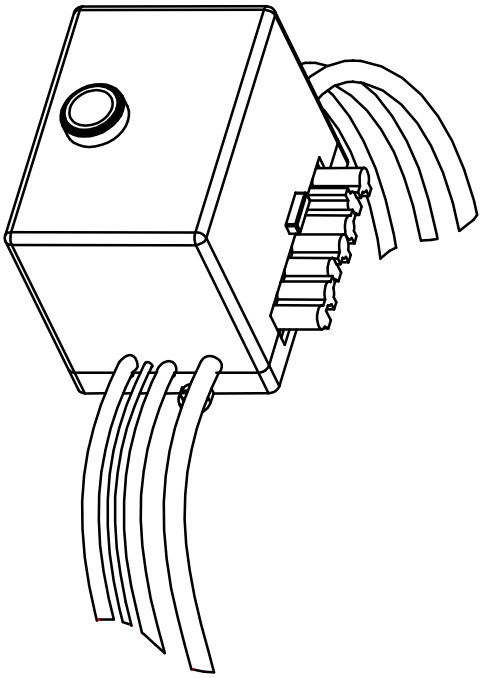
OIL-SYSTEM SERIES
TYPES OS. OS./..

AUTOMATIC OIL BURNER CONTROLS



APPLICATION

This range of electronic oil burner controls has been specifically designed for oil burners for non permanent operation.

The automatic burner controls of this series are suitable for:

- monobloc oil burners;
- warm air generators;
- steam boilers;
- power washers;
- kilns.

Due to the technical and structural characteristics and to the variety of models they can be used for the automation of cookers and oil burner operated appliances for domestic and industrial applications.

FEATURES

TABLE 1 shows the main features of this series.

Other important features are:

- in accordance with the European standard concerning monobloc oil burners and control systems DIN EN230: 1991-05. The DIN registration numbers relevant to this series of devices are the following:
  - basic type OS1and derived models **DIN 5F157/03**
  - basic type OS2 and derived models **DIN 5F158/03**
- flame detection also by UV sensor types FD1 and FD2;
- types OS1 and OS2 (only if TV = 20s and TS = 5s) are also in compliance with the standard DIN 4794 part 2, edition December 1980, for warm air generators (WLE);
- two independent safety contacts in series to oil valve outputs;
- electrical service life at max load >250.000 operations;
- simple wiring and installation.

TABLE 1

	single flame	dual flame	pre-heater	fuel throughput < 30kg/h	fuel throughput > 30kg/h	WLE	flame detectors : FC11/. FC13/. FC14/.	remote reset on the 7 poles connector	remote lockout signal and reset
OS1	*		(1)	*		*	*	(1)	(1)
OS2		*	(1)		*	*	*	(1)	

(1) see “CONTROLS DENOMINATION”.

TECHNICAL DATA

Supply Voltage:	220-240V~ 50-60Hz
on request :	110-120V~ 50-60Hz
Operating temperature range:	-20℃ +60℃
Ambient humidity:	95% max at 40℃
Protection degree:	IP 40
Times	
- Prepurge time **(TV):**	1,5/10/20/30/40 s
- Safety time **(TS):**	5/10 s
- Dropout time on running flame failure:	< 1s

The times given on the burner control label correspond to the values guaranteed. The actual values differ slightly from the values given, as prepurge time can be longer and safety time shorter than their nominal values.

Power consumption:	8 VA
Contact rating:	I max
- Thermostat:	6,0 A cosφ >0,4
- Motor:	2,0 A cosφ >0,4
- Ignition transformer:	2,0 A cosφ >0,4
- EV1:	0,5 A cosφ >0,4
- EV2:	0,5 A cosφ >0,4
- Pre-heater:	0,5 A cosφ =1,0
- External EV1 signal	0.5A cosφ =1.0
- External lockout signal:	1,0 A cosφ =1,0
Internal fuse rating:	6,3 A slow blow
External fuse rating:	4,0 A quick acting
Weight:	360 g

CONTROLS FOR SPECIAL APPLICATIONS

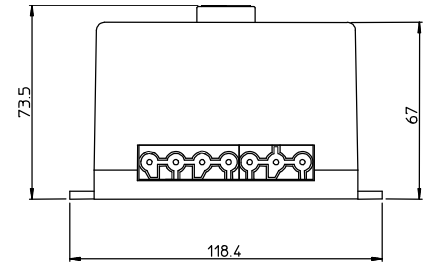
On request it is possible to meet special requirements concerning times and operating cycles.

CONSTRUCTION

The particular construction and the use of surface mounted components enable to have reduced overall dimensions.
The enclosure made of plastic material protects the control from possible damages resulting from crashes, incautious opening, dust and contact with the external environment.
A varistor protects the control from voltage transients on the electric network. An inbuilt fuse protects the internal relays of the control box in case of short circuit on the outputs (valves, ignition transformer, motor and lockout signal).

OVERALL DIMENSIONS

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



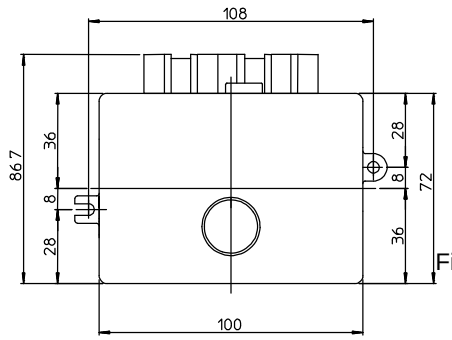


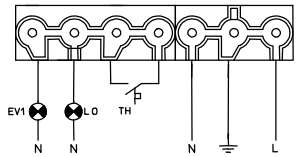
Fig. 1

CONNECTION

The connections of live, neutral, earth, valve signal, external lockout signal and thermostat or remote reset are carried out by a 7 poles connector (for the wiring diagrams see Fig. 2-3). The connections of motor, valves, pre-heater and flame detector are carried out by cables outgoing from the integrated control (see Fig.4).

- Wiring diagram for all versions without option /R

Fig. 2



- Wiring diagram for all versions with option /R

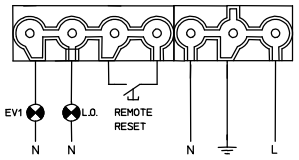


Fig. 3

The two outputs marked by a lamp symbol indicate the first valve (EV1) opening external signals and the lockout signal (L.O.). The thermal contact symbol in Fig.2 corresponds to the ambient thermostat (TH) connection, whereas the push-button symbol in Fig.3 indicates the remote reset connection.
L-N and the earth symbol indicate the control box power supply.

- Cable output description

Followings are the possible cable outputs of the Oil-System series (see Fig.4):

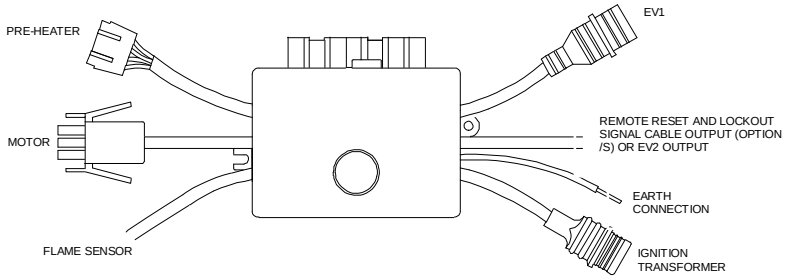


Fig.4

ACCESSORIES

The following data are useful to choose the most suitable flame detector for the application and the control box used.

- **All versions without flame detectors option /B (see Fig. 5)**

front and lateral side	FC11/R 1,5..6,5 lux
	FC11/A 1,5..3,0 lux
front and lateral side	FC13/R 1,5..6,5 lux
	FC13/A 1,5..3,0 lux
front and lateral side	FC14/R 1,5..6,5 lux
	FC14/A 1,5..3,0 lux

The suffix indicates the colour of the flame detector enclosure:

/R	red
/A	blue

The following figure (Fig.5) shows the types and fixing systems of the available flame detectors.
To fix the flame detector FC11,screws with diameter 4 mm are suggested.
The flame detector type FC14, unlike the other types, can be disconnected thanks to a fast-on connector which can be fitted to a Brahma plug (see Fig.5).

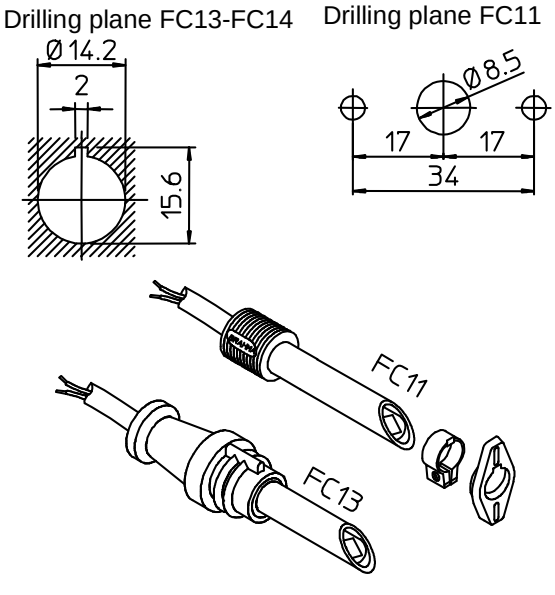


Fig. 5

- **All versions with option /B**	**flame detectors (see Fig. 6)**
front side	FD1
lateral side	FD2

For blue flame burners, FD1 and FD2 flame detectors are suitable to detect ultraviolet light (spectral field from 290 nm to 350 nm).
To fix the flame detector FD1 - FD2, screws with diameter 4 are suggested.

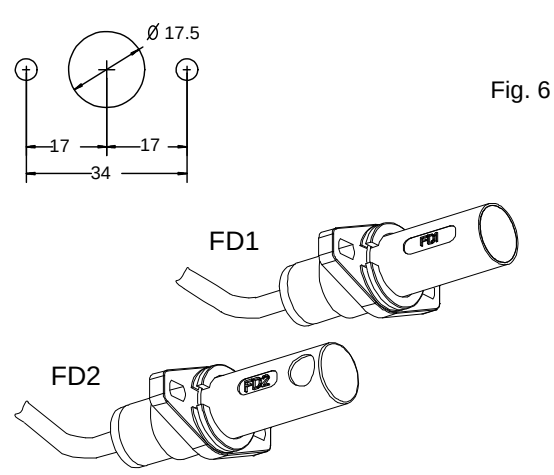


Fig. 6

Pre-heater cable
Length out of housing: 280 mm.
Termination: 4 poles connector AMP cod. 926728-1 with 2.8x0.8 female fast-on cod. 160655-2 (see Fig.7).

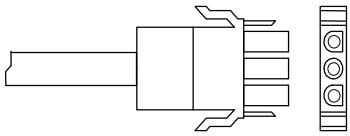


Fig.7

Motor cable

Length out of housing: 190 mm.
Termination: 3 poles connector (see Fig. 8).

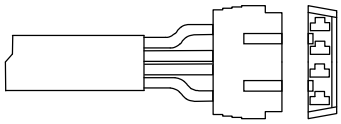


Fig. 8

Flame detectors cable
Length out of housing: 130 mm.
Termination: flame detector types FC11/. – FC13/. (see Fig. 5).

Flame detectors cable with plug
Length out of housing: 130 mm.
Termination: die-cast plug for flame detector type FC14/. (see Fig. 5).

U.V. sensor cable
Length out of housing: 130 mm.
Termination: flame detector types FD1 – FD2 (see Fig. 6).

Valves cable
Length out of housing: 300 mm.
Termination: rectangular die-cast plug type F84 (see Fig. 9).

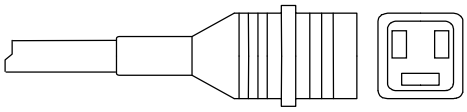


Fig. 9

Ignition transformer cable
Length out of housing: 380 mm.
Termination: triangular die-cast plug type SP1 (see Fig.10).

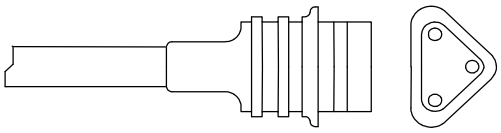


Fig.10

Grounding cable
Length out of housing: 50 mm.
Termination: 5.2 mm internal diameter ring tongue terminal

Wiring options
The lengths of the cables and terminations used can be changed on customer's request.

Ignition transformer
The ignition transformers which can be used are the Brahma types belonging to the TC… series fitted with plug, type TC…PAF and TC…PSF, performing intermittent operation (50% duty cycle) and permanent operation, respectively, and incorporating an inbuilt E.M.C. filter.

DIRECTIONS FOR USE

- Automatic controls are safety devices and must not be opened. The manufacturer's responsibility and guarantee are invalidated if the control is incautiously opened.
- For safety reasons a regulation shutdown must occur every 24 hours (systems for non permanent operation).
- The control can be connected and disconnected only without the main power.
- The control can be mounted in any position.
- Avoid exposing the control 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.

ELECTRICAL INSTALLATION

- The applicable national and 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, as the internal safety devices can be ineffective in case the connecting wires of thermostats and valves are not isolated.
- Before starting the control unit check the cables carefully. Wrong connections can damage the control and compromise the safety of the application.
- The earth wire of the control, the metal frame of the burner and the earth of the electric system must be well connected.
- Avoid putting detection cables close to power or ignition cables.
- Protect the control with a quick acting fuse suitable to the load connected and never exceeding 4A.
- The appliance in which the control is installed must provide adequate protection against the risk of electrical shock.

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 oil.
Then make sure that:

- if the starting attempt occurs with the flame detector obscured, the control performs a lockout after safety time;
- if start up takes place with extraneous light, the control performs a lockout within 10 seconds;
- when the flame detector is obscured in running position, supply to the oil valves is interrupted within 1 second and after a recycling the control proceeds to lockout;
- the intervention of limiters or safety devices causes a safety shutdown according to the application;
- operating times and sequence are suitable to the control unit used.

On switching off of the ambient thermostat or boiler thermostat, the control unit supplies the burner motor and the ignition transformer and proceeds to a self-checking of its own components. During prepurge time TV the internal circuit makes a test of the flame signal amplifier circuit. Extraneous light signal or a fault in the amplifier leading to the same condition cause the lockout of the control within 10 seconds.
At the end of prepurge time TV the control output of the first oil valve is energized; if a flame signal is detected at the end of safety time TS, the control unit deenergizes the ignition transformer and goes to running position.
At the end of safety time TS, in the controls with two flame stages the ignition transformer is deenergized and the second oil valve is supplied. If no flame signal is detected during safety time TS, the control goes to lockout, the control outputs of the valves, the ignition transformer and the burner motor are switched off while the lockout signals are supplied.
The controls prearranged for the use of an oil pre-heater supply the pre-heater when the ambient thermostat or the boiler thermostat switch off. In this way, the starting sequence begins after switching off of the pre-heater thermostat.
In types OS1/Z., the switching on of the pre-heater thermostat does not cause the burner shutdown; if the pre-heater is used with types OS./.P., the switching on of the pre-heater thermostat causes the repetition of the starting sequence after the heating stage (RISC) of the pre-heater.
The attached operating cycles are useful to understand how each control operates.

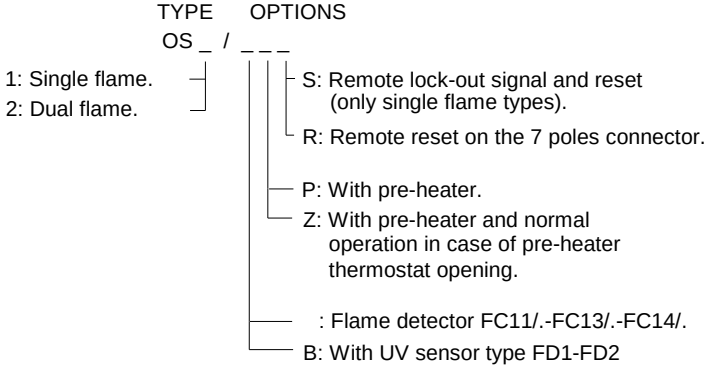
Abnormal operation - Extraneous light

All control units of this series perform a lockout within 10 seconds.

RESET OF THE CONTROL

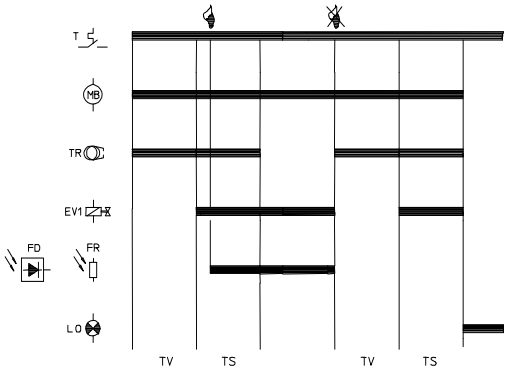
When a control has gone to lockout, a delay of 10 seconds should be considered before attempting to reset the control unit; if this time is not observed the control may not reset.

CONTROLS DENOMINATION

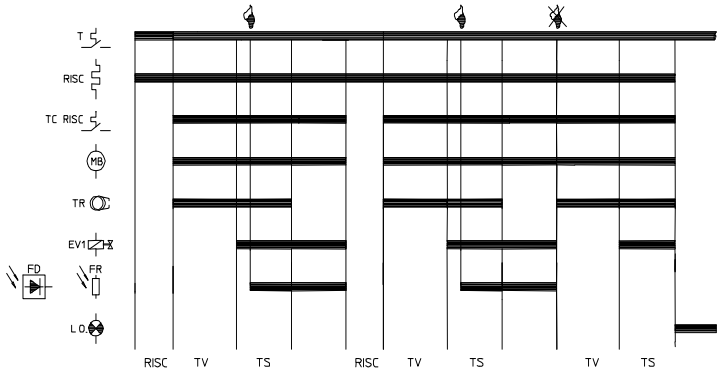


Note: All versions of the Oil-System series are available with 5 wire pre-heater connection on customer's request.

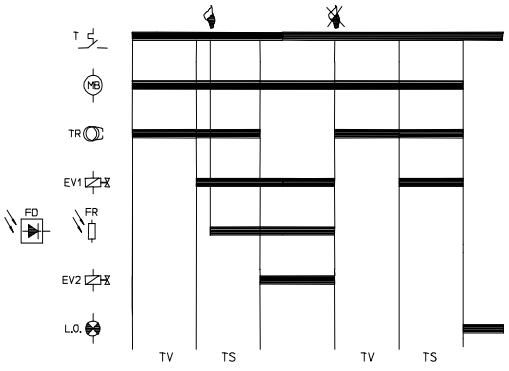
OPERATION CYCLES



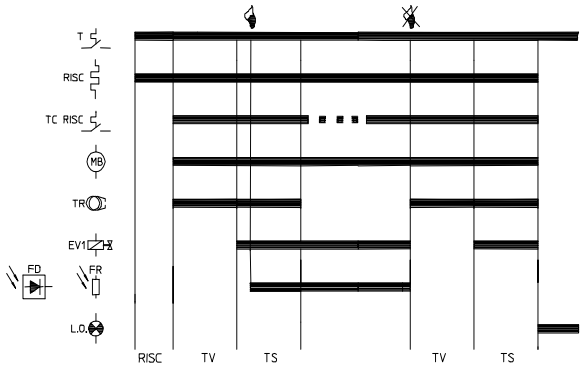
TYPES OS1 OS1/S OS1/R OS1/B OS1/BS OS1/BR



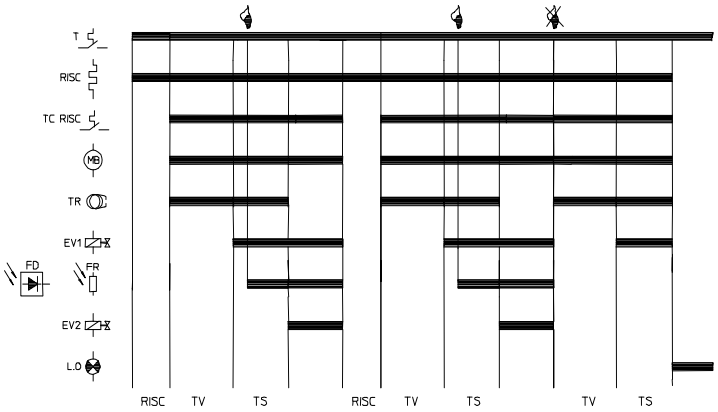
TYPES OS1/P OS1/PS OS1/PR OS1/BP OS1/BPS OS1/BPR



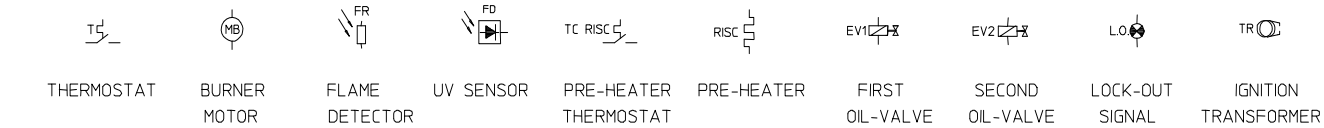
TYPES OS2 OS2/R OS2/B OS2/BR



TYPES OS1/Z OS1/ZS OS1/ZR OS1/BZ OS1/BZS OS1/BZR



TYPES OS2/P OS2/PR OS2/BP OS2/BPR



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

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