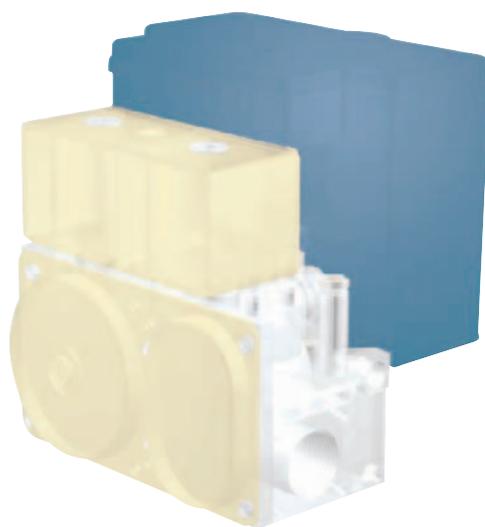




**SIT**Group

**503 EFD**



## **ELECTRONIC FLAME CONTROL DEVICE FOR INTEGRAL MOUNTING ON SIT MULTIFUNCTIONAL GAS CONTROL**

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DESCRIPTION

FEATURES

OPERATING SEQUENCE

TECHNICAL DATA

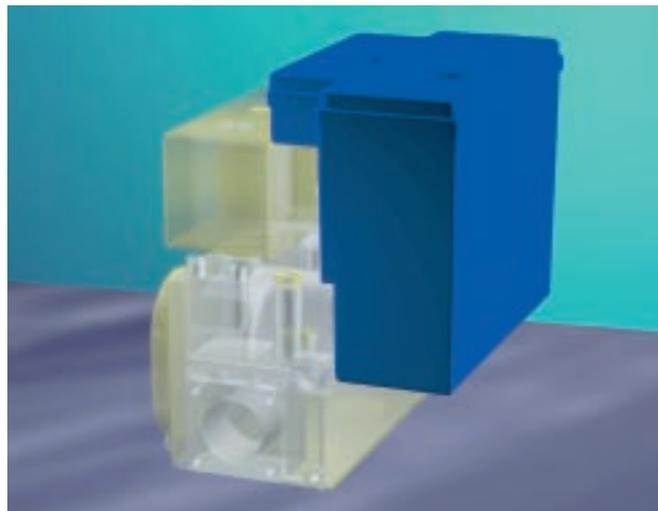
INSTALLATION

## DESCRIPTION

The 503 EFD is an electronic flame safety device for controlling a gas appliance using the principles of flame rectification.

The 503 EFD automatic device has been designed for domestic gas appliances with or without a fan in the combustion circuit; with direct ignition or ignition by means of an intermittent pilot in applications which require either non-volatile or volatile lockout. It is also possible to have two separate electrodes for flame ignition and detection or to have these two functions incorporated in a single electrode.

The 503 EFD family of products has been specifically designed for fixing on SIT 830, 836 and 837 TANDEM and SIT 822, 826 and 827 NOVA multi-functional controls by means of an exclusive plastic container which integrates itself with the valve body and simplifies connection of the solenoid valves.



### Applications

The 503 EFD is an automatic ignition control for applications with intermittent operation in accordance with EN298 for:

- boilers with natural draught
- boilers with forced draught including dynamic control of the air pressure switch.

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**Basic features include:**

- Compact design
- Direct assembly on the gas control
- Incorporated igniter with reduced emission of radio disturbances in accordance with the requirements of the EMC directive
- Direct burner ignition (DBI) or by intermittent pilot (IP)
- Manual reset function and signalling of the non-volatile lockout state either integrated or remote
- Multiple plug-in connectors
- Utilises well established electronic technology for high reliability of operation
- Precise and repeatable timing
- Flame detection by ionization
- EC approval according to EN 298 standard
- Repetition of the cycle after loss off flame during operation
- Permanent lock-out visualization, a without thermostat input being present
- Suitable for applications at low ambient temperatures

**Options available**

- Fan and air pressure switch control
- Single electrode for ignition and flame detection
- Reset button and lockout signalling integrated on board
- Volatile lockout version for specific applications
- 230 Vac output synchronized with flame detection (flame relay contact)
- Possibility to connect an automatic safety thermostat in series with the solenoid valve with manual lockout following its operation
- Protection against miswiring of the pressure switch contacts
- Different flame current sensitivity options may be specified
- Protection rating IP44
- Several pre-purge and safety timings can be tailored to the application

# FEATURES

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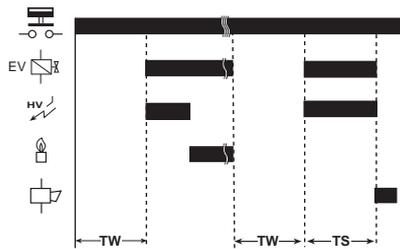
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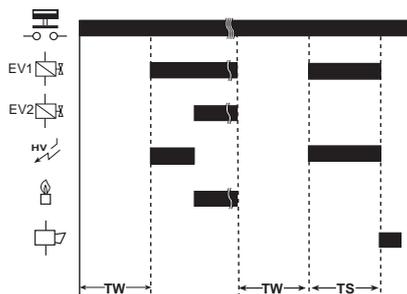
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# OPERATING SEQUENCE

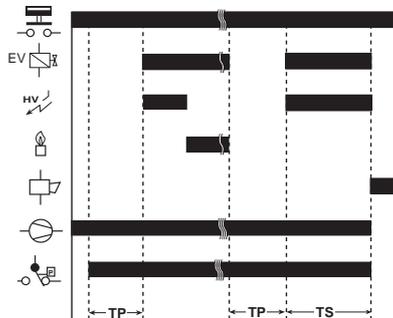
## BOILERS WITH NATURAL DRAUGHT DBI version



## BOILERS WITH NATURAL DRAUGHT IP version



## FAN ASSIATED BOILERS DBI version



### Normal operation (natural draught or fan assisted)

During the waiting or purge time,  $T_w$  or  $T_p$ , the unit verifies that there is no parasitic flame signal present, and that the internal circuitry is operating correctly. If the unit is used on a fan-assisted application, the air pressure switch is verified to be in the N.C. (normally closed) or "no flow" position.

Upon powering the fan, the unit will not begin the operating sequence until the N.O. (normally open) or "flow" position is activated on the air pressure switch. After the scheduled waiting time  $T_w$ , or purge time  $T_p$ , the built-in igniter and the gas valve are energized. This commences the safety time,  $T_s$ . The ignition spark will ignite the gas and the flame will be sensed by the HV electrode (single probe model) or the detection electrode (dual probe model).

Upon sensing the flame, the HV spark will be suppressed and the gas valve will remain energized. When the thermostat is satisfied, the valve and fan are de-energized and the control returns to the stand-by mode. The safety time of the 503 EFD has a constant duration in all operating conditions and, in particular, does not depend on the moment the pressure switch is switched over.

### Behaviour under abnormal conditions

- If the air proving switch is in the N.O. (normally open) or "flow" position at start-up, upon a request for heat, the unit will remain in a waiting mode with the fan de-energized
- If air flow is not proven by the air-flow switch after energizing the fan, the control will remain in the waiting mode with the fan energized until the air flow is sensed
- Upon flame failure during normal operation, the unit will maintain the power to the fan and start again the ignition sequence with a waiting time (or purge time) followed by a safety time
- If no flame is sensed during any part of the safety time, the unit will lockout

### Resetting the unit

To reset the unit the reset switch is depressed. If a first reset is not successful, wait at least 10 seconds before the next attempt.

**AMBIENT WORKING TEMPERATURE**

-20 to + 60 °C

**HUMIDITY**

95 % max. at 40 °C

**SUPPLY VOLTAGE**

220/240 Vac - 15 %, + 10 %, 50-60 Hz

**POWER CONSUMPTION**

maximum 10 VA for versions without fan

maximum 12 VA for versions with fan

**ELECTRICAL RATINGS**

Pilot valve or main valve: 230 Vac, 0,5 A,  $\cos\varphi\geq 0,4$

Fan: 230 Vac, 1A,  $\cos\varphi\geq 0,4$

Flame relay: 230 Vac, 0,5 A,  $\cos\varphi\geq 0,4$

Alarm: 230 Vac, 1A,  $\cos\varphi=1$

**ELECTRICAL CONNECTIONS**

High voltage probe: male fast-on connector 2,8 mm X 0,5 mm

Flame detection probe: male fast-on connector 4,8 mm X 0,5 mm

Other connections: male Molex series 2599 suitable for female Molex series 3001 and 3002 or compatible.

**PROTECTION DEGREE**

Standard IP 40

IP 44 with gaskets

**TIMING**

Minimum waiting time  $T_w$  or purge time  $T_p$ : 1.5 ... 40 sec.

Maximum safety time  $T_s$ : 3 ... 120 sec

**FLAME SENSING**

Minimum flame current: 0,5... 2,5 $\mu$ A (standard 0,5)

Recommended flame current: > 3 times the minimum current

**FUSING**

Internal: 4A fast

External: 3.15A fast or less depending on the electrical loads. This fuse protects the device in the event of overloading or short circuits and prevents the intervention of the internal fuse.

**IGNITION**

Ignition voltage: 15 KV at 30 pF load

Repetition rate: 1Hz...25 Hz (standard 25)

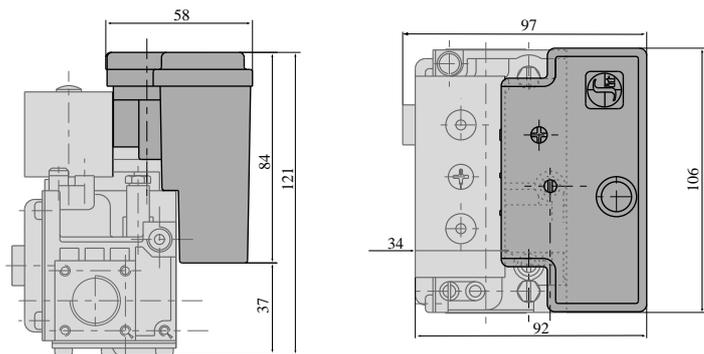
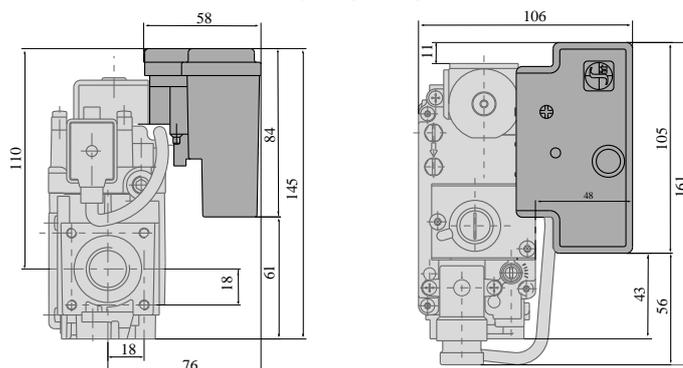
Max. length of the cable: 2 m

Spark gap recommended: 2-4 mm

**MOUNTING**

Integrated on SIT 830, 836 or 837 TANDEM and SIT 822, 826, 827

NOVA multifunctional gas controls.

**DIMENSIONS****TANDEM SERIES****NOVA SERIES**

TECHNICAL  
DATA

## **General notes**

Before installing the 503 EFD read and follow the instructions carefully. Failure to follow the instructions could cause damage to the ignition module or the appliance in which it is installed. Make sure the ratings given in the technical data match the specifications of the appliance.

The person installing or replacing the ignition module must be a qualified technician.

When the installation is complete, make sure that the ignition module operates properly in accordance to the normal operating sequence.

To ensure an optimal life, fit the 503 EFD in a position in which the ambient temperature during operation is as low as possible and in which it is subjected to low heat radiation from the appliance.

To eliminate the effects of electromagnetic interference, the 503 EFD and the ignition electrodes should be mounted in a shielded environment.

## **Installation**

503 EFD is expressly dedicated to be mounted on TANDEM and NOVA series multifunctional gas controls.

The module should be mounted in such a way that it is not subjected to excessive heat, moisture, dust, grease or oil. It also must not be subjected to water or steam cleaning. The control should be mounted and shielded in a way that it will not get wet.

Excessive heat can damage the module and shorten the operating life of the control.

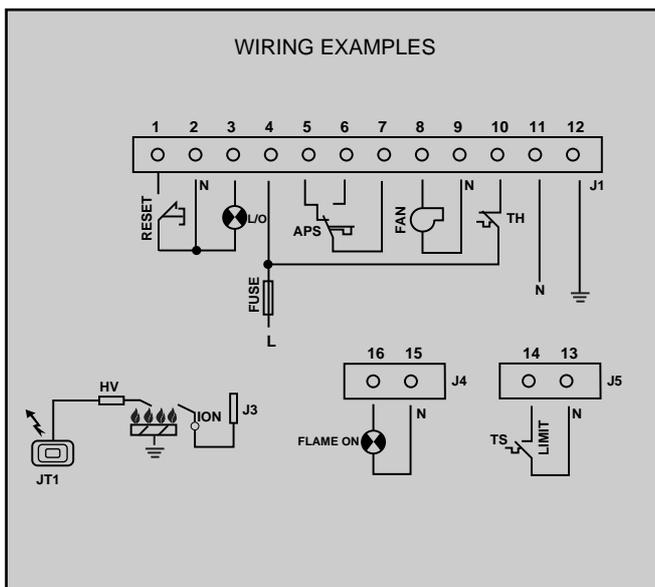
For applications that operate at high temperature, some insulation, shielding and forced air circulation may be necessary to keep the control operating properly.

## Wiring

The module must be mounted close enough to the burner to allow short direct routing of the high voltage cable. Use a suitable high-voltage cable that conforms to the electrical standards. The cable must not run in continuous contact with a metal surface or the spark voltage will be reduced as an effect of the parasitic capacitance.

The necessary connections between the ignition control module and external loads should be made by using thermoplastic insulated wires with a minimum rating of 105°C.

Disconnect power before making any wiring connections to prevent electrical shock or equipment damage.



Refer to the wiring diagram for detailed information on the correct connections.

It is recommended that unit should be protected by an external quick-acting fuse of appropriate ratings to prevent problems due, for example, to short circuit or faulty loads.

Note that a good connection is required between the burner and the ground terminal on the control module if correct operation is to be obtained.

High voltage electrodes should be

mounted at the burner with a spark gap set according to the electrical specification data.

## Flame check

The minimum flame ionization current is 0.5  $\mu$ A. For a stable flame detection this ionization current under normal conditions should be higher than 2  $\mu$ A. To measure the ionization current connect a DC microammeter in series with the flame detection probe.

If the flame current is insufficient, check that the flame detection probe is fully in the flame.

Note that the flame detection is affected by the polarity of the connection to the main supply.

For safety reasons, the flame is detected only with the correct line polarity connected to the control. Otherwise the unit will go to lockout at the end of the safety time, even if the burner is lit.

To check the flame signal with single probe unit, short-circuit the microammeter during ignition to prevent the sparks damaging the measuring instrument.

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