

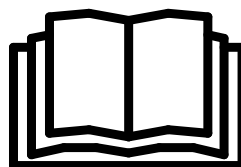


INSTRUCTION MANUAL

UNIT AIR HEATER

TYPE WWH

EN 402I



THIS DOCUMENTATION MUST ABSOLUTELY BE READ BEFORE STARTING THE INSTALLATION.
INSTRUCT USER AND LEAVE THIS DOCUMENT WITH HEATER FOR REFERENCE.

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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 WWH heater.

1.1. Description

The WWH 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 grill 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 WWH is in fact a radiator with a fan on the back. When hot water is pumped through the radiator, and the fan is on, the heater will blow hot air. The heater will give no heat when the fan is off, no matter there is hot water running through the radiator.

The heater requires a control (thermostat) to arrange the supply of hot water and to switch the fan on/off. There are several options for control, this will be described later in this manual.

For a better air distribution it's always better to choose 2 or more heaters instead of 1 heater. For example, it's better to select two 30kW heaters, instead of one 60kW heater.

1.3. Matching capacity hot water boiler and WWH

In case the capacity of the boiler is higher than that of the WWH, the boiler won't be able to release all the heat produced. This will cause the boiler to go on and off (commute). 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 WWH which has an higher output than the boiler itself.

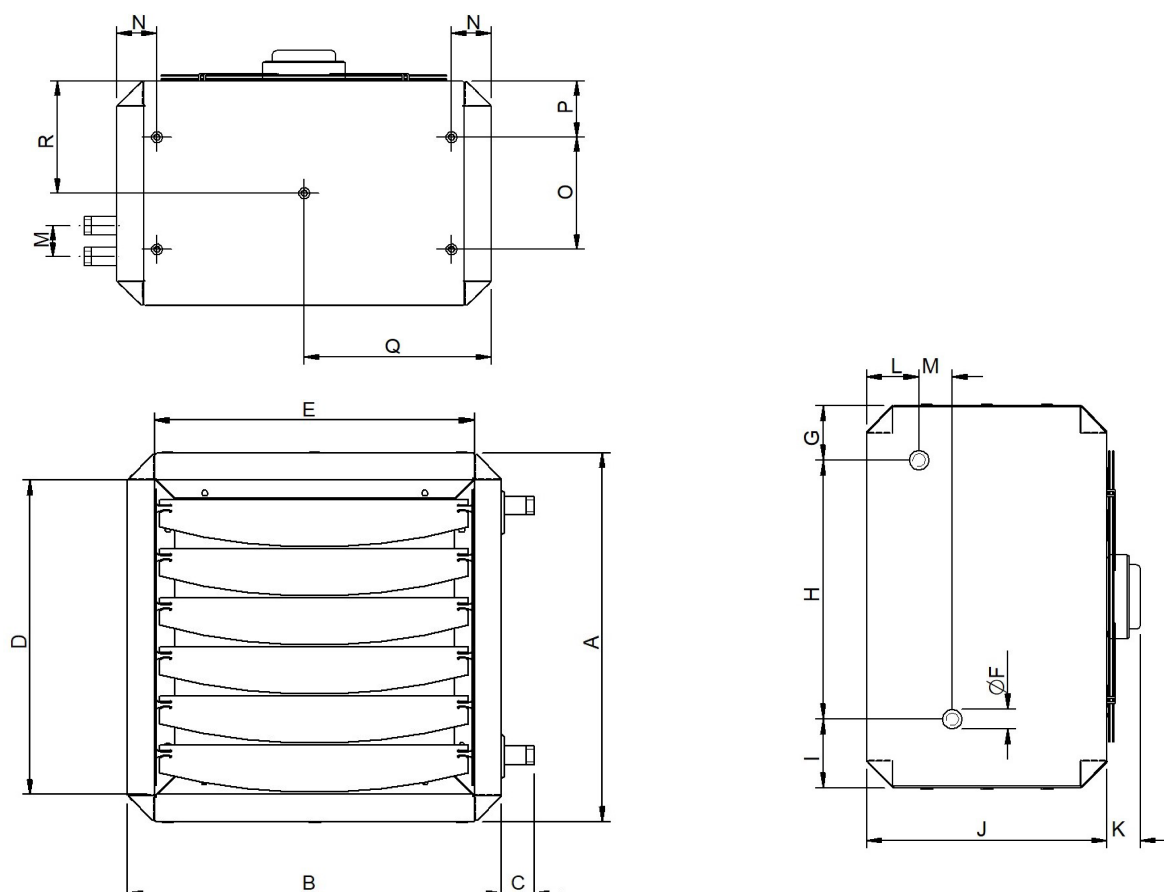
1.4. Warranty

Operation and /or installation of appliances not according to this manual can imply invalidation of the warranty.

2. Technical

2.1 Table with data

The WWH is available in 8 models with capacities that differ from 10 to 80 kW. The range of 10-80 kW heaters is subdivided in 3 basic sizes. The type number of the appliance starts with the housing model (1,2 and 3). See table below for exact measurements.



Type	110	115	120	230	235	245	350	365	380
Modeltype	1	1	1	2	2	2	3	3	3
A	510,5	510,5	510,5	692,5	692,5	692,5	863,5	863,5	863,5
B	509	509	509	693	693	693	864	864	864
C	46,5	46,5	44	34	34	42	33	33	34
D	435,5	435,5	435,5	585	585	585	756	756	756
E	435	435	435	585	585	585	756	756	756
F	3/4"	3/4"	3/4"	3/4"	3/4"	1"	1"	1"	1"
G	91,75	91,75	72,75	93,5	93,5	82,75	107,25	107,25	93,75
H	327	327	346	504,5	504,5	515,5	652	652	666,5
I	91,75	91,75	91,75	94,5	94,5	94,25	104,25	104,25	103,25
J	320	320	320	363	363	363	357,5	357,5	357,5
K	45	45	45	83	83	83	66,8	66,8	66,8
L	70	70	69	86	86	86	93	93	86,5
M	39	39	44	43,5	43,5	45	35	35	45,5
N	54,5	54,5	54,5	76,5	76,5	76,5	87	87	87
O	160	160	160	160	160	160	160	160	160
P	80	80	80	101	101	101	78	78	78
Q	254,5	254,5	254,5	346,5	346,5	346,5	432	432	432
R	160	160	160	181	181	181	158	158	158

Type	Unit	110	115	120	230	235	245	350	365	380
Heating capacity (90/70)	kW	11.4	14.9	17.6	25.2	32.2	42.7	47.0	59.3	72.1
Air output	m ³ /hr	1200	1900	1500	2800	4300	3800	5400	8200	6300
Throw horizontal	m	10	14	12	19	22	19	20	25	21
Throw vertical	m	3,5	5	4	6	7	6	7	8	7
Electrical supply	V	230	230	230	230	230	230	230	230	230
Consumed current (max)	A	0.75	0.75	0.75	1.50	1.50	1.50	3.0	2.6	2.6
Power consumption	W	165	165	165	350	350	350	680	600	600
Weight (incl. water)	kg	20	20	21	31	31	32	44	61	65
Water connection (ext.)	G	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1	1	1	1
Water sided pressure loss	kPa	2	3	3	3	3	5	4	5	9
Recommended suspension height	m	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Noise level (5 m. in front of heater)	dB(A)	50	59	58	52	57	56	58	58	58

2.2. User's restrictions

Work pressure:	Max.	5 bar
Water temperature:	Max.	100°C
	Min.	4°C (freezing danger!)
Environment temperature:	Max.	40°C
	Min.	4°C (freezing danger!)
Protection grade:	IP54	

Note: Frost can cause the internal copper tubes in the exchanger to burst, the exchanger will leak. No warranty on this.

2.3. Pre-check

Before installing the heater, please check if the heater is in accordance with the order, and whether it suites the local and present provisions (electrical supply etc.). The heater also has to meet local and national legislations.

After installation ensure that the appliance is no hazard for persons or can cause damage in terms of 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 WWH is provided with 8 M10 suspension points on the side panels.

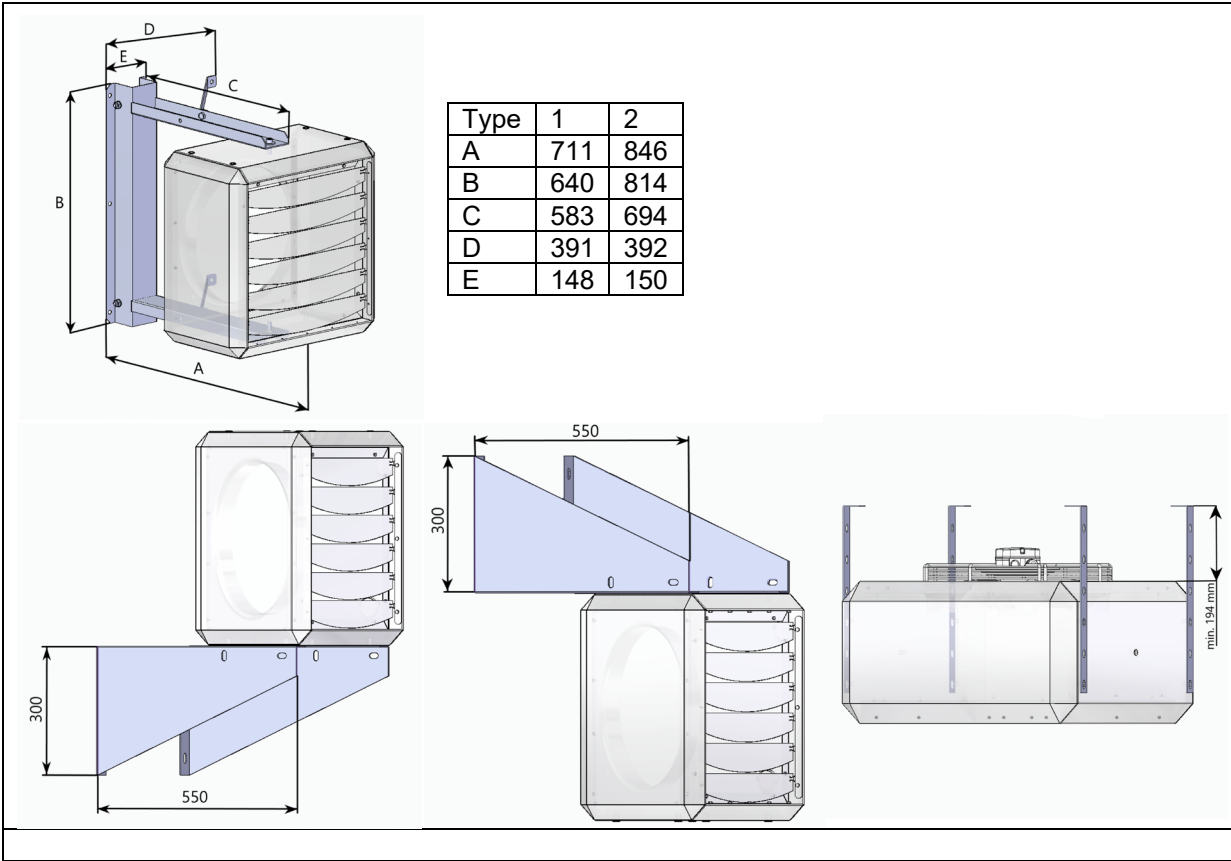
Use preferably the specially designed cantilever brackets or the ceiling mounting-set.

Take care that the heater is placed stable and that there is no tension on the water sided connections.

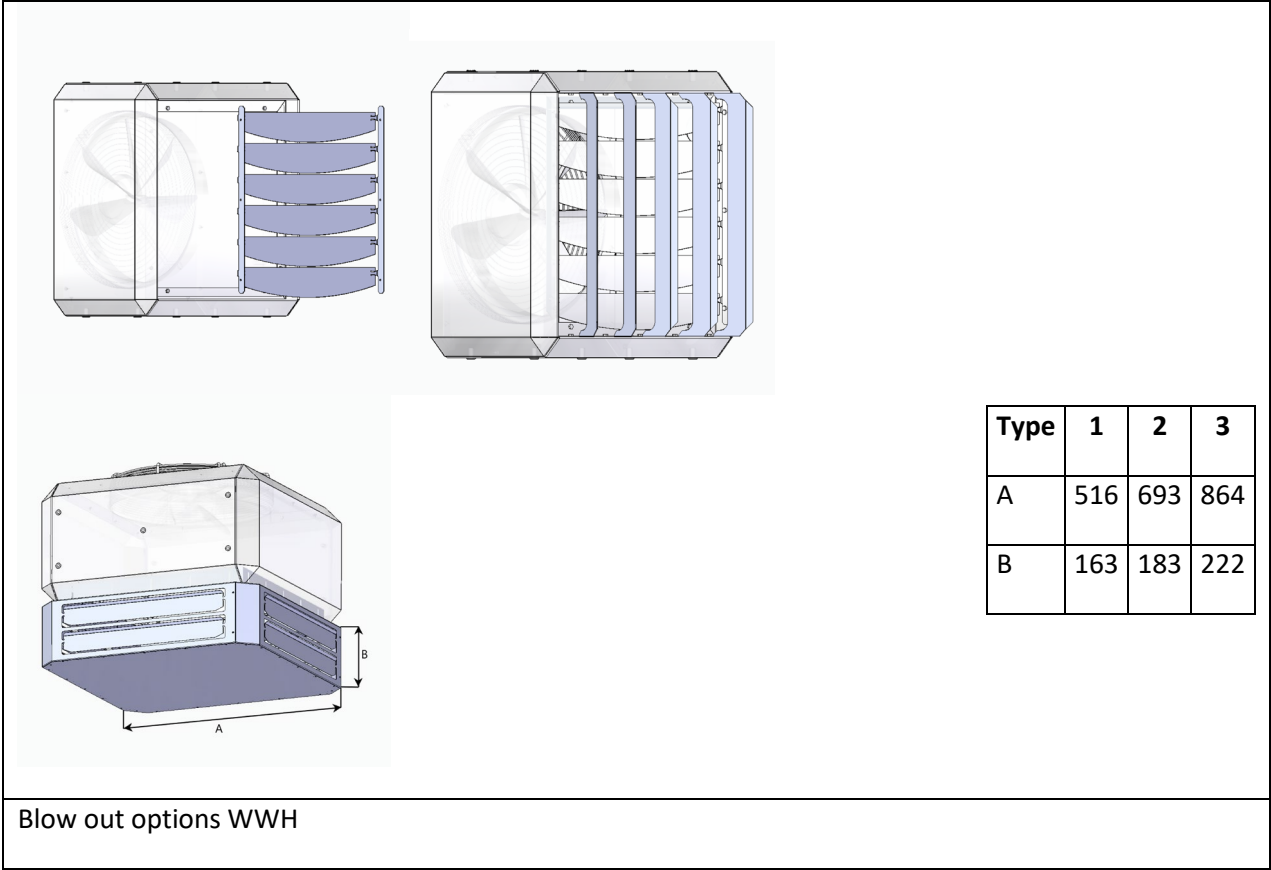
Wall setup: The pipe connections for water should always be **horizontal**, with a view to venting of the internal pipes. The heater can be turned over slightly, but the heater may absolutely not hang askew. Place the heater in such manner that, the return connection (cold water) is at the lowest point. It's important to place the venting in the duct near the heater.

Ceiling setup: Again the pipe connections to the heater should be horizontal, to enable venting of the internal tubes. To avoid draught place the heater high enough (minimum 2,5m). If necessary use our outlet cone or the 4-way down flow plenum. Application of a plenum will decrease the throw with factor 4.

Fig. 3



3.2 Blow-out options



The outlet grill can easily be taken off, turned around and replaced, to direct the discharge in any desirable direction.

Attention: When replacing the grill, always use the same screws (or screws of same length). A longer screw could pierce the exchanger!

See to it that the discharge is not blocked and that the heater has a free suck. Make sure that there's sufficient circulation of air in the room (enough ventilation) without the airstream being considered as draft. Heaters suspended to the wall should always blow in direction of the cold regions.

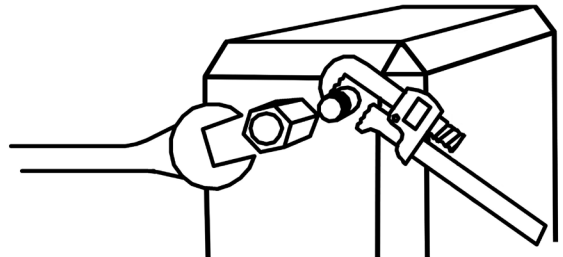
3.3 Water connections

Connections for hot water supply and return (two times $\frac{3}{4}$ inch or two times 1 inch) are marked with a red and a blue sticker. Red is water supply and blue is water return. Do not twist these connections, the heater will not give the desired output.

The WWH is not provided with a standard venting. There is the possibility to place one when it is desired.

Prevent mechanical tension on the connections, this will cause leakage.

Warning: Prevent damage to the heater, hold the connections with pliers to avoid twisting of welded parts of the connections. Do not put excessive force! Internal welds may break and cause leakage.



4. Electrical connection

4.1 230Vac supply

The installation must comply with all applicable local and/or national standards i.e. NEN 1010. There should be a suitable electrical group 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 has to be equipped with a 230 Volt isolation switch or power plug. This switch should disconnect phase and neutral (not earth) and have a 3mm contact opening at least. Switches or power plugs must be accessible at all times.

4.2 General functioning of the unit

The WWH is simply described as a radiator with a ventilator at the back. If there is hot water flowing through the radiator, and the heater is on, the heater will blow hot air. But when hot water is flowing through the radiator and the heater is off, the heater will not discharge hot air. If the fan is turned on, but the boiler water is cold, there could be a draught. This must be prevented.

The installation should have some kind of control to make turning on/off the hot water boiler and the fan of the WWH separately, possible. The WWH and the boiler are 2 separate systems. Both systems need to be controlled. There are several ways to do this. It depends on the situation and needs of the user, what combination of controls will work best.

4.3 Connecting options

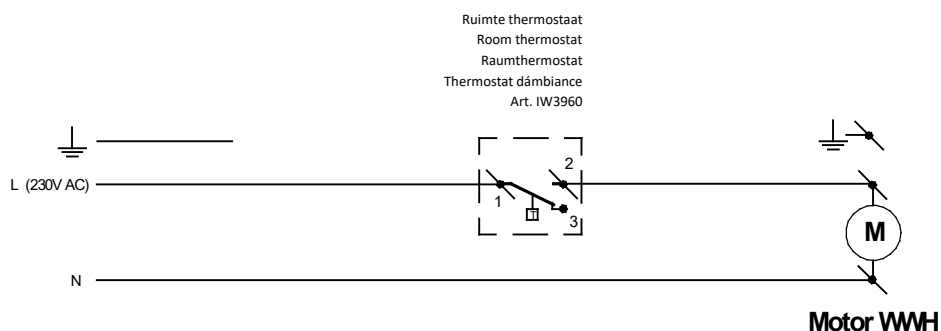
4.3.1 Connection with only a room thermostat

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

Operation:

The on/off room thermostat will switch on the fan of the WWH when there is heat demand. The fan will blow air over the heat exchanger. If the water is hot, the heater will discharge hot air. If the water is cold the heater will blow cold air, this can be experienced as draught.

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



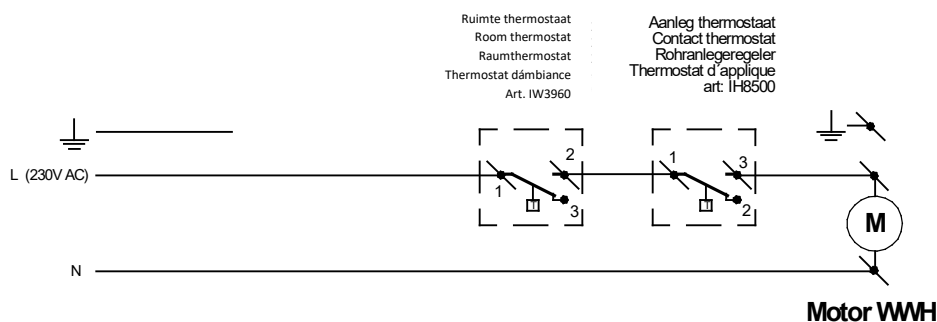
4.3.2 Connection with room thermostat combined with contact thermostat

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

Operation:

The on/off thermostat will switch when there is heat demand. The contact thermostat will not close (connect) before the water has reached the pre-set temperature. In this situation, the fan of the WWH will transport hot air. This will prevent draught.

The boiler must be turned on and off separately.



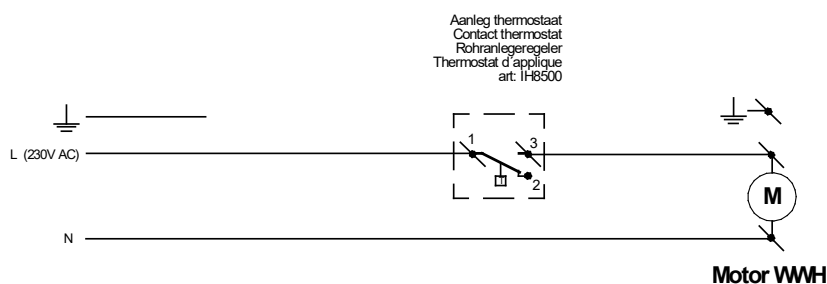
4.3.3 Connection with contact thermostat

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

Operation:

The contact thermostat will close if the water has reached the pre-set temperature. In this situation the WWH will only discharge hot air.

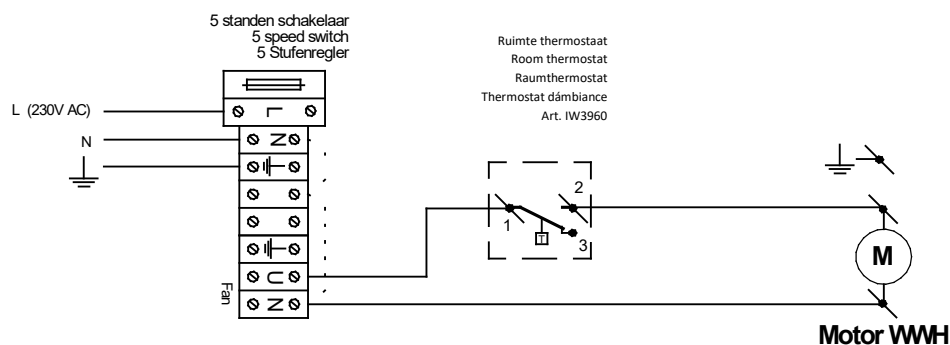
The boiler thermostat will switch on the boiler. The boiler will pump hot water around. The contact thermostat of the WWH will close if the water is hot enough. The fan will blow hot air into the room. If the boiler is shut off by the boiler thermostat, the water will cool down and the contact thermostat will open (disconnect) and will cause the WWH to stop blowing.



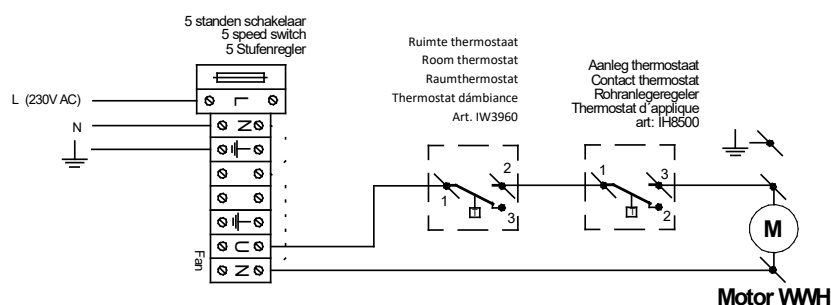
4.3.4 Combinations with a 5-step switch

To reduce the noise level of the WWH, it's possible to install an optional 5-step switch. This switch will regulate the fan speed of the WWH. Please note that if the fan speed is lower, the heat discharge of the heater will be lower as well. This guide contains tables (in the back) displaying heat discharges at various fan speeds.

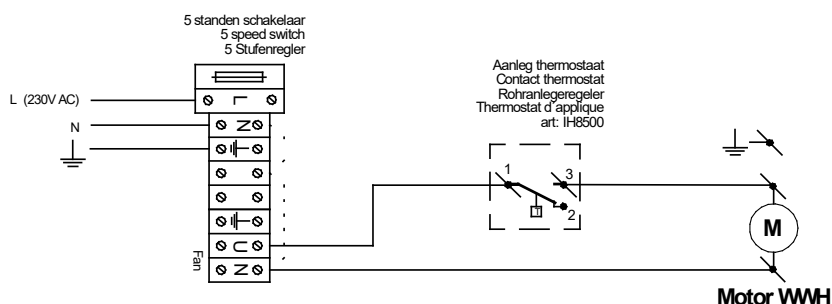
5-step switch with a room thermostat



5-step switch in combination with a room thermostat and contact thermostat



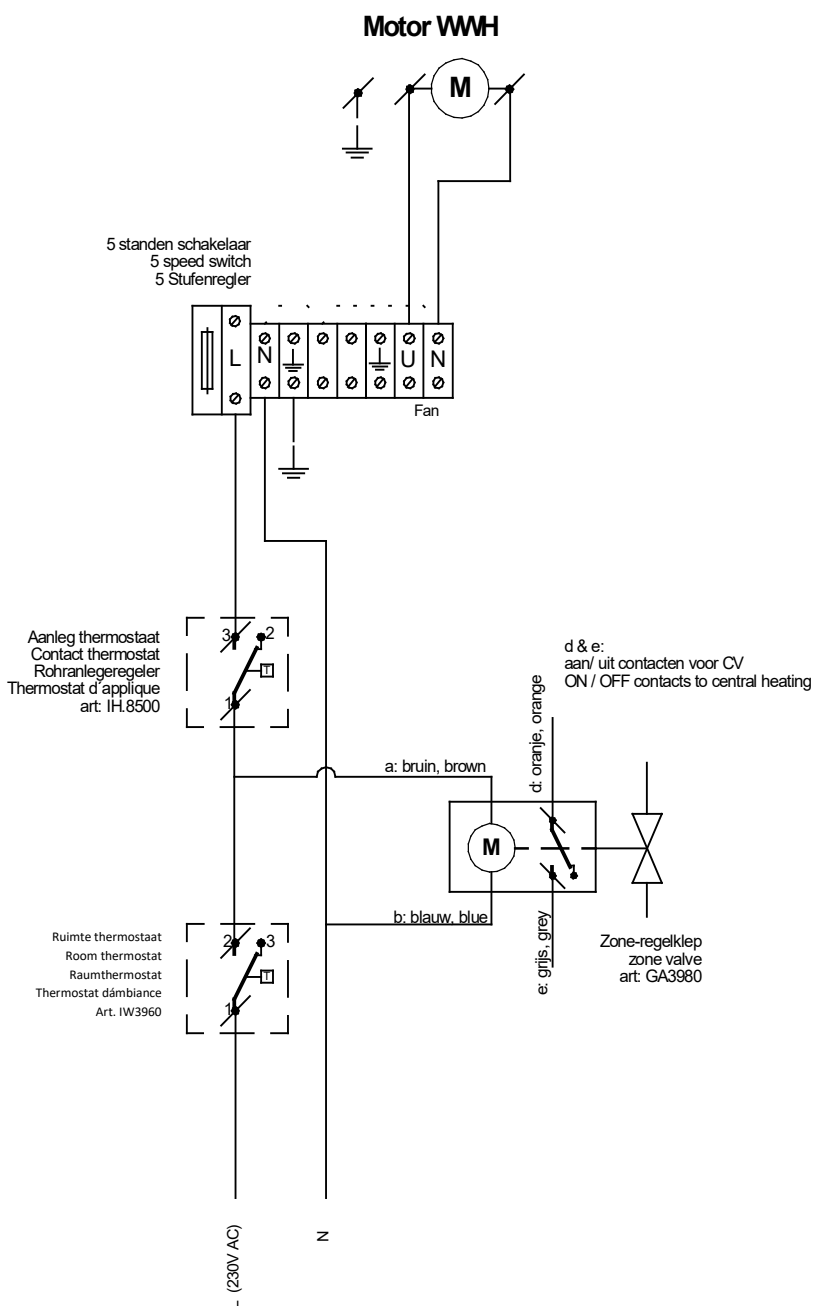
5-step switch with contact thermostat



4.4 Connection with zone valve

The zone valve is applied on the WWH when one boiler has to heat several rooms separately. In this situation the zone-valve will control the hot water boiler and hot water supply to the WWH. Operation in short can be summarized as follows:

- Heat demand is created through the room thermostat. RT switches 230Volt and powers the zone-valve, this will switch the boiler on.
 - Boiler makes hot water.
 - Contact Thermostat measures water temperature. If water temperature is higher than the temperature set, CT will supply power to the WWH. The fan will blow. If an optional 5-stage switch has been applied, the current will first be transformed to the voltage desired, the fan will turn faster/slower.
 - If temperature requested has been reached, the RT will open the contact and cut off power supply to the zone-valve; the boiler will be shut off eventually.
 - CT measures a water temperature that is lower than the temperature set and will open the contact. The fan will stop!
- The diagram shows a schematic for the 'Motor WWH'. It features a circle labeled 'M' representing the motor. To the left of the motor is a switch symbol (two diagonal lines meeting at a point). Below the switch is a ground symbol (three horizontal lines of decreasing width). To the right of the motor is another switch symbol. Below this switch is a vertical line representing a power supply or return line.



5. Maintenance and operation

Caution:

Make sure that you have turned off the power group that you are working on. The heater must be earthed.

5.1 Maintenance

Especially in dusty spaces, it's important to clean the heater regularly. If the heat exchanger is heavily covered by dust-traps it will not displace the heat sufficiently. Use a vacuum cleaner or compressed air. Avoid damage to the fins. Clean also the fan and the fan grill.

5.2 Safe operation

The heater is controlled by the room thermostat and/or the 5-stage switch if there is one connected to it. 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 outlet is normally no user's 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 irrevocable damage to the installation. A constant supply of hot water from the boiler must be ensured. Frost damage will exclude warranty claims!

6. Water temperatures / air volumes

The conversion diagram shows heater capacities in KW under different conditions. These conditions may be:

- Water temperature, for example 90/70°C (Regime)
- Air temperature sucked by the fan (Air temp)

6.1 WWH capacity at various water temperatures

Watertemperature	Airtemperture					
	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

6.2 Example

What is the capacity of a WWH 235 at a water temperature of 80/60 degrees in a room where it is 10 degrees? The table in section 2.1 shows the capacity of the WWH 235 at 90/70 degrees and a room temperature of 15 degrees. This is 27.7 kW.

Type		110	115	120	230	235	245	350	365	380
Heating capacity (90/70)	kW	11.7	14.7	19.5	22.8	27.7	38.7	48.2	54.4	76.8
Air displacement	m³/hr	1400	2200	1900	2600	3850	3450	6600	8450	7600
Throw horizontally	m	10	14	12	19	22	19	20	25	21
Throw vertically	m	3.5	5	4	6	7	6	7	8	7
Connection voltage	V	230	230	230	230	230	230	230	230	230
Current	A	0.75	0.75	0.75	1.5	1.5	1.5	3.0	2.4	2.5
Power	W	165	165	165	350	350	350	680	561	563
Weight (incl. water)	kg	20	20	21	31	31	32	44	61	65
Water connection	G	¾	¾	¾	¾	¾	1	1	1	1
Water pressure drop	kPa	2	3	3	3	3	5	4	5	9
Minimum height	m	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Noise level (5m)	dB(A)	50	59	58	51	61	60	62	58	56

At a regime of 80/60 degrees and an ambient temperature of 10 degrees. the conversion factor according to the above table in section 6.1 is: 0.91.

	Air temperature					
Water 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

The net power will therefore become $0.91 \times 27.7 \text{ kW} = 25.2 \text{ kW}$.

7. DISPOSAL & RECYCLING

Waste processing

The symbol on the material, accessories or packaging indicates that this product may not be treated as household waste. Dispose of the device via the collection point for the recycling of waste electrical and electronic equipment within the EU and in other European countries that have separate collection systems for used electrical and electronic equipment. By disposing of the device correctly, you will help prevent potential environmental and human health hazards that could otherwise be caused by mishandling the waste device. Recycling materials contributes to the conservation of natural resources. Therefore, do not dispose of your old electrical and electronic equipment with household waste.

