

PARTS & SERVICE NEWS

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SUBJECT: FLUSHING PROCEDURE FOR WORK EQUIPMENT AND STEERING SYSTEM HYDRAULIC CIRCUITS

PURPOSE: To introduce flushing procedure for the work equipment and steering system hydraulic circuits on WA1200-3 wheel loaders

APPLICATION: WA1200-3 Wheel Loaders, Serial Nos. 50001 and up

FAILURE CODE: 6010BL

DESCRIPTION:

1. Introduction

When carrying out flushing on the WA1200-3 wheel loaders to remove dust from the hydraulic circuits after finishing repair work for malfunctioning of the hydraulic equipment and devices, follow the procedure described in this Service News.

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2. Choosing a flushing pattern.

- Depending on the degree of hydraulic circuit contamination, choose either flushing pattern out of the following.

Pattern	Description	Page
A	If a pump is damaged and needs to be repaired.	
B	At present no damaged pump is found but repairs are made in advance to the machine that has a repair history due to a troubled hydraulic equipment such as a pump.	
C	No hydraulic equipment on the machine has experienced any trouble in the past and an advance repair is made to the machine which is operated all right.	

3. Work outline on the flushing pattern

No.	Work item	Applicable flushing pattern		
		A	B	C
1	Flushing and repairing a single unit of hydraulic equipment: <ul style="list-style-type: none"> - Hydraulic pump ----- - Valves ----- - Hydraulic cylinder ----- - Hydraulic tank ----- - Oil cooler ----- - Hydraulic tube and hose ----- 	○ ○ ○ ○ ○ ○	— — — — — —	— — — — — —
2	Short circuited flushing on hydraulic circuit <ul style="list-style-type: none"> - Lift cylinder circuit ----- - Dump cylinder circuit ----- - Steering cylinder circuit ----- 	○ ○ ○	○ ○ ○	— — —
3	Replacing the hydraulic oil (with fresh oil)	○	○	—
4	Replacing parts such as element	○	○	○

4. Parts required when flushing

Quantity of part per machine

No.	Part Name	Part No.	Flushing pattern		
			A	B	C
1	Element special for flushing	07063-41187	3	+	+
2	Standard element	208-60-61180	3	3	3
3	Plate for clogging the filter by-pass circuit	21T-60-13680	3	3	3
4	Element for PPC	209-60-12840	2	2	2
5*1 *2	Flange for short circuiting the tube	F-20	4	4	+
		F-14	2	2	+
6	Strainer for in line filter	207-60-61250	2	2	2
7	strainer for in line filter	209-60-65240	6	6	6
8*1	O-ring (Bucket Cyl)	07000-22060	4	4	+
9*1	O-ring (Boom Cyl)	07000-22060	8	8	+
10*1	O-ring (STG Cyl)	07000-23048	8	8	+
11	Strainer	427-60-15320	1	1	+
12	Hyd. oil cooler	SEE PRATS BOOK	1	+	+

NOTE:

*1: Needed only when a short circuited flushing is made for the tube (needs to be removed after completing flushing)

*2: See Page 3-a (local made)

Part No. F-14
 Part name: Flange
 Material: SS400P

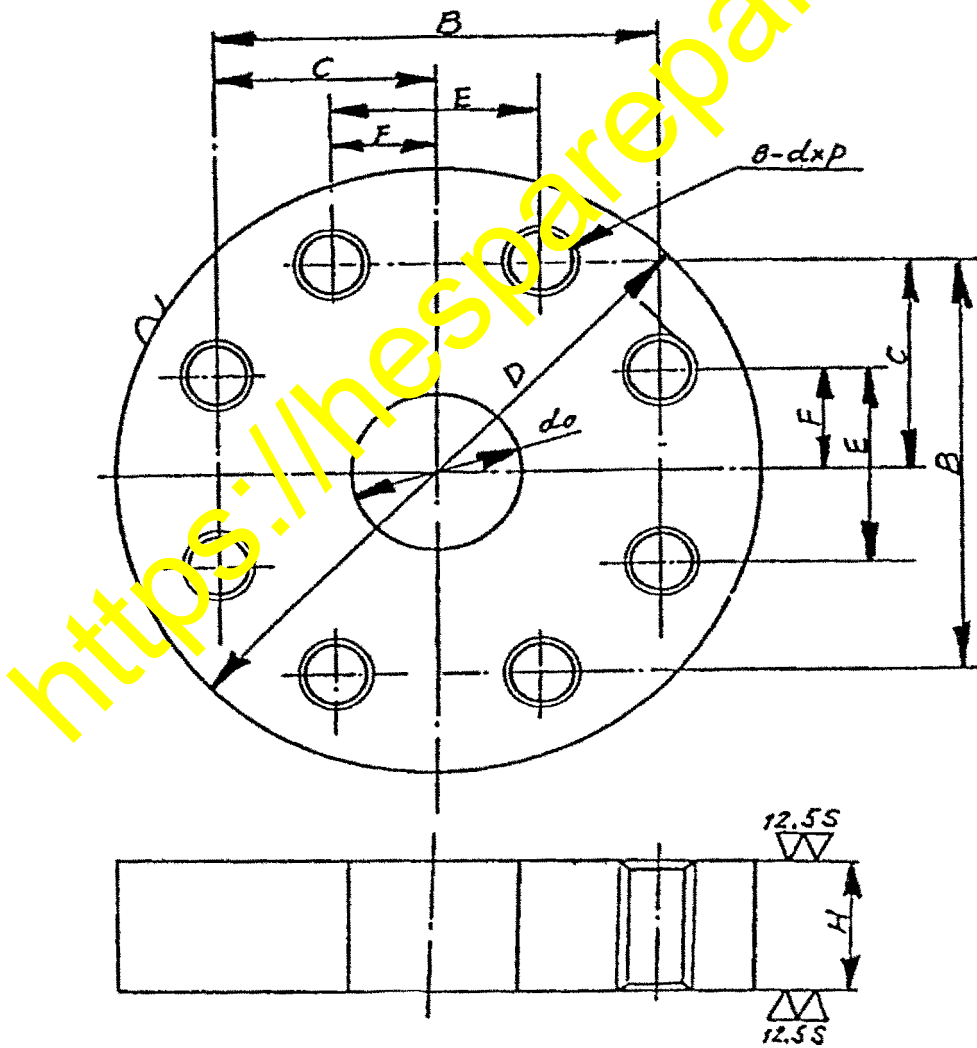
Part No. F-20
 Part name: Flange
 Material: SS400P

Dimension table (mm)

F-14	
D	115.0
B ± 0.2	79.4
d	14.0
P	2.0
C	39.7
d 0	33.0
F	18.25
E ± 0.2	36.50
H	30.00

Dimension table (mm)

F-20	
D	140.0
B ± 0.2	96.8
d	18.0
P	2.5
C	48.4
d 0	38.0
F	22.25
E ± 0.2	44.50
H	38.00



5. How to flush

5-1 For flushing pattern A

(When a hydraulic pump has been damaged and needs to be repaired)

- (1) • Drain oil from the hydraulic tank.
 - Remove the strainer located in the tank (see fig 2).
- (2) Disassembling, flushing, and assembling the equipment
 - 1) If a pump is found troubled, replace the pump with a new one.
 - 2) Disassemble, flush, and assemble the following hydraulic valves:
 - Control valve (two valves)
 - PPC relief valve
 - Hydraulic tank
 - PPC valve
 - Steering demand valve
 - Breather
 - Cold relief valve (if cooling line)
 - Emergency Stop
Diverter valve
(if equipped)
 - 3) Disassemble, flush, and assemble the following hydraulic cylinders:
 - Lift cylinders (two cylinders)
 - Steering cylinders (two cylinders)
 - Dump cylinder (two cylinders)
 - 4) Hydraulic oil cooler
 - Replace the Hydraulic oil cooler (See Fig. 1)
 - 5) Remove the hydraulic tube and hose from the machine, then flush them.
 - 6) After the parts have been disassembled and flushed, install these parts to the machine.
- (3) Before flushing
 - 1) Replace the filter element on the hydraulic tank with a one special for flushing (See Fig. 2), Attach the brand-new filter element.
 - 2) Replace the filter by-pass valve with a plate for clogging the by-pass circuit. (See Fig. 2)
 - 3) By using short circuiting flanges, connect and make short circuited the IN and OUT hoses on the hydraulic cylinders. (See Fig. 6)
 - 4) Fill the hydraulic tank with fresh hydraulic oil up to the specified level. (See Operation Manual, section "Servicing at 2000 hr.")
For the hydraulic oil level see Operation Manual, section "Servicing at 100 hr.")
- (4) Flushing
 - 1) Start the engine and run at low idling without operating the work equipment and without heating up to the time when the hydraulic oil temperature is 40° – 50°C.
 - 2) Run the engine at medium speed for 20 minutes.
Do not operate the work equipment nor make steering during the running of engine.
 - 3) Run the engine at full speed and control the lever in the following order:
 - ① Steering, right Hold 2 minutes.
 - ② Steering, left Hold 2 min.
 - ③ Boom, raise Hold 2 min.
 - ④ Boom, lower Hold 2 min.
 - ⑤ Bucket, tilt Hold 2 min.
 - ⑥ Bucket, dump Hold 2 min.
 Repeat above operations ① to ⑥ more than 5 times.

if the emergency stop system is equipped the machine.

(5) Restoring to the original condition

- 1) Remove the short circuiting flanges from all cylinder circuits, then install hoses to the cylinders:
 - Lift cylinders (two cylinders)
 - Dump cylinder (two cylinders)
 - Steering cylinders (two cylinders)
- 2) Replace the flushing-use element on the hydraulic tank filter with a new standard element.
- 3) Remove the by-pass circuit clogging plate from the filter, then install the by-pass valve to restore to the original condition.
- 4) Replace the PPC -use element with a new one. (Fig-5)
- 5) Fill the hydraulic tank with the specified amount of hydraulic oil (fresh oil).
- 6) Replace the inline filter Strainer with a new one. (Fig-4)

5-2 For flushing pattern B

At present no damaged pump is found but repairs are made in advance to the machine that has a repair history due to a troubled hydraulic equipment such as a pump.

(1) • Drain oil from the hydraulic tank.

- Remove the strainer located in the tank (see fig-3)

(2) Before flushing

- 1) Replace the filter element on the hydraulic tank with one special for flushing. (See Fig. 2)
- 2) Replace the filter by-pass valve with a plate for clogging the by-pass circuit. (See Fig. 2)
- 3) By using short circuiting flanges, connect and make short circuited the IN and OUT hoses on the hydraulic cylinders. (See Fig. 6)
- 4) Fill the hydraulic tank with fresh hydraulic oil up to the specified level. (See Operation Manual, section "Servicing at 2000 hr.")
For the hydraulic oil level see Operation Manual, section "Servicing at 100 hr.")

(3) Flushing

- 1) Start the engine and run at low idling without operating the work equipment and without steering up to the time when the hydraulic oil temperature is 40° — 50°C.
- 2) Run the engine at medium speed for 20 minutes.
- 3) Run the engine at full speed and control the lever in the following order:
 - ① Steering, right Hold 2 minutes.
 - ② Steering, left Hold 2 min.
 - ③ Boom, raise Hold 2 min.
 - ④ Boom, lower Hold 2 min.
 - ⑤ Bucket, tilt Hold 2 min.
 - ⑥ Bucket, dump Hold 2 min.
 Repeat above operations ① to ⑥ more than 5 times.

if the emergency stg system is equipped the machine.

(4) Restoring to the original condition

- 1) Remove the short circuiting flanges from all cylinder circuits, then install hoses to the cylinders:
 - Lift cylinders (two cylinders)
 - Steering cylinders (two cylinders)
 - Dump cylinder (two cylinders)
- 2) Replace the flushing-use element on the hydraulic tank filter with a new standard element.
- 3) Remove the by-pass circuit clogging plate from the filter, then install the by-pass valve to restore to the original condition.
- 4) Replace the PPC use element with a new one. (Fig-5)
- 5) Fill the hydraulic tank with the specified amount of hydraulic oil (fresh oil)
- 6) Replace the inline filter strainer with a new one. (Fig-4)

5-3 For flushing pattern C

No hydraulic equipment on the machine has experienced any trouble in the past and an advance repair is made to the machine which is operated all right.

(1) Before flushing

- 1) Replace the filter element on the hydraulic tank with a one special for flushing (See Fig. 2)
- 2) Replace the filter by-pass valve with a plate for clogging the by-pass circuit. (See Fig. 2) .
- 3) Fill the hydraulic tank with fresh hydraulic oil up to the specified level. (See Operation Manual section "Servicing at 2000 hr.")
For the hydraulic oil level see Operation Manual, section "Servicing at 100 hr.")

(2) Flushing

- 1) Start the engine and run at low idling without operating the work equipment and without steering up to the time when the hydraulic oil temperature is $40^{\circ} - 50^{\circ}\text{C}$.
- 2) Run the engine at medium speed for 20 minutes.
- 3) Run the engine at full speed and control the lever in the following order
 - ① Steering to the most Right to left (or left to right) and lock to lock, 2-way and 10 times
 - ② Operating the boom Raise and lower with full stroke, 10 times
 - ③ Operating bucket Tilt and dump with full stroke, 10 times

if the emergency stop system is equipped the machine.

- 4) Checking the element: After one cycle of above operations ① to ③ has been completed, check the element. If it is dirt, clean the element and flush another cycle.

(3) Restoring to the original condition

- 1) Replace the flushing-use element on the hydraulic tank filter with a new standard element.
- 2) Remove the by-pass circuit clogging plate from the filter, then install the by-pass valve to restore to the original condition.
- 3) Replace the PPC-use element with a new one. (Fig-5)
- 4) Fill the hydraulic tank with the specified amount of hydraulic oil (fresh oil).
- 5) Replace the inline filter strainer with a new one. (Fig-4)

Replacing the hydraulic oil cooler.

Replace the hydraulic oil cooler located behind the radiator as shown in Fig. 1.

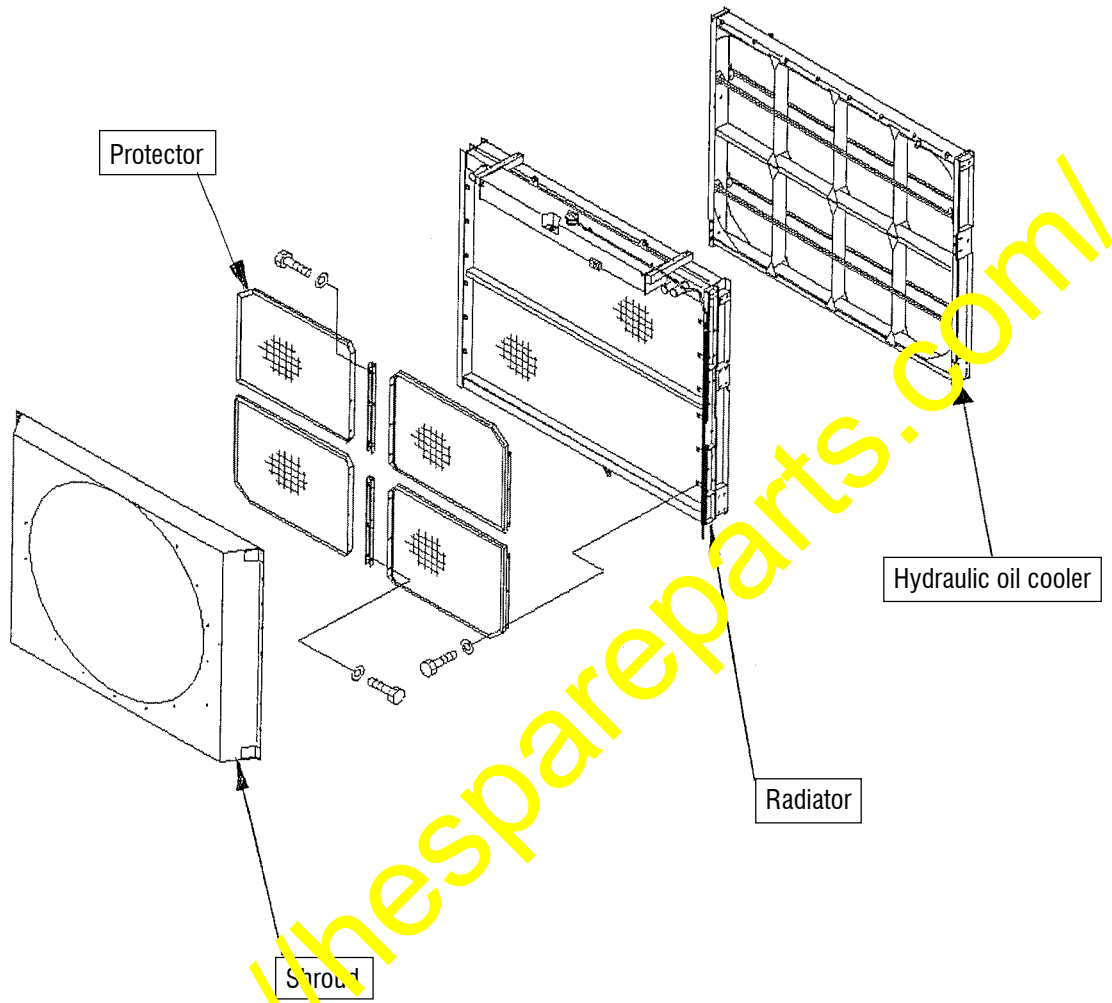


Fig. 1

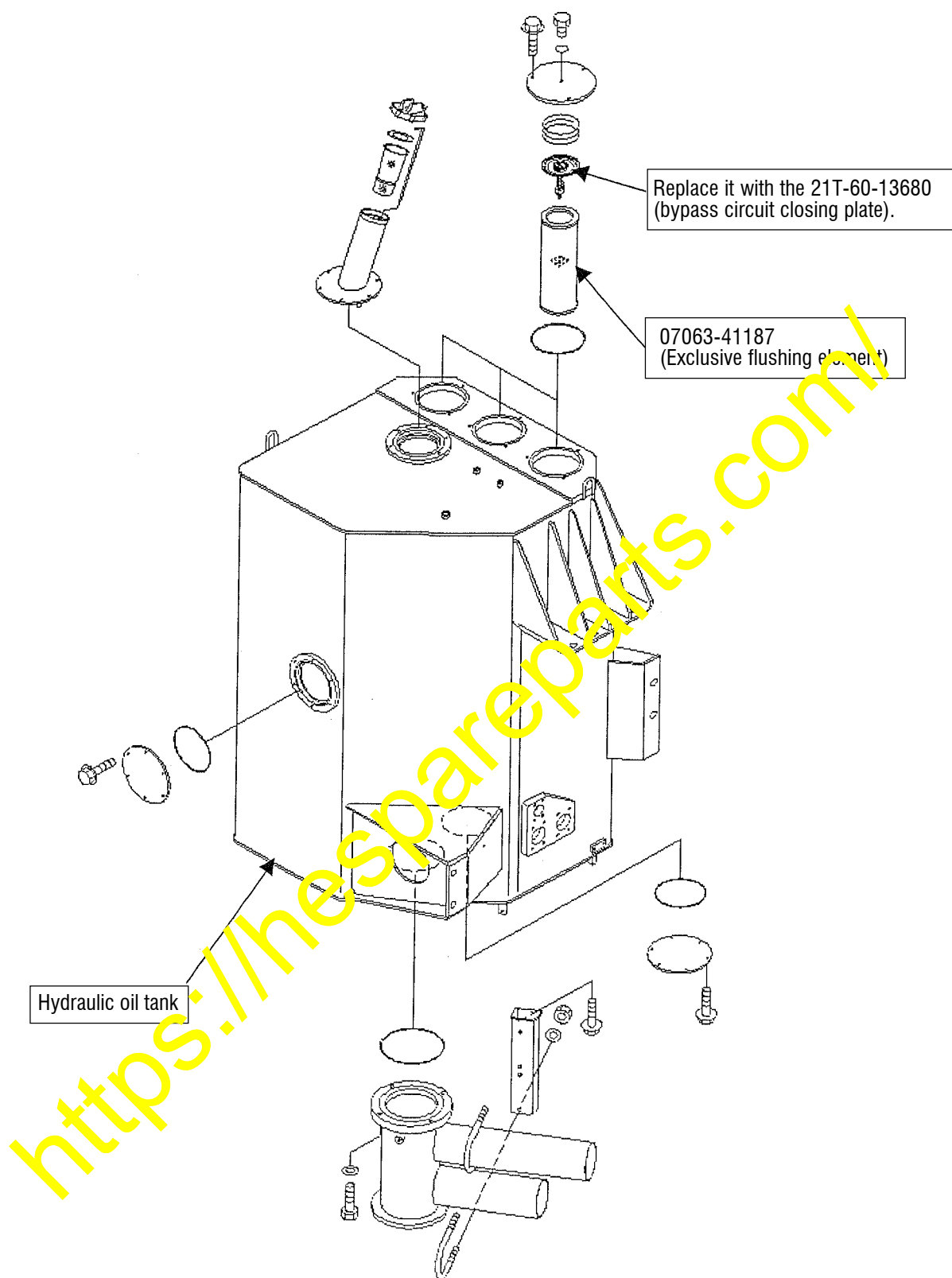


Fig. 2

- ① Replace the element with the exclusive flushing element.
- ② Replace the plate with the bypass circuit closing plate (21T-60-13680).

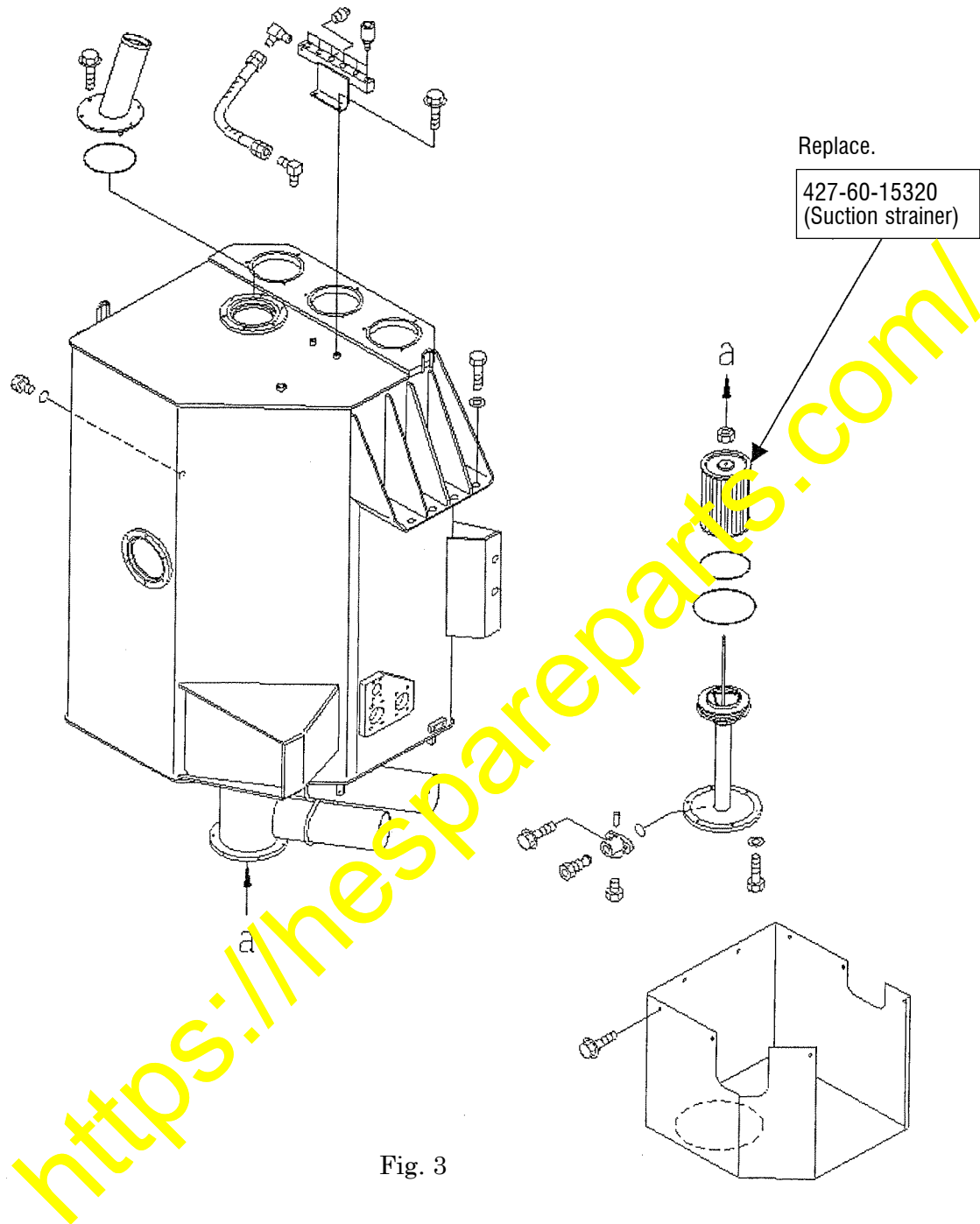


Fig. 3

- ③ Replace it with the suction strainer (a new part).

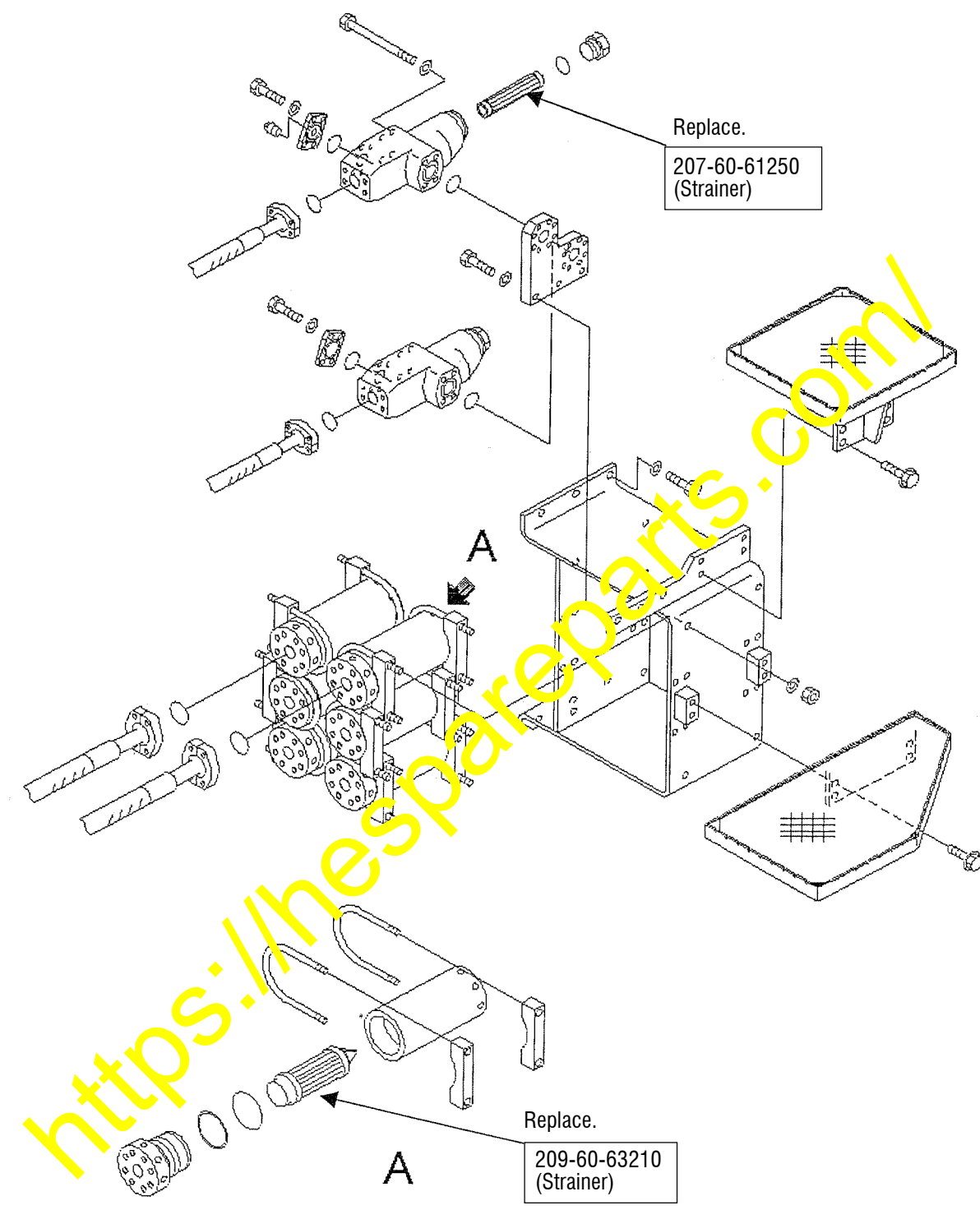


Fig. 4

④ Replace them with new strainers.

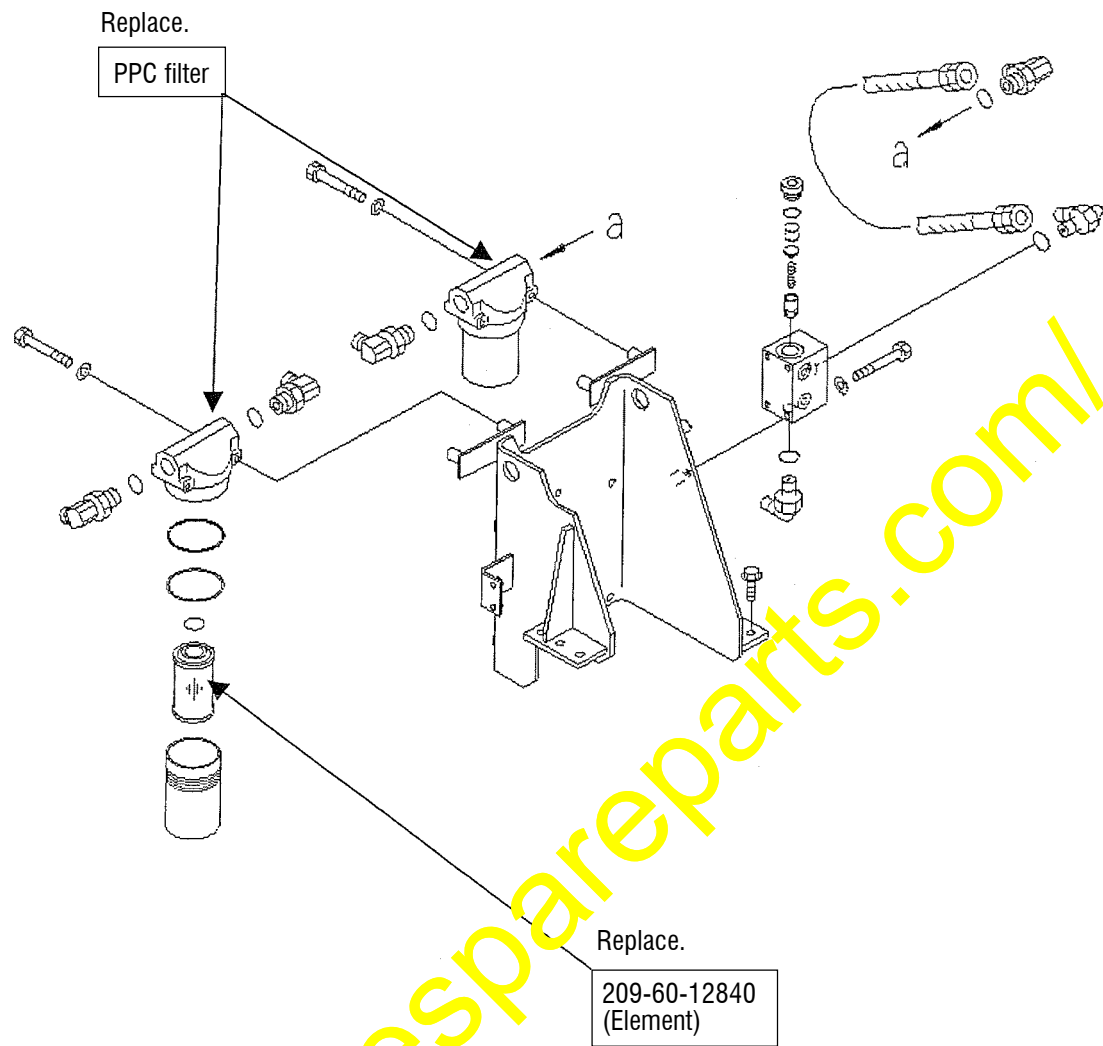
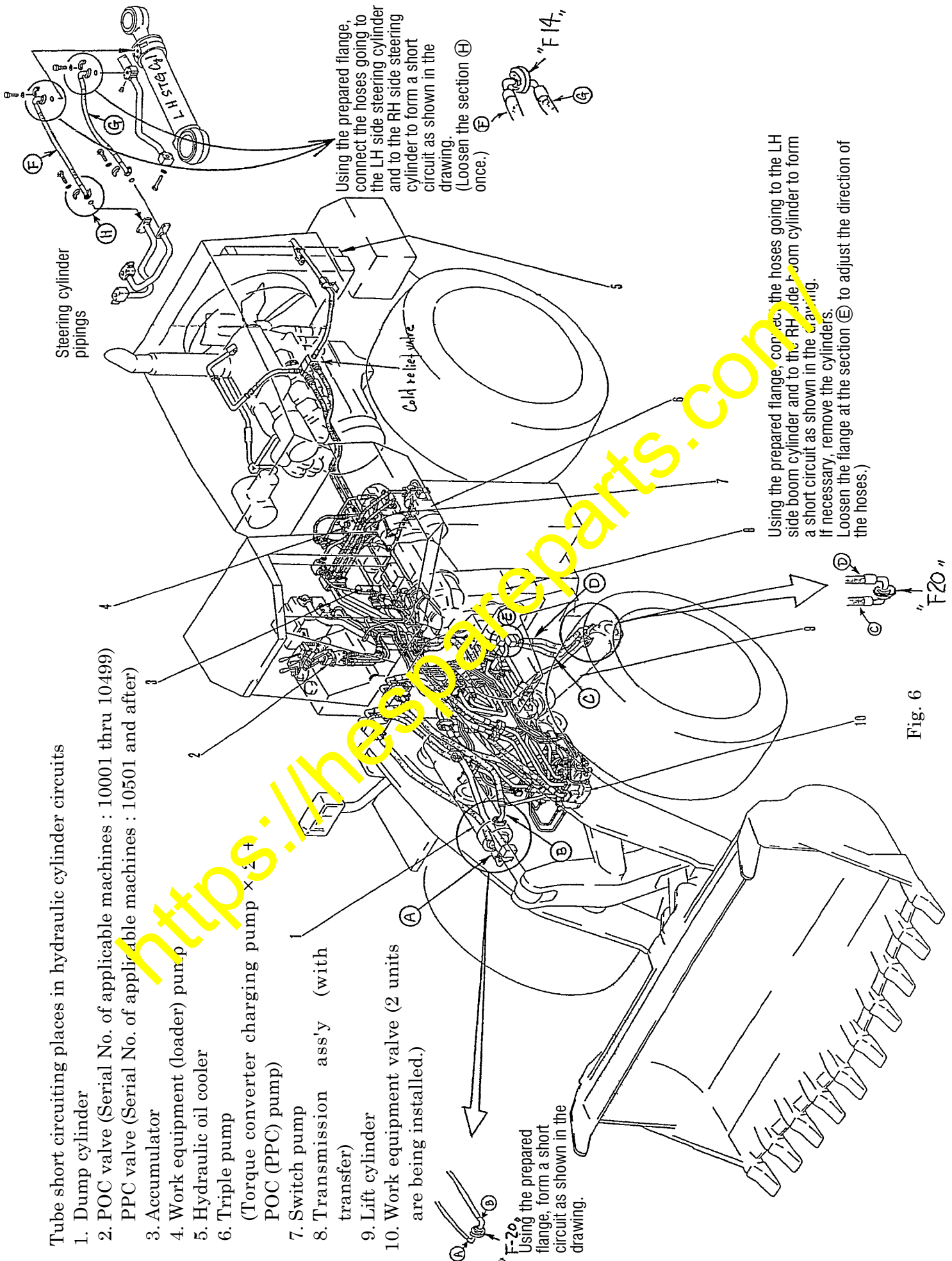


Fig. 5

- ⑤ Replace the filter and element with new parts.

Tube short circuiting places in hydraulic cylinder circuits

1. Dump cylinder
2. POC valve (Serial No. of applicable machines : 10001 thru 10499)
PPC valve (Serial No. of applicable machines : 10501 and after)
3. Accumulator
4. Work equipment (loader) pump
5. Hydraulic oil cooler
6. Triple pump
(Torque converter charging pump × 2 +
POC (PPC) pump)
7. Switch pump
8. Transmission ass'y (with transfer)
9. Lift cylinder
10. Work equipment valve (2 units are being installed.)



Using the prepared flange, connect the hoses going to the LH side steering cylinder and to the RH side steering cylinder to form a short circuit as shown in the drawing. (Loosen the section (H) once.)

Using the prepared flange, connect the hoses going to the LH side boom cylinder and to the RH side boom cylinder to form a short circuit as shown in the drawing. If necessary, remove the cylinders. Loosen the flange at the section (E) to adjust the direction of the hoses.)

"F20"
Using the prepared flange, form a short circuit as shown in the drawing.

Fig. 6