housing
8.	Lub. oil filter
9.	Oil sump
10.	Exhaust out let
11.	Exhaust manifold
12.	Exhaust bend
13.	Crank case
14.	Radiator Hose

Operational and Maintenance Manual G11 Series

2.13.1 Engine Illustrations for 6G11 Series Engine

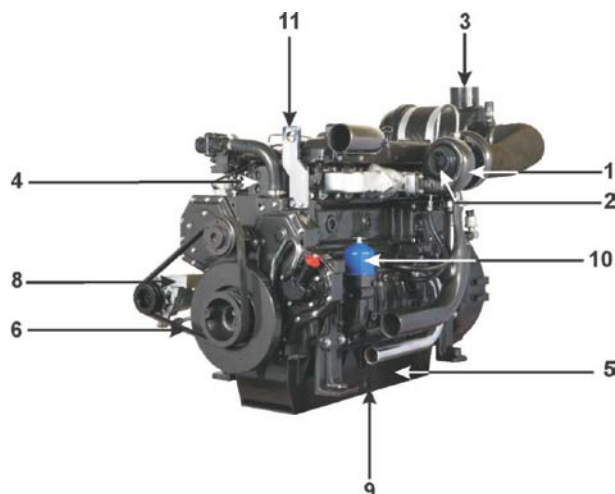


Fig.18 6G11 Series engine

1.	Turbocharger
2.	Exhaust out
3.	Air inlet
4.	Cylinder head
5.	Oil sump
6.	Belts
7.	Breather
8.	Alternator
9.	Oil drain plug
10.	Centrifugal Filter
11.	Lifting bracket



Fig.19 6G11 Series engine

1.	Water Inlet
2.	Water manifold
3.	Exhaust manifold
4.	Lub. Oil filter
5.	Flywheel
6.	Flywheel housing
7.	Oil header
8.	Engine foot
9.	Air Cleaner
10.	Turbo charger
11.	Exhaust outlet

Operational and Maintenance Manual G11 Series

2.14 Dimensions and weight – 3G11 Series Engine

For overall dimensions see the layout drawing.

Engine weight - 380 kg

Flywheel flange – SAE 3/11.5

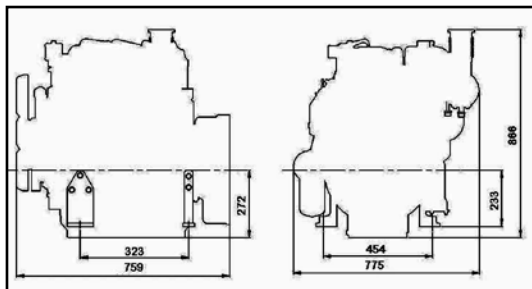


Fig. 20 Overall Engine Dimensions

2.15 Dimensions and weight – 4G11 Series Engine

For overall dimensions see the layout drawing.

Engine weight - 465 kg

Flywheel flange – SAE 3/11.5

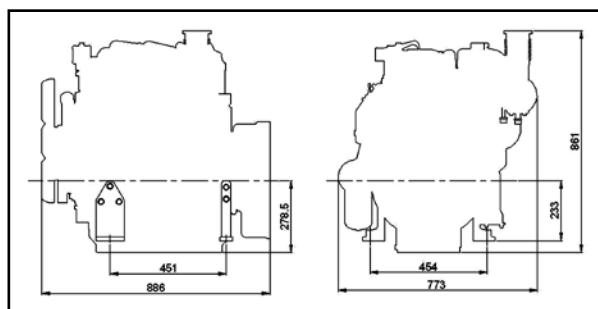


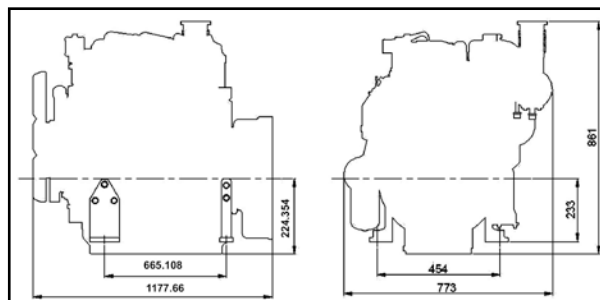
Fig. 21 Overall Engine Dimensions

2.16 Dimensions and weight – 6G11NA

For overall dimensions see the layout drawing.

Engine weight – 650 kg

Flywheel flange – SAE1/14"



2.17 Engine Lifting Instructions

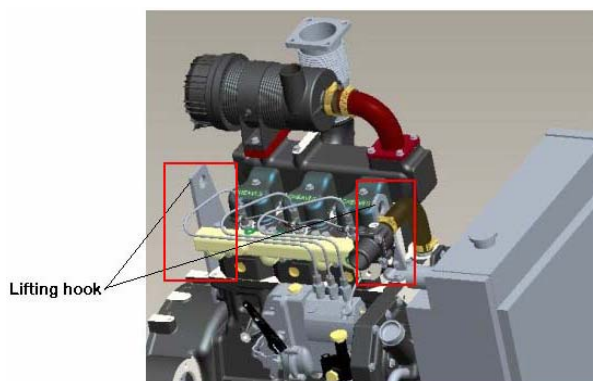


Fig. 22 Lifting Hook for 3G11 Engine

Take all safety precautions while lifting and moving the engine. Only trained personnel should handle the engine. You can consult Greaves service dealers, if necessary.

Remove water and oil from the engine before lifting. If your engine has cast iron sump then the engine can be rested on the sump. For any other type sump, use blocks under engine feet.

Avoid jerks or abrupt resting of engine. The engine should never be rested, stored or lifted in any other direction than upright. The engine should never be rolled on the ground.

Operational and Maintenance Manual G11 Series

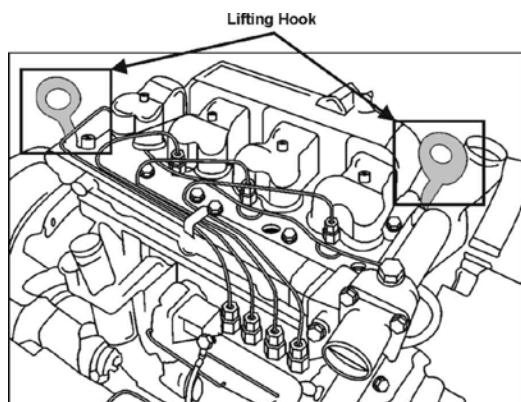


Fig. 23 Lifting Hook for 4G11 Engine

The engine is provided with four transportation feet even if only two feet (gear end) are required for application. Store the spare feet, (flywheel end) carefully. Fit those two extra feet before lifting the engine. The engine should not be rested on bell housing for long durations.

Use only the eyebolts provided on the engine crankcase for lifting purpose. The eyebolts are to be used for lifting engine only. Do not lift engine coupled with alternator or entire DG set using these bolts. Ensure that, the I bolts are completely engaged before engine is lifted.



Fig. 24 Lifting Hook for 6G Engine

While lifting the engine, use correct size of tackles, ropes, chains, cranes, hoists or any other lifting or transportation device. While lifting or

transportation, the ropes or tackles should be positioned in such a way that they do not damage engine components like rocker cover, fuel pumps, high pressure pipes, etc. The engine should be balanced while lifting and moving. Do not keep the engine hanging on lifting tackles.

2.18 Transport, packing and storage

2.18.1 Safety notes for transport



Damage due to improper transport!

Significant damage to property and injuries to persons can occur in the case of improper transport.

Therefore:

- Proceed carefully when unloading the packages and on delivery and internal transport and observe the signs and notices on the packing.
- Only use the attachment points provided.
- Do not remove packing until just before the installation.

2.18.2 Transport inspection

Check the delivery immediately on receipt for completeness and transport damage.

If externally detectable transport damage is found, proceed as follows:

- Do not accept the delivery, or only with reservation.
- Record the extent of transport damage in the transport documents or on the delivery note of the forwarding agent.
- Start complaints procedure.



NOTE!

- Claim any damage as soon as it is detected.
- Compensation claims can only be submitted within
- The applicable complaints periods.



GREAVES
SINCE 1859

Operational and Maintenance Manual G11 Series

3. SYSTEMS

3.1 Lubrication System

3.1.1 G11 Engine Lub. System

G11 series engines use positive pressurized lubrication system. The main functions of the lubrication system are as follows:

- Lubrication of friction related parts.
 - To carry away the heat generated by friction
 - To avoid corrosion
 - To wash away debris created by friction wear.
- a) The G11 series engine uses a positive displacement, G-rotor pump, which is gear driven.
 - b) The system has a pressure-regulating valve, lube oil filter and lube oil cooler, which are housed in a lube oil header.
 - c) Providing oil through push rod lubricates the rocker assembly. The fuel pump and turbo chargers are positively lubricated.

The lube oil system is adequately designed to provide sufficient lubrication, oil change period, filter element life and minimize lube oil consumption and running cost.

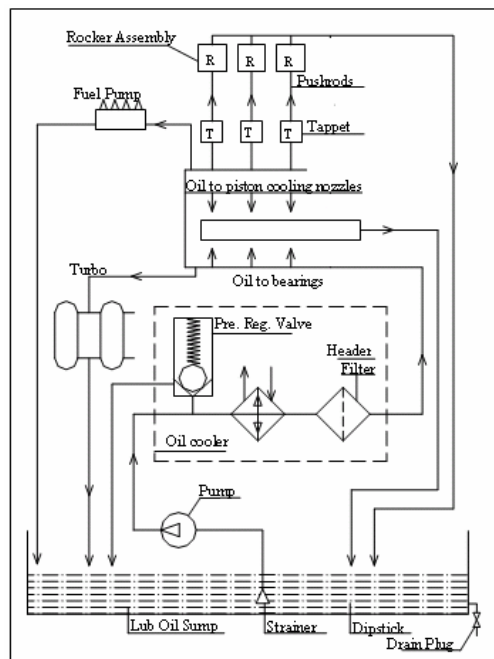


Fig. 25 Lubrication System of 3G11 Series Engine

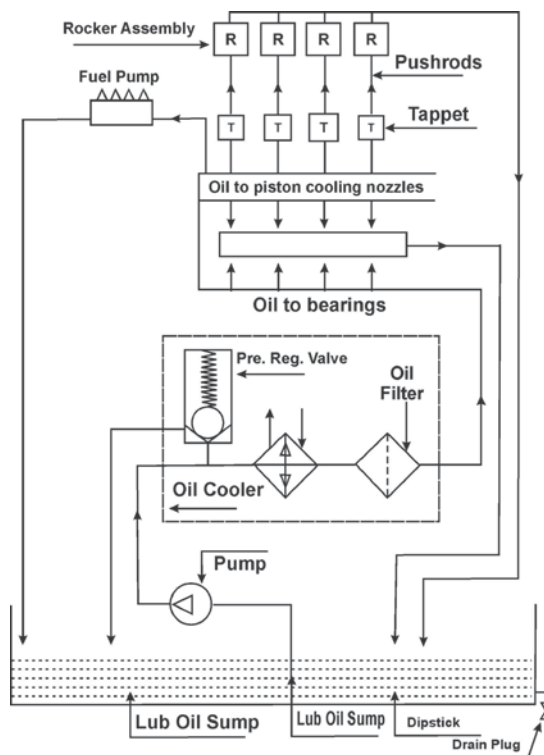


Fig. 26 Lubrication System of 4G11 Series Engine

Operational and Maintenance Manual G11 Series

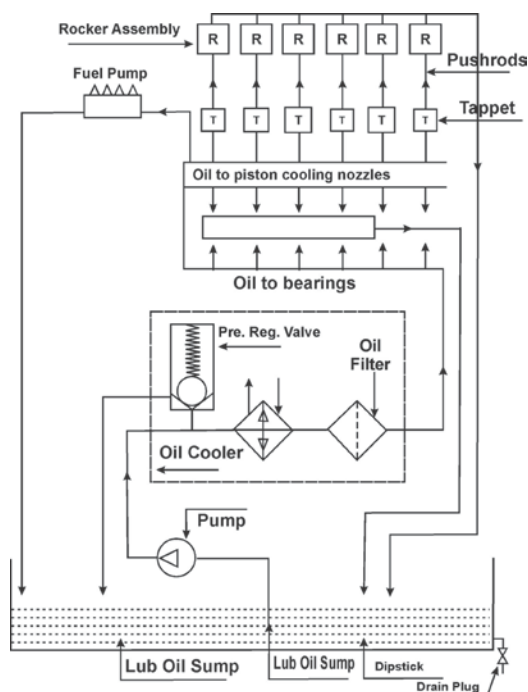


Fig. 27 Lubrication System of 6G11 Series Engine

Recommended Oil for G series engines	
Company	Oil brand name
Greaves Cotton Ltd	Greaves Maxtherm (API CF -4- 15 W 40)

Engine Oil Recommendations for Greaves Engines

Quality of Lubricating oil is one of the key drive factors to decide the performance, Durability and total cost of operation of diesel engine. Hence we have always been recommending the best available / suitable engine oil to be used in our engine. Greaves Ferymann has been continuously upgrading the products to incorporate latest technology such as low temperature after cooling, two stage turbo charging, electronics, air to air charge air cooling, high power to weight ratio etc. for meeting customer expectations of engine performance, durability and cost of operation. Lubricating oil has also undergone various improvements to meet the requirements of these changes in diesel engine technology. With this, SAE 15W40 grade Lubricating oil with API CH-4 classification is now available in India from most of oil companies. This is the best engine oil currently

available in India suitable for Greaves engines. Greaves India Limited strongly recommends the use of SAE 15W40 Lub oil with API CH-4, CES 20071 & CES 20076 classification for all Greaves engines to get the various advantages and optimum performance from the engine. This oil has a minimum TBN of 10.5 to counteract the higher sulphur content of high speed diesel available in India.

CAUTION !

Beware of the spurious oils in the market. Bad oil quality is detrimental to engine performance. Hence oil should always be procured from the original manufacturer or the authorized distributor. Lubricating oil to be used in the engine must meet all qualities as per manufacturer's specifications. Greaves India recommends audit checks of fresh engine oil to ensure the quality of oil. Facility to check suitability of oil for using it in the engine is available with Greaves service network. If in doubt about the quality of lub oil, contact lub oil manufacturing company / Greaves service network and get oil analysed in laboratories. Do not intermix different brands of oil as two different brands of oils may not be compatible with each other. It is therefore recommended that the brand which is used for initial fill / oil change, should only be used for top-up. Different brand of oil may be used after draining all the existing oil i.e., at the oil drain interval and after flushing the lub oil system with new brand of oil.

3.1.2 Permissible engine inclination

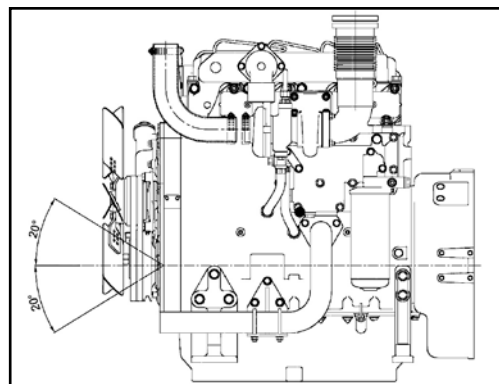


Fig. 28 Engine inclination

Operational and Maintenance Manual G11 Series

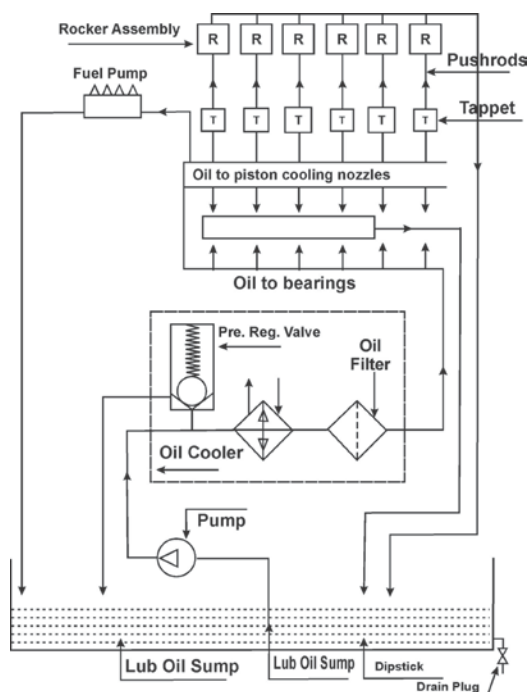


Fig. 27 Lubrication System of 6G11 Series Engine

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3.1.2 Permissible engine inclination

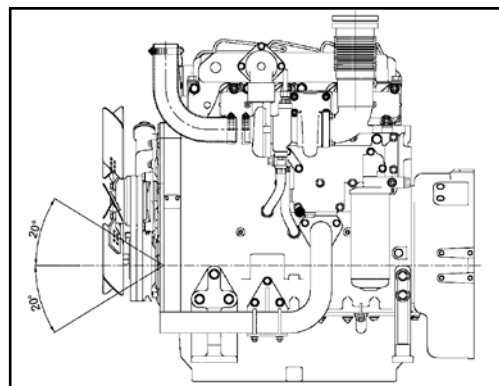


Fig. 28 Engine inclination

Operational and Maintenance Manual G11 Series

3.2 Engine Cooling Systems

3.2.1 G11 Series Engine Cooling System

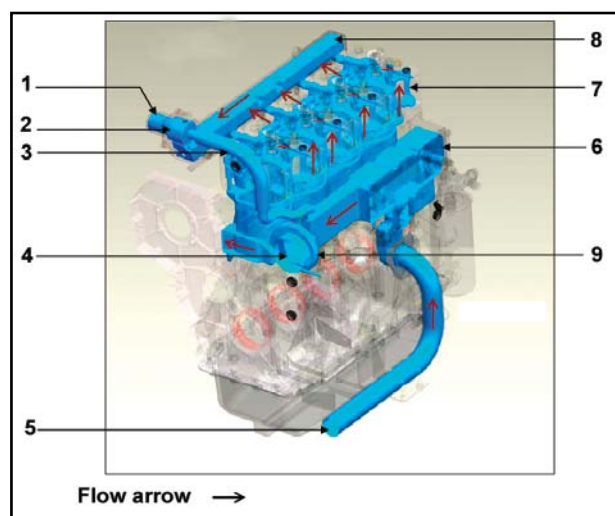


Fig. 29 3G11 series engine cooling system

1.	Water out to radiator
2.	Thermostat
3.	Bypass
4.	Water pump
5.	Water in from radiator
6.	Oil cooler cavity
7.	Cylinder head
8.	Water manifold
9.	Weeping hole

G11 series engines are water-cooled engines. The water pump is gear driven. The water is cooled by a radiator fan system. The fan is driven by a fan drive system and is not mounted on the water pump. The water also cools lube oil in the lube oil cooler.

A thermostat (74°C start to 82°C full open) controls the water temperature. The radiator has a pressure cap, which maintains the static pressure at 0.5 bar (7 psi). A drain plug is provided to drain the system. The water system provides adequate cooling in a simple and efficient manner to satisfy

the cooling needs of canopy enclosed genset application.

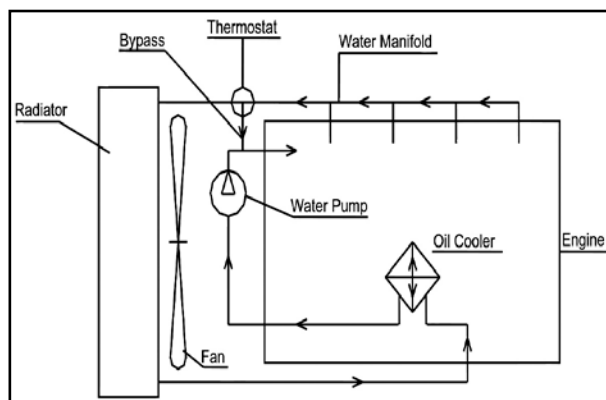


Fig.30 Cooling System diagram for G11 Series Engines

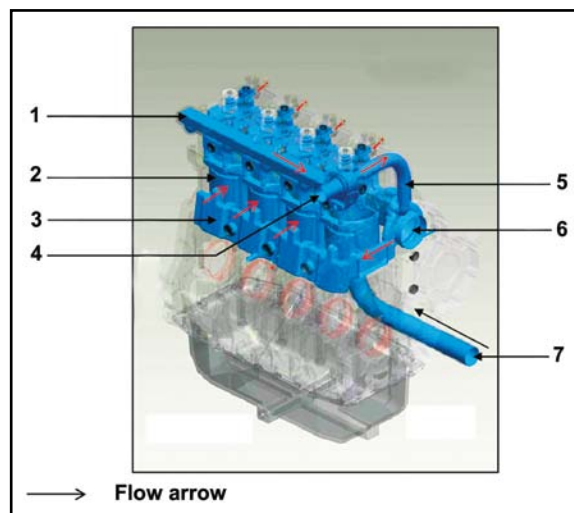


Fig.31 4G11 Series Cooling System

1.	Water outlet manifold
2.	Cylinder water cavity
3.	Water core
4.	Water out
5.	Bypass
6.	Water pump
7.	Water in

Operational and Maintenance Manual G11 Series

3.2.2 Cooling system data

Pump	Centrifugal
Drive	Engine driven gear drive
Static water pressure (radiator cap)	7 psi
Typical steady state water temp	72 – 90°C
Max allowable water temp	95 - 96°C

3.2.3 Water specifications

pH value	6 – 8
Calcium/magnesium hardness	180-ppm max
Chlorides	Less than 40 ppm
Sulfates	Less than 100 ppm
TDS (Total Dissolved Solids)	Less than 400 ppm

3.2.4 Coolant additive specification

Fill requisite quantity of cooling water duly mixed with Greaves maxtherm specialty summer coolant / anti-freeze compounds about 20% by volume or cooling conditioner with anti-freeze, if required.

3.2.5 Filling up coolant on a new installation

The engine is supplied with the coolant, which has to be filled up after installation. For this refer procedure below:

1. Open the de-aeration plug.
2. Open the radiator cap.
3. Ensure all hoses are in place.
4. Prepare coolant in the specified proportion.
5. Pour coolant through the spout.
6. Water takes some time to fill up the system through the radiator tubes.
7. Wait for 20 seconds before restarting the pouring.
8. Coolant will first start coming out of the de-aeration opening.

9. Wait for the air to escape and close the plug.
10. Keep on pouring till the water is filled up in the radiator top tank. Close the cap firmly.

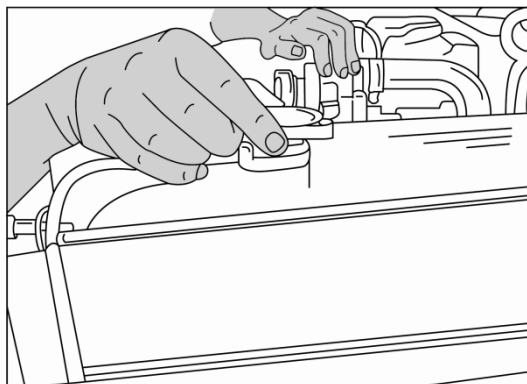


Fig. 32 Radiator Cap

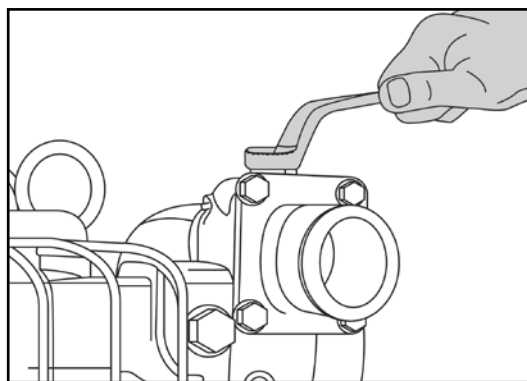


Fig. 33 De-aeration Plug

3.2.6 Topping up coolant in an already installed engine

1. Never open the radiator cap of an engine that has just stopped.
2. Wait for at least 15 minutes after stopping the engine.
3. For normal top ups, it is not necessary to de-aerate the system.
4. Fill up coolant wait till the coolant level settles.
5. Confirm that the level is correct. Put the radiator cap back.

Operational and Maintenance Manual G11 Series

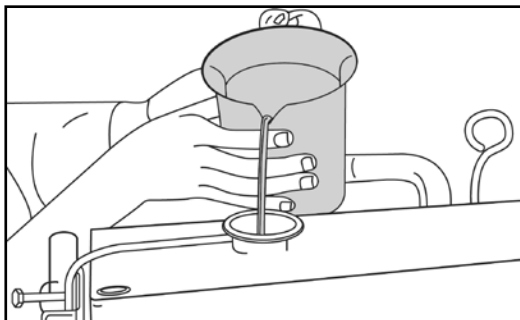


Fig. 34 Coolant Filling through Radiator cap

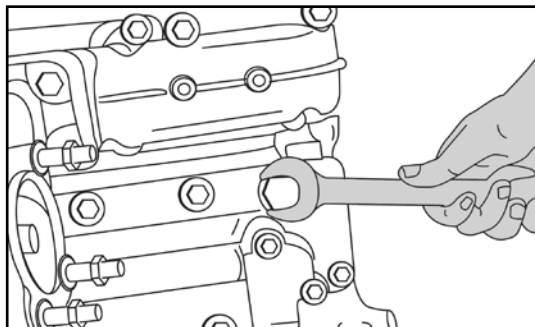


Fig. 36 Drain Plug on Oil Cooler Header

3.2.7 Draining the system



Note:

Coolant mixture is poisonous. Store it safely.

1. The engine is provided with 3 drain plugs.
2. The drain plug on oil cooler header is for draining the system till cylinder head level.
3. The drain plug on crankcase is for draining the entire engine.
4. The drain plug on the radiator is for draining the entire system.
5. Drain the coolant in a tray.
6. Dispose off the coolant safely in an environmentally friendly way.

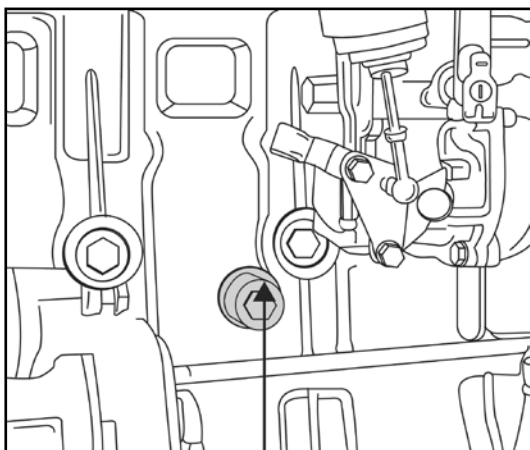


Fig.35 Drain Plug on Crankcase

3.2.8 Thermostat element replacement:

Thermostat is provided in the cooling circuit to attain the stable coolant temperature as quickly as possible. Running engine for long hours on cold coolant increases the wear of the liners and piston. For this reason, it is wrong to run an engine without a thermostat element. Normally the thermostat does not require any regular maintenance. However, if sudden coolant temperature variation is observed, inspect the thermostat element. If the element is not resting properly on its seat or if there is any other defect in the thermostat element, it is advisable to replace it.

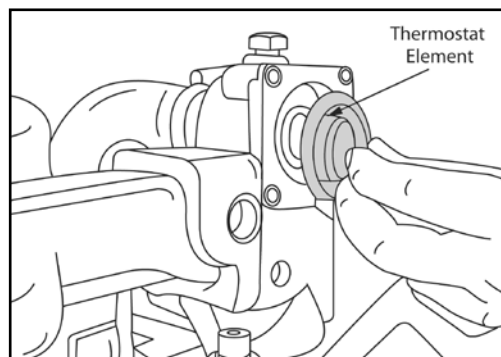


Fig.37 Thermostat

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3.2.9 Water pump

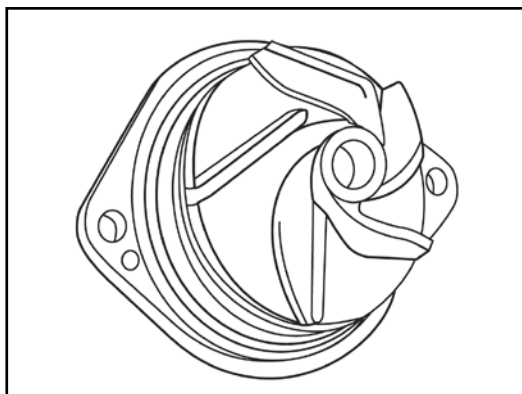


Fig.38 Water Pump

G11 series engine have gear driven water pump. A weeping hole is provided on the crankcase for the water to leak out. In an unlikely event of water coming out of weeping hole, immediately stop the engine and inform service dealer for changing of pump seal or sealing ring.

3.2.10 Cleaning the radiator / CAC:

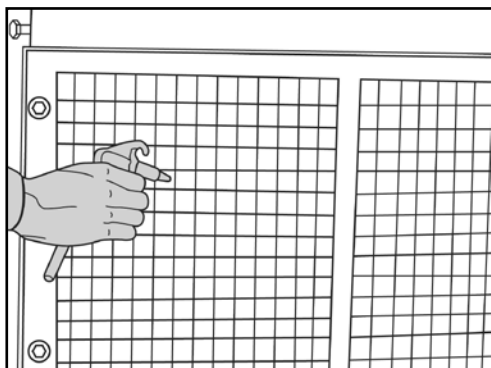


Fig. 39 Cleaning the radiator CAC

Radiator / CAC has to be cleaned every 500 hours. This frequency can vary depending on the dust condition in the area of installation, application and environment. Blowing compressed air in the direction opposite to the normal fan airflow direction cleans radiator. Do not use water or chemicals. These can harden the deposits into very hard cake-like formations, which are very difficult to dislodge.

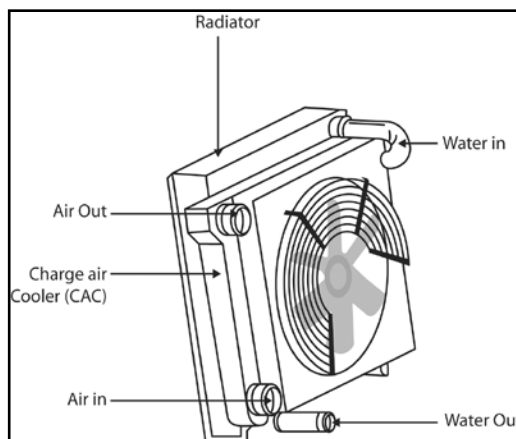


Fig.40 Radiator charge air cooler

Radiator / CAC has to be cleaned every 500 hours. This frequency can vary depending on the dust condition in the area of installation, application and environment. Blowing compressed air in the direction opposite to the normal fan airflow direction cleans radiator. Do not use water or chemicals. These can harden the deposits into very hard cake-like formations, which are very difficult to dislodge.

Operational and Maintenance Manual G11 Series

4.2 Trapped Air Removal from System

Bleeding of delivery pump needs to be performed

- Before engine operates first time.
- After long period of inactivity.
- If FIP or HPP loosened and there is air in the line.

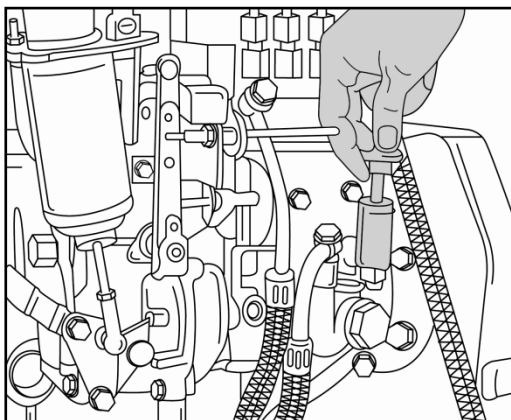


Fig. 44 Removing air from fuel line

Bleeding Process;

- Unscrew feed pump knob.
- Loosen fuel inlet banjo.
- Pump manually, till fuel comes through the screw free of air Knob may be relocked.

Operational and Maintenance Manual G11 Series

5. ELECTRICAL SYSTEMS

5.1 Starter / Alternator

Electrical system is provided with the engine including a 12 Volts starter and an alternator.

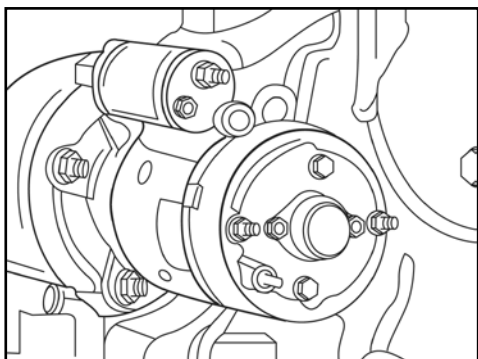


Fig. 45 Starter

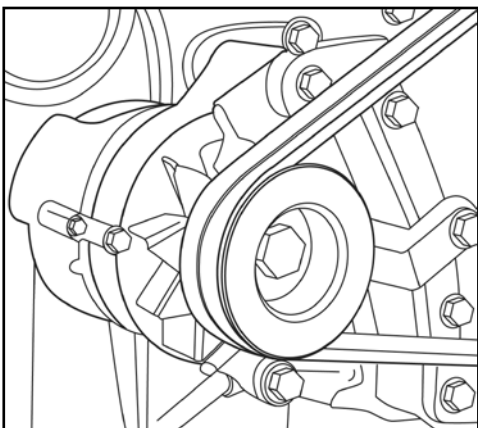


Fig. 46 Alternator

5.2 Electrical Control Panel

Control panel has operating controls and indicators for starting, stopping and monitoring during operation of the engine.

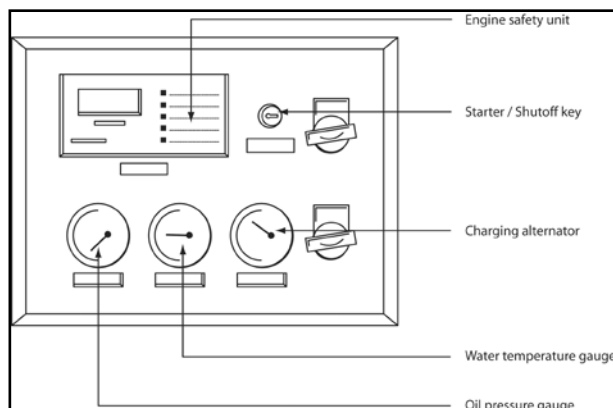


Fig.47 Control Panel

5.3 Battery

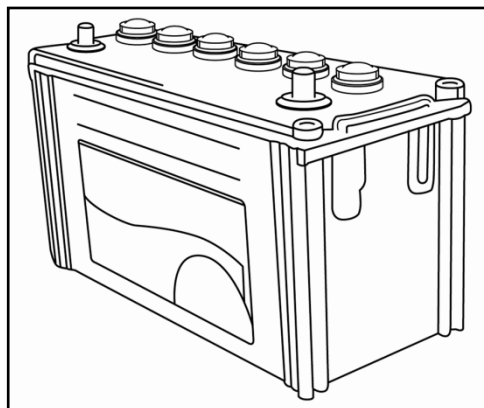


Fig.48 Battery

12 Volt / 24 Volt (optional), 88 Amp-Hr capacity battery is recommended

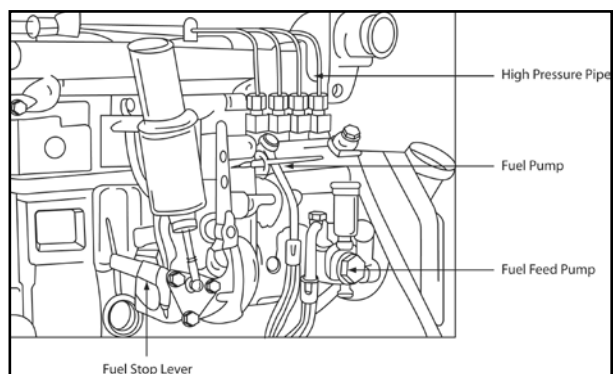


Fig.49 Fuel System

Operational and Maintenance Manual G11 Series

FIP and injectors are supplied by BOSCH and warranty is covered. Servicing these is a highly skilled work. This has to be done by authorized service agency or shop.

5.4 Alternator (option)

The permanent magnets on the magnet carrier (1) on the flywheel side induce an alternating current proportional to speed in the coils of the stator (2).



NOTE!

The connector (3) can be different.

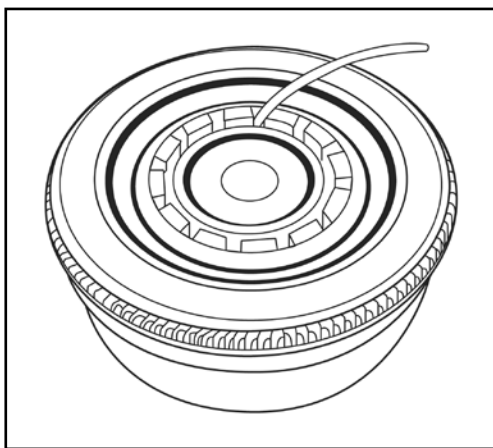


Fig. 50 Alternator

5.5 Alternator regulator (option)

The alternating current is rectified in the alternator regulator (fig.) and constantly regulated to approx. 14.2-14.5 v.

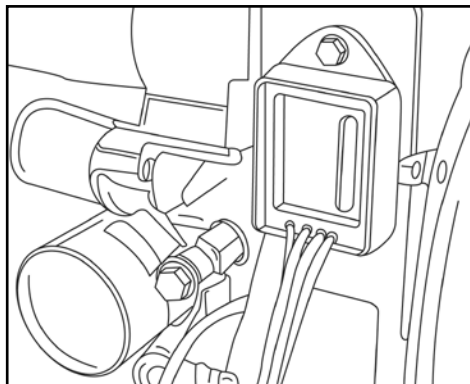


Fig. 51 Alternator regulator

Connections on the alternator regulator:

- 2 x yellow (alternator coils input, can be connected either way)
- 1 x red (charging current output)
- 1 x brown (charge indicator, connecting terminal 15 ignition switch)
- Earth connection is made using the mounting surface.

5.6 Operating conditions

Permitted operating temperatures -20 °C to 70 °C (measured on the alternator regulator surface).

There must be an intact earth connection between alternator regulator and engine and between alternator regulator and external attachment (no painted mounting surfaces).

Operational and Maintenance Manual G11 Series

5.7 Dangers and cause of failure

Dangers	Cause of failure
Battery terminals incorrectly connected	Damage to the charging circuit
Defective battery or complete discharge	Destruction of the alternator regulator
Disconnection of the battery when the engine is running	Immediate destruction of the alternator regulator
External start with jump leads for defective or completely discharged battery	Destruction of the alternator regulator
Manual starting with disconnected battery	Destruction of the alternator regulator
Interruption of the earth connection of the alternator regulator to the engine	Destruction of the alternator regulator

Welding work



WARNING!

Material damage due to welding work on the machine!

Welding work on the machine can cause high material damage.

Therefore:

- Always disconnect the negative pole of the battery in advance.
- Disconnect the plug connection to the alternator regulator.

Batteries

- Observe the following safety factors
- Batteries produce explosive gases.
- Keep away from naked flames and other ignition sources. Do not smoke.

- Do not lay any tools on the battery.
- Always disconnect the negative pole of the battery before performing work on the electrical system.
- Do not mix up the + (plus) and - (minus) poles of the battery.
- Connect the plus cable first and the minus cable afterwards when installing the battery.
- Disconnect the minus cable first and the plus cable afterwards when removing the battery.
- Always avoid short-circuits and earth contact of live cables.
- In the case of faults in the electrical system, first check the cable connections for good contact.
- Replace defective indicator lamps immediately.
- Do not remove the ignition key during operation.
- Do not disconnect the battery while the engine is running (occurring voltage peaks can destroy electronic components, e.g. the alternator regulator).
- **Do not spray parts of the electrical system during engine cleaning with a water jet or high pressure jet.**
- Always disconnect the minus terminal of the battery and disconnect the plug connection to the alternator regulator for welding work.



WARNING!

Risk of injury due to incorrect handling of batteries!

Batteries must be handled with particular caution.

Therefore:

- Never expose batteries to high temperatures. There is a risk of explosion.
- Escaping liquid due to incorrect use can result in skin rashes. Avoid contact with the liquid. Always rinse with a lot of water in the case of contact with the liquid. If the liquid gets into the eyes, rinse immediately with water and contact a doctor immediately.

Operational and Maintenance Manual G11 Series

6. ENGINE OPERATION

6.1 Standard and Typical Operating Conditions

Standard Operating Conditions				
Sr. no	Parameters	Unit	Value	Remark
1	Ambient temperature (ISO 3046)	°C	25	
2	Relative humidity (ISO 3046)	%	50	
3	Altitude (ISO 3046)	Above mean sea level	0	
4	Ambient temperature at which deration will be applicable	°C	35	Only for turbocharged and turbo after cooled engines
5	Relative humidity at which deration will be applicable	%	85	Only for turbocharged and turbo after cooled engines
6	Altitude at which deration will be applicable	Above mean sea level	500	Only for turbocharged and turbo after cooled engines
7	Minimum temp at which engine can be started without starting aid	°C	2	
8	Air cleanliness for standard dry air cleaner	mg/m3	25	At 1.5 m above ground in normal industrial area or agricultural land on a wind less conditions
9	Inclination in both directions		Less than 1 deg	For genset application

Operational and Maintenance Manual G11 Series

Typical steady state operating parameters				
1.	Lube oil pressure	Bar	3.5-4.5	
2.	Lube oil pressure	bar	2.9-4	6G11
2.	Lube oil temperature	°C	85-100	
3.	Water temperature	°C	78-90	
4.	Suction depression (new air cleaner element)	Mm WC Max	150	
5.	Suction depression (clogged air cleaner element)	Mm WC Max	250	250mm for new filter, max 550 mm choke limit
6.	Exhaust back pressure	Mm Hg	25	
8.	Steady state rpm variation	Total RPM	5	
9.	Max fuel suction lift	Meter	1	
10.	Typical fuel temperature	°C	35-39	

6.2 Starting the Engine

6.2.1 Safety Instructions

- The legal regulation for safety must generally be observed
- The engine may only be operated or maintained by trained staff
- Ensure sufficient ventilation in engine room
- Cleaning maintenance and repair should be done when engine is stopped and secured.

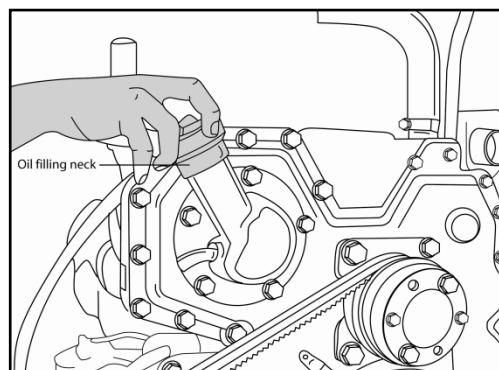


Fig. 52 Lube Oil Filler Neck

6.2.2 First time start after installation

- Check all electrical, fuel, exhaust and other connections.
- Check that all critical fasteners are tightened (Flywheel coupling, foot mounting, AVM bolts, crank pullet bolts, etc). Check engine alignment and mounting on foundation.
- Engine is filled with Lube oil through the filler neck. Oil to be filled at desired level to be checked with dipstick. Confirm that engine has adequate coolant and oil.

Confirm that air bubbles have been removed from fuel and coolant circuit.

Operational and Maintenance Manual G11 Series

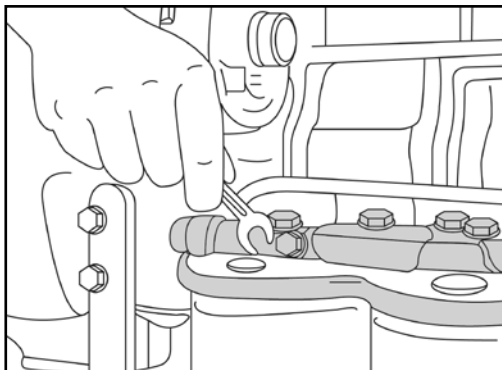


Fig. 53 Lub oil filter head

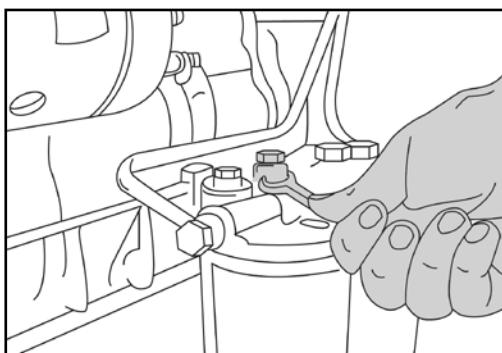


Fig. 54 Lub oil filter head

- Check belt tension and make adjustments, if required.

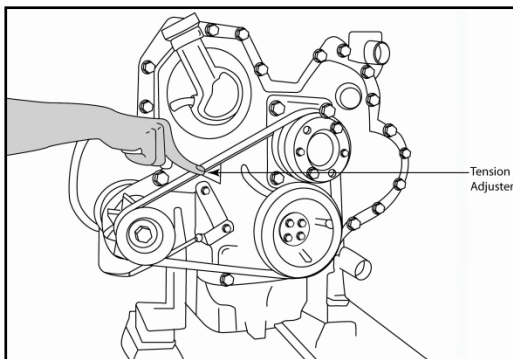


Fig. 55 Belt tension

- Confirm the battery condition.
- Confirm that all necessary safety guards are in place.

- Confirm if all safety precautions have been taken.
- Confirm that the electrical breaker is in OFF position.

Note:

Sudden loading of the engine from 0 to 100% of rated load is to be avoided for turbocharged and turbo after cooled engine. In turbo after cooled engines sudden loading is limited to 45 to 50 % of the rated power as per ISO 8528. Never try to start the engine on load.

- Start the engine and run on no load for 5 to 10 minutes.
- Observe abnormalities like noise, vibration, rattling brackets, leakages, etc.
- Check oil pressure. Confirm that all the meters are working.
- Confirm that everything is OK and then slowly load the engine.
- The engine is provided with a battery-charging alternator.
- During the normal running of the engine, the charging lamp should be OFF.

If the battery-charging lamp turns ON during engine running, it is an indication that the battery is not getting charged. Check the circuit and take corrective actions.

6.2.3 In case of Key start:

- For starting the engine turn the key from "OFF" to "ON" This will light up the battery voltage gauge and the pilot lamp will light up.
- Turn the key further. Engine will rotate, when the engine picks up speed, release the key.

Operational and Maintenance Manual G11 Series

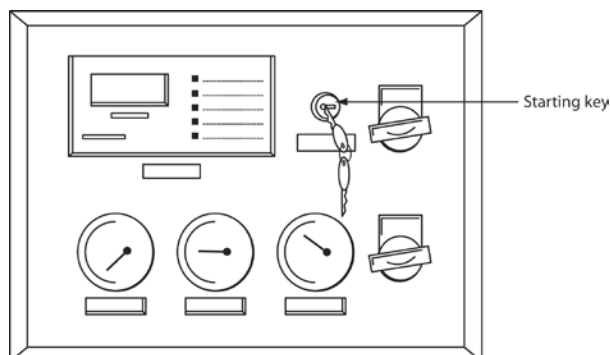


Fig. 56 Engine ignition

Note:

- Wait for 20 to 30 seconds between 2 startup attempts.
- Do not turn the key when the engine is running.

6.2.4 In case of push button start

- Press the push button. Release immediately when the engine picks up speed.

Note:

- Do not push the button when the engine is running.
- Wait for 20 to 30 seconds between 2 startup attempts.

6.2.5 AMF operation start up

- In case of Auto Mains Failure (AMF) mode operation of power generation application, the engine starts automatically when the grid power fails.
- It is extremely important to inform everybody that genset is in AMF mode.
- Access to area nearby genset should be avoided as the engine can start automatically without notice.
- In case of maintenance, it is necessary to put the engine in non-AMF mode and remove battery cables before starting maintenance.

6.3 Stopping the engine

- Remove the load from the engine.
- Run for 2 minutes to stabilize the temperatures. Recommended for turbocharged and turbo after cooled engines.
- Push the stop button to stop the engine.
- The engine can also be stopped manually by turning the stop lever on the fuel pump (Photo STOP lever on fuel pump).

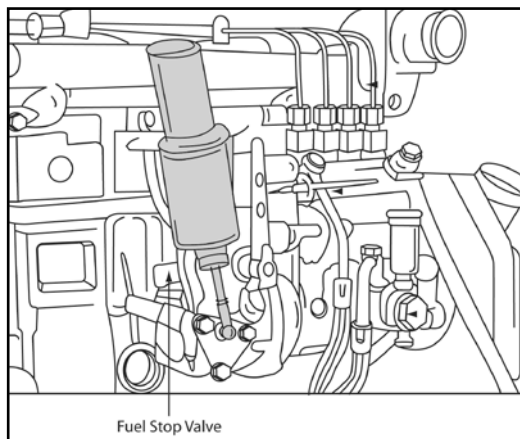


Fig. 57 Fuel Stop Valve

Turn the key to "Off" mode so that battery does not get depleted / discharged.

6.4 Safety stop

The engine will automatically stop in case of certain safety conditions like

- High water temperature
- Low lube oil pressure

Check the reason for this event before trying to restart. Do not restart, till the event is completely explained and corrective action is taken. Never bypass safeties or try to change their operating limits.

Operational and Maintenance Manual G11 Series

6.5 Running in

Running on of the engine is extremely important for the engine (means what). A good running on will ensure good, long life for the engine.

During the first 50 hours of running, do not load the engine suddenly and restrict the load to 80 %.

After 50 hours, the engine can be loaded suddenly (Typically a sudden load of 45 % of the rated load is allowed as per ISO 8528) and full load can be applied.

After 100 hours carry out the following actions:

- Change oil,
- Change lube oil filter cartridge,
- Change fuel filter elements,
- Change fuel filter on feed pump (Button filter or sediment bowl),
- Check belt tension and correct it, if required,
- Check tappet clearance and correct it, if required,
- Check engine for leakages and tighten the fasteners, if required

Take corrective action if abnormal noise, vibrations are observed. Now the engine is ready for its long life.

Operational and Maintenance Manual G11 Series

7. SERVICE AND MAINTENANCE

7.1 Maintenance of Lube oil system

7.1.1 General

Oil change periods depend on the engine usage, application, installation and quality of fuel and lube oil. It is necessary that oil should be changed at least once in six months, if the engine use is less than specified, oil change period varies.

For gen set applications, it is necessary that the engine be installed on level horizontal plane area (Angle 1 deg max). For trolley mounted gen set transitional angle of 12 deg is acceptable. However, gen set should never be run in an inclined position on continuous basis.

	3G11	4G1111	6G11
Sump capacities	8 Liters	10 Liters	17 Liters
Engine capacities (with oil filter)	9 Liters	11 Liters	18 Liters

oil change period	First oil change after 60hr, next oil change ref. page no. 4, sr.no.47
Oil filter change period	Refer page no. 5, sr. no.52
Steady state lube oil pressure	3.5 – 4.5 bar
Steady state lube oil pressure	2.9 – 4 for 6G11
Steady state lube oil temp	85-105°C
Lube oil consumption	<0.2 % of fuel consumption

Ambient temp (Deg C)	Grade of oil
-20 to + 20	SAE 10 W 30
-10 to +55	SAE 15 W 40
-5 to +45	SAE 20 W 40

Operational and Maintenance Manual G11 Series

7.1.2 Changing Lube Oil

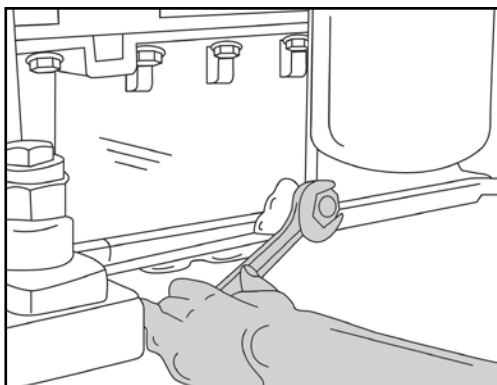


Fig. 58 Drain Plug

After the specified oil change period, oil should be changed irrespective of the oil condition. In this period, the chemical properties of the oil are depleted. This is not visible to naked eye or cannot be judged by experience or feel. Start the engine and run it till it gets warmed up. When the oil temperature reaches 70 to 80 °C, stop the engine. Place a tray under the sump drain plug and open the drain plug. Please note that the oil is hot. Drain completely. (Approximately 20 minutes). Refit the drain plug. Remove the oil filter and drain it. Fill up the oil filter with fresh specified oil from sealed pack and refit the oil filter. (Refer figure 5.1.4.1) Open the oil-filling cap. Take required quantity of specified oil from a sealed package. Pour in the filler through a funnel, after a specified quantity is if filled up, confirm oil level by dipstick. (Refer figure 5.1.3.1) and fit the oil filler cap.

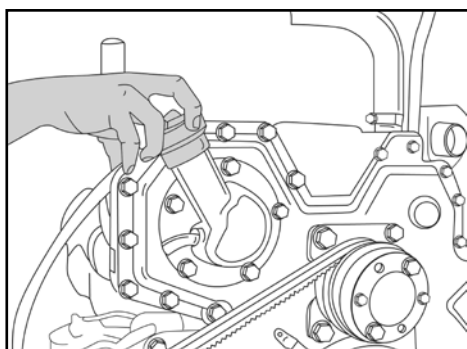


Fig. 59 Oil Filling

Dispose off the used oil in a proper environmentally friendly way.

7.1.3 Checking oil level

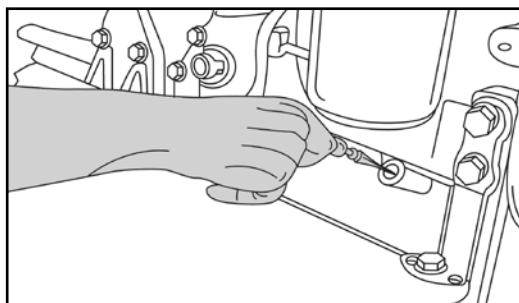


Fig. 60 checking oil level

This preferably is done before starting the engine. If the engine is running, then stop it and wait for 30 minutes (for an accurate measure of oil level). Routine checking can be done in a few minutes after stopping the engine. Lube oil sump capacity is seven liters at mean dipstick marking. Fill the oil till upper level mark without exceeding it. Do not operate engine with oil level below lower mark.

Remove dipstick and wipe it. Re-insert the dipstick till it rests on the collar. Remove the dipstick and observe the oil level. If the level is between low mark and high mark, oil level is ok. If level is below low oil level mark, fill up oil at least to between low and high oil marks. If the oil level is above high-level mark, then drain the oil and bring the level back to high level. More oil in the sump than required is not only a waste; in extreme cases it is injurious for the engine.

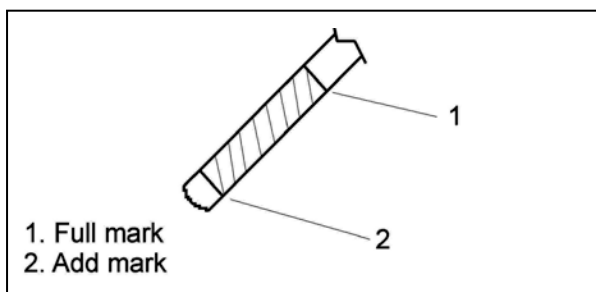


Fig. 61 Dipstick marks for oil level

Operational and Maintenance Manual G11 Series

7.1.4 Changing oil filter with oil

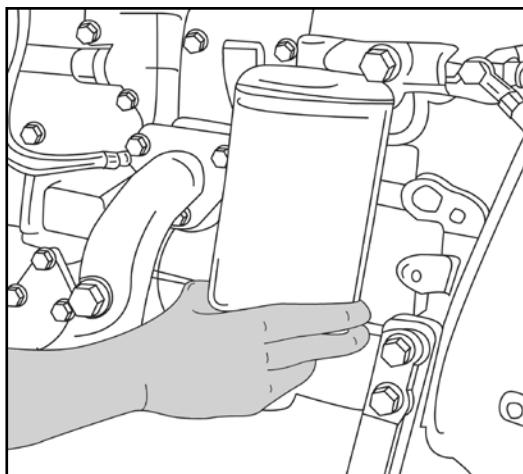


Fig. 62 changing oil filter

- This operation is done preferably a few hours after the oil is changed.
- G11 series engines use spin-on type oil filters
- Clean up the lube oil filter area on the engine.
- Remove the oil filter cartridge.
- A commercially available strap type tool can be used to remove and re-fit the oil filter cartridge. The cartridge has oil in it and has to be stored carefully to avoid spillage.
- Take a new genuine oil filter cartridge. Fill up fresh specified oil from sealed package into the oil filter cartridge. Fit it using the strap tool.

Note:

Never try to clean up a cartridge and re-use. This causes severe injury to the engine.

7.2 Maintenance of Fuel System

Use only clean fuel, without water or particulate suspension, impurities etc. Maintain the fuel tank full reducing possibility of air and condensation entering the system. Bleeding of delivery pump must be done if

- Engine operates first time,
- If it is idle for long time,
- If High Pressure Pipe lines are loosened,
- If air is trapped in the system between fuel tank and feeds pump connecting flexible pipe.

7.2.1 Fuel filter

To protect the FIP and Injectors, fuel filter is provided before FIP. If the filter element is contaminated then it need to be replaced. For changing fuel filter cartridge

- Close the fuel cock.
- Loosen the filter cartridge with strap wrench.
- Coat the seal of the new filter cartridge with fuel.
- Screw the filter cartridge in filter head down to the seal, then tighten by ½ turn.
- Bleed the fuel filter.

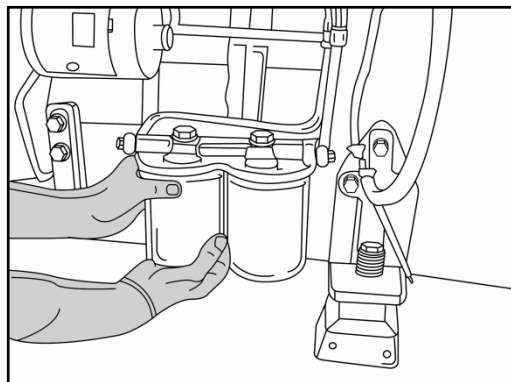


Fig. 63 Fuel Filter

Similarly you can change filter element if required from fuel filter.

Operational and Maintenance Manual G11 Series

7.2.2 Fuel strainer

Fuel feed pump is mounted on FIP. It has fuel strainer, which needs cleaning periodically. Remove banjo bolt below feed pump at the inlet. Unplug screw to take out the strainer. Clean the strainer with diesel and refit the assembly.

7.2.3 Fuel Injection Pump

It is recommended that Fuel Injection pump servicing is done by BOSCH authorized service agent / personnel at authorized service center preferably through Greaves service personnel.

7.2.4 Injector NOP (nozzle opening pressure) adjustment

Injector servicing needs to be done by authorized service personnel. Hence this needs to be brought to the authorized service station for servicing and setting.

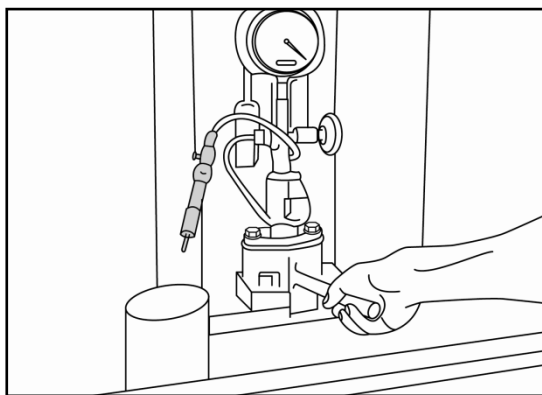


Fig. 64 Nozzle Testing (Description of nozzle testing)

7.2.5 Dry Type Air Cleaner

The element in the air cleaner needs to be replaced or serviced, when maximum allowable restriction has been reached. Remove the filter element gently. It is recommended to replace the filter element once used. But only in exceptional cases the filter element is to be blown out in longitudinal direction and then inside. Reassemble the element after careful inspection and confirmation for reuse.

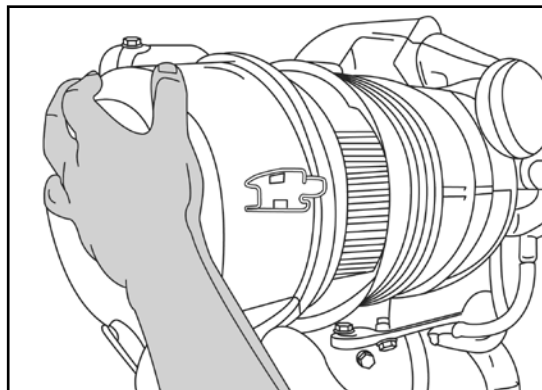


Fig. 65 Air Filter

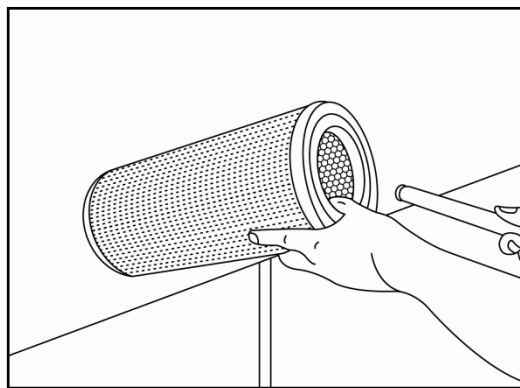


Fig.66 Air Filter Element

7.3 Inspection and checking of V belt tension

Ensure that the belt tension is correct by pressing it by finger or thumb as shown. Deflection needs to be 5 to 8 mm. It can be adjusted at the alternator adjuster as shown below. Operate the engine with new belt for five to ten minutes and then adjust the belt tension.

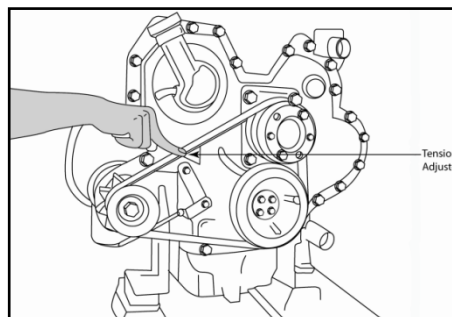


Fig.67 Inspection and Checking of V Belt Tension

Operational and Maintenance Manual G11 Series

7.4 Checking and Adjustment of Valve clearance

Adjust the valve clearance when engine is in cold condition. Adjust the clearance with piston at top dead center and ensure that both valves are closed. Clearance is 0.4 mm. for both inlet and exhaust valves.

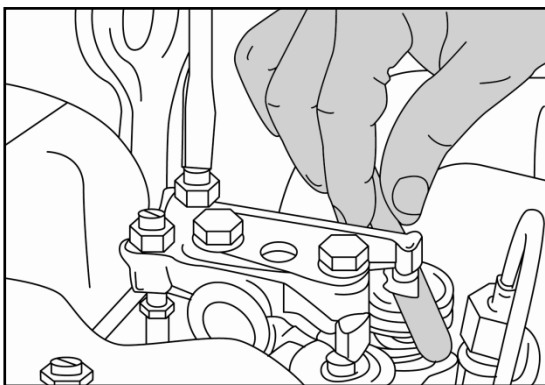


Fig.68 Checking and adjustment of Valve Clearance

7.5 Flywheel Run out

Flywheel run out on face to be maintained as 0.2 mm. Flywheel coupling mounting bore run out wrt. Crank shaft axis 0.10 mm max

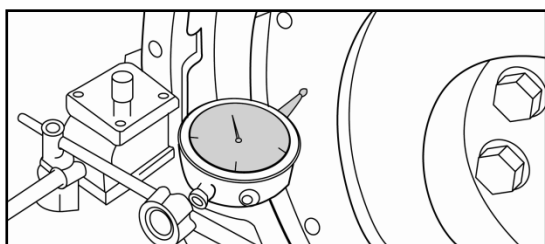


Fig. 69 Flywheel Run outs

7.6 Timing Gear

Except water pump and oil pump gear, all other gears in the gear train has timing markings, which need to be aligned to get correct fuel injection and valve timing. FIP gear has kidney slots and it is mounted on coupling flange on FIP shaft with four bolts. The finer adjustment of injection timing can be made by loosening these bolts and turning FIP shaft as required in any desired direction.

Idle gear matching with crank gear, match idler gear '0' and matching with crank gear '0'.

Locate cam gear in dowel & ensure matching of mark '1' mark on cam gear matching with '1-1' marking of idler gear.

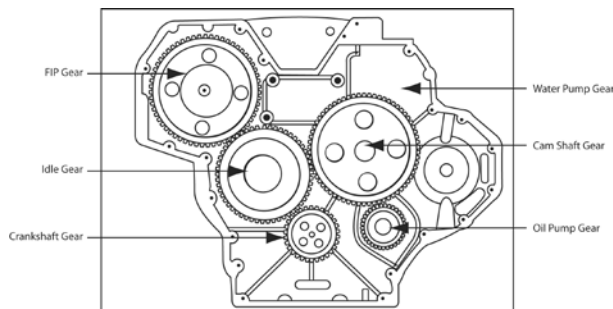


Fig.70 Engine gear train

7.7 Maintenance of cooling system

The engine cooling system contains gear driven water pump, cooling passages on the engine and cylinder head, water manifold, thermostat, radiator, fan and lube oil cooler (which is cooled by engine water)

The water used should be clean, free from dirt or dust, floating matter, colorless, without smell. Add Greaves supplied coolant in correct proportion for efficient cooling of the system. Bad water can cause severe corrosion. These corrosion products can block cooling system and severely damage the engine.

Hard water can completely chock up the cooling system with scale formation, salts, sulfates and other compounds. This can cause engine seizure. Never use concentrated acidic compounds or soda lime to clean up the cooling system.

7.8 Battery Checking Instructions

The battery is of lead acid type. After 150 hours of running it should receive the attention as follows:

1. Brush the dirt from the battery.
2. Remove the vent plugs.
3. Check the level of Acid.

Operational and Maintenance Manual G11 Series

- The acid in each cell should be kept in level with the top of the separators. Top up, if necessary, with distilled water. Do not allow distilled water to come in contact with metal, use only the glass or earthenware container and funnel.
- Do not bring a naked light bulb near when plugs are removed or when the battery is on charge as the gas given off by the acid is highly inflammable.
- The charge of the battery can be checked with hydrometer which shows specific gravity of the electrolyte. This varies with the state of the charge. Check the specific gravity of the acid with a hydrometer. When charged the specific gravity should be as follows:

A
At climates below 80°F (27°C) specific gravity corrected to (60°F) (16°C)
1.28-1.30
B
At climates between 80°F and 100°F (27°C-38°C) specific gravity corrected to (60°F) (16°C)
1.25-1.27
C
At climates over 100°F (38°C) specific gravity corrected to (60°F) (16°C)
1.22-1.24

When the hydrometer is as low as 1.25 for "A", "1.20" for B and "1.18" for "C" the battery must be charged as soon as possible, either by the engine or from an independent source.

- Clean the vent plugs and free their air passages.
- Ensure that the terminals are free from corrosion. If corrosion has taken place, the terminal should be disconnected from the battery and the corrosion scraped off. Wipe with a rag moistened with weak ammonia or bicarbonate of soda solution. The terminal should be bolted tightly on the terminal posts and coated with petroleum jelly (no grease).

Please note that while engine is supplied charged on low amperage or slow charge from authorized battery maintenance / repair shop. Time required for initial battery charging is approximately 48 Hrs. Always use battery full charged while commissioning of engine.

Some assorted maintenance jobs

- Starter and alternator brushes to be replaced, if worn out sufficiently.
- To clean exhaust, silencer and piping for soot.
- Fuel tank to be drained to remove sediments or cleaned at regular intervals.
- Check and tighten fasteners, if required at regular intervals.

7.9 Electronic Governor and actuator fitment

Engine speed is sensed by magnetic pickup sensor. This sensor is used by electronic control unit to give signal to rotary actuator to control speed regulating lever of fuel injection unit to control the speed of engine at 1500 rpm for 50Hz Genset.

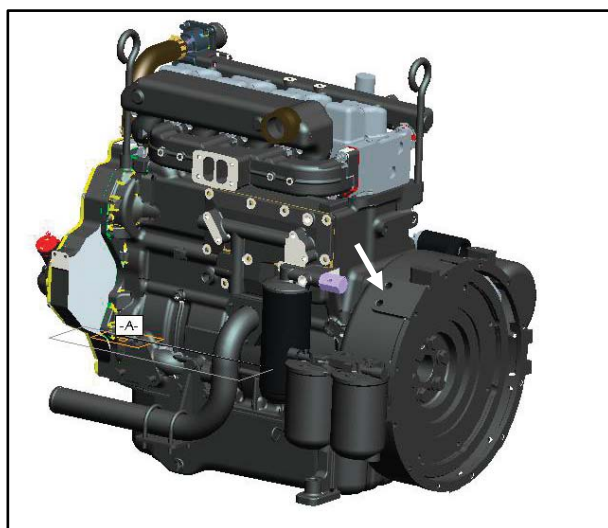


Fig.71 Actuator

Operational and Maintenance Manual G11 Series

Operational and Maintenance Manual G11 Series

7.10 Maintenance Schedule

Sr. no	Particulars	Maintenance Schedule								
		Daily	60 hours	500 hours	1000 hours	1500 hours	3000 hours	3500 hours	10000 hours	Others
1	Check oil level in Sump	**								
2	Check Belt	**								
3	Check Fuel level in tank	**								
4	Check water level in radiator	**								
5	Check Battery condition	**								
6	Clean coarse fuel filter		**	**	**	**	**	**	**	Every 500 Hrs
7	Change air filter			**	**	**	**	**	**	Every 500 Hrs
8	Change oil filter cartridge		** #	**	**	**	**	**		Typical change periods are maximum periods. Depending on the local conditions, these may have to be shortened. Set up your own maintenance frequency with experience, Based on site conditions
9	Change fuel filter cartridge		** #	**	**	**	**	**		
10	Changing oil		** #	**	**	**	**	**		
11	Cleaning up radiator fins			**	**	**				
12	Checking up valve clearance and set if necessary			**	**	**	**	**		First re-set valve clearance after 60hours of running.
13	Tightening up external fasteners				**		**			Check regularly

Operational and Maintenance Manual G11 Series

Sr. no	Particulars	Maintenance Schedule								Others
		Daily	60 hours	500 hours	1000 hours	1500 hours	3000 hours	3500 hours	10000 hours	
14	Clean injector, nozzles and spray Change if necessary				**		**			
15	Cleaning up fuel tank				**		**			Or at least once in a year
16	Cleaning up exhaust silencer							**		Or at least once in a year
17	Checking exhaust bellows and change if							**		After 3500 Hrs
18	Checking valve and insert condition, change if							**		
19	Calibrating fuel pump								**	To be done by Bosch authorized dealer
20	Changing valve stem seals if leakage observed								**	If leakage is observed
21	Changing gear end and flywheel end oil seals								**	Whenever the oil leakage is observed
22	Changing thermostat element								**	
23	Changing cylinder head								**	

Operational and Maintenance Manual G11 Series

Sr. no	Particulars	Maintenance Schedule								Others
		Daily	60 hours	500 hours	1000 hours	1500 hours	3000 hours	3500 hours	10000 hours	
24	Changing air / exhaust / water manifold / thermostat housing gaskets								**	
25	Checking sensors and change if necessary								**	
26	Overhauling starter and alternator								**	
27	Checking and changing AV mounts if required								**	
28	Replace radiator cap with rubber ring							**		Major overhaul should be carried out at 10000 hours or 7 years whichever is earlier. Carry out all activities of top overhaul also. Except rubber parts and gaskets if metal parts can be reusable then need not be replaced based on condition of the parts.
29	All rubber hoses and hose clips								**	
30	Changing main bearings if required								**	
31	Changing of Con rod big end and small end bearings if required								**	
32	Changing set of gaskets and O rings								**	
33	Changing water pump if required								**	
34	Changing valves, valve guides and valve seat inserts if required								**	
35	Changing high pressure pipes								**	

Operational and Maintenance Manual G11 Series

Sr. no	Particulars	Maintenance Schedule								Others
		Daily	60 hours	500 hours	1000 hours	1500 hours	3000 hours	3500 hours	10000 hours	
36	Changing injectors if required								**	
37	Changing liners if required								**	
38	Changing piston assembly if required								**	
39	Checking and changing Con rod small end bush if required								**	
40	Changing fuel pump elements if required								**	To be procured from Bosch authorized dealer
41	Checking all critical fasteners and replace if necessary								**	
42	Checking fan drive assembly							**		
43	Add coolant additive			**	**	**	**	**	**	Every 500 hrs
44	Replace cooling water and additive						**			
45	Change belt							**		
46	Check engine protection system				**		**		**	
36	Changing injectors if required								**	
37	Changing liners if required								**	

Operational and Maintenance Manual G11 Series



Operational and Maintenance Manual G11 Series

Note :

1. **This schedule is applicable only when Greaves Maxtherm oil and coolant are used**

2. **# - For initial starting only**

Notes:

Never re-use following items

- Cylinder head gasket,
- Copper washers,
- O-rings,
- Valve stem seals,
- Oil seals,

Top and major overhaul depends on the type of loading, quality of installation, quality and regularity of maintenance, etc., the above mentioned intervals are typical periods. Users should keep a close watch on their engine installation to see the signs of service requirement. It is also advisable to get the engine overhauled in lean operation period or ahead of a heavy season of running.

Operational and Maintenance Manual G11 Series

8. ENGINE PRESERVATION

8.1 Engine preservation during prolonged period of non-usage

If the period between engine dispatch from Greaves and the installation is more than six months or if an engine is to be non operational for more than twelve months, the engine has to be preserved to avoid damage due to corrosion, dust, and other factors. Preferably a preserved engine should be covered in plastic sheet and stored in cool dry, shaded place.

Following instructions are to be followed for engine preservation:

1. Run the engine with clean fuel at rated speed at no load for about 10 minutes. This warms up the engine and the lube oil is circulated all over inside the engine.
2. Stop the engine and immediately drain the oil. Fill up the engine with one of the preservative oils to the low level mark on dipstick. Choose preservative oil from the list given below.
3. Run the engine at rated speed with no load for 5 minutes.
4. Make a clean solution of preservative oil and diesel (1: 5 ratio) and connect the mixture to the fuel pump inlet by gravity feed.
5. Drain the coolant from cooling system. Rinse the system thoroughly with clean water. Fill the cooling system with mixture of water and any of the coolant additives listed - in the requisite ratio.
6. Crank the engine and run it at rated speed with no load for half a minute. Stop the engine.
7. Remove air cleaner, fuel filter and lube oil filter, pack them separately.
8. Drain preservative oil from sump and refit the drain plug. Drain water preservative mixture from cooling circuit. Treat all unpainted open surfaces with rust preventive coats.
9. Seal all openings with caps, plastic sheets or waterproof paper. Seal the dipstick with the tape.
10. After this point do not rotate the engine.
11. Remove belts and store separately.
12. The battery should be disconnected. Ensure electrolyte level. Charge the battery at regular intervals.
13. Put a mark on the engine indicating date of preservation.
14. Periodically inspect the engine for corrosion, effects of humidity and dirt.
15. The above procedure has to be repeated after every 12 months.

Operational and Maintenance Manual G11 Series

Recommended preservatives

Manufacturer	Rust preventive	Cooling system	Lube oil and fuel circuit
Bharat Petroleum	Bharat Rustol 152	Bharat Sherol B emulsion with water (1: 20 ratio)	Bharat Preserve oil 30
Indian Oil Corporation	Servo RP 125	Servo Cut S 20% Emulsion with water	Servo preserves 30. Servo Run-N oil 30
Hindustan Petroleum	Rustop 274	Koolkit 40.5% emulsion with water	Auto run T 120
Veedol	Veedol Rustop IT	Veedol Amulkut 4 Emulsion with water 1:15	Veedol 30/40

8.2 Putting a preserved engine back into operation. (Check numbering)

1. Remove all seals. Clean up the engine. Remove rust preventive coat.
2. Fit air cleaner, fuel filter, Lube oil filter, and belts. Use new filter elements. Apply correct tension to the belts.
3. If rubber components (Hoses, belts, etc) are cracked or brittle, replace them.
4. Fill up correct grade oil up to the high level mark on dipstick.
5. Fill up coolant. Remove trapped air.
6. Connect supply of clean fuel. Remove trapped air.
7. Fit a charged battery. Check the electrical connections.
8. Run the engine at rated speed at no load for 5 minutes. Observe and look for any irregular noise, vibration, etc. If some irregular behavior is observed take corrective actions or call authorized service dealer.
9. Start the engine and put it into service.

Operational and Maintenance Manual G11 Series

9. INSTALLATION DO'S AND DON'TS

9.1 Do's

1. Install the engine on horizontal, hard area. This area should be properly ventilated. It should have access to maintenance areas.
2. All the mounting structure should properly rest on the ground.
3. Check with civil engineers and architects before mounting the engine on slabs, beams, raised structures, above ground floor, etc.
4. Check fire hazard possibility near fuel, oil storage.
5. Plan release direction of the exhaust.
6. Judge engine size properly. Seek help from Greaves service dealers or area offices for this purpose.
7. Provide adequate safety measures around installation area.

9.2 Don'ts

1. Never install the engine on inclined surface.
2. Remember that a good installation reduces running cost, maintenance cost, provides reliable and safe service.

Operational and Maintenance Manual G11 Series

10. GCL REGIONAL OFFICE AND DEALER ADDRESSES

Location Name	Address	Tele. / Fax & e-mail
GREAVES COTTON LIMITED, PUNE	Western Region Office Corporate Park II, 4 th Floor , Sion Tromby Road, Chembur, Mumbai - 400071	Tel. 91-20-27473564(O) Fax- . 91-20-27472276 / 27474567 After Office Hours- 91 20 7472601(O) www.greavescotton.com
Mr. Manish Kulkarni Regional Manager West Region	Corporate park II, Sion Trombay Road, Chembur.Mumbai-71.	Tel - 022-25262676(o) Mob - 9920465952 manish.kulkarni@greavescotton.com
Mr. M B Kulkarni Service Manager	Chembur Office	Tel - 022-25264711(O) Tel - 022-28406702 ® Fax-022-25262622. Mob - 9820605381 mb.kulkarni@greavescotton.com
Mr. Rishikesh Nirmal Assistant Managar Sales	Chembur Office	Mob-9820926588 Tel 022-25264715 rishikesh.nimal@greavescotton.com
Mr.Vinod Kapadnis Asst Manager Sales	DEU Pune	Mob-9158004221 vinod.kapadnis@greavescotton.com
MR.S. G. More Assistant Manager (Sales)	Chembur Office.	sg.more@greavescotton.com Tel - 022-25264716(O) Mob-9833475415 Fax-022-25262622. sgmore@greavesmail.com
	AHMEDABAD Jaldarshan' opp. natraj cinema, Ashram Road, Navrangpura Ahmedabad –380009	Tel - 91-79-26581856 Fax - 91-79-26587783

Operational and Maintenance Manual G11 Series

Location	Name	Address	Tele. / Fax & e mail
BRANCH OFFICES			
PUNE	Mr.S Barmanray Branch Manager	Ahmadbad Office	Tel - 079 - 26585709(O) Tel - 079 - 65411073 ® Mob - 9825147873 Fax-079-26587783 s.barmanray@greavescotton.com
	Mr.Rathod Nikunj Manager (Marketing)	Ahmadbad Office	Tel-079-26581861(O) Tel-079-65420632 (R) Mob - 9909919147 nikunj.rathod@greavescotton.com
	Mr.Saurabh Nagar Assistant Manager (Service)	Ahmadabad Office	Tel-079-26581861(O) Mob - 09879001506 saurabh.nagar@greavescotton.com
	GOA- RESIDENT OFFICE	C/o UPA engineering Sales & Services, Vasco- da-Gama	Tel- 0832-2514512, 2513685(O)
BHOPAL	Sandeep Singh, Assistant Manager (Service)	Greaves Cotton Ltd , BG 1, WR, D3 - 404, Danish Nagar, Hoshangabad Road, Bhopal-462026	sr.singh@greavescotton.com M-9425603620
NAGPUR	Mr.Atul Meshram Assitant Manager Sales	1004 A wing lokmat bhavan, ramdaspath varda road Nagpur-4440010	Mobile - 9823061917 Tel-0712-2423991 atul.meshram@greavescotton.com
WESTERN DEALERS			
Mumbai Central Area Boiser, Tardeo)	G.S. Enterprises	24,Nagdevi Cross Lane, 3 rd floor, Mumbai- 400003	Mr. Shabbir/Abhijit Mob-9820038788 Tel- 022 -28935025 ® Tel- 022- 23722303(O) Tel-022- 23451686(O) Fax-23453804
Kolhapur, Karad, Sangli and Ratnagiri	Deltran Diesel	2094-A, Vikram Nagar, Market Yard, Kolhapur- 416005	Ravindra Balgunde Mob. 9421219836 Mr.H.V.Bhasker Rao Mob- 9422413750 Satish- 9422046240 Tel-0231-2652326 Tel-0231-2651095 Tel-0231-2537931 (R) Fax- 0231-2654072

Operational and Maintenance Manual G11 Series

Pune, Ahmednagar Nashik, Solapur, A'bad	M K Services	6/15 Chintamani Industrial Estate, Sinhagad rd, Wadgaon bk, Pune 411041	Mr.Madhusudan Kashilekar Mob - 9822043604 Cell -9372007424 Tel/Fax - 020 - 24393688
Aurangabad, Jalgaon, Marathwada, Dhule.	M.K.Services	303, Labh Chambers Station Road, Aurangabad-431005, Nashik - 422008.	Mr.Vinod Apshinde 9372007438 Tel/fax- 0240-6621885 Mr. Rajesh 9372007437/36/38/39 Simant - 9372007411 Tele Fax - 0253 - 2399778
Thane, Bhiwandi, New mumbai, kalyan, panvel, up to chiplun	Geekay Engg Services	W/354, T.T.C Area. Thane Belapur Road MIDC, Rebale, NEW MUMBAI- 400701	Mr. S.N.Gokhale 9321134078 Sadanand Kelkar Mob- 9820133409 Shirish Gokhale 8879122965 Tel-022-27606868(O) Tel-022-27606969(O) Tel-022-25360643® 27602663 response@dieselinerepairs.co.in,
Nagpur, Akola, Amravati Vardha, Buldhana, Buldhana	Nagpur Motors & Machineries	Subhash Road, Nagpur- 440018	Mr. Mohan Nabira "Mob- 9422101936 Mob : 9422102309 nagpurmotors123@rediffmail.com Te-0712-2726307 (O) Tel-0712-2726306 (O) Tel- 0712-2231187 ®
Goa, Sindudurg	UPA Engg Sales & Services	1) House No-557, Dande Vado Chinchinim, Salcete, Goa-403715 2) Pai Building, Mundvel, Behind Uma Petrol Pump, Vasco-Da-Gama, Goa-403802	Tel- 0832-2863532 (O) Tel- 0832-2863533 (O) Fax- 0832-2863534 TeleFax- 0832-2513685 (Vasco) Tel -0832-2514512(Vasco) upaengg@gmail.com
GUJRAT Ahmedabad Mehasana, Bhavnagar Kheda, Surendranagar	Ravi Rashmi Energymech Ltd.	1 st floor, Avani Complex, Behind Navarangpura Police Station, Navarangpura, Ahmedabad- 380009	Rameshan R. Mob- 9327580886 ravirashmigroup@yahoo.co.in Tel-079-26562868(O) Tel-079-26561046(O) Fax- 079-26565024

Operational and Maintenance Manual G11 Series

Baroda Panchmahal, Anand	Jay Mech.	15, Sunrise Complex, opp. Jay Ambe School, Near Darbar Chokdi, Manjalpur Vadodra	Tejash Athavia Mob- 99779388488 jaymech@rediffmail.com
Surat Kim, Hazira, Bharuch	Ajay Enterprises	1/660, Bundar Street, behind Civil Court, Nanpura, Surat- 395001	Ajay Athavia Mob- 9825861456 ajayenterprise@rediffmail.com Tel- 0261-2471217 Tel- 0261-2462756
Vapi, Silvassa, Daman Valsad	Deev Engineers	A-2/16, 2nd Phase, Near Old Nathani Paper Mills, GIDC Vapi 396195	Mr. Varghese Mob- 9825114985 mt_varghese@indiatimes.com mtv@deevengineers.com Tel- 0260-2431620(O) Tel- 0260-2990243/245(O) Fax-0260-2426997(O)
Rajkot, Amreli Surendranagar Bhavnagar, Porbander Morvi	Cristline Marketing Pvt Ltd.	301-302, Topaz Arked, Opp. The Imperial Palace , Dr. Yagnik Road Rajkot- 360001	Mr. Joseph Rozario Mob- 9824222660 cristline@rozariogroup.com joseph@rozariogroup.com Tel-0281-2464105(O) Tel.fax-0281-3048861/62/63
Veraval, Junagarh	Continental Diesel Services	Near Kapishwar cold Storage, GIDC Estate Veraval	Mr.Bell/Mr.Sandip Mob- 9427229642 9427256308 continentalvrl@yahoo.co.in
Gandhidham, Bhuj, Naliya Rajkot, Jamnagar, Morbi	MVR Diesel Electromech Engineers	"MVR House", Plot No.105, Sector – 1/A, Gandhidham- 3700201 Branch off- 303 Ronak Complx Near Bombay Hotel Gondal road Rajkot	Mr.M. V.R.Mohan Mob- 9825274076 9428749072 9825274076 mvrDiesel@yahoo.co.in Tel-02836-329883 Tel fax-02836-226719 Tel-02836-367645/46(R)
Jamnagar (only for Reliance)	Kishor Motor Store	10-11, Manibhadra complx, Near Vibhaji School, Jamnagar-361001	Mr.Gaurang Shah Mob- 9824211082 gaurangshah@kishormotors.com 0288-2676252, 0288-2678325

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MADHYA PRADESH Indore, Khargaon, Sendhwa, Ratlam, Devas Ujjain, khandwa.	Katare Power Industries	114 Dey's Tower, 19/2 Manorama Gunj, Palasia, Indore- 452001	
Bhopal, Sagar, Harda, Mandideep, Jabalpur, Hoshangabad.	Karan Agencies	204, Dynamic Centre, Plot no- 241/242 Zone.1, Maha Rana Pratap Nagar, Bhopal- 462011	Mr. S.K.Sinha Mob- 9425004664 Mob- 9039589630 Satish karanagencies@gmail.com Tel- 0755-2555584/85(O) Tel- 0755-2417028 ®
Jabalpur, Satna, Rewa, Singourli, Chindwara"	Karan Agencies (Br. Off)	No Office Only Res Engineer C.P.Sharma S/O Raghuwanshi Sharma Manegaon Gram Panchyat, Near-Govt.High School, Ranjhi	Mr. Chandra Prakash Sharma Mob- 9589196753 Mob- 9669445401 Shiv Kumar karanagencies@gmail.com
Raipur, Bilaspur, Korba Ambikapur, Bhilai Rajnandgaon Chattisgad state	S S Diesels	shree dutt prabha,ring road no.1,gali no.1 transport nagar,tatibandh Raipur-492099	Mr.S P Varvandkar 9300723313 Suresh Goswami 9301723312 ssdiesels@gmail.com Tel Fax- 0771-2572782/83

NORTH REGION

Delhi	M/s GREAVES COTTON LIMITED	Exp. Building Annexe,9-10 Bahadur Shah Zafar Marg P.B.No.7024, New Delhi- 110002	Tel.:91-11-23730554 (8 ines) /23317039 FAX.:91-1123359782 / 23357739
	Mr. Rajiv Kulshreshta Regional Manager	Delhi	Tel. 011-23359783 Mobile-9654141301 rajeev.kul@greavescotton.com
	Mr. Narendra Sharma Dy. Genral Manager	Delhi	Tel.011-23311521(O) Mob. 09654101303 n.sharma@greavescotton.com

Operational and Maintenance Manual G11 Series

	Mr. Manish Trivedi Manager Service NR	Delhi	Mob. 09654101304 Tel.011-23318037(O) manish.trivedi@greavescotton.com
	Mr. Kapil Saini Asst. Manager-Sales	Delhi	Mob. 09891442407 kapil.saini@greavescotton.com
	Mr. P.S. Guleria Asst. Manager-Service	Delhi	Mob- 09871816336 ps.guleria@greavescotton.com
Lucknow		Office no. 208, lind floor Shalimar Square 126/31 B N Road, Lal Bagh LUCKNOW-226001	0522-2202900
Chandigarh	Mr. Gurinder Singh Asst. Manager-Service	Chandigarh	Mob-09216348121 gurinder.singh@greavescotto.com
	Mr. Atul Aluwalia Dy. Genral Manager	Chandigarh	Mob- 0951325885 atul.aluwalia@greavescotton.com
Jaipur	Mr. Mayank Agarwal Asst. Manager-Sales	Jaipur	Mob- 09460727237 mayank.agarwal@greavescotton.com
	Mr. Sunil Sadh Asst. Manager-Service	Delhi	Mob- 09810770502 sunil.sadh@greavescotton.com

NORTH DEALERS

Ghaziabad Bulandsher, Meerut Noida, Hapur, Shahibabad,	M/s. Ambika Power point	211/6 Rajendra Nagar Ind.Area, Opp: Dass Factory, P.O. Mohan Nagar, G.T Road, Ghaziabad-201007	Mr. S.K.Sharma Mobile No: 09212077086, 09810282482 Mr.Rajeev Goswami Mobile No: 09810545055, 09212679484 app_rg40@yahoo.co.in & ambika.powerpoint@gmail.com Tel-0231-2651095 Tel-0231-2537931(R) Fax- 0231-2654072 0120-2658465(O) 0120-6565590(O) 0120-2632688(R)
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Faridabad, Palwal	M/s.Power(Service) Syndicator	B-488, IInd Floor, Nehru Ground Opp.Punjab national Bank, N.I.T. Faridabad-121001	Mr. R.P.Singh pss_fbd@sify.com Mobile:9312215510 0129-2421298 (O) 0129-2413356(O) FAX: 0129-2411898
	M/s.R.S. Powertronix	305,310, Triveni Complex E-10-12, Jawahar Park, Laxmi Nagar, Vikas Marg, Delhi-110 092	Mr.D.K.Sharma Mobile: 9312268885 rspowertronix@yahoo.co.in
New Delhi, Sonipat, Rohtak	M/s.Delhi Power Service & Co.	E-45-B Vishwakarma Cololy., Lalkuan Mehrauli-Badarpur Road, New Delhi-110044	Mr.J.K.Verma Mobile: 9811225115 jkv_dpssc@yahoo.co.in 011-26360314 (O)
	M/s. Radiant Power Engineers	WZ-B-93, Tanwar Market Naraina, Ring Road New Delhi-110 028	Mr.Ansar Ali Mobile: 9810621361 radiantpower@sify.com 011-25777570 (O) 011-65070489(R)
	M/s.Power Service Syndicate (Gurgaon)	596/3, Prem Nagar, Sec.12A, Near Telephone Exchange, Gurgaon- 122001	Mr.R.P.Singh Mobile: 9312215510,9312965409 pss_gurgaon@gmail.com 0124-2335026
	M/s.Supertech Engineers & Co.	Zila Hotel Compound, Opp: Sophia Market Court Road, Saharanpur-247001	Mr.K.K.Katarya supertech@supertechmail.com Mob-09927045957, 09927045958 0132-2725957 (O) 0132-2645564 (R) FAX: 0132-2711149
Panipat, Narnaul & Hissar	M/s. Kamboj Power Generator Service	Plot No.-331,Sec 25 Phase-II, GT Road, Panipat-132103	Mr. Teja Kamboj Mobile: 9416508275 kambojgenset@gmail.com 09812075295(O)
Agra, Mathura,Kosi, Bharat Pur	M/S Abhavaya Engines & Machines Pvt Ltd	77, Dushant Nagar Sikandra - Bodla Road Agra	Mr. Yogendra Singh Mobile-09758019501 09761210000 (O) abhavaya_empl@gmail.com

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UP Vanarasi Kanpur, Kannouj Fatehpur, Jhansi Orai, Farukhabad	M/s.Tumen Diesels	D38/1, 2nd Floor, Hauzkatora, Godowlia Varanasi-221001	Mr.Suman Jaiswal Mobile: 9839043988 tumen_vs@sify.com 0542-2412878 (O) 0542-2419088 (Tele fax)
Kanpur Lucknow, Faizabad, Rai-Bareilly, Sitapur, Allahabad, Gonda, Balrampur	M/s.Diesel Sales and Service	783/5, W1 Block, Saket Nagar, Kanpur-208014	Mr.S.Banerjee Mobile: 9935490033 shubh5@dataone.in 0512-2611229 (O) 0512-2608029 ®
	M/s.Hi-Tech Diesels	123/426, Fazal Ganj, Factory Area Opp: Panama Factory, Kanpur-208012	Mr.S.N.Ahmed Mob :9415050740, 9005092250 0512-2234185 (O) 0512-2502790 (R) Fax:0512-2234732
Lukhnow	M/s. Frontline Technocrats (P) Ltd.	326 A&B, 3rd floor, Sahara Shopping Centre Faizabad Road, Indira Nagar, Lucknow-226016	Mr.Vinod Sehgal Mobile: 9415028353 ftpl@sancharnet.in 0522-2346292 (O) 0522-2343705 (Tele Fax) 0522-2329970 (R)
	M/s. Shri Vishwakarma Diesel Engineers	near Suvidha Hotel,Kashipur Bye Pass road, Rudrapur (Udham Singh Nagar) uttarakhand	Mr. Dharmendra Sharma Mobile No. 09837357950 & 09412946172 svde.2002@gmail.com, & shrivishwakarmadieselengineers@ rediffmail.com dharmendrasharma1977@yahoo.co.in 05944-245966
Abu Road Sirohi, Barmer,	M/s.Power Engineering	B-88, RIICO Industrial Colony, Abu Road	Mr.R.K.Panchal Mobile-09414153821,09680672543 Mr.Ananad Panchal, 9414353826 kkpanchal75@yahoo.com 02952-221266 (O) Fax:02974-226621 rkpanchal_61@yahoo.co.in
	M/s.Manish Industrial Corporation	Madan Kirpa 275/6 Laxmi Chowk, Ajmer-305001	Mr.R.C.Jain Mobile: 9414007508 mic_ajmer@yahoo.co.in 0145-2624706 (O) 0145-2624708 (O) 0145-2600960 (R)

Operational and Maintenance Manual G11 Series

Jaipur, Savai Madhopur	M/s.Pink City Engg. & Trading Co.	Shop No.5, (Chowdhary Complex) Hazi Colony Corner, Jhotwara Road Jaipur-302016	Mr.M.L.Gupta Mobile: 09352682949 Mr.Ashish Gupta Mob-09352682952 pinkcityengineering@gmail.com 0141-2304491 (O) 0141-2304179 (O) 0141-2304429 (R) Fax: 0141-2304179
	M/S Modern Power Engineers	G-8(B) Amber Tower S.C Road, Jaipur-302016	Mr. Deepak Sharma Mob-09414055633,09314873633 response@indiagensets.com deepak@indiagenset.com , pe_jpr@yahoo.co.in 0141-2378221 0141-5115633
Jodhpur	Ashutosh Enterprises	Office - 9, Aatmaram O/s Sojati Gate, jodhpur	(M)-09214176621,07737926301 & (M)-09784116475 kgsharma@ashutoshenterprises.com , contact@ashutoshenterprises.com
	M/s Modern Power Engineers	Ganga Shahar Road Bikaner	(M)-09982370108 mpejpr@rediffmail.com
Chandigarh	M/s.Power Tech Engineers	760 Ind.Area, Phase-II Ram Darbar, Chandigarh-160002	Mr.Parshottam Singh Mobile: 9216787082/9216887082 parshot_singh1@yahoo.co.in 0172-4614195(O) 0172-2656559(O)
Amritsar	M/s.K.C.Engineers	1st Floor, Street No.4, Kot-Atma Singh, Near Chowk Hussain Pura, Amritsar	Mr.J.S.Grewal Mobile: 9463500200 info@kcengineers.net 0183-2531457 (O)
Jalandhar	M/s Punjab Power Solutions	Shop No. 4&5, Near Bassi Auto Clinic Lamba Pind, G.T. Road , Bye Pass Jalandhar-144004	Mr. Krishan Kumar Mobile: 9872288444 , 9872788444 greaveskrishan@yahoo.co.in 0181-2421550 (O)
Jammu and Kashmir Jammu-Tawi	M/s. Fairdeal Enterprises	5, Exchange Road, Jammu-Tawi Pin: 180001	Mr.D.L.Chopra Mr.Y.Chopra Mobile: 9419183626 fairdeal@live.in powerlinkers@yahoo.co.in 0191-2543712 (O) 0191-2473057 (R) Fax: 0191-2543712(Tele Fax)

Operational and Maintenance Manual G11 Series

Leh - Ladakh	M/s.National Engineering	Skalzangling, Airport Road Opp:Post Office Leh - Ladakh-194 101	Mr.Vinod Malik 9419179110 national.engineering.leh@gmail.com 9419179110, 9560163737
Srinagar	M/s Asian Automobiles Engineers,	Shop 37 Batmaloo Adda Srinagar, J&K 190009	Mr. Mazid, Mobile No.- 09419088686,09419002317 asianautoeng@yahoo.com 0194-2455916 (O)

Location	Name	Address	Tele. / Fax & e mail
BRANCH OFFICES			
Kolkata	Greaves Cotton Ltd Regional Office - Kolkata	Akash Tower, 5th Floor 781, Anandapur Kolkatta- 700107 Tel- 91-33-2421459(O), 40120900 Fax- 91-33-22424325	Tel - 079 - 26585709(O) Tel - 079 - 65411073 ® Mob - 9825147873 Fax-079-26587783 s.barmarney@greavescotton.com
	Mr. S.Banerjee Sr Manager Marketing	Kolkata Office	Tel-033- 40120926(O) Mob- 9674164481 s.banerjee@greavescotton.com
	Mr.D. Chakraborty Manager Service	Kolkata Office	Tel- 033-40120943(O) Mob-9836886517 debesh.chakraborty@greavescotton.com
	Mr.A.Roy Manager Commercial	Kolkata Office	Tel- 033-40120941(O) Mob-9674164478 a.roy@greavescotton.com
	Mr. S.Biswas Asst Manager Service	Kolkata Office	Tel- 033-40120954(O) Mob-9830116012 sushanta.biswas@greavescotton.com
	Mr. S.Ghosh Asst Manager Marketing	Kolkata Office	Tel- 033-40120941(O) Mob-9830116014 s.ghosh@greavescotton.com
Ranchi	Greaves Cotton Ltd	Ranchi Opp.Arya hotel H.B Road ,Second floor . LALUR, Ranchi - 834 001 2530900/2530997	Tel- 91-651- Fax 91-651-2530981

Operational and Maintenance Manual G11 Series

	Mr. P.Baisya Branch Manager	Ranchi Office	Tel- 91-651-2530900/2530981 Fax 91-651-2530998 Tel-0651-2202407 Mob- 9835158912, 9051780616 p.baisya@greavescotton.com
	Mr. S. Mishra Manager Marketing	Ranchi Office	Mob- 9709001238 s.mishra@greavescotton.com
	Mr. A.K. Mishra Asst Manager Service	AMAZ Shopping Mall (Vishal Megamart Complex) 6 th Floor, Room No-604 Guwahati-1	Mob- 9955124789 ak.mishra@greavescotton.com Tel-0361-2735426
Guwahati	Mr.M.Dutta Asst Manager Marketing	Guwahati office	Mob- 9864111253 munim.dutta@greavescotton.com
	Mr.S. Barpujari Asst Manager Service	Guwahati office	Mob- 9864155225 s.borpujari@greavescotton.com

EAST DEALERS

WEST BENGAL Kolkatta	Stotex Corporation	33/1, N.S. Road, Marshall House, 6th Floor, Shop No. 636 Kolkatta 700 001.	Prakash Jain – 9831027938 stotexcorp@rediffmail.com Tel- 033-22307119(O) Tel- 033-30283164(O) Fax : 033-30227119 Tel : 033 -32594157 ®
	Unitrade International	2B, Grant Lane, Room no-52, Kolkatta- 700 012	Mr. Ramesh jain / Manoj Jain Ramesh - 9830041204 Manoj – 9831031494 unitrade1980@yahoo.co.in Tel- 033-22114598 (O) Tel- 033-22114904 (O) Tel033-24462471 ® Fax : 033-22114904
	United Machinery & Appliances	12, Ganesh Chandra Avenue, Kolkatta 700 001.	Mr Arijit Bose - 9831276909 service@unitedmachinerycal.com Tel - 033 -22379500 (O) 033 - 22379630 (O) Fax - 033 - 22256128

Operational and Maintenance Manual G11 Series

Siliguri	Modern Commercial Corp.	Kapil Centre, Sevoke Road, Siliguri - 734001	Mr. Kazal Sarkar Mob- 9434007238 kazal.sarkar@gmail.com mccslg@sancharnet.in Tel-0353-2542208, 6457184 Fax- 0353-2547108 (O) Tel- 0353-2596881 ®
	United Diesel	Pakurtala More, Ashram para, Nazrul Sarani, Siliguri – 734 001	Mr Sanjay Dey / Sudip Saha 9832066460 / 9733008395 sudip_saha2004@yahoo.co.in
TRIPURA Agartala	Jyotish Chandra Saha	Motor Stand Agartala – 799001 Tripura	Mr Asim Saha 9436168242 jcs_sons@rediffmail.com Ph: 0381-2204257, 2225317
ASSAM Guwahati Tinsukia	Mechwell Engineers	Kamakhya Umananda Bhawan, Opp. Axis bank, first floor, A.T.Road, Guwahati- 781001	Mr.pakaj/ S.K.Bhattacharjee Mob- 9435199451 / 9435111988 mecwelengineers@yahoo.com Tel-0361- 2513724 (O) Tel-0361- 2516375 (O) Tel-0361- 2477265 ® Fax- 0361- 2516375
	Runway India	Forth floor,GS Tower near Himmatsingh petrol pump AT road, Guwahati- 781001	Manoj Lundia – 9435035319 Rakesh – 9859947043 runwayindia@rediffmail.com Tel-0361- 2607241 (O) Tel-0361- 2604901 (O)
	Industrial Trade & Agency	Makum Road,Jamuna Bhawan, Tinsukia 786125	Mr. Pradeep Kasera Mob- 9435037606 itagencies@sancharnet.in Tel-0374-2338390 (O) Fax : 0374-2336289
ARUNACHAL PRADESH Itanagar	Rubu Construction	Near R.K.Mission H – Sector Itanagar – 791 113	Debasish Ghosh - 9856080052 rubu_construction@indiatimes.com Tel: 0360-2292682

Operational and Maintenance Manual G11 Series

JHARKHAND Jamshedpur	Agro Engg. & Eqpt. Co.	Q Road, Bistupur, Jamshedpur 831 001	Mr. Amit Hazra – 9204550799 trade@agroengg.biz Tel- 0657-2320559 (O) 0657-6456222 (O) Fax : 0657-2425170
	Tech Trade Engineering	Stn.road P.O.Tatanagar Jamshedpur 831 002	Mr.Y.P.Gambhir Mob- 9431113633/ 9234623633 techtrade@dataone.in ypgambhir@gmail.com Tel-0657-2290349,2290348
Ranchi	Utility Services	22 Agro HSG COLONY HIG22 Ranchi 834 002	Mr. M. J. Kale/ Mr. Ghanekar Mob- 9431114407 / 9431127874 utilityservices@yahoo.com Tel- 0651-2241756 (O)
BIHAR Patna	Royal Enterprises	Shop No 8, Commercial complex, Saket Plaza, Jamal Road, Patna – 800 001	Mr Y Rathore / Manoj Krishna 9334129421 / 9835418332 services.royal10@gmail.com Ph: 0612 – 3261762 Fax – 0612-2299233
	K.K. Enterprises	shop 114 first floor narayan plaza, Exhibition Road pin-800001	Mr. Kundan Kumar Mob-9835004333, 9334643200 k.k.enterprises@indiatimes. com Tel- 0612- 2206016 (O),
ORISSA Bhubaneshwar	Unique Supplier and Services,	Pushpa Market, Jharpara, 6 Cuttak Road, Bhubaneshwar 751 006	Mr. Pradip Kumar Mob- 9437082076 unique_suppliers@yahoo.com Tel-0674-2575324 (O) Telfax-0674-2575319 (O)
Raurkela	Intake Associate	D102, Nirmal Market Power House road Raurkela-769001	Mr.Jugal Sharma Mob-9433013328 dpkishore@dataone.in Tel- 0661-6522325
ANDMAN AND NICOBAR Port Blair	Aishi Enterprises	Abadin Village MB No-58. Port Blair-744101	Prakash Jain – 9831027938 Aniket-09830836675

Operational and Maintenance Manual G11 Series

WESTERN DEALERS			
Mumbai Central Area Boiser, Tardeo)	G.S.Enterprises	24,Nagdevi Cross Lane, 3rd floor Mumbai- 400003	Mr. Shabbir/Abhijit Mob-9820038788 Tel- 022 -28935025 ® Tel- 022- 23722303(O) Tel-022- 23451686(O) Fax-23453804
Kolhapur, Karad, Sangli and Ratnagiri	Deltran Diesel	2094-A, Vikram Nagar, Market Yard, Kolhapur- 416005	Ravindra Balgunde Mob. 9421219836 Mr.H.V.Bhasker Rao Mob- 9422413750 Satish- 9422046240 Tel-0231-2652326 Tel-0231-2651095 Tel-0231-2537931 R) Fax- 0231-2654072
Pune, Ahmednagar Nashik, Solapur, a'bad	M K Services	6/15 Chintamani Industrial Estate, Sinhagad rd, Wadgaon bk, Pune 411041	Mr.Madhusudan Kashilekar Mob - 9822043604 Cell -9372007424 Tel/Fax - 020 - 24393688
Aurangabad, Jalgaon, Marathwada, Dhule.	M.K.Services	303, Labh Chambers Station Road, Aurangabad- 431005, Nashik - 422008.	Mr.Vinod Apshinde 9372007438 Tel/fax- 0240-6621885 Mr. Rajesh 9372007437/36/38/39 Simant - 9372007411 Tele Fax - 0253 - 2399778
Thane, Bhiwandi, New mumbai, kalyan, panvel, up to chiplun	Geekay Engg Services	W/354, T.T.C Area. Thane Belapur Road MIDC, Rebale, NEW MUMBAI- 400701	Mr. S.N.Gokhale 9321134078 Sadanand Kelkar Mob- 9820133409 Shirish Gokhale 8879122965 Tel-022-27606868(O) Tel-022-27606969(O) Tel-022-25360643 ® 27602663 response@dieselenginerepairs.c o.in,
Nagpur, Akola, Amravati Vardha, Buldhana, Buldhana	Nagpur Motors & Machineries	Subhash Road, Nagpur- 440018	Mr. Mohan Nabira "Mob- 9422101936 Mob : 9422102309 nagpurmotors123@rediffmail. com Te-0712-2726307 (O) Tel-0712-2726306 (O) Tel- 0712-2231187 ®

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Goa, Sindudurg	UPA Engg Sales & Services	1) House No-557, Dande Vado Chinchinim, Salcete, Goa-403715 2) Pai Building, Mundvel, Behind Uma Petrol Pump, Vasco-Da-Gama, Goa-403802	Tel- 0832-2863532 (O) Tel- 0832-2863533 (O) Fax- 0832-2863534 TeleFax- 0832-2513685 (Vasco) Tel -0832-2514512(Vasco) upaengg@gmail.com
GUJRAT Ahmedabad Mehasana, Bhavnagar Kheda, Surendranagar	Ravi Rashmi Energymech Ltd.	1st floor, Avani Complex, Behind Navarangpura Police Station, Navarangpura, Ahmedabad- 380009	Rameshan R. Mob- 9327580886 ravirashmigroup@yahoo.co.in Tel-079-26562868(O) Tel-079-26561046(O) Fax- 079-26565024
Baroda Panchmahal, Anand	Jay Mech.	15, Sunrise Complex, opp. Jay Ambe School, Near Darbar Chokdi, Manjalpur Vadodara	Tejash Athavia Mob- 99779388488 jaymech@rediffmail.com
Surat Kim, Hazira, Bharuch	Ajay Enterprises	1/660, Bundar Street behind Civil Court, Nanpura, Surat- 395001	Ajay Athavia Mob- 9825861456 aenterprise@rediffmail.com Tel- 0261-2471217 Tel- 0261-2462756
Vapi, Silvassa, Daman Valsad	Deev Engineers	A-2/16, 2nd Phase, Near Old Nathani Paper Mills, GIDC Vapi 396195	Mr. Varghese Mob- 9825114985 mt_varghese@indiatimes.com mtv@deevengineers.com Tel- 0260-2431620(O) Tel- 0260-2990243/245(O) Fax-0260-2426997(O)
Rajkot, Amreli Surendranagar Bhavnagar, Porbander Morvi	Cristline Marketing Pvt Ltd.	301-302, Topaz Arked, Opp. The Imperial Palace , Dr. Yagnik Road, Rajkot- 360001	Mr. Joseph Rozario Mob- 9824222660 cristline@rozariogroup.com joseph@rozariogroup.com Tel-0281-2464105(O) Tel.fax-0281-3048861/62/63
Veraval, Junagarh	Continental Diesel Services	Near Kapishwar cold Storage, GIDC Estate Veraval	Mr.Bell/Mr.Sandip Mob- 9427229642 9427256308 continentalvrl@yahoo.co.in

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Gandhidham, Bhuj, Naliya Rajkot, Jamnagar, Morbi	MVR Diesel Electromech Engineers	"MVR House", Plot No.105, Sector – 1/A, Gandhidham- 3700201 <i>Branch off-</i> 303 Ronak Complx Near Bombay Hotel Gondal road Rajkot	Mr.M. V.R.Mohan Mob- 9825274076 9428749072 9825274076 mvrDiesel@yahoo.co.in Tel-02836-329883 Tel fax-02836-226719
Jamnagar (only for Reliance)	Kishor Motor Store	10-11,Manibhadra complx, Near Vibhaji School,Jamnagar-361001	Mr.Gaurang Shah Mob- 9824211082 gaurangshah@kishormotors.com 0288-2676252, 0288-2678325
MADHYA PRADESH Indore, Khargaon, Sendhwa, Ratlam, Devas Ujjain, khandwa.	Katare Power Industries	114 Dey's Tower, 19/2 Manorama Gunj, Palasia, Indore- 452001	Mr. Umesh Sharma Mob- 9425054857 RAJESH Mob- 9425059587 U.B SHARMA ubsharma.indore@gmail.com Tel- 0731- 2595407(R) Telfax-0731-4090021
Bhopal, Sagar, Harda, Mandideep, Jabalpur, Hoshangabad.	Karan Agencies	204, Dynamic Centre, Plot no- 241/242 Zone.1, Maha Rana Pratap Nagar, Bhopal- 462011	Mr. S.K.Sinha Mob- 9425004664 Mob- 9039589630 Satish karanagencies@gmail.com Tel- 0755-2555584/85(O) Tel- 0755-2417028 ®
Jabalpur, Satna, Rewa, Singourli, Chindwara"	Karan Agencies (Br. Off)	No Office Only Res Engineer C.P.Sharma S/O Raghuwanshi Sharma Manegaon Gram Panchyat, Near-Govt.High School, Ranjhi	Mr. Chandra Prakash Sharma Mob- 9589196753 Mob- 9669445401 Shiv Kumar karanagencies@gmail.com
Raipur, Bilaspur, Korba Ambikapur, Bhilai Rajnandgaon Chattisgad state	S S Diesels	shree dutt prabha,ring road no.1,gali no.1 transport nagar, tatibandh, Raipur-492099	Mr.S P Varvandkar 9300723313 Suresh Goswami 9301723312 ssdiesels@gmail.com TelFax- 0771-2572782/83

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NORTH REGION			
Delhi	M/s GREAVES COTTON LIMITED	Exp. Building Annexe,9-10 Bahadur Shah Zafar Marg P.B.No.7024, New Delhi-110002	Tel.:91-11-23730554 (8 lines) /23317039 FAX.:91-11-23359782/ 23357739
	Mr. Rajiv Kulshreshta Regional Manager	Delhi	Tel. 011-23359783 Mobile- 9654141301 rajeev.kul@greavescotton.com
	Mr. Narendra Sharma Dy. General Manager	Delhi	Tel.011-23311521(O) Mob. 09654101303 n.sharma@greavescotton.com
	Mr. Manish Trivedi Manager Service NR	Delhi	Mob. 09654101304 Tel.011-23318037(O) manish.trivedi@greavescotton.com
	Mr. Kapil Saini Asst. Manager-Sales	Delhi	Mob. 09891442407 kapil.saini@greavescotton.com
	Mr. P.S. Guleria Asst. Manager-Service	Delhi	Mob- 09871816336 ps.guleria@greavescotton.com
Lucknow		Office no. 208, lind floor Shalimar Square 126/31 B N Road, Lal Bagh Lucknow-226001	0522-2202900
Chandigarh	Mr. Gurinder Singh Asst. Manager-Service	Chandigarh	Mob-09216348121 gurinder.singh@greavescotton.com
	Mr. Atul Aluwalia Dy. Genral Manager	Chandigarh	Mob- 0951325885 atul.aluwalia@greavescotton.com
Jaipur	Mr. Mayank Agarwal Asst. Manager-Sales	Jaipur	Mob- 09460727237 mayank.agarwal@greavescotton.com
	Mr. Sunil Sadh Asst. Manager-Service	Delhi	Mob- 09810770502 sunil.sadh@greavescotton.com

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NORTH DEALERS

Ghaziabad Bulandsher, Meerut Noida, Hapur, Shahibabad,	M/s. Ambika Power point	211/6 Rajendra Nagar Ind.Area, Opp:Dass Factory,P.O. Mohan Nagar,G.T Road, Ghaziabad-201007	Mr. S.K.Sharma Mobile No: 09212077086, 09810282482 Mr.Rajeev Goswami Mobile No:09810545055, 09212679484 app_rg40@yahoo.co.in & ambika.powerpoint@gmail.com Tel-0231-2651095 Tel-0231-2537931 (R) Fax- 0231-2654072 0120-2658465 (O) 0120-6565590 (O) 0120-2632688 (R)
Faridabad, Palwal	M/s.Power(Service) Syndicator	B-488, IInd Floor, Nehru Ground Opp.Punjab national Bank, N.I.T. Faridabad-121001	Mr. R.P.Singh pss_fbd@sify.com Mobile:9312215510 0129-2421298 (O) 0129-2413356(O) FAX: 0129-2411898
	M/s.R.S. Powertronix	305,310, Triveni Complex E-10-12, Jawahar Park, Laxmi Nagar, Vikas Marg, Delhi-110 092	Mr.D.K.Sharma Mobile: 9312268885 rspowertronix@yahoo.co.in
New Delhi, Sonipat, Rohtak	M/s.Delhi Power Service & Co.	E-45-B Vishwakarma Cololy., Lalkuan Mehrauli-Badarpur Road, New Delhi-110044	Mr.J.K.Verma Mobile: 9811225115 jkv_dpssc@yahoo.co.in 011-26360314 (O)
	M/s. Radiant Power Engineers	WZ-B-93, Tanwar Market Naraina, Ring Road New Delhi-110 028	Mr.Ansar Ali Mobile: 9810621361 radiantpower@sify.com 011-25777570 (O) 011-65070489(R)
Gurgaon Saharanpur Haridwar, Karnal Yamuna Nagar Dehradun & Garhwal of Uttaranchal State,	M/s.Power Service Syndicate (Gurgaon)	596/3, Prem Nagar, Sec.12A, Near Telephone Exchange, Gurgaon- 122001	Mr.R.P.Singh Mobile: 9312215510,9312965409 pss_gurgaon@gmail.com 0124-2335026

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	M/s.Supertech Engineers & Co.	Zila Hotel Compound, Opp: Sophia Market Court Road, Saharanpur-247001	Mr.K.K.Katarya supertech@supertechmail.com Mob-09927045957, 09927045958 0132-2725957 (O) 0132-2645564 (R) FAX: 0132-2711149
Panipat, Narnaul & Hissar	M/s. Kamboj Power Generator Service	Plot No.-331, Sec 25 Phase-II, GT Road, Panipat-132103	Mr. Teja Kamboj Mobile: 9416508275 kambojgenset@gmail.com 09812075295(O)
Agra, Mathura,Kosi, Bharat Pur	M/S. Abhavya Engines & Machines Pvt Ltd	77, Dushant Nagar Sikandra - Bodla Road Agra	Mr. Yogendra Singh Mobile-09758019501 09761210000(O) abhavya_empl@gmail.com
UP Vanarasi Kanpur, Kannouj Fatehpur, Jhansi Orai, Farukhabad	M/s. Tumen Diesels	D38/1, 2nd Floor, Hauzkatora, Godowlia Varanasi-221001	Mr.Suman Jaiswal Mobile: 9839043988 tumen_vs@sify.com 0542-2412878 (O) 0542-2419088 (tele fax)
Kanpur Lucknow, Faizabad, Rai-Bareilly, Sitapur, Allahabad, Gonda, Balrampur	M/s. Diesel Sales and Service	783/5, W1 Block, Saket Nagar, Kanpur-208014	Mr.S.Banerjee Mobile: 9935490033 shubh5@dataone.in 0512-2611229 (O) 0512-2608029 ®
	M/s. Hi-Tech Diesels	123/426, Fazal Ganj, Factory Area Opp: Panama Factory, Kanpur-208012	Mr.S.N.Ahmed Mob :9415050740,9005092250 0512-2234185 (O) 0512-2502790 (R) Fax:0512-2234732
Lukhnow	M/s.Frontline Technocrats (P) Ltd.	326 A&B, 3rd floor, Sahara Shopping Centre Faizabad Road, Indira Nagar, Lucknow-226016	Mr.Vinod Sehgal Mobile: 9415028353 ftpl@sancharnet.in 0522-2346292 (O) 0522-2343705 (Tele Fax) 0522-2329970 (R)
	M/s Shri Vishwakarma Diesel Engineers	near Suvridha Hotel,Kashipur Bye Pass road,Rudrapur (Udham Singh Nagar) uttarakhand	Mr. Dharmendra Sharma Mobile No. 09837357950 & 09412946172 svde.2002@gmail.com , & shrivishwakarmadieselengineers@rediffmail.com dharmendrasharma1977@yahoo.co.in 05944-245966

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Abu Road Sirohi, Barmer,	M/s.Power Engineering	B-88, RIICO Industrial Colony, Abu Road	Mr.R.K.Panchal Mobile-09414153821, 09680672543 Mr.Ananad Panchal, 9414353826 kkpanchal75@yahoo.com 02952-221266 (O) Fax:02974-226621 rkpanchal_61@yahoo.co.in
	M/s.Manish Industrial Corporation	Madan Kirpa 275/6 Laxmi Chowk, Ajmer-305001	Mr.R.C.Jain Mobile: 9414007508 mic_ajmer@yahoo.co.in 0145-2624706 (O) 0145-2624708 (O) 0145-2600960 (R)
Jaipur, Savai Madhopur	M/s.Pink City Engg. & Trading Co.	Shop No.5, (Chowdhary Complex) Hazi Colony Corner, Jhotwara Road Jaipur-302016	Mr.M.L.Gupta Mobile: 09352682949 Mr.Ashish Gupta Mob-09352682952 pinkcityengineering@gmail.com 0141-2304491 (O) 0141-2304179 (O) 0141-2304429 (R) Fax: 0141-2304179
	M/S Modern Power Engineers	G-8(B) Amber Tower S.C Road, Jaipur-302016	Mr. Deepak Sharma Mob-09414055633,09314873633 response@indiagensets.com deepak@indiagenset.com, pe_jpr@yahoo.co.in 0141-2378221 0141-5115633
Jodhpur	Ashutosh Enterprises	Office - 9, Aatmaram O/s Sojati Gate, jodhpur	(M)-09214176621,07737926301 & (M)-09784116475 kgsharma@ashutoshenterprises.com, contact@ashutoshenterprises.com
	M/s Modern Power Engineers	Ganga Shahar Road Bikaner	(M)-09982370108 mpejpr@rediffmail.com
Chandigarh	M/s.Power Tech Engineers	760 Ind.Area, Phase-II Ram Darbar, Chandigarh-160002	Mr.Parshottam Singh Mobile: 9216787082/9216887082 parshot_singh1@yahoo.co.in 0172-4614195(O) 0172-2656559(O)
Amritsar	M/s.K.C.Engineers	1st Floor, Street No.4, Kot-Atma Singh, Near Chowk Hussain Pura, Amritsar	Mr.J.S.Grewal Mobile: 9463500200 info@kcengineers.net 0183-2531457 (O)

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Jalandhar	M/s Punjab Power Solutions	Shop No. 4&5, Near Bassi Auto Clinic Lamba Pind, G.T. Road , Bye Pass Jalandhar-144004	Mr. Krishan Kumar Mobile: 9872288444 , 9872788444 greaveskrishan@yahoo.co.in 0181-2421550 (O)
Jammu and Kashmir Jammu-Tawi	M/s.Fairdeal Enterprises	5, Exchange Road, Jammu-Tawi Pin: 180001	Mr.D.L.Chopra Mr.Y.Chopra Mobile: 9419183626 fairdeal@live.in powerlinkers@yahoo.co.in 0191-2543712 (O) 0191-2473057 (R) Fax: 0191-2543712(tele Fax)
Leh - Ladakh	M/s.National Engineering	Skalzangling, Airport Road Opp:Post Office Leh - Ladakh-194 101	Mr.Vinod Malik 9419179110 national.engineering.leh@gmail.com 9419179110 9560163737
Srinagar	M/s Asian Automobiles Engineers,	Shop 37 Batmaloo Adda Srinagar,J&K 190009	Mr. Mazid Mobile No.- 09419088686,09419002317 asianautoeng@yahoo.com 0194-2455916 (O)
SOUTH REGION			
Chennai	GREAVES COTTON LTD	Wavoo Mansion, 6 th floor 48 (old no.39) Rajaji Salai Chennai- 600001	Tel- 91-44-25255200(O), 25224571, Fax- 91-44-25224557
	Mr. Darshan Desai General Manager	Chennai Office	Tel-044-25224571(O) Mob:- 09176832881 Tel-044- 24464955 ® Mob- 9176832881 dk.desai@greavescotton.com
	Mr. K I Sahayaraj Manager Marketing	Chennai Office	Tel- 044-25251351(O) Tel - 044 - 26281674 Mob-09176832884 ki.sagayaraj@greavescotton.com
	Mr. G.V. Subramaniam Asst Manager Service	Chennai Office	Tel- 91-44-25255200(O) Mob - 09176921132 venkatasubramanian.g@greavescotton.com

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Coimbatore	Mr. N. Govindrajan Manager Marketing	Coimbatore Office	Mob-09176921131 n.govindarajan@greavescotton.com
Bangalore	GREAVES COTTON LTD	Bangalore 16/3 Ali Asker road Bangalore 560052	Tel- 080-22262062, 22262506 (O) Tel- 080-22253472(O)
	Mr. Gururaj Bellary Sr.Manager Service	Bangalore office	Tel- 080- 22262501(O) Mob - 09739003872 gururaj.bellary@greavescotton.com
	Mr. Nataraja. T.U Asst Manager Service	Bangalore office	Mob: +919449052068 Mob: +919986000970 tu.nataraja@greavescotton.com
Hyderabad	Mr. K.S. Thampan Dy. General Manager	Hyderabad Mob: +919052224848 6-2-47 A.C.Guards P.o.Box No-9 Hyderabad-500004	Tel- 040-23314025(O) Tel- 040-23316446(O) Tel- 040-23390544(O) Tel- 040-23318557(O) ks.thampan@greavescotton.com
	Mr. Mathavan Asst Manager Service	Hyderabad Office	Mob- 09160252736 n.mathavan@greavescotton.com
Kochi	P.R. Krishnakumar Sr. Manager	39/66/36 MG Road Arnakulam, Kochi 682015	0484-2359661 , 2359372 Mob :-9847082899, 09645075370 pr.krishnakumar@greavescotton.com
	Mr. P.R. Radhakrishnan Asst Manager Service	Kochi Office	Mob-9447579062/ 09645075379 pr.radhakrishnan@greavescotton.com

SOUTH DEALERS

TAMILNADU Chennai	Industrial Diesel Engineers	53, Vada Agaram Street Off: Nelson Manickam road, Choolaimedu, Chennai-600 094	Mr.Bijoy Pillai Mob- 098410 98110 Email : info@idengineers.com Tel-044- 23742722 (O) Tel-044- 23743735 (O) Tel -044-23613149 ® Fax-044- 23741762
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	UVDV Power Engineers	No 14, Jayammal Street, Teynamted, Chennai 600018	Mr.M.V.Venkatesh (Partner) Mob:-07299988881 Service Manager- Mr. Balasubraminyam 09841073897 Email : uvdvpower@gmail.com uvdvservice@gmail.com Tel- 044- 24335761(O) Fax-044- 24344875
Trichy	Phoenix Engineers	KSM Complex, 51/3, Pudukottai Main Road, Subramanyapuram, Trichy - 620 020	Mr. Raja Tel: 0431 - 2333433
Madurai	Gen Service and Controls	No.7, Gayathri street, Duraisamy nagar, By pass road, Madurai- 625 010	Mr. V. Ganesh Mob-9443258608 Mob-9894054141 Email: genservice@airtelmail.in, genservice_madurai@yahoo.co.in Tel-0452- 4354141 (O), Mob: 09442200298 Tel- 0452- 2383336 (Fx) Tel- 0452- 4354156®
Tirunelveli	Gen Service and Controls	No.11B, Kambaramayanam, street, Vannarpettai, Tirunelveli 627 003	Mr.Pavanasam Mob - 9500954017
Salem	Mach Diesels	3/159-2, Maninoor road Kondalampatti, Salem 636 010	Mr.N.Satish Kumar Mob- 9443042739 Email: machdiesels@bsnl.in Tel-0427-2274566 (Tfx),
Coimbatore	Power Techs	R.K.Building, 2108 Trichy Road, Singanallur, Coimbatore- 641 005	Mr.C.V.Ramakrishnan Mob- 09443225992,9443064207 Email:powertechs@vsnl.com : powertechs@hotmail.com Tel-0422- 2599255 Fax -0422- 2599256 Mob: 9244402606, Res: 0422 – 2317385, 2317386

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Pondicherry	Phoenix Engineers	No.11, 3rd Cross Street, Mohan Nagar, Puducherry – 605 005	Mr.S. Jeyasingh Mob-09443253054 Email:phoenixengrs@yahoo.co.in Service Manager:- Mr Nagarajan Mob:- 9994974030 Tel :- 0413- 6500260 Telfx- 0413-2277844,
ANDHRA PRADESH Hyderabad	Raju & Sastry	G3 Arun Apartments, Red hills, Opp. Cancer Hospital, Hyderabad - 500 004	Mr.Raju 0 9849120730 Mr.U.G.K.Sastry 09849120720 Email: ugksastry@gmail.com, rajsastry@mail.com 040-23390796 (Fx) 040-23307717 (O) 040- 23372118 (O) 040- 24066709 ® 040- 24043688 ®
Secunderabad	Power On Engineers	No. 5-2-413, Ground Floor, Dacha Mansion, Hyder basti, Secunderabad- 500 003	Mr.Subba Rao 98480 53318 Mr.Kandasamy – 09440078430, Mr. N. Srinivas Rao – 09849306447, Mr. M. Gurrayya - 09849458509 Email: poweron2007@gmail.com 040- 27541057 (O) 040- 66203318 (Tel Fax) 040- 23530535 ® & 09290711456
Vizag	D.S. Enterprises	C-5 Classic complex, Prakasaraopet, Daba Gardens, Vizag 530 020	Mr.D.R.Raju 09392624465 Mr.Varma 9346768113 Email: info@dsentp.com, 0891- 2705258 (O) 0891- 2705217 (O) 0891- 2540216 (TFx) 0891- 2553778 ® 0891- 2792653 ®
Vijayawada	Sree Guru Raghavendra	Agencies, 38-4-5 Montessori College Street, Bunder Road, Vijayawada 520 010	Mr.CH.Kottaiah M.9848113083 Mr.Srinivasa rao M.09849355839 Email : coastguru@rediffmail.com, 0866- 2493874 (O) 0866- 2494983 (Tel. Fax) 0866- 2494983 ®
Nellore	"Coromandal Agro & Marine Agencies	26-2-346,Jyothi nagar, 2 nd street, Vedayapalem beside j.k. Tyres, Nellore -524004	Mr.T.K.S.Manimaran 09440275343, 09000600254 Mr.G.Vengadesan 09440045642, 09000600250, Email:cama_gcl_mlr@yahoo.co.i n gvmwm@rediffmail.com 0861- 2349184,(O) 0861- 2349185 (Tel Fax)

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KERALA Cochin	Judeson Engineering Sales & Service,	CC-53/923 "ASHISHAM" Chilavannur Road, Elamkulam, Kochi 682 020	Mr. Prem Kumar 9447035721 Email : judeson@satyam.net.in, judesonengg@vsnl.net 0484- 2317625 (TFx) 0484- 2318625 (O) , 3078110. Res: 0484-2314001
Trivandrum	Judeson Engineering Sales & Service,	TC-34/938, Old airport road, Valiathope Junction, Vallakkadavu, Trivandrum - 695008	Mr. Johnson – 09447185726, 09495985726, Email: judesontvm@gmail.com
Quilon	Judeson Engineering Sales & Service,	Olikkara House, Kavand Post, Kollam – 691003	Mr.Donnel Fernandez 9447252942 Email : judeson@satyam.net.in
Cochin	Unique Diesels (P) Ltd., 41/1789,	Seetharam Complex, Opp Sudheendra Medical Mission Hospital, Chittoor Road, Cochin - 682 018.	Mr. Manu.S. 94470 32865 Email : engserv@vsnl.net, 0484- 2366884 (O) 0484- 2367994 (O) 0484- 2367995 (Fx) 0484- 2389020 ®
Kottayam	Unique Diesels (P) Ltd.,	Sree Krishna Complex, 12/1016, M.L.Road, Kottayam - 686001	Mr.Baburaj, 09961425002 0481- 2300333 (O)
Calicut	Electro Diesels 4/612,	"Sobh", Therveedu Line, Calicut -673 032	"Mr. James - 09447142481 Email : electrodiesels@rediffmail.com 0495- 2761740 (Tel Fax), 09645931910
Palakkad	Electro Diesels	Dibba Tourist Home V.H.Road, Near Veterinary Hospital, Room No.103	Mr. Subramaniam 09645931940,
KARNATAKA Bangalore	Trans Diesel Engineers,	No.110/4-1,M.Krishnappa Layout, Opp. Cross Indian Oil Petrol Bunk, (Lalbagh Traders), Lalbagh Road, Bangalore, 560 027	Mr. Ravish - 09742680000 email: ravisha@transdiesels.com, office@transdiesels.com Service Manager:- Mr.Kariyappa (8453004656, 9742258160) Tel :080 - 22242624 (O) Tel :080 - 22272839 (O) Fax: 080 - 22240478 Tel : 080 - 23405953 (R)
Mangalore	Trans Diesel Engineers,	No. 8, Masco Plaza Maidan, 4 th Cross Road, Mangalore - 575 001	Area Manager :- Mr. Loknath - 09742258163/08453004650 transdieselmlr@gmail.com Tel :0824-2448811 (O)

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Hubli	Spearhead Bizs,	LF- 003, Kundagol Complex, Club Road, Hubli - 580029	"Mr.Pradeep. S. Mathad - 09611521323, email: mathadpradeep@gmail.com Tel: 0836 - 2253151
Bangalore	Supreme Diesel Service & Consultancy,	35, 1 st Floor, 2nd Cross, Journalist Colony, Bangalore 560 002	Mr. Umkanth 9448289870 Email: akashuk@eth.net Tel : 080-41513733 (O) Tel : 080-41513734 (O) Tel : 080-41513735 (O) Fax : 080-26704737 Tel Res : 080 -23481987
Mysore	Supreme Diesel Service & Consultancy,	No Office, Handled by Bangalore office	
Bijapur	Supreme Diesel Service & Consultancy,	C/O B.B Patil, No103, Near Sainik School, Opp GM Hall, Shastry Nagar, Bijapur	Ahmed - 0725988405, Mr. Bashir - 09164342070