SITGroup

NEW

585 BIC

INTEGRATED ELECTRONIC DEVICE FOR THE SAFETY AND REGULATION OF GAS APPLIANCES

Field of application

Atmospheric (with or without forced draught) or condensing boilers and instantaneous water heaters

Reference standards

EN 298 Gas appliance directive (GAD 90/396/EEC).

EN 60730 Low voltage directive (LVD 73/23/EEC).

EN 61000 EMC directive (89/36/EEC).
ANSI Z21.20 available on request.

Main features

Safety (flame control) and regulation functions integrated and implemented on a single card.

Safety and temperature control functions are managed using microcontroller technology. The board has integrated diagnostics functions.

9.955.082 02 (09) Subject to change without notice

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DESCRIPTION AND APPLICATION

BIC 585 is a family of electronic devices that integrate both flame control and gas appliance regulating functions, implemented on the same card.

BIC 585 is designed for use with combination boilers, floor standing boilers, instantaneous water heaters with forced- or natural-draught atmospheric burners or premix condensing boilers.
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.

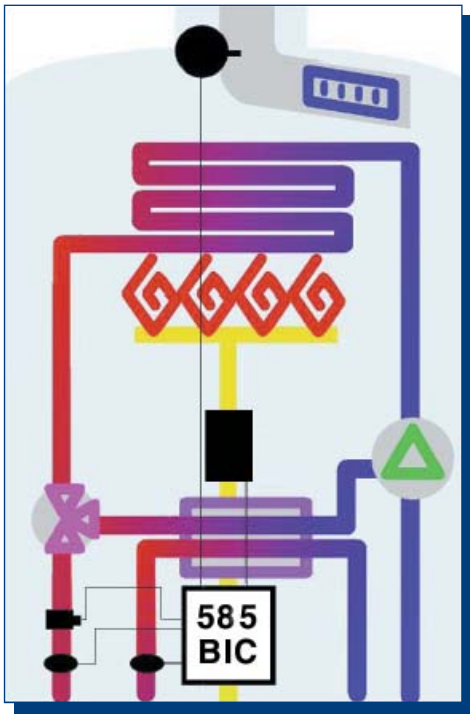
Temperatures are regulated by means of a direct feedback from temperature sensors placed at the domestic hot water and central heating water delivery outlets.

The safety (flame control) functions are achieved with the aid of a microprocessor.

The regulating functions are implemented by the same microprocessor.

The power supply required is 85 ÷ 253 Vac, 50 ÷ 60 Hz.

BIC 585 has been designed with a modular construction that ensures excellent flexibility in its customization to suit the needs of the appliance.



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CONSTRUCTIONAL FEATURES

Type	Single side printed circuit board with surface-mounted (SMT) and conventional mounting type (PTH) components.	
Protection degree	IP00	
Dimensions	STANDARD	145 x 115 mm
	PREMIUM	200 x 115 mm
	TOP	240 x 115 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, non corrosive
Mounting position	any
Life (minimum number of cycles)	300,000

STANDARDS

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

Safety aspects	EN 298 : 2003
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 boards satisfy the following EMC standards:

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

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CONFIGURATION AND INPUTS

Configuration	Standard	Premium	Top
board dimension 145*115 mm	✓	-	-
board dimension 200*115 mm	-	✓	-
board dimension 240*115 mm	-	-	✓
Pinheader connectors (High voltage)	-	o	o
PC interface	✓	✓	✓
Display connector	o	o	o
PE Fastonblock	-	o	o
Integrated ignition	✓	o	o
fan driver 325Vdc	-	-	o
OpenTherm	o	o	o
RS-485	-	o	o
85÷253Vac	✓	✓	✓

Inputs	Standard	Premium	Top
Safety Limit Thermostat (24Vdc)	✓	✓	✓
TTB (24Vdc)	✓	-	-
TTB (24Vdc) not in combination with APS	-	o	o
Water Pressure Switch (24Vdc)	-	-	o
Water Pressure sensor / switch (5Vdc)	o	o	-
Gas Pressure Switch (24Vdc)	-	o	o
Air Pressure Switch (24Vdc)	o	o	o
Air Pressure Sensor (5Vdc)	o	-	-
1st general purpose input (24Vdc)	o	o	o
2nd general purpose input	o	-	o
outlet ntc	✓	✓	✓
inlet ntc	o	o	o
dhw ntc / switch	o	o	o
General purpose ntc / switch	-	o	o
Flue ntc / thermostat	o	o	o
Outside ntc	o	o	o
zone ntc	-	-	o
0÷10V	-	o	o
PT1000	o	-	-
Ionisation separate from ignition	o	o	o
Turbine 5V, not possible if 24V is selected	o	o	o
Turbine 24V, not possible if 5V is selected	-	o	o
Fan tacho signal	o	o	o
Heat demand CH (L')	-	o	o

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OUTPUTS

Outputs	Standard	Premium	Top
Gas Valve (line voltage)	✓	✓	✓
Pump relay	✓	✓	✓
2nd pump relay	-	o	o
Pump pwm (24Vdc)	-	o	o
Fan relay	o	o	-
Fan triac	o	-	-
Fan pwm (not possible if modulation coil is needed)	o	o	o
Modulation coil (not possible if pwm is needed)	o	o	o
Three-way valve relay(230V)	o	o	o
Stepper motor unipolar 24Vdc	o	o	o
Stepper motor bi-polar 24Vdc	o	o	o
External Igniter	o	o	o
LPG valve relay	-	o	o
991 AEROTECH HM mixer (24Vdc)	-	o	o
voltfree 1	o	o	o
voltfree 2	-	-	o
voltfree 3	-	-	o

Legend

present :	✓
optional :	o
not possible :	-

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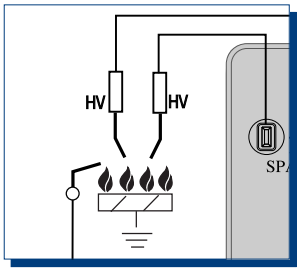
FUNCTIONS

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.

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



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).

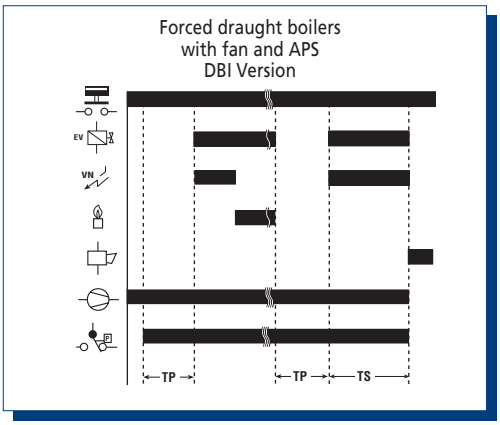
If the pressure switch does not switch over, the system remains in the standby condition.

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).

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

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

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 or fan PWM 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 switches off when the temperature has exceeded the value set by the user, plus the established pre-programmed off set.

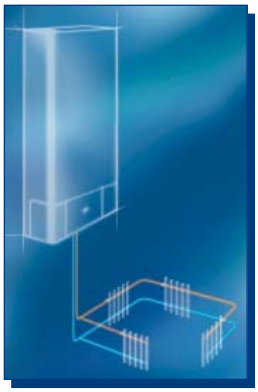
Primary overtemperature function (limit thermostat). If the temperature of the primary circuit exceeds 90 °C, the burner is extinguished until the temperature has returned to below 80 °C.

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 or fan pwm 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).

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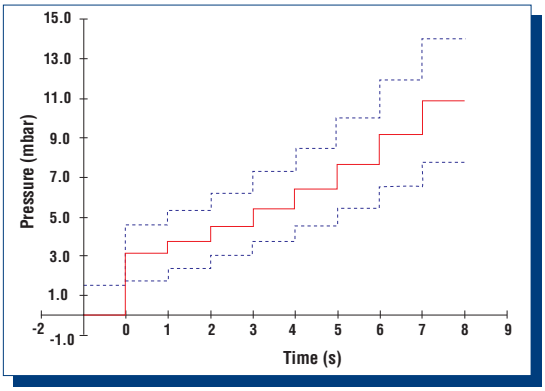
OTHER FUNCTIONS AVAILABLE

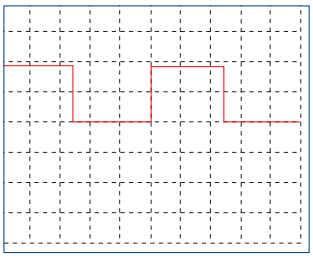
SLOW IGNITION

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.



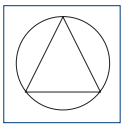
ANTI-CYCLES

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.

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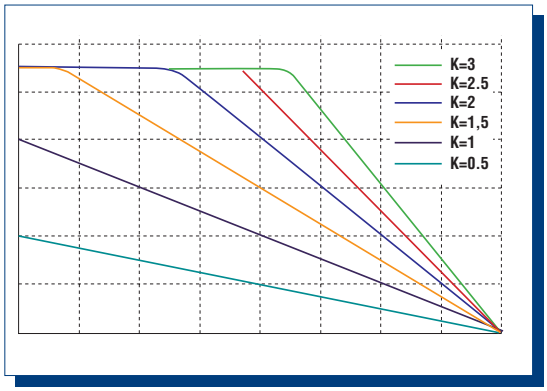
TEMPERATURE REGULATING FUNCTION

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.

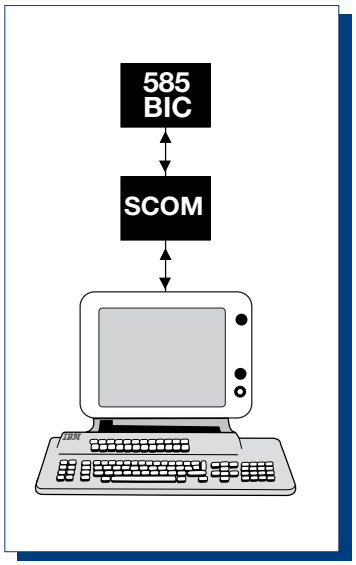
Among the failures it is worth mentioning: no-flame conditions and lockouts caused by the safety thermostat, air pressure switch, lack of water, and so on.

OTHER FEATURES

The controls have many more features that are described in the detailed product descriptions that are available through the SIT sales organization.

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*

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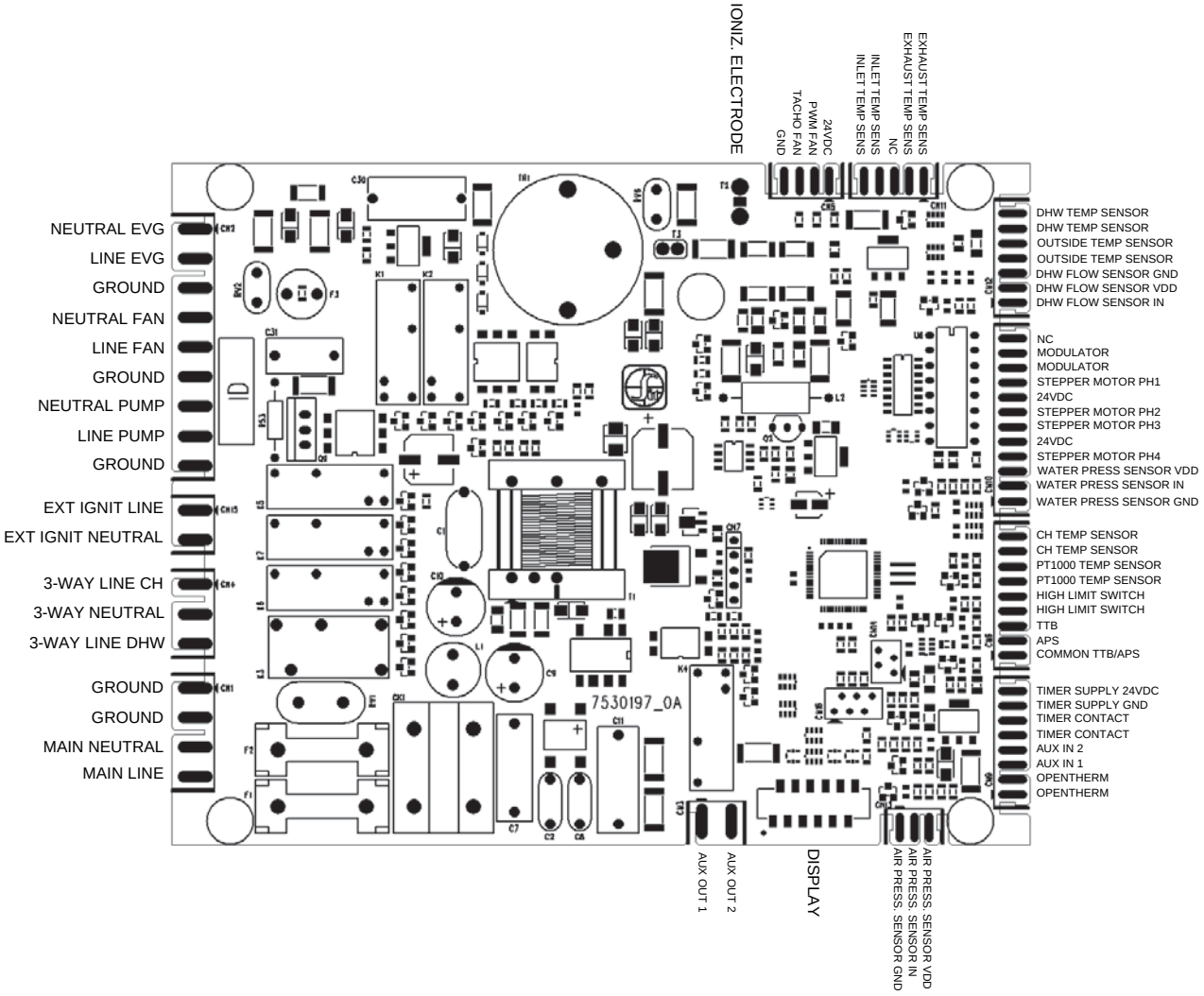
STANDARD



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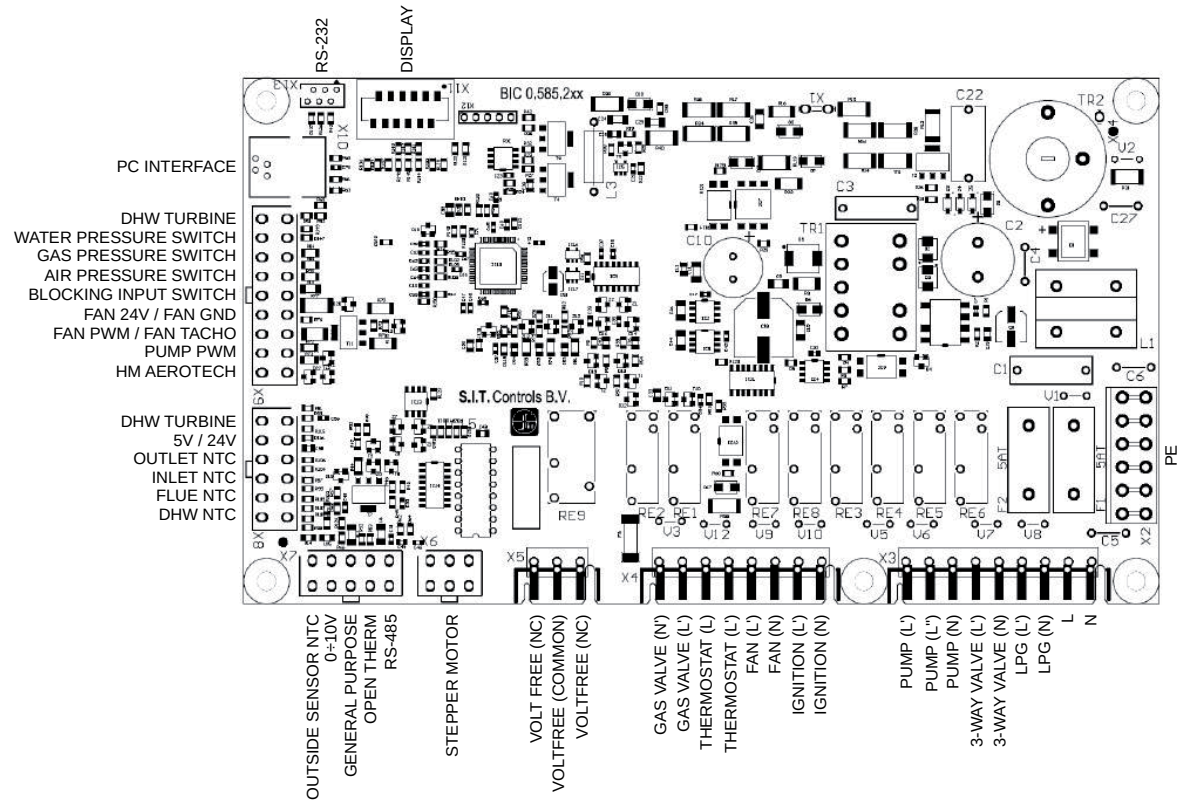
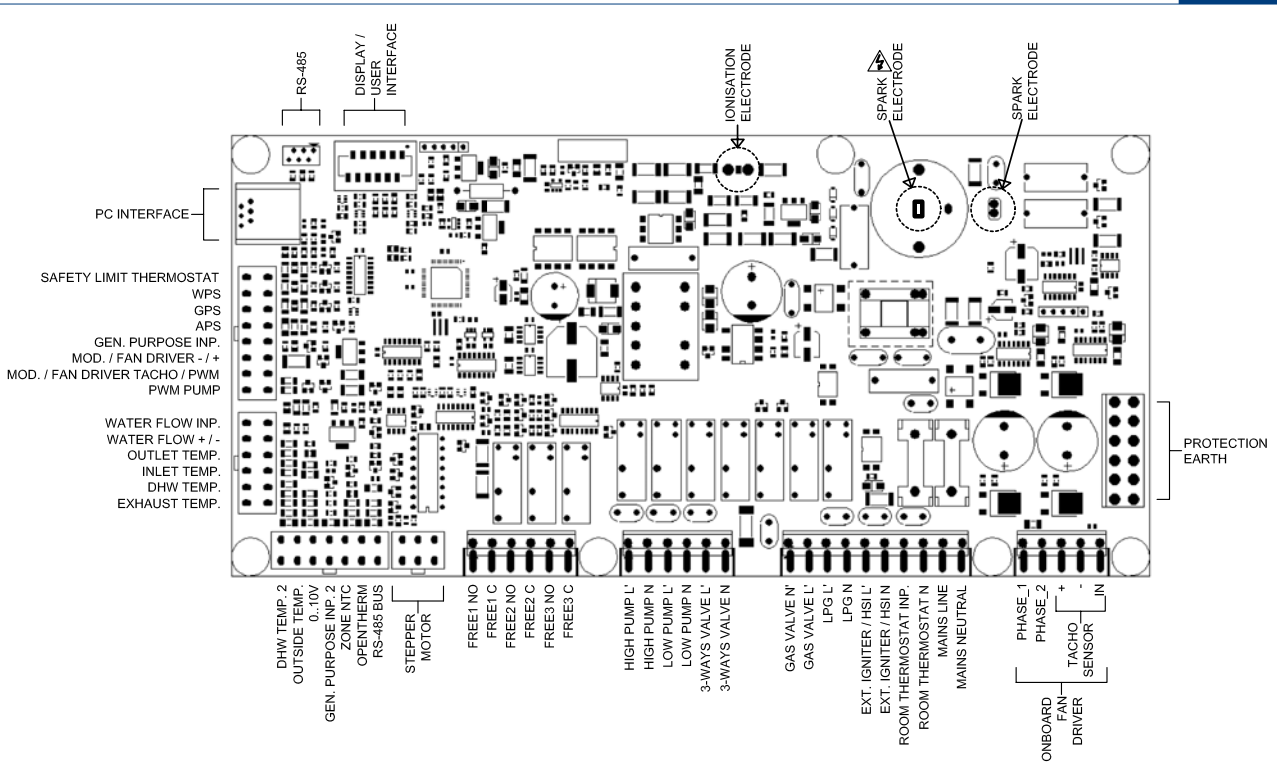
PREMIUM



TOP



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