



## **INSTALLATION MANUAL**

**LPHW Warm Air Heater**

**Model SWH (MK2)**



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The meaning of the symbol on the material, its accessory or packaging indicates that this product shall not be treated as regular waste. Please, dispose of this equipment at your applicable collection point for the recycling of electrical and electronic equipments waste. In the European Union and Other European countries which there are separate collection systems for used electrical and electronic product. By ensuring the correct disposal of this product, you will help prevent potentially hazardous to the environment and to human health, which could otherwise be caused by unsuitable waste handling of this product. The recycling of materials will help conserve natural resources. Please do not therefore dispose of your old electrical and electronic equipment with your regular waste.

## 1. General

This user's guide is meant for the installer and if necessary for the user. It's a reference to operation and installation of the SWH heater.

### 1.1. Description

The SWH is an effective in-direct fired heater. The heat exchanger consist of copper tubes and aluminium fins. This is an approved design for an optimal heat exchange.

The grille has been designed to accomplish an optimal air displacement at the lowest possible sound level.

With a 5-stage switch is it possible to reduce the air output and noise level.

### 1.2. Function

The SWH is essentially a radiator with a fan on the back. When hot water is pumped through the radiator, and the supply air fan is on, the heater will blow hot air. The heater will give no heat when the supply air fan is off, irrespective if there is hot water running through the radiator.

The heater requires a control (thermostat) to operate the supply of hot water and to switch the supply air fan on/off.

There are several options for control, this will be described later in this manual.

For a good air distribution it's always better to choose 2 or more heaters instead of a single heater. For example, it's better to select two 30kW heaters, instead of one 60kW heater.

### 1.3. Matching capacity of hot water boiler and SWH

In case the capacity of the boiler is higher than that of the SWH, the boiler won't be able to release all the heat produced.

This will cause the boiler to go on and off. As a consequence of this the installation won't be able to reach the temperature demanded. For small installations it is advisable to select a SWH which has an higher output than the boiler itself.

### 1.4 Guarantee

Operation and /or installation of appliances not in accordance with this manual will invalidate guarantee.

## 2 Technical

### 2.1 Technical data

The SWH is available in 8 models with capacities from 11.7 to 54.4kW. The range of nine models is subdivided into 3 basic sizes.

See table2, for dimensions

SPECIFICATION GUIDE - SWH Series										
Model		SWH110	SWH115	SWH120	SWH230	SWH235	SWH245	SWH350	SWH365	
Maximum heat output*	kW	11.7	14.7	19.5	22.8	27.7	38.7	48.2	54.4	
Air volume	m <sup>3</sup> /h	1400	2200	1900	2600	3850	3450	6600	8450	
Throw	Horizontal	m	10	14	12	19	22	19	20	25
	Vertical	m	3.5	5	4	6	7	6	7	8
Electrical supply	V	230V 1 Phase N & E - 50Hz								
Rated power	W	79	164	153	175	310	326	450	561	
Electrical current	A	0.3	0.7	0.7	0.8	1.4	1.4	2.0	2.4	
Sound level @ 5m	dB(A)	50	59	58	51	61	60	62	58	
Weight (incl water)	kg	20	20	21	31	31	32	44	61	
Water connection		¾"					1"			
Water coil pressure drop	kPa	2	3	3	3	3	5	4	5	
Minimum suspension height	m	2.5								

\* Based upon water flow and return temperature of 90/70°C and air temperature of 15°C

Table 1 - Technical data

## 2.2 Dimensions

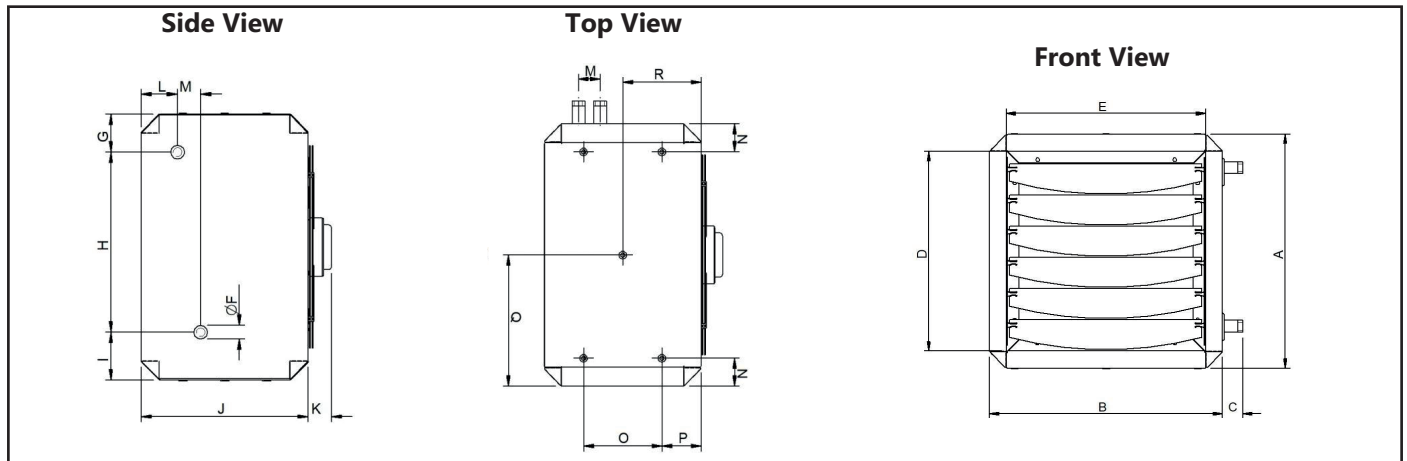


Table 2 DIMENSIONAL DATA - SWH Series

Model	SWH 110	SWH 115	SWH 120	SWH 230	SWH 235	SWH 245	SWH 350	SWH 365
A	510.5			692.5			863.5	
B	509			693			864	
C	46.5		44		34	42		33
D	435.5			585			756	
E	435			585			756	
F	$\frac{3}{4}$ "			1"				
G	91.75		72.75		93.5	82.75		107.25
H	327		346		504.5	515.5		652
I	91.75				94.5	94.25		104.25
J	320			363			357.5	
K	45			83			66.8	
L	70		69		86			93
M	39		44		43.5	45		35
N	54.5			76.5			87	
O	160			160				
P	80			101			78	
Q	254.5			346.5			432	
R	160			181			158	

## 2.3. Operating Parameters

Working pressure: Max. 5 bar

Water temp: Max. 100°C; Min. 4°C (risk of freezing)

Ambient temp: Max. 40°C; Min. 4°C (risk of freezing)

Protection grade: IP54

**NOTE** Frost can cause the internal copper tubes in the coil to burst and subsequently to leak.. This is not covered by warranty.

## 2.4. Pre-check

Before installing the heater, please check the heater supplied is the same as ordered, and ensure it suits the application, supplies available (electrical, water etc.) along with any local or national regulations.

After installation ensure that the appliance is safe and is not a hazard for personnel and cannot cause, or be, damage(d) by the contents within the space i.e moisture, dust, inflammable or corrosive gases, smoke and/or combustible materials.

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

## 3. Installation

### 3.1 Suspension

The SWH is provided with 10 No M10 suspension points on the side panels.

It is recommended that the specially designed cantilever brackets or the ceiling mounting-set are used when mounting the heater.

Ensure that the heater is placed in a stable position, and that there is no tension on the water side connections.

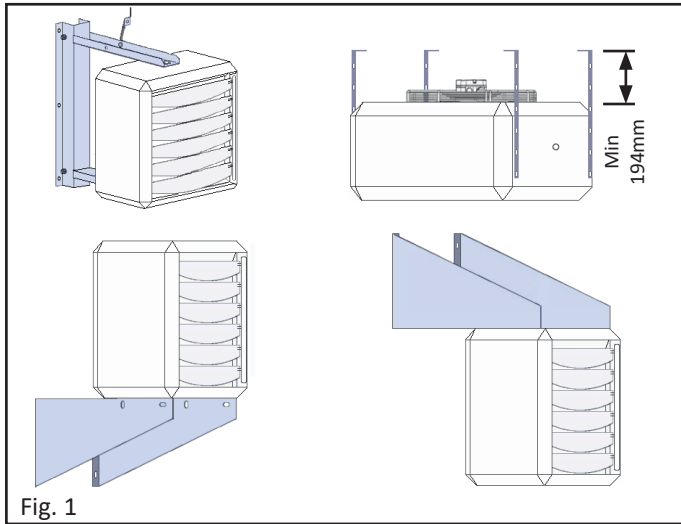
**Wall installation:** The pipe connections for water should always be horizontal, to enable a drain/venting point to be fitted. The heater can be tilted forward slightly, but the heater may **NOT** hang askew.

Place the heater in such a manner that the return

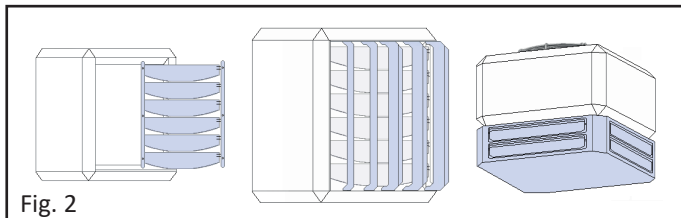
connection (cold water) is at the lowest point. It is important to place the drain/venting point in the pipework near the heater.

**Ceiling installation:** Again the pipe connections to the heater should be horizontal, to enable drain/venting of the internal tubes.

To avoid draughts place the heater high enough (minimum 2.5m). If necessary use our 4-way downflow plenum, use of a plenum will reduce the throw by a factor of 4. See Fig. 1.



The discharge grille, 4-sided discharge plenum and the vertical louvres are easy to adjust to the desired airflow direction.



Make sure that the exchanger is not damaged and that the heater discharge is not blocked, and the supply air fan has no restrictions. Make sure that there's sufficient circulation of air within the space without the airstream being considered a draught.

Heaters fixed to the wall should always blow in the direction of the cooler areas.

**3.2 Water connections**

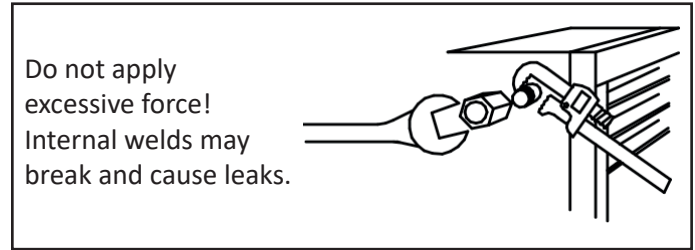
Connections for hot water supply and return (2 x ¾" or 2 x 1") are marked with a red and a blue sticker. Red is water supply and blue is water return.

Do not swap these connections, as this will affect the heat output.

The SWH is not provided with a vent/drain . This should be fitted as part of the pipework installation and should be as close to the heater connections as possible.

Do not over tighten the pipework on the heater connections, this will result in leaks!

**WARNING!** To prevent damage to the heater, hold the water connections with a wrench to avoid twisting the welded parts of the connections.



**4. Electrical connection**

**4.1 230Vac supply**

The installation must comply with all applicable local and/or national standards.

There should be a suitable mains electrical isolator with a main fuse.

There is an electrical diagram further on in this guide. The supply is 230Vac (50 Hz) with earth.

**Isolation switch or power plug**

The heater must be equipped with a 230V isolation switch or power plug. This switch should disconnect live and neutral (not earth) and have a minimum 3mm contact opening. Switches or power plugs must be accessible at all times.

**4.2 General functioning of the unit**

The SWH is simply described as a radiator with a fan at the rear. If there is hot water flowing through the radiator, and the heater is on, the heater will blow warm air. But when hot water is flowing through the radiator and the heater is off, the heater will not discharge warm air.

If the fan is turned on, but the water supply is cold, then ambient air will leave the heater, possibly causing draughts. This should be prevented.

The installation should have some form of control to make turning on/off the hot water boiler and the fan of the SWH separately, possible. The SWH and the boiler are 2 separate systems. Both systems need to be controlled.

There are several ways to do this. This is dependant upon the application and needs of the user.

**4.3 Connecting options**

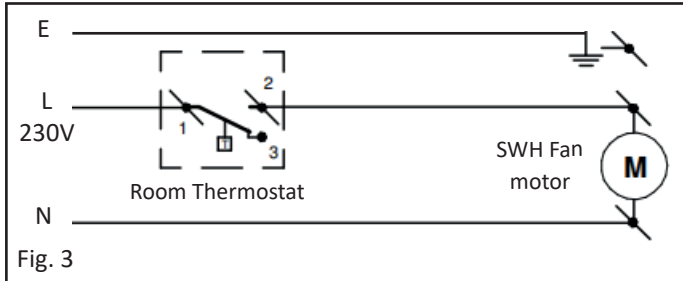
**4.3.1 Connection with only a room thermostat**

This option is only possible when there is a continuous hot water supply. The hot water boiler should have its own control.

**Operation:**

The on/off room thermostat will operate the fan of the SWH when there is a demand for heat. The fan will blow air over the heat exchanger, if the water is hot the heater will discharge warm air. If the water is cold the heater will blow ambient air, this can be experienced as a draught. See Fig. 3.

The boiler must be switched on/off separately. Therefore a second room thermostat is required. See Fig. 4.



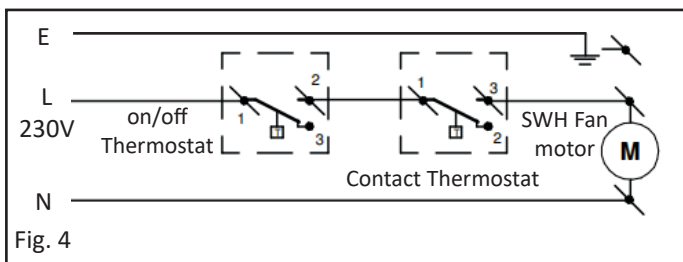
**4.3.2 Connection with room thermostat combined with contact thermostat**

This option is applicable when the boiler is controlled by its own thermostat and there is a continuous hot water supply.

**Operation:**

The on/off thermostat will operate when there is a demand for heat. The contact thermostat will not close until the water has reached a pre-set temperature. In this scenario, the fan of the SWH will blow warm air and will prevent draughts. See Fig. 4.

The boiler must be turned on and off separately.



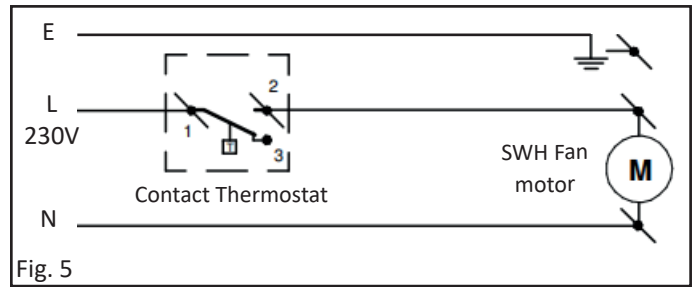
**4.3.3 Connection with contact thermostat**

This option is applied if the thermostat of the boiler is in the same room as the SWH.

**Operation:**

The contact thermostat will close if the water has reached the pre-set temperature. In this scenario the SWH will only discharge warm air. The boiler thermostat will switch on the boiler. The boiler will pump hot water around the system with the contact thermostat of the SWH closing if the water is hot enough. The fan will blow warm air into the space. See Fig. 5.

If the boiler is shut off by the boiler thermostat, the water will cool down and the contact thermostat will open (disconnect) causing the SWH fan to stop.

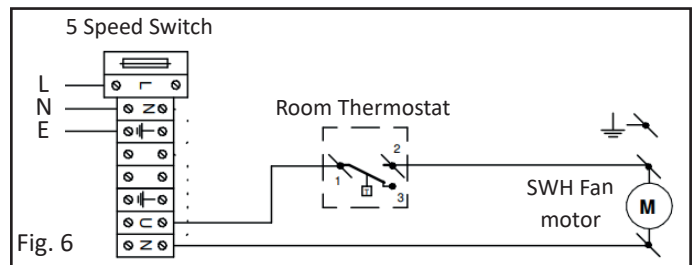


**4.3.4 Combinations with a 5 speed switch**

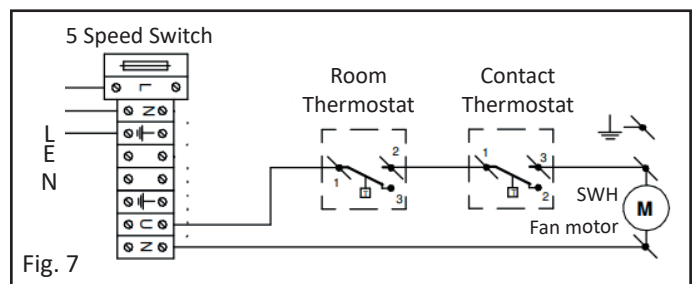
To reduce the noise level of the SWH, it is possible to install an optional 5 speed switch. This switch will regulate the fan speed of the SWH.

Please note that if the fan speed is lower, the heat discharge of the heater will be lower as well. This guide contains tables (at the back) displaying heat discharges at various fan speeds.

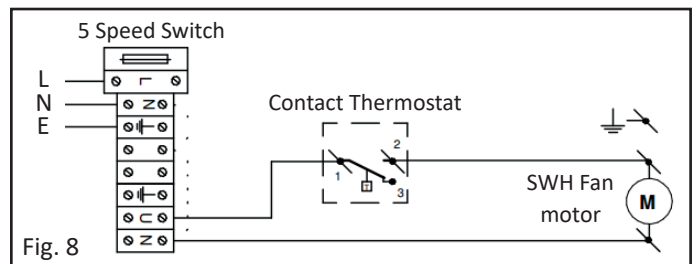
**5 Speed switch with a room thermostat (Fig. 6)**



**5 Speed switch in combination with a room thermostat and contact thermostat (Fig. 7)**



**5 Speed switch with contact thermostat (Fig. 8)**



**4.4 Connection with zone valve**

The zone valve is applied to the SWH when one boiler is to heat several rooms, separately. In this scenario the zone-valve will control the hot water boiler and hot water supply to the SWH. Operation can be summarized as follows:

- Heat demand is created through the room thermostat.
- Room thermostat switches 230V and powers the zone-valve, this will switch the boiler on.
- Boiler operates and hot water is produced.
- Contact Thermostat measures water temperature. If water temperature is higher than the temperature set, Contact thermostat will supply power to the SWH. The fan will operate. If an optional 5 speed switch has been fitted, the current will first be transformed to the voltage desired, the fan will run faster/ slower.
- If temperature requested has been reached, the room thermostat will open and break power supply to the zone-valve; the boiler will be shut off eventually.
- Contact thermostat measures a water temperature that is lower than the temperature set and will open the contact. The fan will stop! (see Fig. 9).

## 5. Maintenance and operation

**Caution!** Make sure that you have turned off the power supply to the heater you are working on. The heater must be earthed.

### 5.1 Maintenance

Especially in dusty spaces, it is important to clean the heater regularly. If the heat exchanger is heavily covered by dust, it will not displace the heat sufficiently. Use a vacuum cleaner or compressed air taking care to avoid-damaging the heat exchanger fins. Clean also the fan, guard and air outlet grille.

### 5.2 Safe operation

The heater is controlled by the room thermostat and/or the 5 speed switch if there is one present. There are no controls on the heater itself.

Depending on the installation, the user can make following settings:

- Control main or isolation switch
- Turn up and down room thermostat
- Turn up and down contact thermostat
- Change fan speed with 5-stage switch

Adjusting direction of the air outlets is not normally a user action, this is done by the installer.

### 5.3 Frost damage

**ATTENTION!** Frost damage!

Do not set the room thermostat lower than 5°C. Freezing of the exchanger or the tubes, will cause irreparable damage to the heater. A constant supply of hot water from the boiler must be ensured. Frost damage will void warranty claims!

## 6. Water temperatures/ air volumes

The technical data table (table 1) shows heater capacities (KW) with supplied hot water temperature of 90/70°C.

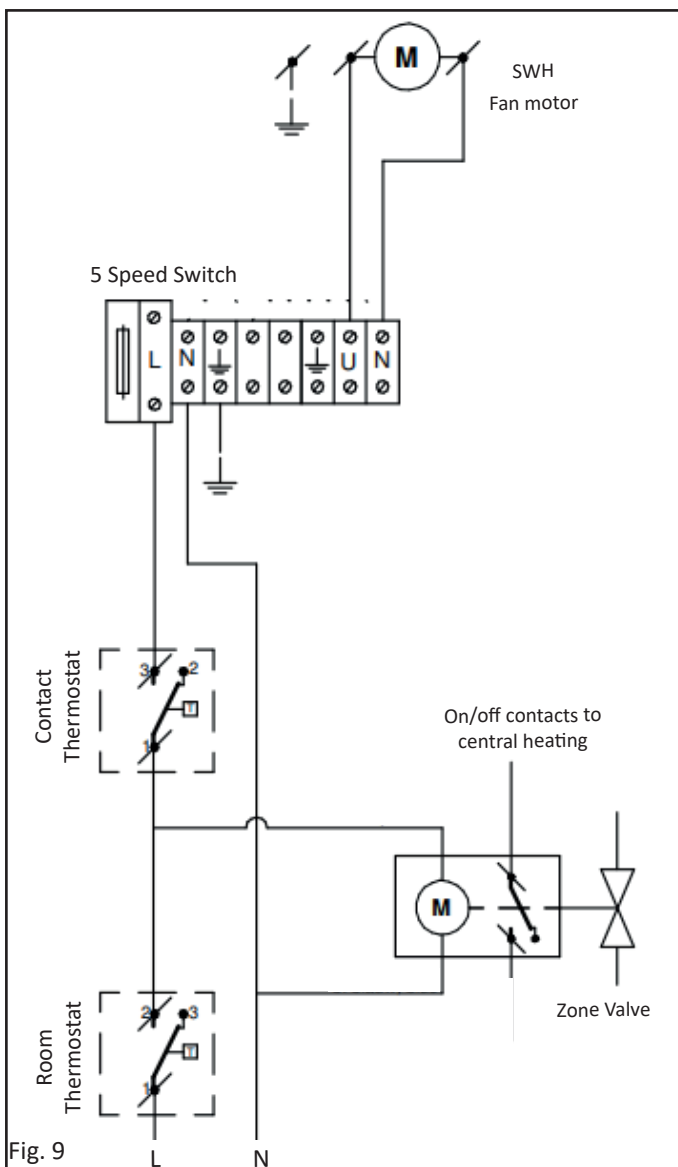
### 6.1 Other water temperatures

In applications where the water flow and return temperatures are not 90/70°C, the heat output from the SWH will be reduced.

To calculate the heat output at different water temperatures, please refer to table 3. Select the water temperature along with the air temperature at the fan inlet.

Where these intersect on the table, this figure is multiplied by the given heat output in table 2, the resultant figure is the new heat output of the appliance at the new flow and return water temperatures.

The SWH is not suitable for steam applications.



Water Temperature	Air Temperature					
	0°C	5°C	10°C	15°C	18°C	20°C
90/70°C	1.30	1.19	1.10	1.00	0.94	0.91
80/60°C	1.11	1.01	0.91	0.82	0.76	0.73
70/50°C	0.92	0.82	0.73	0.64	0.56	0.55
60/40°C	0.73	0.64	0.54	0.45	0.40	0.37
50/30°C	0.54	0.45	0.37	0.27	0.22	0.18

Table 3

## 6.2 Example

What is the capacity of a SWH235 at a water temperature of 80/60°C degrees in a room with an ambient temperature of 10°C?

Table 1 in section 2, shows the capacity of the SWH235 at 90/70°C and 15°C ambient room temperature. This is 27.7 kW.

SPECIFICATION GUIDE - SWH Series										
Model		SWH110	SWH115	SWH120	SWH230	SWH235	SWH245	SWH350	SWH365	
Maximum heat output*	kW	11.7	14.7	19.5	22.8	27.7	38.7	48.2	54.4	
Air volume	m <sup>3</sup> /h	1400	2200	1900	2600	3850	3450	6600	8450	
Throw	Horizontal m	10	14	12	19	22	19	20	25	
	Vertical m	3.5	5	4	6	7	6	7	8	
Electrical supply	V	230V 1 Phase N & E - 50Hz								
Rated power	W	79	164	153	175	310	326	450	561	
Electrical current	A	0.3	0.7	0.7	0.8	1.4	1.4	2.0	2.4	
Sound level @ 5m	dB(A)	50	59	58	51	61	60	62	58	
Weight (incl water)	kg	20	20	21	31	31	32	44	61	
Water connection		¾"					1"			
Water coil pressure drop	kPa	2	3	3	3	3	5	4	5	
Minimum suspension height	m	2.5								

With a water temperature of 80/60°C and 10°C ambient room temperature, the conversion factor is, according to table 3 above.

Water Temperature	Air Temperature					
	0°C	5°C	10°C	15°C	18°C	20°C
90/70°C	1.30	1.19	1.10	1.00	0.94	0.91
80/60°C	1.11	1.01	0.91	0.82	0.76	0.73
70/50°C	0.92	0.82	0.73	0.64	0.56	0.55
60/40°C	0.73	0.64	0.54	0.45	0.40	0.37
50/30°C	0.54	0.45	0.37	0.27	0.22	0.18

So the heat output output will be 0.91 x 27.7 kW = 25.2 kW





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