
HOMEL FURNACE (HMW-40-100)
INGOT CHARGER (IP-T1)
INSTRUCTION MANUAL



MEICHU SEIKI CO., LTD.

"HOMEL" FURNACE INSTRUCTION MANUAL

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A-1 . OUTLINE

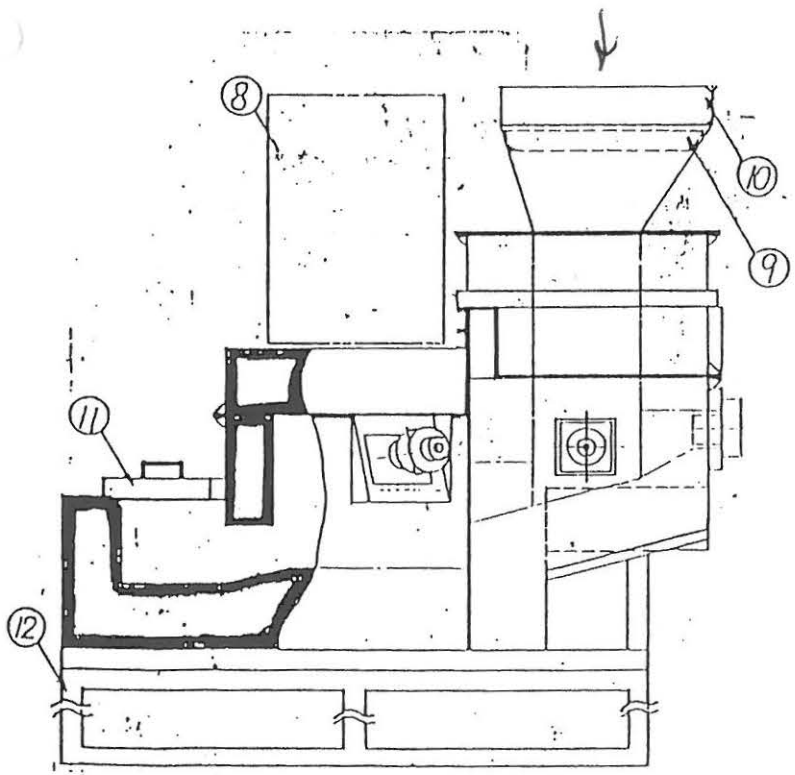
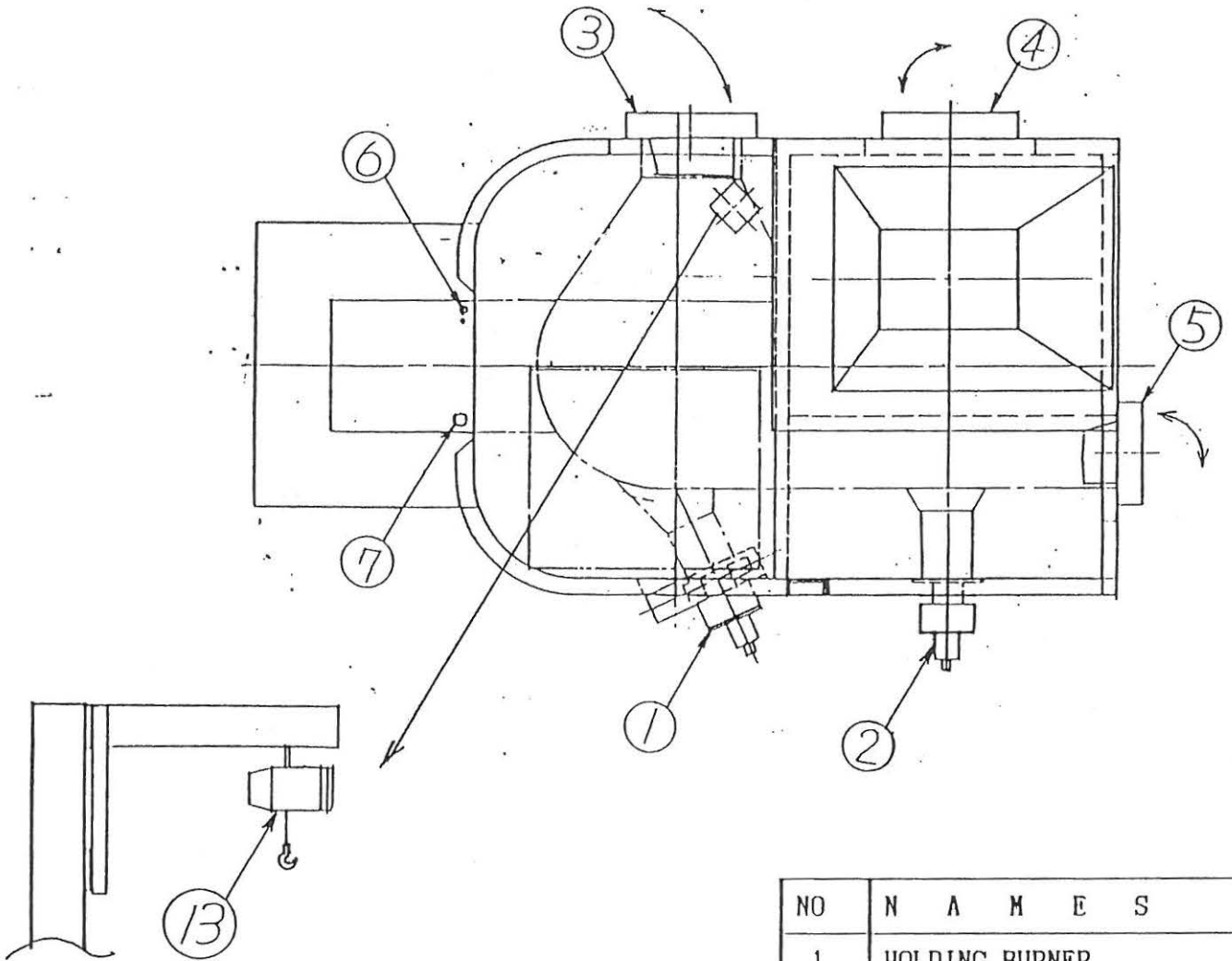
This is a continuous melting and holding furnace for aluminum which capacity has 300Kg/Hr for melting and 1000Kg for holding.

A-2 . EXPLANATION OF PARTS

- ① Holding burner 150,000Kcal/Hr
Burner for keeping temperature of aluminum alloy in the set.
- ② Melting burner 150,000Kcal/Hr
Burner for melting aluminum alloy .
- ③ Holding chamber inspection door.
Door for cleaning and inspecting the holding chamber.
- ④ Melting chamber inspection door.
Door for cleaning and inspecting the melting chamber.
- ⑤ Dry hearth chamber inspection door.
Door for cleaning and inspecting the dry hearth chamber.
- ⑥ Metal level detector(Fig.1)
Detector for extinguish melting burner automatically.
Burner is extinguished when detector edge catches metal level and re-fired after time up.
- ⑦ Termocouple & Protective tube.(Fig.2)
Insert thermocouple into the protective tube not for touching metal directly.

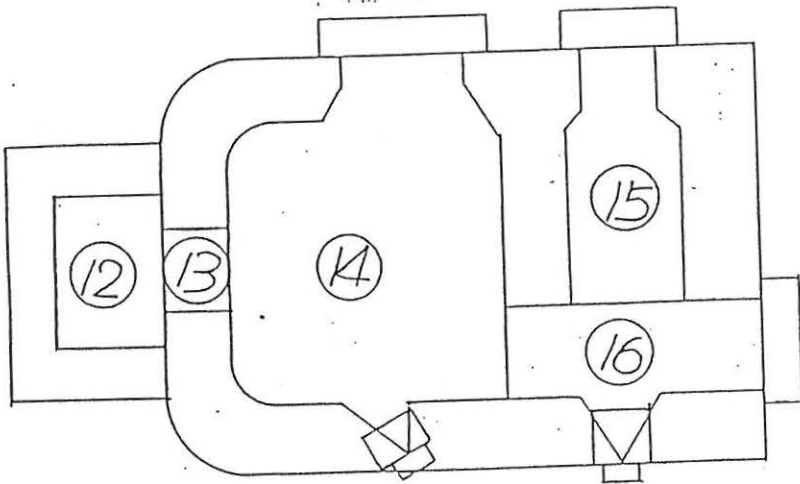
- ⑧ Combustion unit
Various combusting equipments,blower and magnet valve,etc.are included.
Each valve is set in combustion ajustment.
- ⑨ Material charging door.
Close the door for keeping warm except in operation.
- ⑩ Metal well cover
Close the door for keeping warm except in operation.
- ⑪ Base of furnace
- ⑫ Metal well chamber
Place for dipping metal.
- ⑬ Partition
Prevention from leak of holding burner frame and flowing dross in the holding chamber out to metal well chamber.
- ⑭ Holding chamber
Place for pool of molten metal.
(Rising temperature,settlement)
- ⑮ Melting chamber.
Place for melting aluminum alloy.
- ⑯ Dry hearth chamber
Slope way for blowing moalten metal into the holding chamber and rising temperature.

A . NAMES OF MAIN PARTS & OPERATION



NO	N A M E S
1	HOLDING BURNER
2	MELTING BURNER
3	HOLDING CHAMBER INSPECTION DOOR
4	MELTING CHAMBER INSPECTION DOOR
5	DRY HEARTH CHAMBER INSPECTION DOOR
6	METAL LEVEL DETECTOR
7	TERMOCOUPLE & PROTECTIVE TUBE
8	COMBUSTION UNIT
9	MATERIAL CHARGING DOOR
10	HOPPER
11	METAL WELL COVER
12	FURNACE STAND
13	CHAIN HOIST

NAMES OF FURNACE BODY PARTS



NO	NAMES
12	METAL WELL CHAMBER
13	PARTITION
14	HOLDING CHAMBER
15	MELTING CHAMBER
16	DRY HEARTH CHAMBER

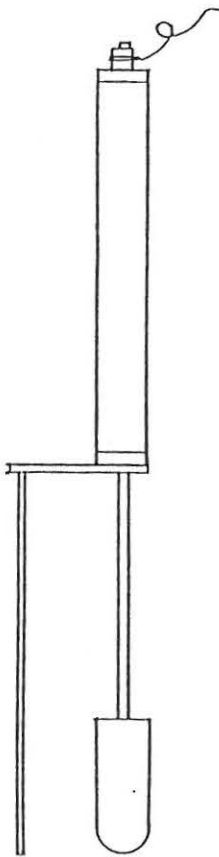


Fig.1
Metal level detector

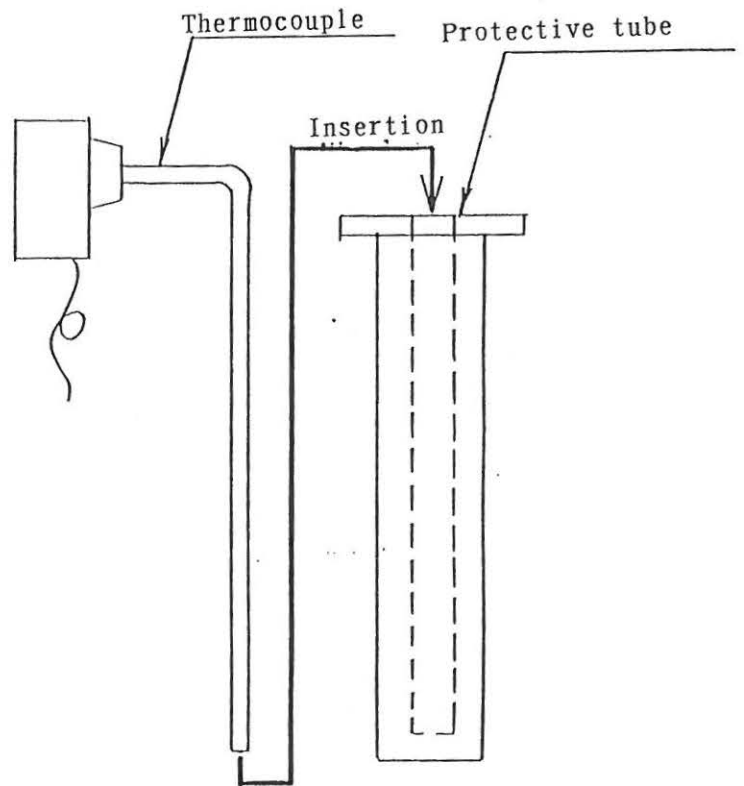
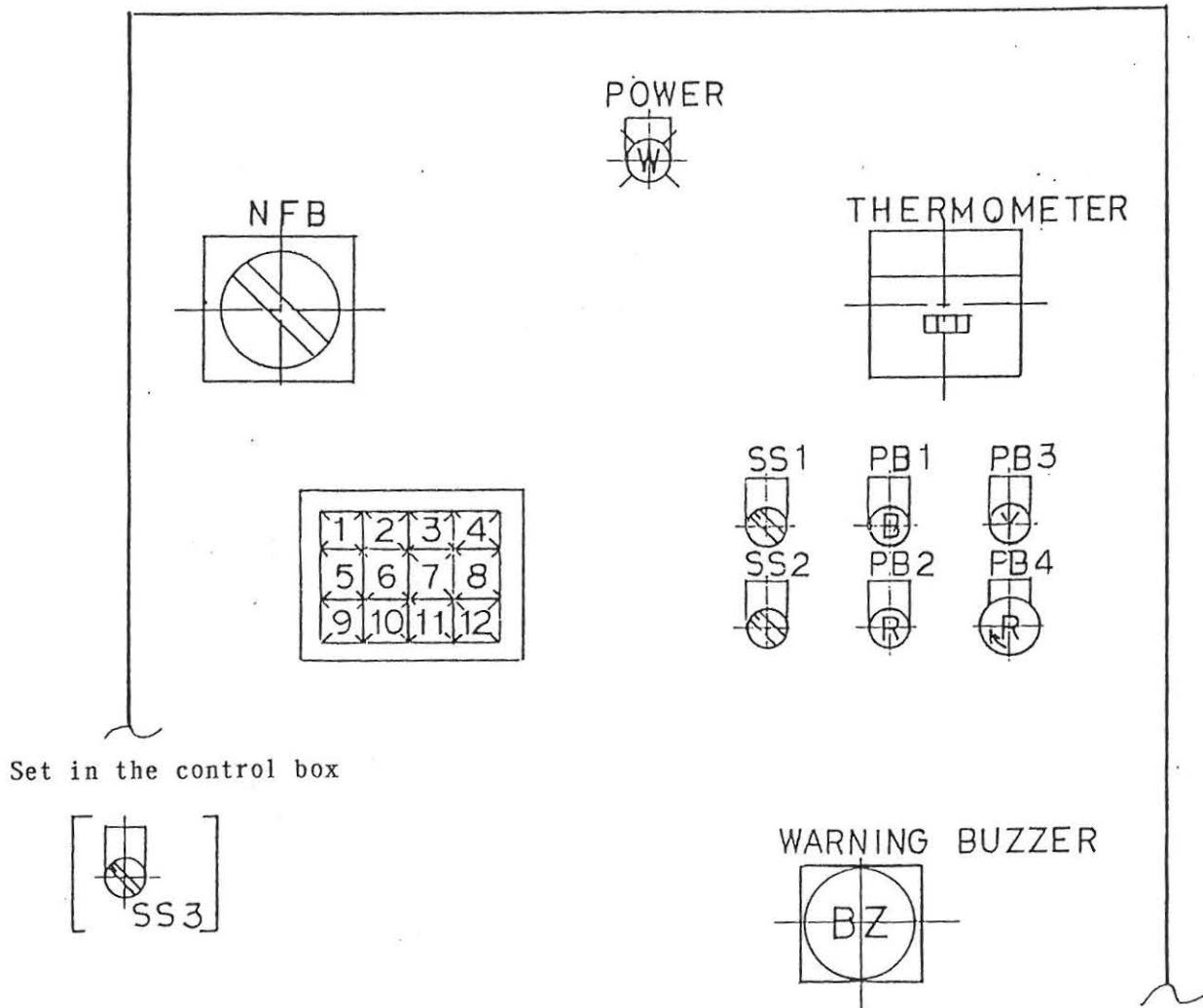


Fig.2

A-3 . NAMES OF OPERATION SWITCHES & THEIR FUNCTIONS



- SS 1: BLOWER OFF - ON
- SS 2: HOLDING BURNER OFF - ON
- PB 1: MELTING BURNER ON
- PB 2: MELTING BURNER OFF
- PB 3: TROUBLE RESET
- PB 4: EM. STOP

- PL → PILOT LAMP
- PB → PRESS BUTTON SWITCH
- SS → SELECT SWITCH

SS 3: INTERLOCK OFF - ON

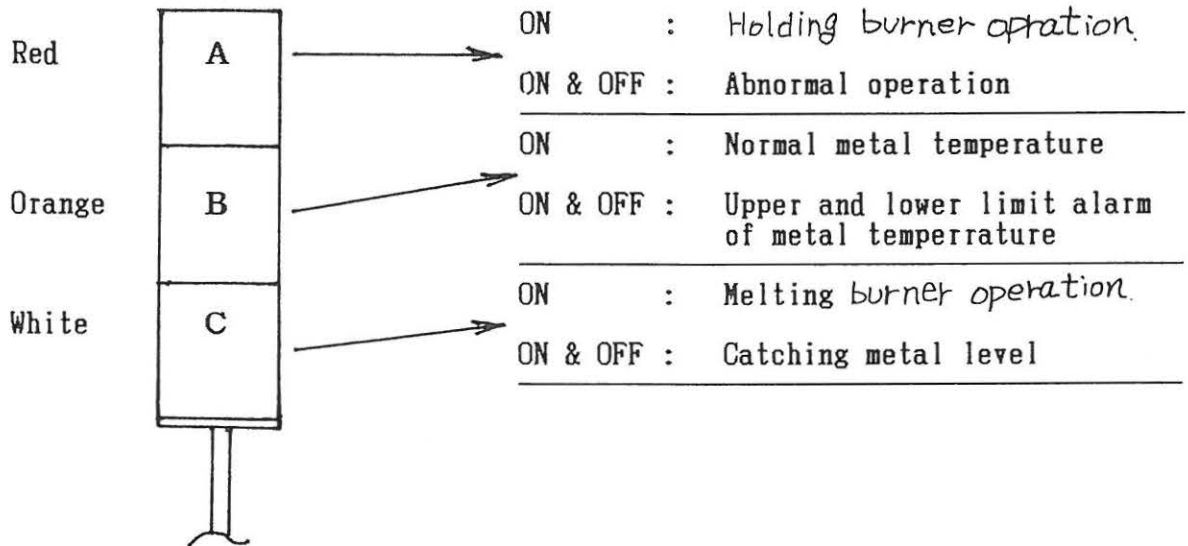
S Q U A R E L I G H T L A M P

BLOWER ON	HOLDING BURNER ON	MELTING BURNER ON	TEMP. UPPER LIMIT
AIR PRESS DOWN	HOLDING FLAME CATCH	MELTING FLAME CATCH	TEMP. LOWER LIMIT
GAS PRESS DOWN	HOLDING BURNER MISFIRE	MELTING BURNER MISFIRE	DOOR OPEN LIMIT

C O L O R

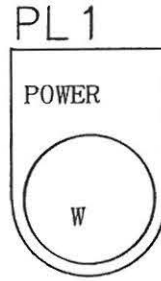
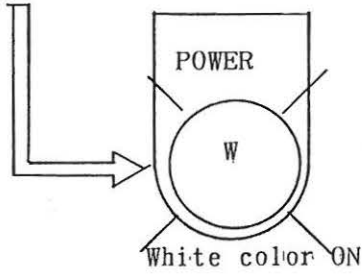
GREEN	ORANGE	ORANGE	RED
RED	ORANGE	ORANGE	RED
RED	RED	RED	GREEN

S I G N A L T O W E R



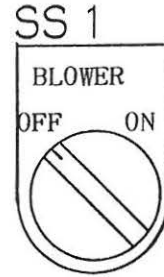
POWER ON RAMP

- Power confirmation and white lamp ON .



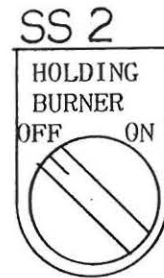
BLOWER ON-OFF SWITCH

- Turn to ON side, and blower starts, Square light 1 ON.
- * Square light is named light below.



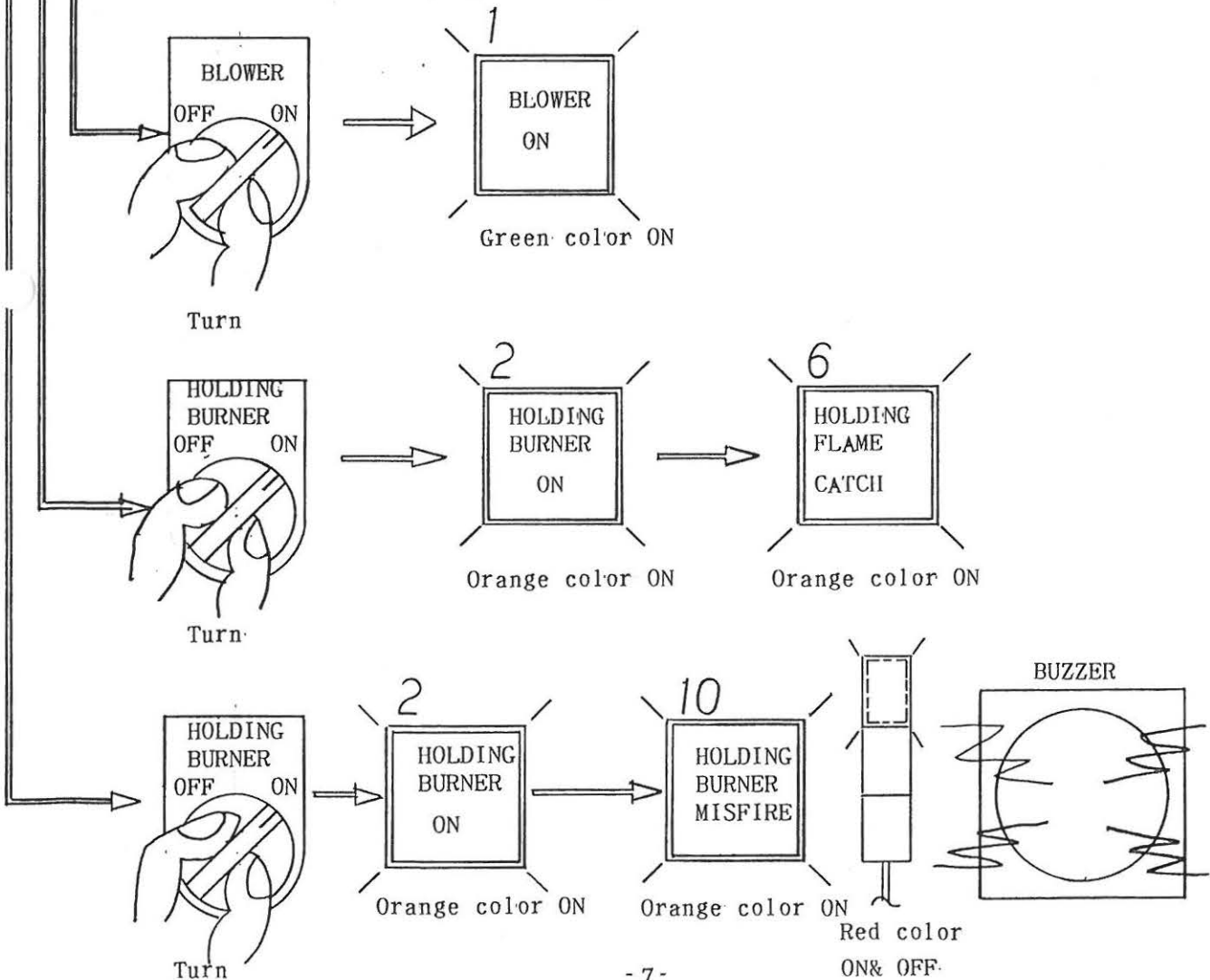
HOLDING BURNER ON - OFF SWITCH

- Holding burner operation switch
- Turn to ON side, and light 2 ON.



- ① In case of fire, light 6 ON.

- ② In case of misfire, Light 10 ON, buzzer ON, and signal tower A ON.



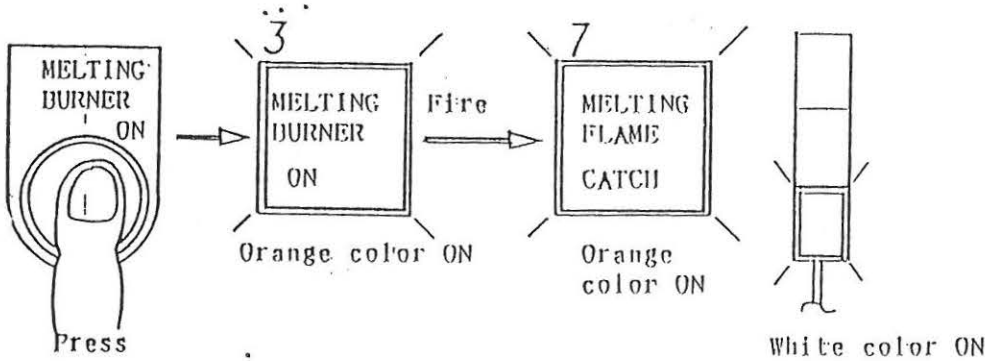
MELTING BURNER ON PRESS BUTTON SWITCH



① In case of fire

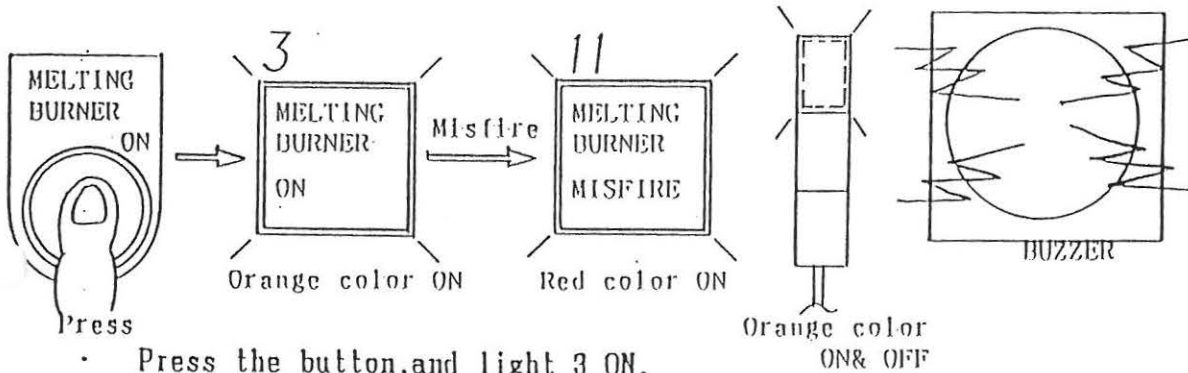


• In the case of material charging door is close, melting burner is not fire.
• Open material charging door (light 12 ON)



- Press the button and light 3 ON, light 7 ON after fire.
- Signal tower C ON.

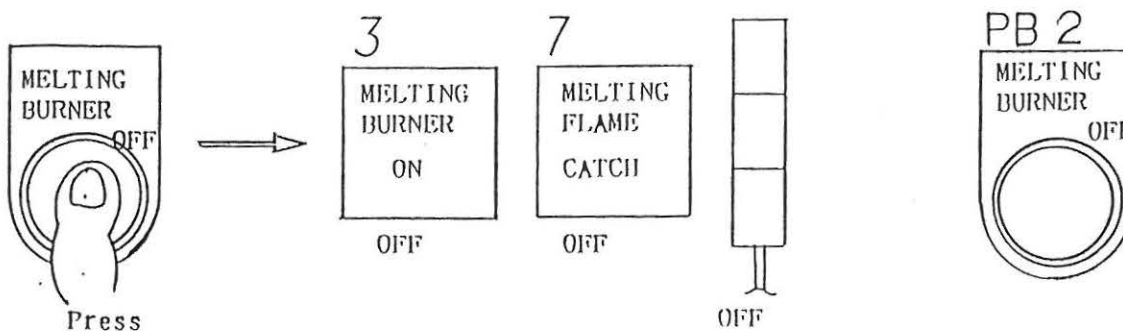
② In case of misfire.



- Press the button, and light 3 ON.
- Light 11 ON, buzzer ON, and signal tower A ON & OFF .

MELTING BURNER OFF PRESS BUTTON SWITCH

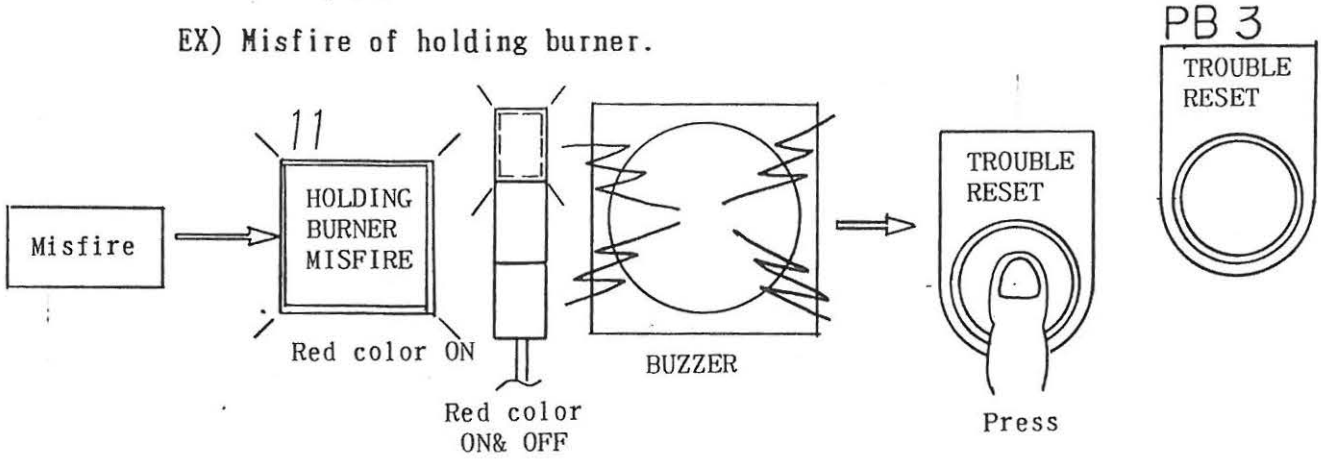
- Press the button, and light 3, light 7 OFF, melting burner is extinguished.



TROUBLE RESET PRESS BUTTON SWITCH

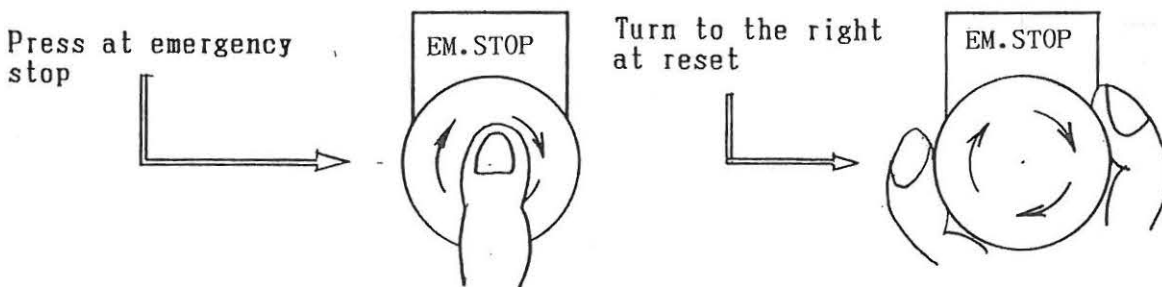
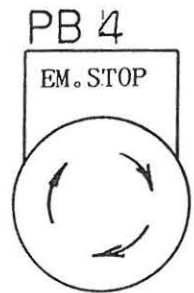
- Press button for canceling these alarm in trouble of misfire, abnormal air and gas pressure.

EX) Misfire of holding burner.



EM.STOP PRESS BUTTON SWITCH

- Press at emergency stop and cut of control circuit.
- This type of switch is PUSH-LOCK and TURN-RESET. Turn to the right at reset.



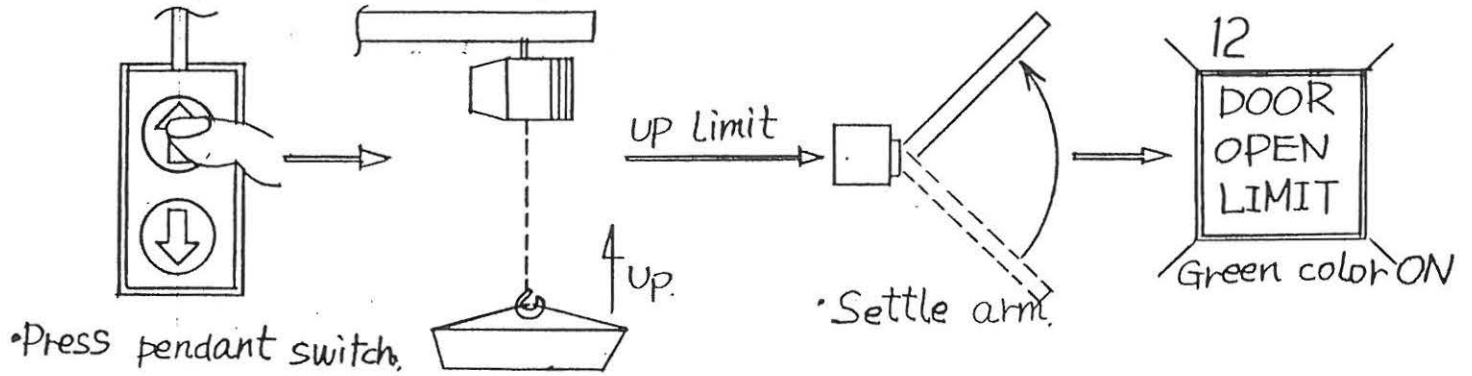
INTER LOCK ON-OFF SWITCH(Set in the control box)

- Operation switch at ON-OFF of abnormal metal temperature signal sending to the die-casting machine.



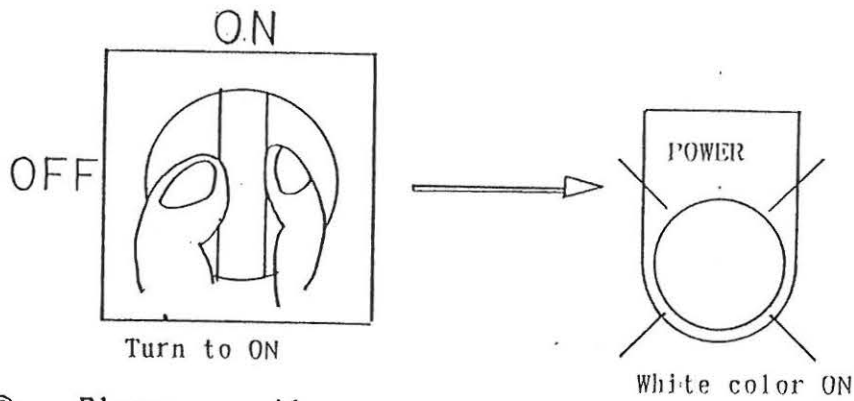
MATERIAL CHARGING DOOR OPEN & CLOSE PROCEDURE

• Operation chain hoist

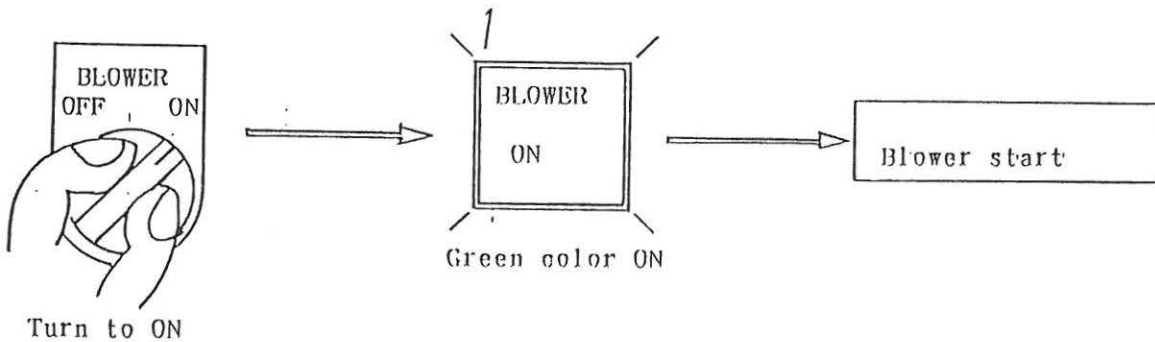


A-4. BURNER IGNITION & EXTINGUISHING PROCEDURE

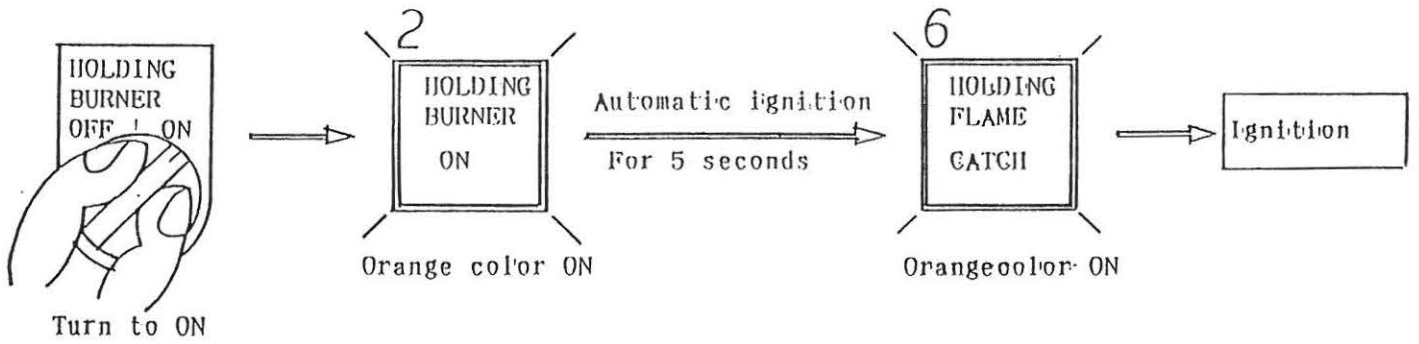
① Power ON.



② Blower operation

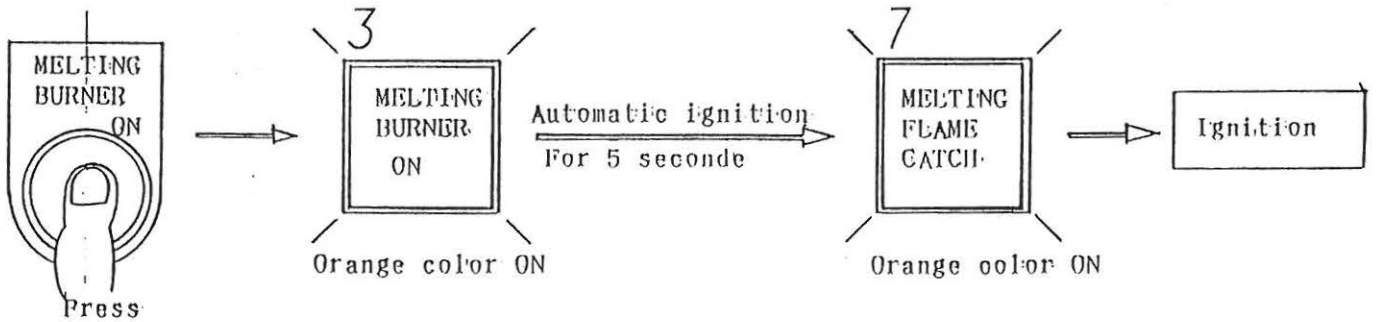
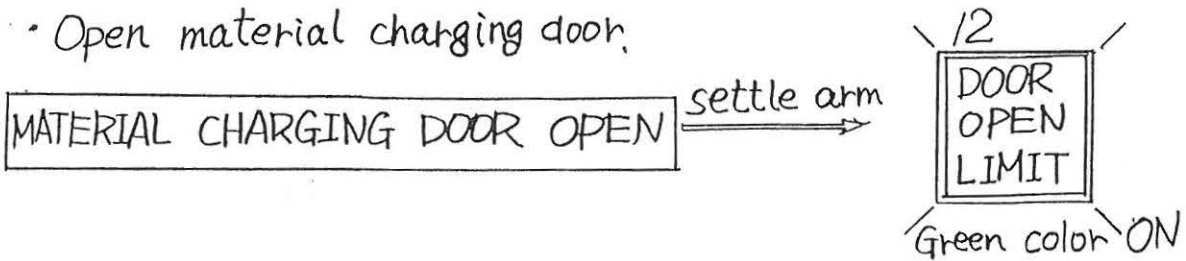


③- 1 Holding burner ignition

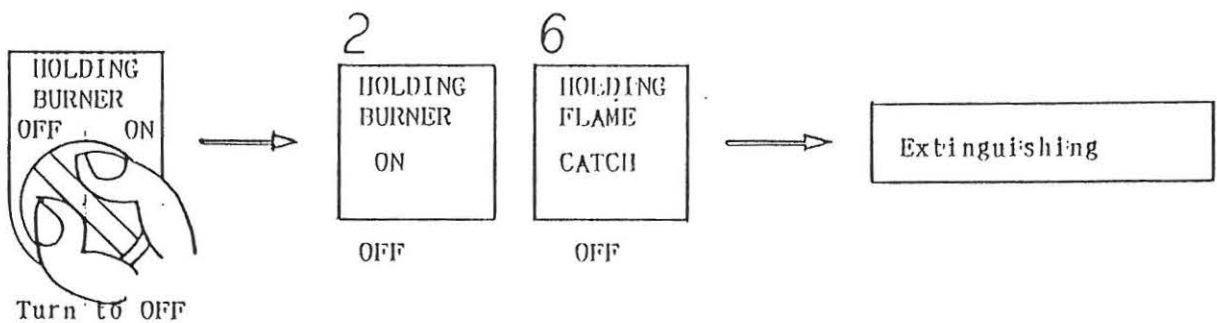


③- 2 Melting burner ignition

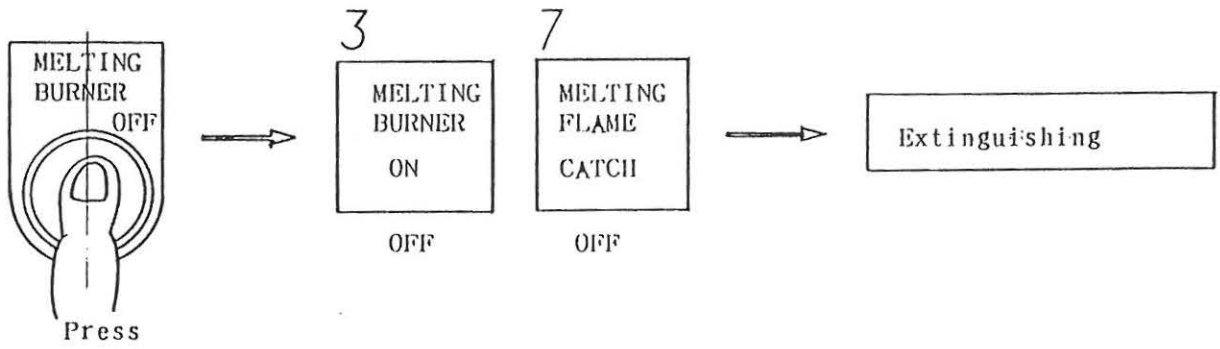
• Open material charging door.



④- 1 Holding burner extinguishing

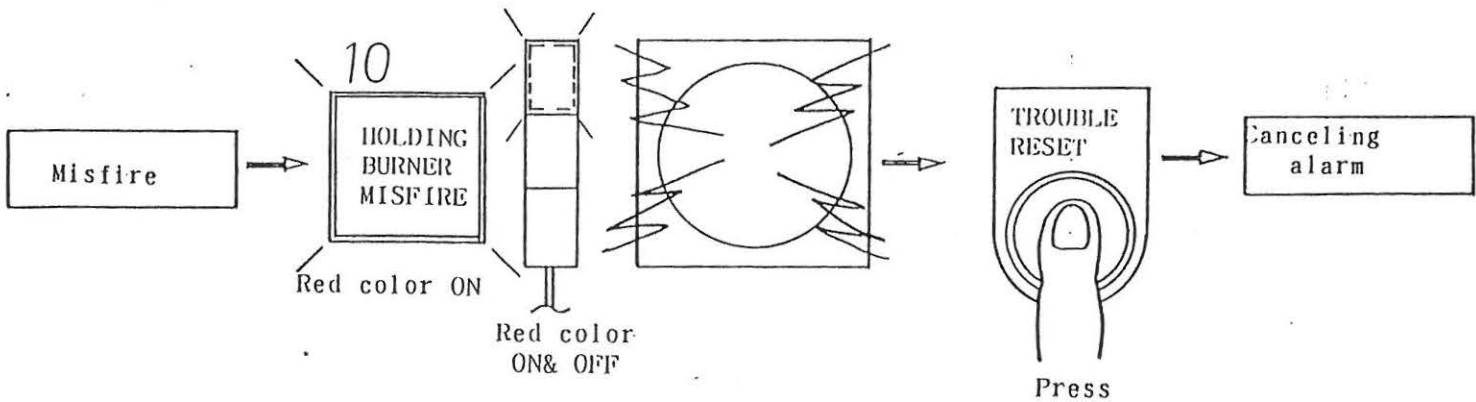


④- 2 Melting burner extinguishing



⑤ In case of misfire of pilot burner.

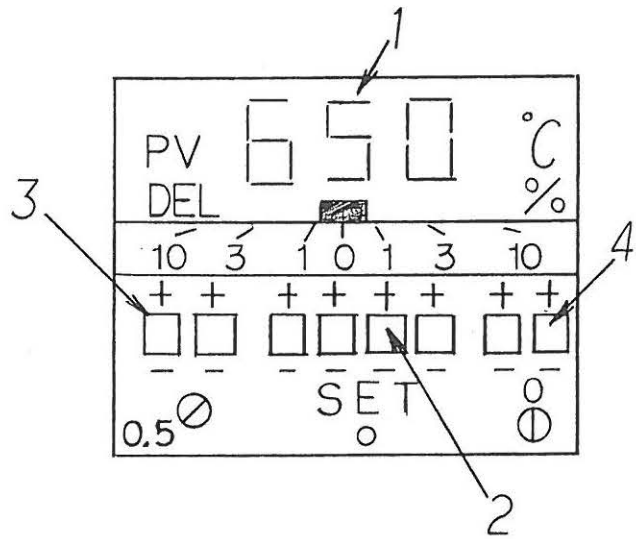
EX) Holding burner



Operate ignition procedure again after canceling alarm.

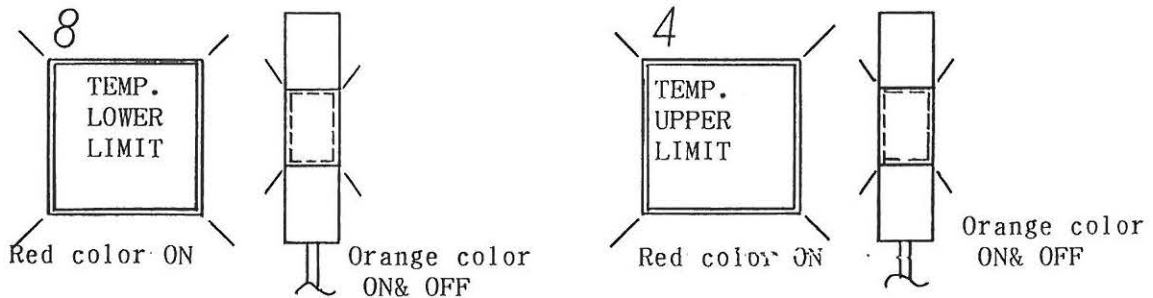
A-5. THERMOMETER

1. Real metal temperature.
2. Set temperature.
3. Lower limit alarm set.
4. Upper limit alarm set.



EX) Set temperature at 650°C, temperature alarm set ± 10 °C.

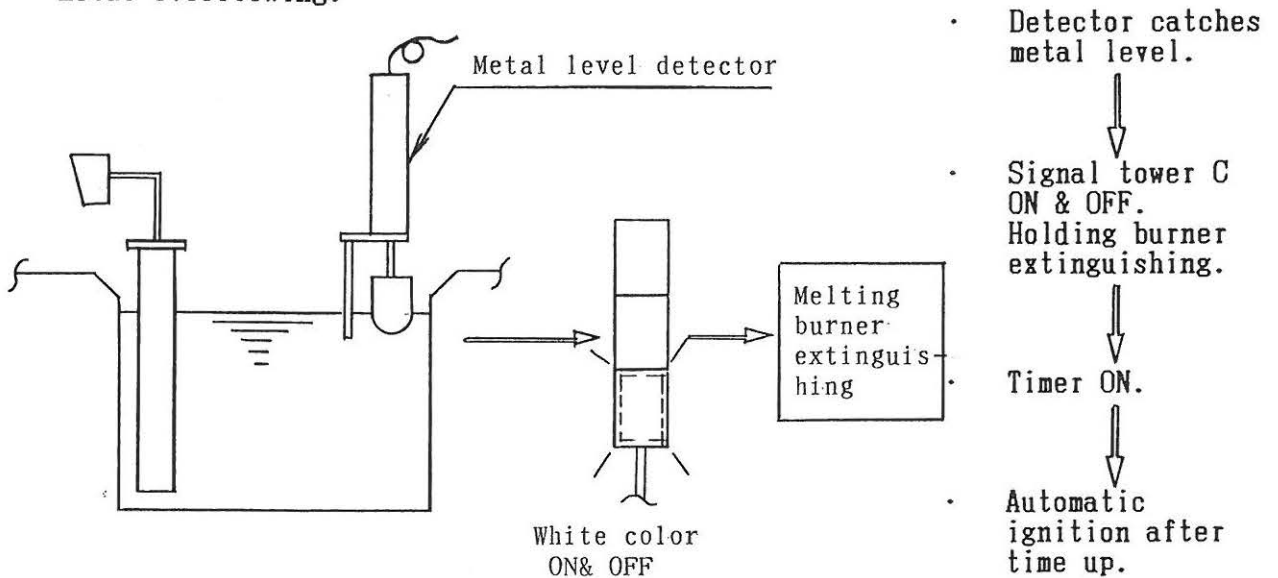
- ① If real temperature is under 640 °C, light 8 ON, signal tower B ON & OFF.
- ② If real temperature is over 660 °C, light 4 ON, signal tower B ON & OFF.



* Control system of holding burner repeats ON-OFF of burner automatically in the range of $\pm 3 \sim 5$ °C of temperature setting and keep the constant temperature of molten metal.

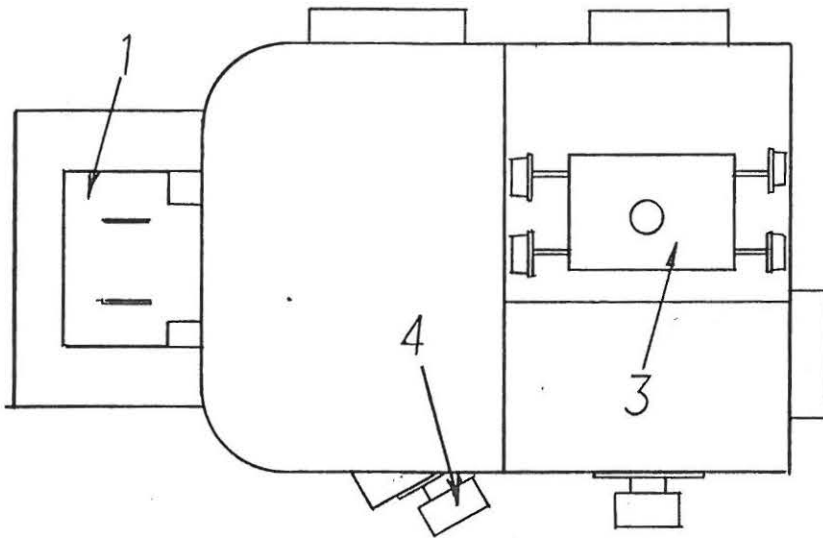
A-6. METAL POOL OVER LAMP

* Melting burner is extinguished automatically for preventing molten metal overflowing.



B . OPERATING PROCEDURE

B-1. Start-up operating procedure.

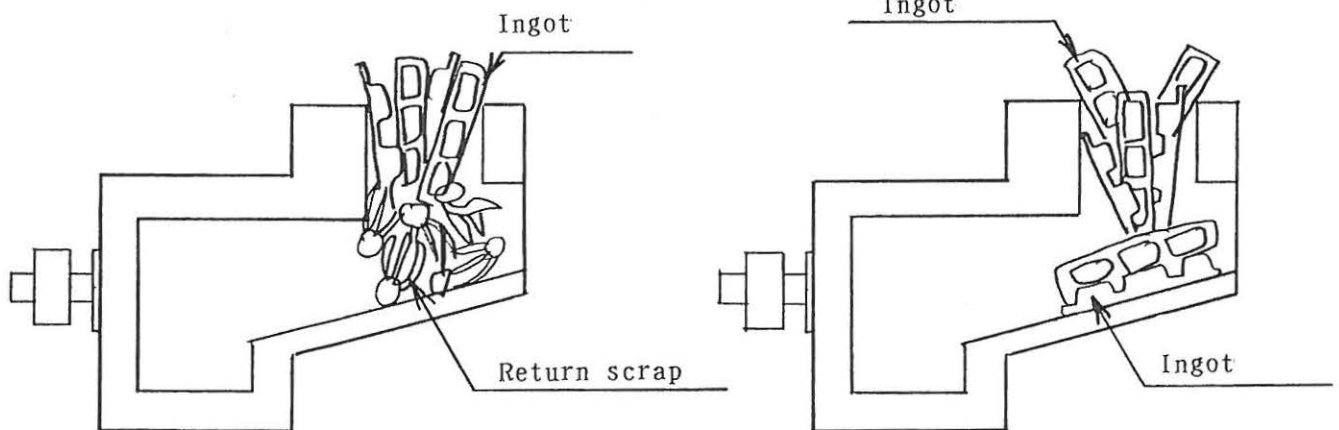


- ① Close the metal well cover
 - ② Set thermometer 650°C.
 - ③ Close the charging door.
 - ④ Pre-heat furnace interior by holding burner.
 - ⑤ Start to melt after 8 hours.
- * Cover opening with insulation.

B-2. Continuous operating procedure.

- ① The first material charging.

Charge return scrap at first for durability of furnace material in case of ingot only.
Lay ingot on the hearth at first and charge.



- ② Continuous material charging.

Charge continuously, and full the pre-heating tower with material.

③ Operating procedure at the end of melting.

- (1) Suspend material charging before the completion of casting.
- (2) Push out unmelted material to the front of the melting burner and melt that about 15 minutes.(Fig.1)
- (3) Drop soft material into the holding chamber from the dry hearth chamber inspection door.(Fig.2)
- (4) Move remaining material in front of melting chamber inspection door to the dry hearth chamber.
- (5) Repeat works (2)(3)(4), and clean the melting chamber and dry hearth chamber
- (6) Extinguish the melting burner, and then close the charging door.
- (7) Perform flux treatment in the holding chamber.

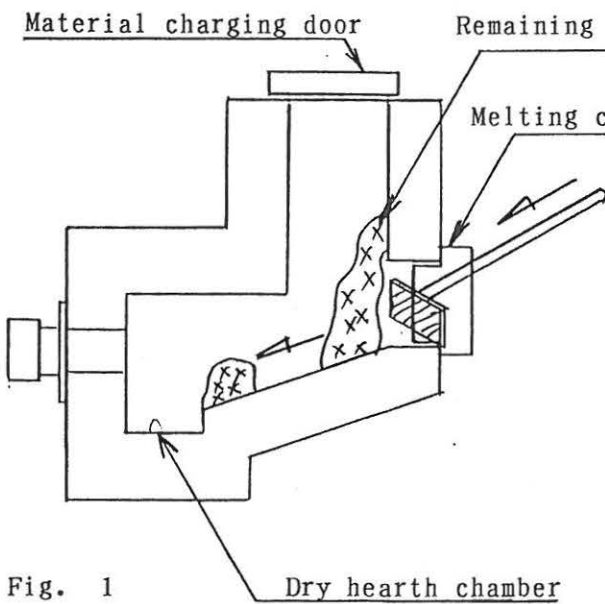


Fig. 1

Push out material forward

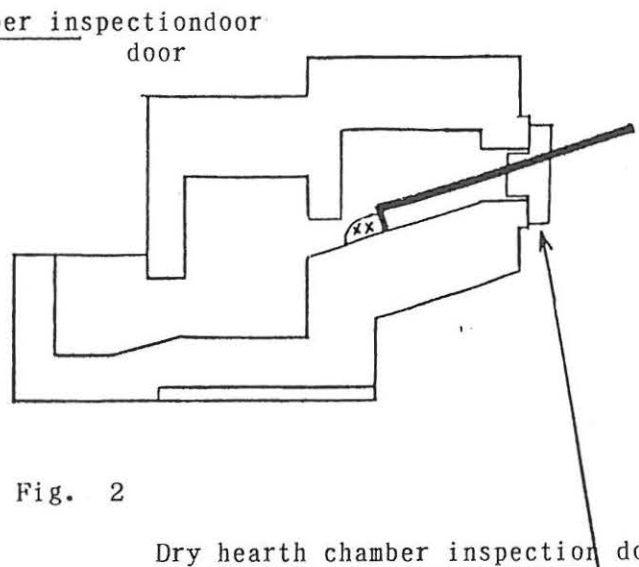


Fig. 2

Drop material into the holding chamber

* It is very important work to clean the melting chamber and dry hearth chamber at the end of melting. Neglection may cause serious troubles to operation.

B-3. Stop of furnace operation for long time.

* Dip up molten metal entirely in the furnace in case of stopping operation more than five days.

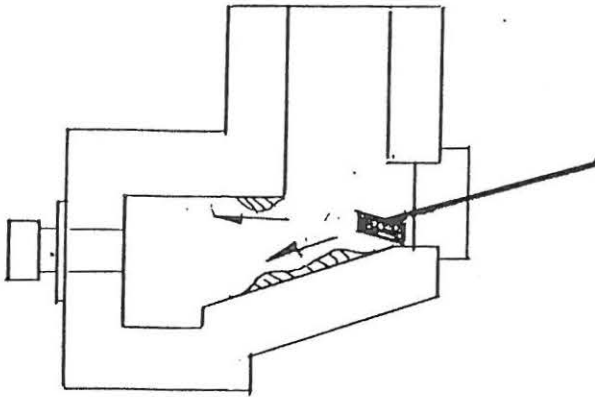
M A I N T E N A N C E I T E M S

Work items	Twice a shift	Once a shift	Once a day	Once a week	Once a month	Once quart- erly	Once half a year
Cleaning holding chamber		○					
Cleaning melting chamber		○					
Cleaning dry hearth chamber	○						
Cleaning metal well chamber		○					
Cleaning the bottom part of the partition				○			
Cleaning the protective tube			○				
Coating metal level detector			○				
Cleaning burnertile			○				
Cleaning and inspection of furnace interior							○
Cleaning main burners					○		
Cleaning pilot burners					○		
Cleaning blower filter				○			
Inspection of control moter air valve						○	

C . MAINTENANCE & INSPECTION

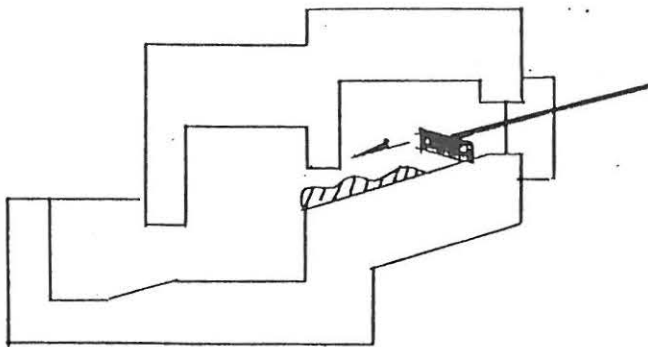
C-1. Furnace body.

① Cleaning melting chamber once a shift.



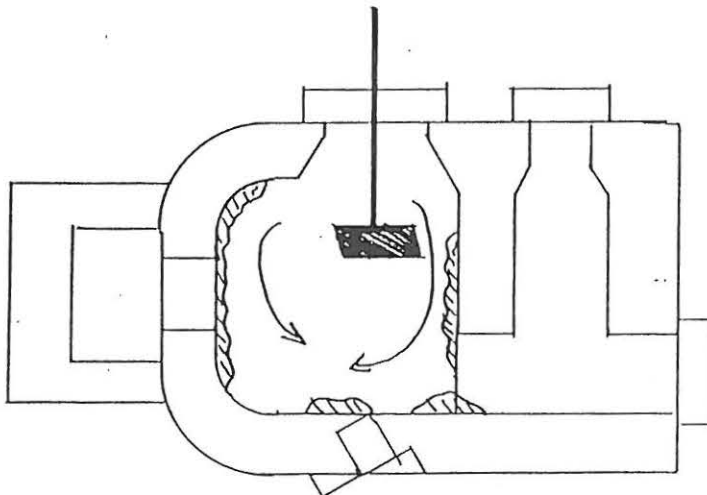
- Perform from melting chamber inspection door.
- Clean dross attached side wall and hearth.
- Clean ever corner.

② Cleaning dry hearth chamber twice a shift.



- Perform from dry hearth inspection door.
- Clean dross attached to side wall and hearth.
- Clean every corner.
- Clean the tip of dry hearth especially.

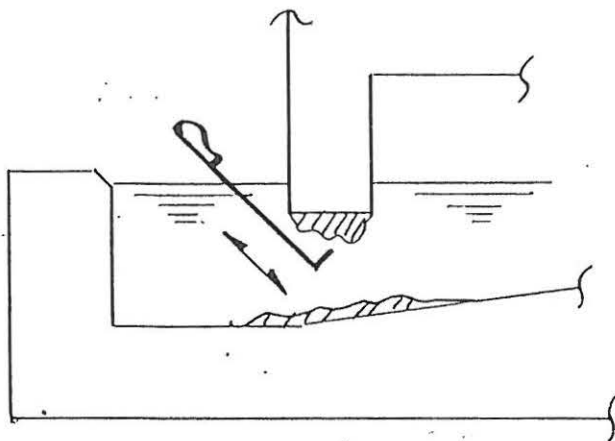
③ Cleaning holding chamber once a shift.



- Perform from holding chamber inspection door.
- Perform flux treatment.
- Clean side wall well.
- Clean every corner.
- Scrape ash out of furnace after flux treatment.

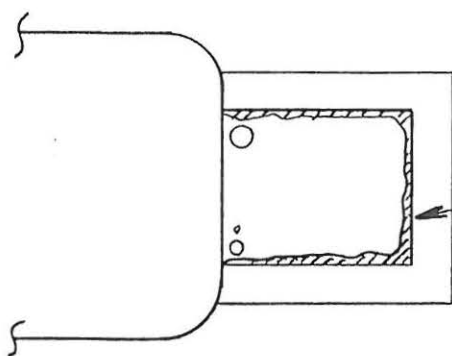
* Flux treatment
2~ 4Kg

④ Cleaning the bottom of the partition once a week.



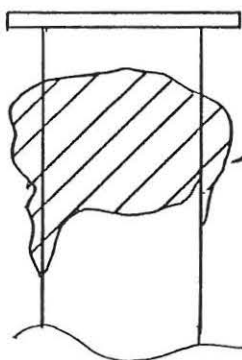
- Perform from the metal well and holding chamber inspection door.
- It's more effective perform under the metal level down.

⑤ Cleaning metal well chamber once a shift.



Cleaning dross attached to the wall.

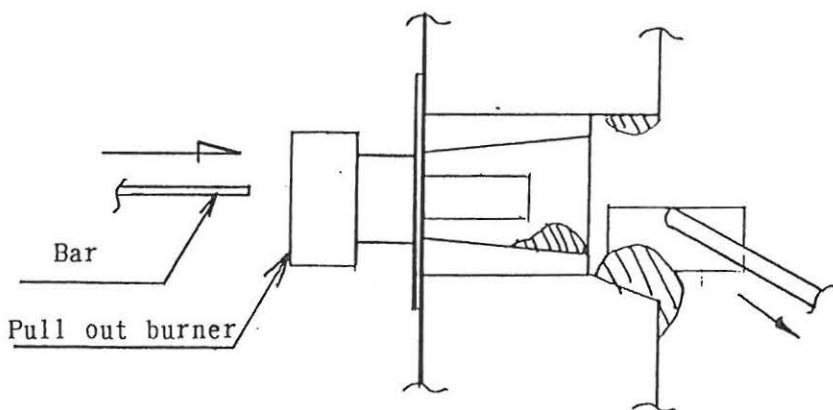
⑥ Cleaning protective tube once a day.



Remove dross.

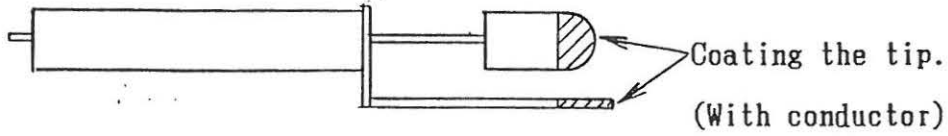
* Be carefull to crack because of ceramics.

⑦ Cleaning burner tile once a day.



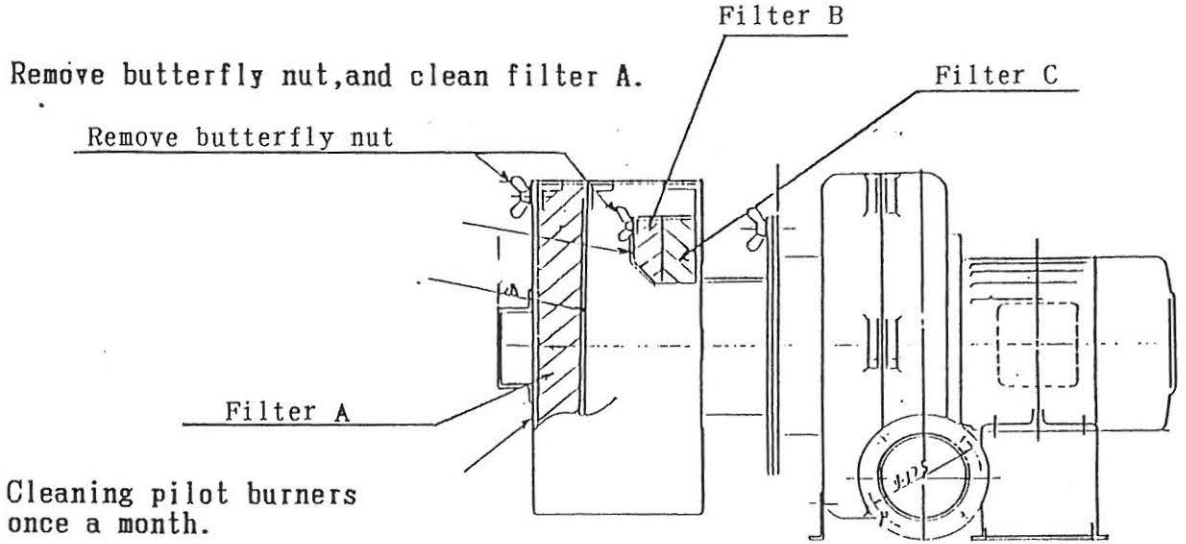
- Remove oxide forward from burner tile from each inspection door.
- Pull out burner and remove oxide of burner tile interior with bar.

⑧ Coating metal level detector once a day.



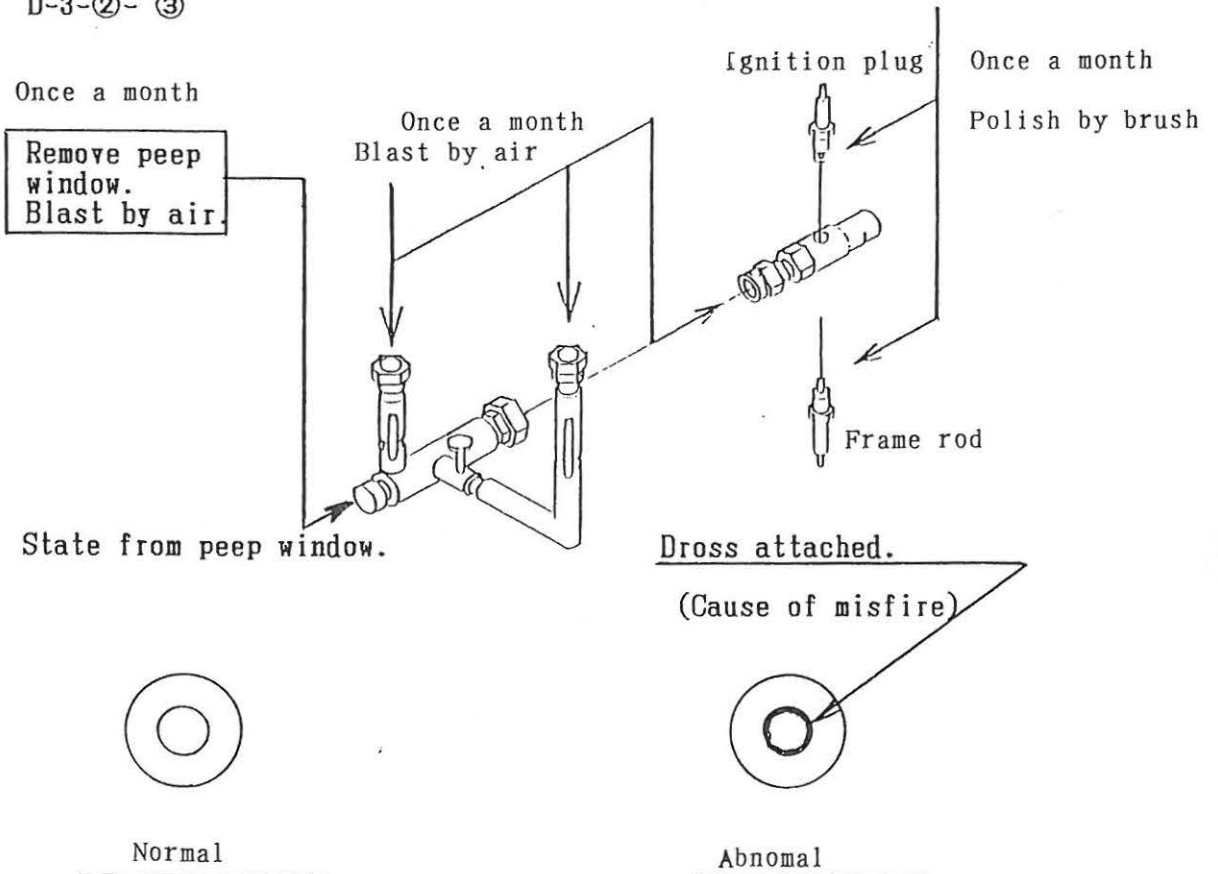
C-2. Combustion equipments.

① Cleaning blower filter once a week.

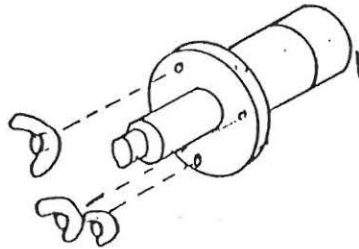
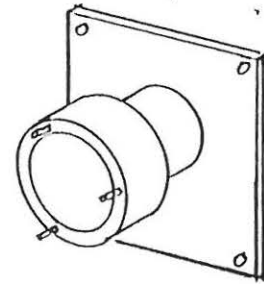


② Cleaning pilot burners once a month.

D-3-②- ③

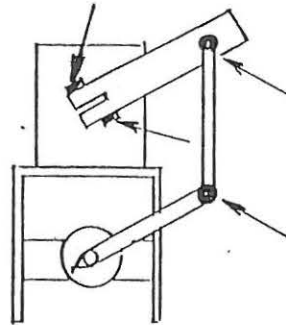


- ③ Cleaning main burners Once a month.



Remove carbon cleanly by air blasting.

- ④ Inspection of control moter. Quarterly.
 Inspect screw joint.



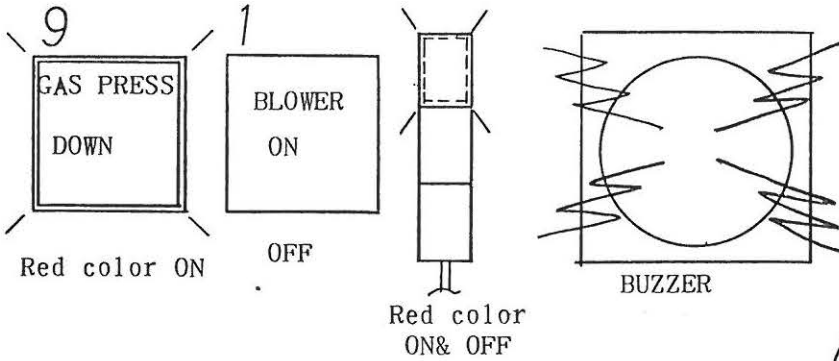
D . MAIN CAUSES & INSPECTION IN TROUBLES.

- D-1. POWER LAMP OFF.
- ① Power is not supplied.
 - ② Circuit protector (cp1.cp2) in the control box OFF.
- D-2. BLOWER DOESN: T START.
- ① Two phases wiring.
 - ② The thermal relay of magnet switch MS 1 in the control box is short cut.
 - ③ Emergency stop button in the pressing state.
 - ④ Wire is cut.

D-3. BURNER DOESN'T IGNITE.

① In case that blower stops at alarm.

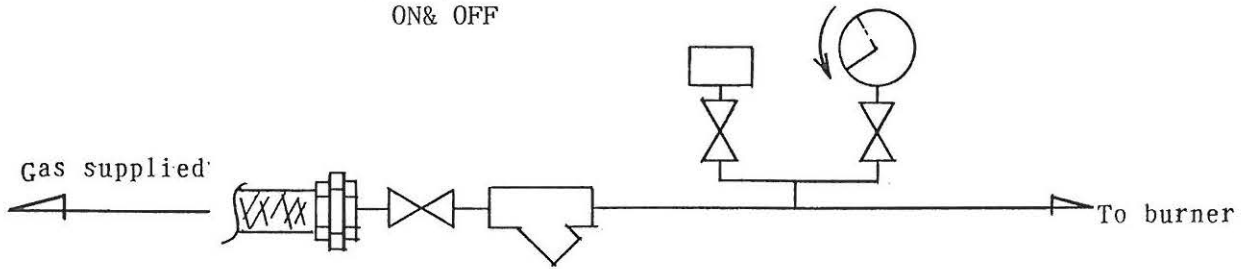
(1) Gas is not supplied.



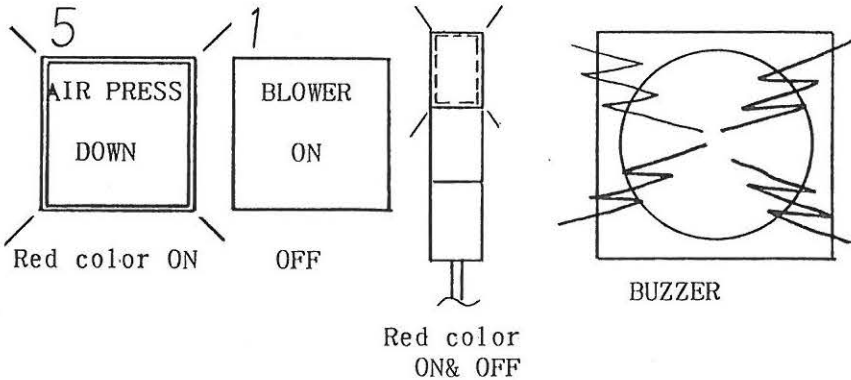
• Light 9 ON, light 1 OFF, and blower stop.

• Signal tower A ON & OFF, and buzzer ON.

* Inspect gas supplied and main valve.



(2) Air pressure drops.

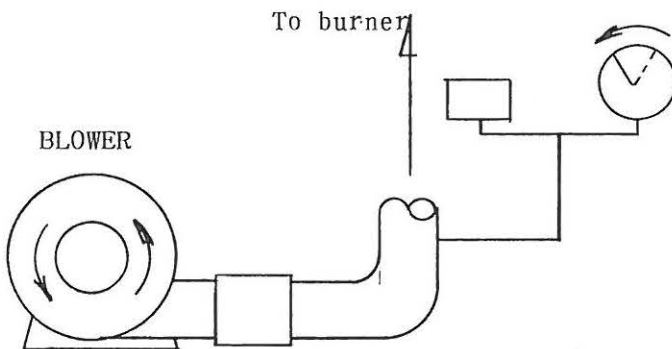


• Light 5 ON, light 1 OFF, and blower stop.

• Signal tower A ON & OFF, and buzzer ON.

* Clean filter.

* Inspect if revolution is reverse.

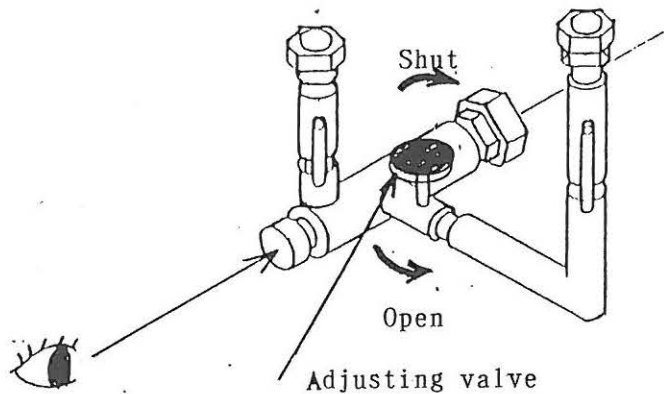


② In case that blower doesn't stop at alarm.

(1) Wrong adjustment of pilot burner.

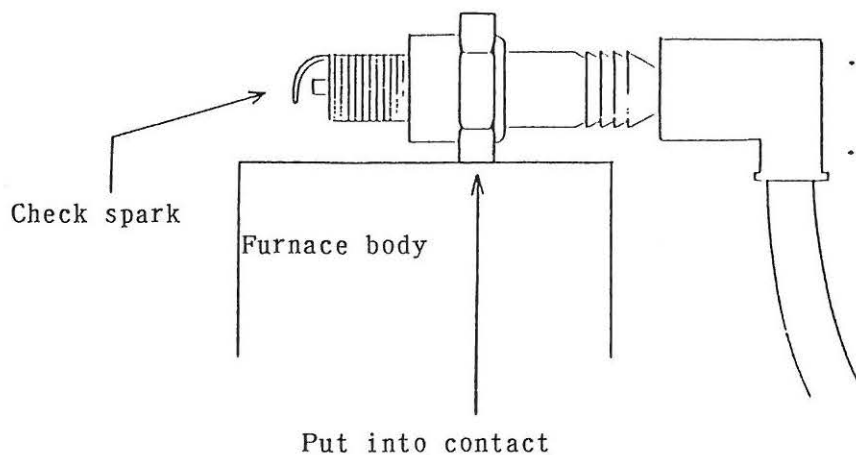
• Take pilot burner apart, and clean.

• Adjust the adjusting valve after fabrication checking the blue flame from the peep window.



(2) Ignition plug doesn't spark.

Confirmation of spark



* In case of no spark.

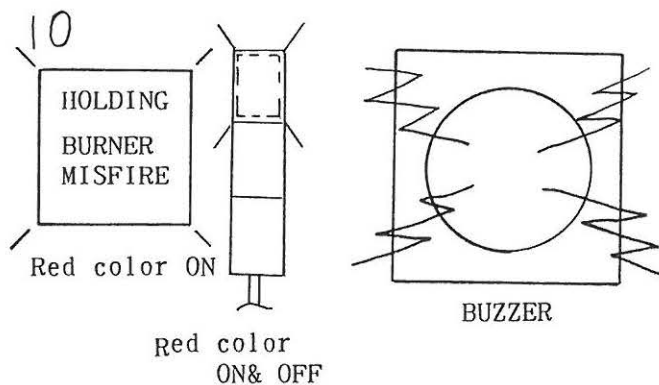
• Check of wire cut.

• Exchange plug and cleaning

(3) Magnet valve doesn't operate.

* Circuit protector (cp 3, cp 4) in the control box OFF.

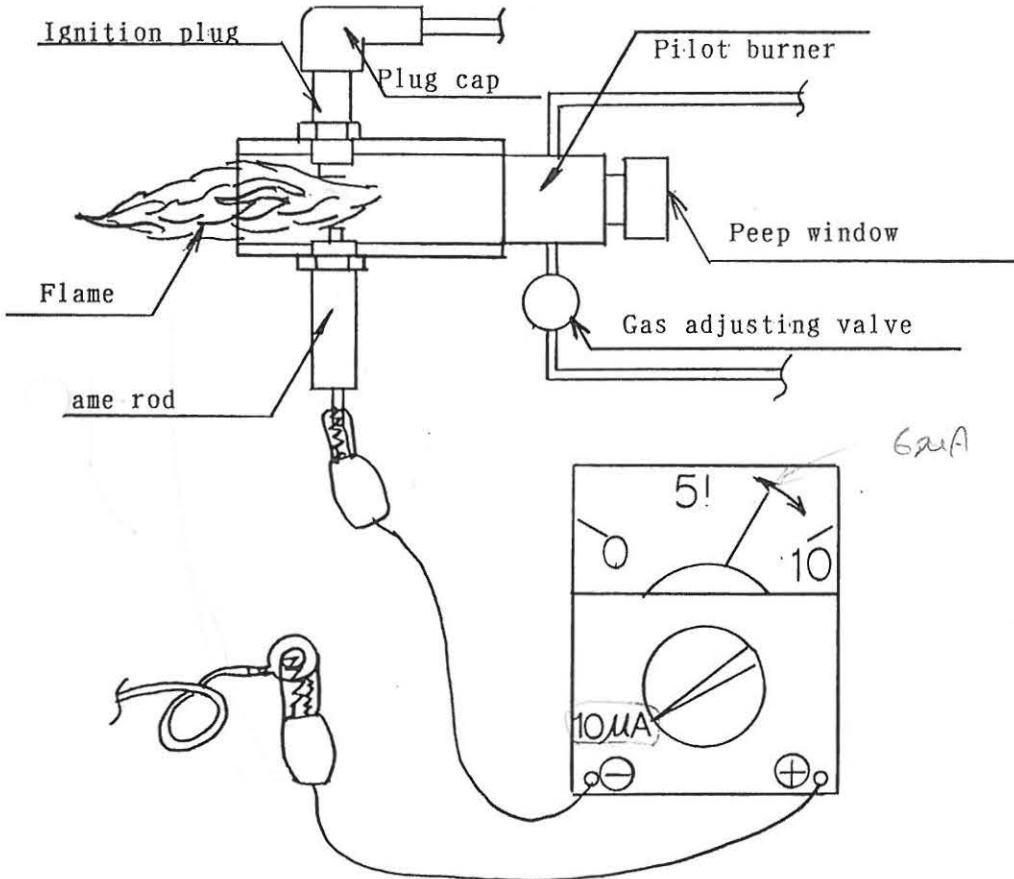
* Wire is cut.



* Adjustment with flame ammeter.

• Adjust the gas adjusting valve to be in the state of stability more than 6 micro ampere.

* The signal of misfire breaks out less than 2 micro ampere.



(4) The problem of flame detector.

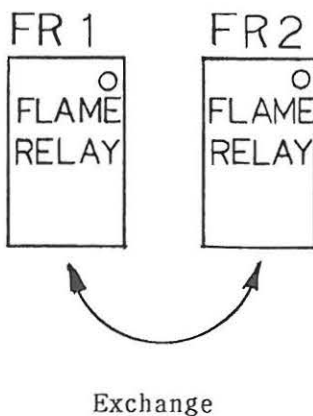
(In case of misfire alarm in a few seconds after ignition)

① Flame rod doesn't check the flame.

* Clean or exchange flame rod.

② Abnormal of flame relay.

Check



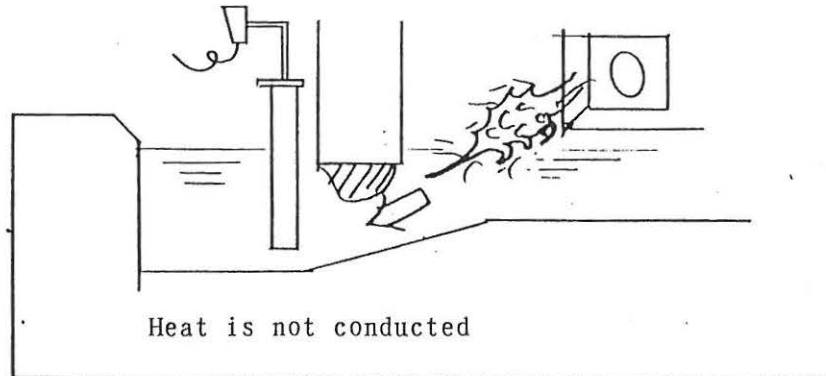
• Exchange the flame relay in trouble for another.

• If another burner misfires after exchange, the flame relay is in trouble.

D-4. Temperature of metal doesn't rise.

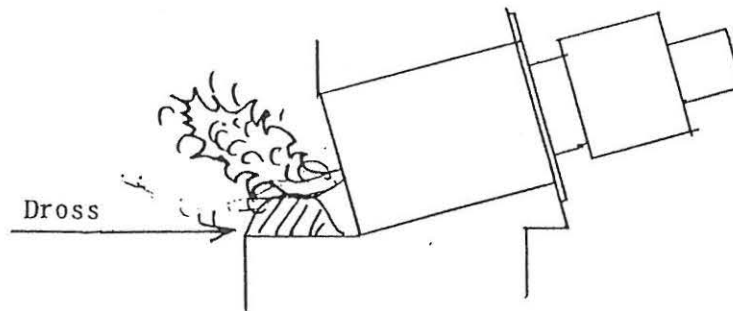
① Dross is attached to the bottom of partition.

* Remove dross.



② Flame turns up because of dross attached to the front of the burner.

* Remove dross.

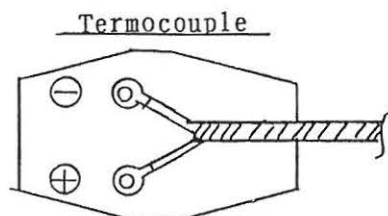


③ Dross floats on the surface of molten metal.

④ Thermocouple is in breakdown, or protective tube is cracked

* Exchange.

⑤ Plus and minus of thermocouple is not connected correctly.



E . THE OTHER CAUSIONS

- ① Don't touch furnace shell to avoid burn.
- ② Don't throw water or wet material into aluminum melt to avoid possible explosion.
- ③ Cut power at inspection and repairs.
- ④ Don't open panel door while furnace is operating.

The end.