# **CONTENTS**

|    | N <sub>1</sub>           | ο. ι | of page |
|----|--------------------------|------|---------|
| 10 | STRUCTURE AND FUNCTION   | •    | 10-1    |
| 20 | TESTING AND ADJUSTING    | - :  | 20-1    |
| 30 | DISASSEMBLY AND ASSEMBLY | - :  | 30-1    |
| 40 | MAINTENANCE STANDARD     | -    | 40-1    |

## HOW TO READ THE SHOP MANUAL

#### **VOLUMES**

Shop manuals are issued as a guide to carrying out repairs. They are divided as follows:

Chassis volume: Issued for every machine model
Engine volume: Issued for each engine series

Electrical volume: Each issued as one volume to cover all models

These various volumes are designed to avoid duplicating the same information. Therefore to deal with all repairs for any model, it is necessary that chassis, engine, electrical and attachment volumes are ready.

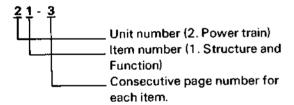
#### DISTRIBUTION AND UPDATING

Any additions, amendments or other changes will be sent to KOMATSU distributers. Get the most upto-date information before you start any work.

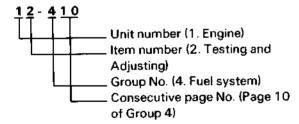
#### **FILING METHOD**

- See the page number on the bottom of the page.
   File the pages in correct order.
- Following examples show how to read the page number.

Example 1 (Chassis volume):



Example 2 (Engine volume):



 Additional pages: Additional pages are indicated by a hyphen (-) and number after the page number. File as in the example.
 Example:

#### REVISED EDITION MARK ( @ @ .... )

When a manual is revised, an edition mark is recorded on the bottom outside corner of the pages.

#### REVISIONS

Revised pages are shown at the LIST OF REVISED PAGES on the between the title page and SAFETY page.

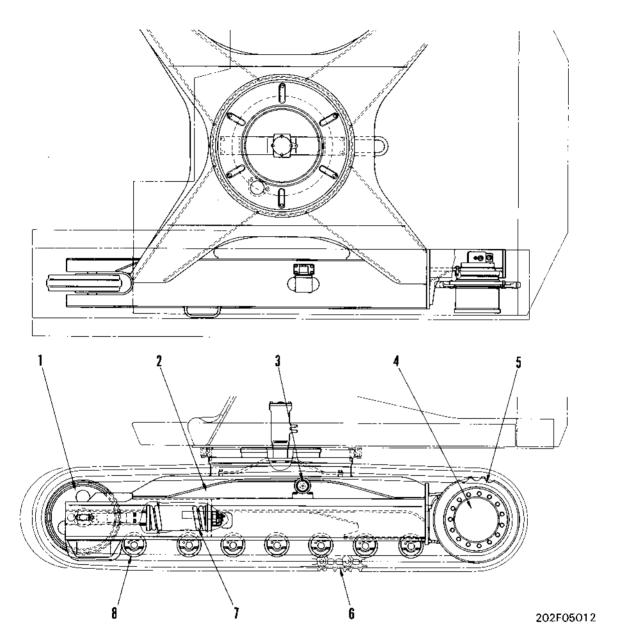
#### **SYMBOLS**

So that the shop manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

| Symbol   | Item                   | Remarks  |  |  |  |
|----------|------------------------|--|--|--|--|
| A        | Cafata                 | Special safety precautions are necessary when performing the work.   |  |  |  |
| **       | Safety                 | Extra special safety precautions are necessary when performing the work because it is under internal pressure.         |  |  |  |
| *        | Caution                | Special technical precautions or other precautions for preserving standards are necessary when performing the work.    |  |  |  |
| kg       | Weight                 | Weight of parts or systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc. |  |  |  |
| & kgm    | Tighten-<br>ing torque | Places that require special attention for the tightening torque during assembly.                                       |  |  |  |
| <u></u>  | Coat                   | Places to be coated with adhesives and lubricants etc.   |  |  |  |
|          | Oil, water             | Places where oil, water or fuel must be added, and the capacity.   |  |  |  |
| <u>:</u> | Drain                  | Places where oil or water must be drained, and quantity to be drained.   |  |  |  |

# TRACK FRAME

# PC120,130-5K

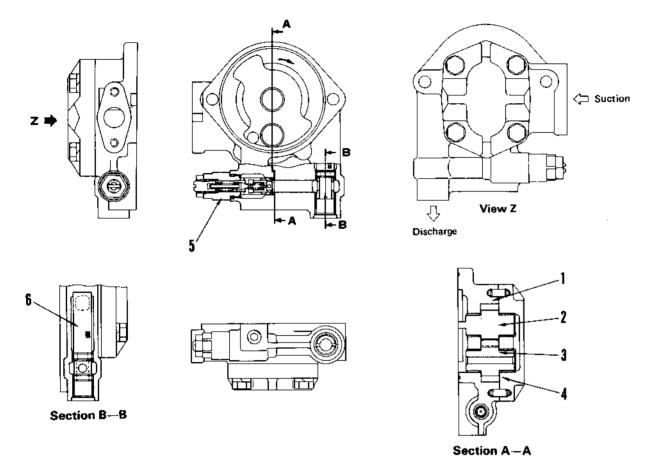


- 1. Idler
- 2. Track frame
- 3. Carrier roller
- 4. Travel motor

- 5. Sprocket
- 6. Track shoe
- 7. Idler cushion
- 8. Track roller

TOCOUTY

### PC180LC, LLC, NLC-5K



202F05620

- 1. Body
- 2. Drive gear
- 3. Driven gear
- 4. Cover
- 5. Relief valve
- 6. Filter

### **SPECIFICATIONS**

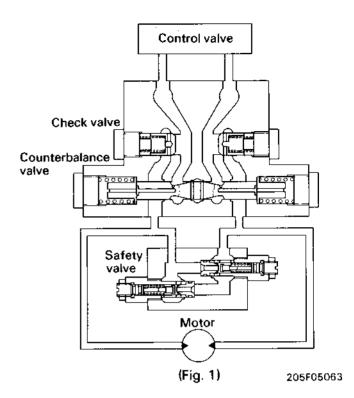
Type: BAR25

Theoretical delivery: 25 cc/rev. Operating pressure: 30 kg/cm<sup>2</sup>

20205

#### **BRAKE VALVE**

- The brake valve consists of a check valve, counterbalance valve, and safety valve in a circuit as shown in the diagram on the right.
   (Fig. 1)
- The function and operation of each component is as given below.



# 1) Counterbalance valve, check valve Function

 When traveling down a slope, the weight of the machine makes it try to travel faster than the speed of the motor.

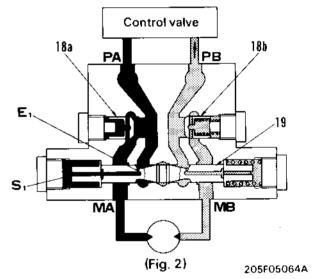
As a result, if the machine travels with the engine at low speed, the motor will rotate without load and will run away, which is extremely dangerous.

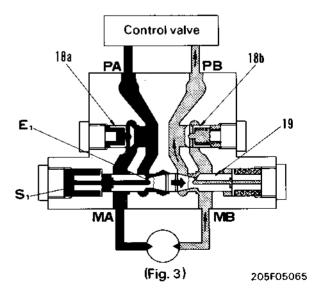
To prevent this, these valves act to make the machine travel according to the engine speed (pump discharge volume).

#### Operation when pressure is supplied

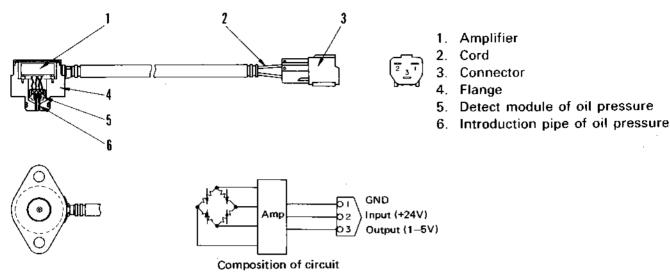
- When the travel lever is operated, the pressurized oil from the control valve is supplied to port PA. It pushes open check valve (18a) and flows from motor inlet port MA to motor outlet port MB. However, the motor outlet port is closed by check valve (18b) and spool (19), so the pressure at the supply side rises. (Fig. 2)
- The pressurized oil at the supply side flows from orifice E1 in spool (19) to chamber S1, and when the pressure in chamber S1 goes above the spool switching pressure, spool (19) is pushed to the right in the direction of the arrow.

As a result, port **MB** and port **PB** are connected, the outlet port side of the motor is opened, and the motor starts to rotate. (Fig. 3)





#### 7) PUMP PRESSURE SENSOR



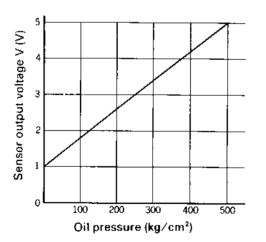
202F05162A

#### **OUTLINE**

 The pump discharge pressure is converted to a voltage, and the signal is sent to the pump controller.

#### **FUNCTION**

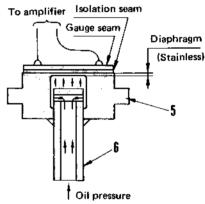
The voltage output is proportional to the pressure.



202F05163

 Relationship between output voltage V (v) and pressure P (kg/cm²).
 V = 0.008 x P + 1.0

#### **OPERATION**



202F05164

- When the pressurized oil entering from pressure introduction pipe (6) is pressurized by the diaphragm of pressure sensor module (5), the diaphragm shape changes. A bridge is formed on the opposite face of this diaphragm by a strain gauge, and the deflection of the diaphragm is converted from a resistance value of the strain gauge to the bridge output voltage and is sent to the voltage amplifier (amp).
- The voltage is further amplified by the amplifier, and is output to the controller.

# TESTING AND ADJUSTING CHARGING PUMP PRESSURE

#### 1. Measuring

★ Oil temperature when measuring:

45 - 55°C

- 1) Remove pressure pick-up plug (1) (Thread dia. = 10mm, Pitch = 1.25mm), and install oil pressure gauge C1 (60 kg/cm²).
- 2) Start the engine and measure with the engine at high idling.
- ★ When testing for internal leakage of the equipment in the control circuit, use the parts given below to shut off the circuit for the following sections when measuring the relief pressure.

| No. | Portion of hydraulic circuit shut off | Component that can be tested                     |  |  |
|-----|---------------------------------------|--|--|--|
| 1   | Piston pump<br>inlet port             | Piston pump                                      |  |  |
| 2   | Charging pump outlet port             | Pump, TVC valve,<br>solenoid valve,<br>PPC valve |  |  |
| 3   | Solenoid valve                        | Solenoid valve                                   |  |  |
| 4   | L.H. PPC valve inlet port             | L.H. PPC valve                                   |  |  |
| 5   | R.H. PPC valve inlet port             | R.H. PPC valve                                   |  |  |

- ★ For Items No.2 and below, it is possible to check if the equipment above it is normal.
- ★ Use the following parts to shut off the circuit.
  - For elbow

Sleeve nut:

07221-20210, 07221-20315 07221-20422

Plug:

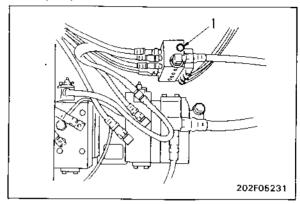
07222-00210, 07222-50315 07222-00414

• For hose

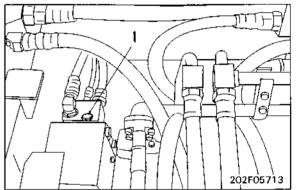
Plug:

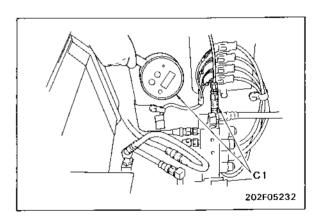
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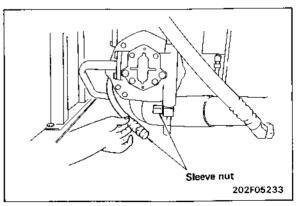
#### PC120,130,150



#### PC180



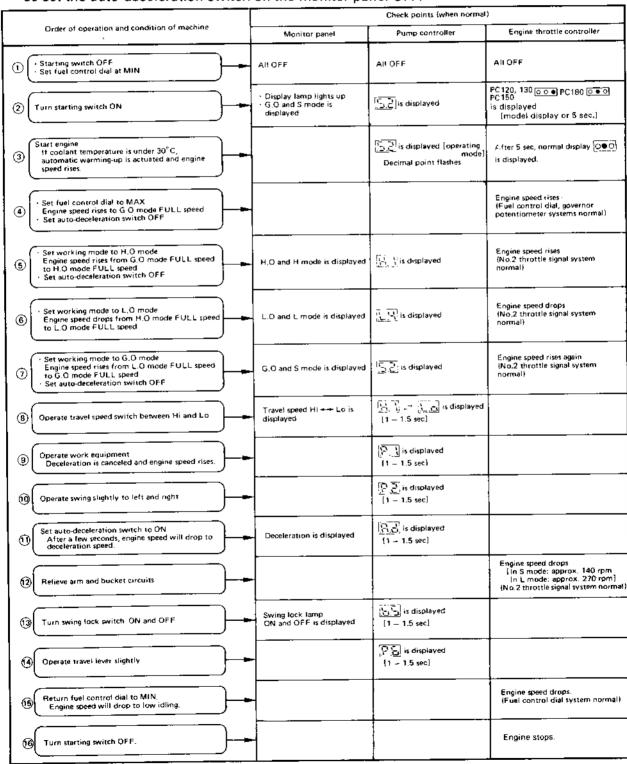




#### 2. Checking operation of electrical system

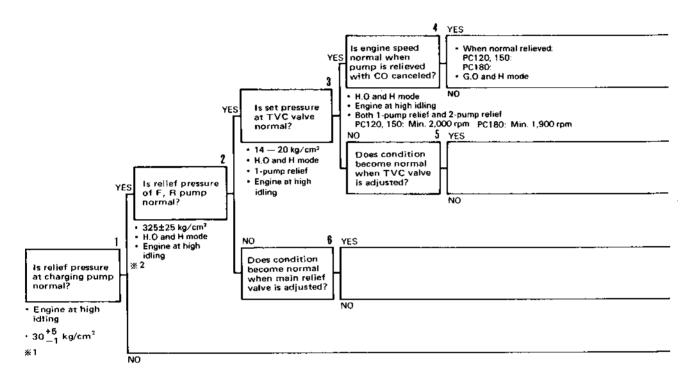
When the set of operations given below is carried out in the order given, and the action of the monitor panel, pump controller, and engine throttle controller are as given in the table, the monitor panel (EMACC) and both the controllers are normal.

- The [H.1] and other displays given in the table are the monitor displays given by the controller if the input and output signals are normal
- The monitor display of the pump controller is displayed for 1.5 seconds after the signal is input, and after that the operation mode is displayed.
- For items (4), (5) and (7), the system automatically enters the auto-deceleration mode, so set the auto-deceleration switch on the monitor panel OFF.



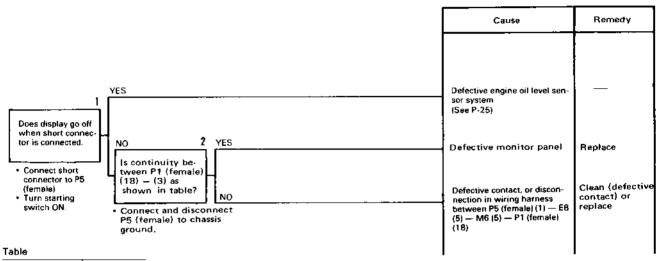
# H-1 Speeds of work equipment, travel, swing are all slow

- ★ If there are other problems, such as travel deviation or low bucket or swing speed, go to H-14.
- \* 1. If the pressure is not at least 27 kg/cm<sup>2</sup>, the spool of the acceleration (Hi) end is not fully actuated.
- \* 2. The discharge pressure of the pump has an effect on the TVC valve set pressure, so check it before adjusting the TVC valve set pressure.

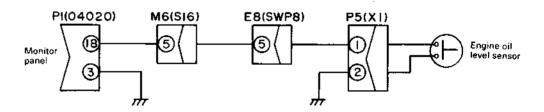


# b) (Engine oil level) flashes

★ Use the dipstick to check that the engine oil is at the specified level before carrying out the troubleshooting.



Short connector Continuity
Connected Yes
Disconnected No



FK203P5063

#### 5. Regulator valve

- Put punch in contact with ring notch, tap with a hammer and remove ring (14). (See F1)
  - ★ When the ring is removed, the hole is damaged, so repair the hole after removing the ring.
- 2) Remove stopper (15), spring (16), and valve (17), (See F1)

#### 2. Brake piston

- Blow in compressed air from hole of passage for parking brake, and remove piston (23). (See F5)
  - ★ Blow the air in carefully. If the air is blown in suddenly, the piston will fly out.

#### DISASSEMBLY OF HYDRAULIC MOTOR

#### 1. Rear flange

1) Remove 9 mounting bolts (18). (See F2)

- 2) Remove rear flange (19). (See F3)
- 3) Remove pin from rear flange.
- 4) Remove 10 springs (20). (See F3)
- 5) Remove timing plate (21). (See F3)

6) Remove bearing (22). (See F4)

#### 3. Cylinder, piston assembly

- 1) Set travel motor facing side.
- 2) Drain oil from motor.
- Hold cylinder block (24) with both hands, and remove together with piston assembly. (See F6)
  - ★ Before removing, rotate the cylinder block backwards and forwards 2 — 3 times by hand, and check that the shoe is completely disconnected from the swash plate.

#### 4. Disc, plate

- 1) Remove plate from spindle.
- 2) Remove plate and disc from cylinder block.

#### 5. Piston

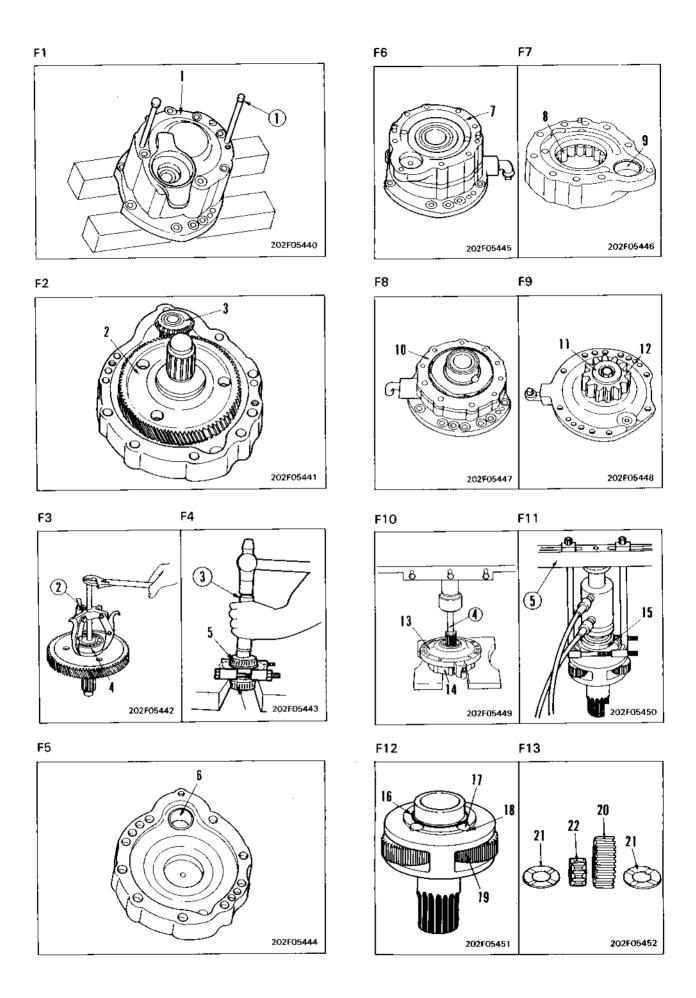
- 1) Remove piston (25) and retainer plate (26). (See F7)
- 2) Remove thrust ball (27). (See F7)
- 3) Remove 3 pins (28). (See F7)

#### 6. Swash plate

- 1) Remove swash plate.
- 2) Remove thrust plate from swash plate.
- 3) Remove 2 balls.
- Blow in compressed air from hole of passage, and remove speed selector piston.

#### 7. Disassembly of cylinder block

- Set cylinder block on press work stand, and hold washer in position with press. (See F8)
  - Load of press: Min. 80 kg.
- 2) Using pliers, remove snap ring (29). (See F8)



## REMOVAL OF CONTROL VALVE ASSEMBLY (PC120,130,150)



**★▲** Lower the work equipment to the ground and release the remaining pressure in the circuit. For details, see TESTING AND ADJUSTING, Releasing pressure in hydraulic circuit for machines with PPC valve.

- ★ Mark all the piping with tags to prevent mistakes in the mounting position when installing.
- 1. Disconnect hoses (1) and (2), (See F1)
  - ★ Disconnect 2 of 5 hoses (1) at the work equipment end, and 2 of 5 hoses (2) at the swing motor end.
- 2. Disconnect hose (3). (See F2)
- 3. Disconnect cable (4). (See F3)
- Disconnect hoses (5). (See F3)
  - ★ Disconnect 5 PPC hoses at left side of L.H. control valve.
- 5. Disconnect cable (6). (See F3)
- 6. Disconnect hoses (7). (See F3)
  - ★ Disconnect 6 PPC hoses between right side of L.H. control valve and left side of R.H. control valve.
- 7. Disconnect hoses (8), (See F3)
  - ★ Disconnect 9 PPC hoses at right side of R.H. control valve.
- 8. Remove control valve assembly (9). (See F4)
  - ★ Remove the L.H. control valve, R.H. control valve, and mounting frame as an assembly.



kg See Weight Table.

## INSTALLATION OF CONTROL **VALVE ASSEMBLY (PC120,130,150**

- Carry out installation in the reverse order to removal.
- Refilling with oil.
  - \* Refill to the specified level, and run the engine to circulate the oil through the system. Then check the oil level again.

### REMOVAL OF CONTROL VALVE ASSEMBLY (PC180)



Lower the work equipment to the ground and release the remaining pressure in the circuit. For details, see TESTING AND ADJUSTING, Releasing pressure in hydraulic circuit for machines with PPC valve.

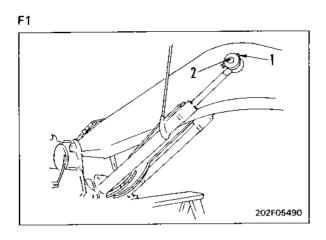
- \* After removing the piping, mark with tags to prevent mistakes when installing.
  - 1. Disconnect hoses (1) and (2). (See F5)
  - 2. Disconnect tube (3). (See F5)
  - 3. Disconnect hoses (4), (5), and (6), (See F5)
    - ★ Disconnect hose (5) at the swing motor
  - 4. Disconnect tube (7). (See F5)
- 5. Disconnect hose (8), (See F6)
- 6. Disconnect hoses (9), (See F6)
  - ★ Disconnect 2 PPC hoses at the left side of the L.H. control valve.
- 7. Disconnect cable (10). (See F7)
- 8. Disconnect hoses (11). (See F7)
  - ★ Disconnect 9 PPC hoses between the right side of the L.H. control valve and the left side of the R.H. control valve
- 9. Disconnect cable (12), (See F7)
- 10. Disconnect hoses (13), (See F7)
  - ★ Disconnect 5 PPC hoses at the right side of the R.H. control valve.
- Disconnect hose (14). (See F7)
- 12. Remove control valve assembly (15). (See F7, F8)

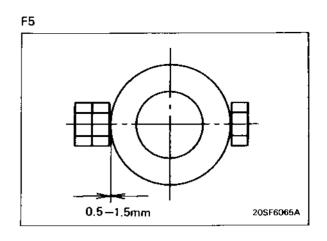


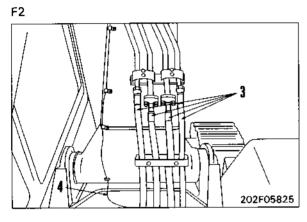
kg See Weight Table.

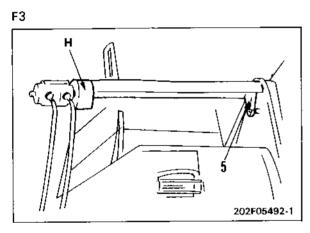
## INSTALLATION OF CONTROL VALVE ASSEMBLY (PC180)

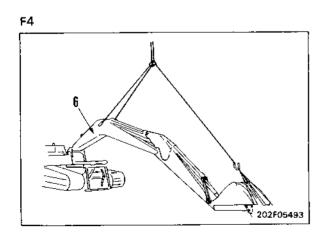
- Carry out installation in the reverse order to removal.
- Bleeding air.
  - \* Refill with oil to the specified level, and bleed the air.
    - For detail, see TESTING AND ADJUSTING, Bleeding air.
  - ★ After bleeding the air, check the level of the hydraulic tank.







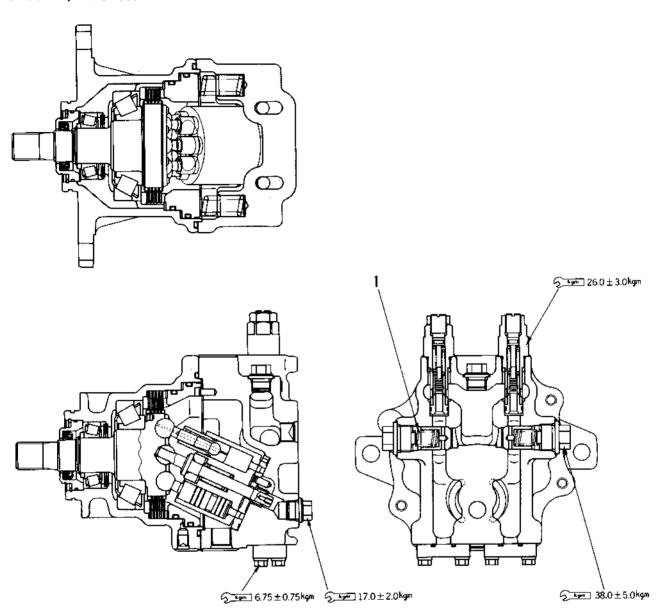




# K203P5

# **SWING MOTOR**

PC120,130-5K PC150HD, NHD-5K



202F05658

Unit: mm

| No. | Check item              | T                     | Criteria            |                   |              |                   | Remedy  |
|-----|-------------------------|-----------------------|---------------------|-------------------|--------------|-------------------|---|
| 1   | Check valve spring x 0. | Standard size         |                     |                   | Repair limit |                   |   |
|     |                         | Free length<br>x O.D. | Installed<br>length | Installed<br>load | Free length  | Installed<br>load | Replace spring<br>if any damages<br>or deforma- |
|     |                         | 62.5 x 20.0           | 35.0                | 0.36              | _            | 0.29 kg           | tions are found                                 |