

End User Instruction Manual

IHS Ground & Water Source Heat Pumps

*** Single Temperature Control**

Models: TERRA Compact 5 – 12kW
TERRA Twin (2*8, 2*10, 2*12kW)

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Introduction

A standard system includes: heat pump, Hygienik Tank, tank stat, diverter valve or twin head pump, hot water programmer and underfloor heating controls.

The heat pump is switched on or activated by either the underfloor heating or the hot water system calling for heat.

IHS strongly recommends that you contact your electricity provider and apply for low cost electricity tariff, ex. Economy 10, Economy 7 and Eco Tariff. It's worth shopping around for utility providers.

Note: Economy 10 is an ideal tariff and it gives three periods of off-peak electricity, spread over ten hours. Many customers also utilise these times to run dishwashers, washing machines, etc. at set times.

The timings vary from region to region but could be in the order of this:

Example Only

Cheap Tariff On	Cheap Tariff Off
04.30 am	07.30 am
13.30 pm	16.30 pm
20.30 pm	00.30 am

Underfloor Heating

The underfloor heating system uses a ST6100 programmer. The heating controls should be set to match the low tariff times. This will ensure the lowest possible running costs for the system.

In winter, ten hours of cheap tariff time may not be enough to keep your building up to temperature, however the system has been designed to cope with this.

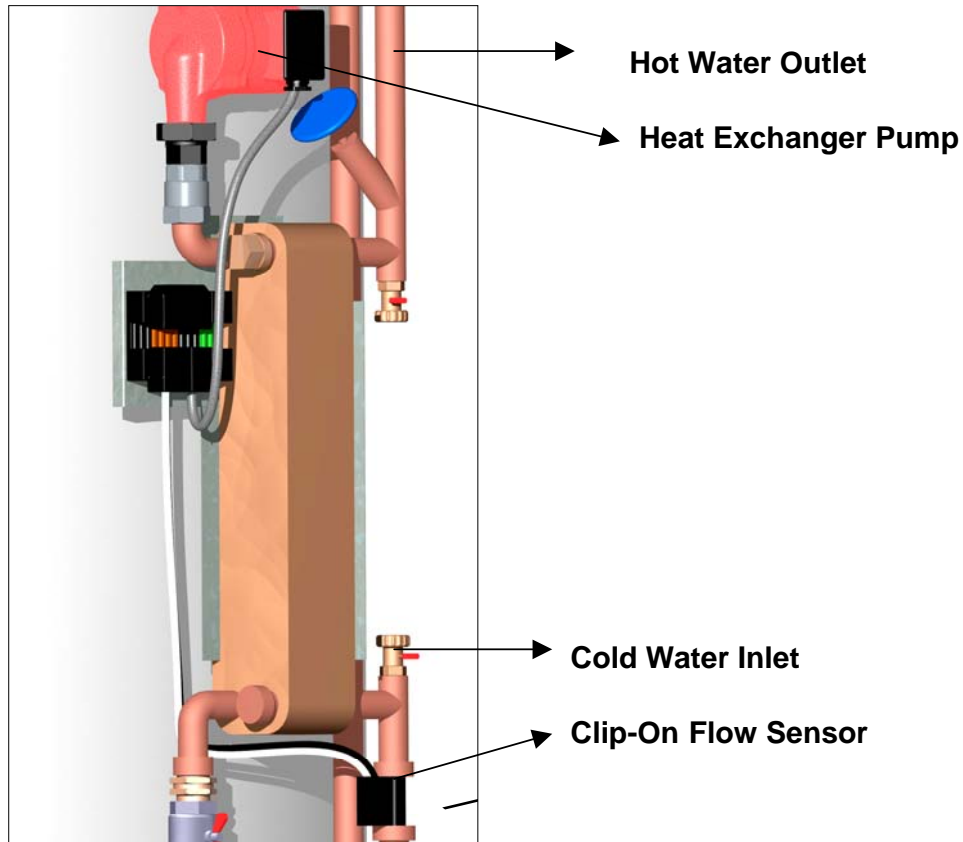
Normally when your underfloor heating programmer is timed to be on, the mid-point of your room stat is pre-set at 20°C. When it is timed off, the mid-point on the room stat is pre-set at 15°C. This temperature can be varied by +/- 6°C so any room will never fall below a pre-set temperature. This means the heat pump can still run even when the programmer is timed off.

We advise you to set your room stats at 20°C for living areas and at 16°C for bedrooms.

To avoid extreme temperature variations in your underfloor heating, it is important that you don't change the room stat settings dramatically. If a room is too cold, simply move the stat up by 1°C. Similarly if it is too hot, reduce temperature by 1°C. Leave for 24 hours before adjusting again. The secret with underfloor heating is to set the system for stable comfort temperatures rather than what the actual stat reads.

Naturally, the lower the temperature the lower the running costs.

Hot Water



The Hygienik Tank is fitted with a heat exchanger. A heat pump, solar panels or other heat source such as a wood burning stove or even a conventional boiler can be integrated and connected to it.

The heat exchanger fits on the side of the tank.

One side is connected to the primary water (Central Heating Water) on the top of the Hygienik Tank. The other (secondary) side is connected to the domestic mains water system.

On the secondary side, once the hot water tap is turned on, the flow switch give a signal to the heat exchanger pump to come on. It will pump the water from the top of the tank through the plate heat exchanger in to the bottom of the tank while the mains cold water will flow in the opposite direction through the plate heat exchanger, extracting heat from the primary circuit.

IMPORTANT: Check the flow rate on the label on your plate heat exchanger.

Flow rates come in 25 litres, 35 litres, 50 litres and 70L/min.

Ensure that the amount of water drawn is no more than the stated flow rates. This can be checked by using the bucket test. Use a 10L bucket and a watch. Simply open the biggest tap (probably the bath tap) and time how long it takes to fill the bucket.

A modern high-pressure shower should use no more than 11L/min; therefore a 25L/min heat exchanger should run two showers at once.

An eco-shower uses 7L/min. These are good high-pressure showers. If your shower uses more, you will have to place a restrictor on your shower. The shower is most likely built for a non-pressurised system.

Shower types such as a deluge model or full body showers are not recommended for modern energy efficient heating systems.

Hot Water Programming

For timing the hot water, an ST6100 programmer is used.

All IHS standard heat pump systems give hot water priority. This means that when the hot water system is calling for heat, the heating is off. Care should be given to the timing of the hot water system. Ideally it would be set for three periods in each day: eg early morning, lunchtime and evening. How long these periods need to be depends on the water required and tank size but one and a half hours for each should be sufficient. In the winter it may be better to set these periods outside the low tariff times to allow for priority to be given to the heating system. (We suggest using low tariff periods for underfloor heating.) However in the spring, autumn and summer it is better to time the hot water so that it is on solely in the cheaper periods.

When the hot water programmer is timed on it supplies power to the tank stat. If the temperature in the tank is below the set point of the tank stat (ie the water in the tank is cooler) the output of the heat pump is diverted to the Hygienik Tank. Once the tank temperature increases beyond the set point of the tank stat, then the output of the heat pump returns once more to the heating.

The tank stat is set at the time of commissioning. It is essential that the end user does not adjust it. Adjusting the system or tank stat yourself may cause the heat pump output to be directed permanently to the Hygienik Tank resulting in a loss of heating.

Setting The Tank Stat

If, however, you disregard our advice, please carry out the following steps in order to put things right:

When the tank is cool, switch the hot water programmer to "Continuous" and turn the tank stat fully up.

Check the heat pump output temperature (see next section).

The heat pump should run 4-6°C past the output temperature.

When the heat pump switches off on high temperature (Light No. 4), slowly turn down the tank stat until you hear it click.

This sets the stat to the correct position.

Setting The Heat Pump Output Temperature

You may need to adjust the heat pump temperature down in order to dry out a new underfloor installation. (See Underfloor Heating Installation Manual for further details).

Gradually step the temperature up over time until the maximum output of 49°C is reached. The heat pump temperature is normally set at 49°C. It actually runs at about 4-6°C higher, giving a final output temperature of 53 - 55°C.

Briefly press the "P" button on the heat pump temperature controller. It will flash between "SP1 " and the set temperature, which is normally 49°C. **It should not be set higher.**

Use the down arrow to set the desired temperature (ex. 27°C should give an output of between 31°C and 33°C).

Press the "P" button once more to set.

It is important to remember that when the heat pump temperature is turned down, the temperature of the water in the Hygienik Tank will also be lower.

Setting The ST6100 Programmers

- Move the vertical slider on the right hand side to "set day/time".
- Push the "day" button until the correct day is highlighted.
- Use the "+" and "-" buttons to set the time.
- Now move the programmer to "set programme", use the "+" and "-" buttons to set the first on period; then press the next "on/off"; repeat for next "on/off".
- Now press "copy" button **seven** times to copy the programme to all days.
- Put the slider to "run programme".
- Put the horizontal slider to "auto".

For further information refer to the product leaflet.

Heat Pump Operation

On the front panel of the heat pump, there are two rocker switches, five red warning lights and one green light in a row.

The green rocker switch is the main on and off switch.

The black rocker switch is for the ground loop pump and has two positions: "flush" and "auto".

In flush mode, the ground loop pump will always run, even if the heat pump is off. (Providing there is power to the heat pump).

We recommend putting the system in flush mode prior to commissioning in order to remove all the air out of the ground loop system.

In the auto position, the ground loop pump is automatically switched on shortly before the heat pump comes on. This is the normal operating position for the heat pump.

Green and Red (Warning) Lights

When the green light is on, it means that the heat pump is in normal operating mode and should be running.

When any of the red lights come on, it generally indicates a fault (See fault finding table page 8).

Temperature Read-out Function

There is also a temperature read-out function on the heat pump. This is the temperature that the heat pump is giving to the heating system. (On well water systems, there should be a second readout; this is the discharge temperature from the heat pump.)

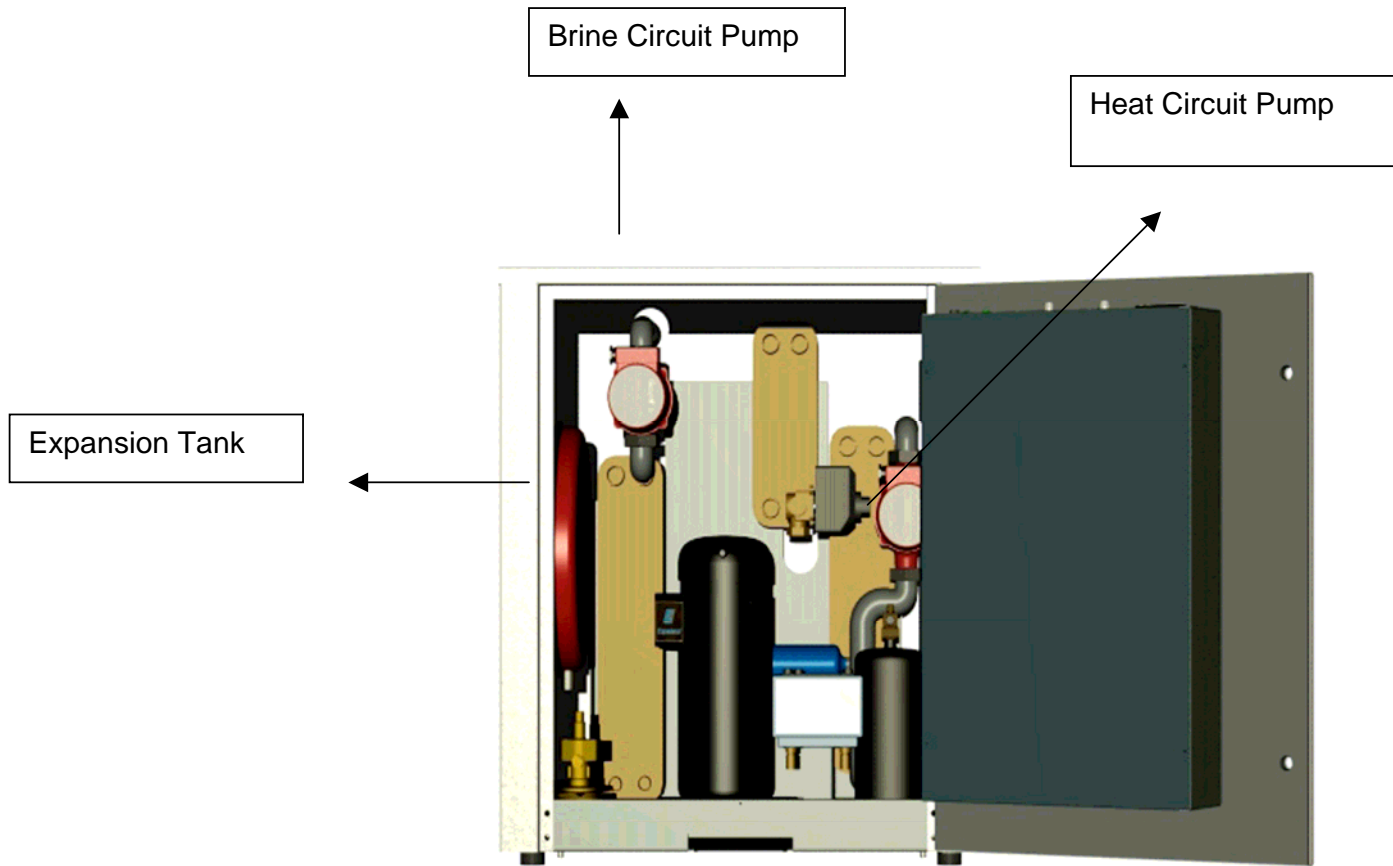
Once the heat pump calls for heat, there is an eight-minute delay until the heat pump runs.

On twin systems there is a further eight minutes until the second compressor runs.

Fault Finding

Problem	No light on heat pump control panel; no temperature read-out
Check	Are the main isolator and auxiliary spur switched on? Check fuse on front panel There are further circuit breakers inside the heat pump; call IHS for advice

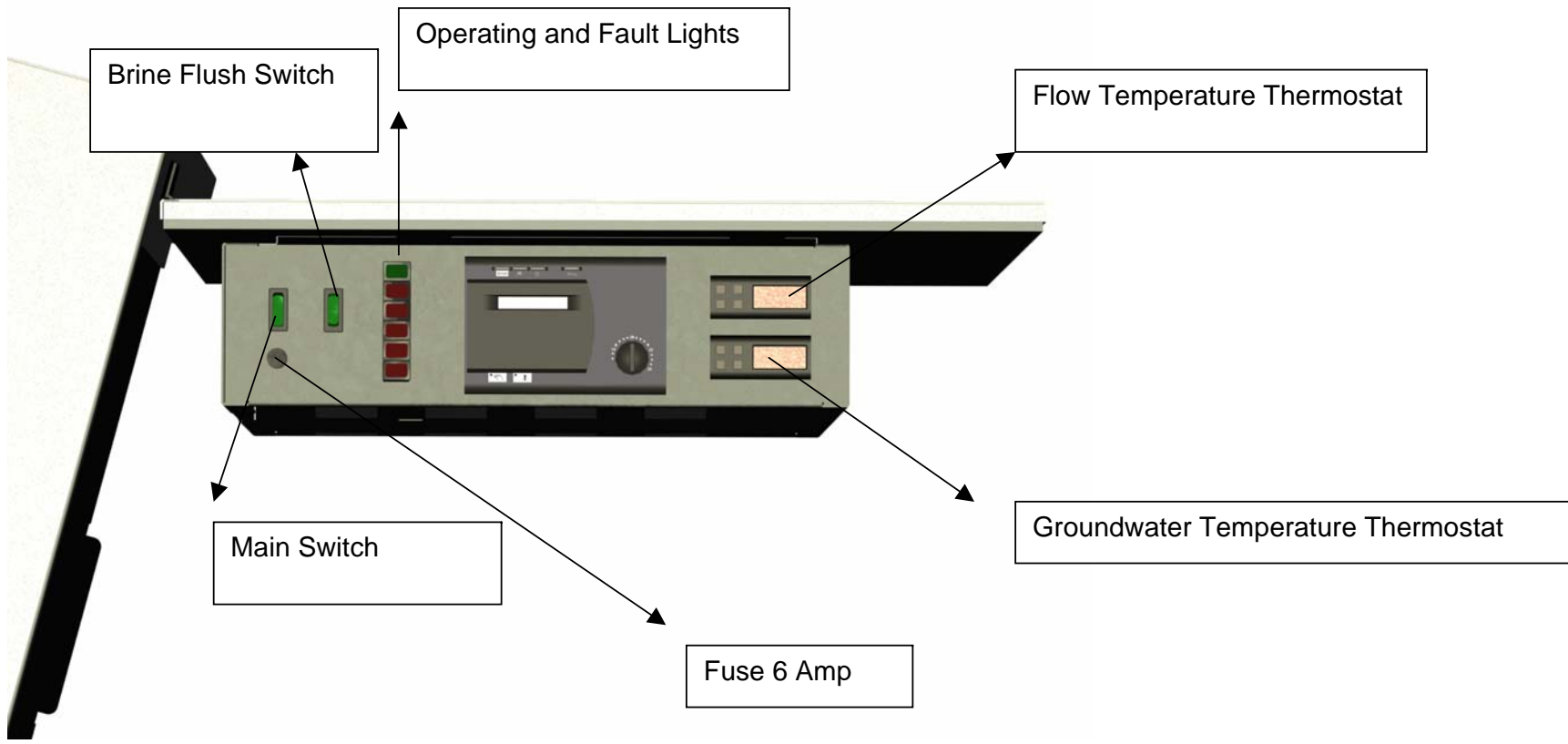
Fault Code	Meaning	Possible Problem
Error 1	Heat pump high pressure fault. Usually due to poor circulation on the heat pump output.	<p>Blocked strainer on the return line from the Hygienik Tank</p> <p>Solution: Switch pump off. Isolate with isolation valves and clean as required.</p>
		<p>Air in the Hygienik Tank</p> <p>Solution: Put a hose on the bleed point at the top of the tank and open tap to see if any air comes out. Re-pressurise heating system to 1.5 bar as required.</p>
		<p>Diverter valve in wrong position</p> <p>Solution: Remove actuator head and confirm that the valve is pointing to either the heating or the Hygienik tank.</p>
		<p>Heat pump circulating pump not running</p> <p>On the compact unit, the pump is inside the heat pump on the right. On other units it is in the return line after the strainer. Call IHS or consult your heating engineer for advice on how to check the pump.</p>



(Unit shown is a compact model)

Fault Code	Meaning	Possible Problem
<p>Error 2 In ground loop or closed borehole systems</p>	<p>This is a heat pump low-pressure fault. Usually caused by insufficient flow rate on input side of the heat pump</p>	<p>Blocked strainer on the flow from the ground loop</p> <p>Solution: Switch pump off. Isolate with isolation valves and clean if necessary.</p>
		<p>Ground loop pump not running</p> <p>On the compact unit, it's inside the heat pump on the left. On other units it is in flow line after the strainer. Call IHS or consult your heating engineer for advice on how to check the pump.</p>
		<p>Loss of pressure</p> <p>Solution: Check that the ground loop system has pressure, this is normally between 1.5 and 2 bar. Re-pressurise as necessary but if pressure loss persists, look for evidence of leaks in ground loop chain and at the ground loop manifold.</p>
<p>Error 2 On well systems</p>		<p>Blocked strainer on flow from well</p> <p>Solution: Switch pump off. Isolate with isolation valves and clean with an old toothbrush.</p>
		<p>No pressure</p> <p>Solution: For constant pressure systems, check that pressure is indicated on the gauge. Check that the outlet 2-port valve is open. You can see the arrow of the actuator head through the motor casing. It should be pointing in line with the pipe and not at right angles to it. Check that the fault light is not illuminated on the well controller. For variable speed units, check that the speed controller is not switched off. Is it possible that you have run out of water?</p>

Fault Code	Meaning	Possible Problem
Error 3	The thermal overload of the compressor has cut in	Is the ambient temperature of the heat pump room too high? Should be less than 35°C Is the main electricity supply to the heat pump within 220-230V? Are the cable terminals tight?
Error 4	The heat pump has reached its maximum preset temperature	This is perfectly normal. The heat pump will automatically reset as required
Error 5	The ground water temperature is too low	In ground loop systems the ground loop chain has to be thoroughly checked In well systems this is often seen when there is insufficient water in the well If the problem persists call IHS/your heating engineer for advice



(Unit shown is a compact model)

General Operating Problems

Insufficient domestic hot water	<p>The most common problem is air in the Hygienik Tank. Put a hose on the bleed point at the top of the tank. Take to a sink or outside. Gently open the tap. If air is heard then wait till air stops. Re-pressurise the heating system to 1.5 bar. Get your installer to show you how to do this before leaving the job.</p>
	<p>Are you trying to run off too much hot water at once? The heat exchanger has a limit on the flow rate it can supply. Do the bucket test!</p>
	<p>Is the heat exchanger pump running when a tap is opened? Is it possible that the flow sensor has been knocked off? (The flow sensor is located on the cold water inlet pipe to heat exchanger)</p>
	<p>Is the strainer in the secondary side of the heat exchanger (in the main water inlet) blocked? Isolate and clean as required</p>
	<p>Is the timer for domestic hot water programmed for a sufficient period?</p>
	<p>Is the tank stat set correctly? (See instruction on page 5)</p>
(Diverter valve systems)	<p>Is the valve pointing to the hot water tank?</p> <p>Solution: Turn off heating, turn hot water clock to continuous. If tank is cold, valve should point to hot water tank. (Check if the pipe going to the tank gets warmer).</p>
(Twin pump systems)	<p>Has the pump for the hot water tank switched on?</p>

No Heating

Is the tank stat set correctly? For diverter valve and twin pump systems, the pipe to the tank will always be warm. Reset the tank stat.

Is a room-stat calling for heat?

Check and see whether at least one light from zones 1-6 on the underfloor heating control box is illuminated.

Is the boiler output light on the heating control box illuminated? (Light has flame symbol)

Are the pump lights on the same control box illuminated?

Is the heating circulation pump running?

In diverter valve systems, is the diverter valve pointing to heating rather than hot water?

Twin pump systems - is the heating pump running?

Check warmth of pipe to see which direction the heat is going.

Routine Maintenance

The heat pump system needs very little maintenance.

There are three main strainers (filters) to check: ground loop strainer, central heating strainer and hot water plate heat exchanger strainer.

After the heat pump has been in service for more than three months (where any initial problems should arise) they only need to be checked annually (see below).

The system may need to be checked however, if the heat pump is showing error codes (see tables above).

Well systems (often referred to as open borehole systems) may require more regular checks - see below.

Airing the Hygienik Tank

In the first three months of operation, regularly check for air in the Hygienik Tank. You can do this by carrying out the following steps:

- Place a hose on the bleed point at the top of the tank.
- Take the hose outside or to a sink.
- Gently open the tap. If air is heard, then wait till it stops.
- Re-pressurise the heating system to 1.5 Bar. Get your installer to show you how to do this before leaving the job.

Checking the groundloop Strainer

Compact Unit

To check the strainer in the compact unit:

- Open door and switch off power to the heat pump. Flush / auto switch must be in auto.
 - The groundloop pump is on the left hand side; underneath this is an isolator valve.
 - Close the isolator valve.
 - Find and identify the strainer, to the left of the strainer is another isolator valve. Close this.
 - Place a small bowl under the strainer and undo the chamber head with a suitable spanner. Remove the mesh and check it has no foreign objects in it. Clean under a tap if need be. Re-fit the strainer.
 - Open the valve to the left.
 - Finally, open the valve inside the heat pump.
 - Ensure that the pressure of the groundloop system is set to 1.5 Bar.
- Re-pressurise if necessary.

Larger/ Twin Units

There is no isolation valve inside the heat pump; instead there is one on each side of the strainer. Check as above.

Well System

Switch off the power to the heat pump and switch off the well pump control unit. There is an isolator valve on either side of the filter. Close these. Locate the small red drain tap. Place a bowl under this and open the tap. When the water stops flowing, unscrew the bottom of the filter and remove the cartridge. Clean if necessary, using an old toothbrush.

Well systems should be checked every quarter or more frequently if required.

Checking the Heating Strainer

The strainer is found in the return line between the Hygienik Tank and the heat pump.

Compact Unit

To check the strainer in the compact unit:

- Open door and switch off power to the heat pump.
- The heat pump circulation pump is on the right hand side; underneath this is an isolator valve.
- Close the isolator valve.
- Find and identify the strainer, to the right of the strainer is another isolator valve. Close this.
- Place a small bowl under the strainer and undo the chamber head with a suitable spanner. Remove the mesh and check it has no foreign objects in it. Clean under a tap if need be. Re-fit the strainer.
- Open the valve to the right.
- Finally, open the valve inside the heat pump.
- Ensure that the pressure of the heating system is set to 1.5 Bar.
- Re-pressurise if necessary.

Larger/ Twin Units

There is no isolation valve inside the heat pump; instead there is one on each side of the strainer. Check as above.

Other than the above, check that both the heating and ground loop system is holding pressure at 1.5 Bar.

IHS recommends that all installers attend a ground source heat pump seminar prior to installations. We offer them free of charge in our head office with any system purchase.

Please ask your plumber/commissioning engineers to demonstrate how to carry out maintenance tasks.

In the case of well systems, you should learn how to check the filter yourself.

Guarantees

The IDM system carries a two-year labour and parts guarantee.

In order to avail of an extra four-year guarantee on parts from IDM, an annual maintenance contract should be purchased from IHS. Under this maintenance agreement, you will be entitled to an annual system check from an IHS service engineer at a mutually suitable time. Following the visit, you will receive a comprehensive written summary highlighting any necessary action required. The engineer will perform a complete system diagnosis and will compare readings taken from the original commissioning. Additionally, they will check you still have sufficient anti-freeze protection in your ground loop system.

For more information, please contact the head office on 01854 613 161, or email sales@invisibleheating.co.uk .