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**SERVICE MANUAL**

**SCREW COMPRESSOR**

**PDS130S-5C3**



**FAC-37B (YANMAR)**

**PDS130SC-5C3**



**FAC-37BC (YANMAR)**

**PDS175S-5C3**



**FAC-52B (YANMAR)**

**PDS175SC-5C3**



**FAC-52BC (YANMAR)**

# Preface

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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 Catalog” 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 Catalog” 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.

Regarding the part numbers mentioned in this manual, we request you to refer to the Parts catalog separately supplied together with the unit, because the parts numbers in this manual are sometimes changed.

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.

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# 1. Specification

## 1.1 Specifications

Item	unit	PDS130S[SC]-5C3	PDS175S[SC]-5C3
<b>●Weight · Mass</b>			
Overall length	mm	1,700	1,970
Overall length (Bonnet only)	mm	1,580	1,850
Overall width	mm	890	950
Overall height	mm	1,080	←
Net dry mass	kg	640[650]	740[750]
Operating mass	kg	720[730]	840[850]
<b>●Compressor air-end</b>			
Free air delivery	m <sup>3</sup> /min	3.7	5.0
Working pressure	MPa	0.69	←
Pressure of pressure control valve	MPa	0.4	←
Burst pressure of safety valve	MPa	1.0	←
Ambient conditions: temperature	°C	-15 to +40	←
Ambient conditions: altitude	m	less than 1,500	←
<b>●Engine</b>			
Type		YANMAR 3TNV88-BDHK	YANMAR 4TNV88-BDHKS
Rated output	kW/min <sup>-1</sup>	26.9/3,000	34.9/3,000
Fuel consumption	g/kW·h	268	258
Rated RPM	min <sup>-1</sup>	3,000	←
RPM at unload conditions	min <sup>-1</sup>	1,500	1,300
Net dry mass	kg	148	164
<b>●Lubricating oils</b>			
Engine oil capacity (H/L level)	L	6.7/2.8	7.4/4.0
Compressor oil capacity (including receiver tank and oil cooler etc.)	L	15.0	←
Compressor oil capacity to be filled		Ambient temperature -15°C to 40°C : MOBIL: RARUS 424 SHELL: CORENA OIL RS32 CALTEX: COMPRESSOR OIL RA32	
Coolant capacity	L	4.5	5.8
Fuel tank capacity	L	70.0	90.0
<b>●Fuel consumption ratio (for reference only)</b>			
At no load	L/Hr	2.7	←
At 50% full load	L/Hr	4.1	5.0
At 70% full load	L/Hr	5.0	6.3
At full load	L/Hr	7.3	9.5

# 1. Specification

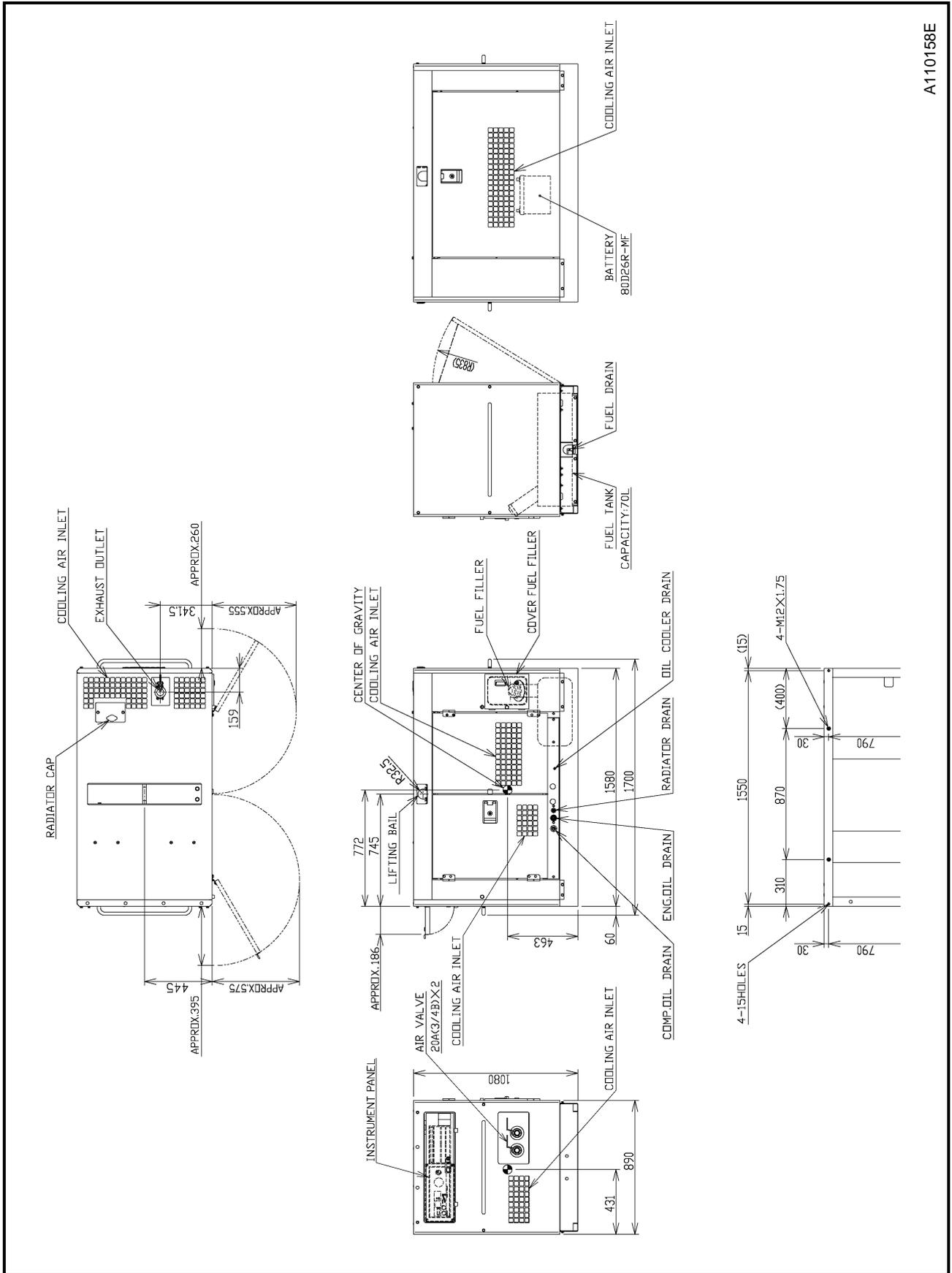
## 1.2 Set Value

Item	unit	PDS130S[SC]-5C3	PDS175S[SC]-5C3
<b>●Emergency stop devices</b>			
Actuating pressure of discharge air temperature switch	°C	120	
Actuating temperature of water temperature switch	°C	110	
Actuating pressure of oil pressure switch	MPa	0.05	
Discharge air temperature sensor disconnection		When it detects disconnection, it stops sensing and it makes the unit stop.	
Coolant temperature sensor disconnection		When it detects disconnection, it stops sensing and it makes the unit stop.	
<b>●Warning devices</b>			
Actuating pressure of discharge air temperature switch	°C	115	
Actuating temperature of water temperature switch	°C	105	
Battery failure		When not charged	
Actuating pressure of air filter indicator	kPa	6.2	
<b>●Set value</b>			
Pressure control valve	MPa	0.4	
Actuating pressure of safety valve	MPa	1.0	
Unload starting pressure	MPa	0.69	
<b>●Engine RPM</b>			
Rated RPM	min <sup>-1</sup>	3,000	
RPM at unload	min <sup>-1</sup>	1,500	1,300
<b>●Indications of gauges or instruments during operation</b>			
Discharge pressure gauge (at full load)	MPa	0.40 to 0.69	
Discharge pressure gauge (at no load)	MPa	0.72 to 0.90	

# 1. Specification

## 1.3 Outline Drawing

(1)PDS130S[SC]-5C3

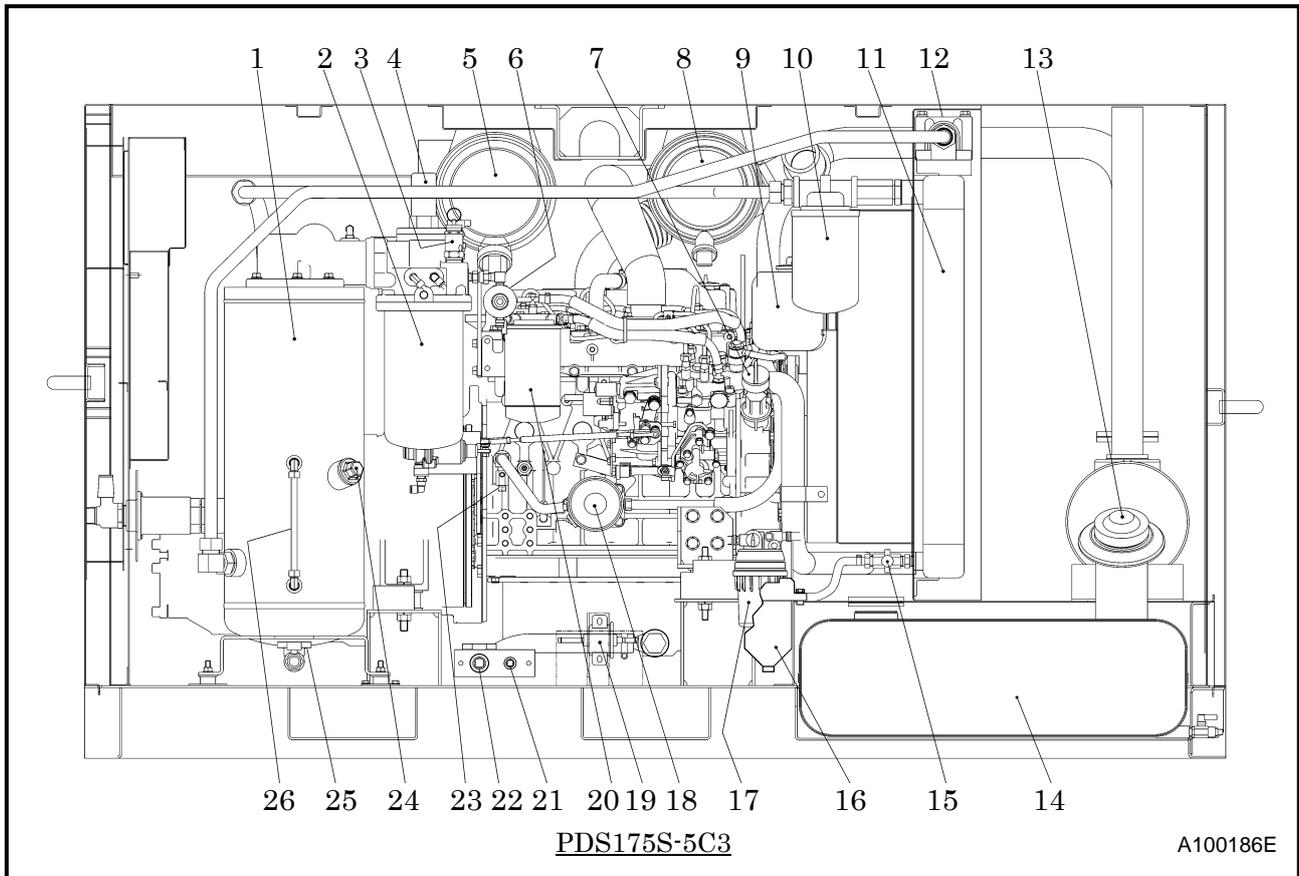


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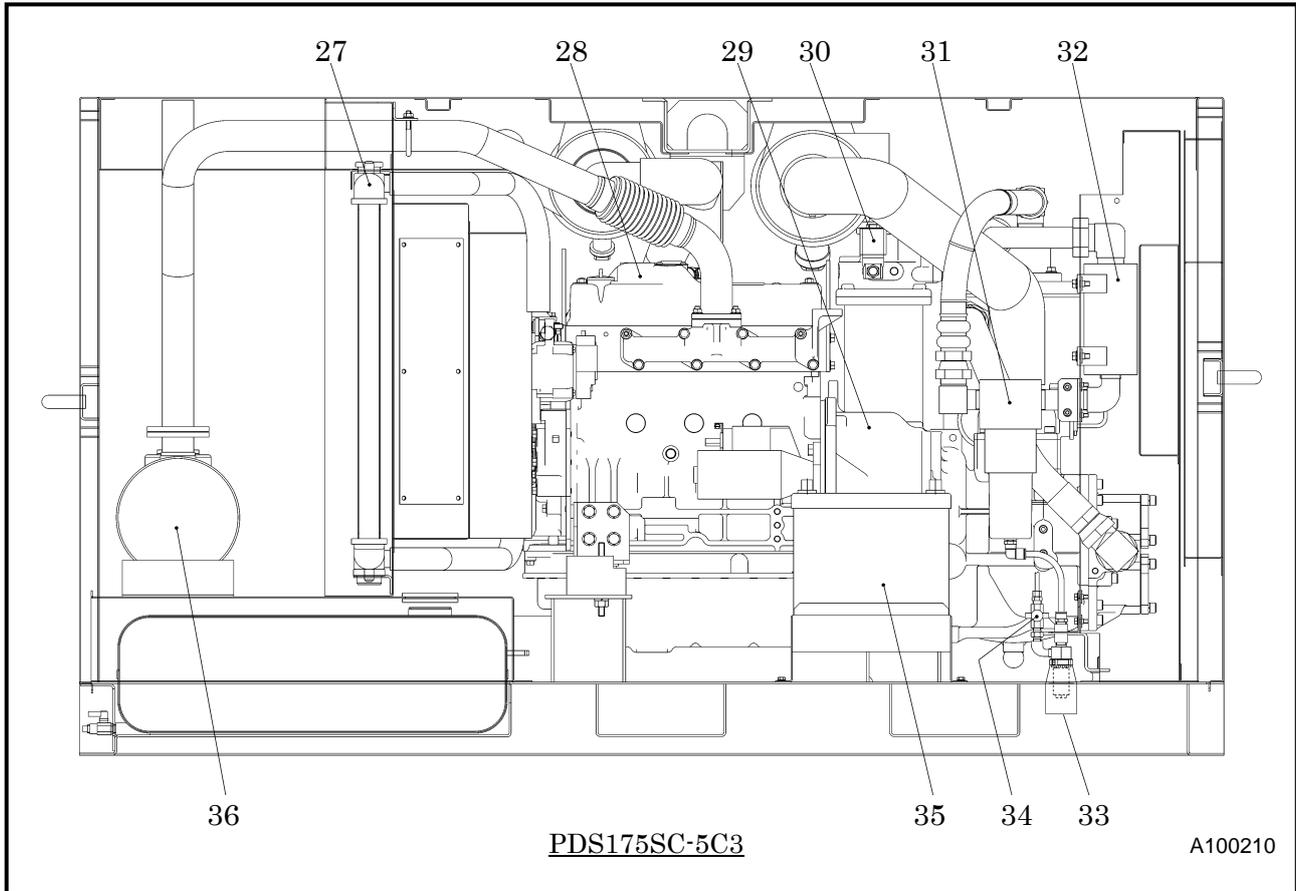
# 1. Specification

## 1.4 Internal Components and Part Names



No.	Description	Function
1	Separator receiver tank	For separating compressor oil from compressed air sent into the tank.
2	Oil separator	For separating oil mist mixed in compressed air.
3	Safety valve	For releasing compressed air to the atmosphere when the pressure rises higher than the rated pressure.
4	Pressure control valve	For keeping the receiver tank pressure higher than 0.4MPa in the tank.
5	Air filter (For compressor)	For filtering the dust floating in the intake air.
6	Pressure regulator	For adjusting intake air volume (into compressor air-end)
7	Engine oil filler port	For supplying and replenishing engine oil to engine.
8	Air filter (For engine)	For filtering the dust floating in the intake air.
9	Reserve tank	For checking engine cooling water level and for replenishing cooling water.
10	Compressor oil filter	For filtering compressor oil circulating in the system.
11	Oil cooler	For cooling compressor oil circulating in the system.
12	By-pass valve	For keeping compressor oil at optimum temperature.
13	Fuel tank filler port	For supplying and replenishing fuel.
14	Fuel tank	For storing diesel fuel oil.
15	Oil cooler drain valve	For draining condensate accumulated at the bottom of oil cooler.
16	Fuel pre filter	For filtering dust and foreign things mixed in fuel oil and also for separating water.
17	Sedimenter	For separating water mixed or to-be mixed in the fuel oil.
18	Engine oil filter	For filtering engine oil.
19	Fuel air-bleeding electromagnetic pump	For automatically bleeding air from fuel pipes.

# 1. Specification



No.	Description	Function
20	Fuel filter	For filtering dust and foreign matter mixed or to be mixed in the fuel oil.
21	Radiator drain plug	For draining condensate accumulated at the bottom of radiator.
22	Engine oil drain plug	For draining engine oil for replacement of it and for maintenance
23	Coolant drain valve	For draining condensate from engine.
24	Compressor oil filler port	For supplying and replenishing compressor oil.
25	Separator receiver tank drain valve	For draining condensate accumulated at the bottom of compressor oil.
26	Compressor oil level gauge	For checking compressor oil level.
27	Radiator	For cooling the coolant for engine because it is water-cooled.
28	Engine	For driving the compressor.
29	Air-end	For compressing intake air.
30	Solenoid valve for starting unloader (SV)	For controlling operation upon starting.
31	Drain separator	For separating water from compressed air cooled through after cooler.
32	After cooler	For cooling compressed air.
33	Drain port of air pipe	For collecting condensate and draining it.
34	Drain warming valve	For preventing freezing of water separated through drain separator when exhausting it.
35	Battery	For electrically starting engine.
36	Exhaust muffler	Equipment which muffles an engine exhaust sound.

Those parts No.31, 32, 33 and 34 are additionally used for after-cooler type units.



# 1. Specification

## 1.5.1 Indicator lamp

**[Indicator lamp]** Turn the starter switch to “RUN” position. Then the lamp goes on.

Item	Contents	Measures	Monitor
GLOW	Press starter switch “GLOW” and the lamp goes on and after preheating is finished, the lamp will be off.	—	
CHARGE	Lamp goes on when alternator is not charging.	Check wiring. Check alternator.	

**[Warning Display]** Whenever a little disorder or trouble occurs during operation, the operation continues. When the warning lamp flickers, take appropriate measures to recover the situation swiftly.

Item	Failure code	Contents	Measures
DISCHARGE TEMP.H	A1	Lamp flickers when the air temperature at the outlet of the air-end reaches 115°C.	See “Troubleshooting”
WATER TEMP.H	A2	Lamp flickers when coolant temperature reaches 105°C.	
COMP. AIR FILTER	A3	Lamp flickers when air filter gets clogged and suction resistance increases. [Actuating resistance is more than 6.2kPa.]	Clean Replace
ENG. AIR FILTER	A4		
CHARGE	A5	Belt loosened and/or cut Faulty generation of alternator	See “Troubleshooting”

**[Emergency Display]** When abnormality occurs during operation, it displays, lamp lights and the machine is brought to emergency stop. Be sure to follow the measures shown below before starting the unit again.

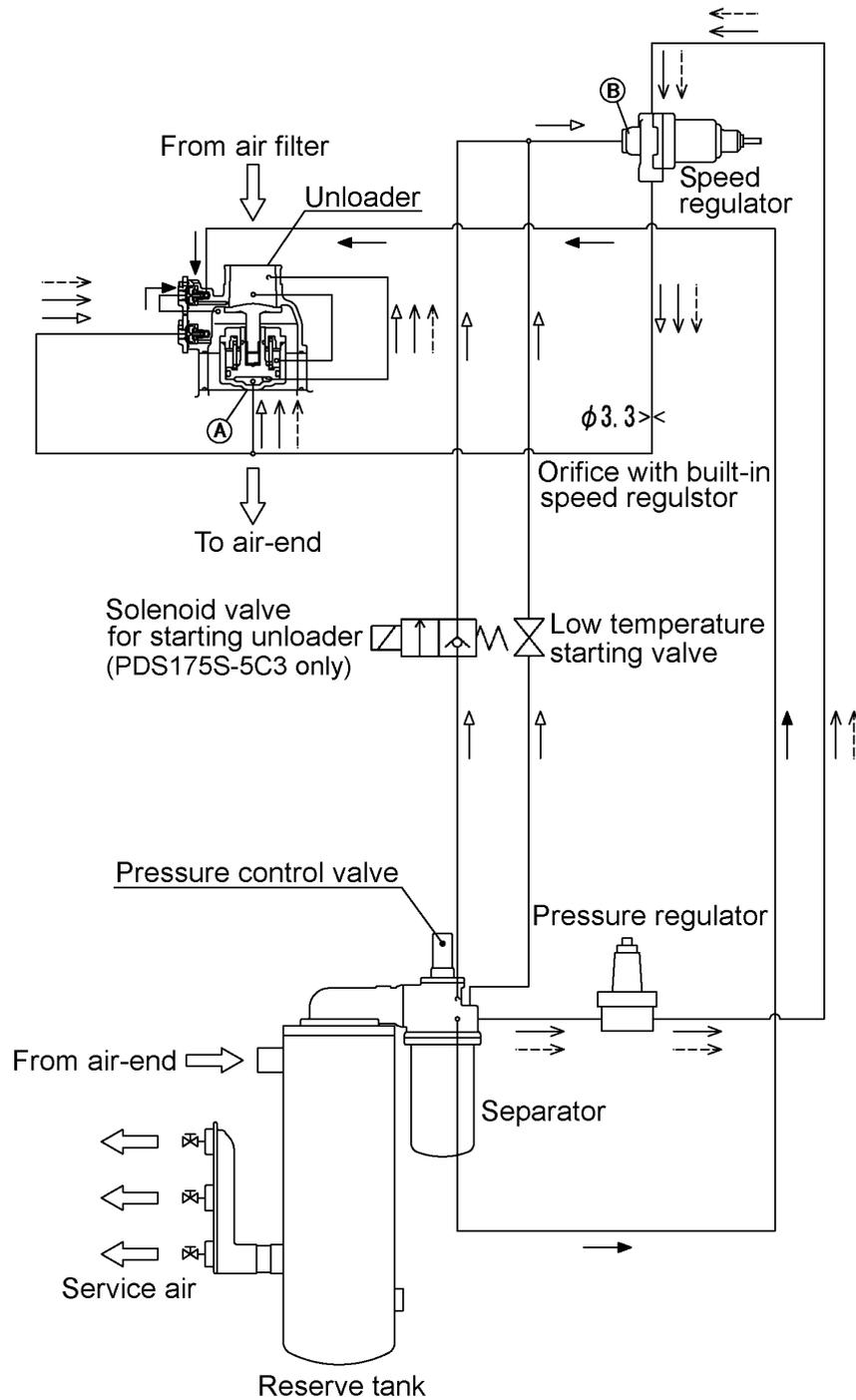
Item	Failure code	Contents	Measures
DISCHARGE TEMP. E	E1	Lamp displays when the air temperature at the outlet of the air-end reaches 120°C.	See “Troubleshooting”
WATER TEMP.E	E2	Lamp displays when coolant temperature reaches 110°C.	
ENG. OIL PRESS.	E3	Lamp goes on when engine oil pressure drops. [The function pressure is below 0.05MPa.]	
DISCHARGE TEMP.SENSOR	E6	It is displayed when air temperature sensor at the outlet port of compressor air end is disconnected.	
WATER TEMP.SENSOR	E7	It is displayed when engine coolant temperature sensor is disconnected.	

# 1. Specification

## 1.6 Capacity Control Device

[Standard type]

	Functions of solenoid valve	Air flow
Start	OPEN	→
Load operation	CLOSE	→
Unload operation	CLOSE	---→
Stop	CLOSE	→



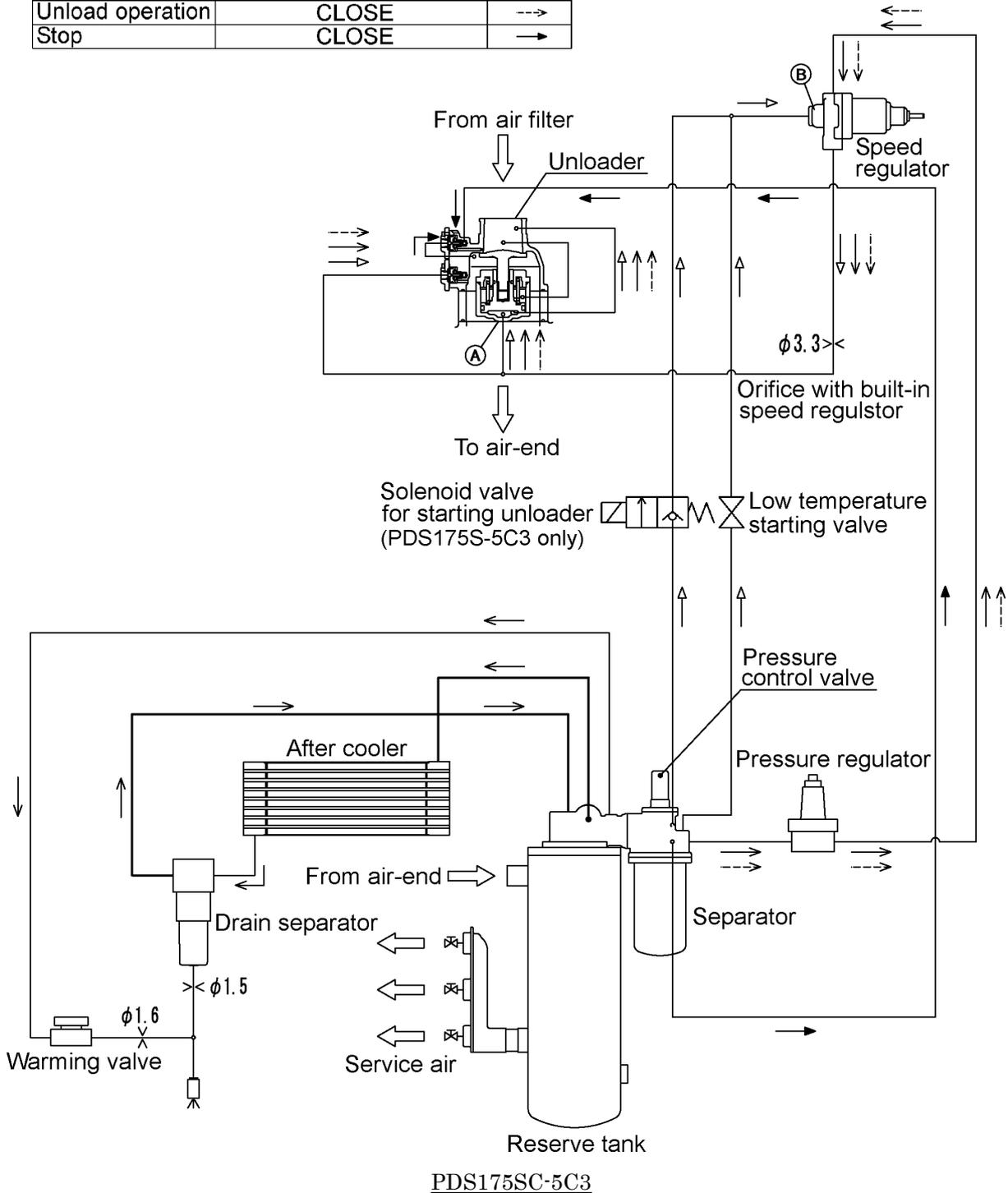
PDS175S-5C3

PC10020E

# 1. Specification

[After cooler type]

	Functions of solenoid valve	Air flow
Start	OPEN	→
Load operation	CLOSE	→
Unload operation	CLOSE	---
Stop	CLOSE	→



PC10021E

# 1. Specification

Step	Response
Start	Compressed air flows into the unloader chamber (A) and speed regulator chamber (B) at start-up, because the solenoid valve for starting unloader opens. The pressure in chamber (A) rises soon, and unloader valve fully closes due to low pressure. Thus the load required for starting is reduced.
Load operation	<p>※1            [When 5 seconds after start-up have passed the solenoid valve for starting unloader closes,] and according as the discharge pressure rises or drops, the air flowing into the unloader chamber (A) and speed regulator chamber (B) from the pressure regulator increases and decreases. Thus according as unloader valve position and engine speed change, free air delivery is steplessly and automatically regulated from 0 to 100%.</p>
Suction port closing unload operation	<p>When air consumption is reduced, and the pressure exceeds the rated one, speed regulator functions to lower the engine speed in proportion to the pressure rise and, at the same time, to close unloader valve.            Under unloaded operation, the interior of compressor air-end becomes vacuum and vacuum noise is caused. In order to prevent this phenomenon, the secondary pressure of pressure regulator is sent to the vacuum relief valve, and as a signal of this function, it makes the vacuum relief valve work and thus it prevents the interior of compressor air-end from becoming higher vacuum state.</p>
Stop	At stop, the compressed air in compressor air end is sent to an auto-relief valve and as a signal, it makes an auto-relief valve work and to relieve the compressed air to the atmosphere out of separator receiver tank.

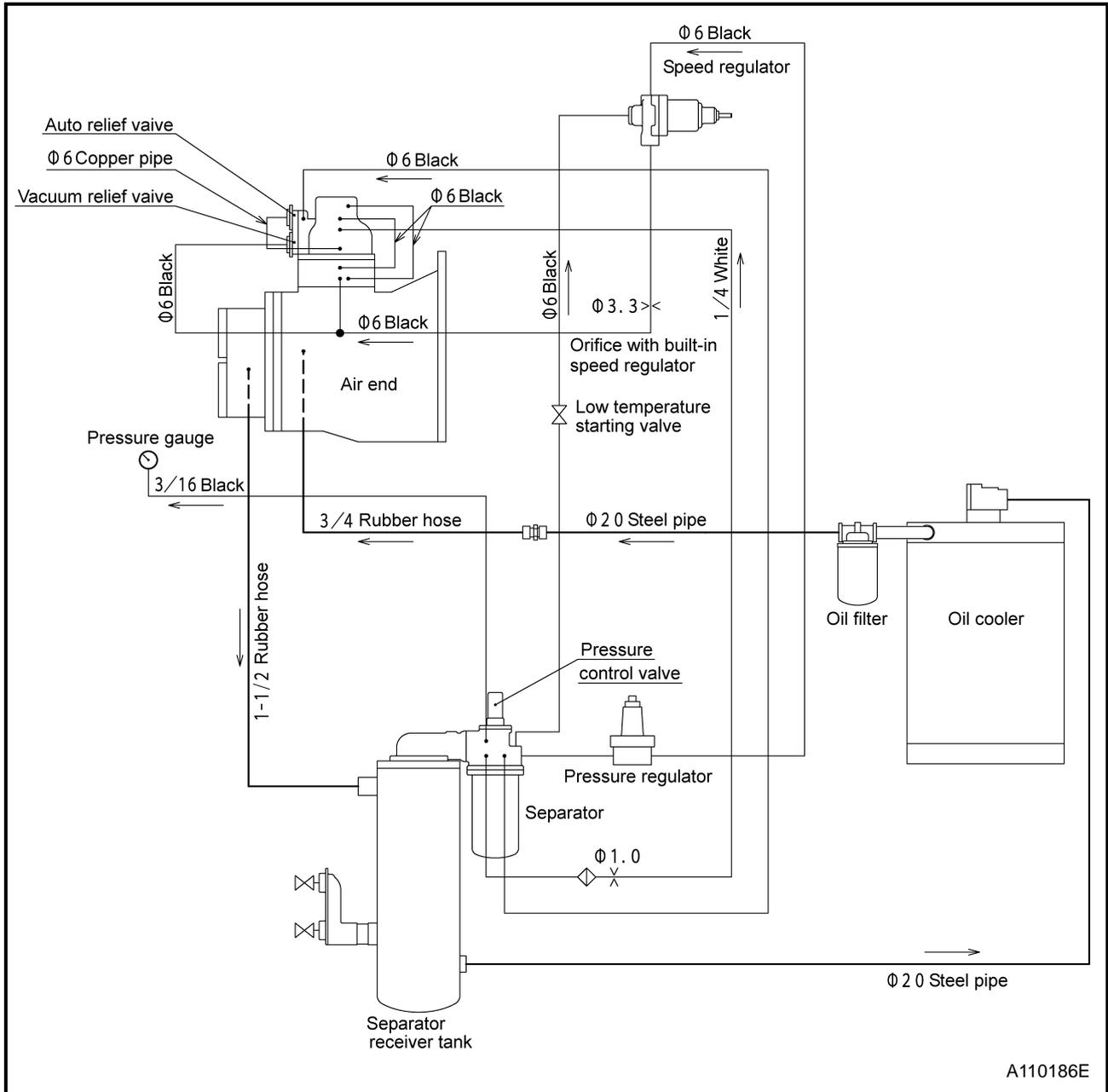
The solenoid valve for starting unloader marked ※1 is installed to PDS175S(SC)-5C3 only.

# 1. Specification

## 1.7 Piping Diagram

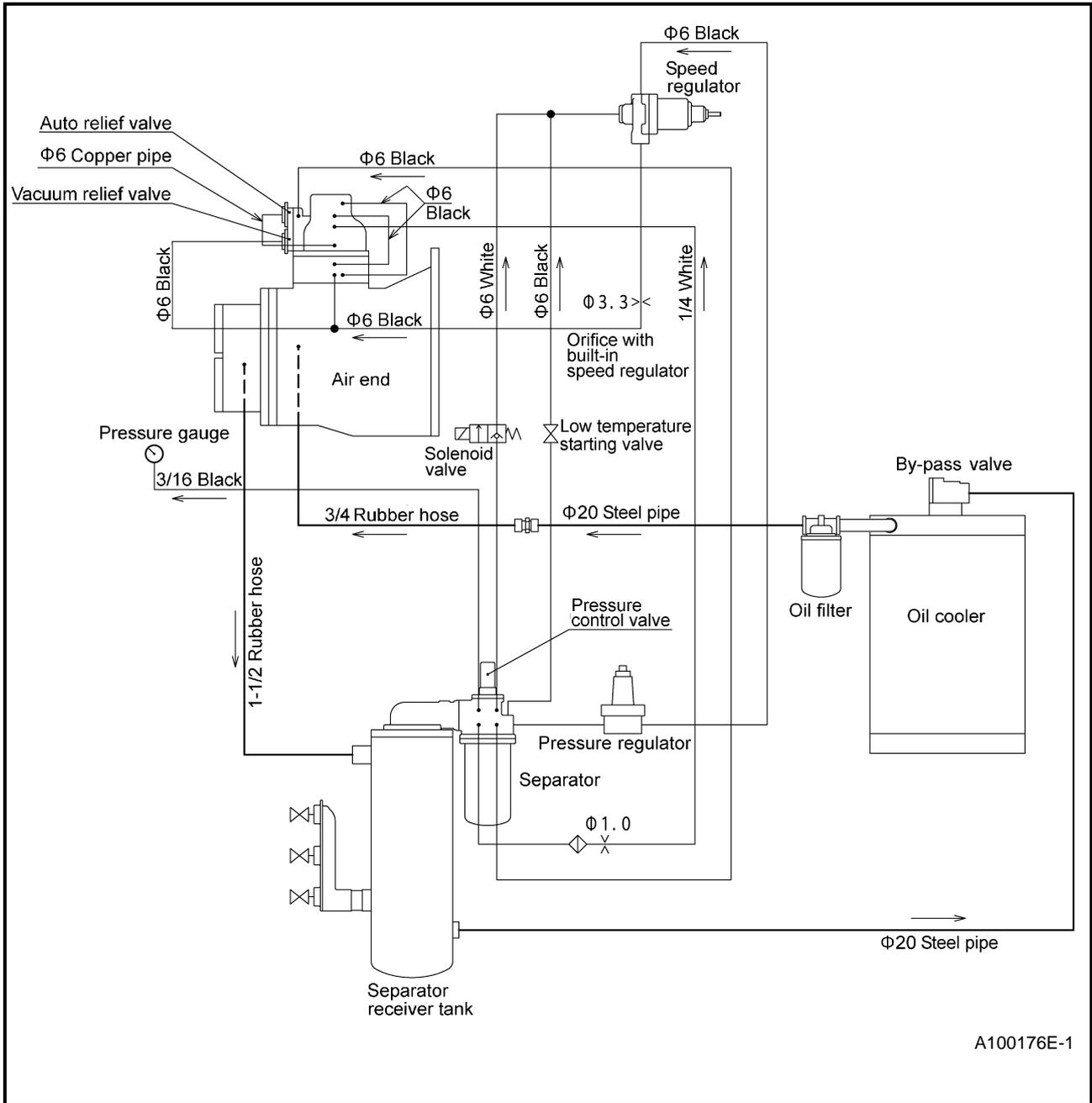
Standard type

(1)PDS130S-5C3



# 1. Specification

(2)PDS175S-5C3

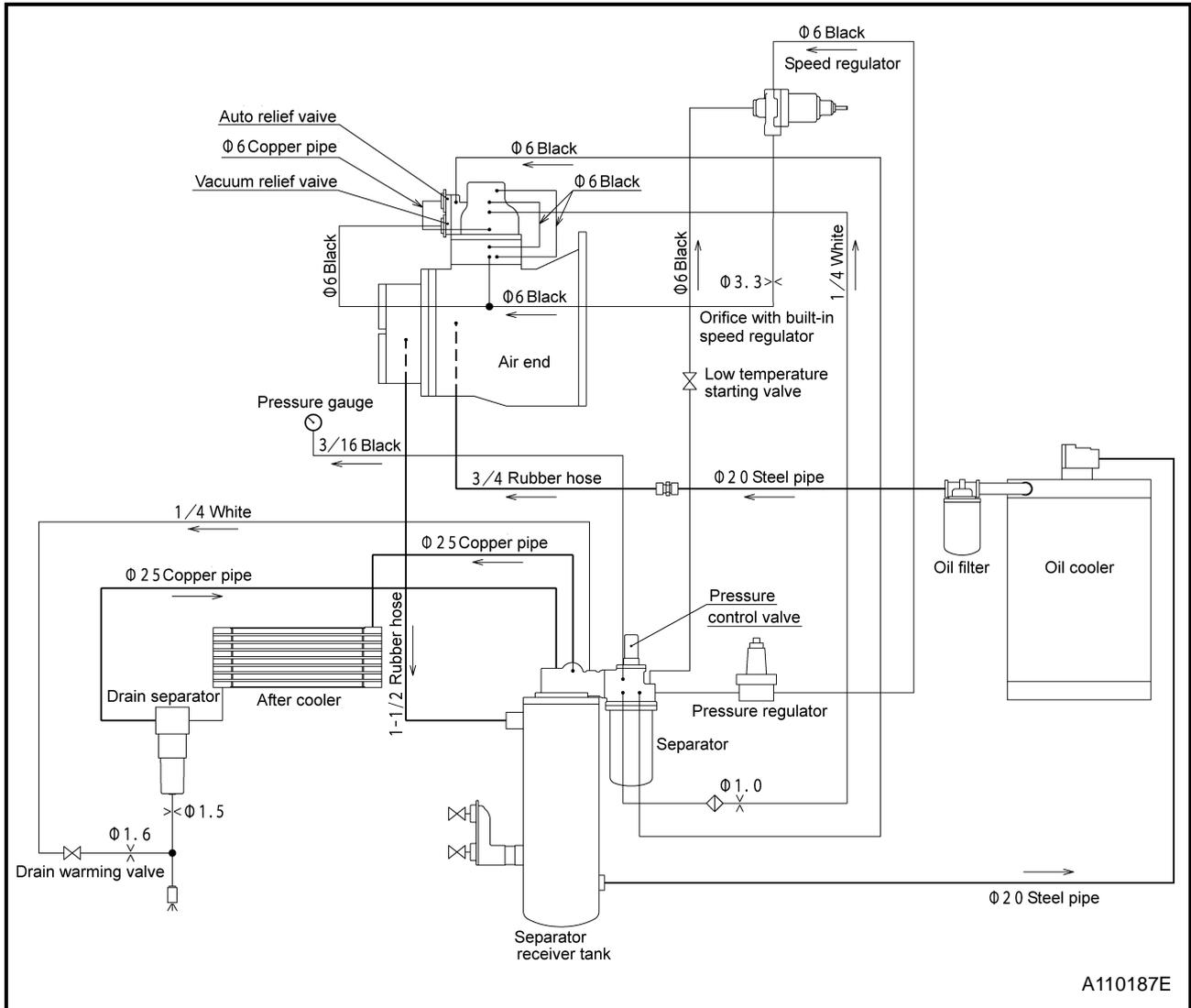


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# 1. Specification

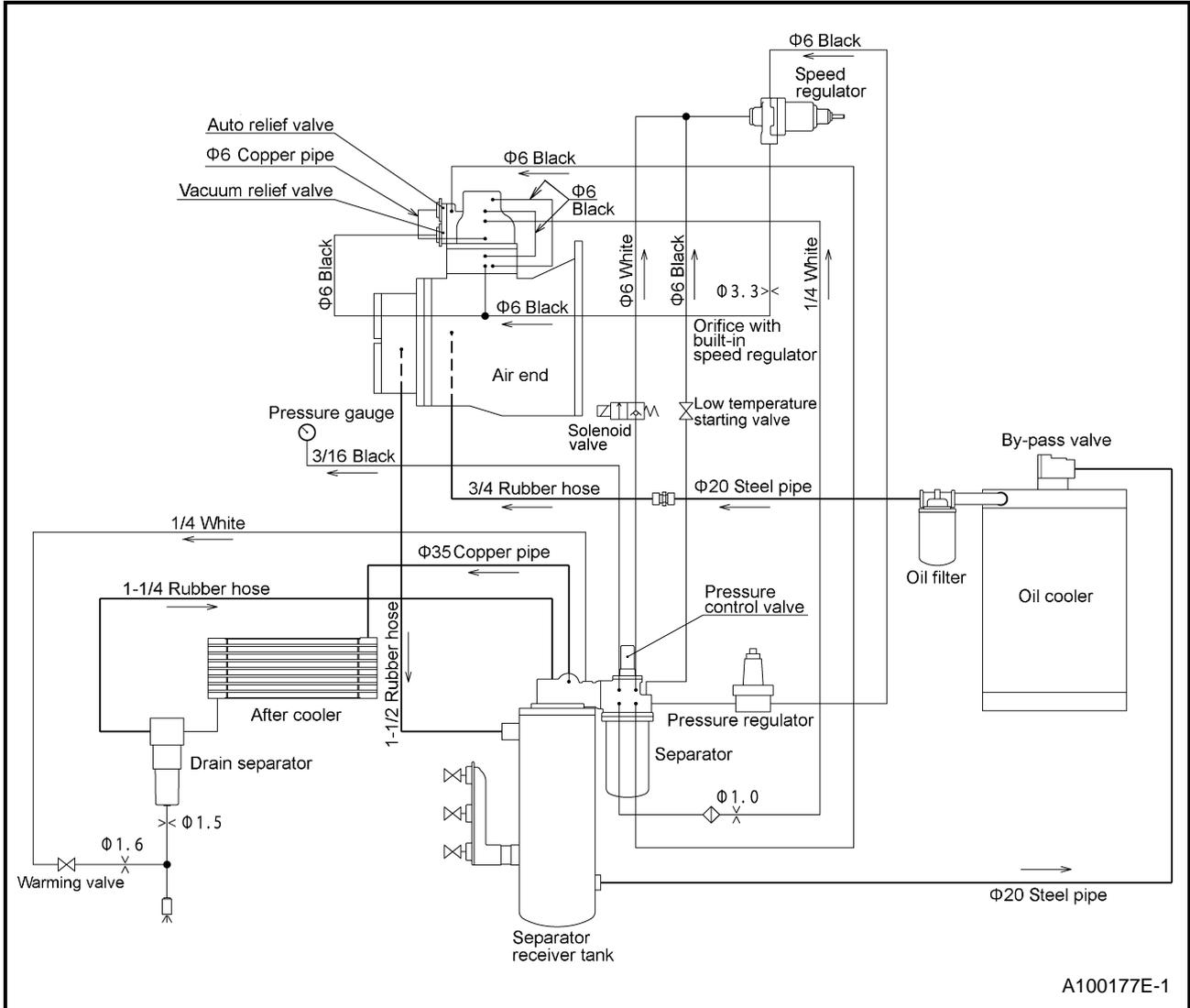
After cooler type

(1)PDS130SC-5C3



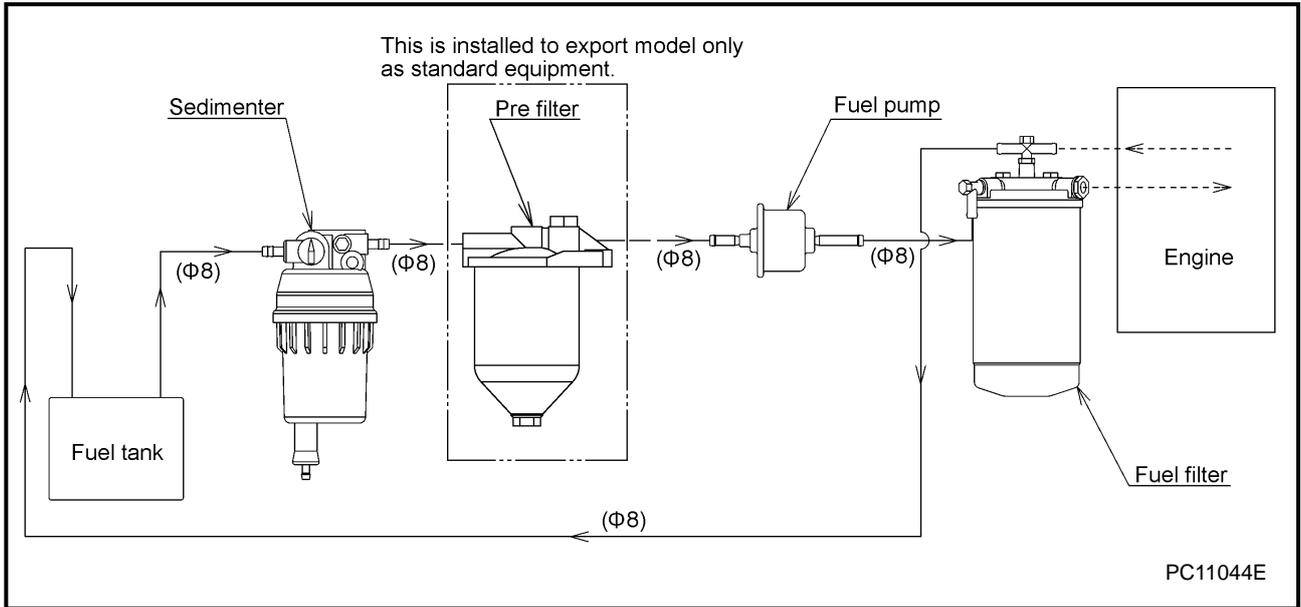
# 1. Specification

(2)PDS175SC-5C3



# 1. Specification

## 1.8 Fuel Piping



## 2. Maintenance

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### 2.1 Cautions for Overhauling

#### 2.1.1 Precautions before starting work

(1) Work to be performed

It is very important to always plan in advance what facilities, tools, instruments, materials, oil, etc. you will need to use; the exact locations and methods of performing inspection, adjustment, or disassembly; and the key points of any repair work to be performed.

(2) Care not to spill oil

Use a pan to collect used compressor oil, engine oil when changing the oil or attaching or detaching an oil line. If a large volume of oil is expected to flow out make, sure to drain any accumulated oil from the reserve tank, engine oil pan in advance.

[Follow the designated regulations to dispose of compressor oil and engine oil.]

(3) Care when detaching parts

When disassembling a complicated part, put a matching mark to indicate the position of detached parts for future reference. Make sure that the negative cable is detached from the battery terminals before starting repair work.

(4) Tools to be prepared

① Measuring instruments (e. g. tester, insulation resistance gauge etc.)

② Tools

③ Torque wrenches

④ Jigs and specialized tools

⑤ Sealing tape (GAFLON seal tape)

⑥ Liquid gasket (ThreeBond 1212)

⑦ Lubricant (NICHIMOLY LAP spray or equivalent)

⑧ Molybdenum sulfide (Paste spray type)

⑨ Grease

- Lithium based all-purpose grease [CALTEX MULTIFAK EP1]

- Lithium natrium based heat resistant grease [MULTINOC SDX]

⑩ Diesel oil

⑪ Compressor oil

⑫ Cleaning cloths

⑬ Literatures (such as manuals etc.)

#### 2.1.2 Disassembly and assembly

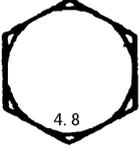
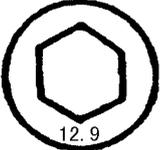
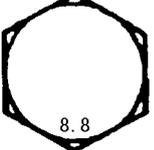
- (1) Select such a place for component disassembly where it is enough spacious and shall be dust-free.
- (2) Clean also the surroundings of the part or component to be disassembled, removing smudge and adhesive matter by washing them.
- (3) Before removing nylon tubes, hydraulic hoses and also fuel hoses, clean the inside of the machine unit. And also cover all the openings of them temporally to prevent foreign matter and dust from entering inside.
- (4) When dismantling the disassembled parts or component, wash their surfaces well and place them on clean paper or cloth so that they can be kept clean and from being damaged.
- (5) Check each part for any dirt and discoloration. Then wash it in detergent oil (diesel oil) slightly. However, do not wash rubber parts with diesel oil.
- (6) Be careful not to damage disassembled parts, they are precision built.
- (7) Replace consumables such as oil seals, O-rings, filters, oil, etc. with new items when reassembling parts.
- (8) Apply "CALTEX MULTIFAK EP1" to O-ring surface and "MULTINOC SDX" to sliding portion of oil seal.
- (9) When reassembling, place the parts or components according to reassembling order and reassemble them correctly without any part un-reassembled and un-used.
- (10) When reassembling an assembled part (set part), be sure to replace it as an assembly.
- (11) Make sure to follow the tightening torque and clearance when reassembling the disassembled parts or components.
- (12) If the parts or components which are being disassembled are left untreated, ambient humidity or dirt may cause rust or corrosion. If it is unavoidably necessary to stop disassembling job on the way, make sure to protect them against rust and dirt.
- (13) After finishing the disassembling job, make sure to check the assembled unit for the direction of rotation, rotation speed and oil leak.
- (14) At first, perform trial operation at so slow speed that it may not cause seizure or overheating.

## 2. Maintenance

### 2.2 Tightening Torque

#### 2.2.1 General bolts and nuts tightening torque

Fasten all the bolts and nuts with the specified tightening torque when assembling.

Kind  Strength and sorting  Width of across flat· Tightening torque  Bolt diameter (mm)	Low or Middle carbon steel bolt (SS400B etc...)		High tensile strength bolt (SCM435 etc...)		
	4.6~6.8 (4T~6T)		8.8~12.9 (7T~12T)		
	 Hexagon bolts		 Socket bolts	 Hexagon bolts	
Hexagon bolts Width of across flat (mm)	Tightening torque N·m (kgf·cm)	Socket bolts Width of across flat (mm)	Hexagon bolts Width of across flat (mm)	Tightening torque N·m (kgf·cm)	
6	10	5 (51)	5	10	10 (100)
8	13	12 (124)	6	13	25 (245)
10	17	25 (245)	8	17	49 (485)
12	19	43 (425)	10	19	85 (845)
14	22	68 (675)	12	22	135 (1,350)
16	24	106 (1,055)	14	24	210 (2,100)
18	27	145 (1,450)	14	27	290 (2,900)
20	30	205 (2,050)	17	30	410 (4,100)
22	32	280 (2,800)	17	32	560 (5,600)
24	36	345 (3,450)	19	36	710 (7,100)
Applied sections.	For general sections such as bonnet and frame.		For specified sections.		

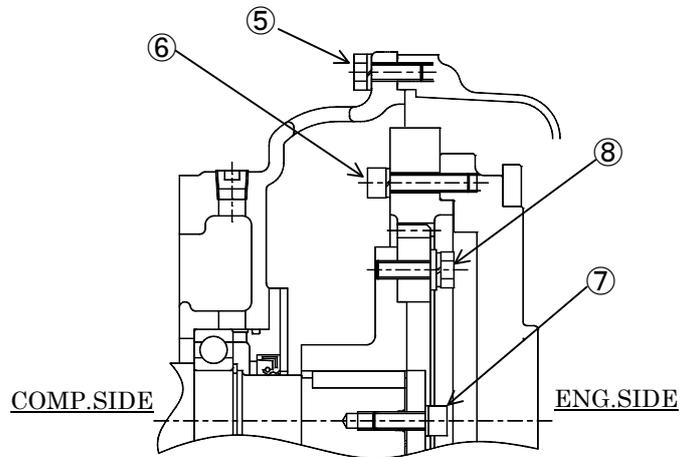
#### IMPORTANT

- The above torque values in the table shall be applicable for the bolts and nuts used for machine
- Generally, the abovementioned tightening torques should be followed, but in some points different torque is specified. So use the tightening torque without fail. (See following pages.)
- Make sure to remove rust and dust before tightening.

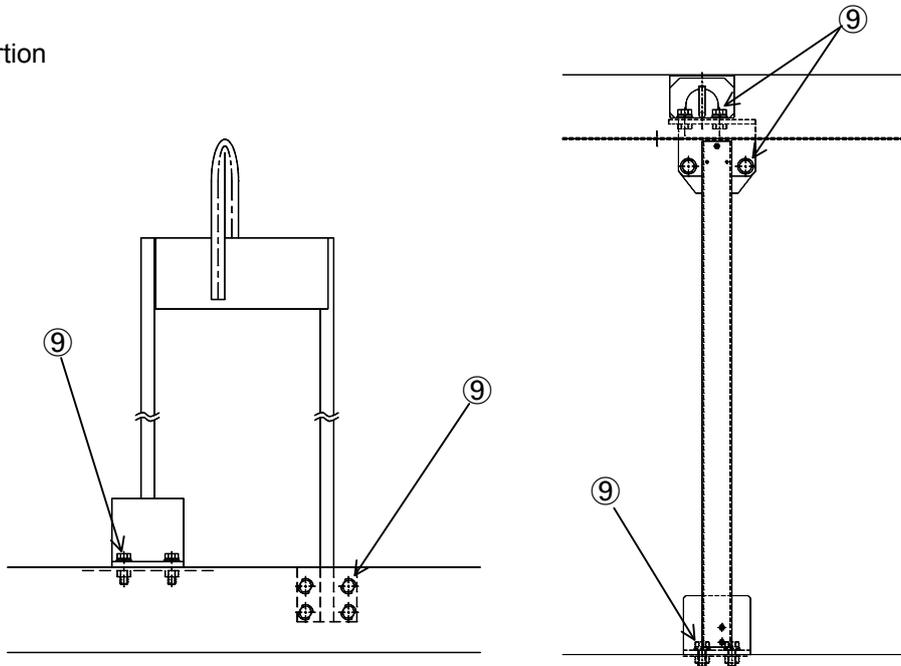


## 2. Maintenance

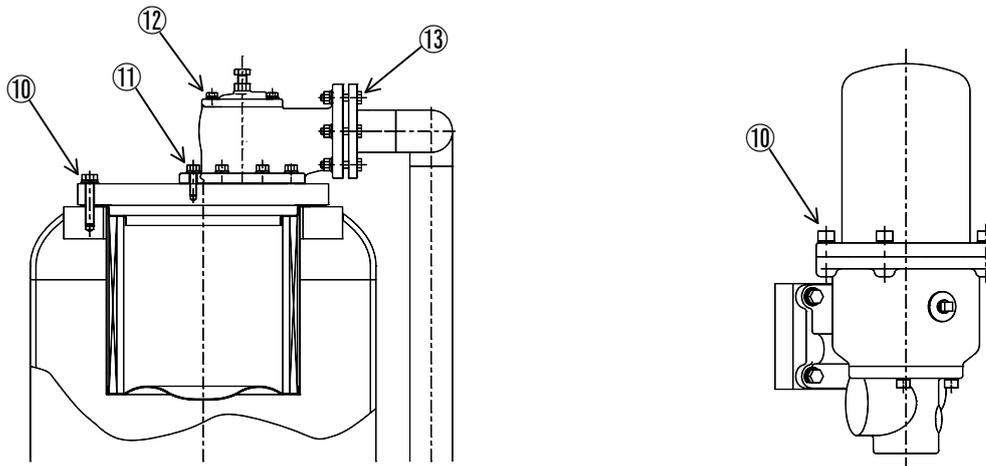
### 3 Coupling portion between comp. air end and engine



### 4 Lifting portion



### 5 Pressure vessel and pipes



## 2. Maintenance

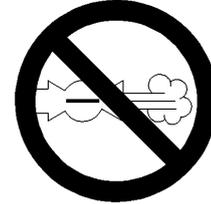
### 2.3 How to adjust Regulator and How to replace Diaphragm

#### 2.3.1 Method of adjustment regulator



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

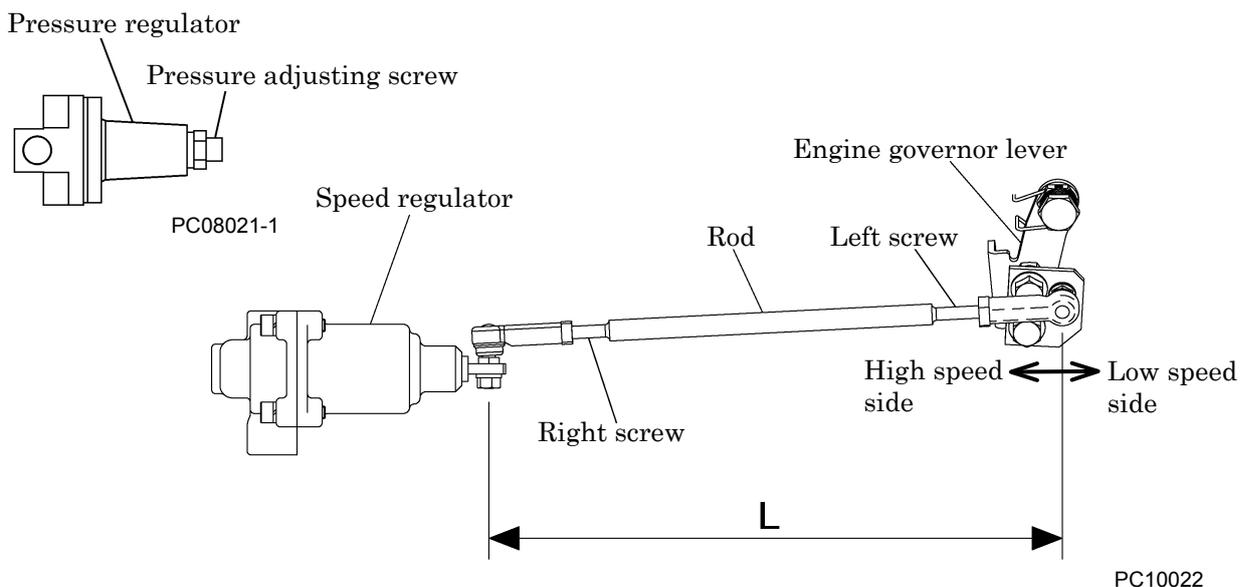
- When adjusting regulator system, install a silencer to the air delivery port and wear earplugs for protection of hearing damage.



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 procedure> (For engine speed and pressure, see 1.2)



- ① Adjust the length of the rod connecting speed regulator so that engine governor lever can be pulled toward high speed side, with compressor kept stopping.  
(Making the rod length short, engine speed increases.)
- ② Adjust this system so that when unload starting pressure exceeds 0.69MPa(7kgf/cm<sup>2</sup>) by turning pressure adjusting screw, speed regulator can start to function to lower engine RPM.  
(Tightening the screw, the pressure rises, and loosening it, the pressure drops.)

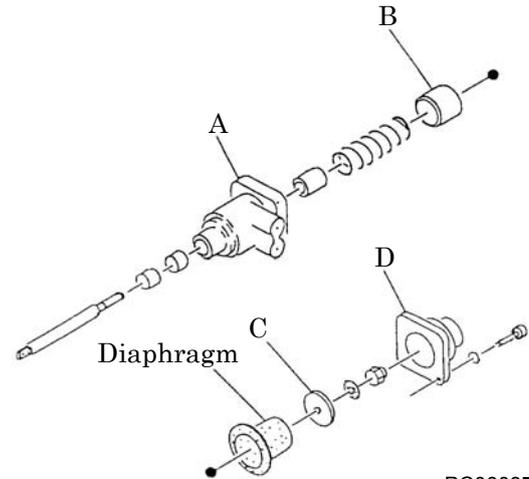
## 2. Maintenance

### 2.3.2 Change diaphragm

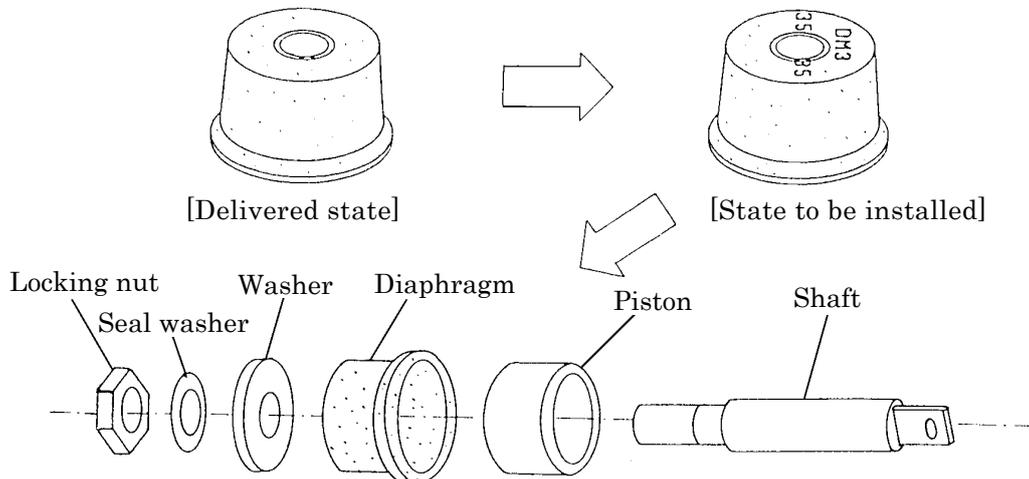
#### Speed Regulator (Bellophragm type)

<Procedure>

- ① Remove the speed regulator from the bracket and disassemble it.
- ② Replace diaphragms with new ones.
- ③ Check A to D shown in figure for any burrs.
- ④ Diaphragm is delivered in different state from the state in which it should be installed. So install diaphragm which should be turned inside out, as shown in the following Fig.



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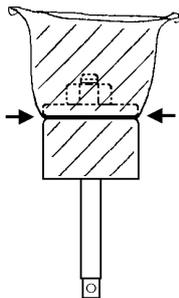


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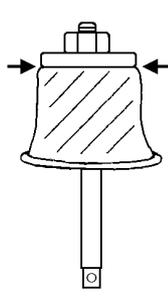
- ⑤ Internal face of body and cap and also both internal face and external face of diaphragm should be coated with molybdenum oxide spray.

How to spray molybdenum oxide paste : The areas in oblique line should be sprayed with this paste.

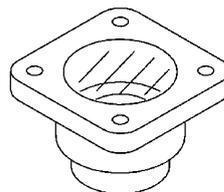
Diaphragm should be rolled up and back face and piston should be sprayed.



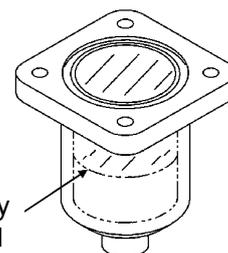
Then it should be returned and be sprayed.



Inside of body should be sprayed.



Inside face of body should be sprayed till middle line.



※ Jointed portion should be sprayed enough.

PC11037-1

## 2. Maintenance

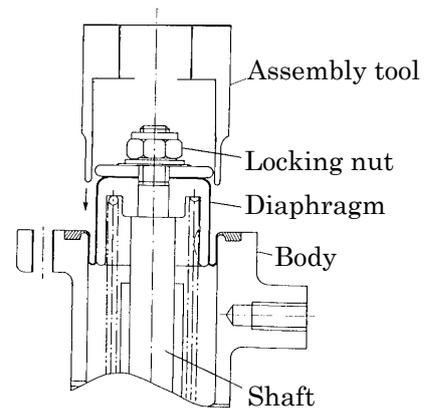
- ⑥ Install diaphragm to shaft and piston and fasten it with a locking nut.

Tightening torque :  $8\text{N}\cdot\text{m}$ ( $80\text{kgf}\cdot\text{cm}$ )

**Important** : Be careful not to tighten the locking nut excessively. Excessive tightening can cause washer to turn together and twisting diaphragm. The diaphragm will be damaged in shorter period.

- ⑦ Put in diaphragm to be settled equally in the body using an assembly tool.

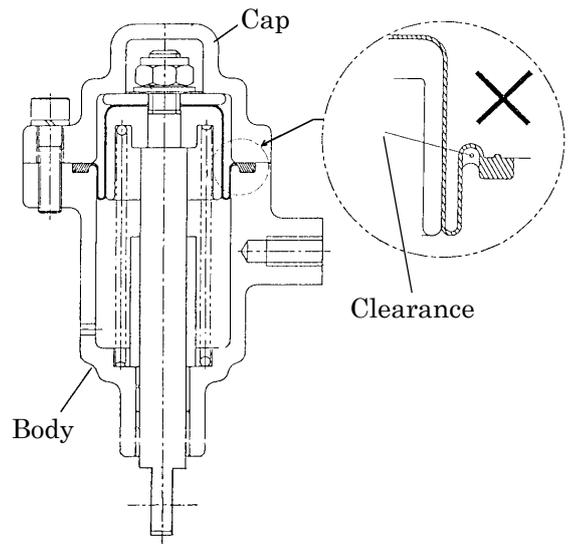
**Important** : Once diaphragm is settled in, turn slowly the tool for secure installation. When turning the tool, hold the diaphragm not to be afloat.



- ⑧ After diaphragm is set in, install the cap and then assemble speed regulator.

**Important** : Before installing the cap, make sure again that the portion of diaphragm shown in right figure is seated intact. If diaphragm is afloat, it can cause diaphragm to be caught in when installing cap.

If the shaft is turned after installation is finished, it could damage diaphragm. Take care.



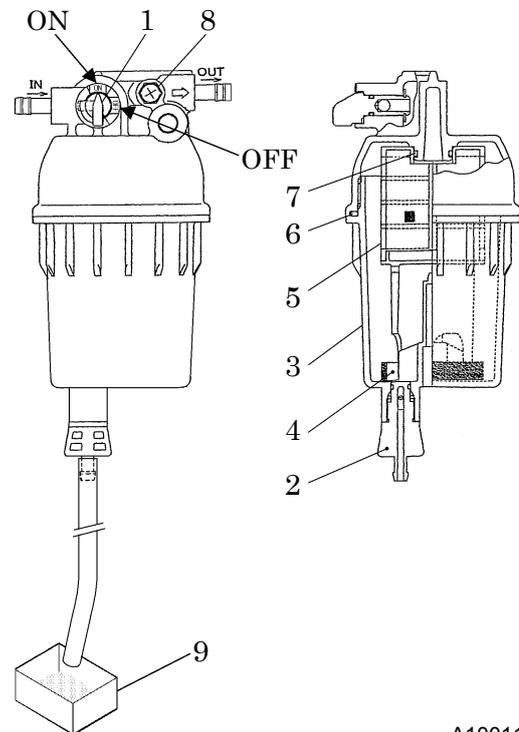
- ⑨ After re-assembling the speed regulator, adjust it according to the adjustment method of speed regulator (See 2.3.1)

## 2. Maintenance

### 2.4 Clean of Element in Sedimenter

<Procedure>

- ① Turn fuel selector valve “1” to “OFF” position.
- ② Loosen the drain valve “2” and drain out condensed water inside.
- ③ Turn the cup “3” to the left and remove the cup “3”. Be careful to remove the cup “3” because it is filled with fuel. Wipe out split fuel completely.
- ④ Remove float “4” inside cup “3”
- ⑤ Washing element “5” and the cup inside with new fuel.
- ⑥ Replace element “5” and O ring “6”, “7” if they are found broken or damaged.
- ⑦ After finishing clean, assemble it in reverse procedure.
- If air is found still in fuel pipe, place starter switch to “RUN” position and loosen air bleeding bolt “8” to bleed air. After finishing air bleeding, tighten the air bleeding bolt “8” .
- Drain the condensate in container “9” ,and then dispose of condensate according to the designated regulations.



A100117

### 2.5 Change Oil separator

#### IMPORTANT

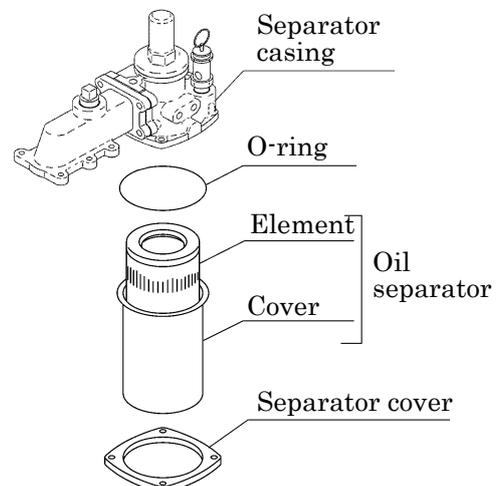
- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface. Use CALTEX MULTIFAK EP1 grease or equivalent.

- Even before the periodic interval time of replacement, replace the oil separator whenever the oil consumption increases and also oil is found mixed in the discharge air.
- When consumption of the oil is still unusual even after cleaning strainer in the scavenging orifice, change the oil separator with a new one.

[Tightening torque of separator cover bolt]

 : 8 mm

 : 49 N·m (485 kgf·cm)



A100179

## 2. Maintenance

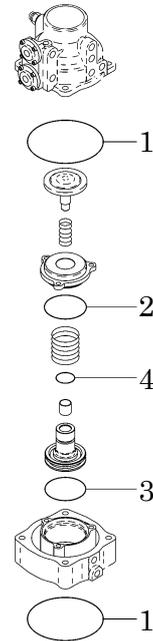
### 2.6 Change O-Ring of Unloader

<Caution during O-ring replacement>

Supply grease to O-ring “1” , “2” , “3” , “4” after replacement.

#### IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.  
Use CALTEX MULTIFAK EP1 grease or equivalent.



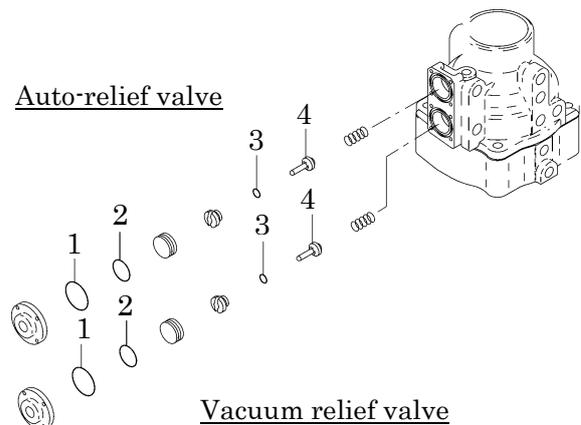
A070337

### 2.7 Check O-ring and Needle valve of Auto-relief valve and Vacuum relief valve

#### IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.  
Use CALTEX MULTIFAK EP1 grease or equivalent.

- Disassemble and clean the component, and check O-ring “1” , “2” , “3” and needle valve “4” . Then, replace O-ring “1” , “2” , “3” and rubber on the needle valve “4” , if hardened.



A070339

## 2. Maintenance

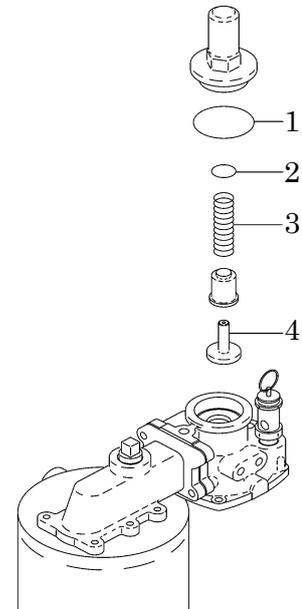
### 2.8 Performance check of Pressure control valve

#### IMPORTANT

- When reassembling, apply sufficient grease to O-ring Slot/O-ring and sliding surface.  
Use CALTEX MULTIFAK EP1 grease or equivalent. Grease of poor quality will deteriorate the material.

#### <Procedure>

- ① When closing stop valve and fully opening service valve while the machine is running, make sure that the discharge pressure gauge shows the figure between 0.34 to 0.47MPa.
- ② When the pressure is lower than 0.34MPa, replace spring “3” with a new one.
- ③ When the indicator shows excessively higher pressure, you will find that the piston does not move smoothly due to foreign material and rust stuck inside valve. In such a case, disassemble the component for checking and cleaning.



A100180

### 2.9 Check Pressure control valve O-Ring and Piston

- After disassembling and cleaning pressure control valve, check O ring “1” , “2” and piston “4” .  
When the rubber of these parts is found hardened, or damaged, replace them.
- After replacement, run the machine to check its function, air-leak or any disorder.

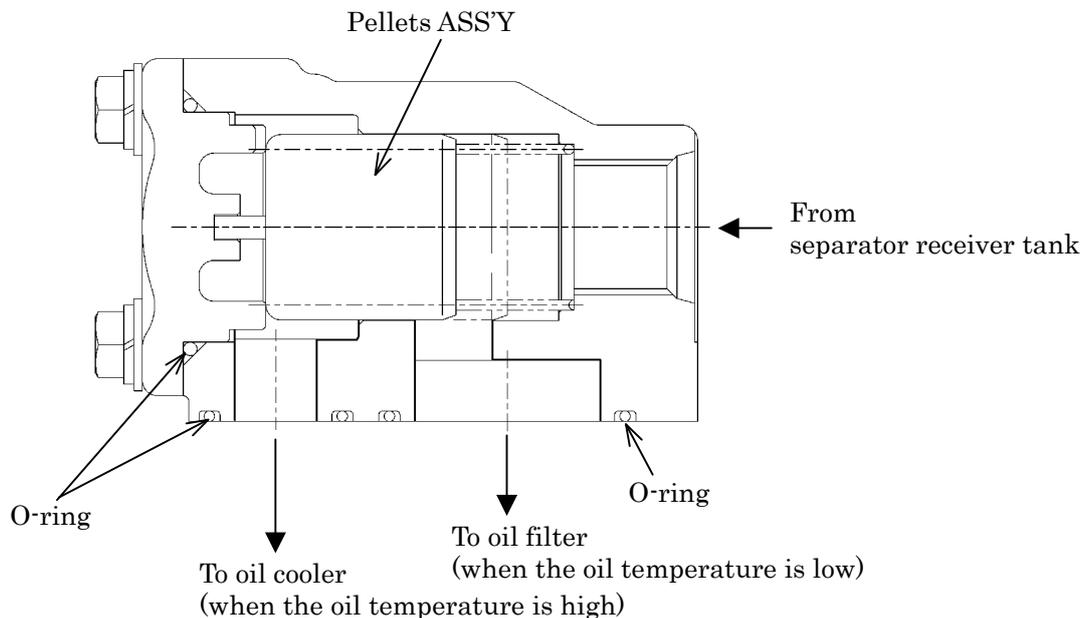
## 2. Maintenance

### 2.10 Change of Pellet assembly of By-pass valve [PDS175S(SC)-5C3 only]

● 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.

<Procedure>

- 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.)



Actuating temperature	By-pass valve fully closing temperature
$82 \pm 3^{\circ}\text{C}$	$89 \pm 2^{\circ}\text{C}$

## 2. Maintenance

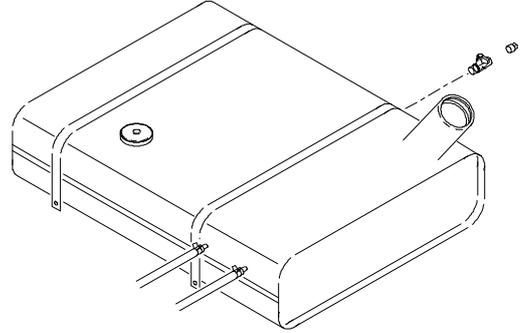
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### 2.11 Clean inside of Fuel tank

- Condensate is caused and accumulated at the bottom of fuel tank, owing to churning of dust or dirt mixed when fuel oil is fed and water drop caused while fuel oil tank is used for a long time. When any condensate is found afloat and fuel filter gets clogged too fast, fuel oil tank should be cleaned after condensate is removed from fuel oil tank even before the specified cleaning interval time.

<Procedure>

- ① Open drain valve to remove fuel oil from fuel tank.
- ② Remove side cover under door.
- ③ Remove fuel pipes and wires connected to fuel tank.
- ④ Remove belt holding fuel tank and remove tank.
- ⑤ Insert cleansing nozzle through fuel filler port or drain port for cleaning tank.
- ⑥ After cleaning job is finished, install fuel tank from which water or the like should be completely removed.



PC10023

## 2. Maintenance

### 2.12 Values of Various Adjustments of Engine

Item		Unit	PDS130S[SC]-5C3	
Engine model			YANMAR 3TNV88-BDHK	
Tightening torque of head bolts		N·m	First time	41.1 to 46.9
			Second time	85.3 to 91.1
Valve clearance	Air intake	mm	0.20±0.05 (when engine is cold)	
	Discharge	mm	0.20±0.05 (when engine is cold)	
Firing order			1-3-2-1 (No.1 cylinder at flywheel side)	
Injection timing (BTDC)		°	FIT 13.5 (at lift 2.5mm)	
Nozzle injection pressure		MPa	21.6[0,+0.1]	
Compression (at 250min <sup>-1</sup> )	Standard	MPa	3.43±0.1	
	Working limit	MPa	Limited value	2.75±0.1
			Each cylinder limit value	Not specified
Thermostat	Temperature for start of release	°C	71±1.5	
	Full open temperature	°C	85	
	Valve lift	mm	More than 8.0	

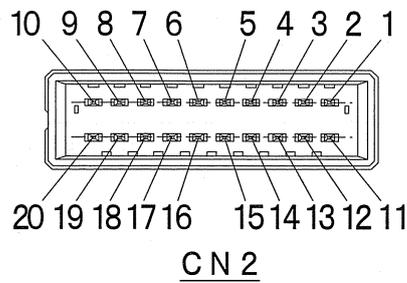
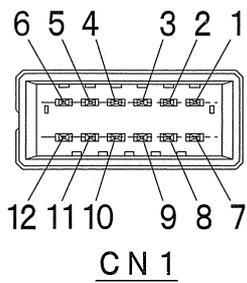
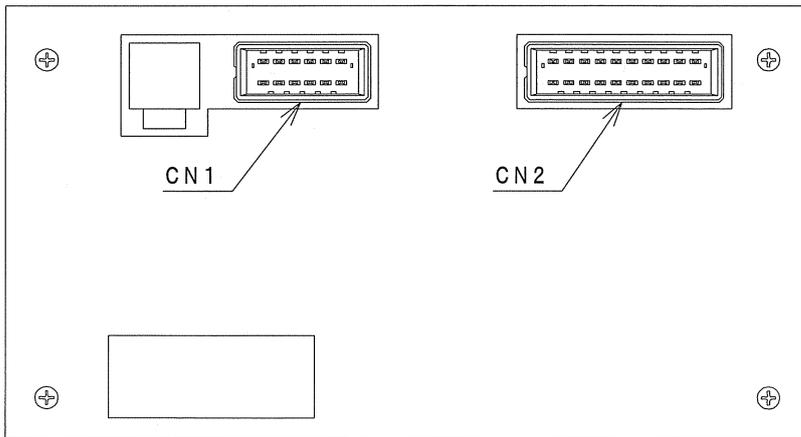
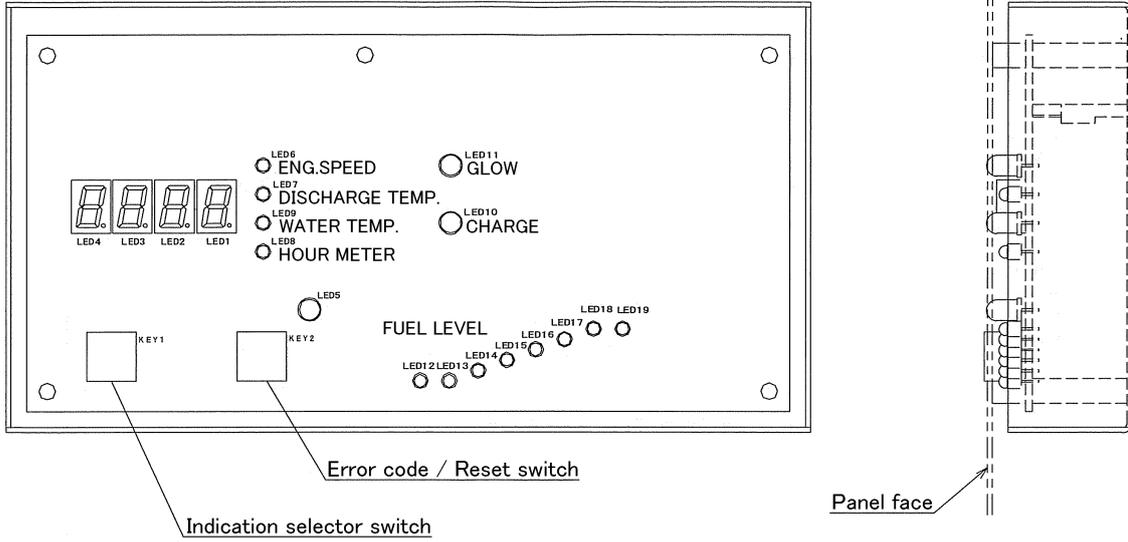
Item		Unit	PDS175S[SC]-5C3	
Engine model			YANMAR 4TNV88-BDHKS	
Tightening torque of head bolts		N·m	First time	41.1 to 46.9
			Second time	85.3 to 91.1
Valve clearance	Air intake	mm	0.20±0.05 (when engine is cold)	
	Discharge	mm	0.20±0.05 (when engine is cold)	
Firing order			1-3-4-2-1 (No.1 cylinder at flywheel side)	
Injection timing (BTDC)		°	FIT 13.5 (at lift 2.5mm)	
Nozzle injection pressure		MPa	21.6[0,+0.1]	
Compression (at 250min <sup>-1</sup> )	Standard	MPa	3.43±0.1	
	Working limit	MPa	Limited value	2.75±0.1
			Each cylinder limit value	Not specified
Thermostat	Temperature for start of release	°C	71±1.5	
	Full open temperature	°C	85	
	Valve lift	mm	More than 8.0	

※For the details, see service manual supplied by engine manufacturer.

# 3. Electric System

## 3.1 Control

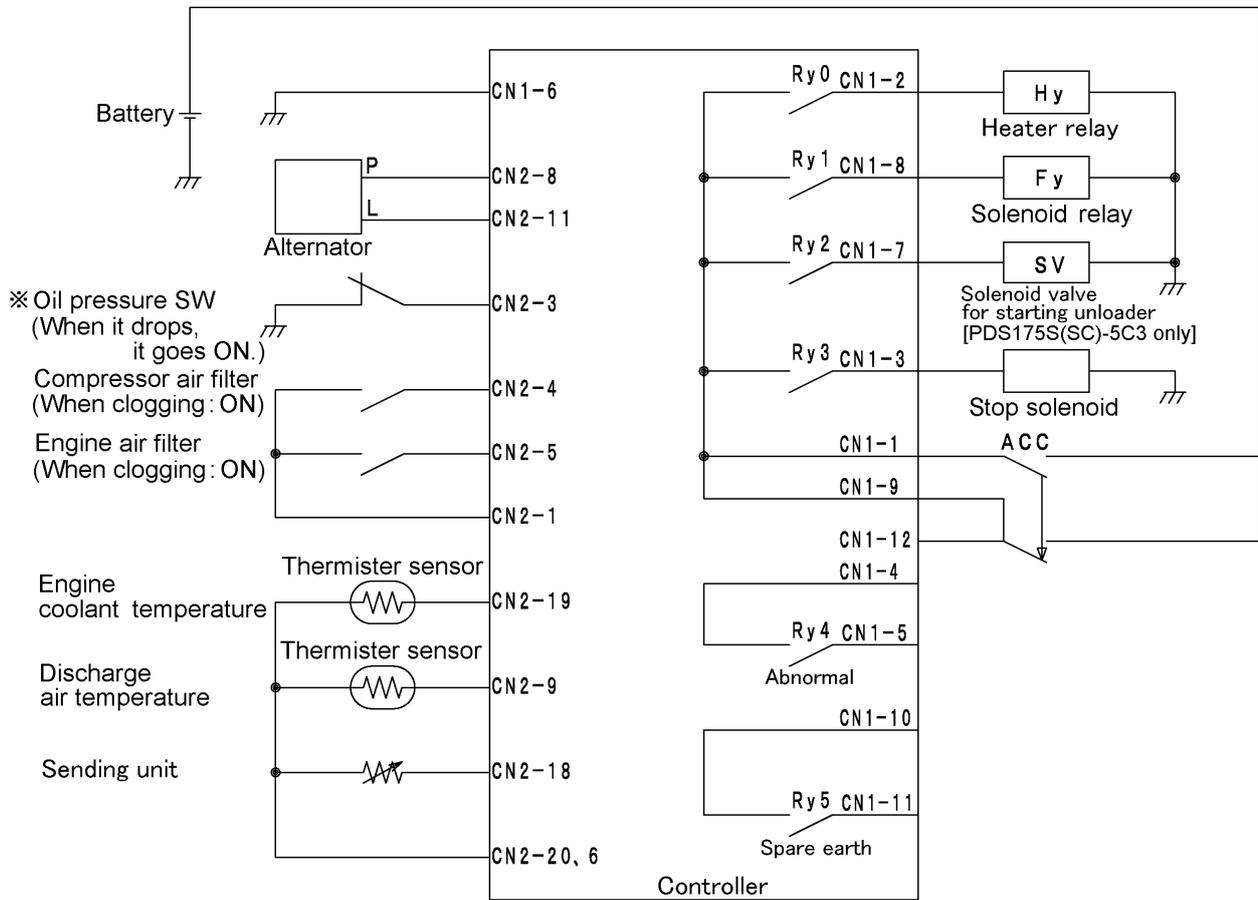
Part number: 46870 51901



PC10024E

# 3. Electric System

## 1. Exterior connection drawing

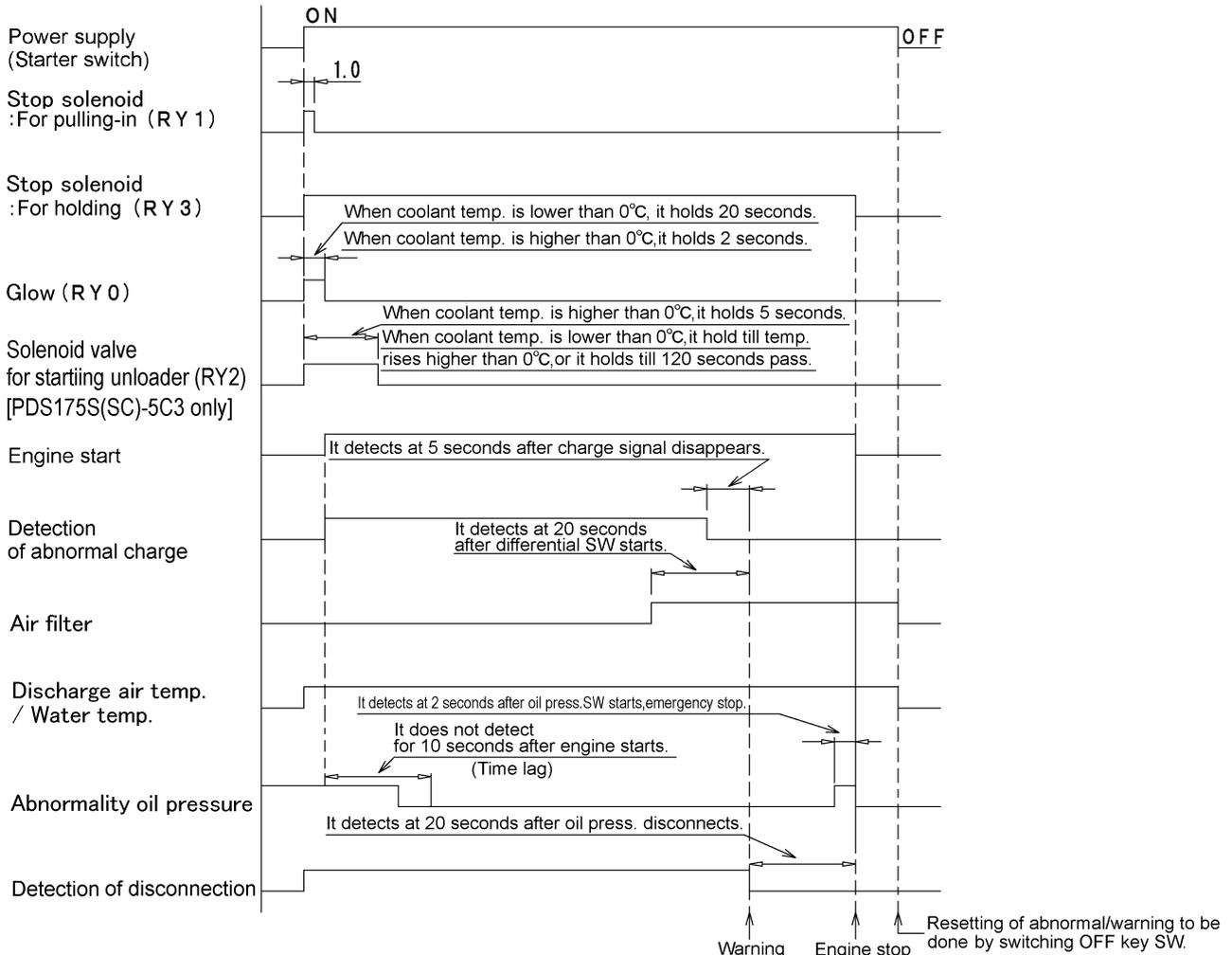


PC10025E

※:As engine oil pressure switch contact is B, the contact is ON when engine shuts down. After engine starts, the contact becomes OFF due to rise of engine oil pressure. Oil pressure detecting circuit of controller functions at circuit of contact A. After engine oil pressure switch is kept ON for 2 seconds, engine is brought to emergency stop. (Engine oil pressure abnormality detecting circuit functions 10 seconds after it detects alternator generation signal.)

# 3. Electric System

## 2. Timing of each output relay



PC10026E

## 3. Warning · emergency display and emergency stop functions

Item		Indicator	Sensor		Actuation	Detecting timing	Time lag
Warning	Discharge temp. H	A-1	Thermister	—	Lamp goes on at 115°C	Always	1.0 sec
	Water temp. H	A-2	Thermister	—	Lamp goes on at 105°C	Always	1.0 sec
	Comp. air filter	A-3	Negative pressure SW	A contact	Flickering at differential pressure 6.0kPa	Always	10.0 sec
	Eng. air filter	A-4	Negative pressure SW	A contact	Flickering at differential pressure 6.0kPa	Always	10.0 sec
	Charge	A-5	—	—	Charge signal disappears and lamp goes on.	After starting engine	5.0 sec
Emergency	Discharge temp. E	E-1	Thermister	—	Lamp goes on at 120°C	Always	1.0 sec
	Water temp. E	E-2	Thermister	—	Lamp goes on at 110°C	Always	1.0 sec
	Eng. oil press	E-3	Pressure SW	B contact	Lamp goes on when oil pressure is lower than 0.05MPa.	10 seconds after engine starts	2.0 sec
	Discharge temp. sensor	E-6	Thermister	—	Disconnected and lamp goes on.	After starting engine	20.0 sec
	Water temp. sensor	E-7	Thermister	—	Disconnected and lamp goes on.	After starting engine	20.0 sec

- Emergency : Compressor continues to run.
- Warning : Compressor stops.

# 3. Electric System

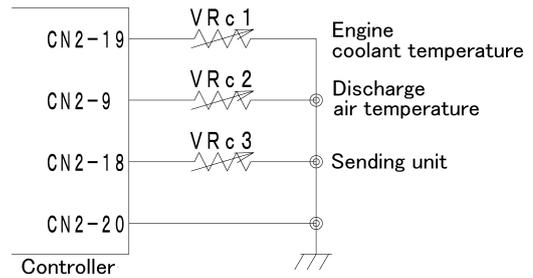
## 4. Functions of each output relay

Mark	Name	Remark
RY0	Relay for heater relay	It goes ON when starter SW is ON. When coolant temp. is lower than 0°C, it becomes OFF 20 seconds later. When coolant temp. is higher than 0°C, it becomes OFF 2 seconds later.
RY1	Relay for solenoid relay	It goes ON for 1 second when starter SW is ON.
RY2	Relay for starting unloader [PDS175S(SC)-5C3 only]	It goes ON when starter SW is ON. When coolant temp. is lower than 0°C, or when 120 seconds pass, it becomes OFF. When coolant temp. is higher than 0°C, it becomes OFF 5 seconds later.
RY3	Relay for solenoid	It goes ON when starter SW is ON.
RY4	Abnormality output relay	
RY5	Spare output relay	

## 5. Adjustment and inspection

Perform the detection and inspection of discharge air temperature, engine coolant temperature, and setting unit by controller in the following steps.

- (1) Connect resistance to controller as shown right.  
Or use multi-speed variable resistance (resistance value: 1.0kΩ) for VRc1, VRc2 and VRc3.



PC10027E

- (2) Gradually lower resistance values of VRc1 and VRc2 and measure them when they reach abnormal values. Then check and confirm that they are within the following ranges.

Item		Set temperature (°C)	Resistance (Ω)
Engine coolant VRc1	Warning	105	640 ± 15
	Emergency	110	560 ± 15
Discharge air temperature VRc2	Warning	115	491 ± 15
	Emergency	120	432 ± 15

- (3) Sending unit

Float position	Resistance (Ω)
F	3.0 ± 2.0
1/2	32.5
E	110.0 ± 7.0

### 3. Electric System

6.List of functions

(1)Connector CN1

Pin No.	Line color	Connection	Remark
1	R/W	CN1-12	Common
2	Y/R	Heater relay [A] terminal	When starter switch is "ON" , and voltage is applied to CN1-12 terminal, interior contact (RYO) is "ON" , and voltage is outputted out of CN1-2 terminal to make a heater relay function. 2 seconds later (when coolant temp. is lower than 0°C, 20 seconds later) the interior contact (RYO) becomes "OFF" to cut power supply to heater relay and complete engine preheating.
3	W/B	Stop solenoid [R] terminal	<b>For holding stop solenoid</b> When starter switch is "ON", and voltage is applied to CN1-12 terminal, interior contact (RY3) is "ON", and voltage is outputted from CN1-3 terminal to supply power to R terminal for holding stop solenoid. When starter switch is "OFF" or emergency stop system functions, the interior contact (RY3) becomes "OFF" to cut power supply to the stop solenoid and consequently engine stops.
4	—	NIL	For outputting signal of abnormality
5	—	NIL	For outputting signal of abnormality
6	—	NIL	
7	Y/G	Solenoid valve for starting unloader [PDS175S(SC)-5C3 only]	When starter switch is "ON" , and voltage is applied to CN1-12 terminal, interior contact (RY2) is "ON" , and voltage is outputted out of CN1-7 terminal to make the solenoid valve for starting unloader function. Accordingly, compressor performs starting unloader mode operation and thus load at start-up is reduced. 5 seconds later (at lower temp. than 0°C after coolant temp. rises up to higher than 0°C, or 120 seconds pass, which is shorter.), the interior contact (RY2) becomes "OFF" to cut power supply to the solenoid for starting unloader and then starting unloader mode operation will be switched to normal operation.
8	Y/L	Solenoid relay	<b>For pulling stop solenoid</b> When starter switch is "ON", and voltage is applied to CN1-12 terminal, interior contact (RY1) is "ON", and voltage is outputted out of CN1-8 terminal to make the solenoid relay function. Thus power is supplied to W terminal of stop solenoid and it pulls interior plunger. 1 second later, the interior contact (RY1) becomes "OFF" to cut power supply to solenoid relay. Then stop solenoid is switched to holding circuit.
9	W/B	CN1-12	Common
10	—	NIL	Spare earth
11	—	NIL	Spare earth
12	R/W	Starter switch [ACC] terminal (Through 5A Fuse)	Power supply

### 3. Electric System

#### (2)Connector CN2

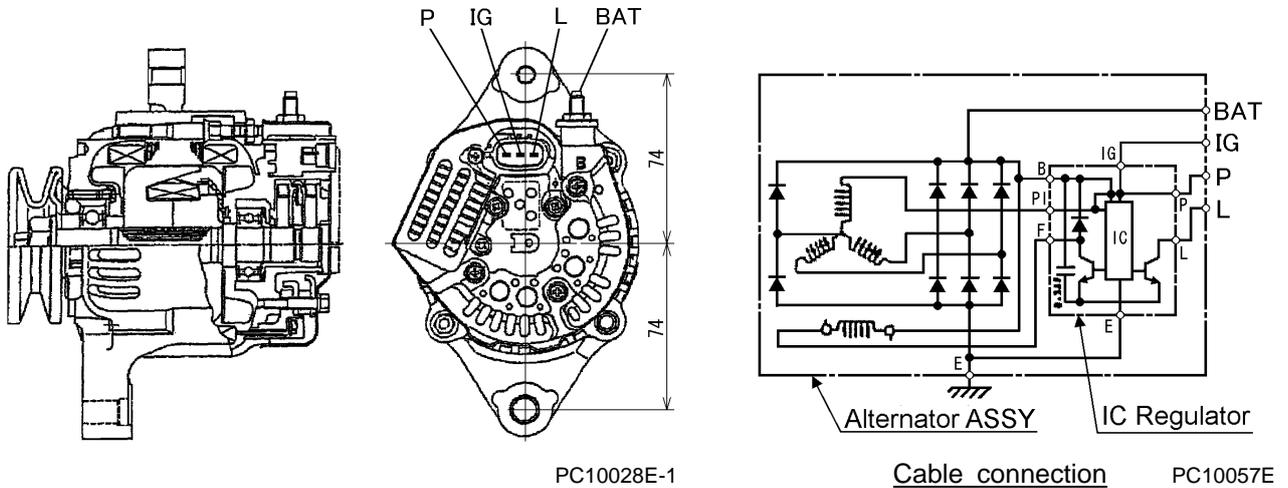
Pin No.	Line color	Connection	Remark
1	B	Earth	
2	—	NIL	Spare earth (In put)
※ 3	G	Engine oil pressure switch	No electrical connection found. When engine oil pressure drops, engine oil pressure switch turns “ON” to electrical connection. When electrical connection, interior contact (RY3) between CN1-1 and CN1-3 terminal turns “OFF” to cause emergency stop to engine. ●Set pressure of emergency stop oil pressure below 0.05MPa
4	G/R	Compressor air filter	Detection of compressor air filter clogging.
5	G/L	Engine air filter	Detection of engine air filter clogging.
6	—	NIL	Spare earth (interior ground)
7	—	NIL	
8	W/R	Alternator P terminal	Input alternator frequency (engine rotating speed signal)
9	G/B	Discharge air temp. sensor	Detection of discharge air temperature. When it is higher than the emergency stop actuating set temperature, interior contact (RY3) between CN1-1 and CN1-3 terminals will be turned “OFF” to make engine emergency stop. ●Warning·Emergency stop set temperature Warning temperature:115℃ Emergency stop temperature:120℃
10	—	NIL	Spare earth (In put)
11	W/B	Alternator L terminal	For detecting abnormal charge
12	—	NIL	Spare earth (In put)
13	—	NIL	Spare earth (In put)
14	—	NIL	Spare earth (In put)
15	—	NIL	Spare earth (In put)
16	—	NIL	Spare earth (In put)
17	—	NIL	Spare earth (In put)
18	G/Y	Sending unit	For detecting residual fuel
19	Y/B	Coolant temp. sensor	Detection of engine coolant temperature. When the set temperature of emergency stop becomes higher, the interior contact (RY3) between CN1-1 and CN1-3 terminals turns “OFF” to cause engine to emergency stop. ●Warning·Emergency stop set temperature Warning temperature:105℃ Emergency stop temperature:110℃
20	G/B	Earth	

※ : Abnormal oil pressure detection circuit of controller starts to function in 10 seconds after it detects alternator generating signal with CN2-18 terminal.

# 3. Electric System

## 3.2 Alternator [Dynamo regulator (IC type)]

Engine maker part number: 129423-77200



### (1) List of functions

Pin No.	Line color	Connection	Remark
BAT	R	Starter motor B terminal	Power for charging voltage.
IG	R/B	5A Fuse (Through joint connector)	It detects battery voltage, and it controls rotor coil electromagnetic current.
L	W/B	Controller CN2-11 terminal	It makes warning lamp go on when battery charging function is abnormal.
※ P	W/R	Controller CN2-8 terminal	Output alternator frequency (engine rotating signal)
E	—	Earth	Earth

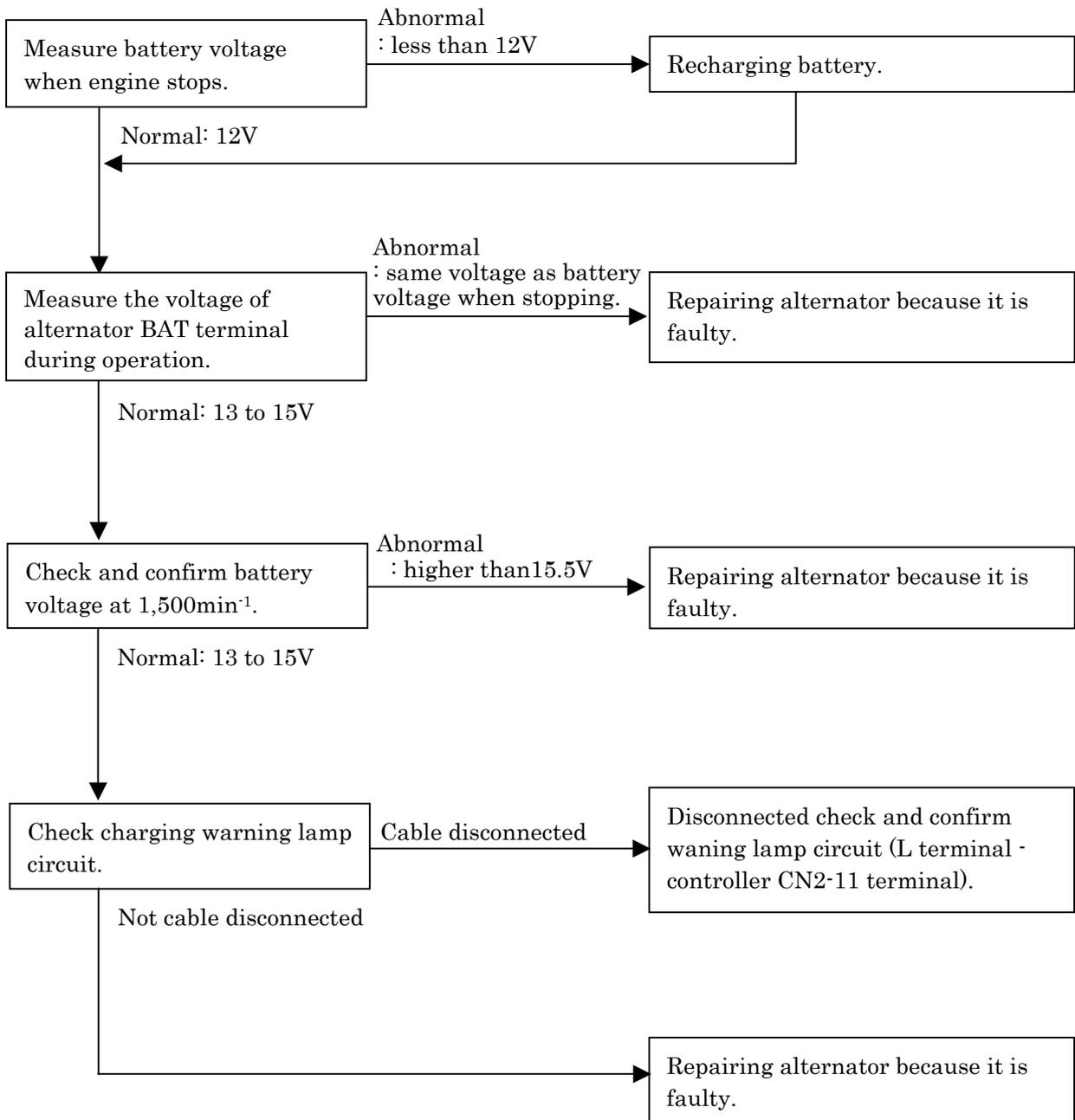
※For diagnosing P terminal, check the generating voltage between P-E terminal and it is normal if the voltage detected is about DC2.2V.

### (2) Judgement of alternator functions

Checking method by measuring battery terminal at full load operation	Normal Value
Measure the battery terminal voltage at 1,500min <sup>-1</sup> .	13 to 15V

# 3. Electric System

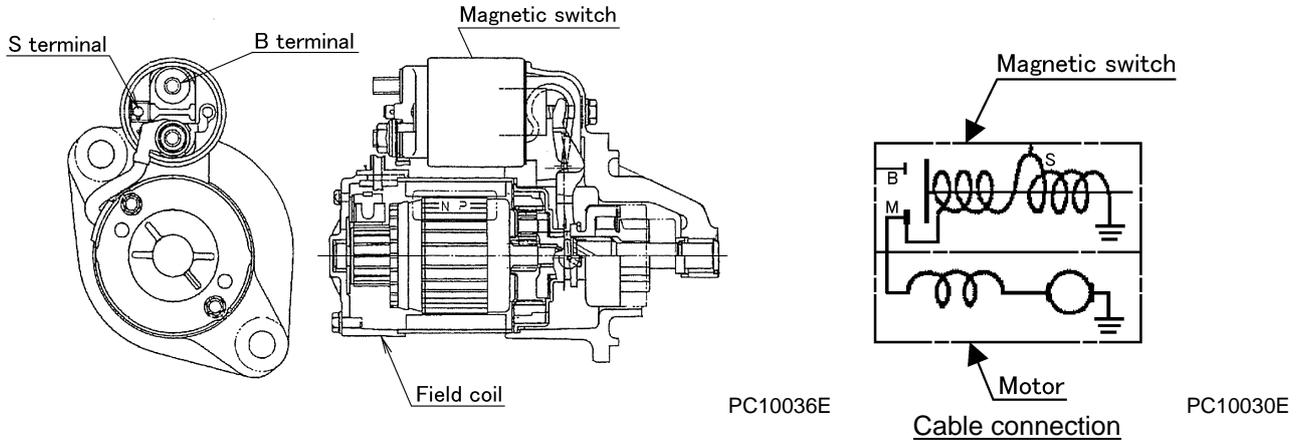
## (3) Diagnosing when battery charging warning lamp lights



# 3. Electric System

## 3.3 Starter

Engine maker part number: 129242-77010



### (1) List of functions

Pin No.	Line color	Connection	Remark
B	B	Battery + terminal	For supplying power to starter which enables starter pinion to turn.
S	W	Safety relay B terminal	For supplying power to make starter pinion to spring out and also a little power to make pinion turn for smooth engagement between pinion gear and ring gear when they are in contact.

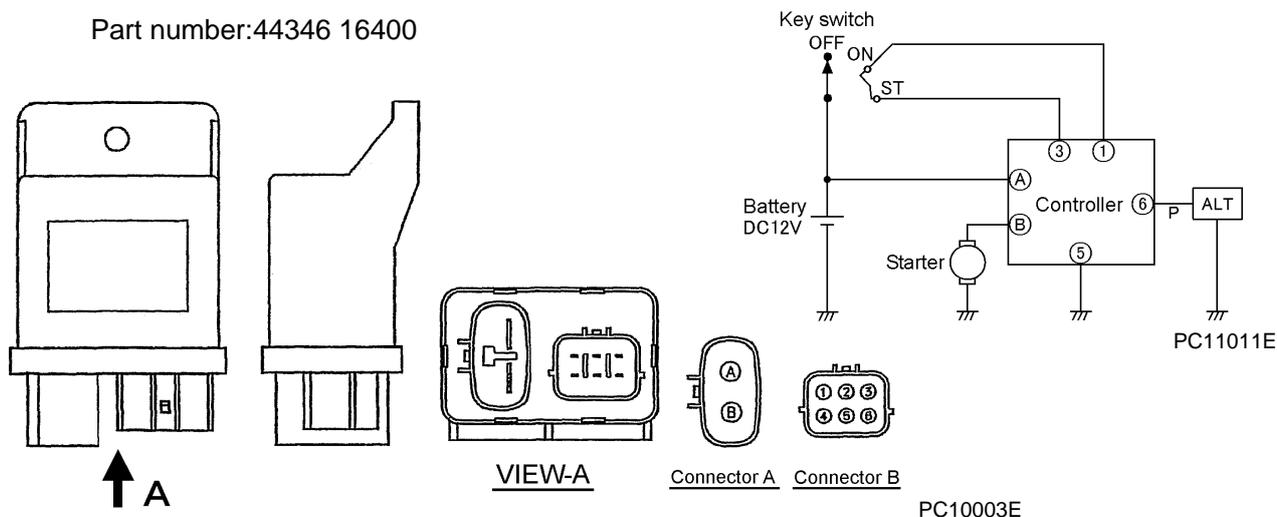
### (2) Judgement of starter functions

Checking method by measuring battery terminal at full load operation	Normal Value
During normal operation at normal temperature	7.7V, 400A and pinion RPM: lower than 1,400min <sup>-1</sup> .

# 3. Electric System

## 3.4 Safety relay

Part number:44346 16400

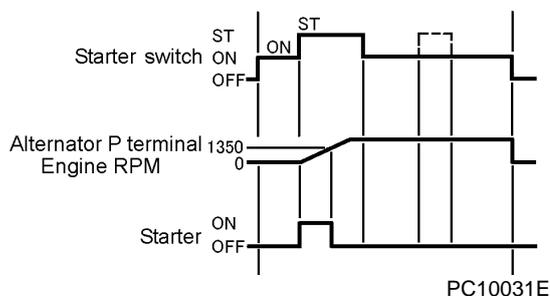


(1) Specification

Rated voltage	DC12V	
Range of voltage at which unit is used	DC10 to 15V	
Range of temperature at which unit is used	-30 to +80°C	
Rated load	MAX 40A	
Power input of alternator (P terminal)	※ frequency signal	
Interior contact between A and B terminal	Engine speed for contact disconnection	1,350 ± 210min <sup>-1</sup>
	Engine speed for recovery	650 ± 150min <sup>-1</sup>

※For the details, see engine service manual.

(2) Chart of function



(3) List of functions

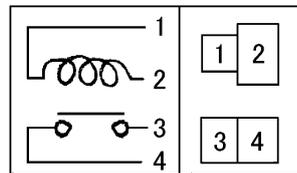
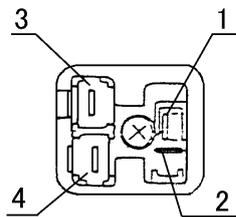
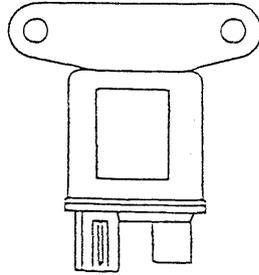
Pin No.	Line color	Connection	Remark
1(C)	R/B	Starter switch ACC terminal	Power supply
2	-	NIL	
3(E)	W/B	Starter switch C terminal	Signal of start is inputted When starter switch is turned to "START" and voltage is applied to E terminal the contact between terminal A and B is switched to "ON" to supply power to starter motor S terminal to turn starter motor. When alternator P terminal frequency inputted to terminal H exceeds 250 Hz (at engine speed of 1,350min <sup>-1</sup> ), the contact between terminal A and B is switched to "OFF" and power supply to starter motor is cut to stop engine. And after starting is secured, the contact between terminal A and B is kept "OFF" to prevent overrun and plunging of pinion gear.
4	-	NIL	
5(G)	B	Earth	
6(H)	W/R	Alternator P terminal	Input alternator frequency (engine rotating speed signal)
A	R	Starter motor B terminal	For excitation terminal of starter motor magnet switch excitation coil.
B	W	Starter motor S terminal	

# 3. Electric System

## 3.5 Solenoid relay · Heater relay

Part number:44327 05000

Engine maker part number:119650-77910



Cable connection

PC10005

### (1) Specification

Rated voltage	DC12V
Continuous rating	1min
Coil resistance (between No.1 and No.2 terminal)	13Ω

### (2-1) Solenoid relay functions list

Pin No.	Line color	Connection	Remark
1	Y/L	Controller CN1-8 terminal	See“CN1-8 terminal of NO.6 List of function of No.3.1 Controller”.
2	B	Earth	
3	G	30A Fuse	
4	Y	Stop solenoid W terminal	

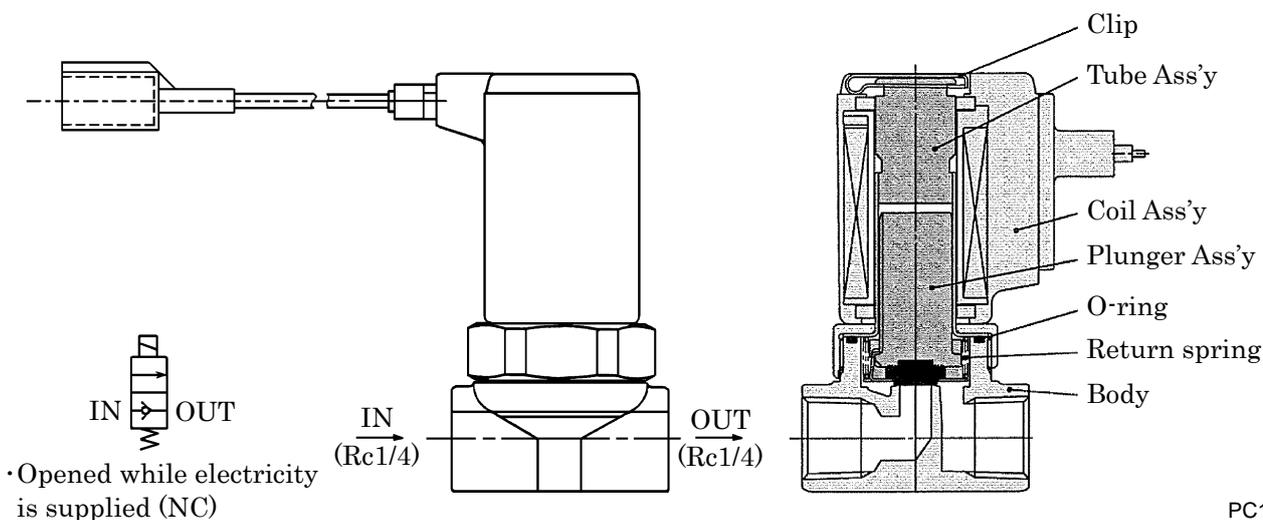
### (2-2) Heater relay functions list

Pin No.	Line color	Connection	Remark
1	Y/R	Starter switch R2 terminal	When starter switch is turned to “GLOW” or “START”, power is supplied to switch the contact between No.3 and No.4 terminal to “ON”.
2	B	Earth	
3	R	50A Fuse (Through alternator BAT terminal)	When the contact between No.3 and No.4 terminal is “ON”, preheating begins.
4	L	Glow plug	

### 3. Electric System

#### 3.6 Starting unloader Solenoid valve [PDS175S(SC)-5C3 only]

Part number:46811 24100



PC10037

(1) Specification

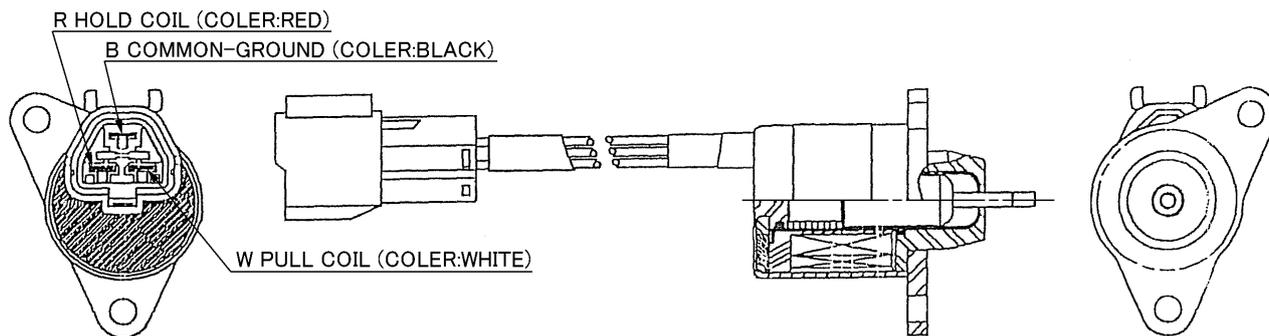
Rated voltage	DC12V
Function	Power is supplied. It is ON (NC)

(2) List of functions

For details of functions, see “NO.6 List of function (CN1-7 terminal) of No.3.1 Controller” .

#### 3.7 Stop solenoid

Engine maker part number:119233-77932



PC10012E

(1) Specification

Rated voltage		DC12V
Suction coil	Rated current	36.5A
	Resistance	0.33 Ω ± 10%
Holding coil	Rated current	0.49A
	Resistance	24.5 Ω ± 10%

(2) List of functions

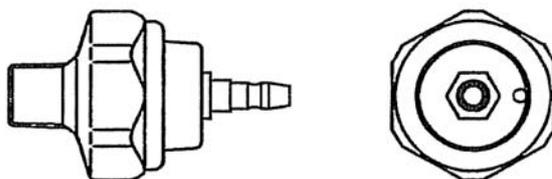
Pin No.	Line color	Connection
W	Y	30A Fuse (Power supply) [Suction power supply]
R	W/B	Controller CN1-3 [Holding power supply]
B	B	Earth

※For details of functions, see “No.6 List of function (CN1-3 and CN1-8 terminal) of No.3.1 Controller” .

## 3. Electric System

### 3.8 Engine oil pressure Switch (For emergency stops)

Part number:44328 21800



PC10013

#### Specification

Operation pressure	0.05MPa (0.5kgf/cm <sup>2</sup> )
Contact type	B contact switch (Contact "OFF" in excess of operation pressure)
Time lag	<ul style="list-style-type: none"> <li>• 10 seconds after engine starts.</li> <li>• 2 seconds during operation ※</li> </ul>

※When such situation under operation pressure continues longer than 2 sec.  
It brings engine to emergency stop.

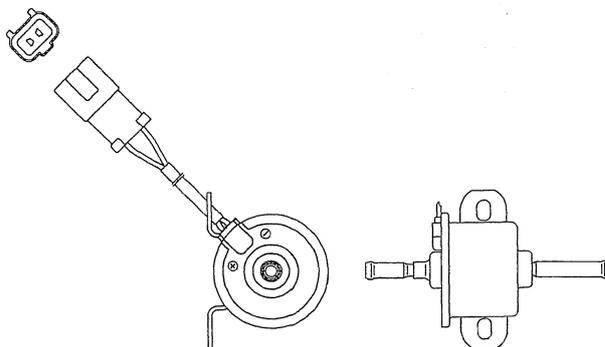
### 3.9 Fuel air-bleeding Electromagnetic Pump

Part number:43650 02700

Engine maker part number:129612-52100

#### Specification

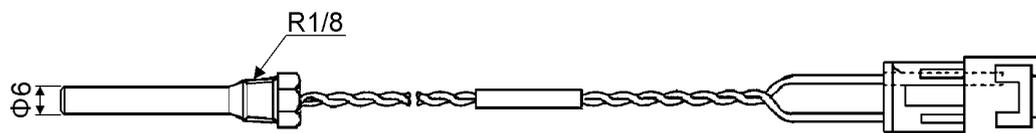
Rated voltage	12V
Operating current	1.5A (MAX)
Delivery capacity	0.4-1.1 L/min



PC10014

### 3.10 Discharge air temperature Sensor · Coolant temperature Sensor

Part number:44364 06500



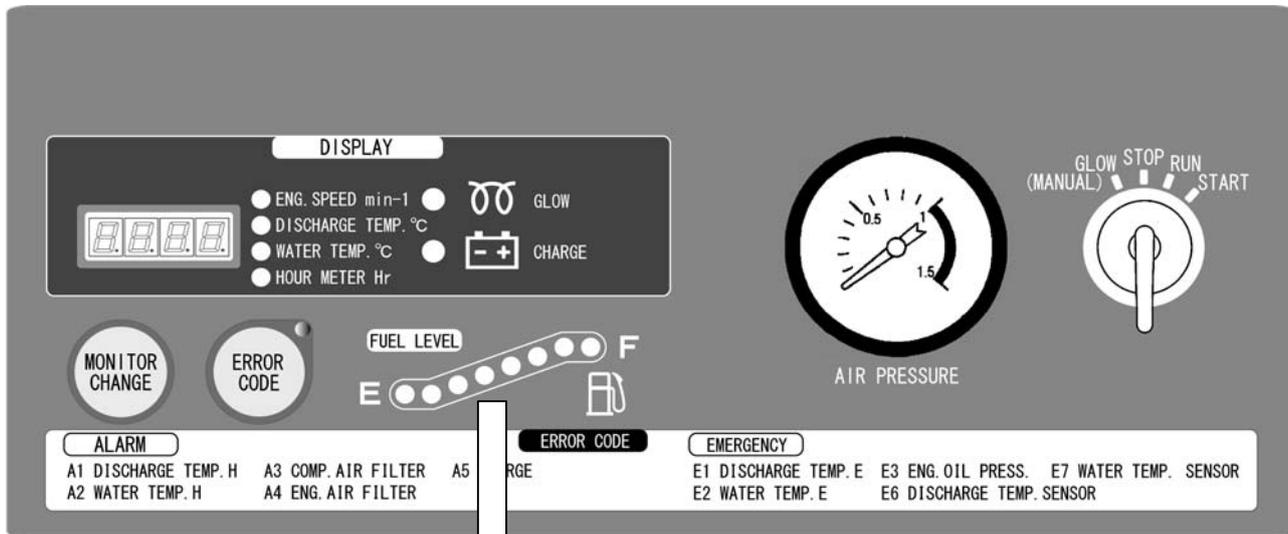
PC08033

《Note》 Take care not to tighten excessively. Less than 1.96N·m(20kgf·cm)

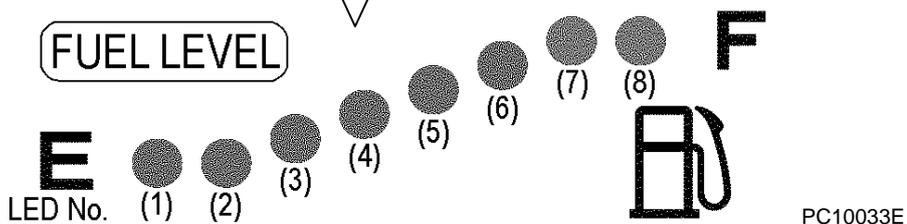
※For temperature characteristic of resistance, see "No.5.Adjustment and inspection of No.3.1 Controller" .

# 3. Electric System

## 3.11 Fuel meter (Display)



A110165



Relation between indicator lamp (LED) and residual fuel level

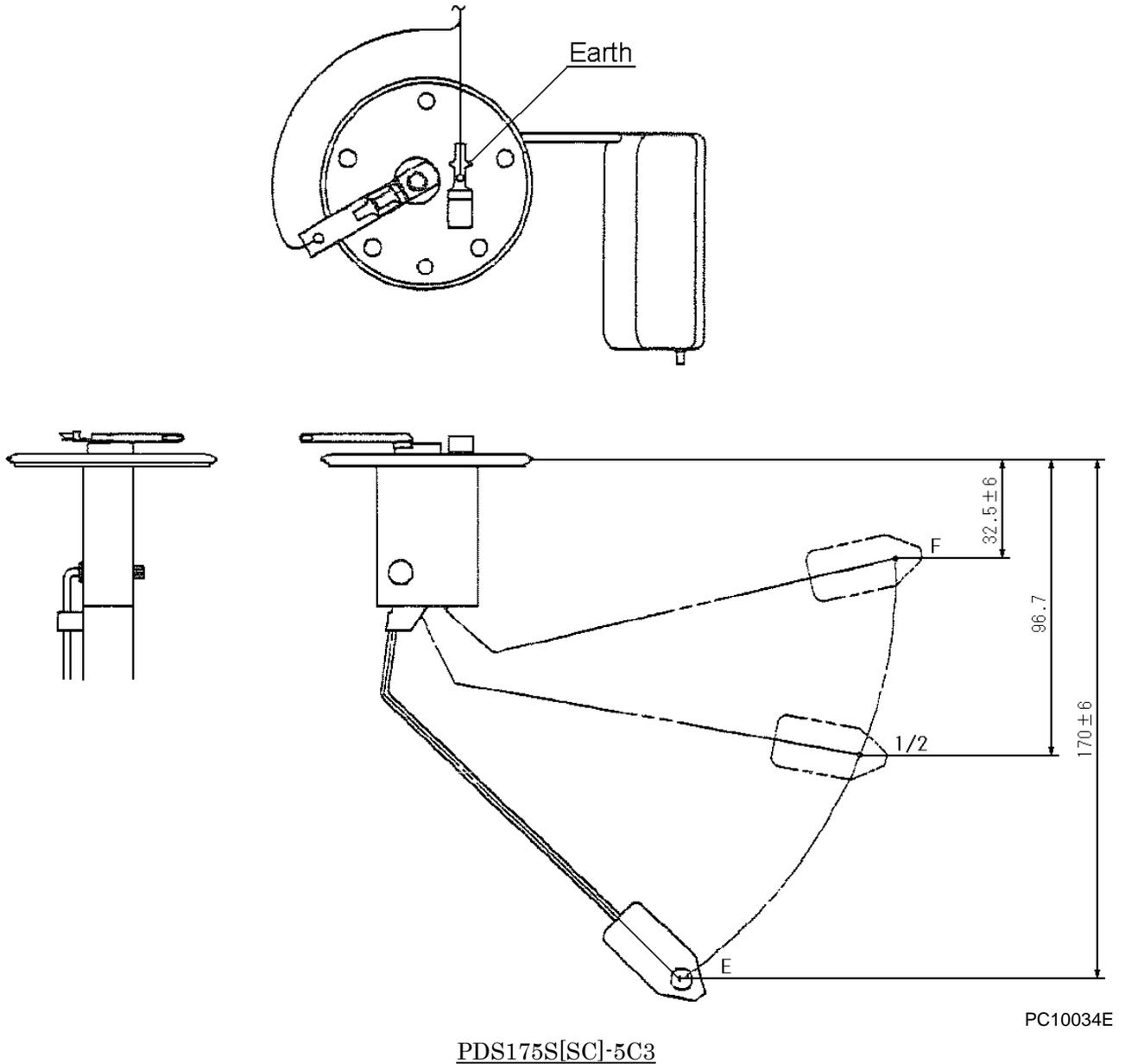
Indicator lamp		Remaining fuel (L)		Remark
		PDS130S[SC]-5C3	PDS175S[SC]-5C3	
Full tank		70	90	F
LED No.8	OFF (Green)	50	70	
LED No.7	OFF (Green)	44	61	
LED No.6	OFF (Green)	38	53	
LED No.5	OFF (Green)	31	45	1/2
LED No.4	OFF (Green)	25	36	
LED No.3	OFF (Red)	19	28	
LED No.2	OFF (Red)	14	21	
LED No.1	Blinking (Red)	10	16	E

# 3. Electric System

## 3.12 Sending unit

PDS130S[SC]-5C3 Part number:36159 04600

PDS175S[SC]-5C3 Part number:36159 04300



※For resistance at float position, see “No.5.Adjustment and inspection of No.3.1 Controller” .

# 4. Troubleshooting

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## 4.1 Repairing Procedures

When performing failure diagnosis, pay special attention to the followings, observing general cautions.

### 4.1.1 Safety caution

- (1) Removing such cap and/or plug for receiver tank, fuel tanks and pipes where pressure is loaded, stop the machine and relieve all the interior pressure. Install measuring instruments connected firmly.
- (2) When doing the job with co-worker(s) together, make sure to give signal to the other person(s) and do not allow other persons to come near to the job site.
- (3) Take care not to touch hot portions and not to be involved in turning portions.

### 4.1.2 Caution during failure diagnosis

- (1) Do not make haste to disassemble the unit

If the unit is disassembled urgently.

- ① You may disassemble the other portions which are not related with the trouble.
- ② The cause of trouble may be missing.

The unnecessary reparations require more spare parts and man-hours, and reparation costs will increase more. What is worse, you will lose reliance or trust from clients, operators and users.

Therefore, it is absolutely necessary to investigate the trouble more carefully in advance and to follow the required procedures for failure diagnosis.

- (2) Ask the clients about the trouble in details

In order to prevent misunderstanding and incorrect judgment about the trouble, it is necessary to ask users or operators about the following questions.

- ① Is there any other disorder than the trouble he has informed?
- ② Anything abnormal occurred before this trouble?
- ③ Did this trouble happen unexpectedly? Or the unit had been operated in bad conditions before?
- ④ When and how did this trouble occur?
- ⑤ Had he repaired the unit before this trouble occurred?
- ⑥ Did he not experience similar trouble before?

- (3) Inspection items before starting diagnosis

Sometimes such trouble may be caused owing to routine mishandling of the unit. Before starting failure diagnosis, check the following items.

- ① The engine runs short of engine oil or its oil is not dirty?
- ② Check each wire connection for any disconnection.
- ③ Check the other portions for any damage.

- (4) Confirmation of trouble

Discuss with user(s) and/or operator(s) sufficiently about the trouble. As a result, judge whether their judgment is based on the numerical comparison or sentimental basis. Make him (them) understand well the reparation or correction you have finished.

Then check and confirm by yourself the cause of the trouble.

Note) Never proceed any investigation or measurement which may cause further greater damage.

# 4. Troubleshooting

## (5) Procedures of diagnosis

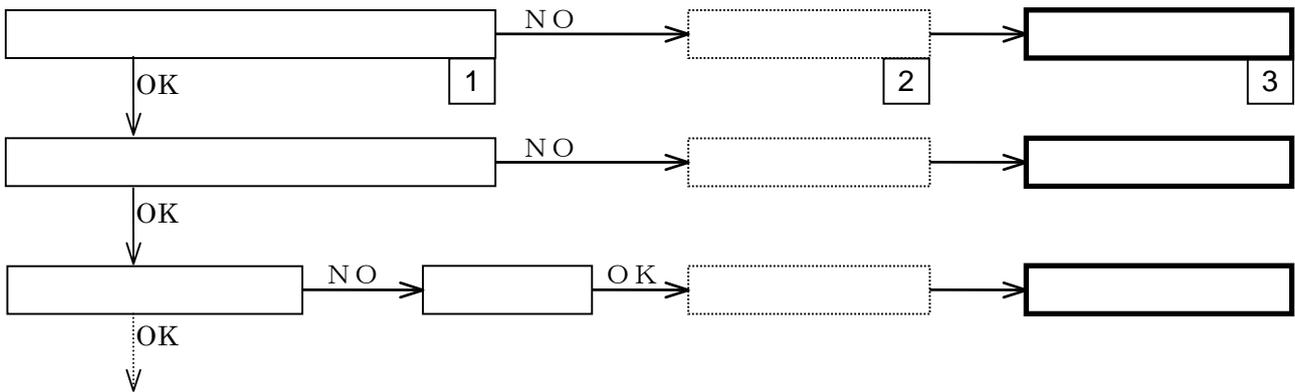
When you become well experienced, you can find out the cause easily during the process of confirmation (4). But easy understanding could cause unexpected failure. So check and judge it according to the following procedures.

- ① Check the easiest thing or portion first.
- ② Investigate the most possible cause.
- ③ Check the other things connected to the trouble.
- ④ Check for the possibility of any other troubles.
- ⑤ Start proper and careful investigation on this trouble.

## (6) Prevention of repeated occurrence of similar trouble

Even if you have repaired the trouble, unless you get rid of the fundamental cause of the trouble, it will repeatedly occur. Therefore, perform full investigation of the trouble, and it is absolutely necessary to remove the basis of the trouble.

### 4.1.3 How to use the failure diagnosis



① In the troubleshooting column something abnormal is mentioned in lined parenthesis.



② In the troubleshooting column the cause of the said trouble is mentioned in dotted parenthesis.



③ In the troubleshooting column the countermeasures or treatment are mentioned in the double lined parenthesis.



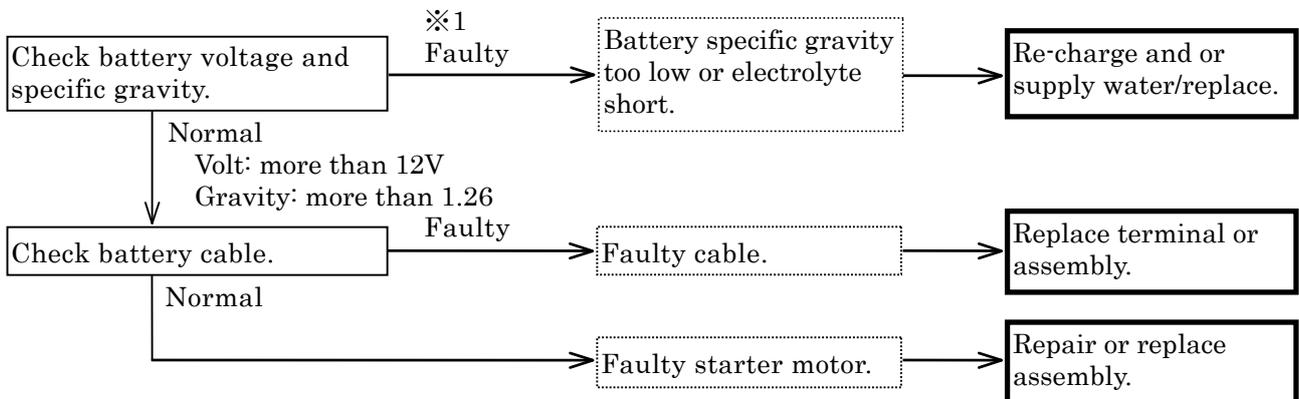
④ 1 under each column means the index of explanation.

For details, see 4.5 “Explanation of trouble diagnosis”

# 4. Troubleshooting

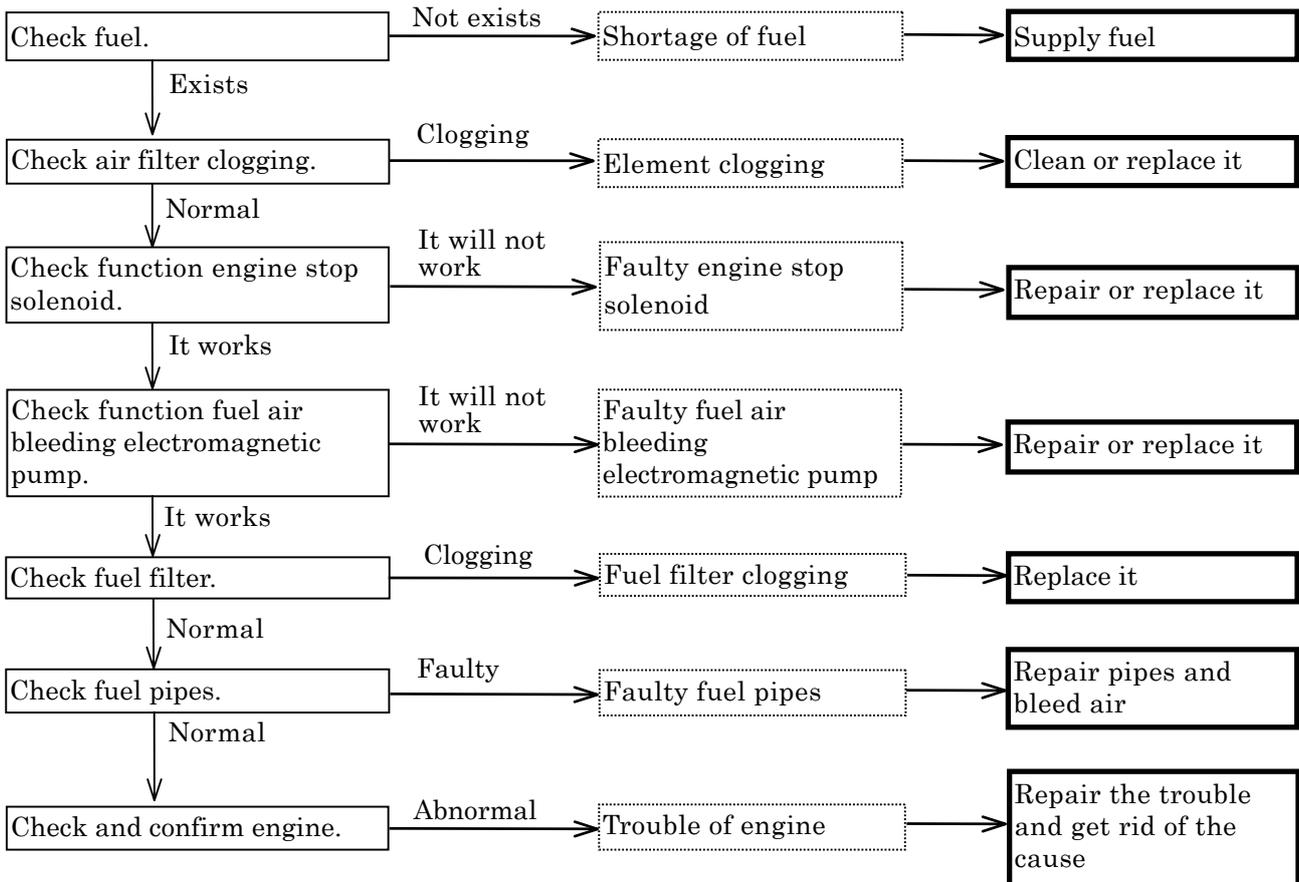
## 4.2 Failures of Compressor and Engine

### 4.2.1 At start-up, starter rotates slowly



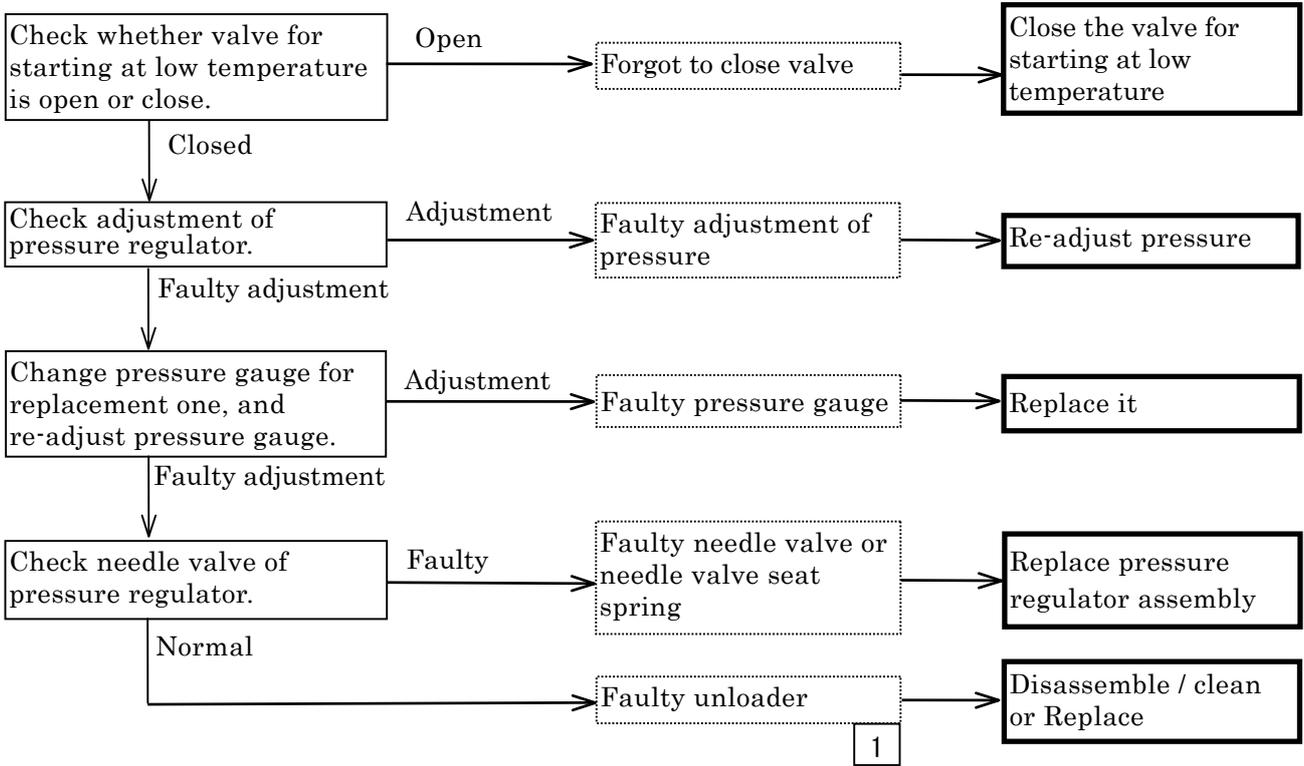
※1 : When starter switch is placed at the “START” position, the battery is not normal if B terminal voltage decreases by 10V.

### 4.2.2 Starter turns, but engine will not start



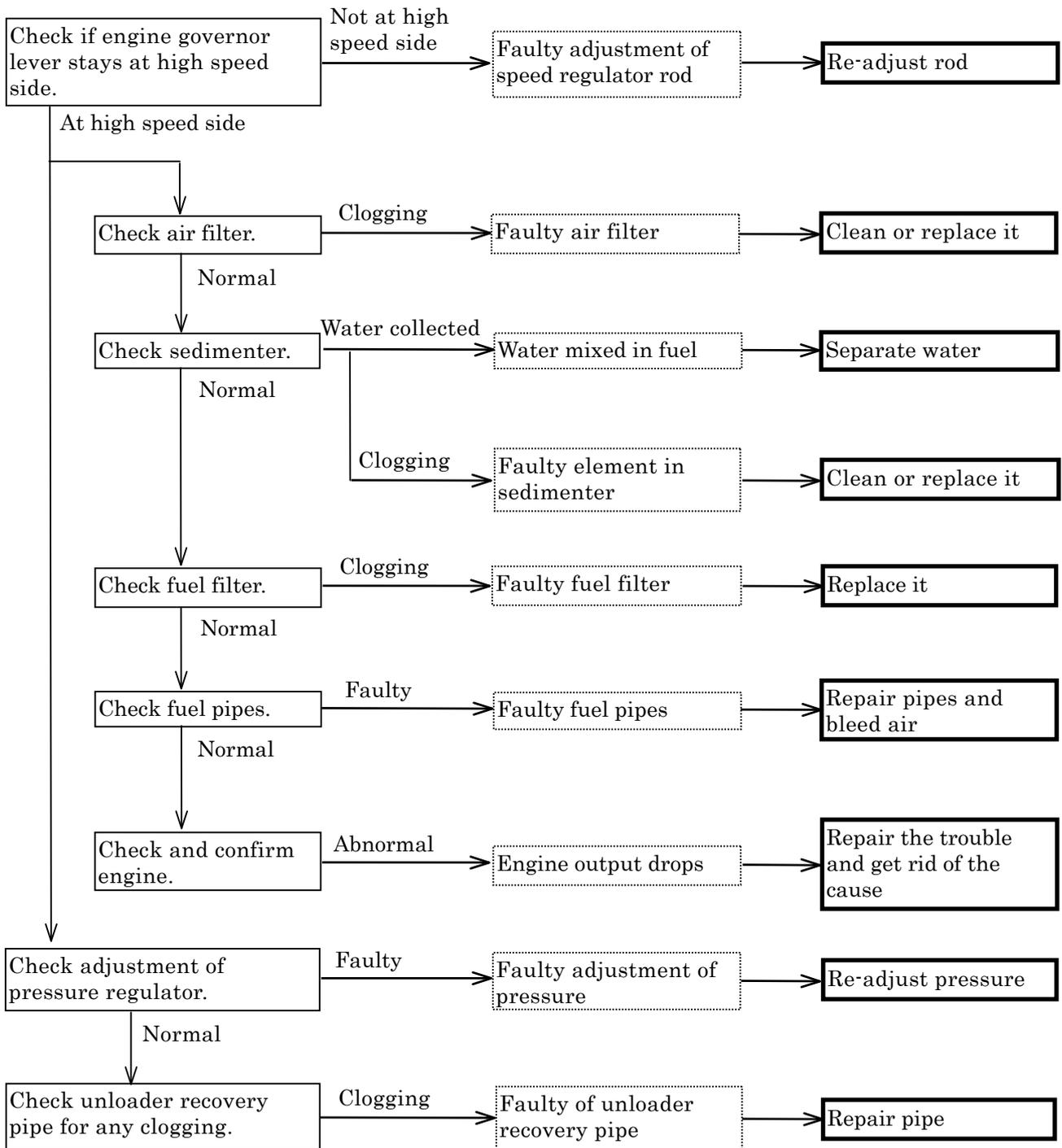
# 4. Troubleshooting

## 4.2.3 Engine revolutions will drop before pressure rises up to rated one



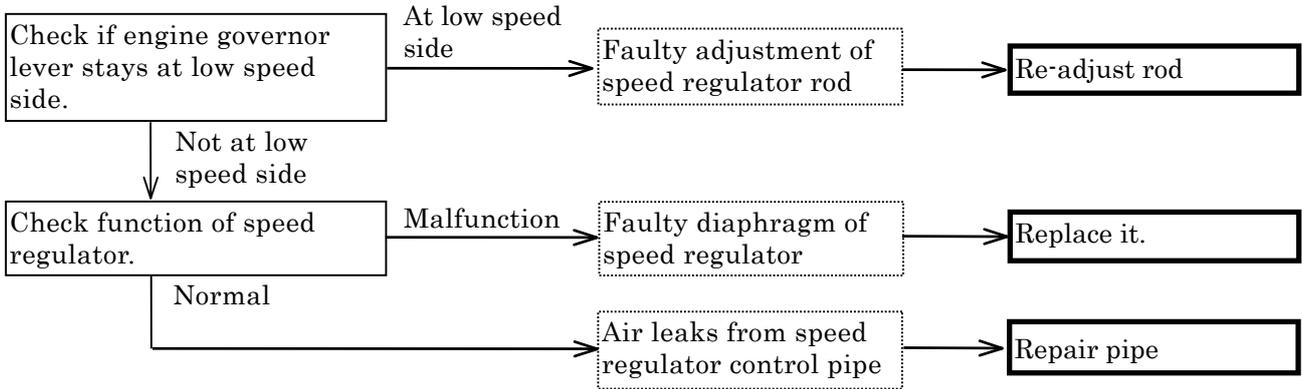
# 4. Troubleshooting

## 4.2.4 Engine will not turn to meet rated revolutions

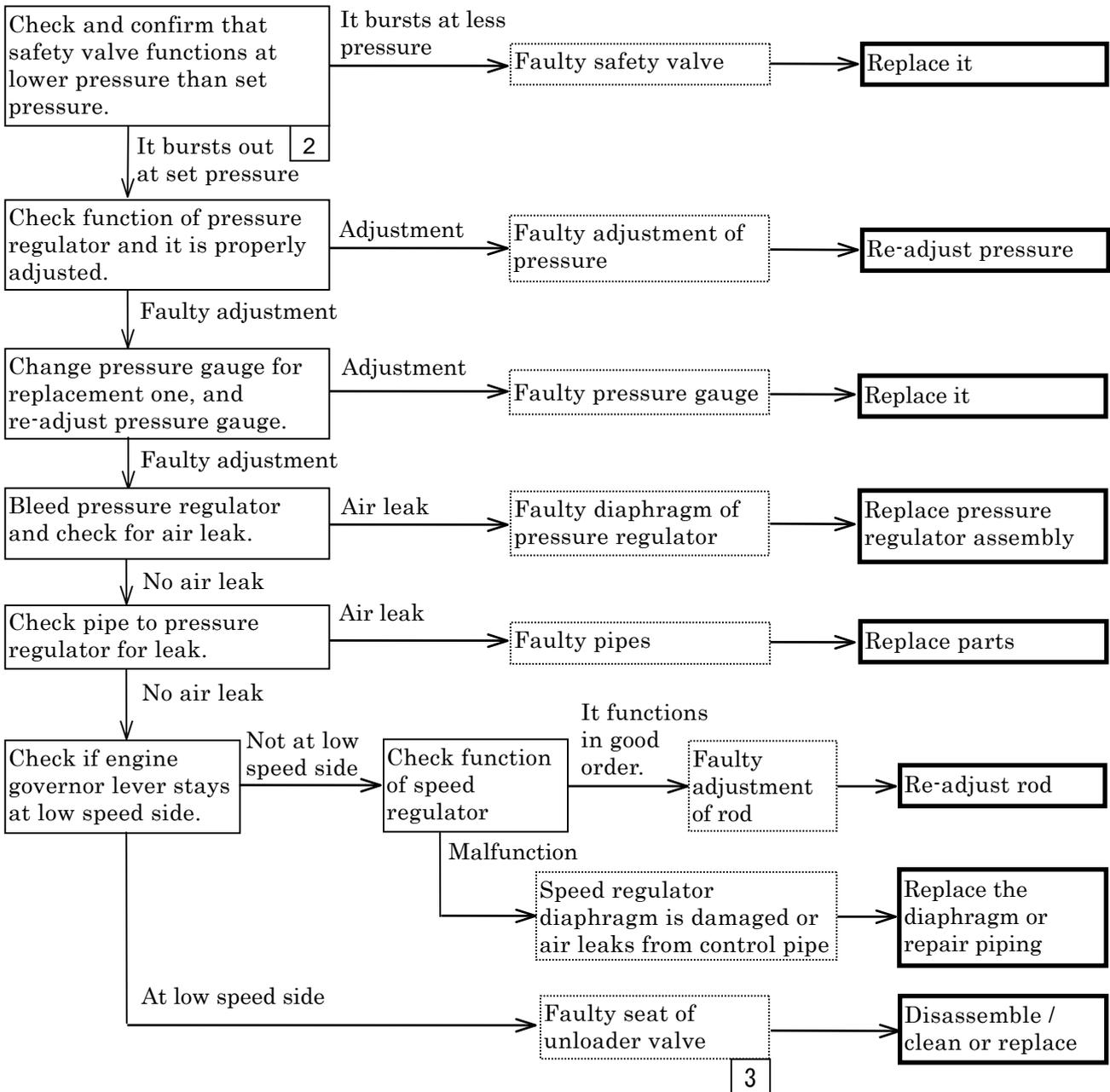


# 4. Troubleshooting

## 4.2.5 Minimum speed not available even upon no-load operation

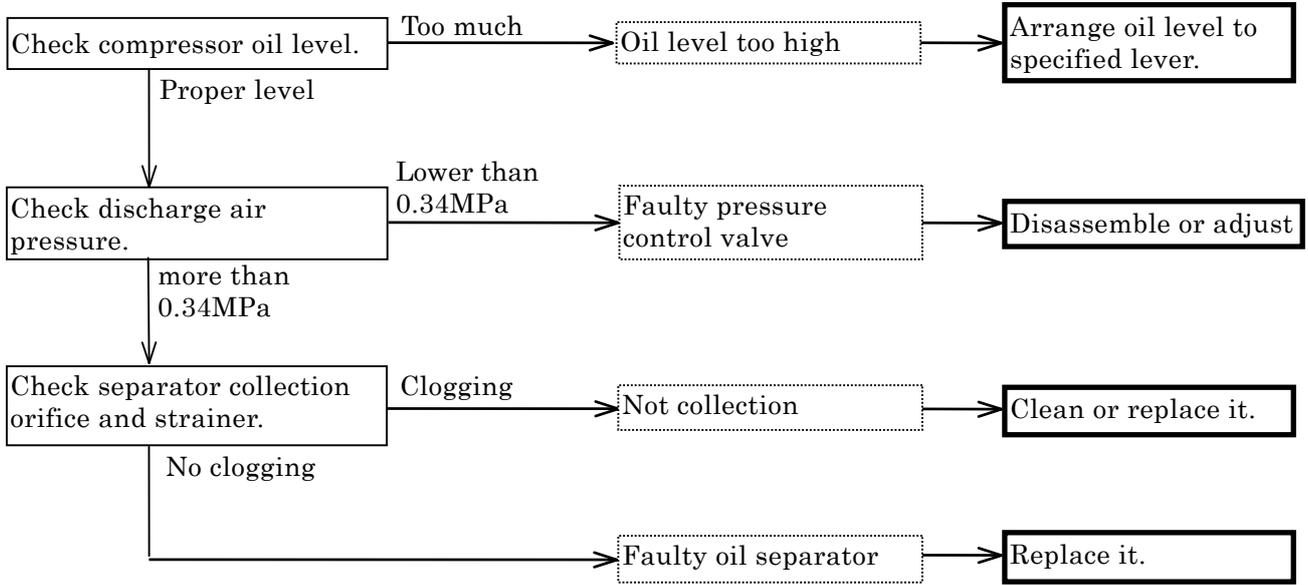


## 4.2.6 Safety valve bursts out during unloaded operation

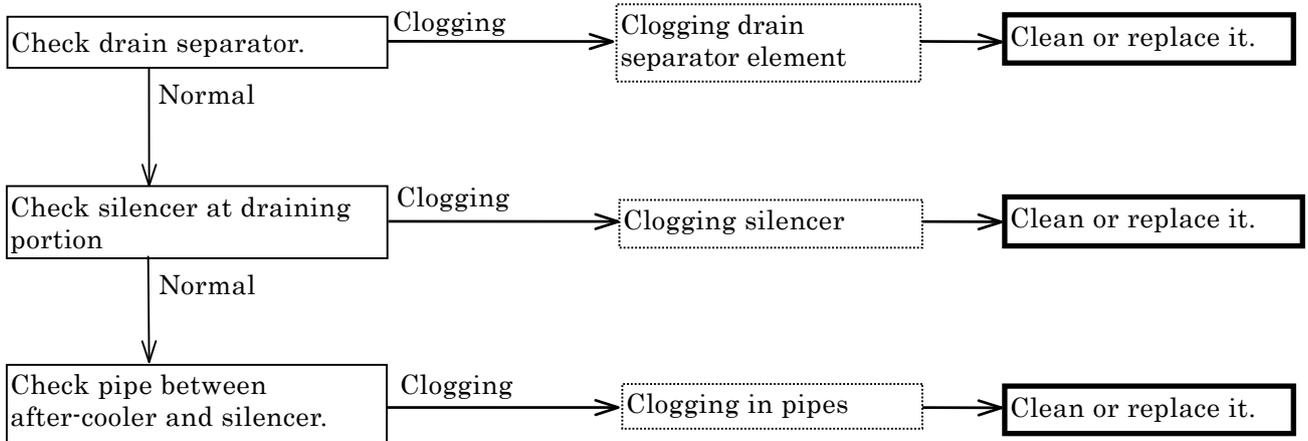


# 4. Troubleshooting

## 4.2.7 Oil mixed found in delivery air

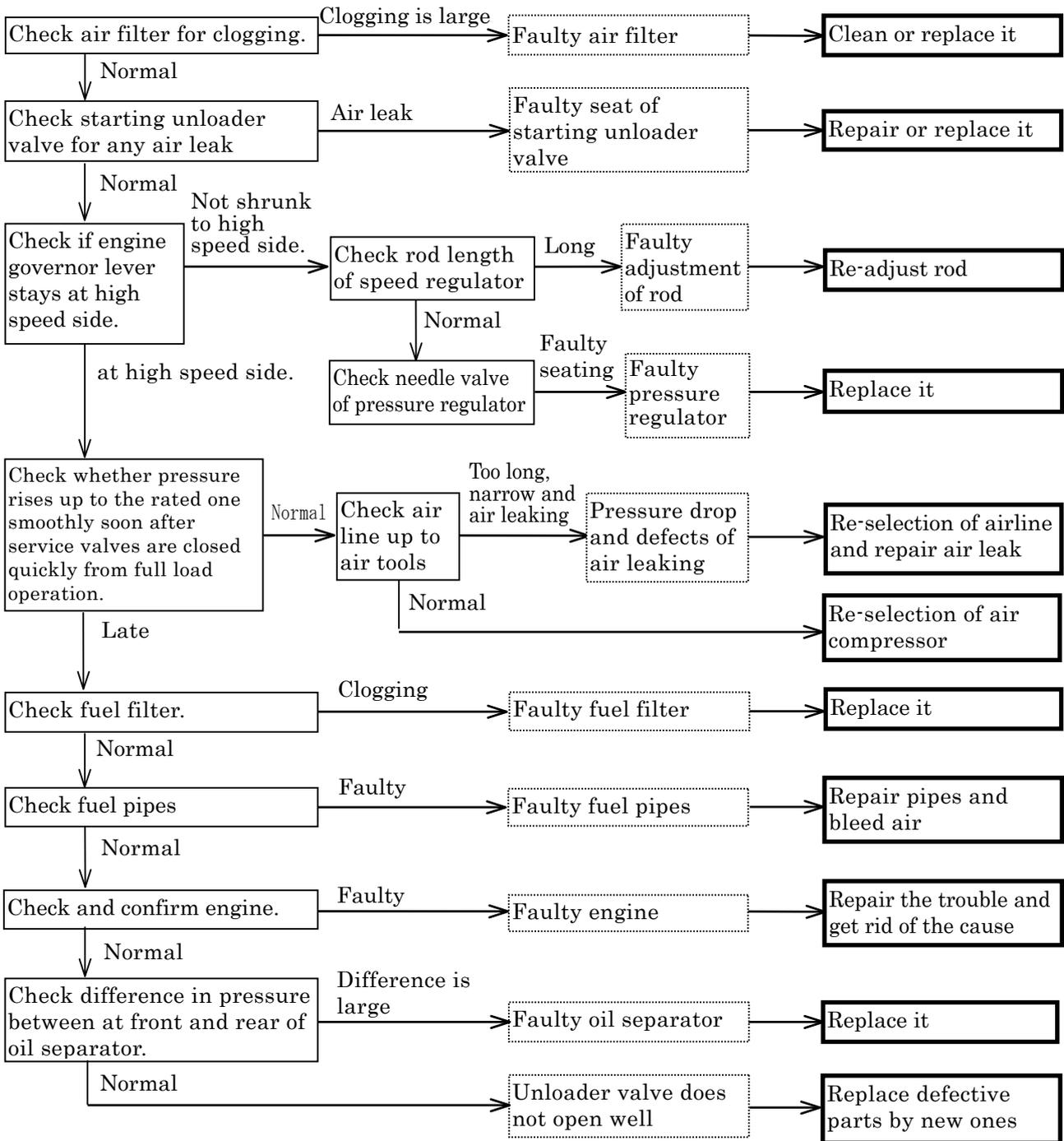


## 4.2.8 Water found mixed in discharge air (After cooler type)



# 4. Troubleshooting

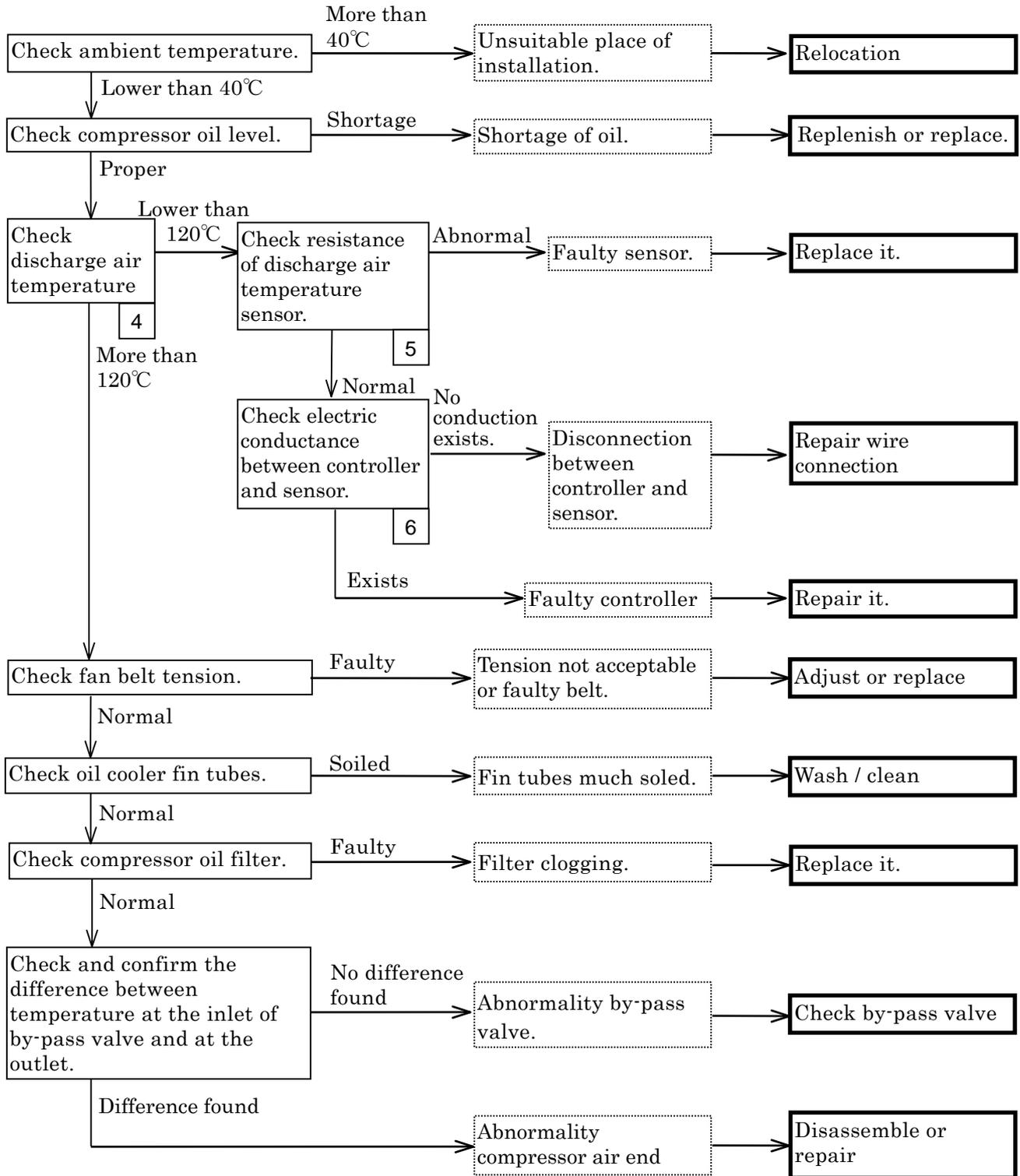
## 4.2.9 Discharge air is insufficient



# 4. Troubleshooting

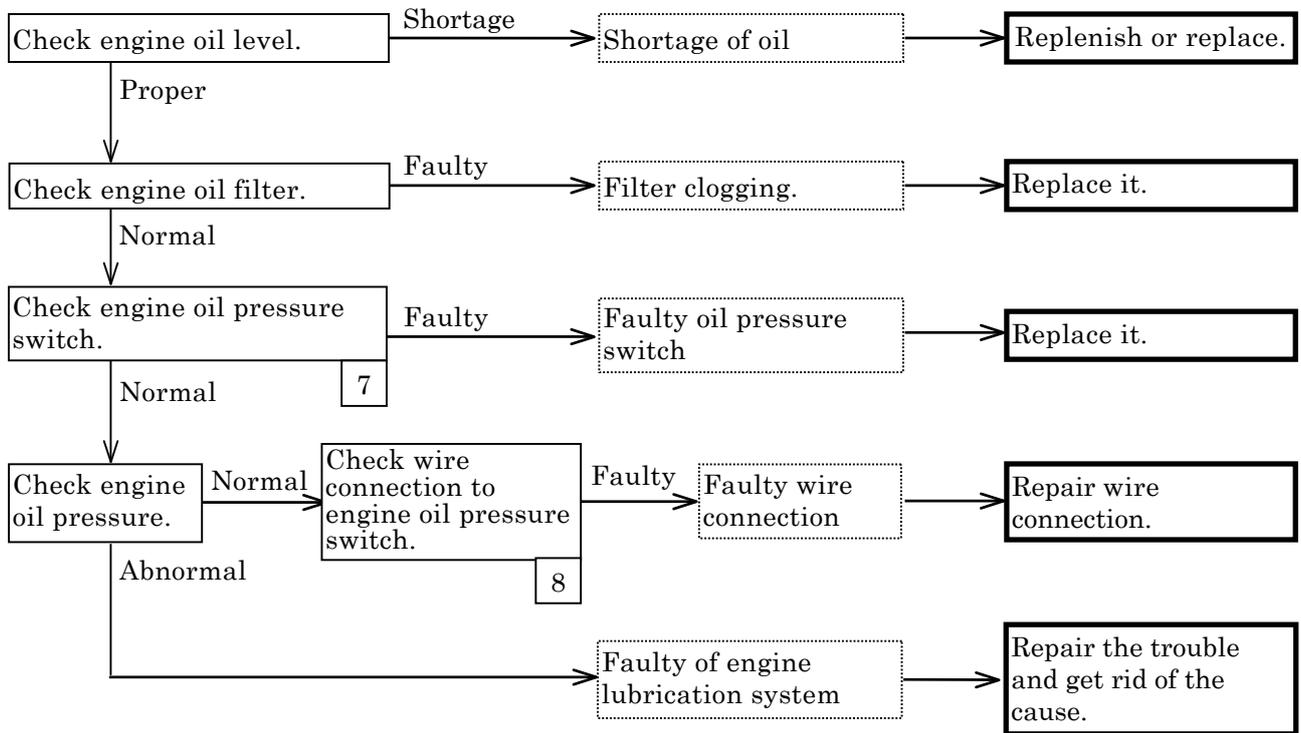
## 4.3 Operation of Emergency Switch

### 4.3.1 Discharge air temperature indication lamp glows and engine stops.



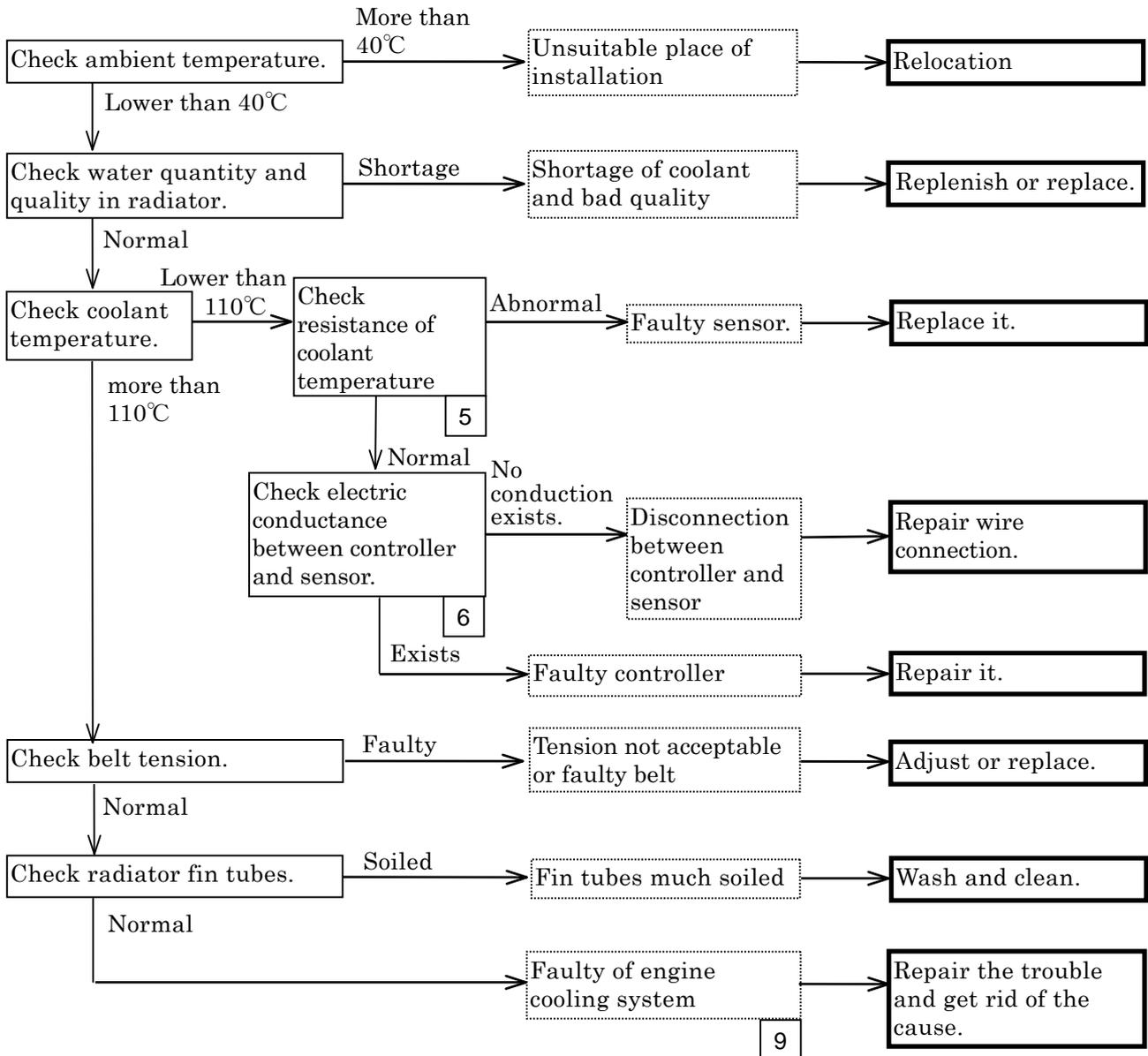
# 4. Troubleshooting

## 4.3.2 Engine oil pressure emergency indication lamp glows and engine stops



# 4. Troubleshooting

## 4.3.3 Engine coolant temperature lamp glows and engine stops

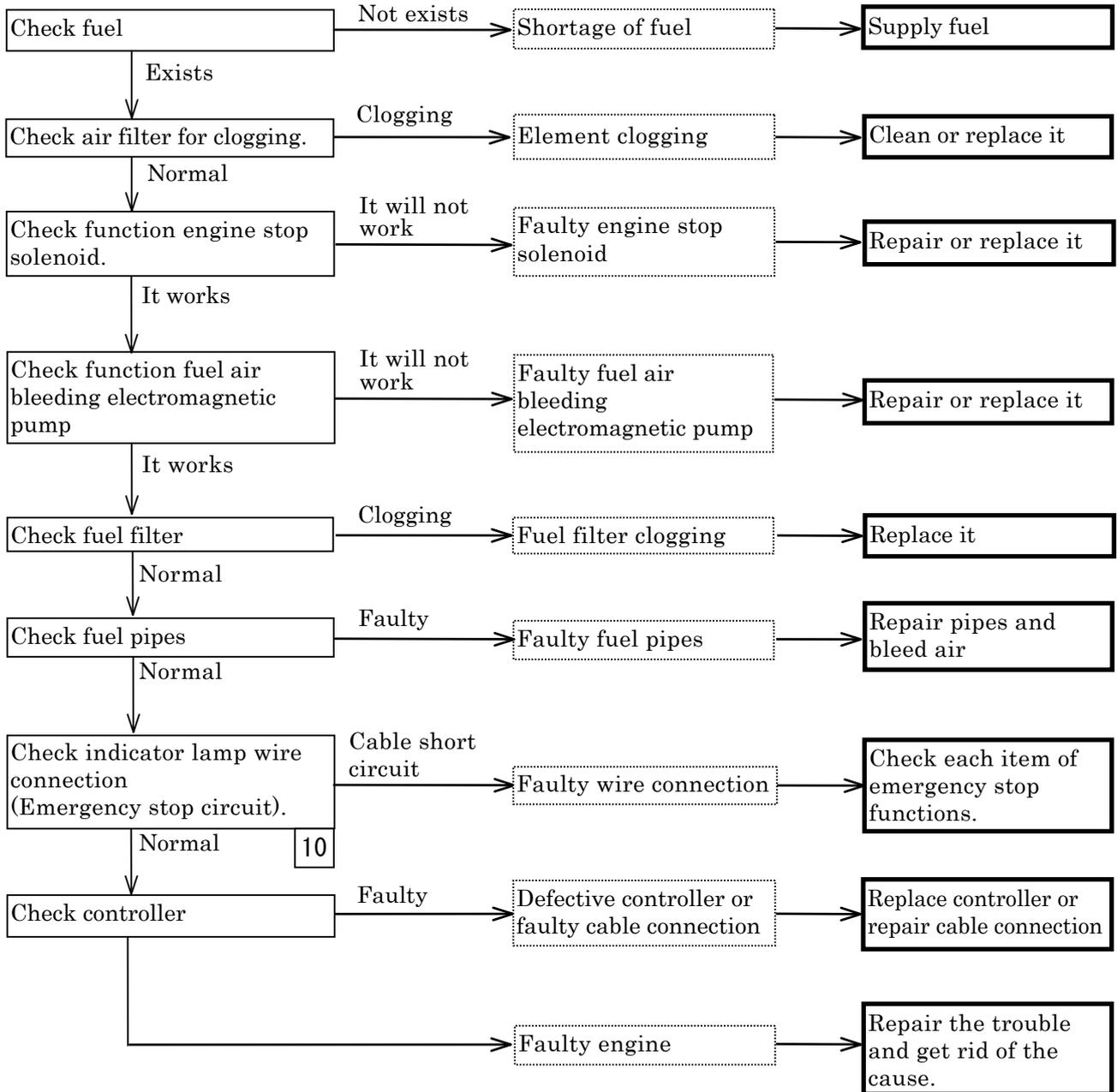


# 4. Troubleshooting

## 4.4 Others

### 4.4.1 Indicator lamps will not glow, but engine stops.

(Starter switch is not set in contact, and primary circuit of battery relay is not connected properly. Blown fuse trouble is exempted.)



# 4. Troubleshooting

## 4.5 Explanation of Trouble diagnosis

No.	Item	Cause	Remedy
1	Faulty unloader.	Unloader valve cannot be open.	Disassemble unloader valve, and check the function of valve and piston. Further check unloader orifice for any clogging.
2	Check and confirm that safety valve functions at lower pressure than set pressure.	Check and locate pressure maladjustment or defective safety valve.	In case of malfunction of safety valve, safety valve assembly should be replaced.
3	Faulty seat of unloader valve.	Faulty seat of unloader valve or faulty sliding function of valve and piston.	Disassemble unloader valve, and clean seat surface and check function of valve and piston.
4	Check discharge air temperature, using digital monitor.	Check whether actual rise of discharge air temperature stops engine or any failure of electrical circuit stops engine.	
5	Check resistance of discharge air temperature/coolant temperature sensor.	For resistance characteristics of discharge air temperature and coolant temperature sensor, See 3.10.	Even disconnection of thermo sensor or its short-circuit causes engine to stop.
6	Check conductance between controller and discharge air temperature sensor/coolant temperature sensor.	<p>Check whether there is any disconnection or short-circuit in cable connection between controller, discharge air temperature sensor and coolant temperature sensor.</p> <p>Clarify whether the trouble is caused by faulty cable connection or defective controller. When discharge air temperature/coolant temperature exceeds the set temperature (120°C /110°C), interior contact (RY3) between controller CN1-1 and CN1-3 terminals turns OFF to cut electrical connection to stop solenoid and making engine stop.</p>	<p>Connect variable resistor (1kΩ) as shown in the following figure and gradually lower resistance value of variable resistor. And when it displays abnormality, measure the value and check whether it is within the range of resistance of set temperature. (See No.5.Adjustment and inspection of No.3.1)</p>

## 4. Troubleshooting

---

No.	Item	Cause	Remedy
7	Check engine oil pressure switch.	For actuation pressure of oil pressure switch, See 1.2 “List of set values”.	
8	Check for any defective connection.	Check and make sure that no disconnection has been found for engine oil pressure switch. (Switching “ON” engine oil pressure switch enables engine emergency stop.)	
9	Faulty of engine cooling system.	When any trouble is not found in thermostat, coolant pump can be in disorder.	For the temperature at which thermostat valve opens, refer to 2.12.
10	Check indicator lamp wire connection.	It sometimes happens that emergency stop circuit is active, but warning lamp will not light on because its circuit is in trouble. Try to locate its cause.	

## 5. References

### 5.1 Comparison between consumable parts and electrical appliances

Item	PDS130S[SC]-5C3	PDS175S[SC]-5C3
●Element / Filter / Belt		
Air filter ASS'Y (For compressor)	32100 44600	32100 34502
Air filter element (outer)	32143 11700	32143 11800
Air filter element (inner)	32143 12900	32143 13000
Air filter ASS'Y (For engine)	32100 44600	←
Air filter element (outer)	32143 11700	←
Air filter element (inner)	32143 12900	←
Oil separator	34220 16101	←
O-ring for oil separator	03402 15140	←
Compressor oil filter ASS'Y	37400 13600	←
Oil filter cartridge	37438 05501	←
Engine oil filter	41290 01100 (Engine maker part number: 119005-35151)	←
Fuel filter	43543 01400 (Engine maker part number: 129907-55801)	←
Sedimenter element	(Engine maker part number: 129242-55730)	←
O-ring	(Engine maker part number: 24311-000160)	←
O-ring	(Engine maker part number: 24321-000750)	←
Belt	(Engine maker part number: 129612-42380)	(Engine maker part number: 129612-42350)
●Air control		
Speed regulator	36400 22600	36400 21901
Diaphragm	36437 01500	←
Pressure regulator	36400 19000	←
Auto relief valve / Vacuum relief valve	(built-in unloader)	←
Needle valve	36429 00801	←
O-ring	03402 25008	←
O-ring	03402 25021	←
O-ring	21221 02100	←
Unloader valve	22100 41201	←
O-ring (2 pieces)	03402 10125	←
O-ring	03402 10070	←
O-ring	21441 04800	←
O-ring	21441 04900	←
Pressure control valve	35300 17000	←
O-ring	03402 15075	←
O-ring	03402 25032	←
Spring	22144 07700	←
Piston	35303 03300	←

## 5. References

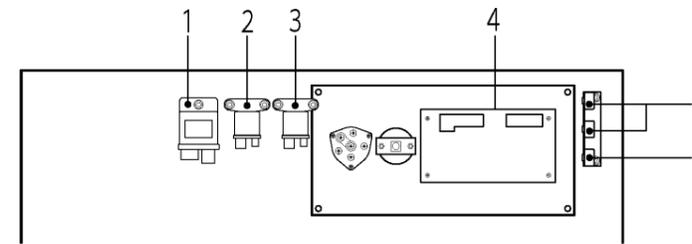
Item	PDS130S[SC]-5C3	PDS175S[SC]-5C3
● Instruments on panel		
Starter switch	44322 07300	←
Pressure gauge	36141 15503	←
● Oil line		
By-pass valve ASS'Y	37200 11502	←
Pellet	37231 02100	←
O-ring	03402 25045	←
● Electrical appliances		
Controller	46870 51901	←
Safety relay	44346 16400 (Engine maker part number: 119802-77200)	←
Solenoid relay Heater relay	44327 05000 (Engine maker part number: 119650-77910)	←
Solenoid valve for starting unloader	—	46811 24100
Fuse 30A(FUSE1)	44470 02600	←
Fuse 5A(FUSE2)	44470 02100	←
Discharge air temp. sensor / Coolant temp. sensor	44364 06500	←
Engine oil pressure switch	44328 21800 (Engine maker part number: 114250-39450)	←
Sending unit	36159 04600	36159 04300
Fuel air-bleeding electromagnetic pump	43650 02700	←
Stop solenoid	(Engine maker part number: 119233-77932)	←

## 5.2 Engine Wiring Diagram [SER.NO. : 0051~]

STOP	○					
GLOW	○	○				○
RUN	○		○			○
START	○		○	○	○	○
	B	R1	ACC	R2	C	BR

Starter SW.

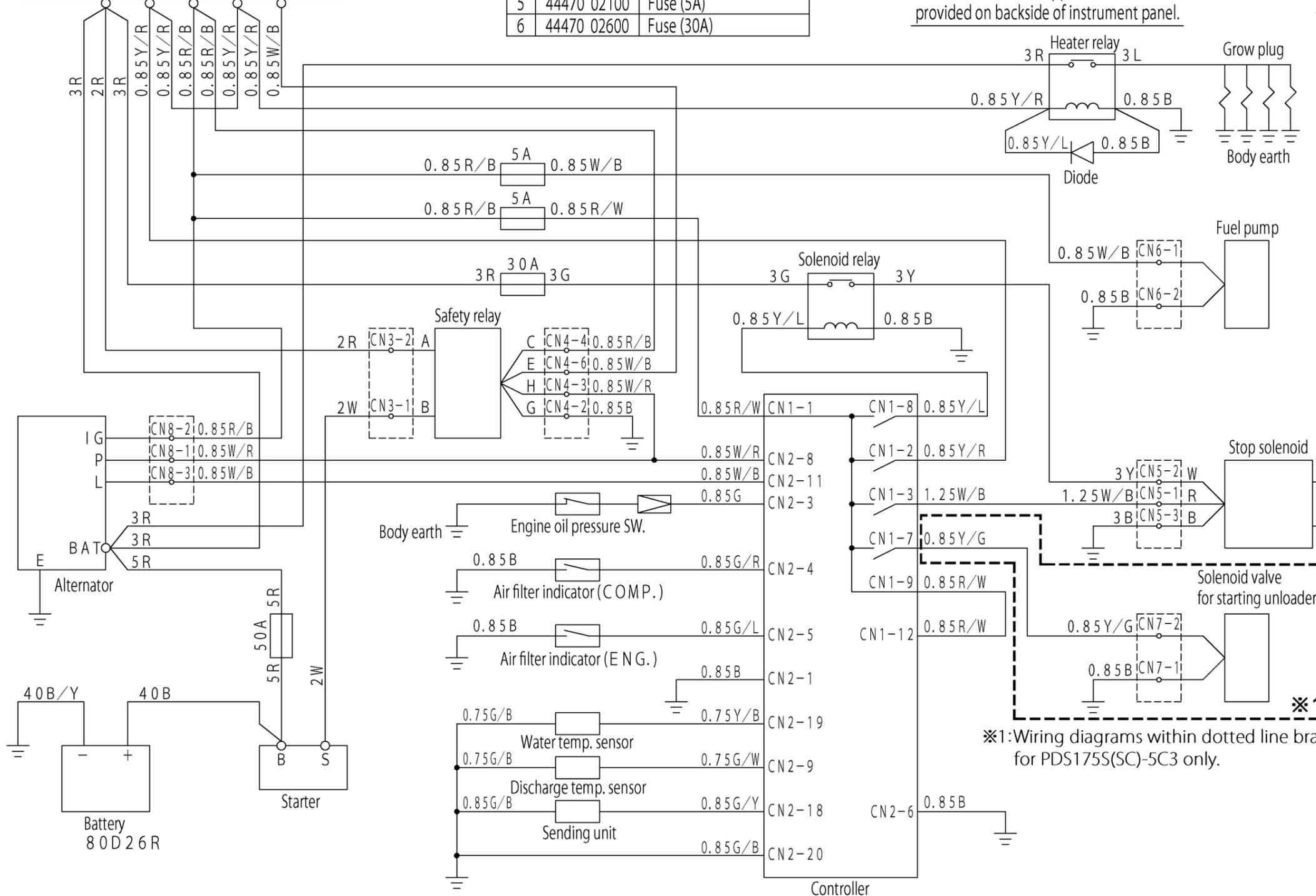
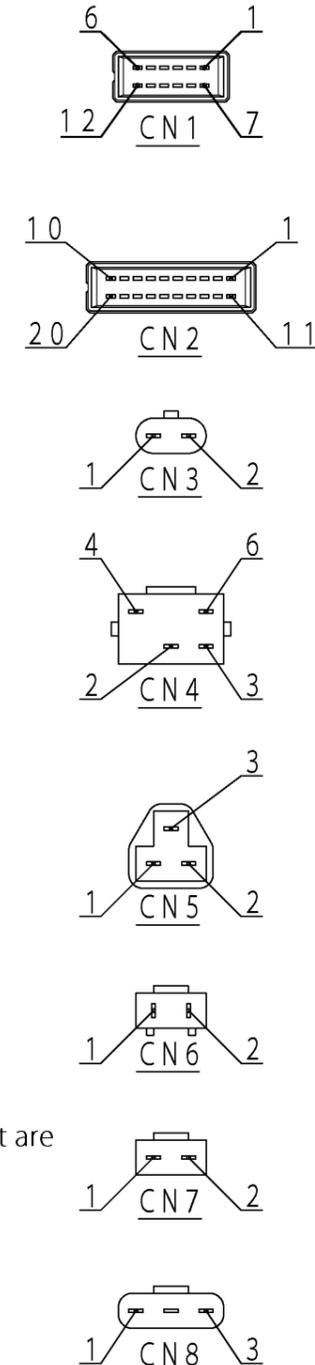
No.	Part No.	Part Name
1	44346 16400	Safety relay
2	44327 05000	Heater relay
3	44327 05000	Solenoid relay
4	46879 54300	Controller complete
5	44470 02100	Fuse (5A)
6	44470 02600	Fuse (30A)



Position of electrical apparatus provided on backside of instrument panel.

### Connector terminal arrangement

The following arrangement is seen from the side of the connector inserting port.



※1: Wiring diagrams within dotted line bracket are for PDS175S(SC)-5C3 only.

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**NPC-0071-1**  
PRINTED IN JAPAN 2012. 3



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