User, Service and Installation Manual

AP-1, AP-2, AP-3 Series

Atmospheric stainless-steel gas infra-red heaters for use in well ventilated areas

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

AP-1, AP-3

AP-1-F
AP-3-F
AP-3-FT

AP-2

AP-2-F
AP-2-FT

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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.
- Install these heaters only in according with all applicable local and/or national regulations for installation and ventilation of gas heaters.
- Improper installation, adjustment, alteration, service or maintenance can cause injury, damage or death. For assistance or additional information consult your dealer, gas supplier or installer.
- Use these heaters only in well ventilated environment.
- Before installation and use make sure that the required type of gas and gas pressure, as mentioned on the data plate, is 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 the heaters. Close these taps when the heaters are not in use.
- Installation, maintenance and conversion to other gases shall only be done by competent, qualified and experienced installers.
- Make sure that during service, maintenance, cleaning and other work on the heaters, gas lines and electricity are closed and the heaters are cooled down.
- These heaters are intended for heating of animals, poultry, barns, workshops, local outside heating projects and other similar heating purposes in agricultural environment.
- When gas is smelled or a leak is detected, directly close the gas supply and immediately take care for 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 solved and the system is safe again. Consult an installer.
- If a heater is not safe to use anymore, remove it so that nobody accidentally operates the heater. Store the heater in a safe place, mark that it cannot be used, and contact a service agent or gas installer to solve the problem.
- This heater has an open flame. Make sure and take action that small children, mentally disabled persons or elderly people never can touch the appliance or are in the vicinity without supervision.

Do not:

- These heaters are not intended for domestic use or for use in habitable parts of buildings and houses.
- Never use LPG heaters below ground level or in cellars or basements.
- Never use these heaters in small rooms or insufficient ventilated areas. This can be dangerous and is forbidden.
- Do not use these heaters for other purposes than room heating. Other use is not foreseen or evaluated and maybe will be dangerous.
- Do not use another gas or gas pressure than what is written on the data plate.
- Never use these heaters in rooms or areas where combustible liquids or vapours are used or stored or where there is a danger for dust explosions. These heaters are not ATEX approved.
- Never cover these heaters with cloths or other materials for drying purposes.
- Make sure that never gas lines, gas hoses, electric lines, etc. are mounted directly above the heaters or are heated by these.
- Take care that gas hoses are not heated above 40 degrees Celsius.
- Never modify heaters. The manufacturer does not take any responsibility for modified heaters.
- Bad installation, wrong adjustment or incorrect maintenance can cause damage, accidents or even personal injury or death.
- Do not touch, move, handle or service the heater when it is burning or in operation.

General information

Model identification

The main identification of the different models is AP-1, AP-2 and AP-3. These are independent atmospheric stainless steel infra-red heaters. Suffixes are used behind these model names to add additional type information about the models (e.g. AP-2-FT).

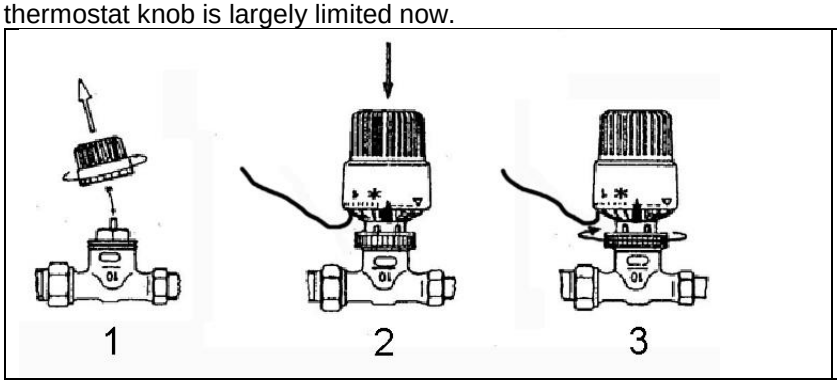
F: equipped with a single dust filter
T: equipped with an independent manual thermostat with remote sensor (Ti = integrated sensor)
Ha: adjusted for high altitude installation (>1400 meter)

Packaging
Normally (depending model and order quantity) the heaters are packed per 1, 2, 4 of 6 in a box. Always check the heaters for transport damage directly after receiving them. Note that the heaters will be a bit discoloured by temperature due to a 5 minutes quality check after manufacturing.

The heaters are pre-assembled. In some cases, if there is a risk for damaging during transport, the thermocouple sensor is separated from the gas safety device. Re-assembly can be simply done by screwing the M8 nut (29) of the sensor back on the safety device (14). Do not tighten too strong.

The thermostat knob is always delivered separated from the thermostat valve.
1) Remove the protection cover from the thermostat valve.
2) Turn the knob on maximum temperature and push the knob on the valve.
3) Fix the knob by turning the large metal screw ring till it stops (at least 2 turns, hand tight).

For thermostats with a remote sensor only: bend the sensor line carefully (no sharp bends) to the thermostat valve and secure the sensor line with a ty-rap around the red protection lining and the thermocouple safety device (see picture). Note that the tubing is hollow, a sharp bend will close the tubing and makes the sensor worthless. The chance of breaking the line at the entrance of the thermostat knob is largely limited now.



Installation
Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible. Make sure that the gas and gas line are clean. Install a gas filter and condensate trap before the heaters in case the gas or gas line is dirty or wet/oily. No guarantee can be given on heaters operating on a gas or gas line that is not dry and clean.

Dimensions
Physical dimensions of the appliances (rounded values)

	Length (cm)	Width (cm)	Height (cm)	Weight (kg)
AP-1-F	35	21	17	0,8
AP-1-FT	42	21	17	1,1
AP-2-F	53	29	16	1,4
AP-2-FT	60	29	16	1,7
AP-3-F	35	21	17	0,8
AP-3-FT	42	21	17	1,1

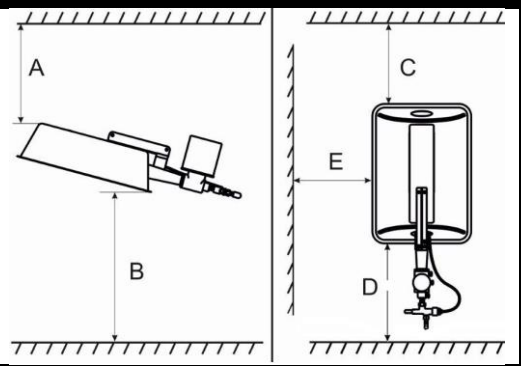
Place of installation
The heaters are intended for use in well ventilated areas only. Do not install the heaters in situations that are not well ventilated. See also below for more ventilation information. Check also your local regulations for the ventilation and room size requirements. The number of heaters per building is depending the type of building, the animals, the insulation, the climate and local wind conditions. Check with your installer or distributor for a heat transmission calculation to determine the number of heaters needed.

Make sure that the place of installation is free of draft (less than 1 m/s). Too much draft will make the flames unstable and will result in a lower infra-red heat efficiency. It is advisable to install an alarm system that reacts on temperature in case a temperature drop will cause damage. Find in the table below a rough guideline for the installation height to start with. Adjust afterwards to the height based on your personal preference and experience.

Operational Distances	AP-1	AP-2	AP-3
To the ground	60-100 cm	125-160 cm	75-120 cm

Safety distance to combustible materials
The heaters produce heat by radiation and by combustion gases. It is important to take the following distances in account from the heaters to combustible materials. This is to avoid fire or overheating. Do not use the heaters in situations where the distances to combustibles are smaller. Never store gases or inflammable liquids or easy combustible materials in close vicinity of the heaters.

Safety Distances	AP-1	AP-2	AP-3
to the ceiling (A)	>40 cm	>75 cm	>50 cm
to the ground. (B)	>60 cm	>125 cm	>75 cm
in front of heater (C)	>25 cm	>50 cm	>25 cm
to the back (D)	>20 cm	>50 cm	>20 cm
to side walls (E)	>20 cm	>50 cm	>20 cm



The minimum distance to non-combustible materials depends on the specific local situation. Keep in mind that there must be sufficient free space left to vent the combustion gases away. Otherwise, they will influence the combustion and proper function of the heater. On locations where the combustion gases can vent away easily, a minimum of 25 cm to the ceiling is advisable. Note: Be aware that some non-combustible materials can be subject to discolouring when they become too hot.

Warning: be careful with the use of heaters in places with storage of manure. Manure can contain large amounts of methane and other inflammable gases.

Ventilation
These models of appliances are of the so-called type A1. That means that there is no independent air supply connection and no flue connection. The flue gasses are vented away by the ventilation of the space.

A proper ventilation is extreme important for safe and convenient operation. Lack of ventilation can cause production of carbon monoxide (very poisonous). Sufficient ventilation shall be guaranteed by a monitored fan or by permanent, non-adjustable, ventilation openings. Consult EN13410:2001 for more details.

Beside other important requirements this standard states in short that a 1,5 times room air replacement per hour is sufficient in most situations. Also, a maximum of 5W heat input per m3 room content is considered to be safe. If this is not the case make sure that a minimum of 10m3/h air replacement per 1 kW heat input is guaranteed by means of fans or ventilation openings.

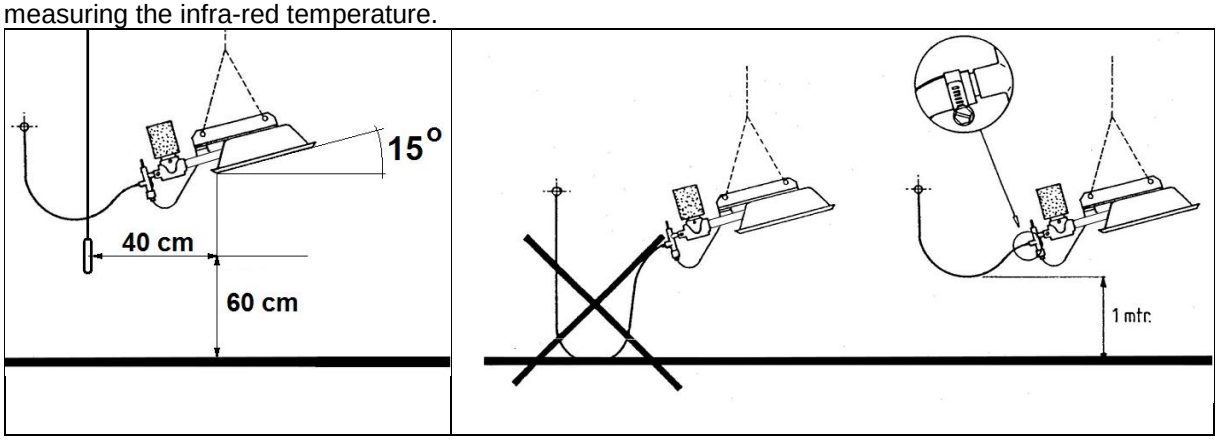
In case local requirements ask for more stringent ventilation, or when animals ask for more ventilation, always follow the most stringent requirements. In case there are no requirements or standards for ventilation in the country of installation, a minimum ventilation of 20m3/h per kW heat input is advisable. Check regularly if fans are working properly and ventilation openings are not closed.

Installation
The heaters are intended for suspension only. Mount a chain with a S-hook to the suspension hook of the heater (only AP-2) or use the two holes in the suspension frame to mount two short chains for making a hanging triangle (AP-1,3 see picture below). The chain and S-hooks shall be galvanised or made of stainless steel. Mount the chain to a rigid part of the construction of the building. Do not use the gas line, gas hose or electric lines for suspension purposes. Never use rope or plastic mounting materials. Place the S-hooks at such a place that the heater reflector makes an angle of approximately 15 degrees to the horizontal and with the gas safety device at the lower end. Never hang the heater horizontally while in that case the flue gases will influence a proper combustion.

The gas safety device 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). Take into account the safety distances mentioned on page 3. After installation always check if the gas type and gas pressure complies with the technical table and data plate information. Remove the black end cap from the safety device.

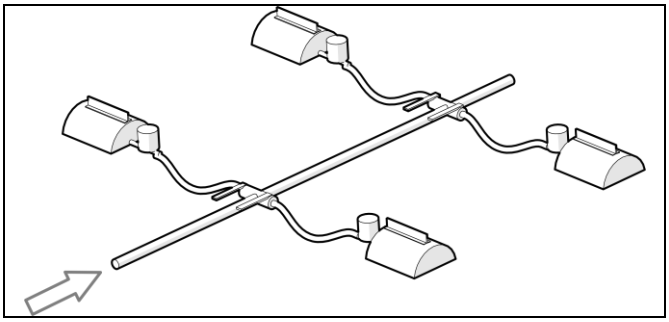
The gas hose shall be hanging free and have a distance of minimal 1 meter from the ground (AP-1, AP-3 as much as possible). This to make sure that animals will not damage the hose. Connect the hose via an individual gas tap to the central gas supply.

A guideline for placement of the sensor of the temperature regulation is 60 cm above the ground and minimal 40 cm away from a heater. Use sensors with a black surface in case the regulation is based on measuring the infra-red temperature.



Gas line supply

In case a main gas line supplies the gas to the heaters, make sure that an authorised company in your country, in accordance with the local rules and requirements, install 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 in each section. Use the common available calculation methods as written in most gas installation standards. Contact an installer or the distributor in case this calculation method is not available in your area. For data needed to calculate the dimensions of the gas line, see the technical table on the last page.



The most common way to install a gas line is in the centre of the barn (at least 2 meter high) with every 3 to 5 meter a “T” or “cross” connection for gas supply to the heaters. Always mount a (easy reachable) gas tap at the beginning of the gas hose to the heaters. This gas tap is needed to close the gas supply to the burners to extinguish the flames. In addition, it makes it possible to remove the heaters after use or to service the heaters safely. The gas inlet at the heater side is standard a 8 mm hose nipple (optional a smooth hose nipple or a G1/8” right handed thread. Other connections are possible after consultation). Always use approved gas sealant to close the gas connections.

Gas cylinder supply

The gas can also be supplied from LPG gas cylinders. The minimum size is a 11 kg cylinder or larger. Before buying a cylinder make sure that the connections of the gas regulator and the gas valve of the cylinder are of the same type. Check with your gas supplier for the correct size of gas regulator. 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 again 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.

In case the gas cylinder is placed in the same room as the heater is, keep it at a safe distance from the heater so it will not be over heated. Advisable is at least 2 meters. Make sure that the gas cylinder valve can easily be reached to close the gas supply in an emergency. Pay special attention how to change the gas cylinders in a safe way.

For the AP-1 and AP-3 it is sufficient to have one gas cylinder (11 kg or larger) per heater. For the AP-2 a minimum of 1,5 gas cylinders (of 11 kg) per heater is needed for a guaranteed gas supply. For a 45-kg gas cylinder a maximum of two AP-2 heaters is recommended. Having more heaters on the gas cylinders as recommended above will give gas capacity problems, especially when it becomes colder.

Gas hose
In most installations, the heaters are not connected directly to the gas system but a gas hose is used. Keep the hoses always as short as possible, especially for natural gas and low-pressure LPG. For high pressure LPG, the maximum length (concerning capacity issues) is 5 meter.

The gas hoses must be inspected frequently and must be changed within the prescribed intervals. Check the hose at least every 6 weeks. Avoid twisting or stress of the gas hose. Twisting or stress will shorten the live time of the gas hose. During inspection, check the hose for damage, splitting, ageing and cracking. Pay special attention to the connections. If a defect is seen directly change the gas hose by a new one of the same type. 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 your gas supplier. Always use official approved gas hoses, suitable for the pressure concerning. Replace a gas hose always by a type of the same length, internal diameter and equivalent quality. For safety reasons: never use air hoses or water hoses, these are very dangerous for gas transportation and will leak soon!

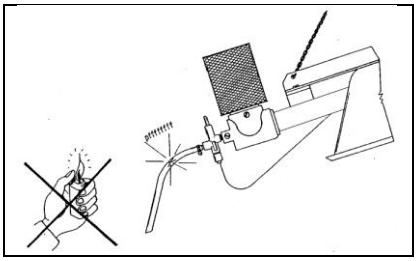
The gas hose shall always be connected to the heater with the help of hose clips. Not using hose clips at both ends of the gas hose is very dangerous. Make sure that the gas hose never is heated above 40 degrees Celsius.

Changing gas cylinders
In case gas cylinders are used, changing or connecting gas cylinders must be done preferably outside, or in a well-ventilated area, in a flame-free environment and away from other people.

- Check if there are no other operating heaters, other gas heaters, burning candles or people smoking cigarettes in the area.
- Be sure that the valve on the gas cylinder is closed and the burner of the heater is 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 if the rubber seals on the cylinder valve or on the regulator connecting nut are fitted properly and able to fulfil its function and are not damaged or worn. If the last case is true, do not use it and replace the seals first.
- 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.

Biogas
While biogas can be corrosive under certain conditions it is important that the biogas is clean before entrance to the appliances. The gas shall be dry and free from dust, oily and greasy particles to avoid internal blockage of the appliances. Also, halogens, chlorides, H2S and NH3 shall be removed to avoid corrosion. The tolerance for proper combustion on biogas with a composition of CH4=60% is +/- 4% CH4.

Soundness check
Before using a new built gas system, first make sure that the installer made 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.



Gas leakage
When a gas leak is detected, immediately close the gas supply and disconnect electricity. Keep flames away. Do not use the heater anymore. 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.

Operation

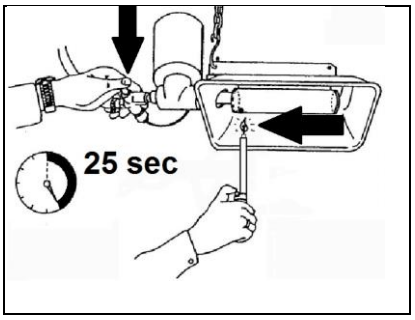
New heaters

New heaters need a cleaning period before they are ready for operation. Turn the ventilation to maximum position or place the heaters outside in the open air. Fire the heaters for at least two hours on full capacity to burn-off oily and greasy remnants of the production. Make sure that after two hours all smoke and smell is disappeared. The smoke and smell can be unhealthy, so keep animals and human beings away till the heaters and the environment air is clean.

Ignition of the heater

Always ignite a heater on maximum heat input setting. After a pre heating time of 60 seconds the heater can be adjusted to the desired heat input setting.
Warning: after a 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.

AP-(1,2,3)-F, -FT versions:
1) Open all gas taps (and turn the thermostat or gas pressure regulator on maximum).
2) Keep a flame of a BBQ lighter (or long match) in the ignition hole of the burner tube.
3) Press the knob of the gas safety device and wait for 10-25 seconds after ignition before releasing the knob.
4) The burner will stay on now.
5) Repeat al steps again in case the burner directly extinguishes.



Heat regulation of the heater

AP-(1,2,3)-F version:
The heat input of this heater can only be changed by adjusting the pressure of the gas supply. 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, adjustment is not possible and only continuous operation or on-off operation is allowed.

AP-(1,2,3)-FT version:
Make sure that the gas supply pressure remains constant at the value indicated on the data plate. Adjust the heat input by setting the thermostat knob at the desired value. Note that the temperature on the ground will be several degrees higher than at the sensor. So, use the setting on the thermostat knob as a rough guideline and always check the real temperature on the ground

Approx. Temperature (T)
Δ = 15 °C
* = 20 °C
1 = 22 °C
2 = 28 °C
3 = 33 °C
4 = 36 °C
5 = 38 °C

Extinguishing the heater

AP-(1,2,3)-F, -FT versions:
Close the gas tap or the central gas supply. The burner will extinguish now. The thermocouple safety valve will close after 60 seconds.

Visual examination of the flame

Check after every ignition (and also during regular barn inspection) if a heater still burns correctly. The flame shall remain always inside the burner tube. The burner tube shall be equal red/orange in high firing position and having a blue flame.

A burner does not operate well in case there is a (green)-blue cloud inside the reflector and/or a (green)blue flame tongue is coming out the exhaust hole in the reflector. Soot deposit on the reflector and yellow flames are also a sign of bad functioning and are not allowed. Cleaning will solve these problems in most cases. Note that yellow tipping in low fire is allowed.

In high fire position, the flame makes a soft roaring noise. In case the burner makes a loud roaring noise and the burner tube does not become equal red/orange, the venturi gauze is damaged and the flame is burning inside the venturi tube (back firing). The venturi tube becomes very hot now at the beginning of the venturi. Directly extinguish the burner and replace the damaged venturi tube and gauze by a new one.

Service and maintenance

General

The frequency of maintenance is strongly depending on the quality of the combustion air and the intensity of use. When used in poultry houses, maintenance is advised every 6 weeks or by changing the animals. By use in clean environment conditions, the maintenance period can be extended but not longer than 6 months. In case heaters are not used for a long period, always do maintenance first before using them again. Wear safety goggles during cleaning with compressed air.

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.

WARNING: always switch off the heater and isolate the gas before carrying out any service or maintenance operation.

Order of maintenance

- First clean the heater and filter as described below by daily maintenance. Take the venturi out during cleaning to remove dust directly behind it.
- Clean the reflector and other parts (excluding the burner tube and venturi gauze) with water and mild detergent and a cloth or soft brush.
- Carefully inspect the burner tube and venturi gauze on damage, cracks and holes. Replace when needed.
- Check the 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 and injector with compressed air. Make sure that the pressure of the compressed air is not larger than the 1,5x the pressure stamped on the safety device (65 or 1400 mbar). Otherwise the rubber seals inside the safety device will become damaged.
- Check the condition of the thermocouple sensor. Replace in case the tip is burnt-in already to avoid unnecessary shut down later on.
- Check all gas carrying parts and connections for gas tightness with leak detection liquid or soapy water according the procedure in the standards applicable in 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 allowed by local requirements, has 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.

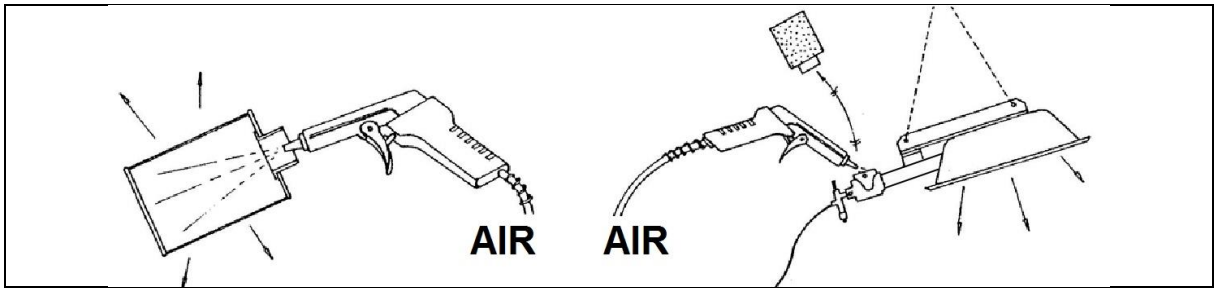
Daily maintenance

In dusty or dirty environments check and clean a heater every day. In case a heater is not cleaned internally the heat efficiency will drop and the lifetime of the burner tube and venturi gauze will become shorter or they will be destroyed. Also, there is a possibility that carbon monoxide (poisonous) will be produced and soot deposit will occur. To keep the heater internally and externally free of dust is important. Inspect and clean also every day the combustion air openings into the building and the proper functioning of exhaust fans.

Dust filter

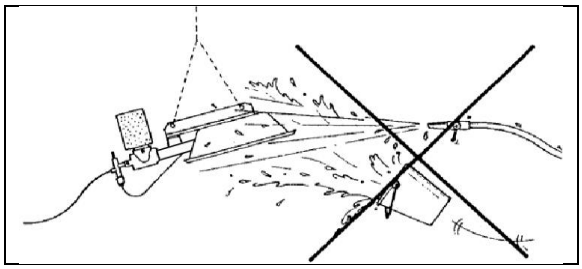
Dust filters must be check every day and cleaned in case needed. Remove a filter before cleaning. Dry dust can be removed by tapping the filter softly against a solid surface like the sole of a shoe. The dust will fall off easy now. In case the filter is still not clean, brush the surface gently with 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 placing them back. Even with the use of a filter still check the heater regularly inside while very fine dust still will pass the filter and pollute the heater internally.

Advice: Lots of farmers use a second set of dust filters. They replace the dusty ones directly with the clean ones and clean the filters outside the barn to avoid unneeded disturbance of the animals.



Internal cleaning
The internal part of a heater can be cleaned with compressed air or with a tube brush. If needed do this every day. First clean the outside of the burner tube. Then the inside of the venturi and burner tube via the dust filter connection. Repeat this 3 times to be sure the dust is removed. Do not hit the venturi gauze while it becomes a bit brittle due to the temperature.

Water
Never clean the heater with water, steam or chemicals. Also, do not use high pressure jets to clean the heater. The lifetime of the burner tube and venturi gauze will go down when it becomes wet and again hot afterwards. In case a heater becomes wet unintentionally, first make sure that it is dried completely before using it again.



High fire
The lifetime of infrared heaters in a dusty environment will be extended in case these heaters are operated on high fire every 12 to 24 hours for minimal 15 minutes. This burns off dust in the burner that accumulates during low-fire operation. This is only needed in case heaters operate on lower setting for a longer period. When a barn computer is used for heating and ventilation, it will be easy to modify the program to add a 15 minutes high fire operation every day. In case a mechanical thermostat is used a solution can be to put the sensor for 15 minutes in a bucket with cold water during daily inspection of the barn.

Consumable parts
Thermocouples (21, 29), burner gauzes (19, 28) and the magnet unit (#53 mini) 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 thermocouple and magnet unit, position thermocouple
- Remove the thermocouple by unscrewing the nut M8 at the gas safety device.
- Unscrew the nut (14) at the gas safety device (3).
- Remove the broken magnet unit and replace by a new one.
- Replace the nut 14 and close carefully (firmly but not excessive) to avoid gas leakage.
- Screw thermocouple nut M8 in nut (14). Hand-tight first and then an additional 1/6 turn.
- Make sure that the tip of the thermocouple is positioned in the upper hole of the burner gauze (AP-2, AP-3) or as far as possible in between the burner and burner gauze (AP-1)
- Carefully check for gas leakage before taking back into operation.

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 and contact the manufacturer or dealer for the parts needed. (new injector (9), new venturi (17, 27), new thermostat body (5) 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.
- Consult the technical table for the proper ring distance. (Rings are counted from the gas safety device).
- 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 your heater at the end of its life in a recycling company.

Fault finding table

Trouble	Action
Burner does not light.	• Check if gas valve of the gas cylinder or gas line is open • Check if gas cylinder is empty • First ignition will take up to 60 or more seconds before gas is available • Check if the injector is blocked • Check if the gas pressure/gas quality is identical to the pressure indicated on the data plate
Burner extinguishes after lighting	• Keep button safety device pressed for a longer period (up till 25 seconds) • Check if the thermocouple is connected properly to the gas safety device • Check if the thermocouple tip is close to the flame • Thermocouple or magnetic coil of the safety device is broken. • Gas pressure lower than minimum requested • Heater not suspended at 15 degrees angle
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 • Check if the gas pressure regulator is broken. • Wrong gas is used. Check data plate for the correct gas supply • Venturi/air inlet is blocked/dirty • Check the size of the venturi and injector with the table • Not enough fresh air available due to mounting situation • Air filter is dirty • Heater not suspended at 15 degrees angle
The burner is only partly glowing	• Wrong gas or pressure is used. Check data plate with the gas supply • Check if the injector or venturi are blocked or dirty • Check the injector and venturi size with the table • Check if pipe sizes or gas hoses have sufficient capacity • Check the setting of the thermostat
The burner makes a lot of noise after ignition or after several minutes	• Wrong gas is used. Check data plate with the gas supply • Check if the venturi gauze is broken or damaged so the flame burns inside the venturi tube
The burner does not work at minimum position	• Gas pressure is not correct. Check the gas pressure with the data plate • Wrong gas is used. Check data plate for the correct gas supply • Check the size of the venturi and injector with the table • Sensor or wire thermostat is broken • Thermostat valve adjusting mechanism is blocked
Heater will not attain the desired temperature	• There is insufficient heat in the building for heat loss (i.e., not enough brooders). • The thermostat sensing bulb is incorrectly placed • The thermostat is out of calibration or broken

Declaration of conformity

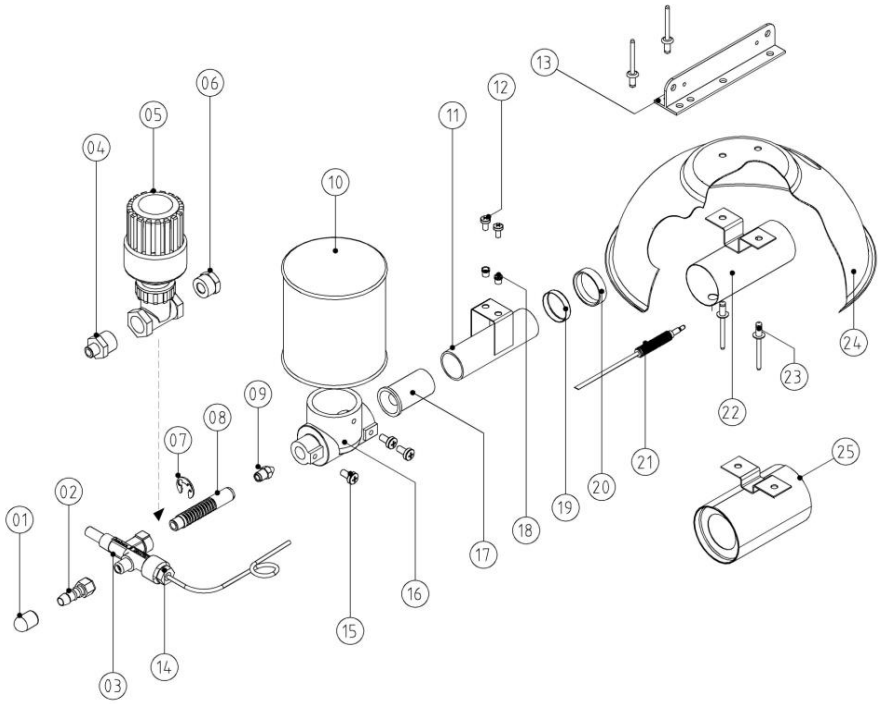
We, Alke B.V., located in Scherpenzeel, The Netherlands, hereby declare that the AP series, marked on their data plates with CE and with CE approval/production supervision by Kiwa (number 0063) are in compliance with the following EU legislation:

- Directive on appliances burning gaseous fuels (GAD) 2009/142/EC (ex 90/396/EEC)
- Regulation on appliances burning gaseous fuels (GAR) 2016/426/EU

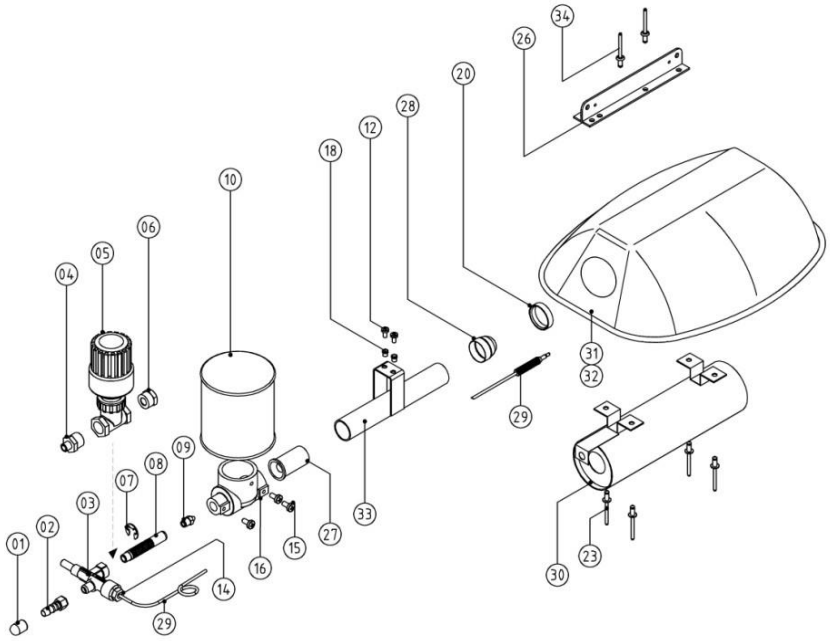
Scherpenzeel, 01-04-2018

Adri van Alphen
President

Parts list



No.	Part #	Description	No.	Part #	Description
1	07000000	End cap black PVC	18	07073000	Blind rivet nut M4
2	01327000	Hose nipple 8mm	19	02456000	Venturi gauze (flat) (AP-1, AP-3)
2	01328000	Hose nipple 8mm, smooth	20	03882000	Clamping ring venturi
3	00101010	Gas safety device 1/8”	21,29	00201000	Thermocouple M8x320
3	00106000	Gas safety device w/hose nipple	22	02505000	Burner AP-1 36x85mm
4	01429000	Reducing nipple 1/8”-3/8”	23	07060000	Rivets 4,8x8,5
5	0092xxxx	Thermostat-consult factory	24	02350000	Reflector (AP-1, AP-3)
6	01405000	Reducing ring 3/8”-1/8”	25	02510000	Burner AP-3 50x80 mm
7	07009000	Distance ring	26	03856000	Suspension frame 155mm (AP-2)
8	01301000	Injector holder	27	013070xx	Venturi 25x62-consult factory
9	01161xxx	Injector M8x0,75–consult factory	28	02459000	Venturi gauze (ball) (AP-2)
10	02530000	Dust filter small	29	00202000	Thermocouple M8x450 (alternative)
11	08893130	Venturi tube (complete) (AP-1, AP-3)	30	02516000	Burner AP-2 61x210mm
12	07130000	Screw SS M4x10	31	02351000	Reflector Oval
13	03855000	Suspension frame 120mm (AP-1, AP-3)	32	02352000	Reflector Square (not shown)
14	00158000	Safety device nut M8x1	33	08893100	Venturi tube (complete)
15	07135000	Screw SS M5x10	34	07059000	Rivets 4,8x8,8 SS Avinox
16	01799000	Connection piece 25mm		03903000	Suspension hook AP1/AP2/AP3
17	013060xx	Venturi 25x40–consult factory		00161000	Magnet unit #53 (mini)



Technical table

Category (-)	Gas (-)	Max. Supply press. (mbar)	Min. Supply press.** (mbar)	Max. Heat Input (kW Hs)	Min. Heat Input (kW Hs)	Gas consumption (g/h or m3/h)	Main Injector (1x) (mm)	By-pass injector T **(1x) (mm)	Venturi (mm)	Ring Injector Holder (-)	NOx class (-)	Remarks (-)
AP-1 series												
I2L, I2ELL	G25	50	25	1,3	0,9	0,15 m3/h	0,71	x	11	7	x	x
I2H, I2E, I2ELL	G20	50	25	0,95	0,67	0,09 m3/h	0,55	x	9	5	x	x
I3P	G31	200	5	1,25	0,19	89 g/h	0,36	x	7,5	5	x	x
I3P	G31	310	25	1,15	0,3	82 g/h	0,32	x	7,5	5	x	x
I3P	G31	1400	30	1,1	0,16 (T=0,5)	79 g/h	0,22	0,16	6,5	5	1	0063CS3936
Biogas	x	75	10	1,0	0,33	0,18 m3/h	0,75	x	6,5	5	x	x
AP-2 series												
I2L, I2ELL	G25	50	25	3,5	2,45	0,39 m3/h	1,15	1,3	13	7	1	0063CS3936
I2H, I2E, I2ELL	G20	50	25	3,5	2,45	0,35 m3/h	1,05	1,2	13	7	1	0063CS3936
I2H, I2E	G20	300	10	5,1	0,9	0,48 m3/h	0,82	0,34	10,5	5	1	0063CS3936
I3B/P	G30	300	5	5,3	0,6	385 g/h	0,61	0,22	14	5	x	x
I3P	G31	200	5	4,8	0,75	345 g/h	0,71	x	14	4	x	x
I3P	G31	300	30	5,0	1,6	360 g/h	0,66	0,39	14	8	1	0063CS3936
I3P	G31	1000	20	5,7	0,8	410 gr/h	0,52	x	11	6	x	x
I3P	G31	1400	20	5,6	0,65 (T=1,2)	400 g/h	0,47	0,22	10	5	1	0063CS3936
I3P	G31	1400	20	4,6	0,55	329 g/h	0,45	x	11	4	x	(Ha>1400m)
I3P	G31	2000	20	5,4	0,5 (T=1,4)	386 g/h	0,41	0,22	10	4	x	x
AP-3 series												
I2L, I2ELL	G25	50	25	1,6	0,96	0,18 m3/h	0,82	x	11	9	x	x
I2H, I2E, I2ELL	G20	50	25	1,6	0,96	0,15 m3/h	0,74	x	11	9	x	x
I3P	G31	200	100	2,0	1,55	144 g/h	0,47	x	14	6	x	x
I3P	G31	310	25	1,7	0,48	121 g/h	0,39	0,22	11,5	8	x	(ball gauze burner)
I3P	G31	1400	20	1,95	0,21(T=0,75)	140 g/h	0,27	0,18	7,5	5	1	0063CS3936
I3P	G31	1400	20	1,2	0,15	87 g/h	0,23	-	6,5	6	-	(Ha>1400m)
Biogas	-	75	10	1,5	0,5	0,26 m3/h	0,91	-	7,5	6	-	-

** In case the heater is equipped with a thermostat (T, Ti) with bypass injector the heater shall be operated on maximum supply pressure only. See also the pressure information on the data plate. Note that the minimum heat input with a thermostat is sometimes a bit higher than without thermostat.

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)

G31 = propane; G20 = natural gas (100% methane); G25 = natural gas (86% methane); Biogas = 60% methane + 40% carbon dioxide