

# Service Manual

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## **Diesel Engine 3.3 Liter (DB33A)**

# Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

**Read and understand all safety precautions and warnings before operating or performing lubrication, maintenance and repair on this product.**

Basic safety precautions are listed in the "Safety" section of the Service or Technical Manual. Additional safety precautions are listed in the "Safety" section of the owner/operation/maintenance publication. Specific safety warnings for all these publications are provided in the description of operations where hazards exist. WARNING labels have also been put on the product to provide instructions and to identify specific hazards. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons. Warnings in this publication and on the product labels are identified by the following symbol.



**Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.**

**Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.**

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

DAEWOO cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by DAEWOO is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.
















The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. DAEWOO dealers have the most current information available.

# TO THE CUSTOMERS

This operation and maintenance manual is designed to serve as a reference for DHI's customers and distributors who wish to gain basic product knowledge on DHI's DB33 Diesel engine.

To maintain the engine in optimum condition and retain maximum performance for a long time, CORRECT OPERATION and PROPER MAINTENANCE are essential.

In this manual, the following symbols are used to indicate the type of service operations to be performed.

	Removal		Adjustment
	Installation		Cleaning
	Disassembly		Pay close attention-Important
	Reassembly		Tighten to specified torque
	Align the marks		Use special tools of manufacturer's
	Directional Indication		Lubricate with oil
	Inspection		Lubricate with grease
	Measurement		

If you have any question or recommendation in connection with this manual, please do not hesitate to contact our head office, dealers or authorized service shops.

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# 1. GENERAL INFORMATION

## 1.1. General Repair Instructions

1. For safety, park the truck on even ground or work station and fix the wheels using wedges and hand brake during operation.
2. Before performing service operations, disconnect the grounding cable from the battery to reduce the chance of cable damage and burning due to short-circuiting.
3. Before performing service operations release the air pressure in the machine air line system for safety. To not do so is extremely dangerous.
4. Use covers to prevent the components from damage or pollution.
5. Brake oil and anti-freeze solution must be handled with reasonable care as they cause paint damage.
6. The use of proper tools and special tools where specified is important for efficient and reliable service operation.
7. Use genuine DAEWOO parts exclusively.
8. Used cotter pins, gaskets, O-rings, oil seals, lock washers and self-lock nuts should be discarded and new ones should be prepared for installation as normal function of the parts can not be maintained if these parts are reused.
9. To facilitate proper and smooth reassembly operation, keep disassembled parts neatly in groups. Keeping bolts and nuts separate is very important as they vary in hardness and design depending on the position of installation.
10. Clean the parts before inspection or reassembly. Also clean oil ports, etc. using compressed air to make certain they are free from restrictions.
11. Lubricate rotating and sliding faces of parts with oil or grease before installation.
12. When necessary, use a sealant on gaskets to prevent leakage.
13. Carefully observe all specifications for bolts and nuts torques.
14. When a service operation is completed, make a final check to ensure that the service has been done properly.

## 1.2. Engine Specifications




Items	Engine Model	DB 33A
Engine type		Water-cooled, 4 cycle in-line, overhead valve type
Combustion chamber type		Direct injection type
Cylinder liner type		Dry type, casting liner
Timing gear system		Gear drive type
No. of piston ring		Compression ring 2, oil ring 1
No. of cylinder-bore ; stroke	(mm)	4-102 ; 100
Total piston displacement	(cc)	3,268 (199 cu in)
Compression ratio		17.5 : 1
Engine dimension(length ; width ; height)	(mm)	795 ; 701 ; 720 (31 ; 28 ; 28 in)
Engine weight(dry)	(kg)	340 (750 lbs)
Fuel injection order		1-3-4-2
Fuel injection timing(B.T.D.C static)		13 ; ~
Type of fuel used		High-speed diesel fuel (SAE No.2)
Injection pump type		VE (DOOWON)
Governor type		Mechanical governing
Injection nozzle type		Multi-hole type (6 hole) - VCO nozzle
Fuel injection pressure	(Kg/cm <sup>2</sup> )	220 (3,128 psi)
Compression pressure	(kg/cm <sup>2</sup> )	30 (at 200 RPM) (426 psi)
Low idle speed	(R.P.M)	775-825
High idle speed	(R.P.M)	2400-2500
Intake and exhaust valve clearance(at cold)	(mm)	0.4
Intake valve	Open at	28 (B.T.D.C)
	Close at	62 (A.B.D.C)
Exhaust valve	Open at	70 (B.B.D.C)
	Close at	28 (A.T.D.C)
Lubrication method		Pressurized circulation
Oil pump type		Gear type
Oil filter type		Full-flow type
Lubricating oil capacity	(§ /)	7.5 (Oil pan) (1.97 gal)
Oil cooler type		Water cooled
Cooling method		Pressurized circulation
Cooling water capacity(engine only)	(§ /)	7.5 (1.97 gal)
Thermostat type		Wax pallet type (with jiggle valve)
Generator voltage-capacity(V-A)		12-61
Starter Voltage-output(V-KW)		12-2.5

### 1.3. Torque Specifications

**Standards bolts**

The torque values given in the following table should be applied where a particular torque is not specified.

(Unit : kgf·m)

Bolt identification  Bolt diameter ; pitch			
	4T Low carbon steel	7T High carbon steel	9T Alloy steel
6 ; 1.0	0.4-0.8	0.5-1.0	-
8 ; 1.25	0.8-1.8	1.2-2.3	1.7-3.1
10 ; 1.25	2.1-3.5	2.8-4.7	3.8-6.4
i 10 ; 1.5	2.0-3.4	2.8-4.6	3.7-6.1
12 ; 1.25	5.0-7.5	6.2-9.3	7.7-11.6
i 12 ; 1.75	4.6-7.0	5.8-8.6	7.3-10.9
14 ; 1.5	7.8-11.7	9.5-14.2	11.6-17.4
i 14 ; 2.0	7.3-10.9	9.0-13.4	10.9-16.3
16 ; 1.5	10.6-16.0	13.8-20.8	16.3-24.5
i 16 ; 2.0	10.2-15.2	13.2-19.8	15.6-23.4
18 ; 1.5	15.4-23.0	19.9-29.9	23.4-35.2
20 ; 1.5	21.0-31.6	27.5-41.3	32.3-48.5
22 ; 1.5	25.6-42.2	37.0-55.5	43.3-64.9
24 ; 2.0	36.6-55.0	43.9-72.5	56.5-84.7

The i indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.