WSM

WORKSHOP MANUAL
DIESEL GENERATOR

KJ-X 50 HERTZ SERIES

Kubota

KiSC issued 09, 2009 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 attempt to repair or use this unit.

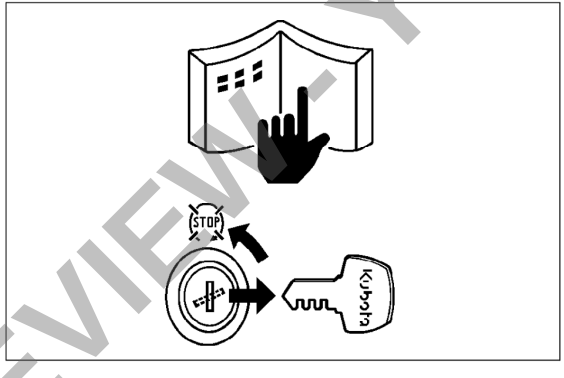
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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.**



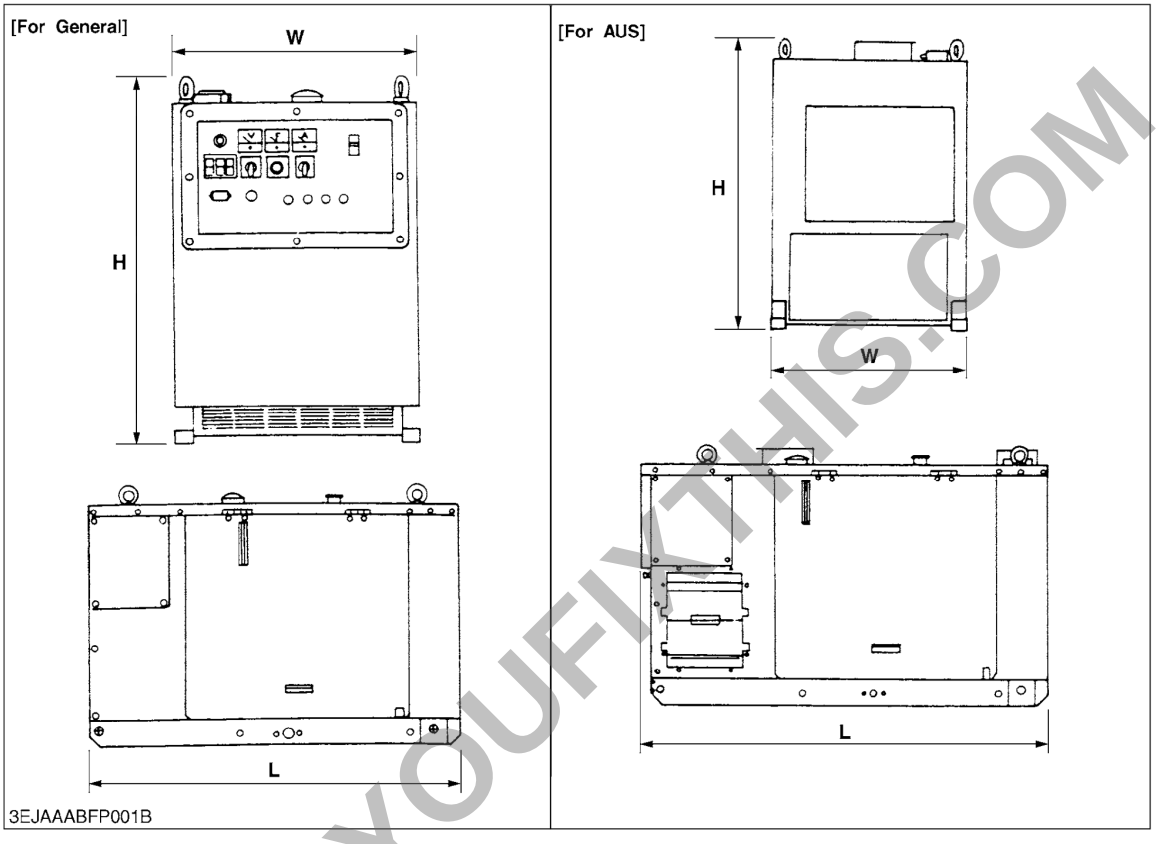
BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and generator unit.
- Place the generator unit 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 on the control panel.

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DIMENSIONS



For General

Model		KJ-S130VX	KJ-S170FX	KJ-T130DX	KJ-T180VX	KJ-T230FX	KJ-T300
Length	mm (in.)	1488 (58.58)	1610 (63.39)	1393 (54.84)	1488 (58.58)	1613 (63.50)	1717 (67.60)
Width	mm (in.)	650 (25.6)	740 (29.1)	650 (25.6)	650 (25.6)	740 (29.1)	824 (32.4)
Height	mm (in.)	971 (38.2)	996 (39.2)	971 (38.2)	971 (38.2)	996 (39.2)	1046 (41.18)

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For AUS

Model		KJ-S130VX-AUS	KJ-S170FX-AUS	KJ-T130DX-AUS	KJ-T180VX-AUS	KJ-T230FX-AUS	KJ-S240-AUS	KJ-T300-AUS
Length	mm (in.)	1518 (59.76)	1643 (64.68)	1423 (56.02)	1518 (59.76)	1643 (64.68)	1717 (67.60)	1717 (67.60)
Width	mm (in.)	650 (25.6)	740 (29.1)	650 (25.6)	650 (25.6)	740 (29.1)	824 (32.4)	824 (32.4)
Height	mm (in.)	971 (38.2)	996 (39.2)	971 (38.2)	971 (38.2)	996 (39.2)	1046 (41.18)	1046 (41.18)

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SPECIFICATIONS

Model		KJ-S130VX		KJ-S170FX	
Generator	Type	Revolving field, self-excited brushless AC generator			
	Insulation class	H			
	Frequency	50 Hz			
	Output	12.5 kVA (12.5 kW)		17.0 kVA (17.0 kW)	
	Voltage (AC)	110 / 220 V	120 / 240 V	110 / 220 V	120 / 240 V
	Current	56.8 A	52.1 A	77.3 A	70.8 A
	Number of phases	1			
	Number of poles	4			
	Power factor	100%			
Engine	Model	V2203-E/E2		F2803-E/E2	
	Type	Vertical, water cooled, 4-cycle, diesel engine			
	Number of cylinders	4		5	
	Bore × Stroke	87.0 × 92.4 mm (3.43 × 3.64 in.)			
	Total displacement	2197 cm^3 (134.1 cu.in.)		2746 cm^3 (167.6 cu.in.)	
	Rated output	16.9 kW (23.0 PS)		21.1 kW (28.7 PS)	
	Speed	1500 min^{-1} (rpm)			
	Combustion system	Spherical combustion chamber			
	Compression ratio	23 : 1			
	Cooling system	Pressurized radiator, forced circulation with water pump			
	Lubricating system	Forced lubrication by trochoid pump			
	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-8, 11			
	Starting system	Electric type			
	Battery	12 V x 80 AH			
	Fuel tank capacity	37 L (9.8 U.S.gals)		60 L (16 U.S.gals)	
	Coolant capacity	9.0 L (2.4 U.S.gals)		10.5 L (2.77 U.S.gals)	
	Engine oil capacity	7.6 L (2.0 U.S.gals)		10.5 L (2.77 U.S.gals)	
Net weight		500 kg (1100 lbs)		610 kg (1340 lbs)	
Emergency stop mechanism		In case of abnormal oil pressure or water temperature			

* 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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6. MAINTENANCE CHECK LIST

To maintain long-lasting and safe engine performance, make it a rule to carry out regular inspections by following the table below.

Item \ Service interval		Daily	Initial 50 hours	Every 100 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 3000 hours	Every 1 year	Every 2 year	Refe-rence Page
Engine oil	Checking	☆										G-9
	Changing		☆		☆							G-11, 14
Oil filter cartridge	Replacing		☆			☆						G-12, 16
Coolant	Checking	☆										G-10
	Changing										☆	G-27
*Air cleaner element (replace the element after 6-times cleanings)	Clearing			☆								G-12
	Replacing									☆		G-29
Fan belt	Checking		☆		☆							G-12, 15
	Replacing						☆					G-17
*Fuel hoses and clamp bands	Checking			☆								G-13
	Replacing										☆	G-29
*Intake air line	Checking				☆							G-15
	Replacing										☆	G-29
Battery	Checking			☆								G-13
	Replacing										☆	G-30
Radiator hoses and clamp bands	Checking				☆							G-15
	Replacing										☆	G-30
*Fuel filter	Replacing					☆						G-16
Water jacket and radiator interior	Cleaning						☆					G-18
Valve clearance	Checking						☆					G-19, 20
Electric wiring and loose connections	Checking				☆							–
*Injection nozzle pressure	Checking							☆				G-21, 22
*Injection pump	Checking								☆			G-25
*Injection timing	Checking								☆			G-23, 24
Generator side bearing	Checking						☆					G-21

* The items listed above (* marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.

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5. 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 6.8	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31
M8	18 to 20	1.8 to 2.1	13 to 15	24 to 27	2.4 to 2.8	18 to 20
M10	40 to 45	4.0 to 4.6	29 to 33	49 to 55	5.0 to 5.7	37 to 41
M12	63 to 72	6.4 to 7.4	47 to 53	78 to 90	7.9 to 9.2	58 to 66
M14	108 to 125	11.0 to 12.8	79.6 to 92.5	124 to 147	12.6 to 15.0	91.2 to 108

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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

[1] D1703-E/E2, V2203-E/E2, F2803-E/E2

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Replenish fuel	G-13
	Air in the fuel system	Vent air	G-13
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel hose clogged	Clean or replace	G-13
	Fuel filter clogged	Replace	G-16
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	7 to 12, G-5
	Fuel with low cetane number	Use specified fuel	7 to 12
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	S-38
	Incorrect injection timing	Adjust	S-27
	Fuel camshaft worn	Replace	S-45
	Injection nozzle clogged	Clean or replace	S-31, 32
	Injection pump malfunctioning	Repair or replace	S-29, 30, 42
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	S-45 to 49 S-94 to 101
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	S-38, 39, 40
	Improper valve timing	Correct or replace timing gear	S-45
	Piston ring and cylinder worn	Replace	S-47, 48, 49, 92, 93,102
	Excessive valve clearance	Adjust	S-22
	Stop solenoid malfunctioning	Replace	–
Starter Does Not Run	Battery discharged	Charge	–
	Starter malfunctioning	Repair or replace	S-104, 105, 106
	Key switch malfunctioning	Replace	–
	Wiring disconnected	Connect	–

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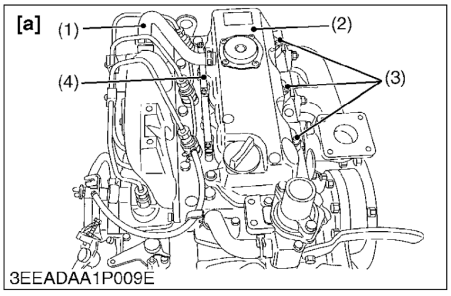
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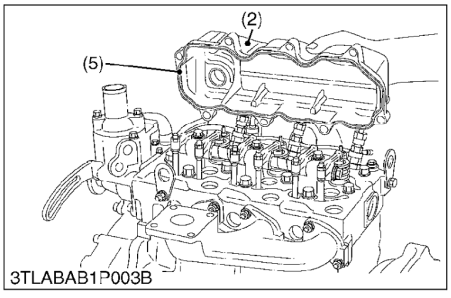
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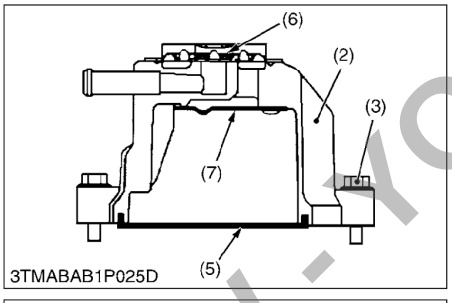
[2] DISASSEMBLING AND ASSEMBLING

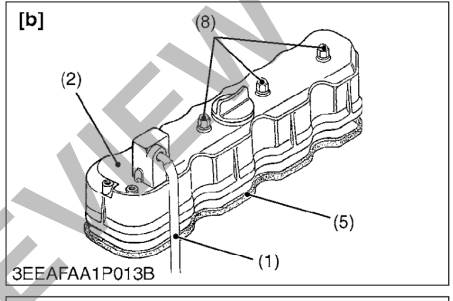
(1) D1703-E/E2, V2203-E/E2, F2803-E/E2

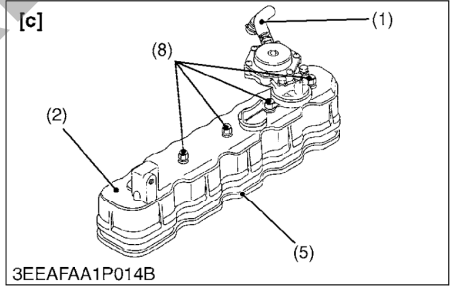
1) Cylinder Head and Valves











Cylinder Head Cover

1. Remove the lead (4).
2. Remove the breather hose (1).
3. **[a] D1703-E2, V2203-E2**
   Remove the cylinder head cover screws (3).
   [b] D1703-E, V2203-E / [c] F2803-E, F2803-E2
   Remove the cylinder head cover cap nuts (8).
4. Remove the cylinder head cover (2).

(When reassembling)

- Check to see if the cylinder head cover gasket (5) is not defective.

Tightening torque	Cylinder head cover screw	9.81 to 11.2 N·m 1.00 to 1.15 kgf·m 7.24 to 8.31 lbf·ft
	Cylinder head cover cap nut	7 to 8 N·m 0.7 to 0.9 kgf·m 5 to 6 lbf·ft

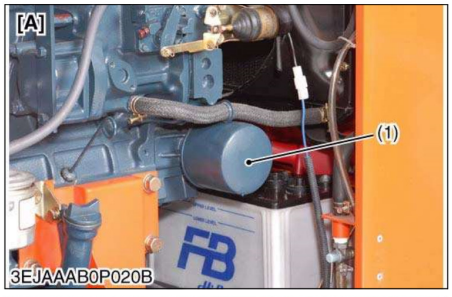
(1) Breather Hose
(2) Cylinder Head Cover
(3) Cylinder Head Cover Screw
(4) Lead
(5) Cylinder Head Cover Gasket
(6) Breather Valve
(7) Plate
(8) Cylinder Head Cover Cap Nut

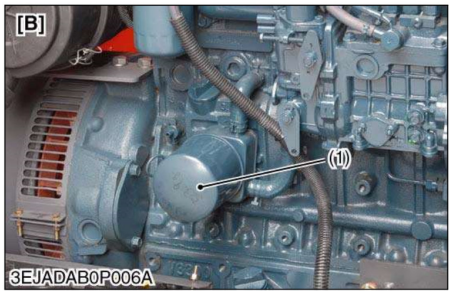
[a] D1703-E2, V2203-E2
[b] D1703-E, V2203-E, F2803-E
[c] F2803-E2

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Replacing Oil Filter Cartridge

CAUTION

- **Be sure to stop the engine before replacing filter cartridge.**

1. Remove the oil filter cartridge (1) with the filter wrench.
2. Apply a slight coat of oil onto the new cartridge gasket.
3. To install the new cartridge, screw it in by hand. Over tightening may cause deformation of rubber gasket.
4. After the new cartridge has been replaced, the engine oil normally decrease a little. Thus see that the engine oil does not leak through the seal and be sure to read the oil level on the dipstick. Then, replenish the engine oil up to the specified level.

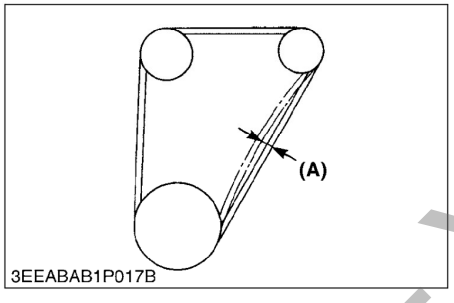
■ IMPORTANT

- **To prevent serious damage to the engine, replacement element must be highly efficient. Use only a KUBOTA genuine filter or its equivalent.**

(1) Engine Oil Filter Cartridge

[A] KJ-S130VX(-AUS)
KJ-S170FX(-AUS)
KJ-T130DX(-AUS)
KJ-T180VX(-AUS)
KJ-T230FX(-AUS)
[B] KJ-T300(-AUS)
KJ-S240-AUS

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Checking Fan Belt Tension

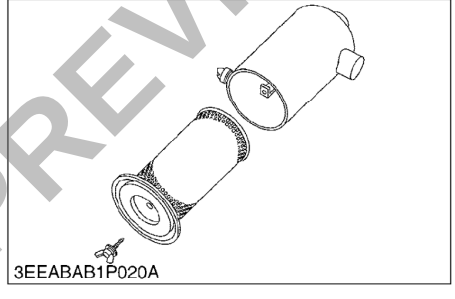
1. Measure the deflection **(A)**, depressing the belt halfway between the fan drive pulley and alternator pulley at specified force 98 N (10 kgf, 22 lbf).
2. If the measurement is not within the factory specifications, loosen the alternator mounting screws and relocate the alternator to adjust.

Deflection **(A)**	Factory spec.	KJ-S130VX(-AUS) KJ-S170FX(-AUS) KJ-T130DX(-AUS) KJ-T180VX(-AUS) KJ-T230FX(-AUS)	7.0 to 9.0 mm 0.28 to 0.35 in.
		KJ-T300(-AUS) KJ-S240-AUS	10 to 12 mm 0.40 to 0.47 in.

(A) Deflection

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[3] CHECK POINTS OF EVERY 100 HOURS



Cleaning Air Cleaner Element

1. Remove the air cleaner element.
2. Use clean dry compressed air on the inside of the element.
   Pressure of compressed air must be under 205 kPa (2.1 kgf/cm^2, 30 psi).
   Maintain reasonable distance between the nozzle and the filter.

■ NOTE

- **The air cleaner uses a dry element. Never apply oil to it.**
- **Do not run the engine with filter element removed.**
- **Change the element once a year or every 6th cleaning.**

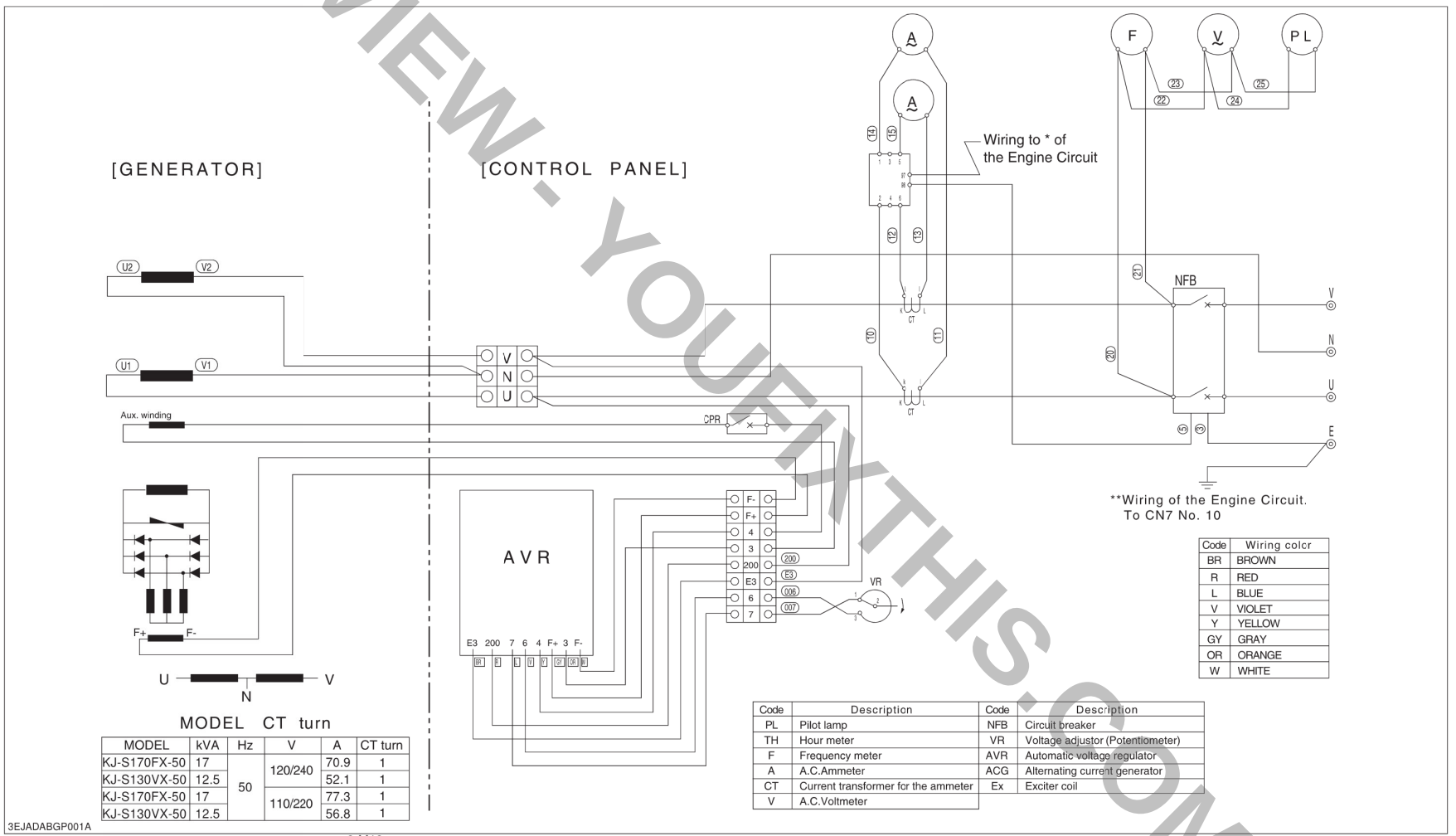
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7. WIRING DIAGRAM

[1] GENERATOR DIAGRAM

KJ-S130VX (110 / 220 V, 120 / 240 V), KJ-S170FX (110 / 200 V, 120 / 240 V)



MODEL CT turn

MODEL	kVA	Hz	V	A	CT turn
KJ-S170FX-50	17	50	120/240	70.9	1
KJ-S130VX-50	12.5			52.1	1
KJ-S170FX-50	17		110/220	77.3	1
KJ-S130VX-50	12.5			56.8	1

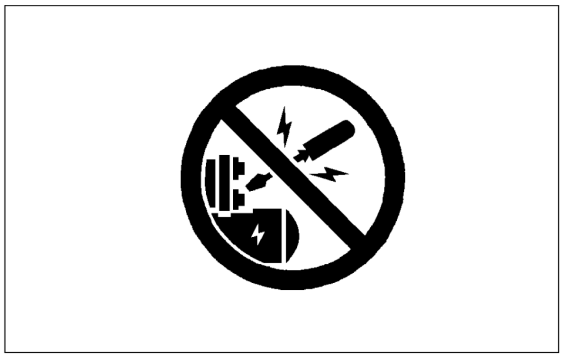
Code	Wiring colcr
BR	BROWN
R	RED
L	BLUE
V	VIOLET
Y	YELLOW
GY	GRAY
OR	ORANGE
W	WHITE

Code	Description	Code	Description
PL	Pilot lamp	NFB	Circuit breaker
TH	Hour meter	VR	Voltage adjustor (Potentiometer)
F	Frequency meter	AVR	Automatic voltage regulator
A	A.C.Ammeter	ACG	Alternating current generator
CT	Current transformer for the ammeter	Ex	Exciter coil
V	A.C.Voltmeter		

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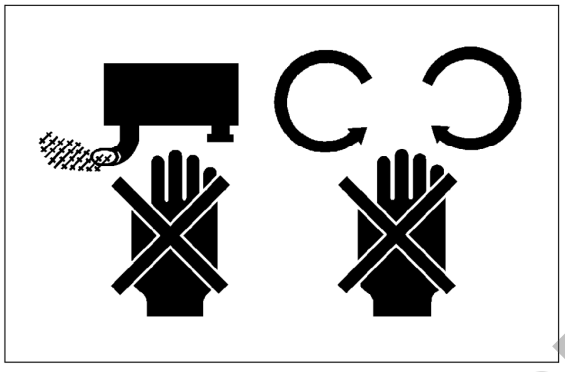
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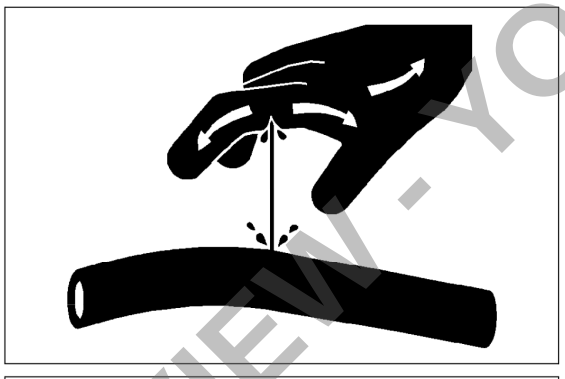
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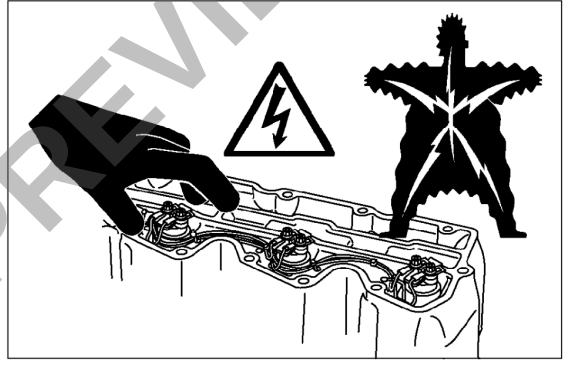


SAFETY STARTING

- 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.

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