SHOP MANUAL

KOMATSU

12V140-1 SERIES

DIESEL ENGINE

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SAFETY
SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for safe machine operation. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe. Some of these techniques require the use of tools specially designed by Komatsu for the specific purpose.

To prevent injury to workers, the symbol ⚠ is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, hand shield, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making any repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
    Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
    Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
13. Before starting work, remove the leads from the battery. Always remove the lead from the negative (–) terminal first.
14. When raising heavy components, use a hoist or crane.
    Check that the wire rope, chains and hooks are free from damage.
    Always use lifting equipment which has ample capacity.
    Install the lifting equipment at the correct places.
    Use a hoist or crane and operate slowly to prevent the component from hitting any other part.
    Do not work with any part still raised by the hoist or crane.
15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
16. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.
17. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.
18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.
19. Be sure to assemble all parts again in their original places.
    Replace any damaged parts with new parts.
    - When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly installed.
21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
24. Take care when removing or installing the tracks of track-type machines.
    When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

FOREWORD
GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following chapters; these chapters are further divided into the each main group of components.

STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.
In addition, this section may contain hydraulic circuit diagrams, electric circuit diagrams, and maintenance standards.

TESTING AND ADJUSTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs.
Troubleshooting charts correlating "Problems" with "Causes" are also included in this section.

DISASSEMBLY AND ASSEMBLY

This section explains the procedures for removing, installing, disassembling and assembling each component, as well as precautions for them.

MAINTENANCE STANDARD

This section gives the judgment standards for inspection of disassembled parts.
The contents of this section may be described in STRUCTURE AND FUNCTION.

OTHERS

This section mainly gives hydraulic circuit diagrams and electric circuit diagrams.
In addition, this section may give the specifications of attachments and options together.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Use the specifications given in the book with the latest date.

APPLICABLE MACHINE

★ Serial No. shows for engine serial No.

Engine	Serial No.	Applicable machine	
SA12V140-1		D475A-2, D475A-3, D475A-5	Bulldozer
		WA800-2, WA800-3, WA900-1, WA900-3	Wheel loader
		HD785-3, HD785-5, HD985-3	Dump truck
		INGERSOLL RAND	Crawler drill
		EPSA12V140	
		EG750B-1L	
		Generator	Generator (50Hz)
		Generator	Generator (IMS in South Africa)
		DCA800SPK	DENYO Generator
		DCA-800SSK	MQ Generator
		J12V140E-G1-1	Generator (4 Pole)
		J12V140E-G1-1	Generator (6 pole)
SDA12V140E-1		D475A-3	Bulldozer
SAA12V140-1		Generator	Generator (50Hz)
		SAA12V140-P920	Generator (50Hz)
		SAA12V140-P920	Generator (60Hz)
		SAA12V140-P1030	Generator (50Hz)
		SAA12V140-P1150	Generator (50Hz)

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SPECIFICATIONS

Engine model			SA12V140-1		
Applicable machine			D475A-2	WA800-2	WA800-3
Number of cylinder – Bore x Stroke		mm	12 – 140 x 165		
Total piston displacement		ℓ {cc}	30.5 {30,480}		
Firing order			R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4		
Dimensions	Overall length	mm	1,715	2,000	2,000
	Overall width	mm	1,515	1,450	1,450
	Overall height (excluding exhaust pipe)	mm	1,475	2,000	2,000
	Overall height (including exhaust pipe)	mm	1,592	–	–
Performance	Flywheel horsepower	kW {HP}/rpm	574 {770}/2,000 (Net)	588 {789}/2,000 (Net)	603 {808}/2,000 (Net)
	Maximum torque	Nm {kgm}/rpm	3,350 {342}/1,400 (Net)	3,730 {380}/1,400 (Net)	3,730 {380}/1,400 (Net)
	High idling speed	rpm	2,100 – 2,200	2,200 – 2,300	2,200 – 2,300
	Low idling speed	rpm	600 – 680	600 – 650	650 – 700 (on the machine) 680 – 730 (engine only)
	Minimum fuel consumption ratio	g/kW•h {g/HP•h}	201 {150} (Net)	197 {147} (Net)	208 {155} (Net)
Dry weight		kg	3,300	3,200	3,170
Fuel injection pump			BOSCH PE-P type		BOSCH PE-P(PS7S) type
Governor			BOSCH RSUV centrifugal, all speed type		BOSCH RSUV centrifugal, all speed type
Lubricating oil amount (refill capacity)		ℓ	103 (95)	98 (90)	120 (108)
Coolant amount		ℓ	215	301	(engine only: 85)
Alternator			24 V, 35 A (With cab and air conditioner: 50A)	24 V, 75 A	24 V, 75 A
Starting motor			24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2
Battery			12 V 170 Ah x 4	12 V 200 Ah x 4	12 V 170 Ah x 4
Turbocharger			KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2
Air compressor			–	ZEXEL reciprocation, single cylinder type x 2	–
Others			With aftercooler	With aftercooler	With aftercooler

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SA12V140-1			
WA900-1	WA900-3	HD785-3	HD785-3 (option) (With KOMATSU electronic governor)
12 - 140 x 165			
30.5 {30,480}			
R1 - L1- R5 - L5 - R3 - L3 - R6 - L6 - R2 - L2 - R4 - L4			
2,000	2,036	2,036	2,036
1,450	1,252	1,252	1,252
2,000	2,000	1,525	-
-	-	-	1,874 (With retarder: option)
			High power mode / Economy mode
627/2,000 (Net) {840/2,000} (Net)	636/2,000 (Net) {853/2,000} (Net)	783/2,100 (Net) {1,010/2,100} (Net)	753/2,100 (Net) {1,010/2,100} (Net) / 647/1,700 (Net) {880/1,700} (Net)
3,730/1,400 (Net) {380/1,400} (Net)	4,090/1,300 (Net) {417/1,300} (Net)	4,170/1,500 (Net) {425/1,500} (Net)	4,170/1,500 (Net) {425/1,500} (Net) / 3,820/1,250 (Net) {390/1,250} (Net)
2,200 - 2,300	2,300 - 2,350	2,400 - 2,500	2,400 - 2,500 / 2,050 - 2,150
650 - 700	680 - 730	650 - 700	620 - 720 / 645 - 695
194 (Net) {145} (Net)	208 (Net) {155} (Net)	205 (Net) {153} (Net)	205 (Net) {153} (Net) / 205 (Net) {153} (Net)
3,200	3,520	3,100	3,100
BOSCH PE-P (PS7S) type		BOSCH PE-P type	KOMATSU KFE6S135 type
BOSCH RSUV centrifugal, all speed type		BOSCH RFD min. max. speed control type	KOMATSU electronic control type
82 (64)	96 (87)	85 (66)	88 (59)
317	(engine only: 85)	230	230
24 V, 50 A	24 V, 75 A	24 V, 50 A	24 V, 75 A
24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2
12 V 170 Ah x 4	12 V 170 Ah x 4	12 V 200 Ah x 4	12 V 200 Ah x 4
KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	KOMATSU KTR 110 type x 2
-	-	ZEXEL reciprocation, single cylinder type x 2	ZEXEL reciprocation, single cylinder type x 2
With aftercooler	With aftercooler	With aftercooler, (option) retarder	With aftercooler, (option) retarder

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Engine model			SA12V140-1		
Applicable machine			HD785-5	HD785-5 (option) (With KOMATSU electronic governor)	
Number of cylinder – Bore x Stroke		mm	12 – 140 x 165		
Total piston displacement		ℓ {cc}	30.5 {30,480}		
Firing order			R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4		
Dimensions	Overall length	mm	2,036		
	Overall width	mm	1,252		
	Overall height (excluding exhaust pipe)	mm	–		
	Overall height (including exhaust pipe)	mm	1,514 1,874 (with retarder: option)		
Performance				High power mode	Economy mode
	Flywheel horsepower	kW/rpm {HP/rpm}	783/2,000 (Gross) {1,050/2,000} (Gross) 753/2,000 (Net) {1,010/2,000} (Net)	793/2,000 (Gross) {1,060/2,000} (Gross) 753/2,000 (Net) {1,010/2,000} (Net)	699/1,900 (Gross) {937/1,900} (Gross)
	Maximum torque	Nm/rpm {kgm/rpm}	4,170/1,400 (Gross) {425/1,400} (Gross) 4,120/1,400 (Net) {421/1,400} (Net)	4,170/1,400 (Gross) {425/1,400} (Gross) 4,130/1,400 (Net) {421/1,400} (Net)	4,050/1,300 (Gross) {413/1,300} (Gross)
	High idling speed	rpm	2,300 – 2,400	2,300 – 2,400	2,300
	Low idling speed	rpm	620 – 720	620 – 720	620 – 720
	Minimum fuel consumption ratio	g/kW•h {g/HP•h}	197 (Gross) {145} (Gross)	194 (Gross) {145} (Gross)	194 (Gross) {145} (Gross)
Dry weight		kg	3,100	3,100	3,100
Fuel injection pump			BOSCH PE-P (PS7S) type	KOMATSU KFE6S135 type	
Governor			BOSCH RFD min. max. speed control type	Electronic control type	
Lubricating oil amount (refill capacity)		ℓ	132 (120)	132 (120)	
Coolant amount		ℓ	(Engine only: 90)	(Engine: 90)	
Alternator			24 V, 75 A	24 V, 75 A	
Starting motor			24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	
Battery			12 V 200 Ah x 4	12 V 200 Ah x 4	
Turbocharger			KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	
Air compressor			ZEXEL reciprocation, single cylinder type x 2	ZEXEL reciprocation, single cylinder type x 2	
Others			With aftercooler, (option) retarder	With aftercooler, (option) retarder	

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SA12V140-1			
HD985-3 (With KOMATSU electronic governor)		J12V140E-G1-1 (4 pole generator)	J12V140E-G1-1 (6 pole generator)
12 – 140 x 165			
30.5 {30,480}			
R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4			
2,036		2,284	2,284
1,252		1,333	1,333
–		1,655	1,655
1,874 (With retarder: option)		–	–
High power mode / Economy mode			
753 {1,010}/2,100 (Net)	647 {880}/1,700 (Net)	549 {757}/1,500 (50 Hz)	382 {527}/1,100 (50 Hz)
		615 {848}/1,800 (60 Hz)	451 {622}/1,200 (60 Hz)
4,170 {425}/1,500 (Net)	3,820 {390}/1,250 (Net)	–	–
2,400 – 2,500	2,050 – 2,150	Max. 1,575 (50 Hz) Max. 1,890 (60 Hz)	Max. 1,550 (50 Hz) Max. 1,260 (60 Hz)
620 – 720	645 – 695	700 – 900	700 - 900
205 {153} (Net)	205 {153} (Net)	(At rated flywheel horsepower) 211 {157} (50 Hz) 215 {160} (60 Hz)	(At rated flywheel horsepower) 211 {157} (50 Hz) 215 {160} (60 Hz)
3,100		3,200	3,200
KOMATSU KFE6S135 type KOMATSU electronic control type		BOSCH PE-P (PS7S) type ZEXEL electronic control type	BOSCH PE-P (PS7S) type ZEXEL electronic control type
93 (77)		159 (155)	159 (155)
230		85 (Engine only)	85 (Engine only)
24 V, 50 A		24V, 35 A (opt)	24 V, 35 A (opt)
24 V, 7.5 kW x 2		24 V, 7.5 kW x 2	24 V, 7.5 kW x 2
12 V 170 Ah x 4		12 V 200 Ah x 4	12 V 200 Ah x 4
KOMATSU KTR110 type x 2 ZEXEL reciprocation, single cylinder type x 2 With aftercooler, (option) retarder		KOMATSU KTR110 type x 2 – With aftercooler	KOMATSU KTR110 type x 2 – With aftercooler

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Engine model			SA12V140-1		
Applicable machine			DCA800SPK (DENYO • generator) (With ZEXEL electronic governor)	Generator (50 Hz only)	INGERSOLL RAND crawler drill
Number of cylinder – Bore x Stroke		mm	12 – 140 x 165		
Total piston displacement		ℓ {cc}	30.5 {30,480}		
Firing order			R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4		
Dimensions	Overall length	mm	1,996	2,936	1,755
	Overall width	mm	1,342	1,924	1,513
	Overall height (excluding exhaust pipe)	mm	1,590	1,616	1,552
	Overall height (including exhaust pipe)	mm	–	–	–
Performance	Flywheel horsepower	kW {HP}/rpm	613 {822}/1,500 (50 Hz) (Net) 736 {987}/1,800 (60 Hz) (Net)	613 {822}/1,500 (50 Hz) (Net)	709 {950}/1,800 (Net)
	Maximum torque	Nm {kgm}/rpm	–	–	3,980 {406}/1,400 (Net)
	High idling speed	rpm	1,563 – 1,573 (50 Hz) 1,876 – 1,886 (60 Hz)	Max. 1,560	1,950 – 2,050
	Low idling speed	rpm	750 – 850	700 – 900	1,150 – 1,250
	Minimum fuel consumption ratio	g/kW•h {g/HP•h}	(At rated flywheel horsepoer) 211 {157} (Net, 50 Hz) 215 {160} (Net, 60 Hz)	(At rated flywheel horsepower) 211 {157} (Net, 50 Hz) –	205 {153} (Net)
Dry weight		kg	3,300	3,100	3,100
Fuel injection pump			BOSCH PE-P (PS7S) type	BOSCH PE-P (PS7S) type	BOSCH PE-P type
Governor			ZEXEL electronic control type	ZEXEL electronic control type	BOSCH RSUV centri-fugal, all speed type
Lubricating oil amount (refill capacity)		ℓ	103 (95)	88 (80)	102 (92)
Coolant amount		ℓ	215	85 (Engine only)	85 (Engine only)
Alternator			24 V, 35 A (With cab and air conditioner: 50A)	24 V, 25 A	–
Starting motor			24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2
Battery			12 V 170 Ah x 4	12 V 220 Ah x 2	12 V 240 Ah x 4
Turbocharger			KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2
Air compressor			–	–	–
Others			With aftercooler	With aftercooler	With aftercooler

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SA12V140-1				
EG750B-1L	EPSA12V140	Generator IMS (in South Africa)	DCA-800SSK (MQ generator)	
12 – 140 x 165				
30.5 {30,480}				
R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4				
2,936 1,924 1,616 –	2,267 1,329 2,027 –	2,936 1,924 1,916 –	1,996 1,334 1,528 –	
613 {822}/1,500 (Net) –	581 {779}/1,800 (Net) –	630 {844} /1,500 (50 Hz) (Net) 762 {1,022} /1,800 (60 Hz) (Net) –	812 {1,088} /1,800 (60 Hz) (Net) –	
Max. 1,560	2,000 ± 50	1,563 – 1,573 (50 Hz) 1,876 – 1,886 (60 Hz)	Max. 1,890	
700 – 900 (At rated flywheel horsepower) 210 {157} (Net)	850 – 900 (At rated flywheel horsepower) 208 {155} (Net)	700 – 900 (At rated flywheel horsepower) 210 {157} (Net)	700 – 900 215 {160} (Net)	
3,100	3,100	2,950	3,100	
BOSCH PE-P type BOSCH RSUV centrifugal, all speed type	BOSCH PE-P type BOSCH RSUV centrifugal, all speed type	BOSCH PE-P (PS7S) BOSCH RSUV centrifugal, all speed type	BOSCH PE-P (PS7S) Electronic governor (ZEXEL)	
88 (80)	88 (80)	88 (79)	151 (148)	
58 (Engine only)	168	85 (Engine only)	85 (Engine only)	
24 V, 25 A 24 V, 7.5 kW x 2 12 V 220 Ah x 2	24 V, 25 A 24 V, 7.5 kW x 2 12 V 220 Ah x 2	24 V, 25 A 24 V, 7.5 kW x 2 12 V 200 Ah x 4	24 V, 35 A 24 V, 7.5 kW x 2 12 V 200 Ah x 4	
KOMATSU KTR110 type x 2 – With aftercooler	KOMATSU KTR110 type x 2 – With aftercooler	KOMATSU KTR110 type x 2 – With aftercooler	KOMATSU KTR110 type x 2 – With aftercooler	

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Engine model			SAA12V140-1		
Applicable machine			Generator (50 Hz only)		
Number of cylinder – Bore x Stroke		mm	12 – 140 x 165		
Total piston displacement		ℓ {cc}	30.5 {30,480}		
Firing order			R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4		
Dimensions	Overall length	mm	2,187		
	Overall width	mm	1,600		
	Overall height (excluding exhaust pipe)	mm	1,697		
	Overall height (including exhaust pipe)	mm	–		
Performance	Flywheel horsepower	kW {HP}/rpm	Rated flywheel horsepower 773 {1,050}/1,500 (Net) Maximum flywheel horsepower 851 {1,160}/1,500 (Net)		
	Maximum torque	Nm {kgm}/rpm	–		
	High idling speed	rpm	(At rated flywheel horse power) Max. 1,570 (At max. flywheel horse-power) Max. 1,580		
	Low idling speed	rpm	800 – 850		
	Minimum fuel consumption ratio	g/kW•h {g/HP•h}	(At rated flywheel horsepower) 211 {155} (Net)		
Dry weight		kg	3,170		
Fuel injection pump			BOSCH PE-P type		
Governor			BOSCH RSUV centri-fugal, all speed type		
Lubricating oil amount (refill capacity)		ℓ	157 (40)		
Coolant amount		ℓ	170		
Alternator			24 V, 25 A		
Starting motor			24 V, 7.5 kW x 2		
Battery			12 V 200 Ah x 4		
Turbocharger			KOMATSU KTR110 type x 2		
Air compressor			–		
Others			With air cooled aftercooler		

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SAA12V140-P920 (50 Hz)	SAA12V140-P920 (60 Hz)	SAA12V140-P1030 (50 Hz)	SAA12V140-P1150 (50 Hz)	
SAA12V140-1				
12 - 140 x 165				
30.5 {30,480}				
R1 - L1- R5 - L5 - R3 - L3 - R6 - L6 - R2 - L2 - R4 - L4				
2,283	2,283	2,283	2,283	
1,701	1,701	1,701	1,701	
1,748	1,748	1,748	1,785	
-	-	-	-	
689/1,500 {924/1,500}	861/1,800 {1,154/1,800}	774/1,500 {1,037/1,500}	861/1,500 {1,154/1,500}	
758/1,500 {1,016/1,500}	947/1,800 {1,269/1,800}	850/1,500 {1,140/1,500}	947/1,500 {1,269/1,500}	
Max. 1,568	Max. 1,882	Max. 1,568	Max. 1,568	
Max. 1,575	Max. 1,890	Max. 1,575	Max. 1,575	
800 - 850 (At rated flywheel horsepower) 208 {155}	800 - 850 (At rated flywheel horsepower) 208 {155}	800 - 850 (At rated flywheel horsepower) 210 {157}	800 - 850 (At rated flywheel horsepower) 208 {155}	
3,170	3,170	3,170	3,170	
BOSCH PE-P type BOSCH RSUV centri-fugal, all speed type	BOSCH PE-P type BOSCH RSUV centri-fugal, all speed type	BOSCH PE-P type BOSCH RSUV centri-fugal, all speed type	BOSCH PE-P type BOSCH RSUV centri-fugal, all speed type	
157 (141)	157 (141)	157 (141)	157 (141)	
170	170	170	170	
24 V, 25 A	24 V, 25 A	24 V, 25 A	24 V, 25 A	
24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	
12 V 200 Ah x 2	12 V 200 Ah x 2	12 V 200 Ah x 2	12 V 200 Ah x 2	
KTR110 x 2	KTR110 x 2	KTR110 x 2	KTR110 x 2	
-	-	-	-	
-	-	-	-	

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Engine model			SDA12V140E-1		
Applicable machine			D475A-3 with KOMATSU electric governor	D475A-5 with KOMATSU electric governor	
Number of cylinder – Bore x Stroke		mm	12 – 140 x 165		
Total piston displacement		ℓ {cc}	30.5 {30,480}		
Firing order			R1 – L1– R5 – L5 – R3 – L3 – R6 – L6 – R2 – L2 – R4 – L4		
Dimensions	Overall length	mm	1,970	1,715	
	Overall width	mm	1,535	1,525	
	Overall height (excluding exhaust pipe)	mm	2,178	1,453	
	Overall height (including exhaust pipe)	mm	–	–	
Performance	Flywheel horsepower	kW {HP}/rpm	619 {830}/2,000 (Net)	670 {899}/2,000 (Gross)	
	Maximum torque	Nm {kgm}/rpm	3,697 {377}/1,400 (Net)	3,825 {390}/1,400 (Gross)	
	High idling speed	rpm	2,150±50	2,150±50	
	Low idling speed	rpm	$620\ ^{+80}_{0}$	$620\ ^{+80}_{0}$	
	Minimum fuel consumption ratio	g/kW•h {g/HP•h}	201 {150} (Net)	213 {159} (Gross)	
Dry weight		kg	3,540	3,540	
Fuel injection pump			KOMATSU KFE6S135		
Governor			Electronic control type		
Lubricating oil amount (refill capacity)		ℓ	142 (134)	132 (120)	
Coolant amount		ℓ	82 (Engine only) 8.4 (Dual circuit aftercooler)		
Alternator			24 V, 75 A	24 V, 90 A	–
Starting motor			24 V, 7.5 kW x 2	24 V, 7.5 kW x 2	
Battery			12 V 170 Ah x 4	–	
Turbocharger			KOMATSU KTR110 type x 2	KOMATSU KTR110 type x 2	
Air compressor			–	–	
Others			With dual circuit aftercooler	With dual circuit aftercooler	

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DISASSEMBLY

Special tools

No.	Part No.	Part Name	Q'ty
A	795-102-2102	Spring pusher	1
B	795-100-1191	Piston ring tool	1
C	795-236-1000	Liner puller	1
D	795-502-1121	Holder	1
E	795-507-1110	Remover	1

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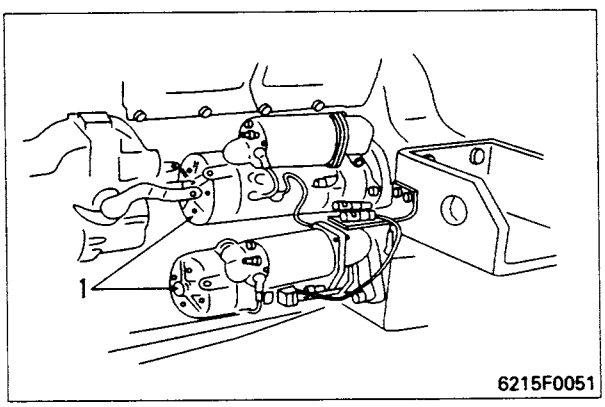
1. Washing

- Before disassembling the engine, check all parts for any cracks or damage, then clean the whole engine carefully with steam so that the disassembly work can be carried out swiftly.
  1) Before washing, remove starting motor assembly (1), alternator assembly (2), and electric wiring.
  2) Cover all the openings of the engine with tape.
  3) Using a washing machine, clean engine.
     ★ Wash with particular care all mating surfaces where mud tands to collect.



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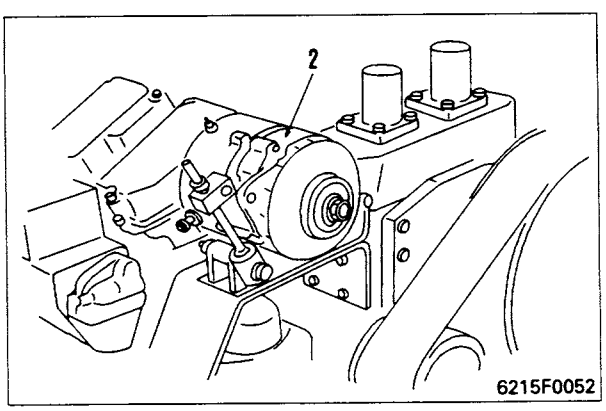

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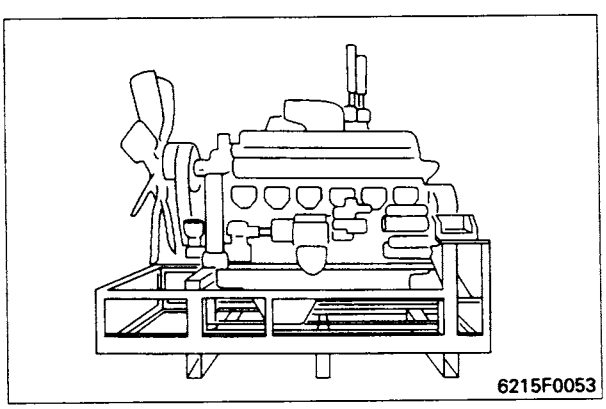
2. Setting engine stand

- Prepare a stable engine stand that will prevent the engine from falling over, then set the engine assembly on the stand and secure it in position.

kg Engine assembly: Approx. 3,200 kg
(The weight differs according to the machine mounting the engine.)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3. Engine cooling water and engine oil

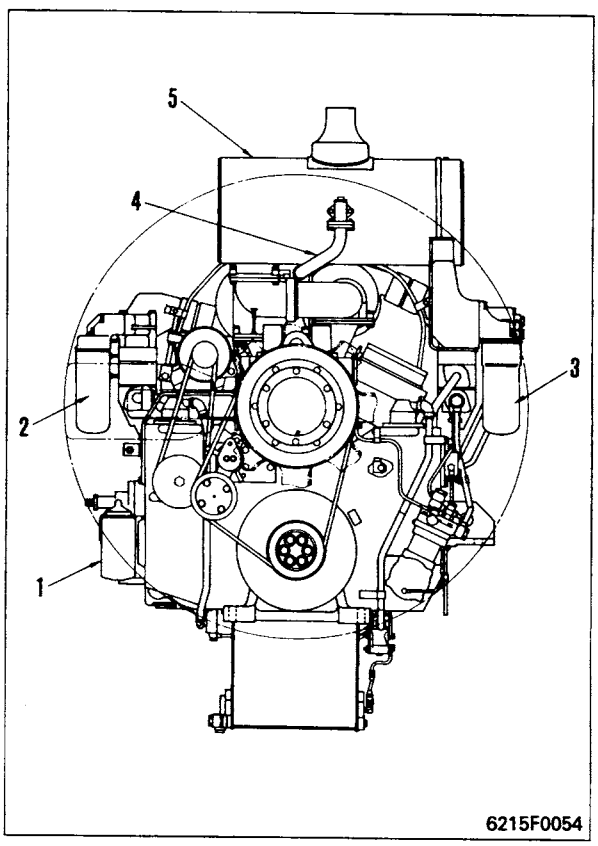
Drain engine cooling water and engine oil.

Engine oil: Approx. 90 ℓ

(The amount of oil differs according to the machine model.)

4. Filter

- Engine equipped with filters
  1) Using filter wrench, remove corrosion resistor (1), oil filter (2), and fuel filter (3).
  2) Remove bypass filter.



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5. Muffler assembly

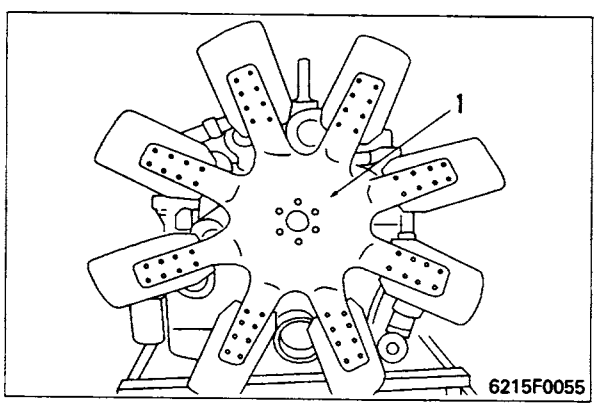
- Engine equipped with muffler
  1) Disconnect komaclone tube (4), then remove muffler assembly (5) and muffler bracket.

6. Fan

1) Using nylon sling, sling fan, then remove mounting bolts.
2) Remove fan (1).

kg Fan: 75 kg

(The weight differs according to the machine model.)

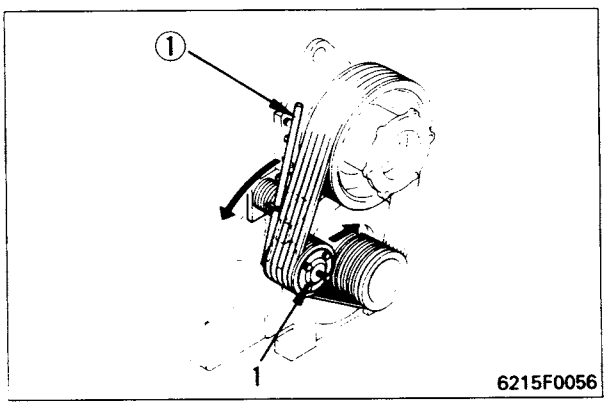


7. Fan belt

1) Insert bar ① (length: approx. 50 cm [19.685 in]) in hole (ϕ 18 mm [0.7087 in]) of tension pulley bracket, then pull it forward to loosen spring tension, and remove fan belt.

⚠ Insert the bar securely and make sure that it does not come out.

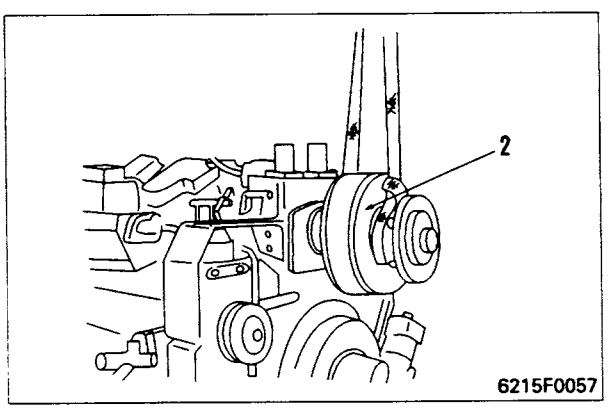
2) Remove tension pulley assembly (1) together with bracket.



8. Fan pulley assembly

1) Using nylon sling, sling fan pulley assembly, and remove mounting bolts.
2) Remove fan pulley assembly (2).

kg Fan pulley assembly: 85 kg



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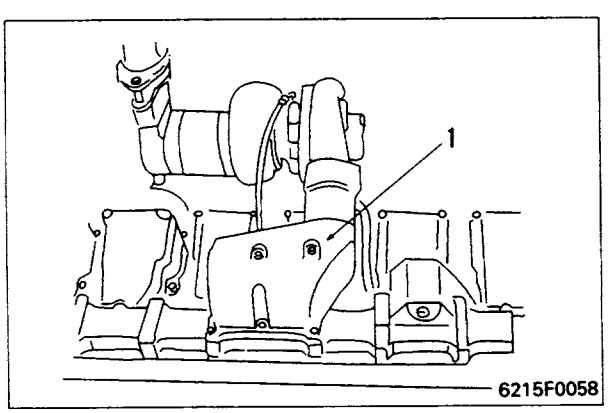
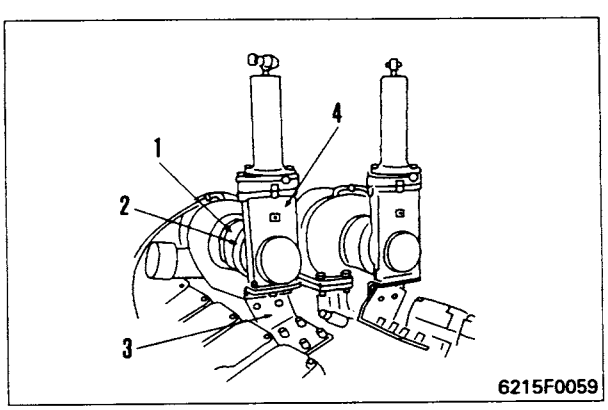
9. Intake connector

Remove intake connector (1).



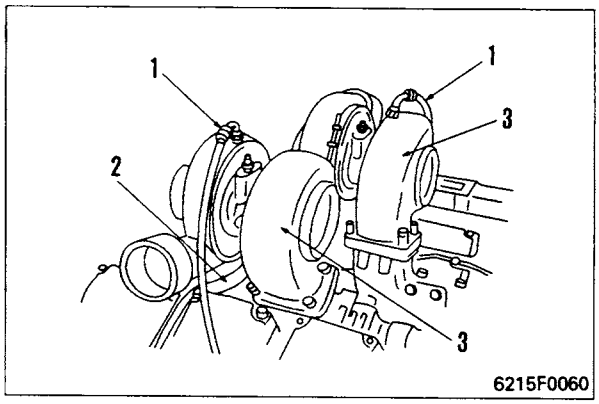
10. Exhaust brake assembly

1) Disconnect clamp (2) of exhaust connector (1).
2) Remove exhaust brake assembly (4) together with bracket (3).



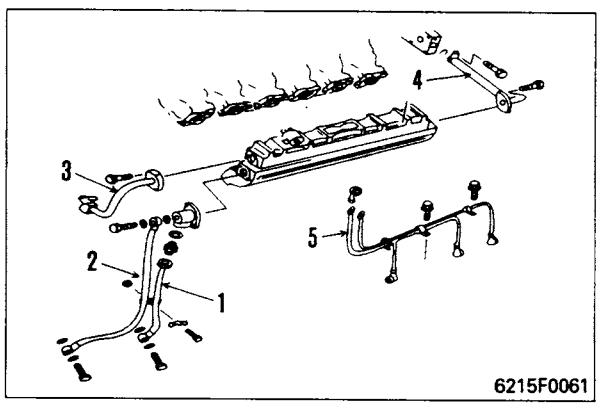
11. Turbocharger assembly

1) Disconnect turbocharger oil supply tube (1) and drain tube (2).
2) Remove turbocharger assembly (3).
   ★ Remove the turbocharger oil supply tube and the drain tube after removing the intake manifold.

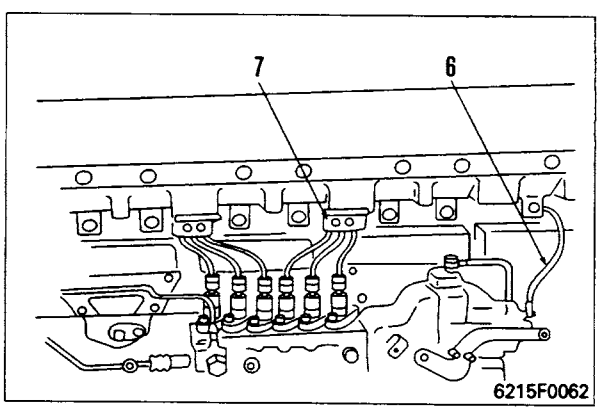


12. Intake manifold, aftercooler assembly

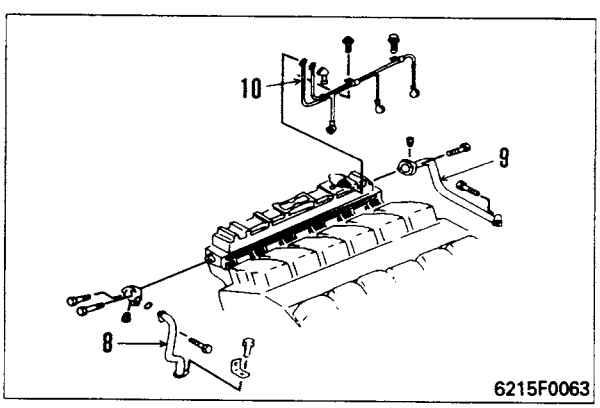
- Left bank
  1) Disconnect tubes (1) and (2) for air compressor.
  2) Remove tubes (3) and (4) for aftercooler.
  3) Remove heater relay wiring (5).



  4) Remove boost compensator tube (6).
  5) Remove clamp (7) of fuel injection tube.



- Right bank
  1) Remove tubes (8) and (9) for aftercooler.
  2) Remove wiring (10) of electrical intake air heater.



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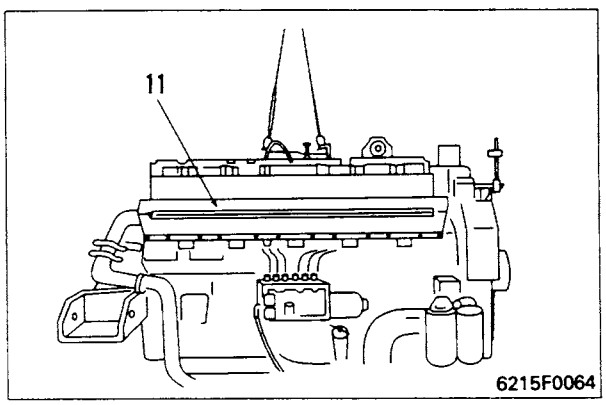
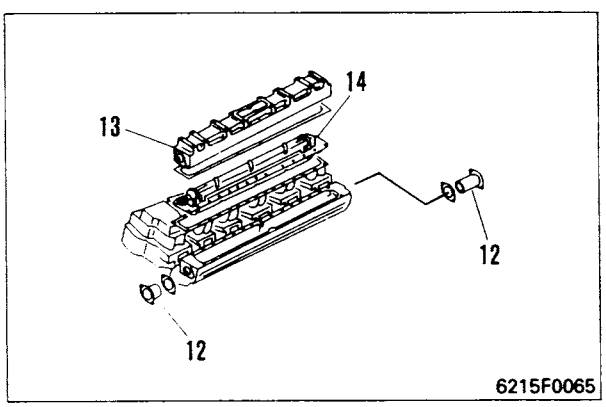
3) Sling intake manifold and aftercooler assembly (11), and remove mounting bolts.
   ★ To prevent the electrical intake air heater from falling off, install a guide bar in the mounting bolt hole of the intake manifold below.
4) Remove intake manifold and aftercooler assembly.

kg Intake manifold, aftercooler assembly: 50 kg



- Remove the aftercooler core as follows.
  i) Remove connector (12).
  ii) Remove cover (13).
  iii) Remove aftercooler core (14).



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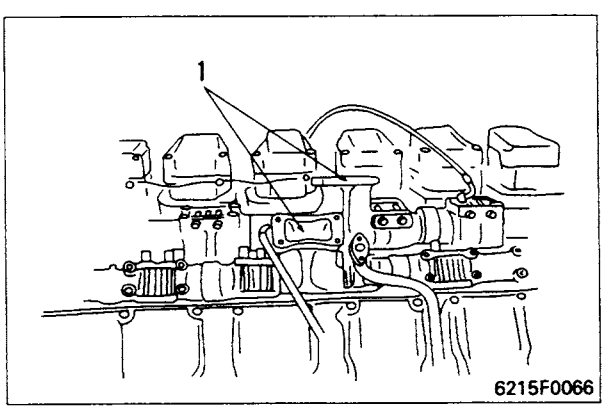
13. Exhaust manifold assembly

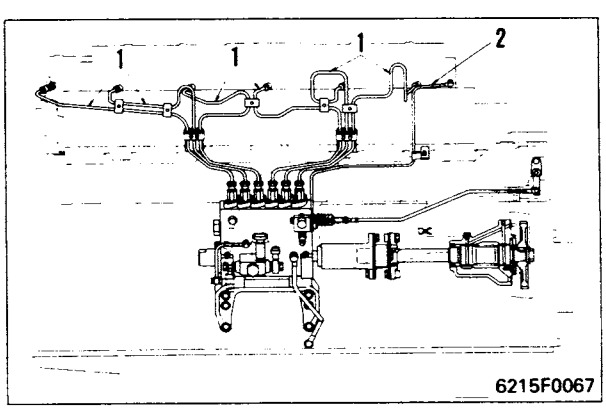
Remove exhaust manifold assembly (1).

kg Exhaust manifold assembly: 30 kg



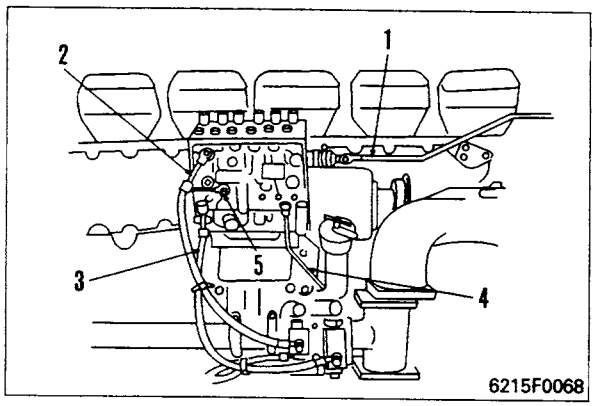
14. Fuel injection pipe, spill tube

1) Remove cover of injection pump drive shaft.
2) Remove fuel injection pipe (1).
3) Remove spill tube (2).
   ★ Install a protective cover to prevent any dirt or dust from getting into the discharge port of the injection pump or the inlet port of the nozzle connector.



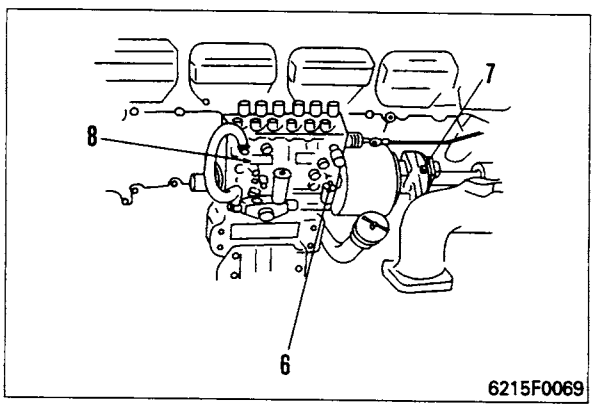
15. Fuel injection pump assembly

1) Remove governor rod (1).
2) Disconnect fuel hoses (2) and (3).
3) Remove oil supply tubes (4) and (5).

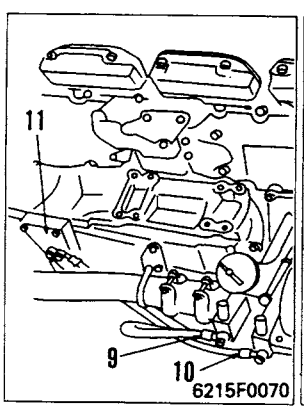


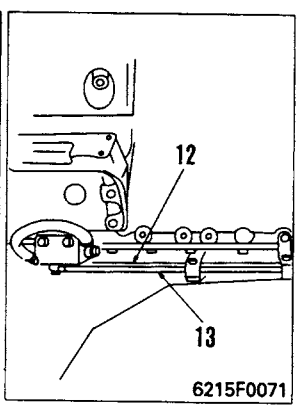
4) Remove 4 bolts (6), then loosen coupling bolt (7), and remove injection pump assembly (8).
   - ★ For the right bank injection pump assembly, disconnect the coupling, loosen 4 mounting bolts holding the injection pump bracket, pull out the injection pump and bracket at an angle as one unit, then remove the mounting bolts.
   - ★ Use tape to prevent the coupling key from being lost.

   kg Fuel injection pump assembly: 38 kg



5) Disconnect fuel hoses (9) and (10).
6) Remove bracket (11).
7) Remove clamp, then remove tubes (12) and (13).





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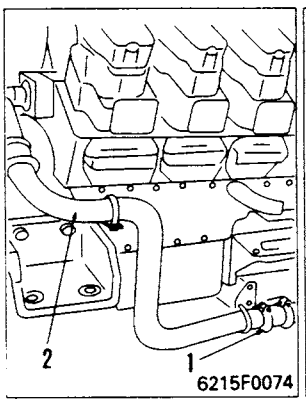
16. Water pump assembly

1) Disconnect 2 U-clamps and master joint (1), then remove bypass tube (2).
2) Remove bypass tube (3).
3) Remove tube (4).



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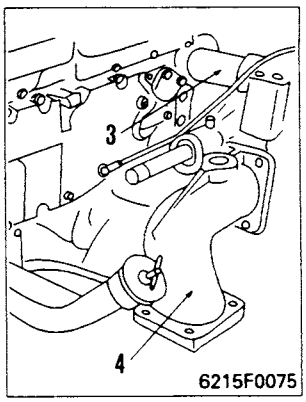

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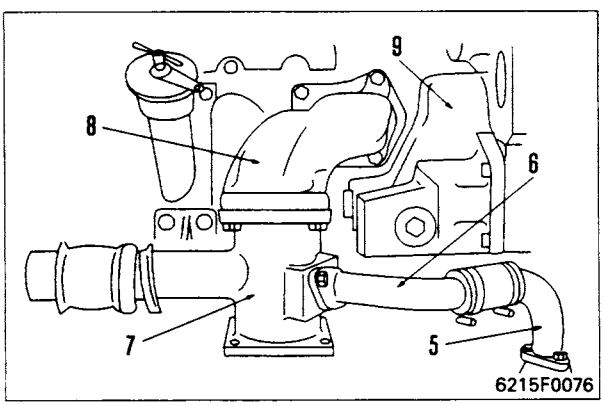
4) Remove tubes (5), (6), and (7) as a set.
5) Remove tube (8).
6) Remove bolts, then remove water pump assembly (9).
   ★ The water pump is held by two mounting bolts at the front and two mounting bolts at the rear.



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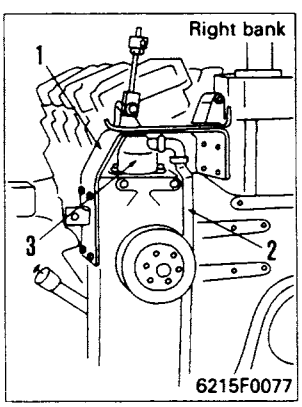
17. Breather

1) Remove alternator bracket (1).
   ★ The alternator bracket is on the right bank only.
2) Remove clamp, then remove tube (2).
3) Remove breather (3).



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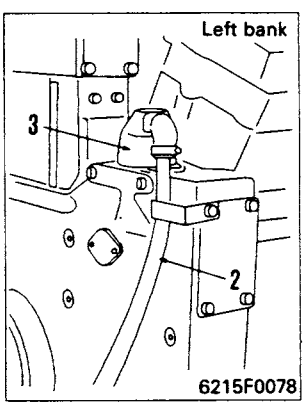

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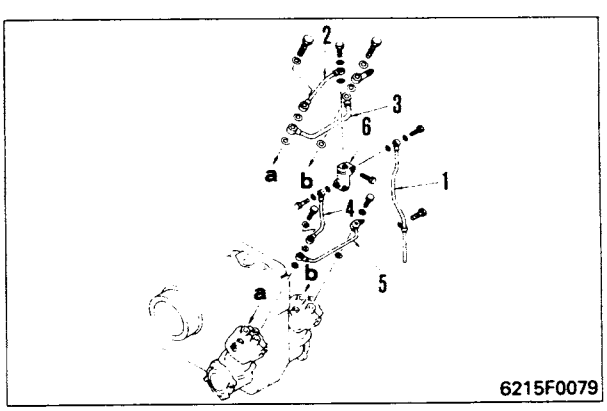
18. Air compressor

- Engine installed with air compressor.

1) Remove tubes (1), (2), (3), (4), and (5).
2) Remove unloader valve (6).



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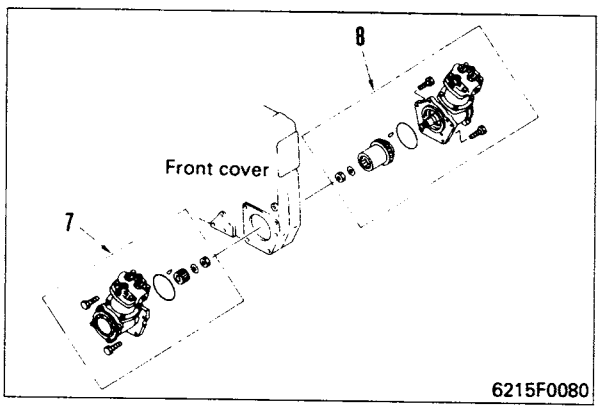
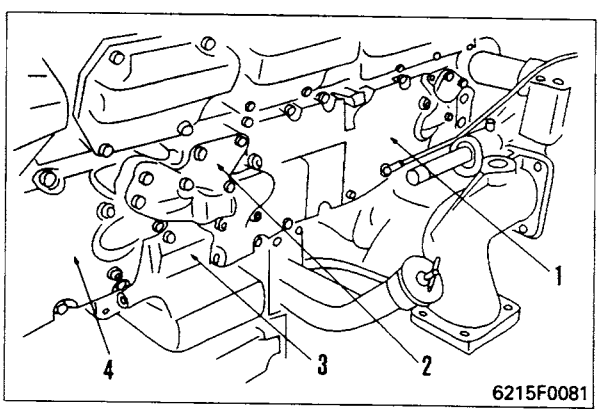
3) Remove front compressor (7).
   ★ With spline shaft
4) Remove rear compressor (8).
   ★ With gear



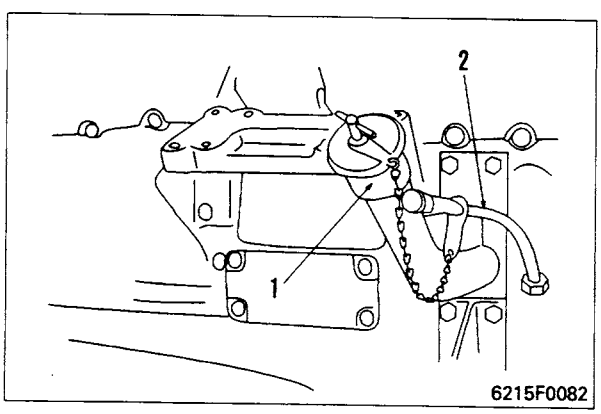
19. Oil cooler assembly

1) Remove front oil cooler assembly (1).
2) Remove manifolds (2) and (3).
3) Remove rear oil cooler assembly (4).



20. Oil filler, oil level gauge

1) Remove bracket, then oil filler (1).
2) Remove oil level gauge guide (2).
   ★ Loosen the nut at the root of the level guide, then remove the guide.



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