SIT Group

SIT 580 BIC

INTEGRATED ELECTRONIC DEVICE FOR THE SAFETY AND REGULATION OF GAS APPLIANCES

Field of application

Combination boilers, instantaneous water heaters and floor standing boilers fitted with natural or forced-draught atmospheric burners.

Reference standards

EN 298 Gas appliance directive (GAD 90/396/EEC).
EN 60730 Low voltage directive (LVD 73/23/EEC).

Main features

Safety (flame control) and regulation functions integrated and implemented on a single card.
Safety functions are managed using analogue or digital (microprocessor) technology.
Regulating functions are managed by microprocessor.
Diagnostics on board the card.

9.955.112 111

SIT 580 BIC

DESCRIPTION AND APPLICATIONS

BIC 580 is a family of electronic devices that integrate both flame control and gas appliance regulating functions, implemented on the same card.

BIC 580 is designed for use with combination boilers, floor standing boilers or instantaneous water heaters with forced- or natural-draught atmospheric burners.
The device can be applied to boilers with separate domestic water and central-heating exchangers or to those with integrated exchangers.

The device controls both the delivery temperature of the domestic hot water and that of the central heating circuit, giving priority to the domestic hot water supply.

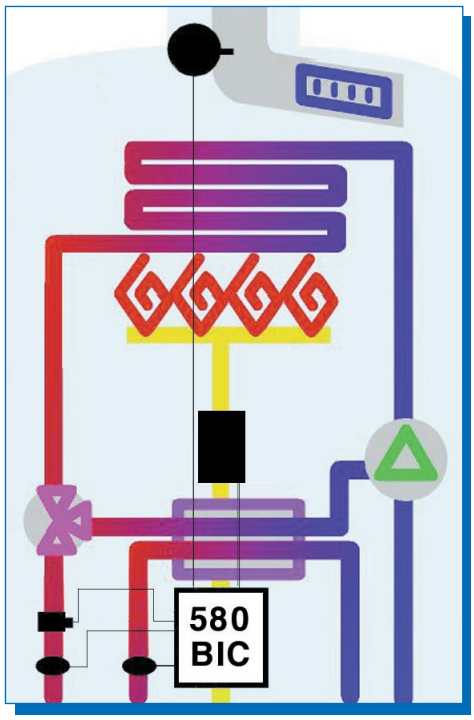
Both temperatures are regulated by means of a direct feedback from temperature sensors placed at the domestic hot water and central heating water delivery outlets.

The safety (flame control) functions are achieved with analogue circuitry or with the aid of a microprocessor (in the digital version).

The regulating functions are implemented by a microprocessor.

The power supply required is 230 Vac 50 Hz.

BIC 580 has been designed with a modular construction that ensures excellent flexibility in its customization to suit the needs of the appliance.



SIT 580 BIC

CONSTRUCTIONAL FEATURES

Type	Single side printed circuit board with surface-mounted (SMT) and conventional mounting type (PTH) components.
Protection degree	IP00
Dimensions	186 x 50 x 125 mm The specified dimensions refer to a given model and are for guidance only.

CONDITIONS OF USE

Ambient temperature range	-10...60 °C
Relative humidity	90% RH @ 40 °C non-condensing
Mounting position	any
Life (minimum number of cycles)	300,000

STANDARDS

The card has been designed and manufactured in compliance with the following standards:

Electrostatic discharge	EN 61000-4-2
Dips and interruptions	EN 61000-4-11
Burst	EN 61000-4-4
Surge	EN 61000-4-5
Induced currents	EN 61000-4-6

The card satisfies the following EMC standards:

Continuous conducted emissions	EN 55014
Harmonics	EN 61000-3
The supply transformer satisfies the standard	EN 60742

SIT 580 BIC

Inputs and outputs

The information provided here refers to a combination boiler with a separate exchanger and is an example only, since the features of the device can be adapted to suit specific needs.

Area	Function	Power supply	Type of connection	Notes and SIT Line
Main supply	-	230 Vac 50 Hz	Molex	
Safety	Flame detection	0.5 µA minimum	Faston	1.5 µA recommended
	Air pressure switch	230 Vac	Molex	 SIT 380 ARIA *
	Reset button	-	Molex	
	Summer-winter switching button	-	Molex	
Regulation	Room thermostat	230 Vac	Molex	Also available in low-voltage versions
	Safety thermostat	230 Vac	Molex	
	Flue gas thermostat	230 Vac	Molex	
	Clock Programmer	230 Vac	Molex	
	Heating circuit temperature probe	Low voltage	Lumberg	NTC 10 kOhm 25 °C
	Domestic hot water temperature probe	Low voltage	Lumberg	NTC 10 kOhm 25 °C
	Instantaneous hot water request	Low voltage	Lumberg	Available both for switching and for Hall-effect flow sensor versions
	Water pressure switch	Low voltage	Lumberg	 SIT 340 AQUA *
	Probe for outside temperature control	Low voltage	Lumberg	NTC 10 kOhm 25 °C
	Communication interface			SIT protocol

S T U P N I

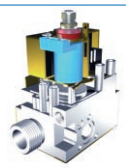
* For further information on the product, please contact the SIT offices at the addresses specified on the back cover, or go to our web site www.sitgroup.it, to ask for more detailed documentation.

SIT 580 BIC

Inputs and outputs

The information provided here refers to a combination boiler with a separate exchanger and is an example only, since the features of the device can be adapted to suit specific needs.

INPUTS OUTPUTS

Area	Function	Power supply	Type of connection	Notes and SIT Line
Safety	Ignition	230 Vac	Stelvio	 External igniter NAC 504 *
				580 BIC versions available with igniter on board.
				 Supply connector to 960.40x SIGMA range *
	Power supply to fan	230 Vac	Molex	
	Gas control with safety solenoid valves	230 Vac	Power supply by means of external igniter	 SIT 845 SIGMA *
Regulation				
	Electric three-way valve	230 Vac	Molex	
	Pump	230 Vac	Molex	
	Power supply to modulator	16 V 310 mA	Lumberg	 Modulator connector to 950.45x range *
	Diagnostics	-	-	LEDs on board the PCB or on separate display

* For further information on the product, please contact the SIT offices at the addresses specified on the back cover, or go to our web site www.sitgroup.it, to ask for more detailed documentation.

SIT 580 BIC

ON BOARD CONTROLS

NG/LPG — Jumper. A jumper can be used to change the current control parameters from LPG to methane gas.

CH — Potentiometer. This is for regulating the temperature setting for the central-heating water. The temperature can be set within a range from 45 to 85 °C. If an outside temperature controller probe is installed, this potentiometer adjusts the correlation value K between the heating temperature and the outside temperature.

DHW — Potentiometer. This enables regulation of the temperature setting for the domestic hot water.
The standard range is 35 – 65 °C.

Other options, such as changing the pump overrun or ignition delay times, etc., are feasible through the use of specific jumpers on the card.

FUNCTIONS

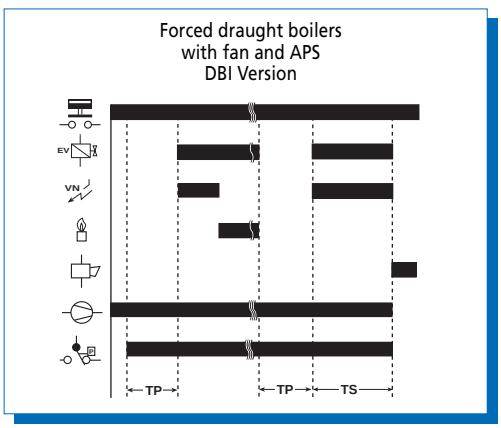
Ignition control and flame supervising function.

When a request for ignition is received, the ignition sequence begins by verifying first of all that the pressure switch is in the NC position.

Then the fan is powered and the passage of the pressure switch to the NO position is verified. This is the start of the prepurge time (TP).

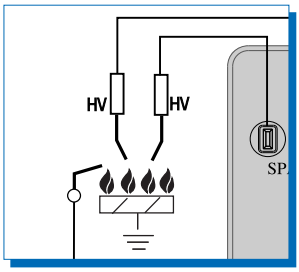
At the end of the prepurge time, the igniter and the safety solenoid valves on the gas control are powered. This is the start of the safety time (TS).

When the detection electrode transmits the flame signal, the igniter is no longer powered.



If this is not the case, the system remains in the standby condition.

If the pressure switch does not switch over, the system remains in the standby condition.



Various combinations of the safety time and prepurge time are available, depending on the type of appliance concerned.

If the flame is not detected at the end of the safety time, the system goes into volatile or non-volatile lockout mode, depending on the version. To restore the system to operating conditions, the power supply must be re-enabled, or the reset button must be pressed.
In the event of the flame signal no longer being detected during operation, the ignition electrode is powered immediately and the gas valve remains open. If, at the end of the safety time, the flame has still not been re-lit, the system goes in lockout.
An option for multiple attempts is available in the versions with microprocessor-controlled safety functions.

FUNCTIONS

Domestic hot water function (DHW)

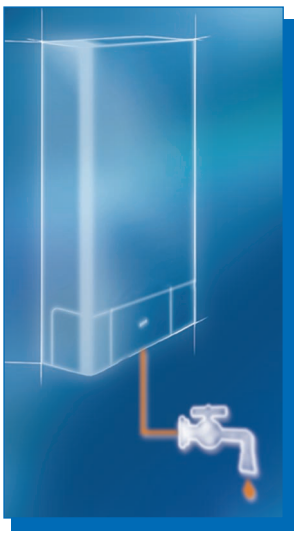
When domestic hot water is required (switch or flow-sensor), the control powers the pump.

The temperature measured by the probe situated at the domestic hot water outlet is then verified and, on the basis of the difference between this and the temperature setting established by the user, the control may or may not request a burner ignition cycle.

After the burner has been lit, the current to the gas control modulator is driven to regulate the temperature of the water delivered according to the setting established by the user. This regulation is of the PID type and is implemented in the microprocessor software.

The burner is lit when the temperature drops below the temperature setting by a certain tolerance margin.
Conversely, the burner goes out when the temperature has exceeded the value set by the user, plus the established tolerance value.

Primary overtemperature function (limit thermostat). If the temperature of the primary circuit exceeds 90 °C, the burner is extinguished until the temperature has returned to below 80 °C.

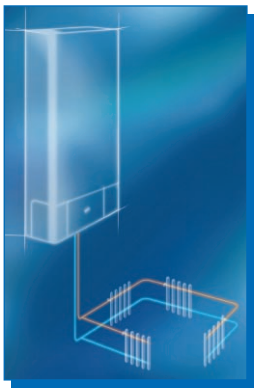


Central heating function (CH)

The heating phase is enabled when both the summer/winter switch and the clock contact are closed. This phase is only enabled if domestic hot water is not being delivered, since the latter always takes priority.
The pump is then powered.

The temperature measured by the probe positioned at the central heating water outlet is then verified and, on the basis of the difference between this and the temperature setting established by the user, the control may or may not request a burner ignition cycle.

The opening of the summer/winter switch disables the central heating function.



The burner is lit when the temperature is lower than the temperature setting by a certain tolerance margin.

Conversely, the burner is extinguished when the temperature has exceeded the value set by the user, plus the established tolerance value.

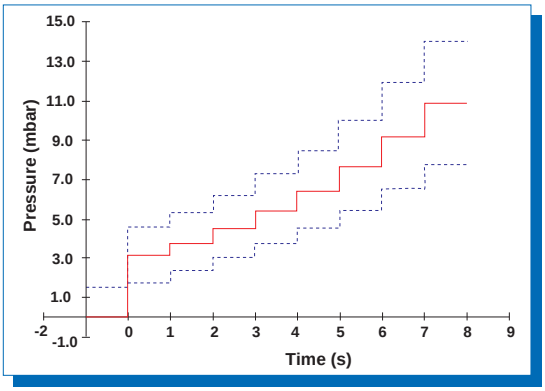
After the burner has been lit, the current to the gas control modulator is driven to regulate the temperature of the water being delivered according to the setting established by the user. This regulation is of the PID type and is implemented in the microprocessor software (see DHW function).

SIT 580 BIC

OTHER FUNCTIONS AVAILABLE

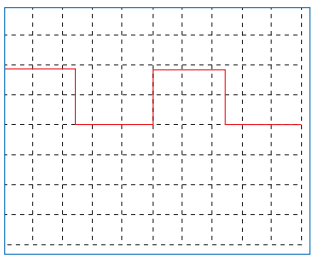
SLOW IGNITION

The microprocessor makes it possible to adjust the control current to set the pressure level established during ignition and subsequently regulate the rising ramp, thus tailoring it to the type of appliance involved.



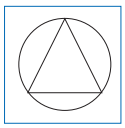
ANTI-CYCLES

To avoid an excessive number of ignition cycles when the heating is on, a minimum interval can be established between when the flame is extinguished due to the set point being exceeded and when it can subsequently be re-ignited, regardless of whether the temperature has dropped below the established value for re-ignition.



PUMP OVERRUN

When the demand for heating ceases, the pump continues to circulate the water for a certain amount of time. This function enables overtemperatures to be avoided and makes better use of the heat produced towards the end of the heating phase.



PUMP ANTI-SEIZE

In the event of the pump not being required for some time, the system briefly operates the pump for a brief period anyway (generally after 24 hours of inactivity), even if there is no need, in order to prevent the risk of the pump seizing up.

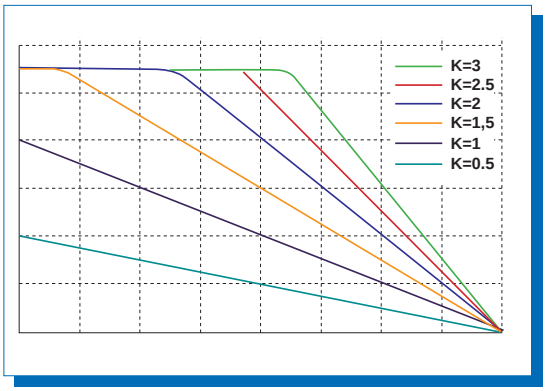
ANTIFREEZE FUNCTION

In the event of the temperature on the central heating water dropping to below an established value (generally 5 °C), the heating function is enabled even if it is not requested. This is done to protect the appliance and the central heating system from damage due to freezing.
When the temperature returns above a preset threshold (generally 30 °C), this function is disabled.

SIT 580 BIC

TEMPERATURE REGULATING FUNCTION

The control can be combined with an outside probe in order to perform a temperature regulating function. In this mode, the temperature of the central heating water is no longer governed to suit a fixed setting, but as a function of the outside temperature, according to the formula shown in the graph, where K can be adjusted by the user according to the thermal characteristics of the building and of the central heating system.



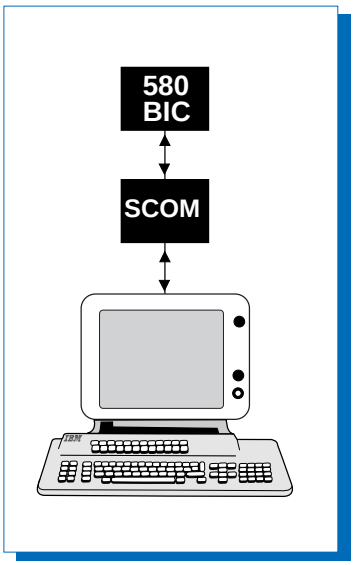
DIAGNOSTICS

The card is fitted with SMD LEDs or conventional diagnostics on board, or with a separate display, for identifying the operating conditions and any failures.

Among the failures it is worth mentioning: no-flame conditions and lockouts caused by the safety thermostat, air pressure switch, lack of water, and so on.

SCOM

Serial type communication interface. This enables the exchange of data between the microprocessor on the card and other devices operating under the SIT proprietary protocol.

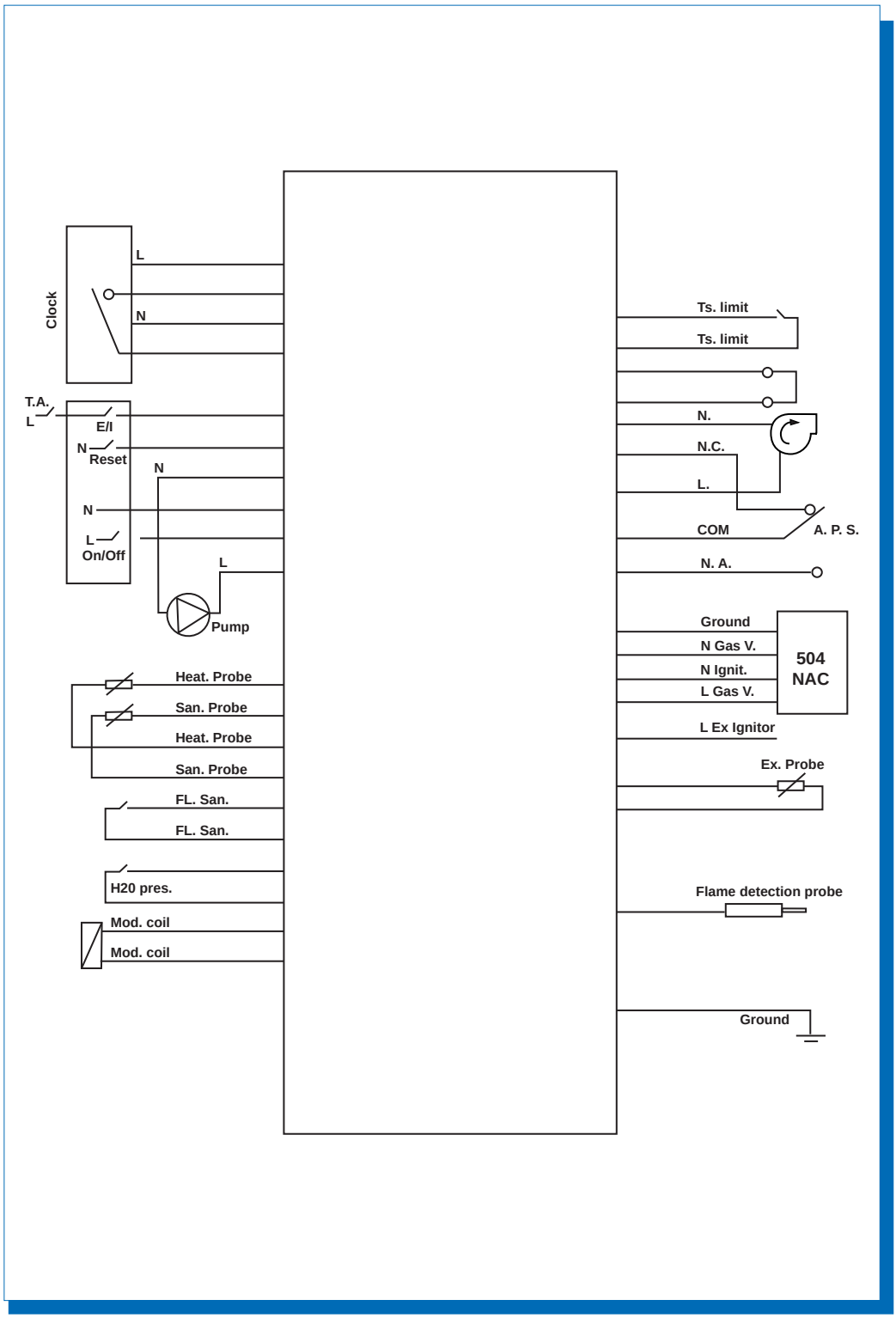


Among the various options available, it is worth mentioning:
- *varying the setting parameters*
- *monitoring operating conditions*
- *connection to a remote control*

SIT 580 BIC

COMBINATION BOILER VERSION

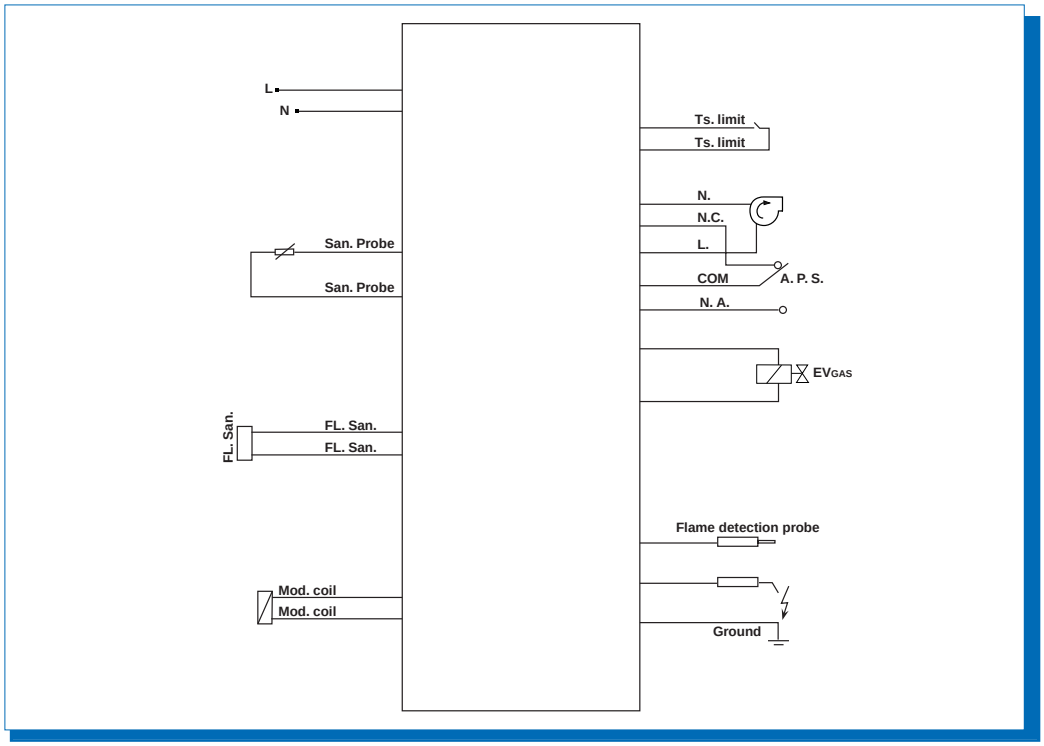
Two separate exchangers
Separate igniter



SIT 580 BIC

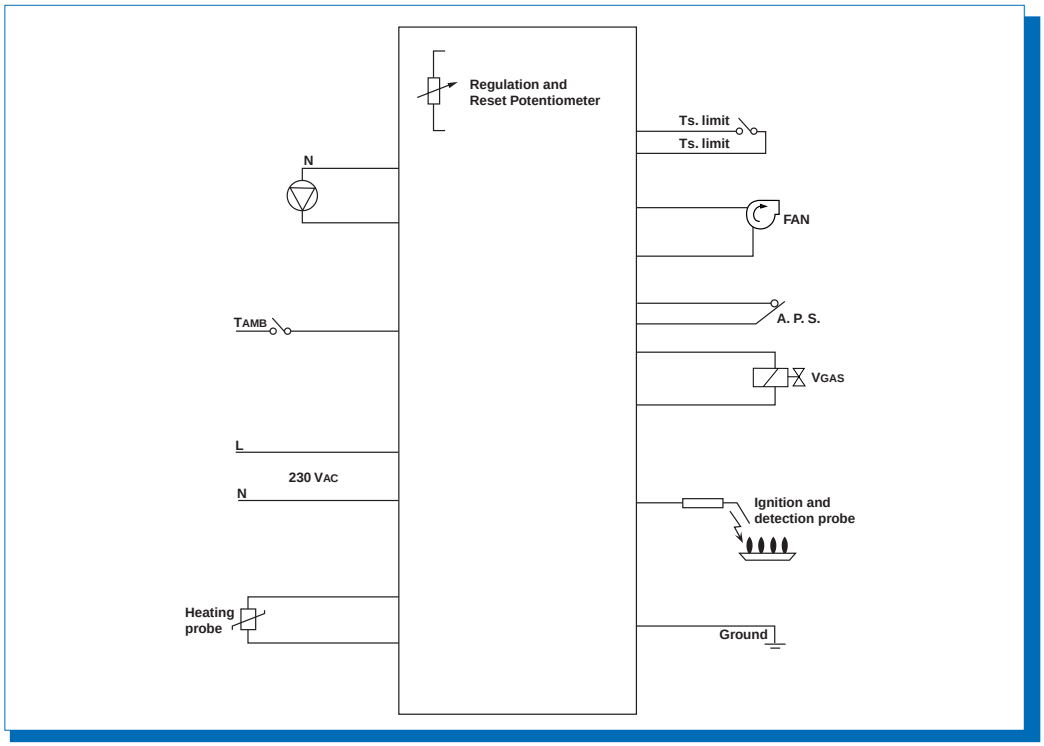
INSTANTANEOUS HOT WATER BOILER VERSION

Integrated igniter



FLOOR STANDING BOILER VERSION

Integrated igniter



SIT GROUP
www.sitgroup.it - e-mail: marketing@sitgroup.it