

INSTRUCTION MANUAL

UNIT AIR HEATER

TYPE WWH

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

Content

- 1 GENERAL**
 - 1.1 Description
 - 1.2 Function
 - 1.3 Matching capacity boiler and WWH
 - 1.4 Guarantee
- 2 TECHNICAL FEATURES**
 - 2.1 Table with data
 - 2.2 User's restrictions
 - 2.3 Pre-check
- 3 INSTALLATION**
 - 3.1 Suspension
 - 3.2 Water connections
- 4 ELECTRICAL CONNECTION**
 - 4.1 230Vac supply
 - 4.2 General functioning of the unit
 - 4.3 Connecting options
 - 4.4 Control with zone valve
- 5 MAINTENANCE AND OPERATION**
 - 5.1 Maintenance
 - 5.2 Safe operation
 - 5.3 Frost damage
- 6 WATER TEMPERATURE/ AIR VOLUMES**
 - 6.1 Example
 - 6.2 Conversion table WWH-110
 - 6.3 Conversion table WWH-115
 - 6.4 Conversion table WWH-120
 - 6.5 Conversion table WWH-230
 - 6.6 Conversion table WWH-235
 - 6.7 Conversion table WWH-245
 - 6.8 Conversion table WWH-350
 - 6.9 Conversion table WWH-365
 - 6.10 Conversion table WWH-380

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.

1.1 Guarantee

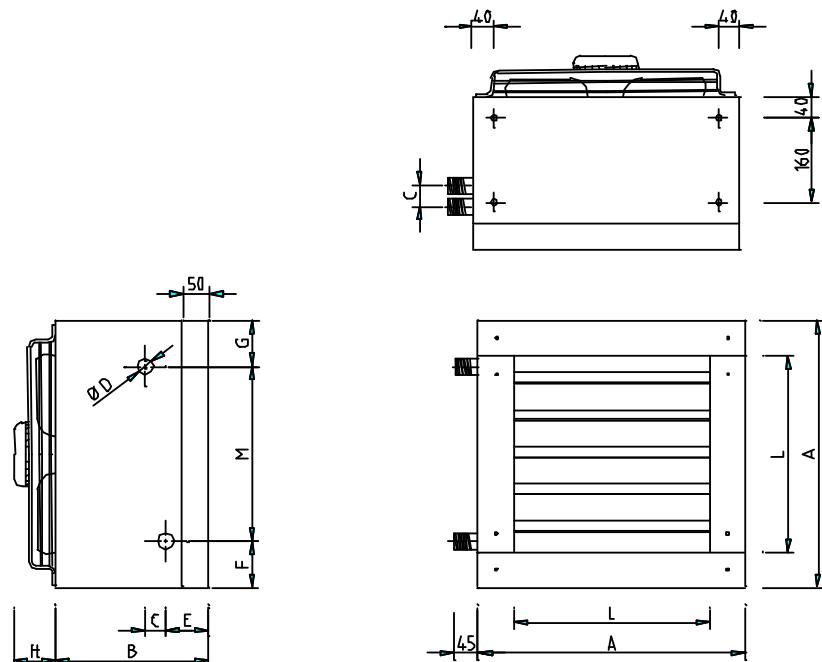
Operation and /or installation of appliances not according to this manual can imply invalidation of guarantee.

2 Technical features

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.

[Geef tekst op]



Type	110	115	120	230	235	245	350	365	380
Model size	1	1	1	2	2	2	3	3	3
A	505	505	505	679	679	679	834	834	834
B	290	290	290	290	290	290	340	340	340
C	40	40	43	40	40	43	40	40	43
D	¾"	¾"	¾"	¾"	¾"	1"	1"	1"	1"
E	81	81	79,5	81	81	79,5	81	81	79,5
F	87,5	87,5	75	87	87	74,5	89,5	89,5	77
G	87,5	87,5	87,5	87	87	87	89,5	89,5	89,5
H	90	90	90	135	135	135	190	190	190
L	375	375	375	535	535	535	690	690	690
M	330	330	342,5	505	505	517,5	655	655	667,5

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	59,3	72,1
Air output	m³/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	0,6	1,2	1,2	0,8	1,7	1,7	2,4	3,2	3,2
Power consumption	W	110	170	170	165	365	365	540	730	730
Weight (incl. water)	kg	20	20	21	31	31	32	44	61	65
Water connection (ext.)	G	¾"	¾"	¾"	¾"	¾"	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	61	62

2.2. User's restrictions

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

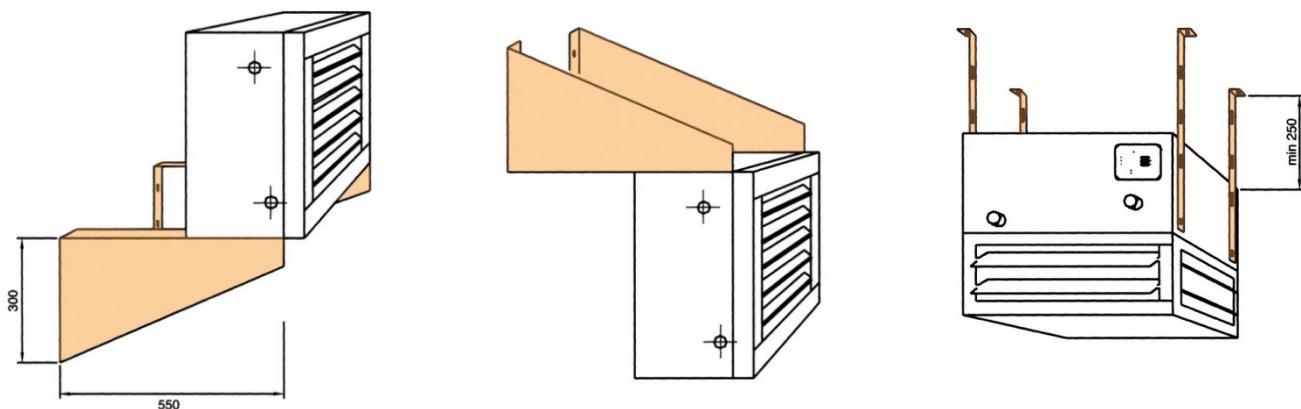
Use preferably the specially designed cantilever brackets or the ceiling mounting-set.

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.

Fig. 3

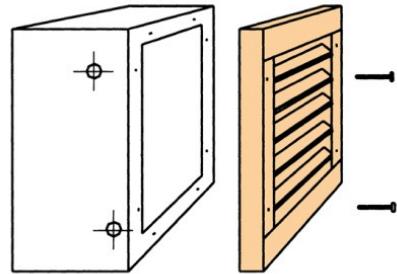


[Geef tekst op]

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.



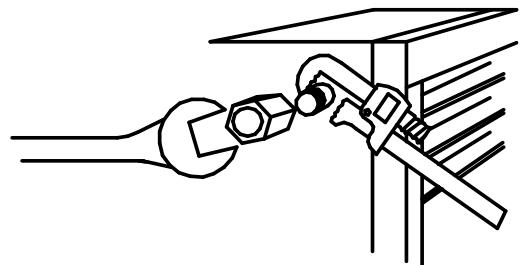
3.2 Water connections

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

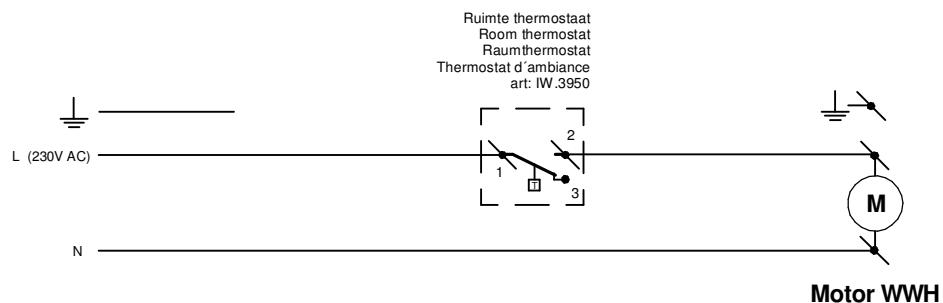
4.3.1 Connection with only a room thermostat

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.



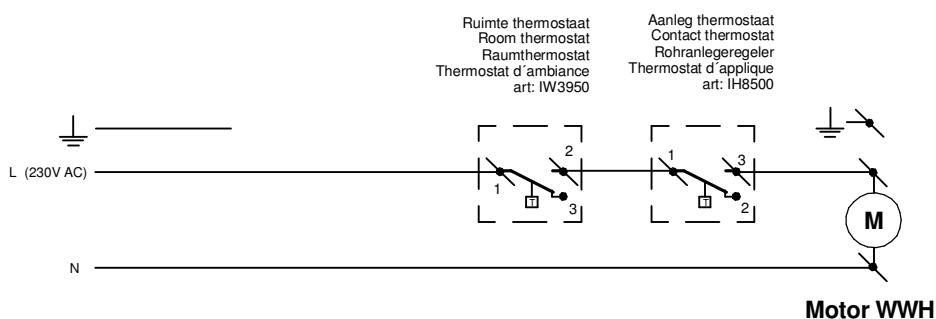
4.3.2 Connection with room thermostat combined with contact thermostat

This option is applied when the boiler is controlled by its own thermostat and there is a continuous 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.



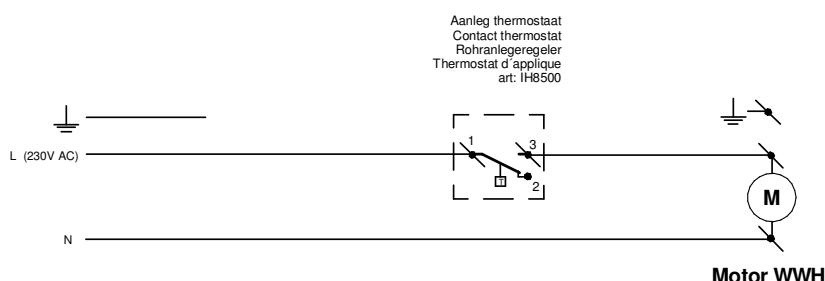
4.3.3 Connection with contact thermostat

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.

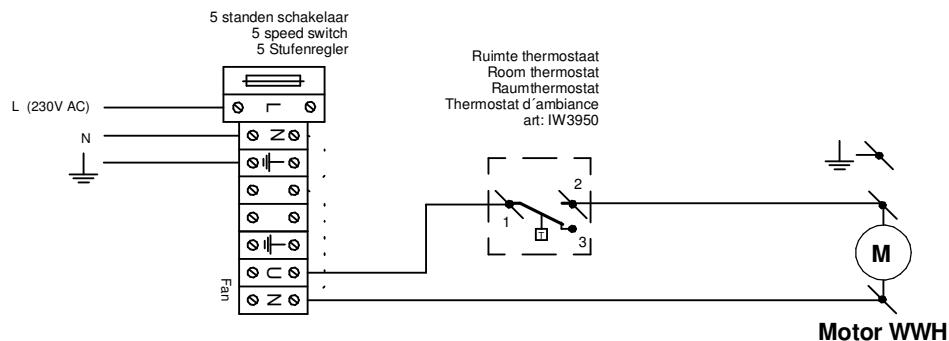


[Geef tekst op]

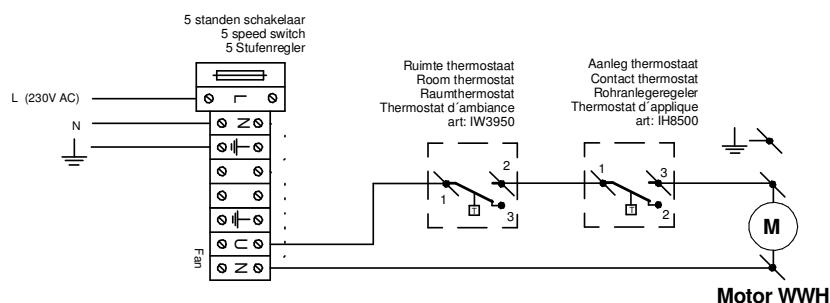
4.3.4 Combinations with a 5-step switch

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.

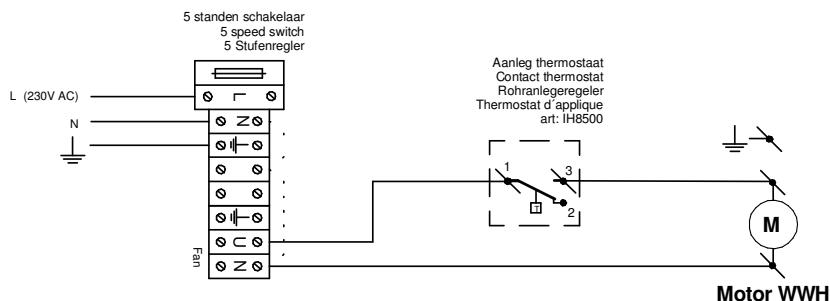
5-step switch with a room thermostat



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



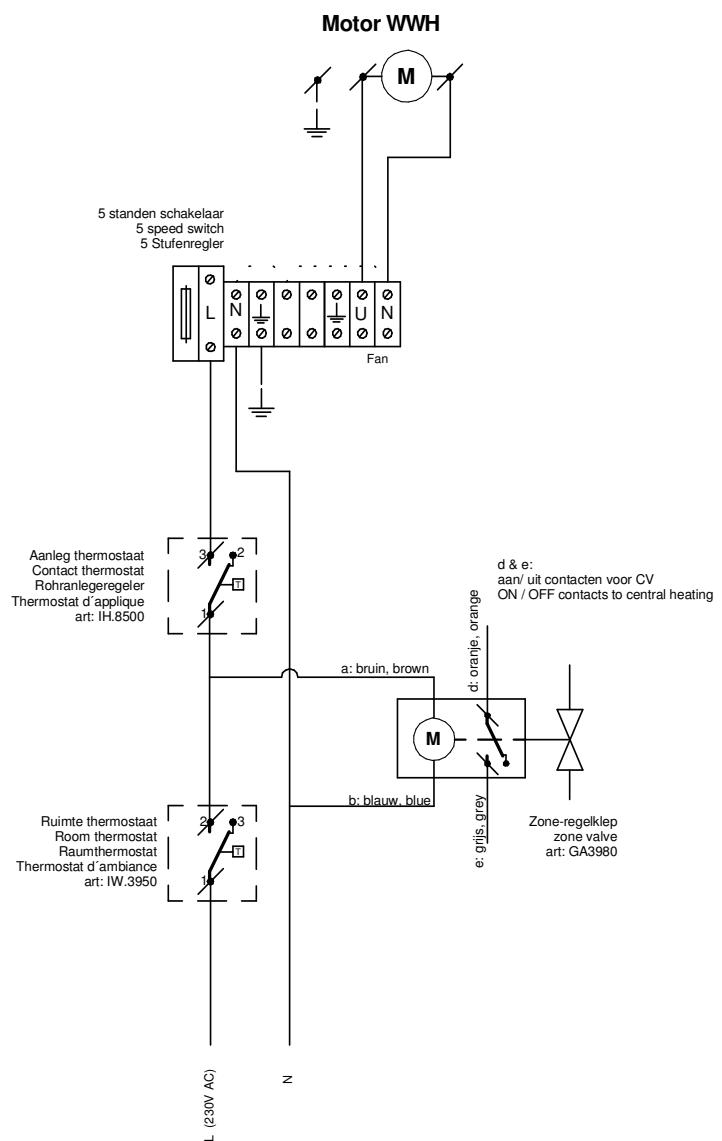
5-step switch with contact thermostat



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!



5. Maintenance and operation

Cauzion:

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)
- Turning speed of the fan. When the 5-step switch is applied, the power supplied (voltage) is relevant.

In addition following information can be selected from the conversion diagram:

- Output (kW)
- Air volume (m³/h)
- Noise level (dB)
- Discharge temperature (°C)
- Water flow (m³/h)
- Water pressure loss/water-sided differential pressure (kPa)

6.1 Example

What is the output of a WWH 230 with a water supply (regime) of 80/60 °C, in a room with a environment temperature of 10 °C? The 5-step switch is on stage 3.

Look in the WWH 230 diagram. Select on the vertical axis the field 'regime 80/60 °C' and then in the column 'air temperature' 10 °C.

The output is now shown on the horizontal axis in the field speed 3, under the column kW (answer= 21 Kw).

[Geef tekst op]

6.2 Conversion diagram WWH 110

		Type WWH 110						Type WWH 110					
		Snelheid / Speed 5, 230V			Snelheid / Speed 4, 180V			Snelheid / Speed 3, 160V			Snelheid / Speed 2, 140V		
		Luchtdoorlaat / Air Flow			1200 m ³ /h			1100 m ³ /h			800 m ³ /h		
Geluidsniveau / Sound Level		50 dB (A)	44 dB (A)	41 dB (A)	41 dB (A)	37 dB (A)	33 dB (A)	37 dB (A)	34 dB (A)	31 dB (A)	37 dB (A)	34 dB (A)	33 dB (A)
Regime / Régime	Lucht / Air	Lucht / Air	Water	Lucht / Air	Water	Lucht / Air	Water	Lucht / Air	Water	Lucht / Air	Water	Lucht / Air	Water
Temp. °C	kW	Temp. °C	m ³ /h	kPa	kW	Temp. °C	m ³ /h	kPa	kW	Temp. °C	m ³ /h	kPa	kW
55/45	10	114	16.5	100	7	10.8	16.4	0.94	6	10.2	17.3	0.89	5
	0	9.1	21.2	0.80	4	8.7	21.9	0.76	4	8.2	22.7	0.71	4
	5	8.1	24.0	0.70	4	7.6	24.6	0.67	3	7.2	25.4	0.63	3
	10	7.0	26.8	0.61	3	6.6	27.3	0.58	2	6.2	28.0	0.54	2
	15	5.9	29.5	0.52	2	5.6	30.0	0.49	2	5.3	30.6	0.46	2
	18	5.3	31.1	0.46	2	5.0	31.6	0.44	1	4.8	32.1	0.41	1
	20	4.9	32.2	0.43	1	4.7	32.7	0.41	1	4.4	33.1	0.38	1
60/40	-10	10.5	13.4	0.46	2	10.0	14.2	0.43	1	9.4	15.2	0.41	1
	0	8.3	19.1	0.36	1	7.9	19.8	0.34	1	7.4	20.6	0.32	1
	5	7.2	22.0	0.31	1	6.8	22.6	0.30	1	6.4	23.3	0.28	1
	10	6.1	24.7	0.27	1	5.8	26.3	0.25	1	5.5	25.9	0.24	1
	15	5.1	27.5	0.22	1	4.9	27.9	0.21	1	4.6	28.5	0.20	1
	18	4.5	29.1	0.20	1	4.3	29.5	0.19	1	4.1	30.0	0.18	1
	20	4.1	30.2	0.18	1	3.9	30.6	0.17	1	3.7	31.0	0.16	1
70/50	-10	12.7	18.4	0.56	2	12.1	19.4	0.63	2	11.4	20.5	0.50	2
	0	10.4	24.2	0.46	2	9.9	25.0	0.43	1	9.4	26.0	0.41	1
	5	9.3	27.0	0.41	1	8.9	27.8	0.39	1	8.4	28.7	0.37	1
	10	8.2	29.8	0.36	1	7.8	30.5	0.34	1	7.4	31.3	0.32	1
	15	7.2	32.6	0.31	1	6.8	33.2	0.30	1	6.5	33.9	0.28	1
	18	6.6	34.2	0.29	1	6.3	34.8	0.27	1	5.9	35.5	0.26	1
	20	6.2	35.3	0.27	1	5.9	35.9	0.26	1	5.5	36.5	0.24	1
80/60	-10	15.0	23.4	0.68	3	14.2	24.6	0.62	3	13.4	25.9	0.59	2
	0	12.6	29.2	0.55	2	12.0	30.2	0.53	2	11.3	31.4	0.50	2
	5	11.5	32.1	0.50	2	10.9	33.0	0.48	2	10.3	34.1	0.45	1
	10	10.4	34.9	0.46	1	9.8	35.8	0.43	1	9.3	36.7	0.41	1
	15	9.3	37.7	0.41	1	8.8	38.5	0.39	1	8.3	39.4	0.37	1
	18	8.7	39.4	0.38	1	8.2	40.1	0.36	1	7.7	41.0	0.34	1
	20	8.2	40.5	0.36	1	7.8	41.2	0.34	1	7.4	42.0	0.32	1
90/70	-10	17.2	28.4	0.76	4	16.3	29.7	0.72	3	15.4	31.1	0.69	3
	0	14.8	34.2	0.65	3	14.0	35.4	0.62	3	13.2	36.7	0.60	2
	5	13.6	37.1	0.60	2	12.9	38.2	0.57	2	12.2	39.4	0.54	2
	10	12.6	40.0	0.55	2	11.8	41.0	0.52	2	11.1	42.1	0.49	2
	15	11.4	42.8	0.50	2	10.8	43.8	0.48	2	10.2	44.8	0.45	1
	18	10.7	44.5	0.47	2	10.2	45.4	0.45	1	9.6	46.4	0.42	1
	20	10.3	45.6	0.45	1	9.8	46.5	0.43	1	9.2	47.4	0.40	1

[Geef tekst op]

6.3 Conversion diagram WWH 120

Type WWH 120											
V2012			Snelheid / Speed 5, 180V			Snelheid / Speed 4, 180V			Snelheid / Speed 3, 180V		
Luchtdruk / Air Flow			1500 m3 / h			1300 m3 / h			1200 m3 / h		
Geweldiveau / Sound Level			58 dB (A)			49 dB (A)			42 dB (A)		
Regime / Régime / Lucht / Air temp. °C	Lucht / Air kW Temp. °C cm3 / h kPa	Water kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa	Water kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa	Water kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa	Water kW Temp. °C cm3 / h kPa	Lucht / Air kW Temp. °C cm3 / h kPa
55/45	-40	17.8	21.4	1.53	8	16.0	23.1	1.40	8	15.2	24.0
0	12.1	26.2	1.23	5	12.3	27.5	1.12	5	12.2	23.3	1.06
5	12.2	28.5	1.08	5	11.3	29.7	0.93	5	10.8	30.4	0.94
10	10.8	30.8	0.94	4	9.8	31.8	0.88	3	9.2	32.5	0.81
15	9.2	33.0	0.80	3	8.4	34.0	0.73	3	8.0	34.5	0.65
18	8.3	34.3	0.72	2	7.5	35.2	0.66	2	7.2	36.7	0.58
20	7.6	35.2	0.67	2	7.0	36.0	0.61	2	6.8	36.5	0.50
60/40	-40	16.3	18.2	0.71	2	15.0	20.8	0.65	2	14.2	21.7
0	12.9	23.9	0.68	2	11.8	26.3	0.62	1	11.2	28.1	0.59
5	11.3	26.2	0.59	1	10.2	27.8	0.56	1	9.8	28.1	0.53
10	9.8	28.5	0.42	1	8.8	29.8	0.38	1	8.4	30.2	0.37
15	8.0	30.7	0.35	1	7.4	31.8	0.32	1	7.0	32.2	0.31
18	7.1	32.0	0.31	1	6.5	32.9	0.28	1	6.2	32.3	0.27
20	6.5	32.8	0.28	1	6.0	33.7	0.26	1	5.7	34.1	0.26
70/50	-40	18.8	25.3	0.88	3	18.1	27.2	0.78	3	17.1	29.3
0	16.2	30.1	0.71	2	12.8	31.7	0.65	2	11.1	32.7	0.62
5	14.5	32.4	0.64	2	12.3	34.0	0.58	2	12.8	34.8	0.55
10	12.9	34.8	0.58	1	11.8	36.1	0.52	1	11.2	38.8	0.49
15	11.3	37.0	0.29	1	10.3	38.2	0.25	1	9.8	38.9	0.23
18	10.3	38.3	0.24	1	9.8	38.5	0.21	1	9.0	40.1	0.19
20	9.7	39.2	0.22	1	8.9	40.3	0.19	1	8.4	40.9	0.17
80/60	-40	23.2	31.4	1.02	4	21.1	33.6	0.93	4	20.1	36.8
0	19.5	36.2	0.88	3	17.8	38.1	0.78	3	16.9	39.2	0.68
5	17.8	38.6	0.78	3	16.3	40.4	0.71	2	15.4	41.4	0.68
10	16.1	40.3	0.71	2	15.7	42.8	0.65	2	14.0	43.5	0.61
15	14.2	42.2	0.63	2	13.2	44.8	0.58	2	12.5	45.6	0.52
18	13.2	44.6	0.63	2	12.3	46.0	0.62	1	11.7	46.8	0.56
20	12.8	45.5	0.58	1	11.7	48.8	0.51	1	11.1	47.8	0.49
90/70	-40	28.5	37.4	1.17	4	24.2	39.3	1.07	5	23.0	41.3
0	22.8	42.3	1.01	2	20.8	42.5	0.92	2	19.8	42.8	0.87
5	21.0	44.7	0.93	1	19.2	46.3	0.85	1	18.2	43.0	0.80
10	19.3	45.6	0.85	2	17.8	48.0	0.78	2	16.7	50.1	0.72
15	17.6	46.2	0.73	2	16.1	51.2	0.71	2	15.2	52.3	0.65
18	16.6	46.8	0.63	2	15.1	52.6	0.67	2	14.2	53.5	0.58
20	15.9	51.7	0.70	2	14.6	53.2	0.61	2	13.8	57.7	0.50

[Geef tekst op]

6.4 Conversion diagram WWH 230

		Type WWH 230				Type WWH 230				Type WWH 230			
		Snelheid / Speed 1, 180V		Snelheid / Speed 2, 180V		Snelheid / Speed 3, 180V		Snelheid / Speed 1, 120V		Snelheid / Speed 2, 120V		Snelheid / Speed 3, 120V	
		Luchtdruk / Air Flow		2800 m3/h		2600 m3/h		2400 m3/h		2000 m3/h		1800 m3/h	
		52 dB (A)		28 dB (A)		23 dB (A)		39 dB (A)		32 dB (A)		30 dB (A)	
Regime / Lucht / Air Regime / Lucht / Air	Temp. °C KW	Temp. °C Cm3 / h kPa	KW	Temp. °C Cm3 / h kPa	KW	Temp. °C Cm3 / h kPa	KW	Temp. °C Cm3 / h kPa	KW	Temp. °C Cm3 / h kPa	KW	Temp. °C Cm3 / h kPa	KW
65.45	-10	25.2	12.3	2.21	0	21.3	15.0	21.2	5	21.1	15.3	20.8	5
	0	20.3	20.2	1.77	2	19.4	20.8	1.69	2	18.5	21.4	1.61	2
	5	17.9	23.1	1.56	2	17.1	23.6	1.45	3	16.3	22.2	1.42	3
	10	15.5	25.9	1.25	2	14.8	28.2	1.29	3	14.1	27.0	1.23	2
	15	13.2	28.8	1.15	2	12.6	29.2	1.10	3	12.0	28.7	1.05	3
	18	11.8	30.5	1.03	3	11.3	30.8	0.98	3	10.7	31.3	0.92	2
	20	10.8	31.8	0.92	2	10.2	32.0	0.91	2	9.9	32.3	0.86	2
60.40	-10	23.2	12.2	1.01	2	22.2	12.9	0.97	2	21.2	13.6	0.92	2
	0	18.2	18.1	0.79	2	17.2	18.6	0.78	2	16.8	19.3	0.73	1
	5	15.8	21.0	0.63	1	15.1	21.5	0.66	1	14.5	22.1	0.63	1
	10	13.5	23.9	0.63	1	12.9	24.3	0.58	1	12.3	24.8	0.56	1
	15	11.2	28.7	0.59	1	10.7	27.1	0.57	1	10.2	27.5	0.55	1
	18	9.8	28.2	0.53	1	9.2	28.7	0.51	1	8.0	28.1	0.39	1
	20	8.9	28.5	0.39	1	8.6	29.8	0.37	1	8.2	30.2	0.36	1
70.60	-10	28.2	17.0	1.23	2	27.0	17.8	1.18	2	26.7	18.7	1.13	2
	0	23.1	22.9	1.01	3	22.1	23.7	0.97	2	21.1	21.1	0.92	2
	5	20.6	25.9	0.90	2	18.8	26.5	0.87	2	18.3	27.2	0.82	2
	10	18.2	28.8	0.80	2	17.5	28.2	0.78	2	16.8	30.0	0.73	1
	15	15.9	31.6	0.68	1	15.2	32.2	0.67	1	14.5	32.7	0.63	1
	18	13.5	33.3	0.63	1	13.8	33.8	0.61	1	13.3	34.2	0.58	1
	20	11.8	32.5	0.59	1	13.0	34.9	0.57	1	12.2	35.2	0.52	1
80.60	-10	33.2	21.8	1.46	3	31.8	22.7	1.40	3	30.3	23.6	1.33	3
	0	28.0	27.8	1.23	2	26.8	22.6	1.18	2	25.5	23.6	1.12	3
	5	25.2	30.7	1.12	3	23.3	31.5	1.07	3	23.2	32.2	1.02	3
	10	23.0	33.7	1.01	2	22.0	34.4	0.97	2	21.0	35.2	0.92	2
	15	20.5	38.5	0.90	2	19.7	37.2	0.86	2	18.8	37.8	0.82	2
	18	18.1	38.3	0.84	2	18.3	38.8	0.80	2	17.5	39.8	0.77	1
	20	16.2	35.2	0.80	2	17.2	40.0	0.77	1	16.6	40.7	0.73	1
90.70	-10	38.2	28.6	1.68	4	35.6	27.7	1.61	4	34.8	28.9	1.53	3
	0	32.8	32.6	1.42	3	31.4	33.6	1.38	3	29.8	34.7	1.32	3
	5	30.2	35.6	1.33	3	29.3	36.5	1.27	2	27.5	37.5	1.21	2
	10	27.7	38.5	1.22	2	28.5	38.2	1.17	2	26.2	40.3	1.11	3
	15	25.2	41.4	1.11	3	24.1	42.2	1.08	3	23.0	43.1	1.01	2
	18	23.8	33.2	1.05	2	22.8	43.8	1.00	2	21.7	44.7	0.95	2
	20	22.8	32.3	1.01	2	21.8	45.1	0.96	2	20.3	46.8	0.92	2

[Geef tekst op]

6.5 Conversion diagram WWH 235

Type WWH 235		Speed 1 180V				Speed 2 180V				Speed 3 180V				Speed 4 180V								
V2012		Snelheid / Speed 5 230V		Snelheid / Speed 4 180V		Snelheid / Speed 3 180V		Snelheid / Speed 2 180V		Snelheid / Speed 1 180V		1800 m³/h		2400 m³/h		2400 m³/h						
Luchtdruk / Air Flow		≤3000 m³/h		3700 m³/h		3200 m³/h		3200 m³/h		3200 m³/h		38 dB (A)		44 dB (A)		38 dB (A)						
Regime / Régime °C	Lucht / Air Temp. °C	Lucht / Air kW	Temp. °Cm3 / h kPa	Lucht / Air Water	Lucht / Air kW	Temp. °Cm3 / h kPa	Lucht / Air Water	Lucht / Air kW	Temp. °Cm3 / h kPa	Lucht / Air Water	Lucht / Air kW	Temp. °Cm3 / h kPa	Lucht / Air Water	Lucht / Air kW	Temp. °Cm3 / h kPa	Lucht / Air Water	Lucht / Air kW					
66446	-10	32.4	10.2	2.83	8	26.8	11.6	2.6	8	27.5	13.0	2.39	6	23.1	15.8	2.01	5	20	18.2	1.72	2	
	0	25.5	16.8	2.26	9	23.9	17.9	2.08	5	22	18.1	1.82	4	18.5	21.2	1.81	2	16	23.2	1.39	3	
	5	22.8	20.0	1.99	5	21	21.1	1.83	2	18.3	22.1	1.69	4	16.3	24.2	3	1.22	3	1.1	28.0	1.23	2
	10	19.8	23.3	1.72	2	18.2	24.2	1.69	2	16.7	25.1	1.66	3	14.1	27.0	2	1.23	2	1.22	28.5	1.08	3
	15	16.8	26.4	1.49	3	15.2	27.2	1.35	3	14.2	28	1.22	2	12	28.7	3	1.05	3	1.04	31.0	0.9	2
	18	15	28.3	1.31	3	13.8	29.1	1.2	2	12.7	29.8	1.11	3	10.7	31.3	0.95	2	9.3	32.5	0.81	2	
	20	13.8	29.6	1.21	2	12.8	30.3	1.11	3	11.8	31.0	1.03	3	9.81	32.3	0.86	2	8.59	33.5	0.75	1	
60440	-10	28.3	8.3	1.28	3	27.1	9.6	1.18	2	25	10.8	1.03	3	21.2	13.8	0.92	2	18.4	15.9	0.8	2	
	0	23	14.8	1.00	3	21.3	16.0	0.83	2	18.6	17.1	0.86	2	16.6	18.3	0.73	1	1.6	21.2	0.83	1	
	5	20	18.1	0.87	2	18.2	19.1	0.8	2	17	20.1	0.72	1	15.5	22.1	0.63	1	12.6	23.8	0.55	1	
	10	17	21.4	0.74	1	16.7	22.2	0.68	1	14.5	23.1	0.63	1	12.3	24.8	0.56	1	10.7	28.3	0.47	1	
	15	14	22.6	0.61	1	13	25.3	0.57	1	12	26.0	0.52	1	10.2	27.5	0.46	1	8.92	28.8	0.38	1	
	18	12.3	25.5	0.52	1	11.2	27.1	0.5	1	10.6	27.3	0.46	1	9	28.1	0.39	1	7.87	30.3	0.32	1	
	20	11.2	27.7	0.49	1	10.3	28.3	0.45	1	9.59	28.8	0.42	1	8.18	30.2	0.36	1	7.16	31.3	0.31	1	
70550	-10	25.8	12.3	1.57	4	33	13.9	1.45	3	30.4	15.5	1.33	3	25.7	18.7	1.13	2	22.3	21.5	0.98	2	
	0	29.3	19.0	1.28	2	27	20.3	1.18	2	24.9	21.7	1.08	3	21.1	24.4	0.92	2	18.2	28.8	0.8	2	
	5	26.2	22.3	1.15	2	24.2	23.5	1.06	3	22.3	24.7	0.98	2	19.8	27.2	0.92	2	16.3	29.4	0.71	1	
	10	23.1	25.5	1.01	3	21.3	26.6	0.83	2	18.7	27.7	0.86	2	16.6	30.0	0.73	1	12.6	31.8	0.63	1	
	15	20.1	28.7	0.88	2	18.5	29.7	0.81	2	17.1	30.7	0.76	1	14.5	32.7	0.63	1	12.6	34.5	0.55	1	
	18	18.3	30.6	0.8	2	16.9	31.6	0.74	1	15.6	32.5	0.68	1	13.3	34.2	0.58	1	11.5	35.9	0.5	1	
	20	17.2	31.9	0.75	1	15.8	32.8	0.69	1	14.8	33.7	0.62	1	12.4	35.4	0.54	1	10.8	37.0	0.47	1	
80660	-10	42.3	16.2	1.86	2	38	18.2	1.71	2	35.9	20.0	1.68	2	30.3	23.8	1.33	3	26.2	27.0	1.15	2	
	0	35.6	22.1	1.57	2	32.8	22.7	1.42	3	30.2	26.3	1.33	3	23.5	28.6	1.12	3	22.1	32.2	0.97	2	
	6	32.4	26.4	1.42	3	28.8	27.8	1.31	3	27.5	28.2	1.21	2	23.2	32.2	1.02	3	20.1	34.8	0.88	2	
	10	29.3	29.6	1.29	2	27	31.0	1.18	2	24.8	32.4	1.03	3	21	35.2	0.92	2	18.2	37.5	0.8	2	
	15	26.2	32.8	1.15	2	24.1	34.1	1.06	3	22.2	35.2	0.98	2	18.8	37.9	0.82	2	16.2	40.1	0.71	1	
	18	22.3	34.8	1.07	3	22.4	36.0	0.99	2	20.7	37.2	0.91	2	17.5	39.6	0.77	1	15.1	41.6	0.68	1	
	20	23.2	36.1	1.02	3	21.3	37.2	0.92	2	18.7	38.3	0.86	2	16.8	40.7	0.73	1	14.2	42.6	0.63	1	
90770	-10	43.7	20.4	2.15	5	44.8	22.5	1.99	4	41.3	24.8	1.82	4	34.3	28.9	1.53	3	30.1	32.4	1.33	2	
	0	21.9	27.1	1.85	2	38.6	29.0	1.7	2	35.6	30.9	1.66	3	28.9	32.7	1.32	3	25.8	37.8	1.12	2	
	5	18.6	30.5	1.7	4	35.5	32.2	1.57	3	32.7	34.0	1.41	3	27.5	37.5	1.21	2	23.8	40.5	1.05	2	
	10	25.2	33.7	1.58	3	32.6	35.2	1.43	3	30	37.0	1.32	3	26.2	40.3	1.11	3	21.8	43.1	0.98	2	
	15	32.2	37.0	1.52	3	29.6	38.5	1.31	2	27.3	40.0	1.12	2	23	43.1	1.01	2	19.9	45.7	0.88	2	
	18	30.2	38.8	1.32	3	27.8	20.2	1.23	2	26.7	21.8	1.13	2	21.7	24.7	0.95	2	18.7	47.2	0.82	2	
	20	28.1	40.2	1.28	2	26.8	21.8	1.18	2	24.7	23.0	1.08	3	20.8	25.8	0.92	2	18	48.2	0.78	2	

[Geef tekst op]

6.6. Conversion diagram WWH 245

Type WWH 245		Speed 1: 180V			Speed 2: 160V			Speed 3: 160V			Speed 4: 120V		
		Snelheid: Speed 1: 180V			Snelheid: Speed 2: 160V			Snelheid: Speed 3: 160V			Snelheid: Speed 4: 120V		
Regime / Gedrukt: Standaard Level		Lucht / Air			Water			Lucht / Air			Water		
Regime /	Gedrukt: Standaard Level	kW	Temp. °C	km3/h kPa									
55.45	-10	32.4	-9.9	37.0	17	28.9	21.6	3.39	-6	24.1	23.9	-1	23.8
	0	35.2	-25.0	26.8	11	21.3	26.2	27.3	-1	27.5	26.3	2	25.1
	5	30.2	-27.5	26.3	10	27.8	23.7	2.41	8	26.3	32.5	2	23.2
	10	28.3	-29.9	2.9	8	25.1	31.0	2.0	7	21.2	7.2	7	20.5
	15	22.5	-32.2	1.66	6	20.6	32.3	1.60	6	18.1	9.5	6	9.5
	18	20.2	-32.3	1.63	5	13.5	34.7	1.62	5	13.3	35.3	1	35.3
	20	18.7	-34.7	1.63	4	17.2	36.5	1.60	4	16.1	36.7	1	36.7
60.40	-10	30.0	-8.2	17.2	3	16.8	38.7	1.60	3	32.4	22.2	1	27.5
	0	31.8	-23.3	1.39	2	29.2	24.8	1.27	2	26.8	23.8	1	23.8
	5	27.8	-26.8	1.21	1	25.6	27.0	1.12	1	22.6	26.7	0	26.7
	10	22.0	-28.2	1.52	0	22.0	29.3	0.98	0	18.5	32.5	0	32.5
	15	20.2	-30.6	0.83	-2	18.6	31.5	0.81	-2	16.2	32.8	-2	32.8
	18	17.9	-32.0	0.73	-2	16.5	32.8	0.72	-2	14.6	34.1	-1	34.1
	20	16.2	-32.9	0.72	-2	15.1	33.7	0.68	-1	13.2	34.8	-1	34.8
70.50	-10	38.0	-23.9	2.0	8	42.1	26.8	1.93	5	38.8	23.5	1	11.5
	0	39.7	-29.0	1.74	5	38.4	30.7	1.59	5	32.1	32.0	1	32.0
	5	35.6	-51.6	1.56	4	32.6	32.0	1.43	4	26.6	35.2	0	26.6
	10	31.6	-52.0	1.28	2	29.0	36.4	1.27	2	26.6	37.3	1	21.7
	15	27.8	-38.4	1.21	3	25.5	37.7	1.2	2	22.5	39.2	3	39.2
	18	26.5	-37.8	1.1	2	23.4	39.0	1.12	2	20.6	40.6	2	40.6
	20	23.8	-56.8	1.02	2	22.0	39.8	0.98	2	18.4	41.5	1	41.5
80.60	-10	58.0	-28.5	2.48	8	51.3	31.7	2.28	7	56.2	34.8	1	18.3
	0	57.4	-54.7	2.03	6	43.5	32.7	1.91	6	23.2	39.2	1	39.2
	6	53.3	-27.3	1.60	5	38.7	36.0	1.72	4	27.8	41.6	1	41.6
	10	39.2	-38.8	1.72	4	36.0	41.4	1.58	4	31.6	43.8	1	43.8
	15	35.2	-42.2	1.66	2	32.3	42.7	1.42	2	28.5	45.9	1	45.9
	18	32.8	-43.7	1.46	1	30.2	45.1	1.33	1	28.6	47.2	1	47.2
	20	31.2	-44.7	1.38	3	28.8	46.0	1.26	3	26.3	48.0	1	48.0
90.70	-10	63.8	-32.1	2.32	10	58.6	37.6	2.58	8	51.5	41.1	2	22.7
	0	55.1	-40.2	2.43	8	50.5	42.8	2.23	7	42.2	45.7	1	35.7
	5	50.8	-52.0	2.24	7	48.6	45.0	2.16	6	41.0	48.0	1	48.0
	10	36.8	-45.6	2.08	6	39.8	42.8	1.79	5	37.8	52.2	1	52.2
	15	32.7	-48.0	1.88	5	31.7	49.1	16.8	5	32.4	52.2	1	52.2
	18	30.1	-49.5	1.78	4	30.5	51.2	16.3	4	32.5	52.6	1	52.6
	20	28.6	-50.5	2.05	3	29.5	52.1	1.77	3	31.2	52.7	1	52.7

6.7 Conversion diagram WWH 350

v2012		Snelheid / Speed 5 230V			Snelheid / Speed 4 180V			Snelheid / Speed 3 160V			Snelheid / Speed 2 140V			Snelheid / Speed 1 120V			
Luchttoezicht / Air Flow		5400 m³/h			4800 m³/h			4500 m³/h			4000 m³/h			3400 m³/h			
Geluidsniveau / Sound Level		53 dB(A)			48 dB(A)			42 dB(A)			38 dB(A)			34 dB(A)			
Regime :	Lucht : Air	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	Water	Lucht : Air	
Regime °C	Temp. °C	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	Temp. °C m3/h kPa	kW	
5645	-10	46.9	13.3	429	12	42.7	14.4	381	10	42.1	15.1	347	10	39.8	9	35.4	7
	0	37.7	19.4	328	8	35.1	20.4	306	7	33.8	20.9	295	5	31.9	7	28.4	5
	5	33.2	22.4	230	6	31.1	23.3	270	6	29.8	23.8	260	6	28.2	5	24.5	5
	10	28.9	25.4	252	5	26.9	26.2	235	5	25.9	26.6	226	5	24.5	5	25.1	4
	15	24.5	28.4	215	4	23.0	28.1	200	4	22.1	28.4	186	3	20.9	3	27.2	4
	18	22.1	30.1	193	3	20.5	30.7	180	3	19.1	31.1	173	3	18.8	3	31.6	3
	20	20.5	31.3	173	3	19.1	31.9	157	3	18.4	32.2	150	3	17.4	3	32.7	3
6040	-10	43.5	11.6	166	3	40.7	12.7	1.77	3	39.2	13.3	171	4	37.1	4	14.2	3
	0	34.4	17.7	150	3	32.2	18.7	140	3	31.0	19.2	135	2	29.4	2	19.9	2
	5	30.1	20.8	131	2	28.1	21.6	123	2	27.1	22.1	118	2	25.6	2	22.7	2
	10	25.8	23.8	112	3	24.1	24.5	105	3	23.2	24.9	101	2	22.0	2	20.7	2
	15	21.5	26.7	9.84	2	20.2	27.3	0.88	2	19.4	27.7	0.85	2	18.4	2	28.2	2
	18	19.1	28.5	0.63	2	17.9	29.0	0.78	1	17.2	29.3	0.75	1	15.3	1	29.8	1
	20	17.4	22.6	275	1	15.2	30.1	0.71	1	15.7	30.4	0.69	1	14.9	1	30.9	1
7050	-10	52.5	16.1	232	5	49.1	17.4	2.15	4	47.3	18.2	2.07	4	44.7	4	19.2	3
	0	45.2	22.3	189	3	40.4	29.4	177	3	38.9	24.1	170	4	36.8	4	25.0	3
	5	38.8	25.2	179	2	36.2	26.4	159	3	34.9	27.0	153	3	33.0	3	27.8	2
	10	34.4	28.4	150	3	32.1	28.3	1.41	2	30.9	28.6	1.35	2	28.3	2	30.6	2
	15	30.1	31.3	4.32	2	28.1	32.2	1.23	2	27.0	32.6	1.18	2	25.6	2	33.3	2
	18	27.5	33.1	120	2	25.7	33.9	1.13	3	24.8	31.3	1.08	3	23.5	3	35.0	2
	20	25.8	34.3	113	2	24.2	35.0	1.06	3	23.3	35.1	1.02	2	22.0	2	36.0	2
8060	-10	61.6	20.6	275	3	57.5	22.1	253	5	55.3	22.9	24.3	5	52.3	4	24.2	4
	0	52.0	28.8	229	4	48.6	28.2	213	4	46.8	28.9	205	4	44.2	4	30.0	3
	5	47.4	29.9	206	4	44.3	31.4	4.05	3	42.5	31.8	4.07	3	40.3	3	32.8	3
	10	42.9	32.3	183	2	40.1	34.1	3.75	3	38.5	34.7	3.59	3	36.5	3	35.7	2
	15	38.5	35.9	163	3	36.0	37.0	1.58	3	34.6	37.6	1.52	3	32.8	3	38.4	3
	18	35.9	37.7	153	2	33.5	38.7	1.47	3	32.3	39.3	1.42	2	30.5	2	40.1	2
	20	34.2	38.9	150	2	31.9	39.9	1.40	2	30.7	40.4	1.36	2	28.1	2	41.2	2
9070	-10	70.5	26.0	311	7	65.8	26.7	29.0	6	53.3	27.7	27.9	6	59.9	6	29.1	6
	0	60.7	21.3	263	3	56.7	32.8	250	5	54.6	33.7	24.0	5	51.6	5	35.0	4
	5	56.1	34.4	247	5	52.2	35.9	2.31	4	50.3	35.7	2.22	4	47.3	4	37.9	3
	10	51.4	37.5	227	4	48.0	38.8	2.12	4	45.2	39.5	2.04	3	43.7	3	40.7	3
	15	47.0	40.5	207	4	42.8	41.8	1.93	3	42.1	42.5	1.86	3	39.8	3	43.5	2
	18	44.3	42.3	195	2	41.2	43.2	1.82	3	39.8	44.2	1.75	3	37.6	3	45.2	2
	20	42.5	43.5	187	2	39.7	44.7	1.75	3	38.2	45.3	1.63	3	36.1	3	46.3	2

6.8 Conversion diagram WWH 365

Type WWH 365									
V2012		Snelheid / Snelheid 5 230V		Snelheid / Snelheid 4 180V		Snelheid / Snelheid 3 160V		Snelheid / Snelheid 2 140V	
Luchtdebit / Air Flow	B210 m³/h	Lucht / Air	Water						
Geulderieveu / Soundlevel	61 dB(A)	49 dB(A)	46 dB(A)	44 dB(A)	41 dB(A)	39 dB(A)	37 dB(A)	35 dB(A)	33 dB(A)
Regime /	Lucht / Air	Lucht / Air	Water						
Régime °C	kW	Temp. °C	m3/h	kPa	kW	Temp. °C	m3/h	kPa	kW
55/45	-10	59.1	9.3	5.16	17	46.4	13.5	4.04	12
	3	47.5	16.1	4.15	12	37.2	8	3.25	21.3
	5	41.9	19.5	3.85	10	32.9	22.6	2.87	6
	10	36.4	22.3	3.17	7	28.6	25.5	2.49	5
	15	31.0	26.1	2.71	6	24.4	24.5	2.12	4
	18	27.9	28.1	2.43	5	21.9	31.2	1.91	3
	20	25.8	29.4	2.25	4	20.2	31.4	1.77	3
60/40	-10	54.6	7.8	2.38	5	43.0	11.8	1.88	3
	3	43.1	14.3	1.98	3	31.4	17.9	1.49	3
	5	37.6	18.1	1.64	3	26.8	22.0	1.30	2
	10	32.1	21.3	1.40	3	23.5	23.9	1.11	3
	15	26.8	24.3	1.17	2	21.3	23.8	0.93	2
	18	23.7	26.3	1.03	2	18.9	23.6	0.82	2
	20	21.6	27.3	0.94	2	17.2	23.7	0.75	1
70/50	-10	0.00	11.1	2.89	0	0.02	1.23	0.228	4
	3	54.3	18.4	2.38	5	42.8	22.5	1.87	3
	5	48.7	21.3	2.13	4	38.4	25.5	1.68	3
	10	43.1	25.2	1.89	3	34.0	23.0	1.49	3
	15	37.7	28.5	1.65	3	29.7	31.4	1.30	2
	18	34.6	30.5	1.51	3	27.2	33.2	1.19	2
	20	32.3	31.3	1.47	2	25.0	34.4	1.12	3
80/60	-10	77.6	15.1	3.40	8	81.9	21.8	7.68	6
	3	65.5	22.2	2.88	6	51.5	2.0	2.28	4
	5	59.7	25.3	2.62	6	46.9	3.1	2.06	4
	10	54.0	29.5	2.37	5	42.5	33.1	1.87	3
	15	48.5	32.4	2.13	4	38.1	33.1	1.87	3
	18	45.2	34.3	1.98	3	35.6	37.9	1.56	3
	20	43.0	36.7	1.89	3	33.8	33.0	1.49	3
90/70	-10	88.8	10.1	3.92	10	60.7	25.3	3.07	6
	3	76.7	26.1	3.38	8	60.1	31.5	2.65	6
	5	70.7	29.4	3.12	7	55.5	34.6	2.44	5
	10	64.9	32.3	2.86	6	50.9	37.7	2.24	4
	15	59.3	36.2	2.61	5	46.5	40.7	2.05	4
	18	55.9	38.2	2.40	5	43.8	42.5	1.93	3
	20	53.7	39.5	2.36	5	42.1	43.7	1.85	3

[Geef tekst op]

6.9 Conversion diagram WWH 380

Inst. No 2012		Snelheid / Speed 5. 230V		Snelheid / Speed 4. 180V		Snelheid / Speed 3. 160V		Snelheid / Speed 2. 140V		Snelheid / Speed 1. 120V		
Gedrukte Luftdichte / Air Flow		6500 m ³ /h		5200 m ³ /h		3400 m ³ /h		2600 m ³ /h		2100 m ³ /h		
Regime / Lucht / Air		Lucht / Air		Water		Lucht / Air		Water		Lucht / Air		
Regime /	Lucht / Air	kW	Temp. °C	m ³ /h	kPa	kW	Temp. °C	m ³ /h	kPa	kW	Temp. °C	
W9546	-10	71.3	20.3	6.21	31	63.2	22.6	5.91	25	27.5	4.14	
0	57.5	25.4	6.01	21	51.0	27.3	4.44	18	38.2	3.35	11	
5	50.9	27.9	4.22	18	45.1	29.6	3.62	12	31.2	2.93	9	
10	42.4	30.3	3.87	12	39.2	31.3	3.34	11	23.8	2.59	7	
15	38.1	32.7	3.32	11	33.8	34.1	2.64	8	25.6	2.52	5	
18	34.3	34.2	2.93	9	30.5	35.4	2.08	6	23.0	2.33	4	
20	31.9	35.1	2.78	9	28.3	38.2	2.47	7	21.4	38.8	4	
60140	-10	68.1	19.0	2.97	9	60.6	21.2	2.64	8	46.0	26.2	2.33
0	54.5	24.0	2.37	6	48.4	25.9	2.1	5	36.8	30.1	1.63	
5	47.9	28.5	2.03	5	42.6	28.2	1.88	4	32.0	32.0	1.41	
10	41.4	28.9	1.80	4	36.8	30.4	1.61	4	28.1	33.8	1.22	
15	35.0	35.3	1.62	4	31.2	32.6	1.36	3	23.8	35.6	1.34	
18	31.3	32.7	1.38	3	27.8	33.9	1.21	2	21.2	38.8	1.93	
20	28.8	35.6	1.25	3	25.6	34.7	1.12	3	18.7	37.3	1.83	
7050	-10	81.2	24.6	3.66	12	72.2	27.2	3.16	9	56.6	33.1	2.39
0	67.3	29.7	2.92	8	69.8	32.3	2.82	7	52.3	37.0	1.93	
5	60.9	32.2	2.62	6	53.8	34.3	2.35	6	40.7	38.9	1.73	
10	54.5	34.7	2.36	6	47.8	36.8	2.10	6	36.3	40.8	1.59	
15	47.4	37.1	2.03	5	42.2	33.3	1.85	4	32.0	42.7	1.43	
18	43.7	36.6	1.18	4	38.8	40.1	1.70	2	28.5	33.7	1.29	
20	41.2	39.5	1.80	4	38.6	41.3	1.60	4	27.8	44.2	1.23	
6060	-10	94.3	30.1	2.12	15	83.7	33.1	3.88	12	63.2	39.8	2.73
0	80.5	55.5	5.92	11	71.0	58.5	5.12	6	53.6	43.5	2.55	
5	73.2	57.6	3.21	9	62.3	49.3	2.88	3	49.0	2.15	2.15	
10	66.4	40.4	2.92	8	68.3	42.7	2.59	7	42.5	27.8	1.93	
15	59.8	42.9	2.82	7	53.1	45.3	2.33	6	40.1	28.8	1.78	
18	55.9	44.3	2.26	6	48.3	48.3	2.18	6	37.6	50.7	1.65	
20	53.3	45.3	2.32	6	47.4	47.2	2.08	5	35.8	51.5	1.57	
9070	-10	107.0	56.7	1.73	19	95.2	39.1	4.19	15	71.8	46.8	3.16
0	92.7	45.8	4.08	12	82.2	44.3	3.82	11	61.9	50.7	2.73	
5	85.7	45.5	3.73	12	76.0	48.4	3.38	10	57.2	52.7	2.52	
10	78.8	46.1	3.47	11	68.3	43.7	3.03	8	52.6	62.6	2.32	
15	72.1	43.6	3.18	9	63.9	51.1	2.61	8	48.1	56.8	2.12	
18	68.1	50.1	3.00	8	60.4	52.4	2.88	7	45.5	57.7	2.19	