# EX5500
# Workshop Manual

# SECTION 1
# GENERAL INFORMATION

## —CONTENTS—

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## PRECAUTIONS FOR DISASSEMBLING AND ASSEMBLING

### Preparations for Disassembling

- Clean the Machine

  Thoroughly wash the machine before bringing it into the shop. Bringing a dirty machine into the shop may cause machine components to be contaminated during disassembling/assembling, resulting in damage to machine components, as well as decreased efficiency in service work.

- Inspect the Machine

  Be sure to thoroughly understand all disassembling/assembling procedures beforehand, to help avoid incorrect disassembling of components as well as personal injury.
  Check and record the items listed below to prevent problems from occurring in the future.

  - The machine model, machine serial number, and hour meter reading.
  - Reason for disassembly (symptoms, failed parts, and causes).
  - Clogging of filters and oil, water or air leaks, if any.
  - Capacities and condition of lubricants.
  - Loose or damaged parts.

- Prepare and Clean Tools and Disassembly Area

  Prepare the necessary tools to be used and the area for disassembling work.

### Precautions for Disassembling and Assembling

- Precautions for Disassembling

  - To prevent dirt from entering, cap or plug the removed pipes.
  - Before disassembling, clean the exterior of the components and place it on a work bench.
  - Before disassembling, drain gear oil from the reduction gear.
  - Be sure to provide appropriate containers for draining fluids.
  - Use matching marks for easier reassembling.
  - Be sure to use the specified special tools, when instructed.
  - If a part or component cannot be removed after removing its securing nuts and bolts, do not attempt to remove it forcibly. Find the cause(s), then take the appropriate measures to remove it.
  - Orderly arrange disassembled parts. Mark and tag them as necessary.
  - Store common parts, such as bolts and nuts with reference to where they are to be used and in a manner that will prevent loss.
  - Inspect the contact or sliding surfaces of disassembled parts for abnormal wear, sticking, or other damage.
  - Measure and record the degree of wear and clearances.

- Precautions for Assembling

  - Be sure to clean all parts and inspect them for any damage. If any damage is found, repair or replace it.
  - Dirt or debris on the contact or sliding surfaces may shorten the service life of the machine. Take care not to contaminate any contact or sliding surfaces.
  - Be sure to replace O-rings, backup rings, and oil seals with new ones once they are disassembled. Apply a film of grease before installing.
  - Be sure that liquid-gasket-applied surfaces are clean and dry.
  - If an anti-corrosive agent has been used on a new part, be sure to thoroughly clean the part to remove the agent.
  - Utilize matching marks when assembling.
  - Be sure to use the designated tools to assemble bearings, bushings and oil seals.
  - Keep a record of the number of tools used for disassembly/assembly. After assembling is complete, count the number of tools, so as to make sure that no tools are missing.

**Bleeding Air from Hydraulic System**

When hydraulic oil is drained, the suction filter or the suction lines are replaced, or the removal and installation of the pump, swing motor, travel motor or cylinder is done, bleed air from the hydraulic system in the following procedures:

- Bleeding Air from Hydraulic Pump

**IMPORTANT: If the engine is started with air trapped in the hydraulic pump housing, damage to the pump may result. Be sure to bleed air before starting the engine.**

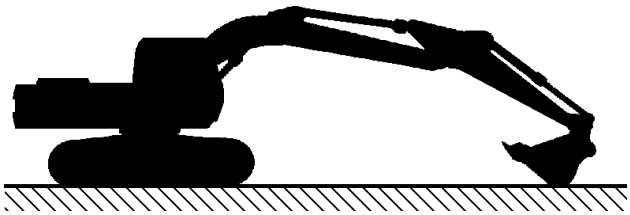
- Remove the air bleeding plug from the top of the pump and fill the pump housing with hydraulic oil.
- After the pump housing is filled with hydraulic oil, temporarily tighten the plug. Then, start the engine and run at slow idle speed.
- Slightly loosen the plug to bleed air from the pump housing until hydraulic oil oozes out.
- After bleeding all the air, securely tighten the plug.

- Bleeding Air from Travel Motor / Swing Motor

- With the drain plug / hose on travel motor / swing motor removed, fill the motor case with hydraulic oil.

- Bleeding Air from Hydraulic Circuit

- After refilling hydraulic oil, start the engine. While operating each cylinder, swing motor and travel motor evenly, operate the machine under light loads for 10 to 15 minutes. Slowly start each operation (never fully stroke the cylinders during initial operation stage). As the pilot oil circuit has an air bleed device, air trapped in the pilot oil circuit will be bled while performing the above operation for approx. 5 minutes.
- Reposition the front attachment to check hydraulic oil level.
- Stop the engine. Recheck hydraulic oil level. Replenish oil as necessary.



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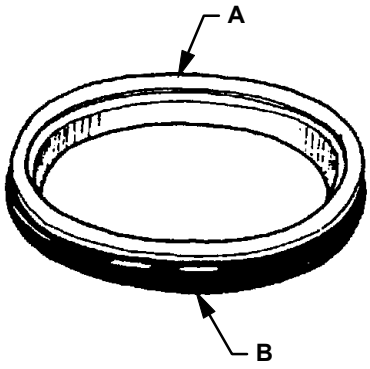
**Floating Seal Precautions**

1. In general, replace the floating seal with a new one.
   If the floating is to be reused, follow these procedures:

   (1) Keep seal rings together as a matched set with seal ring faces together. Insert a piece of cardboard to protect surfaces.

   (2) Check the seal ring face (A) for scuffing, scoring, corrosion, deformation or uneven wear.

   (3) Check O-ring (B) for tears, breaks, deformation or hardening.

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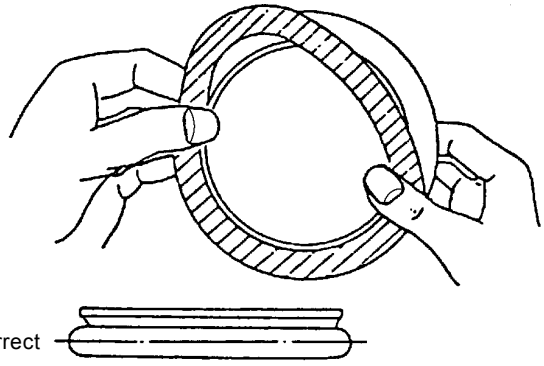
2. If incorrectly assembled, oil leakage or damage will occur. Be sure to do the following, to prevent trouble.

   (1) Clean the floating seal and seal mounting bores with cleaning solvent.
   Use a wire brush to remove mud, rust or dirt.
   After cleaning, thoroughly dry parts with compressed air.

   (2) Clean the floating seal and seal mounting bores, as dust on them tends to enter the floating seal when installing it.

   (3) Check that the O-ring is not twisted, and that it is installed correctly on the seal ring.

   (4) After installing the floating seal, check that seal ring surface (A) is parallel with idler face (C) by measuring the distances seal ring surface (A) and idler face (C) at point (a) and (b), as illustrated. If these distances differ, correct the O-ring seating.

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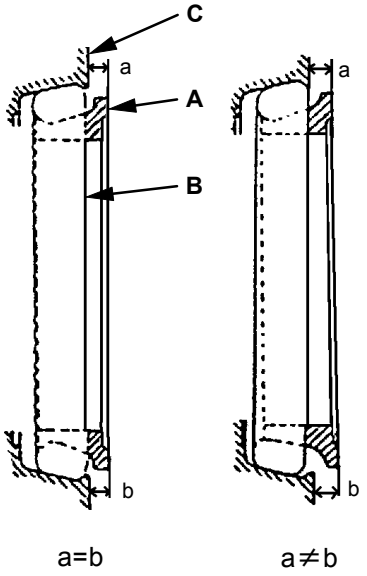


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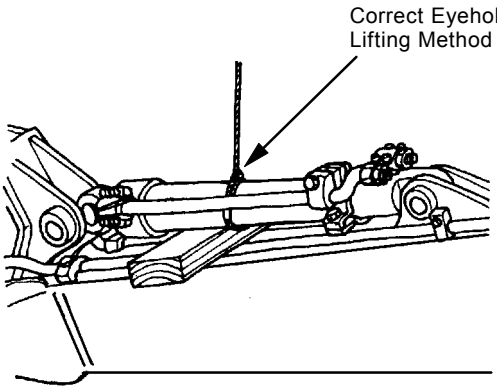
**Precautions for Using Nylon Sling**

1. Follow the precautions below to use nylon slings safely.

- Attach protectors (soft material) on the corners of the load so that the nylon sling does not directly contact the corners. This will prevent the nylon sling from damage and the lifted load from slipping.
- Lower the temperature of the lifted load to lower than 100 °C (212 °F). If unavoidably lifting a load with a temperature of 100 °C (212 °F) or more, reduce the load weight.
- Do not lift acid or alkali chemicals.
- Take care not to allow the sling to become wet. The load may slip.
- When required to use more than one sling, use slings with the same width and length to keep the lifted load balanced.
- When lifting a load using an eyehole, be sure to eliminate any gaps between the sling and load. (Refer to the right illustration.) Reduce the load weight so that it is less than 80 % of the sling breaking force.
- Avoid using twisted, bound, connected, or hitched slings.
- Do not place any object on twisted or bent slings. (Refer to the right illustration.)
- When removing the slings from under the load, take care not to damage the nylon slings. Avoid contact with protrusions.
- Avoid dragging slings on the ground, throwing slings or pushing slings with a metal piece.
- When using with other types of slings (wire rope) or accessories (shackle), protect the joint so that the nylon sling is not damaged.
- Store the nylon slings indoors so they won't deteriorate with heat, sun light, or chemicals.

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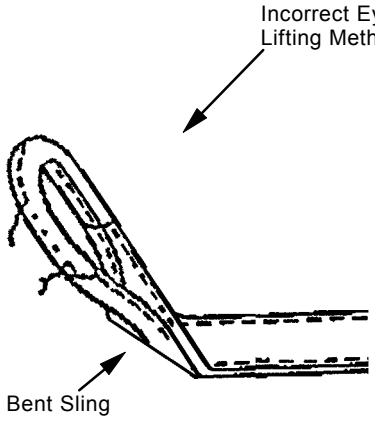


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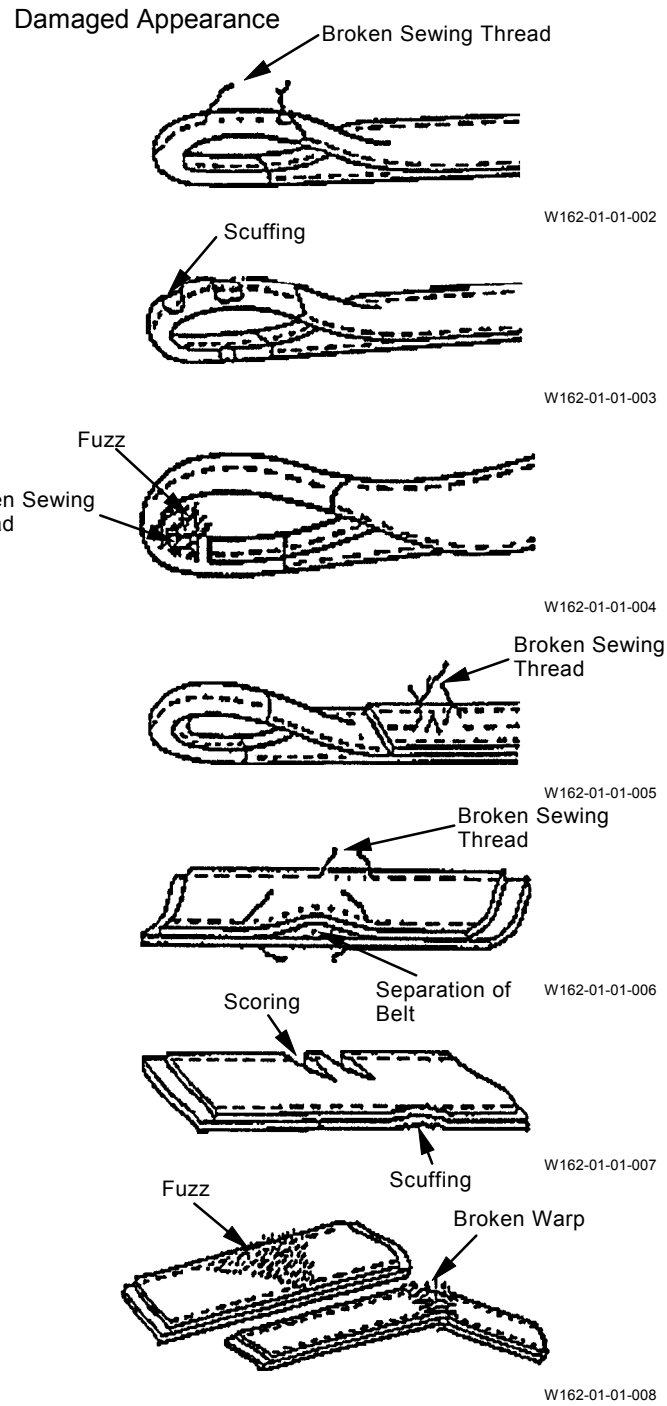
**CAUTION: If a load is lifted with a damaged nylon sling, serious personal injury may result. Be sure to visually check the nylon sling for any damage before using.**

2. Before using a nylon sling, visually check the nylon sling for any damage corresponding to examples shown to the right. If any damage is found, cut and discard the sling. Even if no damage is found, do not use slings older than 7-years.



**Maintenance Standard Terminology**

"Standard"
1. Dimension for parts on a new machine.
2. Dimension of components or assemblies adjusted to specification. Tolerances are indicated as necessary.

"Allowable Limit"
1. Machine cannot operate normally with the parts exceeding this dimension installed.
2. Repair or adjustment is impossible if this dimension is exceeded.
3. To maintain high machine availability and to save the repair expense, the machine parts should be repaired or replaced before reaching the "Allowable Limit."

## TIGHTENING TORQUE SPECIFICATIONS

| | Descriptions | Bolt Dia (mm) | Qty | Wrench Size (mm) | Torque | | |
|---|---|---|---|---|---|---|---|
| | | | | | N·m | kgf·m | lbf·ft |
| 1 | Engine cushion rubber mounting bolt | 36 | 12 | 55 | 3140 | 320 | 2310 |
| 2 | Engine bracket mounting bolt | 30<br>22<br>UNC 3/4 | 24<br>8<br>32 | 46<br>36<br>28.6 | 1420<br>740<br>440 | 145<br>75<br>45 | 1050<br>540<br>330 |
| 3 | Hydraulic oil tank mounting bolt | 36 | 10 | 55 | 2400 | 245 | 1770 |
| 4 | Fuel tank mounting bolt | 36 | 22 | 55 | 2400 | 245 | 1770 |
| 5 | Pump transmission mounting bolt | UNC 1/2 | 32 | 19 | 118 | 12 | 87 |
| 6 | Pump device mounting bolt | 24 | 24 | 36 | 690 | 70 | 510 |
| 7 | Fan drive pump mounting bolt | 20 | 8 | 30 | 390 | 40 | 290 |
| 8 | Gear pump mounting bolt | 12 | 8 | 19 | 88 | 9 | 65 |
| 9 | Control valve mounting nut | 20 | 24 | 30 | 390 | 40 | 290 |
| 10 | Swing device mounting bolt | 36 | 56 | 55 | 3140 | 320 | 2310 |
| 11 | Swing motor mounting bolt | 20 | 16 | 30 | 390 | 40 | 290 |
| 12 | Battery mounting bolt | 10 | 24 | 17 | 49 | 5 | 36 |
| 13 | Cab mounting bolt | 18 | 8 | 27 | 295 | 30 | 215 |
| 14 | Cab bed mounting bolt | 12 | 50 | 19 | 88 | 9 | 65 |
| 15 | Swing bearing mounting bolt | 56 | 142 | 85 | 9800 | 1000 | 7230 |
| 16 | Counterweight mounting nut | 56 | 14 | 85 | 6860 | 700 | 5060 |
| 17 | Engine bed mounting bolt | 36 | 84 | 55 | 3140 | 320 | 2310 |
| 18 | Oil cooler mounting bolt | 27 | 8 | 41 | 1370 | 140 | 1010 |
| 19 | Radiator mounting nut | 27 | 8 | 41 | 1370 | 140 | 1010 |
| 20 | Fan motor housing mounting bolt | 16 | 8 | 24 | 205 | 21 | 152 |
| 21 | Fan motor bracket mounting bolt | 12 | 12 | 19 | 88 | 9 | 65 |
| 22 | Travel device mounting bolt | 36<br>56<br>24<br>20 | 24<br>56<br>40<br>46 | 55<br>85<br>36<br>30 | 3140<br>9800<br>690<br>390 | 320<br>1000<br>70<br>40 | 2310<br>7230<br>510<br>290 |
| 23 | Travel motor mounting bolt | 22 | 16 | 32 | 740 | 75 | 540 |
| 24 | Upper roller mounting bolt | 30 | 24 | 46 | 1910 | 195 | 1410 |
| 25 | Lower roller mounting bolt | 56 | 56 | 85 | 9800 | 1000 | 7230 |
| 26 | Track pin-retaining bolt | 30 | 156 | 46 | 1910 | 195 | 1410 |
| 27 | Side frame mounting bolt | 64 | 80 | 95 | 14700 | 1500 | 10850 |
| 28 | Track guard mounting bolt | 45<br>24 | 22<br>48 | 70<br>36 | 4710<br>690 | 480<br>70 | 3470<br>510 |
| 29 | Travel motor cover mounting bolt (backhoe) | 36 | 30 | 55 | 3140 | 320 | 2310 |
| 30 | Front pin lock bolt (loading shovel) | 24<br>20<br>27 | 36<br>8<br>10 | 36<br>30<br>19 (Hexagon bar wrench) | 930<br>390<br>1030 | 95<br>40<br>105 | 690<br>290<br>760 |
| 31 | Front pin lock bolt (backhoe) | 24<br>20 | 20<br>22 | 36<br>30 | 930<br>390 | 95<br>40 | 690<br>290 |

*NOTE: 1. Apply lubricant (e.g.white zinc B dissolved into spindle oil)to bolts and nuts to stabilize friction coefficient of them.*

*2. Make sure bolt and nut threads are clean before installing.*

*3. Apply loctite to threads of engine cushion rubber mounting bolts, and lower roller mounting bolts before installing.*

## TORQUE CHART

**CAUTION: Use tools appropriate for the work to be done. Makeshift tools and procedures can create safety hazards. For loosening and tightening nuts and bolts, use correct size tools. Otherwise, tightening tools may slip, potentially causing personal injury.**

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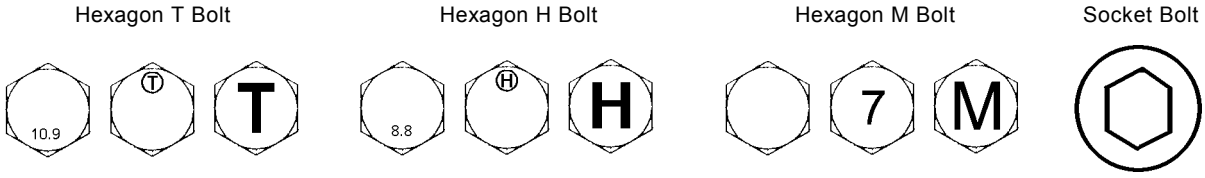
### Bolt Types

Tighten nuts or bolts correctly to torque specifications. Four different types and grades of bolt are employed. Make sure to employ correct bolts and tighten them correctly when assembling the machine or components.

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**Specified Tightening Torque Chart**

| Bolt Dia. | Wrench Size | Hexagon Wrench Size | T Bolt, Socket Bolt | | | H Bolt | | | M Bolt | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft |
| M 8 | 13 | 6 | 29.5 | 3 | 22 | 19.5 | 2 | 14.5 | 9.8 | 1 | 7.2 |
| M 10 | 17 | 8 | 64 | 6.5 | 47 | 49 | 5 | 36 | 19.5 | 2 | 14.5 |
| M 12 | 19 | 10 | 108 | 11 | 80 | 88 | 9 | 65 | 34 | 3.5 | 25.5 |
| M 14 | 22 | 12 | 175 | 18 | 130 | 137 | 14 | 101 | 54 | 5.5 | 40 |
| M 16 | 24 | 14 | 265 | 27 | 195 | 205 | 21 | 152 | 78 | 8 | 58 |
| M 18 | 27 | 14 | 390 | 40 | 290 | 295 | 30 | 220 | 118 | 12 | 87 |
| M 20 | 30 | 17 | 540 | 55 | 400 | 390 | 40 | 290 | 167 | 17 | 123 |
| M 22 | 32 | 17 | 740 | 75 | 540 | 540 | 55 | 400 | 215 | 22 | 159 |
| M 24 | 36 | 19 | 930 | 95 | 690 | 690 | 70 | 505 | 275 | 28 | 205 |
| M 27 | 41 | 19 | 1370 | 140 | 1010 | 1030 | 105 | 760 | 390 | 40 | 290 |
| M 30 | 46 | 22 | 1910 | 195 | 1410 | 1420 | 145 | 1050 | 540 | 55 | 400 |
| M 33 | 50 | 24 | 2550 | 260 | 1880 | 1910 | 195 | 1410 | 740 | 75 | 540 |
| M 36 | 55 | 27 | 3140 | 320 | 2310 | 2400 | 245 | 1770 | 930 | 95 | 690 |

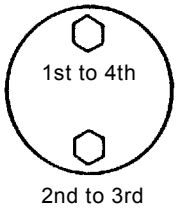
**IMPORTANT: The following items are applied to both fine and coarse pitch threads.**

1. **Apply lubricant (i. e. white zinc B dissolved Into Spindle oil) to nuts and bolts to reduce their friction coefficients.**
   **The plated bolts require no lubricant.**
2. **Torque tolerance is ±10 %.**
3. **Be sure to use bolts of correct length. Bolts that are too long cannot be tightened, as the bolt tip comes into contact with the bottom of the bolt hole. Bolts that are too short cannot develop sufficient tightening force.**
4. **The torques given in the chart are for general use only. Do not use these torques if a different torque is given for a specific application.**
5. **Make sure that nut and bolt threads are clean before installing.**
   **Remove dirt or corrosion, if any.**

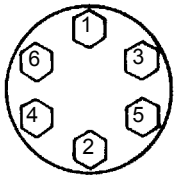
### Bolt Tightening Order

When tightening two or more bolts, tighten them alternately, as shown, to ensure even tightening.

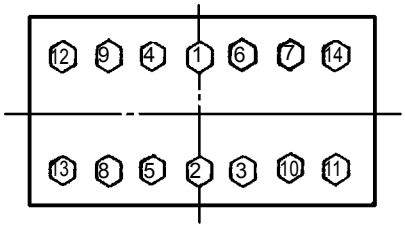
Equally tighten upper and lower alternately




Tighten diagonally




Tighten from center and diagonally

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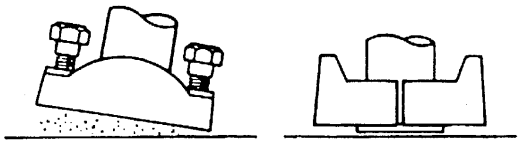
**Service Recommendations for Split Flange**

**IMPORTANT:**
**(1) Be sure to clean and inspect sealing surfaces. Scratches / roughness cause leaks and seal wear. Unevenness causes seal extrusion. If defects cannot be polished out, replace the component.**
**(2) Be sure to use only specified O-rings. Inspect O-rings for any damage. Take care not to file O-ring surfaces. When installing an O-ring into a groove, use grease to hold it in place.**
**(3) Loosely assemble split flange halves. Make sure that the split is centrally located and perpendicular to the port. Hand-tighten the bolts to hold the parts in place. Take care not to pinch the O-ring.**
**(4) Tighten bolts alternately and diagonally, as shown, to ensure even tightening.**
**(5) Do not use air wrenches. Using an air wrench often causes tightening of one bolt fully before tighten the others, resulting in damage to O-rings or uneven tightening of bolts.**



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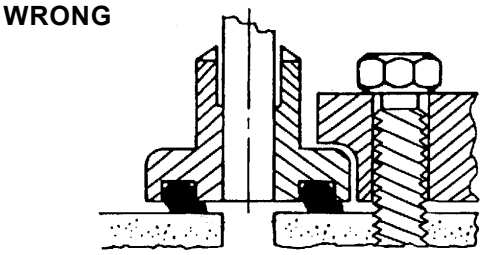


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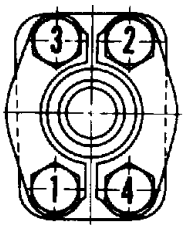


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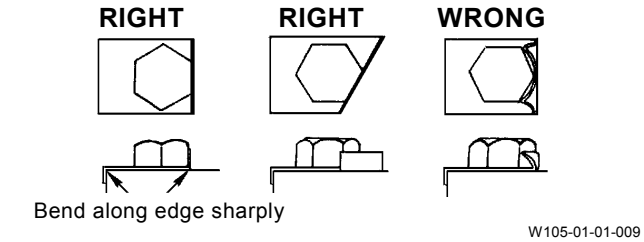
**Nut and Bolt Lockings**

• Lock Plate

**IMPORTANT: Do not reuse lock plates. Do not try to bend the same point twice.**







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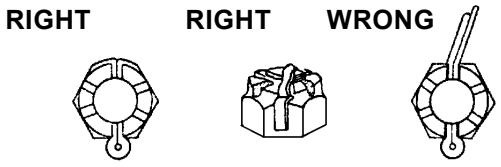
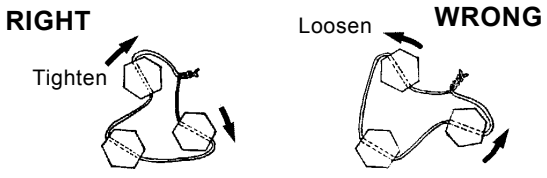
• Cotter Pin

**IMPORTANT: Do not reuse cotter pins. Match the holes in the bolt and nut while tightening, not while loosening.**




• Lock Wire

**IMPORTANT: Apply wire to bolts in the bolt-tightening direction, not in the bolt-loosening direction.**

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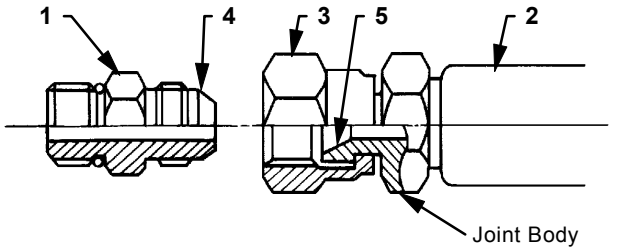
## PIPING JOINT

**IMPORTANT: The torques given in the chart are for general use only.**
**Do not use these torques if a different torque is given for a specific application.**

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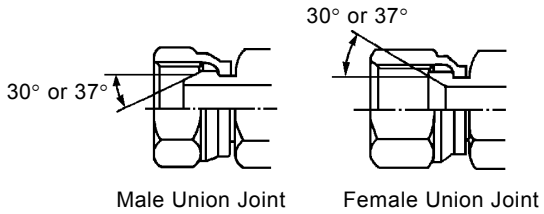
**Pipe Thread Connection / Union Joint Tightening Torque Specifications**

**Union Joint**

Metal sealing faces (4) and (5) of adaptor (1) and hose (2) fit together to seal pressure oil. Union joints are used to join small-diameter lines.

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**IMPORTANT: (1) Do not over-tighten union nut (3). Excessive force will be applied to metal sealing surfaces (4) and (5), possibly cracking adaptor (1). Be sure to tighten union nut (3) to specifications.**

**(2) Scratches or other damage to sealing surfaces (4) or (5) will cause oil leakage at the joint. Take care not to damage them when connecting /disconnecting.**

| Type | Wrench Size | | Tightening Torque | |
|---|---|---|---|---|
| | Union Nut | Joint Body | N·m (kgf·m) | lbf·ft |
| 30° Male Union Joint | 19 | 19 | 59 (6) | 43 |
| | 22 | 22 | 98 (10) | 72 |
| | 27 | 27 | 118 (12) | 87 |
| | 36 | 36 | 235 (24) | 134 |
| | 41 | 41 | 295 (30) | 215 |
| | 50 | 50 | 490 (50) | 360 |
| | 60 | 60 | 670 (68) | 490 |
| | 70 | 70 | 980 (100) | 720 |
| 37° Female Union Joint | 19 | 17 | 44 (4.5) | 32.5 |
| | 22 | 19 | 59 (6) | 43 |
| | 27 | 22 | 118 (12) | 87 |
| | 36 | 30, 32 | 235 (24) | 134 |
| | 41 | 36 | 295 (30) | 215 |
| | 50 | 46 | 490 (50) | 360 |

*NOTE: Tightening torque for the non-union type 37 ° male joint is the same as the 37 ° female union joint.*

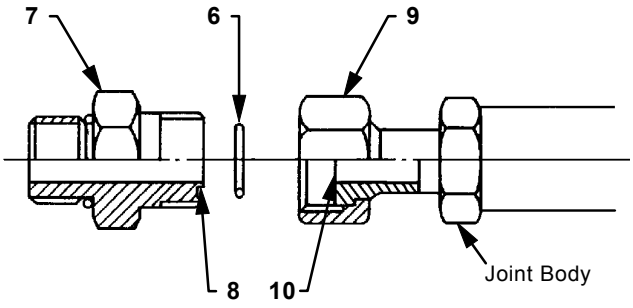
**O-Ring Seal Joint**
O-ring (6) seats against the end face of adaptor (7) to seal pressure oil.

**IMPORTANT: (1) Be sure to replace O-ring (6) with a new one when reconnecting.**

**(2) Before tightening union nut (9), confirm that O-ring (6) is seated correctly in O-ring groove (8). Tightening union nut (9) with O-ring (6) displaced will damage O-ring (6), resulting in oil leakage.**

**(3) Take care not to damage O-ring groove (8) or sealing face (10). Damage to O-ring (6) will cause oil leakage.**

**(4) If union nut (9) is found to be loose, causing oil leakage, do not tighten it to stop the leak. Instead, replace O-ring (6) with a new one, then tighten union nut (9) after confirming that O-ring (6) is securely seated in place.**



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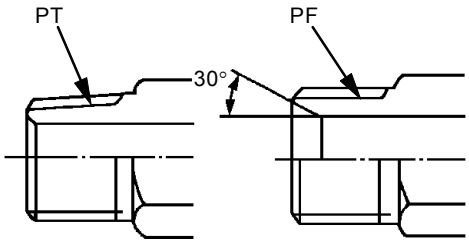
| Wrench Size | | Tightening Torque | |
|---|---|---|---|
| Union Nut | Joint Body | N·m (kgf·m) | lbf·ft |
| 19 | 17 | 59 (6) | 43 |
| 22 | 19 | 98 (10) | 72 |
| 27 | 22 | 118 (12) | 87 |
| 36 | 30, 32 | 235 (24) | 134 |
| 41 | 36 | 295 (30) | 215 |
| 50 | 46 | 490 (50) | 360 |

**Screwed-In Connection**

**IMPORTANT: Many types of screwed-in connections are used for hose connections. Be sure to confirm that the thread pitch and thread type (tapered or straight) are the correct type before using any screw-in connection.**




Male Tapered Thread  Male Straight Thread

W105-01-01-018

| Male Tapered Thread | | |
|---|---|---|
| Wrench | Tightening Torque | |
| Joint Body | N·m (kgf·m) | lbf·ft |
| 17, 19 | 59 (6) | 43 |
| 19, 22 | 98 (10) | 72 |
| 27, 22 | 118 (12) | 87 |
| 36, 32 | 235 (24) | 134 |
| 41 | 295 (30) | 215 |
| 50 | 490 (50) | 360 |
| 60 | 670 (68) | 490 |
| 70 | 980 (100) | 720 |

**Seal Tape Application**

Seal tape is used to seal clearances between male and female threads, so as to prevent any leakage between threads.

Be sure to apply just enough seal tape to fill up thread clearances. Do not overwrap.

Internal Thread

External Thread  Clearance

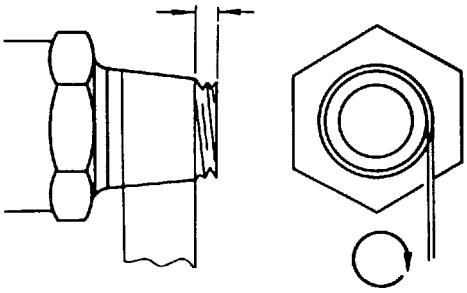
W105-01-01-019

- Application Procedure

  Confirm that the thread surface is clean, free of dirt or damage.

  Apply seal tape around threads as shown. Wrap seal tape in the same direction as the threads.

Leave one to two pitch threads uncovered



M114-07-041

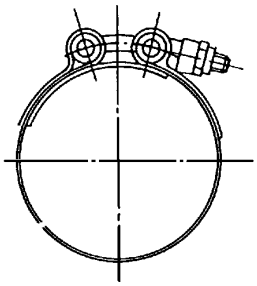
**Low-Pressure-Hose Clamp Tightening Torque**

Low-pressure-hose clamp tightening torque differs depending on the type of clamp.

See below for correct tightening torque of each type of low-pressure-hose clamp.

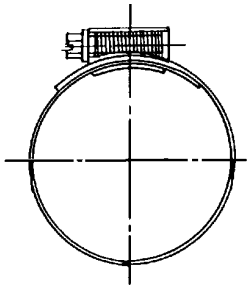
T-Bolt Type Band Clamp:
4.4 N·m (0.45 kgf·m, 3.25 lbf·ft )
Worm Gear Type Band Clamp:
5.9 to 6.9 N·m (0.6 to 0.7 kgf·m, 4.3 to 5.1 lbf·ft )

T-Bolt Type



M114-07-042

Worm Gear Type



M114-07-043

**Connecting Hose**

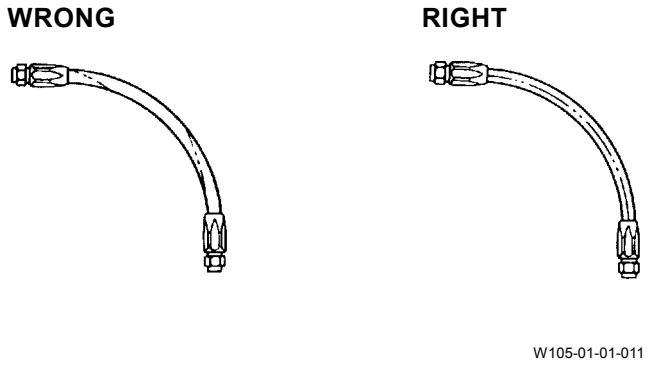
**CAUTION:**

**(1) When replacing hoses, be sure to use only genuine Hitachi service parts. Using hoses other than genuine Hitachi hoses may cause oil leakage, hose rupture or separation of fitting, possibly resulting in a fire on the machine.**

**(2) Do not install hoses kinked. Application of high oil pressure, vibration, or an impact to a kinked hose may result in oil leakage, hose rupture or separation of fitting. Utilize print marks on hoses when installing hoses to prevent hose from being installed kinked.**

**(3) If hoses rub against each other, wear to the hoses will result, leading to hose rupture. Take necessary measures to protect hoses from rubbing against each other.**

**Take care that hoses do not come into contact with moving parts or sharp objects.**

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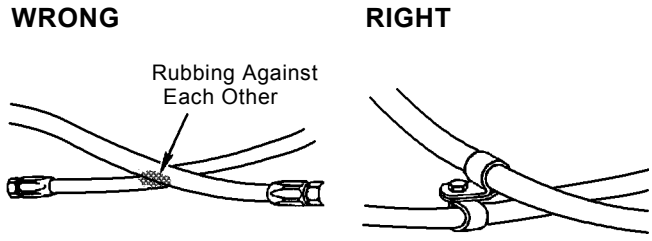


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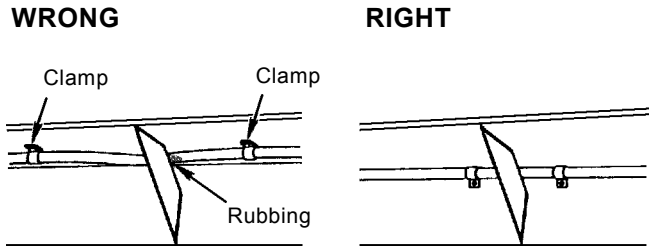


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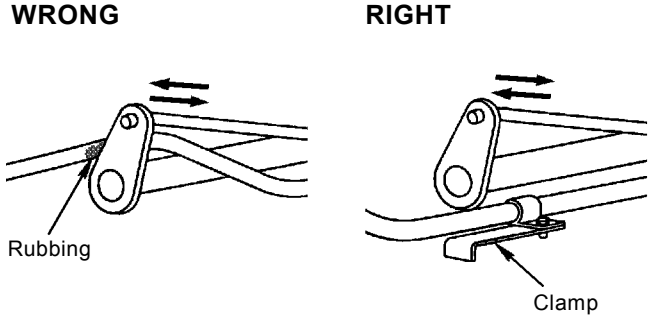


W105-01-01-014

*** REFEREVCE: Major Parts to Be Replaced at Regular Intervals.**

The parts listed below deteriorate as the machine ages and are worn out or fatigued by repeated loads, resulting in possible severe personal injury and/or machine trouble. The service life of these parts can not be detected through machine operation or visual inspection.

Therefore, these parts should be replaced at regular intervals even if no abnormalities are noticed. In case any abnormalities are found on a part at any time regardless of its specified replacement interval, immediately replace the part.

| Periodic Replacement Parts | | | Replacement Intervals |
|---|---|---|---|
| Engine | | Fuel hose (Fuel tank to filter) | Every 2 years |
| | | Fuel hose (Fuel tank to injection pump) | Every 2 years |
| | | Heater hose (Heater to engine) | Every 2 years |
| Hydraulic System | Basic Machine | Pump suction hose | Every 2 years |
| | | Pump delivery hose | Every 2 years |
| | Front-End Attachment | Motor line hose | Every 2 years |
| | | Cylinder line hose | Every 2 years |
| | | Pilot hose | Every 2 years |

**IMPORTANT: Be sure to replace seals, such as O-rings and hose clamp along with replacing hoses. Each hose has an individual service life. If any abnormalities are found during the regular interval check and/or maintenance service, be sure to replace with a new one.**

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