SAFE OPERATION

Careful operation is your best assurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how much experience they may have, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's obligation to provide all operators with this information and instruct them on safe operation.

Be sure to observe the following for safe operation.

1. OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE ENGINE" before attempting to start and operate the engine.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life. If the engine does not perform properly, consult your local Kubota Engine Distributor first.



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2. WEAR SAFE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury.
- Use additional safety items-PPE, e.g. hard hat, safety protection, safety goggles, gloves, etc., as appropriate or required.
- DO NOT operate the machine or any equipment attached to it while under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating the engine.

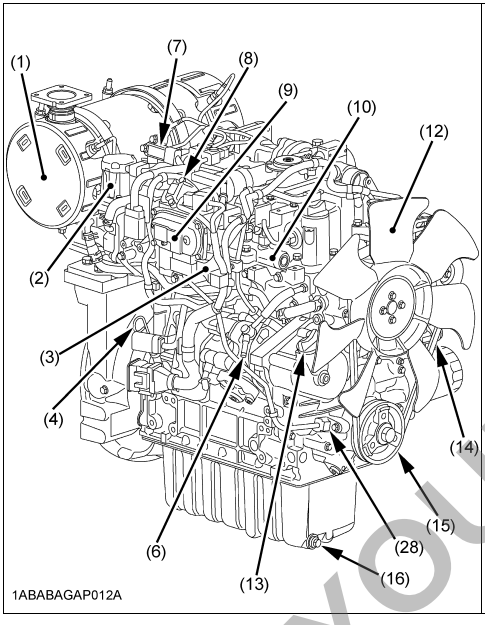

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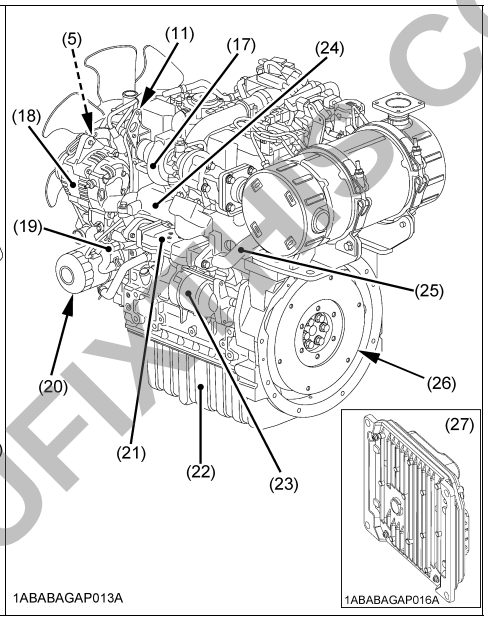
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NAMES OF PARTS

[V1505-CR-TE5]





(1) Diesel particulate filter (DPF)
(2) EGR valve
(3) Intake manifold
(4) Oil level gauge
(5) G sensor
(6) Supply pump
(7) Differential pressure sensor
(8) Boost and temperature sensor
(9) Intake air throttle
(10) Rail
(11) Engine hook
(12) Cooling fan
(13) Oil filler plug
(14) Fan belt
(15) Fan drive pulley
(16) Oil drain plug
(17) Turbo-charger
(18) Alternator
(19) Oil pressure switch
(20) Oil filter cartridge
(21) EGR cooler
(22) Oil pan
(23) Starter
(24) Exhaust manifold
(25) EGR pipe
(26) Flywheel
(27) ECU (Engine Control Unit)
(28) NE sensor

NOTE :
- (27) ECU (Engine Control Unit) is not connected to the engine in the figure above.

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SPECIFICATIONS

Model	V1505-CR-TE5
Type	Vertical, water-cooled, 4-cycle diesel engine
Number of cylinders	4
Bore and stroke mm (in.)	78 × 78.4 (3.07 × 3.09)
Total displacement L (cu.in.)	1.498 (91.38)
Combustion type	Direct injection type
Rated output / Speed*1 kW / min^{-1} (rpm) (HP / min^{-1} (rpm))	33.0 / 3000 (44.9 / 3000)
Max. torque / Rotating speed N-m / min^{-1} (rpm) (lb-ft / min^{-1} (rpm))	118.6 / 2000 (87.5 / 2000)
Maximum bare speed min^{-1} (rpm)	3220
Minimum bare idling speed min^{-1} (rpm)	1000 to 1100
Order of firing	1-3-4-2
Direction of rotation	Counter-clockwise (viewed from flywheel side)
Compression ratio	17.6
Fuel	Diesel Fuel No.2-DULS
Lubricant (API classification)	CJ-4 or CK-4
Dimension mm (in.) (length x width x height)	787 × 455 × 691 (31.0 × 17.9 × 27.2)
Dry weight kg (lbs.)	173 (341.7)
Starting system	Cell starter
Starting motor	12V, 1.2 kW
Charging generator	12V, 720 W
Recommended battery capacity	12V, 55 AH
EU engine family name	LKBXL01.5A1D
CO_2 Emission data g/kWh Non-road steady-state test cycle Non-road transient test cycle	 804.1 848.0

*1 Gross intermittent SAE J1995

NOTE :
- Specifications are subject to change without notice.
- This CO_2 measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.

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TROUBLESHOOTING

If the engine does not function properly, use the following chart to identify and correct the cause.

■ When it is difficult to start the engine

Cause	Countermeasures
Fuel is thick and doesn't flow.	* Check the fuel tank, and remove water, dirt and other impurities. * Check the fuel filter cartridge and replace it if necessary.
Engine oil becomes thick in cold weather and engine cranks slow.	* Use oils of different viscosities, depending on ambient temperatures. (Use 10W-30 in winter season.)
Battery is discharged and the engine will not crank.	* Charge the battery.

■ When output is insufficient

Cause	Countermeasures
Fuel is insufficient.	* Refuel. * Check the fuel system. (Bleed the fuel system if necessary.)
Overheating of moving parts	* Consult your KUBOTA Dealer.
Air cleaner is dirty.	* Clean the element.
The output is limited because of a trouble.	* Check the engine warning lamp. (If a trouble occurs, it means that the ECU might be in the output limiting mode.)

■ When engine suddenly stops

Cause	Countermeasures
Lack of fuel	* Refuel. * Check the fuel system. (Bleed the fuel system if necessary.)
Overheating of moving parts	* Consult your KUBOTA Dealer.
Air cleaner is dirty.	* Clean the element.
Forced stop due to a trouble	* Check the engine warning lamp. (If a serious trouble occurs, it means that the ECU might have forced the engine to a stop.)

NOTE :
- If the cause of trouble can not be found, contact your KUBOTA Dealer.

IMPORTANT :
- If any of the sensors of common-rail engine malfunctions, the engine output and rotating speed drops during the run. In such case, contact your KUBOTA Dealer for repair.

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OPERATOR WARNING AND INDUCEMENT

1. Warning signal for Emission failure

Engine warning signal for emission failures must be indicated and shall not be the same as the warning used for the purposes of malfunction or other engine maintenance, though it may use the same warning system.
All the emission failures are also recorded in the ECU.

Emission failures are related to the PM control diagnosis (PCD) and NOx control diagnosis (NCD), as mentioned below.

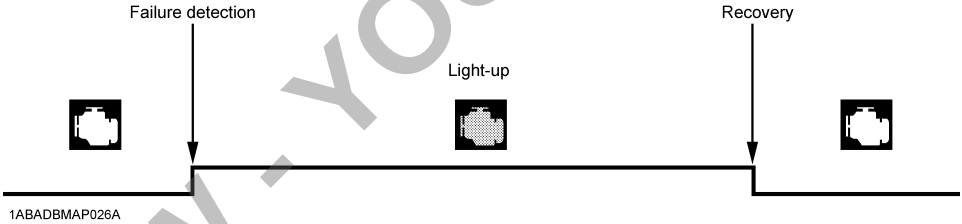
PCD / NCD	Monitor type	Subject component	Inducement	P-code	SPN	FMI
PCD	Removal of the DPF system	DPF system	No applicable	P1A28	3936	7
	Loss of function of the DPF system			P3015	3936	2
	Failures of the PCD system			P2455	3251	3
NCD	Removal of the EGR system	EGR system	Applicable	U0076	523578	2
	Removal of the MAF sensor	MAF system		P0102	132	4

IMPORTANT :
- The system has operator inducement strategy in order to comply with EU stage V emission regulations.

2. Warning Indicator

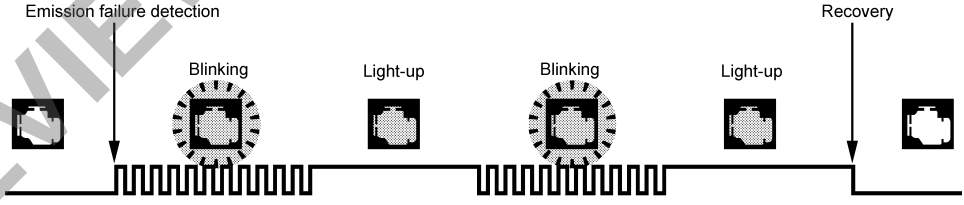
The malfunction indicator lamp behaves as shown below.
Refer to the operator's manual for the warning / inducement indicator strategy of the each machine which the engine is installed.

(1) Usual warning (Emission failure not detected)



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(2) Emission failure and other warnings detected



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SERVICE INTERVALS

Observe the following for service and maintenance.

[Except V1505-CR-TE5]

Interval	Item	Ref. page		
Daily	Checking of engine oil level	18		
	Checking of fuel level	21		
	Checking of coolant level	21		
	Checking of fan belt	24		
Every 50 hours	Checking of fuel pipes and clamp bands	25		
	Draining of water separator (Type 1)	26		
Every 250 hours	Checking of radiator hoses and clamp bands	28		
	Cleaning of air cleaner element	29	*1	
	Adjustment of fan belt tension	29		
	Checking of intake air line	30		
Every 500 hours	Changing of engine oil	31	◎	
	Replacement of oil filter cartridge	32	◎	
	Replacement of fuel filter cartridge	32		
	Removal of sediment in fuel tank	32	*3	
	Cleaning of water jacket (radiator interior)	32	*3	
	Replacement of fan belt	32	*3	
	Cleaning of water separator (Type 1)	32	*3	
Every 500 hours or 1 year	Replacement of water separator filter (Type 2)	33	*3	
Every 1000 hours	Checking of valve clearance	33	*3	
Every 1500 hours	Checking of injector tip	33	*3	@
	Checking of EGR cooler	33	*3	@
	Changing of oil separator element	33		@
	Checking of PCV valve	34	*3	@
Every 3000 hours	Checking of turbo-charger	34	*3	@
	Checking of EGR system	34	*3	@
Every 3000 to 6000 hours	Cleaning of DPF	34	*3	@

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OPERATING THE ENGINE

STARTING THE ENGINE (NORMAL)

WARNING

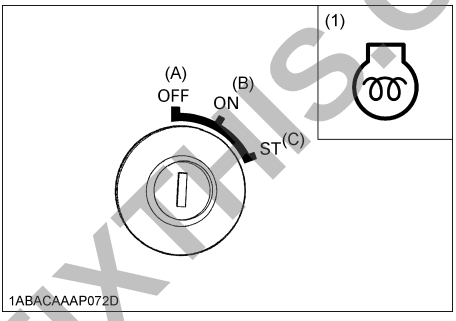
To avoid personal injury or death:

- **Do not allow children to approach the machine while the engine is running.**
- **Be sure to install the machine on which the engine is installed, on a flat place.**
- **Do not run the engine on gradients.**
- **Do not run the engine in an enclosed area. Exhaust gas can cause air pollution and exhaust gas poisoning.**
- **Keep your hands away from rotating parts (such as fan, pulley, belt, flywheel etc.) during operation.**
- **Do not operate the machine while under the influence of alcohol or drugs.**
- **Do not wear loose, torn or bulky clothing around the machine. It may catch on moving parts or controls, leading to the risk of accident. Use additional safety items, e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.**
- **Do not wear radio or music headphones while operating engine.**
- **Check to see if it is safe around the engine before starting.**
- **Reinstall safeguards and shields securely and clear all maintenance tools when starting the engine after maintenance.**

IMPORTANT :

- Do not use ether or any starting fluid for starting the engine, or a severe damage will occur.
- When starting the engine after a long storage (of more than 3 months), activate the starter for about 10 seconds to allow oil to reach every engine part.

1. **Set the fuel cock to the "ON" (OPEN) position.**
2. **Insert the key into the key switch.**
3. **Turn the key to the "ON" position and hold it until the heater indicator turns off.**



(1) Heater indicator

(A) "OFF" SWITCHED OFF
(B) "ON" OPERATION
(C) "ST" STARTING

4. **Turn the key to the "STARTING" position and the engine should start. Release the key immediately when the engine starts.**
5. **Check to see that the oil pressure lamp and charge lamp are off. If the lamps are still on, immediately stop the engine, and determine the cause.**
   (See "CHECKS DURING OPERATION" in "OPERATING THE ENGINE" section.)

NOTE :

- If the oil pressure lamp stays on after the engine starts and runs, shut the engine off immediately and check the following:
  - if there is enough engine oil.
  - if the engine oil has dirt in it.
  - if the wiring is faulty.

  If the oil pressure lamp continues to stay on and is not resolved by checking these items, contact your local KUBOTA Dealer for service.

6. **Warm up the engine at medium speed without load.**

IMPORTANT :

- If the engine does not catch or start at 10 seconds after the starter switch is set at "STARTING" position, wait for another 30 seconds and then begin the engine starting sequence again. Do not allow the starter motor to run continuously for more than 20 seconds.
- If a DPF overheat warning is indicated, keep in mind that the engine cannot get restarted until the DPF temperature drops below 300°C (572°F).

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FOREWORD

You are now the proud owner of a KUBOTA Engine. This engine is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your engine, please read this manual carefully. It will help you become familiar with the operation of the engine and contains many helpful hints about engine maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.

This Operator's Manual should be considered a permanent part of the engine and should remain with the engine when it is resold.

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 assemble 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, could result in minor or moderate injury.
IMPORTANT :	Indicates that equipment or property damage could result if instructions are not followed.
NOTE :	Gives helpful information.

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