

# HEAT GENIE USER & INSTALLER MANUAL



**systemlink**  
energy saving solutions

**HEAT GENIE  
MANUAL**

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### V3.8

This specification relates to the Heat Genie Solid Fuel Link-up family. It specifies operating conditions and installation requirements for the Heat Genie assuring correct and safe operation. The Heat Genie should only be installed by suitably qualified personnel. Systemlink accepts no responsibility for installation and use of Heat Genie equipment unless these requirements are strictly adhered to. Systemlink reserves the right to amend this specification and the Heat Genie product configuration as it sees fit.

# 01 | INTRODUCTION FOR USER AND INSTALLER

Thank-you for purchasing the **SystemLink Heat Genie** product. In the box you will find:

- The Heat Genie with Auto Air Vent
- Thermal Safety Valve with remote probe (standard 1.3m length)
- SystemLex Wiring Centre
- Strainer (to be installed on the return line from heating system into Heat Genie)
- Installation Manual
- Mounting Shelf

**Heat Genie** is a fully insulated central heating Link-up device that joins an open-vented solid fuel boiler to a new or existing heating system whether that system is open-vented or sealed. The Heat Genie ensures complete hydraulic separation between the solid fuel appliance and the heating system.

## **Description of operation for the User:**

When the system has electrical power, in normal operation, when a fire is lit in the solid fuel appliance and it comes up to temperature, the pipe stat causes the pumps to run to dissipate heat from the solid fuel appliance to the hot water cylinder and when the hot water cylinder is up to temperature it sends heat to the heating.

In a fault situation, for example, if there is a power cut, the solid fuel appliance then begins to gravity flow to the Heat Genie (hot water rises by natural convection). If the solid fuel appliance reaches a critical level of temperature of 95°C the thermal safety valve opens and cold water is allowed to flow through the Heat Genie, thereby keeping the solid fuel appliance from overheating. For Thermal Safety Valve Maintenance refer to page 17.

## **Further Information for the Installer:**

Heat Genie should be installed by a competent person and in accordance with local regulations. With the Heat Genie you can heat any zone or heat sink with either the solid fuel heat source or other linked heat source such as an oil or gas boiler.

All heat dissipation and safety elements for the solid fuel heat source are handled by the Heat Genie whereas typically a cylinder coil or heat-leak radiator would be required.

Heat Genie can also provide rapid domestic hot water heating from the solid fuel heat source and gives the ability to provide near instantaneous hot water to baths, showers and taps.

When wired as shown Heat Genie gives priority to the solid fuel heat source when it is lit/running, heating hot water (DHW) first and when DHW is up to temperature switching over to heating. The Heat Genie operation is dependant on a pipe thermostat which is typically set to 60-65°C. This reduces the dependency on fossil fuels and saves money.

There is one input circuit and two output circuits connected to the Heat Genie. The input circuit comes from the solid fuel appliance. The solid fuel appliance will always be open-vented. The first output circuit goes to the heating system. The decision to use an open or sealed heating system design is entirely at the discretion of the installer as Heat Genie will work equally well with both types of system. The second output circuit is the safety cooling circuit. This can be from a pressurised or open-vented cold water supply. It must be a reliable cold water supply in the event of a power cut. Note the safety cooling circuit cold water supply **must not** be taken from the stove feed/vent tank as it contains heating water treated with corrosion inhibitor etc. The choice of system must, however, be fully compliant with the recommendations of the manufacturer of the particular heat sources to be used.

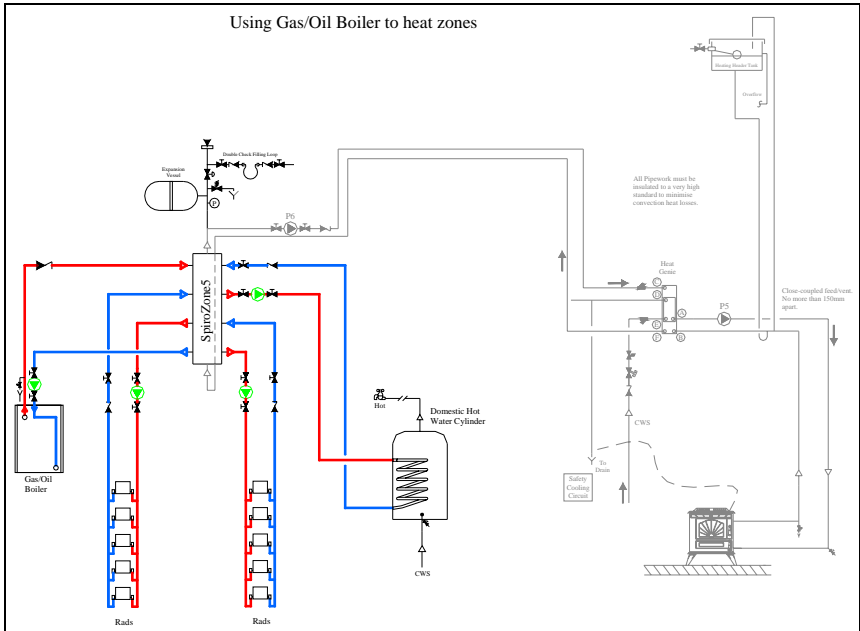
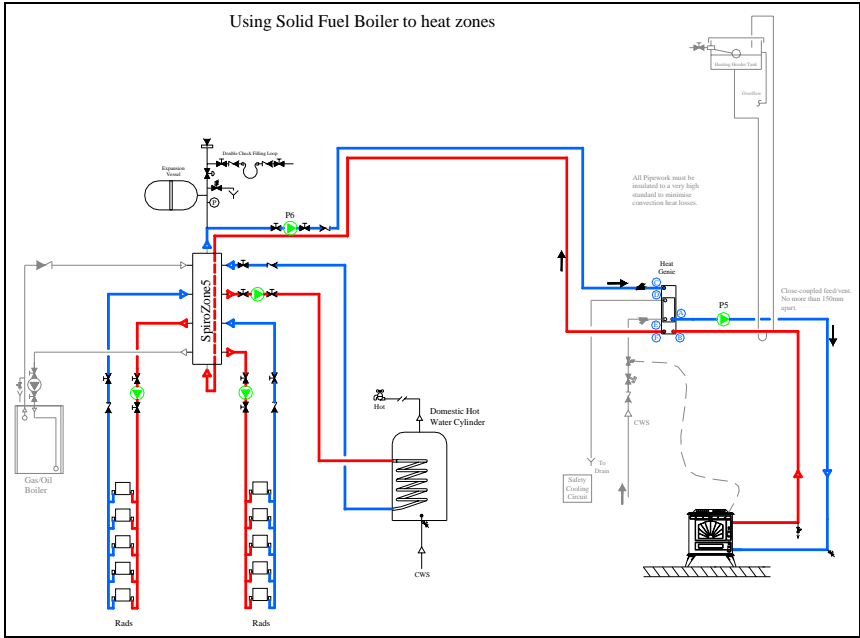
The use of **plastic pipe** is **forbidden** on all pipework directly connected to the Heat Genie and in general should be avoided on a solid fuel system. Of course an existing system may have plastic pipe already installed in the main heating system and this can be acceptable provided the stove is not oversized as this could lead to very hot water being pumped into the heating system. Special attention must be given to underfloor heating which normally requires lower flow temperature than a stove will typically output. To avoid damage to floors the use of a mixing valve on the underfloor heating input is strongly advised.

**CAUTION!** If the Heat Genie is installed in an area where limescale is present in the water and the Rapid Domestic Hot Water is connected through the safety heat exchanger as shown in the example on page 7 or in Scenario 2 on page 13, then the water must be treated with a water softener. Otherwise there is the possibility that limescale could block the flow of cold water through the capillary safety valve and the heat exchanger on the opposite side of the solid fuel appliance. This will lead to an unsafe situation. Heat Exchangers damaged by scaling are not covered by warranty. If the water exceeds the values below a water softener should be installed:

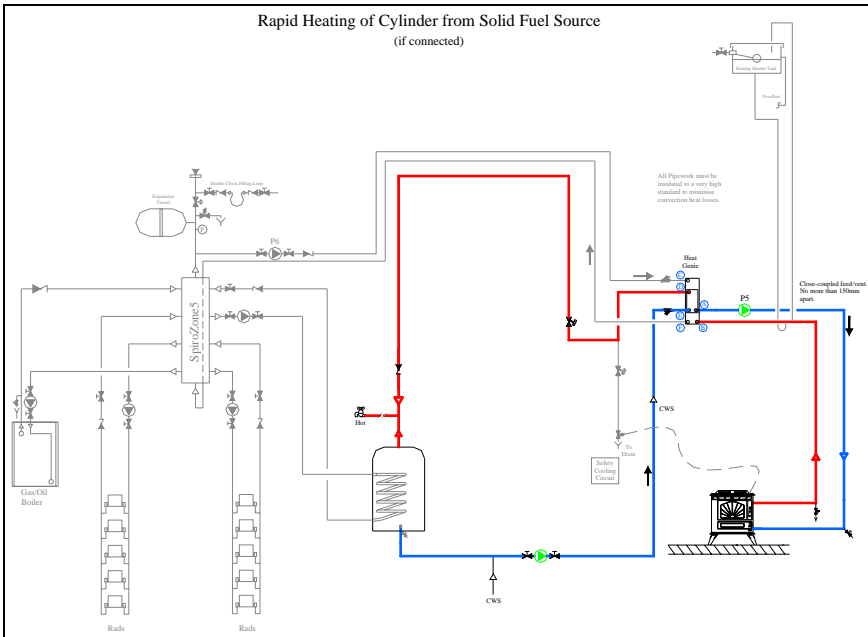
Description	pH	Total Dissolved Solids (TDS)	Total Hardness	Chlorides	Magnesium	Calcium	Sodium	Iron
Maximum Recommended Levels	6.5-9.0	600 mg/litre	150 mg/litre	300 mg/litre	10 mg/litre	20 mg/litre	150 mg/litre	1 mg/litre

**CAUTION!** If during normal operation hot water is continuously discharged for long periods from the safety cooling circuit, seek advice from a competent heating engineer. Persistent discharge should not be tolerated.

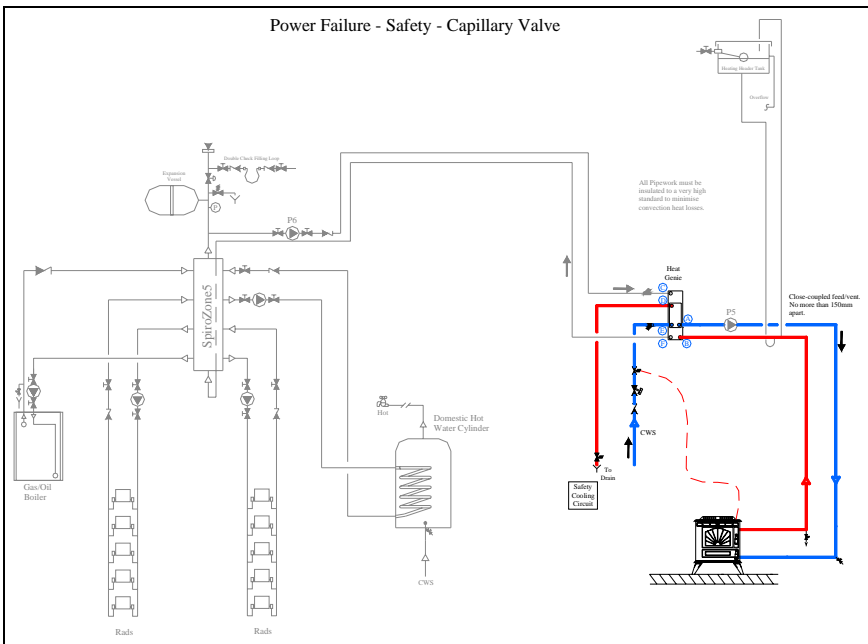
# 02 | MODES OF OPERATION



### Rapid Heating of Cylinder from Solid Fuel Source (if connected)



### Power Failure - Safety - Capillary Valve



# 03 | MOUNTING OF THE HEAT GENIE

## General Information

When considering where to mount the Heat Genie, allow adequate space for pumps and other connected equipment. Dimensions can be found on page 26. The Heat Genie should be mounted **no more than 3 metres horizontally** away from the solid fuel appliance with all pipework having a continuous rise to it. The Heat Genie can be mounted using the shelf provided or alternatively due to its light weight can be supported by its bracketed connecting pipe-work.

## Noise Considerations

Heat Genie should be installed with adequate support for pumps and pipework such that noise and vibration from pump circulation is minimized.

## Orientation

Heat Genie must be installed in a vertical orientation as shown in Figure 1. It must not be installed on the side, or in any orientation other than shown, due to the thermosyphoning principles that Heat Genie can operate under in certain scenarios. There is a sticker on the Heat Genie pipework just below the air vent with an arrow pointing to the top side. It is possible to swap the short loop linking the heat exchangers from the left side (as shown below in Figure 1) to the right side (as shown in Figure 2), if it is more convenient for installation. If this is done, all other connection must also swap sides, i.e. A, B will swap from bottom left to bottom right.

# 04 | PORT CONNECTIONS

Please see Figure 1 & Figure 2 below to explain the symbols used to identify the various types of port connections. Heat Genie must be installed according to these symbols to prevent any problems or voiding of warranty.

Note ports D & E can have a dual function if the 'rapid hot water from solid fuel' option is used.

Connect the included Auto Air Vent using the 312 compression fitting (also included) to the 1/2" pipe stub.

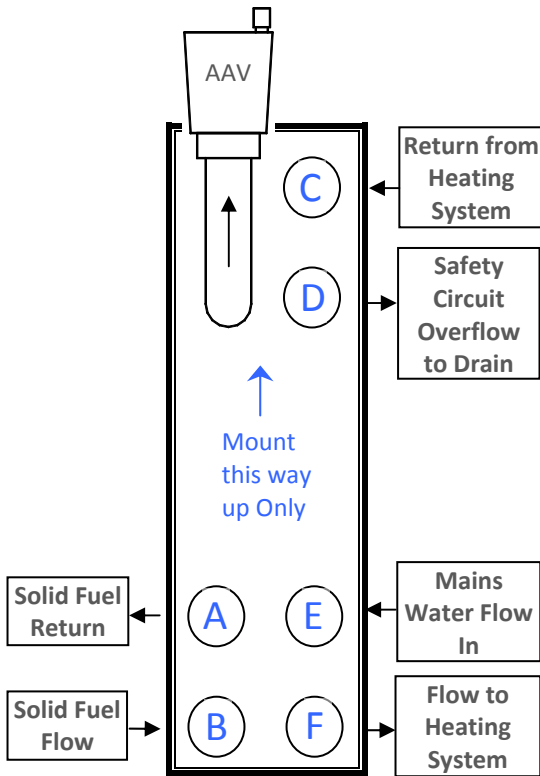


Figure 1



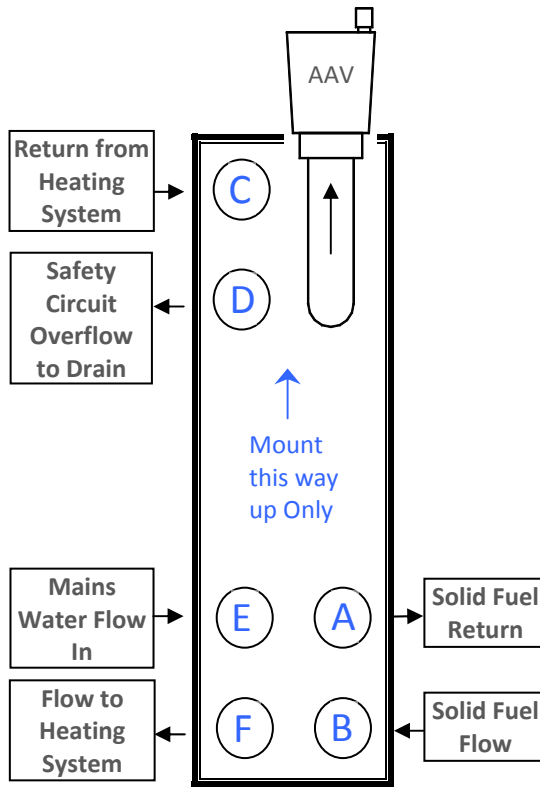


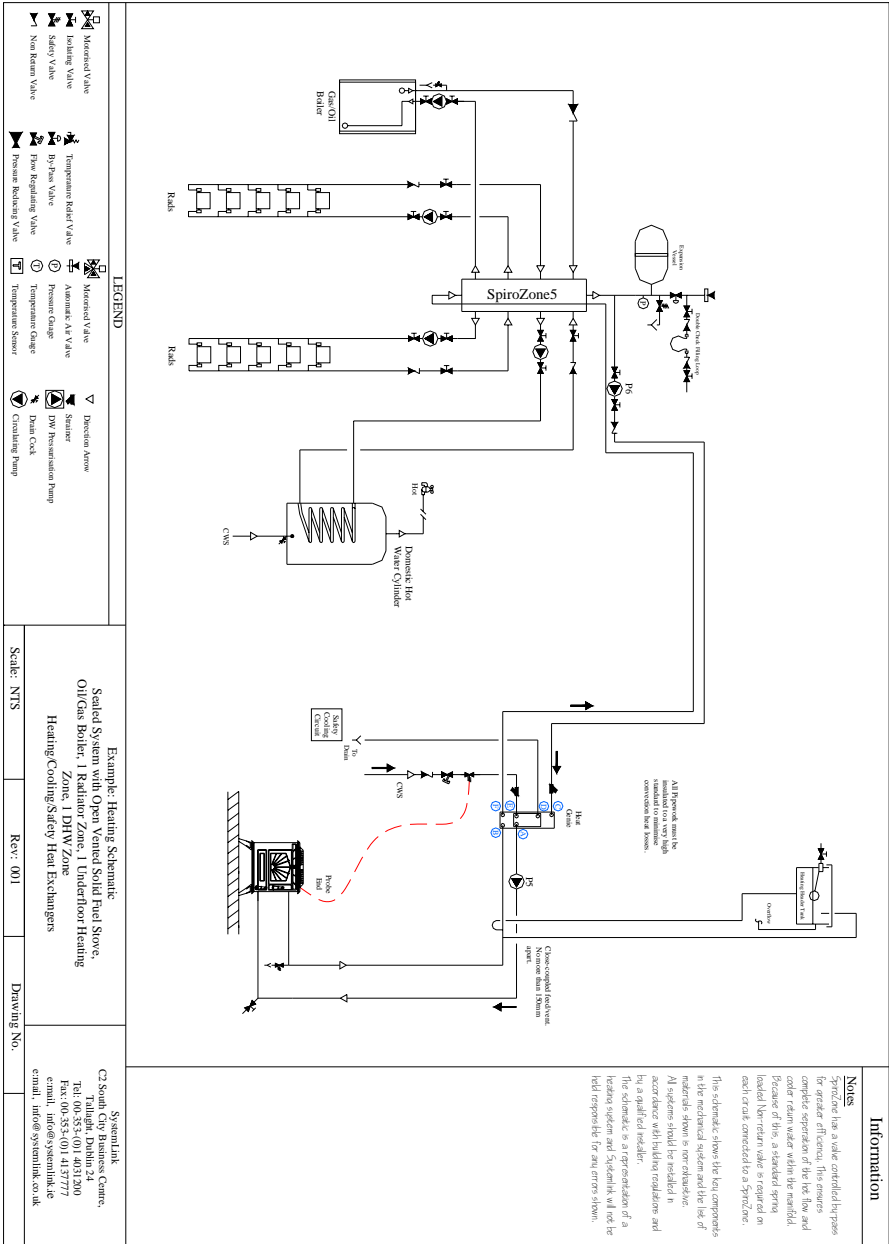
Figure 2

Please note ancillary devices such as expansion vessels/tanks or air vents are not shown in these schematics for Domestic Hot Water as DHW can be open vented or pressurised. These schematics are for illustrative purposes only.

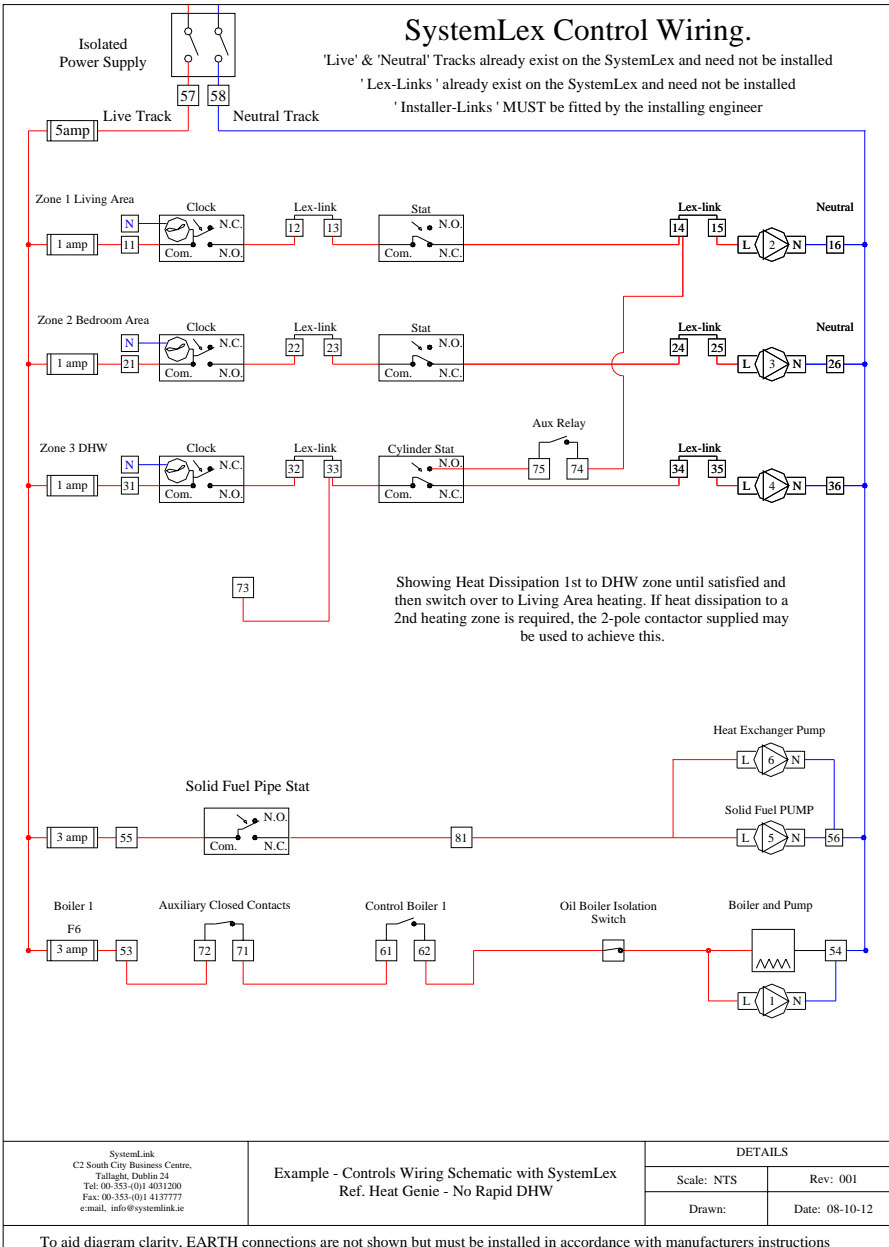
### Installation Scenarios:

There are a number of different installation scenarios for the Heat Genie, which depend on the appliances to be installed or already installed. You will find schematics relating to them on the following pages. Many of them show a fully pumped system zoned using a SystemLink SpiroZone manifold. SpiroZone is a zoning and neutralising manifold with built-in bypass. It should be noted that it is not necessary to have a SpiroZone to install a Heat Genie however we do recommend it as the most reliable method for link-up and zoning. If you have a non-standard installation please contact us for advise.

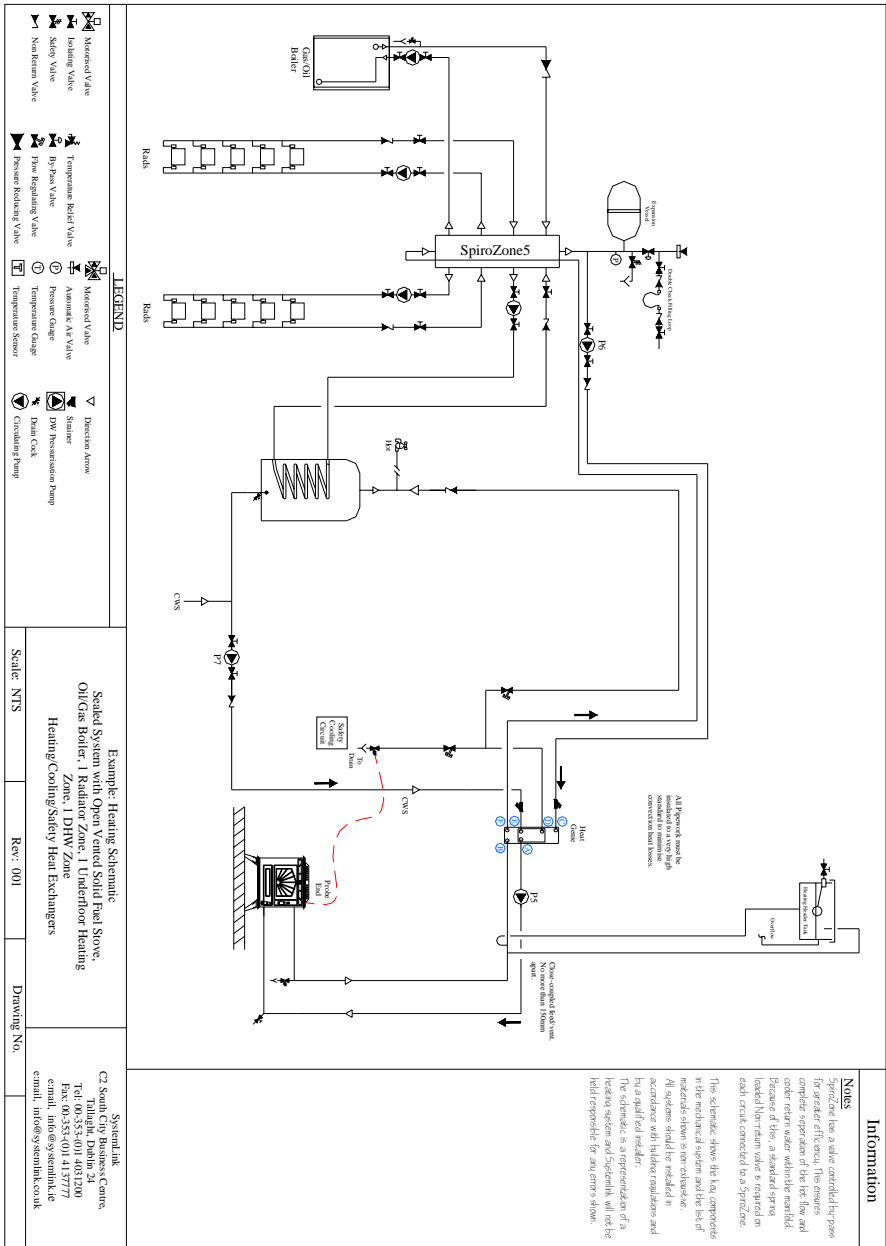
# Scenario 1 – Mechanical Schematic - Unvented fully pumped manifold heating system with open-vented solid fuel appliance with standard hot water heating.



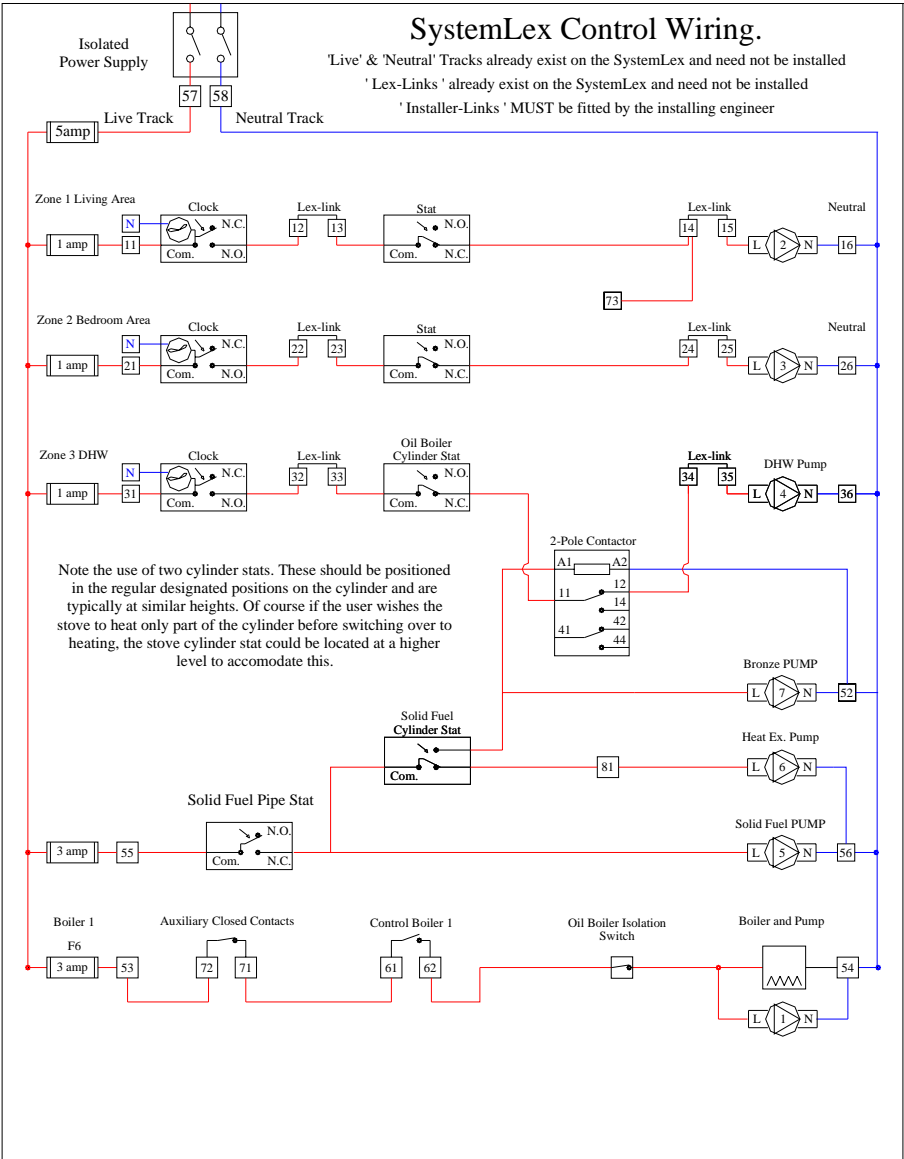
# Scenario 1 – Electrical Schematic - Unvented fully pumped manifold heating system with open-vented solid fuel appliance with standard hot water heating.



# Scenario 2 - Mechanical Schematic – Unvented fully pumped manifold heating system with open-vented solid fuel appliance including rapid hot water heating of cylinder from solid fuel appliance only.



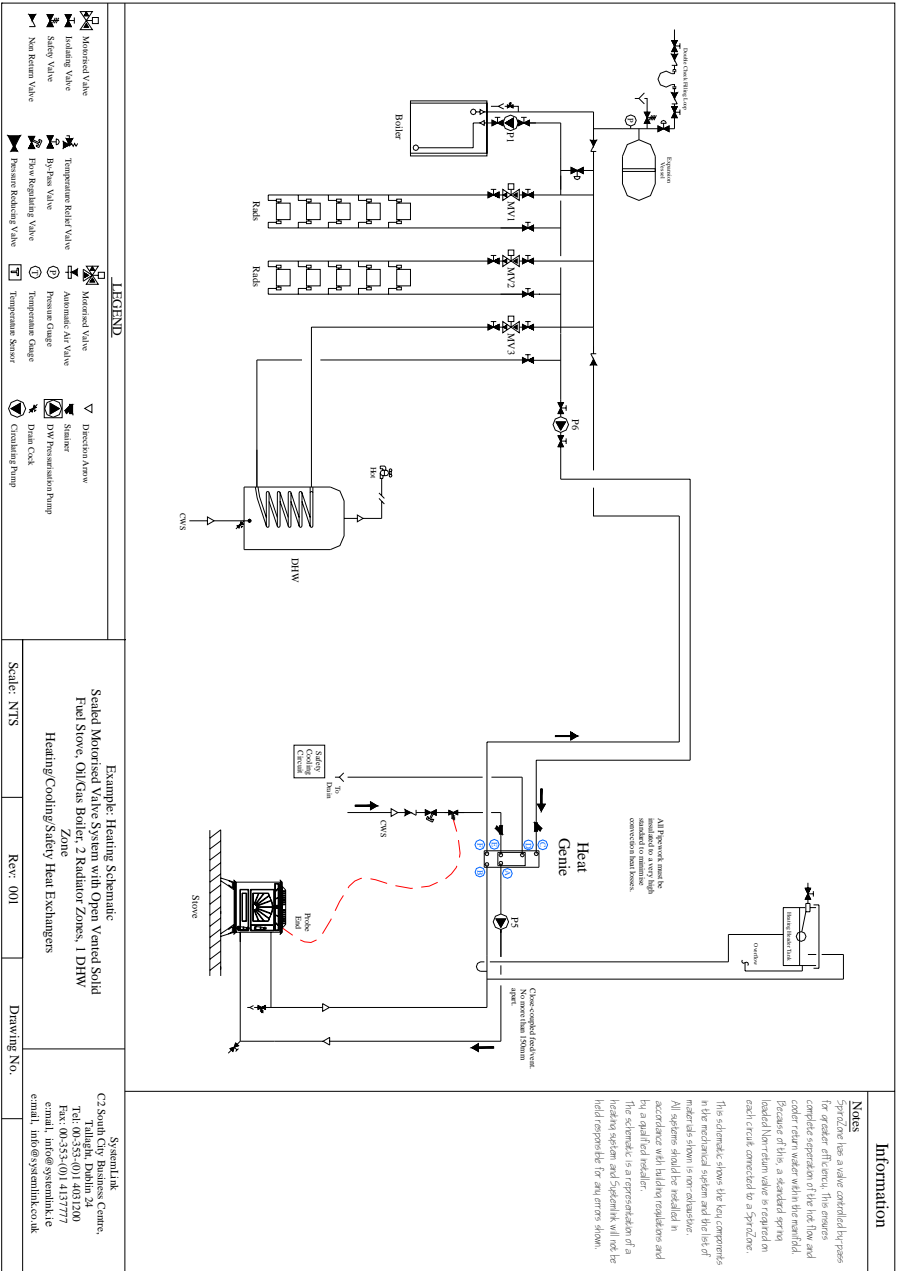
# Scenario 2 - Electrical Schematic – Unvented fully pumped manifold heating system with open-vented solid fuel appliance including rapid hot water heating of cylinder from solid fuel appliance only.



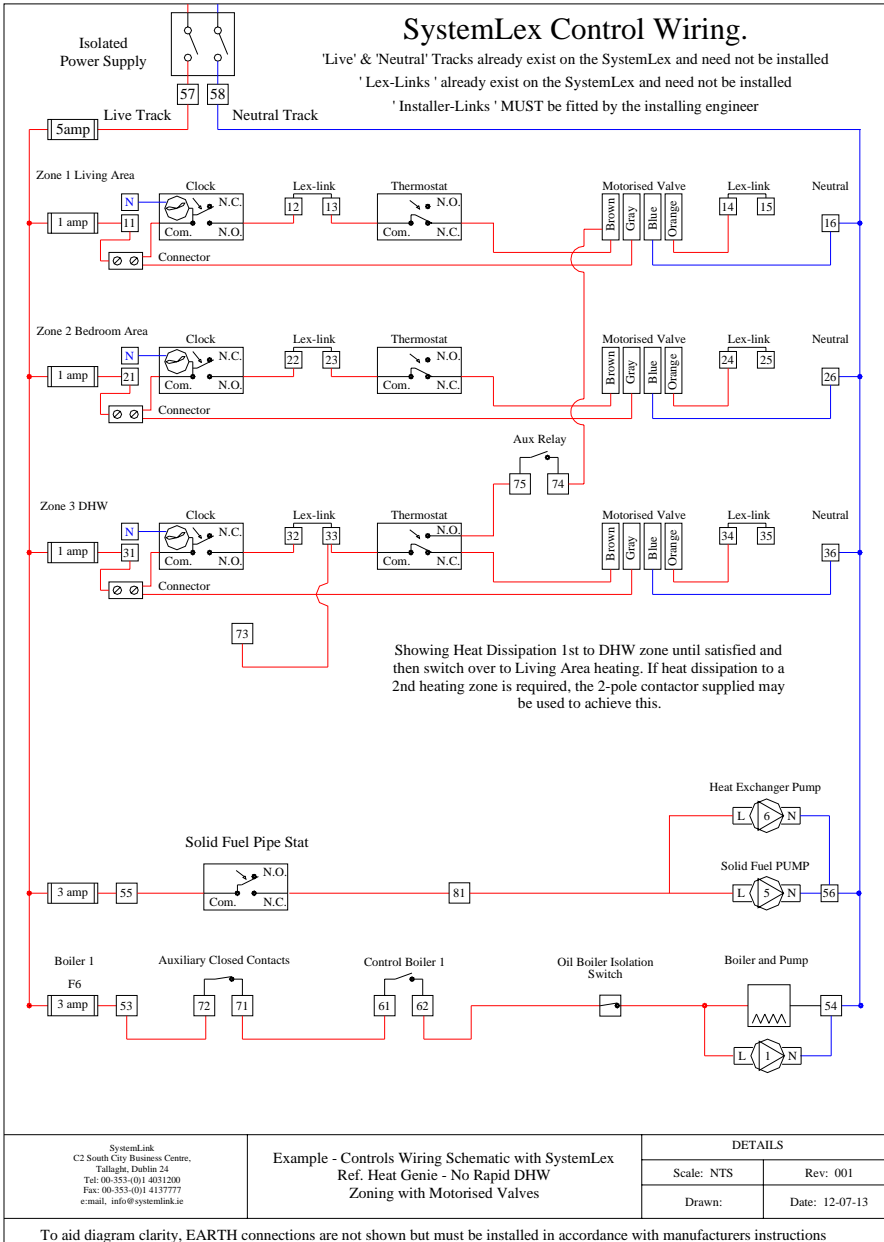
<p style="font-size: small;">SystemLink                  C2 South City Business Centre,                  Tallaght, Dublin 24                  Tel: 00-353-01 4031200                  Fax: 00-353-01 4137777                  e-mail: info@systemlink.ie</p>	<p><b>Example - Controls Wiring Schematic with SystemLex                  Ref. Complete System with rapid DHW from Solid Fuel                  Source</b></p>	<p><b>DETAILS</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">Scale: NTS</td> <td style="border: 1px solid black; padding: 2px;">Rev: 001</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">Drawn:</td> <td style="border: 1px solid black; padding: 2px;">Date: 08-10-12</td> </tr> </table>	Scale: NTS	Rev: 001	Drawn:	Date: 08-10-12
Scale: NTS	Rev: 001					
Drawn:	Date: 08-10-12					

To aid diagram clarity, EARTH connections are not shown but must be installed in accordance with manufacturers instructions

# Scenario 3 – Mechanical Schematic – Unvented motorised valve heating system with open-vented solid fuel appliance with standard hot water heating.



# Scenario 3 – Electrical Schematic - Unvented motorised valve heating system with open-vented solid fuel appliance with standard hot water heating.



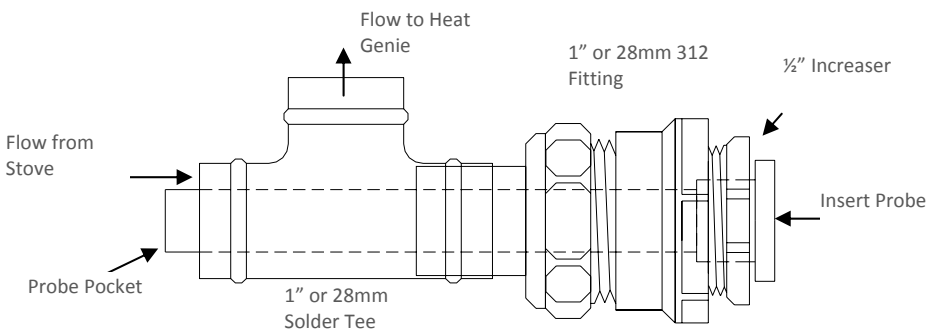
# 05 | GENERAL INSTALLATION INFORMATION

## Thermal Safety Valve

The safety valve is a thermal safety discharge valve and must be installed as per the following instructions and its manufacturer's instructions which are included in its box. Care must be taken over the capillary tube, sheath and heat sensitive activation element to ensure that there is no damage that would cause the valve to operate incorrectly. **The valve should be tested prior to commissioning of the system and periodic maintenance should be performed as outlined below.**

Both connections on the valve are  $\frac{3}{8}$ " BSP female threaded connections.

The safety valve probe should be fitted either directly into the solid fuel appliance (if there's a spare upper connection) or in a tee piece on the flow pipe coming from the solid fuel appliance **immediately at the boiler outlet** itself so that it may register the opening temperature of 95C. If installing in the stove ensure there is sufficient depth for the pocket **before** screwing it into position. If the valve is installed on the flow pipe there must be no other shut-off device or valve between the safety valve and the solid fuel appliance. Safety circuit pipework (cold water supply in and hot out to drain) should be sized accordingly however it is recommended to use a minimum of  $\frac{3}{4}$ " pipework for this circuit. If the cold water storage tank is used to supply the safety circuit a minimum head height of 1m is desirable. All pipework from the solid fuel appliance to the Heat Genie and around the probe itself should be very well insulated to minimise losses and ensure the probe gets a correct reading of temperature.



**Figure 3 Mounting of Safety Valve Probe**

The cooling water safety supply flow rate should be set at a value sufficient to stop the solid fuel appliance from overheating when running at full load, without using more water than necessary. A



flow control valve can be used to set this flow rate and once set the valve adjustment lever should be removed to prevent tampering. The location of the thermal safety valve should be such that: it is accessible for testing, provides visual indication of valve operation and in the event of automatic discharge of water or steam the discharge should not create a hazard to persons or controls or components which affect the operation of the system. The orientation when fitted should prevent the accumulation of materials or water, internally or externally which could interfere with its operation. Where a pipe is fitted to discharge to the exterior of the dwelling, it should be so arranged as to prevent the likelihood of its contents freezing.

If during normal operation hot water is continuously discharged for long periods from the safety cooling circuit, seek advice from a competent heating engineer. Persistent discharge should not be tolerated. Note it is good practice to install a standard safety valve on the stove pipework in addition to the heating system side of the Heat Genie.

## **Safety Valve Maintenance**

To ensure correct operation of the thermal safety drain over the long-term, periodic drainage of the valve is required (at least once a year); to perform such operation, press the red discharge button located at the top of the valve head. Such operation allows cleaning of the seal seat where foreign particles can build up.

## **Safety Valve Testing**

Initial testing of the safety valve to ensure correct operation prior to commissioning can be done first of all by pressing on the red button to confirm the valve opens freely and then by immersing the probe at the end of the capillary valve into a boiling kettle. This will open the valve and allow water to discharge through the valve. Further complete testing of the safety valve system should be carried out upon commissioning of the system.

## **Acceptable Media**

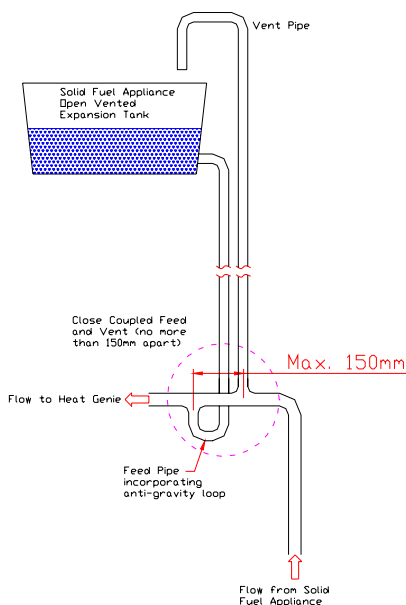
A suitable and approved heating system corrosion inhibitor should be used in accordance with manufacturer's instructions.

The Heat Genie is compatible with water/propylene glycol solutions in all concentrations, however, be aware that pump performance can be affected by changes in viscosity. Particulates of greater than 200 microns in size should be excluded. Prior to operation Heat Genie hydronic networks must be thoroughly flushed to remove flux residues, particulates and other extraneous material. Mild caustics (pH between 7 and 10) and/or biocides may be used for flushing purposes but must be thoroughly flushed after use.

## Operating Temperature and Pressure

Heat Genie media temps must be in the range of 5 to 97°C. The max permissible service pressure is 4 bar gauge. If the heating system side of the Heat Genie is sealed a standard 3 bar safety valve should be fitted. The Heat Genie should not be exposed to water hammer effects or other pressure transients likely to exceed this limit. If danger of freezing is a possibility if left unused for long periods the circuit should be drained to avoid freeze damaging the Heat Genie.

**A close coupled feed and vent (no more than 150mm apart) is recommended to help prevent pumping over.** The solid fuel appliance pump is always installed on the return pipework from the Heat Genie. Fill and expansion circuit equipment should be capable of withstanding temperatures of up to 110°C. A minimum head height of 1 metre is desirable.



**Figure 4 Close Coupled Feed & Expansion**

## Using Rapid Hot Water Heating from Solid Fuel Appliance

If this option is used as shown in Scenario 2, it is important to note that water may be supplied from the Heat Genie at high temperature. This temperature is dependant on the flow rate of the rapid hot water pump circuit (Pump P7 Scenario 2), the temperature of the water being pumped from the bottom of the cylinder and the temperature of the solid fuel appliance. Therefore anti-scald thermal

mixing valves should be installed on the DHW outlet as appropriate. It is worth noting also that the heating rate of the cylinder is dependent on the flow rate of the rapid hot water pump circuit and that the flow rate to the DHW outlets is dependent on the cold water supply as per usual, i.e. cold water storage tank height, mains supply pressure, booster pump etc. Please note that cold water supply flow rate must be more than rapid hot water pump flow rate.

## Commissioning of the Heat Genie System

A thorough commissioning of the Heat Genie system should take place once all items have been installed correctly. Flow rates should be set. The solid fuel appliance and Heat Genie should be tested to ensure correct transfer of heat to the heating system. In fully zoned systems, some zones are designated to switch on automatically when the solid fuel appliance is running. Ensure these zones are switching on as expected even when the room and cylinder thermostats are switched off. Then the safety cooling circuit should be tested by cutting power to the pumps and ensuring that the thermal safety valve opens and allows cold water to flow through the Heat Genie so that cooling takes place as necessary.

## Wiring of the Heat Genie with SystemLex

All wiring related to the SystemLex printed circuit board **MUST** be installed by a competent person and be in accordance with current statutory wiring regulations and any local regulations that apply. The power supply must be 230V AC~50Hz, Single Phase.

The method of connection to the mains electricity supply **MUST** facilitate complete electrical isolation of the entire installation. A fused double pole switch, with at least 3mm (1/8") contact separation in both poles, serving only the SystemLex Controller should be used. The main fuse on the mains input on the SystemLex is rated at 5 Amps.

The **solid fuel pipe thermostat** should be located on the flow pipework between the solid fuel appliance and the Heat Genie. The setting for the pipe stat will vary depending on the size, fuel type and how the solid fuel appliance is used but is typically in the region of 60-65°C. When the level of temperature in the stove flow pipework is above the set-point of the pipe stat power should be sent from the pipe stat to terminal 81 on the SystemLex. This will cause the relevant pumps to run while locking out the other heat source.

Note that the scenario wiring diagrams all show connection to a 230V switched-live boiler.

Note **Caution!** below and see page 23 for examples of voltage free or low-voltage boiler switching option.

Any timeclocks or thermostats which are 230V can be connected to the SystemLex. Included on the following pages are examples of various types of timeclock, thermostats, 230V switch live and voltage free boiler switching connections.

**CAUTION!** Under no circumstances, should high and low voltage circuits be conducted through contacts on the same relay, as this would not comply with minimum clearance requirements specified by international wiring regulations. If a control is required on a circuit of different voltage than the primary circuit, the auxiliary control relay or an external relay should be used.

**CAUTION!** Devices attached to the SystemLex Controller **MUST** be properly earthed in accordance with manufacturer's specifications.

# SystemLex Central Heating Wiring Control Center

SystemLex is a pre-configured electronic wiring center that connects the controls (clocks and thermostats), pumps and boilers together in a logical and easy to understand way. SystemLex does all the complex cross wiring for the installer - all that is left is to connect the system elements direct to the board.

SystemLex is pre-configured to automatically fire the boiler(s) only when one or more time/temperature zone controls call for heat.

Wiring external to the SystemLex printed circuit board MUST be in accordance with the current regulations and any manufacturer's instructions that apply. The power supply must be 230Vac~50Hz.

Devices attached to SystemLink MUST be properly earthed. A fused double pole switch, with at least 3mm (1/8") contact separation in both poles, serving only the SystemLex panel should be used.

Zones 1-4: 4 sets of terminals, to which external time and temperature controls may be attached, fused at 1 amp. The LED's on the board show which zone elements are operating and help make fault diagnosis easy.

All neutral terminals are cross connected on the board with preinstalled tracks.

Power Supply: 1 set of terminals for electrical mains supply connection fused at 5amps, (57, 58);

A general control power supply to facilitate use of a multi-zone clock, fused at 3amps (51, 52);

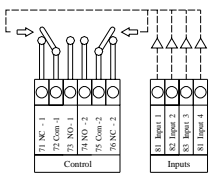
2 sets of terminals for power supply connection to the boilers, fused at 3amps, (53, 54 and 55, 56).

Control: 2 sets terminals to provide either Switched or Voltage Free control to boilers (61, 62 and 63, 64).

Auxiliary Outputs: 2 sets of auxiliary Output Relay terminals to facilitate auxiliary functions (71, 72, 73 and 74, 75, 76).

Auxiliary Input: 4 auxiliary input terminals (81, 82, 83, 84), to receive 230Vac supplies, any one of which will cause the auxiliary double pole relay to switch contacts, without back feeding to any other input.

## Operation of Auxiliary Relay

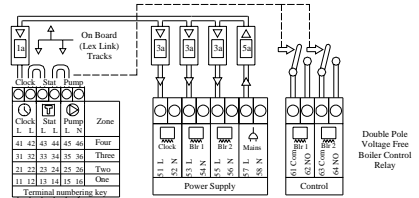


The Auxiliary relay is an optional control opportunity that works independently of the boiler control relay. Applying mains to any auxiliary input (81, 82, 83, or 84) will operate the double pole auxiliary relay contacts but will not back feed to other auxiliary inputs.

## Technical Data

Supply .....	230Vac 5A 50Hz 1 Phase
Zones .....	4
Main Relay Rating .....	DPNO 5A
Boilers .....	2
Boiler Supply .....	2
Clock Supply .....	1
Auxiliary Inputs .....	4
Auxiliary Outputs .....	DPNO 5A
Operating Temperatures .....	0 - 50°C
Enclosure Rating .....	IP20
Main Fuse .....	230Vac 5A T Anti-surge
Boiler/Clock Fusing .....	230Vac 3A T Anti-surge
Zone Fuses .....	4 of 230Vac 1A T Anti-surge
Zone Call Indicators .....	4
Mains Supply Indicators .....	1
Boiler Call Indicators .....	1
Auxiliary Call Indicators .....	1
Transient Suppression .....	Yes
Terminals .....	2.5mm-Sq.
Coil/Contact Creepage / Clearance .....	8mm / 8mm*

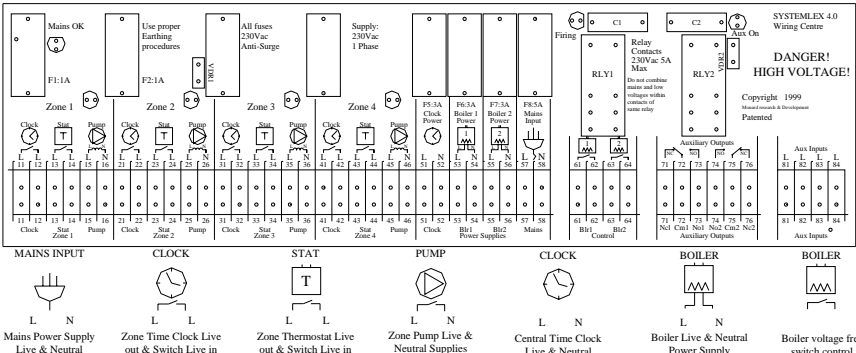
The Boiler Control Relay works independently of the Auxiliary Relay. When any zone control call provides mains to it's zone 'Stat' input (14, 24, 34, or 44) the boiler control will operate the double pole relay contacts to switch on the boiler but will not back feed to other zone's controls or pumps.



- Neutral Connection for all zone control Equipment
- Pump Control Switch Live.
- Temperature Control Call Input.
- Output from Time Control to Zone Stat.
- Time Control Call Input.
- Fused (1amp.) Permanent Live to all Zone Controls

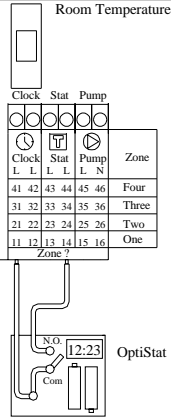
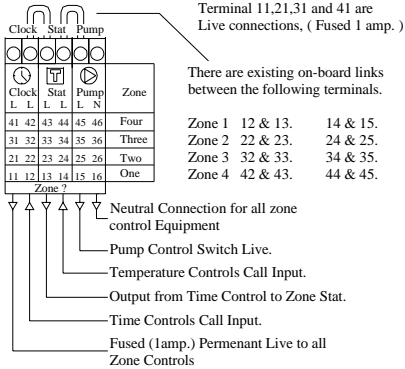
\* Note:

*Under no circumstances should high and low voltage circuits be conducted through contacts on the same relay, as this would not comply with the clearances (minimum distance between switching contacts) specified by IE and international wiring regulations. If a control is required on a circuit of different voltage to the primary circuit, the auxiliary relay or a separate external relay should be used.*

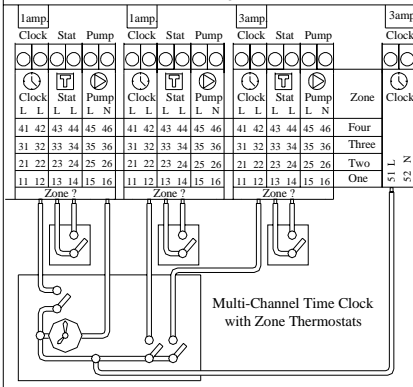
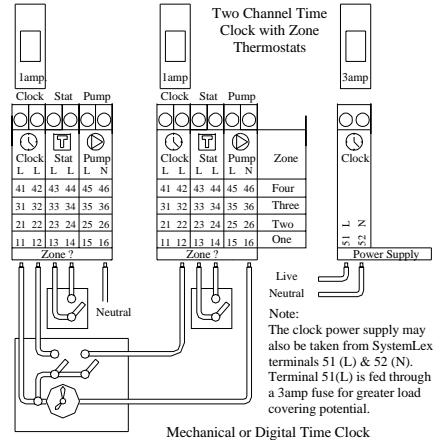
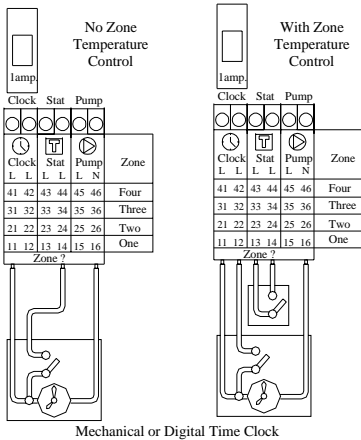


Due to product development, certain design elements and specifications may change on an ongoing basis

# SystemLex External Controls Wiring

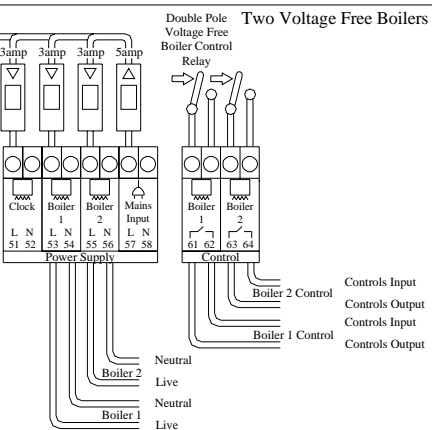
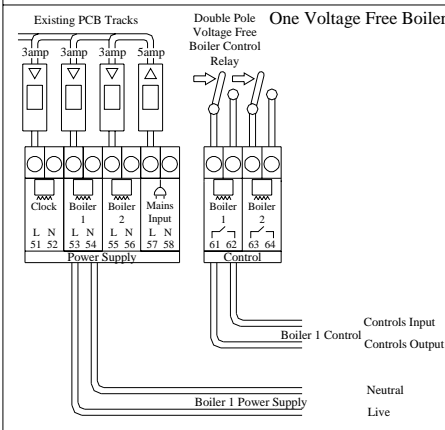
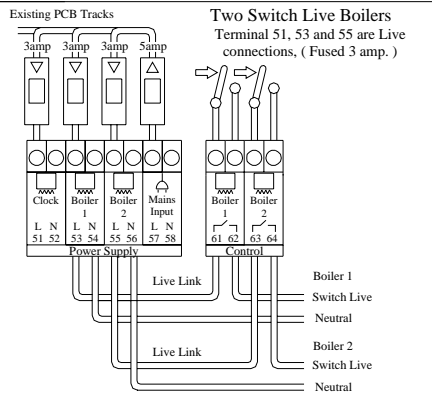
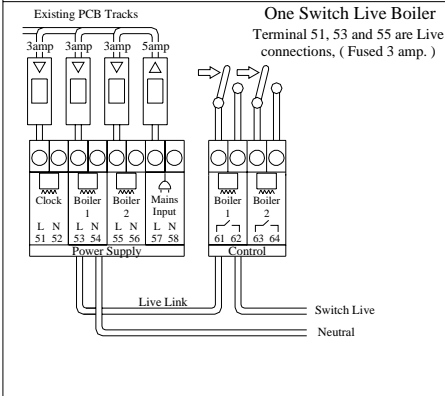
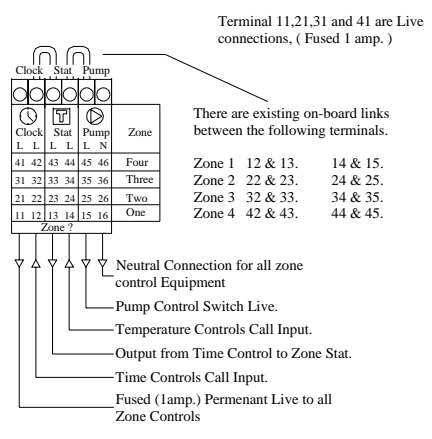
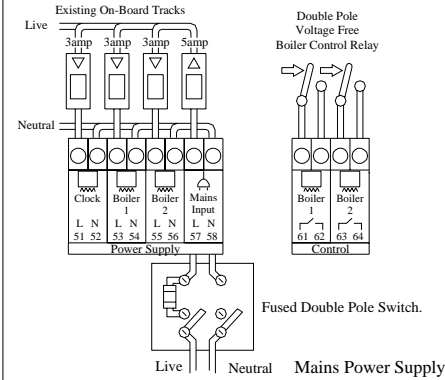


Battery Operated Programmable Room Thermostat



# SystemLex

## External Controls Wiring



# 06 | TROUBLESHOOTING

## SystemLex Fault Finding Guide

### Important

#### Procedure:

On completion of installation or any service or fault finding task which has required the breaking and remaking of electrical connections, the following checks must be completed:

If external controls are fitted (e.g. Time clock or Room Thermostat), ensure these are switched 'OFF' and not calling for heat. Then using a multi-meter confirm the following:

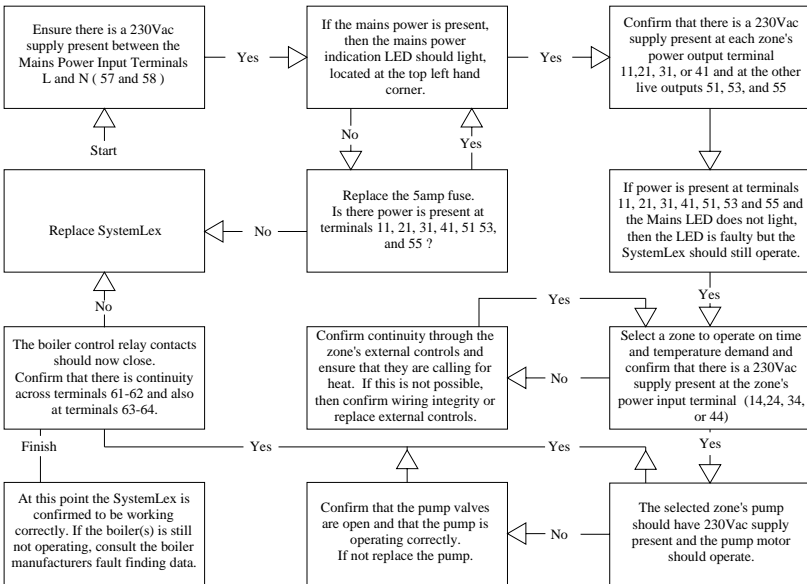
1. Earth Continuity.
2. Polarity.

### Electrical Fault Finding on SystemLex wiring control center

#### Procedure:

1. Turn on the main isolation switch
2. Confirm 230Vac power at terminals 57 live, and 58 neutral. Mains LED only should light at the top left hand corner.
3. Select a zone and call for heat. The selected zone's LED should now light. An audible 'click' may be heard from the SystemLex control relay and the boiler should fire.
4. Turn off the first selected zone call and repeat step 3 with the next zone to be tested.
5. Repeat step 3 with final zone.

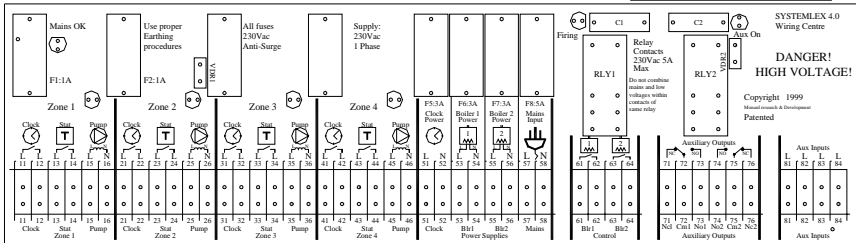
If the system does not work correctly then follow the fault finding guide below.



The Auxiliary control relay is provided as an additional support during the electrical installation of SystemLex. It has no effect on the other SystemLex control or boiler firing functions.

If 230Vac power is presented to any auxiliary input ( 81, 82, 83, or 84) then the relay's LED should light and it's contacts should switch, eg.: From 72 -71 to 72-73 and 75-76 to 75-74

The Auxiliary relay is operating correctly.  
If an auxiliary function is required then replace the SystemLex.



Due to product development, certain design elements and specifications may change on an ongoing basis



## Mechanical Fault Finding

Problem	Solution
System is pumping over when pump runs	Rather than piping the stove flow straight up to the expansion tank, make sure to tee the expansion pipe off the main flow pipe. This way we are encouraging the pumped flow to push through the Heat Genie rather than pumping over. Maximise height of expansion pipe over tank water level. A close coupled feed and vent (no more than 150mm apart) is recommended to help prevent pumping over.
System is pitching before safety valve opens	Be aware of the risk of scalding if this situation occurs. This can happen if the thermal safety valve probe is misreading the temperature. Ensure the probe is installed directly into stove (in spare connection or pocket) or in flow pipe directly out of the stove. Maximise height of expansion pipe over tank water level.
Insufficient heat transfer from Heat Genie into heating system	To ensure correct and full heat transfer, flows on opposite sides of heat exchangers in Heat Genie must be counter-current. Poor heat transfer will be experienced if connected incorrectly. Check connections with figures 1 & 2.  The flow rate into the Heat Genie from the stove should match the flow rate out of the Heat Genie to the heating system and should be appropriate to the number of kilowatts being transferred.

# 07 | SYSTEM SPECIFICATIONS & DIMENSIONS

## Specifications:

A space of 490mm X 330mm X 150mm (Height X Depth X Width) is required to install the Heat Genie.

## Water Content:

	Stove Side (ml)	Heating Side (ml)	Cooling Side (ml)
15kW	693	468	125
20kW	810	585	125
30kW	1005	780	125

Heat Genie link-up systems are available in a range of sizes to suit different kW output stoves.

## Insulation:

- Type: PU Rigid Foam
- Nominal Thickness: 20mm
- Thermal Conductivity: 0.0029 W/mK

Max Permissible Pressure: 4 bar

Source Connection Size and Type: 1" or 28mm Pipe Stubs\*

Other Connections: ¾" or 22mm Pipe Stubs\*

\*Imperial for R.O.I. and Metric for U.K./N.I. Markets

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