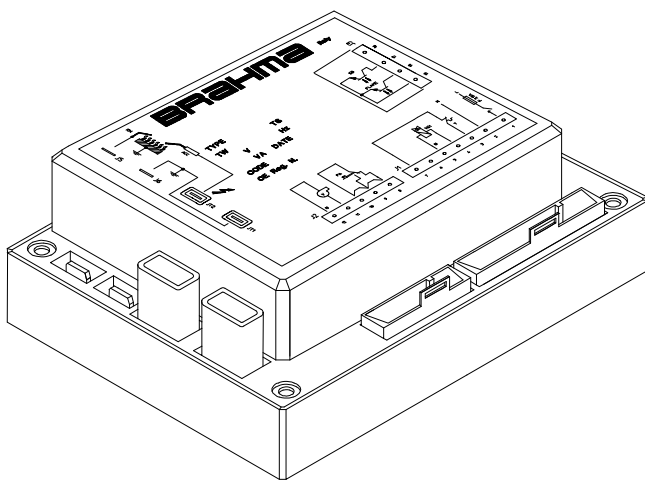


MICROFLAT SERIES
TYPES CM11F/O CE11F/O
CM31F/O CE31F/O

AUTOMATIC CONTROL SYSTEMS FOR GAS BURNERS AND INSTALLATIONS WITH OR WITHOUT FAN, WITH BUILT-IN E.M.C. FILTER AND OPTOISOLATORS



Application

This range of electronic gas burner control systems has been specifically designed for atmospheric burners for intermittent operation (systems for non-permanent operation), with or without fan in the combustion circuit. The control units type CM11F/O and CM31F/O are provided with **non-volatile** lockout, which means that a restart from the safety shutdown condition can only be accomplished by a manual reset of the system. The control units type CE11F/O and CE31F/O are provided with **volatile** lockout, which means that a restart from the safety shutdown condition can only be accomplished by an interruption of the main power and its subsequent restoration.

The control units of this series are suitable for the connection with electronic control boards, with insulation between the automatic ignition system and the control part at low voltage. As these controls carry out the correct operation of the ignition burner cycle and flame monitoring, they are suitable to transmit the necessary signals for the control part operation by using three optoisolators with insulation of 4KV and clearance and creepage distances of the printed circuit board $\geq 8\text{mm}$ (reinforced isolation). These automatic burner control units are therefore fit to be connected to SELV circuits (Safety Extra Low Voltage, e.g. 24V).

The automatic burner controls of this series are suitable for:

- combi boilers;
- heating boilers;
- warm air generators;
- radiant heaters;
- water heaters.

Thanks to their technical features these controls can be used for the automation of ovens, cookers and in gas firing installations with atmospheric burner in general.

Features

Table 1 shows the main features of this series. Other important features are:

- EC certification (CE Reg. N°63AQ0625) in accordance with Gas Appliance Directives 90/396 and 93/68;
- in accordance with EN 298 (European standard for automatic gas burner control systems and flame detectors);
- completely solid and high efficient inbuilt ignition device with built-in **E.M.C. filter**;
- two independent safety contacts in series on the gas valve output (non-volatile lockout);
- flame monitoring by the retification property of the flame (ionization).

Table 1

	BURNER			OPTIONS			classification code according to EN298 (2)
	single flame	atmospheric without fan	atmospheric with fan	non-volatile lockout	volatile lockout	connectors molex (1)	
CM 11F/O (3)	*	*		*		*	AMCLXN
CM 31F/O	*		*	*		*	FMCLXN
CE 11F/O	*	*			*	*	AMCVXN
CE 31F/O	*		*		*	*	FMCVXN

(1) : Standard connectors are stelvio-stocko type (see Fig.2).

(2) : Flame failure during TS causes spark restoration.

(3) : Type CM11F/O code 37146211 has no safety related waiting time TW.

TECHNICAL DATA

Supply Voltage: 220-240V~ 50-60Hz
 on request: 110-120V~ 50-60Hz
Operating temperature range: -20°C +60°C
Ambient humidity: 95% max at 40°C
Protection degree: IP 00

Times:
 - Prepurge or waiting time * (TW): 1,5 ... 40 s
 - Safety time (TS): 3 ... 120 s
 - Drop out time on running flame failure: < 1 s
 * type CM11F/O code 37146211 has no safety related waiting time TW.

The times given on the burner control label correspond to the values guaranteed. The actual values slightly differ from the values given, pre-purge or waiting time is in fact longer and safety time shorter than their nominal values.

Power consumption, at starting up:

types without burner 10 VA
 types with burner 12 VA

Power consumption, running:

types without burner 7 VA
 type with burner 9 VA

Contact rating:

-Thermostat: 4 A cos φ ≥ 0.4
 -VG1: 0.5 A cos φ ≥ 0.4
 -Fan: 1 A cos φ ≥ 0.4

Max. length of the cables of external components:

1m

Internal fuse rating:

4 A Fast

External fuse rating:

3.15 A Fast

Flame control:

The ionization flame detection device makes use of the rectification property of the flame (ionization).

The ionization flame detector device is not a safe to touch output (no provision with protective impedances).

-Minimum ionization current: 0.5µA
 on request: 1.2µA/2.5µA

-Recommended ionization current: 3 ÷ 5 times the minimum ionization current

-Max. length of the cable: 1m

-Minimum insulation resistance of the cable and the flame detection device to earth: ≥ 50MΩ

-Max. parasitic capacitance of the detection probe: ≤ 1nF

-Max. short circuit current: < 200µA AC

Ignitor:

-Peak ignition voltage: 15 KV at 30pF loading
 on request: 12/18 KV

-Peak current: 800 mA

-Spark repetition rate: 25 Hz
 on request: 1 ... 8/10/12/16 Hz

-Max.length of the cable: 2 m

-Spark gap recommended: 2-4 mm

-Consumption: 2,5 VA

-Spark energy: 20 mJ

Optoisolators (current rating):

-flame detection: 5mA ± 20%

-lockout signal: 5mA ± 20%

-reset: 50mA ± 20%

Weight: 170 g

CONSTRUCTION

The enclosure made of plastic material and the varnishing of the circuit board protect the control from mechanical damages, dust and dirt from the conditions of installation.

Through the use of a board assembled with surface mounted components and of a new **patented** circuit generating the ignition spark which limits the EM to a minimum, it has been possible to reduce the printed circuit board dimensions and to realize even the most complex executions with extremely compact dimensions.

A varistor protects the control from voltage transients on the main supply, caused for example by discharges such

as thunderbolts. An internal fuse protects the relays of the control box in case of short circuits on the outputs (valves and fan). In any case the control must be protected with a fast blow external fuse suitable to the load connected and never exceeding 3.15 A.

Overall Dimensions

The following figure (Fig. 1) shows the overall dimensions of the controls.

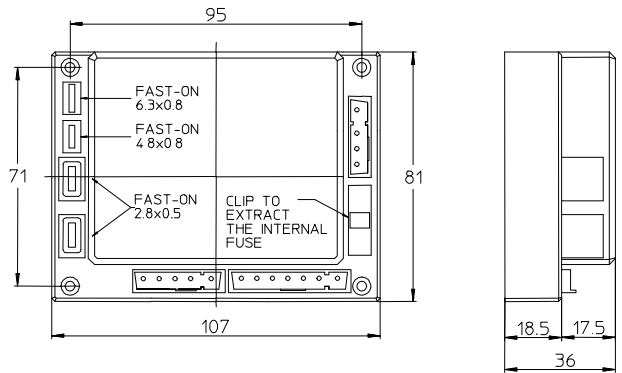


Fig.1

Possible fixing

top: Self-tapping screw UNI 6951AB 2.9x22
 M3x22 screw UNI 6107

bottom: Screwplast self-forming screw ISO0003 F 3.5x13
 Screwplast self-forming screw ISO0003 F 3.9x13

Accessories

The control units are usually supplied with a kit of female connectors (see Fig.2 and Fig.3).

Do not fit terminals and female connectors of different types.

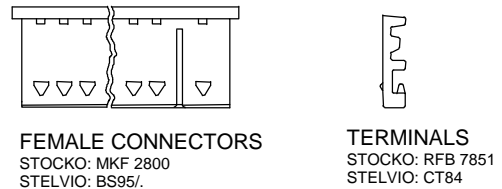


Fig.2

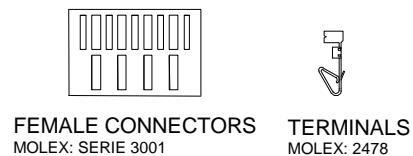


Fig.3

Connection

The use of non-reversible connectors with a different number of poles makes the connection easy and reliable. One-way fast-on connectors of different sizes for ignition and detection electrodes permit their easy installation and replacement.

The dual output ignition device allows spark generation on one point (3a), two points (3b) or between two electrodes isolated from the metal frame of the burner (3c), see Fig.4. The configuration (3c) assures a limited EM emission.

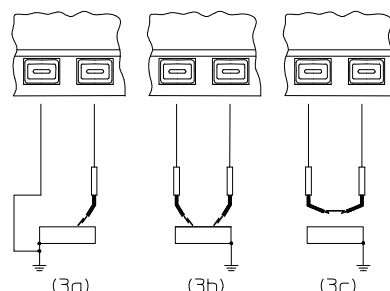


Fig. 4

Provisions such as strain relieves, sufficient earth terminals and neutral terminals should be present in the appliance or in external connection boxes.

DIRECTIONS FOR USE

- For technical and safety reasons a regulation shutdown must occur every 24 hours (systems for non-permanent operation).
- Automatic controls are safety devices and must not be opened. The manufacturer's responsibility and guarantee are invalidated if the control is opened.
- The control must be connected and disconnected only after switching off the main power.
- The control can be mounted in any position.
- Avoid exposing the control unit to dripping water.
- Ventilation and the lowest temperature ensure the longest life of the control.
- Make sure that the type (code and times) you are using is correct before installing or replacing the control.
- The gas appliance on which the control is installed must provide adequate protection against the risk of electrical shock (at least IP20).

Electrical installation

- The applicable national regulation and the European standards (e.g. EN 60335-1/EN 50165) regarding electrical safety must be respected.
- Live and neutral should be connected correctly, a mistake could cause a dangerous situation, i.e. the valves would still be live with the thermostats and limits switched off. If live-neutral polarity is not respected the control performs a non-volatile lockout (or volatile lockout in the types which are provided with) at the end of the safety time at starting up.
- Before starting the system check the cables carefully. Wrong connections can damage the control and compromise the safety.
- The earth terminal of the control, the metal frame of the burner and the earth on the main supply must be well connected.
- Avoid putting the detection cable and SELV signals close to power or ignition cables.
- Use a heat resistant cable for the detection probe, well insulated to the ground and protected from possible moisture (or water in general).
- Use an ignition cable as short and straight as possible and keep it far from other conductors to reduce the emission of interference (max.length <2m and insulation voltage >25KV).

In case of live-neutral network with unearthed neutral or live-live network (with centre of the star not earthed) the control can operate correctly by means of a built-in resistor. In the presence of this kind of network it is advisable to use our isolation transformer type AR1.

In case of "partial" short circuits or bad insulation between phase and earth the voltage on the ionization probe can be reduced until it causes the lockout of the control, because of the impossibility of detecting the flame signal.

Checking at start

Always check the control before the first start and also after any replacement or a long period of non-operation of the system. Before any ignition attempt make sure that the combustion chamber is free from gas.

Then make sure that:

- if the starting attempt occurs without gas supply the control performs a non-volatile lockout (or volatile lockout in the types which are provided with) after TS;
- when stopping the gas flow while the control is in running state the supply to the gas valve is interrupted within 1 second, and after a recycling the control proceeds to a non-volatile lockout (or volatile lockout in the type which are provided with);
- operating times and sequence are suitable;

- the level of the flame signal is sufficient, see Fig.5 for the measuring test;
- the ignition probe(s) is (are) adjusted in the most stable way for a spark gap between 2-4 mm;
- the intervention of limiters or safety devices causes a safety shutdown according to the application.

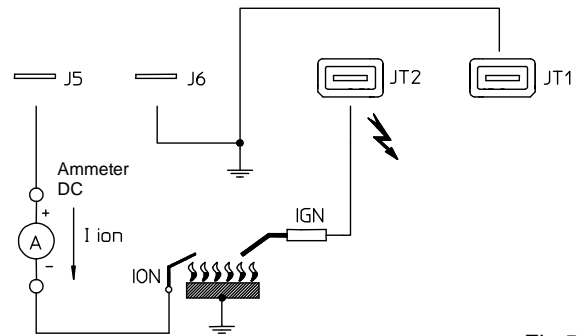


Fig.5

Operation

At every start the control unit proceeds to a self-checking of its own components. During the waiting or prepurge time (TW) the operation of the flame signal amplifier is checked. A parasitic flame signal or a fault in the amplifier leading to the same condition prevent the control from starting.

In the types with fan control, before the elapsing of the prepurge time, the air pressure switch contacts are checked to prove their "no air flow" state.

Only if the test is positive the fan is started and with the air pressure switch in "air flow" state the prepurge time begins. In the types provided with volatile lockout the lockout signal output is supplied during TW.

At the end of the waiting or prepurge time the VG1 gas valve is energized and the ignition device is operated. In this way the safety time (TS) begins. If the presence of flame is detected during the safety time the ignition device is inhibited and the flame signal output is supplied.

On the contrary, if the control detects no presence of flame by the end of TS, it proceeds to non-volatile lockout (or volatile lockout in the types which are provided with), the VG1 gas valve and the ignition device are switched off while the lockout signal output is supplied.

Flame failure during the safety time causes the ignition device to be activated within one second.

The attached diagrams are useful to understand how each control operates.

Reset of the control

When a control has gone to non-volatile lockout, a ten-second delay should be allowed before attempting to reset the control unit; if this time is not observed the control may not reset correctly.

In case of volatile lockout, the restart from the safety shutdown condition can only be accomplished by an interruption of the main power and its subsequent restoration.

The volatile lockout models are not provided with any independent manual reset function. The application of these types of controls is therefore restricted to only those appliances where resetting by switching off the heat demand is allowed by European standards.

In general, the reset of the appliance must occur in sight and in the near vicinity of the appliance. Resetting must also occur by means of a conscious manual action and not by means of automatic device such as thermostats or timers.

Please note that it is allowed to combine the reset button together with the main switch on the appliance. In this case an alarm light will have to be installed too.

For example, Fig.6 shows the connection between a CM11F/O control device. For more information about the correct application of these controls, please contact our technical department.

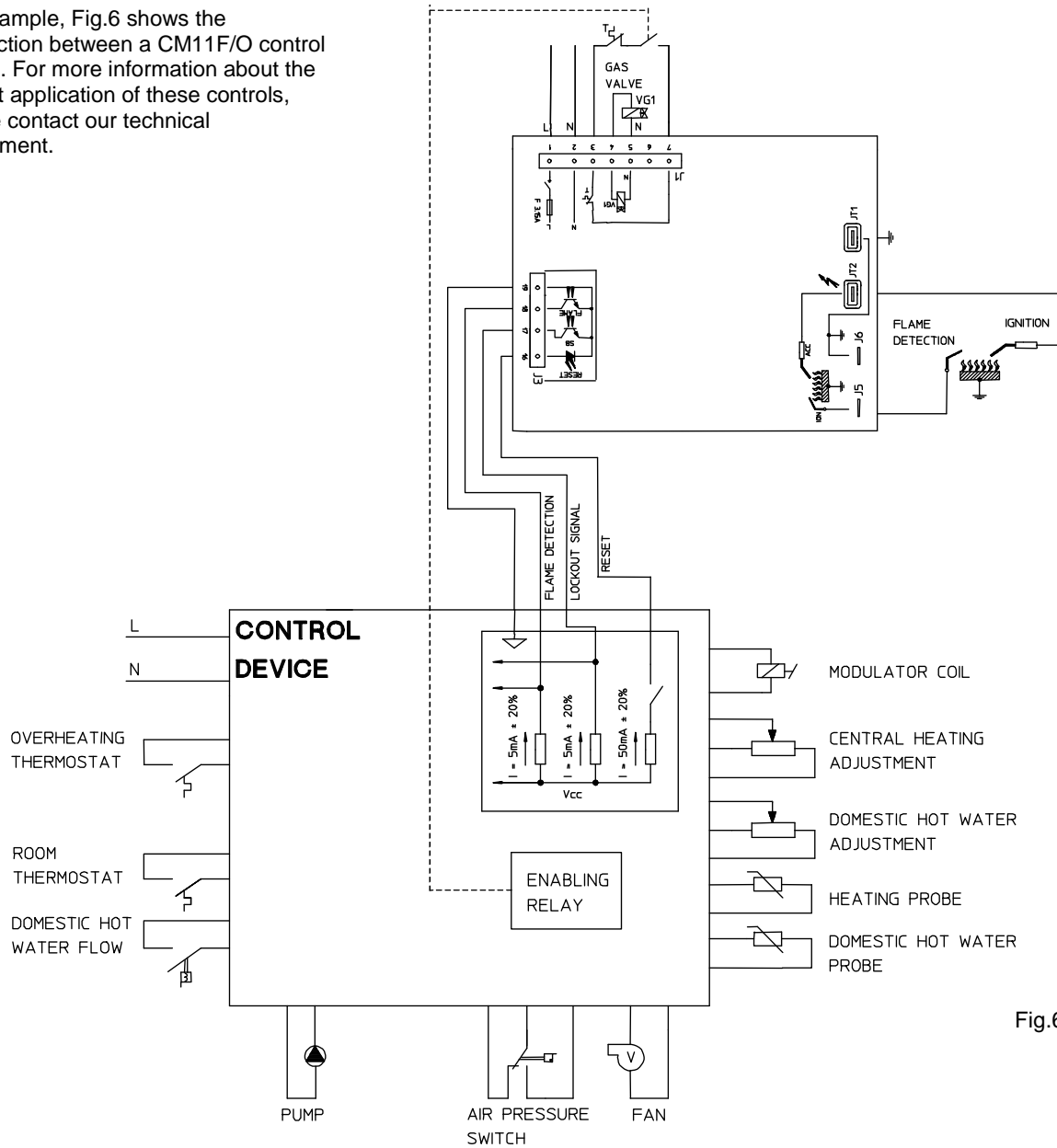
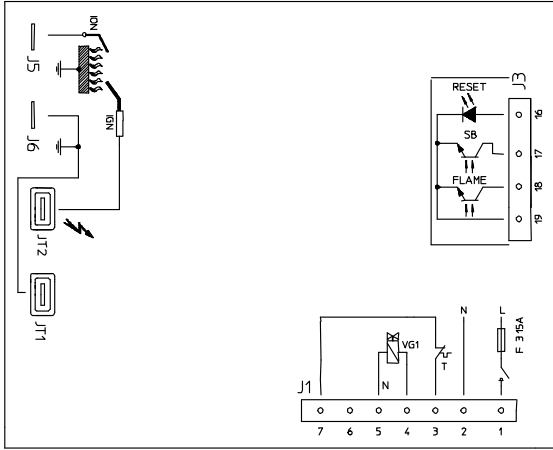


Fig.6

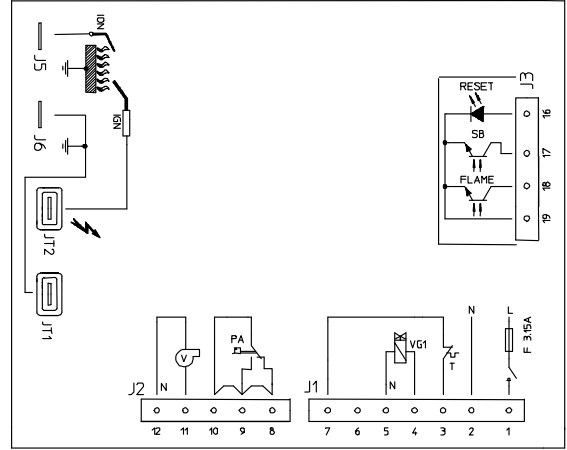
CONTROLS DENOMINATION

Type	Options
<p>C — Manual reset</p> <p>E — Electrical reset</p> <p>1 — Without fan</p> <p>3 — With fan</p> <p>Example: CM31F/O OPT.XF 16</p> <p>Type M: manual reset</p> <p>3 with fan</p> <p>Options X: molex connectors</p> <p>F: accessible internal fuse</p> <p>15: 15 KV standard</p> <p>16: 16 Hz discharge frequency</p>	<p>— Spark repetition rate</p> <p>— : 25 Hz standard</p> <p>— nn: shows discharge frequency</p> <p>— Ignition voltage</p> <p>— : 15 KV standard</p> <p>H: 18 KV</p> <p>L: 12 KV</p> <p>F: Accessible internal fuse</p> <p>— : Stocko-stelvio connectors</p> <p>X: Molex connectors</p>

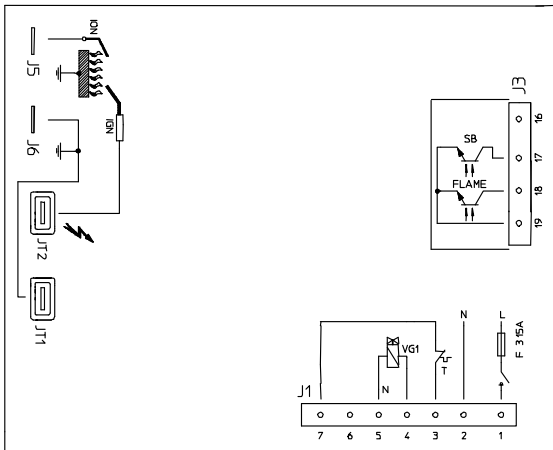
CONNECTION DIAGRAMS



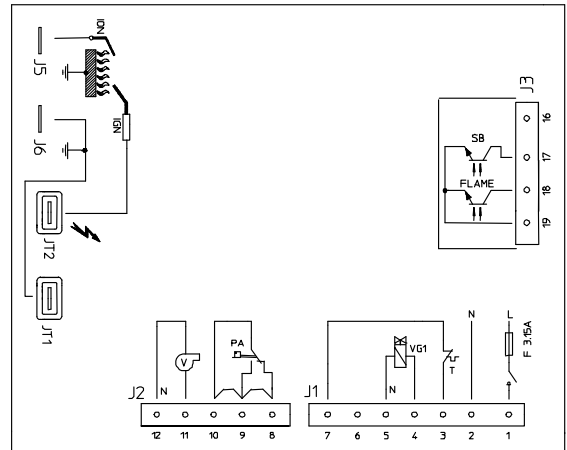
TYPE CM11F/O



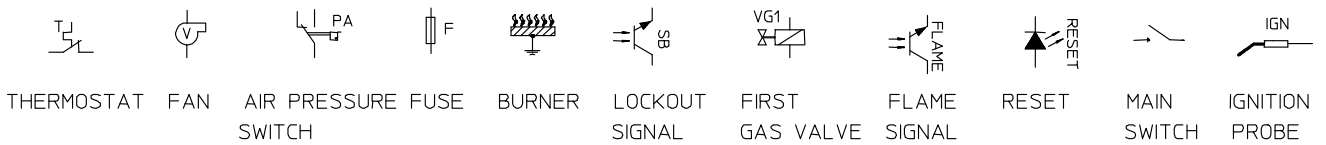
TYPE CM31F/O



TYPE CE11F/O

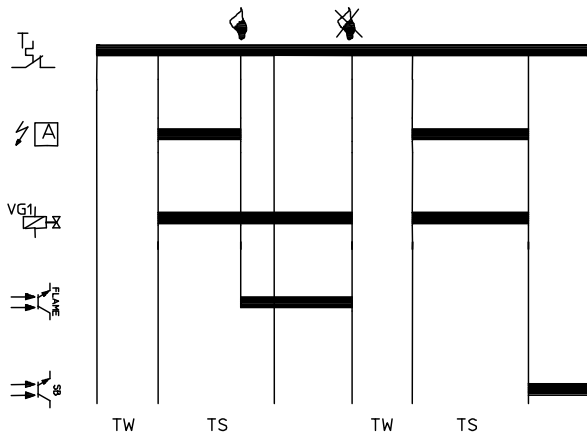


TYPE CE31F/O



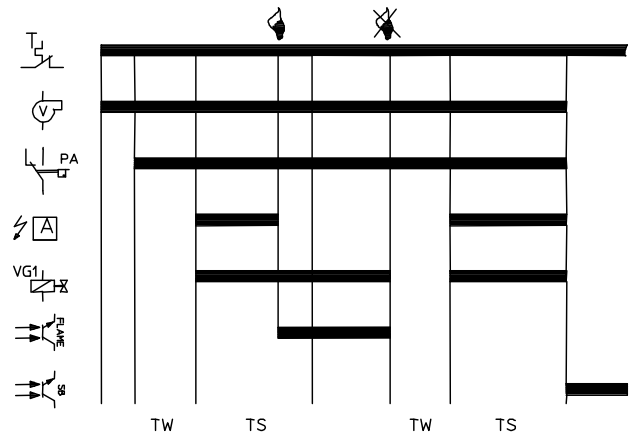
NOTE: the limit thermostat has to be wired in series to the live.

OPERATING CYCLES

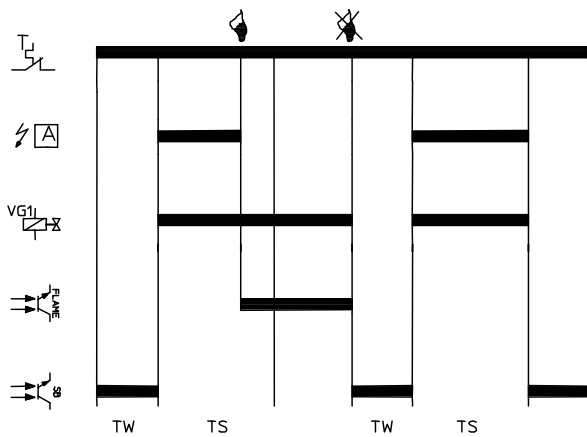


TYPE CM11F/O

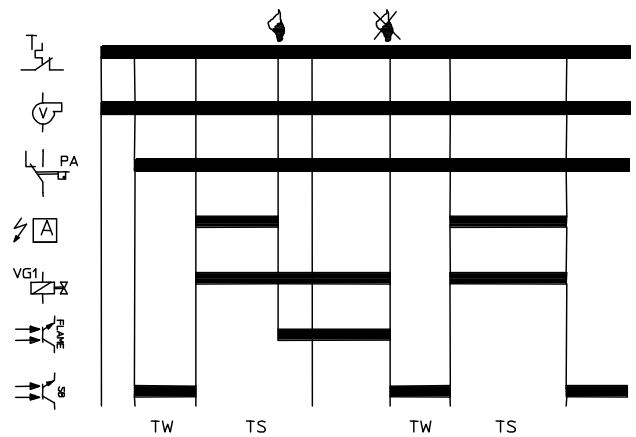
Type CM11F/O code 37146211 has no safety-related waiting time TW



TYPE CM31F/O



TYPE CE11F/O



TYPE CE31F/O



ATTENTION -> Company Brahma S.p.A. takes no responsibility for any damage resulting from Customer's tampering with the device.

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

2011/06/07 subject to amendments without notice