



SA HEAT PUMP ENGINEERS^{CC}

***BWH SERIES
HOT WATER HEAT PUMPS***



SA Heat Pump Engineers CC

SA Heat Pump Engineers CC supplies and installs heat pumps for the purpose of generating domestic hot water for mines, hospitals, prisons, schools, hotels, hostels, industrial change houses, large complexes and all applications requiring hot water. The company also has a complete range of heat pumps to cater for swimming pool heating.

Using SA Heat Pump Engineers' heat pumps to generate hot water can save you up to 70% on your hot water heating bill!

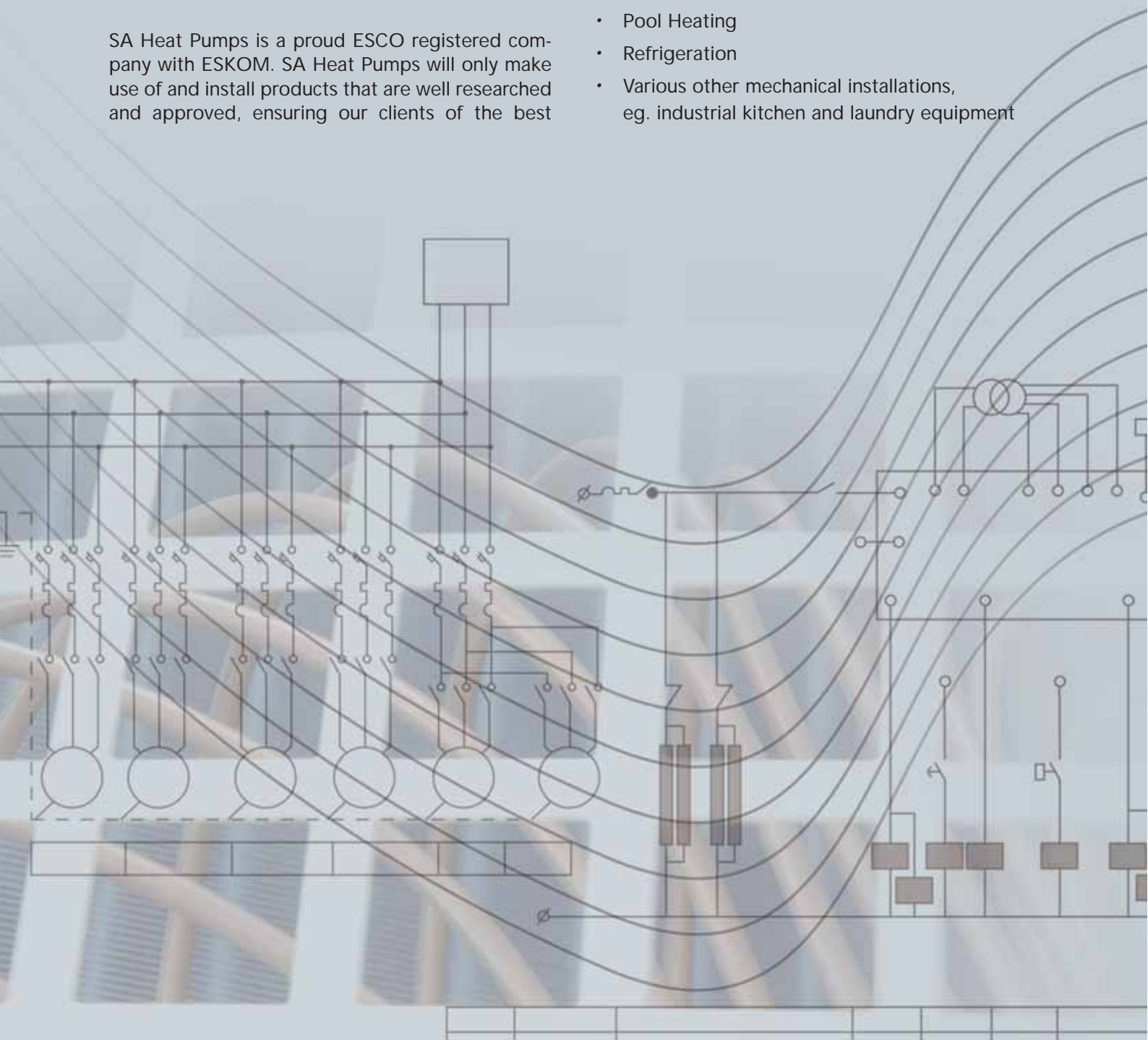
Boasting 20 years experience, SA Heat Pump Engineering CC is a BEE rated company that strives towards rendering the best service and quality to its clients, creating service-orientated, long-term relations and building strong pillars of support on repeat business. **We do not gain contracts - we build clients.**

SA Heat Pumps is a proud ESCO registered company with ESKOM. SA Heat Pumps will only make use of and install products that are well researched and approved, ensuring our clients of the best

quality and safety of products. We believe in operational site offices employing the best equipment, staff and technology to ensure quick and accurate installations. Various branches across South Africa.

Products

- Industrial and domestic heat pumps
- Hot Water Installations
- Air Conditioning
- Industrial Piping
- Hot Water Installations
- Electrical Installations
- Steam Boilers
- Hot Water Storage Vessels
- Tanks
- Central Heating
- Compressed Air Installations
- Pool Heating
- Refrigeration
- Various other mechanical installations, eg. industrial kitchen and laundry equipment

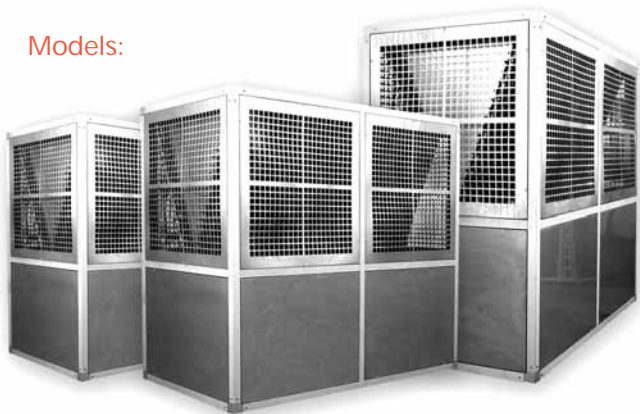


AIR TO WATER HOT WATER HEAT PUMP UNITS: BWH Series

Saving up to 70% of your hot water bill!

The BWH series units are available in seven models ranging from 16 kW to 130kW and are ideal for hospitals, hostels, hotels, green houses or other applications that require large amounts of hot water. As opposed to conventional water heaters, the BWH series units are extremely safe and clean as they do not require boilers or furnaces and only make use of electricity. Their ingenious design makes the surprisingly efficient and economical, able to **save up to 70% of your hot water bill!**

Models:



BWH 8

BWH 15

BWH 25

Other models include the BWH 3, BWH 4, BWH 6 and the BWH 40.

Easy and economical installation:

These self-contained units are assembled, internally wired and charged with refrigerant at the factory, and subjected to stringent test runs before delivery. Only water piping and mains power supply is required for on the spot installation, thus greatly reducing installation work and costs. On the whole the units are also compact and light, ensuring easy handling and installation.

Space-saving:

No machine room is required for installation and units can be installed on a roof or anywhere outdoors. As there is no boiler, fuel tank or cooling tower required, necessity for space and costs of installation is greatly reduced.

Anti-corrosion:

The hot water piping is fabricated from CU, which ensures a high degree of anti-corrosion. The stainless steel casing is treated against rust and is completely weather proof for outdoor installation.

New refrigerant circuit:

A large supply of hot water of up to 60°C (140°F) can be obtained in outdoor temperatures ranging from

as low as -5°C (23°F) WB to as high as 30°C (86°F) WB, due to the pole change fan motor and unique refrigerant circuit design, as well as the application of a new environmental-friendly refrigerant R134A. A newly developed compressor and a heat exchanger with tremendously efficient heat transfer tubes raise the COP of the unit.

Safe operating and easy maintenance:

A complete set of safety devices, fitted on the front of the unit, protects the unit from potential problems:

- Full set of indicating lamps
- Gauges for suction and discharge pressures
- Remote controller (optional)

Operation can easily be controlled from indoors by means of the remote controller, a slim, compact design that operates on a 24V safety circuit.

Compressor:

The scroll compressor used within the heat pumps is compact, light, highly efficient, powerful and durable. The compressor is held by springs in its casing to minimize vibration, while special vibration isolation rubber pads reduce vibration transfer to a minimum. A complete set of safety devices such as over-current relay, compressor thermal protector encased in the motor coil, high pressure switch, and crankcase heater are equipped, ensuring a longer life-cycle and problem-free operation.

Heat pump coaxial coils

Condenser:

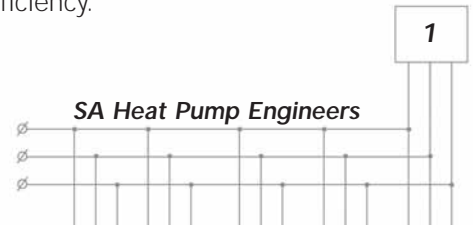
Heat Exchanger:

The heat exchanger on the water side is of coaxial type, made from seamless carbon steel tube for outer tube and twisted copper tube for inner tube. Comparing to other smooth tube-in-tube heat exchangers, the configuration of a spiral twisted tube creates a two-counter-directional flowing pattern, with a hot and cold side, ensuring the highest heat transferring efficiency. Its other advantages include its compactable size, adaptability, durability and leakage protection.



Evaporator:

The evaporator is cut in waffle fins, in a louver shape so as to increase heat transfer co-efficiently. Furthermore, Hi-X internal screw thread tubes, of which the internal surface has been modified by serration, are used for additional efficiency.



Model	BWH	Size	BWH3	BWH4	BWH6	BWH8	BWH15	BWH25	BWH40
General	Heating capacity	KW	16	20	31.6	48	80	110	156
	Power input	KW	4.6	5.7	10	14	22.2	32	48
	Capacity steps	%	0-100	0-100	0-50-100	0-50-100	0-33-66-100	25-50-75-100	0-50-100
Compressor	Nr.		1	1	2	2	3	4	2
	Type		Scroll						
	Oil		P.O.E						
	Oil volume	L	2	2	6	8	12	16	16
Fan	Type		Axial						
	Nr.		1	1	2	2	2	2	2
	Power input	KW	0.25	0.45	0.47*2	0.47*2	0.7*2	0.7*2	1.1*2
	Current	A	0.6	1	2	2	3	3	4
	Air flow	m3/h	3600	4500	6200*2	6200*2	13000*2	13000*2	15000*2
Evaporator	Type		Fin coil						
	Material		Al/Cu						
Condenser	Type		Co-axial (heat exchanger)						
	Water flow	m3/h	0.29	0.37	0.58	0.88	1.50	2.02	2.86
	Inlet/outlet nozzle	DN	20	20	25	32	40	40	50
	Max water side operation pressure	MPa	1						
	Max refrigerant side operation pressure	MPa	3						
	Resistance	KPa	23	25	28	24	26	28	40
Refrigerant	Nr. of circuits		1	1	2	2	3	2	2
	Type		R134 A						
	Weight	Kg	4.5	5	8	12	18	22	26
	Power supply		380V/3P/50Hz						
	Noise	dB(A)	60	61	63	65	66	68	70
	Weight	Kg	410	430	465	480	495	970	1170

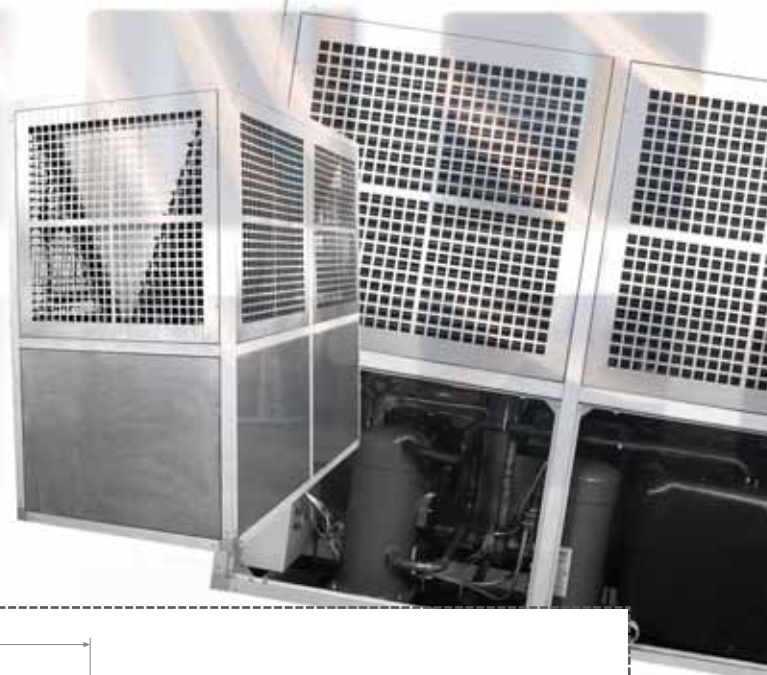
Note: Heating capacity is based on entering water temperature 13°C. leaving hot water temperature 60°C, and outdoor ambient temperature 25 /60%RH. Noise measured at 1m in open field.



1.1 The following safety devices are standard:

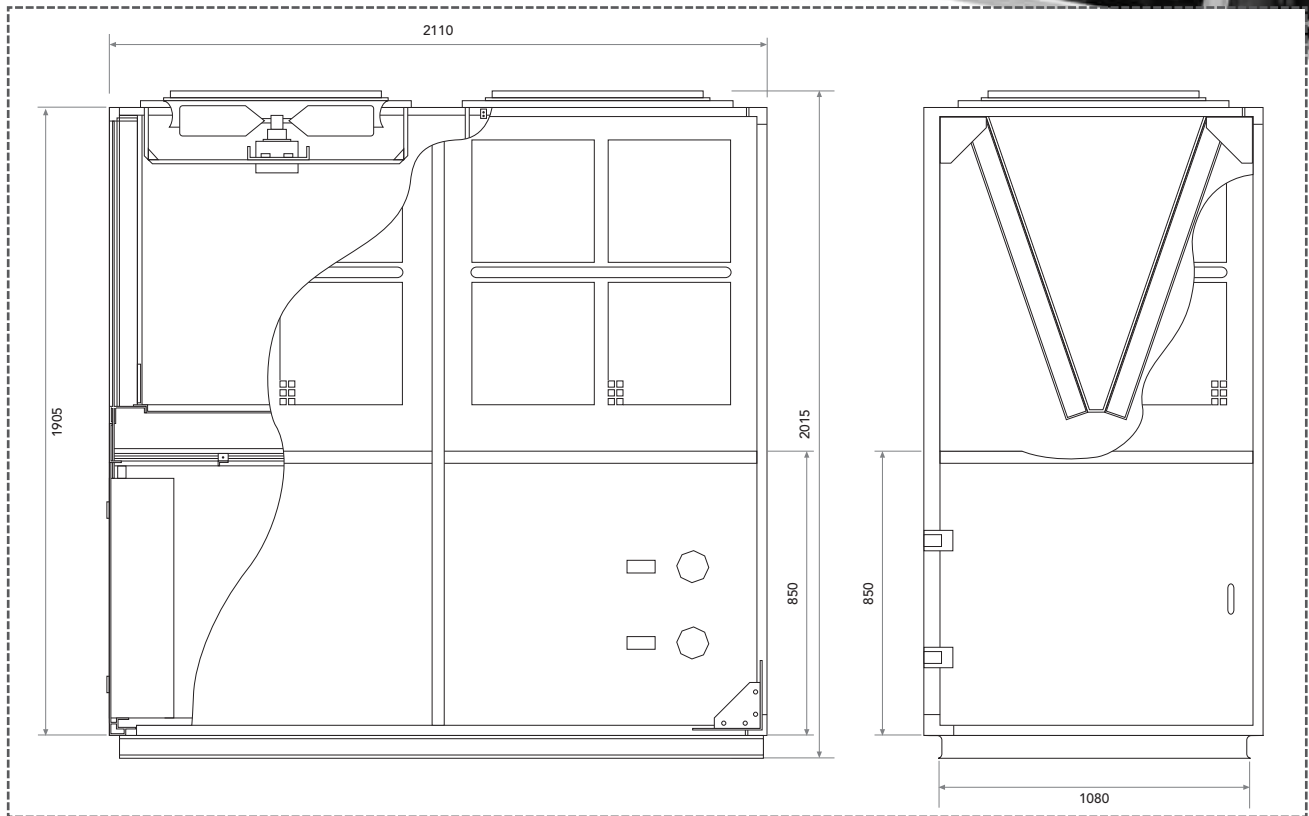
- Freeze-up protection thermostat
- Compressor thermal protector
- Fan motor thermal protector
- Over-current relay (compressor)
- Fuse
- High pressure switch
- Low pressure switch
- Fusible plug
- Crankcase heater
- Phase Reversal Protection

1.2 Power supply: 3 phase, 50Hz 380~415V

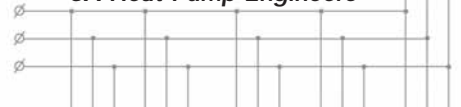


2. Dimensions and weight of BWH series heat pumps

BWH 25



Model: BWH 3	Dimension mm Lenght*width*height: 1200*925*1330	Weight (kg): 380
Model: BWH 4	Dimension mm Lenght*width*height: 1200*925*1330	Weight (kg): 380
Model: BWH 6	Dimension mm Lenght*width*height: 1564*925*1330	Weight (kg): 400
Model: BWH 8	Dimension mm Lenght*width*height: 1880*925*1330	Weight (kg): 490
Model: BWH 15	Dimension mm Lenght*width*height: 2110*1080*1758	Weight (kg): 800
Model: BWH 25	Dimension mm Lenght*width*height: 2110*1080*2038	Weight (kg): 1000
Model: BWH 40	Dimension mm Lenght*width*height: 2110*1080*2050	Weight (kg): 1170



3. Capacity Tables

3.1 Heating capacity [50Hz]

Water Inlet Temperature: 13°C													
Model	O TEMP	Leaving Hot Water Temperature (°C)											
		50				55				60			
		CAP	WFR	PI	COP	CAP	WFR	PI	COP	CAP	WFR	PI	COP
BWH 3	-5	9.3	0.21	3.4	2.77	8.3	0.17	3.5	2.38	7.8	0.14	3.7	2.07
	0	10.8	0.24	3.8	2.84	10.4	0.21	3.9	2.69	9.7	0.18	4.2	2.31
	10	15.0	0.34	4.1	3.62	14.1	0.29	4.2	3.33	13.1	0.24	4.5	2.92
	25	18.0	0.40	4.4	4.08	17.0	0.33	4.5	3.77	16.0	0.29	4.6	3.48
	35	20.7	0.47	4.7	4.39	19.8	0.40	4.9	4.03	19.1	0.35	5.0	3.79
BWH 4	-5	11.7	0.27	4.2	2.79	10.4	0.22	4.3	2.40	9.7	0.18	4.6	2.09
	0	13.5	0.31	4.7	2.86	13.0	0.27	4.8	2.72	12.2	0.23	5.2	2.33
	10	18.7	0.43	5.1	3.66	17.6	0.36	5.2	3.36	16.4	0.30	5.6	2.94
	25	22.6	0.51	5.5	4.12	21.3	0.44	5.6	3.81	20.0	0.37	5.7	3.51
	35	25.8	0.61	5.8	4.43	24.7	0.51	6.1	4.06	23.8	0.44	6.2	3.82
BWH 6	-5	17.3	0.39	7.2	2.40	16.4	0.34	7.4	2.22	15.7	0.29	8.0	1.96
	0	21.6	0.49	8.1	2.67	20.4	0.42	8.4	2.43	18.9	0.35	8.9	2.12
	10	29.7	0.68	8.7	3.41	26.5	0.58	8.9	2.98	25.7	0.47	9.6	2.68
	25	35.6	0.81	9.3	3.83	34.2	0.71	9.6	3.56	31.6	0.58	10.0	3.16
	35	41.1	0.96	10.7	3.84	39.2	0.81	10.6	3.70	37.0	0.68	11.5	3.22
BWH 8	-5	26.1	0.59	10.1	2.58	24.8	0.51	10.4	2.38	23.7	0.43	11.2	2.13
	0	32.7	0.74	11.4	2.86	30.9	0.63	11.7	2.64	28.6	0.52	12.4	2.31
	10	44.9	1.02	12.2	3.68	42.1	0.87	12.5	3.37	38.8	0.71	13.5	2.87
	25	53.8	1.22	13.0	4.13	51.7	1.06	13.5	3.82	48.0	0.88	14.0	3.43
	35	62.1	1.44	15.0	4.14	59.3	1.21	14.8	4.00	56.0	1.02	16.1	3.48
BWH 15	-5	43.6	0.99	16.7	2.61	41.5	0.85	16.9	2.45	39.0	0.72	17.9	2.18
	0	54.7	1.24	18.1	3.02	52.3	1.07	18.5	2.82	48.2	0.89	20.3	2.37
	10	75.3	1.70	19.4	3.88	67.3	1.38	20.4	3.30	65.4	1.20	22.2	2.94
	25	90.1	2.00	21.0	4.21	86.8	1.79	22.0	3.95	80.0	1.50	23.0	3.47
	35	103.0	2.40	23.0	4.47	99.0	2.03	24.0	4.13	91.5	1.67	24.7	3.70
BWH 25	-5	64.1	1.45	22.5	2.84	57.3	1.17	23.4	2.45	53.3	0.98	25.0	2.13
	0	74.0	1.67	25.3	2.92	71.6	1.47	25.8	2.78	66.8	1.23	28.1	2.38
	10	103.0	2.33	27.6	3.73	96.7	1.98	28.2	3.43	90.1	1.65	30.8	2.93
	25	124.0	2.80	29.5	4.20	119.0	2.38	30.4	3.91	113.0	2.00	32.0	3.53
	35	142.0	3.30	31.4	4.52	136.0	2.78	32.8	4.15	131.0	2.40	35.0	3.74
BWH 40	-5	90.9	2.1	35.2	2.58	81.3	1.7	36.6	2.22	75.6	1.4	39.1	1.93
	0	104.9	2.4	39.6	2.65	101.5	2.1	40.3	2.52	94.7	1.7	43.9	2.16
	10	146.1	3.3	43.2	3.38	137.1	2.8	44.1	3.11	127.8	2.3	46.9	2.72
	25	175.9	4.0	46.1	3.81	165.9	3.4	47.1	3.53	156.0	2.9	48.0	3.25
	35	201.4	4.7	49.1	4.10	192.9	3.9	51.3	3.76	185.8	3.4	52.5	3.54

3.2 Operation limit Recommendable water flow rate:

Model	Max. m3/h($\Delta t=10^{\circ}\text{C}$)	Min. m3/h($\Delta t=47^{\circ}\text{C}$)
BWH3	1.4	0.29
BWH4	1.7	0.37
BWH6	2.7	0.58
BWH8	4.1	0.88
BWH15	7.1	1.5
BWH25	9.4	2
BWH 40	13.4	2.86

Symbols:

- O TEMP: Outdoor Temperature (°C DB)
- CAP: Capacity (KW)
- WFR: Water Flow Rate (m³/h)
- PI: Power Input (kw)
(total)
- COP: Coefficient of Performance

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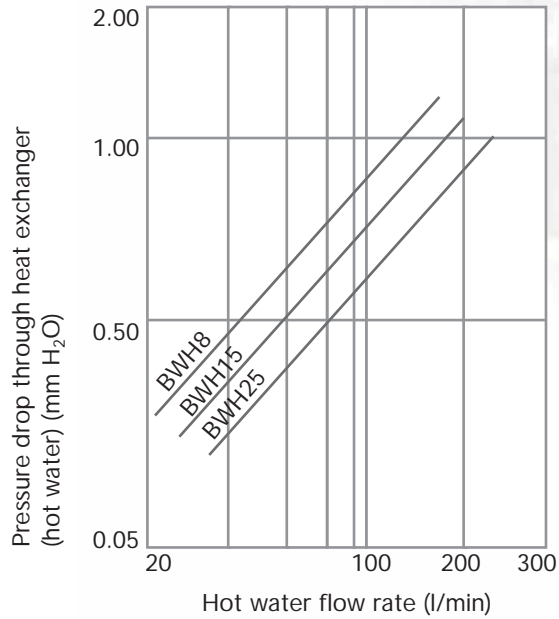
Note:

Water flow rate in these capacity tables is based on water temperature. rise t (10~50)°C

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3.3 Pressure drop through heat exchanger on water side



4. Electric characteristics

Unit	Power	Comp(ea)		FM(ea)	
Model	Volts-ph-Hz	LRA	RLA	KW	FLA
BWH3	380V/3ph-50Hz	66	8.5	0.25*1	0.4
BWH4	380V/3ph-50Hz	80	9.5	0.45*1	0.75
BHW6	380V/3ph-50Hz	66	8.5	0.47*2	1.1
BWH8	380V/3ph-50Hz	96	11	0.47*2	1.1
BWH15	380V/3ph-50Hz	96	12	0.7*2	1.6
BHW25	380V/3ph-50Hz	192	24	0.7*2	1.6
BWH40	380V/3ph-50Hz	320	39	1.1*2	2

Symbols:

- Comp: Compressor
- FM: Fan Motor
- LRA: Locked Rotor Amps
- RLA: Rated Load Amps
- KW: Fan Motor Rated Output
- FLA: Full Load Amps

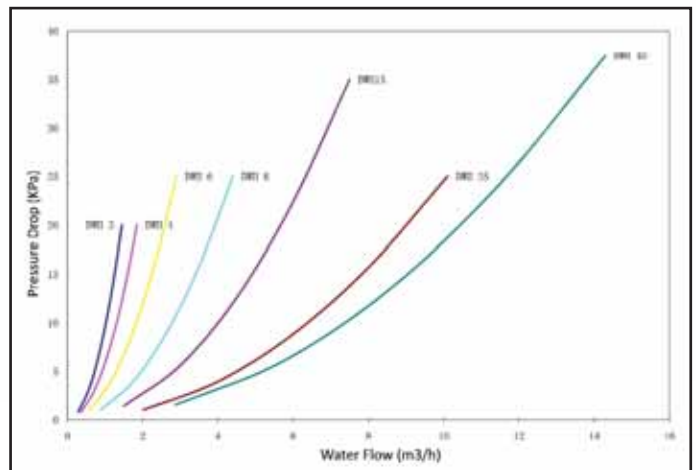
Information on other models are available on request.

Notes:

RLA is based on the following conditions:
Hz. 50, Max. 420 and Min. 347

Voltage Range:

Hz	50
Max.	420
Min.	347

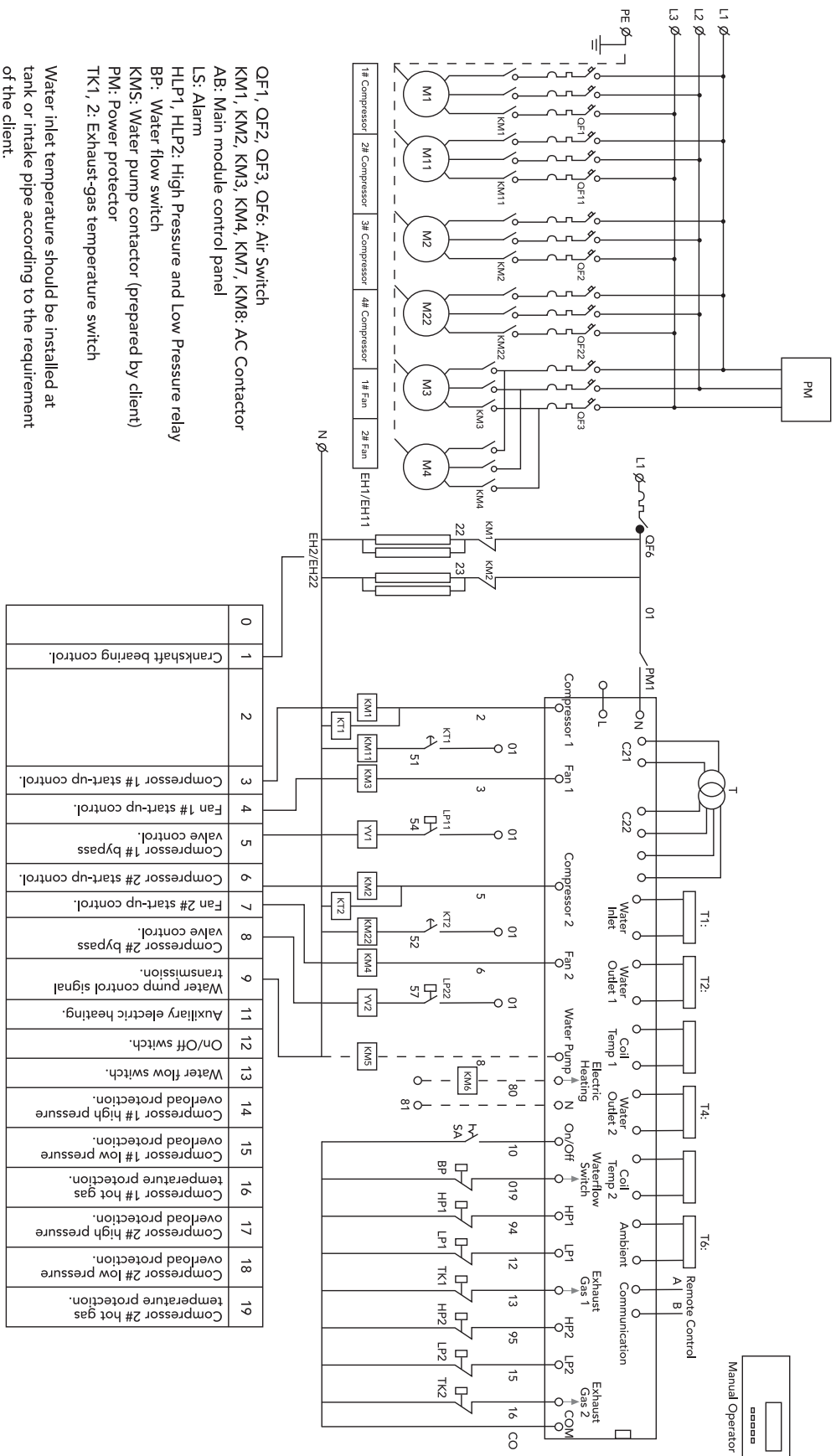


Units are suitable for use in electrical systems where voltage supplied to unit terminals is not below or above listed range limits.

Maximum allowable voltage unbalance between phases is 2%.

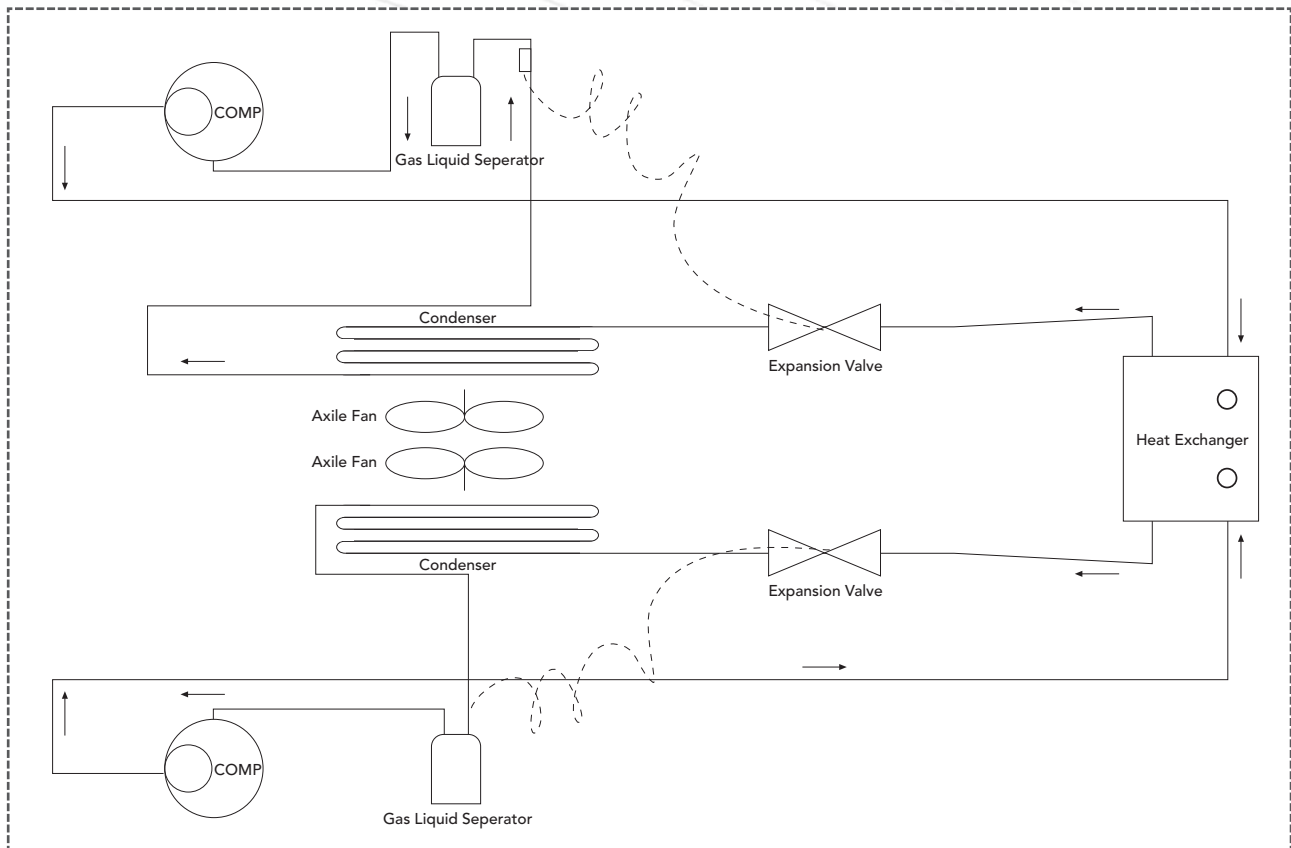


5. Wiring diagrams



6. System layout:

6.1 BHW 8 & 15



6.2 BWH 25

7. Optional accessory

The remote controller is an optional accessory for all models.

8. Transportation and quality control

8.1 Move and Installation:

- In the course of moving and installing, vibration-proof measures should be taken to avoid unit damage.
- In the course of conveying and hoisting, protection measures should be taken. Impacting on unit outside casing, sloping or overturning is not allowed.

8.2 Quality Control:

- Check whether the packaging is complete and without any damage.
- See whether all the accessories are complete according to the packaging list.
- Should there be damage to the unit, or incomplete accessories, the transportation party should be held responsible for compensation.

- Should there be any other problem besides the superficial damage, the company should be informed.

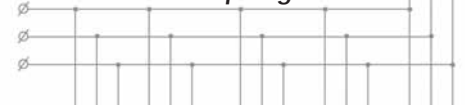
9. Installation

9.1 Service space

- Minimum spacing required: on location without water pipe, the minimum installation spacing required is 500mm; on location requiring water pipe, the minimum installation spacing is 1000mm. Keep enough ventilation at the top, or install a ventilator appropriate for wind cooling.
- Should there not be enough space for running of air to hot water unit, it will result in part super-cooling and the unit heating capacity will reduce. It may potentially affect the life-span of the unit.

9.2 Selection of installation position

This unit can be installed at any location on the building floor, although, when selecting the appropriate location for installation, attention should be given to the following factors and environmental conditions:



- Enough space should be allowed for installation of unit as well as daily maintenance and noise reduction.
- Unit should be installed horizontally and away from living space. Suggest installing the unit on the balcony or flat roof.
- Should unit be installed on a roof, attention should be given to wind direction. Unit should not be installed in a strong wind gap, air exhaust sections of other equipment, thick and hot steam, or consumable gas.
- In multi-level buildings, the unit should be installed concentratively, saving the water pipe, conducting wire of electrical equipment, and installation fee. This also ensures convenience for maintenance and reduces system resistance.
- When several units are installed together, the minimum distance among units should be ensured. In order to avoid noise superposition to result in vibration, the minimum distance between units should not be less than 1m.

9.3 Unit & system installation

9.3.1 Water system installation

Correct or incorrect installation of water system will influence the functionality and performance of the unit. It is therefore crucial that qualified technicians be used when installing the water system unit.

- Prevent system pipeline from leaking
- Water system pipeline should be selected from qualified heat preservation material. Heat preservation thickness is based on adiabatic performance; in principle it should be ensured that there is not too much heat exchange between water system and surroundings.
- Water pipe suspension bracket should have a certain intensity and the distance between two suspension brackets should not be too long, depending on the thickness of the water pipeline, although the general recommended distance is no more than 4000mm.
- Automatic air release valves should be set respectively on protuberant part and highest position of the water system.
- Drain contamination valve should be set at the lowest position of the water system pipeline.

- Since the unit has been installed with a high efficiency heat exchanger, the use of ground water, river water, lake water and any unprocessed water within the unit is not allowed.
- In order to avoid dirt deposit or blockage due to extended usage, it may be necessary to connect the unit to a filter and water treatment device respectively. 4 Mesh/Inch - 60Mesh/Inch is recommended for the filter screen. The water treatment device selection should refer to the diameter of water pipe, the current speed, and the instructions of the manufacturer.
- The thermometer and pressure gauge should be set within the water inlet pipe and outlet pipe respectively, in order to observe and analyse the running condition of the system.
- The cut-off valve and by-pass pipe should be set in front of the water inlet pipe and outlet pipe respectively, to ensure convenience when doing repairs.
- In order to avoid problems occurring while the system is in running condition, the system water pipeline should be thoroughly cleansed before connecting it to the unit, waiting for clear water to flow from pipeline.
- One year after installation and running of unit, a regular acid pickling measure should be taken against the water system pipeline, ensuring that the dirt within the heat exchanger and pipe can be cleaned, and that the unit can reach the stated water flow rate and appropriate water temperature.
- In order to guarantee a normal water flow rate and current speed, the standard configured water pump should be regulated.
- Insufficient water flow rate will damage the unit. When assembling water unit, the water system pipeline should be installed with the water flow switch connected according to the requirements of the drawing. The unit is able to realise protection function automatically based on the signals provided by the water flow switch.



9.3.2 Unit installation method

Under normal conditions, the unit should be installed and fixed on the floor of the building. Should different installation methods be required, SA Heat Pump Engineers should be contacted in order to avoid installation failure and inconvenience.

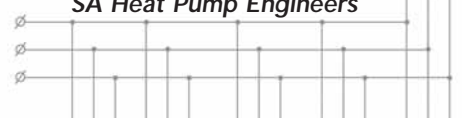
⚠ Attention should be given to safety of installation in order to avoid accidents.

Although internal focus parts of the unit have been applied, the necessary shockproof measures should be taken in order for the unit to function more efficiently. This can be achieved by installing damping rubber washers between the unit and base. The damping washer should not be less than 10-15mm.

9.3.3 Electrical equipment control installation requirements

- Arrange for qualified electrical equipment technicians to undertake installation.
- When handling electrical equipment, it is crucial to check and verify that the unit is not connected to electrical power supply. Do not handle unit when power supply is switched on.

- Before connecting to power supply, carefully read instructions with regards to the electrical controller and wiring diagrams, and install based on complete compliance to requirements of drawing.
- Make sure that the electrical power supply is appropriate for the unit capacity requirement. If it does not match the unit, reference should be made to the related electrical equipment standard to alter electrical power supply.
- A safety protection setting should be present between the unit and the electrical power supply. When selecting the type and standard of the safety protection equipment, reference should be made to the related electrical equipment criteria and technical instructions of the product.
- When concluding the line connections, it should be verified whether the unit is connected to the earth. Inadequate earth, or earth faults, are not allowed and should therefore be avoided.



Kempton Park Office Numbers

Tel: +27 11 394 1112/3

Fax: +27 11 394 1122

Kempton Park Address:

3 Forge Road

Spartan, Kempton Park

1619

Wicus Pretorius 082 696 1000

Anton Van Locherenberg 082 371 7676

Godfrey Sutherland 082 579 0841

Email: saheat@netactive.co.za

sahpe@telkomsa.net

Web Address:

www.saheatpump.co.za

Contact our head office for an
authorised dealer in your area.