

SHOP MANUAL

N-855 SERIES

Engine Serial No. 26100001 and up

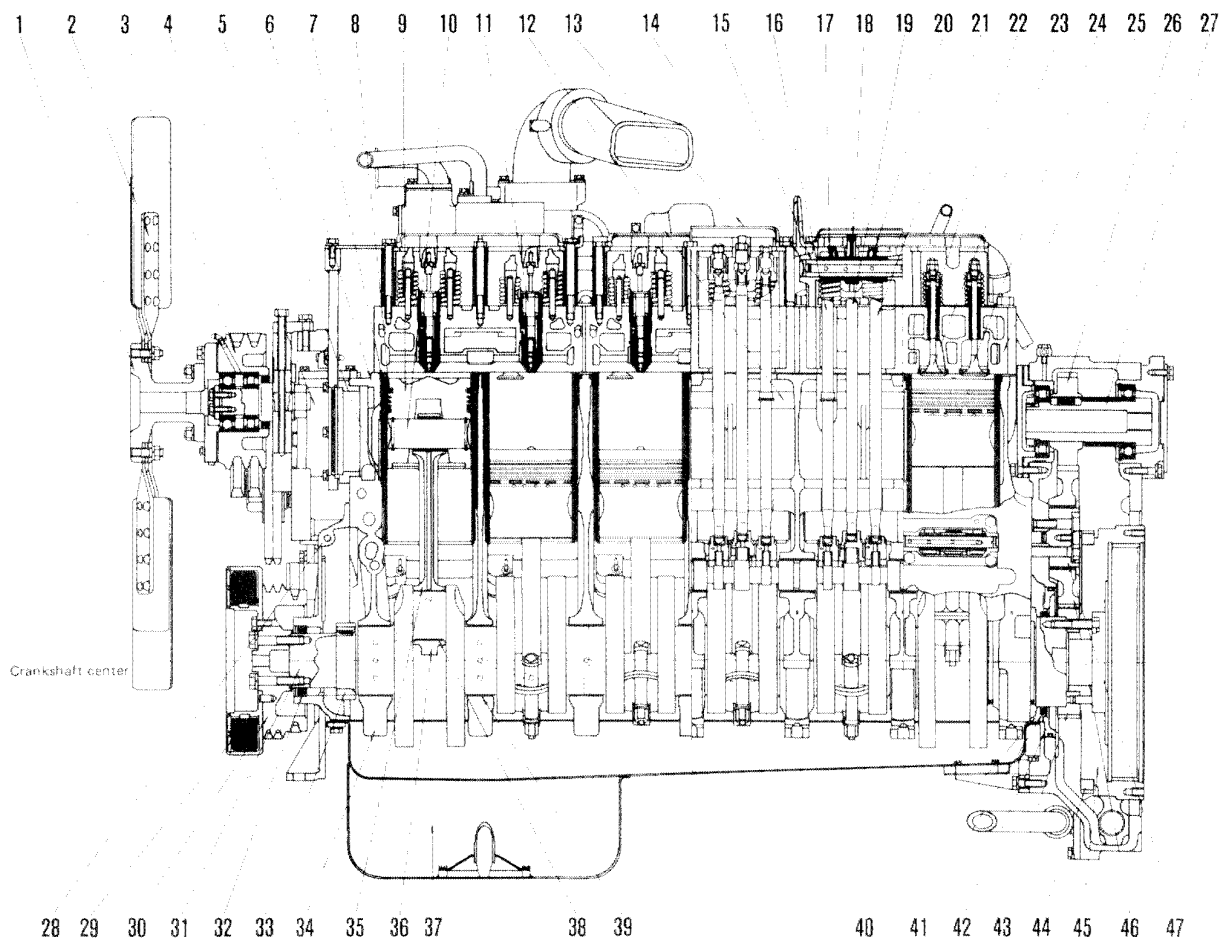
11 ENGINE **STRUCTURE AND FUNCTION**



CONTENTS

GENERAL STRUCTURE	11-004	FUEL SYSTEM	
INTAKE AND EXHAUST SYSTEM	11-006	Fuel system chart	11-045
Turbocharger	11-014	PT fuel pump	11-048
After-cooler	11-016	PT fuel pump drive	11-058
ENGINE BODY		Injector	11-060
Cylinder head	11-017	Fuel filter	11-061
Valve system	11-018	Water separator	11-063
Cylinder block	11-020	Aneroid control valve	11-064
Main circulation system	11-022	COOLING SYSTEM	
Timing gear	11-023	Cooling system chart	11-066
Camshaft, cam follower and push rod ...	11-024	Water pump	11-068
Injection timing, valve timing	11-025	Fan drive	11-071
Flywheel and flywheel housing	11-026	Tension pulley	11-075
LUBRICATION SYSTEM		Thermostat	11-077
Lubrication system chart	11-034	Corrosion resistor	11-078
Oil pump	11-036	ACCESSORY	
Oil filter and oil cooler	11-039	Air compressor	11-079
Full-flow filter	11-042	ELECTRICAL SYSTEM	
By-pass filter	11-043	Alternator	11-080
Oil cooler	11-044	Starting motor	11-083
		Electrical intake air heater	11-085

GENERAL STRUCTURE

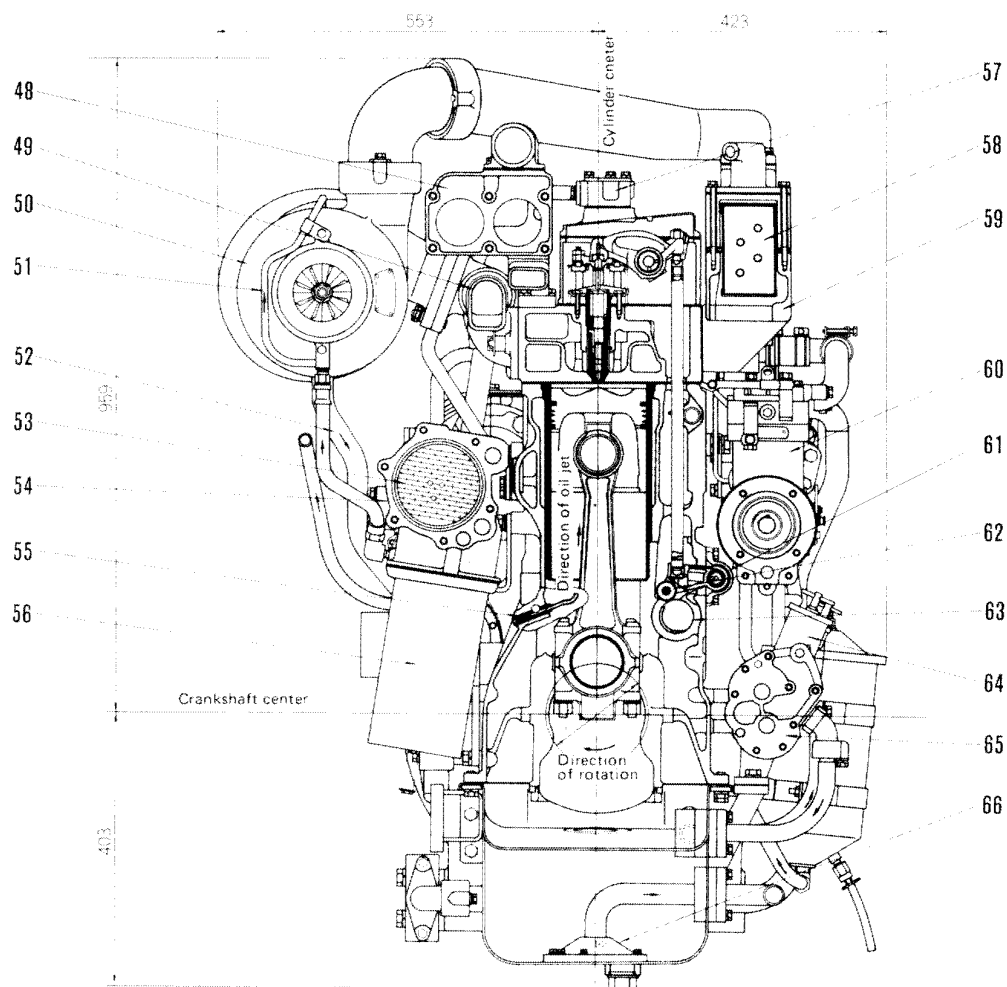


6710F012

- | | | | |
|-------------------------------|---------------------------|----------------------------|----------------------------------|
| 1. Fan spacer | 14. Rocker arm housing | 27. PTO gear shaft | 40. Rear cover plate |
| 2. Fan | 15. Rocker arm shaft | 28. Gear case | 41. Rear oil seal |
| 3. Fan pulley | 16. Push rod (Exhaust) | 29. Vibration damper | 42. Seal retainer |
| 4. Water pump | 17. Rocker arm (Exhaust) | 30. Crankshaft pulley | 43. PTO drive gear |
| 5. Liner seal ring | 18. Rocker arm (Injector) | 31. Crankshaft | 44. Ring gear |
| 6. Cylinder block | 19. Push rod (Injector) | 32. Front oil seal | 45. Flywheel |
| 7. Cylinder liner | 20. Rocker arm (Intake) | 33. Crankshaft gear | 46. PTO idler gear |
| 8. Piston ring | 21. Push rod (Intake) | 34. Main bearing cap | 47. PTO idler shaft |
| 9. Piston | 22. Valve guide | 35. Connecting rod | 48. Thermostat housing |
| 10. Piston pin | 23. Valve (Intake) | 36. Connecting rod cap | 49. Exhaust manifold |
| 11. Injector | 24. Valve (Exhaust) | 37. Oil pan | 50. Turbocharger |
| 12. Compression release shaft | 25. Cylinder head | 38. Connecting rod bearing | 51. Oil pipe (to turbocharger) |
| 13. Rocker arm housing | 26. PTO gear | 39. Main bearing | 52. Oil pipe (from turbocharger) |

STRUCTURE AND FUNCTION

GENERAL STRUCTURE



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- | | |
|---------------------------|------------------------|
| 53. Oil cooler element | 60. Air compressor |
| 54. Oil cooler housing | 61. Cam follower shaft |
| 55. Piston cooling nozzle | 62. Cam roller |
| 56. Full-flow filter | 63. Camshaft |
| 57. Crankcase breather | 64. Oil filler |
| 58. After-cooler core | 65. Oil pump |
| 59. After-cooler housing | 66. Oil strainer |

Engine:

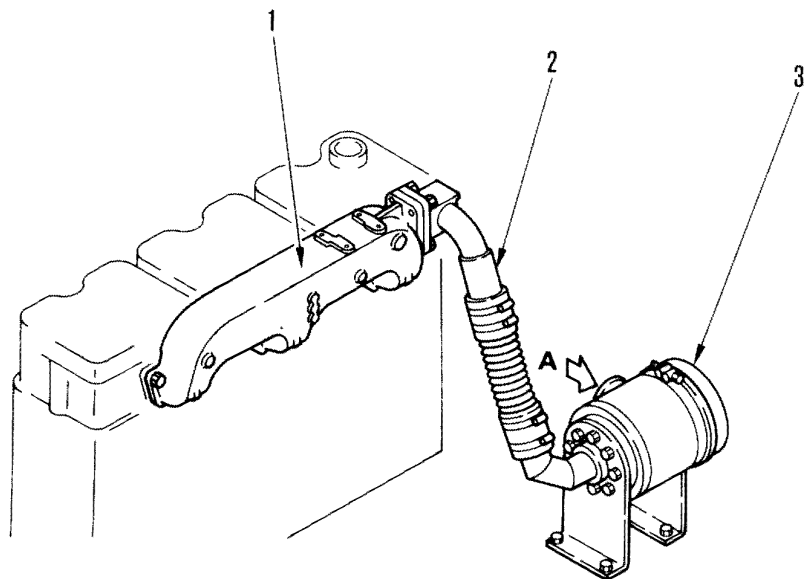
N-855-C
 NT-855-C (With turbocharger)
 NTA-855-C
 (With turbocharger and after-cooler)

Type: In-line, 6-cylinders, water-cooled, direct fuel injection, 4-cycle diesel engine.

INTAKE AND EXHAUST SYSTEM

N-855-C (For PC300-1, 2, PC300LC-1, 2)

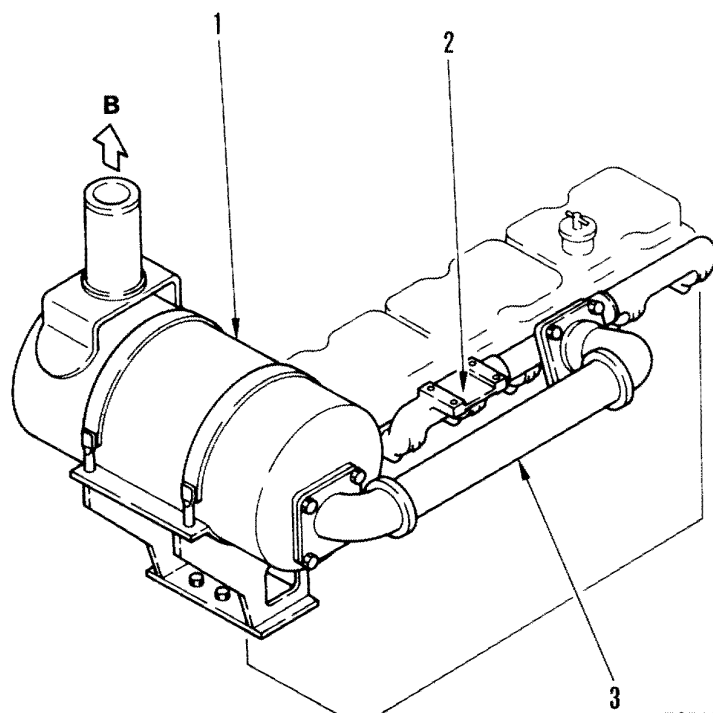
INTAKE SYSTEM



- 1. Intake manifold
- 2. Intake connector pipe
- 3. Air cleaner
- A. Intake

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EXHAUST SYSTEM



- 1. Muffler
- 2. Exhaust manifold
- 3. Exhaust connector pipe
- B. Exhaust

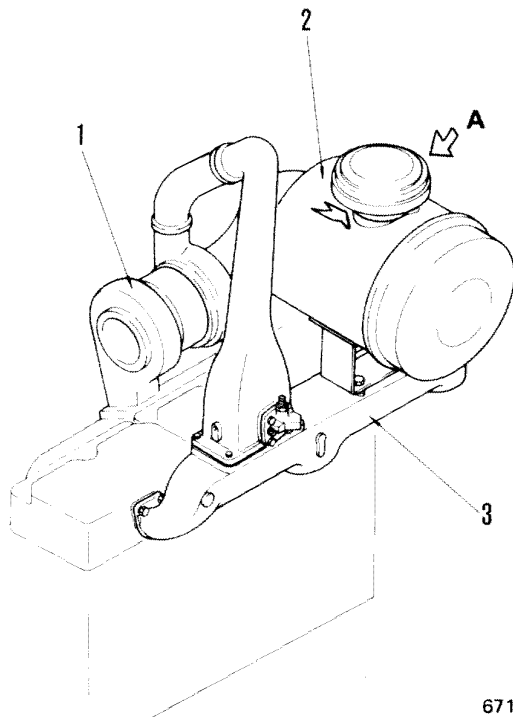
F6710A002

STRUCTURE AND FUNCTION

INTAKE AND EXHAUST SYSTEM

NT-855-C (For D80, 85-18, D95S-2)

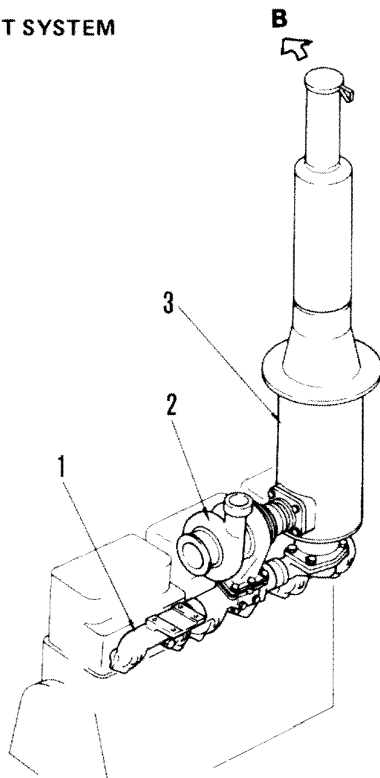
INTAKE SYSTEM



- 1. Turbocharger
- 2. Air cleaner
- 3. Intake manifold
- A. Intake

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EXHAUST SYSTEM

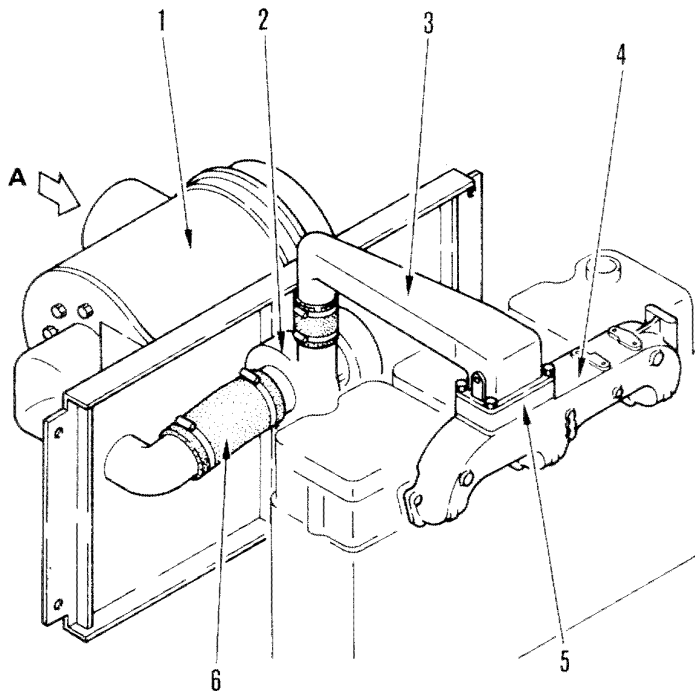


- 1. Exhaust manifold
- 2. Turbocharger
- 3. Muffler
- B. Exhaust

6710F056

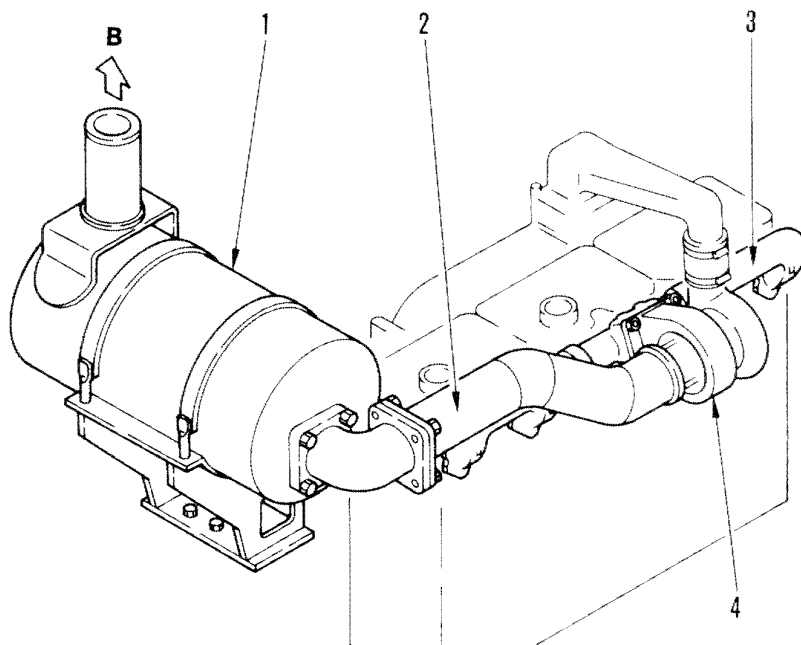
NT-855-C (For PC400-1, PC400LC-1)

INTAKE SYSTEM



F6710A003

EXHAUST SYSTEM



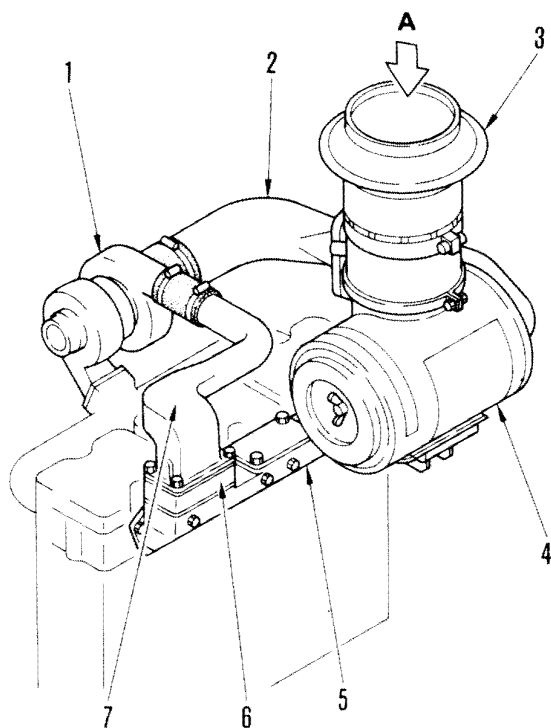
F6710A004

STRUCTURE AND FUNCTION

INTAKE AND EXHAUST SYSTEM

NT-855-C (For W170-2, W180-1)

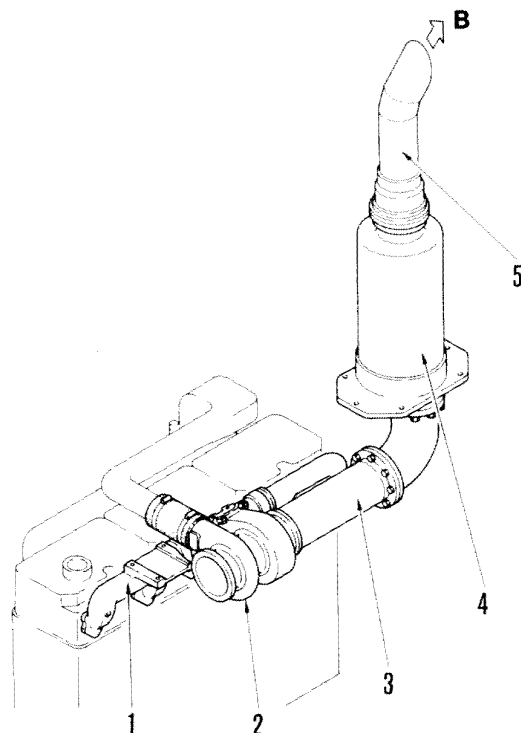
INTAKE SYSTEM



1. Turbocharger
2. Intake connector pipe
3. Precleaner
4. Air cleaner
5. Intake manifold
6. Electrical intake air heater
7. Intake connector pipe
- A. Intake

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EXHAUST SYSTEM



1. Exhaust manifold
2. Turbocharger
3. Exhaust connector pipe
4. Muffler
5. Exhaust pipe
- B. Exhaust

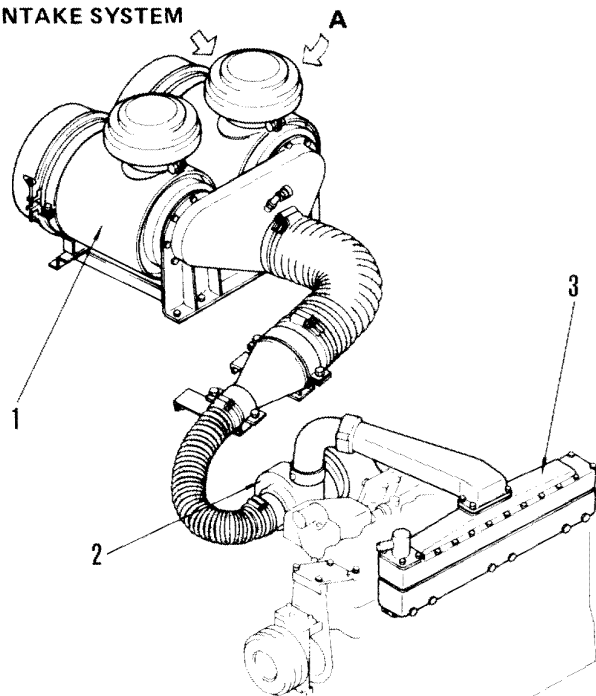
F6710A006

STRUCTURE AND FUNCTION

INTAKE AND EXHAUST SYSTEM

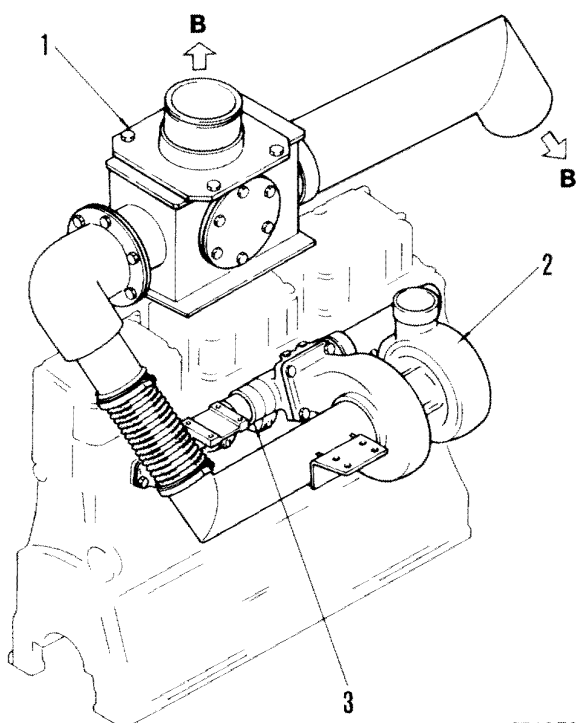
NTA-855-C (For HD320-2)

INTAKE SYSTEM



- 1. Air cleaner
- 2. Turbocharger
- 3. After-cooler
- A. Intake

EXHAUST SYSTEM



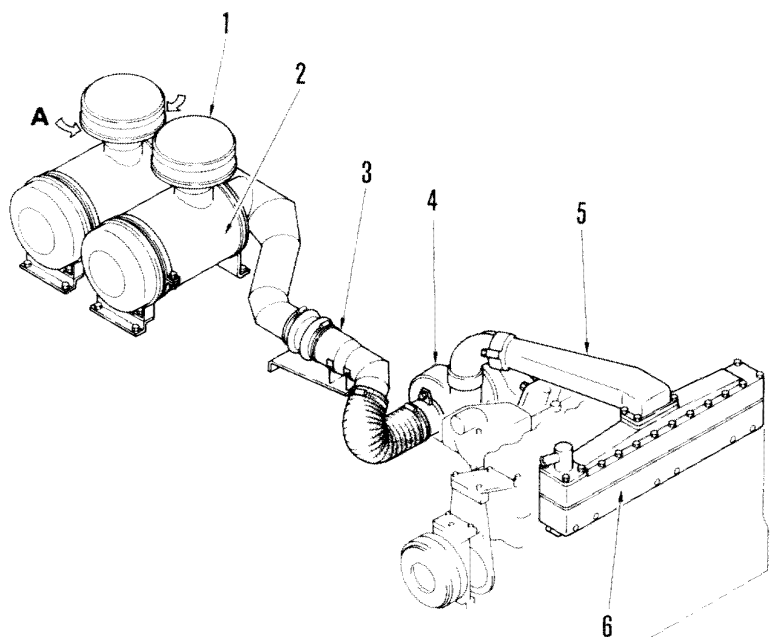
- 1. Muffler
- 2. Turbocharger
- 3. Exhaust manifold
- B. Exhaust

STRUCTURE AND FUNCTION

INTAKE AND EXHAUST SYSTEM

NTA-855-C (For HD320-3)

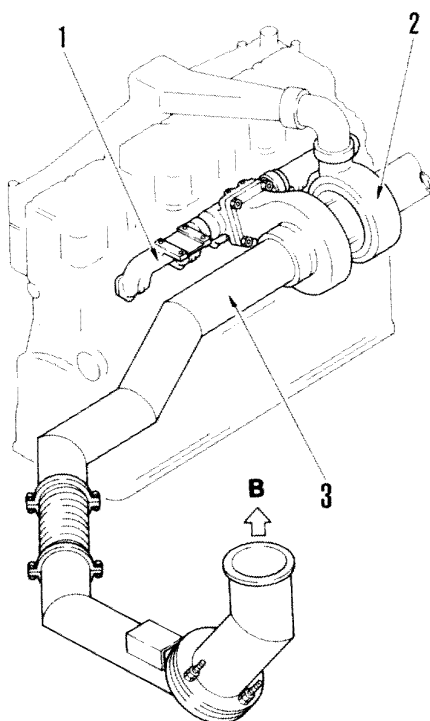
INTAKE SYSTEM



1. Precleaner
2. Air cleaner
3. Intake connector pipe
4. Turbocharger
5. Intake connector pipe
6. After-cooler
- A. Intake

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EXHAUST SYSTEM

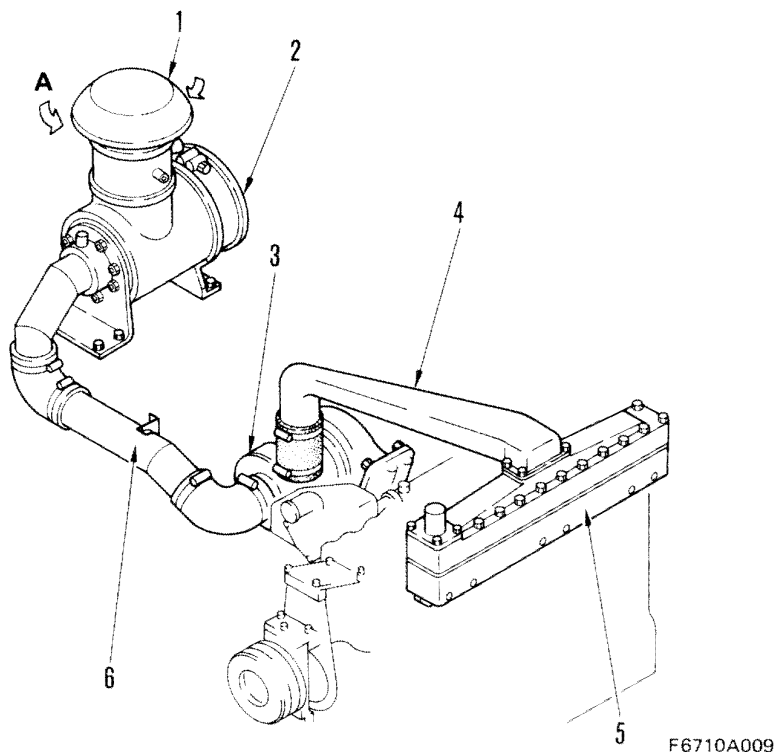


1. Exhaust manifold
2. Turbocharger
3. Exhaust pipe
- B. Exhaust

F6710A008

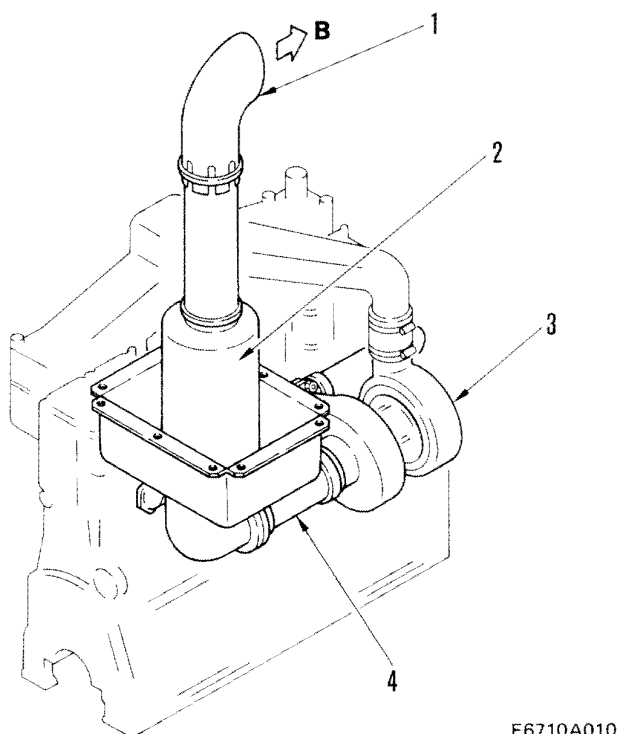
NTA-855-C (For WS16S-2, WS23-1-FRONT ENGINE)

INTAKE SYSTEM



- 1. Precleaner
- 2. Air cleaner
- 3. Turbocharger
- 4. Intake connector pipe
- 5. After-cooler
- 6. Intake connector pipe
- A. Intake

EXHAUST SYSTEM



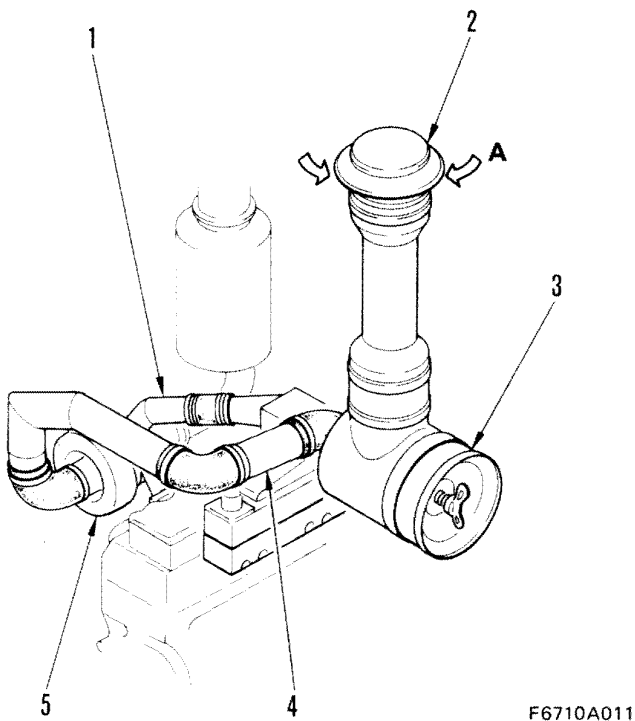
- 1. Exhaust pipe
- 2. Muffler
- 3. Turbocharger
- 4. Exhaust connector pipe
- B. Exhaust

STRUCTURE AND FUNCTION

INTAKE AND EXHAUST SYSTEM

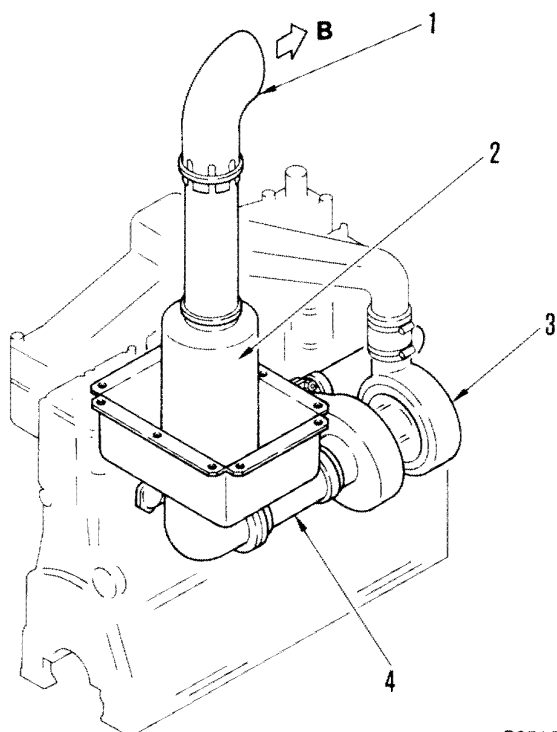
NTA-855-C (For WS23-1-REAR ENGINE)

INTAKE SYSTEM



- 1. Intake connector pipe
- 2. Precleaner
- 3. Air cleaner
- 4. Intake connector pipe
- 5. Turbocharger
- A. Intake

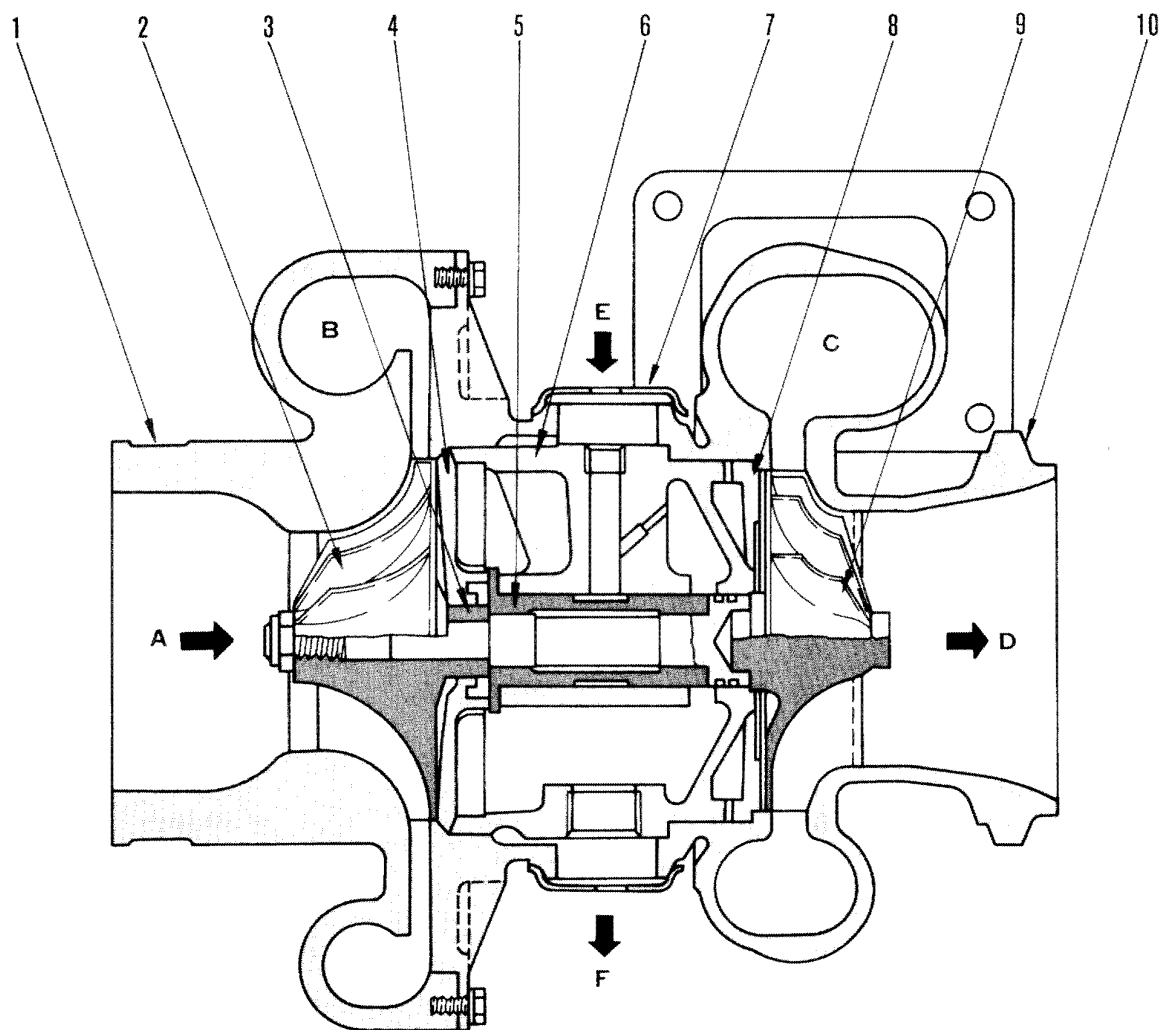
EXHAUST SYSTEM



- 1. Exhaust pipe
- 2. Muffler
- 3. Turbocharger
- 4. Exhaust connector pipe
- B. Exhaust

TURBOCHARGER

CUMMINS ST-50 (NT-855-C and NTA-855-C)



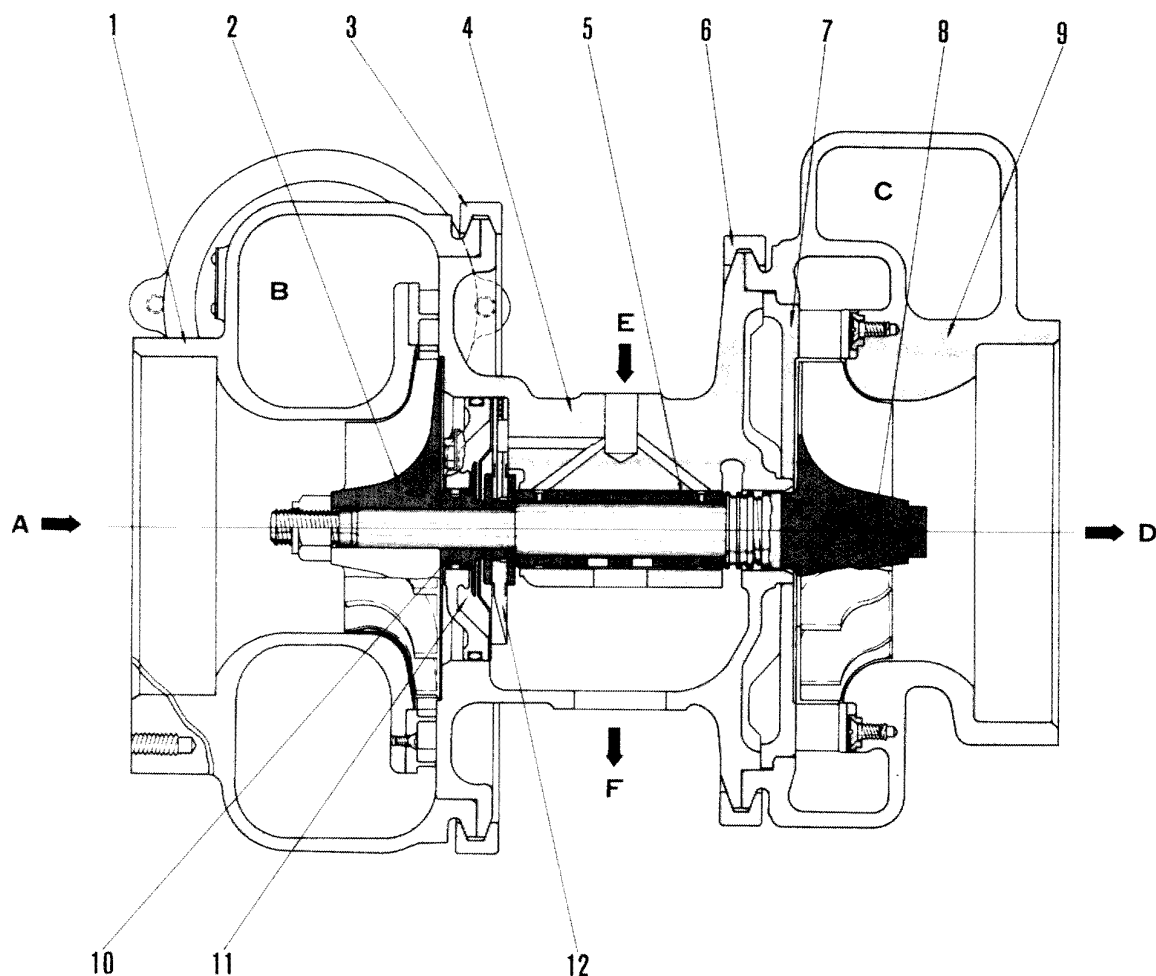
6710F059B

- | | |
|--------------------|---------------------------|
| 1. Blower housing | 9. Turbine impeller |
| 2. Blower impeller | 10. Turbine housing |
| 3. Sleeve | A. Air inlet |
| 4. Shield | B. Air outlet |
| 5. Journal bearing | C. Exhaust inlet |
| 6. Center housing | D. Exhaust outlet |
| 7. Clamp | E. Lubricating oil inlet |
| 8. Shield | F. Lubricating oil outlet |

Turbocharger specifications

Model:	Cummins ST-50
Length x Width x Height	334mm x 278mm x 308mm
Weight:	27.5kg
Continuous rotation:	70,000 rpm
Maximum charging	31.2kg/min.
Maximum temperature (At inlet)	705°C and below
Direction of rotation (viewed from blower):	Clockwise
Lubrication method:	Forced lubrication with engine oil

KOMATSU KTR-130 (NTA-855-C)



6710F058

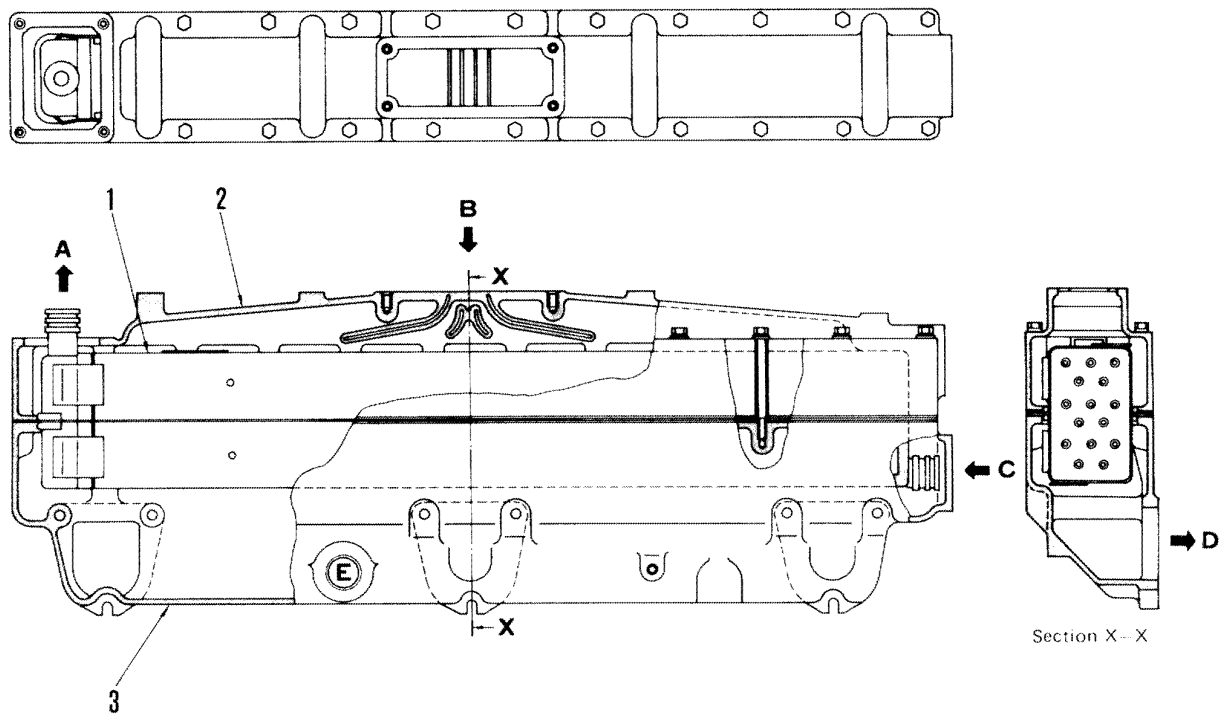
- | | |
|---------------------|---------------------|
| 1. Blower housing | 10. Slinger |
| 2. Blower impeller | 11. Insert |
| 3. Clamp | 12. Thrust bearing |
| 4. Bearing housing | A. Air inlet |
| 5. Journal bearing | B. Air outlet |
| 6. Clamp | C. Exhaust inlet |
| 7. Shield | D. Exhaust outlet |
| 8. Turbine impeller | E. From oil filter |
| 9. Turbine housing | F. To oil pan drain |

Turbocharger specifications

Model:	Komatsu KTR-130
Length x Width x Height	325mm x 295mm x 344mm
Weight:	30kg
Continuous rotation:	70,000rpm
Maximum charging	31.8kg/min.
Maximum temperature (At inlet)	750°C and below
Direction of rotation (viewed from blower):	Clockwise
Lubrication method:	Forced lubrication with engine oil

AFTER-COOLER

NTA-855-C



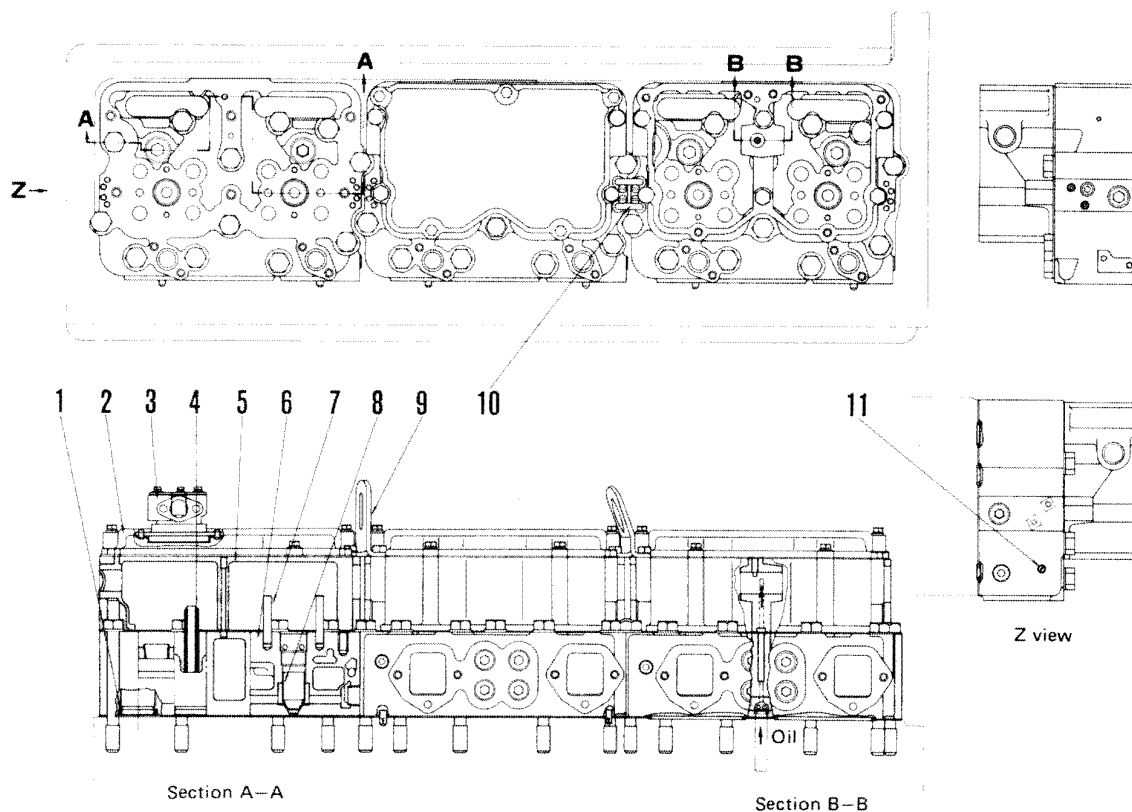
6710F060

- 1. Core
- 2. Cover
- 3. Housing

- A. Water outlet (To thermostat)
- B. Air intake (From turbocharger)
- C. Water intake (From cylinder block)
- D. Air outlet (To intake manifold)
- E. Compressor outlet

ENGINE BODY

CYLINDER HEAD



6710F061

1. Valve seat insert
2. Rocker arm housing cover
3. Crank case breather
4. Valve guide
5. Rocker arm housing
6. Cylinder head
7. Crosshead guide
8. Injector sleeve
9. Lifting bracket
10. Fuel cross tube
11. Fuse plug

CYLINDER HEAD

- Direct injection, 4-valve, injector type
- 1 cylinder head for 2 cylinder

VALVE SEAT INSERT

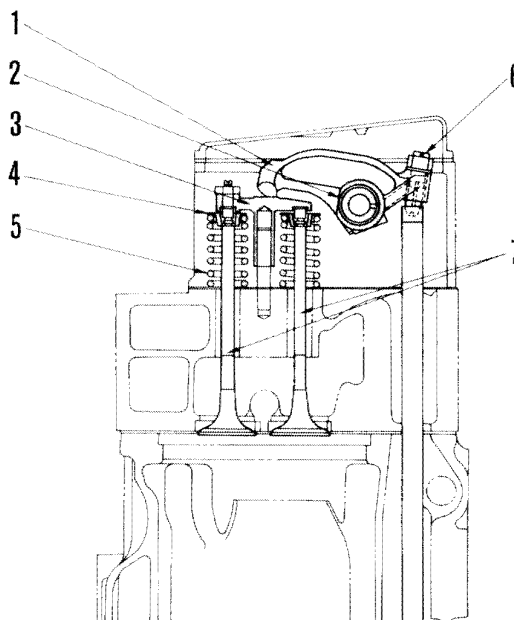
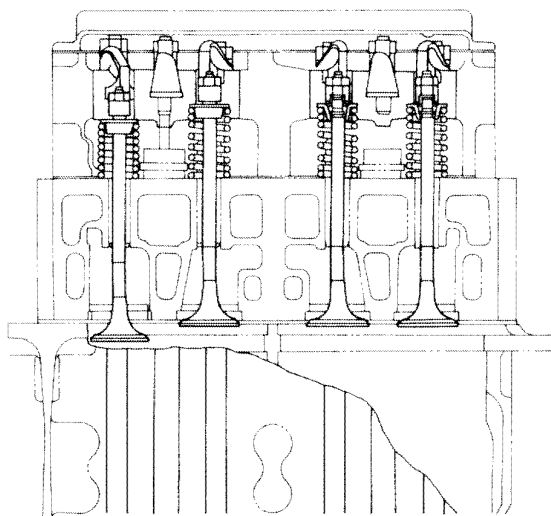
N-855-C:

Press-fitted insert for exhaust.

NT-855-C, NTA-855-C:

Press fitted insert for intake and exhaust.

VALVE SYSTEM



Intake valve

6710F062

1. Intake rocker arm
2. Rocker arm shaft
3. Crosshead
4. Valve guide
5. Valve spring
6. Rocker arm adjustment screw
7. Intake valve
8. Exhaust rocker arm
9. Crosshead adjustment screw
10. Exhaust valve

VALVE CLEARANCE

- Engine No. 26102754 – 26155791

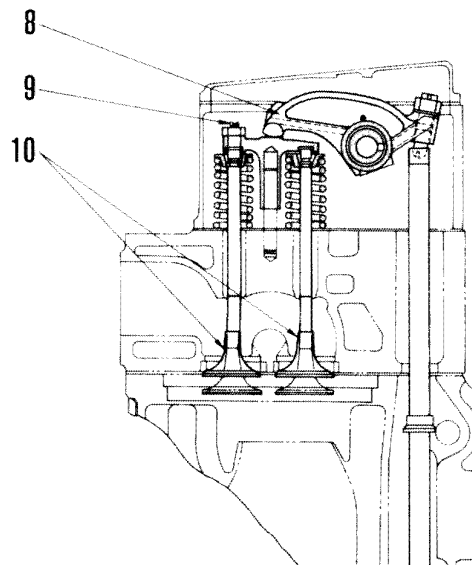
Unit: mm

	Intake valve	Exhaust valve
Cold (20°C)	0.41	0.74
Warm (60°C)	0.36	0.69

- Engine No. 26155792 and up

Unit: mm

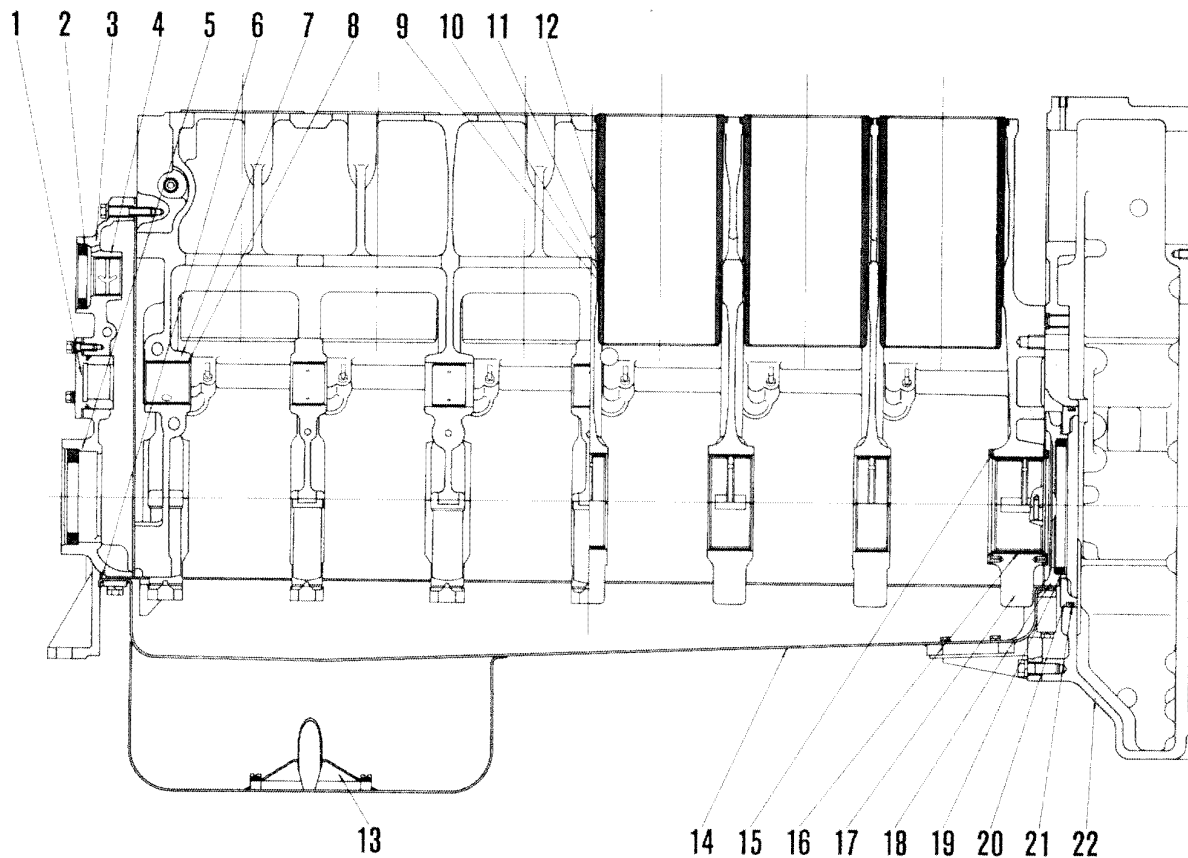
	Intake valve	Exhaust valve
Cold (20°C)	0.36	0.69
Warm (60°C)	0.36	0.69



Exhaust valve

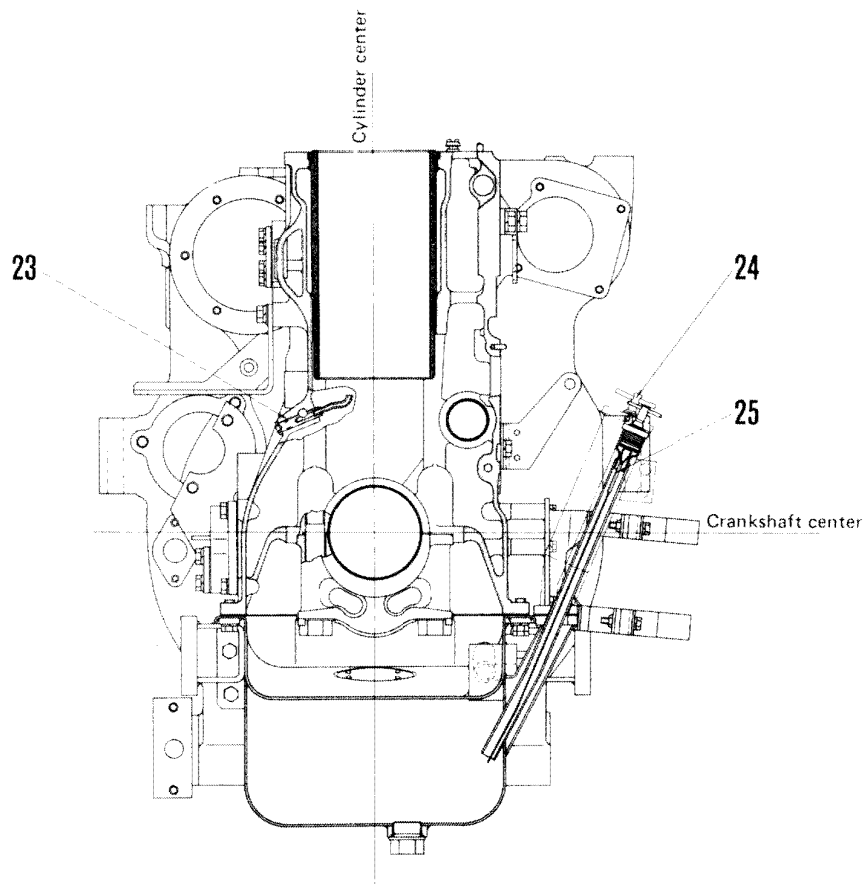
6710F063

CYLINDER BLOCK



6710F064A

- | | |
|-----------------------------------|-----------------------|
| 1. Camshaft support | 11. Liner clevis seal |
| 2. Accessory drive seal | 12. Cylinder liner |
| 3. Gear case | 13. Oil strainer |
| 4. Accessory drive gear | 14. Oil pan |
| 5. Front oil seal | 15. Thrust bearing |
| 6. Front support | 16. Main bearing |
| 7. Cylinder block | 17. Main bearing cap |
| 8. Camshaft bushing | 18. Rear cover |
| 9. Liner O-ring (Silicon rubber) | 19. Rear oil seal |
| 10. Liner O-ring (Nitrile rubber) | 20. Oil seal retainer |



6710F065

- 21. Retainer O-ring
- 22. Flywheel housing
- 23. Piston cooling nozzle
- 24. Oil filler
- 25. Oil level gauge

Cylinder liner

Wet liner

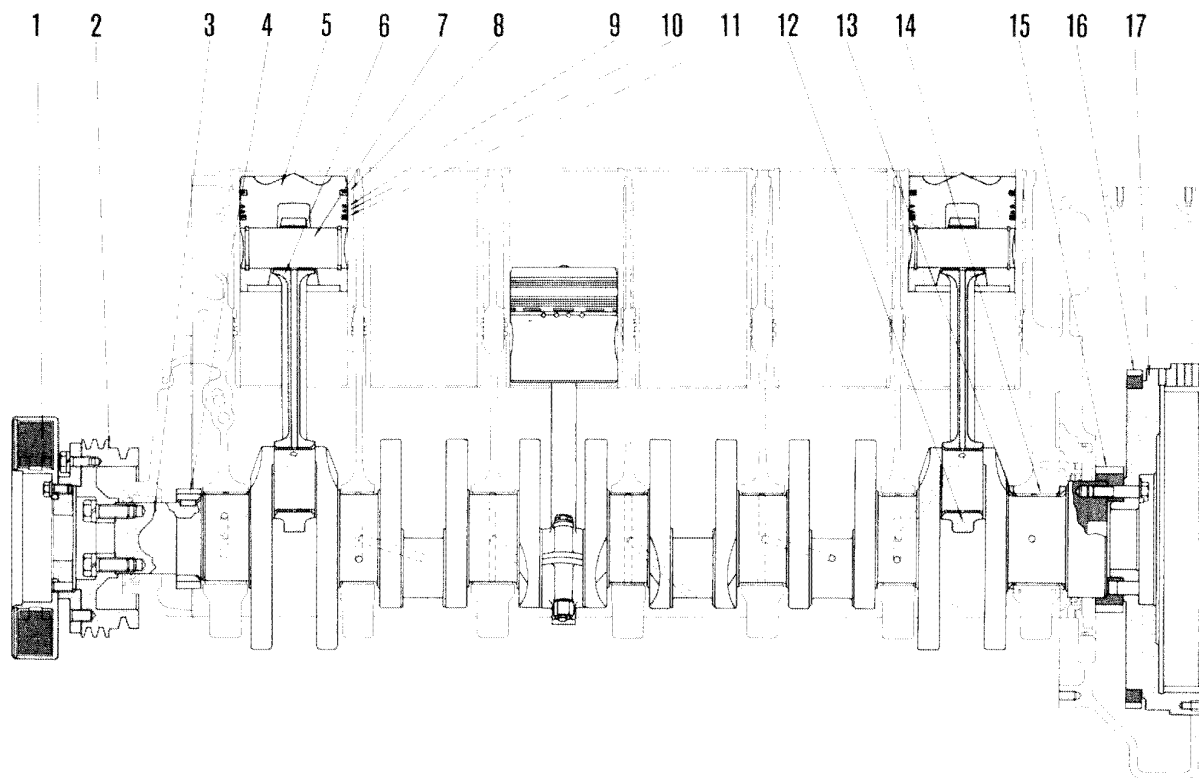
Clevis seal, O-ring x 2

Cylinder block

Crankshaft: 7 bearings

Camshaft: 7 bearings

MAIN CIRCULATION SYSTEM



6710F066A

- | | |
|--|---|
| 1. Vibration damper | 11. Oil ring |
| 2. Crankshaft pulley | 12. Connecting rod cap |
| 3. Crankshaft | 13. Thrust bearing |
| 4. Crankshaft gear
(No. of teeth: 36) | 14. Main bearing cap |
| 5. Piston | 15. PTO drive gear
(No. of teeth:
D80, 85-18: 44
D95S-2: 49) |
| 6. Connecting rod | 16. Ring gear
(No. of teeth: 138) |
| 7. Piston pin | 17. Flywheel |
| 8. Top ring | |
| 9. Second ring | |
| 10. Third ring | |

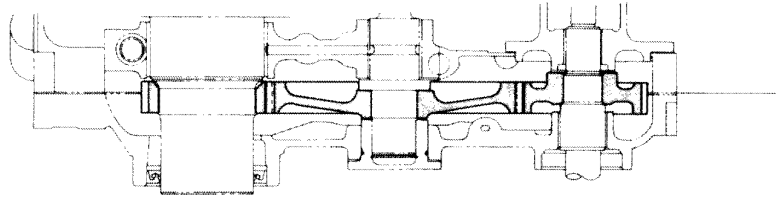
CRANKSHAFT

- Journal and filet portion:
Induction hardening

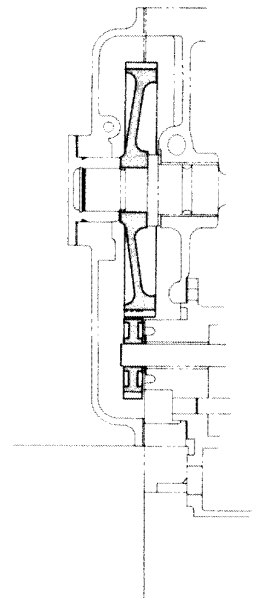
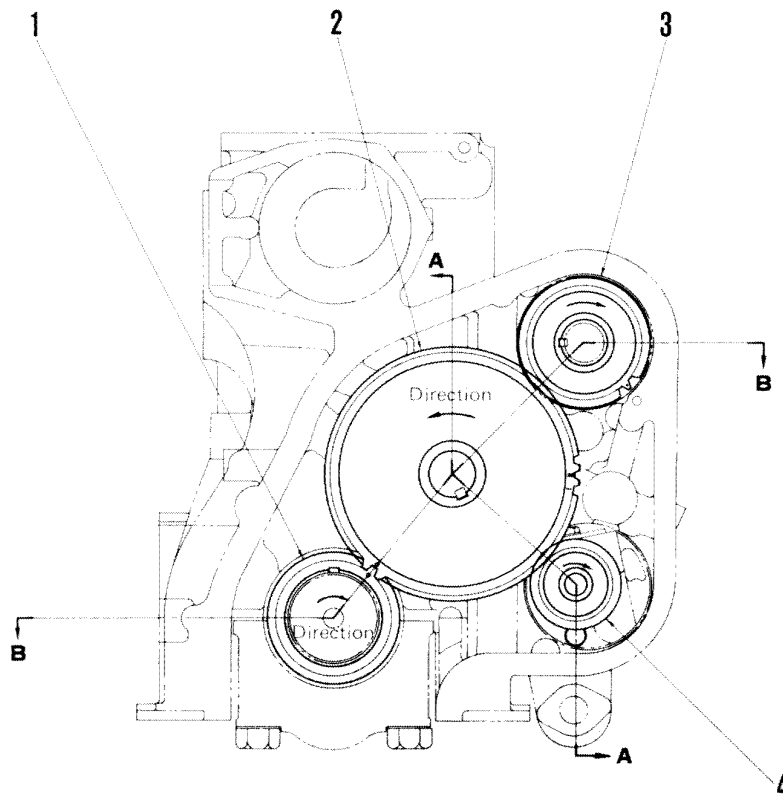
PISTON RING

- N-855-C, NT-855-C: 4 rings
- NTA-855-C
Engine No. 26102754 – 26134153:
5 rings
Engine No. 26134154 and up: 4 rings

TIMING GEAR



Section B-B

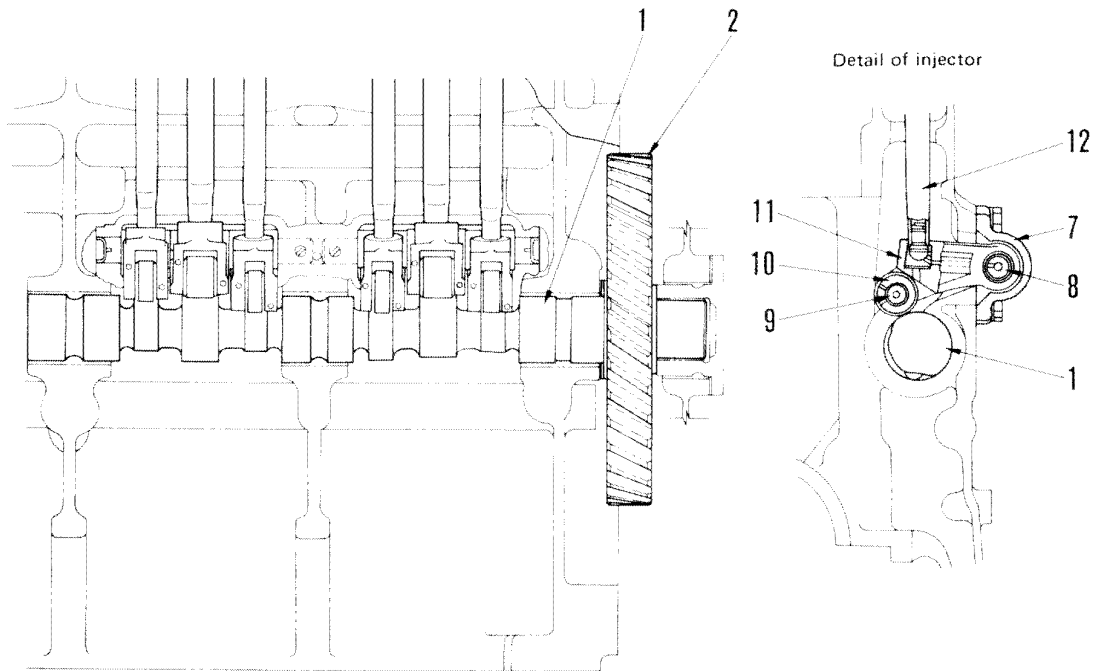


Section A-A

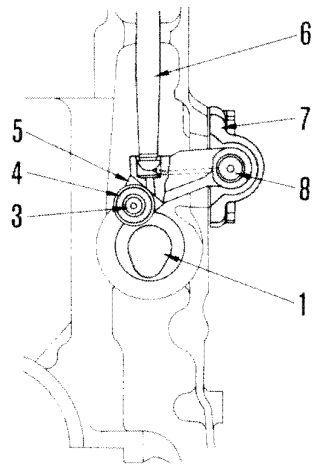
6710F067

1. Crankshaft (Number of teeth 36)
2. Camshaft gear (Number of teeth 72)
3. Accessory drive gear (Number of teeth 36)
4. Oil pump drive gear (Number of teeth 24)

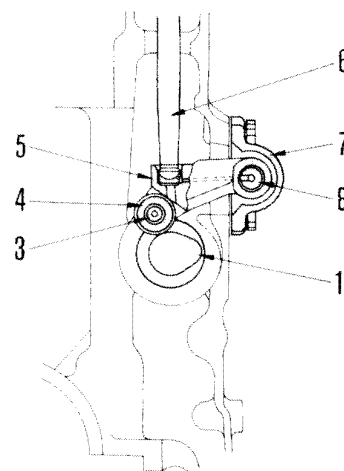
CAMSHAFT, CAM FOLLOWER AND PUSH ROD



Detail of intake side



Detail of exhaust side



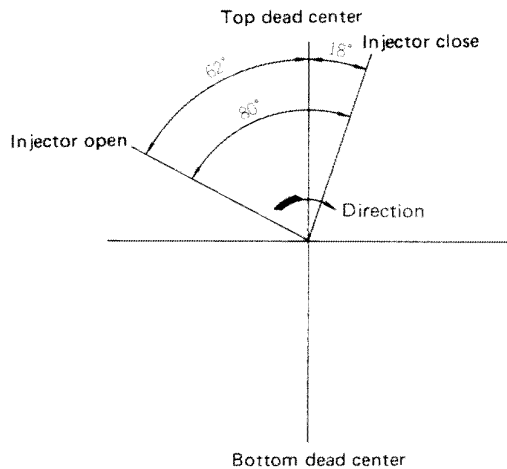
6710F068A

- | | |
|--|-------------------------------|
| 1. Camshaft | 7. Cam follower housing |
| 2. Camshaft gear
(No. of teeth: 72) | 8. Lever shaft |
| 3. Roller pin (For valve) | 9. Roller pin (For injector) |
| 4. Cam roller (For valve) | 10. Cam roller (For injector) |
| 5. Lever (For valve) | 11. Lever (For injector) |
| 6. Push rod (For valve) | 12. Push rod (For injector) |

CAMSHAFT

- Cam and journal portion:
Induction hardening

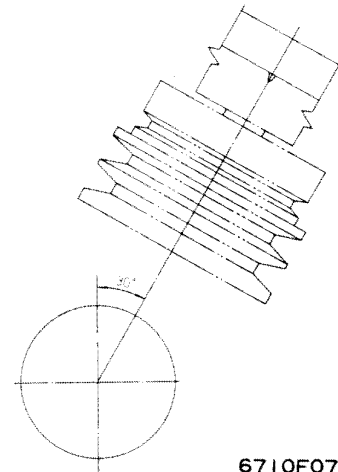
INJECTION TIMING



6710F069A

Injector, valve clearance point position

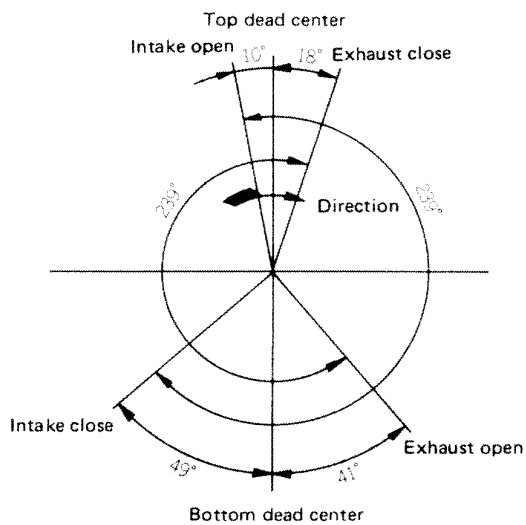
(Shows 1.6 cylinder)



6710F070

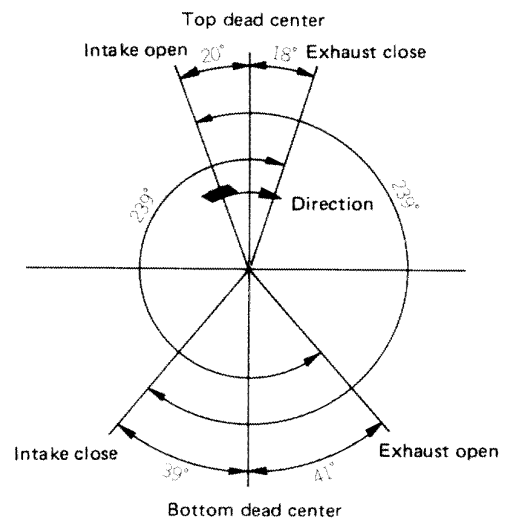
VALVE TIMING

N-855-C



6710F072A

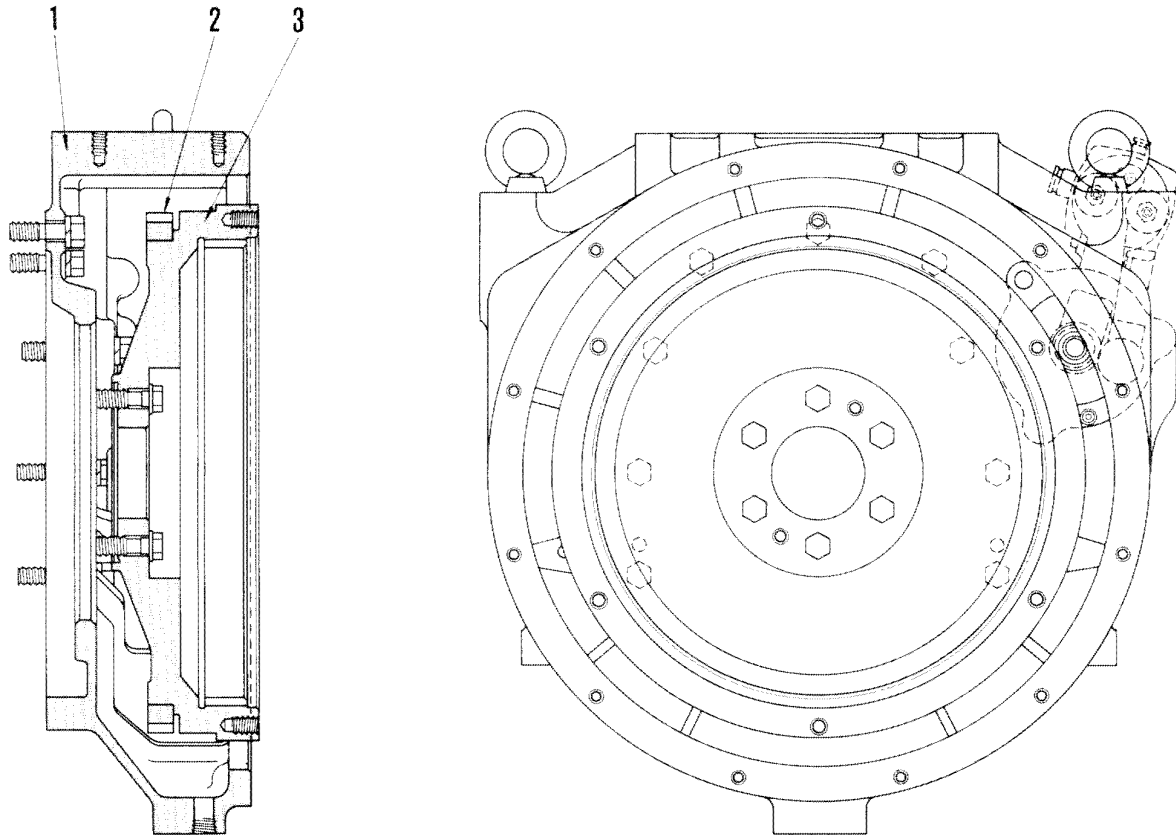
NT-855-C, NTA-855-C



6710F071A

FLYWHEEL AND FLYWHEEL HOUSING

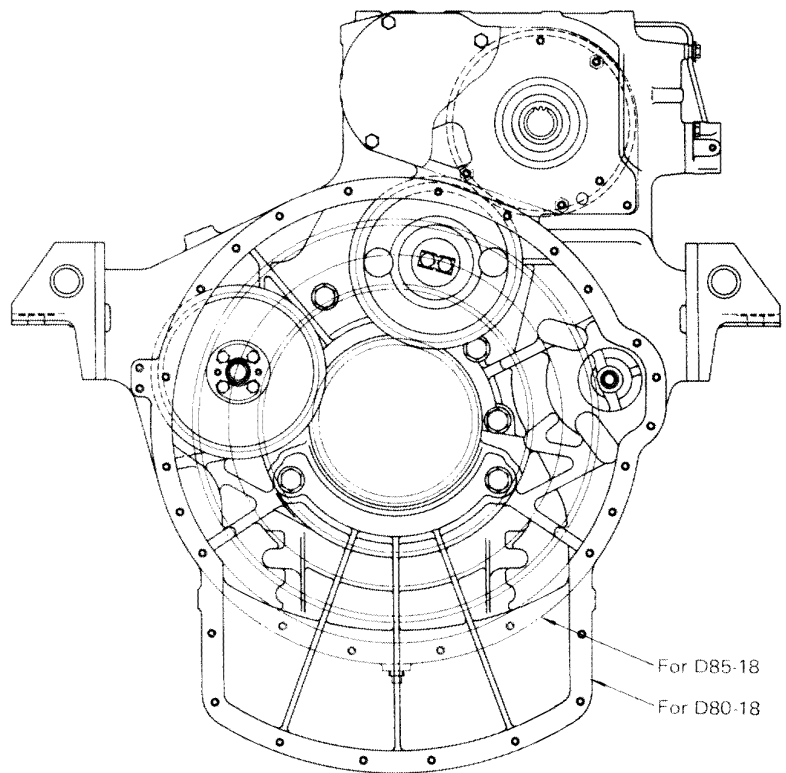
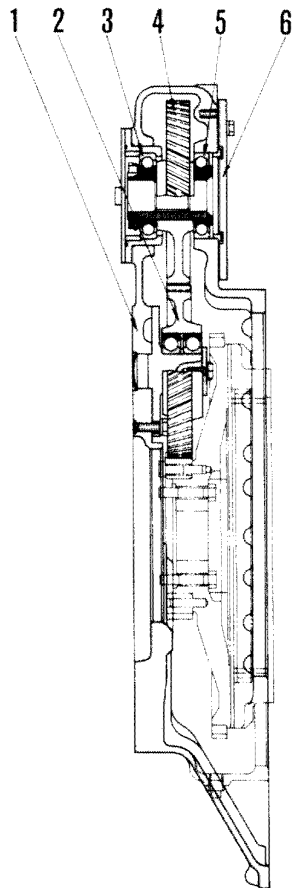
N-855-C (For PC300-1, 2 and PC300LC-1, 2)



6710F072-1

1. Flywheel housing
2. Ring gear (No. of teeth: 138)
3. Flywheel

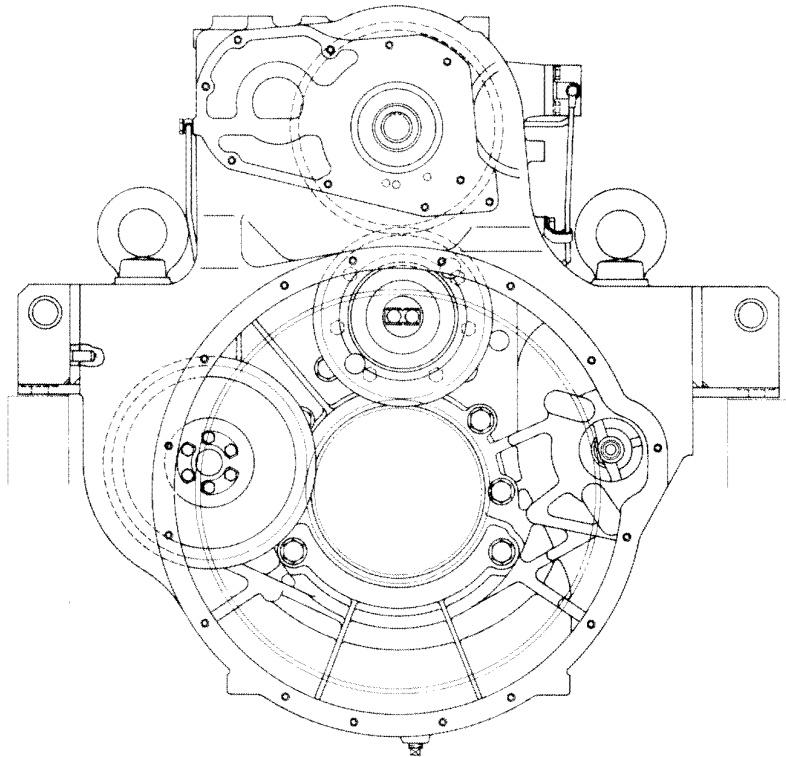
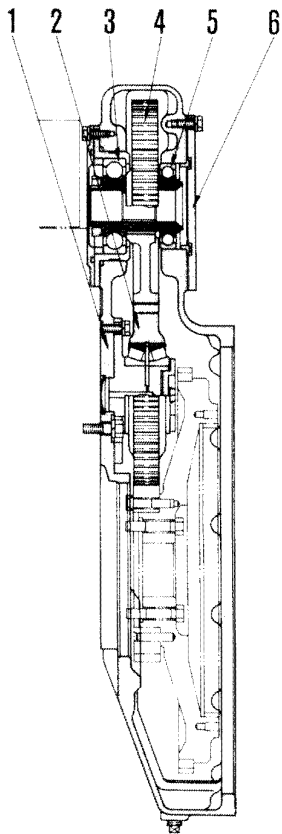
NT-855-C (For D80-85-18)



6710F073

1. Flywheel housing
2. Idler gear (Number of teeth 51)
3. Ball bearing
4. P.T.O. gear (Number of teeth: 56)
5. Ball bearing
6. P.T.O. cover

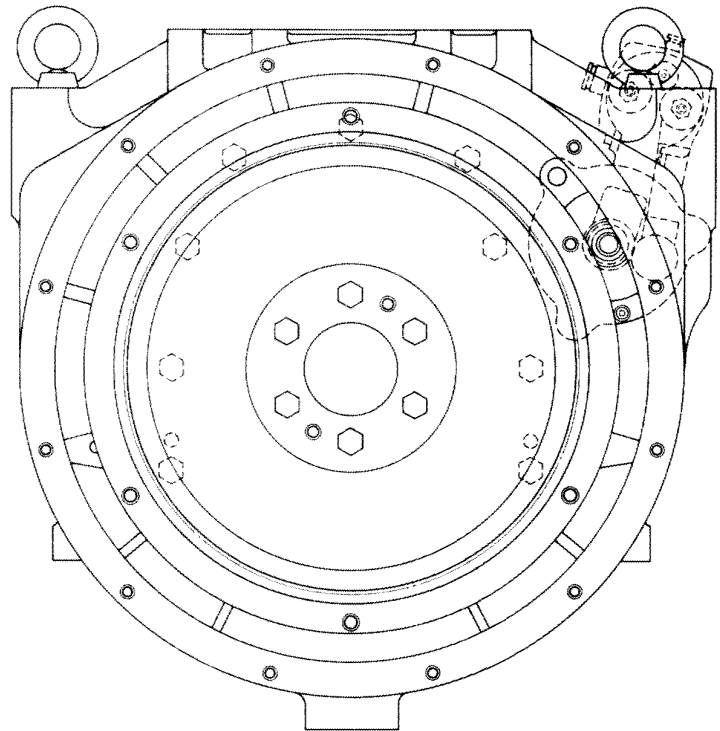
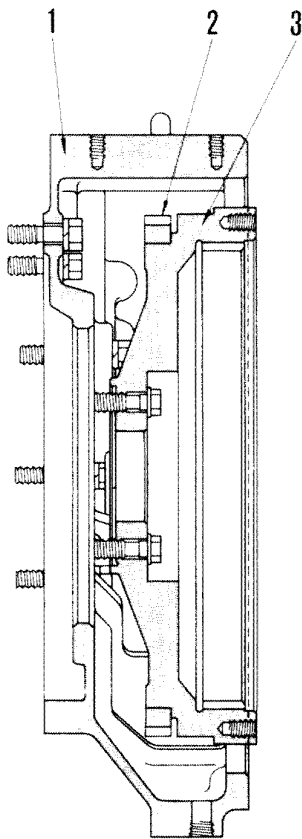
NT-855-C (For D95S-2)



6710F074

1. Flywheel housing
2. Idle gear (Number of teeth 43)
3. Ball bearing
4. P.T.O. gear (Number of teeth: 51)
5. Ball bearing
6. P.T.O. cover

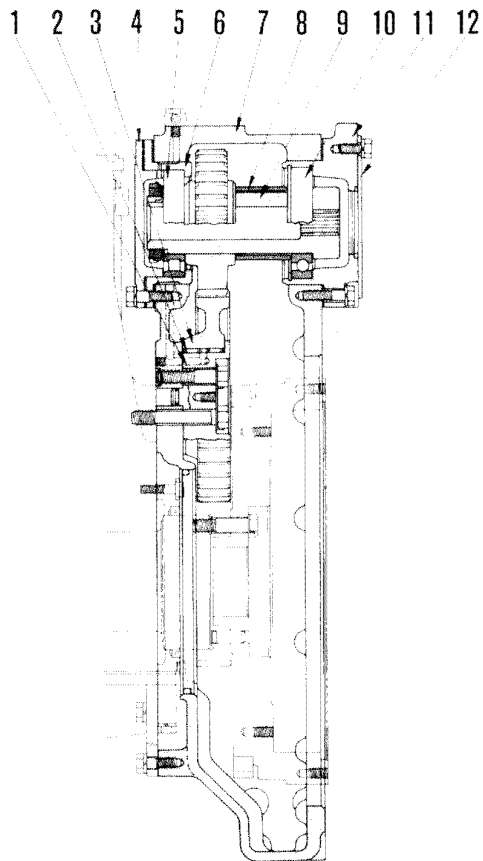
NT-855-C (For PC400-1, PC400LC-1, W170-2, W180-1)



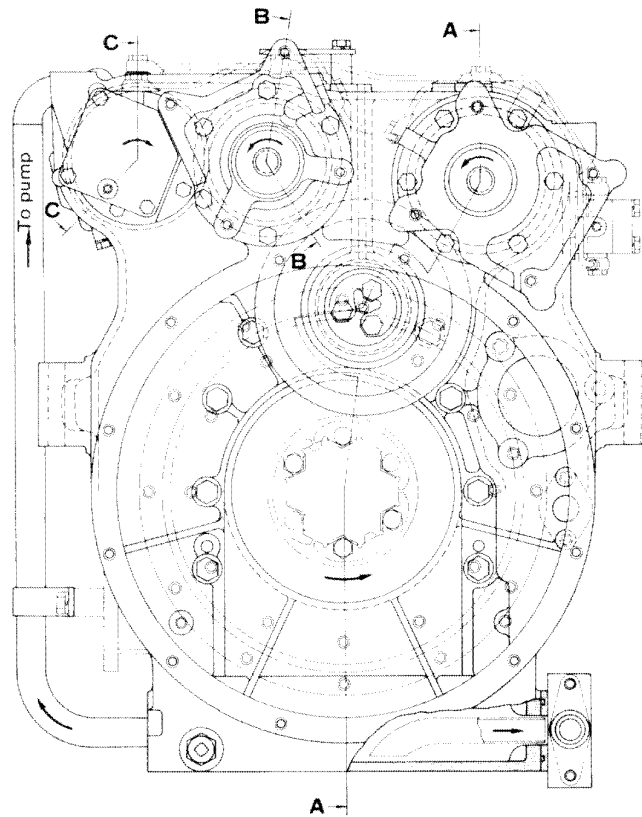
6710F072-1

1. Flywheel housing
2. Ring gear (No. of teeth: 138)
3. Flywheel

NTA-855-C (For HD320-2 Engine No. 26102754 – 26155098)



Section A-A

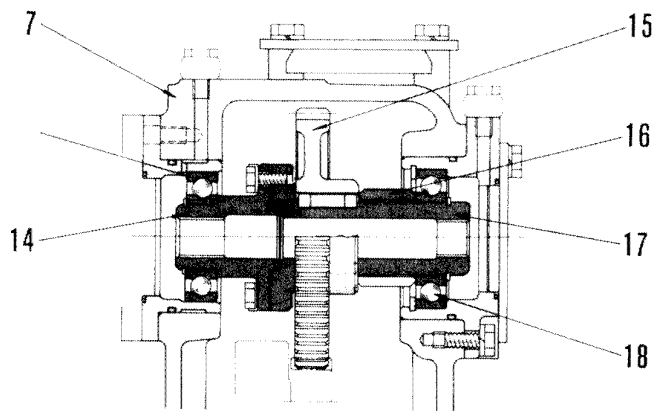


6710F075A

- | | |
|---|------------------------------|
| 1. P.T.O. idler gear shaft | 7. Flywheel housing |
| 2. Needle bearing | 8. Spacer |
| 3. P.T.O. idler gear (Number of teeth 52) | 9. Steering pump drive shaft |
| 4. Bearing case cover | 10. Ball bearing |
| 5. Roller bearing | 11. Bearing case |
| 6. Bearing case | 12. Bearing case cover |

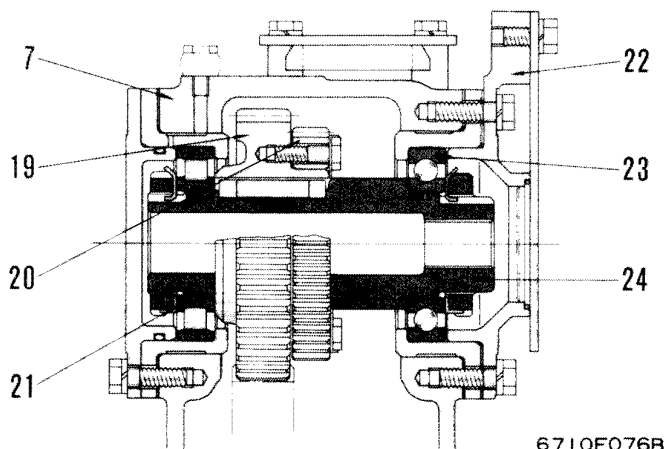
STRUCTURE AND FUNCTION

FLYWHEEL AND FLYWHEEL HOUSING



- 13. Ball bearing
- 14. Scavenging pump drive shaft
- 15. Scavenging pump drive gear (Number of teeth 51)
- 16. Spacer
- 17. Scavenging pump drive shaft
- 18. Ball bearing

Section C-C (Scavenging pump drive system)

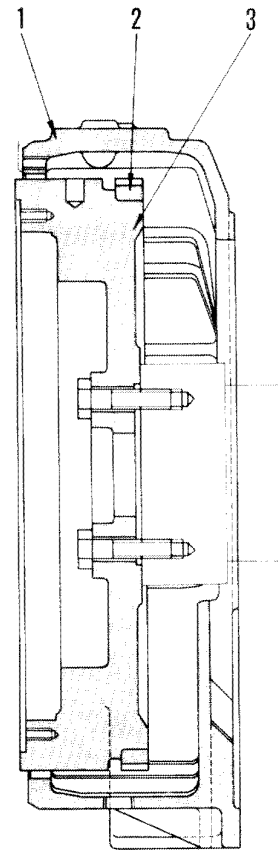
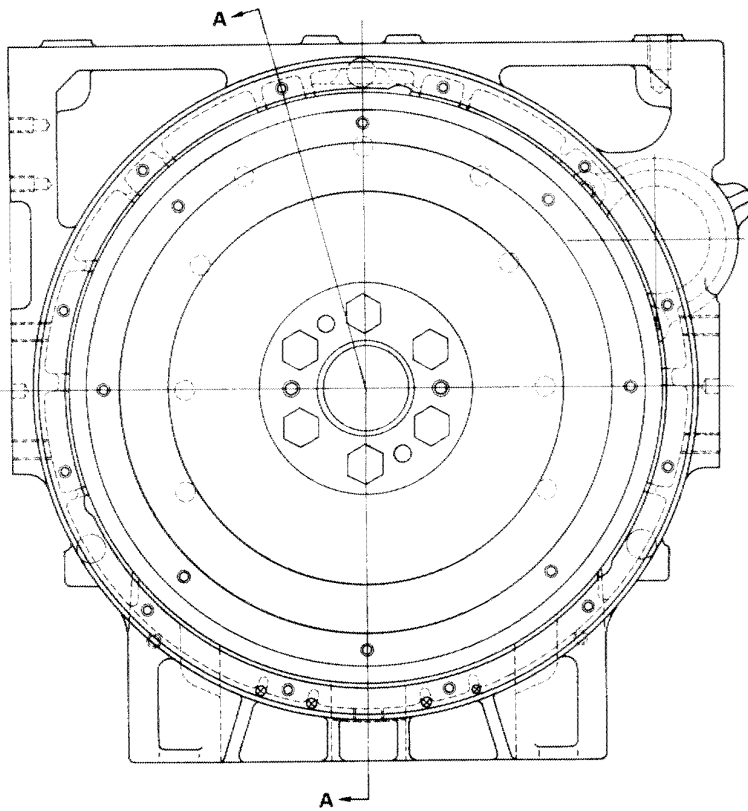


- 19. Hydraulic pump drive gear (Number of teeth 35)
- 20. Scavenging pump driven gear (Number of teeth 46)
- 21. Roller bearing
- 22. Bearing case cover
- 23. Ball bearing
- 24. Hydraulic pump drive shaft

6710F076B

Section B-B (Hydraulic pump drive system)

NTA-855-C (For HD320-2 Engine No. 26155099 and up)
(For WS16S-2 and WS23-1)



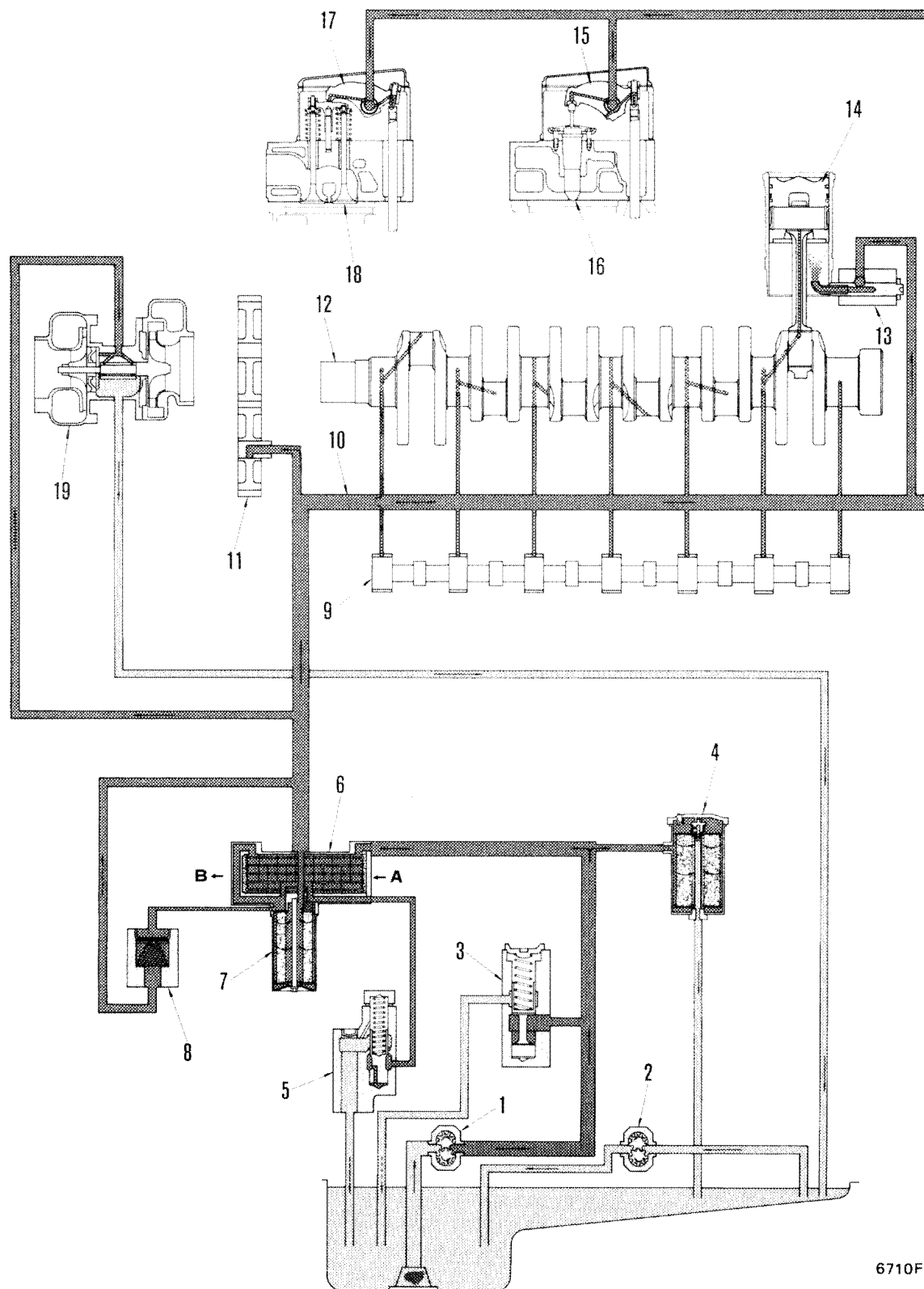
Section A-A

6710F115A

1. Flywheel housing
2. Ring gear (No. of teeth: 118)
3. Flywheel

LUBRICATION SYSTEM

LUBRICATION SYSTEM CHART



6710F077A

STRUCTURE AND FUNCTION

LUBRICATION SYSTEM CHART

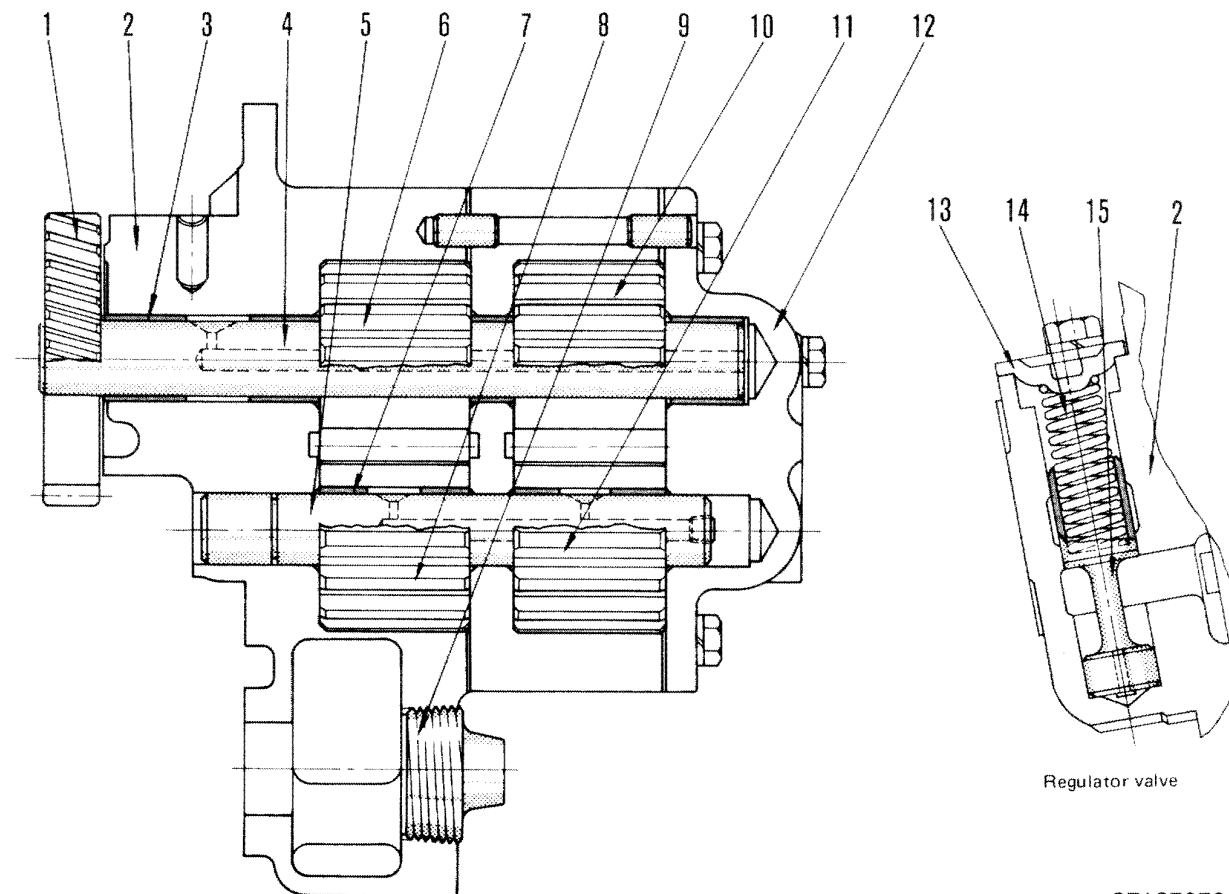
1. Oil pump
 2. P.T.O. scavenging pump
 3. By-pass valve ($9.15 \pm 0.25 \text{ kg/cm}^2$)
 4. By-pass filter
 5. Regulator valve ($4.4 \pm 0.4 \text{ kg/cm}^2$)
 6. Oil cooler
 7. Oil filter
 8. Oil filter safety valve ($3.15 \pm 0.35 \text{ kg/cm}^2$)
 9. Camshaft
 10. Main oil gallery
 11. Timing gear
 12. Crankshaft
 13. Piston cooling nozzle
 14. Piston
 15. Rocker arm (For injector)
 16. Injector
 17. Rocker arm (For intake and exhaust valve)
 18. Intake and exhaust valve
 19. Turbocharger
-
- A. From water pump
 - B. To water manifold

OIL PUMP

WITH SCAVENGING PUMP

NT-855-C (For D80, 85-18, D95S-2)

NTA-855-C (For HD320 Engine No. 26102754 – 26136175 and 26136178 – 26138576)



Regulator valve

6710F078A

- | | |
|--|--|
| 1. Pump drive gear
(No. of teeth: 27) | 9. Plug |
| 2. Pump body | 10. Scavenging pump drive gear
(No. of teeth: 9) |
| 3. Bushing | 11. Scavenging pump driven gear
(No. of teeth: 9) |
| 4. Drive shaft | 12. Pump cover |
| 5. Driven shaft | 13. Valve retainer |
| 6. Oil pump drive gear
(No. of teeth: 9) | 14. Valve spring |
| 7. Bushing | 15. Regulator valve spool |
| 8. Oil pump driven gear
(No. of teeth: 9) | |

OIL PUMP

- Type: Gear pump
- Pump speed: Engine speed x 1.333

REGULATOR VALVE

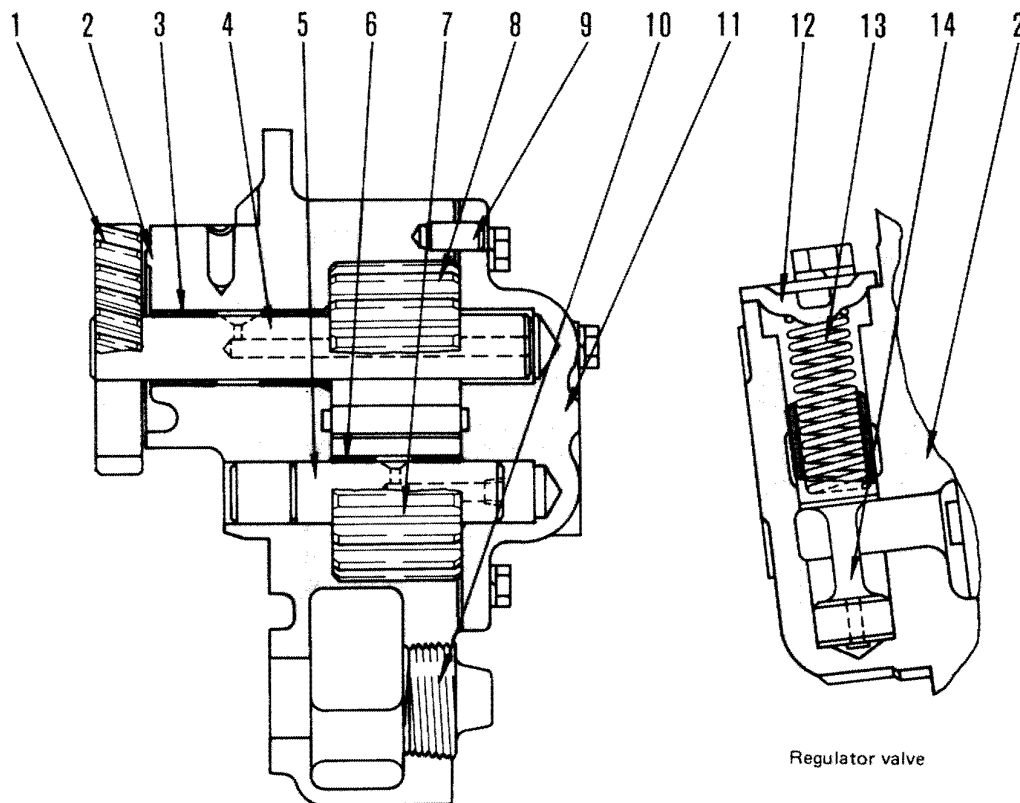
- Set pressure: $4.4 \pm 0.4 \text{ kg/cm}^2$

WITHOUT SCAVENGING PUMP

N-855-C

NT-855-C (For PC400-1, PC400LC-1, W170-2, W180-1)

NTA-855-C (For HD320 Engine No. 26136176, 26136177 and 26138577 and up)
(For WS16S-2, WS23-1)



Regulator valve

6710F079

- | | |
|--|---|
| 1. Pump drive gear
(No. of teeth: 27) | 8. Oil pump drive gear
(No. of teeth: 9) |
| 2. Pump body | 9. Dowel pin |
| 3. Bushing | 10. Plug |
| 4. Drive shaft | 11. Cover |
| 5. Driven shaft | 12. Valve retainer |
| 6. Bushing | 13. Valve spring |
| 7. Oil pump driven gear
(No. of teeth: 9) | 14. Regulator valve spring |

OIL PUMP

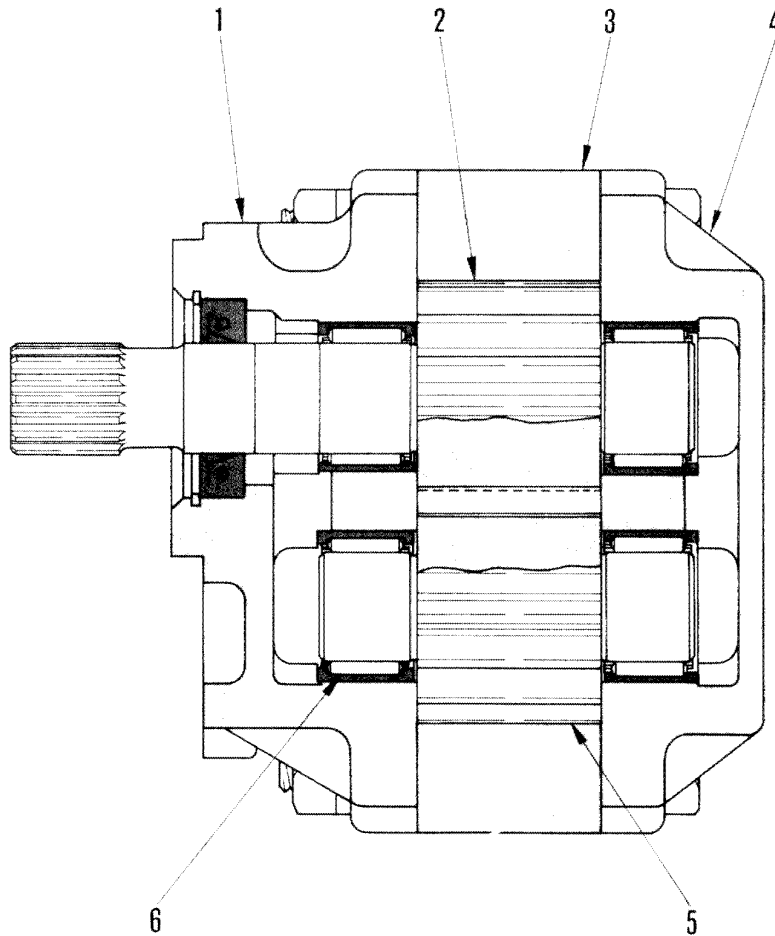
- Type: Gear pump
- Pump speed: Engine speed x 1.333

REGULATOR VALVE

- Set pressure: $4.4 \pm 0.4 \text{ kg/cm}^2$

PTO SCAVENGING PUMP

NTA-855-C (For HD320 Engine No. 26102754 – 26155098)



6710F080

1. Front housing
2. Drive gear
(No. of teeth: 15)
3. Gear housing
4. Rear housing
5. Driven gear
(No. of teeth: 15)
6. Needle bearing

Specifications

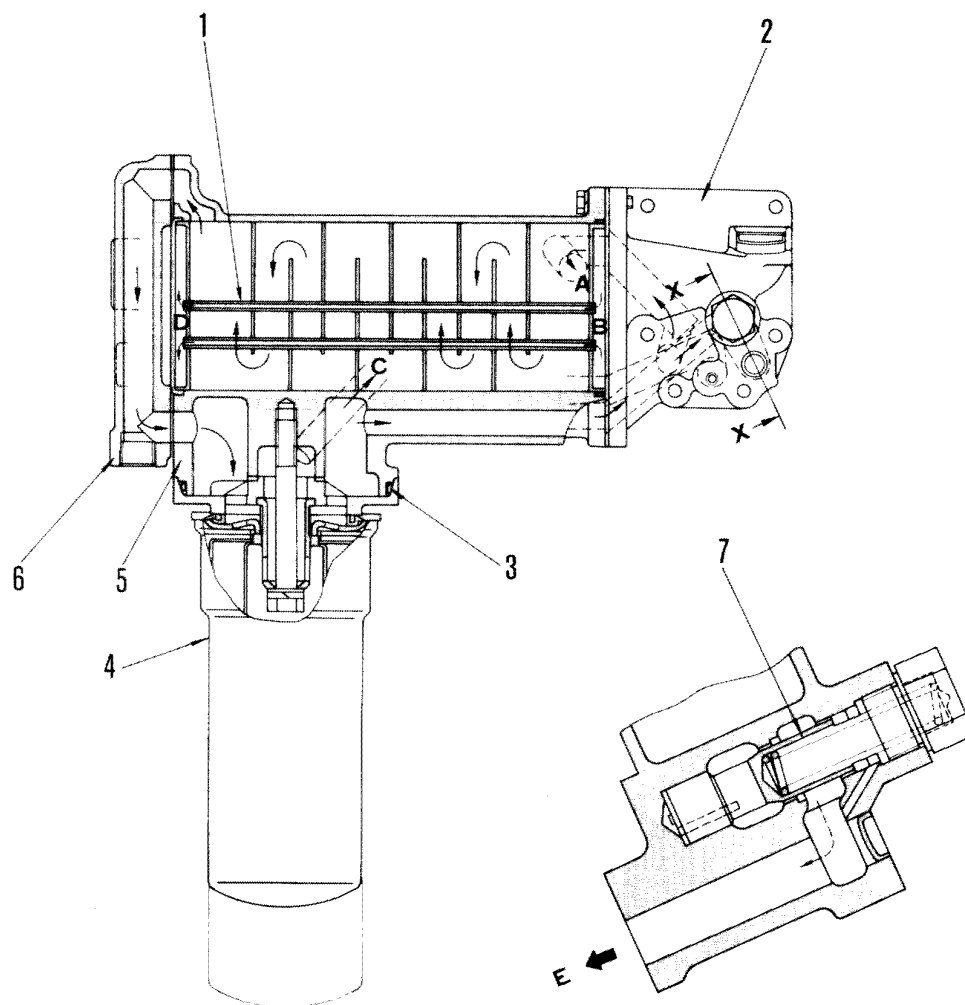
- Model: FAR032
- Max. revolution: 2,300 rpm
- Max. pressure: 30 kg/cm²

OIL FILTER AND OIL COOLER

OIL FILTER BUILD IN OIL COOLER

NT-855-C (D80, 85-18, D95S-2)

NTA-855-C (WS16S-2, WS23-1)



Section X-X

6710F081A

- | | |
|-----------------------|------------------------------|
| 1. Cooler element | A. From oil pump (oil) |
| 2. Oil cooler cover | B. From water pump (water) |
| 3. Seal ring | C. To main gallery (oil) |
| 4. Oil filter | D. To water manifold (water) |
| 5. Oil cooler housing | E. To oil pan |
| 6. Oil cooler cover | |
| 7. Regulator valve | |

OIL FILTER

- Filtration area: 0.84 m²

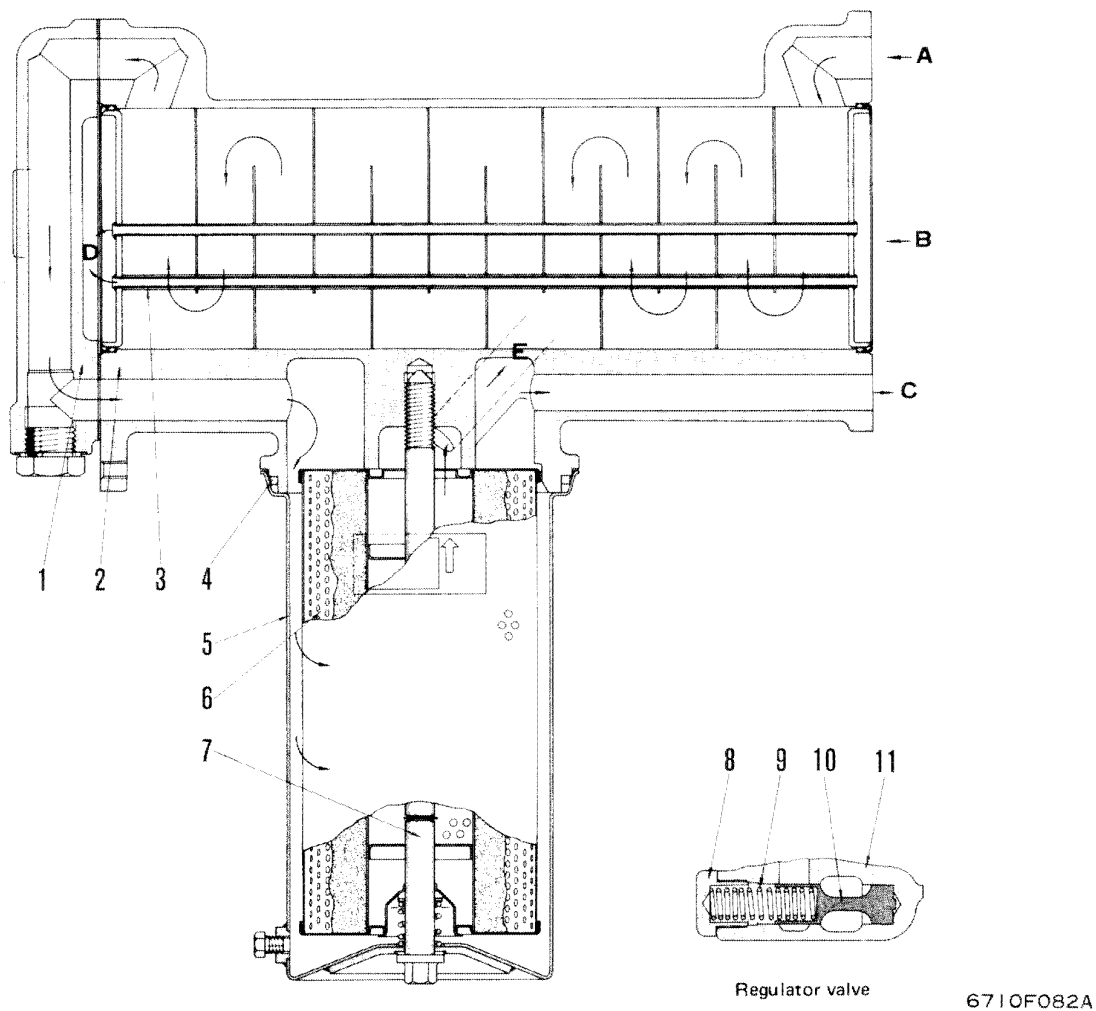
OIL COOLER

- Effective area: 1.058 m²

REGULATOR VALVE

- Set pressure: 4.4 ± 0.4 kg/cm²

NTA-855-C (HD320 Engine No. 26102754 – 26155098)



1. Cooler cover
2. Cooler housing
3. Cooler element
4. Seal ring
5. Filter case
6. Filter element
7. Center bolt
8. Cap
9. Valve spring
10. Regulator valve
11. Water pump inlet housing

- A. From oil pump (oil)
- B. From water pump (water)
- C. To regulator valve (oil)
- D. To water manifold (water)
- E. To main gallery (oil)

OIL FILTER

- Filtration area: 0.84 m²

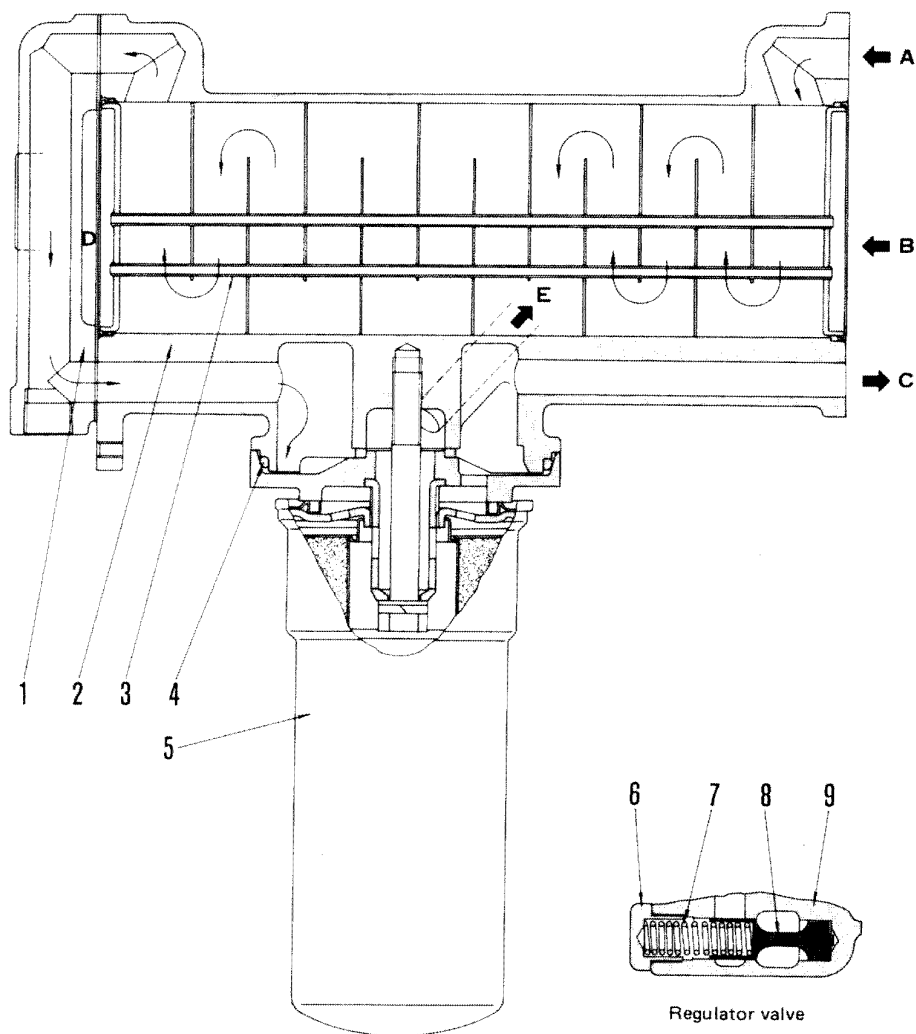
OIL COOLER

- Effective area: 1.37 m²

REGULATOR VALVE

- Set pressure: 4.4 ± 0.4 kg/cm²

NTA-855-C (HD320 Engine No. 26155099 and up)



6710F083A

1. Cooler cover
2. Cooler housing
3. Cooler element
4. Seal ring
5. Oil filter
6. Cap
7. Valve spring
8. Regulator valve
9. Water pump inlet housing

- A. From oil pump (oil)
- B. From water pump (water)
- C. To regulator valve (oil)
- D. To water manifold (water)
- E. To main gallery (oil)

OIL FILTER

- Filtration area: 0.84 m²

OIL COOLER

- Effective area: 1.37 m²

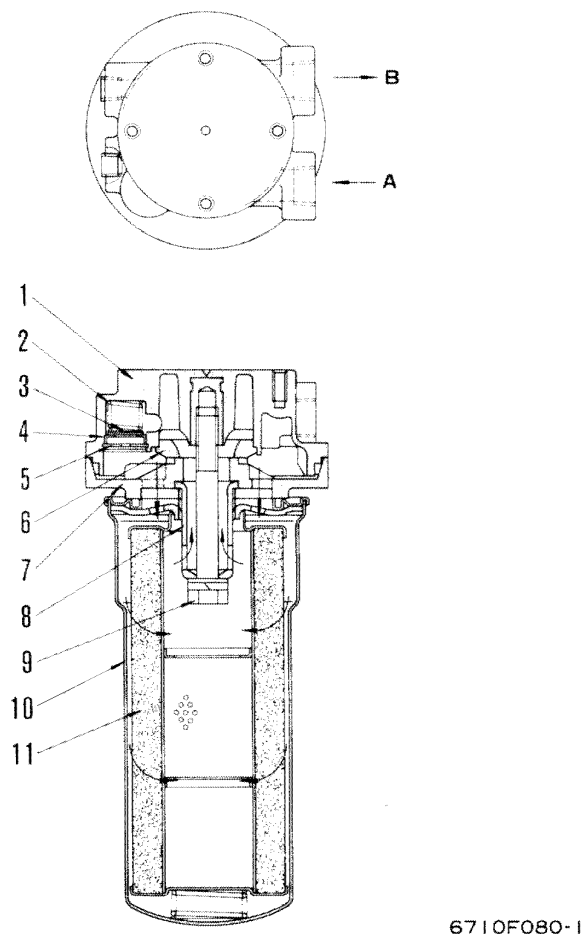
REGULATOR VALVE

- Set pressure: 4.4 ± 0.4 kg/cm²

FULL-FLOW FILTER

N-855-C

NT-855-C (For PC400-1, PC400LC-1, W170-2, W180-1)



6710F080-1

1. Head bracket
2. Valve spring
3. Safety valve
4. Valve seat
5. Ring
6. Adapter
7. Adapter
8. Insert
9. Center bolt
10. Cartridge
11. Element

- A. Fuel inlet
- B. Fuel outlet

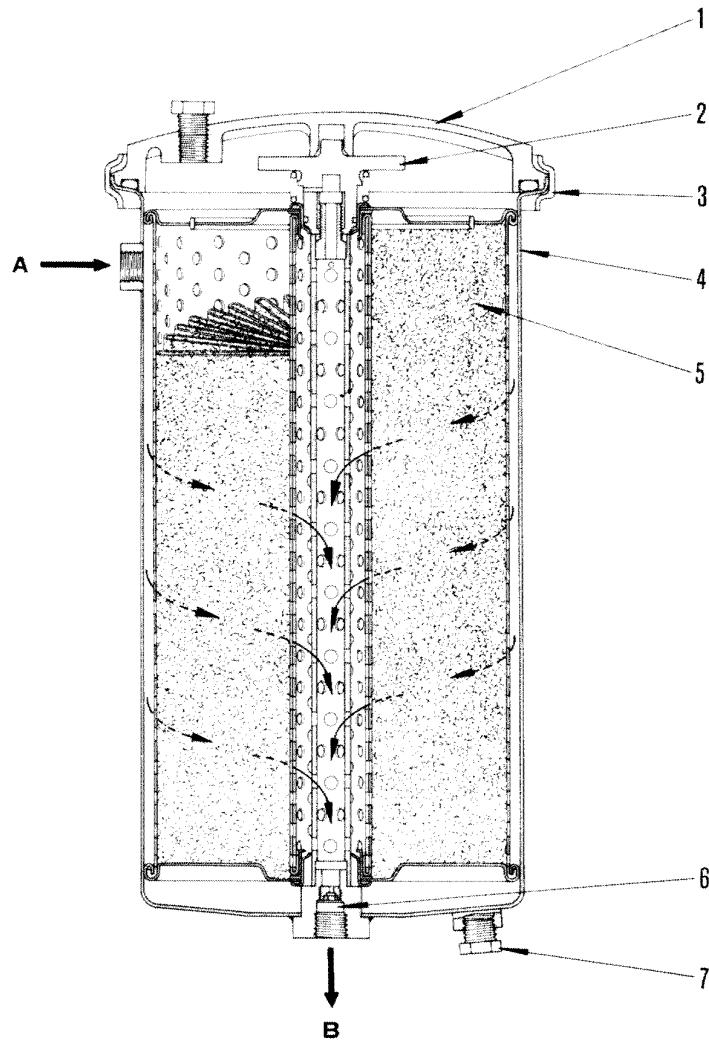
FULL-FLOW FILTER

- Filtration area: 0.84 m²

SAFETY VALVE

- Set pressure: 3.14 ± 0.34 kg/cm²

BY-PASS FILTER

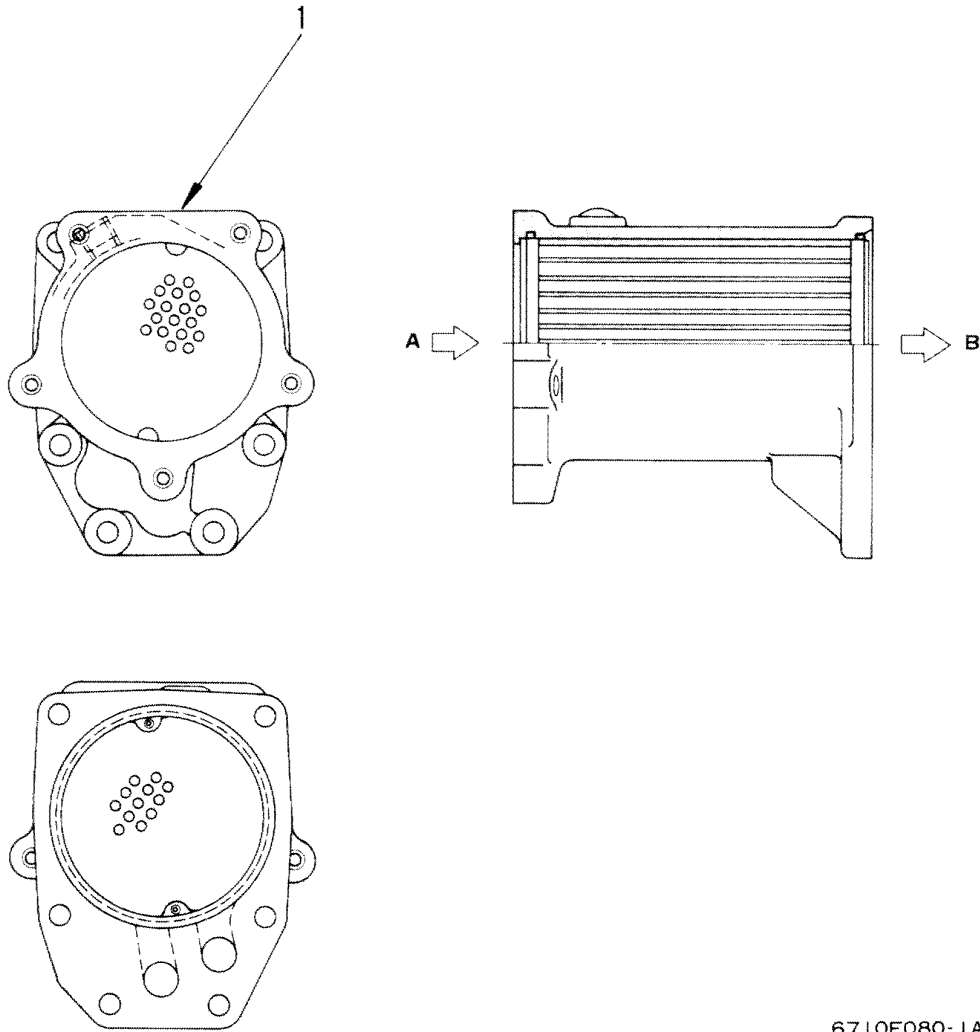


6710F083-I

- | | |
|-------------------|------------------|
| 1. Filter cover | A. From oil pump |
| 2. Support | B. To oil pan |
| 3. Coupling | |
| 4. Filter case | |
| 5. Filter element | |
| 6. Orifice plug | |
| 7. Drain plug | |

OIL COOLER

N-855-C



6710F080-1A

1. Oil cooler

A. Water inlet

B. Water outlet

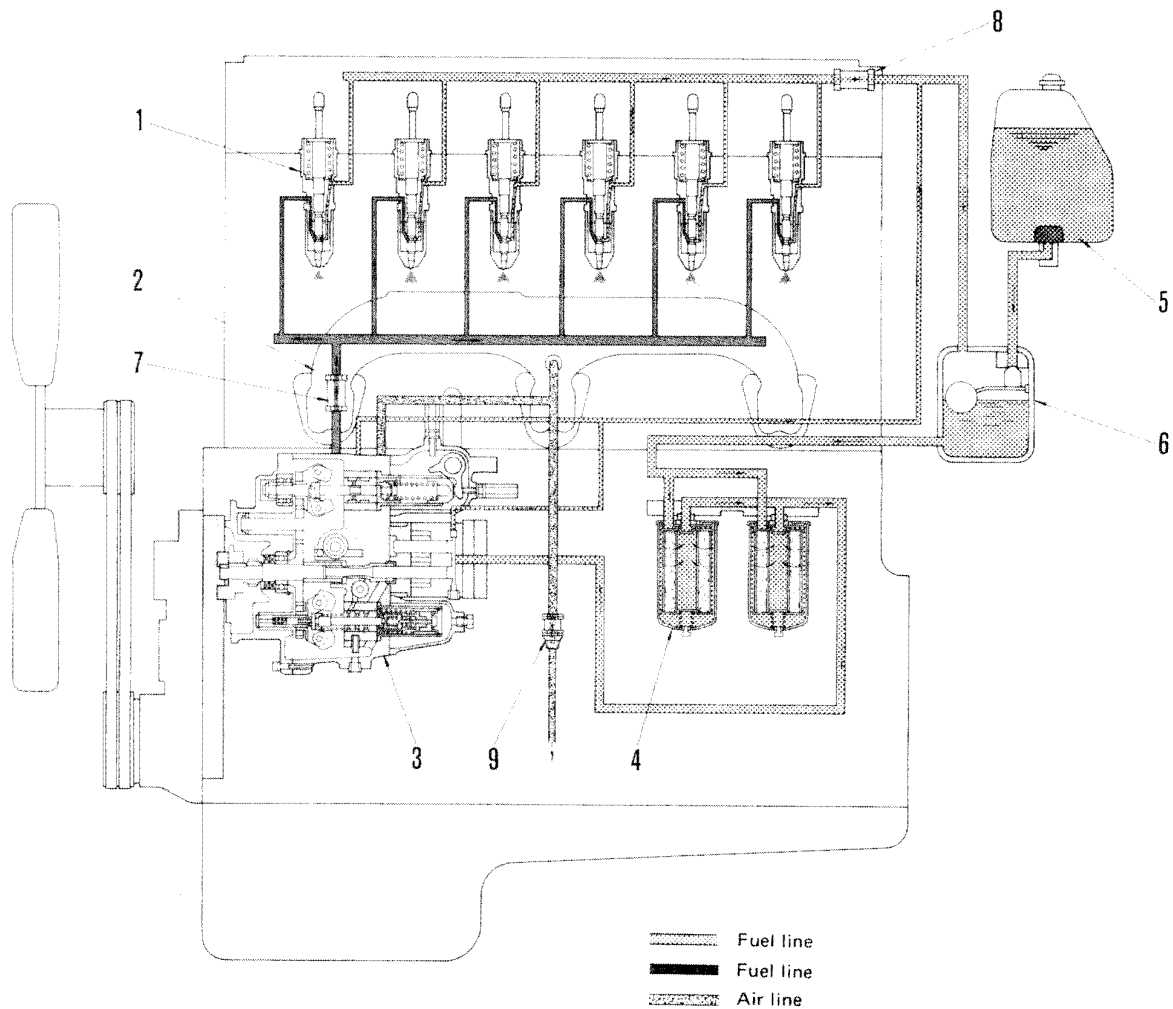
FUEL SYSTEM

FUEL SYSTEM CHART

N-855-C

NT-855-C

NTA-855-C (Except HD320-2, HD320-3)



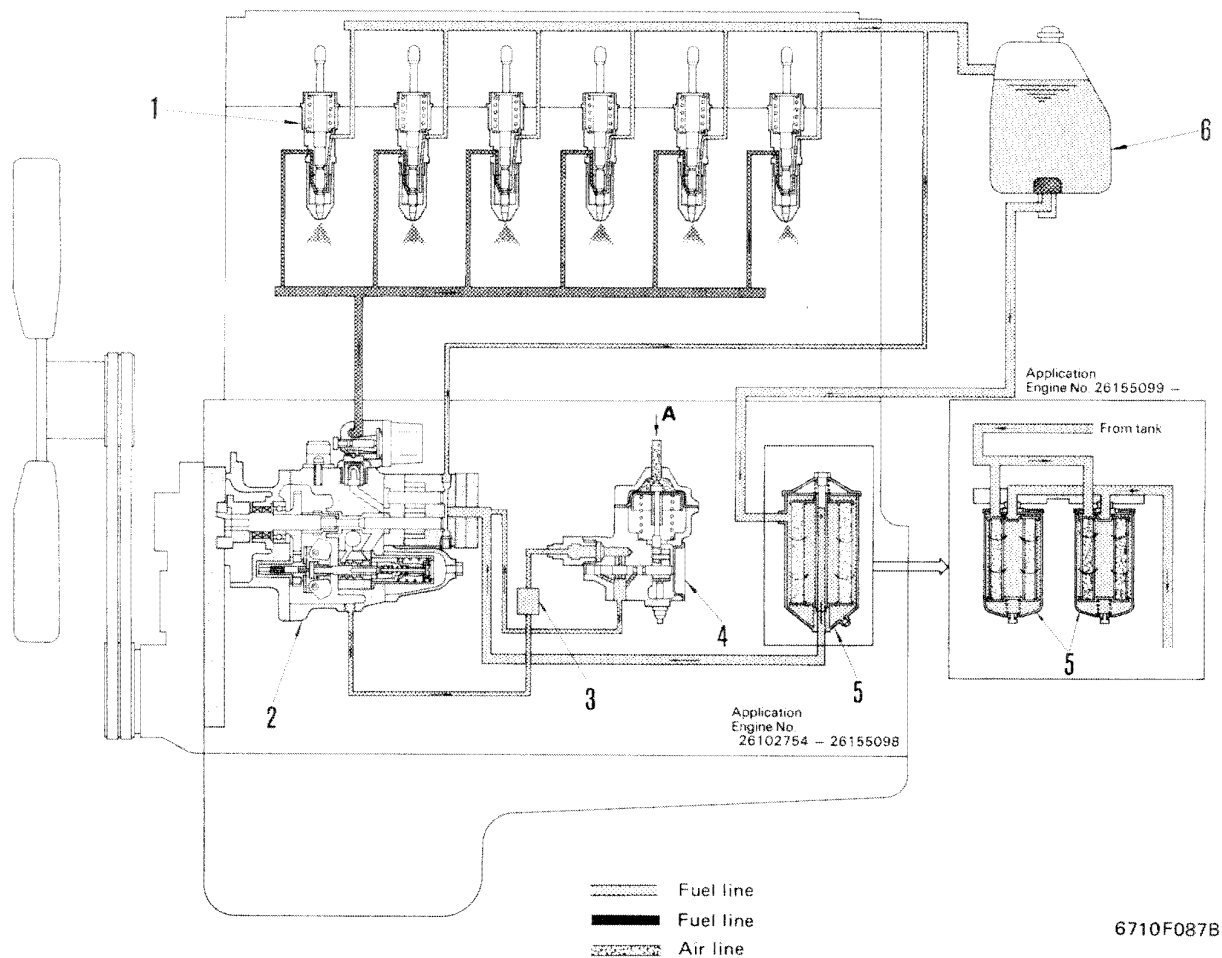
6710F086A

- | | |
|--------------------|---|
| 1. Injector | 6. Float tank |
| 2. Intake manifold | 7. Check valve
(Cracking pressure: $0.28 \pm 0.07 \text{ kg/cm}^2$) |
| 3. PT fuel pump | 8. Check valve
(Cracking pressure: $0.027 \pm 0.008 \text{ kg/cm}^2$) |
| 4. Fuel filter | 9. Check valve
(Cracking pressure: 0.035 kg/cm^2) |
| 5. Fuel tank | |

FUEL SYSTEM CHART

STRUCTURE AND FUNCTION

NTA-855-C (HD320-2)

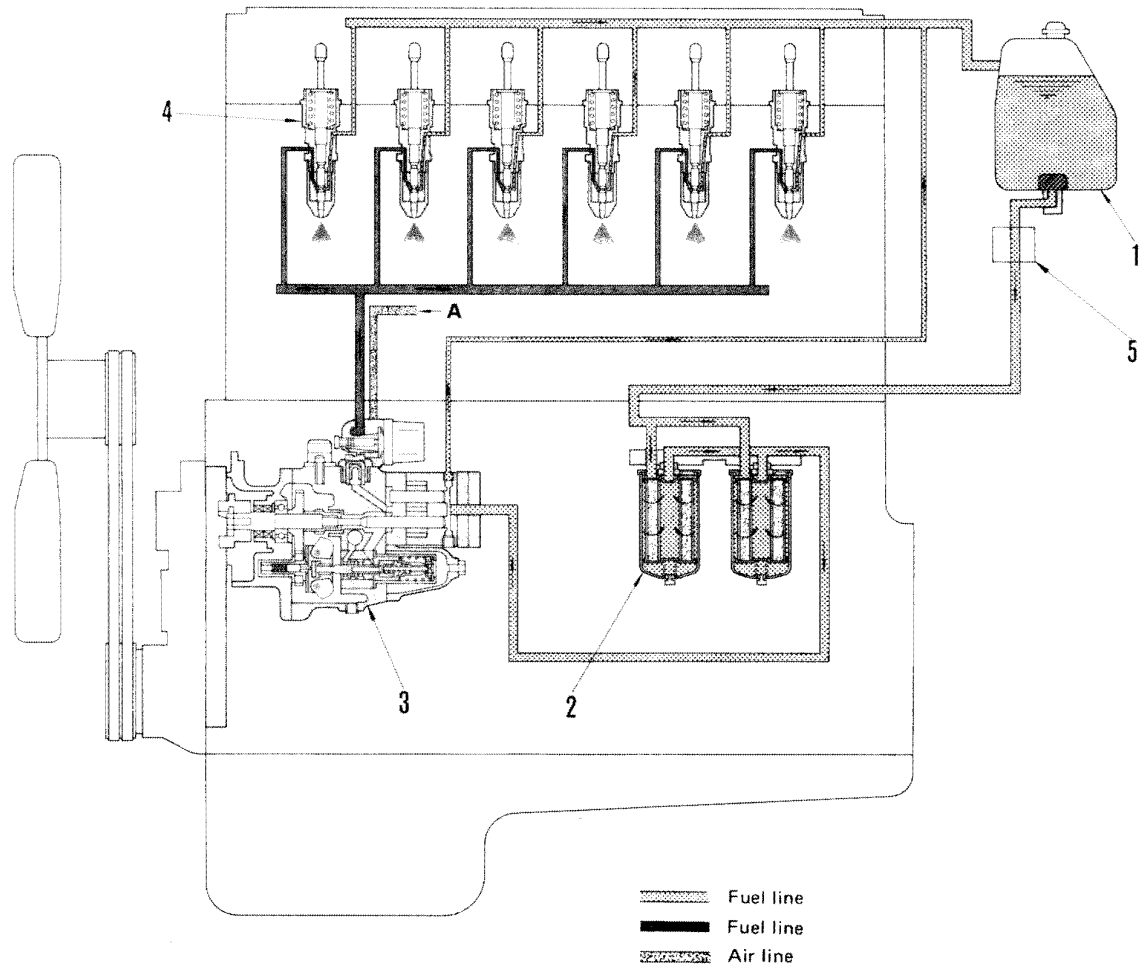


6710F087B

1. Injector
2. PT fuel pump
3. Check valve
4. Aneroid control valve
5. Fuel filter
6. Fuel tank

A. From after-cooler (air)

NTA-855-C (HD320-3)



6710F087-1

1. Fuel tank
2. Fuel filter
3. PT fuel pump
4. Injector

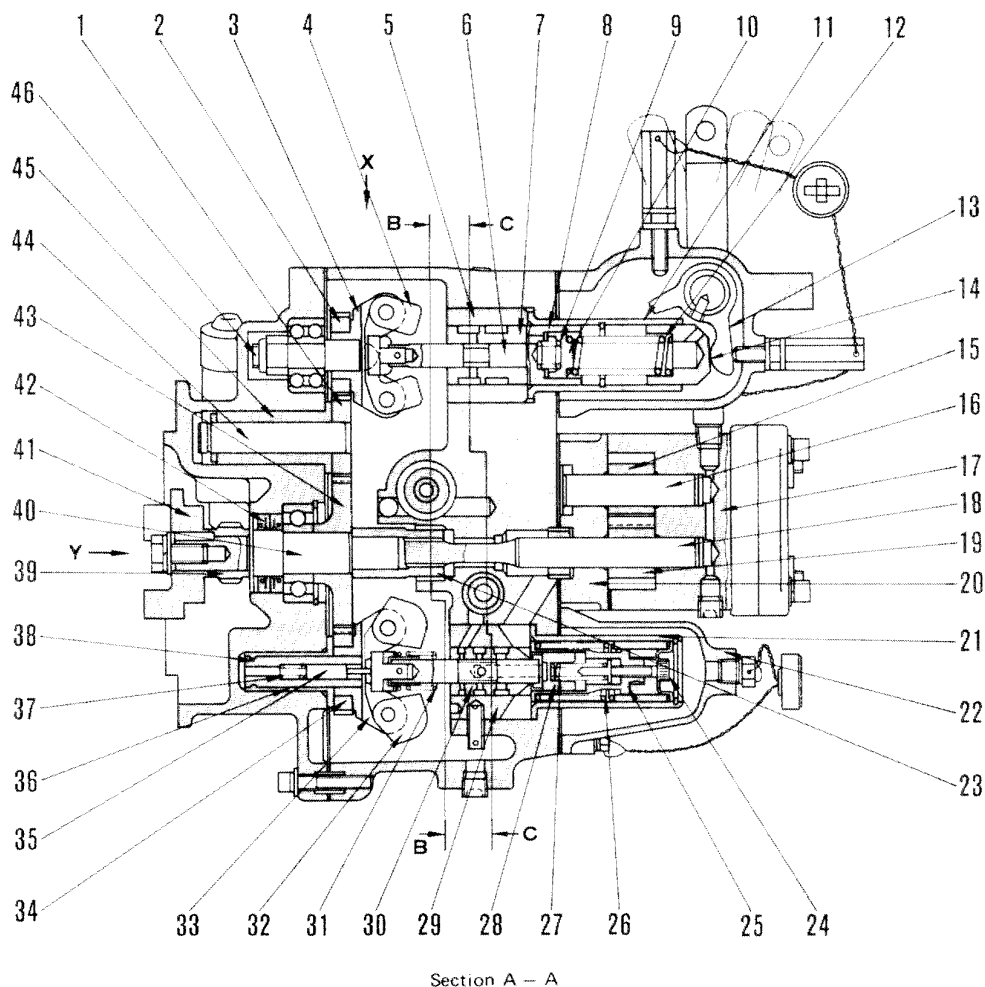
A. From after-cooler (air)

PT FUEL PUMP

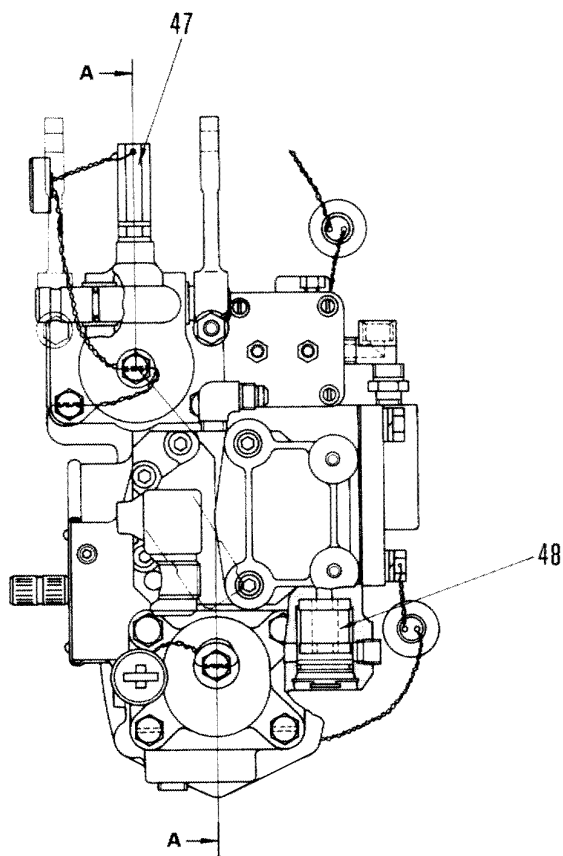
N-855-C

NT-855-C

NTA-855-C (Except HD320-2 and HD320-3)



- | | |
|--|---|
| 1. Idler gear (No. of teeth: 26) | 11. VS governor spring pack housing |
| 2. VS governor drive gear (No. of teeth: 26) | 12. VS governor spring |
| 3. Weight carrier | 13. Stopper lever |
| 4. Weight | 14. Throttle plunger |
| 5. VS governor barrel | 15. Pump driven gear (No. of teeth: 10) |
| 6. VS governor plunger | 16. Driven shaft |
| 7. VS governor sleeve | 17. Gear pump body |
| 8. VS governor idler plunger | 18. Gear pump drive shaft |
| 9. VS governor idle spring | 19. Pump drive gear (No. of teeth: 10) |
| 10. VS governor spring retainer | 20. Gear pump cover |

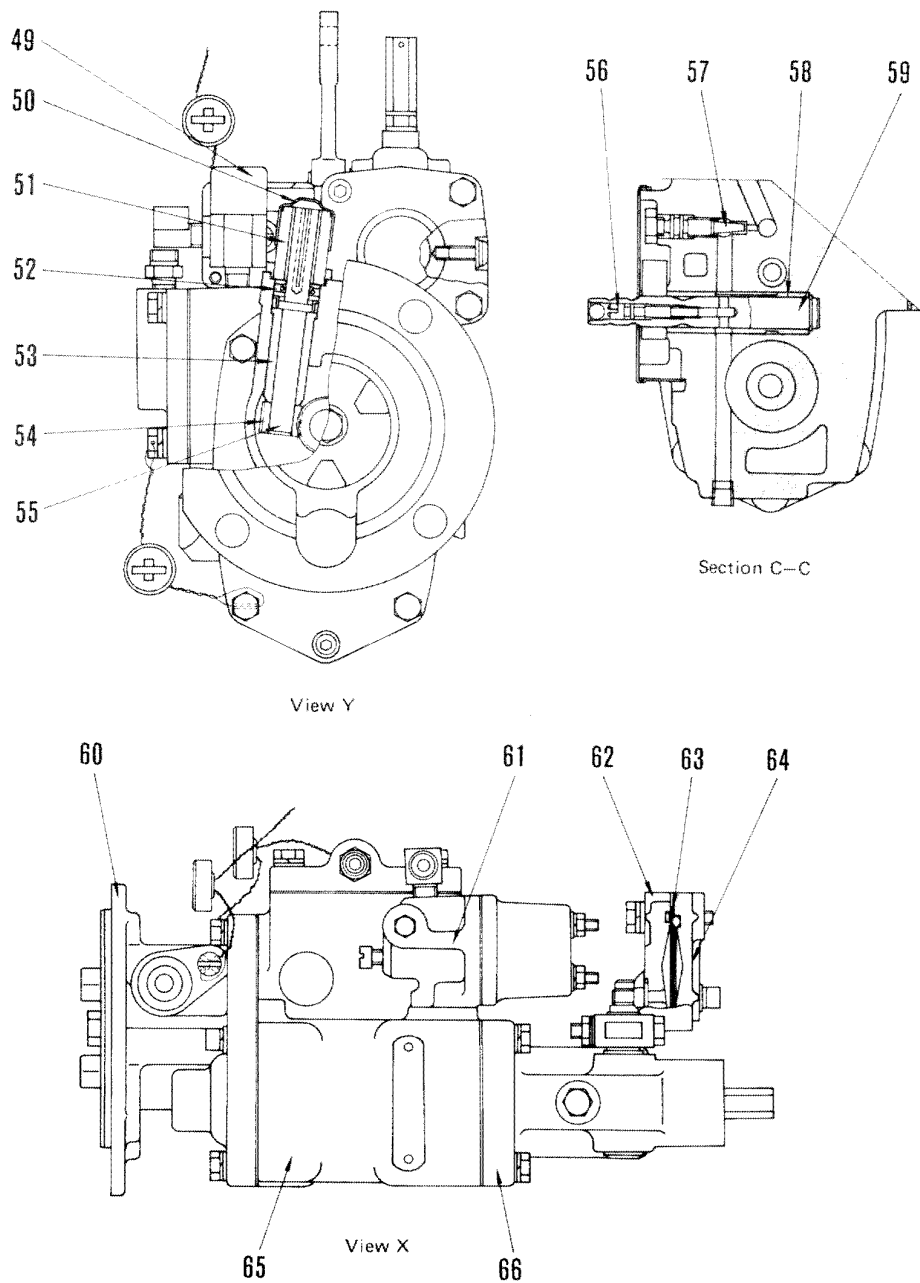


6710F090A

- | | | |
|-------------------------------|---|-----------------------------------|
| 21. Spring pack housing | 31. Torque spring | 41. Drive coupling |
| 22. Spring pack cover | 32. Main governor weight | 42. Oil seal |
| 23. Coupling | 33. Weight carrier | 43. Drive gear (No. of teeth: 49) |
| 24. Idle adjustment screw | 34. Main governor drive gear (No. of teeth: 26) | 44. Idle shaft |
| 25. Governor plunger guide | 35. Weight assist plunger | 45. Bushing |
| 26. Main governor spring | 36. Bushing | 46. VS governor shaft |
| 27. Main governor idle spring | 37. Weight assist spring | 47. Adjustment screw |
| 28. Idler plunger (button) | 38. Governor weight shaft | 48. Filter screen |
| 29. Governor barrel | 39. Service meter drive gear (No. of teeth: 9) | |
| 30. Governor sleeve | 40. PT pump drive shaft | |

PT FUEL PUMP

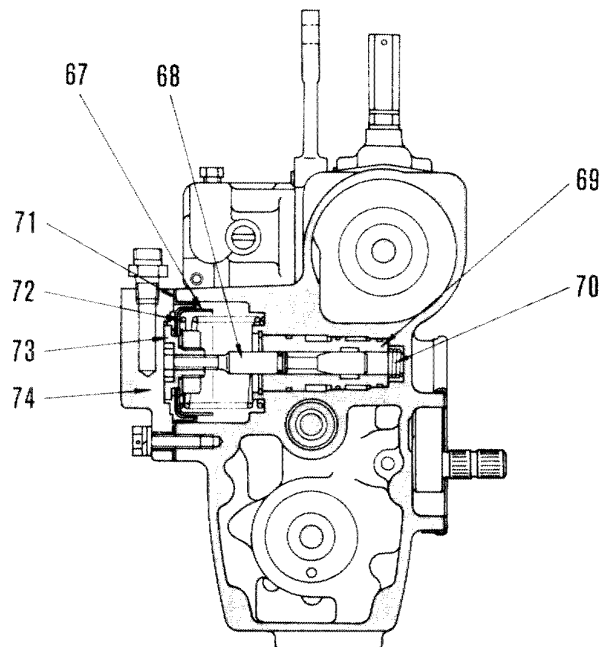
STRUCTURE AND FUNCTION



- | | | |
|-------------------|--|--------------------|
| 49. Breather | 54. Service meter drive gear (No. of teeth: 9) | 59. Throttle shaft |
| 50. Dust cap | 55. Service meter drive shaft | 60. PT pump cover |
| 51. Drive housing | 56. Idle screw | 61. Shut-off valve |
| 52. Oil seal | 57. Needle barrel | 62. Damper body |
| 53. Bushing | 58. Sleeve | 63. Diaphragm |

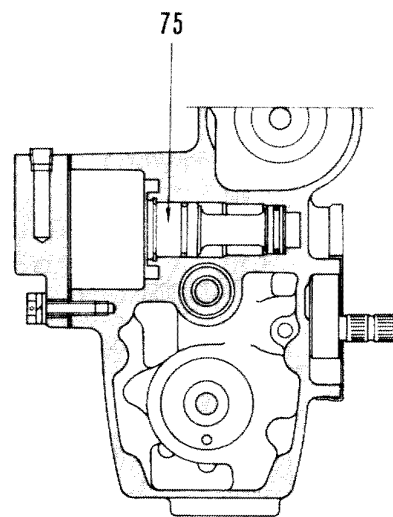
STRUCTURE AND FUNCTION

PT FUEL PUMP



Section B—B

With AFC



Section B—B

Without AFC

6710F091A

64. Pulsation damper cover

65. PT pump housing

66. Spring pack cover

67. AFC piston

68. AFC plunger

69. AFC barrel

70. Spring

71. AFC bellows

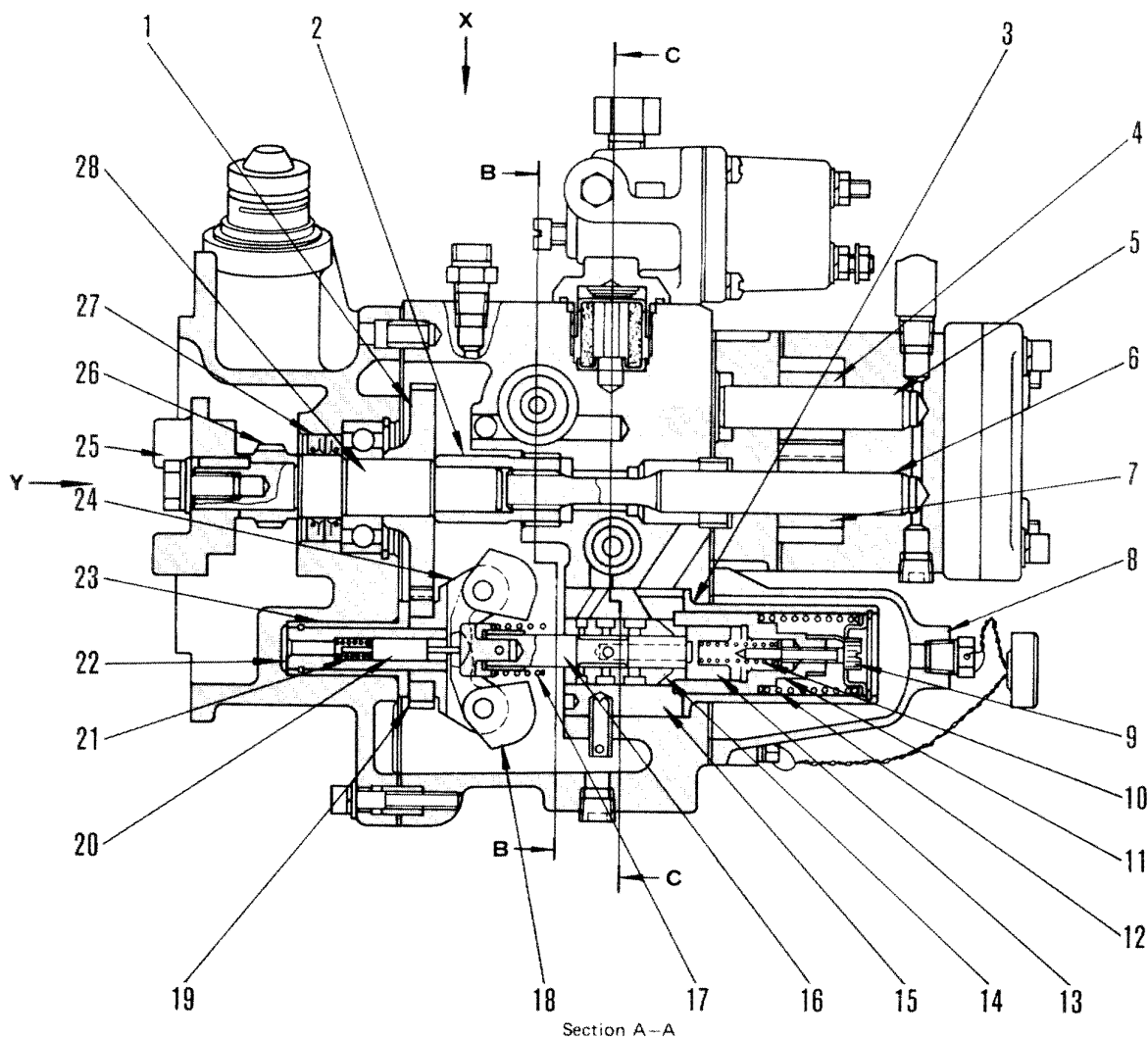
72. AFC spring

73. AFC center bolt

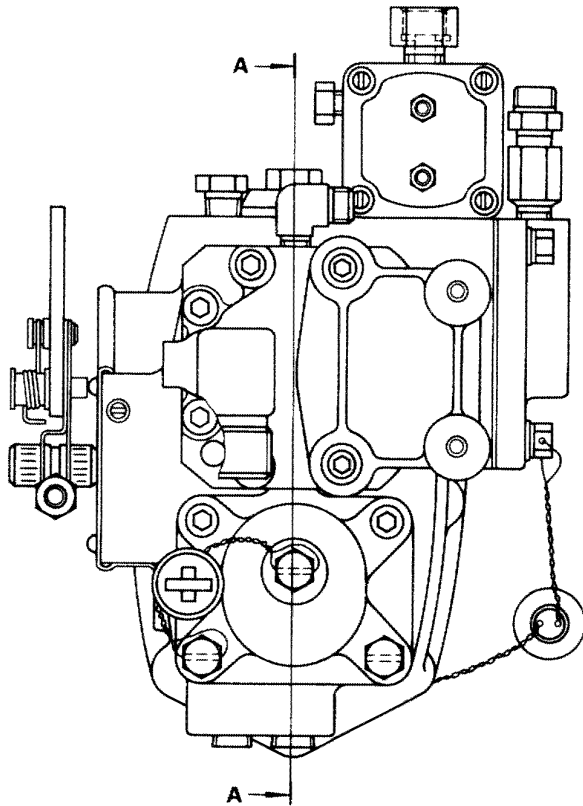
74. AFC cover

75. Barrel

NTA-855-C (For HD320-2 and HD320-3)

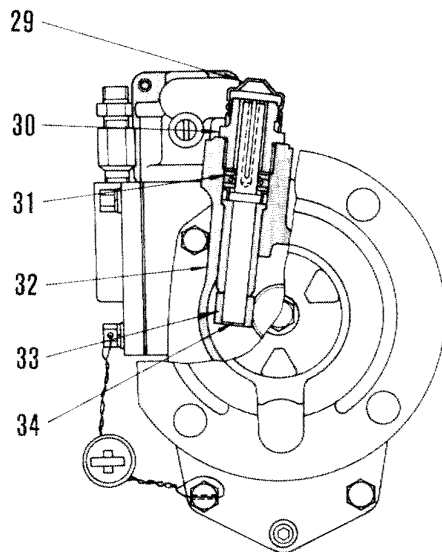


- | | |
|--|--|
| 1. PT pump drive gear (No. of teeth: 49) | 11. Plunger guide |
| 2. Coupling | 12. Governor spring |
| 3. Spring pack cover | 13. Idler plunger (button) |
| 4. Pump driven gear (No. of teeth: 10) | 14. Governor sleeve |
| 5. Driven shaft | 15. Governor barrel |
| 6. Gear pump drive shaft | 16. Governor plunger |
| 7. Pump drive gear (No. of teeth: 10) | 17. Torque spring |
| 8. Spring pack cover | 18. Governor weight |
| 9. Idler adjustment screw | 19. Governor drive gear (No. of teeth: 26) |
| 10. Idler spring | 20. Weight assist plunger |

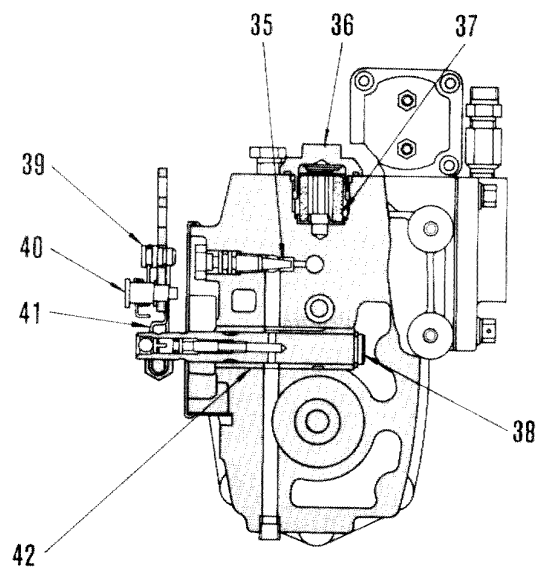


6710F088A

- 21. Weight assist spring
- 22. Governor weight shaft
- 23. Bushing
- 24. Weight carrier
- 25. Drive coupling
- 26. Service meter drive gear (No. of teeth: 9)
- 27. Oil seal
- 28. PT pump drive shaft



View Y

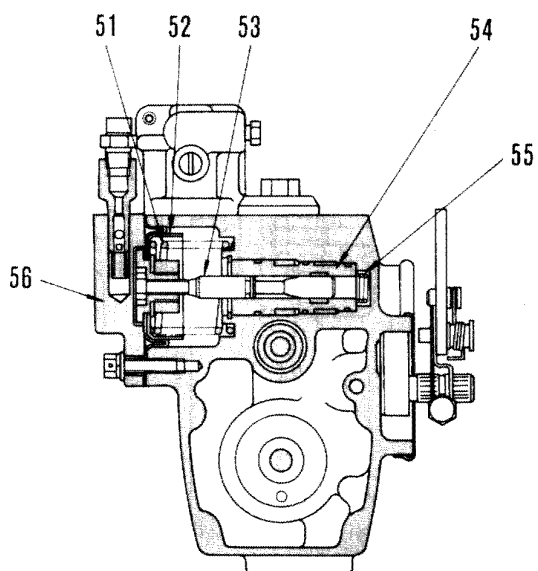
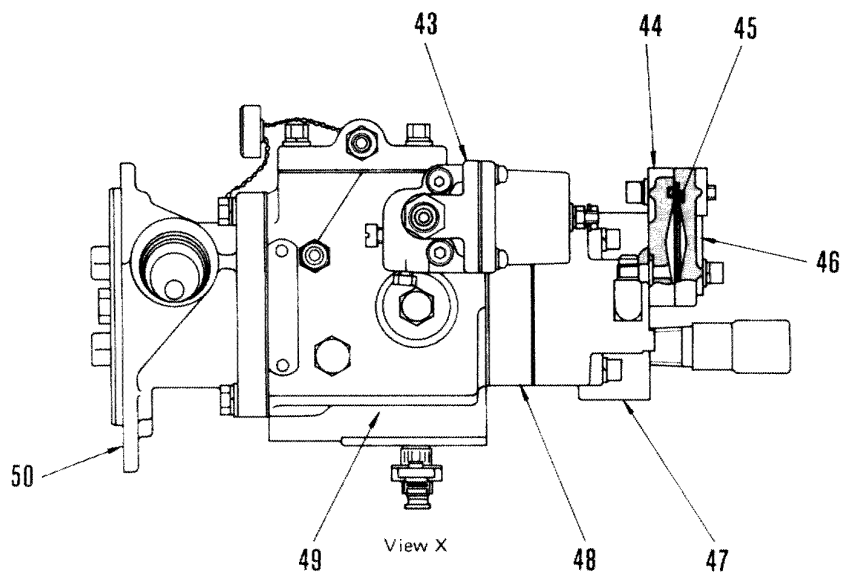


Section C — C

- 29. Dust cap
- 30. Service meter drive housing
- 31. Oil seal
- 32. Bushing
- 33. Service meter drive gear (No. of teeth: 9)

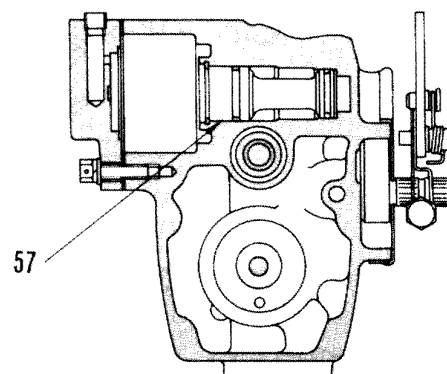
- 34. Service meter drive shaft
- 35. Needle valve
- 36. Filter cap
- 37. Filter screen
- 38. Throttle shaft

- 39. Stopper
- 40. Swivel joint
- 41. Throttle lever
- 42. Sleeve



Section B—B

With AFC



Section B—B

Without AFC

6710F089A

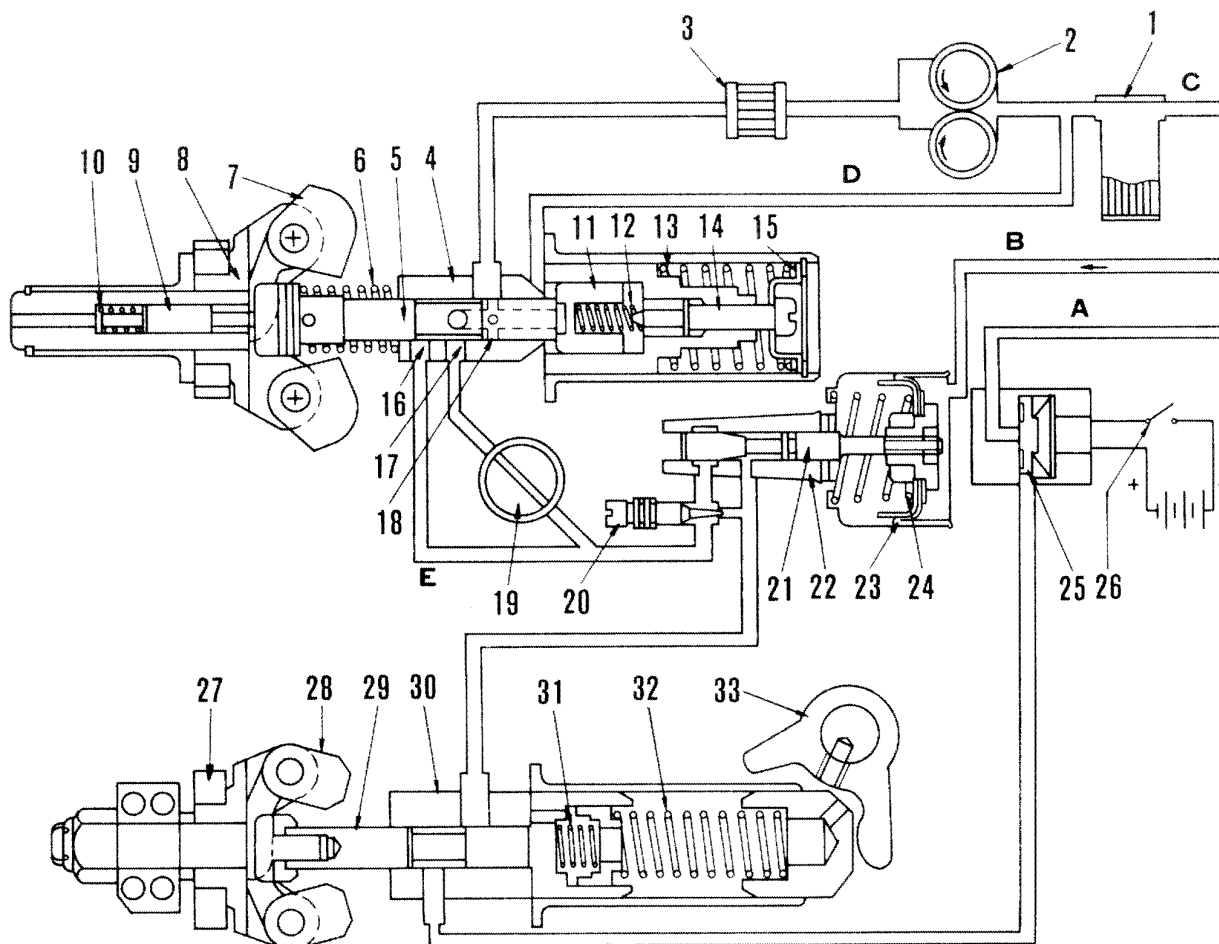
- | | | |
|---------------------------|-------------------------|----------------|
| 43. Shut-off valve | 49. PT pump housing | 54. AFC barrel |
| 44. Pulsation damper body | 50. PT pump front cover | 55. Spring |
| 45. Diaphragm | 51. AFC spring | 56. AFC cover |
| 46. Damper cover | 52. AFC piston | 57. Barrel |
| 47. Gear pump housing | 53. AFC plunger | |
| 48. Gear pump cover | | |

PTG-VS FUEL PUMP FUEL FLOW AND GOVERNOR (For NT-855-C)

The schematics show a PTG-VS fuel pump with an air fuel control (AFC). The PTG-VS fuel pump has two governors in series: The PTG governor and the VS governor. The PTG governor has the same hardware and function as in the PTG fuel pump. The VS governor is a restricting governor that senses engine speed. The fuel flows from the fuel filter through the PTG governor, AFC section, VS governor, shut down valve, and to the injectors. The PTG-VS (variable speed) fuel pump provides stable constant speed operation at any throttle or speed setting.

ENGINE NOT RUNNING

Ignition switch is open, solenoid valve is closed. The VS throttle is in the closed position when the engine is not running, eliminating any flow or pressure in engine fuel passages. Turbo boost pressure is not available to act upon diaphragm, to deflect AFC spring. The AFC plunger is in the closed position.



6710F121

1. Fuel filter
 2. Gear pump
 3. Filter screen
 4. Governor plunger
 5. Weight assist plunger
 6. Torque control spring
 7. Fly weights (Governor weights)
 8. Fly weight drive gear
 9. Weight assist plunger
 10. Weight assist spring
 11. Idle spring plunger
 12. Idle speed spring
 13. Governor spring
 14. Idle speed adjusting screw
 15. Maximum speed governor shims
 16. Idler speed governor port
 17. Main governor port
 18. Governor dump port
 19. Throttle shaft
 20. AFC needle valve
 21. AFC control plunger
 22. AFC barrel
 23. Diaphragm (Bellows)
 24. AFC spring
 25. Solenoid valve
 26. Ignition switch
 27. VS governor weight drive gear
 28. Fly weights (VS governor weights)
 29. Weight assist plunger (VS governor plunger)
 30. VS governor sleeve
 31. Governor spring (VS idle speed spring)
 32. VS maximum speed governor spring
 33. VS throttle
- A: Fuel to injectors
B: Air from intake manifold
C: Fuel from tank
D: By-passed fuel
E: Idle fuel passage

STARTING AND IDLE

Ignition switch is closed, causing solenoid valve to be energized and in open position. The gear pump supplies fuel to the governor; the governor weights push the governor plunger to a position to supply fuel to the VS governor. The VS governor weights move the VS plunger to open and regulate idle. Fuel pressure then forces the idle spring plunger back to allow excess fuel to by-pass and regulate pressure. Idle fuel which has flowed through the restricted "no air" needle valve, passes through the VS governor and on to the solenoid valve. The AFC plunger blocks fuel from passing through the AFC barrel due to insufficient turbo "boost" pressure available to act upon the diaphragm to deflect the AFC spring.

NORMAL DRIVING

The throttle is connected to a pedal or lever by which the operator controls fuel flow and rail pressure to the injectors. The position of the VS governor plunger, which is positioned by the counteracting forces of the VS governor spring and the VS governor weight force, controls the amount of fuel flow and rail to the injectors. The governor weight force increases as speed increases. The amount of fuel delivered to the VS governor depends upon the regulating counteracting forces of the governor spring and torque spring which influences the amount of fuel by-passed at the end of the governor plunger and idle spring plunger. The maximum fuel pressure and fuel flow are regulated in the speed range of the engine by the governor itself. Fuel is passing through the needle valve and AFC barrel since sufficient turbo "boost" is available to act upon the diaphragm and overcome the AFC spring. The final fuel flow is regulated at the VS governor and passes through the solenoid valve on to the injector.

BEGINNING OF HIGH SPEED GOVERNING

Fuel is still flowing from the governor through both the needle valve and AFC barrel, VS governor, to the solenoid, and on to the injectors. However, it can be noticed that the VS governor port is being closed which causes more fuel to be by-passed by the plunger and idle spring plunger. The VS plunger and port thereby control governor regulation on the droop curve by restricting fuel flow.

COMPLETE HIGH SPEED GOVERNING

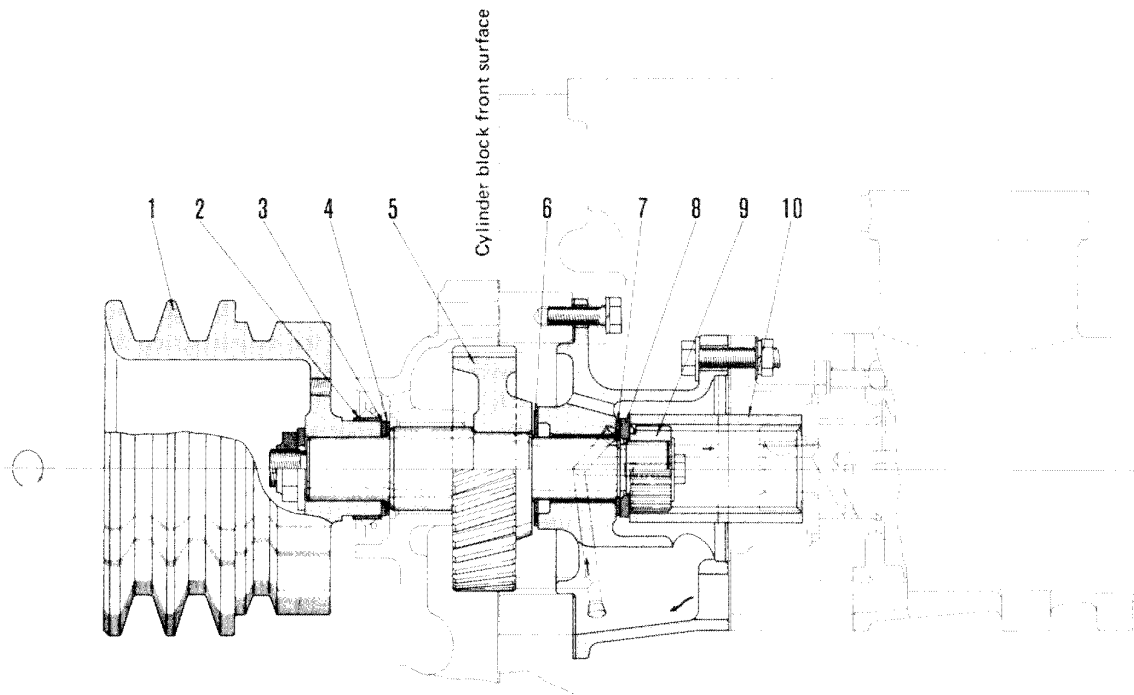
Gear pump supplied fuel is flowing to the VS governor, which is restricting the flow of fuel to the engine. The supplied fuel is being by-passed by the plunger and idle spring plunger and dump holes; thus only sufficient fuel will pass to maintain high idle speed. The throttle is open and fuel will flow through restricted "no air" needle valve, and on to solenoid valve. AFC plunger blocks fuel from passing through AFC barrel. Turbo "boost" pressure is not available to act upon diaphragm to deflect AFC spring.

PT FUEL PUMP DRIVE

WITH AIR COMPRESSOR

NT-855-C (PC400-1, PC400LC-1, W170-2, W180-1)

NTA-855-C (HD320-2, 3, WS16S-2, WS26-1)

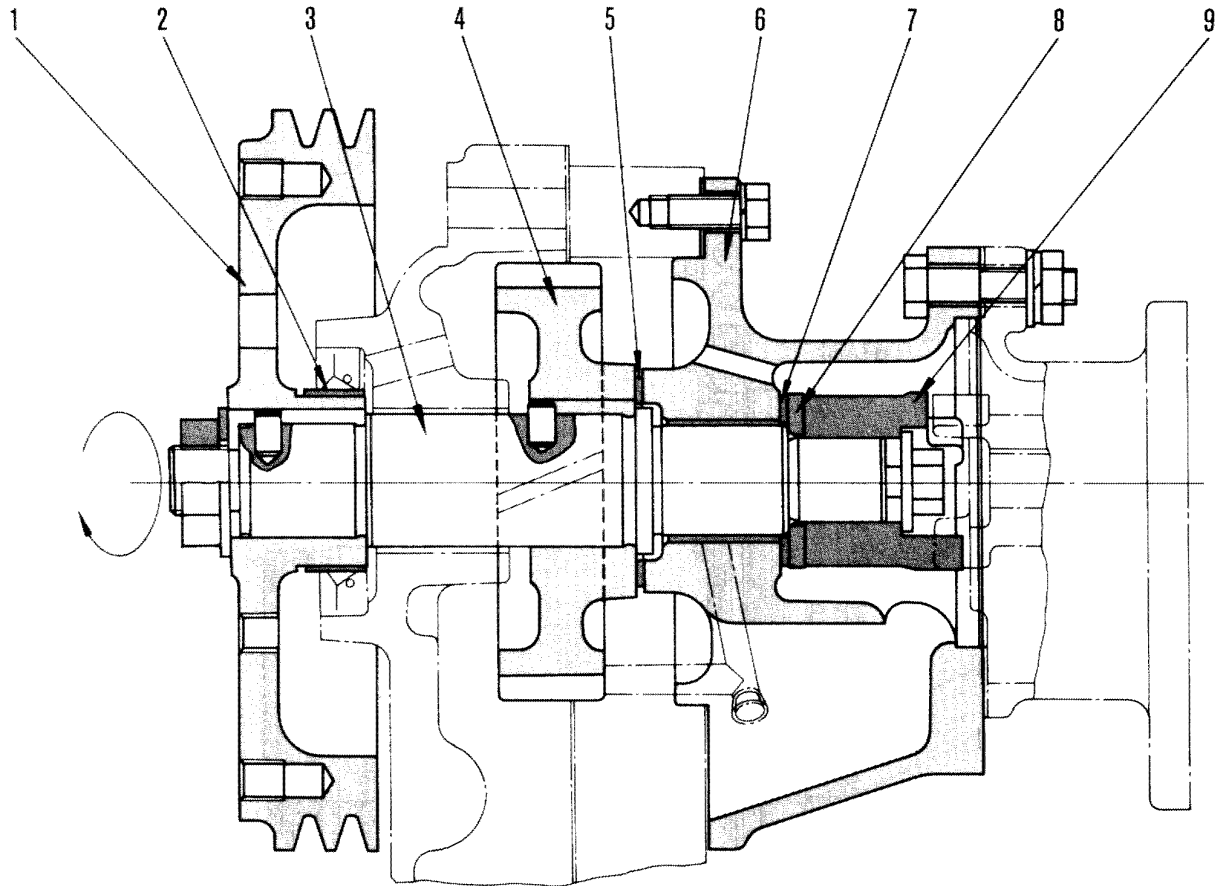


6710F092A

- | | |
|---|-------------------|
| 1. Accessory drive pulley | 6. Thrust washer |
| 2. Sleeve | 7. Thrust washer |
| 3. Slinger (NTA-855-C) | 8. Washer |
| 4. Spacer | 9. Drive coupling |
| 5. Accessory drive gear
(No. of teeth: 36) | 10. Coupling |

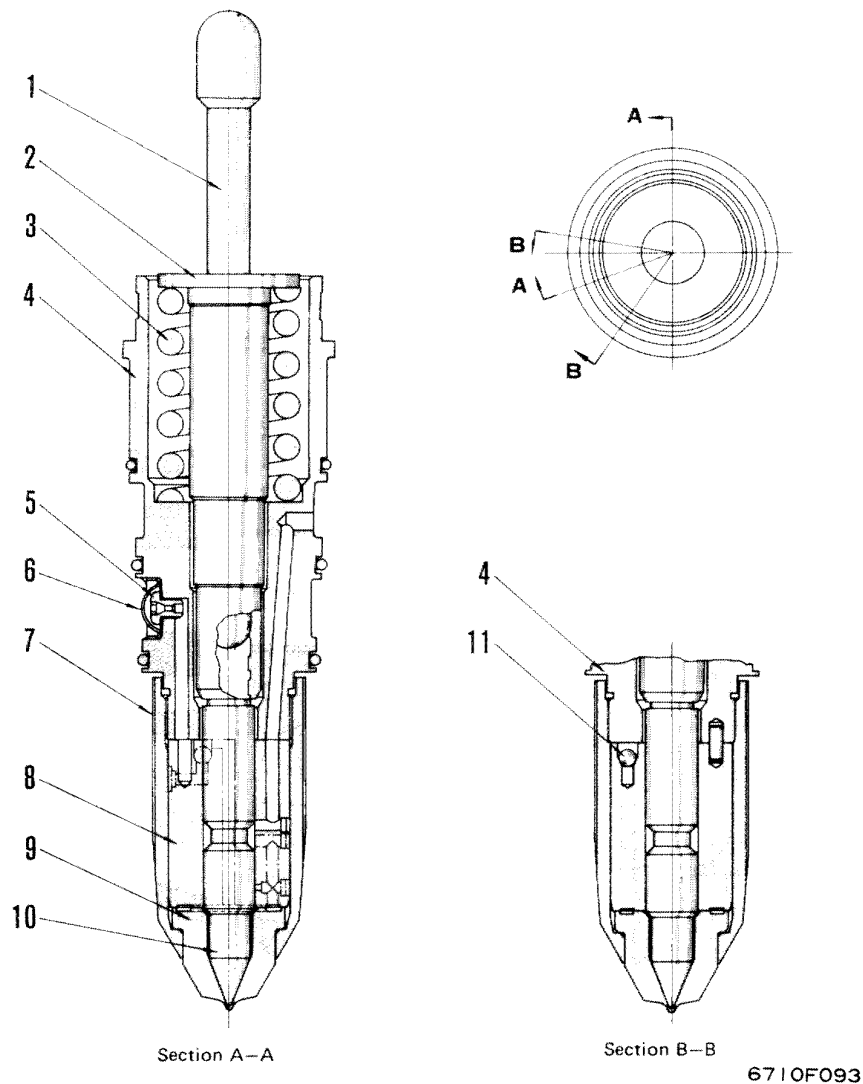
WITHOUT AIR COMPRESSOR

NT-855-C (D80, 85-18, D95S-2)



6710F092-1

INJECTOR

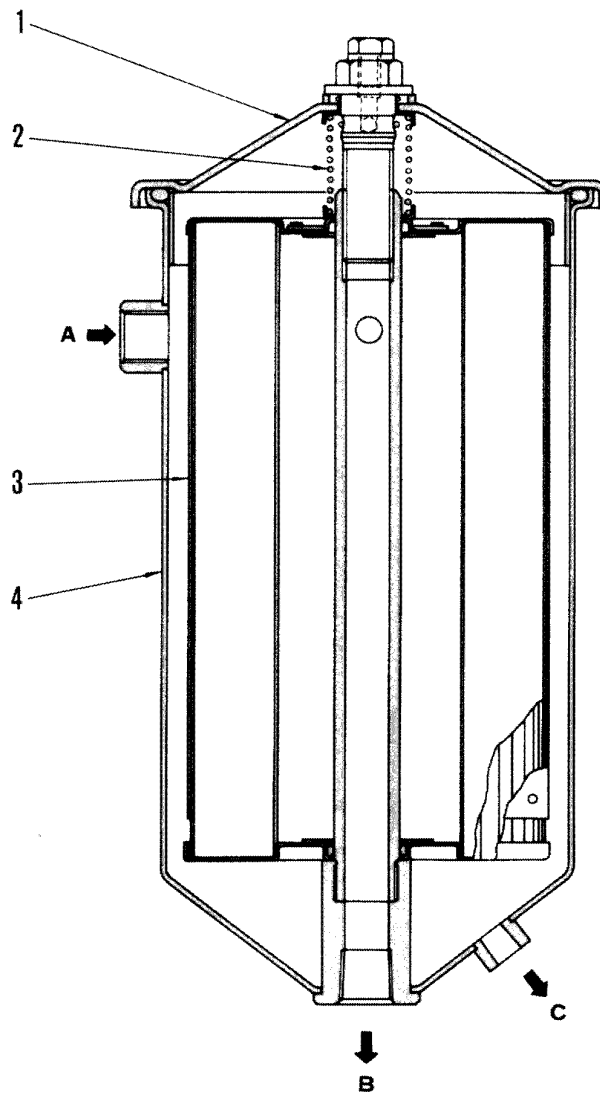


- | | |
|---------------------|----------------------|
| 1. Plunger link | 7. Injector retainer |
| 2. Plunger coupling | 8. Injector barrel |
| 3. Injector spring | 9. Injector cup |
| 4. Injector adapter | 10. Injector plunger |
| 5. Orifice plug | 11. Check ball valve |
| 6. Filter screen | |

6710F093

FUEL FILTER

Center bolt type



6710F094

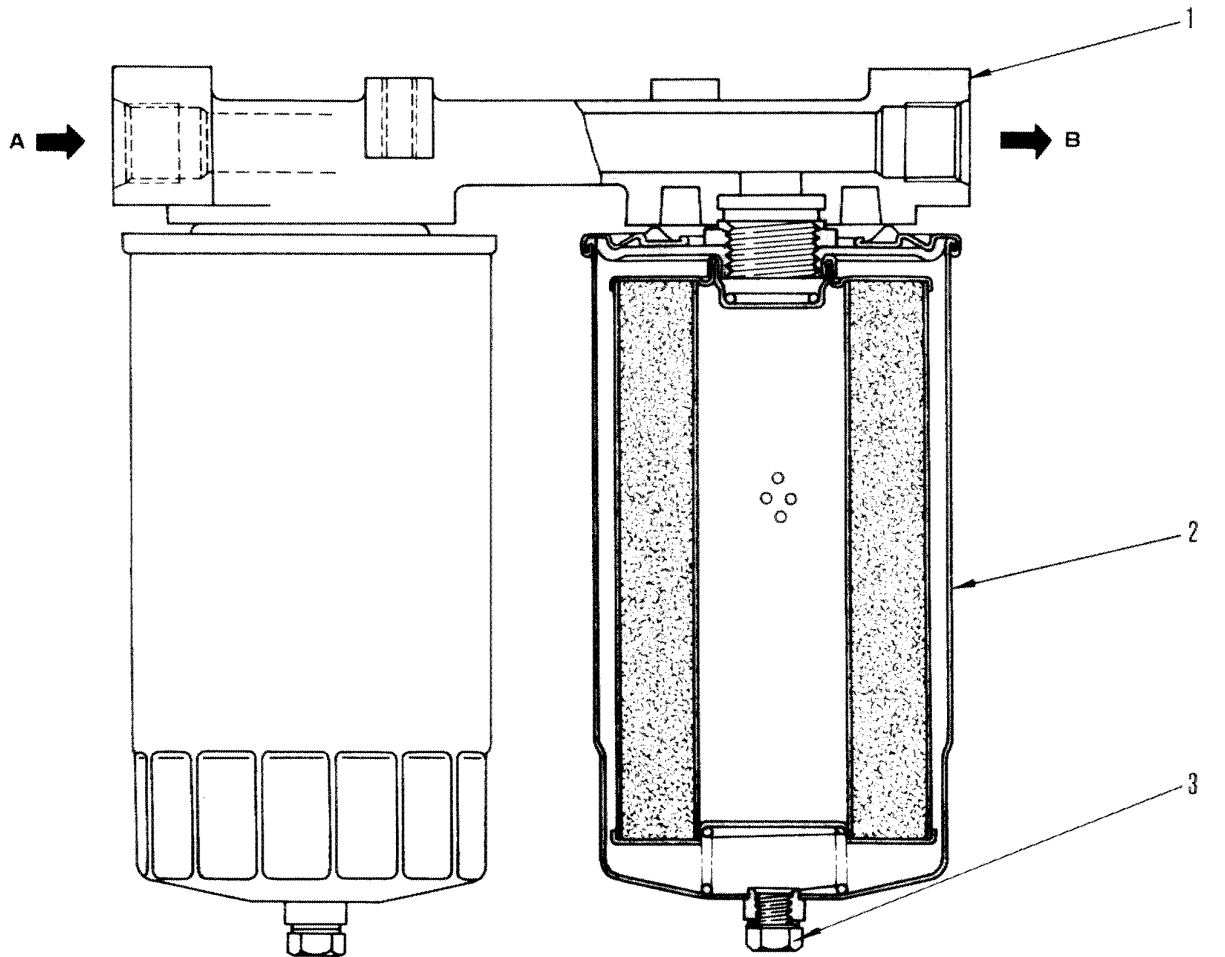
1. Cover
2. Spring
3. Element
4. Body

Filter

Filtration area : 1,21m²

- A. From fuel tank
B. To PT fuel pump
C. To drain

Cartridge type



6710F095B

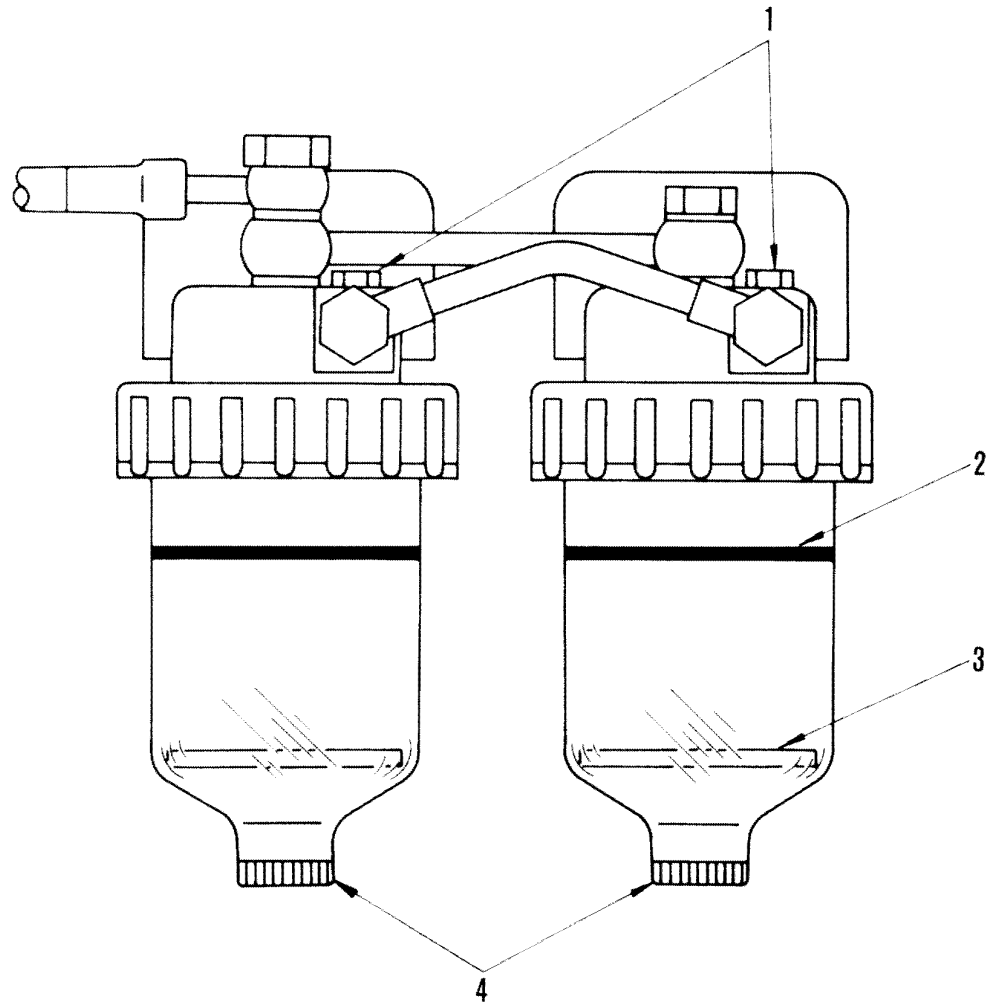
- 1. Filter bracket
- 2. Cartridge assembly
- 3. Drain plug

Filter

Filtration area : 1.0m^2
 $(0.5\text{m}^2 \times 2)$

- A. From fuel tank
- B. To PT fuel pump

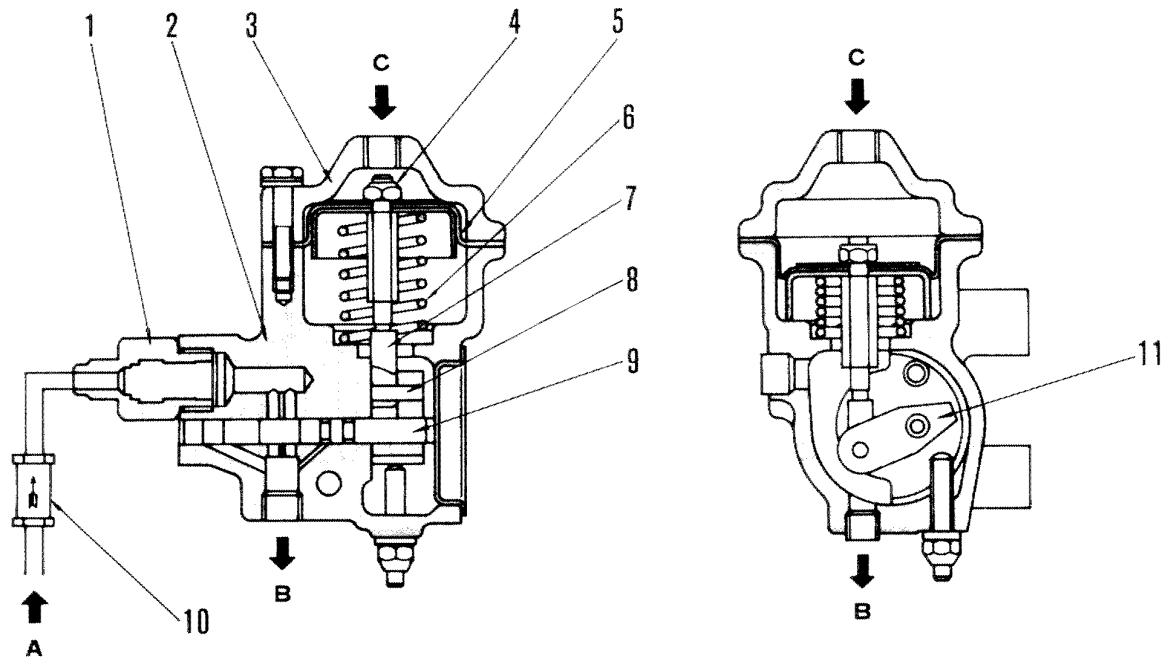
WATER SEPARATOR (OPTION)



- 1. Air bleeding plug
- 2. Allowable water level (red line)
- 3. Float
(floats on water to indicate the water level)
- 4. Drain plug

ANEROID CONTROL VALVE

NTA-855-C (For HD320-2)



6710F096

1. Inlet fitting
2. Housing
3. Cover
4. Upper shaft
5. Piston
6. Aneroid control spring
7. Lower shaft
8. Aneroid control pin
9. Aneroid control valve
10. Check valve
11. Aneroid control lever

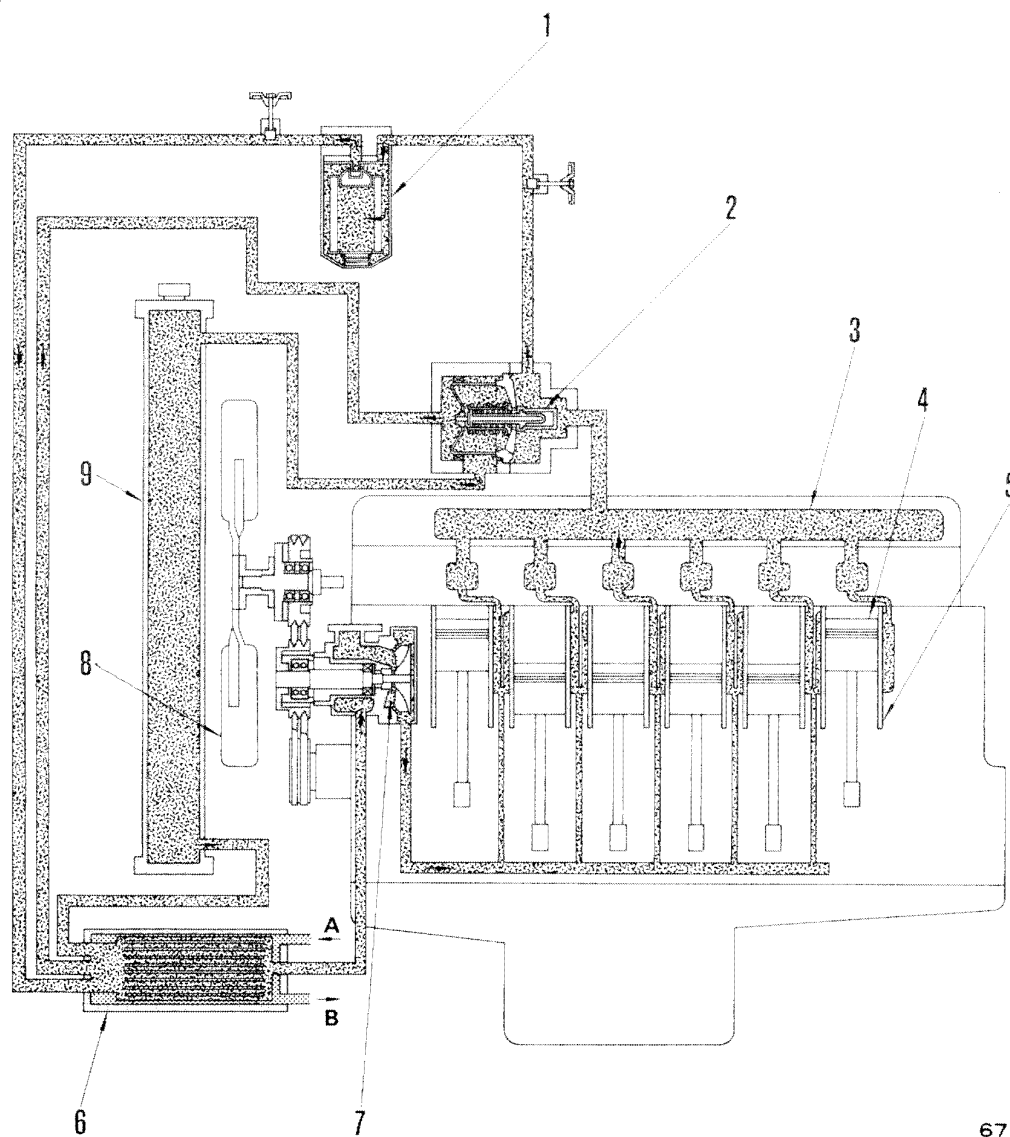
- A. From PT fuel pump
- B. To PT fuel pump
- C. From after-cooler

Check valve pressure : $1.05 \pm 0.25 \text{ kg/cm}^2$

COOLING SYSTEM

COOLING SYSTEM CHART

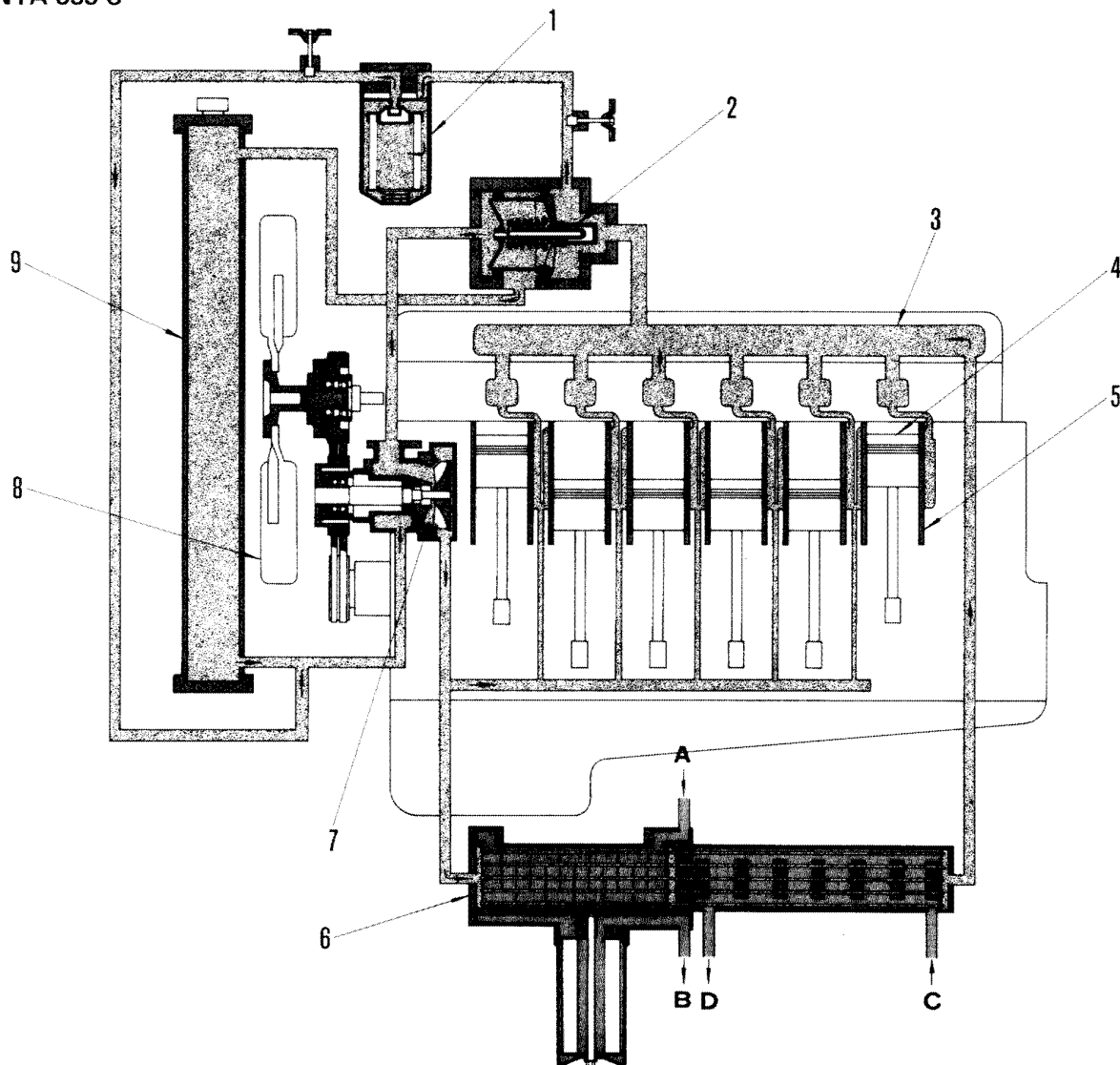
N-855-C



6710F096-1

- | | |
|-----------------------|--------------------------|
| 1. Corrosion resistor | 7. Water pump |
| 2. Thermostat | 8. Fan |
| 3. Water manifold | 9. Radiator |
| 4. Piston | A. From oil pump (oil) |
| 5. Cylinder liner | B. To main gallery (oil) |
| 6. Oil cooler | |

NT-855-C
NTA-855-C



6710F097A

- 1. Corrosion resistor
- 2. Thermostat
- 3. Water manifold
- 4. Piston
- 5. Cylinder liner

- 6. Oil cooler
- 7. Water pump
- 8. Fan
- 9. Radiator

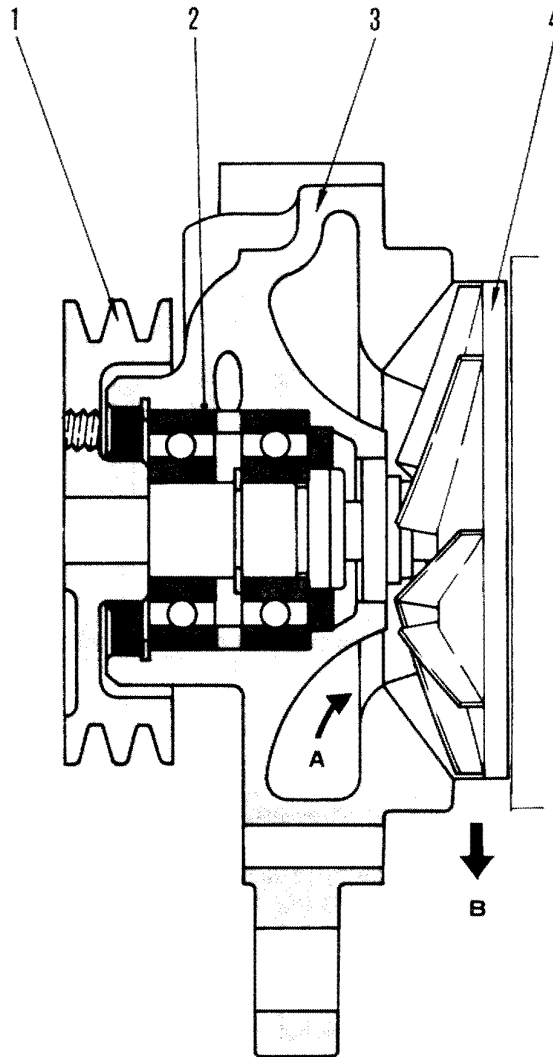
- A. From oil pump (oil)
- B. To main gallery (oil)
- C. From machine chassis (oil)
- D. To machine chassis (oil)

WATER PUMP

N-855-C

NT-855-C

NTA-855-C (WS16S-2, WS23-1)

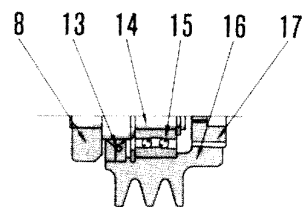
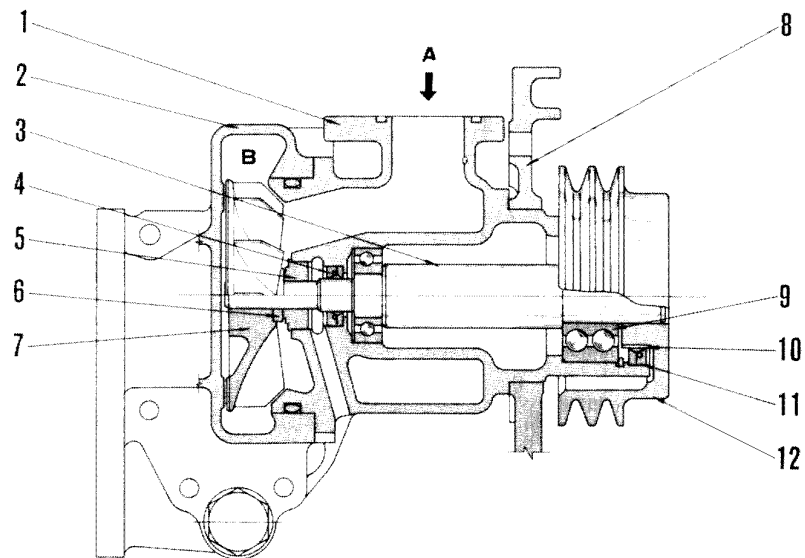


6710F098A

1. Pulley (O.D.: 118,5 mm)
2. Ball bearing
3. Pump housing
4. Impeller

- A. From radiator
- B. To oil cooler

NTA-855-C (For HD320-2)



Idler pulley

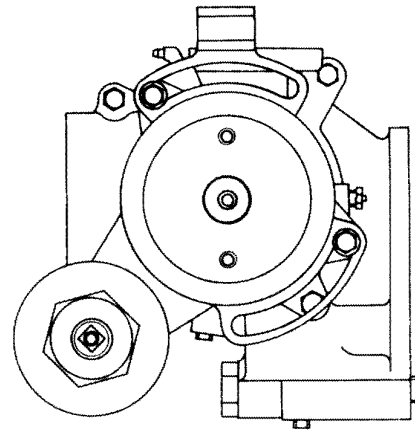
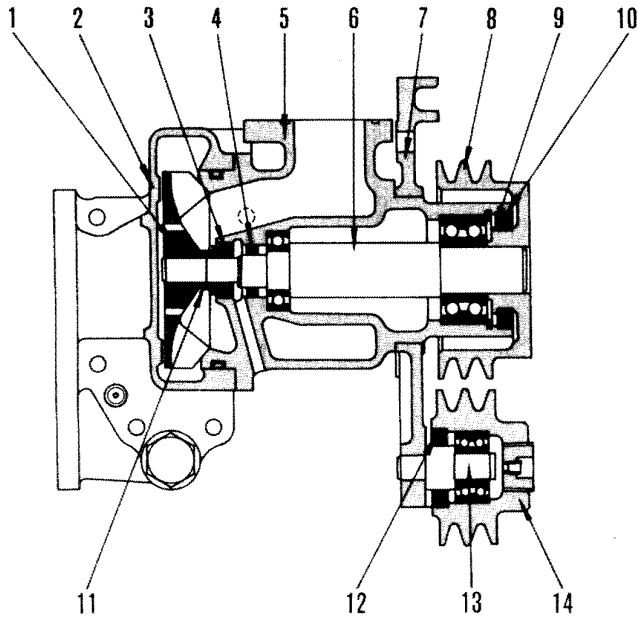
6710F099A

- | | | |
|------------------|--------------------------------|----------------------------------|
| 1. Inlet housing | 8. Idler pulley bracket | 15. Ball bearing |
| 2. Pump housing | 9. Ball bearing | 16. Idler pulley |
| 3. Pump shaft | 10. Wear sleeve | 17. Plug |
| 4. Oil seal | 11. Oil seal | |
| 5. Water seal | 12. Pump pulley (O.D.: 142 mm) | A. From radiator, thermostat |
| 6. Pump seat | 13. Oil seal | B. To oil cooler, cylinder block |
| 7. Impeller | 14. Idler pulley shaft | |

WATER PUMP

STRUCTURE AND FUNCTION

NTA-855 (For HD320-3)

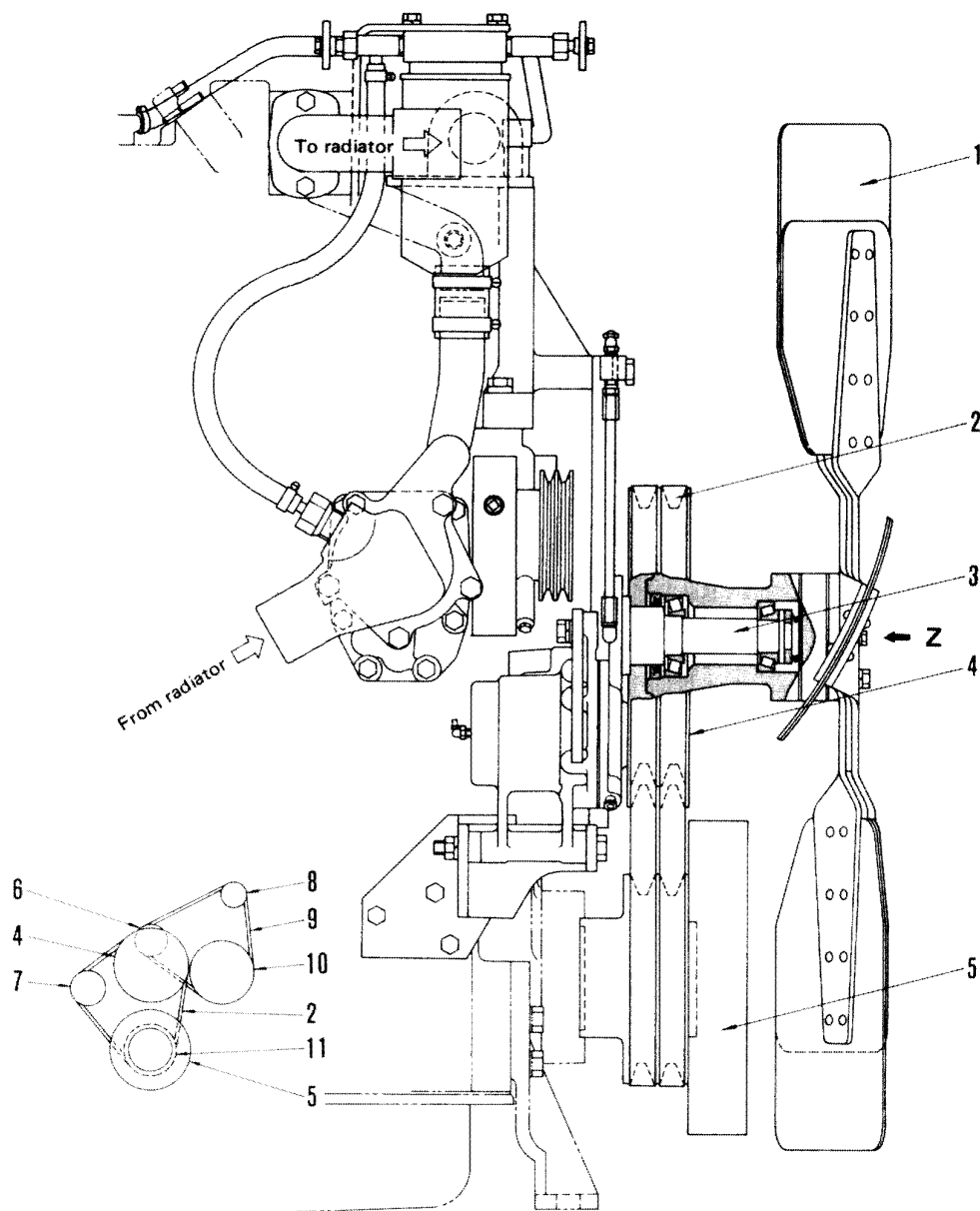


6710F099-3

- | | |
|-------------------------|------------------------|
| 1. Impeller | 8. Pump pulley |
| 2. Inlet housing | 9. Wear sleeve |
| 3. Water seal | 10. Oil seal |
| 4. Oil seal | 11. Pump seat |
| 5. Pump housing | 12. Oil seal |
| 6. Pump shaft | 13. Idler pulley shaft |
| 7. Idler pulley bracket | 14. Idler pulley |

FAN DRIVE

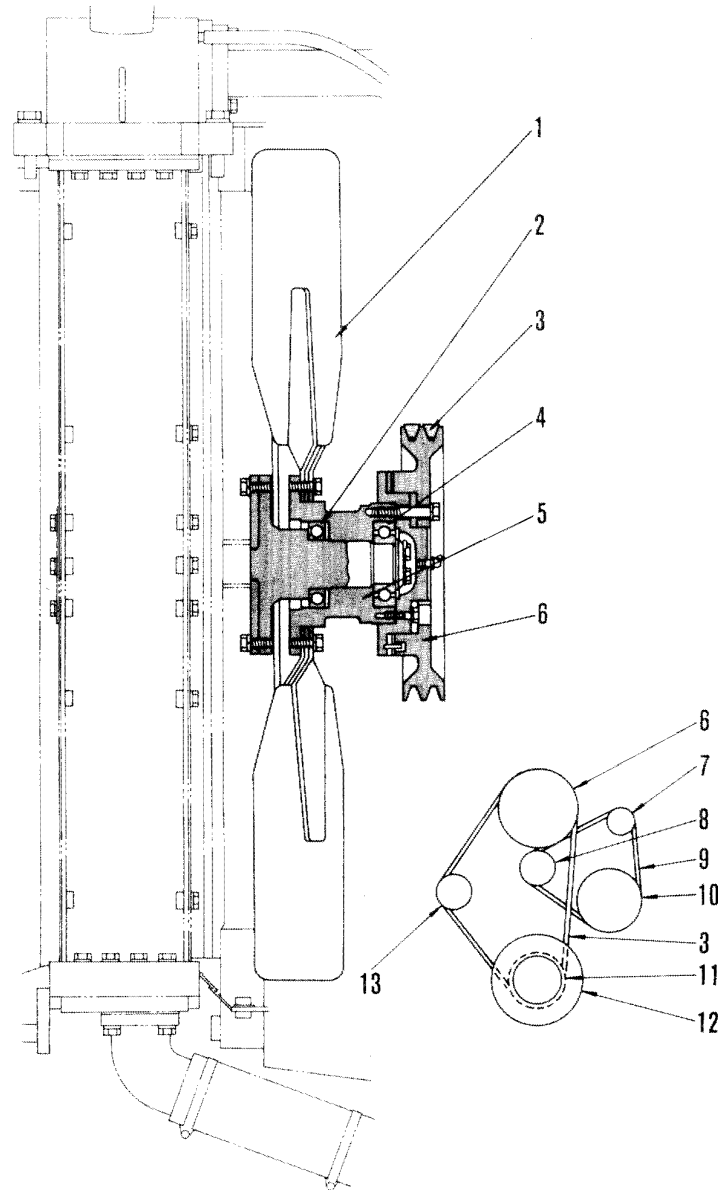
N-855-C



6710F099-1A

- | | |
|---------------------------------------|---|
| 1. Fan | 7. Tension pulley (O.D.: 125 mm) |
| 2. V-belt | 8. Alternator pulley (O.D.: 95 mm) |
| 3. Fan drive shaft | 9. V-belt |
| 4. Fan pulley (O.D.: 262 mm) | 10. Accessory drive pulley (O.D.: 222.3 mm) |
| 5. Vibration damper | 11. Crank pulley (O.D.: 183 mm) |
| 6. Water pump pulley (O.D.: 118.5 mm) | |

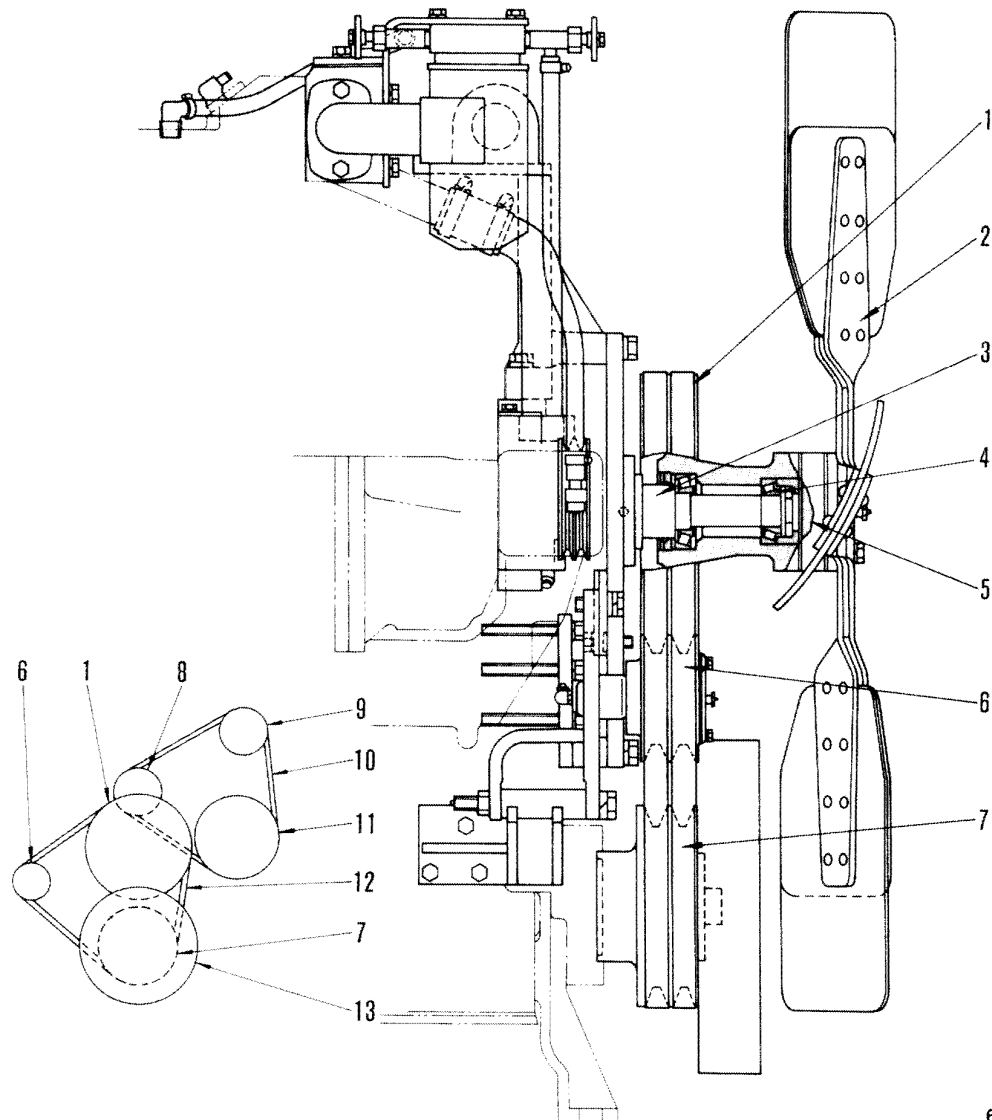
NT-855-C (For D80, 85-18, D95S-2)



6710F100A

- | | |
|------------------------------|---|
| 1. Fan | 7. Alternator pulley (O.D.: 95 mm) |
| 2. Ball bearing | 8. Water pump pulley (O.D.: 118.5 mm) |
| 3. V-belt | 9. V-belt |
| 4. Ball bearing | 10. Accessory drive pulley (O.D.: 222 mm) |
| 5. Fan spacer | 11. Crank pulley (O.D.: 183 mm) |
| 6. Fan pulley (O.D.: 262 mm) | 12. Vibration damper |
| | 13. Tension pulley (O.D.: 120 mm) |

NT-855-C (For PC400-1, PC400LC-1, W170-2, W180-1)
NTA-855-C (For WS16S-2, WS23-1)



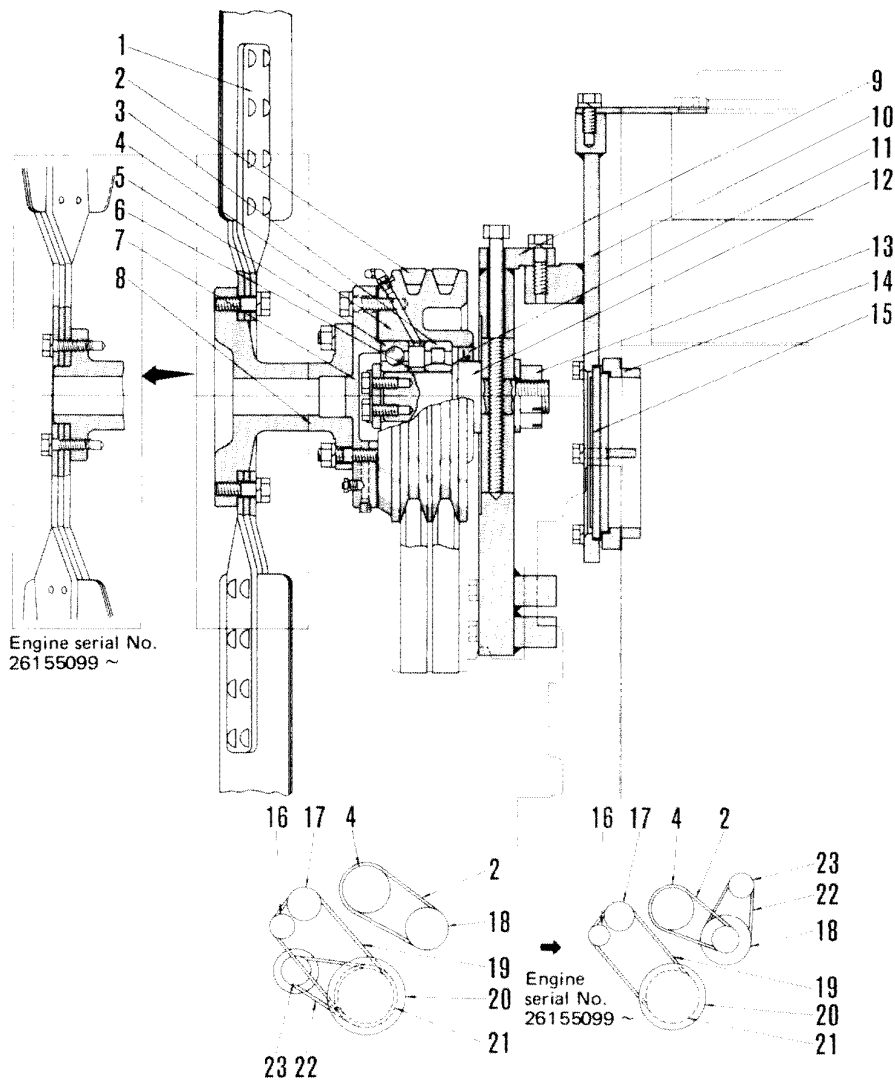
6710F099-4

- | | | |
|--|--|---|
| 1. Fan pulley (O.D.)
(O.D. for PC400-1: 262 mm
W170-2, W180-1: 315 mm,
WS16S-2: 336 mm) | 5. Fan spacer | 8. Water pump pulley (O.D.: 118 mm) |
| 2. Fan | 6. Tension pulley
(O.D. for PC400-1, W170-2, W180-1:
120 mm, WS16S-2: 118 mm) | 9. Alternator pulley (O.D.: 118 mm) |
| 3. Fan drive shaft | 7. Crank pulley
(O.D. for PC400-1: 194 mm,
W170-2, W180-1: 180 mm,
WS16S-2: 192 mm) | 10. V-belt |
| 4. Ball bearing | | 11. Accessory drive pulley (O.D.: 222 mm) |
| | | 12. V-belt |
| | | 13. Vibration damper |

FAN DRIVE

STRUCTURE AND FUNCTION

NTA-855-C (For HD320-2, HD320-3)

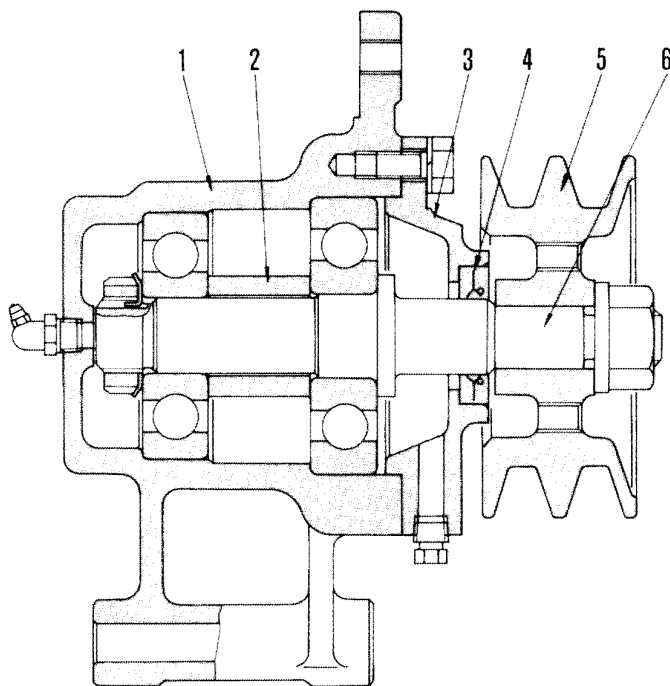


6710F101B

- | | | |
|-------------------------------------|--------------------------------------|--|
| 1. Fan | 10. Fan bracket | 18. Accessory drive pulley |
| 2. V-belt | 11. Oil seal | (Alternator drive O.D.: Change 155 mm to 238 mm) |
| 3. Roller bearing | 12. Fan drive shaft | (Fan drive O.D.: 155 mm) |
| 4. Fan pulley (O.D.: 228 to 247 mm) | 13. Lock nut | 19. V-belt |
| 5. Ball bearing | 14. Water pump support | 20. Vibration damper |
| 6. Spacer | 15. Water pump cover | 21. Crank pulley |
| 7. Cover | 16. Idler pulley (O.D.: 101.5 mm) | (Water pump drive O.D.: change 238 mm to 260.5 mm) |
| 8. Fan spacer | 17. Water pump pulley (O.D.: 118 mm) | (Alternator drive O.D.: 260.5 mm) |
| 9. Bracket | | 22. V-belt |
| | | 23. Alternator pulley (O.D.: 120 mm) |

TENSION PULLEY

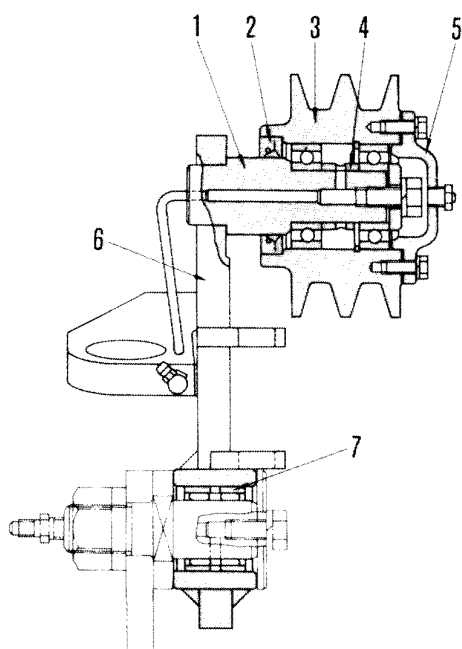
N-855-C



1. Tension pulley bracket
2. Spacer
- e. Cover
4. Oil seal
5. Tension pulley
6. Tension pulley shaft

6710F099-2A

NT-855-C (For D80, 85-18, D95S-2)



1. Tension pulley shaft
2. Oil seal
3. Tension pulley
4. Spacer
5. Pulley cover
6. Tension pulley bracket
7. Needle bearing

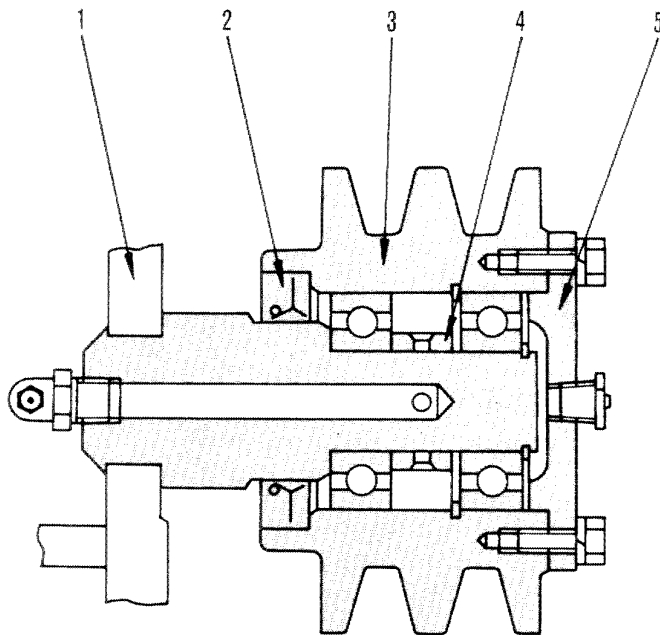
6710F099-5

TENSION PULLEY

STRUCTURE AND FUNCTION

NT-855-C (For PC400-1, W170-2, W180-1)

NTA-855-C (For WS16S-2, WS23-1)

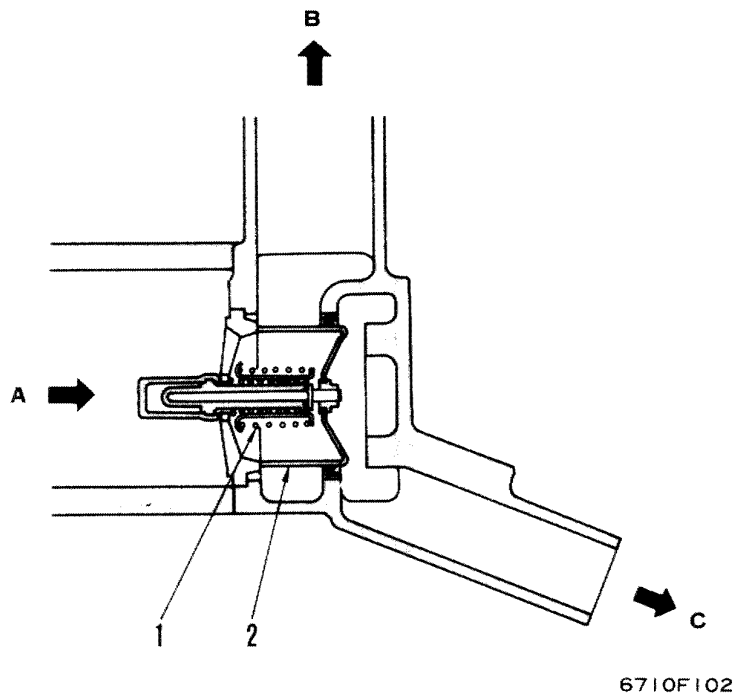


1. Bracket
2. Oil seal
3. Tension pulley
4. Spacer
5. Cover

6710F099-6

THERMOSTAT

NT-855-C



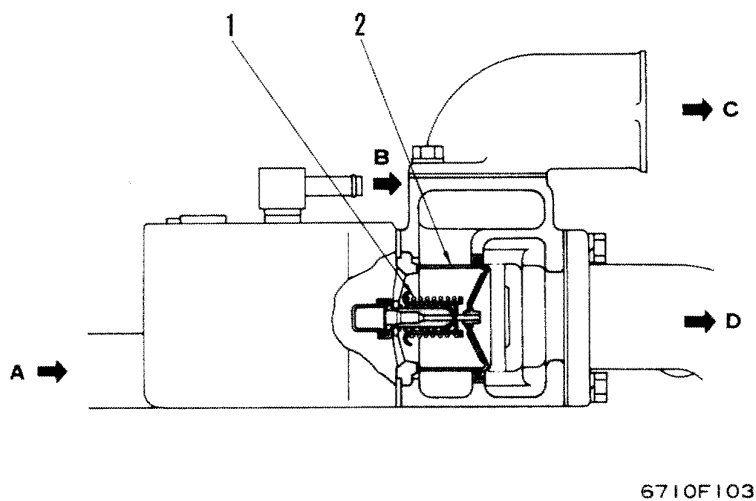
- 1. Spring
- 2. Thermostat case
- A. From water manifold
- B. To radiator upper tank
- C. To water pump

Opening temperature : 75.5~78.5°C

Full opening temperature : 90°C

Full opening lift : 10mm minimum

NTA-855-C



- 1. Spring
- 2. Thermostat
- A. From water manifold
- B. To radiator upper tank
- C. To radiator upper tank
- D. To water pump

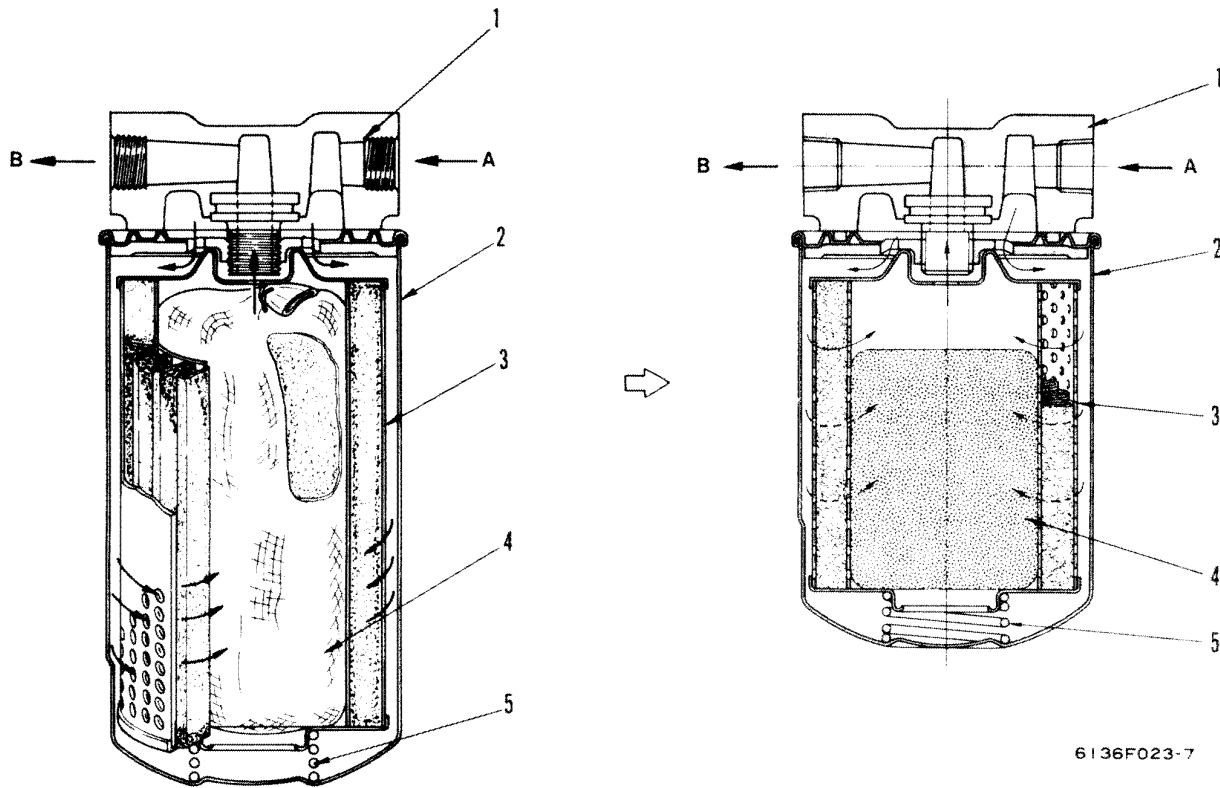
Opening temperature : 74.5~78.5°C

Full opening temperature : 90°C

Full opening lift : 10mm minimum

CORROSION RESISTOR

CARTRIDGE TYPE



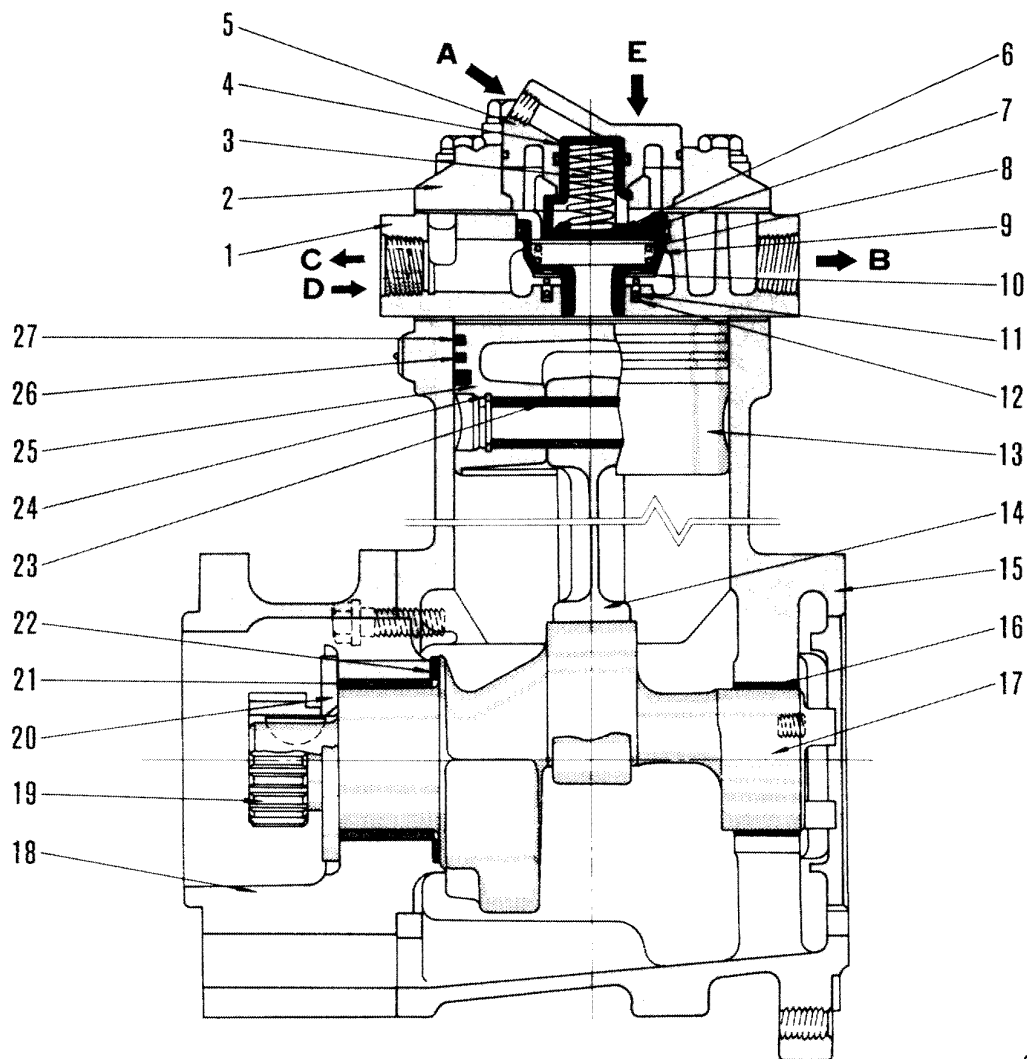
1. Bracket
2. Cartridge
3. Element (Paper)
4. Element (Chemicals)
5. Spring

- A. Water inlet
B. Water outlet

ACCESSORY

AIR COMPRESSOR

(For N-855-C, NTA-855-C)

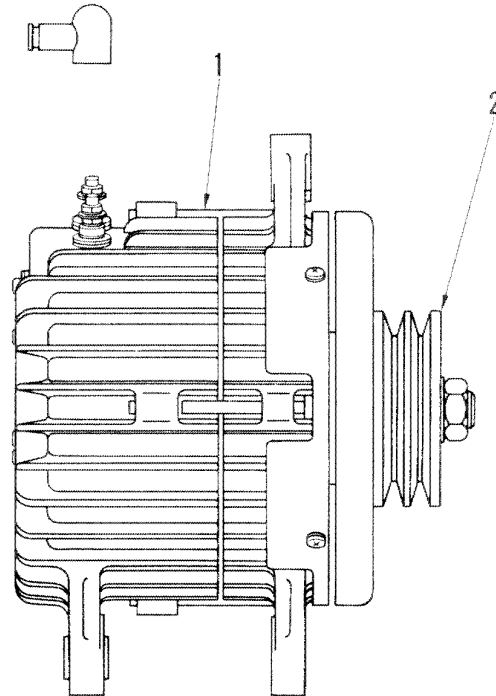
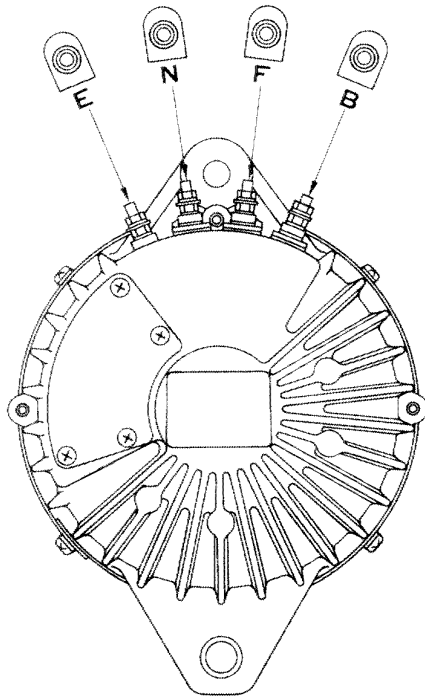


6710F105

- | | | |
|--------------------------|-----------------------|-------------------------|
| 1. Cylinder head | 12. Wear plate | 23. Piston pin |
| 2. Cylinder head cover | 13. Piston | 24. Snap ring |
| 3. Unloader valve spring | 14. Connecting rod | 25. Oil ring |
| 4. Unloader valve cap | 15. Crankcase | 26. Piston ring (No. 2) |
| 5. Unloader valve body | 16. Crankcase bushing | 27. Piston ring (TOP) |
| 6. Inlet valve seat | 17. Crankshaft | |
| 7. Inlet valve | 18. Support | A. From air tank |
| 8. Inlet valve spring | 19. Half coupling | B. To air tank |
| 9. Outlet valve seat | 20. Thrust washer | C. Cooling water outlet |
| 10. Outlet valve | 21. Support bushing | D. Cooling water inlet |
| 11. Outlet valve spring | 22. Thrust washer | E. From intake manifold |

ELECTRICAL SYSTEM

ALTERNATOR



F6710A012

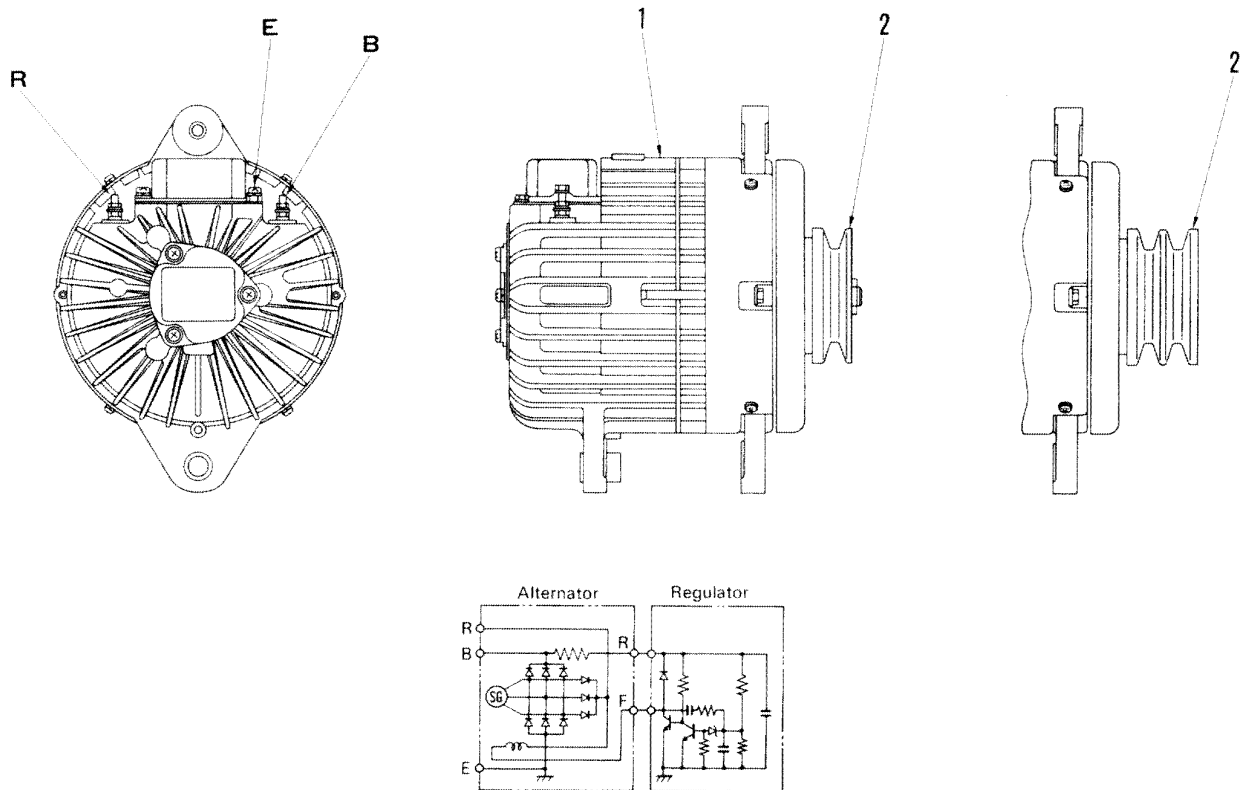
1. Alternator
2. Pulley

E, N, F, B: Terminal

Engine model	Applicable machine	Type	Specification	Pulley O.D. (mm)	Weight (kg)
N-855-C	PC300-1, 2 PC300LC-1, 2	Maker: NIKKO DENKI Type: Sealed	24V, 25A	95	14
NT-855-C	D85A, E, P, F-18 D85A, E-18 D95S-2 PC400-1, PC400LC-1	Maker: NIKKO DENKI Type: Sealed	24V, 25A	95	14
	W170-2	Maker: NIKKO DENKI Type: Sealed	24V, 35A	120	15

STRUCTURE AND FUNCTION

ELECTRICAL SYSTEM



F6710A013

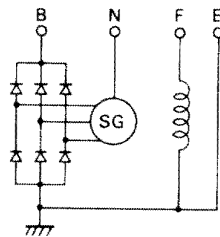
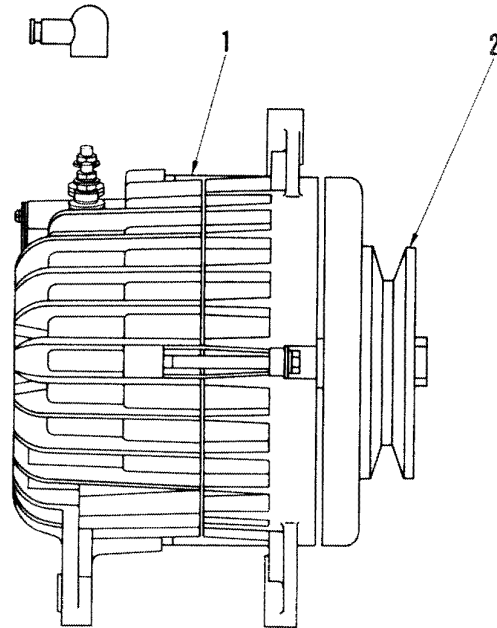
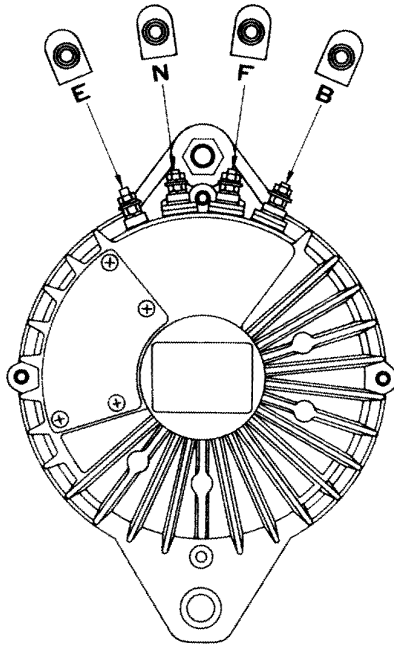
- 1. Alternator
- 2. Pulley

B, E, F, R: Terminal

Engine model	Applicable machine	Type	Specification	Pulley O.D. (mm)	Weight (kg)
NT-855-C	W180-1	Maker: NIKKO DENKI Type: Sealed	24V, 35A	95 (Double pulley)	17.5
NTA-855-C	HD320	Maker: NIKKO DENKI Type: Sealed	24V, 35A	120 (Single pulley)	18
	WS16S-2 WS23-1			95 (Double pulley)	17.5

ELECTRICAL SYSTEM

STRUCTURE AND FUNCTION



F6710A014

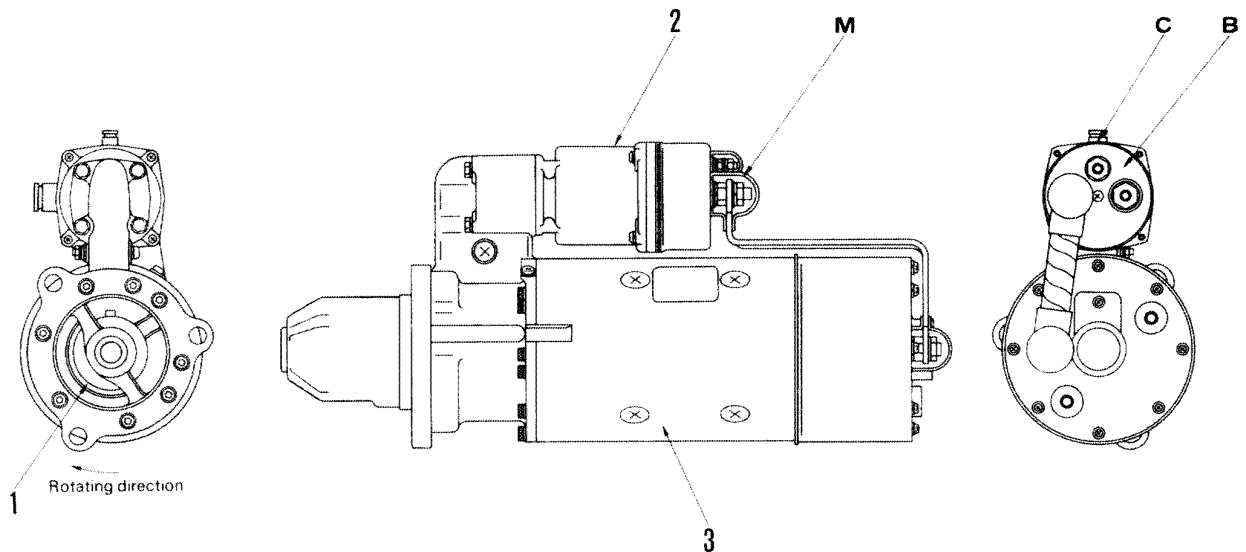
1. Alternator
2. Pulley

B, E, F, N: Terminal

Engine model	Applicable machine	Type	Specification	Pulley O.D. (mm)	Weight (kg)
NTA-855-C	HD320	Maker: NIKKO DENKI Type: Sealed	24V, 35A	190	13

STARTING MOTOR

WITHOUT SAFETY RELAY

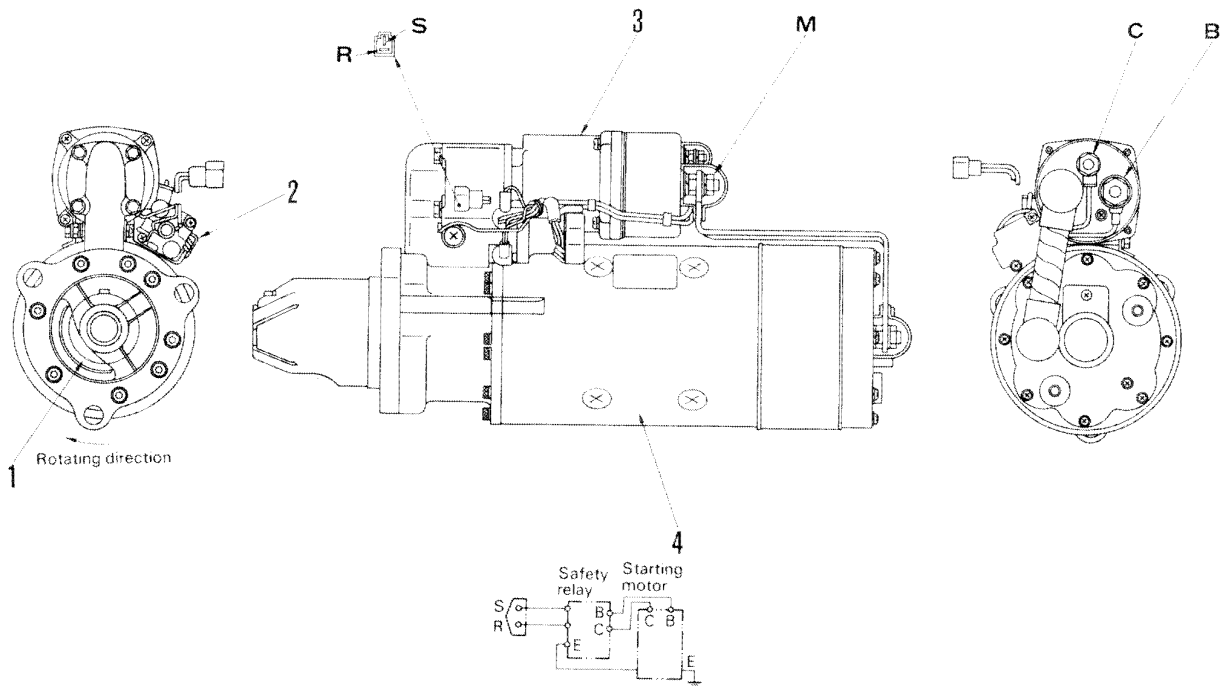


F6710A015

1. Pinion
2. Magnetic switch
3. Starting motor
- B, C, M: Terminal

Engine model	Applicable machine	Type	Specification	Number of pinion teeth	Weight (kg)
N-855-C	All machine	Maker: NIKKO DENKI Type: Sealed	24V, 11kW	11	44.5
NT-855-C	All machine	Maker: NIKKO DENKI Type: Sealed	24V, 11kW	11	44.5
NTA-855-C	HD320-2, 3 WS16S-2 WS23-1	Maker: NIKKO DENKI Type: Sealed	24V, 11kW	11	44.5

WITH SAFETY RELAY



F6710A016

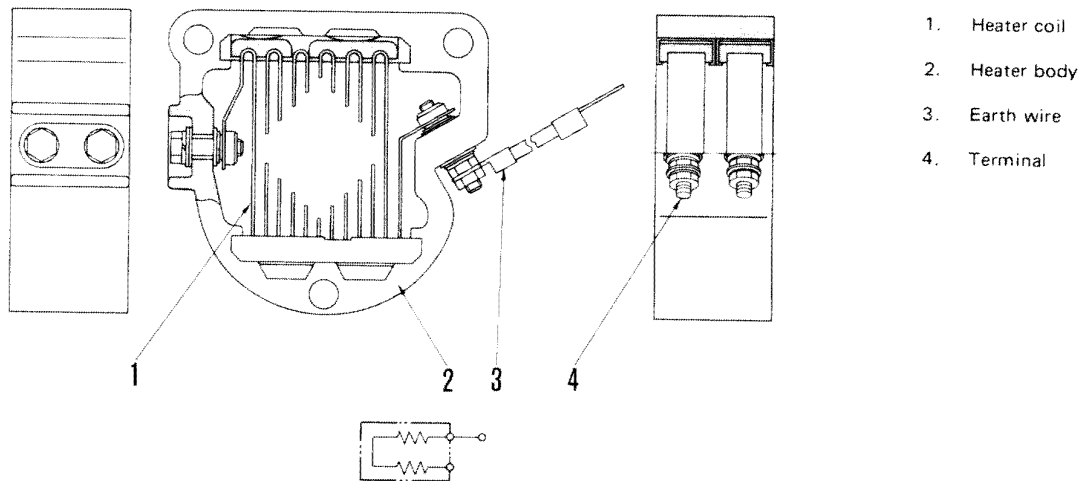
1. Pinion
2. Safety relay
3. Magnetic switch
4. Starting motor
- B, C, E, M, R, S: Terminal

Engine model	Applicable machine	Type	Specification	Number of pinion teeth	Weight (kg)
NT-855-C	W170-2 W180-1	Maker: NIKKO DENKI Type: Sealed	24V, 11kW	11	45

ELECTRICAL INTAKE AIR HEATER

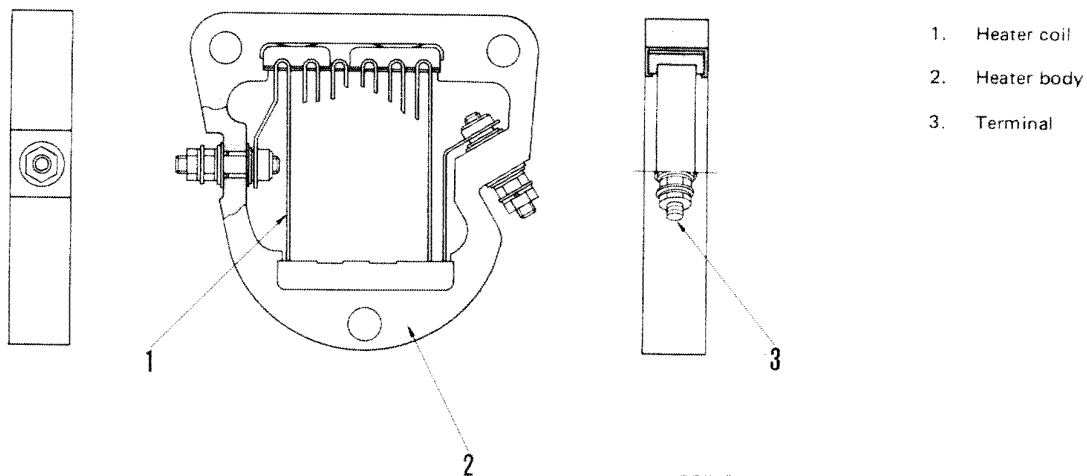
RIBBON TYPE

- SMALL SIZE (For PC300-1, 2, PC300LC-1, 2)



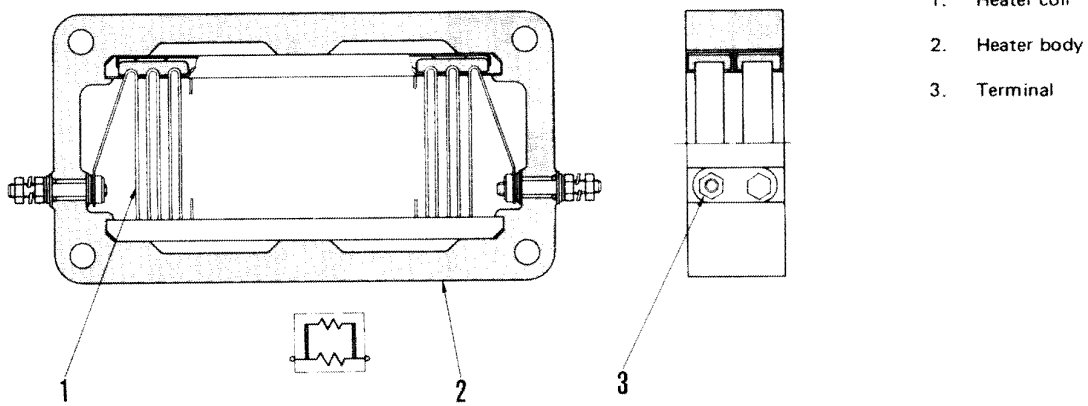
F6710A017

- SMALL SIZE (For PC400-1, PC400LC-1, W170-2, W180-1)



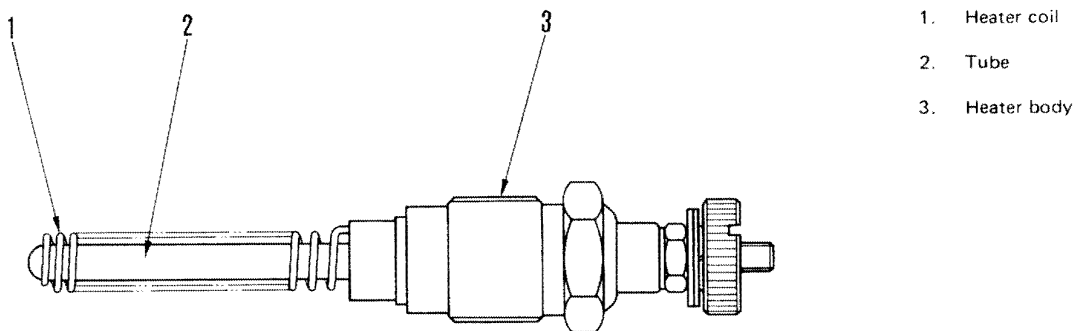
F6710A018

● **LARGE SIZE (For PC400-1, PC400LC-1, W170-2, W180-1)**



F6710A019

COIL TYPE (For D80, 85-18, D95S-2)



F6710A020