# Shop Manual

VENBM09000

# WA70M-8E0

## WHEEL LOADER

**Model:** WA70M-8E0

**Serial number:** H71051 and up

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local KOMATSU distributor for those items you may require.
- Materials and specifications are subject to change without notice.
- The Wheel Loader WA70M-8E0 is equipped with the engine 4D98E-6SHA.


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KOMATSU

### 50 DISASSEMBLY AND ASSEMBLY

This section describes the special tools, work procedures, and safety precautions necessary for removal, installation, disassembly, and assembly of the components and parts. In addition, tightening torques, quantity, and weight of the coating materials, lubricants, and coolant necessary to these works are shown.

### 60 MAINTENANCE STANDARDS

This section describes the maintenance standard value of each component. The maintenance standard shows the criteria and remedies for disassembly and assembly.

### 80 THE OTHER INFORMATION

This section describes the structure and function, testing and adjusting, and troubleshooting for all of the other components or equipment which cannot be separately classified in the appendix.

### 90 Circuit diagrams

This section describes hydraulic circuit diagrams and electrical circuit diagrams.

## Selecting wire ropes

Select adequate ropes depending on the weight of the parts to be hoisted referring to the table below.

**REMARK**

The allowable load is calculated with one sixth (safety factor 6) of the breaking load of the rope.

**Wire rope (JIS G3525 6x37-A type) (Standard Z twist wire ropes without galvanizing)**

| Nominal diameter of rope (mm) | Allowable load (kN {t}) |
|---|---|
| 10 | 8.8 {0.9} |
| 12 | 12.7 {1.3} |
| 14 | 17.3 {1.7} |
| 16 | 22.6 {2.3} |
| 18 | 28.6 {2.9} |
| 20 | 35.3 {3.6} |
| 25 | 55.3 {5.6} |
| 30 | 79.6 {8.1} |
| 40 | 141.6 {14.4} |
| 50 | 221.6 {22.6} |
| 60 | 318.3 {32.4} |

## Precautions for disconnecting air conditioner piping

**NOTICE**

When replacing the air conditioner unit, air conditioner compressor, condenser or receiver drier, etc., collect the refrigerant (air conditioner gas: R134a) from the air conditioner circuit before disconnecting the air conditioner hoses.

**REMARK**

- Ask a qualified person for collecting, adding and filling operations of the refrigerant (air conditioner gas: R134a).
- Never release the refrigerant (air conditioner gas: R134a) to the atmosphere.

⚠ **Put on the protective eyeglasses, gloves and working clothes with long sleeves while you are collecting or filling the refrigerant. Otherwise, when refrigerant gas (R134a) gets in your eyes, you may lose your sight, and when it touches your skin, you may suffer from frostbite.**

- When loosening the nuts fixing air conditioner hoses and tubes, be sure to use 2 wrenches; use one wrench to fix and use the other one to loosen the nut.

## Precautions for air conditioner piping

- When installing the air conditioner piping, be careful so that dirt, dusts and water do not enter the hose.

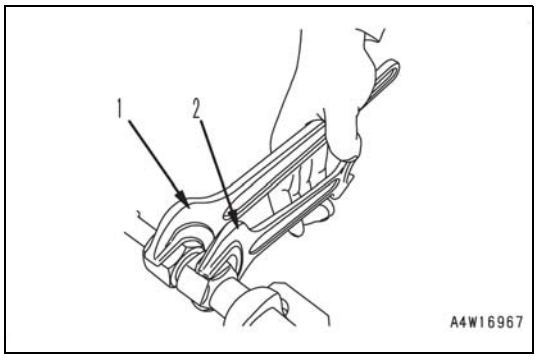
Check that the O-rings are fitted to the joints when connecting the air conditioner piping.

# PRECAUTIONS FOR DISCONNECTION AND CONNECTION OF PIPINGS

When performing "testing and adjusting" of the machine, "removal and installation" and "disassembly and assembly" of the components, observe the following precautions.

## PRECAUTIONS FOR REMOVAL AND DISASSEMBLING WORK

- If the cooling water contains coolant, dispose of it correctly as chemicals. Do not drain it to the sewage rashly.
- After disconnecting the hoses or tubes, plug them to prevent dust from entering.
- When draining oil, prepare a container with sufficient capacity.
- Check the matchmarks which indicate the installing position and put matchmarks on the places where they seem necessary before removal of the components to prevent any mistake when assembling.
- To prevent any excessive force from being applied to the wiring, always hold the connectors when disconnecting the connectors. Do not pull the wires.
- Attach the tags to wires and hoses so that installation is done to the correct installing positions.
- Check the thickness and number of shims when storing shims.
- When hoisting the components, prepare the slings with sufficient strength.
- When using forcing screws to remove any component, tighten the forcing screws uniformly and alternately.
- Before removing any component, clean the surrounding area and cover the component to prevent any foreign material from entering after removal.
- To disconnect the face seal type hose from the cylinder tube, loosen the joint by gripping the two wrenches together, one is the wrench (1) on the hose side, and another is the wrench (2) on the cylinder tube reaction force point as shown in the following figure. Use the grip strength only. Check after disconnecting the hose that the joint portion of the cylinder and the cylinder tube is tightened to the specified torque. Re-tighten it if the tightening torque is insufficient.




**NOTICE**

**Cylinder tube is rotated due to the load applied to the reaction force point of the cylinder tube, and it is a cause of weakening of the tightening torque. It may lead to oil leakage.**

**Check of function of muffler in exhaust system**

**REMARK**

When an equipment is described as a muffler in exhaust system, it is one of the followings. (The applications or components of equipment are different depending on its models or specifications.)

- DPF
- DOC muffler
- Muffler
- Exhaust pipe
- Parts which connects the above, or etc.

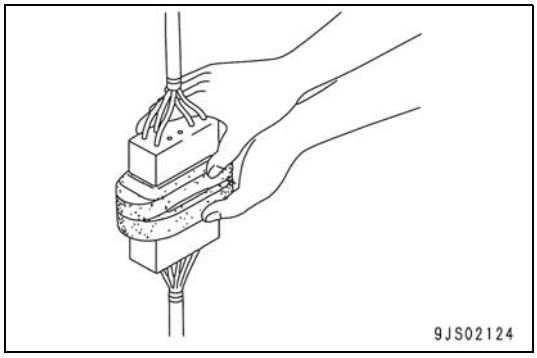
Check that there is no unusual noise by comparing to it of the time when the machine was new.

If there is any unusual noise, repair DPF or muffler, referring to "TROUBLESHOOTING" and "DISASSEMBLY AND ASSEMBLY".

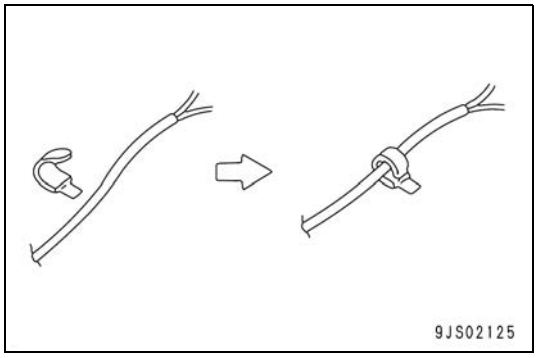
3. Correct the protrusion of the boot and misalignment of the wiring harness.

   • If the connector is with the boot, correct any extrusion of the boot. In addition, if the wiring harness is misaligned or the clamp is out of position, adjust it to its correct position.

     **REMARK**
     If the protrusion of the boot and misalignment of the wiring harness cannot be fixed, remove the clamp to adjust them.

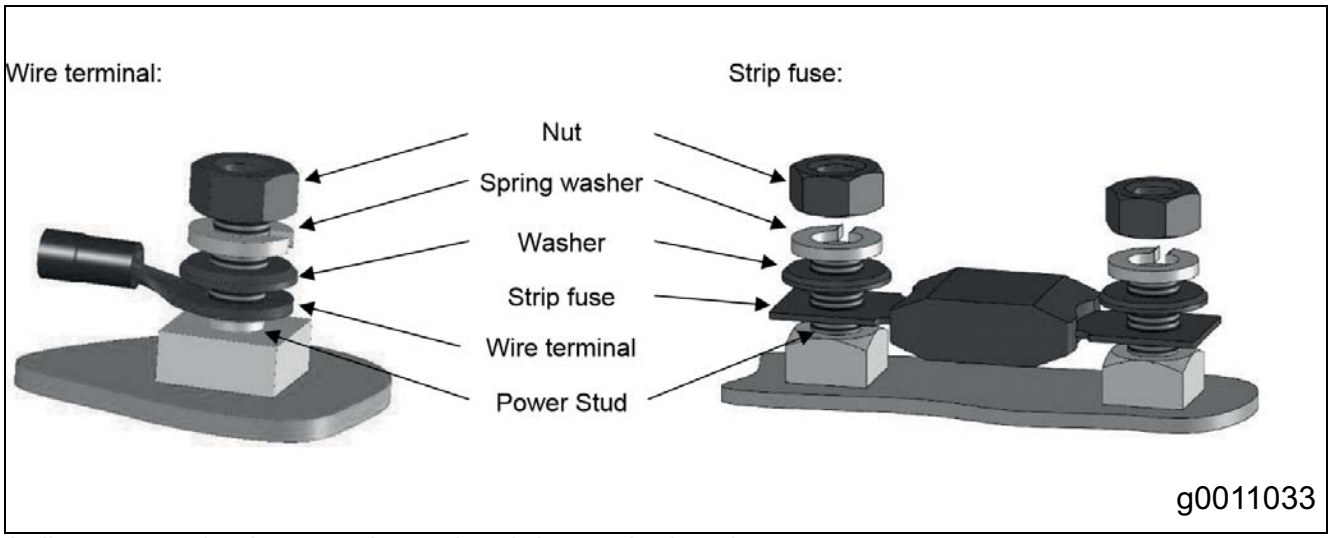



   • If the connector clamp is removed, be sure to return it to its original position. Check that there is no looseness.



## Method for connecting ring terminals and strip fuses to power stud of printed circuit boards

The assembly of a strip fuse and a wire terminal with a power stud on a printed circuit board, has to be performed as follows:




A direct connection between the stud and the conductive element is required and no mounting elements are to come in between.

For the board equipped with spring washers, it is expressly forbidden to reuse these elements if they were tightened with high torque.

Consider the following maximum torque for the nuts on the power studs of the printed circuit boards (central electric board and relaybox).

| Thread size (metric) | M5 | M6 | M8 |
|---|---|---|---|
| Max. torque [Nm] | 2,2 | 3,9 | 9,0 |

| Nominal No. | Thread diameter (mm) | Width across flats (mm) | Tightening torque (Nm {kgm}) | |
|---|---|---|---|---|
| | | | Range | Target |
| 18 | 18 | 27 | 34.3 to 44.1 {3.5 to 4.5} | 39.2 {4.0} |
| 20 | 20 | 30 | 44.1 to 53.9 {4.5 to 5.5} | 49.0 {5.0} |
| 24 | 24 | 32 | 58.8 to 78.4 {6.0 to 8.0} | 68.6 {7.0} |
| 30 | 30 | 32 | 93.1 to 122.5 {9.5 to 12.5} | 107.8 {11.0} |
| 33 | 33 | - | 107.8 to 147.0 {11.0 to 15.0} | 127.4 {13.0} |
| 36 | 36 | 36 | 127.4 to 176.4 {13.0 to 18.0} | 151.9 {15.5} |
| 42 | 42 | - | 181.3 to 240.1 {18.5 to 24.5} | 210.7 {21.5} |
| 52 | 52 | - | 274.4 to 367.5 {28.0 to 37.5} | 323.4 {33.0} |

# TABLE OF TIGHTENING TORQUE FOR BOSS PIPING JOINTS WITH FLAT SEAL (DIN3852)

**REMARK**

Tighten the pipe joint for boss with the torque shown in the table below unless otherwise specified.

g0011035

| Thread diameter | Width across flats (mm) | Tightening torque | |
|---|---|---|---|
| | | Target (Nm) | Tolerance (Nm) |
| M12x1.5 | Varies depending on type of connector. | 25 | 0/-2,5 |
| M14x1,5 | | 50 | 0/-5 |
| M16x1,5 | | 70 | 0/-7 |
| M18x1,5 | | 90 | 0/-9 |
| M20x1,5 | | 130 | 0/-13 |
| M22x1,5 | | 130 | 0/-13 |
| M26x1,5 | | 180 | 0/-18 |
| M27x2 | | 200 | 0/-20 |
| M33x2 | | 230 | 0/-23 |
| M42x2 | | 330 | 0/-33 |

| Thread diameter | Width across flats (mm) | Tightening torque | |
|---|---|---|---|
| | | Target (Nm) | Tolerance (Nm) |
| G1/8A | Varies depending on type of connector. | 20 | 0/-2 |
| G1/4A | | 50 | 0/-5 |
| G3/8A | | 80 | 0/-8 |
| G1/2A | | 100 | 0/-10 |
| G3/4A | | 180 | 0/-18 |
| G1A | | 230 | 0/-23 |
| G1 1/4A | | 330 | 0/-33 |
| G1 1/2A | | 500 | 0/-50 |

## COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator causing a defective heat exchange and overheating.
- Do not use water that is not suitable for drinking.
- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze prevents corrosion in the cooling system. The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is, even in hot areas.
- Anti- freeze is flammable, so be extremely careful not to expose it to open flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature. For details of the mixing ratios, see Operation Manual: "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM“.
- If the engine overheats, wait for the engine to cool down before adding coolant.
- If the coolant level is low, it will cause overheating and corrosion due to the air in the coolant.

## GREASE

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the maintenance section are nipples for overhaul, so they need not be lubricated. If any part becomes stiff after being used for a long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing. Be particularly careful to wipe off the old grease in places where sand or dirt in the grease would cause the rotating parts to wear.

## STORING OIL AND FUEL

- Keep oil and fuel indoors to prevent any water, dirt or other impurities from penetrating.
- When keeping barrels for a long period, lay the barrel down on its side so that the filler port is at the side (to prevent moisture from being sucked in).
  If barrels have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long term storage, be sure to use in the order of 'first in - first out' (use the oldest oil or fuel first).

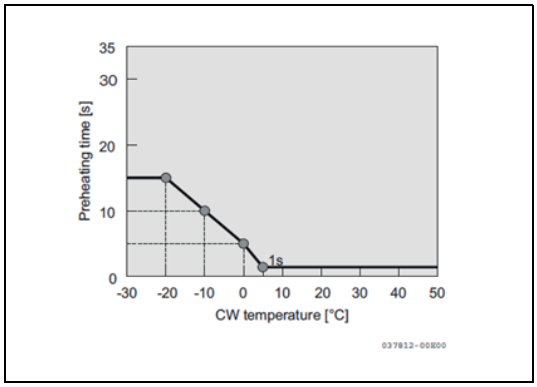
| Abbreviation | Actual word spelled out | Purpose of use (major applicable machine (*1), or component/system) | Explanation |
|---|---|---|---|
| ICT | Information and Communication Technology | Communication and electronic control | A general term for the engineering and its socially applied technology of information processing and communication. |
| IMA | Inlet Metering Actuator | Engine | This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump fuel discharged volume. (Same |
| IMU | Inertial Measurement Unit | Engine | This is a device to detect the angle (or angular velocity) and acceleration of the 3 axes that control motions. |
| IMV | Inlet Metering Valve | Engine | This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump combustion discharged volume. (Same as IMA) |
| CCV | Closed Crankcase Ventilation | Engine | This is a mechanism that burns the blowby gas again by separating oil from blowby gas and returning it to the intake side. It primarily consists of filters. |
| KCSF | Komatsu Catalyzed Soot Filter | Engine | This is a filter that captures soot in exhaust gas. |
| DOC | Komatsu Diesel Oxidation Catalyst | Engine | This is a catalyst that is used for purifying exhaust gas.<br>It is built in to DPF or assembled with the muffler. |
| DPF | Komatsu Diesel Particulate Filter | Engine | This is a component that is used to purify the exhaust gas. DOC (catalyst) and KCSF (filter to capture soot) are built-in it.<br>It is installed instead of the conventional muffler. |
| KTCS | Komatsu Traction Control System | Travel and brake (HM) | This is a function that performs braking with the optimum force and recovers the driving force of the wheels by actuating the inter-axle differential lock when the wheels runs idle while the machine travels on the soft ground. |
| LCD | Liquid Crystal Display | Machine monitor | This is an image display equipment such as a monitor in which the liquid crystal elements are assembled. |
| LED | Light Emitting Diode | Electronic parts | This is a semiconductor element that emits light when the voltage is applied in forward direction. |
| LIN | Local Interconnect Network | Communication and electronic control | This is one of communication standards that are used in the network on the machine. |
| LS | Load Sensing | Hydraulic system | This is a function that detects differential pressure of pump, and controls discharged volume corresponding to load. |
| LVDS | Low Voltage Differential | Communication and electronic control | This is one of communication standards that are used in the network on the machine. |
| MAF | Mass Air Flow | Engine | This indicates engine intake air flow. This is not used independently but is used as combined with sensor. Mass air flow sensor can be called as MAF sensor. |

# FUNCTION OF AUTOMATIC PREHEATING SYSTEM

- Automatic preheating system is installed for the engine to start easily in cold weather.
- When the starting switch is turned to "ON" position, the automatic preheating system starts to set the preheating time automatically corresponding to the coolant water temperature.
- The preheating pilot lamp on the machine monitor lights up and the electric glow plugs are energized when the starting switch is turned to "ON" position.
- Engine controller detects coolant temperature with the temperature sensor and sets the preheating time according to them (up to 15 sec).
- Pilot lamp on monitor stays lit while preheating is operated. Keep the starting switch in "ON" position during this time. If starting switch is turned to "START" position, automatic preheating is canceled.

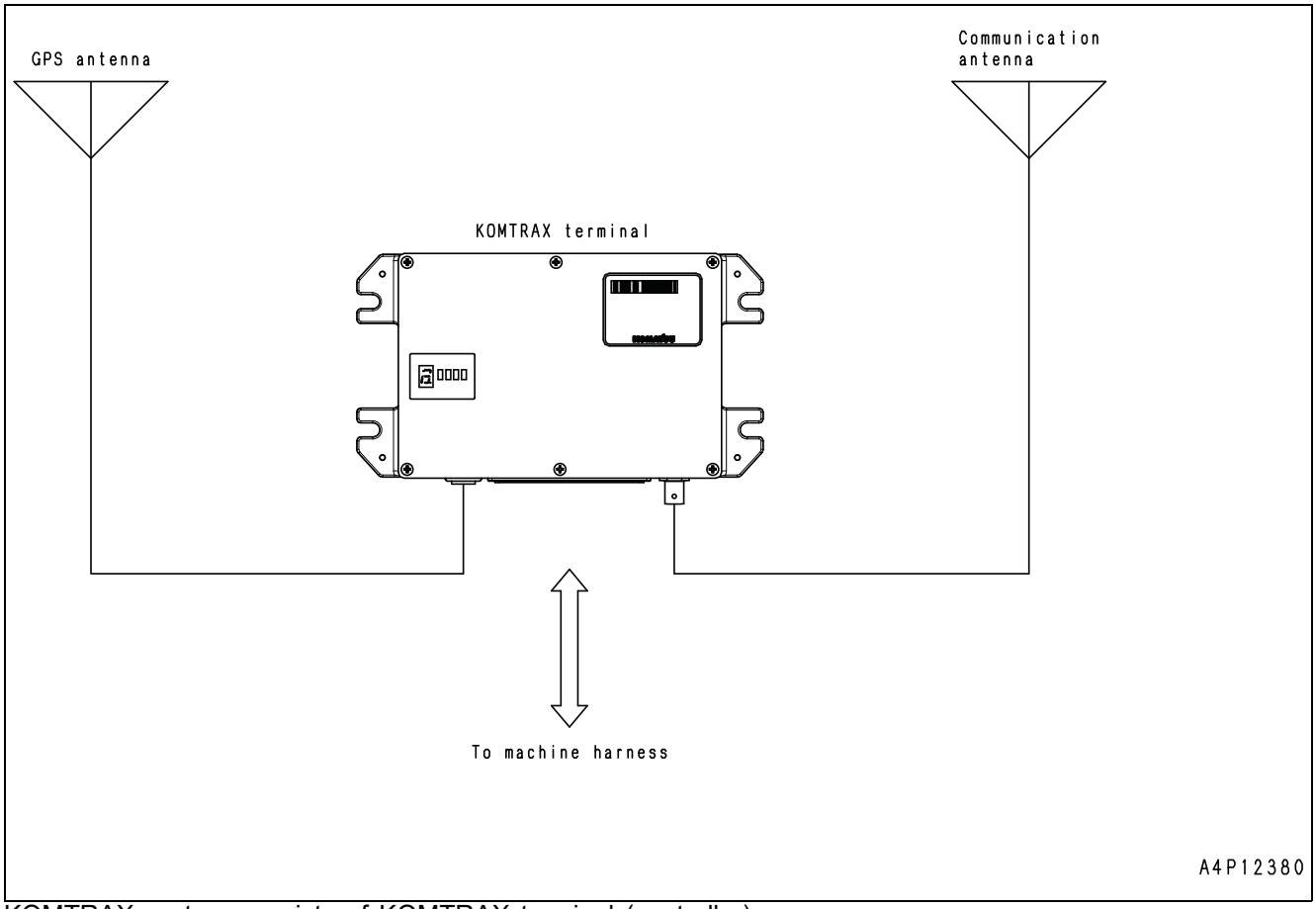
# OPERATION OF AUTOMATIC PREHEATING SYSTEM

1. When the starting switch is turned to "ON" position, the engine controller starts.
2. The engine controller drives the preheater relay just after starting switch is turned to "ON" position, and the electric heater relay operates for electric heater to start preheating of the engine.
3. The operating time of preheater is shown in the following figure.



# KOMTRAX SYSTEM

## KOMTRAX SYSTEM DIAGRAM




KOMTRAX system consists of KOMTRAX terminal (controller) and two antennas (communication and GPS)

## FUNCTION OF KOMTRAX SYSTEM

- KOMTRAX system transmits various types of information on the machine. KOMTRAX administrator sees the information in the office and supplies various services to the customers.
- KOMTRAX system can transmits the following information.
- Positional information
- Operation information (service meter, odometer, etc.)
- Fuel consumption information
- Machine working condition information

**REMARK**

To provide the services, you need to establish radio station for KOMTRAX separately.

## Service mode function of machine monitor

These functions are not displayed normally. These are for a technician to display and set with special switch operation. These functions are used for special settings, testing, adjusting, or troubleshooting.

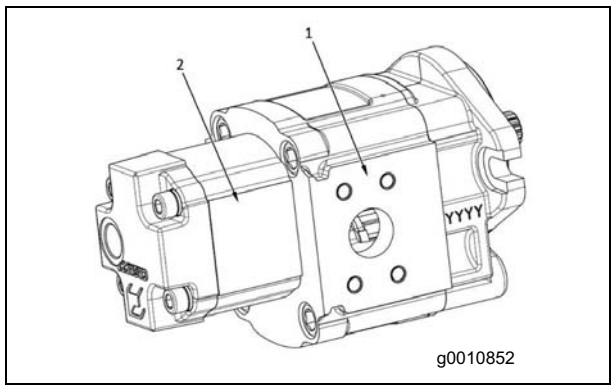
Items available in the service mode are as follows.

| | |
|---|---|
| Self-define Monitoring | |
| Abnormality Record | Mechanical Sys Abnormality Record |
| | Electrical Sys Abnormality Record |
| Maintenance Record | |
| Maintenance Mode Setting | |
| Phone Number Entry | |
| Default | Machine Model Selection |
| | Option Selection |
| | Unit Selection |
| Adjustment | T/C Device Calibration |

**REMARK**

For operating method of the service mode functions, See "SERVICE MODE" on page 30-70.

## Structure of the pump for steering, work equipment and cooling fan




Double pump
1 Pump for steering and work equipment
2 Pump for cooling fan

## Specifications of the pumps for steering, work equipment, cooling fan and high flow

**Work equipment / Steering pump**

Model: CASAPPA KP30.31

Discharged pressure: max. 23,0 MPa {235 kg/cm$^2$}

Standard discharged volume: 61.4 ℓ/min

**Cooling fan pump**

Model: CASAPPA PL20.8

Discharged pressure: max. 28,0 MPa {285 kg/cm$^2$}

Standard discharged volume: 17,4 ℓ/min

## Operation of HST pump

- The HST pump is a variable displacement pump, where the displacement pistons are mounted axially parallel to the drive shaft. They react against the swash plate.

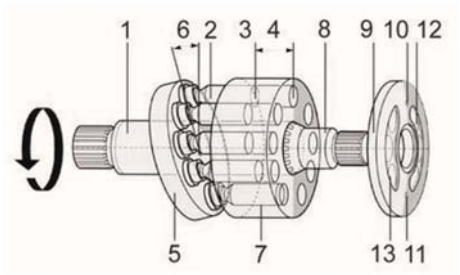
- The drive shaft is rotated by the engine. The drive shaft is rigidly connected to the cylinder head.

  The cylinder head rotates with the drive shaft. The pistons (2) are mounted in the cylinder head. The pistons are mounted on guide shoes, which glide on the swash plate. Due to the tilted position of the swash plate, this causes an axial displacement of the pistons in the cylinder head. The guide shoes are held with oil pressure against the swash plate.

  During rotation the pistons move between bottom dead centre and top dead centre and back to the start position. In moving between the dead centres (here the piston changes its linear direction) the piston completes a stroke. Because of this oil is sucked in on the inlet port and displaced through the outlet port. The displaced oil volume depends on the piston area and the length of stroke.

  Suction takes place when the oil fills the increasing cylinder space. The oil is additionally forced into the cylinder by charge pump pressure. The returning piston forces the oil out of the cylinder head through the outlet port.

  The swash plate angle can be changed to increase or decrease the piston stroke and with this the displaced oil volume. When the swash plate angle changes over the neutral position, the pumped direction also changes. Inlet becomes outlet, outlet becomes inlet.



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1. Drive shaft
2. Pistons
3. Piston area
4. Piston displacement
5. Swash plate
6. Operating angle
7. Cylinder head
8. Drive shaft
9. Control plate
10. Top dead centre
11. Bottom dead centre
12. Inlet port (rotation as shown)
13. Outlet port (rotation as shown)

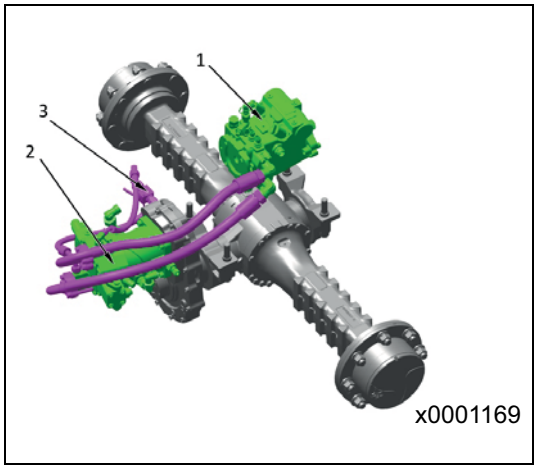
## Function of towing system

For towing the machine, follow the instructions in the operator's manual.

For towing the machine, the HST motor needs to be bypassed. If this is not done, rotation of the wheels will be transmitted through the transfer box to the HST motor (2). The oil displaced by the motor would be forcing the pump (1) to turn, which may damage the engine.

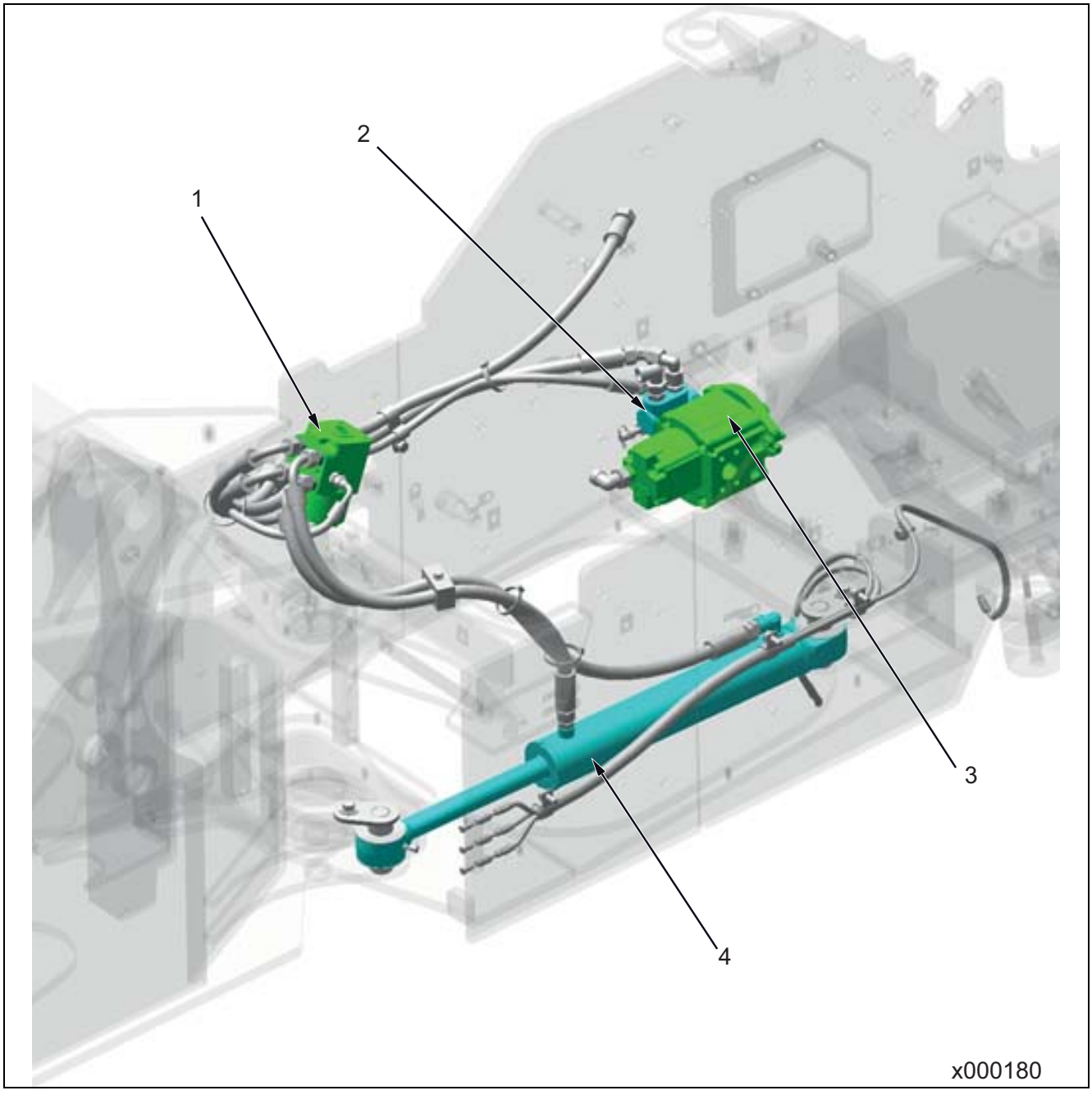
This is achieved by activating the towing valve (3) by turning the lever downwards.

After activating the valve, the oil displaced by the motor (2) is not flowing through the pump (1), but through the towing valve (3). In this case, no rotational force is generated in the pump (1) and a damage of the engine is prevented.



# STEERING SYSTEM

## LAYOUT DRAWING OF STEERING SYSTEM

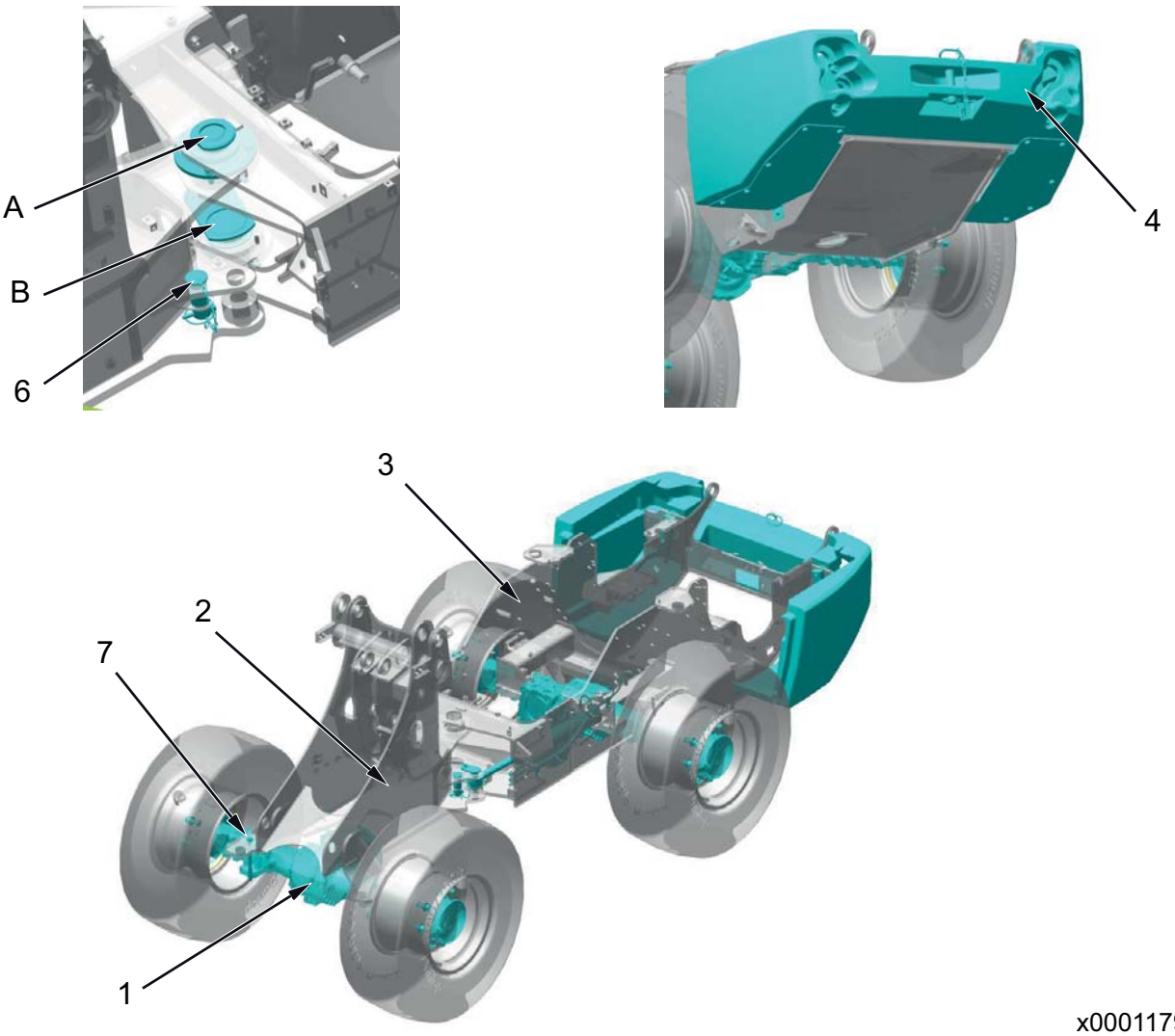



1 Orbitrol valve
2 Priority valve
3 Steering pump
4 Steering cylinder

# UNDERCARRIAGE AND FRAME

## FRAME, AXLE MOUNT AND CENTER HINGE PIN

### Structure of frame, axle mount and center hinge pin general view

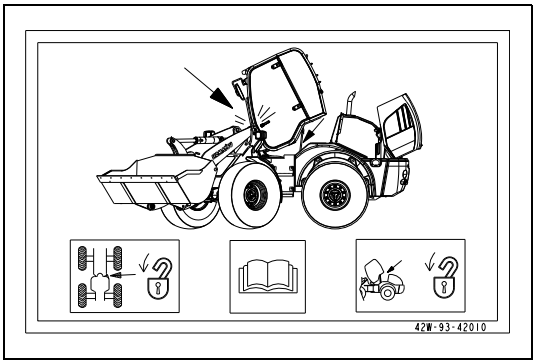



1 Front axle
2 Front frame
3 Rear frame
4 Counterweight
6 Frame lock bolt
7 Axle mounting bolt
A Detail see next picture
B Detail see next picture

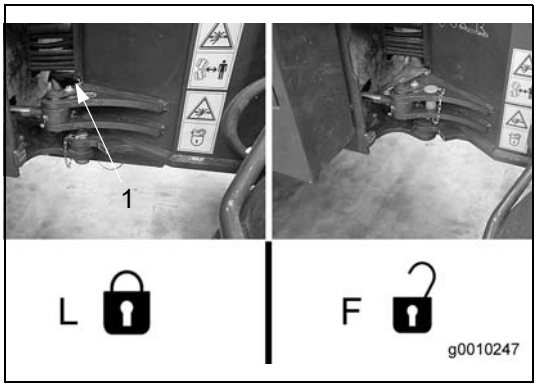
# TIPPING UP THE OPERATOR'S CAB (STANDARD, WITHOUT TIPPING CYLINDER)

- **Risk of injury! The tipped up operator’s cab can suddenly lower itself!**
- **Never enter the raised cabin.**
- **Never start the engine with the cabin up.**
- **Never tip up the cabin in strong winds.**

1. Park the machine on solid, level ground.
2. Lower the work equipment to the ground and switch off the engine.
3. Close the cab door.



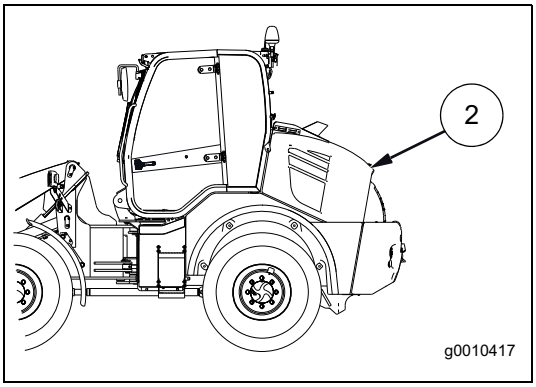

4. Secure the articulated steering (1) with the locking bolt.




**NOTICE**

The machine has to be positioned as for driving in a straight line, and the articulated steering has to be secured with the locking bolt! If the operator's cab is tipped up while the machine is bent, the front frame may damage the windscreen!

5. Open the engine hood (2).



# 20 STANDARD VALUE TABLE

# TEST CERTIFICATE

| **Chassis Nº:** | | | **Customer:** | | |
|---|---|---|---|---|---|
| Test temperatures | | | | Target | **Value** |
| | 1 | Cooling water | °C | 82±5 | |
| | 2 | Hydraulic oil (drive and working hydraulic, measured in the hydraulic oil cooler return) | | 50±5 | |
| Engine speed | | | | Target | **Value** |
| | 3 | Low idle speed | rpm | 900±10 | |
| ★ | 4 | High idle speed | | 2230±10 | |
| | 5 | Engine speed hydrostat full stall (oil temperature: min.55°c) | | 2230±10 | |
| | 6 | Engine speed working hydraulic+hydrostat full stall | | 2230±10 | |
| | 7 | Start of drive RPM | | 1050±50 | |
| System pressures | | | | Target | **Value** |
| ★ | 8 | Work hydraulic pressure | bar | 230+5 | |
| ★ | 9 | Steering hydraulic pressure | | 180±5 | |
| | 10 | Feed pressure (low idle speed and test temperature) | | min. 26 | |
| | 11 | Feed pressure (high idle speed and test temperature) | | max. 30 | |
| ★ | 12 | Pressure (absolut) machine is full braked forward | | 455±5 | |
| ★ | 13 | Pressure (absolut) machine is full braked backward | | 455±5 | |
| Steering cycle times | | | sec | Target | **Value** |
| | 14 | Low idle speed, left and right (end to end) | | LH: 3.3±04<br>RH: 4.2±04 | |
| ★ | 15 | Rated idle speed, left and right (end to end) | | LH: 1.7±04<br>RH: 2.1±04 | |
| Lift and tilt times | | | | Target | **Value** |
| ★ | 16 | Raising time with empty bucket | | 5.3±0.3 | |
| ★ | 17 | Dump time of bucket on full raised position | | 1.1±0.3 | |
| ★ | 18 | Roll back time from ground level of bucket to bucket stopper | | 1.0±0.5 | |
| Lower times | | | | Target | **Value** |
| ★ | 19 | Lowering time from full raised position to ground level of bucket | | 3.2±0.5 | |
| ★ | 20 | Lowering time from full raised position to ground level of bucket joystick in float position | | 4.3±0.5 | |
| Travel speeds | | | km/h | Target | **Value** |
| | 21 | 1. drive range: 20 km/h STD (Tires 455/70R20) | | 0 - 5±1 | |
| | 22 | 2. drive range: 20 km/h STD (Tires 455/70R20) | | 0 - 20±1 | |
| ★ | 27 | Fan speed 20 km/h version | rpm | 2000±50 | |

All measurements and setups has to do at operation temperature of machine!

★ Measurements with maximum engine speed!

| Abbreviation | Actual word spelled out | Purpose of use (major applicable machine (*1), or component/system) | Explanation |
|---|---|---|---|
| MMS | Multimedia Messaging Service | Communication | This is a service that allows transmission and reception of short messages consisting of characters or voice or images between cell phones. |
| NC | Normally Closed | Electrical system, hydraulic system | This is a characteristic of electrical or hydraulic circuits. Circuit is normally closed if it is not actuated, and it opens when it is actuated. |
| NO | Normally Open | Electrical system, hydraulic system | This is a characteristic of electrical or hydraulic circuits. Circuit is normally open if it is not actuated, and it closes when it is actuated. |
| OLSS | Open-center Load Sensing System | Hydraulic system | This is a hydraulic system that can operate multi- ple actuators at the same time regardless of the load. |
| PC | Pressure Compensation | Hydraulic system | This is a function that corrects the oil pressure. |
| PCCS | Palm command control system | Steering (D Series) | This is a function that electrically controls the en- gine and transmission in an optimal way with the controller instantly analyzing data from levers, pedals, and dials. |
| PCV | Pre-stroke Control Valve | Engine | This is a valve that adjusts the fuel intake amount at the pump inlet in order to control fuel dis- charged volume of supply pump. |
| PPC | Proportional Pressure Control | Hydraulic system | This is a system that operates actuators in proportion to the oil pressure. |
| PPM | Piston Pump and Motor | Hydraulic system (D, PC, etc) | Piston type hydraulic pump and motor. |
| PTO | Power Take Off | Power train system | Power take-off mechanism |
| PTP | Power Tilt and power Pitch dozer | Work equipment (D Series) | This is a function that performs hydraulic control of the tilt and pitch of the dozer blade of the bull- dozer. |
| ROPS | Roll-Over Protective Structure | Cab and canopy | ROPS is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine rolls over. (Roll-over protective structure)<br>This performance is standardized as ISO 3471 or ISO 12117-2. |
| SCR | Selective Catalytic Reduction | Urea SCR system | This is an exhaust gas purifier using urea water that converts nitrogen oxides (NOx) into harmless nitrogen and water by oxidation-reduction re- action. It may also be mentioned as exhaust gas purification catalyst or part of the name of related devices. |
| SI | Le Systeme International d' Unites (International unit system) | Unit | Abbreviation for "International System of Units" It is the universal unit system and "a single unit for a single quantity" is the basic principle applied. |
| SOL | Solenoid | Electrical system | This is an actuator that consists of a solenoid and an iron core that is operated by the magnetic force when the solenoid is energized. |

Free for technical reason

# TEST FUEL CIRCUIT FOR LEAKAGE

**Tools for testing the leakage in fuel system**

| Symbol | Part No. | Part name | Q'ty | Remarks |
|---|---|---|---|---|
| A | Commercially available | Developer for dye penetrant (color checker) | 1 | |

- **Very high pressure is generated in the high-pressure circuit of the fuel system. If fuel leaks while the engine is running, it presents a serious danger that could result in a fire. When the fuel circuit is tested or any component is removed from or installed to it, check for fuel leakage according to the following procedure.**
- **Place the machine on a level ground, lower the work equipment to the ground, apply the parking brake, turn work equipment lock switch to LOCK position, and stop the engine.**
- **Chock the tires to prevent the machine from moving.**
- **Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.**

Clean the engine and the parts around it and degrease them in advance so that you can easily find the leakage if any.

For testing of fuel system for leakage to perform troubleshooting or others, refer to this section.

## METHOD FOR TESTING FUEL CIRCUIT FOR LEAKAGE

### Testing method of fuel circuit for leakage at engine stopped

1. Start the engine.
2. Stop the engine after the engine automatic warm-up function is cancelled and the engine speed is stabilized while the accelerator pedal is not depressed (low idle).
3. Spray the colour checker A to the high-pressure supply pump, common rail, injectors, and joints of the high-pressure piping.
4. Check the fuel piping and component for fuel leakage.
   - Check the high-pressure circuit for fuel leakage focusing on the area where the colour checker A is sprayed.
   - If there is a fuel leakage, repair it and perform the testing from Step 1 again.

# TEST DRIVE SHAFT FOR LOOSENESS, BACKLASH, AND DAMAGE

- **Place the machine on a level ground, lower the work equipment to the ground, set the parking brake lever in PARKING position and work equipment lock switch in LOCK position, and stop the engine.**
- **Chock the tires to prevent the machine from moving.**

For testing of the drive shaft for looseness, backlash and damage to perform troubleshooting or others, refer to this section.

## METHOD FOR TESTING DRIVE SHAFT FOR LOOSENESS, BACKLASH, AND DAMAGE

Check the drive shaft for damage, abnormal backlash, and loosening of connecting bolts and nuts.

1. Move the cross member at the universal joint up and down, right and left, and rotate in both directions to check.
2. Move the sliding part of the drive shaft upward and rotate it in both directions for several times to check.

**REMARK**

- If any part is loosened or damaged, repair it.
- For the tightening torques, See "DISASSEMBLY AND ASSEMBLY" on page 40-1.

# TEST AND ADJUST BRAKE PEDAL

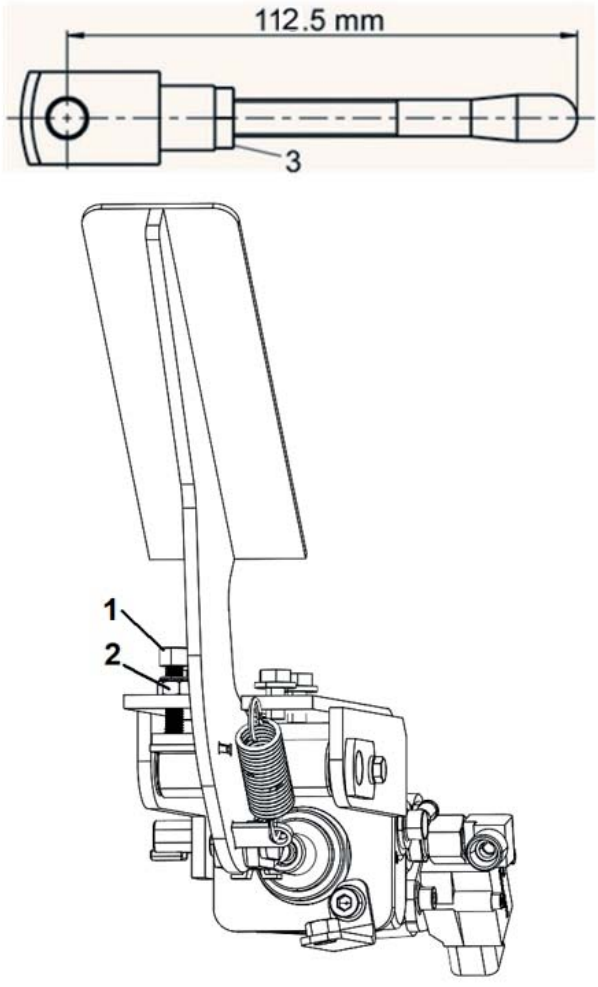
**Park the machine on level ground and secure it against rolling away and jack-knifing!**
**Lower the bucket, switch the engine off and actuate the parking brake!**

### Length of rod

1. Mount the fork to the brake rod, loosen the locking nut (3) and set the length of the brake to approx. 112.5 mm.
2. Install the brake rod to the brake pedal.

### Angle of brake pedal

1. Release the locknut (2) and turn the adjusting bolt (1) to adjust the pedal angle to 45°.
2. Tighten the locknut (2) and check the pedal angle adjustment.




x0001184

# TEST ECSS ACCUMULATOR NITROGEN GAS PRESSURE

**Risk of injury!**
**Release remaining pressure from pressurized circuit before working on the ECSS accumulator.**

For detail See "Releasing the remaining pressure in ECSS" on page 40-54.

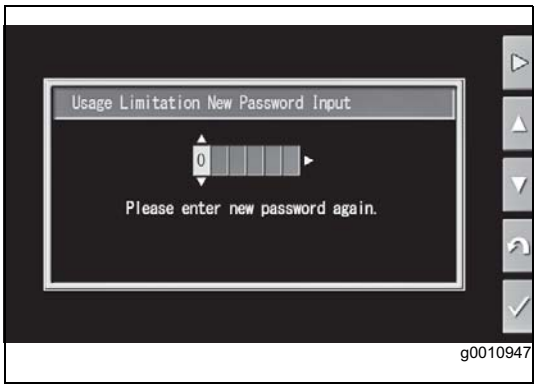
Put on the appropriate protective equipment (goggles, leather gloves, protective clothes) so that the leaked nitrogen gas does not come in contact with your skin or clothes. Perform the work on the windward side as much as possible.

- **When using the nitrogen gas indoors or on an ill-ventilated location, ventilate the room, etc. and observe the Industrial Safety and Health Law, Ordinance on Prevention of Anoxia, etc.**
- **The accumulator is charged with high-pressure nitrogen gas, and incorrect operation may cause an explosion which will lead to serious injury or death. When handling, always observe the following.**
- Do not bring open flame close to it or do not dispose of it in fire.
- Do not perform drilling, welding or flame-cutting.
- Do not hit or roll it or subject it to any impact.
- Discharge the gas before disposing.
- Before disassembly and removal, be sure to lower the charged gas pressure to the ambient pressure.
- Be sure to use the nitrogen gas for charging.
- Do not charge explosive gas such as oxygen.
- Follow this procedure always when handling accumulator.

For testing and charging of ECSS accumulator nitrogen gas pressure to perform troubleshooting, refer to this section.

- When the inputted password is incorrect, a message to request inputting the password again is displayed.
- Set a new password of 4 to 6 digits (A password with 3 or less digits or 7 or more digits is not allowed to set)

3. After "Usage Limitation New Password Input" screen is displayed again, use a switch on the switch panel to input and validate a new password. NEXT switch (6): Switch to the next numeric input box UP switch (7): Increase the Number in the selected box.DOWN switch (8): Decrease the number in the selected box.RETURN switch (9): Clears an input numeric/ Return the screen to the standard screen.
ENTER switch (10): Validates the inputted password.



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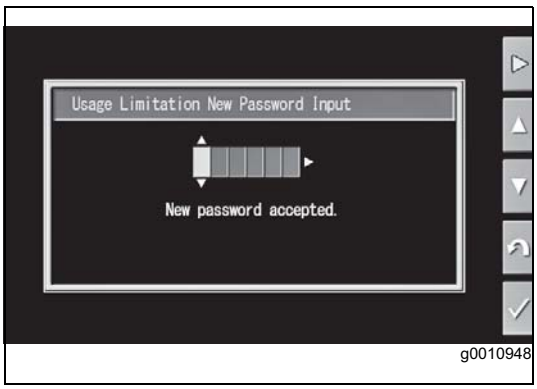
**REMARK**

If the inputted password is different from the one inputted before, a message to request inputting again is displayed.

If "Usage Limitation Setting" screen is displayed after the screen to notify completion of setting is displayed, the password is changed successfully.



g0010948

| Monitoring code | Self-define Monitoring items (screen displayed) | Unit | Applicable component | Remark |
|---|---|---|---|---|
| 68701 | DPF Reg Control Status | - | DPF | 0: Normal operation<br>1: Start of automatic speed control by ECU<br>2: After injectin and retard, Intake throttle operation (Target position limitation)<br>3: Intake throttle operation (No limitation of target position)<br>4: Post injection (Phase 1)<br>5: Judgement of finishing the DPF regeneration (Start of judgment by the DBF middle temperatur)<br>6: Post injection (Phase 2)<br>7: Judgement of finishin the DPF regeneration<br>8: Finish of automatic speed control by ECU (Gradually deceleration)<br>9: Accumulation value reset |
| 68702 | Emergency Mode Status | - | DPF | 0: Not detected<br>1: Emergency detection when operating assist regeneration<br>2: Emergency detection when operating reset regeneration<br>3: Emergency detection when operating stationary regeneration |
| 68703 | Stat Reg Request Flag | - | DPF | 0: No stationary regeneration request<br>1: Stationary regeneration request by operator command<br>2: Stationary regeneratio request by emergency<br>3: Recovery regeneration request |
| 68704 | Ash Cleaning Request Flag | - | DPF | 0: No ash cleaning request<br>1: Ash cleaning request (Low)<br>2: Ash cleaning request (High) |
| 68705 | DPF Reg Control Start Flag | - | DPF | 0: Warm-up incompleted for DPF regeneration control<br>1: Warm-up completed for DPF regeneration control |
| 68706 | Required DPF Reg Status | - | DPF | 0: Regeneration not needed<br>1: Regeneration needed - lowest level<br>2: Regeneration needed - moderate level<br>3: Regeneration needed - highest level |
| 68707 | DPF Reg Permission Status | - | DPF | 0: Not allowed<br>1: Allowed |

**Selectable items from Maintenance Record**

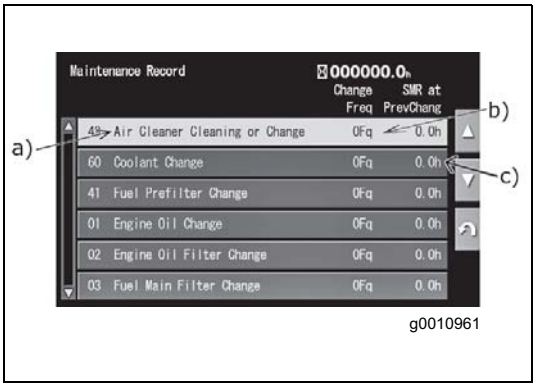
| Code | Item |
|---|---|
| 49 | Air Cleaner Cleaning or Change |
| 60 | Coolant Change |
| 41 | Fuel Prefilter Change |
| 01 | Engine Oil Change |
| 02 | Engine Oil Filter Change |
| 03 | Fuel Main Filter Change |
| 11 | Differential Oil Change |
| 25 | T/M Oil Change |
| 15 | Axle Oil Change |
| 10 | Hydraulic Oil Change |
| 04 | Hydraulic Oil Filter Change |
| 80 | General Machine Maintenance |

Displayed information of "Maintenance Record" screen

a: Maintenance items

b: Number of replacements up to now

c: Service meter reading (SMR) at the last replacement



6. When the settings of the items are completed, press RETURN switch (9) to return to the "Default" screen from the "Option Selection" screen.

   **REMARK**

   If ENTER switch (10) has never been pressed (no change is made) for setting of any item, this screen will not be displayed even if the display changes from "Option Selection" screen to "Default" screen.

7. After the screen which prompts you a key off is displayed, turn the starting switch to OFF position.

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Turning the starting switch to OFF position completes "Option Selection" setting.

## METHOD FOR SETTING WITH DEFAULT SETTING MENU (UNIT)

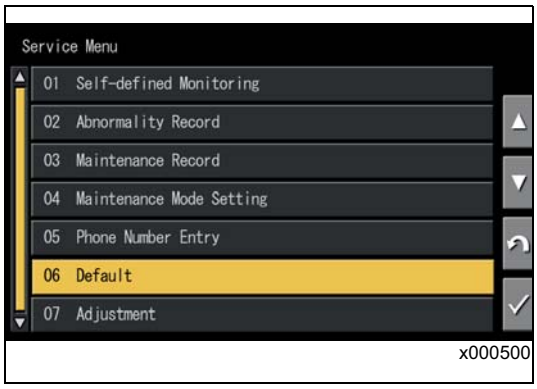
Default menu is used to check or change default values of the machine monitor and machine.

"Unit Selection" function is used to select the unit of the data to be displayed on standard screen.

1. Select "Default" on "Service Menu" screen.

   **REMARK**

   For selection method, See "METHOD FOR OPERATING SERVICE MODE" on page 40-70.



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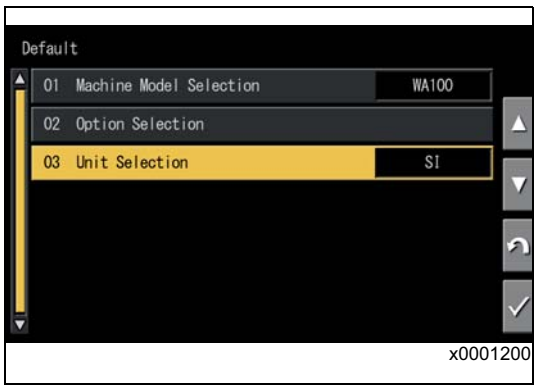
2. After the "Default" screen is displayed, select "Unit Selection".

   **REMARK**

   For selection method, sSee "METHOD FOR OPERATING SERVICE MODE" on page 40-70.



x0001200

# 40 TROUBLESHOOTING

## List of abbreviations used in the circuit diagrams

| Abbreviation | Actual word spelled out |
|---|---|
| A/C | Air Conditioner |
| A/D | Analogue-to-Digital |
| A/M | Air Mix Damper |
| ACC | Accessory |
| ADD | Additional |
| AUX | Auxiliary |
| BR | Battery Relay |
| CW | Clockwise |
| CCW | Counter Clockwise |
| ECU | Electronic Control Unit |
| ECM | Electronic Control Module |
| ENG | Engine |
| EXGND | External Ground |
| F.G. | Frame Ground |
| GND | Ground |
| IMA | Inlet Metering Actuator |
| NC | No Connection |
| S/T | Steering |
| STRG | |
| SIG | Signal |
| SOL | Solenoid |
| STD | Standard |
| OPT | Option |
| OP | |
| PRESS | Pressure |
| SPEC | Specification |
| SW | Switch |
| TEMP | Temperature |
| T/C | Torque Converter |
| T/M | Transmission |

# INFORMATION DESCRIBED IN TROUBLESHOOTING TABLE

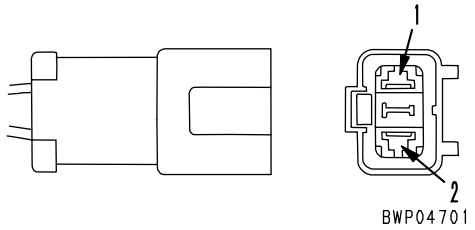
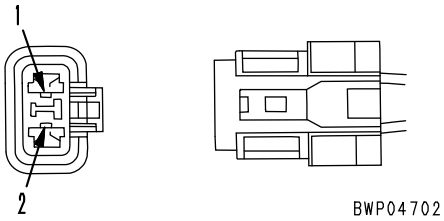
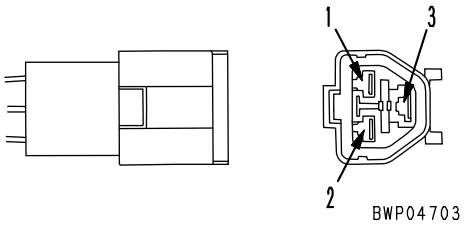
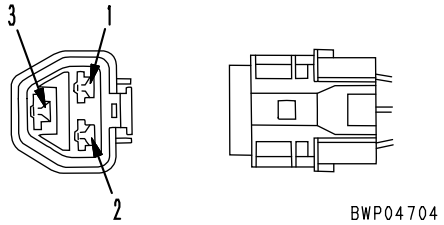
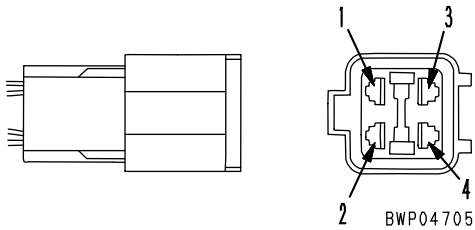
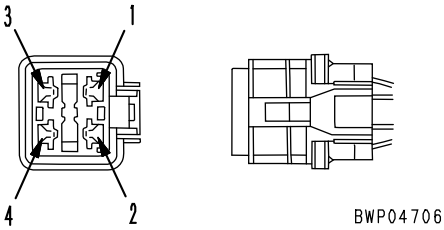
The following types of information are described in the troubleshooting list and related circuit diagram. Fully understand the description and perform troubleshooting

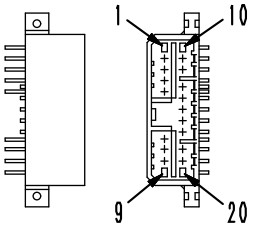
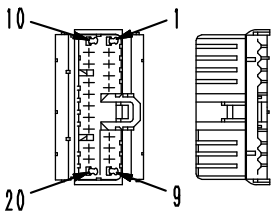
| | | | |
|---|---|---|---|
| Action level | Failure code | Failure | Failure name displayed on "Abnormality Record" screen of the machine monitor |
| Display on machine monitor | Display on machine monitor | | |
| Details of failure | Description of the failure detected by the machine monitor or controller | | |
| Action of controller | An action that is performed to protect the system and devices when a failure is detected by the machine monitor or controller | | |
| Problem on machine | A problem that is displayed as a failure on the lift truck as a result of an action (shown above) that is performed by the machine monitor or controller. | | |
| Related information | Information related to the occurred failure and its troubleshooting | | |

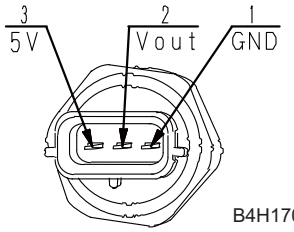
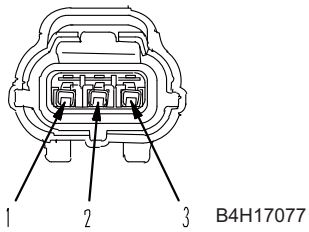
| No. | Cause | Procedure, measuring location, criteria, and remarks |
|---|---|---|
| 1 | Defective --- | Contents of description<br>• Procedure<br>• Measuring point<br>"Between A and B" denotes measuring values such as voltage and resistance between A and B.<br>"Between A and ground" means the measurement of voltage, resistance or others between place A and the place which has a continuity with chassis frame such as unpainted hexagonal head bolt or bolt hole which has no rust, etc.<br>• Criteria to judge probable causes (standard value), remarks<br>How to use troubleshooting sheet<br>• Perform troubleshooting procedures in following order.<br>• If the check result does not meet the criteria, the probable cause described on the left column is the actual cause of the failure.If the check result meets the criteria and there is no specific instruction, proceed to the next step (cause).<br>• If a defect is found and repaired, check that the defect has been corrected. Failures in wiring harness<br>• Open circuit<br>When the wiring and the internal circuit of the connector are not connected with each other, and there is no continuity<br>• Ground fault<br>A wiring harness not to be connected to the GND (ground) circuit comes into contact with the GND (ground) circuit or chassis accidentally.<br>• Hot short circuit<br>A wiring harness not to be connected to the power circuit comes into contact with the power circuit accidentally.<br>• Short circuit<br>An independent wire in the harness abnormally comes into contact with one of another wire. (Defective insulation in connector or others) |
| 2 | Open or short circuit in wiring harness | |
| 3 | Open circuit in wiring harness (wire breakage or defective contact of connector) | |
| 4 | Ground fault in wiring harness (contact with ground circuit) | |
| 5 | Hot short circuit | |
| 6 | Short circuit in wiring harness | |

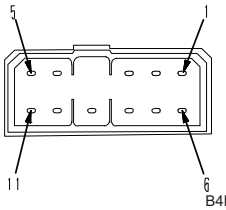
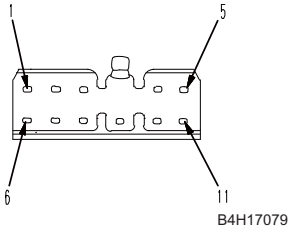
# CONNECTOR CONTACT IDENTIFICATION

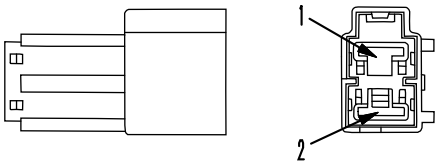
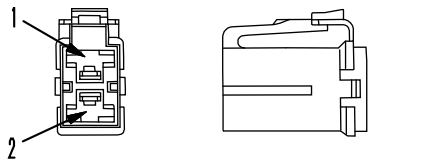
The male or female is for pin, and the convex or concave is for fitting (housing).

| No.of pins | X type connector | | T-adapter Part No. |
|---|---|---|---|
| | Male (female housing) | Female (male housing) | |
| 1 | Part No.: 08055-00181 | Part No.: 08055-00191 | 799-601-7010 |
| 2 |  |  | 799-601-7020 |
| | Part No.: 08055-00282 | Part No.: 08055-00292 | |
| 3 |  |  | 799-601-7030 |
| | Part No.: 08055-00381 | Part No.: 08055-00391 | |
| 4 |  |  | 799-601-7040 |
| | Part No.: 08055-00481 | Part No.: 08055-00491 | |
| — | • Terminal part No.: 79A-222-3370<br>• Electric wire size: 0.85<br>• Grommet: Black<br>• Q'ty: 20 | • Terminal part No.: 79A-222-3390<br>• Electric wire size: 0.85<br>• Grommet: Black<br>• Q'ty : 20 | — |
| — | • Terminal part No.: 79A-222-3380<br>• Electric wire size: 2.0<br>• Grommet: Red<br>• Q'ty: 20 | • Terminal part No.: 79A-222-3410<br>• Electric wire size: 2.0<br>• Grommet: Red<br>• Q'ty: 20 | — |

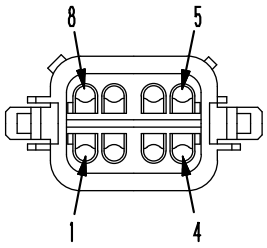
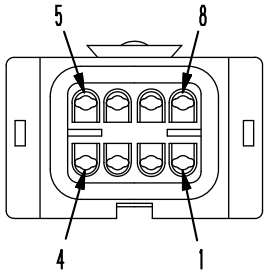
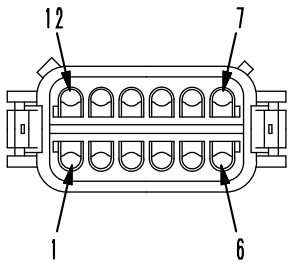
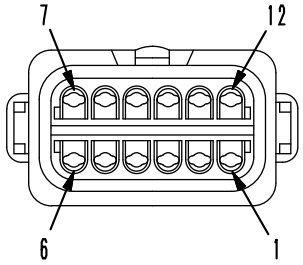
| No.of pins | AMP070 type connector | | T-adapter Part No. |
|---|---|---|---|
| | Male (female housing) | Female (male housing) | |
| 20 |  |  | 799-601-7550 |
| | — | Part No.: 7821-92-7370 | |

| No. of pins | AMP type connector | | T-adapter Part No. |
|---|---|---|---|
| | Oil pressure sensor | | |
| | Sensor side (plug) | Harness side (receptacle) | |
| 3 |  |  | 799-601-9420<br>(Kit: 799-601-4101)<br>(Kit: 799-601-4201) |
| | - | - | |

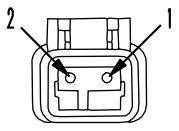
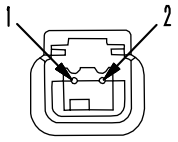
| No. of pins | YAZAKI type connector | | Testing connection use special tool part No. |
|---|---|---|---|
| | Wiper intermittent unit | | |
| | Male (female housing) | Female (male housing) | |
| 11 |  |  | — |
| | — | — | |

| No.of pins | L type connector | | T-adapter Part No. |
|---|---|---|---|
| | Male (female housing) | Female (male housing) | |
| 2 |  |  | — |
| | — | — | |

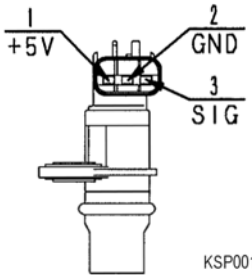
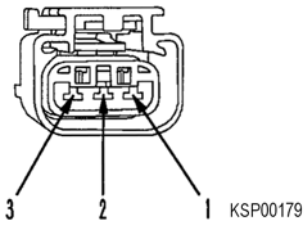
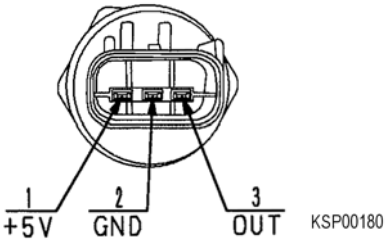
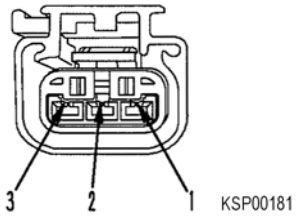
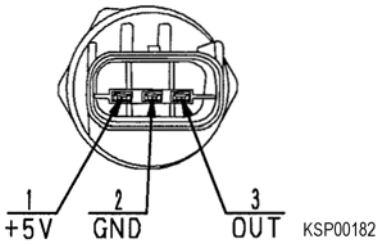
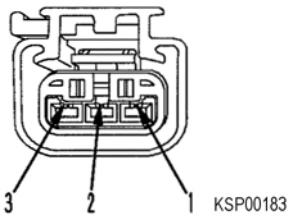
[The pin No. is also marked on the connector
(electric wire insertion end)]

| No.of pins | DT Series connector | | |
|---|---|---|---|
| | Body (plug) | Body (receptacle) | T-adapter Part No. |
| 8 |  BWP05045 |  BWP05046 | Body color (Gray): 799-601-9060<br>Body color (Black): 799-601-9070<br>Body color (Green): 799-601-9080<br>Body color (Brown): 799-601-9090 |
| | Part No.: 08192-1820☐ (Normal type)<br>08192-2820☐ (Fine wire type) | Part No.: 08192-1810☐ (Normal type)<br>08192-2810☐ (Fine wire type) | |
| 12 |  BWP05047 |  BWP05048 | Body color (Gray): 799-601-9110<br>Body color (Black): 799-601-9120<br>Body color (Green): 799-601-9130<br>Body color (Brown): 799-601-9140 |
| | Part No.: 08192-1920☐ (Normal type)<br>08192-2920☐ (Fine wire type) | Part No.: 08192-1910☐ (Normal type)<br>08192-2910☐ (Fine wire type) | |

[The pin No. is also marked on the connector
(electric wire insertion end)]

| No.of pins | DTM Series connector | | T-adapter Part No. |
|---|---|---|---|
| | Body (plug) | Body (receptacle) | |
| 2 |  BWP05049 |  BWP05050 | 799-601-9010<br>799-601-9890 |
| | Part No.: 08192-02200 | Part No.: 08192-02100 | |

FRAMATOME connector for engine

| No. of pins | NE speed sensor (95, 107, 114, 125, 140 engine)<br>CAM sensor (95, 107, 114 engine) | | T-adapter Part No. |
|---|---|---|---|
| | Sensor side (plug) | Harness side (receptacle) | |
| 3 |  |  | 799-601-4130<br>(Kit: 799-601-4101)<br>(Kit: 799-601-4201) |
| | — | — | |
| **No. of pins** | **Boost (air intake) pressure sensor (125, 140 engine)<br>Exhaust manifold pressure sensor (107, 114 engine)** | | |
| | **Sensor side (plug)** | **Harness side (receptacle)** | |
| 3 |  |  | 799-601-4180<br>(Kit: 799-601-4101)<br>(Kit: 799-601-4201) |
| | — | — | |
| **No. of pins** | **Lubricating oil pressure sensor (125, 140 engine)** | | |
| | **Sensor side (plug)** | **Harness side (receptacle)** | |
| 3 |  |  | 799-601-4150<br>(Kit: 799-601-4101)<br>(Kit: 799-601-4201) |
| | — | — | |

| | | |
|---|---|---|
| F5.8 | 5 A | Monitor |
| F5.9 | 10 A | Spare |

| Part | Name | Remark |
|---|---|---|
| BR1 | Machine select 1 | No function |
| BR2 | Machine select 2 | No function |
| BR4 | ECSS relay bypass | Set to off position for normal operation. |
| BZ1 | Buzzer | |
| R158.2 | Komtrax relay | |
| R16 | Backup alarm relay | |
| R167 | Blank | |
| R209 | Return to dig relay | |
| R235 | Driving range relay | |
| R3 | Fan drive reverse relay | |
| R31 | Air condition relay | |
| R337 | Interval relay | |
| R373.1 | Blank | |
| R373.2 | Parking brake REV relay | |
| R376 | Blank | |
| R411 | Over center valve relay | |
| R42 | ECSS relay | |
| R45 | Monitor brightness relay | |
| R56.1 | Low beam relay | |
| R56.2 | High beam relay | |
| R67 | Flasher relay | |
| ROP3 | Option relay | Relay not part of the machine. Socket can be used for individual option. |
| R51 | Blank | Not used in machine |

| Failure Code | Trouble-shooting Code | Failure (Displayed on screen) | Applicable component | History category | Remarks |
|---|---|---|---|---|---|
| #B1471 | P1471 | External Monitoring IC and CPU Fault 1 | ECU | Electrical System | Internal error of ECU |
| #B1473 | P1473 | ROM Fault | ECU | Electrical System | Internal error of ECU |
| #B1474 | P1474 | Shutoff Path Fault 1 | ECU | Electrical System | Internal error of ECU |
| #B1475 | P1475 | Shutoff Path Fault 2 | ECU | Electrical System | Internal error of ECU |
| #B1476 | P1476 | Shutoff Path Fault 3 | ECU | Electrical System | Internal error of ECU |
| #B1477 | P1477 | Shutoff Path Fault 4 | ECU | Electrical System | Internal error of ECU |
| #B1478 | P1478 | Shutoff Path Fault 5 | ECU | Electrical System | Internal error of ECU |
| #B1479 | P1479 | Shutoff Path Fault 6 | ECU | Electrical System | Internal error of ECU |
| #B1480 | P1480 | Shutoff Path Fault 7 | ECU | Electrical System | Internal error of ECU |
| #B1481 | P1481 | Shutoff Path Fault 8 | ECU | Electrical System | Internal error of ECU |
| #B1482 | P1482 | Shutoff Path Fault 9 | ECU | Electrical System | Internal error of ECU |
| #B1483 | P1483 | Shutoff Path Fault 10 | ECU | Electrical System | Internal error of ECU |
| #B1484 | P1484 | Recognition Error of Engine Speed | ECU | Electrical System | Internal error of ECU |
| #B148A | P148A | EGR Valve Sticking | ECU | Electrical System | Internal error of EGR Valve |
| #B1562 | P1562 | Charge Switch Disconnec-tion | ECU | Electrical System | Related pins at ECU: A66 |
| #B1568 | P1568 | Charge Alarm | ECU | Mechanical System | Related pins at ECU: A66 |
| #B1608 | P1608 | Excessive Voltage of Supply 1 | ECU | Electrical System | Internal error of ECU |
| #B1609 | P1609 | Sensor Supply Voltage Error 1 | ECU | Electrical System | Related pins at ECU: A44 |
| #B160E | P160E | EEPROM Memory Read Error | ECU | Electrical System | Internal error of ECU |
| #B160F | P160F | EEPROM Memory Writing Error | ECU | Electrical System | Internal error of ECU |
| #B1613 | P1613 | H Bridge Control IC (CAN Communction Error) | ECU | Electrical System | Internal error of ECU |
| #B1617 | P1617 | Insufficient Voltage of Sup-ply 1 | ECU | Electrical System | Internal error of ECU |
| #B1618 | P1618 | Sensor Supply Voltage Error 2 | ECU | Electrical System | Related pins at ECU: A45 |

| Failure Code | Trouble-shooting Code | Failure (Displayed on screen) | Applicable component | History category | Remarks |
|---|---|---|---|---|---|
| #R9Q8B | 0x8500 (11) | Speed Sensor Motor Input Fault Unknown | HST | Electrical System | Related pins at HST: 8, 10, 30 and 56 |
| #R9Q8J | 0x8500 (19) | Speed Sensor Motor Input CAN Communication Error | HST | Electrical System | Not in use |
| #R9Q8V | 0x8500 (31) | Speed Sensor Motor Input Not Available | HST | Electrical System | Related pins at HST: 8, 10, 30 and 56 |
| #R9QDB | 0x8530 (11) | Velocity Not Plausible Fault Unknown | HST | Electrical System | Related pins at HST: 8, 10, 30 and 56. In addition check the tire size and tire size compensation in the default menu. |
| #W8001 | | CAN Communication Error (SA03) Bosch Rexroth | HST | Electrical System | Missing CAN Communication between I/O Controller 64P and HST (Related pins at 64P: B7 and B6 or pins at HST: 49 and 50). |
| #W8003 | | CAN Communication Error (SA00) ECU | ECU | Electrical System | Missing CAN Communication between I/O Controller 64P and ECU (Related pins at 64P: B7 and B6 or pins at ECU: A75 and A33). |
| #W8006 | | CAN Communication Error (SA20) Komtrax | Komtrax | Electrical System | Missing CAN Communication between I/O Controller 64P and Komtrax Controller (Related pins at 64P: B5 and B4 or pins at Komtrax: A11 and A10). |
| #W8200 | | CAN Communication Error (SA17) Display | MON | Electrical System | Missing CAN Communication between I/O Controller 64P and Monitor (Related pins at 64P: B5 and B4 or pins at Monitor: 20 and 29). |
| #W8400 | | CAN Communication Error (SA82) Fan Controller | FAN | Electrical System | Missing CAN Communication between I/O Controller 64P and Fan Drive Relay (Related pins at 64P: B5 and B4 or pins at Fan Drive Relay: H and L). |
| #W8800 | | CAN Communication Error (SA1E) 64P | 64P | Electrical System | Missing CAN Communication between I/O Controller 64P and Monitor (Related pins at 64P: B5 and B4 or pins at Monitor: 20 and 29). When this error is displayed, no other error can be displayed on the monitor. |
| CA144 | | Coolant Water Temp (Low) Sensor Short Circuit | MON | Mechanical System | Related pins at I/O Controller 64P: A3 |
| CA145 | | Coolant Water Temp (Low) Sensor Open Circuit | MON | Mechanical System | Related pins at I/O Controller 64P: A3 |
| DDWCKZ | | Direction Switch Abnomality | MON | Mechanical System | Faulty plausibility check at I/O Controller 64P for MFL FNR-Switch. Related pins at I/O Controller 64P: D15 and D7 |
| DGH2KA | | Hyd Oil Sensor Open Circuit | MON | Mechanical System | Related pins at I/O Controller 64P: A4 |

# E-15 SOME ITEMS OF GAUGES AND CAUTION LAMPS ON MACHINE MONITOR ARE NOT DISPLAYED PROPERLY

| | |
|---|---|
| Failure | Some items of gauges and caution lamps are not displayed properly. |
| Related information | If mechanical system failure code is displayed, perform troubleshooting for that code first. |

| No. | Cause | Procedure, measuring location, criteria and remarks |
|---|---|---|
| 1 | Defective sensor or switch | Perform troubleshooting for failure code related to defective sensor or switch. |
| 2 | Defective CAN communication system | Perform troubleshooting for failure code related to defective CAN communication. |
| 3 | Defective 64P controller | If no failure is found by checks on causes 1 and 2, 64P controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.) |

# TROUBLESHOOTING FOR HYDRAULIC AND MECHANICAL SYSTEMS (H MODE)

## INFORMATION MENTIONED IN TROUBLESHOOTING TABLE (H MODE)

The following information is summarized in the troubleshooting table. Before performing troubleshooting, understand that information fully.

<table>
<tr><td colspan="2">Failure</td><td>Failure symptom that appears on machine</td></tr>
<tr><td colspan="2">Related information</td><td>Information on occurred failure or troubleshooting</td></tr>
<tr><td>No.</td><td>Cause</td><td>Procedure, measuring location, criteria and remarks</td></tr>
<tr><td>1</td><td rowspan="5">Probable cause of failure<br>(Each number is serial number,<br>not priority sequence.)</td><td rowspan="5"><Contents of description><br>• Criteria to determine probable causes<br>• Remarks for determination of probable cause</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
</table>

# S-1 ENGINE DOES NOT CRANK WHEN STARTING SWITCH IS TURNED TO START POSITION

| Failure | Engine does not crank when starting switch is turned to "START" position |
|---|---|
| Related information | • See E-mode in "ENGINE DOES NOT START (ENGINE DOES NOT CRANK)" for electrical system troubleshooting<br>• If any failure code is displayed, perform troubleshooting for that code first. |

| No | Cause | Point to check, remarks | Remedy |
|---|---|---|---|
| 1 | Defective starting circuit wiring system | When starting switch is turned to START, starting motor pinion does not pop out. | Perform troubleshooting of “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E mode, and take corrective action. |
| 2 | Defective starting motor (safety relay portion) | • Starting motor pinion makes grating noise (When starting switch is turned to START position, starting motor pinion pops out).<br>• Starting motor pinion comes off halfway (When starting switch is turned to START position, starting motor pinion pops out).<br>• Starting motor makes flapping sound and does not turn (When starting switch is turned to START position, starting motor pinion protrudes) (Reference: “Flapping sound” means sound made when starting motor pinion pops in and out) | Perform troubleshooting of “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E mode, and take corrective action. |
| 3 | Breakage of flywheel ring gear | If starting motor pinion makes grating noise and the starting motor does not turn, visually check the flywheel ring gear. | Replace if the item is broken |
| 4 | A crack on the EGR cooler (Reference: coolant contained in exhaust) | Disconnect the inlet and outlet gas piping of EGR cooler to check if water containing coolant is draining.<br>**REMARK**<br>Moisture in exhaust gas may be condensed, but this is not a failure. Check if it is coolant or not. | After EGR cooler replacement, drain the water in the engine cylinder. |

| No | Cause | Point to check, remarks | Remedy |
|---|---|---|---|
| 19 | Defective valve clearance | • When engine is operated, unusual noise is heard from around cylinder head.<br>• Check valve clearance. | Valve clearance adjustment |
| 20 | Defective injector | • A low-temperature cylinder is found when touching the exhaust manifold right after the engine starts.<br>• A cylinder running at the unchanged speed is found during operation in the cylinder cut-out mode.<br>**REMARK**<br>If a black smoke is seen continuously during warm-up operation after storage for a few days, injector may be defective. | Replace injector. |
| 21 | Defective engine controller | In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly. | Engine controller replacement |
| 22 | Defective contact of valve and valve seat | • Measure compression pressure (See Standard value table).<br>• Check valve clearance | Valve or valve seat repair or replacement |
| 23 | Defective piston ring | • Remove plug of bore for measuring the exhaust gas color in front of DOC, and check color of the exhaust gas coming out of the bore.<br>• Measure compression pressure (See standard value table).<br>• Check piston ring and piston ring groove. | Piston ring and piston replacement |

# S-17 COOLANT TEMPERATURE RISES TOO HIGH (OVERHEATING)

| Failure | Coolant temperature rises too high (overheating) |
|---|---|
| Related information | If any failure code is displayed, perform troubleshooting for that code first. |

| No. | Cause | Point to check, remarks | Remedy |
|---|---|---|---|
| 1 | Clogged radiator core | Check for clogging of radiator core and crushing of fin. | Cleaning of radiator core |
| 2 | Malfunction of thermostat | Thermostat does not open at cracking temperature.<br>**REMARK**<br>Opening temperature: 82 °C) | Thermostat replacement |
| 3 | Defective coolant temperature gauge | The error is detected in coolant temperature gauge system, but measured coolant temperature in radiator is normal. | Coolant temperature sensor monitor or wiring harness replacement |
| 4 | Increase of fuel injection amount | Fuel injection amount is excessive. | Perform troubleshooting of “FUEL CONSUMPTION IS EXCESSIVE” in S mode and take corrective action. |
| 5 | Low coolant level | Check coolant level for decrease. | Refilling with coolant |
| 6 | Coolant leakage | Check coolant piping for coolant leakage. | Coolant piping replacement |
| 7 | Broken water pump | Visually check water pump (check of water leakage through shaft seal, breakage of impeller, breakage of shaft) | Water pump replacement |
| 8 | Overheat due to increase in EGR ratio (EGR amount against fresh air intake amount) caused by defective mass air flow and temperature sensor | Check for defective mass air flow and temperature sensor. | Mass air flow and temperature sensor replacement |
| 9 | Overheat caused by increase of EGR ratio (quantity of EGR to fresh intake air) caused by deformation of air cleaner | Check air cleaner and rectifying wire net for deformation. | Air cleaner repair or replacement |
| 10 | Defective cylinder head or head gasket | Check if there are many bubbles in radiator and if coolant blows back. | Perform troubleshooting of “OIL IS IN COOLANT” in S mode and take corrective action. |
| 11 | Defective piston ring | • Remove plug of bore for measuring the exhaust gas colour in front of DOC and check colour of the exhaust gas coming out of the bore. (Reference: See TESTING AND ADJUSTING “TEST EXHAUST GAS COLOR”)<br>• Measure compression pressure (See standard value table). (Reference: See “TESTING AND ADJUSTING”, “Testing compression pressure”.)<br>• Check piston ring and piston ring groove. | Piston ring and piston replacement |

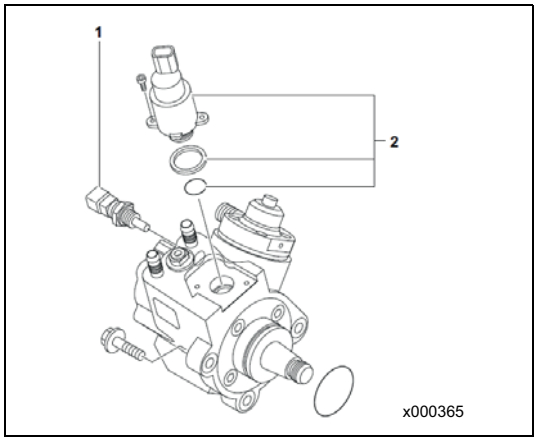
| Abbreviation | Actual word spelled out | Purpose of use (major applicable machine (*1), or component/system) | Explanation |
|---|---|---|---|
| SCR | Selective Catalytic Reduction | Urea SCR system | This is an exhaust gas purifier using urea water that converts nitrogen oxides (NOx) into harmless nitrogen and water by oxidation-reduction re- action. It may also be mentioned as exhaust gas purification catalyst or part of the name of related devices. |
| SI | Le Systeme International d' Unites (International unit system) | Unit | Abbreviation for "International System of Units" It is the universal unit system and "a single unit for a single quantity" is the basic principle applied. |
| SOL | Solenoid | Electrical system | This is an actuator that consists of a solenoid and an iron core that is operated by the magnetic force when the solenoid is energized. |
| TOPS | Tip-Over Protective Structure | Cab and canopy | This is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine tips over. (Roll-over protective structure of hydraulic excavator) This performance is standardized as ISO 12117. |
| TWV | 2-Way Valve | Hydraulic system | This is a solenoid valve that switches over direction of flow. |
| VGT | Variable Geometry Turbocharger | Engine | This is a turbocharger on which the cross-section area of the exhaust passage is variable. |
| VHPC | Variable Horse Power Control | Engine control | This is a function that finely controls the maximum output of the machine so that high work efficiency and low fuel consumption rate are both achieved. |

5. Reinstall the fuel filter.

   Bolts M10: 35-43Nm (25.8-31.7 ft*lb, 3.6-4.4 kgf*m)
6. Reinstall the common rail and the return pipe from the injector.
7. Reinstall the return pipe from the supply pump.
8. Reinstall the fuel supply pipe (supply pump inlet) from the fuel filter.
9. Reinstall the wiring coupler of the fuel temperature sensor.
10. Reinstall the wiring coupler of the SCV.

**NOTE**
Be sure to perform priming the engine before starting. If air is mixed to the fuel, seizure to the supply pump and the injector may result.

11. Replace attached parts of the supply pump Spare parts for the fuel temperature sensor (1) and the fuel metering valve (suction control valve) (2) are available for replacement. See the below table for the part number and the tightening torque.



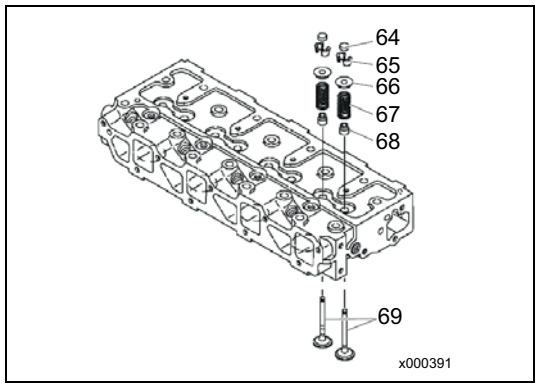

| Part name | Part No. | Tightening torque |
|---|---|---|
| Fuel temperature sensor (with gasket) | 129A00-51200 | 19.2 - 22.1 ft·lb (26 - 30 N·m; 2.7 - 3.1 kgf·m) |
| Fuel metering valve (suction control valve) (with seal ring and O-ring) | 129A00-51100 | 2.2 - 3.0 ft·lb (3.0 - 4.0 N·m; 0.31 - 0.41 kgf·m) |
| Fuel metering valve seal ring | 129A00-51110 | – |
| Fuel metering valve O-ring | 129A00-51120 | – |
| Fuel metering valve fixing bolt | 129A00-51130 | – |

4. Place all the valves (69) in their proper location in the cylinder head.

5. Place the cylinder head on the workbench with the combustion side down to install the valve springs. Install the valve spring (67) and the spring retainer (68).

6. Using the valve spring compressor tool, compress the valve spring.

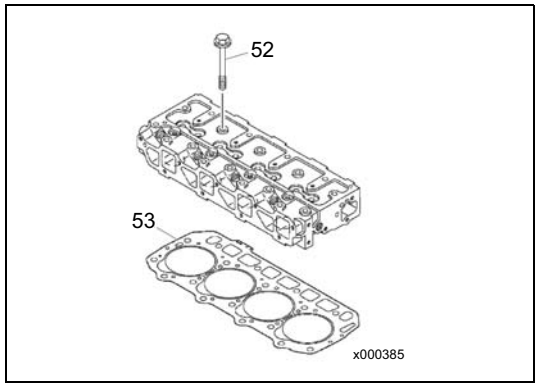
7. Insert the valve keepers (65) and slowly release the tension on the valve spring. Install the valve cap (64). Repeat the steps on all the remaining valves.




### 3. Reassembly of cylinder head

1. Carefully clean both the combustion surface of the cylinder head and the top surface of the cylinder block. Then place a new cylinder head gasket (53) on the cylinder block.

2. Position the cylinder head on the cylinder head gasket.



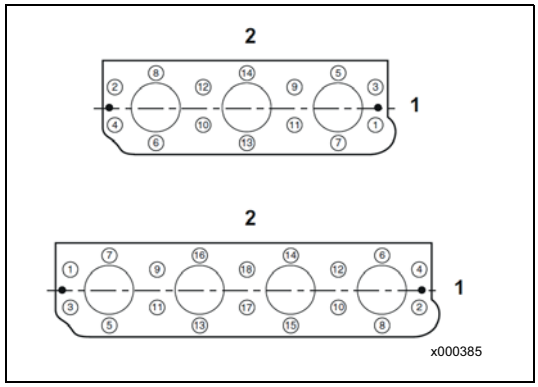

3. Lightly oil the threads of the cylinder head bolts (52). Tighten the bolts to the specified torque in two steps as shown in the chart below. Tighten in the sequence shown in the picture on the right.

   - First step: half of final torque
   - Second step: final torque

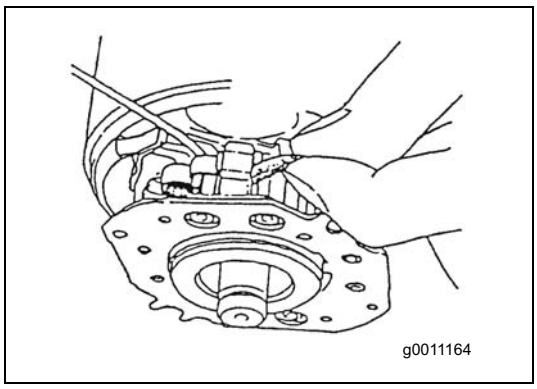
4. Insert the push rods in their respective positions.

   1: Fan end

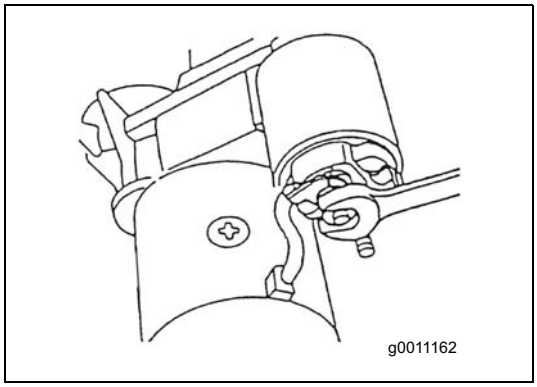
   2: Camshsaft side



8. Position the brush springs in brush holders. Reinstall the brushes in the brush holders. Reversing the brushes will cause the starter motor to turn backwards.

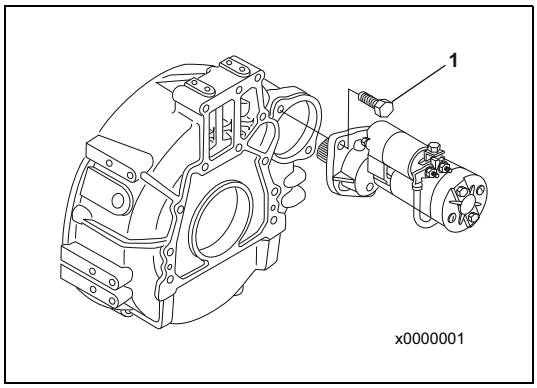



9. Carefully install the brush holder assembly to the armature assembly.
10. Reinstall the field coil assembly with the armature assembly to the gear housing.
11. Reinstall the rear cover to the brush holder assembly. Securely tighten the two bolts.
12. Reinstall the two M4 through bolts. Securely tighten the through bolts. Reconnect the wire to the magnetic switch assembly. Tighten the M8 nut. Reinstall the cover over the connection.




## Install the Starter Motor

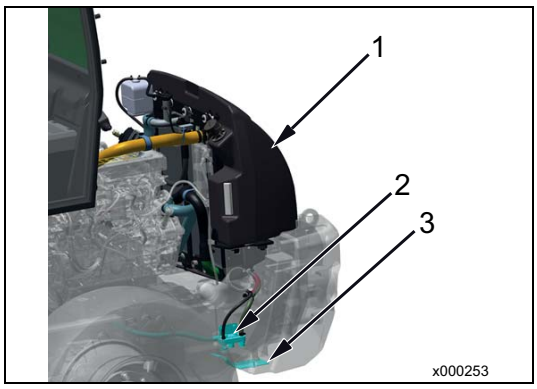
1. Reinstall the starter motor to the flywheel housing.
2. Reinstall the starter mounting bolts (1).
3. Reconnect the electrical wires to the magnetic switch assembly (solenoid). Be sure to place the cover over the battery positive (+) cable connection.

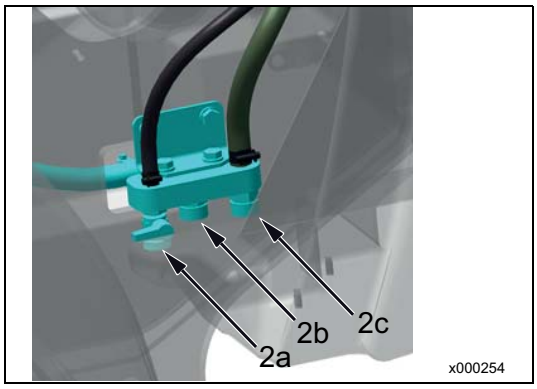


**2. Drain the hydraulic oil from the radiator**

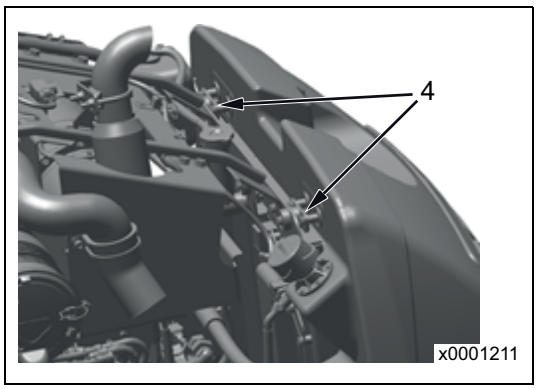
Total hydraulic oil: 80l
Hydraulic oil in tank: approx. 45l

1. Unscrew three bolts and remove (3) cover.
2. Screw a drain hose onto the drain valves and open the drain valves for coolant (2a), engine oil (2b) and hydraulic oil (2c).
3. Close the hydraulic lines and coolant lines immediately with a plug in order to prevent vapours from exiting and to prevent any dirt and foreign particles from entering. Remove air filter assembly.



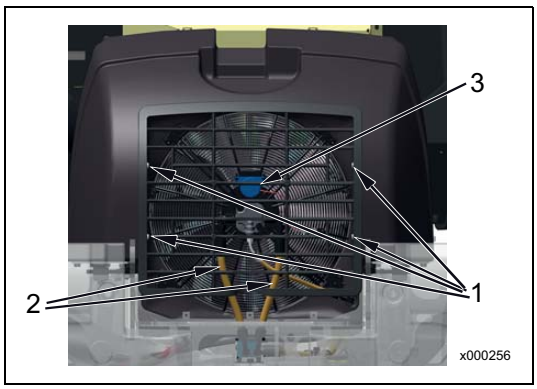

4. Remove the bolts (4).




**3. Remove hydraulic and coolant hoses**

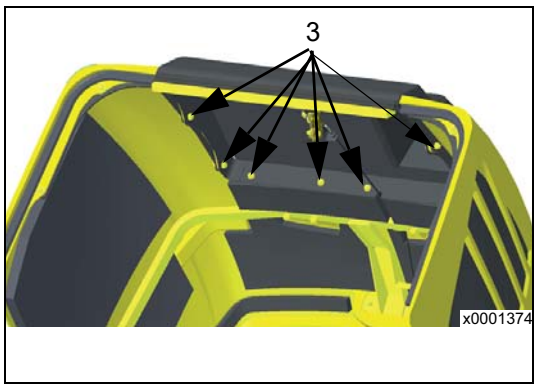
Allow residual oil and coolant will flow out of the radiator.

1. Loosen the four screws (1) and remove the radiator guard.
2. Disconnect the both hydraulic hoses (2) from the fan drive.
3. Disconnect the connector (3) from the backup buzzer.



3. Loosen the fastening screws (3) and remove the steel hood (1).

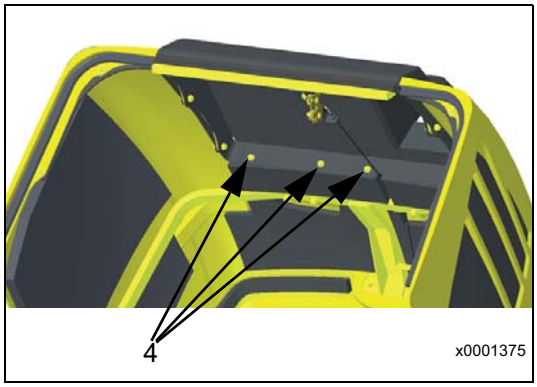
   Steel hood: 9 kg




## Installation of steel hood

1. Open the engine hood and secure it against falling down by means of a support rod.
2. Tighten all fastening screws (3) slightly. To make sure to achieve the smallest possible gap between front side of steel hood (1) and plastic hood (2) the 4 screws (4) have to be tightened first. Then finally tighten the other screws.

   Screws: 27-34Nm (2.75-3.47kgm)

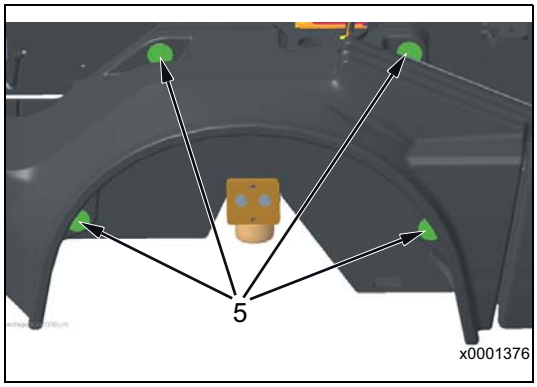



## Removal of engine hood assembly

- **Park the machine on level ground and secure it against rolling away and jack-knifing!**
- **Lower the bucket, switch the engine off and actuate the parking brake!**

1. Remove the counterweight.
2. Open the engine hood and secure it against falling down by means of a support rod.
3. Loosen the eight fastening screws (5) on both sides and remove the both fenders.

   Screws: 59 - 74 Nm (6.01 - 7.54 kgm)



Adjust the air conditioner belt. For details See "TEST AND ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION" on page 50-35.

## REMOVE AND INSTALL AIR CONDITIONER CONDENSER ASSEMBLY

- **Place the machine on a level ground and set the parking brake switch to ON position.**
- **Set the frame lock bar to LOCK position and chock the tires.**
- **Lower the work equipment to the ground and set the work equipment lock switch to LOCK position.**
- **Turn the starting switch to OFF position to stop the engine.**
- **Turn the battery disconnect switch to OFF position and remove the key.**
- **Ask a qualified person for collecting, adding, and filling operations of the refrigerant. (Only qualified persons can work.)**
- **Never release the refrigerant to the atmosphere.**
- **If refrigerant gas gets in your eyes, you may lose your eye sight. And if it touches your skin, you may suffer from frostbite. Accordingly, put on the protective eyeglasses, gloves, and working clothes with long sleeves while you are collecting or filling with the refrigerant.**

**NOTE**
Check the connector numbers and installed positions before disconnecting the wires and hoses and write them down.

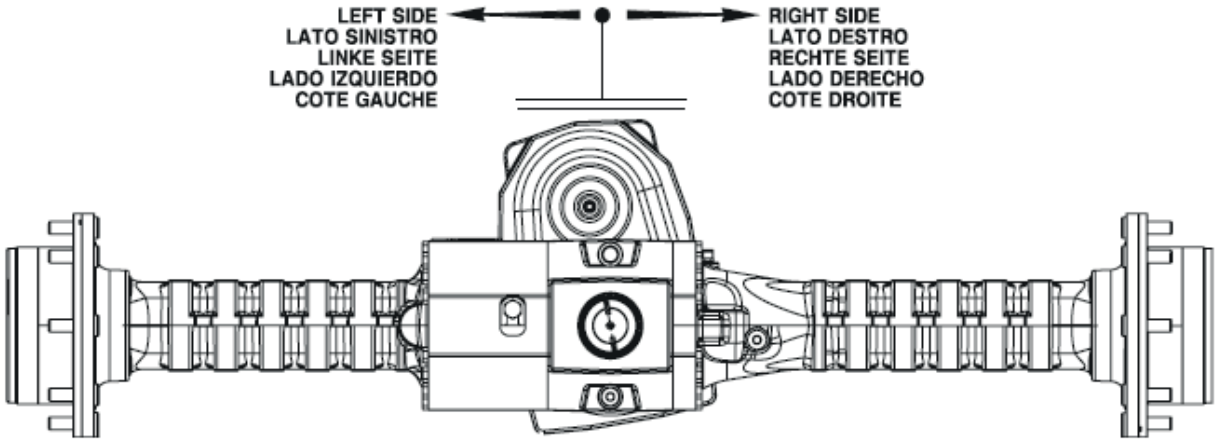
**NOTE**
When disconnecting the wires and hoses, take extreme care not to damage or deform the wires and hoses by the clips and clamps. If the wires or hoses may be damaged or deformed, remove the clips and clamps before starting the work.

# GEARBOX (TRANSFER ASSEMBLY)

## PRECAUTIONS FOR ASSEMBLY AND DISASSEMBLY

## SPECIFICATIONS

### DEFINITION OF VIEWPOINTS




### DATA PLATE


**1** - Model number
**2** - Reduction ratio
**3** - Serial number
**4** - Axle number

x0001333

AREXONS (REPOSITIONABLE JOINTING COMPOUND FOR SEALS)

Solvent-based sealing compound for elastic seals, drying through evaporation. Used for sealing the outer diameter of sealing rings for rotating shafts with outer metal reinforcement.

SILICONE

Semi-fluid adhesive material used for sealing and filling and to protect components from environmental and physical elements. Polymerises with non-corrosive dampness.

TECNO LUBE/101 (SILICONE-BASED GREASE)

Highly adhesive synthetic grease, with silicone compounds added.
Applied to adjustment screws with hole communicating with oil-type fluids.
Used when frequent adjusting is required.

MOLIKOTE (DOW CORNING)

Lubricating compound containing molybdenum disulphide, used to lubricate articulation pins and to prevent sticking and oxidation of parts that are not lubricated on a regular basis.

(LITHIUM-BASED) GREASE

Applied to bearings, sliding parts and used to lubricate seals or parts during assembly.

## SAFETY PRECAUTIONS

1 - During all operations described in this manual, the axle should be fastened onto a trestle, while the other parts

mentioned should rest on supporting benches.

2 - When removing one of the arms, an anti-tilting safety trestle should be placed under the other arm.

3 - When working on an arm that is fitted on the machine, make sure that the supporting trestles are correctly positioned

and that the machine is locked lengthways.

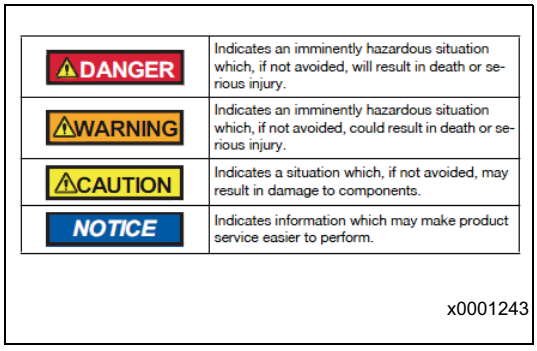
4 - Do not admit any other person inside the work area; mark off the area, hang warning signs and remove the ignition

key from the machine.

5 - Use only clean, quality tools; discard all worn, damaged, low-quality or improvised wrenches and tools. Ensure that all dynamometric wrenches have been checked and calibrated.

6 - During maintenance operations, always wear protective glasses, safety footwear, protective gloves and all P.P.E. (Personal Protective Equipment) in function of the risks which the workers may be exposed to.

7 - Should you stain a surface with oil, remove marks straight



## Disassembly

**⚠CAUTION**

Before draining oil, release the internal pressure, for details see OIL DRAINING p. 17.

**⚠CAUTION**

Make sure all fluids are contained during inspection, maintenance, tests, adjustment and repair of the product. Prepare a suitable container to collect the fluid before removing any component containing fluids. Dispose of all fluids following legal and local regulations.

**⚠CAUTION**

Hot oil and components can cause personal injury. Avoid skin contact.

**⚠CAUTION**

Perform all operations on both arms.

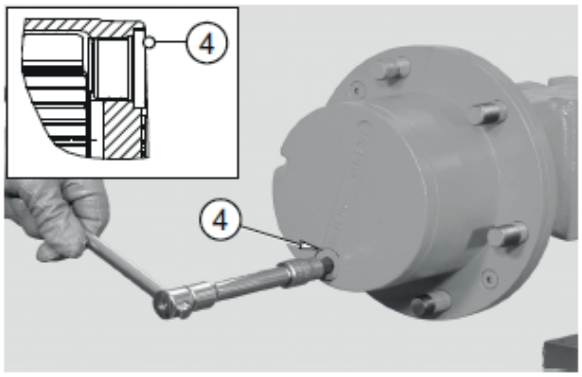



**FIGURE 1:** Remove the oil - level plug (4).

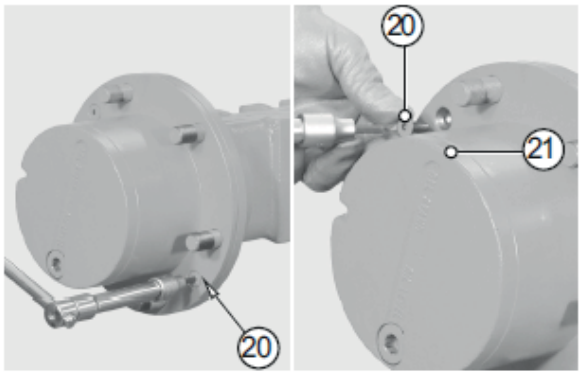



**FIGURE 2:** Remove the securing screws (20) from the spider cover (21).

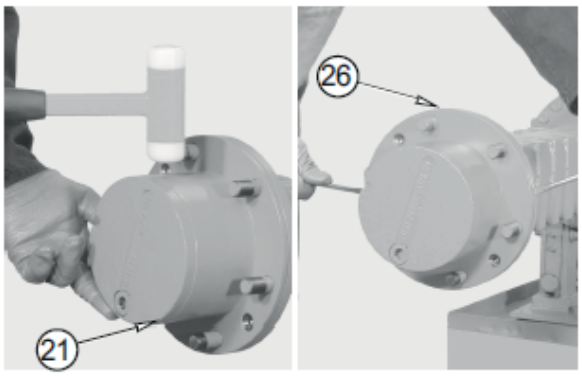



**FIGURE 3:** Disjoin the spider cover (21) from the hub (26) by alternatively forcing a screwdriver into the appropriate slots.

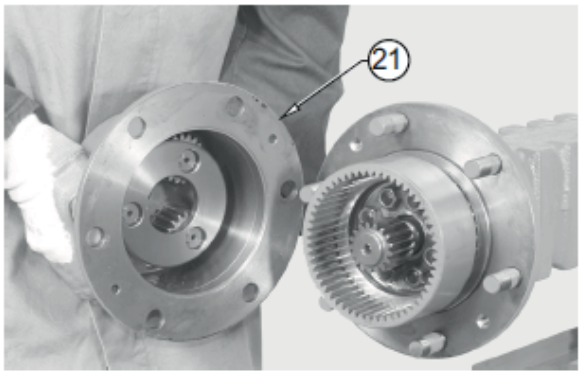



**FIGURE 4:** Remove the complete planetary carrier cover (21).

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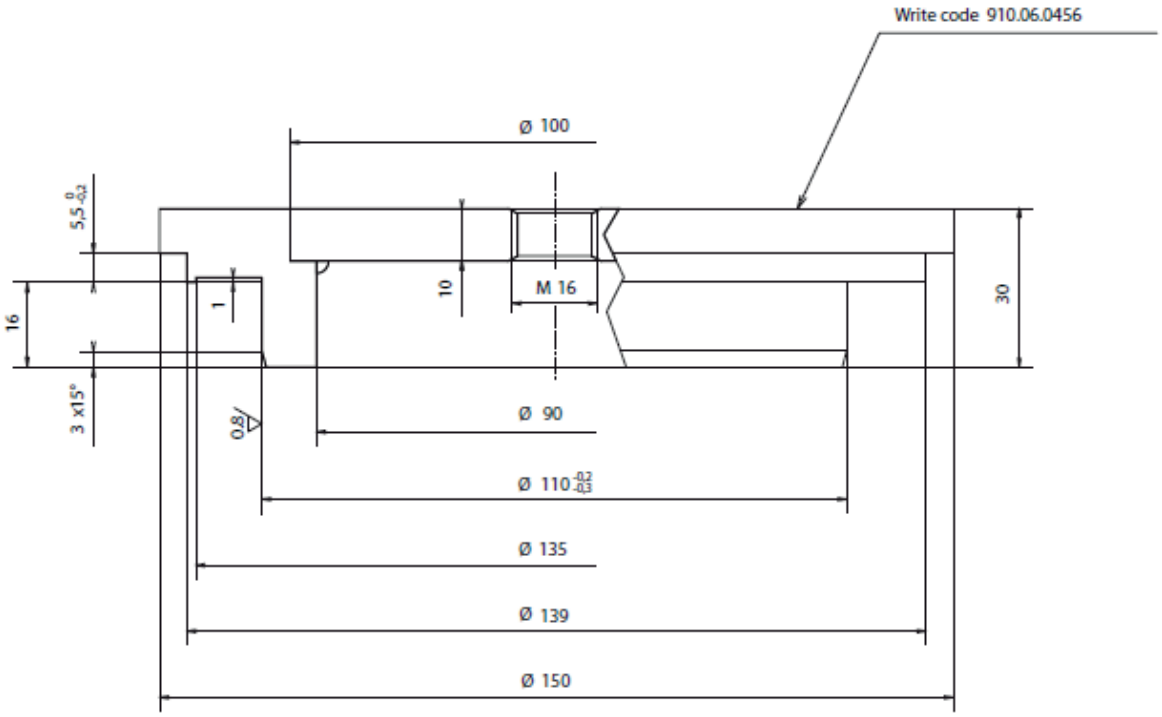
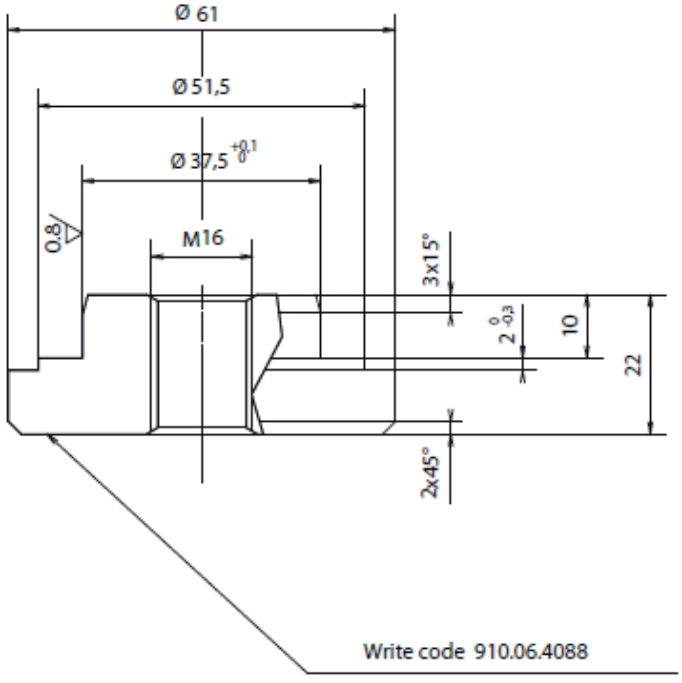
## T2

**P/N:** 910.06.0456




## T3

**P/N:** 910.06.4088

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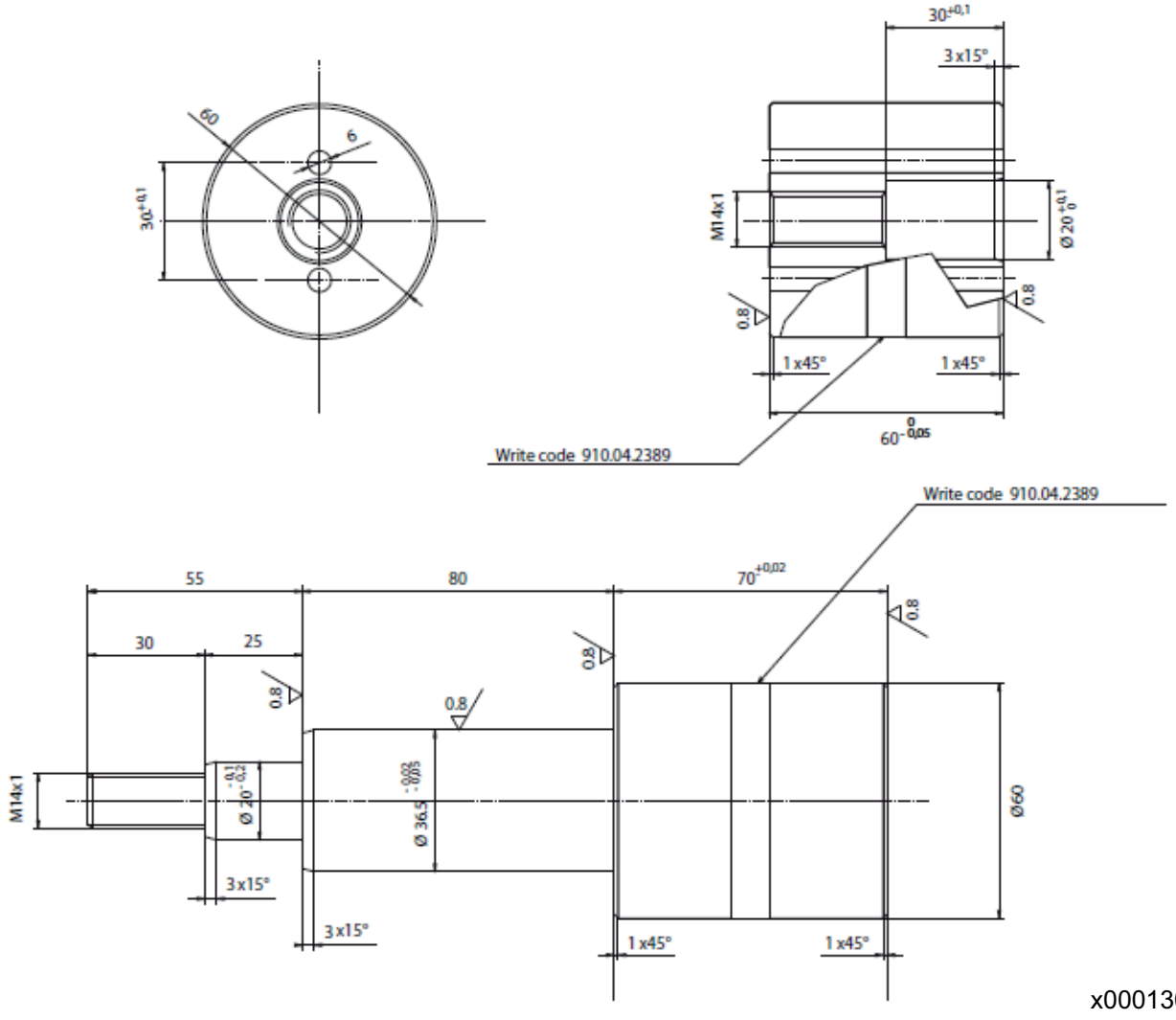
## T3

**P/N:** 910.04.2389




x0001303

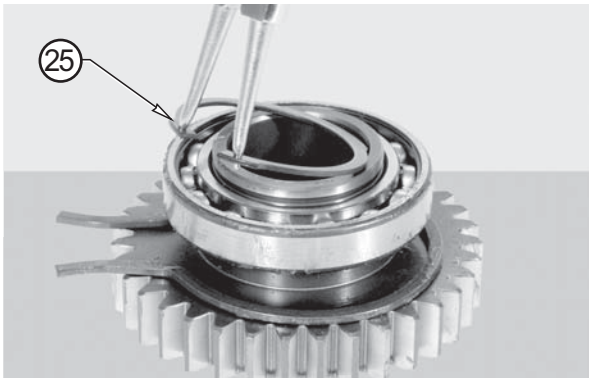



FIGURE 17: Remove the snap ring (25).

**⚠WARNING**

Removal of the snap rings can cause personal injuries. You must wear appropriate safety equipment. To avoid injury to eyes, wear eye protection equipment.

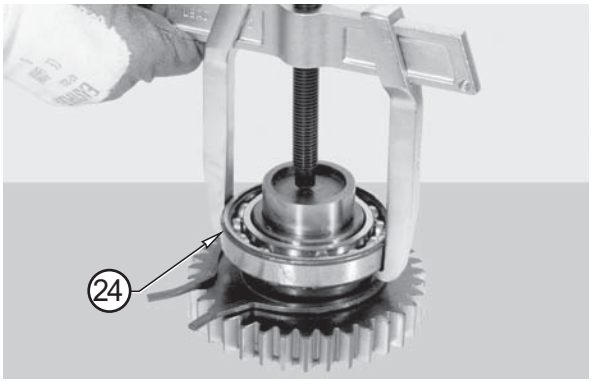



FIGURE 18: With a puller, remove the bearing (24) from the input shaft (18).

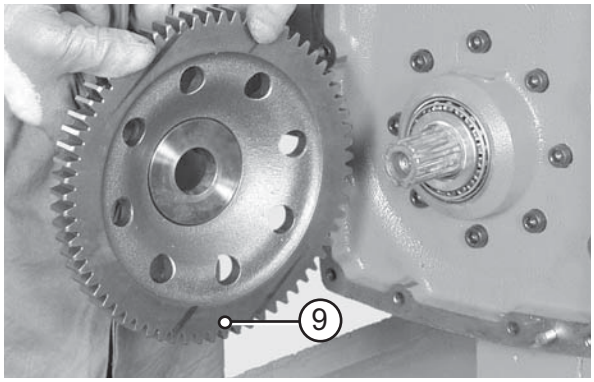



FIGURE 19: Remove the flange and secondary gear wheel (9) using two levers.

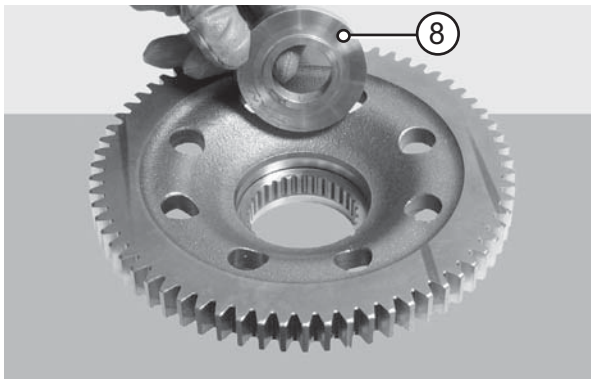
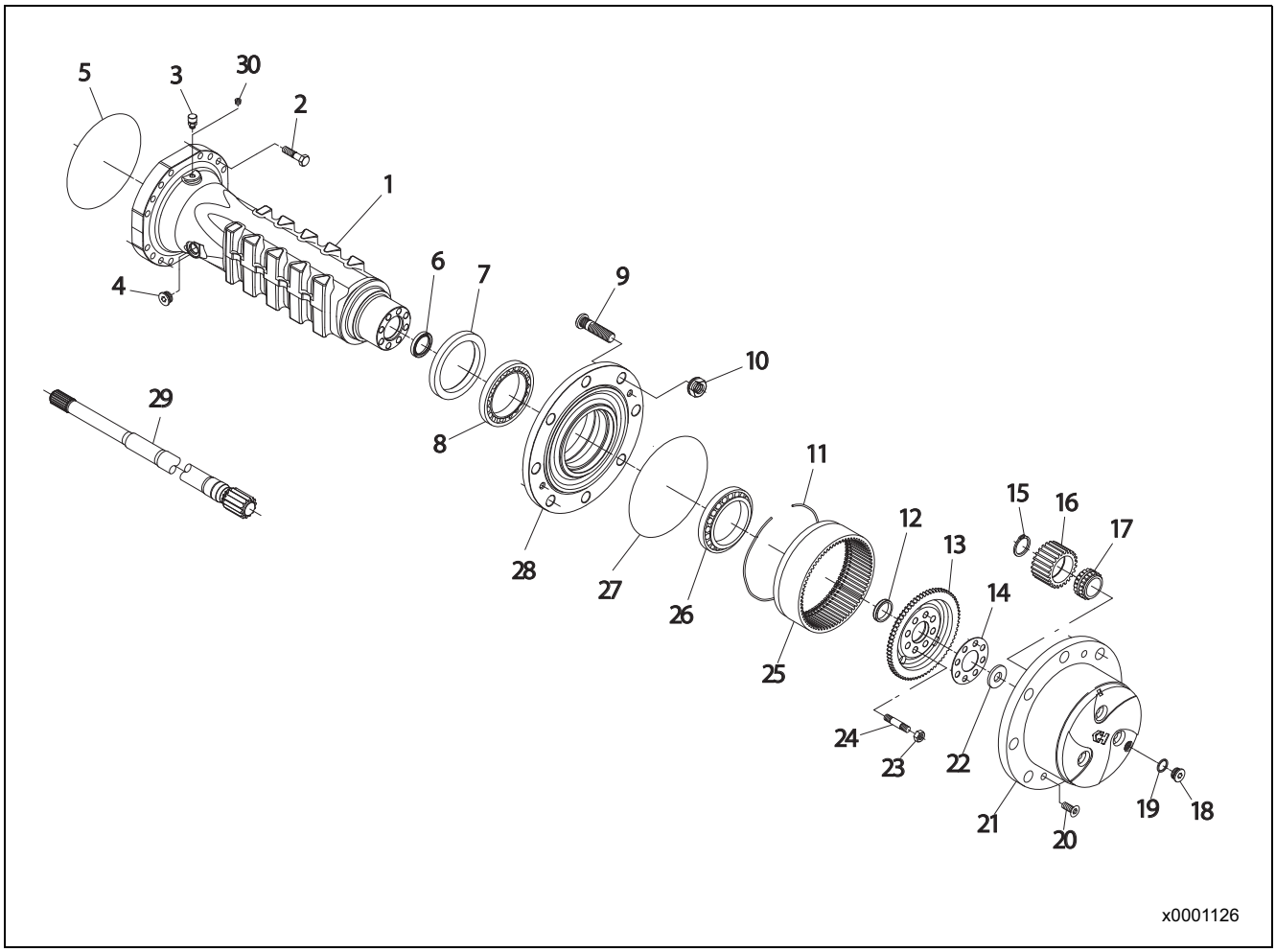



FIGURE 20: Remove the center ring (8).

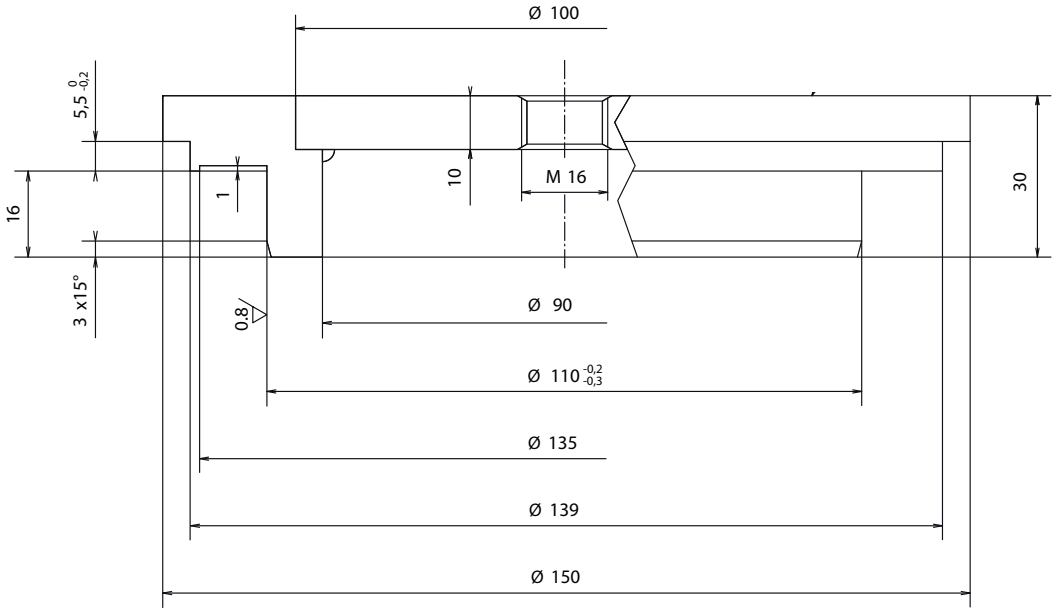
x0001120

# PLANETARY REDUCTION AND AXLE SHAFT

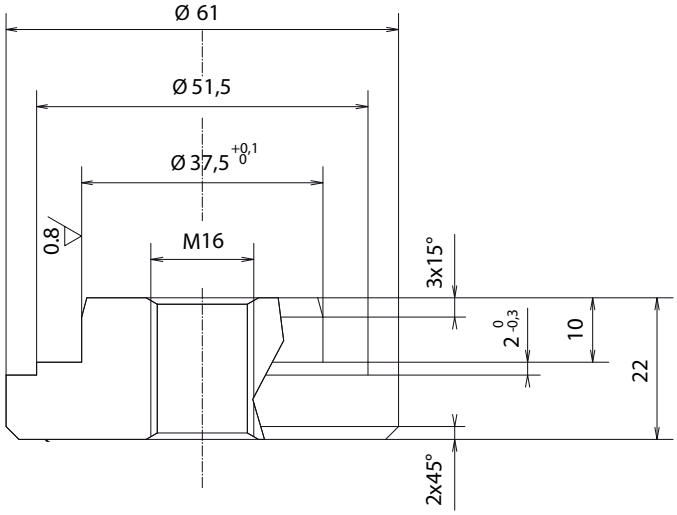
## Exploded view



T2




T3




x0001136

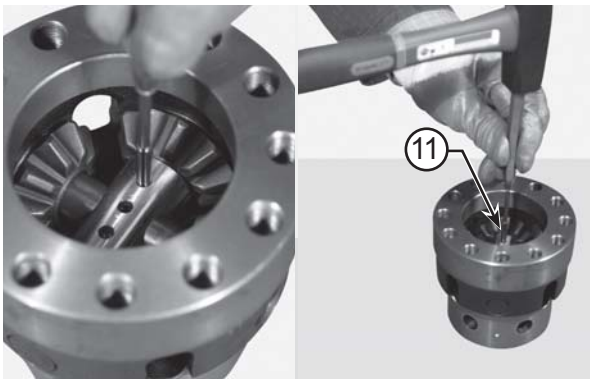



FIGURE 19: Bring the pin holes in line with the help of a pin - driver.
Insert pins (11) to end of stroke.

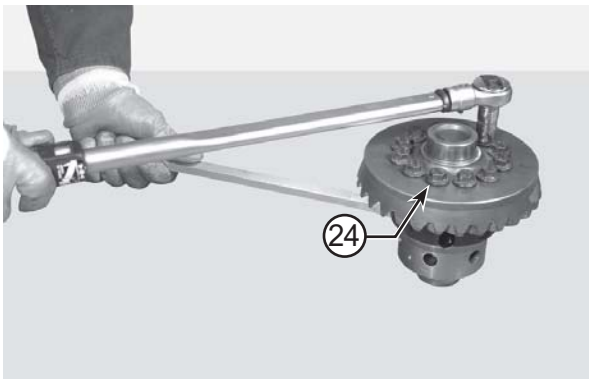



FIGURE 22: Tighten the capscrews of the crown wheel using the criss-cross method.
Torque wrench setting: 78 - 86 N·m

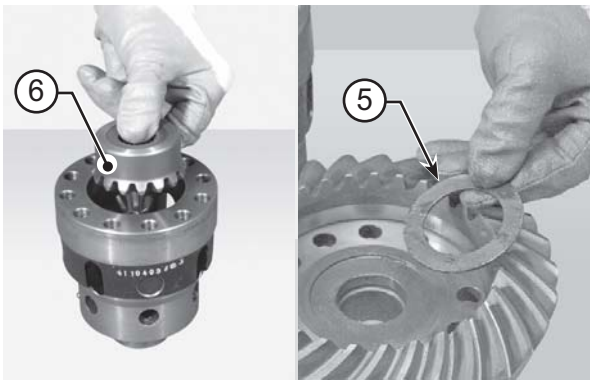



FIGURE 20: Insert planetary gear wheel (6).
Position the shim washer (5) on the crown (13).

NOTE:

In order to hold the shim was her (5) in position, apply grease to it.


FIGURE 21: Install the crown wheel (13).

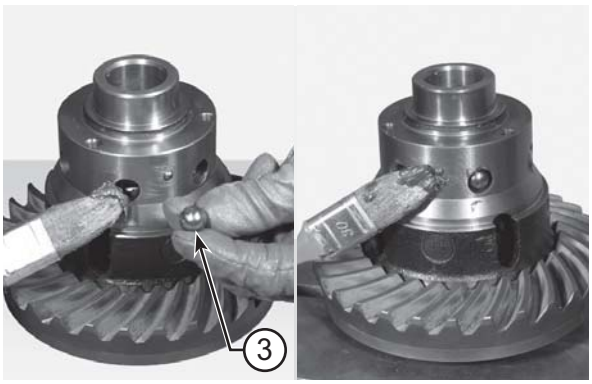



FIGURE 23: Grease and insert balls (3).

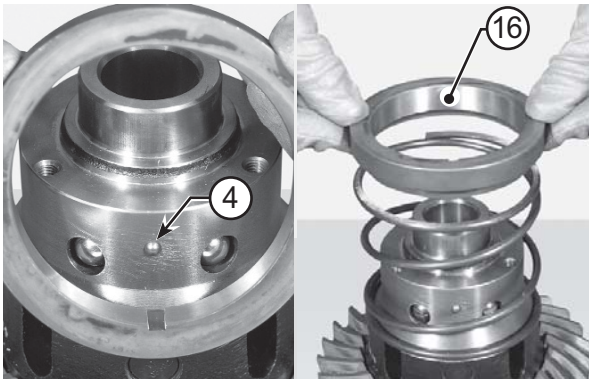



FIGURE 24: Verify the position of the slot that fits the coupling (16) to the fixing ball (4).

x0001146

# PRECAUTIONS FOR ASSEMBLY AND DISASSEMBLY OF AXLE COMPONENTS

## Safety precautions

1. During all operations described in this manual, the axle should be fastened onto a trestle, while the other parts mentioned should rest on supporting benches.

2. When removing one of the arms, an anti-tilting safety trestle should be placed under the other arm.

3. When working on an arm that is fitted on the machine, make sure that the supporting trestles are correctly positioned and that the machine is locked lengthways.

4. Do not admit any other person inside the work area; mark off the area, hang warning signs and remove the ignition key from the machine.

5. Use only clean, quality tools; discard all worn, damaged, low quality or improvised wrenches and tools. Ensure that all torque wrenches have been checked and calibrated.

6. Always wear gloves and non-slip rubber shoes when performing repair work.

7. Should you stain a surface with oil, remove marks straight away.

8. Dispose of all lubricants, seals, rags and solvents once work has been completed. Treat them as special waste and dispose of them according to the relative law provisions obtaining in the country where the axles are being overhauled.

9. Make sure that only weak solvents are used for cleaning purposes; avoid using turpentine, dilutants and toluol, xylol-based or similar solvents; use light solvents such as Kerosene, mineral spirits or water-based, environment friendly solvents.

10. For the sake of clarity, the parts that do not normally need to be removed have not been reproduced in some of the diagrams.

11. After repair work has been completed, accurately touch up any coated part that may have been damaged.

12. Before draining oil it is mandatory to loosen the oil filling plug or the breather (if present), and wait until the internal pressure is completely released. Remove the oil draining plug and drain oil only when the pressure is completely released.

## Lubricant & Sealant specifications

1 - Locking, sealing and lubricating materials referred to in this manual are the same used in the shop-floor.

2 - The table below gives an account of the typical applications of each single material, in order to facilitate replacement with

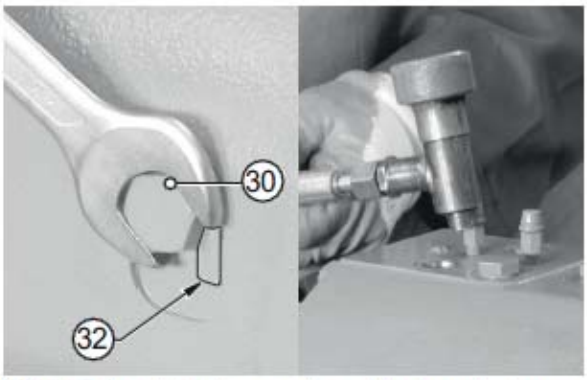



**FIGURE 4:** Insert block screws to end stroke and release pressure. Gradually loosen the sleeve and remove.

**DANGER**

Carefully check that the hydraulic pressure is discharged completely before removing the external pump sleeve connected to the brake.

**FIGURE 5:** Remove the screws of the planetary gearbox cover on the brake side.
Remove the planetary gearbox cover.

**FIGURE 6:** Remove the axle half shaft.

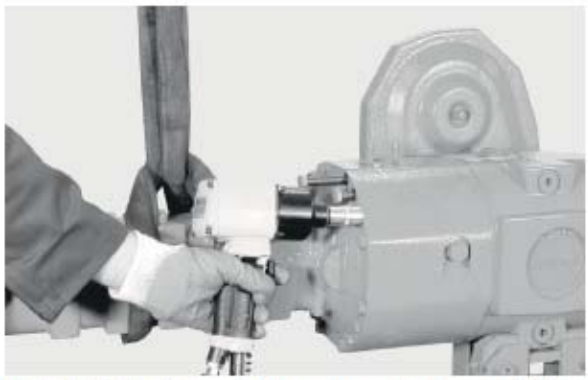


**FIGURE 7:** Sling the arm to be removed and connect it to a hoist. Remove screws.

**FIGURE 8:** Take off the arm and lay it down vertically


**FIGURE 9:** In order to keep the disc springs of the negative brake preloaded, tighten the screws with washers to the end stop.

X0001251

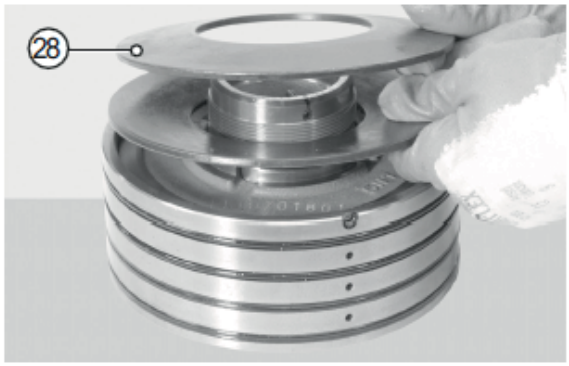



**FIGURE 60:** Insert the disc springs in the right position (28).

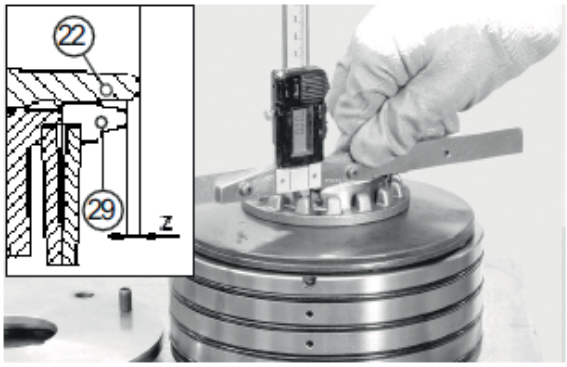



**FIGURE 63:** Check the earlier measured distance Z from the plane to the tooth next to the pin.

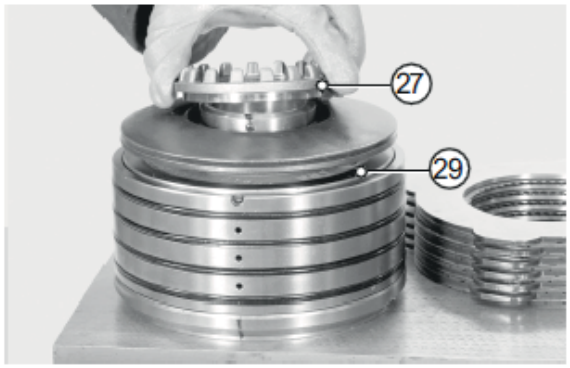



**FIGURE 61:** Insert at the bottom the piston of the negative brake (27) and tighten up the slotted nut (29).

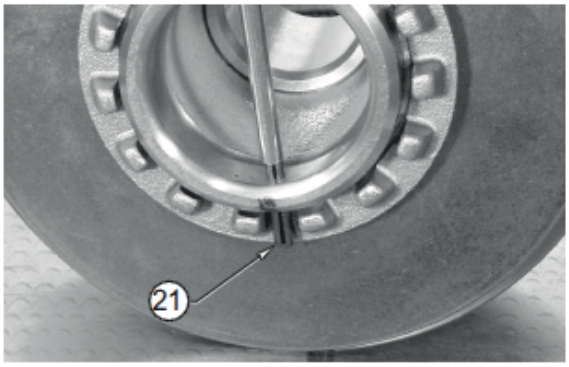



**FIGURE 64:** Put the pin in locking (21) position.

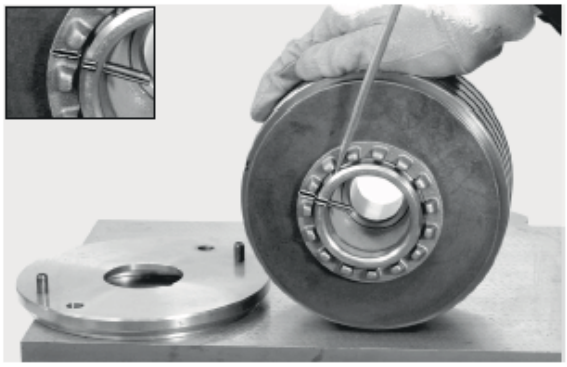


**FIGURE 62:** Tighten down the slotted nut to the earlier determined position.

**FIGURE 65:** Insert two screws of M12 to fix the break arm.

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**FIGURE 12:** Remove the planetary gear (22) with washer (23).

x0001270

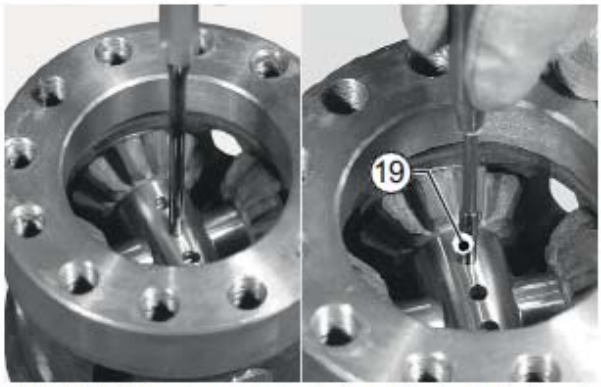



**FIGURE 19:** Bring the pin holes in line with the help of a pin - driver.
Insert pins (19) to end of stroke.


**FIGURE 20:** Insert and replace, if necessary, the discs of the differential lock (24, 25).
In case of new discs pack (as spare part), dip the complete disc pack in oil (with LS additive) at least 8 hours (plus 2 dripping hours) before assembly, for details about oil see MAINTENANCE INTERVALS p. 20

**⚠CAUTION**

First and last disc have to be of steel (25).


**FIGURE 21:** Install the thrust block with maximum internal diameter.
Position the bearing (26) in the differential unit.
Install the thrust block with minimum internal diameter.


**FIGURE 22:** Insert the snap ring (27).

**⚠WARNING**

Personal injury can result when installing snap ring. The appropriate safety equipment must be worn. To avoid injury to your eyes, wear protective glasses during this procedure.


**FIGURE 23:** As to ring (33), the side without notches must face outwards.

x0001287

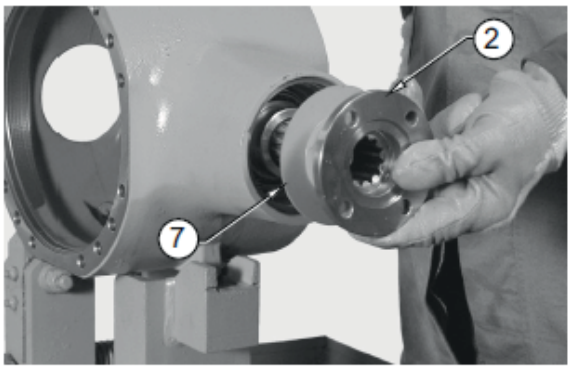



**FIGURE 29:** Install the flange (2) onto the pinion (11) without the sealing ring.

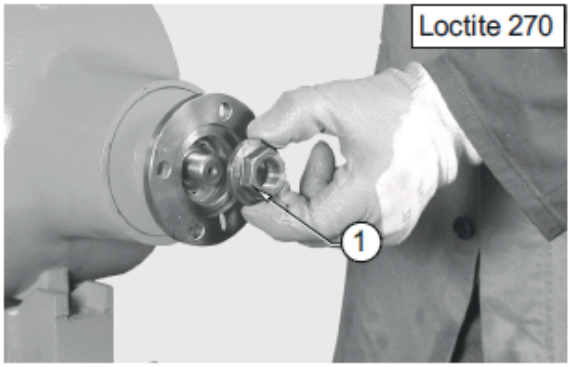



**FIGURE 30:** Install the nut (1) without Loctite 270.

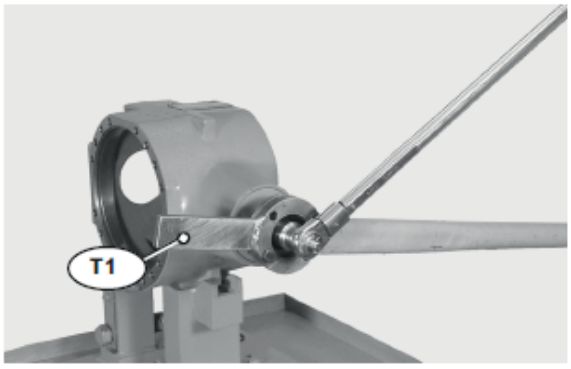



**FIGURE 31:** Lock the wrench T1 (See drawing T1 p. 258), rotate the pinion using a dynamometric wrench, up to a minimum required torque setting of 260 N-m.

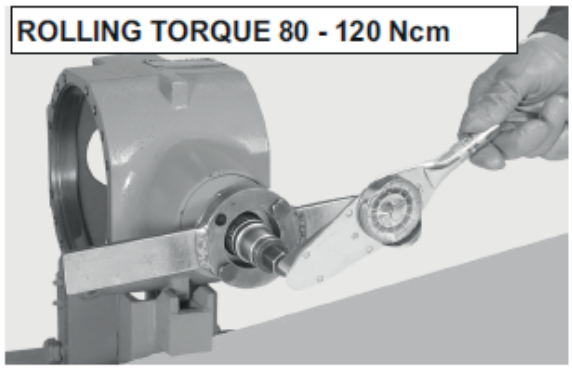



**FIGURE 32:** Apply onto the pinion (1) the bar - hold and with the help of a torque meter, check the torque of the pinion (1). Torque: 80 - 120 N-cm

**⚠CAUTION**

If torque exceeds the maximum value, then the size of shim "S1 " (4) between the bearing (9) and the spacer (3) needs to be increased.

If torque does not reach the set value, increase the torque setting of the ring nut (10) in different stages to obtain a maximum value of 300 N-m.

If torque does not reach the minimum value, then the size of shim "S1 " (4) needs to be reduced.

When calculating the increase or decrease in size of shim "S1 ", bear in mind that a variation of shim of 0.01 mm corresponds to a variation of 60 N-cm in the torque of the pinion (1).

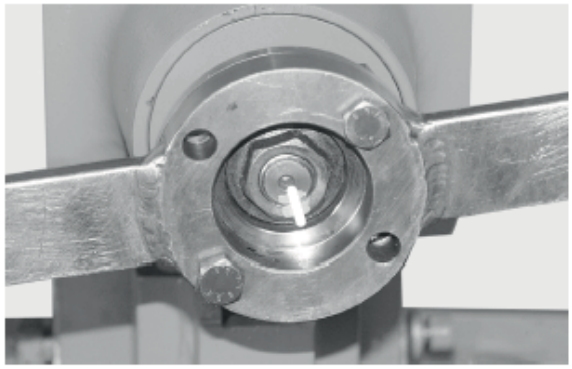
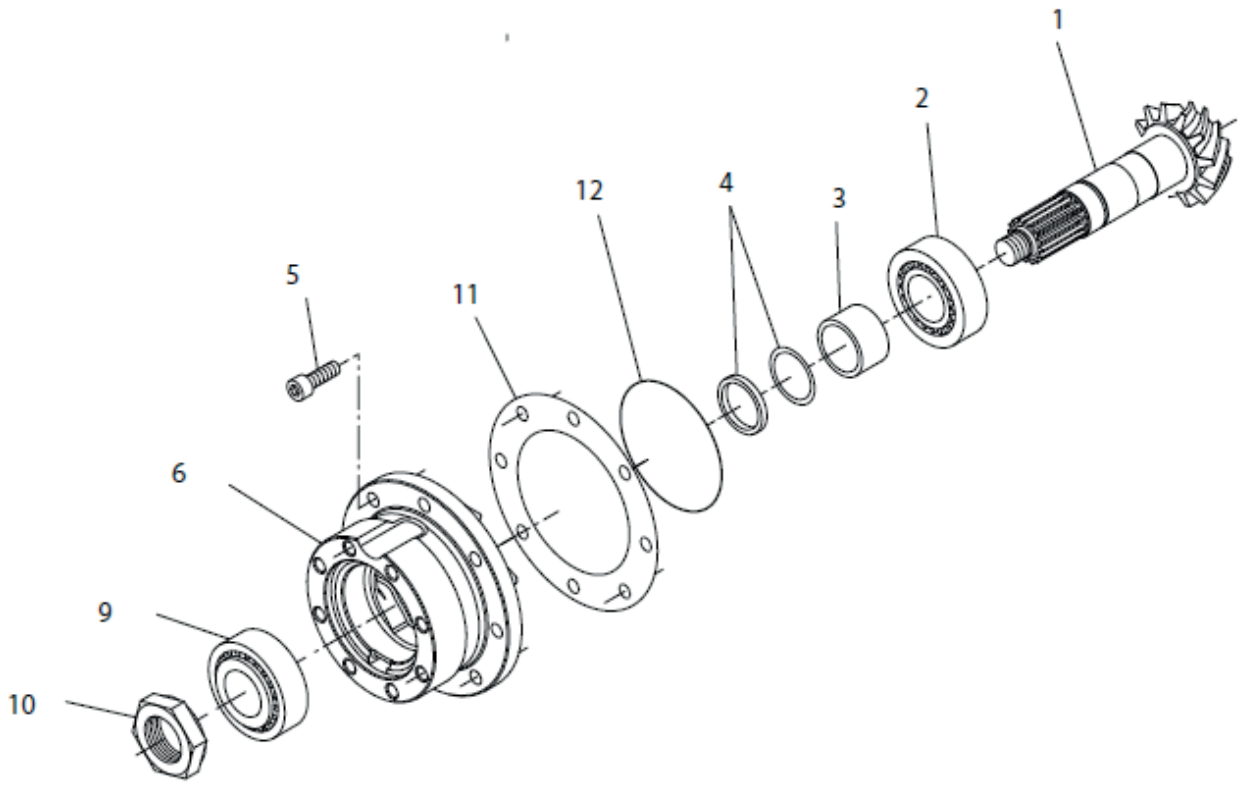


**FIGURE 33:** Make positional marks across nut (1) and pinion (11) tang; then remove nut and flange (2)

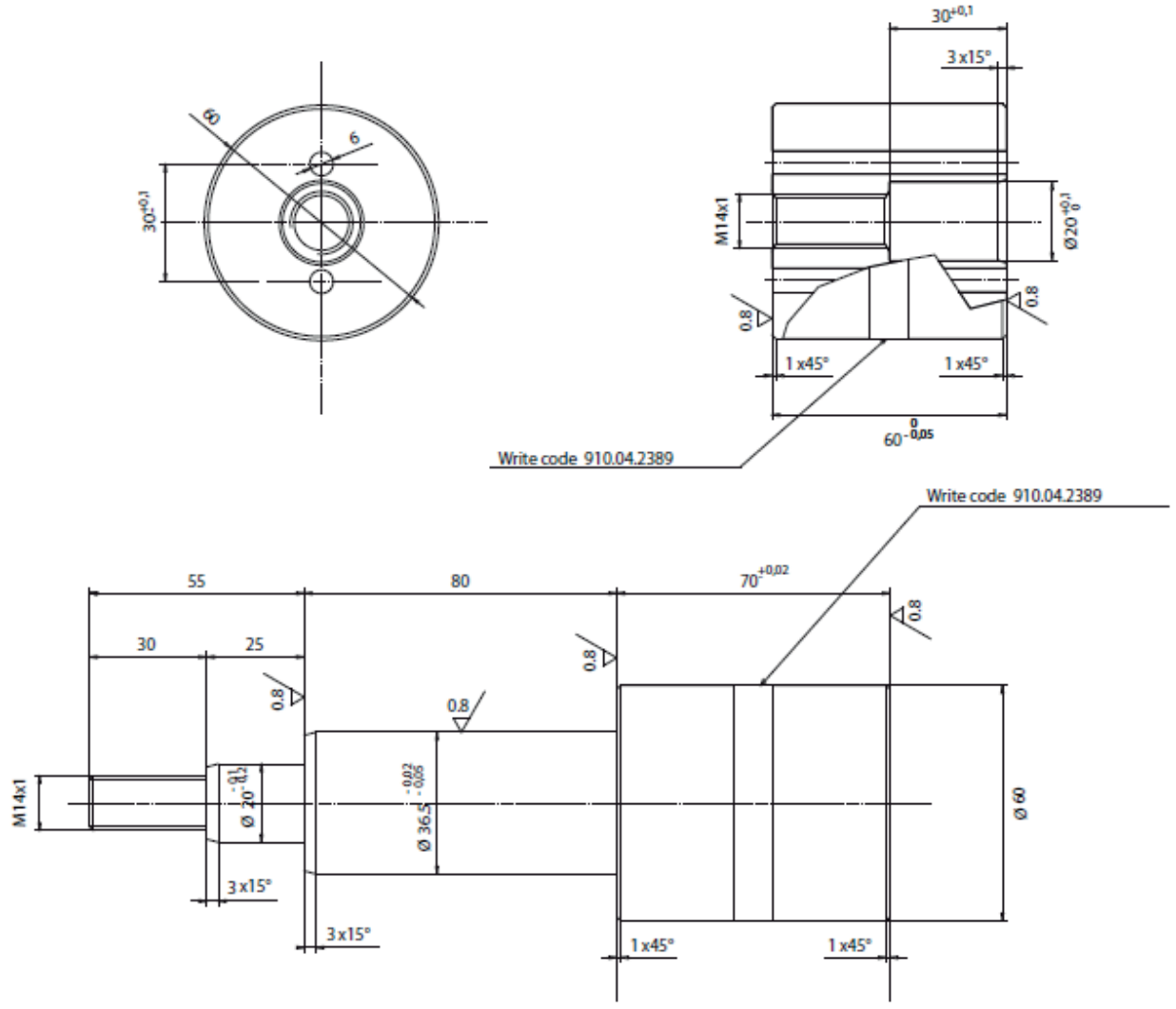
x0001343

## Exploded view



## T4

**P/N:** 910.04.2389




x0001362

## Assembly

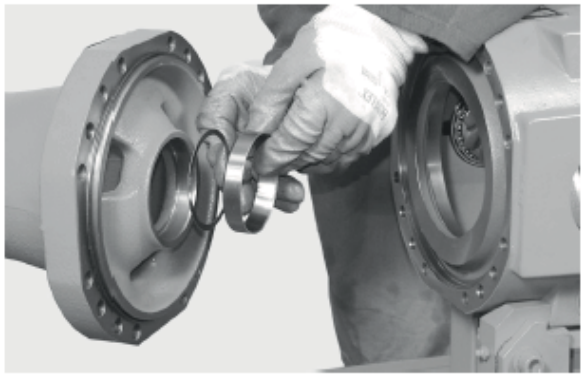


**FIGURE 1:** SETTING OF THE CROWN WHEEL AND PINION
Insert the thrust block of the bearing (6) opposite side of the crown wheel shims (Sb)(7) to an initial thickness of about 0,55mm.

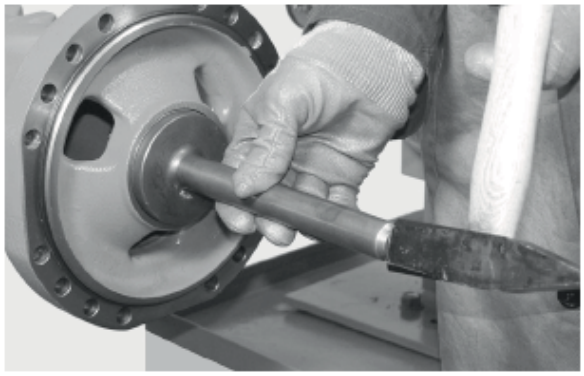


**FIGURE 2:** Insert the thrust block (6) and the shims (Sb)(7) into the arm.

**NOTE:**
**Check that it is at the end of stroke.**

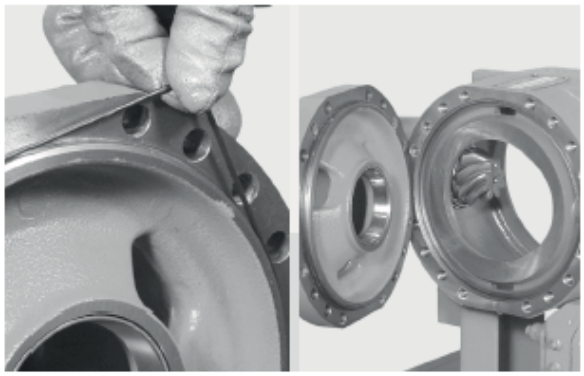


**FIGURE 3:** Inspect the o-ring (2) and grease.

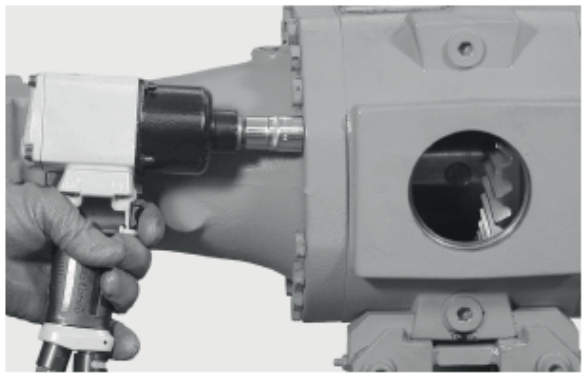


**FIGURE 4:** Temporarily insert all screws of the arm (18).

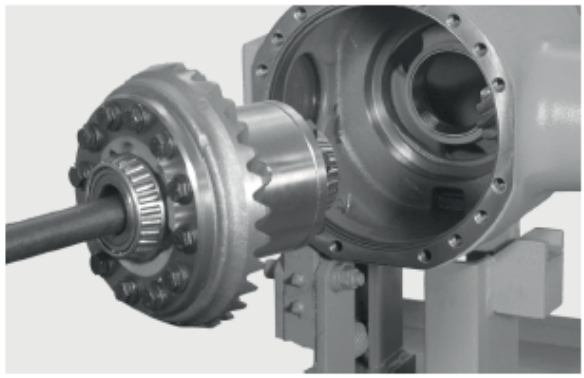


**FIGURE 5:** Insert complete differential (5).

**⚠CAUTION**

Do not damage the seat of the o-ring with the ring gear.

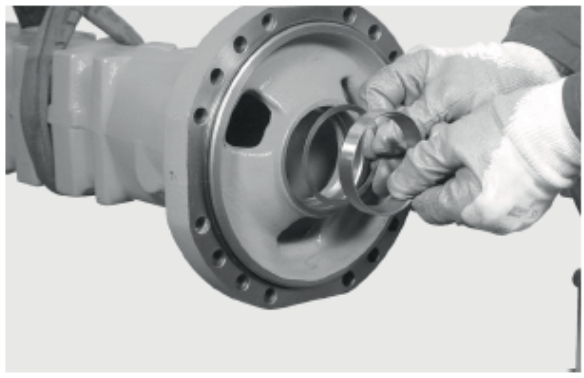
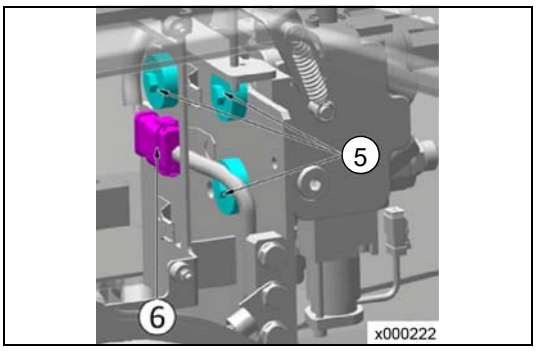


**FIGURE 6:** SETTING OF THE CROWN WHEEL AND PINION
Inser t thrust block (4) of the bearing shims (Sc)(3) of an initial thickness of about 0,75mm.

x0001370

11. Unscrew the three fastening screws (5) under the front frame and lift the main control valve out of the machine.

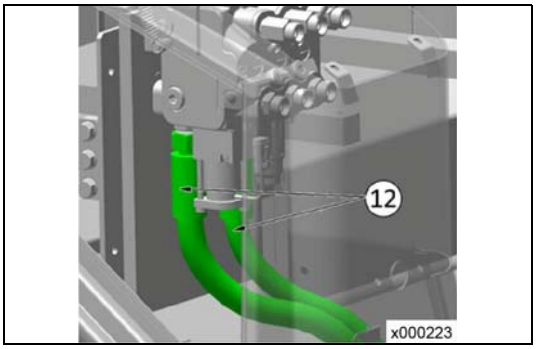



12. . Remove the two remaining hoses (12) from the main valve.

★ Close the hydraulic lines immediately with plugs in order to prevent any dirt and foreign particles from entering.

Now you can remove the main valve from the cabin.

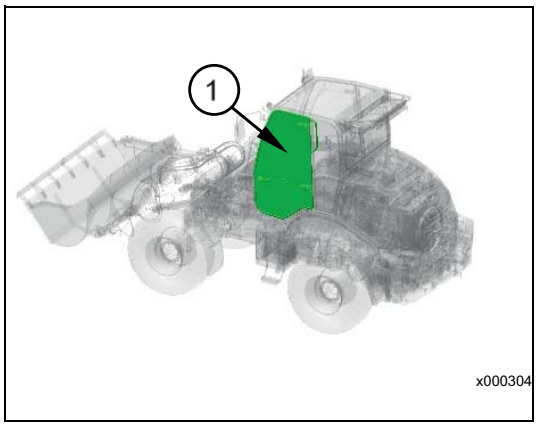
Main control valve: 16,7kg



**Cab door assembly**

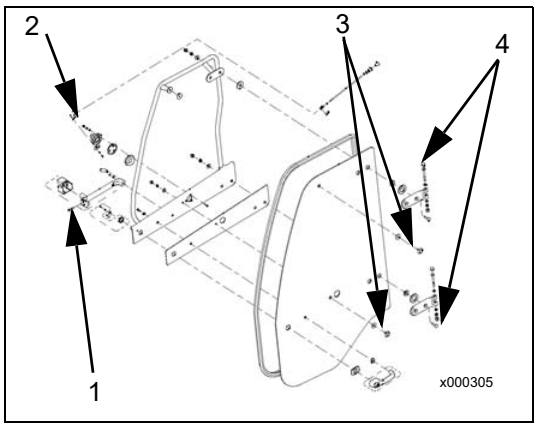
1. Reassemble the door assembly. For reference see the sketches below.

2. Reassemble the complete door assembly (1) to the cab.



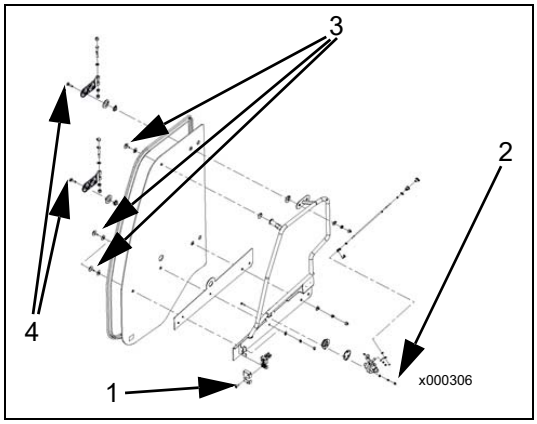

a. Left door assembly

- Screw M8 (1): 25 Nm
- Screw M6 (2): 10 Nm
- Screw M8 (3): 11 Nm
- Screw M10 (4): 15 Nm




b. Right door assembly

- Screw M8 (1): 25 Nm
- Screw M6 (2): 10 Nm
- Screw M8 (3): 11 Nm
- Screw M10 (4): 15 Nm



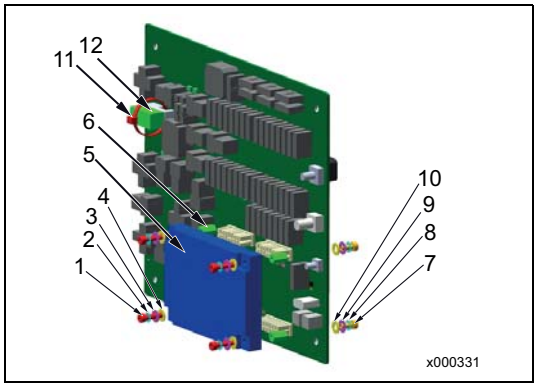
# ELECTRICAL SYSTEM

## REMOVE AND INSTALL ENGINE CONTROLLER ASSEMBLY

- **Place the machine on a level ground and activate the parking brake.**
- **Lower the work equipment to the ground.**
- **Turn the starting switch to OFF position to stop the engine.**
- **Turn the battery disconnect switch to OFF position and remove the key. (For details, see TESTING AND ADJUSTING, "HANDLE BATTERY DISCONNECT SWITCH".)**
- **Do not plug or unplug the ECU for a period of at least 60 seconds after power to the unit has been turned on or off.**
- **Do not plug or unplug the connector of the DCU when the power is on. Moreover, when the key switch is tuned OFF and you have confirmed that the after-run has finished (Check the operating noise of the SM, or define the time after the key is off until the DCU shuts off (approx. 10 min.)), remove the connector.**
- **Do not touch connector pins of the ECU and DCU with bare hands. Doing so may result in corrosion of the connector pins and/or damage to the internal circuits of the ECU and DCU due to static electricity.**
- **Do not force a measuring probe into the female coupler. Doing so may cause contact failure of the connector pins, resulting in malfunction of the ECU.**
- **Take care to prevent water from entering the couplers when plugging or unplugging the connector. Water inside the couplers may cause corrosion, resulting in malfunction of the ECU.**
- **Avoid plugging/unplugging the connector more than approx. 10 times.**
  **Frequent plugging/unplugging of the connector may cause contact failure of the connector pins, resulting in malfunction of the ECU.**
- **Do not use the ECU and DCU that has ever suffered drop impact.**
- **Do not disassemble the ECU and DCU terminal.**

through the hole in the socket of the relay.

## Install I/O controller 64P

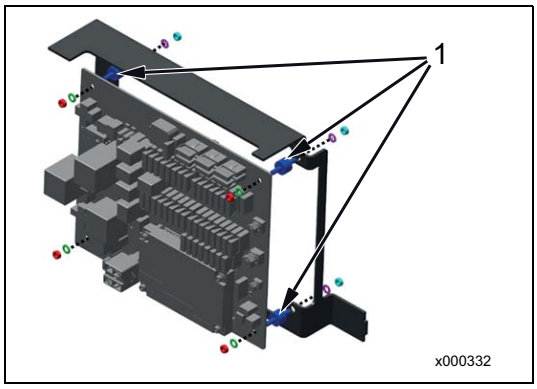



1. If required mount the spacers (6) at the front side of the central electric board, bolts (7), toothed washers (8), metal washers (9) and plastic washers (10) at the rear.
   Check the picture for the correct order of the parts.
2. Fix the spacer at the front side while tightening the bolt at the rear side.

   Bolts (7) (6): Max. 0,8 Nm
3. Check the socket connectors on the central electric board and on the controller for the correct orientation of the controller.
4. Push the I/O Controller 64P (5) to its socket connectors on the central electric board.
5. Tighten the four bolts (1) together with toothed washers (2), metal washers (3) and plastic washers (4). Check the picture above for the correct order of the parts.

   Bolts (1): Max. 0,8 Nm

## Install central electric boar (CEB)



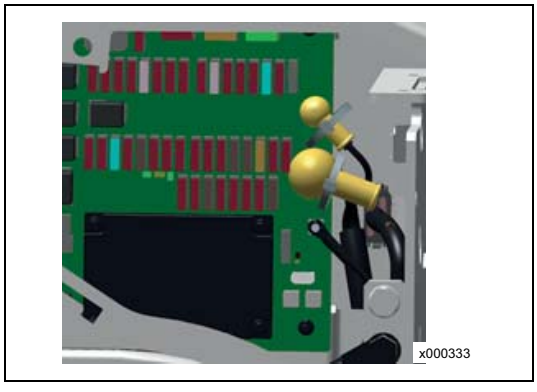

1. If necessary, move all accessory parts (IO controller 64P, fuses, relays, buzzer, bridge jumper, etc.) from an old central electric board to the new one and add additional parts.

   Minimum all parts, which have been equipped before, should be equipped afterwards.

   Put the parts back to the exact same position as before.

   For the correct place of the components check also: See "SPARE FUSES AND RELAY" on page 50-68.
2. Place the central electric board with its accessories in the console inside the cabin on the dampers (1).
3. Put the washers on the stud of the damper and tighten the nuts.

   Nuts: Max. 4,5 Nm




4. Connect the CEB wiring harness back to the terminals at the front side of the board. For the method of assembling the ring terminals and the tightening torques, See "Method for connecting ring terminals and strip fuses to power stud of printed circuit boards" on page 50-59.

   ★ Make sure the cap at the end of the cable covers the terminal of the central electric board.

   ★ Turn the cable on the terminal in a way, that contact with the surrounding covers is avoided.
5. Fix the caps of the harness on the terminals with cable ties.

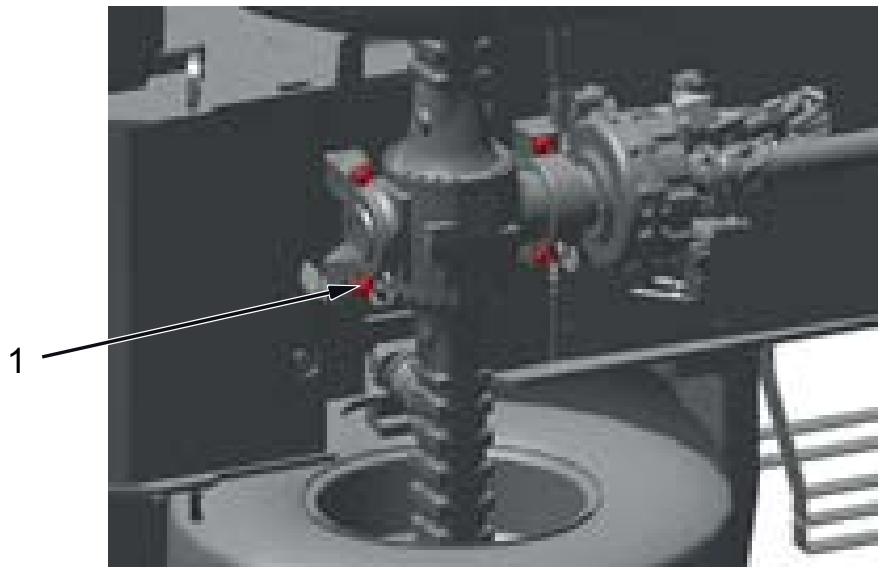
# ABBREVIATION LIST

- This list of abbreviations includes the abbreviations used in the text of the shop manual for parts, components, and functions whose meaning is not immediately clear. The spelling is given in full with an outline of the meaning.
- Abbreviations that are used in general society may not be included.
- Special abbreviations which appear infrequently are noted in the text.
- This list of abbreviations consists of two parts. The first part is a list of the abbreviations used in the text of the manual, and the second part is a list of the abbreviations used in the circuit diagrams.

## List of abbreviations used in the text

| Abbreviation | Actual word spelled out | Purpose of use (major applicable machine (*1), or component/system) | Explanation |
|---|---|---|---|
| ABS | Antilock Brake System | Travel and brake<br>(HD, HM) | This is a function that releases the brake when the tires skid (tires are not rotated). This function applies the brake again when the tires rotate. |
| AISS | Automatic Idling Setting System | Engine | This is a function that automatically sets the idle speed. |
| AJSS | Advanced Joystick Steering System | Steering<br>(WA) | This is a function that performs the steering operations with a lever instead of using a steering wheel. This function performs gear shifting and changing forward and reverse direction. |
| ARAC | Automatic Retarder Accelerator Control | Travel and brake<br>(HD, HM) | This is a function that automatically operates the retarder with a constant braking force when letting go of the accelerator pedal on the downhill. |
| ARSC | Automatic Retarder Speed Control | Travel and brake<br>(HD, HM) | This is a function that automatically operates the retarder to ensure that the machine speed does not accelerate above the speed set by the opera- tor when letting go of the accelerator pedal on the downhill. |
| ASR | Automatic Spin Regulator | Travel and brake<br>(HD, HM) | This is a function that drives both wheels automatically using the optimum braking force when the tire on one side spins on the soft ground sur- faces. |
| ATT | Attachment | Work equipment | A function or component that can be added to the standard specification. |
| BCV | Brake cooling oil control valve | BRAKE<br>(HD) | This is a valve that bypasses a part of the brake cooling oil to reduce the load applied to the hydraulic pump when the retarder is not being used. |
| CAN | Controller Area Network | Communication and electronic control | This is one of communication standards that are used in the network on the machine. |
| CDR | Crankcase Depression Regulator | Engine | This is a regulator valve that is installed to CCV ventilator. It is written as CDR valve and is not used independently. |
| CLSS | Closed-center Load Sensing System | Hydraulic system | This is a system that can actuate multiple actuators simultaneously regardless of the load (provides better combined operation than OLSS). |

# MAINTENANCE STANDARD OF REAR AXLE




x0001235

| No. | Item | Judgment criteria | Remedy |
|---|---|---|---|
| 1 | Rear axle bolts (4x) | 560 Nm | |

# ABBREVIATION LIST

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| AISS | Automatic Idling Setting System | Engine | This is a function that automatically sets the idle speed. |
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| ASR | Automatic Spin Regulator | Travel and brake<br>(HD, HM) | This is a function that drives both wheels automatically using the optimum braking force when the tire on one side spins on the soft ground sur- faces. |
| ATT | Attachment | Work equipment | A function or component that can be added to the standard specification. |
| BCV | Brake cooling oil control valve | BRAKE<br>(HD) | This is a valve that bypasses a part of the brake cooling oil to reduce the load applied to the hydraulic pump when the retarder is not being used. |
| CAN | Controller Area Network | Communication and electronic control | This is one of communication standards that are used in the network on the machine. |
| CDR | Crankcase Depression Regulator | Engine | This is a regulator valve that is installed to CCV ventilator. It is written as CDR valve and is not used independently. |
| CLSS | Closed-center Load Sensing System | Hydraulic system | This is a system that can actuate multiple actuators simultaneously regardless of the load (provides better combined operation than OLSS). |

- The quantity of the liquid refrigerant that can be evaporated in the evaporator depends on the amount of heat (refrigeration load) to be removed under the specific evaporation temperature (evaporation pressure).
- The expansion valve controls the refrigerant supply rate to prevent too much or too little supply of the liquid refrigerant.

(*1) Throttle action

- If there is a narrow section in the passage through which liquid is flowing at a constant rate, a resistance to the flow is generated.
  When the liquid passes through a narrow section, cross-sectional area suddenly increases. The liquid expansion causes pressure and temperature to decrease.
- No heat is transferred between inside and outside by the throttle action.

## Evaporation (Evaporator)

- The evaporator evaporates the liquid refrigerant (superheated vapor).
- The refrigerant evaporates, while absorbing an amount of heat necessary for evaporation (evaporation heat) from the air around the cooling fins (air in the cab).
- The cooled air is sent into the cab by the blower fan, and it decreases the temperature in the cab.
- In the evaporator, the misty refrigerant sent from the expansion valve and the evaporated gas refrigerant are mixed together.
- The temperature (evaporation temperature) and the pressure (evaporation pressure) at which the liquid refrigerant is evaporated are proportional to each other.
- To evaporate the liquid refrigerant at lower temperature, the pressure in the evaporator must be kept as low as possible. For this purpose, the compressor sucks in the evaporated refrigerant.

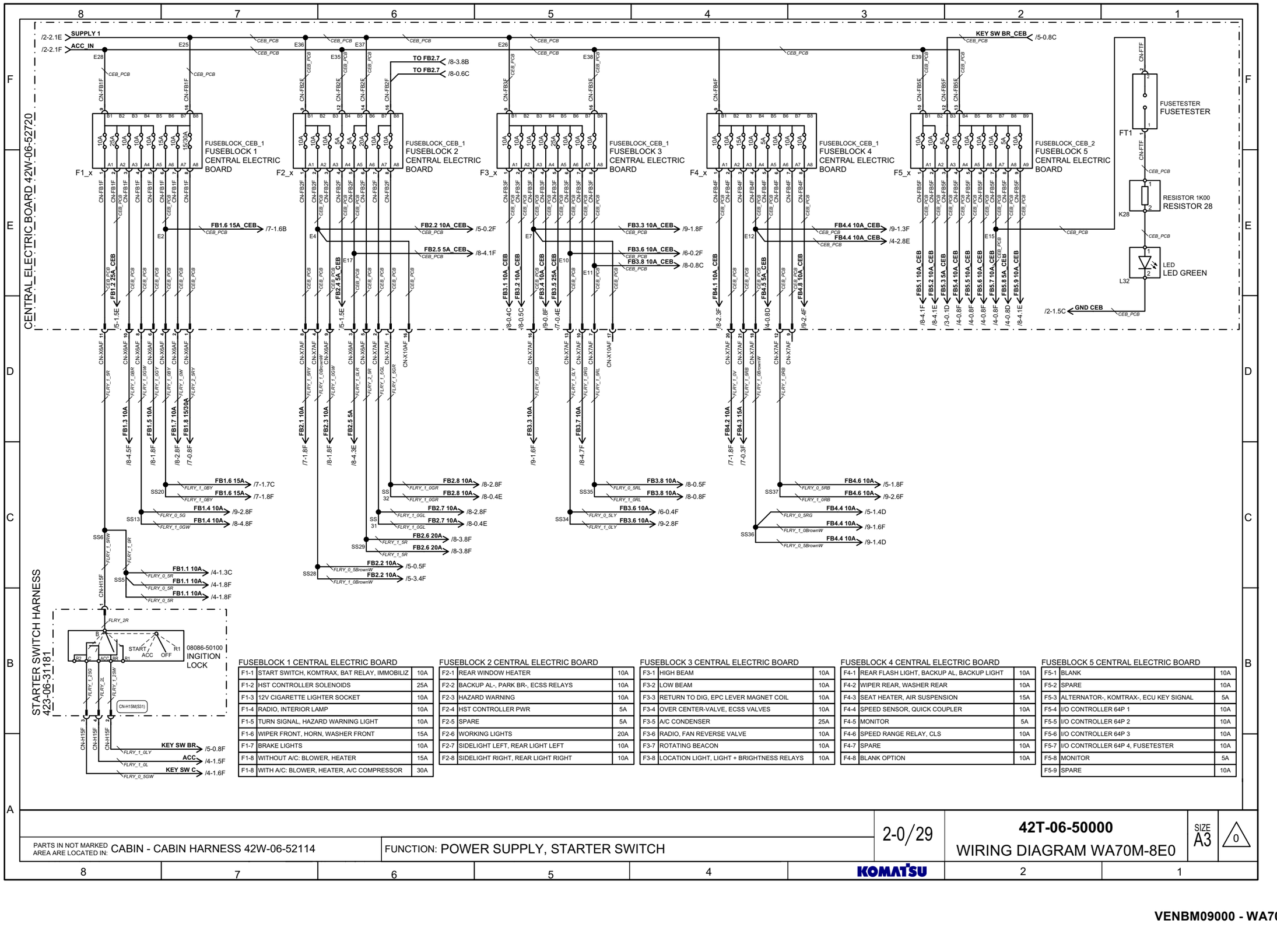
## Relation between refrigerant and cooling trouble

- While repeating the refrigeration cycle, the refrigerant circulates in the refrigeration circuit and dissipates the heat in the cab to the outside of the cab.
- If there is an insufficient quantity of refrigerant, all of it is evaporated while it is passing through the evaporator. This causes evaporator efficiency to deteriorate, which will result in defective air conditioning.
- If there is excessive refrigerant, not all of it is evaporated and part of it will be sucked into the compressor in liquid form, which causes the compressor to compress the liquid and may damage the components.

# 90 OTHER

**NOTE**
Spare part numbers and drawing numbers are only for orientation between pages.
For more details, see Part No. in Parts Book.

# 2-0 POWER SUPPLY, STARTER SWITCH




### FUSEBLOCK 1 CENTRAL ELECTRIC BOARD

| | | |
|---|---|---|
| F1-1 | START SWITCH, KOMTRAX, BAT RELAY, IMMOBILIZ | 10A |
| F1-2 | HST CONTROLLER SOLENOIDS | 25A |
| F1-3 | 12V CIGARETTE LIGHTER SOCKET | 10A |
| F1-4 | RADIO, INTERIOR LAMP | 10A |
| F1-5 | TURN SIGNAL, HAZARD WARNING LIGHT | 10A |
| F1-6 | WIPER FRONT, HORN, WASHER FRONT | 15A |
| F1-7 | BRAKE LIGHTS | 10A |
| F1-8 | WITHOUT A/C: BLOWER, HEATER | 15A |
| | WITH A/C: BLOWER, HEATER, A/C COMPRESSOR | 30A |

### FUSEBLOCK 2 CENTRAL ELECTRIC BOARD

| | | |
|---|---|---|
| F2-1 | REAR WINDOW HEATER | 10A |
| F2-2 | BACKUP AL-, PARK BR-, ECSS RELAYS | 10A |
| F2-3 | HAZARD WARNING | 10A |
| F2-4 | HST CONTROLLER PWR | 5A |
| F2-5 | SPARE | 5A |
| F2-6 | WORKING LIGHTS | 20A |
| F2-7 | SIDELIGHT LEFT, REAR LIGHT LEFT | 10A |
| F2-8 | SIDELIGHT RIGHT, REAR LIGHT RIGHT | 10A |

### FUSEBLOCK 3 CENTRAL ELECTRIC BOARD

| | | |
|---|---|---|
| F3-1 | HIGH BEAM | 10A |
| F3-2 | LOW BEAM | 10A |
| F3-3 | RETURN TO DIG, EPC LEVER MAGNET COIL | 10A |
| F3-4 | OVER CENTER-VALVE, ECSS VALVES | 10A |
| F3-5 | A/C CONDENSER | 25A |
| F3-6 | RADIO, FAN REVERSE VALVE | 10A |
| F3-7 | ROTATING BEACON | 10A |
| F3-8 | LOCATION LIGHT, LIGHT + BRIGHTNESS RELAYS | 10A |

### FUSEBLOCK 4 CENTRAL ELECTRIC BOARD

| | | |
|---|---|---|
| F4-1 | REAR FLASH LIGHT, BACKUP AL, BACKUP LIGHT | 10A |
| F4-2 | WIPER REAR, WASHER REAR | 10A |
| F4-3 | SEAT HEATER, AIR SUSPENSION | 15A |
| F4-4 | SPEED SENSOR, QUICK COUPLER | 10A |
| F4-5 | MONITOR | 5A |
| F4-6 | SPEED RANGE RELAY, CLS | 10A |
| F4-7 | SPARE | 10A |
| F4-8 | BLANK OPTION | 10A |

### FUSEBLOCK 5 CENTRAL ELECTRIC BOARD

| | | |
|---|---|---|
| F5-1 | BLANK | 10A |
| F5-2 | SPARE | 10A |
| F5-3 | ALTERNATOR-, KOMTRAX-, ECU KEY SIGNAL | 5A |
| F5-4 | I/O CONTROLLER 64P 1 | 10A |
| F5-5 | I/O CONTROLLER 64P 2 | 10A |
| F5-6 | I/O CONTROLLER 64P 3 | 10A |
| F5-7 | I/O CONTROLLER 64P 4, FUSETESTER | 10A |
| F5-8 | MONITOR | 5A |
| F5-9 | SPARE | 10A |

PARTS IN NOT MARKED AREA ARE LOCATED IN: CABIN - CABIN HARNESS 42W-06-52114

FUNCTION: POWER SUPPLY, STARTER SWITCH

2-0/29

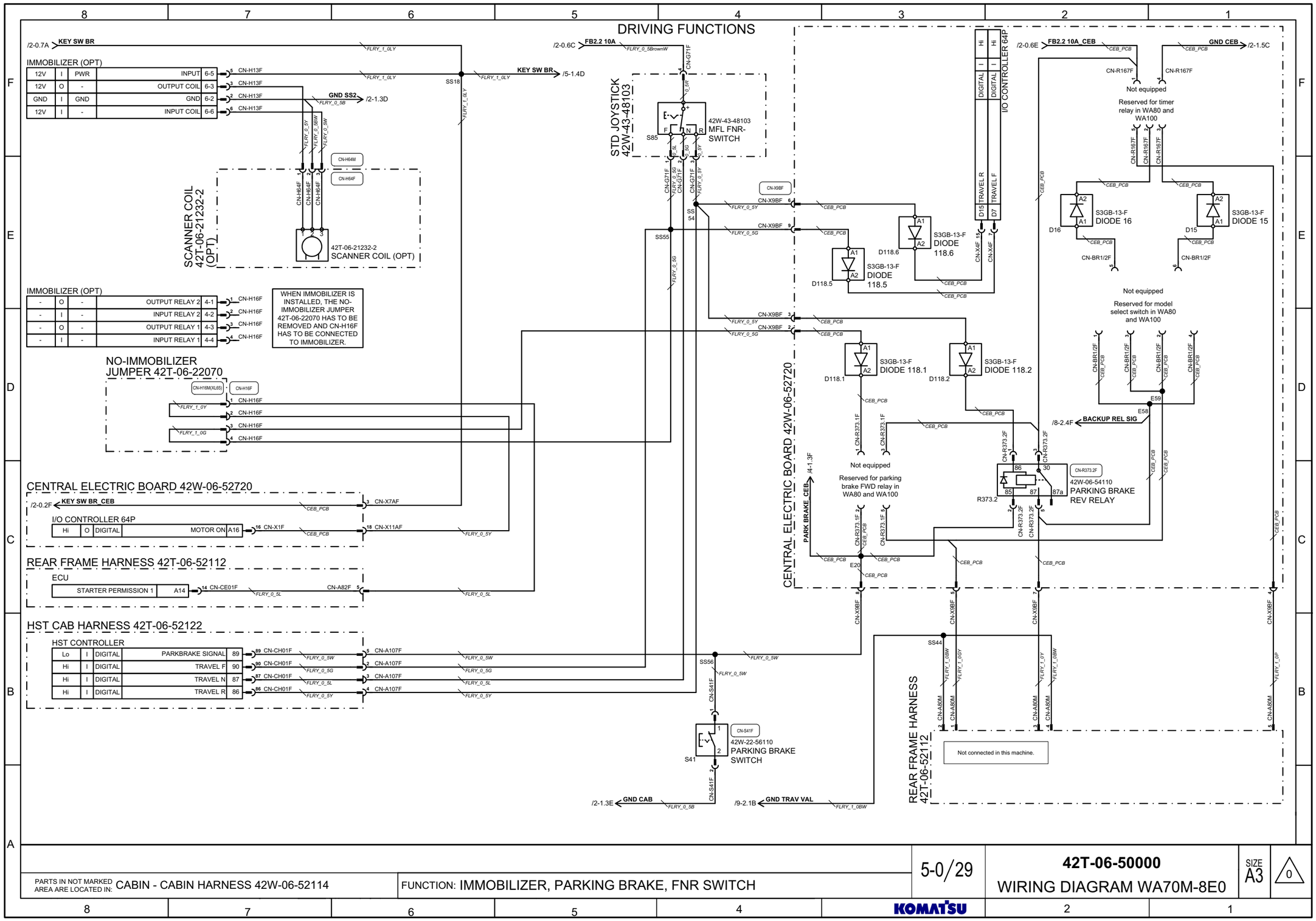
**42T-06-50000**

WIRING DIAGRAM WA70M-8E0

SIZE A3

0

# 5-0 IMMOBILIZER, PARKING BRAKE, FNR SWITCH




PARTS IN NOT MARKED AREA ARE LOCATED IN: CABIN - CABIN HARNESS 42W-06-52114

FUNCTION: IMMOBILIZER, PARKING BRAKE, FNR SWITCH

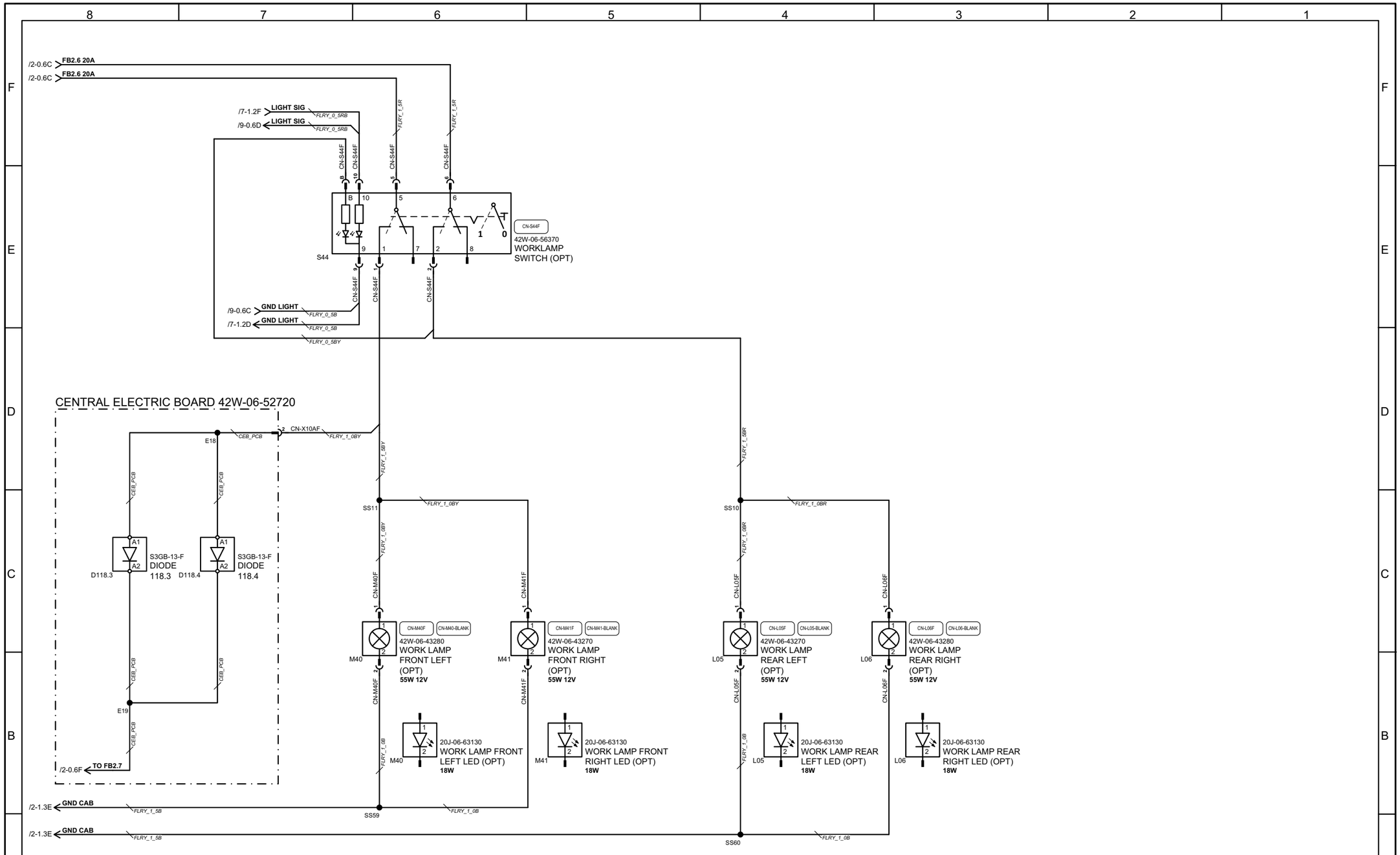
5-0/29

**42T-06-50000**
WIRING DIAGRAM WA70M-8E0

SIZE A3

0

# 8-3 WORK LAMPS




| | | | |
|---|---|---|---|
| PARTS IN NOT MARKED AREA ARE LOCATED IN: CABIN - CABIN HARNESS 42W-06-52114 | FUNCTION: WORK LAMPS | 8-3/29 | 42T-06-50000<br>WIRING DIAGRAM WA70M-8E0 |
| | | | SIZE A3 ⚠ 0 |

## W2 CONNECTOR LIST 5

| No | ◄ NAME | PART NUMBER | PART OF |
|---|---|---|---|
| 357 | CN-XE1M(XF6) | 08192-22830 | FRONT FRAME - FRONT HARNESS 42T-06-51312 |
| 358 | CN-Y01F | 42W-09-H7890 | FRONT FRAME - CLS HARNESS 42W-06-51770 (OPT) |
| 359 | PIN + | 42W-09-H9420 | REAR FRAME - BATTERY CABLE 42T-06-52271 |
| 360 | PIN + | 42T-09-H4550 | REAR FRAME - STARTER CABLE 42T-06-52282 |
| 361 | PIN - | 08030-06010 | REAR FRAME - BATTERY GROUND 42T-06-52221 |
| 362 | SOCKET | 42T-06-29130 | CABIN - ROTATING BEACON PLUGBOX 42T-06-29130 (OPT) |

PARTS IN NOT MARKED AREA ARE LOCATED IN:

FUNCTION: CONNECTOR LIST

W2-5

**42T-06-50000**
WIRING DIAGRAM WA70M-8E0

SIZE A3

0

# W3 PIN LOCATION LIST 10

| NO. | CONNECTOR NAME | PIN NO | ▲ PART OF | DRAWN ON PAGE |
|---|---|---|---|---|
| 791 | CN-R56.1F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.1F | 42T-06-50000 8-0.5B |
| 792 | CN-R56.1F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.1F | |
| 793 | CN-R56.1F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.1F | |
| 794 | CN-R56.1F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.1F | |
| 795 | CN-R56.1F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.1F | |
| 796 | CN-R56.2F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | 42T-06-50000 8-0.4B |
| 797 | CN-R56.2F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | 42T-06-50000 8-0.4B |
| 798 | CN-R56.2F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | 42T-06-50000 8-0.4B |
| 799 | CN-R56.2F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | |
| 800 | CN-R56.2F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | 42T-06-50000 8-0.4B |
| 801 | CN-R56.2F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | |
| 802 | CN-R56.2F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | |
| 803 | CN-R56.2F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | |
| 804 | CN-R56.2F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R56.2F | |
| 805 | CN-R67F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | 42T-06-50000 8-1.7D |
| 806 | CN-R67F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | 42T-06-50000 8-1.7D |
| 807 | CN-R67F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | 42T-06-50000 8-1.7D |
| 808 | CN-R67F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | |
| 809 | CN-R67F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | 42T-06-50000 8-1.7D |
| 810 | CN-R67F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | |
| 811 | CN-R67F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | |
| 812 | CN-R67F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | |
| 813 | CN-R67F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R67F | |
| 814 | CN-R158.2F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | 42T-06-50000 4-1.5E |
| 815 | CN-R158.2F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | 42T-06-50000 4-1.5E |
| 816 | CN-R158.2F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | 42T-06-50000 4-1.5E |
| 817 | CN-R158.2F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | 42T-06-50000 4-1.4E |
| 818 | CN-R158.2F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | |
| 819 | CN-R158.2F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | |
| 820 | CN-R158.2F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | |
| 821 | CN-R158.2F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | |
| 822 | CN-R158.2F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R158.2F | |
| 823 | CN-R167F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | 42T-06-50000 5-0.2F |
| 824 | CN-R167F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | 42T-06-50000 5-0.1F |
| 825 | CN-R167F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | 42T-06-50000 5-0.1F |
| 826 | CN-R167F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | 42T-06-50000 5-0.1F |
| 827 | CN-R167F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | 42T-06-50000 5-0.2F |
| 828 | CN-R167F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | |
| 829 | CN-R167F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | |
| 830 | CN-R167F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | |
| 831 | CN-R167F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R167F | |
| 832 | CN-R209F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | 42T-06-50000 9-1.8F |
| 833 | CN-R209F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | 42T-06-50000 9-1.8E |
| 834 | CN-R209F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | 42T-06-50000 9-1.7F |
| 835 | CN-R209F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | 42T-06-50000 9-1.7E |
| 836 | CN-R209F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | |
| 837 | CN-R209F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | |
| 838 | CN-R209F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | |
| 839 | CN-R209F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | |
| 840 | CN-R209F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R209F | |
| 841 | CN-R235F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | 42T-06-50000 5-1.3F |
| 842 | CN-R235F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | 42T-06-50000 5-1.3E |
| 843 | CN-R235F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | 42T-06-50000 5-1.3F |
| 844 | CN-R235F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | 42T-06-50000 5-1.3E |
| 845 | CN-R235F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | 42T-06-50000 5-1.3E |
| 846 | CN-R235F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | |
| 847 | CN-R235F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | |
| 848 | CN-R235F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | |
| 849 | CN-R235F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R235F | |
| 850 | CN-R337F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.6C |
| 851 | CN-R337F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.6C |
| 852 | CN-R337F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.5C |
| 853 | CN-R337F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.5C |
| 854 | CN-R337F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.5C |
| 855 | CN-R337F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | |
| 856 | CN-R337F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | |
| 857 | CN-R337F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 7-1.6C |
| 858 | CN-R337F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R337F | 42T-06-50000 5-0.3D |
| 859 | CN-R373.1F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | 42T-06-50000 5-0.3C |
| 860 | CN-R373.1F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | 42T-06-50000 5-0.3D |
| 861 | CN-R373.1F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 862 | CN-R373.1F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | 42T-06-50000 5-0.3C |
| 863 | CN-R373.1F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 864 | CN-R373.1F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 865 | CN-R373.1F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 866 | CN-R373.1F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 867 | CN-R373.1F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.1F | |
| 868 | CN-R373.2F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | 42T-06-50000 5-0.2D |
| 869 | CN-R373.2F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | 42T-06-50000 5-0.2C |
| 870 | CN-R373.2F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | 42T-06-50000 5-0.2D |
| 871 | CN-R373.2F | 4 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | |
| 872 | CN-R373.2F | 5 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | 42T-06-50000 5-0.2C |
| 873 | CN-R373.2F | 6 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | |
| 874 | CN-R373.2F | 7 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | |
| 875 | CN-R373.2F | 8 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R373.2F | |
| 876 | CN-R376F | 9 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R376F | 42T-06-50000 9-1.3E |
| 877 | CN-R376F | 1 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R376F | 42T-06-50000 9-1.3E |
| 878 | CN-R376F | 2 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R376F | 42T-06-50000 9-1.3E |
| 879 | CN-R376F | 3 | CABIN - CENTRAL ELECTRIC BOARD 42W-06-52720 CN-R376F | 42T-06-50000 9-1.3E |

No entry in „DRAWN ON PAGE“ means pin is not used.

PARTS IN NOT MARKED AREA ARE LOCATED IN:

FUNCTION: PIN LOCATION LIST

W3-10

**42T-06-50000**
WIRING DIAGRAM WA70M-8E0

SIZE A3

0

KOMATSU

# W3 PIN LOCATION LIST 20

| NO. | CONNECTOR NAME | PIN NO | ▲ PART OF | DRAWN ON PAGE |
|---|---|---|---|---|
| 1671 | CN-A19F | 6 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-3.7D |
| 1672 | CN-A19F | 7 | REAR FRAME - REAR FRAME HARNESS | |
| 1673 | CN-A19F | 8 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.3E |
| 1674 | CN-A22F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.5C |
| 1675 | CN-A26F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.6C |
| 1676 | CN-A29F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-2.5B |
| 1677 | CN-A31.1F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-2.5B |
| 1678 | CN-A31.2F | 2 | REAR FRAME - REAR FRAME HARNESS | |
| 1679 | CN-A39F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.3F |
| 1680 | CN-A50F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4C |
| 1681 | CN-A50F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4C |
| 1682 | CN-A52-BLANK | A | REAR FRAME - REAR FRAME HARNESS | |
| 1683 | CN-A52-BLANK | B | REAR FRAME - REAR FRAME HARNESS | |
| 1684 | CN-A52-BLANK | C | REAR FRAME - REAR FRAME HARNESS | |
| 1685 | CN-A52F | A | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-2.3C |
| 1686 | CN-A52F | B | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-2.3C |
| 1687 | CN-A52F | C | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-2.3C |
| 1688 | CN-A53F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.6C |
| 1689 | CN-A53F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.6B |
| 1690 | CN-A54.1F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.3B |
| 1691 | CN-A54.2F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.3B |
| 1692 | CN-A55M | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.2B |
| 1693 | CN-A55M | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.2B |
| 1694 | CN-A66F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.2C |
| 1695 | CN-A66F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.2C |
| 1696 | CN-A66F | 3 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.2C |
| 1697 | CN-A66F | 4 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.2C |
| 1698 | CN-A76F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4C |
| 1699 | CN-A76F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4C |
| 1700 | CN-A80F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5E<br>,42T-06-50000 5-1.5B |
| 1701 | CN-A80F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5E<br>,42T-06-50000 5-1.5B |
| 1702 | CN-A80F | 3 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5E<br>,42T-06-50000 5-1.5B |
| 1703 | CN-A80F | 4 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5E<br>,42T-06-50000 5-1.5B |
| 1704 | CN-A80F | 5 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5E<br>,42T-06-50000 5-2.4D |
| 1705 | CN-A80F | 6 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D<br>,42T-06-50000 5-2.4C |
| 1706 | CN-A80F | 7 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D |
| 1707 | CN-A80F | 8 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D<br>,42T-06-50000 5-2.4C |
| 1708 | CN-A80F | 9 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D<br>,42T-06-50000 5-2.4C |
| 1709 | CN-A80F | 10 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D<br>,42T-06-50000 5-2.4C |
| 1710 | CN-A80F | 11 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D<br>,42T-06-50000 5-1.5B |
| 1711 | CN-A80F | 12 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 1-1.5D |
| 1712 | CN-A81F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1713 | CN-A81F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1714 | CN-A81F | 3 | REAR FRAME - REAR FRAME HARNESS | |
| 1715 | CN-A81F | 4 | REAR FRAME - REAR FRAME HARNESS | |
| 1716 | CN-A81F | 5 | REAR FRAME - REAR FRAME HARNESS | |
| 1717 | CN-A81F | 6 | REAR FRAME - REAR FRAME HARNESS | |
| 1718 | CN-A81F | 7 | REAR FRAME - REAR FRAME HARNESS | |
| 1719 | CN-A81F | 8 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1720 | CN-A81F | 9 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1721 | CN-A81F | 10 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1722 | CN-A81F | 11 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1723 | CN-A81F | 12 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-1.5C |
| 1724 | CN-A82F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.5B |
| 1725 | CN-A82F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.5B |
| 1726 | CN-A82F | 3 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.3D |
| 1727 | CN-A82F | 4 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.5B |
| 1728 | CN-A82F | 5 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 5-0.6C |
| 1729 | CN-A82F | 6 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.3D |
| 1730 | CN-A82F | 7 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 3-0.3E |
| 1731 | CN-A82F | 8 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.7B |
| 1732 | CN-A82F | 9 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 6-0.5B |
| 1733 | CN-A82F | 10 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 6-0.5B |
| 1734 | CN-A82F | 11 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-0.6C |
| 1735 | CN-A82F | 12 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 6-0.1C |
| 1736 | CN-A83F | 1 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.3C |
| 1737 | CN-A83F | 2 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.3C |
| 1738 | CN-A83F | 3 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-2.2C |
| 1739 | CN-A83F | 4 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-1.5D |
| 1740 | CN-A83F | 5 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-1.5D |
| 1741 | CN-A83F | 6 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.7D |
| 1742 | CN-A83F | 7 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.6D |
| 1743 | CN-A83F | 8 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.6D |
| 1744 | CN-A83F | 9 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.4D |
| 1745 | CN-A83F | 10 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 8-2.2D |
| 1746 | CN-A83F | 11 | REAR FRAME - REAR FRAME HARNESS | |
| 1747 | CN-A83F | 12 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 4-1.6C |
| 1748 | CN-A84F | 1 | REAR FRAME - REAR FRAME HARNESS | |
| 1749 | CN-A84F | 2 | REAR FRAME - REAR FRAME HARNESS | |
| 1750 | CN-A84F | 3 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4D |
| 1751 | CN-A84F | 4 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 7-1.4D |
| 1752 | CN-A84F | 5 | REAR FRAME - REAR FRAME HARNESS | 42T-06-50000 2-2.3F |

No entry in „DRAWN ON PAGE“ means pin is not used.

PARTS IN NOT MARKED AREA ARE LOCATED IN:

FUNCTION: PIN LOCATION LIST

W3-20

**42T-06-50000**
WIRING DIAGRAM WA70M-8E0

SIZE A3

0

KOMATSU