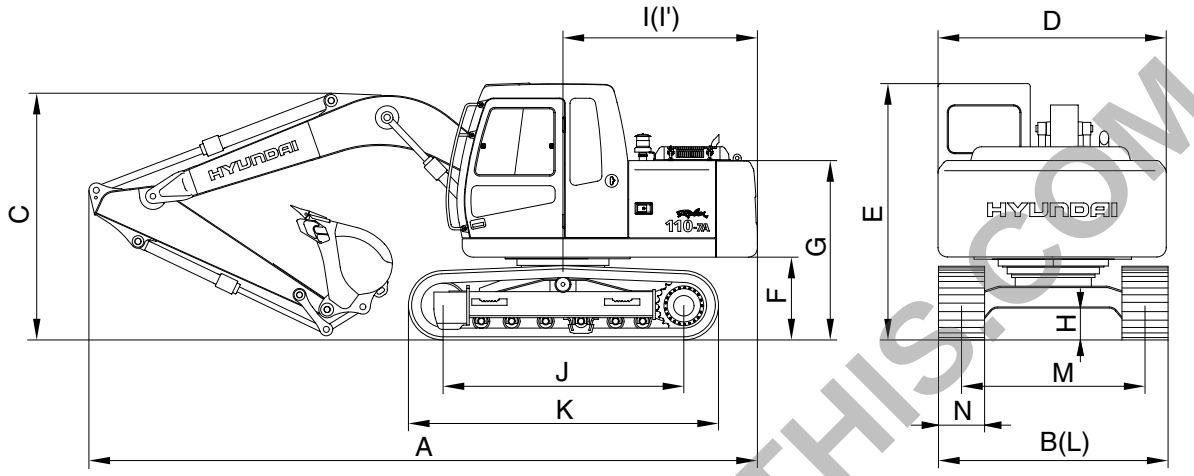
## 2. SPECIFICATIONS

### 1) R110-7A

#### (1) 4.3m(14' 1") MONO BOOM, 2.26m(7' 5") ARM




1107A2SP02

| Description | | Unit | Specification |
|---|---|---|---|
| Operating weight | | kg(lb) | 11200(24690) |
| Bucket capacity(SAE heaped), standard | | $m^3(yd^3)$ | 0.45(0.59) |
| Overall length | A | mm(ft-in) | 7270(23' 10") |
| Overall width, with 500mm shoe | B | | 2490( 8' 2") |
| Overall height | C | | 2720( 8' 11") |
| Superstructure width | D | | 2475( 8' 1") |
| Overall height of cab | E | | 2800( 9' 2") |
| Ground clearance of counterweight | F | | 900( 2' 11") |
| Engine cover height | G | | 1990( 6' 6") |
| Minimum ground clearance | H | | 440( 1' 5") |
| Rear-end distance | I | | 2110( 6' 11") |
| Rear-end swing radius | I' | | 2130( 7' 0") |
| Distance between tumblers | J | | 2610( 8' 7") |
| Undercarriage length | K | | 3340(10' 11") |
| Undercarriage width | L | | 2490( 8' 2") |
| Track gauge | M | | 1990( 6' 6") |
| Track shoe width, standard | N | | 500(20") |
| Travel speed(Low/high) | | km/hr(mph) | 3.4/5.2(2.1/3.2) |
| Swing speed | | rpm | 12.0 |
| Gradeability | | Degree(%) | 35(70) |
| Ground pressure(500mm shoe) | | $kgf/cm^2(psi)$ | 0.39(5.55) |

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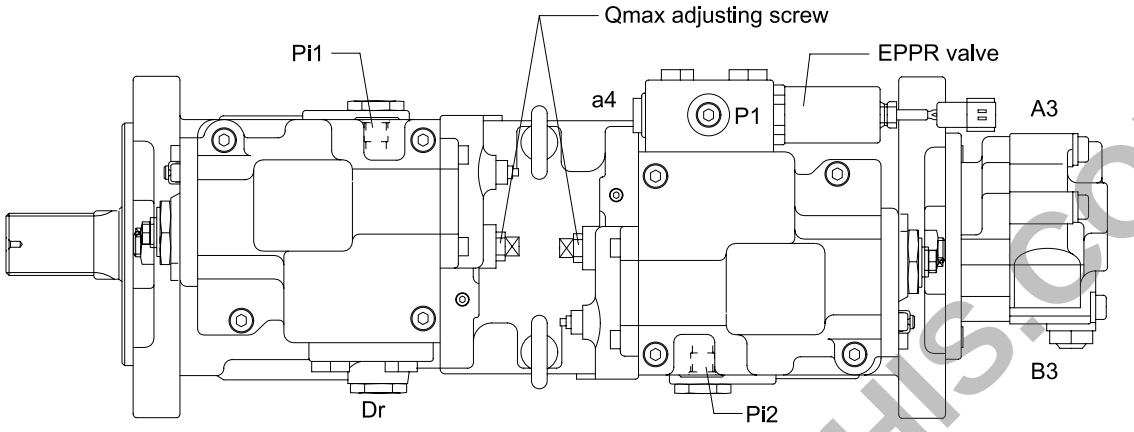


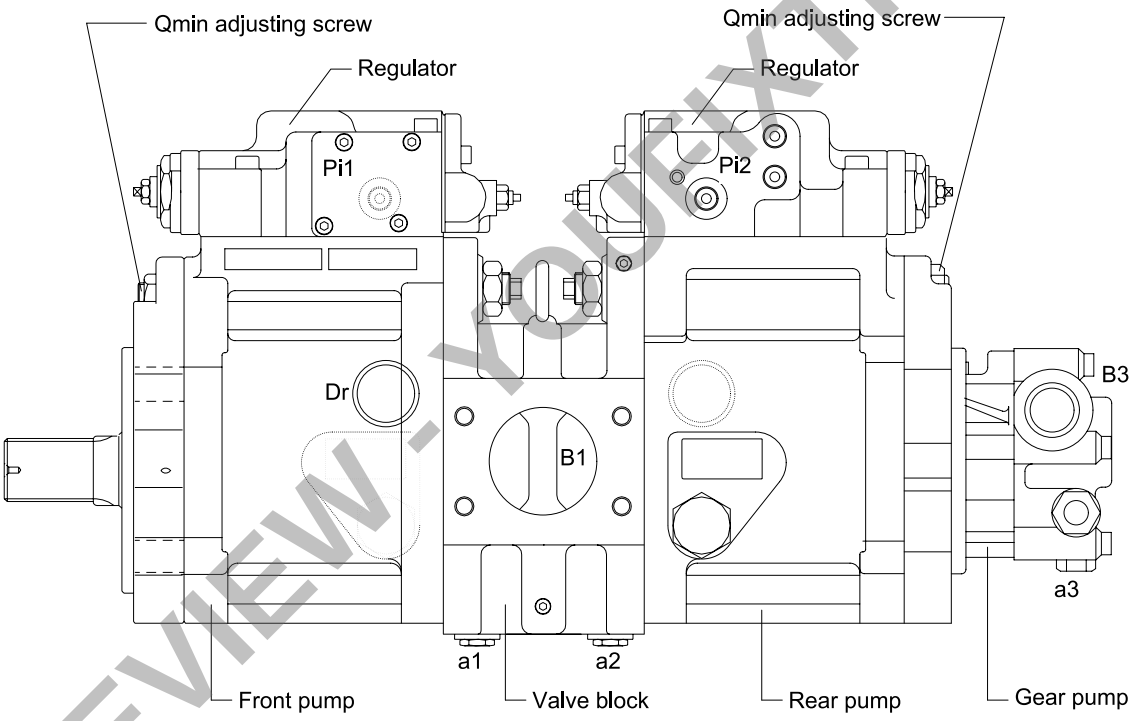
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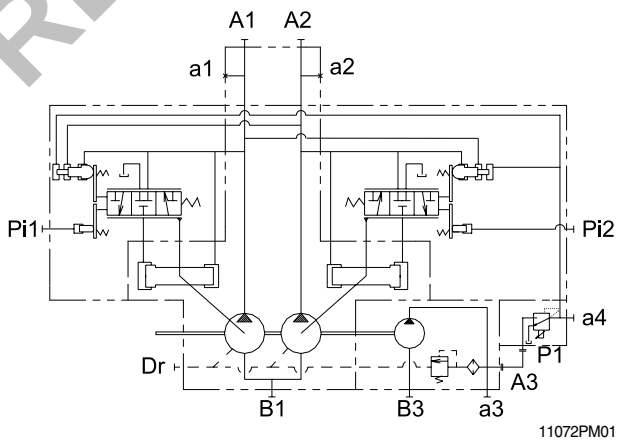
## GROUP 1 PUMP DEVICE

### 1. STRUCTURE

The pump device consists of main pump, regulator and gear pump.




11072PM01

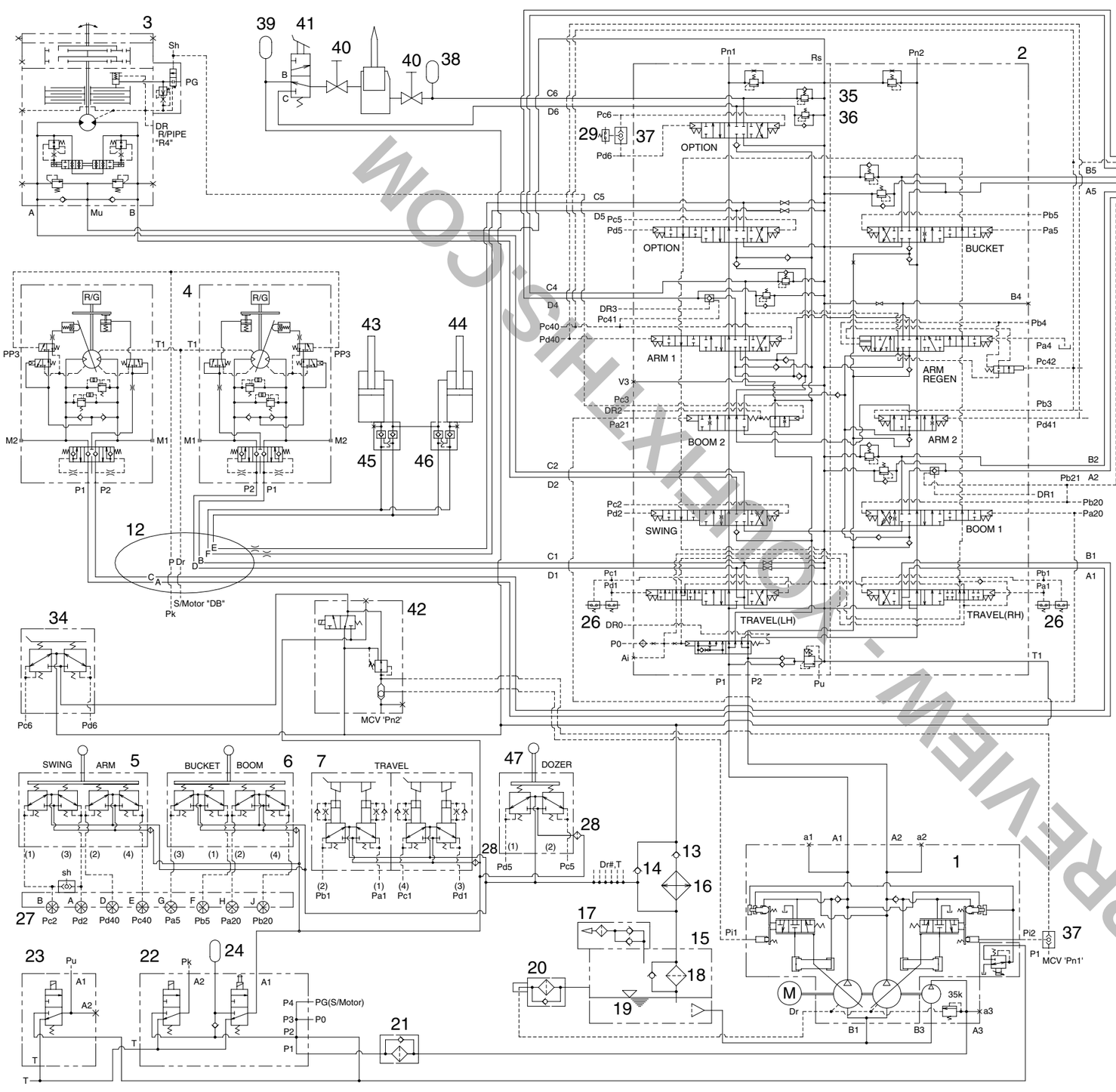
| Port | Port name | Port size |
|---|---|---|
| A1,2 | Delivery port | SAE6000psi 3/4" |
| B1 | Suction port | SAE2500psi 2 1/2" |
| Dr | Drain port | PF 1/2 - 19 |
| Pi1,i2 | Pilot port | PF 1/4 - 15 |
| P1 | EPPR port | PF 1/4 - 13 |
| a1,2 | Gauge port | PF 1/4 - 15 |
| a3 | Gauge port | PF 1/4 - 14 |
| a4 | Gauge port | PF 1/4 - 13 |
| A3 | Gear pump delivery port | PF 1/2 - 19 |
| B3 | Gear pump suction port | PF 3/4 - 20.5 |

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## GROUP 1 HYDRAULIC CIRCUIT

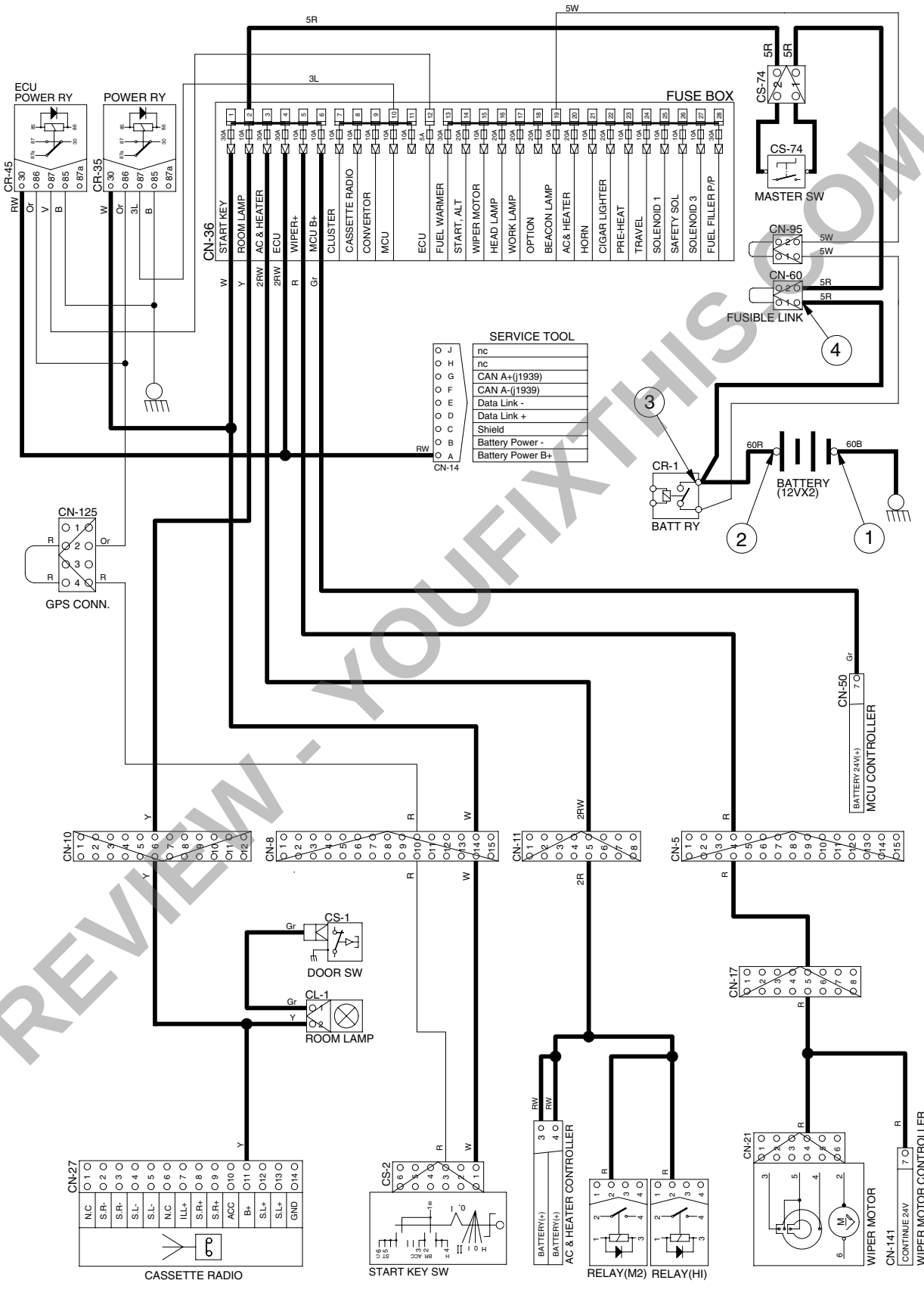



1 Main pump
2 Main control valve
3 Swing motor
4 Travel motor
5 RCV lever(LH)
6 RCV lever(RH)
7 RCV pedal
8 Boom cylinder(LH)
9 Boom cylinder(RH)
10 Arm cylinder
11 Bucket cylinder
12 Turning joint
13 Check valve
14 Check valve
15 Hydraulic tank
16 Oil cooler
17 Air breather
18 Bypass valve
19 Strainer
20 Spin filter
21 Line filter
22 2 Solenoid valve
23 1 Solenoid valve
24 Accumulator(option)
26 Pressure switch(option)
27 Terminal
28 Last guard filter
29 Pressure switch(option)
30 Boom safety valve(option)
31 Arm safety valve(option)
32 Pressure switch(option)
33 Shut off valve(option)
34 Breaker pedal(option)
35 Port relief valve(option)
36 Port relief valve(option)
37 Shuttle valve(option)
38 Accumulator(option)
39 Accumulator(option)
40 Stop valve(option)
41 2 way selector valve(option)
42 Control valve
43 Dozer cylinder(LH, option)
44 Dozer cylinder(RH, option)
45 Check valve(option)
46 Check valve(option)
47 RCV lever(Dozer, option)

1107A3HC01

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# POWER CIRCUIT




1107A4EL04

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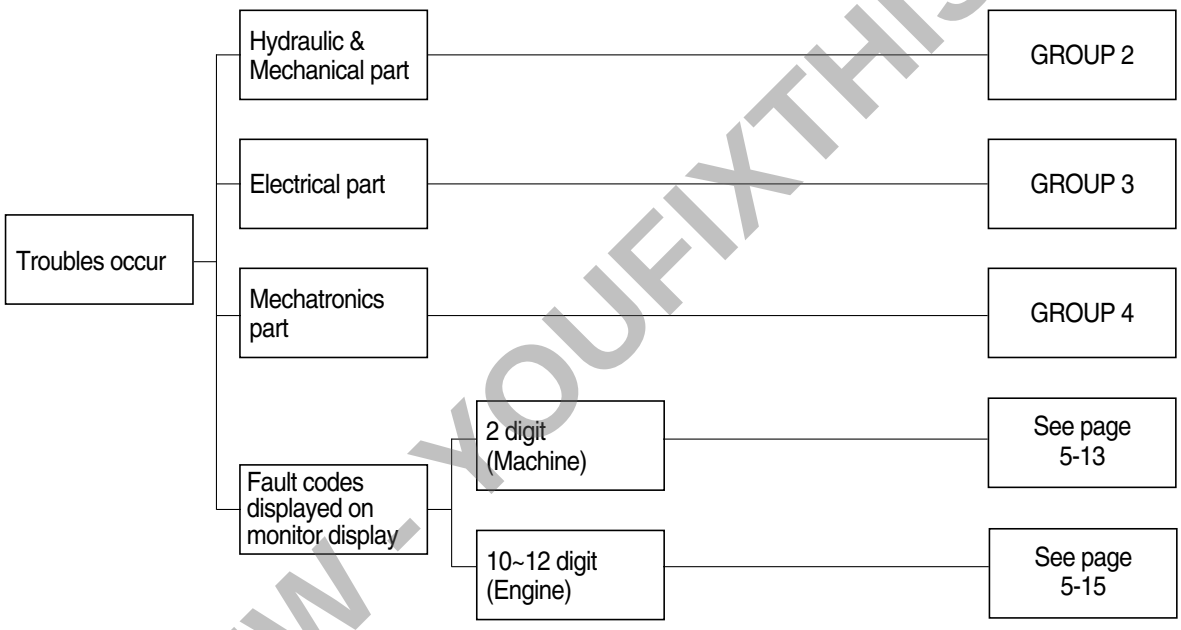
# SECTION 6 TROUBLESHOOTING

## GROUP 1 BEFORE TROUBLESHOOTING

### 1. INTRODUCTION

When a trouble is occurred in the machine, this section will help an operator to maintain the machine with easy.

The trouble of machine is parted Hydraulic & Mechanical system, Electrical system and Mechatronics system. At each system part, an operator can check the machine according to the troubleshooting process diagram.




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## 1. REMOVAL AND INSTALL

### 1) REMOVAL

(1) Lower the work equipment to the ground and stop the engine.

(2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping

(3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

⚠ **Escaping fluid under pressure can penetrate the skin causing serious injury.**

(4) Loosen the drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

- Hydraulic tank quantity : 100 ℓ (26.4 U.S. gal)

(5) Remove socket bolts(75) and disconnect pipe(74).

(6) Disconnect pilot line hoses(11, 13, 14, 35, 37,47).

(7) Remove socket bolts(67) and disconnect pump suction tube(5).

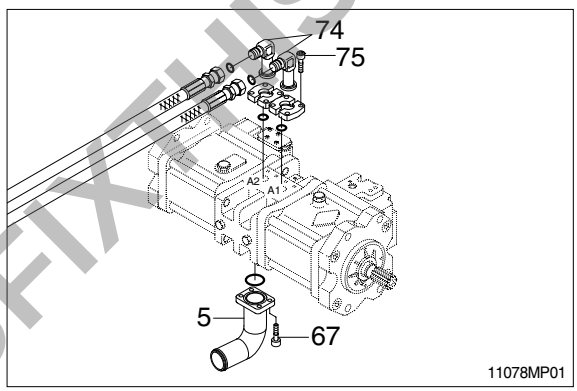
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

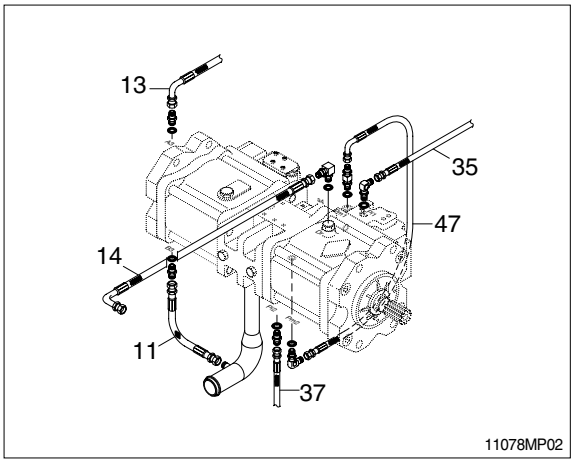
(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 90㎏(200lb)

※ Pull out the pump assembly from housing. When removing the pump assembly, check that all the hoses have been disconnected.




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# GROUP 2 TIGHTENING TORQUE

## 1. MAJOR COMPONENTS

| No. | Descriptions | | Bolt size | Torque | |
|---|---|---|---|---|---|
| | | | | kgf · m | lbf · ft |
| 1 | Engine | Engine mounting bolt(Engine-Bracket) | M12 × 1.75 | 10.0±1.0 | 72.3±7.2 |
| 2 | | Engine mounting bolt(Bracket-Frame, FR) | M16 × 2.0 | 30±3.5 | 253±25.3 |
| 3 | | Engine mounting bolt(Bracket-Frame, RR) | M20 × 2.5 | 55±3.5 | 398±25.3 |
| 4 | | Radiator mounting bolt, nut | M12 × 1.75 | 12.2±1.3 | 88.2±9.4 |
| 5 | | Coupling mounting bolt | M16 × 2.0 | 22.0±1.0 | 159±7.2 |
| 6 | | Main pump housing mounting bolt | M10 × 1.5 | 6.1±0.3 | 44.1±2.2 |
| 7 | Hydraulic system | Main pump mounting bolt | M16 × 2.0 | 22.1±2.4 | 159±17.3 |
| 8 | | Main control valve mounting bolt | M12 × 1.75 | 12.2±1.3 | 88.2±9.4 |
| 9 | | Fuel tank mounting bolt | M20 × 2.5 | 45±5.1 | 325±36.9 |
| 10 | | Hydraulic oil tank mounting bolt | M20 × 2.5 | 45±5.1 | 325±36.9 |
| 11 | | Turning joint mounting bolt, nut | M12 × 1.75 | 12.3±1.3 | 88.2±9.4 |
| 12 | Power train system | Swing motor mounting bolt | M16 × 2.0 | 29.6±3.2 | 214±23.1 |
| 13 | | Swing bearing upper mounting bolt | M18 × 2.0 | 41.3±4.5 | 299±32.5 |
| 14 | | Swing bearing lower mounting bolt | M16 × 2.0 | 29.7±4.5<br>23±2.5 | 215±32.5 |
| 15 | | Travel motor mounting bolt | M16 × 2.0 | 29.7±4.5 | 166±18.1 |
| 16 | | Sprocket mounting bolt | M16 × 2.0 | 29.7±4.5<br>29.7±4.5 | 215±32.5 |
| 17 | | Carrier roller mounting bolt, nut | M16 × 2.0 | 29.7±4.5 | 215±32.5 |
| 18 | Under carriage | Track roller mounting bolt | M16 × 2.0 | 31.3±4.7<br>29.7±4.5 | 215±32.5 |
| 19 | | Track tension cylinder mounting bolt | M16 × 2.0 | 100±15 | 215±32.5 |
| 20 | | Track shoe mounting bolt, nut | M16 × 1.5 | 12.8±3.0<br>4.05±0.8 | 226±34.0 |
| 21 | | Track guard mounting bolt | M16 × 2.0 | | 215±32.5 |
| 22 | Others | Counter weight mounting bolt | M24 × 3.0 | | 723±109 |
| 23 | | Cab mounting bolt, nut | M12 × 1.75 | | 92.6±21.7 |
| 24 | | Operator's seat mounting bolt | M 8 × 1.25 | | 29.3±5.8 |

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## 3. ERROR CODES TABLE

| Error code No. | Description |
|---|---|
| 1 | Short circuit in accel actuator system |
| 2 | Potentiometer circuit is shorted to Vcc(5V) or battery + |
| 3 | Short circuit in pump EPPR valve system |
| 4 | Short circuit in boom down EPPR valve system |
| 5 | Short circuit in travel speed solenoid system |
| 6 | Short circuit in power boost solenoid system |
| 7 | Short circuit in max flow solenoid system |
| 10 | Short circuit in hour-meter system |
| 11 | Accel dial circuit is shorted to Vcc(5V) or battery + |
| 12 | P1 pressure sensor circuit is shorted to power supply(24V) line |
| 13 | P2 pressure sensor circuit is shorted to power supply(24V) line |
| 14 | P3 pressure sensor circuit is shorted to power supply(24) line |
| 15 | Boom down pressure circuit is shorted to power supply(24V) line |
| 16 | Accel actuator circuit is open or shorted to ground |
| 17 | Potentiometer circuit is open or shorted to ground |
| 18 | Pump EPPR valve circuit is open or shorted to ground |
| 19 | Boom down EPPR valve circuit is open or shorted to ground |
| 20 | Travel speed solenoid circuit is open or shorted to ground |
| 21 | Power boost solenoid circuit is open or shorted to ground |
| 22 | Max flow solenoid circuit is open or shorted to ground |
| 25 | Hour-meter circuit is open or shorted to ground |
| 26 | Accel dial circuit is open or shorted to ground |
| 27 | P1 pressure sensor circuit is open or shorted to ground |
| 28 | P2 pressure sensor circuit is open or shorted to ground |
| 29 | P3 pressure sensor circuit is open or shorted to ground |
| 30 | Boom down pressure sensor circuit is open or shorted to ground |
| 31 | Engine preheater circuit is open or shorted to ground |
| 32 | Travel alarm buzzer circuit is open or shorted to ground |
| 33 | Alternator circuit is open or shorted to ground |
| 34 | Controller input voltage is below 18V |
| 35 | Controller input voltage is over 38V |
| 36 | Communication error with cluster |
| 37 | Engine speed sensor circuit is open or shorted to ground |
| 38 | Anti-restart relay circuit is open or shorted to ground |
| 39 | Accel actuator does not stop at a target position |
| 40 | There is more than 500rpm difference between target speed and actual speed |

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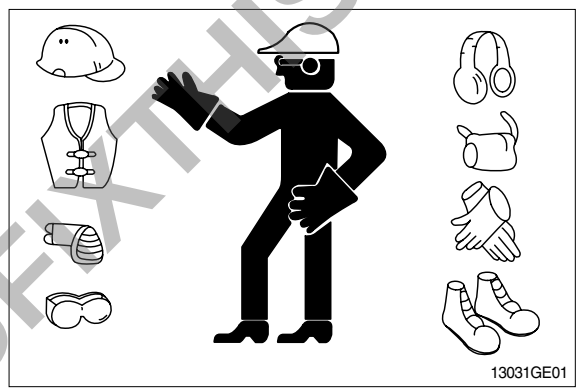
## GROUP 1 SAFETY HINTS

### FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

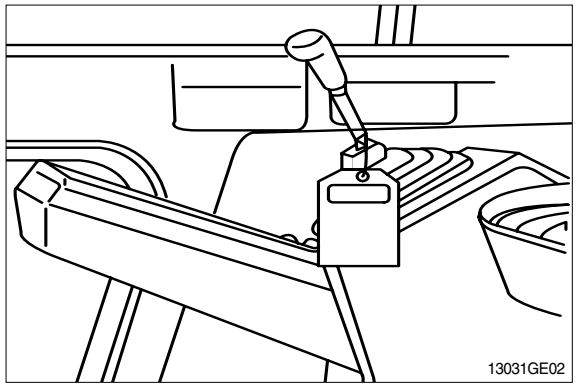
### WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



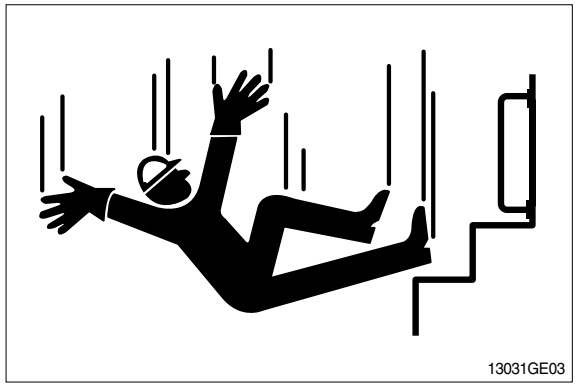

### WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.
Before performing any work on the excavator, attach a 「**Do Not Operate**」 tag on the right side control lever.




### USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.





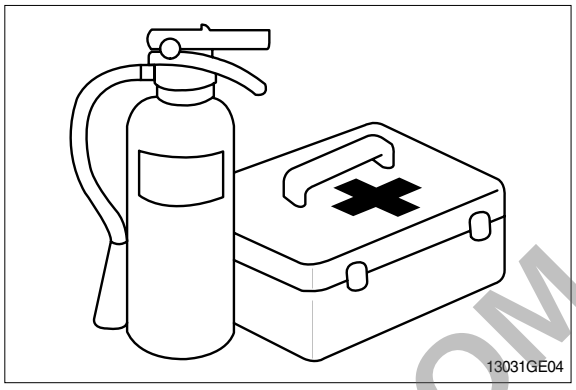

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## PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

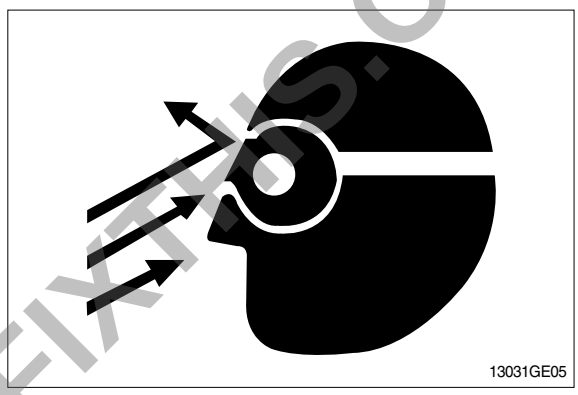
Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.




## PROTECT AGAINST FLYING DEBRIS

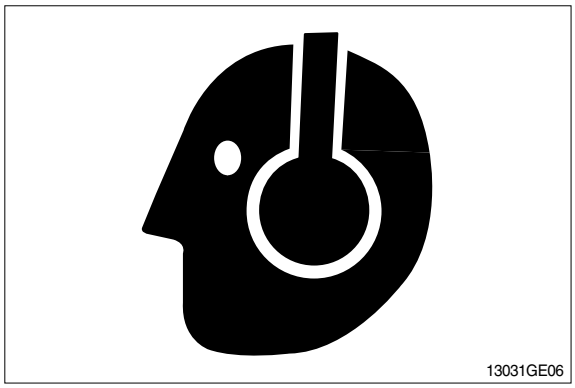
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.




## PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

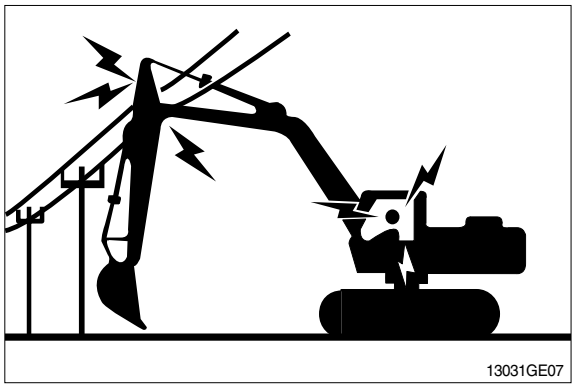
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.




## AVOID POWER LINES

Serious injury or death can result from contact with electric lines.

Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.

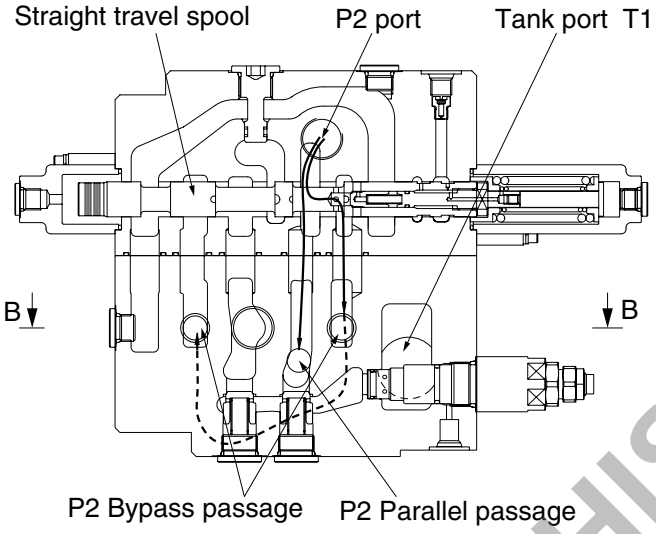



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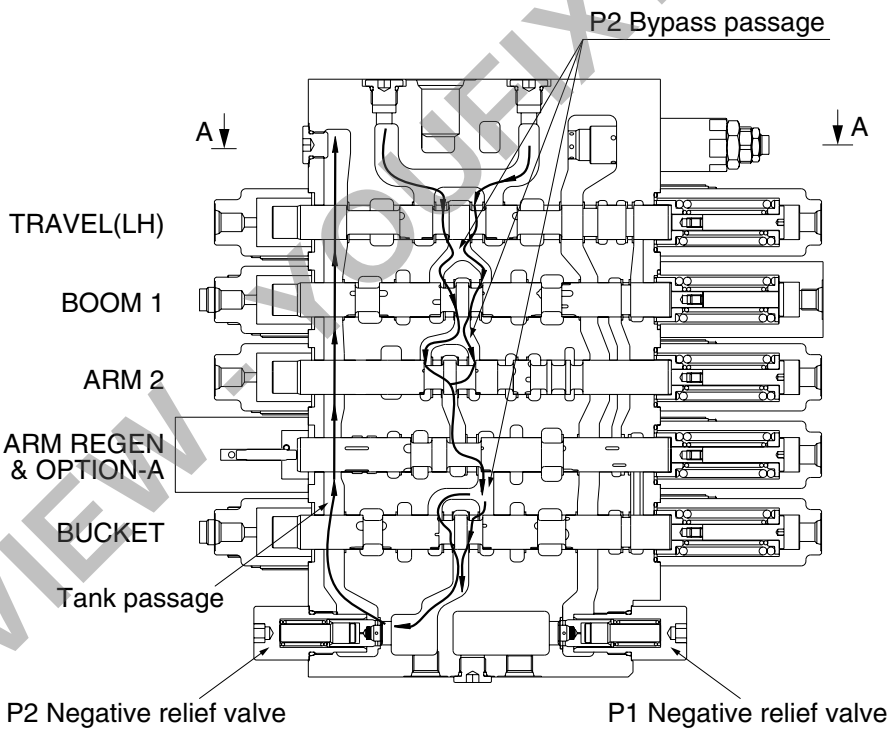


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### (2) P2 SIDE




SECTION A-A




SECTION B-B

1607A2MC11

The hydraulic fluid from pump A2 flows into the main control valve through the inlet port "P2", pass the travel straight spool, into the P2 bypass passage and P2 parallel passage.

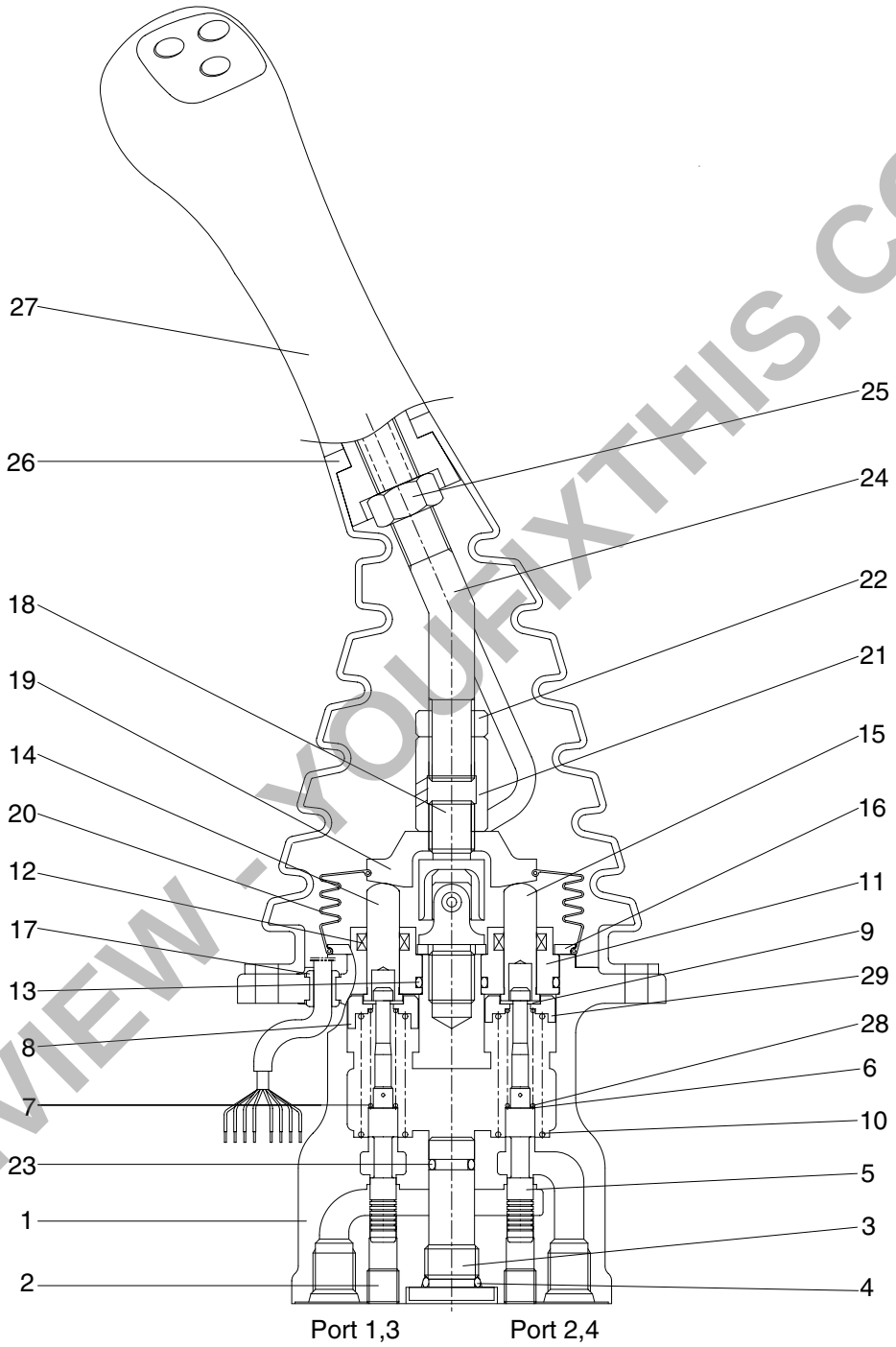
The hydraulic fluid from the pump A2 is directed to the tank through the bypass passage of spools : travel left, boom 1, arm 2, arm regeneration & option A and bucket, the negative relief valve, tank passage, and the tank port "T1"



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## CROSS SECTION



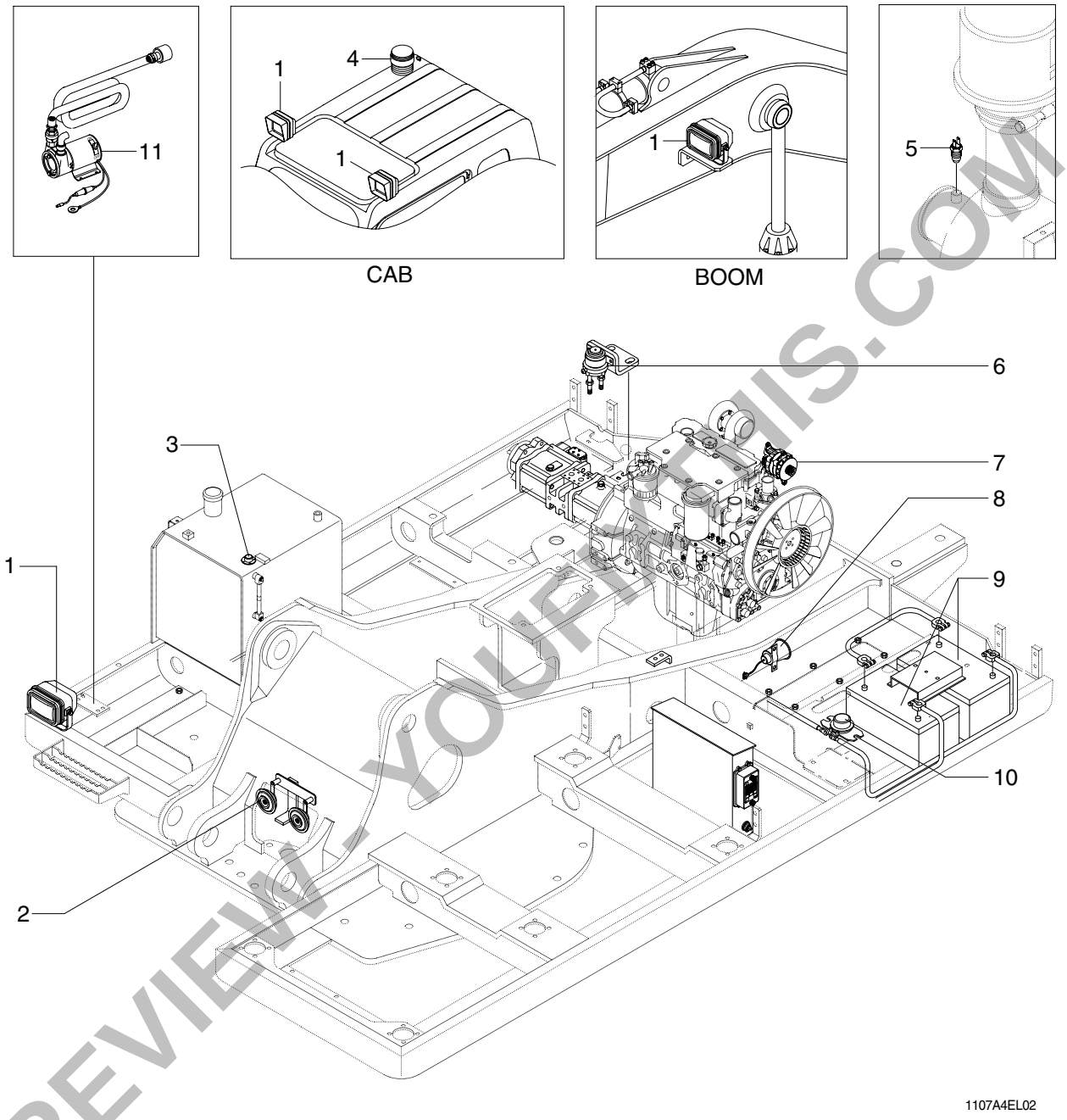

2507A8RL01

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## 2. LOCATION 2




| | | | | | |
|---|---|---|---|---|---|
| 1 | Lamp | 5 | Air cleaner switch | 9 | Battery |
| 2 | Horn | 6 | Heater relay | 10 | Battery relay |
| 3 | Fuel sender | 7 | Alternator | 11 | Fuel filler pump |
| 4 | Beacon lamp | 8 | Travel alarm buzzer | | |

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## 2) CLUSTER CHECK PROCEDURE

### (1) Start key : ON

① Check monitor initial 5 seconds

a. All lamps light up.
b. Buzzer sound.

② Check monitor after 5 seconds : Indicate cluster version and machine condition

a. Cluster program version : 「1.00 」 ← Indicates program version 「1.00 」 for 5 seconds.
b. Tachometer : 0rpm
c. Fuel gauge : All light up below appropriate level
d. Hydraulic oil temperature gauge : All light up below appropriate level
e. Engine coolant temperature gauge : All light up below appropriate level
f. Warning lamp

※ During start key **ON** the engine oil pressure lamp and battery charging lamp go on, but it is not abnormal.
※ When engine coolant temperature below 30°C, the warming up lamp lights up.

③ Indicating lamp state

a. Work mode selection : General work
b. Power mode selection : S mode
c. User mode selection : No LED ON
d. Auto decel LED : ON
e. Travel speed pilot lamp : Low(Turttle)

### (2) Start of engine

① Check machine condition

a. Tachometer indicates at present rpm
b. Gauge and warning lamp : Indicate at present condition.

※ When normal condition : All warning lamp OFF

c. Work mode selection : General work
d. Power mode selection : S mode
e. User mode selection : No LED ON
f. Auto decel LED : ON
g. Travel speed pilot lamp : Low(Turttle)

② When warming up operation

a. Warming up lamp : ON
b. 10 seconds after engine started, engine speed increases to1200 rpm(Auto decel LED : ON)

※ Others same as above ①.

③ When abnormal condition

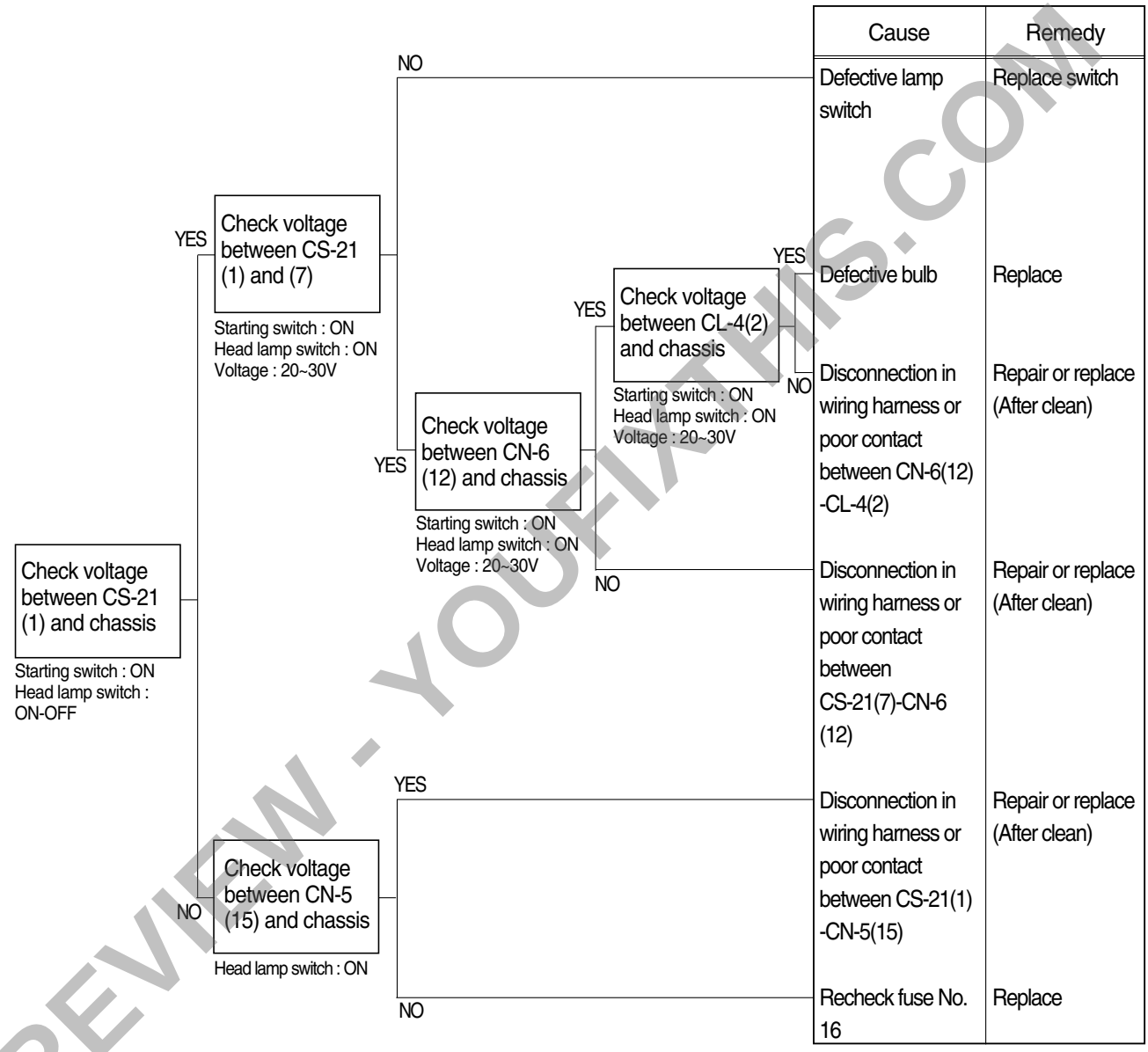
a. The lamp lights up and the buzzer sounds.
b. If **BUZZER STOP** switch is pressed, buzzer sound is canceled but the lamp light up until normal condition.

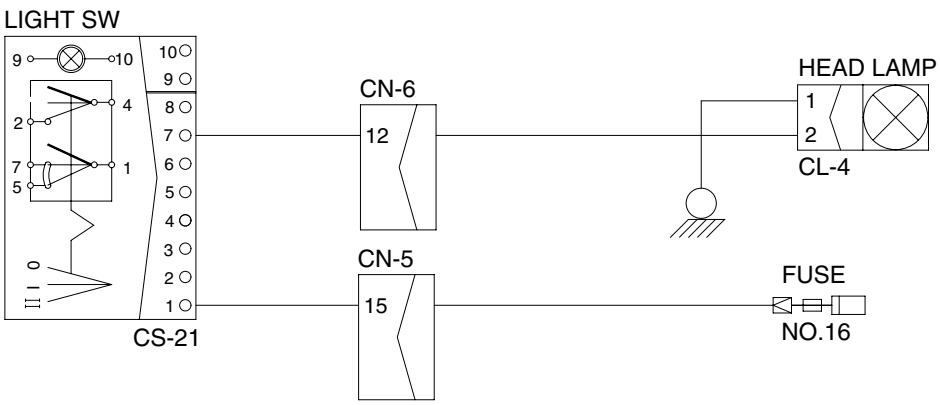
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## 15. WHEN STARTING SWITCH IS TURNED ON, HEAD LAMP DOES NOT LIGHTS UP

- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted and short of fuse No.16.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.



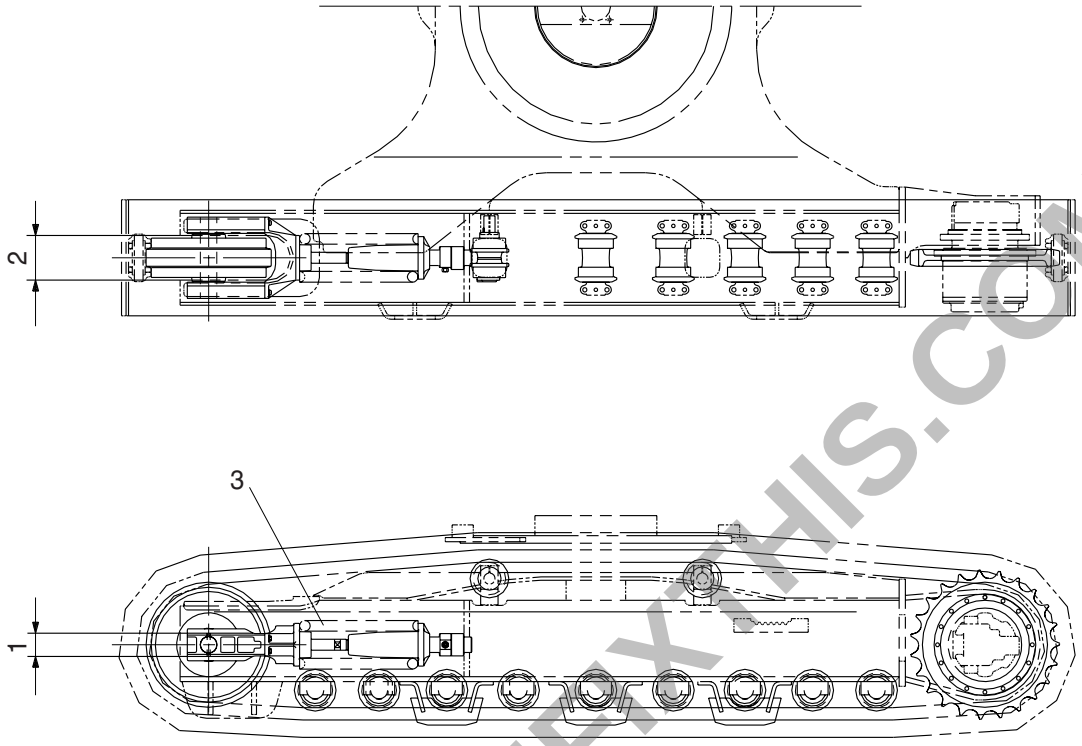

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## 5) TRACK FRAME AND RECOIL SPRING




21037MS05

Unit : mm

| No. | Check item | Criteria | | | | | Remedy |
|---|---|---|---|---|---|---|---|
| 1 | Vertical width of idler guide | | Standard size | Tolerance | Repair limit | | Rebuild or replace |
| | | Track frame | 103 | +2<br>0 | 107 | | |
| | | Idler support | 100 | - 0<br>- 0.5 | 98 | | |
| 2 | Horizontal width of idler guide | Track frame | 192 | +2<br>0 | 196 | | |
| | | Idler support | 190 | - | 188 | | |
| 3 | Recoil spring | Standard size | | | Repair limit | | Replace |
| | | Free length | Installation length | Installation load | Free length | Installation load | |
| | | ø 192 × 470 | 405 | 8,497kg | - | 6.978kg | |

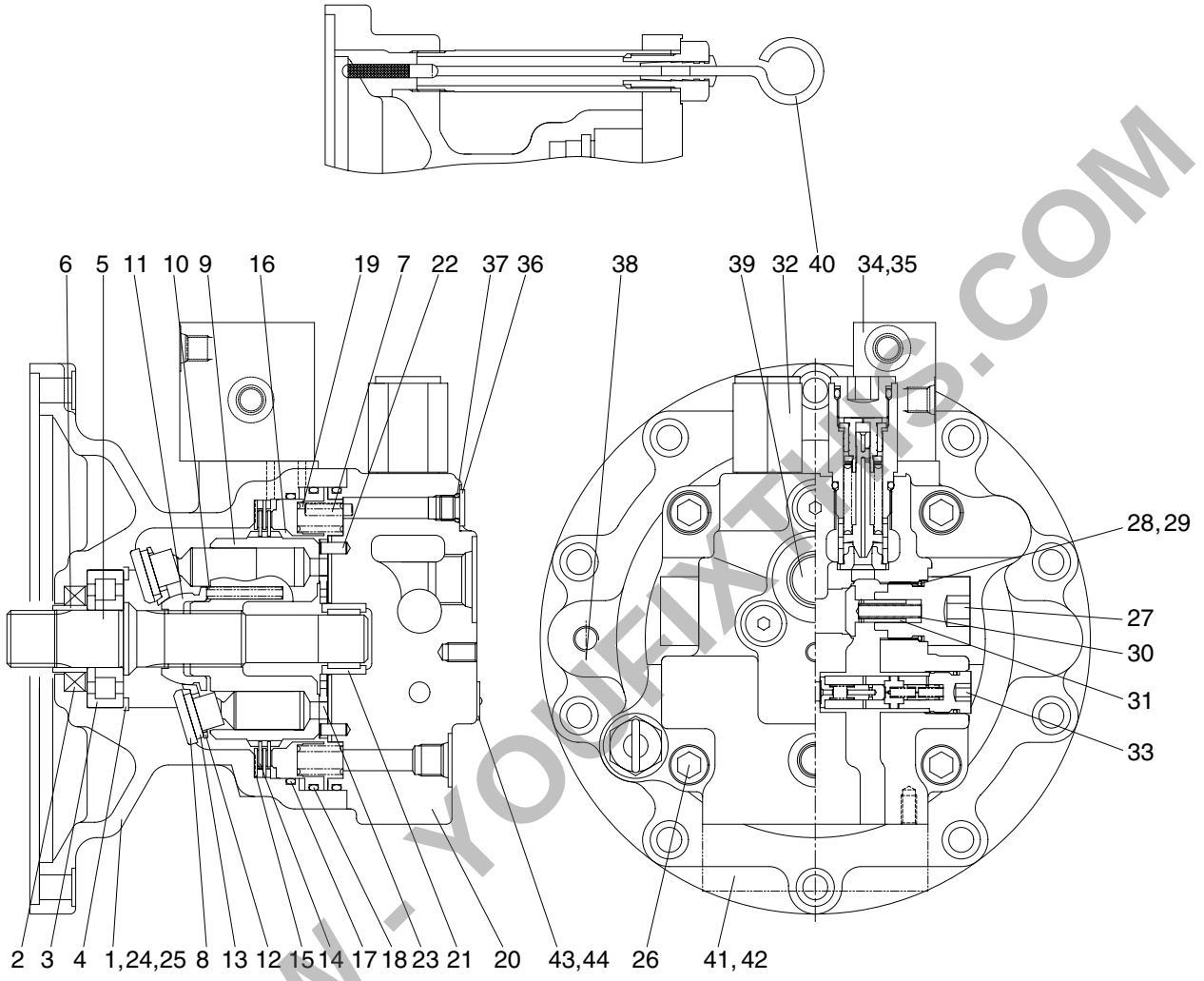
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## 2. DISASSEMBLY AND ASSEMBLY OF SWING MOTOR

### 1) STRUCTURE




| | | | | | |
|---|---|---|---|---|---|
| 1 | Body | 17 | O-ring | 33 | Anti-rotating valve |
| 2 | Oil seal | 18 | O-ring | 34 | Time delay valve |
| 3 | Roller bearing | 19 | Spring | 35 | Wrench bolt |
| 4 | Snap ring | 20 | Rear cover | 36 | Plug |
| 5 | Shaft | 21 | Needle bearing | 37 | O-ring |
| 6 | Bushing | 22 | Pin | 38 | Plug |
| 7 | Pin | 23 | Valve plate | 39 | Plug |
| 8 | Shoe plate | 24 | O-ring | 40 | Level gauge |
| 9 | Cylinder block | 25 | O-ring | 41 | Flange |
| 10 | Spring | 26 | Wrench bolt | 42 | O-ring |
| 11 | Ball guide | 27 | Plug | 43 | Name plate |
| 12 | Set plate | 28 | Back up ring | 44 | Rivet |
| 13 | Piston assembly | 29 | O-ring | 45 | Plug |
| 14 | Friction plate | 30 | Spring | 46 | O-ring |
| 15 | Plate | 31 | Check | 47 | O-ring |
| 16 | Brake piston | 32 | Relief valve | 48 | Black up ring |

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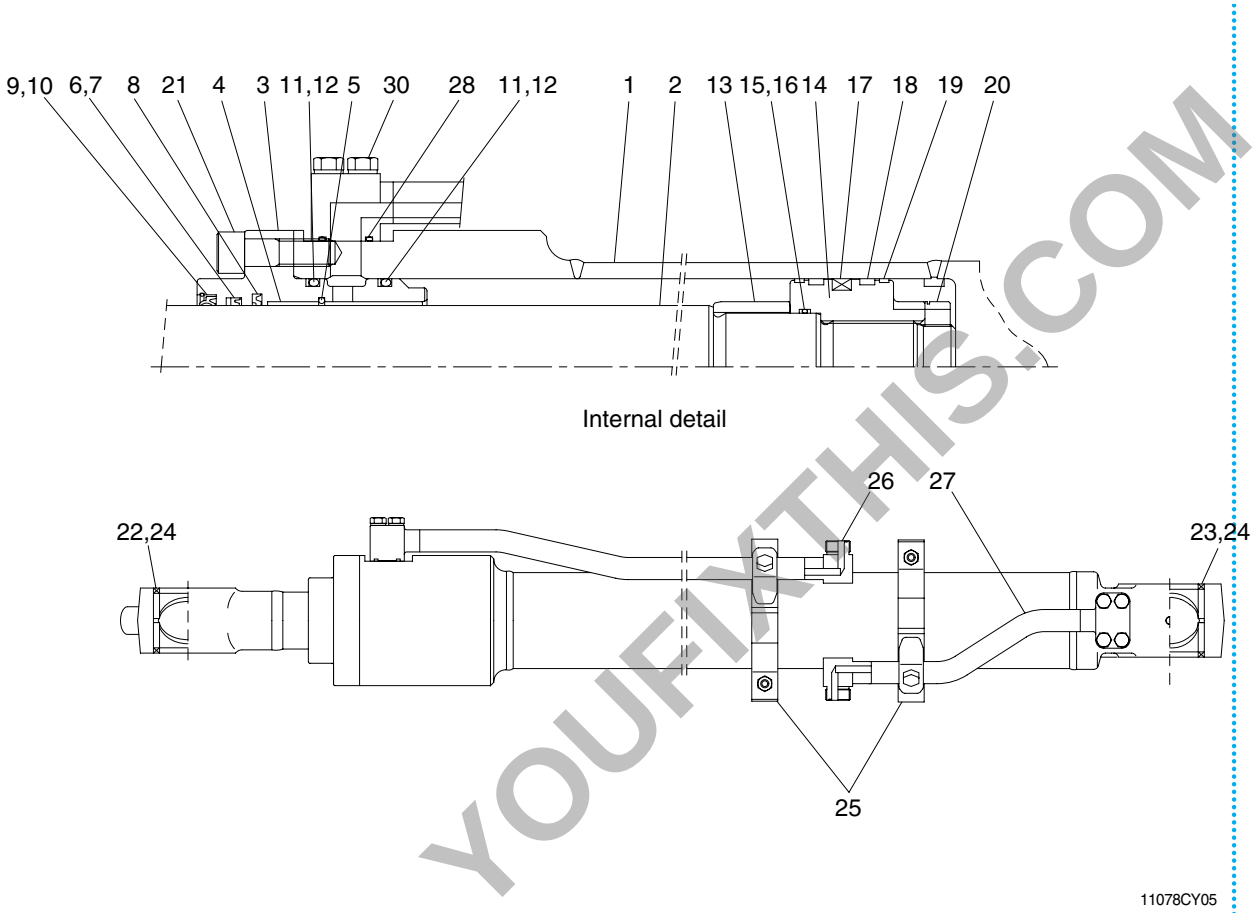


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## 2. DISASSEMBLY AND ASSEMBLY

### 1) STRUCTURE

#### (1) Bucket cylinder




| | | | | | |
|---|---|---|---|---|---|
| 1 | Tube assembly | 11 | O-ring | 21 | Hexagon socket head bolt |
| 2 | Rod assembly | 12 | Back up ring | 22 | Pin bushing |
| 3 | Gland | 13 | Cushion ring | 23 | Pin bushing |
| 4 | DD2 bushing | 14 | Piston | 24 | Dust seal |
| 5 | Snap ring | 15 | O-ring | 25 | Band assembly |
| 6 | Rod seal | 16 | Back up ring | 26 | Pipe assembly(R) |
| 7 | Back up ring | 17 | Piston seal | 27 | Pipe assembly(B) |
| 8 | Buffer ring | 18 | Wear ring | 28 | O-ring |
| 9 | Dust wiper | 19 | Dust ring | 29 | O-ring |
| 10 | Snap ring | 20 | Lock nut | 30 | Hexagon socket head bolt |

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