Gas-fired air heaters

MEC 25÷85
MEC 35÷85 C

ACCORRONI®
E. G.

Technical information

MEC 25÷85 - MEC 25÷85 C

GAS-FIRED AIR HEATERS
MEC - MEC C SERIES
Models 25 - 30 - 35 - 50 - 57 - 85

Technical information

This manual is divided into three sections:

- ***SECTION 1 - GENERAL INFORMATION***
  It contains all the information relative to the description of the air heaters and their technical features
- ***SECTION 2 - TECHNICAL INFORMATION FOR THE INSTALLER***
  It contains all the instructions and prescriptions that the technical installer must comply with to ensure effective plant operation
- ***SECTION 3 - USER OPERATING AND MAINTENANCE INSTRUCTIONS***
  The section is reserved for the user and contains all the information needed to use the appliance correctly and to perform periodic tests

Important notes:

1 - To use the appliance correctly and safely, the installer, the user and the maintenance man, for their respective competencies, must comply with what is indicated in this manual.
2 - The word **WARNING**! is followed by information which, because of its importance, must be carefully observed and for which non-compliance may damage the appliance and/or reduce operating safety.
3 - The paragraphs written with **bold** characters contain important information, warnings or recommendations which should be carefully considered.
4 - The technical data, styling characteristics, components and accessories reported in this manual are not binding. A2B Accorroni E.G. S.r.l. reserves the right to make changes, at any time, that are considered necessary to improve the product.
5 - The lawful references, standards or technical rules mentioned in this manual are presented merely for the sake of information and should be considered valid as of the date this manual is printed, as indicated on the last page. If new regulations or amendments to current laws go into effect, this will not obligate A2B Accorroni E.G. S.r.l. in any way with regard to others.
6 - A2B Accorroni E.G. S.r.l. is responsible for ensuring that its product conforms to the laws, directives and construction standards in force at the time the product is sold. Knowledge and compliance with legal regulations and standards regarding plant design, installation, operation and maintenance are the exclusive responsibility, for the respective competencies, of the designer, installer and user.

SUMMARY

SECTION 1 - GENERAL INFORMATION page

FIGURE SUMMARY

SECTION 1 - GENERAL INFORMATION

1. PRINCIPAL CHARACTERISTICS

1.1 APPLIANCE CLASSIFICATION

These appliance are defined as “Gas-fired air heaters with an atmospheric burner equipped with a fan in the combustion circuit”.

In addition, they are classified according to harmonised European standards EN 437 and prEN 1020 into:

category - according to the types of gas, at the different supply pressures, that they can use;

type - according to the possible methods to exhaust the combustion productions (*see also 4.3.1*).

1) Category II_{2H3+}

the air heater is suitable to use gas that belongs to two families. The atmospheric burner can be fed with the gas from the second group (natural gas - group H) and the gas from the third group (butane and propane at the two pressure ratings 28-30 and 37 mbar)

2) Type C_{12}

The combustion circuit is sealed with respect to the environment in which it is installed and the combustion air supply and combustion product exhaust lines are connected outside the room by means of ducts which pass directly through the outside wall of the room, including terminals within a square with a 50 cm side.

3) Type C_{52}

The combustion circuit is hermetically sealed with respect to the environment in which it is installed and the combustion air supply and combustion product exhaust lines are connected outside the room by means of ducts with terminals located also on walls not in the room. The combustion products can be exhausted also with a special duct on the roof of the building.

4) Type B_{22}

Combustion air intake is performed within the environment, while the combustion products are exhausted through a duct that passes directly through an external wall or on the roof of a building.

1.2 CERTIFICATION - EC MARKING

The MEC air heaters, as previously described and classified, have obtained the “CE type test certificate” in conformity with EEC Directive 90/396 and with reference to the harmonised European standard prEN 1020. Attaching the CE marking shown below also guarantees that the appliance conforms with EEC directive 73/23 (“Low voltage”) and EEC directive 89/336 (“Electromagnetic compatibility”).

CE

1.3 FUNCTIONAL DESCRIPTION

The MEC warm air heater consists basically of a heat exchanger operating between the combustion products of a gas burner and the air flow exerted by one (models 25-30-35), two (models 50-57) or three fans (model 85).

The air is drawn from the room by the fan(s), conveyed to the exchanger which, operating to the rated temperature by the burner, transfers heat to the air.

With the MEC series appliances, the warm air is inserted directly into the environment and the flow can be directed using the louvers, while with the MEC C series appliances, the warm air can be distributed in the rooms by using special ducts and delivery outlets.

Fan operation is controlled by a thermostat: to prevent cold air from entering the environment, the fan begins operating after the burner is ignited. Instead, the fan is stopped with a short delay with respect to when the burner is extinguished, to allow the exchanger to cool off gradually.

In case of malfunction or if the fan(s) does(do) not turn on and the exchanger overheats, a safety thermostat trips and cuts off the gas flow to the burner.
The combustion products are exhausted outdoors by a centrifugal fan installed after the combustion circuit. If the ducts are obstructed or the fan does not work, a differential pressure switch cuts off the gas flow to the burner.

Air heater operation can be controlled by a room thermostat (not supplied) or from a remote-control panel (supplied on request). With the remote-

control panel the air heater can be used, during the summer, just to ventilate the room, excluding the burner operation.

1.4 CONSTRUCTION CHARACTERISTICS

The casing is built with epoxy-powder painted steel plate to guarantee extended service life.

The air delivery opening is located in the front of the appliance along with the horizontal louvers which can be adjusted manually (MEC), or with a special configuration to connect ducts (MEC C). The exchanger is equipped with the ventilation thermostat and the safety thermostat bulb.

The rear of the appliance includes the following:

- the axial (MEC) or centrifugal (MEC C) convection fan(s) with safety grille
- the connectors to attach the combustion air inlet and combustion product exhaust ducts
- the gas supply connector
- the electric cable entries

The following is installed in a service door on the right side:

- the electric board with relative wiring
- the burner control device
- the appliance reset button with relative illuminated signal
- the safety thermostat
- the differential pressure switch
- the gas unit
- the flue exhaust fan (except model 85)

Instead, only for the model 85, the service door on the left side contains the following:

- the ignition transformer, with relative electrode, serving the second burner
- the gas connector and header with injectors to feed the second burner

The interior of the appliance includes:

- the combustion chamber and the stainless steel heat exchangers
- the flue exhaust fan (model 85 only)
- the stainless steel atmospheric burner including ignition electrodes and flame detector (in model 85 there are two burners installed in opposite positions)

1.5 PACKAGE CONTENTS

The air heater is shipped with cardboard packing and internal protective pieces in pre-formed cardboard. There is an envelope inside the service door of the appliance containing: this technical information manual, the warranty and service documents, what is needed to change the type of gas, along with the relative adhesive label and plug for the combustion product intake hole.

1.6 ACCESSORIES SUPPLIED ON REQUEST

In addition to the material described above, the following accessories can also be supplied on request:

- remote-control panel, including the principal operating commands and signals
- support brackets designed to attach the appliance in a hanging position, for air heater versions with axial (MEC) and centrifugal (MEC C) fans
- combustion product exhaust kit for horizontal wall-mounted exhaust layouts including: rigid duct, length 1 metre, joints and wind protection terminal (duct diameter 80 mm up to model MEC / MEC C 35, 100 mm for models MEC /MEC C from 50 to 85)
- rigid pipes, 45° and 90° bends, 90° bend with condensate drain, connectors and wind protection terminals to create different exhaust configurations, including the vertical roof layout
- kit to supply combustion air from outdoors with protection terminal
- additional air delivery grille with adjustable vertical louvers (MEC)
- drilled polyethylene pipe Ø 400 mm for air distribution in agricultural and zoo-technical applications
- circular connectors for air delivery in polyethylene duct
- air intake connector duct (MEC C)

1.7 FIELDS OF USE

MEC and MEC C air heaters can be used to build modular plants, consisting of one or more appliances, to meet the heating requirements of small spaces such as artisan laboratories, etc., up to large volumes, such as industrial sheds, warehouses, churches and sports facilities.

Therefore, the heat dispersion of the building must be calculated as well as the required heating power, selecting the number and type of air heaters in relation to the values, such as: air flow and throw, head available when using distribution ducts, effective coverage of the areas to be heated, any air changes, etc.

The MEC and MEC C air heaters are built for installation in rooms, whether they are specially designed for the appliances (technical room) or other activities (i.e. directly inside the environment to be heated). The quality and the dimensions of the materials used have been chosen to guarantee a reasonable service life and are suitable to operate the appliances, both in their entirety and relative to their parts, provided that the appliances are professionally installed and are subjected to mechanical, chemical and thermal stress conditions corresponding to normal use.

The air heater must not be installed under conditions for which it was not specifically designed, e.g. where the atmosphere is highly corrosive or salty.

For "open" outdoor installations, it is necessary to use the MEC EX series air heaters, which go beyond the scope of this manual and which have been specifically designed and built for this purpose.

Based on what is prescribed by the current installation standards, the MEC and MEC C air heater applications may be summarised as follows:

- MEC series air heaters with axial, free-delivery fans can be used if there are no special air distribution problems or there are no physical obstacles to obstruct such distribution, such as partitions, shelving or bulky machinery, etc. In these cases, the effective coverage of the areas to be heated must be evaluated in relation to the air throw of the appliances
- MEC C air heaters with ductable centrifugal fans can be used for the cases in which, unlike what was described in the previous paragraph, it is not possible to serve the desired area efficiently with the free air delivery. The MEC C air heaters are also suitable if a filter must be applied to the air intake (in fact, centrifugal fans are needed due to the load losses induced by that filter) and/or a change is required with outdoor air, to be conveyed by ducts.

WARNING! It is important to verify that the design and installation conform with current standards. Ensure that the environment in which the air heater will be installed will not create a hazard, i.e. where excessive (volatile) dust, flammable or corrosive substances and/or vapours and combustible materials may be present.

1.8 DIMENSIONS - MEC series with axial fans - Models 25 - 30 - 35

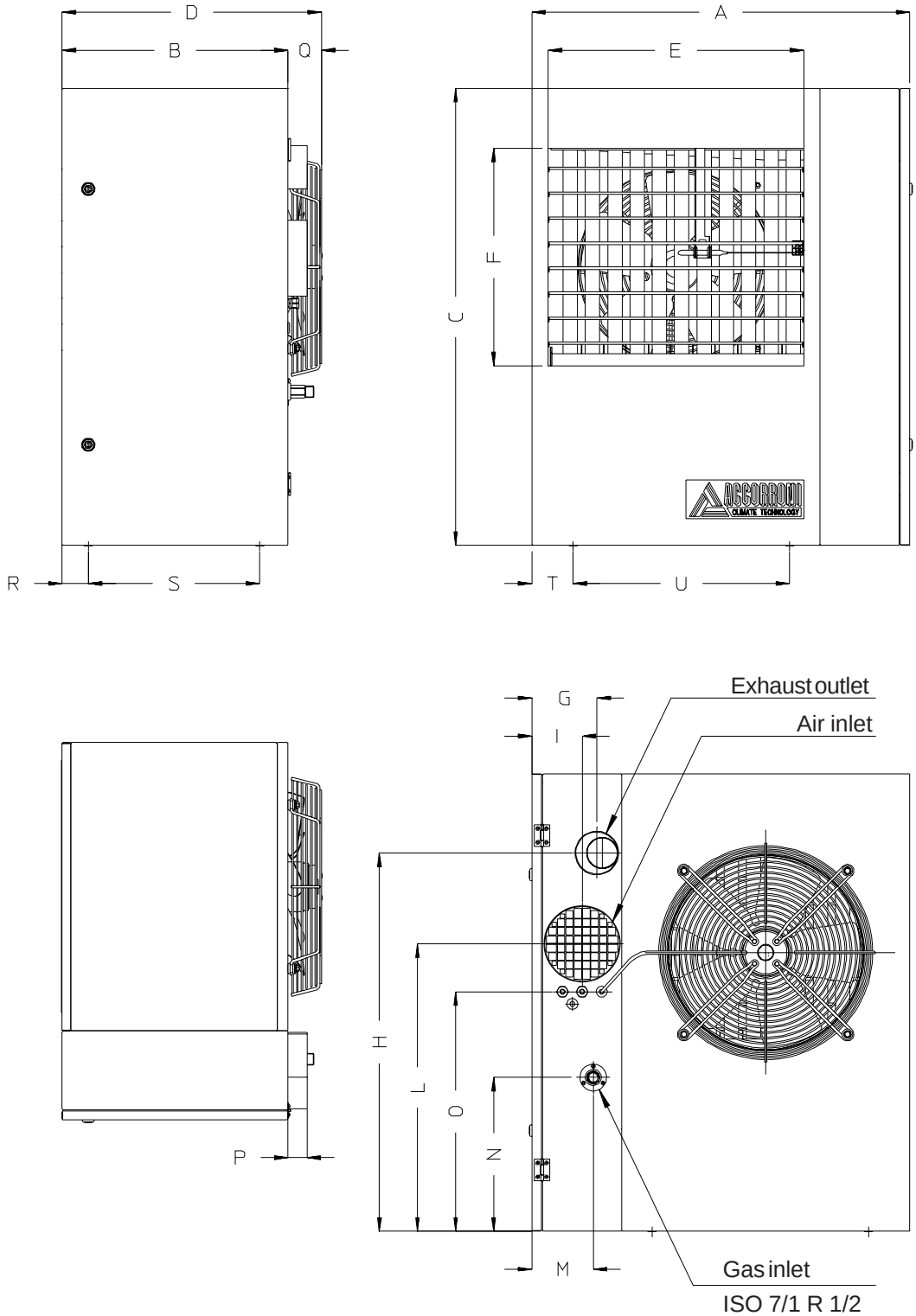
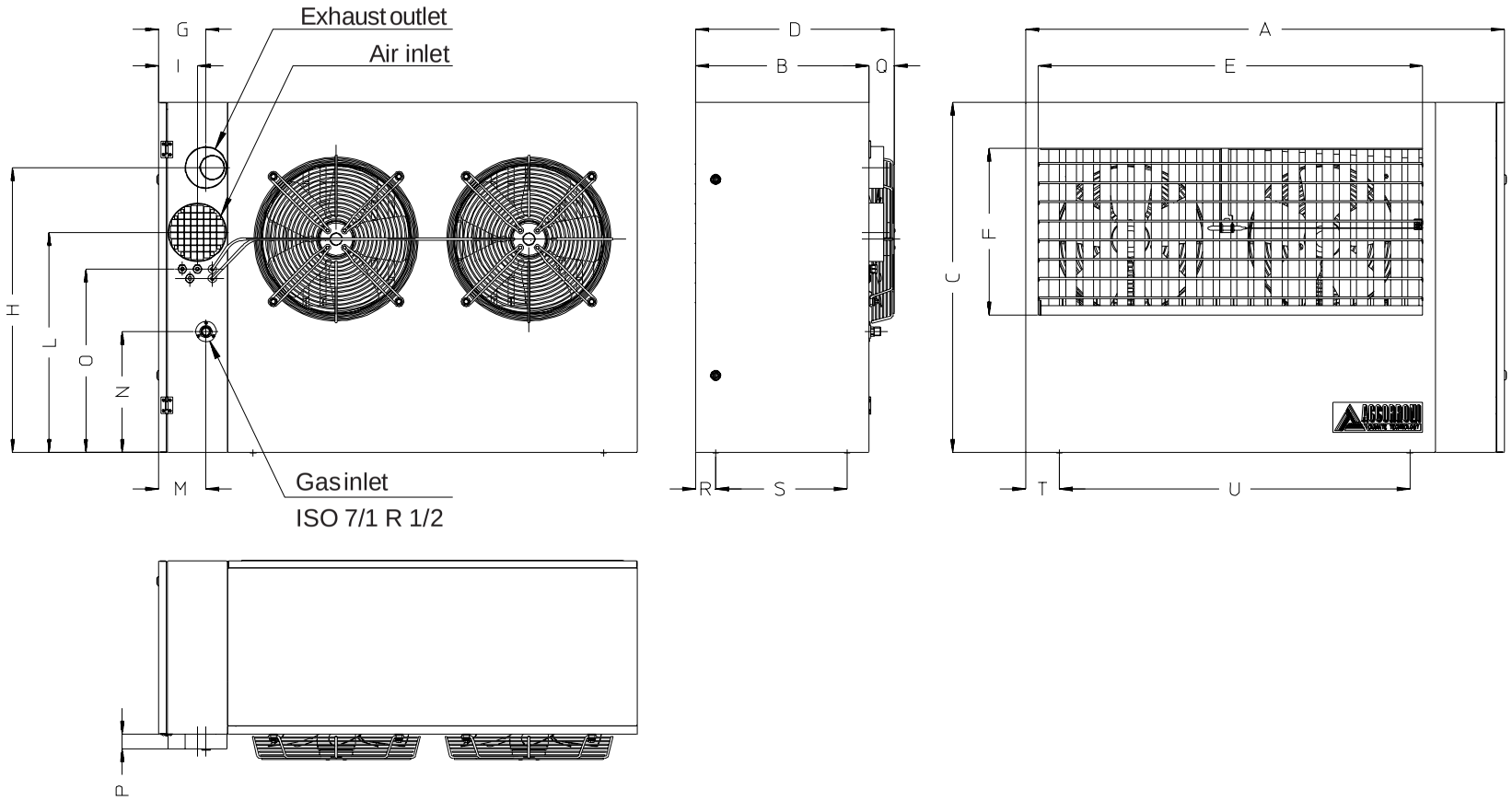


Fig. 1

A	B	C	D	E	F	G	H	I	L	M
695	415	840	477	470	400	120	695	93	528	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
283	440	35	62	48	315	76	398	Ø140	Ø 80	R 1/2"

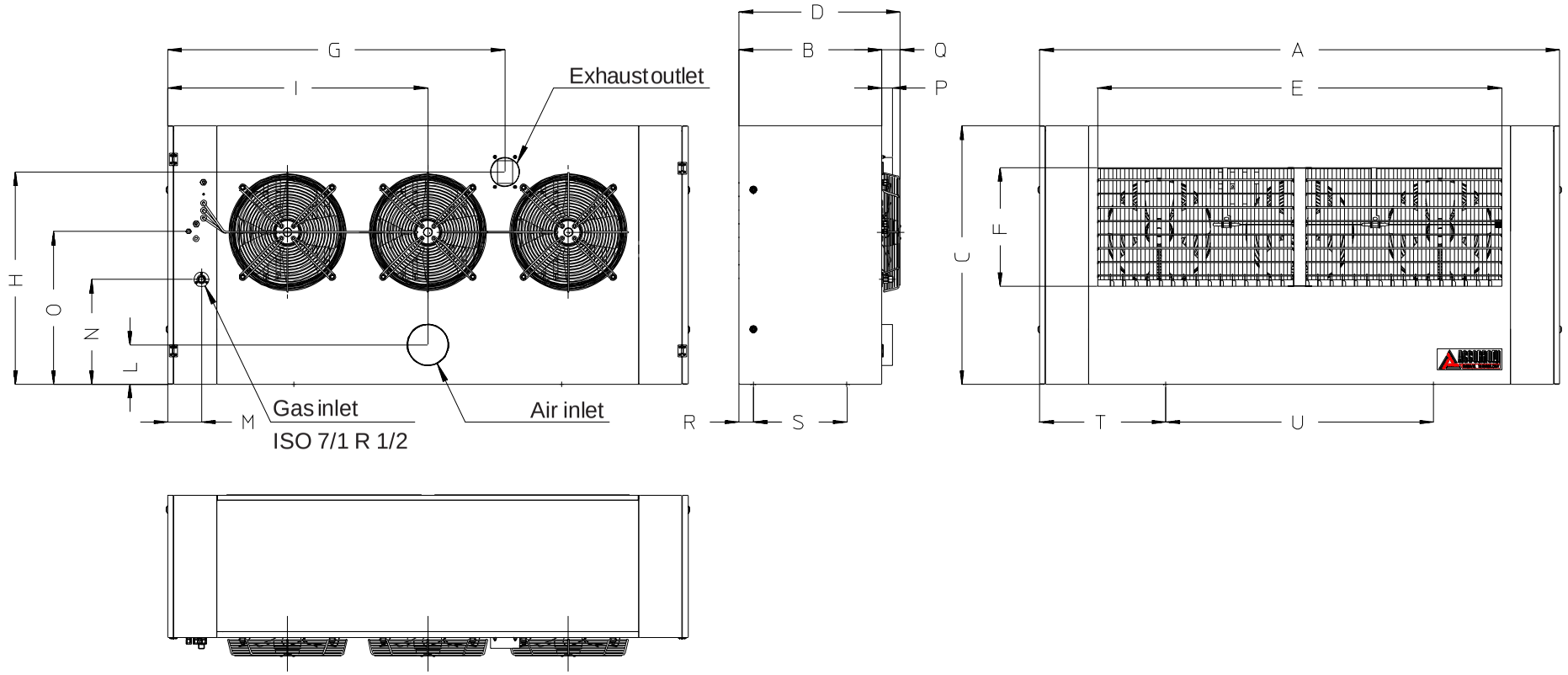
1.8 DIMENSIONS - MEC series with axial fans - Models 50 - 57



A	B	C	D	E	F	G	H	I	L	M
1.147	415	840	477	922	400	113	684	93	528	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
290	440	35	62	48	315	81	840	Ø140	Ø 100	R 1/2"

Fig. 2

1.8 DIMENSIONS - MEC series with axial fans - Model 85



A	B	C	D	E	F	G	H	I	L	M
1.748	480	870	542	1.358	400	1.133	715	874	133	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
353	515	35	62	48	315	424	900	Ø140	Ø 100	R 1/2"

Fig. 3

1.9 DIMENSIONS - MEC C series with centrifugal fans - Models 25 - 30 - 35

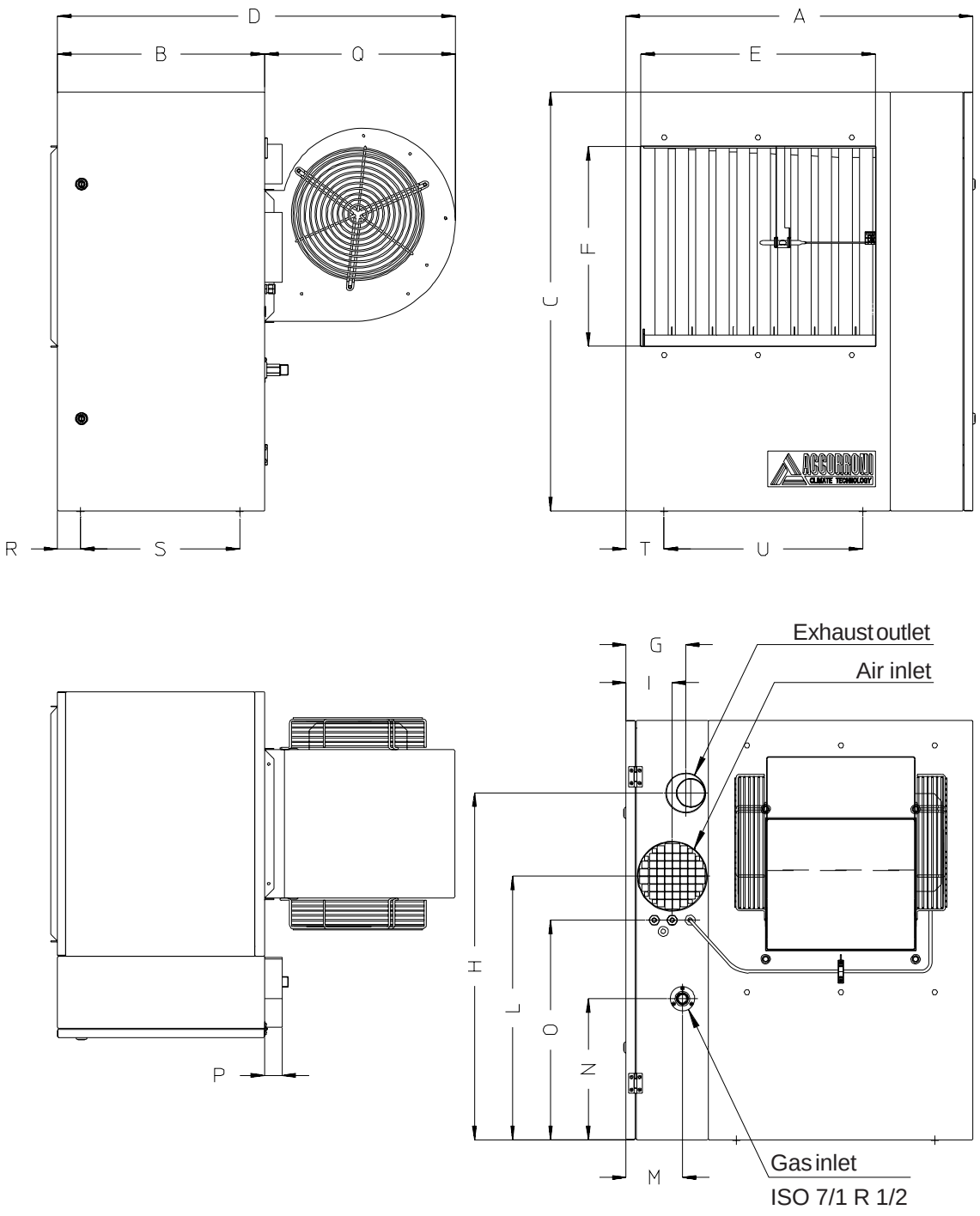
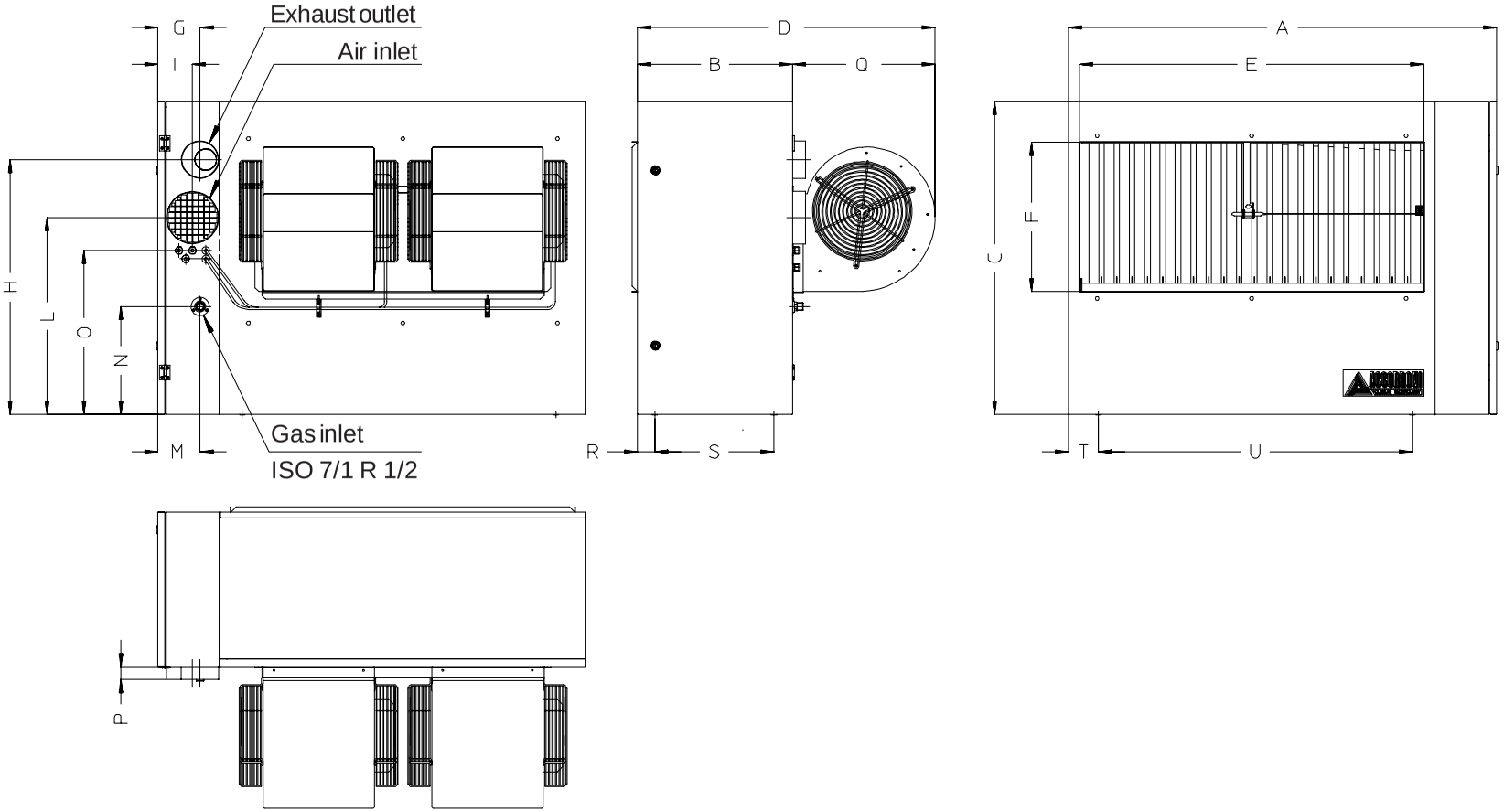


Fig. 4

A	B	C	D	E	F	G	H	I	L	M
695	415	840	797	470	400	120	695	93	528	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
283	440	35	382	48	315	76	398	Ø140	Ø 80	R 1/2"

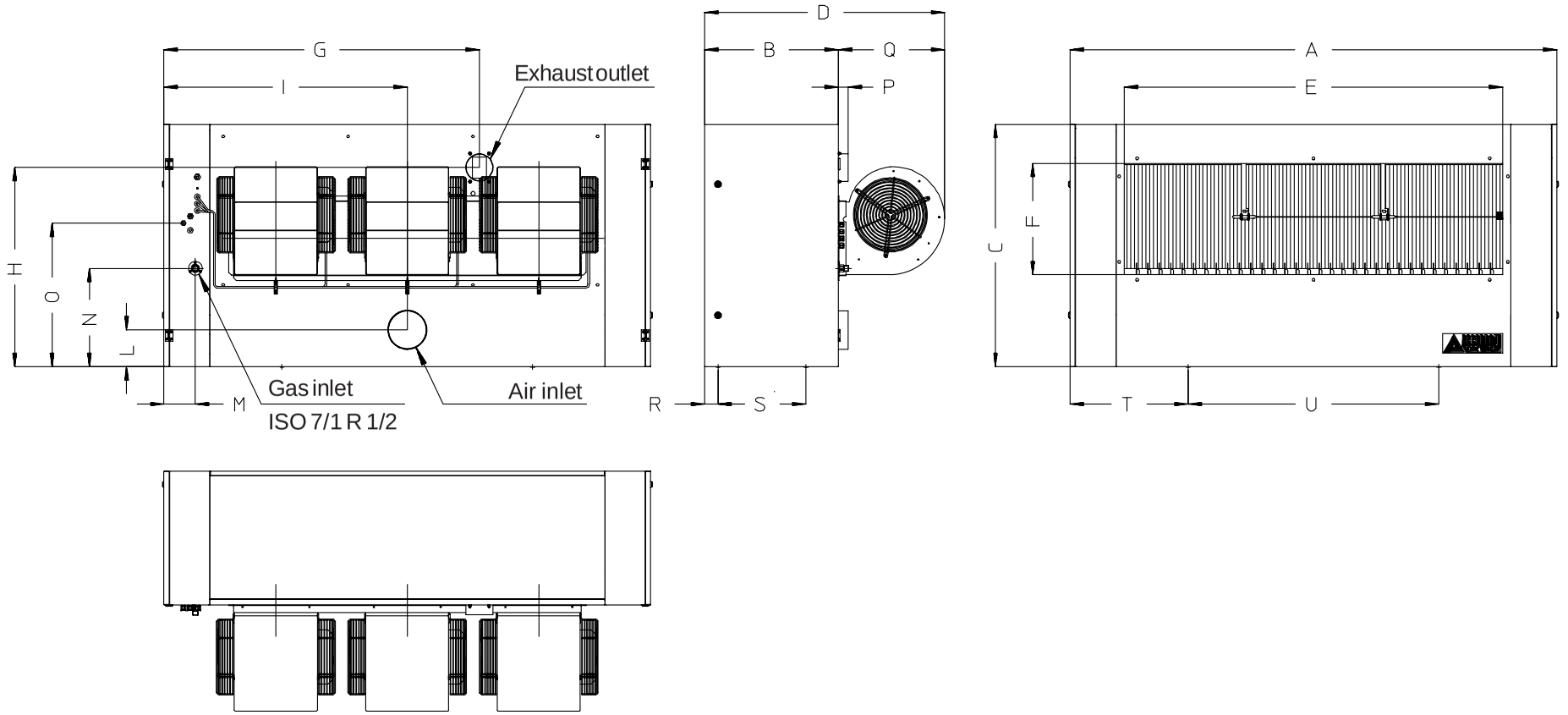
1.9 DIMENSIONS - MEC C series with centrifugal fans - Models 50 - 57



A	B	C	D	E	F	G	H	I	L	M
1.147	415	840	797	922	400	113	684	93	528	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
290	440	35	382	48	315	81	840	Ø140	Ø 100	R 1/2"

Fig. 5

1.9 DIMENSIONS - MEC C series with centrifugal fans - Model 85



A	B	C	D	E	F	G	H	I	L	M
1.748	480	870	862	1.358	400	1.133	715	874	133	113
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Air**	**Flue gas**	**Gas**
353	515	35	382	48	315	424	900	Ø140	Ø 100	R 1/2"

Fig. 6

1.10 EXPLODED VIEW - Models 25 - 30 - 35

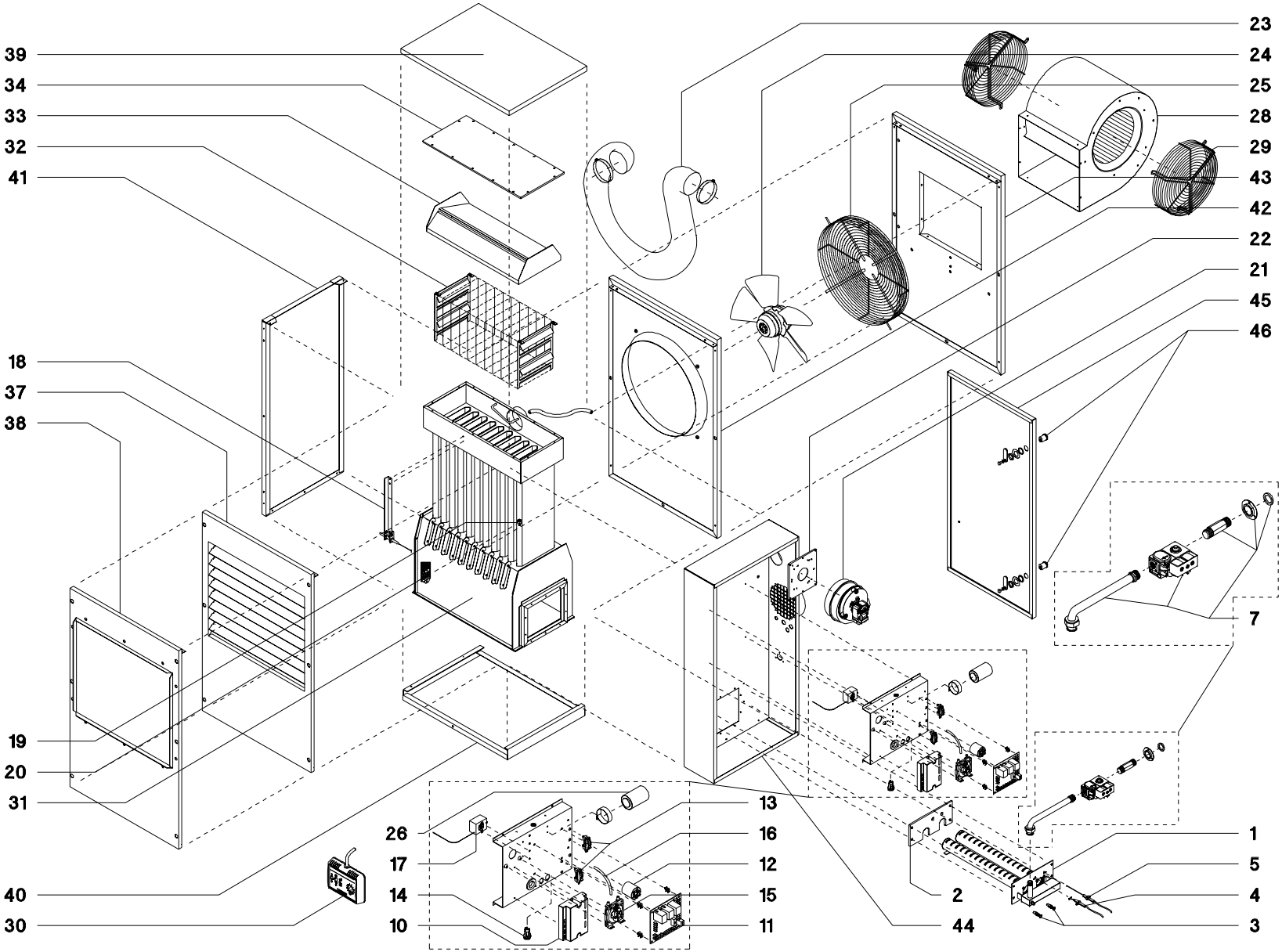


Fig. 7

1.10 EXPLODED VIEW - Models 50 - 57

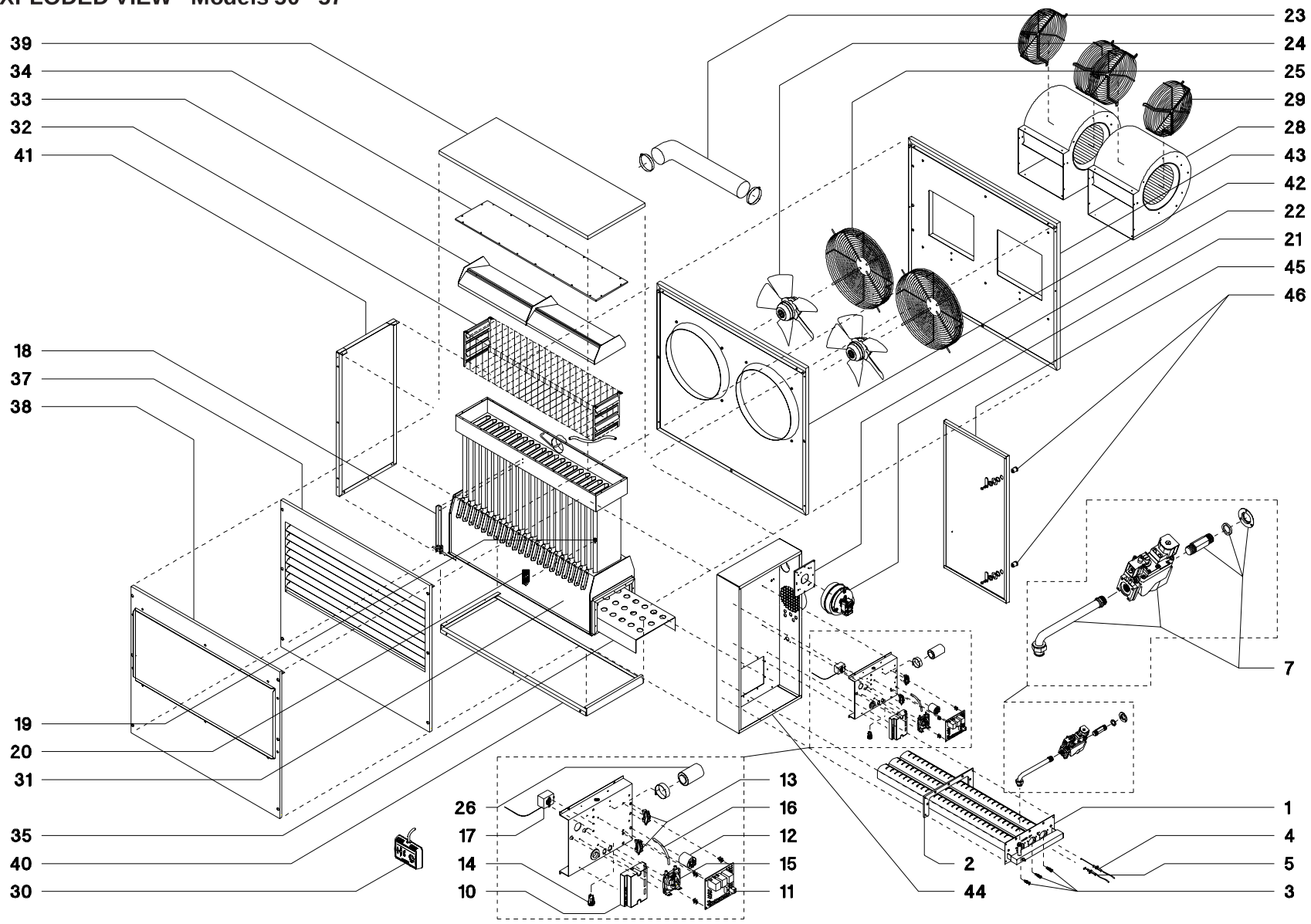


Fig. 8

1.10 EXPLODED VIEW - Model 85

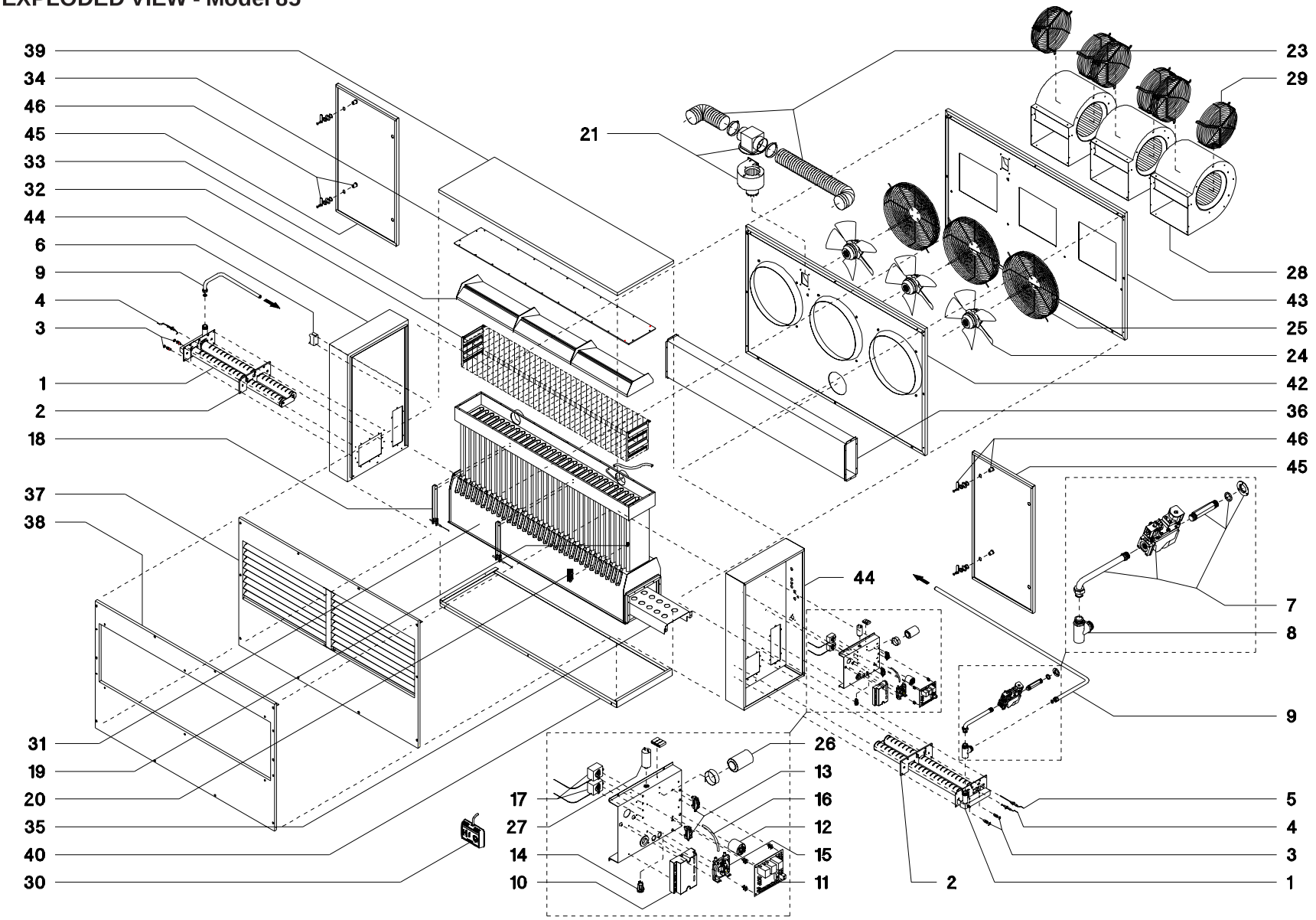
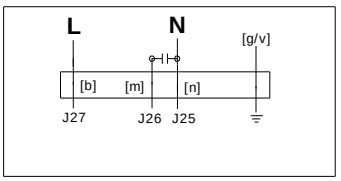


Fig. 9

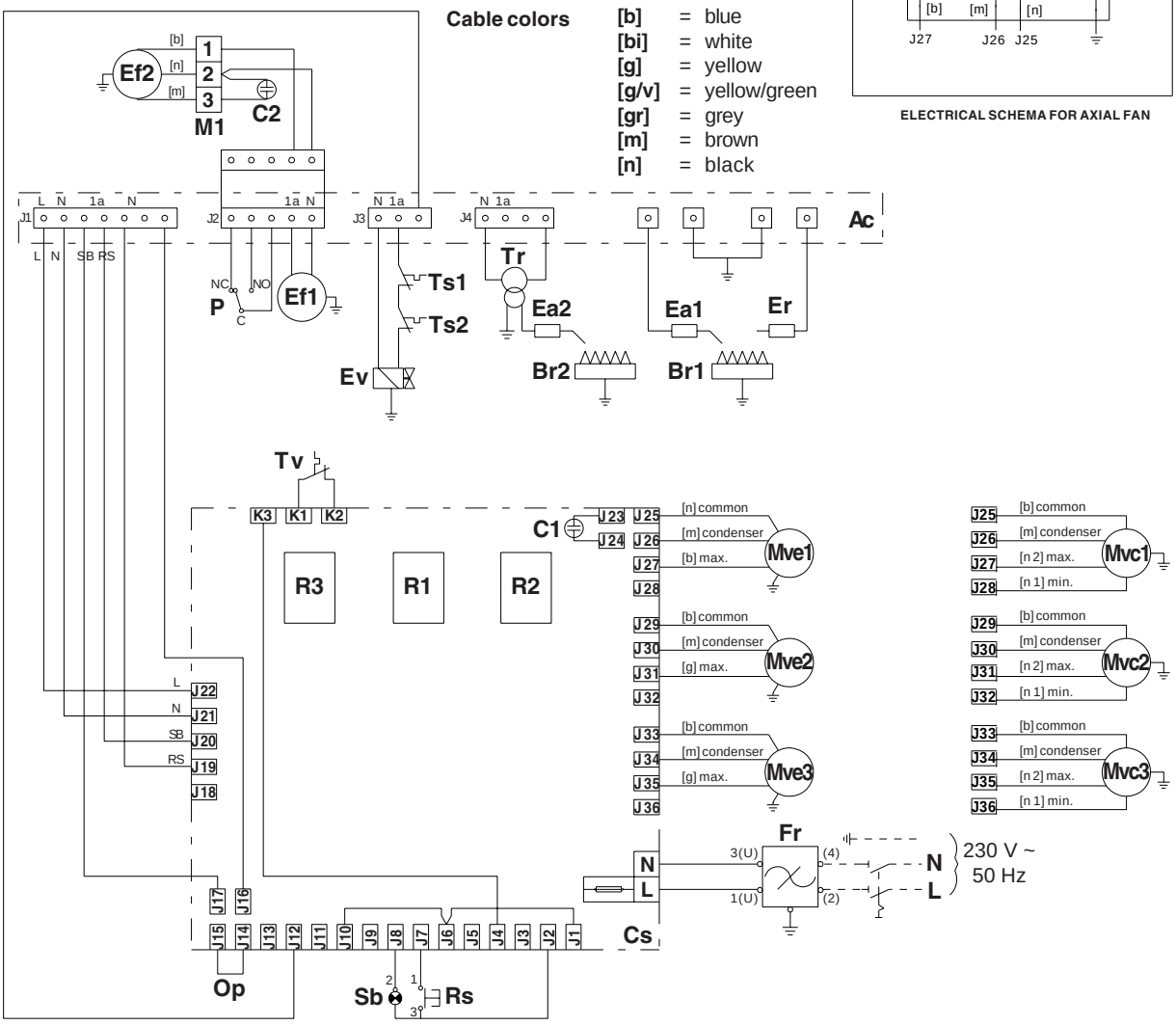
Parts legend

1 Atmospheric burner
2 Burner insulating gasket
3 Gas injectors
4 Ignition electrode
5 Flame detection electrode
6 Second ignition transformer (model 85)
7 Complete gas unit
8 “T” gas fitting (model 85)
9 Gas supply pipe for 2nd burner (model 85)
10 Control device
11 Printed circuit board
12 Radio interference filter
13 Cable gland
14 Reset button
15 Differential pressure switch
16 Silicon pressure switch tube
17 Safety limit thermostat
18 Limit thermostat support
19 Fan control thermostat
20 Fan control thermostat protection
21 Flue exhaust fan
22 Flue exhaust diaphragm (models 25-30-35-50-57)
23 Flue exhaust stainless steel duct
24 Axial fan (MEC)
25 Axial fan protection grille
26 Fan condenser
27 Flue exhaust condenser
28 Centrifugal fan (MEC C)
29 Centrifugal fan protection grille
30 Remote-control panel (supplied on request)
31 Combustion chamber/exchanger
32 Flue gas mixers
33 Flue gas deflector
34 Exchanger cover
35 Combustion air deflector (models 50-57-85)
36 Burner air header (model 85)
37 Front panel with delivery grille (MEC)
38 Rear panel with delivery outlet (MEC C)
39 Top panel
40 Bottom panel
41 Side panel (models 25-30-35-50-57)
42 Rear panel (MEC)
43 Rear panel (MEC C)
44 Side box
45 Service door
46 Lock

1.11 WIRING DIAGRAM MEC 35-35C-57-57C-85-85C



ELECTRICAL SCHEMA FOR AXIAL FAN



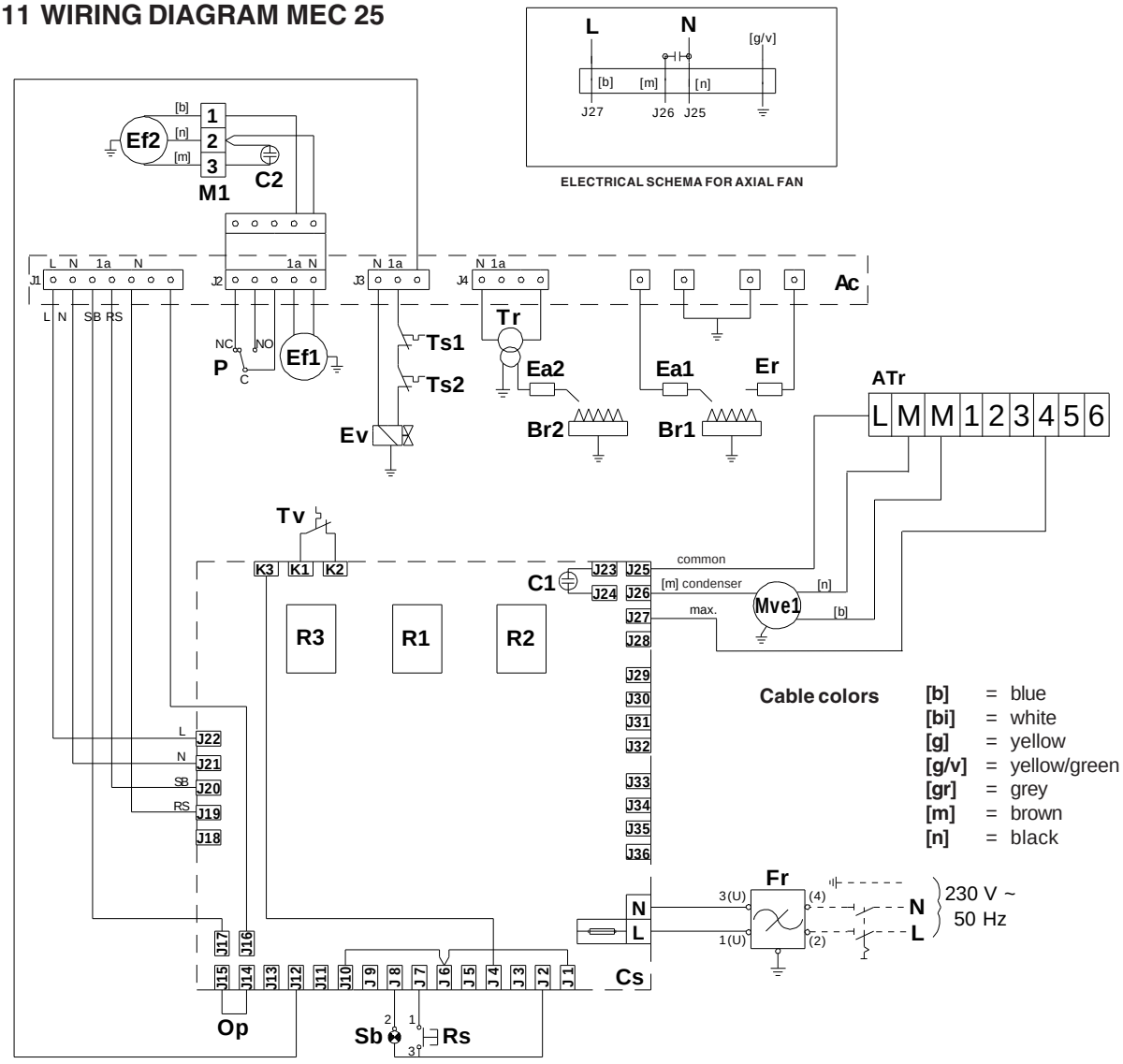
Ac = Control equipment
Br1 = Burner
Br2 = Second burner (MEC 85)
C1 = Fan motor condenser
C2 = Flue exhaust motor condenser (MEC 85)
Cs = Printed circuit board
Ea1 = Ignition electrode
Ea2 = Br2 ignition electrode (MEC 85)
Ef1 = Flue exhaust motor (MEC 25-57)
Ef2 = Flue exhaust motor (MEC 85)
Er = Flame detection electrode
Ev = Gas solenoid valve
Fr = Radio interference filter
M1 = Ef2 connection terminal boards (MEC 85)
Mvc1 = Centrifugal fan motor (MEC C 25-85)
Mvc2 = Centrifugal fan motor (MEC C 50-85)
Mvc3 = Centrifugal fan motor (MEC C 85)
Mve1 = Axial fan motor (MEC 25-85)
Mve2 = Axial fan motor (MEC 50-85)
Mve3 = Axial fan motor (MEC 85)

Op = Jumper for auxiliaries
P = Differential pressure switch
R1 = Fan relay (MEC C)
R2-R3 = Fan relay (MEC C / MEC 85)
Rs = Reset button
Sb = Lockout signal
Tr = Br2 ignition transformer (MEC 85)
Ts1 = Safety thermostat
Ts2 = Second safety thermostat (MEC 85)
Tv = Fan thermostat
⎓ = Fuse
- - - - - = Connection to be made
——— = Series connection
——— = Varying connection (model depending)

Warning:
- Install an omnipolar switch with a contact opening of at least 3 mm.
- The 230 V ~ 50 Hz single-phase power supply must be connected according to the phase-neutral polarity.

Fig. 10

1.11 WIRING DIAGRAM MEC 25



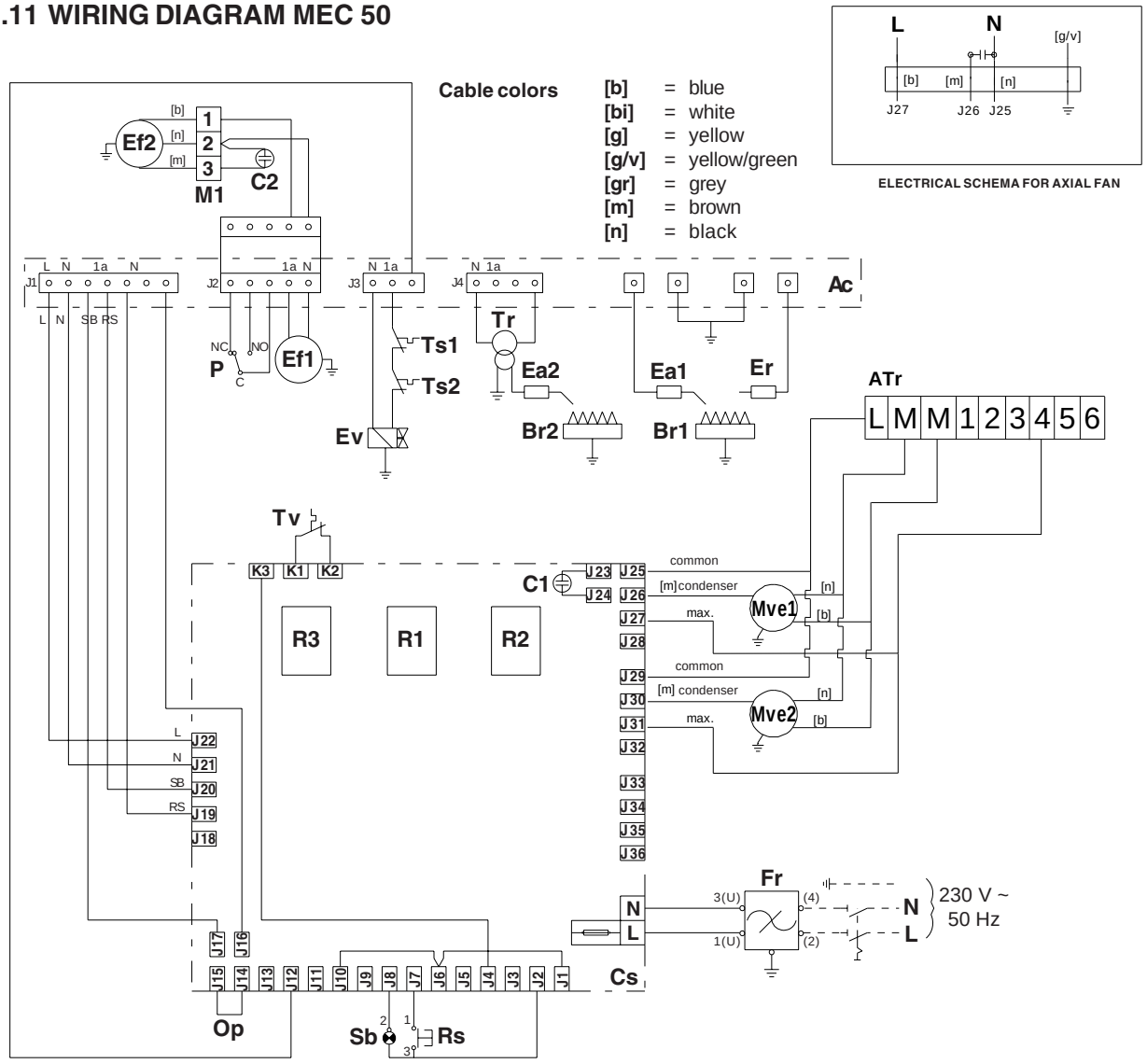
Ac = Control equipment
Br1 = Burner
Br2 = Second burner (MEC 85)
C1 = Fan motor condenser
C2 = Flue exhaust motor condenser (MEC 85)
Cs = Printed circuit board
Ea1 = Ignition electrode
Ea2 = Br2 ignition electrode (MEC 85)
Ef1 = Flue exhaust motor (MEC 25-57)
Ef2 = Flue exhaust motor (MEC 85)
Er = Flame detection electrode
Ev = Gas solenoid valve
Fr = Radio interference filter
M1 = Ef2 connection terminal boards (MEC 85)
Mvc1 = Centrifugal fan motor (MEC C 25-85)
Mvc2 = Centrifugal fan motor (MEC C 50-85)
Mvc3 = Centrifugal fan motor (MEC C 85)
Mve1 = Axial fan motor (MEC 25-85)
Mve2 = Axial fan motor (MEC 50-85)
Mve3 = Axial fan motor (MEC 85)

Op = Jumper for auxiliaries
P = Differential pressure switch
R1 = Fan relay (MEC C)
R2-R3 = Fan relay (MEC C / MEC 85)
Rs = Reset button
Sb = Lockout signal
Tr = Br2 ignition transformer (MEC 85)
Ts1 = Safety thermostat
Ts2 = Second safety thermostat (MEC 85)
Tv = Fan thermostat
ATr = Autotransformer
⊟ = Fuse
- - - - - = Connection to be made
——— = Series connection
——— = Varying connection (model depending)

Warning:
- Install an omnipolar switch with a contact opening of at least 3 mm.
- The 230 V ~ 50 Hz single-phase power supply must be connected according to the phase-neutral polarity.

Fig. 10

1.11 WIRING DIAGRAM MEC 50



Ac = Control equipment
Br1 = Burner
Br2 = Second burner (MEC 85)
C1 = Fan motor condenser
C2 = Flue exhaust motor condenser (MEC 85)
Cs = Printed circuit board
Ea1 = Ignition electrode
Ea2 = Br2 ignition electrode (MEC 85)
Ef1 = Flue exhaust motor (MEC 25-57)
Ef2 = Flue exhaust motor (MEC 85)
Er = Flame detection electrode
Ev = Gas solenoid valve
Fr = Radio interference filter
M1 = Ef2 connection terminal boards (MEC 85)
Mvc1 = Centrifugal fan motor (MEC C 25-85)
Mvc2 = Centrifugal fan motor (MEC C 50-85)
Mvc3 = Centrifugal fan motor (MEC C 85)
Mve1 = Axial fan motor (MEC 25-85)
Mve2 = Axial fan motor (MEC 50-85)
Mve3 = Axial fan motor (MEC 85)

Op = Jumper for auxiliaries
P = Differential pressure switch
R1 = Fan relay (MEC C)
R2-R3 = Fan relay (MEC C / MEC 85)
Rs = Reset button
Sb = Lockout signal
Tr = Br2 ignition transformer (MEC 85)
Ts1 = Safety thermostat
Ts2 = Second safety thermostat (MEC 85)
Tv = Fan thermostat
ATr = Autotransformer
= Fuse
= Connection to be made
= Series connection
= Varying connection (model depending)

Warning:
- Install an omnipolar switch with a contact opening of at least 3 mm.
- The 230 V ~ 50 Hz single-phase power supply must be connected according to the phase-neutral polarity.

Fig. 10

1.12 TECHNICAL DATA TABLE		Units	**25**	**30**	**35**	**50**	**57**	**85**
Heat input (H_i)		kW	25,0	30,0	34,8	50,0	57,0	85,0
		kcal/h	21.500	25.800	29.900	43.000	49.000	73.100
Heat output (H_i)		kW	22,9	27,5	31,9	45,3	51,6	75,6
		kcal/h	19.700	23.650	27.400	38.960	44.380	65.050
Gas	Natural gas G20	m^3/h	2,65	3,17	3,70	5,29	6,03	9,00
consumption	Butane G30	kg/h	1,97	2,37	2,76	3,94	4,49	6,70
(15 °C - 1.013 mbar)	Propane G31	kg/h	1,94	2,32	2,71	3,88	4,42	6,60
Burner	G20 p 20 mbar	mbar	10,0	10,5	12,0	10,4	10,5	11,0
pressure	G30 p 28-30 mbar	mbar	27,7	27,6	27,4	24,2	24,2	25,0
(15 °C - 1.013 mbar)	G31 p 37 mbar	mbar	36,5	36,3	36,0	32,5	32,5	32,5
Injector size	G20	mm/100	310	340	350	350	370	400
	G30 - G31	mm/100	175	195	210	185/240	220	240
Gas service connection		"	R 1/2					
Air supply diameter		mm	140					
Flue exhaust diameter		mm	80			100		
Electrical supply			230 V ~ / 1 / 50 Hz					
MEC series with axial fans	Air volume	m^3/h	2.100	2.300	2.500	4.600	5.000	7.400
	Fan speed (rpm)	n°	1.095	1.215	1.370	1.260	1.350	1.335
	Throw	m	16	18	22	18	22	22
	Temperature rise	°C	33	35	37	30	31	30
	Sound level (at 5 m)	dBA	45	47,5	50,5	50,5	54	55,5
	Electric power	W	175	185	215	380	400	530
	Fuse	A	4					
	Net weight	kg	64			106		180
MEC C series with ductable centrifugal fans	Air volume	m^3/h	2.000	2.150	2.500	4.300	5.000	7.300
	Fan speed (rpm)	n°	880	900	930	900	930	950
	Useful pressure	Pa	100	100	80	100	80	80
	Temperature rise	°C	34	38	37	31	31	31
	Sound level (at 5 m)	dBA	45	45	48,5	48	51,5	53
	Electric power	W	580	580	580	1.050	1.050	1.550
	Fuse	A	6,3			10		15
	Net weight	kg	73			125		207

2. CONTROL AND SAFETY DEVICES

2.1 CONTROL DEVICE

This device is housed in a heat-resistant and shockproof plastic enclosure and is mounted on the air heater electric board, inside the service door (*fig. 11*).
The control device operates on the ionisation flame detection principle, using a special probe on the burner.

The detection circuit must be fed with single-phase 230 V ~ mains voltage. The circuit is sensitive to the phase-neutral polarity and if this is reversed, the device will lock out within the safety time, even if the flame has a regular shape.

2.2 GAS UNIT

The gas unit includes two, direct operation solenoid valves with class B closing devices (maximum pressure 60 mbar) and a pressure regulator. The die-cast aluminium casing is equipped with 1/2 RP threaded gas inlet and outlet connections and two inlet and outlet pressure measurement fittings. The gas unit is also equipped with an inlet filter *(figures 12-13)*.

2.3 DIFFERENTIAL PRESSURE SWITCH

This device shuts off the burner if the flue gas exhaust fan flow rate is insufficient, caused by fan malfunction or an obstruction in the combustion circuit.

CONTROL DEVICE

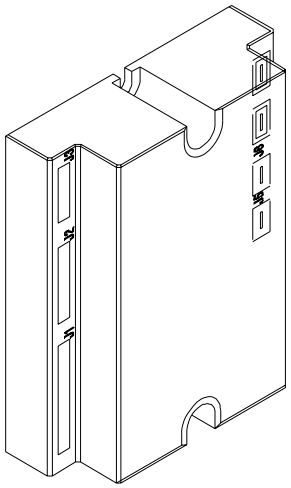


Fig. 11

GAS UNIT- Models 50 - 57 - 85

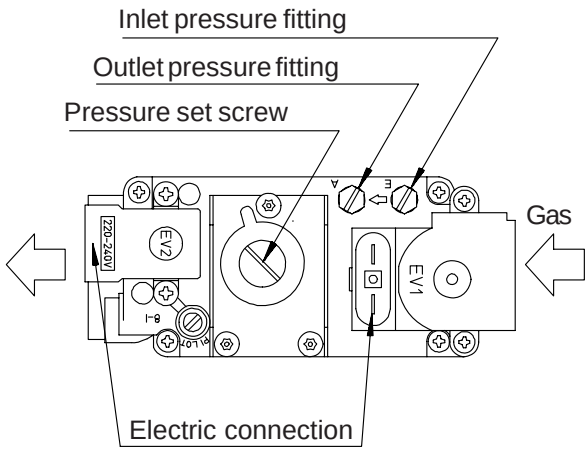


Fig. 13

GAS UNIT - Models 25 - 30 - 35

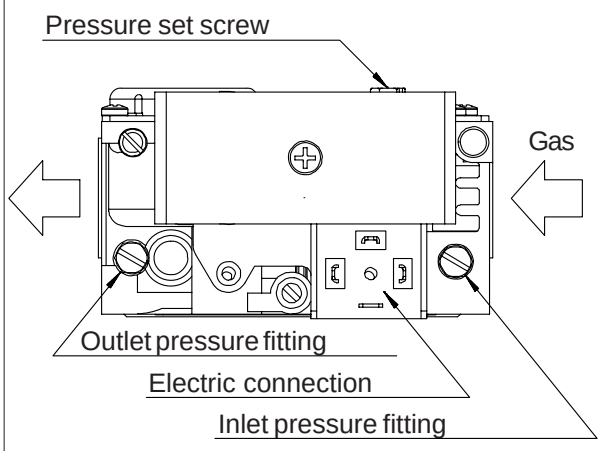


Fig. 12

DIFFERENTIAL PRESSURE SWITCH

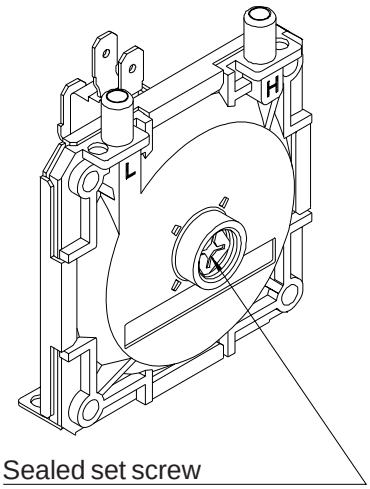


Fig. 14

The pressure switch is mounted on the air heater electric board and is connected by a silicon tube to a pressure fitting on the exchanger to detect the differential pressure on the combustion circuit. A set screw, located on the front of the device, is used for calibration, which is performed in the factory, according to the appliance model, and locked with a seal (*fig. 14*).

2.4 FAN THERMOSTAT

This thermostat controls fan operation, making it start when the exchanger has reached the rated operating temperature and stopping it when the exchanger has adequately cooled. The thermostat is attached to a threaded support, located on an element of the exchanger (*fig. 15*).

2.5 SAFETY THERMOSTAT

The thermostat is designed to interrupt burner operation when the air temperature in the air heater reaches a set value, i.e. when the exchanger overheats due to insufficient air flow or a fan malfunction. The thermostat enclosure is attached to the electric board inside the air heater service door. The sensitive bulb, connected to the thermostat enclosure by a capillary tube, is located in front of the exchanger, on a special support bracket (*fig. 16*).

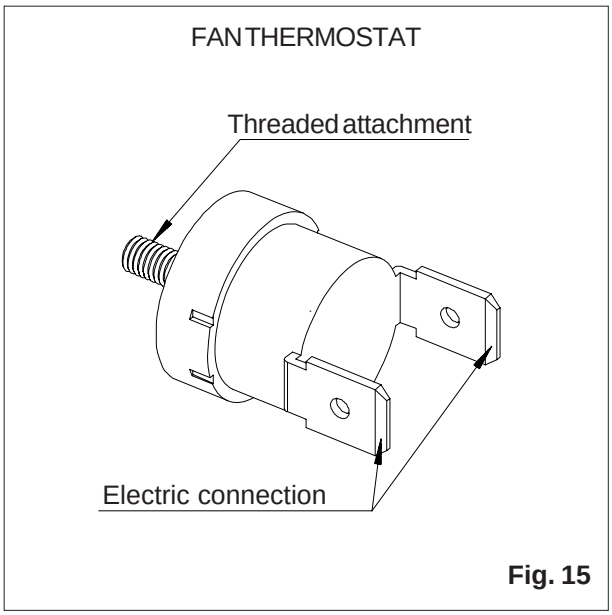


Fig. 15

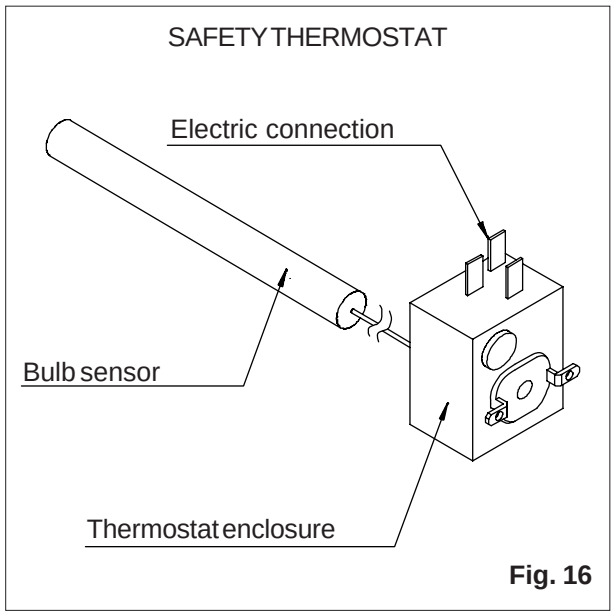


Fig. 16

SECTION 2 - TECHNICAL INFORMATION FOR THE INSTALLER

3. PRECAUTIONS

3.1 GAS SAFETY (Installation and Use) (Amendment) REGULATIONS 1990

The law requires all gas appliances to be installed by competent persons in accordance with the above regulations. Failure to install appliances correctly may lead to persecution. It is in your own interests and that of safety to ensure compliance with the law.

3.2 RELATED DOCUMENTS

Air heater(s) must be installed in accordance with the requirements and recommendations of British Standard BS 6230 1991 "Installation of Gas Fired Forced Convection Air Heaters for Commercial and Industrial Space Heating".

The installation must also be in accordance with the relevant requirements of "The Gas Safety (Installation and Use regulation) and (Amendment Regulations 1990)" and the "Building" and "IEE Regulations". The requirements of the "Local Building Standards Office", the premises "Insurance" company and the "Fire Office" must also be observed.

3.3 TRANSPORT AND HANDLING

The MEC air heaters are supplied with cardboard packing and internal protective pieces in pre-formed cardboard, while the MEC C series models are also supplied with wooden pallets, attached to the base of the appliance with 4 screws (M8). Cap cardboard packing is attached with plastic straps.

The air heater can be handled with a fork-lift truck or transpallet, making sure to balance its weight on the supports. For safety reasons, considering the relatively heavy weight, do not try to lift the appliance by hand. Do not hang with slings or ropes, since there are no specific anchor points. Always observe the instructions reported on the box indicated by the special graphic symbols.

When delivered, check that no visible damage on the packing and/or on the device has occurred during transport. If damage is noted, immediately submit a claim to the shipping agent.

3.4 DATA CHECK

Check that the air heater and its technical characteristics match what is indicated by the design or other documents.

The type of gas for which the air heater has been designed and the relative supply pressure are found on the exterior of the packing and on a special label located on the inside of the appliance service door.

WARNING! If the type gas for which the appliance has been designed is different from the one being used, the adaptation operation must be carried out by skilled technical personnel, during the first start-up operation and relative tests.

3.5 USING THE INSTRUCTIONS

WARNING! When installing or working on the appliance, comply with all the instructions reported in this manual. Changes to any type of connection and non-compliance with these instructions will immediately invalidate the warranty and release the manufacturer from all responsibilities.

4. INSTALLATION

4.1 LOCATION

The installation of a warm air heating system must be in strict accordance with any fire regulations or insurance company's requirements pertaining to the area in which the system is installed, particularly where special risks are involved, such as areas where petrol vehicles are housed, where cellulose is sprayed, in wood-working departments, etc.

In addition, where a warm air heating system is installed in a shop or department store or an office building, any relevant recommendations of CP3:Ch-IV pertaining to such buildings, with respect to the installation and maintenance of any fire escape routes, must be complied with.

As already described, the possible air heater installations can be summarised into two different solutions:

4.1.1 Installation of MEC air heaters for the free delivery of warm air

To ensure the optimal configuration of the air heaters within an environment, it is recommended to observe the following instructions:

a) position the air heater as close as possible to the occupied area, also for what concerns the installation height of the appliance, without however taking the risk of striking people directly with the flow of warm air

b) when installing the appliance consider the presence of obstacles, such as pilasters, shelving and stored materials which might prevent the warm air from being delivered

c) when more than one air heater is installed in the same room, it is recommended to distribute the warm air in opposing directions (*fig. 17*)

d) Where there is a large inflow of cold air, such as next to entrance doors, it is recommended to install an air heater so that the stream of warm air flows directly towards the cold sources.

4.1.2 Installation of MEC C air heaters for distribution of ducted air

For ducted installation it is recommended to observe the following instructions:

a) for ducted units, all delivery and return air ducts, including air filters, jointing and any insulation or lining, must be constructed entirely of materials which will not contribute to a fire, are of adequate strength and dimensionally stable for the maximum internal and external temperatures to which they will be exposed during commissioning and normal operation.

When selecting materials, it is also necessary to consider the working environment and the air temperatures which will result when the overheat limit thermostat is being commissioned. Where inter-joist spaces are used as duct routes, they should be suitably lined with a fire-resisting material

b) a full and unobstructed return air path to the air heater(s) must be provided.

If the air heater(s) will be installed in a plant room, the return air and warm air discharge layouts must prevent any interference with flue operation by the air circulation fan. The return air intake(s) and the warm air outlet(s) should, therefore, be fully ducted, in the plant room, to and from the air heater(s) respectively. The openings in the plant room structure crossed by ducting must be fire stopped.

c) make sure that return-air intakes are kept clear of any sources of smells and fumes, and in special circumstances, where there is any possibility of polluting the air with dust, shavings, etc., precautions must be taken by carefully positioning return-air intakes and installing screens to prevent contamination.

4.2 MINIMUM HEIGHTS AND DISTANCES

If the appliance is installed in the room to be heated, the installation height has a direct effect on the optimum distribution of the warm air. For this reason the air heater should be installed with its base at a height of 2.5 metres from the ground (*fig. 18*).

Do not install the air heater at higher levels from the ground, thus limiting the stratification of the air. If this is not possible or for the case involving rooms with heights greater than 6-7 metres, it is

POSITION INDICATIONS

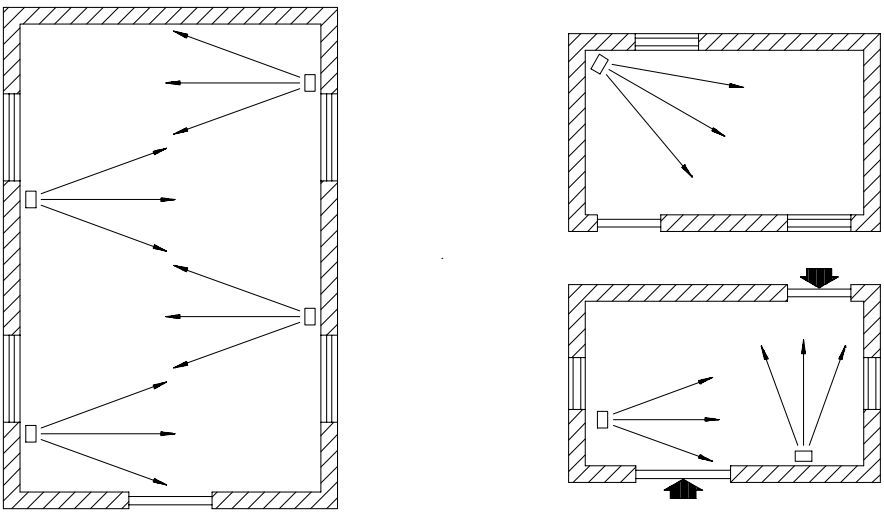


Fig. 17

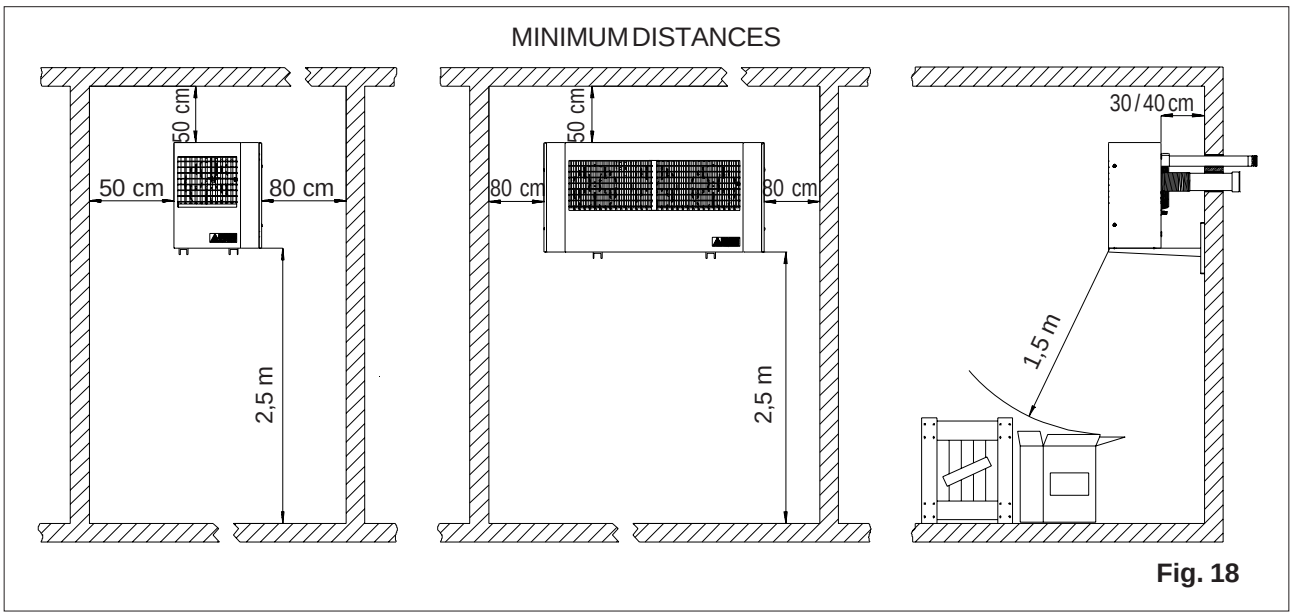


Fig. 18

recommended to combine the air heaters with the installation of Arianne air mixers (see the specific documentation), to optimise the distribution of the air, ensuring the uniformity of the temperature in the environment and ensuring significant energy savings.

The appliance rests on two support brackets (supplied on request in two separate versions for the MEC and MEC C series) each equipped with two attachment holes with a diameter of 14 mm.

WARNING! Make sure that the support capacity of the wall where the brackets are attached and the wall anchor system are adequate for the weight of the appliance to be installed (see the technical data table on page 18).

If the support brackets are built differently, attach the appliance as required respecting the proper distance from the wall. This distance, measured from the rear corner of the air heater housing, must be at least 30 centimetres for the MEC series and 40 centimetres for the MEC C series, to ensure a correct air intake to the fan(s). For this reason and to make maintenance easier, the air heater must not be installed inside niches or in positions where they are difficult to access. It is recommended to respect the minimum distances indicated in *fig. 18*.

Any combustible materials stored near the air heater must be at least 1.5 metres away from the appliance.

When installing MEC C ducted air heaters, it should be recalled that, to perform maintenance, there must be free access to the front of the exchanger which contains the fan and safety control thermostats.

4.3 AIR INTAKE AND FLUE EXHAUST DUCTS

4.3.1 Type definition

As already mentioned in point 1.1, the MEC and MEC C air heaters can be installed with different configurations of the air intake and combustion product exhaust ducts and these different solutions constitute the definition of “type”.

The possible solutions are reported below in relation to the CE certification for the appliances:

- Type C_{12}

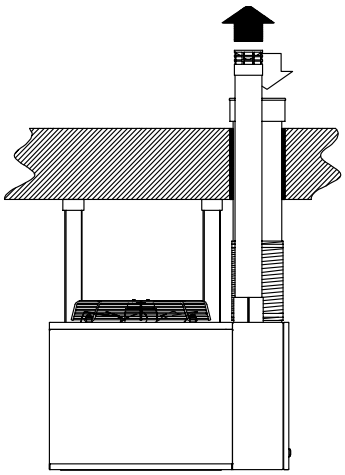
The combustion circuit is hermetically sealed with respect to the environment in which the air heater is installed. The ducts pass directly through the outside wall of the room, with terminals close to each other (*fig. 19*).

- Type C_{52}

The combustion circuit is hermetically sealed with respect to the environment in which the air heater is installed.

Both types of ducts are connected to the outdoors, but their terminals may also be located on walls not in the room. The combustion products can be exhausted also with a special duct on the roof of the building (*fig. 20*).

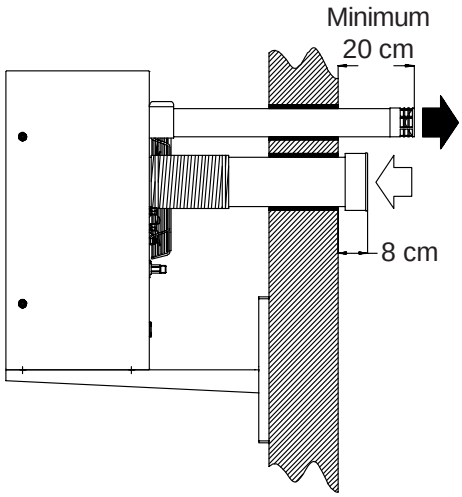
WARNING! In the previous solutions (Type C), the intake and exhaust ducts, including the relative terminals, are considered by the standards to be integral parts of the air heater. Therefore, they must be requested from A2B Accorroni E.G. S.r.l., together with the appliance.



Top view

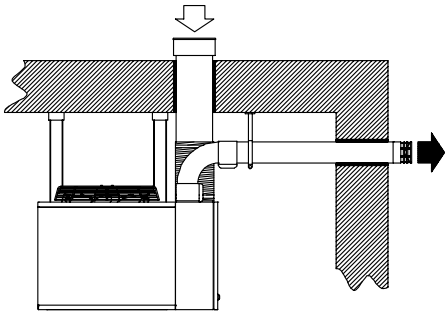
Type C_{12}

The combustion circuit is hermetically sealed with respect to the environment. The ducts pass directly through the outside wall of the room, with terminals close to each other.



Side view

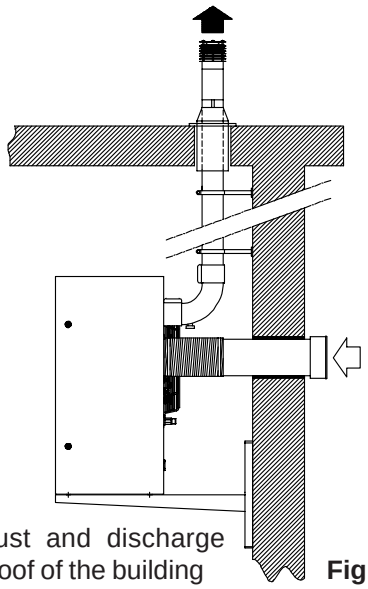
Fig. 19



Top view
Terminals far apart and located on different walls

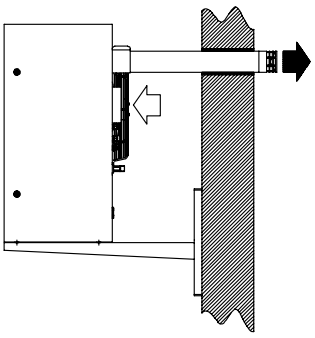
Type C_{52}

The combustion circuit is hermetically sealed with respect to the environment. Both types of ducts are connected to the outdoors, but their terminals may also be located on walls not in the room.



Side view
Wall exhaust and discharge above the roof of the building

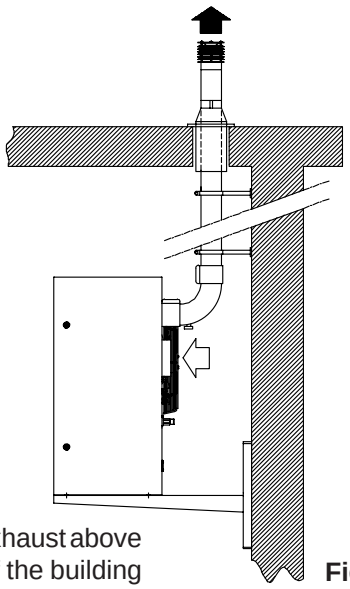
Fig. 20



Side view
Exhaust directly through the external wall

Type B_{22}

Open combustion circuit with combustion air taken from within the environment. In this case the correct amount of combustion air must be guaranteed by means of suitable opening in the walls.



Side view
Vertical exhaust above the roof of the building

Fig. 21

- Type B_{22}

The combustion circuit is not hermetically sealed with respect to the environment in which the air heater is installed. Combustion air intake is performed within the environment, while the combustion products are exhausted through a horizontal duct that passes directly through an external wall or vertically above the roof of the building (*fig. 21*).

If the ducts and terminals supplied by AC-CORRONI S.r.l. are not used, the following must be taken into consideration:

- it is recommended to use ducts with a smooth interior surface, the diameter of which should not be less than the exhaust fitting on the appliance
- the duct and terminal material must be suitable for the specific use, in relation to the heat and chemical stress exerted by the combustion products
- the joints must guarantee an efficient seal and the attachment of various elements must be stable over time
- if a vertical duct is used, it is recommended to drain off any condensate in the lower part. If the vertical duct runs outside the building, it is recommended to use insulated pipes

WARNING! In this solution (Type B_{22}), the room must be adequately ventilated to ensure the correct amount of combustion air, by means of openings on the sides of the room, with the dimensions and characteristics established by the current safety standards.

In all the cases outlined above the length of the ducts must always respect the limits described in the next point.

4.3.2 Duct length limits

The length of the ducts must remain with the limits described below, otherwise the load losses generated might not allow the appliance to operate correctly, thus causing the differential pressure switch to be activated. It should be recalled that a bend is equivalent to a straight segment of about 50 cm. The relative position of the external terminals must comply in general with what is indicated in *figures 19-20-21* and in particular with the specific instructions included in the duct kit supplied on request.

Length (cm)	Min.	Max.
Exhaust only (Type B_{22})	**50**	**450**
Exhaust + intake (Types C_{12} - C_{52})	**2 x 50**	**2 x 300**

4.4 INSTALLATION OPERATIONS

Based on the installation design, set up the gas (the diameters of which must ensure the necessary gas volume) and electricity supply lines, in addition to the support brackets and the holes to pass the combustion air and flue exhaust ducts.

4.4.1 Attaching the brackets

Remove the 4 screws (M8 x 30) on the bottom of the air heater; lift it using a suitable device and place it on the support brackets. Adjust the position and attach the appliance using the screws that were previously removed.

4.4.2 Connecting the intake and exhaust ducts

Connect the ducts *(according to the different cases described in point 4.3.1)* to the attachments on the air heater and make sure they are properly sealed by using the special fittings.

WARNING! The material comprising the external wall crossed by the ducts and any covering must not be sensitive to the heat produced by the flue duct. If not, the passage hole must be protected with insulation that insulates the wall or the covering.
The flue should terminate in a freely exposed position and must be situated so as to prevent the combustion products from entering any opening in a building in such a concentration that may be considered a health risk or become a nuisance.

4.4.3 Gas connection

Connect the gas supply line to the threaded fitting on the air heater by using a removable rigid connector.

It is recommended to mount a manual gas on-off valve along the piping in an easy-to-access position.

Check the seal of the gas piping and make sure that it is installed in conformity with the current standards regarding gas plants.

4.4.4 Electrical connections

Ensure that the electric power supply available is 230 V single-phase 50 Hz. Install an omnipolar circuit-breaker with an adequate rating (with a contact opening of at least 3 mm) near the appliance

to be used as a general switch to turn off the appliance.

Insert the power supply cable through the special cable gland, making sure to cut the wires so that the yellow/green earth cable is longer than the other two. This precaution, in case of accidental detachment , allows the earth cable to be the last connection to be removed. The power supply cable shall have a cross-section of 3 x 1.5 mm², with an external diameter of 9.8 mm.

Connect the power supply cables to the phase (L) and neutral (N) attachments of the network filter (FR) and to the special air heater earth tower (see wiring diagrams). When connecting the phase and neutral wires, use the faston type terminals 6.3 x 0.8 mm supplied with the appliance.

Comply with the phase/neutral polarity, otherwise the control equipment will generate a safety lock out.

THESE APPLIANCES MUST BE EARTHED.

4.4.5 Using the remote-control panel (supplied on request)

The remote-control panel (*fig. 23*) includes the main appliance control functions (on-off switch, electronic room thermostat, lock out and operating signals, reset button, summer ventilation). It is supplied in a kit, including an appliance connection cable, anchor bolts with screws for wall mounting and the necessary instructions. The connection, already available on the appliance board, must be performed by a qualified electrician.

WARNING! If the panel is attached to a metal structure, such a structure must be earthed.

4.4.6 Using the room thermostat, timed thermostat or timer (not supplied)

A bridge has been installed in the appliance electric board for external OP controls - *see wiring diagrams* - between the faston connectors (type 4.8 x 0.8 mm) J14 and J15. Remove the bridge and connect the above-mentioned attachments to the terminals of the regulation device switch. It is recommended to use a double-insulated cable for which the external diameter ensures the seal of the cable gland entering the appliance.

When using a thermostat or timed thermostat, it must be installed in a position that is easy to access and avoids exposure to air flows, heat sources or excessive humidity, which may affect the temperature measurements.

The regulation device must conform with the current standards and must be installed in compliance with the standards.

4.4.7 Connecting more than one unit with a single timer

To operate several appliances with just one timer follow the diagram reported in *fig. 22*, using the same connections J14 and J15 described in the previous point. To complete this special connection, use a normally open contact relay with an adequate rating.

5. START-UP

WARNING! The appliance initial start-up operations and the relative tests must be performed by skilled technical personnel.

5.1 TESTS

5.1.1 Before starting the air heater, make sure that all the current provisions and standards relative to the installation of these appliances have been observed, especially for what concerns the correct positioning of the combustion product exhaust duct and gas supply piping.

5.1.2 Make sure that the 230 V ~ single-phase 50 Hz electric power supply and the relative earth wire are connected correctly to the air heater electric board.

5.1.3 Check that the gas injectors mounted on the burner correspond to those indicated for the type of gas to be used *(table on page 18)*.

The appliance are delivered already set in the factory to use natural gas G20, with a supply pressure of 20 mbar. Instead, if the gas from the third group is used (G30 - G31), first carry out the operations described in point *6.1.*

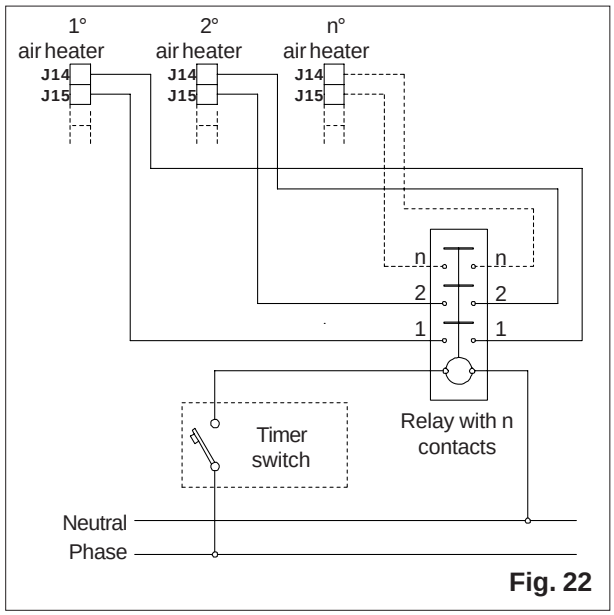


Fig. 22

5.1.4 Check that the gas on-off valves on the meter and near the air heater are open. Make sure that the air inside the gas supply piping has been bled off.

5.2 IGNITION

5.2.1 Ignition procedure

(The instructions to the remote-control panel functions - supplied on request - refer to fig. 23).

a) Energise the appliance using the omnipolar circuit-breaker described in point 4.4.4

- **appliance equipped with a remote-control panel**:

  push the switch (*A*) to the top *"ON"* position. Turn the room thermostat dial (*E*) clockwise to the highest value

- **appliance with room thermostat**:

  set the thermostat regulation device to the highest value

b) Check that the burner control equipment is not in the lock out condition

- **appliance equipped with a remote-control panel**:

  this is indicated by the red light of the *"reset"* button (*B*). Press the button (*D*) to continue the cycle

- **appliance part of standard supply or equipped with room thermostat**:

  this is indicated by the red illuminated button located at the bottom of the electric board inside the appliance. Press the button to continue the cycle.

REMOTE-CONTROL PANEL

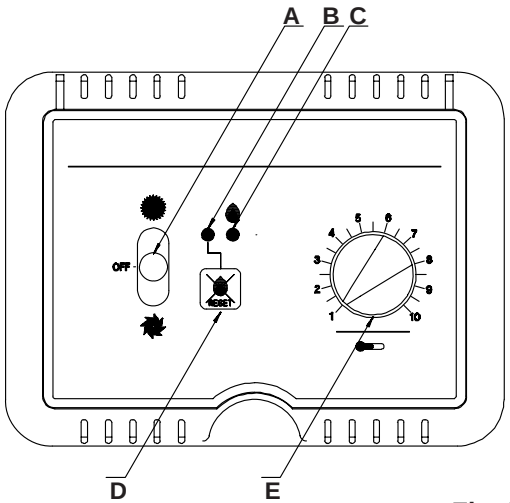


Fig. 23

At this point the pre-ventilation phase begins, starting the flue exhaust fan which, when operating correctly, closes the differential pressure switch contacts.

After completing the pre-ventilation phase, the system simultaneously opens the gas solenoid valves and activates the transformer to discharge the electrode to ignite the burner (in the models 50 - 57 - 85 the gas solenoid valves open gradually and this cannot be modified).

From the moment in which the burner is ignited, the flame must be detected by the special ionisation sensor within the specific safety time, otherwise the control equipment enters the lock out mode.

This may occur in particular in a new plant due to air in the gas piping. In this case, wait about one minute and reset the appliance (see point b above) to begin a new cycle. Repeat the operation unit the residual air has been bled off and the ignition is regular.

The exchanger heating phase begins after the burner has been ignited. The exchanger reaches the rated operating temperature after about three minutes and at that point a thermostat starts the fan(s) to distribute warm air in the environment.

5.2.2 Controls

WARNING! When operations or visual inspections are performed on the air heater with the door(s) open, be extremely cautious and work under safe conditions. Never expose parts of the body (hands, face, etc.), especially to the effect of any burner ignition which may occur under conditions that cannot be completely predicted or controlled.

Insert the manometer into the pressure inlet on the burner (*figures 24-25-26*) after backing off the fastening screw a few turns. Start the air heater and check that the pressure to the burner corresponds to what is indicated in the technical data table.

If the pressure of the gas delivered to the burner does not correspond to the value indicated, use the special pressure set screw *(figures 12-13)*, after having removed the protection plug, to obtain the specific value. Turn it counter-clockwise to decrease the pressure and clockwise to increase the pressure.

Remove the manometer and tighten the pressure set screw, carefully checking the seal. Replace the regulator protection plug.

Turn the room thermostat dial to the minimum value and check that the burner shuts off.

WARNING! When the burner turns off, the fan(s) will continue to operate for a few minutes, to properly cool the exchanger. Therefore, it is important not to turn off the air heater using the mains switch, that also cuts off the power supply to the fan(s), since this might lead to overheating and trip the safety thermostat.

Then repeat the start-up operation to observe and check that the burner has ignited correctly and that the flame is stable. It is also necessary to check the ignition of the second burner (model 85 only), which ignites at the same time as the first one. The discharge of the ignition electrode in the second burner will continue for about 30 seconds; check that it operates correctly.

If the remote-control panel is installed, perform the following test: while the air heater is not operating, set the switch (*A*) to the bottom *"ventilation"* position and check that causes the fan(s) to start operating (summer ventilation).

If the MEC C series air heaters are installed with warm air distribution ducts, operate the appliance for at least 30 minutes. In the meantime, check that warm air flows freely from the duct grilles or outlets, under the foreseen design conditions. Any obstructions, improper adjustments of the outlets or incorrect dimensioning of the ducts might cause the appliance to overheat, and trip the safety thermostat. If this occurs, try to identify and eliminate the possible causes of such overheating.

Once the tests have been completed, close the air heater service door(s) correctly.

5.3 USEFUL INFORMATION

It is recommended to inform the user about all the operations necessary to use the air heater correctly, with particular reference to the ignition and shutdown phases and about the importance of periodic tests, which must be performed at least once every year by skilled personnel.

6. GAS TYPE CHANGE

WARNING! The operations described below must be carried out by skilled technical personnel.

6.1 SWITCHING FROM GAS IN THE SECOND GROUP (G20) TO GAS IN THE THIRD GROUP (G30 - G31)

a) check that the envelope supplied with the air heater contains the replacement injectors, with the relative seal washers and the adhesive label, on which to indicate the new type of gas being used, to replace the original one, inside the air heater service door.

- **For the models 50 - 57 and 85 there is also an aluminium diaphragm with calibrated hole. The use of this diaphragm is described in point f) below**

b) check that the diameter of the injectors indicated for the type of gas to be used (*see technical data table on page 18*) corresponds to what is stamped on the injectors

c) close the gas on-off valve and disconnect the electric power supply

d) disassemble the injectors from the burner using a 12 mm hex wrench (*figures 24-25-26*)

- Model 85 is equipped with two burners, mounted in an opposing positions (see exploded diagrams). To access the second burner it is necessary to open the service door on the left of the appliance. The operations to replace the injectors of the aforementioned burner are similar to those for the other models (*fig. 27*).

e) screw the new injectors into place, inserting

GAS INJECTOR REPLACEMENT (models 25-30-35)

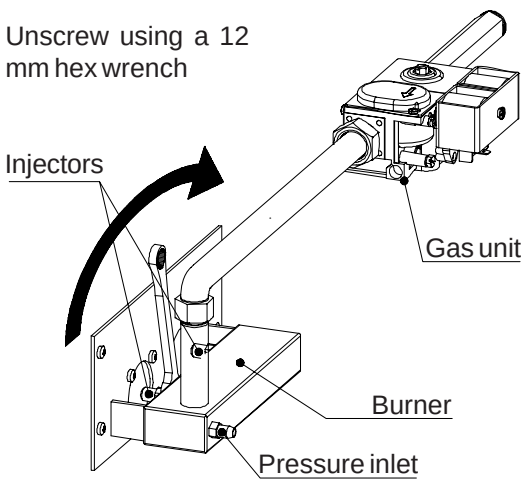


Fig. 24

the new seal washers and completely tighten to guarantee a proper gas seal (*fig. 27*)

f) (**only for models 50 - 57**) unscrew the gas fitting on the burner, remove the gasket and replace it with the calibrated diaphragm. The diameter of the hole corresponds to: 7.1 mm for model 50 and 7.6 mm for model 57. Make sure that the diaphragm is in the exact position and tighten the fitting nut (*fig. 25*).

(**only for model 85**) unscrew the fitting after the gas unit, corresponding to the position of the "T" fitting. Remove the gasket and replace it with the calibrated diaphragm. The diameter of the hole corresponds to: 9.6 mm. Make sure that the diaphragm is in the exact position and tighten the fitting nut (*fig. 26*).

g) use the pressure regulator screw, after having removed the protection plug, tightening it (clockwise) carefully at the limit switch. Replace the protection plug

h) start the air heater according to what is indicated in point 5.2

i) Insert the manometer into the upstream pressure inlet on the burner (*figures 15-16*) after having removed the closing screw. Check that the supply pressure corresponds to what is indicated in the technical data table. If the gas supply pressure does not correspond to the value indicated, use the pressure reducer (second stage) installed externally to obtain the correct value

l) remove the manometer and tighten the pressure inlet screw

m) use a special spray or electronic leak detector to identify any leaks in the gas circuit, with particular attention on the burner and gas unit pressure inlets.

6.2 SWITCHING FROM GAS IN THE THIRD GROUP (G30 - G31) TO GAS IN THE SECOND GROUP (G20)

WARNING! For this gas type change operation a new adapter kit is required and should be requested from the authorised dealer. In fact, it is recommended not to use the injectors and the gaskets from the original supply, since the seals might have deteriorated.

a) check that the envelope supplied with the air heater contains the replacement injectors, with the relative seal washers and the adhesive label, on which to indicate the new type of gas being used, to replace the original one, inside the air heater service door. For the models 50 - 57 - 85 there is also an gasket with a diameter of 24 x 18 mm

b) check that the diameter of the injectors indicated for the type of gas to be used (*see technical data table on page 18*) corresponds to what is stamped on the injectors

c) close the gas on-off valve and disconnect the electric power supply

d) disassemble the injectors from the burner using a 12 mm hex wrench (*figures 24-25-26*)

- Model 85 is equipped with two burners, mounted in an opposing positions (see exploded diagrams). To access the second burner it is necessary to open the service door on the left of the appliance. The operations to replace the injectors of the aforementioned burner are similar to those for the other models (*fig. 27*)

GAS INJECTOR REPLACEMENT (models 50 - 57)

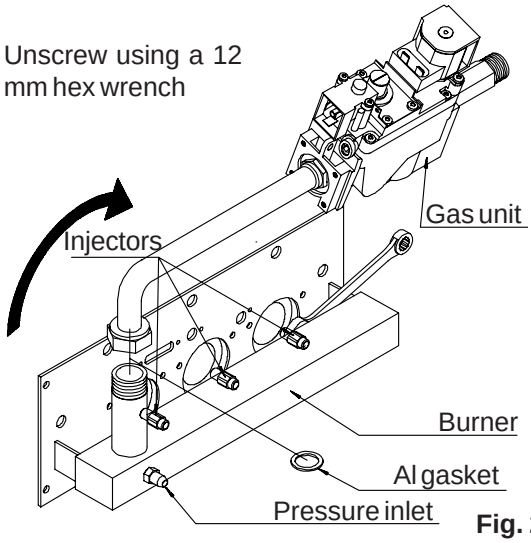


Fig. 25

GAS INJECTOR REPLACEMENT (model 85)

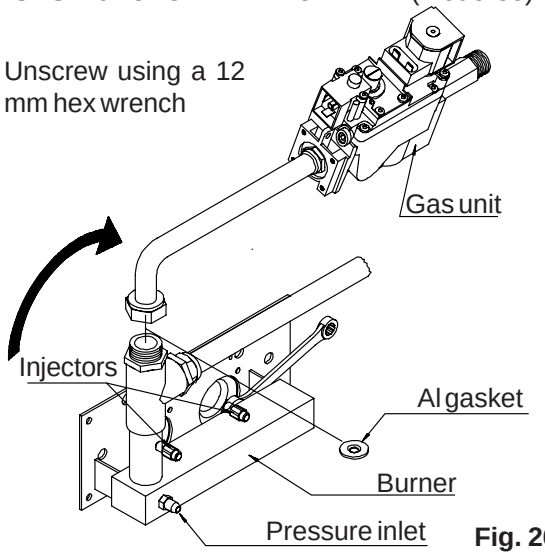


Fig. 26

e) screw the new injectors into place, inserting the new aluminium seal washers and completely tighten to guarantee a proper gas seal (*fig. 27*)

f) (**only for models 50 - 57**) unscrew the gas fitting on the burner, remove the calibrated diaphragm and replace it with the new aluminium gasket. Make sure that the gasket is in the exact position and tighten the fitting nut (*fig. 25*)

(**only for model 85**) unscrew the fitting after the gas unit, corresponding to the position of the "T" fitting. Remove the calibrated diaphragm and replace it with the new aluminium gasket. Make sure that the gasket is in the exact position and tighten the fitting nut (*fig. 26*)

g) remove the protection plug of the pressure regulator (*figures 12-13*) and back off the regulator screw 3-4 turns

h) start the air heater according to what is indicated in point 5.2

i) Insert the manometer into the pressure inlet on the burner (*figures 24-25-26*) after having backed off the closing screw a few turns. Check that the pressure to the burner corresponds to what is indicated in the technical data table. If the pressure of the gas to the burner does not correspond to the value indicated, use the pressure regulator screw (*figures 12-13*) to obtain the correct value. Turn it counterclockwise to decrease the pressure and clockwise to increase the pressure

l) remove the manometer and tighten the pressure inlet screw. Replace the regulator protection plug.

GAS INJECTOR INSTALLATION

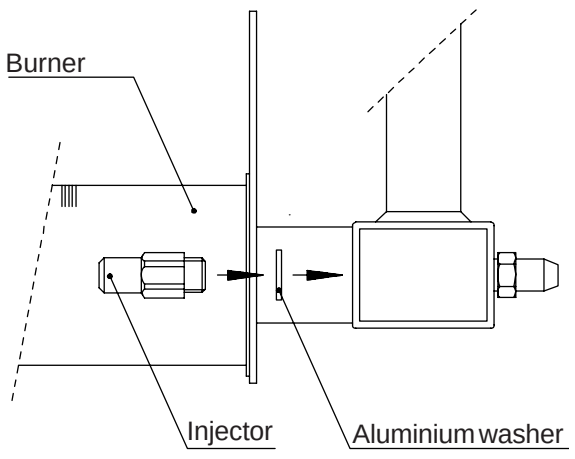


Fig. 27

m) use a special spray or electronic leak detector to identify any leaks in the gas circuit, with particular attention on the burner and gas unit pressure inlets.

7. OPERATING DEFECT

7.1 PRELIMINARY TESTS

Before performing specific tests, make sure that:

a) the electric power supply is properly connected (with particular attention focused on the phase-neutral polarity and earth connector) and that any external adjustment components, such as a room thermostat or timer, operate correctly

b) the gas supply is correct, the gas on-off valve is open and the pressure to the burner corresponds to what is indicated in the technical data table

c) the external terminals of the combustion air intake and combustion product exhaust ducts are not obstructed or that their material has deteriorated

d) any remote-control panel operates properly.

7.2 POSSIBLE DEFECTS

The following is a list of possible defects along with their probable causes. *The information indicated in italics refers to repair operations or corrections which are the responsibility of the authorised Technical Service Centre.*

7.2.1 The appliance does not start even if the conditions described in the previous points are correct.

a) the flame detection circuit of the control equipment is malfunctioning and the initial self-check does not allow the cycle to continue.

- *Replace the control equipment (see point 8.1)*.

b) The flame detection electrode has an earth leakage.

- *Check the correct position of the electrode. The ceramic insulation material may be cracked and this is difficult to determine visually. In case of doubt, replace the electrode (see point 8.7)*.

c) the contacts of the differential pressure switch are stuck in the position they assume when the draft is correct.

- *Replace the pressure switch if its microswitch does not reset the contacts to the regular position (see point 8.4)*.

d) the flue exhaust fan motor is malfunctioning and the differential pressure switch does not issue the enabling signal to start the cycle.

- *Replace the fan making sure to re-assemble the unit as reported in figures 38-39 (see point 8.9)*.

7.2.2 The control equipment is not in a block condition, but the cycle remains in continuous pre-ventilation.

a) the differential pressure switch does not issue the enabling signal to continue the cycle because the flue exhaust or air supply ducts are obstructed.

- *First eliminate any obstructions that may be blocking the terminals and always check the entire duct route to identify possible damage or alterations*.

b) the differential pressure switch does not issue the enabling signal to continue the cycle because the flue exhaust fan does not operate correctly and does not exert an adequate vacuum.

- *Check for any friction problems regarding fan motor rotation. Check that the fan is in the correct position, that nothing interferes with the rotation and that there are no deformations. Replace the fan, if necessary, making sure to re-assemble the unit as reported in figures 38-39 (see point 8.9)*

c) the differential pressure switch does not issue the enabling signal to continue the cycle because it is malfunctioning or its electrical connection has been interrupted.

- *Check for damage to the connection cable and the relative terminals. Do not try to adjust the pressure switch, removing the seal. Instead, it should be replaced.*

d) the differential pressure switch does not issue the enabling signal to continue the cycle because the pressure inlet tube is obstructed or the silicon connection tube is detached or broken.

- *Check that the silicon tube is properly connected and that there are no holes or cuts. If it is undamaged, check the steel pressure inlet tube and clear it by removing any obstructions or deposits. To carry out this entire operation, it will be necessary to access the interior of the exchanger flue gas header*.

  Under particular temperature and humidity conditions, condensate may form which, if present inside the silicon tube, and even just a few drops, might prevent the pressure switch from performing the measurement.

7.2.3 At the end of the pre-ventilation phase, the ignition electrode does not discharge and the control equipment blocks within the safety time.

a) the ignition transformer is malfunctioning.

- *Replace the control equipment which contains the transformer. Since these are electronic components, it is recommended not to try to replace just the transformer, nor to use improper tools*.

b) the ignition electrode is no longer connected to the equipment connector.

- *Restore the connection or replace the electrode including the cable. Do not make joints to avoid reducing the cable insulation level.*

c) The ignition electrode is not correctly positioned or its ceramic insulation is damaged, with a subsequent leakage of the ignition discharge.

- *Replace the electrode including the cable.*

7.2.4 At the end of the pre-ventilation phase, the ignition electrode discharges, but the flame is not formed and the control equipment blocks within the safety time.

a) No gas supply or there is air inside the piping.

- *Determine why there is no gas supply first checking the on-off components on the feed line. Completely bleed off any residual air and restart the appliance.*

b) The gas solenoid valves do not open because the coils are malfunctioning or their electrical connection has been interrupted.

- *Check if the connection cable and relative terminals have been damaged. Use a special tool to verify that the coils have failed and replace them, if necessary (see point 8.3).*

c) The safety thermostat is malfunctioning and does not allow the solenoid valves to open.

- *Replace the safety thermostat (see point 8.6).*

7.2.5 At the end of the pre-ventilation phase, the ignition electrode discharges, the flame is formed correctly, but the control equipment blocks within the safety time.

a) The phase-neutral electric power supply is not correctly connected to the respective terminals,

marked as “L” and “N” and reversing the polarity may de-activate the flame detection device.

- *Check using a multimeter or phase detector and correctly connect the cables to the corresponding terminals.*

b) The flame detection electrode is not correctly positioned and is not in contact with the flame.

- *Check if the electrode is properly connected and if there are any deformations. Comply with what is indicated in figures 34-35-36.*

c) The flame detection electrode electric connection has been interrupted.

- *Check the electrode connection to the control equipment. If the cable or ceramic insulation is damaged, replace the electrode in accordance with the positions indicated in figures 34-35-36.*

7.2.6 The control equipment blocks during normal operation.

a) The gas supply was cut off and the equipment, after repeating the ignition cycle, and without detecting the flame within the safety time period, entered the block mode.

- *Determine why the gas supply prior to the air heater was interrupted. Restart the appliance using the Reset button on the control panel.*

b) The incorrect positioning of the external intake and exhaust terminals has caused combustion products to return and this prevents the flame from being formed and therefore from being detected by the electrode .

- *Change the position of the external terminals, considering that the exhaust duct should project about 10 cm more than the intake duct. Check that the terminals are not installed inside niches o recesses in the walls and that there are no obstructions that prevent the air from circulating.*

c) The safety thermostat cuts off the supply to the gas solenoid valve because overheating has occurred due to incorrect operation or a failure of the convection fan(s).

- *Check for obstructions or dust deposits on the fan(s) and relative grille(s). Replace the malfunctioning fan, if necessary (see point 8.10).*

d) The safety thermostat cuts off the supply to the gas solenoid valve because overheating has occurred due to incorrect operation of the fan control thermostat.

- *Replace the control thermostat of the fan(s) (see point 8.5).*

7.2.7 The burner stops while it is operating, even if the ambient temperature does not require it.

a) The room thermostat (or the remote-control panel) is defective or is incorrectly positioned in the room to detect the necessary temperature.

- *If the panel is considered to be in the correct position and the defect continues, the panel should be replaced. It is recommended, since these are electronic components, not to try to effect repairs on the printed circuit board of the panel.*

b) The differential pressure switch stops the burner because the flue exhaust fan volume is incorrect, due to an obstruction in the ducts or because the ducts are too long.

- *Remove any obstructions and/or check the length of the ducts according to what is indicated in point 4.3.2.*

8. REPLACING PARTS

Since specific technical skills are required to replace the parts listed below, it is recommended to advise the user to always contact skilled technical personnel. For safety and quality reasons, it is recommended to use original spare parts when replacing components.

WARNING! All the following operations must be carried out while the air heater is turned off, disconnecting the gas and electric supplies.

8.1 CONTROL EQUIPMENT

Disconnect the cables pulling on the relative terminals and extracting the connectors, releasing them first from the special retainer. Replace the equipment, attached using the two self-threading screws. Insert the terminals and the connectors into their respective housings (*fig. 28*).

8.2 FUSE

Using a special tool, remove the fuse on the printed circuit board on the electric panel inside the air heater. The new fuse must have the same characteristics as the original one: “instantaneous”, certified and with a rating corresponding to the technical data table on page 18. Replace the fuse with the new on exerting slight pressure until it enters the housing.

8.3 GAS SOLENOID VALVES

8.3.1 Models 25 - 30 - 35

Disconnect the electric connection on the gas unit. Remove the screw that attaches the coil block and remove it from the housing. Pull out the coils from the metal cage and replace them with new ones. Replace the coil block into the housing on the gas unit, tighten the fastening screw and re-establish the electrical connection (*fig. 29*).

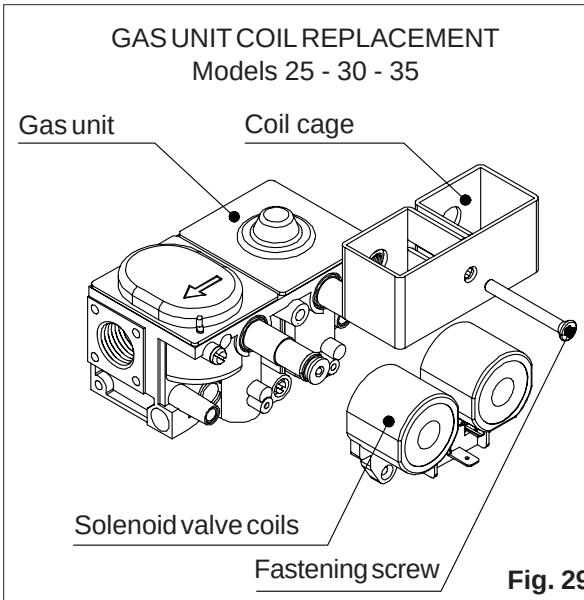


Fig. 29

8.3.2 Models 50 - 57 - 85

Disconnect the electrical connection of the defective coil. Remove the screw that attaches the coil to the gas unit and remove it from the housing. Insert the new coil, tighten the fastening screw and re-establish the electrical connection (*fig. 30*).

8.4 DIFFERENTIAL PRESSURE SWITCH

Disconnect the electrical connection and the silicon tube. Loosen the fastening screws and remove the pressure switch. Mount the new pressure switch and re-establish the electrical connection making sure to respect the position of the contacts. Re-insert the silicon tube (*fig. 31*).

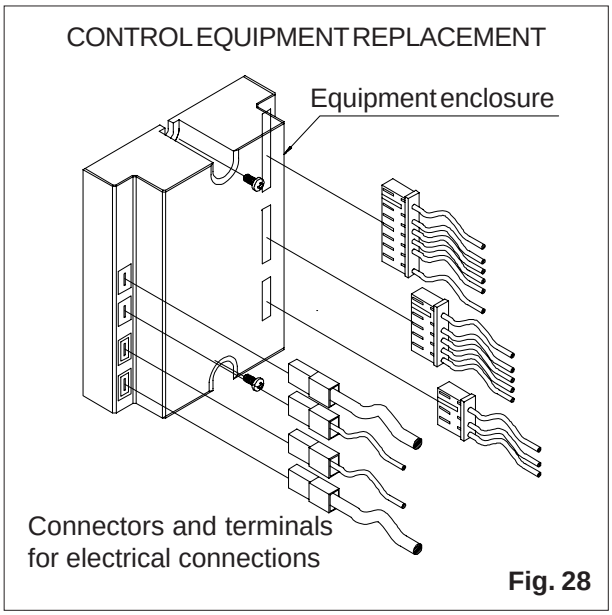


Fig. 28

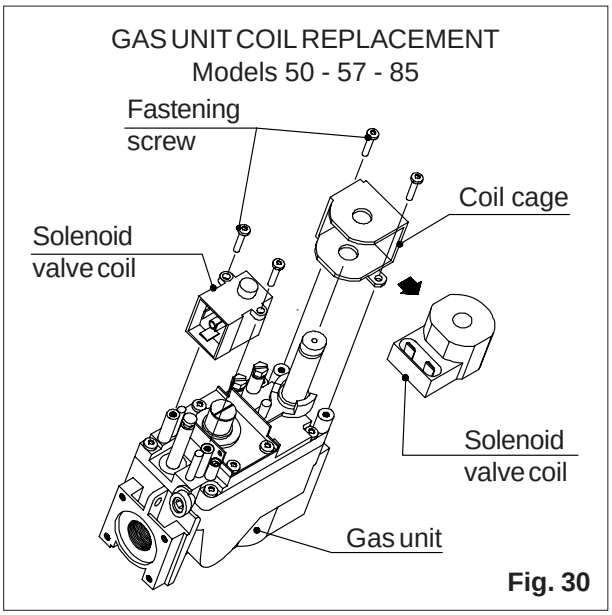


Fig. 30

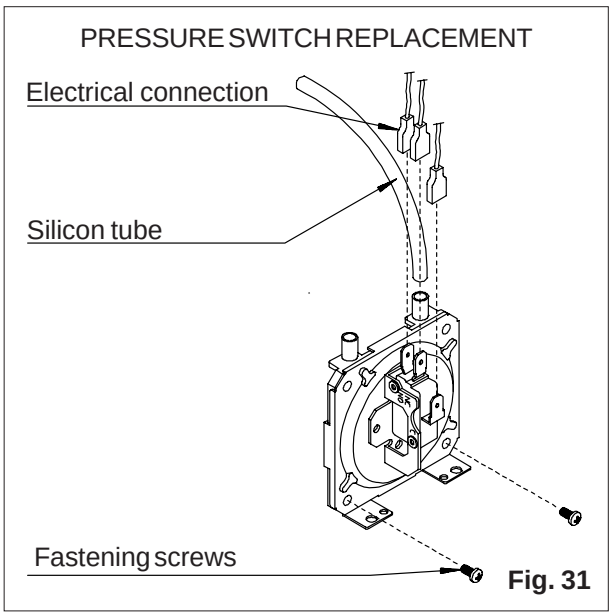


Fig. 31

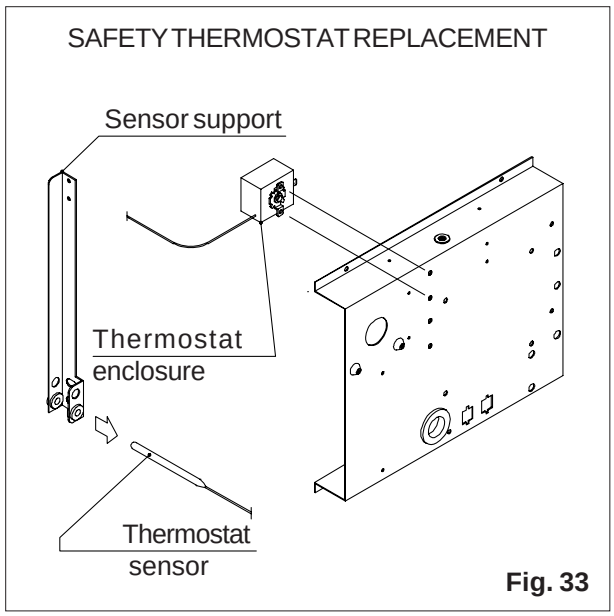


Fig. 33

WARNING! The calibration of the new differential pressure switch must correspond to the appliance model on which it is replaced. In fact, the pressure switches are calibrated in the factory and sealed. Do not try to perform improper adjustments tampering with the seal.

8.5 CONTROL THERMOSTAT OF THE CONVECTION FAN(S)

Remove the protection grille that shields the thermostat. Disconnect the cables and unscrew the thermostat from the threaded support. Insert the new thermostat, screwing it all the way in by hand (do not use tools which might damage the thermostat). Make sure that the distance between the thermostat enclosure and the threaded support is not greater than 3 mm, to guarantee that the sensor remains in contact with the wall of the exchanger. Re-establish the electrical connection and replace the protection grille (*fig. 32*).

8.6 SAFETY LIMIT THERMOSTAT

To access the thermostat remove the four screws which attach the appliance electric board. Disconnect the cables and remove the two screws that attach the thermostat enclosure to the board. Use a pair of pliers to pull out the thermostat sensor from its support in the front of the exchanger. Pull out the sensor and the relative capillary element. Mount the new thermostat by reversing the order of the previous operations (*fig. 33*).

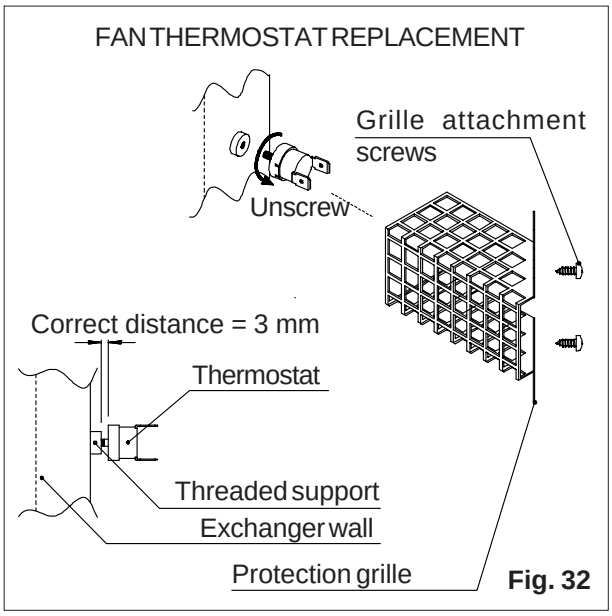


Fig. 32

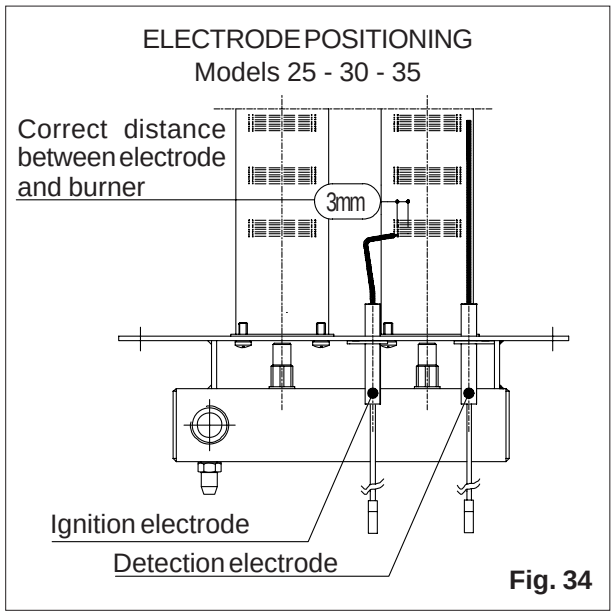


Fig. 34

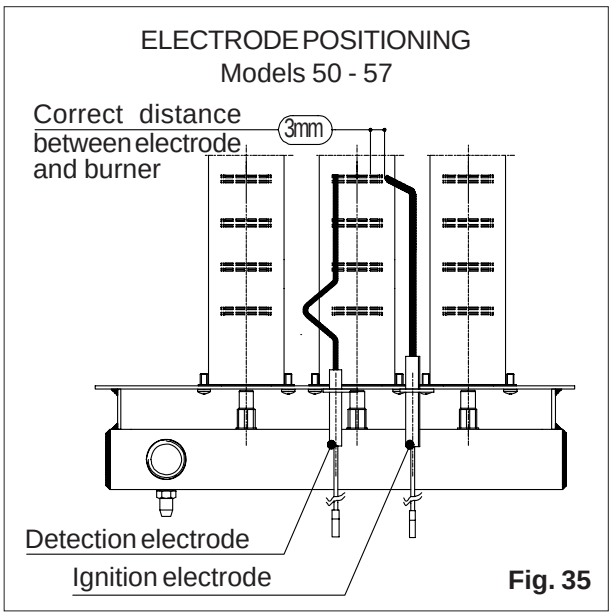


Fig. 35

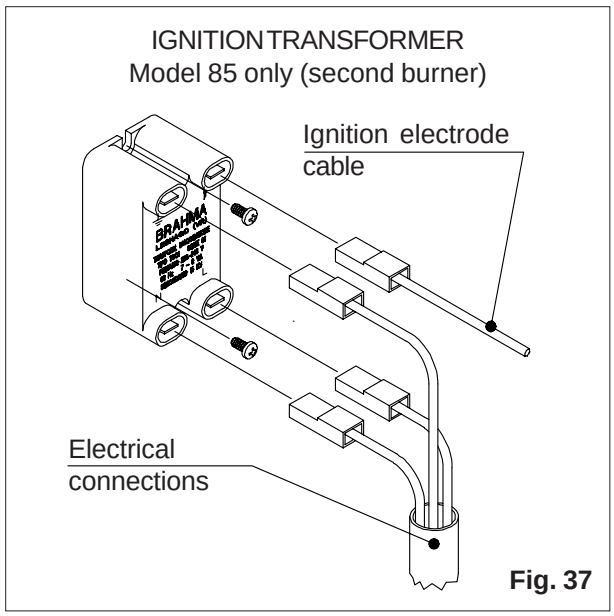


Fig. 37

8.7 ELECTRODES

Disconnect the cable connection on the control equipment. Remove the fastening screws and remove the electrodes from the housing in the burner. Insert the new electrodes, attach the supports and re-establish the electrical connection. To check the position of the electrodes on the burner, free the burner from the fitting with the gas unit, remove the four fastening screws on the air heater and extract it until the electrodes emerge. The position of the electrodes with respect to the burner must correspond to what is indicated in the figures *34-35-36*.

Only model 85 has another ignition electrode on the second burner, with the same relative position. To access the second burner and the relative ignition electrode, open the service door on the left of the appliance.

8.8 SECOND BURNER IGNITION TRANSFORMER (MODEL 85 ONLY)

Only model 85, with a second burner, has a special ignition transformer, located in the compartment on the left of the appliance, which can be accessed by opening the relative service door.

Disconnect the power supply cables and those to the ignition electrode from the transformer. Remove the transformer by loosening the two self-threading fastening screws. Insert the new transformer and re-establish the electrical connections respecting the connections indicated with the special symbols (*fig. 37*).

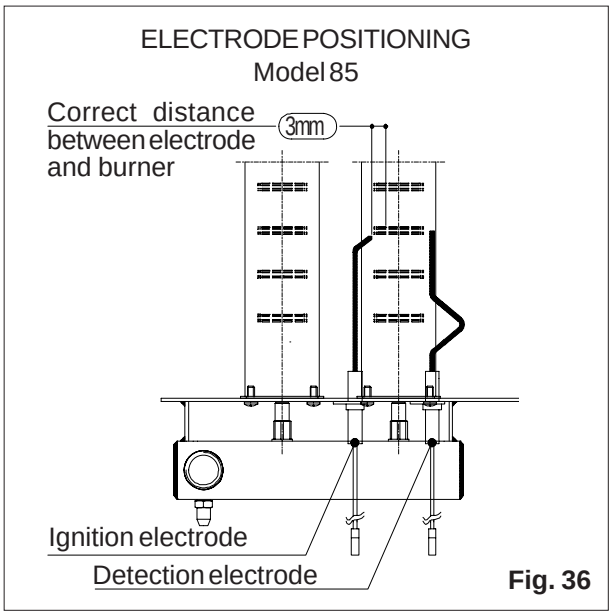


Fig. 36

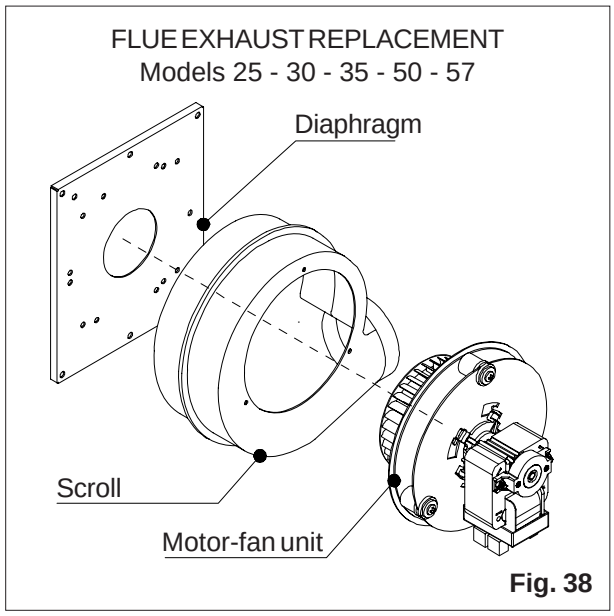


Fig. 38

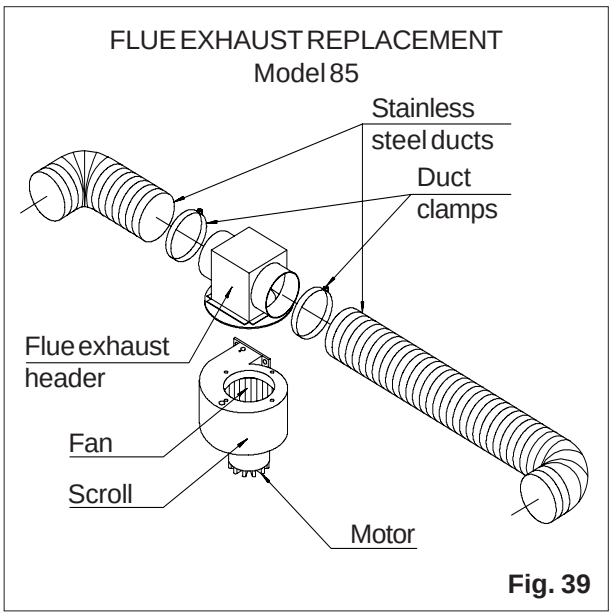


Fig. 39

8.9 FLUE EXHAUST FAN

8.9.1 Models 25 - 30 - 35 - 50 - 57

Disconnect the motor electrical connection and loosen the three scroll fastening screws. Gently remove the motor-fan unit and, respecting the original position, insert the new unit. Tighten the screws and re-establish the electrical connection. Make sure the fan rotates correctly and without friction (*fig. 38*).

8.9.2 Model 85

Disconnect the fan connection from the terminal strip on the air heater electric board. Remove the top panel of the air heater housing using a suitable tool, lifting until releasing the snap fasteners.

Loosen the duct clamps on the exchanger fittings and extract the flexible stainless steel ducts from the fittings. In the rear of the appliance, corresponding to the fitting with the flue exhaust duct, unscrew the four fan scroll fastening screws. Extract the unit, being careful not to damage the gasket between the fan scroll and the rear panel of the air heater.

Disassemble the flexible stainless steel ducts from the unit and insert them on the new fan, checking that they have not been damaged. Insert the new unit reversing the order of the previous operations. Carefully tighten the clamps on the fittings of the flexible stainless steel ducts to ensure a proper seal; re-establish the electrical connection (*fig. 39*).

8.10 CONVECTION FAN

8.10.1 MEC series axial fan

Disconnect the fan electrical connection from the terminal strip on the printed circuit board of the air heater electric panel. Unscrew the four screws that attach the fan grille to the rear panel of the air heater. Extract the unit and release the fan from the grille, removing the four fastening screws.

Clean the grille, removing all dust deposits and attach the new fan, making sure to use the original screws since thread depths of more than 5 mm might damage the motor. Re-insert the fan-grille unit into the housing and attach it with the screws, inserting the grommets including spacers (*fig. 40*). Re-establish the electrical connection making sure to respect the original connection as shown in the diagrams and attaching the cables using suitable clamps.

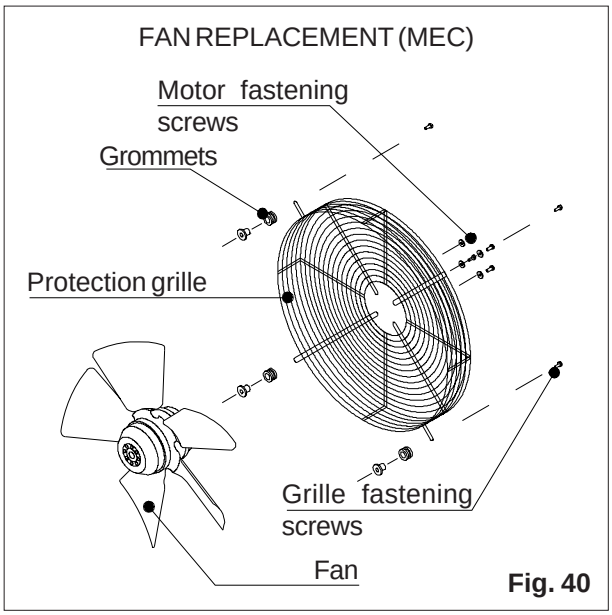


Fig. 40

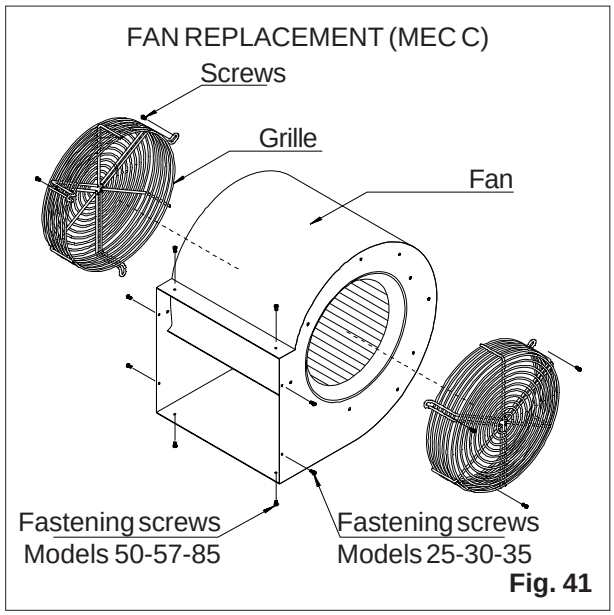


Fig. 41

8.10.2 MEC C series centrifugal fan

Disconnect the fan electrical connection from the terminal strip on the printed circuit board of the air heater electric panel. Unscrew the four screws that attach the fan to the rear panel of the air heater (on the side for models 25 - 30 - 35; at the top and bottom for models 50 -57 -85). Extract the unit and disassemble the fan protection grilles. Clean the grilles and mount them on the new fan. Insert, position and attach the new unit, re-establish the electrical connection making sure to respect the original connection as shown in the diagrams and attaching the cables using suitable clamps.

CLEANING THE EXCHANGER

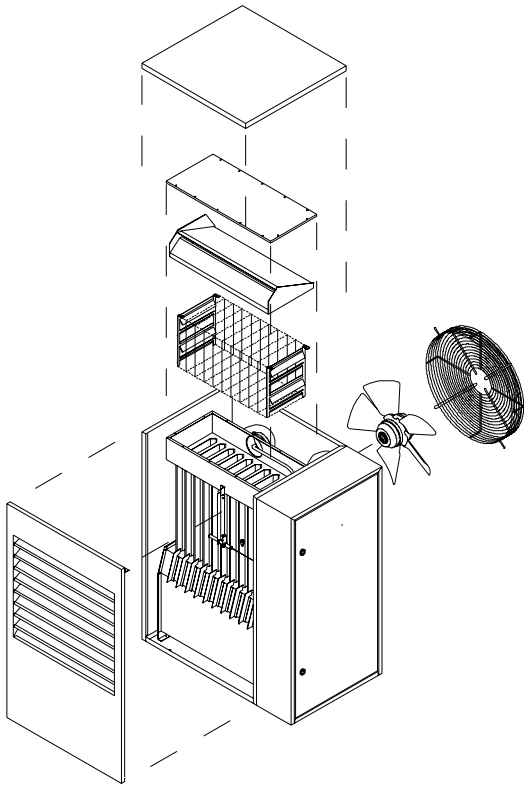


Fig. 42

9. PERIODIC MAINTENANCE OPERATION

9.1 USER INFORMATION

It is recommended to advise the user to carry out the operations indicated in point *13.1* of this manual at least once every two months.

9.2 YEARLY INSPECTION

9.2.1 Control and safety devices

WARNING! Specific technical skills are required to test the control and safety devices and this is why it is important to contact skilled personnel.

Carefully carry out all the operations described in chapter 5 and, in case of malfunctions, consult chapter 7 regarding operating defects.

9.2.2 Cleaning the exchanger

Disassemble the top panel and the front panel with the air delivery grille and remove any dust deposits on the exchanger.

Clean the limit thermostat sensor, removing any dust deposits.

If necessary, clean the rear of the exchanger, after having disassembled the fan. Remove the dust using a brush or a jet of compressed air.

Disassemble the cover at the top of the flue exhaust header, use a circular movement to remove the internal deflector and check that there are no carbon deposits on the visible surface that may obstruct the passage of combustion products. If necessary, also remove the mixers from the exchanger ducts and thoroughly clean all the surfaces.

Check that the fitting duct between the header and the flue exhaust fan has not deteriorated and that there are no deposits inside. Check that the pressure inlet tube of the flue pressure switch is not obstructed.

Check the condition of the electric system and check the efficiency of the connections.

Carefully replace the components and check that they operate regularly (*fig. 42*).

10. *HEALTH AND SAFETY STATEMENT*

10.1 GENERAL

Under the 1987 Consumer Protection Act and Section 6 of the 1974 Health and Safety at Work Act, we hereby provide the following information about substances that are hazardous to health. Product range reference: MEC and MEC C Series air heaters.

10.2 CAUTIONARY NOTE

During the first firing operation, some smoking may occur. This is due to the burning off of protective/lubricating oils used when the appliance was being manufactured. Most of this will have been removed during the production testing process. It is a wise precaution to ensure that adequate ventilation is provided during the initial firing operation and throughout the commissioning period. This is particular important if the exhaust air is blown into a confined space. This smoking does not constitute a poison hazard.

10.3 MISCELLANEOUS

Small quantities of adhesives and sealants used in the product are dried and cured and present no known hazard.

10.4 THERMOSTAT (Thermal overheat limit control)

Material:	llluminating Kerosene.
Description:	Sealed vial contains a small quantity in liquid form.
Recognition:	Colourless liquid, paraffin oil/ petroleum hydrocarbon odour.
Characteristics:	Non-corrosive, flammable with no poisonous reference-CH poison Class 3
Precautions:	Avoid handling. This product can irritate and remove fat from the skin. Prolonged contact may cause dermatitis. Avoid breathing vapour. Avoid eye contact. Do not ingest.
First Aid:	Skin - Wash thoroughly with soap and water. Eyes - Rinse immediately with copious amounts of clean water.
lngestion:	Seek medical advice.

10.5 ELECTROLYTIC CAPACITOR

Two types are used by random selection:

Recognition:	1. Plastic enclosure 2. Aluminium enclosure
Material:	Contained liquid electrolyte
Known hazards:	Electric shock possible if charged.
Precautions:	Discharge to ground/earth. Do not incinerate.
First Aid:	Treat for electric shock íf affected.

END OF HEALTH AND SAFETY STATEMENT

SECTION 3 - USER OPERATING AND MAINTENANCE INSTRUCTIONS

11. *START-UP*

11.1 FIRST FIRING AND TESTING

WARNING! It should be recalled that the first firing of the appliance and the relative tests must be performed by skilled technical personnel. Non-compliance with this procedure will invalidate the warranty conditions and release the manufacturer from all responsibilities.

11.2 TESTS

Before operating the air heater, make sure that the installer has correctly carried out the operations under his competence.

11.3 IGNITION

WARNING! Any operation on the appliance not expressly described below must be performed by skilled personnel.

Check that the gas on-off valves on any meter and near the appliance are open.

(The instructions to the remote-control panel functions - supplied on request - refer to fig. 43).

a) Energise using the omnipolar circuit-breaker installed near the appliance

- **appliance equipped with a remote-control panel**:

  push the switch (*A*) to the *"ON"* position. Turn the room thermostat dial (*E*) clockwise to the highest value

REMOTE-CONTROL PANEL

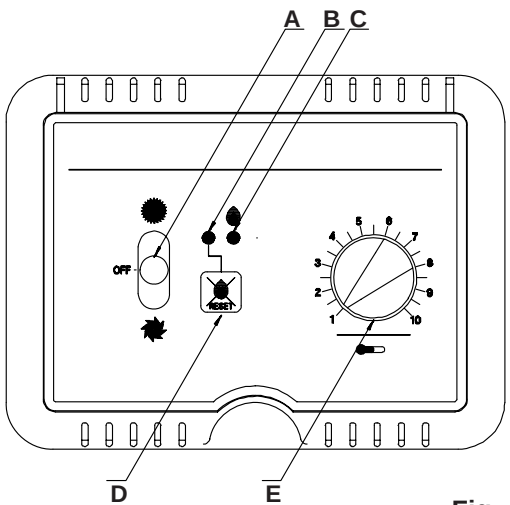


Fig. 43

- **appliance with room thermostat**:

  set the thermostat regulation device to the highest value

After this operation, the appliance starts working and, after about three minutes from when the burner was ignited, a thermostat starts the fan(s) to distribute warm air in the environment.

If the air heater operation is controlled by the remote-control panel (*fig. 43*), when the room has reached the desired temperature, adjust the room thermostat by slowly turning (counterclockwise) the regulation dial (*E*) until the burner turns off, indicated by the green lamp (*C*).

If the air heater is controlled by another type of device or a room thermostat, set the required temperature according to what is indicated in the instructions provided with the regulation device.

From this point the air heater operation will be completely automatic and will maintain the desired temperature in the room.

Generally, the appliance blocks during a fault or operating defect. Therefore, it is recommended to contact a Technical Service Centre.

If the air heater is controlled by the remote-control panel, the block condition is signalled by turning on the red lamp on the *"reset"* button (*B*).

11.4 SHUTDOWN

11.4.1 To turn off the air heater for a short period of time, just use the room thermostat (lowering the set temperature value or using a switch, if present) or, with a remote-control panel, setting the switch (*A*) to the *"OFF"* position, without moving the temperature regulation dial.

WARNING! When the burner turns off, the fan(s) will continue to operate for a few minutes, to properly cool the exchanger. Therefore, it is important not to turn off the air heater using the mains switch, that also cuts off the power supply to the fan(s), since this might lead to overheating and trip the safety thermostat.

11.4.2 To turn off the air heater for an extended period of time:

a) follow the same operations described in point 11.4.1

b) after the fan(s) have turned off, disconnect the electric power supply at the mains switch

c) close the gas on-off valve

11.5 SUMMER VENTILATION (appliance equipped with a remote-control panel)

During the summer, the MEC air heater can be used to ventilate the environment, excluding the burner according to the following operations:

a) close the gas on-off valve

b) turn on the electric power supply using the mains switch

c) set the switch (*A*) to the *"VENTILATION"* position

d) to stop the fan, set the switch (*A*) to the *"OFF"* position.

12. PLANT MAINTENANCE

12.1 ROUTINE MAINTENANCE TO BE PERFORMED BY THE USER

It is recommended to carry out the following operations at the beginning of each heating season and then at least once every month during operation:

WARNING! The operations described in points a) b) and c) below must be performed while the air heater is not functioning, excluding the gas and electric supplies.

a) check that the combustion product exhaust and any air intake ducts, including the external terminals, are not obstructed or that their material has deteriorated

b) clean the external parts of the air heater simply by using a damp cloth

c) use a brush or a jet of compressed air to remove the dust deposits on the external surfaces of the exchanger, on the fan intake grille and on the safety thermostat sensor

d) make sure that the operating phases are regular, as described in point *11.3.*

12.2 ANNUAL AIR HEATER INSPECTION

To reduce possible failures to a minimum and to keep the air heater operating at peak efficiency, and therefore providing the best output and ensuring the lowest operating costs, it is recommended to perform a general inspection of the air heater at least once a year. More frequent servicing may be required depending on the environmental conditions where the air heater is installed. Regular inspections area necessary, especially in dirty areas, to assess the servicing frequency.

NOTE:

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