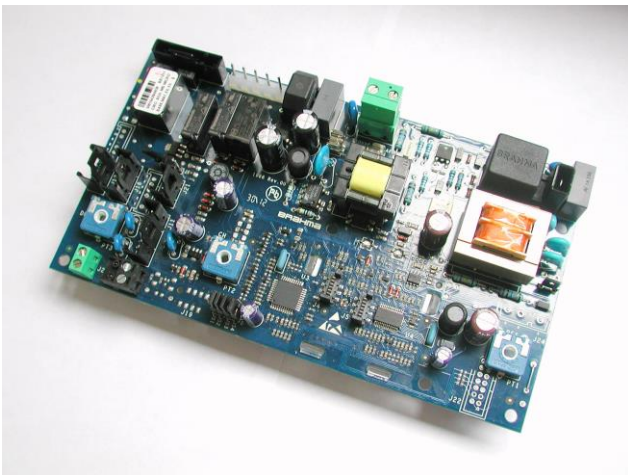


TEMPERATURE DIGITAL CONTROL SYSTEM SERIES 1966

BRAMA

MICROCONTROLLER-BASED DEVICE
FOR BURNER IGNITION AND
THERMOREGULATION PROCESS IN
ATMOSPHERIC OR CONDENSING GAS
BOILERS



DESCRIPTION

These electronic systems are suitable for operating cycle and temperature control in closed-chamber and open-chamber gas boilers, fitted with atmospheric or premixed gas burner.

GENERAL FEATURES

- Compliance with **EN298:2012** (European Standard for automatic gas and oil burner control systems and flame detection) and with EN60730-2-5 (European Standard for automatic controls with C class software);
- **EC-** type certification (CE PIN **0051BT3706**) in accordance with the new European **Gas Appliances Regulation** (EU) 2016/426 (GAR);
- Safe to touch single electrode for ignition and flame monitoring with on board ignition device;
- Possibility of multiple ignition attempts;
- Electrical or manual reset from lockout position;
- Control of the boiler parts (system circulator, fan, 3 way valve, modulating gas valve, flow switch / flow meter, air pressure switch or flue gas thermostat, safety thermostats, NTC probes, room thermostat etc.);
- Management of combustion flow recuperator for half condensing gas boiler. Management of condense electrode and flow thermostat.
- Driving the Brahma gas valve VCM01 with or without pressure sensor or standard 230Vac gas valve with 24V modulator coil.
- Automatic identification of the boiler type equipped (open or closed combustion chamber);
- Controls, adjusters and signals through two potentiometers, 3 trimmers and one LCD with 32 segments.
- Remote Brahma LCDX control panel connection option.
- Use of NTC contact and/or immersion probes for temperature measurement (up to three);
- Central heating temperature compensation by outside probe.
- Use of a normally closed contact safety thermostat or outgoing temperature probe with two NTC elements;
- 4kV and 5mm PELV (Protective Extra Low Voltage) insulation on the Printed Circuit Board surface between components connected to the mains supply and low voltage controls;
- Flame modulation by means of a proportional, integral and derivative (PID) digital electronic system;
- Varistor protecting the system from voltage transients which may be generated in the mains supply;
- Connection with remote control device Opentherm compatible on the same connector of the room thermostat;
- Connection with RS-232 interface.
- Connection with RS-485 interface (optional module)

TECHNICAL DATA

Supply voltage:	230V - 50/60Hz
Supply voltage range	+10% / -15%
Supply voltage frequency	50 / 60 Hz
Operating temperature range	-20°C ÷ +60°C
Humidity range :	95% max at 40°C not condensing
IP protection degree	IP 00
Power consumption (no loads)	
stand-by:	18.0 VA
safety time	21.0 VA
running	19.5 VA
Weight:	max 240g
Dimensions:	190x105x35 mm

INTEGRATED TEMPERATURE CONTROL SYSTEM

The integrated temperature control systems are usually customized (according to customer's requirements) as far as operation and control of the boiler parts are concerned. However, for a more detailed description, hereunder we will refer to the system series 1966 in its "standard" configuration.

The main technical features are described here below.

Classification codes according to EN298:

Character	Specification	Code
1°	Fanned and atmospheric	B
2°	Direct ignition of the main burner	M
3°	Non-volatile lockout	L
	Volatile lockout	V
	Recycling	C
4°	Non-volatile lockout	L
	Volatile lockout	V
5°	Fixed times	X
6°	System for non-permanent operation	N

Times (*):

waiting time (TW):	1,5 ÷ 60 s
pre-purge time (TP):	1,5 ÷ 60 s
safety time (TS):	3 ÷ 60 s
spark ignition time (TSP):	(TS - 1) s
response time on flame failure:	< 1 s
post-purge time:	0 ÷ 1800 s
inter-waiting or inter-purge time:	0 ÷ 240 s
lockout due to air flow failure at start	3 ÷ 120 s
lockout due to flame fault	0 ÷ 60 s
pre-ignition time	0 ÷ 60 s

(*) The above times correspond to guaranteed values. Actual values may differ from declared ones, as waiting (TW) or pre-purge (TP) may be longer and safety time (TS) shorter.

Ignition attempts : 1 ÷ 10

Max Loads rating:

Gas valve VCM01	0,4A _{DC}	
Gas valve 230V _{AC}	0,25A _{AC}	cos φ ≥ 0.4
Fan 230V _{AC}	0,4A _{AC}	cos φ ≥ 0.4
Three way valve 230V _{AC}	0,1A _{AC}	cos φ ≥ 0.4
Circulator 230V _{AC}	0,5A _{AC}	cos φ ≥ 0.4

The power supply of the board is filtered so the total sum of the current allowed by the board for the loads is 1.2 A. The sum of loads must be less than this value.

Max. cable length of external components: ≤ 1 m

Internal fuse 3,15A 250V_{AC} quick act

Flame control:

The flame detection device makes use of the rectification property of the flame. The detection probe is a safe touch output and the device is more sensitive to flame at start-up.

Minimum ionisation current: 0.5μA_{DC}
on request 1.2μA_{DC}

Maximum ionisation current:
phase sensitive: 8.1μA_{DC}
voltage on electrode 193V_{RMS}
no phase sensitive (option no. 2 N): 3.8μA_{DC}
voltage on electrode 97V_{RMS}

Recommended ionisation current:
3 ÷ 5 times the min. ionisation current

Maximum cable length: 1 m

Minimum insulation resistance of detection electrode and cable to earth: ≥ 50 MΩ
Max. electrode stray capacitance: ≤ 1 nF
Max. short circuit current: < 200μA_{AC}

Ignition device:

Peak ignition voltage at 30pf loading : 15 kV
on request 18 kV

Peak current : 800mA

Spark repetition frequency : 25 Hz

on request < 25 Hz

Max. length of the high voltage cable: 2 m

Recommended spark gap : 2-4 mm

Spark energy : 20 mJ

CONNECTIONS

High voltage connections (230V_{AC})

Function	Reference	Type
Main supply	J1 2 poles	SAURO-CIM020P7
Circulator	J6	MOLEX - 10085051
Three way valve	5 poles	
Fan	J13	STOCKO - MKS
Gas valve 230V _{AC}	5 poles	2825-6-0-505
Safety earth	J14,J15	Fast-on male 6,3x0.8
Ignition electrode	TR1	Fast-on male 2.8x0.5
Ionization electrode	J12	Fast-on male 4.8x0.8
Electronic Remote ignition transformer	J24 3 poli	STOCKO - MKS 2823-6-0-303 Stocko

Remote ignition transformer	J23 2 poli	MOLEX - 10082051
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Low voltage connections (PELV)

Description	Reference	Type
Gas valve type VCM01*xx	J8 11 / 8 / 4	LUMBERG 2,5 MSF
Gas pressure sensor	poles	
Water pressure switch or pressure transducer	according to requested features	
24V Gas valve modulator		
Safety thermostat or double NTC probe	J17 5 poles	LUMBERG 2,5 MSF
Air pressure switch (closed chamber)		
Combustion safety device (open chamber)		
Flowmeter or flowswitch	J11	LUMBERG 2,5 MSF
Domestic hot water probe	7 poles	
Central heating probe or 1° NTC of safety probe		
Fan speed sensor	J16	LUMBERG 2,5 MSF
PWM control of Brushless fan	6 poles	
Condense electrode	J21	LUMBERG 2,5 MSF
Combustion flow temperature	4 poles	
Room thermostat or remote control device Opentherm compatible	J18	DEGSON - DG332J-5.0- 02P-13
RS232 connection	J19 8 poles	LUMBERG MICS o Molex PICO FLEX
Outside probe	J20 2 poles	SAURO MSB02001
Control panel BRAHMA LCDx	J22	Connettore a 14 vie

Safety thermostat

The system is totally safe against possible overheating in primary circuit, by means a safety thermostat realized by a normally closed contact thermostat (manual or automatic reset) or by a temperature probe with double NTC thermistor connected to the 1965 board. Thermostat switching immediately stops gas flow and leads the system to a non-volatile lockout.

In case of double NTC probe, the system monitors primary circuit temperature and the two thermistors consistency; if the consistency test fails, the system turns off the burner and waits until this condition is verified. If primary circuit temperature is higher than a fixed threshold, the system enters in a non-volatile lockout status. Before attempting a new starting cycle, it's necessary to reset the board from lockout.

Temperature measuring probes

The system can control up to three temperature probes; primary circuit probe must be always present and the DHW probe can be not available, depending on software settings selected by the user and desired comfort.

Please note that primary circuit CH probe can also operate as a limit thermostat, inhibiting any heat demand if water temperature exceeds a pre set limit temperature.

The system detects any probe fault for open circuit or short circuit.

External probe

("Shifting temperature" mode)

The system is prearranged for an external NTC probe connection (third probe), which measures the outside temperature of the building where the boiler is placed. If 1966 board detects an outside temperature probe connection, the available adjustments in heating mode are the required ambient temperature and the room's heat dispersion coefficient.

Primary heating system outgoing water temperature is adjusted according to the outside climatic conditions, in order to ensure high comfort and energy saving.

In particular, if the outside temperature increase, the primary system water temperature is decreased according to a "compensation curve".

System circulator

The 1966 board can be connected to any type of circulator with 230V_{AC} supply voltage. Circulator lockout prevention function is available according to customer's requirements.

3 way valve

The system can control boilers provided with an electric 3 way valve (230V_{AC}), boilers fitted with an hydraulic 3 way valve, boilers equipped with a Domestic Hot Water circulator (to be connected on the same contact as the 3 way valve). Different operation modes are determined by suitable software settings.

Fan

The system is prearranged to control two types of fan:

- Standard 230V_{AC} fan (*)
- Brushless 230V_{AC} fan, controlled by a 24V_{DC} PWM signal.

(*) 230 V_{AC} type driving can also be realized in phase-cut mode to control fan speed rotation.

Gas valve

The system can drive a standard 230V_{AC} gas valve or the 24V_{DC} Brahma gas valve series VCM01*xx (without gas pressure sensor) or VCM01*Sxx (with gas pressure sensor). Using a BRAHMA gas valve with gas pressure sensor it's possible to monitoring the burner gas pressure and maintain it stable also in presence of input gas pressure variations. It's possible to set the minimum and maximum burner gas pressure by control panel.

Using a BRAHMA gas valve without pressure sensor, the maximum gas pressure is limited by a diaphragm.

The minimum gas pressure is settable by control panel. Any input gas pressure variations are adjusted by a software algorithm.

Air pressure switch or flue gas thermostat

Atmospheric burner application

The 1966 board realized an automatic identification of the combustion chamber type in use (closed or open chamber). The air pressure switch checks the combustion products circulation in the combustion chamber and allows boiler ignition only if the fan is operating and the draft is regular; it also ensures boiler safety shutdown if one of these conditions fail during operation. In open-chamber boilers the air pressure switch can be replaced by a flue gas thermostat, using the same connector but different pin.

Pre mixed burner application

In this case it's possible to disable air pressure switch check by a software option.

Water pressure switch / Differential pressure switch

The system is configured by software to recognize a particular input either (minimum) water pressure switch in primary circuit or a differential pressure switch: in the first case, the device ensures that system pressure is higher the minimum pressure allowed for correct operation, whereas the second solution guarantees safety against possible circulator failures.

Water pressure intervention ensures boiler safety shutdown (in differential mode this will only occur if circulator is in running status).

Primary circuit pressure transducer

Alternatively to water pressure switch it's possible to connected to the 1966 board a primary circuit pressure transducer and display primary circuit pressure on LCD control panel if present.

Domestic Hot Water flow-switch or flow - meter

The 1966 board can be connected to a device able to detect domestic hot water drawings. This signal can be obtained by a flow sensor (flow-switch) or a flow-meter.

Room thermostat

The room thermostat (or chrono-thermostat) is connected to the 1966 board by two wires (24VDC). The system is designed to operate with a contact isolated from the power supply line. Room thermostat can be an on/off thermostat or an Opentherm® compatible device.

Condense level electrode

The pcb can manage an electrode that detects the condense level inside the flow recuperator. The system works in order to prevent electrolysis on electrode.

Termostato fumi ausiliario

The pcb can manage a flow temperature thermostat inside the flow recuperator.

Settings and visualization

The 1966 board can be provided with 2 potentiometers for CH and DHW temperature settings and one

potentiometers for MODE setting. An on board LCD display show informations about boiler functioning

Alternatively to on board LCD and trimmers, the 1966 board can be connected to an optional remote 8 digits LCD control panel, type BRAHMA LCDx, provided with additional push buttons and an LCD display with backlight.

RS-232 communication

1966 pcb has an auxiliary 8 poles connector for RS232 communication. This connector can be used to connect the board to external modules for wireless communication or RS485 bus for cascade mode (please refer to 1964 interface).

INSTALLATION DIRECTIONS

- Respect the applicable national and European standards regarding electrical safety (e.g. EN 60335-1, EN 60335-2-102, EN 50165), bearing in mind that ignition and flame control systems are safety devices: the manufacturer's responsibility and guarantee are invalidated in case of Customer's tampering with the product;
- Before the first start-up, make sure that the loads are well connected to avoid any dangerous situation or failure in the appliance. Particular attention should be paid to earth connections: make sure that all loads (fans, gas solenoid valves, ignition transformer, ...) are connected to the appliance safety earth, using for example the connector on board;
- The system is designed to stay in running status for less than 24h (system for non-permanent operation). Reaching this limit causes a regulation shutdown to enable the unit to check its own efficiency;
- All operations (installation, maintenance, etc.) must be carried out by a qualified technician.
- Before any connection operation, completely isolate the system from power supply (multi-pole disconnection). Place the system safely to avoid accidental switch-on and make sure there is no voltage. If the system is not switched off, there is a risk of electric shock.
- Check the cables before starting operation. Incorrect wiring may damage the unit and compromise the system safety.
- During and after any operation (installation, maintenance, etc.), make sure that the type, timing and code are the ones provided, that the wiring is in good condition and perform the safety check in the "Commissioning notes"
- In the event of a fall or impact, the devices must not be started, as safety functions may be compromised even if no damage is visible to the outside.
- Faulty devices or damaged must be unplugged from power supply and cannot be used.
- Condensation, ice formation and liquids intake are not permitted.
- Make sure that the device is protected against hot or live items/surfaces, eventually using a proper protective box;
- The unit can be mounted in any position;

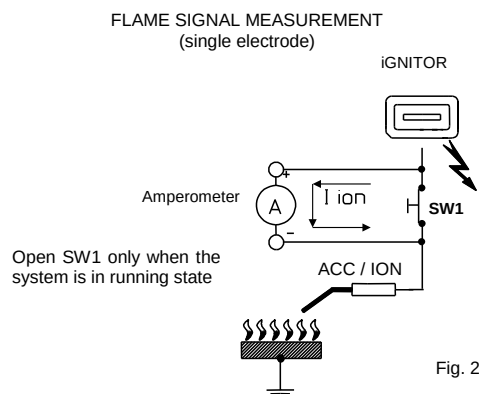
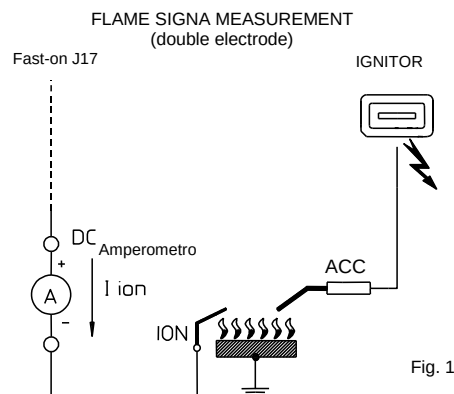
- Avoid exposure to dripping water;
- A ventilated installation environment and a suitably low temperature ensure the longest life of the control system;
- Before installing or replacing the unit, make sure that the type, code and times are correct;
- The appliance in which the control systems are installed should provide adequate protection against the risk of electric shock (at least IP20);
- Keep signal cables and power cables as far from each other as possible;
- Always run the high-voltage ignition cables separately while observing the greatest possible distance to the unit and to other cables
- Use heat resistant detection cables and electrodes, and make sure that they are well insulated to the ground and protected from possible moisture or water in general;
- Keep the ignition cable as short and straight as possible and place it far from other conductors to reduce the emission of electromagnetic interference (max. length <2m and insulation voltage >25kV).
- EMC emission requirements, according to the directive EN55014-1, shall be tested after the incorporation of the burner control system into the equipment.
- Burner controls has a designed lifetime* of 250,000 burner startup cycles which, under normal operating conditions in heating mode, correspond to approx. 10 years of usage (starting from the production date given on the type field). This lifetime is based on the endurance tests in the standard EN 298. A summary of the conditions has been published by the European Control Manufacturers Association (Afecon) (www.afecor.org). The designed lifetime is based on use of the burner control according to the manufacturer's technical notes. After reaching the designed lifetime in terms of the number of burner startup cycles, or the respective time of usage, the burner control has to be replaced by authorized personnel.

* The designed lifetime is not the warranty time specified in the Terms of Delivery

COMMISSIONING NOTES

When commissioning the plant or when doing maintenance work, make the following safety checks:

Safety check to be carried out	Anticipated response
Burner startup without gas supply	Lockout at the end of (TS)
Burner operation with simulated loss of flame. For that purpose, close the fuel supply during operation and leave it in this state.	Recycle with lockout at the end of ignition attempts.



ACCESSORIES

System can be provided with:

- Wiring connectors and terminals.
- RS-232 connection wiring.
- Contact temperature probes Brahma series ST03, ST04, ST07 and ST11.
- Single NTC thermistor immersion temperature probes Brahma series ST06, ST6B, ST09 and ST10.
- Double NTC thermistor immersion temperature probe Brahma series ST12.
- Chronothermostat series BAT1.
- Remote control devices Opentherm® compatible (Encrono OT1, Encrono OT2 or KRONOS OT11).
- Ignition and flame detection electrodes series SA, RS and RB.
- Brahma lcd control panel series LCDx
- Brahma RS485 interface pcb 1964 type.

For accessories technical features, see relative technical sheets available in our web site www.brahma.it.

OPERATING CYCLE

Following description is related to the 1966 board with standard operative mode.

Burner's starting cycle begins against a heat demand by the room thermostat (CH mode) or by the flow-switch/flow-meter (DHW mode), only if water temperature is lower than a preset value. In every starting cycle the system makes a self-check of its own components and identifies the combustion chamber type. A flame amplifier fault (flame simulation) prevents the burner from starting. In case of a closed-chamber boiler, the board starts up the fan only if the air pressure switch is in "no-air-flow" position; when it switches into "air-flow" position, the pre-purge time TP begins, and at the end of it the gas valve is energized, the ignition

device is activated and the safety time TS begins. In case of an open-chamber boiler, the waiting time TW begins only if the flue gas thermostat is in operative state (contact in normally closed position).

If a flame signal is detected at the end of TS time, the thermoregulation temperature process will begin, and the burner flame will be modulated in order to reach the same water temperature as the preset value. If no flame signal is detected within safety time, at the end of TS time the gas valve will be closed. If the number of attempts is completed, a non volatile lockout condition will occur, otherwise another ignition attempt will be carried out. To reset the system from a lockout state, press the related push-button. If hot water demand still occurs, the boiler will start a new ignition cycle; if conditions leading to lockout still occur, the boiler will go back to the lockout status. Lockout condition is visualized by on-board leds and by optional LCDx control panel connected to the board.

The boiler keeps on running until heat demand stops, or one of the safety devices switches on, or the flame extinguishes.

OPERATING CYCLE VARIATIONS

Followings are possible variations on the operating cycle depending on the application:

Option (12): Lockout due to flame simulation

If the system detects a flame signal at start-up or during the waiting time (TW) or the pre-purge time (TP), it will proceed to the lockout condition immediately (option K) or after nn seconds delay time (option Knn).

Option (13): No air flow or flue gas thermostat opened at start-up

If air pressure switch or flue gas thermostat are in open state at start-up, the device will go to lockout status after nn seconds delay time (option Qnn).

Option (14): Air flow failure or flue gas thermostat opened in running state

If air pressure switch or flue gas thermostat operates in running state the lockout condition is immediately reached (option R).

Opzione (15): Flame failure in running state

Lockout condition is immediately reached on flame failure during running state (option V).

Option (16): Ignition attempts

The system performs multiple ignition attempts. Attempts number is set on request.

Option (17): Pre-ignition time

The ignition device starts to operate at the end of TW/TP time for nn second before the the safety time (TS) beginning.

Option (18): Post-purge time

Time interval between any shut-down and fan switching off (the time is set on request).

Option (19): Inter-waiting or inter-purge time

The device starts an additional waiting or pre-purge time, after an unsuccessful ignition attempt and before starting a new ignition attempt (TW -TP/TS cycle).

Option (20): Combustion safety device monitoring mode
Combustion safety device monitoring occurs also in stand-by

Option (21): Safety thermostat monitoring mode
Safety thermostat monitoring occurs also in stand-by

Option (22): Central heating temperature probe monitoring

System inhibits ignition cycle if anomalies on central heating temperature probe occurs.

Reset from a lockout condition

Non-volatile lockout

Reset is carried out only by the local or remote push button.

Volatile lockout Reset is carried out by power supply interruption.

Domestic Hot Water mode

If the Domestic Hot Water circuit is available, the relative demand can be detected by a water flow-switch, or flow-meter or tank probe. The system can be used in various boilers type, like DHW instantaneous mono-thermal or bi-thermal, or internal or external accumulation tank; DHW mode can be set according to customer's requirements.

Heating mode

Heating demand can be carried out by the room thermostat or by a remote control device Opentherm® compatible.

Heating mode can be set according to customer's requirements.

Circulator overrun

Every time the boiler switches off, the circulator keeps on running for a short time, to prevent water overheating in the primary heat exchanger.

This function can be customized according to customer's requirements.

Antifreeze mode

When the outgoing water temperature in primary circuit drops below a fixed threshold, the boiler will start an ignition cycle in heating mode. This mode overstays until a fixed deactivation temperature is reached.

This function can be customized according to customer's requirements.

Minimum output gas pressure

If the system uses a gas valve without gas pressure sensor (VCM01*_xx), a particular operative mode is required for the minimum gas pressure calculation. This operative mode can be customized according to customer's requirements .



DISPOSAL OPERATIONS NOTES

The system contains electronic components and must not be disposed as a domestic waste.

Refer to local legislations for special wastes disposal

TYPE 1966 BOARD DENOMINATION

Following coding explains the meaning of the code shown on the label board.

1966 . H W . S . X

H: letter/s attributed to the customer, according to internal BRAHMA code

W: customer progressive number, indicating a particular hardware and software specified in a customized technical document

S: safety firmware index revision (00, 01 ... progressive order)

X: thermoregulation firmware index revision (00, 01 ... progressive order)

Hereunder is a list of total features and options of the 1966 board, used by the customer to identify the required device. These options aren't reported on label board but in the device technical document.

Series	Type	Options
1965	(1) (2) (3) (4) (5) (6)	(7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22)

(1) Gas valve type

- 1** Gas valve VCM01*xx (without pressure sensor)
- 2** Gas valve VCM01*Sxx (with pressure sensor)
- 3** Standard gas valve 230V_{AC}

(2) Fan type

- 1** Standard fan 230V_{AC} with ON/OFF command
- 2** Standard fan 230V_{AC} with power modulation without rpm speed sensor
- 3** Standard fan 230V_{AC} with power modulation with rpm speed sensor
- 4** 230V_{AC} Brushless fan with PWM command and rpm speed sensor

(3) Lockout state type

- M** Non volatile lockout (standard version)
- E** Volatile lockout

(4) Supply connection type

- No letter** Phase sensitive device (standard version)
- N** No phase sensitive device
- T** No phase sensitive device with on board separation transformer

(5) Safety thermostat type

- No letter** NTC temperature probe with two sensible elements (standard version)
- S** Normally closed contact safety thermostat

(6) Ignition voltage peak value (with capacitive discharge on board igniter)

- No letter** 15 kV (standard version)
- H** 18 kV

(7) Waiting time or pre-purge time

- TW/TP nn** Waiting time or pre-purge time expressed in seconds

(8) Safety time

- TS nn** Safety time expressed in seconds

(9) Minimum ionization current

- No number** 0.5μA_{DC} (standard sensibility)
- 1,2** 1.2μA_{DC}

(10) Ignition device operative mode

- No letter** Ignition device operates during the "spark ignition time" TSP (standard version)
- B** Ignition spark is switched off when flame presence is detected

(11) Spark ignition frequency

- No letter** 25 Hz (standard version)
- nn** Value less than 25Hz

(12) Behaviour in case of flame simulation signal or flame amplifier fault

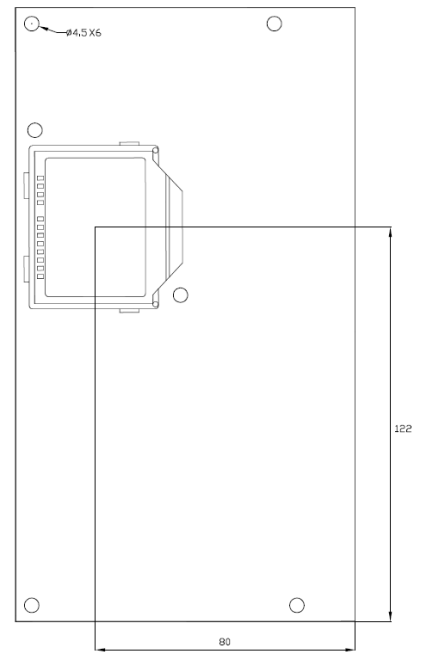
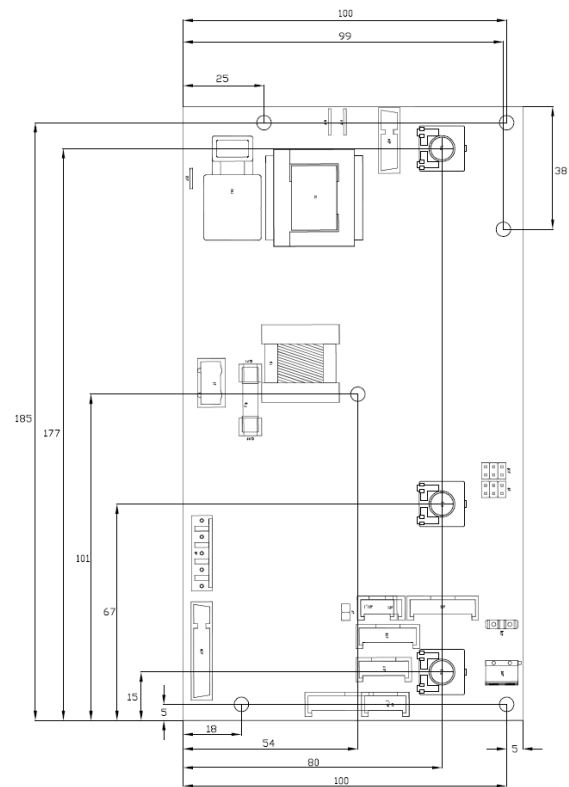
- No letter** The device doesn't start the ignition cycle (standard version)
- K** The device proceeds to the lockout condition immediately
- Knn** The device proceeds to the lockout condition after nn seconds

(13) Absence or insufficient air flow / flue gas thermostat in open state at start-up

- No letter** The device doesn't start the ignition cycle (standard version)
- Qnn** The device proceeds to the lockout condition after nn seconds

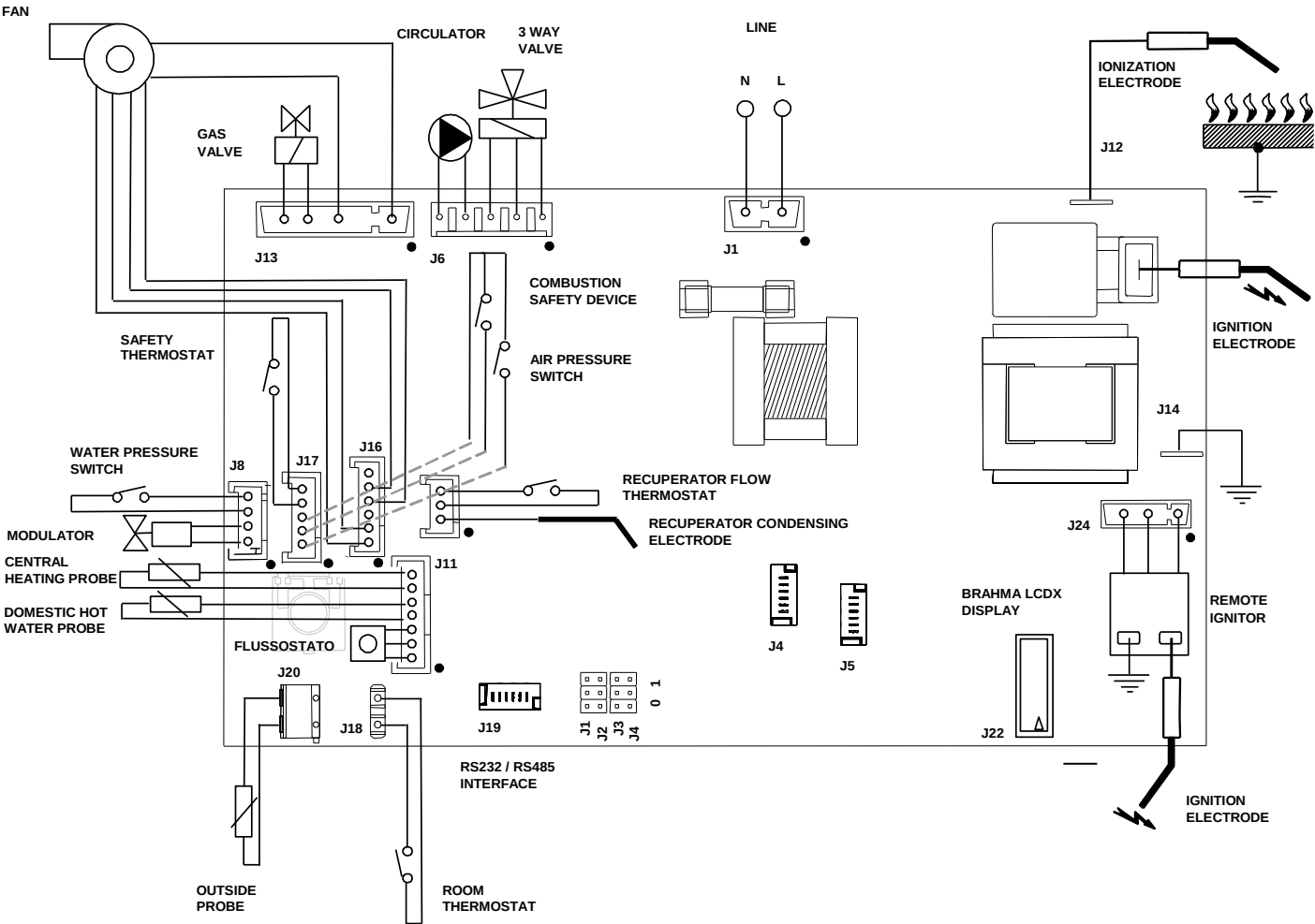
- (14) **Air flow / flue gas thermostat failure in running state**
No letter The device carries out a safety shut down and remains in waiting/pre-purge time (standard version)
R The device proceeds to the lockout condition
- (15) **Flame failure in running state**
No letter The device carries out one or more ignition attempts (standard version)
V The device proceeds to the lockout condition
- (16) **Ignition attempts**
No letter Single ignition attempt (standard version)
Ynn Multiple ignition attempts (nn number of ignition attempts)
- (17) **Pre-ignition time**
No letter Not available (standard version – ignition device starts to operate at safety time beginning)
Jnn The ignition device starts to operate nn seconds before safety time beginning
- (18) **Post-purge time**
No letter No post-purge time (standard version)
PTnn The device performs nn seconds post-purge time
- (19) **Inter-wating or inter-purge time**
No letter No inter-purge time (standard version)
Inn The device performs nn seconds inter-purge time
- (20) **Combustion safety device monitoring**
/ Monitoring occurs only during heat request
C Monitoring occurs in every state
- (21) **Safety thermostat monitoring**
/ Monitoring occurs only during heat request
S Monitoring occurs in every state
- (22) **Central heating probe monitoring**
/ 1965 safety module inhibits ignition cycle if any anomaly on central heating probe occurs
L 1965 safety module let the ignition cycle start if any anomaly on central heating probe occurs
- (23) **Air pressure switch monitoring**
/ The board detects the air pressure switch contact during every state of ignition cycle
P The board does not detect the air pressure switch, This option is used in boiler with pneumatic gas valve (pre mixed application).

DIMENSIONS



Unit measures: mm – Tolerance: $\pm 0.2\text{mm}$

WIRING DIAGRAM



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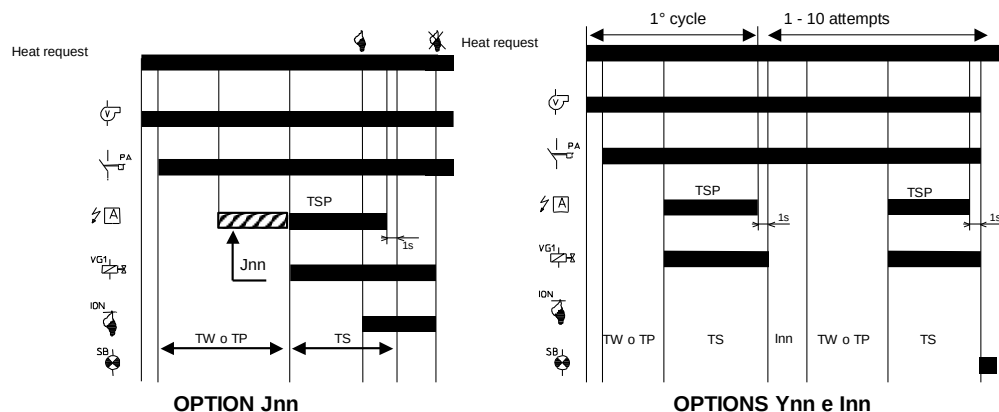
The diagrams illustrate four different interlocking options for a burner control system. Each diagram shows a sequence of events over time, with a vertical timeline and horizontal bars representing the duration of each event.

- Option Qnn:** Shows a sequence where the fan (V) runs, then the gas valve (VG1) opens, and the igniter (ION) fires. The igniter fires after a delay (Qnn) from the gas valve opening.
- Option K-Knn:** Shows a sequence where the fan (V) runs, then the gas valve (VG1) opens, and the igniter (ION) fires. The igniter fires after a delay (Knn) from the gas valve opening. A safety thermostat (SB) is also shown.
- Option R:** Shows a sequence where the fan (V) runs, then the gas valve (VG1) opens, and the igniter (ION) fires. The igniter fires after a delay (R) from the gas valve opening. A safety thermostat (SB) is also shown.
- Option V:** Shows a sequence where the fan (V) runs, then the gas valve (VG1) opens, and the igniter (ION) fires. The igniter fires after a delay (V) from the gas valve opening. A safety thermostat (SB) is also shown.

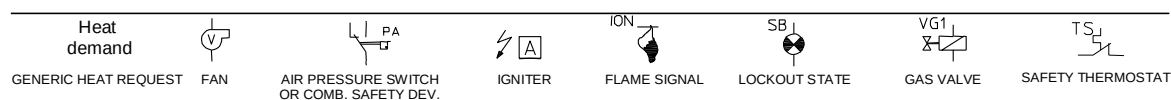
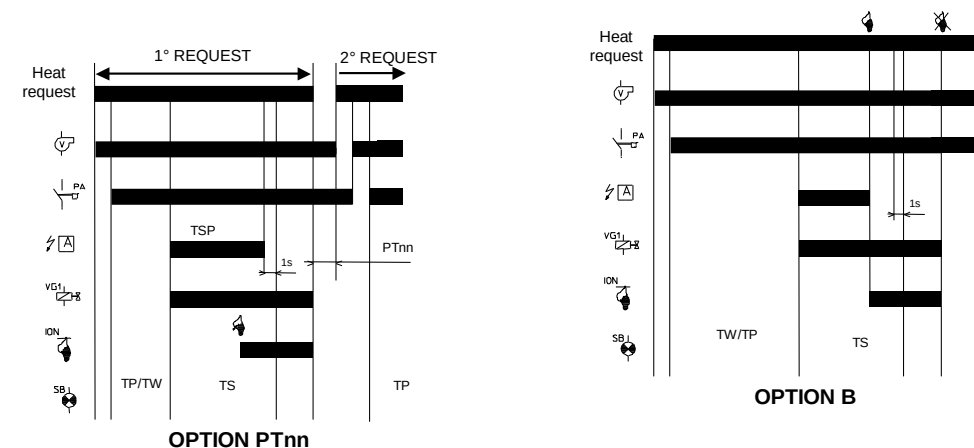
Legend:

- Heat demand
- FAN
- AIR PRESSURE SWITCH OR COMB. SAFETY DEV.
- IGNITER
- FLAME SIGNAL
- LOCKOUT STATE
- GAS VALVE
- SAFETY THERMOSTAT

OPERATING CYCLE DIAGRAM FOR OPTIONS: Jnn – Ynn – Inn



OPERATING CYCLE DIAGRAM FOR OPTIONS: PTnn - B



ATTENTION ->Company Brahma S.p.A. declines any responsibility for any damage resulting from user tampering

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