GUARD

Operation and Maintenance Documentation

COMMERCIAL & INDUSTRIAL HEAT Part of Turnbull & Scott

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1. PURPOSE OF THE DEVICE

The air curtain is intended to be used in regions with a moderate and cold climate, in spaces where temperature ranges from -10 to +40°C, in conditions free from external factors such as pollens and hydrometeor (horizontal precipitation).
In winter, air curtains protect against heat loss in rooms by directing an airstream across the entrance way and preventing cold air from entering the heated space. In summer, the curtains may be used as cooling devices preventing the entry of hot air and pollutants from outside.
The GUARD air curtains are designed to protect against heat losses in buildings of medium and high capacity and with a required mounting height is of 4 m such as:

- supermarkets, large retail space,
- car showrooms and service stations,
- sports and show halls,
- exhibition surfaces

2. BASIC TECHNICAL PARAMETERS

parametry		Curtain with water heater			Curtain with electric heater		
		GUARD 100W	GUARD 150W	GUARD 200W	GUARD 100E	GUARD 150E	GUARD 200E
Lenght of unit	m	1	1.5	2	1	1.5	2
max installation height	m	4	4	4	4	4	4
Max air output	m³/h	1200 / 1550 / 2000	2200 / 3000 / 3600	2900 / 4000 / 4800	1200 / 1550 / 2000	2200 / 3000 / 3600	2900 / 4000 / 4800
Heat output *	kW	10-16	20-29	25-40	4 - 7	6,5 - 11	8,5 - 14
Max working pressure	MPa	1,6	1,6	1,6	-	-	-
Diameter of connection nozzles	˝	1/2'	1/2'	1/2'	-	-	-
motor power supply, consumption	V/Hz A	230/50 1,95A	230/50 2,6A	230/50 2,6A	230/50 1,95A	230/50 2,6A	230/50 2,6A
Motor power	kW	51 / 106 / 220	75 / 162 / 320	75 / 162 / 320	51 / 106 / 220	75 / 162 / 320	75 / 162 / 320
electric heater power supply, consumption	V/Hz A	-	-	-	400/50 11,0A	400/50 16,6A	400/50 22,4A
Weight filled with water / without water	kg	18,0 / 16,5	22,6 / 20,5	31,0 / 28,0	17	21,5	29
volume level I / II / III	dB (A)	44 / 49 / 59	45 / 49 / 61	46 / 49 / 61	44 / 49 / 59	45 / 49 / 61	46 / 49 / 61
Protection class IP		IP21	IP21	IP21	IP21	IP21	IP21

parametry		Curtain without heater		
		GUARD 100C	GUARD 150C	GUARD 200C
Lenght of unit	m	1	1.5	2
max installation height	m	4	4	4
Max air output	m³/h	1250 / 1600 / 2100	2250 / 3100 / 3700	3000 / 4200 / 5000
Heat output *	kW	-	-	-
Max working pressure	MPa	-	-	-
Diameter of connection nozzles	˝	-	-	-
motor power supply, consumption	V/Hz A	230/50 1,95A	230/50 2,6A	230/50 2,6A
Motor power	kW	51 / 106 / 220	75 / 162 / 320	75 / 162 / 320
electric heater power supply, consumption	V/Hz A	-	-	-
Weight filled with water / without water	kg	15	18,5	25
volume level I / II / III	dB (A)	45 / 50 / 60	46 / 50 / 61	47 / 50 /61
Protection class IP		IP21	IP21	IP21

Noise level measured in distance of 3 m in open space building

3. HEAT OUTPUT RANGES

GUARD 100-150-200 W Air curtains with water heater

GUARD 100W																									
inlet/outlet water temperature	50/30					60/40					70/50					80/60					90/70				
inlet air temperature	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
III - max air flow - 2000 m3/h																									
heat output [kW]	6,6	5,6	4,6	3,6	2,6	9,0	7,9	6,9	5,8	4,8	11,3	10,3	9,2	8,1	7,1	13,7	12,6	11,5	10,5	9,4	16,0	14,9	13,9	12,8	11,7
outlet air temperature [°C]	11,4	14,9	18,3	21,9	25,4	14,9	18,3	21,8	25,2	28,7	18,4	21,8	25,2	28,7	32,1	21,9	25,3	28,7	32,1	35,5	25,4	28,8	32,2	35,6	39,0
water flow [m³/h]	0,2	0,2	0,2	0,1	0,1	0,4	0,3	0,3	0,2	0,2	0,5	0,4	0,4	0,3	0,3	0,6	0,5	0,5	0,4	0,4	0,7	0,6	0,6	0,5	0,5
pressure drop [kPa]	1,0	1,0	0,6	0,6	0,3	2,0	2,0	1,0	1,0	1,0	4,0	3,0	2,0	2,0	1,0	5,0	5,0	4,0	3,0	2,0	7,0	6,0	5,0	5,0	4,0
II - mid air flow - 1550 m3/h																									
heat output [kW]	5,9	5,0	4,2	3,3	2,4	7,9	7,0	6,1	5,3	4,4	10,0	9,1	8,2	7,2	6,3	12,0	11,1	10,2	9,2	8,3	14,0	13,1	12,2	11,2	10,3
outlet air temperature [°C]	12,5	15,8	19,1	22,4	25,8	16,4	19,6	22,9	26,2	29,5	20,3	23,5	26,8	30,0	33,3	24,2	27,4	30,6	33,9	37,1	28,0	31,3	34,5	37,7	40,9
water flow [m³/h]	0,2	0,2	0,1	0,1	0,1	0,3	0,3	0,2	0,2	0,2	0,4	0,4	0,3	0,3	0,2	0,5	0,4	0,4	0,4	0,3	0,6	0,5	0,5	0,5	0,4
pressure drop [kPa]	1,0	1,0	0,5	0,5	0,2	2,0	2,0	1,0	1,0	0,0	3,0	2,0	2,0	1,0	1,0	4,0	3,0	3,0	2,0	2,0	6,0	5,0	4,0	4,0	3,0
I - low air flow - 1200 m3/h																									
heat output [kW]	5,3	4,5	3,8	3,0	2,3	7,0	6,3	5,5	4,7	3,9	8,8	8,0	7,2	6,4	5,6	10,5	9,7	8,9	8,1	7,3	12,2	11,4	10,6	9,8	9,0
outlet air temperature [°C]	13,7	16,8	19,9	23,0	26,2	18,0	21,1	24,1	27,2	30,3	22,3	25,3	28,4	31,5	34,5	26,6	29,6	32,7	35,7	38,8	30,9	33,9	36,9	40,0	43,0
water flow [m³/h]	0,2	0,2	0,1	0,1	0,1	0,3	0,2	0,2	0,2	0,1	0,3	0,3	0,3	0,2	0,2	0,4	0,4	0,4	0,3	0,3	0,5	0,5	0,4	0,4	0,4
pressure drop [kPa]	1,0	0,8	0,5	0,5	0,2	1,0	1,0	1,0	0,7	0,6	2,0	2,0	1,0	1,0	1,0	3,0	3,0	2,0	2,0	1,0	4,0	4,0	3,0	3,0	2,0

GUARD 150W																									
inlet/outlet water temperature	50/30					60/40					70/50					80/60					90/70				
inlet air temperature	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
III - max air flow - 3600 m3/h																									
heat output [kW]	13,5	11,7	10,0	8,2	6,4	17,4	15,6	13,8	12,1	10,3	21,3	19,5	17,7	15,9	14,1	25,1	23,3	21,6	19,7	18,0	29,0	27,2	25,4	23,6	21,8
outlet air temperature [°C]	11,9	15,4	18,9	22,5	26,0	15,1	18,6	22,1	25,7	29,2	18,3	21,8	25,3	28,9	32,4	21,5	25,0	28,6	32,0	35,6	24,7	28,2	31,7	35,2	38,7
water flow [m³/h]	0,5	0,4	0,3	0,2	0,2	0,6	0,6	0,5	0,4	0,3	0,8	0,7	0,7	0,6	0,5	1,0	0,9	0,8	0,7	0,7	1,2	1,1	1,0	0,9	0,8
pressure drop [kPa]	4,0	3,0	2,0	1,0	1,0	8,0	6,0	4,0	3,0	2,0	12,0	10,0	8,0	6,0	5,0	17,0	14,0	12,0	10,0	8,0	22,0	19,0	17,0	14,0	12,0
II - mid air flow - 3000 m3/h																									
heat output [kW]	12,5	10,9	9,3	7,8	6,1	16,1	14,4	12,8	11,2	9,6	19,6	17,9	16,3	14,7	13,1	23,1	21,4	19,8	18,2	16,6	26,5	24,9	23,3	21,6	20,0
outlet air temperature [°C]	12,7	16,1	19,5	22,9	26,3	16,2	19,6	23,0	26,4	29,8	19,7	23,1	26,5	29,9	33,2	23,2	26,5	29,9	33,3	36,7	26,6	30,0	33,4	36,7	40,1
water flow [m³/h]	0,4	0,4	0,3	0,2	0,2	0,6	0,5	0,4	0,4	0,3	0,7	0,7	0,6	0,5	0,5	0,9	0,8	0,8	0,7	0,6	1,1	1,0	0,9	0,8	0,8
pressure drop [kPa]	4,0	3,0	2,0	1,0	0,6	6,0	5,0	4,0	3,0	2,0	10,0	8,0	6,0	5,0	4,0	14,0	12,0	10,0	8,0	7,0	18,0	16,0	14,0	12,0	10,0
I - low air flow - 2200 m3/h																									
heat output [kW]	11,0	9,7	8,4	7,0	5,7	14,0	12,6	11,3	9,9	8,6	16,9	15,5	14,2	12,9	11,5	19,8	18,4	17,1	15,7	14,4	22,7	21,3	20,0	18,6	17,3
outlet air temperature [°C]	14,2	17,4	20,6	23,7	26,9	18,2	21,3	24,5	27,7	30,9	22,1	25,3	28,5	31,6	34,8	26,1	29,2	32,4	35,6	38,7	30,0	33,1	36,3	39,5	42,6
water flow [m³/h]	0,4	0,3	0,2	0,2	0,1	0,5	0,4	0,4	0,3	0,3	0,6	0,6	0,5	0,4	0,4	0,8	0,7	0,6	0,6	0,5	0,9	0,8	0,8	0,7	0,6
pressure drop [kPa]	3,0	2,0	1,0	1,0	0,6	5,0	4,0	3,0	2,0	1,0	7,0	6,0	5,0	4,0	3,0	10,0	8,0	7,0	6,0	5,0	13,0	11,0	10,0	8,0	7,0

GUARD 200W																									
inlet/outlet water temperature	50/30					60/40					70/50					80/60					90/70				
inlet air temperature	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
III - max air flow - 4800 m3/h																									
heat output [kW]	19,5	17,2	14,8	12,4	9,9	24,7	22,3	19,9	17,5	15,1	29,8	27,4	25,0	22,6	20,2	34,9	32,5	30,1	27,7	25,3	40,0	37,6	35,2	32,8	30,4
outlet air temperature [°C]	12,5	16,0	19,5	23,0	26,5	15,7	19,2	22,7	26,2	29,7	18,9	22,4	25,9	29,4	32,9	22,1	25,6	29,1	32,6	36,1	25,2	28,7	32,2	35,7	39,2
water flow [m³/h]	0,7	0,6	0,5	0,4	0,2	0,9	0,8	0,7	0,6	0,5	1,1	1,0	0,9	0,8	0,7	1,4	1,2	1,1	1,0	0,9	1,6	1,5	1,4	1,3	1,2
pressure drop [kPa]	9,0	6,0	4,0	3,0	1,0	15,0	12,0	9,0	7,0	5,0	22,0	19,0	15,0	12,0	9,0	32,0	27,0	23,0	19,0	15,0	42,0	37,0	32,0	27,0	23,0
II - mid air flow - 4000 m3/h																									
heat output [kW]	18,2	16,0	13,8	11,7	9,4	22,8	20,7	18,5	16,3	14,1	27,5	25,3	23,1	20,9	18,8	32,1	29,9	27,7	25,5	23,4	36,6	34,5	32,3	30,1	27,9
outlet air temperature [°C]	13,3	16,7	20,1	23,5	26,8	16,8	20,2	23,6	27,0	30,3	20,3	23,7	27,0	30,4	33,8	23,7	27,1	30,5	33,8	37,2	27,1	30,5	33,9	37,3	40,6
water flow [m³/h]	0,6	0,5	0,4	0,3	0,2	0,8	0,7	0,6	0,5	0,4	1,0	0,9	0,8	0,7	0,6	1,2	1,1	1,0	0,9	0,8	1,4	1,3	1,2	1,1	1,0
pressure drop [kPa]	7,0	5,0	4,0	2,0	1,0	12,0	10,0	7,0	5,0	4,0	19,0	16,0	13,0	10,0	8,0	26,0	22,0	19,0	16,0	13,0	35,0	30,0	26,0	22,0	19,0
I - low air flow - 2900 m3/h																									
heat output [kW]	15,9	14,1	12,3	10,5	8,7	19,8	18,0	16,2	14,4	12,6	23,6	21,8	20,0	18,2	16,4	27,4	25,6	23,8	22,0	20,2	31,2	29,4	27,6	25,8	24,0
outlet air temperature [°C]	15,0	18,1	21,3	24,4	27,5	18,9	22,1	25,2	28,4	31,5	22,9	26,0	29,2	32,3	35,5	26,8	29,9	33,1	36,2	39,4	30,7	33,8	37,0	40,1	43,3
water flow [m³/h]	0,5	0,4	0,4	0,3	0,2	0,7	0,6	0,5	0,4	0,4	0,8	0,8	0,7	0,6	0,5	1,0	0,9	0,9	0,8	0,7	1,2	1,1	1,0	1,0	0,9
pressure drop [kPa]	5,0	4,0	3,0	2,0	1,0	9,0	7,0	5,0	4,0	3,0	13,0	11,0	9,0	7,0	5,0	18,0	16,0	13,0	11,0	9,0	24,0	21,0	18,0	16,0	13,0

GUARD 100-150-200 E Air curtains with electric heater

	GUARD 100E					GUARD 150E					GUARD 200E				
temp. powietrza wlotowego [°C]	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
moc grzewcza [kW]	7,0	7,0	7,0	7,0	7,0	11,0	11,0	11,0	11,0	11,0	14,0	14,0	14,0	14,0	14,0
temp. powietrza wylotowego [°C]	12	17	22	27	32	13	18	23	28	33	14	19	24	29	34

GUARD E series (with electric heater) are based **on a new type of PTC electric coils**
It is a modern and safe solution, additional advantages of PTC heaters

- Lack of voltage on surface of electric coil
- Significantly lower coil temperature in comparison to old type of electric heaters (e.g. heating wires, spirals)
- Large heat exchange surface (surface of contact of the heat exchanger with heated air)
- Fully automatic heat control depending on air flow
- Complete elimination of the risk of system overheating due to self-regulating heating modules (heat capacity automatically reduces when air flow goes down)
- Low energy consumption

4. GENERAL AND SAFETY PRINCIPLES

The GUARD air curtains are manufactured in compliance with the rules and standards concerning quality, ecology, utility and work comfort. Before starting the device is sure to read the Manual carefully.

The GUARD air curtains are delivered ready-to-use in a cardboard package that is to protect from any mechanical damages. The package consists of: the device, the Manual (Operation and Maintenance Documentation) and the Guarantee. If the optional automatic control ordered, it shall be delivered in a separate package. Make sure all the aforementioned elements are in the package immediately after the delivery. In the absence of any element, please fill in the suitable carrier document.

NOTICE!

- Do not use the curtain in rooms containing any flammable and/or combustible substances, biological substances or in environments with corrosive air components.
- Do not use the curtain in rooms with relative humidity above 80%
- Do not leave the curtain ON unattended for long periods
- Do not use the curtain without proper grounding
- Do not turn the curtain on without protective cover in place
- Before conducting any maintenance or cleaning work or during the break in operation for an extended period of time, make sure you unplug the power cable
- To connect the air curtain, use a supply cable with a fork that protects against unintended disconnecting from the power
- When the air curtain is connected directly to the cable, please make sure there is a splitter protecting against any undesired disconnecting
- Pay special attention while transporting the device not to damage the casing
- When the device is being operated, ensure the safety rules in accordance with the labor standards relating to the operation of any electrical devices
- Do not place any objects on the curtain or reduce the airflow in order to ensure the fire safety and if sparks or a damaged supply cable noticed, discontinue the operation immediately
- Electricity network, to which the curtain is connected, should be protected against overloading and short circuit

CAUTION!

- To avoid serious danger of electric shock, installation must be performed by a qualified electrician
- To avoid the serious danger to electric shock disconnect the power supply prior to conducting any repair or maintenance work
- Any leakage repairs of the heating medium in the device, of which pipes are under pressure, is strictly prohibited
- Cut-off/stop valve must be used to supply a heating medium
- It is prohibited to connect grounding-type plug to water pipe, gas tubes, lightning conductors, telephone or antenna network
- Wait for at least 3 hours before connecting the device from the power supply if the temperature while transporting is below zero

NOTICE !

- Before mounting the device, read the manual carefully and adhere to the rules concerning the mounting procedures. Not applying to the rules may result in the inappropriate functioning of the device and the loss of the guarantee rights.

- Pay special attention when working with electrical elements of the device.

5. INSTALLATION

When deciding on the air curtain position you should take into account such factors as:

- Ease of access for servicing,
- Access to water and electricity supplies

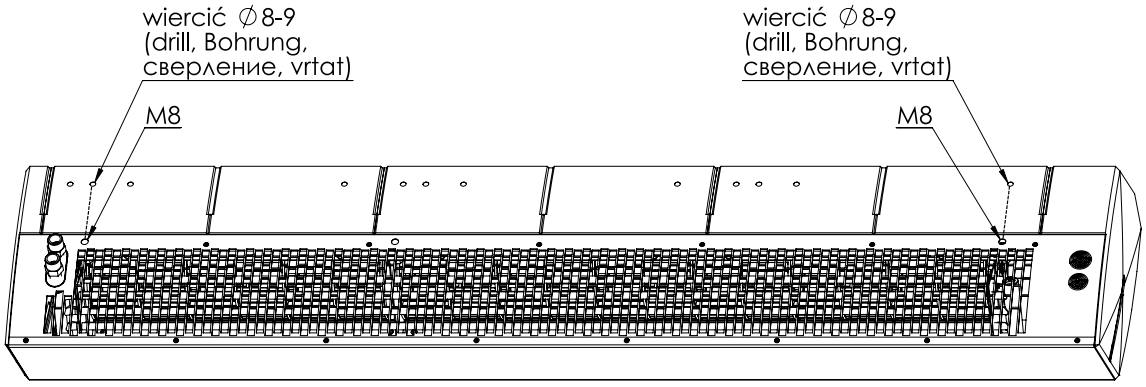
It is recommended to install the air curtain in position above the entrance opening, on the wall or under the ceiling, on support pins or horizontal mounting brackets. It is also possible to mount it vertically to a wall or other structure using vertical mounting brackets. It's important to make sure that the unit is properly levelled. In case of positioning in a different way than horizontal or vertical, during installation, damage to the fan may occur and in consequence malfunction of the unit.

Inlets and outlets cannot be blocked by any objects. When installing the curtains, keep in mind that you will have free access to the control panel. With larger door openings, it is possible to mount more curtains of the same type, one by one, to create an uninterrupted air flow. The curtain is permanently mounted in either a horizontal or vertical position (on the left/right side of the entrance).

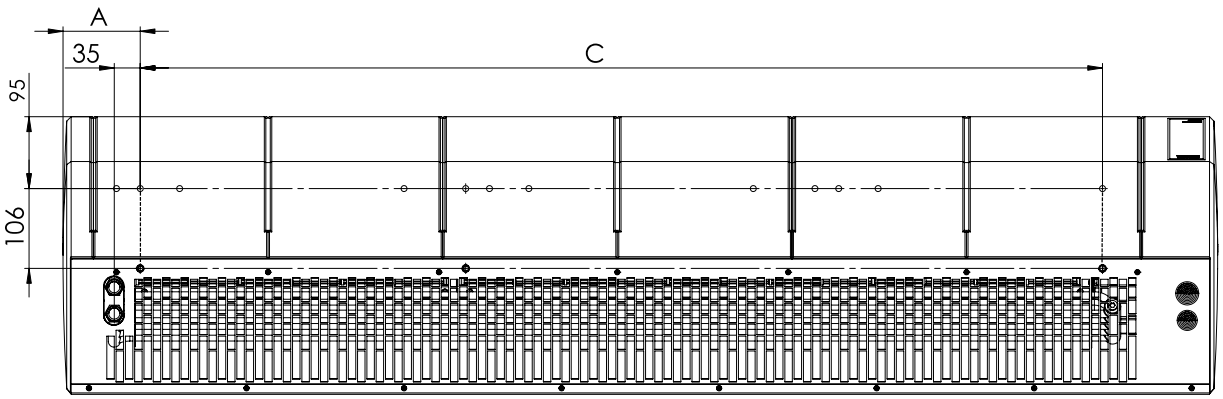
Curtain connection should be done in a serviceable manner; manual shut-off valves should be installed on both nozzles to enable disconnection. In case of a solenoid valve (option - automatics), it must be connected at the water outlet of the device, otherwise it may be damaged. When tightening the pipeline to the exchanger, the heater connection must be protected against torque (which may cause leakage in the exchanger).

Horizontal installation under the ceiling using mounting pins

Installation under the ceiling is done by using 4 M8 pins. In order to hang the device on the pins, drill holes Ø 8-9mm in the EPP housing directly in front of the existing holes in the steel inlet grille. The exact location is indicated by special tags on the EPP housing. The pins should be screwed into the nippers at a depth of 10-14mm.

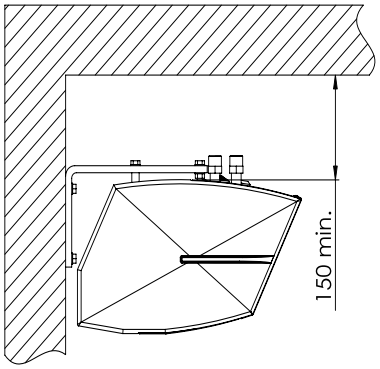


Drawing below shows the position of the mounting holes for the pins



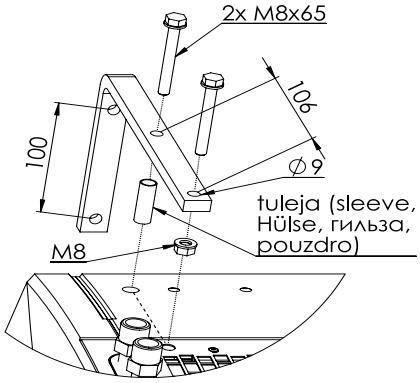
Curtain size	A(mm)	C(mm)	Nuber of pins M8
100	72	857	4
150	104	1295	4
200	157	1712	4

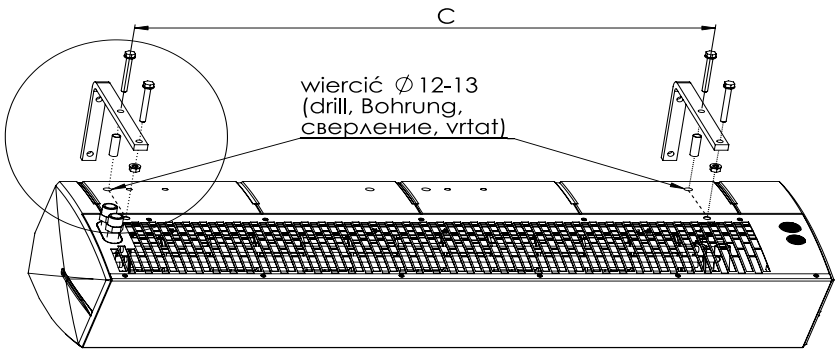
It is important to note that the minimum distance between the device and the ceiling is not less than 150 mm. This will ensure easy access to the water exchanger spigots, cable entries as well as free air flow to the inlet grille.



Wall installation by means of a horizontal bracket

The curtain can be mounted to the wall in a horizontal position using 2 mounting brackets to the horizontal system. In the brackets there are Ø9mm holes for M8 screws. In the EPP housing, drill holes Ø 12-13mm in front of existing holes in the steel intake grille. The exact location is indicated by the special tags on the EPP housing and the figure below. Then insert the spacer sleeves into the holes and fix the brackets. Screw the remaining screws into the nuts under the steel intake grille so that both grips are in one plane. Locknuts under the handles are used to secure the screws from unscrewing.

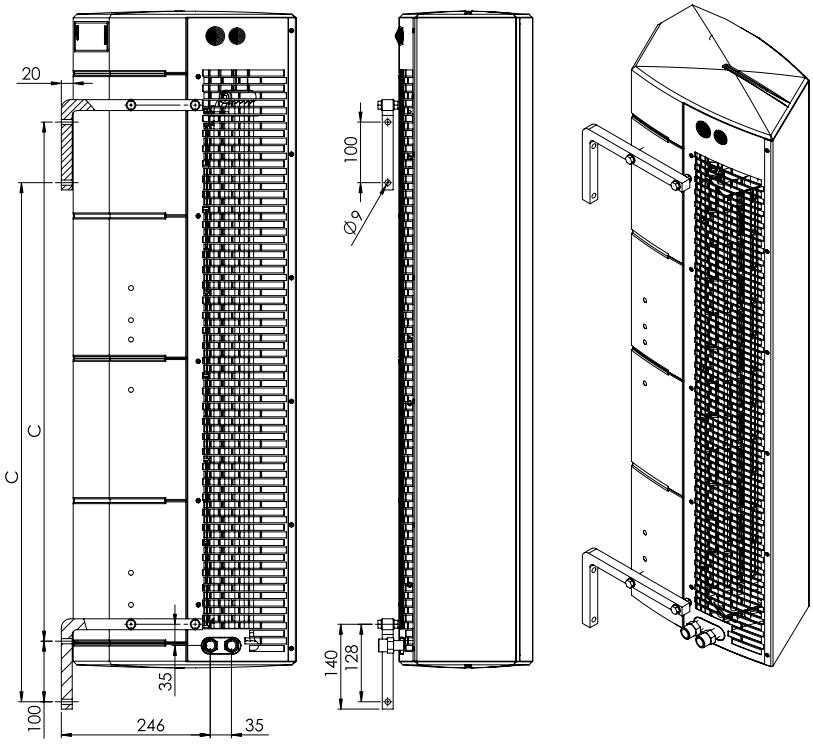




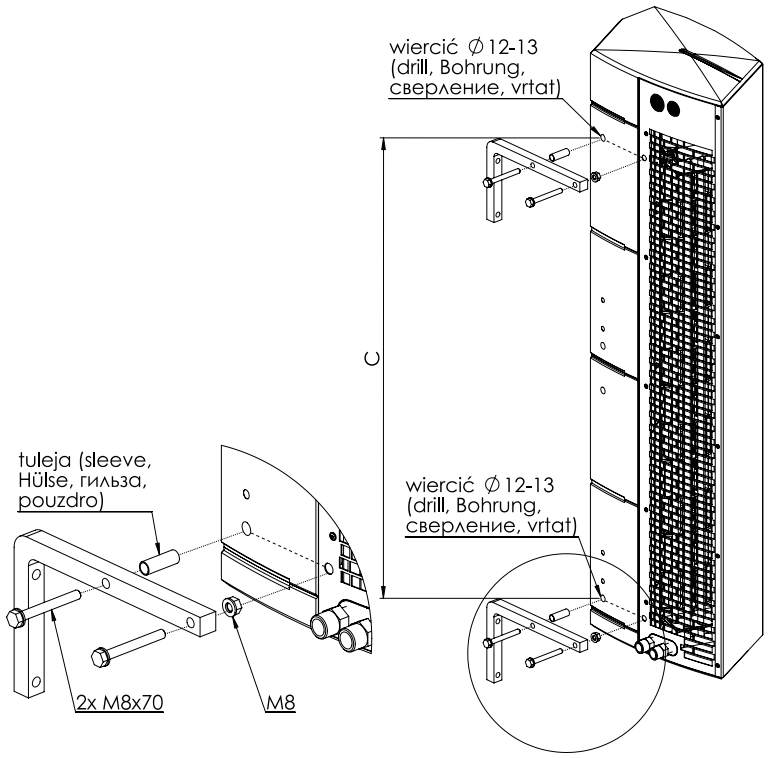
Curtain size	C(mm)	Number of brackets
100	857	2
150	1295	2
200	1712	2

Installation using brackets for vertical mounting

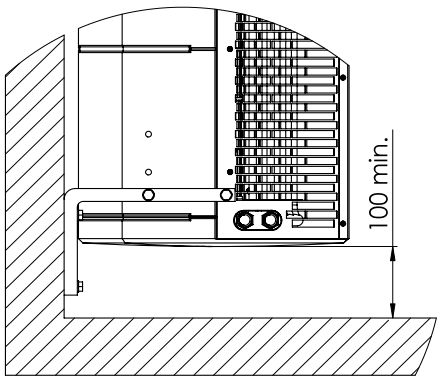
It is also possible to install the unit vertically with the engine downwards and upwards. Two vertical mounts are used for this purpose. In the brackets there are Ø9mm holes for M8 screws. In the EPP housing, drill holes Ø 12-13mm in front of existing holes in the steel intake grille. The exact location is indicated by special tags on the EPP housing and the figure below. Then insert the spacer sleeves into the holes and fix the brackets. Screw the remaining screws into the nuts under the steel intake grille so that both grips are in one plane. Locknuts under the handles are used to secure the screws from unscrewing.



Curtain size	C(mm)
100	857
150	1295
200	1712



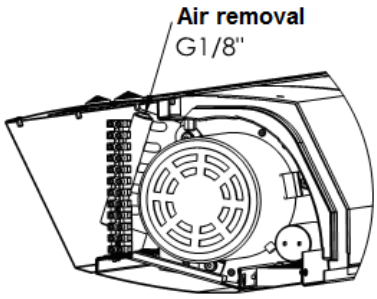
It is important to note that the minimum distance between the unit and the floor for installation with engine at the bottom is not less than 100mm. This allows access to the electrical terminal strip and to the water exchanger vent.



Connection of heating medium

The connection of the heating medium to the heat curtain, using G 1/2" threaded connections, should be made on the basis of a design by an authorized designer. If the air curtain is connected to a district heating network without a mixing unit, a water filter is required.

In case of horizontal and vertical mounting with nozzles at the top, the exchanger is vented through the nozzles. If the device is mounted vertically with nozzles at the bottom, to vent the exchanger, use a vent which is located on the exchanger collector on the engine side.

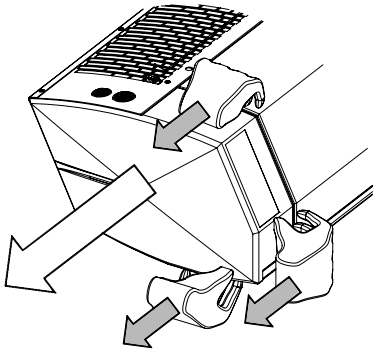


ATTENTION!

It is necessary to ensure that the unit is properly leveled. When it is mounted in a position other than vertical or horizontal there is a risk of fan damage and unit malfunction

Connecting the power supply and control system of the curtain

To connect the power supply, control and / or bleed the Exchange move out the right lid, which is fastened with the lock to the lower steel housing and the main housing EPP. The lid is disassembled in the direction shown by the arrows in the figure below. The lid should be grasped in the following places indicated in the drawing and should be gradually "released" from the locks for several millimetres. Cable entries for power and control cables are located on the inlet grille.



ATTENTION!

Ensure that no connection wire is clamped between the lid and the rest of the curtains before assembling the lid.

6. CONTROL PANEL

The curtain control is done by using the COMFORT control panel, which allows adjusting the flow and air temperature. The control panel should be located outside the curtain airflow zone. Up to 2 GUARD curtains can be connected to one COMFORT panel.

Description of the COMFORT control panel switches
ON/OFF – switching on/off of the machine
I-II-III – fan gear switches, COMFORT terminal strip clamps
- clamp 8 - high speed III
- clamp 7 - middle speed II
- clamp 6 - low speed I

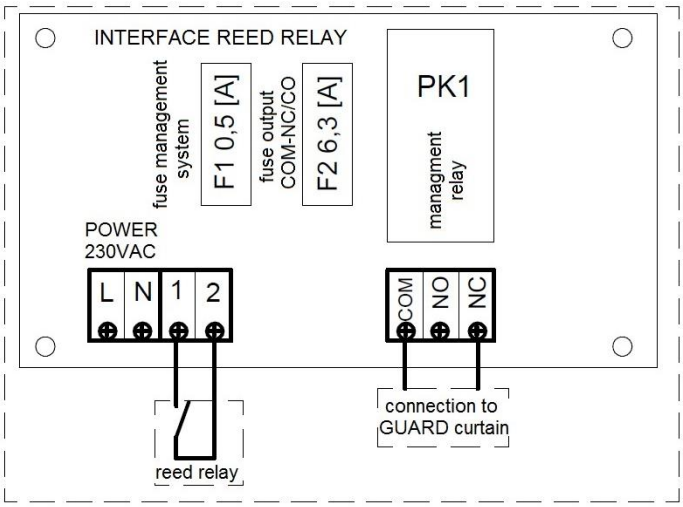
HEAT - when the room temperature is lower than the set value, the thermostat switches on the fan (GUARD W, E, C), the electric heater (GUARD E) and the valve actuator (GUARD W); When the set temperature is reached, the fan is switched off, the valve closes the water flow or the electric heater switches off
FAN / COOL – not supported function, in this settings the device does not work

To install the control panel, unscrew the screw, remove the front cover and panel board, fix the panel to the wall, and replace the panel and cover (installation instructions and fixing kit are included in the package).

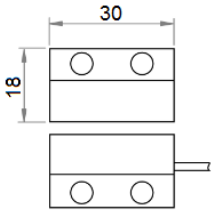
7. GUARD DOOR SWITCH

The **GUARD (DC)** door switch is an additional element for switching the curtain on/off, depending on the opening of the door. It is designed for indoor installation. It includes:
- Relay cabinet - reed relay switchboard
- Reed relay - Reinforcement for door-fitting, hermetic magnetic switch, consisting of a movable and fixed element

Scheme of the relay cabinet – reed relay interface



Dimensions of reed relay



Parameters of relay reed switchboard

- Power supply 230V/50Hz
- Inductive load relay contact 5(A)
- NC magnetic sensor circiut NC
- IP66

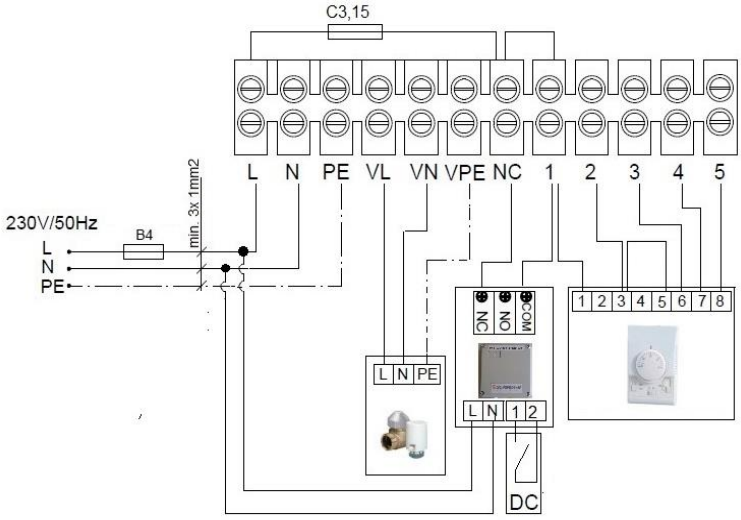
When installing the GUARD door switch, remove the factory-made jumper:

- **NC-1** for curtain GUARD W (curtain with a water heater) / GUARD C (curtain without a water heater)
- **NC-COM** for curtain GUARD E (curtain with an electric heater)

8. DIAGRAMS OF ELECTRICAL CONNECTIONS

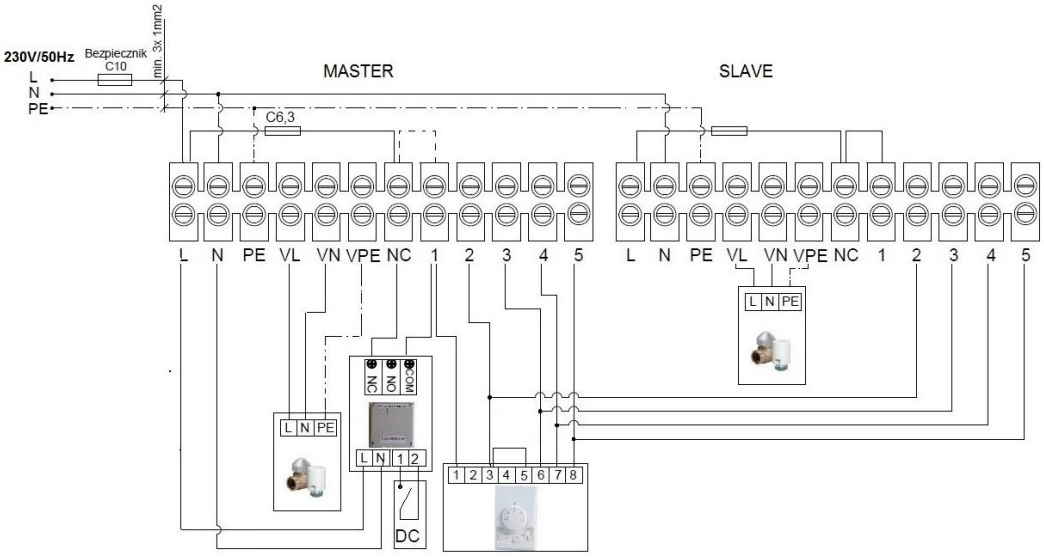
The electrical network to which the curtain will be connected should provide protection against overheating and short circuiting. It is necessary to protect the air curtain by grounding. Electrical installation and connection to the air curtain must be in accordance with applicable building codes and regulations, electrical connection should be carried out by a qualified person familiar with the above instruction. The fan motor has standard internal thermal protection to protect the motor from overheating. The set does not include: power cord, or main switch

8.1 Diagram of connecting one GUARD 100-150-200 W (water heater) and C (without heater) to the COMFORT panel



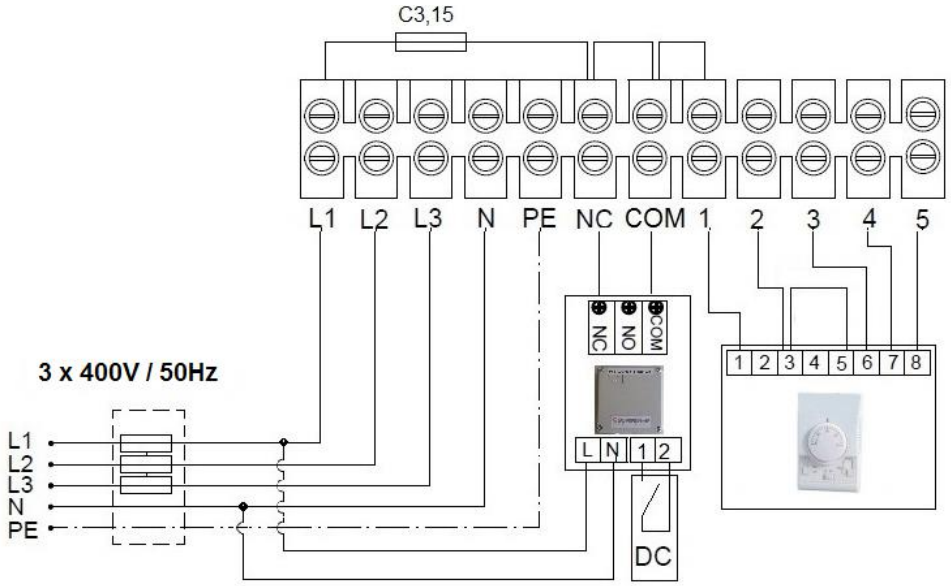
- Power supply 230V / 50Hz; Security system B4; Cross section of power supply cables min. 3 x 1mm
- Control Panel COMFORT - 3-speed fan control with thermostat, (OMY 5x 1.0mm)
- Actuator valve - control 230V/50Hz (OMY 2 x 0.75mm - TS Lite SONNIGER),

8.2 Diagram of connecting two GUARD 100-150-200 W (water heater) and C (without heater) to one COMFORT panel



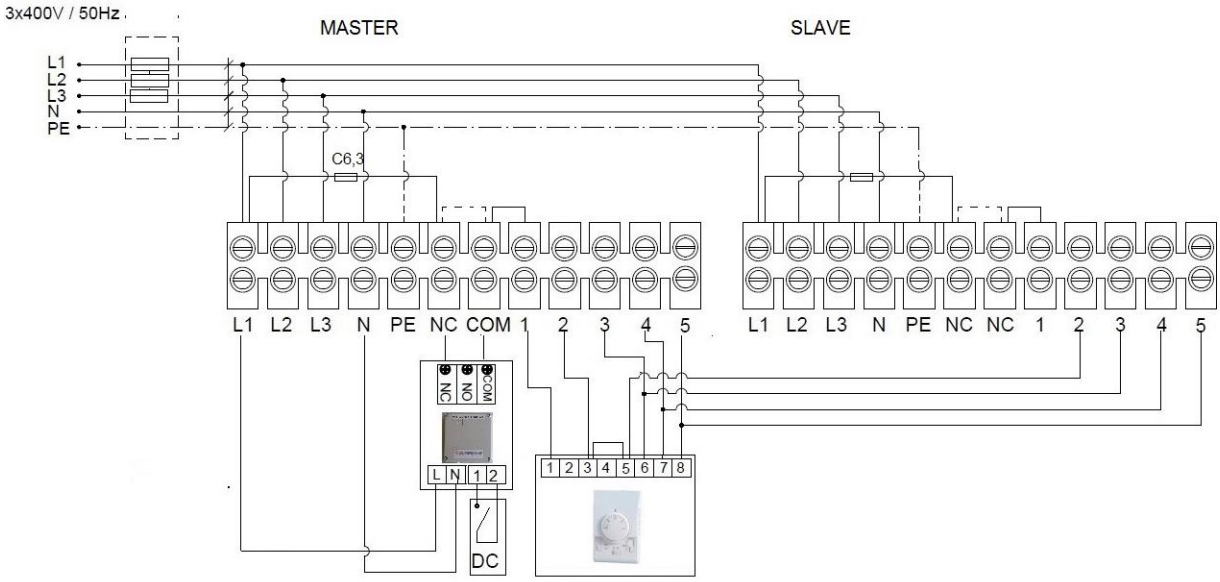
- **In the MASTER curtain between the L-NC terminals, replace the factory-made fuse (C 3.15) with C 6.3.**
- Power supply 230V/50Hz; protection of the C10 system; cross section of power supply cables min. 3 x 1.5 mm
- COMFORT control panel - 3-speed fan control with thermostat (OMY 5x 1.0mm)
- Actuator valve - control 230V / 50Hz (OMY 2 x 0.75mm - TS Lite SONNIGER),

8.3 Diagram of connection of one GUARD 100-150-200 E curtain (electric heater) to the COMFORT panel



- 400V/50Hz power supply; wire cross section; current protection circuit
  - min. 5 x 2,5 mm¸ for G100E ; (B16)
  - min. 5 x 2,5 mm¸ for G150E; (B20)
  - min. 5 x 4 mm¸ for G200E; (B25)
- Control Panel COMFORT - 3-speed fan control with thermostat, (OMY 5x 1.0mm¸)

8.4 Diagram of connection of two GUARD 100-150-200 E curtain (electric heater) to one COMFORT panel

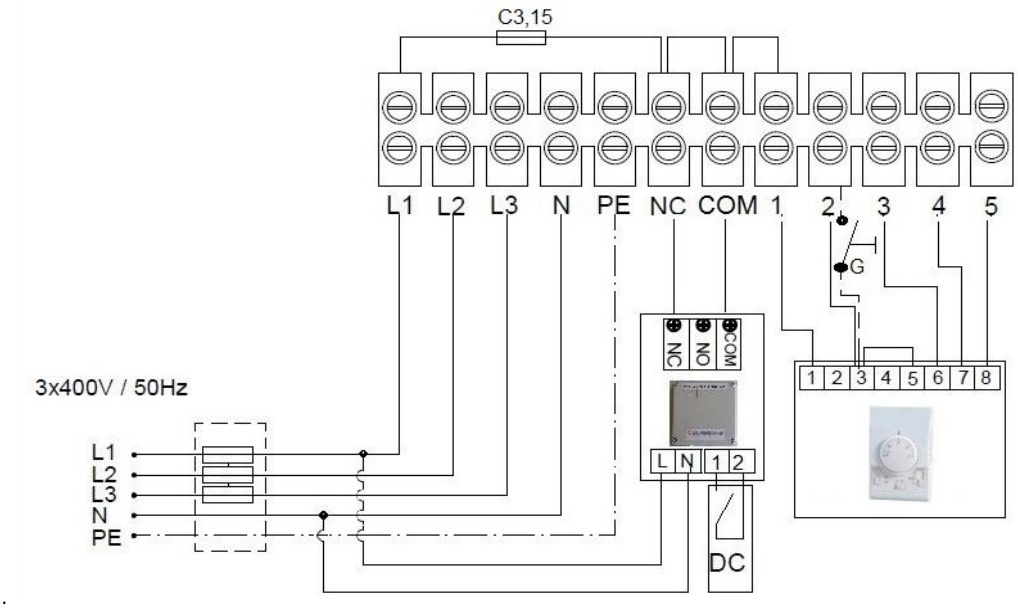


- **In the MASTER curtain between the L1-NC terminal, replace the factory-made fuse (C 3.15) with C 6.3**
- 400V / 50Hz power supply; wire cross section; current protection of the system - should be selected according to the parameters of the individual versions of the curtains
- COMFORT control panel - 3-speed fan control with thermostat (OMY 5x 1.0mm¸)

8.5 Diagram of connection of GUARD 100-150-200 E curtain in cold curtain mode (with electric heater switched off)

In the summer time, it is possible to switch off the electric heater and use the GUARD E curtain as a cold curtain (i.e., fan only, electric heater does not work). In this case, a simple power cut-off installation (shown in the dashed diagram below) must be made. The installation consists in inserting any on/off switch (labelled as "G") into the control circuit between **terminal 3 on Comfort Panel and Terminal 2 in the GUARD curtain**. The on/off switch itself should be installed in a place suitable for the curtain user.

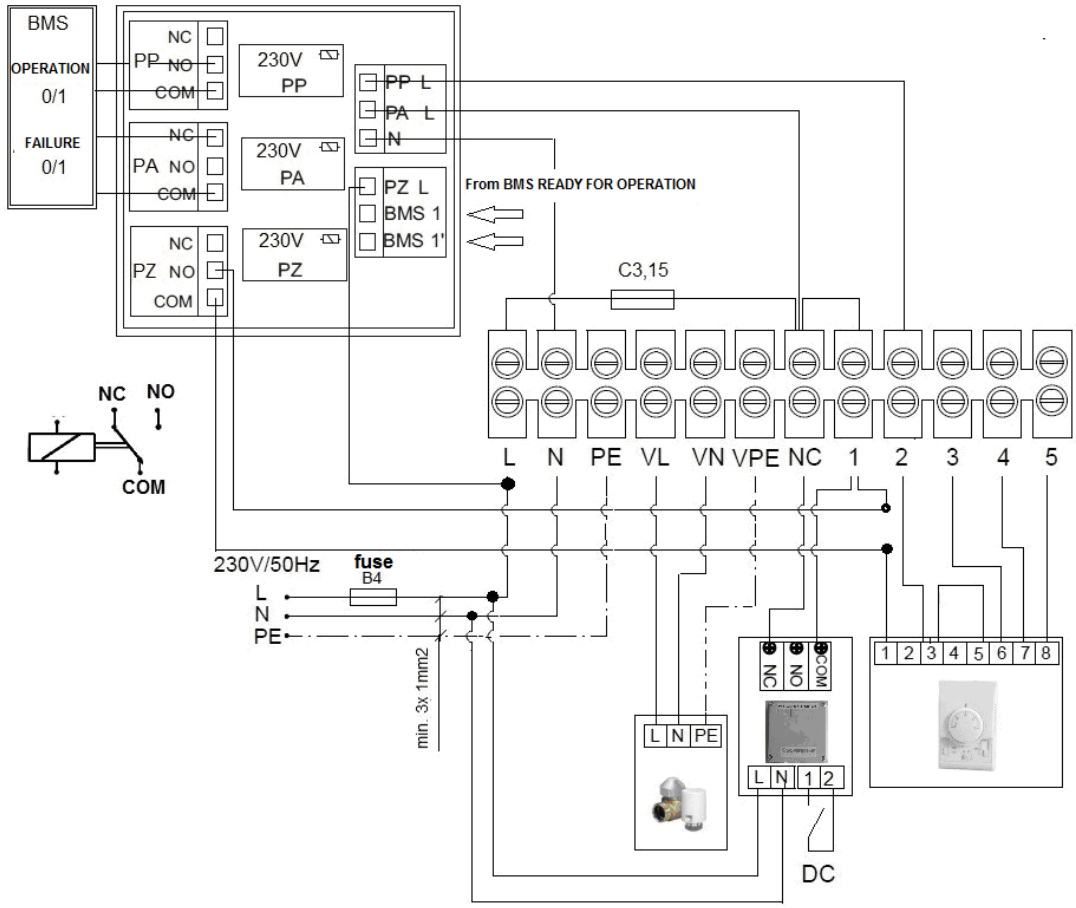
Warning! The Comfort Panel thermostat must be set to max. The on/off switch and the wires to the switch are not included in the scope of delivery



Connection of GUARD curtains based on BMS communication module

- The BMS module for GUARD curtains allows to monitoring the operation of the curtain (EMERGENCY/FAILURE signal) and switches the curtain on/off from the master BMS system.
- With the use of digital signals 0/1 (potential free contact), the BMS SONNIGER can work with any BMS master protocol without need to convert the signal

8.6 Connection diagram of GUARD 100-150-200 W and C with BMS module



SIGNALS FROM BMS

PZ „READY FOR OPERATION”

- Digital signal "1" from the master BMS (potential-free contact) - Curtain ready for operation
- Digital signal "0" from the master BMS system (potential-free contact open) - Curtain disabled

SIGNALS TO BMS - MONITORING THE CURTAIN WORK (NOTE - ON/OFF switch on the COMFORT panel in ON position, "READY FOR OPERATION” signal activated):

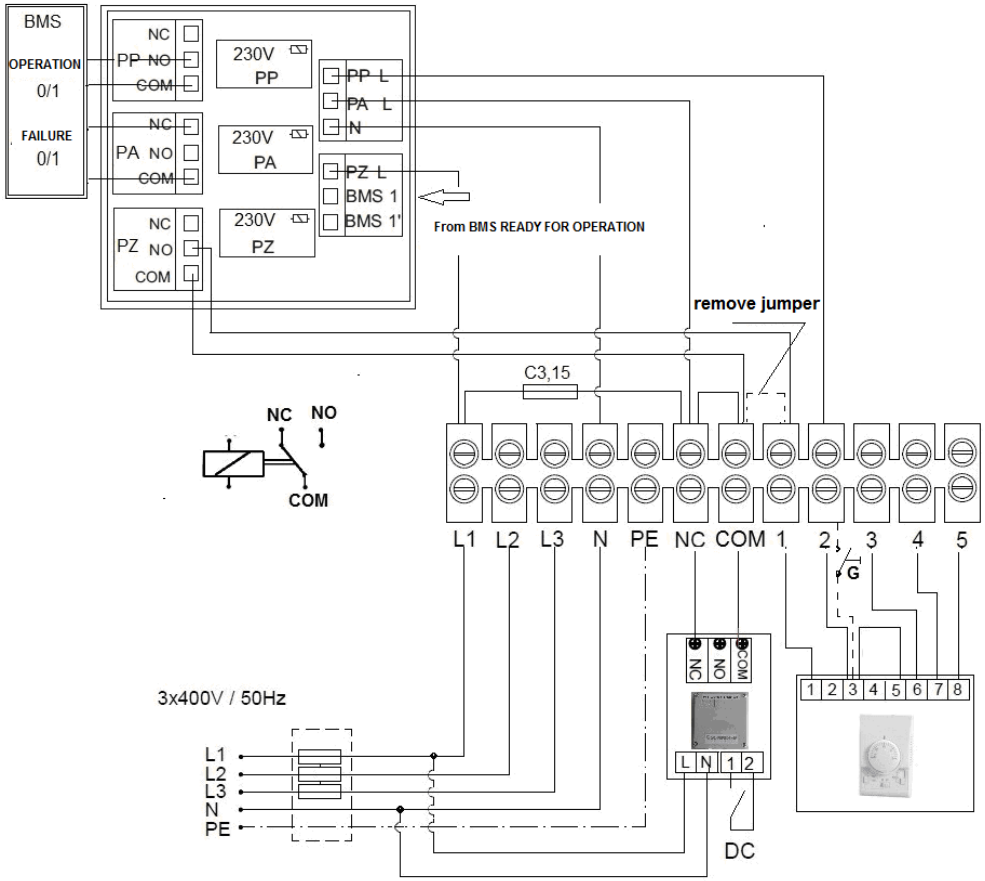
PP „OPERATION”

- Digital signal "1" (potential-free contact closed) - information about the operation of the curtain- reed relay on - door opened
- Digital signal "0" (potential-free contact opened) – Reed relay off - door closed
- If the contactor is not used - after the "OPERATION" signal is applied, the curtain operates continuously in the thermostat mode - digital signal "1" (potential-free contact closed)
- When the curtain is switched off via the thermostat - digital signal "0" (potential-free contact open)

PA „FAILURE”

- With proper operation of the curtain - digital signal "0" (potential-free contact opened)
- After triggering the fuse C3,15 - digital signal "1" - curtain failure (potential-free contact closed)

8.7 Diagram of connection of GUARD 100-150-200 E curtain with BMS module



ATTENTION!

While using BMS communication module for GUARD electric series remove factory installed jumper between **COM-1**

SIGNALS FROM BMS
PZ „READY FOR OPERATION”

- Digital signal "1" from the master BMS (potential-free contact closed) - Curtain ready for operation
- Digital signal "0" from the master BMS system (potential-free contact opened) - Curtain disabled

SIGNALS TO BMS - MONITORING THE CURTAIN WORK (NOTE - ON/OFF switch on the COMFORT panel in ON position, "READY FOR OPERATION” 1 signal activated):

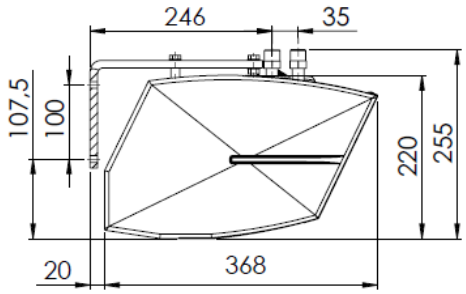
PP „OPERATION”

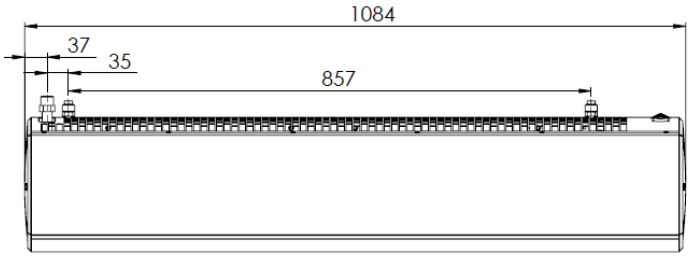
- Digital signal "1" (potential-free contact closed) - information about the operation of the curtain- reed relay on - door opened
- Digital signal "0" (potential-free contact opened) - Reed relay off - door closed
- If the contactor is not used - after the "WORKING" signal is applied, the curtain operates continuously in the thermostat mode - digital signal "1" (potential-free contact closed)
- When the curtain is switched off via the thermostat "0" digital signal (potential-free contact opened)

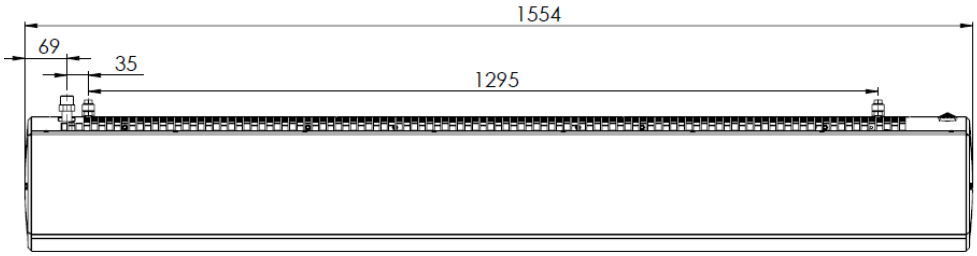
PA „FAILURE”

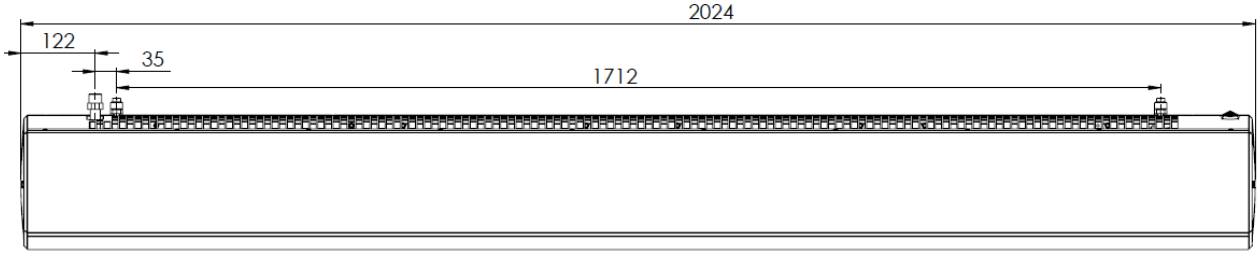
- With proper operation of the curtain - digital signal "0" (potential-free contact opened)
- After triggering the fuse C3,15 - digital signal "1" - curtain failure (potential-free contact closed)

9. DIMENSIONS OF THE GUARD 100-150-200 W, E, C CURTAINS









10. OPERATION AND MAINTENANCE

The engine and fan of the GUARD air curtains are maintenance-free devices but regular check-ups are advised, especially motor and bearing (fan's rotor should rotate freely, free from any axial and radial throws/run-outs and undesired knocks/rattles.

The heat exchanger requires systematical cleaning of all dirt's /impurities off. Before the start of the heating period, the heat exchanger is advised to be cleaned with compressed air directed to the air outlets; there is no need for dismantling of the device.

Pay special attention when cleaning the exchanger's fin due to high possibility of damaging them. If the fin is bent use a special tool. If the device has not been used for a longer period of time, unplug it before the next use.

The heat exchanger is not equipped with any fire protection device. The heat exchanger may be damaged if the room temperature goes below 0°C; anti-freeze liquid must be added to the water circulation/system. Anti-freeze liquid must be appropriate for the material the exchanger is made of (copper) as well as other elements of the hydraulic system/circulation. The liquid must be diluted with water accordingly to the manufacturer's recommendation.

NOTICE !

- Any and all repair and maintenance works must be conducted with the power off and the heat input disconnected.
- Only suitably qualified staff well acquainted with the safety regulations concerning handling with an electrical device must be employed when the device is being installed, started and operated
- In the event of coolant leak, when the water system is under pressure, any repairs of the leakage are strictly prohibited.
- Any repairs of the device must be conducted only if the device is disconnected from the power supply.
- If the device being operated gives metallic clatter, vibration or the level of noise is increasing, check if the mounting of the fan has not become loose – in case of any problems contact the installer of the device or the SONNIGER Authorized Service immediately.

11. TROUBLESHOOTING AND TECHNICAL PROBLEMS

Possible problems and solutions are shown below. To eliminate a problem encountered contact the SONNIGER Authorized Service.

Fault, symptoms	Potential causes	Solutions
No heating, fan not operating	No power supply	Check the power switch Check the power supply Check the power cable – if it is damaged - replace the cable
	Damage to the fan	Replace the motor
	Damage to the switches on control panel	Check the switches – if are damaged – replace
Heating medium leakage -leakage on joints with hot water supply system - leakage in collector	Loss of tightness	Sealing supply system; repairing the heat exchanger
Heat output drop	Temperature of the heating medium differs from the required one Contaminated heat exchanger's surface	Restore the temperature of the heating medium Clean the surface of the heat exchanger

GUARANTEE TERMS AND CONDITIONS

1. General

(a) In these Conditions of Sale:-

"The seller means Commercial Industrial Heat Ltd, "the buyer means a buyer of any goods from the seller and "the goods means any goods sold by the seller to the buyer.

(b) The seller only does business upon the terms of these Conditions of Sale which shall be deemed to be incorporated into any contract between the buyer and the seller. If there is any conflict between these conditions and the terms of the buyer's orders, these conditions shall prevail except to the extent that the seller has agreed in writing that they are excluded. These Conditions of Sale shall not be altered or varied except by express written amendment signed on behalf of the seller. The buyer confirms to the seller that no written or oral representation made by or on behalf of the seller (other than as expressly incorporated in these Conditions of Sale) have induced the buyer to enter into this contract.

2. Delivery

(a) Except where otherwise specifically stated in writing, any references to delivery shall be construed as referring to date of dispatch from the seller's works. Any period quoted will run from receipt by the seller of either the buyer's order or final technical information necessary for manufacture, whichever shall be the later.

(b) Quoted or acknowledged dates for dispatch are made by the seller in good faith and every effort will be made to adhere to them but the seller shall not be under any liability whatsoever for the consequences of any delay. Time for delivery is not of the essence of the contract.

(c) If for any reason the buyer fails to take delivery of any goods after it has received notification that they are ready for delivery, the seller shall be entitled to invoice the buyer for any expense (including storage and insurance) that may have been incurred as a result of the buyer's failure to take delivery at the appropriate date.

(d) Delivery shall be deemed to have been accepted unless and to the extent that in the case of non-delivery the seller is notified in writing within seven days from dispatch and in the case of damage, the goods are signed for as damaged and the seller is notified on the day of delivery, such notification to be confirmed in writing within three days after delivery.

(e) The seller reserves the right to deliver any goods by instalments and to invoice accordingly. The provisions of these Conditions of Sale shall apply to such instalments as if each constituted a separate contract hereunder.

(f) Where goods are to be delivered by instalments and the buyer

(i) fails to accept any delivery when due; or

(ii) defaults making payment when due,

then in either case the seller may cancel any or all subsequent deliveries and the buyer shall compensate the seller in full for any loss or expense arising from such cancellation.

(g) Delivery to the buyer is complete when the goods are unloaded from transport to the buyer or into the buyer's vehicle and the risk then passes to the buyer who shall be responsible for affecting his own insurance. The buyer shall be responsible for the safe unloading of the goods from the vehicle in which they are delivered.

(h) If the seller replaces goods free or charge delivery shall be deemed to have been made and risk shall pass in respect of those goods in accordance with condition 2 (g).

3. Warranty

(a) The seller warrants (subject to condition 6 below) that the goods manufactured by it are free from defects in material or workmanship provided that the seller's liability shall be limited to repair or replacement free of charge at the seller's works of the defective part within twelve months after delivery, provided notification of such failure or defect is given to the seller immediately upon the same becoming apparent and on the seller's request the goods are promptly returned to the seller carriage paid.

(b) When the price quoted includes delivery other than at the seller's works the seller will repair or, at its option, replace free of charge, goods lost or damaged in transit, provided that it is given written notification of such loss or damage within such time as will enable it to comply with the carrier's conditions of carriage regarding loss or damage in transit or where delivery is made by the seller's own transport within a reasonable time after receipt of the advice note.

(c) The seller warrants that it will have good title to sell all goods to be supplied and that they will be free from all liens and encumbrances in favour of any third party not declared or known to the buyer before or at the time of contract. In the case of goods supplied but not manufactured by the seller, the seller will, so far as it is able to do so, extend to the buyer the benefit of the supplier's warranty.

(d) The seller shall be under no liability for any defect which is due to accident, fair wear and tear, negligent use, tampering, improper handling, improper use, improper operation or improper storage or any other default on the part of any person other than the seller.

(e) Save for, and in respect of, the above warranty:-

(i) The seller shall not under any circumstances be liable for loss of profits, loss of orders or consequential loss of any kind.

(ii) The seller shall not be liable for any damage to property arising from any defect in the goods or from the negligence of the seller, its servants or agents.

(iii) All conditions, representations, warranties or undertakings in connection with the goods, whether implied by statute, common law or any other reason whatsoever and whether as to quality, condition, fitness for use or otherwise whatsoever, are hereby excluded.

(f) Where these conditions apply and the buyer deals as a consumer for the purpose of the Unfair Contract Terms Act 1977 ("a consumer sale") this condition will be in addition to the statutory rights of the purchaser meaning of that

expression, as defined in the Consumer Transactions (Restrictions on Statements) Order 1976 ("statutory rights") and will in no way affect the statutory rights of the buyer and in particular, in the case of a consumer sale, none of the statutory rights are excluded by condition 3 (e) above.

(g) All goods are sold explicitly on the understanding that they will be used only in the prescribed manner as designed. The seller expressly rejects liability for any risks to health and safety resulting from any use of the goods which is not in accordance with the operating instructions normally provided.

(h) Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or for ninety days, whichever is the greater.

4. Quotations

The seller reserves the right to cancel or withdraw any quotation, without notice, at any time before acceptance. A quotation issued by the seller does not constitute an offer to supply goods and any orders placed by the buyer following a quotation issued by the seller shall not be binding on the seller unless and until accepted by the seller in writing.

5. Price

(a) All goods are sold and all prices are quoted ex works unless otherwise stated. Small orders may be subject to a minimum charge. The buyer's attention is drawn to condition 8 (b) below.

(b) Unless otherwise stated the price of the goods excludes Value Added Tax (VAT) or any other tax, duty or levy which shall be added to the amount set out on the seller's invoice and paid to the buyer.

(c) All prices quoted or acknowledged are firm for delivery within the delivery period stated in the seller's quotation or acknowledgement.

(d) In the event of the suspension of work or inability on the seller's part to delivery either as a result of instructions from the buyer or through failure by the buyer to provide the seller with the seller's necessary instructions the contract price may be increased by the seller to cover any extra expense thereby incurred by the seller.

(e) The seller shall be entitled to revise the price of goods to reflect any increase in the cost of materials, rates of wages or overhead costs incurred by it or made to take account of change in exchange rates or any new increased tariffs, import charges or taxes.

(f) The price of goods may be increased for the supply of any quantity smaller than that quoted for.

6. Description

(a) All descriptions, drawings and other particulars furnished in catalogues, price lists and other documents issued by the seller are as accurate as possible but being given for general information are not to be treated as binding unless specifically confirmed in writing. All dimensions and materials are, unless otherwise stated, subject to reasonable variations resulting from the raw material available or arising in the ordinary course of manufacture.

(b) All items mentioned in condition 6 (a) above are the seller's property and so far as they are capable of being the subject of copyright are the seller's copyright and may not be copied or reproduced by the buyer without the seller's written consent.

7. Packing

Containers and any packing materials supplied as returnable will also be charged to the buyer's account by the seller but will be credited if returned carriage paid in good condition within twenty eight days and duly advised.

8. Payment

(a) Except where otherwise stated the seller will invoice the goods upon dispatch or upon notification of readiness for dispatch whichever is the earlier. Invoices shall become due for payment within thirty days of the invoice date without reduction or deferment on account of disputes or cross claims.

(b) Notwithstanding condition 8 (a) above, the seller may at its option require payment in part or full prior to dispatch and the seller reserves the right to withhold delivery of the goods until such payment is received.

(c) Whilst any moneys remain unpaid upon a contract entered into under these conditions of sale after the due date for payment the seller reserves the right to refuse to commence or continue with any subsequent or prior order from the buyer and the seller shall be under no liability whatsoever for any such refusal

but the buyer will remain liable for the cost of all materials and work in connection with the manufacture or acquisition of goods by the seller for the purpose of future deliveries less an allowance of the value thereof as realised or as utilised by the seller.

(d) The seller shall be entitled to charge interest at an annual rate equal to the Base Rate from time to time of Barclays Bank Plc plus four percent on all overdue accounts from the due date for payment until the actual date of payment.

(e) The seller shall be entitled to bring an action for the price whether or not the property in the goods has passed to the buyer.

9. Passing of Property

(a) The property in the goods shall remain in the seller until full payment for the goods has been received by the seller.

(b) Until payment in full for the goods has been received by the seller, the buyer shall keep the goods free from any charge, lien or encumbrance whatsoever and shall store the goods separately from its own goods or those of any person and will make or otherwise identify the goods clearly and conspicuously as the property of the seller.

(c) Until payment in full for the goods has been received by the seller, the seller may at any time require the goods to be returned to it and if such requirement is not forthwith complied with may retake possession of the goods and for such purpose is irrevocably authorised to enter upon any premises of or occupied by the buyer or its agents.

(d) Before payment in full for the goods has been received by the seller, the buyer (acting on its own account and not as agent of the seller) is licensed by the seller to agree to sell any of the goods in its possession in the ordinary course of its business provided that the seller has not required the return of the goods.

(e) Any sale by the buyer before payment in full for the goods has been received by the seller shall be on the express condition that the proceeds of such sale (including for the purposes of this condition any right to or claim for such proceeds) are held in trust for the seller and such proceeds shall be kept distinct and apart from other moneys of the buyer.

10. Insolvency etc.

If the buyer shall default in or commit any breach of its obligations to the seller or if any distress or execution shall be levied upon the buyer or if the buyer shall become bankrupt or insolvent or shall compound with its creditors or proceedings are commenced for the liquidation of the buyer (other than for a voluntary winding up for the purposes of re-organisation) or if a receiver or manager is appointed over the buyer's assets or any of them then the seller shall be entitled to cancel this and any other contract with the buyer in whole or

in part by written notice and such cancellation shall be without prejudice to any right or remedy accrued or accruing to the seller.

11. Materials

Where the buyer sends the seller items such as materials, tools or the like in connection with the buyer's orders it does so at its own risk and the seller accepts no responsibility for insuring such property except by arrangement in writing. Any patterns, jigs or tools provided by the seller remain the property of the seller except as stated by the seller in writing.

12. Tests

In the case of special tests at the seller's premises or on site which may be necessary or called for on the buyer's order seven days notice in writing or any shorter agreed notice will be given to the buyer of such tests. In the event of failure or delay on the buyer's part to attend the tests they will proceed in the buyer's absence and shall for all purpose of the contract of sale be deemed to have been accepted on the buyer's behalf if the person conducting the tests shall certify in writing that the goods have duly satisfied the tests. Unless included in the seller's quotation any test requested by the buyer may be charged for in addition to the quoted price. Unless specifically indicated the seller's price does not include for inspection by the buyer or any other inspection on behalf of the buyer.

13. Indemnity

When manufacturing or designing goods to specifications supplied by the buyer the seller shall not be liable for any loss of damage of whatever nature arising in any way out of or out of the use of defective designs, specifications or information supplied by the buyer or on its behalf and the buyer will keep the seller fully and effectually indemnified in respect thereof.

14. Patent Rights

(a) Patent, design and other intellectual property rights relating to goods offered or supplied shall remain the seller's absolute property and the seller's designs and drawings shall not be reproduced or disclosed to any third party without its previous written consent. The buyer will not without the seller's previous written consent copy or enable others to copy any goods or part thereof supplied by the seller.

(b) The buyer hereby indemnifies the seller against all claims, damages, costs and expense to which the seller may become liable through executing any order in accordance with the buyer's specification or drawing by the infringement or the

alleged infringement of a patent, registered design or similar intellectual property rights.

15. Sub-Contracting

The seller reserves the right to sub-contract the fulfilment of any order (including any installation) or any part thereof.

16. Cancellation and Variation

No cancellation of any order can be accepted without the prior consent of the seller in writing.

17. Governing Law

These conditions shall be governed by and construed in accordance with English Law and the parties shall be subject to the exclusive jurisdiction of the English Courts.

18. Notices

Any notice given by either the buyer of the seller shall be sufficiently given if sent by first class recorded delivery post (air mail post for export orders) or telex or facsimile transmission addressed to the place of business of the relevant party shown on the face hereof and shall be deemed to have been received (a) in the case of postage two days (seven days for export orders) after it was posted and (b) in the case of telex or facsimile transmission on the date of dispatch.

19. Force Majeure

The seller shall not be liable to the buyer for any failure to perform its obligations under the contract to the extent that such performance is hindered by acts of God, war, sabotage, explosions, epidemic, strikes, lockouts, labour disputes, shortage of labour or materials, compliance with rules, regulations or orders of any Governmental office, department or agency, fire storm, flood, earthquake or other natural catastrophe or any other.

GUARANTEE CARD

INVESTEMENT: ……

Device model:……

Serial number:……...

Date of purchase:…….....

Start date: ……..

Details of installation company:
Person activating the device:……..

Name of company:……

……..

Address:……..

Telephone:……

Signature of a person who has started the device:……

Installation works, check-ups/inspections, repairs:

Date	The scope of installation works, inspections, repairs	Signature and installation company stamp