

# INSTALLER AND USER INSTRUCTIONS

N° 05000706 / 0



**AMC 12/19/29/39/48/58/78/97/116**

PLEASE READ CAREFULLY THIS DOCUMENT BEFORE STARTING THE INSTALLATION.  
THIS DOCUMENT SHALL BE LEAVED AT THE END-USER AFTER INSTALLATION.

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# INDEX

<b>1. APPLICATION RESTRICTIONS</b>	<b>Page</b>	<b>4</b>
1.1 Pre-check .....		4
1.2 Protection degree .....		4
<b>2. TECHNICAL SPECIFICATIONS</b>	<b>Pages</b>	<b>5 to 6</b>
<b>3. INSTALLATION</b>	<b>Pages</b>	<b>7 to 12</b>
3.1 Hanging and fixing .....		7 to 8
3.2 Gas connection .....		9
3.3 Electrical connection .....		9 to 10
3.4 Air intake / Combustion products discharge .....		10 to 12
3.5 Condensate discharge .....		12
<b>4. APPLIANCE OPERATION</b>	<b>Pages</b>	<b>13 to 15</b>
4.1 Generality .....		13
4.2 Heat demand .....		13
4.3 Delta-T regulation (De-stratification fan mode) .....		13
4.4 Summer ventilation .....		13
4.5 Thermal protections .....		14
4.6 Pressure switch .....		14
4.7 Description of the control board .....		14 to 15
<b>5. STARTING AND SETTING</b>	<b>Pages</b>	<b>15 to 16</b>
5.1 Generality .....		15
5.2 Start by using the service button .....		16
5.3 Start by using the MULTITHERM thermostat .....		16
5.4 Flame default simulation and restart .....		16
5.5 Control board display .....		16
<b>6. ADJUSTEMENT OF THE GAS VALVE</b>	<b>Page</b>	<b>17</b>
<b>7 TROUBLESHOOTING</b>	<b>Pages</b>	<b>18 to 19</b>
7.1 Generality .....		18
<b>8. MAINTENANCE</b>	<b>Page</b>	<b>20</b>
8.1 Main inspection of the appliance .....		20
8.2 Appliance servicing .....		20
8.3 Ignition electrode .....		20
<b>9. REGULATION EXAMPLES</b>	<b>Pages</b>	<b>21 to 23</b>
9.1 Individual regulation with MULTITHERM C or S (AMC 12 to 58) .....		21
9.2 Centralized regulation with MULTITHERM C or S (AMC 12 to 58) .....		21 to 22
9.3 Individual regulation with MULTITHERM C or (AMC 78 to 116) .....		22
9.4 Centralized regulation with MULTITHERM C or S (AMC 78 to 116) .....		22 to 23
9.5 Regulation with a Building Management System (BMS) .....		23

<b>10. INTERNAL ELECTRIC DIAGRAM</b>	<b>Pages</b>	<b>24 to 25</b>
--------------------------------------	--------------	-----------------

10.1 Warm air heaters AMC 12 to 58 .....	24
10.2 Warm air heaters AMC 78 to 116 .....	25

<b>11. SPARE PARTS</b>	<b>Pages</b>	<b>26 to 29</b>
------------------------	--------------	-----------------

11.1 Spare parts .....	26
11.2 Exploded view AMC 12 to 19 .....	27
11.3 Exploded view AMC 29 to 58 .....	28
11.4 Exploded view AMC 78 to 116 .....	29

## **GENERALITIES**

*In order to improve the products, SBM is reserving the right to modify without warning, the specifications of the appliances.*

# 1. APPLICATION RESTRICTIONS



***The installation and maintenance of this air heater should be performed by an authorized competent installer and in accordance with this manual.***



***The appliance shall be CE marked.  
Respect the safety clearances with the inflammable materials.***



***This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.***



***In case where the air intake is done inside the room (type B connection), provide a sufficient ventilation by referring to the rules in force.***

## 1.1 Pre-check

Before unpacking and installation, please check (i.e. on the data badge) if the heater is in accordance with the order and if it is suitable for the local present provisions (gas type, gas pressure, electrical supply etc.)

The Installation must comply with all applicable local and national standards.

If this heater is drawing its combustion air from within the room in where it is located, the necessary combustion ventilation requirements must be followed for gas safety regulations.

Make sure that the warm air can be blown out freely. There should absolutely be (no possibility of) materials within 5m from the front of the heater.

The heaters have been tested in detail on safety and correct operating settings before leaving the factory. It has been adjusted for the type of gas that is stated on the data badge.  
If there is any doubt, please contact SBM.

## 1.2 Protection degree

The appliances have been designed for a use in a dry and not very dusty environment (protection degree **IP20**).

The heater should not be installed in areas containing any corrosive or explosive steam, in high moisture or dust concentrations, at negative pressures or temperatures higher than 30°C; please consult SBM. The guarantee is then invalidated.

## 2. TECHNICAL SPECIFICATIONS

	AMC MODEL	12	19	29	39	48	58	78	97	116
Maximal heat input Hi (G20 & G31)	kW	12,5	20,0	30,0	40,0	50,0	60,0	80,0	100,0	120,0
Minimal heat input Hi (G20 & G31)	kW	4,0	6,0	9,0	12,0	15,0	18,0	24,0	30,0	36,0
Maximal heat output (G20 & G31)	kW	12,0	19,2	29,0	38,8	48,3	58,0	77,6	96,8	115,8
Minimal heat output (G20 & G31)	kW	4,2	6,4	9,5	12,8	15,9	19,1	25,2	31,5	37,8
Maximal heat input Hi (G25)	kW	10,5	16,8	25,8	33,3	42,0	49,8	66,6	84,0	99,6
Minimal heat input Hi (G25)	kW	3,1	5,0	7,7	10,1	12,6	15,2	20,2	25,2	30,4
Maximal heat output (G25)	kW	10,1	16,1	24,9	32,3	40,5	48,1	64,6	81,0	115,8
Minimal heat output (G25)	kW	3,3	5,3	8,0	10,8	13,4	16,1	21,2	26,5	31,9
Efficiency at max. heat input	%	96,0	96,0	96,5	97,0	96,5	96,6	97,0	96,8	96,5
Efficiency at min. heat input 30%	%	106,0	106,0	106,0	106,5	106,0	106,0	105,0	105,0	105,0
Maximum hot air flow	m <sup>3</sup> /h	2000	2600	3000	4500	5000	6000	8500	10000	12000
Maxi. horizontal throw	m	15	20	23	26	28	30	30	30	33
Gas connection		Rp 1/2" (ISO 7)			G 3/4" (ISO 228)			Rp 1" (ISO 7)		
Electrical supply		230 VAC / 50-60 Hz								
Puissance électrique absorbée	W	250	250	275	450	600	600	900	1000	1050
Maximum electric current	A	1,1	1,1	1,2	2,0	2,6	2,6	3,9	4,4	4,7
Low voltage thermostat		Yes								
Sound level (average)	dBA	45	45	45	47	48	49	50	51	52
Minimal hanging height	m	1,7								
Maximal length of the duct	m	9								
Weight	kg	45	50	75	85	105	110	180	195	205
Maximum condensation flow	l/h	2	2	3	3	4	4	6	8	8

### Natural gas G20 and G25

Nominal supply gas pressure G20	mbar	20 (17 to 25)								
Nominal supply gas pressure G25	mbar	25 (20 to 30)								
Gas category	Cat.	I <sub>2ESi</sub>								
Class for combustion products discharge		B23, C13 or C33								
Maximum gas consumption G20	m <sup>3</sup> /h	1,3	2,1	3,2	4,2	5,3	6,3	8,4	10,6	12,6
Maximum gas consumption G25	m <sup>3</sup> /h	1,3	2,0	3,1	4,0	5,0	5,9	8,0	10,0	11,8
CO <sub>2</sub> at high speed G20	%	9,5	9,5	9,2	9,2	9,2	9,2	9,2	9,2	9,2
CO <sub>2</sub> at low speed G20	%	9,0	9,0	8,8	8,8	8,8	8,8	8,8	8,8	8,8
CO <sub>2</sub> at high speed G25	%	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0
CO <sub>2</sub> at low speed G25	%	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,8
NO <sub>x</sub> (at 0% of O <sub>2</sub> )	mg/kWh	28	20	38	35	28	30	31	27	29
NO <sub>x</sub> class		5								
CO (at 0% of O <sub>2</sub> )	mg/kWh	4	5	1	1	3	3	1	4	1
Maximum combustion products flow	kg/h	19,4	31,1	48,1	64,2	80,2	96,2	128,4	160,4	192,4

### Propane G31

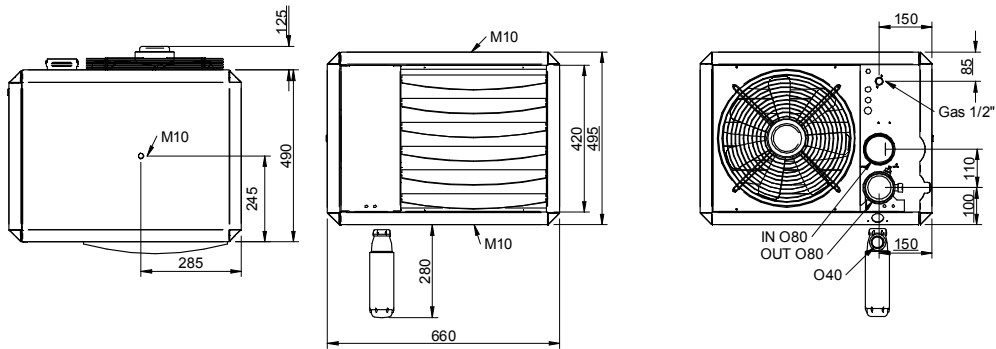
Nominal supply gas pressure G31	mbar	30-50								
Supply gas pressure (min-max) G31	mbar	25-50								
Gas category	Cat.	I <sub>3P</sub>								
Class for combustion products discharge		B23, C13 or C33								
Maximum gas consumption G31	kg/h	1,0	1,6	2,4	3,2	4,0	4,8	6,4	8,0	9,6
CO <sub>2</sub> at high speed level G31	%	10,7	10,7	11,0	11,0	11,0	11,0	11,0	11,0	11,0
CO <sub>2</sub> at low speed level G31	%	10,3	10,3	10,5	10,5	10,5	10,5	10,5	10,5	10,5
NO <sub>x</sub> (at 0% of O <sub>2</sub> )	mg/kWh	24	17	36	39	32	41	39	34	41
NO <sub>x</sub> class		5								
CO (at 0% of O <sub>2</sub> )	mg/kWh	13	8	3	1	1	1	1	1	1
Maximum combustion products flow	kg/h	19,4	31,1	48,1	64,2	80,2	96,2	128,4	160,4	192,4

The AMC 78, 97 and 116 models are compound respectively of 2x AMC 39, 2x AMC 48 and 2x AMC 58 in a same body with one gas connection and one air intake/exhaust gases, one electric connection, one connection for the thermostat and one connection for condensates.

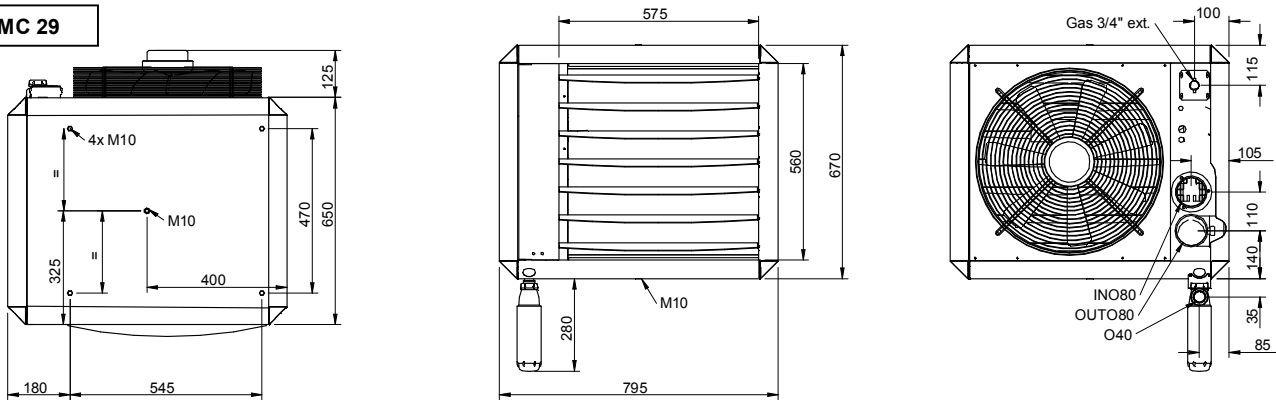
For a proper operation and in order to avoid interaction between the premix fan and the burner, a check valve was added.

The connection of the **MULTITHERM C** or **S** to the AMC 78, 97 and 116 models as well as the micro-switch S2 and S3 setting is explained in the paragraph 9.3 and 9.4, pages 22 and 23.

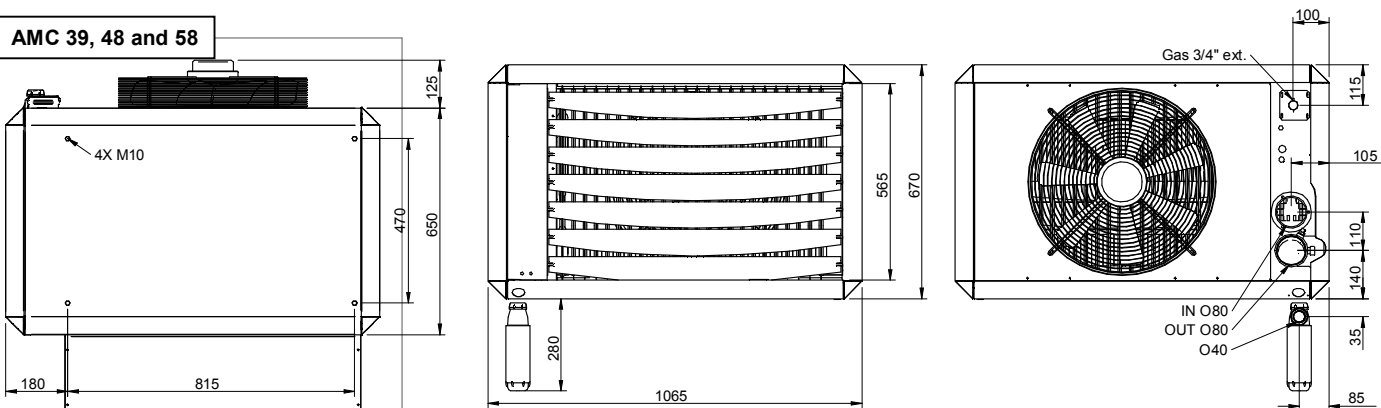
**AMC 12 and 19**



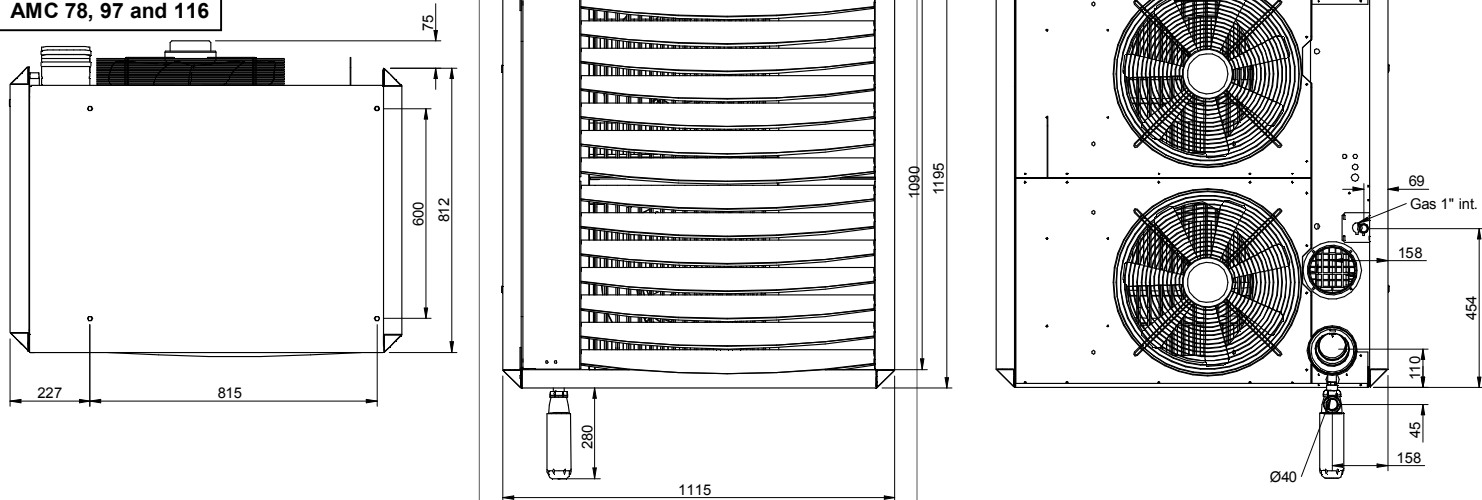
**AMC 29**



**AMC 39, 48 and 58**



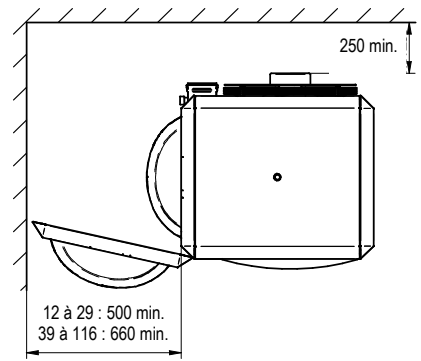
**AMC 78, 97 and 116**



### 3. INSTALLATION

#### 3.1 Hanging and fixing

- Check that the support is solid enough.
- The warm air heater must apire and exhaust freely  
The presence of any obstacle can conduct to an over-Heating of the appliance.
- Keep sufficient distance between the heater and any obstruction, in connection with safety and access for service and maintenance. Pay particular attention to any flammable materials. Please take into account the the necessary service and maintenance work.
- The heater can be installed horizontally or with an angle of maximum 45°.
  - The units are provided with pieces of M10 threaded sockets as fixing points.
  - AMC 12 and 19 models have 2 pieces of M10 threaded sockets in their centre on the top and underneath the heater.
  - AMC 29 and 39 have 2 pieces of M10 threaded sockets in their centre on the top and underneath then 4 additional pieces of M10 threaded sockets on the top of the heater.
  - AMC 48 and 58 models have 4 threaded sockets on the top and underneath.
  - See the schemes above to see the dimensions.
  - We recommend using the SBM suspension kits for a safe installation.
  - Be sure that there is no mechanical tension on the different connections after installation.

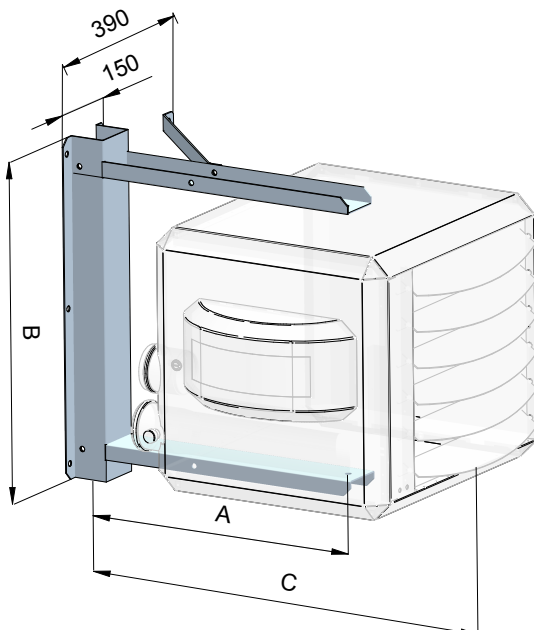


**Consult the "APPLICATION RESTRICTION" chapter page 4.**

- Positioning possibilities

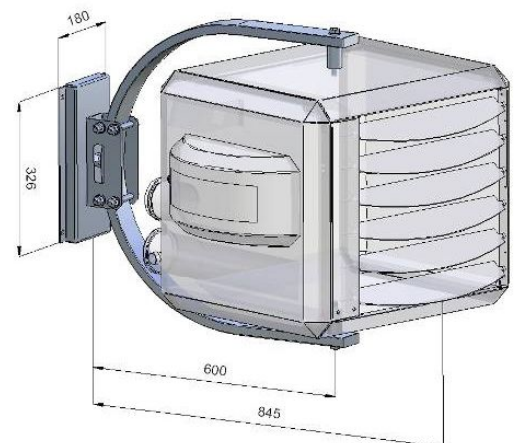
#### Standard bracket for AMC 12 to 39 orientable at 180° horizontally

Ref. SBM	Designation	A	B	C
<b>5760007</b>	WALL BRACKET AM12-29/AMC12-19	555	640	800
<b>5760008</b>	WALL BRACKET AM39-58/AMC29-39	665	815	990



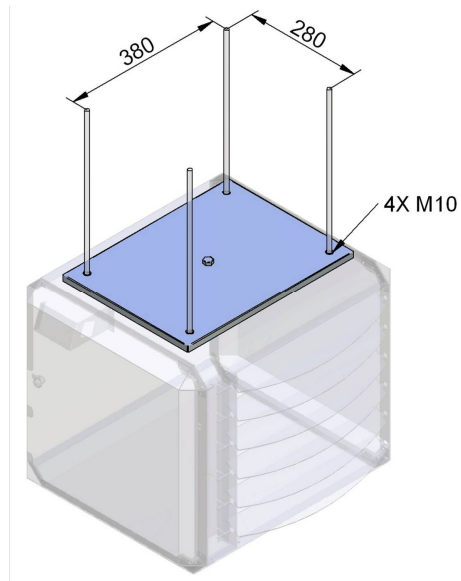
#### Design bracket for AMC 12 and 19 orientable at 180° horizontally

Ref. SBM	Designation
<b>5760013</b>	DESIGN BRACKETAM12-29/AMC12-19



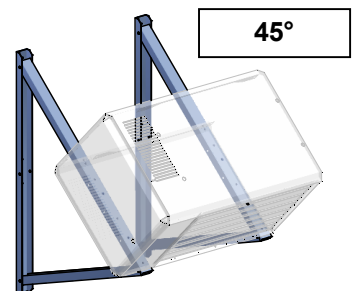
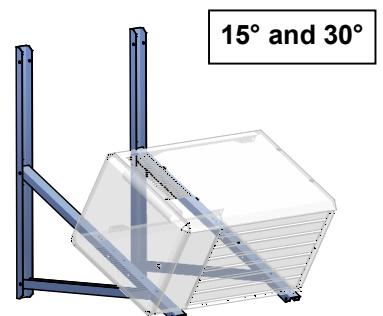
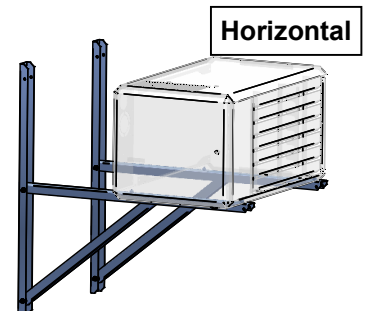
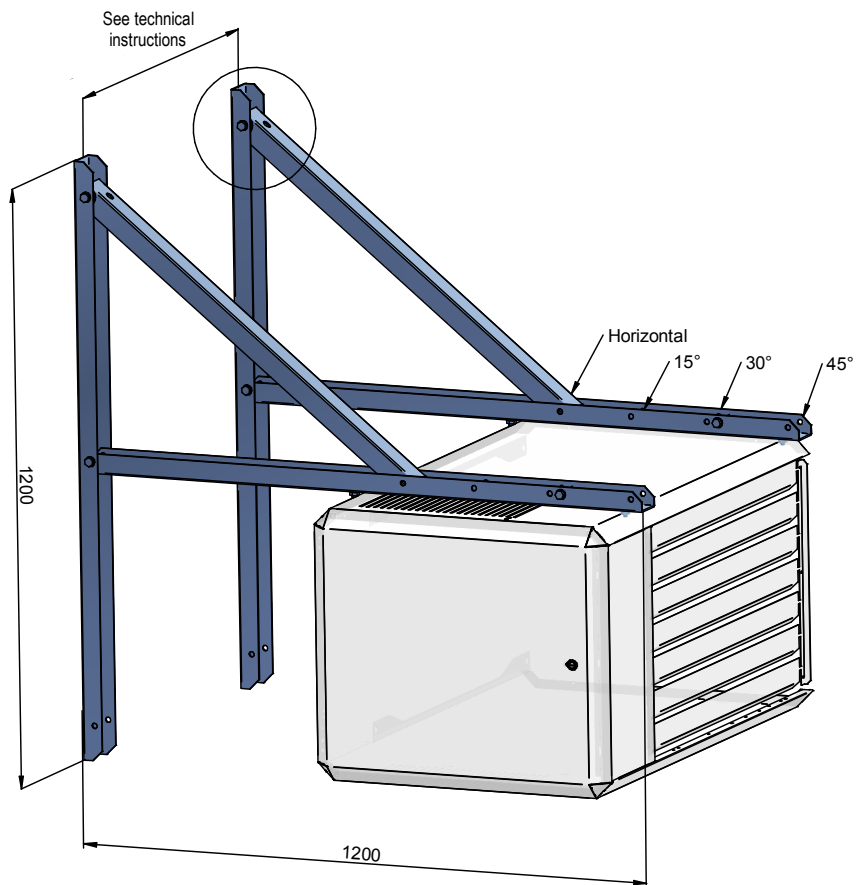
## Suspension adapter AM 12, 19 and 29 for M10 threaded bars suspension

Ref. SBM	Designation
5760012	ADAPT. THREADED BARS AM AMC



## Cantilever brackets for AMC 29 to 58.

Ref. SBM	Designation
5760011	CANTILEVER BRACKETS AMC





## 3.2 Gas connection

- The gas installation shall be done by a qualified worker. The rules of gas installation shall be respected.
- A manual isolation gas valve in the supply line must be placed within reach of the heater, and all gas lines must be mounted without any mechanical tension. The installation of a gas filter and the purge of gas pipes before the first start-up are strongly recommended.
- The sealing of the gas network have to be checked before the first start of the installation according to the rules in force.
- The dynamic gas pressure upstream the solenoid valve shall be at least 17 mbar for G20 and 20 mbar for G25. This dynamic pressure cannot be greater than 30 mbar. For G31, it shall be less than 37 mbar.
- It is eventually possible to change the gaz type (natural gas/propane). In this case, please contact your installer.



***These appliances were design to operate with natural gas G20 or G25. When operating with G25, the heat input will be lower than when operating in G20 (see the technical specifications in page 5). It is forbidden to turn the setting screws which are sealed by the manufacturer.***

## 3.3 Electrical connection

### 3.3.1 Electric supply 230 V

- The electrical installation shall satisfy the local/national rules in force. Be sure that the main supply is 230VAC with earth and a **R.S.D (Residual Current Device) with a sensibility of 30 mA** upstream the heater for the protection of people and installation. The polarity phase/neutral shall be absolutely respected. See the electrical diagram, pages 24 and 25.

### 3.3.2 Electrical supply interruption

- Never interrupt the power supply of the device accidentally. It could drive to an overheating of the heat exchanger and to the safety state of the overheated device. Be careful to the electric breaks of the network, it is possible that the temperature of the appliance is going up (overheating)



***Never turn off the power while the unit is warming up!***

### 3.3.3 Room Thermostat

- The warm air heaters AM can be driven only with the **MULTITHERM S** or **C** thermostat. They are not operating with simple ON/OFF thermostat.
- MULTITHERM** thermostats type :

**MULTITHERM S** (Ref SBM **5760001**) ; modulating numerical thermostat **without clock** able to regulate from 1 to 8 appliances AMC 12 to 58 or 1 to 4 appliances AMC 78 to 116.

**MULTITHERM S WITH CONTACT** (Ref SBM **5760004**); modulating numerical thermostat **without clock, with terminal for external contact**, able to regulate from 1 to 8 appliances AMC 12 to 58 or 1 to 4 appliances AMC 78 to 116.

**MULTITHERM C** (Ref SBM **5760001**) ; modulating numerical thermostat **with clock** able to regulate from 1 to 8 appliances AMC 12 to 58 or 1 to 4 appliances AMC 78 to 116.

**MULTITHERM C WITH CONTACT** (Ref SBM **5760005**) ; modulating numerical thermostat **with clock, with terminal for external contact**, able to regulate from 1 to 8 appliances AMC 12 to 58 or 1 to 4 appliances AMC 78 to 116.

☐ Recommendations for **MULTITHERM** installation :

- The connection between the **MULTITHERM** and the warm air heaters have to be done with a two-wires shielded and twisted cable 1 x 2 x 0.75 mm, with a maximum length of 200 m.
- Connect the earth shield of the cable only to the earth terminal in the warm air heater.
- The appliances should be disconnected from the electrical network during the connection.
- The installation and start-up of the room thermostat are described into the technical instructions delivered with the **MULTITHERM S** or **C**.
- The thermostat have to be installed in a dry place and moderately dusty.
- Place the thermostat in a place where the air can circulate freely.
- Take care of the risk of sun exposition or the presence of warm sources.
- Avoid installing it near to a cold wall or where there is air flow.



***Do never install the thermostat closed to the internal network communication antennas! These last are emitting a radiation which can conduct to a disturbance of the thermostat. It is always necessary to keep a distance of some meters.***

### 3.3.4 Fuses

- ☐ There are 2 fuses in the appliance, on the main print board: F1 and F2 are placed on the phase and neutral of the electric supply of the heater. In case of defective fuse, replace it with an identical fuse size 5x20 - 5A TempORIZED.

## 3.4 Air intake / combustion products discharge

Check for compliance with local / national regulations. Only the material mentioned above can be used. This applies for wall or roof terminals also for exhaust products connections in order to have a certified and approved installation.

In some cases, and according to the regulation, the terminal must exceed the rooftop by at least 0.5m.

### 3.4.1 Flue materials

- ☐ It is allowed to use only the sealed and corrosion resistant flue pipes CE marked with a temperature class **at least T120**.

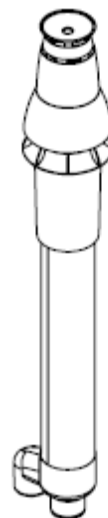
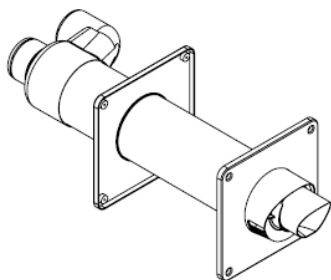
These flue pipes are not supplied by SBM.

Use only flue pipes with the same diameter.

### 3.4.2 Terminals

- ☐ Only the terminals supplied by SBM can be used.  
These terminals are certified with the warm air heaters.

Terminals		Roof flashings			
Ref. SBM	Designation	Ref. SBM	Designation	Ref. SBM	Designation
<b>5760020</b>	ROOF TERMINAL AMC 80/125	<b>5760022</b>	FLAT ROOF FLASHING 80/130	<b>5760023</b>	ADJUSTABLE FLASHING
<b>5760035</b>	ROOF TERMINAL AMC 130/210	<b>5760036</b>	FLAT ROOF FLASHING 130/210	<b>5760037</b>	ADJUSTABLE FLASHING
<b>5760034</b>	WALL TERMINAL AMC 80/125				
<b>5760038</b>	WALL TERMINAL AMC 130/210				



### 3.4.3 Assembly



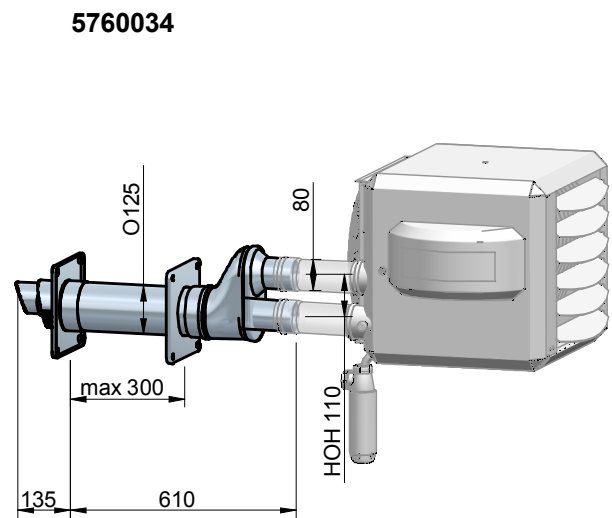
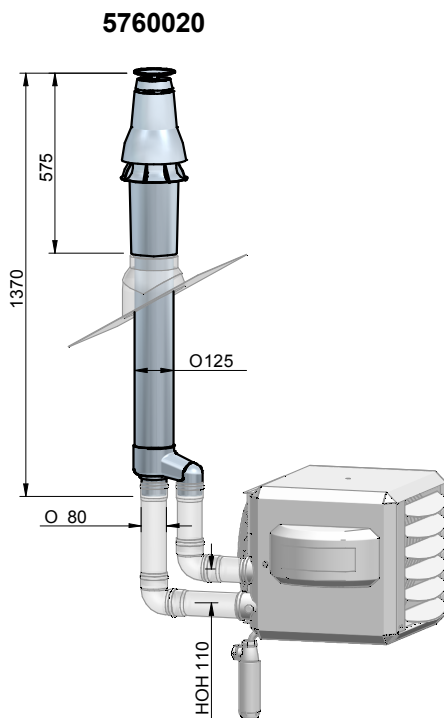
**Follow the assembly instruction of the air intake and combustion products discharge includes into the package of these systems.  
Always check the proper sealing of the flue systems.**

- ❑ The warm air heater is a condensation unit. Think when installing to give an inclination of  $\geq 50$  mm per metre toward the unit.  
In order to avoid a water accumulation, fit the duct with an inclination toward the warm air heater.

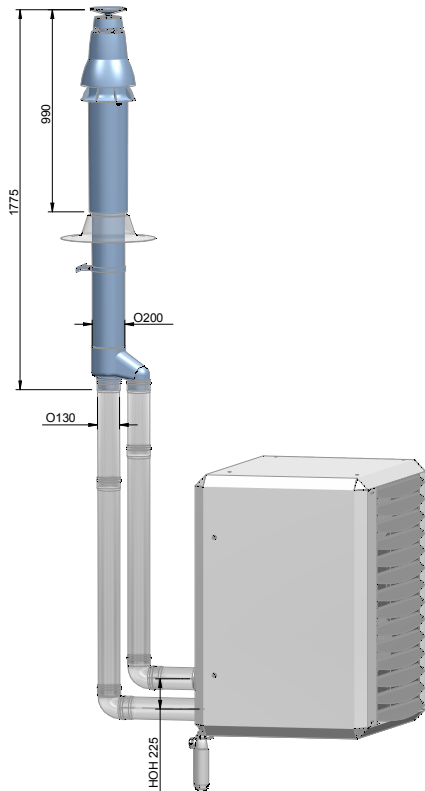
### 3.4.4 Flue pipes length

- ❑ The maximum flue length of the exhaust gases and air intake is 9 meters (counting the bends) a  $90^\circ$  bend equal to 1.5 m linear and a  $45^\circ$  bend equal to 1 m linear. In case of roof terminal, the distance between the top of the terminal and the roof has to be at least 0.5 m. Take into account the presence of other ventilation systems or barriers close to the terminal outlet.

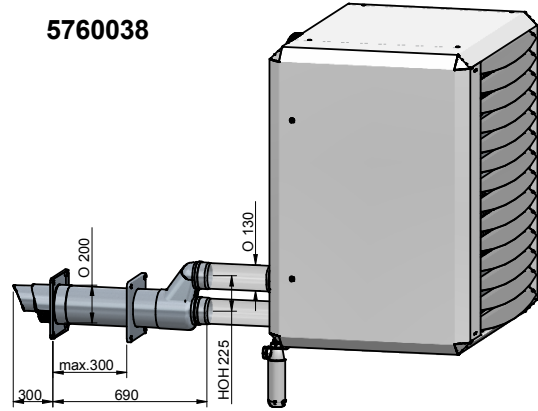
### AMC 12 to 58



**AMC 78 to 116**  
**5760035**



**5760038**



**3.5 Condensate discharge**

The condensate discharge pipe is on the bottom of the heater. The siphon delivered with the appliance shall be connected to this condensate discharge. A plastic tube Ø 40mm can be connected to the siphon. The discharge system (not supplied by SBM) after the siphon has to be  $\geq \text{Ø}25\text{mm}$  and mounted with an inclination to the sewer. The advised inclination should be minimum 30mm per meter. The horizontal length should not exceed 5 meters.



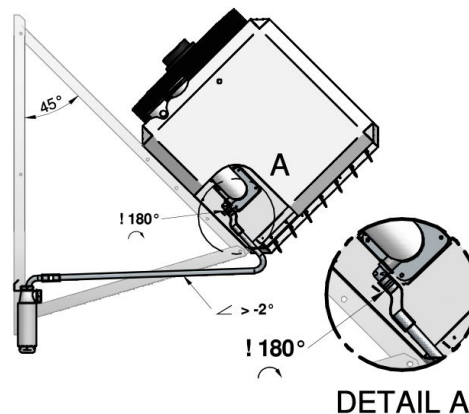
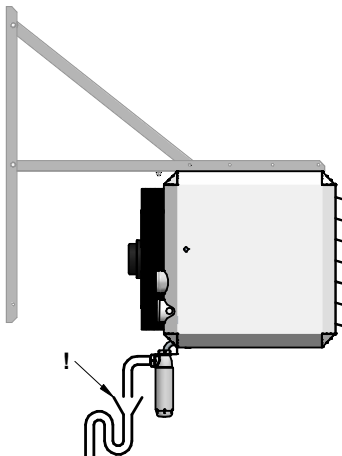
**The condensate should be connected according to local and national regulations. Do not let the condensate drip on the roof or roof edge outside the building, dangerous ice can be formed in the winter. Condensate should be drained away to the sewer.**

To be sure that the condensate can always flow out of the heater, an extra siphon should be mounted before connecting to the sewer.



**Before servicing the appliance, fulfil the siphon(s) with water in order to avoid the dispersion of combustion products into the room.**

If the appliance is mounted with an inclination between  $0^\circ$  and  $45^\circ$ , the condensate discharge will be done in the front of the appliance (at the factory, the discharge is behind the appliance). Therefore, the small sheet metal in the front of the heater can be removed and the pipe can be replaced to the front of the heater.



## 4. APPLIANCE OPERATION

### 4.1 Generality

The unit can heat (in winter) as well as ventilate (in summer). By using the temperature-sensor on the unit and the one in the room-thermostat, the temperature-difference between the two in the room is monitored (see chapter 4.3).

If the desired temperature is not reached, the appliance will heat. The modulating burner gives the exact quantity of necessary heat to reach a comfortable temperature.

### 4.2 Heat demand

If the thermostat indicates heat demand, the following cycle will start:

1) **Pre-purge** :

The electronic circuit board acknowledges the heat-demand and the premix burner fan will start running for 30 seconds.

The display of the control print board indicates **1**.

2) **Ignition** :

After 30 seconds of pre purge the electrode will spark for max. 5 seconds, the gas valve is opened and the gas-air mixture will ignite

The display of the control print board indicates **2**.

If the air/gas mix is not lighted or if there is no flame detected, the control print board start a second ignition attempt before be in security state.

In this case, the display of the control print board indicates alternatively **A** and **1**.

3) **Heating** :

Once the flame is detected, the unit will modulate to the desired load after 15 seconds.

The display of the control print board indicates **b**.

Depending on the given load, the system fan will start modulating (step-less) as well. The air heater will always burn for a minimum of 4 minutes. This is to evaporate eventual condensation in the discharge system.

4) **End of heat demand** :

When the heat demand ends, the burner will switch off and the system fan will continue to run for around 3 minutes in order to cool the unit down

The display of the control print board indicates **P**.

The unit will try to ignite twice before lockout on flame fault. In the case of flame failure during operation, the heater will attempt one restart.

When the heater is in lockout you see in the display intermittent an **A** and **1**. On the display of the **MULTITHERM** you will see failure **1**.

### 4.3 Delta-T regulation (de-stratification fan mode)

When the difference of temperatures between the sensor on the unit (the NTC) and the sensor in the **MULTITHERM** is bigger than the set value (factory setting standard 8°C), the burner is turning off and only the main fan will operate at a regulated speed depending on the differential temperature difference. This operation ensures an even temperature distribution throughout the building, thus acting as a fully automatic variable de-stratification fan.

The Delta-T mode is working only in combination with the **MULTITHERM** thermostat.

If you don't desire to use the Delta-T regulation, it is possible to disable it in the parameters menu of the **MULTITHERM**. See the technical instructions of the **MULTITHERM**.

### 4.4 Summer ventilation

It is possible to ventilate the ambient air with the AM unit independently from the heat demand through the summer ventilation function of the **MULTITHERM S** or **C**. The summer ventilation can be set on 3 different speeds, see the technical instructions of the **MULTITHERM**.

## 4.5 Thermal protections

### 4.5.1 Protection of the exchanger

- ❑ The thermal protection of the exchanger is done by 2 CTN temperature probes set on the exchanger of the unit.  
In case of overheating of the exchanger, in a first time, the speed of the main fan will increase and in a second time, the capacity of the burner will be limited at its minimum. In case of abnormal overheating, the electric supply of the premix system will be closed. When the exchanger is cold enough, the heat cycle restart (the display shows alternatively **E** and **1**).  
If the overheating continue (defective electrical supply cutting), the control board is going to a safety state (the display on the board shows alternatively **A** and **2** and the **MULTITHERM** shows the code 2).  
After controlling and fixing, the control board shall be reset directly by pressing the button on the control board or by the menu of the **MULTITHERM** (see the technical instructions).

### 4.5.2 Protection of the exhaust gases pipe

- ❑ For a use of plastic exhaust gases pipes on the warm air heaters, a sensor controls the exhaust gases temperature ( $T < 120^{\circ}\text{C}$ ). When the exhaust gases temperature is too high ( $T > 110^{\circ}\text{C}$ ), the burner decrease its power to the minimum.  
Nevertheless the temperature increases and reaches  $115^{\circ}\text{C}$ , the burner stops. When, after a re-ignition, the situation is the same, the heater is locked (the safety board shows alternatively **A** and **7**).

## 4.6 Pressure switch

The appliance is equipped with a pressure switch in order to control the combustion air flow through the heat exchanger.  
During the pre-ventilation step, the difference of pressure between inside and outside the exchanger is measured.  
If the difference of pressures is too weak, the display on the control board shows alternatively **A** and **9** which means a pressure drop in the heat exchanger which have to be checked.

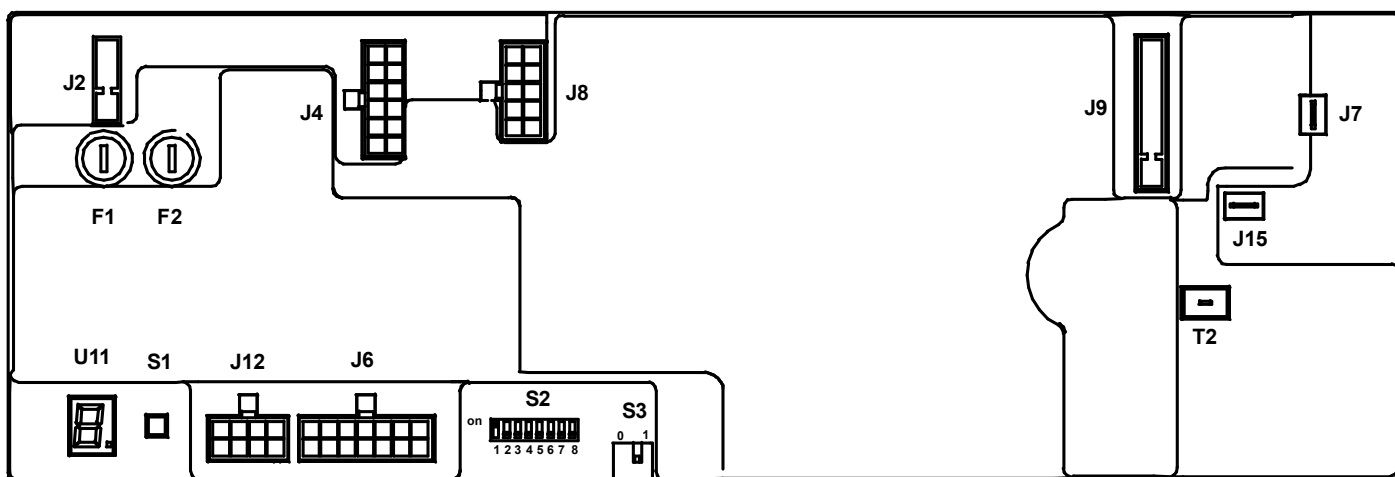
## 4.7 Description of the control board

The control board controls all the functions of the AM heater and communicates with the thermostat **MULTITHERM**.

The control board integrates the following functions :

- ModBus communication system with the **MULTITHERM**
- Ignition of the burner by sparks
- Flame detection by ionisation
- Modulation of the gas valve opening
- Modulation of the premix fan with information return
- Modulation of the main fan
- Heat protection of the exchanger (2 CTN sensors)
- Control of the ambient temperature (CTN sensor)
- LED signals of the heater: heat demand (green LED) and safety state (red LED)
- Display of the heater state on the 8 segments screen
- Reset button
- Service mode function
- Recognition system of the appliance

## View of the control board inside the heater



- J2** : connection for electric supply 230VAC  
**J4** : Connection for main fan and gas valve  
**J6** : Connection for **MULTITHERM**, thermostat, red and green lamps, pressure switch and identification of the appliance (2 resistances)  
**J7** : Earth pin of the board  
**J12** : Connection of the 2 CTN probes  
**J15** : Connection of the ionisation probe

**F1** and **F2** : Fuses size 5x20 - 5A temporized.

**U11** : 7 segment display.

**S1** : reset button.

**S2** : micro switch for use of the **MULTITHERM** thermostat with several heaters.  
(factory setting of the micro switch 1 on ON position).

**S3** : Micro switch for the electrical supply of the **MULTITHERM**.

**T2** : connection of the ignition transformer

## 5. STARTING AND SETTING

### 5.1 Generality

The AMC heater was fully controlled and tested in factory before shipment. The combustion products were measured in order to optimize the air/gas mix. Once installed, no setting is necessary. Only the proper operation has to be checked.



**Never turn the setting screw of the gas valve! (sealed).**

Once the installation done according to these instructions, the warm air heater can be turning on. Be sure that the gas pipe is clean, tight and purged. Set the appliance under electrical tension, open the rear door to watch the first start and be familiar with the operation of the heater.

Ask for a heat demand, the warm air heater operates in heating mode during 4 minutes at least. Even if there is an interruption of the heat demand.

If the mix air/gas is not lighted or if the flame is not detected, the control board tries a second ignition before going in safety state if there is no flame.



**Do not forget to inform the end-user about the following points :**

- **The way to use the appliance and the thermostat and particularly on the possibility to reset the system.**
- **The possibility to disconnect the appliance in case of failure (gas valve, switch button).**
- **A regular maintenance is necessary.**

## 5.2 Start by using the service button

By pressing the **S1** button (reset / start) while around 10 seconds, the appliance will start a heating cycle, the display of the control board will show alternatively **L** (Low) and the operation code:

- 1** = 30 sec of pre-ventilation
- 2** = 5 sec of ignition of the burner
- b** = 15 sec of flame stabilization
- b** = heating at low power

By pressing a second time on the **S1** button, the appliance will operate at its full power, the display will indicate alternatively **H** (High) and the operation code as described above.

By pressing a third time the **S1** button, the appliance will operation under normal condition which means according to the **MULTITHERM** heat demand.

5 minutes after the last impulsion on the **S1** button, the service mode will be automatically deactivated.

## 5.3 Start by using the MULTITHERM thermostat

Create a heat demand on the **MULTITHERM** by setting a comfort temperature greater than the measured temperature. The heating cycle will start:

pre-purge (30 sec), ignition (5 sec), flame stabilization (15 sec) and heating mode.

A heating cycle last at least 4 minutes.

## 5.4 Simulation du défaut de flamme et réarmement

After shutting the gas valve, the unit shall go in safety state:

- ❶ Post-ventilation (**P**)
- ❷ Pre-purge (**1**)
- ❸ Ignition (**2**)
- ❹ Post-ventilation (**P**)
- ❺ The display on the control board and the **MULTITHERM** show **A 1**.
- ❻ The red lamp of the unit is lighting.

Check, by opening the gas valve and pressing the **S1 button** that the heating cycle restarts.

## 5.5 Control board display

Table of the operation codes of the warm air heater:

Display	State	Description
<b>0</b>	Stand-by	The unit is ready to start
<b>1</b>	Pre-purge	The control board measure the difference of pressure into the exchanger and activate the pre-ventilation while 30 seconds.
<b>2</b>	Ignition	Sparkling for 5 secondes, gas valve opening. Flame detection while 5 seconds.
<b>b</b>	Heating	After 15 seconds of flame stailization, the warm air heater operates at the asked capacity. The appliance operates for 4 minutes at least.
<b>P</b>	Post-ventilation	After stop of the burner, the exchange is cooled for 3 minutes at small speed. Le pre-mix fan is still turning while 1 minute.
<b>F</b>	Summer ventilation	Only the main fan is operating during the summer ventilation mode (activation using <b>MULTITHERM</b> thermostat)
<b>F</b> blinking	Destratification fan mode	The main fan is operating at its low speed during the destratification fan mode.
Alternatively <b>L</b> and <b>1</b> (or <b>2</b> or <b>b</b> )	Low speed mode	Heating in low speed by pressing the <b>S1</b> button of the control board.
Alternatively <b>H</b> and <b>1</b> (or <b>2</b> or <b>b</b> )	High speed mode	Heating in high speed by pressing the <b>S1</b> button of the control board.



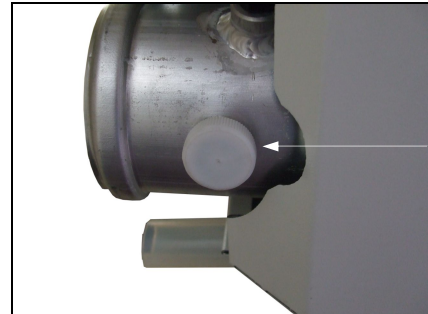
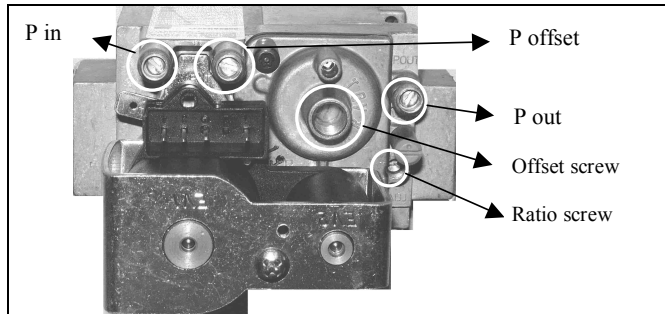
## 6. ADJUSTEMENT OF THE GAS VALVE

After starting the system, it is not necessary to set the gas valve, it was already done in the factory.



**In case of replacement, only a qualified person is allowed to set the new gas valve. An inappropriate setting can cause an overheating, a non-ignition of the burner or the emission of carbon monoxide.**

**Use a calibrated combustion analyser and place the probe in the provided hole.**



In order to set the gas valve, there are 2 setting screws :

- Ratio screw : for the operation at low capacity
- Offset screw : for the operation at high capacity

Turning on the appliance at its high speed by pressing the servicing button **S1** for 10 seconds then press it again. The display shows alternatively H and b.

Research the appropriate CO<sub>2</sub> values in the technical specifications of the table 5.

- ❑ 1) Check the CO<sub>2</sub> at high speed (High mode).  
Decrease the CO<sub>2</sub> by turning the Ratio screw in clockwise (less gas).  
Increase the CO<sub>2</sub> by turning the Ratio screw in anticlockwise (more gas).
- ❑ 2) Then check the CO<sub>2</sub> at low speed (Low mode) by pressing twice the **S1** button, then press it for 10 seconds.  
The CO<sub>2</sub> level at low speed shall be lower than the CO<sub>2</sub> level at high speed.  
Decrease the CO<sub>2</sub> by turning the Offset screw in clockwise.  
Increase the CO<sub>2</sub> by turning the Offset screw in anticlockwise.

After have set the CO<sub>2</sub> at low speed, go back to high speed and readjust the CO<sub>2</sub> level. Then go back to low speed to eventually readjust the CO<sub>2</sub> level.

Repeat these steps until the 2 values are correct.



**Do never forget to check the CO level (carbon monoxyde) of the appliance !!!  
Too much CO means mainly that the mix air/gas is to rich.  
The CO value has to be always lower than 100 ppm.**

In the case of AMC 78, 97 and 116 models, check respectively at low and high capacity the 2 heating units and adjust if necessary.

After this control, the 2 units shall heat together.

## 7. TROUBLESHOOTING

### 7.1 Generality

In order to facilitate the fault detection, the display on the control board indicates a code which corresponds to a diagnosis. On the **MULTITHERM** screen will appear a code too.  
(See the diagnosis list below).

Take care of the reaction time of the heater (do not react too quickly!) as well as the warning LED.

#### **Cause of default conducting to a safety state of the appliance and requiring rearming.**

Display	Default	Cause / Solution
Alternatively <b>A</b> and <b>0</b>	Internal default	Defective control board, replace it
Alternatively <b>A</b> and <b>1</b>	Ignition default	While 5 seconds, presence of flame then the flame disappears : <b>Cause 1</b> No flame : <b>Cause 2</b>
Alternatively <b>A</b> and <b>2</b>	Overheating of the exchanger	Overheating default state of the heat exchanger: <b>Cause 3</b>
Alternatively <b>A</b> and <b>3</b>	Default of the overheating probe	The overheating probe of the exchanger go to a default state: <b>Cause 4</b>
Alternatively <b>A</b> and <b>4</b>	Flame default	Flame default in repetition during the operation: <b>Causes 1</b> or <b>5</b>
Alternatively <b>A</b> and <b>5</b>	Internal default	Defective control board, replace it
Alternatively <b>A</b> and <b>6</b>	Default of the overheating probe	Default of the electric connection: <b>Cause 10</b>
Alternatively <b>A</b> and <b>7</b>	Flame detection	Ionisation without presence of flame : check the electrode and the cable
Alternatively <b>A</b> and <b>8</b>	Pre-mix default	The premix is not starting: <b>Cause 6</b> The premix is operating: <b>Cause 7</b>
Alternatively <b>A</b> and <b>9</b>	Pressure switch default	The burner fan is not working: <b>Cause 6</b> The burner fan is working: <b>Cause 7</b> The combustion air through the heat exchange is not sufficient: <b>Cause 11</b>

#### **Cause of default conducting to a safety state.**

**After removing the defective part, the appliance will work again.**

Display	Default	Cause / Solution
Alternatively <b>E</b> and <b>0</b>	Internal default	Defective control board, replace it
Alternatively <b>E</b> and <b>1</b>	1 <sup>st</sup> overheating probe	Overheating of the exchanger, after cooling, the appliance will restart: <b>Cause 3</b>
Alternatively <b>E</b> and <b>2</b>	Appliance identification default	The identification of the appliance is not correct: <b>Cause 8</b>
Alternatively <b>E</b> and <b>3</b>	Appliance identification default	The identification of the device is not correct: <b>Cause 8</b>
Alternatively <b>E</b> and <b>9</b>	Problème lors du réarmement	Repetition of the rearms in a short time: <b>Cause 9</b>

#### **Cause 1 : While 5 seconds, presence of flame then the flame disappears.**

- The flame is not detected. Check the ionisation probe and the cable.  
(Electrical resistance shall be around 1 kΩ)
- Bad earth connection, hence a too weak ionisation current.
- The control board is defective, replace it

#### **Cause 2 : No flame.**

- No gas or gas pressure too weak. Check the gas pressure upstream the gas valve.
- The mix air/gas is not correct. Check the setting of the gas valve (page 15).
- The gas valve is not opening. Check, while sparking that the electric supply of the gas valve is 230V.
- Check if there is sparks. Remove if necessary the ionisation probe or cable.

#### **Cause 3 : Overheating of the exchanger.**

- Overheating of the exchanger: check if the main fan is operating normally.
- Check the setting of the gas valve (page 15)

**Cause 4 : the overheating probe of the exchanger go to a default state.**

- The probe is compound of 2 resistances. Measure the resistance of each element. The resistance values shall be 20k $\Omega$  at 25° and 25k $\Omega$  at 20°.  
If they are varying too much, or if the difference between the 2 resistances is too big, replace the probe.
- Do a rotation of a quarter turn of the probe (on its axis) in order to modify the surface of contact where the temperature is measured.

**Cause 5 : Flame default in repetition during the operation.**

- Bad earth connection of the heater.
- The setting of the gas valve is not correct. Modify the setting (page 15).
- The combustion products duct is obstructed

**Cause 6 : The premix is not starting.**

- The premix is blocked: check the burner fan.
- The premix is under tension: check the wiring

**Cause 7 : The premix is operating but not the appropriate speed.**

- Check if the premix is not dirty.
- Check if the premix can turn freely.
- Check the electric wiring. (see the scheme at page 24 and 25)

**Cause 8 : The identification of the appliance is not correct**

- Check if the identification resistances are well connected on the control board. If necessary, replace the identification resistances.

**Cause 9 : Trouble when rearming the appliance.**

- If in a short time, the rearming button was pressed to often, this default will disappear after some time. By cutting the electric supply, this problem will be solved.

**Cause 10 : The control board is not reacting.**

- The J4 connector is not well engaged or there is a bad electrical connection between the terminals 5 and 11 of this connector.
- The control board is defective, replace it
- One of the 2 fuses is defective, replace it

**Cause 11 : The combustion air through the heat exchange is not sufficient**

- Check if there is no air leak inside the exchanger.
- Check the connection of the pressure switch and its operation.

**Cause 12 : The exhaust gases sensor detects an error.**

- The temperature of exhaust gases > 120°C, check the CO and CO<sub>2</sub> values.  
Check the settings of the gas valve (page 17)
- Bad connection of the temperature sensor: check the wiring
- Defective temperature sensor: the value of the resistance shall be 20k $\Omega$  at 25° and 25k $\Omega$  at 20°.

**The warm air heater is working but there are other troubles**

**There is a detonated ignition of the burner.**

- Check the gas valve setting: a proper CO<sub>2</sub> level in the combustion products at high and low speed is important for a good ignition.
- Check the ignition cable.
- Check the position of the ignition electrode, sparking shall take place between the 2 electrodes and not between an electrode and the burner.

**Insufficient output of the heater.**

- The heat provided by the appliance will be not sufficient if the pressure drops in the duct are too high. In good conditions, the pressure drops of the exhaust gases are not greater than 30 Pa.

**The main fan is not working or the rotation speed is not varying.**

- Check the operation of the main fan by connecting it directly to the 230V. If the fan is working properly, it means that the problem is coming from the control board because it sets the rotation speed of the main fan between 800 and 1300 tr/mn. Replace the control board.

## 8. MAINTENANCE

The heater shall be controlled and if necessary cleaned regularly (at least one or two times a year) by a qualified installer. This is especially important if the appliance is used in hard conditions such as dusty or wet area or used with a high intensity.

### 8.1 Main inspection of the appliance

- Check the main state of the installation. Inspect the heater, the thermostat, the wires, the gas pipe and the combustion products duct.
- Control the CO<sub>2</sub> and CO level into the combustion products, as well at high speed that at low speed (see chapter 6, page 17).

### 8.2 Appliance servicing



**Before begin the servicing, shut the electric and gas supplies.**

- Disassemble the burner/premix by unscrewing the 8 hex bolts.
- Check inside the exchanger that it is not dirty or damaged
- Check the state of the burner, if necessary, clean up the electrode helps to fine sandpaper. Take care to not twist the electrode.
- Check the duct.
- Eventually clean inside the appliance with a vacuum cleaner.
- Clean outside the exchanger, the blades of the main fan with compressed air or a cloth or a smooth brush. Do never use a metallic brush !
- Reassemble the burner (use new seals).

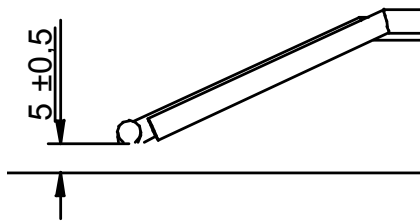
Once the servicing done, open the electric and gas supplies.

- Check once again the levels of CO<sub>2</sub> and CO of the combustion products.
- Check the proper operation of the heater.

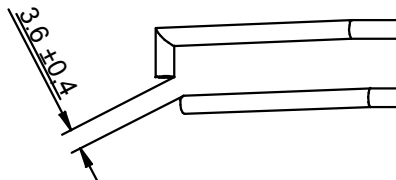
### 8.3 Ignition electrode

In order to obtain a proper ignition of the burner, it is important that the electrode is set correctly.

- The distance between the electrode and the burner have to be of  $5.0 \pm 0.5$  mm.



- The distance between the 2 electrodes have to be of  $3.6 \pm 0.4$  mm

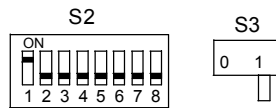


- It is important that the sparkling take place between the 2 electrodes and not between one electrode and the burner. It can conduct to a detonated ignition of the heater.

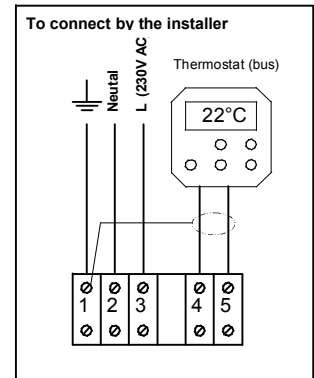
## 9. REGULATION EXAMPLE OF AMC HEATERS

### 9.1 Individual regulation with MULTITHERM C or S (only one unit of AMC 12 to 58)

- Connect the thermostat to the terminals **4** and **5** according to the scheme shown beside.
- Check the setting of the micro switches **S2** and **S3**.



The modification of the position of micro switches shall be done with the power supply off. If it is not the case, the modification will not be taken into account by the appliance.



### 9.2 Centralized regulation with MULTITHERM C or S (many warm air heaters AM 12 to 58)

The thermostat can regulate from **1** to **8** heaters AM 12 to 58.

The modification of the position of micro switches shall be done with the power supply off. If it is not the case, the modification will not be taken into account by the appliance.

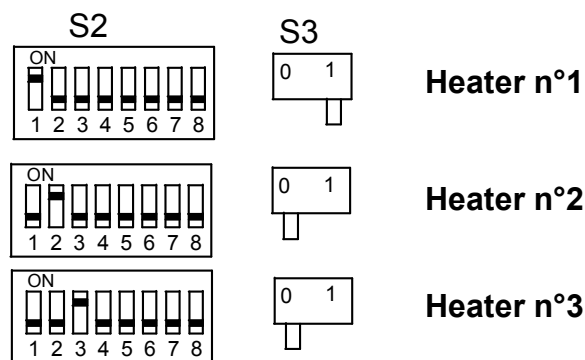
Proceed as following :

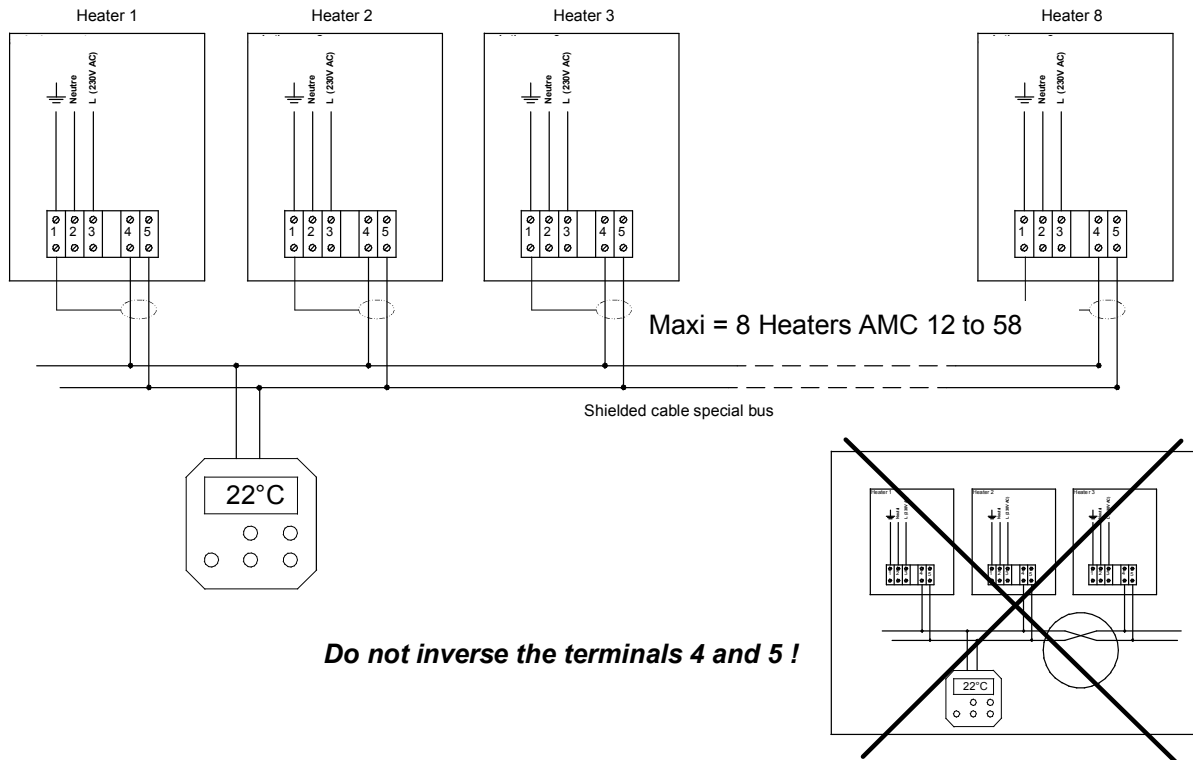
- Connect the thermostat to the terminals **4** and **5** of the heaters (in parallel).
- Assign to each unit a proper number from **1** to **8** by switching the micro switch on ON (to set with **S2** on the control board)
- On the appliance where it is assigned the number **1**, the micro switch **S3** shall be on position **1**. On the **other heaters**, the **S3** switch will be on position **0**.



**If the micro switch S3 of the MULTITHERM supply is in position 1 in several warm air heaters, the system will not work.**

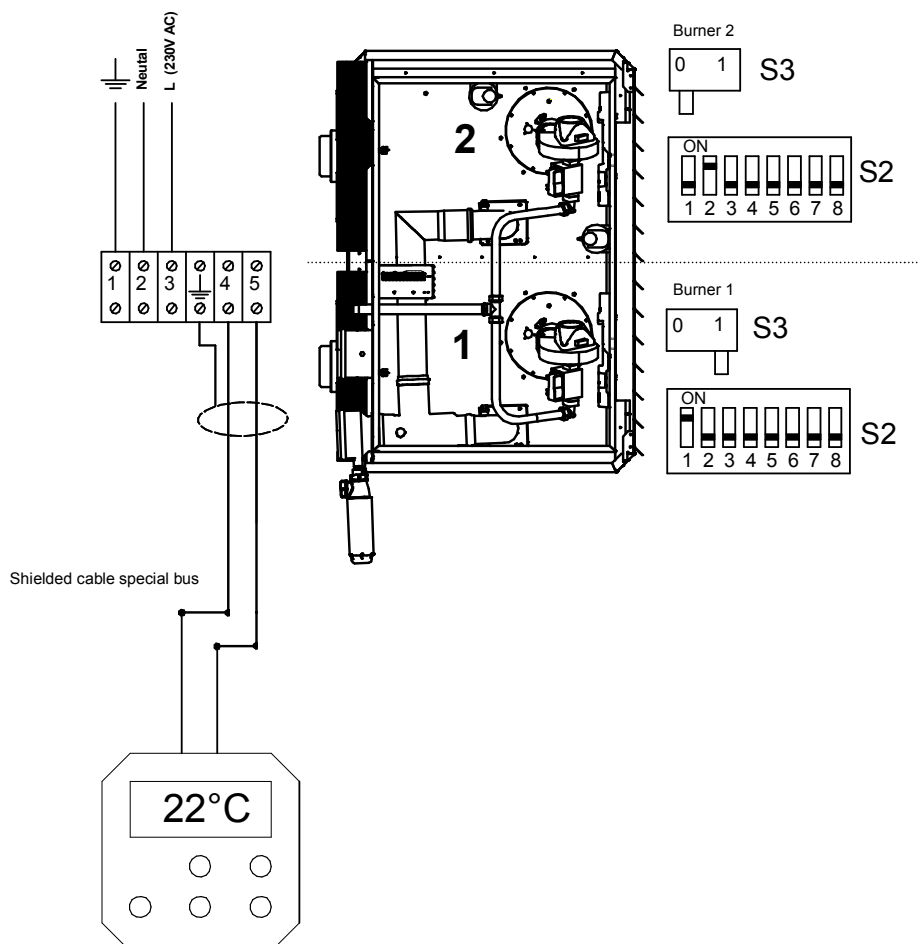
The operation of the **MULTITHERM** stay the same that in the case of centralized regulation.





### 9.3 Individual regulation with MULTITHERM C or S (only one unit of AMC 78 to 116)

- Connect the thermostat to the terminals **4** and **5** according to the scheme shown below
- Check the setting of the micro switches **S2** and **S3**.
- The modification of the position of micro switches shall be done with the power supply off. If it is not the case, the modification will not be taken into account by the appliance.



## 9.4 Centralized regulation with MULTITHERM C or S (many warm air heaters AMC 78 to 116)

The thermostat can regulate from 1 to 4 heaters AMC 78 to 116 maximum, whether 8 burners.

The modification of the position of micro switches shall be done with the power supply off. If it is not the case, the modification will not be taken into account by the appliance.

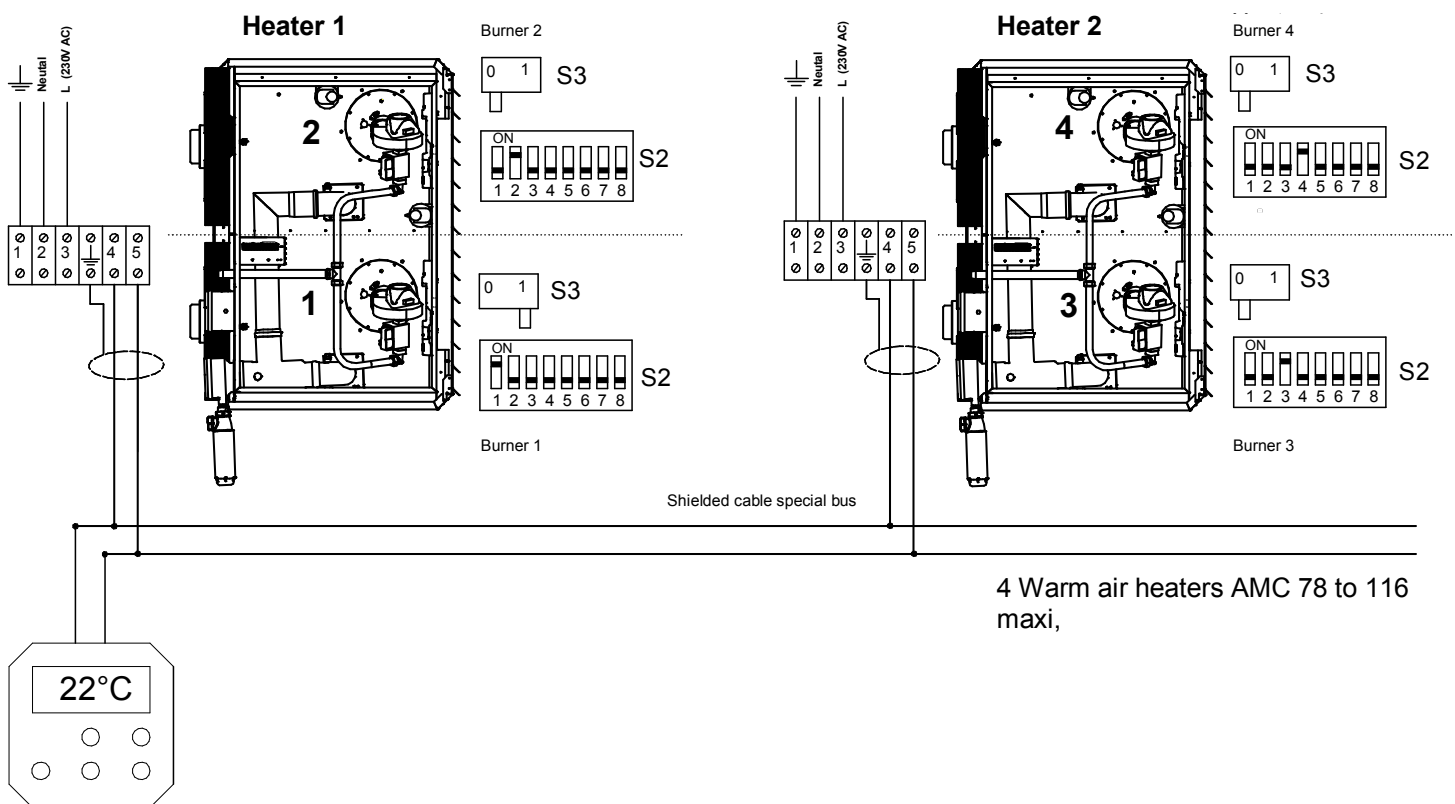
Proceed as following :

- Connect the thermostat to the terminals 4 and 5 of the heaters (in parallel).
- Assign to each unit a proper number from 1 to 8 by switching the micro switch on ON (to set with **S2** on the control board)
- On the appliance where it is assigned the number 1, the micro switch **S3** shall be on position 1. On the **other heaters**, the **S3** switch will be on position 0.



**If the micro switch S3 of the MULTITHERM supply is in position 1 in several warm air heaters, the system will not work.**

The operation of the **MULTITHERM** stay the same that in the case of centralized regulation.

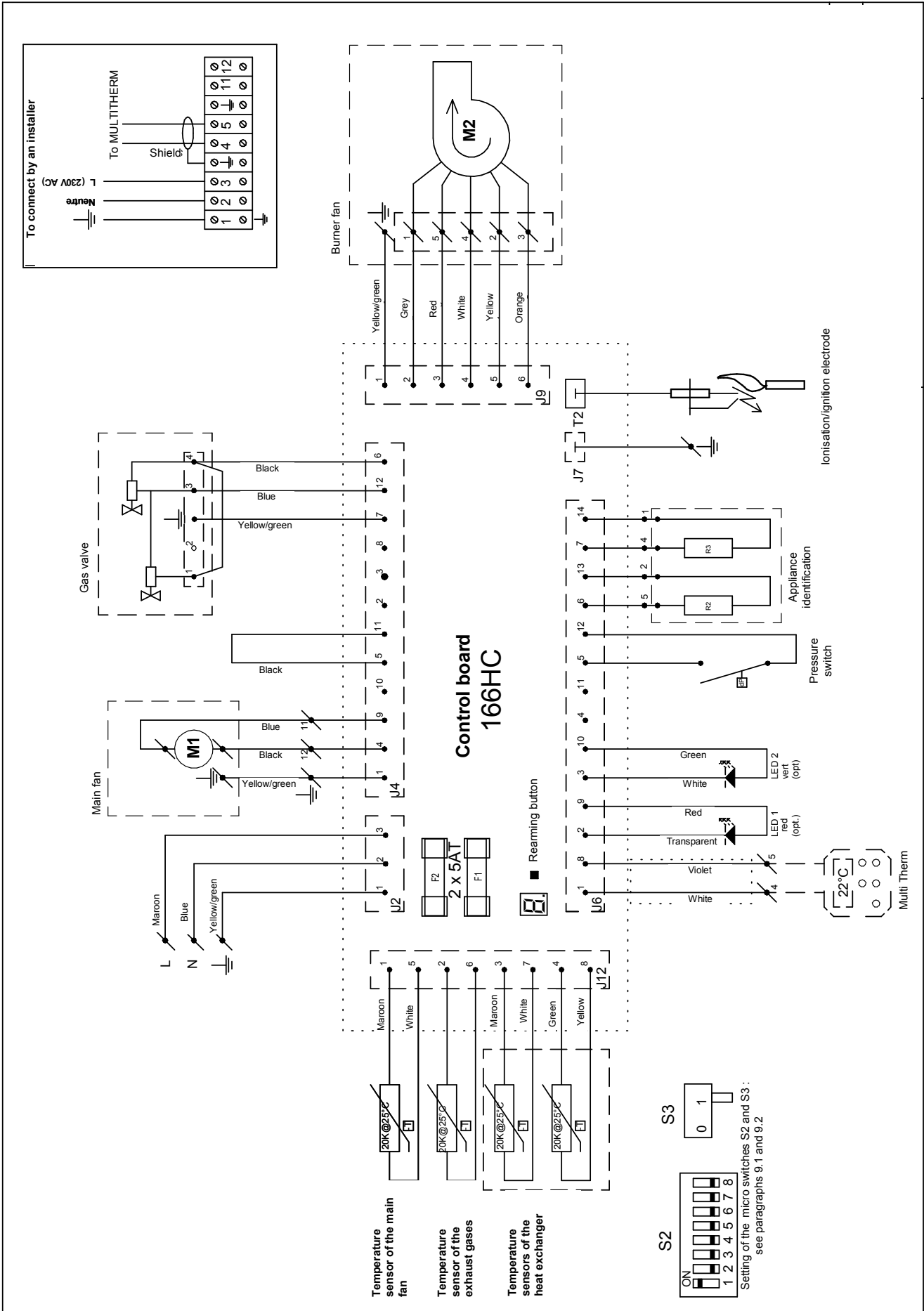


## 9.5 Regulation from a Building Management System (BMS)

The **Interface Board** (option) allow regulating warm air heaters AM helps to a Building Management System (BMS) using 0-10V signal (Ref SBM: **5760003** INTERFACE BOARD MULTITHERM-BMS). For the supply of the interface, please contact SBM.

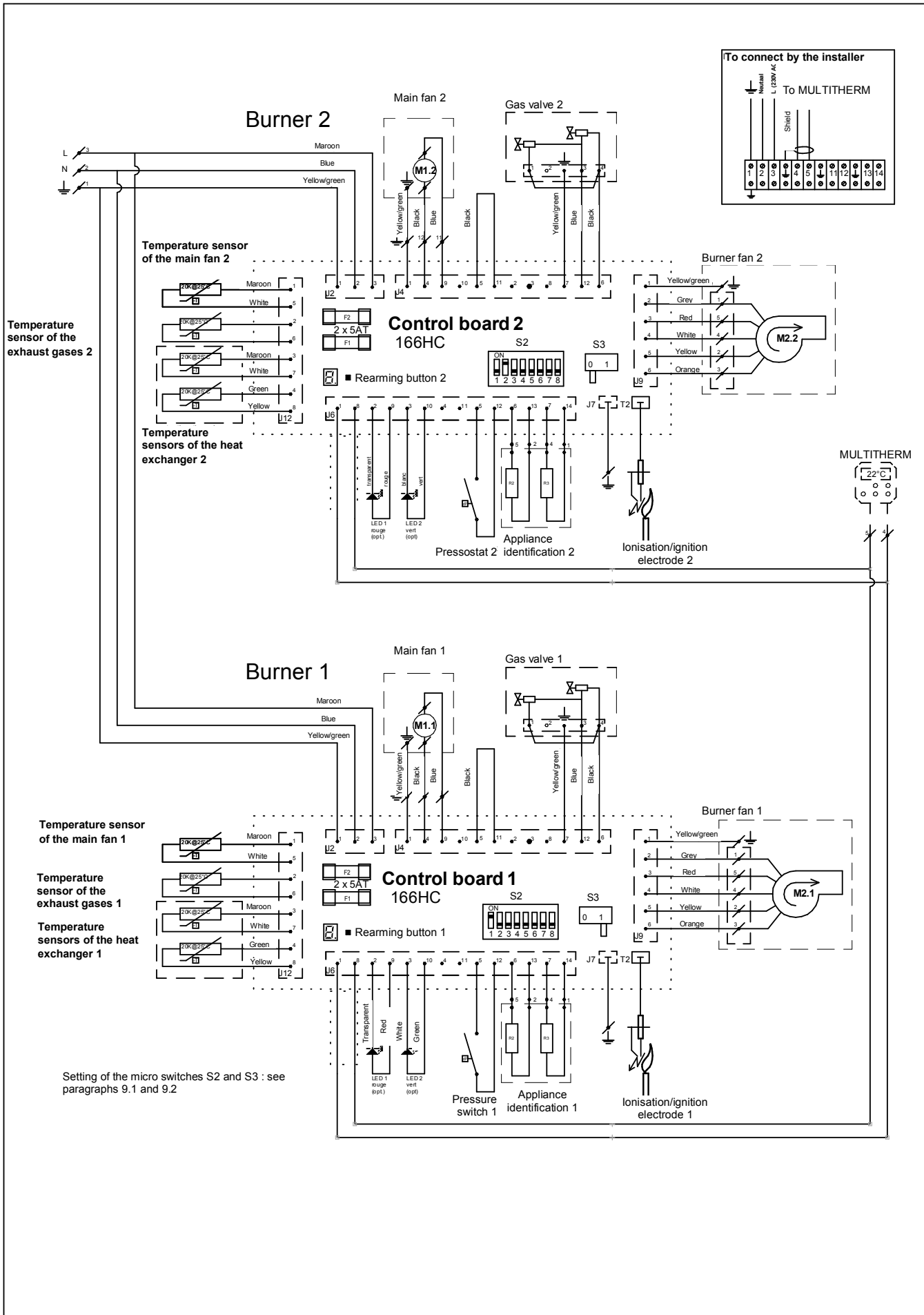
# 10. INTERNAL ELECTRIC DIAGRAM

## 10.1 AMC 12 to 58 warm air heaters





## 10.2 AMC 78 to 116 warm air heaters

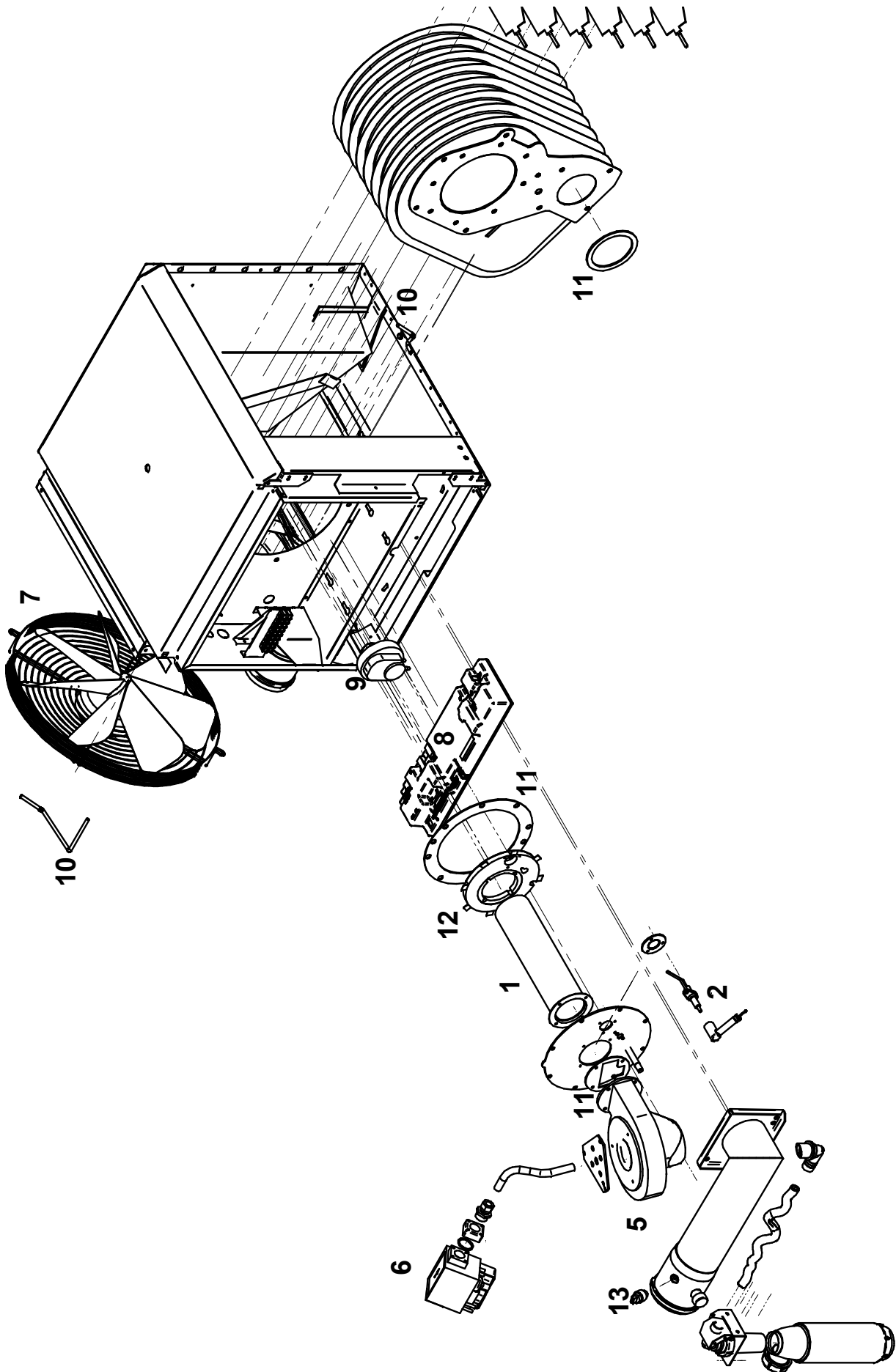


# 11. SPARE PARTS

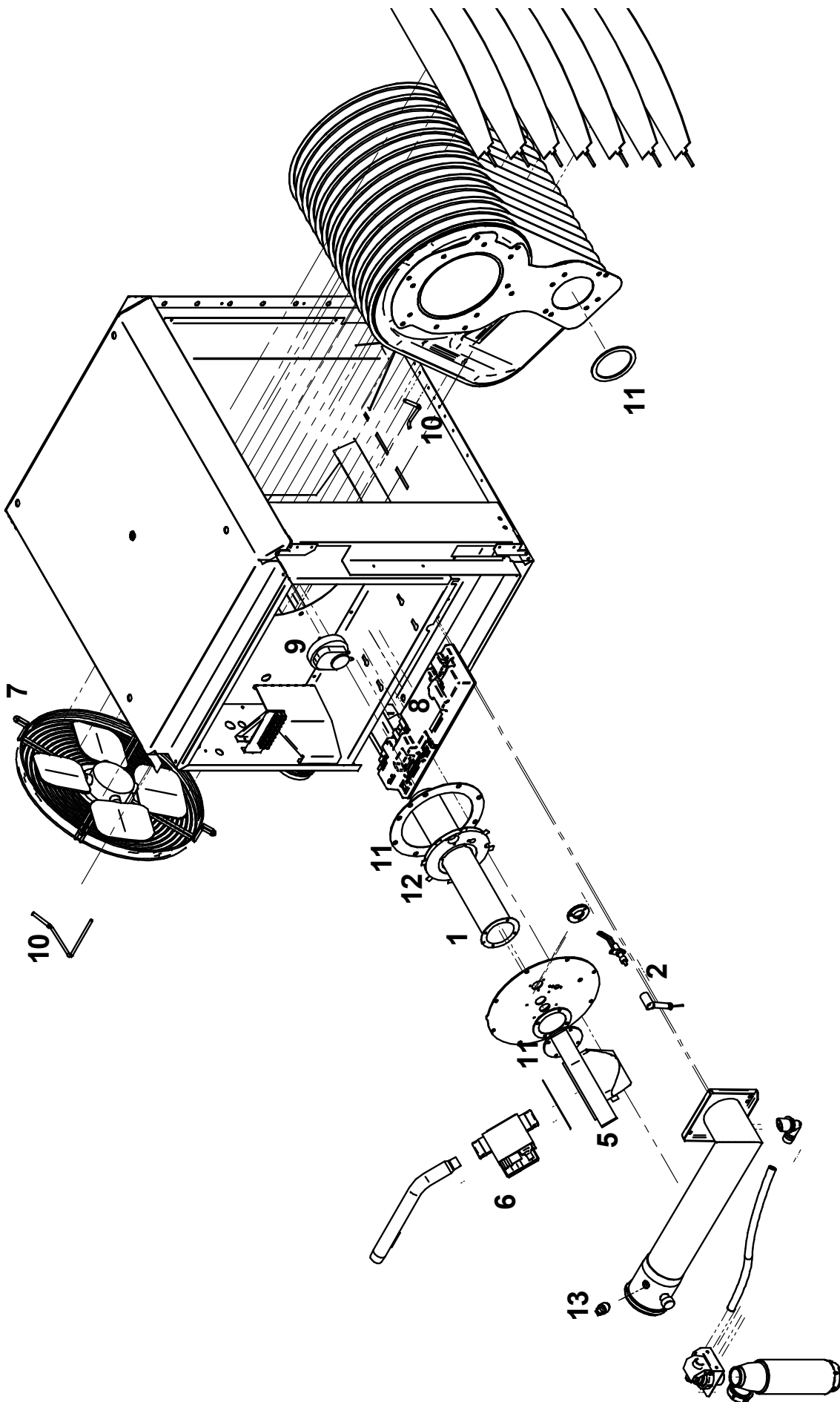
## 11.1 Spare parts

Rep.	Designation	AMC 12	AMC 19	AMC 29	AMC 39	AMC 48	AMC 58	AMC 78	AMC 97	AMC 116
<b>1</b>	NG BURNER AMI/AMC (For natural gas G20-G25)	5850000	5850001	5850002	5850002	5850003	5850004	5850002	5850003	5850004
<b>1</b>	PROPANE BURNER AMC (For propane G31)	5850010	5850011	5850012	5850013	5850014	5850015	5850016	5850017	5850018
<b>2</b>	IGNITION/IONI. PROBE AMI/AMC	5850019	5850019	5850019	5850019	5850019	5850019	5850019	5850019	5850019
<b>5</b>	PREMIX FAN AMI/AMC (Premix fan)	5850020	5850020	5850020	5850020	5850020	5850020	5850020	5850020	5850020
<b>6</b>	SIGMA VALVE 848 AMI/AMC (Gas valve SIT SIGMA 848)	5850021	5850021	5850021	5850021	5850021	5850021	5850021	5850021	5850021
<b>7</b>	MAIN FAN AMI/AMC (Helicoidally fan)	5850022	5850022	5850022	5850023	5850035	5850035	5850023	5850035	5850035
<b>8</b>	CONTROL BOARD AM/AMC (Control board Argus 0166-HC)	5850025	5850025	5850025	5850025	5850025	5850025	5850025	5850025	5850025
<b>9</b>	PRESSURE SWITCH AM/AMC (Pressure switch)	5850026	5850026	5850026	5850026	5850026	5850026	5850026	5850026	5850026
<b>10</b>	OVERHEATING PROBE AMC (Overheating probe CTN)	5850028	5850028	5850028	5850028	5850028	5850028	5850036	5850036	5850036
<b>11</b>	GASKET BURNER/EXCH. AMC (Set of gasket. inlet and outlet of heat exchanger, premix, rear panel)	5850030	5850030	5850031	5850031	5850031	5850031	5850031	5850031	5850031
<b>12</b>	INS. BURN. AMC (Insulation of the burner + flange)	5850032	5850032	GA6704	5850033	5850033	5850033	5850033	5850033	5850033
<b>13</b>	EXHAUST GASES PROBE AMC (Exhaust gases probe)	5850034	5850034	5850034	5850034	5850034	5850034	5850034	5850034	5850034

11.2 Exploded view of AMC 12 to 19



11.3 Exploded view of AMC 29 to 58



11.4 Exploded view of AMC 78 to 116

