

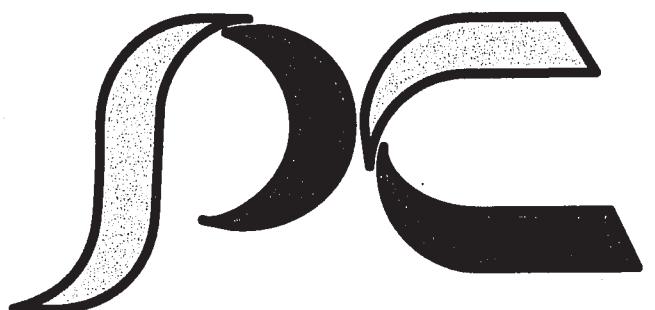


SERVICE MANUAL

SCREW COMPRESSOR

FAC-110P/110B (ISUZU) ←
FAC-110PC/110BC (ISUZU) ←

PDS265S-4B1/5B1
PDS265SC-4B1/5B1
PDS265SD-4B1/5B1
PDS390S-4B1/5B1
PDS390SC-4B1/5B1
PDS390SD-4B1/5B1



HOKUETSU INDUSTRIES CO., LTD.

Preface

This service manual explains about the cautions for maintenance jobs and is to serve a guide for the electric system, and troubleshooting for service personnel.

In this book the fundamental matters and other things already mentioned in the “Instruction Manual” and the “Parts Catalogue” are omitted to avoid duplication.

Therefore, for the operation and handling of this unit, we request you to refer to the instruction manual and caution plates, and further for the structure and components of the unit, please refer to the “Parts Catalogue” separately to be supplied with the unit.

If you should find any description which does not coincide with the instruction manual and parts catalog, we request you to make sure to start the job after clarifying it.

Service personnel is required to safely take quick and proper countermeasures as well as to use correct technology of maintenance in case of field services and periodical maintenance.

It is important that service personnel should have proper and sufficient knowledge about the structure and function of the unit and should be well familiar with such technique mentioned in them.

Copies of this service manual are intended to be distributed to limited numbers of our customers. The unauthorized reproduction or distribution of this service manual is prohibited.

Table of Contents

1. Specification -----	1-1
1.1 Specifications -----	1-1
1.2 Outline drawing -----	1-3
1.3 Internal Components and Part Names -----	1-7
2. Maintenance -----	2-1
2.1 Periodic Inspection List -----	2-1
2.2 Maintenance procedures -----	2-3
2.3 Values of Various Adjustments of Engine -----	2-10
3. Electric System -----	3-1
3.1 Location of electric appliances -----	3-1
3.2 Engine controller -----	3-2
3.3 Preheating device -----	3-6
3.4 Time relay -----	3-9
3.5 Alternator -----	3-10
3.6 Safety relay -----	3-12
3.7 Heater relay -----	3-13
3.8 Discharge air temperature switch (Discharge air temperature thermistor amplifier) -----	3-14
3.9 Thermo-sensor for water temperature gauge and discharge air temperature gauge -----	3-15
3.10 Discharge air temperature sensor (For discharge air temperature switch) -----	3-15
3.11 Engine speed down controller -----	3-16
3.12 Tachosensor -----	3-17
3.13 Tachometer -----	3-18
3.14 Discharge air temperature gauge -----	3-20
3.15 Coolant temperature gauge -----	3-21
3.16 Sending unit -----	3-22
3.17 Electromagnetic pump -----	3-22
3.18 Motor stopper relay -----	3-23
3.19 Wiring Diagram -----	3-27
4. References -----	4-1
4.1 Fuel consumption -----	4-1
4.2 Noise level -----	4-1
4.3 Piping Diagram -----	4-2

1. Specification

1.1 Specifications

Item	unit	PDS265S(SC)[SD]-4B1 Trailer type	PDS265S(SC)[SD]-5B1 Box type
Compressor	Type	Single-stage oil cooled, screw type compressor	
	Free air delivery	m ³ /min	7.5
	Working pressure	MPa (kgf/cm ²)	0.7
	Lubricating system		Forced Lubrication by compressed pressure
	Driving system		Direct driving with rubber coupling
	Receiver tank capacity	m ³	0.069
Engine	Lubricating oil capacity	L	33
	Model		NISSAN DIESEL 2B-BD30T
	Type		Water-cooled 4-cycle direct injection type with turbo charged
	Number of cylinders, bore stroke		4 — 96mm × 102mm
	Compression ratio		18.5 : 1
	Total displacement	L(cc)	2.953(2,953)
	Rated output	kW(PS)	62(84.3)
	Revolution per minute	min ⁻¹	2,700
	Fuel consumption	g/kW·h (g/PS·h)	244(179.5)
	Overall length×Overall width×Overall height	mm	816 × 623 × 715
	Net dry mass	kg	250
	Starter	kW	2.1
	Manufacturer		HITACHI
	Alternator	A	40
	Manufacturer		HITACHI
	Battery		95D31R×1
	Fuel tank capacity	L	114
Weight · Mass	Lubricating oil capacity	L	10 (Total oil capacity)
	Lubricating oil capacity H~L	L	10~6 (Oil pan capacity)
	Coolant capacity (including radiator)	L	11
	Belt size		A-1085
	Overall length (Bonnet only)	mm	2,000[2,125]
	Overall length (with drawbar folded up)	mm	(2,350) [2,350]
	Overall width	mm	1,600 (1,450) [1,450]
	Overall height	mm	1,615 (1,550) [1,550]
	Net dry mass	kg	1,265 (1,235) [1,270]
	Operating mass	kg	1,410 (1,380) [1,415]
	Size of exhaust pipe	mm	φ 80

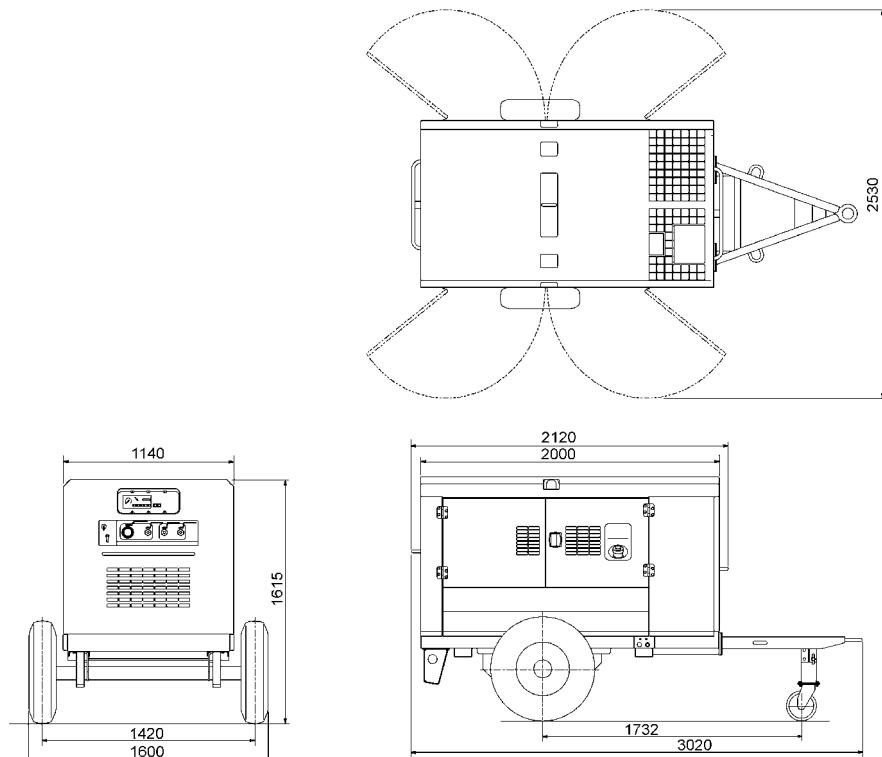
1. Specification

Item	unit	PDS390S(SC)[SD]-4B1 Trailer type	PDS390S(SC)[SD]-5B1 Box type
Compressor	Type	Single-stage oil cooled, screw type compressor	
	Free air delivery	m ³ /min	11.0
	Working pressure	MPa (kgf/cm ²)	0.7
	Lubricating system		Forced Lubrication by compressed pressure
	Driving system		Direct driving with rubber coupling
	Receiver tank capacity	m ³	0.098
Engine	Lubricating oil capacity	L	51
	Model		ISUZU DD-4BG1T
	Type		Water-cooled 4-cycle direct injection type with turbo charged
	Number of cylinders, bore stroke		4 — 105 × 125
	Compression ratio		18.0 : 1
	Total displacement	L(cc)	4,329(4,329)
	Rated output	kW(PS)	80.9(110)
	Revolution per minute	min ⁻¹	2,400
	Fuel consumption	g/kW·h (g/PS·h)	266(195.6)
	Overall length×Overall width×Overall height	mm	955.5 × 678 × 857
	Net dry mass	kg	380
	Starter	kW	4.5
	Manufacturer		DENSO
	Alternator	A	25
	Manufacturer		Nikko Electric Industry
	Battery		80D26R×2
	Fuel tank capacity	L	182
Weight · Mass	Lubricating oil capacity	L	14 (Total oil capacity)
	Lubricating oil capacity H~L	L	14~9 (Oil pan capacity)
	Coolant capacity (including radiator)	L	13
	Belt size		B-47.7
	Overall length (Bonnet only)	mm	2,600[2,725]
	Overall length (with drawbar folded up)	mm	(3,060) [3,060]
	Overall width	mm	1,798 (1,525) [1,525]
	Overall height	mm	1,780 (1,760) [1,760]
Weight · Mass	Net dry mass	kg	1,820 (1,880) [1,935]
	Operating mass	kg	2,040 (2,095) [2,150]
Size of exhaust pipe		mm	φ 75
			φ 75

1. Specification

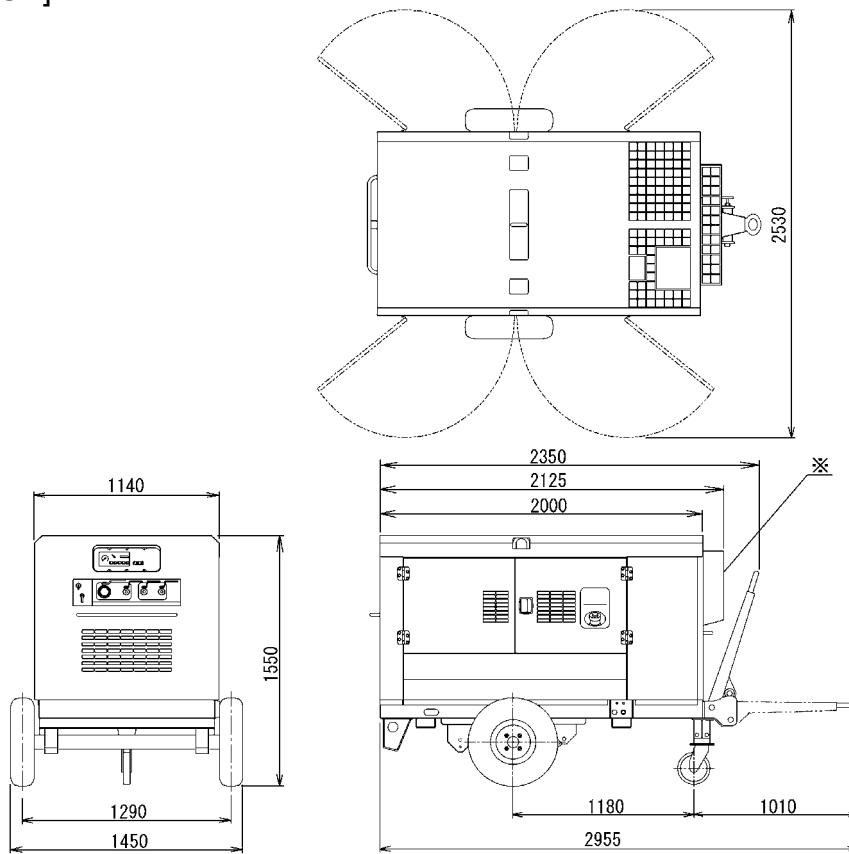
1.2 Outline drawing

PDS265S-4B1



A030612

PDS265SC[SD]-4B1

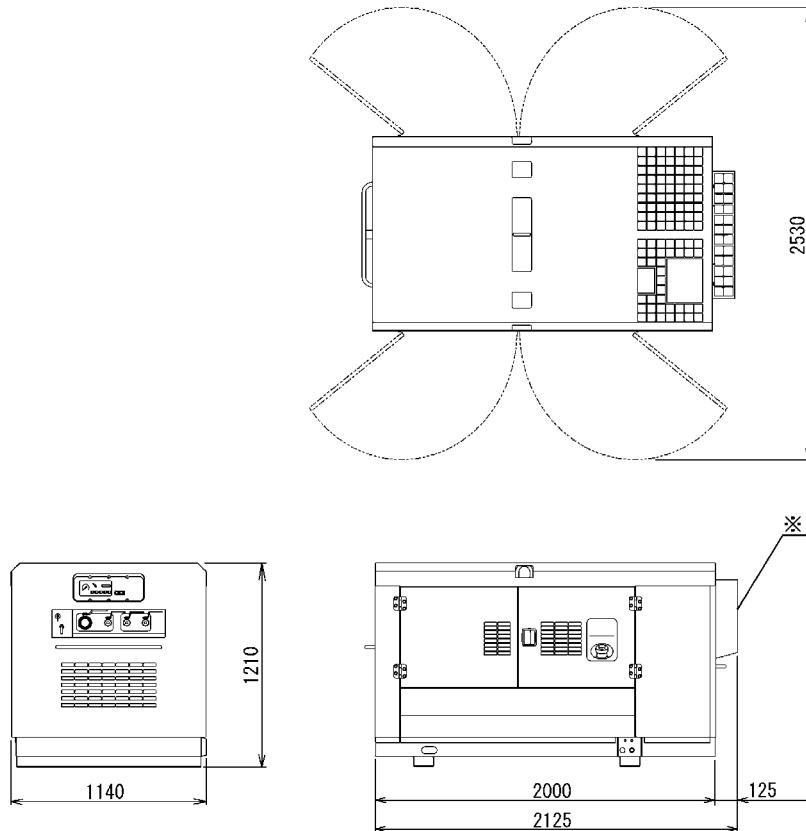


A040146

The part (after warmer cover) marked * is fitted to dry air type unit only.

1. Specification

PDS265S(SC)[SD]-5B1

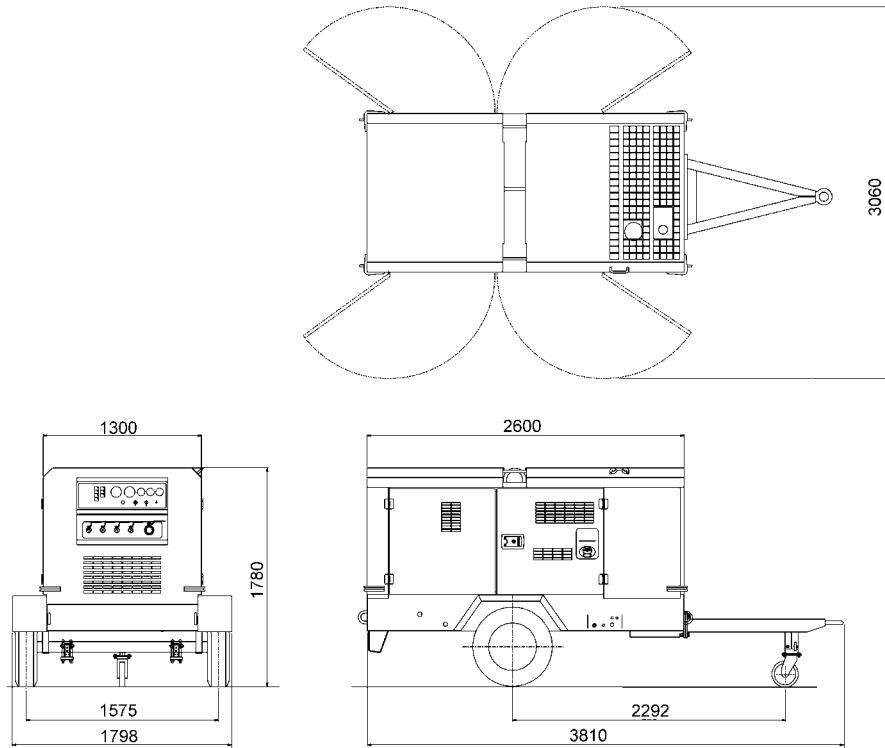


A040147A

The part (after warmer cover) marked * is fitted to dry air type unit only.

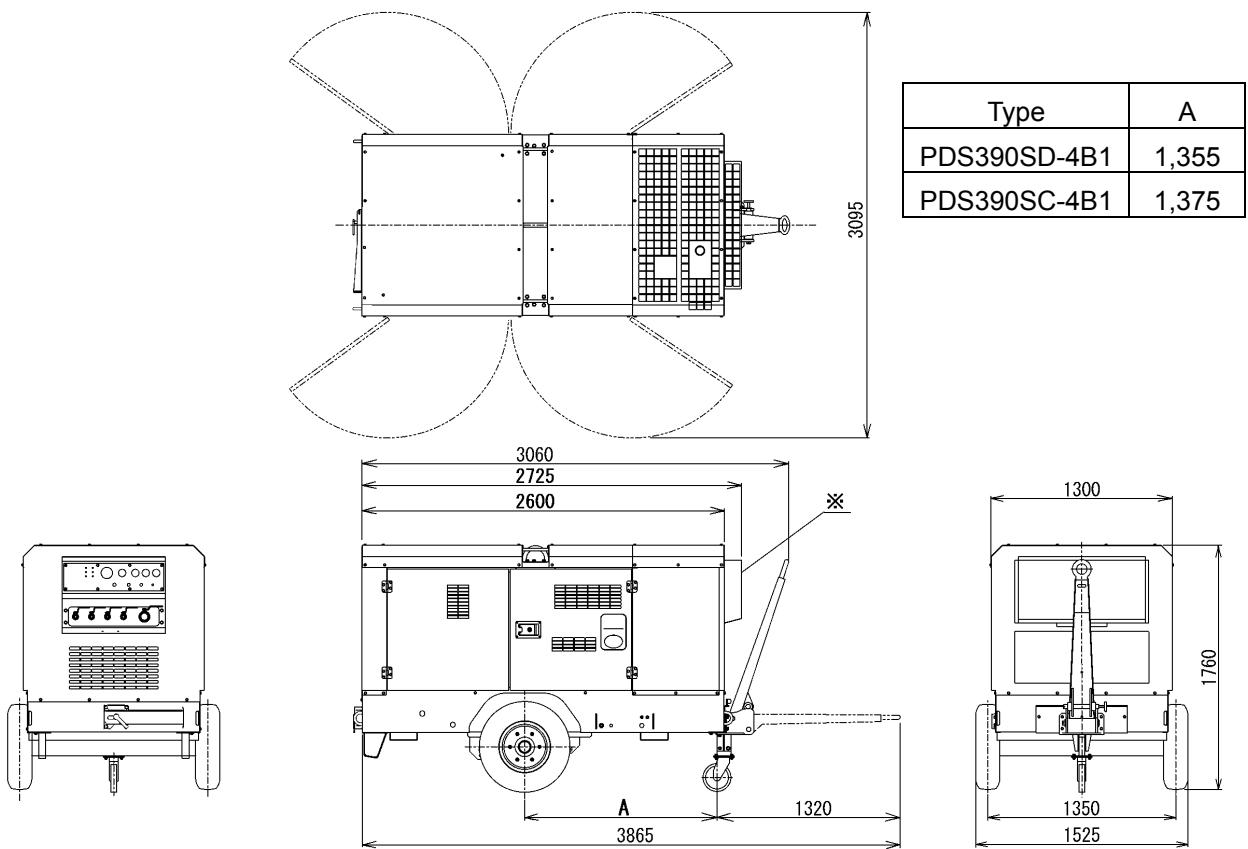
1. Specification

PDS390S-4B1



A030289-1

PDS390SC[SD]-4B1

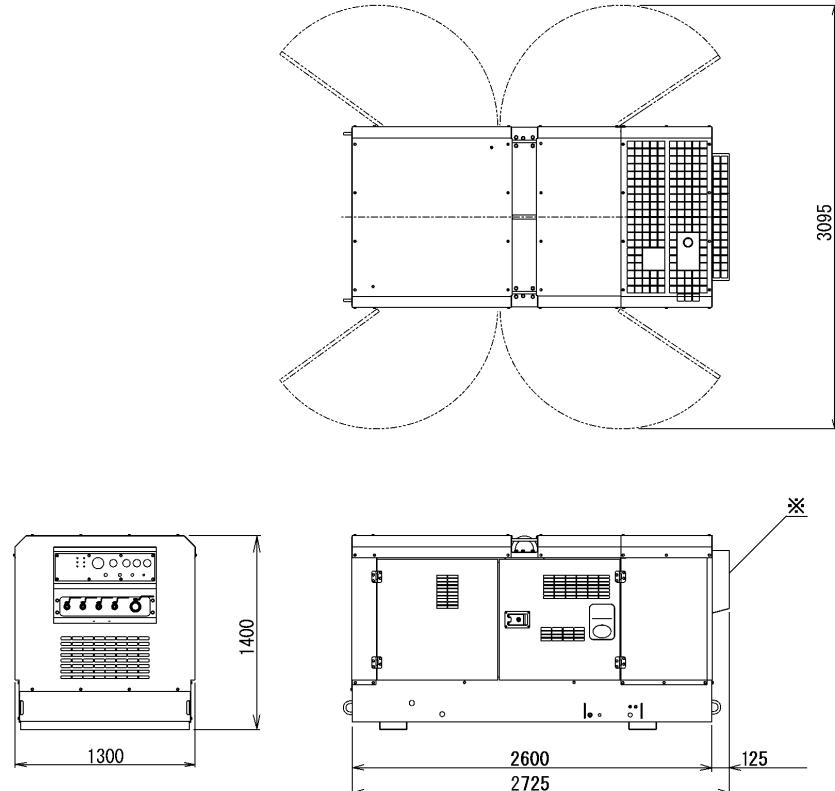


A030647A

The part (after warmer cover) marked * is fitted to dry air type unit only.

1. Specification

PDS390S(SC)[SD]-5B1



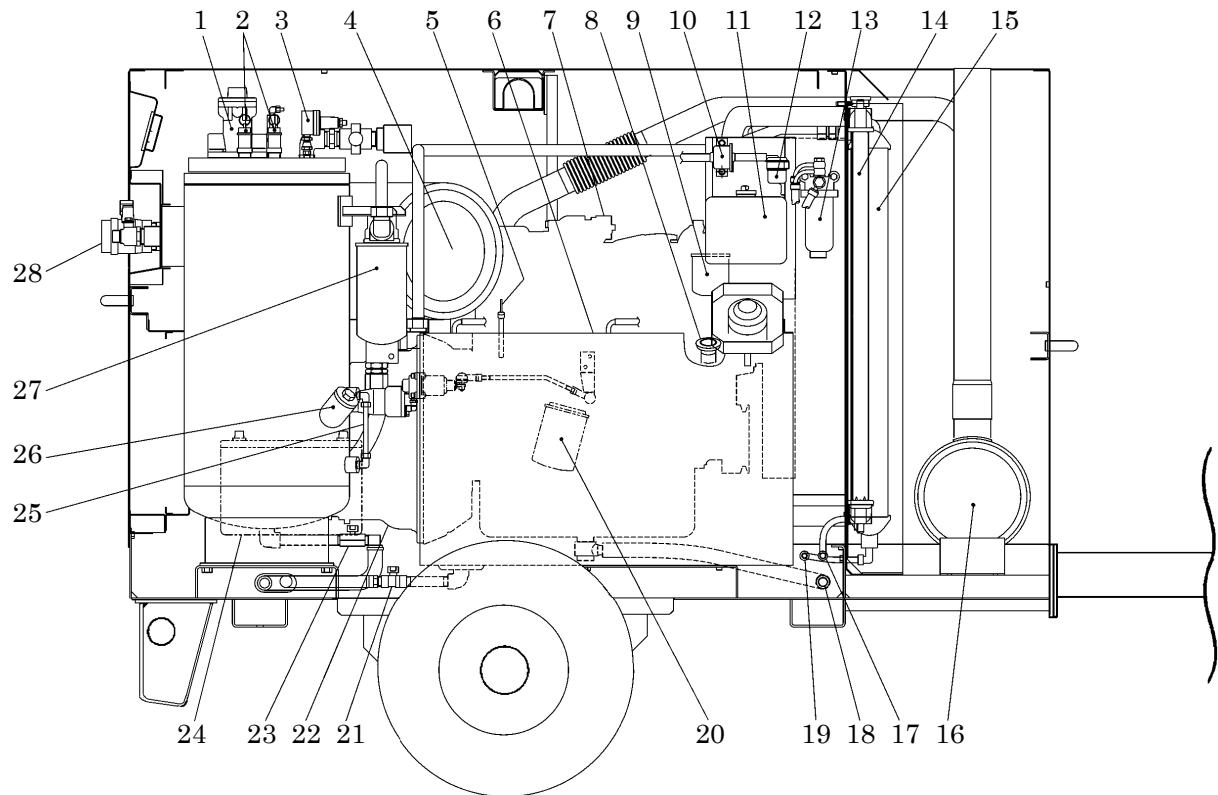
A030236A

The part (after warmer cover) marked ** is fitted to dry air type unit only.

1. Specification

1.3 Internal Components and Part Names

PDS265S (Standard type)



A030609

PDS265S-4B1

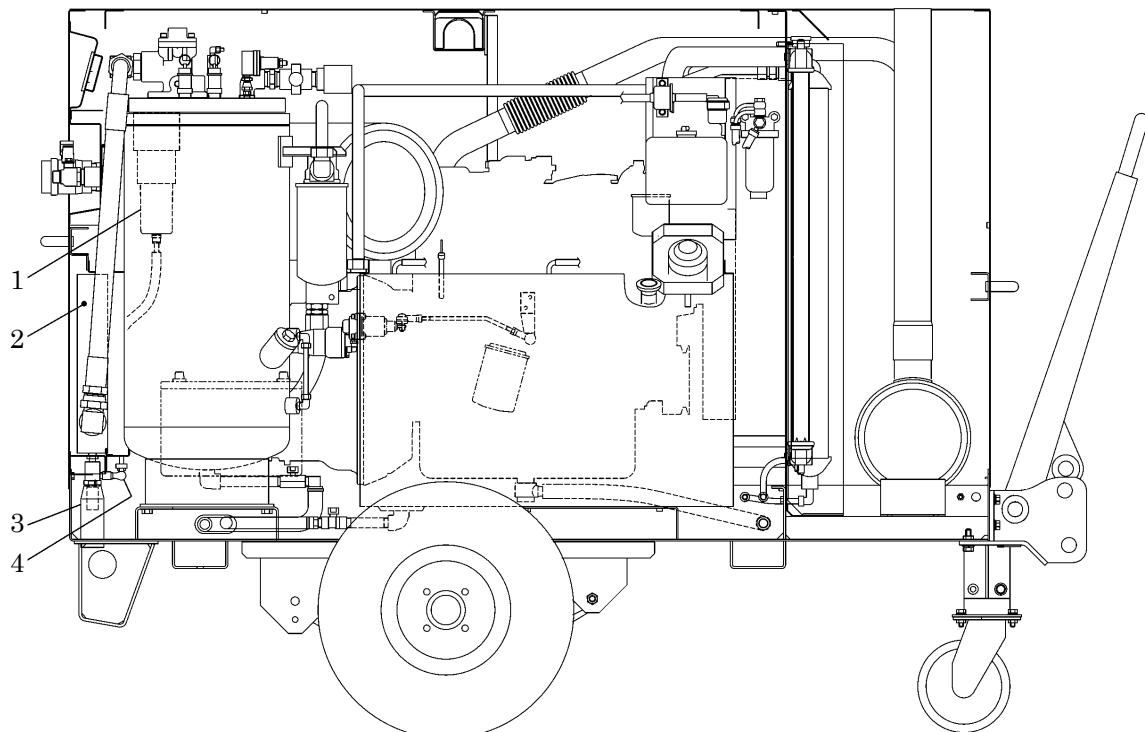
- | | |
|---|---|
| 1. Pressure control valve | 15. Oil cooler |
| 2. Safety valve | 16. Exhaust muffler |
| 3. Pressure regulator | 17. Coolant drain plug (radiator) |
| 4. Air filter element | 18. Engine oil drain plug |
| 5. Engine oil level gauge | 19. Oil cooler drain plug |
| 6. Fuel tank | 20. Engine oil filter ❁ |
| 7. Engine | 21. Fuel tank drain valve |
| 8. Engine oil filler port | 22. Air end |
| 9. Fuel filter | 23. Drain valve for separator receiver tank |
| 10. Fuel air bleeding electromagnetic pump | 24. Battery ❁ |
| 11. Reserve tank | 25. Compressor oil level gauge |
| 12. Filter for fuel air-bleeding electromagnetic pump | 26. Compressor oil filler port |
| 13. Sedimentor | 27. Oil filter |
| 14. Radiator | 28. Service valve |

Both instruments 20 & 24 marked “❁” are provided on the other side (opposite side of Maintenance).

1. Specification

PDS265SC (After cooler type)

Only the special devise additionally or optionally attached to the standard unit are shown in the following figure.



A040022

PDS265SC-4B1

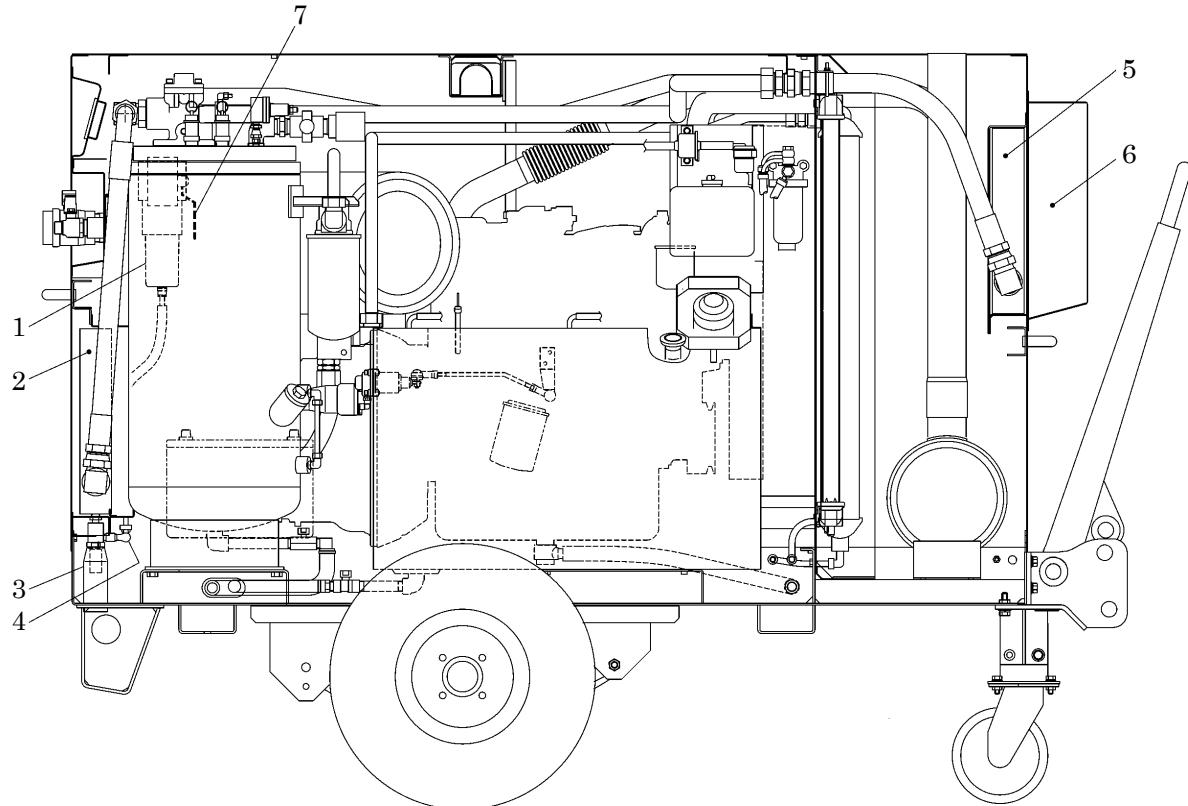
- 1. Drain separator
- 3. Drain port of air pipe

- 2. After cooler
- 4. Discharge noise reducing valve

1. Specification

PDS265SD (Dry air type)

Only the special devise additionally or optionally attached to the standard unit are shown in the following figure.



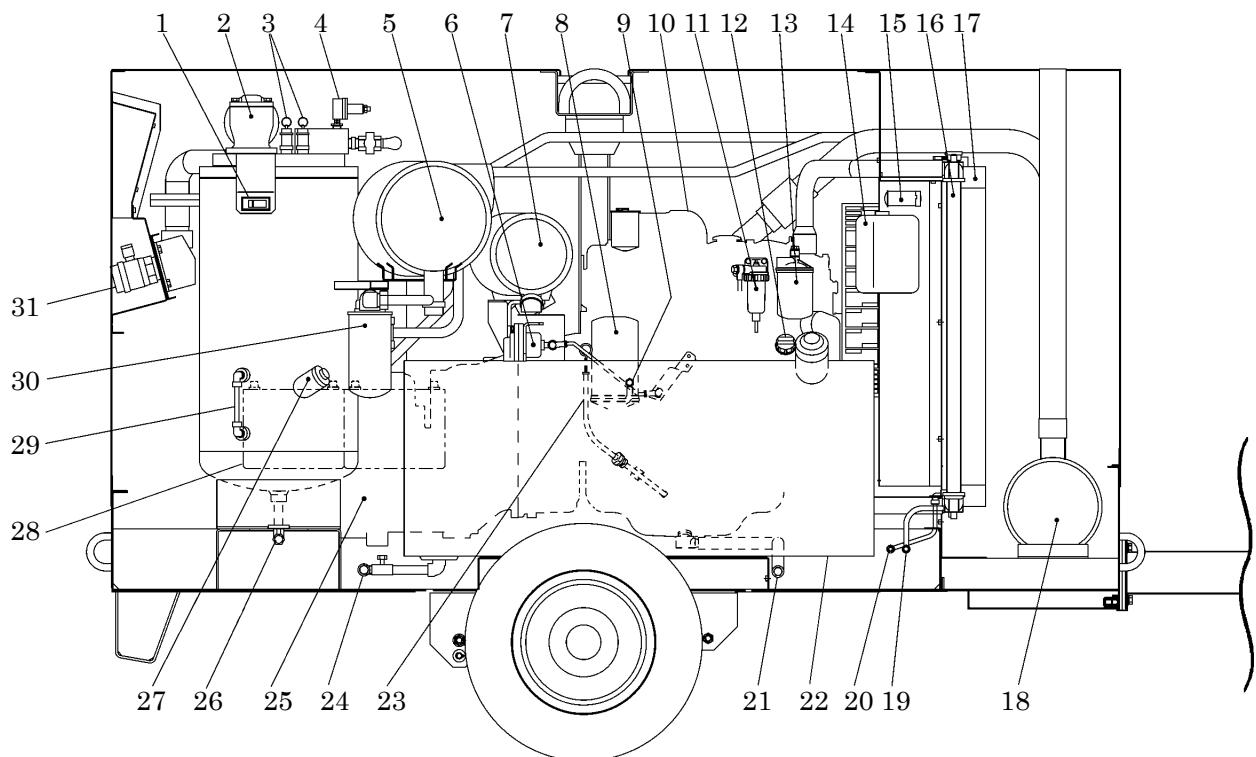
A040144

PDS265SD-4B1

- | | | |
|-----------------------------------|-----------------|---------------------------|
| 1. Drain separator | 2. After cooler | 3. Drain port of air pipe |
| 4. Discharge noise reducing valve | 5. After warmer | 6. After warmer cover |
| 7. Temperature selection valve | | |

1. Specification

PDS390S (Standard type)



A030268

PDS390S-4B1

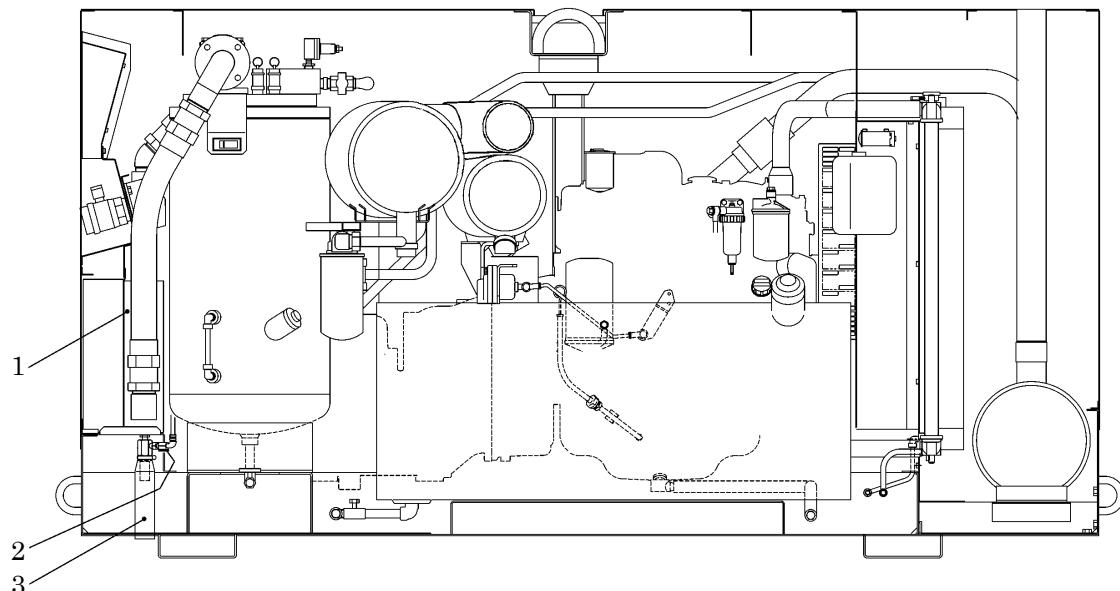
- | | |
|--|---|
| 1. Differential pressure gauge | 17. Oil cooler |
| 2. Pressure control valve | 18. Exhaust muffler |
| 3. Safety valve | 19. Coolant drain plug (radiator) |
| 4. Pressure regulator | 20. Oil cooler drain plug |
| 5. Air filter element (compressor) | 21. Fuel tank |
| 6. Speed regulator | 22. Engine oil drain plug |
| 7. Air filter element (engine) | 23. Engine oil level gauge |
| 8. Engine oil filter | 24. Fuel tank drain valve |
| 9. Coolant drain plug (engine) | 25. Air end |
| 10. Engine | 26. Drain valve for separator receiver tank |
| 11. Sedimentener | 27. Compressor oil filler port |
| 12. Engine oil filler port | 28. Battery |
| 13. Fuel filter | 29. Compressor oil level gauge |
| 14. Reserve tank | 30. Compressor oil filter |
| 15. Fuel air bleeding electromagnetic pump | 31. Service valve |
| 16. Radiator | |

1. Specification

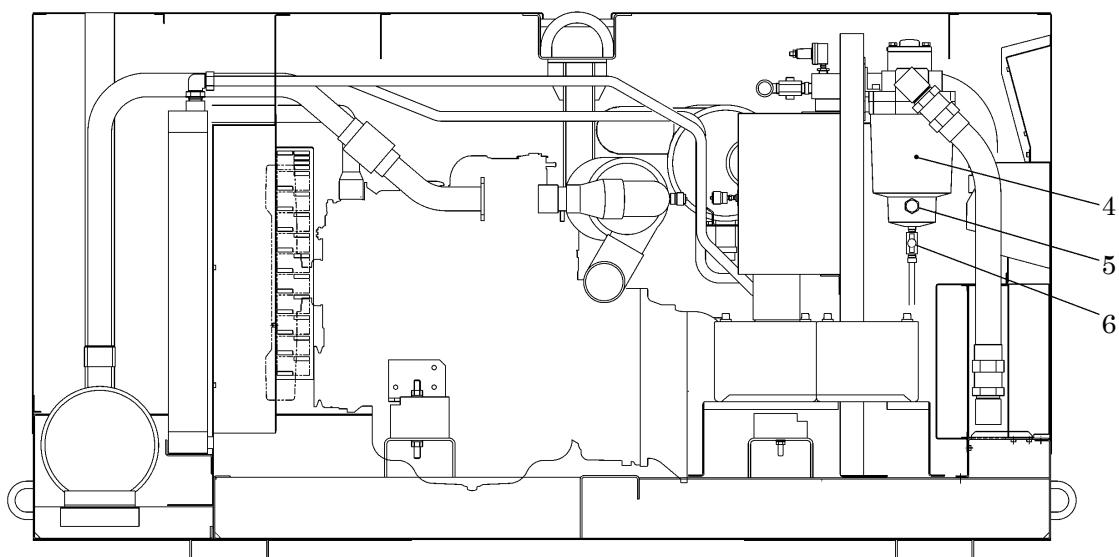
PDS390SC (After cooler type)

Only the special devise additionally or optionally attached to the standard unit are shown in the following figure.

<Maintenance side>



<Opposite side of maintenance>



A030327

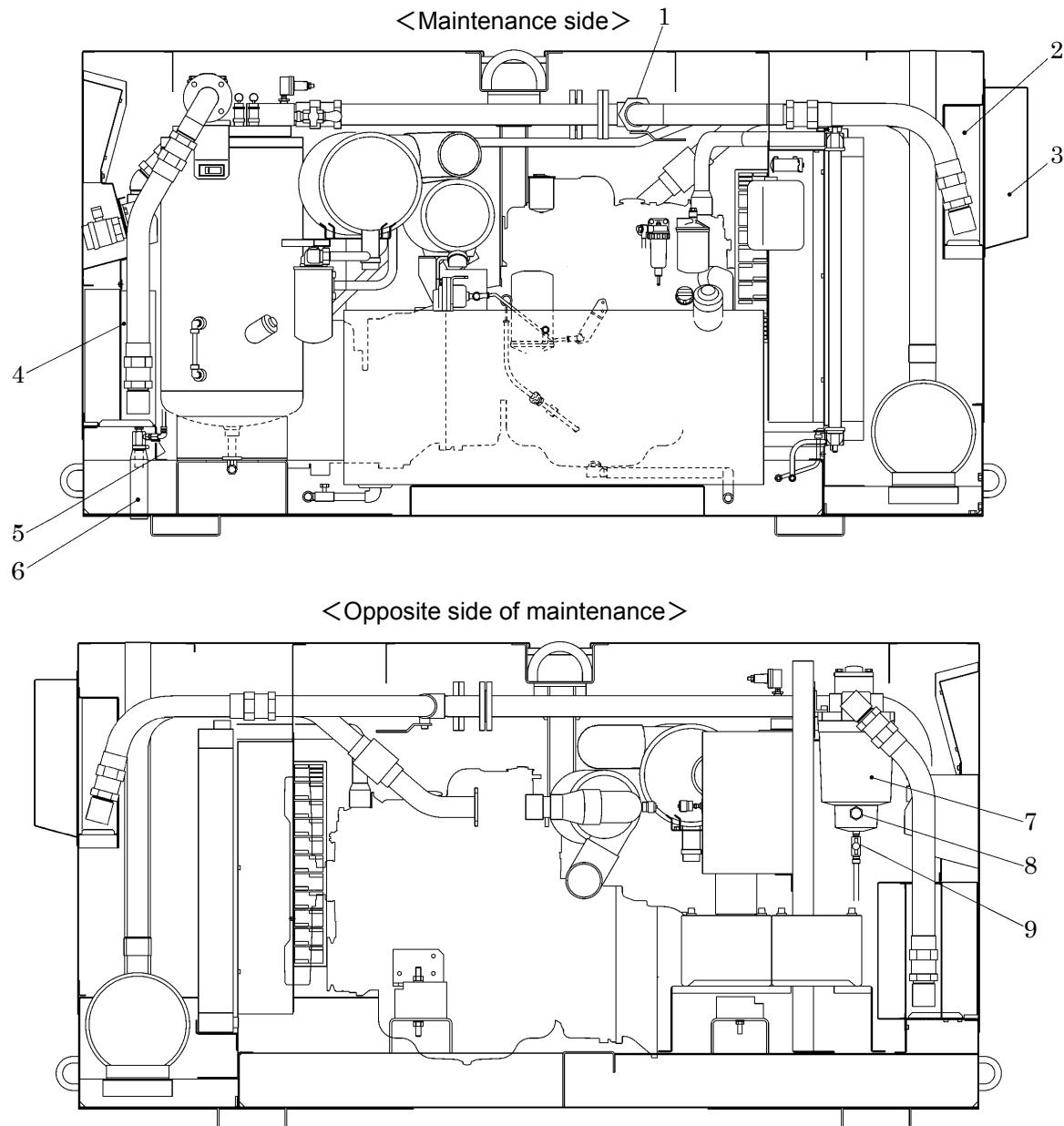
PDS390SC-5B1

- | | | |
|--------------------|-----------------------------------|---------------------------|
| 1. After cooler | 2. Discharge noise reducing valve | 3. Drain port of air pipe |
| 4. Drain separator | 5. Drain level gauge | 6. Drain valve |

1. Specification

PDS390SD (Dry air type)

Only the special devise additionally or optionally attached to the standard unit are shown in the following figure.



A030232

PDS390SD-5B1

- | | | |
|--------------------------------|-----------------------------------|-------------------------------|
| 1. Temperature selection valve | 2. After warmer | 3. Duct of cooling air outlet |
| 4. After cooler | 5. Discharge noise reducing valve | 6. Drain port of air pipe |
| 7. Drain Separator | 8. Drain level gauge | 9. Drain valve |

2. Maintenance

2.1 Periodic Inspection List

Such items marked ○ shall be carried out by customers. The columns marked ● shall be done by an expert, because this requires professional knowledge. So please contact nearest distributor or service center.

The following table shows the inspection and maintenance intervals under normal operation conditions. In case the unit is operated under harsh environmental conditions and operation conditions, the intervals should be shortened.

(Unit:Hour)

Maintenance	Daily	300	500	1,000	2,000	3,000	6,000	8,000	12,000
Check compressor oil level.	○								
Drain separator receiver tank.	○								
Check looseness in pipe connecting part, and wear and tear of pipe.	○								
Check oil, water, fuel and air leak.	○								
Check performance of gauge and indication lamps.	○								
Performance Check of Safety Valve.	○								
Change compressor oil.		※1○	○						
Change compressor oil filter.		※1○	○						
Clean strainer in the scavenging orifice.			○						
Clean and Change air filter element.			○						
Clean outside of the oil cooler.				○					
Clean outside of the after cooler and after warmer. (After cooler type and dry air type)					○				
Clean and change drain separator. (After cooler type and dry air type)						※2○			
Inspection and cleaning of the silencer fitted at the drain port of air pipe. (After cooler type and dry air type)				○					
Supply grease to trailer spring pin.					○				
Change speed regulator diaphragm.					☆●				
Change oil separator.						●			
Change nylon tubes.						●			
Change unloader o-ring.						★●			
Change spacer of unloader.				※5○		★●			
Change pressure regulator						●			
Check and Change hoses.						★●			
Check o-ring, needle valve of auto-relief valve.						★●			
Check o-ring, needle valve of vacuum-relief valve.						※3 ★●			
Change o-ring of pressure control valve (PDSF530S only)						★●			
Change rubber coupling.							※3●	※4●	
Change oil seal and bearing							※3●	※4●	

※1: primary change interval.

※2: This column is for PDS390SC and SD only. Whenever any water is found mixed in delivery air, perform cleaning even before specified change interval.

※3: change interval for PDS265S(SC)[SD].

※4: change interval for PDS390S(SC)[SD].

Regarding the item marked ※5, check the function of the unloader. In case the unloader malfunctions, change O-ring or bushing of unloader. This is because either of both parts may be worn out.

The items or parts marked ☆ should be replaced every two years even if they are not in disorder within their periodical maintenance interval because their materials will change or become degraded as time passes.

Also for the same reason, the parts marked ★ should be replaced every three years.

2. Maintenance

Maintenance		Daily	300	500	1,000	2,000	3,000	6,000	8,000	12,000
Engine	Drain fuel level. (Including sedimenter.)	○								
	Check fuel level	○								
	Check engine oil level.	○								
	Check coolant level.	○								
	Check looseness in pipe connectors, terminals and tear in wiring.	○								
	Check V-belt tension.	○								
	Change engine oil.			※1○						
	Change engine oil filter.			※1○						
	Check battery electrolyte.		(250) ○							
	Clean and change air-filter element.			※2○	※3○					
	Clean and change filter inside the fuel air bleeding electromagnetic pump.			※2○	※3○					
	Change fuel filter.			※3○	※2○					
	Clean the strainer provided inside the engine feed pump.				○					
	Change coolant.				☆○					
	Clean outside of radiator.				○					
	Check fuel rubber hose.					★●				
	Clean inside of radiator.				●					
	Clean inside of fuel tank.				●					
	Change radiator hoses.					★●				
	Change wiring harness.						※3●	※2●		

※1: Both engine oil and engine oil filter should be changed at primary change interval of first 50 hours only.

※2: change interval for PDS265S(SC)[SD].

※3: change interval for PDS390S(SC)[SD].

The items or parts marked ☆ should be replaced every two years even if they are not in disorder within their periodical maintenance interval because their materials will change or become degraded as time passes.

Also for the same reason, the parts marked ★ should be replaced every three years.

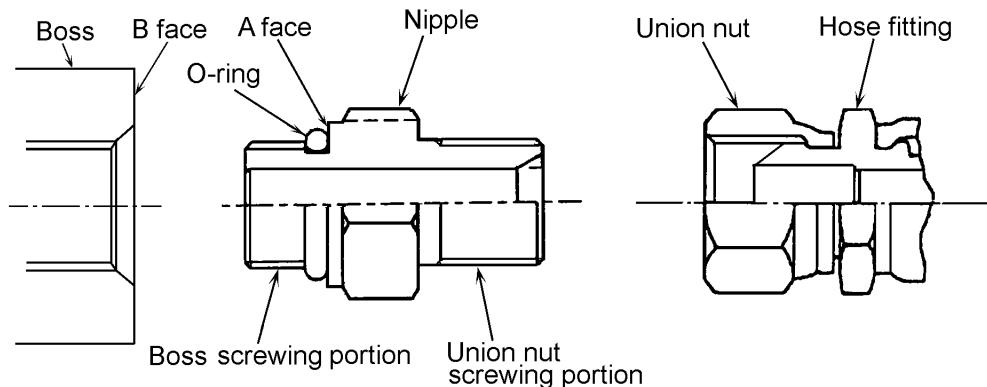
2. Maintenance

2.2 Maintenance procedures

General or routine maintenance should be performed in accordance with operation manual. In this clause, such maintenance items which are not mentioned in the manual, and specially important items are mentioned.

2.2.1 Tightening torque for hose, joint etc...

(1) Rubber hose piping



<How to tighten Nipple>

- ① Check for any damage and twist the O-ring which is fitted on boss screwing portion.
- ② Screw in a nipple to the boss at the pipe end and tighten the nipple till A face of nipple contacts B face of boss.

<How to tighten union nut>

Should be tighten Union nut according to following torque.

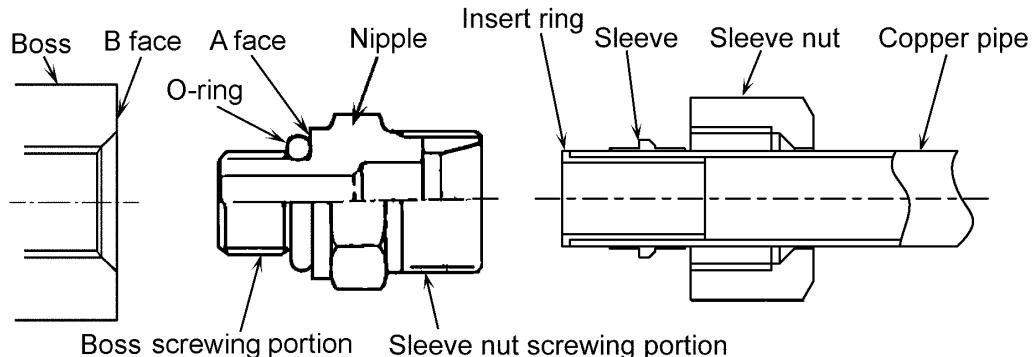
Parallel thread for pipe		
Bolt size G (PF)	Tool Width of across flat (mm)	Tighten torque N·m (kgf·cm)
1/4	19(17)	25 (250)
3/8	22(19)	50 (500)
1/2	27(22)	59 (600)
3/4	36(30)	120 (1,200)
1	41(36)	140 (1,400)
1 1/4	50	170 (1,700)
1 1/2	60	210 (2,100)

IMPORTANT

- Excessively tightening of union nut can cause excessive wedging action so that union nut can be broken. So tighten the nut, according to the specified torques.
- Damaged seating surface can cause oil leakage. So take special care when disassembling and reassembling.

2. Maintenance

(2)Piping of copper pipes



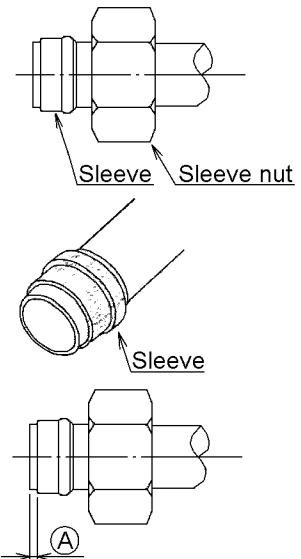
<How to tighten nipple>

- ① Check for any damage and twist the O-ring which is fitted on boss screwing portion.
- ② Screw in a nipple to the boss at the pipe end and tighten the nipple till A face of nipple contacts B face of boss.

<How to tighten sleeve nut>

1) Checking pipe

- ① Make sure that the pipe is already fitted with insert ring, sleeve and sleeve nut.
- ② Check whether the pipe and insert ring, sleeve nut are caulked aslant or not
- ③ Visually check and confirm that there are a few millimeters (A point) distance between the pipe end and sleeve.) As an aimed figure, about 3 to 4 mm is required.

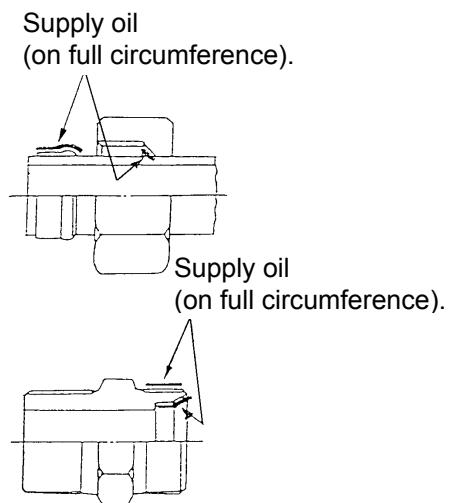


IMPORTANT

- When retightening the sleeve nut after loosening the tightened sleeve nut, mark "match-mark" on the location of the sleeve nut with white chalk before loosening it and then remove it.
When installing the sleeve nut again, tighten it a little further than the original position.

2. Maintenance

- 2) Coat pipe and nipple with lubricant.
 - ① Coat sleeve of pipe and sleeve nut with lubricant (NICHIMORI LAP spray or equivalent).
 - ② Coat threaded portion of nipple and seating face with lubricant. Supply oil (full circumference).

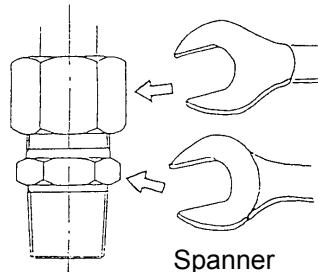
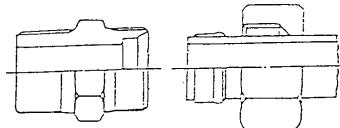


IMPORTANT

- Unless sleeve and sleeve nut are coated with lubricant, they can be caulked and the sleeve can turn together with the nut and it can cause oil leakage.

- 3) Tightening procedures
 - ① Screw sleeve nut of pipe to nipple. Make sure to tighten sleeve nut to nipple by hand till its "stop end".
 - ② Holding the nipple side with one spanner, tighten the sleeve nut at the pipe side with another spanner.
 - ③ When tightening the sleeve nut at pipe side, you will find a sudden rise point of tightening torque (sharp torque rise point). You shall give a 1/4 turn tightening to the point, thus interior sleeve getting curved.

Tighten nut by hand



Spanner

2. Maintenance

2.2.2 Change Oil Separator

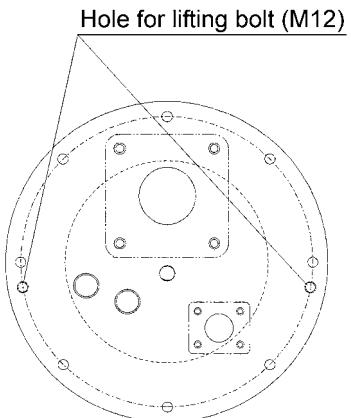
When replacing oil separator (3), do not fail to replace gasket (2) (4) also.

<Procedures>

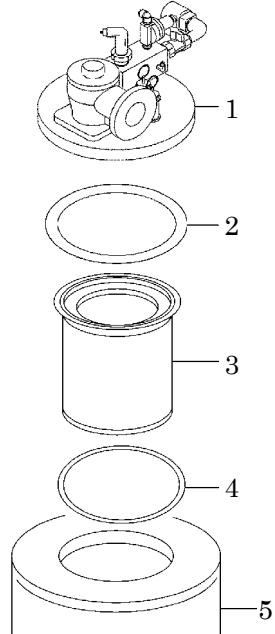
- ① Remove all the pipes fitted on separator cover (1).
- ② Remove all the fixing bolts of separator cover (1).
- ③ Install 2 bolts into 2 bolts holes (2 points). And then dismantle the separator cover (1), lifting it up.
- ④ Replace the oil separator (3) and gaskets (2) (4) by new ones.
- ⑤ Clean and degrease the connecting portion between separator cover (1) and separator receiver tank (5) and check and confirm that there are no damages nor abnormalities.
- ⑥ Tighten the fixing bolts of separator cover (1) according to the specified torque. (Tighten the bolts diagonally and after tightening all the bolts, ultimately tighten them again in full circumference.)

 : 17 mm

 : 62.8 N·m (640kgf·cm)



Details of separator cover



PDS390S-4B1/5B1

A030194-2

2. Maintenance

2.2.3 Change pressure control valve of o-ring

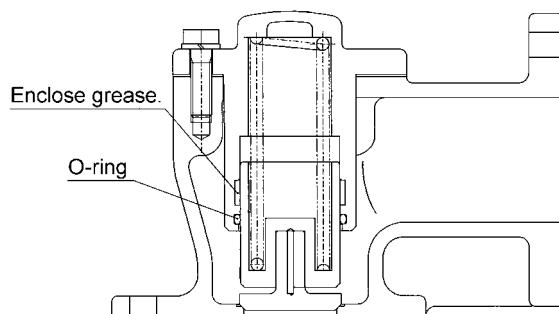
- Pressure drop below 0.39MPa (4kgf/cm²) during operation can be owing to deterioration of O-ring.
So change the O-ring even before predetermined change interval.

<Procedures>

- ① Disassemble the upper of pressure control valve and change O-ring.
- ② After replacement of O-ring, make sure that there is no abnormality found during operation.

IMPORTANT

- When reassembling, apply sufficient grease to O-ring slot, sliding surface of piston, O-ring.
Use CALTEX MULTIFAK EP1 grease.



PDS390S-4B1/5B1

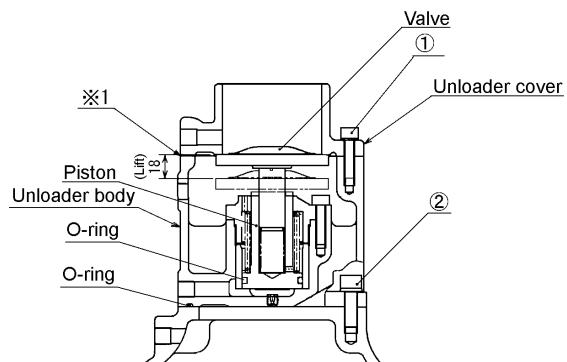
2.2.4 Change O-ring of Unloader

<Procedures>

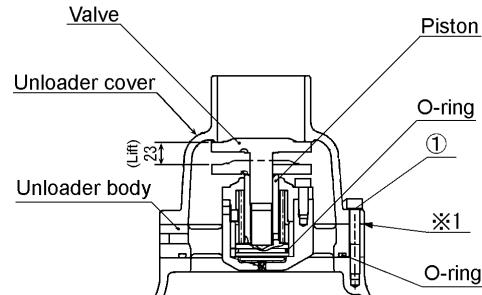
- ① Disassemble unloader valve and change O-rings.
(2 points)
- ② When changing O-rings, fully coat O-rings, O-ring groove, sliding portions of valve and piston with Lithium base extreme pressure grease.
- ③ When re-assembling it, coat the seating faces of unloader body and cover with liquid sealing packing LOCTITE FMD127 and retighten them according to the specified torque mentioned in the following table.

IMPORTANT

- When reassembling, apply sufficient grease to O-ring slot, sliding surface of piston, O-ring.
Use CALTEX MULTIFAK EP1 grease.



PDS265S-4B1/5B1



PDS390S-4B1/5B1

Tightening torque of unloader assembling bolts

No.	Item	Type	Bolt diameter (mm)	Socket bolts Width of across flat (mm)	Tightening torque N·m (kgf·cm)
①	Tightening torque of unloader cover assembling bolts	PDS265S(SC)[SD]	8	6	24.0(245)
		PDS390S(SC)[SD]	10	8	47.6(485)
②	Tightening torque of unloader body assembling bolts	PDS265S(SC)[SD]	10	8	/
		PDS390S(SC)[SD]	—	—	—

※1 : When assembling unloader cover and body, coat the contacting faces with liquid sealing packing LOCTITE FMD-127.

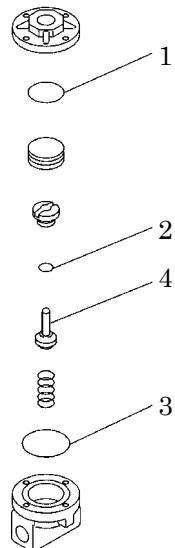
2. Maintenance

2.2.5 Check o-ring and needle valve of auto-relief valve / vacuum relief valve

- Disassemble and clean the component, and check O-ring (1), (2), (3) and needle valve (4). Then, replace O-ring (1), (2), (3) and needle valve (4) if its rubber is hardened.

IMPORTANT

- When reassembling, apply sufficient grease to O-ring slot, sliding surface of piston, O-ring. Use CALTEX MULTIFAK EP1 grease.



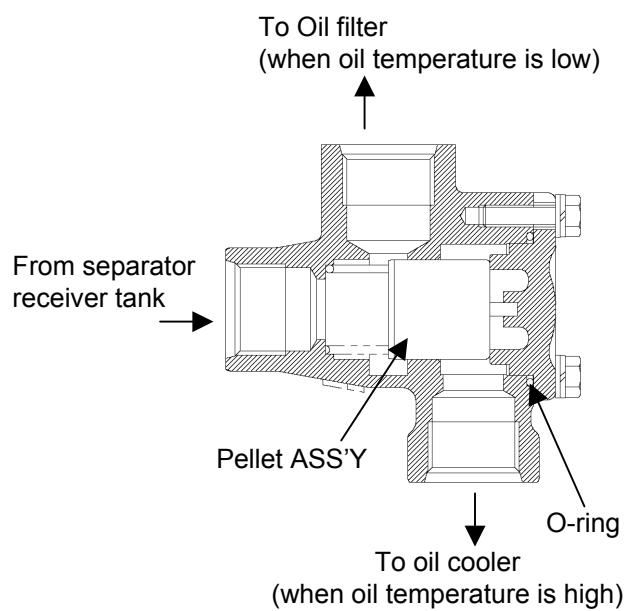
H000057

2.2.6 Replacement of pellet assembly of by-pass valve

By-pass valve fitted on this unit is of full bore type. While the unit is used for normal operation, it is not to perform periodical replacement of the Inner pellet assembly, but when such trouble as excessive rise of compressor oil temperature, it becomes necessary to replace it, in accordance with the following procedures.

<Procedures>

- ① First stop the unit and make sure that there is no residual pressure left in the separator receiver tank.
- ② After checking and confirming that the temperature of compressor oil has become amply low, open drain valves on separator receiver tank and oil cooler to empty compressor oil completely.
- ③ After having drained oil completely, remove the pellet assembly of by-pass valve and O-ring.
- ④ Replace the pellet assembly and O-ring by new ones. Install O-ring coated thinly with compressor oil.
- ⑤ Supply compressor oil through the filler port provided on the receiver tank. (Refer to operation manual.)
- ⑥ Start operation and check the function of by-pass valve. (It functions well when delivery air temperature will not rise abnormally.)



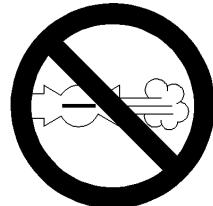
2. Maintenance

2.2.7 Adjustment of Regulator



CAUTION — Operation with compressed air supply port opened is prohibited —

- When adjusting regulator system, install a silencer to the air delivery port and wear earplugs for protection of hearing damage.

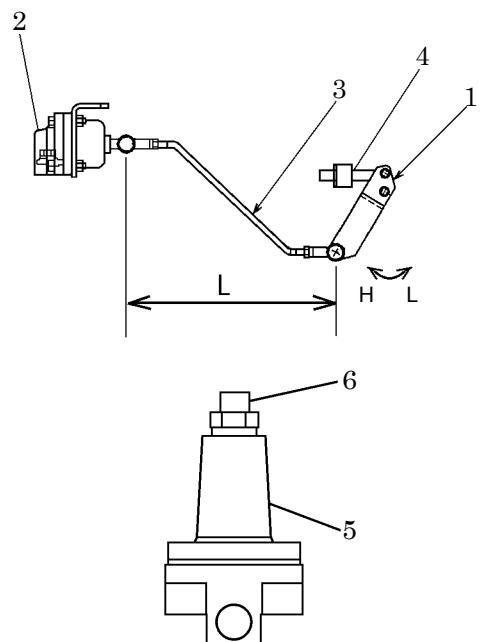


D003

- The speed regulator is already adjusted prior to delivery ex.works. Never change the setting of the regulator by turning bolt and rod recklessly.
- If it is necessary to re-adjust the speed regulator due to overhauling or any trouble, adjust it in accordance with the following procedures.

<Adjustment procedures>

- While compressor is kept stopping, adjust the length of rod (3) connecting the speed regulator (2) so that engine governor (1) may be pulled to high speed side. (Shortening the rod length L raises speed.)
- After starting engine, make adjustment of system by turning pressure adjusting screw (6) of a pressure regulator (5) so that speed regulator (2) may function to reduce the speed when the pressure exceeds 0.7MPa (7.1kgf/cm²). (Screwing in of the adjusting screw raises pressure and vice versa loosening the screw reduces pressure.)
- Make a fine adjustment of rod length L so that engine rated speed may meet the value in the following table under full load operation (at delivery pressure of 0.7MPa(7.1kgf/cm²).



H000059

Type	Full load operation	Unload operation	(Unit: min^{-1})
PDS265S(SC)[SD]-4B1/5B1	2,700	Approx. 1,500	
PDS390S(SC)[SD]-4B1/5B1	2,400	Approx. 1,300	

2. Maintenance

2.3 Values of Various Adjustments of Engine

PDS265S(SC)[SD]-4B1/5B1

Item		unit	Specifications	
Model			NISSAN DIESEL 2B-BD30T	
Tightening torque of head bolts		N·m (kgf·m)	First time	39~44(4~4.5)
			Second time	54~59(5.5~6)
			Third time	90° ±10° (angle tightening)
Valve clearance	Air intake	mm	0.35 (in warm season)	
	Discharge	mm	0.35 (in warm season)	
Firing order			1-3-4-2	
Injection timing (BTDC)		°	8	
Nozzle injection pressure		MPa (kgf/cm²)	18.14(185)	
Compression	Standard	MPa (kgf/cm²)	2.94(30) (Rotation speed 200min⁻¹)	
	Working limit	MPa (kgf/cm²)	Limited value	2.45(25)
			Each cylinder limit value	0.29(3)
Thermostat	Temperature for start of release	°C	82	
	Full open temperature	°C	95	
	Valve lift	mm	9	

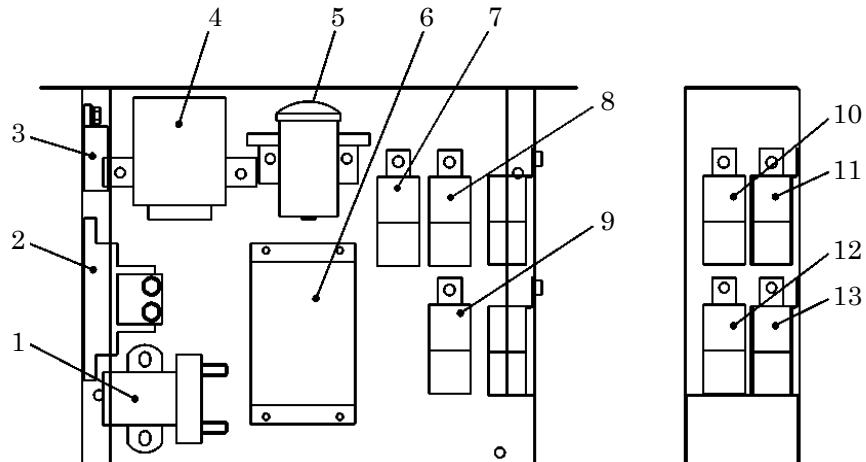
PDS390S(SC)[SD]-4B1/5B1

Item		unit	Specifications	
Model			ISUZU DD-4BG1T	
Tightening torque of head bolts		N·m (kgf·m)	First time	69(7.0)
			Second time	88(9.0)
			Third time	90° ~120° (angle tightening)
Valve clearance	Air intake	mm	0.4 (in cold season)	
	Discharge	mm	0.4 (in cold season)	
Firing order			1-3-4-2	
Injection timing (BTDC)		°	7	
Nozzle injection pressure		MPa (kgf/cm²)	18.14(185)	
Compression	Standard	MPa (kgf/cm²)	3.04(31) (Rotation speed 200min⁻¹)	
	Working limit	MPa (kgf/cm²)	2.2(22) (Rotation speed 200min⁻¹)	
Thermostat	Temperature for start of release	°C	82	
	Full open temperature	°C	95	
	Valve lift	mm	10	

3. Electric System

3.1 Location of electric appliances

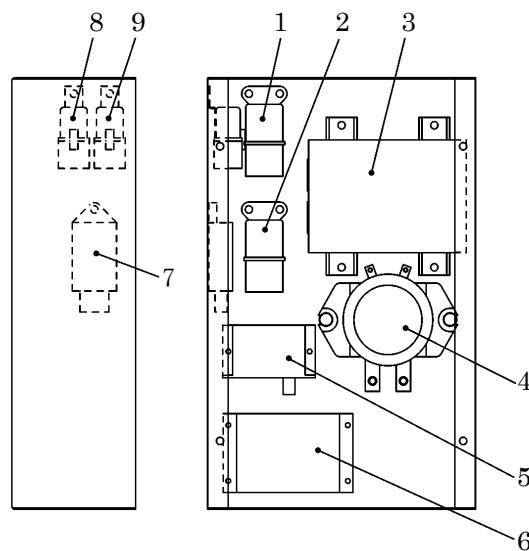
PDS265S(SC)[SD]-4B1



A040303

- | | |
|---------------------------------|------------------------------|
| 1. Heater relay | 8. Timer relay |
| 2. Safety relay | 9. Oil pressure cancel relay |
| 3. Time relay | 10. Motor stopper relay |
| 4. QHS glow controller | 11. Stop relay (B) |
| 5. Battery relay | 12. Stop relay (C) |
| 6. Engine speed down controller | 13. Stop relay (A) |
| 7. Fuel drop relay | |

PDS390S(SC)[SD]-4B1



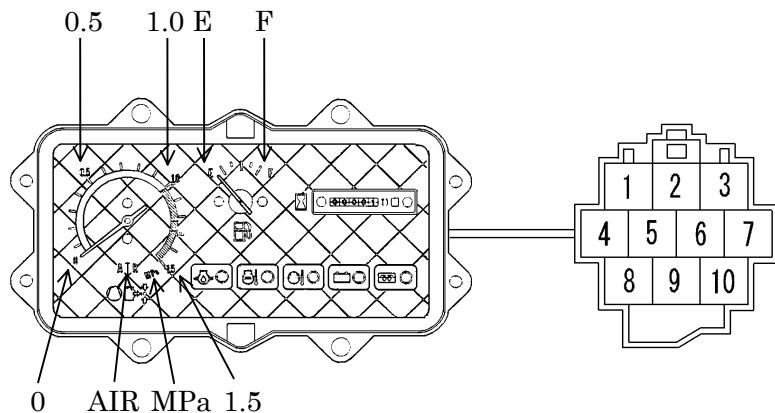
A040305

- | | |
|---|---------------------------------|
| 1. Safety relay | 6. Engine speed down controller |
| 2. Glow relay | 7. QOSIII timer |
| 3. Controller | 8. Motor stopper relay |
| 4. Battery relay | 9. Stop relay |
| 5. Discharge air temperature switch
(thermister amplifier) | |

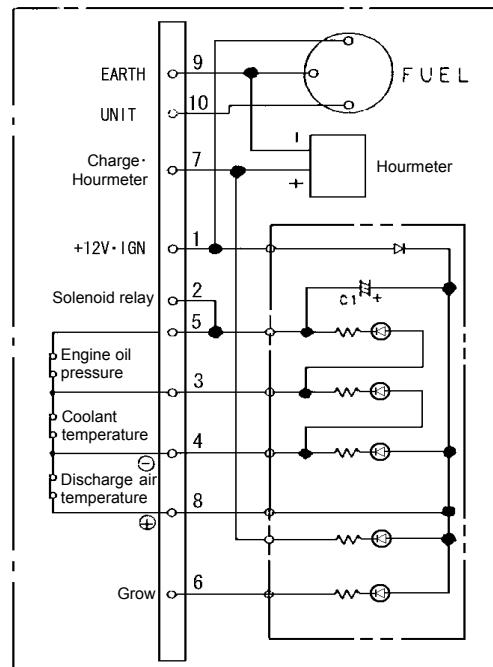
3. Electric System

3.2 Engine controller

PDS265S(SC)[SD]-4B1/5B1



[Wiring diagram inside instrument panel]



(1) Residual fuel oil in fuel gauge () shows reference value

Pointer position	Remaining fuel (L)	Resistance (Ω)
E	28	95
1/2	68	(32.5)
F	100	7

(2) List of functions

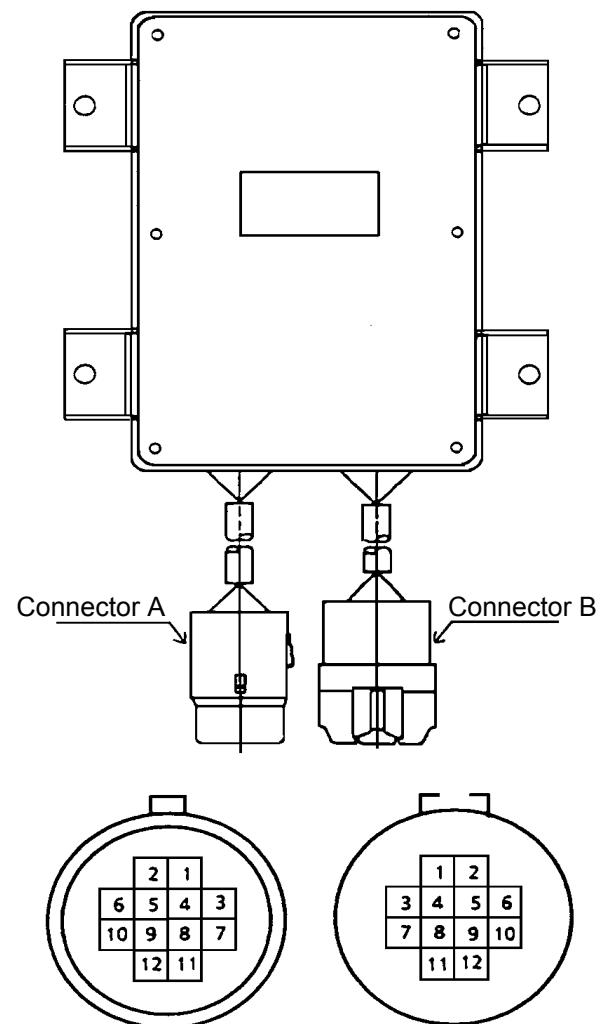
Pin No.	Line color	Connection	Remark
1	R/Y	1A Fuse	Power supply
2	L/R	Stop relay (a) No.1 terminal	When starter switch is "ON", voltage is applied to No.1 terminal of stop relay (a). When "OFF", it is not electrically supplied.
		Oil pressure cancel relay (d) No.5 terminal	When emergency stop switch is switched "ON", about 2V voltage is generated, but excitation of stop relay (a) is released owing to lack of voltage and so engine is brought to an emergency stop.
3	Y/W	Engine oil pressure switch	During normal operation there is no electrical flow. When engine oil pressure switch is opened, electrical flow occurs between 2-3 terminals inside instrument panel assembly and then when cooling water temperature switch is switched "Open", electrical flow occurs between 3-4 terminals. Thus emergency stop lamp goes on and engine is brought to an emergency stop.
		Coolant temperature switch	
4	G/R	Coolant temperature switch	During normal operation there is no electrical flow. When cooling water temperature switch is "ON", electrical flow occurs between 3-4 terminals inside instrument panel assembly and delivery air temperature switch is switched "ON", electrical flow occurs between 1-4 terminals, and it occurs also between 8-4 terminals. Thus emergency stop lamp goes on and engine is brought to an emergency stop.
		Discharge air temperature switch	
5	Y/R	Engine oil pressure switch	During normal operation there is about 12 volt inputted. When engine oil pressure switch is "ON", electrical flow is "OFF". When cooling water temperature switch or delivery air temperature switch is "ON", about 2V voltage is inputted.

3. Electric System

Pin No.	Line color	Connection	Remark
6	Y	QHS glow controller No.4 terminal	During preheating operation, it causes preheat lamp to go on.
7	W/R	Alternator L terminal	Bad charging→Charging lamp is caused to light on. During normal operation, power signal is inputted from alternator L terminal.
		QHS glow controller No.6 terminal	Refer to 3.3.1 “QHS glow controller”.
8	G/W	Discharge air temperature switch	During normal operation there is no electrical flow. During normal operation, no electrical flow occurs. When delivery air temperature switch is “ON”, electrical flow occurs between 8-4 terminals inside instrument panel assembly. Thus emergency stop lamp goes on and it performs an emergency stop to engine.
9	B	Earth	
10	G/Y	Sending unit	When starter switch is switched “ON”, it shows residual fuel in the fuel tank.

3. Electric System

PDS390S(SC)[SD]-4B1/5B1



3. Electric System

List of functions

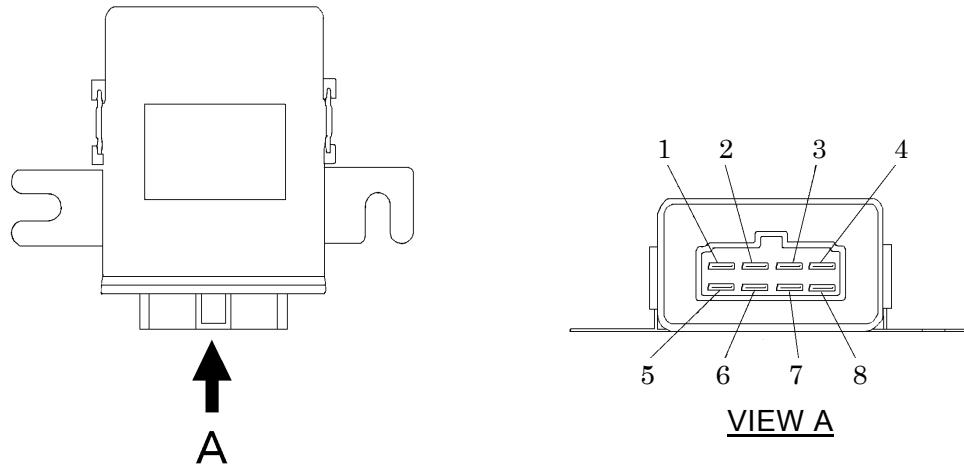
	Pin No.	Line color	Connection	Remark
Connector A	3	Y	Discharge air temperature rise warning lamp	When electric flow to connector B No.5 terminal is cut, it gets connected to ground and warning lamp goes on.
	5	L/R	Motor stopper relay No.2 terminal	During normal operation, it is connected to ground and it forms excitation circuit of motor stopper relay. Motor stopper functions by ACC power supply, and accordingly emergency stop switch connected to No.2, 5 and 8 terminal is switched OFF. After a certain time passes, the connection to grounding is opened to shut "OFF" the motor stopper relay excitation circuit, and engine is brought to an emergency stop.
	7	Y/R	Engine oil pressure drop warning lamp	When electric flow to No.2 terminal of connector B is cut off, it gets connected to ground and it actuates alarm lamp.
	8	Y/L	Tachosensor $(+)$	For detecting engine RPM
Connector B	2	G/R	Engine oil pressure switch	During normal operation electric flow occurs. When engine oil pressure switch is switched "OFF", electric flow is cut off to activate engine emergency stop.
	3	W/B	Tachosensor $(-)$	For detecting engine RPM
	4	B/W	Safety relay No.4 terminal	At engine startup, it is connected to grounding connector. When operation is ensured, it functions to open circuit to grounding, to protect starter motor. RPM required to switch off safety relay is $1260 \pm 66 \text{ min}^{-1}$.
	5	Y/B	Discharge air temperature thermister amplifier No.1 terminal	During normal operation electric flow occurs. When electric flow to delivery air thermistor amp No.1 terminal is cut off, it actuates engine emergency stop.
	6	B	Earth	
	8	G/W	Coolant temperature switch	During normal operation electric flow occurs. It is cut off cooling water temperature switch "OFF" and it activates engine emergency stop.
	10	W/Y	Coolant temperature rise warning lamp	When electric flow to No.8 terminal of connector B is cut off, it gets connected to ground connector and actuates alarm lamp.
	11	R/W	Starter switch ACC terminal	Power supply

3. Electric System

3.3 Preheating device

3.3.1 QHS glow controller

PDS265S(SC)[SD]-4B1/5B1



(1) List of functions

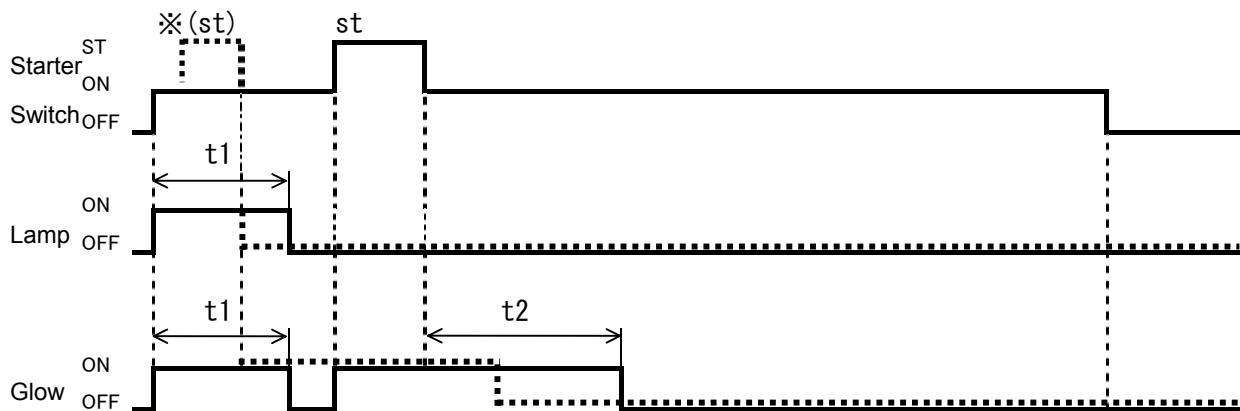
Pin No.	Line color	Connection	Remark
1	B/W	Starter switch C terminal	Detection of start signal.
2	G	Coolant temperature sensor	Detection of water temperature.
3	B	Earth	
4	Y	Controller No.6 terminal	During preheating operation, it is connected to ground and it activates preheating lamp. When power supply is inputted to No.7 terminal, the connection between No.3 terminal and No.4 terminal becomes ON during a specified time (t_1) according to the coolant temperature and it makes LED light ON. Further, while the preheating lamp lights ON, and start signal is sent to No.1 terminal, The connection between No.3 terminal and No.4 terminal becomes OFF to make the preheating lamp light OFF.
5	L	Heater relay excitation coil	Power supply for excitation of heater relay. When the start signal is inputted to No.1 terminal, it preheats, regardless of coolant temperature.
6	W/R	Alternator L terminal	Detection of generation signal. When no generating signal is inputted to No.6 terminal after detecting start signal at No.1 terminal, it cuts output to No.5 terminal and it will not do after heating.
7	R/W	10A Fuse	Power supply
8	-	NIL	

3. Electric System

(2) Coolant temperature·glow instantaneous characteristic (at the time of key-OFF-ON)

Water temp. (°C)	Lamp lights·Glow time t1 (sec)	After heat time t2 (sec)
-15	19	190
0	2	75
10	1	48

(3) Chart of function



※ : The chart marked ※ 1 shows the function chart at which the starter switch is placed at "st" position.

(4) Coolant temperature sensor (for automatic preheating)

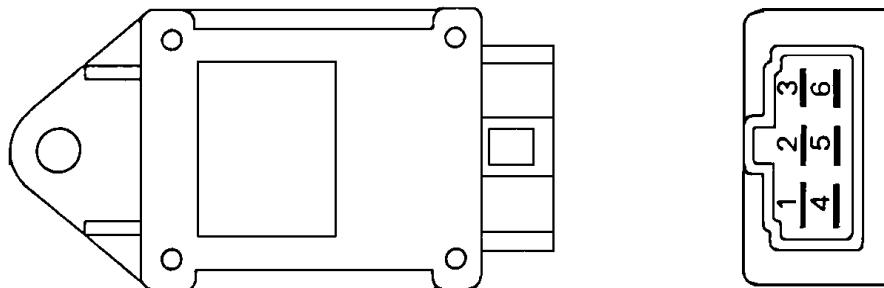
Coolant temperature·Resistance characteristics

Water temp. (°C)	Resistance (k Ω)
-15	11.5
0	5.6
40	1.2

3. Electric System

3.3.2 QOSIII timer

PDS390S(SC)[SD]-4B1/5B1



List of functions

Pin No.	Line color	Connection	Remark
1	B/Y	Starter switch C terminal	Detection of start signal.
2	L/Y	Glow lamp	Preheating lamp is ON. During preheating operation it is connected to No.6 grounding connector, and it causes preheating lamp to light. [Lamp lighting time for reference] at water temperature approx. 1 second at 5°C approx. 5 seconds at 15°C
3	R/W	Starter switch ACC terminal	Power supply
4	L/W	Coolant temperature sensor	Detection of water temperature.
5	W/R	Glow relay No.3 terminal	Glow relay for excitation. When performing preheating operation, it is connected to No.6 ground connector and it forms excitation circuit. When No.3 terminal is electrically supplied, it is preheated for the same time as the lighting time of preheating lamp. While start signal is inputted to No.1 terminal, it activates preheating, irrespective of cooling water temperature.
6	B	Earth	

3. Electric System

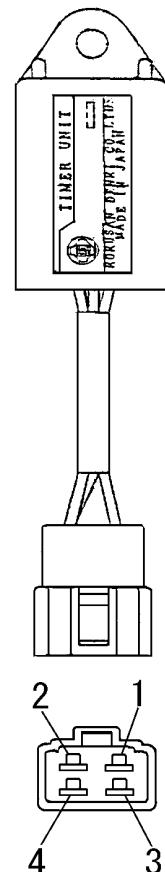
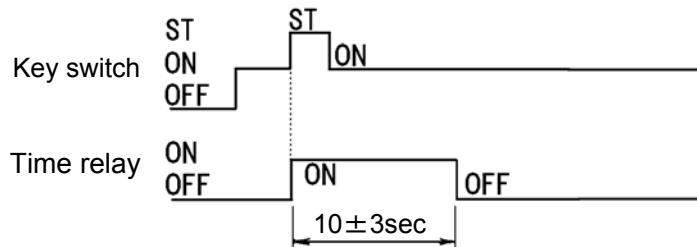
3.4 Time relay

PDS265S(SC)[SD]-4B1/5B1 [for the purpose of cancellation of emergency stop circuit]

(1) Specification

Range of power supply voltage in use	6~15V
Time of relay functioning	10±3 sec

(2) Chart of function



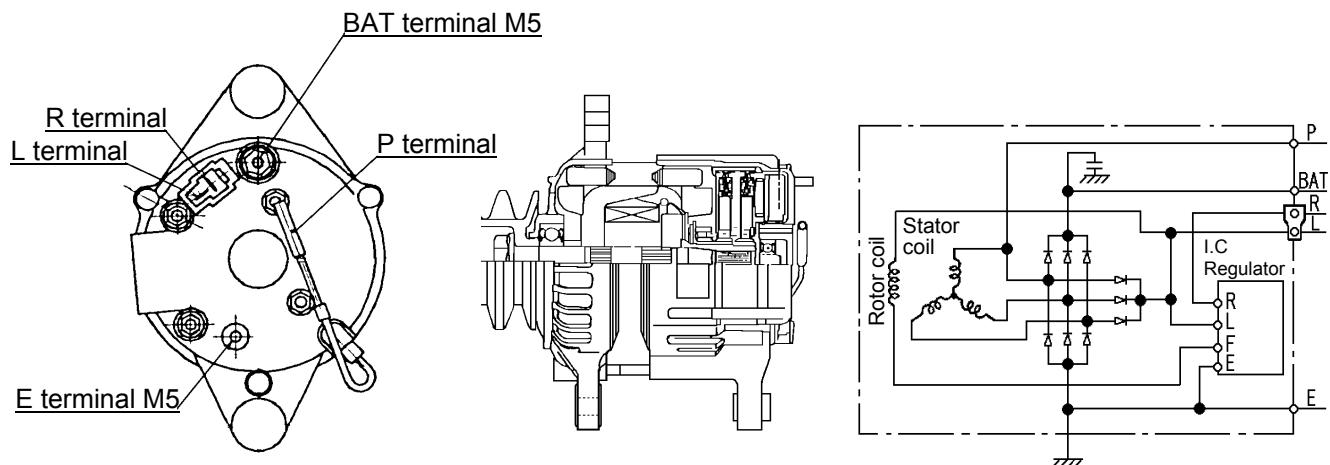
List of functions

Pin No.	Line color	Connection	Remark
1	-	NIL	
2	G/W	Oil pressure cancel relay (d) No.1 terminal (through diode)	Power supply for excitation to oil pressure cancellation relay (d). When voltage is applied to No.4 terminal, voltage is outputted for 10 seconds from No.2 terminal to excite oil pressure cancellation relay (d). Consequently, emergency stop circuit due to instable conditions of engine oil pressure soon after engine starts is avoided.
3	B	Earth	
4	G	Starter switch C terminal (through diode)	Power supply

3. Electric System

3.5 Alternator

PDS265S(SC)[SD]-4B1/5B1



(1) List of functions

Pin No.	Line color	Connection	Remark
BAT	W	Battery relay	Power for charging voltage
R	R/W	10A Fuse	Detect output voltage from alternator and adjust the current flowing to rotor coil.
L	W/R	Controller No.7 terminal	Generator signal output (for putting out charging lamp). Power supply for hourmeter.
		QHS glow controller No.6 terminal	Refer to 3.3.1 "QHS Glow Controller"
		Battery relay (through diode(D2))	Circuit to avoid trouble due to surge voltage. For prevention of trouble to electric appliance by delaying occurrence of surge voltage through combination of alternator L terminal and battery relay.
※1 P	W	Safety relay No.3 terminal	For separating starter When the frequency of P terminal exceeds $190 \pm 10\text{Hz}$, safety relay contact changes and separates starter motor.
E	B	Earth	

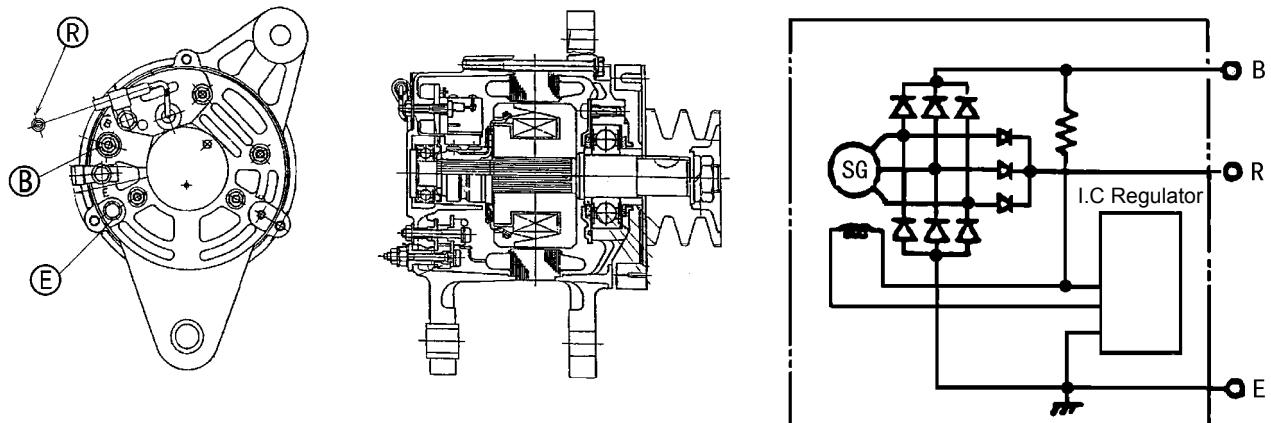
※1 : When diagnosing defects of P terminal, it is judged as good if the generated voltage between P-E terminals is about DC 7.2V during no load operation.

(2) How to Check

Checking method by measuring battery terminal at full load operation	Normal Value
Measure the battery terminal voltage at full load operation.	$14.5 \pm 0.8\text{V}$

3. Electric System

PDS390S(SC)[SD]-4B1/5B1



(1) List of functions

Pin No.	Line color	Connection	Remark
B	R	Battery relay	Power for charging voltage
R	W/G	Tachometer (with hourmeter) No.3 terminal	Generator signal output (For hour meter functioning)
		Charging lamp indicating bad charging	Generator signal output (for putting out charging lamp indicating bad charging)
E	B	Earth	

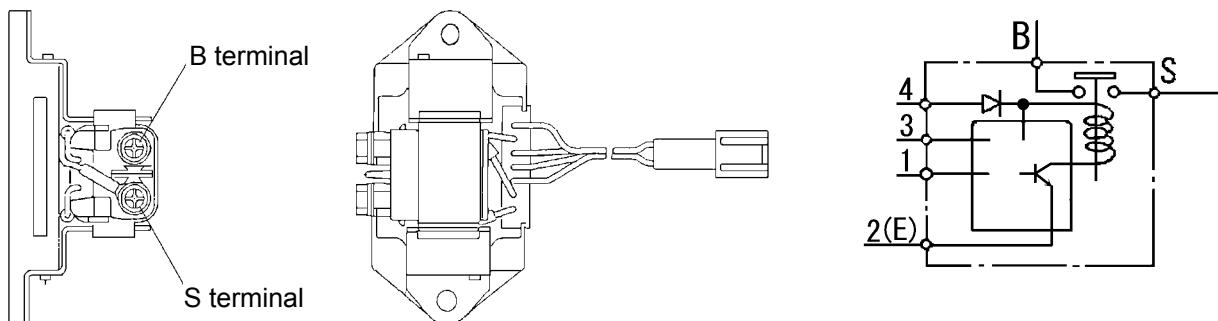
(2) How to Check

Checking method by measuring battery terminal at full load operation	Normal Value
Measure the battery terminal voltage at full load operation.	$28.5 \pm 1V$

3. Electric System

3.6 Safety relay

PDS265S(SC)[SD]-4B1/5B1



(1) Specification

RPM to separate starter motor (RPM of alternator)	$1,900 \pm 100 \text{min}^{-1}$
RPM to separate starter motor (RPM of engine)	$1,260 \pm 66 \text{min}^{-1}$
Pulley ratio (Crank pulley/alternator pulley)	1.51
No. of poles of alternator	12P
Frequency to separate starter motor (Frequency of alternator)	$190 \pm 10 \text{Hz}$
Detection terminal	No.3 terminal

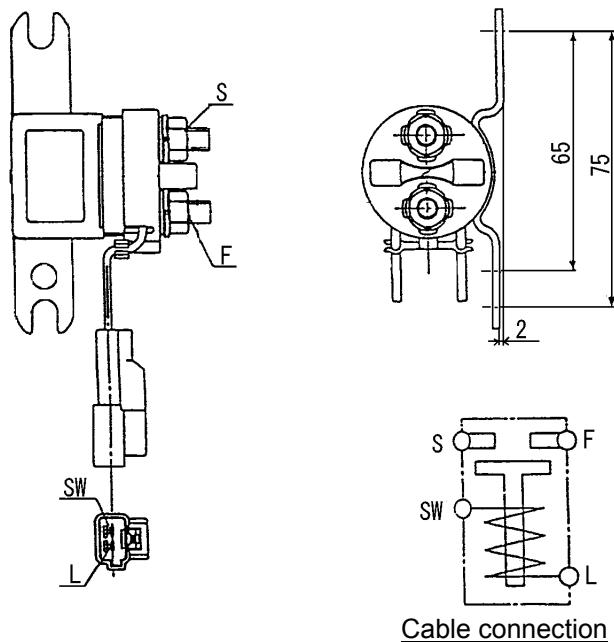
(2) List of functions

Pin No.	Line color	Connection	Remark
B	W	Battery relay M8 terminal	Power supply for starter motor
S	Y	Starter motor S terminal	When No.4 terminal receives start signal input, the contact between B-S terminal contacts "ON" and it applies voltage to S terminal of starter motor.
1	R/W	10A Fuse	Power supply
2	B	Earth	
3	W	Alternator P terminal	Detecting the alternator frequency, and when it exceeds $190 \pm 10 \text{Hz}$, the connection between B-S terminals becomes OFF.
4	B/W	Starter switch C terminal	Start signal input terminal

3. Electric System

3.7 Heater relay

PDS265S(SC)[SD]-4B1/5B1



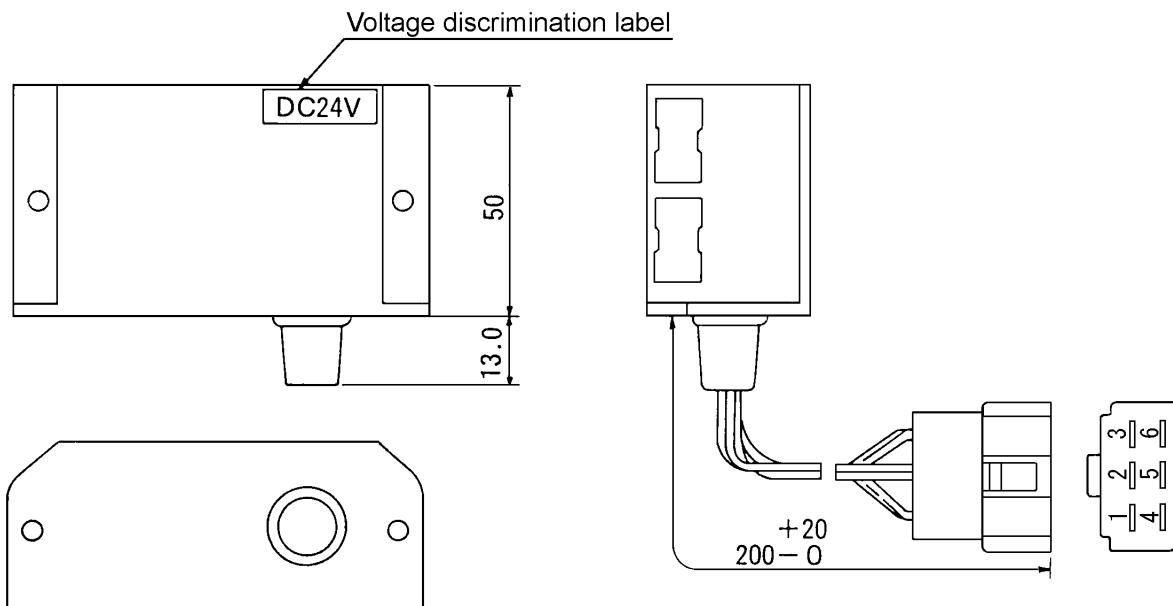
List of functions

Pin No.	Line color	Connection	Remark
SW	L	QHS glow controller No.5 terminal	Input of exciting current.
L	B	Earth	Output of exciting current.
F	W	Battery relay M8 terminal	Power supply for preheating.
S	L	Air heater	Output of current for preheating.

3. Electric System

3.8 Discharge air temperature switch (Discharge air temperature thermistor amplifier)

PDS390S(SC)[SD]-4B1/5B1

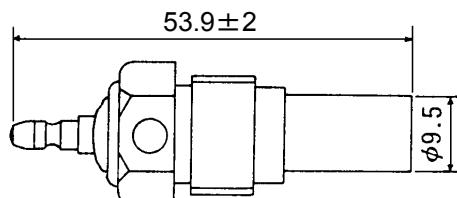
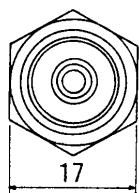


List of functions

Pin No.	Line color	Connection	Remark
1	Y/B	Controller B-5 terminal	During normal operation, it is electrically supplied. (When power is supplied to No.3 terminal, the interior contact between No.1 and No.4 terminal is electrically supplied to contact "ON"). When the discharge air temperature exceeds the predetermined temperature, the interior contact between No.1 and No.4 terminal becomes "OFF" to shut off electrical supply. ●Set temperature for emergency stop function: 120°C
2	G/B	Discharge air temperature Sensor	For detection of delivery air temperature.
3	R/W	Starter switch ACC terminal	Power supply
4	B	Earth	
5	G/B	Discharge air temperature sensor	For detecting delivery air temperature.
6	B	Earth	

3. Electric System

3.9 Thermo-sensor for water temperature gauge and discharge air temperature gauge

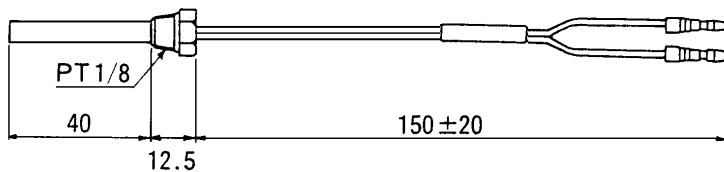


Characteristic of temperature resistance

Water temp. (°C)	Resistance (Ω)	Permissible value
35	670.0	±80.0
80	118.0	±6.0
105	54.5	±2.7
115	42.0	±2.5

3.10 Discharge air temperature sensor (For discharge air temperature switch)

PDS390S(SC)[SD]-4B1/5B1



Characteristic of temperature resistance

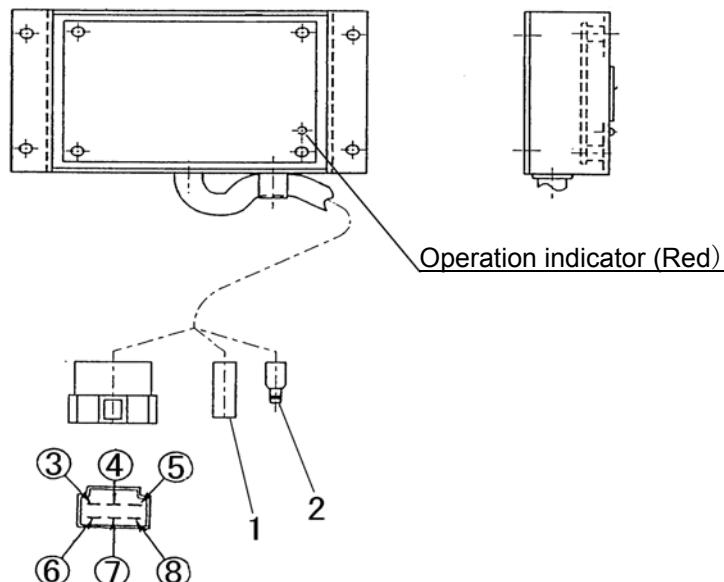
Water temp. (°C)	Resistance (Ω)	Permissible value
85	1300	±50
95	840	±33
110	560	±17
115	490	±17
120	432	±15

《Note》 Take care not to tighten excessively.

Less than 2N·m(20kgf·cm)

3. Electric System

3.11 Engine speed down controller



List of functions

Pin No.	PDS265S(SC) [SD] color	PDS390S(SC) [SD] color	Connection	Remark
1	Y/G	Y/L	Tachosensor + terminal	For detection of RPM.
2	B	W/B	Tachosensor - terminal	For detection of RPM.
3	R/W	R/W	Starter switch ACC terminal	Power supply
4	L	W/L	Warning lamp for engine speed drop	For lighting warning lamp. When engine speed drops, it gets connected to No.6 terminal to cause the warning lamp to light on.
5	R/W	R/W	Starter switch ACC terminal	Power supply for stop signal.
6	B	B	Earth	
7	NIL	NIL		
8	G/Y	Y/W	Stop relay (C) No.1 terminal	Outputting of stop signal. ※ No conductivity during normal operation. When engine is operated within the range of engine resonant RPM, it gets connected to No.5 terminal to form excitation circuit.

Connection () shows that for PDS265S(SC)[SD]-4B1/5B1.

※ : In case it is operated continuously or about 15 seconds in total within the range of engine resonant RPM, it outputs emergency stop signal about 7 seconds.

Range of resonant RPM	PDS265S(SC)[SD]-4B1/5B1	PDS390S(SC)[SD]-4B1/5B1
Low RPM set value	350 min ⁻¹	500 min ⁻¹
High RPM set value	1,300 min ⁻¹	1,000 min ⁻¹

IMPORTANT

- When engine stops by engine speed down controller function, warning indication lamp continues "ON" till starter switch is switched "OFF".
- When engine stops by engine speed-down controller function, it enables engine to stop when it is operated for a certain time within the resonant RPM range even if engine is restarted without switching "OFF" the starter switch. (In this time, warning indication lamp keeps lighting.)

3. Electric System

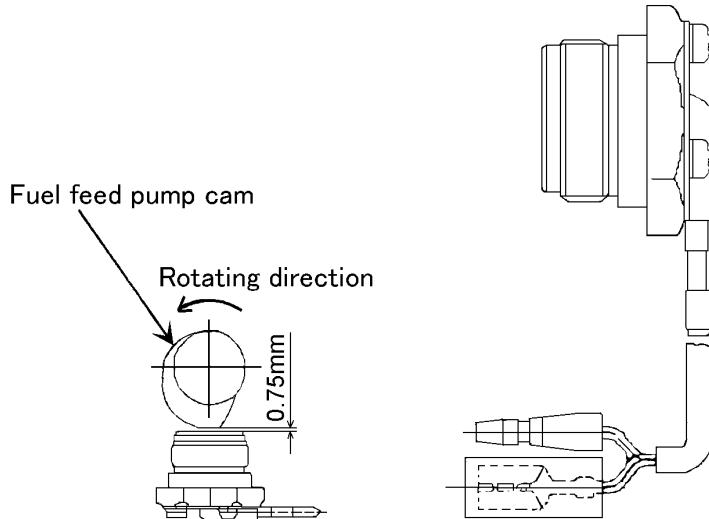
3.12 Tachosensor

PDS265S(SC)[SD]-4B1/5B1

(1) Checking whether voltage generated between terminals is proper or not

During operation at the rated conditions	With the clearance of 0.75mm between the feed pump cam and the extreme end of tachosensor, it is proper if the voltage generated between tachosensor terminals is more than 1.4V.
--	---

To measure the voltage generated between tach sensor terminals, measure it using ACV range of digital tester.

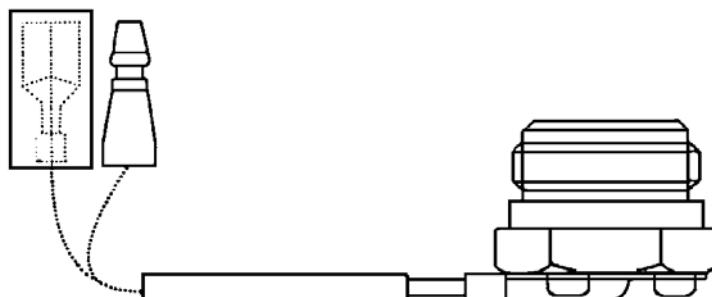


(2) Installation

Screw in the tachosensor to the indicated position under the feed pump and tighten it according the specified tightening torque. Consequently, the clearance of 0.75mm between the extreme end of the tachosensor and feed pump cam is secured.

: 53.9~73.5N·m (5.5~7.5kgf·m)

PDS390S(SC)[SD]-4B1/5B1



Generating voltage between terminals

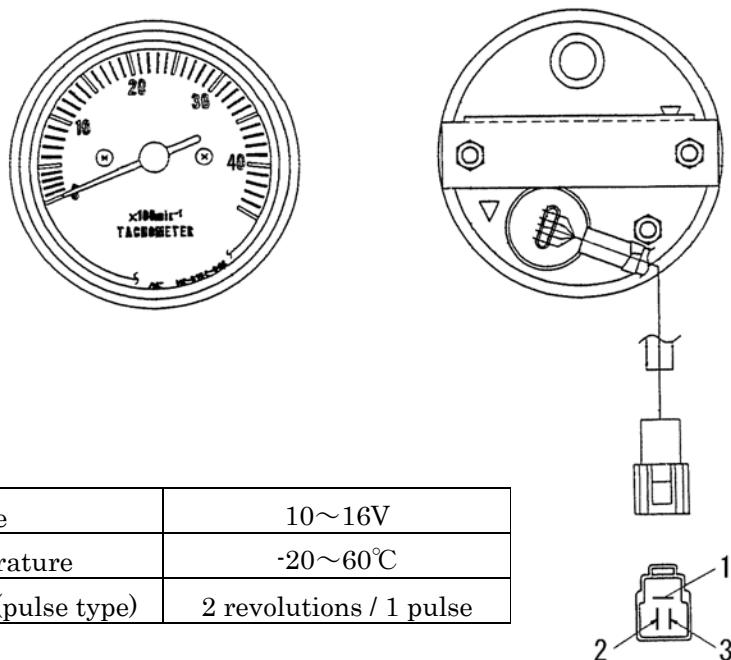
Full load operation	Remark
Above 0.6V	Digital tester ACV range

(The above-mentioned values are generally inclined ones, so they vary upon change of RPM.)

3. Electric System

3.13 Tachometer

PDS265S(SC)[SD]-4B1/5B1 (Option)



(1) Specifications

Operation voltage	10~16V
Operation temperature	-20~60°C
Revolution ratio (pulse type)	2 revolutions / 1 pulse

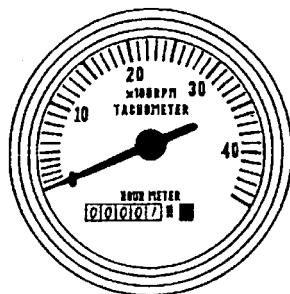


(2) List of functions

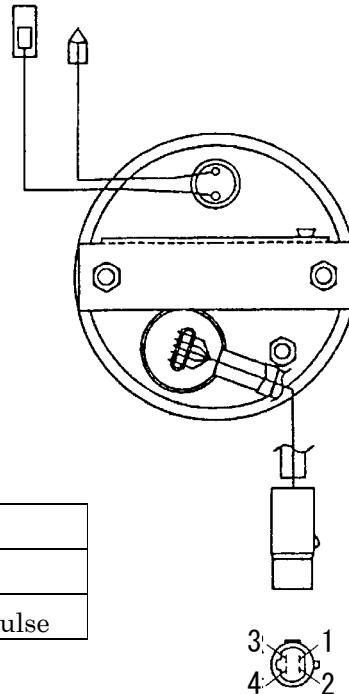
Pin No.	Line color	Connection	Remark
1	R/W	Starter switch ACC terminal	Power supply.
2	Y/G	Tachosensor+terminal	Detection of engine revolutions.
3	B	Earth	

3. Electric System

PDS390S(SC)[SD]-4B1/5B1



(with hourmeter)



(1) Specifications

Operation voltage	20~30V
Operation temperature	-20~60°C
Revolution ratio (pulse type)	2 revolutions / 1 pulse

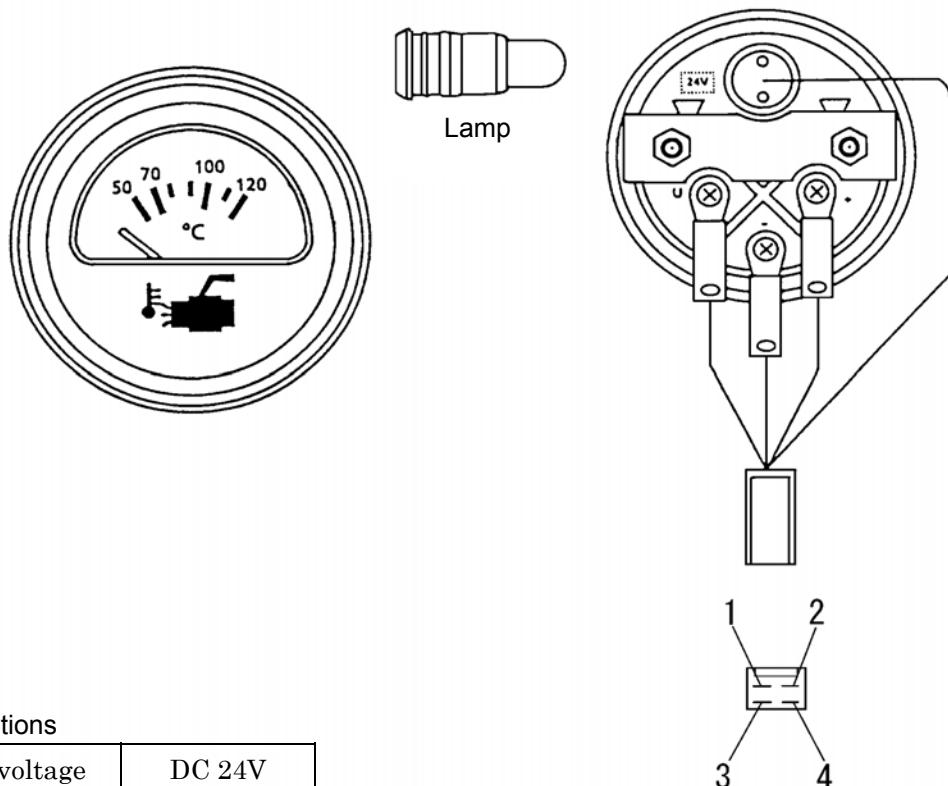
(2) List of functions

Pin No.	Line color	Connection	Remark
1	Y/L	Tachosensor+terminal	Detection of engine revolutions.
2	R/W	Starter switch ACC terminal	Power supply.
3	W/G	Alternator R terminal	Input of hour meter function signal
4	B	Earth	
Terminal, Male	R/G	Light switch	Power supply for lighting
Terminal, Female	B	Earth	For lighting

3. Electric System

3.14 Discharge air temperature gauge

PDS390S(SC)[SD]-4B1/5B1



(1) Specifications

Operation voltage	DC 24V
Lamp output	3W

(2) List of functions

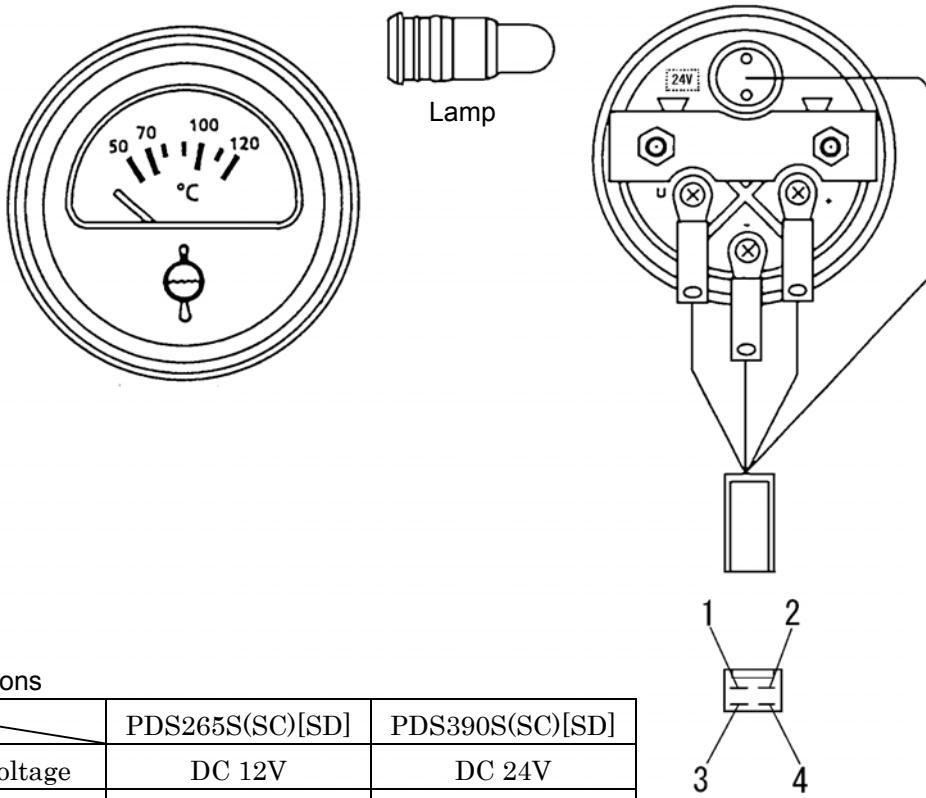
Pin No.	Line color	Connection	Remark
1	R/W	Starter switch ACC terminal	Power source for discharge air temperature gauge.
2	G/L	Discharge air temperature sensor	For detection of delivery air temperature.
3	R/G	Light switch	Power supply for lighting
4	B	Earth	

3. Electric System

3.15 Coolant temperature gauge

PDS265S(SC)[SD]-4B1/5B1 (Option)

PDS390S(SC)[SD]-4B1/5B1



(1) Specifications

	PDS265S(SC)[SD]	PDS390S(SC)[SD]
Operation voltage	DC 12V	DC 24V
Lamp output	—	3W

(2) List of functions

Pin No.	PDS265S(SC) [SD] color	PDS390S(SC) [SD] color	Connection	Remark
1	R/W	R/W	Starter switch ACC terminal	Power source for water temperature gauge.
2	Y/B	G/Y	Water temperature sensor	For detection of delivery water temperature.
3	—	R/G	Light switch	Power supply for lighting
4	B	B	Earth	

(3) Temperature range and resistance value of sensor

Temperature range	Sensor resistance value
50°C~70°C	350Ω~170Ω
70°C~100°C	170Ω~63.5Ω
100°C~120°C	63.5Ω~36.2Ω

3. Electric System

3.16 Sending unit

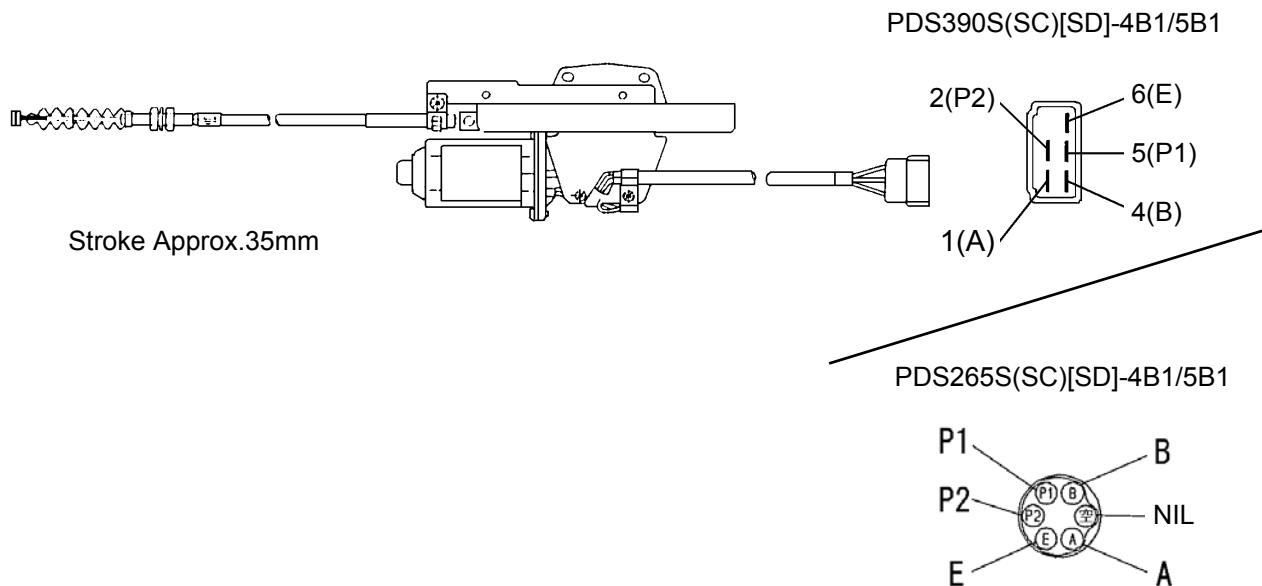
Pointer position	PDS265S(SC)[SD]-4B1/5B1	PDS390S(SC)[SD]-4B1/5B1	Resistance (Ω)
	Remaining fuel (L)	Remaining fuel (L)	
E	13	23	110 ± 7
1/2	54	84	32.5 ± 4
F	102	156	3 ± 2

3.17 Electromagnetic pump

	PDS265S(SC)[SD]-4B1/5B1	PDS390S(SC)[SD]-4B1/5B1
Rated voltage	12V	24V
Operating current	1.5A(MAX)	1.5A(MAX)
Delivery capacity	0.4L/min(MIN)	1.4L/min (MIN)

3. Electric System

3.18 Motor stopper relay



List of functions

Pin No.	PDS265S(SC) [SD] color	PDS390S(SC) [SD] color	Connection
1(A)	Y	L	Motor stopper relay No.3 terminal (COM)
2(P2)	L	W	Motor stopper relay No.5 terminal (NO)
3	—	—	NIL
4(B)	R/G	R	20A Fuse < 10A Fuse > (Power supply.)
5(P1)	G	G	Motor stopper relay No.6 terminal (NC)
6(E)	B	B	Earth

< > shows the connection point of PDS390S(SC)[SD]-4B1/5B1.

3. Electric System

Function of motor stopper

1. Before engine starts

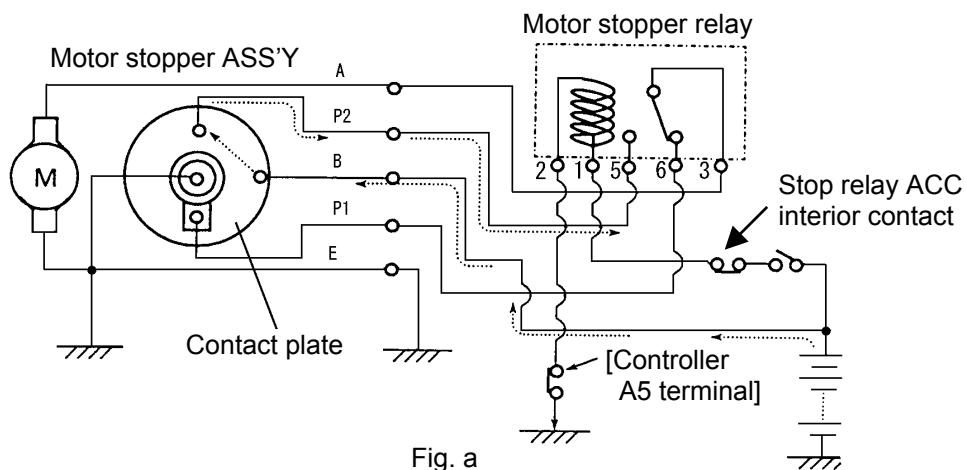


Fig. a

- ① As the ACC contact is open before starting engine, the exciting current is not provided, but internal contact is as shown in fig a.
- ② When the contact plate inside the motor stopper assembly is positioned as shown in fig a, there is a conduction between B terminal P2 terminal. Accordingly, the voltage of the battery is applied to No.5 terminal of motor stopper relay.

2. Engine starts

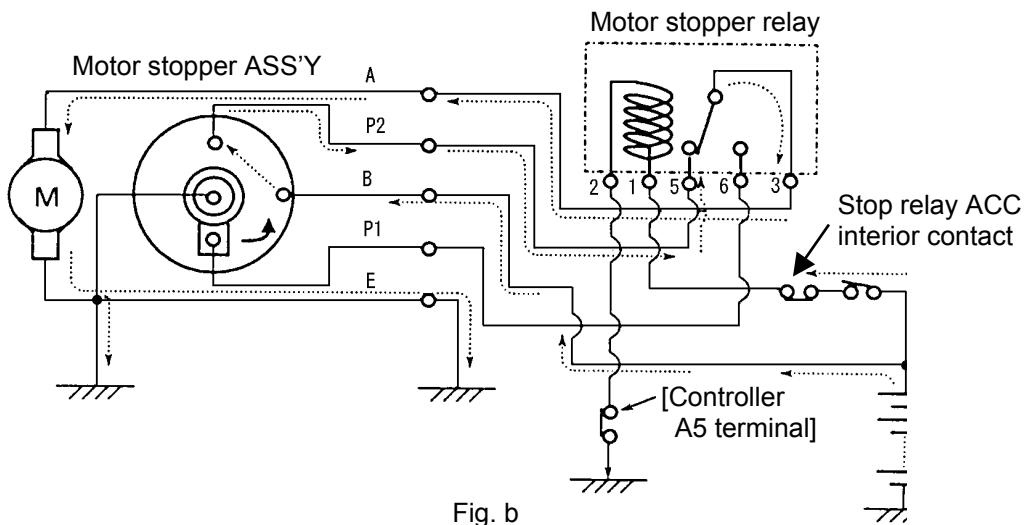


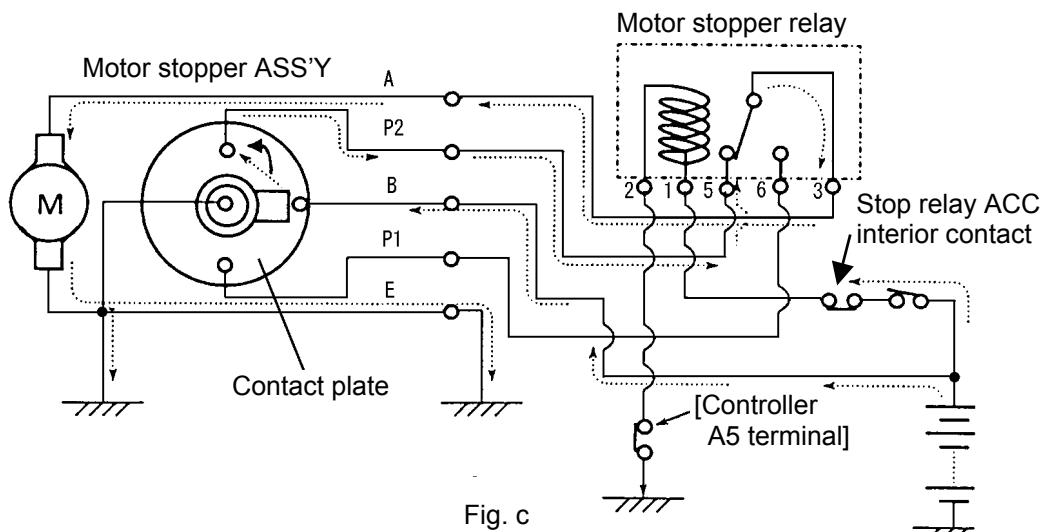
Fig. b

- ① When closing the ACC contact by handling the starter switch ("Operation" position), the circuit of stop relay inside contact → motor stopper relay No.1 terminal → exciting coil → motor stopper relay No.2 terminal [→controller A5 terminal→controller inside contact] → grounding is formed and the motor stopper relay is excited. Accordingly, motor stopper relay contact functions.
- ② As the voltage of battery is already applied to the motor stopper relay No.5 terminal, the circuit of motor stopper relay No.5 terminal → motor stopper relay No.3 terminal→ motor stopper seembly A terminal → motor → grounding is formed and the motor starts.

Electric appliances in [] are fitted on PDS390S(SC)[SD]-4B1/5B1 only.

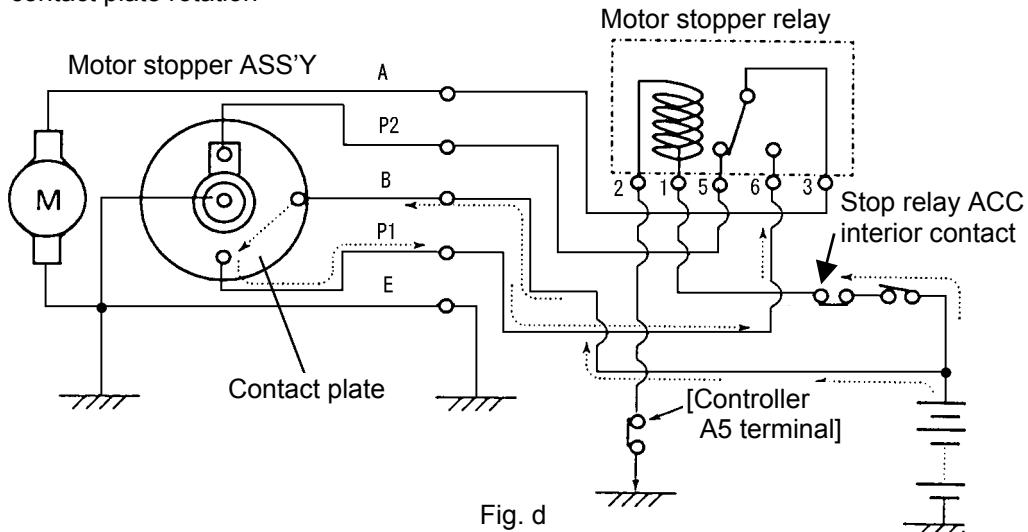
3. Electric System

3. Rotation of contact plate



- ① When motor begins to rotate, the worm fitted to the motor shaft rotates and at the same time worm wheel rotates.
- ② The worm wheel and contact plate are interconnected and so it continues to rotate as shown in Fig c.

4. Stop of contact plate rotation



- ① When the contact plate turns 180° degree from the state at which it stays, the electrical conduction disappears between B and P2 terminal as shown in Fig. d, P2 terminal is connected to the grounding side. Further, it follows that the armature of the motor gets short-circuited and so it is electrically braked so that the contact plate stops surely at the constant position.
- ② At the same time worm rotation is reduced by worm wheel, and further the rotation will be changed for reciprocal movement via the lever. The stroke extends the wire to move the fuel lever fitted at the injection pump to open the fuel circuit.
- ③ When the contact plate stays at the position shown in Fig d, the conduction appears between B and P1 terminal and so the voltage of battery is applied to motor stopper relay No.6 terminal.

Electric appliances in [] are fitted on PDS390S(SC)[SD]-4B1/5B1 only.

3. Electric System

5. Engine stops (normal stop)

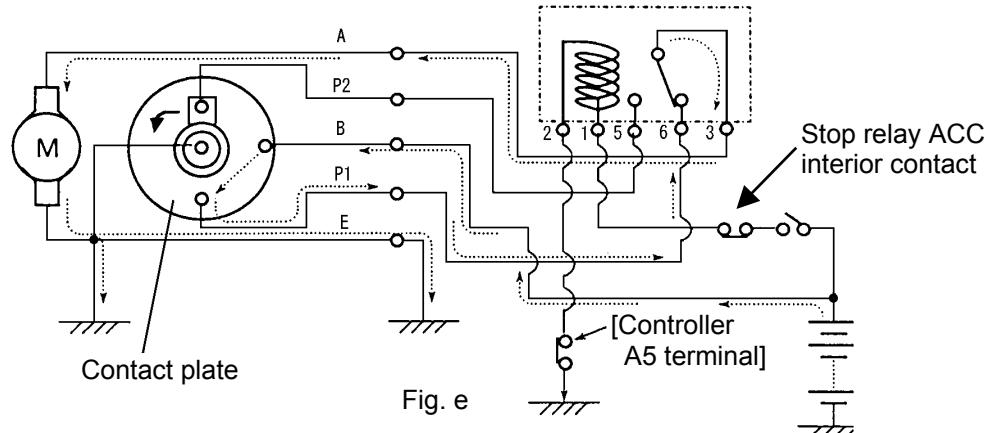


Fig. e

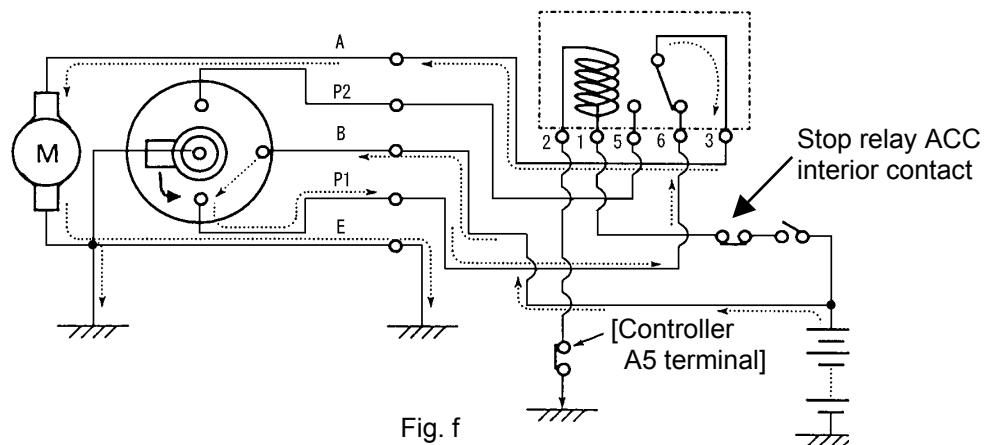


Fig. f

- ① To stop engine, handle starter switch to open ACC contact (“Stop” position) so that excitation circuit of motor stopper relay may be released to move the contact point as shown in Fig e.
- ② As the voltage of battery is already applied to motor stopper relay No.6 terminal, the circuit of motor stopper relay No.3 terminal → motor stopper assembly A terminal → motor → grounding is formed and so the motor turns and at the same time the contact plate also turns as shown in the Fig f.
- ③ The contact plate continues to turns from 180° position shown Fig e to the 360° position in Fig a via Fig f position. At the same time when the contact plate rotates the wire is pulled to close fuel line circuit by the fuel line connected to injection pump to close the fuel circuit to stop engine.
- ④ Motor and contact plate stop to rotate at specified position in Fig a, and return to the position in the clause “1. Before engine starts”.

6. Emergency stop

- ① When any abnormality takes place in engine oil pressure, cooling water temperature, and discharge air temperature, emergency stop circuit of controller functions (**stop relay (a) switch opens**) [**contact between controller A5 terminal and grounding connector opens**], excitation circuit of motor stopper relay is released. The process of engine stop is the same as described in “Engine stops (normal stop) and the following description.
- ② When engine speed drops abnormally, [**and when stop button is pushed on**], stop relay functions to open motor stopper relay excitation circuit. The process of engine stop is the same as described in “Engine stops (normal stop) and the following description.

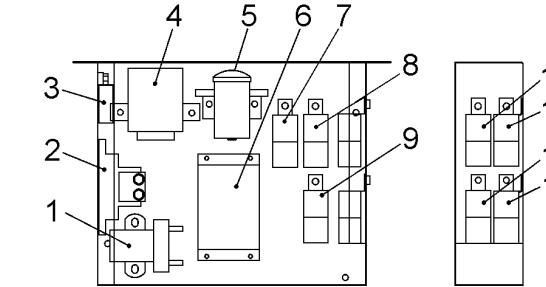
Electric appliances in () are fitted on PDS265S(SC)[SD]-4B1/5B1 only.

Electric appliances in [] are fitted on PDS390S(SC)[SD]-4B1/5B1 only.

3. Electric System

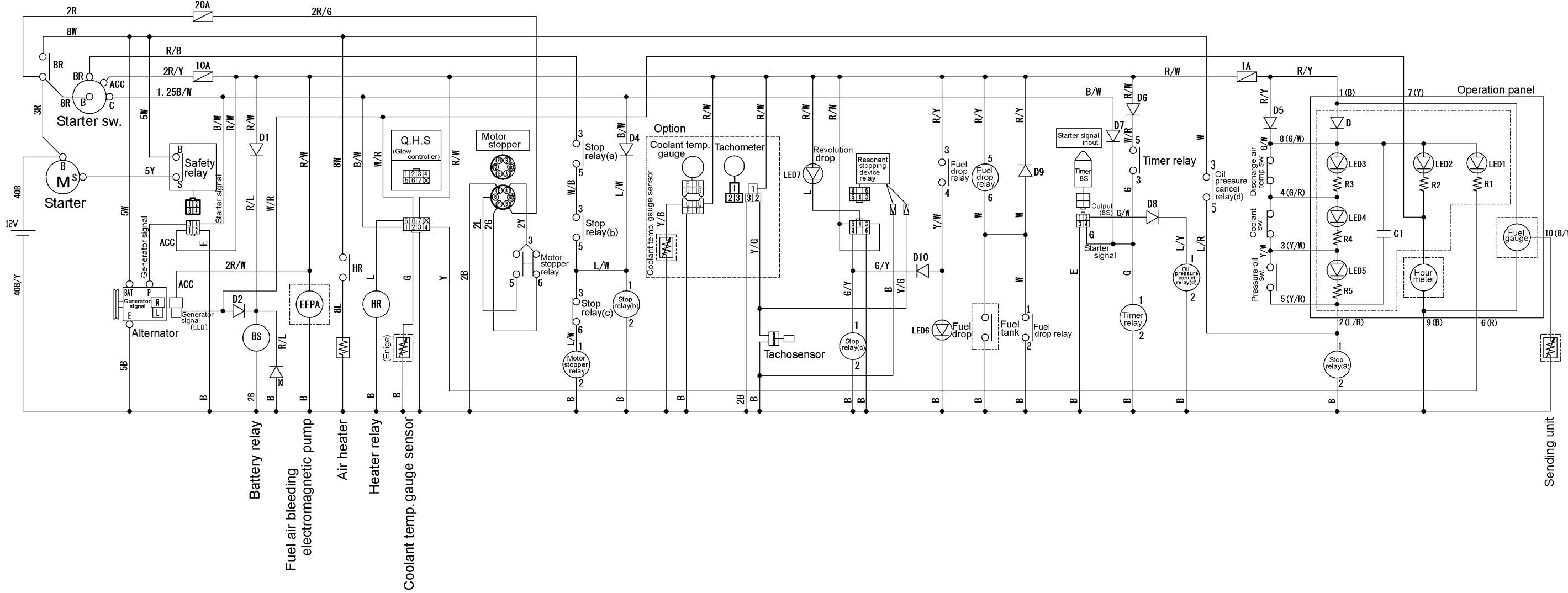
3.19 Wiring Diagram

PDS265S(SC)[SD]-4B1/5B1



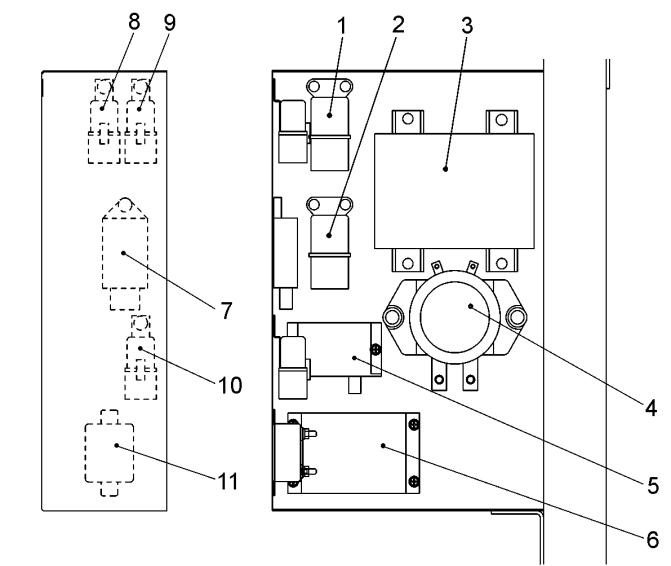
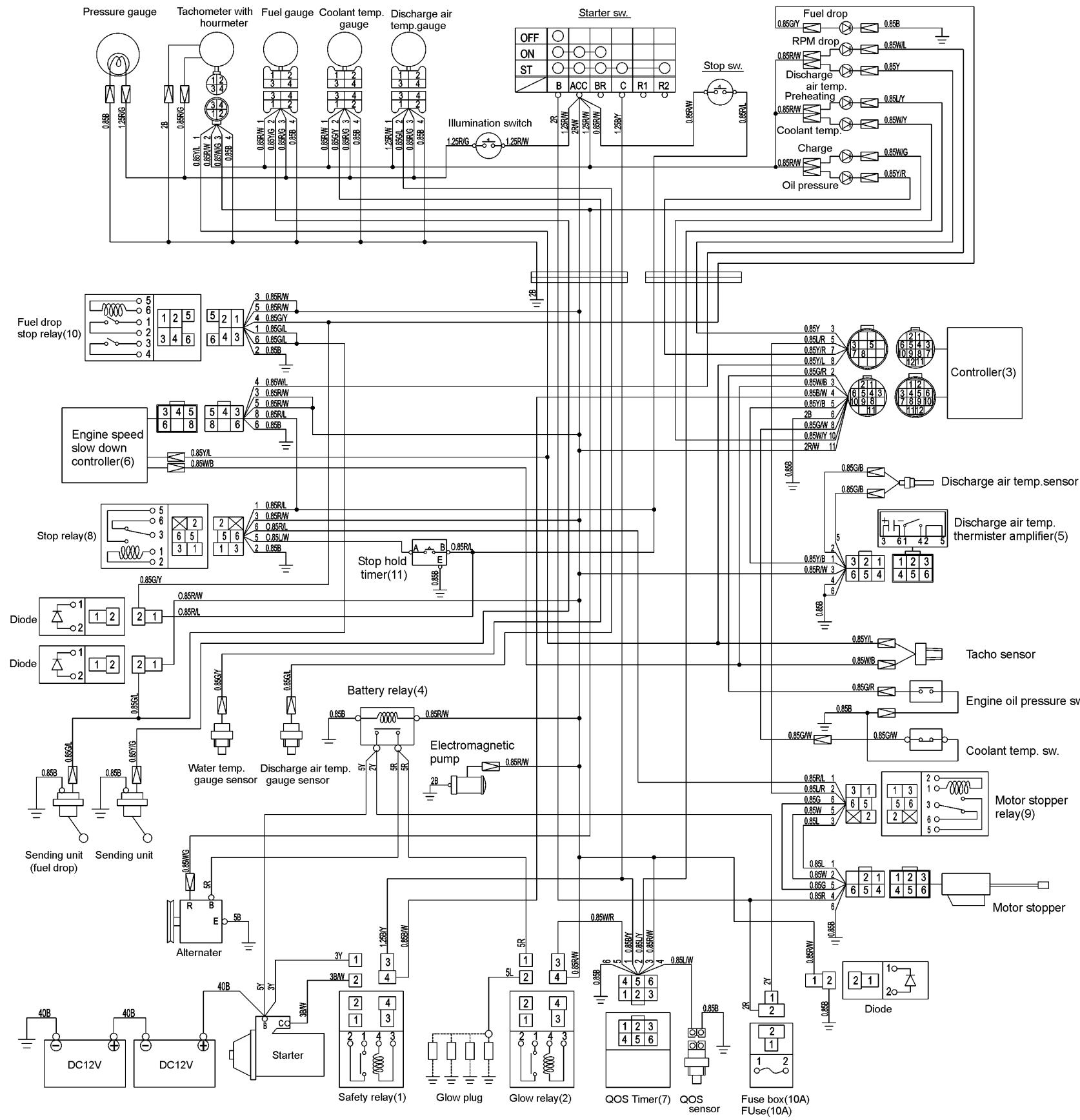
LED1	Preheating lamp
LED2	Warning lamp for charging
LED3	Emergency lamp for discharge air temperature rise
LED4	Emergency lamp for coolant temperature rise
LED5	Emergency lamp for engine oil pressure drop
LED6	Emergency lamp for residual fuel oil level
LED7	Emergency lamp for engine speed down

Mounting position of the bracket on switch panel



3. Electric System

PDS390S(SC)[SD]-4B1/5B1



4. References

4.1 Fuel consumption

Item	PDS265S(SC)[SD]-4B1/5B1	PDS390S(SC)[SD]-4B1/5B1
No load (L/h)	5.0	7.5
50% load (L/h)	9.5	12
70% load (L/h)	11.0	15
Full load (L/h)	15.3	22

4.2 Noise level

(Setting standard : Rated RPM rated load)

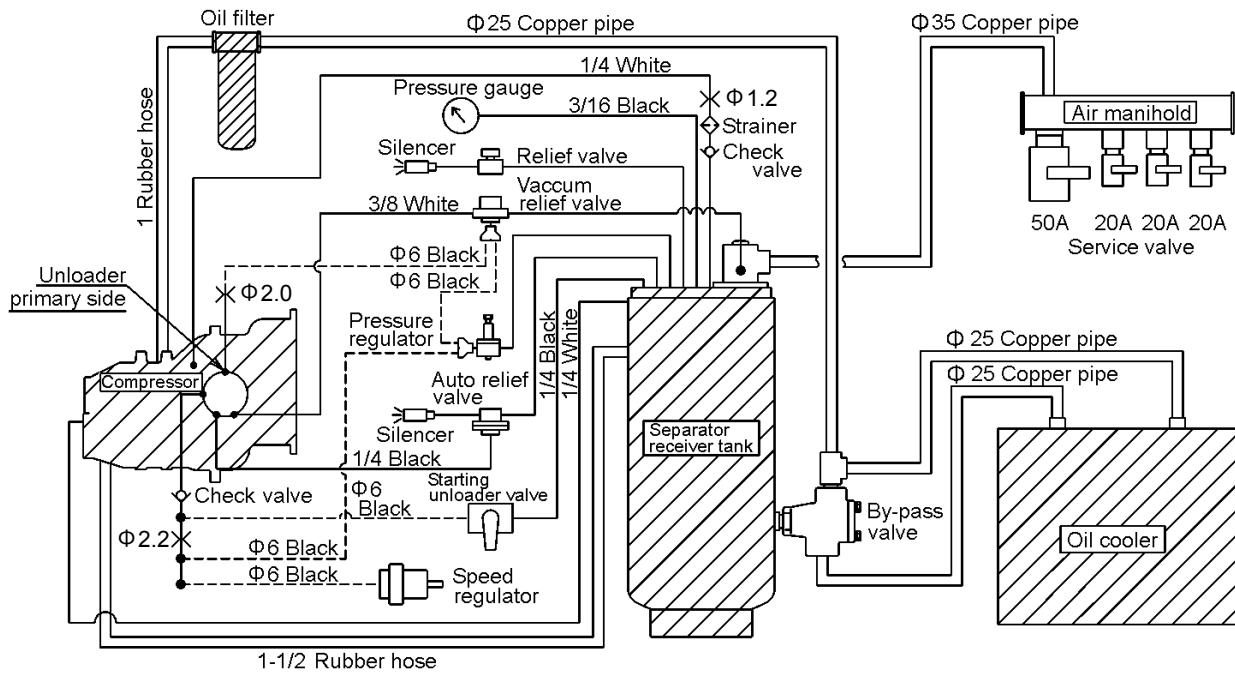
Item	PDS265S(SC)[SD]-4B1/5B1	PDS390S(SC)[SD]-4B1/5B1
Low noise level required	SUPER SILENT	SUPER SILENT
Sound power level in decibels (dB)	98	98
Sound pressure level (distance at 7 m in 4 directions)	69	69

Sound pressure level (at average distance of 7m) is calculated and converted based on acoustic power level.

4. References

4.3 Piping Diagram

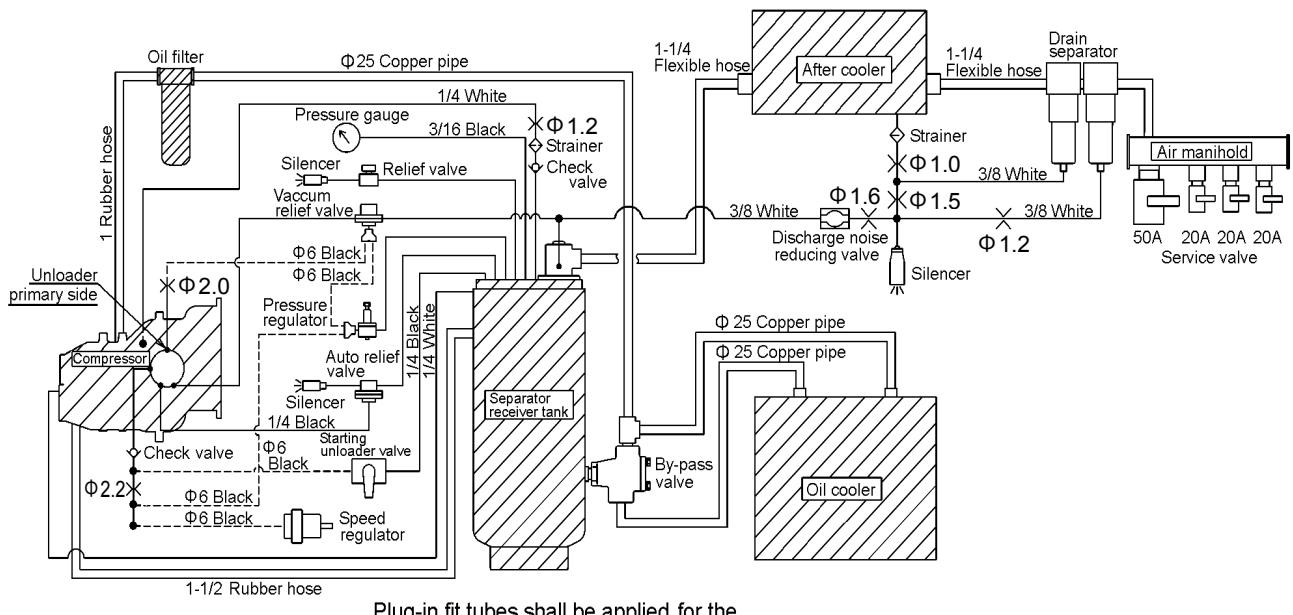
PDS265S-4B1/5B1



Plug-in fit tubes shall be applied for the piping line with dotted line -----.

A040294E

PDS265SC-4B1/5B1

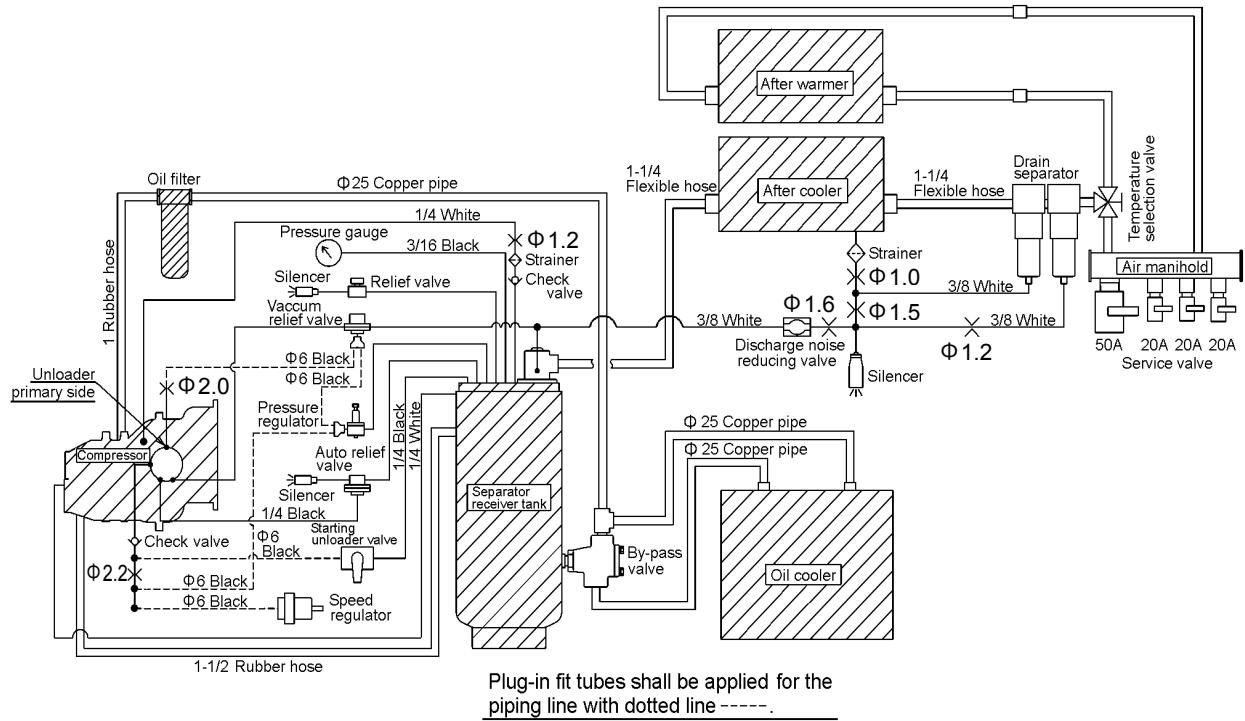


Plug-in fit tubes shall be applied for the piping line with dotted line -----.

A040295E

4. References

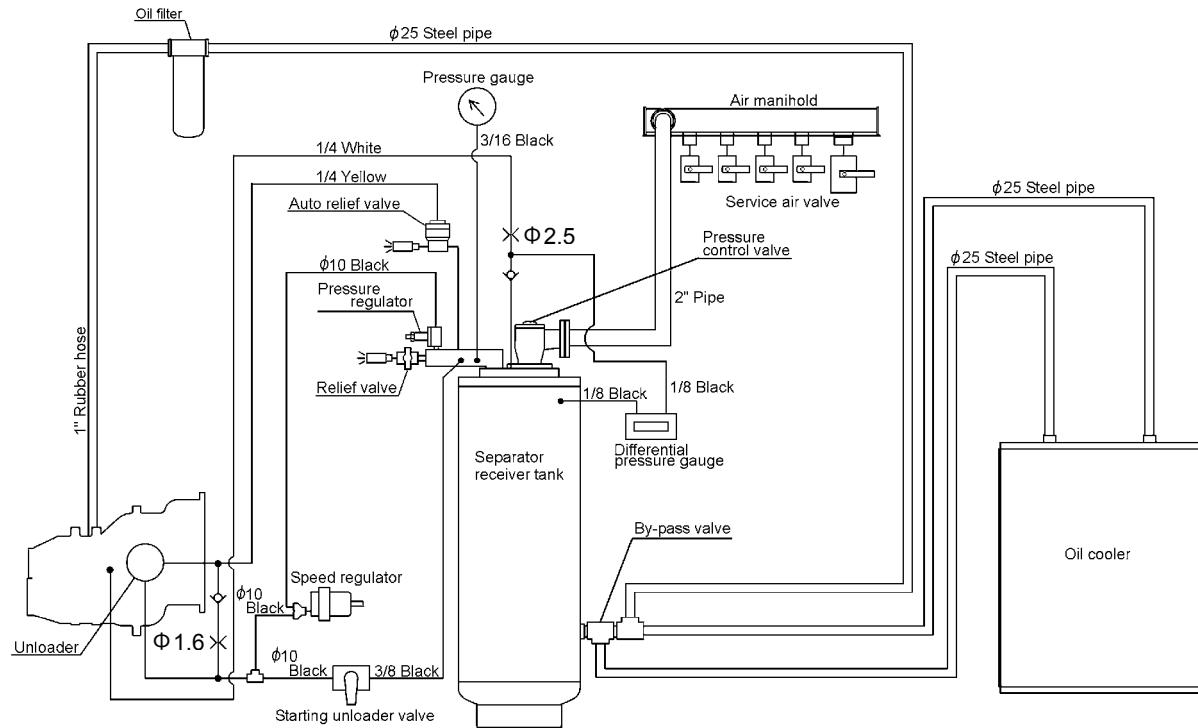
PDS265SD-4B1/5B1



A040296E

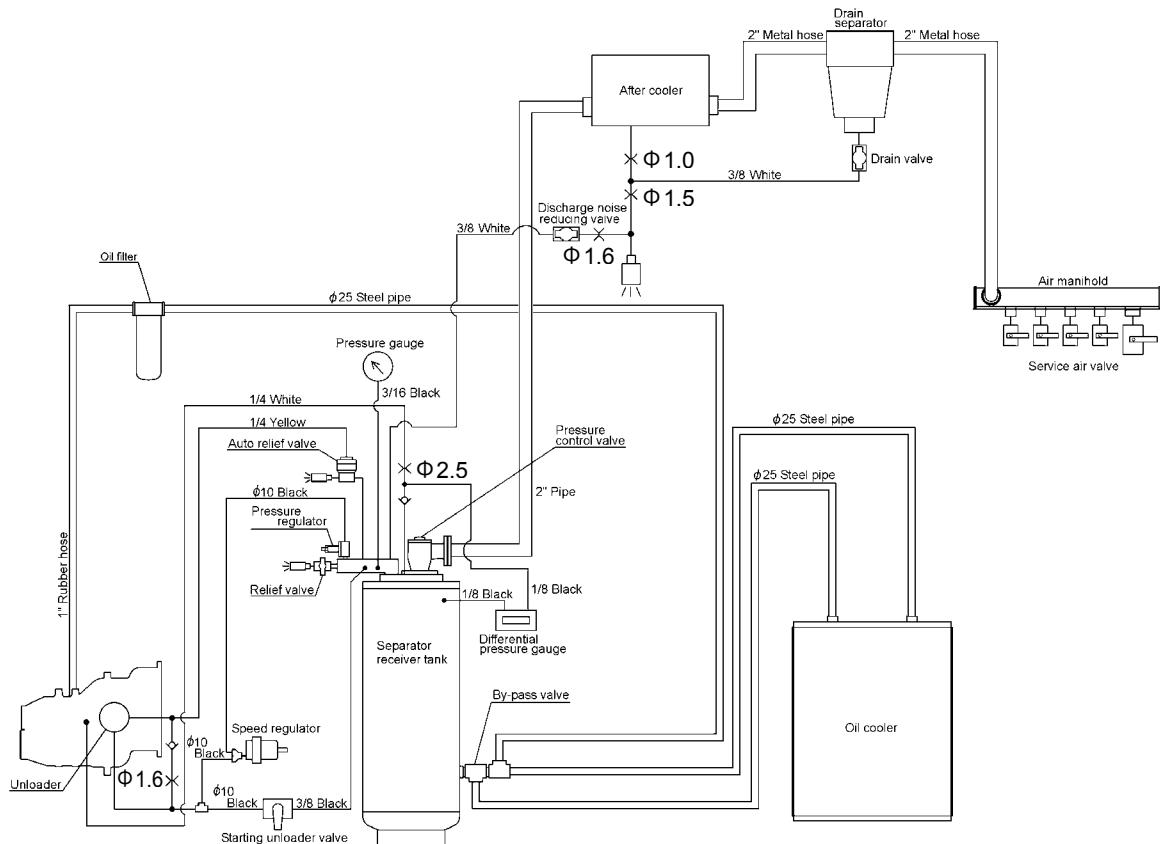
4. References

PDS390S-4B1/5B1



A050527E

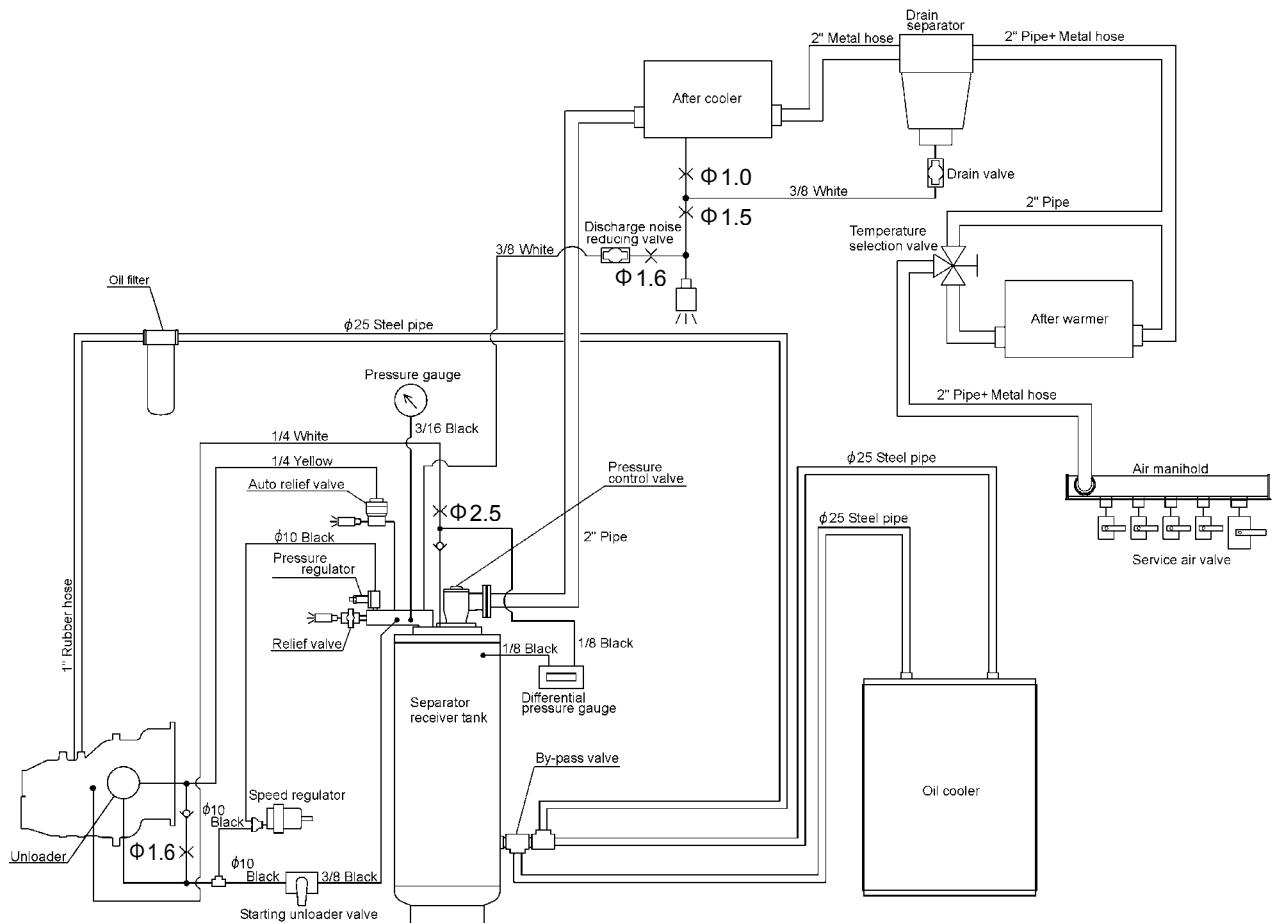
PDS390SC-4B1/5B1



A050528E

4. References

PDS390SD-4B1/5B1



A050529E

This text book contains the most recent information available at the time of printing, and the contents of the list are based on information in effect at that time and are subject to change without notice.

HOKUETSU INDUSTRIES CO., LTD.

8TH FLOOR SHINJUKU SAN-EI BLDG,
22-2 NISHI-SHINJUKU 1-CHOME, SHINJUKU-KU
TOKYO 160-0023 JAPAN
TEL:81-3-3348-7281
FAX:81-3-3348-7289
URL:<http://www.airman.co.jp>



Trademark of American Soybean Association

AIRMAN
HOKUETSU INDUSTRIES CO., LTD.