

WHO 095 / 175 DIESEL HEATER



SERVICE MANUAL

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

IMPORTANT SAFETY INSTRUCTIONS

BASIC SAFETY AND PRECAUTIONS

1. Beware of electric shock hazards. Disconnect all power before servicing
2. Avoid short circuits. Always measure the resistance of the circuits before assembly. Short circuits can cause defects.
3. Heaters get extremely hot after combustion. Give enough time for the heater to cool before servicing.
4. Check for any fuel leakage or emission leakage from the heater.
5. Always use listed spare parts for any replacement.
6. Product modification is prohibited. WELTEM does not bear any responsibility for breakdowns or damages due to product modification.
7. Always inspect power plugs, power cords and wires for any damages or deterioration.
8. Always conduct operation and combustion tests after servicing.

MAINTENANCE

- **Combustion Furnace and Heat Pipes** : Check for any scorch marks(soot) once a year and clean them if spotted
- **Heat Reflector** : Inspect for any corrosion or contamination once a year and clean them if spotted.
- **Fuel Filter (Inside the tank)** : Check for any contamination with bare eyes once a year and change the tank if spotted.
- **Caters** : Check for any damages once a month.

CAUTION FOR REPLACING SPARE PARTS

1. Do not perform any replacement or services with power on
2. Please leave no scratches on the product while servicing.
3. When dismantling any connector-type wires, please pull whole set of wires rather just a line of wire.
4. Please refer to the wiring diagram provided when wiring any wire connectors.
5. Give enough length and spaces for wire connections.
6. Inspect for any missing parts for assembly/disassembly
7. Use appropriate tools and listed parts for repair.

IMPORTANT : TEST HEATERS AFTER EACH INSPECTION /SERVICE

1. Please test the heater after each inspection or service.
2. The heater may not ignite properly after any inspection or service due to improper fuel supply to the burner.
3. However, try re-igniting the heater once or twice till the heater ignites properly and performs proper combustion.

CONTENTS

SPECIFICATIONS

Item		Specifications		
Model		WHO-095	WHO-135	WHO-175
Burner model		GPM2-W095	GPM2-W135	GPM2-W175
Kcal/h		9,000	13,000	17,000
Power supply	Voltage	230V		
	(Hz)	50		
Power consumption during ignition		60W	60W	80W
Power consumption during combustion		40W	40W	60W
Fuel		Diesel	Diesel	Diesel
Fuel consumption (L/h)		0.9~1.0 L/h	1.2~1.3 L/h	1.7~1.8 L/h
Fuel tank capacity (Maximum)		30l	45l	45l
Weight		40kg	58kg	63kg
Size (WHD)		970X320X950	1300X320X950	1300X320X1120

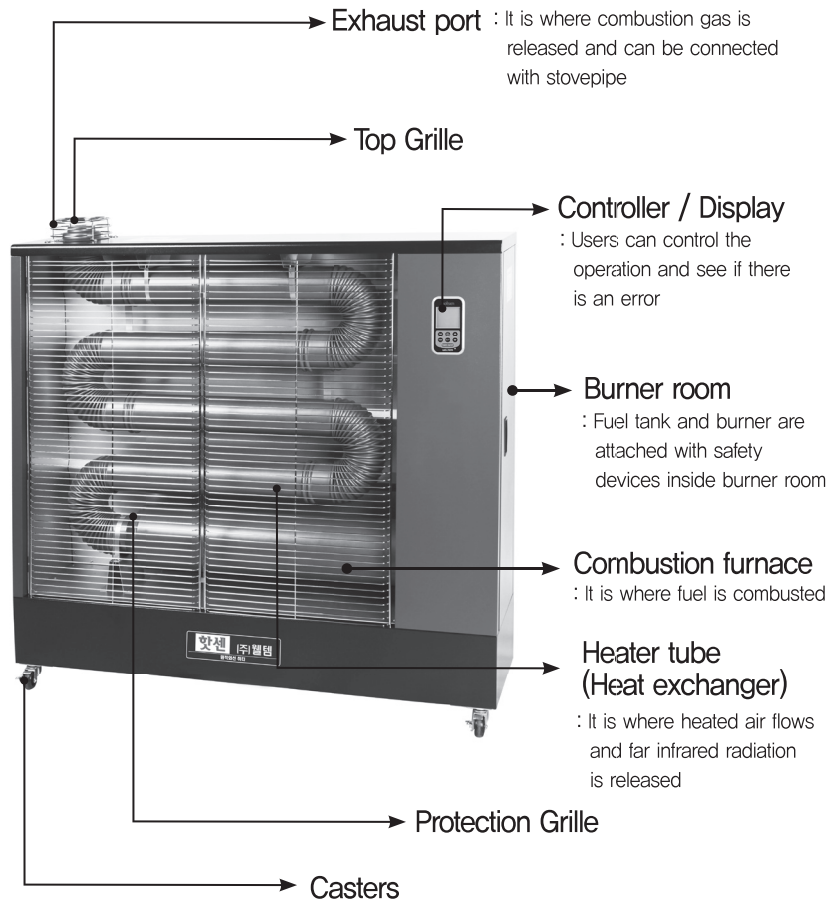
Part Name		Specifications		
Model		WHO-095	WHO-135	WHO-175
Burner model		GPM2-W095	GPM2-W135	GPM2-W175
Hertz(Hz)		50	50	50
NOZZLE		0.25 60°S	0.30 60°S	0.40 60°S
Pump pressure (kgf/²)		8.0	9.0	9.0
Air damper		1.0	1.0	1.5
Orifice		ø16.5	ø22	ø28
DIFFUSER		ø65 × 1.0H	ø65 × 2.0H	
MOTOR		8222 1.2uF		8228 1.5uF
FAN		ø108 × 4.2h (C.C.W)		
I.G TRANS		220V 50/60Hz 18.5kV 28mA		
ELEC PUMP		VSG-36 220V 50/60Hz		
Phototube		0 LUX : 0.5KΩ ~ 10 LUX : 10~23KΩ		
Combustion Characteristics				
Ignition		No delayed ignition and must have firm clear flame		
Flame Characteristics		Flame must not glow during combustion and backfire		
Noise		70dB or under		
Vibration		There should be no noticeable vibration affecting the performance of the operation.		
Oil leakage		They must not be any oil leakage in any part of the burner		
Oil drop		There should not be oil drop during operation.		

BURNER INSPECTION

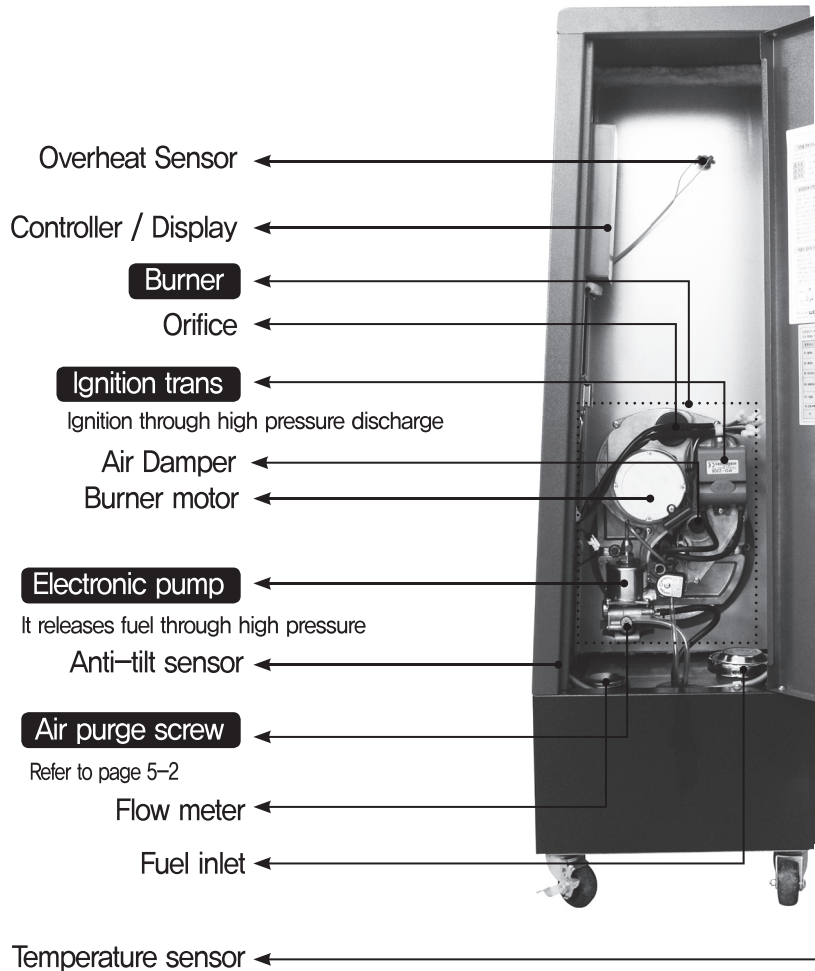
Inspection & Tests		Inspection / Test Criteria
Burner Inspection	Visual inspection	There should not be detrimental defects of unassembled, deformation, peeling and crack.
	Damper	Must comply with specifications
	Orifice	Must comply with specifications
Combustion Test	Ignition Spark	Look for defective discharge
	Ignition	No delayed ignition and must have firm clear flame
	Flame characteristics	Flame must not glow during combustion and backfire
	Fuel system check	Check for any fuel leakage during combustion
	Flame stop	Check for any oil drops after flame stops

PARTS

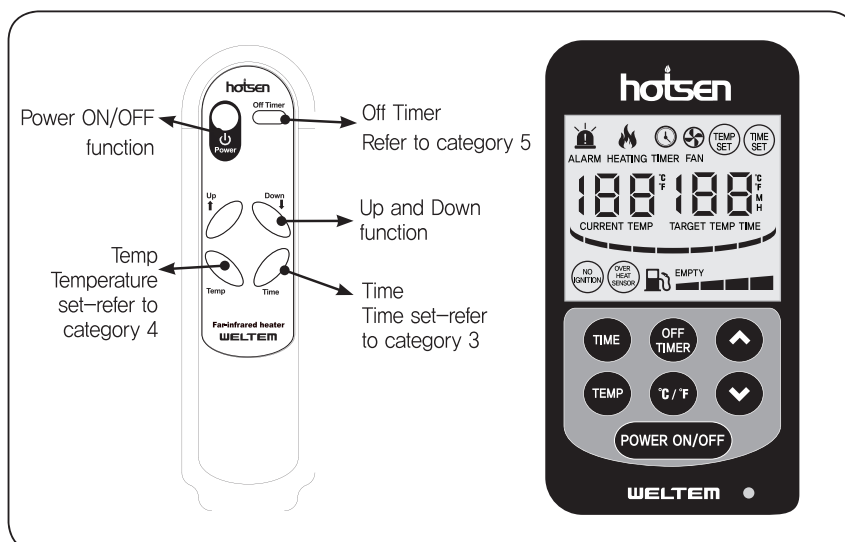
FRONT PARTS



INNER PARTS



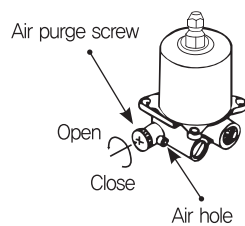
OPERATION GUIDE



1. Plug the power cord. Current temperature and the fuel amount are displayed.
2. **POWER ON/OFF** Turns the heater on/off
 - It takes few seconds for the heater to blow hot air
 - If the ambient temperature is close to the target temperature, heater stops

NOTE

The first ignition might fail due no circulation of fuel in the burner. E1 alarm might go on. Try air purge procedure described below.



- ① Rotate the air purge screw counterclockwise for 2~3 rounds.
- ② Re-start the heater
- ③ Captured air will be released from the air hole and fuel will start to drip in few seconds
- ④ Close the air purge screw when clean fuel drips out.
- ⑤ Keep repeat this process until fuel drips out of the air purge screw.

IMPORTANT: DO NOT FULLY UNSCREW THE AIR PURGE SCREW

3. **TIME** TIME BUTTON
 - Time button can set interval of heating cycles (Cycle of 30 Minutes, 5 Minutes increment).
Example) if 20 min is set, the heater will run for 20mins and off for 10 mins and this cycle will keep repeat.
4. **TEMP** TEMP BUTTON
 - TEMP button allows users to set desired temperature.
 - The heater can detect ambient temperature and operate within the desired temperature. (Temperature range : 0~40°C)
5. **OFF TIMER** OFF TIMER
 - Off TIMER allows users to turn off the heater automatically after desired time. Press OFF TIMER and adjust the timer by pressing up and down arrows. To set OFF TIMER, just wait for few seconds after you set the timer. OFF TIMER screen will disappear soon and the timer setting will be saved to the controller automatically. To cancel OFF TIMER, simply press OFF TIMER again.
6. **°C / °F** '°C or °F' Button
 - Can set the temperature units either in '°C or °F'
7. **POWER ON/OFF** IMPORTANT NOTICE!
 - DO NOT UNPLUG THE HEATER AFTER TURNING OFF THE HEATER
 - HEATER FAN WILL STILL BE RUNNING TO COOL THE HEATER.
 - PLEASE GIVE ENOUGH TIME FOR THE HEATER TO COOL. BEFORE UNPLUGGING.

Empty tank alarm will go on when the fuel tank is empty. Please turn off the unit to refuel to prevent any fire hazards.

TROUBLESHOOTING

► If following messages appears on the display, check the following and take appropriate actions.

Error Code	Possible Causes	Solutions
E1	Burner is not ignited	- Lack of fuel - Fuel pipe is filled with air (→ Drain the air) - Phototube is contaminated (→ Clean the phototube)
E2	<ul style="list-style-type: none"> Phototube error Residual flame is detected. 	- Check if the phototube is loose (→ Fix the phototube) Phototube is defective (→ Replace the phototube) - This phenomenon may occur when turning off the heater right after the combustion (→ Firmly connect temperature sensor)
E3	Temperature Sensor malfunction	- Check the sensor connection (→ Firmly connect the sensor)
E4	Product is overheated	- Check if there is any burnt sign inside the burner (→ Request service) - Check if overheat protector wire is disconnected (→ Operate the heater again after connecting the wire)
E5	Heater is tilted	- Tilt error may occur when the heater is shaken or moved (→ Operate the heater again) - Inversion switch wire is disconnected (→ Operate the heater again after connecting the wire)
E6	No fuel	- Refuel and operate the heater again
HI	Temperature is over 50 degree C	- Reposition the sensor so that it can sense ambient temperature rather than inside the heater.

- After taking corrective actions, please restart the heater by pressing the power button twice

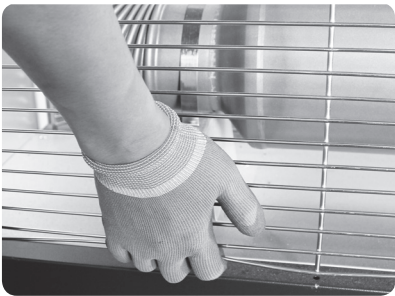
► If following messages appears on the display, check the following and take appropriate actions.

Symptom	Possible Causes	Solutions
The display shows nothing	- No power supply - Unplugged - Blown fuse	- Connect Power - Connect the sensor - Refuel
Heater keeps turning on and off	- Timer is on (check the lamp)	- Adjust Timer
Display shows full tank but the heater is not working	- Fuel sensor is disconnected - Empty fuel tank	- Connect the wire - Refuel
Can smell burnt fume during initial combustion	- Foreign substances are burnt inside the gasket	- No actions is needed, the smell will disappear within 1-2 hours
Can smell fuel	- You can smell fuel after heater is turned off - There might be some leaked fuel during refueling	- Run the heater for 15 mins - Clean out the leaked fuel
Ambient temperature seems abnormal	- Check the location of the temperature sensor (The sensor might got mislocated and measuring inside temperature of the heater.	- Re-locate the sensor at the right position

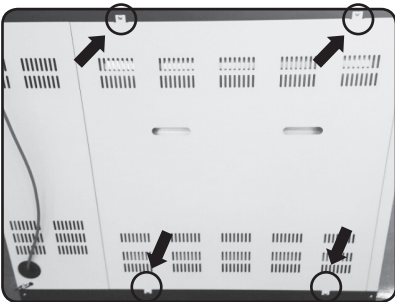
MAINTENANCE

STOVEPIPES

NOTE : Reverse following procedures for assembly.

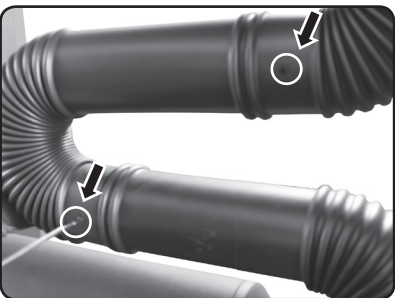


1. Lift up the protection grille and pull forward it gently.

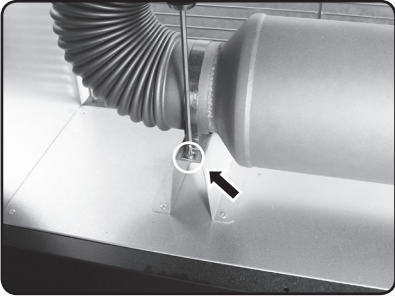


2. Loosen 4 bolts and disassemble heat reflecting board.

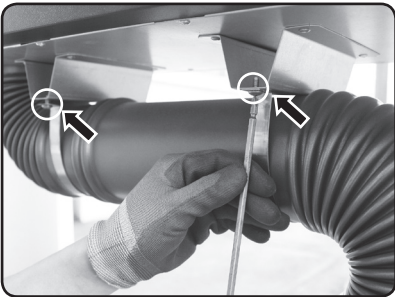
Heat reflecting board : Clean after checking erosion and pollution once a year. (Please replace if heavy corrosion.)



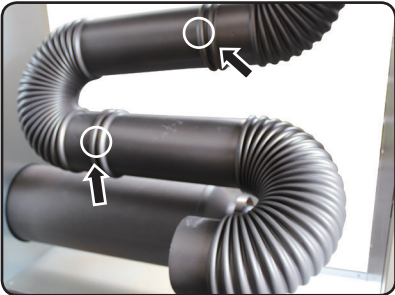
3. Loosen 2 bolts to the connection of stovepipe at the back of the product.



4. Disassemble 2 bolts connected.



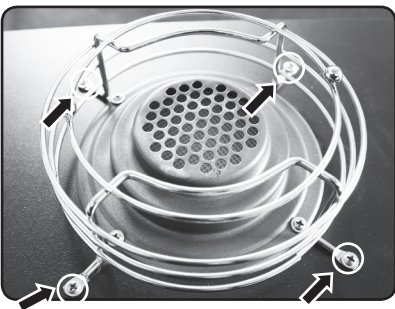
5. Loosen 4 bolts



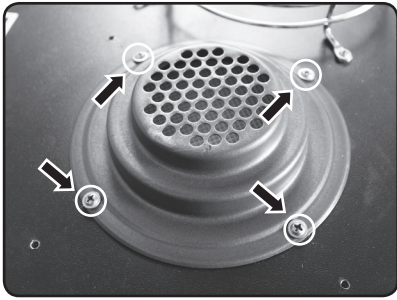
6. Rotate the stovepipes right and left until stovepipes get separated.

STOVEPIPE FILTER

NOTE : Reverse following procedures for assembly.



1. Disassemble after loosen 4 bolts connected to grille.



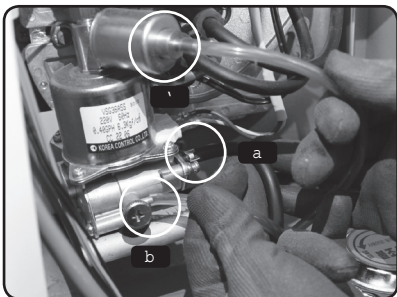
2. Disassemble after loosen 4 bolts connected to exhaust port.



3. Check for contamination and replace if necessary.

HOW TO CLEAN AND REPLACE FUEL FILTER

NOTE : Reverse following procedures for assembly.



1. Pull out the hoses connected at Point "A" and "C".

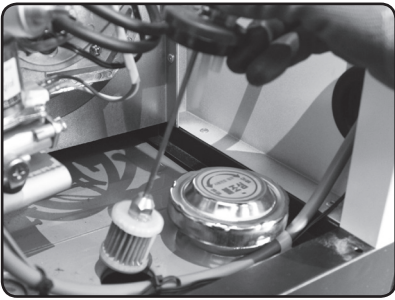
Please mark the hoses so that hoses do not get mixed up.



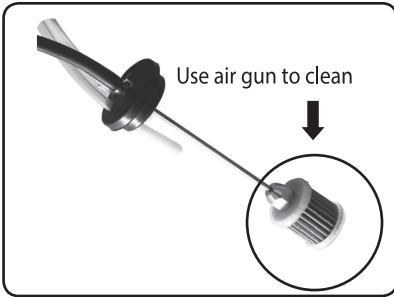
2. Press point "B" with a clamp and pull out the hose



3. Disassemble the rubber stopper.



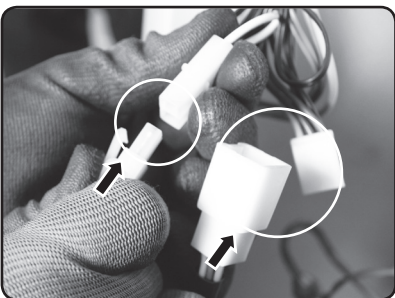
4. Lift the fuel filter up.



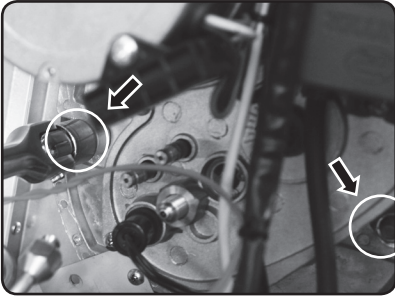
5. Follow steps in reverse order to assemble the parts. Use air guns to clean the residue and dust. If the filter is contaminated too much, replace it with a new part.

BURNER AND NOZZLES

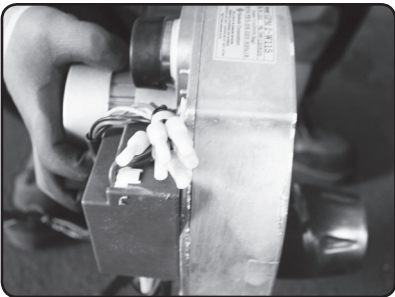
NOTE : Reverse following procedures for assembly.



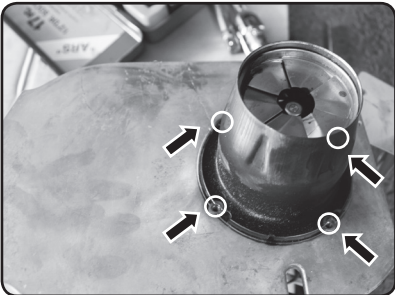
1. Disconnect two connectors



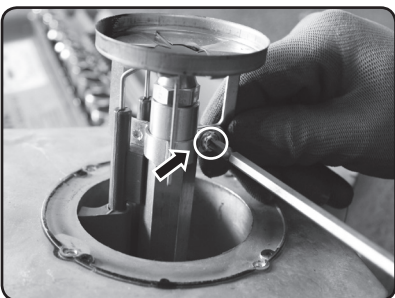
2. Loosen the nuts either side of the burner by using 14mm box driver and disassemble the burner.



3. Burner comes out of the heater

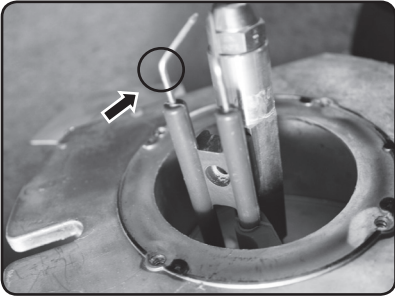


4. Loosen 4 bolts on that connects burner tube and burner together. Pull out the tube from the burner.



5. Disassemble bolts & nuts on baffle plate carefully.

*Please be careful not to lose the bolts & nuts. Do not tamper with any set values.

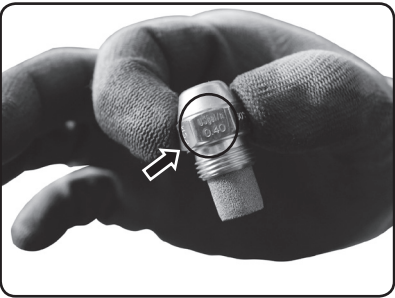


6. Do not touch or bend the circled parts



7. Clamp the part with a 16mm wrench and use a 14mm torque wrench to remove the nozzle from the parts.

*Please use two wrenches to prevent erosion.

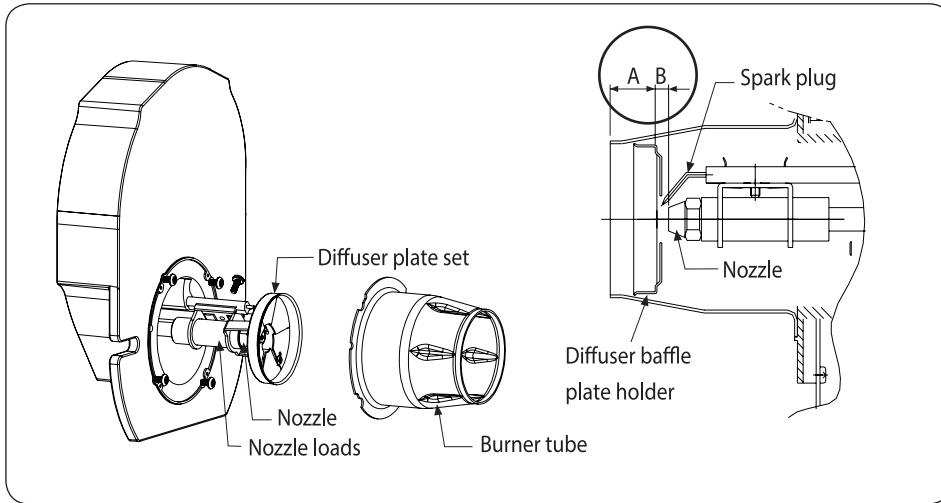


8. Specification of the nozzle is written on the product as shown in the picture. Please make sure to listed parts as shown in the name plate.

*Nozzle and baffle plate must be 6~7mm apart. Do not tamper with any set values.

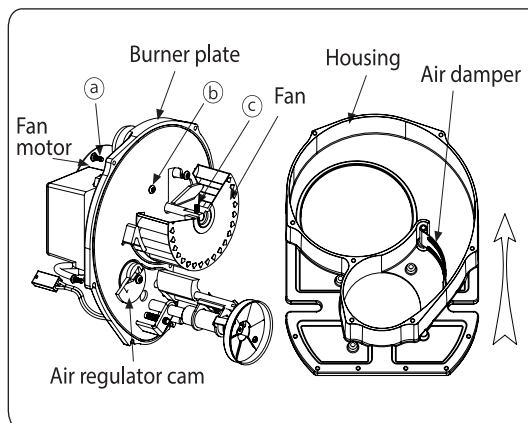
BURNER OVERVIEW

PARTS



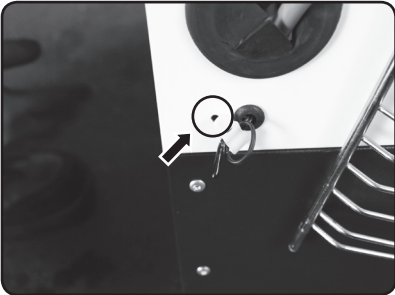
How to assemble the fan and the fan motor

1. Disassemble the burner from the product such as method of burner disassembly/nozzle replacement.
2. Disassemble the electronic pump, loosen bolts "A" fixed into burner plate and then remove the housing.
3. Loosen hex bolt "B" by using hex wrench 3mm, disassemble the fan, loosen bolt "C" and then remove the fan motor.
4. When assembly, give a slope the top of housing to down slightly and assemble closed in damper not to catch to air regulator cam assembled into burner plate.



TEMPERATURE SENSOR

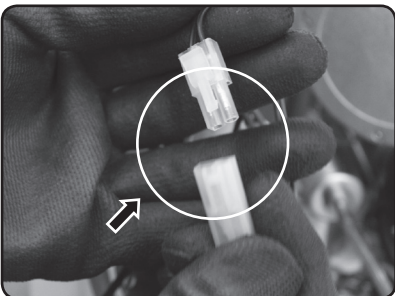
NOTE : Reverse following procedures for assembly.



1. Loosen the bolt that hold the sensor



2. Untie the tie

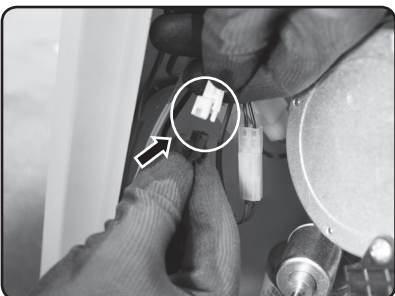


3. Disconnect the connector

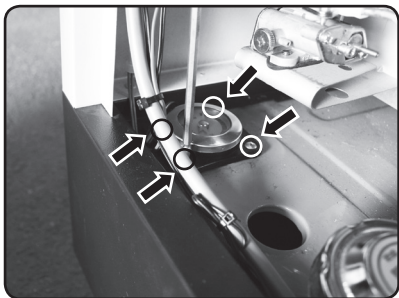
*Make sure temperature sensor is at the location that can measures ambient temperature, not inside the heater.

HOW TO REPLACE FLOWMETER

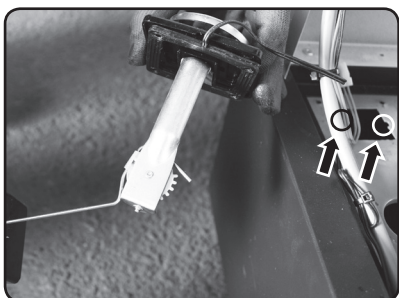
NOTE : Reverse following procedures for assembly.



1. Disconnect the connector



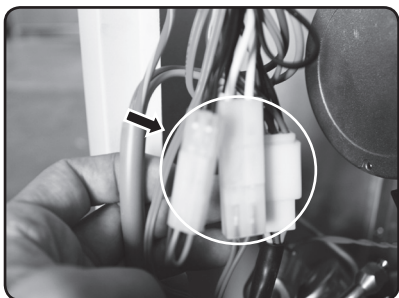
2. Loosen 4 bolts and gently move it right and left to lift the flowmeter from the heater.



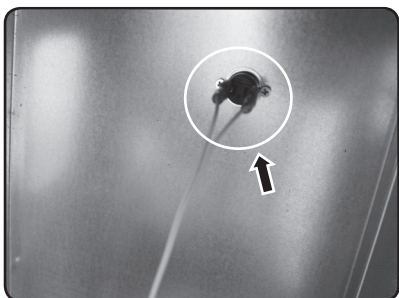
3. When you are re-assembling, make sure that flowmeter fits to the holes indicated in the picture correctly

PCB

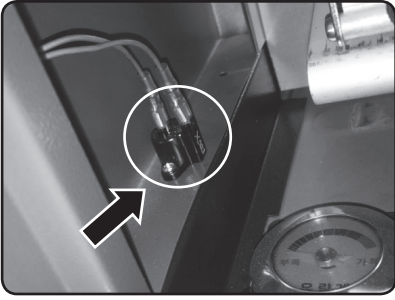
NOTE : Reverse following procedures for assembly.



1. Disconnect 3 connectors shown in the picture



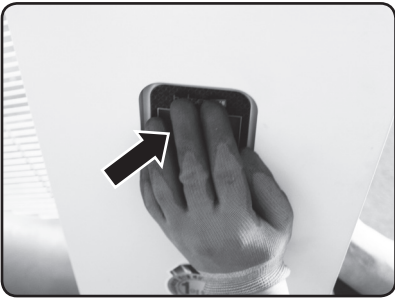
2. Disconnect the over heat sensor.



3. Disconnect anti-tilt sensor



4. Loosen 4 bolts shown in the picture

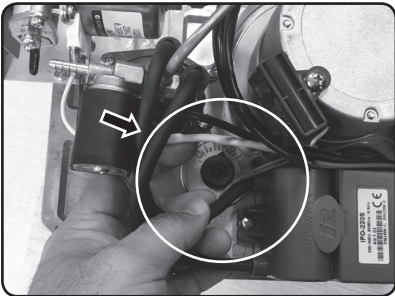


5. Remove the PCB from the heater.

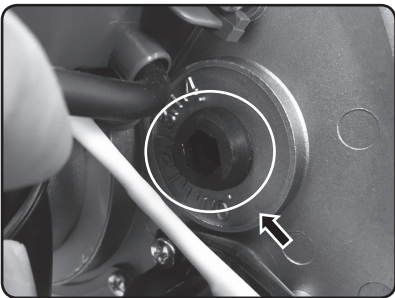


DAMPER ADJUSTMENT

When smoke, incomplete combustion, misfire or unstable ignition are detected, please adjust air dampers and orifice. Following procedures adjust the air intake that can improve burner combustion.



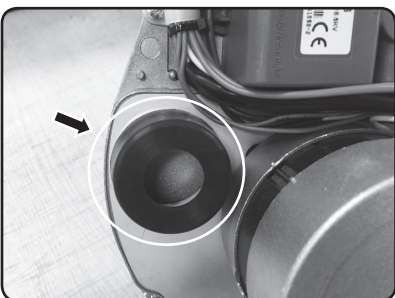
1. Use Allen wrench (Hex) to adjust the damper dial to change the air flow to the burner



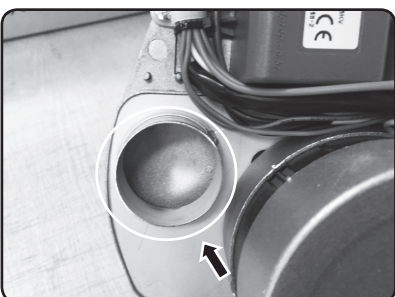
2. Damper can be set between "0~4.0". 0 is minimum air flow and 4.0 is maximum air flow

When setting air damper value, always add +0.1 or +0.2 from the desired value. i.e) if you wish to set "1.0", set it either "1,1" or "1.2".

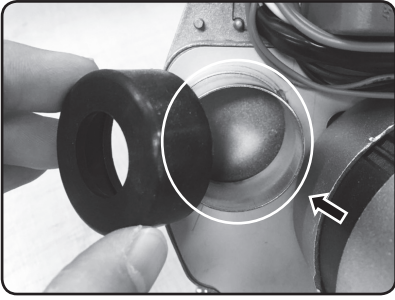
ORIFICE(RUBBER AIR INLET)



1. Decide the optimal orifice (rubber ring that controls air flow to the burner)

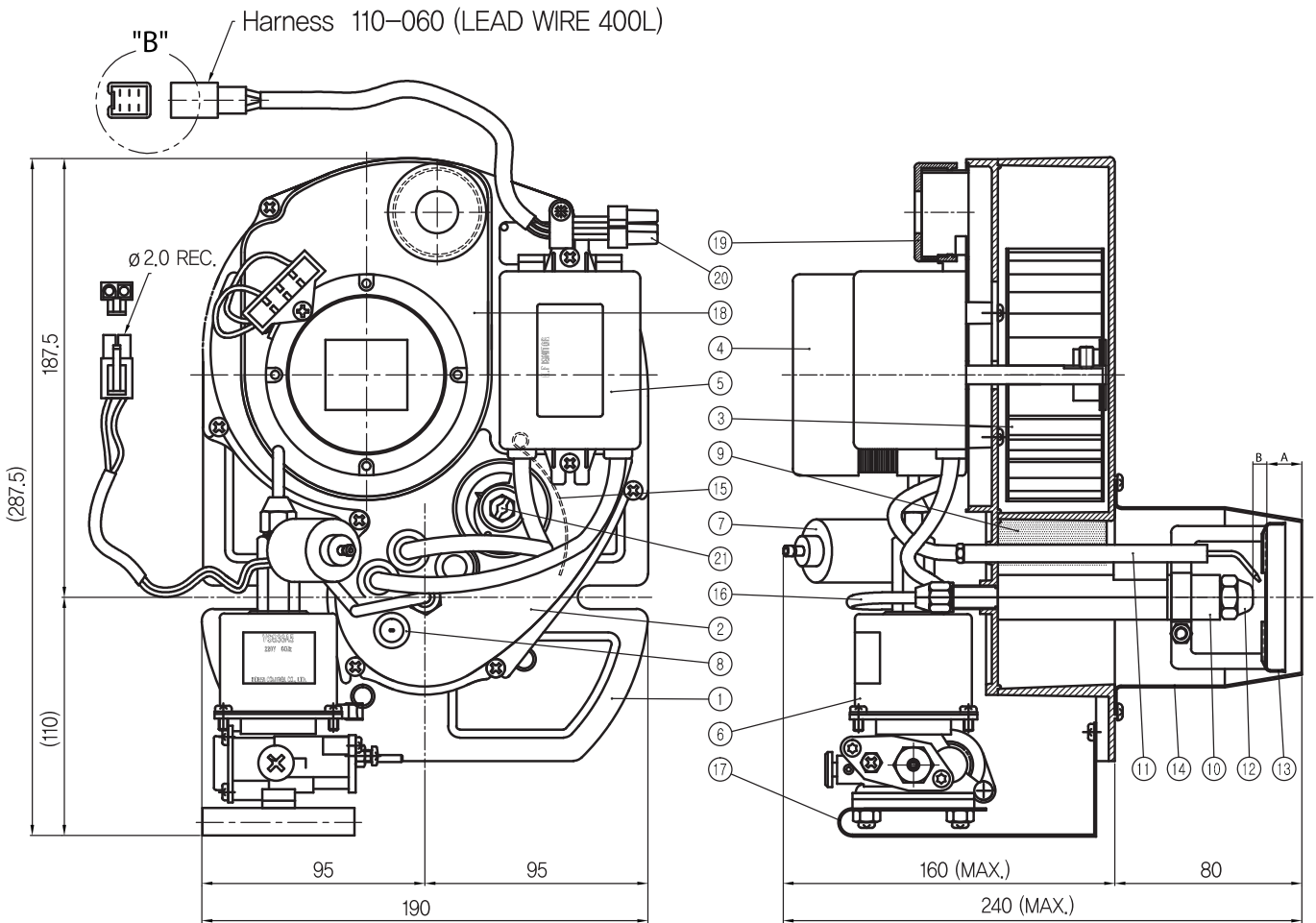


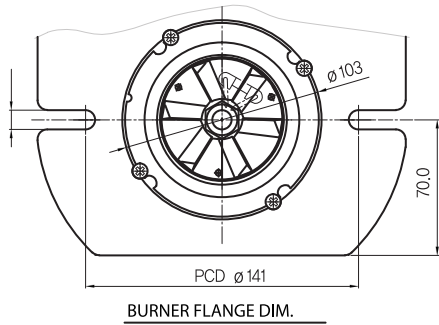
2. Remove the ring from the air inlet.



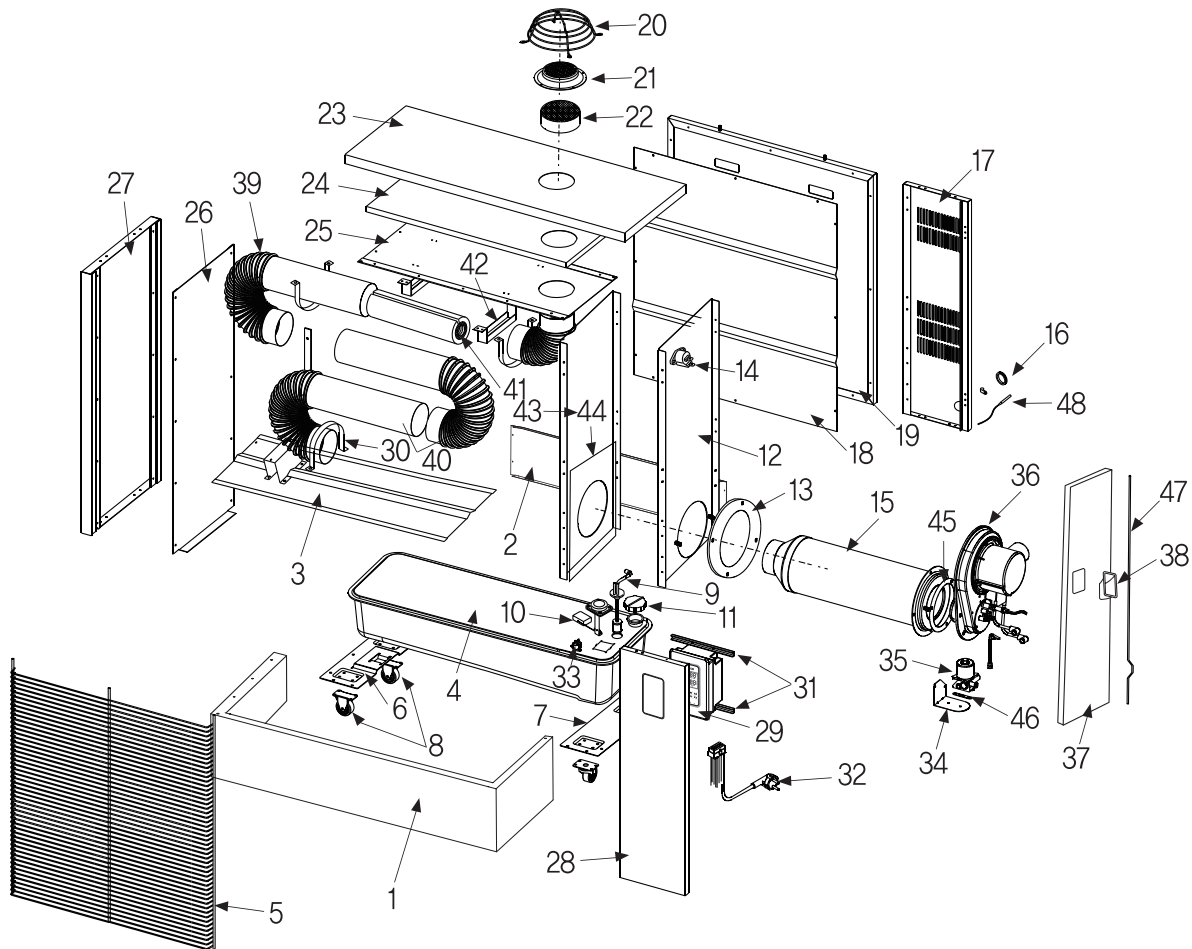
3. Identify appropriate orifice size and put it back on the inlet.

EXPLODED VIEW OF BURNER



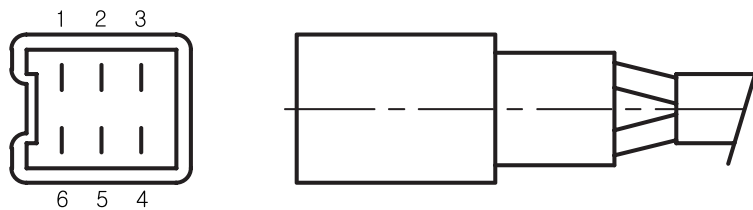


NO	Name	SIZE	MAT'L	REMARKS
1	BURNER HOUSING		ALDC10	Housing Base
2	BURNER FLANGE		ALDC10	Housing Flange
3	SIROCCO FAN		AL	ø108X42x34(BL)
4	MOTOR			8222/8228/8234
5	I.G TRANS			18.5KV, 28mA
6	ELEC. PUMP			VSG-36A5
7	OIL SOL. VALVE			
8	PHOTO CELL	SHORT		HEAD ON TYPE
9	AIR GUIDE		NBR	Electrode bar RUBBER
10	NOZZLE GROUP		C3602	HEX. 19 x 130L
11	ELECTROD	P18X140L	EPOXY	
12	OIL NOZZLE			
13	DIFFUSER		STS304	ø 65 X 1.0h (m ²) ø 65 X 1.5h (Floral pattern)
14	BLAST TUBE		STS304	ø 80 X 80L x 1t
15	AIR DAMPER	0.9t	EGl	
16	COPPER PIPE	PF 1/8	C1220	PF 1/8 x ø 4.7 X 0.7t
17	Electronic pump B/K	0.7t	EGl	
18	MOTOR FLANGE	0.8t	EGl	
19	Cover of outlet of air		NBR	
20	Insulation CAP			
21	DAMPER KNOB		PC	



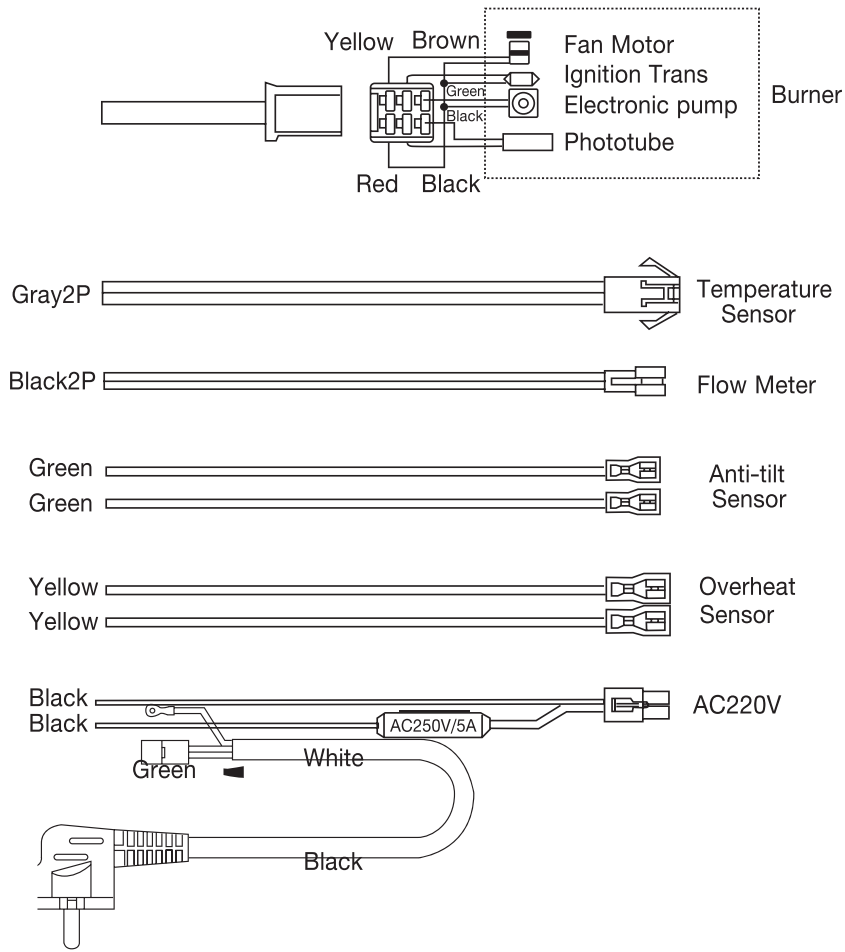
NO	Name	NO	Name	NO	Name
1	BOTTOM FRONT CASE	18	REFLECTOR REAR	35	ELECTRIC PUMP
2	BOTTOM REAR CASE	19	REAR CASE	36	OIL BURNER ASM
3	REFLECTOR BOTTOM	20	TOP GRILLE	37	DOOR BODY
4	FUEL TANK ASM	21	EXHAUST PORT	38	HANDLE
5	SAFETY NET	22	ADSORBOR	39	EXCHANGE TUBE B
6	WHEEL SUPPORT-L	23	UPPER CASE	40	EXCHANGE TUBE A
7	WHEEL SUPPORT-R	24	TOP CASE PACKING	41	TUBE PACKING ASM
8	WHEEL	25	REFLECTOR TOP	42	PIPE SUPPORT-U
9	FILTER ASSY	26	REFLECTOR SIDE CASE-L	43	REFLECTOR SIDE CASE-R
10	INDICATOR ASM	27	SIDE CASE-L	44	BURNER GUIDE PACKING
11	CAP ASSY	28	SIDE FORNT CASE-R	45	BURNER PACKING
12	THERMOSTAT GUIDE BRACKET	29	PCB ASM	46	PUMP PACKING
13	EXCHANGE GUIDE PACKING	30	PIPE BRACKET	47	DOOR BAR
14	THERMOSTAT	31	PCB BRACKET	48	ROOM THERMISTOR
15	EXCHANGE PIPE ASM	32	CONDUCTOR ASM		
16	POWER CORD RING	33	AUTO OFF SWITCH		
17	SIDE REAR CASE-R	34	PUMP BRACKET		

CONNECTOR SPECIFICATIONS

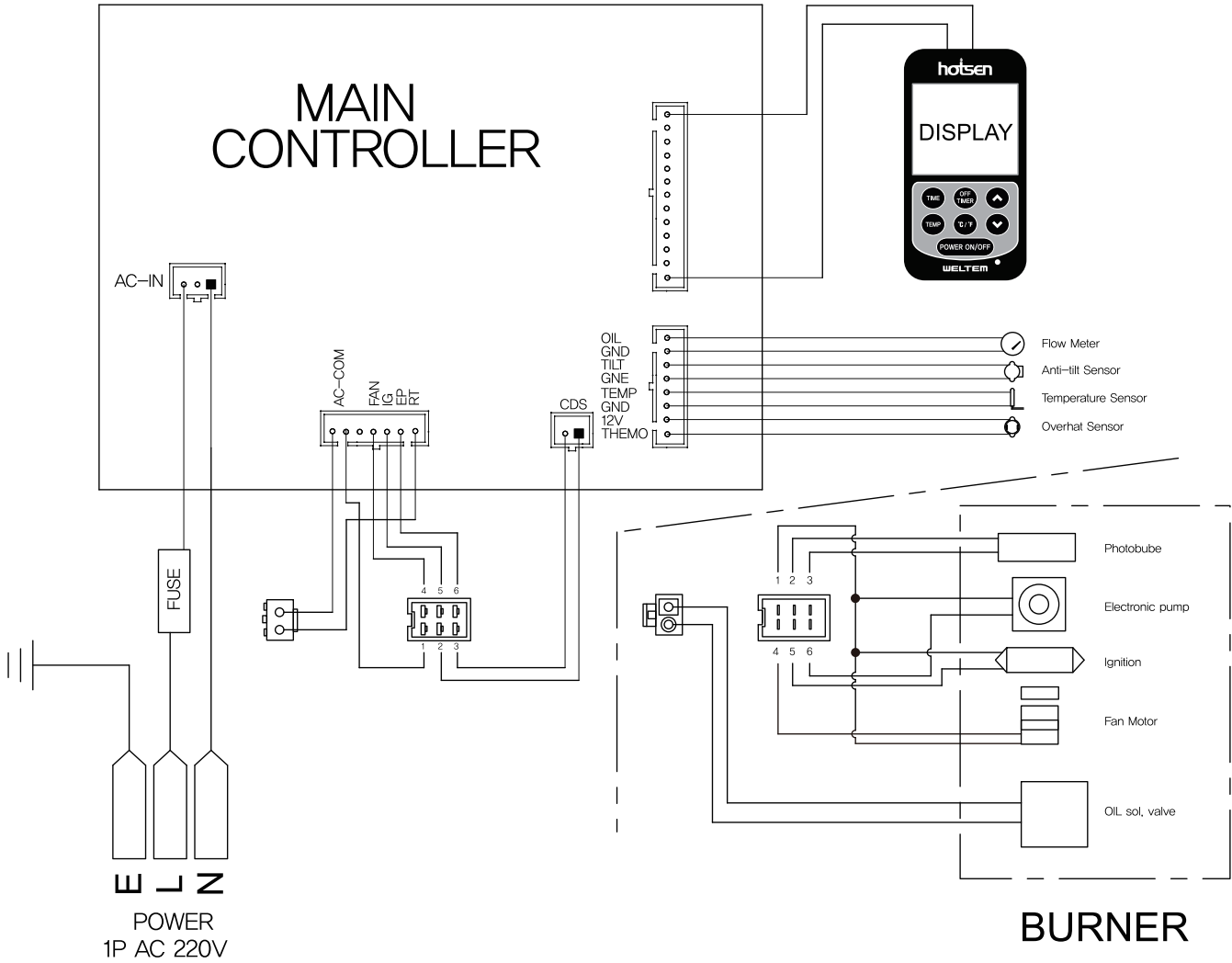


DETAIL OF "B"

Item	NO 1	NO2	NO 3	NO4	NO 5	NO 6
Name	AC common	Photoelectric tube		Electronic pump	Trans	Fan motor
Color	Red	Black		Green	Brown	Yellow
Nominal cross section : 0.5mm ²						



WIRING DIAGRAM



Connector specifications

Item	NO 1	NO2	NO 3	NO4	NO 5	NO 6
Name	AC common	Photoelectric tube		Electronic pump	Trans	Fan motor
Color	Red	Black		Green	Brown	Yellow
Nominal cross section : 0.5mm ²						