

# Daystar

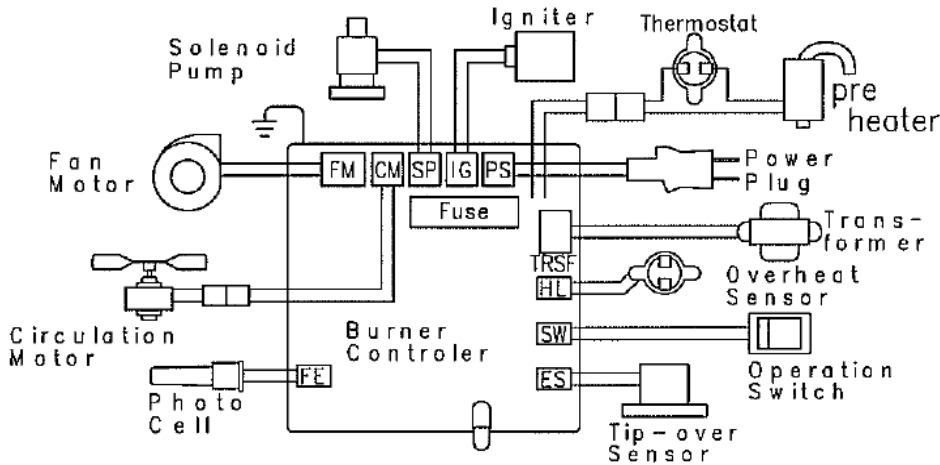
## PH1/PH5

# Maintenance Manual



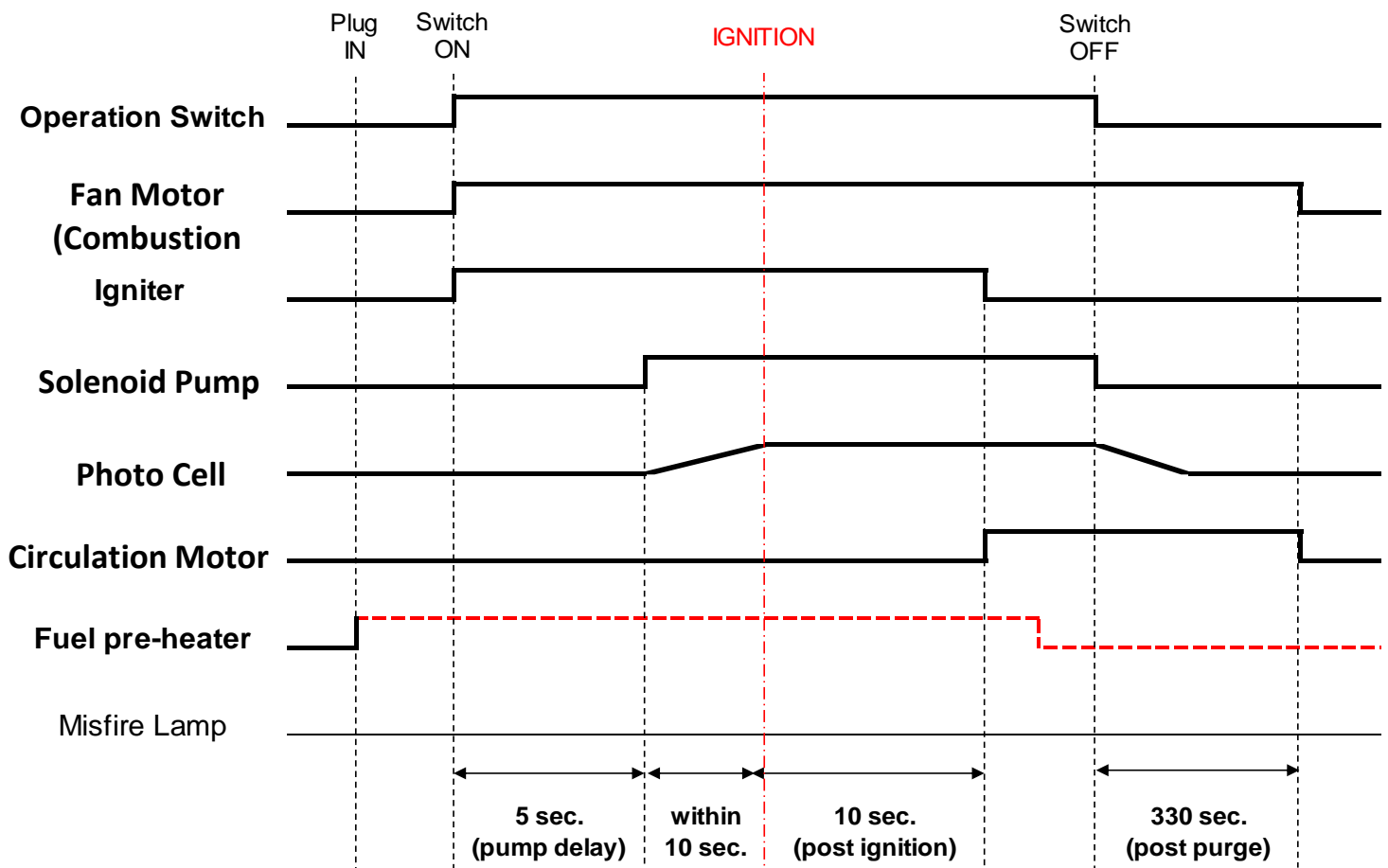
**Shizuoka Seiki Co., Ltd.**

# 1 Wirign Diagram



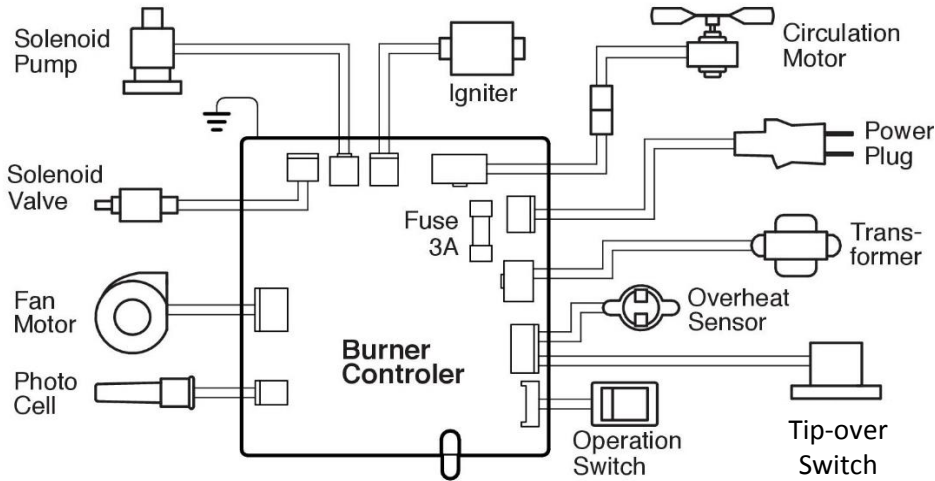
Connecto r No.	Parts Name
CN1	Photo Cell
CN2	Operation Switch
CN3	Overheat sensor
CN4	Power Code
CN5	Fan Motor
CN6	Circulation Motor
CN7	Igniter
CN8	Solenoid Pump
CN9	Transformer
CN10	Tip-over Sensor

# 2 Operation Sequence



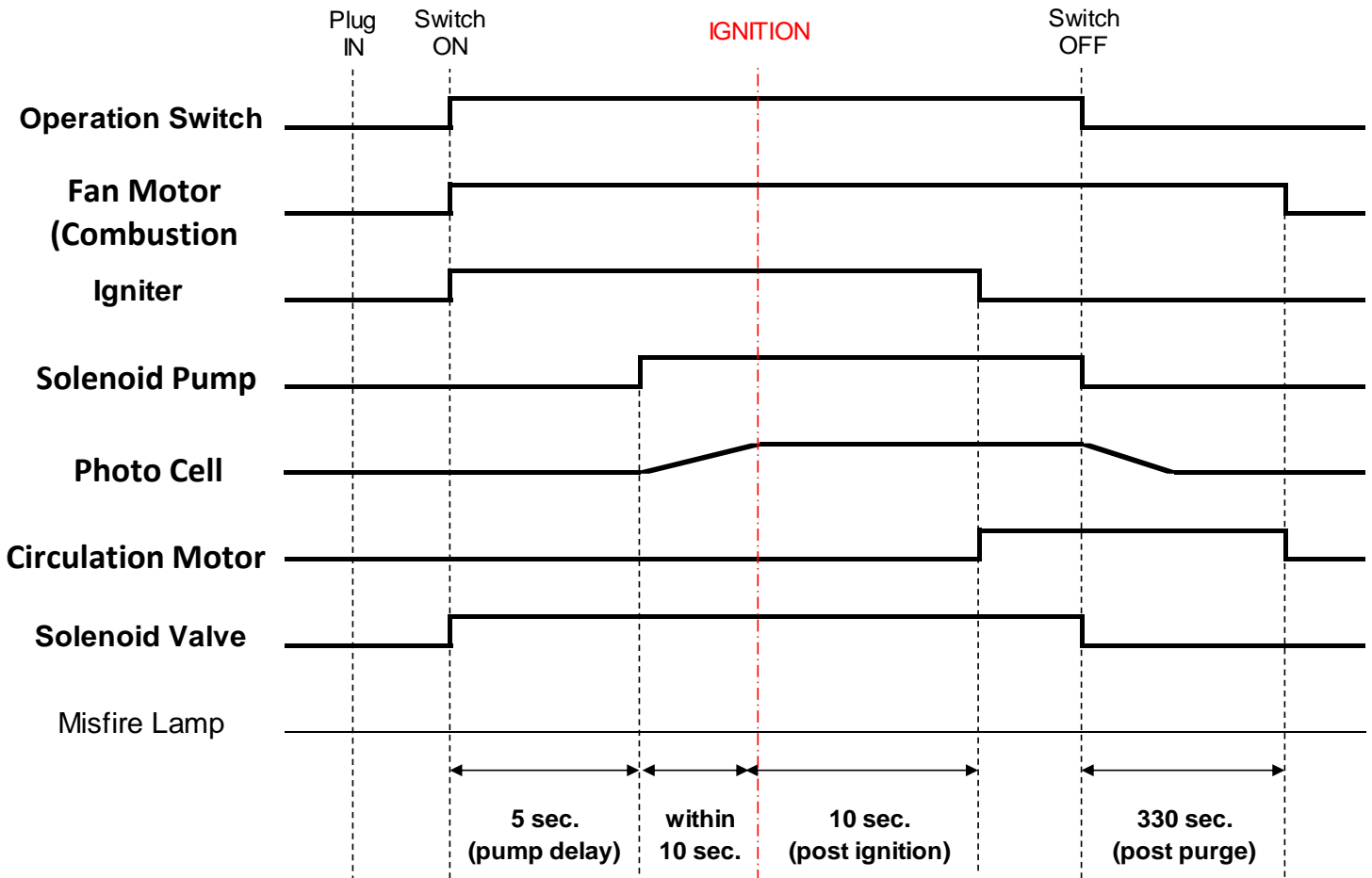
**※Fuel pre-heater : Operating when the temperature in the inside of burner cover falls below 41 degrees Fahrenheit (5 degrees Celsius) and stopping when it reach over 68 degrees Fahrenheit (20 degrees Celsius).**

### 3 Wirign Diagram



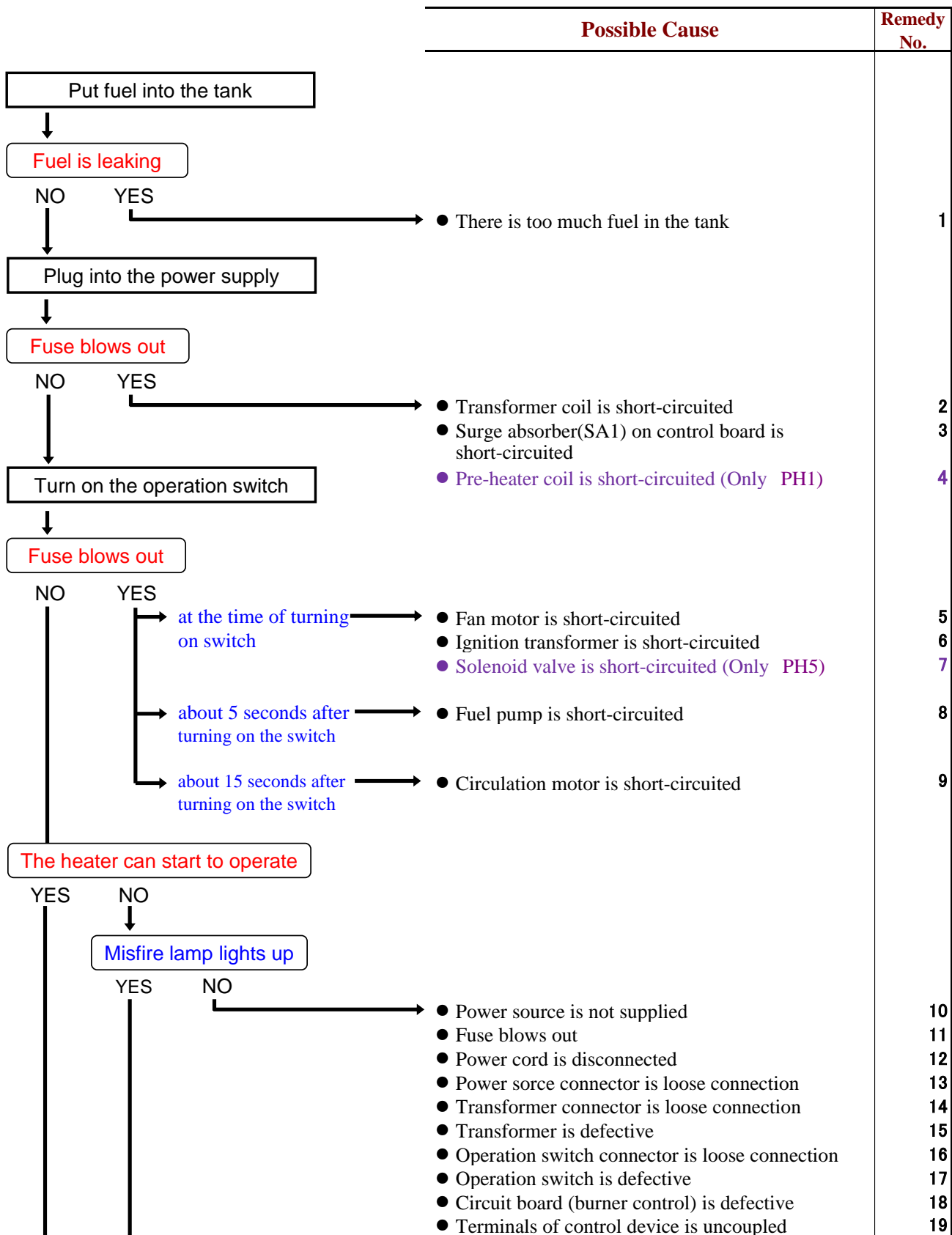
Connector No.	Parts Name
CN1	Power Code
CN2	Operation Switch
CN3	Overheat Sensor & Tip-over Switch
CN4	Photo Cell
CN5	Fan Motor
CN6	Circulation Fan
CN7	Igniter
CN8	Solenoid Pump
CN9	Transformer
CN10	Solenoid Valve

### 4 Operation Sequence



Operation Flowchart

MODEL: Daystar PH1/PH5



Operation Flowchart

MODEL: Daystar PH1/PH5

		Possible Cause	Remedy No.
		<ul style="list-style-type: none"> <li>● There is loose connection for tip-over switch or overheat sensor</li> <li>● There is breaking of wire for lines of tip-over or overheat sensor</li> <li>● Tip-over switch or overheat sensor is defective.</li> </ul>	<p>20</p> <p>21</p> <p>22</p>
<p>Combustion fan is running (Able to hear the sound of fan)</p>			
YES			
NO		<ul style="list-style-type: none"> <li>● Combustion fan connector is loose connection</li> <li>● Combustion fan motor is clogged</li> <li>● Combustion fan and/or circuit board (burner control) is defective</li> </ul>	<p>23</p> <p>24</p> <p>25</p>
<p>Electrode is sparking (Able to hear the sound of spark)</p>			
YES			
NO		<ul style="list-style-type: none"> <li>● Ignition transformer connector or high-voltage cord is loose connection</li> <li>● Electrode is defective</li> <li>● Ignition transformer is defective (crack in high-voltage cord)</li> <li>● Circuit board (Burner control) is defective</li> </ul>	<p>26</p> <p>27</p> <p>28</p> <p>29</p>
<p>The heater ignites</p>			
YES			
NO (Misfire lamp)			
<p>Fuel pump does not turn on (no vibration of fuel pump)</p>			
YES			
NO		<ul style="list-style-type: none"> <li>● Fuel pump connector is loose connection</li> <li>● Fuel pump is defective</li> <li>● Circuit board (Burner control) is defective</li> </ul>	<p>30</p> <p>31</p> <p>32</p>
<p>Fuel pump is idling with clicking sound</p>			
NO			
YES		<ul style="list-style-type: none"> <li>● Fuel pump is inhaling remaining air in fuel line (especially brand-new heater or after refueling)</li> <li>● Pump is inhaling air from the fittings of fuel line between tank and fuel pump</li> </ul>	<p>33</p> <p>34</p>

Operation Flowchart

MODEL: Daystar PH1/PH5

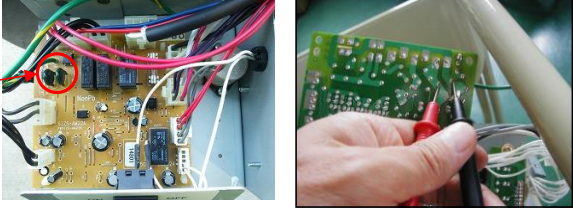
		Possible Cause	Remedy No.
<p>Fuel is sprayed normally from the nozzle</p> <p>YES</p> <p>NO</p> <p>(fuel drips down from the disk or does not come out at all)</p> <p>(Fuel is sprayed normally from the nozzle)</p>		<ul style="list-style-type: none"> <li>Fuel line is clogged</li> <li>Fuel filter (element) is clogged</li> <li>Nozzle is clogged</li> <li>Fuel pump is clogged or defective</li> <li>Fuel filter and/or nozzle is clogged by thick fuel</li> </ul>	<p>35</p> <p>36</p> <p>37</p> <p>38</p> <p>39</p>
<p>Combustion stops during the operation</p> <p>NO</p> <p>YES</p> <p>Misfire within about 25</p> <p>NO</p> <p>YES</p>		<ul style="list-style-type: none"> <li>Lens of flame monitor is dirty or dusty</li> <li>Poor lighting is detected by flame monitor</li> <li>Flame monitor connector is loose connection</li> <li>Flame monitor is defective</li> <li>Direct sunlight hits flame monitor</li> <li>Circuit board (burner control) is defective</li> <li>Run out of fuel</li> <li>Nozzle is clogged</li> <li>Fuel filter is clogged</li> <li>Air intake of fuel gauge is clogged</li> </ul>	<p>42</p> <p>43</p> <p>44</p> <p>45</p> <p>46</p> <p>47</p> <p>48</p> <p>49</p> <p>50</p> <p>51</p>
<p>Combustion is stable</p> <p>YES</p> <p>NO</p>		<ul style="list-style-type: none"> <li>Nozzle is clogged</li> <li>Fuel pump is clogged or defective</li> </ul>	<p>52</p> <p>53</p>

Operation Flowchart

MODEL: Daystar PH1/PH5

		Possible Cause	Remedy No.
<p>Smoke comes out</p> <p>NO</p>			
<p>YES</p> <p>Smoke is continuous</p> <p>NO</p>		<ul style="list-style-type: none"> <li>Fuel viscosity is increasing</li> </ul>	54
<p>YES</p> <p>Which color is the smoke?</p> <p>Black</p>		<ul style="list-style-type: none"> <li>Fuel viscosity is increasing</li> <li>Nozzle is clogged</li> </ul>	55 56
<p>White</p> <p>Heater is using in high altitude</p> <p>NO</p>		<ul style="list-style-type: none"> <li>Combustion air is insufficient</li> </ul>	57
<p>YES</p> <p>gives off black smoke</p>		<ul style="list-style-type: none"> <li>Oxygen for combustion is low because of high altitude</li> </ul>	58
<p>Smell of fuel comes out</p> <p>NO</p>			
<p>YES</p> <p>The unburnt component may come out under the temperature of combustion chamber is low right after ignition. This unburnt component causes odor. However this may stop within 3 minutes because the temperature of</p>			
<p>Quantity of combustion air is too much</p> <p>Nozzle is clogged</p> <p>Fuel filter is clogged</p> <p>The nozzle is incorrect</p>			59 60 61 62
<p>Flame bounces out from the disk</p> <p>NO</p>			
<p>YES</p> <p>Operating in high altitude</p> <p>NO</p>		<ul style="list-style-type: none"> <li>Combustion air is insufficient</li> </ul>	63
<p>YES</p>		<ul style="list-style-type: none"> <li>Oxygen for combustion is low because of high</li> </ul>	64
<p>Normal Operation</p>			

## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Fuel is leaking</b>				
1	Too much fuel in the tank	Check the fuel level		Drain excess fuel
<b>Fuse blows out</b>				
<b>At the time of plugging into the power supply</b>				
2	Transformer coil is short-circuited	Disconnect transformer connector (CN 9) from circuit board, then measure coil resistance values of two leads. Standard: PH1 - 1.5k $\Omega$ (white-red) 5.5 $\Omega$ (purple-purple) PH5 - 200 $\Omega$ (white-red) 7 $\Omega$ (purple-purple) • Without multimeter	If either lead shows 0 $\Omega$ , the transformer is short-circuited	Replace a transformer
		Disconnect transformer connector (CN 9) from circuit board, then plug into AC outlet	If the fuse is intact, the transformer is short-circuited	Replace a transformer
3	Surge absorber(SA1) on control board is short-circuited	Measure resistance at surge absorber (SA)	If resistance value is 0 $\Omega$ , surge absorber is short-circuited	Replace a circuit board (burner control)
	SA			
4	Pre-heater is short-circuited (Only PH1)	Unplug transformer connector , then measure coil resistance values PH1 - about 2700 $\Omega$	If resistance value is 0 $\Omega$ , pre-heater is short-circuited	Replace pre-heater





## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>At the time of turning on operation switch</b>				
5	Fan motor is short-circuited	Disconnect fan connector (CN 5) from circuit board, then measure resistance between terminals • Without multimeter	If value leads 0Ω, the fan coil is short-circuited	Replace a fan motor
		Unplug fan connector (CN 5), and then start operation	If the fuse is intact, the fan coil is short-circuited	Replace a fan motor
6	Ignition transformer is short-circuited	Disconnect ignition connector (CN 7) from circuit board, then measure resistance between terminals • Without multimeter	If the value shows ∞Ω, the ignition coils is short-circuited	Replace an ignition transformer
		Disconnect ignition connector (CN 7), and then start operation	If the fuse is intact, the ignition coils is short-circuited	Replace an ignition transformer
7	Solenoid valve is short-circuited (Only PH5)	Unplug solenoid valve connector (CN 10), then measure coil resistance values PH5- about 1.8kΩ	If resistance value is 0Ω, solenoid valve is short-circuited	Replace solenoid valve
<b>About 5 seconds after turning on operation switch</b>				
8	Fuel pump is short-circuited	Disconnect fuel pump connector (CN 8) from circuit board, then measure resistance between terminals • Without multimeter	If the value shows 0Ω, the fuel pump coil is short-circuited	Replace a fuel pump
		Disconnect fuel pump connector (CN 8), then turn on	If fuse is intact, the fuel pump coil is short-circuited	Replace a fuel pump
<b>About 15 seconds after turning on operation switch</b>				
9	Circulation motor is short-circuited	Disconnect circulation motor connector (CN 6) from circuit board, then measure resistance between terminals • Without multimeter	If the value shows 0Ω, the circulation motor is short-circuited	Replace a circulation motor
		Disconnect circulation motor connector (CN 6), then turn on	If fuse is intact, the circulation motor coil is short-circuited	Replace a circulation motor

### VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Heater cannot start up (heater does not operate at all with switching on)</b>				
<b>Misfire lamp doesn't light up</b>				
10	Power source is not supplied	Measure voltage of AC outlet. Standard: AC120V (or plug in another power tool and see if it	If the value shows 0V, power cable is not receiving electricity. (or if under 100V, could be power shortage)	Plug into a working outlet
11	Fuse blows out	Take fuse out from circuit board, then check each lead with circuit tester	If circuit tester reads $\infty$ $\Omega$ , fuse blows out	Find a cause(s) of blown fuse and solve it,(refer to #2-7), then replace with a new one
12	Power cord is disconnected	Take power source connector (PH1:CN 4,PH5:CN1) out from circuit board, then check each lead with circuit tester	If either of the lead is broken, power cord is defective	Replace a power cord
13	Power source connector is loose connection	Plug in power source connector again, then turn on	If it works normally, power source connector fails on contact	Plug in connector firmly
14	Transformer connector is loose connection	Plug in transformer connector (CN 9) again, and then turn on	If it works normally, transformer connector fails on contact	Plug in connector (CN 9) firmly
15	Transformer is defective	Measure voltage at output side of transformer connector (CN 9). Standard: PH1 - Input=AC230V(white-red) Output=AC15V(purple-purple) PH5 - Input=AC120V(white-red) Output=AC15V(purple-purple)	If tester reads normal voltage at input side, and reads 0V at output side, transformer is defective.	Replace a transformer
16	Operation switch connector is loose connection	Plug in operation switch connector (CN 2) again, then turn on switch	If it works normally, operation switch connector fails in	Plug in connector (CN 2) firmly
17	Operation switch is defective	Take operation switch connector (CN 2) out, then check lead with multimeter. Standard: Conducting (0 $\Omega$ ) when turned on switch	If it doesn't conduct when turned on switch, operation switch is defective.	Replace an operation switch


## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
18	Circuit board (Burner control) is defective	Measure voltage at input side of transformer connector (CN 9)  Standard: PH1 - AC230V(white-red) PH5 - AC120V(white-red)	If power source is normal and tester reads 0V at input side, circuit board is defective.	Replace circuit board (burner control)
19	Terminals of control device is uncoupled	Check whether the terminals for control device are connected firmly by wiggling them		Firmly connect terminals on control device
	PH1 		PH5 	
<b>Misfire lamp lights up</b>				
20	There is loose connection for tip-over switch or overheat sensor	Plug tip-over switch (PH1:CN10,PH5:CN3) or overheat sensor connector (CN 3) again, and then turn on	If it works normally, connector(s) fails on contact	Plug connectors firmly
21	There is breaking of wire for lines of tip-over switch or overheat sensor	Check each lead with circuit tester	If circuit tester reads $\infty \Omega$ , there is breaking wire for tip-over switch and/or overheat sensor	Replace wire(s)
22	Tip-over switch or overheat sensor is defective	Check the conduction of overheat sensor and Tip-over switch (Standard value) Resistance value : $0\Omega$	If it doesn't conduct ( $\infty\Omega$ ), Tip-over switch or Overheat sensor are defective	Replace Tip-over or Overheat sensor
<b>Combustion fan(fan motor) does not run</b>				
23	Combustion fan connector is loose connection	Plug combustion fan connector (CN 5) again, and then turn on	If it works normally, combustion fan connector fails on	Plug connector (CN5) firmly
24	Combustion fan motor is clogged	Try to rotate a vane by hand	If a vane isn't rotated smoothly or completely, the combustion fan is clogged	Replace a combustion fan
25	Combustion fan and/or circuit board (Burner control) is defective	Refer to above #23 & 24	There is no cause in #23 & 24, combustion fan and/or circuit board are defective	Replace a combustion fan and/or circuit board

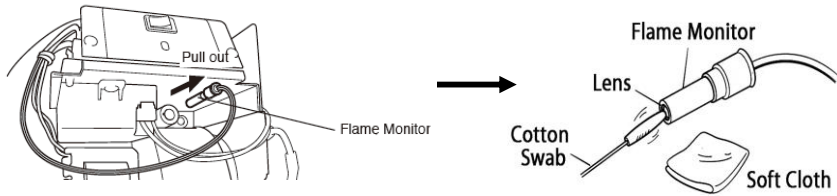
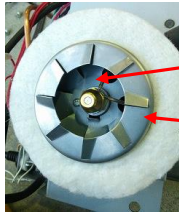
## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Electrode is not sparking</b>				
26	Ignition transformer connector (CN7) or high-voltage cord is loose connection			Connect connection of ignition transformer connector (CN7) or high-voltage cord
27	Electrode is defective (abnormal electrode)	Confirm that an electrode or a high-voltage cord are not wet		Replace an
	(clearance is out of alignment)	Refer to drawing①		Clean an electrode or a high-voltage cord
28	Failure of igniter	Measure voltage at igniter connector (CN7) on burner controller	If voltage is normal, igniter fails	Replace igniter
29	Failure of burner controller	Standard (black-black): PH1 - AC230V PH5 - AC120V	If multimeter reads 0V, burner control fails	Replace burner controller
<b>The heater does not ignite</b>				
<b>Fuel pump doesn't turn on (no vibration of fuel pump)</b>				
30	Fuel pump connector (CN8) is loose connection	Plug fuel pump connector (CN8) again, and then turn on	If it works normally, fuel pump connector fails on contact	Plug connector (CN8) firmly
31	Fuel pump is defective	Measure voltage at output side of fuel pump connector on circuit board:	If the value shows standard voltage, the pump is defective	Replace a fuel pump
32	Circuit board (Burner control) is defective	Standard: (red-blue) PH1: 115~184 V PH5: 60~96V	If the value does NOT show standard voltage, the circuit board is defective	Replace a circuit board
<b>Fuel pump is idling with clicking sound</b>				
33	Fuel pump is inhaling air which is remaining in fuel line (especially brand-new heater or after refueling)			Repeat start-operation 2 or 3 times in order to pump air out of fuel line *NEVER repeat more than 4 times in a row as fire may result
34	Pump is inhaling air from the fittings of fuel line between tank and fuel pump	Confirm no loose fitting in fuel line	If any loose fittings, tighten it	Tighten all fittings and repeat start-operation


### VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Fuel is not sprayed normally from the nozzle</b>				
35	Fuel line is clogged			Clear the clog in fuel line
36	Fuel filter (element) is clogged	Check with eyes whether or not the fuel filter is dirty or fouled		Replace a fuel filter
37	Nozzle is clogged	Refer to Picture ③		Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone.
38	Fuel pump is clogged or defective	Loose the brass nut, then switch on and check whether fuel comes out (place a pan under the pump)	If no fuel is pump up or fuel is not flowing at least 2" high, the fuel pump is clogged or defective (see exhibit "How to restore the fuel	Replace a fuel pump Clean and flush the tank with kerosene, alcohol or acetone
				
39	Fuel filter and/or nozzle is clogged by thick fuel		Because of low temperature, fuel viscosity increase and fuel filter and/or nozzle is clogged	Replace a fuel filter and/or nozzle, and warm the fuel or mix kerosene with diesel
<b>(Fuel is sprayed normally form the nozzle)</b>				
40	Nozzle is clogged			Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone.
41	Fuel is contaminated with water		Because of condensation, there is the dew condensation water in the tank	Replace a fuel thoroughly

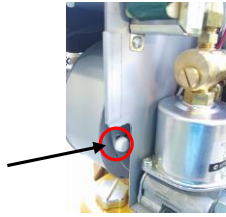
## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Combustion stops during the operation</b>				
<b>Misfire in about 25 seconds after ignition</b>				
42	Lens of flame monitor is dirty or dusty	Take a flame monitor out, and check whether its lens is clear or not	If it is dirty or dustiness, flame monitor cannot detect flame properly	Clean the lens of flame monitor with soft cloth
				
43	Poor lighting is detected by flame monitor	Remove a burner and check whether the whirl vane and inside of draft tube are clear or not	If they are dirty or dustiness, flame monitor cannot detect flame light properly *usually this will be happen with above #44	Clean the whirl vane and inside of draft tube or replace a vane *clean the lens of flame monitor
<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">Cleaning the whirl vane and inside of</div>  <div style="margin-left: 10px;"> <p>whirl vane</p> <p>draft tube</p> </div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">Clean the whirl vane and inside of draft tube (especially behind whirl vane) till they are shining</div> </div>				
44	Flame monitor connector is loose connection	Plug flame monitor connector (PH1:CN1,PH5:CN4) again, and then turn on	If it works normally, flame monitor connector fails on contact	Plug connector firmly
45	Flame monitor is defective  PH1 till 2006/2007  PH5 till 2015/2016	Disconnect flame monitor connector (PH1:CN1,PH5:CN4) from circuit board, then check transition of resistance by changing quantity of light into flame monitor	If the value of resistance is nonstandard, the flame monitor is defective Standard: black-black dark: over 2MΩ light: under 10KΩ	Replace a flame monitor
	PH1 from 2006/2007 serial# J-01  PH5 from 2016/2017 serial# Z-01	Measure voltage at flame monitor connector on burner controller standard	If voltage doesn't change, flame monitor fails standard: White-White&red dark - about DC5V light - DC1.2V and under	Replace a flame monitor
46	Direct sunlight hits flame monitor	Unplug flame monitor connector (PH1:CN1,PH5:CN4), then turn on switch	If it starts, sunlight is detected by flame monitor	Move disk away from direct sunlight or bright light
47	Circuit board (Burner control) is defective		If it doesn't start, circuit board is defective	Replace a circuit board

## VAL6 Daystar PH1/PH5 Trouble Shooting

No.	Possible Cause	How to check	Result	Remedy
<b>Misfire after about 30 seconds after ignition</b>				
48	Run out of fuel	Check whether fuel is in		Refueling
49	Nozzle is clogged			Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone
50	Fuel filter (element) is clogged	Check with eyes whether or not the fuel filter is dirty or fouled		Replace a fuel filter
51	Air intake of fuel gauge is clogged	Check if air intake of tank cap is clogged with dust	If air intake of tank cap is clogged, fuel flow is insufficient by pressure drop in fuel tank.	Clear an air intake of tank cap
				
<b>Combustion is not stable</b>				
52	Nozzle is clogged			Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone
53	Fuel pump is clogged or defective	Loose the brass nut, then switch on and check whether fuel comes out (place a pan under the pump)	If no fuel is pump up or fuel is not flowing at least 2" high, the fuel pump is clogged or defective (see Exhibit A "How to restore the fuel	Replace a fuel pump Clean and flush the tank with kerosene, alcohol or acetone
<b>Smoke comes out</b>				
<b>Smoke is continuous for about 3 minutes</b>				
54	Fuel viscosity is increased by low ambient temperature	Check whether ambient temperature is not under minus 20 degree Celsius (-20°C) and make sure winter fuel is used	If temperature is under -20°C or summer fuel is used, fuel is not sprayed normally from the nozzle because fuel viscosity is increased by low ambient temperature	Warming up fuel, refueling winter fuel or mixing kerosene with fuel in order to decrease fuel viscosity
<b>Heater produces WHITE smoke</b>				
55	Fuel viscosity is increased	Check whether ambient temperature is not under minus 20 degree Celsius (-20°C) and make sure winter fuel is used	If temperature is under -20°C or summer fuel is used, fuel is not sprayed normally from the nozzle because fuel viscosity is increased by low ambient temperature	Warming up fuel, refueling winter fuel or mixing kerosene with fuel in order to decrease fuel viscosity
56	Nozzle is clogged			Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone

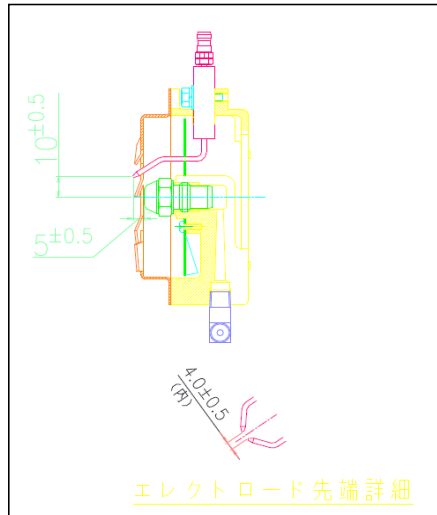
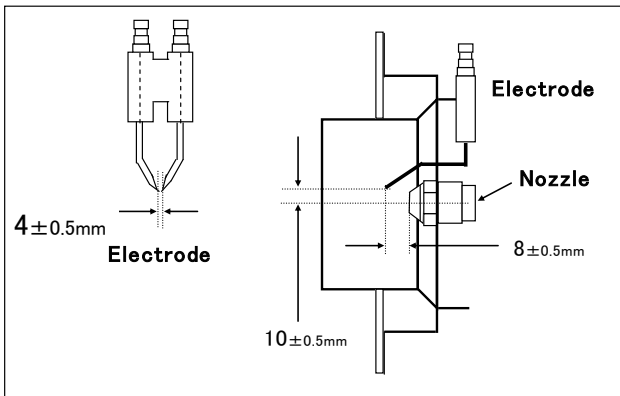
**VAL6 Daystar PH1/PH5 Trouble Shooting**

No.	Possible Cause	How to check	Result	Remedy
<b>Heater produces BLACK smoke</b>				
57	Combustion air is insufficient	Check whether a combustion fan is run (refer to #23, 24, 25)	If the combustion fan does not run, imperfect combustion occurs by low oxygen.	Replace a combustion fan and/or circuit board
		Check whether vanes of combustion fan are dusty.	If vanes are dusty, imperfect combustion is occurs by low oxygen.	Clean a vanes of combustion fan
		Check whether air inlet opening for combustion is appropriate	If opening is small, imperfect combustion occurs by low oxygen	Adjust a air inlet opening Normal scale: PH1 「4」、PH5 「1」※ refer to chart 1
		Check whether applied voltage is normal Standard: PH1:230V±10% PH5:120V±10%	If applied voltage is lower than -10%, imperfect combustion by decreasing of combustion fan rotation	Find a cause(s) of low voltage and solve it * or plug into another outlet
<b>Heater is using in high altitude</b>				
58	Oxygen for combustion is low because of high altitude	Check whether the heater is operating in an altitude higher than 1000m	If its altitude is higher than 1000m, imperfect combustion occurs by low oxygen environment	Expand an air inlet opening gradually until smoke is clear away Normal scale: PH1 「4」、PH5「1」※ refer to chart 1
<p>Adjustment of air inlet</p> <p>expand an air inlet opening for combustion fan gradually (scale should be 1 plus or more) until smoke is clear away or flame doesn't protrude from the radiation disk.</p>				
<b>Smell of fuel comes out</b>				
59	Combustion air is too much	Check whether air inlet opening for combustion is appropriate	If air inlet opening if too much, imperfect combustion occurs	Narrow an air inlet opening Normal scale: PH1 「4」、PH5「1」※ refer to chart 1



**VAL6 Daystar PH1/PH5 Trouble Shooting**

No.	Possible Cause	How to check	Result	Remedy
60	Nozzle is clogged			Replace a nozzle Clean and flush the tank with kerosene, alcohol or acetone
61	Fuel filter (element) is clogged	Check with eyes whether or not the fuel filter is dirty or fouled		Replace a fuel filter
62	Nozzle is incorrect	Check whether correct nozzle is used Mark: 0.4USgal/h 80°H (danfoss)		Replace a correct nozzle
<b>Flame bounces out from the disk</b>				
63	Combustion air is insufficient	Check whether a combustion fan is run (refer to #23, 24, 25)	If the combustion fan does not run, imperfect combustion occurs by low oxygen	Replace a combustion fan and/or circuit board
		Check whether vanes of combustion fan are dusty	If vanes are dusty, imperfect combustion occurs by low oxygen	Clean a vanes of combustion fan
		Check whether air inlet opening for combustion is appropriate	If opening is small, imperfect combustion occurs by low oxygen	Adjust a air inlet opening Normal scale: PH1「4」、PH5[1] ※ refer to chart 1
		Check whether applied voltage is normal Standard: PH1:230V±10% PH5:120V±10%	If applied voltage is lower than -10%, imperfect combustion by decreasing of combustion fan rotation	Find a cause(s) of low voltage and solve it * or plug into another outlet
<b>Heater is using in high altitude</b>				
64	Oxygen for combustion is low because of high altitude	Check whether the heater is operating in an altitude higher than 1000m	If its altitude is higher than 1000m, imperfect combustion occurs by low oxygen environment	Expand an air inlet opening gradually until smoke is clear away Normal scale: PH1「4」、PH5[1]※refer to chart 1



PH1: till G-01  
PH5: till G-04

PH1: from G-02  
PH5: from F-01

# Daystar PH1

**Chart1 Standard resistance of functional parts**

Parts	Connector No	Lead	Condition	Resistance	Memo
Operation Switch	CN 2	White - White	on	0 Ω	
			off	∞ Ω	
Tip-over Switch	CN 10	Gray - Gray	not in working	0 Ω	Operation angle: 50 - 80°
			in working	∞ Ω	
Overheat Sensor	CN 3	Red - Red	not in working	0 Ω	80±4°C off
			in working	∞ Ω	60±7°C on
予熱ヒーター用サーモスタット	*1	Blue - Blue	not in working	0 Ω	20±5°C off
			in working	∞ Ω	5±5°C on
Photo Cell (flame monitor)	CN 1	White - White (Red Line)	dark light	about DC5V DC1.2V以下	
Transformer	CN 9	Red - White	input	about 1.5k Ω	
		Purple - Purple	output	about 5.5 Ω	
Igniter	CN 7	Black - Black (thin)	input	-	
		Black - Black (bold)	output	about 2.8k Ω	
Solenoid Pump	CN 8	Blue - Red	-	about 262 Ω	
Fan Motor (Combustion fan)	CN 5	Gray - Gray	-	about 70 Ω	gate: Normal scale 4 from G-02, Normal scale 6 till G-01.
Circulation Motor	CN 6	Gray - Gray	-	about 88 Ω	
Fuel pre-heater	*1	Blue - White	in working	about 2700 Ω	

**Chart2 Input & Output of Burner Control**

Parts	Connector No	Lead	Condition	Voltage
Power code	CN 4	Brown - Light Blue	-	AC 230V (±10%)
Transformer	CN 9	Red - White	input	AC 230V (±10%)
		Purple - Purple	output	about AC 15V
Igniter	CN 7	Black - Black (thin)	input	AC 230V (±10%)
Solenoid Pump	CN 8	Blue - Red	-	AC 115-184V
Fan Motor	CN 5	Gray - Gray	-	AC 230V (±10%)
Circulation Motor	CN 6	Gray - Gray	-	AC 230V (±10%)
Fuel pre-heater	※1	Blue - White	-	AC 230V (±10%)

\*2

\*1 Connector from circuit board for fuel pre-heater

\*2 Output voltage may differ depending on measuring instrument because of half-wave rectification

# Daystar PH5

**Chart1** Standard resistance of functional parts

Parts	Connector No	Lead	Condition	Resistance	Memo
Operation Switch	CN 2	White - White	on	0 Ω	
			off	∞ Ω	
Tip-over Switch	CN 3	Gray - Gray	not in working	0 Ω	Operation angle: 50 — 80°
			in working	∞ Ω	
Overheat Sensor		Red - Red	not in working	0 Ω	OFF: 176±8 degrees F ON: 140±13 degrees F
			in working	∞ Ω	
Photo Cell (flame monitor)	CN 4	Black - Black	dark	over 2M Ω	
			light	under 700k Ω	
Transformer	CN 9	Red - White	input	about 200 Ω	
		Purple - Purple	output	about 7 Ω	
Igniter	CN 7	Black - Black (thin)	input	-	
		Black - Black (bold)	output	about 4k Ω	
Solenoid Pump	CN 8	Blue - Red	-	about 85 Ω	
Fan Motor (Combustion fan)	CN 5	Gray - Gray	-	about 16 Ω	gate: Normal scale 1 from F-01, Normal scale 3 till G-04
Blower Motor	CN 6	Gray - Gray	-	about 16 Ω	
Solenoid Valve	CN 10	Red - Red	-	1.8k Ω	

**Chart2** Input & Output of Burner Control

Parts	Connector No	Lead	Condition	Voltage	
Power code	CN 1	Black - White	-	AC 120V (±10%)	
Transformer	CN 9	Red - White	input	AC 120V (±10%)	
		Purple - Purple	output	about AC 15V	
Igniter	CN 7	Black - Black (thin)	input	AC 120V (±10%)	
Solenoid Pump	CN 8	Blue - Red	-	AC 60-96V	*1
Fan Motor	CN 5	Gray - Gray	-	AC 120V (±10%)	
Blower Motor	CN 6	Gray - Gray	-	AC 120V (±10%)	
Solenoid Valve	CN 10	Red - Red	-	about AC 100V	*2

\*1, 2 Output voltage may differ depending on measuring instrument because of half-wave rectification

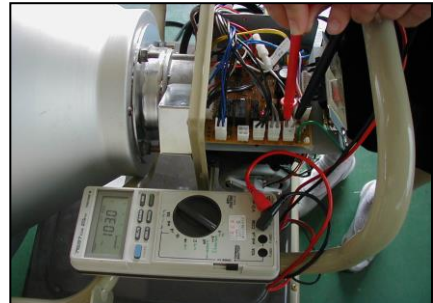
### Picture 1 How to measure resistance

- ① Pull out a connector which you will measure from burner control
- ② Turn on the resistor and set resistor range
- ③ Insert the lead head of resistor to connector [lead wire side] and measure resistance



### Picture 2 How to measure voltage

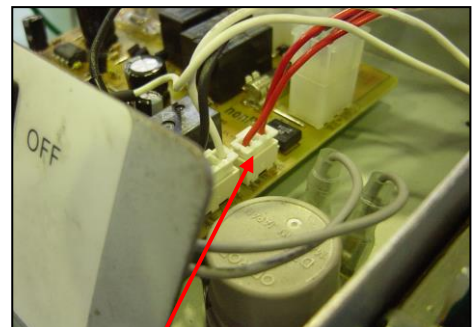
- ① Operate the heater
- ② Turn on the resistor and set AC voltage range
- ③ Insert the lead head of resistor to connector and measure resistance



### Picture 3 Removing a burner



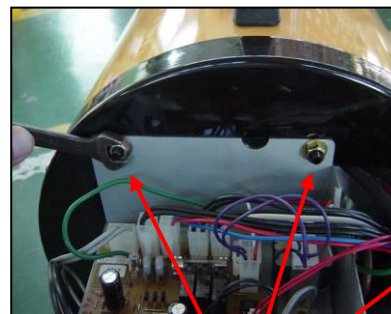
Unscrew two screws and take a burner cover off



Pull out the connector of overheat sensor from board  
(or disconnect the red wire of overheat sensor behind the burner base)



- ① Unscrew a nut and remove the Suction Pipe from the tank
- ② Remove the Return Hose from the air vent valve



Unfasten three nuts and take a burner unit off



(lower)

Picture 4 Inspection fuel pump



Remove a pipe and check whether fuel comes out

\* Standard pump pressure

Picture 5 Inspection terminals for control device(PH1)



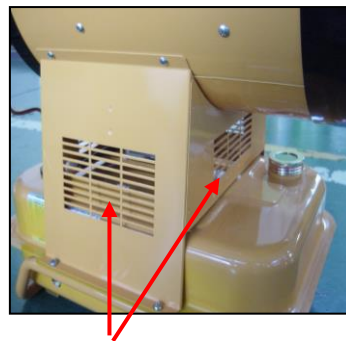
Check whether the terminals for control device are coupled firmly

Picture 6 Inspection terminals for control device(PH5)



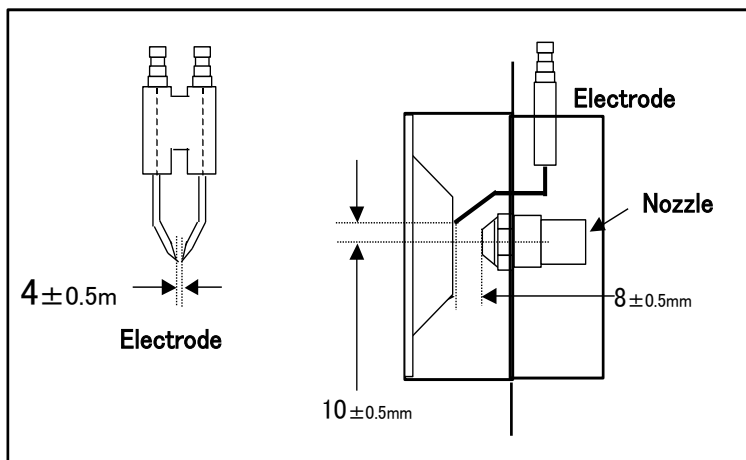
Check whether the terminals for control device are coupled firmly

Picture 7 Inspection an air inlet of circulation motor

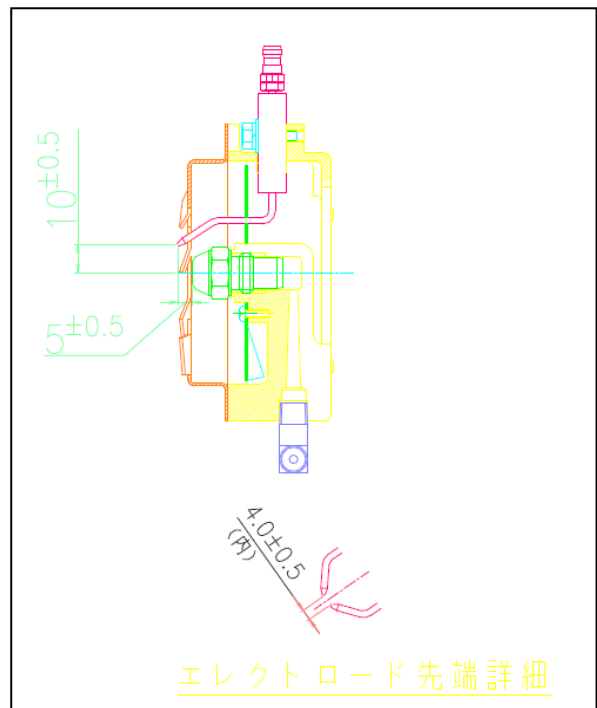


Check whether or not the air inlet

Picture 8 Standard position of electrode



PH1 : till G-01  
PH5 : till G-04



エレクトロード先端詳細

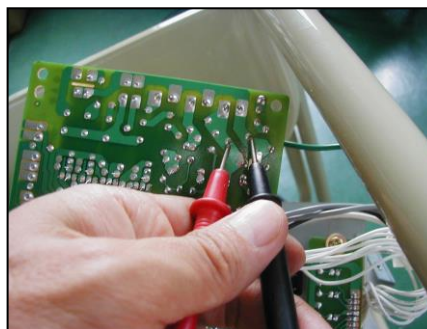
PH1 : from G-02  
PH5 : from F-01



**Picture 9** Inspection surge absorber (SA)

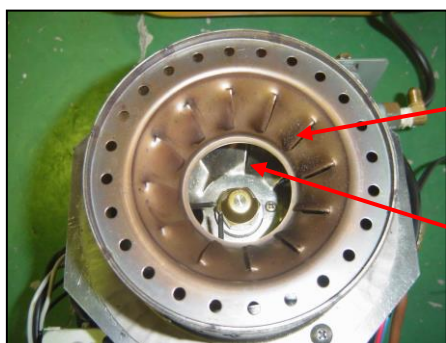


SA



Take out the burner control, and point the lead head at solder part of SA

**Picture 10** Inspection draft tube and fan



draft tube

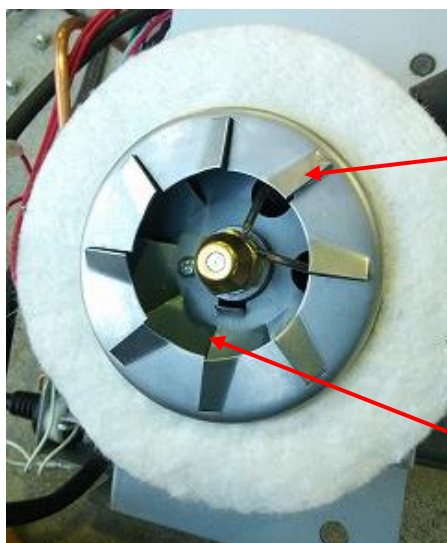
whirl vane

PH1 :till G-01  
PH5:till G-04

**Picture 11** Inspection fuse



Check whether or not the fuse blows out



draft tube

whirl vane

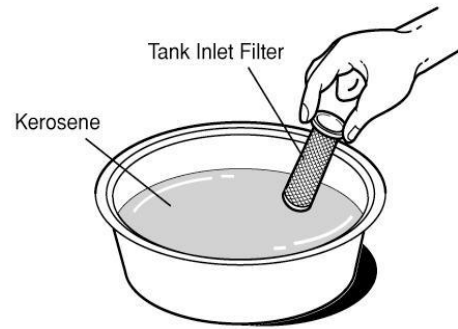
PH1 :from G-02  
PH5:from F-01

In case of draft tube and fan are dusty, please clean them up

## ..... Daily Inspection.....

### ■ Inspection of the tank inlet filter

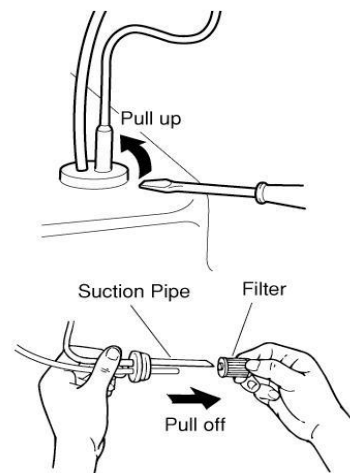
- 1 Please remove the fuel cap and check if dirt/dusts stick to the tank inlet filter.
- 2 If there are any dirt/dusts, remove the filter and wash it with fuel.
- 3 Please restore the tank inlet filter, and tighten firmly the fuel cap.



### ■ Inspection of the filter and drainage of water from the fuel tank.

#### Checking the filter element

- 1 Remove the suction pipe from the fuel tank.
- 2 If the filter is dirty, replace it with a new one.
- 3 Return the suction pipe to the fuel tank and firmly secure.



#### Drainage of water from the fuel tank

- 1 Remove the fuel cap, take out the tank inlet filter and insert a handy suction pump into the tank.
- 2 Remove as much fuel as possible (with the handy suction pump).
- 3 Restore the tank inlet filter and tighten firmly the fuel cap.
- 4 Use a cloth, etc., to wipe off any kerosene or water on the fuel tank.

### ■ Inspecting the Tip-over switch

- 1 While the heater is operating, grasp the handle and shake the heater up and down, and from side to side.
- 2 Check if the tip-over switch has automatically extinguished the flame.
- 3 If the tip-over switch did not activate, shut down the heater and contact the dealer from whom you purchased the heater.

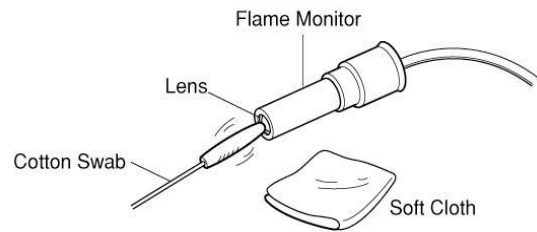
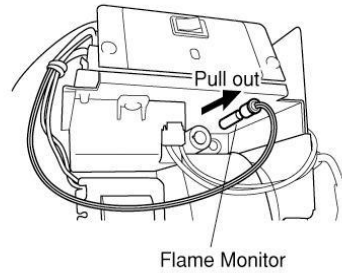
## ■ Inspection and cleaning of the flame monitor

**Observations** - When removing the flame monitor, hold it by its main assembly; do not pull out the

1 Remove the burner cover and pull out the flame monitor, and check whether or no its lens is dirty/foul.

2 If the lens is dirty/foul, please wipe the surface of the lens with a soft cloth, etc, until it becomes clear.

3 Restore the flame monitor, then please surely fix with screws the burner cover.



## ■ Inspection of "dirt/dusts" on the main unit

1 Check whether or not dirt/dusts are on and around the heater.

2 The heater must be checked, if used for a long time.

3 If dusts are found, please remove them with a vacuum cleaner or wipe with a soft cloth, etc.

4 Please ask the dealer from whom you purchased the heater to check the heater once every other season.