

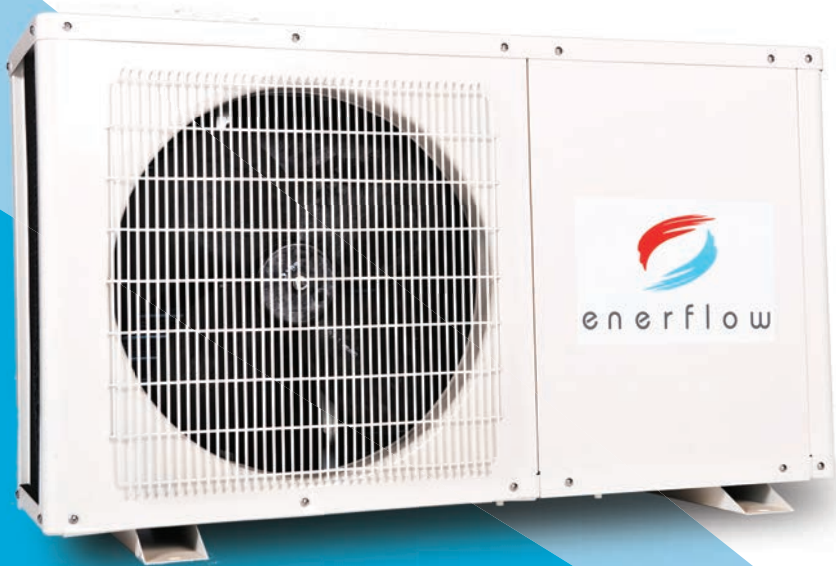


enerflow

Residential Heat Pump

USER GUIDE

GENERATION 5



**Please read this guide before
operating the heat pump**

FOR INFORMATION ONLY
Configuration Management
M-Tech Industrial (Pty) Ltd

TABLE OF CONTENTS

Table of contents	2
1. SAFETY CAUTIONS AND WARNINGS	3
2. HEAT PUMP CONTROLLER FUNCTIONS	4
2.1 Controller and Button Functions	4
2.2 Heat Pump Modes	4
2.3 Setting the Time & Day	6
2.4 Timer Function	6
3. ELEMENT BACK-UP	8
4. LEGIONELLA DISINFECTION CYCLE	9
5. MICRO CIRCULATION FUNCTION	10
6. HEAT PUMP OPERATING PARAMETERS	11
6.1 Changing Parameters	13
7. MAINTENANCE AND SERVICING	15
7.1 Self-maintenance by the user	15
7.1.1 Cleaning the strainer	15
7.1.2 Other general maintenance considerations	16
7.2 Annual service performed by the installer	16
7.3 Heat pump self-protection codes	17
8. OPTIMISE ENERGY SAVINGS	20
8.1 How it works	20
8.2 How to optimise energy efficiency	21
8.3 Suggested timer settings	22
RESIDENTIAL HEAT PUMP WARRANTY	23
Warranty Conditions	23
INSTALLATION HANDOVER CERTIFICATE	25
PERFORMANCE SPECIFICATIONS	27

SAFETY CAUTIONS AND WARNINGS

1

WARNING It is the responsibility of the user to operate and use the heat pump according to the instructions detailed in this guide. The user shall ensure that the health and safety of any other person in the area or site near where the heat pump is installed is not endangered by his conduct or activities when operating the heat pump. The user is responsible to prevent any tampering with the heat pump.

WARNING This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Incorrect handling can cause a serious hazard depending on the situation.

WARNING Children should be supervised to ensure that they do not play with the appliance.

WARNING Ensure that the electricity installation complies with local standards and regulations. This appliance must be installed in accordance with the national wiring regulations as contained in SANS 10142.

CAUTION Installation and maintenance must only be performed by qualified personnel who are familiar with local codes and regulations.

WARNING Ensure that the electricity/power supply is switched off before any installation work begins. Note that electric shock is dangerous and can cause death.

WARNING Do not turn off main power supply to the heat pump during a vacation or if not in use. The heat pump must have electricity in order to protect itself during cold climate conditions. It is recommended that the target temperature be set to 25 °C in order to save electricity during prolonged periods of non-use.

WARNING Do not turn the unit off and immediately on again. Allow 30 seconds for the refrigerant pressure to equalize. Do not disconnect/connect power while heat pump is in operation.

CAUTION There are some sharp edges within the unit that may cause injury.

CAUTION Note that the unit contains a rotating fan that may cause injury if the protective grid is removed. Ensure not to touch or work on the unit while in operation.

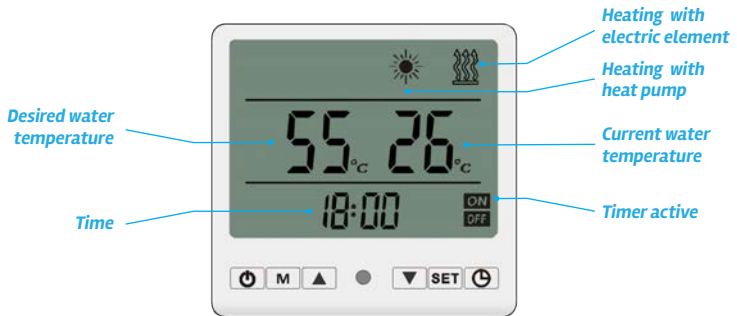
HEAT PUMP CONTROLLER FUNCTIONS

2.1 Controller and Button Functions

Your Enerflow heat pump makes use of an intelligent LCD controller. This controller can be used to inform the user of certain parameters and change settings on the heat pump unit. The changes that can be made with this controller include the following:

- Changing the desired water temperature;
- Setting up the timers and
- Activating the electrical element for fast heating mode.

Below is a depiction of the controller interface and buttons:



Display	Name	Function
⏻	Power	Switches the heat pump between heating mode and standby mode.
M	Mode	Activates the fast heating mode by also engaging the geyser element.
▲▼	Arrows	Used for changing the current setting up or down.
SET	Settings	Used to change the time, day or parameter settings of the unit.
🕒	Clock	Used for activating and setting up timers.

2.2 Heat Pump Modes

Once the system is switched on at the main power distribution board (DB), the intelligent controller will start up and display the initialization phase for a few seconds after which the time will be displayed as 00:00. The unit is now in standby mode and ready for operation.

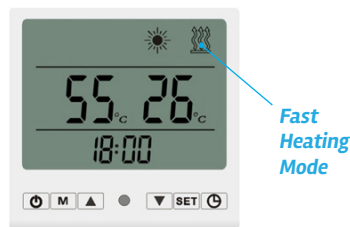
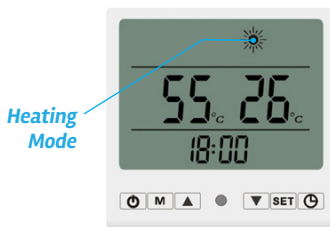
Initialization phase



Ready for Operation



The user can select between standby mode and heating mode by pressing the  button.



The user can also activate a fast heating mode by pressing the **M** button. This will activate both the backup element inside the geyser and the heat pump to work simultaneously to heat the water.

NOTE: Fast heating mode activates the electrical element which will lead to more energy consumption and should only be used in the exemption when reheating time needs to be reduced due to a temporary higher demand of hot water.

WARNING Do not turn off main power supply to the heat pump during a vacation or if not in use. The heat pump must have electricity in order to protect itself during cold climate conditions. It is recommended that the heat pump is placed in standby mode with all timers removed and the target temperature set at 25°C to keep the heat pump from heating the water.



2.3

Setting the Time & Day

The Enerflow heat pump has intelligent control that can be optimised to run more efficiently and also be adjusted to suit the user's daily routing. As part of this control, the time zones that the heat pump may operate in needs to be set up. The following steps will help you to set the Day and Time settings required for the timer.

1. Press the **SET** button once.
(The **Day** will now be flashing.)
2. Make use of the ▲▼ buttons to change the **Day**.
(0=Sunday, 1= Monday...6=Saturday)
3. Press the **SET** button again to acknowledge the **Day** setting and continue to the **Hours** setting.
(The **Hour** position will now be flashing.)
4. Make use of the ▲▼ buttons to change the **Hour**.
(Change to the current Hour)

Time Setting



Press the **SET** button again to acknowledge the **Hours** setting and continue to the **Minutes** setting.
(The **Minutes** position will now be flashing.)

5. Make use of the ▲▼ buttons to change the **Minutes**.
(Change to the current **Minutes**.)
6. Press **SET** to acknowledge the **Minutes** setting.

NOTE: To lock or unlock the intelligent controller, press and hold the ⌚ button and the **SET** button simultaneously for a few seconds.











2.4

Timer Function

The Enerflow heat pump can be set to only run during specific periods of the day. This function allows the heat pump to adjust to the user's daily routine and ensures that hot water is available when it should be. This function also ensures that the heat pump can be set to operate mainly during the hottest part of the day when it is most efficient and thus saving as much energy as possible.

Follow the steps below to set the **Timer Function**:

1. Press the ⌚ button once to enter **Timer 1 ON** slot.
(The Hours and the "1 ON" sign will flash.)
2. Make use of the ▲▼ buttons to set the **Hour**.
(Set to the first start-up **Hour**)

3. Press the  button to acknowledge the **Hour** setting and continue to the **Minutes** setting. (The **Minutes** and the “**1 ON**” sign will flash.)
4. Make use of the   buttons to set the **Minutes** parameter. (Set to the first start-up **Minutes**)
5. Press the  button to acknowledge the **Minutes** setting and continue to the “**1 OFF**” **Hour** setting. (The **Hours** and the “**1 OFF**” sign will flash.)
6. Make use of the   buttons to set the **Hour**. (Set to the first shutdown **Hour**)
7. Press the  button to acknowledge the **Hour** setting and continue to the **Minutes** setting. (The **Minutes** and the “**1 OFF**” sign will flash.)
8. Make use of the   buttons to set the **Minutes**. (Set to the first shutdown **Minutes**)
9. Press the  button to acknowledge the **Minutes** setting and continue to the “**2 ON**” **Hour** setting. (The **Hours** and the “**2 ON**” sign will flash.)
10. To set up the second time zone, repeat steps 2 to 7 above for “**2 ON**” and “**2 OFF**”.


Timer
Active



NOTE:

- *It is possible to decrease your saving by setting your timers incorrectly (such as letting the heat pump operate during the coldest part of the day).*
- *The heat pump will operate even without any timers being engaged.*
- *For energy efficient timer settings please see Section 9: How to optimise energy savings.*

Follow the steps below to cancel the Timer Function (thus allowing the heat pump to reheat the water as and when required during a 24 hour day):

1. Press the  button.
2. Press the **SET** button.
3. Repeat steps 1 and 2 four times to cancel all 4 time settings (1 ON, 1 OFF, 2 ON and 2 OFF).

NOTE: *Time zones in the **Timer Function** are **NOT** allowed to overlap.*

The table illustrates an incorrect timer setting where time zone 1 and time zone 2 overlaps with a resulting allowed operational time in column 3

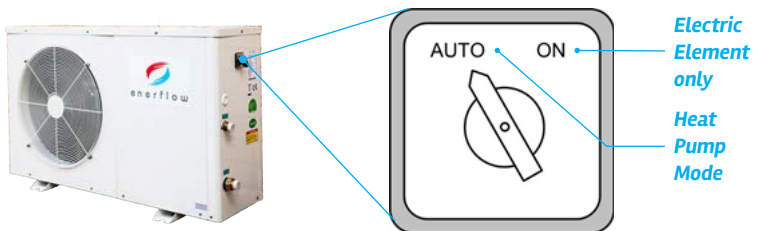
COLUMN 1 Time Zone 1	COLUMN 2 Time Zone 2	COLUMN 3 Active Time Zone
ON at 08h00 OFF at 23h00	ON at 04h00 OFF at 09h00	ON at 04h00 OFF at 09h00

The heat pump will therefore only run between 4 AM and 9 AM irrespective of the first time Zone allowing it to run till 11 PM

ELEMENT BACK-UP

The Enerflow heat pump is equipped with the intelligent function to use the electrical element located in the geyser as a backup system. This is to ensure that the user will have hot water even in the adverse event where the heat pump has entered into self-protection caused by an external event (such as too low or too high electrical supply voltage). During such an event the Enerflow heat pump will display the corresponding Error Code (see Trouble Shooting section of this guide) and an audible “Beep” will be heard to ensure the user takes note of the fault. The backup element will automatically be activated during such an event.

In the unlikely event where the heat pump is struck by lightning for instance, the intelligent controller may not function properly anymore. In such an event, the Enerflow heat pump is also equipped with an electrical cross-over switch (located on the side panel of the heat pump) which can be used to bypass the heat pump completely. By turning the switch from the default Auto position to the ON position redirects the electrical power away from the intelligent controller directly to the electric element (**Auto = Heat pump operation, On = Backup element only**). Once the power is switched over to the electric element, it will be controlled by the element thermostat to heat the water inside the geyser to the thermostat set-temperature.



NOTE: The cross-over switch can be used to remove the “Beeping” sound without disengaging the element. **Please write down the self-protection error code before switching the cross-over switch so that the installer may be informed of what caused the error.**



WARNING Always ensure that an appropriate and approved geyser thermostat is installed. When the cross-over switch is engaged, electrical power to the control of the heat pump is removed. The heat pump will not be able to protect itself during extremely cold weather conditions (<3°C) and it is therefore recommended that an authorised installer is contacted as soon as possible to determine the fault and switch the heat pump back to Auto after the fault has been rectified.



WARNING Take note that if the thermostat temperature may be set higher than the heat pump set temperature. The resulting water then be hotter and could cause scalding.

LEGIONELLA DISINFECTION CYCLE

4

The Enerflow heat pump has the ability to disinfect your geyser once a week (Monday mornings at 02h00) from bacteria such as Legionella*. During this process the heat pump will automatically be started to heat the water to 55°C where after the electric element will be activated until the target temperature (set in parameter 6** – recommended 60°C) is reached (geyser thermostat set to 60°C as default during installation). This temperature will be maintained for the time period as set in parameter 7 (10 to 30 min).

NOTE: During the Disinfection Cycle the  sign will flash on the LCD controller:

WARNING When this function is set to activate, the water may be hotter than 55°C and may result in scalding. Adequate care should be taken to prevent scalding in small children or individuals with mental impairment.

** The pathogenic Gram-negative bacterium that grows in central heating and air conditioning systems at a certain temperature that can cause Legionnaires' disease.*

*** Standard geyser maximum temperature is 75°C controlled by the thermostat.*

For more information please visit

www.health24.com/Medical/infectious-diseases/Bacterial-infections/Legionnaires-disease-20120721-2

!

MICRO CIRCULATION FUNCTION

Your Enerflow heat pump has the functionality of heating a central, ring-main water distribution pipeline. This function is used to ensure that hot water is supplied throughout the residence as an instant hot-water-on-tap solution. The installer will ensure that the commissioning valve on the return line is set to an approximate 10% bypass (i.e. closed 90%). Activate the micro circulation function by changing Parameter 8 to the value of 1 (see section on Heat Pump Operating Parameters) on the intelligent controller. With this function enabled, the water pump will run for 40 seconds during the period set in Parameter 9 (adjustable between 2 and 60 minutes). Thus, if Parameter 9 is set to 10, the heat pump will start the water circulation pump every 10 minutes for the predefined 40 seconds. Depending on the volume of water in the ring-main, the Parameter 9 interval should be adjusted accordingly (more volume = smaller intervals to ensure that the water is kept at the desired temperature).



Micro Circulation Function

(See Section 3.8)

0 = function off;

1 = function on.

NOTE:

- *Ring-main systems are less energy efficient due to higher thermal losses in the circulation pipes.*
- *To minimise thermal losses it is very important that the circulating piping in the ring-main system be insulated properly with at least R-1 rated lagging. In the case of a 20mm (3/4 inch) pipe, R-1 rated lagging has a thickness of about 25mm.*



WARNING All plumbing installations must comply with local standards, regulations and bylaws. Refer to the latest versions of SANS 1352, SANS 10252, SANS 10254

HEAT PUMP OPERATING PARAMETERS

The heat pump operation is governed by 22 input parameters. Some of the operating parameters may be adjusted by the user if required. The remainder of the parameters are set by the qualified installer and should not be changed. The function and range of all the parameters are explained in the following table:

Parameter	Description	Range	Default	Remark
0	Target water temperature*	25 ~ 75°C	55°C	Adjustable
1	Set temperature difference – Difference between actual measured water temperature at the position of the heat pump temperature probe and set/required water temperature. (The smaller the difference, the more frequently the heat pump restarts)	2 ~ 5°C	5°C	Adjustable
2	Defrosting interval	30 ~ 90 min	40 min	Do not change
3	Temperature at which defrosting operation starts	-30 ~ 0°C	-7°C	Do not change
4	Temperature at which defrosting operation stops	2 ~ 30°C	13°C	Do not change
5	Duration of defrosting operation	2 ~ 12 min	8 min	Do not change
6	Target water temperature for disinfecting cycle	60 ~ 90°C	60°C	Adjustable
7	Duration of disinfecting cycle	10 ~ 120 min	30 min	Do not change
8	Micro circulation function (Off = 0; On = 1)	0 / 1	0	Adjustable
9	Micro circulation cycle interval	2 ~ 60 min	2 min	Adjustable
10	Installer function	1 ~ 10 min	3 min	Do not change
11	Installer function	70 ~ 100°C	90°C	Do not change
12	Installer function	5 ~ 30°C	20 °C	Do not change
13	Compressor discharge protection temperature	90 ~ 125°C	115°C/b5	Do not change
14	Temperature for exiting the compressor discharge protection	5 ~ 30°C	30°C	Do not change

Parameter	Description	Range	Default	Remark
15	Heat pump auto restart mode (Off = 0; On = 1)	0 / 1	1	Adjustable
16	Starting temperature for defrosting evaporator	-9 ~ 10 °C	4°C	Do not change
17	Beeper (Off = 0; On = 1)	0 / 1	1	Adjustable
18	Disinfecting cycle (Off = 0; On = 1)	0 / 1	1	Do not change
19	Geyser temperature measurement probe offset	-10 ~ 10°C	3°C	Do not change
20	Automatic geyser temperature measurement probe offset	0 (fixed) / 1 (calculated)	0	Do not change
21	EEV setting	0 - 5	0 - 5	See remarks at the end of the table
22	HP temperature measurement probe offset	-5 ~ 5 °C	3 °C	Do not change
A	Water temperature	-9 ~ 90°C	Reading	Temperature output
B	Evaporator coil temperature	-9 ~ 90°C	Reading	Temperature output
C	Compressor discharge temperature	0 ~ 127°C	Reading	Temperature output
D	Ambient temperature	-9 ~ 90°C	Reading	Temperature output
E	Heat pump return water temperature	-9 ~ 90°C	Reading	Temperature output
F	Electronic expansion valve operating parameter	0 ~ 50	Reading	Valve open output

**A maximum water temperature of 55°C can be reached by the heat pump without using auxiliary heaters. However, if the target temperature is set between 55°C and 75°C the electric heater will be activated above 55°C to reach this temperature.*

Remarks

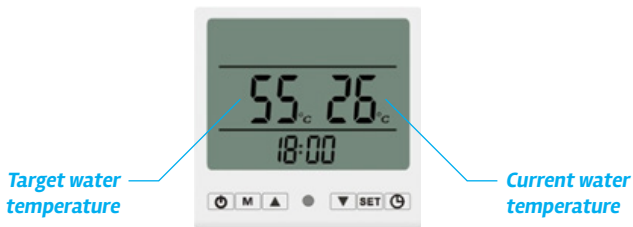
- Parameter 0 – It is advised to set the target temperature at 55°C.
- Parameter 1 – Temperature difference between target and measured temperature before heat pump starts. Recommended to set this at 5°C.
- Parameter 13 – It is advised to set the temperature at 115°C which is indicated as b5.
- Parameter 14 – It is advised to set the temperature at 30°C
- Parameter 21 – Parameter 21 should be set to a specific number with regards to the unit you have:
 - Parameter 21 should be set as “1” for ERHP-SU08E-MS;
 - Parameter 21 should be set as “2” for ERHP-SU14E-MS & ERHP-SU14E-PL;
 - Parameter 21 should be set as “3” for ERHP-SU08E- PL;
 - Parameter 21 should be set as “4” for ERHP-SU20E-MS & ERHP-SU20E-PL;
 - Parameter 21 should be set as “5” for ERHP-SU26E-MS.


Changing Parameters

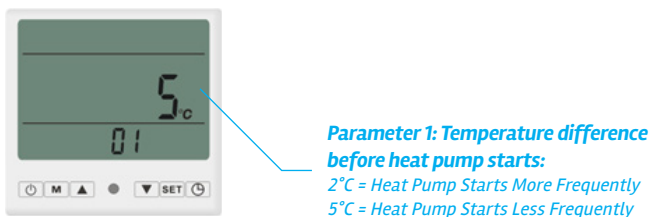
6.1

To adjust or change the parameter settings, follow the steps below:

If the target temperature needs to be changed, parameter 0 can be modified as explained in the steps or alternatively the user can simply press the ▲▼ buttons.



1. Press the Power  button to engage standby mode.
(The picture of the sun will no longer be on the display)
2. Press and hold the **SET** button for 3 seconds.
(Display will “Beep” and parameter number “00” and the current setting “55°C” will flash)



1. Make use of the ▲▼ buttons to select between the different operating parameters.
2. To change an operating value, press the SET button once. (Quickly)
(The parameter number “At the bottom” will not be flashing anymore, but the current setting “Indicated between the lines” will continue to flash)
Note: If both continue to flash, please ensure the heat pump is in Standby mode.
3. Make use of the ▲▼ buttons to change the value to the desired or default value.
4. Press the SET button to confirm the setting and return to selecting an operating parameter.
(To change the values of these parameters, repeat steps 3 to 6.)
5. To exit this mode automatically, wait for 5 seconds without pressing any buttons or press the ⏻ button to exit manually.

MAINTENANCE AND SERVICING

7

The following maintenance should be done by the user at least quarterly. In areas where excessive debris is present in the water (i.e. at construction sites or where repairs were done on municipal water lines) more frequent maintenance may be required.

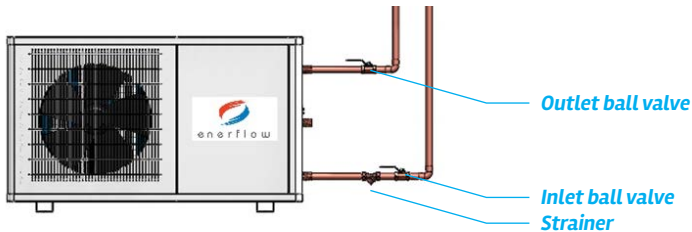
Before undertaking any maintenance on the heat pump, engage the Standby Mode as indicated in section 3.2 Heat pump modes.

Self-maintenance by the user

7.1

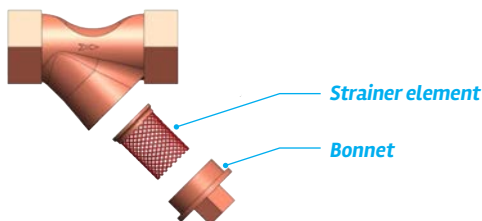
Cleaning the strainer

7.1.1



The strainer can be cleaned by using the diagram above and following the steps listed below:

1. Close the outlet and inlet ball valves at the heat pump.
2. Remove the Bonnet of the strainer by using the correct size spanner.
3. Remove the strainer element or Sieve.
4. Rinse and clean the strainer element under running water by slightly opening the inlet ball valve.
5. Reinsert the strainer and close the Bonnet hand tight only.
6. Open the outlet ball valve slightly to allow any air that may have entered into the heat pump to be released through the strainer.
7. Close the bonnet completely now by using the correct size spanner again.
8. Open the ball valves to the full open position.



7.1.2

Other general maintenance considerations

- Clear away any objects or trim vegetation that is within 500mm from the heat pump unit and that could restrict air flow into the heat pump.
- The airway of the fan and the evaporator needs to be cleaned at least annually to ensure effective airflow and heat transfer. If any obstruction such as cobwebs, leaves and the like on the outside of the heat pump is observed, clear this out immediately. Do not use a high pressure water hose to spray down the unit; the heat exchanger fins may be damaged.
- Ensure that all the parameters are set correctly.

7.2

Annual service performed by the installer

Although your Enerflow heat pump is a self-contained and reliable means of providing eco-friendly hot water, an **annual** service is required to ensure efficient performance and that warranty conditions are met. The following items must be checked:

- Ensure that the water supply pressure and flow rate is sufficient at all times.
- Ensure that the geyser tank probe is still correctly inserted and fastened into the geyser probe pocket or onto the geyser flange.
- Open and service the water circulation pump.
- Ensure that water drainage holes in the heat pump base plate are not blocked. Water build up in the base of the heat pump unit could lead to premature rust and damage internal components.
- Service the heat pump Diverter Valve.
- Test the Back-up element to ensure that it is still in a good working condition.
- Descale the heat pump unit using a non-industrial descaling fluid such as Brown Vinegar or Kettle Cleaner.
- Ensure the refrigerant charge (i.e. amount of gas inside the heat pump) is still sufficient.
- No maintenance needs to be performed on the internal refrigerant components of your Enerflow heat pump.
- The unit is designed with a close loop refrigerant cycle that does not need short term maintenance or service under normal operation.
- Ensure that the system is drained completely of water if it is not going to be used in the winter in order to avoid a pipe from bursting due to freezing.

NOTE: The service operations as described in the section above shall only be carried out by qualified installer/personnel who are well trained within their respective fields. In areas where hard water conditions are present, this service may need to be performed more frequently (such as every 4–6 months).

Heat pump self-protection codes

7.3

NOTE: Please make use of the following table to do troubleshooting if an error or fault occurs. If the problem persists shut down the system and switch off the main power supply or activate the crossover switch as described in this guide. Hereafter, contact your installer for assistance.

Fault/Error	Possible Cause	Recommended Action/Remark
Heat pump does not start.	<ul style="list-style-type: none"> • Geyser temperature is (<55°C). • Circuit breaker off. • Heat pump protection Error. • Loose electrical connections. • Unit failure. 	<ul style="list-style-type: none"> • Check water temperature. • Check Circuit Breaker. • Identify the Error and attempt to correct. • Contact an Electrician. • Contact the Installer.
Fan does not work	<ul style="list-style-type: none"> • High air temperature (> 35°C). • Physical obstruction. • Fan failure. 	<ul style="list-style-type: none"> • Check the air temperature • Check if the fan rotates freely and that no restrictions are present. • Contact the Installer.
Heat pump works with insufficient heating.	<ul style="list-style-type: none"> • Very cold air temperature (<2°C). • Finned coil is dirty. • Obstacle blocks air inlet/ outlet. • Fan not running. 	<ul style="list-style-type: none"> • Check the air temperature. • Clean the finned coil as per maintenance section. • Remove the obstacle. • Contact the installer.
P01	Water inlet temperature sensor failure.	<p>In case of any of these failures the Installer must be contacted to check the connections and replace sensor if required.</p>
P02	Evaporator coil temperature failure.	
P03	Compressor discharge temperature sensor failure.	
P04	Ambient temperature sensor failure.	
P05	HP Switch failure.	
P06	LP Switch failure.	
P07	Too high compressor discharge temperature.	

Fault/Error	Possible Cause	Recommended Action/Remark
P08	First class anti-freeze protection.	Error will automatically disappear after ambient temperatures rises.
P09	Second class anti-freeze protection.	Error will automatically disappear after ambient temperatures rises.
P10	Water level sensor failure.	Contact the installer.
P11	Overload protection.	Contact the installer.
P12	Heat pump return water temp. failure.	In case of any of these failures the installer must be contacted to check the connections and replace sensor if required.
E01	Phase protection sensor failure.	Contact the installer.
E04	Phase rotation detected.	Contact the installer.
E05	HP switch protection.	<ul style="list-style-type: none"> • Electric element will be activated automatically. • Switch off main power supply to the heat pump, wait 30 seconds and switch on again. • Clean inline water strainer. • Check municipal water supply pressure. • Contact the installer to open and clean water circulation pump.
E06	LP switch failure.	Contact the installer.
E07	Too high compressor discharge temperature.	<ul style="list-style-type: none"> • Switch off main power supply to the heat pump, wait 30 seconds and switch on again. • Clean strainer and open a hot water tap to flush/prime the water lines. • Ensure that the fan is not restricted by dirt or leaves. • Check municipal water supply pressure. • Contact the installer to open and clean water circulation pump.
E08	Communication failure.	<ul style="list-style-type: none"> • Reconnect LCD display unit extension cable. • Ensure the plugs has a proper connection. • Contact the installer.
Defrosting sign indicating	Defrosting mode activated.	Heat pump will continue with normal operation after defrosting is completed.

NOTE: *If any of the errors above appear frequently, contact your installer.*

PLEASE NOTE THE FOLLOWING:

1. *Outdoor temperature, water inlet temperature and parameter settings may affect the performance and power consumption of the heat pump unit.*
2. *Ensure that the heat pump air flow is not blocked.*
3. *If the ambient temperature is too high, the fan may stop working temporarily in order to protect the system. The heat pump will however still provide hot water to the geyser. If the temperature decreases the fan will resume operation again.*
4. *If the unit enter the defrosting mode the fan may stop working temporarily. Once the evaporator coil temperature has reached an acceptable level, the fan will resume operation.*
5. *Ensure that the unit is well ventilated and that no cold air is redirected back into the evaporator (i.e. do not install the heat pump in small enclosed rooms).*
6. *Ensure that all the isolation valves are open before the heat pump is turned on.*

OPTIMISE ENERGY SAVINGS

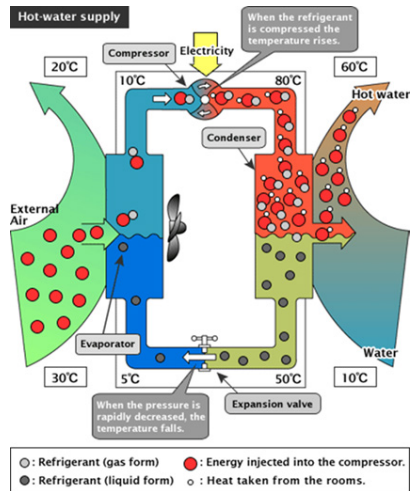
In this section the basic functioning of a heat pump is explained to enable the user to optimise the energy savings of the heat pump.

8.1

How it works

The Enerflow heat pump uses an air-source-vapour-compression-cycle to transfer heat from ambient temperatures in the atmosphere to the water in a geyser. A refrigeration/gas cycle is normally made up of four components (**Evaporator**, **Compressor**, **Condenser**, and **Expansion Valve**) each with a very specific function.

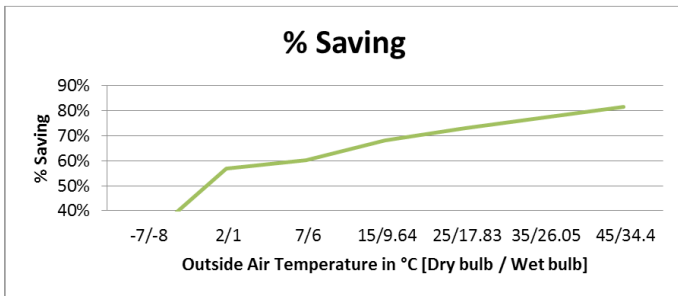
Below is a depiction of such a gas cycle that interacts with a water circulation cycle similar to what can be found in the Enerflow heat pumps. The picture below (for illustration purposes only) shows the major components and is used to briefly explain how they interact to deliver energy efficient hot water. The **evaporator** is used as a heat exchanger that enables heat transfer from the warmer ambient air to the colder gas inside the evaporator tubes. An electric fan is used to ensure the air is drawn over the evaporator fins and enhance heat transfer. This absorbed heat/energy is then further intensified (i.e. more energy added) by passing the gas through the **compressor** which increases the pressure and temperature of the gas cycle. This high-pressure-high-temperature gas is then able to transfer the energy to the water through a second heat exchanger, the **condenser**. The water from the geyser is pumped through the condenser where it collects the energy in the condenser tube, transfers it to the water and thereby heating it. Finally the cooler-high-pressure gas is passed through an **intelligently controlled expansion valve** that rapidly lowers the gas pressure and temperature. This low-pressure-low-temperature gas is then passed to the evaporator where energy can once again be harvested from the warmer atmospheric air. This closed loop cycle operation will continue until the water in the geyser is at the heat pump set temperature. At this stage the intelligent controller will turn off the components in a specific protective sequence and put the heat pump in standby.



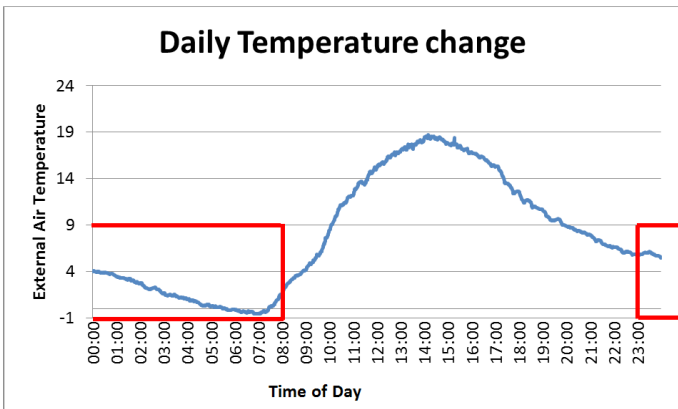
(Picture reference <http://aboutyourrefrigeration.blogspot.com>)

From the basic explanation of how a heat pump works, it should be clear that the refrigeration gas cycle will absorb more energy when the outside ambient temperature is hotter (i.e. when there is more energy available). This section will advise the user of the heat pump how to optimise the energy savings by setting up the heat pump timers properly.

The graph below depicts a typical Enerflow heat pump's saving at certain atmospheric air- and inlet water temperatures. In this picture it can be clearly seen that the heat pump will save more energy (i.e. money) at higher outside air temperatures.



The picture below depicts the typical average daily ambient temperature on an hourly basis for South Africa (reference: www.worldclim.org).



In the picture it can be seen that the temperatures is at its lowest during the late evenings and early mornings. Therefore, it is recommended that the heat pump be operated as little as possible during these colder periods of the day (i.e. between 11PM at night to 8AM in the morning).

Every household's daily hot water consumption profile is different and therefore not all timer settings could be the same. However, this section may be used as a guideline that can be followed to enhance energy saving. The assumption made herein is that no large quantity of hot water will be consumed before 13h00–14h00 and that the majority of hot water is consumed between 19h00–21h30.

ON 1: This is used to turn the heat pump on, and should be set to as late as possible in the early afternoon i.e. 14h00.

OFF 1: This is used to turn the heat pump off and should be set to 1 hour after the family has gone to bed e.g. 23h00, thus leaving geyser with hot water ready to be used for the morning showers etc.

ON 2: This is used to activate the second timeslot at which the heat pump should turn on, and should be set to 1–2 hours before hot water is to be consumed in the morning. The heat pump will further heat the water that may not have been heated by ON1 and also recover the heat loss of the geyser during the night.

OFF 2: This is used to deactivate the second timeslot and should be set to heat just enough water for morning consumption (i.e. two showers). It is best to let the heat pump deactivate before consumption starts.

Below are some examples of timer settings to guide the user.

Example 1: For a family with someone at home during the morning.

ON 1:	08:00
OFF 1:	23:00
ON 2:	04:00
OFF 2:	05:00

Example 2: For a family not home during the morning.

ON 1:	11:00
OFF 1:	23:00
ON 2:	04:00
OFF 2:	05:00

NOTE:

- *The LCD controller will turn off the internal components of the heat pump and enter into standby mode when the desired set water temperature is reached. During this time, the water temperature will be monitored and if the temperature falls below the set temperature (see allowed temperature deviation as set in Parameter 1) the heat pump will start heating the water again. Thus, it is important to note that the timer settings allows the heat pump to operate during that specified interval only.*
- *The Enerflow heat pump may heat the geyser faster than an electrical element in outside air temperatures higher than 18°C, but may take longer when outside air temperatures are below 18°C. Therefore the timers should allow the heat pump to reheat the water as long as the conditions outside is favourable.*

RESIDENTIAL HEAT PUMP WARRANTY

The Enerflow residential heat pump unit is covered by a carry-in warranty. The manufacturer will therefore be liable for all costs with regards to repairing the heat pump at any of their appointed service centres during the warranty period. The heat pump removal, delivery and re-installation cost is not covered by the manufacturer's warranty and the manufacturer will not be responsible for these costs.

The client can alternatively request an authorised field service agent to repair the heat pump onsite. The callout fee and travel to the site will be for the clients account. The replacement/repair of parts still covered by the manufacturer's warranty and the associated labour cost to perform this replacement/repair of the parts will be for the manufacturer's account.

Warranty Conditions

1. M-Tech Industrial (the manufacturer) warrants the product to be free from defects in material and workmanship for a period of twenty four (24) months. An additional twelve (12) months warranty (thus thirty six (36) months in total) will be granted on the water circulation pump and an additional 36 months (thus a total of sixty (60) months) will be granted on the compressor unit of the product.
2. The warranty will only be valid provided that proof of the correct installation, commissioning and operating procedures – as set out during training and certification – were followed.
3. The date of commencement of the warranty period stipulated in clause 1.1 will be the date of first installation of the products – with accompanying proof of installation – or three (3) months after the date of sale or delivery of the products to the distributor, whichever is the shortest.
4. Any product or part of the product proving defective within the warranty period will be repaired or replaced at M-Tech Industrial's opinion when returned to M-Tech Industrial's domicilium (or written communicated alternative address), transportation charges pre-paid. M-Tech Industrial will not be responsible for any installation or removal costs.
5. Any product or part of the product that was repaired under the conditions of clause 1.4 and that was still within the warranty period shall be subject to the original warranty period as set out in 1.3 or an additional six (6) months warranty, whichever is the greater.
6. Any product or part that was repaired not under the conditions of clause 1.4 shall be warranted for 6 months.

1. Damage caused to components due to rust is not covered under these warranty conditions.
2. Wetted component warranties will only be valid where products are installed to handle water that complies with SANS241 Class 1.
3. Under no circumstances shall M-Tech Industrial be responsible for loss of Distributor's profit or for any consequential or indirect or any other damages of any nature whatsoever and from whatever cause arising. Nor shall any state of damage or non-functionality be warranted as a result of acts of God (including damage due to extreme cold and frost) or Force Majeure.
4. Notwithstanding the provisions where goods are to be manufactured to the instructions, drawings or specifications of Distributor, M-Tech Industrial shall not be liable in any way for any loss, injury or damage whatsoever sustained by Distributor or any other person.
5. M-Tech Industrial reserves the right to do quality checks, in addition to that already performed at the manufacturing plant, on a batch sample. M-Tech Industrial will be responsible for the cost of transport (including return fees) for these batch sample products.

INSTALLATION HANDOVER CERTIFICATE

This certificate should be kept in a safe place. The client may be required to present it in the event of a warranty claim.

- Once the installation is complete and the system tested, the installer shall ensure that the client understands the operational and safety requirements of the heat pump.
- All repair- and service work must only be performed by a person authorised by the manufacturer. Failure to comply with this will void the warranty.
- Ensure that the details of the certificate below are comprehensively completed by both the client and the installer to ensure the warranty on the heat pump is instated.

Heat Pump Serial Number:	
Installation date:	
INSTALLER DETAILS	
Company Name:	Reference Number:
Surname:	Name:
Signature:	Tel:
CLIENT DETAILS	
Surname:	Name:
Address:	
Suburb:	
City:	
Tel:	
I (the undersigned) acknowledge that the installation was completed and tested as fully functioning. I confirm that the installer has shown me the workings and operation of my Enerflow heat pump. I also understand the operation and safety requirements for this heat pump unit.	
Signature:	

PERFORMANCE SPECIFICATIONS

Please visit www.enerflow.co.za for the performance specifications of your specific heat pump model.



SWIMMING POOL HEAT PUMPS

*Harvests free thermal energy
from the atmosphere and
transfers it to your pool.*



M-Tech Industrial
24 Totius street, Totius Park,
Potchefstroom, South Africa

Tel: +27 (0)18 297 0326/7
Fax: +27 (0)18 297 0318
Email: rhp@enerflow.co.za

www.enerflow.co.za



enerflow

FOR INFORMATION ONLY
Configuration Management
M-Tech Industrial (Pty) Ltd