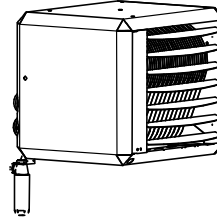


Installation, Operation and Maintenance manual

Condensing PREMIX UNIT AIR HEATER

TYPE HR



WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death or property damage. Be sure to read and understand the installation, operation and service instructions in this manual. Improper installation, adjustment alteration, service or maintenance can cause serious injury, death or property damages.

- Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.

- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance
 - Do not touch any electrical switch; do not use any phone in your building.
 - Leave the building immediately.
 - Immediately call your gas supplier from a phone remote from the building. Follow the gas suppliers instructions.
 - If you can not reach your gas supplier, call the fire department.

- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- Installations in aircraft hangers should be in accordance with ANSI/NFPA No. 409 (the latest edition), standard for aircraft Hangars; in public garages in accordance with ANSI/NFPA No. 88A (latest edition), Standard for Parking Structures; and for repair garages in accordance with ANSI/NFPA No. 88B (latest edition), Standard for repair garages. In Canada, installations in aircraft hangers should be in accordance with the requirements of the enforcing authorities, an in public garages in accordance with CSA B149 codes.

This booklet includes installation, operation, maintenance and service information.
Keep this booklet for future reference.
Before beginning to work on the installation, always consult this booklet.



CSA 2.7-2017
CSA P11-2017
ANSI Z83.8-2016 / 2.6-2016

Instruction manual version CSA-EN185b
Heaters for Canada / North America
Date: 01-2018
Heaters for natural gas and Propane

1 Introduction:

This installation and user manual is produced specifically for the gas, electrical and mechanical installer , it also gives instructions how to use and maintain the heater.

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3 General

3.1 Hazard definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product



WARNING, danger Indicates presence of hazards that can cause severe personal injury, death or substantial property damage



CAUTION: Indicates presence of hazards that will or can cause minor or Caution moderate personal injury or property damage.



INFORMATION: Indicates special important instructions on installation, operation or Notice maintenance that are important but not related to personal injury or property damage.

3.2 For your safety



WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand

BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance
- Do not touch any electrical switch; do not use any phone in your building.
- Leave the building immediately.
- Immediately call your gas supplier from a phone remote from the building. Follow the gas suppliers instructions.
- If you can not reach your gas supplier, call the fire department.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water

Installation and service must be performed by a qualified installer, service agency or the gas supplier.



3.3 Guarantee

The guarantee becomes invalidated when the air heaters are not installed in accordance with this booklet.

4 Application information

4.1 Installation Codes

This utility heater must be installed in accordance with the manufacturer's instruction and local codes. In the absence of local codes, follow the National Fuel Gas Code, ANSI Z223/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1.

4.2 Installation in aircraft hangers or parking structures

Installations in aircraft hangers should be in accordance with ANSI/NFPA No. 409 (the latest edition), standard for aircraft Hangars; in public garages in accordance with ANSI/NFPA No. 88A (latest edition), Standard for Parking Structures; and for repair garages in accordance with ANSI/NFPA No. 88B (latest edition), Standard for repair garages. In Canada, installations in aircraft hangers should be in accordance with the requirements of the enforcing authorities, an in public garages in accordance with CSA B149 codes.



4.3 Gas type

The unit is suited for OR natural gas OR LP Propane gas. On the labels on the packaging and the heater can the gas type be found. itself. In case the heater needs to be converted to another gas type contact your supplier. It can only be converted by the manufacturer or its representative.



4.4 Condensing heater

This is a condensing heater. This means a condensate water discharge system should be installed according to local regulations. Never block this discharge. The unit will stop working

4.5 Pre-check instructions

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

The competent installer must make sure the heater operates correctly and must instruct the user about the safe operation of the heater.

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



Not following these instructions will make the guarantee invalidated



4.6 Protection from water and dust

The heater is not waterproof. This means that it may not be exposed to rain, spray or dripping water. The is not designed for use in a very dusty environment. Dust may accumulate in the heater and may cause a defect of the heater. This is also the case for the room-thermostat.



4.7 Hazardous environment

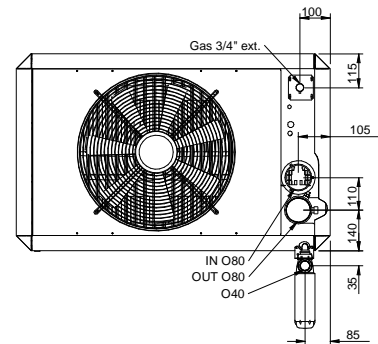
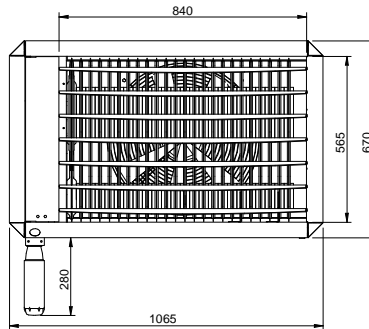
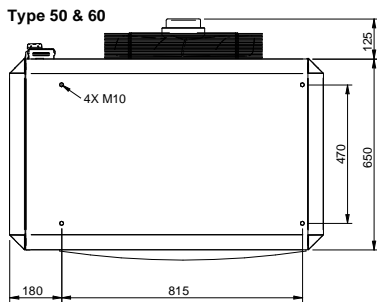
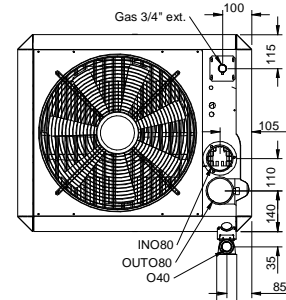
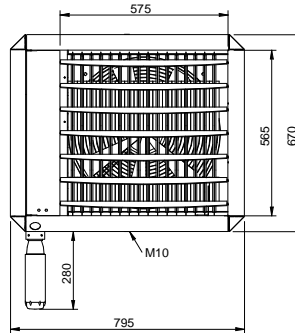
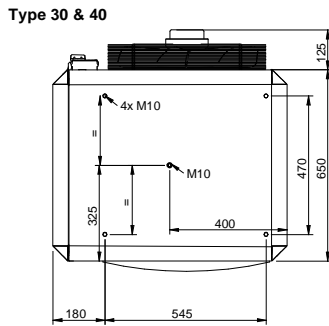
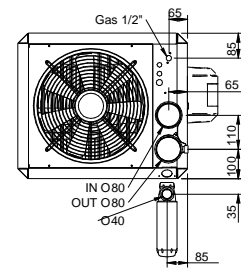
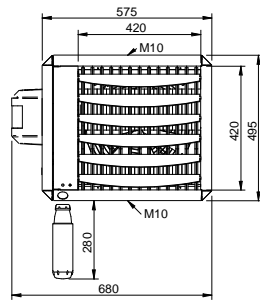
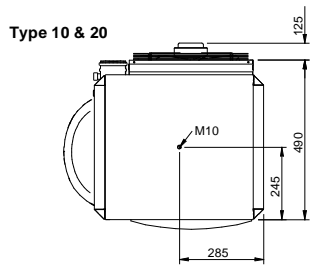
It should be prevented that chlorine or other corrosive containing vapours are sucked into the air intake. These vapours will result in corrosion of the heat exchanger and a leakage of condensate and flue gas.

5 Technical details:

Commercial name	HR47	HR30	HR76	HR50	HR115	HR75
Btu (nom)	47.000	30.000	76.000	49.000	114.000	74.000
Btu (min)	15.000	15.000	23.000	23.000	34.000	34.000
input kW nom.	13,8	8,8	22,3	14,4	33,4	21,7
input kW min.	4,4	4,4	6,7	6,7	10,0	10,0
Eff @ max NG(%)	86,2	91,2	86,9	92,8	87,4	91,5
Eff @ min.NG (%)	95,3	95,3	97,2	97,2	96,0	96,0
Btu output max	40.500	27.300	66.000	45.400	99.500	67.600
Btu output min	14.300	14.300	22.300	22.300	32.600	32.600
Output kW nom.	11,9	8,0	19,3	13,3	29,2	19,8
Output kW min.	4,2	4,2	6,5	6,5	9,6	9,6
Amps @ 115Vac (A)	2,8	2,8	2,8	2,8	2,9	2,9
P @ 115Vac (kW)	0,325	0,325	0,325	0,325	0,338	0,338
Amps @ 230Vac (A)	1,15	1,15	1,15	1,15	1,21	1,21
P @ 230Vac (kW)	0,265	0,265	0,265	0,265	0,278	0,278
Air output (cfm)	1200	1200	1500	1500	1800	1800
m3/hr	2.000	2.000	2.600	2.600	3.000	3.000
Throw (ft)	49	49	66	66	75	75
m3/hr	15	15	20	20	23	23
Gas connection G"	½" in	½" in	½" in	½" in	½" in	½" in
Flue length max (ft)	30	30	30	30	30	30
(m)	9	9	9	9	9	9
Weight (lbs)	100	100	110	110	165	165
(kg)	45	45	50	50	75	75
Sound level (average @ 13 ft (4m)) (dBA)	45	45	45	45	45	45
NG Natural gas settings						
Supply pressure (min-max)	minimal 5,5 IN W.C (1,4 kPa) maximal 20 IN W.C. (5,0 kPa)					
CO2 @ high (%)	9,5	9,5	9,5	9,5	9,2	9,2
CO2 @ low	9,0	9,0	9,0	9,0	8,8	8,8
LP Propane settings						
Supply pressure (min-max)	minimal 8 IN W.C (2,0 kPa) maximal 20 IN W.C. (5,0 kPa)					
CO2 @ high (%)	10,7	10,7	10,7	10,7	11,0	11,0
CO2 @ low	10,3	10,3	10,3	10,3	10,5	10,5

Technical details (cont.)

Commercial name	HR151	HR100	HR190	HR125	HR230	HR150
Btu (nom)	151.000	98.000	189.000	123.000	227.000	148.000
Btu (min)	45.000	45.000	57.000	57.000	68.000	68.000
input kW nom.	44,3	28,7	55,4	36,0	66,5	43,4
input kW min.	13,2	13,2	16,7	16,7	19,6	19,6
Eff @ max (%)	87,1	91,0	87,7	91,6	87,0	91,0
Eff @ min. (%)	95,8	95,8	96,7	96,7	95,5	95,5
Btu output max	131.000	89.200	165.000	112.000	197.000	134.600
Btu output min	43.000	43.000	55.100	55.100	64.900	64.900
Output kW nom.	38,4	26,1	48,4	32,8	57,7	39,4
Output kW min.	12,6	12,6	16,1	16,1	19,0	19,0
Amps @ 115Vac (A)	4,9	4,9	7,0	7,0	7,1	7,1
P @ 115Vac (kW)	0,558	0,558	0,800	0,800	0,820	0,820
Amps @ 230Vac (A)	2,25	2,25	3,3	3,3	3,38	3,38
P @ 230Vac (kW)	0,498	0,498	0,740	0,740	0,760	0,760
Air output (cfm)	2600	2600	2900	2900	3500	3500
m3/hr	4.500	4.500	5.000	5.000	6.000	6.000
Throw (ft)	85	85	92	92	98	98
m3/hr	26	26	28	28	30	30
Gas connection G"	½" in	½" in	½" in	½" in	½" in	½" in
Flue length max (ft)	30	30	30	30	30	30
(m)	9	9	9	9	9	9
Weight (lbs)	187	187	231	231	243	243
(kg)	85	85	105	105	110	110
Sound level (average @ 13 ft (4m)) (dBA)	47	47	48	48	49	49
Natural gas settings						
Supply pressure (min-max)	minimal 5,5 IN W.C (1,37 kPa) maximal 20 IN W.C. (5,0 kPa)					
CO2 @ high (%)	9,2	9,2	9,2	9,2	9,2	9,2
CO2 @ low	8,8	8,8	8,8	8,8	8,8	8,8
LP Propane settings						
Supply pressure (min-max)	minimal 8 IN W.C (2,0 kPa) maximal 20 IN W.C. (5,0 kPa)					
CO2 @ high (%)	11,0	11,0	11,0	11,0	11,0	11,0
CO2 @ low	10,5	10,5	10,5	10,5	10,5	10,5



6 Installation



6.1 Restrictions

See for application-restrictions in Chapter 4 in this manual.

6.2 Positioning, distances

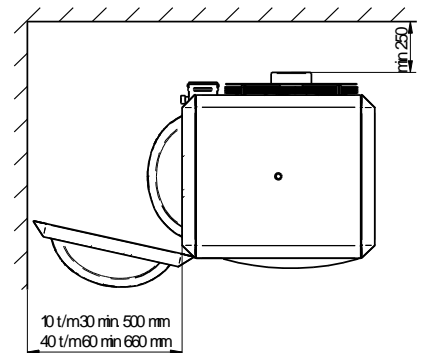
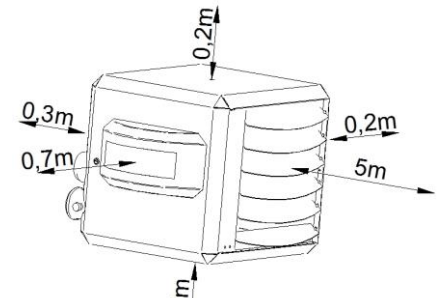
Ventilation gaps around the heater should be maintained from any flammable materials.

If the heater is installed in a garage, there must be a minimum clearance above the floor of 18 in (457 mm).

Make sure that there is enough space for the door of the heater to open.

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

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

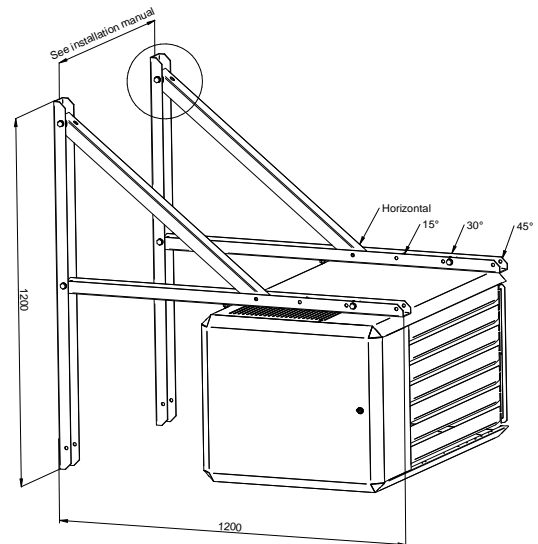
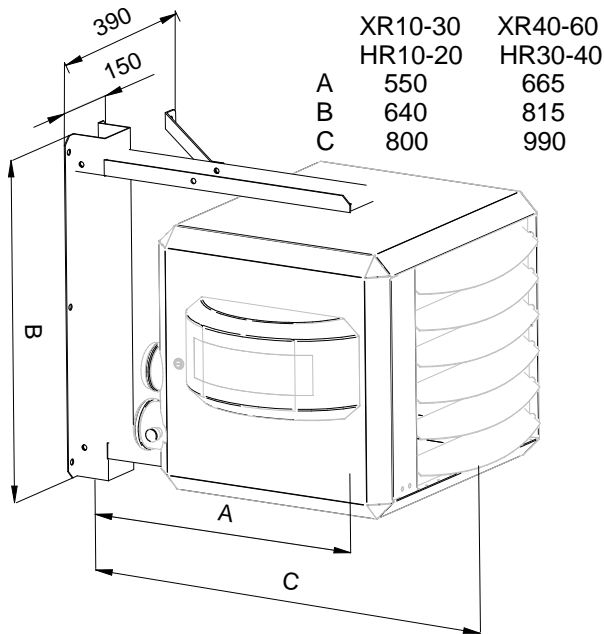


The heater should not be installed in areas containing any corrosive or explosive vapours, in high moisture or dust concentrations, at negative pressures or temperatures higher than 30°C; please consult your supplier..

- Check that the support is solid enough.

- The heater is designed as free hanging. The heater should be able to blow the warm air free from any ducting or obstacles. Also the air intake should be free.
- Use preferably the suspension kits from your supplier.
- Make sure that after fitting, there is no mechanical tension on any connecting gas or electric supplies.

Suspension adapter for type 10 and 20



6.3 Installation at heights

For Installation above 2000 ft (610

m), derate 4% for each 1000 ft (305 m) above sea level.

This can be done by re-adjusting the CO₂ in the flue to the values mentioned on the data label and in the technical table

6.4 Gas connection

The unit is suited for OR natural gas OR Propane gas. It is mentioned on the labels on the packaging and the heater itself. In case the heater needs to be converted to another gas type contact your supplier. It can only be converted by the manufacturer or its representative.

The installation shall confirm with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1NPA 54, or the Natural Gas and Propane Installation Code, CSA B149.4 Pipe size running to the appliance depends on: Length of pipe; Number of fittings; Maximum input requirement of all gas appliances in the property.



A manual isolation valve in the supply line must be placed upstream within reach of the heater. Strain on the gas valve and fittings may result in vibration, premature component failure and leakage and may result in a fire, explosion, property damage, serious injury or death.



The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa). The appliance must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi (3.5 kPa)



The working and standing supply pressure must be for:
 Natural gas (NG) minimal 5,5 IN W.C. (1,37 kPa) and maximal 20 IN W.C. (5,0 kPa),
 Propane (LP) minimal 8 IN W.C. (2,0 kPa) maximal 20 IN W.C. (5,0 kPa)
 measured at the inlet pressure nipple of the gas control in the heater.

Do not use an open flame to test for gas leaks. Failure to follow these instructions may result in fire

6.5 Electrical connection

6.5.1 Power supply



When installed, the appliance must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, and/or the Canadian Electrical Code, CSA C22.1, if an external electrical source is utilized

The unit heater is delivered completely wired internally, where controls of any type are to be added (e.g. room thermostat), the relevant wiring diagrams must be followed to. Never use a room thermostat to interrupt the electrical supply to the heater!

Make provisions to completely isolate the heater for maintenance purposes. This can be an isolation switch (min.3mm contact opening gap), a power plug or a non-switched fuse spur. The wiring diagram for the heater can be found towards the end of this manual.

The supply is 1 Phase 60Hz. with earth. The control circuit is a two wire low voltage Argus-link bus communication.

6.5.2 Room thermostat

The heater can only be controlled by special modulating Winterwarm room thermostats:

The Multi Therm Comfort; modulating digital clock thermostat with optimiser. It can control 1 to 8 air heaters.

The Multi Therm Standard; modulating digital thermostat. It can control 1 to 8 air heaters.

The Interface printboard; special designed interface module for connecting the air heaters with Building Management Systems. (0-10V (modulating input) signal, high/low signal, external reset and other different in and outputs.

In all cases the communication between heater and thermostat is based on a two wire, low-voltage connection. In the appliance the wire for the thermostat has to be connected to connection 4 and 5 (see also electrical wiring diagram) Attention: This also needs a change in the settings on the print board, see chapter 11

When mounting the thermostat, take attention to the following items:

- Mount the thermostat in a place where the air can circulate free pass the thermostat. Take notice that the sun does not shine directly upon the thermostat (in the winter). Do not place the thermostat on a cold wall. Place the thermostat on an inner wall free from draught.

Never place the thermostat within the throw of the heater.

6.5.3 Thermostat cable

In all cases the communication between the heater and the thermostat is based on a two wire, low-voltage connection. In the appliance the wire for the thermostat has to be connected to connection 4 and 5 (see also electrical wiring diagram).



Cable specification: signal cable, 1x2x0,8 mm (shielded and twisted)
Maximum length 250m.

If the cable is chosen too thin, the signal will become too poor. If the cable is not shielded and twisted the signal might become disturbed in an EMC unfriendly environment.

Keep the thermostat cable separated from mains cables. Connect the earth shield of the cable only to the earth terminal in the heater.

If these guidelines are not followed it may result in malfunction of the installation or worse, it could damage the thermostat or the electronics in the heater.



Never mount the thermostat near aerials of internal communication networks. These emit radiation that could lead to disturbance of the thermostat. Always keep some meters distance.

6.5.4 Fuses

On the heater control there is one 3AT fuse. See electrical wiring diagram.
Replace the fuse only by a fuse of the same type, 3AT

6.6 Venting system, Air intake / combustion products discharge

Make sure that the vent installations shall conform with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1.

The combined Winterwarm combustion-air supply / combustion-gas outlet device (Roof terminal or wall terminal) has to be used, only so the installation is approved. See installation drawings.
Always connect a roof terminal for condensing appliances, otherwise condensate can form ice in the winter on the terminal.
Use only pipes and bends for overpressure with profiled sealing-rings

Make sure the roof terminal is at least 0,5m above roof level to prevent snow from blocking the vent terminal.



WARNING: All venting terminals must be positioned away from fresh air intakes, doors and windows to preclude combustion products from entering occupied space. Failure to comply could result in severe personal injury or death and/or property damage

WARNING: Do not locate venting terminals above passage way's. In freezing conditions ice may be formed on the terminal. Failure to comply could result in severe personal injury or death and/or property damage.



Clearance to vent terminal

Distances from adjacent public walkways, adjacent buildings, openable windows and building openings, shall conform with the local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1;

The Natural Gas and Propane Installation Code, B149.1, specifies a 6 ft horizontal vent terminal clearance to gas and electric meters and relief devices.



Final check

After installing of the venting system check for unused openings and seal the whole venting system..

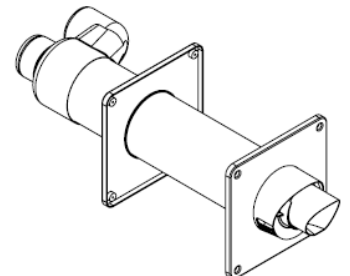
6.6.1 Flue terminals

Only the flue terminals that are provided with the heater may be used. These terminals are certified together with the heater.

The following terminals are allowed:

Concentric roof terminal type M&G Skyline 80-80 article: IA8214

Concentric wall terminal type M&G HR80-80 article: IA8216



6.6.2 Flue material

Only single wall, suited for overpressure and temperature class minimum 250°F flue material is allowed.

- Single thick wall (min 1,5mm) aluminium
- Stainless steel according (min 0,4mm)
- Plastic flue material temperature class 250°F

6.6.3 Inclination of the venting system

During heating, condensate is formed in the discharge system. This condensate must flow back into the heater. Therefore the flue discharge pipes have to be mounted in such a way that the inclination of the pipes will result in the condensate flowing into the heater (minimum inclination 2 inch per 3 ft (50mm per meter).

When the condensate flows back from a stainless steel or plastic flue system into the heater, a separate condensate drain should be mounted before the aluminium flue exit from the heater.

6.6.4 Combustion air intake

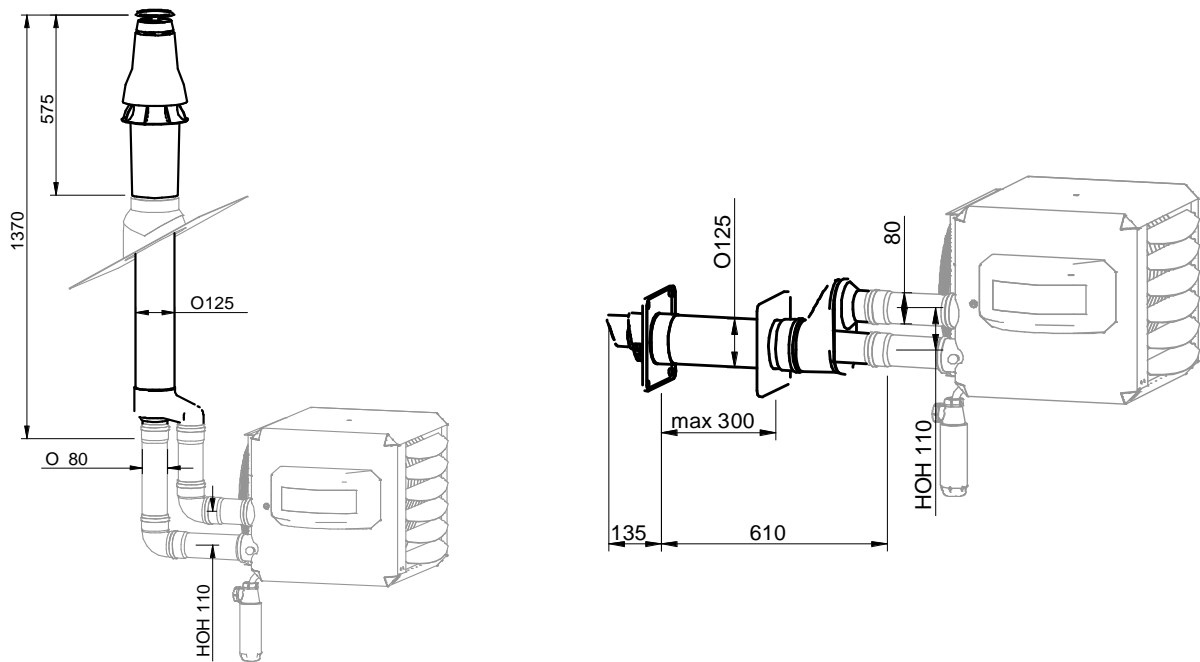
Single wall, ridged, aluminium, stainless steel, plastic air tight and should withstand corrosion.

To avoid accumulation of water into the supply pipes, they should also be mounted with an inclination towards the heater.

6.6.5 Maximum flue length

The maximum pressure drop in either the air supply pipe, or the flue pipe, must not exceed 10 metres straight pipe, excluding the terminal. Whenever bends are used the pressure drop is greater and therefore a 90° bend will count as 2 metres and a 45° bend as 1 metre. All flue pipes must be of the same diameter as the flue spigots on the heater, and all flue joints must be sealed. For further information regarding the flue system please contact your reseller.

In case of a vertical flue terminal, the flue exit should be at least 50cm above the roof. Take also distance into account with air intake openings to the building. (national or local regulations)



6.6.6 Support of venting systems

The venting system shall be installed in accordance with the installation instructions in this manual.

The portions of the venting system shall be supported to prevent sagging.

- First support element max 1.5 feet (0.5m) from the heater
- Horizontal elements
 - Support every separate element minimal once
 - Max distance between supports 3 ft (1m)
- Vertical elements
 - Max distance between supports 6 ft (2m)
- Every venting system needs at least 1 support

6.7 Condensate discharge

The condensate discharge pipe is on the bottom of the heater. The separate delivered siphon has to be connected to the condensate Ø40mm PVC pipe. On the siphon a pipe Ø 40mm can be mounted. The discharge system after the siphon has to be minimum Ø25mm and mounted with an inclination to the sewer. The advised inclination should be minimum 30mm per meter. The horizontal length should not exceed 5 meter.

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

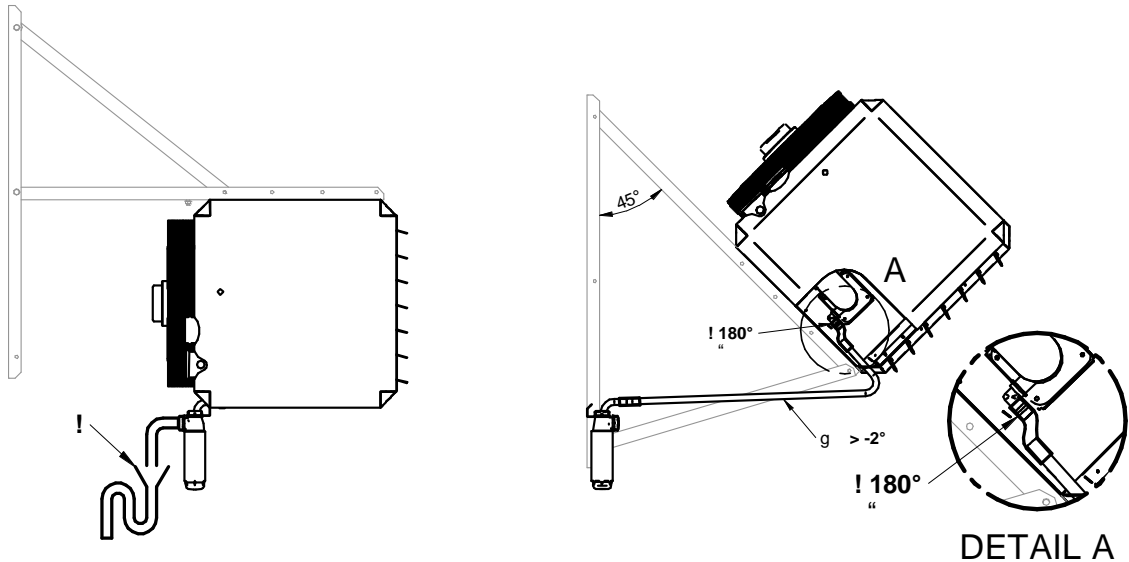
The condensate outlet from the heater should never be closed.

Protect the condensate drain from freezing. Ice can also close the condensate drain.

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

When the condensate discharge system is placed the siphon has to be filled with water. This is important because otherwise the flue gases can flow into the room where the heater is placed.

The heater can be mounted also with the hot air blowing to the ground. In this case the condensate pipe has to be mounted to the front connection of the heater. Therefore the small sheet metal in the front of the heater can be removed and the pipe can be replaced to the front of the heater.



Maximum condensate rate:

Type HR	HR10	HR20	HR30/35	HR40	HR50	HR60
Max. Condensate l/hr	2	2	3	3	4	4

7 Functioning of the unit

7.1 General

The unit can heat as well as ventilate. By using the temperature-sensor on the unit and the one in the room-thermostat, the temperature-difference between the two in the room is monitored. Should the difference become higher than a set value, due to the fact that warm air has accumulated underneath the roof, the system-fan will start and push the warm air down, acting as a de-stratification fan.

7.2 Heat demand

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

- 1. Pre purge:** The electronic circuit board acknowledges the heat-demand and the premix burner fan will start running. The Pressure switch should be made, and then the fan purges for 30 seconds.
- 2. Ignition:** After the 30 seconds of pre purge the electrode will spark for max. 5 seconds, the gas valve is opens and the gas-air mixture will ignite.
- 3. Burn:** When the flame is detected the unit will modulate to the desired load after ca. 15 seconds of stabilisation time. The system fan will start modulating (step-less) as well. The air heater will **always burn for a minimum of 4 minutes.**
- 4. End of heat demand:** When the heat demand ends, the burner will switch off and the system fan will continue to run for ca. 3 minutes in order to cool the unit down.

The unit will try to ignite twice before lockout on flame fault.

In the case of flame failure during operation, the heater will attempt one restart.

When the heater is in lockout you see the led on pcb will turn red. In the display from the thermostat you will see an A1.

7.3 Delta-T-regulation (temperature controlled de-stratification fan)

In case there is no heat demand, the delta-T-regulation will be active.

When the temperature-difference between the sensor on the unit (the NTC) and the sensor in the thermostat is bigger than the set value (factory setting standard 8°C), the system fan will start, at a regulated speed, depending on the differential temperature difference. This operation ensures an even temperature distribution throughout the building, thus acting as a fully automatic variable de-stratification fan. Should this delta-T-regulation not be required, in the Menu Program Settings on the room thermostat this regulation can be switched off. See user manual of the special Winterwarm Room thermostat.

7.4 Summer ventilation

It is possible to let the ventilator run on a certain speed in the summer. Please follow the instructions in the manual from the thermostat.

7.5 High limit protection

7.5.1 T max. Heat exchanger

The unit contains 2 temperature protections. The NTC thermostat monitors the air temperature electronically. Should the temperature, in a first step, become too high, the burner will modulate to the minimum input and the system fan will modulate to the maximum speed. When the temperature still increases, the burner will switch off (on display you see intermittent an E1). When the heat exchanger has been cooled to normal levels the burner will start automatically. Should the temperature increase to an unacceptable level, the heater stops (on the display you see intermittent A2). Only after a manual reset the heater can start again. Manual reset can be done on the electronic circuit board or with the special Winterwarm Room thermostat

7.5.2 T max. Flue gas outlet

For the application of plastic flue material on the HR heaters the maximum flue gas temperature is monitored ($T_{flue} < 120\text{ °C}$). A temperature sensor in the flue outlet the heater monitors the temperature of the flue. When the flue temperature is too high ($T_{flue} > 110\text{ °C}$), the burner modulates its capacity to the minimum. When the temperature keeps rising, and reaches 115 °C , the burner stops. When after an automatic restart the situation repeats itself the heater will lock out. The error A7 will show in the display.

7.6 Flue Transport Supervision

The unit is provided with a pressure switch to control the transport of combustion air through the heat exchanger. It checks in the pre purge phase if there is sufficient movement of combustion air through the heat exchanger by measuring the pressure difference over the heat exchanger. If the pressure difference is too low in the pre purge phase, default A9 will occur. This could mean that combustion air is leaking from the heat exchanger and so the heat exchanger must be checked on leakage.

8 Lighting the appliance / First start-up



Use of electrical connections to the heater other than described might result in unpredictable behaviour, or malfunction. **DO NOT WIRE ANY VOLTAGE, ONLY DRY CONTACTS TO CONTROL BOARD**



Before Start-up refer to Mandatory Pre-commissioning Procedure for (Plastic) Venting Failure to follow these instructions can result in explosions, injury or death.



Prior to turning the gas supply on and lighting the appliance, ensure all aspects of the installation are complete and in conformance with the instructions provided in this manual, including the Vent/Air-Intake sections and the manuals delivered with the vent system and Condensate Drain. Failure to precisely follow these instructions will cause a fire or explosion resulting in property damage, serious injury or death.



Do not store or use gasoline or other flammable vapours & liquids in the vicinity of this or any other appliance. Failure to follow instructions could result in explosion causing property damage, serious injury or death.



If you do not follow these instructions exactly, a fire or explosion may result causing property damage, serious injury or death.



Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance. Failure to follow instructions could result in explosion causing property damage, serious injury or death.

8.1 Safety



WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand

BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance
- Do not touch any electrical switch; do not use any phone in your building.
- Leave the building immediately.
- Immediately call your gas supplier from a phone remote from the building. Follow the gas suppliers instructions.
- If you can not reach your gas supplier, call the fire department.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water

8.2 Putting into operation

1. STOP! Read the safety information above very carefully.
2. Turn off all electric power to the appliance.
3. Set the thermostat to lowest setting.
4. Do not try to light the burner by hand.
5. Make sure the gas line is de-aired. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow the safety information above. If you don't smell gas, go to the next step.
6. The main gas switch should be situated upstream in the gas line near the heater. Close the main gas switch.
7. Wait five (5) minutes to clear out any gas. Then smell for gas including near the floor. If you smell gas, STOP! Follow the safety information above on this page. If you don't smell gas, go to the next step.
8. Open the gas supply
9. Turn on all electric power to the appliance.

10. Set the thermostat to desired setting. And wait for the heater to start.
11. If the appliance will not operate turn off gas to appliance and call your service technician or gas supplier.

8.3 First start up



The initial lighting of the appliance must be performed by a licensed Gas Technician. Failure to follow these instructions may result in property damage, serious injury or death. As soon as the appliance has been fully installed (with regard to de-air of installation, gas, flue gas, air intake, wiring etc.) according to the preliminary installation instructions, it's allowed to put the power plug into a grounded wall socket. The grounded line cord and grounded wall socket must be reachable for service purposes at any time.



Ensure the gas shut-off valve is turned on (only after ALL air is purged out), and that the gas system has been fully tested for leaks.

8.4 General

Prior to packaging, each unit is checked in detail on safety and well functioning. It is a.o. adjusted to the right efficiency of combustion. In general, the heater does not need to be adjusted after installation, only a check of well functioning is necessary by a competent person. Also obtain a flue gas analysis and record it for later reference.

Use only a calibrated instrument !

The CO₂ value may be adjusted if necessary, only do this in case it turns out that the CO₂ value is not correct. Do not ever turn injudiciously the adjusting screws!

Adjustment of the gas control without a supporting flue gas analysis will invalidate the warranty.

Once the unit is installed according this manual, the unit can be put into operation. Make sure the gas pipe is clean, gastight and free from air.

Switch on the electric supply with the maintenance-switch, and open the door in order to be able to observe the first start-up and so become familiar with the functioning of the heater.

Should the gas line not be purged correctly the heater will attempt to start twice before going into a lock-out condition. Manual reset is necessary in that case.

Do not forget to instruct the end user about a safe use of the heater (presence of gas, place of the manual gas valve !), the operation of the heater (lock-out indication and reset) and about the necessary maintenance. This manual must be left with the end user.

8.5 Start by using the service-button

Press the service-button once for 10 seconds, and the unit will commence the ignition-cycle; (30 sec pre-purge, ignition, 15 sec flame stabilise, modulating operation) The burner will then start on minimum load Display print → L/b . By pressing the service-button again, the burner will go to maximum load. Display print → H/b

Pressing the service-button for a third time will put the unit into normal operation. (depending if there is heat demand from the room thermostat).

8.6 Start by using the thermostat

Put the thermostat in the highest position. The start sequence is always the same as 8.2.

8.7 To simulate a lock out condition

Close the manual gas supply valve. The heater will go to lock-out after a restart attempt. The display on the electronic circuit board shows [A 1]. The red LED will light as well. Check also the function of the reset button (with gas valve open again), and observe if the heater starts smoothly.

Display on the print board

0	stand-by	Stand-by
1	Pre-purge	System checks and 30 sec pre purge of the burner fan
2	Ignition	The ignition electrode sparks 5 sec. and the gas valve opens, within 5 sec flame detection should occur.
b	Burn	After 15 sec stabilisation time, the heater will modulate to the desired power. The heater will remain burning minimum 4 minutes.

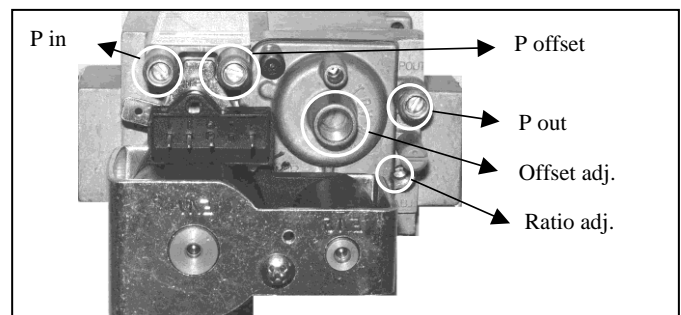
P	Post purge	The heater will cool the heat exchanger for 3 minutes, and the premix fan will post purge for 1 minute.
F	Summer ventilation	The system fan is running on the summer ventilation mode
F Blinking	Delta-T-regulation	The system fan is running on low position on Delta-T-regulation
L/1/2/ ... Blinking	Service Low	The heater is running on the service mode. When the heater burns, the heater will run on minimum power.
H/1/2/ ... Blinking	Service High	The heater is running on the service mode. When the heater burns, the heater will run on maximum power.

9 Adjusting the gas-control

In principle, it is **not** necessary to adjust the gas control after putting the unit into operation.

In case it needs to be adjusted, (e.g. after fitting a new one), this must be done only by a qualified person. **Only use calibrated instruments !** A poor adjustment can lead to overheating and / or production of the poisonous carbon monoxide !.

There are two screws to adjust the gas control, the Offset adjuster and the Ratio adjuster. The Offset adjuster is used in Low fire. The Ratio adjuster is used in High fire.



Put the heater into operation at high fire by pressing the service button first 10 seconds and press again shortly. You see on display H/b.

If the heater does not ignite while sparking, you can, if necessary, close the air-openings of the coloured ring on the gas-air mixer with thumb and forefinger during ignition. The mixture will become richer and will ignite more easily.

Look for the correct CO₂ values in the table with technical data. Readjust the CO₂ when the deviation is more than 0,3%

1 Check the CO₂ in High fire

- Decrease CO₂ → turn the Ratio adjuster to the right (less gas).
- Increase the CO₂ → turn the Ratio adjuster to the left (more gas).

2 Then check the CO₂ in Low fire. The CO₂ in low fire is lower than the high fire CO₂.

- Decrease the CO₂ → turn the Offset adjuster to the left.
- Increase the CO₂ → turn the Offset adjuster to the right

After adjusting the CO₂ in Low fire, return to high fire, and Readjust the CO₂ with the Ratio adjuster. Then return to Low fire again and eventually readjust the CO₂ with the Offset adjuster.

Repeat these steps until both values are oké.

Never forget to check the CO (carbon monoxide) production of the heater!!! Too much CO means mostly that the mixture is too rich. CO value should always be below 100 ppm.

10 Problem solving

10.1 General

When it turns out that the problem is **not** caused by the external circumstances (i.e. no electric supply power or no gas), please take the following instructions into account. Please remember the built in waiting times of the heater (do not react too soon!) and the signals of the LEDs and the code on the display on the electronic circuit board.

To simplify the investigation of the failing heater please check first:

- Check the fuses as well as the wires and plugs in the heater for possible loose contacts.
- In a heat-demand situation, the green LED on the heater must light up.
- In a failure situation, the red LED on the heater must light up, if so, reset.
- Use first the service-button to put the heater in run mode, try later the room thermostat.

Volatile lock out Can only be reset by hand

A/0 Blinking	Internal failure	Print board defective
A/1 Blinking	No Flame	Within 5 sec flame, then flame failure: Case 1: No flame: Case 2
A/2 Blinking	Exchanger too hot	Heater stops on temperature heat exchanger too hot. Case 3
A/3 Blinking	Sensor error	Temperature sensor on heat exchanger error. Case 4
A/4 Blinking	Too many flame failures	Too many flame failures on ionisation; Case 1, 5
A/5 Blinking	Internal error	Print board defective
A/6 Blinking	Safety relays	Safety relay failure Case 10
A/7 Blinking	Flame	Flame detection when there should not be a flame or The flue gas temperature sensor detects an error condition, case 12.
A/8 Blinking	Burner fan	Burner fan dos not run; Case 6 Burner fan runs; Case 7
A/9 Blinking	Pressure switch	Insufficient air transport over the heat exchanger, Case 11

Non volatile lockout Will disappear when the error is cleared.

E/0 Blinking	Internal defect	Print board defective
E/1 Blinking	1 ^e temperature safety	Heater stops on temperature heat exchanger too hot. When heater is cooled down the heater will restart. Case 3
E/2 Blinking	Selection resistance	Heater recognition does not work Case 8
E/3 Blinking	Selection resistance	Heater recognition does not work Case 8
E/9 Blinking	Reset error	Too many switches on reset button Case 9

Case 1: Within 5 sec flame, then flame failure.

- The flame is not detected. Check the ignition cable and electrode. (cable resistance 1K ohm)
- The heater has electrically a poor earth.
- The print board is defective.

Case 2:

- There is not enough gas pressure.
- The mixture of gas/air is poor, adjust the gas valve
- The gas valve does not open, check during ignition on 230V on the valve.
- Check whether the ignition electrode sparks, replace cable, electrode

Case 3: Heat exchanger too hot

-
- Check whether the system fan blows enough air.
 - Check the setting of the gas valve, the heater may be overloaded.
- Case 4:** Temperature sensor on heat exchanger error.
- The sensor has internally 2 sensors. These differ too much. Measure the resistance from each sensor, the resistance should be 20K at 25° en 25K at 20°. If the measured values differ too much, replace sensor.
 - Rotate the sensor ¼ turn. So the contact point is different on the sensor housing.
- Case 5:** Too many flame failures while burning
- The setting of the gas valve is not ok, adjust the gas valve
 - The flue outlet is blocked
- Case 6:** The premix does not run
- Premix fan is Blocked or the wiring is bad
 - Premix fan is defective
- Case 7:** The pre-mix fan runs, but not the correct speed.
- Check if the fan runs smoothly.
 - Check the wiring.
- Case 8:** Selection resistance error
- Check the appliance recognition part, replace if necessary
- Case 9:** Reset button error
- Too many switches on reset button in a short period of time. These error will disappear after some time, or if the main power is disconnected for a while.
- Case 10:** Safety relay error
- Plug J4 is not connected well, the bridge on connector 4 between 5 and 11 is not connected well.
 - Otherwise change printboard.
- Case 11:** Insufficient air transport over the heat exchanger
- Check the pressure switch and the connections
 - Check the heat exchanger for flue leakage
- Case 12:** the flue gas temperature sensor detects an error condition
- The flue gas temperature > 120 ° C → insufficient air transport of the system fan or burner adjustment is not correct, check CO₂ and CO percentages.
 - Loose or closed contact temperature sensor circuit, check the wiring
 - The flue gas temperature sensor faulty, check the resistance value of the RG sensor → 20 k at 25 °C and 25 k at 20 °C.

Heater does start, but shows other problems.

Heater ignites explosively, has often flame failures:

- Check the right setting of the gascontrol, the right CO₂ setting is important for the correct ignition.
- Check the ignition cable (1kOhm)
- Check the setting of the ignition electrode, the spark has to be formed between the electrodes and not between the electrode and the burner.

Insufficient output

- The heat output of the heater will be insufficient if there is too much resistance in the inlet- or outlet flue system. In this case the premix-burner-fan will be on full speed, but because of the high resistance too little air is moved and therefore also too little gas. The pressure in the outlet flue for example, will normally never be above 30 Pascal.

Non modulating system fan

- System fan (M1) does not start or does not vary in speed; Check first the functioning of this fan by connecting it to 230 Volt. Check with a multi-meter if the different lower tensions are secondary present on the transformer as well. The fuse could have failed. If the motor and transformer are OK, the cause of the problem must be in the heater control HC, as the heater control HC dictates the different voltages from the transformer to the fan-motor. In that case, replace the heater control HC.

11 Maintenance / spare parts

The heater must be inspected and cleaned regularly (once a year) by a qualified installer who understands this appliance.

This is all the more important as the circumstances are heavier, especially in case of dust, humidity, high frequency of switching on/off etc.

Activities:

11.1 General inspection

- Check the overall condition of the installation. Check the heater, the thermostat, the wires and the gas line.
- Clean and inspect the condensate pipes and the siphon every year. Always fill the siphon after cleaning with water to prevent flue gas escaping in the room.

11.2 Inspection of the heater

Before starting the inspection, switch off the electric power to the heater with the maintenance-switch and close the manual gas valve.

- Take out the burner, complete with flange and pre-mix fan, by unscrewing the 6 off M6 socket screws and you have taken off the ignition and fan wires
- Check the heat exchanger from the inside for dirt and/or damage.
- Check the burner on damage and clean the ignition electrode if necessary . CAUTION: do not twist the electrode out of shape!
- Check the air supply and the flue discharge.
- Clean eventual the inside of the heater with a vacuum cleaner.
- In case the heat exchanger is dirty on the outside, clean it with a soft brush. Never use a steel wire brush!
- Clean the fan-grid with a vacuum cleaner and a brush.
- Put the burner back in (renew the gasket)

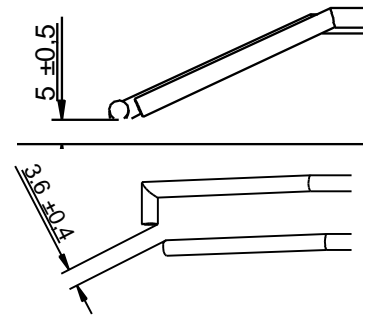
After this, check the heater on efficiency of combustion and adjust these if necessary

Check the heater operates correctly.

11.3 Ignition electrode

For the correct ignition of the burner it is important that the ignition electrode is adjusted right.

- The distance between the electrode and the burner should be 5.0 ± 0.5 mm.
- The distance between the two electrodes should be 3.6 ± 0.4 mm.
- Check the setting of the ignition electrode, the spark has to be formed between the electrodes and not between the electrode and the burner.



12 Examples electrical installation

12.1 Thermostat cable

In all cases the communication between the heater and the thermostat is based on a two wire, low-voltage connection. In the appliance the wire for the thermostat has to be connected to connection 4 and 5 (see also electrical wiring diagram).



Cable specification: signal cable, 1x2x0,8 (shielded and twisted)
Maximum length 200m.

If the cable is chosen too thin, the signal will become too poor. If the cable is not shielded and twisted the signal may become disturbed in an EMC unfriendly environment. Keep the thermostat cable separated from mains cables. Connect the earth shield of the cable only to the earth terminal in the heater.

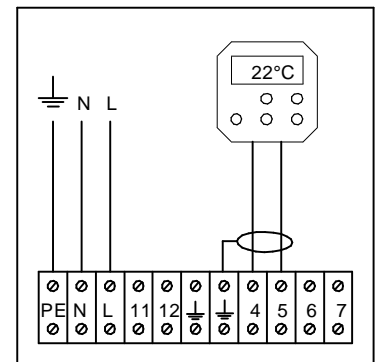
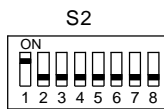
If these guidelines are not followed it may result in malfunction of the installation or worse, it could damage the thermostat or the electronics in the heater.



Never mount the thermostat near aerials of internal communication networks. These emit radiation that could lead to disturbance of the thermostat. Always keep some meters distance.

12.2 Installation with modulating room thermostat

- Connect the heater to Mains
- Connect the thermostat to the terminals according to the diagram. (terminal 4 and 5)
- On the print the switches S2 and S3 need to be set as follows: S2 switch 1 at the ON position, and S3 at 1.



The change of these switches need to be performed without power on the Heater, otherwise these settings take no effect.

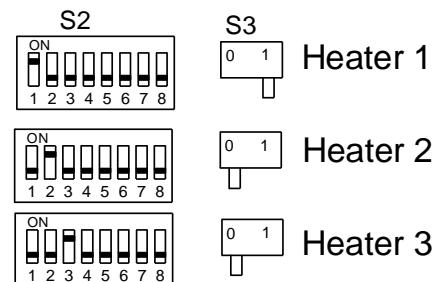
12.3 Installation of more heaters on one thermostat

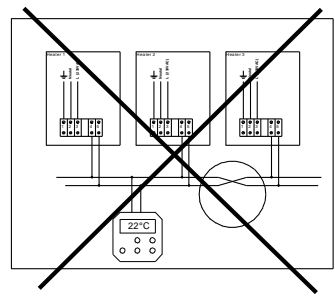
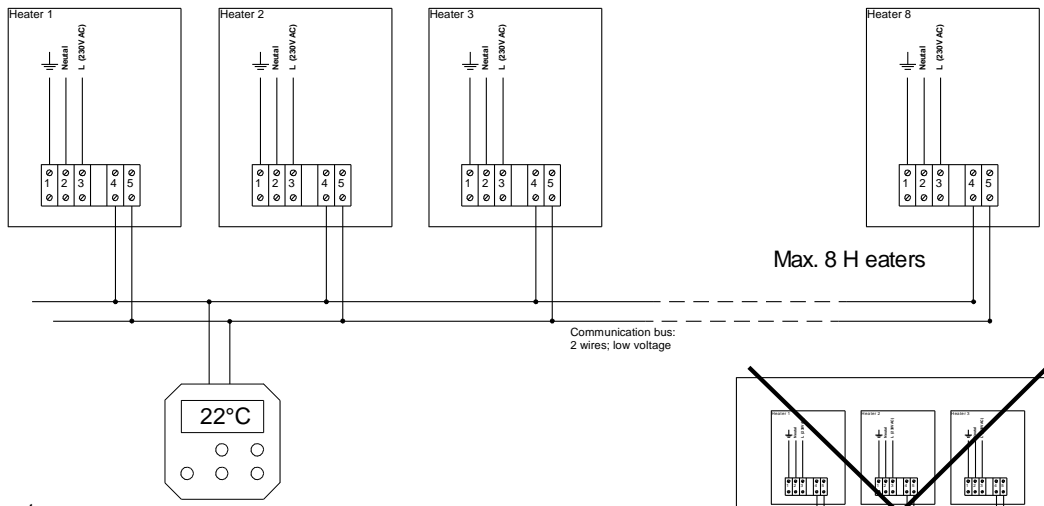
One room thermostat can control 8 heaters. To connect the heaters is very simple. The two wires for the thermostat can be connected to heater one, from heater one to heater two, from heater two to heater three etc. etc. Connect always on terminal 4 and 5. See also the diagram. Standard factory setting: switch 1 "on".

Each heater needs his own unique number to recognise the heater by the room thermostat. The number of the heater can be set by the micro switch on the heater control HC in the heater. The number at the upper position of the switch is the given number for that heater. Make sure that each heater has his own unique number. If more than one heater have the same number the system does not work.

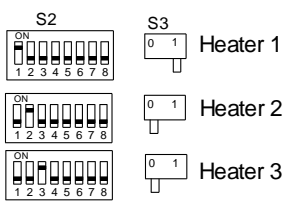
The change of these switches need to be performed without power on the Heater, otherwise these settings take no effect.

Diagram for more heaters on one thermostat





in heaters:
micro switch on printboard.



Important:

When more heaters on one thermostat, each next heater must have its own number (2 til 8). Only in heater nr 1 S3 to ON, other heaters S3 to 0. Do not change clamb 4 with 5 between the heaters.

13 Electrical diagram

Optional thermostat connector

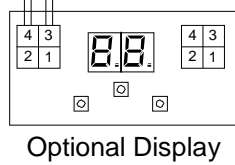
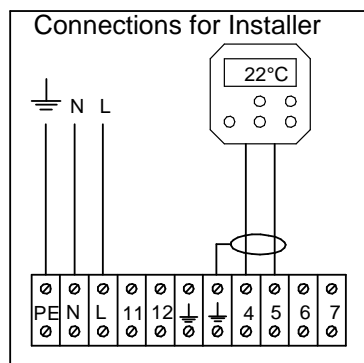
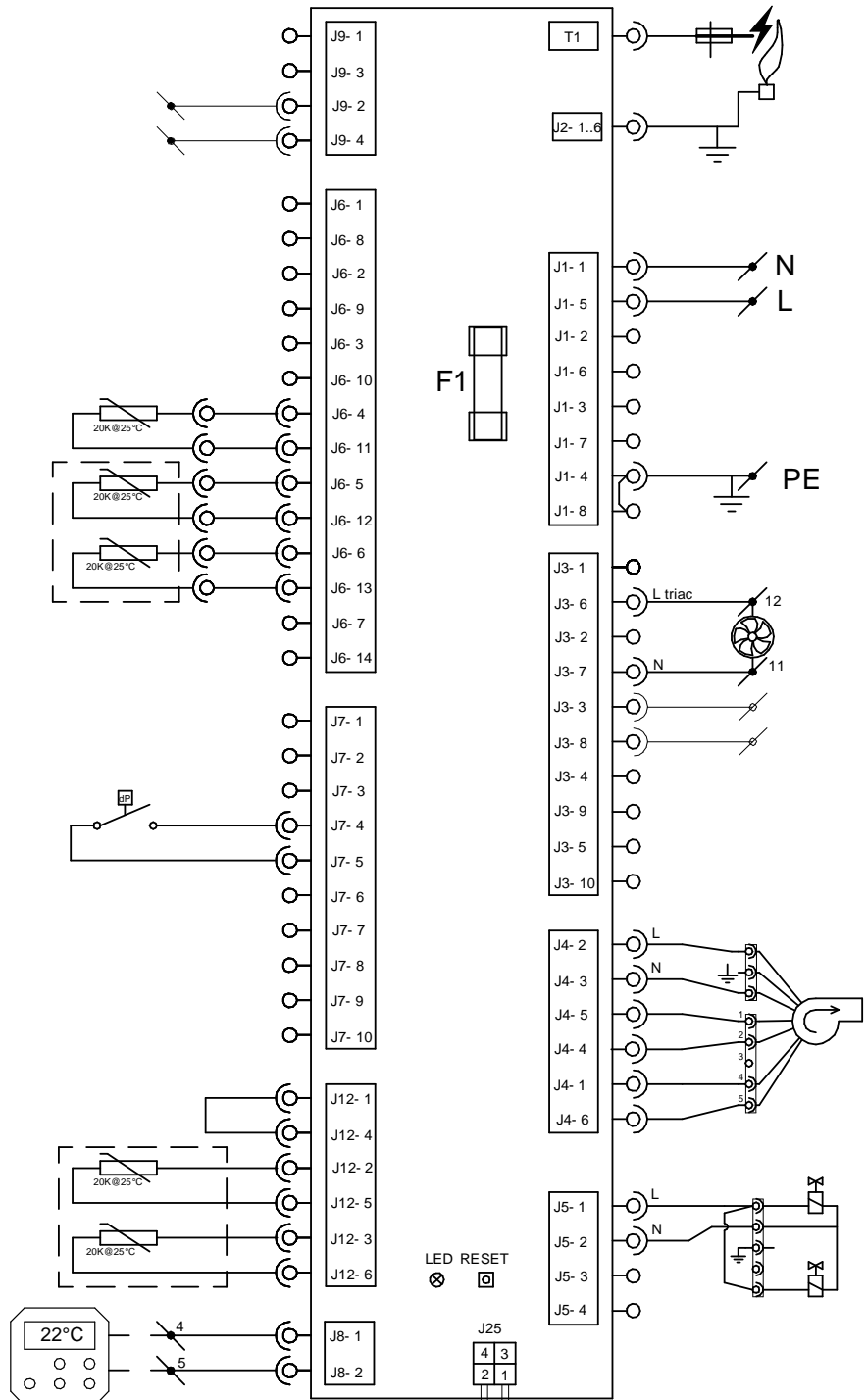
T_top sensor

T_flue sensor

Pressure switch

T_exchanger Sensor

Modulating Thermostat



R150a
FAN TRIAC

14 Spare parts and Exploded views

14.1 Spare parts

		10	20	30	40	50	60
1	Burner HR for nat. gas	GA3206	GA3207	GA3208	GA3208	GA3210	GA3212
1	Burner for Propane	GA3242	GA3244	GA3246	GA3248	GA3250	GA3252
2	Ignition/Ionisation electrode set	GA3460	GA3460	GA3460	GA3460	GA3460	GA3460
5	Premix fan						
6	Gas control SIT SIGMA 848	IX3000	IX3000	IX3000	IX3000	IX3000	IX3000
7	System fan	IX4201	IX4201	IX4201	IH4206	GX4207	GX4207
8	Control Print Board						
9	Air pressure switch	IX3932	IX3932	IX3932	IX3932	IX3932	IX3932
10	NTC Cable sensor set						
11	Gasket set	GA6730	GA6730	GA6731	GA6731	GA6731	GA6731
12	Burner isolation plate	GA6700	GA6700	GA6704	GA6704	GA6704	GA6704
13	Flue sensor						

14.2 Exploded view HR-10

