ENGLISH

JH(2)-SERIES DIESEL ENGINE

OPERATION MANUAL

YANMAR
MARINE DIESEL ENGINE
MODELS : JH(2) SERIES
OPERATION MANUAL

Thank you purchasing a YANMAR Marine Diesel Engine.

[INTRODUCTION]

- This Operation Manual describes the operation, maintenance and inspection of the JH(2) series Yanmar marine diesel engine.
- Read this Operation Manual carefully before operate the engine to ensure that the engine is used correctly and that it stays in the best possible condition.
- Keep this Operation Manual in a convenient place for easy access.
- If this Operation Manual is lost or damaged, order a new one from your dealer or distributor.
- Make sure this manual is transferred to subsequent owners. This manual should be considered a permanent part of the engine and remain with it.
- Constant efforts are made to improve the quality and performance of Yanmar products, so some details included in this Operation Manual may differ slightly from your engine . If you have any questions about such differences, please contact your Yanmar Dealer or Distributor.
- For handling of the marine gear, refer to the Marine Gear Operation Manual.

Operation Manual (Marine Engine)	Models	**JH(2) Series**
	Code No.	**49961-201372**

WARNING SYMBOLS

Most operation, maintenance and inspection problems arise due to users failure to comply with the rules and precautions for safe operation described in this operation manual.
Often, users don't understand or recognize the signs of approaching problems. Mis-handling may cause burns and other injuries and can result in death.

Be sure to read and understand this operation manual carefully before operating the engine and observe all of the instructions and precautions described it.

- These are the warning signs and their meanings which are used in this manual. Pay special attention to these parts.

⚠ DANGER — **DANGER-indicates an imminently hazardous situation which, if not dealt with, WILL result in death or serious injury.**

⚠ WARNING — **WARNING-indicates a potentially hazardous situation which, if not dealt with, COULD result in death or serious injury.**

⚠ CAUTION — **CAUTION-indicates a potentially hazardous situation which, if not dealt with, MAY result in minor or moderate injury.**
This sign in also be used to alert you against unsafe practice.

- The descriptions captioned by 【NOTICE】 are for the particularly important items for handling. If you ignore them, the performance of your machine may be deteriorated leading to a problems.

SAFETY PRECAUTIONS

(Observe these instructions for your own safety!)

■ Precautions for Operation

⚠ DANGER

Fresh Water Tank Filler Cap

- Never open the cap of the fresh water tank while the engine is still hot. Steam and hot water will spurt out and seriously burn you.
  Wait until the temperature of the fresh water tank has dropped, wrap a cloth around the filler cap and loosen the cap slowly.
  After inspection, refasten the cap firmly.

⚠ DANGER

Battery

- Never smoke or permit sparks near the battery, because the battery may emit explosive hydrogen gas. Place the battery in a well ventilated place.

⚠ DANGER

Fuel

- Use only diesel fuel. Never use other fuels, including gasoline, kerosene, etc., because they could cause a fire. The wrong fuel could also cause the fuel injection pump and valve to fail due to lack of proper lubrication.
  Be sure to check that you have selected diesel fuel before filling the fuel tank.

⚠ WARNING

Fire Prevention

- Be sure to stop the engine and confirm that there are no open flames in the vicinty before supplying fuel.
- If you do spill fuel, wipe such spillage carefully and properly dispose of the wiping materials. Wash your hands thoroughly with soap and water.
- Never place oils or other flammables material in the engine room.
- Install a fire extinguisher near the engine room and familiarize yourself with its use.

⚠ WARNING

Exhaust Gas

- Exhaust gas contains poisonous corbon monoxide and should not be inhaled. Be sure to install ventilation ports or ventilators in the engine room and ensure good ventilation during engine operation.

⚠ WARNING

Moving parts

- Do not touch or let your clothing get caught in the moving parts of the engine, such as the front drive shaft, V-belt or propeller shaft, during engine operation. You will be injured.
- Never operate the engine without the covers on the moving parts.

FOR YOUR IN SAFETY

⚠ CAUTION

Burns

- The whole engine is hot during operation and immediately after stopping. The turbocharger, exhaust manifold, exhaust pipe, intercooler and high pressure fuel pipe are very hot. Never touch these parts with your body or clothing.

⚠ WARNING

Alcohol

- Never operate the engine while you are under the influence of alcohol. Never operate the engine when you are ill or feel unwell.

■ Safety Precautions for Inspection

⚠ DANGER

Battery Fluid

- Battery fluid is dilute sulfuric acid. It can blind you if it gets in your eyes, or burn your skin. Keep the fluid away from your body. Wash it off immediately, if you touch it, with a large quantity of fresh water and call your doctor for freatment.

⚠ WARNING

Fire by Electric Short-Circuits

- Always turn off the battery switch before inspecting the electrical system. Failure to do so could cause short-circuiting and fires.

⚠ WARNING

Stop Engine before Servicing,

- Stop the engine before you service it, Turn off the battery switch. If you must inspect while the engine is operating, never touch moving parts.
  Keep your body and clothing well clear of all moving parts.

⚠ CAUTION

Scalds

- If extracting oil from the engine while it is still hot, don't let the oil splash you.
- Wait until the temperature has dropped before extracting cooling water from the engine. Don't let it splash you.

⚠ WARNING

Forbidden Modifications

- Never release the limiting devices such as the engine speed limiter, fuel injection limiter etc.
  Modification will impair the safety and performance of the product and shorten its product life.
  Also note that any troubles arising from such modification are not be covered by our warranty.

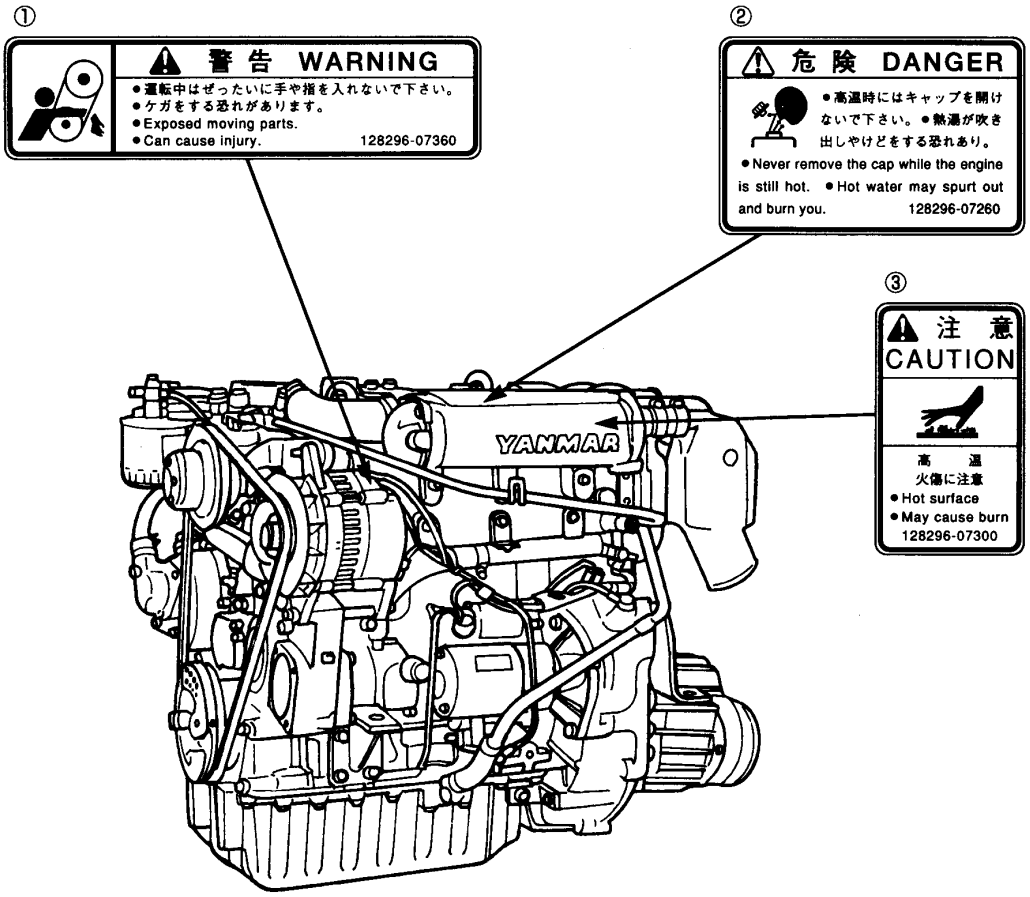
LOCATION FOR WARNING DEVICE LABELS

To insure safe operation, warning device labels have been attached. Their location is shown in the diagram below. Keep the labels from becoming dirty or torn and replace them if they are lost or damaged. Also, replace labels when parts are replaced, ordering them in the same way parts are ordered.

Warning device labels, Parts numbers

No.	Part Code No.
①	128296-07360
②	128296-07260
③	128296-07300

[3JH2 series]



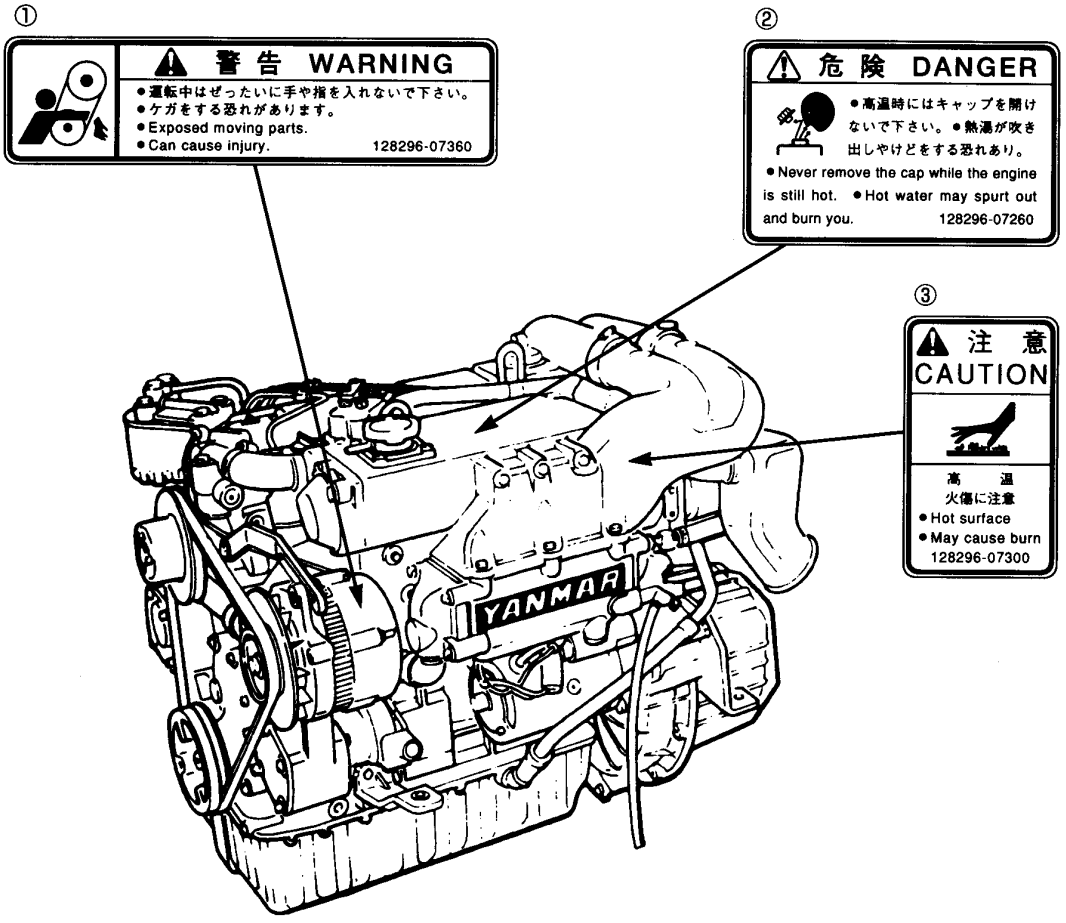
LOCATION FOR WARNING DEVICE LABELS

To insure safe operation, warning device labels have been attached. Their location is shown in the diagram below. Keep the labels from becoming dirty or torn and replace them if they are lost or damaged. Also, replace labels when parts are replaced, ordering them in the same way parts are ordered.

Warning device labels, Parts numbers

No.	Part Code No.
①	128296-07360
②	128296-07260
③	128296-07300

[4JH2 series]



USE, DRIVING SYSTEM, etc.

In the case of Model JH2 series engines with marine gear, connect the marine gear output shaft to the propeller shaft.

In order to obtain full performance from your engine, it is imperative that you check the size and structure of the hull and use a propeller of the appropriate size.

The engine must be installed correctly with safe cooling water and exhaust piping and electrical wiring. The PTO work should be easy to use for onboard equipment.

To handle the drive equipment, driven systems (including the propeller) and other onboard equipment, be sure to observe the instructions and cautions given in the operation manuals supplied by the shipyard and equipment manufactures.

The laws of some countries may require hull and engine inspections, depending on the use, size and cruising area of the boat.

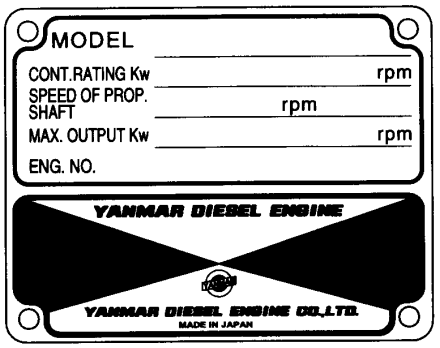
The installation, fitting and surveying of this engine all require specialized knowledge and engineering skills. Consult Yanmar's local subsidiary in your region or your distributor or dealer.

⚠ WARNING

Never modify this product or release the limit devices (which limit engine speed, fuel injection quantity, etc.). Modification will impair the safety and performance of the product and functions and shorten the product life.
Please note that any troubles arising from modification of the product will not be covered by our warranty.

DETAIL OF NAME PLATE

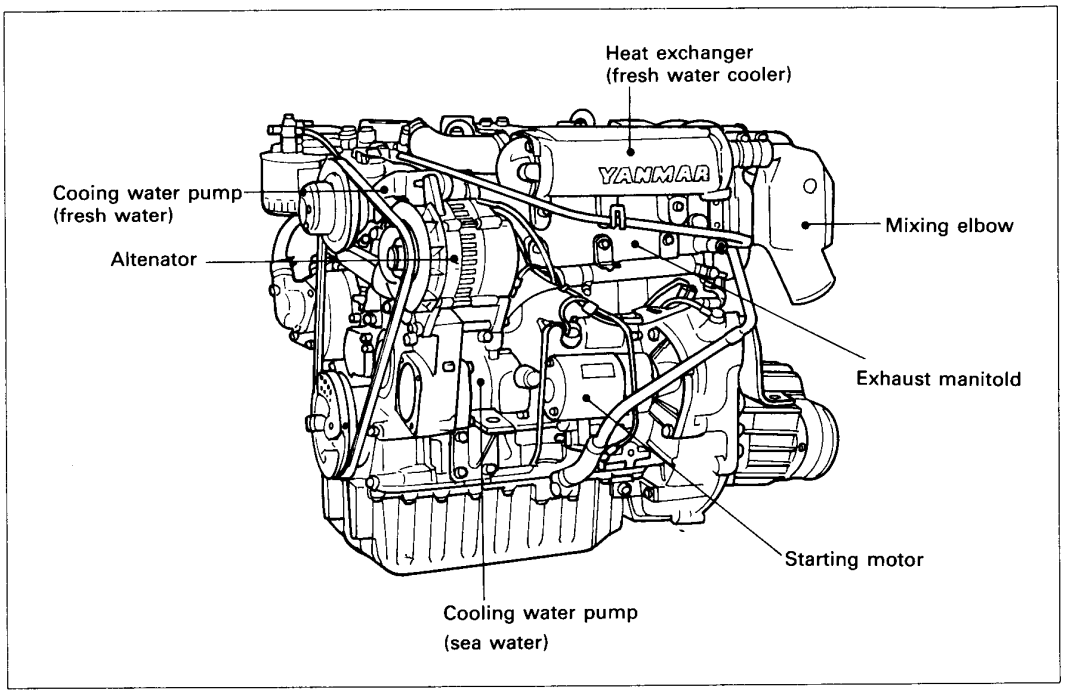
The nameplate shown below is attached on the engine's cylinder block. Check the engine's model number, output, rpm and serial number on the nameplate.



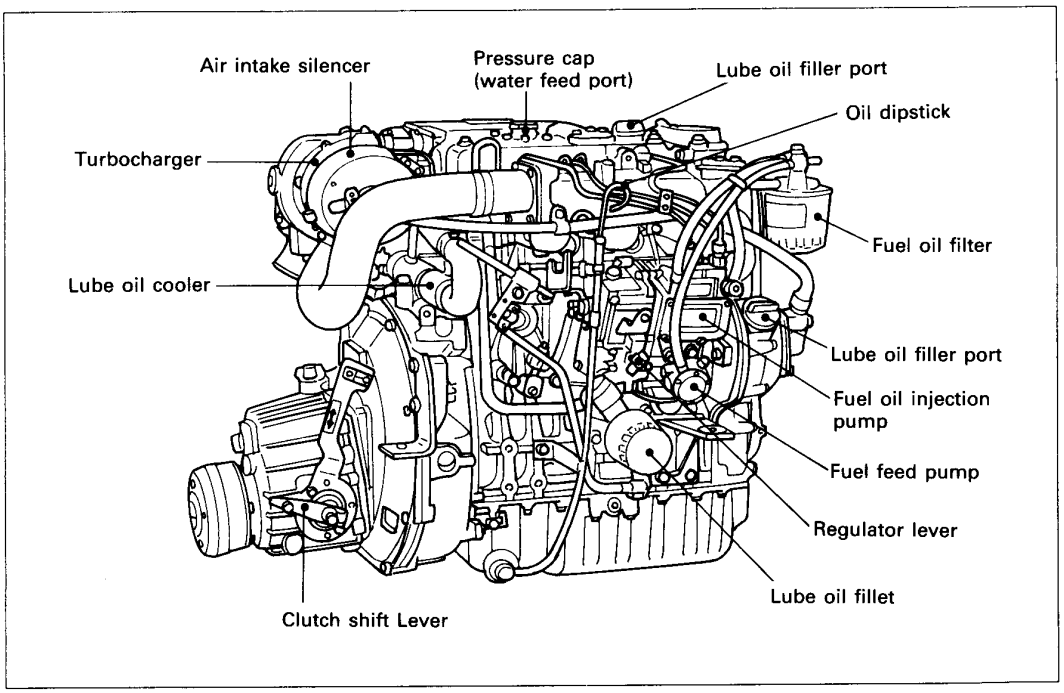
CONTENTS

1. Name of parts

1-1. Name of parts



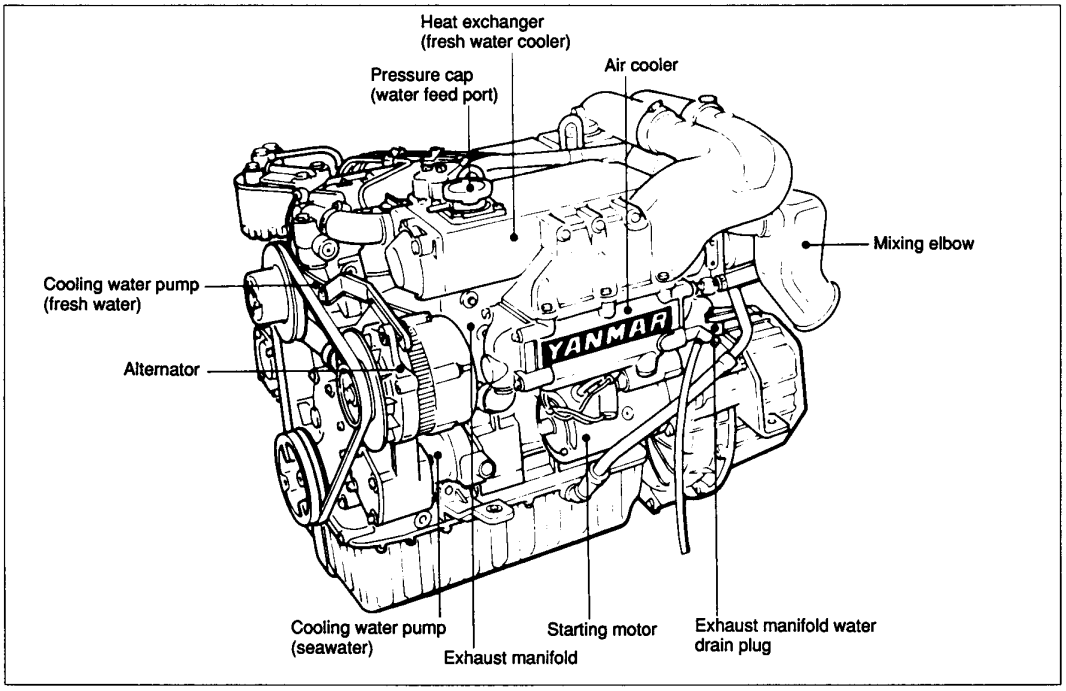
Exhaust Side of 3JH2-T(B)E



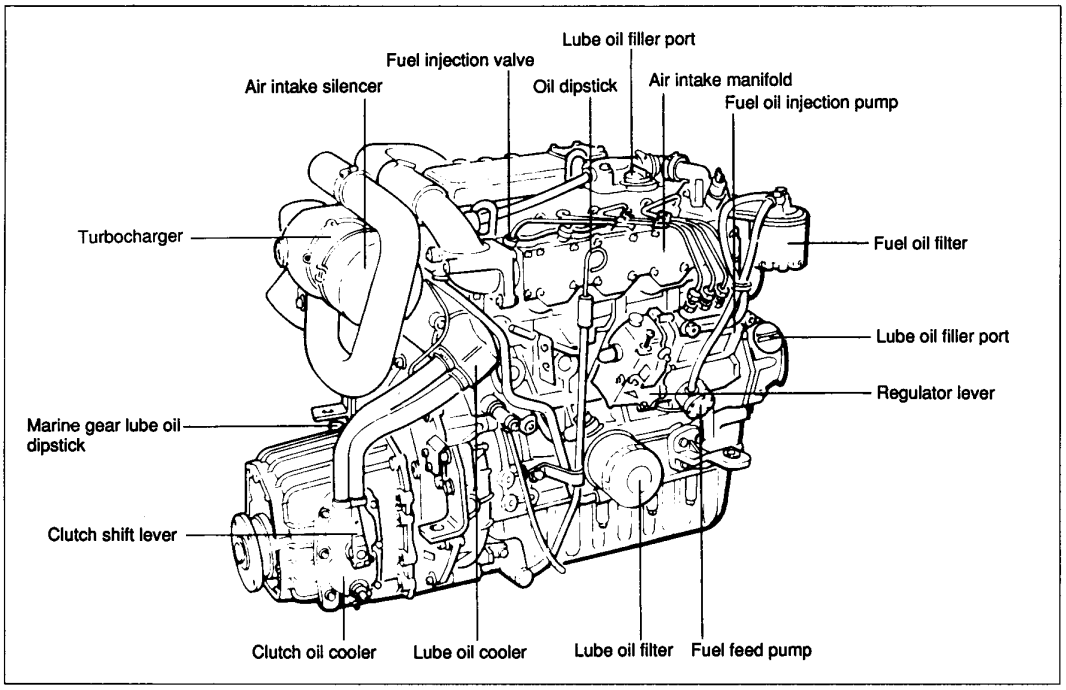
Operation side of 3JH2-T(B)E

1. Name of parts

1-2. Name of parts

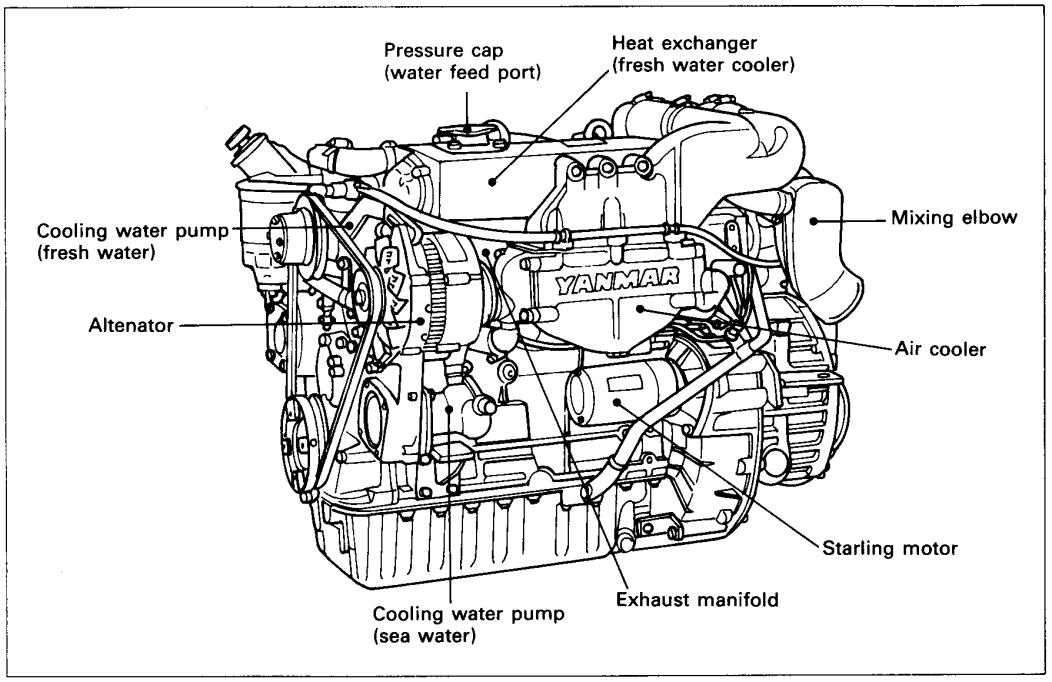


Exhaust Side of 4JH-HT(B)E

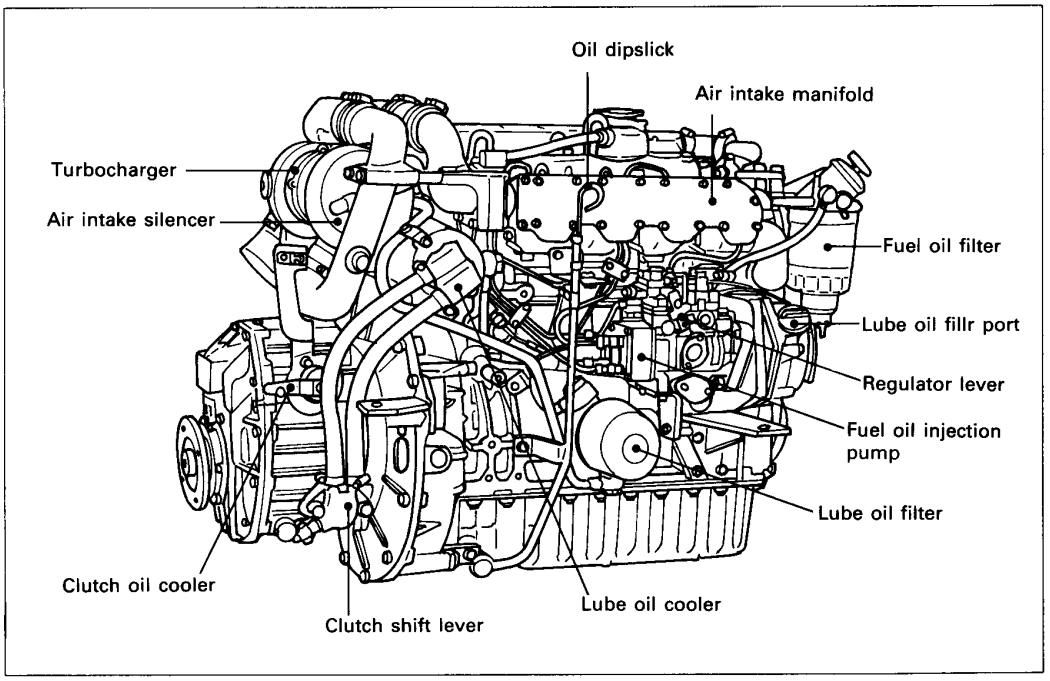


Operation side of 4JH-HT(B)E

1-3. Name of parts



Exhaust Side of 4JH-UT(B)E

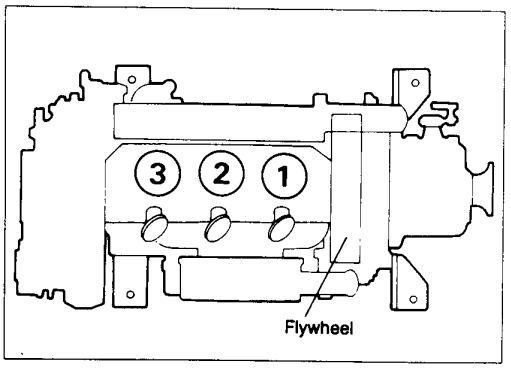


Operation side of 4JH2-UT(B)E

1. Name of parts

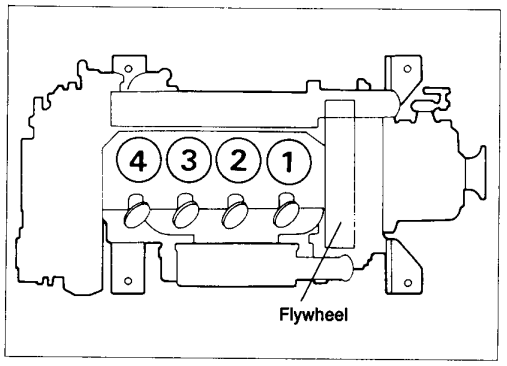
Cylinder Number

(1) The cylinder numbers of the 3 cylinder engine described in this manual are designated as follows.



The sequence of cylinder numbers is given as No. 1, No. 2, and No. 3 starting from the flywheel side.

(2) The cylinder numbers of the 4 cylinder engine described in this manual are designated as follows.



The sequence of cylinder numbers is given as No.1, No.2, and No.3 starting from the flywheel side.

(3) These cylinder numbers are consistently used for devices and parts connected with the cylinder head and valve moving machanism. However, please note that items related to the fuel injection pump do not correspond to the numbering of the cylinders.

2. Specifications

2-1 3JH2E series

Engine Model			3JH2E	3JH2-TE
Type			Vertical 4-cycle water cooled diesel engine	
Combusion system			Direct injection	
Aspiration			Natural aspiration	Turbocharger
Number of cylinders			3	
Bore × stroke		mm (in.)	82 × 86 (3.23 × 3.39)	
Displacement		ℓ (cu.in.)	1.363 (83.14)	
One hour rating output (DIN6270B) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	28.5/3600 (38.7/3600)	35.0/3600 (47.6/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.97 (99.10)	8.62 (122.57)
	Piston speed	m/sec. (ft./sec.)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	25.7/3400 (34.9/3400)	31.6/3400 (43.0/3400)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.8 (96.69)	8.35 (118.73)
	Piston speed	m/sec. (ft./sec.)	9.75 (32.0)	9.75 (32.0)
Compression ratio			18.1	18.0
Fire order			270° 270° 270° 1 — 3 — 2 — 1	
Fuel injection pump			Inline type, YPES-CL	
Fuel injection timing (b.T.D.C.)		degree	bTDC 10°±1°	bTDC 12°±1°
Fuel injection pressure		kg/cm² (lb/in.²)	200±5 (2844±71)	220±5 (3128±71)
Fuel injection nozzle			Hole type	
Direction of rotation	Crankshaft		Counter-clockwise viewed from stem	
	Propeller shaft		Clockwise viewed from stem	
Power take off			At flywheel side	
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump	
Lubrication system			Forced lubrication with trochoid pump	
Starting system	Starting motor		DC 12V, 1.4kW	
	AC generator		12V, 55A (12V, 80A: option)	
Turbo-charger	Type		—	RHB52 (IHI)
	Model		—	MY75
	Cooling system		—	Water cooling
Air cooler system	Type		—	
	Radiation area	m³ (in.³)	—	

2. Specifications

Engine Model			3JH2E	3JH2-TE
Dry weight/ Dimensions (L×W×H) (with Marine gear)	KBW10-E	kg(lbs)/ mm(in.)	183 (400)/ 782.2×511.5×587.5	192 (422)/ 782.2×511.5×587.5
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	2.1/4.9 (128.14/229.50) at engine installation angle 0°	
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	4.7 (286.80)	
	Sub tank	ℓ (cu.in.)	0.8 (48.82)	

2-1-1 Marine gear specifications

KBW10-E

Model		KBW10-E		
Type		Multi disc, wet, mechanical clutch		
Reducion ratio	Ahead	2.14	2.45	※2.83
	Astern	2.50		
Lubricating system		Splach		
Lube oil capacity		0.7ℓ		
Cooling system		Rodiant Cooling		

2-2 3JH2BE series

Engine Model			3JH2BE	3JH2-TBE
Type			Vertical 4-cycle water cooled diesel engine	
Combusion system			Direct injection	
Aspiration			Natural aspiration	Turbocharger
Number of cylinders			3	
Bore × stroke		mm (in.)	82 × 86 (3.23 × 3.39)	
Displacement		ℓ(cu.in.)	1.363 (83.14)	
One hour rating output (DIN6270B) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	28.5/3600 (38.7/3600)	35.0/3600 (47.6/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.97 (99.10)	8.62 (122.57)
	Piston speed	m/sec. (ft./sec.)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	25.7/3400 (34.9/3400)	31.6/3400 (43.0/3400)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.8 (96.69)	8.35 (118.73)
	Piston speed	m/sec. (ft./sec.)	9.75 (32.0)	9.75 (32.0)
Compression ratio			18.1	18.0
Fire order			270° 270° 270° 1 — 3 — 2 — 1	
Fuel injection pump			Inline type, YPES-CL	
Fuel injection timing (b.T.D.C.)		degree	bTDC 10°±1°	bTDC 12°±1°
Fuel injection pressure		kg/cm² (lb/in.²)	200 ± 5 (2844 ± 71)	
Fuel injection nozzle			Hole type	
Direction of rotation	Crankshaft		Counter-clockwise viewed from stem	
	Propeller shaft		Clockwise viewed from stem	
Power take off			At flywheel side	
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump	
Lubrication system			Forced lubrication with trochoid pump	
Starting system	Starting motor		DC 12V, 1.4kW	
	AC generator		12V, 55A (12V, 80A: option)	
Turbo-charger	Type		—	RHB52 (IHI)
	Model		—	MY75
	Cooling system		—	Water cooling
Air cooler system	Type		—	
	Radiation area	m³ (in.³)	—	

2. Specifications

Engine Model			3JH2BE	3JH2-TBE
Dry weight/ Dimensions (L×W×H) (with Marine gear)	KM3A	kg(lbs)/ mm(in.)	173 (378)/ 753.3×511.5×587.5	187 (411)/ 753.3×511.5×587.5
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	2.1/4.9 (128.14/229.50) at engine installation angle 0°	
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	4.7 (286.80)	
	Sub tank	ℓ (cu.in.)	0.8 (48.82)	

2-2-1 Marine gear specifications

KM3A

Model		KM3A		
Type		Constant mesh gear with servo cone clutch (Wet type)		
Reduction ratio	Ahead	2.33	2.66	※3.21
	Astern	3.04	3.04	※3.04
Lubricating system		Splash		
Lube oil capacity		0.45ℓ		
Cooling system		Note ※ : Available only for 3JH2E forced cooling with fan mounted on flywheel		

2-3 4JHE series

Engine Model			4JHE	4JH-TE	4JH-HTE	4JH-DTE
Type			Vertical 4-cycle water cooled diesel engine			
Combustion system			Direct injection			
Aspiration			Natural aspiration	Turbocharger	Turbocharger with intercooler	
Number of cylinders			4			
Bore x stroke		mm (in.)	78 x 86 (3.07 x 3.39)			
Displacement		ℓ (cu.in.)	1.644 (100.33)			
One hour rating output (DIN6270B)	Output/crankshaft speed	HP/rpm (kW/rpm)	44/3600 (32.4/3600)	55/3600 (40.5/3600)	66/3600 (48.6/3600)	77/3600 (56.7/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.69 (95.15)	8.36 (118.91)	10.0 (142.20)	11.7 (166.37)
	Piston speed	m/sec.(ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A)	Output/crankshaft speed	HP/rpm (kW/rpm)	40/3500 (29.5/3500)	50/3500 (36.8/3500)	60/3500 (44.2/3500)	70/3500 (51.5/3500)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.26 (89.04)	7.82 (111.23)	9.39 (133.53)	11.0 (156.42)
	Piston speed	m/sec. (ft./sec.)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)
Compression ratio			17.8	16.2	15.9	15.9
Fire order			180° 180° 180° 180° 1 — 3 — 4 — 2 — 1			
Fuel injection pump			In-line type, YPES-CL			
Fuel injection timing (b.T.D.C.)		degree	bTDC 12° ±1°	bTDC 17° ± 1°	bTDC 17° ± 1°	bTDC 17° ±1°
Fuel injection pressure		kg/cm²(lb/in.²)	200 ± 5 (2844 ± 71)			
Fuel injection nozzle			Hole type			
Direction of rotation	Crankshaft		Counter-clockwise viewed from stern			
	Propeller shaft (Forward)		Clockwise viewed from stern			
Power take off			At flywheel side			
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump			
Lubrication system			Forced lubrication with trochoid pump			
Starting system	Starting motor		DC 12V, 1.8kW			
	AC generator		12V, 55A			
Turbo-charger	Type		–	RHB52 (IHI)	RHB52HW (IHI)	
	Model		–	MY29	MY31	MY34
	Cooling system		–	Air cooling	Water cooling	
Air cooler system	Type		–		Sea-water cooled Plate fin type	Sea-water cooled, Corrugated fin type
	Radiation area	m³ (in.³)	–		0.76 (1178)	0.67 (1038)

2. Specifications

Engine Model			4JH-E	4JH-TE	4JH-HTE	4JH-DTE
Marine gear system	Model		KBW20		KBW21	KBW21
	Type		Mechanical, constant mesh gear with multiple friction disc clutch			
	Reduction ratio (Forward/Reverse)		2.17/3.06, 2,62/3,06, 3,28./3.06			2.17/3.06, 2.62/3.06
	Propeller speed DIN6270A rating (Forward/Reverse)		1615/1145, 1336/1145, 1068/1145			1615/1145, 1336/1145
	Lubricating oil capacity Effect/max	ℓ (cu.in.)	0.15/1.2 (9.15/73.22)			
	Weight	kg (lb.)	26 (57.33)		30 (66.15)	30 (66.15)
Dimensions	Overall length	mm (in.)	906.3 (35.68)		906.3 (35.68)	906.3 (35.68)
	Overall width	mm (in.)	561 (22.09)		561 (22.09)	561 (22.09)
	Overall height	mm (in.)	659 (25.94)		668 (26.30)	668 (26.30)
Engine weight with clutch (dry)		kg (lb.)	236 (520)	232 (511)	246 (542)	246 (542)
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	4.2/8.0 (256.28/488.16)at engine installation angle 8°			
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	6.0 (366.12)			
	Sub tank	ℓ (cu.in.)	0.8 (48.82)			

2-4 4JHBE series

Engine Model			4JH-BE	4JH-TBE	4JH-HTBE	4JH-DTBE
Type			Vertical 4-cycle water cooled diesel engine			
Combustion system			Direct injection			
Aspiration			Natural aspiration	Turbocharger	Turbocharger with intercooler	
Number of cylinders			4			
Bore x stroke		mm (in.)	78 x 86 (3.07 x 3.39)			
Displacement		ℓ (cu.in.)	1.644 (100.33)			
One hour rating output (DIN6270B)	Output/crankshaft speed	HP/rpm (kW/rpm)	44/3600 (32.4/3600)	55/3600 (40.5/3600)	66/3600 (48.6/3600)	77/3600 (56.7/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.69 (95.15)	8.36 (118.91)	10.0 (142.20)	11.7 (166.37)
	Piston speed	m/sec.(ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A)	Output/crankshaft speed	HP/rpm (kW/rpm)	40/3500 (29.5/3500)	50/3500 (36.8/3500)	60/3500 (44.2/3500)	70/3500 (51.5/3500)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.26 (89.04)	7.82 (111.23)	9.39 (133.53)	11.0 (156.42)
	Piston speed	m/sec. (ft./sec.)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)
Compression ratio			17.8	16.2	15.9	15.9
Fire order			180° 180° 180° 180° 1 — 3 — 4 — 2 — 1			
Fuel injection pump			In-line type, YPES-CL			
Fuel injection timing (b.T.D.C.)		degree	bTDC 12° ±1°	bTDC 17° ± 1°	bTDC 17° ± 1°	bTDC 17° ±1°
Fuel injection pressure		kg/cm²(lb/in.²)	200 ± 5 (2844 ± 71)			
Fuel injection nozzle			Hole type			
Direction of rotation	Crankshaft		Counter-clockwise viewed from stern			
	Propeller shaft		Bi-rotation			
Power take off			At flywheel side			
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump			
Lubrication system			Forced lubrication with trochoid pump			
Starting system	Starting motor		DC 12V, 1.8kW			
	AC generator		12V, 55A			
Turbo-charger	Type		–	RHB52 (IHI)	RHB52HW (IHI)	
	Model		–	MY29	MY31	MY34
	Cooling system		–	Air cooling	Water cooling	
Air cooler system	Type		–		Sea-water cooled Plate fin type	Sea-water cooled, Corrugated fin type
	Radiation area	m³ (in.³)	–		0.76 (1178)	0.67 (1038)

2. Specifications

Engine Model			4JH-BE	4JH-TBE	4JH-HTBE	4JH-DTBE
Marine gear system	Model		KM4A			
	Type		Mechanical, constant mesh gear with servo cone clutch (Down angle 7 degree)			
	Reduction ratio (Forward/Reverse)		2.14/2.14, 2.63/2.63, 3.30/3.30			
	Propeller speed DIN6270A rating (Forward/Reverse)		1637, 1332, 1062			
	Lubricating oil capacity Effect/max	ℓ (cu.in.)	0.2/1.3 (12.20/79.33)			
	Weight	kg (lb.)	28 (61.74)			
Dimensions	Overall length	mm (in.)	888.4 (34.98)	888.4 (34.98)	888.4 (34.98)	888.4 (34.98)
	Overall width	mm (in.)	565 (22.24)	565 (22.24)	565 (22.24)	565 (22.24)
	Overall height	mm (in.)	634.5 (24.98)	634.5 (24.98)	643.5 (25.33)	643.5 (25.33)
Engine weight with clutch (dry)		kg (lb.)	228 (503)	234 (516)	244 (538)	244 (538)
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	2.5/7.0 (155.55/427.14) at engine installation angle 0°			
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	6.0 (366.12)			
	Sub tank	ℓ (cu.in.)	0.8 (48.82)			

2-5 4JH2 series

Engine Model			4JH2E	4JH2-TE	4JH2-HTE	4JH2-DTE	4JH2-UTE
Type			Vertical 4-cycle water cooled dissel engine				
Combustion system			Direct injection				
Aspiration			Natural aspiration	Turbocharger	Turbocharger with intercooler		
Number of cylinders			4				
Bore × stroke		mm (in.)	82 × 86 (3.23 × 3.39)				
Displacement		ℓ (cu.in.)	1.817 (110.87)				
One hour rating output (DIN6270B) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	37.5/3600 (51.0/3600)	46.5/3600 (63.2/3600)	56.0/3600 (76.1/3600)	65.0/3600 (88.4/3600)	74.0/3600 (100.6/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.88 (97.83)	8.53 (121.29)	10.32 (146.75)	12.11 (172.2)	13.26 (188.55)
	Piston speed	m/sec.(ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	33.8/3400 (46.0/3400)	41.9/3400 (57.0/3400)	50.7/3400 (68.9/3400)	58.8/3400 (79.9/3400)	66.9/3400 (91.0/3400)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.7 (95.3)	8.3 (118.05)	10.05 (142.94)	11.65 (165.7)	13.76 (195.67)
	Piston speed	m/sec.(ft./sec.)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)
Compression ratio			18.1	18.0	18.0	17.2	17.2
Fire order			180° 180° 180° 180° 1 — 3 — 4 — 2 — 1				
Fuel injection pump			Inline type, YPES-CL				Distributor type VE-HDI
Fuel injection timing (b.T.D.C.)		degree	bTDC 10°±1°	bTDC 12°±1°	bTDC 14°±1°	bTDC 10°±1°	bTDC 12°±1°
Fuel injection pressure		kg/cm²(lb/in.²)	220±5 (3128±71)				
Fuel injection nozzle			Hole type				
Direction of rotation	Crankshaft		Counter-clockwise viewed from stern				
	Propeller shaft		Clockwise viewed from stem (KBW21) Bi-rotation (KM 4A)				
Power take off			At flywheel side				
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump				
Lubrication system			Forced lubrication with trochoid pump				
Starting system	Starting motor		DC 12V, 1.4kW				
	AC generator		12V, 55A (12V, 80A: option)				
Turbo-charger	Type		—	RHB52 (IHI)	RHB52HW (IHI)		
	Model		—	MY67	MYBE	MYBD	MYAZ
	Cooling system		—	Water cooling			
Air cooler system	Type		—		Sea-water cooled Plate fin type	Sea-water cooled, Corrugated fin type	
	Radiation area	m³(in.³)	—		0.76 (1178)	0.85 (1317)	

2. Specifications

Engine Model			4JH2E	4JH2-TE	4JH2-HTE	4JH2-DTE	4JH2-UTE
Dry weight/ Dimensions (L×W×H) (with Marine gear)	KBW20	kg(lbs)/ mm(in.)	226 (498)/ 898.3 × 561 × 634.5 (35.37 × 22 × 24.98)	232 (511)/ 898.3 × 561 × 634.5 (35.37 × 22 × 24.98)	——	——	——
	KBW21		——	——	246 (542)/ 898.3 × 561 × 643.5 (35.37 × 22 × 25.33)	246 (542)/ 898.3 × 561 × 643.5 (35.37 × 22 × 25.33)	246 (542)/ 898.3 × 561 × 643.5 (35.37 × 22 × 25.33)
Lubricating oil capacity Effect/max.		ℓ(cu. in.)	2.5/7.0 (155.55/427.14) at engine installation angle 0°				
Cooling water capacity (Fresh water)	Fresh water tank	ℓ(cu. in)	6.0 (366.12)				
	Sub tank	ℓ(cu. in)	0.8 (48.82)				

2-5-1 Marine gear specifications

(1) KM3P2

Model		KM3P2	
Type		Constant mesh gear with servo cone clutch (Wet type)	
Reduction ratio	Ahead	2.36	2.61
	Astern	3.16	
Lubrication system		Splash	
Lube oil capacity		0.35ℓ	
Cooling system		Forced cooling with fan mounted on flywheel	

(2) KM4A

Model		KM4-A			
Type		Constant mesh gear with servo cone clutch (Wet type)			
Reduction ratio	Ahead	1.47	2.14	2.63	3.30
	Astern	1.47	2.14	2.63	3.30
Lubricating system		Splash			
Lube oil capacity		1.3ℓ			
Cooling system		Sea water cooling and forced cooling with fan mounted on flywheel			

2-6 4JH2BE series

Engine Model			4JH2BE	4JH2-TBE	4JH2-HTBE	4JH2-DTBE	4JH2-UTBE
Type			Vertical 4-cycle water cooled dissel engine				
Combustion system			Direct injection				
Aspiration			Natural aspiration	Turbocharger	Turbocharger with intercooler		
Number of cylinders			4				
Bore × stroke		mm (in.)	82 × 86 (3.23 × 3.39)				
Displacement		ℓ (cu.in.)	1.817 (110.87)				
One hour rating output (DIN6270B) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	37.5/3600 (51.0/3600)	46.5/3600 (63.2/3600)	56.0/3600 (76.1/3600)	65.0/3600 (88.4/3600)	74.0/3600 (100.6/3600)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.88 (97.83)	8.53 (121.29)	10.32 (146.75)	12.11 (172.2)	13.26 (188.55)
	Piston speed	m/sec.(ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A) flywheel output	Output/crankshaft speed	kW/rpm (HP/rpm)	33.8/3400 (46.0/3400)	41.9/3400 (57.0/3400)	50.7/3400 (68.9/3400)	58.8/3400 (79.9/3400)	66.9/3400 (91.0/3400)
	Brake mean effective pressure	kg/cm² (lb./in.²)	6.7 (95.3)	8.3 (118.05)	10.05 (142.94)	11.65 (165.7)	13.76 (195.67)
	Piston speed	m/sec.(ft./sec.)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)	9.75 (32.0)
Compression ratio			18.1	18.0	18.0	17.2	17.2
Fire order			180° 180° 180° 180° 1 — 3 — 4 — 2 — 1				
Fuel injection pump			Inline type, YPES-CL				Distributor type VE-HDI
Fuel injection timing (b.T.D.C.)		degree	bTDC 10°±1°	bTDC 12°±1°	bTDC 14°±1°	bTDC 10°±1°	bTDC 12°±1°
Fuel injection pressure		kg/cm²(lb/in.²)	200 ± 5 (2844 ± 71)				
Fuel injection nozzle			Hole type				
Direction of rotation	Crankshaft		Counter-clockwise viewed from stern				
	Propeller shaft		Clockwise viewed from stem (KBW21) Bi-rotation (KM 4A)				
Power take off			At flywheel side				
Cooling system			Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea-water: Rubber impeller pump				
Lubrication system			Forced lubrication with trochoid pump				
Starting system	Starting motor		DC 12V, 1.4kW				
	AC generator		12V, 55A (12V, 80A: option)				
Turbo-charger	Type		—	RHB52 (IHI)	RHB52HW (IHI)		
	Model		—	MY29	MY31	MY34	
	Cooling system		—	Water cooling			
Air cooler system	Type		—		Sea-water cooled Plate fin type	Sea-water cooled, Corrugated fin type	
	Radiation area	m³(in.³)	—		0.76 (1178)	0.67 (1038)	

2. Specifications

Engine Model			4JH2BE	4JH2-TBE	4JH2-HTBE	4JH2-DTBE	4JH2-UTBE
Dry weight/ Dimensions (L×W×H) (with Marine gear)	KM3P2	kg(lbs)/ mm(in.)	217 (478)/ 864.3 × 561 × 634.5 (34 × 22 × 24.98)	——	——	——	——
	KM4A		228 (503)/ 888.4 × 565 × 634.5 (34.98 × 22.24 × 24.98)	234 (516)/ 888.4 × 565 × 634.5 (34.98 × 22.24 × 24.98)	244 (538)/ 888.4 × 565 × 634.5 (34.98 × 22.24 × 25.33)	244 (538)/ 888.4 × 565 × 634.5 (34.98 × 22.24 × 25.33)	244 (538)/ 888.4 × 565 × 634.5 (34.98 × 22.24 × 25.33)
Lubricating oil capacity Effect/max.		ℓ(cu. in.)	2.5/7.0 (155.55/427.14) at engine installation angle 0°				
Cooling water capacity (Fresh water)	Fresh water tank	ℓ(cu. in)	6.0 (366.12)				
	Sub tank	ℓ(cu. in)	0.8 (48.82)				

2-6-1 Marine gear specifications

KBW20, KBW 21

Model		KBW20		KBW21
Type		Multi disc, wet, mechanical clutch		
Reducion ratio	Ahead	2.17	2.62	3.28
	Astern	3.06		
Lubricating system		Splach		
Lube oil capacity		1.2ℓ		
Cooling system		Forced cooling with fan mounted on flywheel		Sea water cooling and forced cooling with fan mounted on flywheel

3. Basic rules that must be kept for engine handling

Observe the following rules strictly to prolong the life of your engine.

No.	Items to be observed	Details and troubles which may arise if the instructions are neglected
1	Be sure to conduct running-in operation while your engine is still new.	Applications of heavy loads may shorten the life of the engine whille it is still new.
2	Be sure to warm-up the engine.	Warm-up the engine at idling speed for about 5 minutes after starting to permeate the lube oil to all parts of the engine. If the engine is not warmed up, there will be excessive wear of the moving parts.
3	Use fuel with a cetane value of over 45.	Inferior quality fuel can cause starting failure, and the engine will emit bluish white exhaust.
4	Drain the fuel tank on a regular basis.	Before operating the engine, open the drain cock of the fuel tank and remove the precipitates from the fuel. 1st time . . . . . After 50 hrs. 2nd time and thereafter . . Every 300 hrs.
5	Use high quality lube oil.	Inferior quality lube oil will cause seizure of the piston and liner, excessive wear of moving parts and other troubles. The engine's durability will also be lowered.
6	Be sure to replace the lube oil and lube oil filter element on a regular basis.	Lube oil replacement: 1st time . . . . . After 50 hrs. 2nd time and thereafter . . Every 150 hrs. Element replacement: 1st time . . . . . After 50 hrs. 2nd time and thereafter . . Every 300 hrs. **NOTE:** • Use of old lube oil will make engine parts wear fast and cause engine troubles. • The oil pressure drops if the element is old or clogged with dust. This causes main bearing seizures and any dust in the bearing makes it wear faster.

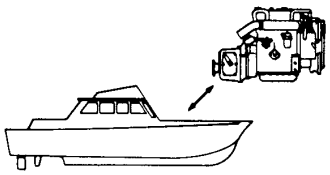
3. Basic rules that must be kept for engine handling

No.	Items to be observed	Details and troubles which may arise if the instructions are neglected
7	Use clean tap water for cooling.	Hard water from wells causes scale deposits on the cooling water system. This lowers the cooling efficiency and raises the cooling water temperature too high, causing seizures of the pistion and liner.
8	Be sure to add anti-rust agent to the cooling water.	Rust in the cooling water system not only accelerates the corrosion of the system but shortens the engine's life on account of the loss of cooling efficiency.
9	Use the anti-freeze in cold areas.	The anti-freeze prevents the cooling water from freezing and cracking the engine. If the cooling water freezes, it may crack the cylinder block, or cooling water pump. So, if anti-freeze is not used, be sure to drain the cooling water completely after operation.
10	Replace cooling water every year.	Contaminated cooling water has a lower cooling efficiency, so the cooling water temperature is liable to rise too high. This causes engine seizure.
11	Prior to operation, always check the cooling water level in the sub tank (Eng. w/sub tank only). In addition, check the cooling water level in the fresh water cooler (heat exchanger) at least once a week.	If the cooling water runs short, the cooling water temperature will rise too high. This causes engine seizure.
12	Check and adjust the drive belt tension of the alternator / cooling water pump.	An improper belt tension will either fail to transmit power satisfactorily or cause overheating. The belt will be damaged.
13	Do not make the starting motor run for more than 15 sec. continuously.	Continuous use of the starting motor for more than 15 sec. will damage the motor.

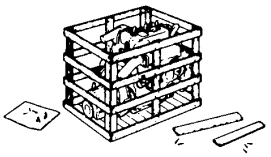
4. Installation

4-1. Procedures of Installation

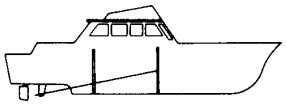
1 Matching engine and boat



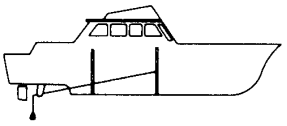
2 Make sure all engine parts and standard accessories are included.



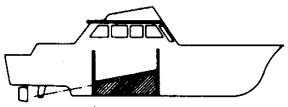
3 Finding the propeller shaft



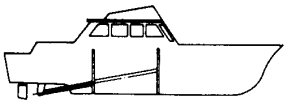
4 Centering



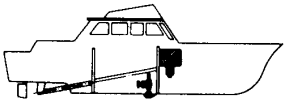
5 Installation of engine bed using propeller shaft as a center



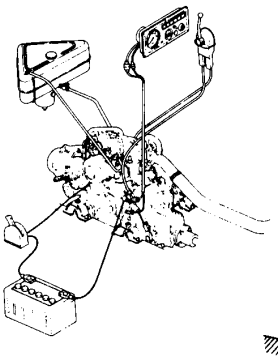
6 Installation of stern tube



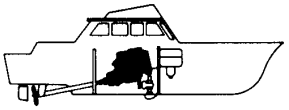
7 Installation of kingston valve and fuel tank



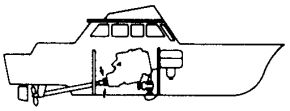
8 Engine running test



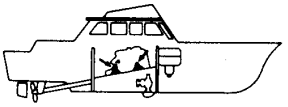
9 Installation of engine and propeller shaft



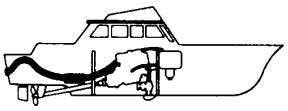
10 Adjustment of propeller shaft alignment



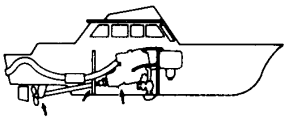
11 Tightening the engine mounting bolts



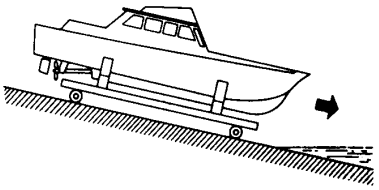
12 Installation of pipes, wires and exhaust pipe etc.



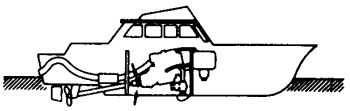
13 Completion check



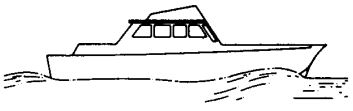
14 Launching



15 Adjustment of the propeller shaft alignment when boat is in the water



16 Trial run



4-2. Notes for the installation

If you (boat owners) want to install the engine on your boat by yourself, please ask advice of your neighboring YANMAR distributors or dealers.

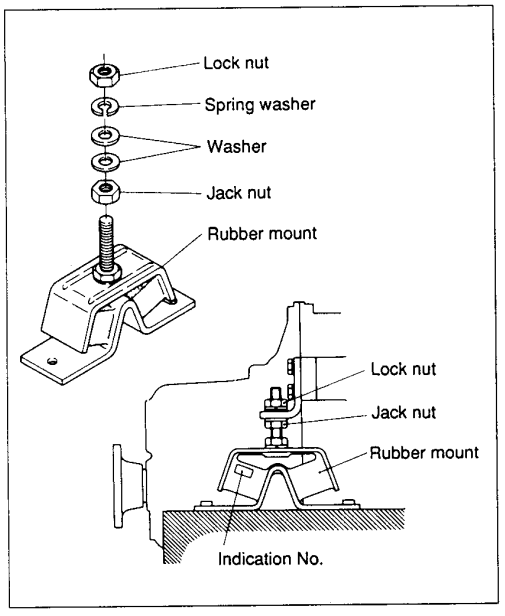
YANMAR has prepared "INSTALLATION MANUAL (PLEASURE BOAT USE)", so you are kindly requested to obtain this manual and work carefully to install the engine following the details in it.

For your reference, brief notes for your work during and after installation are mentioned as follows:

(1) Flexible engine mount

Be sure to use a flexible mount for the installation of every Yanmar engine model. Do not install the engine directly to the engine bed. The use of a flexible mount reduces vibration and noise by absorbing the vibrations at the couplings between the engine and the engine bed.

The dimensions for both front and rear-side use flexible mounts are identical. However, the rubber elastic modulus is different for port and starboard, so be sure to remember their indication numbers.

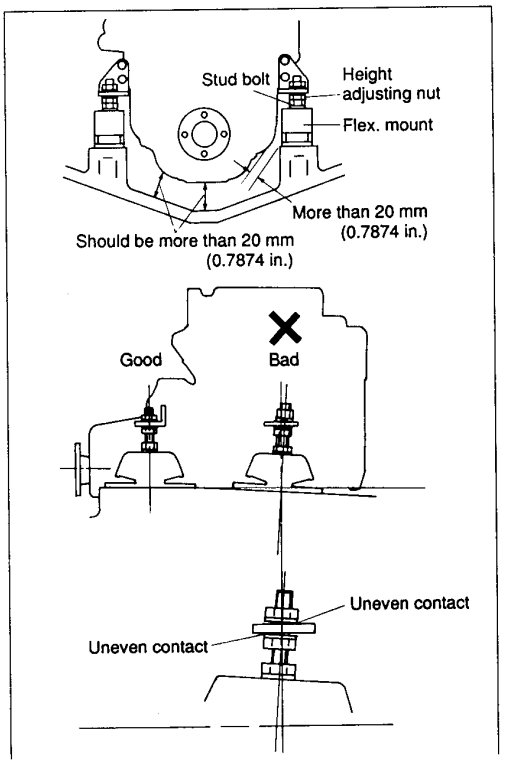


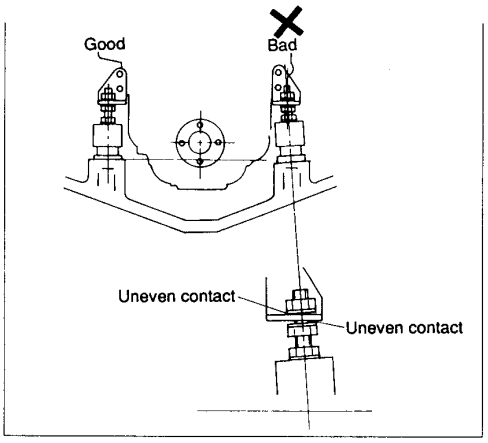
Indication No. of flexible mount		
	Port	starboard
3JH2(-T)E	150	100
4JH Series 4JH2 Series	200	150

When fabricating the engine bed, be sure to leave a 20 mm or larger clearance between the engine bed, and the engine body and marine gear. In addition, be sure to leave 20 mm or larger clearance between the hull bottom, and the engine's oil pan and marine gear. (Measure these values with the height adjusting nuts of the engine's flexible mount brought down to the lower-most point, where they come into contact with the fixing nut of the stud bolts).

NOTE:

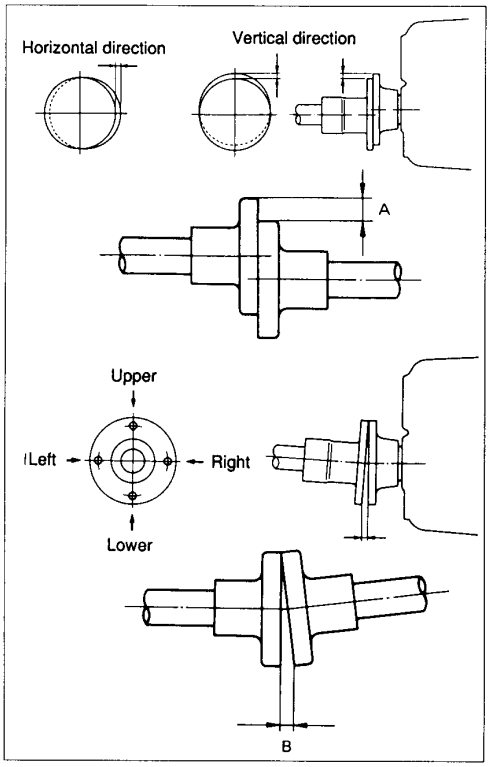
The use of flexible mounts for too many hours makes the rubber lose its tension. This reduces the clearance and there will be interference between the engine and the hull bottom.





(2) Centering the engine

Before connecting the marine gear drive shaft with the propeller shaft, make sure that the flange surfaces of both parts are parallel to each other, and that their centers are aligned. Then adjust the centering of the engine.



mm (in.)

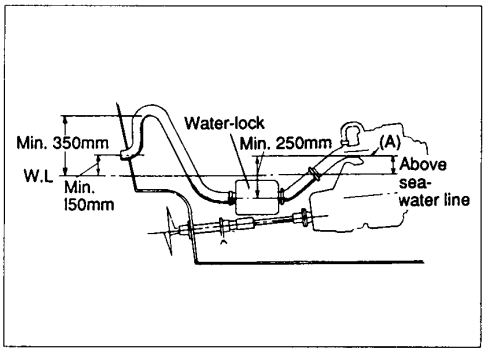
Coupling disalignment A	0.1 - 0.3 (0.0039 - 0.0118)
Coupling face run-out B	0 - 0.2 (0 - 0.0079)

(3) Exhaust system

It is necessary to arrange the piping to allow for inspection of the whole system. Also, a suitable arrangement is necessary to prevent sea-water from flowing back into the engine. A water-lock must be equipped to prevent water remaining in the hose from flowing back to the engine side when stopping the engine or immediately after starting.

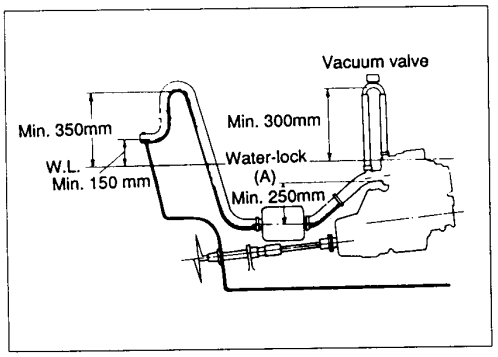
The water-lock must be fixed at the lowest possible position, and the hose must be tilted downward as much as possible. It is also necessary to elevate the exhaust hose at the exhaust outlet to more than 350 mm (13.78 in.) above the loading draft line.

1) When the water outlet of the engine (A) is above the water line:



2) When the water outlet of the engine (A) is below the water line:

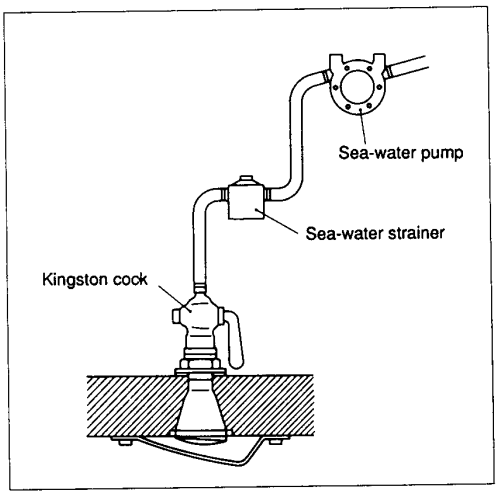
In this case attach a vacuum valve to the elbow of the cooling water pipe.



(4) Sea water cooling system

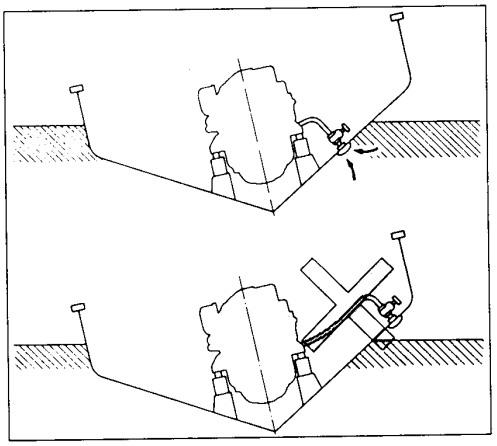
The cooling water inlet consists of the kingston cock and the cooling water hose which connects the cock to the cooling water pump. When the boat is operated in dirty water, provide a sea-water strainer between the kingston cock and the cooling water pump.

The sea-water pump will be damaged if foreign matter is allowed to get into it. Therefore, if the sea-water cock is not already equipped with a strainer, one should be attached between sea-water cock and the pump inlet.



NOTE:

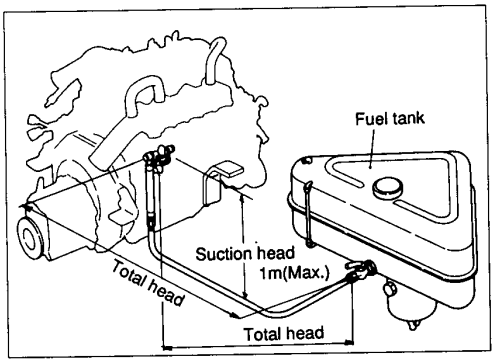
Locate the sea-water inlet well under the draft line. Even when the hull rolls, the inlet must remain under water.



(5) Fuel system

1) The fuel tank should be installed as far as possible from the engine itself.

2) The height of the fuel tank must not be more than 1 meter below the fuel feed pump attached to the engine. If lower, an extra feed pump should be attached.



3) Since the fuel that overflows from the injection nozzle returns to the injection pump, connect the fuel return rubber hose between the fuel injection pump and fuel tank.

(6) Electric system

1) Select battery of sufficient capacity.

Recommended battery capacity
12V—120AH

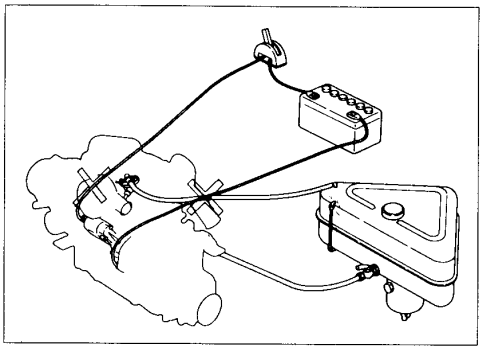
2) To wire the battery, connect (+) wire to the (+) terminal and the (–) wire to the (–) terminal.
Do not confuse them.

NOTE:

If connect the (+) wire to the (–) terminals, the I.C. regulator built in the AC alternator will be damaged.

NOTE:

Route the cable so that it doesn't come in contact with the sharp edges of the engine or heated areas.



NOTE:

Do not clamp the cables together with the fuel pipes. Keep them away from the fuel pipes as much as possible.

3) Use wire of the correct size. Carry out correct wiring according to the wiring diagram for each model.

(7) Remote control system

Only use the single lever remote control head.

NOTE:

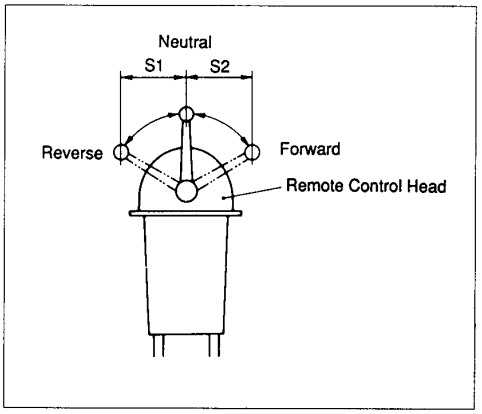
The dual lever remote control head cannot be used because of the large torque needed to operate the marine gear shift lever at engine high speeds (over 1800 rpm). This exceeds its capacity, and make the clutch inoperable.

1) Adjustment of the remote control head

- Marine gearbox control side -

(a) Equal distribution of the control lever stroke.

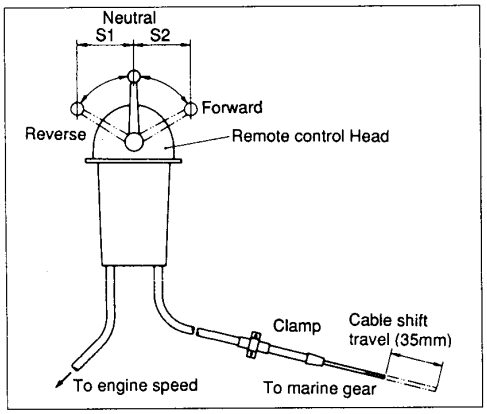
The stroke between neutral → forward (S2), and neutral → reverse (S1) must be equalized.
When either stroke is too short, clutch engagement becomes faulty.



(b) Equalizing the travel distance of the control cable.

After ensuring the equal distribution of the stroke described in (a), connect the cable to the control head, and check that the cable shift travel is 35 mm (1.38 in.) when the control lever is moved from "Neutral" to "Forward" or to "Reverse".

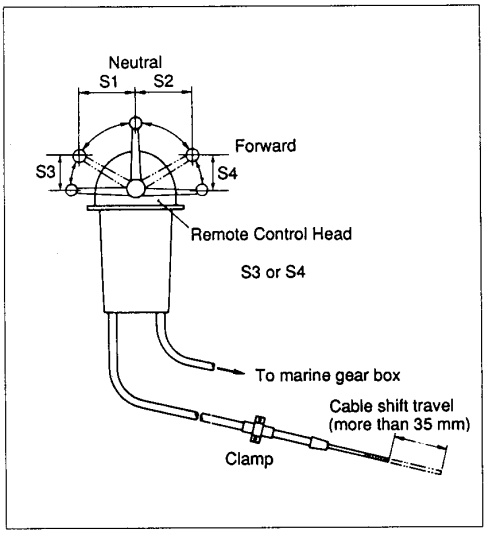
4. Installation



- Engine speed control side -

(a) Confirmation of the control cable shift travel.

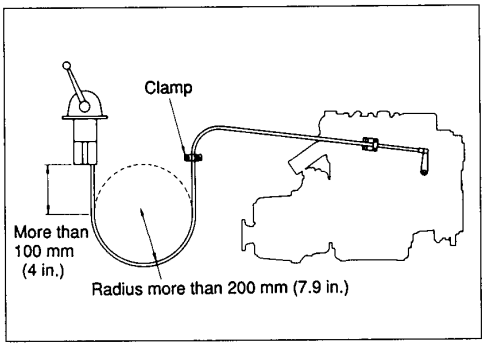
Connect the cable to the control head. Move the control lever to full stroke, and confirm that the cable shift travel is more than 35 mm (1.38 in.). Then connect the cable to the connection part of the governor lever.
If the cable shift travel is below 35 mm (1.38 in.), max. engine speed may not be obtained. If the cable shift travel distance falls below 35 mm after connection, due to cable shift stress, use the cable adjusting screw to adjust it back to 35 mm.



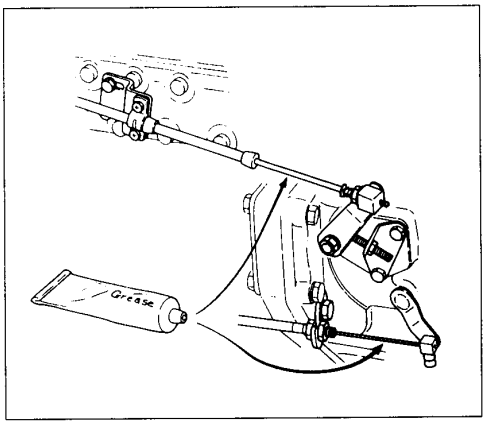
2) Wiring precautions

(a) The minimum radius of cable bend should be 200 mm (7.9 in.).

(b) The outer cable should be bent, if required, at a point more than 100 mm (3.9 in.) from an outer cable clamp so that the clamp can be protected from strain.



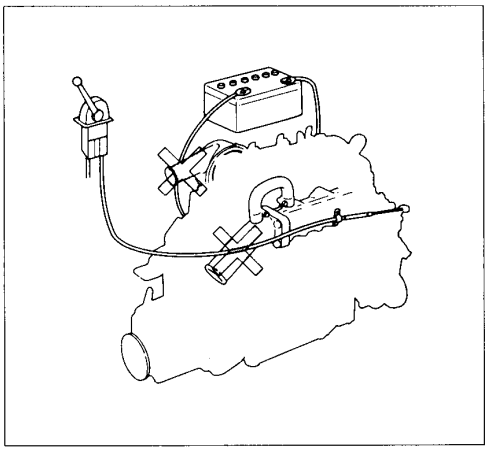
(c) The exposed portion of the inner cable should be coated with a water resistant grease for rust prevention and also for smooth movement of the cable.



(d) The cable should be routed so that it does not come into contact with the heated area of the engine, sharp edges of metallic parts or moving parts.

NOTE:

Avoid clamping a wire harness or any other electrical wire to the cable.



5. Fuel oil, lube oil and cooling water

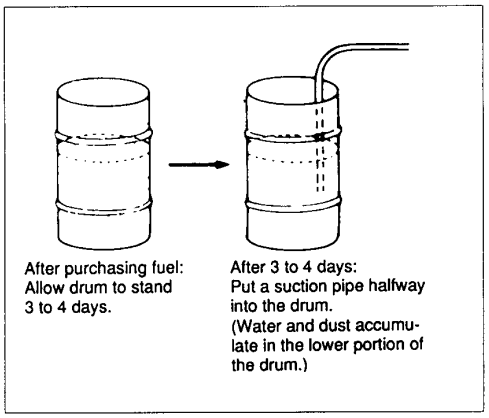
5-1. Selection and handling of fuel oil

(1) Selection of fuel oil

Use the diesel fuel oil which is most suitable for the engine. (Use diesel fuel oil with a cetane value of over 45, less than 0.5% sulphur content and 0.1% water content.)

(2) Handling of fuel oil

1) Water and dust in the fuel oil cause engine failure.
2) Stand the drum for several days to precipitate the water and dust to the bottom. Use the fuel at the top.



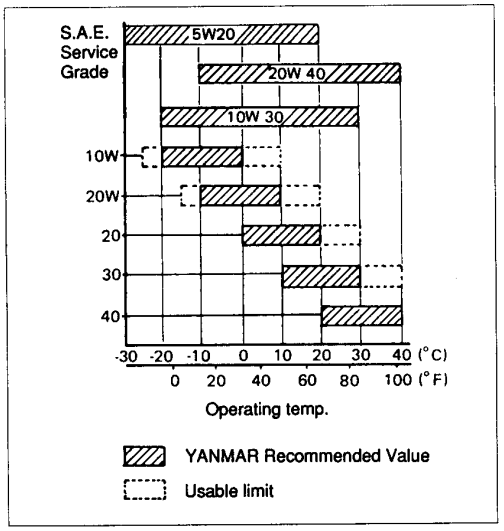
5-2. Selection of lube oil, and refilling

(1) Selection

Nothing affects the performance and durability of your engine more than the lube oil you use. If inferior oil is used, or if your engine oil is not changed regularly, the risk of piston seizure, piston ring sticking, and accelerated wear of the cylinder liner, bearing and other moving components increases significantly. Your engine life may be seriously shortened.

Use Class CD (API Service Classification) oil.

5. Fuel oil, lube oil and colling water

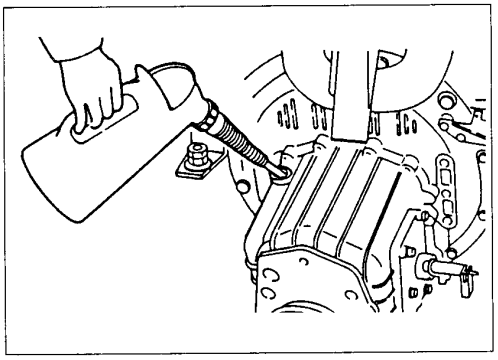


For Marine gear, use the following lube oil.

KM series	Mechanical cone clutch	Same lube oil as the engine
KBW series	Wet multi-disc clutch	ATF-A oil

NOTE:

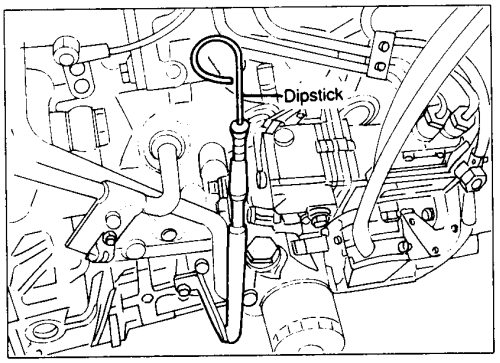
Don't use the ATF-A oil for the mechanical cone clutch (KM series) due to protecting a slip or seizure.



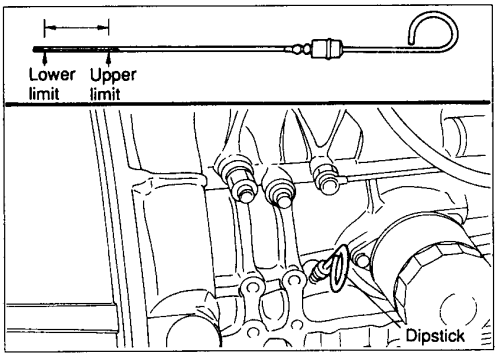
(2) Lube oil supply

1) Open the oil filler port and supply the oil to upper limit of dipstick.

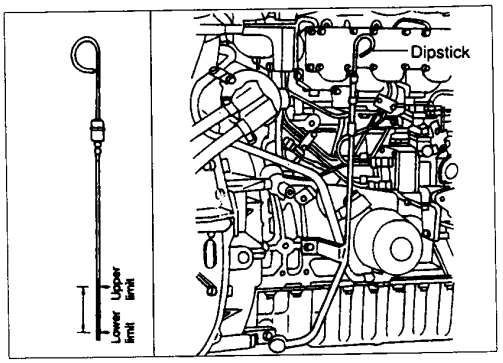
<For 3JH2(-T)E series>

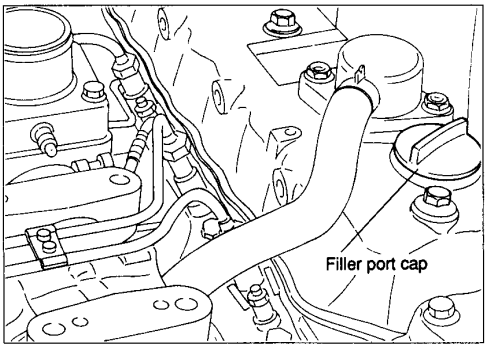


<For 4JH series and 4JH2E, -TE, -HTE, -DTE>



<For 4JH2-UTE>





NOTE:

- *It takes a little while for the lube oil supplied from the filler port to fill the crankcase. Wait for about 3 minutes and then check the oil level.*
- *Make sure that your boat is sitting level when you check the oil. You cannot get the correct reading if it is tilted.*
- *The lube oil quantity in the crankcase falls during the breaking-in operation of a new engine because the oil spreads to the lube oil cooler and lube oil piping. Stop the engine once and wait for about 3 minutes before checking the oil level again.*

5-3. Cooling water (Fresh water cooled engine)

(1) Handling the cooling water

1) Be sure to use clean tap water (with anti-rust agent).

NOTE:

Hard water from wells or sea water causes rusting of the cooling water system. This lowers the cooling efficiency and may cause overheating.

2) Use of anti-freeze

Use anti-freeze, if the temperature is expected to fall below freezing point. The use of anti-freeze removes the need for daily draining of the cooling water. For safety, choose a temperature which is about 5°C lower than the lowest temperature of your area, and then decide the mixing ratio according to the instructions given by the anti-freeze maker.

NOTE:

- *To use the anti-freeze, first drain the cooling water completely from the engine, pour in the anti-freeze to the specified amount, and fill the cooling water up to the mouth of cooling water filler port. Operate the engine for about 30 minutes to fully mix the anti-freeze with water, and then store the engine.*
- *Anti-freeze is usually effective for one year. Refer to the instructions given by the anti-freeze maker.*

3) If no anti-freeze is used in winter, be sure to drain the cooling water from the engine after operation.

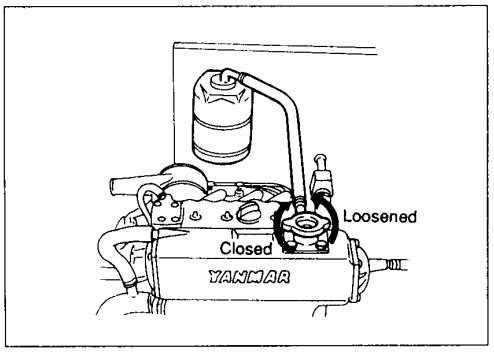
NOTE:

If the cooling water is left in the engine, it may freeze and cause cracking in cooling water pump and cylinder block.

(2) Supply and check of cooling water

1) Supplying water to the engine

Remove the cap on the heat exchanger top to supply cooling water. The cap can be removed by turning it about 120 degrees counterclockwise. Before breaking-in the engine, fill with clean tap water up to the mouth of the filler port. To tighten, slot the cap rear lobe into the filler port notch and press-turn the cap about 120 degrees clockwise.

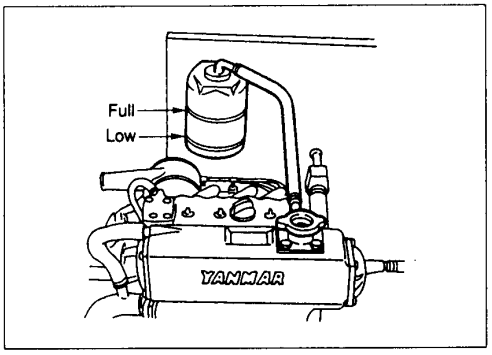


⚠ DANGER

If the filler cap is loose, hot steam and water will spout out and you may be burned.

2) Checking and refilling with cooling water (Engine w/sub-tank)

Check the cooling water level against the "Full" and "Low" marks on the sub-tank. Remove the cap on top to refill. Fill to the "Full" mark.



6. Breaking-in operation

Operate your new engine in accordance with the following procedures.

6-1. Fuel oil

Supply fuel to the fuel tank.

⚠ DANGER

- **Gasoline will catch fire! Check again before supplying that you are using the proper fuel.**
- **If any fuel is spilt, wipe it off completely.**

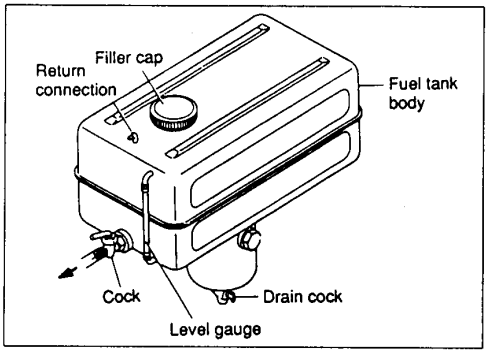
In subsequent engine operations, observe the following rules:

(1) Draining

Even when only using fuel from the top of drum, there will still be some dust or water impurities. These must be drained off before they get into the inner parts of the engine.

(2) Draining the fuel tank

Be sure to install the precipitation trap and draining cock on the bottom of the fuel tank. Before operating the engine, open the cock and remove the sediments from the fuel.



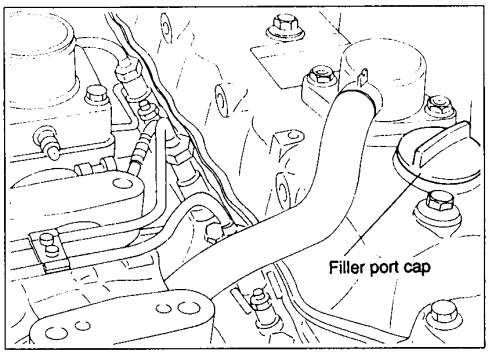
NOTE:

To avoid fire hazards, be sure to stop the engine before refilling with fuel.

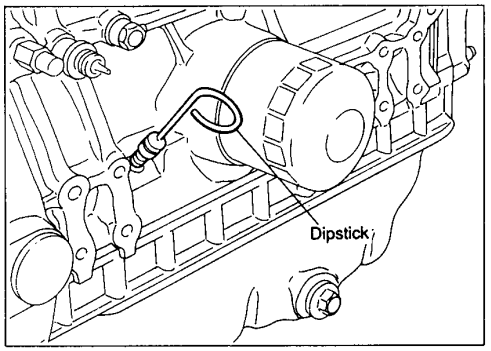
6-2. Supply of lube oil

(1) Lube oil supply to the crankcase

Remove the filler port cap (yellow) to supply lube oil to the crankcase.



Insert the oil dipstick to the port and check that the oil comes up to the upper limit of the oil dipstick.

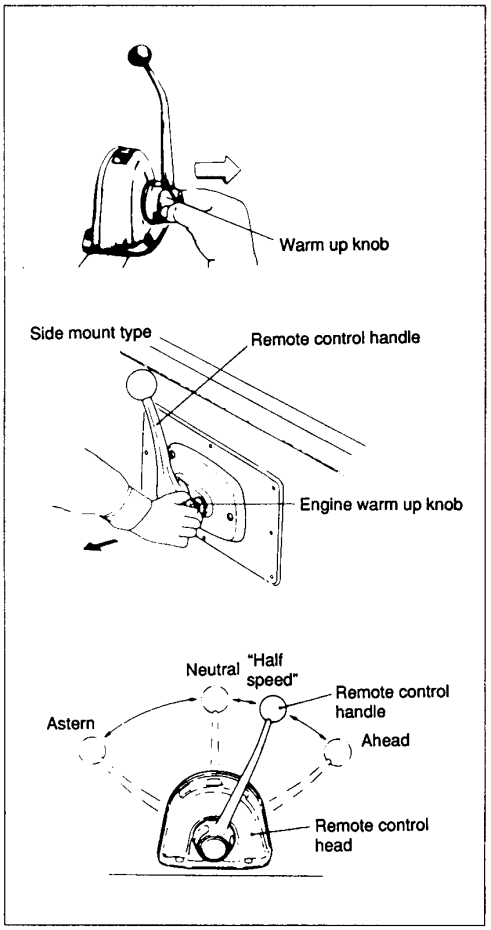


6-3. Air bleeding

The fuel system runs from the fuel tank, through the fuel filter, fuel injection pump and high pressure piping, to the fuel injection nozzles. Fuel is not injected if air is admitted into the fuel system.

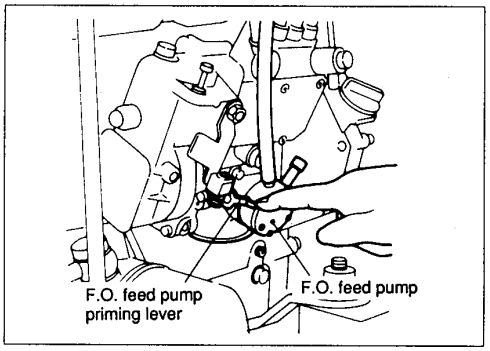
Bleed the air according to the following steps.

(1) Pull out the engine warm up knob on the remote control head and place the control lever in the "HALF SPEED" position.



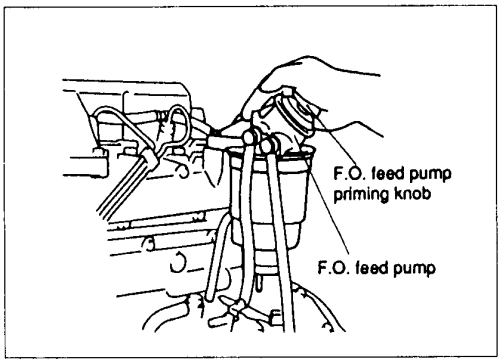
(2) While operating the priming knob on the fuel feed pump or the fuel filter.

〈For 3JH2(B)E series, 4JH(B)E series, 4JH2(B)E, -T(B)E, -HT(B)E, -DT(B)E〉



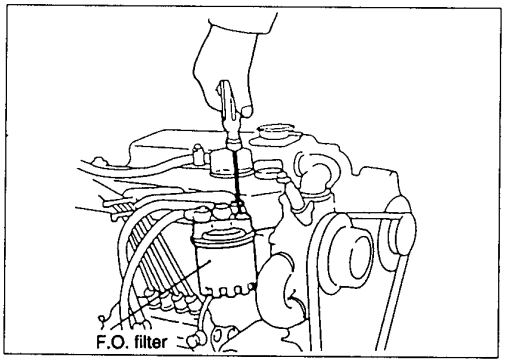
6. Breaking-in operation

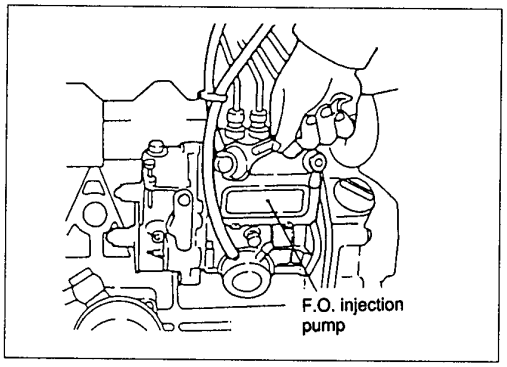
〈For 4JH2-UT(B)E〉



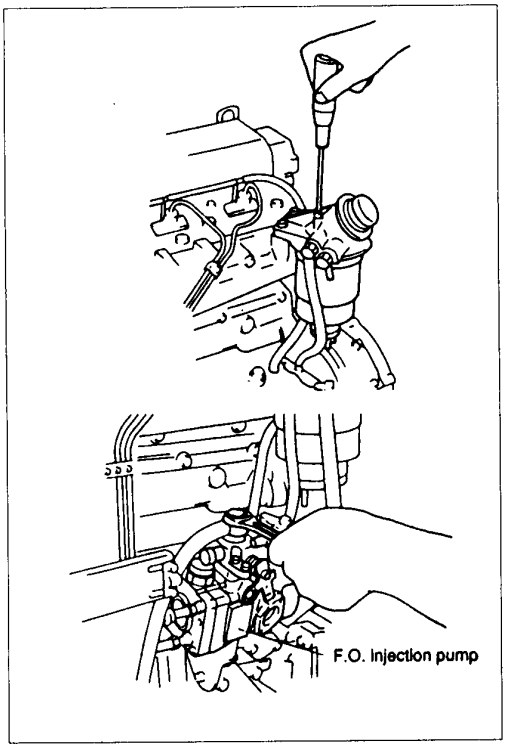
1) Bleed air by loosening the air bleeding screws of the fuel filter and fuel injection pump.

〈For 3JH2(B)E series, 4JH(B)E series, 4JH2(B)E, -T(B)E, -HT(B)E, -DT(B)E〉

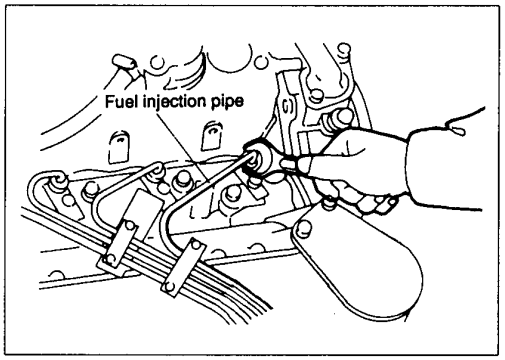




〈For 4JH2-UT(B)E〉



2) Vent air in the fuel injection piping. Loosen the fuel injection pipe nipple on the fuel injection valve side. Repeat this procedure several times. After venting, tighten the fuel injection pipe nipple firmly.



6-4. Lubricating engine parts

(1) Lubricate the governor linkage.

(2) Lubricate the shaft of the regulator handle mount.

6-5. Safety checks

Tidy the area around the engine. Remove any tools or other obstacles from the vicinity of flywheel, rotating parts and the top of the engine.

6-6. Spreading the lube oil

When using the engine after a period of non-use (for more than a month), it is necessary to circulate the lube oil as follows before starting regular engine operation.

(1) Turn the battery switch "ON"

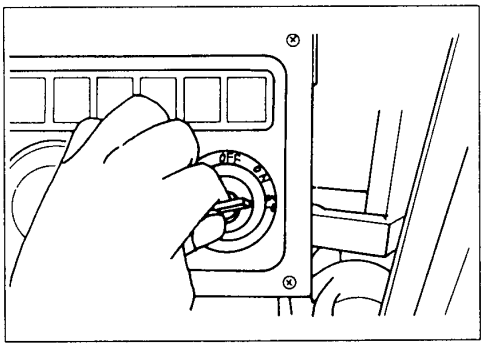
(2) Shift the speed control lever to the "Neutral" position.

(3) Open the kingston cock.

(4) Yanmar offers two lube oil spreading methods. Conduct the following procedure depending on your engine stop method.

1) Manual engine stop type

While pulling on the engine stop cable, insert the key into the starter switch, and turn it to "START". Run the engine for 3 - 5 seconds with the starting motor, and check for abnormal sounds.



2) Electrical engine stop type

While pushing the engine stop button on the instrument panel, turn the key switch to "START". Follow the same procedure as with the manual stop type.

NOTE:

- *Do not release the engine stop cable or stop button when handling the key.*

6-7. Checking the pilot lamps

Check that the pilot lamps on the instrument panel are as shown below when the starter key is turned on:

Pilot lamps	Low L.O. pressure alarm lamp	Lit
	Charge lamp	Lit
	Cooling water temp. alarm lamp	Off

NOTE:

All these signals will continue until the engine starts up or the key is turned off.

6. Breaking-in operation

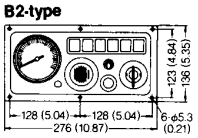
INSTRUMENT PANELS

Available: • Not available: —

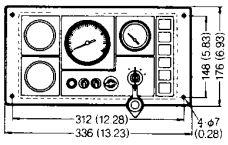
			B2-type	C-type	D-type	E-type
1.	Tachometer		•	•	•	• (Bargraph) • (Digital)
2.	Alarm buzzer	C.W. high temperature	•	•	•	•
		L.O. low pressure	•	•	•	•
		Fuel/water separator	—	—	—	•
3.	Alarm lamp unit	Battery not charging	•	•	•	•
		C.W. high temperature	•	•	•	•
		L.O. low pressure	•	•	•	•
		Fuel/water separator	—	—	—	•
4.	Tachometer illumination switch and alarm buzzer/lamps check switch		•	•	•	•
5.	Starting key switch		•	•	•	•
6.	Push button switch for eng. stop		•	•	•	•
7.	Hole for manual stop cable		•	—	—	—
8.	Operating hour meter		—	•	•	•
9.	L.O. pressure meter		—	•	•	•
10.	C.W. temperature meter		—	•	•	•
11.	Fuse		—	•	•	•
12.	Yanmar marine quartz clock		—	—	•	•
13.	Turbocharger boost meter		—	—	—	•

Unit: mm (in.)

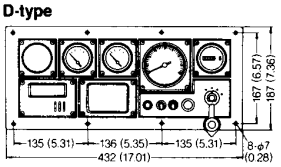
B2-type



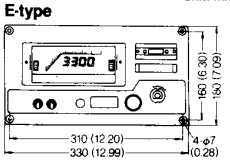
C-type



D-type



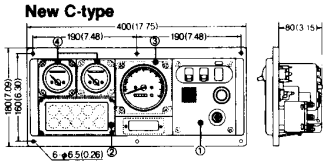
E-type



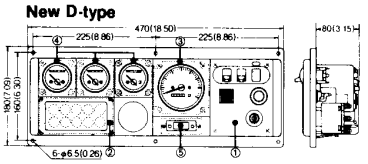
			New C-type	New D-type
①	Switch unit	Key switch (Starter switch)	•	•
		Engine stop switch	•	•
		Alarm buzzer (C.W. temp., L.O. pressure)	•	•
		Alarm buzzer stop switch	•	•
		Illumination switch for tachometer	•	•
②	Alarm lamp unit	Battery not charging	•	•
		C.W. high temperature	•	•
		L.O. low pressure	•	•
		F.O. drain separator (Water level)	•	•
③	Tachometer unit	Tachometer with hour meter	•	•
④	Sub meter unit	L.O. pressure meter	•	•
		C.W. temperature meter	•	•
⑤	Clock unit	Quartz clock	—	•

Unit: mm (in.)

New C-type



New D-type



7. Operating your engine

Before operating the engine, check that there are no obstacles around the engine, especially around the rotational parts.

⚠ WARNING

- **To prevent exhaust gas poisoning, ensure good ventilation during operation. Install ventilation windows, ports or ventilators in the engine room.**

- **Never touch or allow your clothes to touch the moving parts of the engine during operation. If the front drive shaft, V-belt, propeller shaft, etc. caches your body or clothes, serious injury may result. Check that no tools, cloth, etc. are left on or around the engine.**

⚠ CAUTION

The engine is very hot during operation and immediately after stopping, especially the turbocharger, fresh water tank, exhaust pipe and high pressure fuel pipe. Avoid burns! Never touch or allow your clothes to touch these parts.

7-1. Starting

(1) Turn the battery switch "ON"

(2) Pull out the engine warm up knob and place the control lever in the "HALF SPEED" position.

NOTE:

The knob for engine warm up can only be operated when the control lever is placed in the "Neutral" position.

(3) Open the kingston cock

(4) Turn the starter switch key to "START". The engine should start.

Once the engine is started, release the key. The key automatically returns to "ON". (Do not turn off the battery switch and the key switch even after the engine is started). At "ON", the gauges on the instrument panel start operating.

NOTE:

Protecting the battery

Do not run the starter motor for more than 15 seconds at a time. If the engine can't be started, wait for about 15 seconds before using the starter motor again.

Engine re-starting

Be sure to check that the flywheel has come to a standstill before turning the starter switch to "START".

- *The starter motor or flywheel gear may be damaged if the starter switch is operated with the flywheel still moving.*
- *Engines with a safety relay in the circuit can't be re-started unless the starter switch has been turned off once the starter motor was run.*

Battery and key switch

Do not turn off the battery switch and the key switch even after the engine start due to protecting alternator.

When the engine is operated at a low idling speed (below 1000 rpm) for a long time (over 2 hours), excessive carbon and fuel residue tends to accumulate due to incomplete combustion.
Carbon deposits on the injection holes of the fuel injection valve, exhaust valve, the turbine blades of the turbocharger, etc. cause a drop in engine output, knocking, and other troubles. To prevent these problems, be sure to blow off the carbon accumulations by full speed operation.
Operate the engine at over 2500 rpm for one minute in every two (2) hours of continuous low idling operation.

Cold weather starting aid

- *Turn the starter key counterclockwise to the "Heat" (or Glow) position and hold it in that position for about 15 seconds.*
- *Then, return the starter key to "START" to start the engine.*

Boost Compensator

In the case of cold weather, pull the cancel knob of boost compensator for easy starting (4JH(2)-TE, 4JH(2)-HTE, 4JH(2)-DTE). In normal weather, this procedure is not necessary.

(5) When the engine is started, return the remote control handle to the "NEUTRAL" position.

7-2. Cautions after engine starting

Once the engine is started, observe the following instructions.

(1) Warm-up the engine for more than 5 minutes.

NOTE:

- *The lube oil will not spread all the way to the main bearing and other moving parts for some time after starting. To protect these parts from wear, the engine must be idled for about 5 minutes at low speed.*
- *For breaking-in, idle the engine at low speed for 15 - 20 minutes.*

(2) Raise the engine speed above 1000 rpm, and check that the low oil pressure alarm lamp and the charge lamp go out.

NOTE:

If the warning lamps still do not go out when the engine speed is raised above 1000 rpm, the engine is faulty. Stop the engine immediately and consult your nearest Yanmar dealer.

7-3. During engine operation

During engine operation, check the following items once or twice a day.

⚠ DANGER

Do not open the filler cap during operation or immediately after stopping the engine. Hot steam and water will spout out. To remove the cap, wait until the engine has cooled down, wrap the cap with a cloth and loosen the cap slowly. After checking, fasten the filler cap firmly.

(1) Exhaust color

Black exhaust indicates that the engine is under strain. Continued operation will shorten the lives of the intake and exhaust valves, piston rings, cylinder liner and fuel injection valves. Stop engine operation when black exhaust is emitted.

(2) Water and oil leakage

Check that there are no water, oil or gas leaks, loose bolts and abnormal noise, overheating and excessive vibrations. If any abnormality is found, contact your nearest Yanmar dealer.

(3) Avoid resonance range operation

NOTE:

Depending on the driven machine, engine vibrations will be excessive in a certain speed range due to resonance of the engine with the engine bed. Avoid engine operation in this range.

(4) Alarm lamps

- Low oil pressure alarm lamp ("OIL")

  If the low oil pressure alarm lamp is lit while the engine is running at higher than low idle, check whether the lube oil is too low. If not, there is an abnormality in the lube oil circuit. Continued operation will cause engine seizure. Stop the engine soon, and consult your nearest Yanmar dealer.

NOTE:

To check the lube oil level, stop the engine and wait for more than 3 minutes.

- Charge alarm lamp ("CHG")

  If the charge alarm lamp is lit while the engine is running at over 750 rpm, there is a fault in either the charging circuit or the V-belt (slippage or damage). Stop the engine and check. If the V-belt is OK, consult your nearest Yanmar dealer.

- Cooling water temp. alarm lamp ("WATER")

  If the cooling water temp. alarm lamp is lit during load operation of the engine, the engine is overheated. Stop the engine immediately and check the cooling water level. If it is OK, consult your nearest Yanmar dealer.

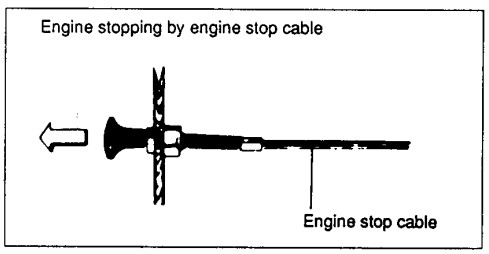
(5) Abnormal noise

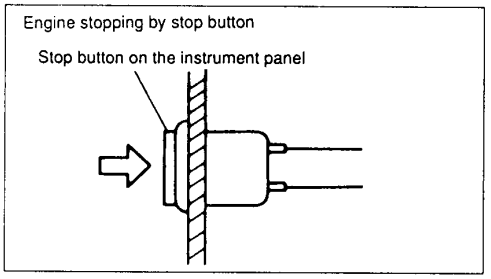
If abnormal sounds are heard during engine operation, stop the engine soon and locate the cause. If it can't be located, consult your nearest Yanmar dealer.

7-4. Engine stopping

(1) Idle the engine before stopping

1) To stop the engine, place the control lever to the "Neutral" position and operate the engine at low idling speed for about 5 minutes.
2) Cut the fuel by the following steps and stop the engine.





NOTE:

If the engine is stopped suddenly at a high temperature, the temperature of various parts will increase, and engine troubles may occur.

3) Turn off the key switch.

NOTE:

When stopping the engine with the starter switch "ON", the lube oil pressure warning buzzer will sound. This is normal and does not indicate engine trouble.

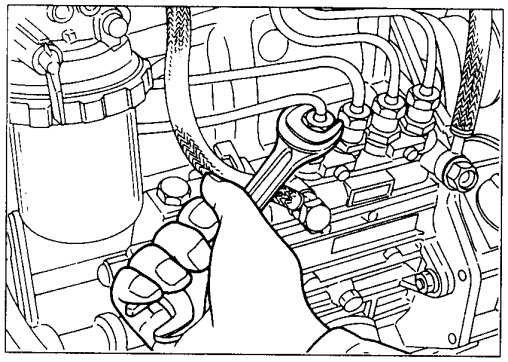
(2) Be sure to close the kingston cock after stopping.

NOTE:

Emergency stop

If the engine can't be stopped with the engine stop cable (or stop button on the instrument panel) or the engine speed can't be lowered by the speed control lever, stop the engine as follows:
Loosen all the nuts on either the fuel injection pump side or the fuel injection nozzle side. This cuts off the fuel supply, and the engine stops. In such cases, consult your nearest

Yanmar dealer to locate the cause and have them repair the engine.



(3) Draining the cooling water

NOTE:

Cooling water freezes in cold temperatures. If anti-freeze is not used, be sure to drain the cooling water after stopping the engine. Also drain the cooling water completely before long storage. Otherwise, water in the cylinder may freeze and crack the cylinder.

- *Before draining the cooling water, remove the pressure cap and the drain plugs of the engine, air cooler and heat exchanger. If the cap is not removed, draining will be hard and may be incomplete.*
- *Do not remove the pressure cap when the engine is in hot condition.*

(4) Wipe off dust and soil and clean the engine.

(5) Turn off the battery switch (if your engine has one).

(6) Pull out the starter key.

8. Periodic checks and maintenance

Periodic checks and maintenance are very important for keeping the engine in good condition and durable.

The chart below indicates which checks to make and when to make them.

System	Item		Before starting	After 50 hrs or one month	Every 150 hrs	Every 300 hrs	Every 600 hrs
Fuel system	Check the fuel level, and refill		○				
	Drain the fuel tank			○ (First)		○	
	Replace the fuel filter					○	
	Check the injection timing						○
	Check the injection spray condition						○
Lubricating system	Check the lube oil level	Crankcase	○				
		Marine gear	○				
	Replace the lube oil	Crankcase		○ (First)	○		
		Marine gear		○ (First)	○		
	Check the oil pressure warning lamp function		○				
	Replace the lube oil filter			○ (First)		○	
Cooling system	Seawater outlet		○ During operation				
	Check cooling water level		○				
	Adjust the tension of cooling water pump driving belt			○ (First)		○	
	Replace the impeller of the cooling water pump (sea water pump)						○ (Replace)
	Replace the cooling fresh water		Every year				
Air intake and exhaust system	Clean the element of the air intake silencer					○	
	Clean the exhaust/water mixing elbow					○	
	Clean the breather pipe					○	
	Check the exhaust gas condition		○ During operation				
	Clean the compressor for turbocharger				○		
Electrical system	Check the charge lamp function		○				
	Check the electrolyte level in the battery		○				
	Adjust the tension of the alternator driving belt			○ (First)		○	
	Check the wiring connectors					○	
Cylinder head, etc.	Check for leakage of water and oil		○ (After starting)				
	Retighten all major nuts and bolts						○
	Retighten the cylinder head bolts						○
	Adjust intake/exhaust valve clearance			○ (First)			○
Remote control system, etc.	Checking the remote control operation			○ (First)			○
	Adjust the propeller shaft alignment			○ (First)			○

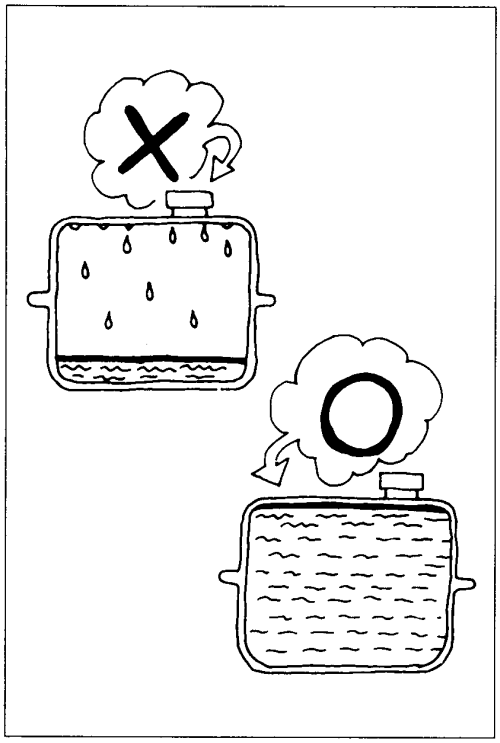
8-1. Check and adjustment of fuel oil system

(1) Fuel level check and resupply

Resupply clean fuel to the fuel tank.

Interval	Daily (after each day's operation)

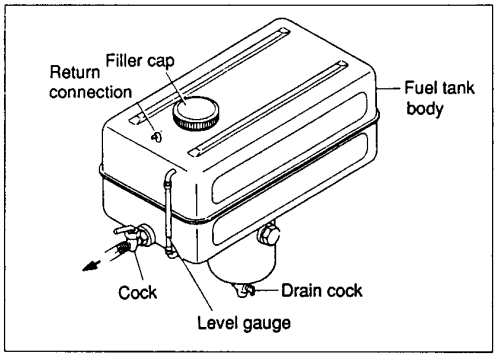
Fill the fuel tank at the end of each day's operation. This prevents water condensation in the fuel tank.



(2) Draining of the fuel tank

Open the drain cock at the bottom of the tank and drain off the sediment.

Interval	1st time ... after 50 hrs.
	2nd time and thereafter ....every 300 hrs.

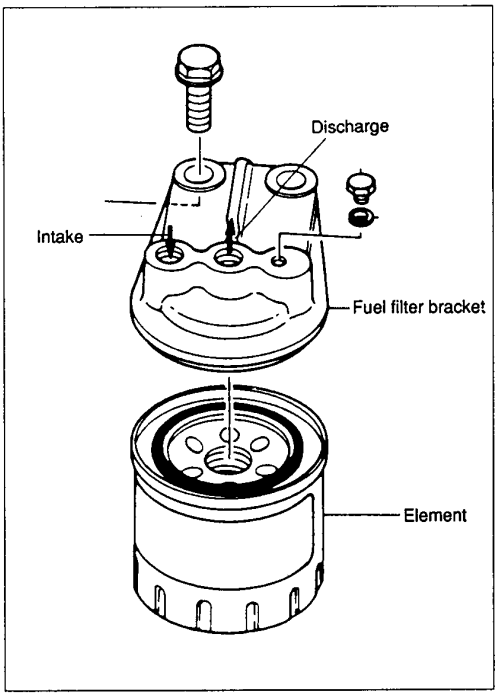


(3) Replacing the fuel filter

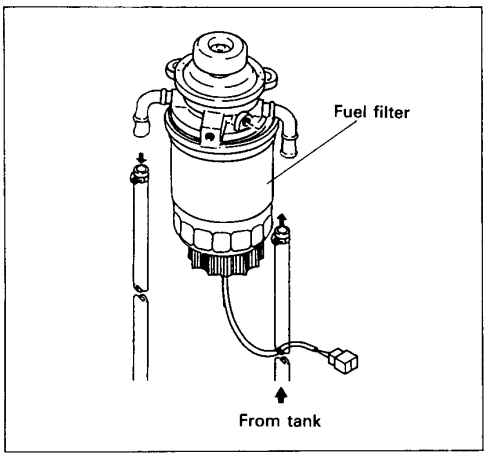
Remove the fuel filter and replace.

Interval	Every 300 hrs.

〈For 3JH2(B)E series, 4JH(B)E series, 4JH2(B)E, -T(B)E, -HT(B)E, -DT(B)E〉



<For 4JH2-UTE>

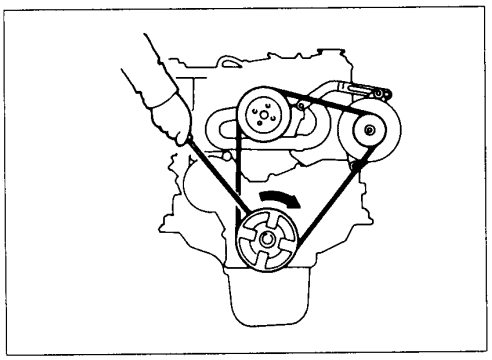


(4) Check of fuel injection timing

1) Remove the high pressure pipe from the fuel injection pump.

2) Pull the engine warm up knob out and place the control lever in the "half speed" position.

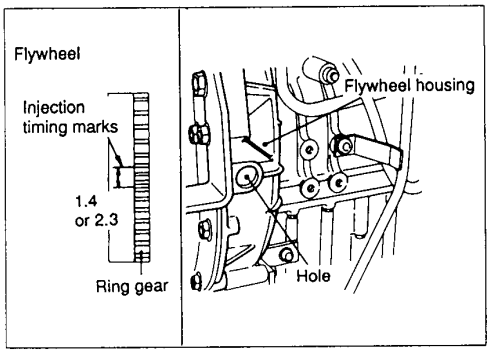
3) Crank the engine lightly to check the fuel injection timing.



4) Timing marks on the flywheel can be seen through the hole on the flywheel housing.

NOTE:

All timing marks on the flywheel are indicated by number; for example, 1.4 or 2.3. These indicate top dead center of the pistons. Fuel injection timing marks are specified degree before this TDC mark.

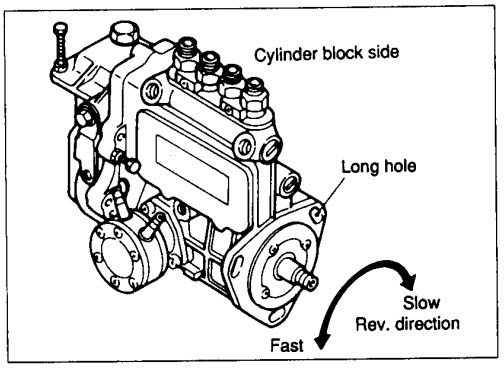


5) Fuel should bubble out at the same time the timing mark on the flywheel and the indication mark on the flywheel housing line up.

6) To adjust the fuel injection timing, adjust the installation position at the long hole of the pump. When it falls to the cylinder block side, injection timing is slower; when it falls to the other side, injection timing is faster.

Fuel injection timing

3JH2(B)E	FID (b.T.D.C.) : 10°±1°
3JH2-T(B)E	FID (b.T.D.C.) : 12°±1°
4JH(B)E	FID (b.T.D.C.) : 12°±1°
4JH -T(B)E -HT(B)E -DT(B)E	FID (b.T.D.C.) : 17°±1°
4JH2(B)E	FID (b.T.D.C.) : 10°±1°
4JH2-T(B)E	FID (b.T.D.C.) : 12°±1°
4JH2-HT(B)E	FID (b.T.D.C.) : 14°±1°
4JH2-DT(B)E	FID (b.T.D.C.) : 10°±1°
4JH2-UT(B)E	FID (b.T.D.C.) : 12°±1°



7) Check the fuel injection timing for all of the cylinders.

Interval	Every 600 hrs.

(5) Check the injection spray condition

Remove the fuel injection nozzle and check the injection spray condition. The spray should be cone-shaped.

NOTE:

For disassembly, adjustment and inspection of the fuel injection pump and fuel injection valve, consult your nearest Yanmar dealer.

Interval	Every 600 hrs.

8-2. Lube oil system

(1) Checking the oil level in the crankcase and the marine gear

Prior to the engine operation, pull out the oil dipstick and check that the oil level is between the upper and lower limits. If the oil is low, resupply.

Check interval	Daily (prior to operation)

⚠ CAUTION

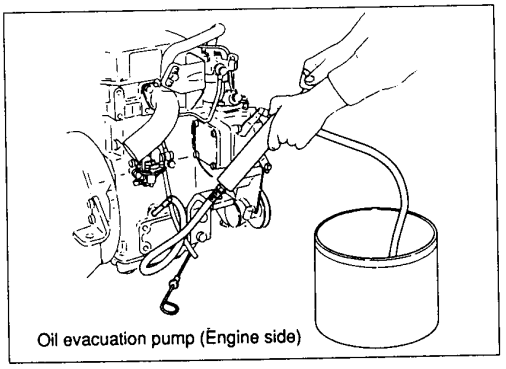
Beware of oil splashes if extracting the lube oil while it is hot.

(2) Replacement of lube oil

It is most effective to drain the lube oil while the engine is still warm. Replace the lube oil as follows:

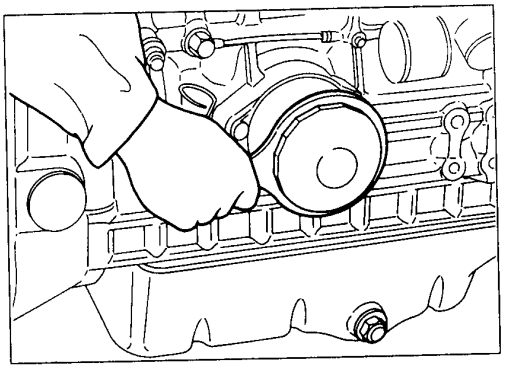
Replacement interval	1st time . . . After 50 hrs.
	2nd time and thereafter . . . Every 150 hrs.

Drain out the lube oil by using oil evacuation pump.



(3) Replacement of lube oil filter

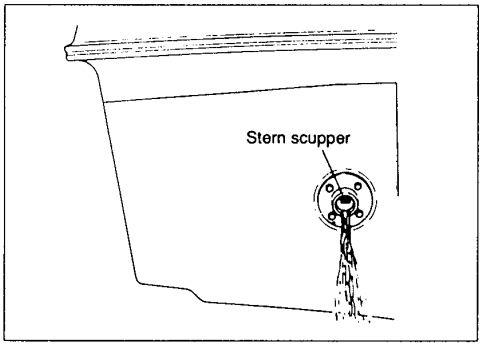
Remove the filter and replace.



Replacement interval	1st time . . . After 50 hrs.
	2nd time and thereafter . . . Every 300 hrs.

8-3. Cooling water system

(1) Make sure that water is coming out of the cooling water outlet pipe during operation.



(2) Checking the cooling water level (Fresh water cooled engine)

[Engines w/sub-tank]

Daily checks of the cooling water level can be done by observing the sub-tank water level. If it is low, refill up to the "FULL" limit. Then press-fit the cover completely back on.

NOTE:

- *Heat exchanger checks are not necessary for daily checks and refilling.*
- *Check the cooling water level when the engine is cold. Engine cooling water flows to the sub-tank when the engine is still hot and makes accurate checks impossible.*

[Engines w/o sub-tank]

Remove the water filler cap on the heat exchanger and check the water level.

NOTE:

- *Do not check the cooling water level while the engine is still hot. Steam or hot water may burst out if the water filler cap is removed soon after the engine is stopped.*

(3) Checking and adjustment of cooling water pump driving belt tension

Check the belt condition, and adjust the tension of the belt.

Adjustment standard.
(For fresh water pump driving belt)
10 mm (with 10kg thumb force)

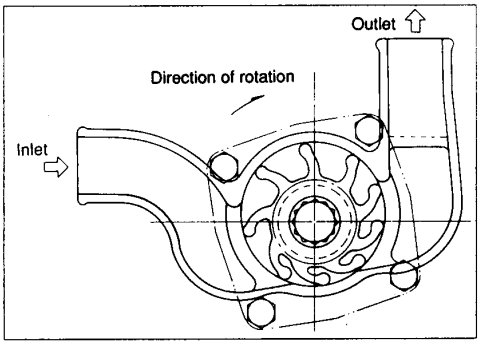
Adjustment interval	1st time . . . After 50 hrs.
	2nd time and thereafter . . . Every 300 hrs.

(4) Replace the impeller of the sea water cooling pump

Replace the impeller.

NOTE:

1. *When inserting the impeller in the pump, make sure that the impeller lies in the proper direction.*
2. *Coat the inside of pump body impeller housing with grease.*



(5) Replacing fresh cooling water

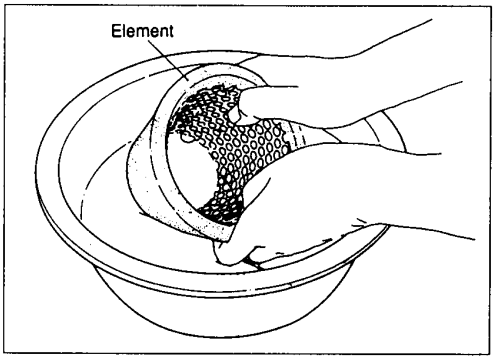
The effectiveness of the anti-corrosive agent will be lowered if the cooling water becomes contaminated.

Replacement interval	Every year

8-4. Air intake system

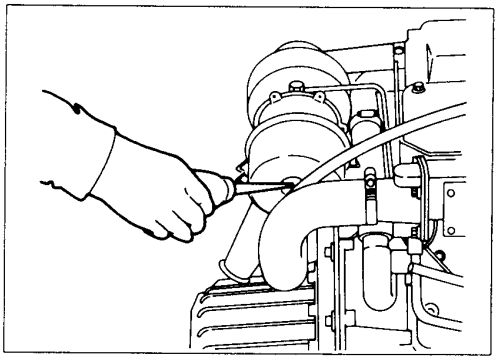
(1) Cleaning the intake silencer element

Wash the element inside the air intake silencer with neutral detergent.



Interval	Every 300 hrs.

(2) Cleaning the turbocharger compressor



Consult your nearest Yanmar dealer for cleaning the turbocharger.

1) With the engine at maximum load, add 50cc of cleaning agent ("Blower Wash") for about 10 seconds using a feeder.

2) After 3 – 5 minutes, add 50cc of fresh water for about 10 senconds.

3) Use a vinyl container or the like for adding the cleaning agent and water. If a large amount of cleaning agent or fresh water is fed into the turbocharger all at once, trouble (damage to the compressor fan wheel, etc.) may occur. Pay careful attention to the amount fed and the time.

4) If there is no change in the turbocharging pressure or in the exhaust temperature, repeat the above cleaning procedures after 10 minutes. If there is still no change after repeating the cleaning procedures 3 – 4 times, the blower is heavily contaminated, or there is some other problem.

5) After cleaning, run the engine with load for at least 15 minutes to allow it to dry.

Interval	Every 150 hrs.

* If cleaned with fresh water, clean every 50 hrs.

8-5. Checking and maintenance of the battery.

⚠ WARNING

- **Before inspecting the electrical system, be sure either to turn off the battery switch or to disconnect the (-) terminal of the earth cable. Otherwise, a short-circuit could cause a fire.**

- **Ensure good ventilation when charging the battery. The use of open flames is strictly prohibited. Hydrogen gas may also catch fire.**

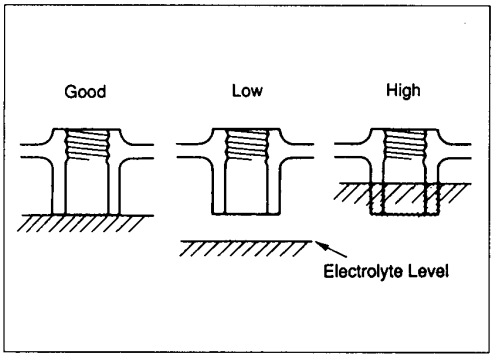
- **Battery fluid is diluted sulfuric acid. It can blind or burn your eyes or skin. Wear goggles and gloves when handling battery fluid. Should the fluid be deposited on your skin, wash with a large quantity of fresh water and seek treatment from a doctor.**

Proper battery maintenance is vital for dependable service.

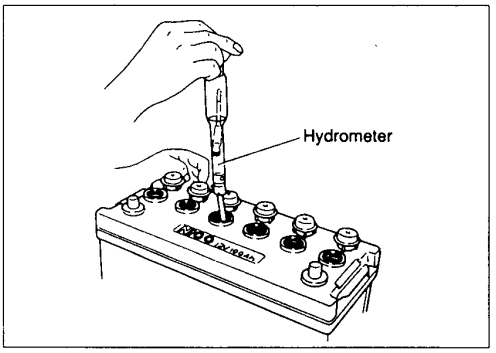
(1) Keep the battery clean by wiping it with a damp cloth.
Keep all connections clean and tight. Remove any corrosion, and wash the terminals with a solution of baking soda and water.

(2) Keep the battery fully charged, especially during cold weather. If the battery needs to be charged, charge it after disconnecting the battery cables from the battery.

(3) Check the level of the electrolyte in each cell before starting. If low, fill to the bottom of the filler neck with distilled water.



(4) To check the battery, use a battery hydrometer. Check the specific gravity of the electrolyte in each cell. Charge the battery if the reading is below 1.215.



NOTE:

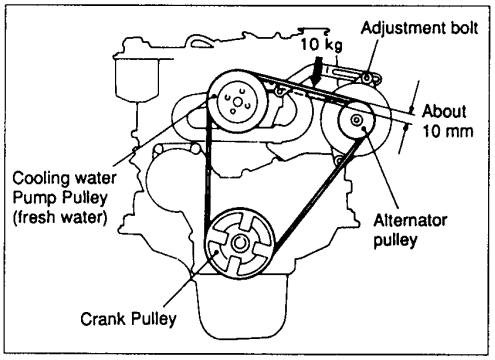
When adding distilled water in freezing weather, run the engine at least 30 minutes to ensure thorough mixing.

8-6. Checking and adjusting the V-belt tension

Too much V-belt tension accelerates V-belt wear, and too little V-belt tension leaves the pulley idle, overheats the engine, and no power is generated. Adjust the belt tension as follows:

(1) Loosen the adjust bolt, and move the charging generator outwards to increase the tension, or move the charging genrator inwards to decrease the tension.

(2) Do not stain the belt with oil. The belt will idle if stained. Wipe off the oil soon.



Adjustment standard
10 mm (with 10 kg thumb force)

Check interval	1st time . . . 50 hrs.
	2nd time and thereafter . . . Every 300 hrs.

8-7. Cheking the engine body

(1) Engine body

For checking and adjusting the following items, consult your nearest Yanmar dealer.

Check and adjustment item	Service interval
Retightening of bolts	Every 600 hrs.
Adjustment of intake/exhaust valve clearance	1st time . . . 50 hrs. 2nd time and thereafter . . . Every 600 hrs.

(2) Lubrication of the governor linkage

Lubricate the governor linkage to ensure smooth operation.

Lubrication interval	Daily (prior to operation)

8-8. Checking the remote control operation

Make sure that the remote control system is working properly.

Check interval	1st time . . . 50 hrs.
	2nd time and thereafter . . . 600 hrs.

8-9. Adjust the propeller shaft alignment

For checking and adjustment the propeller shaft alignment, contact your nearest Yanmar dealer or boatbuilder.

9. Long-term storage

(1) Store your engine in a well ventilated place free from excessive humidity and dust.

(2) Carefully follow these directions when storing your engine for a long period (3 months or more):

1) Clean dust, oil, etc. off the surface of your engine.

2) Change the lube oil.
Change the lube oil filter.

3) Run your engine once a month whenever possible. If not, follow these directions when beginning storage and every subsequent 6 months.

- Remove fuel injection valves on the cylinder head. Supply each combustion chamber with about 2 cc of clean lube oil using an oilcan. Attach and tighten the injection valves.
- Turn the stop lever to "STOP".
- Turn the starter key. Crank up for about 10 seconds so that cylinder walls are uniformly oiled.

4) Leave the cooling water with its anti-freeze, provided that the anti-freeze is not too old.

5) Apply a thin coat of clean oil to the uncoated surface of the engine.

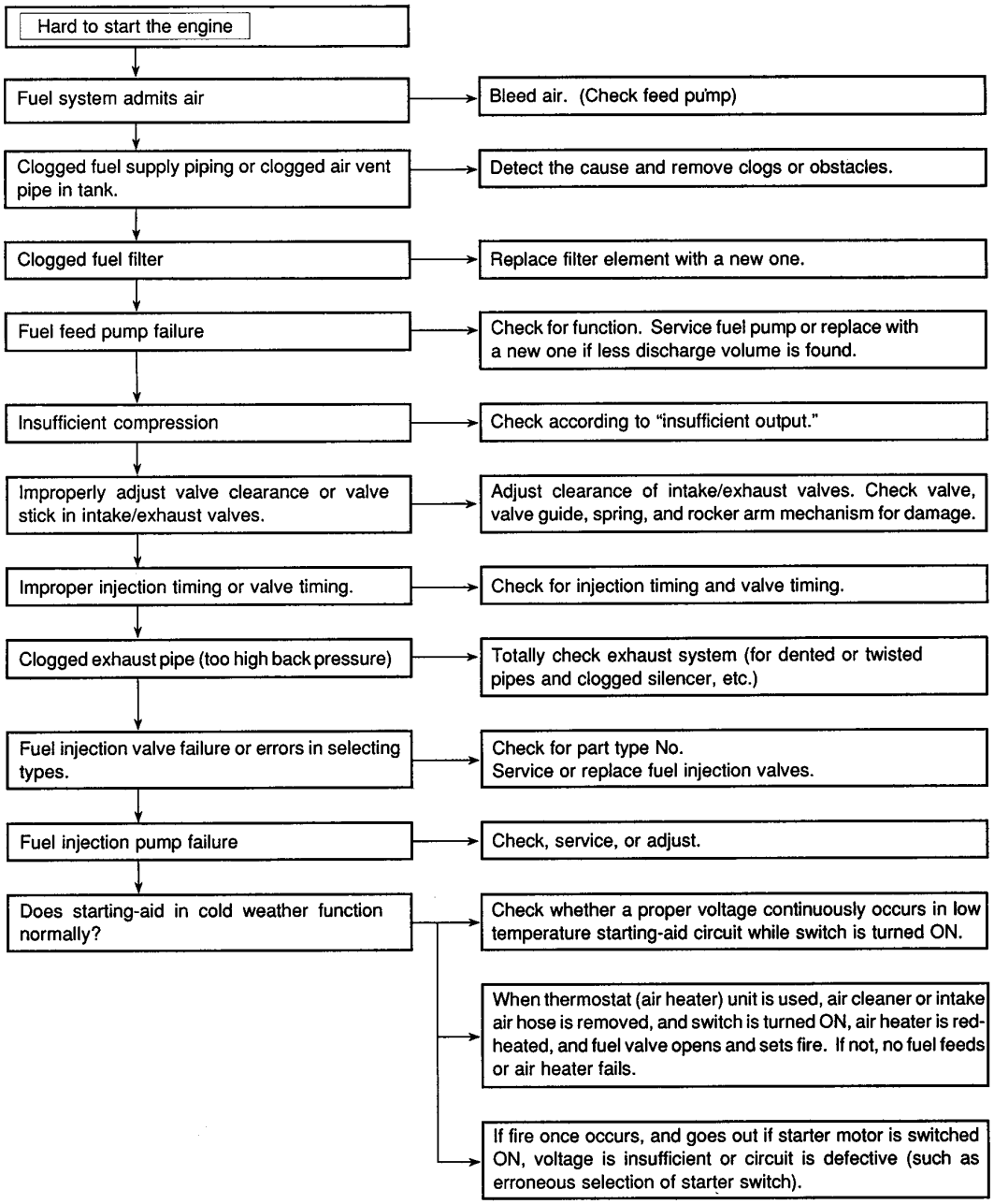
6) Cover the exhaust silencer, air intake silencer, etc. with a PVC film to prevent humid air from entering your engine. Carefully protect the electric system from humidity in the same way.

7) Remove the batteries from the engine and charge them fully before storage. Charge the batteries every month during storage, because they run down naturally (self-discharge).

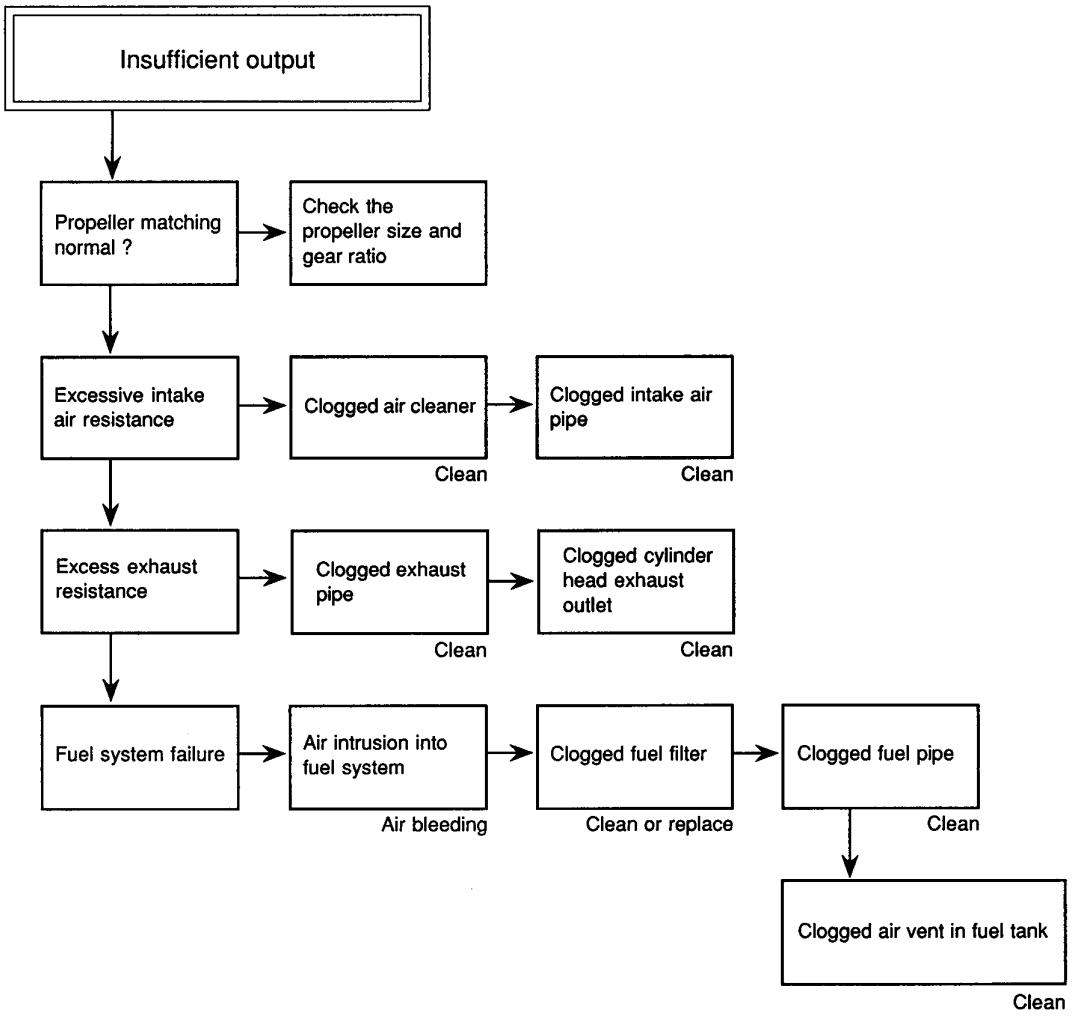
10. Troubleshooting

The following description summarizes the probable cause of and the remedy for general failure by item.

Immediate countermeasures should be taken before a failure is inflamed if any symptom is detected.



10. Troubleshooting



APPENDIX

11 Piping diagrams
11-1 4JH(2)-E

English

1 Fuel oil filter (Cartridge type)
2 Lub. oil pump
3 Fresh water temperature switch
4 Hot water connection inlet
5 Cooling water pump (Sea water)
6 Hot water connection outlet
7 Thermostat
8 Cooling water pump (Sea water)
9 Detail of part (A)
10 Detail of part (B)
11 Detail of part (C)
12 Detail of part (D)
13 Sea water inlet
14 Main bearing
15 Lub. oil inlet filter
16 Fresh water cooler
17 Piston cooling oil jet
18 Mixing elbow
19 Lub. oil cooler
20 Oil pressure switch
21 Fuel injection nozzle
22 Fuel high pressure pipe
23 Pressure control valve
24 Lub. oil filter (Cartridge type)
25 Fuel injection pump
26 Fuel feed pump
27 Fuel oil inlet
28 Fuel overflow
29 From cylinder head
30 To cam shaft

11 Schémas de tuyauterie
11-1 4JH(2)-E

Français

1 Filtre de combustible (type á cartouche)
2 Pompe à huile de lubrification
3 Contacteur de température d'eau douce
4 Raccord d'admission d'eau chaude
5 Pompe à eau de refroidissement (eau douce)
6 Raccord de refoulement d'eau chaude
7 Thermostat
8 Pompe à eau de refroidissement (eau de mer)
9 Détail de (A)
10 Détail de (B)
11 Détail de (C)
12 Détail de (D)
13 Admission d'eau de mer
14 Palier de vilebrequin
15 Filtre d'admission d'huile de lubrification
16 Refrodisseur d'eau douce
17 Tubulure d'huile de refroidissement du piston
18 Coude de mélange
19 Refrodisseur d'huile de lubrification
20 Contacteur de pression d'huile
21 Injecteur de combustible
22 Tuyau haute pression de combustible
23 Soupape régulatrice de pression
24 Filtre d'huile de lubrification (Type ácartouche)
25 Pompe d'injection de combustible
26 Pompe d'alimentation de combustible
27 Admission de combustible
28 Débordement de combustible
29 De la culasse
30 Vers l'arbre à cames

11 Rohrleitungspläne
11-1 4JH(2)-E

Deutsch

1 Kraftstoffilter (Einsatzfilter)
2 Schmierölpumpe
3 Frischwasser-Temperaturschalter
4 Warmwassereinlaß
5 Kühlwasserpumpe (Frischwasser)
6 Warmwasserauslaß
7 Thermostat
8 Kühlwaserpumpe (Salzwasser)
9 Detail (A)
10 Detail (B)
11 Detail (C)
12 Detail (D)
13 Salzwasserauslaß
14 Hauptlager
15 Schmieröleinlaßfilter
16 Frischwasserkühler
17 Kühlöleinspritzung für Kolben
18 Mischkrümmer
19 Schmierölkühler
20 Öldruckschalter
21 Einspritzdüse
22 Kraftstoff-Druckleitung
23 Druckregelventil
24 Schmierölfilter (Einsatzfilter)
25 Einspritzpumpe
26 Kraftstoffpumpe
27 Kraftstoffeinlaß
28 Kraftstoffüberlauf
29 Vom Zylinderkopf
30 Zur Nockenwelle

11 Diagramas de tuberías
11-1 4JH(2)-E

Español

1 Filtro de combustible (Tipo cartucho)
2 Bomba de aceite de lubrificación
3 Interruptor de la temperatura de agua dulce
4 Entrada de la conexión de agua caliente
5 Bomba de agua de enfriamiento (agua dulce)
6 Salida de la conexión de agua caliente
7 Termostato
8 Bomba del agua de enfriamiento (agua salada)
9 Detalle de la parte (A)
10 Detalle de la parte (B)
11 Detalle de la parte (C)
12 Detalle de la parte (D)
13 Entrada de agua salada
14 Conjinte principal
15 Filtro de entrada del aceite de lubricación
16 Enfriador de agua dulce
17 Esprea de aceite enfriador del piston
18 Codo mezclador
19 Enfriador del aceite lubricante
20 Interruptor de la presión del aceite
21 Tobera de inyección de combustible
22 Tubo de alta presión de combustible
23 Válvula de control de la presión
24 Filtro del combustible (Tipo cartucho)
25 Bomba de inyección de combustible
26 Bomba de alimentación de conbustible
27 Entrada de combustible
28 Derrame de combustible
29 Desde la cabeza del cilindro-V
30 Al cojinete del árbol

11 Diagramma dei tubi e dei condotti
11-1 4JH(2)-E

Italiano

1 Filtro del carbourante (tipo a cartuccia)
2 Pompa dell'olio lubrificante
3 Interruttore della tepmeratura dell'acqua dolce
4 Bocca di collegamento dell'acqua calda
5 Pompa dell'acqua di raffreddamento (acqua dolce)
6 Uscita del collegamento dell'acqua calda
7 Termostat
8 Popa dell'acqua di raffreddameto (acqua di mare)
9 Dettaglio della parte (A)
10 Dettaglio della parte (B)
11 Dettaglio della parte (C)
12 Dettaglio della parte (D)
13 Presa dell'acqua di mare
14 Cuscientto principale
15 Filtro d'ingresso dell'olio lubrificante
16 Refrigeratore dell'acqua dolce
17 Getto dell'oilo di raffreddamento del pistone
18 Gomito di miscelaggio
19 Refrigeratore dell'olio lubrificante
20 Interruttore della pressione dell'olio
21 Ugello di iniezione del carburante
22 Tubo del carburante ad alta pressione
23 Valvola di controllo della pressione
24 Filtro dell'olio lubrificante (tipo a cartuccia)
25 Pompa di iniezione del carburante
26 Pompa di alimentazione del carburante
27 Ingrsso del carburante
28 Scarico del troppo pieno del carburante
29 Dalla testata del cilindro a V
30 All'albero a camme

11 kylvattenledningsdiagram
11-1 4JH(2)-E

Svensk

1 Bränslefilter (Patrontyp)
2 Smörjoljepump
3 Vattentemperaturomkopplare
4 Varmvattenintag
5 Kylvattenpump
6 Varmvattenuttag
7 Termostat
8 Kylvattenpump (Havsvatten)
9 Detalj av del (A)
10 Detalj av del (B)
11 Detalj av del (C)
12 Detalj av del (D)
13 Havsvattenintag
14 Huvudlager
15 Smörjoljeintagets filter
16 Färskvattenkylare
17 Kolvens kylningsmunstycke
18 Blandningskrör
19 Smörjoljekylare
20 Oljetrycksomkopplare
21 Bränsleinsprutningsmunstycke
22 Bränslets högtrycksrör
23 Tryckkontrollventil
24 Smörjoljefilter
25 Bränsleinsprutningspump
26 Bränslematarpump
27 Bränsleintag
28 Överflödsbränsle
29 Från topplocket
30 Till kamaxeln

Marks of piping:

MARKS	NAME
RH	Rubber hose
STS	Carbon steel pipe
C1201T	Copper pipe
-#-	Screw joint
-#-	Flange joint
-T-	Eye joint
-<-	Insertion joint
= = = =	Drill hole
- - - - -	Cooling fresh water piping
— — —	Cooling sea water piping
— — —	Lube oil piping
———	Fuel oil piping

The diagram shows in the case of KM3P2/KBW20 marine gear.

Marquage des tuyauteries:

MARQUAGE	DESIGNATION
RH	Flexible en caoutchouc
STS	Tuyau en acier au carbone
C1201T	Tuyau en cuivre
-#-	Joint à vis
-#-	Joint à bride
-T-	Joint à cosse
-<-	Joint par insertion
= = = =	Trou percé
- - - - -	Tuyau d'eau douce de refroidissement
— — —	Tuyau d'eau de mer de refroidissement
— — —	Tuyau d'huile de lubrification
———	Tuyau de combustible

Le schéma s'applique aux boites de vitesses KM3P2/KBW20

Kennzeichnungsrohrietung:

Kennzeichnung	Bezeichnung
RH	Gummischlauch
STS	Stahlrohr
C1201T	Kupferrohr
-#-	Schraubverbindung
-#-	Flanschverbindung
-T-	Gabelverbindung
-<-	Steckverbindung
= = = =	Bohrloch
- - - - -	Frischwasserkühlleitung
— — —	Salzwasserkühlleitung
— — —	Schmierölleitung
———	Kraftstoffleitung

Der Plan zeight dasSchiffsgetriebe KM3P2/KBW20.

Señalización de la tubería:

SEÑALIZACION	NOMBRE
RH	Manguera de corcho
STS	Tubo de acero al carbón
T1201T	Tubo de cobre
-#-	Junta de atornillado
-#-	Junta de reborde
-T-	Junta de ojo
-<-	Junta de inserción
= = = =	Barreno
- - - - -	Tubería de agua dulce de enfriamiento
— — —	Tubería de agua salada de enfriamiento
— — —	Tubería de aceite de lubricación
———	Tubería de combustible

El diagrama es para los casos de engranaje marino KM3P2/KBW20.

Contrassegni dei tubi:

Contrassegni	Nome
RH	Flessibile di gomma
STS	Tubo di acciaio al carbone
C1201T	Tubo di rame
-#-	Giunto a vite
-#-	Giunto a flangia
-T-	Giunto ad occhiello
-<-	Giunto ad inserzione
= = = =	Foro a mandrino
- - - - -	Tubo acqua dolce di raffreddamento
— — —	Tubo acqua di mare di raffreddamento
— — —	Tubo dell'olio lubrificante
———	Tubo del carburante

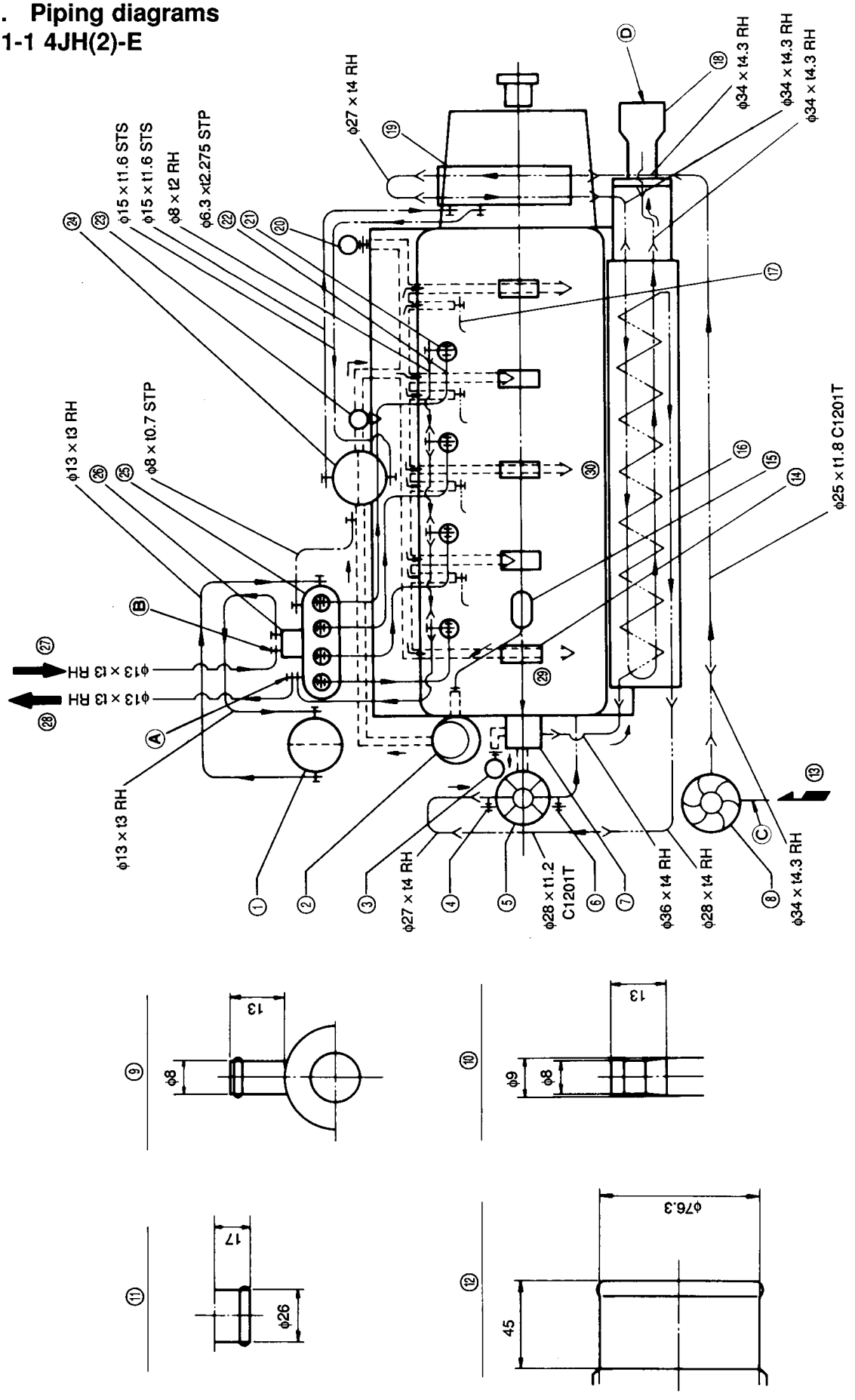
Il diagramma indica il caso dell'ingranaggio marino KM3P2/KBW20

Marken av kylvattenledningsdiagram:

MÄRKEN	NAMN
RH	Gummislang
STS	Kolstålrör
C1201T	Kopparrör
-#-	Skruvled
-#-	Flänsled
-T-	Ögleled
-<-	Isättningsled
= = = =	Borrhål
- - - - -	Färskvattenrör för kylning
— — —	Havsvattenrör för kylning
— — —	Smörjoljerör
———	Bränslerör

Diagrammet visar kopplingen för KM3P2/KBW20.

11. Piping diagrams
11-1 4JH(2)-E



11-2 4JH(2)-TE — English

1 Fuel oil filter (Cartridge type)
2 Lub. oil pump
3 Fresh water temperature switch
4 Hot water connection inlet
5 Cooling water pump (Fresh water)
6 Hot water connection outlet
7 Thermostat
8 Cooling water pump (Sea water)
9 Detail of part (A)
10 Detail of part (B)
11 Detail of part (C)
12 Detail of part (D)
13 Sea water inlet
14 Main bearing
15 Lub. oil inlet filter
16 Fresh water cooler
17 Piston cooling oil jet
18 Mixing elbow
19 Tubocharger
20 Lub. oil cooler
21 Oil pressure switch
22 Fuel injection nozzle
23 Fuel high pressure pipe
24 Pressure control valve
25 Lub. oil filter (Cartridge type)
26 Fuel injection pump
27 Fuel feed pump
28 Fuel oil inlet
29 Fuel overflow
30 From cylinder head
31 To cam shaft

11-2 4JH(2)-TE — Français

1 Filtre de combustible (type à cartouche)
2 Pompe à huile de lubrification
3 Contacteur de température d'eau douce
4 Raccord d'admission d'eau chaude
5 Pompe à eau de refroidissement (eau douce)
6 Raccord de refoulement d'eau chaude
7 Thermostat
8 Pompe à eau de refroidissement (eau de mer)
9 Détail de (A)
10 Détail de (B)
11 Détail de (C)
12 Détail de (D)
13 Admission d'eau de mer
14 Refroidisseur d'eau douce
15 Filtre d'admission d'huile de lubrification
16 Palier de vilebrequin
17 Tubulure d'huile de refroidissement du piston
18 Coude de mélange
19 Turbocompresseur
20 Refroidisseur d'huile de lubrification
21 Contacteur de pression d'huile
22 Injecteur de combustible
23 Tuyan haute pression de combustible
24 Soupape régulatrice de pression
25 Filtre d'huile de lubrification (Type à cartouche)
26 Pompe d'injection de combustible
27 Pompe d'alimentation de combustible
28 Admission de combustible
29 Débordement de combustible
30 De la culasse
31 Vers l'arbre à cames

11-2 4JH(2)-TE — Deutsch

1 Kraftstoffilter (Einsatzfilter)
2 Schmierölpumpe
3 Frischwasser-Temperaturschalter
4 Warmwasserauslaß
5 Kühlesddrtpumpe (Frischwasser)
6 Warmwasserauslaß
7 Thermostat
8 Kühlwaserpumpe (Salzwasser)
9 Detail (A)
10 Detail (B)
11 Detail (C)
12 Detail (D)
13 Salzwasserauslaß
14 Hauptlager
15 Schmieröleinlaßfilter
16 Frischwasserkühler
17 Kühlöleinspritzung für Kolben
18 Mischkrümmer
19 Tubolader
20 Schmierölkühler
21 Öldruckschalter
22 Einspritzdüse
23 Kraftstoff-Druckleitung
24 Druckregelventil
25 Schmierölfilter (Einsatzfilter)
26 Einspritzpumpe
27 Kraftstoffpumpe
28 Kraftstoffeinlaß
29 Kraftstoffüberlauf
30 Vom Zylinderkopf
31 Zur Nockenwelle

11-2 4JH(2)-TE — Español

1 Filtro de combustible (Tipo cartucho)
2 Bomba de aceite de lubrificación
3 Interruptor de la temperatura de agua dulce
4 Entrada de la conexión de agua caliente
5 Bomba de agua de enfriamiento (agua dulce)
6 Salida de la conexión de agua caliente
7 Termostato
8 Bomba del agua de enfriamiento (agua salada)
9 Detalle de la parte (A)
10 Detalle de la parte (B)
11 Detalle de la parte (C)
12 Detalle de la parte (D)
13 Entrada de agua salada
14 Conjinte principal
15 Filtro de entrada del aceite de lubricación
16 Enfriador de agua dulce
17 Esprea de aceite enfriador del piston
18 Codo mezclador
19 Turbocargador
20 Enfriador del aceite lubricante
21 Interruptor de la presión del aceite
22 Tobera de inyección de combustible
23 Tubo de alta presión de combustible
24 Válvula de control de la presión
25 Filtro del combustible (Tipo cartucho)
26 Bomba de inyección de combustible
27 Bomba de alimentación de combustible
28 Entrada de combustible
29 Derrame de combustible
30 Desde la cabeza del cilindro-V
31 Al cojinete del árbol

11-2 4JH(2)-TE — Italiano

1 Filtro del carbourante (tipo a cartuccia)
2 Pompa dell'olio lubricante
3 Interruttore della tepmeratura dell'acqua dolce
4 Bocca di collegamento dell'acqua calda
5 Pompa dell'acqua di raffreddamento (acqua dolce)
6 Uscita del collegamento dell'acqua calda
7 Termostat
8 Pompa dell'acqua di raffreddameto (acqua di mare)
9 Dettaglio della parte (A)
10 Dettaglio della parte (B)
11 Dettaglio della parte (C)
12 Dettaglio della parte (D)
13 Presa dell'acqua di mare
14 Cuscientto principale
15 Filtro d'ingresso dell'olio lubrificante
16 Refrigeratore dell'acqua dolce
17 Getto dell'olio di raffreddamento del pistone
18 Gomito di miscelaggio
19 Turbocompressore
20 Refrigeratore dell'olio lubrificante
21 Interruttore della pressione dell'olio
22 utello di iniezione del carburante
23 Tubo del carburante ad alta pressione
24 Valvola di controllo della pressione
25 Filtro dell'olio lubrificante (tipo a cartuccia)
26 Pompa di iniezione del carburante
27 Pompa di alimentazione del carburante
28 Ingresso del carburante
29 Scarico del troppo pieno del carburante
30 Dalla testata del cilindro a V
31 All'albero a camme

11-2 4JH(2)-TE — Svensk

1 Bränslefilter (Patrontyp)
2 Smörjoljepump
3 Vattentemperaturomkopplare
4 Varmvattenintag
5 kylvattenpump
6 Varmvattenuttag
7 Termostat
8 Kylvattenpump (Havsvatten)
9 Deralj av del (A)
10 Deralj av del (B)
11 Deralj av del (C)
12 Deralj av del (D)
13 Havsvattenintag
14 Huvudlager
15 Smörjoljeintagets filter
16 Färsksvattenkylare
17 Kolvens kylningsmunstycke
18 Blandningskrör
19 Turboaggregat
20 Smörjoljekylare
21 Oljetrycksomkopplare
22 Bränsleinsprutningsmunstycke
23 Bränslets högtryckskrör
24 Tryckkontrollventil
25 Smörjoljefilter
26 Bränsleinsprutningspump
27 Bränslematarpump
28 Bränsleintag
29 Överflödsbränsle
30 Från topplocket
31 Till kamaxeln

Mark of piping: / Marquage des tuyauteries: / Kennzeichnungsrohrietung: / Señalización de la tubería: / Contrassegni dei tubi: / Marken av kylvattenlednings:

MARKS	NAME	MARQUAGE	DESIGNATION	Kennzeichnung	Bezeichnung	SEÑALIZACION	NOMBRE	CONTRASSEGNI	NOME	MÅRKEN	NAMN
RH	Rubber hose	RH	Flexible en caoutchouc	RH	Gummischlauch	RH	Manguera de caucho	RH	Flessibile di gomma	RH	Gummislang
STS	Carbon steel pipe	STS	Tuyau en acier au carbone	STS	Stahlrohr	STS	Tubo de acero al carbón	STS	Tubo di acciaio al carbone	STS	Kolstålrör
C1201T	Copper pipe	C1201T	Tuyau en cuivre	C1201T	Kupferrohr	C1201T	Tubo de cobre	C1201T	Tubo di rame	C1201T	Kopparrör
	Screw joint		Joint à vis		Schraubverbindung		Juntade atornillado		Giunto a vite		Skruvled
	Flange joint		Joint à bride		Flanschverbindung		Junta de reborde		Giunto a flangia		Flänsled
	Eye joint		Joint à cosse		Gabelverbindung		Junta de ojo		Giunto ad occhiello		Ögleled
	Insertion joint		Joint par insertion		Steckverbindung		Junta de inserción		Giunto ad inserzione		Isättningsled
	Drill hole		Trou percé		Bohrloch		Barreno		Foro a mandrino		Borrhål
	Cooling fresh water piping		Tuyau d'eau douce de refroidissement		Frischwasserkühlleitung		Tubería de agua dulce de enfriamiento		Tubo acqua dolce di raffreddamento		Färskvattenrör för kylning
	Cooling sea water piping		Tuyau d'eau de mer de refroidissement		Salzwasserkühlleitung		Tubería de agua salada de enfriamiento		Tubo acqua di mare di raffreddamento		Havsvattenrör för kylning
	Lube oil piping		Tuyau d'huile de lubrification		Schmierölleitung		Tubería de aceite lubricante		Tubo dell'olio lubrificante		Smörjoljerör
	Fuel oil piping		Tuyau de combustible		Kraftstoffleitung		Tubería de combustible		Tubo del carburante		Bränslerör

The diagram shows in the case of KBW20 marine gear.

Il diagramma indica io caso dell'ingranaggio marino KBW20.

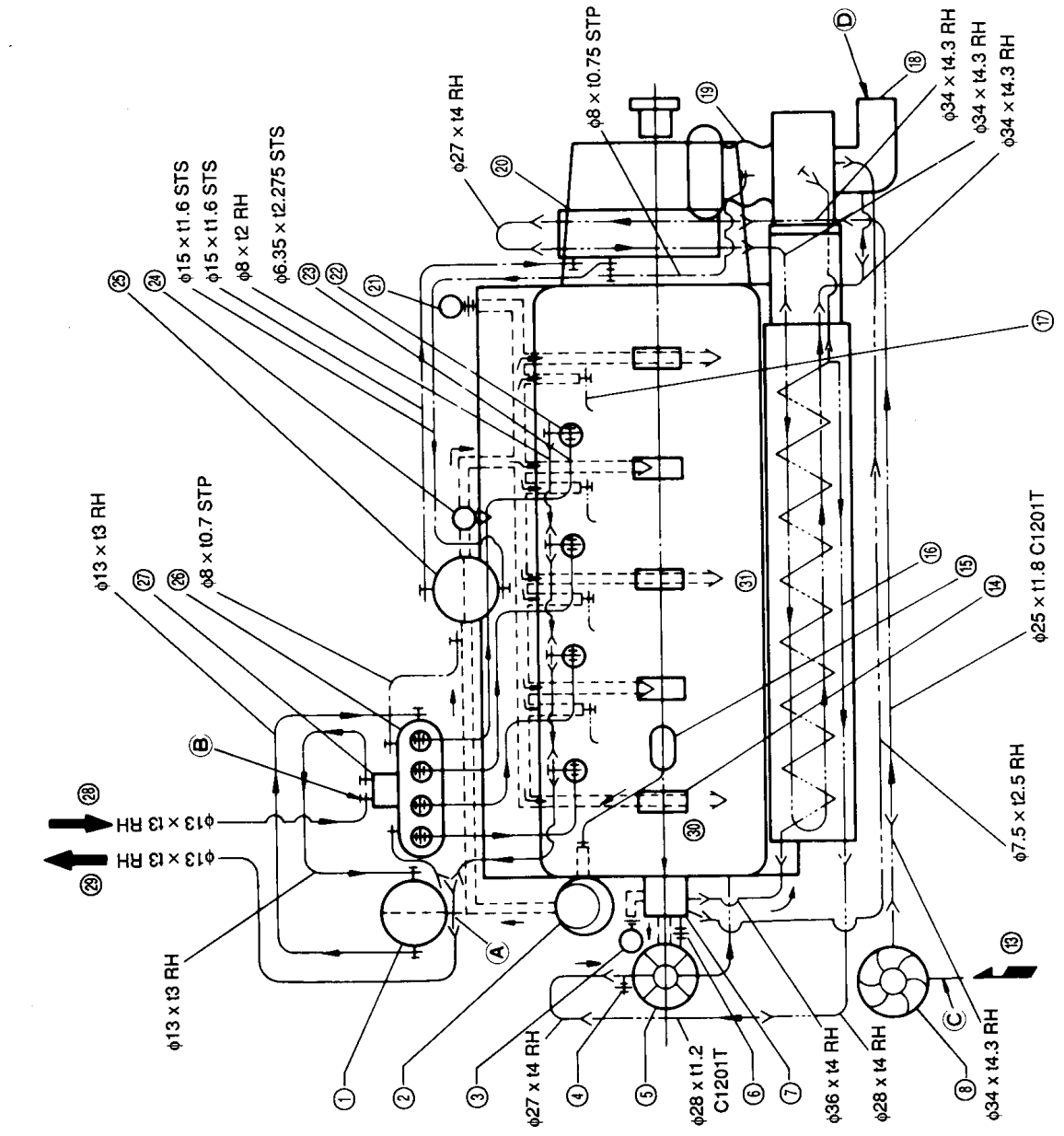
Der Plan zeight das Schiffsgetriebe KBW20.

El diagrama es para los casos de engranaje marino KBW20.

Il diagramma indica il caso dell'ingrannaggio marino KBW20.

Diagrammet visar kopplingen för KBW20.

11-2 4JH(2)-TE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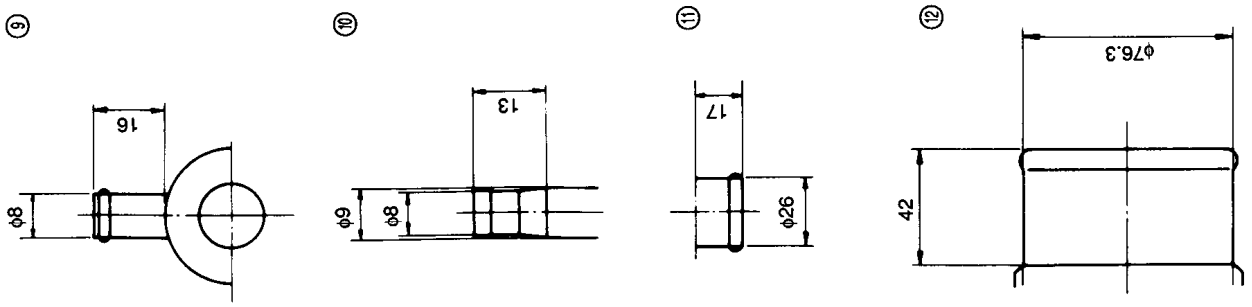
φ8 x t0.75 STP
φ34 x t4.3 RH
φ34 x t4.3 RH
φ34 x t4.3 RH
φ15 x t1.6 STS
φ15 x t1.6 STS
φ8 x t2 RH
φ6.35 x t2.275 STS
φ13 x t3 RH
φ8 x t0.7 STP
φ25 x t1.8 C1201T
φ7.5 x t2.5 RH
φ13 x 13 RH
φ13 x 13 RH
φ13 x t3 RH
φ27 x t4 RH
φ28 x t1.2 C1201T
φ36 x t4 RH
φ28 x t4 RH
φ34 x t4.3 RH


16
φ8
13
φ9
φ8
17
φ26
φ76.3
42

English

1 Fuel oil filter (Cartridge type)
2 Lub. oil pump
3 Fresh water temperature switch
4 Hot water connection inlet
5 Cooling water pump (Fresh water)
6 Hot water connection outlet
7 Thermostat
8 Cooling water pump (Sea water)
9 Detail of part (A)
10 Detail of part (B)
11 Detail of part (C)
12 Detail of part (D)
13 Sea water inlet
14 Main bearing
15 Lub. oil inlet filter
16 Fresh water cooler
17 Piston cooling oil jet
18 Mixing elbow
19 Tubocharger
20 Lub. oil cooler
21 Oil pressure switch
22 Fuel injection nozzle
23 Fuel high pressure pipe
24 Pressure control valve
25 Lub. oil filter (Cartridge type)
26 Fuel injection pump
27 Fuel feed pump
28 Fuel oil inlet
29 Fuel overflow
30 From cylinder head
31 To cam shaft
32 Air cooler
33 Lub. oil cooler for marine gear

Français

1 Filtre de combustible (Type á cartouche)
2 Pompe à huile de lubrification
3 Contacteur de température d'eau douce
4 Raccord d'admission d'eau chaude
5 Pompe à eau de refroidissement (eau douce)
6 Raccord de refoulement d'eau chaude
7 Thermostat
8 Pompe à eau de refroidissement (eau de mer)
9 Détail de (A)
10 Détail de (B)
11 Détail de (C)
12 Détail de (D)
13 Admission d'eau de mer
14 Palier de vilebrequin
15 Filtre d'admission d'huile de lubrification
16 Refrodisseur d'eau douce
17 Tubulure d'huile de refroidissement du piston
18 Coude de mélange
19 Turbocompresseur
20 Refroidisseur d'huile de lubrification
21 Contacteur de pression d'huile
22 Injecteur de combustible
23 Tuyau haute pression de combustible
24 Soupape régulatrice de pression
25 Filtre d'huile de lubrification (Type à cartouche)
26 Pompe d'injection de combustible
27 Pompe d'alimentation de combustible
28 Admission de combustible
29 Débordement de combustible
30 De la culasse
31 Vers l'arbre à cames
32 Refroidisseur d'air
33 Refroidisseur d'juile de lubrifica-tion pour boîte de vitesses marine

Deutsch

1 Kraftstoffilter (Einsatzfilter)
2 Schmierölpumpe
3 Frischwasser-Temperaturschalter
4 Warmwasserauslaß
5 Kühlwaserpumpe (Frischwasser)
6 Warmwasserauslaß
7 Thermostat
8 Kühlwaserpumpe (Salzwasser)
9 Detail (A)
10 Detail (B)
11 Detail (C)
12 Detail (D)
13 Salzwassereinlaß
14 Hauptlager
15 Schmieröleinlaßfilter
16 Frischwasserkühler
17 Kühlöleinspritzung für Kolben
18 Mischkrümmer
19 Turbolader
20 Schmierölkühler
21 Öldruckschalter
22 Einspritzdüse
23 Kraftstoff-Druckleitung
24 Druckregelventil
25 Schmierölfilter (Einsatzfilter)
26 Einspritzpumpe
27 Kraftstoffpumpe
28 Kraftstoffeinlaß
29 Kraftstoffüberlauf
30 Vom Zylinderkopf
31 Zur Nockenwelle
32 Luftkühler
33 Schmierölkühler für Schiffsgetriebe

Español

1 Filtro del combustible (Tipo cartucho)
2 Bomba de aceite de lubrificación
3 Interruptor de la temperatura de agua dulce
4 Entrada de la conexión de agua caliente
5 Bomba de agua de enfriamiento (agua dulce)
6 Salida de la conexión de agua caliente
7 Termostato
8 Bomba del agua de enfriamiento (agua salada)
9 Detalle de la parte (A)
10 Detalle de la parte (B)
11 Detalle de la parte (C)
12 Detalle de la parte (D)
13 Entrada de agua salada
14 Cojinete principal
15 Filtro de entrada del aceite de lubricación
16 Enfriador de agua dulce
17 Esprea de aceite enfriador del pistón
18 Codo mezclador
19 Turbocargador
20 Enfriador del aceite de lubricación
21 Interruptor de la presión del aceite
22 Tobera de inyección de combustible
23 Tubo de alta presión de combustible
24 Válvula de control de la presión
25 Filtro del combustible (Tipo cartucho)
26 Bomba de inyección de combustible
27 Bomba de alimentación de combustible
28 Entrada de combustible
29 Derrame de combustible
30 Desde la cabeza del cilindro-V
31 Al cojinete del árbol
32 Enfriador de aire
33 Enfriador del aceite lubricante desde el engranaje 8 'marino!'

Italiano

1 Filtro del carburante (tipo a cartuccia)
2 Pompa dell'olio lubricante
3 Interruttore della temperatura dell'acqua dolce
4 Bocca di collegamento dell'acqua calda
5 Pompa dell'acqua di raffreddamento (acqua dolce)
6 Uscita del collegamento dell'acqua calda
7 Termostato
8 Pompa dell'acqua di raffreddamento (acqua di mare)
9 Dettaglio della parte (A)
10 Dettaglio della parte (B)
11 Dettaglio della parte (C)
12 Dettaglio della parte (D)
13 Presa dell'acqua di mare
14 Cuscinetto principale
15 Filtro d'ingresso dell'olio lubrificante
16 Refrigeratore dell'acqua dolce
17 Getto dell'olio di raffreddamento del pistone
18 Gomito di miscelaggio
19 Turbocompressore
20 Refrigeratore dell'olio lubrificante
21 Interruttore della pressione dell'olio
22 Ugello di iniezione del carburante
23 Tubo del carburante ad alta pressione
24 Valvola di controllo della pressione
25 Filtro dell'olio lubrificante (tipo a cartuccia)
26 Pompa di iniezione del carburante
27 Pompa di alimentazione del carburante
28 Ingresso del carburante
29 Scarico del troppo pieno del carburante
30 Dalla testata del cilindro a V
31 All'albero a camme
32 Refrigeratore dell'aria
33 Refrigeratore dell'olio lubtificante per l'ingranaggio marino

Svensk

1 Bränslefilter (Patrontyp)
2 Smörjoljepump
3 Vattentemperaturomkopplare
4 Varmvattenintag
5 Kylvattenpump
6 Varmvattenuttag
7 Termostat
8 Kylvattenpump (Havsvatten)
9 Detalj av del (A)
10 Detalj av del (B)
11 Detalj av del (C)
12 Detalj av del (D)
13 Havsvattenintag
14 Huvudlager
15 Smörjoljeintagets filter
16 Färsksvattenkylare
17 Kolvens kyloljemunstycke
18 Blandningskrör
19 Turboaggregat
20 Smörjoljekylare
21 Oljetrycksomkopplare
22 Bränsleinsprutningsmunstycke
23 Bränslets högtrycksrör
24 Tryckkontrollventil
25 Smörjoljefilter
26 Bränsleinsprutningspump
27 Bränslematarpump
28 Bränsleintag
29 Överflödsbränsle
30 Från topplocket
31 Till kamaxeln
32 Luftkylare
33 Smörjoljekylare för kopplingen

Marks of piping:

MARKS	NAME
RH	Rubber hose
STS	Carbon steel pipe
C1201T	Copper pipe
	Screw joint
	Flange joint
	Eye joint
	Insertion joint
	Drill hole
	Cooling fresh water piping
	Cooling sea water piping
	Lub. oil piping
	Fuel oil piping

Marquage des tuyauteries:

MARQUAGE	DESIGNATION
RH	Flexible en caoutchouc
STS	Tuyau en acier au carbone
C1201T	Tuyau en cuivre
	Joint à vis
	Joint à bride
	Joint à cosse
	Joint par insertion
	Trou percé
	Tuyau d'eau douce de refroidissement
	Tuyau d'eau de mer de refroidissement
	Tuyau d'huile de lubrification
	Tuyau de combustible

Kennzeichnungsrohrietung:

Kennzeichnung	Bezeichnung
RH	Gummischlauch
STS	Stahlrohr
C1201T	Kupferrohr
	Schraubverbindung
	Flanschverbindung
	Gabelverbindung
	Steckverbindung
	Bohrloch
	Frischwasserkühlleitung
	Salzwasserkühlleitung
	Schmierölleitung
	Kraftstoffleitung

Señalización de la tubería:

SEÑALIZACION	NOMBRE
RH	Manguera de corcho
STS	Tubo de acero de carbón
C1201T	Tubo de cobre
	Junta de atornillado
	Junta de reborde
	Junta de ojo
	Junta de inserción
	Barreno
	Tubería del agua dulce de enfriamiento
	Tubería de agua salada de enfriamiento
	Tubería de aceite de lubricación
	Tubería de combustible

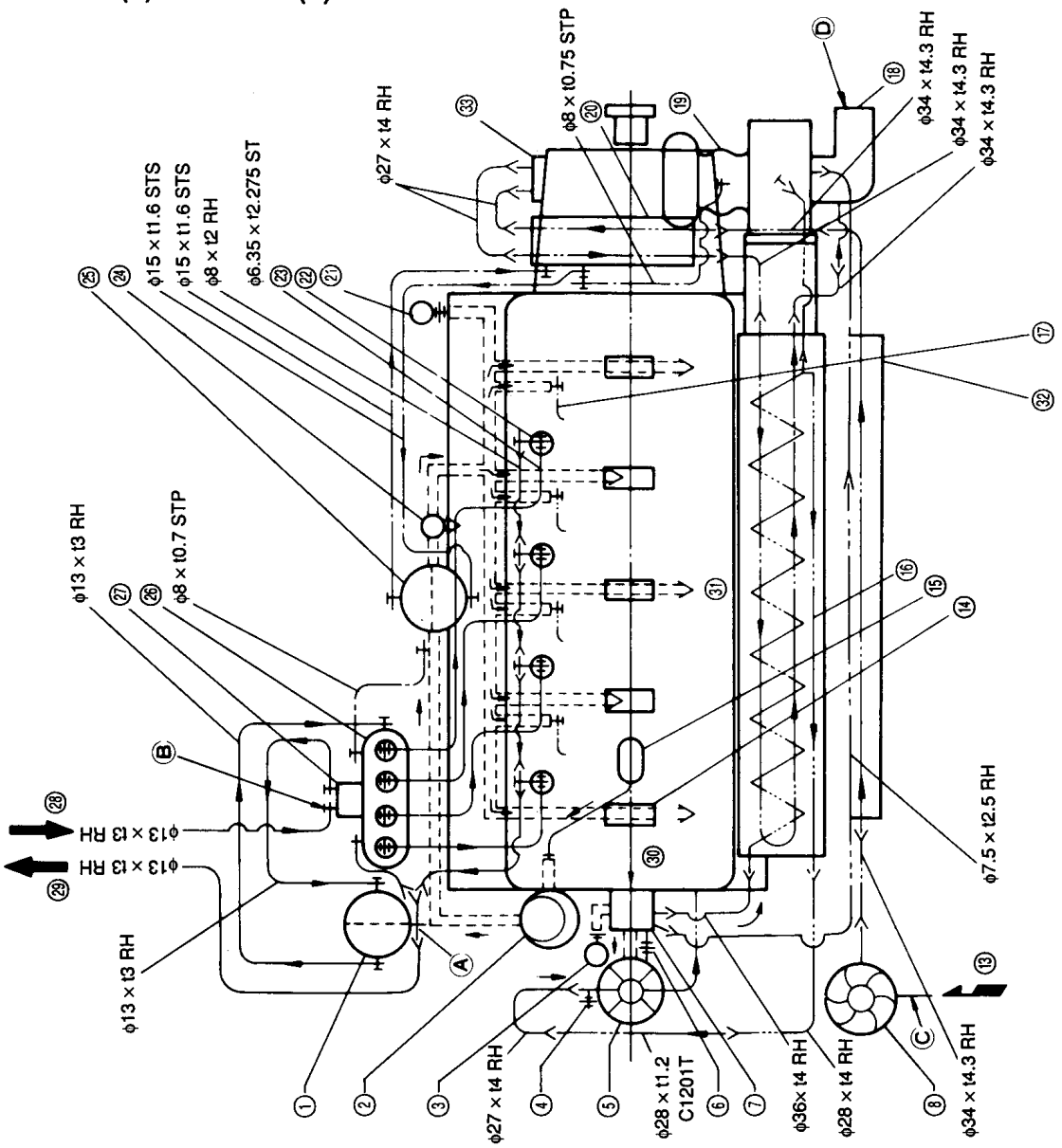
Contrassegni dei tubi:

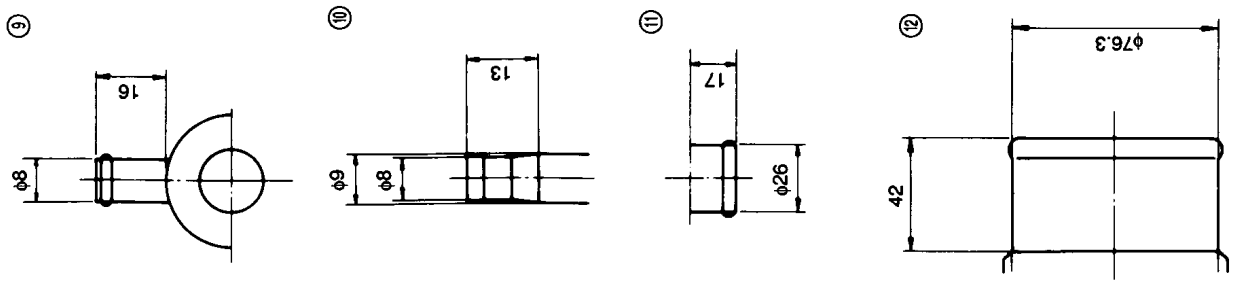
CONTRASSEGNI	NOME
RH	Flessibile di gomma
STS	Tubo di acciaio al carbone
C1201T	Tubo di rame
	Giunto a vite
	Giunto a flangia
	Giunto ad occhiello
	Giunto ad inserzione
	Foro a mandrino
	Tubo acqua dolce di raffreddamento
	Tubo acqua di mare di raffreddamento
	Tubo dell'olio lubrificante
	Tubo del carburante

Marken av kylvattenlednings:

MÄRKEN	NAMN
RH	Gummislang
STS	Kolstålrör
C1201T	Kopparrör
	Skruvled
	Fläns led
	Ögleled
	Isättningsled
	Borrhål
	Färskvattenrör för kylning
	Havsvattenrör för kylning
	Smörjoljerör
	Bränslerör

11-3 4JH(2)-HTE. 4JH(2)-DTE





12 Wiring diagrams
12-1 For B2-type instrument panel

English

1 Battery over 12V—120AH
2 Battery switch
3 Starting motor
4 Alternator
5 Water temp. switch
6 L.O. Pressure switch
7 Tachometer sensor
8 Extension wireharness
9 Tachometer
10 Buzzer
11 L.O. Pressure lamp
12 Water temp. lamp
13 Charge lamp
14 Key switch
15 STOP button
16 Illumination switch
17 Air heater
18 Relay
19 Engine STOP
20 Option
21 Fuel oil lamp

Color coding	
R	Red
W	White
B	Black
L	Blue
Y	Yellow
O	Orange
G	Green

Note: (A), (B) wirehamess for additional, 80A alternator (optional) use.

12 Schémas de câblage
12-1 Tableau de bord de type B2

Français

1 Batterie plus de 12V—120AH
2 Contacteur de batterie
3 Moteur de démarrage
4 Alternateur
5 Contacteur de température d'eau
6 Contacteur de pression d'huile de lubrication
7 Capteur de compte-tours
8 Faisceau de fils prolongateau
9 Compte-tours
10 Ronfleur
11 Lampe de pression d'huile de lubrification
12 Lampe de température d'eau
13 Lampe de charge
14 Contacteur de démarrage
15 Bouton d'arrêt
16 Contacteur (Contrôle des lampes/éclairage)
17 Réchauffeur d'air
18 Relais
19 Arrêt du moteur
20 Option
21 Lampe de carburant

Code des couleurs	
R	Rouge
W	Blanc
B	Noir
L	Bleu
Y	Jaune
O	Orange
G	Vert

Note: (A) (B) Faisceau de fils supplémentaires, utilisation d'un alternateur 80 A (en option)

12 Schaltpläne
12-1 Für Instrumententafel Typ B2

Deutsch

1 Batterie mehr als 12V, 120AH
2 Batterieschalter
3 Startermotor
4 Drehstromlichtmaschine
5 Wassertemperaturschalter
6 Schmieröldruckschalter
7 Tachometersensor
8 Verlängerungskabelbaum
9 Tachometer
10 Summer
11 Schmieröldrucklampe
12 Wassertemperaturlampe
13 Ladekontrollampe
14 Schlüsselschalter
15 Stoppknopf
16 Beleuchtungsschalter
17 Luftvorwärmer
18 Relais
19 Motorstopp
20 Option
21 Brennstofflampe

Farbcode	
R	Rot
W	Weiß
B	Schwarz
L	Blau
Y	Gelb
O	Orange
G	Grün

Zur Beachtung: (A) (B) bezeichnen Kabelbäume bei Verwendung einer zusätzlichen 80-A-Lichtmaschine (Option).

12 Diagramas de cableado
12-1 Panel de mando tipo B2

Español

1 Descargue de batería
2 Interruptor de la batería
3 Motor en arranque
4 Alternador
5 Interruptor de la temperatura del agua
6 Interruptor de la presión del aceite de lubricación
7 Sensor del tacómetro
8 Cableado de extensión
9 Tacómetro
10 Zumbador
11 Lámpara indicadora de la presión del aceite de lubricación
12 Lámpara indicadora de la temperatura del agua.
13 Lámpara indicadora de la carga
14 Interruptor de la llave
15 Botón de "STOP"
16 Conmutador de iluminación
17 Cámara de calefacción
18 Relé
19 Paro del motor
20 Opcional
21 Lámpara indicadora del combustible

Código de Colores	
R	Rojo
W	Blanco
B	Negro
L	Azul
Y	Amarillo
O	Naranja
G	Verde

Nota: Cableado preformado (A) (B) para uso adicional X'del alternador 80A (opcional).

12 Diagramma elettrico
12-1 Pannello degli strumenti di tipo B-2

Italiano

1 Batteria oltre 12V—120AH
2 Interruttore della batteria
3 Motorino di avviamento
4 Alternatore
5 Interruttore della temperatura dell'acqua
6 Interruttore della pressione dell'olio lubrificante
7 Sensore del contagiri
8 Estensione dei cavi conduttori
9 Contagiri
10 Cicalino
11 Spia della pressione dell'olio lubrificante
12 Spia della temperatura dell'acqua
13 Spia della ricarica
14 Interruttore a chiave
15 Tasto di arresto (STOP)
16 Interruttore di illuminazione
17 Riscaldatore dell'aria
18 Relais
19 Arresto del motore
20 Opzione
21 Spia del carburante

Codice colori	
R	Rosso
W	Bianco
B	Nero
L	Blu
Y	Giallo
O	Arancione
G	Verde

Nota: I fasci conduttori (A) e (B) sono per l'uso addizionale con un alternatore (opzionale) da 80A.

12. Kabelnätsdiagram
12-1 För instrumentbräda av typ B2

Svensk

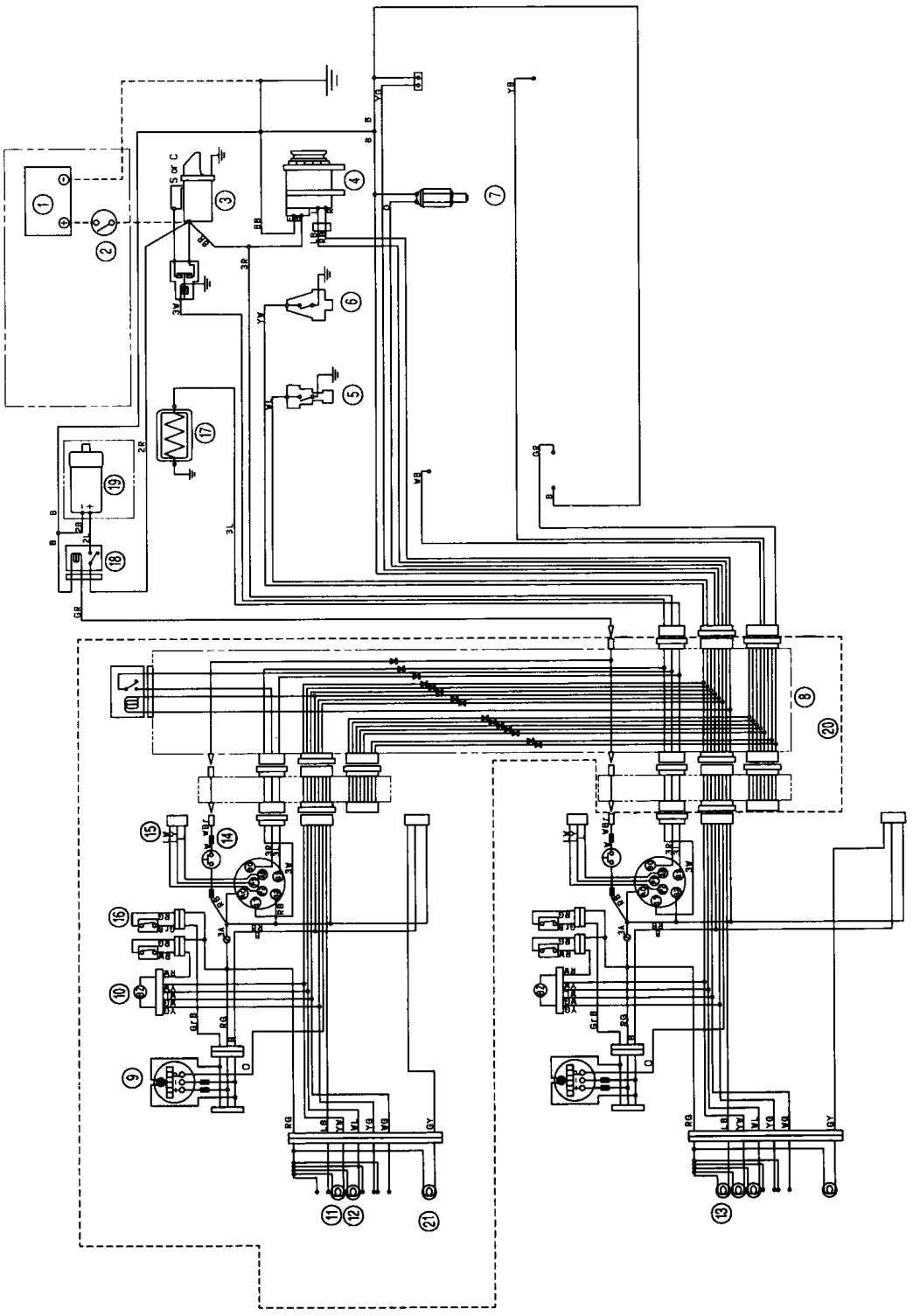
1 Batteri över 12V—120 amperetimmar
2 Batteriomkopplare
3 Startmotor
4 Generator
5 Vattentemperaturomkopplare
6 Smörjoljetryckets omkopplare
7 Takometergivare
8 Förlängningskabelnät
9 Takometer
10 Summer
11 Smörjoljetryckslampa
12 Vattentemperaturlampa
13 Laddningslampa
14 Nyckelomkopplare
15 Stoppknapp
16 Belysningsomkopplare
17 Luftvärmare
18 Relä
19 Stoppknapp för motorn
20 Tillval
21 Brännoljelampa

Färgkod	
R	Röd
W	Vit
B	Svart
L	Blå
Y	Gul
O	Orangefärgad
G	Grön

OBS: Kabelnär (A) (B) för övrig användning med 80A generator (tillval).

12. Wiring diagrams

12-1 For B2-type instrument panel



12-2 C-type instrument panel

English

1 Lube oil pressure gauge
2 Tachometer 12V 3.4W
3 Cooling water thermometer 12V 3.4W
4 Integral hour meter
5 Buzzer switch
6 Light switch
7 Starter switch
8 FUSE (3A)
9 Stop switch
10 C.W.temperature
11 Engine L.O. pressure
12 Clutch L.O. pressure
13 Charging
14 3P Coupler
15 Engine stop (option)
16 Solenoid
17 Relay
18 L.O. pressure gauge sensor
19 C.W. temp. gauge sensor
20 Tachometer sensor
21 C.W. temp. switch
22 L.O.pressure switch
23 Earth bolt (Flywheel housing)
24 Altenator
25 Starting motor
26 Battery switch
27 Battery
28 Air heater (option)
29 Extension wireharness
30 6P connector M
31 4P connector M
32 4P connector F
33 To alarm buzzer

Color coding	
R	Red
W	White
B	Black
L	Blue
Y	Yellow
O	Orange
G	Green

Note: (A)(B) wireharness for additional, 80A alternator (optional) use.

12-2 Tableau de bord de type C

Français

1 Jauge de pression d'huile de lubrification
2 Compte-tours
3 Thermomètre d'eau de refroidissement
4 Compteur horaire intégré
5 Contacteur de ronfleur
6 Contacteur d'éclairage
7 Contacteur de démarrage
8 Fusible (3 A)
9 Contacteur d'arrêt du moteur
10 Température d'eau de refroidissement
11 Pression d'huile de lubrification moteur
12 Pression d'huile de boîte de vitesses
13 Charge
14 *Coupleur à 3 broches (*N'est pas utilisé pour la série JH)
15 Arrêt du moteur (Option)
16 Solénoïde
17 Relais
18 Capteur de jauge de pression d'huile de lubrification
19 Capteur de jauge de température d'eau de refroidissement
20 Capteur de compte-tours
21 Contacteur de température d'eau de refroidissement
22 Contacteur de pression d'huile de lubrification
23 Boulon de masse (carter de volant moteur)
24 Alternateur
25 Moteur de démarreur
26 Contacteur de batterie
27 Batterie
28 Réchauffeur d'air (Option)
29 Faisceau de fils prolongateur
30 Connecteur M à 6 broches
31 Connecteur M à 4 broches
32 Connecteur F à 4 broches
33 Vers le ronfleur d'alarme

Code des couleurs	
R	Rouge
W	Blanc
B	Noir
L	Bleu
Y	Jaune
O	Orange
G	Vert

Note: (A)(B) Faisceau de fils supplémentaires, utilisation d'un alternateur 80 A (en option).

12-2 Fur instrumententafel Typ C

Deutsch

1 Schmierölmanometer
2 Tachometer
3 Kühlwasserthermometer
4 Betriebsstundenzähler
5 Summerschalter
6 Lichtschalter
7 Startschalter
8 Sicherung (3 A)
9 Motorstoppschalter
10 Kühlwassertemperatur
11 Motorschmieröldruck
12 Getriebekastenöldruck
13 Laden
14 *3polige Kupplung (bei Serie JH nicht vorhanden)
15 Motorstopp (Option)
16 Elektromagnet
17 Relais
18 Schmieröldrucksensor
19 Kühlwassertemperatursensor
20 Tachometersensor
21 Kühlwassertemperaturschalter
22 Schmieröldruckschalter
23 Erdungsschraube (Schwungradgehäuse)
24 Drehstromlichtmaschine
25 Startermotor
26 Batterieschalter
27 Batterie
28 Luftvorwärmer (Option)
29 Verlängerungskabelbaum
30 6poliger Stecker M
31 4poliger Stecker M
32 4poliger Stecker F
33 Zum Alarmsummer

Farbcode	
R	Rot
W	Weiß
B	Schwarz
L	Blau
Y	Gelb
O	Orange
G	Grün

Zur Beachtung: (A)(B) bezeichnen Kabelbäume bei Verwendung einer zusätzlichen 80-A-Lichtmaschine (Option)

12-2 Panel de mando tipo C

Español

1 Indicador de la presión del aceite de lubrificación
2 Tacómetro
3 Temperatura del agua de enfriamiento
4 Medidor de horas integral
5 Interruptor del zumbador
6 Interruptor de la lámpara
7 Interruptor de arranque
8 Fusible
9 Interruptor del paro del motor
10 Temperatura del agua de enfriamiento
11 Presión del aceite de lubricación del motor
12 Caja de engranaje de la presión de aceite
13 Cargador
14 Acoplador (No se usa para la serie JH)
15 Paro del motor
16 Solenoide
17 Relé
18 Sensor del indicador de la presión del aceite de lubricación
19 Sensor del indicator de la temperatura del agua de enfriamiento
20 Sensor del tacómetro
21 Interruptor de la temperatura del agua de enfriamiento
22 Interruptor de presión de aceite de lubricación
23 Perno de tierra (Caja del volante)
24 Alternador
25 Motor de arranque
26 Interruptor de la batería
27 Batería
28 Cámara de calefacción (Opcional)
29 Cableado de extensión
30 6P Conector M
31 4P Conector M
32 4P Conector F
33 Al zumbador de alarma

Código de Colores	
R	Rojo
W	Blanco
B	Negro
L	Azul
Y	Amarillo
O	Naranja
G	Verde

Nota: Cableado preformado (A)(B) para uso X'X adicional del alternador 80A (opcional).!

12-2 Pannello degli strumenti di tipo C

Italiano

1 Indicatore della pressione dell'olio lubrificante
2 Contagiri, 12 V, 3,4 W
3 Termometro dell'acqua di raffreddamento,12 V, 3,4 W
4 Indicatore integrale dell'ora
5 Interruttore del cicalino
6 Interruttore di illuminazione
7 Interruttore di avviamento
8 Fusibile (3A)
9 Interruttore di arresto del motore
10 Temperatura dell'acqua di raffreddamento
11 Pressione dell'olio lubrificante del motore
12 Pressione olio scatola del cambio
13 Carica
14 Connettore a 3 poli* (*Non usato per la serie JH)
15 Arresto del motore (opzione)
16 Solenoide
17 Relais
18 Sensore dell'indicatore di pressione dell'olio lubrificante
19 Sensore dell'indicatore di temperatura dell'acqua di raffreddamento
20 Sensore del contagiri
21 Interruttore della temperatura dell'acqua di raffreddamento
22 Interruttore della pressione dell'olio lubrificante
23 Bullone di messa a terra (alloggiamento del volano)
24 Alternatore
25 Motorino di avviamento
26 Interruttore della batteria
27 Batteria
28 Riscaldatore dell'aria (opzionale)
29 Estensione del fascio conduttori
30 Connettore M a 6 poli
31 Connettore M a 4 poli
32 Connettore F a 4 poli
33 Al cicalino di allarme

Codice colori	
R	Rosso
W	Bianco
B	Nero
L	Blu
Y	Giallo
O	Arancione
G	Verde

Nota: I fasci conduttori (A) e (B) sono per l'uso addizionale con un alternatore (opzionale) da 80A.

12-2 Instrumentbräde av typ C

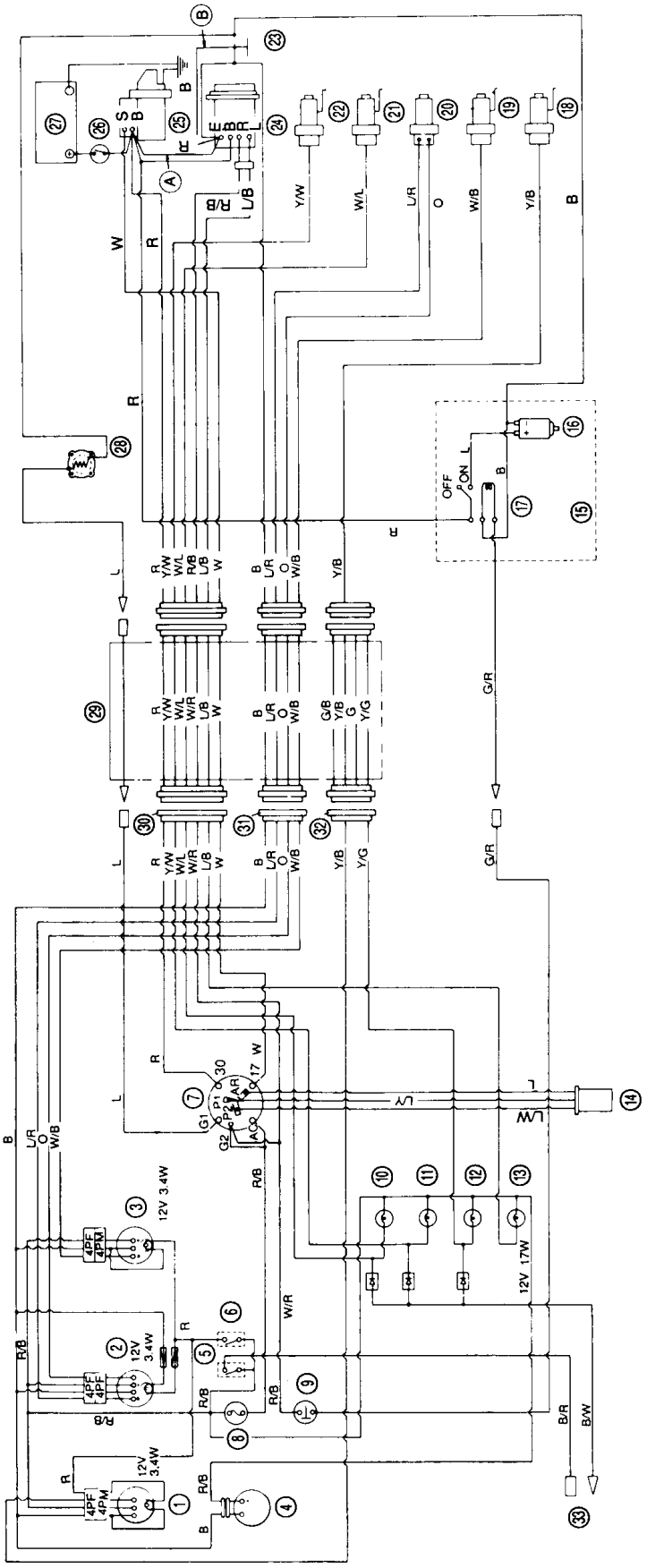
Svensk

1 Mätare för smörjoljetryck
2 Takometer
3 Kylvattentermometer
4 Timmätare
5 Summeromkopplare
6 Belysningsomkopplare
7 Startomkopplare
8 Säkring (3A)
9 Motorstoppomkopplare
10 Kylvattentemperatur
11 Motorns smörjoljetryck
12 Växellådans oljetryck
13 Laddning
14 *3P koppling (*används inte i serien JH)
15 Motorstopp (tillval)
16 Solenoid
17 Relä
18 Givare för smörjoljetrycksmätaren
19 Givare för kylvattentemperaturmätaren
20 Takometergivare
21 Omkopplare för kylvattentemperatur
22 Omkopplare för smörjoljetryck
23 Jordningsbult (Svänghjulshuset)
24 Generator
25 Startmotor
26 Batteriomkopplare
27 Batteri
28 Luftvärmare (tillval)
29 Förlängningskabelnät
30 6P kontakt M
31 4P kontakt M
32 4P kontakt F
33 Till varningssummer

Färgkod	
R	Röd
W	Vit
B	Svart
L	Blå
Y	Gul
O	Orangefärgad
G	Grön

OBS: Kabelnär (A) (B) för övrig användning med 80A generator (tillval).

12-2 C-type instrument panel



12-3 D-type instrument panel

English

1 Lube oil pressure gauge
2 Cooling water thermometer
3 Tachometer light bulb
4 Integral hour meter
5 Buzzer stop switch
6 Light switch
7 Starter switch
8 Fuse (3A)
9 Eng. stop switch
10 Engine L.O. pressure lamp
11 Clutch L.O. pressure lamp
12 C.W. temperature lamp
13 Charge lamp 12V 1.7W
14 3P Coupler
15 Engine stop (option)
16 Solenoid
17 Relay
18 L.O. pressure gauge sensor
19 C.W. temp. gauge sensor
20 Tachometer sensor
21 C.W. temp. switch
22 L.O. pressure switch
23 Earth bolt (Flywheel housing)
24 Alternator
25 Starting motor
26 Battery switch
27 Battery
28 Air heater (option)
29 Extension wireharness
30 6P connector M
31 4P connector M
32 4P connector F
33 To alarm buzzer

Color coding	
R	Red
W	White
B	Black
L	Blue
Y	Yellow
O	Orange
G	Green

Note: (A), (B) wireharness for additional, 80A alternator (optional)use.

12-3 Tableau de bord de type D

Français

1 Jauge de pression d'huile de lubrification
2 Thermomètre d'eau de refroidissement
3 Lampe d'éclairage de compte-tours
4 Compteur horaire intégré
5 Contacteur d'arrêt de ronfleur
6 Contacteur d'éclairage
7 Contacteur de démarrage
8 Fusible (3A)
9 Contacteur d'arrêt du moteur
10 Lampe de pression d'huile de lubrification moteur
11 Pression d'huile de boîte de vitesses
12 Lampe de température d'eau de refroidissement
13 Lampe de charge
14 *Coupleur à 3 broches (*N'est pas utilisé pour la série JH)
15 Arrêt du moteur (Option)
16 Solénoïde
17 Relais
18 Capteur de jauge de pression d'huile de lubrification
19 Capteur de jauge de température d'eau de refroidissement
20 Capteur de compte-tours
21 Contacteur de température d'eau de refroidissement
22 Contacteur de pression d'huile de lubrification
23 Boulon de masse (carter de volant moteur)
24 Alternateur
25 Moteur de démarreur
26 Contacteur de batterie
27 Batterie
28 Réchauffeur d'air (Option)
29 Faisceau de fils prolongateur
30 Connecteur M à 6 broches
31 Connecteur M à 4 broches
32 Connecteur F à 4 broches
33 Vers le ronfleur d'alarme

Code des couleurs	
R	Rouge
W	Blanc
B	Noir
L	Bleu
Y	Jaune
Or	Orange
G	Vert

Note: (A) (B) Faisceau de fils supplémentaires, utilisation d'un alternateur 80A (en option).

12-3 Für Instrumententafel Typ D

Deutsch

1 Schmieröldruckmanometer
2 Kühlwassertemperaturmanometer
3 Tachometerbeleuchtung
4 Betriebsstundenzähler
5 Summerstoppschalter
6 Lichtschalter
7 Startschalter
8 Sicherung (3A)
9 Motorstoppschalter
10 Motorschmieröldrucklampe
11 Getriebekastenöldruck
12 Kühlwassertemperaturlampe
13 Ladekontrollampe
14 *3 poliger Kuppler (*bei Serie JH nicht vorhanden)
15 Motorstopp (Option)
16 Elektromagnet
17 Relais
18 Schmieröldrucksensor
19 Kühlwassertemperatursensor
20 Tachometersensor
21 Kühlwassertemperaturschalter
22 Schmieröldruckschalter
23 Erdungsschraube (Schwungradgehäuse)
24 Drehstromlichtmaschine
25 Startermotor
26 Batterieschalter
27 Batterie
28 Luftvorwärmer (Option)
29 Verlängerungskabelbaum
30 6poliger Stecker M
31 4poliger Stecker M
32 4poliger Stecker F
33 Zum Alarmsummer

Farbcode	
R	Rot
W	Weiß
B	Schwarz
L	Blau
Y	Gelb
O	Orange
G	Grün

Zur Beachtung: (A) (B) bezeichnen Kabelbäume bei Verwendung einer zusätzlichen 80-A-Lichtmaschine (Option).

12-3 Panel de mando tipo D

Español

1 Indicador de presión del aceite de lubricación
2 Tacómetro del agua de enfriamiento
3 Bulbo de luz del tacómetro
4 Medidor de horas integral
5 Interruptor del apagado del zumbador
6 Interruptor de lámparas
7 Interruptor de arranque
8 Fusible
9 Interruptor del paro del motor
10 Lámpara indicadora de la presión del aceite de lubricación del motor
11 Caja de engranaje de la presión de aceite
12 Lámpara indicadora de la temperatura del agua de enfriamiento
13 Lámpara indicadora de la carga
14 Acoplador (No se usa para la serie JH)
15 Paro del motor
16 Solenoide
17 Relé
18 Sensor del indicador de la presión del aceite de lubricación
19 Sensor del indicador de la temperatura del agua de enfriamiento
20 Sensor del tacómetro
21 Interruptor de la temperatura del agua de enfriamiento
22 Interruptor de la presión de aceite del lubricación
23 Perno de tierra (Caja del volante)
24 Alternador
25 Motor de arranque
26 Interruptor de la batería
27 Batería
28 Cámara de calefacción (Opcional)
29 Cableado de extensión
30 6P Conector M
31 4P Conector M
32 4P Conector F
33 Al zumbador de alarma

Código de Colores	
R	Rojo
W	Blanco
B	Negro
L	Azul
Y	Amarillo
O	Naranja
G	Verde

Nota: Cableado preformado (A) (B) para uso X'X adicional del alternador 80A (opcional).!

12-3 Pannello degli strumenti di tipo D

Italiano

1 Misuratore della pressione olio lubrificante
2 Termometro dell'acqua di raffreddamento
3 Bulbo della luce del contagiri (12 V, 3,4 W)
4 Misuratore ore ad integrazione
5 Interruttore di arresto del cicalino
6 Interruttore dell'illuminazione
7 Interruttore di avviamento
8 Fusibile (3A)
9 Interruttore di arresto del motore
10 Spia della pressione dell'olio di lubrificazione del motore
11 Pressione olio scatola del cambio
12 Spia temperatura acqua di raffreddamento
13 Spia della ricarica (12 V, 1,7 W)
14 Connettore a 3 poli* (*Non usato per la serie JH)
15 Arresto del motore (opzione)
16 Solenoide
17 Relais
18 Sensore dell'indicatore di pressione dell'olio lubrificante
19 Sensore dell'indicatore di temperatura dell'acqua di raffreddamento
20 Sensore del contagiri
21 Interruttore della temperatura dell'acqua di raffreddamento
22 Interruttore della pressione dell'olio lubrificante
23 Bullone di messa a terra (alloggiamento del volano)
24 Alternatore
25 Motorino di avviamento
26 Interruttore della batteria
27 Batteria
28 Riscaldatore dell'aria (opzionale)
29 Estensione del fascio condutton
30 Connettore M a 6 poli
31 Connettore M a 4 poli
32 Connettore F a 4 poli
33 Al cicalino di allarme

Codice colori	
R	Rosso
W	Bianco
B	Nero
L	Blu
Y	Giallo
Or	Arancione
G	Verde

Nota: I fasci condutton (A) e (B) sono per l'uso addizionale con un alternatore (opzionale) da 80A.

12-3 Instrumentbräde av typ D

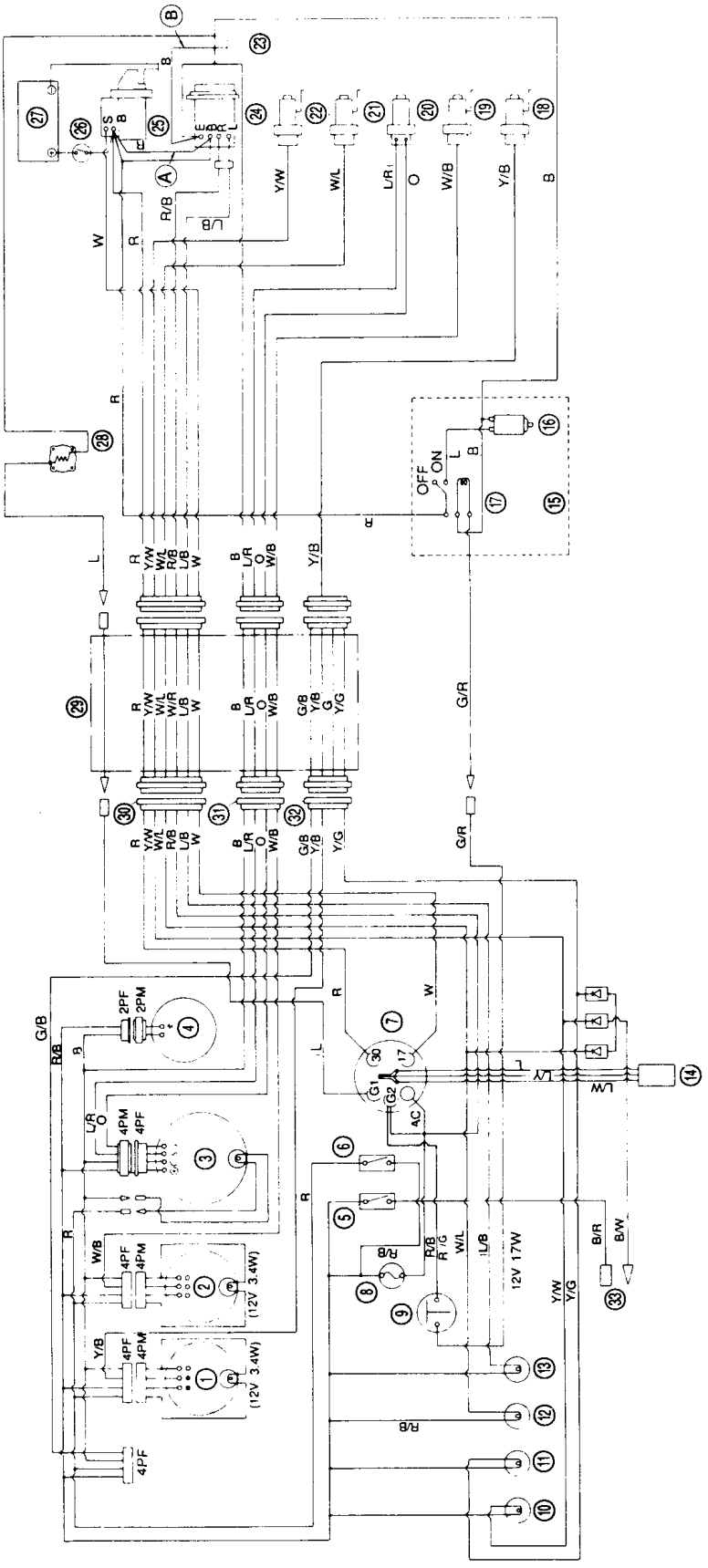
Svensk

1 Mätare för smörjoljetryck
2 Kylvattentermometer
3 Glödlampa för takometer
4 Timmätare
5 Summerns stoppomkopplare
6 Belysningsomkopplare
7 Startomkopplare
8 Säkring
9 Motorstoppomkopplare
10 Lampa för motorns smörjoljetryck
11 Växellådans oljetryck
12 Lampa för kylvattentemperatur
13 Laddningslampa
14 *3P koppling (*används inte i serien JH)
15 Motorstopp (tillval)
16 Solenoid
17 Relä
18 Givare för smörjoljetrycksmätaren
19 Givare för kylvattentemperaturmätaren
20 Takometergivare
21 Omkopplare för kylvattentemperatur
22 Omkopplare för smörjoljetryck
23 Jordningsbult (Svänghjulshuset)
24 Generator
25 Startmotor
26 Batteriomkopplare
27 Batteri
28 Luftvärmare (tillval)
29 Förlängningskabelnät
30 6P kontakt M
31 4P kontakt M
32 4P kontakt F
33 Till varningssummer

Färgkod	
R	Röd
W	Vit
B	Svart
L	Blå
Y	Gul
Or	Orangefärgad
G	Grön

OBS: Kabelnät (A) (B) för övrig användning med 80A generator (tillval).

12-3 D-type instrument panel



12-4 E-type instrument panel

English

1 Detail of coupler (viewed from A-A)
2 Buzzer tilt switch
3 Illumination switch
4 Illumination lamp
5 LCD drive circuit
6 Hour meter
7 Alarm
8 Charge
9 Fuse (3A)
10 Starter switch
11 Instrument panel (No. 1 station)
12 Buzzer
13 Sea water switch
14 Engine stop (option)
15 Solenoid
16 Relay
17 Tacho sensor
18 C.W. temp. sender
19 Eng. oil pressure sender
20 C.W. temp. switch
21 Eng. oil pressure switch
22 Alternator
23 Earth bolt
24 Starter
25 Battery switch
26 Battery 12 V-120AH
27 Air heater (option)
28 Extension wireharness
29 When extension wireharness is 6m or longer
30 Starter relay
31 Starter

Color coding	
R	Red
W	White
B	Black
L	Blue
Y	Yellow
O	Orange
G	Green

Note: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (cross sectional area)

12-4 Tableau de bord de type E Série 4JH2 uniquement

Français

1 Détail du coupleur (Vue A-A)
2 Contacteur d'arrêt de ronfleur
3 Contacteur d'éclairage
4 Lampe d'éclairage
5 Circuit d'entraînement LCD
6 Compteur horaire
7 ALARME
8 CHARGE
9 Fusible
10 Contacteur de démarrage
11 Tableau de bord (station No. 1)
12 Ronfleur
13 Contacteur d'eau de mer
14 Arrêt du moteur (Option)
15 Solénoïde
16 Relais
17 Capteur de compte-tours
18 Emetteur de température d'eau de refroidissement
19 Emetteur de pression d'huile moteur
20 Contacteur de température d'eau de refroidissement
21 Contacteur de pression d'huile moteur
22 Alternateur
23 Boulon de masse
24 Démarreur
25 Contacteur de batterie
26 Batterie
27 Réchauffeur d'air (Option)
28 Code prolongement
29 Lorsque le code prolongement est 6m ou plus
30 Relais de démarreur
31 Démarreur

Code des couleurs	
R	Rouge
W	Blanc
Bk	Noir
L	Bleu
Y	Jaune
Or	Orange
G	Vert

Note: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (surface de la section)

12-4 Für Instrumententafel Typ E Nur Serie 4JH2

Deutsch

1 Detail-Kupplung (Ansicht A-A)
2 Summer-Kippschalter
3 Beleuchtungsschalter
4 Beleuchtungslampe
5 LCD-Treiber
6 Betriebsstundenzähler
7 Alarm
8 Laden
9 Sicherung
10 Startschalter
11 Instrumententafel (Nr. 1)
12 Summer
13 Salzwasserschalter
14 Motorstopp (Option)
15 Elektromagnet
16 Relais
17 Tachometersensor
18 Kühlwassertemperatursensor
19 Motoröldrucksensor
20 Kühlwassertemperaturschalter
21 Motoröldruckschalter
22 Drehstromlichtmaschine
23 Erdungsschraube
24 Starter
25 Batterieschalter
26 Batterie
27 Luftvorwärmer (Option)
28 Verlängerungskabel
29 Mit 6m oder längerem Verlängerungskabel
30 Starterrelais
31 Starter

Farbcode	
R	Rot
W	Weiß
Bk	Schwarz
L	Blau
Y	Gelb
Or	Orange
G	Grün

Zur Beachtung: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (Querschnitt)

12-4 Panel de mando tipo E Sólo para la serie 4JH(2)

Español

1 Detalle del acoplador (Vista desde A-A)
2 Interruptor del zumbador
3 Interruptor de encendido de iluminación
4 Lámpara de iluminación
5 Circuito impulsor de LCD
6 Medidor de horas
7 Alarma
8 Carga
9 Fusible
10 Interruptor de arranque
11 Panel de mando "Estación No. 1".
12 Zumbador
13 Interruptor del agua salada
14 Paro del motor (Opcional)
15 Solenoide
16 Relé
17 Sensor del tacómetro
18 Transmisor de temperatura del agua de enfriamiento
19 Transmisor de la presión del aceite del motor
20 Interruptor de la temperatura del agua de enfriamiento
21 Interruptor de la presión del aceite del motor
22 Alternador
23 Perno de tierra
24 Arranque
25 Interruptor de la batería
26 Batería
27 Cámara de calefacción (Opcional)
28 Cordón de extensión
29 Cuando el cordón de extensión es de 6 m o más
30 Relé de arranque
31 Arranque

Codigos de colores	
R	Rojo
W	Blanco
B	Negro
L	Azul
Y	Amarillo
O	Naranja
G	Verde

Nota: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (Area seccional transversal)

12-4 Pannello degli strumenti di tipo E Solo per la serie 4JH2.

Italiano

1 Dettaglio del connettore (visto dalla sezione A-A)
2 Interruttore di interruzione del cicalino
3 Interruttore di illuminazione
4 Lampadina di illuminazione
5 Circuito diretto LCD
6 Misuratore dell'ora
7 Allarme
8 Carica
9 Fusibile
10 Interruttore di avviamento
11 Pannello degli strumenti (Stazione No. 1)
12 Cicalino
13 Interruttore dell'acqua di mare
14 Arresto del motore (opzione)
15 Solenoide
16 Relais
17 Sensore del contagiri
18 Sensore dell'indicatore di temperatura dell'acqua di raffreddamento
19 Sensore dell'indicatore di pressione dell'olio lubrificante
20 Interruttore della temperatura dell'acqua di raffreddamento
21 Interruttore della pressione dell'olio lubrificante
22 Alternatore
23 Bullone di messa a terra
24 Motorino di avviamento B
25 Interruttore della batteria
26 Batteria
27 Riscaldatore dell'aria (opzionale)
28 Codice di estensione
29 Quando il cavo collegamento è di 6 o più metri
30 Relais di avviamento
31 Avviamento

Codice colori	
R	Rosso
W	Bianco
Bk	Nero
L	Blu
Y	Giallo
Or	Arancione
G	Verde

Nota: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (area della sezione)

12-4 Instrumentbräde av typ E Endast serien 4JH2

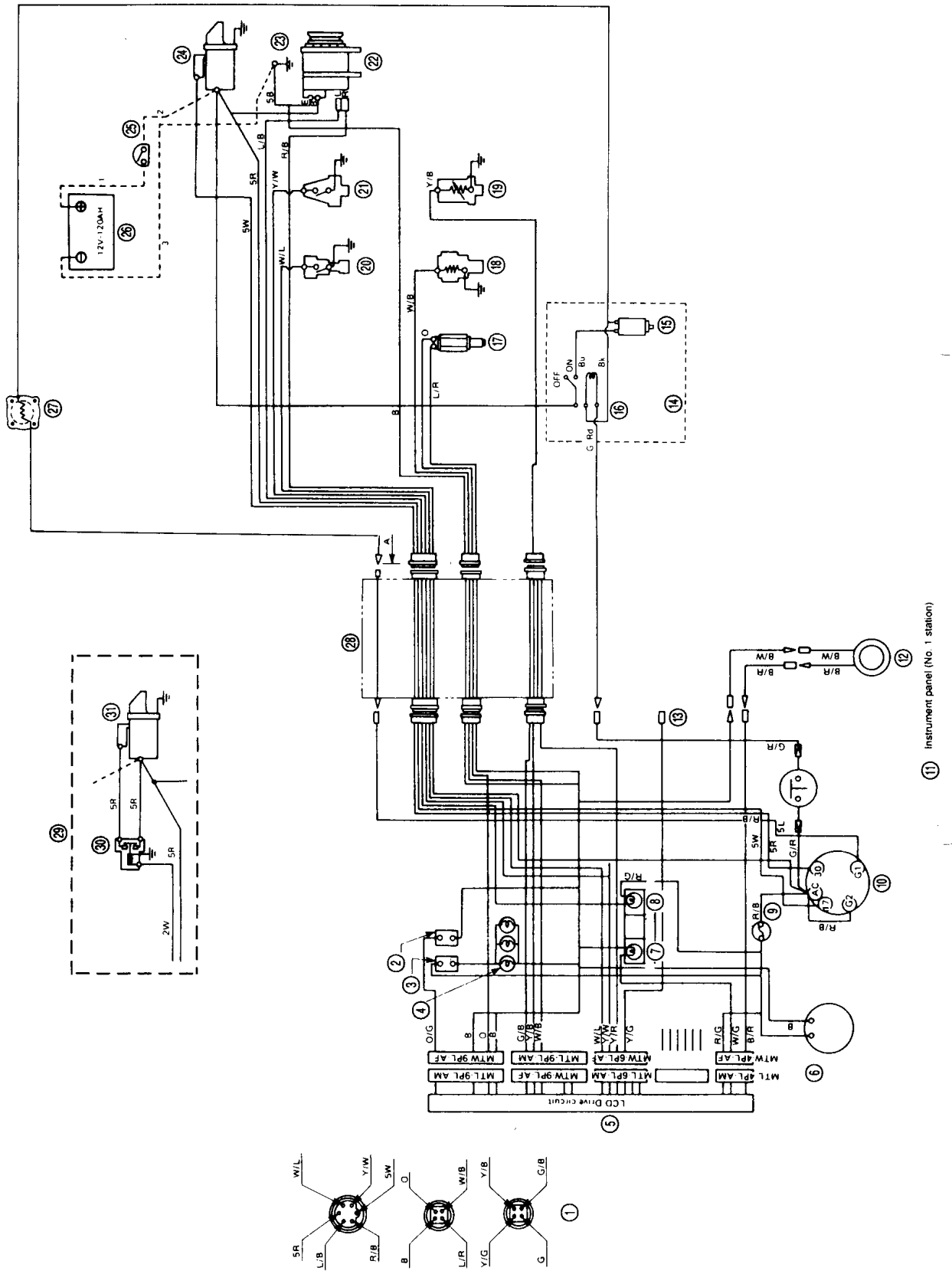
Svensk

1 Detalj av koppling (Sedd från A-A)
2 Summerns vippomkopplare
3 Belysningsomkopplare
4 Belysningslampa
5 Drivkrets med flytande kristaller
6 Timmätare
7 Alarm
8 Laddning
9 Säkring
10 Startomkopplare
11 Instrumentbräde (station No. 1)
12 Summer
13 Havsvattenomkopplare
14 Motorstopp (tillval)
15 Solenoid
16 Relä
17 Takometergivare
18 Givare för kylvattentemperaturmätaren
19 Givare för smörjoljetrycksmätaren
20 Omkopplare för kylvattentemperatur
21 Omkopplare för smörjoljetryck
22 Generator
23 Jordningsbult
24 Startare
25 Batteriomkopplare
26 Batteri
27 Luftvärmare (tillval)
28 Förlängningssladd
29 När förlängningssladden är 6 meter eller längre
30 Startrelä
31 Startare

Fäegkod	
R	Röd
W	Vit
B	Svart
L	Blå
Y	Gul
Or	Orangefärgad
G	Grön

OBS: Ⓐ+Ⓑ+Ⓒ< 2.8 m → 40 mm² (tvärsnittsarea)

12-4 E-type instrument panel



12-5 New C-type instrument panel

English

1 Tacho with Hour meter
2 Buzzer
3 Buzzer stop
4 Illumi
5 FUSE
6 Stop switch
7 Starter switch
8 Relay
9 Eng. oil pressure
10 C.W. Temp
11 Sail Drive
12 Exhaust
13 Fuel emp.
14 Instrument panel (No2 station) (Option)
15 Charge
16 Instrument panel
17 Wire harness
18 Wire harness
19 Option
20 Eng. stop solenoid
21 Air heater (Option for JH2)
22 Procured by customer
23 (Cross sectional area)
24 Battery switch
25 Starter relay
26 Battery
27 Starter
28 C.W. Temp. switch
29 Eng. oil pressure switch
30 Alternator
31 Earth bolt
32 Tacho sensor
33 (C.W. Temp. sender)
34 (sail drive)
35 (Fuel filter switch)
36 (Eng. oil pressure sender)
37 Details of coupler (View B-B)
38 Details of coupler (View A-A)
39 Details of coupler (View C-C)

Cable	Color
R	Red
B	Black
W	White
Y	Yellow
L	Blue
G	Green
O	Orange
Lg	Light green
Lb	Light blue
Br	Brown
P	Pink
Gr	Grey
Pu	Purpl

12-5 Tebleau de bord de Nouveau type C

Français

1 Tachymètre avec compteur horaire
2 Vibreur sonore
3 Dispositif d'arrêt du vibreur sonore
4 Dispositif d'éclairage
5 Fusible
6 Commutateur d'arrêt
7 Commutateur du démarreur
8 Relais
9 Pression de l'huile du moteur
10 Temp. de l'eau de refroidis.
11 Etat de marche
12 Echappement
13 Pas de combustion
14 Tableau de bord (Poste No 2) (En option)
15 Charge
16 Tableau de bord
17 Harnais de câbles
18 Harnais de câbles pour le tableau No 2
19 En option
20 Solénoïde d'arrêt du moteur
21 Réchauffeur d'air (En option pour JH2)
22 Procuré par le client
23 (Zone en coupe transversale)
24 Commutateur de batterie
25 Relais du démarreur
26 Batterie
27 Démarreur
28 Commutateur de temp. de l'eau de refroidis.
29 Avertisseur de pression de lhuile du moteur
30 Alternateur
31 Boulon de mise à la masse
32 Palpeur du tachymètre
33 (Transmetteur de temp. de l'eau de refroidis.)
34 (Etat de marche)
35 (Commutateur du filtre de carburant)
36 (Transmetteur de la pression d'huile du moteur)
37 Détails du coupleur (Vue B-B)
38 Détails du coupleur (Vue A-A)
39 Détails du coupleur (Vue C-C)

Câble	Coloris
R	Rouge
B	Noir
W	Blanc
Y	Jaune
L	Bleu
G	Vert
O	Orange
Lg	Vert clair
Lb	Bleu clair
Br	Brun
P	Rose
Gr	Gris
Pu	Pourpre

12-5 Für Instrumententafel Neuer Typ C

Deutsch

1 Drehzahlmesser mit Betriebsstundenzähler
2 Warnsummer
3 Warnsummer-Absteller
4 Beleuchtung
5 SICHERUNG
6 Stoppschalter
7 Anlasserschalter
8 Relais
9 Motoröldruck
10 Kühlwassertemperatur
11 Segelantrieb
12 Auspuff
13 Kraftstofftank
14 Armaturenbrett (Station Nr. 2) (Sonderzubehor)
15 Laden
16 Armaturenbrett
17 Kabelbaum
18 Kabelbaum für Station Nr. 2
19 Sonderzubehör
20 Motorabstell-Solenoid
21 Gebläseheizung (Sonderzubehör für JH2)
22 Beschaffung durch Kunde
23 (Querschnitt)
24 Batterieschalter
25 Anlasserrelais
26 Batterie
27 Anlasser
28 Kühlwassertemperatur-Schalter
29 Motoröldruck-Schalter
30 Lichtmaschine
31 Masseschraube
32 Drehzahlmessersensor
33 (Kühlwassertemperaturgeber)
34 Segelantrieb
35 (Kraftstoffilter-Schalter)
36 (Motoröldruck-Schalter)
37 Einzelheiten für Steckerkupplung (Ansicht B-B)
38 Einzelheiten für Steckerkupplung (Ansicht A-A)
39 Einzelheiten für Steckerkupplung (Ansicht C-C)

Kabel	Farbe
R	Rot
B	Schwarz
W	Weiß
Y	Gelb
L	Blau
G	Grün
O	Orangefarben
Lg	Hellgrün
Lb	Hellblau
Br	Braun
P	Rosa
Gr	Grau
Pu	Lila

12-5 Panel de mando Nuevo tipo C

Español

1 Tacómetro con contador horario
2 Avisador sonoro
3 Parada del avisador sonoro
4 Iluminación
5 FUSIBLE
6 Interruptor de parada
7 Interruptor de arranque
8 Rele
9 Presión del aceite del motor
10 Temperatura del agua de enfriamiento
11 Accionador de navegación
12 Escape
13 Combustible vacío
14 Panel de instrumentos (estación nº 2) (opción)
15 Carga
16 Panel de instrumentos
17 Cableado preformado
18 Cableado preformado para panel 2
19 Opción
20 Solenoide de parada del motor
21 Calentador de aire (opción para JH2)
22 Adquirido por el cliente
23 (Area de la sección transversal)
24 Interruptor de la batería
25 Relé del arrancador
26 Batería
27 Arrancador
28 Interruptor de temperatura del agua de enfriamiento
29 Interruptor de presión del aceite del motor
30 Alternador
31 Clavija de puesta a tierra
32 Sensor del tacómetro
33 (Transmisor de teperatura del agua de enfriamiento)
34 (Accionador de navegación)
35 (Interruptor del filtro de combustible)
36 (Transmisor de presión del aceite del motor)
37 Detalles del acoplador (vista B-B)
38 Detalles del acoplador (vista A-A)
39 Detalles del acoplador (vista C-C)

Cable	Color
R	Rojo
B	Negro
W	Blanco
Y	Amarillo
L	Azul
G	Verde
O	Naranja
Lg	Verde claro
Lb	Azul claro
Br	Marrón
P	Rosa
Gr	Gris
Pu	Púrpura

12-5 Pannello degli strumenti di tipo C nuovo

Italiano

1 Contagiri con Contaore
2 Segnale acustico
3 Arresto segnale acustico
4 Illuminazione (abbr : Illumi)
5 FUSIBILE
6 Comando di arresto
7 Comando motorino di avviamento
8 Relè
9 Pressione olio motore
10 Temperatura acqua di raffreddamento (abbr : Temp. A. R.)
11 Comando navigazione a vela
12 Scarico
13 No combustibile (abbr : No comb.)
14 Pannello strumenti (2ª Postazione) (Opzionale)
15 Carica
16 Pannello strumenti
17 Cablaggio preassemblato
18 Cablaggio preassemblato per 2° paannello
19 Opzionale
20 Solenoide di arresto motore (abbr : Solenoide arresto mot.)
21 Riscaldatore d'aria (Opzionale per JH2)
22 Procurato dal cliente
23 Superficie in sezione trasversale
24 Comando batteria
25 Relè motorino di avviamento
26 Batteria
27 Motorino di avviamento
28 Comando Temp. A.R.
29 Comando pressione olio mot.
30 Alternatore
31 Bullone di terra elettrica
32 Sensore contagiri
33 (Trasmettitore Temp. A. R.)
34 (comando navigazione a vela)
35 (Comando filtro combustibile)
36 (Trasmettitore pressione olio motore)
37 Dettagli dell' accoppiatore (Vista B-B)
38 Dettagli dell' accoppiatore (Vista A-A)
39 Dettagli dell' accoppiatore (Vista C-C)

Cavo	Colore
R	Rosso
B	Nero
W	Bianco
Y	Giallo
L	Blu
G	Verde
O	Arancione
Lg	Verde chiaro
Lb	Celeste
Br	Marrone
P	Rosa
Gr	Grigio
Pu	Porpora

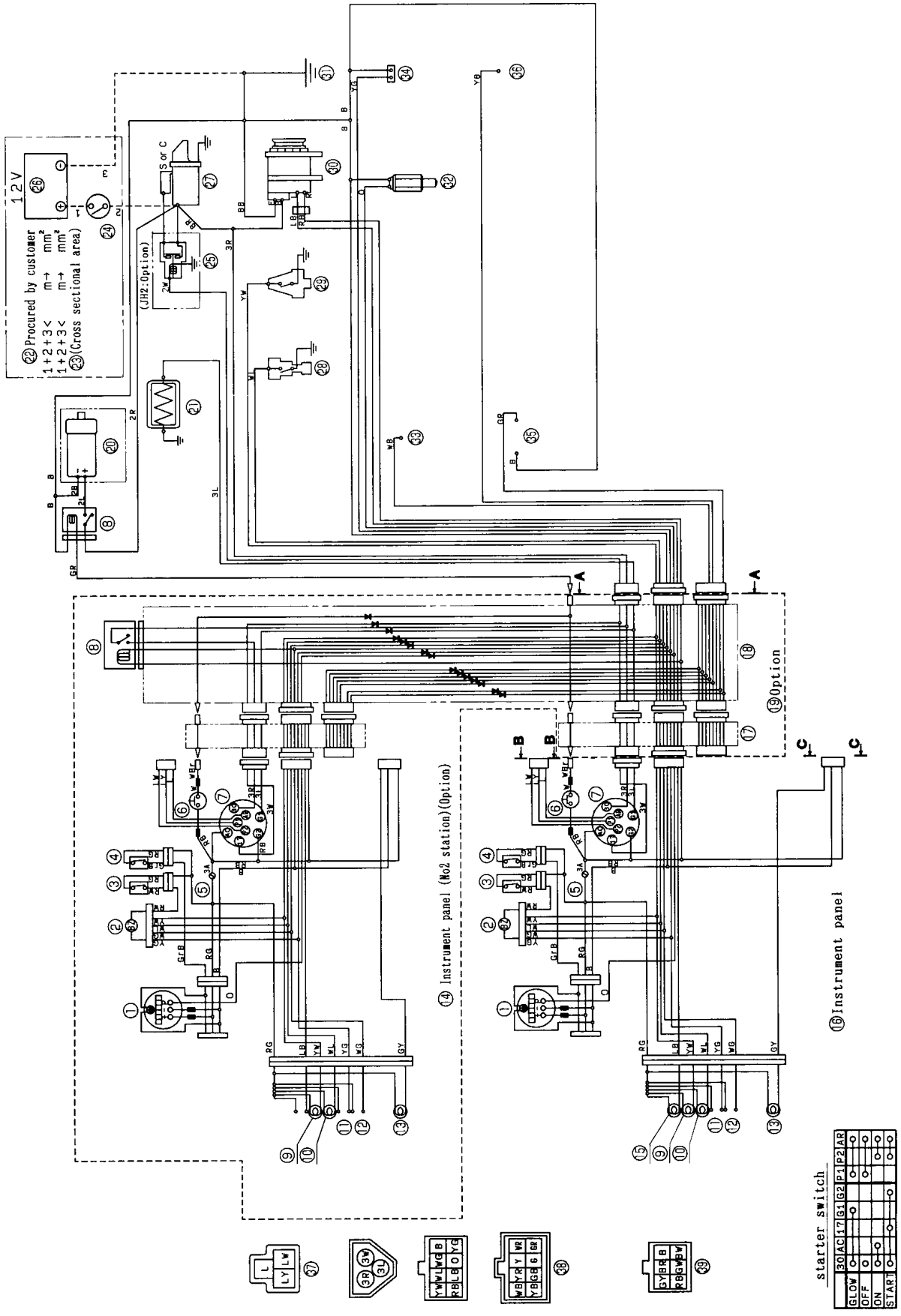
12-5 Instrumentbräde av Ny typ C

Svensk

1 Takometer med tidmätare
2 Summer
3 Summeravstängning
4 Belysning
5 SAKRING
6 Stoppomkopplare
7 Startomkopplare
8 Relä
9 Oljetryck i motor
10 Kylvattentemparatur
11 Marschdrift
12 Avgasrör
13 Bränsle slut
14 Instrumentpanel (Station nr. 2) (extra tilbehor)
15 Laddning
16 Instrumentpanel
17 Kabelnät
18 Kabelnät för 2 a panel
19 Extra tillbehor
20 Motorns stoppsolenoid
21 Luftvarmare (extra tilbehör med JH2)
22 Införskaffad av kunden
23 (Tvarsnitt)
24 Betteriomkopplare
25 Startrelä
26 Batteri
27 Startare
28 Kylvattnets temperaturomkopplare
29 Motorns oljetrycksomkopplare
30 Växelströmsgenerator
31 Jordbult
32 Takometersensor
33 (Kylvattentemperatursändare)
34 (Marschdrift)
35 (Bränslefiltrets omkopplare)
36 (Sändare för motorns oljetryck)
37 Kopplingsdetaljer (Fran B-B)
38 Kopplingsdetaljer (Fran A-A)
39 Kopplingsdetaljer (Fran A-A)

Ledning	Färg
R	Röd
B	Svart
W	Vit
Y	Gul
L	Bl
G	Grön
O	Brandgul
Lg	Ljusgrön
Lb	Ljusblå
Br	Brun
P	Skär
Gr	Grå
Pu	Violett

12-5 New C-type instrument panel



12-6 New D-type instrument panel

English

1 Tacho with Hour meter
2 Buzzer
3 Buzzer stop
4 Illumi
5 FUSE
6 Stop switch
7 Starter switch
8 Relay
9 Eng. oil pressure
10 C.W. Temp
11 Sail Drive
12 Exhaust
13 Fuel emp.
14 Instrument panel (No2 station) (Option)
15 Charge
16 Instrument panel
17 Wire harness
18 Wire harness
19 Option
20 Eng. stop solenoid
21 Air heater (Option for JH2)
22 Procured by customer
23 (Cross sectional area)
24 Battery switch
25 Starter relay
26 Battery
27 Starter
28 C.W. Temp. switch
29 Eng. oil pressure switch
30 Alternator
31 Earth bolt
32 Tacho sensor
33 (C.W. Temp. sender)
34 (sail drive)
35 (Fuel filter switch)
36 (Eng. oil pressure sender)
37 Details of coupler (View B-B)
38 Details of coupler (View A-A)
39 Details of coupler (View C-C)
40 Eng. oil pressure meter
41 C.W. Temp meter
42 Fuel filter

Cable	Color
R	Red
B	Black
W	White
Y	Yellow
L	Blue
G	Green
O	Orange
Lg	Light green
Lb	Light blue
Br	Brown
P	Pink
Gr	Grey
Pu	Purpl

12-6 Tebleau de bord de Nouveau type D

Français

1 Tachymètre avec compteur horaire
2 Vibreur sonore
3 Dispositif d'arrêt du vibreur sonore
4 Dispositif d'éclairage
5 Fusible
6 Commutateur d'arrêt
7 Commutateur du démarreur
8 Relais
9 Pression de l'huile du moteur
10 Temp. de l'eau de refroidis.
11 Etat de marche
12 Echappement
13 Pas de combustion
14 Tableau de bord (Poste No 2) (En option)
15 Charge
16 Tableau de bord
17 Harnais de câbles
18 Harnais de câbles pour le tableau No 2
19 En option
20 Solénoïde d'arrêt du moteur
21 Réchauffeur d'air (En option pour JH2)
22 Procuré par le client
23 (Zone en coupe transversale)
24 Commutateur de batterie
25 Relais du démarreur
26 Batterie
27 Démarreur
28 Commutateur de temp. de l'eau de refroidis.
29 Avertisseur de pression de lhuile du moteur
30 Alternateur
31 Boulon de mise à la masse
32 Palpeur du tachymètre
33 (Transmetteur de temp. de l'eau de refroidis.)
34 (Etat de marche)
35 (Commutateur du filtre de carburant)
36 (Transmetteur de la pression d'huile du moteur)
37 Détails du coupleur (Vue B-B)
38 Détails du coupleur (Vue A-A)
39 Détails du coupleur (Vue C-C)
40 Manomètre de l'huile du moteur
41 Compteur de temp. de l'eau de refroidis.
42 Filtre du carburant

Câble	Coloris
R	Rouge
B	Noir
W	Blanc
Y	Jaune
L	Bleu
G	Vert
O	Orange
Lg	Vert clair
Lb	Bleu clair
Br	Brun
P	Rose
Gr	Gris
Pu	Pourpre

12-6 Für Instrumententafel Neuer Typ D

Deutsch

1 Drehzahlmesser mit Betriebsstundenzähler
2 Warnsummer
3 Warnsummer-Absteller
4 Beleuchtung
5 SICHERUNG
6 Stoppschalter
7 Anlasserschalter
8 Relais
9 Motoröldruck
10 Kühlwassertemperatur
11 Segelantrieb
12 Auspuff
13 Kraftstofftank
14 Armaturenbrett (Station Nr. 2) (Sönderzubehor)
15 Laden
16 Armaturenbrett
17 Kabelbaum
18 Kabelbaum für Station Nr. 2
19 Sonderzubehör
20 Motorabstell-Solenoid
21 Gebläseheizung (Sonderzubehör für JH2)
22 Beschaffung durch Kunde
23 (Querschnitt)
24 Batterieschalter
25 Anlasserrelais
26 Batterie
27 Anlasser
28 Kühlwassertemperatur-Schalter
29 Motoröldruck-Schalter
30 Lichtmaschine
31 Masseschraube
32 Drehzahlmessersensor
33 (Kühlwassertemperaturgeber)
34 Segelantrieb
35 (Kraftstoffilter-Schalter)
36 (Motoröldruck-Schalter)
37 Einzelheiten für Steckerkupplung (Ansicht B-B)
38 Einzelheiten für Steckerkupplung (Ansicht A-A)
39 Einzelheiten für Steckerkupplung (Ansicht C-C)
40 Motoröldruckmesser
41 Kühlwassertemperaturmesser
42 Kraftstoffilter

Kabel	Farbe
R	Rot
B	Schwarz
W	Weiß
Y	Gelb
L	Blau
G	Grün
O	Orangefarben
Lg	Hellgrün
Lb	Hellblau
Br	Braun
P	Rosa
Gr	Grau
Pu	Lila

12-6 Panel de mando Nuevo tipo D

Español

1 Tacómetro con contador horario
2 Avisador sonoro
3 Parada del avisador sonoro
4 Iluminación
5 FUSIBLE
6 Interruptor de parada
7 Interruptor de arranque
8 Rele
9 Presión del aceite del motor
10 Temperatura del agua de enfriamiento
11 Accionador de navegación
12 Escape
13 Combustible vacío
14 Panel de instrumentos (estación nº 2) (opción)
15 Carga
16 Panel de instrumentos
17 Cableado preformado
18 Cableado preformado para panel 2
19 Opción
20 Solenoide de parada del motor
21 Calentador de aire (opción para JH2)
22 Adquirido por el cliente
23 (Area de la sección transversal)
24 Interruptor de la batería
25 Relé del arrancador
26 Batería
27 Arrancador
28 Interruptor de temperatura del agua de enfriamiento
29 Interruptor de presión del aceite del motor
30 Alternador
31 Clavija de puesta a tierra
32 Sensor del tacómetro
33 (Transmisor de teperatura del agua de enfriamiento)
34 (Accionador de navegación)
35 (Interruptor del filtro de combustible)
36 (Transmisor de presión del aceite del motor)
37 Detalles del acoplador (vista B-B)
38 Detalles del acoplador (vista A-A)
39 Detalles del acoplador (vista C-C)
40 Manómetro del aceite del motor
41 Medidor de temperatura del agua de enfriamiento
42 Filtro de combustible

Cable	Color
R	Rojo
B	Negro
W	Blanco
Y	Amarillo
L	Azul
G	Verde
O	Naranja
Lg	Verde claro
Lb	Azul claro
Br	Marrón
P	Rosa
Gr	Gris
Pu	Púrpura

12-6 Pannello degli strumenti di tipo D nuovo

Italiano

1 Contagiri con Contaore
2 Segnale acustico
3 Arresto segnale acustico
4 Illuminazione (abbr : Illumi)
5 FUSIBILE
6 Comando di arresto
7 Comando motorino di avviamento
8 Relè
9 Pressione olio motore
10 Temperatura acqua di raffreddamento (abbr : Temp. A. R.)
11 Comando navigazione a vela
12 Scarico
13 No combustibile (abbr : No comb.)
14 Pannello strumenti (2ª Postazione) (Opzionale)
15 Carica
16 Pannello strumenti
17 Cablaggio preassemblato
18 Cablaggio preassemblato per 2ª paannello
19 Opzionale
20 Solenoide di arresto motore (abbr : Solenoide arresto mot.)
21 Riscaldatore d'aria (Opzionale per JH2)
22 Procurato dal cliente
23 Superficie in sezione trasversale
24 Comando batteria
25 Relè motorino di avviamento
26 Batteria
27 Motorino di avviamento
28 Comando Temp. A.R.
29 Comando pressione olio mot.
30 Alternatore
31 Bullone di terra elettrica
32 Sensore contagiri
33 (Trasmettitore Temp. A. R.)
34 (comando navigazione a vela)
35 (Comando filtro combustibile)
36 (Trasmettitore pressione olio motore)
37 Dettagli dell' accoppiatore (Vista B-B)
38 Dettagli dell' accoppiatore (Vista A-A)
39 Dettagli dell' accoppiatore (Vista C-C)
40 Manometro pressione olio motore
41 Misuratore Temp. A. R.
42 Filtro combustibile

Cavo	Colore
R	Rosso
B	Nero
W	Bianco
Y	Giallo
L	Blu
G	Verde
O	Arancione
Lg	Verde chiaro
Lb	Celeste
Br	Marrone
P	Rosa
Gr	Grigio
Pu	Porpora

12-6 Instrumentbräde av Ny typ D

Svensk

1 Takometer med tidmätare
2 Summer
3 Summeravstängning
4 Belysning
5 SÄKRING
6 Stoppomkopplare
7 Startomkopplare
8 Relä
9 Oljetryck i motor
10 Kylvattentemparatur
11 Marschdrift
12 Avgasrör
13 Bränsle slut
14 Instrumentpanel (Station nr. 2) (extra tilbehor)
15 Laddning
16 Instrumentpanel
17 Kabelnät
18 Kabelnät för 2 a panel
19 Extra tillbehor
20 Motorns stoppsolenoid
21 Luftvarmare (extra tilbehör med JH2)
22 Införskaffad av kunden
23 (Tvarsnitt)
24 Betteriomkopplare
25 Startrelä
26 Batteri
27 Startare
28 Kylvatnets temperaturomkopplare
29 Motorns oljetrycksomkopplare
30 Växelströmsgenerator
31 Jordbult
32 Takometersensor
33 (Kylvattentemperatursändare)
34 (Marschdrift)
35 (Bränslefiltrets omkopplare)
36 (Sändare för motorns oljetryck)
37 Kopplingsdetaljer (Fran B-B)
38 Kopplingsdetaljer (Fran A-A)
39 Kopplingsdetaljer (Fran A-A)
40 Mätare för motorns oljetryck
41 Kylvattentemperaturmätare
42 Bränslemätare

Ledning	Färg
R	Röd
B	Svart
W	Vit
Y	Gul
L	Bl
G	Grön
O	Brandgul
Lg	Ljusgrön
Lb	Ljusblå
Br	Brun
P	Skär
Gr	Grå
Pu	Violett

12-6 New D-type instrument panel