



Engine Workshop Manual

Cummins **Onan**

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Generator Set

MDKBT
MDKBU

California

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

WSM

WORKSHOP MANUAL DIESEL ENGINE

**V3300-E3BG-ONAN-2,
V3300-E3BG-ONAN-3**

Kubota

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of V3300-E3BG-ONAN-2, V3300-E3BG-ONAN-3. It is divided into three parts, "General", "Mechanism" and "Servicing".

■ General

Information on the engine identification, the general precautions, maintenance check list, check and maintenance and special tools are described.

Please refer to the operators manual of ONAN for the maintenance interval and maintenance method.

■ Mechanism

Information on the construction and function are included. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

Refer to Diesel Engine Mechanism Workshop Manual (Code No. 9Y021-01875) for the one which has not been described to this workshop manual.

■ Servicing

Information on the troubleshooting, servicing specification lists, tightening torque, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

Due to covering many models of this manual, information or picture being used have not been specified as one model.

March 2008

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.



DANGER

: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



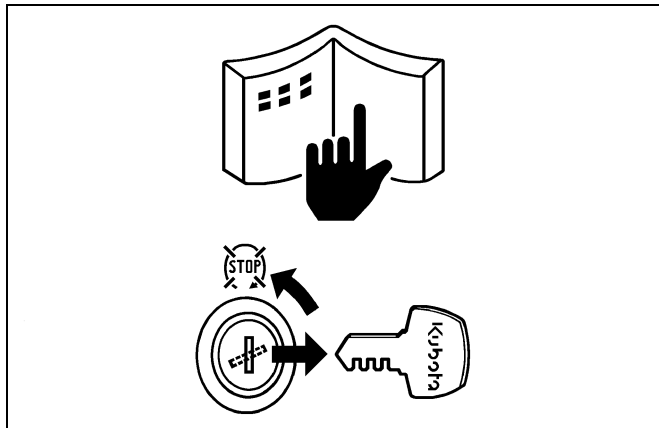
IMPORTANT

: Indicates that equipment or property damage could result if instructions are not followed.



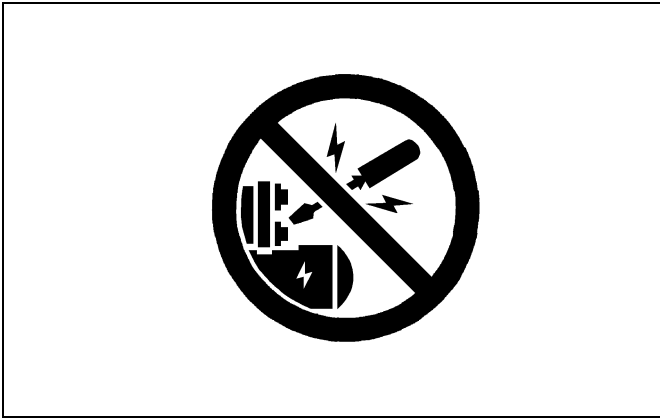
NOTE

: Gives helpful information.



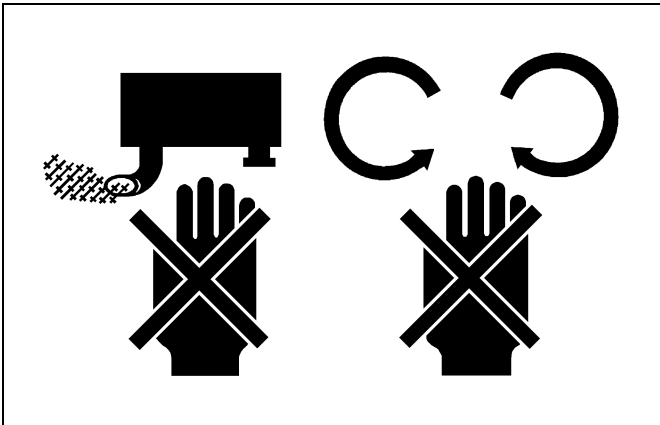
BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your engine safety decals.
- Clean the work area and engine.
- Park the machine on a firm and level ground.
- Allow the engine to cool before proceeding.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.
- Hang a "**DO NOT OPERATE**" tag in operator station.



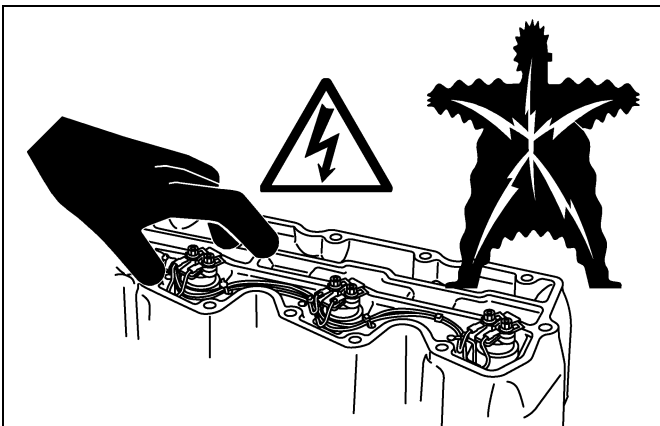
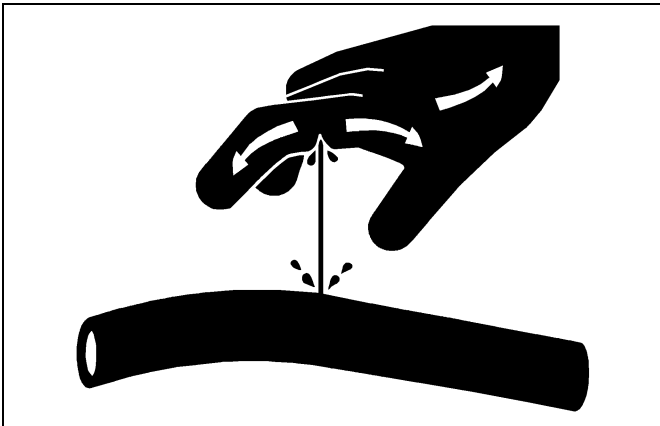
SAFETY STARTING

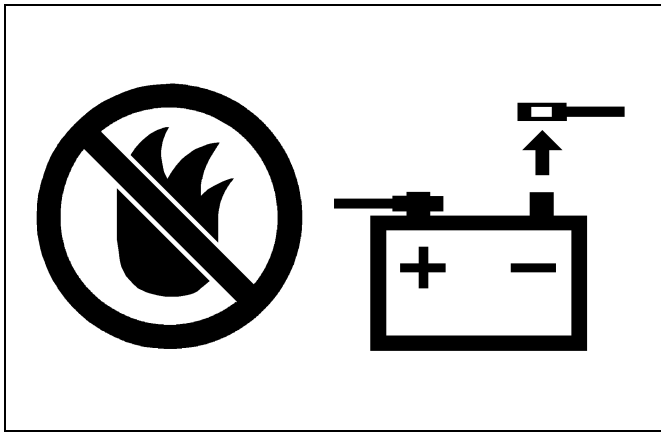
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Unauthorized modifications to the engine may impair the function and / or safety and affect engine life.



SAFETY WORKING

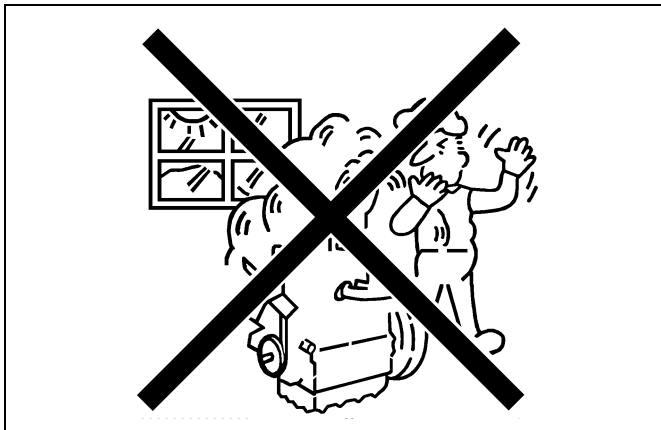
- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.
- Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.
- Do not open high-pressure fuel system. High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect or attempt to repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high pressure common rail fuel system.
- High voltage exceeding 100 V is generated in the ECU, and is applied to the injector. Pay sufficient caution to electric shock when performing work activities.





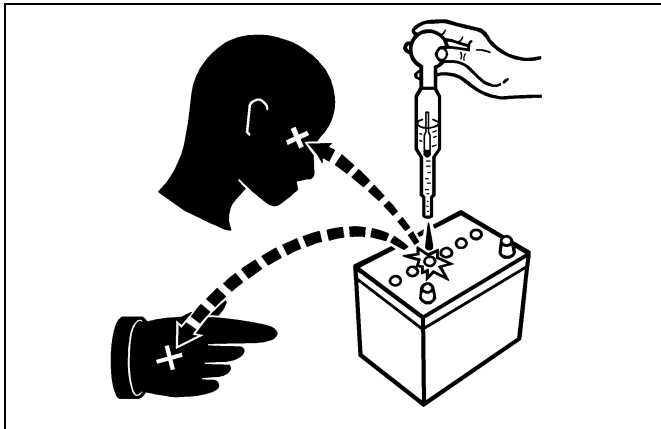
AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.



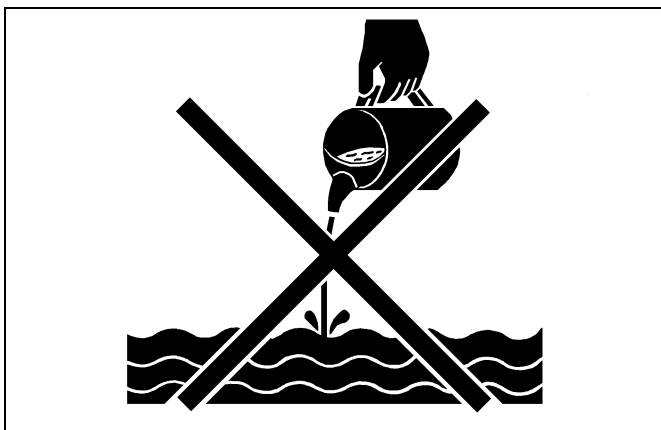
VENTILATE WORK AREA

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.



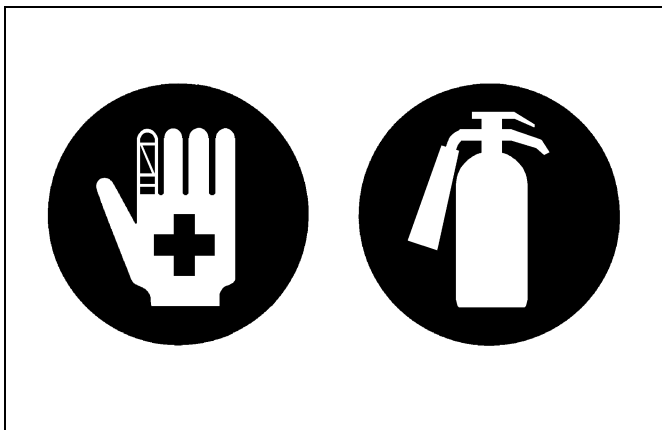
PREVENT ACID BURNS

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.



DISPOSE OF FLUIDS PROPERLY

- Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.

**PREPARE FOR EMERGENCIES**

- Keep a first aid kit and fire extinguisher handy at all times.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

SPECIFICATIONS

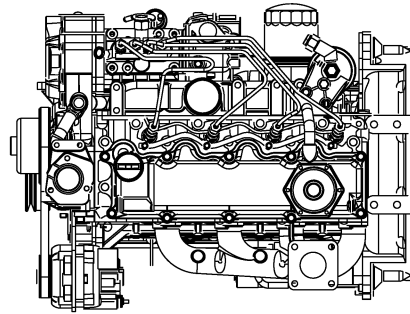
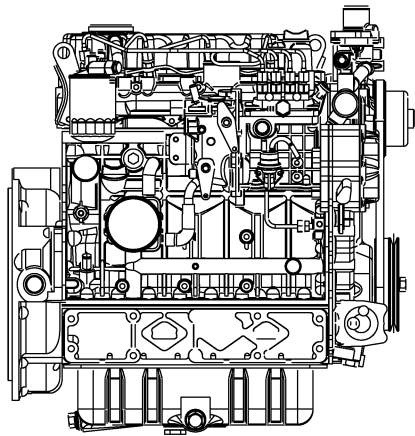
Model		V3300-E3BG-ONAN-2	V3300-E3BG-ONAN-3
Number of Cylinder		4	
Type		Vertical, water-cooled, 4-cycle diesel engine	
Bore × Stroke		98.0 × 110 mm (3.86 × 4.33 in.)	
Total Displacement		3318 cm ³ (202.48 cu.in.)	
Gross Intermittent	SAE J1995 KW(HP)/min ⁻¹ (rpm)	36.5 (48.9) / 1800	
Gross Continuous	SAE J1995 KW(HP)/min ⁻¹ (rpm)	31.7 (42.5) / 1800	
Governor Regulation		Less than 11 %	Less than 7 %
No Load Max. Speed		2000 min ⁻¹ (rpm)	1900 min ⁻¹ (rpm)
Combustion Chamber		Spherical Type (E-TVCS)	
Fuel Injection Pump		Bosch Type	
Governor		Mechanical + Electronic governor (ONAN)	Mechanical
Direction of Rotation		Counter-clockwise (Viewed from flywheel side)	
Injection Nozzle		BOSCH "Throttle" Type	
Injection Timing		0.16 rad (9.0 °) before T.D.C.	
Firing Order		1-3-4-2	
Injection Pressure		13.73 MPa (140.0 kgf/cm ² , 1991 psi)	
Compression Ratio		22.6 : 1	
Lubricating System		Forced lubrication by trochoid pump	
Lubricating Filter		Full Flow Paper Filter (Cartridge Type)	
Cooling System		Pressurized radiator, forced circulation with water pump	
Starting System		Electric Starting with Starter	
Starting Motor		12 V, 2.5 kW	
Starting Support Device		By Glow Plug in Combustion Chamber	
EGR		NONE	
Charging Alternator		12 V, 540 W	
Fuel		Diesel Fuel No. 2-D S500 or S15, see page G-6.	
Lubricating Oil		Class CF lubricating oil as per API classification is recommended. For details on recommended lubricating oils, see page G-6.	
Lubricating Oil Capacity (Oil Pan Depth)		13.2 L (3.49 U.S.gals)	
Weight (Dry) Kg (lbs)		280 (617)	

* Conversion Formula : HP = 0.746 kW, PS = 0.7355 kW

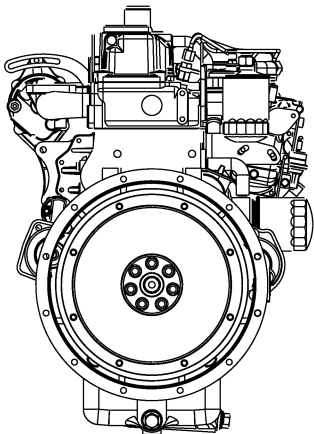
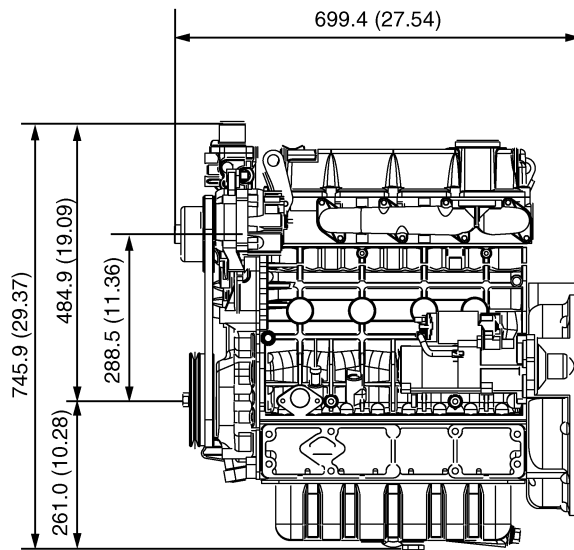
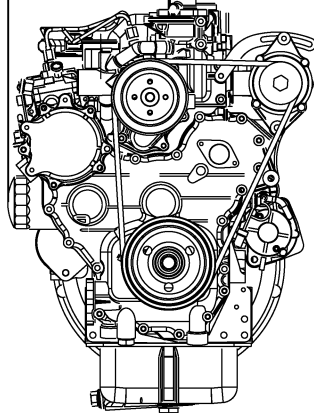
W1028103

DIMENSIONS

Unit : mm (in.)



535.9 (21.10)
280.0 (11.02) 255.9 (10.07)



3EEABALFP001A

GENERAL

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