HEAT ENGINE

Operation manual

Thank you very much for purchasing Miyamura type tea machine.

Instructions for machine operation, installation is listed in this manual.
Please read & understand this operation manual before using.

Please keep this manual safe.
In case of damage/lost of this please contact us. We will reissue this.

MIYAMURA IRON WORKS CO.,LTD

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1 Safety notes

⚠ DANGER

※ Please do not operate the machine a drunk person or feeling not well since dangerous.

※ When operate machine make sure to check whether there is anybody near, calling louder & after checking for danger.

※ Before starting machine & after using make sure to check gas main valve closing, cock switch closing & gas leaking etc.

※ Since there is a danger of burn according to high temperature steam while operation, do not enter inside the machine frame & below the frame.

※ Please be careful of steam supply & steam discharging part when using. Since temperature will be high causes severe burning.

※ Please do not touch steam pipes etc. while supply steam. Since temperature will be high causes severe burning.

※ Please do not climb on the machine while operation. Causes burning from exhaust steam & injury by falling.

※ Do not apply water to machine switches, electric equipment like operation panel.
Might occur electric shock & fire according to leakage.

⚠ CAUTION

※ Please install considering ventilation as not blocking air flow for supplying required fresh air for gas combustion & for exhaust of carbon dioxide gas etc. If air flow is strong use a cover as not to turn OFF.

※ If burn empty without passing steam, since causes severe machine damage, make sure to ignite after passing steam.

※ Since steam adjusting valve get heated while running, be careful by using gloves etc.

※ Please clean the machine after turning OFF the switch & after cooling down properly. And make sure to check gas cock switch, main valve is closed.

※ When cleaning, do not apply water to machine/switch/control panel. May cause damage.

※ Please be careful of pipes, valve & covers when passing near the machine.

※ When occur heated steam, make sure to turn ON input device, steamer or green up etc. Otherwise causes machine damage.

※ When keep supplying heat steam to steamer/green up without inputting leaves, might heated too much. Please be careful since causes machine damage as well as negative effects on leaves.

※ Please read & understand steamer/green up operation manuals too & operate carefully.

⚠ Inspection & cleaning

※ Please clean with air when burner flame port surface dust & heat exchange pipe soot etc. Might reduce heat transfer efficiency & increase convection heat.

※ After the operation open drain valve & make sure that drain water does not accumulate. When next operation, close the valve or close as to leak a little steam.

2 How to install

● About fuel

※ Machine gas burner is propane gas (LPG) usage. Optional 13A equivalent natural gas (LNG) usage.

※ Please use gas pressure in low pressure (280mm Hq(2.55~3.3kPa)). LNG 2kPa (1.0~2.5kPa)
When more than medium pressure add a decompression unit & supply standard pressure gas.

① Please install the machine where there are no flammable things since heats too much (Near heat steam using machines as possible).

※ Since exhaust air from machine exhaust pipe is too hot, please be careful not to touch machines around & equipment directly. Might damage machines.

② Install the machine levelled as not to move & fix with anchor bolts properly.

③ Construct pipes from boiler to the machine. (Make sure to use heat insulation material to steam pipes.)

④ Construct pipes from heat engine to the machine using heat steam. (Make sure to use heat insulation material to steam pipes near both input & output part.)

⑤ Construct machine electric wiring.
To prevent empty burning, please connect feeder operation signal & boiler operation signal.

⑥ Though machine test running & each part checking is done, please reinspect each part due to unforeseen circumstances.

⑦ Process test running, being careful of whether there is no error in gas piping, hat air ping, no gas leak & check whether the flame is proper etc.

● About steam pipe

① Please do not install a valve between heat engine & steam heat using machine.
In case of installing consider about heat-resistance.

② Install the steam amount adjusting valve between machine & boiler.

③ Please construct steam drainpipes as not to put steam to temperature adjusting ignition board.

④ About pipe insulation material
Please use rock wool as insulation material to both input & output pipes. (Do not use Styrofoam as it is not heat resistant and may cause a fire.)

⑤ For vertical piping, please use two elbows and match the angles before installation.

● Interlock wiring to prevent empty firing

※ To prevent empty burning, please connect below signal wires to main ignition board as steam supplying signal to machine.

① Leaf supplying signal, connect AC200V signal to terminal board 12-12A.
Steam supplying signal, connect AC200V signal to terminal board 25-25A.

● Other wiring

Please connect single phase 200V (1.25～2.0sq) & earth wire.

3 How to operate burner gas supplying ignition board

● Operation steps

① Please check power lamp (Transparent) turning ON, LP gas coming near to machine main valve.

② **Supply steam to machine. (If drain is gathered to machine side, discharge with bottom side valve.) (Do not install a valve to machine output side. Might cause severe damage & injury.)**

※ Please be careful when operation since when ignite without supplying steam becomes empty burning & may occur serious explosion. (Connect above empty burning prevention interlock wiring.)

③ Please turn power selector switch to input side.

※ Shows current temperature (Large one) & set temperature (Small one) in temperature indicating controller.

④ Please confirm that ignitable lamp (Green) is ON. (Inter-lock signal is turned ON)

※ Operation condition changes according to the ignition board inside toggle switch TSW1 select position.
There are three modes from top [Feeder signal ignoring, boiler signal working], [Feeder, boiler signal working], [Feeder, boiler signal ignoring].
To ignite when test run, turn toggle switch TSW1 to top ↓ side [Feeder, boiler signal ignore].
Please use normally in one of [Feeder signal ignoring, boiler signal working] or [Feeder, boiler signal working]. (Depends on wiring situation)

⑤ Please turn ON main gas valve fully. (Please check that adjusting valves of each line opened near to full.

※ Please usually use in fully opened state, since if close adjusting valve too much, becomes combustion error without supplying sufficient gas.

⑥ Please turn operation select selector switch to high (Right) or low (Left) from OFF (Center).

※ Enters ignition operation. Burner no.1 ignition lamp (Red) turns ON when confirm ignition.
When doesn't reach set temperature rear line enters ignition operation.Type 150, 200 when confirm ignition, burner no. 2 ignition lamp (Red) turns ON. And opens center valve & burns.

※ If doesn't confirm ignition in timer set time, Burner no.1 or no.2 combustion error (Orange) turns ON & buzzer rings. Stops when operation switch turns to OFF (Center).
Please turn ON switch after inspecting, clearing the combustion error cause.

⑦ Please change temperature settings from ▽、△ keys below steam temperature (Digital temperature indicating controller) Burner ignites/turns OFF automatically and follows the heating temperature.

※ In 150, 200 type low temperature, operates with front 1 line, in high mode front line always ON & other two turns ON/OFF.
In 100 type low combustion 2 lines turn ON/OFF together, when high combustion front line is always ON & other 1 turns ON/OFF.

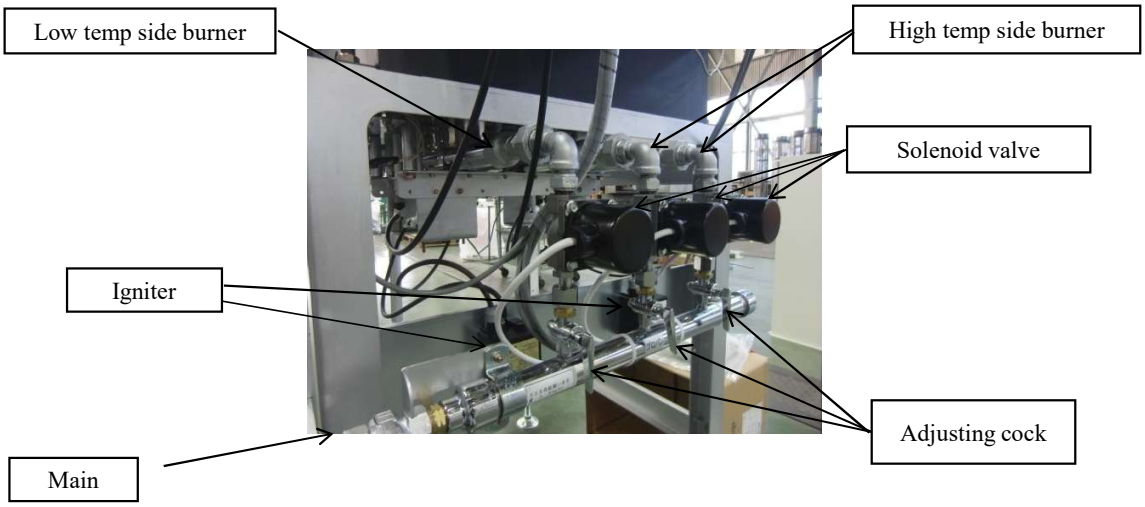
※ Operates ignite/OFF with interlock signal ON/OFF automatically.

⑧ When turn OFF after finishing process, Turn switch to OFF (Center). Turn OFF the power switch after that.

※ **When finish process, make sure to fully close main cock & shut the gas supply.**

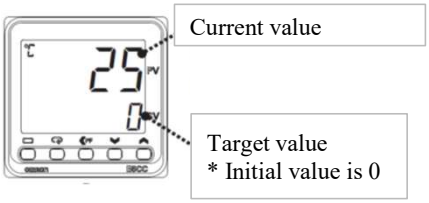
※ If ignition does not work properly, refer 6 [Error & solution].

4 Simple operation method description



LPG pressure: 2.55~3.3kPa (Within the range, higher pressure has an advantage in maximum temperature).
LPG max consumption: Type 200 8.9kg/h, Type 150 5.9kg/h, Type 100 3.9kg/h (4.7, 3.1, 2.1 m3/hr)
LNG pressure: 1.0～2.5kPa: type 200 4.9㎥/hr, type 150 3.3㎥/hr, type100 2.2㎥/hr

● Ignition method



① To prevent empty burning, flow steam before ignite burner.
② Turn main gas valve fully ON.
③ Turn power switch ON.
④ Turn select switch to low temp or high temp from OFF.
⑤ Enters ignition operation, ignition lamp turns ON when confirm ignition.
⑥ To turn OFF, turn the operation select switch to OFF.
⑦ Turn to OFF when finish. Close main valve fully.

※ **For details, please refer [3 How to operate burner gas supplying ignition board] & understand before use.**

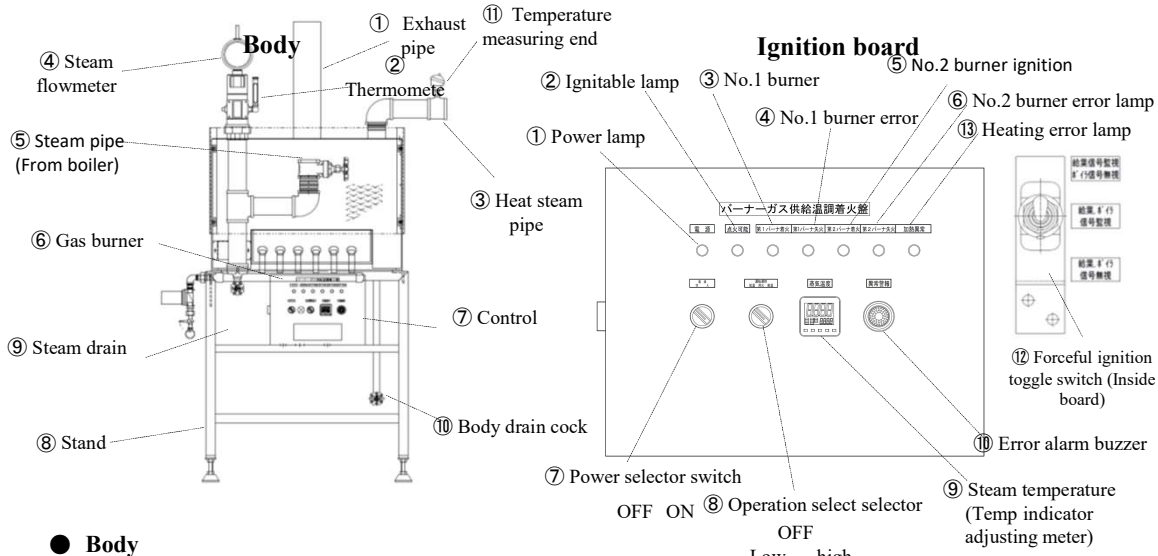
●Temperature adjusting method

○ Steam temperature adjusting, shows preferred temperature in digital temperature adjusting meter △, ▽ key.
○ If close too much each burner line adjusting cock causes combustion error, basically keep fully opened.

● Precations

① If dust gathers top of fire port, since combustion does not work well clean with air etc.
② There is a case of attaching carbide in heat exchange part of fire port top. Inspect daily. Clean with air if there is attaching things. Blow off bottom cover, fallen things to upper part.
(If leave it, leads to machine damage & heat efficiency decrease by convection heat)
③ Please always inspect gas hose crack, bending etc.
④ Always check if the gas hose inserted deep properly & stopping metal set properly.
⑤ Ignition will not work if current temperature is higher than set value.
When selecting high-temperature or low-temperature ignition, select the one with the smallest temperature error depending on the heat engine temperature and steam flow rate.

5 Each part name



● **Body**

① Exhaust tube
Exhausts combustion heat in safe position.

② Thermometer
Shows heat steam temperature.

③ Heat steam pipe
Supply heat steam to using machine.

④ Steam flowmeter
Shows steam amount supplied from boiler.

⑤ Steam pipe
Supplies steam from boiler to heat engine.

⑥ Gas burner
Heats steam supplied from boiler with gas burner & supplies to using machine as heated steam.

⑦ Control panel
Control panel which manages machine gas burner ON/OFF.

⑧ Stand
Stand which to install the machine to proper height.

⑨ Steam drain cock
Drain cock of steam supplied from boiler.

⑩ Body drain cock
Uses for draining the tank before start.
Please close immediately as not to pass heat steam.

● **Ignition board**

① Power lamp
Turns ON when power enters the machine.

② Ignitable lamp
Operation signal supplies from boiler, turns ON in ignitable condition.

③,⑤ No.1, No.2 burner ignition lamp
Turns ON when burner no.1 or no.2 ignition confirms.

④,⑥ No.1, No.2 burner combustion error lamp
Turns ON when burner no.1 or no.2 ignition confirms.

⑦ Power selector switch (OFF ON)
Control panel operation power switch.

⑬ Heating error lamp
Turns ON when the bottom heating abnormality protection circuit is operating due to dry heating, etc.

⑧ Operation select selector switch (Low temp OFF High temp)
Selects ignition operation & turns ON.

⑨ Steam temp (Temp indication adjuster) Sets temperature.

⑩ Error alarm buzzer
Buzzer rings when combustion error & abnormal temperatur

⑪ Temperature measuring edge
Terminal to measure heat steam temperature.

⑫ Forceful ignition toggle switch TSW1
3 positions selecting switch.

From top [Feeder signal working, boiler signal ignoring], center [Feeder, boiler signal working], bottom [Feeder, boiler signal ignoring].

6 Empty running safety device

There is a thermostat to shut down combustion circuit in case by checking combustion room bottom heating error as a safety precaution for dry firing.

Installed in combustion room bottom cover outside, low temperature side bottom part.

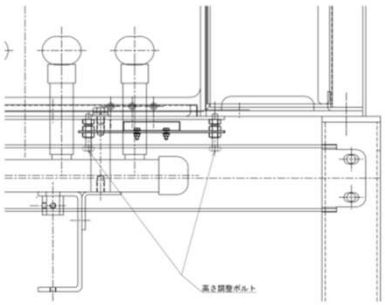
Thermostat detects bottom part cover convection heat & shuts combustion circuit when becomes more than 200℃ & Power to the solenoid valve is cut off and the valve closes.

When the dry heating prevention is activated, the heating abnormality lamp will turn ON. Please set the operation option to "OFF".

To ignite it again, turn the power switch OFF and then ON again.

If the heating error lamp does not turn ON, operation can be resumed.

Please make sure that steam is supplied before starting ignition.



See from bottom

Note)

If the machine operates even when it is not heated due to conditions such as the installation of the machine or the surrounding atmosphere, it is necessary to lower the height of the board on which the thermostat is placed in mm units.

Adjust both sides using the two nuts that fixes the top and bottom of the board to lower it parallelly.

7 Error & solution

● Heat engine trouble shooting

No	Error	State	Solution	Remarks
1	The power lamp (white) does not turn ON even when the power is turned ON.	Fuse is blown	Exchange fuse	5A×2pcs
		The main power has not reached the ignition board.	Check if the wall breaker has tripped.	If it is fallen, clear the cause.
		Switch defect	Switch (contact) replacement	
		Lamp defect	Exchange lamp	Check voltage or continuity (when not energized)
2	The ignition ready lamp (green) does not light up.	Interlock signal has not come.	Please refer empty burning prevention interlock signal wiring page.	Check interlock signal voltage & connection.
3	No sparks even when operation select switch turn to low temperature or high temperature.	Spark rod plug is removed. Plug is damaged.	Insert plug properly. After checking for cracks, defect etc., replace if damaged.	If a current leak occurs at the plug socket and it is burnt, replace it or remove the burnt part.
		Ignition system rod and earth rod are too far apart.	Adjust the position of the ignition rods. Is the gas flowing due to the wind?	Loosen the M5 screw that secures the ignition rod and adjust the distance between the tips of the ignition rods to about 4 to 7 mm.
		The ignition rod is out of position from the burner.	Move the ignition rod towards the center of the burner.	
		Selector switch defect	Replace switch (contact).	Continuity check
		Poor insulation of ignition rod cable.	Route the cable leading to the ignition rod so that it does not come into contact with the stand or other cables.	Check the ignition rod cable for cracks, tear etc. Exchange if deteriorated, brush the rod, exchange.
		Earth rod cable defect	Insert the plug firmly Confirm that there is no disconnection	Check continuity between earth rod tip and igniter earth. Brush the rod, exchange.
		Plug cap of ignition rod and earth rod defect.	Check that the caulked part of the cable is securely fixed, that there are no cracks or damage, and that there is no moisture adhering to it.	Check continuity from the rod tip to the cable end, and check that the ignition rod side is inserted into the igniter. Exchange plug cap.
		Looseness of the terminal block inside the ignition panel	Tighten if it is loose.	
4	Sparks, but doesn't ignite	The manual valve in the gas pipe leading to the ignition burner is closed.	Open manual valve to ignition burner line	**If dust accumulates at the top of the crater, gas will not come out properly. Please clean the air.**
		Solenoid valve is not working	Check the voltage to see if there is electricity. Check if the solenoid valve makes a clicking sound when the ignition is activated.	Check if gas is coming out from the burner crater.
		Is the flow rate adjustment of the solenoid valve fully open?	Align the arrow tip in the center of the nut at the bottom of the solenoid valve with the gas traveling direction.	
		Out of gas, gas flow	Check the pressure of the gas cylinder, is the gas flowing due to wind?	Resetting the gas fuse plug, replacing the gas cylinder (checking the remaining amount and pressure)
		Stucking of brass burner nozzle.	Detach silver color burner, clear the stucking of gas nozzle hole with a wire.	
5	The ignition burner ignites but turns OFF with a misfire alarm.	Flame current value is small	Adjust the position of the flame rod and clean the air above the crater.	Adjust the rod tip to the position where it is surrounded by flames. Brush the rod,
		Flame rod is unplugged or has poor contact.	Remove the rod once, polish the contact area with contact revitalizer, etc., and insert it again.	Apply some conductive grease, brush the edge of rod when detach.
		Plug cap defect	Check the crimped part of the cable	Check continuity from flame rod to terminal block.
		Earth line for flame current.	Continuity check	Visual inspection of the cable and check continuity using a tester.
6	About automatic ignition	Does not ignite automatically	Is the ignition lamp lit? Check the ignition permission signal generating parts on the equipment of the ignition permission supplier, the leaf feeder side or the boiler side	Is the ignition permission signal input? Leaf feeding signal should be checked for voltage between 12-12A or continuity between 11A-11. Check boiler signal voltage between 25-25A or continuity between 2-11A.

※ When error occurs, please contact us or our sales agent.