ALKE
Heating Technology

User, Service and Installation Manual

AL-8, AL-10, AL-12 Series

Atmospheric ceramic gas infrared heaters for outdoor use

Country of destination:
GB, IE, MT
General international manual

AL-12-SEi-AS

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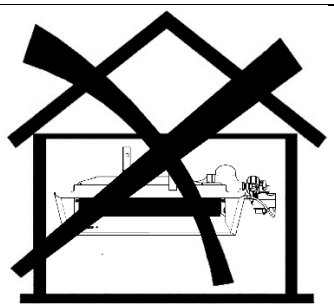


Fig. 1a

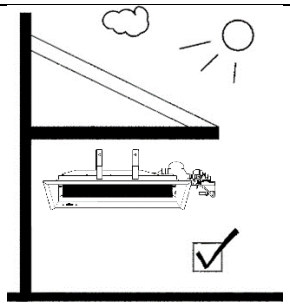


Fig. 1b

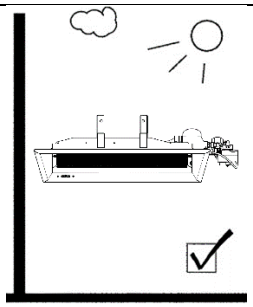


Fig. 1c

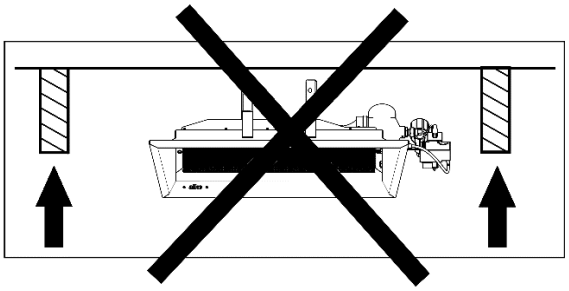


Fig. 1d

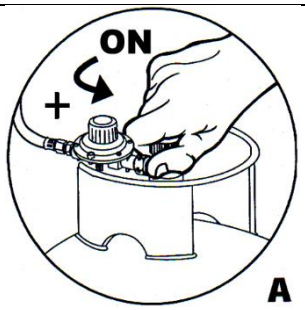


Fig. 2a

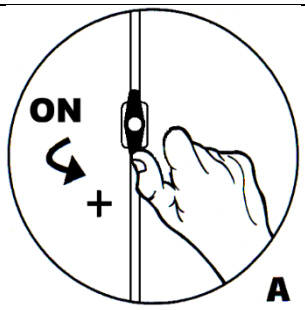


Fig. 2b

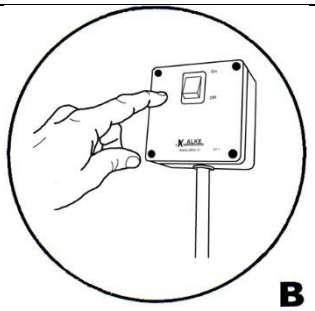


Fig. 3

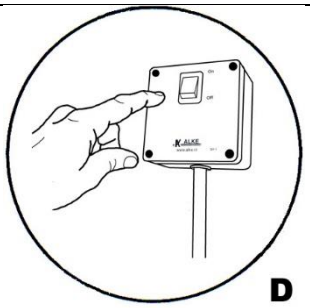


Fig. 4a

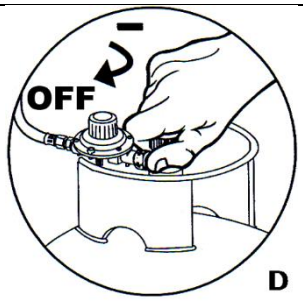


Fig. 4b

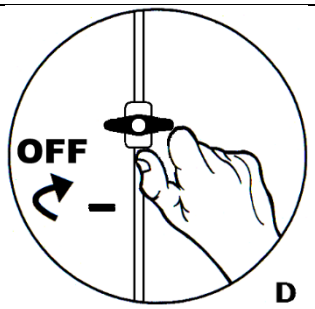
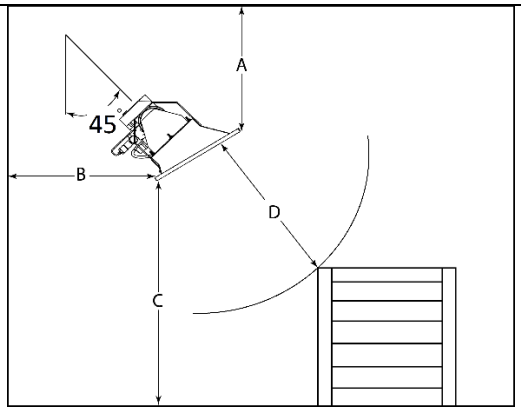


Fig. 4c



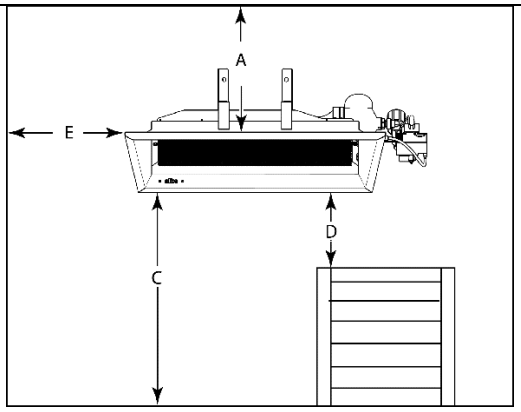


Fig. 5

1. Warnings

Do:

- Read this manual carefully before installation and use and keep it for future reference. Make sure that all daily users know the content of this manual.
- A competent and qualified person, like a gas installer or other professional, shall do the mounting, installation, maintenance and servicing (and conversion to other gases if applicable).
- Install these heaters only in accordance with all applicable local and/or national regulations for installation and ventilation of gas heaters.
- Improper installation, wrong adjustment, alteration, incorrect service or maintenance can cause accidents, injury, damage or death. For assistance or additional information consult the dealer, gas supplier or gas installer.
- Use these heaters only outdoors or in amply ventilated areas, a minimum of 25% of the wall surfaces of these amply ventilated areas must be open. (see fig. 1a, 1b, 1c)
- Before installation and use make sure that the required type of electricity, type of gas and gas pressure (as mentioned on the data plate) are in accordance with the local situation.
- Store gas cylinders always in accordance with national and local regulations.
- Use only gas cylinders with a gas isolation valve, or gas lines with a main gas valve at the beginning. In case more than one heater is connected to a gas system, place also a gas tap directly before each heater. Close these taps when the heaters are not in use.
- Make sure that during service, maintenance, cleaning and other work on the heaters, gas lines are closed and electricity disconnected and the heaters are cooled down
- When gas is smelled or a leak is detected, directly close the gas supply and immediately take care of good ventilation. Do not touch any electrical switch or do not create sparks in another way. Do not use the system before the leaks are repaired and the system is safe again. Consult an installer.
- If a heater is not safe to use anymore, close the gas supply and electricity to the heater so that nobody accidentally can operate the heater. Contact a service agent or gas installer to solve the problem.
- These heaters have an open flame. Make sure and take action that small children, mentally disabled persons or elderly people never can touch the heaters or are in the vicinity without supervision.
- In case the heater is extinguished by an unknown reason, wait for at least 3 minutes before igniting the heater again.
- Many pictures in this instruction show a type AL-10 heater. But these pictures are also valid for the other types.

Do not:

- Do not use these heaters for domestic applications or for use in habitable parts of buildings and houses.
- Do not use these heaters below ground level or in cellars or basements.
- Do not use these heaters in small rooms, enclosed areas or insufficient ventilated areas. This can be dangerous and is forbidden. (see fig 1a)
- Do not use these heaters for other purposes than terrace heating or similar applications. Other use is not foreseen or evaluated and maybe dangerous.
- Do not use another electricity voltage or type, type of gas or gas pressure than what is written on the data plate.
- Do not use these heaters in locations where combustible liquids or vapours are used or stored or where there is a danger for dust explosions. These heaters are not ATEX approved.
- Do not cover these heaters with cloths or other materials for drying purposes.
- Do not install gas lines, gas hoses, electric lines, etc. directly before, above or behind the heaters so they become heated by the heater or flue gases.
- Do not heat gas hoses above 40 degrees Celsius.
- Do not modify heaters. The manufacturer does not take any responsibility for modified heaters.
- Do not touch, move, handle or service a heater when it is in operation.

NOTE: Sometimes in the text numbers between brackets are used. These numbers correspond with the numbers of the exploded view and parts list in the back of the manual.

2. General information

Model identification.

The main identification of the different models is AL-8, AL-10 or AL-12. These are independent atmospheric ceramic gas infrared heaters. Suffixes are used behind these model names to add additional information about the models (e.g. AL-8-SEi-AS).

S: equipped with an individual solenoid valve for high-low operation
Ei: equipped with an electronic ignition device (EID2G)
AS: equipped with an asymmetric reflector
ER: equipped with an economy reflector
See the technical table in chapter 12 for the different gas situations.

Working principle of the heaters.

These heaters provide heat through infrared radiation. Infrared heating is the only heating principle for an efficient heating comfort in outdoor situations. It is comparable with sitting in the sun on an early spring day: the air temperature is still low but the radiation of the sun makes it nice and comfortable. These heaters have a short heating up time: infrared heat is available directly on request.

Safety in general

The heaters comply with the European Gas Safety requirements. An independent test house has approved a prototype in accordance with the European Standards and the Gas Appliance Regulation. After approval the factory is inspected every 6 months by a Notified Body to monitor the production of the certified heaters.

Unpacking the heater.

The carton box will contain the following parts:

- 1 heater with reflector
- 1 manual

Components ordered additional (like mounting brackets or gas hoses) are delivered separately. Please check the heater on transportation damage, etc. before acceptance. Contact directly the transporting company or the dealer in case the carton box and heater are damaged.
Before leaving the factory, all the heaters are operated and tested by the manufacturer on gas for 5 minutes. Note that due to this the burner and reflector of the heater will be a little bit discoloured.

Weather conditions

The heater is made of strong and durable materials. Rain or moisture shall not directly shorten lifetime of the heater (as long as the burner stones remain dry) but of course it is better to protect the heater from these influences. The heater will not efficiently work with strong winds. The wind will make ignition difficult or cools down the safety device, which will cut off the gas supply to the burner. We advice not to use the heater by wind speeds above 3 m/s (3 Beaufort).
In a corrosive environment (like coastal area's or some industrial places) is it possible that parts of the heater show signs of corrosion. In first instance this will not influence safe functioning of the heater. During the yearly service check the evaluation must be made if this is still the case. No guarantee is granted to parts that are corroded or damaged due to placement in a corrosive environment.

3. Installation

General

A competent and qualified person, like a gas installer or other professional, shall do the mounting and installation. In particular this is applicable for the gas technical and electrical part of the installation. Install this heater always in accordance with the applicable gas technical and electrical regulations, local and national installation regulations and with the requirements written in this manual. Before the final delivery of the heating installation the installer shall check the complete system for gas leakage and electrical safety and operate the heater to check for safe and proper functioning.
These heaters are of the so-called type A1. That means that there is no independent combustion air supply connection and no flue connection. The flue gasses are vented away by the ventilation of the space.
The heaters are intended for outdoor use only or amply ventilated areas but not for indoor heating. (See fig. 1a, 1b, 1c). When local regulations allow it, there are no safety objections to use the heater in large indoor spaces for spot heating where space and ventilation conditions are comparable to outdoor use (like exhibition halls, covered shopping streets, etc). First check with the local authorities in these situations. Never use the heater in small indoor spaces.

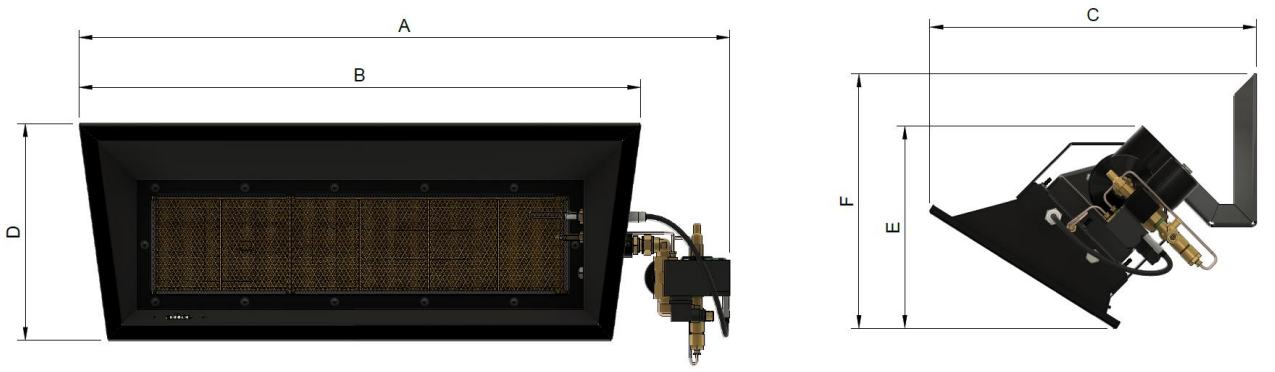
Heater dimensions

Dimensions of the heaters (rounded values)

Model	Length A (cm)	Length B (cm)	Width C (cm)	Height D (cm)	Height E (cm)	Height F (cm)	Weight (kg)
AL-8-Ei-AS	66	57	44	29	30	34	7,6
AL-8-SEi-AS	73	57	44	29	30	34	7,8
AL-10-Ei	87	76	42	34	33	40	9,9
AL-10-SEi	87	76	42	34	33	40	10,4
AL-10-Ei-ER	81	63	45*	39	40	NA	9,5
AL-10-SEi-ER	81	63	45*	39	40	NA	10,0
AL-10-Ei-AS	87	75	44	29	27	34	9,5
AL-10-SEi-AS	87	75	44	29	27	34	10,0
AL-12-Ei	106	94	42	34	33	40	11,8
AL-12-SEi	106	94	42	34	33	40	12,3
AL-12-Ei-ER	99	81	45*	39	40	NA	11,4
AL-12-SEi-ER	99	81	45*	39	40	NA	11,9
AL-12-Ei-AS	105	94	44	29	27	34	11,4
AL-12-SEi-AS	105	94	44	29	27	34	11,9

*) While the heater with the ER reflector does not have brackets, this is the largest width seen from aside.

AL-8, -10, -12 Dimension drawing



Safety distance to combustible materials

The heaters provide heat by radiation and by combustion gases. It is important to take into account the distances as mentioned in the table from the heaters to combustible materials. This is to avoid risk of fire. Do not use the heater in situations where the distances to combustibles are smaller or take additional protective actions. Pay special attention to materials that can move by wind easily in front of the burner, like curtains. Keep these materials always on a distance of 1 meter or more.

Find in the table below the safety distances from the edge of the reflector to the walls/objects concerned. Realize that these distances are safety distances in relation to fire safety. This means that temperatures still can rise to 50 degrees Celsius above ambient temperature (= the limit given in the standards). Be alert on possible other problems, like discolouring. In case of doubt, keep more distance.

Distance to combustible materials (installation angle 45 degrees). See fig. 5			
Model	**AL-8**	**AL-10**	**AL-12**
Upper edge reflector to:			
[A] - combustible ceiling [A] - combustible sunshade cloths	60 cm	80 cm	90 cm
Lower edge reflector to:			
[B] - combustible back-wall	18 cm*	18 cm*	18 cm*
[C] - the ground	240 cm	260 cm	280 cm
Front plane of the reflector to:			
[D] - objects within radiation reach	120 cm	130 cm	160 cm
Side edge reflector to:			
[E] - combustible side-walls	50 cm	50 cm	50 cm

*) This distance is guaranteed when the suspension bracket (number 24) is used.

The minimal distance to non-combustible materials depend on the location but must be at least 30 cm to the ceiling and side walls. Be aware that some non-combustible materials will discolour when they become to hot. Combustible materials can be covered with non-combustible materials to minimize the mounting distances. Inform with a professional about which non-combustible materials can be used and the minimum thickness needed. Always do a practical test with an operating heater to check the final temperatures of the walls and objects.

Ventilation around the heater
Check if there is sufficient space for the combustion gases to vent away, but also if there is enough fresh air available at the inlet of the venturi (14) to the burner. If this is not the case, this will have an influence on the proper combustion and good functioning of the heater. Sooting, long flames and CO emission can occur which is not allowed. Also condensation of water can happen. Installation in between ceiling beams can be a situation where fresh air access will be limited (see also fig. 1d).
Note: electric components shall not reach temperatures above 60 degrees Celsius. Make sure that the electric components (Ei and/or S) after mounting of the heater are sufficient cooled by fresh air and that the combustion gases never can touch these components. Check this during the first operation of the heater.

Heating plan
The location of infrared heaters on a terrace needs the advice of an experienced specialist. Especially when more heaters are used with limited installation space in relation to windows, doors and ceiling height. Also the location in relation the wind direction, open field, beach or urban environment, open air or under a veranda are important for a good advice. Ask the dealer for more information and a heating plan. Check always the safety distances to combustible materials as given above.

Mounting
Mount the heater firmly with metal brackets on the wall or other construction. Make sure that the heaters are mounted with the ceramic burner plaques pointing downwards under an angle of 45 degrees with the horizontal. (see Fig. 6). The long side of the reflector shall be water level in the horizontal surface. For suspension purposes, the brackets of the heaters with the symmetric and asymmetric reflector have 4 holes of ø 8,5mm in a rectangular pattern. Centre to centre 50mm above each other and centre to centre 180mm side by side. Check always the location and dimensions of the holes on the heaters first before drilling holes, etc. The heaters with the economy reflector (ER) have 4 mounting holes of ø 8,2mm in the reflector to attach a chain with the help of carabiners 6x60mm or eyebolts for suspension.

Note: never use a rope or plastic material to mount the heater. Never use the gas line to mount the heater on.

The gas safety device and electric components can handle a maximum temperature of 60 degrees Celsius. Be sure that the heater is not mounted in such a way that this temperature will be reached (e.g. by other heaters in close vicinity).

4. Gas supply information

General
Make sure that an authorised company in the country, in accordance with the local rules and requirements, installs the gas supply system. Check first if the local gas supply situation and electric supply complies with the information on the data plate of the heater. Make sure that the gas is clean. Install a gas filter and condensate trap before the heaters in case the gas is dirty or wet/oily. No guarantee can be given on heaters operating on gas that is not clean.
Always mount a (easy to be reached) gas tap at the end of the gas line. This gas tap is mandatory to make it possible to isolate or to remove the heater after use. For data needed to calculate the dimensions of the gas line, see the technical table.
The screw of the pressure measuring nipple on the gas safety device is susceptible to damage. Use a well-fitting screwdriver #3.

Gas line supply
In case a main gas line supplies the gas to the heaters, make sure that an authorised company in the country installs the system. To avoid problems, use galvanised or copper tubing for the gas line. First make a calculation to determine the capacity of the whole system and the diameters of the piping. Use the common available calculation methods as written in gas pipe installation standards.

Gas hose (in combination with gas line supply)
According to the standard EN419 the connection of the gas heater to the gas line shall be done by a gas hose with a length of minimal 0,5m to maximum 2,0m. This gas hose shall be made of stainless steel, shall be approved according EN14800 or a comparable standard that is appointed by the local authorities.

Gas cylinder supply
Gas can also be supplied from LPG gas cylinders. The minimum recommended size is a 11-kg gas cylinder or larger. Before buying a gas cylinder make sure that the connections of the gas regulator and the gas valve of the gas cylinder are of the same type. Check with the gas cylinder supplier for the correct size of gas regulator, and check whether the capacity is enough for the heater(s) that will be supplied. Check also whether the location of the gas cylinder during use is a safe location and according to the local requirements. Check the technical table for the maximum gas consumption and gas pressure.

Store the gas cylinders always on ground level in a well-ventilated place, preferably outside the room where the heater is. In case the gas cylinder is placed in a cylinder housing, or cover, make sure that there is enough ventilation as requested by the applicable regulations or standards. Never obstruct these ventilation holes. Make sure that the gas cylinders are used in upright position only and are secured against tipping over during use. Gas cylinders laying on their side will give liquid gas. This is very dangerous and will give a fire ball when it reaches the heaters. Make sure that the gas cylinder valve always can be reached easily to close the gas supply in an emergency. Pay special attention how to change the gas cylinders in a safe way.

Gas hose (in combination with gas cylinder supply)
A gas hose must be inspected frequently and must be changed within the prescribed intervals. Check the hose every time the gas cylinder is changed, but at least once a month. Avoid twisting or stress of the gas hose. Twisting or stress will shorten the lifetime of the gas hose. During inspection, check the hose for damage, splitting, aging and cracking. Pay special attention to the connections. Keep the hoses clean from dirt, moisture and dust.

Some countries have regulations that gas hoses must be replaced every 2 or 3 years. Please check with the gas supplier. It is advisable to change the hose every 3 years in case there are no local regulations. Always use official gas hoses. Replace a gas hose always by a type of the same length, internal diameter and equivalent quality. For your own safety: **never use air hoses or water hoses.** These hoses are not suitable gas transportation and will leak quickly!

The gas hose shall always be connected to the heater with the help of hose clips. Not using hose clips at both ends of the gas hose is very dangerous. Make sure that the gas hose never is heated above 40 degrees Celsius.

Changing gas cylinders
Changing or connecting gas cylinders must be done carefully outside, or in an amply ventilated area, in a flame-free environment and away from other people.

- Check if there are no other operating terrace heaters, other gas appliances, burning candles or people smoking cigarettes in the area.
- Be sure that the valve on the gas cylinder is closed, electricity to the heaters is disconnected and the burners of the heater are extinguished.
- Unscrew the nut by which the gas regulator is connected to the gas cylinder valve. (Note that most connections are with left-handed threads. They open in clockwise direction).
- Before connecting the (new) gas cylinder, first check whether the rubber seals on the cylinder valve or on the regulator-connecting nut are fitted properly, are not damaged or worn and able to fulfil its function. If damaged or worn, do not use it or replace the seals.
- After connecting the regulator firmly, open the cylinder valve and check with soapy water if the connection is leak tight. If bubbles appear, the connection leaks. Do not use the heater unless the system is sound.

Soundness check
Before using a new built gas system, the installer shall make a careful and extensive check for gas leakage. After executing a pressure drop test to determine that there are not large leaks, check every connection with soapy water or gas detection liquid with all gas valves open and with maximum gas pressure. Pay special attention to the hose connections. Maintain maximum air ventilation during the test. Repeat this check at least every year. This soundness check shall be done by a competent installer only.

What to do by gas leakage
When a gas leak is detected, immediately close the gas supply and electricity to the heater. Keep open flames away. Do not use the heater anymore and inform other people that possibly will operate the heater. Contact an authorised gas technician, gas installer or gas service agent to determine if the gas leakage can be repaired. Never try to do gas repairs by yourself. Do not use the heater anymore until the problem is solved.

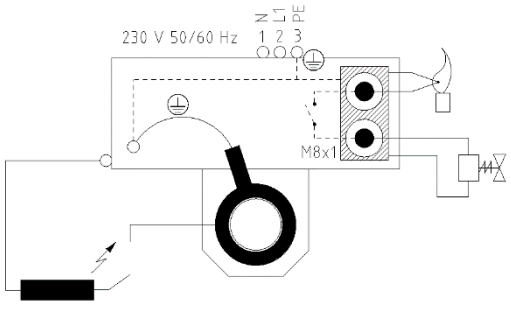
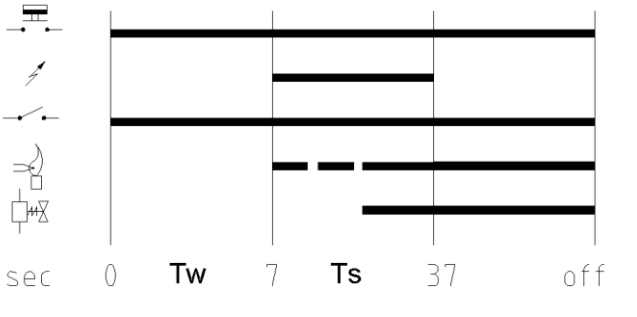
5. Electrical information

General
All electrical connections/installations shall be made in accordance with the national and/or local regulations that are in force in the country of destination where the heater will be installed. Before doing maintenance or installation work always disconnect the electricity to all the lines by removing or disconnecting the fuses from the electrical system to the heaters.

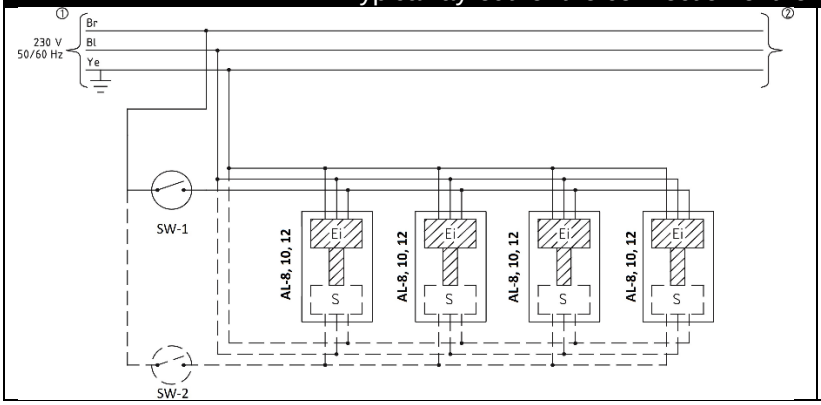
A proper earth connection MUST be made to the heaters with an electronic ignition device (Ei) and/or with a solenoid valve (S). Firstly for safety reasons and secondly the electric ignition device (Ei) will not operate correctly and will give failures or will shut down. The Ei device is not phase sensitive. In case of an electrical fault directly after installation of the heater concentrate first on earth continuity and resistance to earth. These are the main reasons for failures while all heaters are operated for proper functioning before leaving the factory. To maintain the IP65 rating make sure that the rubber seals between the ignition device and electric connector and between the electric connector and electric wiring are in place. Turn the mounting screws and compression nuts of the connectors firmly so no water can enter.

Fuses and switches are not supplied with the heater. The electric installation shall have a separate fuse for the protection of the heaters only. The operation switches prior to the heaters shall be of a double pole type with minimum contact separation of 3 mm. Make sure that always the live wire (or hot wire) of the electric supply is used to switch the heaters on and off. The operating or control box, which is not delivered by the manufacturer but by the installer, can be installed on any desired place and height, provided this is within reach of the user.

Electrical data	Ei	SEi
Electrical supply:	230VAC 50/60Hz, IP65	230VAC 50Hz, IP65
Power:	Max 30VA	Max 50VA
Current rating:	Max 0,2A	0,3A
Waiting time T(w)	7 seconds	7 seconds
Safety time T(s)	30 seconds	30 seconds

Schematic diagram electronic ignition device	Timing diagram electronic ignition device
	

Typical lay-out for the connection of the electric lines



1	To control box
2	To additional zones
SW1	Switch on/off
SW2	Switch high/low fire
BR	Brown
BL	Blue
YE	Yellow/Green = Earth
Ei	Electronic Ignition Device
S	Solenoid for high/low

NB: dotted line is only applicable for the …S… models

6. Operation

New heaters

New heaters need a short cleaning period before they are ready for operation. Fire the heaters for at least 30 minutes on full capacity to burn-off oily and greasy remnants of the production. Make sure that after 30 minutes all smoke and smell is disappeared.

Ignition of the heater

Warning: after a manual operated heater is extinguished (intentionally or unintentionally) wait always for 3 minutes before (re)ignition. This is a worldwide safety rule and intended to ventilate unburned gases away and to leave enough time for the thermocouple device to close.

Note: ignition shall always be done in high fire. To do so, the gas pressure shall be adjusted at maximum (nominal) pressure as indicated on the data plate, solenoid valves shall be in open or high fire position. If desired, the heat input of the heater can be set to low fire after about 30 seconds after ignition.

Note: If 10 ignition attempts are made in sequence within a short interval (<120 seconds per ignition attempt) the electronic ignition device will fall into a safety lockout and needs a reset (cool down period) for 20 minutes. During the reset, leave the power on to feed the internal reset timer.

Electric operated heaters

Ignition of the heater

1) Open all gas taps and turn the gas pressure regulator (if mounted) on maximum pressure according the dataplate, open the solenoid valve (S)(if mounted) by electricity. (Fig. 2a, 2b). In case the heater has a high/low fire setting, ignite always in high fire position.
2) Press the switch to operate the ignition device (Fig. 3). The heater will start the ignition program.
3) After a safety time of 7 seconds the ignitor sparks for 30 seconds and ignites the heater.
4) After 30 seconds, the thermocouple safety device will take over the safety function and supervises the flame. The burner will stay on as long as there is 230V supply on the electric ignition device (Ei).
5) If ignition fails, turn the power to off for at least 1 second to reset the system.

Extinguishing of the heater

Switch-off the electric power supply to the electronic ignition device (Ei) (Fig. 4a). This will close immediately the gas supply by the gas safety device. Close the gas tap or the central gas supply (Fig. 4b, 4c).

Heat regulation of the heater

All models, except models with …S…

The heat input of these heaters can only be changed by adjusting the pressure of the gas supply. In the gas line an adjustable pressure regulator shall be mounted or a special device must be installed to regulate the gas pressure. Check the gas supply pressure information on the data plate of the heater for the minimum and maximum values. If only one pressure is mentioned on the data plate, adjustment is not possible and only continuous operation or on-off operation is allowed.

All models with …S…

Make sure that the gas supply pressure remains constant at the value indicated on the data plate. Adjust the heat input between high and low by opening or closing the solenoid valve (S).

How to check correct operation of the burner
Directly after ignition the burner flames are blue (difficult to see during daylight). After 15 seconds the ceramic burner stone starts glowing and becomes red/orange. After 2-5 minutes the heater reaches the maximum heat output. During normal functioning, the ceramics are glowing red/orange. The burner gauze (20) in front of the ceramics will be a bit red, but flames (blue or yellow) shall not appear outside the gauze. The burner shall only make a soft buzzing noise. Other noises or roaring noise indicates that cleaning or maintenance is needed.
Note: during pre-heating (or cooling down) the heater can make a ticking noise. This is created by the expansion of the material during the temperature change and is not harmful for the heater.

What to do if the heater is not used for a period of time
The heater can stay in place when it will not be used for a period of time. Close all gas valves. When the heater is mounted in a location protected against wind and rain, no other protection is needed. In case the heater will become wet by rain or snow (combined with wind) it is better to protect the heater outside the season with a plastic bag or otherwise. This also protects against dirt.
Take into account the local requirements for long-time storage of the gas bottles out of season. In most places it is only allowed outside in a protected location or in a well ventilated area. The local fire department, environmental department of the municipality or gas supplier can inform you about the regulations.
Note: a wet heater can be damaged by frost
Note: do not forget to remove the protection material before using the heater again

7. Cleaning, maintenance and servicing

General
Always shut off the gas valve and disconnect electricity before maintenance or service is done on the heater. General maintenance and service shall be done at least once a year before the heating season starts or after a long period the heater is not used. Parts that are broken, or are not functioning well, must be replaced directly by identical ones of same brand and type. Consult the dealer or manufacturer in case of doubt.

Dust filter (Optional)
Optional dust filters must be checked a few times during the heating season and cleaned in case needed. Remove a filter before cleaning. Brush the surface gently with a brush or clean it with compressed air from inside to the outside. In case the dust is greasy, clean the filter in warm water with a bit detergent. Make sure that filters are dry before replacing them. For heaters with a dust filter still check the venturi (14) inside regularly while very fine dust still will pass the filter and pollute the heater internally.

Order of maintenance
- First clean the heater (and the optional filters) as described above.
- Clean the reflector (21, 22, 23) and other parts with water, mild detergent and a cloth or soft brush.
- Clean the inside of the venturi (14) and burner tube via the connection piece (11) with compressed air and a tube brush. Repeat this 3 times to be sure that all the dust is removed.
- Carefully inspect the burner ceramics on damage, cracks and holes and if they are still mounted properly. Replace when needed. To clean the burner ceramics, use low pressure air. Clean first the ceramic stones with air from the front side through the gauze. Then clean the inside of the burner with air via the venturi tube. Do not use compressed air above 2 bar because higher pressure will damage the ceramic stones. Never clean the burner stones with water.
- Check the gas injector for obstructions. Remove obstructions by brushing them away and by using a pin or drill to clean the injector hole. Make sure that the injector hole does not become wider by using a pin or drill that is larger than the size stamped on the side of the injector.
- Clean the inside of the gas safety device (4, 5, 6 or 7) and injector with compressed air. Make sure that the pressure of the compressed air is not higher than the 0,5 bar. Otherwise the rubber seals inside the safety device will become damaged.
- Check the condition of the thermocouple tip (15). Replace in case the tip is burnt-in already to avoid unnecessary shut down later on. See additional information for the location of the thermocouple.
- Check the condition of the spark plug (18); no cracks of the ceramic and a spark gap of 3-4 mm. Check if the metal spark wire and earthing wire still makes a 15 degrees angle directly above the ceramics and are not bending away to smaller angles. Clean the electrodes with grinding paper in case they are corroded.
- Clean the ignition device and check the connection of the ignition wire for proper contact and waterproofing. Check if the ignition wire is not damaged and has no cracks.
- Check all gas carrying parts and connections for gas tightness with leak detection liquid or soapy water according the procedure in the standards applicable at the local installation situation. Never use a flame for soundness checks!

- In case a gas hose is used, check this carefully for cracks, wear and other signs of damage or alteration. Replace it also when the maximum lifetime printed on the hose, or the maximum lifetime allowed by local requirements, has been passed.
- Commission the heater after maintenance and check it carefully during first ignition, firing and extinguishing.

In case the heaters need to be stored for a long time, make sure that no dust, spiders, etc. can enter the heater. Use the carton packaging box to store the heater, or a plastic bag if the box is not available anymore, and close this carefully.

Consumable parts
Thermocouples (15) and the magnet unit (3) inside the gas safety device are the most important parts that maybe requires replacement during normal operational life. See the parts list for more information.

Replacement of the magnet unit
- Unscrew the thermocouple extension (8) at the gas safety device (4, 5, 6 or 7) by using spanner #8.
- Unscrew the nut for connection of the thermocouple (or thermocouple extension) at the gas safety device (4, 5, 6 or 7) by using spanner #17.
- Remove the broken magnet unit (3) and replace by a new one.
- Replace the nut for connection of the thermocouple (or thermocouple extension) by using spanner #17 and close carefully (firmly but not excessive) to avoid gas leakage.
- Replace the thermocouple extension (8) at the gas safety device (4, 5, 6 or 7) by using spanner #8.
- Carefully check the gas safety device for gas leakage before taking back into operation.

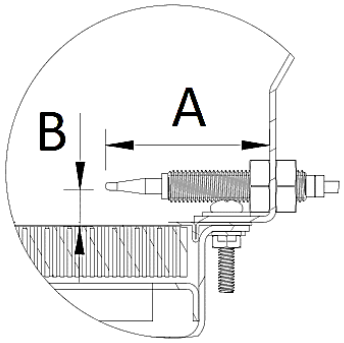
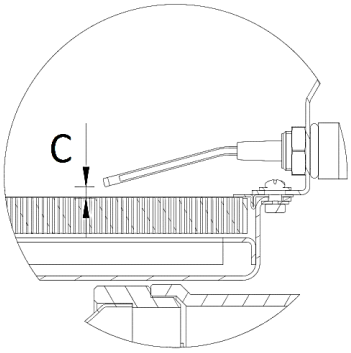
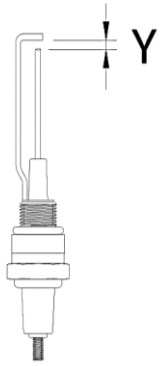
Replacement of the thermocouple
- Remove the thermocouple (15) at the connector of the ignition device (2) by unscrewing the nut M8 of the thermocouple by using a spanner #8.
- Loosen the nuts M8x1 (2x) at the tip of the thermocouple by using a spanner #13 and remove the thermocouple from the reflector.
- Replace with a new thermocouple until the position as indicated in the drawings below. Tighten nut M8x1 (2x) to secure the thermocouple in place.
- Bend the new thermocouple in the identical shape as the old one the and screw the thermocouple nut M8 in the connector of the ignition device (2). Hand-tight first and then an additional 1/6 turn.

Replacement of the gas injection set/air restrictor
- Disconnect the heater from the gas line and disconnect the electric connector (1) from the ignition device (2) (and electric connector (9) from the coil (10) for the S models only).
- Disconnect the thermocouple from the ignition device (2) and disconnect the spark plug wire (17) from the ignition device (2).
- Loosen the nut M20 on the gasway directly after the air inlet connection (11) by using a spanner #25.
- Loosen the M6 screw on the air inlet connection (11) (directly aside the M20 nut). The air inlet connector can turn freely now around its axis.
- A spanner #17 can be placed through the filter opening of the air inlet connector on the gasway. Turn anti-clockwise to loosen the gasline from the spider (13). Turn the gas injection set till it comes separated from the spider (13).
- The air restrictor (12) can be replaced or removed now from the spider.
- Repeat the procedure above in reversed order to mount all parts back again.

Conversion instructions
Conversion shall be done by a qualified installer only. To convert a heater from one gas or gas pressure to another gas or gas pressure, take the following actions.
- Consult the technical table on the last page and contact the manufacturer or dealer with the model number and serial number for the parts needed. (e.g. a new gas injection set (4, 5, 6 or 7), a new air restrictor (12) or a new venturi (14) and a new data plate).
- Replace the parts by new ones. Use a proper gas sealant to avoid gas leakage and seal the new parts.
- Check the gas supply for the proper gas pressure and gas type and do a leakage test first.
- Take the heater into operation and do a visual examination of the flame as explained above.

End-of life disposal
The infrared heaters are made up of valuable recyclable materials. Therefore, deliver the heater at the end of its life in a recycling company.

Position of thermocouple

Position thermocouple AL-8, AL-10, AL-12	
	
A= 33 mm, B= 12 mm	
Position of the spark plug	Spark gap
	
C= 5 mm	Y = 3-4 mm

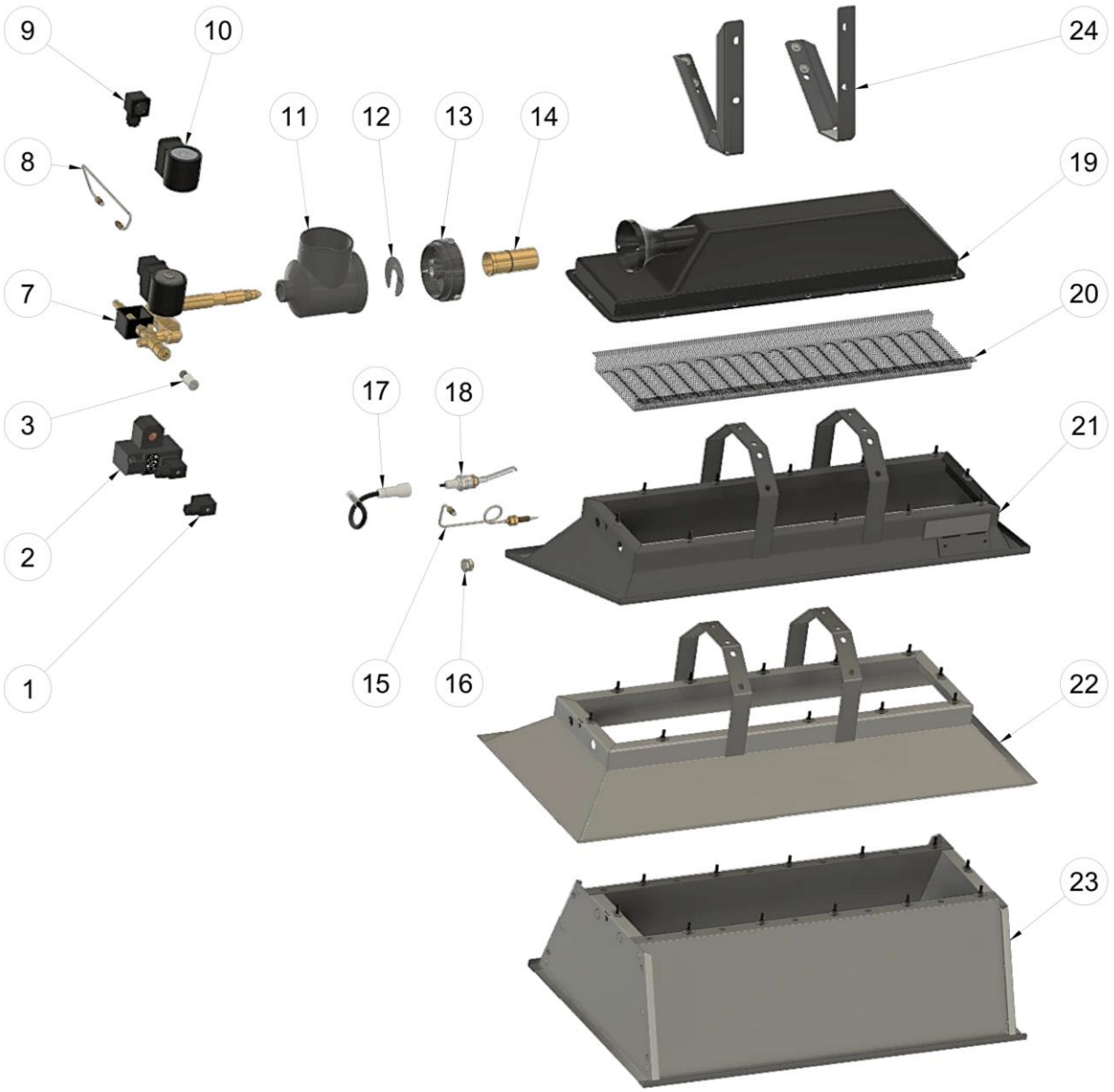
8. Fault finding

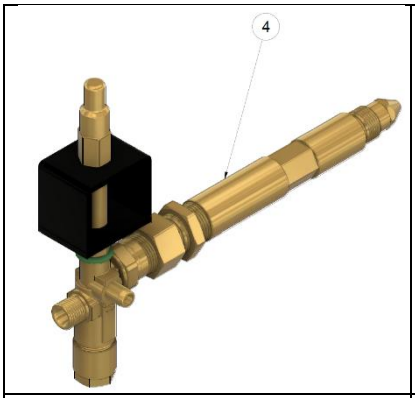
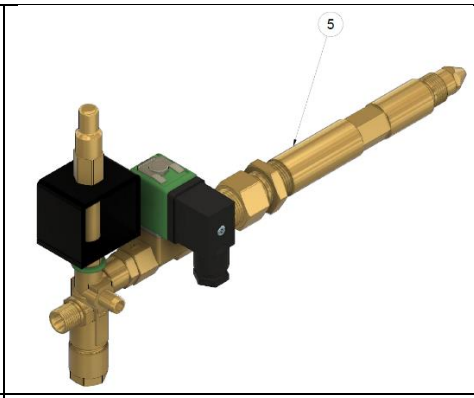
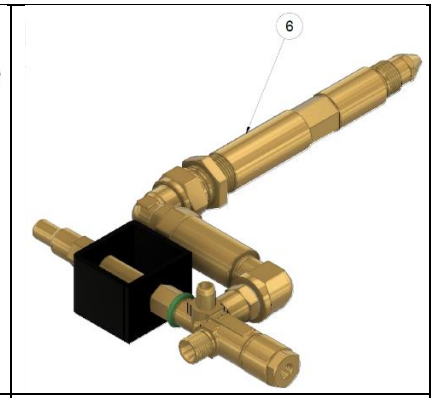
Trouble	Cause
Burner does not light. *Spark is available*	• The gas valve of the gas cylinder (or gas line) is not open • Gas cylinder is empty • Air in the (new) gas lines • Gas injector is blocked • Gas pressure/gas quality is not corresponding with the data plate info • The burner is not on high-fire setting during ignition • The (optional) solenoid valve S is not connected or is damaged • During sparking manual ignition is possible with a lighter: check the location of the spark gap related to the ceramic stone is correct • Gas safety device does not open with a “click” during ignition period, the Ei coil is broken. Replace.
Burner does not light. *No spark available*	• No 230 Volt available at the Ei • Spark electrode line is not connected to the Ei • Spark electrode gap incorrect. Shall be between 3-4 mm • Spark jumps off to other metal parts before the spark electrode. Check wire, connectors and ignitor ceramics. Check if parts are dry • Ignition loop is not complete. Check the ignition wire and earthing wire • Ignitor Ei is broken. Replace • Ei is in recovery phase. Leave the Ei connected to 230V for 20 minutes to reset and try again
Burner extinguishes after lighting	• Position of the thermocouple is wrong (see above) • Thermocouple nuts are not connected properly to the gas safety device and to the Ei unit, or the nuts are loose • Thermocouple is not heated by the flame or not mounted properly • Thermocouple switch in Ei is broken. Check (after switching 230V to the Ei) by multi meter if resistance of the internal switch is <25 mΩ • Thermocouple and/or magnetic coil of the safety device are broken. • Gas pressure lower than minimum requested • Heater not suspended at 45 degrees angle (facing downwards) • Not all burner stones are ignited, especially near the thermocouple
Flames: *- leave the confines of the burner* *- or are sooting* *- or a blue cloud is under the reflector*	• Gas pressure is too high. Check the gas pressure with the data plate • Gas pressure regulator is broken • Wrong gas. Check data plate for the correct gas supply • Venturi/air inlet is blocked/dirty • Venturi and injector wrong. Check with the technical table • Not enough fresh air available due to mounting situation • Air filter is dirty • Heater not suspended at 45 degrees angle
The burner is only partly glowing	• Wrong gas or gas pressure. Check data plate for the gas supply information • Injector or venturi are blocked or dirty • Injector and venturi size are wrong. Check with the technical table • Pipe sizes or gas hoses have insufficient capacity • Setting of the thermostat is wrong
The burner makes a lot of noise after ignition or after several minutes	• Wrong gas. Check data plate for the gas supply information • Burner stone is damaged, the flame burns inside the burner house • A buzzing noise of the Ei is created by magnetic fields and lasts only 30 seconds. Not harmful and temperature dependent. Turn the Ei in another position.
The burner does not work at minimum heat input	• Gas pressure is not correct. Check the gas pressure with the data plate • Wrong gas. Check data plate for the correct gas supply • Size of the venturi and injector is wrong. Check with the technical table • By-pass hole solenoid valve (S) is blocked • Injector (partly) blocked • Thermocouple has not the proper location to the ceramic burner
Heater will not attain the desired temperature	• The solenoid valve (S) is not functioning • Injector partly blocked

9. Parts list

Consult the dataplate on the heater to determine the model you have. For spare parts, service material, advice and information please contact the distributor. Always mention the model name and serial number. Service parts are only available via the distributor or gas installer. For general manufacturers information please see the internet: www.alke.nl

Overview Parts AL-8, -10, -12



		
Number 4	Number 5	Number 6

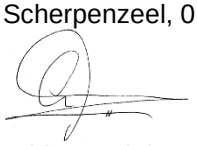
Nr	Art. number	Description			
1	03025000	Rectangular Electric Connector 3-poles			
2	00185005	EID2G Ignition block			
3	00161010	Magnet Coil #74			
		G20-20mbar	G25-20mbar	G25.3-25mbar	G31-50mbar
4	Gas injection set AL-8-Ei				
	10001312	10001332	10001342	10001362	
5	Gas injection set AL-8-SEi				
	10001313	10001333	10001343	10001363	
6	Gas injection set AL-10-Ei				
	10001412	10001432	10001442	10001462	
	Gas injection set AL-12-Ei				
	10001512	10001532	10001542	10001562	
7	Gas injection set AL-10-SEi				
	10001413	10001433	10001443	10001463	
	Gas injection set AL-12-SEi				
	10001513	10001533	10001543	10001563	
8	00198010	Thermocouple extension			
9	03028000	Square Electric Connector 3-poles			
10	00694040	Coil 230 Volt Brahma (AL-10, AL-12)			
	00694002	Coil 230 Volt Asco (AL-8)			
11	01807001	Air inlet connector AL-8, AL-10, AL-12 black			
12	038761XX	Air restrictor (see technical table for diameter. Not on all models)			
13	02708021	Spider black			
14	01304031	Venturi with ring (see technical table for diameter. Not on all models)			
15	00202027	Thermocouple M8x540 Quick + 2 nuts (AL-8)			
	00201011	Thermocouple M8x320 Quick + 2 nuts (AL-10, AL-12)			
16	99951011	Cap + nut			
17	03050031	Spark plug wire + spark plug cap + 2,8mm connector			
18	03003001	Spark plug + nut			
19	02700001	AL-8 Burner house complete with ceramics			
	02701001	AL-10 Burner house complete with ceramics			
	02702001	AL-12 Burner house complete with ceramics			
20	02415000	AL-8 Gauze			
	02416000	AL-10 Gauze			
	02417000	AL-12 Gauze			
21	02308022	AL-8 Asymmetric reflector (AS)			
	02310012	AL-10 Asymmetric reflector (AS)			
	02312012	AL-12 Asymmetric reflector (AS)			
22	02310111	AL-10 Symmetric reflector			
	02312111	AL-12 Symmetric reflector			
23	02310210	AL-10 Economy reflector (ER)			
	02312210	AL-12 Economy reflector (ER)			
24	02722002	Mounting bracket			

10. Declaration of conformity

Alke B.V., located in Scherpenzeel, The Netherlands, hereby declares that the AL-series, marked on their dataplates with CE and with CE approval/production supervision by Kiwa (number 0063) are in compliance with the following EU legislation:

- Regulation on appliances burning gaseous fuels (GAR) 2016/426/EU
- Low Voltage Directive (LVD) 2014/35/EU (models with electric components)
- EMC Directive (EMC) 2014/30/EU (models with electric components)

Scherpenzeel, 01-12-2020



Adri van Alphen
President

11. Technical table (see next page)

Read the technical table for gas related information.

The combination category, gas group, gas supply pressure and countries of destination are selected with the help of the European standards EN 419 and EN 437. These standards give the official situation per country. But their listing is not always complete and sometimes unclear and in contradiction with each other. In some countries the situation locally can be different from the official information or the information is even not available. Our advice is to stay first with the official listing as given in the table below. In other cases, check with the local gas authorities the data plate of the heater to determine if the heater can be used safely in the specific situation.

Information for K-gas only (G25.3)

I_{2EK}. Gas G25.3: This appliance is adjusted for the appliance category K (I_{2K}) and is suitable for use of G and G+ distribution gases according the specifications as written down in the NTA 8837:2012 Annex D with a Wobbe-index of 43,46 – 45,3 MJ/m^3 (dry, gross, 0°C) or 41,23 – 42,98 MJ/m^3 (dry, gross, 15 °C).

This appliance also can be adjusted or converted to the appliance category E (I_{2E}) gas G20 and in that case, it is suitable to use high calorific distribution gases with a Wobbe-index of 49,4 – 51,4 MJ/m^3 (dry, gross, 15 °C). Precondition for the high calorific distribution gas is that the composition contains no more than 7% propane, 12% ethane, 1.5% carbon dioxide, 0.5% hydrogen and 1.8% water vapor, with the total PE number (propane equivalent) not higher than 7 %.

The above limit values for the Wobbe index are the values guaranteed by the EN419 standard tests with the extreme limit gases applicable to the mentioned appliance categories.

Technical table

Gas group	Gas	Max Supply pressure	Min Supply pressure **	Max Heat Input	Min Heat Input	Gas consumption	Main Injector	By-pass hole ** S-model	Venturi	Air restrictor	NOx Class	Remarks
(-)	(-)*	(mbar)	(mbar)	(kW Hs)	(kW Hs)	(g/h or m3/h)	(mm)	(mm)	(mm)	(-)	(-)	(-)
AL-8 series												
2E, 2E+, 2H	G20	20	12	5,8	4,5	0,56 m3/h	1,75	2,10	26,0	X	5	
2LL	G25	20	12	5,8	4,5	0,65 m3/h	1,93	2,30	26,0	X	5	
2K	G25.3	25	15	6,0	4,6	0,65 m3/h	1,82	2,15	26,0	X	5	
2L	G25	25	15	6,0	4,6	0,65 m3/h	1,82	2,15	26,0	X	5	
3P	G31	50	25	5,7	4,0	408 g/h	1,08	1,08	26,0	X	5	
AL-10 series												
2E, 2E+, 2H	G20	20	12	9,4	7,2	0,90 m3/h	2,20	2,35	X	X	5	
2LL	G25	20	12	9,4	7,2	1,05 m3/h	2,45	2,60	X	62	5	
2K	G25.3	25	15	9,3	7,1	1,01 m3/h	2,25	2,35	26,0	X	5	
2L	G25	25	15	9,3	7,1	1,01 m3/h	2,25	2,35	26,0	X	5	
3P	G31	50	25	9,1	6,4	651 g/h	1,37	1,37	X	57	5	
AL-12 series												
2E, 2E+, 2H	G20	20	12	12,3	9,4	1,17 m3/h	2,50	2,70	X	X	5	
2LL	G25	20	12	12,3	9,4	1,37 m3/h	2,80	2,95	X	57	5	
2K	G25.3	25	15	12,2	9,3	1,32 m3/h	2,55	2,70	X	60	5	
2L	G25	25	15	12,2	9,3	1,32 m3/h	2,55	2,70	X	60	5	
3P	G31	50	25	11,9	8,3	851 g/h	1,55	1,55	X	57	5	

* G31 = propane, G20 = natural gas (100% methane), G25 = natural gas (86% methane); G25.3 = natural gas (88% methane)
** In case the heater is equipped with a bypass hole (S version) the heater shall be operated on maximum supply pressure only. See also the pressure information on the data plate.

Conversion calculation from gross heat input kW(Hs) to nett heat input kW(Hi):
Propane: divide gross heat input kW(Hs) by factor 1,09 (example: 1,20 kW(Hs) / 1,09 = 1,10 kW(Hi)
Natural gas: divide gross heat input kW(Hs) by factor 1,11 (example: 1,20 kW(Hs) / 1,11 = 1,08 kW(Hi)

Maintenance

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Maintenance

Installation and commissioning (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

Yearly maintenance (Carried out by) (Stamp installer) Date:	Remarks:

The local distributor: