CONTROL BOARD FOR HOT AIR GENERATORS

DESCRIPTION

Control board for hot air generators equipped with automatic ignition closed-chamber gas burners.
The control board carries out burner ignition, flame monitoring and temperature adjustment functions.
It consists of two logic subunits:
- control and flame monitoring subunit in live-live systems (FCM);
- temperature adjustment control subunit (GT).

The GT subunit controls the FCM subunit through the demand relay, and checks its operation by means of two optoisolators which transfer the flame signal and flame failure lockout signal. The complete board is in compliance with the standard EN 298 and is a development of our FC series (already approved according to EN 298), in particular of our board type FCM31UN with the addition of a safe gas valve control circuit in live-live systems.
Anyway, the logic and safety part of the control and flame monitoring subunit (FCM) does not interact with the logic part of the GT subunit. Therefore, the safety characteristics of the already approved FC SERIES remain unchanged.
Flame failure after an ignition attempt causes non-volatile lockout, which is achieved by means of a bistable relay available in the control board type FCM31UN too.

GENERAL FEATURES:

- operation and failure signalling by means of LEDs in the control board;
- approval according to EN298 for balanced systems;
- elimination of the interference caused by the ignition device and contact switching;
- fan control with post-purge function after a heat demand;
- fan and valve second stage control;
- fume extractor control and air flow check;
- additional auxiliary ignition device control;
- earth connections in the control board;
- 3.15A T (or 6.3A T) extractable external protection fuses;
- low voltage manual reset limit thermostat connection;
- air temperature probe connection;
- available flame arrester connection;
- high voltage connection (230V) for room thermostat, summer ventilation switch, remote lockout signal and reset;
- non-volatile lockout;
- reset through a push-button on the board;
- burner switching off in case of air temperature probe failure;
- available two-core cable connection for a remote device controlling several hot air generators in series.

TECHNICAL DATA

Power supply: 230VAC +10% -15%
Transformer protection: PTC type C883 120°C

FCM timings:

Prepurge time (**TW**)	> 30 sec
Safety time (**TS**)	< 10 sec
Ignition time (**TSP**)	TS – 1
Drop-out time on flame failure	< 1sec

Actual values may differ from declared values, as TW may be longer and TS shorter.

Remote ignition device:

Peak ignition voltage:	15kV with 30pF load
Peak current:	800 mA
Spark frequency:	25 Hz
Spark gap recommended:	2-4mm
Power consumption:	2,5 VA
Spark energy:	20 mJ

Ambient humidity:	95% max at 40°C
Protection degree:	IP 00

Operating temperature range:	-20°C/+60°C
Power supply fuses:	3,15A T
on request:	(6,3A T)
Gas valve outputs:	230VAC 0,1A MAX cosφ 0.4
Fume extractor output:	230VAC 0,35A MAX cosφ 0.4
Fan output:	230VAC 5A

Adjustment temperatures:

Switching off temperature	80°C
Re-ignition temperature	70°C
Ventilation temperature	60°C
Ventilation stop temperature	15°C

The above mentioned values can be modified on request according to customer's requirements.

GT timings:

Air heating time	30 sec
Post-purge time	120 sec

The above mentioned values can be modified on request according to customer's requirements.

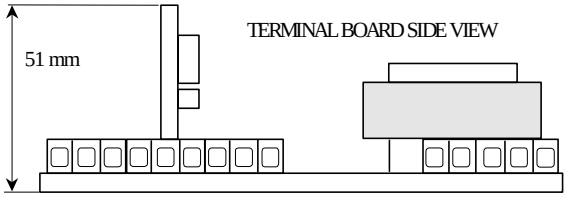
Air temperature probe:

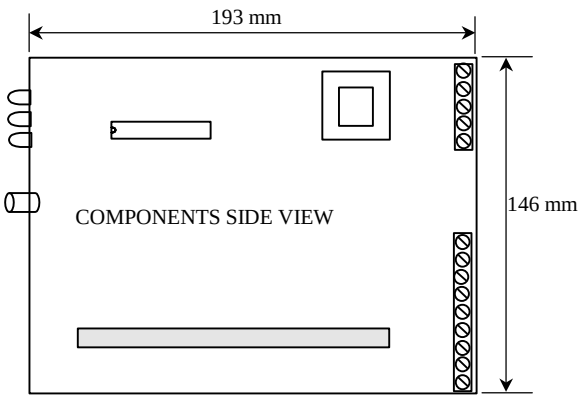
interrupted probe threshold	> 50KΩ
Short-circuit probe threshold	< 80Ω

The above mentioned values can be modified on request according to customer's requirements.

Remarks:
Temperatures refer to the use of air temperature probes with parameters b=3435 and R_{25}= 10KW.

OVERALL DIMENSIONS





REMOTE IGNITION DEVICES

The FC flame control device controls the TR2 ignition transformers, which are usually equipped with 3-pole female connector for on-board connection (GT) and terminal for electrode connection.
For different connections and technical characteristics, see our data sheets “REMOTE IGNITION TRANSFORMERS TYPE TR2”.
The board can also control an additional (Brahma) ignition device, which only needs 230V power supply.

REMOTE CONTROLS

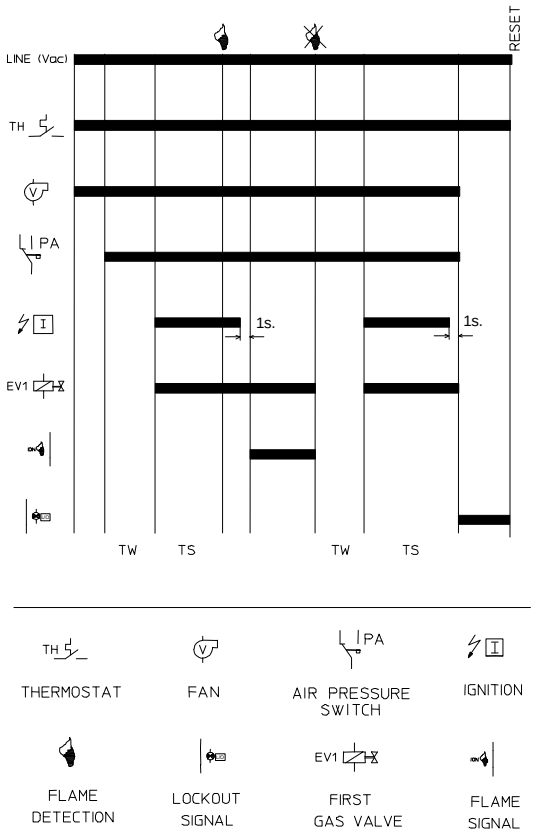
The board is provided with a 9-pole terminal board for the connection of the following parts:
- a high voltage remote room thermostat
- a high voltage remote switch for summer ventilation
- a high voltage flame arrester
- a high voltage remote lockout signal
- a high voltage remote manual reset control.

On the user's side, an additional two-pole terminal board is available for the control of the gas valve/fan second stage.
Furthermore, a two-pole terminal board enables serial communication with other boards of the same type or with a master board controlling several boards of the same type. This communication is possible by closing the JP1 jumper.

OPERATION

Heating mode

The operation stage in heating mode starts on room thermostat demand, enabling the operation of the FCM subunit.



After checking the air pressure switch opening, the FCM unit starts the fume extractor, and after a check of the air flow, the ignition stage begins by counting the prepurge and safety times, as shown in the diagram below.

If no flame signal is detected by the end of the safety time, the system goes to safety lockout due to ignition failure. Before trying to reset the system, wait at least **10 seconds**.
At the end of the safety time the auxiliary ignition device is switched off.
If the temperature measured by the adjustment probe is higher than the *switch off temperature*, the burner is turned off and the yellow LED switches on in a stable way. The burner re-igition occurs at *re-ignition temperature*.

Summer ventilation mode

The operation stage in summer ventilation mode starts on demand of the VM switch (Summer Ventilation).
In this case, the fan is operated despite the lockout of the FCM. The fan is switched off as soon as the VM switch opens.

Fan control

The fan is operated both in heating mode and in summer ventilation mode.
In heating mode, ignition is required if:
- with flame signal on, the *air heating time* has elapsed;
- the temperature measured by the probe is higher than the *ventilation temperature;*

In summer ventilation mode, ignition occurs immediately.

Post-purge

In heating mode, switching off is required if:
- the *post-purge time* has elapsed (since the room thermostat demand stopped);
- the temperature measured by the probe is lower than the *ventilation stop temperature;*

In summer ventilation mode, switching off occurs immediately.

Double stage control

Through a suitable connector it is possible to connect the double stage control of the fan and the gas valves. The stage operation is exclusively decided by the user.

Adjustment probe

An air temperature probe measures the air temperature on heat exchanger output. This probe controls the fan switching on and off beforehand. In case of failure of this probe (short circuit or interruption), the burner is turned off and the failure is signalled by the green LED flashing.

Limit/safety thermostat

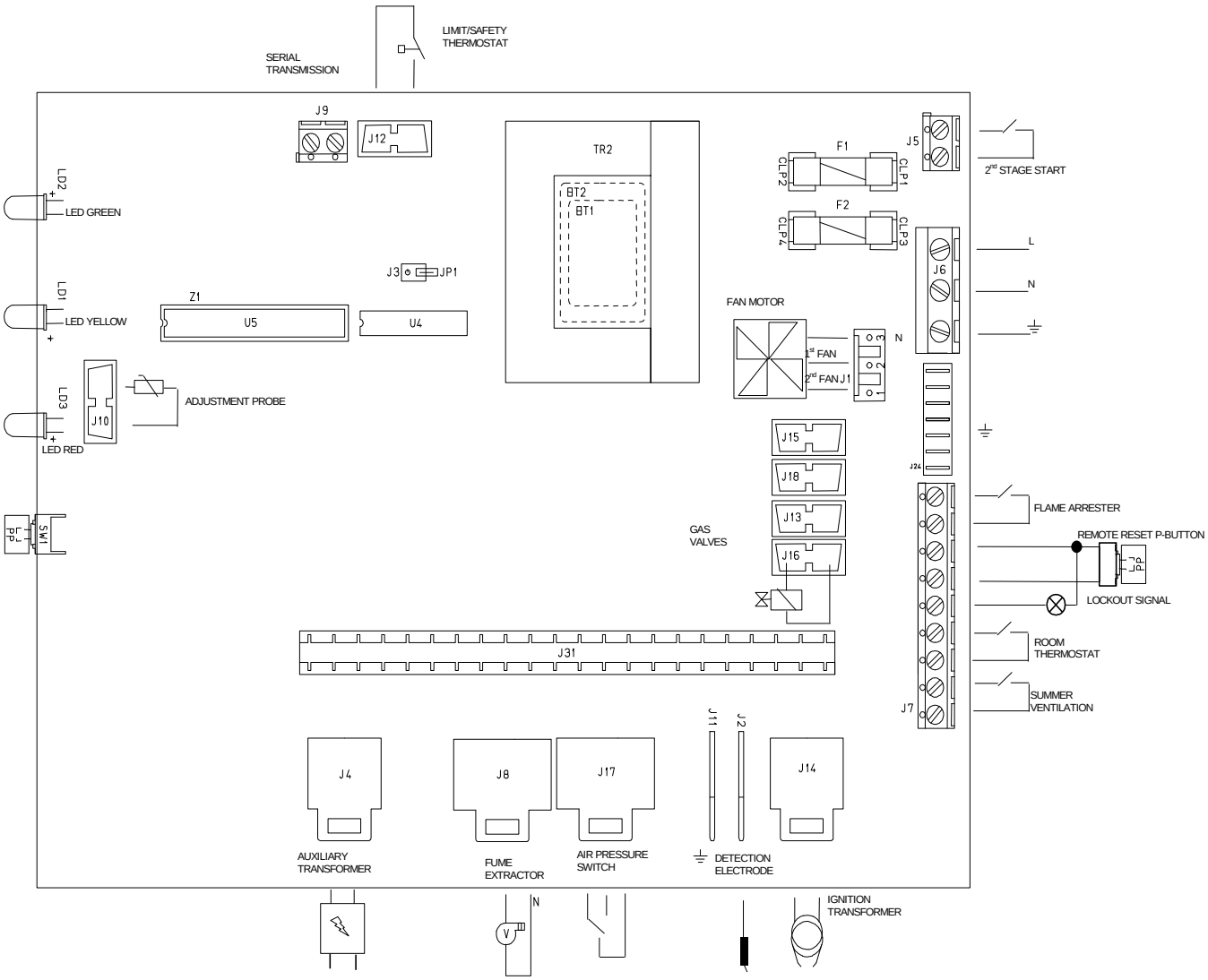
The system enables low voltage connection of a limit or safety thermostat. In order not to compromise the safety of the application, exclusively use this connection; no limit/safety thermostat must be connected in series to the gas valves.

Signals

STATUS	RED LED	YELLOW LED	GREEN LED
Stand-by	OFF	OFF	OFF
Ignition failure lockout	ON	OFF	OFF
Overheating	OFF	ON	OFF
Reset waiting	ON L	OFF	OFF
Limit thermostat switching on	OFF	ON L	OFF
Probe failure	OFF	OFF	ON L
Flame signal on	OFF	OFF	ON

ON = LED switched on in a stable way
ON L = LED switched on intermittently
OFF = LED switched off

Wiring diagram



BRAHMA S.p.A.
Via del Pontiere, 31
37045 Legnago (VR) - ITALY
Tel. +39 0442 635211 - Fax +39 0442 25683
http://www.brahma.it
E-mail: brahma@brahma.it

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