WSM

WORKSHOP MANUAL
DIESEL ENGINE

V3300DI-E2B,V3300DI-T-E2B

Kubota

KiSC issued 01, 2014 A

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GENERAL

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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 try to repair or use this unit.

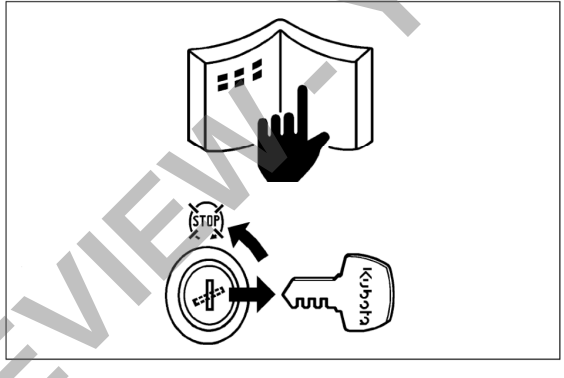
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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

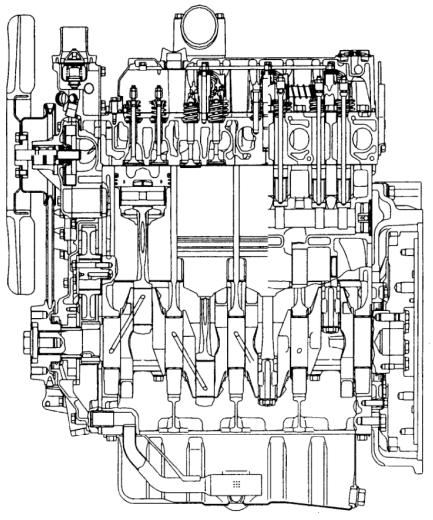
- Read all instructions and safety instructions in this manual and on your engine safety decals.
- Clean the work area and engine.
- Park the machine on a firm and level ground.
- Allow the engine to cool before proceeding.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.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

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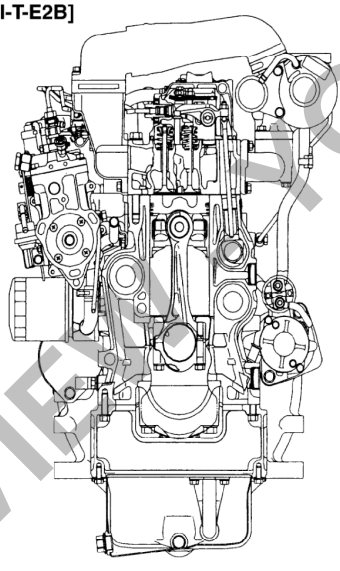
1. FEATURE

[V3300DI-E2B]



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[V3300DI-T-E2B]



3EEABAC1P002B

The V3 series DI engine are the vertical type 4-cycle diesel engine featuring the advanced performances shown below.

This is a small sized, high power and environment conscious engine, which employs the four valve system, two inlet valves with double ports, and two exhaust valves with the new E-CDIS. Thus, this engine achieves high combustion efficiency and complies with various regulations of exhaust gas.

Based upon the conventional model, Kubota developed a unique governor system and various new mechanisms which reduces exhaust emission, noise and vibration and realize durability and high torque.

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3. TIGHTENING TORQUES

Screws, bolts and nuts must be tightened to the specified torque using a torque wrench, several screws, bolts and nuts such as those used on the cylinder head must be tightened in proper sequence and the proper torque.

[1] TIGHTENING TORQUES FOR GENERAL USE SCREWS, BOLTS AND NUTS

When the tightening torques are not specified, tighten the screws, bolts and nuts according to the table below.

Grade / Nominal Diameter / Unit	Standard Screw and Bolt ④			Special Screw and Bolt ⑦		
	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.9	9.8 to 11.3	1.00 to 1.15	7.23 to 8.32
M8	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
M10	39.2 to 45.1	4.0 to 4.6	28.9 to 33.3	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
M12	62.8 to 72.6	6.4 to 7.4	46.3 to 53.5	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5

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Screw and bolt material grades are shown by numbers punched on the screw and bolt heads. Prior to tightening, be sure to check out the numbers as shown below.

Punched number	Screw and bolt material grade
None or 4	Standard screw and bolt SS41, S20C
7	Special screw and bolt S43C, S48C (Refined)

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Fill fuel	G-9
	Air in the fuel system	Vent air	G-9
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel hose clogged	Clean or replace	G-9, 25
	Fuel filter clogged	Replace	G-11, 13
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	4, G-12
	Fuel with low cetane number	Use specified fuel	4
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	S-30
	Incorrect injection timing	Adjust	S-20
	Fuel camshaft worn	Replace	S-41
	Injection nozzle clogged	Repair or replace	S-22, 30
	Injection pump malfunctioning	Repair or replace	S-21, 43
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw and nozzle holder	S-30, 32, 33, 34
	Improper valve timing	Correct or replace timing gear	S-47
	Piston ring and cylinder worn	Replace	S-50, 51, 68, 73
	Excessive valve clearance	Adjust	S-16
	Stop solenoid malfunctioning	Replace	S-26
Starter Does Not Operate	Battery discharged	Charge	G-16, 17
	Starter malfunctioning	Repair or replace	S-25, 55, 74
	Key switch malfunctioning	Replace	–
	Wiring disconnected	Connect	–

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SPECIFICATIONS

Model	V3300DI-E2B	V3300DI-T-E2B
Number of Cylinder	4	
Type	Vertical, water-cooled, 4-cycle DI diesel engine	
Bore × Stroke	98 × 110 mm (3.86 × 4.33 in.)	
Total Displacement	3318 cm^3 (202.48 cu.in.)	
ISO Net Continuous	46.0 kW / 2600 min^{-1} (rpm) (61.7 HP / 2600 min^{-1} (rpm))	56.2 kW / 2600 min^{-1} (rpm) (75.3 HP / 2600 min^{-1} (rpm))
ISO / SAE Net Intermittent	53.0 kW / 2600 min^{-1} (rpm) (71.0 HP / 2600 min^{-1} (rpm))	64.7 kW / 2600 min^{-1} (rpm) (86.7 HP / 2600 min^{-1} (rpm))
SAE Gross Intermittent	55.4 kW / 2600 min^{-1} (rpm) (74.2 HP / 2600 min^{-1} (rpm))	67.1 kW / 2600 min^{-1} (rpm) (89.9 HP / 2600 min^{-1} (rpm))
Maximum Bare Speed	2800 min^{-1} (rpm)	
Minimum Bare Idling Speed	775 to 825 min^{-1} (rpm)	
Combustion Chamber	Reentrant Type, Center Direct Injection Type (E-CDIS)	
Fuel Injection Pump	Bosch Type Mini Pump	
Governor	All speed mechanical governor	
Direction of Rotation	Counter-clockwise (Viewed from flywheel side)	
Injection Nozzle	Bosch P Type	
Injection Timing	0.24 rad. (13.5 °) before T.D.C.	0.21 rad. (12 °) before T.D.C.
Firing Order	1-3-4-2	
Injection Pressure	1st stage 18.6 MPa (190 kgf/cm^2, 2702 psi), 2nd stage 23.5 MPa (240 kgf/cm^2, 3414 psi)	
Compression Ratio	20.0	19.3
Lubricating System	Forced lubrication by trochoid pump	
Oil Pressure Indicating	Electrical Type Switch	
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	Intake Air Heater in Intake Manifold	
Battery	12 V, 112 AH, equivalent	
Charging Alternator	12 V, 540 W	
Fuel	Diesel Fuel No. 2-D (ASTM D975)	
Lubricating Oil	Class CF lubricating oil as per API classification is recommended. If this class of lubricating oil is not available, preferably use Class CD or CE lubricating oil. For details on recommended lubricating oils, see page G-5, 12.	
Lubricating Oil Capacity	13.2 L (3.49 U.S.gals)	
Weight (Dry)	246 kg (542.4 lbs)	255 kg (562.2 lbs)

* The specification described above is of the standard engine of each model.
* Conversion Formula : HP = 0.746 kW, PS = 0.7355 kW

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2. SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Cylinder Head Surface	Flatness	–	0.05 mm 0.0020 in.
Top Clearance		0.72 to 0.90 mm 0.0283 to 0.0354 in.	–
Compression Pressure	V3300DI-E2B	3.92 MPa / 250 min^{-1} (rpm) 40.0 kgf/cm^2 / 250 min^{-1} (rpm) 569 psi / 250 min^{-1} (rpm)	2.90 MPa / 250 min^{-1} (rpm) 29.6 kgf/cm^2 / 250 min^{-1} (rpm) 421 psi / 250 min^{-1} (rpm)
	V3300DI-T-E2B	3.53 MPa / 250 min^{-1} (rpm) 36 kgf/cm^2 / 250 min^{-1} (rpm) 512 psi / 250 min^{-1} (rpm)	2.60 MPa / 250 min^{-1} (rpm) 26.5 kgf/cm^2 / 250 min^{-1} (rpm) 377 psi / 250 min^{-1} (rpm)
Variance Among Cylinders		–	10 % or less
Valve Seat	Angle (Intake)	1.047 rad 60 °	–
	Angle (Exhaust)	0.785 rad 45 °	–
	Width (Intake)	1.6 to 2.0 mm 0.0630 to 0.0790 in.	–
	Width (Exhaust)	2.3 to 2.6 mm 0.0906 to 0.1024 in.	–
Valve Face	Angle (Intake)	1.047 rad 60 °	–
	Angle (Exhaust)	0.785 rad 45 °	–
Valve Recessing	Intake	0.6 to 0.8 mm 0.0236 to 0.0315 in.	1.2 mm 0.0472 in.
	Exhaust	0.85 to 1.05 mm 0.0335 to 0.0413 in.	1.2 mm 0.0472 in.

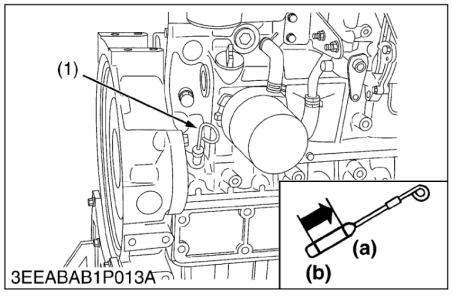
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4. CHECK AND MAINTENANCE

[1] DAILY CHECK POINTS



Checking Engine Oil Level

1. Level the engine.
2. To check the oil level, draw out the dipstick (1), wipe it clean, reinsert it, and draw it out again.
   Check to see that the oil level lies between the two notches.
3. If the level is too low, add new oil to the specified level.

■ **IMPORTANT**

- **When using an oil of different maker or viscosity from the previous one, drain old oil. Never mix two different types of oil.**

■ **NOTE**

- **Be sure to inspect the engine, locating it on a horizontal place. If set on gradients, accurately, oil quantity may not be measured.**
- **Be sure to keep the oil level between upper and lower limits of the dipstick. Too much oil may cause a drop in output or excessive blow-by gas. On the closed breather type engine in which mist is sucked through port, too much oil may caused oil hammer. While too little oil, may seize the engine's rotating and sliding parts.**

(1) Dipstick
(a) Maximum
(b) Minimum

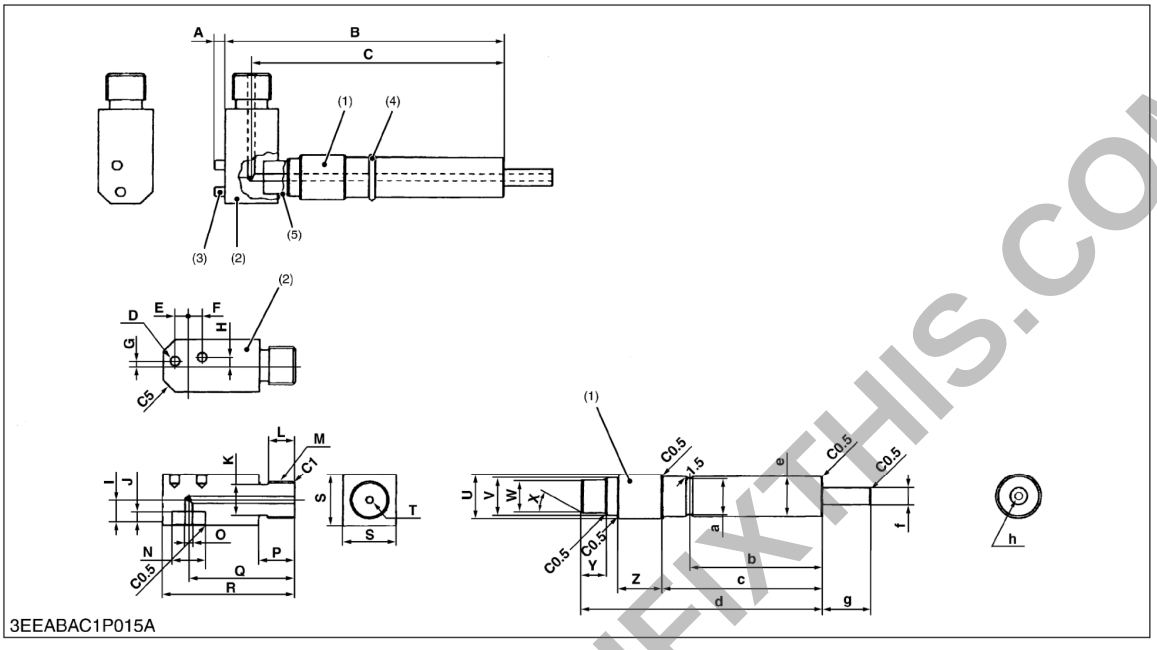
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Nozzle Adaptor for Measuring Cylinder Compression Pressure

Application: Use for measuring diesel engine compression pressure.



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A	5 mm (0.1969 in.)	**T**	3 mm dia., 44.5 to 45 mm depth (0.1181 in. dia., 1.7520 to 1.7717 in. depth)
B	115.9 to 116.1 mm (4.5630 to 4.5709 in.)		
C	105 mm (4.1339 in.)	**U**	19 mm dia. (0.7480 in. dia.)
D	4 mm dia., 4 mm depth (0.1575 in dia., 0.1575 in. depth)	**V**	16 mm dia. (0.6299 in. dia.)
E	6 mm (0.2362 in.)	**W**	14 mm dia. (0.5512 in. dia.)
F	5.3 mm (0.2087 in.)	**X**	0.524 rad (30°)
G	1.9 mm (0.0748 in.)	**Y**	10 mm (0.3937 in.)
H	3.5 mm (0.1378 in.)	**Z**	19 mm (0.7480 in.)
I	11.6 to 12.1 mm (0.4567 to 0.4764 in.)	**a**	14.94 to 15 mm dia. (0.5882 to 0.5906 in. dia.)
J	6 to 6.1 mm (0.2362 to 0.2402 in.)	**b**	55 mm (2.1654 in.)
K	13 mm dia. (0.5118 in. dia.)	**c**	66 mm (2.5984 in.)
L	11 mm (0.4331 in.)	**d**	100 to 100.1 mm (3.9370 to 3.9409 in.)
M	5/8-18UNF-2B	**e**	16.89 to 17 mm dia. (0.6650 to 0.6693 in. dia.)
N	14.0 to 14.011 mm dia. (0.5512 to 0.5516 in. dia.)	**f**	7.1 to 7.2 mm dia. (0.2795 to 0.2835 in. dia.)
O	3 mm dia. (0.1181 in. dia.)	**g**	20.3 to 20.5 mm (0.7992 to 0.8071 in.)
P	15 mm (0.5906 in.)	**h**	3 mm dia. (0.1181 in. dia.)
Q	44 mm (1.7323 in.)	**C0.5**	Chamfer 0.5 mm (Chamfer 0.0197 in.)
R	55 mm (2.1654 in.)	**C1**	Chamfer 1 mm (Chamfer 0.0394 in.)
S	22 mm (0.8661 in.)	**C5**	Chamfer 5 mm (Chamfer 0.1969 in.)

(1) Material SS400
(2) Material S43C-D
(3) Pin 05012-00408
(4) O-ring 04811-00150
(5) Arc welding

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