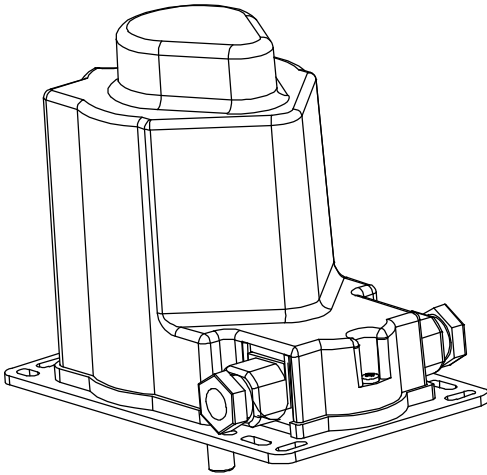


## AIR DAMPER MOTOR

**GENERAL DESCRIPTION**

The RH series air damper motor, like others of the same type, is useful to automate the opening of an air damper in oil, gas or mixed-fuel monobloc burners. Since this product has a general application, it can well be used with the following control units:

- Euro-Oil series types GF2... and OR2...;
- EMG series type MF2;
- Eurogas series type VM42;
- Euroflat series type CM32;
- Eurogas series digital control unit type MPI.

For the electrical, mechanical and operation characteristics of the above-mentioned control units, please refer to the relevant data sheets on our web site [www.brahma.it](http://www.brahma.it).

As for the ignition and flame monitoring device to be used in connection with this servo control, the internal configuration of the latter one varies as described hereunder:

- Air damper fitted to control units type GF2, OR2, CM32, MF2, VM42

The servo control is equipped with three microswitches operated by respective cams coupled to the driving shaft, having the following functions:

- a) positioning of the air damper for the burner first stage start-up;
- b) max. opening positioning;
- c) second stage control.

When no demand occurs, the air damper is in first stage ventilation position.

- Air damper fitted to MPI control unit

In case of operation with the above-mentioned control unit, the air damper is equipped with four microswitches operated by respective cams coupled to the driving shaft, having the following functions:

- a) positioning of the air damper for the burner first stage start-up;
- b) max. opening positioning;
- c) full closing positioning;
- d) second stage control.

When no demand occurs, the air damper is in fully closed position. A feedback is also available, through which the MPI control unit detects that the position requested to the servo control has been reached.

**GENERAL CHARACTERISTICS**

Followings are the main features of the servomotor:

- Protective casing made of plastic material;
- Synchronous motor with two running directions, with a rotation speed depending on the supply voltage frequency and not on the load;
- Manual adjustment of the switching point of the various microswitches controlled by the respective cams.

## TECHNICAL DATA

### • Electrical

Supply voltage:	230Vac ±10% on request 110Vac ±10%
Supply voltage frequency:	50/60Hz (*)
Power consumption:	7.5VA
Operating temperature:	0°C ÷ 60°C
Humidity:	< 95%
Protection degree:	IP40
Cable input:	2 core hitches in PG9 format; reducing adapter from PG13,5 to PG9 on demand
Cable connection:	screw terminal board for cables with a section between 0.5 and 2.5 mm <sup>2</sup>
No. of auxiliary switches:	1
Capacity of aux. switches:	250Vac - 2A

(\*) With a supply frequency of 60Hz, the motor rotation speed increases of 20%, therefore switching times turn out to be shorter (7.5s ⇒ 6.25s - 15s ⇒ 12.5s).

### • Mechanical

Dimensions:	85x142x116mm
Weight:	550g approx.
Base and cover material:	30% fibreglass-added nylon
Cams material:	30% fibreglass-added PA6
Rotation direction:	clockwise or anticlockwise (with the driving shaft of the servo control in front view)
Max. torque:	2Nm
Microswitch activation:	via cams
Limit switch number:	2 or 3
Driving shaft:	see paragraph "Mechanical dimensions"
Max. opening angle:	150°
Switching time:	7.5s for 90° or optionally 15s for 90°
Fixing:	see paragraph "Mechanical dimensions"

## DIRECTIONS FOR INSTALLATION

- The applicable national and European standards regarding electrical safety (e.g. EN 60335-1/EN60730-1/EN50165) should be respected.
- Respect live and neutral; the non-observance of live-neutral polarity may cause dangerous situations.
- Before starting the system check the cables carefully: incorrect wiring can damage the device and compromise the safety of the installation.
- Adjustment (calibration of the switching angles of the cams) and/or maintenance operations should be carried out by skilled technical staff only; in fact, once the protection cover has been removed, you may come into contact with energized parts.
- The system can be mounted in any position.
- Make sure the device is well connected to the earthing system through the appropriate tongue for 6.3x0.8 mm fast-on terminal.
- Avoid exposing the servo control to dripping water, moisture or ice production.

## OPERATING CYCLE

### Setting the switching angles of the cams on the microswitches

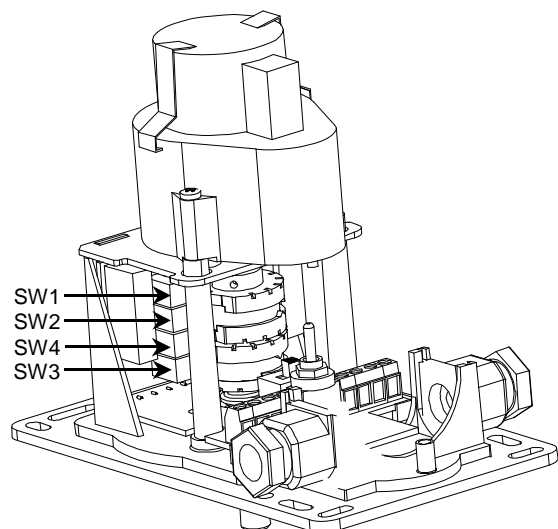
The operations described hereunder should be carried out by skilled technical staff only; in fact, the servomotor is powered, and it is therefore advisable to be careful in order to avoid any accidental contact with energized parts.

With reference to the figures below, the microswitches, operated by the respective cams, have the following functions, regardless of the rotation direction of the driving shaft:

- Air damper fitted to Euro-Oil series control unit
  - SW1: max. opening position limit switch;
  - SW2: 1<sup>st</sup> stage ventilation limit switch;
  - SW3: 2<sup>nd</sup> stage starting/stopping.
- Air damper fitted to MPI control unit
  - SW1: max. opening position limit switch;
  - SW2: fully closed position limit switch;
  - SW4: 1<sup>st</sup> stage ventilation limit switch;
  - SW3: 2<sup>nd</sup> stage starting/stopping.

In order to determine the switching point of the various microswitches, after removing the protection cover, switch the AUTO/MAN (SW5) selector to MAN position, then act on the SW6 bistable switch to rotate the driving shaft in one direction or in the opposite one, if necessary. In order to set the switching point of the cam, position the cam index on the required operation angle appearing on the graduate scale. The cam should be positioned by inserting a small slotted screwdriver into the grooves on the cam body. Once the calibration operations have been accomplished, switch the AUTO/MAN (SW5) selector back to AUTO position, in order for the servo control to be in operating status towards the control unit it is fitted to, and then restore the protection cover.

In case a manual starting of the driving shaft is not required (setting of the device switching angles only), it is not necessary to switch the SW5 selector from AUTO to MAN position; in addition, we recommend disconnecting the servo control from the power supply line in order to avoid any accidental contact with energized parts.

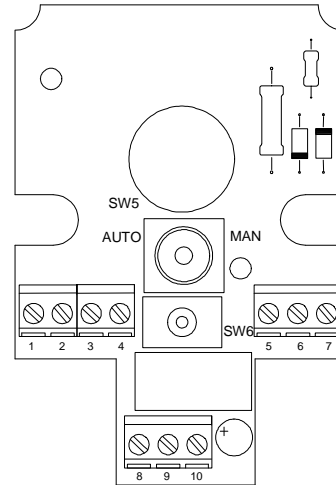


**Operation in connection with MPI control unit**

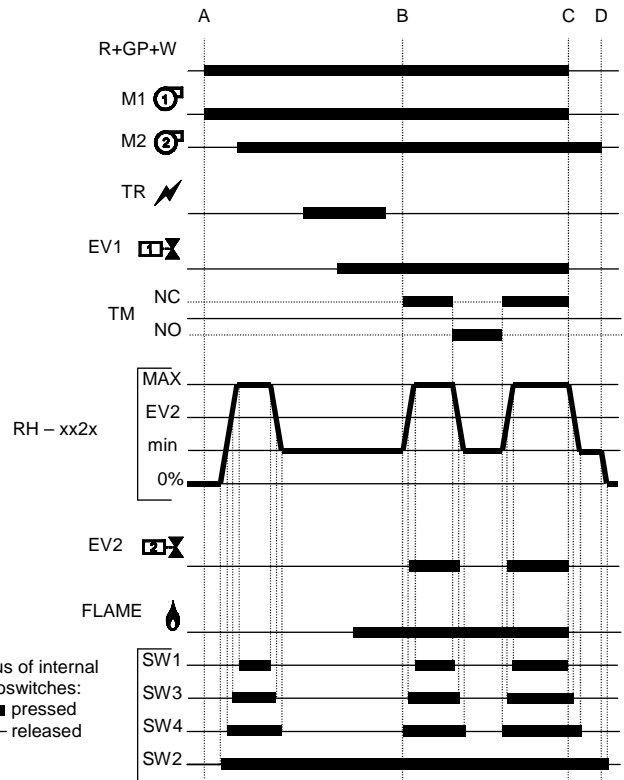
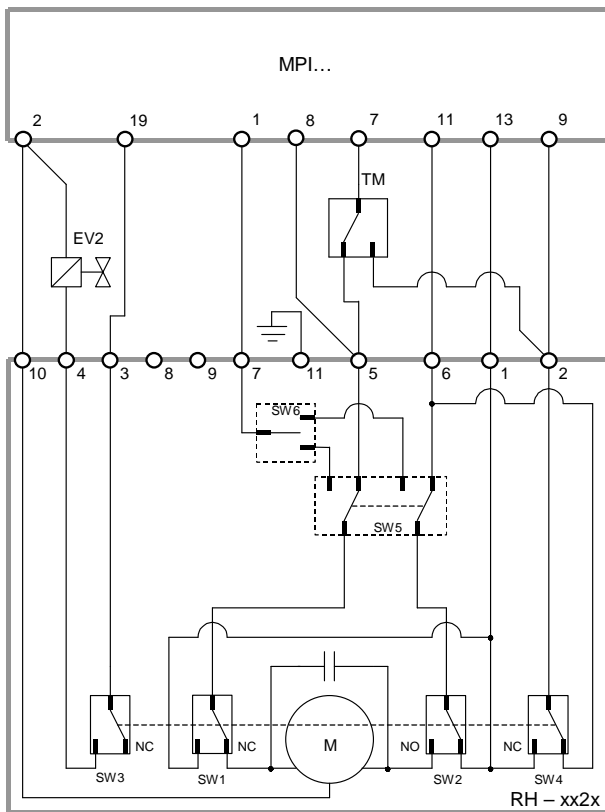
When the burner is in no-heat-demand (stand-by) status, the servomotor is in closed position (0°). On closing of the thermostats connected to the MPI control unit, the line connected to terminal 5 of the servomotor is activated, and the driving shaft starts rotating until it reaches the max. opening position, after which the motor stops automatically. The air damper remains in this condition for the whole ventilation time  $t_1$  of the MPI controller.

At the end of the above-mentioned time, the air damper switches to the min. air flow position for the 1<sup>st</sup> stage, after the activation of the line connected to terminal 2 by the MPI control unit; once the position has been reached the motor stops automatically.

If a flame signal is detected at the end of the ignition sequence, this operation status persists until the MPI controller activates its own line called LR; otherwise, the air damper switches back to fully closed position (non-volatile lockout of the MPI with activation of the line connected to terminal 6 of the air damper). In case the MPI activates the LR line, the operation of the servomotor is dependent on the type of modulation thermostat available in the final application as illustrated below. The reaching of the required position is signalled by the air damper to the control unit through the activation of the line connected to terminal 1 of the servomotor itself.



**Two-stage operation burner with two-wire control**  
RH air damper with internal wiring diagram no. 2



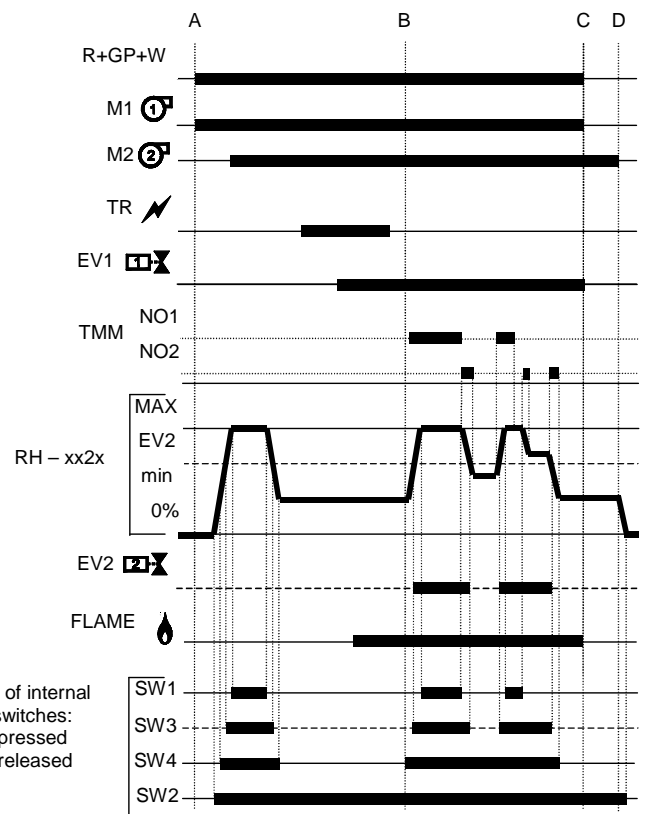
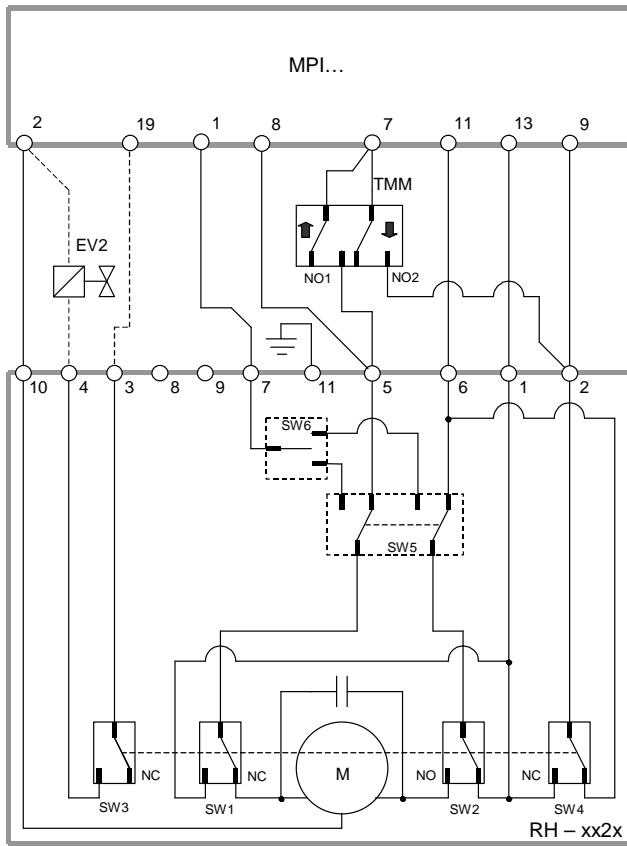
N.B. In the above diagram, the servomotor is in fully closed position (0°).

Key to symbols:

R+GP+W demand signals (various thermostats)  
M1 – M2 motor 1 and motor 2  
TR ignition transformer  
EV1 1<sup>st</sup> stage solenoid valve  
TM modulation thermostat type SPDT  
RH – xx2x air damper  
0%: fully closed position  
min: 1<sup>st</sup> stage air flow position  
EV2: 2<sup>nd</sup> stage ignition contact  
MAX: max. opening position  
EV2 2<sup>nd</sup> stage solenoid valve

NO normally open contact  
NC normally closed contact  
RH terminal 11 6.3x0.8 male fast-on  
A burner ignition cycle start-up  
A – B burner ignition cycle  
B – C burner in running status  
C heat demand end  
C – D air damper closing time  
D burner control unit cycle end;  
ready for a new heat demand

**Modulating operation burner**  
RH air damper with internal wiring diagram no. 2



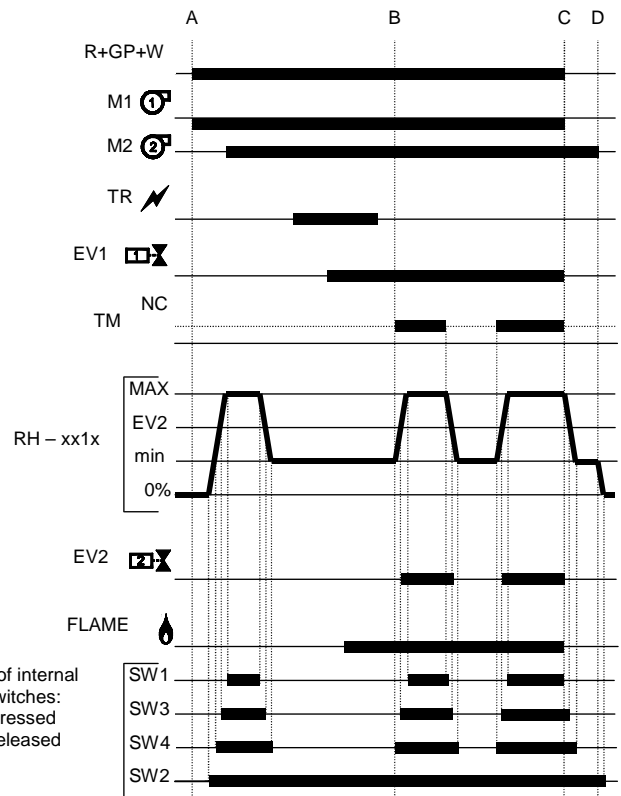
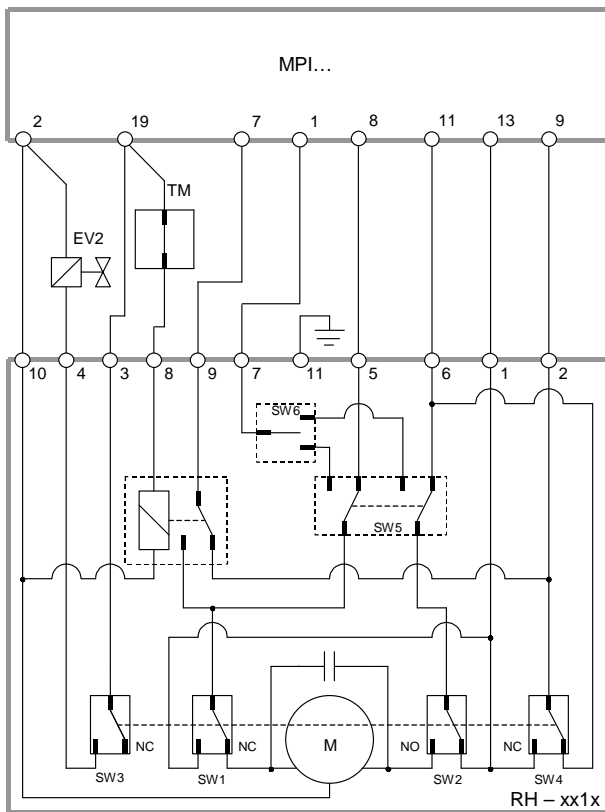
N.B. In the above diagram, the servomotor is in fully closed position (0°).

**Key to symbols:**

R+GP+W demand signals (various thermostats)  
M1 – M2 motor 1 and motor 2  
TR ignition transformer  
EV1 1<sup>st</sup> stage solenoid valve  
TMM modulating modulation thermostat (3-position output)  
RH – xx2x air damper  
0%: fully closed position  
min: 1<sup>st</sup> stage air flow position  
EV2: 2<sup>nd</sup> stage ignition contact  
MAX: max. opening position

EV2 2<sup>nd</sup> stage solenoid valve  
NO normally open contact  
NC normally closed contact  
RH terminal 11 6.3x0.8 male fast-on  
A burner ignition cycle start-up  
A – B burner in running status  
B – C heat demand end  
C – D post-purge  
D burner control unit cycle end

**Two-stage operation burner with single-wire control**  
RH air damper with internal wiring diagram no. 1



N.B. In the above diagram, the servomotor is in fully closed position (0°).

Key to symbols:

R+GP+W demand signals (various thermostats)  
M1 – M2 motor 1 and motor 2  
TR ignition transformer  
EV1 1<sup>st</sup> stage solenoid valve  
TM modulation thermostat type SPST-NC  
RH – xx1x air damper  
0%: fully closed position  
min: 1<sup>st</sup> stage air flow position  
EV2: 2<sup>nd</sup> stage ignition contact  
MAX: max. opening position

EV2 2<sup>nd</sup> stage solenoid valve  
NO normally open contact  
NC normally closed contact  
RH terminal 11 6.3x0.8 male fast-on  
A burner ignition cycle start-up  
A – B burner ignition cycle  
B – C burner in running status  
C heat demand end  
C – D post-purge  
D burner control unit cycle end

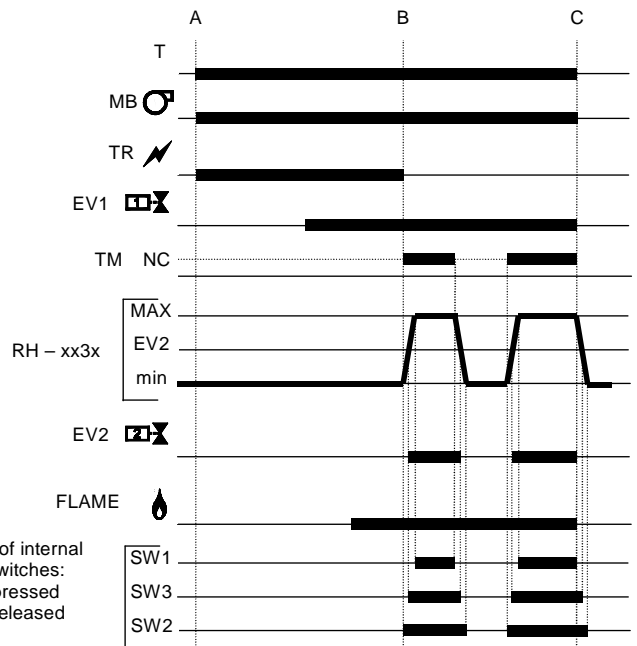
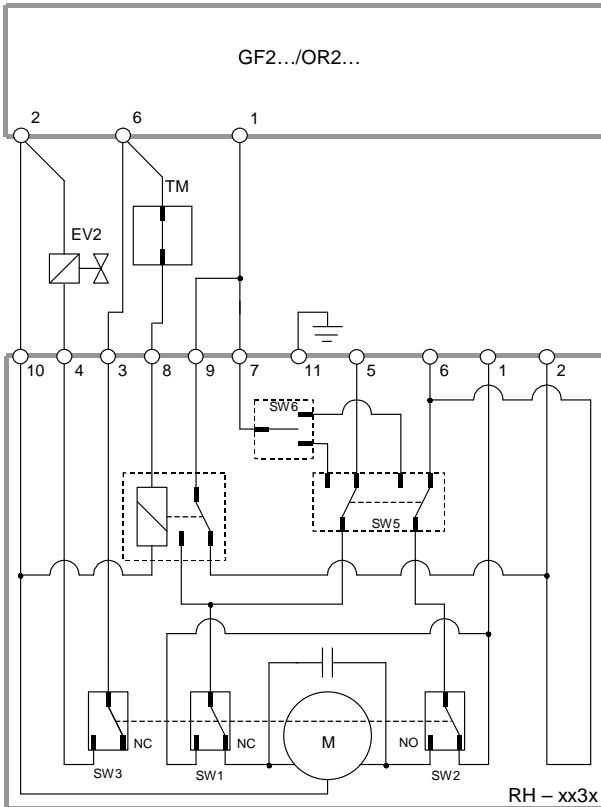
**Operation in connection with control units type GF2..., OR2..., MF2, CM32 and VM42**

When the burner is in no-heat-demand, the servomotor is in first stage ventilation position. On closing of the thermostats connected to the control units type GF2.../OR2.../MF2/CM32/VM42, the ignition cycle starts. At the end of the ignition sequence, the flame detection by the control unit causes the activation of

terminal 6 that, through the TM modulation thermostat type SPST-NC, enables the air damper to switch from the first stage ventilation position to the max. opening position, with energizing of the second fuel valve during the transition stage. In case of thermostat opening or flame extinguishing, the servo control switches back to the first stage ventilation position.

**Two-stage operation burner with single-wire control**

RH air damper with internal wiring diagram no. 3 (with control units type GF2.../OR2...)



Status of internal microswitches:  
 ■ pressed  
 — released

N.B. In the above diagram, the servomotor is in first stage ventilation position (min).

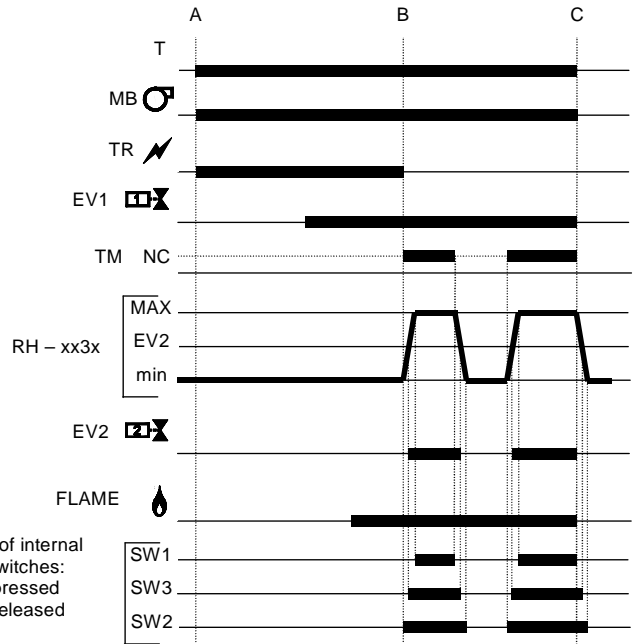
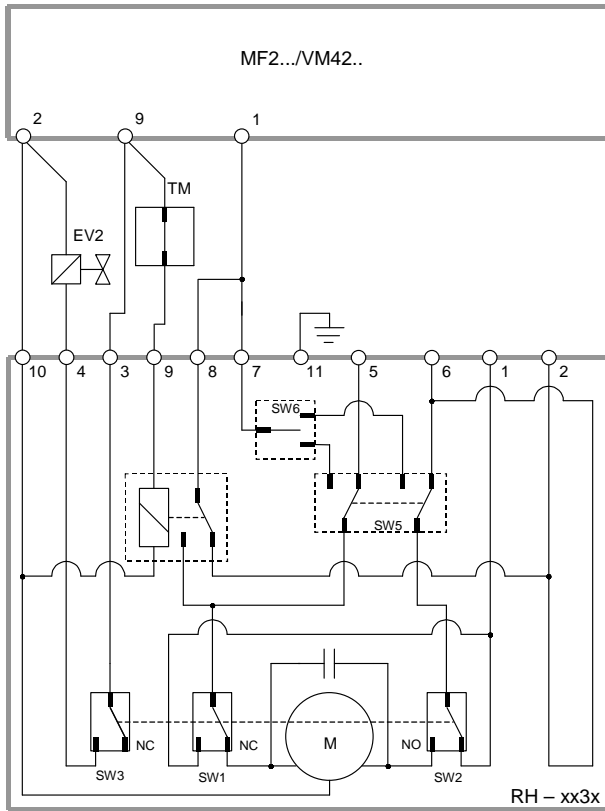
**Key to symbols:**

- T heat demand thermostat
- MB burner motor
- TR ignition transformer
- EV1 1<sup>st</sup> stage solenoid valve
- TM modulation thermostat type SPST-NC
- RH - xx3x air damper
- min: 1<sup>st</sup> stage air flow position
- EV2: 2<sup>nd</sup> stage ignition contact
- MAX: max. opening position

- EV2 2<sup>nd</sup> stage solenoid valve
- NO normally open contact
- NC normally closed contact
- RH terminal 11 6.3x0.8 male fast-on
- A burner ignition cycle start-up
- A - B burner in running status
- B - C heat demand end
- C

**Two-stage operation burner with single-wire control**

RH air damper with internal wiring diagram no. 3 (with control units type MF2.../VM42...)



Status of internal microswitches:  
 ■ pressed  
 — released

N.B. In the above diagram, the servomotor is in first stage ventilation position (min).

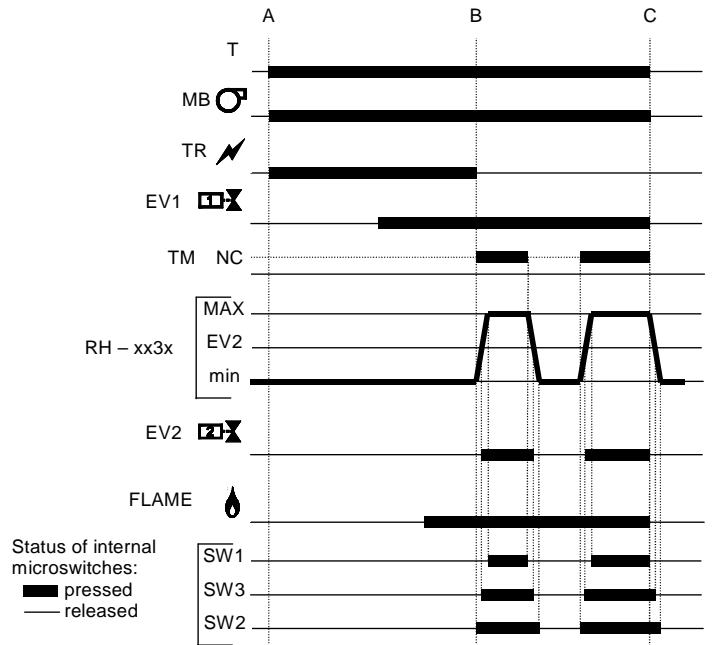
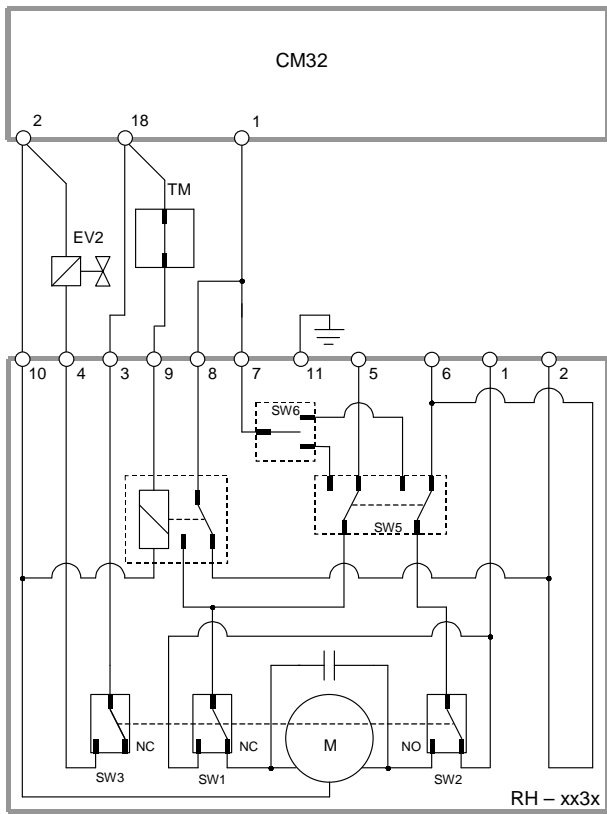
**Key to symbols:**

- T heat demand thermostat
- MB burner motor
- TR ignition transformer
- EV1 1<sup>st</sup> stage solenoid valve
- TM modulating thermostat type SPST-NC
- RH – xx3x air damper
- min: 1<sup>st</sup> stage air flow position
- EV2: 2<sup>nd</sup> stage ignition contact
- MAX: max. opening position

- EV2 2<sup>nd</sup> stage solenoid valve
- NO normally open contact
- NC normally closed contact
- RH terminal 11 6.3x0.8 male fast-on
- A burner ignition cycle start-up
- A – B burner ignition cycle
- B – C burner in running status
- C heat demand end



**Two-stage operation burner with single-wire control**  
 RH air damper with internal wiring diagram no. 3 (with control unit CM32)



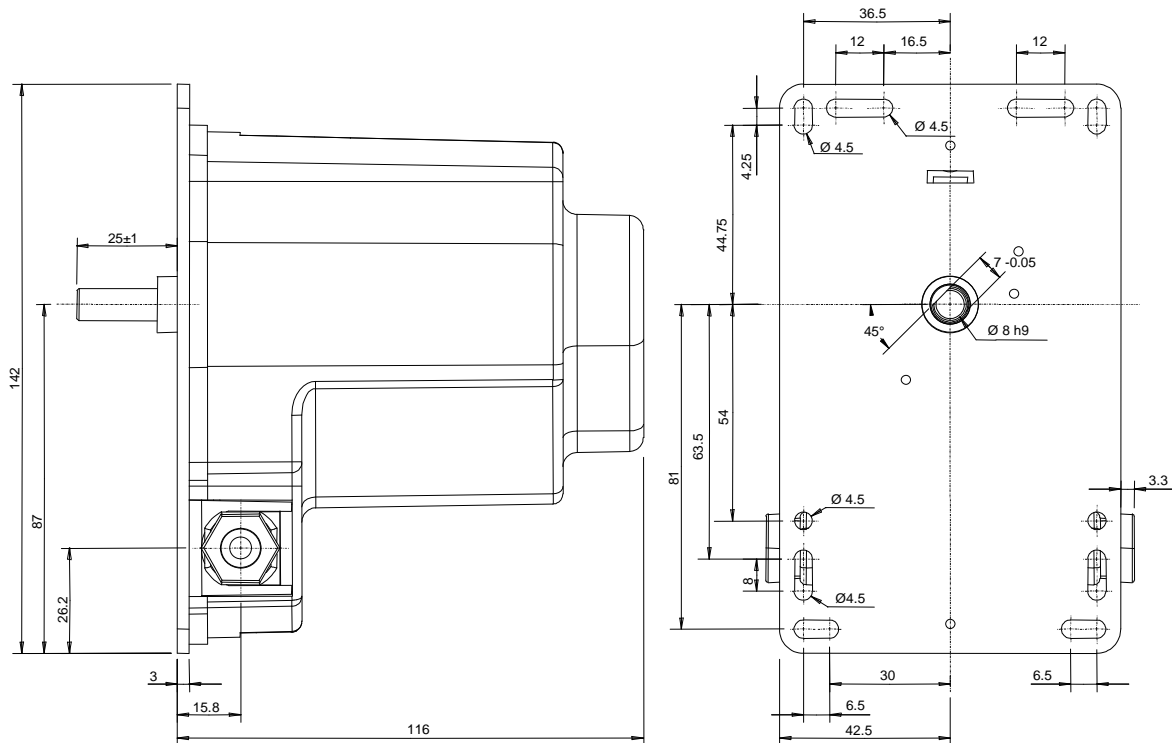
N.B. In the above diagram, the servomotor is in first stage ventilation position (min).

Key to symbols:

- |           |  |
|-----------|--|
| T         | heat demand thermostat                       |
| MB        | burner motor                                 |
| TR        | ignition transformer                         |
| EV1       | 1 <sup>st</sup> stage solenoid valve         |
| TM        | modulation thermostat type SPST-NC           |
| RH – xx3x | air damper                                   |
|           | min: 1 <sup>st</sup> stage air flow position |
|           | EV2: 2 <sup>nd</sup> stage ignition contact  |
|           | MAX: max. opening position                   |

- |                |                                      |
|----------------|--------------------------------------|
| EV2            | 2 <sup>nd</sup> stage solenoid valve |
| NO             | normally open contact                |
| NC             | normally closed contact              |
| RH terminal 11 | 6.3x0.8 male fast-on                 |
| A              | burner ignition cycle start-up       |
| A – B          | burner ignition cycle                |
| B – C          | burner in running status             |
| C              | heat demand end                      |

## MECHANICAL DIMENSIONS



In the above figures, the driving shaft is in fully closed position (0°) in case of an air damper for MPI control unit, or in first stage ventilation position (min) in case of an air damper for GF2.../OR2... control units.

## PART REFERENCES

### Series Options

RH - (1) (2) (3) (4)

- (1) Rotation direction of the driving shaft in front view with the servo control in starting position (0° or min.)  
A or O: anticlockwise (A), clockwise (O)
- (2) Switching time for a 90° angle and a 50Hz supply voltage frequency  
7 or 15: 7.5s (7), 15s (15)
- (3) Internal wiring diagram  
1 or 2 or 3: servomotor to be fitted to an MPI control unit working on a two-stage burner with modulation thermostat with normally closed single contact SPST-NC (1)  
servomotor to be fitted to an MPI control unit working on a two-stage burner with SPDT or modulating two-wire control (2)  
servomotor to be fitted to control units type GF2.../OR2.../MF2/VM42/CM32 (3)
- (4) Supply voltage of the servo control  
23 or 11: 230Vac ±10% 50/60Hz (23) or on demand 110Vac ±10% 50/60Hz (11)

### Example

RH-O7123

RH series air damper, with clockwise rotation direction of the driving shaft (O), switching time for a 90° angle of 7.5 seconds (7), suitable to be fitted to a Eurogas series ignition and flame monitoring device type MPI working on a two-stage final application with modulation thermostat with normally closed single contact (1) and supply voltage of 230Vac ±10% 50/60Hz (23)

**ATTENTION -> Company Brahma S.p.A. declines any responsibility for any damage resulting from the Customer tampering with the device.**

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