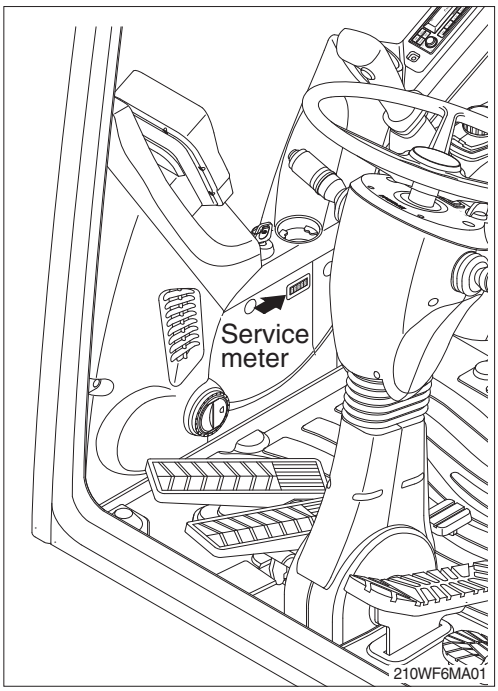
1. INSTRUCTION

1) INTERVAL OF MAINTENANCE

(1) You may inspect and service the machine by the period as described at page 6-11 based on hour meter at control panel.

(2) Shorten the interval of inspect and service depending on site condition. (such as dusty area, quarry, sea shore and etc.)

(3) Practice the entire related details at the same time when the service interval is doubled.
For example, in case of 100hours, carry out all the maintenance 「Each 100hours, each 50 hours and daily service」 at the same time.



PRECAUTION

2) (1) Start to maintenance after you have the full knowledge of machine.

(2) The monitor installed on this machine does not entirely guarantee the condition of the machine.
Daily inspection should be performed according to clause 4, maintenance check list.

(3) Engine and hydraulic components have been preset in the factory.
Do not allow unauthorized personnel to reset them.

(4) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.

⚠ **Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.**

△ **Accumulated grease and oil on the machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours.**

△ **Inspect the engine compartment for any trash build up. Remove any trash build up from the engine compartment.**

(5) Ask to your local dealer or HD Hyundai Construction Equipment for the maintenance advice if unknown.

3) PROPER MAINTENANCE

(1) Replace and repair of parts

It is required to replace the wearable and consumable parts such as bucket tooth, side cutter, filter and etc., regularly.

Replace damaged or worn parts at proper time to keep the performance of machine.

(2) Use genuine parts.

(3) Use the recommended oil.

(4) Remove the dust or water around the inlet of oil tank before supplying oil.

(5) Drain oil when the temperature of oil is warm.

(6) Do not repair anything while operating the engine.

Stop the engine when you fill the oil.

(7) Relieve hydraulic system of the pressure before repairing the hydraulic system.

(8) Confirm if the cluster is in the normal condition after completion of service.

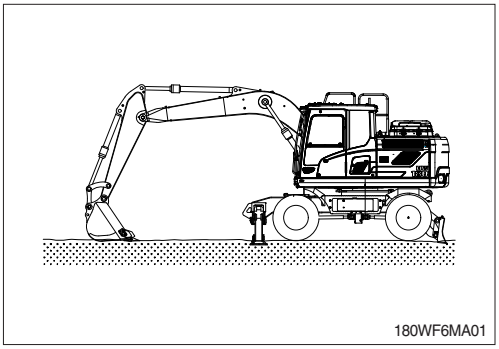
(9) For more detail information of maintenance, please contact local HD Hyundai Construction Equipment dealer.

※ **Be sure to start the maintenance after fully understand the chapter 1, safety hints.**

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

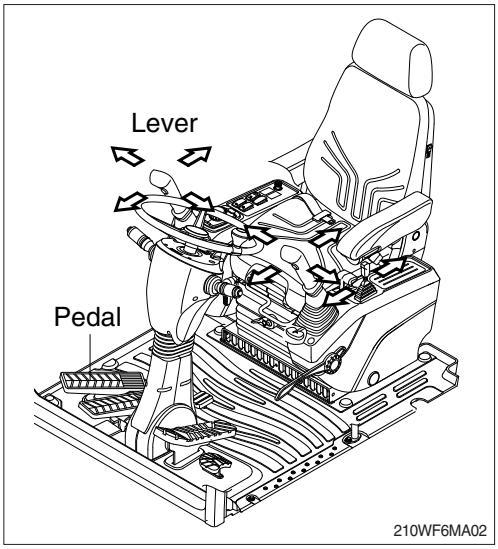
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

(1) Place machine in parking position, and stop the engine.

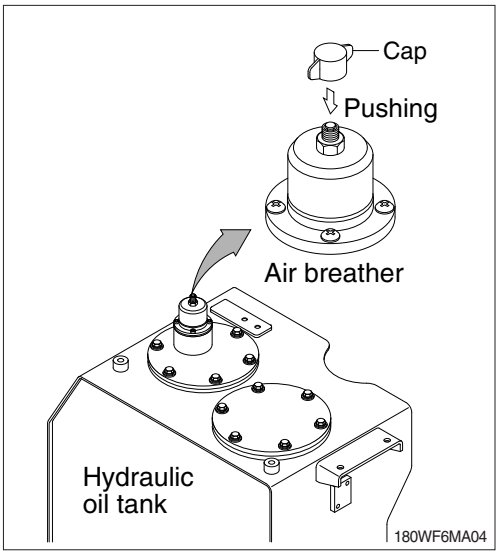


(2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

※ **This does not completely release the pressure, so when serving hydraulic component, loosen the connections slowly and do not stand in the direction where the oil spurt out.**



(3) Loosen the cap and relieve the pressure in the tank by pushing the top of the air breather.



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

(1) Be particularly careful that the joint of hose, pipe and functioning item are not damaged. Avoid contamination.

(2) Assemble after cleaning the hose, pipe and joint of functioning item.

(3) Use genuine parts.

(4) Do not assemble the hose in the condition of twisted or sharp radius.

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

(1) It is desirable to do periodic maintenance the machine for using the machine safely for a long time.
However, recommend to replace regularly the parts related safety not only safety but maintain satisfied performance.

(2) These parts can cause the disaster of life and material as the quality changes by passing time and it is worn, diluted, and gets fatigued by using repeatedly.
These are the parts which the operator can not judge the remained lifetime of them by visual inspection.

(3) Repair or replace if an abnormality of these parts is found even before the recommended replacement interval.

Periodical replacement of safety parts			Interval
Engine		Fuel hose (tank-engine)	Every 2 years
		Heater hose (heater-engine)	
Hydraulic system	Main circuit	Pump suction hose	Every 2 years
		Pump delivery hose	
		Swing hose	
	Working device	Boom cylinder line hose	Every 2 years
		Arm cylinder line hose	
		Bucket cylinder line hose	
	Brake line	Service brake line hose	Every 2 years
		Parking brake line hose	
		Steering line hose	

※1. Replace O-ring and gasket at the same
2. time when replacing the hose.
Replace clamp at the same time if the hose clamp is cracked when checking and replacing the hose.

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

Bolt size	8.8T		10.9T		12.9T	
	kgf · m	lbf · ft	kgf · m	lbf · ft	kgf · m	lbf · ft
M 6×1.0	0.8 ~ 1.2	5.8 ~ 8.6	1.2 ~ 1.8	8.7 ~ 13.0	1.5 ~ 2.1	10.9 ~ 15.1
M 8×1.25	2.0 ~ 3.0	14.5 ~ 21.6	2.8 ~ 4.2	20.3 ~ 30.4	3.4 ~ 5.0	24.6 ~ 36.1
M10×1.5	4.0 ~ 6.0	29.0 ~ 43.3	5.6 ~ 8.4	40.5 ~ 60.8	6.8 ~ 10.0	49.2 ~ 72.3
M12×1.75	6.8 ~ 10.2	50.0 ~ 73.7	9.6 ~ 14.4	69.5 ~ 104	12.3 ~ 16.5	89.0 ~ 119
M14×2.0	10.9 ~ 16.3	78.9 ~ 117	16.3 ~ 21.9	118 ~ 158	19.5 ~ 26.3	141 ~ 190
M16×2.0	17.9 ~ 24.1	130 ~ 174	25.1 ~ 33.9	182 ~ 245	30.2 ~ 40.8	141 ~ 295
M18×2.5	24.8 ~ 33.4	180 ~ 241	34.8 ~ 47.0	252 ~ 340	41.8 ~ 56.4	302 ~ 407
M20×2.5	34.9 ~ 47.1	253 ~ 340	49.1 ~ 66.3	355 ~ 479	58.9 ~ 79.5	426 ~ 575
M22×2.5	46.8 ~ 63.2	339 ~ 457	65.8 ~ 88.8	476 ~ 642	78.9 ~ 106	570 ~ 766
M24×3.0	60.2 ~ 81.4	436 ~ 588	84.6 ~ 114	612 ~ 824	102 ~ 137	738 ~ 991
M30×3.5	120 ~161	868 ~ 1164	168 ~ 227	1216 ~ 1641	202 ~ 272	1461 ~ 1967

(2) Fine thread

Bolt size	8.8T		10.9T		12.9T	
	kgf · m	lbf · ft	kgf · m	lbf · ft	kgf · m	lbf · ft
M 8×1.0	2.1 ~ 3.1	15.2 ~ 22.4	3.0 ~ 4.4	21.7 ~ 31.8	3.6 ~ 5.4	26.1 ~ 39.0
M10×1.25	4.2 ~ 6.2	30.4 ~ 44.9	5.9 ~ 8.7	42.7 ~ 62.9	7.0 ~ 10.4	50.1 ~ 75.2
M12×1.25	7.3 ~ 10.9	52.8 ~ 78.8	10.3 ~ 15.3	74.5 ~ 110	13.1 ~ 17.7	94.8 ~ 128
M14×1.5	12.4 ~ 16.6	89.7 ~ 120	17.4 ~ 23.4	126 ~ 169	20.8 ~ 28.0	151 ~ 202
M16×1.5	18.7 ~ 25.3	136 ~ 182	26.3 ~ 35.5	191 ~ 256	31.6 ~ 42.6	229 ~ 308
M18×1.5	27.1 ~ 36.5	196 ~ 264	38.0 ~ 51.4	275 ~ 371	45.7 ~ 61.7	331 ~ 446
M20×1.5	37.7 ~ 50.9	273 ~ 368	53.1 ~ 71.7	384 ~ 518	63.6 ~ 86.0	460 ~ 622
M22×1.5	51.2 ~ 69.2	370 ~ 500	72.0 ~ 97.2	521 ~ 703	86.4 ~ 116	625 ~ 839
M24×2.0	64.1 ~ 86.5	464 ~ 625	90.1 ~ 121	652 ~ 875	108 ~ 146	782 ~ 1056
M30×2.0	129 ~ 174	933 ~ 1258	181 ~ 245	1310 ~ 1772	217 ~ 294	1570 ~ 2126

2) PIPE AND HOSE (FLARE type)

Thread size (PF)	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

3) PIPE AND HOSE (ORFS type)

Thread size (UNF)	Width across flat (mm)	kgf · m	lbf · ft
9/16-18	19	4	28.9
11/16-16	22	5	36.2
13/16-16	27	9.5	68.7
1-3/16-12	36	18	130
1-7/16-12	41	21	152
1-11/16-12	50	35	253

4) FITTING

Thread size	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

4) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (bracket-frame, FR)	M20 × 2.5	52.1±5.0	377±36.2
2		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90±9.0	651±65.1
3		Engine mounting bolt (engine-bracket)	M12 × 1.75	11.5±1.0	83.2±7.2
4		Radiator mounting bolt, nut	M16 × 2.0	29.7±4.5	215±32.5
5		Fuel tank mounting bolt	M20 × 2.5	57.9±5.8	419±42.0
6		Coupling mounting socket bolt	M18 × 2.5	32.0±1.0	231±7.2
7	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	4.8±0.3	34.7±2.2
8		Main pump mounting socket bolt	M16 × 2.0	25.0±2.5	181±18.1
9		Main control valve mounting bolt	M12 × 1.75	12.2±1.3	88.2±9.4
10		Travel motor mounting socket bolt	M16 × 2.0	29.6±3.2	214±23.1
11		Hydraulic oil tank mounting bolt	M20 × 2.5	57.9±5.8	419±42.0
12		Turning joint mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
13	Power train system	Swing motor mounting bolt	M16 × 2.0	29.6±3.2	214±23.1
14		Swing bearing upper mounting bolt	M18 × 2.5	57.9±6.0	419±43.4
15		Swing bearing lower mounting bolt	M16 × 1.5	57.9±6.0	419±43.4
16		Real axle mounting bolt, nut	M20 × 2.5	58±6.3	419±45.5
17		Transmission bracket mounting bolt	M20 × 2.5	58±6.3	419±45.5
18		Transmission mounting bolt	M20 × 2.5	58±6.3	419±45.5
19		Oscillating cylinder mounting bolt	M22 × 1.5	83.2±9.2	602±66.5
20		Oscillating cylinder support mounting bolt	M16 × 2.0	29.6±3.2	214±23.1
21		Wheel nut	M22 × 1.5	60^{+0}_{-5}	$433^{+0}_{-36.2}$
22		Front drive shaft mounting bolt, nut	M10 × 1.0	5.9±0.6	42.7±4.3
23		Rear drive shaft mounting bolt, nut	M10 × 1.0	5.9±0.6	42.7±4.3
24	Others	Counterweight mounting bolt	M30 × 3.0	199±30	1439±217
25		Cab mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
26		Operator's seat mounting bolt	M 8 × 1.25	4.05±0.8	29.3±5.8

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil (API CJ-4, ACEA-E9)	SAE 10W-30, ★SAE 5W-40
DEF/AdBlue®	ISO 22241 (32.5% high-purity urea and 67.5% deionized water)
Hydraulic oil	HD Hyundai Construction Equipment genuine long life (ISO VG 32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★) HD Hyundai Construction Equipment Bio Hydraulic Oil (HBHO, ISO VG 46)
Swing reduction gear oil	SAE 80W-90 (GL-4/GL-5)
Transmission oil	SAE 10W-30 (API CF-4)
Axle oil	SAE 85W-90 LSD-Additive(API GL-5) or UTTO
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, ★1 Ultra low sulfur diesel
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 50% water.★

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Material
UTTO : Universal Tractor Transmission Oil
DEF : Diesel Exhaust Fluid
DEF compatible with AdBlue®

★1 : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★ : Cold region
Russia, CIS, Mongolia

2) RECOMMENDED OILS

HD Hyundai Construction Equipment genuine lubricating oils have been developed to offer the best performance and service life for your equipment. These oils have been tested according to the specifications of HD Hyundai Construction Equipment and, therefore, will meet the highest safety and quality requirements.

We recommend that you use only HD Hyundai Construction Equipment genuine lubricating oils and grease officially approved by HD Hyundai Construction Equipment.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature ˚C(˚F)
			-50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	23.7 (6.3)	★SAE 5W-40 SAE 30 SAE 10W
Transmission case	Engine oil	2.5 (0.7)	SAE 10W-30 SAE 15W-40
DEF/ AdBlue® tank	Mixture of urea and deionized water	27.0 (7.1)	ISO 22241, High-purity urea + deionized water (32.5:67.5)
Swing drive	Gear oil	See page 6-37	★SAE 75W-90 SAE 80W-90
Front axle	Gear oil	Center : 10.5 (2.8) Hub : 2.5×2 (0.7×2)	SAE 85W-90 LSD or UTTO
Rear axle	Gear oil	Center : 12.5 (3.3) Hub : 2.5×2 (0.7×2)	
Front wide axle	Gear oil	Center : 11.6 (3.06) Hub : 2.5×2 (0.7×2)	SAE 85W-90 LSD or UTTO
Rear wid axle	Gear oil	Center : 14.0 (3.70) Hub : 2.5×2 (0.7×2)	
Hydraulic tank	Hydraulic oil	Tank: 125 (33.0) System: 270 (71.3)	★ISO VG 15 ISO VG 32 ISO VG 46, HBHO VG 46★3 ISO VG 68
Fuel tank	Diesel fuel★1	290 (76.6)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (Grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (Reservoir tank)	Mixture of antifreeze and soft water★2	19.5 (5.2)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Materia
UTTO : Universal Tractor Transmission Oil
DEF : Diesel Exhaust Fluid, DEF compatible with AdBlue®

★1 : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★2 : Soft water
City water or distilled water

★3 : HD Hyundai Construction Equipment Bio Hydraulic Oil

★ : Cold region (Russia, CIS, Mongolia)

※ Using any lubricating oils other than HD Hyundai Construction Equipment genuine products may lead to a deterioration of performance and cause damage to major components.

※ Do not mix HD Hyundai Construction Equipment genuine oil with any other lubricating oil as it may result in damage to the systems of major components.

※ Do not use any engine oil other than that specified above, as it may clog the diesel particulate filter(DPF).

※ For HD Hyundai Construction Equipment genuine lubricating oils and grease for use in regions with extremely low temperatures, please contact HD Hyundai Construction Equipment dealers.

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-27
Hydraulic oil level	Check, Add	6-34
Engine oil level	Check, Add	6-18
Coolant level	Check, Add	6-20
Control panel & pilot lamp	Check, Clean	6-48
Prefilter (water, element)	Check, Drain, Clean	6-27
Fan belt tension & damage	Check, Adjust	6-24
DEF/AdBlue® tank	Check, Add	6-31
★ Attachment pin and bushing	Lubricate	6-47
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		

★ **Lubricate every 10 hours or daily for initial 50 hours.**

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-27
Swing reduction gear oil	Check, Add	6-37
Drive shaft grease (flange bearing)	Check, Add	6-38
Wheel nuts	Check, Tighten	6-40
Tires (air pressure)	Check, Inflate	6-40
Front axle pivot pin bushing	Check, Lubricate	6-39
Lubricate pin and bushing	Lubricate	6-47
· Bucket cylinder rod end		
· Arm + Bucket connecting		
· Arm + Bucket control link		
· Bucket control rod		
· Bucket link connecting		
· Dozer blade cylinder (rod end, tube end)		6-39
· Dozer blade pivot pin		6-39
· Outrigger (pivot pin, cylinder pin)		6-39

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Bolts & Nuts · Power train mounting bolts · Swing motor mounting bolts · Swing bearing mounting bolts · Engine mounting bolts · Counterweight mounting bolts · Turning joint locating bolts · Hydraulic pump mounting bolts	Check, Tight	6-8

※Service the above items only for the new machine, and thereafter keep the normal service interval.

4) EVERY 100 HOURS SERVICE

Check items	Service	Page
Front axle steering case grease	Add, Lubricate	6-39

5) EVERY 200 HOURS SERVICE

Check items	Service	Page
★ Return filter	Replace	6-35
★ Pilot line filter	Replace	6-36
★ Drain filter cartridge	Replace	6-36

★ Replace 3 filters for continuous hydraulic breaker operation only.

6) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-18, 19
Engine oil filter	Replace	6-18, 19
Prefilter (water, element)	Replace	6-27
Fuel filter element	Replace	6-28
Transmission case	Change	6-43
Swing reduction gear case	Change	6-37
Swing reduction gear grease	Check, Add	6-37
Pilot line filter element	Replace	6-36
Hydraulic oil return filter	Replace	6-35
Drain filter cartridge	Replace	6-36
Pressure filter element	Replace	6-35

※ Service the above items only for the new machine, and thereafter keep the normal service interval.

7) EVERY 250 HOURS SERVICE

Check items	Service	Page
Battery (voltage)	Check	6-48
Swing bearing grease	Lubricate	6-37
Aircon & heater fresh air filter	Check, Clean	6-51
Front & rear axle differential gear oil	Add, Lubricate	6-41
Axle planetary gear oil (front, rear)	Add, Lubricate	6-41
Bolts & Nuts	Check, Tight	6-8
· Power train mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Hydraulic pump mounting bolts		
Attachment pin and bushing	Lubricate	6-47
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		

8) INITIAL 500 HOURS SERVICE

Check items	Service	Page
Front & rear axle differential gear oil	Change	6-42
Axle planetary gear oil (front, rear)	Change	6-42

※ Service the above items only for the new machine, and thereafter keep the normal service interval.

9) EVERY 500 HOURS SERVICE

Check items	Service	Page
★ Engine oil	Change	6-18, 19
★ Engine oil filter	Replace	6-18, 19
Prefilter	Change	6-27
Air con & heater filter (outer, inner)	Change	6-51
Air cleaner element (primary)	Check, Clean	6-26
Radiator, oil cooler and charge air cooler	Check, Clean	6-23
Fuel filter element	Replace	6-28

★ Use ultra low sulfur fuel only. Ultra low sulfur fuel : Sulfur content ≤ 15 ppm.

10) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Swing reduction gear oil	Change	6-37
Swing reduction gear grease	Check, Add	6-37
Swing gear & pinion	Change	6-38
Transmission oil	Change	6-43
Hydraulic oil return filter	Replace	6-35
Drain filter cartridge	Replace	6-36
Air breather element	Replace	6-36
Pilot line filter	Replace	6-36
Pressure filter element	Replace	6-35

11) EVERY 1500 HOURS SERVICE

Check items	Service	Page
Front & rear axle differential gear oil	Change	6-42
Axle planetary gear oil (front, rear)	Change	6-42

12) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant★1	Change	6-20, 21, 22, 23
Hydraulic oil★1	Change	6-34-1
HBHO★2	Change	6-34-1
Hydraulic tank suction strainer	Check, Clean	6-35
Air cleaner element (safety, primary)★3	Replace	6-26
Crankcase breather filter	Replace	6-29
RCV lever	Check, Lubricate	6-38
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Replace	-

★1 Conventional

★2 If do not want to change HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil, ISO VG 46) every 2000 hours, contact HD Hyundai Construction Equipment dealer and ask about SAMPLING.

★3 When working in dusty environments, more frequent replacing is highly recommended.

※ Change oil every 600 hours of continuous hydraulic breaker operation.

13) EVERY 4000 HOURS SERVICE

Check items	Service	Page
DEF/AdBlue® tank filter	Replace	6-31-1

14) EVERY 4500 HOURS SERVICE

Check items	Service	Page
DEF/AdBlue® supply module filter	Replace	6-32

15) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil*4	Change	6-34-1

*4 HD Hyundai Construction Equipment genuine long life

※ **Change hydraulic oil every 1000 hours of continuous hydraulic breaker operation.**

16) EVERY 6000 HOURS SERVICE

Check items	Service	Page
Coolant*4	Change	6-20, 21, 22, 23

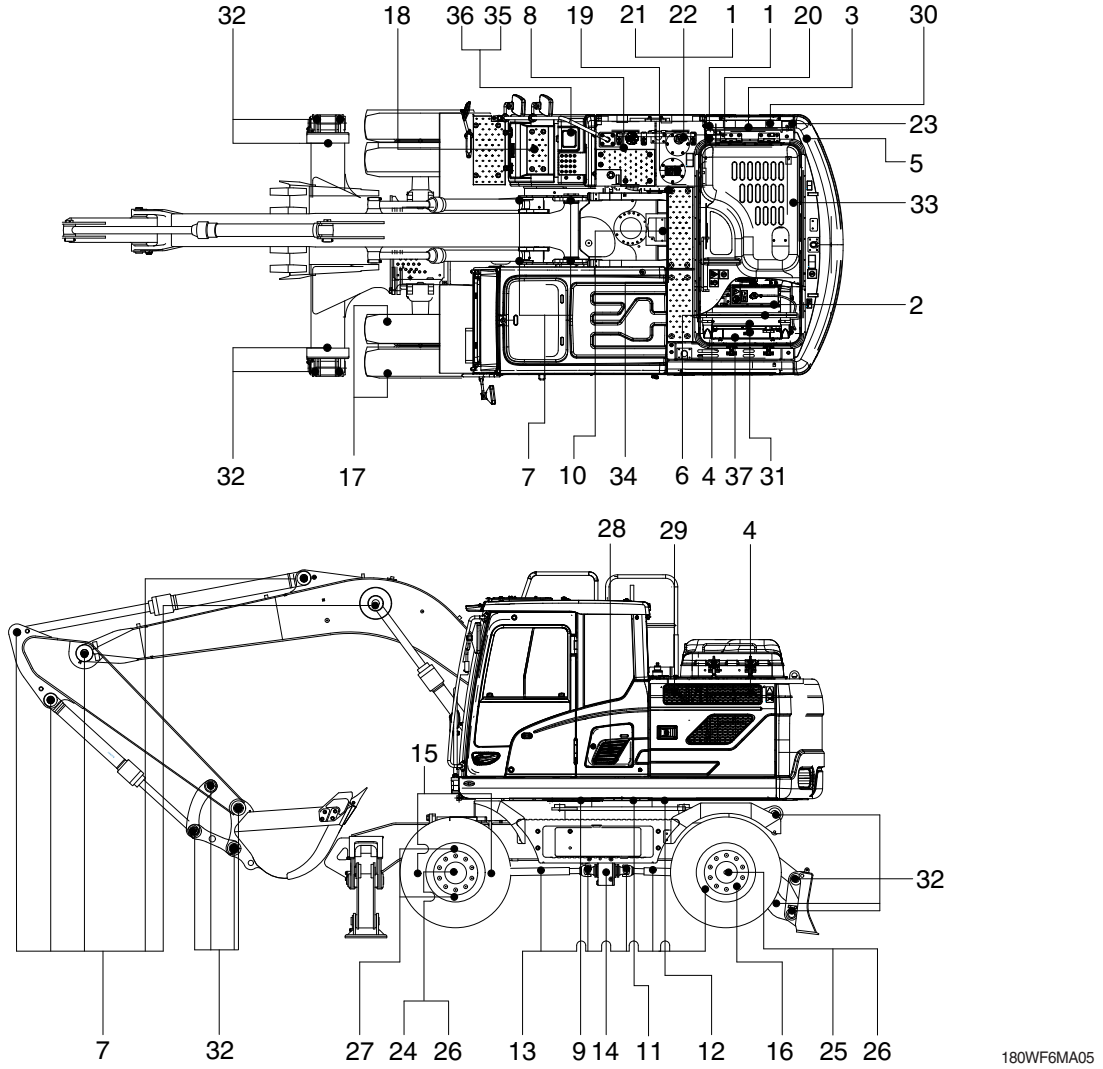
*4 HD Hyundai Construction Equipment genuine long life

17) WHEN REQUIRED

Whenever you have trouble in the machine, you must perform the service of related items, system by system.

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-27
· Prefilter	Clean or Replace	6-27
· Fuel filter element	Replace	6-28
Engine exhaust sysem		
· DEF/AdBlue® supply module filter	Replace	6-32
· DEF/AdBlue® tank	Clean	6-31
Engine lubrication system		
· Engine oil	Change	6-18, 19
· Engine oil filter	Replace	6-18, 19
Engine cooling system		
· Coolant	Add or Change	6-20, 21, 22, 23
· Radiator	Clean or Flush	6-20, 21, 22, 23
· Charge air cooler	Check	6-23
Engine air system		
· Air cleaner element (primary)	Clean, Replace	6-26
· Air cleaner element (safety)	Replace	6-26
Hydraulic system		
· Hydraulic oil	Add or Change	6-34, 34-1
· Return filter	Replace	6-35
· Drain filter cartridge	Replace	6-36
· Pilot line filter	Replace	6-36
· Air breather element	Replace	6-36
· Suction strainer	Clean	6-35
· Tire pressure	Check, Inflate	6-40
Bucket		
· Bucket assy	Replace	6-44
· Tooth	Replace	6-45
· Side cutter	Replace	6-45
· Linkage	Adjust	6-46
Air conditioner and heater		
· Fresh filter	Clean, Replace	6-51
· Recirculation filter	Clean, Replace	6-51, 52

5. MAINTENANCE CHART



Caution

1. Service intervals are based on the hour meter reading.
2. The number of each item shows the lubrication point on the machine.
3. Stop engine while filling oil, and use no open flames.
4. For other details, refer to the service manual.

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
10 Hours or daily	1	Hydraulic oil level	Check, Add	HO	125 (33.0)	1
	2	Engine oil level	Check, Add	EO	23.7 (6.3)	1
	4	Radiator coolant level	Check, Add	C	19.5 (5.2)	1
	5	Prefilter (water, element)	Check, Clean	-	-	1
	6	Fan belt tension & damage	Check, Clean	-	-	1
	35	DEF/AdBlue® tank	Check, Add	DEF	27 (7.1)	1
50 Hours or weekly	8	Fuel tank (water, sediment)	Check, Drain, Clean	DF	260 (68.7)	1
	10	Swing reduction gear case	Check, Add	GO	See page 6-37	1
	13	Drive shaft grease (flange bearing)	Check, Add	PGL	-	6
	15	Front axle pivot pin bushing	Check, Add	PGL	-	2
	16	Wheel nuts	Check, Tighten	-	-	40
	17	Tire (air pressure)	Check, Add	-	-	8
	32	Bucket linkage & blade pins	Check, Add	PGL	-	12
100 Hours	27	Front axle steering case	Add, Lubricate	PGL	-	4

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
250 Hours	7	Attachment pins	Check, Add	PGL	-	11
	9	Swing bearing grease	Check, Add	PGL	-	3
	18	Battery (voltage)	Check	-	-	1
	24	Front axle differential gear case	Add, Lubricate	GO	10.5 (2.77)	1
	25	Rear axle differential gear case	Add, Lubricate	GO	12.5 (3.30)	1
	26	Axle planetary gear case (front, rear)	Add, Lubricate	GO	2.5 (0.66)	4
Initial 250 Hours	2	Engine oil	Change	EO	23.7 (6.3)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (water, element)	Replace	-	-	1
	10	Swing reduction gear case	Change	GO	See page 6-37	1
	11	Swing reduction gear grease	Check	PGL	See page 6-37	1
	14	Transmission case	Change	EO	2.5 (0.8)	1
	19	Hydraulic oil return filter	Replace	-	-	1
	20	Drain filter cartridge	Replace	-	-	1
	23	Pilot line filter element	Replace	-	-	1
	30	Fuel filter element	Replace	-	-	1
	37	Pressure filter element	Replace	-	-	1
500 Hours	2	Engine oil	Change	EO	23.7 (6.3)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (water, element)	Replace	-	-	1
	28	Aircon & heater filter(outer, inner)	Replace	-	-	1
	29	Air cleaner element (primary)	Check, Clean	-	-	1
	30	Fuel filter element	Replace	-	-	1
	31	Radiator, oil cooler, charge air cooler	Clean	-	-	3
Initial 500 Hours	24	Front axle differential gear case	Change	GO	10.5 (2.77)	1
	25	Rear axle differential gear case	Change	GO	12.5 (3.30)	1
	26	Axle planetary gear case (front, rear)	Change	GO	2.5 (0.66)	4
1000 Hours	10	Swing reduction gear case	Change	GO	See page 6-37	1
	11	Swing reduction gear grease	Check, Lubricate	PGL	See page 6-37	1
	12	Swing gear and pinion	Change	PGL	7.9 kg (17.5 lb)	1
	14	Transmission case	Change	EO	2.5 (0.8)	1
	19	Hydraulic oil return filter	Replace	-	-	1
	20	Drain filter cartridge	Replace	-	-	1
	21	Air breather element	Replace	-	-	1
	23	Pilot line filter element	Replace	-	-	1
	37	Pressure filter element	Replace	-	-	1
1500 Hours	24	Front axle differential gear case	Change	GO	10.5 (2.77)	1
	25	Rear axle differential gear case	Change	GO	12.5 (3.30)	1
	26	Axle planetary gear case (front, rear)	Change	GO	2.5 (0.66)	4
2000 Hours	1	Hydraulic oil★1	Change	HO	125 (33.0)	1
	1	Hydraulic oil (HBHO★2)	Change	-	125 (33.0)	1
	4	Radiator coolant★1	Change	C	19.5 (5.2)	1
	22	Hydraulic oil suction strainer	Check, Clean	-	-	1
	29	Air cleaner element (primary, safety)	Replace	-	-	1
	33	Crankcase breather filter	Check, Lubricate	PGL	-	1
	-	RCV lever	Check, Lubricate	PGL	-	2
4000 Hours	36	DEF/AdBlue® tank filter	Replace	-	-	1
4500 Hours	34	DEF/AdBlue® supply module filter	Replace	-	-	1
5000 Hours	1	Hydraulic oil★3	Change	HO	125 (33.0)	1
6000 Hours	4	Radiator coolant★3	Change	C	19.5 (5.2)	1
As required	28	Aircon & heater outer filter	Replace	-	-	1
	28	Aircon & heater inner filter	Clean, Replace	-	-	1
	29	Air cleaner element (safety)	Replace	-	-	1
	29	Air cleaner element (primary)	Clean, Replace	-	-	1

★1 Conventional ★2 HD Hyundai Construction Equipment Bio Hydraulic Oil

★3 HD Hyundai Construction Equipment genuine long life

※ Oil symbol

Please refer to the recommended lubricants for specification.

DF : Diesel fuel GO : Gear oil HO : Hydraulic oil DEF : Diesel exhaust fluid

C : Coolant PGL : Grease EO : Engine oil

1) CHECK ENGINE OIL LEVEL

Check the oil level with the machine on a flat ground before starting engine.

(1) Pull out the dipstick and wipe with a clean cloth.

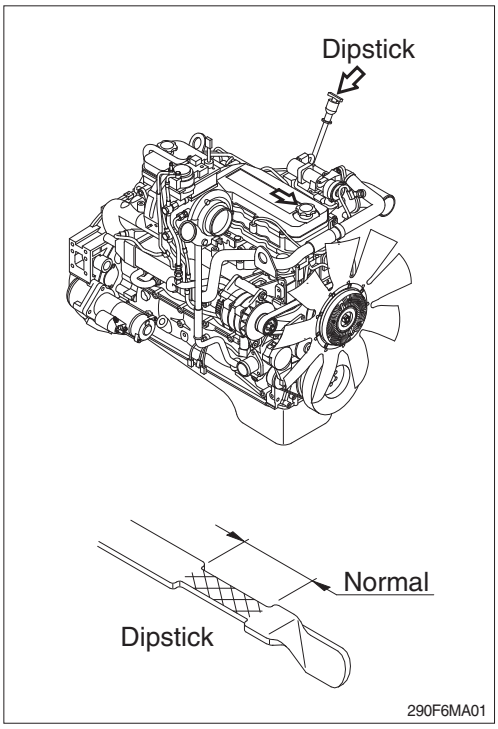
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(3) If oil level is LOW, add oil and then check again.

※ **If the oil is contaminated or diluted, change the oil regardless of the regular change interval.**

※ **Check oil level after engine has been stopped for 15 minutes.**

⚠ **Do not operate unless the oil level is in the normal range.**

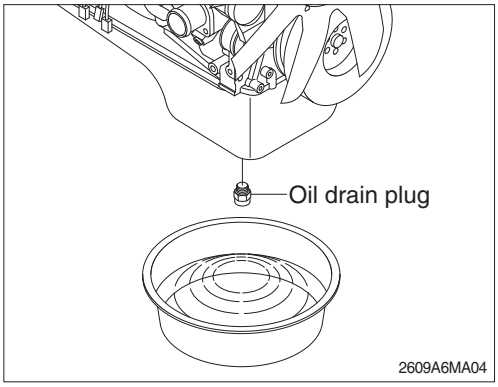


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

(1) Operate the engine until the coolant temperature reaches 60˚C (140˚F). Shut off the engine.

(2) Remove the oil drain plug. Drain the oil immediately to be sure all the oil and suspended contaminants are removed from the engine.

※ **A drain pan with a capacity of 30 liters (7.9 U.S. gallons) will be adequate.**

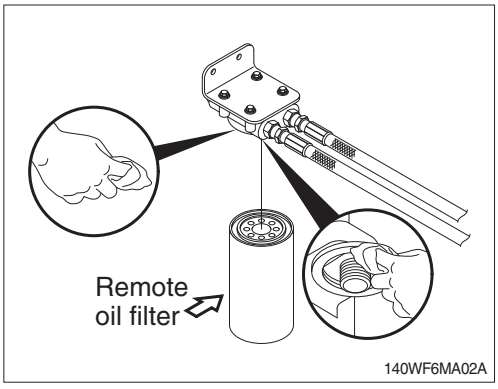


(3) Clean the area around the lubricating oil filter head.

(4) Use oil filter wrench to remove the oil filter.

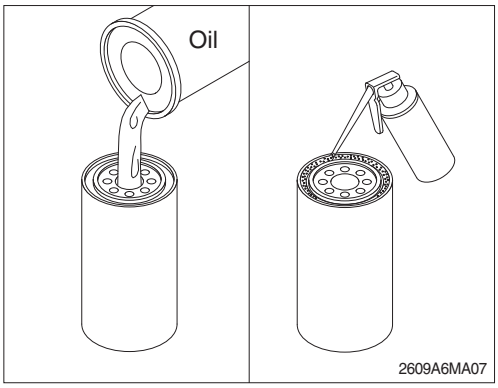
(5) Clean the gasket surface of oil filter head.

※ **The O-ring can stick on the filter head. Be sure it is removed before installing the new filter.**



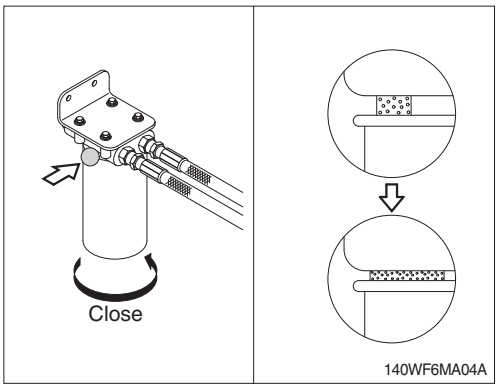
(6) Apply a light film of lubricating oil to the gasket sealing surface before installing the filters.

※ **Fill the filters with clean lubricating oil.**



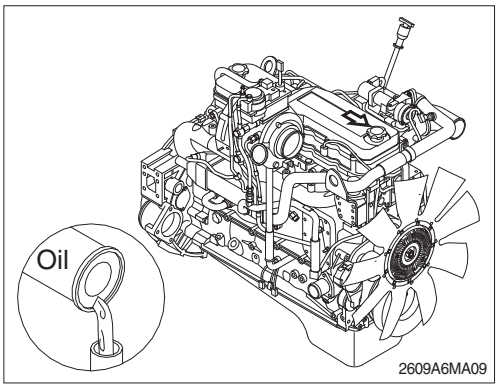
(7) Install the filter to the filter head.
Tighten the filter until the gasket contacts the filter head surface.
Tighten 3/4 to 1 turn after the gasket makes contact with the filter head.

※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**

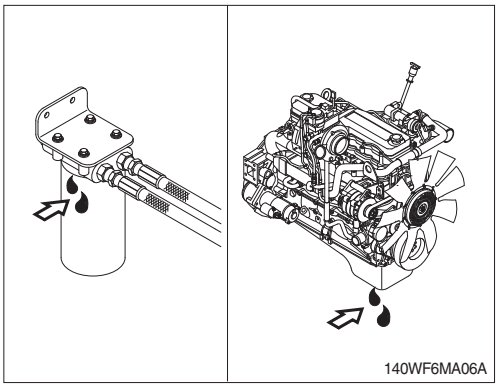


(8) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan drain plug.

(9) Fill the engine with clean oil to the proper level.
- Quantity : 23.7 ℓ (6.3 U.S.gallons)



(10) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick. Allow 15 minutes for oil to drain down before checking.



3) CHECK COOLANT

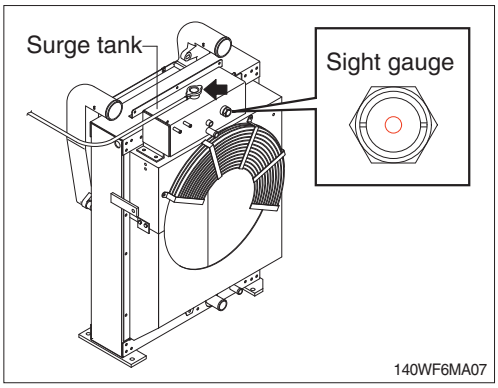
(1) Check the coolant level at sight gauge.
The sight gauge should indicate the middle position.

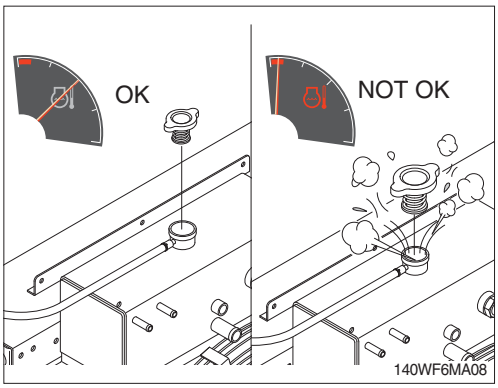
(2) Add the mixture of antifreeze and water after removing the cap of the surge tank if coolant is not sufficient.

(3) Replace gasket of radiator cap when it is damaged.

⚠ **Hot coolant can spray out if surge tank cap is removed while engine is hot. Remove the cap after the engine has cooled down.**

※ **Do not add cold coolant to a hot engine ; engine castings can be damaged. Allow the engine to cool to below 50˚C (120˚F) before adding coolant.**



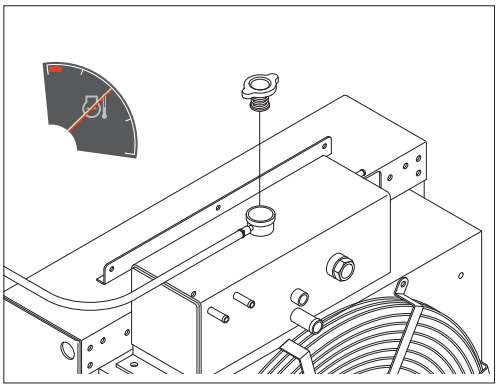


4) FLUSHING AND REFILLING OF RADIATOR

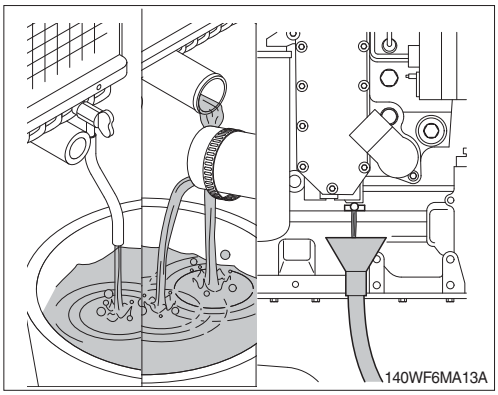
(1) Change coolant

⚠ **Avoid prolonged and repeated skin contact with used antifreeze. Such prolonged repeated contact can cause skin disorders or other bodily injury.**
Avoid excessive contact-wash thoroughly after contact.
Keep out of reach of children.

※ **Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.**
Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.
If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.



⚠ Wait until the temperature is below 50 ° C (122 ° F) before removing the coolant system pressure cap.
Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by opening the drain cock on the radiator, remove the hose of the oil cooler and opening the drain valve on the bottom of the engine oil cooler housing.
A drain pan with a capacity of 40 liters (10.6 U.S. gallons) will be adequate.
· Drain cock tightening torque :
4.2±0.4 kg · m (30.4±2.9 lbf · ft)

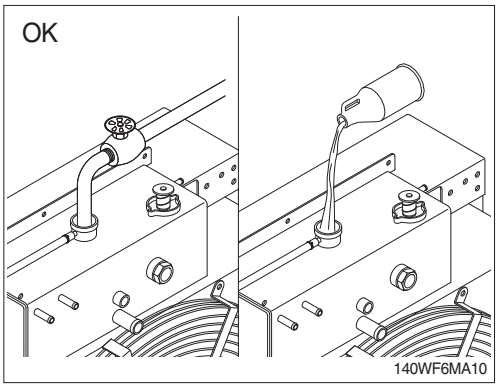


(2) Flushing of cooling system

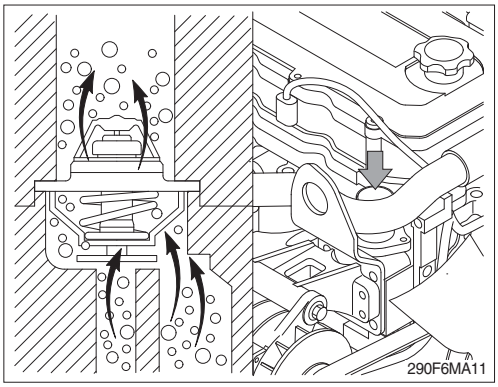
① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

※ Use 0.5kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.

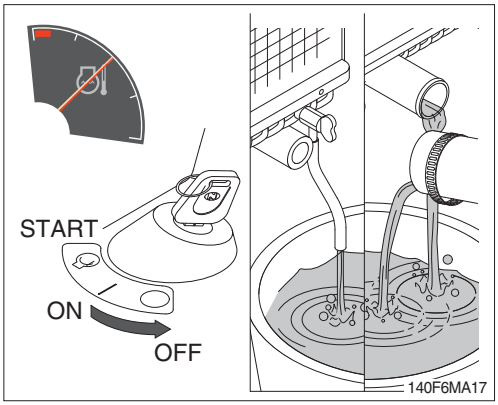
※ Do not install the surge tank cap. The engine is to be operated without the cap for this process.



※ During filling, air must be vented from the engine coolant passages.
The system must be filled slowly to prevent air locks or serious engine damage can result. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.



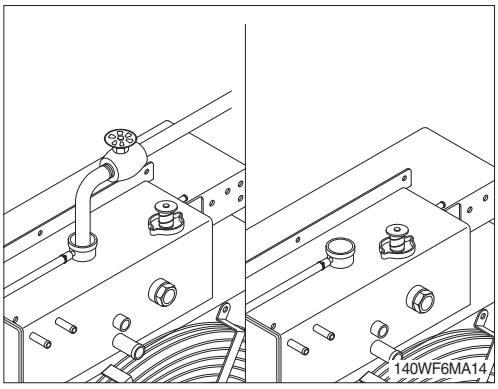
② Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F) .
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

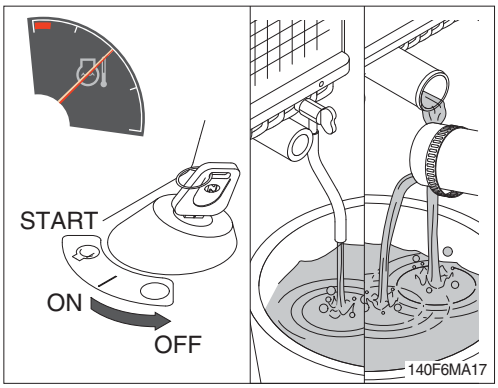
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **Do not install the surge tank cap or the new coolant filter.**



④ Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F) .
Shut the engine off, and drain the cooling system.

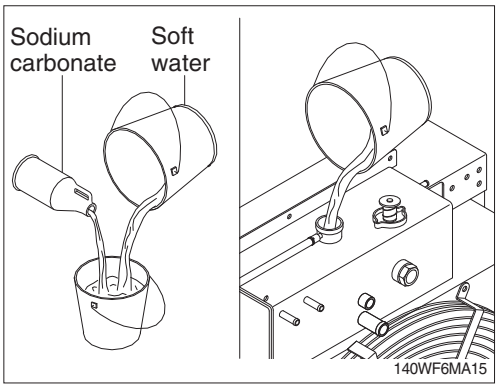
※ **If the water being drained is still dirty, the system must be flushed again until the water is clean.**



(3) Cooling system filling

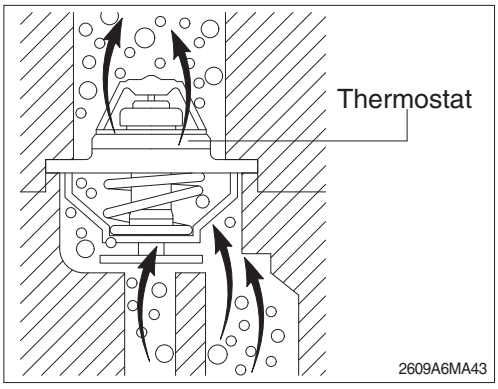
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-10.
Coolant capacity (engine only) : 10 *l* (2.6 U.S. gallons)

※ **Do not use hard water such as river water or well water.**

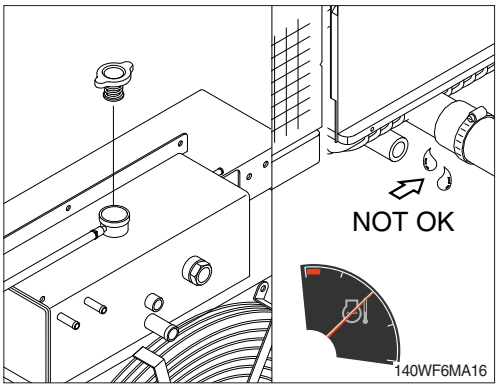


② The system has a maximum fill rate of 19 liters (5.0 U.S. gallons) per minute.
Do not exceed this fill rate.

※ **The system must be filled slowly to prevent air locks.**
During filling, air must be vented from the engine coolant passage.



③ Install the pressure cap. Operate the engine until it reaches a temperature 80˚C (176˚F), and check for coolant leaks.
Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER

Check, and if necessary, clean and dry outside of radiator and oil cooler. After working in a dusty place, clean radiator more frequently.

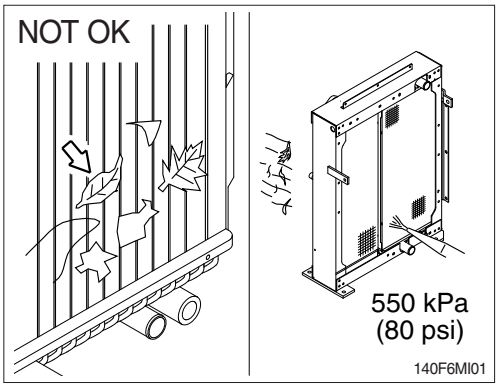
(1) Visually inspect the radiator for clogged radiator fins.

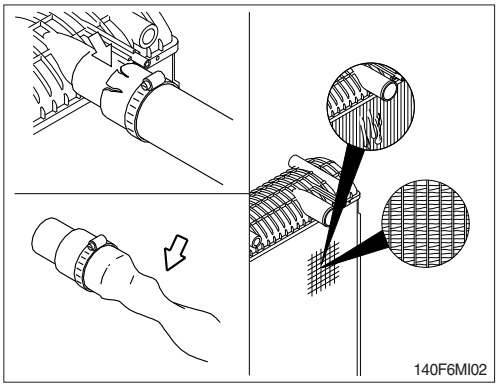
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.

(3) Visually inspect the radiator for bent or broken fins.

※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

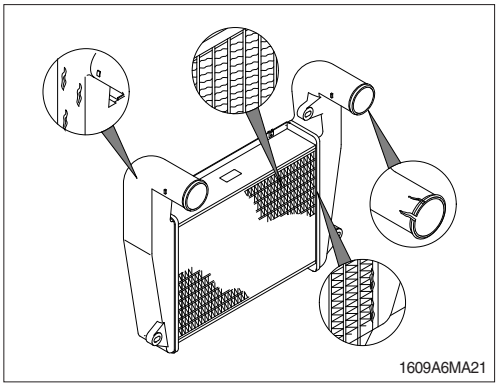
(4) Visually inspect the radiator for core leaks.





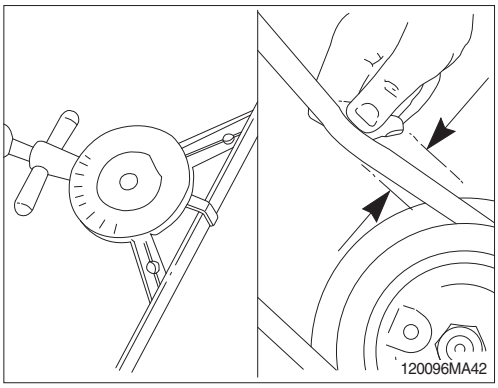
6) CHECK CHARGE AIR COOLER

Inspect the charge air cooler for dirt and debris blocking the fins. Check for cracks, holes, or other damage. If damage is found, please contact HD Hyundai Construction Equipment distributor.



7) FAN BELT

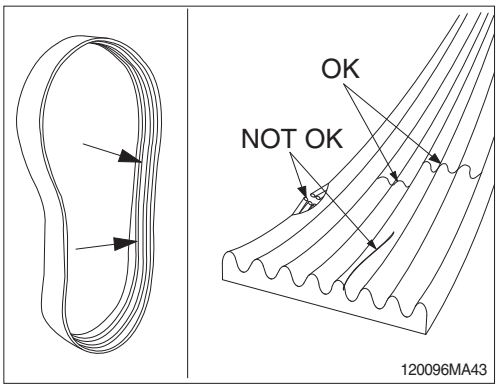
(1) An deflection method can be used to check belt tension by applying 11.3 kgf (25 lbf) force between the pulleys on V-belts. If the deflection is more than one belt thickness per foot of pulley center distance, the belt tension must be adjusted.



(2) Inspect the fan belt for damage.

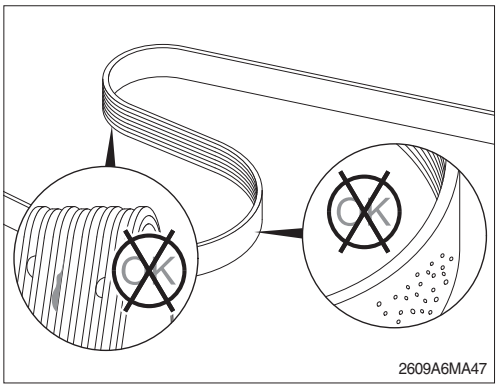
① Transverse (across the belt) cracks are acceptable.

② Longitudinal (direction of belt ribs) cracks that intersect with transverse cracks are not acceptable.



③ Inspect the belt
- Embedded debris
- Uneven/excessive rib wear
- Exposed belt cords
- Glazing (high heat)

※ If any of the above conditions are pressnt, the belt is unacceptable for reuse and must be replaced.



8) INSPECTION OF COOLING FAN

⚠ Personal injury can result from a fan blade failure. Never pull or pry on the fan. This can damage the fan blade and cause fan failure.

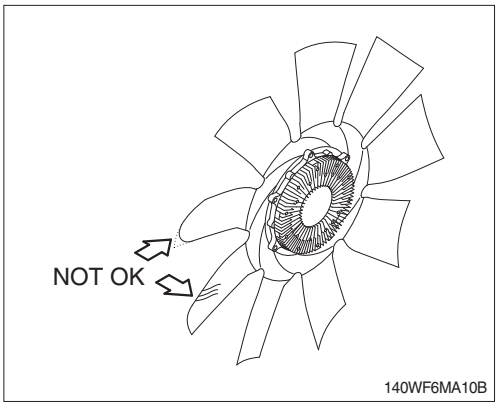
※ Rotate the crankshaft by using the engine bearing gear.

※ A visual inspection of the cooling fan is required daily.

Check for cracks, loose rivets, and bent or loose blades.

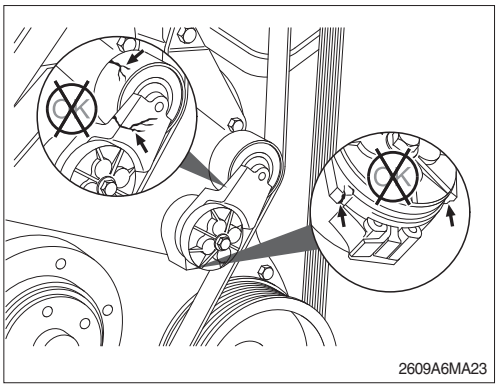
Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.

Replace any fan that is damaged.

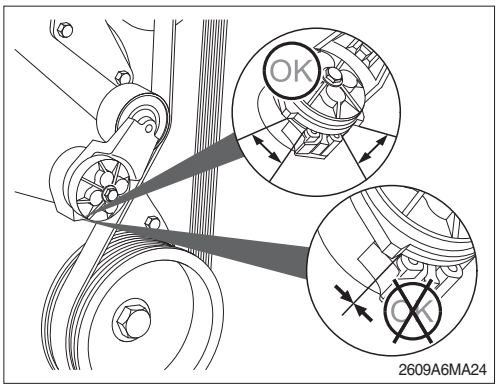


9) FAN BELT TENSIONER

(1) With the engine stopped, check the tensioner arm, pulley, and stops for cracks. If any cracks are found, the tensioner must be replaced.

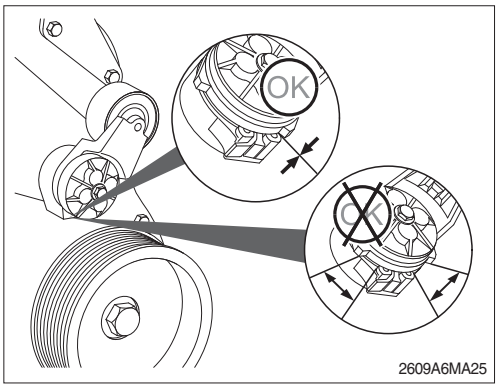


(2) With the belt installed, verify that neither tensioner arm stop is in contact with the spring case stop.
After replacing the belt, if the tensioner arm stops are still in contact with the spring case stop, replace the tensioner.

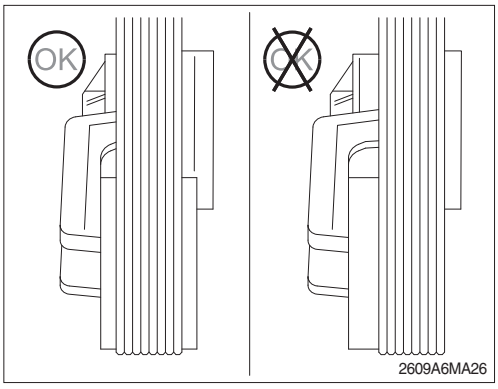


(3) With the belt removed, verify that the tensioner arm stop is in contact with the spring case stop.
If these two are not touching, the tensioner must be replaced.

※ **After replacing the belt, if the tensioner arm stop is still in contact with the spring case stop, the tensioner must be replace.**



(4) Check the location of the drive belt on the belt tensioner pulley. The belt should be centered on, or close to the middle of, the pulley. Misaligned belts, either too far forward or backward, can cause belt wear, belt roll-offs, or increase uneven tensioner bushing wear.



10) CLEANING OF AIR CLEANER

(1) Primary element

① Open the cover and remove the element.

② Wipe all contaminant and debris from inside the housing body.

③ Do not clean the filter element by striking or hitting the filter against any object to shake the debris from the filter element.

④ Clean the filter element with compressed air.

a. Remove dust from filter element by directing the compressed air into the opening of the air filter element.

b. Use 3 kg/cm^2 (40 psi) maximum air pressure and hold the compressed air nozzle at least 2.5 cm (1") away from the pleats while cleaning. Make sure to keep the clean side of air filter free of debris.

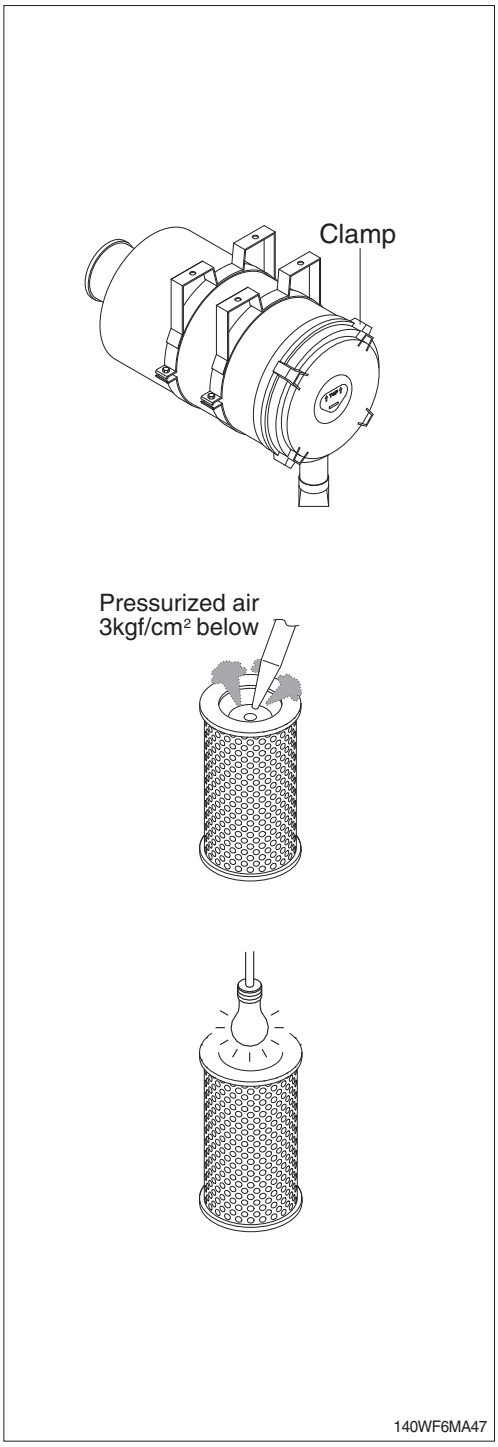
⑤ Visually inspect for damage to the filter elements and components. Use a light source to help identify any defects in the media. If any defects are observed discard the filter element and replace with a new primary filter element.

a. Before any type of cleaning, a visual inspection of the filter is needed. If there is any damage to the filter body, gaskets or endplates, do not clean or reuse; the filter should be discarded. Always clean filters in a clean environment, observe strict inspection procedures and repackage filters immediately after the cleaning process with appropriate materials.

b. Use observe proper safety precautions and dispose of waste materials in an environmentally compliant manner.

⑥ Re-install filter element into the air housing.

⑦ Replace the primary element at the fourth cleaning.



(2) Safety element

The safety filter element should never be cleaned since the safety filter is the last barrier to contaminant before it reaches engine.

The useful life of the safety filter is equivalent to that of the primary air filter only if the primary filter element is being regularly cleaned. If the primary filter element is not cleaned, the safety filter should be changed at every third primary air filter change or after one year of continuous service, whichever occurs first.

11) FUEL TANK

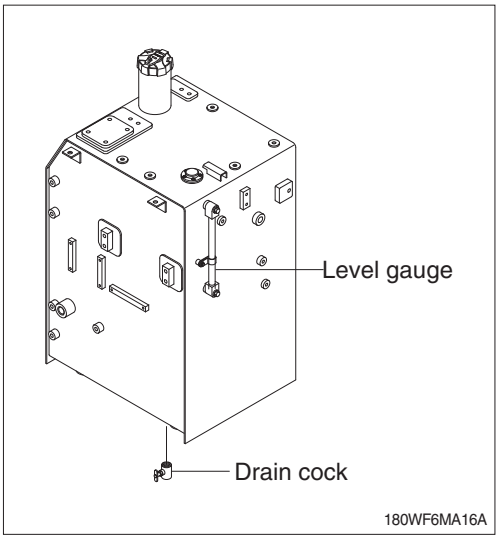
(1) Fill fuel fully when system the operation to minimize water condensation, and check it with level gauge before starting the machine.

(2) Drain the water and sediment in the fuel tank by opening the drain cock.

※ Be sure to LOCK the cap of fuel tank.

※ Remove the strainer of the fuel tank and clean it if contaminated.

⚠ Stop the engine when refueling.
All lights and flames shall be kept at a safe distance while refueling.



12) PREFILTER

※ Inspect or drain the collection bowl of water daily and replace the element every 500hours.

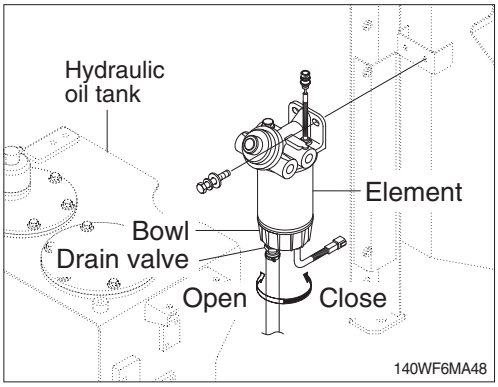
(1) Drain water

① Open bowl drain valve to evacuate water.

② Close drain valve.

※ Don't tighten up a drain valve so strong.

※ Please inspect and drain water frequently for remain water volume to be less than 1/3 volume of a collection bowl.



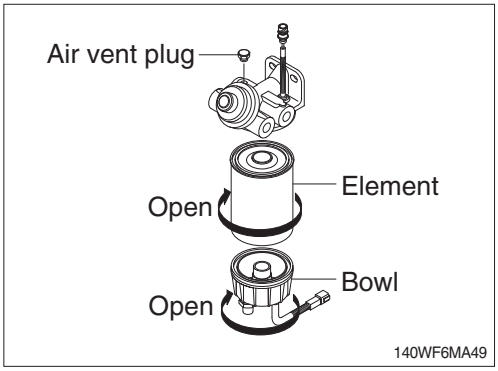
(2) Replace element

① Loosen the air vent plug and drain the unit of fuel. Follow "Drain water" instructions above.

② Remove element and bowl from filter head.

※ The bowl is reusable, do not damage or discard.

③ Separate element from bowl. Clean bowl and seal gland.

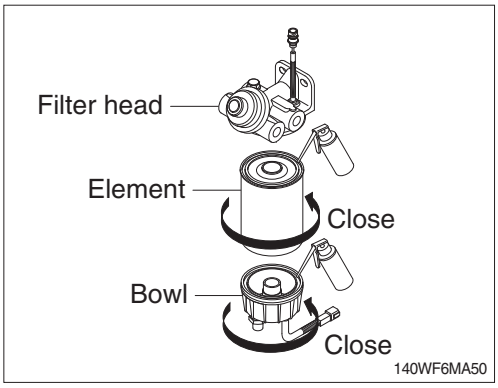


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

⑤ Attach bowl to new element firmly by hand.

⑥ Lubricate new element seal and place in element top gland.

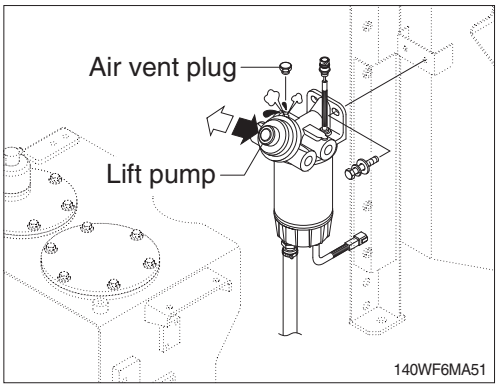
⑦ Attach the element and bowl to the head.



⑧ Do hand-priming the lift pump repeatedly until air bubbles comes out from air vent hole completely.

⑨ Tighten the air vent plug to its origin position.

⚠ The fuel pump, high-pressure fuel lines, and fuel rail contain very high-pressure fuel. Do not loosen any fittings while the engine is running. Personal injury and property damage can result. Wait at least 10 minutes after shutting down the engine before loosening any fittings in the high-pressure fuel system to allow pressure to do decrease to a lower level.



13) REPLACEMENT OF FUEL FILTER

(1) Use 1" wrench, loosen and remove the filter and clean the gasket surface.

※ **Make sure O-ring does not stick to filter head. Remove O-ring with screwdriver if necessary.**

(2) Lubricate the fuel filter O-ring with clean lubricating oil.

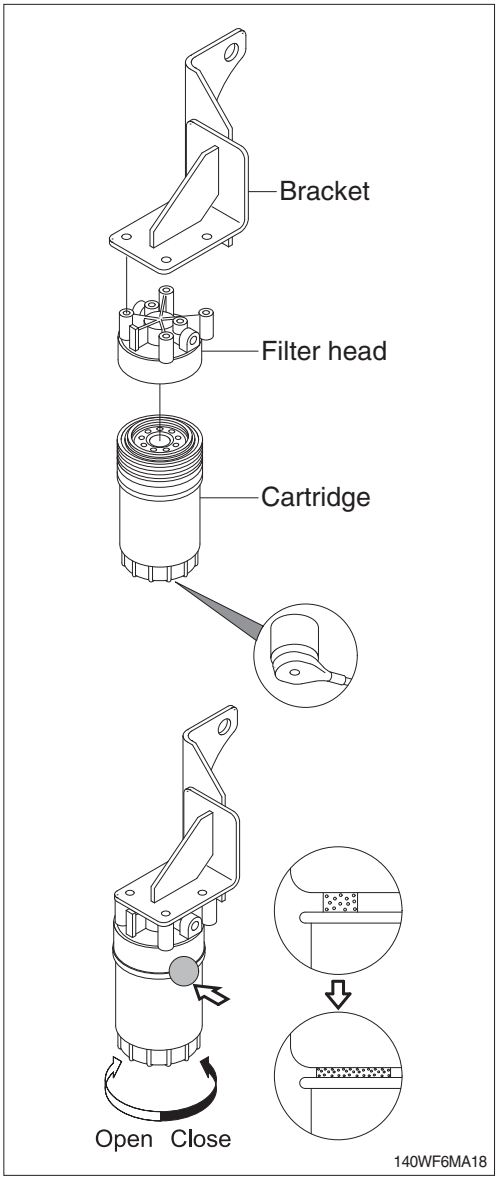
(3) Install the filter on the filter head. Tighten the filter until the gasket contacts the filter head surface. Tighten the fuel filter an additional 3/4 turn after contact.

※ **Mechanical overtightening can distort the threads or damage the filter element seal.**

(4) Relieve the air after mounting.

※ **Do not pre-fill an on-engine fuel filter with fuel. The system must be primed after the fuel filter is installed. Pre filling the fuel filter can result in debris entering the fuel system and damaging fuel system components.**

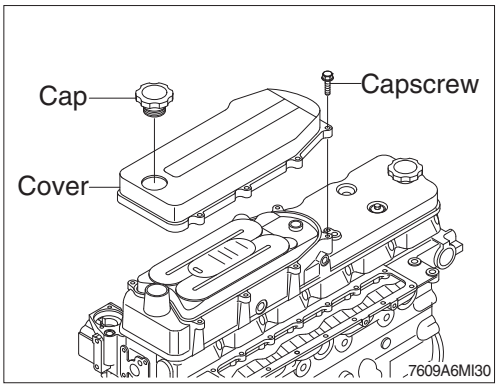
※ **Check for fuel leakage after the engine starts. If air is in the fuel system, the engine will not start. Start engine after bleeding the air according to the method of bleeding air.**



14) CRANKCASE BREATHER FILTER

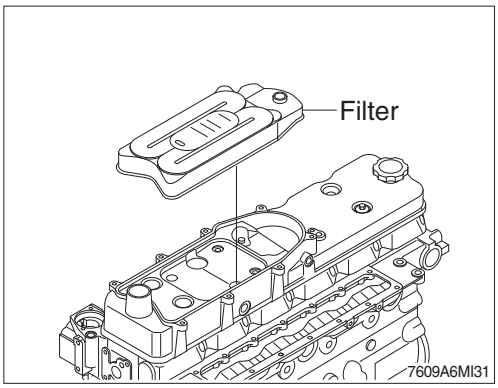
※ **Do not use pneumatic tools to remove the breather cover capscrews. Damage to the rocker cover can result.**

(1) Remove the oil fill cap.
(2) Remove the crankcase breather filter cover capscrews.
(3) Remove the filter cover.

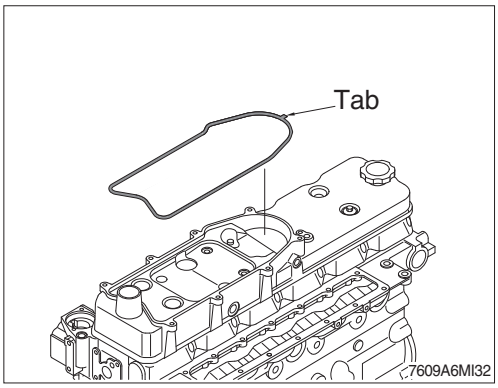


(4) Remove the crankcase breather filter from the rocker lever cover.

※ **Do not disturb the crankcase breather filter gasket located on the rocker lever cover.**
※ **Exposure to oil can cause the gasket to swell, which can make it difficult to install the gasket back into groove. If the gasket comes out of the groove, do not attemp to install the gasket. Replace it with a new gasket.**

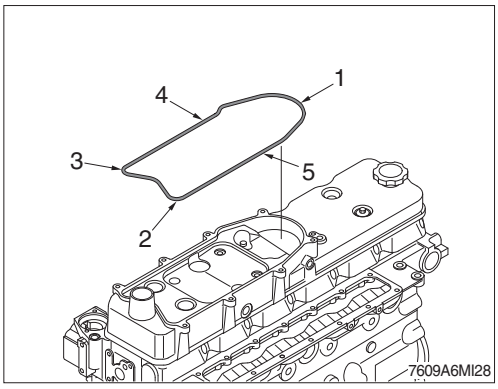


(5) If the gasket is damaged, remove the gasket by grasping the tab on the gasket and pulling up.
(6) Clean the crankcase breather filter mounting surface and O-ring sealing surfaces on the rocker lever cover.
(7) Clean the crankcase breather filter cover with warm soapy water.
Inspect the cover for cracks.
Replace the cover if damage is found.



(8) If the gasket was removed, install the gasket into the rocker lever cover groove starting with the tab end first. Then install the corners opposite the gasket tab end. Finish by pushing in the sides (see illustration).

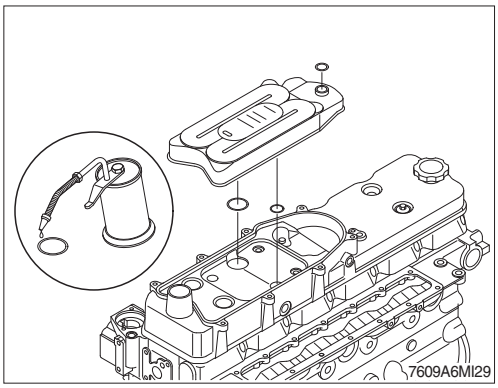
Gently push the gasket down into the groove. Do not used a finger to trace the gasket around into the groove during installation, as this will stretch the gasket, making it difficult to fully seat into the groove.



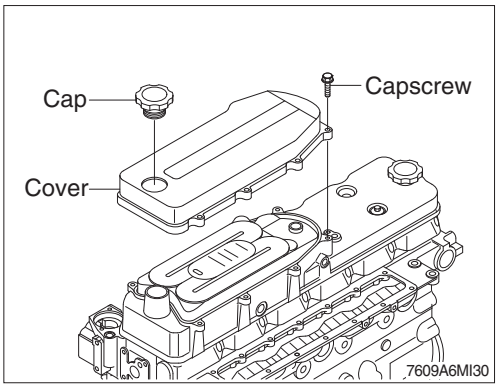
※ **Do not cut the gasket to make it fit into the groove, as this will result in an oil leak.**
The gasket must be fully seated around the entire perimeter of the rocker lever cover groove.

(9) Apply clean engine oil to the O-rings on the crankcase breather filter.

Install the filter onto the rocker lever cover.

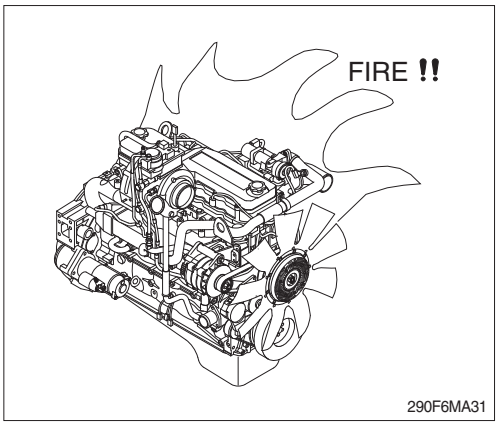


(10) Install the crankcase breather filter cover.
Install the filter cover capscrews.
Tighten the capscrews, starting with the innermost capscrews and working outward in a circular manner.
· 0.71 kgf · m (5.16 lbf · ft)
Install the oil fill cap.



15) LEAKAGE OF FUEL

⚠ **Be careful and clean the fuel hose, injection pump, fuel filter and other connections as the leakage from these part can cause fire.**

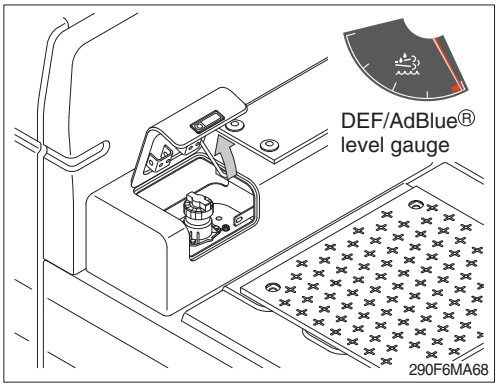


16) DEF/AdBlue® TANK

(1) The DEF/AdBlue® tank level must be checked daily with DEF/AdBlue® level gauge.

(2) If the DEF/AdBlue® level is found to below, DEF/AdBlue® must be added.

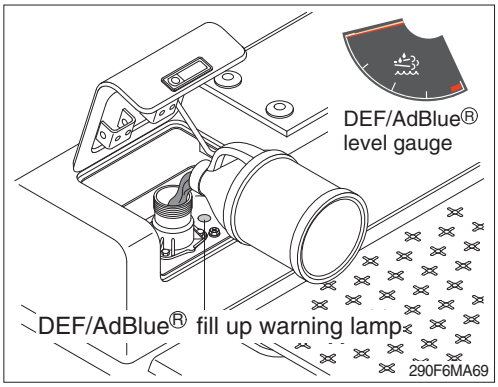
⚠ **It is unlawful to tamper with or remove any component of the aftertreatment system. It is also unlawful to use a catalyst solution that does not meet the specifications provided or the operate the machine with no catalytic solution.**



(3) DEF/AdBlue® fill up warning lamp turns on when tank is completely filled with DEF/AdBlue®. After turning light on, do not pour DEF/AdBlue® any more.

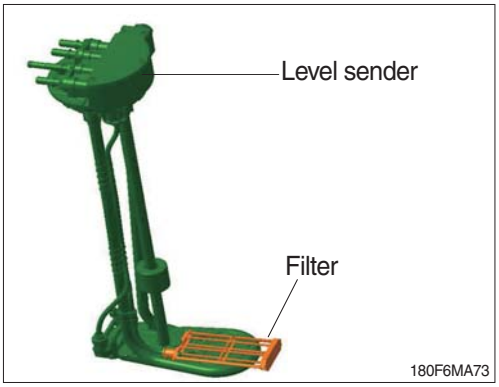
※ **Fill the tank with DEF/AdBlue® after key on and then turn off the start key.**

※ **Be careful to entering dust, sand or other contamination substance when you refill the DEF/AdBlue® into the tank. Otherwise, fatal problem such as engine idle locking, derating or engine stopping can be happen.**



※ **DEF/AdBlue® tank filter**

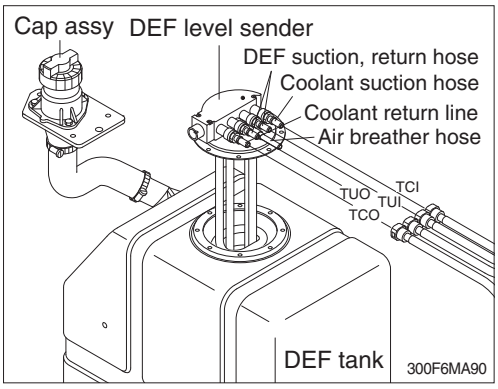
DEF/AdBlue® tank filter is mounted on the level sender of DEF/AdBlue® tank.



16-1) DEF/AdBlue® TANK FILTER

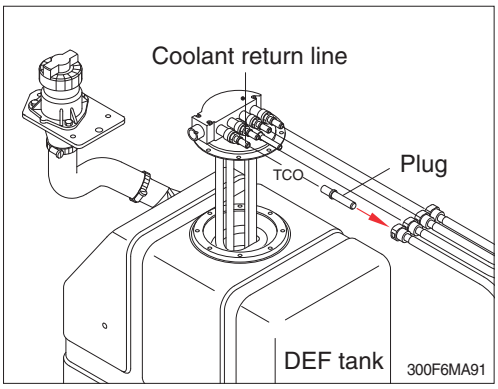
(1) Remove coolant, DEF/AdBlue® and air vent hoses.

※ **Move hoses back and forth 3~4 times to easily remove the hoses.**

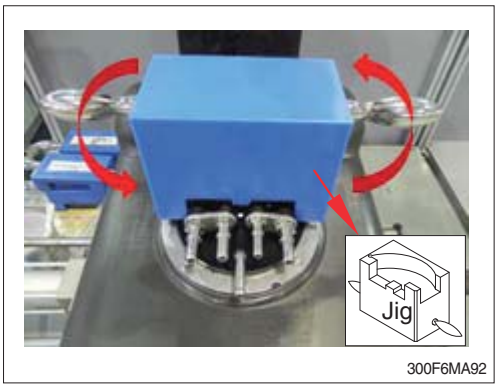


(2) Plugging the coolant return line with the plug (P/no : HDB030-0002).

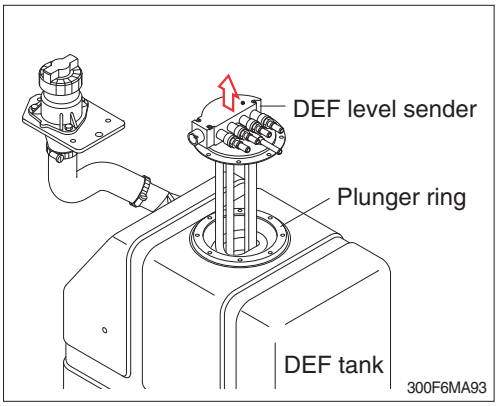
※ **When the coolant return line is removed, the coolant come out from the return line (TCO). Nearly comes out the coolant or DEF from other lines.**



(3) Rotate the DEF/AdBlue® level sender counter-clockwise about 20 degree with the Jig (P/no : HDB030-0001).



(4) Remove the DEF/AdBlue® level sender without removal of the plunger ring.



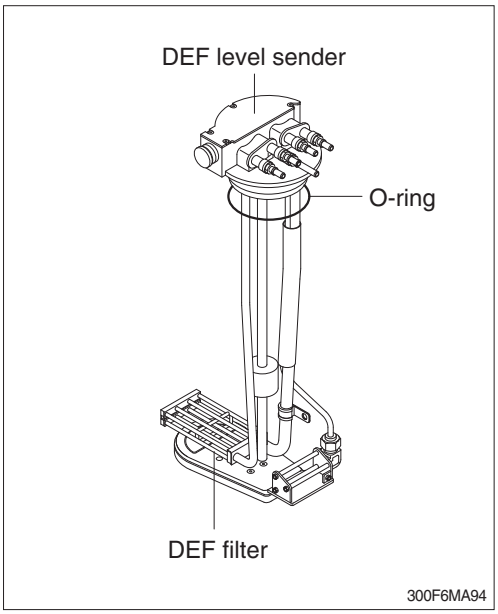
(5) Removed DEF/AdBlue® level sender.

※ **Make sure O-ring is on the right position.**

(6) Replace the DEF/AdBlue® filter and fit with a new filter.

※ **Replace the filter every 4000 hours.**

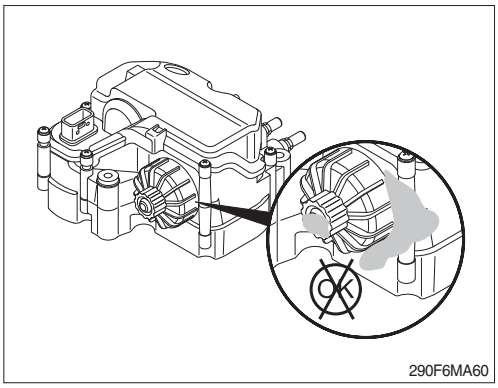
※ **Carry out installation in the reverse order to removal.**



17) DEF/AdBlue® SUPPLY MODULE FILTER

(1) Inspect the area around the seal and vent of DEF/AdBlue® supply module filter cap for signs of leakage.

※ Turn DEF/AdBlue® the master switch mounted electric box.



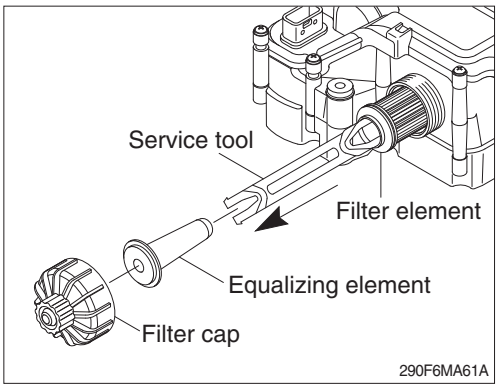
290F6MA60

(2) Unscrew the DEF/AdBlue® supply module filter cap.
A 30 ㎜ wrench can be used on the cap to aid in removal.

(3) Remove the filter equalizing element.

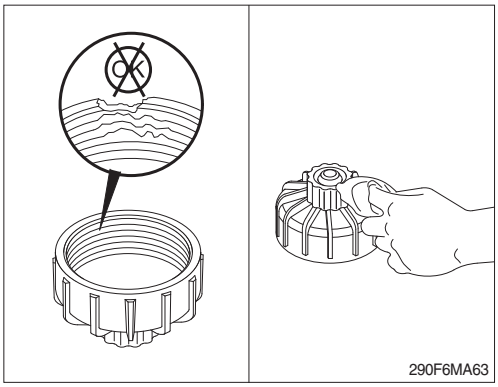
(4) Remove the old filter element.
A disposable service tool is included with the filter to aid in filter removal. Use the appropriate end of the tool, depending on the color of the plastic on the filter.
When inserting the tool a "click" sound can be heard which indicates proper engagement with the filter.

※ If the filter element and equalizing element are removed from the aftertreatment DEF/AdBlue® tank, they must be discarded and replaced; regardless of condition.



290F6MA61A

(5) Clean and inspect the filter cap
① Clean the aftertreatment DEF/AdBlue® tank cap and threads on the DEF/AdBlue® tank with warm water and a clean cloth.
② Check the condition of the threads on the filter cap, if the threads are damaged, replace the filter cap.

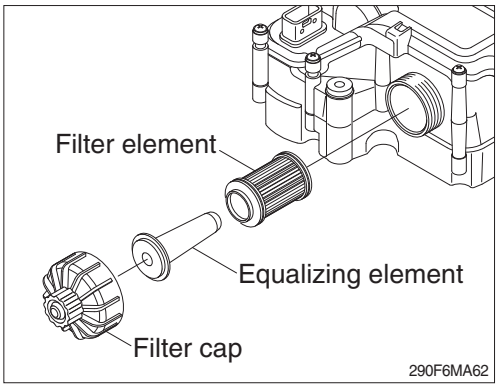


290F6MA63

(6) Slide the filter equalizing element in to the new filter element.

(7) Insert the assembly into the aftertreatment DEF/ AdBlue® supply module.

(8) Install and tighten the filter cap.
· Tightening torque : 2.0 kgf · m (14.5 lbf · ft)



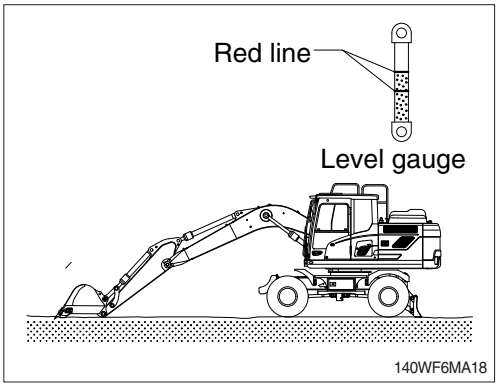
18) HYDRAULIC OIL CHECK

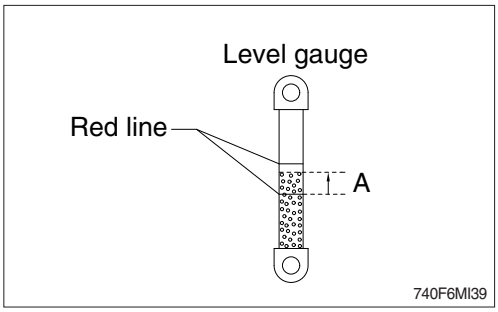
(1) Position the machine as shown in the illustration on the right. Then stop engine.

(2) Check the oil level at the level gauge of hydraulic oil tank.

(3) The oil level is normal if the oil is between the red lines. The oil level depends on the temperature of the hydraulic oil. Refer to the height (A) in the below table to check the level gauge.

Temperature		Height A	
℃	°F	mm	inch
0	32	15	0.6
10	50	25	1.0
20	68	30	1.2
30	86	35	1.4
40	104	40	1.6





※ Refer to page 3-26 for checking the temperature of the hydraulic oil.

※ Add the hydraulic oil, if necessary.

19) FILLING HYDRAULIC OIL

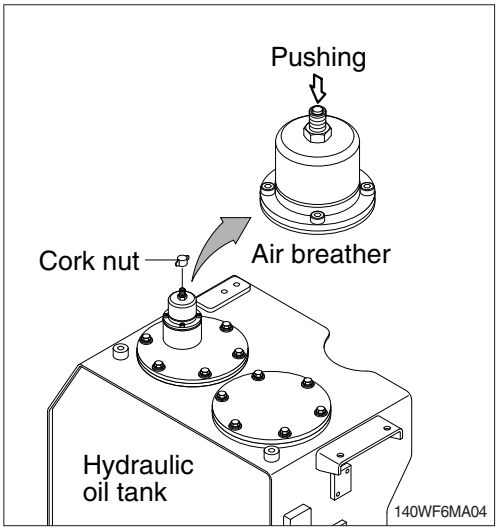
(1) Stop the engine to the position of level check.

(2) Remove the cork nut and relieve the pressure in the tank by pushing the top of the air breather.

(3) Remove the breather on the top of oil tank and fill the oil to the specified level.

(4) Start engine after filling and operate the work equipment several times.

(5) Check the oil level at the level check position after engine stops.



20) CHANGE HYDRAULIC OIL

(1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.

(2) Remove the cork nut and relieve the pressure in the tank by pushing the top of the air breather.

(3) Remove the cover.
· Tightening torque : 6.9±1.4 kgf · m
(50±10 lbf · ft)

(4) Prepare a suitable container.

(5) To drain the oil loosen the drain plug at the bottom of the oil tank.

(6) Fill proper amount of recommended oil.

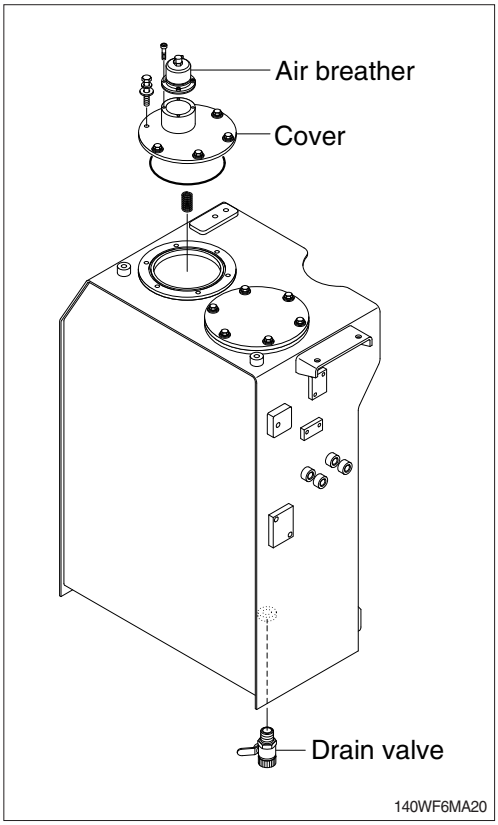
(7) Put the breather in the right position.

(8) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.

(9) Start engine and run continually. Release the air by full stroke of each control lever.

※ Incase of injecting HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil) to machines that have formerly used different hydraulic oil, the proportion of residual oil must not exceed 2 %

※ Do not mix any other Bio oil, use only HBHO as bio oil.
If changing to Bio oil, contact HD Hyundai Construction Equipment dealer.



21) CLEAN SUCTION STRAINER

Clean suction strainer as follows paying attention to the cause to be kept during oil filling.

(1) Remove the cover on the top of the oil tank.
· Tightening torque : 6.9±1.4 kgf · m
(50±10 lbf · ft)

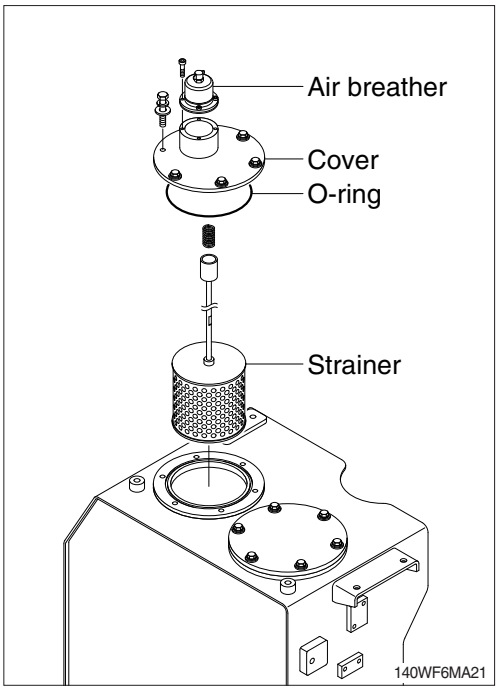
(2) Pull out the strainer in the tank.

(3) Wash the foreign material on the suction strainer with gasoline or cleaning oil.

(4) Replace the suction strainer if it is damaged.

(5) Assemble with reverse order of disassembly.
Be sure to install a new O-ring and reinsert in the oil tank.

※ **Loosen the bolt slowly at the cover can be spring out by the spring when removing it.**



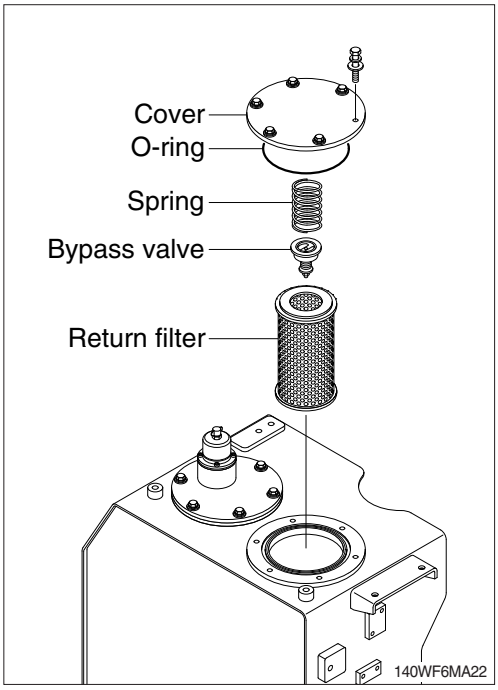
22) REPLACEMENT OF RETURN FILTER

Replace as follows paying attention to the cause to be kept during the replacement.

(1) Remove the cover.
· Tightening torque : 6.9±1.4 kgf · m
(50±10 lbf · ft)

(2) Remove the spring, by-pass valve, and return filter in the tank.

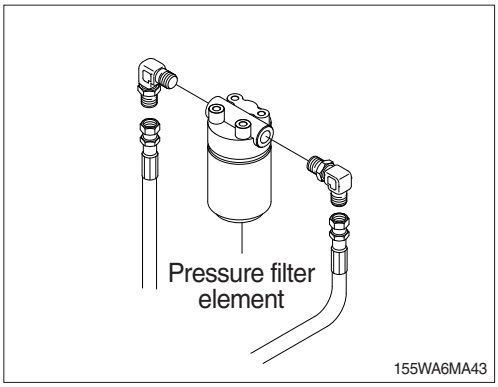
(3) Replace the element with new one.



22-1) REPLACEMENT OF THE PRESSURE FILTER ELEMENT

(1) Loosen the pressure filter.

(2) Install the new filter and tighten.



23) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

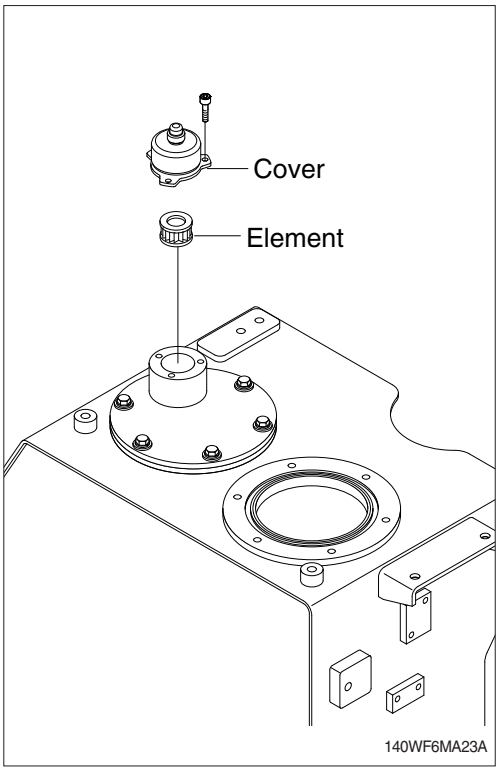
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(2) Loosen the bolt and remove the cover.

(3) Pull out the filter element.

(4) Replace the filter element new one.

(5) Reassemble by reverse order of disassembly.
- Nut tightening torque : 0.8~1.0 kgf · m
  (5.9~7.4 lbf · ft)

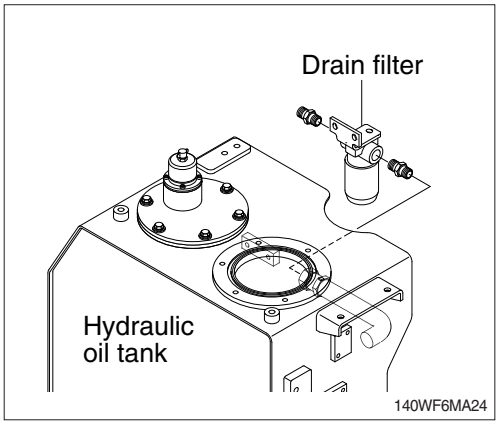


24) REPLACE OF DRAIN FILTER CARTRIDGE

Clean the dust around filter and replace with new one after removing the cartridge.

※ **Tighten about 2/3 turn more after the gasket of cartridge contacts seal side of filter body for mounting.**

※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**



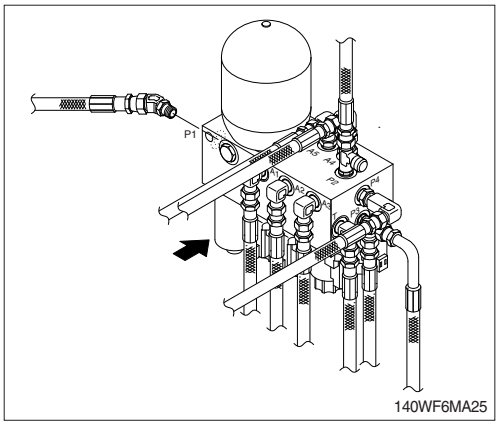
25) REPLACE OF PILOT LINE FILTER

(1) Loosen the nut positioned on the filter body.

(2) Pull out the filter element and clean filter housing.

(3) Install the new element and tighten using specified torque.

※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**

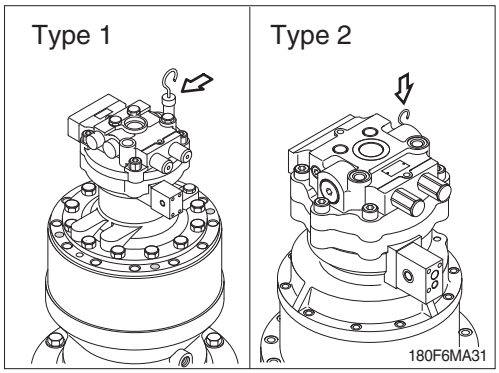


26) CHECK THE SWING REDUCTION GEAR OIL

(1) Pull out the dipstick and clean it.

(2) Insert it again.

(3) Pull out one more time to check the oil level and fill the oil if the level is not sufficient.



27) CHANGE SWING REDUCTION GEAR OIL

(1) Raise the temperature of oil by swinging the machine before replace the oil and park the machine on the flat ground.

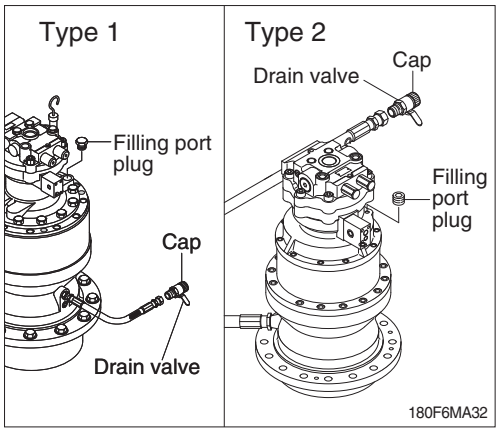
(2) Prepare a proper container.

(3) Remove the cap and open the drain valve.

(4) Clean around the valve and close the drain valve and cap.

(5) Fill proper amount of recommended oil.

- Amount of oil
  - Type 1 : 5.0 ℓ (1.32 U.S.gal)
  - Type 2 : 6.2 ℓ (1.64 U.S.gal)

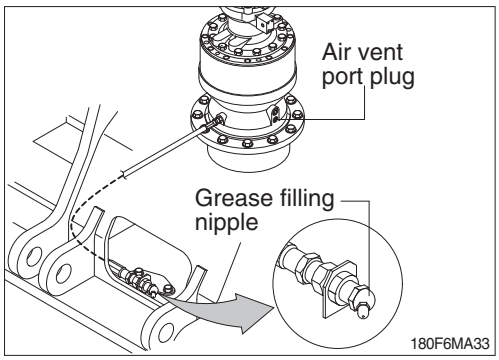


28) LUBRICATE BEARING OF OUTPUT SHAFT IN REDUCTION GEAR (TYPE 1 ONLY)

(1) Remove air vent plug.

(2) Lubricate NLGI No.2 with grease gun until comes out new grease from air vent port.

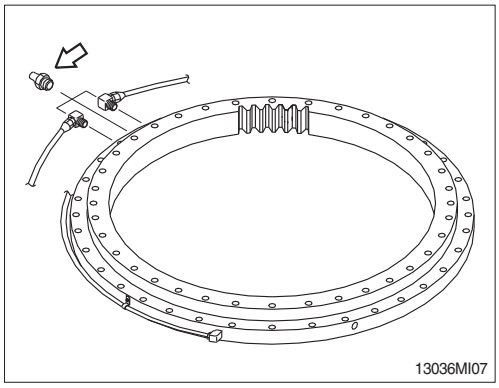
- Amount of oil : 1.2 ℓ (0.32 U.S.gal)



29) LUBRICATE SWING BEARING

(1) Grease at 3 fitting.

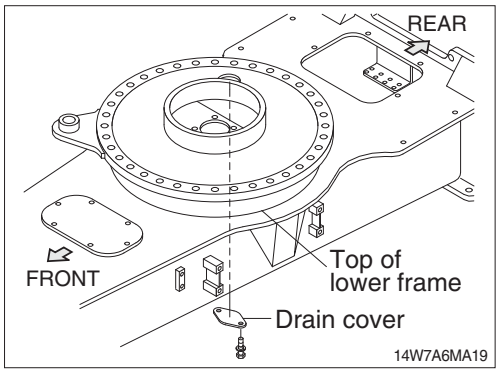
※ **Lubricate every 250 hours.**



30) SWING GEAR AND PINION

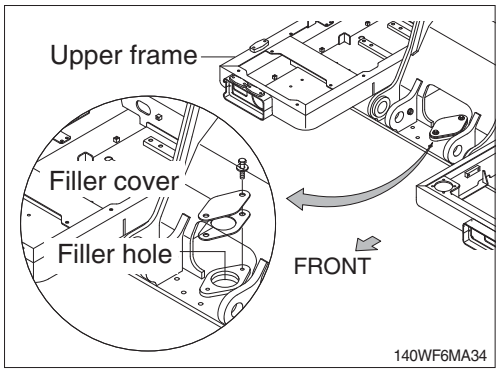
(1) Drain old grease

① Remove under cover of lower frame.
② Remove drain cover of lower frame.
③ Remove filler cover of upper frame.
④ Operate full turn (360˚) of swing several times.



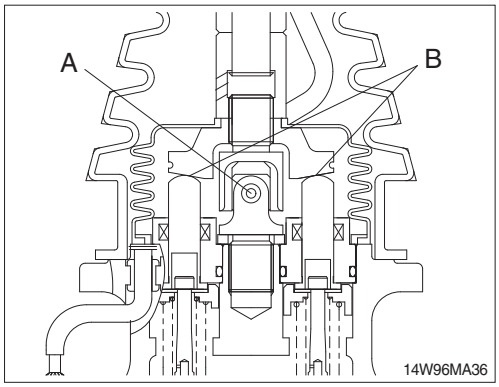
(2) Refill new grease

① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 7.9 kg (17.5 lb)



31) LUBRICATE RCV LEVER

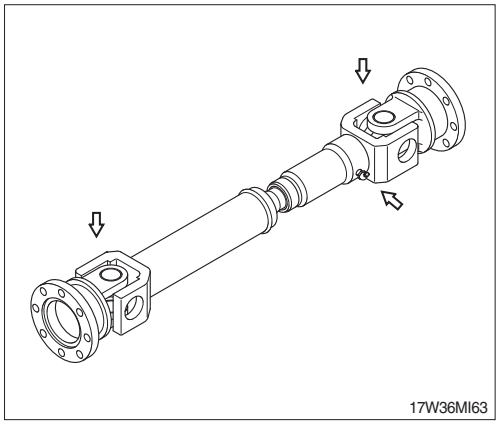
Remove the bellows and with a grease gun grease the joint part (A) and sliding parts (B).



32) LUBRICATE

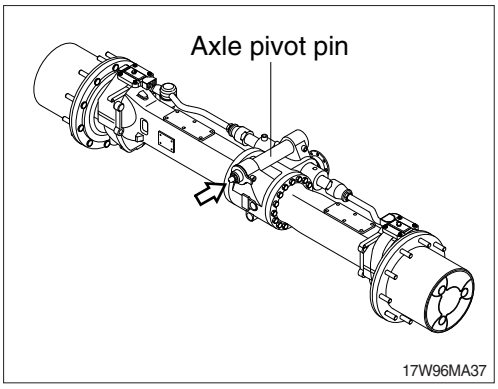
(1) Drive shaft

① Front drive shaft : 3 point
② Rear drive shaft : 3 point

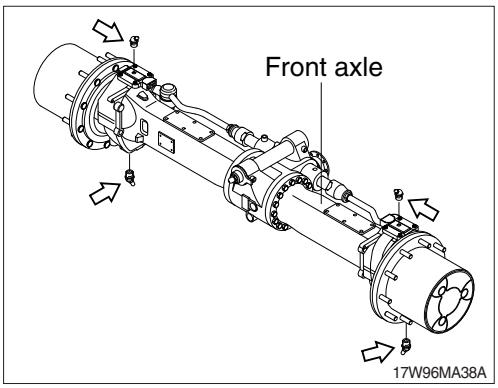


(2) Axle

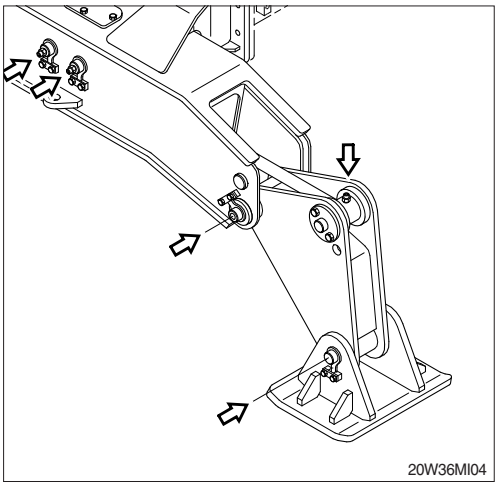
① Front axle : 1 point



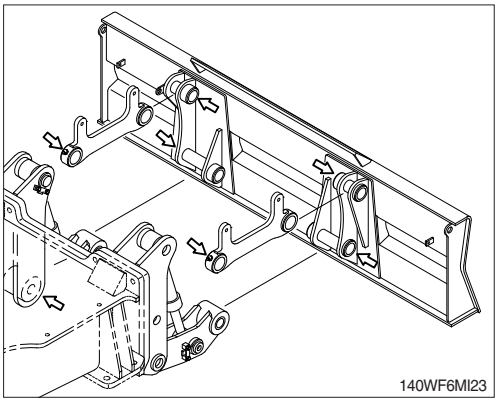
(3) Steering case : 4 point



(4) Outrigger : 8 point



(5) Dozer blade : 12 point



33) TIRE

(1) Air pressure

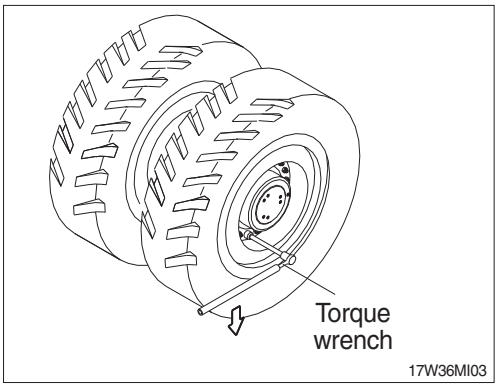
It is important to keep air pressure properly for maximizing tire life. Both excessive and insufficient air pressure of tires should be avoided not to damage tires.

Specification : 7.0 kgf/cm² (100 psi)

(2) Handling of tire

① Removal of tire

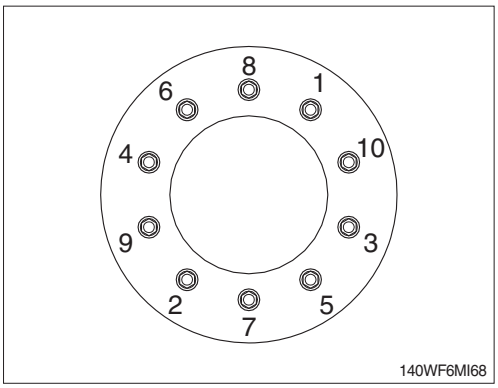
- Lift the main body until a tire separate from the ground, and place the block under front and rear axle.
- Loosen wheel nut with torque wrench and remove tire.



② Installation of tire

- Coat some grease on wheel stud and nut screw.
- Install the tires and tighten a nut slightly and get down a tire on the ground, and then tighten the torque in the order as figure.
  - Tightening torque : 60^{+0}_{-5} kgf · m

    ($433^{+0}_{-36.2}$ lbf · ft)



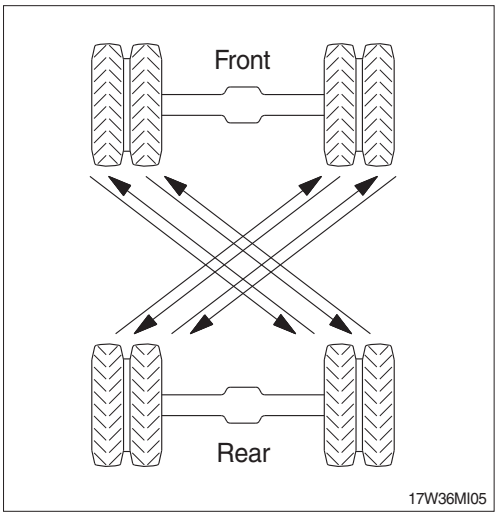
③ Position change of tire

- Tire is worn out differently part by part according to installing position, so change position regularly as figure.

※ **Keep air pressure at standard.**

※ **Use same pattern of groove and same maker's tire.**

※ **Always check the tire before operation.**



(3) Tire size

Specification : 10.00 × 20 - 14PR

34) CHECK AND SUPPLYING PLANETARY GEAR OIL

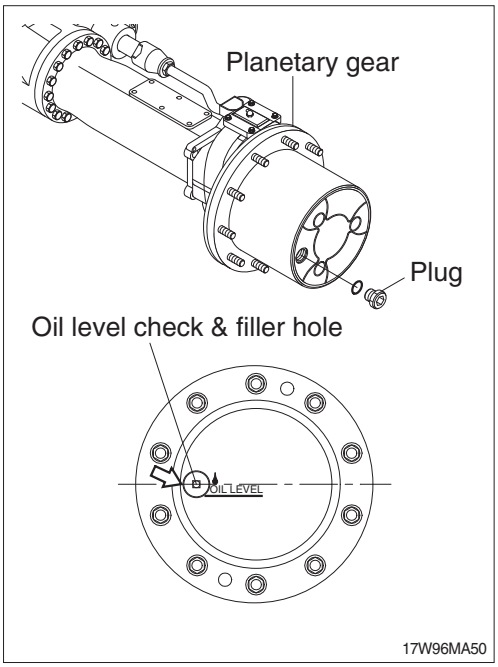
(1) Move the machine to flat ground.

(2) Remove the plug and check the oil amount.

※ **Set the oil level check line of planetary gear in parallel to the around.**

(3) If the oil level is below the plug hole, supply oil through a plug hole.

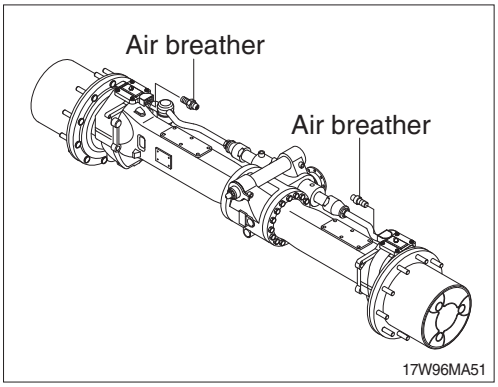
(4) After checking, install plug.



35) CHECK AND SUPPLYING DIFFERENTIAL GEAR OIL

(1) Move the machine to flat ground.

(2) Open the axle air breather to relieve internal air pressure.

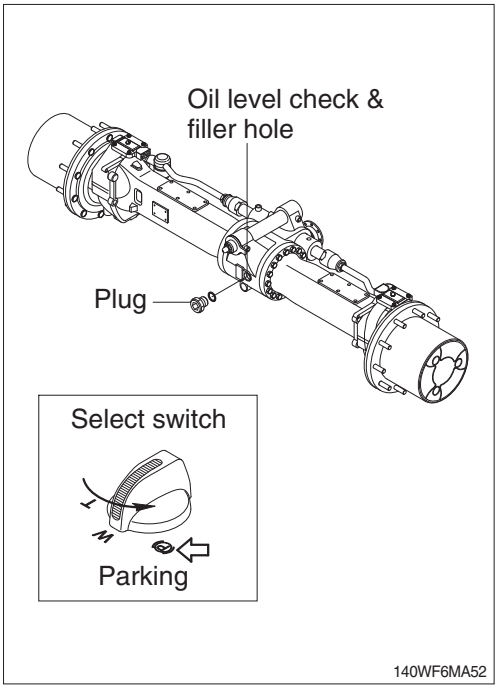


(3) Remove the plug and check the oil amount.
If the oil level is at the hole of the plug, it is normal.

(4) If the oil level is below the plug hole, supply oil through a plug hole.

⚠ **When checking the oil level, set the select switch to parking position.**

⚠ **As the machine is hot after operation, wait until the oil temperature has dropped.**



36) CHANGE THE AXLE OIL

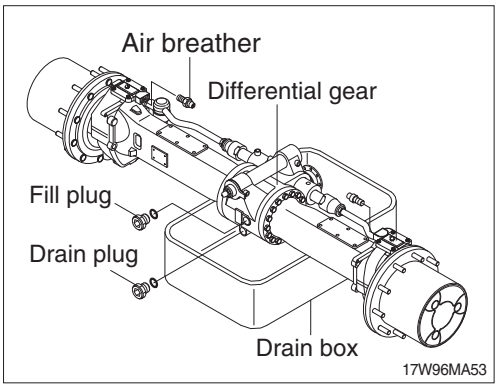
(1) Place a drain box under drain plug to catch oil.

(2) Remove the air breather to relieve internal pressure.

(3) Drain oil the differential gear

① Remove the filling plug and remove the drain plug to drain oil off.

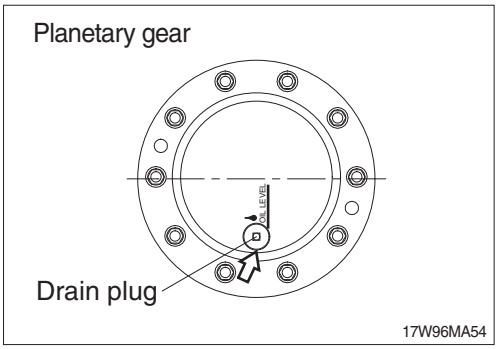
② Wash drain plug and install it.



(4) Drain oil planetary gear

① Drain oil by removing drain plug.

※ **The drain plug should be facing the ground.**



(5) Supply oil into the differential gear and the planetary gear.

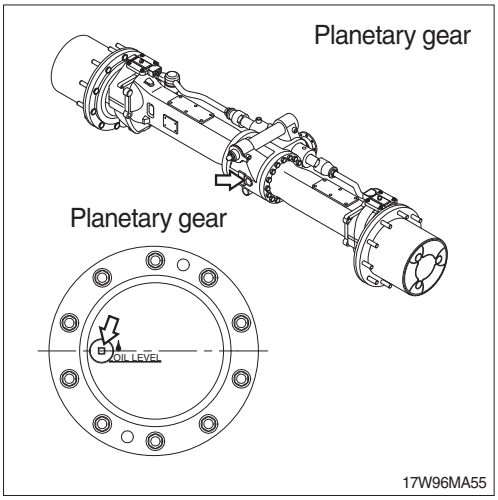
· Oil amount

Description	Capacity
Front axle differential gear	10.5 ℓ (2.77 U.S. gal)
Front wide axle differential gear	11.6 ℓ (3.06 U.S. gal)
Rear axle differential gear	12.5 ℓ (3.30 U.S. gal)
Rear wide axle differential gear	14.0 ℓ (3.70 U.S. gal)
Planetary gear case (each)	2.5 ℓ (0.66 U.S. gal)

(6) Supply oil until it overflows from the oil filler, then install the plug.

⚠ **As the machine is hot after operation, wait until the temperature has dropped.**

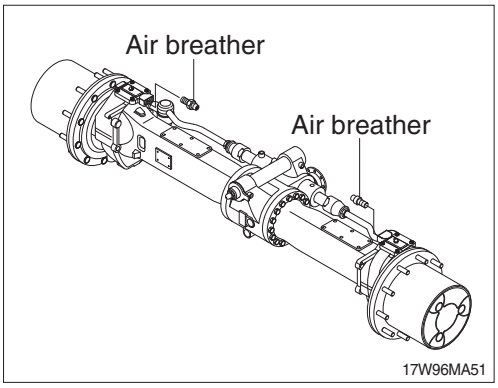
※ **If a work requires frequent use of brake, replace it earlier than normal change interval.**



37) CLEANING AXLE BREATHER

(1) Remove dust or debris around the breather.

(2) Remove the breather and wash it with cleaning oil.



38) CHECK AND SUPPLYING TRANSMISSION OIL

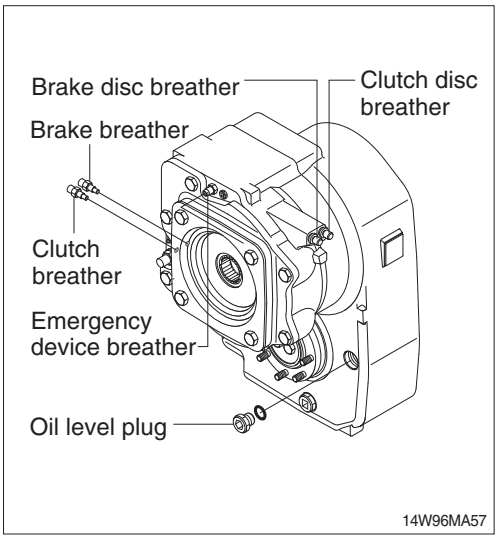
(1) Move the machine to flat ground.

(2) Open the transmission air breather to relieve internal air pressure.

(3) Remove the plug and check the oil amount.
If the oil level is at the hole of the plug, it is normal.

(4) If the oil level is below the plug hole, supply oil through a plug hole.

⚠ As the machine is hot after operation, wait until the oil temperature has dropped.



39) CHANGE THE TRANSMISSION OIL

(1) Place a drain box under drain plug to catch oil.

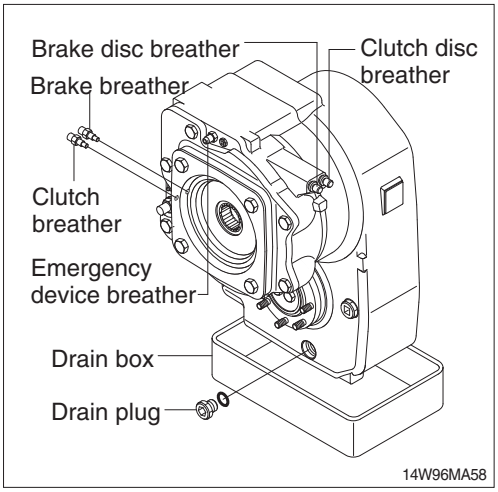
(2) Open the transmission air breather to relieve internal air pressure.

(3) Remove the drain plug to drain oil.

(4) Wash drain plug and install it.

(5) Supply oil into the transmission case.
- Oil amount : 2.5 ℓ (0.7 U.S. gal)

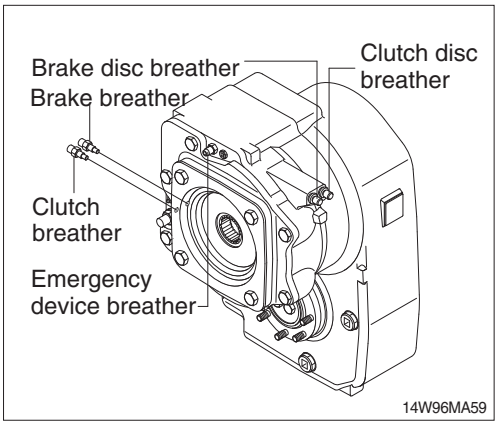
⚠ As the machine is hot after operation, wait until the temperature has dropped.



40) CLEANING TRANSMISSION AIR BREATHER

(1) Remove dust or debris around the air breather.

(2) Remove the air breather and wash it with cleaning oil.



41) REPLACEMENT OF BUCKET

⚠ **When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.**

※ **When the bucket is removed, place it in a stable condition.**

※ **When performing joint work, make sure signals to each other and work carefully for safety's sake.**

(1) Lower the bucket on the ground as the picture shown in the right.

(2) Lock the safety knob to the LOCK position and stop the engine.

(3) Remove the stopper bolts (1) and nuts (2), then remove pins (3, 4) and remove the bucket.

※ **When removing the pins, place the bucket so that it is in light contact with the ground.**

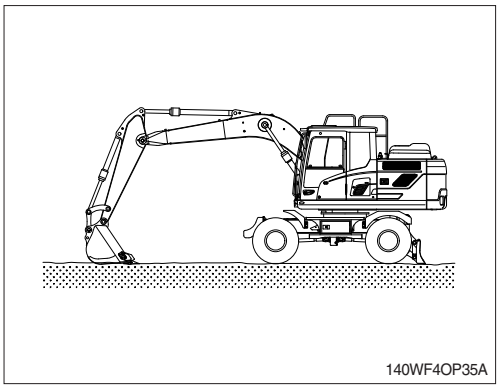
※ **If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.**

※ **After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.**

(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins (3, 4)

※ **When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture. After knocking the pin, move the O-ring down to the regular groove.**

(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.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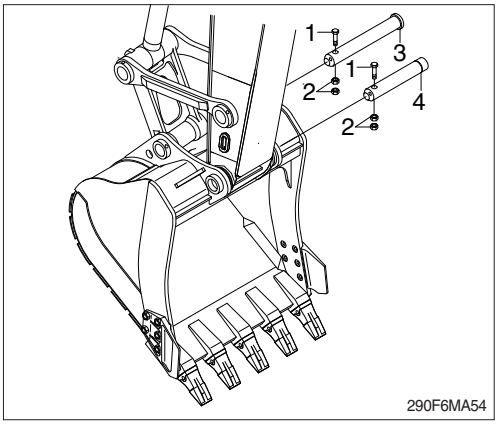

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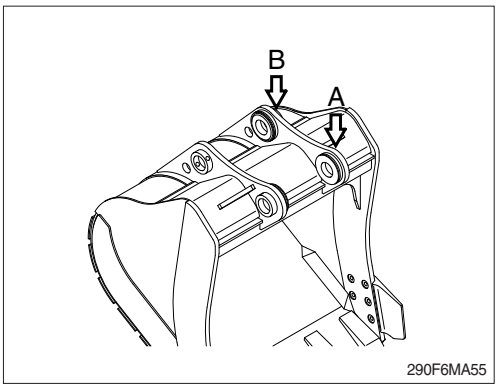

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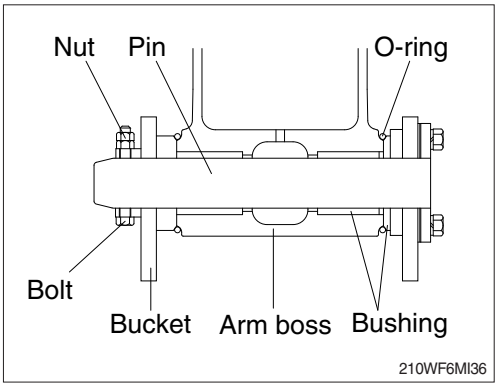

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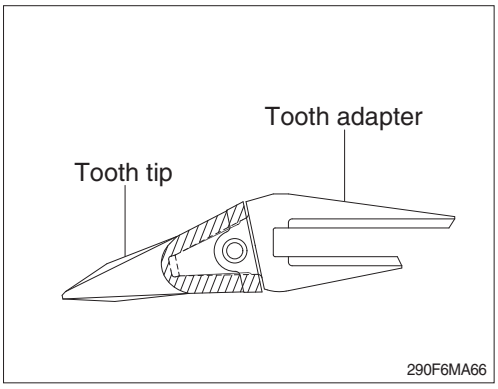
42) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

① Check wearing condition as shown in the illustration and replace tooth tip before adapter starts to wear.

② If excessive use, tooth adapter has worn out, replacement may become impossible.



(2) Instructions for replacement

① Pull out pin by striking pin with punch or hammer, avoiding damage to locking washer.

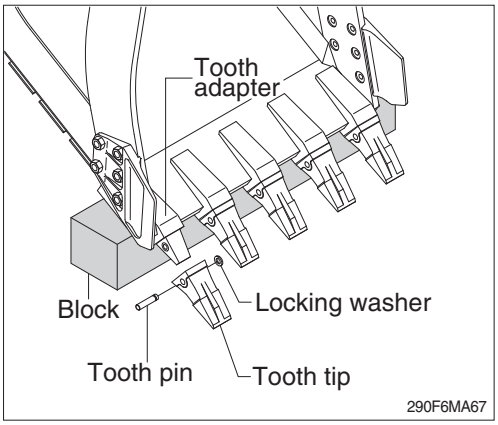
② Remove dust and mud from surface of tooth adapter by using knife.

③ Place locking washer in its proper place, and fit tooth tip to adapter.

④ Insert pin until locking washer is positioned at tooth pin groove.

⚠ Personal injury can result from bucket falling.

⚠ Block the bucket before changing tooth tips or side cutters.



43) ADJUSTMENT OF BUCKET CLEARANCE

(1) Lower the bucket on the ground as the picture shown in the right.

(2) Swing to the left and keep the arm boss to be contact to the bucket left.

(3) Lock the safety knob to the LOCK position and stop the engine.

(4) Measure the clearance (A) between bucket and arm boss. This is the total clearance.

(5) Adjusting

① Loosen bolt (2), and remove washer (3), plate (1) and shim (4).

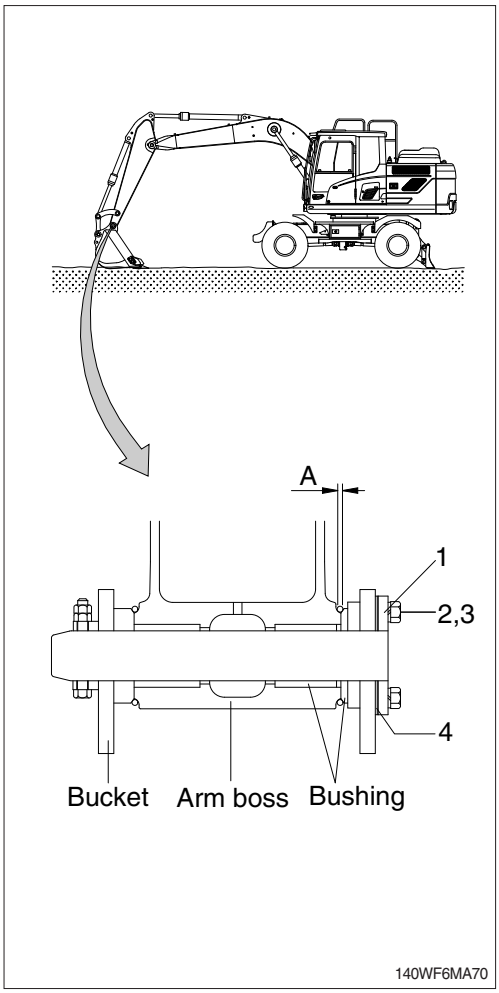
② Remove the shim equivalent value with measuring value.

③ Assemble the parts in the reverse order of removal.

· Tightening torque : 29.6±3.2 kgf · m
(214.0±23.1 lbf · ft)

· Normal clearance : 0.5 ~ 1.0 mm
(0.02 ~ 0.04 in)

※ If the bucket is not adjusted correctly, noise and vibration created during operation, and damaged O-ring, pin and bushing quickly.



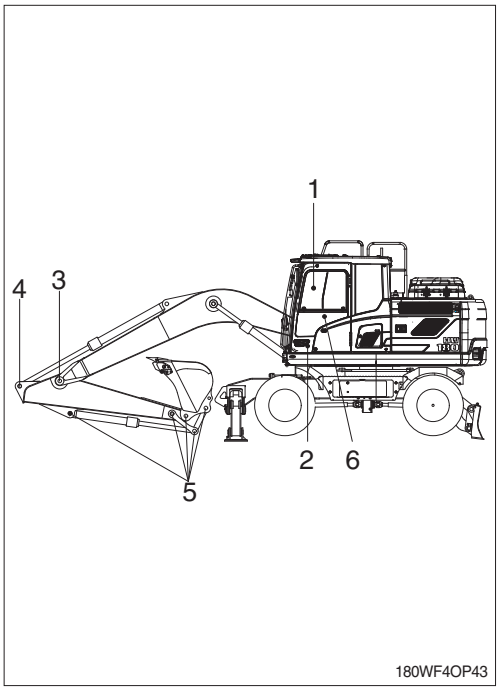
44) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

Lubricate the grease to the grease nipple according to the lubricating interval.

No.	Description	Qty
1	Lubrication manifold at boom	5
2	Boom cylinder pin	2
3	Boom and arm connection pin	1
4	Arm cylinder pin (Rod side)	1
5	Bucket cylinder pin (Head, rod)	2
	Bucket link (Control rod)	3
	Arm and control link connection pin	1
	Arm and bucket connection pin	1
6	Boom rear bearing center	1

※ **Shorten lubricating interval when working in the water or dusty place.**



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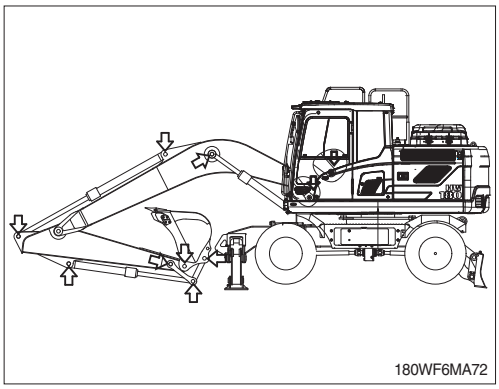
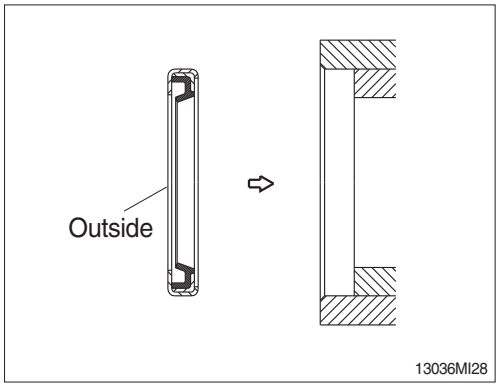
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

※ **Mount the lip to be faced outside when replace the dust seal.**


180WF6MA72

※ **If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.**

※ **Assemble the seal same direction with picture and use with plastic hammer when replace.**



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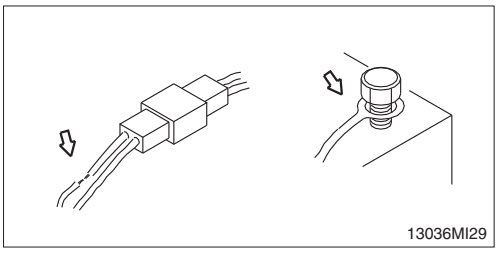
7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Clean

① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ Battery gas can explode. Keep sparks and flames away from batteries.

⚠ Always wear protective glasses when working with batteries.

⚠ Do not stain clothes or skin with electrolyte as it is acid.
Be careful not to get the electrolyte in eyes. Wash with clean water and go to the doctor if it enters the eyes.

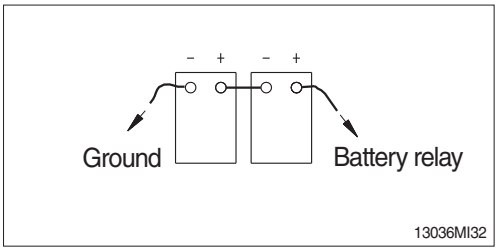
(2) Recycle

Never discard a battery.
Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

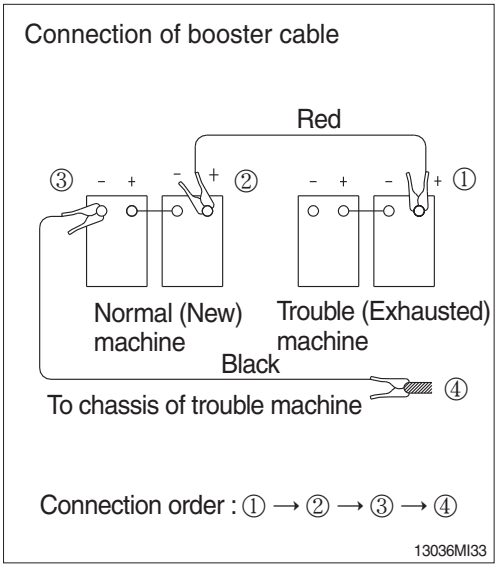
※ **Use the same capacity of battery for starting.**

① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.

② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.

③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

※ **Keep firmly all connection, the spark will be caused when connecting finally.**

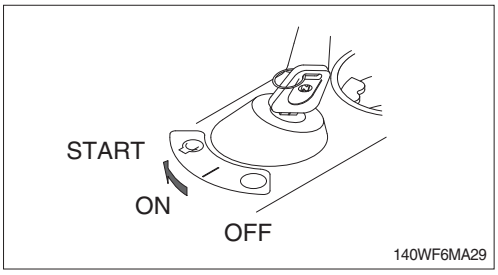


(2) Starting the engine

① Starting the engine of the normal machine and keep it to run at high idle.

② Start engine of the trouble machine with starting switch.

③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

① Take off the booster cable (black).

② Take off the booster cable (red) connected to the (+) terminal.

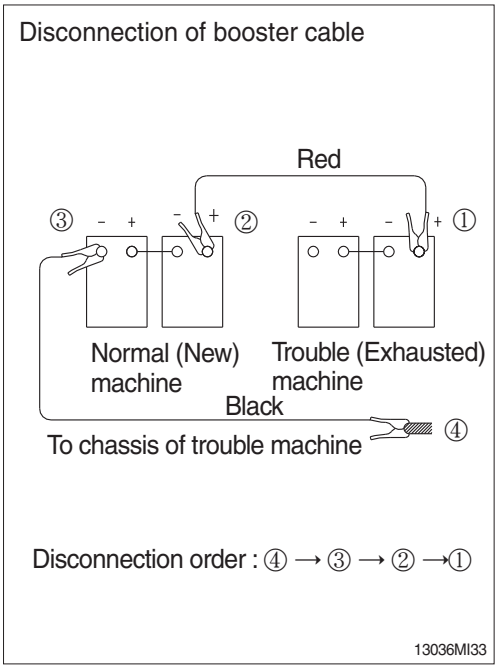
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ **Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.**

※ **Charge the battery in the well ventilated place.**

※ **Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.**

※ **Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.**



(4) Welding repair

Before start to welding, follow the below procedure.

① Shut off the engine and remove the starting switch.

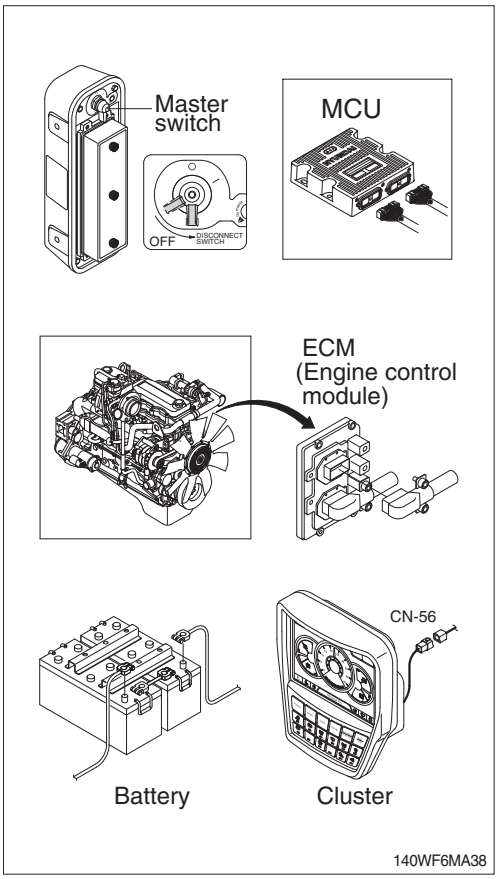
② Disconnect ground cable from battery by master switch.

③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, cluster etc).

④ Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

※ **Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.**

⚠ **Do not attempt to welding work before carry out the above.**
If not, it will caused serious damage at electric system.

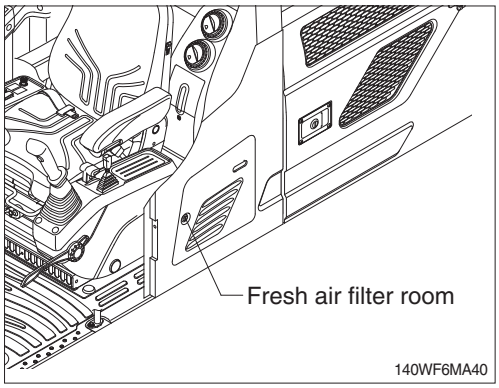


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

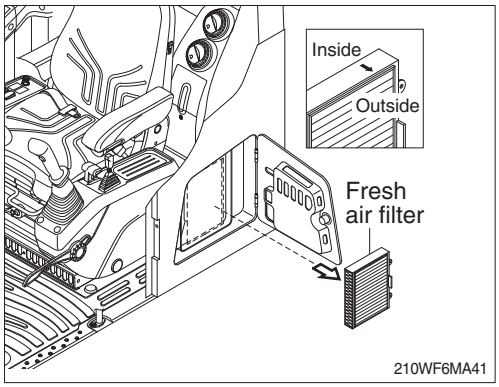
※ **Always stop the engine before servicing.**

(1) Open the LH side cover.



(2) Remove the fresh air filter.

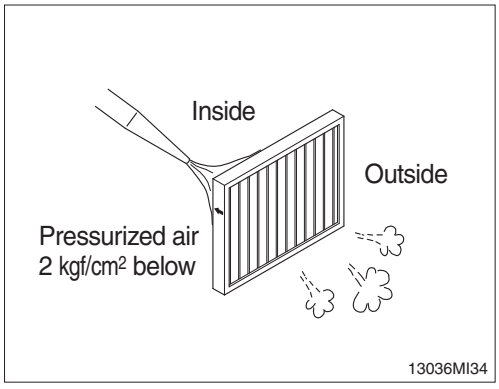
※ **When installing a filter, be careful not to change the filter direction.**



(3) Clean the filter using a pressurized air (below 2 kgf/cm², 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

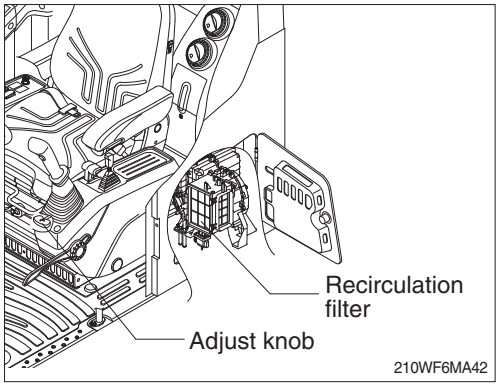
(4) **Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.**



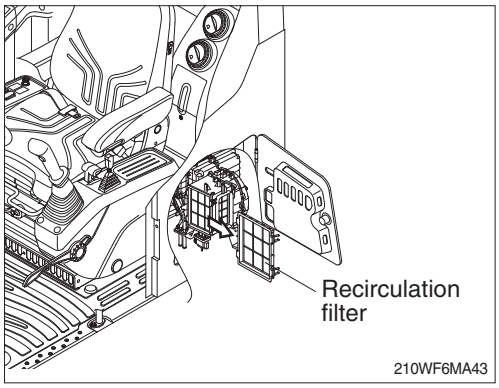
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

※ **Always stop the engine before servicing.**

(1) Move seat and console box to arrow direction using the adjust lever.



(2) Remove recirculation filter.

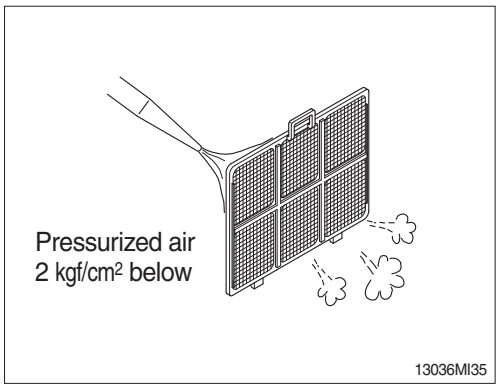


(3) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

△ **When using pressurized air, be sure to wear safety glasses.**

※ **Dry off after washing with water.**

(4) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



3) PRECAUTIONS FOR USING AIR CONDITIONER

(1) When using the air conditioner for a long time, open the window once every one hour.

(2) Be careful not to overcool the cab.

(3) The cab is properly cooled if the operator feels cool when entering there from outside (about 5˚C lower than the outside temperature).

(4) When cooling, change air occasionally.

4) CHECK DURING SEASON

Ask the service center for replenishment of refrigerant or other maintenance service so that the cooling performance is not damaged.

5) CHECK DURING OFF-SEASON

Operate the air conditioner 2 or 3 times a month (each for a few minutes) to avoid loss of oil film in the compressor.

6) Refrigerant (R134-a) amount : 650 ± 20 g