SEN06605-04

Shop Manual

DUMP TRUCK

HD465-8
HD605-8

SERIAL NUMBERS

HD465-30001 and up
HD605-30001 and up

KOMATSU

00 INDEX AND FOREWORD

INDEX

ABBREVIATIONS

- These abbreviations include those used in the shop manual for parts, components, and functions which are not easily understood. The abbreviation is shown and defined in full.
- The list may not include general usage abbreviations.
- Special abbreviations are identified in the text.
- This list of abbreviations is in two parts. One part is abbreviations used in the text of the manual, and the second is abbreviations used in the circuit diagram.

List of abbreviations used in the text

Abbreviation	Terms shown completely	Function (major applicable machine (*), or component and system)	Explanation
ABS	Anti-skid Brake System	Travel and brake (HD, HM)	When the tires slide (wheels do not turn), the brakes are released, and when the wheels start to turn, the brakes are applied again.
AISS	Automatic Idle Setting System	Engine	This function automatically sets the idle speed.
AJSS	Advanced Joystick Steering System	Steering (WA)	A lever is used to perform the steering operations. It shifts gear and changes direction (FORWARD or REVERSE).
ARAC	Automatic Retarder Accelerator Control	Travel and brake (HD, HM)	When the accelerator pedal is released while the machine travels downhill, this function automatically applies the retarder with a constant brake force.
ARSC	Automatic Retarder Speed Control	Travel and brake (HD, HM)	When the accelerator pedal is released while the machine travels downhill, this function automatically applies the retarder. It ensures that the machine speed does not accelerate above the speed set by the operator.
ASR	Automatic Spin Regulator	Travel and brake (HD, HM)	When the tires slip on soft ground surfaces, this function automatically uses the brake force to power each wheel.
ATT	Attachment	Work equipment	A device attached onto the standard machine, to let it do different operations.
BCV	Brake Cooling oil control Valve	Brake (HD)	When the retarder is not used, this valve bypasses part of the brake cooling oil to reduce the load on the hydraulic pump.
CAN	Controller Area Network	Communication and electronic control	One of the communication standards that is used in the circuits on the machine.
CDR	Crankcase Depression Regulator	Engine	A valve installed in the KCCV. It is written as CDR valve and it is not used independently.
CLSS	Closed-center Load Sensing System	Hydraulic system	This system can actuate several actuators at the same time regardless of the load (Improves mixed operations over OLSS).
CRI	Common Rail Injection	Engine	Engine controller electronically controls supply pump, common rail, and injector. This function correctly maintains fuel injection quantity and timing.
ECM	Electronic Control Module	Electronic control system	Electronic control device uses the signals from the sensors on the machine. These signal the actuators to function for the best operation. (Same as ECU)
ECMV	Electronic Control Modulation Valve	Transmission (D, HD, WA, etc.)	Electromagnetic valve that gradually proportions oil pressure to engage clutches and decrease transmission shock.

Abbreviation	Terms shown completely	Function (major applicable machine (*), or component and system)	Explanation
ECSS	Electronically Controlled Suspension System	Travel (WA)	This system absorbs machine vibration during high speed to ensure smooth travel, using hydraulic spring effect of the accumulator.
ECU	Electronic Control Unit	Electronic control system	Electronic control device uses the signals from the sensors on the machine. These signal the actuators to function for the best operation. (Same as ECM)
EGR	Exhaust Gas Recirculation	Engine	This function recirculates part of exhaust gas back to the combustion chamber to reduce temperature and control NOx emissions.
EMMS	Equipment Management Monitoring System	Machine monitor	This system allows monitor check of each sensor of the machine. (Data includes oil and filter replacement intervals, machine malfunctions, failure codes, and failure records)
EPC	Electromagnetic Proportional Control	Hydraulic system	This mechanism allows actuators to be operated in proportion to the current supplied.
FOPS	Falling Object Protection Structure	Cab and canopy	This structure protects the operator from objects that fall. This performance is standardized as ISO 3449.
F-N-R	Forward-Neutral-Reverse	Operation	Forward - Neutral - Reverse
GPS	Global Positioning System	Communication (KOMTRAX, KOMTRAX Plus)	Global Positioning System: This system uses satellites to determine the machine’s present location.
GNSS	Global Navigation Satellite System	Communication (KOMTRAX, KOMTRAX Plus)	Global Navigation Satellite System: This system uses satellites to determine the present machine location.
HSS	Hydrostatic Steering System	Steering (D)	This function uses the hydraulic motor and bevel shaft to control the difference in travel speed of right and left tracks. Therefore the machine can turn without using steering clutches.
HST	Hydro Static Transmission	Transmission (D, WA)	This function uses the hydraulic pump and motor together, to shift the speed range without using gears.
ICT	Information and Communication Technology	Communication and electronic control	A generally accepted term for engineered and applied technology of information procedures and communication.
IMA	Inlet Metering Actuator	Engine	This valve is installed at the inlet port of the pump, and adjusts fuel intake quantity to control fuel volume of the supply pump. (Same as IMV)
IMU	Inertial Measurement Unit	Engine	This is a device to detect the angle and speed of the 3 pivot points that control movements.
IMV	Inlet Metering Valve	Engine	This valve is installed at the inlet port of the pump, and it adjusts fuel intake quantity to control fuel release volume of supply pump. (Same as IMA)
KCCV	KOMATSU Closed Crankcase Ventilation	Engine	This mechanism causes the separation of oil in blowby gas and puts it in the intake side to be burned in the engine. It is primarily made up of filters.

Abbreviation	Terms shown completely	Function (major applicable machine (*), or component and system)	Explanation
KCSF	KOMATSU Catalyzed Soot Filter	Engine	This filter captures soot in exhaust gas. It is assembled in the KDPF.
KDOC	KOMATSU Diesel Oxidation Catalyst	Engine	This component is used to purify exhaust gas. It is assembled in to KDPF or assembled with the muffler.
KDPF	KOMATSU Diesel Particulate Filter	Engine	This component is used to purify the exhaust gas. KDOC (catalyst) and KCSF (filter to capture soot) are part of it. It is installed in the same location as a standard muffler.
KTCS	KOMATSU Traction Control System	Travel and brake (HM)	This function recovers the traction of the wheels by using the brakes automatically with the necessary force. At the same time, it activates the inter-axle differential lock when the wheels idle while the machine travels on soft ground.
LCD	Liquid Crystal Display	Machine monitor	Liquid crystal elements assembled into components such as a monitor.
LED	Light Emitting Diode	Electronic parts	Refers to a semiconductor element that emits light when energized in the forward direction.
LIN	Local Interconnect Network	Communication and electronic control	One of the communication standards that is used in the circuits on the machine.
LS	Load Sensing	Hydraulic system	Function that senses pressure differences of the pump and controls output volume corresponding to load.
LVDS	Low Voltage Differential Signaling	Communication and electronic control	One of the communication standards that is used in the circuits on the machine.
MAF	Mass Air Flow	Engine	This indicates airflow of the engine intake. It is used together with a MAF sensor.
MMS	Multimedia Messaging Service	Communication	Service that allows transmission and reception of short text or voice messages, or pictures between cell phones.
NC	Normally Closed	Electrical system, Hydraulic system	Properties of electrical or hydraulic circuits. Circuit is closed when it is not activated, and opens when it is activated.
NO	Normally Open	Electrical system, Hydraulic system	Properties of electrical or hydraulic circuits. Circuit is open when it is not activated, and closes when it is activated.
OLSS	Open-center Load Sensing System	Hydraulic system	Hydraulic system that can operate more than one actuator at the same time regardless of the load.
PC	Pressure Compensation	Hydraulic system	A function used to correct oil pressure.
PCCS	Palm Command Control System	Steering (D)	System in which a controller instantly analyses data from each lever, pedal, and dial, and performs optimum electronic control of the engine and transmission.
PCV	Pre-stroke Control Valve	Engine	This valve is installed at the inlet port of pump, and it adjusts fuel intake quantity to control fuel volume of supply pump.

Abbreviation	Terms shown completely	Function (major applicable machine (*), or component and system)	Explanation
PPC	Proportional Pressure Control	Hydraulic system	This system is used for controlling pressures. It moves actuators in proportion to oil pressure.
PPM	Piston Pump and Motor	Hydraulic system (D, PC, etc.)	Piston 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)	This function performs hydraulic control of the tilt and angle of the Bulldozer blade.
ROPS	Roll-Over Protective Structure	Cab and canopy	If a machine tilts over, this structure protects the operator who wears a seat belt from injury. (Operator Protection structure) This performance is standardized as ISO 3471.
SCR	Selective Catalytic Reduction	Urea SCR system	It is an exhaust gas conditioner, using urea water which converts nitrogen oxides (NOx) to harmless nitrogen and water. It is also known part of the name of related devices.
SI	Le Systeme International d' Unites (International unit system)	Unit	Abbreviation for "Le Systeme International d' Unites". It is the accepted unit system and "one unit for one quantity" is the basic principle applied,
SOL	Solenoid	Electrical system	Refers to an actuator that moves by magnetic force when the solenoid is energized.
TWV	2-Way Valve	Hydraulic system	Solenoid valve that switches direction of flow.
VGT	Variable Geometry Turbocharger	Engine	A turbocharger which can change the pattern of the exhaust flow area.

*1: Code for applicable machine model

D: Bulldozer

HD: Dump truck

HM: Articulate dump truck

PC: Hydraulic excavator

WA: Wheel loader

List of abbreviations used in the circuit diagrams

Abbreviation	Terms shown completely
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

FOREWORD, SAFETY, BASIC INFORMATION

HOW TO READ THE SHOP MANUAL

- Some of the machine attachments and options described in this shop manual may not be available. If they are required, consult your Komatsu distributor.
- The material and specifications are subject to change without notice.
- Shop Manuals are available for machine and engines. For the engine, see the shop manual for the machine which has the same model engine.
- Machine may differ from the figure contained in this manual. A typical model is shown in the illustrations of this shop manual.

Configuration of the shop manual

This shop manual contains technical information necessary to perform repairs and service. It is divided into the chapters that follow.

00 INDEX AND FOREWORD

This section describes the index, foreword, safety, and basic information.

01 SPECIFICATIONS

This section describes the specifications of the machine.

10 STRUCTURE AND FUNCTION

This section describes the structure and operation of each component with respect to each system. "STRUCTURE AND FUNCTION" is an aid to understand and troubleshoot each component.

20 STANDARD VALUE TABLE

This section describes the standard values for new machine and failure reason for test, adjust, and troubleshoot a problem. Use the standard values table to make sure the standard values for test and adjust, and judge troubles when you troubleshoot a problem.

30 TEST AND ADJUST

This section describes the test tools, the procedures for test and adjustment procedure of each part. The standard values and repair limit for TEST AND ADJUST are described in the "STANDARD VALUE TABLE".

40 TROUBLESHOOTING

This section describes how to troubleshoot failures and provides solution procedures by failure mode.

50 DISASSEMBLY AND ASSEMBLY

This section describes the special tools, work procedures, and safety precautions necessary for removal, installation, disassemble, and assemble of components and parts. In addition, bolt and nut tighten values, quantity, and weight of the materials, lubricants, and coolant necessary to this work is shown.

60 MAINTENANCE STANDARD

This section describes the maintenance standard value of each component. The maintenance standard shows the reason and solution for disassemble and assemble.

80 THE OTHER INFORMATION

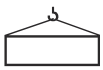
This section describes structure and function, test, adjust, and how to troubleshoot for all of other components or equipment not classified in the appendix.

90 Circuit diagrams

This section describes hydraulic circuit diagrams and electrical circuit diagrams.

Symbols

Important safety and quality items are identified with these symbols to ensure the shop manual is used correctly.

Symbol	Item	Remark
	Danger	If not prevented, this symbol indicates a very dangerous situation which will cause death or serious injury.
	Warning	If not prevented, this symbol indicates a potentially dangerous situation which will cause death or serious injury.
	Caution	If not prevented, this symbol indicates a potentially dangerous situation which will cause injury or property damage around the machine.
	Weight	This symbol indicates the weight of a part or component is an item that requires careful sling selection.
	Tighten Values	This symbol indicates the tighten value for parts which requires special care in assemble work.
	Layer	This signal indicates an area to layer with glue or grease in assembly work.
	Oil and coolant	This signal indicates an area to supply oil, coolant, and the quantity.
	Drain	This signal indicates an area to drain oil, coolant and the quantity.

Signal word

Signal word for a notification described as follows.

Symbol	Item	Remark
NOTICE	Notice	If the precaution of this signal word is not observed, machine damage or shorter service life may occur.
REMARK	Remark	This signal word contains useful information to know.

Unit

International System of Units (SI) is used in this manual. Units used in the past are given in { }.

SAFETY NOTICE FOR OPERATION

- Appropriate service and repair are very important to ensure safe operation of the machine. The shop manuals describe the good and safe service and repair procedures recommended by Komatsu. Some of the service and repair procedures require special tools made by Komatsu for special functions.
- The symbol mark ⚠ is indicated for such matters that require special precautions. ⚠ When work indicated with this warning mark is performed, refer to the instructions with special care. Should a dangerous situation occur during such work, be sure to keep safe and take all necessary measures.

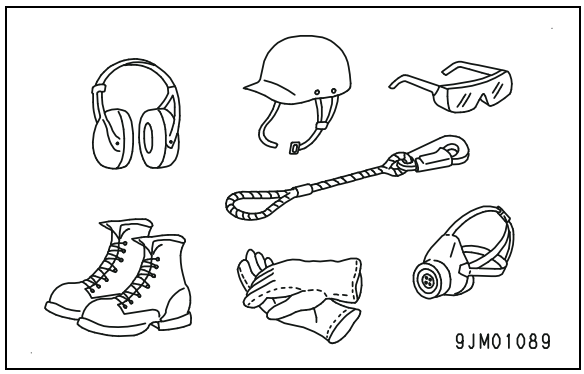
Safety matters

- Good organized workplace
- Correct work clothes
- Obey work standard
- Application of hand signals
- Prohibit persons not approved to operate or handle the machine
- Safety check before you start work
- Wear safety glasses when you clean or grind
- Wear welding goggles and protective clothes for welding
- Be in good condition, and prepare your work area correctly
- Always be alert and careful.

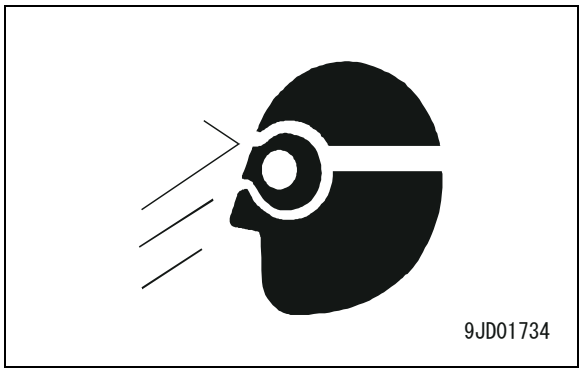
General precautions

⚠ **If the machine is handled incorrectly, it is dangerous. Read and understand what is described in the operation and maintenance manual before operation. Read and understand what is described in this manual before operation.**

- Read and understand the safety labels on the machine before you perform any repairs. For the locations of the safety labels explanation of precautions, see Operation and Maintenance Manual.
- Organize tools and parts removed in the work area. Always keep the work area clean and make sure that there is no dust, dirt, oil, or water on the floor. Smoke only in the approved areas. Never smoke while you work.
- Keep all tools in good condition, learn the correct procedure, and use the proper tools. Examine the tools, machine, lift truck, fully before you start work.
- Always wear safety equipment when you perform any operation. Do not wear loose clothes.



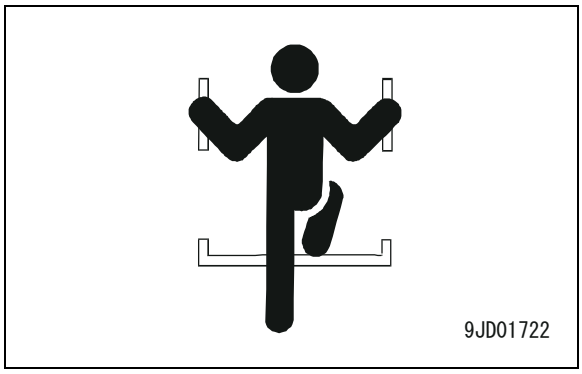
- Always wear the protective eyeglasses when you hit parts with a hammer.
- Always wear the protective eyeglasses when you grind parts.
- When you perform any operation with other persons, always agree on the procedure before you start. Be clear in verbal communication, and observe hand signals. Hang "REPAIR" warning tag in the operator's cab before you start work.
- Work and operation which require license or approved performed by a qualified person.
- Welding repairs performed by approved and experienced welders. When you perform welding, always wear gloves, welding goggles, cap and other clothes for welding work.



- Warm up before you start work with exercise which increases alertness and the range of movement to prevent injury.
- Avoid long work, and take stop at times to keep in good condition. Stop work in a safe area.

Preliminary work precautions

- Put the machine on level ground, and apply the parking brake. Chock the wheels or tracks to prevent machine movement before you make any repairs.
- Lower the work equipment to the ground before you start work. If this is not possible, engage the lock pin or use blocks to prevent the work equipment from movement. In addition, be sure to lock all the control levers and hang "REPAIR" warning tag on them.
- When you perform disassemble or assemble work, support the machine with blocks, jacks, or stays before you start.
- Remove all mud and oil from the steps before you go up and down on the machine. Always use the handrail, or steps when you go up and down on the machine. Never jump on or off the machine. Repair or replace damaged steps or handrails immediately.



Precautions during work

- For the machine with the battery disconnect switch, check before you start the work that the system operating lamp is OFF. Then, turn the battery disconnect switch to off (○) position.

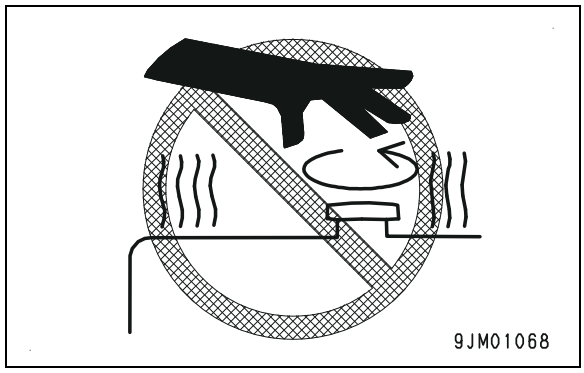
  REMARK

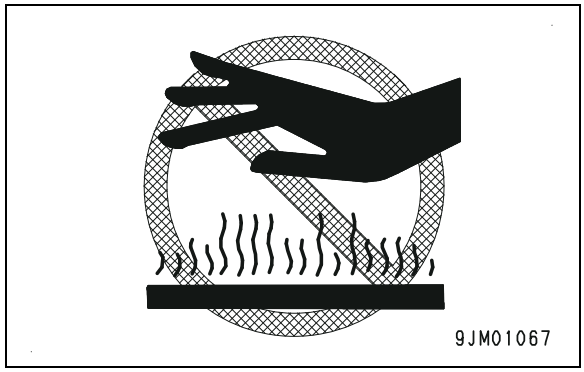
  If the battery disconnect switch is a key type, remove the key after it is turned off (○). For the machine without a battery disconnect switch, turn the start switch to off position, wait for two minutes or more before you start work. Disconnect the battery, start with the negative (-) terminal first.
- For the machine with quickly removed battery terminal (-), make sure that system operating lamp is off before you start work. Then, disconnect the battery terminal (-).

  REMARK

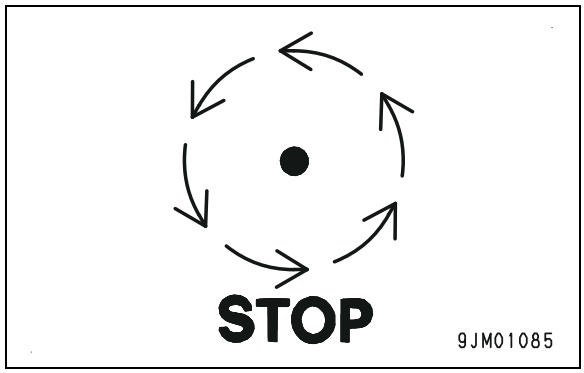
  For the machine without the system in operation lamp, turn the start switch to off position, wait for two minutes or more before start work. Disconnect the battery terminal (-).
- Before you start work, disconnect and remove oil, fuel, water, or air from the system. When you remove the cap, oil filter, drain plug, or oil pressure plug, it do this slowly otherwise the oil spills.
- When you remove or install the oil level plug or the piping in the fuel circuit, wait 30 seconds or longer after the engine is stopped. Start the work after the remaining pressure is released from the fuel circuit.

- The coolant and oil in the circuits are hot when the engine is shut down. Be careful not to become burned. Wait for the oil and coolant to cool before you perform any work on the oil or coolant circuits.

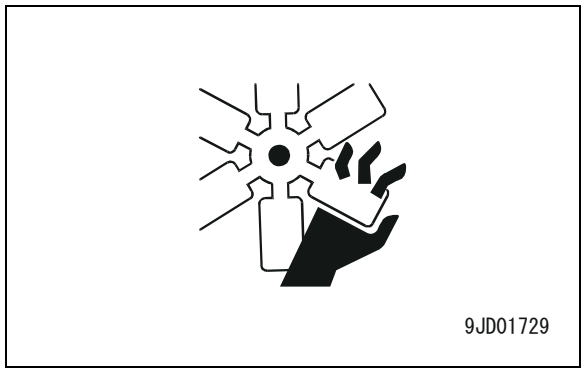




- Before you start work, stop the engine. When you work on or around parts that move, stop the engine. When you examine the machine without shutdown of the engine to measure oil pressure, speed, or temperatures, take extreme care not to become caught in parts that move.
- When you must raise a heavy component (heavier than 25 kg), use a hoist or crane. Before you start work, check that the slings (wire ropes, web slings, chains, or hooks) are free from damage. Always use slings with approved capacity and install them into proper positions. Operate the hoist or crane slowly to prevent the component from touch of any other part. Do not work on any part lifted by a hoist or crane.

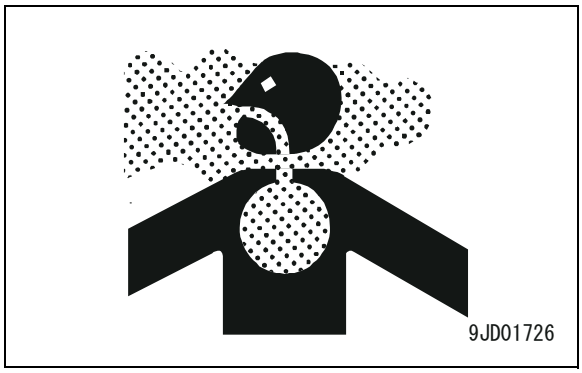


- When you remove a part which is in internal pressure or in reaction force of a spring, always leave 2 bolts in positions. Loosen those 2 bolts gradually and in one and then the other to release the pressure, and then remove the part.
- When you remove a component, do not break or damage the electrical wires. Damaged wires may cause a fire.
- When you remove piping, do not spill the fuel or oil. If any fuel or oil spills onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip or cause fires.
- Do not use gasoline to clean parts as a general rule. Do not use gasoline to clean electrical parts, in particular.



- Be sure to assemble all parts again in their initial positions. Replace any damaged parts with new parts. When you install hoses and wire harnesses, be sure that you do not cause damage to them by contact with other parts when the machine is operated.
- When you install high-pressure hoses and lines, make sure that they are not twisted. Damaged hoses and lines are dangerous, be very careful when you install hoses and lines on high-pressure circuits. In addition, make sure that high-pressure hoses and lines are correctly installed.

- When you assemble or install parts, always tighten them to the specified value. When you install protection parts such as guards, or parts which vibrate or rotate at high speed, make sure that they are installed correctly.
- Never use your fingers or hand when you align two holes. Be careful not to get your fingers caught in a hole.
- Make sure that the measurement tools are correctly installed when you measure hydraulic pressure.
- Take care when you remove or install the tracks machines. Since the track shoe may disconnect suddenly when you remove it, never let anyone near or at either end of the track shoe.
- If the engine is operated for a long time in a closed area with unsatisfactory airflow, there may be dangerous gas. Open the windows and doors to ventilate the area correctly.

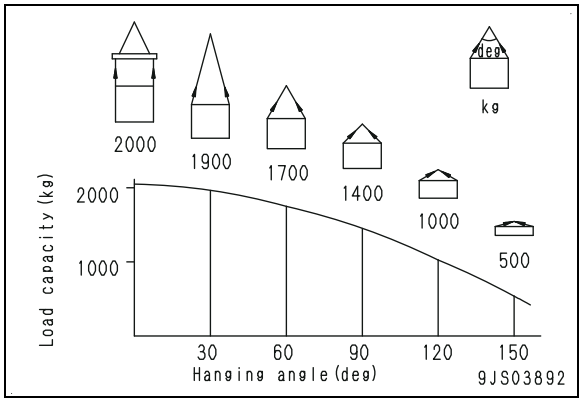


Hand signals and use of sling precautions

- One appointed worker make hand signals and coworkers must communicate with each other frequently. The appointed worker must make hand signals in clear view of the operator's seat and view of the work conditions. The signal worker must stay in front of the load and guide the operator safely.
  - ⚠ **Never stay below the load.**
  - ⚠ **Do not move a load over a person.**
  - ⚠ **Never step on the load.**
  - ⚠ **Do not hold or prevent the load from swinging with your hands.**
  - ⚠ **Personal must move to a safe area away from lifted load.**
- Examine the lift slings before you start work.
- Use gloves during sling work. (Put on leather gloves, if available.)
- Make sure the load weight is balanced and in the middle.
- Use the proper sling corresponding to the weight of the load and procedure to attach them. If too thick wire ropes are used to sling a light load, the load may slip and fall.
- Do not sling a load with 1 wire rope alone. If it is slung so, it may rotate and may slip out of the rope. Install 2 or more wire ropes symmetrically.
  - ⚠ **When you lift with one rope sling, it may allow load to turn or slip from its initial position. This could cause an accident.**
- Attachment angle must be 60 °or smaller as a rule.
- When you sling a heavy load (25 kg or heavier), the angle of the rope must be thinner than the hook.

REMARK

When you sling a load with 2 or more ropes, the force applied to each rope increases with the increase in hang angle. The figure below shows the difference of permitted load in kN {kg} when a lift is made with 2 ropes. Each rope is allowed to sling a maximum of 9.8 kN {1000 kg} vertically, at different hang angles. When the 2 ropes sling a load vertically, they can sling a maximum of 2000 kg of total weight. This weight is reduced to 1000 kg when the 2 ropes are attached at an angle of 120 °. If the 2 ropes lift a 2000 kg load at an angle of 150 °. Each rope is applied to a force as large as 39.2 kN {4000 kg}.

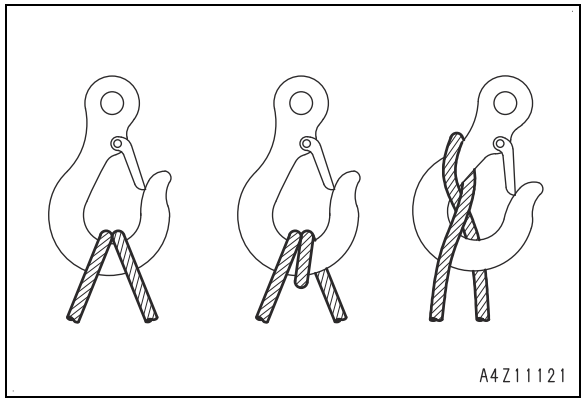


- When you install wire ropes to an angular load, apply pads to protect the wire ropes. If the load may slip, apply proper material to prevent the wire rope from slip.

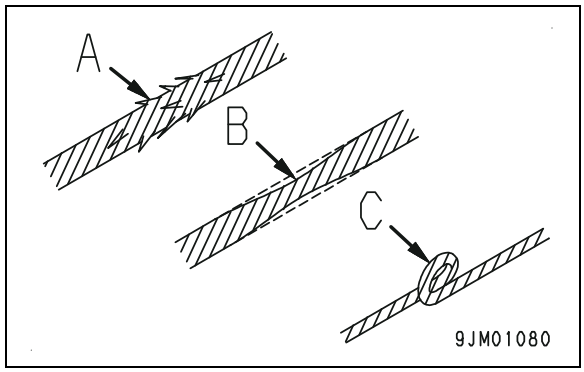
- Use the specified eye bolts and attach them to wire ropes or chains with shackles.
- Attach wire ropes to the middle part of the hook.
  - ⚠ **If hooks does not have a safety lock system, do not use it.**
  - ⚠ **Attachment of sling near the point of the hook may cause the rope to slip off the hook.**

  REMARK

  The hook is the strongest at its middle part.



- Never use a damaged rope sling (A), reduced dimension (B), or bends (C). There is a dangerous that the rope may break during the lift operation.



Precautions for sling up

- Tighten sling slowly with crane. When you settle the wire ropes, do not grasp, but push them from outer edge. If you grasp the sling, injury may occur.
- After the wire ropes are tight, stop the crane and examine the condition of the load, wire ropes, and pads.
- If the load is not stable, the wire rope or chains are twisted, lower the load adjust slings and lift again.
- Do not lift loads on an angle.

Precautions for sling down

- When you lower load, stop it temporarily at 30 cm above the floor, and then lower it slowly.
- Make sure that the load is stable, and then remove the sling.
- Remove bends and dirt from the wire ropes and chains and put them in the specified area.

Precautions when using a mobile crane

REMARK

Read Operation and Maintenance Manual of the crane carefully and operate the crane safely.

Precautions when using an overhead crane

⚠ **When you lift a heavy component (heavier than 25 kg), use a winch or crane.**

REMARK

Weight of components heavier than 25 kg are shown with symbol  in the "DISASSEMBLY AND ASSEMBLY".

- Before you start work, examine the wire ropes, brake, clutch, controller over wind devices. Test ground circuit, crane safety device, caution lamps and examine the safety items.
  - Observe the signals for sling work.
  - Operate the winch in safe area.
  - Be sure to examine the directions on the indication plate (north, south, east and west) on the crane operation switches.
  - Do not sling a load at an angle. Do not move the crane while load has movement.
  - Do not raise or lower a load while the crane move longitudinally or laterally.
  - Do not pull a sling.
  - When you lift a load, stop it just after it clears the ground, examine that the loads is safe, and then finish the lift.
  - Inspect the travel routing and lift a load to a safe height.
  - Put the control switch in a position where it is not an obstruction to the work.
  - After you operate the crane, do not let the control switch swing.
  - Locate the position of the electrical primary switch so you can turn it off immediately in an emergency.
  - If the hoist stops because of an electrical failure, turn off the primary switch. When you set a ground fault circuit, make sure that the devices related to that circuit are not set to operate.
  - Stop the hoist operation when the area becomes obstructed.
  - After you complete the work, and raise the hook a minimum 2 m above the floor. Do not leave the sling installed to the hook.

Select wire ropes

Select adequate wire rope depends on the weight of the parts to be lifted, refer to the table below.

REMARK

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

Wire rope (JIS G3525 6x37-A type) (Standard Z twist wire not galvanized)

Nominal dimension of rope (mm)	Approved 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 when you disconnect air conditioner piping

NOTICE

When you replace the air conditioner unit, air conditioner compressor, condenser or receiver drier, collect the air conditioner gas (R134a) from the air conditioner circuit before you disconnect the air conditioner hoses.

REMARK

- Request a qualified person to collect, add and fill the air conditioner gas (R134a).
- Never release air conditioner gas (R134a) to the atmosphere.

⚠ **Put on protective eyeglasses, gloves and work wear. Otherwise, when air conditioner gas (R134a) gets in your eyes, you may lose your sight. If it touches your skin, it may cause injury.**

- When you loosen the air conditioner hoses and piping, be sure to use 2 wrenches.

Precautions for air conditioner piping

- When you install the air conditioner piping, be careful, to keep dirt, contamination and water from the hose.
- Make sure that the o-rings are attached to the joints when you connect the air conditioner piping.
- Do not use an o-ring again. It is deformed and deteriorated.
- When you remove the o-rings, use a soft tool to prevent damage to piping.
- Make sure the o-ring is not damaged or deteriorated.
- Apply oil for air conditioner gas (R134a) to o-ring.

REMARK

Do not apply oil to the bolts, nuts or unions.

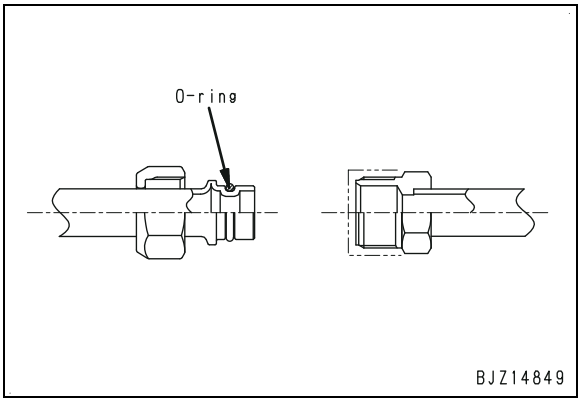
Manufacturer	Part name
DENSO	ND-OIL8
VALEO THERMAL SYSTEMS	ZXL100PG (PAG46 or equivalent)
SANDEN	SP-10

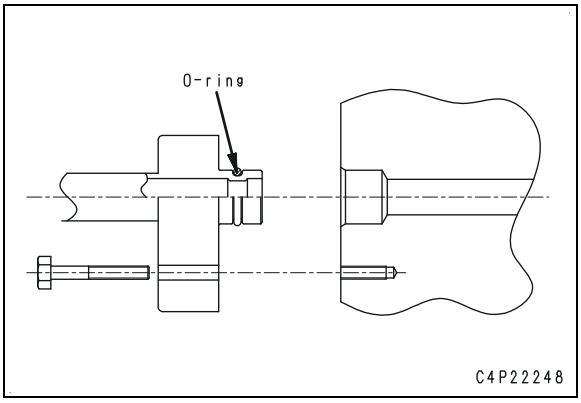
When you tighten nuts on air conditioner hoses and piping, be sure to use 2 wrenches. Use one wrench to hold and tighten the nut with the other wrench. (Use a wrench to tighten).

REMARK

- The figure shows an example of fitting of o-ring.
- An o-ring is attached to each joint of the air conditioner piping.

For tighten values, see "THE OTHER INFORMATION", "PRECAUTIONS FOR DISCONNECTING AND CONNECTING HOSES AND TUBES IN AIR CONDITIONER PIPINGS".



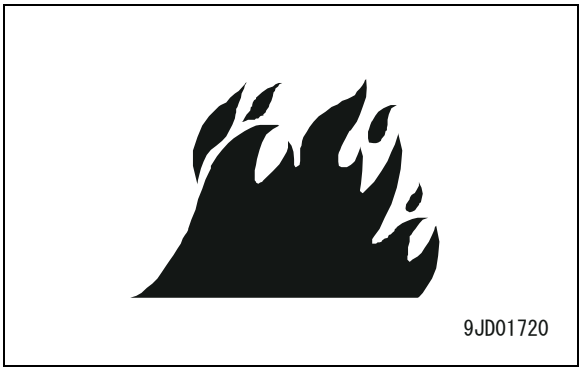


PRECAUTIONS TO PREVENT FIRE

Fire caused by fuel, oil, coolant or window washer fluid

Do not bring any open flame near fuel, oil, and coolant or window washer fluid. Always observe as follows.

- Do not smoke or use open flame near fuel or other flammable materials.
- Shut down the engine before you add fuel.
- Do not leave the machine while you add fuel or oil.
- Tighten the fuel and oil caps correctly.
- Be careful not to spill fuel on hot surfaces or on parts of the electrical system.
- After you add fuel or oil, wipe up any spilled fuel or oil.
- Put greasy rags and other flammable materials into a safe container to maintain safety at the workplace.
- When you clean parts with oil, use a non-flammable oil. Do not use diesel oil or gasoline. There is dangerous that they may catch fire.
- Do not weld or cut any pipes or hoses that contain flammable liquids.
- Determine well-ventilated areas for to store oil and fuel. Keep the oil and fuel in the specified area and do not allow unauthorized persons to enter.
- When you grind or weld on the machine, move any flammable materials to a safe area before you start.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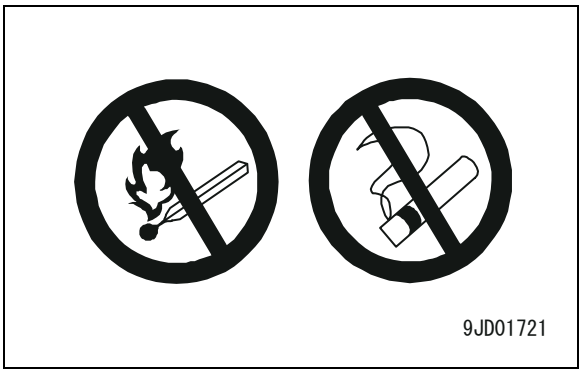
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Fire caused by accumulation or flammable material

- Remove any dry leaves, particles, or any other flammable materials accumulated or attached to or around the engine exhaust system.
- To prevent fires, remove any flammable materials such as dry leaves, particles, or any other flammable materials accumulated around the cooling system.

Fire caused from electrical wires

Short circuits in the electrical system can cause fire. Always observe as follows.

- Keep all the electrical connections clean and correctly tightened.
- Examine wires each day for proper installation or damage. Attach any loose connectors or wire clamps. Repair or replace any damaged wires.

Fire caused by piping

Make sure that all clamps for the hoses and piping, guards, and mounts are correctly attached in position.
If loose, they may vibrate during operation and rub against other parts. This is dangerous, may damage the hoses and cause high-pressure oil to leak cause a fire or serious personal injury or death.

Fire around the machine because of hot exhaust gas

This machine is equipped with KDPF (Komatsu Diesel Particulate filter).
KDPF is a system to clean exhaust gas by removal of soot in exhaust gas. During regeneration, the temperature of exhaust gas may be higher than that of standard models. Do not bring any flammable materials near exhaust pipes.

- When there are dry leaves or pieces of contamination near the work area, set the system to disable the regeneration before you start work. Do this to prevent a fire hazard because of hot exhaust gas.
  See the Operation and Maintenance Manual for the setting procedure.

Explosion caused by lighting equipment

- When you measure fuel, oil, battery electrolyte, or coolant, always use safe light equipment with explosion specifications.

- When you use the electrical system for the lighting equipment from the machine, use the instructions in the Operation and Maintenance Manual.

ACTIONS IF FIRE OCCURS

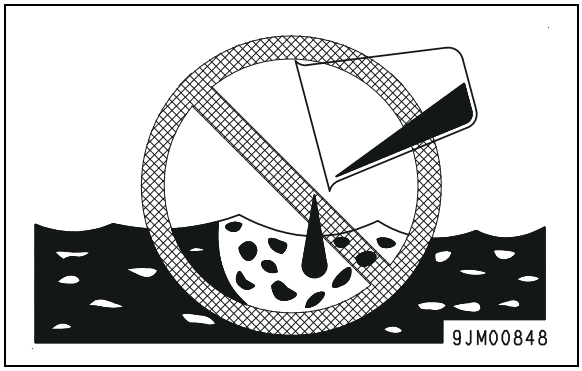
- Turn the start switch to OFF position to stop the engine.
- Use the handrails and steps to move off the machine.
- Do not jump off the machine. You may fall and be injured.
- The fumes generated by a fire contain harmful materials which have a bad influence on your body when they are inhaled. Do not breathe the fumes.
- After a fire, there may be harmful compounds left. If they touch your skin, they may injury your body.
  Be sure to wear rubber gloves when you handle the materials left after the fire.

  When you wear work gloves, wear rubber gloves below them.

PRECAUTIONS FOR REMOVAL OF DANGEROUS MATERIALS

To prevent pollution, use these procedures for removal unwanted materials.

- Always drain the oil from your machine in containers. Never drain the oil or coolant directly onto the ground, dump into drain systems, waterway, or lakes.
- Obey appropriate laws and regulations when you discard harmful objects such as oil, fuel, coolant,solvent, filters, batteries, and DEF.



Avoid burned rubber or plastics which produce a toxic gas that is harmful to people.

- When discard parts made of rubber or plastics (hoses, cables, and harnesses), always comply with the local regulations.

STEPS NECESSARY TO MEET EXHAUST GAS REGULATIONS

This machine meets either of Tier4 Final for North America or Stage IV Europe regulations.

This machine is equipped with two exhaust treatment systems:

- Komatsu Diesel Particulate Filter (hereafter KDPF): A device which captures soot in the exhaust gas to purify exhaust gas. This procedure burns the soot and referred to as "regeneration".
- Urea SCR system: A device which decomposes the toxic nitrogen oxides (NOx) mixed in the exhaust gas into harmless nitrogen and water. Spraying aqueous urea solution into the exhaust gas produces a reaction between the nitrogen oxides and ammonia generated from the urea solution and decomposes the nitrogen oxides into nitrogen and water.

Either AdBlue® or DEF may be used as the aqueous urea solution for the SCR system.

AdBlue® is a registered trade-mark of VDA (Verband der Automobilindustrie e.V.: Automobile Association of Germany).
DEF is the abbreviation for Diesel Exhaust Fluid.

Commercial AdBlue® that is API approved and meets all the requirements defined in ISO 22241-1.

This solution will be represented as AdBlue® throughout this manual.

About AdBlue®

AdBlue® is necessary for the urea SCR system. DEF is a colorless transparent 32.5% urea solution. Urea as main constituent is a material which is used for cosmetics, medical and pharmaceutical products, and fertilizer, etc.

If you add any additional additive agents or water to AdBlue® and use it, the devices will not function properly, and conformance to the exhaust gas regulations will be lost.

- In Europe, use AdBlue®.
- In North America, use DEF (Diesel Exhaust Fluid) which is certified by API (American Petroleum Institute). DEF Certification Mark shown as follows. Look for the API DEF Certification Mark when purchasing DEF.
  API Diesel Exhaust Fluid Certification Mark is the trade mark of API (American Petroleum Institute).

PRECAUTIONS FOR DEF

GENERAL CHARACTER AND PRECAUTIONS FOR USAGE

DEF is a colorless transparent 32.5% urea solution. Urea is the primary material used in medical products, and fertilizer. These situations require immediate step:

- If it gets on your skin, it may cause injury. Immediately take the dirty work wear and shoes off and clean with water. In addition, clean with a solution of soap and water. If your skin becomes red or begins to hurt, immediately consult a doctor.
- Do not induce vomit when swallowed. If swallowed, rinse mouth fully with water and consult a doctor.
- Avoid contact with the eyes. If there is contact, flush with clean water for several minutes and consult a doctor.
- Wear protective eyeglasses when near DEF to protect from solution spray in your eyes. Wear rubber gloves when you perform work handling DEF to avoid skin contact.

PRECAUTIONS WHEN YOU ADD DEF

Do not put fluid other than DEF into DEF tank. If diesel fuel or gasoline is added into the tank, it can cause a fire. Some fluids or agents added can create and emit a toxic gas.

When you open the cap of DEF tank of the machine, ammonia vapor may release. Keep your face away from the fill port when open or fill tank.

PRECAUTIONS WHEN YOU STORE DEF

If the temperature of DEF becomes high, harmful ammonia gas is released. Completely seal the container to be kept. When you open the container, perform in good ventilated area.

Avoid sunlight when you store AdBlue/DEF. Always use the initial container. Do not replace the container of AdBlue/DEF with another one. If AdBlue/DEF is kept in an iron or aluminum container, toxic gas may develop or corrode the container.

PRECAUTIONS FOR FIRE HAZARD AND LEAKAGE

AdBlue/DEF is nonflammable, however, in the case of a fire it may generate an ammonia gas. Act on the “STEPS IF FIRE OCCURS”.

If AdBlue/DEF is spilled, immediately wipe and clean the area with water. If spilled AdBlue/DEF is left and the area is not cleaned, toxic gas or corrosive material and caused a chemical reaction.

THE OTHER PRECAUTIONS

When you discard AdBlue/DEF, treat it as a toxic material. For the procedure, refer to “PRECAUTIONS FOR REMOVAL OF DANGEROUS MATERIALS”. The container of AdBlue/DEF is handled as a toxic material.

Never use an iron or aluminum container when you dispose AdBlue/DEF fluid, because toxic gas may develop and or corrode the container. Use a container made of PP, PE or stainless steel when you handle AdBlue/DEF.

Do not touch any fluid from urea SCR. This fluid becomes acid with the influence of fuel and oxidation catalyzers. If it gets on your skin, fully clean it off with water.

Never relocate or modify the exhaust gas after treatment device. Harmful gas is released and causes serious damage to the environment and violates emission laws.

DEF STORAGE PRECAUTIONS

- If the temperature of AdBlue/DEF becomes high, harmful ammonia gas is generated. Completely seal up container to be kept. When you open the container, open in a good ventilated area.
- When you store AdBlue/DEF, prevent direct sunlight. Always use the initial container. Do not replace the container of AdBlue/DEF with another one. If AdBlue/DEF is kept in an iron or aluminum container, toxic gas may develop or corrode the container.
- AdBlue/DEF freezes at –11 °C. The recommended temperature when stored is -5 °C or greater.
  The relation between the upper temperature limit and the length of time AdBlue/DEF is stored is shown in the table.

Temperature of area	Stored period
Maximum 10 °C	Maximum 36 months
Maximum 25 °C	Maximum 18 months
Maximum 30 °C	Maximum 12 months
Maximum 35 °C	Maximum 6 months

*: Do not keep AdBlue/DEF in the temperature of 35 °C or greater.

How you handle AdBlue/DEF in cold weather

- AdBlue/DEF freezes at –11 °C.
  AdBlue/DEF may freeze and break devices and parts in the DEF tank. Add AdBlue/DEF to the specified quantity for cold weather.
- In cold weather, keep AdBlue/DEF and the machine where the temperature is at –11 °C or higher to prevent the tank from freeze.
  Drain AdBlue/DEF to prevent it from freeze.

PRECAUTIONS WHEN YOU HANDLE HYDRAULIC EQUIPMENT

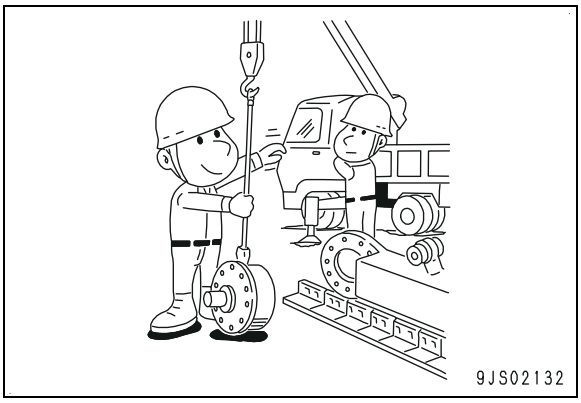
Because of high pressure and more precise hydraulic components, the most likely cause of a failure is dirt and contamination material in the hydraulic circuit. Special care is necessary when you add hydraulic oil, or when disassemble, or assemble hydraulic components.

Select an appropriate workplace

- In wet, windy or dusty environment, do not add hydraulic oil, change filters, or repair the machine.

Disassemble and maintenance work outdoors

- Outdoors, there is a risk of dust go into the component during disassemble or maintenance work. Replacement of the assembly is recommended.
- Perform disassemble and maintenance work in a clean area.



Seal openings and prevent oil flow

Plug openings of the piping and the device which are removed to prevent unwanted material from go into components and oil flow out.

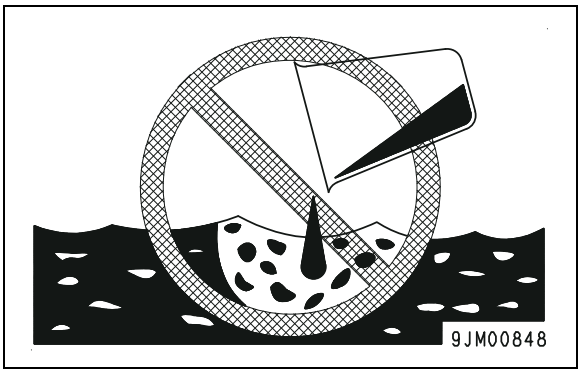
NOTICE

Do not open, otherwise unwanted material may enter or oil leak out and harm the environment.

Do not discard oil without care. Ask for the proper dispose or bring it back to dispose it correctly.

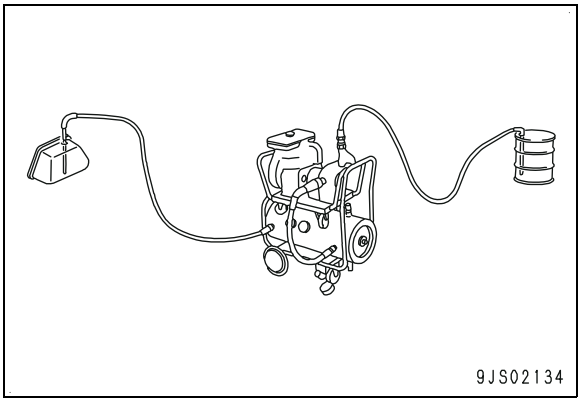
REMARK

Cover the areas tightly with caps or bags.



Prevent unwanted materials during fill

- During the fill hydraulic oil, do not let unwanted materials enter the hydraulic components.
- Clean the oil fill port and area and the fill pump.
- Fill using a filter transfer device which can filter the contaminations accumulated in the oil while stored.



Change hydraulic oil while its temperature is high

- The higher the oil temperature is, the better it flows. Also, the contamination is released from the circuit. Perform the replacement while oil temperature is high.
- It is necessary to drain as all the old hydraulic oil as possible when you change oil.

NOTICE

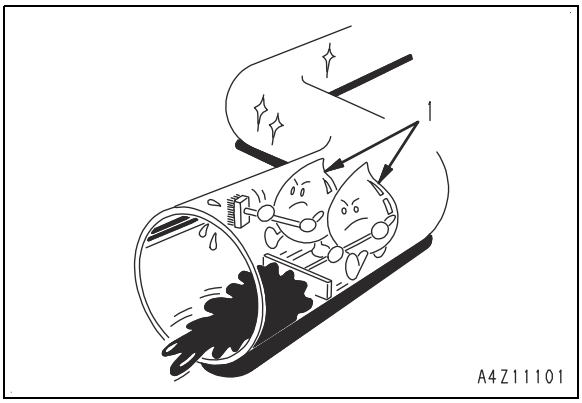
Old hydraulic oil will contaminate new oil when mixed.

REMARK

Drain the old hydraulic oil not only from the hydraulic tank but also from the filter and drain plug in the circuit.

Flush operation

- System flush is required to filter out the contaminations in the hydraulic circuit after you disassemble and assemble, or you replace the oil.
- Usually, the flush procedure is performed twice. Primary flush is performed using special flush oil (1) and the secondary flush is performed by using the specified hydraulic oil.

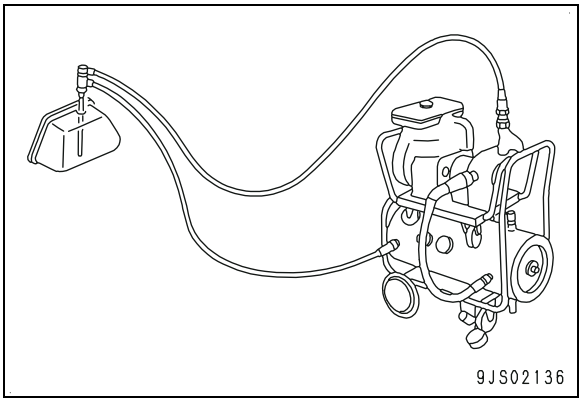


Clean operation

Perform oil flush to remove the contaminations in the hydraulic circuit after repair of the hydraulic components, pump, or control valve.

REMARK

The oil flush equipment can remove the fine (approximately 3 μm) particles that the filter assembled in the hydraulic equipment cannot remove. Prevent, it is very good device.



PRECAUTIONS WHEN YOU DISCONNECT AND CONNECT PIPES

When you perform "TEST AND ADJUST" of the machine, "removal and installation" and "disassemble and assemble" of the components, observe these precautions.

Precautions for removal and disassemble work

- If the cooling system contains coolant, discard it correctly. Do not drain on the ground, or drains.
- After you disconnect hoses and piping, plug them to prevent contamination.
- When you drain oil, prepare a container with sufficient capacity.
- Examine the match marks which indicate the installed position. Place the match marks in the positions where necessary before removal of components to prevent any mistake when assemble.
- To prevent too much force applied to the wires, always hold the connectors when you disconnect harness connectors. Do not pull the wires.
- Attach tags to wires and hoses until installation is done in the correct installed positions.
- Measure the thickness and number of shims.
- When you lift a component, use proper slings with sufficient load capacity.
- When using force screws to remove any component, tighten the force screws equally and in one and then the other.
- Before you remove any component, clean the area and cover the component to prevent any unwanted material from entry after removal.
- After you disconnect the piping or open a pipe joint, install these plugs.

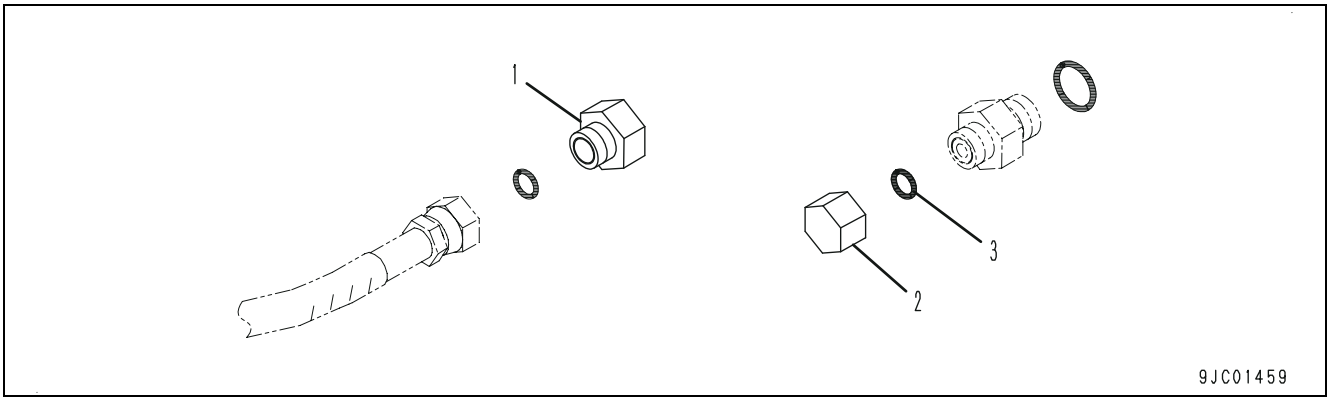
NOTICE

When you disassemble the machine, examine the part number in the Parts book and use the appropriate part that matches the usage conditions.

REMARK

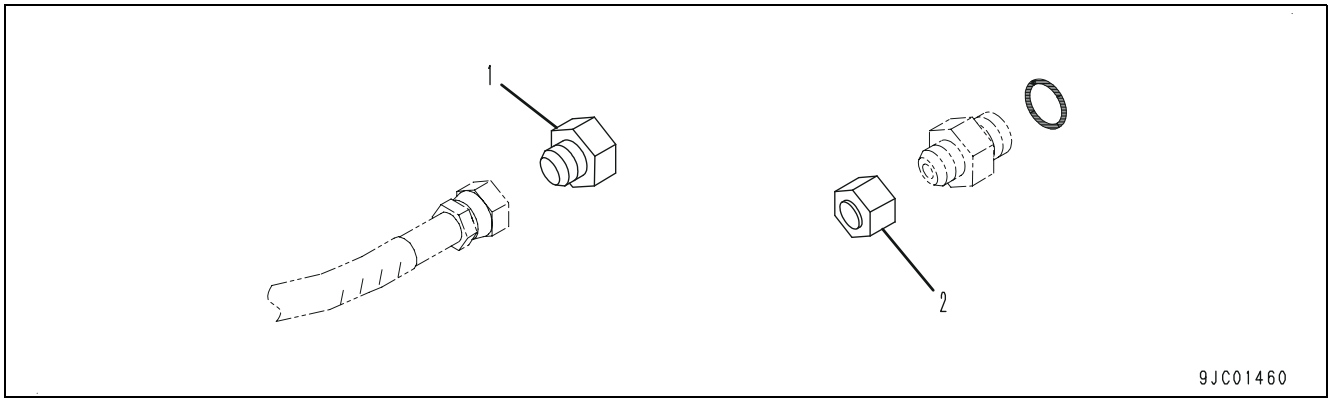
The part numbers of o-ring shown in the table indicate the temporary part number when disassemble and movement of the machine.

Parts for disassemble of the face type seals on hoses and piping



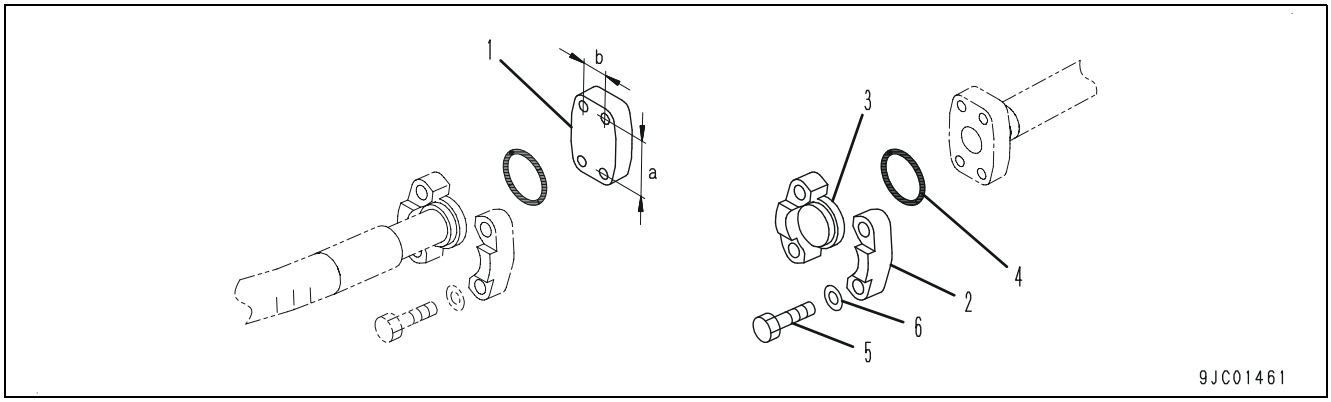
Nominal number	Hose side	Pipe joint side	O-ring (3)
	Plug (1)	Nut (2)	
02	07376-70210	02789-00210	02896-11008
03	07376-70315	02789-00315	02896-11009
04	07376-70422	02789-00422	02896-11012
05	07376-70522	02789-00522	02896-11015
06	07376-70628	02789-00628	02896-11018

Parts for the removal of hoses and piping with taper seals



Nominal number	Hose side	Pipe joint side
	Plug (1)	Nut (2)
02	07376-50210	07222-00210
03	07376-50315	07222-00312
04	07376-50422	07222-00414
05	07376-50522	07222-00515
06	07376-50628	07222-00616
10	07376-51034	07222-01018
12	07376-51234	07222-01219
14	07376-51443	07222-01422

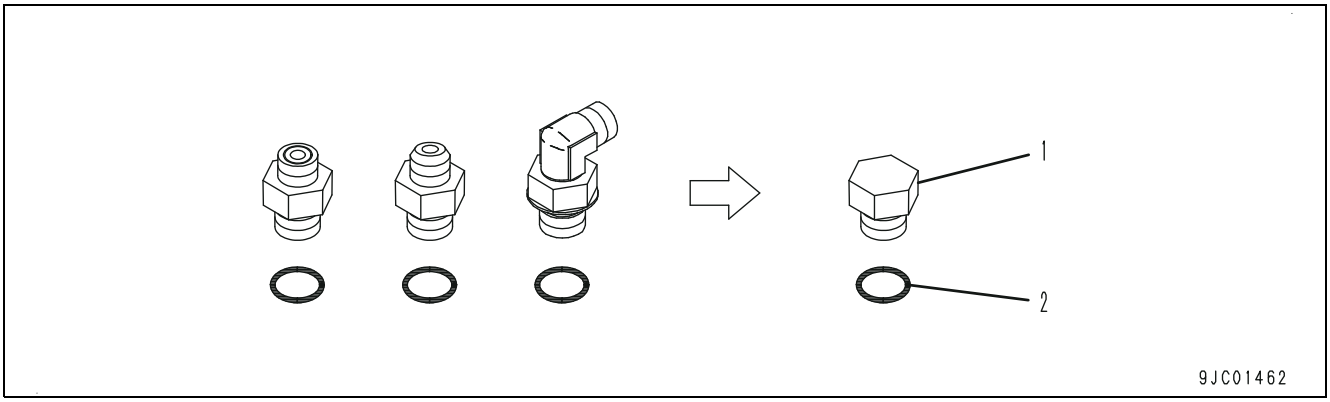
Parts to disconnect split flange type on hoses and piping



Nominal number	Bolt pitch (mm)		Hose side	Tube side		O-ring (4)	Bolt (5)	Washer (6)
	a	b	Flange (1)	Split flange (2)	Sleeve head (3)			
04	38.1	17.5	07379-00400	07371-30400	07378-10400	07000-12021	01010-80825	01643-50823
05	42.9	19.8	07379-00500	07371-30500	07378-10500	07000-13022	01010-80830	01643-50823
06	47.6	22.2	07379-00640	07371-30640	07378-10600	07000-13025	07372-51035	01643-51032
10	52.4	26.2	07379-01044	07371-31049	07378-11000	07000-13032	07372-51035	01643-51032
12	58.7	30.2	07379-01250	07371-31255	07378-11200	07000-13038	07372-51035	01643-51032
	66.7	31.8	07379-01260	07371-51260	07378-11210	07000-13038	01010-81245	01643-51232

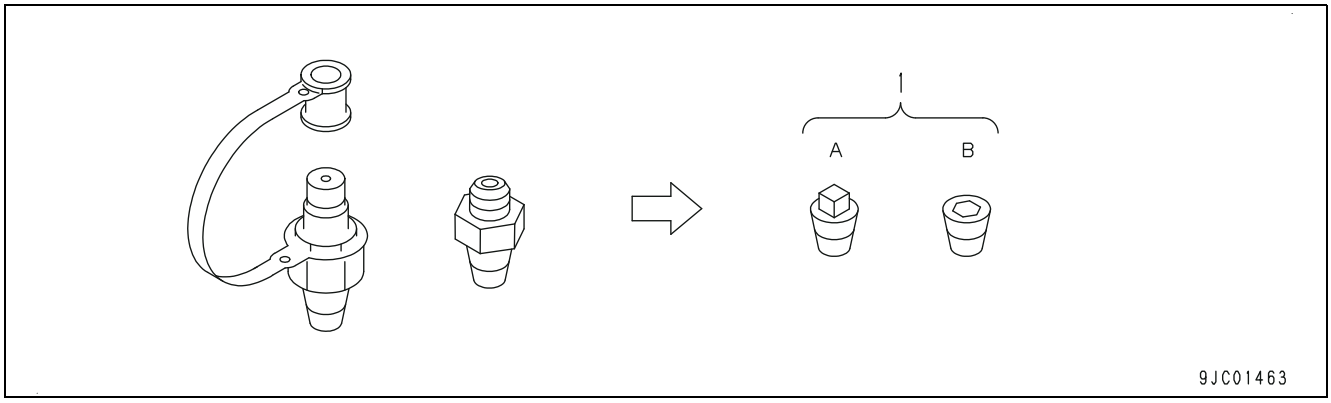
Nominal number	Bolt pitch (mm)		Hose side	Tube side		O-ring (4)	Bolt (5)	Washer (6)
	a	b	Flange (1)	Split flange (2)	Sleeve head (3)			
14	69.9	35.8	07379-01460	07371-31465	07378-11400	07000-13048	07372-51240	01643-51232
	79.4	36.5	07379-01470	07371-51470	07378-11410	07000-13048	01010-81455	01643-31445
20	77.8	42.8	07379-02071	07371-32076	07378-12000	07000-12060	07372-51240	01643-51232
	96.8	44.5	07379-02080	07371-52080	07378-12010	07000-12060	01010-81865	01643-31845
24	88.9	50.8	07379-02484	07371-12484	07378-12400	07000-12070	07372-51240	01643-51232
30	106.4	62	07379-03010	07371-13010	07378-13000	07000-12085	07372-51650	01643-51645
34	120.6	69.8	07379-03411	07371-13411	07378-13400	07000-12100	07372-51650	01643-51645
40	130.2	77.8	07379-04012	07371-14012	07378-14000	07000-12110	07372-51650	01643-51645
50	152.4	92	07379-05011	07371-15011	07378-15000	07000-12135	07372-51655	01643-51645

Parts to remove an o-ring boss type joint



Nominal number	Plug (1)	O-ring (2)
08	07040-10807	07002-10823
10	07040-11007	07002-11023
12	07040-11209	07002-11223
14	07040-11409	07002-11423
16	07040-11612	07002-11623
18	07040-11812	07002-11823
20	07040-12012	07002-12034
24	07040-12412	07002-12434
30	07041-13012	07002-13034
33	07040-13316	07002-13334
36	07041-13612	07002-13634
42	07040-14220	07002-14234
52	07040-15223	07002-15234

Parts to remove taper pipe thread type joint



Nominal number	Nominal thread dimension	Plug (1)	
		Square head type (A)	Hex head (B)
01	$R^1/_8$	07042-00108	07043-00108
02	$R^1/_4$	07042-00211	07043-00211
03	$R^3/_8$	07042-00312	07043-00312
04	$R^1/_2$	07042-00415	07043-00415
06	$R^3/_4$	07042-00617	07043-00617
10	R1	07042-01019	07043-01019
12	$R1^1/_4$	07042-01222	07043-01222
14	$R1^1/_2$	07042-01422	07043-01422
20	R2	07042-02026	07043-02026

Precautions for installation and assembly work

- Tighten the bolts and nuts to the specified value (KES) unless otherwise told.
- Install the hoses without bends or touch. If there are any clamps, correctly attach them.
- Replace all of the gaskets, o-rings, pins, and lock plates with new.
- Bend the pins and lock plates correctly.
- When you apply adhesive, clean the surface and apply 2 to 3 drops to the threads.
- When you apply gasket material, clean the surface, and apply it equally after you make sure that the surface is free from dust or damage.
- Clean all of the parts. If there is any damage or rust found on them, repair it.
- Apply engine oil to the parts that turn or slide on surfaces.
- Apply molybdenum disulfide lubricant (LM-P) to the surfaces of installed parts.
- After you install snap rings, check that is set in the groove completely.
- When you connect wiring harness connectors, clean the connectors to remove oil, dust, or water, then connect them tight.
- Use the eye bolts and screw them in correctly. Match the directions of the eyes and the hook.
- When you install split flanges, tighten the bolts equally in one and then the other to tighten equal.
- As a rule, apply gasket material (LG-5) or liquid sealant (LS-2) to the threads of each screw which receive pressure.

REMARK

If the threads are difficult to clean, you may use a seal tape.

When you wind seal tape onto a right-hand male screw, start clockwise from the 3 thread and move forward in direction of the screw end.

NOTICE

If the seal tape is wound counterclockwise, it may become loose when turned in, and it may come off. If the sealed point is pushed out, it may cause oil leakage.

NOTICE

When you assemble hydraulic equipment such as cylinders, pumps and piping. Be sure to bleed air from the hydraulic circuit before you operate the machine.

1. Start the engine, and run it at low idle.
2. Perform the operation to extend and retract each cylinder of the work equipment. Stop at approximately 100 mm before the travel end for 4 or 5 cycles.
3. Perform the operation to extend and retract each cylinder of the work equipment and stop it at the travel end for 3 or 4 times.

NOTICE

After repair is completed, or when you operate a machine which been stored for a long period. Bleed air from the hydraulic circuit using the same procedure.

Precaution at the time work is done

When you fill, coolant, oil and grease, or when you add of AdBlue/DEF

- For machines with urea SCR system, fill AdBlue/DEF to the specified level before you start the engine.
- Supply the specified quantity of grease to the work equipment parts.
- When the coolant is drained, be sure that the drain valve is correctly tightened. Then fill the coolant reservoir with Komatsu recommends coolant to the specified level. Start the engine to circulate the coolant in the piping, and add the coolant to the specified level again.
- When the hydraulic components are removed and installed, fill the tank with the oil Komatsu recommends to the specified level. Start the engine to circulate the oil in the piping, and add the oil to the specified level again.
- If the hydraulic piping or hydraulic components are removed, be sure to bleed air from the system after assemble. (Refer to "TEST AND ADJUST").

Test installed condition of cylinder heads and components

- Examine the cylinder head, intake and exhaust manifold mounts.
- If there are any fasteners loose, tighten them.

REMARK

For the tighten value, see "DISASSEMBLY AND ASSEMBLY".

Test engine piping for damage

Intake and exhaust system

Make sure that there is no damage to the piping, loose mount bolts, nuts or clamps, on air or exhaust gas leaks at the connections.

If there is any damage or gas leak, tighten or repair the part.

Cooling system

Make sure that there is no damage on the piping. No loose on mount bolts, nuts and clamps.

If there is any damage or leak, tighten or repair the part.

Fuel system

Make sure that there is no damage to the piping's. No loose on mount bolts, nuts and clamps. No fuel leaks.

If there is any damage or fuel leak, tighten or repair the part.

Make sure the exhaust equipment and its installed parts are not damage

REMARK

When an equipment is described as an exhaust equipment, it is one of these. (The components installed on equipment are different on model and machine specifications.)

- KDPF
- AdBlue/DEF mixing tube
- SCR assembly

- KDOC muffler
- Muffler
- Exhaust pipe
- Part which connects to these parts

Visually examine that there is no crack or damage on the exhaust equipment and its installation. If there is any damage, replace the part.

Examine the exhaust equipment and mount bolts, nuts, and clamps on the installation.

If there is any damage, tighten the part.

Make sure function of exhaust system

REMARK

When equipment is described as an exhaust system, it is one of these. (The components on equipment are different, given the machine model or specifications.)

- KDPF
- AdBlue/DEF mix pipe
- SCR assembly
- KDOC muffler
- Muffler
- Exhaust pipe
- Parts which connect to the exhaust system components

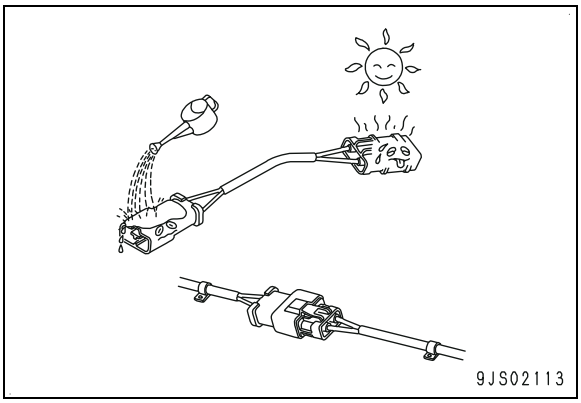
Make sure that there is no unusual noise compared to when the time when the machine was new.

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

PRECAUTIONS WHEN YOU HANDLE ELECTRICAL EQUIPMENT

To maintain the performance of the machine over a long period and to prevent failures or troubles before, they occur. The correct "operation", "maintenance, machine inspection and "repairs" are necessary to be performed. This section deals particularly with correct repair procedures for mechanical components and is pointed at better quality of repairs. For this function, it describes the work procedures in "Handling of electrical equipment".

Handle wire harness and connectors

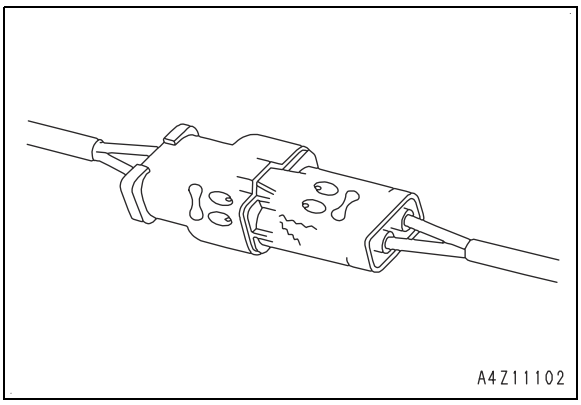


- A wire harness have wires that connect one component to another component. Connectors are used to connect and disconnect one wire from another wire, and covers or pipe are used to protect the wires.
- Compared with other electrical components, water, heat and vibration effect wire harnesses. Furthermore, during inspection and repair operations, they are frequently removed and installed again and are likely to be deformed or damage. For this reason, it is necessary to be very careful when you handle and maintain the wire harnesses.
- If AdBlue/DEF is spilled on wire harnesses or connectors, it may cause corrosion and defective connections. Be careful not to spill it over electrical equipment, wiring harness and connectors, AdBlue/DEF is very corrosive.

Primary causes of failure in wiring harness

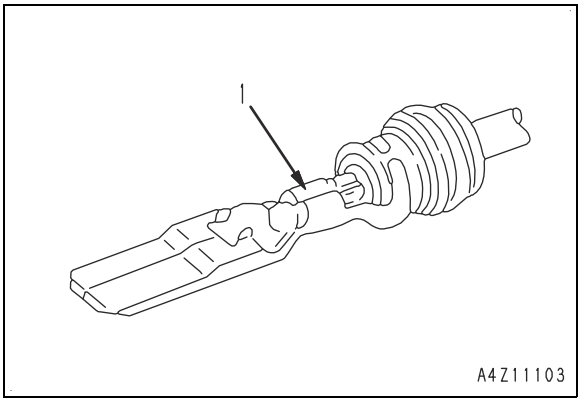
Defective connection of connectors (defective connection between male and female pins)

Problems with defective connection are likely to occur because the male pin is not correctly engaged into the female. This is because one or the two of pins are deformed or not position correctly or there is corrosion on the pin surfaces. The corroded or damage surfaces may become shiny again (and connection may become normal) by connect and disconnect the connectors approximately 10 times.



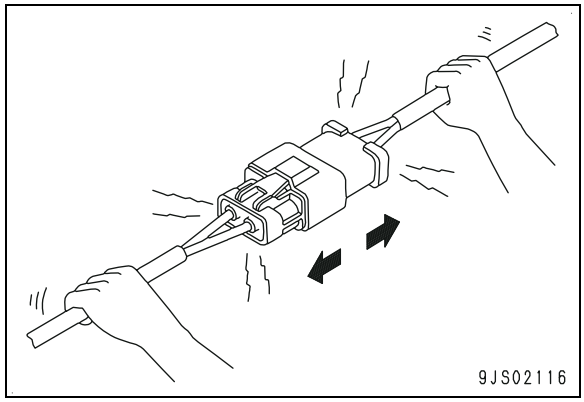
Defective crimp or solder of connectors

The pins on male and female connectors are attached to wires by crimp or solder procedure. If too much force is applied to the wire, the connection (1) may become loose, and cause a defective connection or failure.



Disconnected wire

If the wiring harness is pulled to disconnect the connector, or the components are lifted with a crane while the wiring harness is connected, or a heavy object hits the wiring harness, it may damage the crimp or the soldered pins, or break the wiring harness.

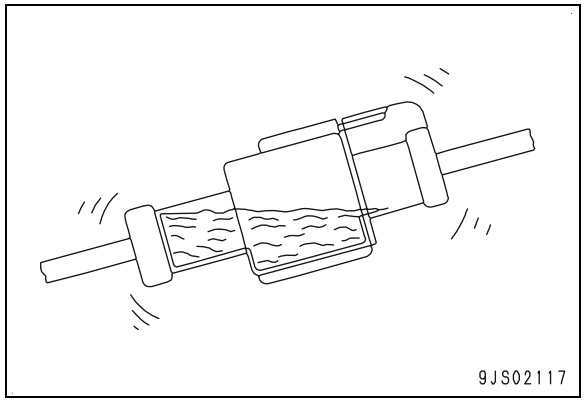


Water go into the connector by high-pressure spray

The connector is made water taut, (water proof structure). But if high-pressure water is sprayed directly on the connector, water may enter the connector.

Do not spray water directly on the connector.

If the connector is sealed, entry of water will not drain. Once water goes into the connector, water goes through pins to cause connection problems. Dry the connector or take appropriate steps before you apply electricity.

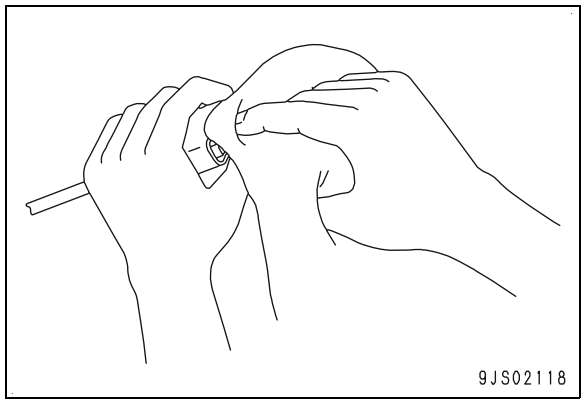


Entry of water, dirt, or dust when you disconnect a connector

If any water, mud or dust is stuck to the outer surface of a connector, it can enter into the connector when disconnected. Before you disconnect connectors, wipe off any water or dirt using a dry rag or dry with compressed air.

Oil, mud, or dust stuck to connector

If any oil or grease is stuck to the connector and an oil layer is on the mating surface of the male and female pins, the oil prevents electrical current flow through, which causes in defective connection. If any oil, grease, dirt or dust is stuck to the connector, wipe off with a dry rag or blow it with compressed air.



NOTICE

- When you wipe the joint of the connector, do not apply too much force or deform the pins.
- If there is oil or water in the compressed air, it will contamination the connector. Use clean filtered air.

PRECAUTIONS WHEN YOU HANDLE FUEL SYSTEM EQUIPMENT

The machines equipped with common rail injection (CRI) have more precise parts than the parts used in the standard pump and line systems. If unwanted material goes into this system, it may cause a failure. Use special care to prevent entry of the unwanted material when servicing the fuel system.

Select an appropriate workplace

Avoid when you add hydraulic oil, replace filters, or repair the machine in wet, windy weather, or dusty environment.

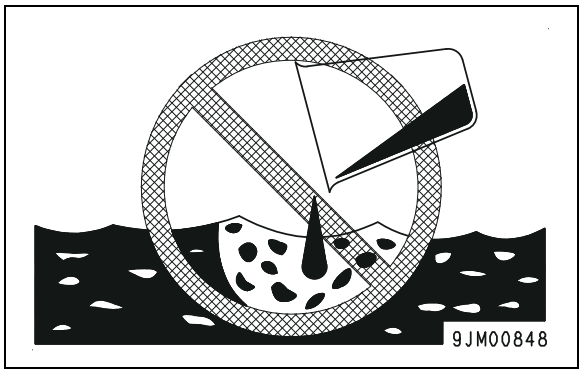
Seal opening

Plug the open pipes and the openings of the removed components with the caps or bags. To prevent unwanted material entry.

NOTICE

Do not leave open or fill with rags, otherwise unwanted material may enter or oil leak oil harm the environment.

Do not discard the oil. Ask for proper procedure, or bring it back to dispose it correctly.



How to clean parts when dirt is stuck

If any dirt or dust attaches to parts of the fuel system, clean fully.

Precautions when you replace fuel filter cartridge

Be sure to use the Komatsu genuine fuel filter cartridge.

NOTICE

Machines equipped with common rail injection (CRI) have more precise parts than the parts used in the standard fuel pump and line systems. To prevent unwanted material from entry this system, the filter employs an especially high performance of filter element. If a filter other than a Komatsu genuine filter is used, fuel system contamination and damage may occur.

PRECAUTIONS WHEN YOU HANDLE INTAKE SYSTEM EQUIPMENT

The machines equipped with a Komatsu Variable Geometry Turbocharger (VGT) have more precise parts than the parts used in the standard turbocharger. If unwanted material goes into this system, it may cause a failure. Use special care to prevent entry of the unwanted material when servicing the intake system.

Select an appropriate workplace

When you add hydraulic oil, replace filters, or repair the machine, avoid wet or windy weather and dusty environment.

Seal opening

Plug the removed pipes and the openings of the removed components with caps or bags to prevent contamination entry.

NOTICE

Do not leave openings not covered, plug otherwise unwanted material may enter.

PRACTICAL USEAGE OF KOMTRAX

Different information which KOMTRAX transmits using radio communication is useful to provide different services for the owner.

When KOMTRAX is installed and in operation, the KOMTRAX system displays machine information. This information is used to troubleshoot problems, run system tests and evaluate machine performance.

Large-sized machines are equipped with KOMTRAX Plus which has more information available.

REMARK

KOMTRAX is not installed to the machine in some countries or areas.

Value of using KOMTRAX

- The location of the machine is examined on a computer.
- Operation information such as service meter, operation hours, fuel consumption, and failure code are shown.
- The operator can examine the hours used and replacement interval of serviceable parts, as fuel filter, hydraulic oil filter, hydraulic oil and engine oil.
- Information of how machine is operated (idle time, travel time, dig time) be examined, and it is used to judge machine operation condition.
- Different reports such as “Fuel burned, operation support”, “Operation reports is generated, and it is utilized as an advice tool for the owner and operator.
- KOMTRAX Plus can record information, trend data, and snap shot data, to evaluate the condition of the machine. This data is used and shown on a computer screens.

How to use KOMTRAX

KOMTRAX performs these functions.

- Fast movement to a request for immediate repair
    1) Examine cautions and failure codes after you receive a repair request from the operator.
    2) To immediately arrange necessary tools, replacement parts that agree with the shown failure code.

Locate the machine using the KOMTRAX machine location function.

- Preventative maintenance
    1) When you examine service records with KOMTRAX, machines which have important failure codes have red or yellow flag.
    2) To examine the condition of the machine with the owner and prepare a visit to the machine.
    3) To immediately arrange necessary tools, replacement parts in relation with the shown failure code.
- Practice of periodic maintenance and inspection service
    1) To examine the service records to find the machine with usage limits of serviceable parts indicated by red flags.
    2) Send an estimate of serviceable parts and labor for the repair to the owner.
    3) To recommend service and inspections, refer to the service meter.

How to operate KOMTRAX

For the operation procedure of each screen of KOMTRAX, ask the key person in your Komatsu distributor.

DISCONNECT AND CONNECT PUSH PULL TYPE QUICK DISCONNECT

REMARK

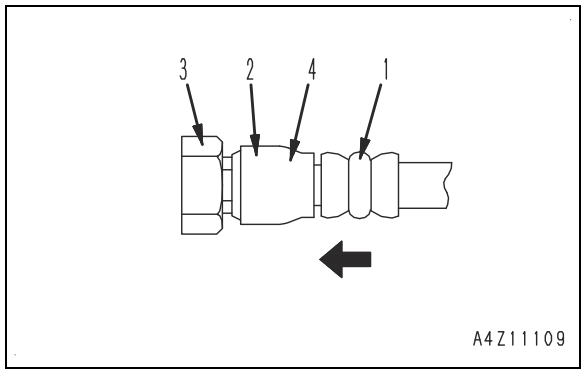
- Loosen the oil fill cap of the hydraulic tank slowly to release the pressure in the hydraulic tank.
- Provide an oil container to receive oil, some hydraulic oil flows out when the hose is disconnected.

PROCEDURE TO DISCONNECT AND CONNECT TYPE 1 PUSH PULL TYPE QUICK DISCONNECT

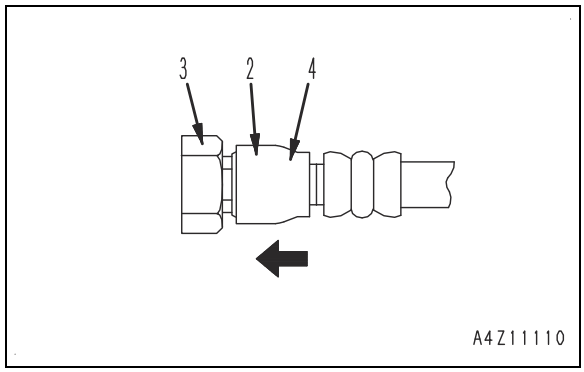
Disconnection

1. Hold adapter (1), and push hose joint (2) into mating adapter (3).

   REMARK
   - Push it in approximately 3.5 mm.
   - Do not hold rubber cap part (4).



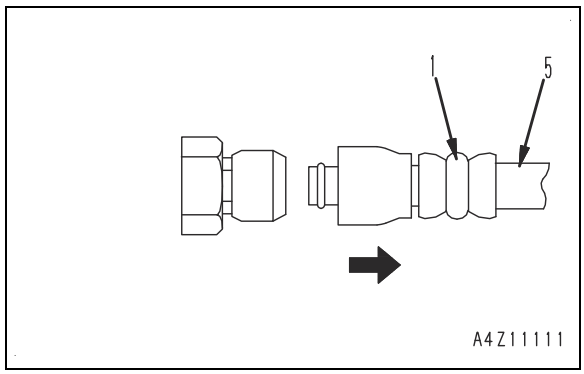
2. While you have the adapter (3) engaged into hose side joint (2), inner rubber cap (4) to adapter (3), side it in until it clicks.



3. Hold hose adapter (1) or hose (5), and pull it out.

   REMARK

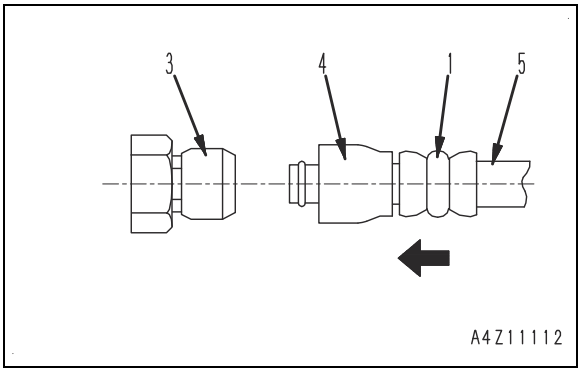
   Provide an oil container to receive a quantity of hydraulic oil which may flow out.



Connection

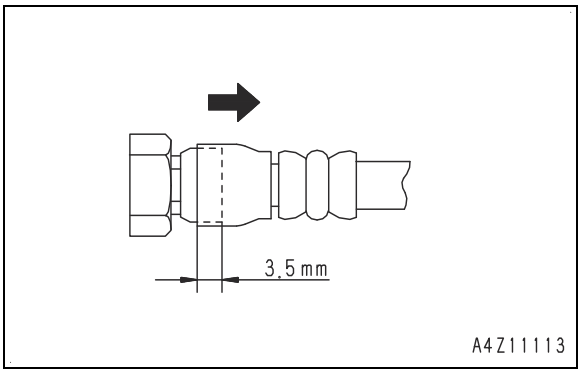
1. Hold hose adapter (1) or hose (5), and engage it in mating adapter (3), align the parts.

   REMARK
   Do not hold rubber cap part (4).



2. After you put the hose in the adapter, pull it to make sure it connected correctly.

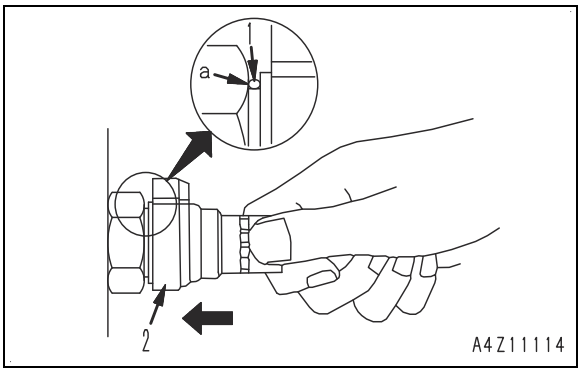
   REMARK
   When the hose fitting is pulled back, the rubber cap moves approximately 3.5 mm toward the hose, but it is not a problem.



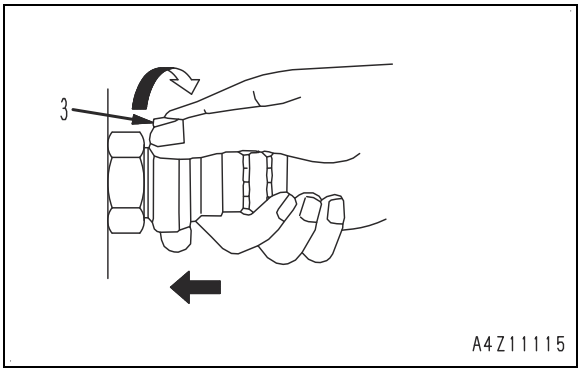
PROCEDURE TO DISCONNECT AND CONNECT TYPE 2 PUSH PULL TYPE QUICK DISCONNECT

Disconnection

1. Hold the adapter part and push body (2) straight until body (1) touches surface (a) of the hex part at the male end.



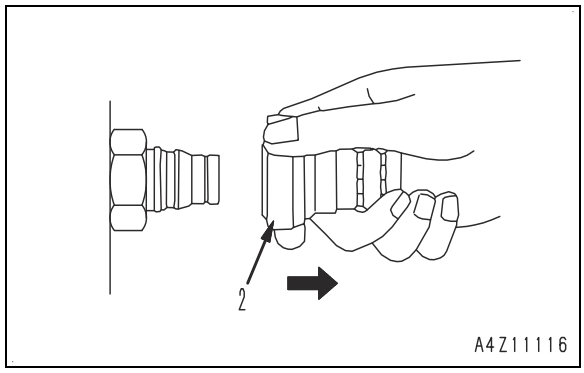
2. While you keep the condition of step 1, turn lever (3) to the right (clockwise).



3. While you keep the conditions of steps 1 and 2, pull out full body (2) to disconnect it.

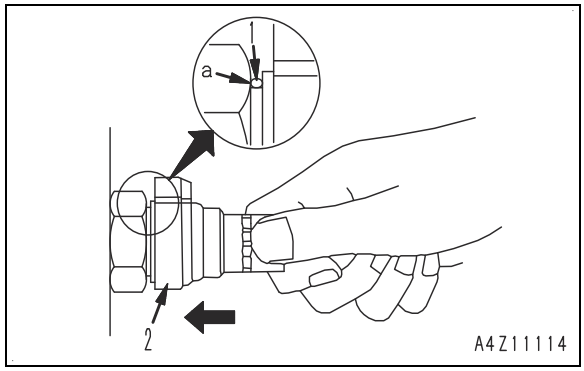
   REMARK

   Provide an oil container to receive a quantity of hydraulic oil which may flow out.



Connection

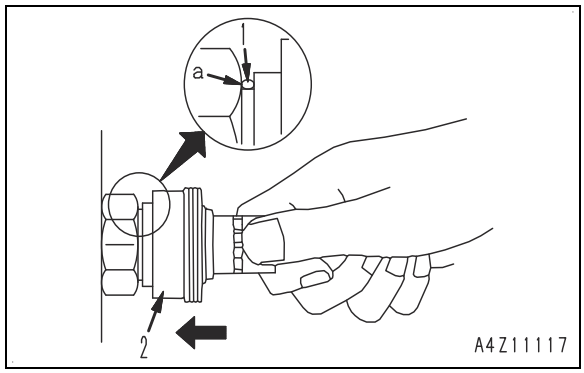
Hold the adapter part and push body (2) straight until slide (1) touches surface (a) of the hex part at the male end.



PROCEDURE TO DISCONNECT AND CONNECT TYPE 3 PUSH PULL TYPE QUICK DISCONNECT

Disconnection

1. Hold the adapter part and push body (2) straight until body (1) touches surface (a) of the hex part at the male end.



2. While you keep the condition of step 1, push cover (3) straight until it touches surface (a) of the hex part on the male side.