8 SCHEDULED MAINTENANCE

Maintenance service (MS) is necessary to keep the tractor in good condition during operation.

Failure to maintain the prescribed frequency and low quality of MS results in a greatly reduced life of the tractor, in an increase in the number of failures, a fall in the engine power and higher costs of operating the tractor. The operator must daily check the tractor, preventing loosening of the fasteners, leaks of fuel, fluids and oil, accumulation of dirt and other deposits, which can cause a fault, fire or accidents.

Caution! If no special instructions are available, stop the engine and engage the parking brake before any MS works, adjustments, etc. If guards and casings were removed, make sure that they are installed to their respective places before you start working on the tractor.

IMPORTANT! Observe the rules of storage and disposal of waste. Never pour liquids to the soil. Use special containers for safe storage of waste.

Refill capacities, l

Engine crankcase / lubrication system	18/22
Engine cooling system (OZH-40 or OZH-65 or Tosol-A40M/A65M)	24
Transmission	43
Fuel pump*	0.25
FDA wheel reduction gear (each)	2.0
FDA final drive	3.9
Hydraulic system oil tank	22.0
HSU oil tank	7.5
Fuel tank	140
Auxiliary fuel tank (if installed)	120
Service brake master cylinder tank (BELARUS-1221V.2)	0.20
Clutch master cylinder tank (BELARUS-1221V.2)	0.20
Left wet brake and DL clutch housing	1.50
Right wet brake and parking brake housing	1.00

* Refilling the fuel pump with oil is required when installing a new or repaired one.

Recommended fuels, oils, lubricants and special liquids

Table

Item reference	Title of the assembly unit	Quantity of assembly units, items.	Name and designation of fuel and lubrication materials				Weight (volume) of FLM, Filled in the tractor when change or refill is needed, kg (dm^3)	Change intervals FLM, hours	Remarks
			Basic	Backup	Auxiliary	Foreign-made			
1	2	3	4	5	6	7	8	9	10
1.1 [1)]	Fuel tank 1)	1	At ambient temperature of 0ºC and more				(140±1)	Filled every shift	1221.2/1221B.2/ 1221T.2/1221.3
		2	Diesel fuel STB 1658-2006 with sulfur content not exceeding 350 mg/kg (0.035%) Grade B	Not available	Blended biodiesel fuel of BDL-V-10, BDL-V-50 TU BY 500036524. 121-2008	Diesel fuel EN 590:2004 with sulfur content not exceeding 350 mg/kg (0.035%)	(260±1,5)		1221.2 with add.tank
		2					(250±1,5)		1222B/1222.3/ 1223
		2	At ambient temperature of minus 5 ºC and more						
			Diesel fuel STB 1658-2006 with sulfur content not exceeding 350 mg/kg (0.035%) Grade C	Not available	Blended biodiesel fuel of BDL-V-10, BDL-V-50 TU BY 500036524. 121-2008	Diesel fuel EN 590:2004 with sulfur content not exceeding 350 mg/kg (0.035%)			
			At ambient temperature of minus 20 ºC and more						
			Diesel fuel STB 1658-2006 with sulfur content not exceeding 350 mg/kg (0.035%) Grade F	Not available	Blended biodiesel fuel of BDL-V-10, BDL-V-50 TU BY 500036524. 121-2008	Diesel fuel EN 590:2004 with sulfur content not exceeding 350 mg/kg (0.035%)			
1.2	Fuel tank 2)	2	At ambient temperature of 0ºC and more						
		2	Diesel fuel STB 1658-2006 with sulfur content not exceeding 50 mg/kg (0.005%) Grade B	Not available	Not available	Diesel fuel EN 590:2004 with sulfur content not exceeding 50 mg/kg (0.005%)	(140±1,5)	Filled every shift	1221.4
		2					(250±1,5)		1222.4
			At ambient temperature of minus 5 ºC and more						
			Diesel fuel STB 1658-2006 with sulfur content not exceeding 50 mg/kg (0.005%) Grade C	Not available	Not available	Diesel fuel EN 590:2004 with sulfur content not exceeding 50 mg/kg (0.005%)			
			At ambient temperature of minus 20 ºC and more						
			Diesel fuel STB 1658-2006 with sulfur content not exceeding 50 mg/kg (0.005%) Grade F	Not available	Not available	Diesel fuel EN 590:2004 with sulfur content not exceeding 50 mg/kg (0.005%)			

1	2	3	4	5	6	7	8	9	10
2 **Oils**									
2.1	Diesel engine crankcase [3)]	1	In summer				(18,0±0,18)	250	1221.2/1221B.2 1221.3/1221T.2 1222B/1222.3 1223
			Motor oil Lukoil-Avangard SAE 15W-40	Motor oils M-10DM, M-10G$_{2K}$ GOST 8581—78	Not available	Castrol Turbomax SAE 15W-40 Hessol Turbo Diesel SAE 15W-40 Essolube XD-3 + Multigrate Shell Rimula TX Shell Rimula Plus Teboil Super NPD (power) Royal Triton QLT (U 76) Neste Turbo LE Mobil Delvac 1400 Super Ursa Super TD (Texaco)			
			In winter						
			Motor oil Lukoil-Super SAE 5W-40	Motor oils M-8DM, M-8GK2 GOST 8581—78	Not available	Shell Helix Diesel Ultra SAE 5W-40 Hessol Turbo Diesel SAE 5W-40 API CF-4			
2.2	Diesel engine crankcase [3)] D-260.1S3A D-260.2S3A D-260.4S3A	1	In summer				(18±0,18)	250	1222.4/1221.4
			Motor oil «Lukoil-Lux» SAE 10W-40 semisynthetics	Not available	Not available	Motor oils Liqui Moly Super Leichtlauf SAE 10W-40, BP Visco 3000 SAE 10W-40, Shell Helix plus SAE 10W-40, Elf Competition SX SAE 10W-40, Agip 2000 GPX SAE 10W-40, Esso ultra oil X SAE 10W-40, Mobil Super Formula SAE 10W-40			
			In winter						
			Motor oil "Lukoil-Sythetic" SAE 5W-40	Motor oil Lukoil-Super SAE 5W-40	Not available	Motor oils Liqui Moly Diesel Synthoil SAE 5W-40, Ethyl Hitec 5909, Castrol TXT Softec Plus, Elf synthese SAE 5W-40, Esso Ultron SAE 5W-40, Shell Helix Ultra SAE 5W-40, Mobil 1 Rally Formula SAE 5W-40			
2.3	Diesel engine crankcase TCD2012 L062V ---------- TCD2013-L062V	1	At ambient temperature from minus 15 ºC to plus 40 ºC				(17±1) Filter (0,5 L)	500	1222.4 1221.4
			REPSOL THPD SAE 15W-40	HESSOL Turbo Diesel SAE 15W-40 API CI-4	Not available	According to engine operating manual			
			At ambient temperature from minus 20 ºC to plus 40 ºC						
			REPSOL UHPD SAE 10W-40	HESSOL Super Longlife SAE 10W-40 API CI-4	Not available	According to engine operating manual			
			At ambient temperature from minus 20 ºC and more						
			HESSOL Turbo Diesel SAE 5W-30 API CI-4	Not available	Not available	According to engine operating manual			

1	2	3	4	5	6	7	8	9	10
2.4	High-pressure fuel pump	1	The same motor oil as in engine crankcase				(0,25±0,01) (0,15±0,01) (0,25±0,01) (0,25±0,01) (0,22±0,01) (0,36±0,01)		When new or repaired pump is mounted : «НЗТА» 4УТНИ «НЗТА» 4УТНИ-Т «YAZDA» «Motorpal» PP4M10P1f «Motorpal»PP6M10P1f, «Motorpal PP6M10P1i
2.5	Transmission housing (coupling cflutch, GB and rear axle)	1	Motor oil M-10G2 GOST 8581—78 (in summer) Motor oil M-8G2 GOST 8581—78 (in winter)	Motor oil M-10B2 GOST 8581—78 Motor oil M-10G2k (in summer) GOST 8581—78 Motor oil M-8G2k (in winter) GOST 8581—78	The same motor oil as in engine crankcase	Motor oil SAE 15W-40 (in summer) SAE 5W-40 (in winter)	(43±0,4) Oil level shall be in this case between the marks «П» and «П»+7mm	Seasonal, but at least every 1000 (250)	1221 and modification 1223
							(55±0,4)		1221 and modification 1223
2.6	Brake housing	2	Motor oil M-10G2 GOST 8581—78 (in summer) Motor oil M-8G2 GOST 8581—78 (in winter)	Motor oil M-10B2 GOST 8581—78 Motor oil M-10G2k (in summer) GOST 8581—78 Motor oil M-8G2k (in winter) GOST 8581—78	Motor oil, the same as in transmission housing	Motor oil, same as in transmission housing	(2,5±0,1) Till the level of check plugs	1000 (500)	1221.2/ 1221B.2/1221.3/ 1221.4 1222B/1222.3/ 1222.4/1222B.4 1223

1	2	3	4	5	6	7	8	9	10
2.7	FDA housing (portal, planetary/parallel-shaft, with long beam)	1	TAp-15V transmission oil State Standard GOST 23652—79	TAD-17i transmission oil, TSp-15K State Standard GOST 23652—79, TEP-15M TU 38.401-58-305-2002	Not available	HESSOL BECHEM HYPOID SAE 80W-90 API GL5/GL4	(3,9±0,04)	1000	1221 and modification 1223
	FDA housing (portal, planetary/parallel-shaft, with solid beam)	1	TAp-15V transmission oil State Standard GOST 23652—79	TAD-17i transmission oil, TSp-15K State Standard GOST 23652—79, TEP-15M TU 38.401-58-305-2002	Not available	HESSOL BECHEM HYPOID SAE 80W-90 API GL5/GL4	(4,5±0,04)	1000	1222B/1222.3/ 1222.4/1222B.4 1223 .
	FDA wheel reduction gear housing (portal, planetary/parallel-shaft)	2	TAp-15V transmission oil State Standard GOST 23652—79	TAD-17i transmission oil, TSp-15K State Standard GOST 23652—79, TEP-15M TU 38.401-58-305-2002	Not available	HESSOL BECHEM HYPOID SAE 80W-90 API GL5/GL4	(4,0±0,04)	1000	1221 and modification 1223
2.8	Front PTO reduction unit	1	TAp-15V transmission oil State Standard GOST 23652—79	TAD-17i transmission oil, TSp-15K, TSp-10 State Standard GOST 23652—79, TEP-15M TU 38.401-58-305-2002	Motor oil M-10G2 State Standard GOST 8581—78	HESSOL BECHEM HYPOID SAE 80W-90 API GL5/GL4	(4,3+0,2)	1000	1221 and modification 1223
2.9	Tank of HLL with hydraulic units [4)]	1	Multigrade oils Hydraulic oil BECHEM Staroil No. 32 TU 903.201.042-05 ADDINOL Hydraulikol HLP 32 TU 903.201.044-05 TNK Gidravlik HLP 32 TU 236.915.052-08 VITTOL HLP-32 [5)]	Not available	Not available	Not available	(28,5±0,5) (30,0±0,5)	1000 First change 500	1221.2/1221T.2 1221B.2/1221.3/ 1221.4 1222B/1222.3/ 1222.4 1223
2.10	HSU tanks with hydraulic units (cylinder, metering pump)	1	Multigrade oils Hydraulic oil BECHEM Staroil No. 32 TU 903.201.042-05 ADDINOL Hydraulikol HLP 32 TU 903.201.044-05 TNK Gidravlik HLP 32 TU 236.915.052-08 VITTOL HLP-32 [5)]	Not available	Not available	Not available	(7,5±0,35) (8,5±0,35) (13,5±0,35) (14,5±0,35) (14,0±0,35)	1000 First change 500	1221.2/1221T.2/ 1221.3/1221.4 (with MMZ engine) 1221B.2 1222.3/1222.4/1223 1222B 1221.4 (with Deutz engine)

1	2	3	4	5	6	7	8	9	10
3 Lubricants									
3.1	Cooling system pump (bearings zone)	1	Grease Litol-24-МЛи 4/12-3 GOST 21150-87	Not available	Not available	Shell Alvania, Shell Tivela	0,05 ±0,003	One time	Filled by the manufacturer, and refill during the operation is not required
3.2	Clutch release yoke bearing	1	Grease Litol-24 GOST 21150-87	BECHEM LCP-GM	Lubricant Solid oil C GOST 4366-76 or Lubricant Solid oil Ж GOST 1033-79	BECHEM LCP-GM	0,02 ±0,001	250	1221 and modification 1223
3.3	FDA reducing gear pivot axle bearing	4	Grease Litol-24 GOST 21150-87	BECHEM LCP-GM	Lubricant Solid oil C GOST 4366-76 or Lubricant Solid oil Ж GOST 1033-79	BECHEM LCP-GM	0,12 ±0,006	125	1221 and modification 1223
3.4	Bearings of FDA propshaft cross	1	Grease №158M TU 38.301-40-25-94	Lubricant AZMOL №158 TU U 00152365. 118-2000	Not available		0,0056 ±0,001	One time	Filled by the manufacturer, and refill during the operation is not required
3.5	Front drive shaft spider bearing of the twin hinged joint	2	Grease №158M TU 38.301-40-25-94	Lubricant AZMOL №158 TU U 00152365. 118-2000	Not available		0,0112 ±0,001	One time	Filled by the manufacturer, and refill during the operation is not required
3.6	Swivel of steering hydraulic cylinder	4	L Grease Litol-24 GOST 21150-87	BECHEM LCP-GM	Not available	BECHEM LCP-GM	0,05 ±0,003	250	1221 and modification 1223
3.7	Rear hitch linkage brace [6)]	2	Grease Litol-24 GOST 21150-87	BECHEM LCP-GM	Lubricante grasa lubricante C GOST 4366-76 ó Lubricante grasa lubricante Ж GOST 1033-79	BECHEM LCP-GM	0,02 ±0,001	500	1221 1223 and modification
310	Spline joints of FPTO	1	Graphite grease GOST 3333-80	Not available	Not available	Not available	0,01 ±0,001	500	12213 and modification 1223
311	Steering link joint	2	Grease Litol-24 GOST 21150-87	BECHEM LCP-GM	Not available	BECHEM LCP-GM	0,02 ±0,001	1000	1221 and modification 1223

1	2	3	4	5	6	7	8	9	10
4 Special fluids									
4.1	Clutch hydraulic drive tank and cylinders	1 2	Hydraulic-brake fluid “Neva-M” ТУ 2451-053-36732629-2003	Not available	Not available	DOT3, DOT4 (Germany)	(0,4±0,1) (0,4±0,1) (0,8±0,2)	1000 (8-10)	1222.3/1222.4 1223 1221B.2 1222B/1222B.4
4.2	Brake hydraulic drive tank and cylinders	2 3	Hydraulic-brake fluid “Neva-M” ТУ 2451-053-36732629-2003	Not available	Not available	DOT3; DOT4 (Germany)	(0,8±0,1) (0,4±0,1) (1,2±0,3)	1000 (8-10)	1222.3/1222.4 1223 1221B.2 1222B/1222B.4
4.3	Cooling system (with heat exchanger) of MMW engines		Low-freezing cooling fluid «Tosol Dzerzhinski TS-40» (up tp minus 40 C), «Tosol Dzerzhinski TS-65» (up to minus 65 C) TU 2422-050-36732629-2003	Liquido refrigerante ОЖ-40 (hasta menos 40°C), ОЖ-65 (hasta menos 65°C), GOST 28084-89	Not available	MIL-F-5559 (BS 150), (USA) FL-3 Sort S-735, (England)	(33,5±0,5)	1 vez 2 años	1221.2/1221T.2 1221B.2 1221.3/1221.4 1222B/1222.3/ 1222.4/1222B.4 1223
	Cooling system of diesel engine TCD2013L062V				Not available	MIL-F-5559 (BS 150), (USA) FL-3 Sort S-735, (England)			1221.4 1222.4/1222B.4

Maintenance after running-in (30 service hours)

1. Inspect and wash the tractor.
2. Listen how all components of the tractor operate.
3. Check tightening of the cylinder head fastening bolts (Operation 36).
4. Check clearance between valves and rockers (Operation 22).
5. Clean the impellers of the engine centrifugal oil filter and the gearbox (Operations 13, 14). Clean the GB strainer (Operation 16).
6. Check the generator belt tension (Operation 8).
7. Discharge sediment from fuel tanks, coarse and fine filters of the engine (Operations 7, 23).
8. Check and, if necessary, adjust the clutch, brake pedal free travel and the air system (Operations 26, 26a, 28, 28a).
9. Check condition of the batteries, clean the terminal connections and vent holes (Operation 29).
10. Change the oil in:

- engine crankcase (Operation 17),
- power train housings (Operation 42),
- wheel reduction gears and FDA final drive (Operation 43).

11. Replace the paper filter elements of the engine and hydraulic system filters (Operations 18, 32).
12. Lubricate the clutch release yoke bearing (Operation 19).
13. Discharge condensate from pneumatic system receivers (Operation 5).
14. Check and as necessary restore the tightness of the air cleaner and intake (Operation 24).
15. Check and as necessary tighten the external threaded connections (Operation 41).
16. Check operation of the engine, steering, brakes, controls, illumination and signaling systems (Operation 5a).
17. Lubricate the bearings of FDA wheel reduction gear supports (Operation 10).
18. Lubricate the pivots of the steering cylinders (Operation 9).

Maintenance table

Nos. of operations	Contents of works	Interval, every hrs						
		10	125	250	500	1,000	2,000	total
1	Oil level in engine	×						
2	Coolant level in engine	×						
3	Oil level in hydraulic system tank	×						
3a	Oil level in HSU tank	×						
4	Transmission oil level	×						
5	Remove condensate from cylinder of pneumatic system	×						
5a	Check operation of the engine, HSU, brakes and instruments	×						
6	Check fluid level in the housings of main cylinders of clutch and service brake control drives (BELARUS-1221V.2)	×						
6a*	Check fastening of air conditioner hoses	×						
6b*	Check/clean air conditioner condenser	×						
6c*	Check/clean air conditioning drainage pipes	×						
6d*	Remove condensate from the charge air cooler (CAC) tank of the engine (BELARUS-1221.3)	× winter	× summer					
6e	Check/adjust tension of drive belt of air conditioner compressor		×					
7	Discharge sediment from the coarse fuel filter and fuel tanks		×					
8	Check generator belt tension		×					
9	Lubricate steering cylinder pivots		×					
10	Lubricate bearings of FDA reducer kingpin axles		×					
11	Air pressure in tires		×					
12	Check the engine air cleaner		×					
12a	Check and tighten fasteners of wheel hubs and nuts		×					
13	Clean the centrifugal oil filter of the engine			×				
14	Clean the GB centrifugal oil filter			×				
15	Check the oil level in the hub casings and FDA final drive			×				
16	Rinse the GB oil strainer			×				
17	Change engine oil			×				
18	Replace the engine oil filter PFE			×				
19	Lubricate the clutch release yoke bearing			×				

Table, continued

Nos. of operations	Contents of works	Interval, every hrs						
		10	125	250	500	1,000	2,000	total
20	Turbocharger (tightening fasteners)			×				
21	Front wheel toe-in			×				
22	Check and adjust valve clearances in the engine				×			
23	Discharge sediment from the fuel fine filter of the engine				×			
24	Check tightness of connections of the air cleaner and intake				×			
25	Check oil level in the wet brake housings				×			
26	Adjust free travel of the clutch pedal (BELARUS-1221.2/1221.3)				×			
26a	Adjust free travel of the clutch pedal (BELARUS-1221V.2)				×			
27	Steering wheel play				×			
28	Brake pedal and parking brake lever travel				×			
28a	Brake pedal travel (BELARUS-1221V.2)				×			
29	Batteries				×			
30	Clean the filter of the air pressure regulator in the pneumatic system							
31	Check tightness of pneumatic system lines				×			
32**	Replace the oil filter of the hydraulic system				×			
32a**	Replace the HSU oil filter				×			
33	Clean generator				×			
34	Clean the cab heating and ventilation system filter				×			
34a*	Replace filter drain	Each 800 service hours or once a year						
35	Check bearings of FDA reducer kingpin axles				×			
35a	Check tightening of the clamp bolts of the CAC air ducts (BELARUS-1221.3)				×			
36	Tighten engine cylinder head fastening bolts					×		
37	Clean engine air cleaner					×		
38	Clean engine fuel coarse filter					×		
39	Replace the engine fuel fine filter PFE					×		
40	Play in HSU rod joint					×		
41	Check and tighten the outer bolted connections					×		

Table, continued

Nos. of operations	Contents of works	Interval, every hrs						
		10	125	250	500	1,000	2,000	total
42	Change oil in the transmission and the hydraulic system and HSU oil tanks					×		
43	Change oil in the FDA final drive and wheel reduction gears					×		
44	Lubricate the RHL right brace					×		
45	Lubricate the RHL arms pivoting shaft					×		
46	Check engine injectors					×		
47	Generator					×		
48	Bearings of the FDA reducer flange (check, adjust)					×		
49	Engine fuel pump						×	
50	Flush the engine cooling system						×	
51	Flush the engine air breathers						×	
52	Adjusting the engine centrifuge							×
53	Adjust oil pressure in the gearbox							×
54	Maintenance of the cab ventilation and heating system							×

* If an air-conditioner is installed

**Subsequent changes after 1,000service hours

Providing access to components for maintenance

Important! After the maintenance, set in place all removed guards and casings before starting work.

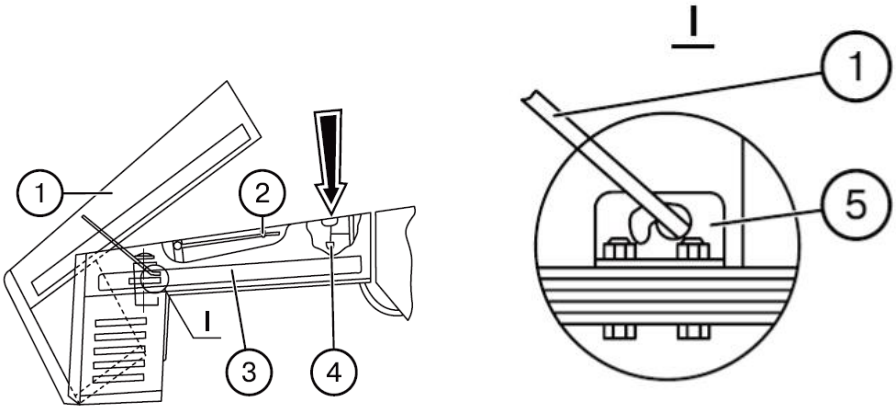
Hood (BELARUS-1221.2/1221V.2)

The hood is hinged in the front of the tractor to ensure its rapid tilting forward to access the engine components.

To raise the hood:

Pull the lever (4) of the latch (if you are at the left side of the tractor) and raise the hood (3).

Holding the hood with your right hand, release the bar (1) of the detent (2) and enter the free end of the bar (1) into the shaped notch in the bracket (5). See Fig. 8.1



Important! Make sure that the hood (3) is securely fixed in the raised position.

To lower the hood:

Slightly raise the hood to release the bar (1). Fix it with the detents (2).

Lower the hood and fix with the upper latch, applying a force from your hand in the direction of the arrow.

Hood (BELARUS-1221.3)

The mask and hood are hinged on supports located on the front of the frame immediately behind the heat exchanger block of engine cooling. The fastening of the mask and hood is designed to allow quickly opening them and thus having a quick access to separate units of the tractor.

To remove the left side panel (4) (fig.8.2), open two locks (7) on the left side and remove the side panels (4).

To remove the right side panel (5), open the two locks (7) on the right side and remove the side panel (5).

To open the hood 3 and lock it open, proceed as follows:

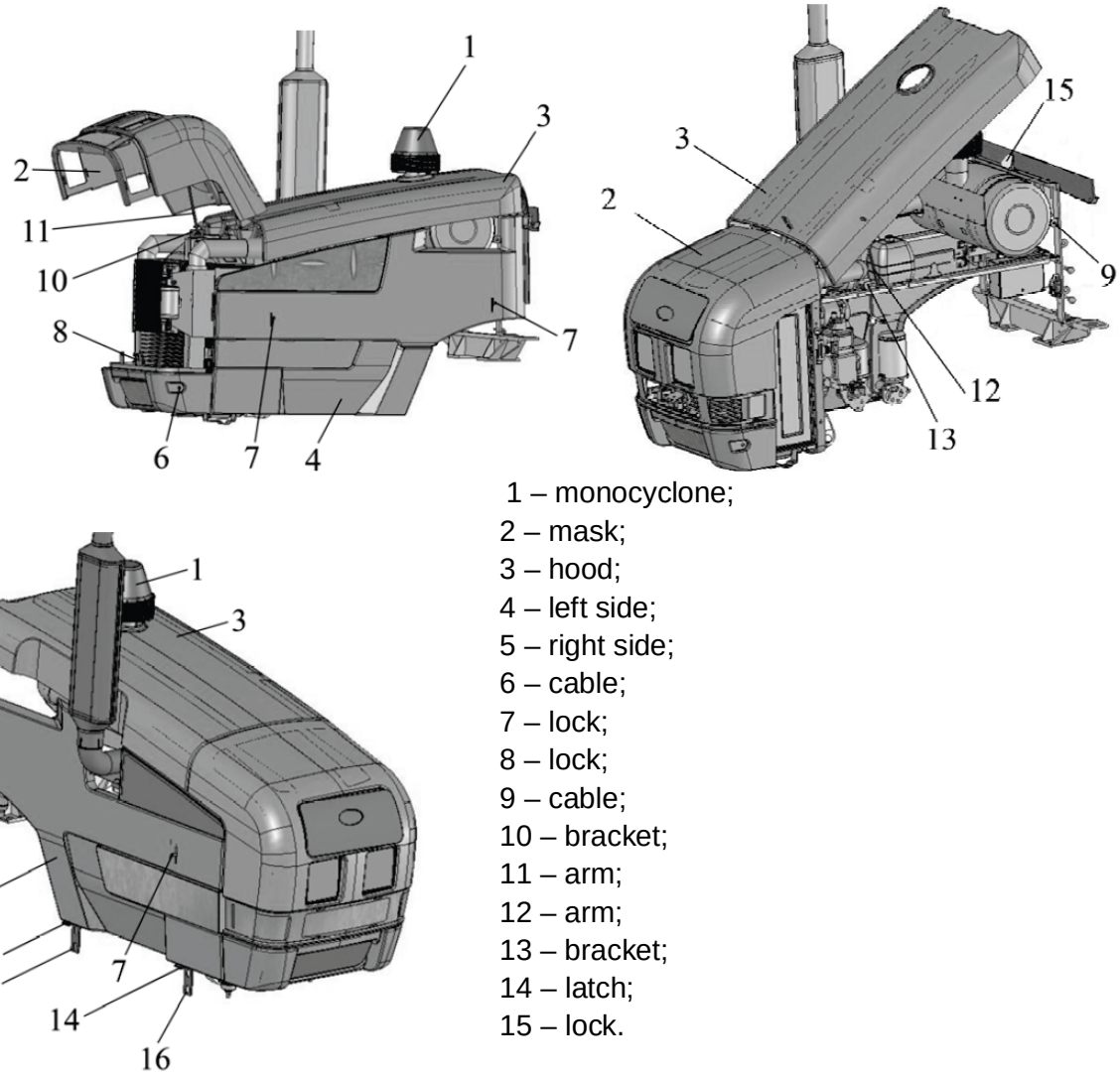
- close the mask (2) if it was in the open position;
- remove the monocyclone (1);
- open the lock (15) by pulling the cable (9);
- grip the edge of the hood (3) (near the cab) and open it to its highest position;
- fix the hood (3) with the rod (12) in the bracket (13).

To open the mask (2) and lock it in raised position, proceed as follows:

- close the hood 3 if was open;
- open the lock (8) by pulling the cable (6);
- grip the bottom edge of the mask (2) and open it to its highest position;
- fix the mask (3) with the rod (11) in the bracket (10).

Do not open the hood (3) and mask (2) simultaneously.

ATTENTION: before you start maintenance works in the area under the mask and hood, make sure they are securely locked open!



1 – monocyclone;
2 – mask;
3 – hood;
4 – left side;
5 – right side;
6 – cable;
7 – lock;
8 – lock;
9 – cable;
10 – bracket;
11 – arm;
12 – arm;
13 – bracket;
14 – latch;
15 – lock.

Fig. 8.2

To install the sides (4) and (5), proceed as follows:

- install the latches (14) of the sides to the seats on the brackets (16);
- fasten the sides (4), (5) with the locks (7).

To lower and close the hood (3), proceed as follows:

- slightly raise the hood (3) to release the rod (12);
- secure the rod (12) in the clamp on the hood (3);
- lower the hood (3) to its low position until a distinctive click is heard (the lock (15) engages);
- install the monocyclone (1);

To lower and close the mask (2), proceed as follows:

- slightly raise the mask (2) to release the rod (11);
- secure the rod (11) in the clamp on the mask;
- lower the mask (3) to its low position until a distinctive click is heard (the lock (8) engages);

SCHEDULED MAINTENANCE OPERATIONS

AFTER EVERY SERVICE 10 HOURS OR DAILY (WHICHEVER IS EARLIER)

Operation 1. Oil level in engine (fig.8.3)

Check the oil level, installing the tractor on an even surface and not earlier than 3-5 minutes after stopping the engine when the oil fully flows down to the crankcase:

Remove the oil level gauge from the right side of the engine, wipe it clean and reinsert it into place until it stops;

Remove the oil level gauge and determine the oil level. It must be between the top and bottom oil level gauge marks. As necessary, add oil through the filler neck, removing the cap.

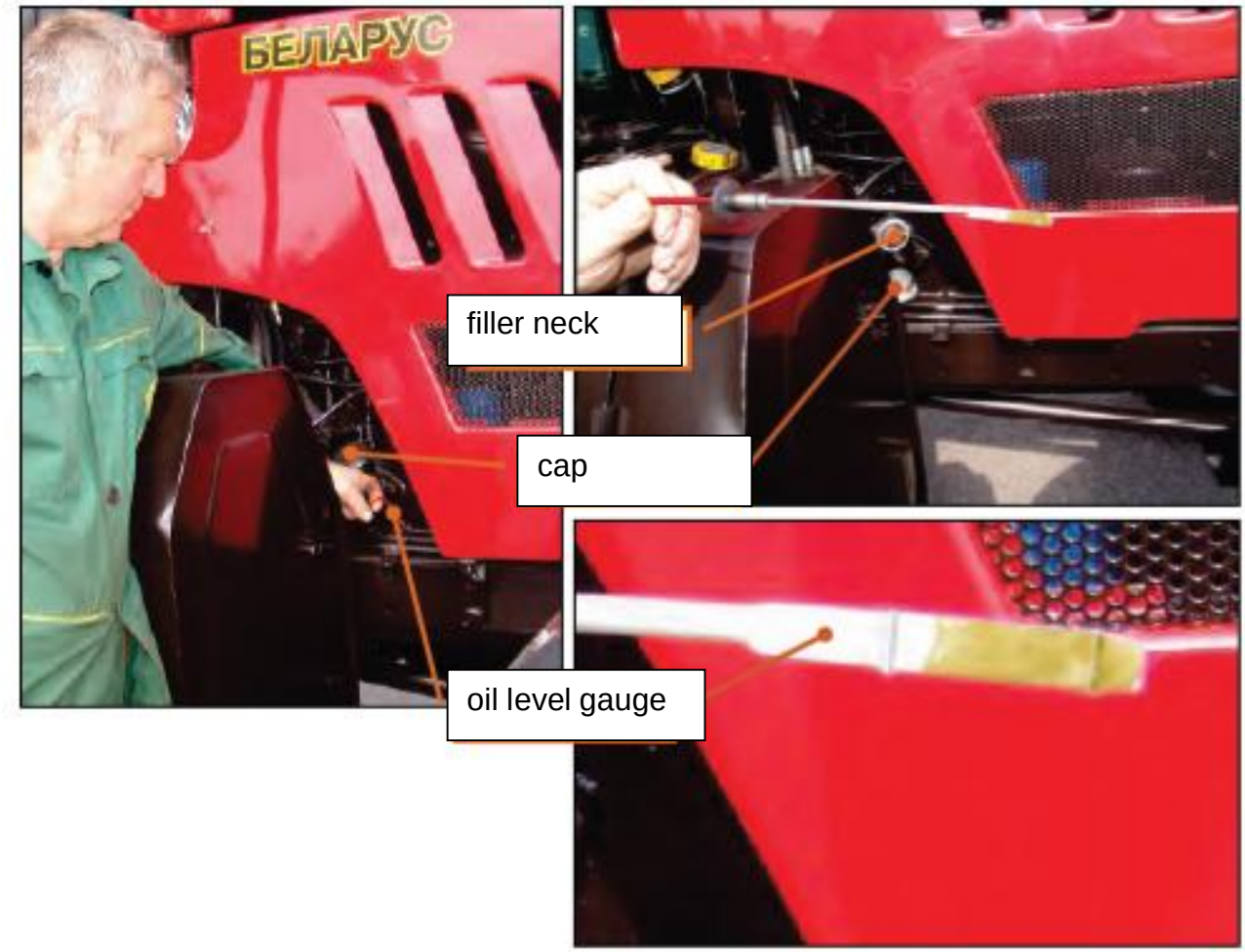


Fig.8.3

IMPORTANT! Do not operate the engine with the oil level below the bottom oil level gauge mark.

IMPORTANT! Do not add oil to a level above the top oil level gauge mark. Excessive oil will burn up, creating a false impression of high oil consumption for fumes.

Operation 2. Coolant level in engine

Caution! The engine cooling system operates under pressure which is maintained by a valve in the heat exchanger cap. It is dangerous to remove the cap on a hot engine. Let the engine cool down, put a thick cloth on the cap and, slowly opening the cap, remove the pressure from the system before you completely remove the cap. Avoid exposure of open parts of the body to hot coolant.

With a screwdriver blade inserted into the recess of the hatch (2) in the upper front part of the hood, tilt back the cover to gain access to the heat exchanger cap. Remove the cap, taking the above precautions, and check the coolant level that must be up to the upper end of the filler neck.

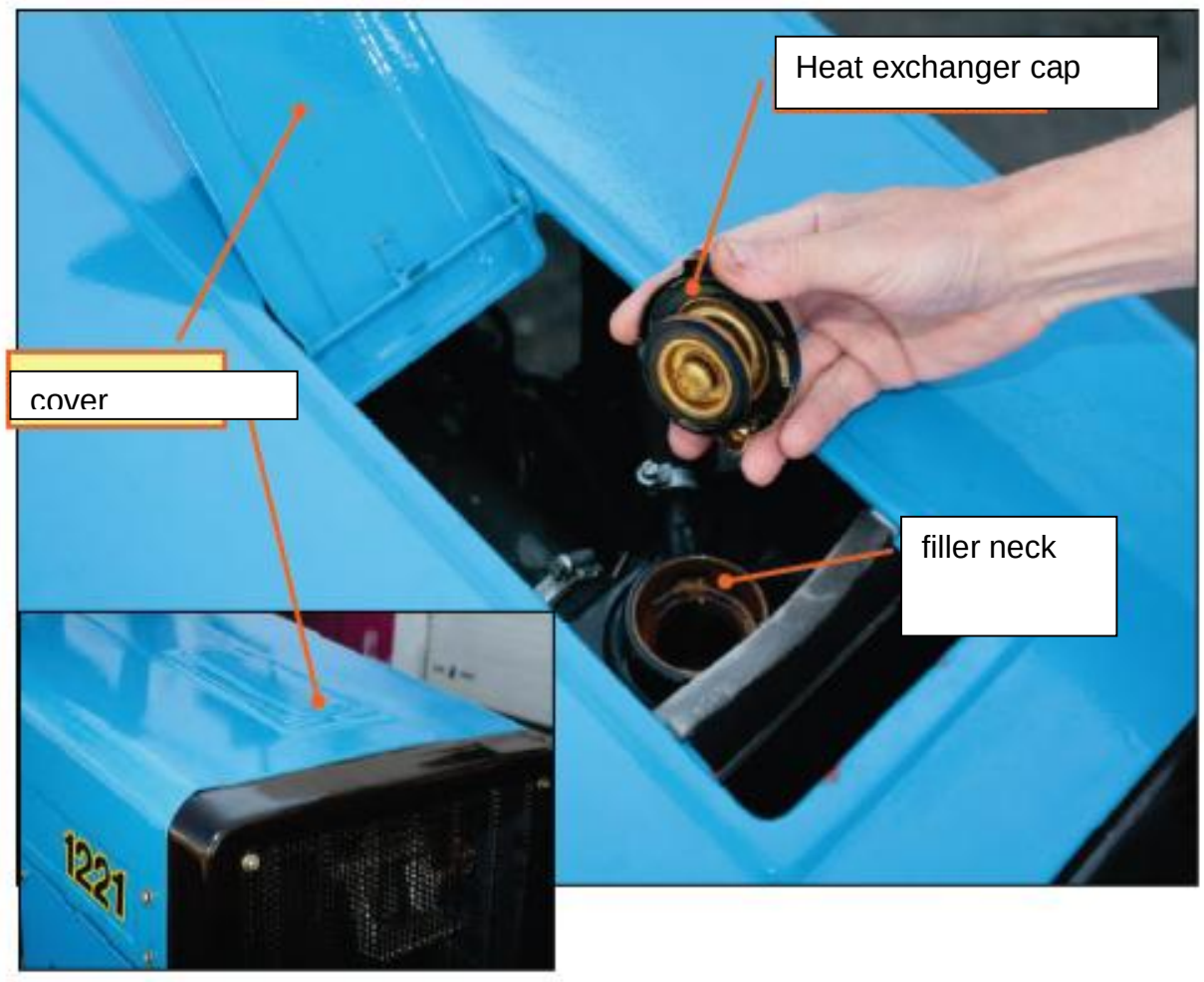


Fig. 8.4

IMPORTANT! Do not let the level drop lower than 40 mm from the upper end of the filler neck.

Operation 3. Oil level in hydraulic system tank (Fig. 8.5)

Before you check the oil level, install the tractor on a flat, horizontal surface. Stop the engine and brake the tractor with the parking brake.

Check the oil level in the hydraulic system tank by the oil gauge glass on the left side of the tractor. The level should be between the marks “0” and “П” ± 5 mm, and for machines that require high intake of oil, at the level of mark “С”. As necessary, add oil to the level of the mark “П”, removing the threaded cap.

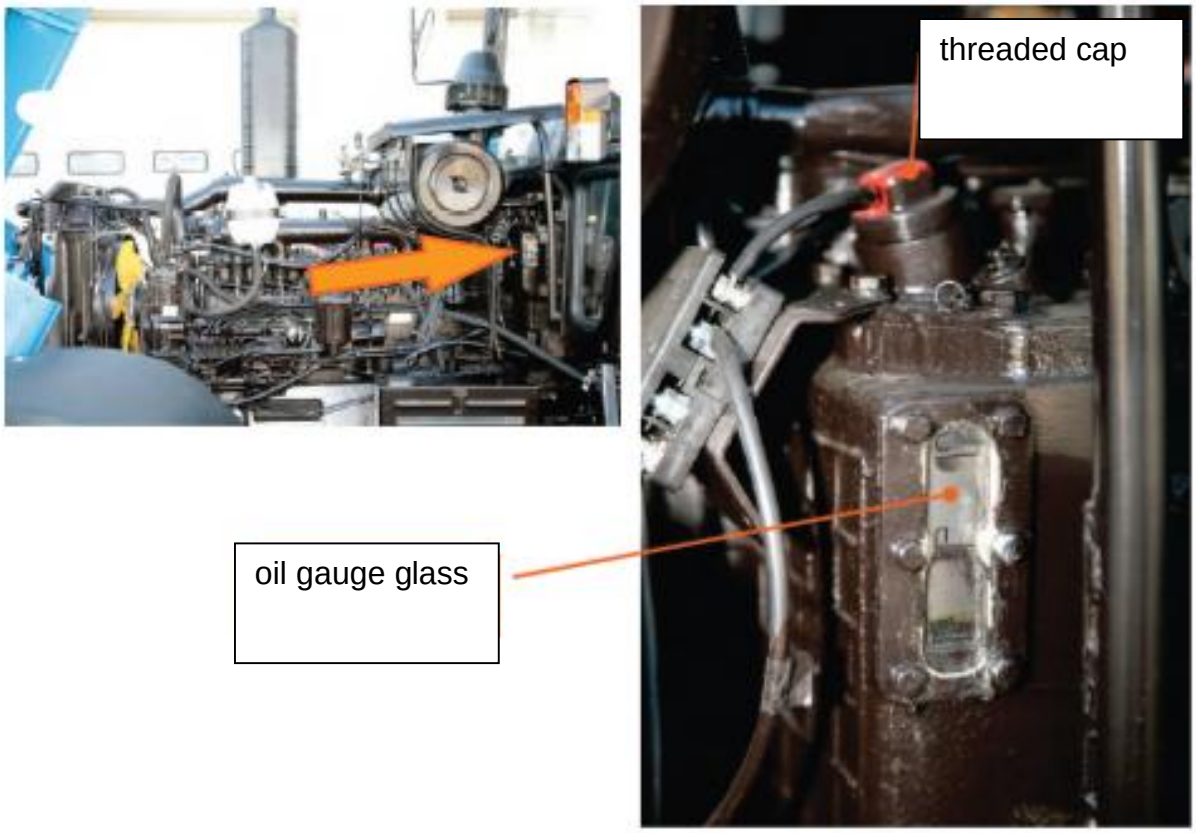


Fig.8.5

IMPORTANT! Do not admit that the level is 40 mm under the top of the filler neck

Operation 3a. Oil level in HSU tank (Fig.8.6)

Check the oil level in the HSU tank (5) by performing the following operations:

- Remove the filler neck cap;
- Remove the strainer from the filler neck;
- Check the oil level by the strainer, which must be between the filter bottom (the lower limit) and the middle of the strainer (the upper limit). As necessary, add oil until the middle of the strainer.

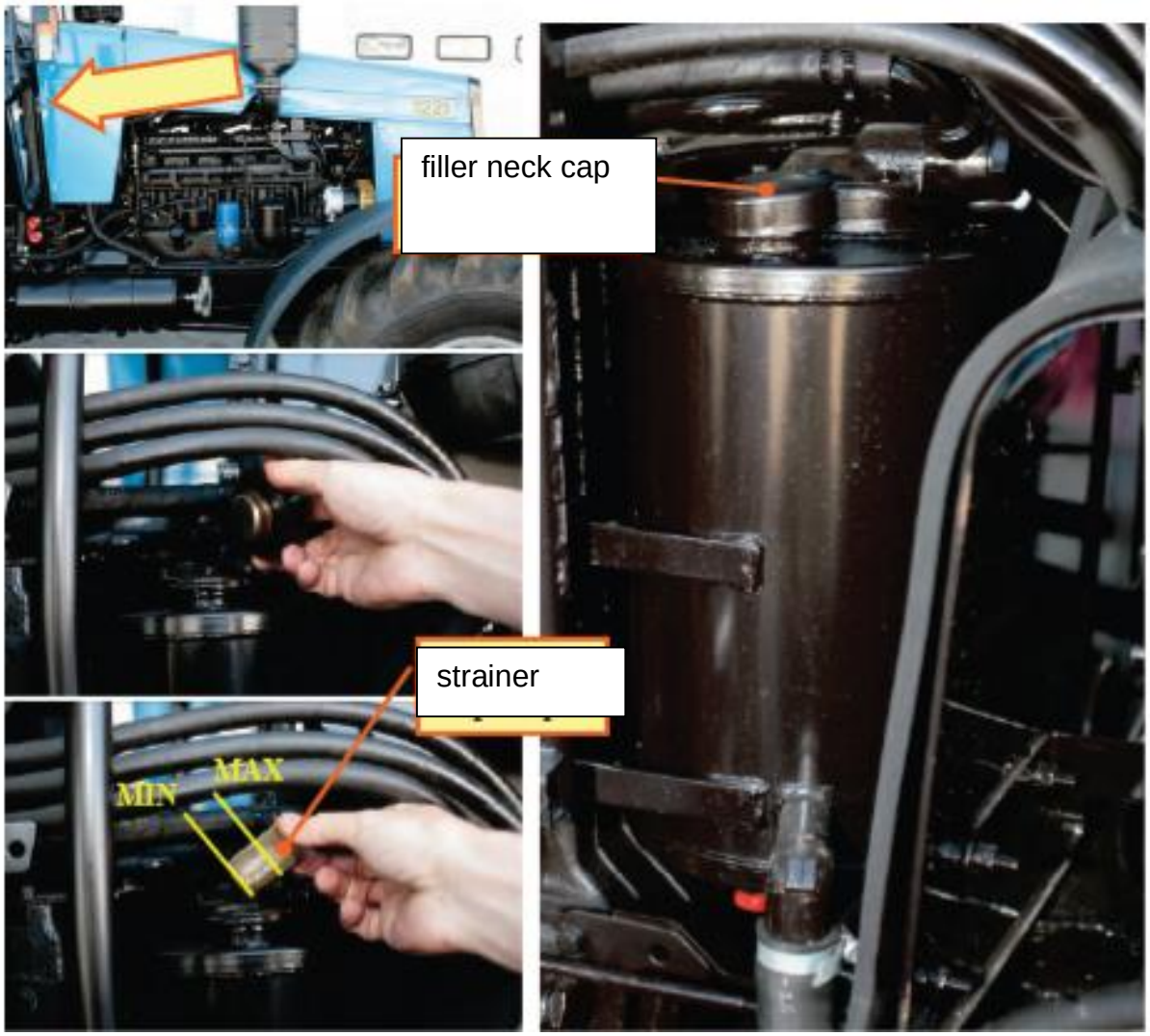


Fig.8.6

Operation 4. Transmission oil level (Fig. 8.7)

Check the oil level by the oil-gauge glass (1) on the right side of the GB, following the requirements set forth in the Operation 3. The oil level must be between the marks “0” and “П”. As necessary, add oil, removing the filler neck cap (2).

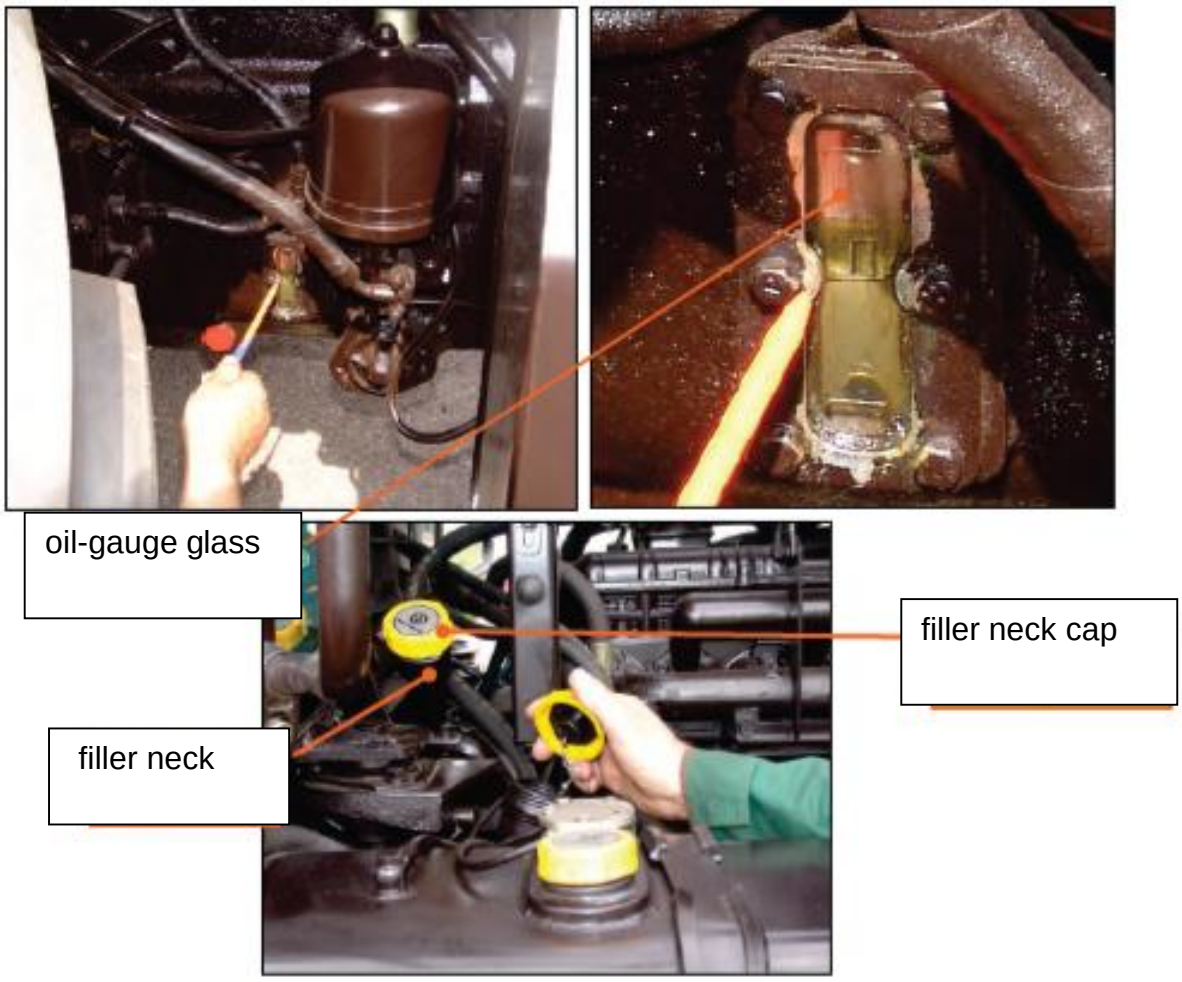


Fig. 8.7

Operation 5. Discharge condensate from cylinders of the pneumatic system (Fig.8.8)

Pull the ring (1) towards and up, open the valve and hold it open until the complete condensate and dirt are fully discharged. Discharge condensate from the two cylinders on the left and right sides of the tractor.

Fig. 8.8

Operation 5a. Check operation of the engine, steering, brakes and lighting and signaling devices

The engine must work steadily in all modes.

The controls, brakes, light and sound signaling devices must be in good condition.

Operation 6. Check fluid level in the housings of main cylinders of clutch and service brake control drives (BELARUS-1221V.2) (Fig. 8.9)

Slide the covers from the housings of the main cylinders of clutch and brake control, and check the fluid levels that must be 10 to 15 mm below the upper ends of the housings, but not less than ¾ of the upper cavity volumes. As necessary, add fluid to the level. Install the covers to place.

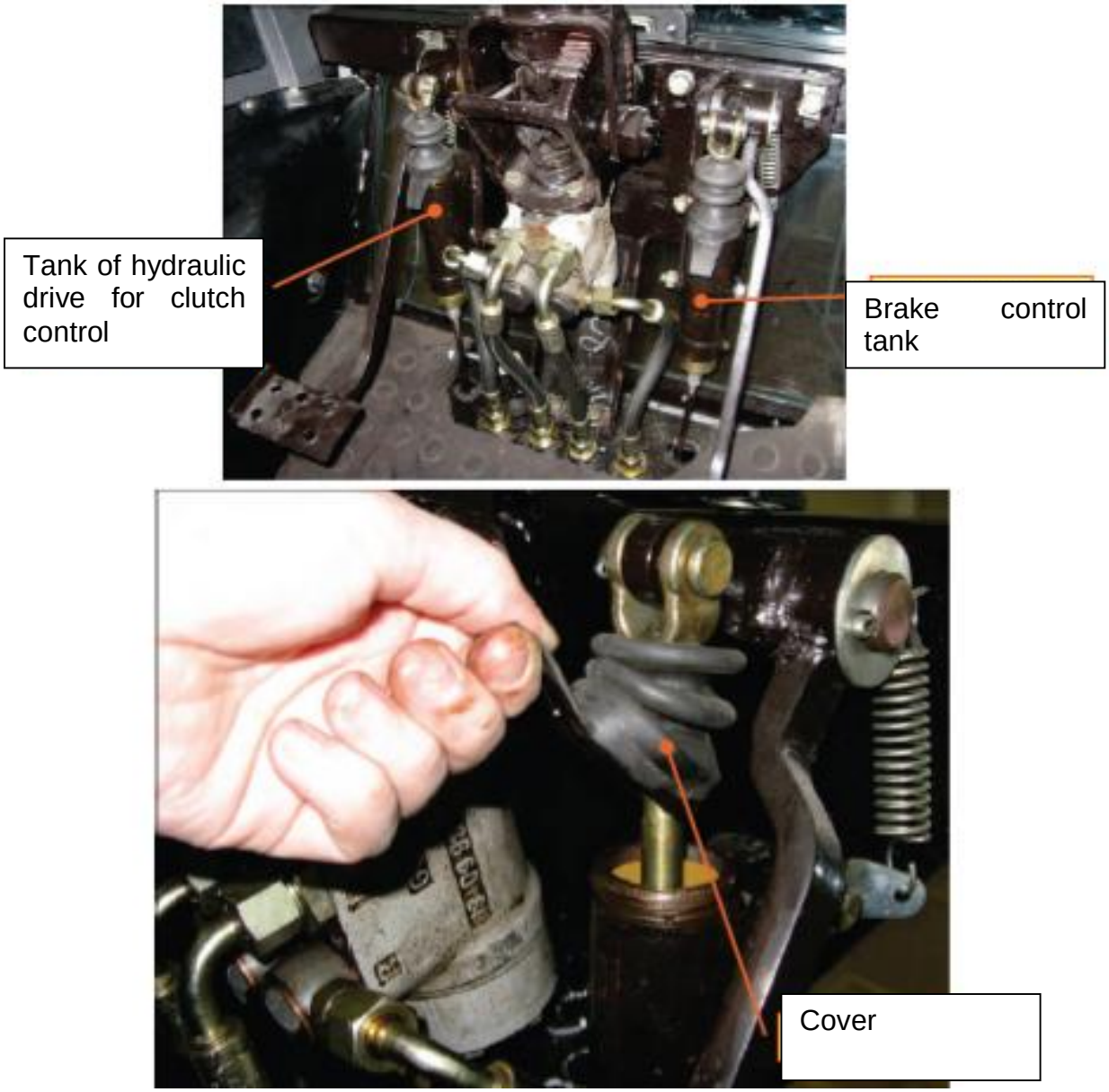


Fig. 8.9

Operation 6a. Check fastening of air conditioner hoses (if an air-conditioner is installed)

The conditioner hoses must be securely fastened with tension bands. Do not allow contact of the hoses with tractor's moving parts.

Operation 6b. Check/clean the air conditioner condenser (if an air-conditioner is installed)

Check cleanliness of the air conditioner core. If it is clogged, clean the air conditioner with compressed air. Direct air flow with the hood open perpendicularly to the condenser plane top-down. Straighten folded finning with a special comb or plastic (wooden) plate. In case of severe clogging of the condenser, rinse it with hot water under pressure of 0.15 to 0.2 MPa max and blow with compressed air.

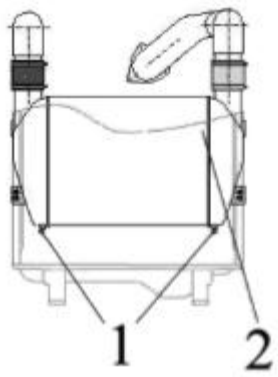
Operation 6c. Check/clean drain pipes of condensate (if an air-conditioner is installed)

Blue drain pipes are to the right and left of the heat exchanger pipe under the ceiling panel. Check and, as necessary in order not to allow plugging, clean the drain pipes. A sign of a clean drain pipe is water dripping when the conditioner is operating in hot weather.

Operation 6d. Discharge condensate from the engine heat exchanger (CAC) tanks (BELARUS-1221.3) (fig.8.10)

To remove condensate from the engine CAC heat exchanger tanks, proceed as follows:

- unscrew the two caps 1 in the bottom of the intercooler (2) and let condensate drain;
- screw the plugs 1.



1- plugs;
2- engine heat exchanger (CAC)

Note: In winter the operation is carried out every 10 hours of work, in summer – after every 125 hours of work.

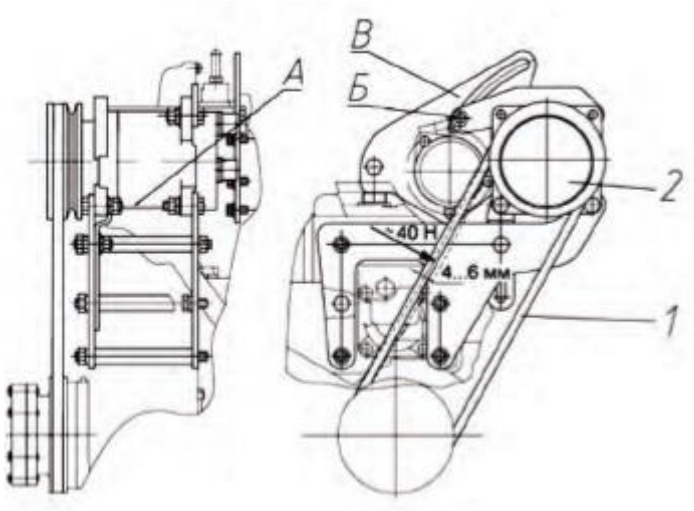
AFTER EVERY 125 SERVICE HOURS

Perform the operations of the previous MS and the following ones:

Operation 6e. Check/adjust tension of the air conditioner compressor drive belt (Fig. 8.11)

Tension of the air conditioner compressor drive belt (1) is deemed normal if deflection of its branch from the engine crankshaft pulley to the compressor pulley as measured in the middle point is 4 to 6 mm when a force of (39 ± 2.0) N is applied perpendicularly to the middle part of the branch.

Adjust tension of the belt (1) by turning the compressor (2) around the rotation axis A and tightening the threaded coupling (B) in the groove of the sector (C). After adjustment, the belt deflection under a force of (39±2.0) N, applied perpendicularly to the middle part of the branch, must be 4 to 6 mm.



1- compressor drive belt;
2- compressor;

Fig. 8.11

Operation 7. Discharge sludge from the coarse fuel filter and from the fuel tanks (Fig.8.12)

Open the drain plugs of the fuel tanks and the drain plug of the filter casing.

Drain sediment and water until pure fuel emerges from the plugs. Discharge sediment to a special container and properly dispose of it.

Close the drain plugs of the fuel tanks and filter.

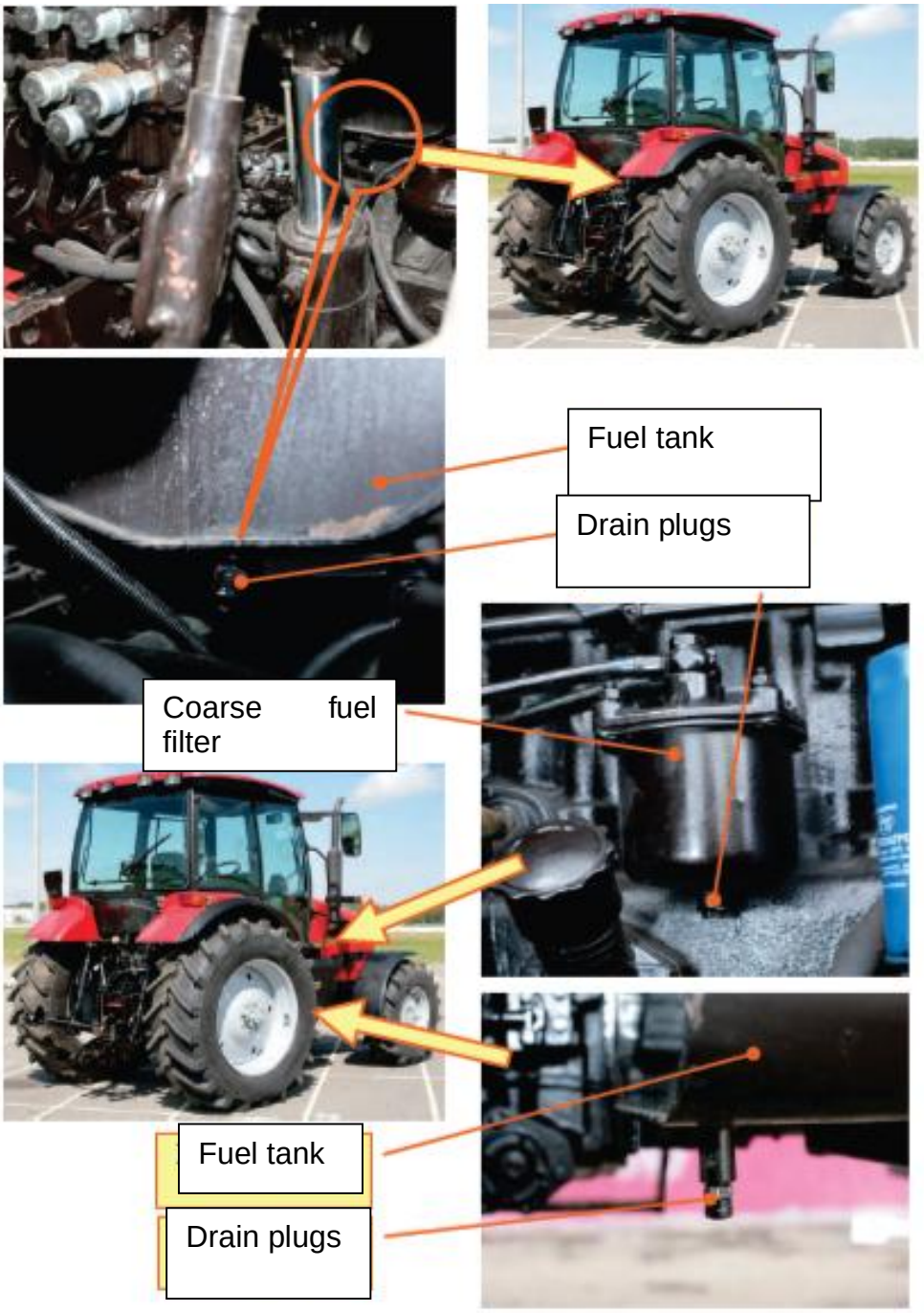


Fig. 8.12

Operation 8. Check generator drive belt tension (Fig.8.13)

The generator belt tension is deemed normal if the deflection of its branch between the pulleys of the crankshaft and the generator is 30 to 33 mm when it is pushed with a force of 40 N.

To adjust the belt tension, loosen the generator fastening and turn the generator housing to provide the required tension. Tighten the strip fastening bolt and the nuts of the generator fastening bolts.

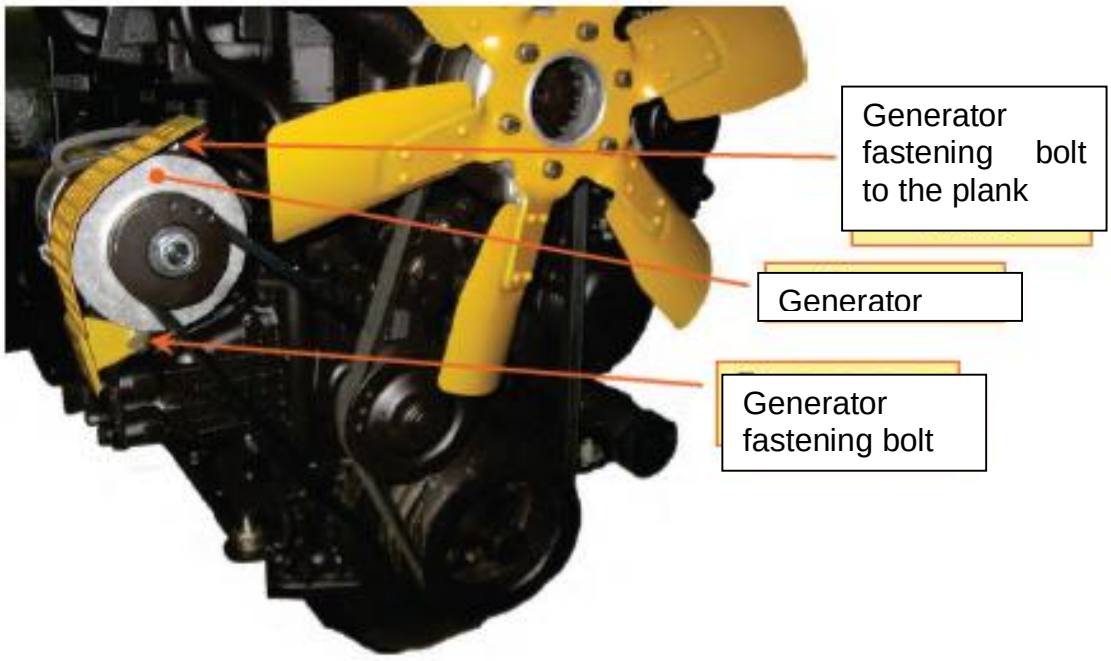


Fig. 8.13

Operation 9. Lubricate the steering cylinder joints (Fig. 8.14)

Using a gun, lubricate the joints through the lubricators (2) (4 lubrication points) with Litol-24 grease or its analogs (Bechem LCP-GM).

Fig. 8.14

Operation 10. Lubricate bearings of the FDA reduction gear kingpin axles and the pivot axis hubs (Fig.8.15)

• Splint the lubricators (1) with Litol-24 or Bechem LCP-GM grease making 4 to 6 injections (4 lubrication points).

• Grease the lubricator (2) with the lubricant specified above until the lubricant emerges from the gaps between the FDA housing and the front bar.

3 — pivot axis hub.

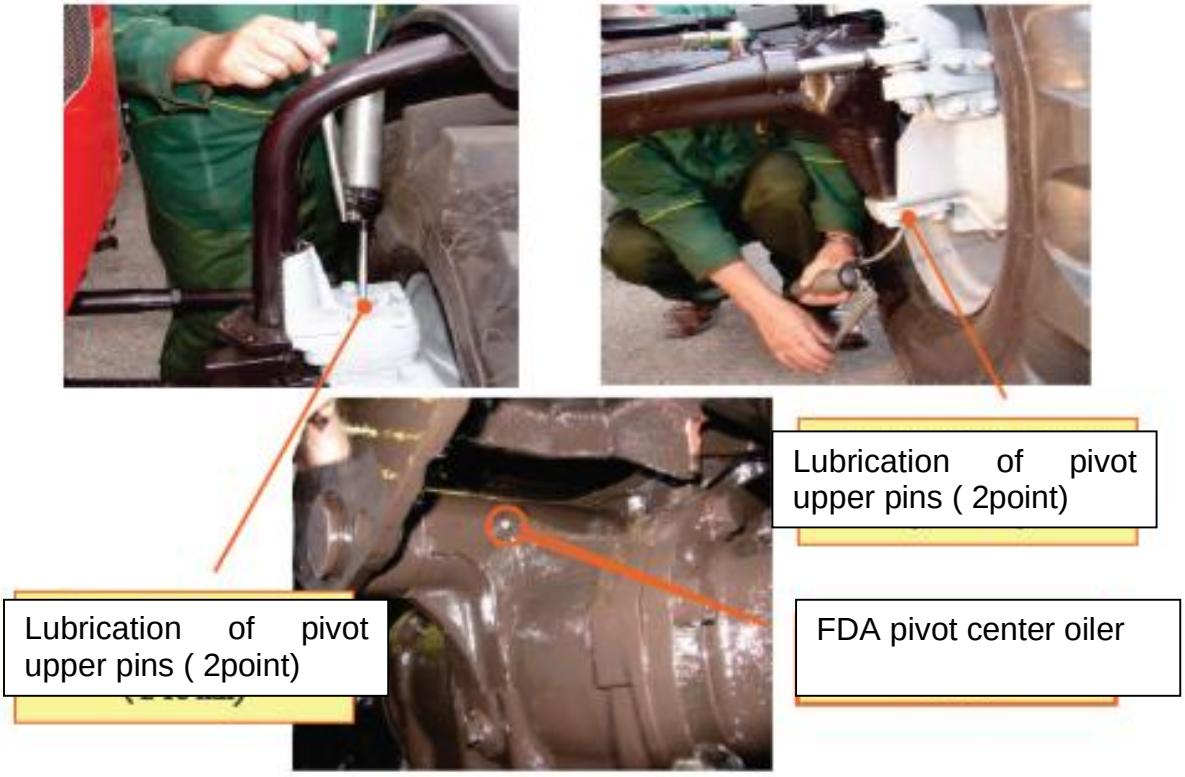


Fig.8.15

Operation 11. Air pressure in tires (fig.8.16)

Check condition of the tread and air pressure in the tires. If necessary, bring the pressure to the rated in accordance with the load as specified in the section “Combining”.

Fig.8.16

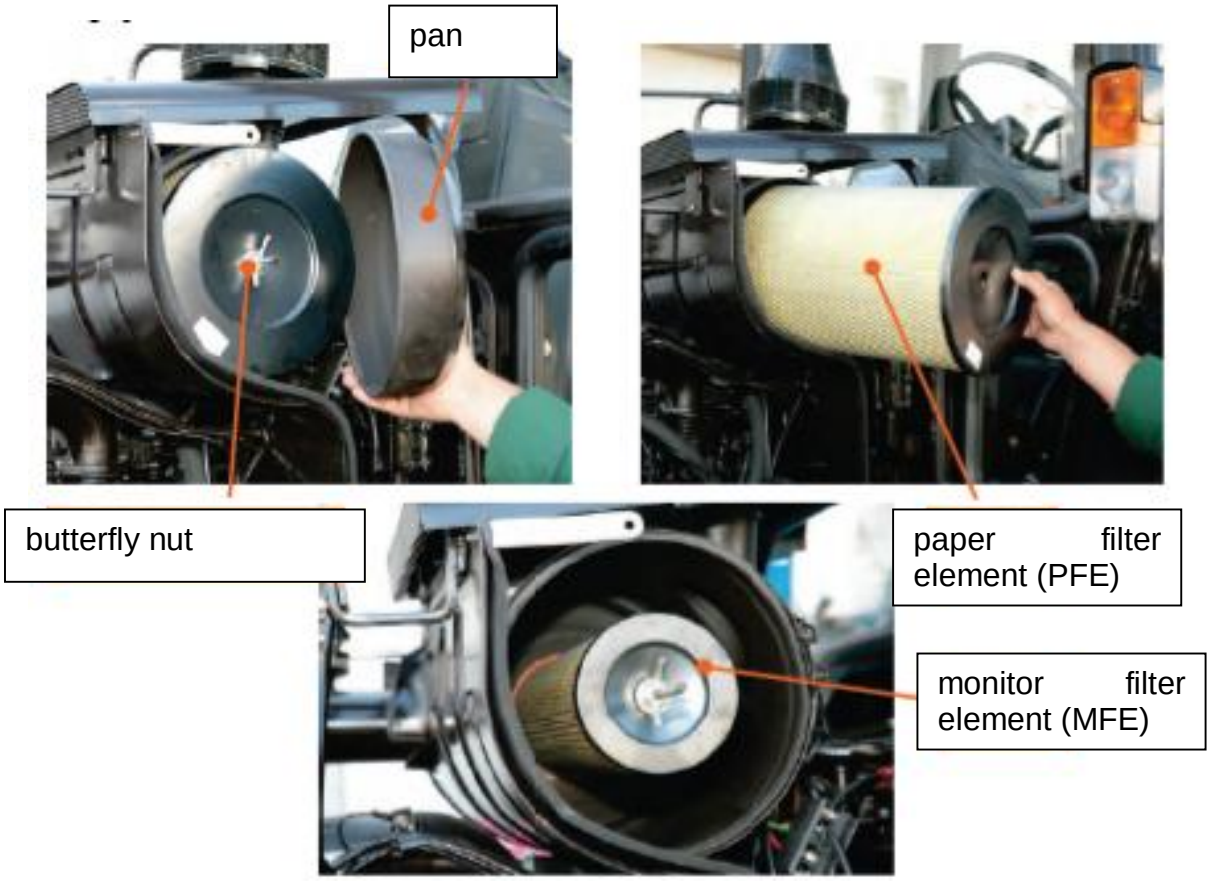
\

Operation 12. Check the engine air cleaner (Fig. 8.17)

Check condition of the paper filter elements (PFE) for presence of paper break and correct installation of the PFE.

To check the basic filter element (BFE), proceed as follows:

- unscrew the butterfly nut and remove the pan;
- unscrew the butterfly nut and remove the BFE;
- check the monitor filter element for contamination without removing it from the casing.



ATTENTION! Removing the monitor filter element (4) from the casing (6) is not recommended.

Note: In case of strong dust, perform the Operation 12 every 20 hours of engine operation.

Operation 12a. Check and tighten fasteners of wheel hubs and nuts (Fig.8.18)

Check the tightening torques and, as necessary, tighten:

- bolts (1) of the rear wheel hubs to a torque of 360 to 500 N•m;
- nuts fastening the rear wheels to the hubs — 300 to 350 N•m;
- nuts fastening the front wheels to the flanges — 200 to 250 N•m;
- nuts fastening the front wheel disks to the rim brackets — 180 to 240 N•m

Fig. 8.18

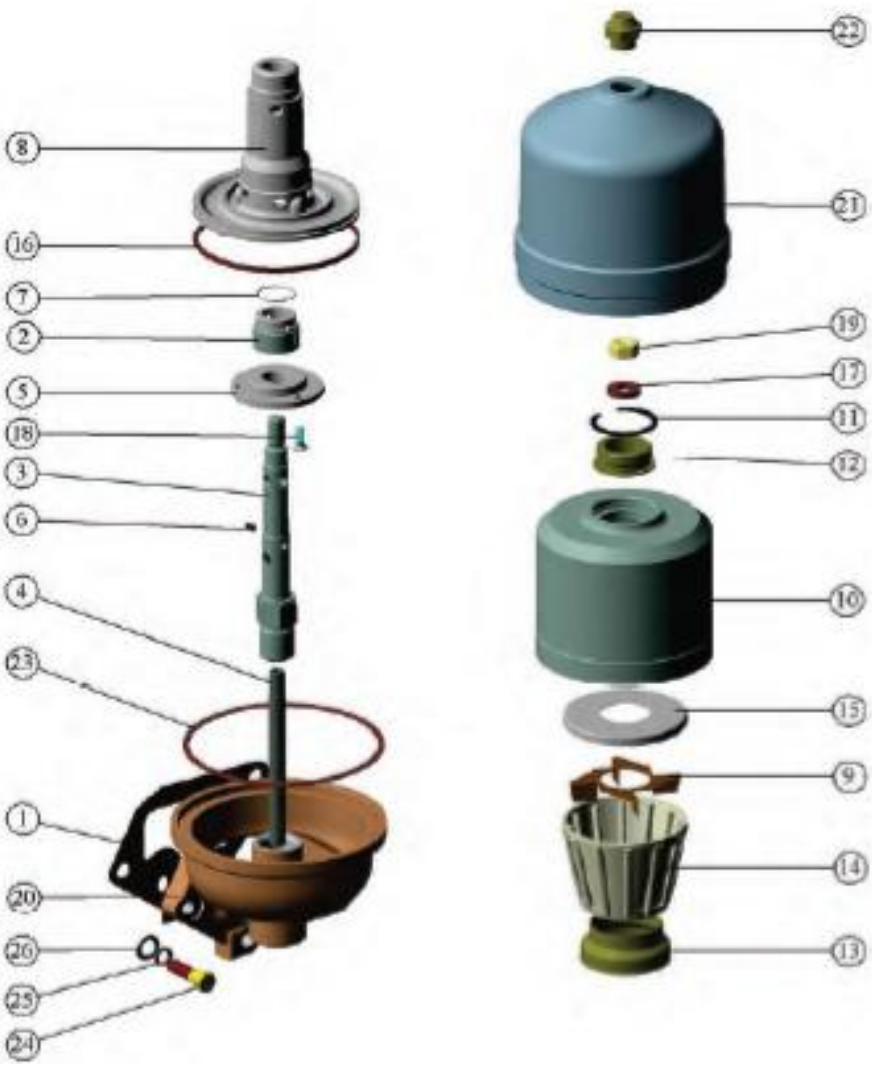
AFTER EVERY 250 SERVICE HOURS

Perform the previous MS and the following operations:

Operations 13, 14. Clean the centrifugal oil filters of the engine and GB (Fig. 8.19)

- Remove the nut (22) and cap (21). Using wrench and screwdriver remove the cup of the rotor (10). Remove the cover (15), the impeller (9) and filter(14). Clean and rinse the mesh filter (14) in petrol. Using a scraper, remove deposits from the inner walls of the rotor (10).

  Lubricate the O-ring with motor oil. Align the balance marks on the cup and the rotor housing. Tighten the nut (22) with a torque of 35 to 50 N•m.



1-gasket;
2-tip;
3-rotor axle;
4-tube;
5- rotorhousing cover;
6-roller;
7-ring;
8-rotor housing;
9-rotor impeller;
10-rotor cup;
11-thrust ring;
12-nut;
13-inner cup;
14-filtering mesh;
15-cover;
16-ring;
17-thrust washer;
18-screw;
19-nut;
20-housing;
21-cap;
22-nut;
23-gasket;
24-bolt;
25,26-washers.

Note: After the engine stops, a noise of rotating rotor must be heard for 30 to 60 seconds. This indicates that the filter is working properly.

Operation 15. Check the oil level in the hub casings and FDA final drive (Fig. 8.20)

Check the oil level:

- In the hub casings (left and right). As necessary, add oil to the level of the check-filler hole plugged with the plug.
- In the FDA final drive. As necessary, add oil to the level of the check-filler hole plugged with the plug.

Grades of oils to fill:

Transmission oils: Tap-15V, TAD-17i, TSp-15K, or their equivalents.

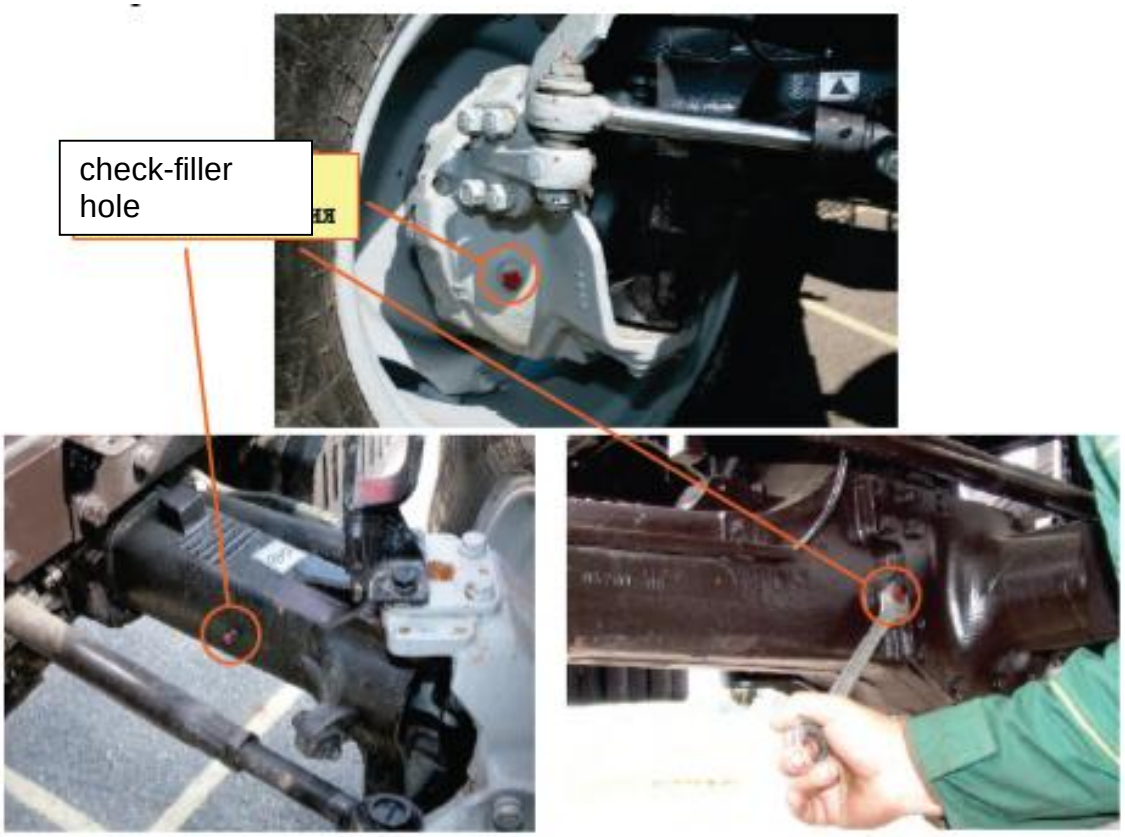


Fig. 8.20

Operation 16. Rinse the GB oil strainer (Fig. 8.21)

- Unscrew and remove the mesh filter cover and take the strainer assembly out from the GB housing with a help of clamp. Dismount the filter screwing by turns locknut and clamp with stud. Remove washer. Spring, piston, O-ring and filtering elements. Rinse the elements in diesel fuel till removing of all dirt. Assemble the strainer in the reverse order, taking into consideration, that the rings shall be obligatory mounted at both sides of filtering elements set.

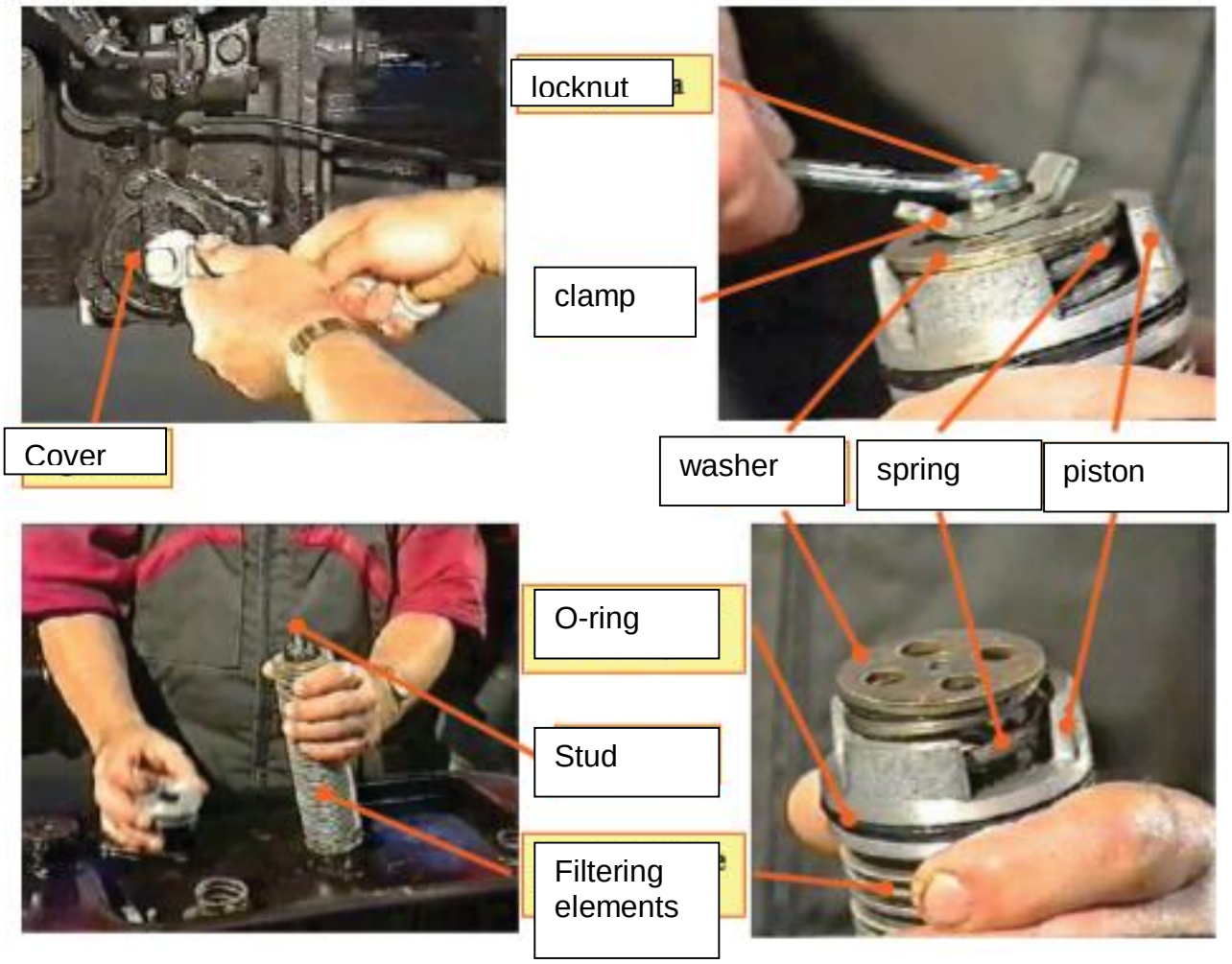


Fig. 8.21

Note: Make sure that the sealing rings (7) are installed on the both sides of the package of mesh elements.

Note: Screw the butterfly nut (4) to get the washers (10) flush with the end face of the piston.

Operation 17. Change engine oil (Fig. 8.22)

- Warm up the engine to its normal operating temperature (70°C min.).
- Install the tractor on an even surface, stop the engine and brake the tractor with the brake.
- Remove the cover of the oil filler neck and unscrew the drain plug. Discharge oil into a suitable container for storage of waste oils.
- Install the drain plug to place and fill in fresh clean motor oil through the oil filler neck (1).
- Install the cover of the oil filler neck to place.
- Start the engine and let it operate for 1-2 minutes.
- Check the oil level with the probe as described in the Operation 1.
- If necessary, add oil to the level.

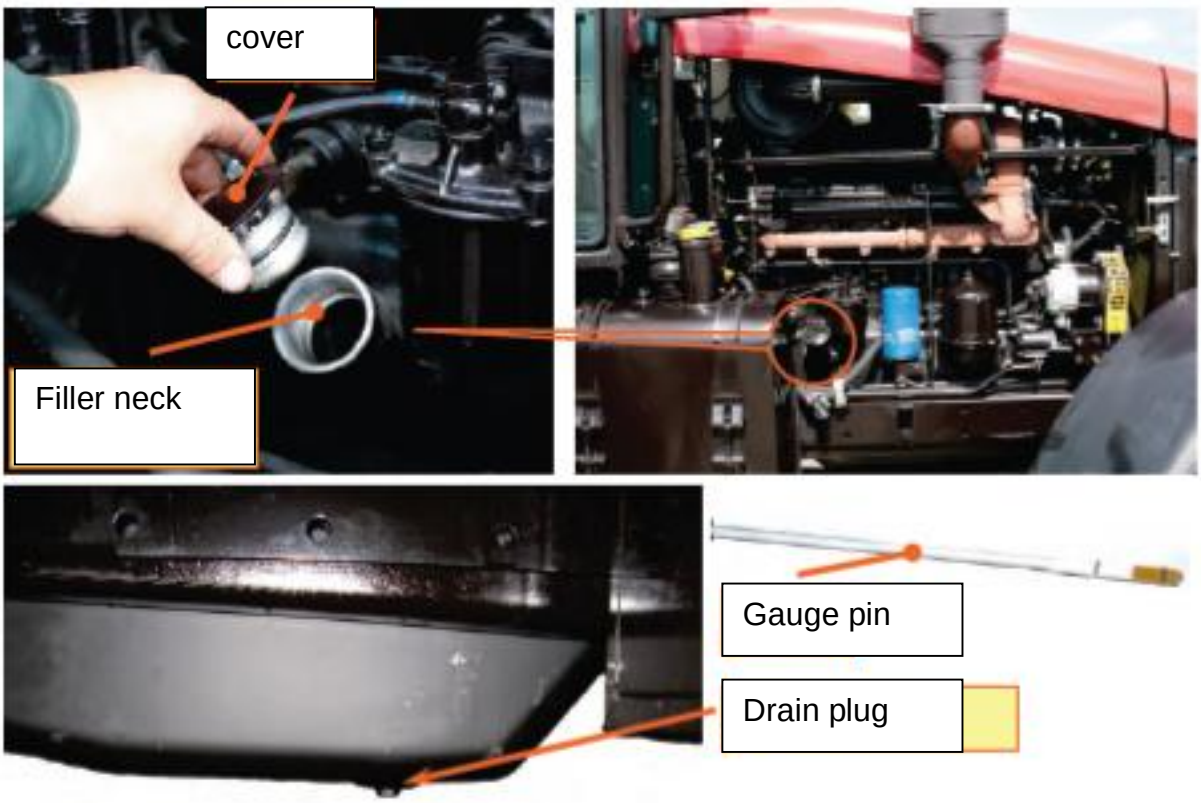
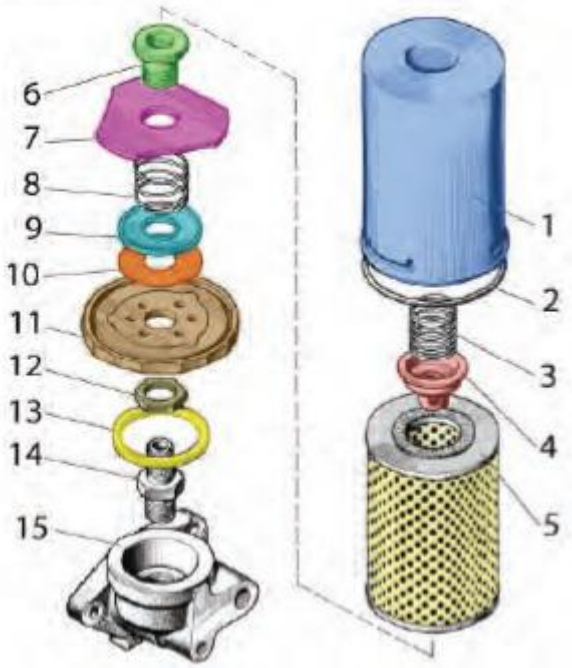


Fig. 8.22

Operation 18. Replace the PFE of the engine oil filter (performed simultaneously oil change) (Fig. 8.23)

- Unscrew the cap (1) assembled with the paper filter element (5).
- Unscrew the nut (12) and remove the bottom (11) with the gaskets (2) and (13).
- Press on the clamp (7) moving it inside the cap (1) by 3 to 4 mm and then rotate it to align the three lugs on the clamp (7) with the grooves of the cap (1).
- Remove the clamp, PFE (5), relief valve (4), spring (3).
- Rinse all parts with diesel fuel.
- Install a new filter element, performing the operations in the reverse order. If necessary, replace the gaskets (2) and (13). Tighten the nut (12) to a torque of 30 to 40 N•m. Lubricate the gasket (13) with motor oil.
- Screw in the filter assembly to an additional 3/4 turn after the gasket (13) touches the housing (15).



1-cap;
2-ring;
3-spring;
4-relief valve;
5-filter element;
6-fitting;
7-clamp;
8-spring;
9-washer;
10-antidrain valve;
11-bottom;
12-nut;
13-gasket;
14-fitting;
15-filter housing.

Fig. 8.23

ATTENTION! Screw in the filter only by force of hands, grasping the cap (5) of the filter.

Operation 19. Lubricate the clutch release yoke bearing (Fig. 8.24)

- Remove the plug (1) from the left side of the clutch housing.
- Using a gun, make 4 to 6 injections of Litol-24 grease through the lubricator screwed into the housing of the release yoke to lubricate the release bearing.

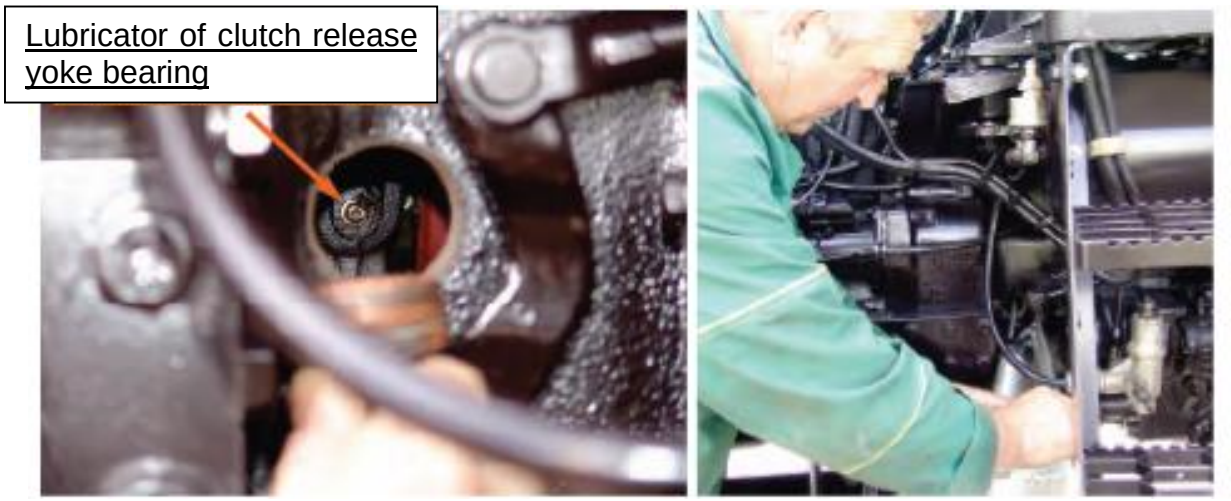


Fig. 8.24

Note: Do not inject excessive amounts of grease, as excessive grease will accumulate inside the clutch housing and can get to the dry friction surfaces.

Operation 20. Turbocharger

Check tightening of fasteners of the turbocharger (1), exhaust manifolds (3) and exhaust pipe bracket (2). As necessary, tighten the fasteners to a torque of 35 to 40 N•m.

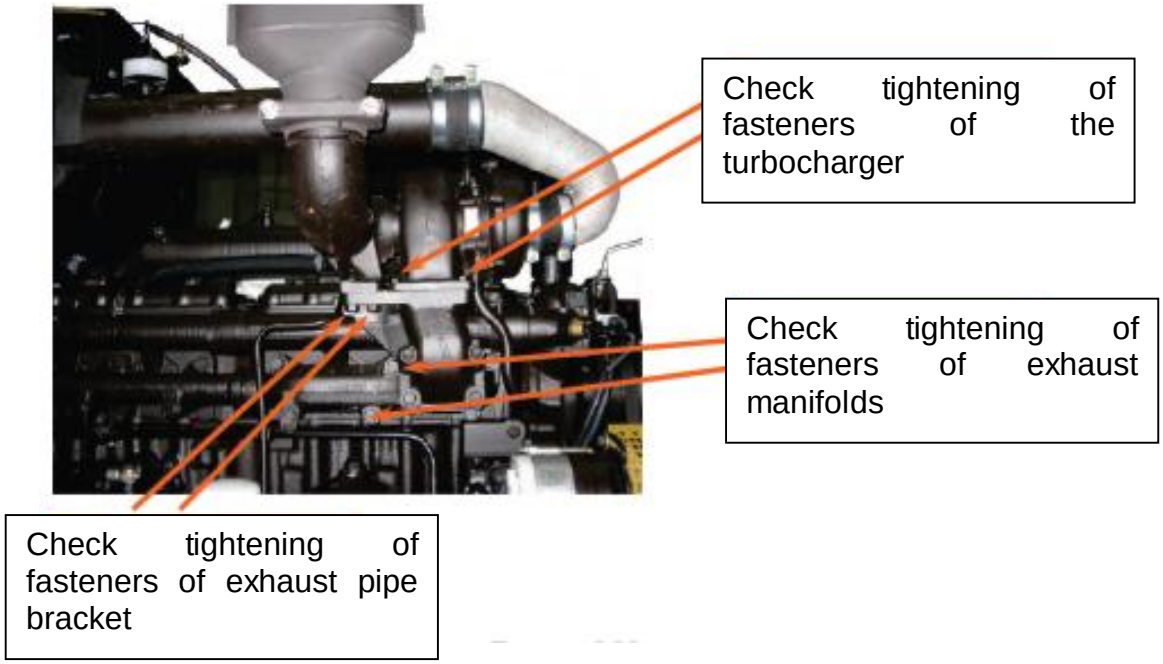


Fig. 8.25

Operation 21. Front wheel toe-in (Fig. 8.26)

The front wheel toe-in must be within 0 to 8 mm.

Perform adjustment in the following sequence:

- Loosen the lock-nuts (1) and (3)
- Set the required toe-in by rotating the tube of steerihg rod (2).
- Tighten the lock-nuts (1) and (3).

Note: Toe-in is determined as difference of the A and B sizes.

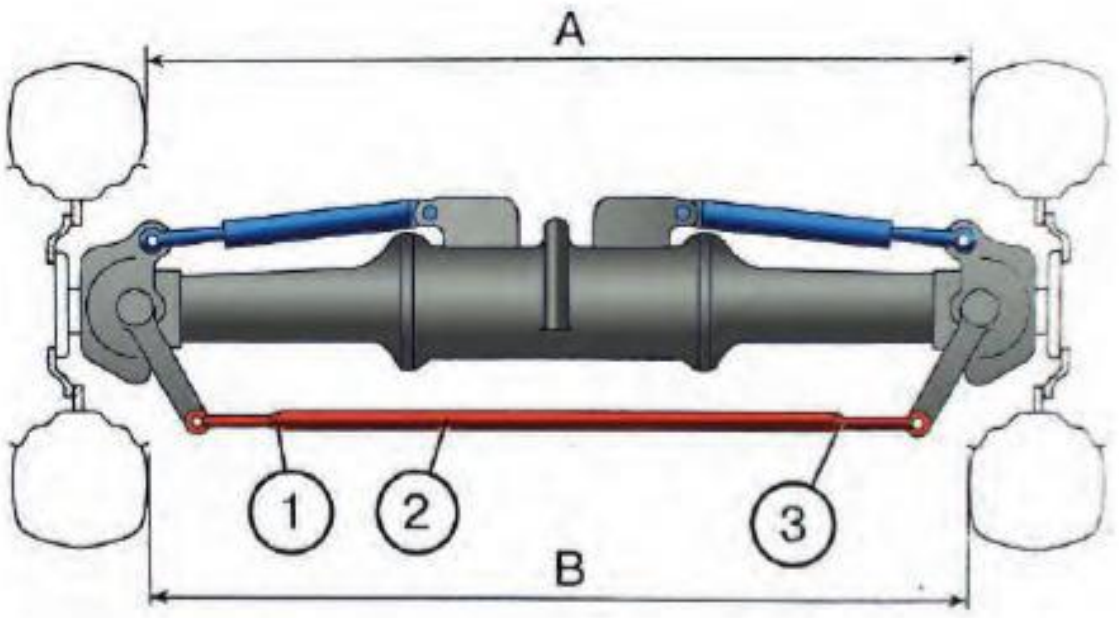


Fig. 8.26

AFTER EVERY 500 SERVICE HOURS

Perform the operations of the previous MS and the following ones:

Operation 22. Check and adjust valve clearances in the engine (Fig. 8.27)

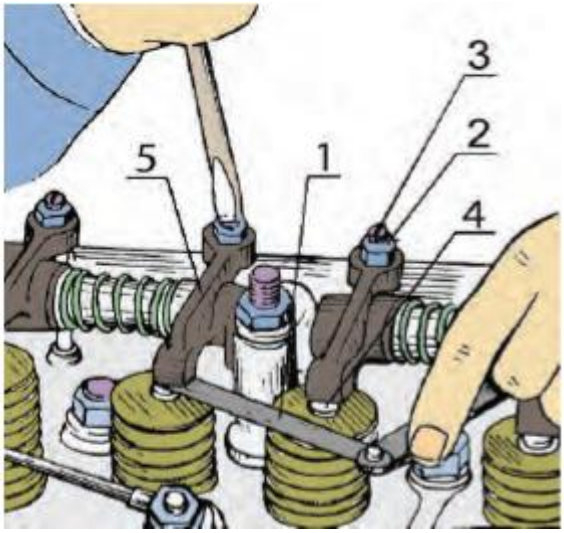
Note: Check the clearances on a cold engine after checking the cylinder head bolt tightening (Operation 37).

- Remove the cover caps from the cylinder heads.
- Check tightening of the bolts and nuts fastening the rockers arm shaft brackets (60 to 90 N•m).
- Turn the crankshaft until the valves overlap in the first cylinder (the inlet valve starts opening, and the exhaust valve ends closing).
- Adjust the clearances in the 3, 5, 7, 10, 11 and 12 valves (counting from the fan).

ATTENTION! The clearance between the ends of the valve rods (5) and the arm shaft strikers (4) must be 0.25 to 0.30 mm for the inlet valves and 0.40 to 0.45 mm for the exhaust valves.

- Crank the crankshaft to 360°, making an overlap in the sixth cylinder, and adjust clearances in the 1, 2, 4, 6, 8 and 9 valves.

  - To adjust the clearance, release the locknut (2) of the adjustment screw (3) and using a key and screwdriver set the necessary clearance by the probe (1). After setting the clearance, tighten the locknut (2) and re-check the clearance with the probe.
- After adjusting, install the removed parts to their places.



1-probe;
2-locknut;
3-adjustment screw;
4-valve rod;
5-arm.

Operation 23. Discharge sediment from the fuel fine filter of the engine (Fig. 8.28)

- Unscrew the air-bleed plug by 2…3 turns.
- First unscrew the sediment discharge plug and discharge sediment from the filter housing until clean fuel emerges. Screw the plugs (1) and (2).

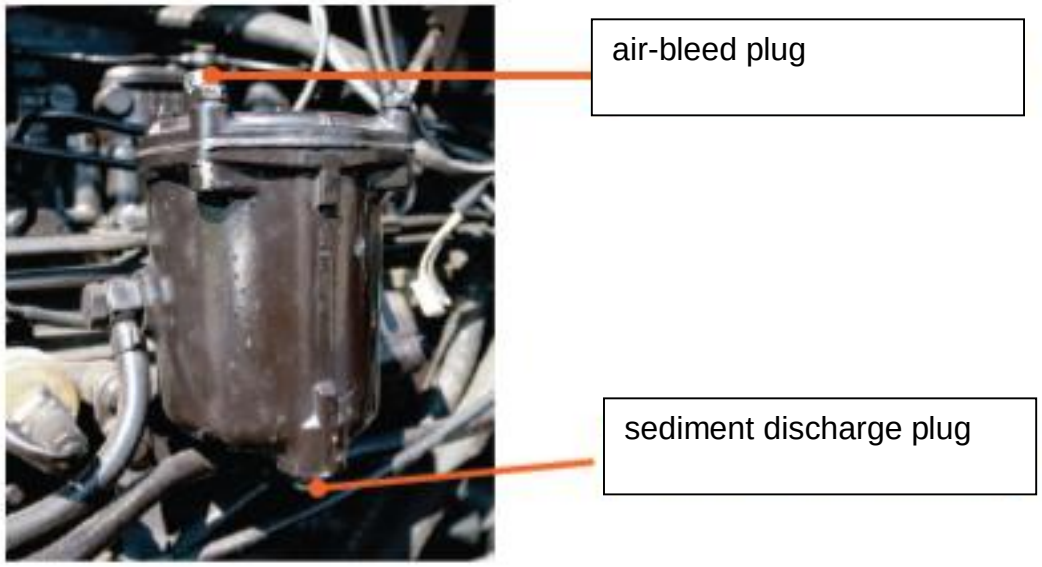


Fig. 8.28

Operation 24. Check tightness of connections of the air cleaner and intake (Fig. 8.29)

- Remove the monocyclone.
- Start the engine.
- Set the medium idle speed.
- Close the suction pipe (1) of the air cleaner. The engine must stop at this.
- Otherwise, identify and eliminate leakages in the air cleaner and intake joints.

Fig. 8.29

Operation 25. Check oil level in the wet brake housings

• Check oil level in the left and right housings. The oil level must be up to the lower edge of the check-fill hole plugged with the plug (1).

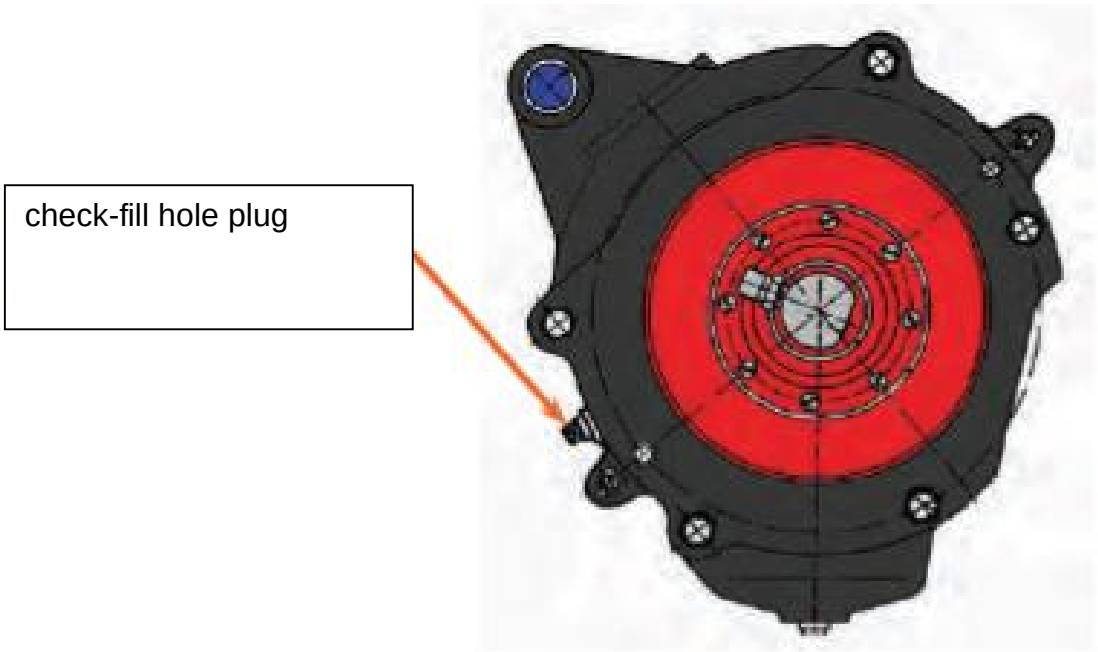


Fig. 8.30

Operation 26. Adjust free travel of the clutch pedal (BELARUS-1221.2/1221.3) (Fig. 8.31)

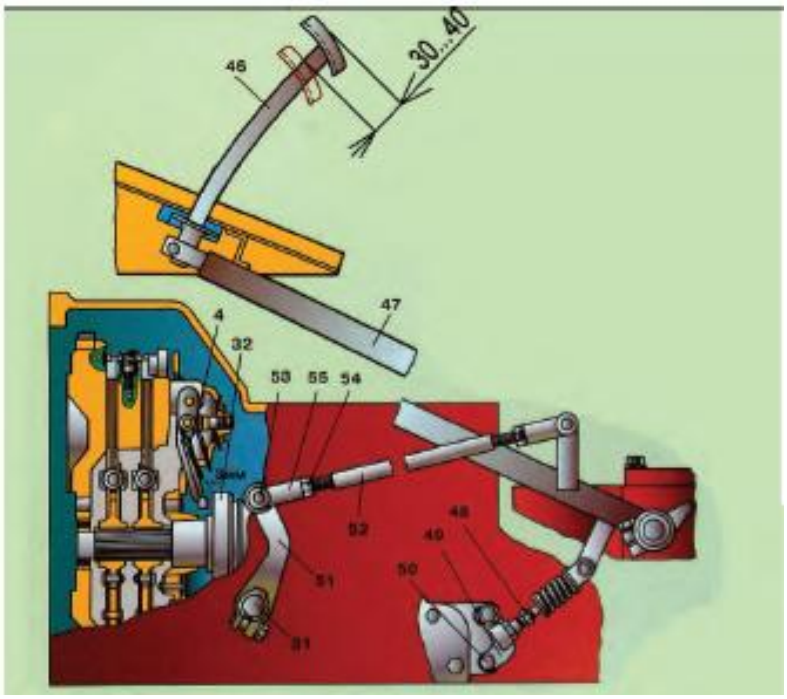
Free travel of the clutch pedal must be within 30 to 40 mm, which corresponds to a play of 3 mm between release bearing 32 and release lever 4.

The clutch pedal free travel is adjusted by changing the rod (52) length.

- disconnected the rod (52) from the lever (1)., having unsplint and remove the pin (2);
- Unscrew the screw (48) so that the pedal move up to the initial position until stop against the cabin floor.

• Turn the lever (51) counterclockwise until it stops, that is, when the release bearing 32 touches the release levers4, than turning the forks (55) of the rod 52, align the holes in the fork and the lever (1) and then screw in the fork 55 of the rod 52 by 5 to 5.5 turns, connect with the lever with a help of pin 53.

- Make sure that the clutch pedal always safely returns up to stop against the floor in the area of pedal free movement. Otherwise, adjust the servo-unit spring force using the bolt (48) or change the position of the bracket (49) turning it around the axis of the fastening bolt (50).



4-release lever;
31- clutch disengage shaft;
32-release bearing;
46-pedal rod;
47-lever;
48-bolt;
49-bracket;
50-bolt;
51-lever;
52-rod;
53-pin;
54-locknut;
55-yoke;

Fig. 8.31

Operation 26a. Adjust free travel of the clutch pedal (BELARUS-1221V.2)

I. Clutch pedal free travel adjustment at forward motion 1 (BELARUS-1221V.2) (Fig. 3.32)

Unlock and remove the pins 27;

Disconnect the rods 2 and 9 from pedal 1 and from lever 10 respectively;

Loosen locknuts 29, 30;

Move operating cylinder ahead , to choose the play between the operating cylinder piston and hydraulic booster pusher;

Turning the fork 28, combine the openings in pedal 1 yoke and lever after that turn the fork to 1,5…2 revolutions;

Install the pin and lock the yoke with locknut 29;

Turn the lever 10 contraclockwise against the stop and rotating the rod 9 fork 31 combine the openings of the lever 10 and of the fork 9, after that turn the fork to 5…5,5 revolutions

Connect the fork with the lever with the help of the pin 27;

Locknut the fork with nut 30.

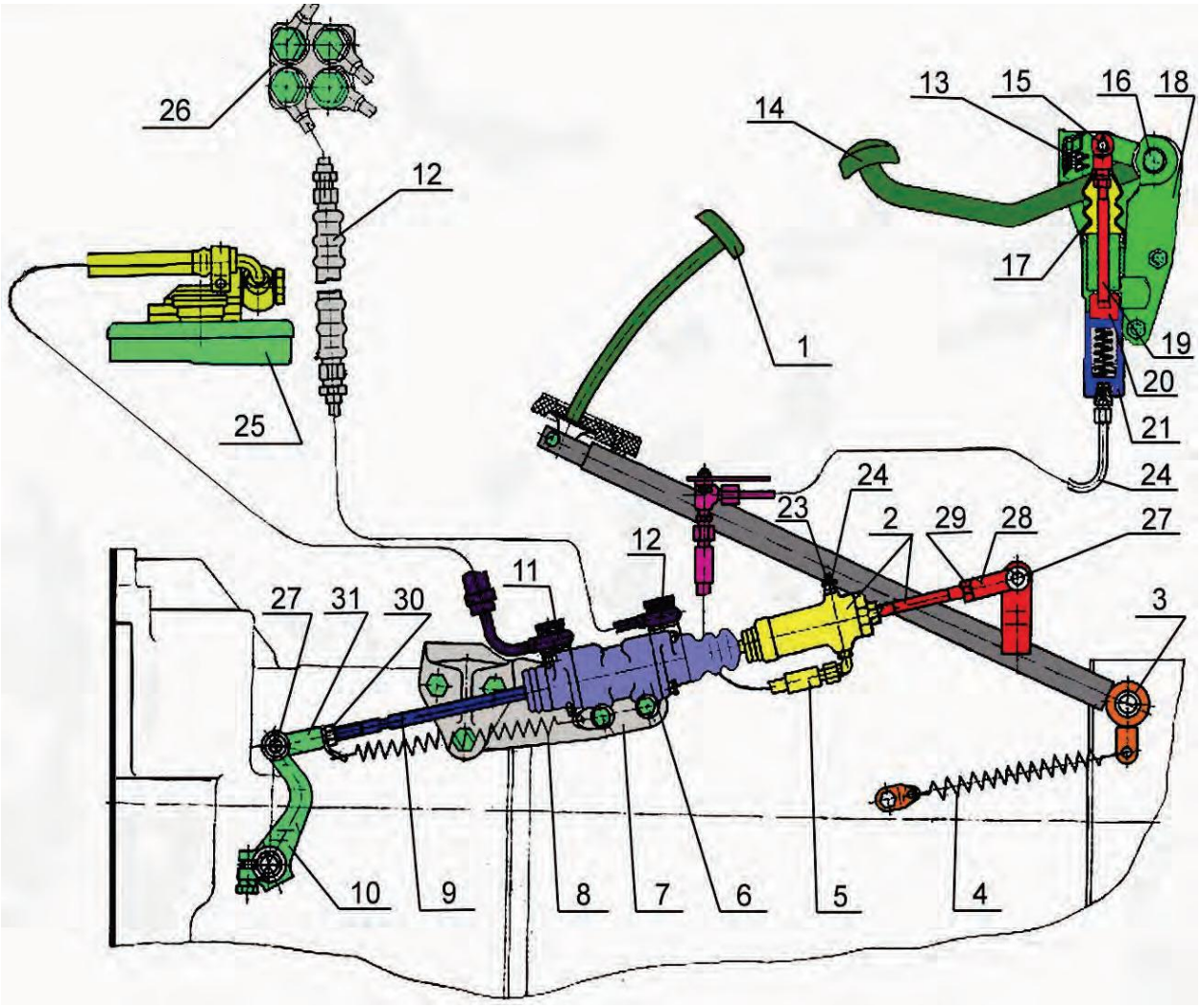


Fig. 8.32

II. Clutch pedal free travel adjustment at reverse motion (Fig. 8.33) (BELARUS-1221B.2)

Without deinstallation of pin 2 perform the following operations:

1) dislocate cover 10 of main cylinder to achieve access to the locknut 9.
2) ease the locknut 9 off.
3) Turning pusher 6 set clutch pedal free travel within 4,5…9,5 mm, what corresponds to the play “K” = (1…2) mm between the pusher and piston 5.
4) Tighten the locknut 9.

Check a brake fluid level in a chamber of the main cylinder which should be by 10…15 mm below the upper end of the main cylinder housing. Add a brake fluid if necessary;

Bleed a hydrostatic drive system, doing the following:

• remove a safety cap (23) of a valve (24) of operating cylinder (2) and put a pipe on a valve head and sink a free end of the pipe into a tank with «Neva-M» or DOT3, DOT4 brake fluid;

• push the pedal (1) several times, and holding it pressed unscrew the valve by ¼ turn deflating air bubbles into the tank;

• tighten the valve and release the pedal. Repeat these operations until the entire deaeration;

• remove the pipe, put the cape back, and add a brake fluid.

• Mount the hood 10.

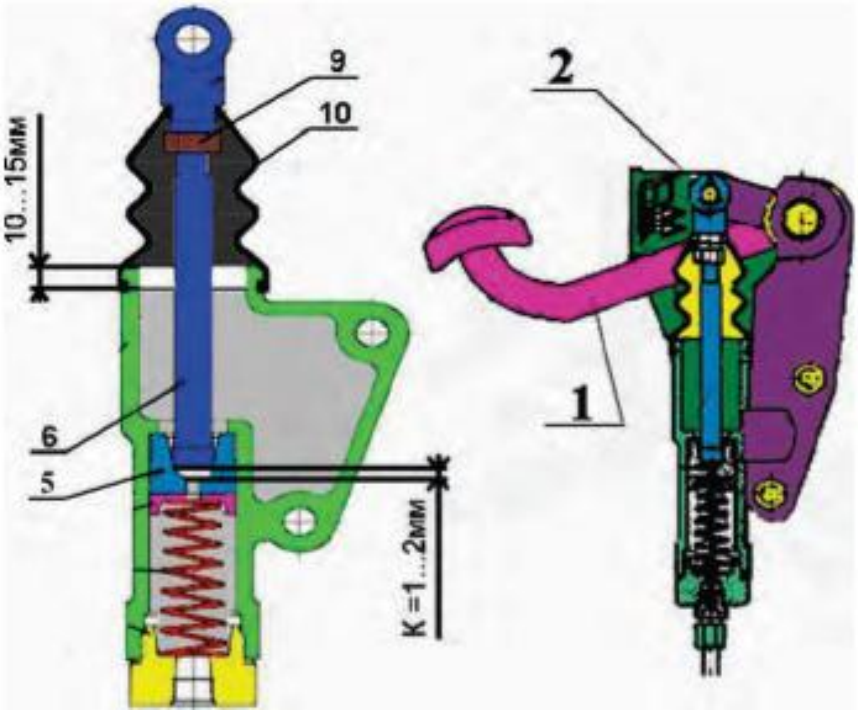


Fig. 8.33

Operation 27. Steering wheel play (fig. 8.34)

With the engine running, the steering angular play must not exceed 25°. Otherwise, check and eliminate plays in the joints of cylinders, steering link and steering column.

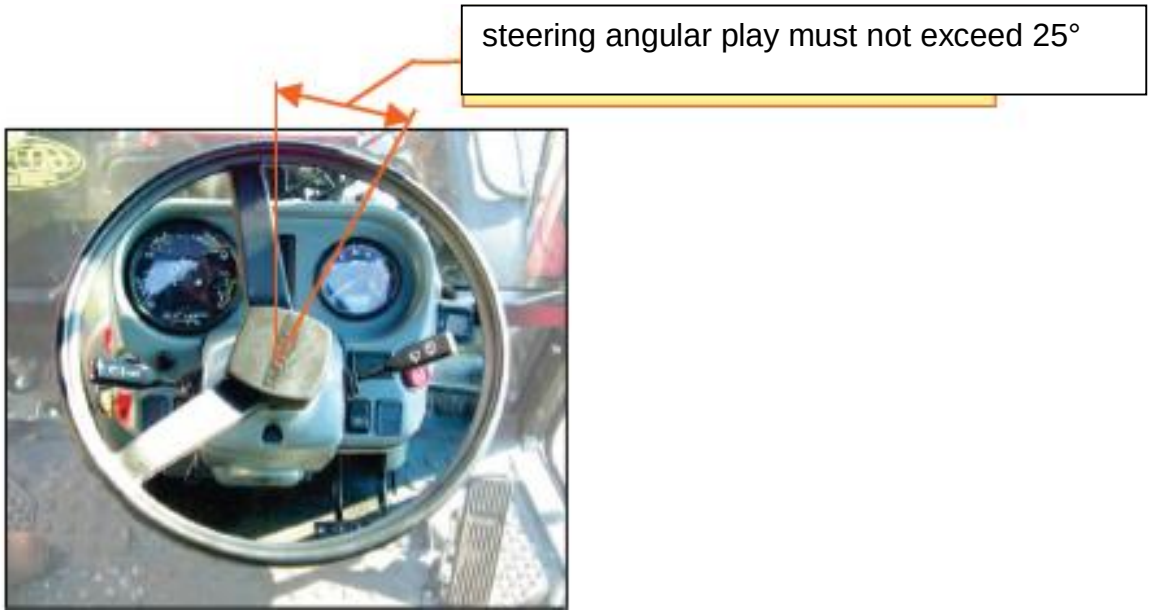
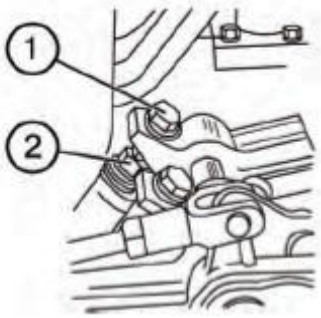


Fig. 8.34

Operation 28. Brake pedal and parking brake lever travel

The full travel of the right service brake pedal under a force of 120 N on the pedals must be 115 to 125 mm. Otherwise, adjust the brakes as follows:

- Loosen the locknut (2) of the adjustment bolt (1) of the right service brake.
- Screwing in or out the bolt, adjust the travel of the right service brake pedal.
- Repeat the same for the left service brake pedal.



Note: The left service brake pedal travel must be by 5 to 20 mm less for simultaneous actuation of the brakes when braking with interlocked pedals.

IMPORTANT! The minimum travel of the interlocked service brake pedals under a force of 250 N must not be less than 105 mm.

The parking brake must be fully engaged when the lever (1) is locked on the third or fourth tooth of the sector (A) under a force on the handle of 400 N.

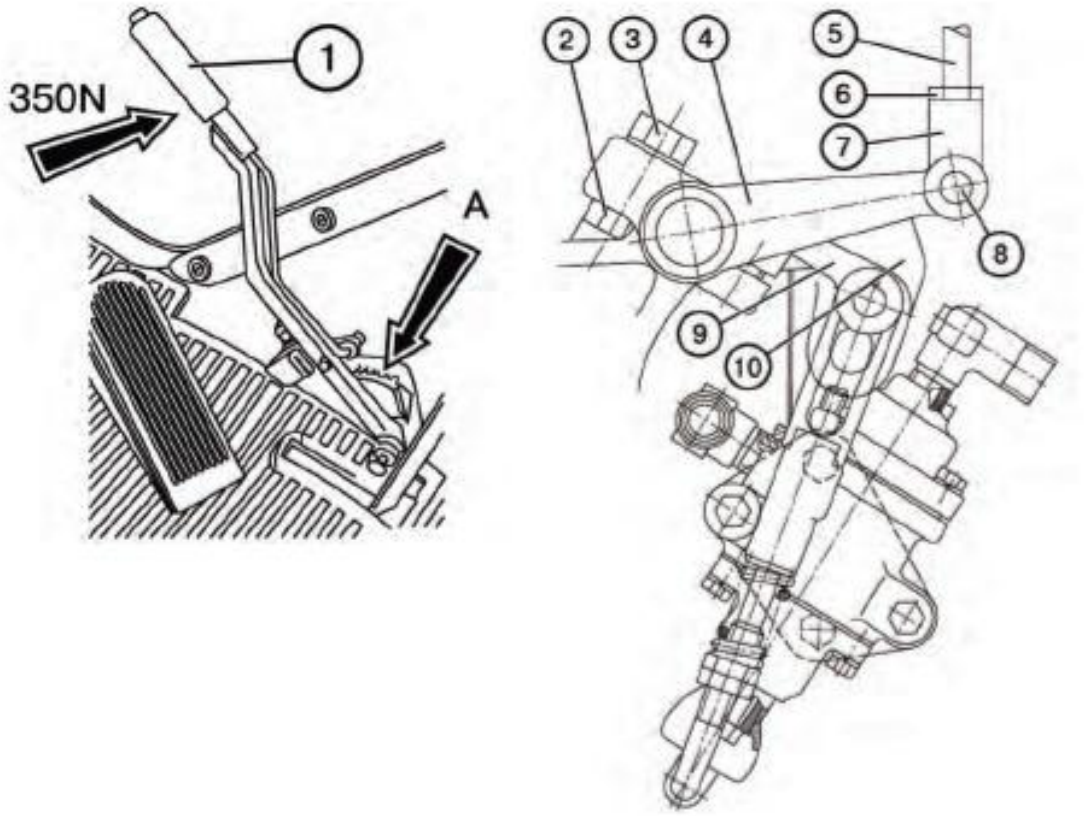


Fig. 8.36

Before adjusting the parking brake, install the tractor on an even surface, stop the engine and lock the rear wheels from front and rear:

- Shift the lever (1) to the extreme front (off) position.
- Loosen the locknut (2) of the adjustment bolt (3) of the parking brake (on the right side of the tractor).
- Screwing in or out the bolt (3), obtain a complete disengagement of the parking brake at the fourth tooth of the sector (A) under a force on the lever (1) of 350 N.
- Lock the bolt (3) with the nut (2).

If the tractor is equipped with a pneumatic system and works with trailers equipped with pneumatic brakes, adjust the parking brake as follows:

- Shift the lever (1) to the extreme front (off) position.
- Loosen the locknuts (2) and (6) and remove the pin (8).
- Turn the lever (4) so that the upper edge of the groove in the lever (9) align with the upper edge of the groove in the lever (10).
- If necessary, adjust the length of the rod (5) with the fork (7), setting the pin (6) and splint it.
- Turning the adjusting screw (3), adjust the lever (1) so that the parking brake be fully engaged on the 3rd or 4th tooth of the sector A under a force on the lever of 350 N.
- Tighten the locknuts (2) and (6).

IMPORTANT! With the brake pedals interlocked, unsimultaneity of wheel braking must not exceed 1 m as measured by the wheel footprints.

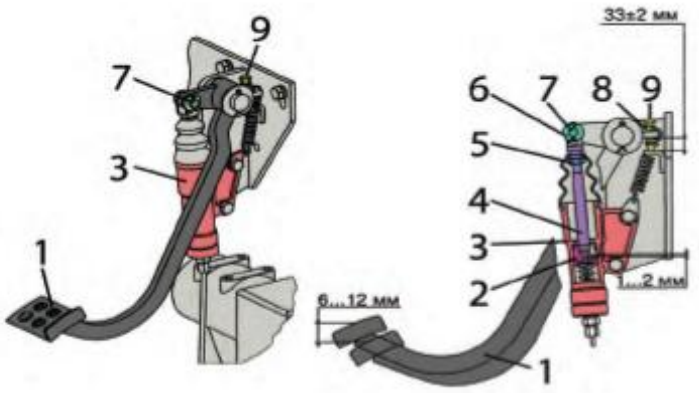
Operation 28a. Brake pedal travel (BELARUS-1221V.2) (Fig. 8.37)

Perform brakes adjustment with reverse control post in the following order:

1.Check and if necessary adjust size 33+2 mm, having screw stop bolt (9) for the indicated length. After adjustment of the stop bolt (9). Lock the nut (8).

2.Adjust pedal 1 free travel within 6…12 mm, what corresponds to the play 1…2 mm betweem the pusher (4) of the main brake cylinder (3) and piston (2). For adjustment perform the following:

- unlock and remove pin (7);
- take off protective cover and unscrew the locknut (5) by several turns;
- screwing and unscrewing the fork (6) from the pusher (4), set pedal (1) free travel within the abovementioned limits. Full pedal travel shall be in this case 90…110 mm.
- lock the nut 5, locknut the pin 7 and put the cover back.



1-pedal;
2-piston;
3-main brake cylinder;
4-pusher;
5-locknut;
6-fork;
7-pin;
8-nut;
9-stop bolt.

Fig. 8.37

Operation 29. Batteries (Fig. 8.38)

CAUTION! The batteries contain sulfuric acid that causes severe burns in case of skin exposure. Avoid exposure of hand skin, eyes and clothing to the acid. When the acid gets onto external body parts, rinse them with a strong jet of pure water. In case of ingestion, drink plenty of water or milk. In case of contact with the mucous membrane of an eye, rinse it with plenty of water for 15 minutes and then call for medical assistance. Keep sparks or flames away from the area of electrolyte, as this can cause an explosion. Charge the batteries in a ventilated room. When servicing batteries wear protective goggles and gloves.

- Check the electrolyte level (it must be above the edges of the separators by 10 to 15 mm, i.e. corresponding to the top mark on the battery body). If necessary, add distilled water **(filling with electrolyte is not recommended)**;
- Check the electrolyte density, in case of a drop in density by 0.03 g/cm³ recharge the battery. Do not measure the electrolyte density immediately after filling with distilled water because the readings will not be correct;
- Wipe the battery surface with 10% solution of baking soda and then wash with water;
- Lubricate the terminals of two lead-in wires with a thin layer of petrolatum and tighten;
- The battery must be properly secured on the tractor;
- If there are ventilation holes in the plugs 1, clean them

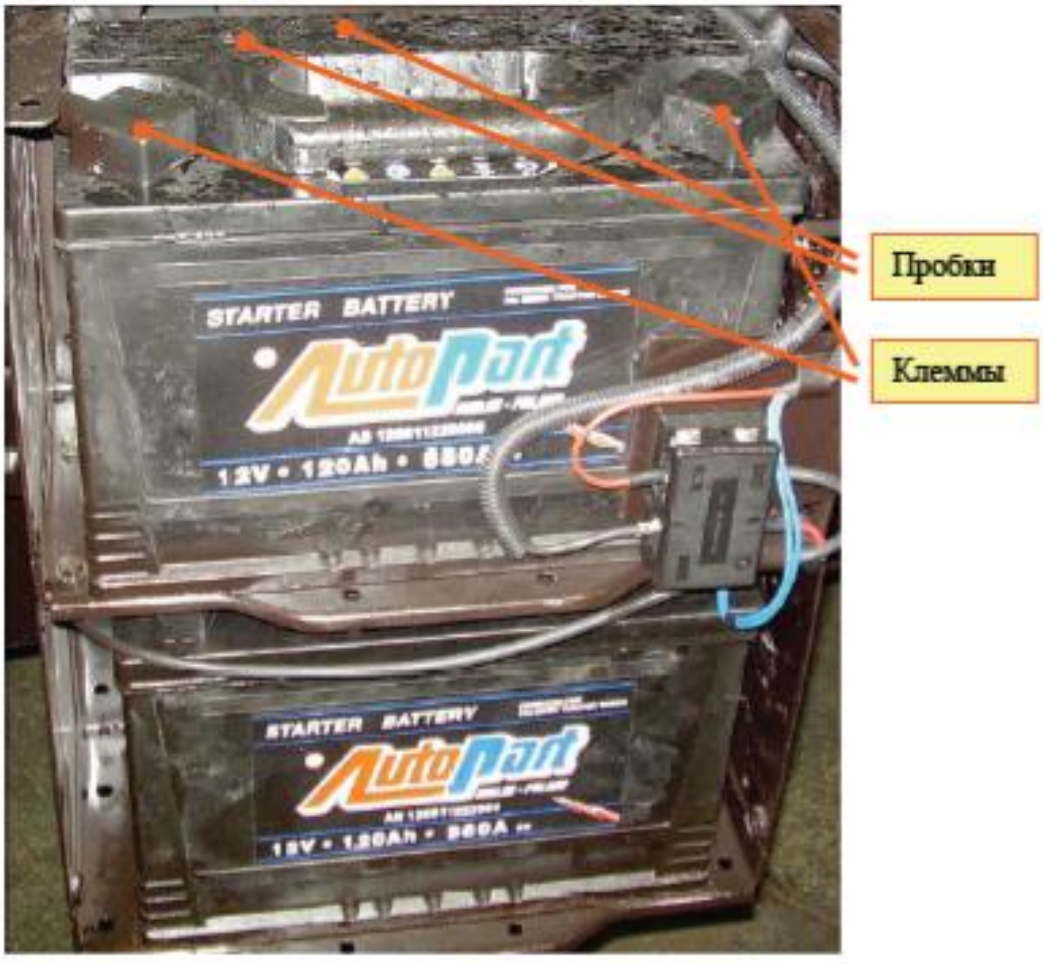


Fig. 8.38

Operation 30. Clean the filter of the air pressure regulator in the pneumatic system (Fig. 8.39)

To clean the filter element:

- Remove the bolts (1) and cover (2).
- Take out the filter element, wash it in detergent solution and blow with compressed air.
- Assemble the strainer in the reverse order.

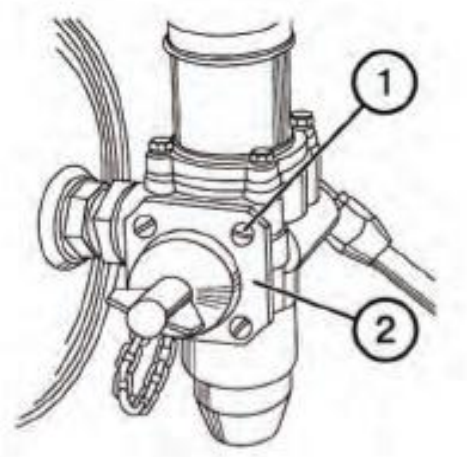


Fig. 8.39

Operation 31. Check tightness of pneumatic system lines

- Bring the air pressure in the pneumatic system to 6.0 to 6.5 kgf/cm² (by readings of the air pressure indicator on the dashboard) and stop the engine.
- Check by the pointer that the pressure drop for 30 minutes did not exceed 2 kgf/cm². Otherwise, find the location of air leak and fix the fault.

Operation 32. Replace the oil filter of the hydraulic system (Fig.8.40)

Note: Perform subsequent replacements of the oil filter in the hydraulic system every 1,000 service hours.

- Remove the screws (2), cover (1) and take out the filter element assembly using the stop (4).
- Remove the nuts (3), stop (4) and filter element (5).
- Wash the casing (6) in detergent solution.
- Install a new filter element and reassemble the filter performing the operations in the reverse order.
- Install the filter assembly to the tank of the hydraulic system, close with the cover (1) and fasten with the bolts (2).

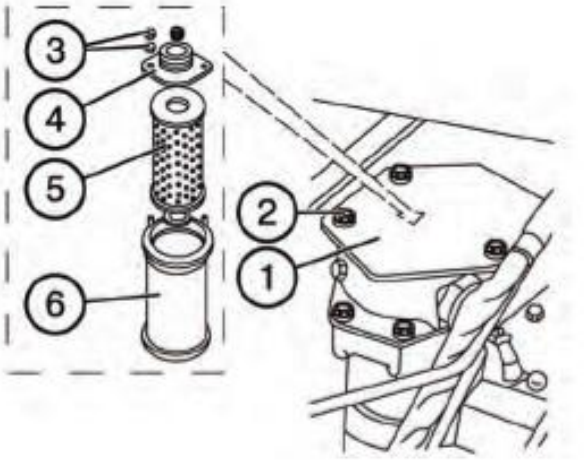
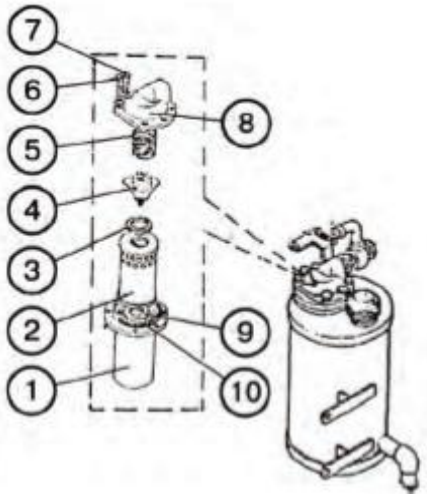


Fig. 8.40

Operation 32a. Replace the HSU tank oil filter (Fig. 8.41)

Replace the HSU oil filter proceeding as follows:

- Unscrew the four bolts (7) (M6×16) and remove the filter assembly;
- Unscrew the two bolts (6) (M6×25) and disconnect the filter cover (8) from the carrier (1);
- Remove the filter element (2), spring (5), pressure relief valve assembly (4) and O-rings (3), (9);
- Rinse the carrier (1) in a washing liquid;
- Install a new filter element and reassemble the filter performing the operations in the reverse order as compared to disassembling.
- Install the filter assembly into the HSU tank making sure that the seals (10) and the seals between the carrier and the tank are installed correctly. Tighten the bolts (6, 7).



NOTE: Perform subsequent replacements of the oil filter in the HSU and hydraulic system every 1,000 service hours.

Operation 34. Clean generator (Fig. 8.42)

Clean the generator from dust and dirt.

Check and, if necessary, tighten the bolts fastening the generator.

Check the tightening torque of the generator terminals and other electrical equipment (starter, batter y switch, etc.)

Fig. 8.42

Operation 34. Clean the cab heating and ventilation system filter (Fig.8.43)

Note: In wet conditions, such as in the early morning hours before servicing the filter do not switch on the fan, because any water particles trapped in the filter are difficult to remove.

- Raise the cab roof (1).
- Remove the two mounting bolts and filter cover (2) together with the two filtering elements (3).

Lightly shake the elements to remove free dust particles from the filter.

ATTENTION! Be careful not to damage the filter!

- Clean the filters with compressed air under a pressure not exceeding 2 bar. Hold the hose nozzle not closer than 300 mm from the filter in order not to damage the PFE.

Direct the air jet through the filter in the direction opposite to the normal flow as indicated by the arrows marked on the filter housing.

- Install the filter performing the operations in the reverse order.

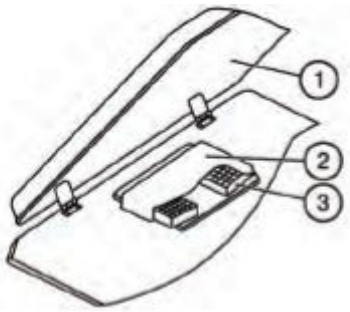


Fig.8.43

Note: When operating the tractor in conditions of high dust exposure, clean the filter more frequently.

Operation 34a*. Replace filter drain (ehe operation is performed each 800 service hours or once a year)

ATTENTION: for replacement of the filter drain, contact a special service station. Replace only using special equipment.

Operation 35. Check bearings of FDA reducer kingpin axles (Fig, 8.44)

The preload in bearings shall be so, that the cam turn force, applied to the flansh (5) is within the limits of 60…80 N. If necessary adjust in the following mode:

Unscrew four bolts (2) and screw in two extracting bolts in manufacturing holes (1) of axle (3);

Remove necessary quantity of the gaskets(4) from the both sides;

Screw out extracting bolts and tighten bolts (2) with a moment 120…140 Nm.

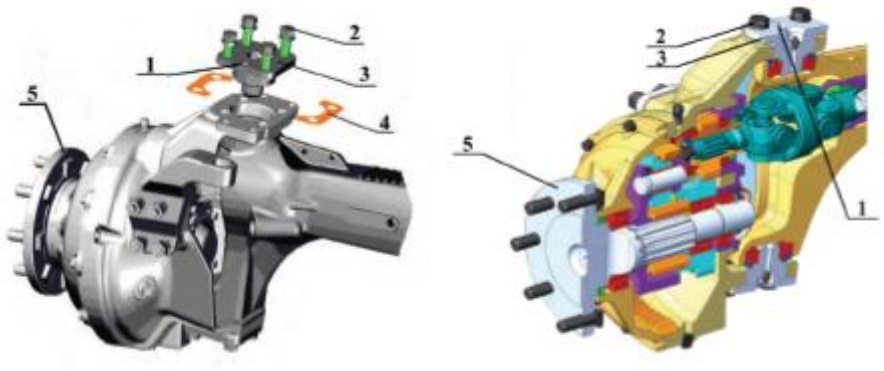


Fig. 8.44

Operation 35a. Check tightening of the clamp bolts of the CAC air ducts (BELARUS-1221.3)

Check and tighten up as necessary the bolts fastening the CAC air ducts. The tightening torque of the CAC air duct clamp bolts must be 10 to 15 N•m.

AFTER EVERY 1,000 SERVICE HOURS

Perform the operations of the previous MS and the following ones:

Operation 36. Tighten engine cylinder head fastening bolts (Fig. 8.45)

Check tightening of the fastening bolts of the cylinder heads on a hot engine proceeding as follows:

- Remove the caps and covers of the cylinder heads.
- Remove the rocker shafts with the rockers and poles.
- Using a torque spanner, tighten all the bolts fastening the heads to a torque of 190 to 210 N•m in the sequence shown in the figure on the right (for simplicity, the figure shows one cylinder head).

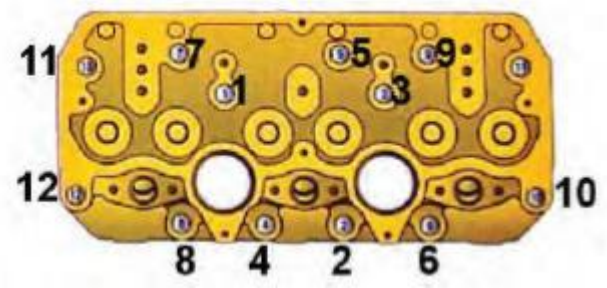


Fig. 8.45

Note: Before tightening the bolts, loosen them by 1/6 turn.

- Install the rocker shafts to places and adjust the clearances between the rockers and the valves (See Operation 21 of this Manual).
- Install the covers and caps of the cylinder heads to place.

ATTENTION! Perform the first check of bolt torque of the cylinder heads after running in the tractor.

Operation 37. Clean engine air cleaner (Fig. 8.46)

- Remove the monocyclone, clear the mesh, swirler and ejection slots from dust and dirt.
- Unscrew the butterfly nut and remove the pan;
- Remove the basic filter element . Pay attention to the condition of the control filter element (4).

ATTENTION! Pollution of the CFE indicates a damaged BFE (the paper shutter broken, the bottoms unstuck).

Note: Taking out the CFE (4) from the casing (6) is not recommended.

If the BFE has no damage, blow it with compressed air first from inside, then outside to completely remove dust.

ATTENTION! To avoid a break of the paper shutter, air pressure must not exceed 0.2 to 0.3 MPa.

Direct the air jet at an angle to the BFE surface. Avoid contamination with oil or mechanical damage to the BFE.

ATTENTION! Do not blow the BFE with exhaust gases and do not rinse it in diesel fuel.

Clean the exhaust pipe, inner surfaces of the housing and air pan from dust and dirt.

- Check condition of the sealing rings.
- Make sure that the BFE is correctly installed in the housing and tighten the butterfly nut by hand.
- Perform the Operation 24 to check tightness of the air cleaner and intake.

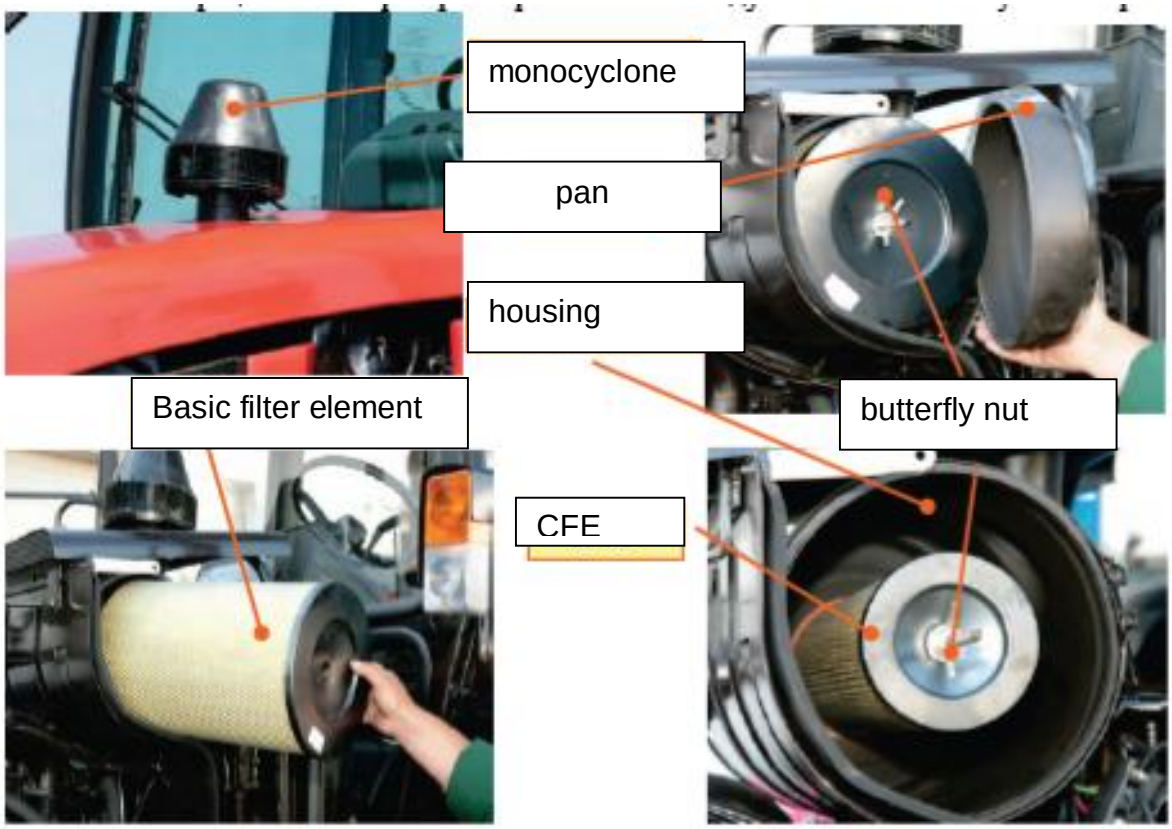


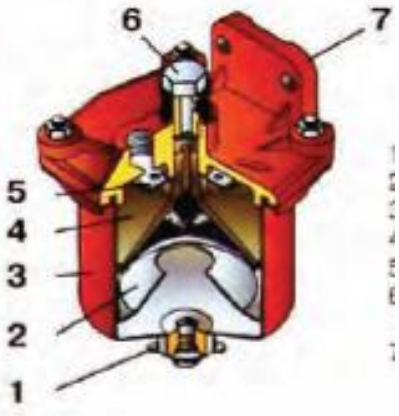
Fig. 8.46

Operation 38. Clean engine fuel coarse filter (Fig.8.47)

- Clean outer surface of the filter, unscrew the bowl fastening screws;
- Remove the bowl (3), turn off reflector (4) with mesh. Remove the diffuser (5).

Rinse in diesel fuel the reflector (4) with mesh, diffuser and inner bowl (3) cavity. Assembly the filter in reverse order and blow up fuel system (Operation 39).

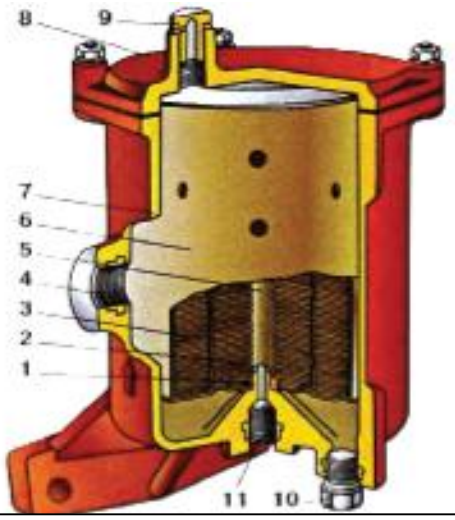
bowl fastening screws



1- plug;
2- dash pot;
3- bowl
4- reflector
5- diffuser
6- bolt of turning anglepiece
7- filter housing

Operation 39. Change filter elements of fine fuel filter (Fig. 8.48)

Unscrew the plug (10) and discharge sediment.
Unscrew the four nuts and remove the cover (8).
Take off the housing and waste the filter elements
Rinse the housing and cover with pure diesel fuel.
Install a new filter element 6
Check the cover seal and, if necessary, replace it.
Install the cover 8 and tighten the four fastening nuts.
Screw the plug 10.
Remove the air from the fuel system.



1- rubber sealing of the filter element
2- second stage fuel filter element (paper)
3- first stage fuel filter element (paper)
4- threaded opening for connection of raw fuel supply pipe.
5- purified fuel cavity
6- filter element
7- filter housing
8- filter cover
9- plug with orifice hole for air outlet
10- plug for fuel sediment drain opening
11- threaded hole for connection of purified fuel bleeding pipe

Fig. 8.48

To bleed air from the system(Fig. 8.49):

Loosen by 2…3 turns the plug (4) for air removing from the fuel pump (3).
Loosen by 2…3 turns the plug (1) for air removing on housing of fine fuel filter (2).

Quickly purge the system with the hand-priming pump (5), consequently turning the plug (1) on fine fuel filter until clean fuel without air bubbles emerges from the plug and then plug (4) on the fuel pump.

Screw the handle of the hand-priming pump.

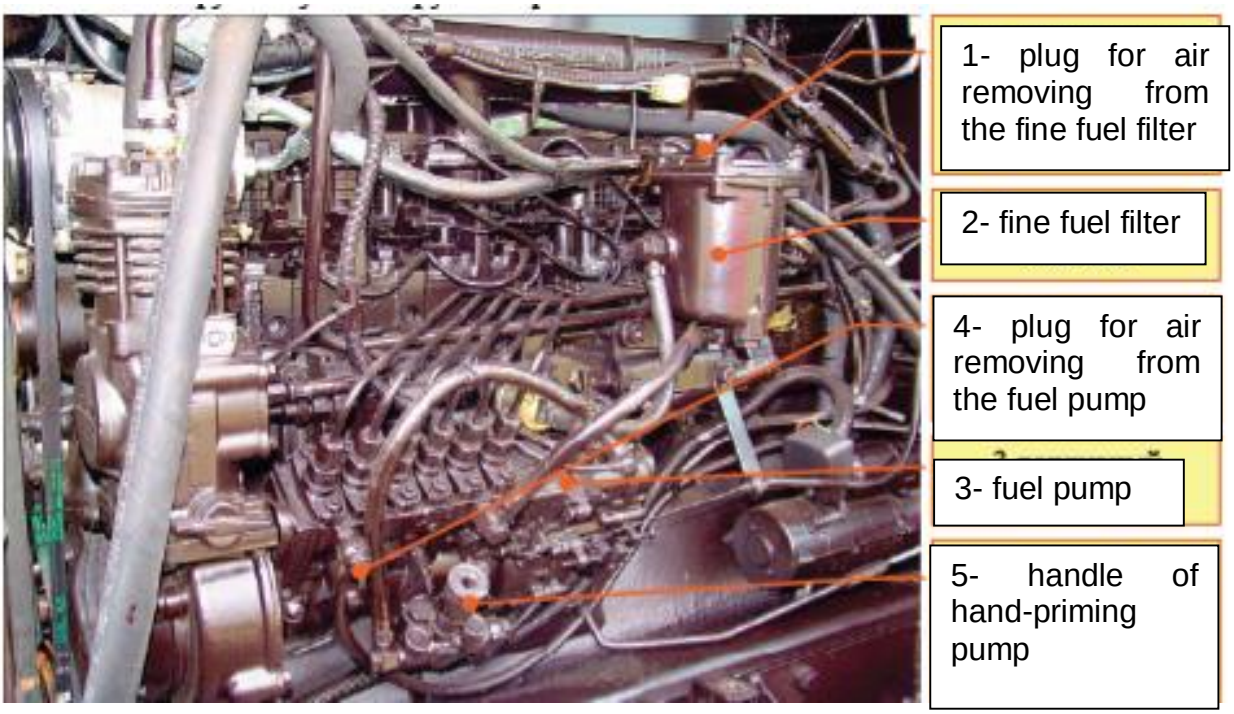


Fig. 8.49

Note: If the engine start is difficult, loosen in turn the captive nut of each injector fuel line, while cranking the crankshaft to remove air from the lines. Crank the crankshaft for 10 to 15 seconds for each line and tighten the captive nut without stopping cranking. If any disturbances are observed, loosen and screw each nut with the engine running.

Operation 40. Check play in the steering link joints (Fig. 8.50)

When the engine is running, turn the steering wheel in both directions to check the free travel and play in the joints of the steering link.

If there is play in the joints, proceed as follows:

- Remove the locking wire.
- Screw in the threaded plug so as to eliminate the gap in the joint.
- Lock the plug with wire.

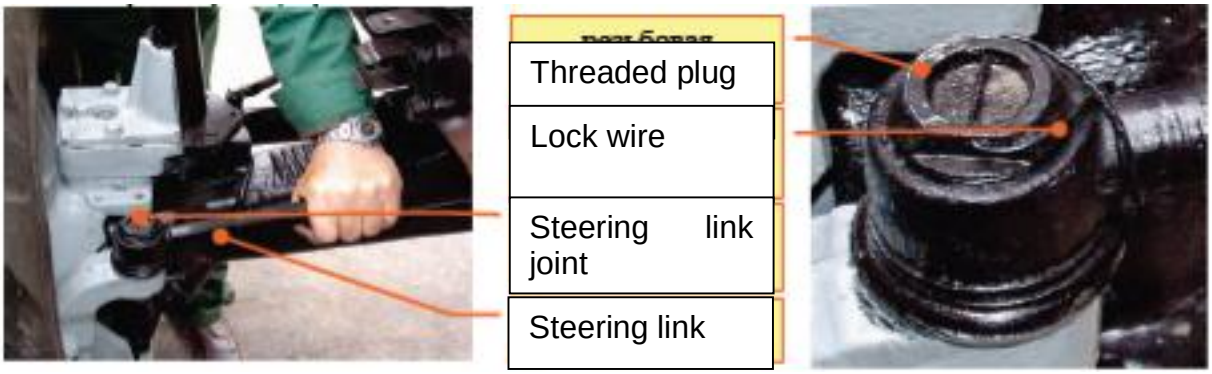


Fig.8.50

Note: If tightening of threaded plugs does not eliminate a gap in the joints, disassemble the joint and replace worn parts.

Operation 41. Check and tighten external fasteners

Check and, if necessary, tighten, the following bolted connections:

- Nuts of front and rear wheel hugs and bolts of rear hubs.
- Front beam — half-frame — side plates — front hitch linkage and PTO (if installed).
- Engine — clutch housing.
- Clutch housing — GB housing.
- GB housing — rear axle housing
- Rear axle housing — rear hitch linkage bracket.
- Rear axle housing — universal hitch.
- Front and rear cab supports.
- Nuts of FDA driveline flanges.
- Front fender brackets — FDA wheel reduction gears.
- Rear axle housing — top cover (two rear bolts M20).
- Bracket and fingers of the steering hydraulic cylinder.
- FDA-housing – sleeves –reduction gear wheels
- Hydraulic hoist fasteners (if installed)

Operation 42. Change oil in the transmission housings, hydraulic system oil tanks, HSU and wet brake housings (Fig.8.51)

Before changing oil, operate the tractor to warm up the transmission and hydraulic system oil.

- Install the tractor on an even surface, lower the rear hitch linkage rods to the lowest position, stop the engine and brake the tractor with the parking brake.
- Lock the rear wheels with wedges on both sides.
- Remove the cover (1) of the oil filler neck of the transmission, the plug (3) of the hydraulic system oil tank and the plug (5) of the HSU oil tank.
- Remove the drain plugs (2, 4, 6) from housings of the gearbox, rear axle, hydraulic system oil tanks and HSU respectively and discharge oil into a container for collection of waste oil. Properly dispose of waste oil.

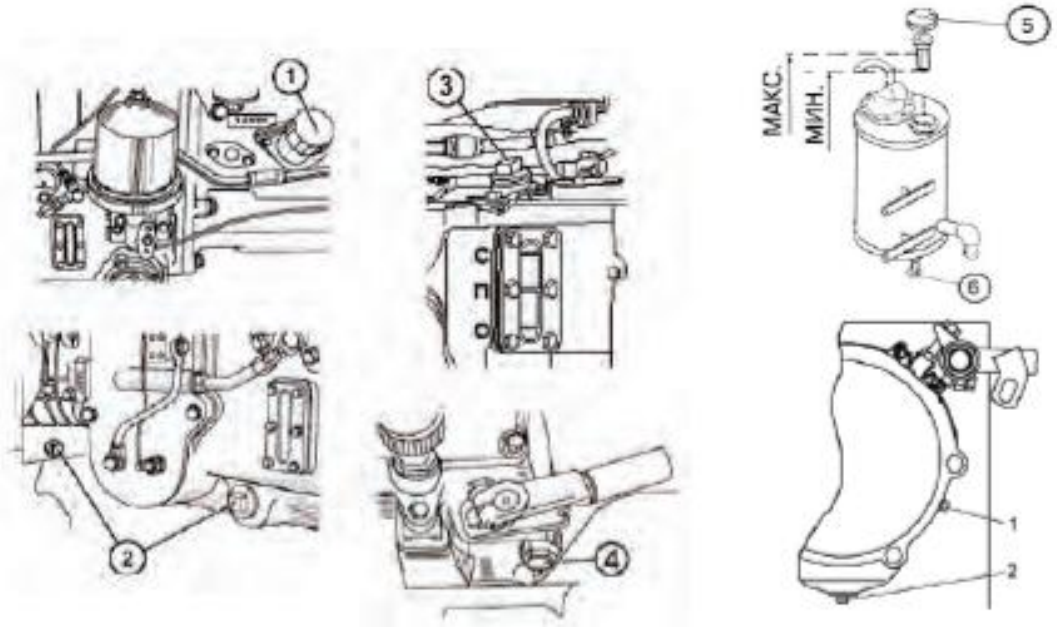


Fig. 8.51

Caution! Be careful to avoid contact with hot oil.

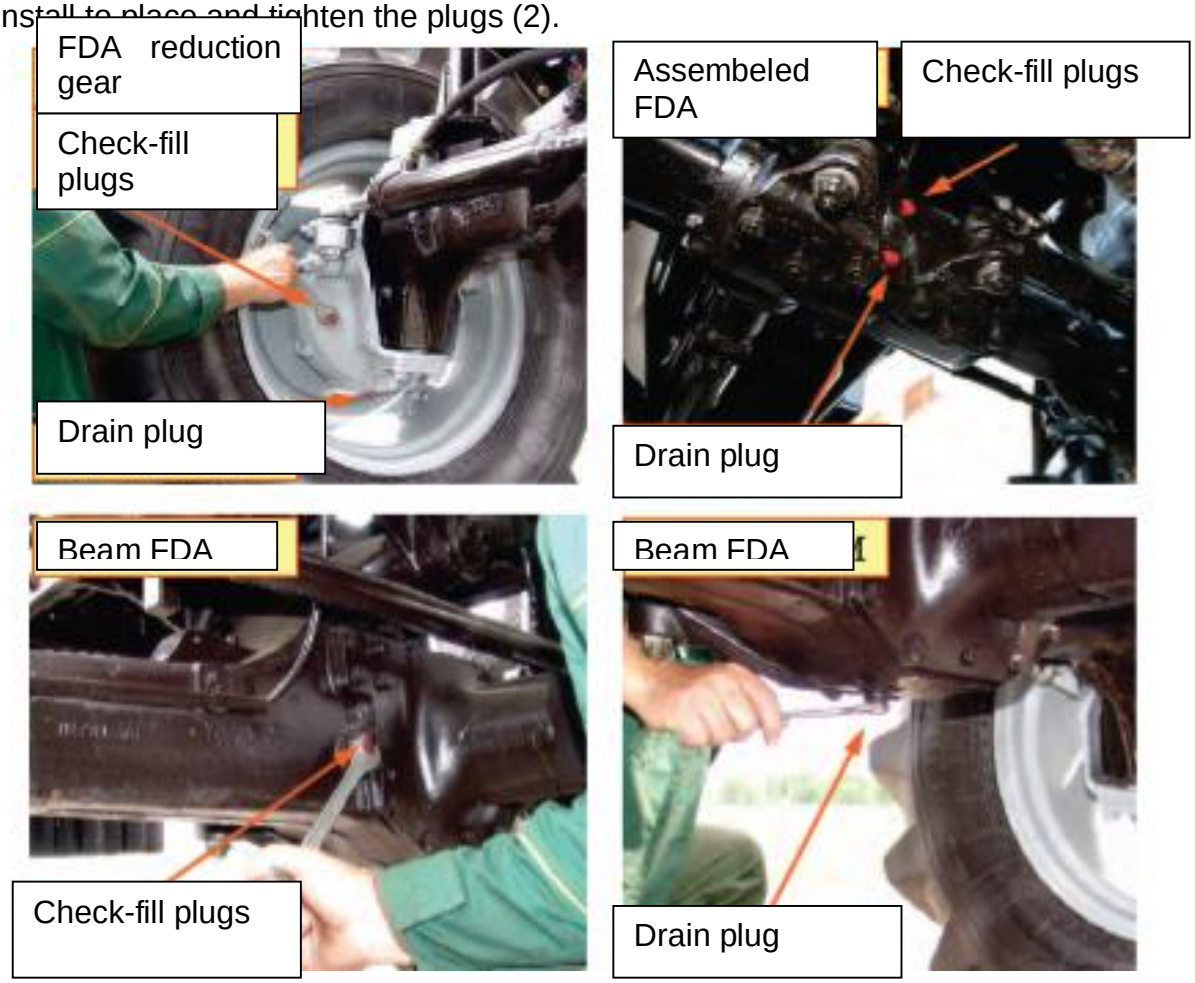
- Install the drain plugs (2, 4, 6) to place and fill the transmission housing, the hydraulic system and HSU oil tanks with fresh oil to the required level.

Change oil in a multi-disk brake housings operating in oil bath, proceeding as follows:

- unscrew the check-fill plugs (1) of the left and right housings;
- unscrew the drain plugs (2) and discharge oil as described above;
- screw the drain plugs (2);
- fill the housings with fresh motor oil.
- screw in the filler plugs (1);

Operation 43. Change oil in the FDA final drive and wheel reduction gears (Fig. 8.52)

- Operate the tractor and warm up the oil in the FDA housings.
- Install the tractor on an even, horizontal surface. Stop the engine. Engage the parking brake and lock the wheel with wedges on both sides.
- Remove the check-fill plugs (2) and the drain plugs (1). Discharge oil into a special container to collect waste oils. Properly dispose of oil.
- Install the drain plugs to place and tighten them.
- Fill the housings with fresh transmission oil to the lower edge of the check-fill holes.
- Install to place and tighten the plugs (2).



Note: Change oil also during the seasonal MS.

Operation 44. Lubricate the RHL right adjustable brace (Fig.8.53)

Using a gun, lubricate the adjustment mechanism of the right brace (one lubrication point). Make 4 to 6 injections through the lubricator in the upper part of the brace. Lubricant: Litol-24 (or Bechem LCP-GM).

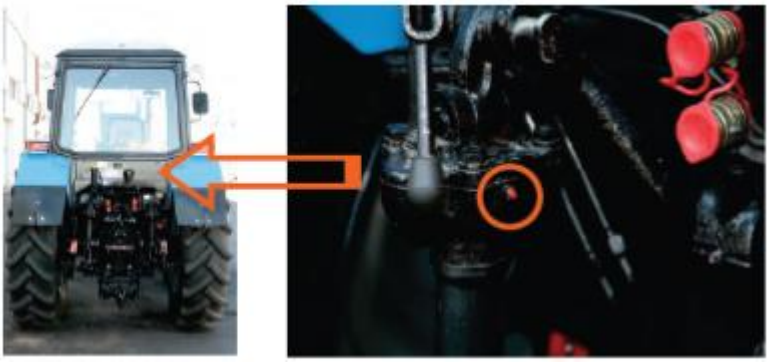


Fig. 8.53

Operation 46. Lubricate the RHL pivoting shaft (Fig. 8.54)

Using a gun, inject grease into two lubricators located on the linkage bracket until the grease emerges from gaps. Grease: Litol-24 or Bechem LCP-GM.

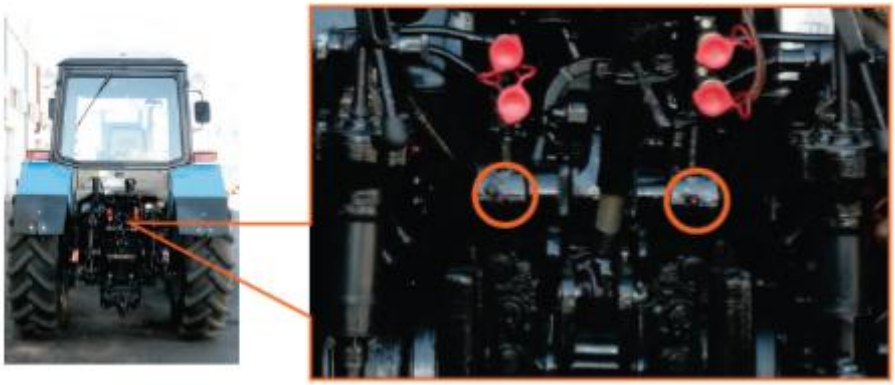


Fig. 8.54

Operation 47. Check injectors (Fig. 8.55)

IMPORTANT! The injectors must be cleaned and adjusted by a qualified expert in shop.

Caution! Diesel fuel going out from the injector under a high pressure can penetrate deeply into the skin tissue of the hand resulting in serious injuries. Never use your hand to check injector leaks. Use paper or cardboard. Wear goggles. Before disconnecting the fuel lines, stop the engine to remove the pressure. Before you start the engine, firmly tighten connections of the fuel lines. In case of skin contact with a fuel jet, immediate seek medical help to avoid blood poisoning.

Note: It is convenient to have spare injectors ready for use.

To replace the injectors, proceed as follows:

- Completely clean the surfaces adjacent to the removed parts.
- Unscrew the captive nuts (5) and disconnect the fuel injection pipes (4) from the injectors (2) and the fuel pump (not shown).
- Remove the fuel injection pipes (4).
- Remove the six bolts (1) and the drain pipe. Sort out copper washers (two washers on each banjo bolt).

Remove the bolts (3) fastening the injectors and remove the injectors (2).

- Send the injectors to a shop for maintenance.
- Install new injectors and removed parts in the reverse order. Tighten the bolts (3) fastening the injectors evenly in 2-3 steps. Final tightening torque is 20 to 25 N•m
- Purge the fuel system as specified in the Operation 39.

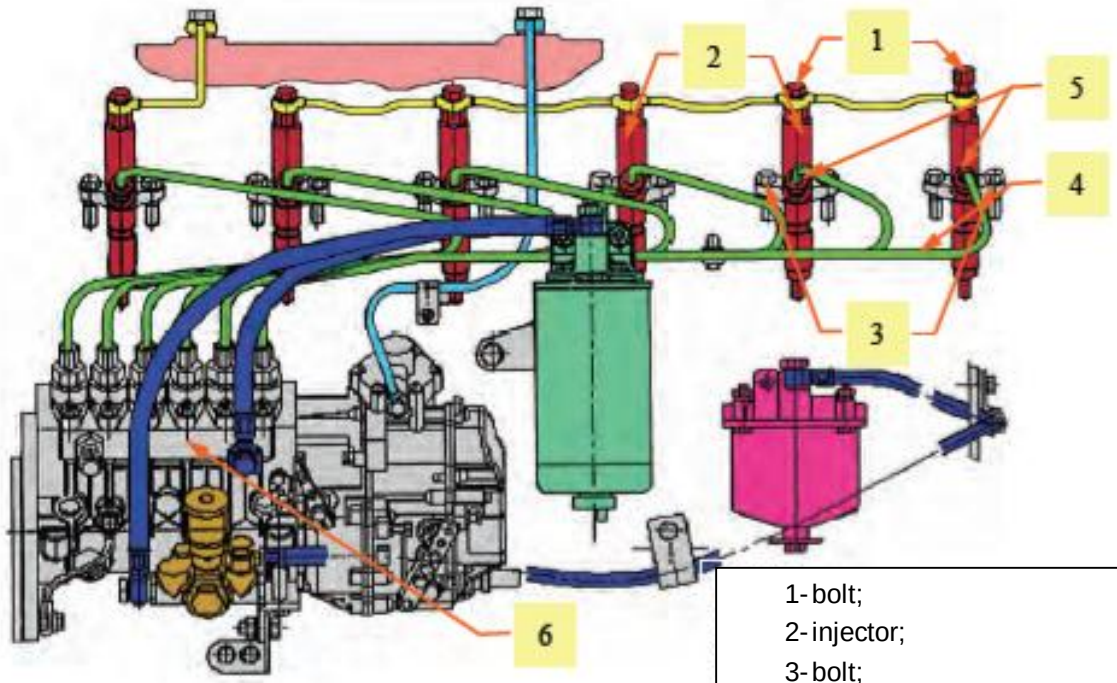


Fig. 8.55

1- bolt;
2- injector;
3- bolt;
4- high pressure fuelpipes
5- nut
6- fuel pump

Operation 47. Generator (Fig. 8.56)

- Loosen the bolts (1) and (2), turn the generator in the direction of the engine unit and remove the generator drive belts (4) from the pulley (3).
- Check free rotation of the rotor and wear of the bearings.

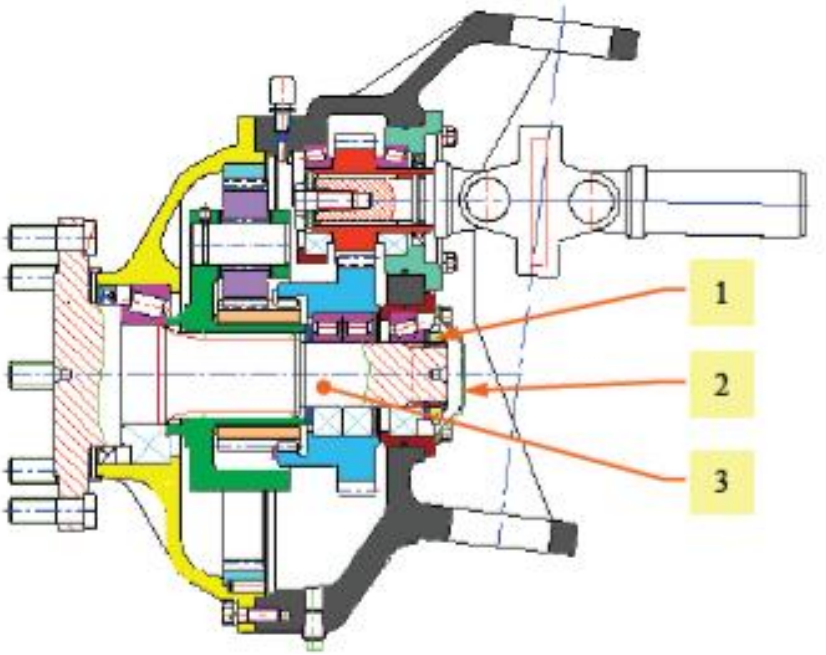
If necessary, remove the generator and send it to a shop for repair.

Fig. 8.56

Operation 48. Flange bearings of the FDA planetary/parallel-shaft reduction gear (Fig. 8.57)

Check and, if necessary, adjust the tapered roller bearings (3, 5) without play, proceeding as follows:

- Unscrew the screws and remove the cover (2);
- Tighten the nut (1) to a torque of 180 to 200 N•m (18 to 20 kgf•cm), and then unscrew it by 15 to 20°;
- Unstake the nut in two flange slots (4). Install the cover (2) to place.



1- nut
2- cover
3- flange

Fig. 8.57

AFTER EVERY 2,000 SERVICE HOURS

Perform the operations of the previous MS and the following ones:

Operation 49. Engine fuel pump

The delivery commencement angle of the fuel pump must be within the limits specified the table on the right. Only a qualified technician should check and adjust the delivery commencement angle.

Remove the pump and send it to shop for bench check of conformity to the adjustment parameters (speed mode, rated delivery per stroke, delivery per stroke, etc.).

Model of fuel pump	Adjustment of timing angle, deg. to UDC		
	D-260.2	D-260.2S	D-260.2S2
363-40 OJSC YAZDA, Russia	20±1	15±1	—
Motorpal PP6M10P1f, Czech Republic	16±1	16±1	—
363-40.02T OJSC YAZDA, Russia	—	–	6±0.5

Operation 50. Flush the cooling system

To flush, use a solution of 50-60 g of sodium carbonate and 1 liter of water.

Proceed as follows:

- Pour 2 liters of kerosene into the water heat exchanger and fill the system with the prepared solution.
- Start the engine and work for 8 to 10 hours, then discharge the solution into a special container and flush the cooling system with pure water.

Operation 51. Flush the engine air breathers (Fig. 8.58)

- Remove the air breather housings (1), remove the air breathers from the caps of the cylinder head covers, rinse them in diesel fuel and blow with compressed air. Assemble the air breathers in the reverse order.

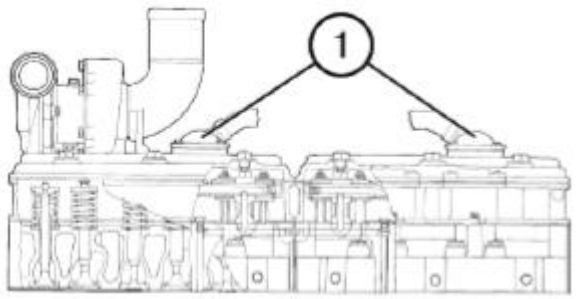


Fig. 8.58

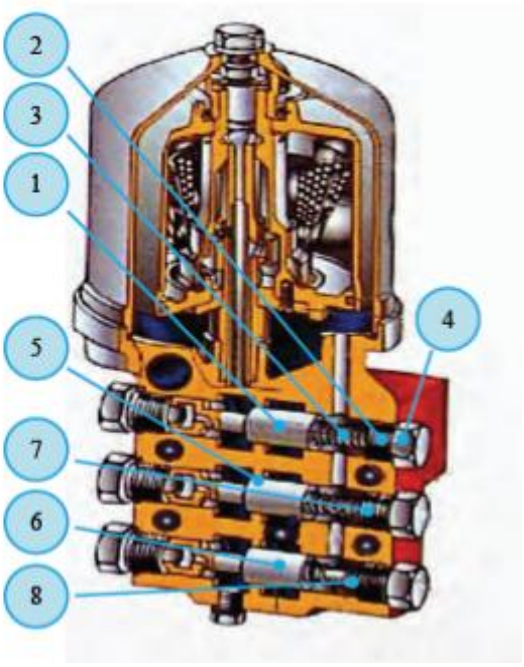
Operation 52. Adjust oil pressure in the engine lubricating system

If the oil pressure in the lubrication system of a warmed-up engine at a rated crankshaft speed is below 0.28 MPa (2.8 kgf/cm²), stop the engine and correct the fault. Check tightness of the oil lines and serviceability of the relief valve in the oil filter. One way to increase the pressure is adjustment of the relief valve, paper oil filter in a special shop.

Operation 53. Adjust the relief valve of the gearbox centrifuge (Fig. 8.59)

The valve (1) maintains an oil pressure in the system of 0.9 to 1.0 MPa (9 to 10 kgf/cm²).

If the pressure drops below the specified limit, adjust the valve (2) by installing additional washers (5) between the spring (3) and the plug (6).



1- valve
2- aditional washers
3- spring
4- plug
5- valve
6- valve
7- , 8- washers

Fig. 8.59

IMPORTANT! If the pressure drops below 0.7 MPa (7.0 kgf/cm²), stop the tractor and contact a technician.

The valve (7) maintains an oil pressure before the rotor of the centrifuge. It must be 0.75 MPa (7.5 kgf/cm²).

The lubrication valve (12) is set for a pressure of 0.2 ± 0.05 MPa (2.0 ± 0.5 kgf/cm²) and maintains the oil pressure in the GB lubricating system. Adjust the valves with the washers (9) and (11).

Operation 54. Maintenance of the cab ventilation and heating system (Fig. 8.60)

For efficient operation of the ventilation and heating system, perform the following operations:

1. After pouring a cooling fluid (water) into the cooling system, start the engine and without opening the valve (1) on the left side of the engine let the engine operate at medium speed to warm up the coolant in the system to 50 to 60°C, and then open the valve (1) to fill the heat exchanger with the fluid.
2. Make sure that the fluid is circulating through the heater, slightly opening the drain plug (4) on the right side of the cab. The heat exchanger must start warming up, at that the coolant level in the water heat exchanger of the engine must drop.
3. Add the coolant to the heat exchanger to the upper edge of the filler neck (Operation 2, p. N7).
4. For a quick warm-up of the cab, switch on the heater fan switch (3) and open the recirculation valves (2).

5. To discharge the coolant from the heater and the engine cooling system, install the tractor on an even surface, open the heater valve (1), remove the cap of the engine water radiator, remove the left and right drain plugs (4) and open the drain valves of the water radiator and the cylinder block of the engine.

6. During the warm season, the valve (1) must be closed for operation of the system in the ventilation mode.

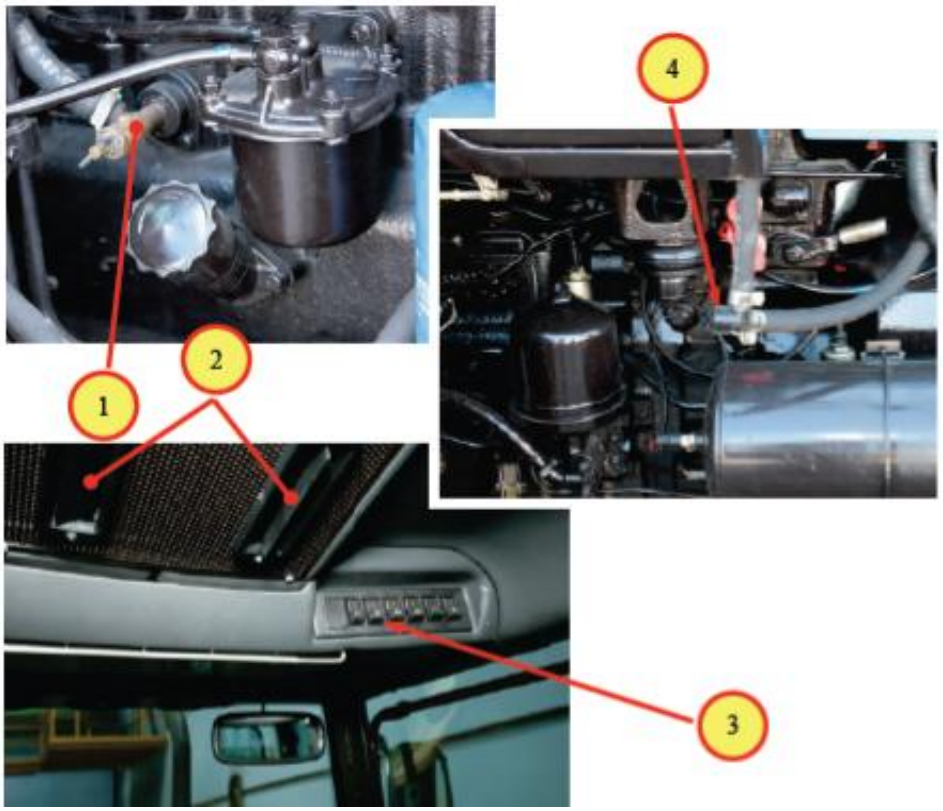


Fig. 8.60

ATTENTION! During the cold season, to avoid ice plugs, if the cooling system is filled up with water, blow the heating system with compressed air, first closing the valves for draining water from the water radiator and the cylinder block of the engine and install the water radiator cap to place.