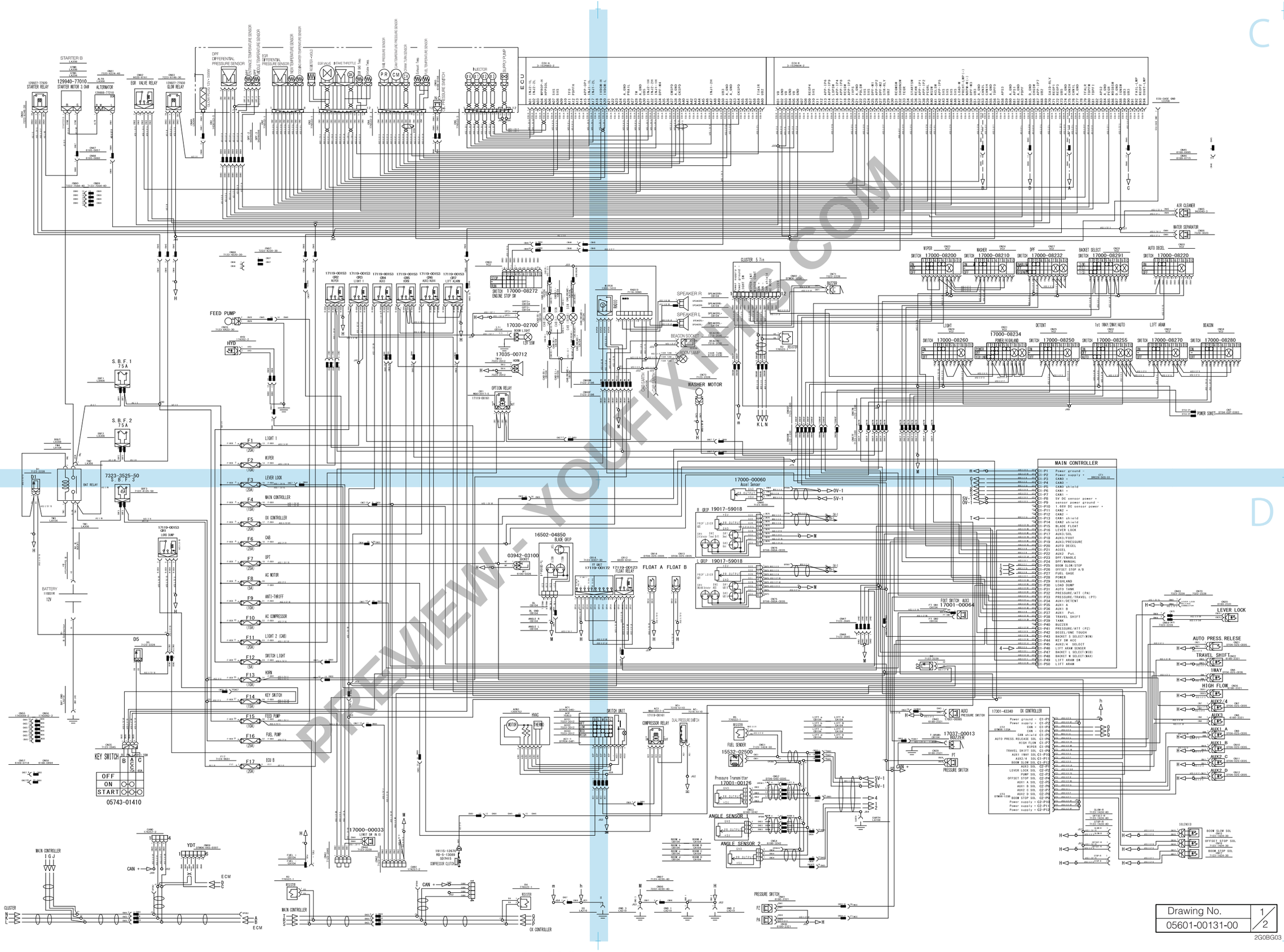
ELECTRICAL CIRCUIT DIAGRAM



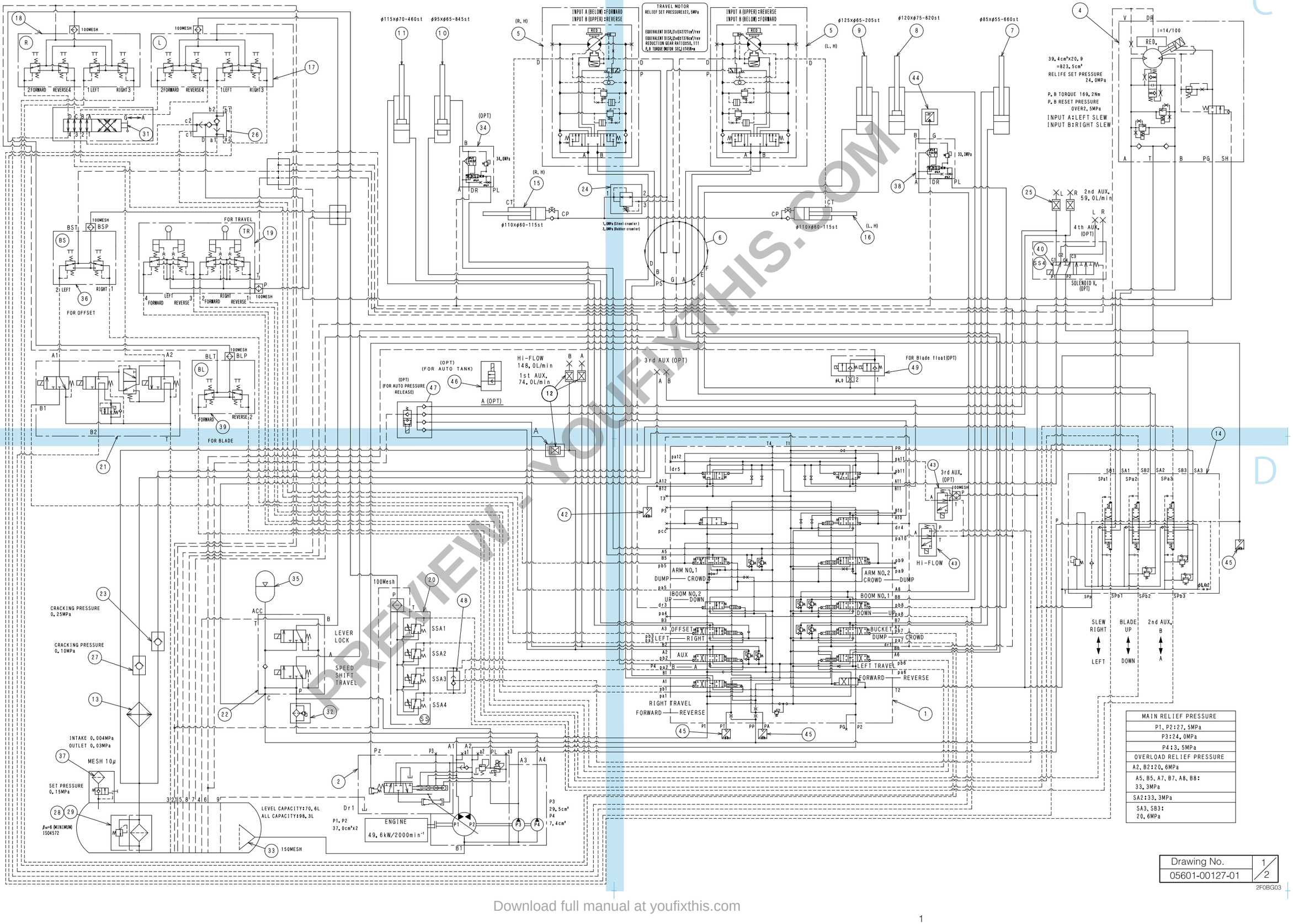
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Drawing No.	1/2
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HYDRAULIC CIRCUIT DIAGRAM



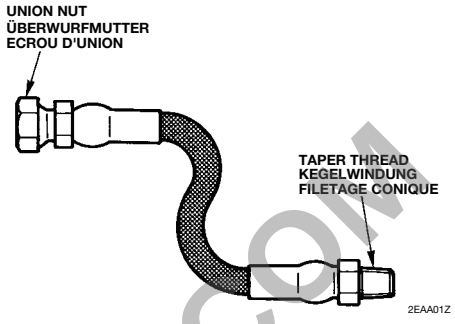
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TIGHTENING TORQUE

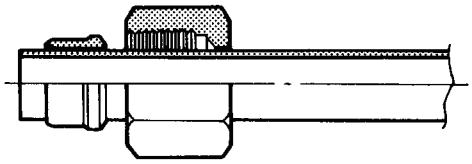
Hydraulic hose

Hose fitting size	Tightening torque			
	Union nut (G)		Taper thread (R)	
	N·m	ft.-lb	N·m	ft.-lb
1/8	$9.8^{+4.9}_{0}$	$7.3^{+3.5}_{0}$	11.8 ± 1.2	8.7 ± 0.8
1/4	$24.5^{+4.9}_{0}$	$18.1^{+3.5}_{0}$	29.4 ± 2.9	21.7 ± 2.1
3/8	$49.0^{+4.9}_{0}$	$36.2^{+3.5}_{0}$	53.9 ± 5.4	39.8 ± 3.9
1/2	$58.8^{+4.9}_{0}$	$43.4^{+3.5}_{0}$	88.3 ± 8.8	65.1 ± 6.4
3/4	$117.7^{+4.9}_{0}$	$86.8^{+3.5}_{0}$	147.1 ± 14.7	108.5 ± 10.7
1	$137.3^{+4.9}_{0}$	$101.3^{+3.5}_{0}$	196.1 ± 19.6	144.7 ± 14.3



Bite-type pipe fitting for steel pipe

Outer diameter of pipe (mm)	Tightening torque	
	N·m	ft.-lb
8	34.3 ± 4.9	23.5 ± 3.5
10	41.7 ± 2.5	30.7 ± 1.7
12	58.8 ± 4.9	43.4 ± 3.5
15	88.3 ± 4.9	65.1 ± 3.5
16	93.2 ± 4.9	68.7 ± 3.5
18	132.4 ± 4.9	97.6 ± 3.5
22	205.9 ± 9.8	151.8 ± 7.2
27.2	245.2 ± 9.8	181.0 ± 7.2
28	313.8 ± 19.6	231.4 ± 14.3
32	313.8 ± 19.6	231.4 ± 14.3
35	411.9 ± 19.6	303.7 ± 14.3

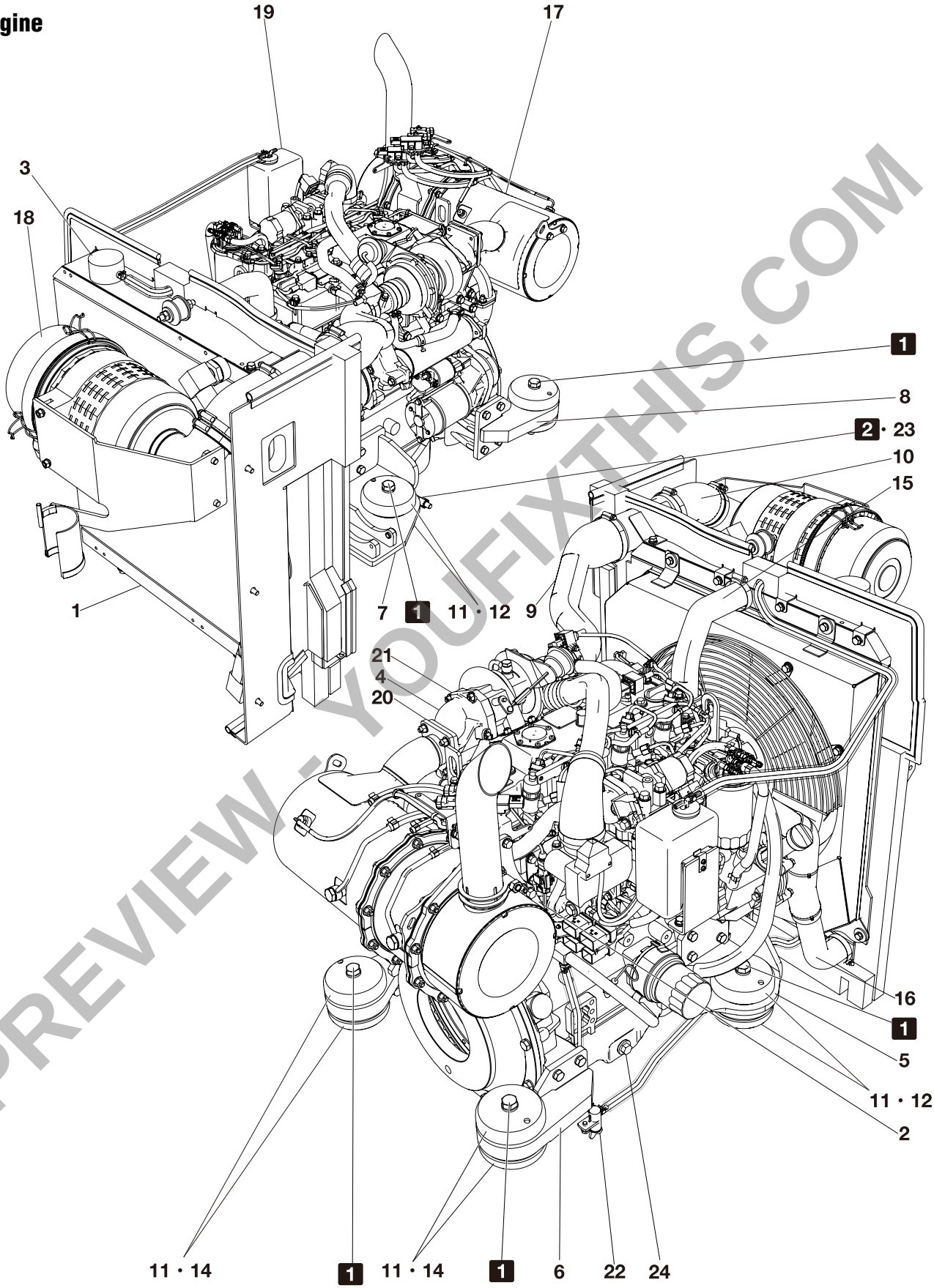


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DRIVE SYSTEM

Engine



1 256 N·m (189 ft.-lb.) ThreeBond #1324
2 Check to ensure that there is no paint or other coating on the surfaces of the terminal contacts.

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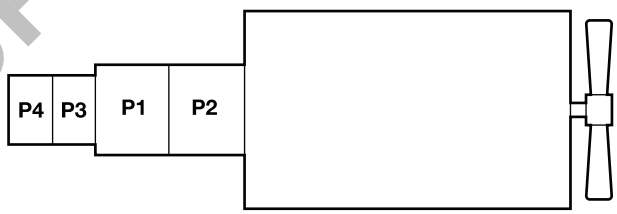
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OVERALL MACHINE

No operation is possible.

1	Check the hydraulic oil level.	Insufficient	Add hydraulic oil.
		Sufficient	
2	Check the hydraulic pump.	Faulty	• Repair or replace the hydraulic pump. • Replace the coupling.

1. Check the hydraulic oil level.
   Check the hydraulic oil tank level.
   ☞ "4. Disassembly and assembly, Hydraulic oil tank"
   When adding, use the same brand of oil currently being used.
   ☞ "2. Service data, Fuel and lubricant table"
2. Checking the hydraulic pump.
   • Checking the pump pressure
   ☞ "2. Service data, Performance criteria"



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SPECIFICATION TABLES

			Standard arm	Middle arm	Long arm
Operating mass	Rubber crawler	kg (lb)	8420 (18565)	8520 (18780)	8530 (18810)
	Steel crawler	kg (lb)	8620 (19000)	8715 (19210)	8730 (19240)
Engine output	Net (ISO 14396) kW/min.$^{-1}$(hp/rpm)		51.6/2000 (69.2/2000)		
	Net (ISO 9249/SAEJ1349) kW/min.$^{-1}$(hp/rpm)		49.6/2000 (66.5/2000)		
Bucket capacity	Heaped capacity	m^3 ($ft.^3$)	0.245 (8.65)		
	Struck capacity	m^3 ($ft.^3$)	0.185 (6.53)		

Performance

Standard loading mass			kg (lb)	441 (972)
Slew speed			min^{-1} (rpm)	10 (10)
Travel speed	Rubber crawler	1st	km/h (mph)	2.7 (1.68)
		2nd	km/h (mph)	5.2 (3.23)
Travel speed	Steel crawler	1st	km/h (mph)	2.6 (1.62)
		2nd	km/h (mph)	4.9 (3.04)
Maximum tractive force			kN (lbf)	88 (19783)
Gradeability			%	58
			deg.	30
Ground pressure	Rubber crawler	Standard arm	kPa (psi)	37.9 (5.5)
		Middle arm	kPa (psi)	38 (5.51)
		Long arm	kPa (psi)	38.1 (5.53)
	Steel crawler	Standard arm	kPa (psi)	39.3 (5.7)
		Middle arm	kPa (psi)	39.4 (5.71)
		Long arm	kPa (psi)	39.5 (5.73)
Noise level	Sound-power level		dB (A)	99
	Sound-pressure level		dB (A)	82

Dimensions of complete machine

Overall length	Middle arm		mm (in.)	6860 (270)
	Long arm		mm (in.)	6885 (271.1)
Overall width	During normal operation		mm (in.)	2300 (90.6)
Overall height	Rubber crawler	Cab	mm (in.)	2725 (107.3)
	Steel crawler	Cab	mm (in.)	2735 (107.7)

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LUBRICANT AND FUEL CHART

Select the appropriate fuel, lubricant, and grease according to temperature by referring to the table below.

- Regardless of the specified time, change the oil if it becomes too dirty or degraded.
- When refilling, never mix oils of different brands. If a brand is to be changed, replace all of the fuel/oil.

Part	Type	Selection by air temperature -4 14 32 50 68 86 104°F -20 -10 0 10 20 30 40°C	When to change/ replenish	Capacity
Engine oil pan	Diesel engine oil API: CJ-4 class or above ACEA: E6 class	SAE 10W-30 SAE 15W-40	Every 250 hrs. after the first 50 hrs.	Upper limit: 9.4 L (9.9 US qt.) Lower limit: 5 L (5.3 US qt.)
Hydraulic tank	Takeuchi genuine hydraulic oil 46	ISO VG46	Every 4000 hrs.***	Total amount of oil: 120 L (31.7 US gal.) Tank capacity: 71 L (18.7 US gal.)
	Anti-wear hydraulic oil	ISO VG32 ISO VG46 ISO VG68	Every 2000 hrs.***	
Engine cooling system	**Cooling water (water + coolant) SAE-J814C, J1034	Mixture of 50% coolant Mixture of 30% coolant	Every 1000 hrs.	14.0 L (14.8 US qt)
Travel reduction gear	Gear oil API: GL-4	SAE 90	Every 1000 hrs. after the first 250 hrs.*	1.1 L (1.16 US qt.)
Carrier roller	Engine oil API: CD class	SAE 30	–	0.140 L (4.73 fl. oz.)
Track roller	Gear oil	ISO VG220	–	0.180 L (6.1 fl. oz)
Idler	Engine oil API: CD class	SAE 30	–	0.150 L (5.07 fl. oz.)
Slew bearing	Lithium grease EP-2 NLGI No. 2	–	Every 50 hrs.	As required
Working equipment			Daily or every 10 hrs.	
Levers			When required	

* If the ratio of traveling time to total operating time is high, replace the gear oil earlier than the specified time.

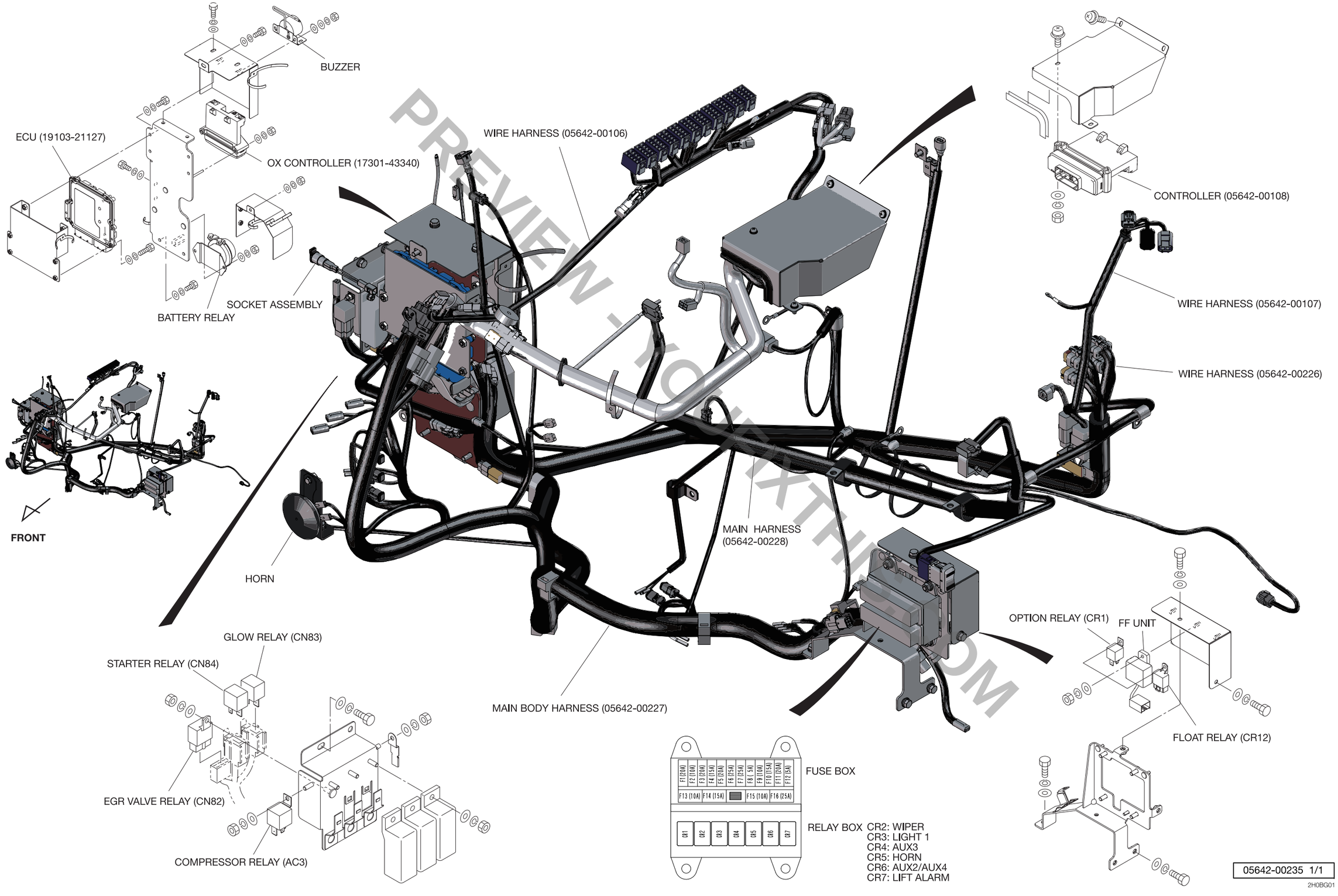
** For water, use tap water (soft). Do not use well or river water.
When the ambient temperature drops below 0°C (32°F), add coolant (antifreeze). Follow the coolant manufacturer's instructions to determine the mixture ratio.

*** The replacement interval for hydraulic oil depends on the oil type being used. New machines are shipped from the factory with the Takeuchi genuine hydraulic oil 46. This manual describes when to replace the hydraulic oil assuming that this Takeuchi oil is used. When a conventional anti-wear hydraulic oil is used, replace it every 2000 hours.

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WIRE HARNESS DIAGRAM

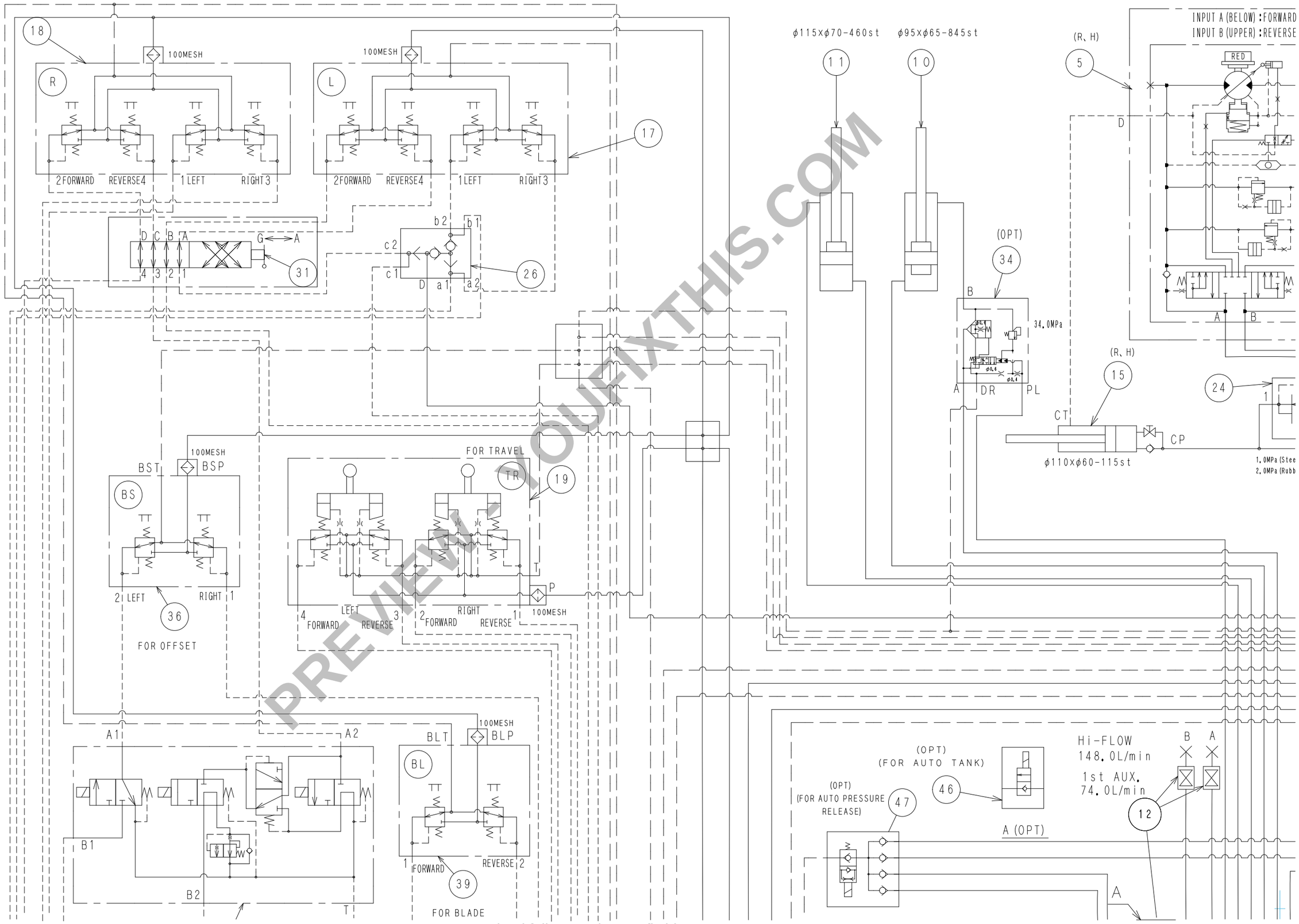


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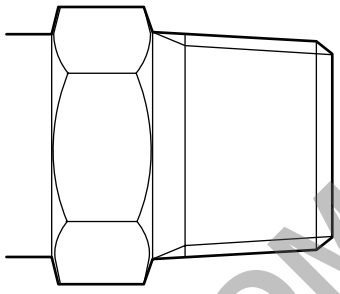


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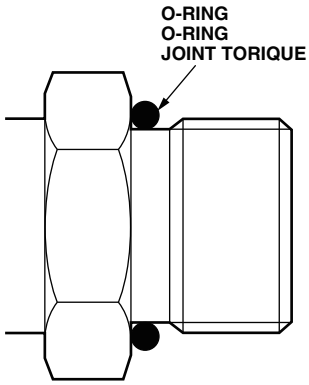
Joint for piping

Nominal thread diameter (R)	Tightening torque			
	Steel		Cast steel	
	N·m	ft.-lb	N·m	ft.-lb
1/8	11.8 ± 1.2	8.7 ± 0.8	10.8 ± 1.1	8.0 ± 0.7
1/4	29.4 ± 2.9	21.7 ± 2.1	24.5 ± 2.5	18.1 ± 1.7
3/8	53.9 ± 5.4	39.8 ± 3.9	49.0 ± 4.9	36.2 ± 3.5
1/2	88.3 ± 8.8	65.1 ± 6.4	73.5 ± 7.4	54.3 ± 5.3
3/4	147.1 ± 14.7	108.5 ± 10.7	127.5 ± 12.7	94.1 ± 9.3
1	196.1 ± 19.2	144.7 ± 14.3	171.6 ± 17.2	126.6 ± 12.5


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Joint for piping (O-ring seal type)

Nominal thread diameter (G)	Tightening torque	
	N·m	ft.-lb
1/8	19.6 ± 2.0	14.5 ± 1.4
1/4	34.3 ± 4.9	25.3 ± 3.5
3/8	53.9 ± 4.9	39.8 ± 3.5
1/2	63.7 ± 4.9	47.0 ± 3.5
3/4	93.2 ± 4.9	68.7 ± 3.5
1	107.9 ± 9.8	79.5 ± 7.2
1–1/4	117.7 ± 9.8	86.8 ± 7.2
1–1/2	137.3 ± 9.8	101.2 ± 7.2



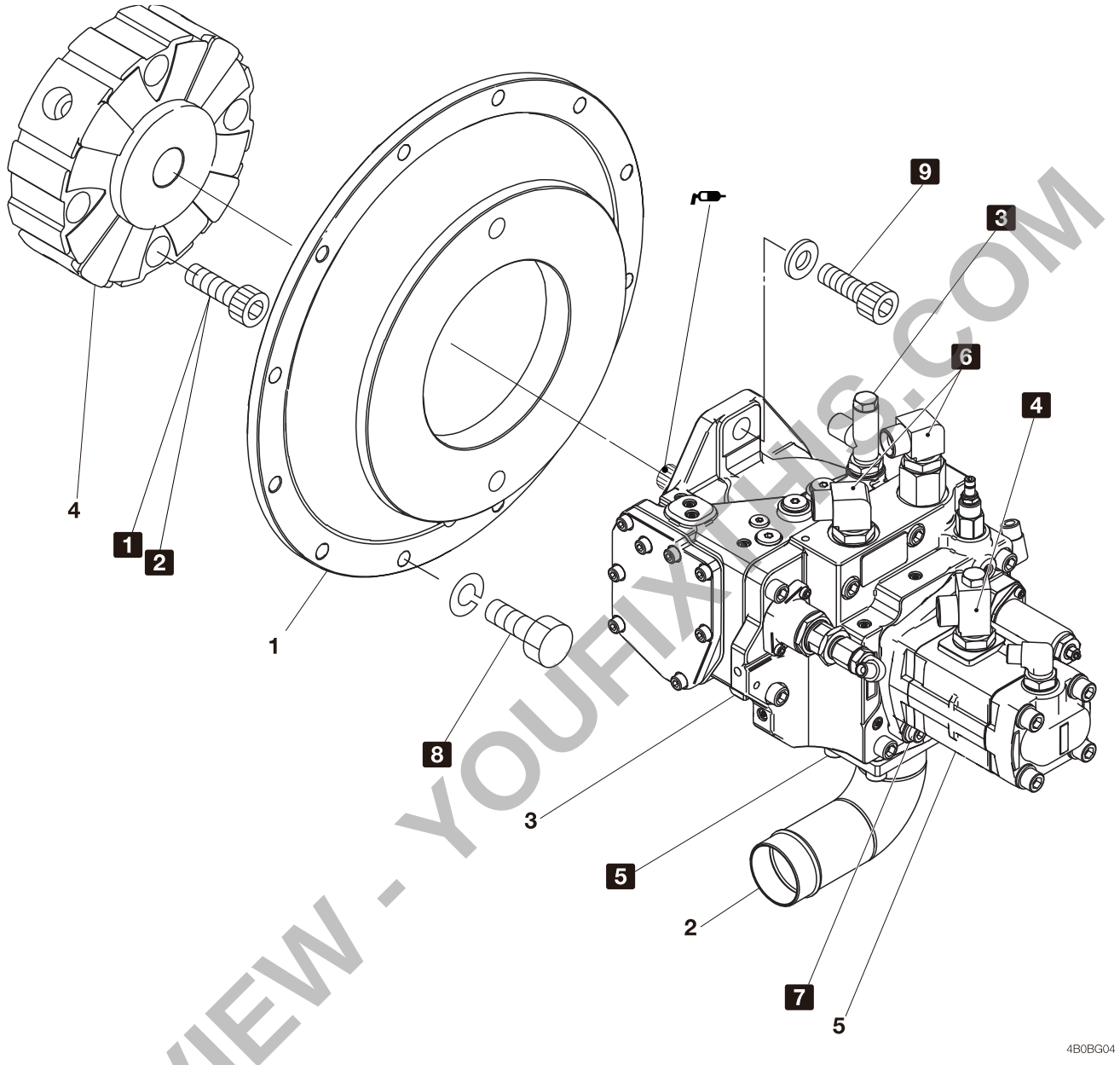
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Nominal thread diameter (UNF)	Tightening torque	
	N·m	ft.-lb
7/19–20	16.7 ± 2.0	12.3 ± 1.4
1/2–20	22.6 ± 2.0	16.6 ± 1.4
9/16–18	31.4 ± 2.9	23.1 ± 2.1
3/4–16	59.8 ± 4.9	44.1 ± 3.5
1–1/16–12	102.0 ± 5.9	75.2 ± 4.4
1–5/16–12	135.3 ± 7.8	99.8 ± 5.8
1–5/8–20	181.4 ± 9.8	133.8 ± 7.2

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Hydraulic pump



- Apply molybdenum disulfide grease on the spline.
  - Applying a large amount of grease on the spline hole in the coupling assembly may cause the grease to drip down onto rubber parts and cause the rubber to deteriorate.

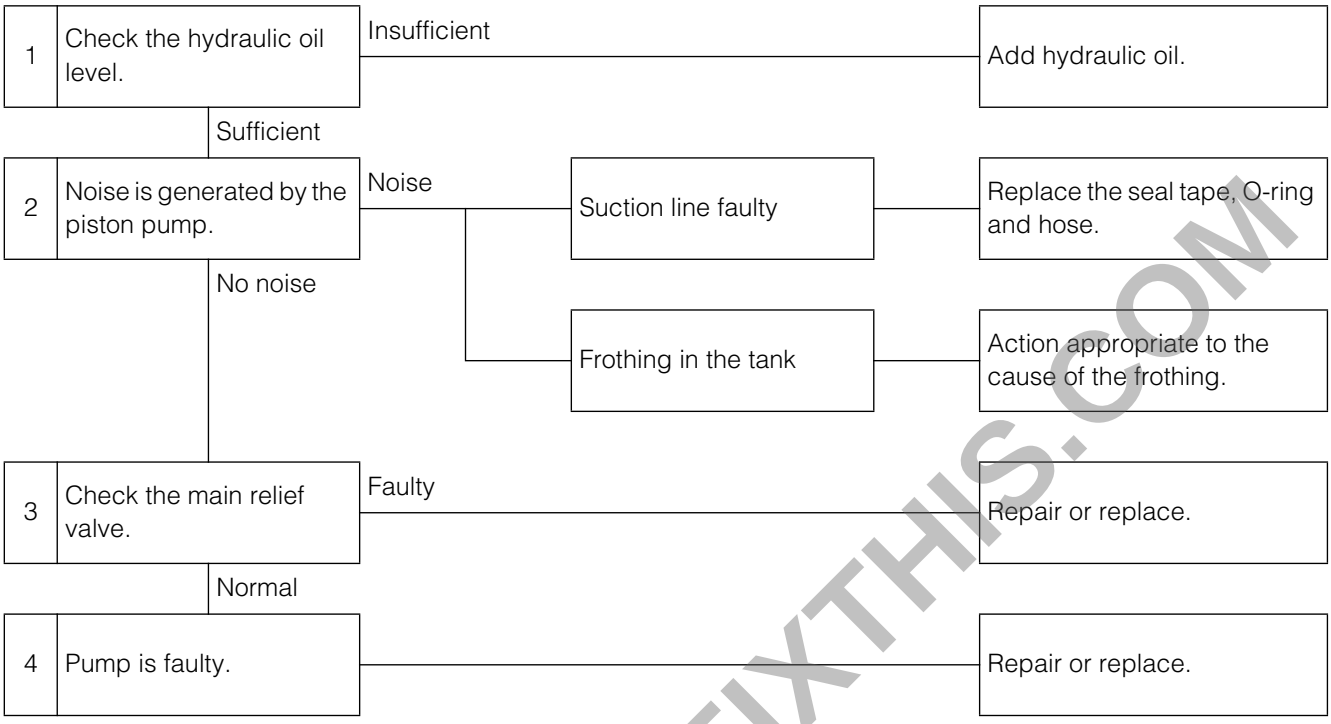
1. 210 to 230 N·m (155 to 170 ft.-lb.)
2. The bolts have already been coated with a special coating to prevent them from becoming loose. Do not use bolts other than the ones that came with the machine.
   Do not reuse bolts that have been loosened.
3. Air vent port
4. 98 N·m (72 ft.-lb.)
5. 87 N·m (64 ft.-lb.)
6. 170 N·m (125 ft.-lb.)
7. 54.9 N·m (40.5 ft.-lb.)
8. 55 N·m (41 ft.-lb.)
9. 335 N·m (247 ft.-lb.)

1. Engine housing
2. Suction pipe
3. Hydraulic pump
4. Coupling
5. Gear pump

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All systems working, but insufficient power.



1. Check the hydraulic oil level.
   Check the hydraulic oil tank level.
   ☞ "4. Disassembly and assembly, Hydraulic oil tank"
   When adding, use the same brand of oil currently being used.
   ☞ "2. Service data, Fuel and lubricant table"

2. Noise is generated by the piston pump.
   The noise is likely to be caused by cavitation in the pump, due to a faulty suction line. Check the following.
   a. The lines for sucking the hydraulic oil.
      - Apply grease or oil on the suspected faulty sections and check for a change. (check if air is being sucked)
   b. Clogging in the suction filter.
   c. Apply pressure to the hydraulic oil tank.
   ☞ "4. Disassembly and assembly, Hydraulic oil tank"

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Dimensions of base machine

Overall length of base machine			mm (in.)	2855 (112.4)
Overall width of base machine			mm (in.)	2300 (90.6)
Overall width of upper slewing structure			mm (in.)	2170 (85.4)
Overall width of upper slewing structure		Left	mm (in.)	1090 (42.9)
		Right	mm (in.)	1080 (42.5)
Cab width			mm (in.)	1060 (41.7)
Overall height of base machine	Rubber crawler	Cab	mm (in.)	2725 (107.4)
	Steel crawler	Cab	mm (in.)	2735 (107.7)
Swing radius			mm (in.)	1280 (50.3)
Rearmost distance of slewing structure from the axis of rotation			mm (in.)	1280 (50.3)
Clearance height under slewing structure			mm (in.)	715 (28.1)
Crawler base	Rubber crawler		mm (in.)	2210 (87)
	Steel crawler		mm (in.)	2180 (85.8)
Crawler overall length	Rubber crawler		mm (in.)	2855 (112.4)
	Steel crawler		mm (in.)	2830 (111.4)
Undercarriage overall width	During normal operation		mm (in.)	2300 (90.6)
Track gauge	During normal operation		mm (in.)	1850 (72.8)
Track shoe width			mm (in.)	450 (17.7)
Ground clearance of undercarriage	Rubber crawler		mm (in.)	315 (12.3)
	Steel crawler		mm (in.)	320 (12.6)

Engine

Part Name			Yanmar 4TNV98CT-WTBZ
Type			4-cycle, vertical, water-cooled, in-line diesel engine (direct-injection)
Number of cylinders – Internal diameter × stroke		mm (in.)	4-98 ×110 (3.86 × 4.33)
Total displacement		mL (cu. In.)	3318 (202.5)
Maximum torque		N·m (ft.-lb.)	283 to 308 (208.7 to 227.2)
		$min.^{-1}$ (rpm)	1300 (1300)
Specific fuel consumption (at rated output)		g/(kW·h) (lb./hp-hr.)	226 (0.372)
Fuel/air cleaner			Centrifugal, filter paper-type
Cooling system	Fan		Suction-type
	Radiator		Pressure sealed-type
Starting system	Voltage	V	12
	Output	kW	3.0
Generator	Voltage	V	12
	Output	A	80
Battery	Voltage	V	12
	Capacity	A·h	72
	Quantity		1

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Diesel fuel standards

Use a diesel fuel that is compliant with any of the standards below. The table below shows standards from various countries/regions.

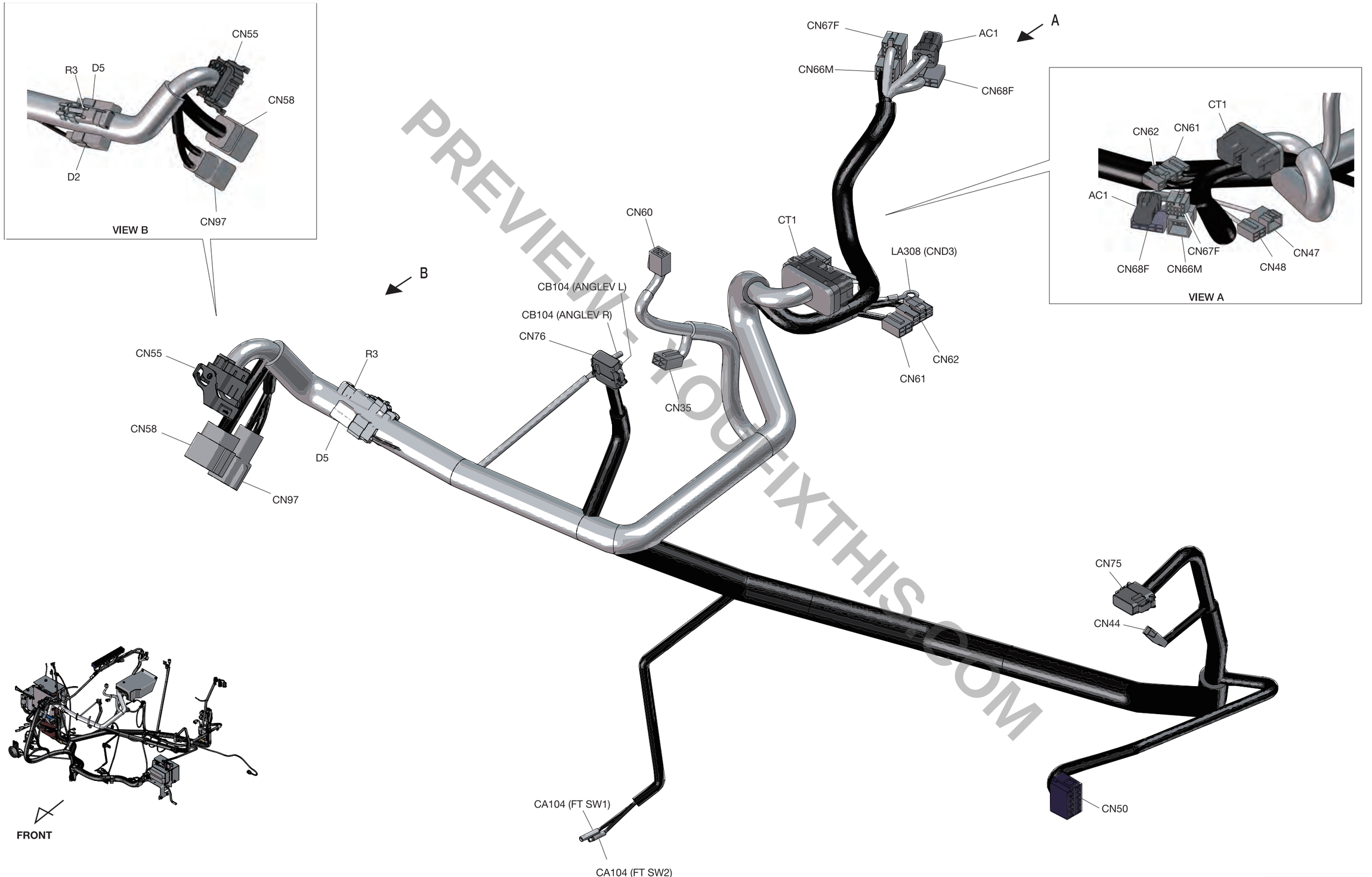
Diesel fuel standards	Region
No. 2-D, No. 1-D, ASTM D975-94	USA
EN590:96	EU
ISO 8217 DMX	International standard
BS 2869-A1 (or A2)	UK
JIS K2204 Grade, 2-go	Japan
KSM-2610	Korea
GB252	China

Part	Type		Capacity
Fuel tank	Diesel fuel	To maintain the performance and service life of the engine, always use clean and high-quality fuel. • To avoid freezing in cold climates, use a light oil that still functions when the temperature is at least 12°C (54°F) below the lowest expected ambient temperature. • Use a light oil that has a cetane number of 45 or higher. When operating at a very low temperature or at a high altitude, a higher cetane number fuel will be required. • The sulfur content must be less than 0.5% by volume. The recommended value, however, is less than 0.05%. An electronically-controlled engine with an EGR system should use fuel containing less than 0.05% sulfur. The use of fuel containing a high sulfur content may cause sulfuric acid corrosion to occur inside the cylinder. • Do not mix fuel with any kerosene, used engine oil, or leftover fuel. • Poor quality fuel can degrade engine performance. It can also damage the engine. • Avoid adding any additives to the fuel. Some fuel additives can degrade engine performance.	100 L (26.3 US gal.)

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Main harness

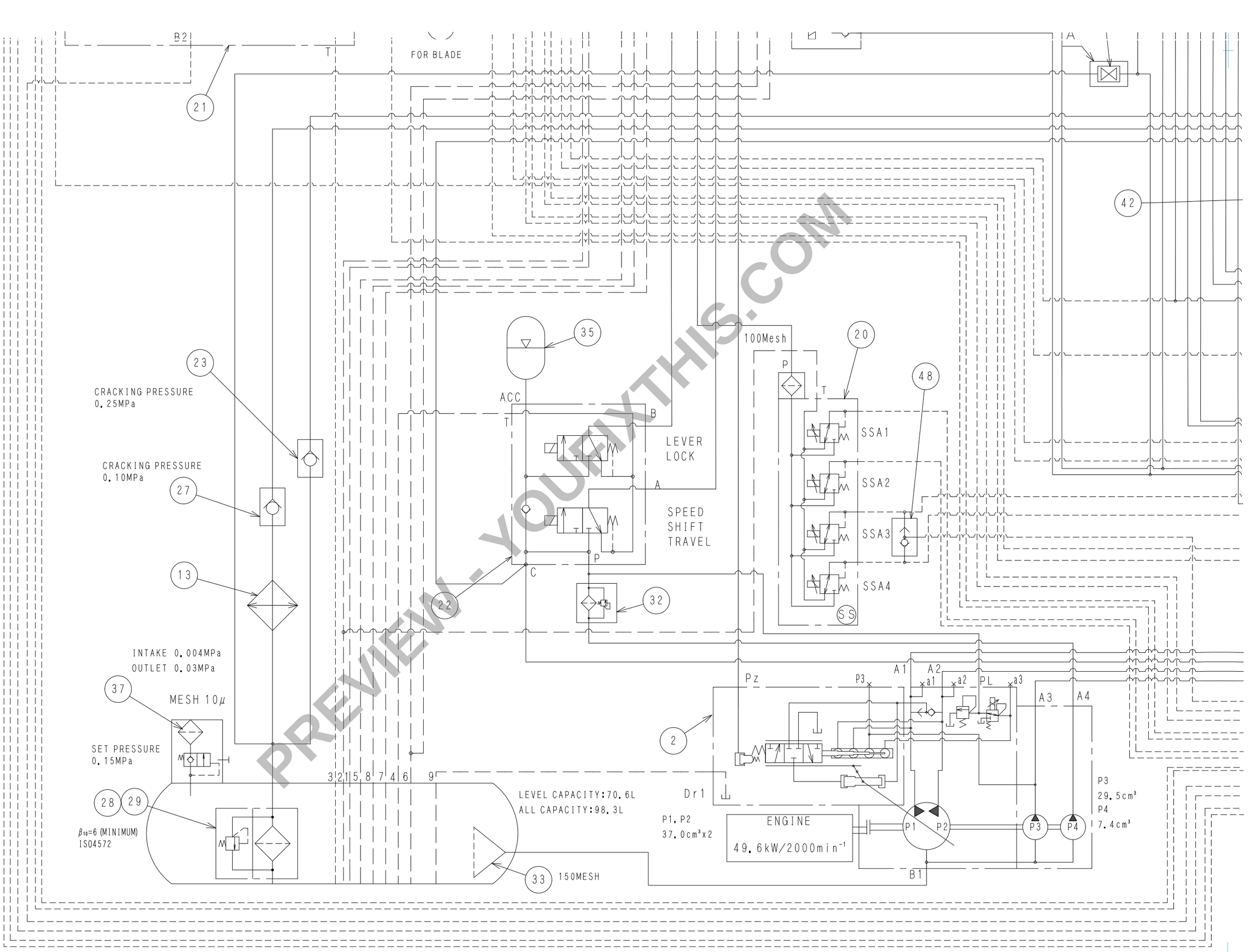


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Bolts and nuts (JIS strength category 10.9)

Thread	Size × pitch	Tightening torque			
		General tightening points		Special tightening points	
		N·m	ft.-lb	N·m	ft.-lb
Coarse	M6 × 1.0	9.8 ± 0.5	7.2 ± 0.4	11.8 ± 1.1	8.7± 0.4
	M8 × 1.25	22.6 ± 1.1	16.6 ± 0.8	26.5 ± 2.5	19.5 ± 0.9
	M10 × 1.5	47.1 ± 2.4	34.7 ± 1.7	54.9 ± 4.9	40.5 ± 2.0
	M12 × 1.75	83.4 ± 4.1	61.5 ± 3.0	97.1 ± 7.4	71.6 ± 3.5
	M14 × 2.0	134.4 ± 6.7	99.1 ± 4.9	155.9 ± 12.7	115.0 ± 5.7
	M16 × 2.0	207.9 ± 10.4	153.3 ± 7.7	241.2 ± 17.2	177.9 ± 8.9
	M20 × 2.5	410.9 ± 20.5	303.1 ± 15.1	475.6 ± 23.7	350.8 ± 17.5
Fine	M8 × 1.0	24.5 ± 1.2	18.1 ± 0.9	28.4 ± 1.4	21.0 ± 1.0
	M10 × 1.25	50.0 ± 2.5	36.9 ± 1.8	58.8 ± 2.9	43.4 ± 2.2
	M12 × 1.5	87.3 ± 4.3	64.4 ± 3.2	102.0 ± 5.1	75.2 ± 3.8
	M14 × 1.5	135.3 ± 6.8	99.9 ± 5.0	157.9 ± 7.8	116.5 ± 5.8
	M16 × 1.5	220.6 ± 11.0	162.7 ± 8.1	256.0 ± 12.7	188.8 ± 9.4
	M20 × 1.5	452.1 ± 22.6	333.4 ± 16.6	524.7 ± 26.1	387.0 ± 19.2

1. General tightening points (non-lubricated)
   All securing points that have no special tightening torque specified in this manual and that are not special tightening points.
2. Special tightening points (grease with molybdenum disulfide applied)
   Points where a specific tightening torque is specified in this manual.
3. Points where thread-locking compound should be applied (ThreeBond #1324).
4. If a tightening torque value is specified in this manual for a point not listed in the table above, follow the specification listed in the manual.
5. To tighten multiple bolts and nuts evenly, tighten opposite bolts/nuts alternately as a pair.

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TRAVEL SYSTEM

Removing the crawler

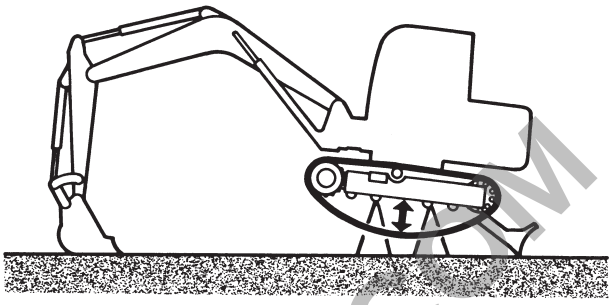
⚠ WARNING

When working under the machine while it is raised up, be sure to use a stand to support the machine.

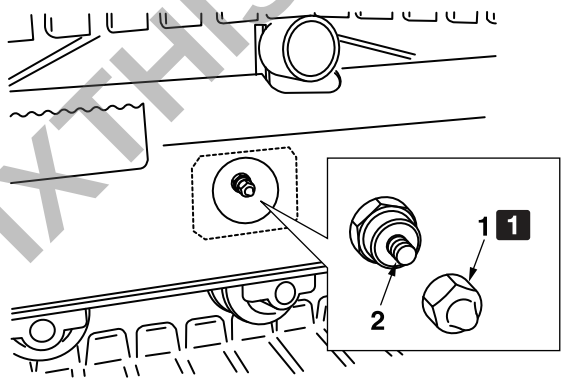
Important: When replacing crawlers, replace both the right and left ones at the same time.

1. Raise the machine.
   - Use the blade and the hoe attachment to raise the machine at least 500 mm (19.7 in.).
2. Adjust the tensioning cylinder valve.
   a. Remove the cover.
   b. Take out the valve nut (1), and loosen the screw (2).
   c. After completely loosening the crawler tension, tighten the screw (2), and secure the valve in place with the nut (1).

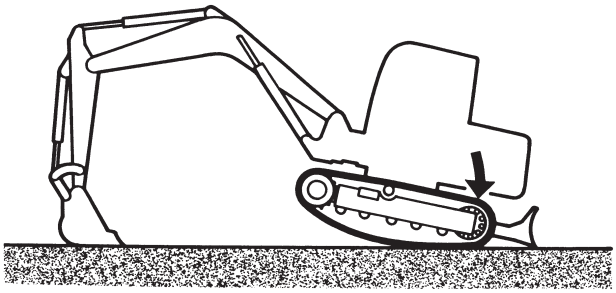
   1 Nut: 18.6 to 21.6 N·m (13.7 to 15.9 ft.-lb.)
3. Lower the blade side of the machine, and then lower the crawler to the ground and position it in such a way that deflection is maximized.
   - With the engine turned off, slowly lower the crawler.
4. If the crawler is positioned further out than the idler, slide the crawler over to the side of the idler.
5. Release the engagement between the crawler and the sprocket, and then slide the crawler to the side to remove it.



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4C0AQ03Z

Installing the crawler

1. Lift up the machine, and insert the crawler into the frame.
   - Be sure to firmly attach the sprockets and idler to the crawler.

   Crawler: 362 kg (798 lb.)
2. Tighten the crawler tension.
   - Start the engine, and set the travel speed switch to the 2nd gear.
   - Check the crawler tension.

   ☞ “2. Service data, Performance criteria”

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Boom, bucket, slew and arm fail to move or are too slow.

1	Check the gear pump.	Faulty	• Repair or replace the gear pump. • Replace the coupling.
	Normal		
2	Check the fuse.	Faulty	Replace the fuse.
	Normal		
3	Check the limit switch, harness, and controller.	Faulty	Adjust or replace the limit switch.
	Normal		
4	Check the lever lock solenoid valve.	Faulty	Repair or replace the lever lock solenoid valve.
	Normal		
5	Check the pilot relief valve.	Faulty	Repair or replace the pilot relief valve.
	Normal		
6	Check the pilot valve.	Faulty	Repair or replace the pilot valve.

1. Check the gear pump.
   Check the pump P4 that supplies hydraulic pressure for the pilot valve.
   ☞ "2. Service data, Performance criteria"
   ☞ "5. Troubleshooting, Gear pump"
   Also, check the line filter for possible clogging, and clean it if necessary.

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Hydraulic system

Hydraulic pump drive system			Engine-linked
Hydraulic pump	Type		Double-gear variable discharge piston plus double gear
	Quantity		1
	Delivery	L/min. (US gal./min.)	74 (19.55)
		L/min. (US gal./min.)	74 (19.55)
		L/min. (US gal./min.)	59 (15.59)
		L/min. (US gal./min.)	15 (3.96)
	Hydraulic pump control system		Total horsepower control
Main relief valve pressure setting		MPa (psi)	27.5 (3990)
		MPa (psi)	27.5 (3990)
		MPa (psi)	24.0 (3480)
		MPa (psi)	3.5 (510)
Hydraulic tank pressure			Pressure valve
Control valve	Type		Directional control valve with 14 valves in series
	Operation type		Hydraulic pilot-operated
Hydraulic oil filter	Type		Glass fiber filter paper-type
	Filter precision		BETA 10 = 6
	Attachment position		Return circuit (inside tank)
Hydraulic oil cooler	Cooling system		Air-cooled

Operating device

Cab	Position		Left side
	Construction		Suspension seat, adjustable
Cab or canopy	Construction		Steel-enclosed cab with fully reinforced glass windows
Control levers and pedals	Shifting operation		Variable travel speed switch (operating lever handle grip)
	Travel operation		Hydraulic pilot operated, 2 levers
	Slew operation		Hydraulic pilot-operated
	Arm operation		Hydraulic pilot-operated
	Bucket operation		Hydraulic pilot-operated
	Boom operation		Hydraulic pilot-operated
	Offset operation		Hydraulic pilot-operated
	Other		Service operation: Switch-operated
Instruments, switches	Cluster gauges		Light, windshield wiper, windshield wiper fluid, auto-deceleration function, power, high-altitude mode, 1st service AUTO tank, detent, lift alarm, and beacon light
Lighting devices	Boom light	V-W	12 V-55 W, H3-halogen
Warning, safety devices			Horn (12 V, 108 dB, 415 Hz)
Other			–

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SAFETY ALERT SYMBOL



This symbol represents the safety alert.
The message that follows the symbol contains important information regarding human safety.
Read and understand the message to avoid personal injury or death.

Safety label

Safety labels are used to alert operators or other people exposed to the risks of injury or damage. There are the following three types of labels.
Read the labels carefully as they are important for your safety.

⚠ DANGER

The word “DANGER” indicates an imminently hazardous situation which, if not avoided, is likely to result in serious injury or death.

⚠ WARNING

The word “WARNING” indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

⚠ CAUTION

The word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word “IMPORTANT” is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

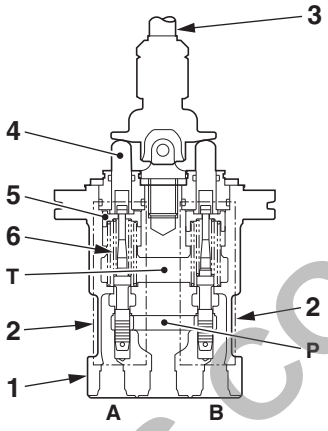
This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. It is also impossible to cover all hazards and risks which may be associated with the maintenance of the machine in every environment. For maintenance work, each person must take adequate safety precautions against possible hazards in the respective working environment.

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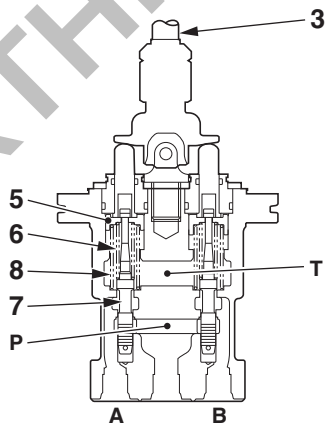
PILOT VALVE (CONTROL LEVER)

The pilot valve is a remote-controlled valve with a reducing valve system used to operate the spool in the control valve. The pilot valve comes with right and left control levers.
The pilot valve casing (1) contains a vertical shaft hole that incorporates a reducing valve (2). When the lever (3) is tilted, the push rod (4) and spring seat (5) are pushed down, which changes the pressure of the secondary pressure spring (6).
The casing (1) contains the oil inlet port P (primary pressure) and the tank port T. The secondary pressure which corresponds to changes in operating angle produced using the lever (3) can be provided through the output ports A and B located below the vertical shaft hole. The secondary pressure functions as the pilot pressure to activate the spool of the control valve.



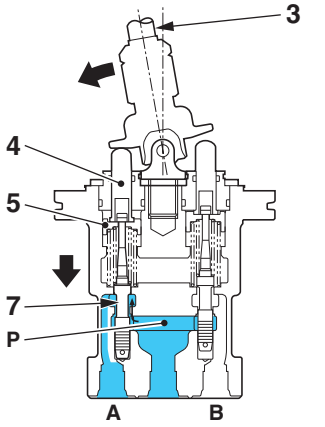
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When the lever (3) is in the neutral position:
The force of the spring (6) that determines the output pressure (secondary pressure) of the pilot valve is not conveyed to the spool (7). This causes the spool (7) to be pushed up by the return spring (8) and spring sheet (5), and the output ports A and B are connected to the tank port T, which makes the pressures in the ports A and B be equal to the pressure in the tank port T.



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When the lever (3) is tilted:
When the lever (3) is tilted and the push rod (4) is pushed, the spring sheet (5) and spool (7) move downward, and the input port P is connected to the output port A. The oil from the pilot pump then flows into the output port A to generate a pressure.



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1 Bolt: 102 ± 82 N·m (75.2 ± 60.5 ft.-lb.) ThreeBond #1324

1. Hydraulic tank
2. Cover
3. Air breather
4. Valve assembly
5. Spring
6. O-ring
7. Cover
8. Suction filter
9. O-ring
10. Plate
11. Cover
12. Check valve
13. Sight gauge
14. Filter element
15. Plug
16. Shim (05680-35138), selected usage
17. Shim (05680-35139), selected usage
18. Spacer (03230-54001), selective usage
19. Spacer (03230-54002), selective usage
20. Spacer (03230-54003), selective usage

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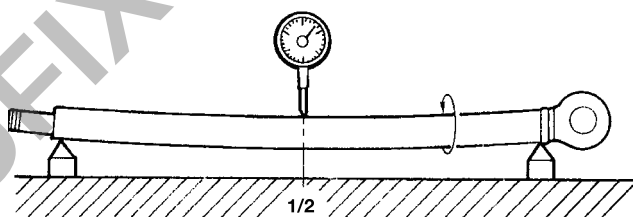
Inspection and adjustment

Inspection after disassembly

Clean each part thoroughly with wash oil, then carry out the following checks. When a cylinder has been disassembled, replace all the seals with new ones.

1. Piston rod
   - Replace the rod if cracks are found.
   - Repair the threads or replace the rod if the threads are damaged.
   - Replace the rod if the plating layer is broken, rusted, or scratched.
   - Replace the rod if it is bent more than the limit of 1 mm (0.039 in.) per meter (3.28 ft.). (For the measurement method, refer to the figure on the right.)
   - Replace the clevis bushing if the inner diameter is worn.

   Measuring bending
   a. Support the ends of the parallel portion of the rod on V-blocks.
   b. Set a dial gauge at the midpoint between the two blocks.
   c. While rotating the rod, read the maximum and minimum run-out indicated by the dial gauge.
      Even if the bending of the rod lies within the limits above, it may not move smoothly due to localized bending. Therefore, replace the rod if it makes a squeaking noise or sticks when testing operation after reassembly.



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2. Tube
   - Replace the tube if cracks are found in a welded joint.
   - Replace the tube if the inside surface is scratched or if it leaks hydraulic oil.
   - Replace the clevis bushing if the inner diameter is worn.

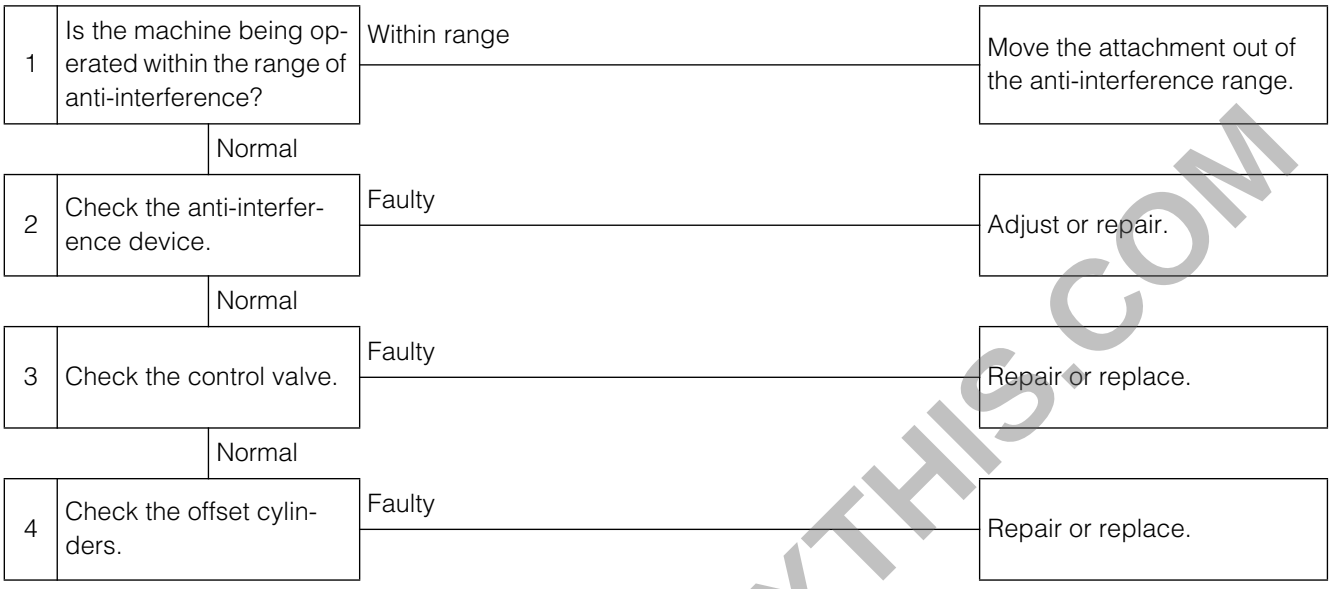
3. Rod cover
   - Replace the bushing if the bushing inner diameter is worn and the clearance with the piston rod exceeds 0.25 mm (0.0098 in.).
   - Replace the bushing if the inside surface of the bushing is scratched to a depth greater than the depth of the coating layer.

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OFFSET

Offset cylinders do not move.



1. Is the machine being operated within the range of anti-interference?
   If completely unable to use the left offset, check to see if the attachment is operating within the range of anti-interference.
   Move the attachment running with the right offset set out of the range of anti-interference if it is within the range.
2. Check the anti-interference device.
   ☞ "5. Troubleshooting, Anti-interference Device"

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