CHAPTER 1
GENERAL

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1. Specifications

1-1. Direct Sea Water Cooling Type

Model			1GM10		
Type					
Combustion chamber					
Number of cylinders			1		
Bore x stroke		mm (in.)			
Displacement		ℓ (in.³)	0.318 (19.40)		
Continuous rating output (DIN6270A)	Output/Crankshaft speed	HP/rpm (kW/rpm)	8/3400 (6.0/3400)		
	Brake mean effective pressure	kg/cm² (lb/in.²)			
	Piston speed	m/sec. (ft/sec.)			
One hour rating output (DIN6270B)	Output/crankshaft speed	HP/rpm (kW/rpm)	9/3600 (6.7/3600)		
	Brake mean effective pressure	kg/cm² (lb/in.²)			
	Piston speed	m/sec. (ft/sec.)			
Compression ratio					
Fuel injection timing (FID)		degree	b.TDC15±1		
Fuel injection pressure		kg/cm² (lb/in²)			
Main power take off					
Front power take off					
Direction of rotation	Crankshaft				
	Propeller shaft (Ahead)				
Cooling system			Direc		
Lubrication system					
Starting system					
Clutch	Model		KM		
	Type		Mechanical		
	Reduction ratio (Ahead/A stern)		2.21/3.06	2.62/3.06	3.22/3.06
	Propeller speed DIN.A rating (Ahead/Astern)	rpm	1540/1113	1298/1113	1055/1113
	Lubricating oil capacity	ℓ (in.³)	0.25 (1		
	Clutch weight	kg (lb.)	9.5 (2(		
Dimensions	Overall length	mm (in.)	547 (21.53)		
	Overall width	mm (in.)	410 (16.14)		
	Overall height	mm (in.)	485 (19.09)		
Lubricating oil capacity (rake angle 8°)	Total	ℓ (in.³)	1.3 (79.33)		
	Effective	ℓ (in.³)	0.6 (36.61)		
Engine weight with cluth (dry)		Kg (lb.)	76 (168)		

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2GM20	3GM30	3HM35
Vertical 4-cycle water cooled diesel engine		
Swirl pre-combustion chamber		
2	3	3
75 x 72 (2.95 x 2.83)		80 x 85 (3.15 x 3.35)
0.636 (38.81)	0.954 (58.21)	1.282 (78.23)
16/3400 (11.9/3400)	24/3400 (17.9/3400)	30/3200 (22.4/3200)
6.66 (94.71)		6.58 (93.57)
8.16 (26.77)		9.07 (29.76)
18/3600 (13.4/3600)	27/3600 (20.1/3600)	34/3400 (25.4/3400)
7.07 (100.54)		7.02 (99.82)
8.64 (28.35)		9.63 (31.59)
23.0		24.8
b.TDC15±1	b.TDC18±1	b.TDC21±1
170±5 (2347~2489)		160±5 (2204~2347)
at Flywheel side		
at Crankshaft V-pulley side		
Counter-clockwise viewed from stern		
Clockwise viewed from stern		
t sea water cooling (rubber impeller water pump)		
Complete enclosed forced lubrication		
Electric and manual		Electric
2C	KM3A	KBW10E
cone clutch with single stage for both ahead and astern		Wet multi-disc mechanical type

2.21/3.06	2.62/3.06	3.22/3.06	2.36/3.16	2.61/3.16	3.20/3.16	2.14/2.50	2.83/2.50
1540/1113	1298/1113	1055/1113	1441/1076	1303/1076	10631/1076	1498/1280	1129/1280
5.26)			0.3 (18.31)			0.7 (42.72)	
0.95)			11.0 (24.26)			17.5 (38.58)	
638 (25.12)			735 (28.94)			786 (30.94)	
455 (17.91)			455 (17.91)			485 (19.09)	
495 (19.50)			495 (19.50)			617 (24.29)	
2.0 (122.05)			2.6 (158.65)			5.4 (329.51)	
1.3 (79.33)			1.6 (97.63)			2.7 (164.75)	
106 (234)			130 (287)			158 (348)	

1-2. Fresh Water Cooling Type

Model			
Type			
Combustion chamber			
Number of cylinders			
Bore x stroke		mm (in.)	
Displacement		ℓ (in.^{3})	
Continuous rating output (DIN 6270A)	Output/Crankshaft speed	HP/rpm (kW/rpm)	16
	Brake mean effective pressure	kg/cm^2 (lb/in.^{2})	
	Piston speed	m/sec. (ft/sec.)	
One hour rating output (DIN 6270B)	Output/Crankshaft speed	HP/rpm (kW/rpm)	18
	Brake mean effective pressure	kg/cm^2 (lb/in.^{2})	
	Piston speed	m/sec. (ft/sec.)	
Compression ratio			
Fuel injection timing (FID)		degree	
Fuel injection pressure		kg/cm^2 (lb/in.^{2})	
Main power take off			
Front power take off			
Direction of rotation	Crankshaft		
	Propeller shaft (Ahead)		
Cooling system			
Lubrication system			
Starting system			
Clutch	Model		
	Type		Mec
	Reduction ratio (Ahead/Astern)		2.21/3.06
	Propeller speed DIN. A rating (Ahead/Astern)	rpm	1540/1113
	Lubricating oil capacity	ℓ (in.^{3})	
	Clutch weight	kg (lb.)	
Dimensions	Overall length	mm (in.)	
	Overall width	mm (in.)	
	Overall height	mm (in.)	
Lubricating oil capacity (rake angle 8°)	Total	ℓ (in.^{3})	
	Effective	ℓ (in.^{3})	
Engine weight with clutch (dry)		kg (lb.)	

2GM20F	3GM30F	3HM35F
Vertical 4-cycle water cooled diesel engine		
Swirl pre-combustion chamber		
2	3	
75 x 72 (2.95 x 2.83)		80 x 85 (3.15 x 3.35)
0.636 (38.81)	0.954 (58.21)	1.282 (78.23)
/3400 (11.9/3400)	24/3400 (17.9/3400)	30/3200 (22.4/3200)
6.66 (94.71)		6.58 (93.57)
8.16 (26.77)		9.07 (29.76)
/3600 (13.4/3600)	27/3600 (20.1/3600)	34/3400 (25.4/3400)
7.07 (100.54)		7.02 (99.82)
8.64 (28.35)		9.63 (31.59)
23.0		24.8
b.TDC 15±1	b.TDC 18±1	b.TDC 21±1
170±5 (2347~2489)		160±5 (2204~2347)
at Flywheel side		
at Crankshaft V-pulley side		
Counter-clockwise viewed from stern		
Clockwise viewed from stern		
*Fresh water cooling with heat exchanger		
Complete enclosed forced lubrication		
Electric		

KM2-C		KM3A			KBW10E	
hanical cone clutch with single stage for both ahead and astern					Wet multi-disc mechanical type	
2.62/3.06	3.22/3.06	2.36/3.16	2.61/3.16	3.20/3.16	2.14/2.50	2.83/2.50
1298/1113	1055/1113	1441/1076	1303/1076	1062/1076	1498/1280	1129/1280
0.25 (15.26)		0.30 (18.31)			0.70 (42.72)	
9.5 (20.95)		11.0 (24.26)			17.5 (38.58)	
643 (25.31)		740 (29.13)			791 (31.14)	
482 (19.00)		455 (17.91)			475 (18.70)	
545 (21.46)		545 (21.46)			638 (25.12)	
2.0 (122.05)		2.6 (158.65)			5.4 (329.51)	
1.3 (79.33)		1.6 (97.63)			2.7 (164.75)	
114 (251)		138 (304)			167 (368)	

1-3. Direct Sea Water Colling Type (Sail-drive)

Model			1GM10C
Type			
Combustion chamber			
Number of cylinders			1
Bore x stroke		mm (in.)	
Displacement		ℓ (in.^{3})	0.318 (19.40)
Continuous rating output (DIN 6270A)	Output/Crankshaft speed	HP/rpm (kW/rpm)	8/3400 (6.0/3400)
	Brake mean effective pressure	kg/cm^2 (lb/in.^{2})	
	Piston speed	m/sec. (ft/sec.)	
One hour rating output (DIN 6270B)	Output/Crankshaft speed	HP/rpm (kW/rpm)	9/3600 (6.7/3600)
	Brake mean effective pressure	kg/cm^2 (lb/in^2)	
	Piston speed	m/sec. (ft/sec.)	
Compression ratio			
Fuel injection timing (FID)		Degree	b.TDC 15±1
Fuel injection pressure		kg/cm^2 (lb/in.^{2})	
Main power take off			
Front power take off			
Direction of rotation	Crankshaft		
	Propeller shaft (Sail-drive)		
Cooling system			
Lubrication system			
Starting system			
Sail-drive	Model		
	Reduction system		
	Reduction ratio (Ahead/Astern)		
	Propeller speed DIN. A rating	rpm	
	Lubricating capacity	ℓ (in.^{3})	
	Dry weight	kg (lb.)	
Lubricataing oil capacity (Engine side)	Total	ℓ (in.^{3})	1.3 (79.33)
	Effective	ℓ (in.^{3})	0.6 (36.61)
Engine weight with Sail-drive unit (Dry)		kg (lb.)	104 (229)

2GM20C	3GM30C	3HM35C
Vertical, 4-cycle water cooled diesel engine		
Swirl pre-combustion chamber		
2	3	
75 x 72 (2.95 x 2.83)		80 x 85 (3.15 x 3.35)
0.636 (38.81)	0.954 (58.21)	1.282 (78.23)
16/3400 (11.9/3400)	24/3400 (17.9/3400)	30/3200 (22.4/3200)
6.66 (94.71)		6.58 (93.57)
8.16 (26.77)		9.07 (29.76)
18/3600 (13.4/3600)	27/3600 (20.1/3600)	34/3400 (25.4/3400)
7.07 (100.54)		7.02 (99.82)
8.64 (28.35)		9.63 (31.59)
23.0		24.8
b.TDC 15±1	b.TDC 18±1	b.TDC 21±1
170±5 (2347~2489)		160±5 (2204~2347)
at Flywheel side		
at Crankshaft V-pulley side		
Counter-clockwise viewed from stern		
Counter-clockwise viewed from stern		
Direct sea water cooling (rubber impeller water pump)		
Complete enclosed forced lubrication		
Electric and manual		Electric
SD 20		SD 30
Constant mesh gear with dog clutch		
2.64/2.64		
1289		1212
2.2 (134.24)		
30 (66)		32 (70)
2.0 (122.05)	2.6 (158.65)	5.4 (329.51)
1.3 (79.33)	1.6 (97.63)	2.7 (164.75)
134 (295)	153 (337)	180 (397)

2. Principal Construction

Engine model		1GM10	2GM20	3GM30	3HM35
Group	Part	Construction			
Engine block	Cylinder block	Integrally-cast water jacket and crankcase			
	Cylinder liner	Sleeveless			
	Main bearing	Metal housing type			
	Oil sump	Oil pan			
Intake and exhaust systems and valve mechanism	Cylinder head	Integrated type cylinders			
	Intake and exhaust valves	Poppet type, seat angle 90°			
	Exhaust manifold	—		Water-cooled type	Water-cooled type
	Exhaust silencer	Water-cooled mixing elbow type			
	Valve mechanism	Overhead valve push rod, rocker arm system			
	Intake silencer	Round polyurethane sound absorbing type			
Main moving elements	Crankshaft	Stamped forging			
	Flywheel	Attached to crankshaft by flange, with ring gear			
	Piston	Oval type			
	Piston pin	Floating type			
	Piston rings	2 compression rings, 1 oil ring			
Lubrication system	Oil pump	Trochoid pump			
	Oil filter	Full-flow cartridge type, paper element			
	Oil level gauge	Dipstick			
Cooling system	Water pump	Rubber impeller type			
	Thermostat	Wax pellet type			
Fuel system	Fuel injection pump	YPFR-0707-1	YPFR-0707-2	YPFR-0707-3	
	Fuel injection valve	Throttle valve, OSDYD1			
	Fuel feed pump	Mechanical type			
	Fuel strainer	Filter paper			
Governor	Governor	Centrifugal all-speed mechanical type			
Starting system	Electric	Pinion ring gear type starter motor			
	Manual	Camshaft starting			—
Electrical system	Charger	Alternator (with built-in IC regulator)			
Reduction reversing	Reduction gear	Helical gear constant-mesh system			
Clutch system	Clutch	Servo-cone type			Wet multi-disc mechanical type

Fresh-water cooling system (2GM20F, 3GM30F and 3HM35F)

Cooling system	Sea water pump	Rubber impeller type
	Fresh water pump	Centrifugal type
	Thermostat	Wax pellet type
	Heat exchanger	Multi-tube type

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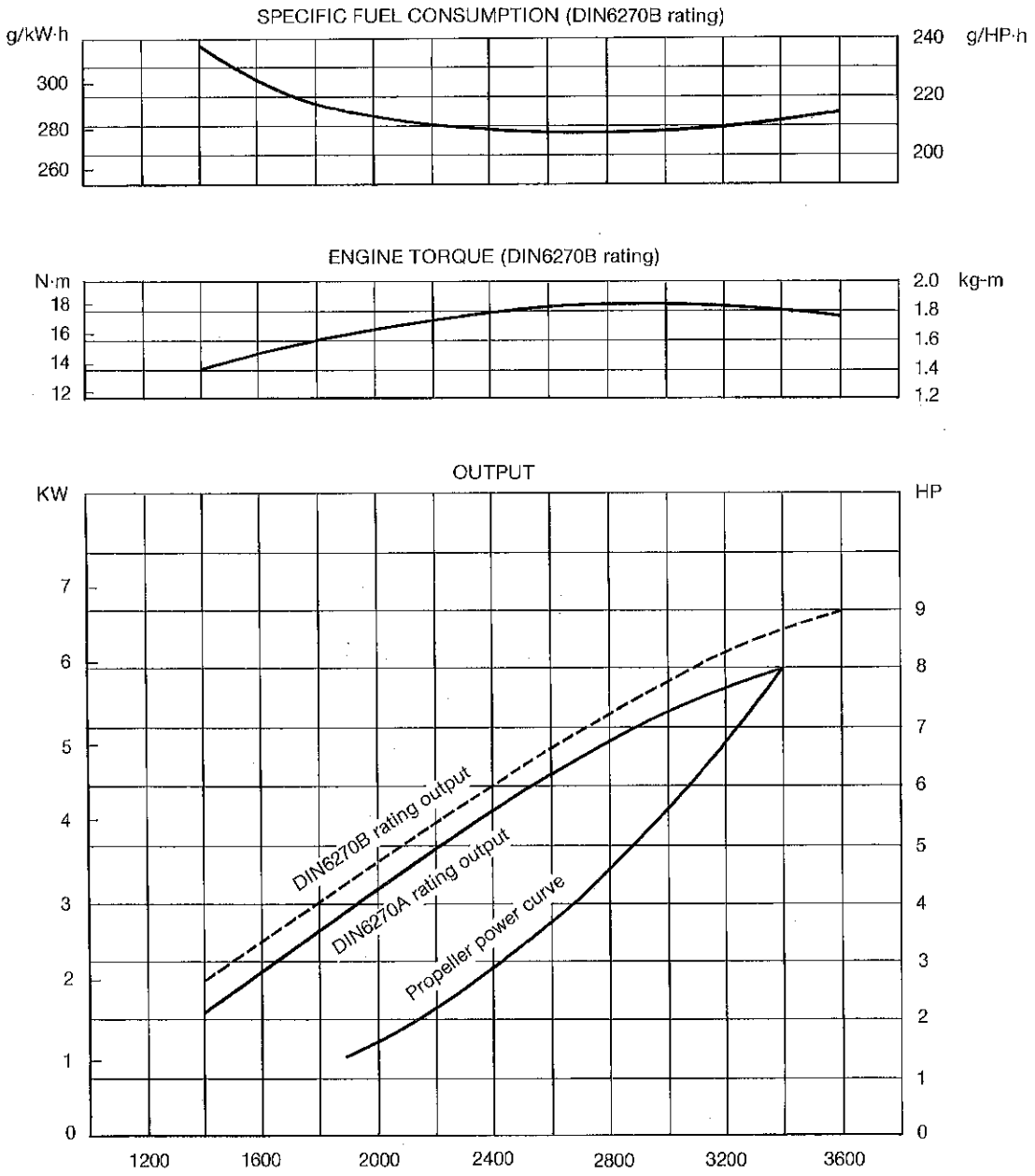
3. Performance Curves

3-1. 1GM10(C)



SPEED OF CRANKSHAFT: rpm
THE ENGINE FLYWHEEL OUTPUT IS APPROX 3% HIGHER.

NOTE: These curves show the average performance of respective engine in test operation at our plant.

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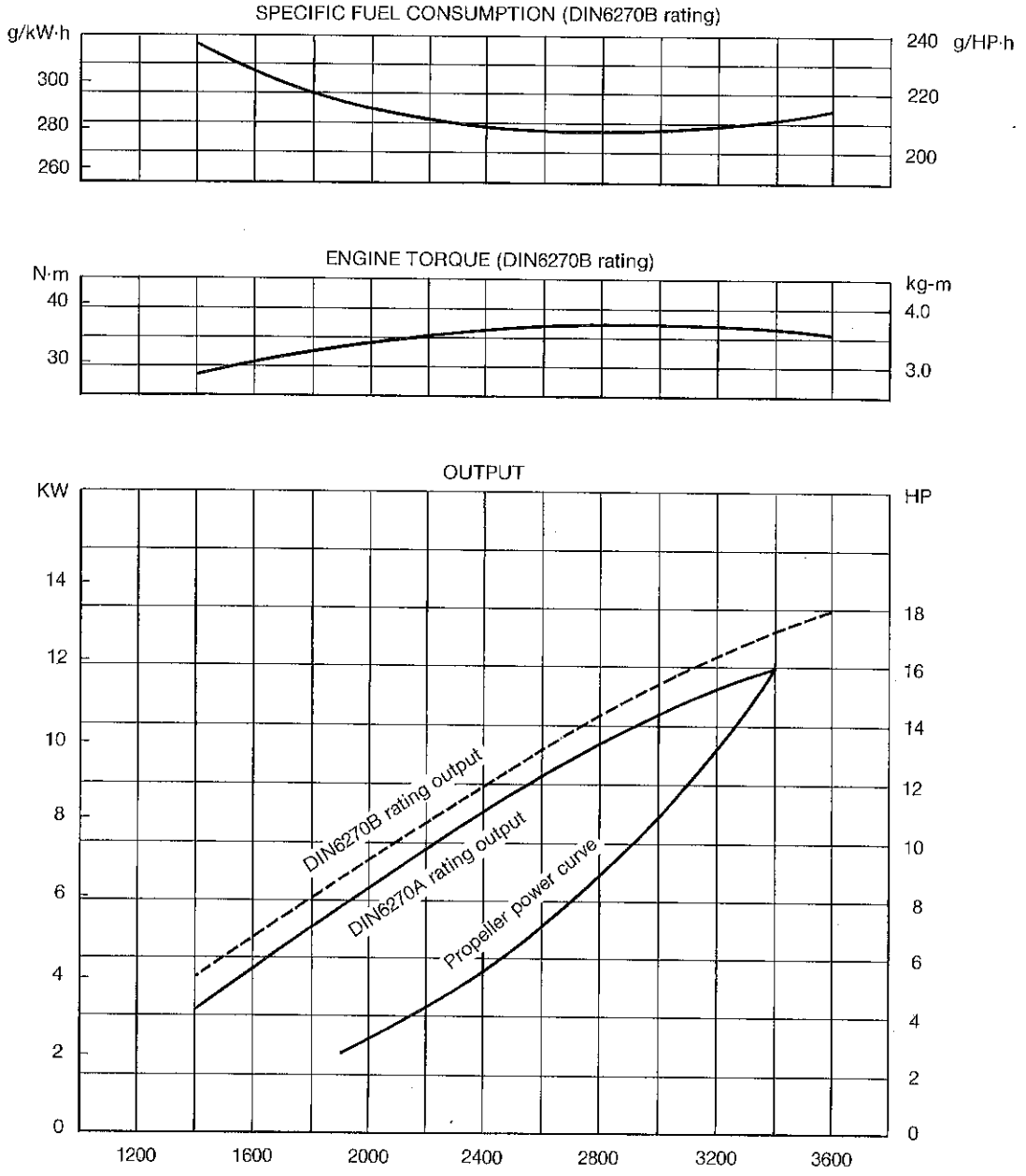
3-2 2GM20(F)(C)



SPEED OF CRANKSHAFT: rpm
THE ENGINE FLYWHEEL OUTPUT IS APPROX.3% HIGHER.

NOTE: These curves show the average performance of respective engine in test operation at our plant.

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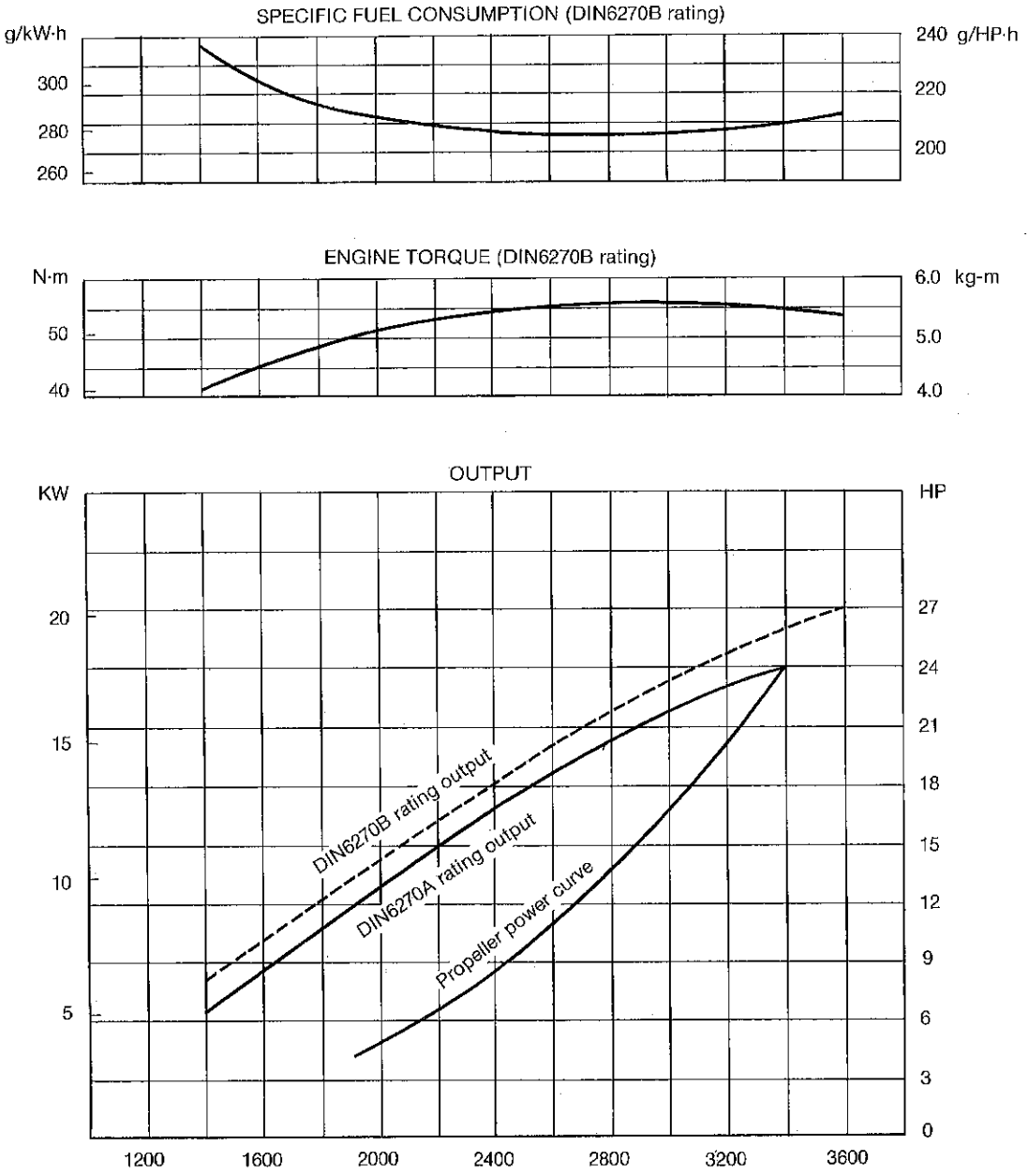
3-3 3GM30(F)(C)



SPEED OF CRANKSHAFT: rpm
THE ENGINE FLYWHEEL OUTPUT IS APPROX 3% HIGHER.

NOTE: These curves show the average performance of respective engine in test operation at our plant.

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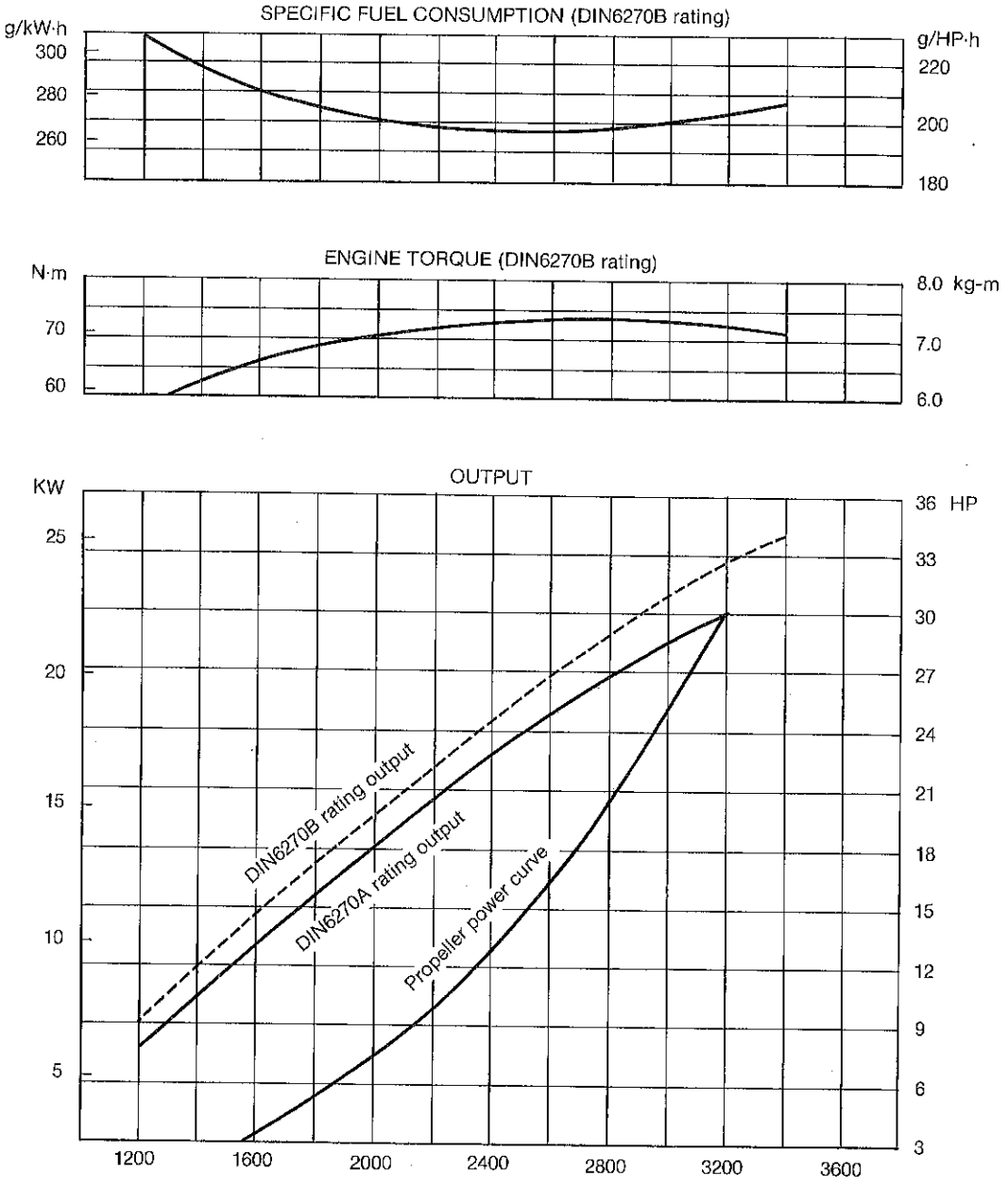
3-4 3HM35(F)(C)



NOTE: These curves show the average performance of respective engine in test operation at our plant.

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4. Features

4-1 Superior combustion performance

The unique Yanmar swirl precombustion chamber and new cooling system display superior combustion performance in all types of operation. Low-speed, low-load combustion performance, especially demanded for marine applications, is also superb, and stable performance is maintained over a wide range of speeds. Since starting characteristics are also excellent and warm-up is fast, full engine performance can be obtained within a short time.

4-2 Low operating costs

Excellent combustion and low friction reduce fuel costs, while the optimized piston shape ring configuration and improved cooling system reduce oil consumption. continuous operating time has been extended and operating costs reduced through improved durability.

4-3 Compact, lightweight

The cylinder head is the integrally-cast type, and the crankshaft is the housing type. Minimum weight has been pursued for each engine part, and a reduction reversing gear employing a special new mechanism has been incorporated to obtain revolutionary engine lightness.

4-4 Long term continuous operation

Improved durability has been achieved by adopting special construction and materials for main moving parts and the valve mechanism, which are the areas most subject to trouble in high-speed engines. Moreover, a bypass system with a thermostat maintains the cooling water at a stable high temperature, resulting in reduced cylinder liner and piston ring wear, reduced thermal load around the combustion chamber, and substantially improved durability. Long-term continuous operation is possible by correct operation and proper attention to fuel and lubricating oil.

4-5 Low vibration

Vibration has been reduced by minimizing the weights of the pistons, connecting rods, and other sources of vibration, stringent weight management at assembly, and balancing of the flywheel, V-pulley, etc. Vibration has also been suppressed through the adoption of a special cylinder block rib construction and improved rigidity. Rubber shock mounts are available when the engine is to be used under conditions which may lead to severe vibration.

4-6 Quiet operation

Intake and exhaust noises have been lowered by adopting an intake silencer, water-cooled exhaust manifold and water mixing elbow type exhaust system.
The precombustion chamber system and semi-throttle type injection valve suppress combustion noise substantially.
Moreover, gear noise has been reduced by the use of helical gears around the gear train and clutch gear, and by the buffering effect of a damper disc.
In addition, noise prevention measures have also been taken at the control valve mechanism and other parts.

4-7 Superior matching to the hull

(1) Four-point support engine installation feet make installation easy.
(2) Mist intake system prevents contamination of the engine room.
(3) Since the fuel pump is mounted on the engine, the fuel tank can be installed anywhere.
(4) Water-cooled manifold prevents a rise in the engine room temperature.
(5) Independent type instrument panel can be installed wherever it is easiest to see.
(6) Speed, clutch forward and reverse, and engine stop can all be remotely controlled.
(7) The use of rubber and vinyl hoses for ship interior piping not only facilitates piping work, but also eliminates brazing faults caused by vibration.
(8) Electric type bilge pump is available as an option.

4-8 Easy to operate

(1) Cooling water temperature switch and lubricating oil pressure switch are provided, and alarm lamps and buzzer are mounted on the instrument panel.
(2) Manual starting handle permits manual starting.
(Except model 3HM35(C) and fresh water cooling type)
(3) Positive clutch engagement and disengagement; propeller shaft does not rotate when clutch is placed in neutral position.

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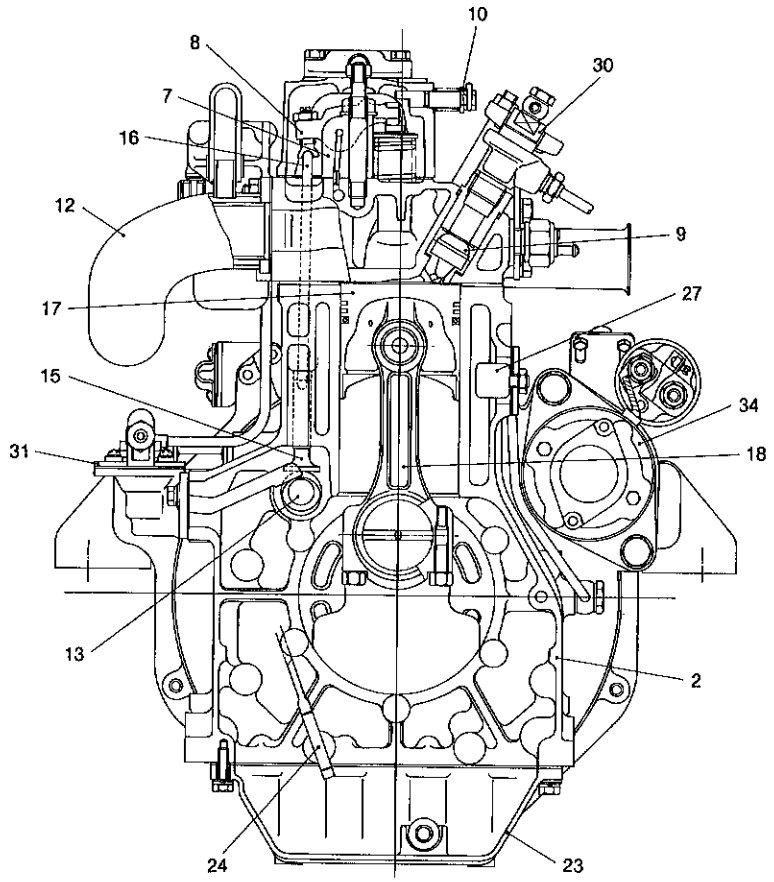
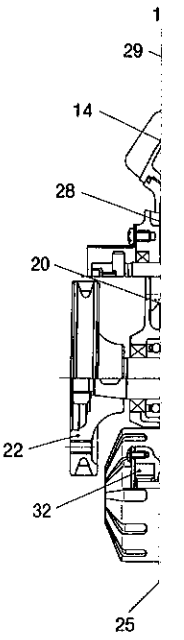
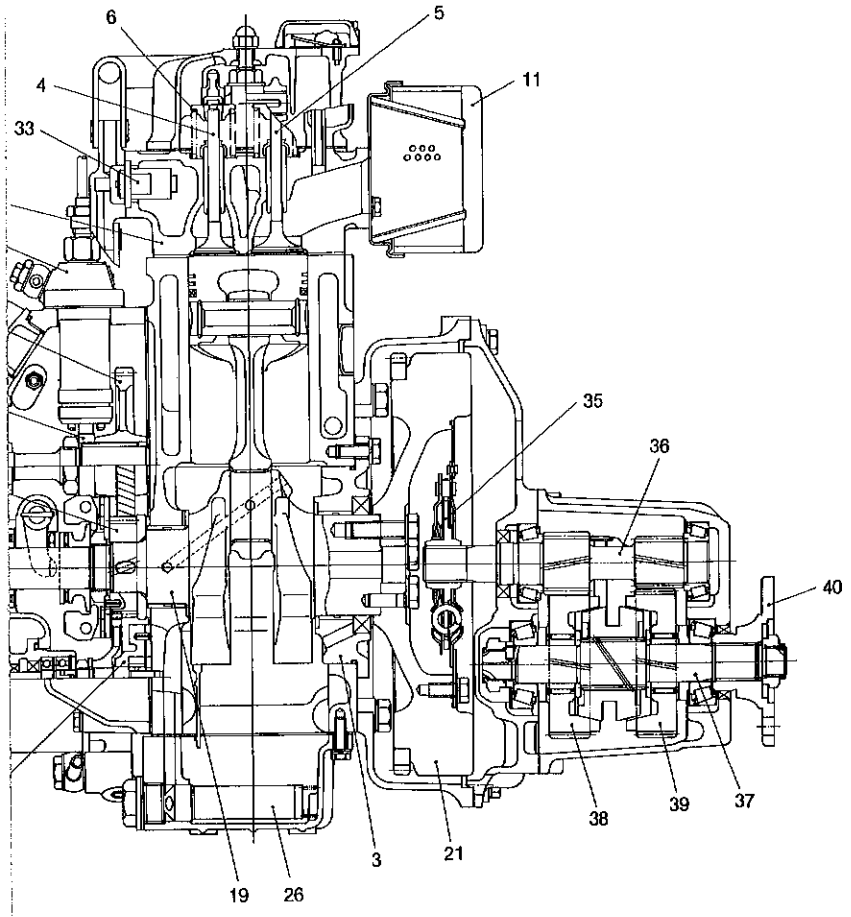
5. Engine Cross-Sections

5-1 1GM10





1. Cylinder head
2. Cylinder body
3. Main bearing housing
4. Exhaust valve
5. Intake valve
6. Valve spring
7. Valve rocker arm support
8. Valve rocker arm
9. Precombustion chamber
10. Decompression lever
11. Intake silencer
12. Mixing elbow
13. Camshaft
14. Camshaft gear
15. Tappet
16. Push rod
17. Piston
18. Connecting rod
19. Crankshaft
20. Crankshaft gear
21. Flywheel
22. Crankshaft V-pulley
23. Oil pan
24. Dipstick
25. Lubricating oil pump
26. Lubricating oil inlet pipe
27. Anticorrosion zinc
28. Fuel injection pump cam
29. Fuel injection pump
30. Fuel injection nozzle
31. Fuel feed pump
32. Cooling water pum
33. Thermostat
34. Starter motor
35. Damper disc
36. Input shaft
37. Output shaft
38. Forward large gear
39. Reverse large gear
40. Output shaft coupl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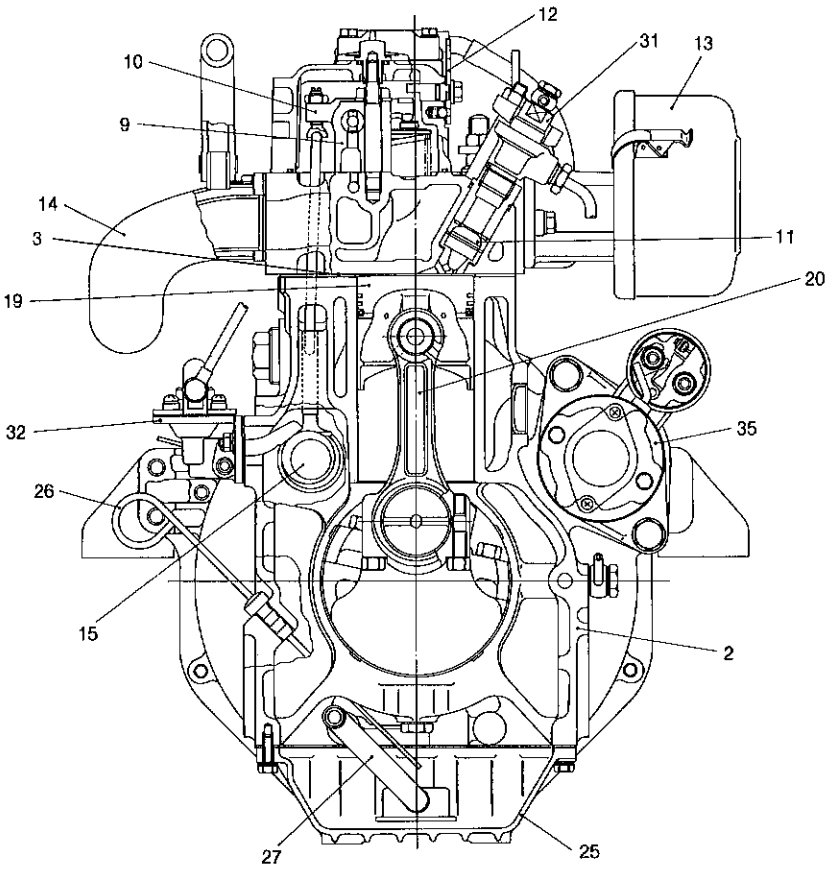
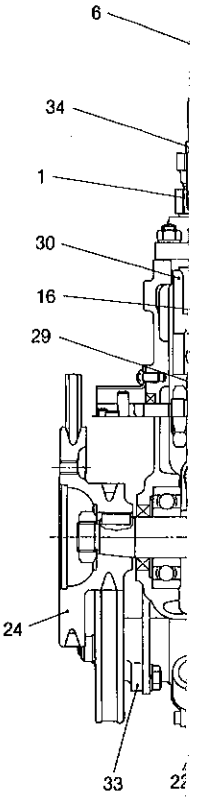
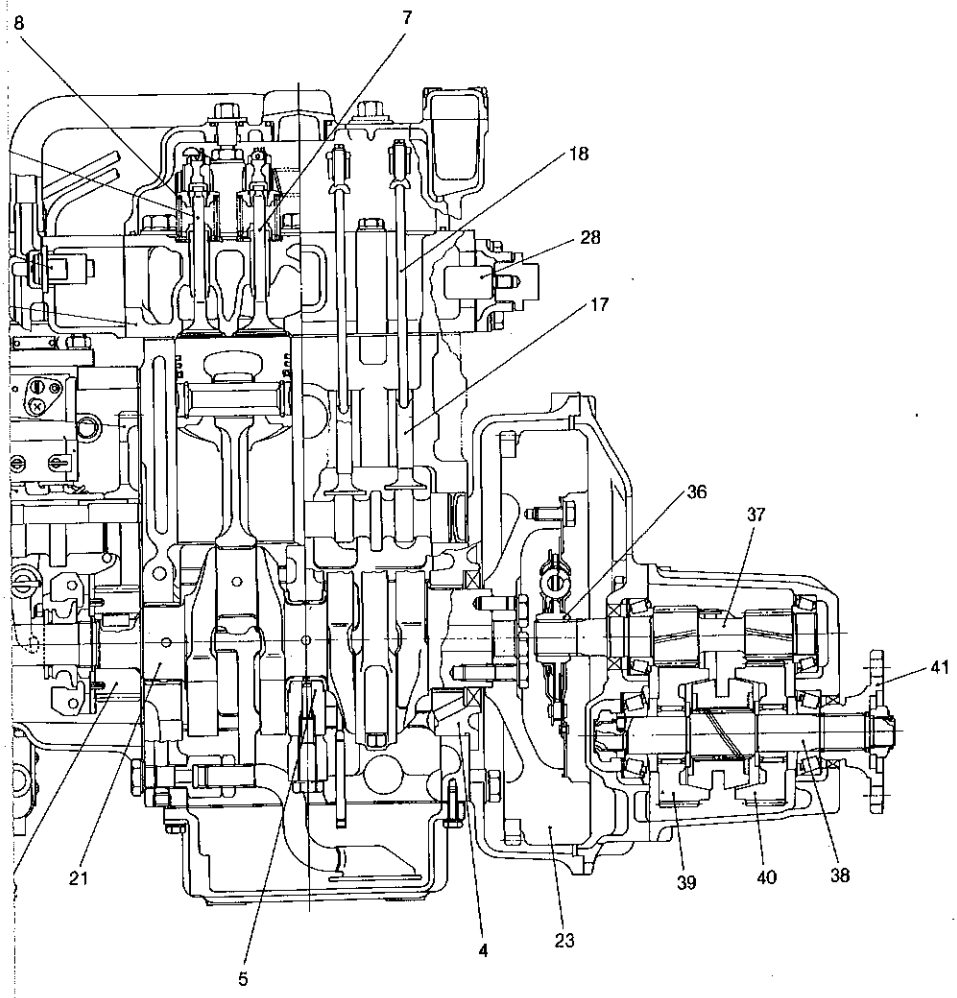
5-2 2GM20





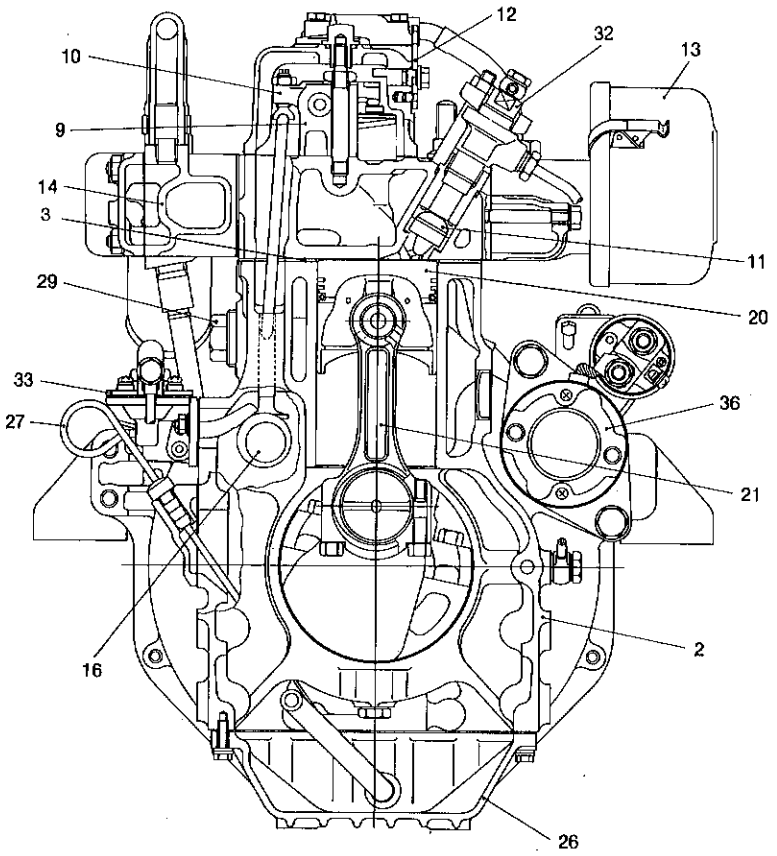
1. Cylinder head
2. Cylinder body
3. Cylinder head gasket
4. Main bearing housing
5. Intermediate main bearing housing
6. Exhaust valve
7. Intake valve
8. Valve spring
9. Valve rocker arm support
10. Valve rocker arm
11. Precombustion chamber
12. Decompression lever
13. Intake silencer
14. Exhaust manifold
15. Camshaft
16. Camshaft gear
17. Tappet
18. Push rod
19. Piston
20. Connecting rod
21. Crankshaft
22. Crankshaft gear
23. Flywheel
24. Crankshaft V-pulley
25. Oil pan
26. Dipstick
27. Lubricating oil inlet pipe
28. Anticorrosion zinc
29. Fuel injection pump cam
30. Fuel injection pump
31. Fuel
32. Fuel
33. Coo
34. Ther
35. Star
36. Dam
37. Inpu
38. Outp
39. Forv
40. Revo

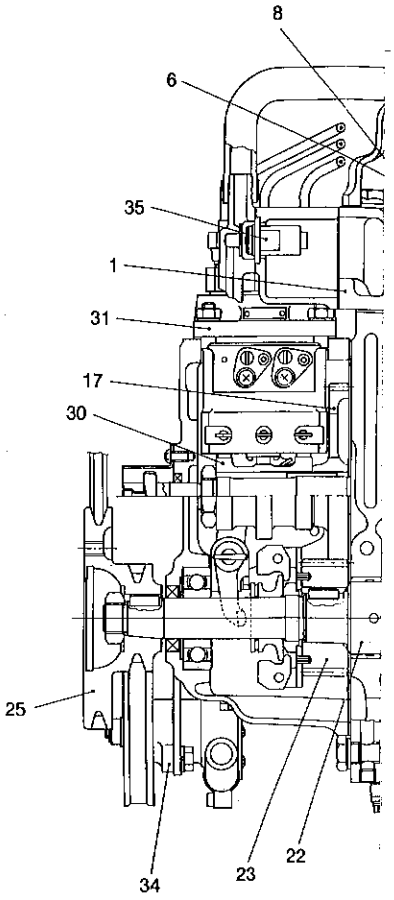


injection nozzle
feed pump
ling water pump
mostat
ter motor
per disc
t shaft
out shaft
vard large gear
erse large gear

41. Output shaft coupling

5-3 3GM30





1. Cylinder head
2. Cylinder body
3. Cylinder head gasket
4. Main bearing housing
5. Intermediate main bearing housing
6. Exhaust valve
7. Intake valve
8. Valve spring
9. Valve rocker arm support
10. Valve rocker arm
11. Precombustion chamber
12. Decompression lever
13. Intake silencer
14. Exhaust manifold
15. Mixing elbow
16. Camshaft
17. Camshaft gear
18. Tappet
19. Push rod
20. Piston
21. Connecting rod
22. Crankshaft
23. Crankshaft gear
24. Flywheel
25. Crankshaft V-pulley
26. Oil pan
27. Dipstick
28. Lubricating oil inlet pipe
29. Anticorrosion zinc
30. Fuel injection pump cam
31. Fuel inject
32. Fuel inject
33. Fuel feed
34. Cooling wa
35. Thermosta
36. Starter mo
37. Damper di
38. Input shaft
39. Output sha
40. Forward la

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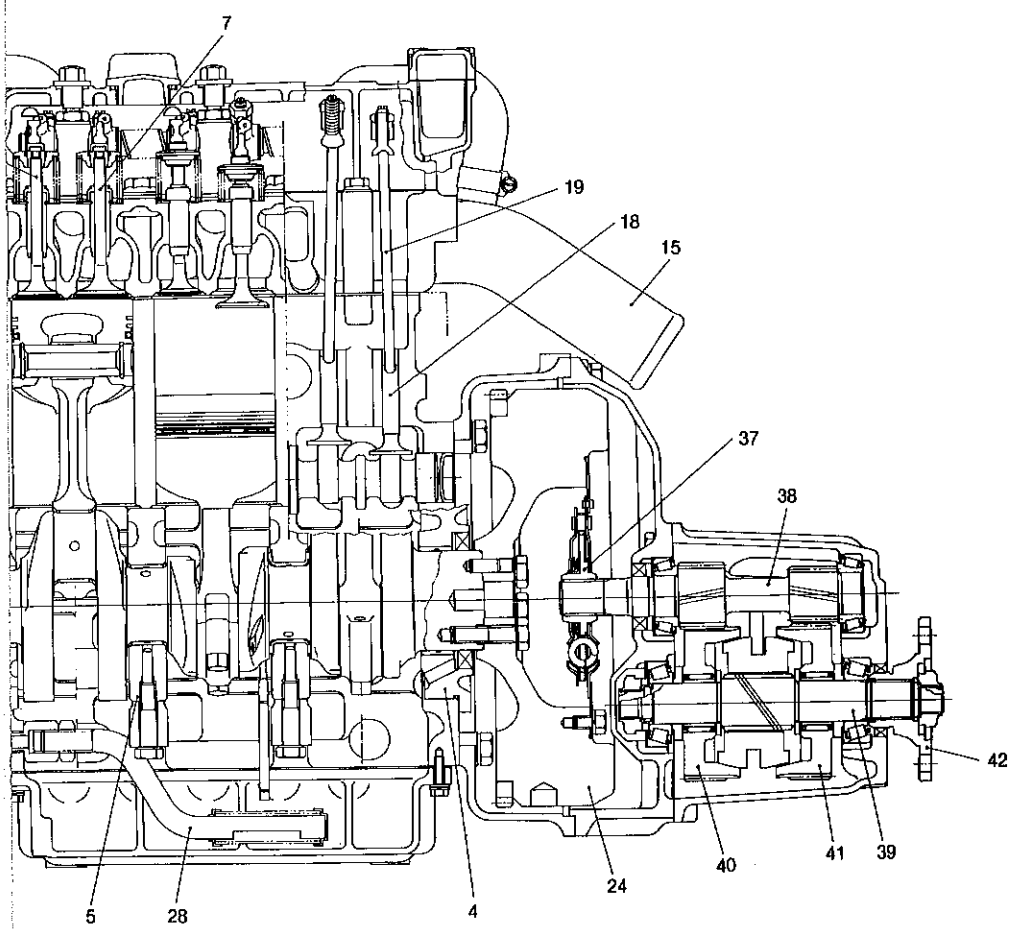

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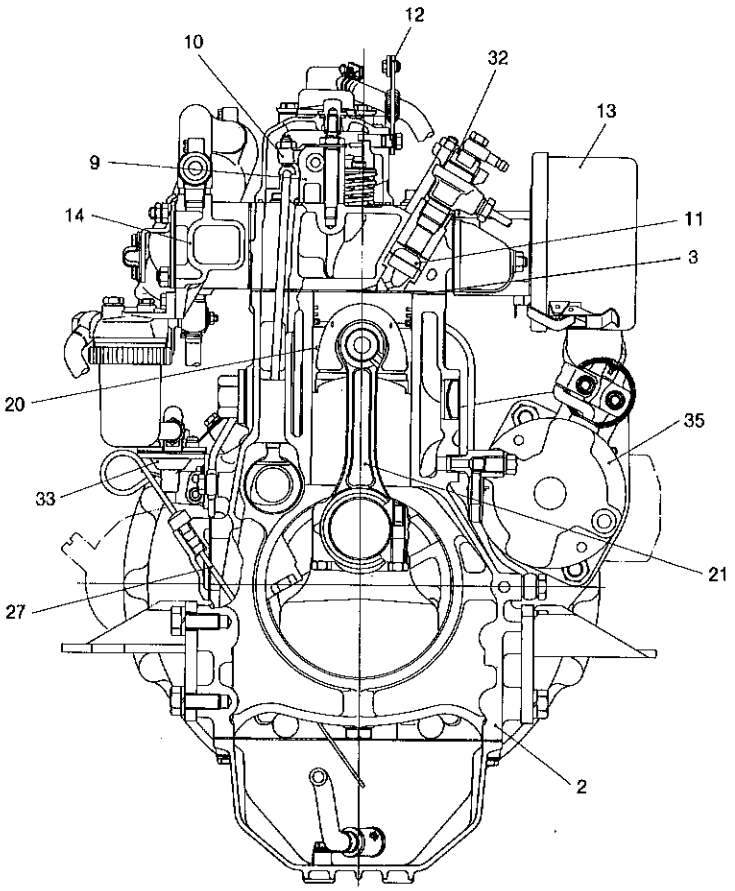
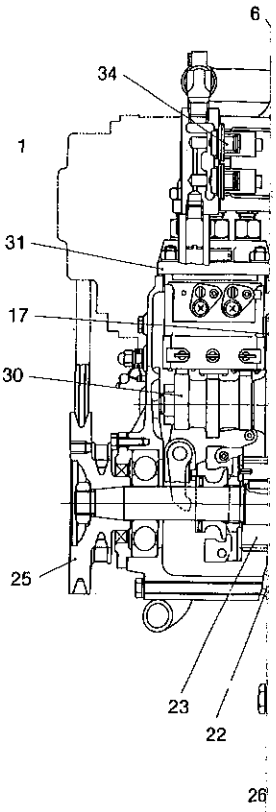
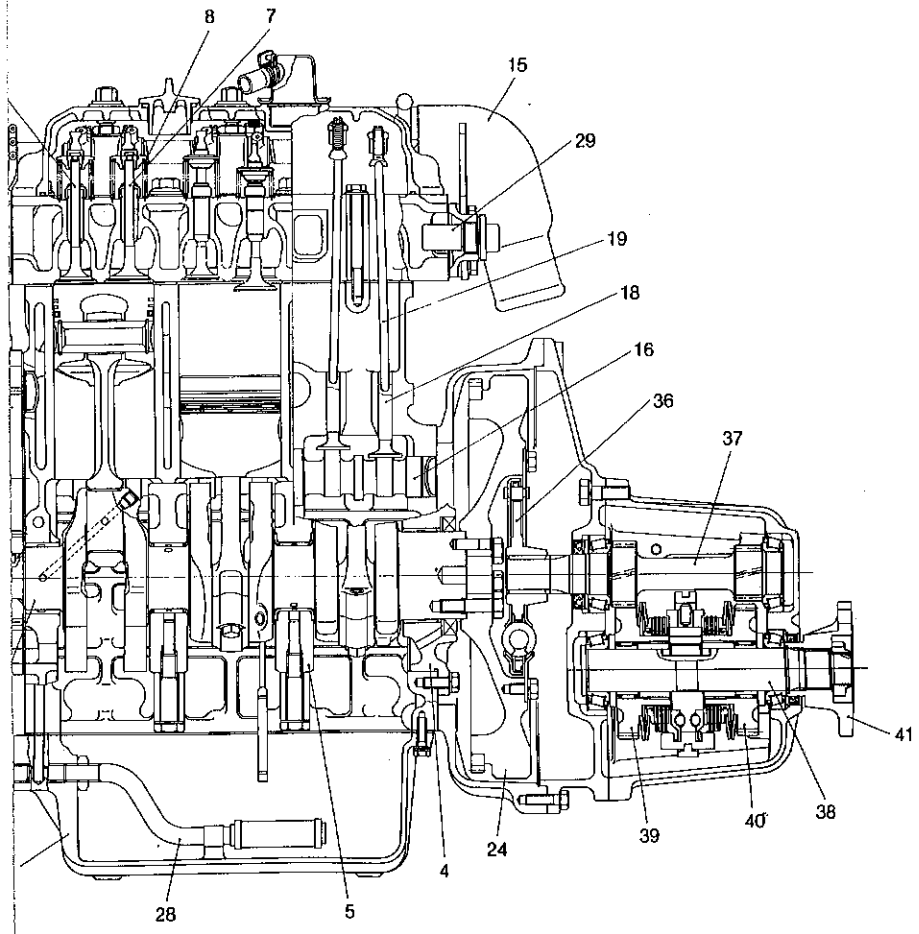
41. Reverse large gear
42. Output shaft coupling

5-4 3HM35





1. Cylinder head
2. Cylinder body
3. Cylinder head gasket
4. Main bearing housing
5. Intermediate main bearing housing
6. Exhaust valve
7. Intake valve
8. Valve spring
9. Valve rocker arm support
10. Valve rocker arm
11. Precombustion chamber
12. Decompression lever
13. Intake silencer
14. Exhaust manifold
15. Mixing elbow
16. Camshaft
17. Camshaft gear
18. Tappet
19. Push rod
20. Piston
21. Connecting rod
22. Crankshaft
23. Crankshaft gear
24. Flywheel
25. Crankshaft V-pulley
26. Oil pan
27. Dipstick
28. Lubricating oil inlet pipe
29. Anticorrosion zinc
30. Fuel injection pump cam
31. Fuel injec
32. Fuel injec
33. Fuel feed
34. Thermost
35. Starter mo
36. Damper d
37. Input shaf
38. Output sh
39. Forward l
40. Reverse l



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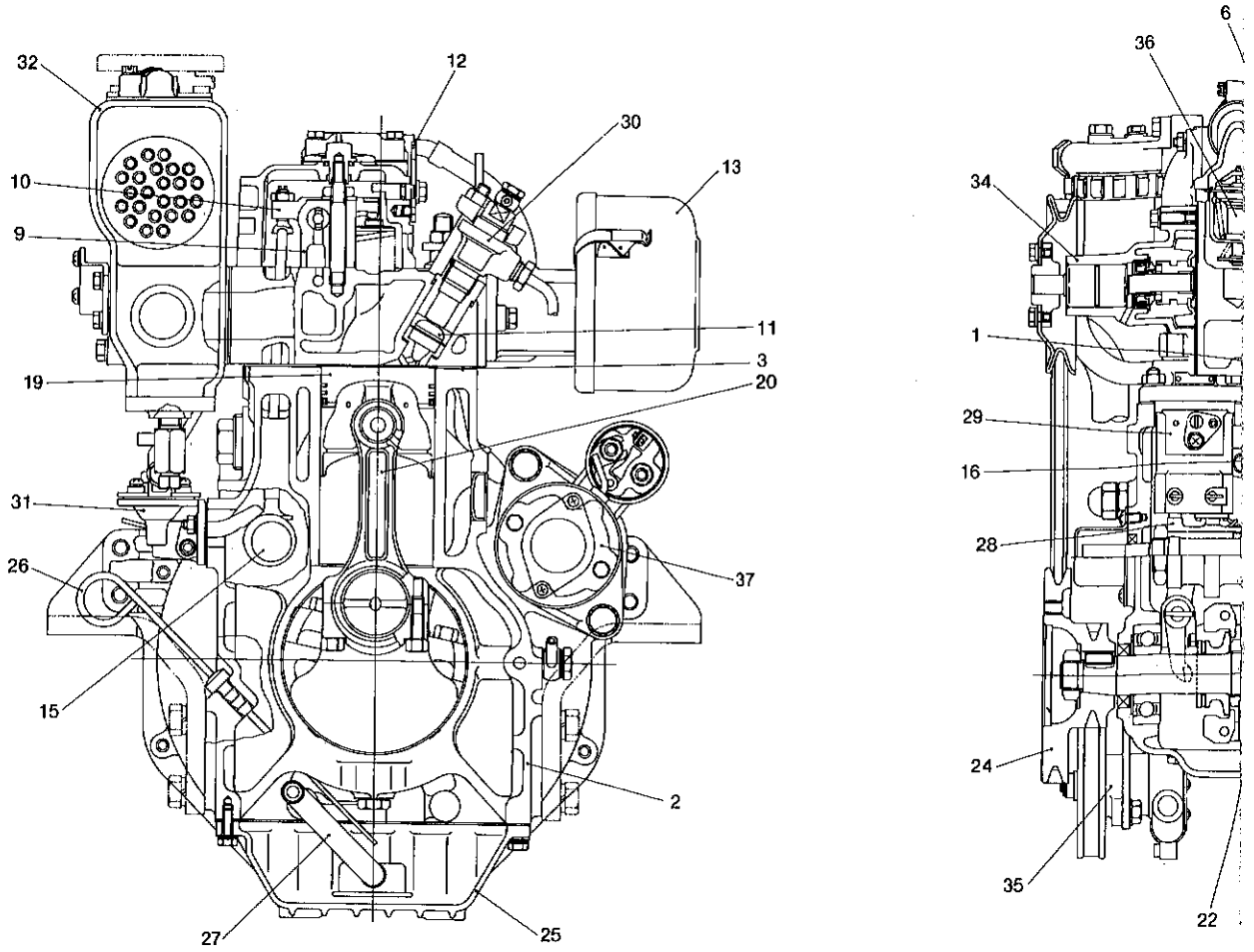
rge gear

41. Output shaft coupling

5-5 2GM20F



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22. Crankshaft gear
23. Flywheel
24. Crankshaft V-pulley
25. Oil pan
26. Dipstick
27. Lubricating oil inlet pipe
28. Fuel injection pump cam
29. Fuel injection pump
30. Fuel injection nozzle
31. Fuel f
32. Heat
33. Press
34. Coolir
35. Coolir
36. Therm
37. Starte
38. Damp
39. Input
40. Outpu

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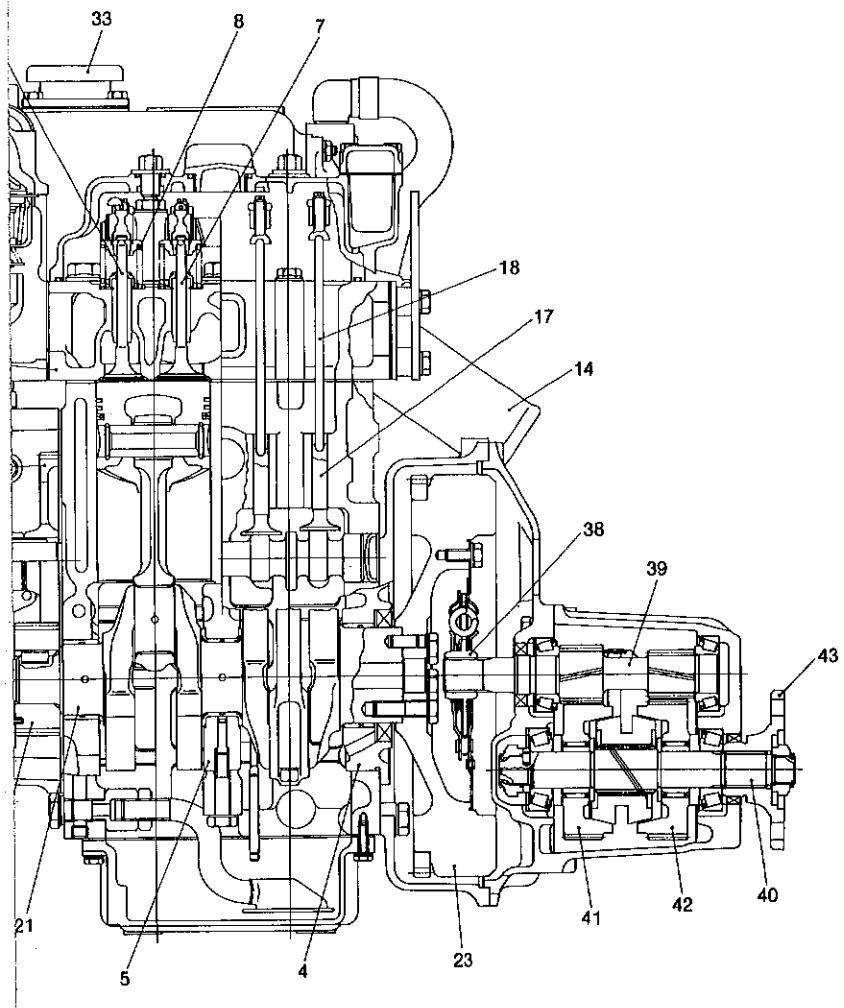

eed pump
xchanger & exhaust manifold
re control valve
g fresh water pump
g sea water pump
ostat
motor
r disc
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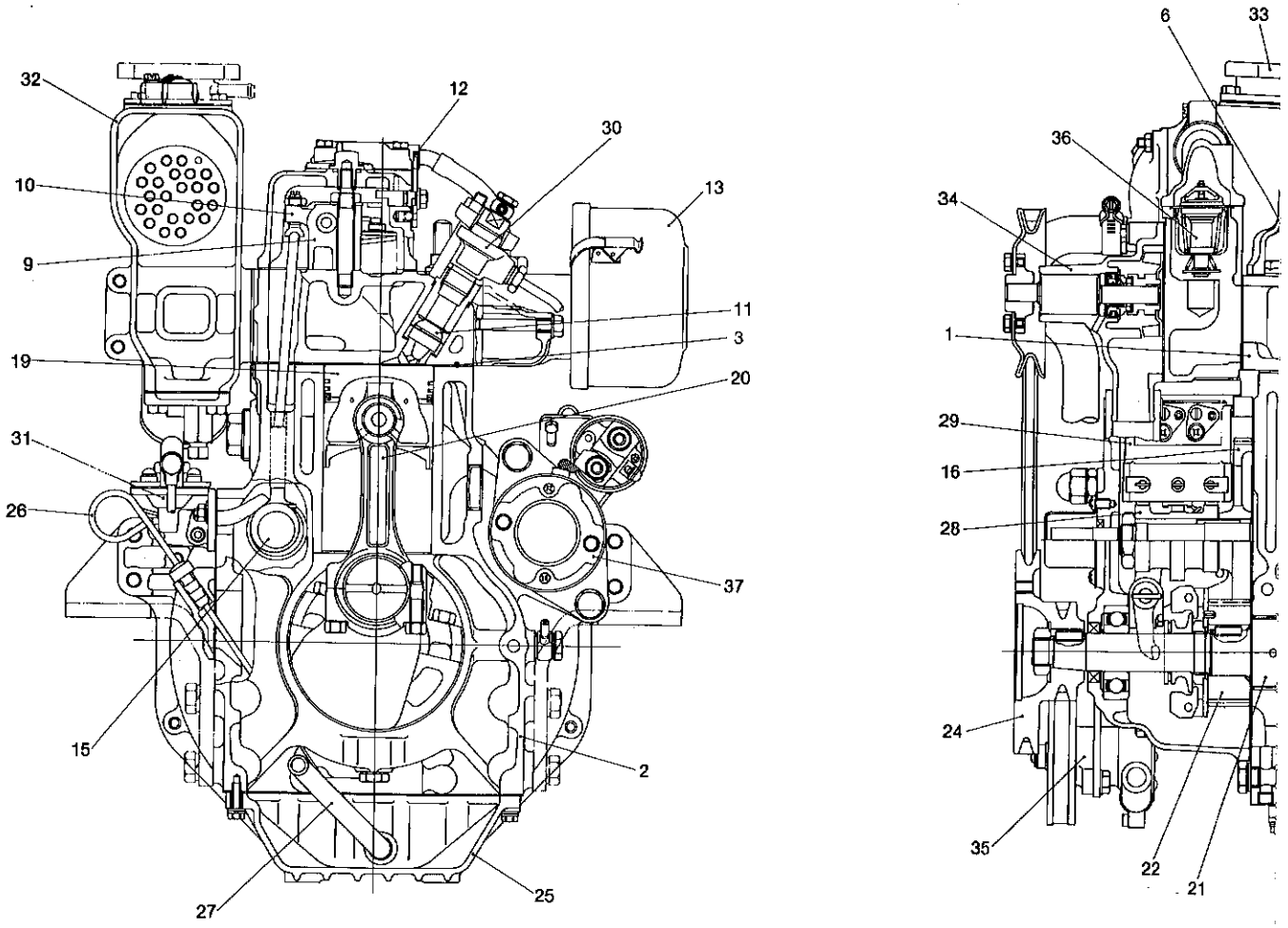
shaft

41. Forward large gear
42. Reverse large gear
43. Output shaft coupling

5-6 3GM30F



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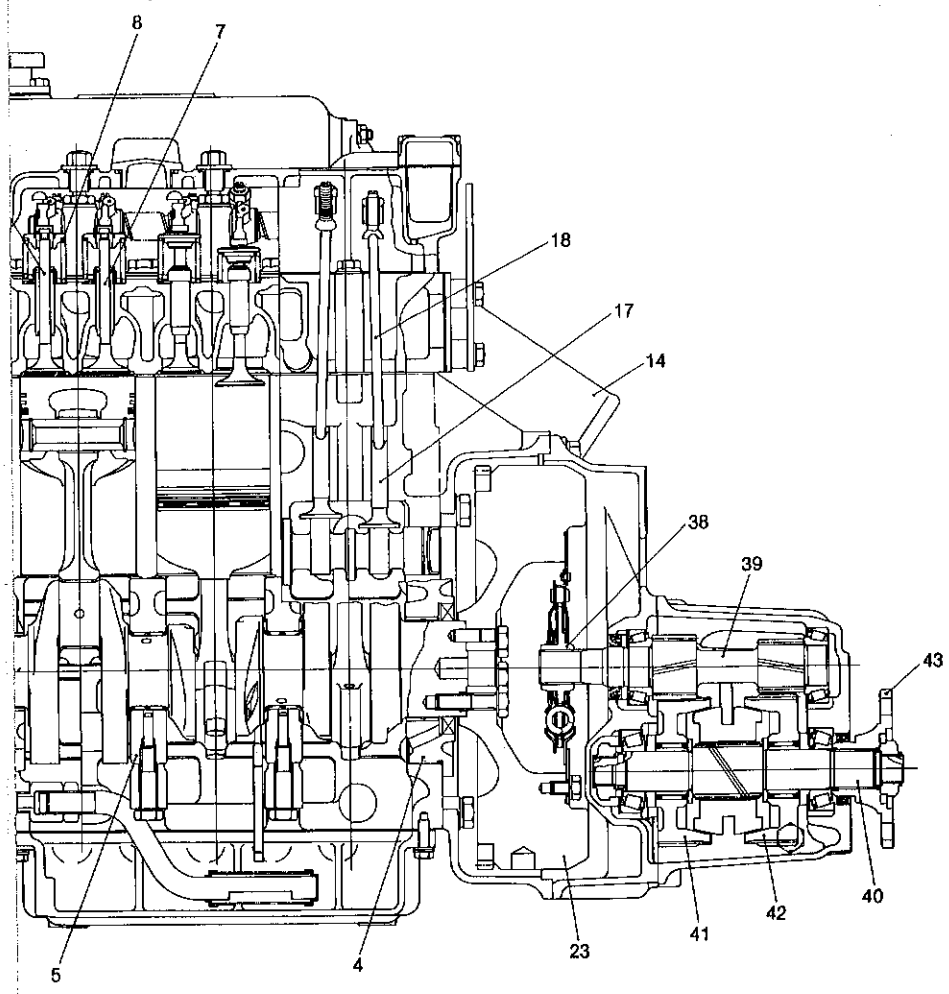
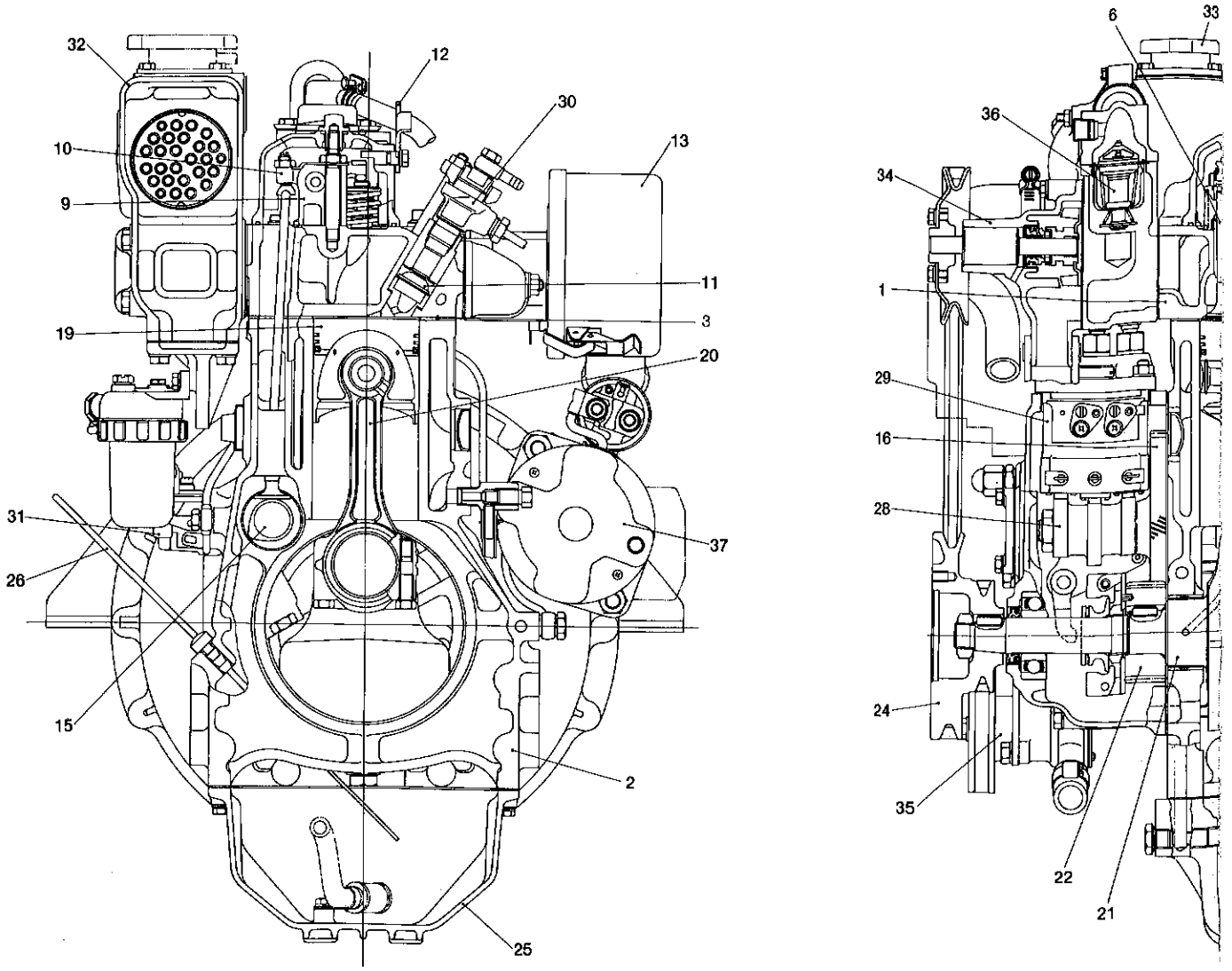
23. Flywheel
24. Crankshaft V-pulley
25. Oil pan
26. Dipstick
27. Lubricating oil inlet pipe
28. Fuel injection pump cam
29. Fuel injection pump
30. Fuel injection nozzle
31. Fuel feed pum
32. Heat exchangi
33. Pressure conti
34. Cooling fresh
35. Cooling sea w
36. Thermostat
37. Starter motor
38. Damper disc
39. Input shaft
40. Output shaft



)p
er & exhaust manifold
ol valve
water pump
ater pump

41. Forward large gear
42. Reverse large gear
43. Output shaft coupling

5-7 3HM35F



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27. Lubricating oil inlet pipe
28. Fuel injection pump cam
29. Fuel injection pump
30. Fuel injection nozzle
31. Fuel feed pump
32. Heat exchanger & exh
33. Pressure control valve
34. Cooling fresh water p
35. Cooling sea water pu
36. Thermostat
37. Starter motor
38. Damper disc
39. Input shaft
40. Output shaft

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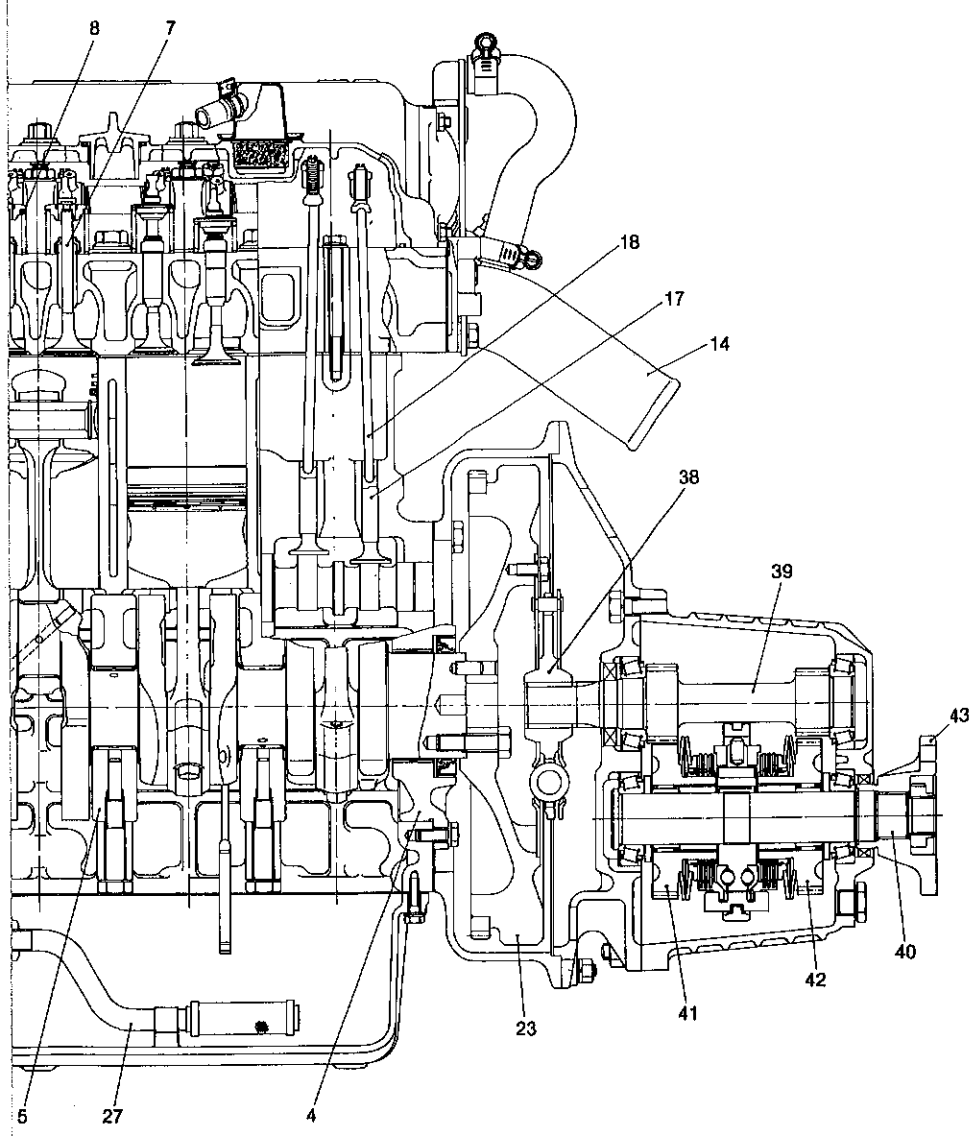

aust manifold
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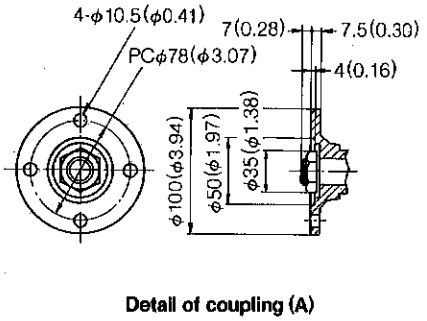
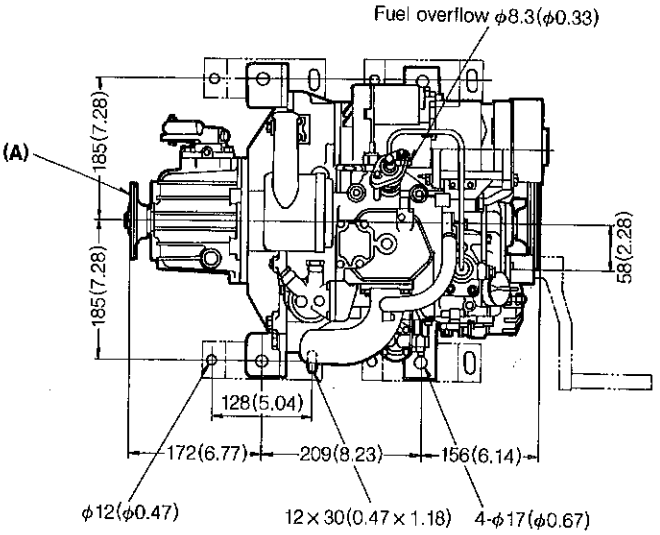
41. Forward large gear
42. Reverse large gear
43. Output shaft coupling

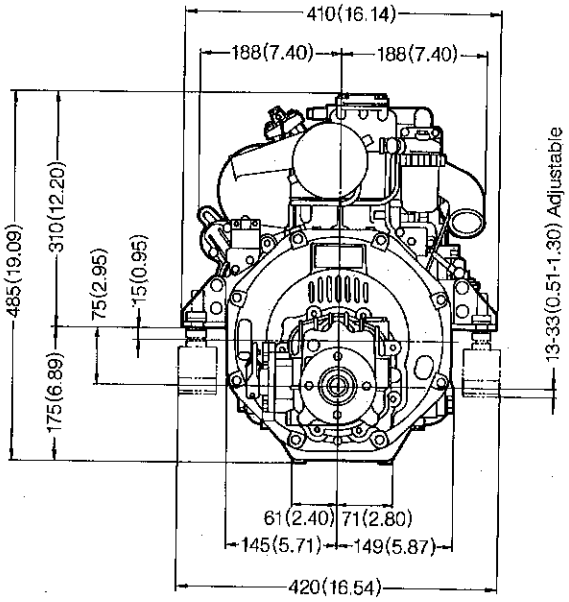
6. Dimensions

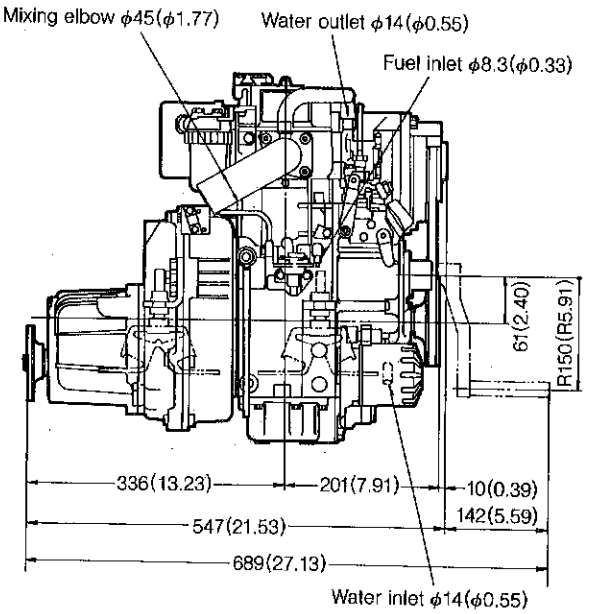
6-1 1GM10



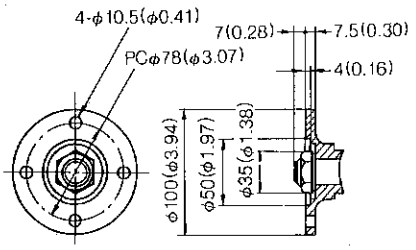
Detail of coupling (A)



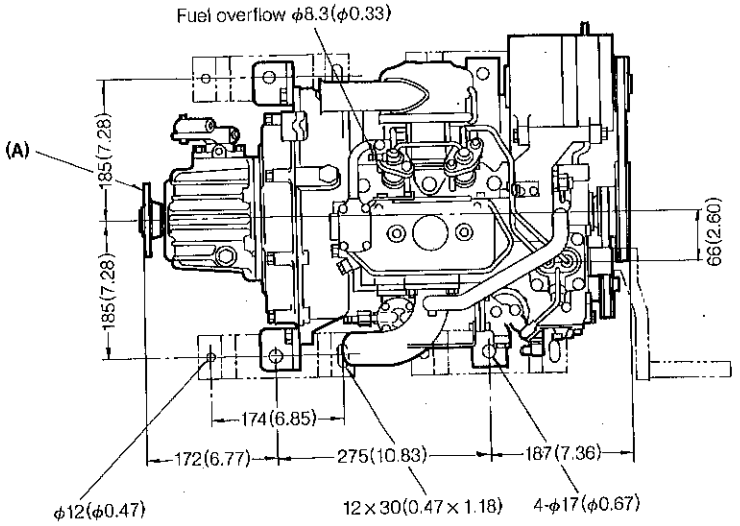


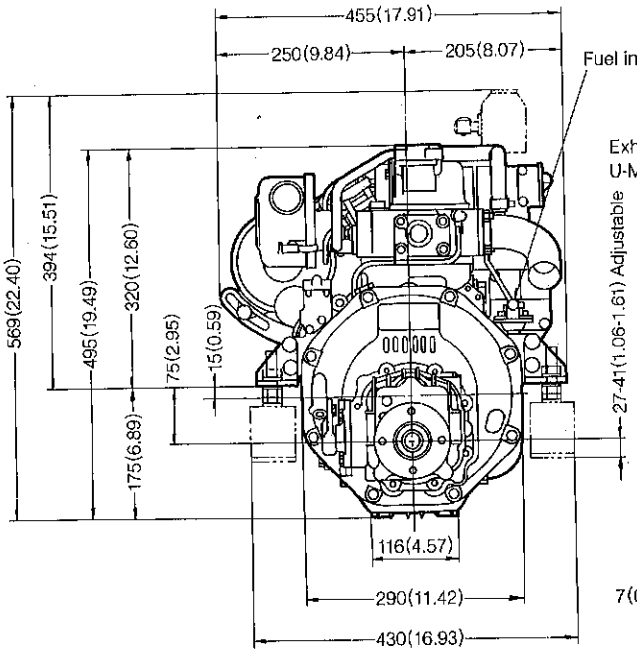


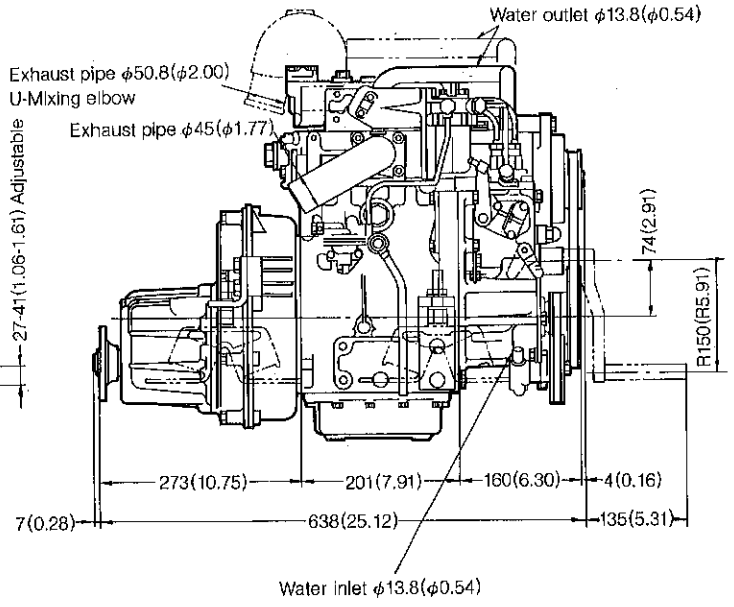
6-2 2GM20



Detail of coupling (A)







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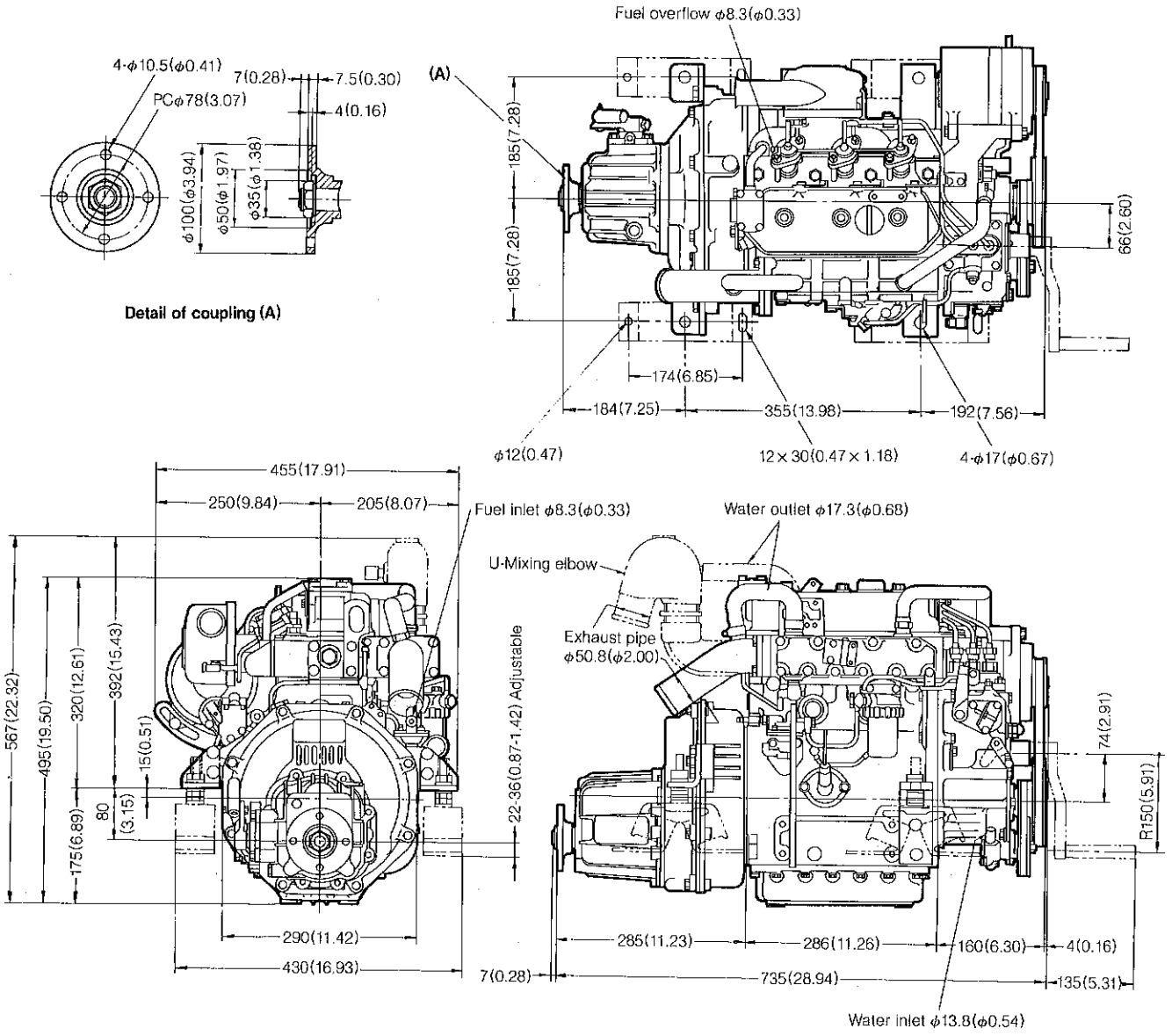
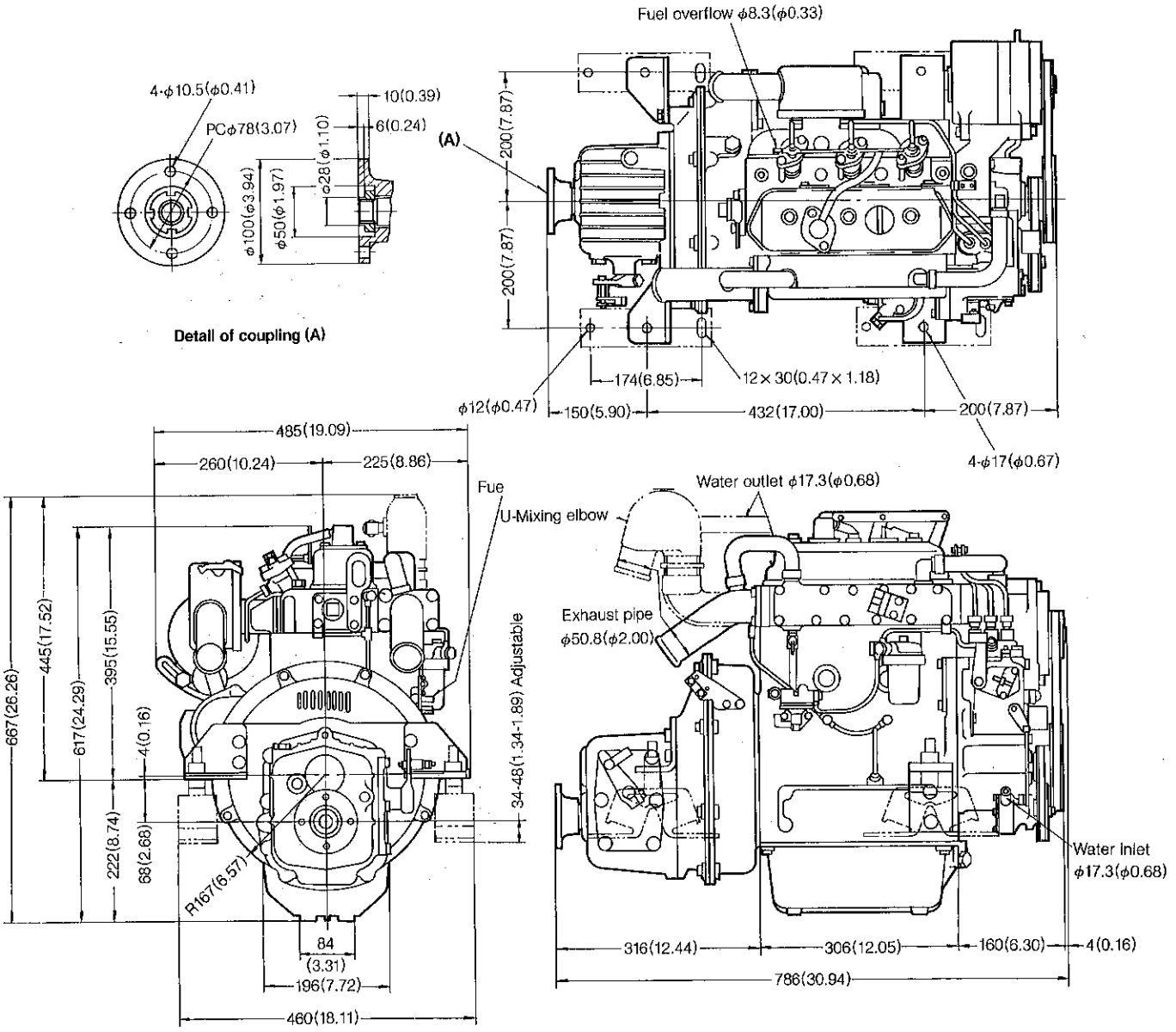
6-3 3GM30


4-φ10.5(φ0.41)
PCφ78(3.07)
7(0.28)
7.5(0.30)
4(0.16)
φ100(φ3.94)
φ50(φ1.97)
φ35(φ1.38)
Detail of coupling (A)
(A)
Fuel overflow φ8.3(φ0.33)
185(7.28)
185(7.28)
66(2.60)
174(6.85)
184(7.25)
355(13.98)
192(7.56)
φ12(0.47)
12×30(0.47×1.18)
4-φ17(φ0.67)
455(17.91)
250(9.84)
205(8.07)
Fuel inlet φ8.3(φ0.33)
Water outlet φ17.3(φ0.68)
U-Mixing elbow
Exhaust pipe
φ50.8(φ2.00)
567(22.32)
495(19.50)
320(12.61)
392(15.43)
15(0.51)
80
(3.15)
175(6.89)
22-36(0.87-1.42) Adjustable
74(2.91)
R150(5.91)
290(11.42)
430(16.93)
285(11.23)
286(11.26)
160(6.30)
4(0.16)
7(0.28)
735(28.94)
135(5.31)
Water inlet φ13.8(φ0.54)

6-4 3HM35



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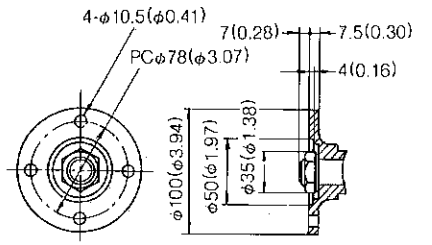
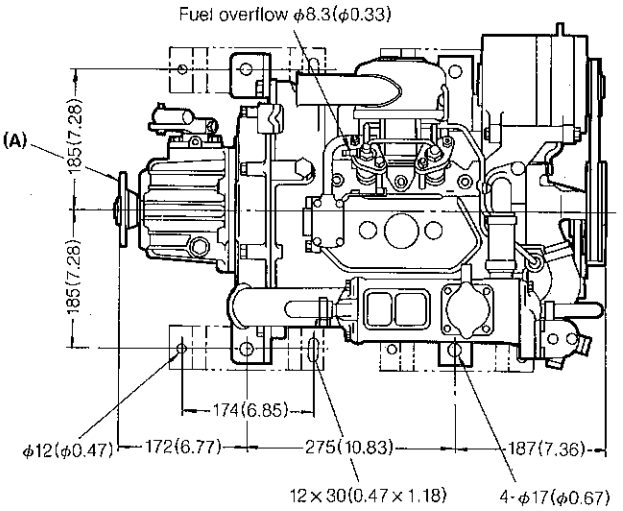
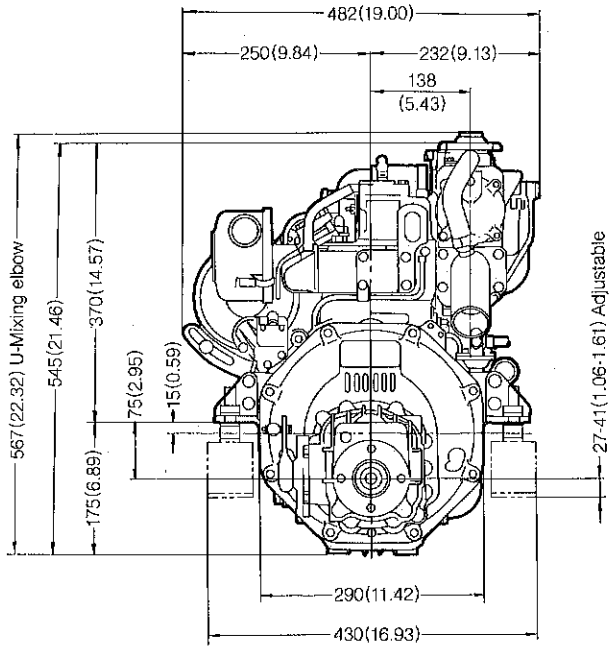
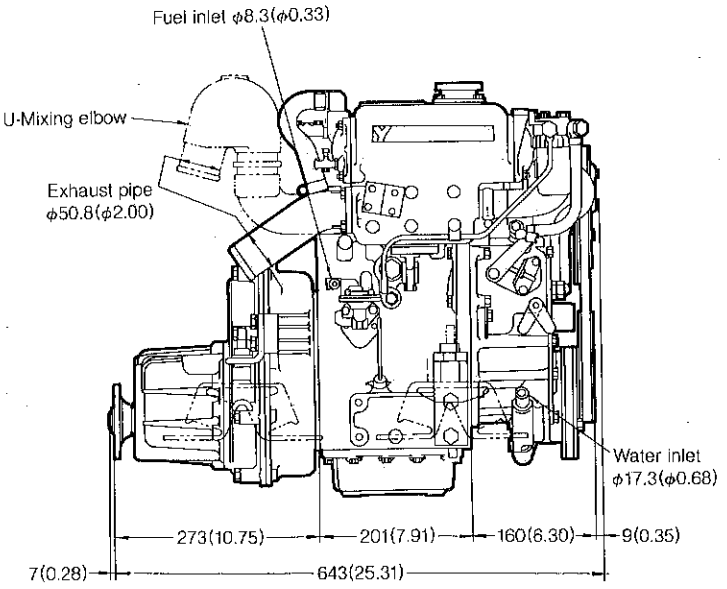
6-5 2GM20F



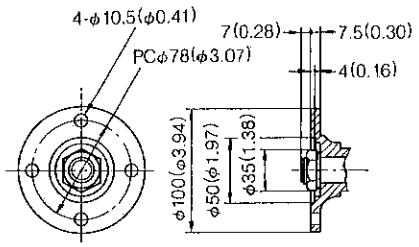
Detail of coupling (A)



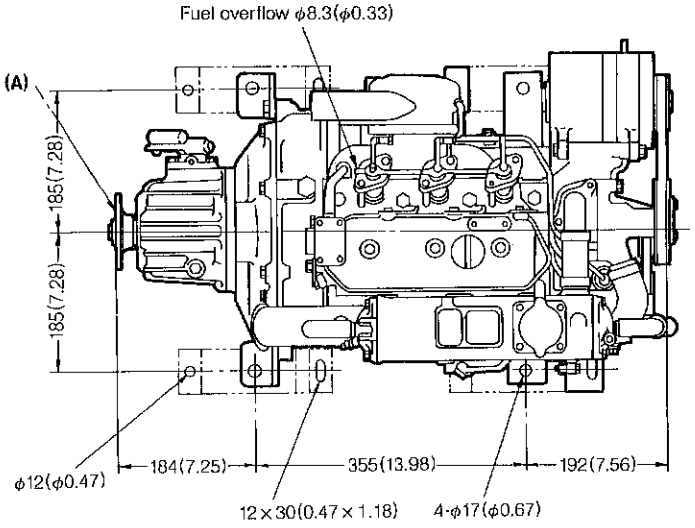


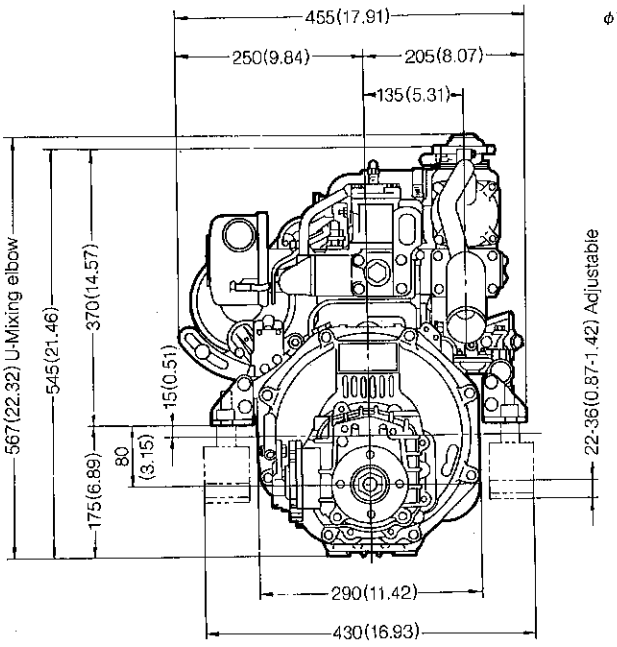


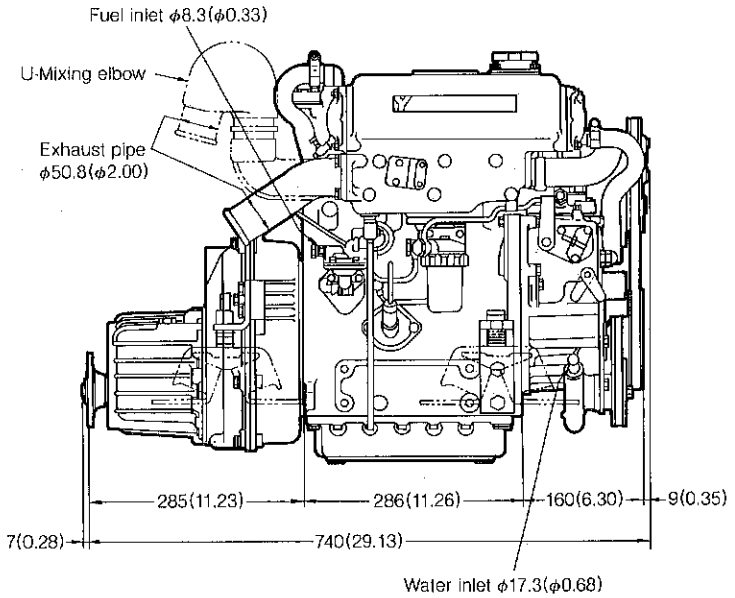
6-6 3GM30F



Detail of coupling (A)







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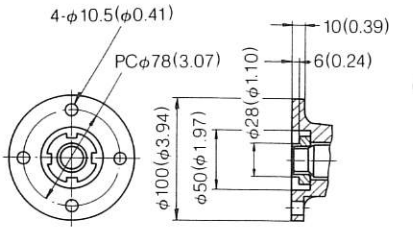
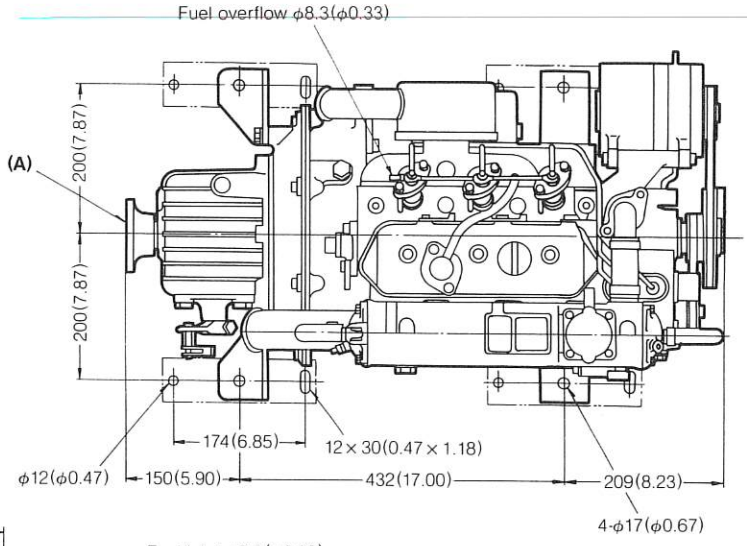
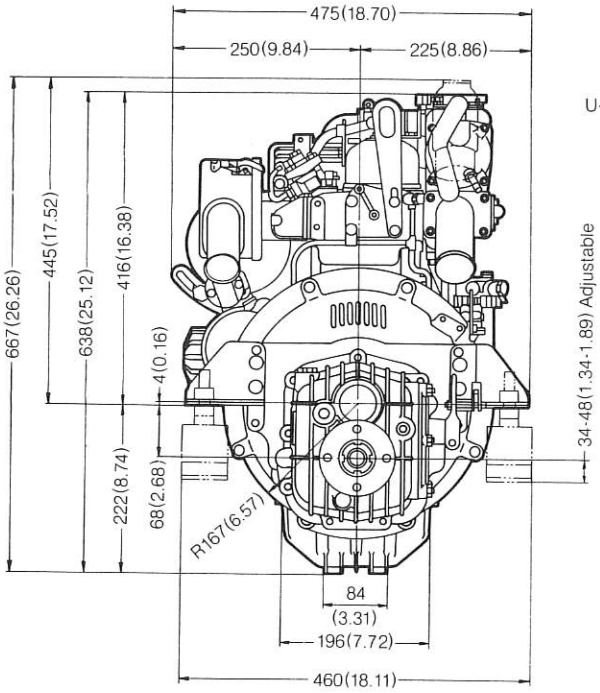
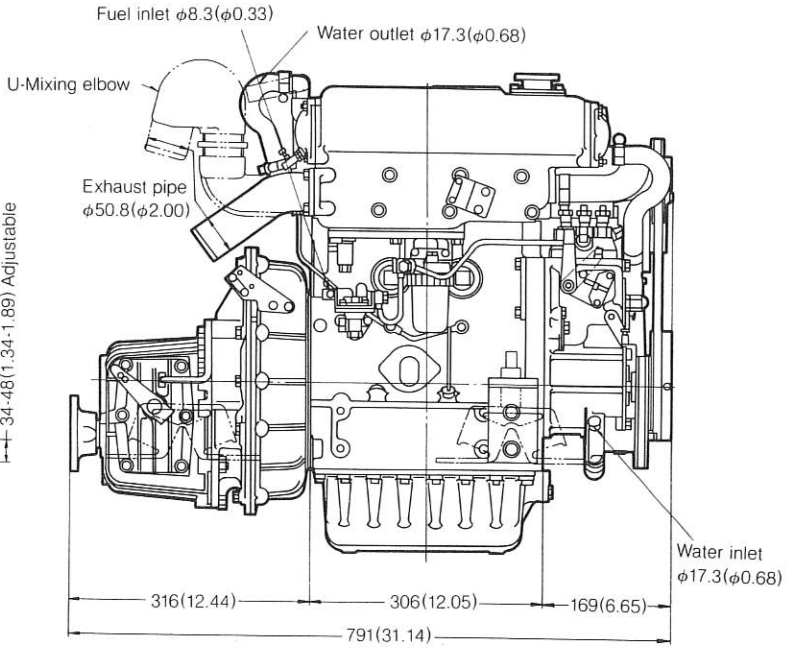
6-7 3HM35F



Detail of coupling (A)

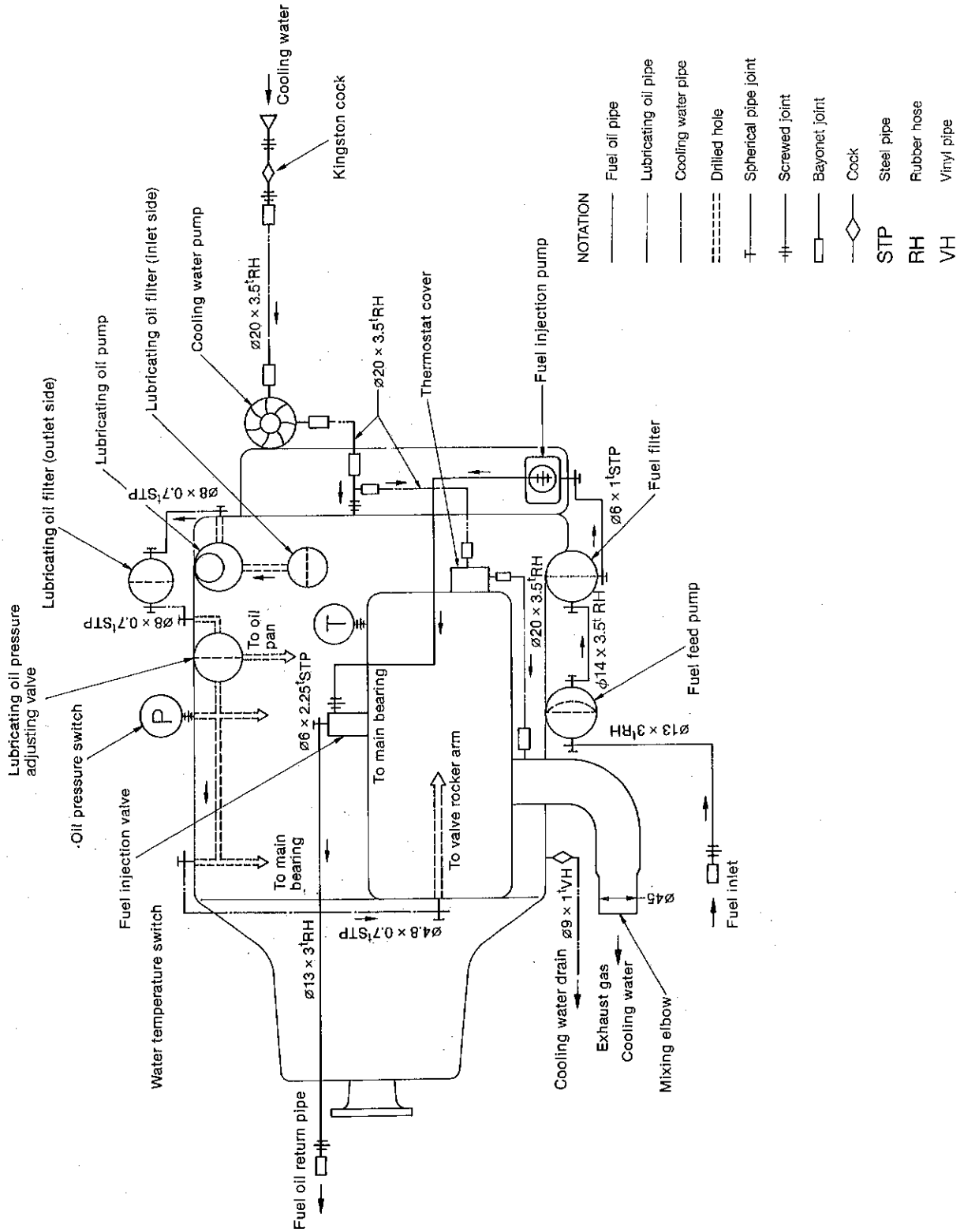






7. Piping Diagrams

7-1 1GM10



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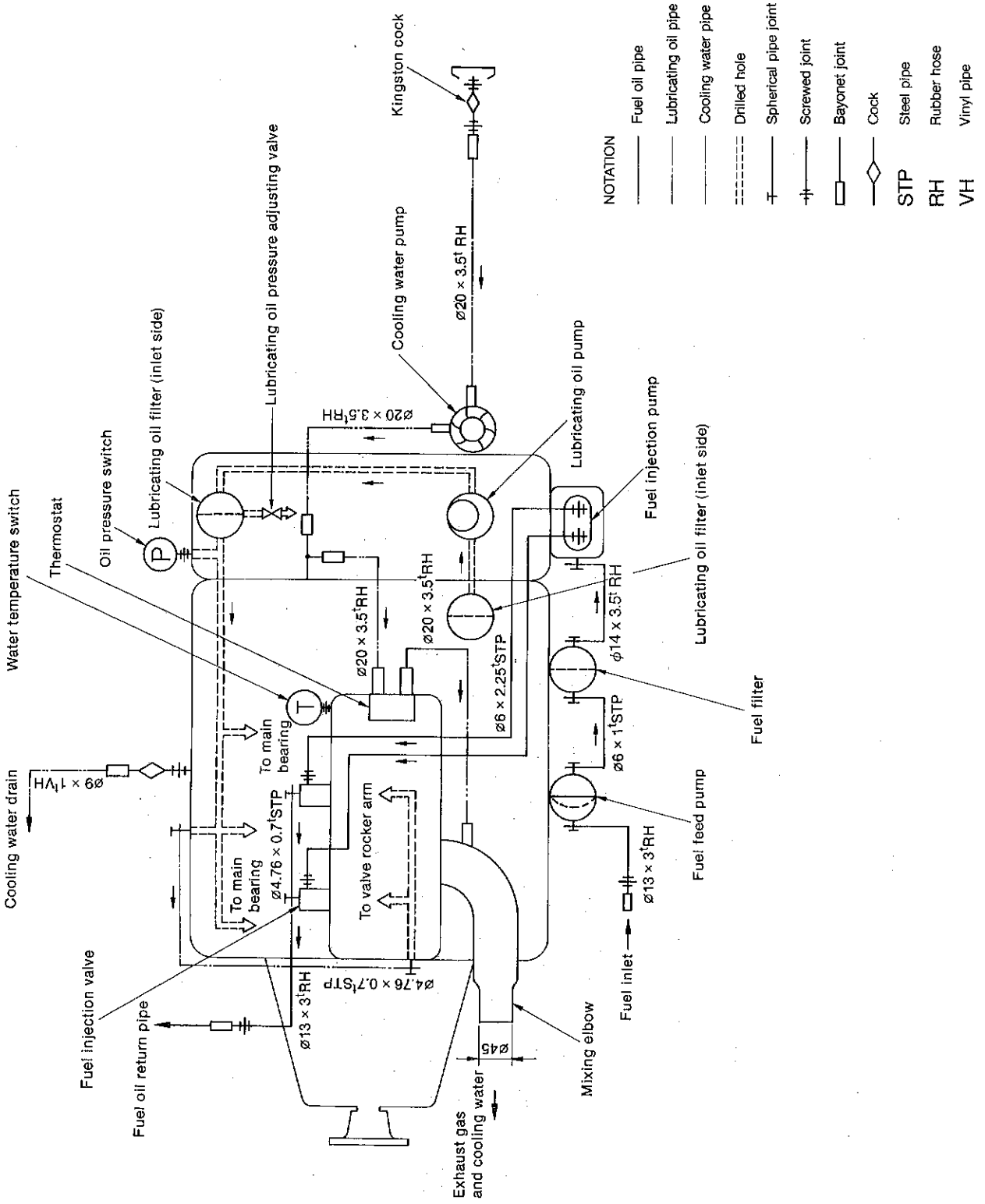
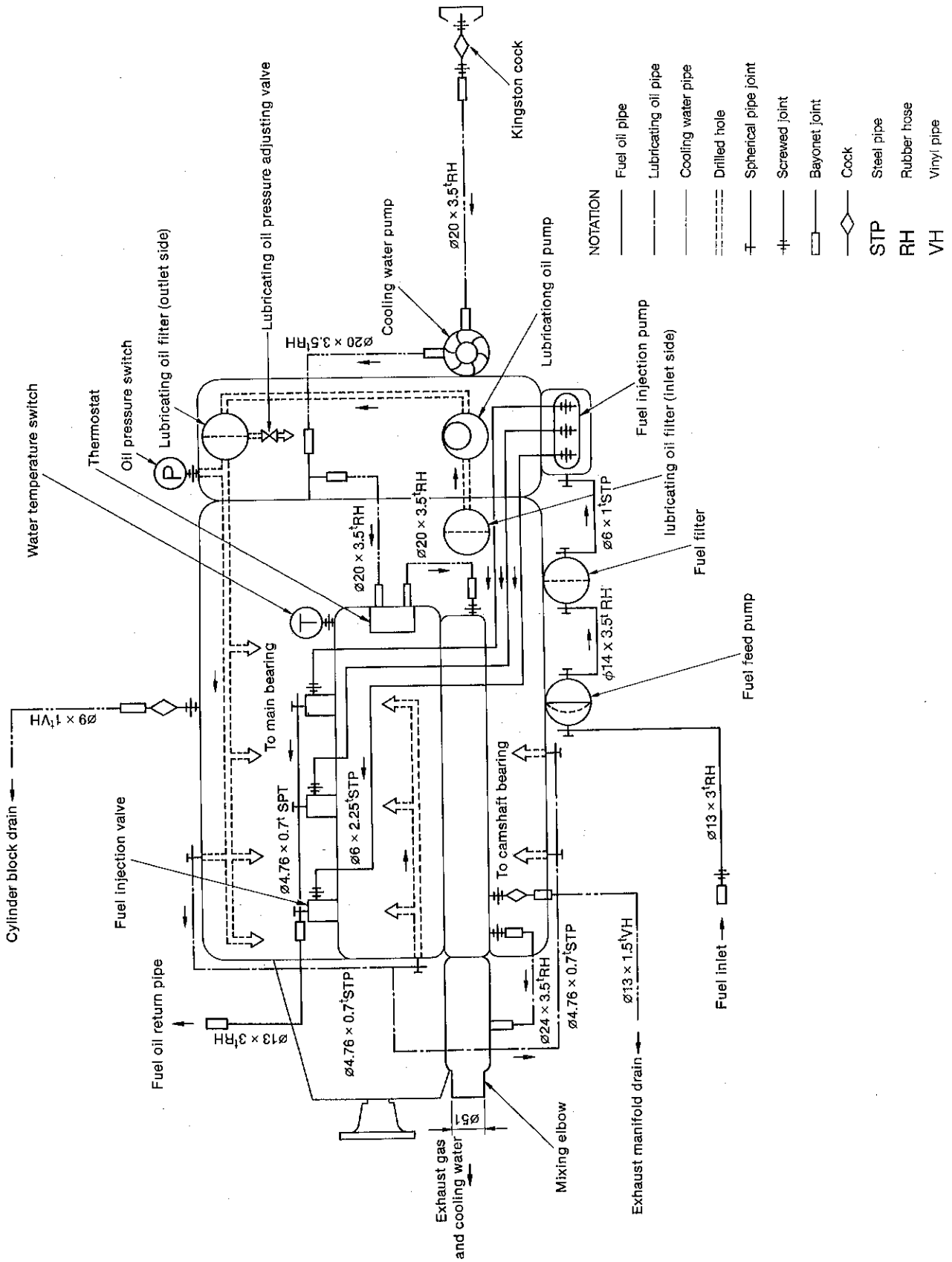
7-2 2GM20


Kingston cock
Cooling water pump
Lubricating oil pressure adjusting valve
Lubricating oil filter (inlet side)
Oil pressure switch
Thermostat
Water temperature switch
Lubricating oil pump
Fuel injection pump
Lubricating oil filter (inlet side)
Fuel filter
Fuel feed pump
Fuel inlet
Mixing elbow
Exhaust gas and cooling water
Fuel oil return pipe
Fuel injection valve
Cooling water drain
To main bearing
To valve rocker arm
ø20 × 3.5t RH
ø14 × 3.5t RH
ø6 × 2.25t STP
ø6 × 1t STP
ø13 × 3t RH
ø4.76 × 0.7t STP
ø45
NOTATION
Fuel oil pipe
Lubricating oil pipe
Cooling water pipe
Drilled hole
Spherical pipe joint
Screwed joint
Bayonet joint
Cock
STP Steel pipe
RH Rubber hose
VH Vinyl pipe

7-3 3GM30 and 3HM35



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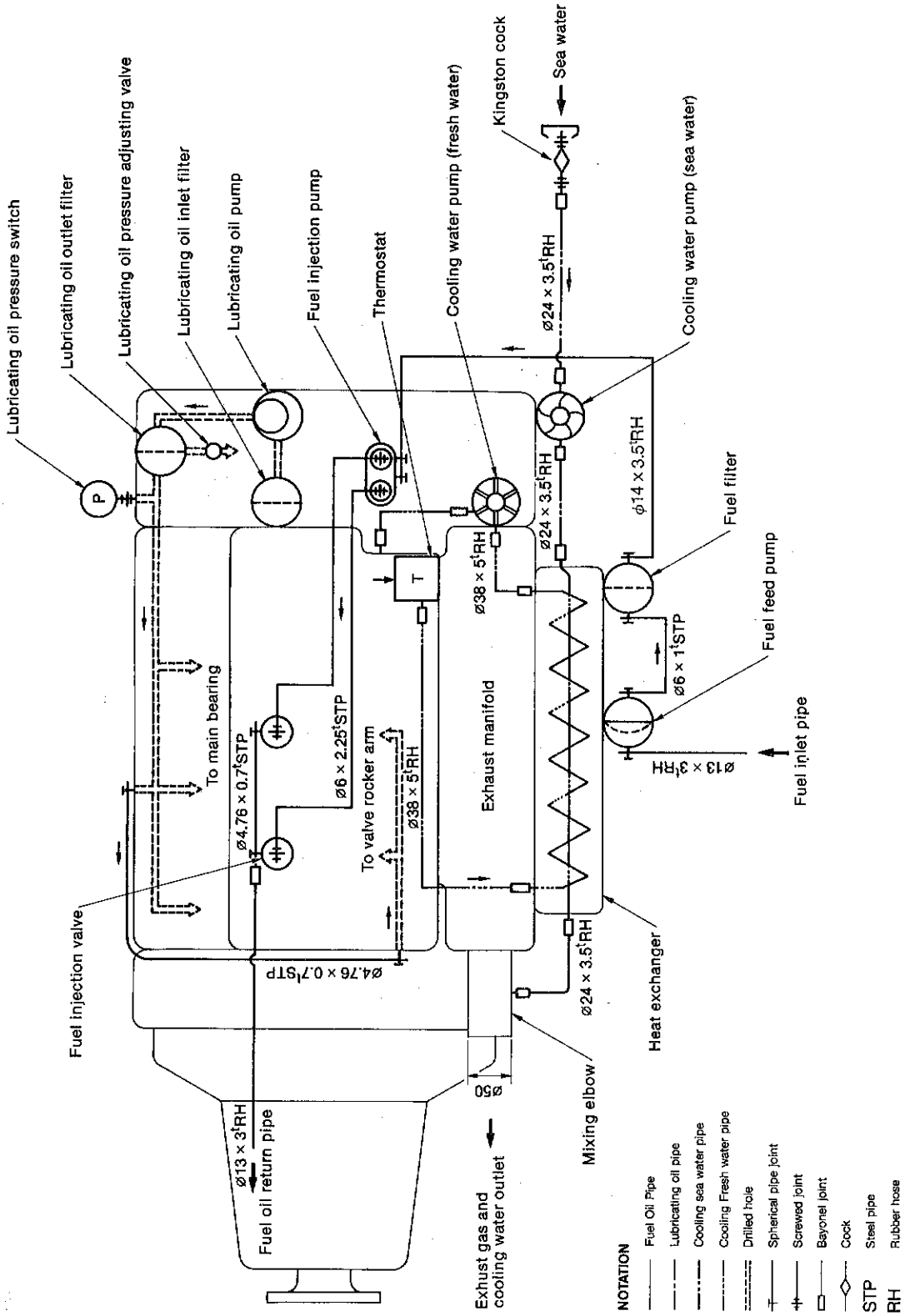
7-4 2GM20F



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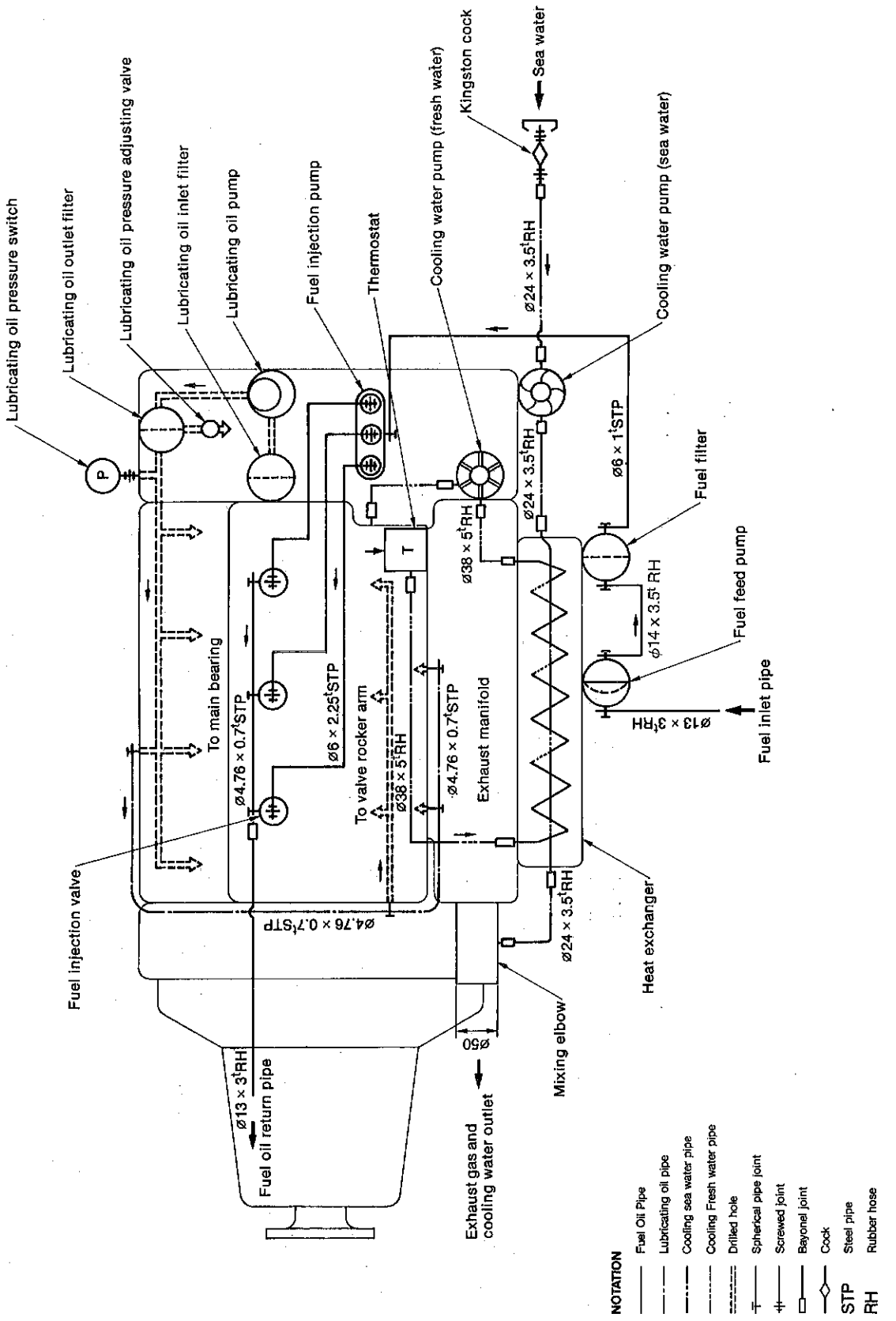
7-5 3GM30F and 3HM35F



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