YANMAR

SERVICE MANUAL

EXCAVATOR

ViO25-6

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2. TECHNICAL DATA

2. Technical Data

2-1 Specifications

Item				Unit	ViO25-6
Main specifications of machine					
Dimensions					
Overall length (Transportation position)				mm	4110
				mm	4120
Cabin	Overall height		Transportation position	mm	2530
			Traveling position	mm	2530
	Overall width		Full machine width	mm	1500
Canopy	Overall height		Transportation position	mm	2520
			Traveling position	mm	2520
	Overall width		Full machine width	mm	1500
Tumbler center distance (Steel track / rubber track)				mm	1590
Track gauge				mm	1250
Minimum ground clearance				mm	320
Traveling performance					
Travel speed	Steel track		Low speed (Forward/Reverse)	km/hr	2.8
			High speed (Forward/Reverse)	km/hr	4.5
	Rubber track		Low speed (Forward/Reverse)	km/hr	2.8
			High speed (Forward/Reverse)	km/hr	4.5
Permissible water depth limit				mm	500
Work performance					
Bucket	Width (Standard)			mm	400
	[Standard. JIS heaped capacity]			cu.m	0.06
	Number of teeth / Installation method			pcs.	3 / Rubber pin lock type
Work range					
Maximum digging depth	With blade raised			mm	2490
	With blade on the ground			mm	2690
Maximum depth of vertically digging				mm	1150
Maximum dumping height				mm	2830
Minimum front swing radius (with boom in front center)			Cabin	mm	1950
			Canopy	mm	
Minimum front swing radius (with boom in full swing)			Cabin	mm	1650
			Canopy	mm	

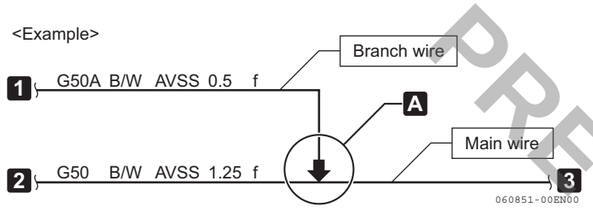
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2-9 Wiring Diagram

■ How to Read Wiring Diagrams

● Intersections and Wire Connections

<Example>

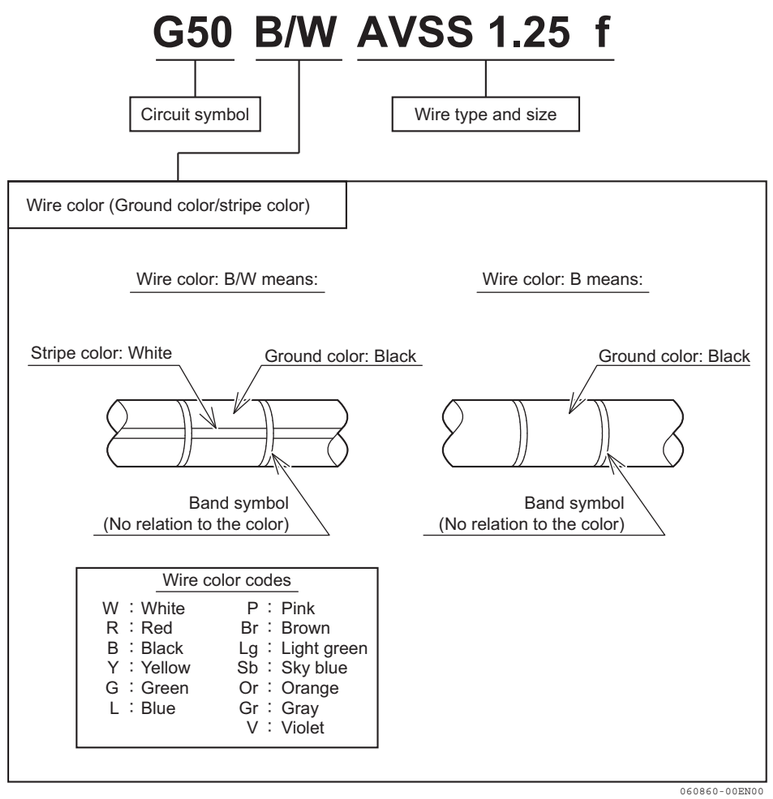


The point of arrow **A** on the main wire shown in the figure above represents an intersection of the branch wire and the main wire.
The direction of the arrow indicates which one is the branch wire (the arrowed line represents the branch wire) and also shows the division between the branch wire and the main wire.

In the example above, the wires are divided as follows.

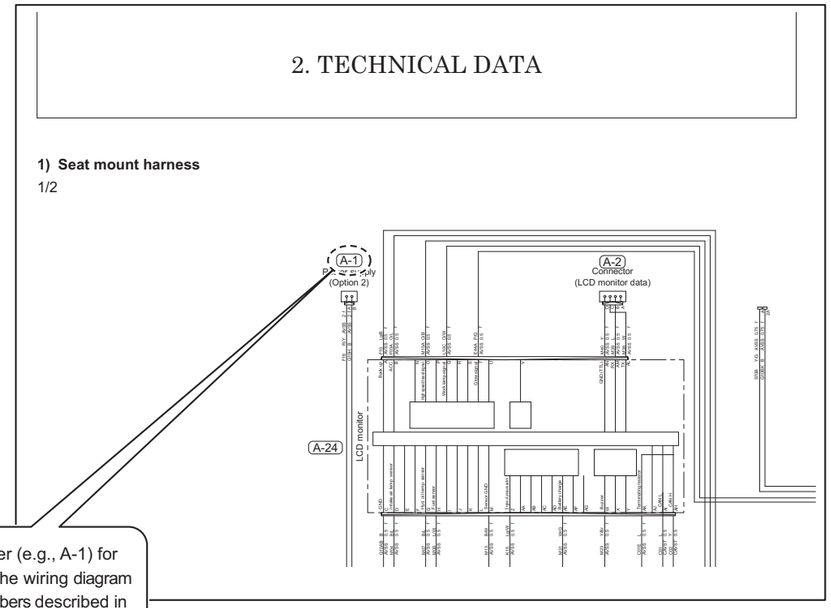
1 to the point of arrow **A** : Branch wire G50A B/W AVSS 0.5 f
2 to **3** : Main wire G50 B/W AVSS 1.25 f

● How to Read Wiring Symbols

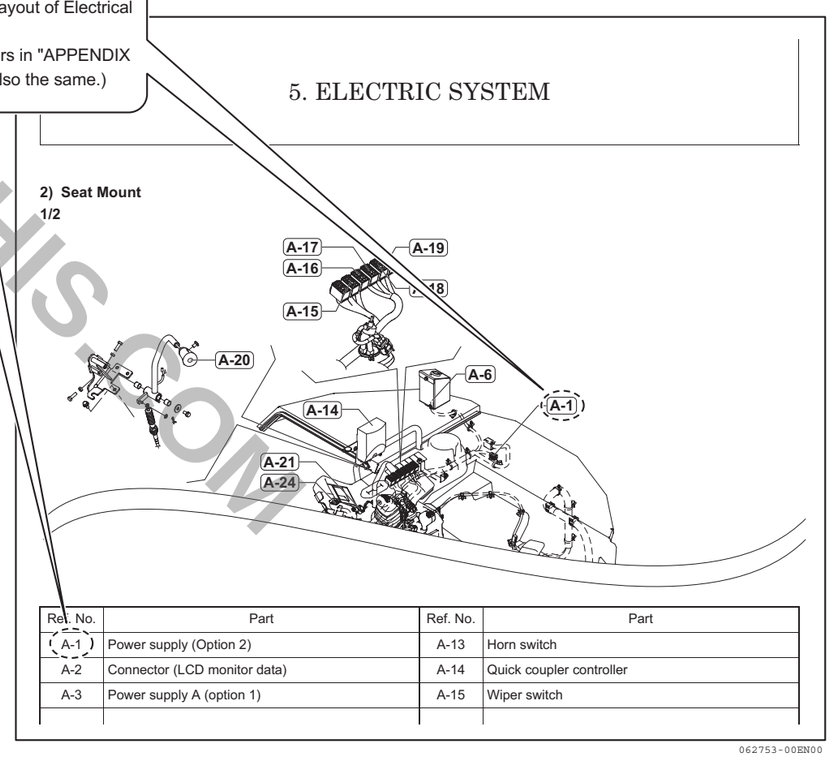


● Reference numbers

<Example>



Each reference number (e.g., A-1) for electric equipment in the wiring diagram corresponds to the numbers described in Section "5-1-1 Parts Layout of Electrical Equipment".
(The reference numbers in "APPENDIX Wiring Diagram" are also the same.)

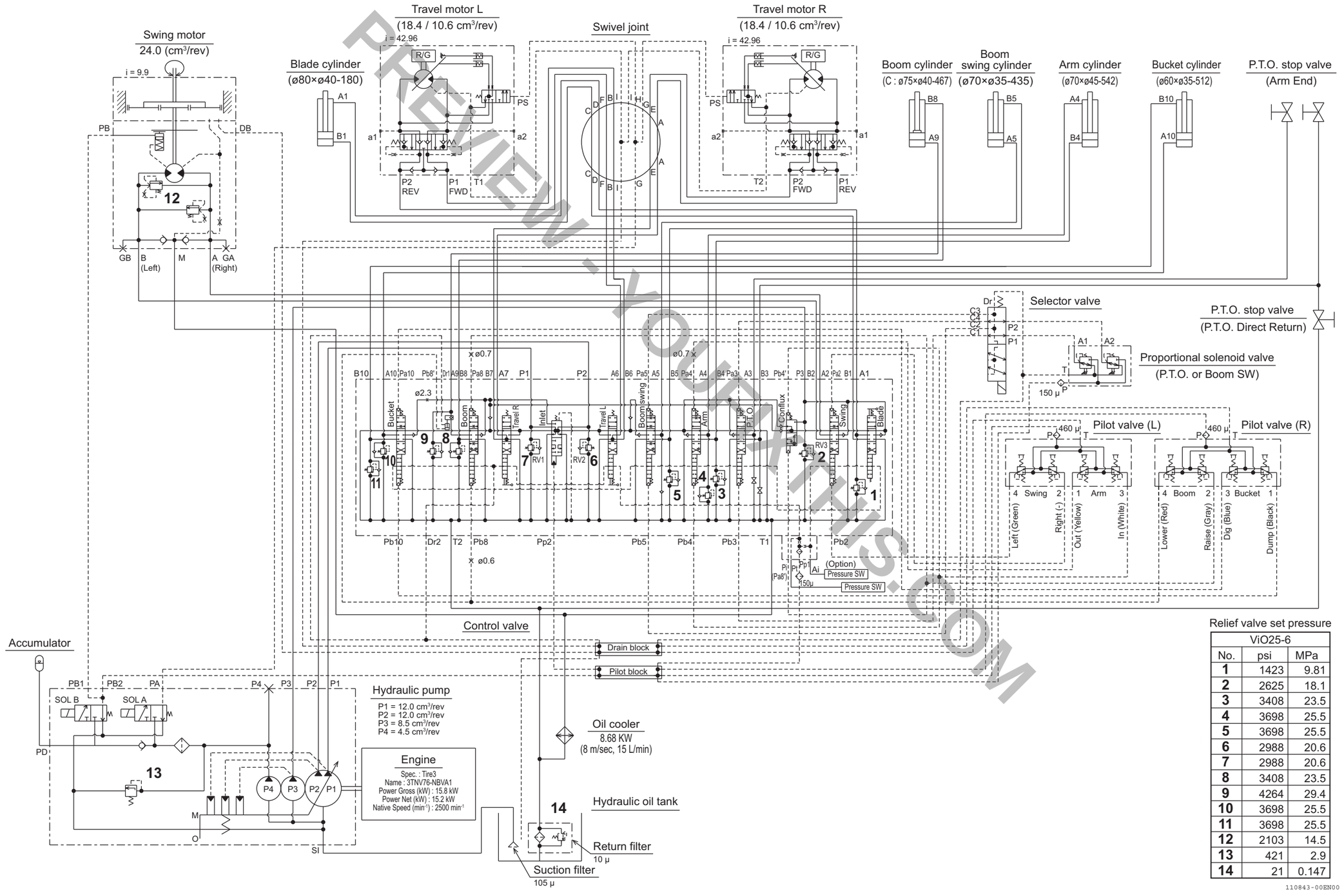


Ref. No.	Part	Ref. No.	Part
A-1	Power supply (Option 2)	A-13	Horn switch
A-2	Connector (LCD monitor data)	A-14	Quick coupler controller
A-3	Power supply A (option 1)	A-15	Wiper switch

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2-8 Hydraulic Circuit Schematic

Applicable model : ViO25-6



Relief valve set pressure

ViO25-6		
No.	psi	MPa
1	1423	9.81
2	2625	18.1
3	3408	23.5
4	3698	25.5
5	3698	25.5
6	2988	20.6
7	2988	20.6
8	3408	23.5
9	4264	29.4
10	3698	25.5
11	3698	25.5
12	2103	14.5
13	421	2.9
14	21	0.147

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4-2-4 Cylinder Head

Cylinder Head Components

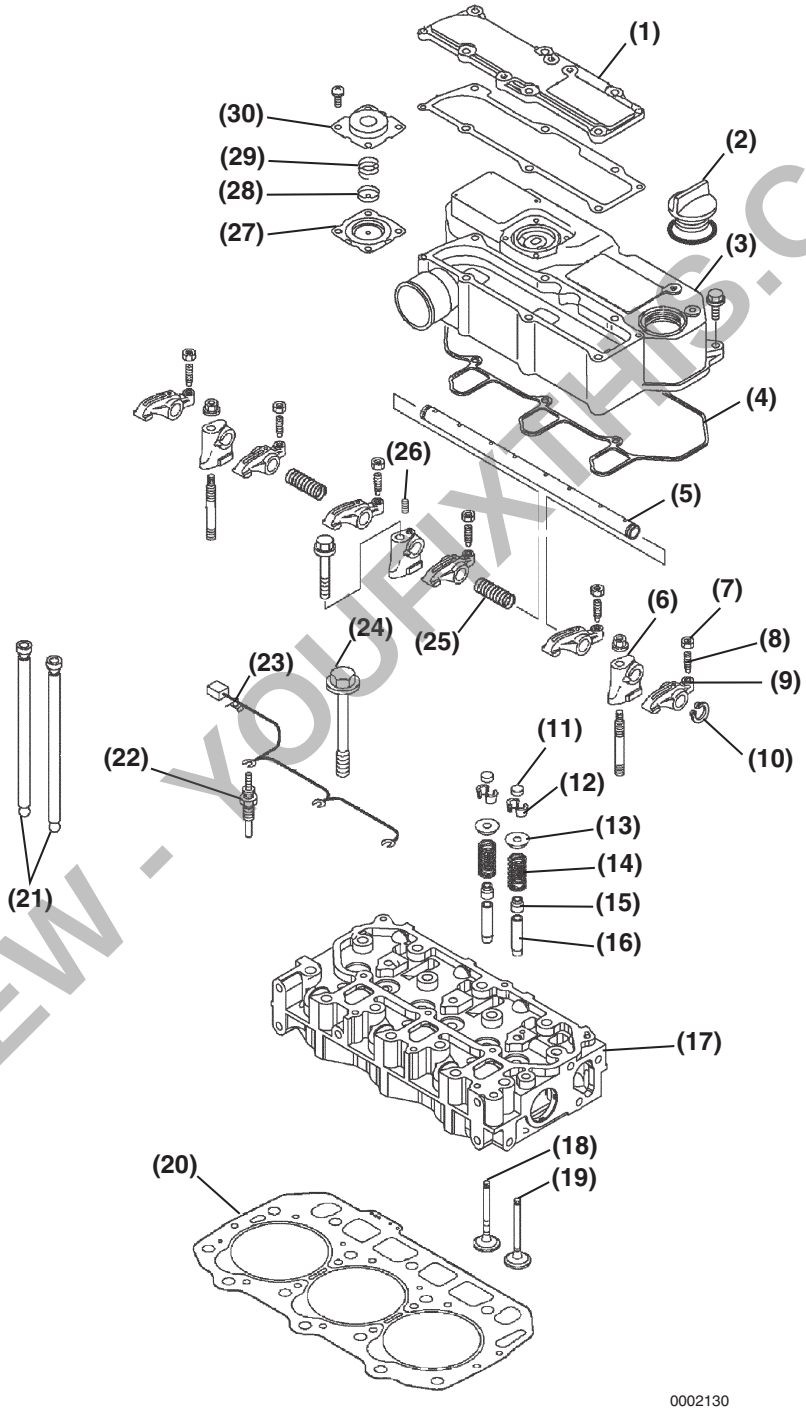


Figure 4-2-1

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3-7 List of Tightening Torque

3-7-1 Machine

Applicable model			ViO25-6		
Equipment No		Tightening part	Thread size	Tightening torque N•m	Adhesive
Engine / Electrical equipment					
	1	Engine mount vibroisolating rubber	Nut 10	24.5 to 32.3	
	2	Engine × Engine mount (Fore Left)	M10×25	44.1 to 58.9	ThreeBond 1324
	3	Engine × Engine mount (Fore Right)	M10×25	44.1 to 58.9	ThreeBond 1324
	4	Engine × Engine mount (Rear Left)	M10×25	44.1 to 58.9	ThreeBond 1324
	5	Engine × Engine mount (Rear Right)	M10×25	44.1 to 58.9	ThreeBond 1324
	6	Engine mount × Stopper (Left)	M10×25	44.1 to 58.9	ThreeBond 1324
	7	Engine mount × Stopper (Fore Right)	M10×25	44.1 to 58.9	ThreeBond 1324
	8	Air cleaner	M8×20	19.6 to 22.6	
	9	Air cleaner intake hose	Hose clip 70	2.16 to 2.45	
	10	Cooling water hose	Hose clip 41	2.45 to 2.94	
	11	Oil cooler hose	Hose clip 22	3.9 to 4.9	
	12	Fuel level gauge unit	M5×12 (Pan head screw)	1.18 to 1.47	
	13	Fuel level gauge hose	Hose band 13	0.98 to 1.47	
	14	Fuel oil tank drain valve	R3/8	19.6 to 29.4	Loctite 577
	15	Fuel oil tank holding band	Nut 10	2.45 to 2.94 <Tank holding side>	24.5 to 32.3 <Lock nut side>
	16	Battery holding rod	Nut 6	1.96 to 2.94 (Lower <holding>)	4.9 to 5.88 (Upper <Locknut>)
	17	Accelerator cable locknut	Nut 6	3.92 to 4.90	
	18	Wire harness × Starter motor terminal	Nut 8	5.88 to 11.77	
	19	LCD monitor × Panel cover	M6×20	1.0 to 1.5	
	20	Panel cover (lower) × Panel cover (upper)	M5×14 (Tapping screw)	2.55 to 3.3	
	21	Safety switch (Travel speed)	Locknut (Fine thread) 20	19.6 to 24.5	
	22	Safety switch (Cut-off lever)	Locknut (Fine thread) 20	19.6 to 24.5	
	23	Accelerator dial (holding nut)	Nut (Fine thread) M9	1.33 to 1.47	

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5-4 Error Code List

Error code	Classification	Error description	Detection condition	Causes	Corrective measures
00 000091.00	Caution	Accelerator sensor malfunction: above normal operating range (SAEJ1843)	Sensor voltage is 4.6 V or more, or 0.2 V or less.	• Connection failure of connectors • Harness wiring failure (engine control dial wiring disconnected or short circuited to GND) • Defective accelerator sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and engine control dial. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000091.01	Caution	Accelerator sensor failure: below normal operating range (SAEJ1843)	Sensor voltage is 4.6 V or more, or 0.2 V or less.	• Connection failure of connectors • Harness wiring failure (engine control dial wiring disconnected or short circuited to GND) • Defective accelerator sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and engine control dial. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000091.02	Caution	Accelerator sensor malfunction: intermittent failure	Sensor voltage is 4.6 V or more, or 0.2 V or less.	• Connection failure of connectors • Harness wiring failure (nearly broken wiring of sensor signal line, sensor 5 V line or sensor GND line) • Defective accelerator sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and accelerator sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000091.03	Caution	Accelerator sensor malfunction: short circuit to high voltage side	Sensor voltage is 4.6 V or more, or 0.2 V or less.	• Connection failure of connectors • Harness wiring failure (sensor GND line disconnected or sensor signal line short circuited to power supply) • Defective accelerator sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and accelerator sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000091.04	Caution	Accelerator sensor malfunction: short circuit to low voltage side	Sensor voltage is 4.6 V or more, or 0.2 V or less.	• Connection failure of connectors • Harness wiring failure (sensor signal line disconnected or short circuited to GND, or sensor 5V line disconnected or short circuited to GND) • Defective accelerator sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and accelerator sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000091.15	Caution	Accelerator sensor malfunction: disabled (SAEJ1843)	Sensor voltage is 4.6 V or more, or 0.2 V or less.	Engine ECU map data setting fault	Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000100.01	Warning	Abnormal engine oil pressure	Engine oil pressure switch is on after engine has started.	• Low engine oil pressure • Defective engine oil system • Harness wiring failure (engine oil pressure switch wiring short circuited to GND) • Defective engine oil pressure switch • Engine ECU internal circuit failure	Inspect the engine oil system. Check the harnesses and engine oil pressure switch. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000100.04	Warning	Engine oil pressure switch failure	Engine oil pressure switch is off while engine is stopped with starter switch in the "ON" position.	• Connection failure of connectors • Harness wiring failure (engine oil pressure switch wiring disconnected or short circuited to power supply) • Defective engine oil pressure switch • Engine ECU internal circuit failure	Check the connectors, harnesses and engine oil pressure switch. Turn the starter switch to the "OFF" position and then to the "ON" position to check if the error code is displayed again.
00 000110.00	Warning	Engine coolant temperature sensor malfunction: too high	Sensor voltage is 4.8 V or more.	• Engine overheating • Insufficient amount of engine coolant • Defective engine cooling system • Defective coolant temperature sensor system	Inspect the engine cooling system. Check the connectors, harnesses and coolant temperature sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000110.02	Warning	Engine coolant temperature sensor malfunction: intermittent failure	Error undefined is detected 10 times.	• Connection failure of connectors • Harness wiring failure (nearly broken wiring of sensor signal line, sensor 5 V line or sensor GND line) • Defective coolant temperature sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and coolant temperature sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.
00 000110.03	Warning	Engine coolant temperature sensor malfunction: short circuit to high voltage side	Sensor voltage is 4.8 V or more.	• Connection failure of connectors • Harness wiring failure (sensor signal line disconnected or short circuited to power supply, or sensor GND line disconnected) • Defective coolant temperature sensor • Engine ECU internal circuit failure	Check the connectors, harnesses and coolant temperature sensor. Turn the starter switch to the “OFF” position and then to the “ON” position to check if the error code is displayed again.

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5. Reinstall the crankshaft pulley.
6. Reinstall the washer and bolt. Tighten to the specified torque. *See "3-7-2 Engine Tightening Torque" section for tightening torque.*

Installation of Oil Pan

1. Reinstall the oil pickup tube **(Figure 4-2-100, (1))** and a new O-ring **(Figure 4-2-100, (2))**.

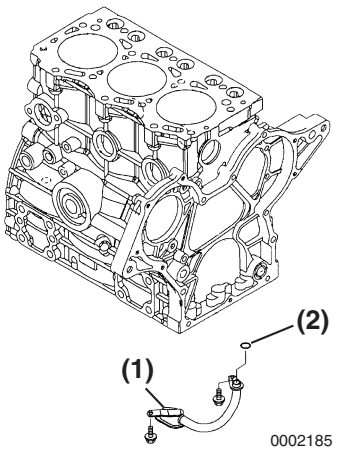


Figure 4-2-100

2. Apply a continuous bead of ThreeBond Liquid Gasket No. 1212, Yanmar Part No. 977770-01212 to the mounting surface of the oil pan **(Figure 4-2-101, (2))** and crankcase extension (if equipped) **(Figure 4-2-101, (1))**. Be sure to circle each bolt hole.
3. If equipped, reinstall the crankcase extension **(Figure 4-2-101, (1))**. Reinstall the oil pan and tighten the bolts securely.

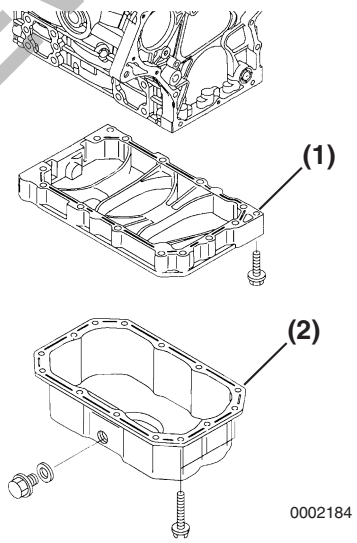


Figure 4-2-101

Final Assembly of Engine

1. Reinstall the starter motor.
2. Reinstall the cylinder head. *See Reassembly of Cylinder Head on page 4-2-15.*
3. Reinstall the engine in the machine.
4. Reconnect the fuel and coolant lines.
5. Reinstall the alternator.
6. Reconnect and adjust the throttle cable.
7. Reconnect all electrical connections.
8. Fill the engine with oil and coolant.
9. Reconnect the battery cables, negative (-) cable last.

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8-2 Quick Reference Table for Troubleshooting

The following table summarizes the general trouble symptoms and their causes.
If any trouble symptom occurs, take corrective action before it becomes a serious problem.

Trouble symptoms are shown in columns and their causes are shown in rows.

Whether boxes where the column and rows intersect are marked with a circle should be checked.

Example: When the bucket does not move at all

Trouble symptom: Implement does not move at all. (Bucket)

Items relevant to causes whose corresponding boxes are marked with a circle must be inspected and repaired.

Cause \ Symptoms and conditions of failures		Implement does not move at all										Implement's force			
		All implements	Boom	Arm	Bucket	Boom swing	Swing	Blade	Travel R	Travel L	P.T.O.	Boom	Arm	Bucket	Boom swing
1. Hydraulic pump	Hydraulic pump ASSY	○													
	Piston pump P1			○		○				○	○		○		○
	Piston pump P2		○		○				○			○		○	
	Gear pump P3						○	○							
	Pilot pump P4		○	○	○	○	○		○	○	○	○	○	○	○
	Cut-off valve	○	○	○	○	○	○		○	○	○	○	○	○	○
	Travel speed switch valve														
2. Control valve	Sections related to P1 flow														
	Sections related to P2 flow														
	Sections related to P3 flow														
	Boom section		○									○			
	Arm section			○									○		
	Bucket section				○									○	
	Boom swing section					○									○
	Blade section							○							
	Swing section						○								
	Travel R section								○						

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2-7 Fuel, Lube Oil and Grease Recommended

Components	Fluid	Temperatures °C								Quantity prescribed (L)	
		-	-20	-10	0	10	20	30	+		
Thermal engine	Engine oil		SAE 10W CD							3,4	–
			SAE 10W-30 CD								
				SAE 15W-40 CD							
Travel gears	Box oil	SAE 90 (GL-4)								0,5	by reducer
Hydraulic circuit	Hydraulic oil			ISO VG46						25,0	in the tank
										14,0	the rest
Fuel tank	Diesel				N° 2-D					30,5	–
			N° 3-D								
		N° 3-D (S)									
Cooling system	Long-life cooling fluid **YANMAR POWER COOLANT B–36**									3,4	radiator
										0,4	expansion flask

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2-6 Periodic Inspection and Servicing

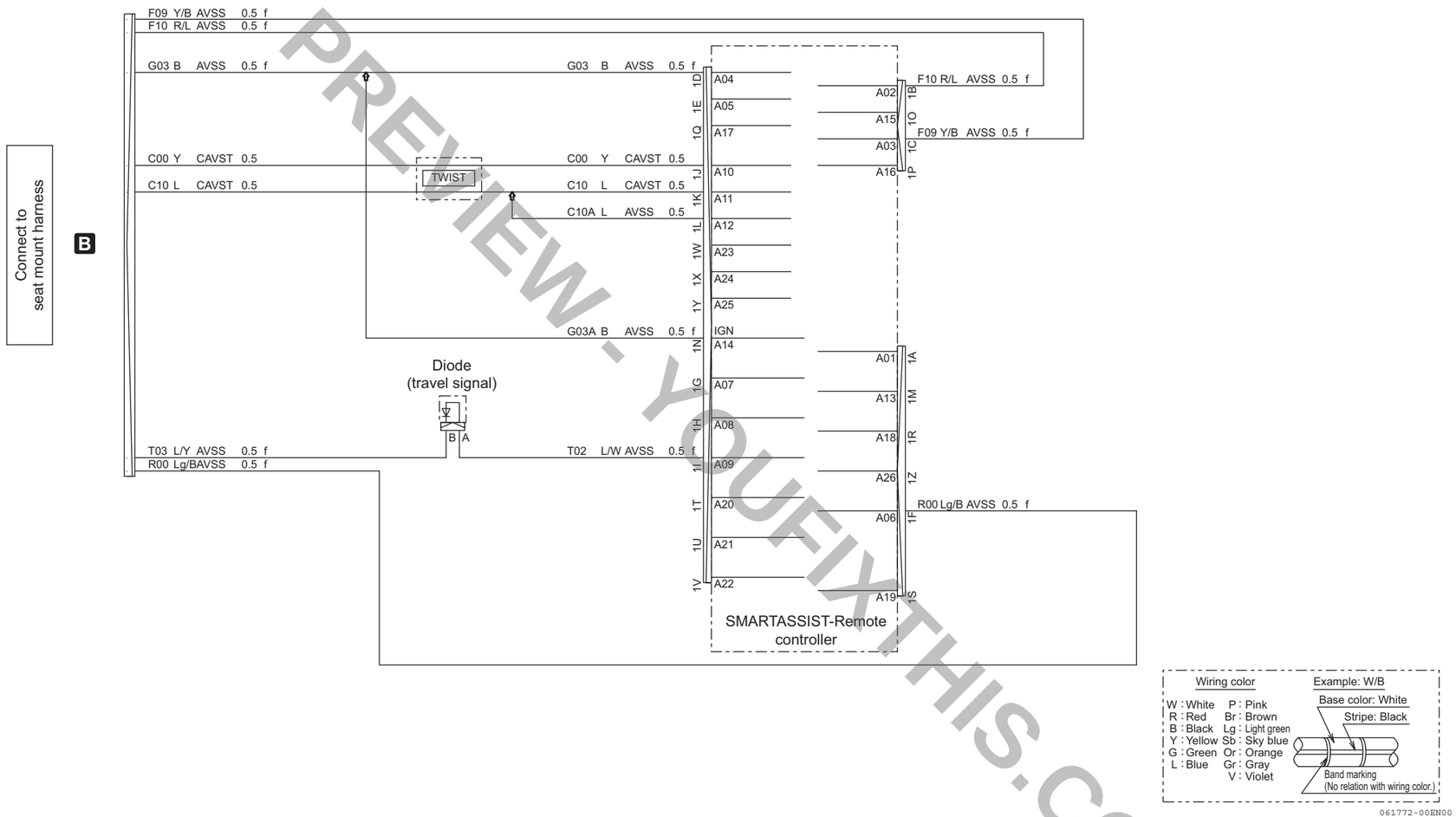
○: Verification and adjustment ●: Replacement □: Cleaning ■: Greasing

Parts & Operations		Daily	Every 50h	Every 250h	Every 500h	Every 1000h / Every year	Every 2000h / Every two years
General.	Missing or broken parts	○					
	Tightening of nuts and bolts	○					
	Motor state	○					
	Machine	□					
Transmissions	Oil for travel gears		● 1st time		○	●	
	Rotation reducer		● 1st time		○	●	
Hydraulic circuit	Hydraulic oil	○				●	
	Aspiration filter					□	
	Hydraulic oil return filter		● 1st time		●		
	Operation of the accumulator	○					
Greasing	Greasing points	■					
	Rotation pin and crown		■				
Chassis	Bearing rollers and bearings, idler wheels	○				■	
	Track tension	○					
Electrical equipment	Headlights, horn, travel alarm	○					
	Dashboard and indicators	○					
	System state	○					
Engine	Water separator	○					
	GO filter			●			
	Air filter (dusty atmosphere every 250 h)				●		
	Engine oil	○	● 1st time		●*		
	Oil filter		● 1st time		●*		
	Cooling fluid	○					●
	Belt	○				●	
	Radiator vents	○			□		
	Fuel hose, coolant hose						●
	Intake and exhaust valves					○	
	Injectors and injection pressure						○
Heating						○	

*. Every 500h / Every year

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3) SMARTASSIST-Remote harness



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NOTICE

Make sure the engine is installed on a level surface. If a continuously running engine is installed at an angle greater than (IDI = 25°, DI = 30°) in any direction or if an engine runs for short periods of time (less than three minutes) at an angle greater than (IDI = 30°, DI = 35°) in any direction, engine oil may enter the combustion chamber causing excessive engine speed and white exhaust smoke. This may cause serious engine damage.

NOTICE

Observe the following environmental operating conditions to maintain engine performance and avoid premature engine wear:

- Avoid operating in extremely dusty conditions.
- Avoid operating in the presence of chemical gases or fumes.
- Avoid operating in a corrosive atmosphere such as salt water spray.
- NEVER install the engine in a floodplain unless proper precautions are taken to avoid being subject to a flood.
- NEVER expose the engine to the rain.

NOTICE

Observe the following environmental operating conditions to maintain engine performance and avoid premature engine wear:

- The standard range of ambient temperatures for the normal operation of Yanmar engines is from -15°C to +45°C.
- If the ambient temperature exceeds +45°C the engine may overheat and cause the engine oil to break down.
- If the ambient temperature is below -15°C the engine will be hard to start and the engine oil may not flow easily.
- Contact your authorized Yanmar industrial engine dealer or distributor if the engine will be operated outside of this standard temperature range.

NOTICE

If any indicator illuminates during engine operation, stop the engine immediately. Determine the cause and repair the problem before you continue to operate the engine.

NOTICE

- Only use the engine oil specified. Other engine oils may affect warranty coverage, cause internal engine components to seize and / or shorten engine life.
- Prevent dirt and debris from contaminating the engine oil. Carefully clean the oil cap / dipstick and the surrounding area before you remove the cap.
- NEVER mix different types of engine oil. This may adversely affect the lubricating properties of the engine oil.
- NEVER overfill. Overfilling may result in white exhaust smoke, engine overspeed or internal damage.

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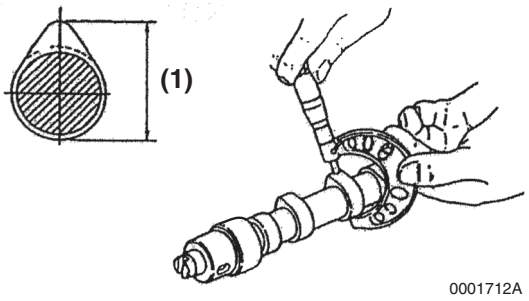


Figure 4-2-78

4. Measure the diameter of the gear end **(Figure 4-2-79, (1))**, intermediate **(Figure 4-2-79, (2)),** and flywheel end **(Figure 4-2-79, (3))** bearing journals. Record the measurements. *See "3-2 Engine Service Standard" section for the service limit.*

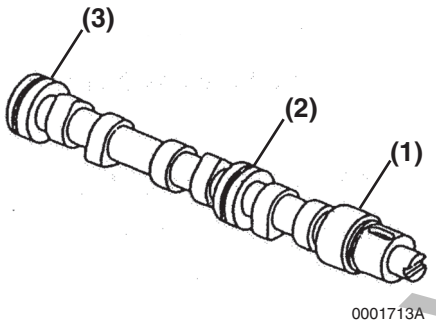


Figure 4-2-79

Inspection of Camshaft Bushing and Bores

1. Measure the I.D. of the front bushing and the remaining bores in the cylinder block. Record the measurements. *See "3-2 Engine Service Standard" section for the service limit.*

If the camshaft bushing is not within specification, replace using the appropriate service tool. If the remaining bores are not within specification, the cylinder block will require replacement as there are no bearing inserts used.

Inspection of Idler Gear and Shaft

1. Measure the outside diameter **(Figure 4-2-80, (1))** of the idler gear shaft **(Figure 4-2-80, (2))**. Record the measurements. *See "3-2 Engine Service Standard" section for the service limit.*
2. Measure the inside diameter **(Figure 4-2-80, (3))** of the idler gear bushing **(Figure 4-2-80, (4))**. Record the measurements. *See "3-2 Engine Service Standard" section for the service limit.*

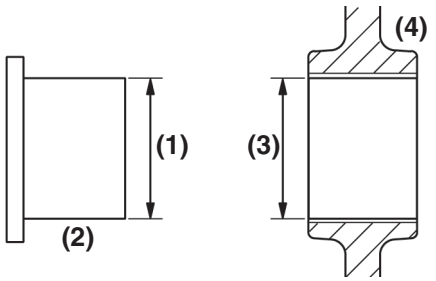


Figure 4-2-80

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4-5-4 Checking Engine Oil Pressure

Perform an engine oil pressure check if there is any indication of low oil pressure such as the oil pressure indicator is on or the oil pressure gauge indicates low oil pressure.

1. Disconnect the wire lead from the oil pressure switch or sending unit **(Figure 4-5-2, (1))**.

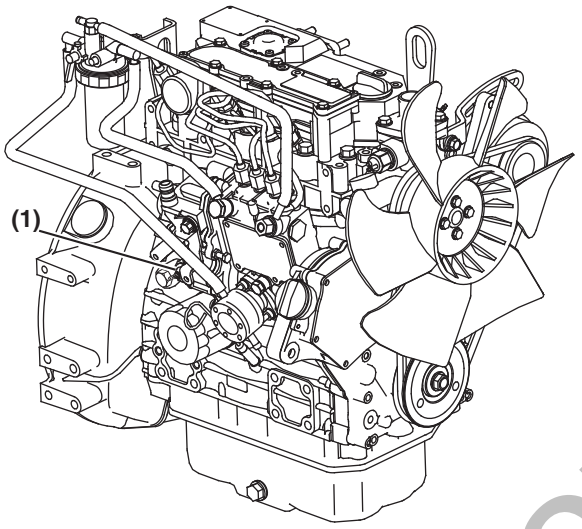
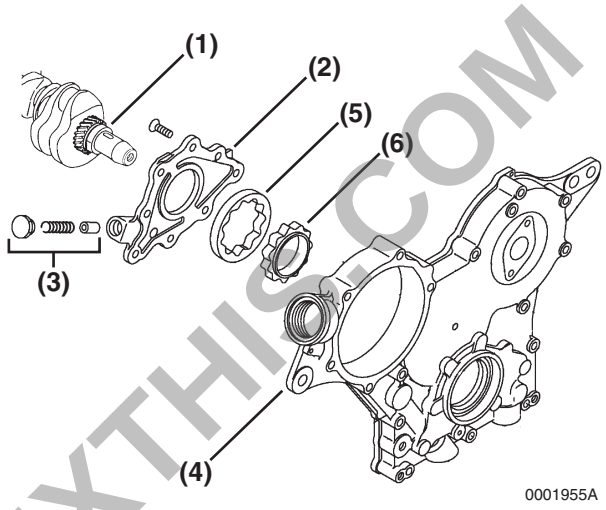


Figure 4-5-2

2. Remove the oil pressure switch.
3. Install a mechanical oil pressure gauge in the oil pressure switch port.
4. Start the engine:
   - If the mechanical oil pressure test gauge indicates good oil pressure, replace the faulty oil pressure switch or sending unit or faulty machine oil pressure gauge in instrument panel.
   - If the mechanical oil pressure test gauge indicates low oil pressure, troubleshoot the lubrication system to locate the cause of the low oil pressure. *See Troubleshooting Charts on page 4-10-6.* Repair as necessary.

4-5-5 Trochoid Oil Pump

Oil Pump Components



1 – Crankshaft
2 – Oil Pump Cover
3 – Oil Pressure Regulator
4 – Gear Case Cover
5 – Outer Rotor
6 – Inner Rotor

Figure 4-5-3

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6-2-3 Bucket

1) Bucket “Curl”

(1) Pilot oil flow

When the bucket control lever is moved to the left to curl the bucket, the oil from the pilot pump P4 flows through the cut-off valve, the port 3 of the pilot valve (RH) to the port Pa10 of the bucket section to move its spool.

(2) Oil flow from hydraulic pump

The oil from the piston pump P1 flows through the port P1 of the inlet section and the parallel passage to the bucket section, the port A10 of the control valve and to the A10 of the bucket cylinder to extend its cylinder rod.
The return oil from B10 of the bucket cylinder flows back to the hydraulic oil tank through the port B10 of the bucket section and the ports T1 and T2 of the control valve. The return oil from the port T1 flows through the oil cooler.

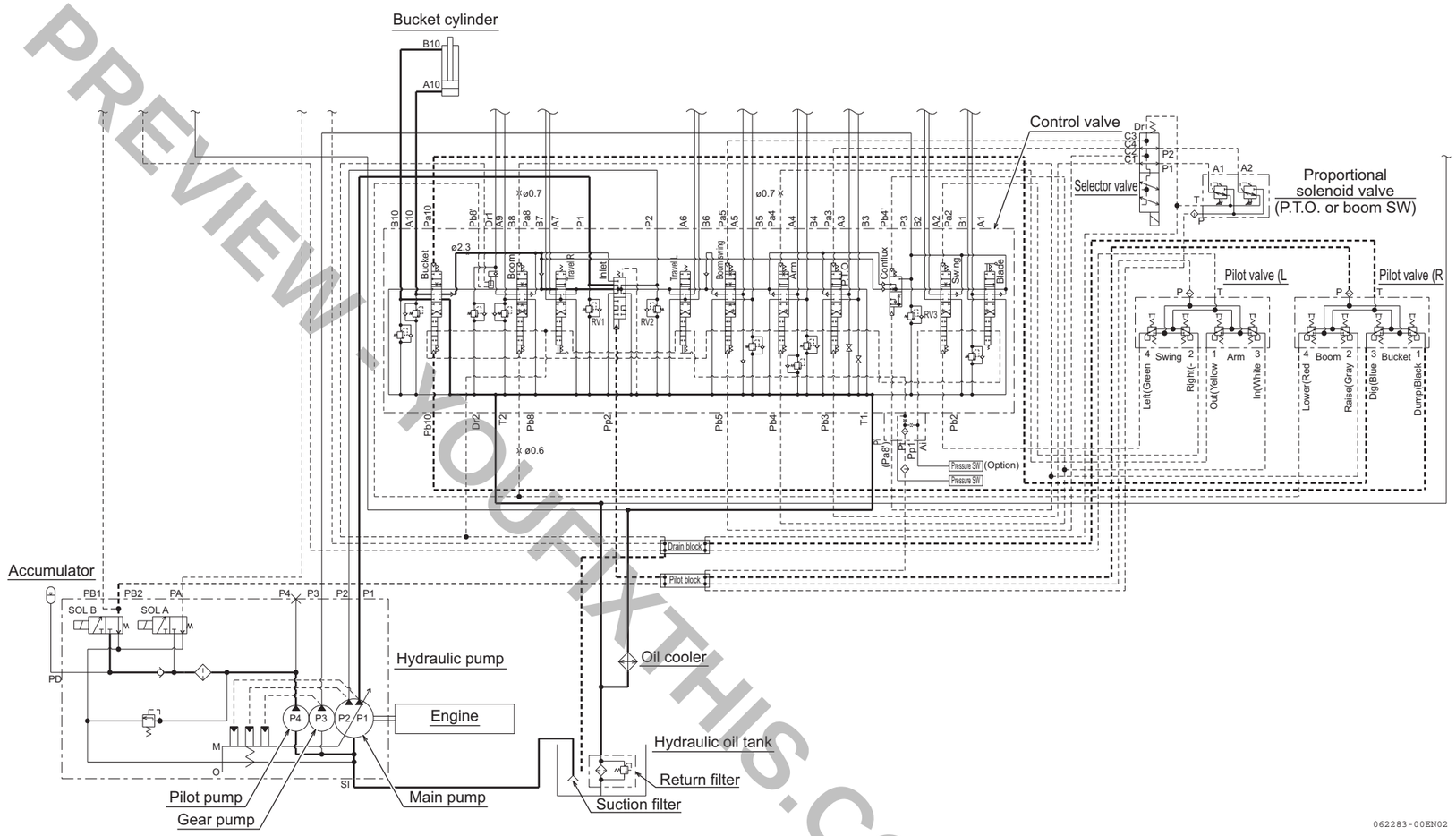
2) Bucket "Dump"

(1) Pilot oil flow

When the bucket control lever is moved to the right to dump the bucket, the oil from the pilot pump P4 flows through the cut-off valve, the port 1 of the pilot valve (RH) and the port Pb10 of the control valve to the bucket section to move its spool.

(2) Oil flow from hydraulic pump

The oil flows in the opposite direction to the oil flow in the Bucket Curl operation with regard to the bucket cylinder.



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(2) Boom down operation

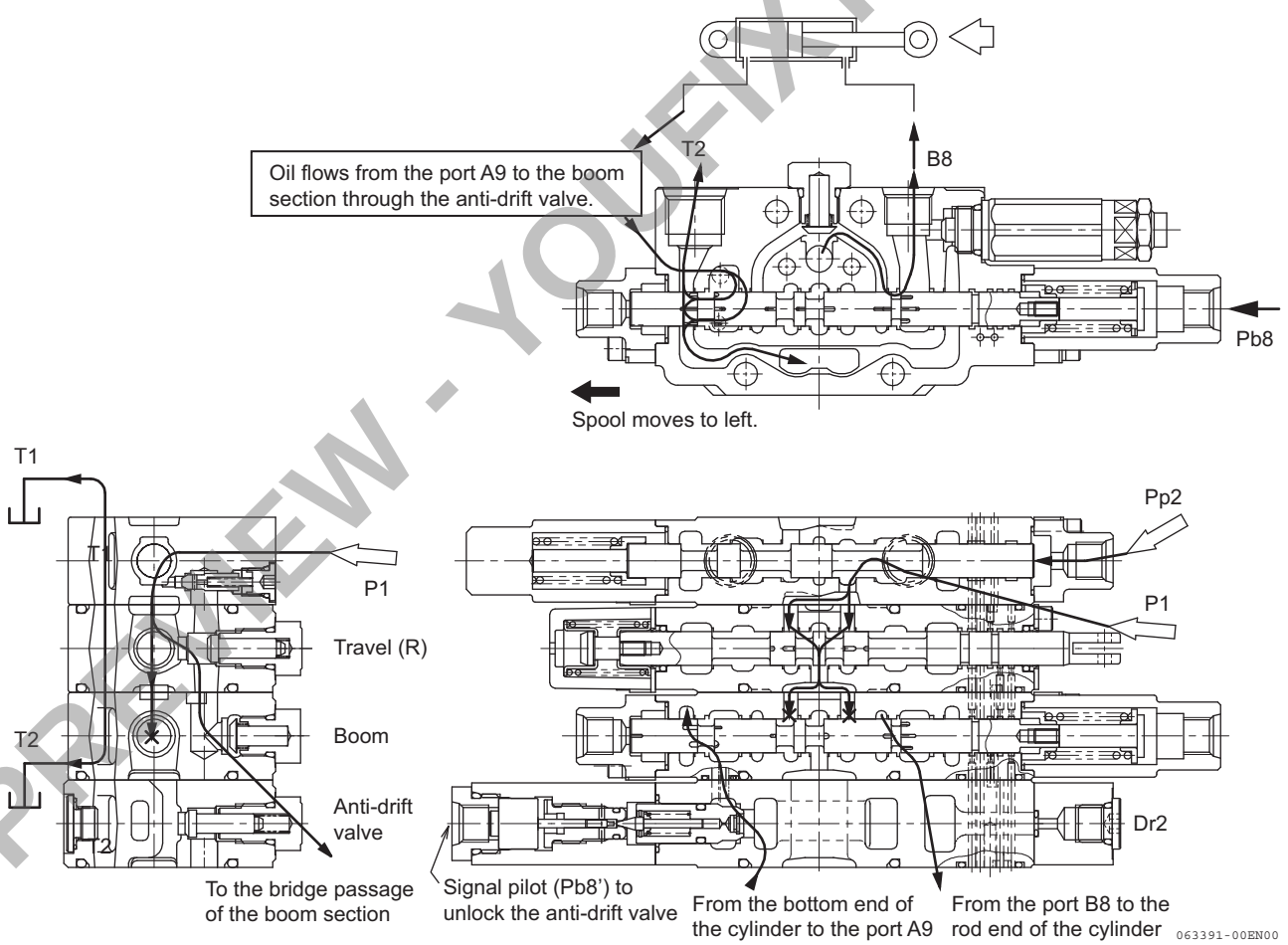
When the boom control lever is pushed forward to lower the boom, the oil from the pilot valve flows to the port Pb8 to move the spool of the boom section and to the port Pb8' through the port Pb8 to unlock the anti-drift valve.

Owing to the boom spool movement, the P1 by-pass passage is blocked (a part of oil flows out to the by-pass oil passage through the notches on the spool), so that the oil from the port P1 flows through the parallel oil passage via a check valve in the by-pass oil passage in the travel section to the parallel passage of the boom section.

The passage between the port B8 and the bridge passage is opened through the notch in the boom spool as the spool has been moved. Therefore the oil in the parallel passage flows through the load check valve of the boom section and the bridge passage to the port B8 and is fed to the rod end of the boom cylinder.

Meanwhile, the return oil from the bottom end of the boom cylinder flows to the return oil passage through the port A9 on the anti-drift section, the anti-drift valve, which is opened by the pilot pressure from the port Pb8', and the notch in the boom spool which opens the return oil passage as the spool has been moved.

Thus, the boom cylinder is retracted to lower the boom.



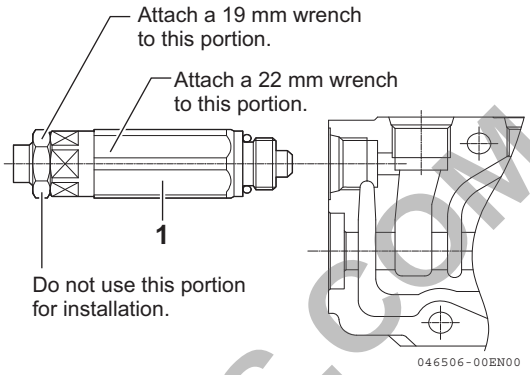
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4)-4. Reinstallation of relief valves

(1) Reinstallation of circuit relief valves and system relief valves

Taking the arm section as an example, the relieve valve installation procedure is described below.

[1] Install and tighten circuit relief valve **1** to the specified torque with a wrench or a socket wrench (22 mm). [Tightening torque: 37.3 to 41.2 N·m]



Installation of circuit relief valve

Note:

- *Attach a wrench (or socket wrench) to the 22 mm hexagonal portion of the body.*
- *If a 22 mm wrench (or socket wrench) is not available, use a 19 mm wrench on the hexagonal portion shown in the figure on the right to tighten the valve.*

WARNING:

Be careful not to damage the seat portion of the socket protruding from the end face of the circuit relief valve when installing it into the valve body.

If the seat portion is damaged, internal leaks can occur and the corresponding attachment may not be held in place.

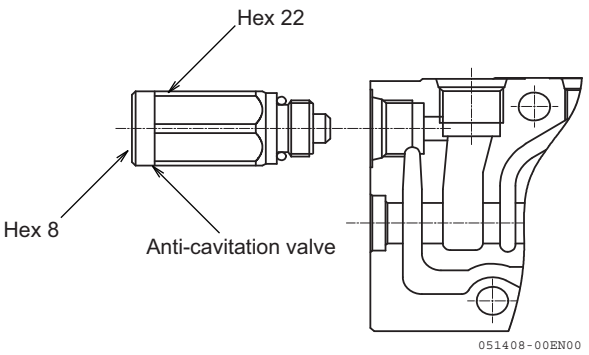
When installing the relief valve using a 19 mm wrench, be sure not to attach it on the lock nut.

If the lock nut is turned, the adjust screw is turned with it resulting in changes in the preset value and this may cause a decrease in performance or breakage of the machine.

(2) Reinstallation of anti-cavitation valve (on Boom swing section)

Tighten the valve with a 22 mm wrench or a hexagon bar wrench (8 mm) to reinstall it.

[Tightening torque: 37.3 to 41.2 N·m]

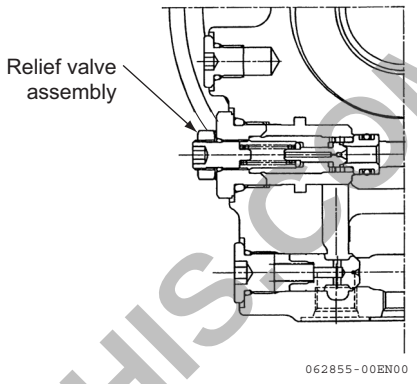
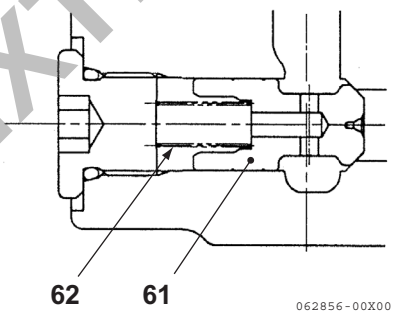
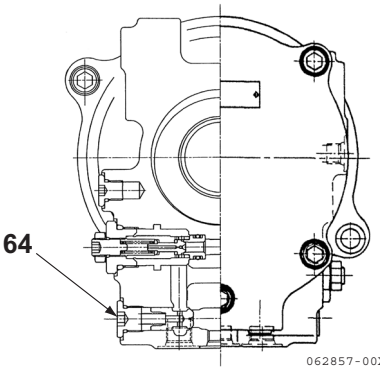
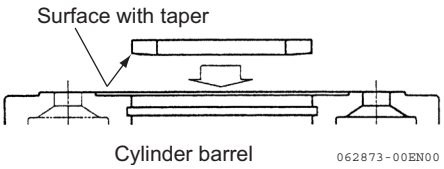
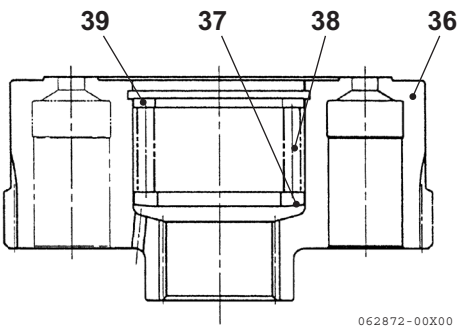


Installation of anti-cavitation valve

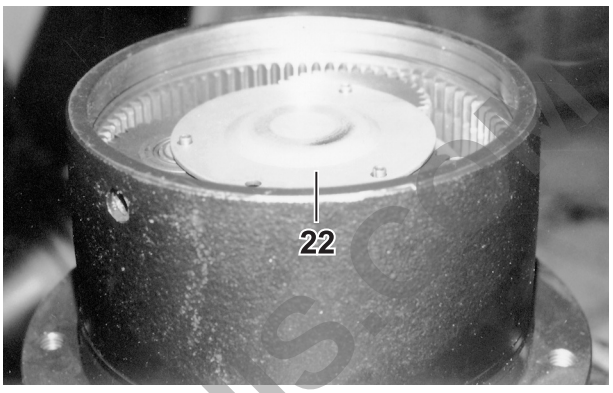
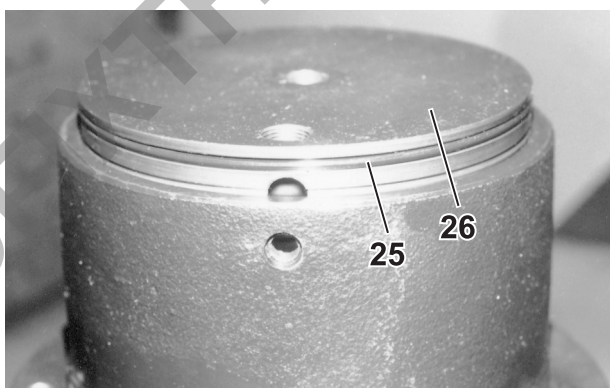
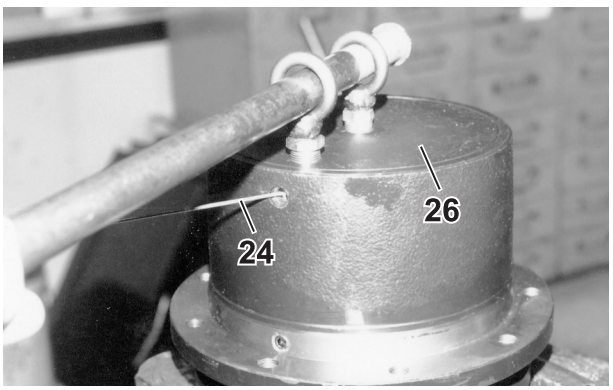
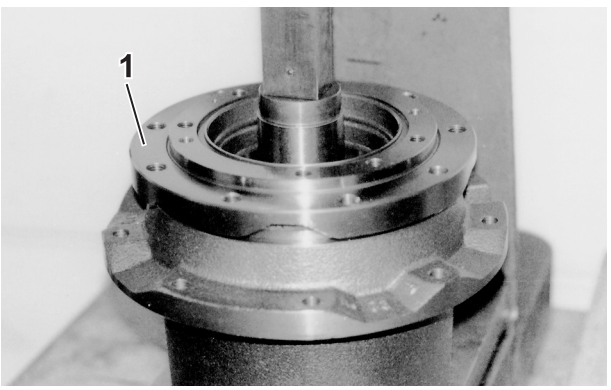
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5. Reassembly

1) Hydraulic Motor

Procedure	
(1) Install relief valve assembly. **Tightening torque: 147.0 to 167.0 N•m**	
(2) Install check valves **61** and springs **62**.	
(3) Install plugs **64** (with O-ring). **Tightening torque: 37.3 to 41.2 N•m**	
(4) Install collar **37**, spring **38** and washer **39** into cylinder barrel **36**. ***Note:*** *Be careful with installation direction of collar **37**.* 	

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Procedure	
(13) Install the thrust plate **22**.	
(14) Apply grease to the O-ring **25** and install it to the cover **26**. Install the cover on the housing **6** with the U-groove aligned with the tapped hole for the plug **8** in the housing **6**.	
(15) Bend the end of the wire **24** by about 8 mm at an angle of 90 degrees and insert it into the tapped hole in the housing **6**. Turn the cover **26** to draw in the wire **24**. **Tools :** • Eye bolt (S-1) • Round rod (S-15) (16) Tighten the plugs **8**. Tightening torque : 6.86 to 8.82 N·m **Tools :** • Torque wrench 1 • Hexagon bit 6	
(17) Press-fit the oil seal **30** into the flange holder **1**. **Tool :** • Oil seal press-fitting jig (S-8)	

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2) Reinstallation

Reinstall the fan belt in the reverse order to the removal procedure.

Note:

Adjustment after replacing V-belt:

Install a new V-belt and run the engine for 5 minutes or more. Then readjust the V-belt tension to the slack value shown in the table below.

Item	Fan belt
Pressing force N	98
Slack mm	10 to 15

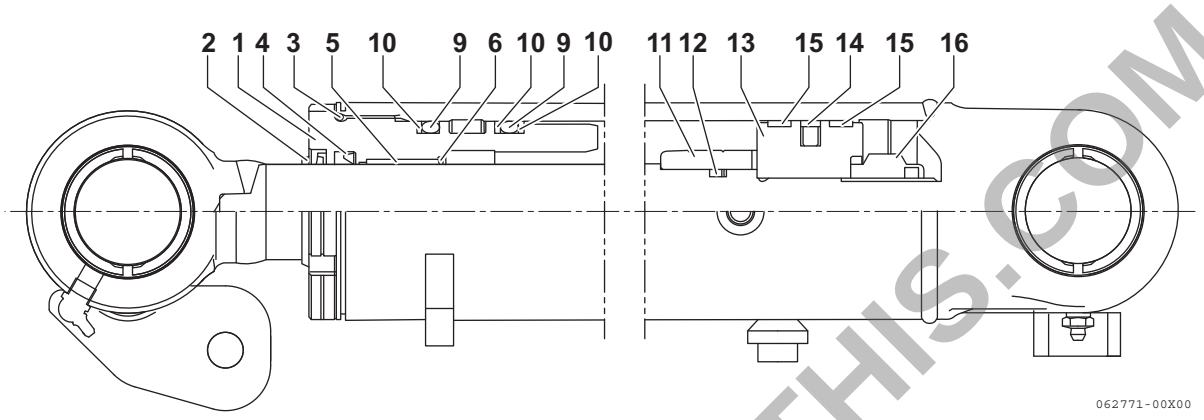
Fan belt	Cogged belt A36

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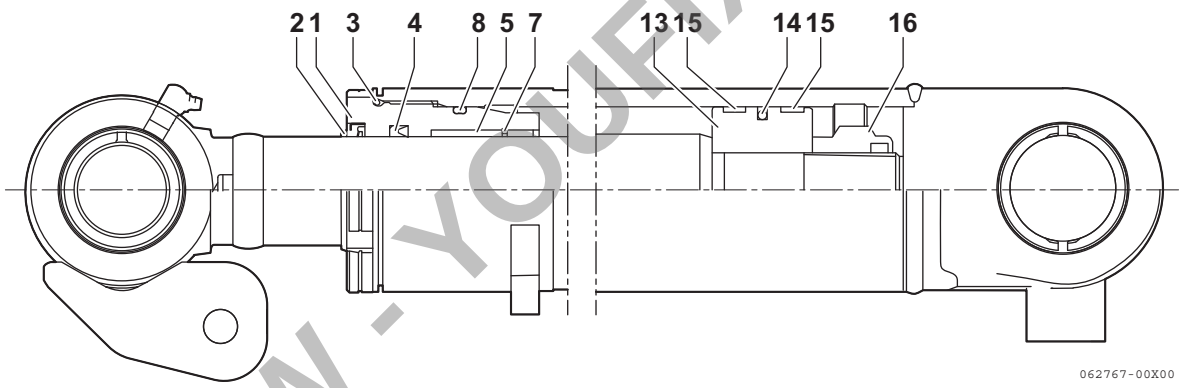
7-5-7 Disassembly and Reassembly of Hydraulic Cylinder

1) Sectional View and Parts

Boom cylinder



Arm, Bucket, Boom swing and Blade cylinders



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