

The future of heating is here

nrqLINK

INSTALLATION AND TRAINING MANUAL



NRG Link Dual-Pressure Interlinking System for interconnecting sealed to open (Solid Fuel) heating systems

Including:

- Plate Heat Exchanger, Non Return Valve
- Pre-assembled Copper Tubing, Air Vent,
- 1 1/4" Internal Primaries, Primary Side Injector,
- 2x Lowara 25-6 130 Ecocirc Circulator Pumps,
- Pre-wired Wiring Centre / Terminals,
- Pipe Thermostat, 1" Plumbing Connections,
- Insulated Cover & Mounting Bracket.

CONTENTS

Technical Data & Safety Guidelines	2	6.0 The Solid Fuel Appliance	5
1.0 Introduction & General Information	3	7.0 Gravity Circuit	5
1.1 Introduction	3	7.1 Guideline on the Gravity Circuit	6
1.2 Important	3	8.0 The Use of Mechanical Valves	6
1.3 Installation Guidelines	3	9.0 Cold Feed & Expansion Tank / Cistern	6
2.0 The Solid Fuel Appliance	3	10.0 Electric Wiring Information	7
2.1 Secondary (Interlinked) Appliance	3	11.0 Internal Pipe Thermostat	7
3.0 Precautions with Solid Fuel	3	12.0 Dual Boiler Call Strategy	7
4.0 Preliminary System Checks	3	13.0 Precautions and Questions & Answers	8
5.0 NRG Link General Information	4	Example Pipework & Wiring Diagrams	9
5.1 NRG Link Operating Modes	4	NRG Link - Basic System Principles	14
5.2 NRG Link Installation Guidelines	4	Design Assistance Sketch Pad	16

**CAUTION! YOUR SAFETY IS INVOLVED. FAILURE TO FOLLOW THESE INSTRUCTIONS
MAY RESULT IN INJURY.**

LEAVE THIS MANUAL AS A REFERENCE GUIDE FOR THE USER



WARNING

Risk of damage to or malfunction of the appliance. Pay special attention to the warnings concerning danger to people.



DANGER OF BURNS

Wait for the appliance to cool down before working on the parts exposed to heat.



DANGER - HIGH VOLTAGE

Live components - electrocution hazard.



DANGER OF FREEZING

Possible danger due to the formation of ice due to low temperatures.



IMPORTANT INFORMATION

Information to read with particular care as it is useful for correct system operation.



GENERIC PROHIBITION

It is forbidden to do/use the things indicated alongside the symbol.

Technical data

Electric supply: 200 - 240 V (AC) ; 50 - 60 Hz

Circulators

Power consumption: (2 No.) 4 - 42 W

Pipe Thermostat

Temperature Range 30 - 90°C

Max Ambient temperature 45°C

Switch Rate 6(2.5) A

Switch Type SPDT (Type 1B)

Switch Differential 6-10°C

Switch Configuration 1 - 3 Make on temperature rise

1 - 2 Break on Temperature rise

Factory Setting (on primary return position) 55°C

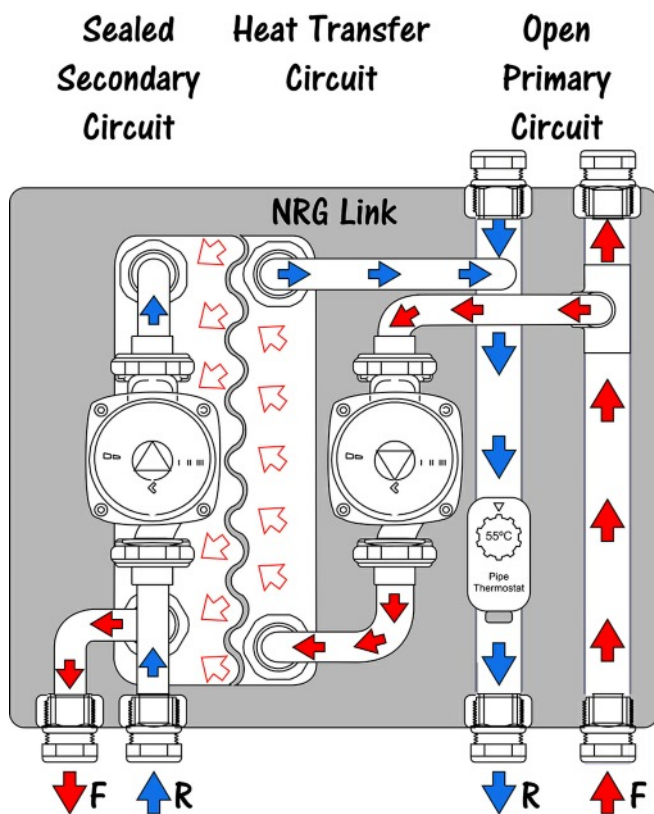
Plate Exchanger

Heat Capacity (based on water temperatures and flow rates as outlined below) 20 kW

Circuit	Primary	Secondary
Primary circuit fluid	Water	Water
Fluid flow rate	1.75 m ³ /h	1.75 m ³ /h
Fluid speed	0.2182 m/s	0.2177 m/s
Inlet temperature	75°C	56°C
Outlet temperature	65°C	66°C
Pressure drop	0.696 mH2O	0.710 mH2O
Partial exchange coefficient	21137	20229

1.0 Introduction and General Information

Fig 1



We would like to thank you for purchasing the NRG link unit. This manual contains technical and installation guidelines to assist with the correct installation of the system.



1.1 Introduction

Experience with conventional methods has shown that improperly installed solid fuel interlinked systems are troublesome, difficult to control, most often very inefficient and potentially dangerous.

The NRG Link is a plumbing and wiring interface method used to interconnect the primary open vented part of a 'wet' Solid Fuel Appliance installation to any other wet sealed or open vented system that uses an alternative fuel such as Oil, Gas, Heat Pump or Solar heating for common heat distribution in a reliable, simple and cost-effective way using standard well established principles with a safe and compact design.

1.2 Important



All uncontrolled solid fuel systems must be open vented and include an open gravity-fed or 'primary' heat leak circuit.

1.3 Installation Guidelines

This manual gives supplementary guidance for safe and effective interlinking. It is to be applied in conjunction with the open and sealed-system boiler installation instructions.

The interconnection between a sealed and an open vented systems must be installed by a suitably competent person in compliance with all relevant appliance manufacturers' directions, codes of practice, trade regulations and by-laws.

It is the responsibility of the installer to ensure that the boiler(s) used are CE approved and are properly commissioned. Failure to do so may invalidate the boiler(s) and NRG-Link's guarantees.

2.0 The Solid Fuel Appliance

This can be a stove/room heater approved to EN13240, with a maximum boiler to water output of 20 kW burning either biomass or mineral fuel.

2.1 Secondary (Interlinked) Appliance

The secondary heating appliance in the interlinked system could be a conventional or condensing oil or gas-fired boiler, a cooker, solar heating or a heat pump. In all instances, it is essential to ensure that the selected secondary appliance can handle or adapt to the additional heat input from the uncontrolled solid fuel source.



3.0 Precautions With Solid Fuel System

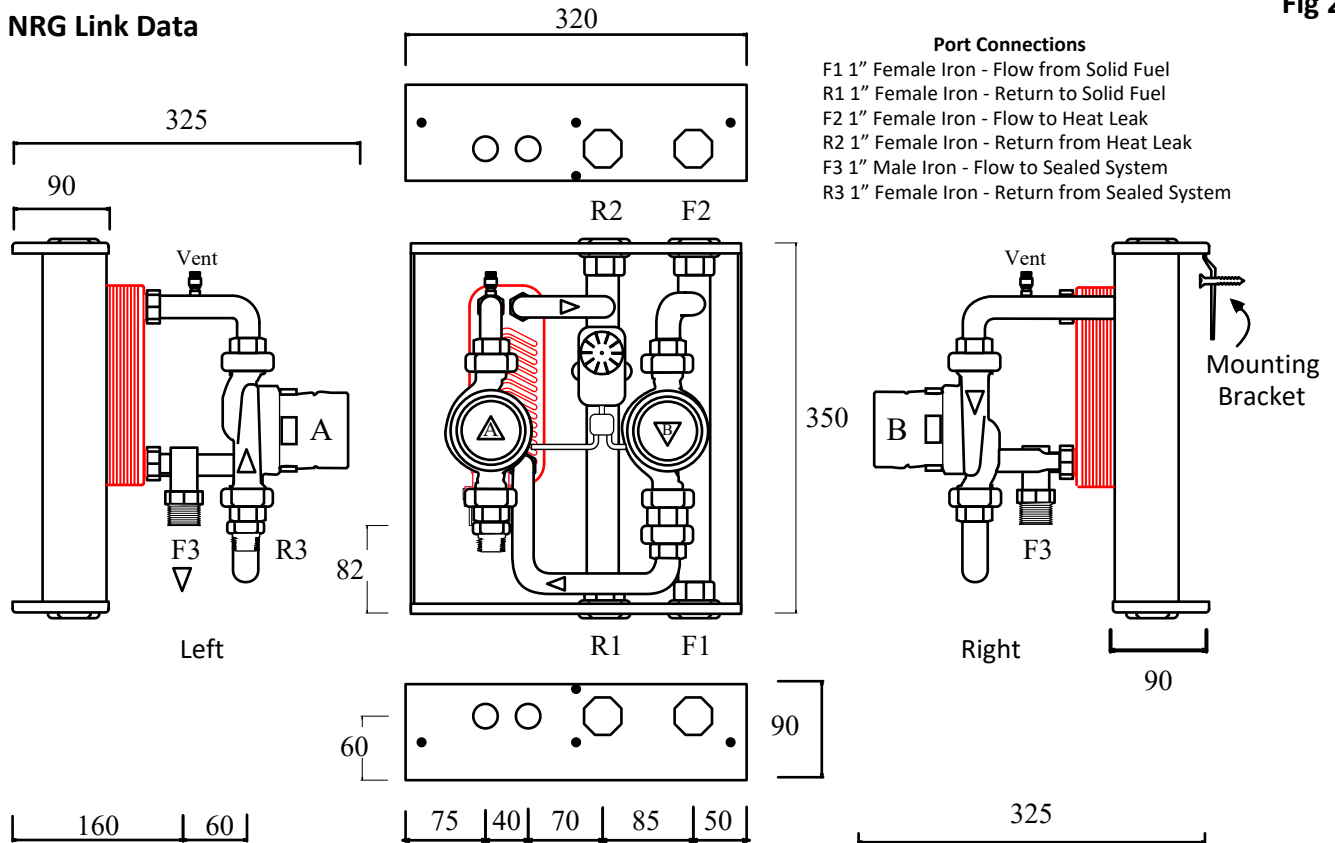
This NRG Link has been designed to work in normal circumstances at a temperature lower than the boiling point of water at atmospheric pressure. Care should be taken to reduce the risk of the solid fuel appliance boiling. The maximum recommended design temperature is 75°C



4.0 Preliminary System Checks

Before installing the NRG Link, the sealed system must be cleaned and flushed to eliminate residual thread-cutting swarf, solder and any solvents, using suitable off-the-shelf non-acid and non-alkaline products that do not damage the metal or fibrous parts. To protect the system from corrosion, sludge and scale, use inhibitors heating circuits. Use these products in strict compliance with the manufacturers' instructions.

Fig 2



Dimensions: 350mm(H) x 320mm(W) x 325mm(D)

Weight: 8 kg

Max Operating Temperature: 110°C

Max Pressure: 3 Bar

Heat Transfer Capacity: 20 kW

5.0 NRG Link General Information

The NRG Link can automatically manage the exchange of heat from the open system to the sealed system when the internal pipe thermostat switches contacts and activates the built-in pumps. The heat from the solid fuel circuit is then transferred to the sealed system by the unit's plate exchanger.

The unit is also designed to facilitate an unobstructed (1" minimum) open vented gravity circuit from a solid fuel appliance to an appropriate heat leak medium such as a DHW cylinder, a heat leak radiator circuit or a combination of both.

The NRG Link principle is based on a well-established 'Injector Tee' method that has proven to be reliable, simple, cost-effective and safe.

5.1 NRG Link Operation Modes

The unit operates under 2 different conditions; Gravity Circulation and Pumped Circulation:

- On initial solid fuel heat-up, the gravity circuit supplies the heat leak and circulates through the NRG Links primary-side pipework until the return pipe reaches the pipe thermostat's set point (min 55°C) to operate the pumps.
- When this happens the primary (right hand) pump draws the primary hot water through the plate heat exchanger and then injects it back into the primary return having exchanged the heat to the secondary side. This also boosts the circulation in the gravity circuit. At the same time, the secondary (left hand) pump circulates a counterflow through the plate heat exchanger, collecting the heat from the primary side for delivery to the sealed heating system.

5.2 NRG Link Installation Guidelines

The NRG Link must be a part of the gravity circuit and positioned to allow the flow from the solid fuel appliance to rise upwards through the flow pipe F1-F2 and return in the adjacent pipe R2-R1.



For the NRG Link to operate safely and correctly the exchanged heat must have an open path to the sealed (secondary) systems heat emitters at all times. The heat emitters on the secondary system should have sufficient capacity to handle the solid fuel appliance heat output at full load.

Note: The return pipe from the sealed system must include a 28 mm (1") 80 to 100 micron strainer to prevent any debris entering and obstructing the NRG Link plate heat exchanger.



6.0 The Solid Fuel Appliance

Continuous combustion type solid fuel appliances require that the heat energy is safely transferred away from the heat source until the fuel source is exhausted. Experience with conventional methods has shown that improperly installed solid fuel interlinked systems are troublesome, difficult to control, most often very inefficient and potentially dangerous.

It is essential to comply with manufacturer's instructions especially with regard to the flow and return piping connections where there are optional ports available on the boiler.

Some appliances require that both connections are on the same side and others require diagonally opposite connection points. Failure to comply with the particular manufacturer's instructions could render the appliance unsafe as well as reduce its efficiency.

The final piping configuration must not inhibit the safe or proper use of any one appliance e.g. by restricting the appliance heat output when it is operating.

7.0 Gravity Circuit

When the solid fuel appliance is heating the hot water in the primary flow pipe expands. This makes its density lower (lighter) and causes it to rise. As the hot water rises it will eventually meet the heat leak or NRG Link. When heat is removed by the heat leak or heat transferred to the sealed system by NRG Link's heat exchanger, the water will cool, increase in density and fall downwards through the return pipe to be reheated in the solid fuel appliance. The combination of the hot water rising and the cooler water falling creates a gravity circulation.

The velocity of a gravity circuit depends primarily on the up-feed height from the appliance to the top of the circuit (excluding the vent/expansion height), the diameter of the pipe (minimum 28mm / 1"), the condition and smoothness of the internal pipe walls, the slope of the pipe, and the temperature differential (Delta T) across the circuit taking the heat leak into account.

Every opportunity should be taken to maximise the upward angle of the primary circuit pipework from the solid fuel appliance and most particularly when the flow pipe exits the boiler. Here a minimum incline of 20 degrees would be most advantageous. The minimal slope rising to the vent/expansion connection point is 1 degree at each section of the primary circuit. This equates to about 20 mm/m or just over 1/4" / ft.

A maximized vertical length of the flow pipe from the solid fuel appliance to the heat leak will positively affect the amount of "thermal lift" and result in stronger water flow in the gravity circuit. The length of the initial horizontal pipe-run is a critical factor in how well the solid fuel gravity circuit will operate as too long will delay the initial circulation and restrict the flow.

Therefore, the ideal position for heat leak cylinders/radiators is directly above the solid fuel boiler and the heat leak should connect as close as possible to the solid fuel appliance.



Due to heat losses through the pipe, a three-story building is the practical limit for a gravity hot water circuit. Above this, the pipe losses can restrict or even disrupt the gravity circulation. This could lead to the water close to the solid fuel appliance overheating and potentially boiling.



It is vital that any heat leak radiator or DHW heat leak circuit is sized to dissipate the 'turndown' output according to the stove manufacturer's guidelines. That is where the solid fuel appliance has an automatic turndown air damper-mechanism or an automatic facility to control or maintain combustion when the appliance has reached its maximum safe operating water temperature output and the mechanism delivers a lower supply of air to the combustion chamber to maintain minimal heat delivery. Generally, the

turndown output of a solid fuel appliance is at least 15% of the stove's output to water.


The overall system plan should utilise as much useful heat from the 'heat leak' emission as possible rather than dissipating that heat to an unused location where it is of no advantage.

The gravity circuit must be open vented and unobstructed by any pumps, non-return valves, motorised or mechanical valves or any other restriction. This primary circuit must also include an open cold feed and a heat leak facility. It must be designed to operate by gravity circulation alone, independent of an electric power supply. The circuit should rise continuously to a Vent /Expansion tee at a high point. It must also pass through the NRG Link and include a Heat Leak in its route. When the water is cooled by the heat exchange it should fall back to the appliance through the Primary return which again should be designed to allow air to rise to the open vent.

7.1 Guidelines on the Gravity Circuit

- Only metallic pipe should be used on primary circuits.
-  Manual or automatic air vents must not be used on primary circuits as the system could become extremely dangerous if any of its mechanical parts fail and trap air, preventing the gravity circulation.
- The total gravity circuit length should be less than 25 M in total including both the Flow & Return pipe.
- The number of sharp pipe elbows/bends on the primary circuit should be minimised. Preferably use manual pipe bends formed by a bending spring or pipe bender rather than sharp fittings.
-  The installer must ensure that there is a properly sized safety valve fitted directly on each appliance or on its flow pipe in direct unobstructed contact with the appliance's water contents. The valve outlet must terminate safely at a low level. The pressure relief device must be capable of expelling any excess system pressure. The valve outlet must not be a source of danger to anyone in the

vicinity and be in accordance with guidelines and regulations.

-  As an insulated DHW cylinder is no longer accepted as a reliable heat leak, it may be necessary to include additional heat leak radiator(s) in a primary heat leak circuit.
- Pressurised DHW cylinders cannot be used as heat leaks. They can, however, be heated from the solid fuel appliance through the secondary side of the NRG Link (see figure 8).



8.0 The use of Mechanical Valves

Non-Return Valves (NRVs) and motorised valves (MVs) are safe to use as inter-linking distribution control methods on the secondary pipework as detailed in the schematics included further on.

Thermostatic radiator valves must never be used on primary heat leak radiators or on any radiators that would be allocated the function of dissipating heat from the solid fuel appliance.

Motorised valves used on the secondary side heat dissipation circuits must be the 'Normally Open' (Power Close) type. This will ensure that any potentially defective valve will not form a blockage to the circulating heated volume from the solid fuel system that could lead to a dangerous system.



Fig 6 shows an example method of bypassing secondary system motorised valves where the NRG Link's output is piped to inlet points on the heating circuits, beyond the control valves, to access radiator circuits for the necessary heat dissipation function.

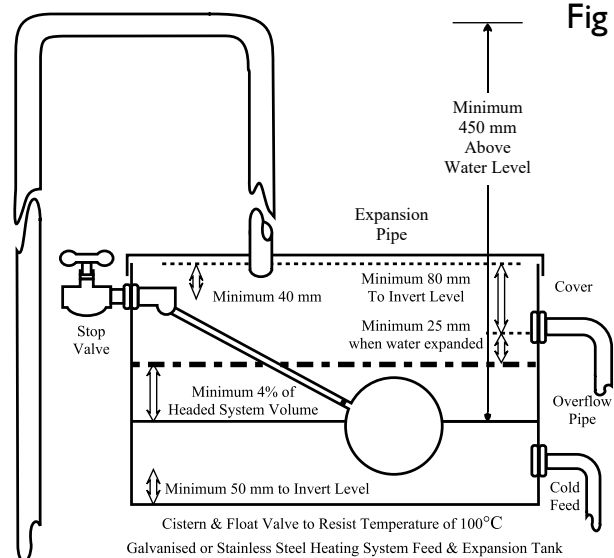


Fig 3

9.0 Cold Feed & Expansion Tank / Cistern

A feed and expansion (F&E) cistern/tank fabricated of galvanised or stainless steel must be used on all solid fuel open-vented central-heating systems. The purpose of the F&E tank is to ensure that an open vented circuit never becomes pressurised as well as provide a receptacle for any heated/expanded volume that returns to the system when the expanded volume cools. If the F&E tank is undersized, it will overflow when the system is heated and refill on cooling with fresh oxygenated water. This will result in increased system corrosion and other associated problems.

The F&E tank should be sized and located in accordance with all regulations and manufacturer's guidelines.



The following points are critical to ensure proper installation of the F&E tank (see figure 3 for reference):

- The F&E tank should be sized and set up to accommodate (without overflowing) at least 4% expansion of the total system contents, i.e. boiler(s), pipework, radiators and cylinder coil or thermal store etc.
- The F&E cistern and the system expansion vent pipe above the cistern must be located at the highest practicable point in the system
- The overflow pipe must be at least 22 mm diameter and capable of handling boiling water.
- When the heating system is up to operating temperature, there must be at least 25 mm air gap between the surface of the expanded water and the invert level of the overflow pipe.
- The expansion vent pipe should have a minimum diameter of 22 mm and a gooseneck bend that terminate above F&E tank. In the event of the system water becoming overheated the expansion vent pipe will allow the water to discharge into the F&E tank, preventing dangerous pressure buildup.
- Shut-off valves or any other mechanical item that might interfere with or obstruct the flow must never be installed on the expansion vent pipe or the cold feed.

- The cold feed and expansion vent pipework must be entirely metallic.
- The connection for the cold feed must be taken from the side of the cistern and never from the bottom to prevent debris that might have accumulated in the cistern from being drawn down into the system.
- The ball float and valve should be metallic.



10.0 Risk of electric shock.

The internal wiring centre is live when installed. Isolate the electric supply before carrying out any work. Failure to follow these instructions may result in personal injury or damage to property.



11.0 Internal Pipe Thermostat

The internal pipe thermostat in the NRG Link is mounted on the gravity circuit return pipe and it is set at 55°C.

In some instances, where for example the NRG Link is located close to or above a DHW cylinder it will be necessary to ensure that the thermostat is not switched 'on' unnecessarily by heat drifting from the stored hot water. In that case, the thermostat must be moved to a lower position on the return, closer to the solid fuel stove.

To ensure continued safe operation it is imperative that the pipe thermostat is securely fastened to the primary circuit pipework and that its calibration be checked periodically by confirming that the stat contacts switch properly when the set-point is reached.



12.0 Dual Boiler Call Strategy

If the solid fuel boiler is not capable of heating the entire system then it would make sense to allow the secondary boiler to continue working but it is important to consider the effect of the high-temperature solid fuel boiler's output on the efficiency of the secondary boiler.

With many system configurations, it is possible to use both appliances at the same time. This is particularly the case with most oil boilers or stoves. Certain gas boilers or heat pumps may detect the increase in their return water temperature from the incoming solid fuel source

and may wrongly identify it as an internal fault and go to a 'lockout' state.

If that is the case, a 'switch-live' from the NRG Link's pipe thermostat can be used to output an additional live switch input to a relay that will switch the second boiler 'off' when the solid fuel boiler is working. However, if both boilers can work in tandem then the second boiler can provide any additional heat required when the solid fuel appliance is in operation.

The NRG Zone Manifold from NRG Awareness is particularly suited for allowing two different temperature boilers to work together.



13.0 Precautions to Pipe Freezing

There are two distinct dangers to system water freezing in pipes during colder conditions. One is where any water trapped between two freezing/ expanding ice blockages can become pressurised enough to burst the pipe wall. This may lead to potential water damage to the property. The second issue is where an ice blockage will seal the water contents within the system which can then have catastrophic results if it is subsequently heated to a degree where the total system is over pressurised. This is why a properly fitted safety valve located on the flow pipe in proximity to the solid fuel appliance is a critical component.

Therefore, all vulnerable pipework should be sufficiently protected and insulated, especially in unheated areas like the attic.



14.0 Questions & Answers

How safe are solid fuel systems?

Solid fuel systems are probably the safest of all systems if they are installed correctly and follow the basic guidelines set out in this manual but rule number one is that the system must not rely on mechanical devices to maintain their safety. There are more safety features to a good solid fuel system than most other systems. For example, it has a perfect open path to an open expansion tank.



What are the most critical issues when designing solid fuel systems?

1. *There must be absolutely no mechanical device(s) in the primary water flow circuit.*
2. *The expansion and cold feed must not have valves or other obstructions.*
3. *The Cold Feed must have a direct path to the solid fuel stove at all times and must not pass through plate exchangers, cylinder coils, radiators or other similar equipment to reach the overheating appliance.*
4. *The appliance's heat output must not be larger than the heat load of the system it supplies.*
5. *The Heat Leak on the primary circuit must be able to distribute the heat output from a fully loaded appliance when the air dampers are closed.*

Can Solid Fuel Systems be used efficiently with low-temperature systems like heat pumps or under-floor heating systems?

Absolutely yes if the correct design criteria are applied. If you are designing a system NRG Awareness offers technical support by phone or email to assist. We can also provide system schematic diagrams for both the plumbing and wiring work. NRG Awareness can also provide ancillary control equipment; panels etc. to help deal with any unusual queries or control issues.

How cost effective is the NRG Link?

*We find that installers do not take the true cost of installing dual heating systems into account. Often we find that too much time is wasted trying to figure out how exactly to put the system together, sourcing the parts, & taking the wiring costs and actual installation time into account. If the costs are properly compared then NRG Link is the best choice by far. **It is the only procurable system available that complies with all manufacturer's guideline and regulations.***

Technical Support

NRG Link Technical support is available at:
www.nrgawareness.com - www.nrgzone.ie

NRG Link Basic Principle - Including Secondary Heat Distribution to an NRG Zone 5 Manifold.

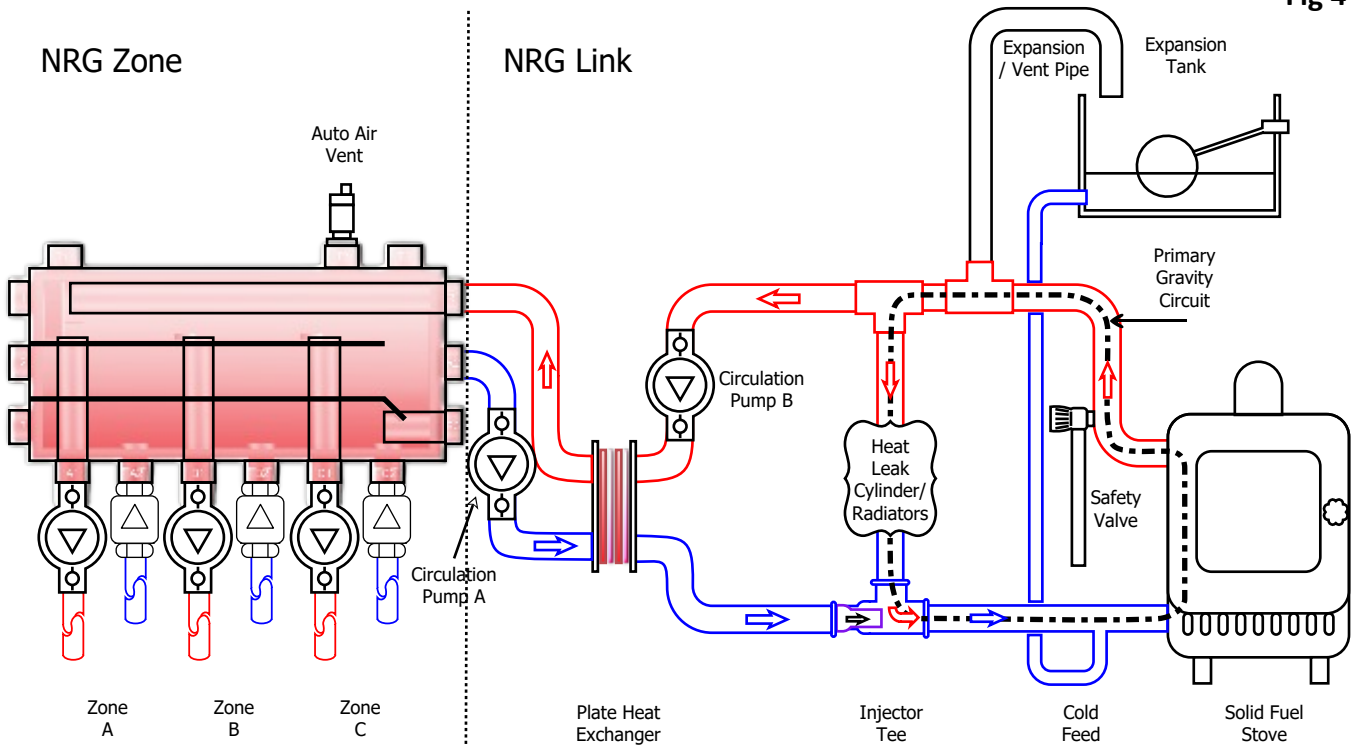


Fig 4

NOTE;

In this instance the return to the heat pump buffer should be connected to the lower side connection on the NRGZone.

This will collect the coolest returning water from the zones and increase the efficiency of the heat pump.

It will also permit the solid fuel appliance and the heat pump to operate together under controlled conditions.

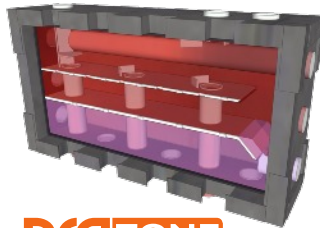
The return to the solid fuel stove should be connected to the middle side connection on the NRGZone.

This will collect any hotter by-passing water in the NRGZone and increase the performance of the stove by maintaining a return temperature above 55 C when controlled by the built-in pipe thermostat in the NRG Link.

It will also permit the solid fuel appliance and the heat pump to operate together under controlled conditions.

The by pass vent shown on the solid fuel Primary circuit allows air at a high level in the return pipe to escape upwards to the Primary Flow where it is released through the open vent

EXAMPLE SINGLE STORY INTERLINK HEAT PUMP & SOLID FUEL STOVE



nrgZONE

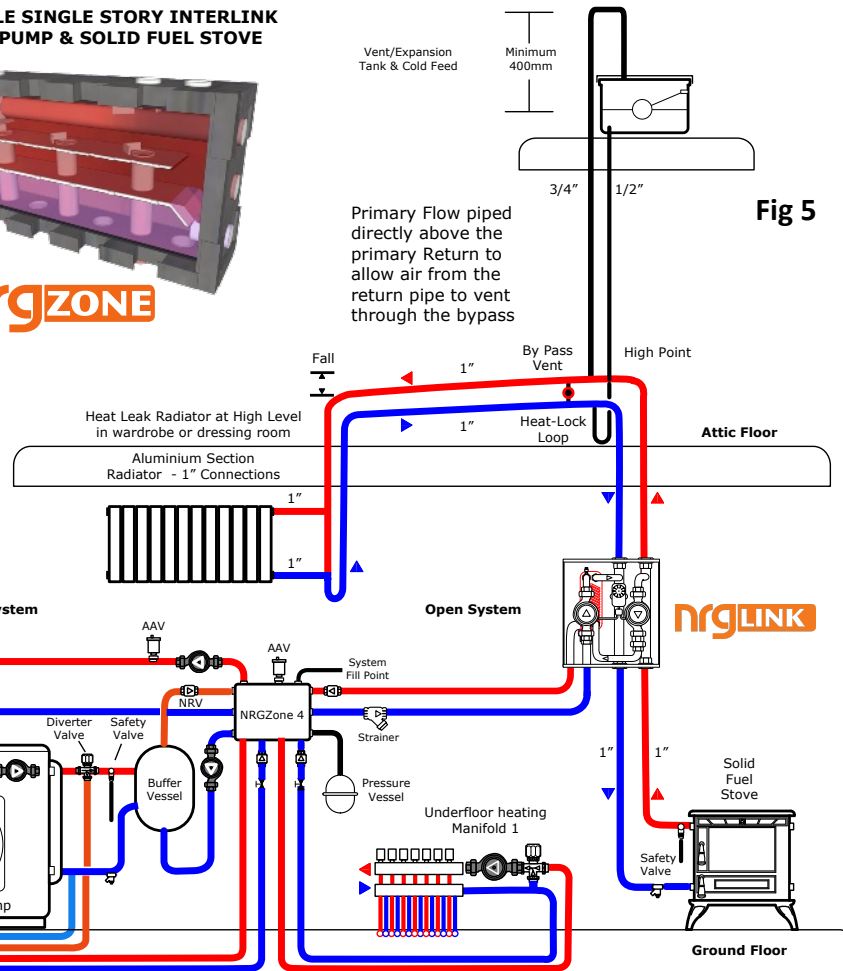
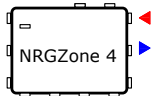


Fig 5

Figure 5 shows how an 'Up&Over' gravity heat leak system could be designed. The heat leak radiator is used to dissipate excess heat when there is a power shortage. The layout also show how to pipe a system with a sealed system heat

pump that require a buffer tank and an open solid fuel system. In this instance a DHW zone and 2 separate Under-floor heating zones can utilise the heat from heat pump and solid fuel system simultaneously.

NRG Link interconnection of Solid Fuel appliances with Heat Leak.

In the examples below the NRG Link system is sited above the solid fuel appliance and the unit's integral primary pipework facilitates a gravity fed circuit to heat leak circuits above the units mounting location.

Fig 6 shows a solid fuel stove with a primary heat leak circuit to a conventional open vented DHW dual coil cylinder with 1" open gravity circuit from the stove to the cylinder.

The secondary sealed system is interlinked on the system side of an 'S' Plan motorised zone valve control configuration with non return valves (NRV's) preventing any back-feeding between the systems and zones

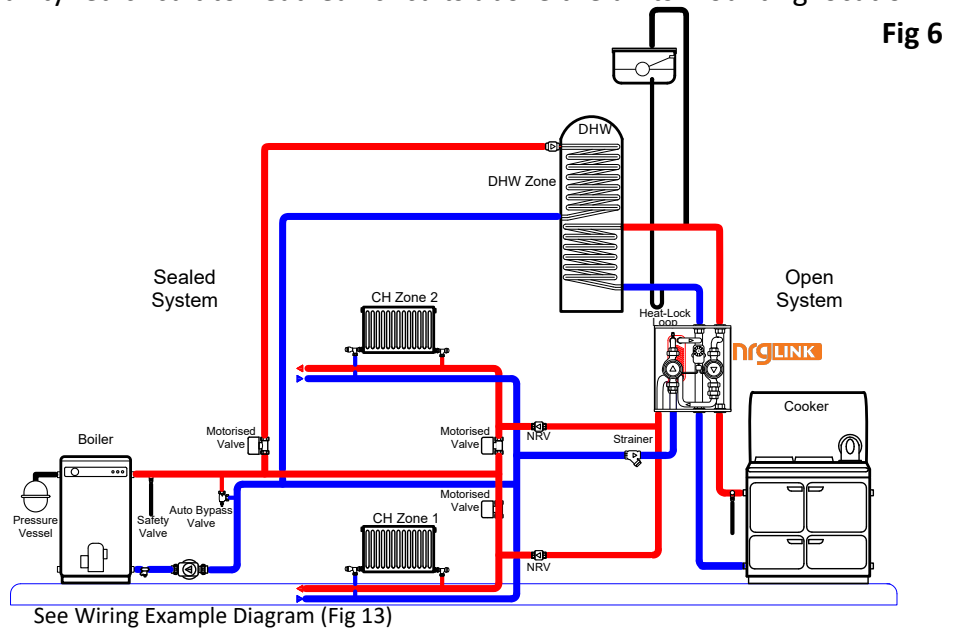


Fig 6

Fig 7 shows an open vented solid fuel stove with a heat leak to a conventional open vented DHW dual coil cylinder.

The secondary sealed system uses an NRG Zone 4 manifold creating a radiator, under floor heating and a DHW circuit.

In this instance the manifold allows the coldest zone return water to return to the condensing boiler while the stove maintains a 55°C return temperature.

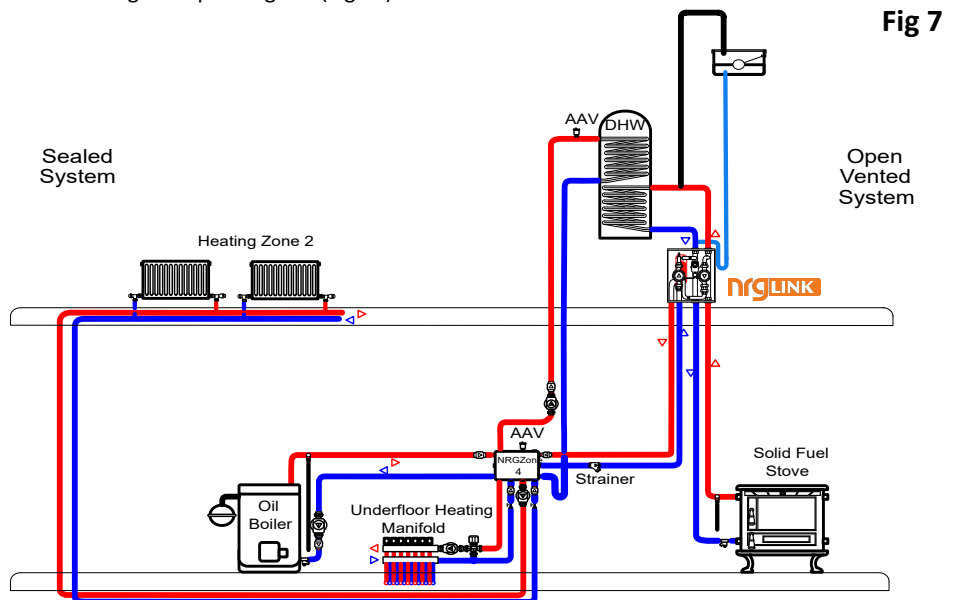


Fig 7

Fig 8 shows an interconnection between an open vented solid fuel stove with a heat leak radiator - towel rail circuit and a closed system combi-boiler.

The two appliances are isolated from each other by non return valves on the interlinking pipework.

In each of the three examples above the heat leak circuit receives heated water from the solid fuel appliance before the NRG Link stat allows the heat to be transferred to the sealed system.

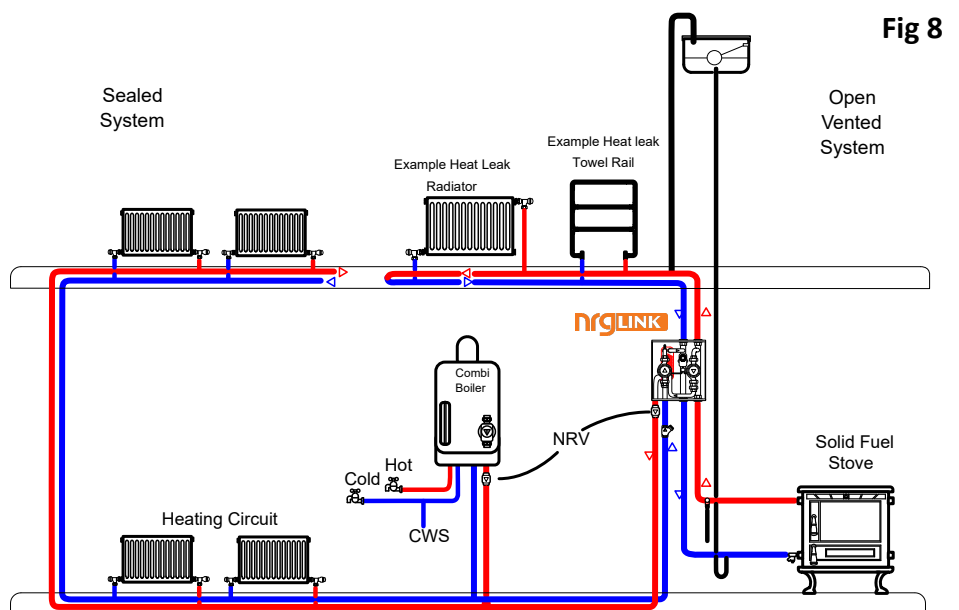


Fig 8

NRG Link interconnection of Solid Fuel appliances with Heat Leak located below the NRG Link system.
 In the examples below the NRG Link system is sited above the solid fuel appliance and the unit's integral primary pipework facilitates a gravity fed circuit to a heat leak circuit below the units mounting location.

Fig 9 shows a solid fuel stove with a 1" open gravity circuit from the stove to the heat leak.

In this instance the NRG Link can exchange heat from the solid fuel stove to the sealed heating system before it reaches the heat leak circuit.

The sealed system comprises a gas combi-boiler which is isolated from the solid fuel heat input by Non Return Valves (NRVs) .

The main benefit of this method is that the heat leak circuit only receives residual heat from the gravity circuit and the sealed system can gain the bulk of the heat generated by the solid fuel appliance.

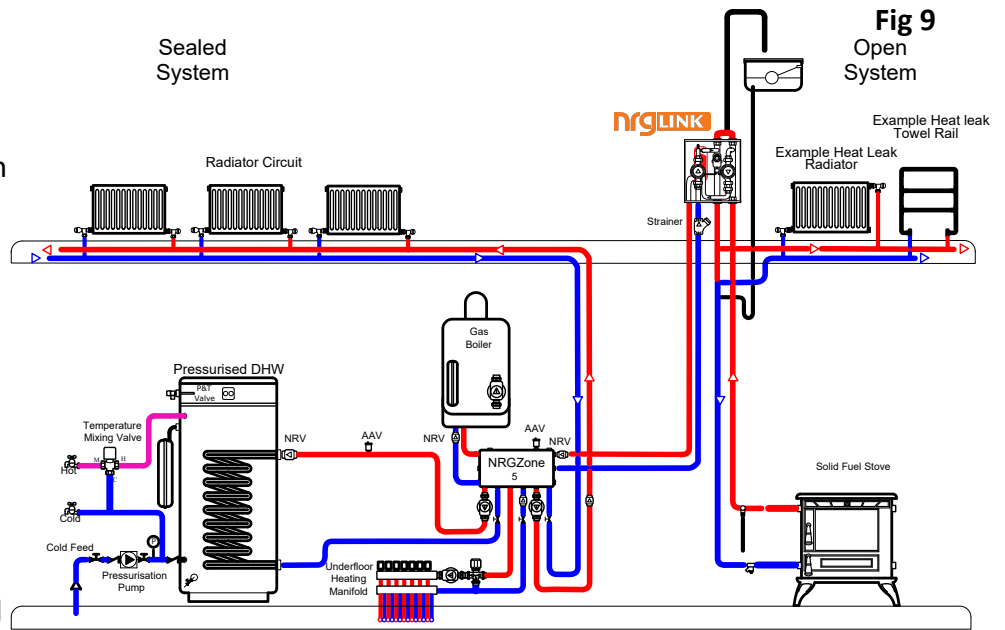
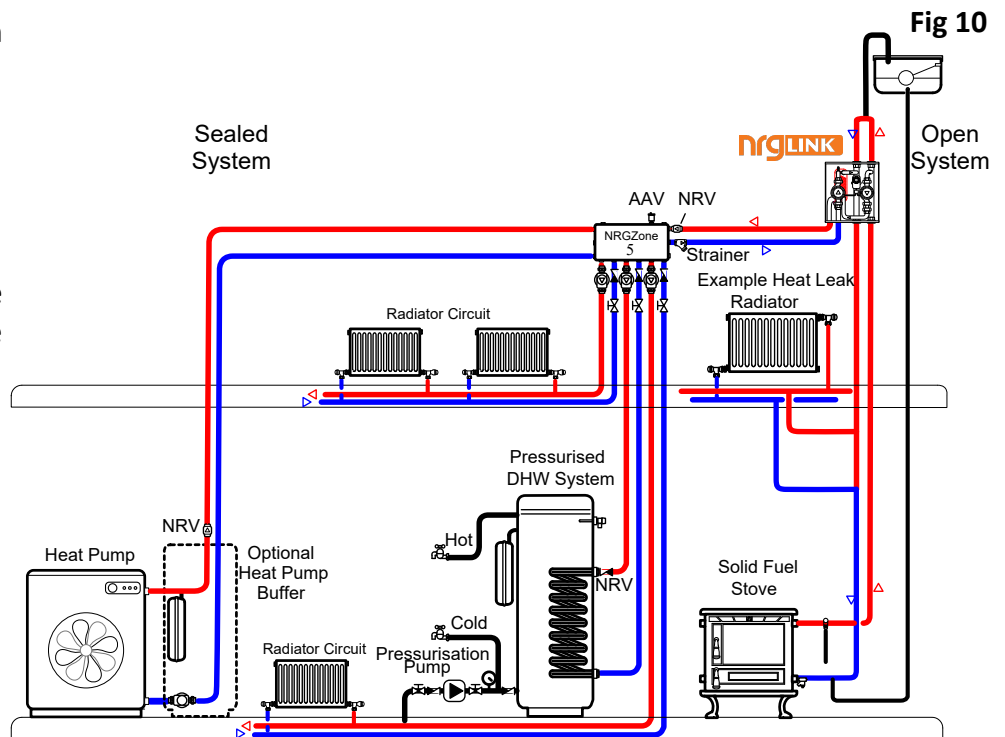


Fig 10 shows an interconnection between an open vented solid fuel stove with a heat leak radiator circuit and a closed system Heat Pump.

The NRG Link, controlled by it's pipe stat is used to prioritise the the solid fuel system heat to the sealed system.

The interlink is completed using an NRG Zone 5 manifold allowing the heat pump to have primary access to the coldest zone return water to increase it's efficiency and to work in tandem with the stove.

The pressurised DHW system has indirect controllably access to the heat from the solid fuel appliance which complies with all regulations and good work practice



See Example Wiring Diagram (Fig 16)

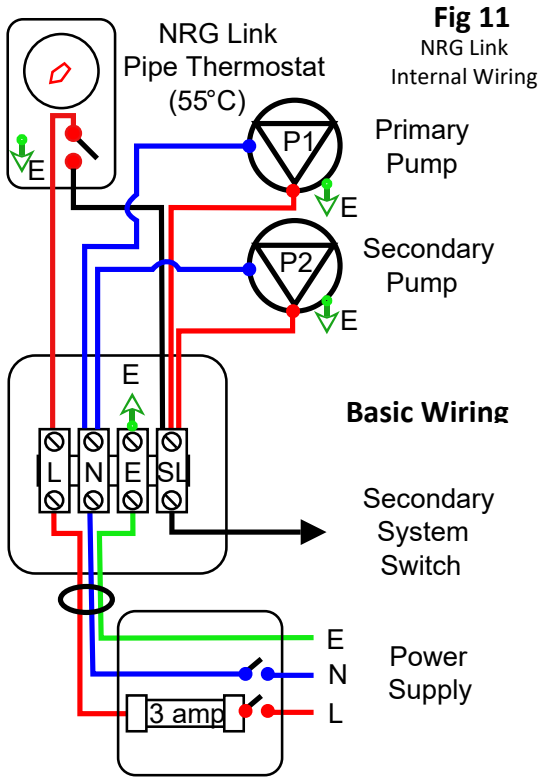


Fig 11
NRG Link
Internal Wiring

Basic Wiring

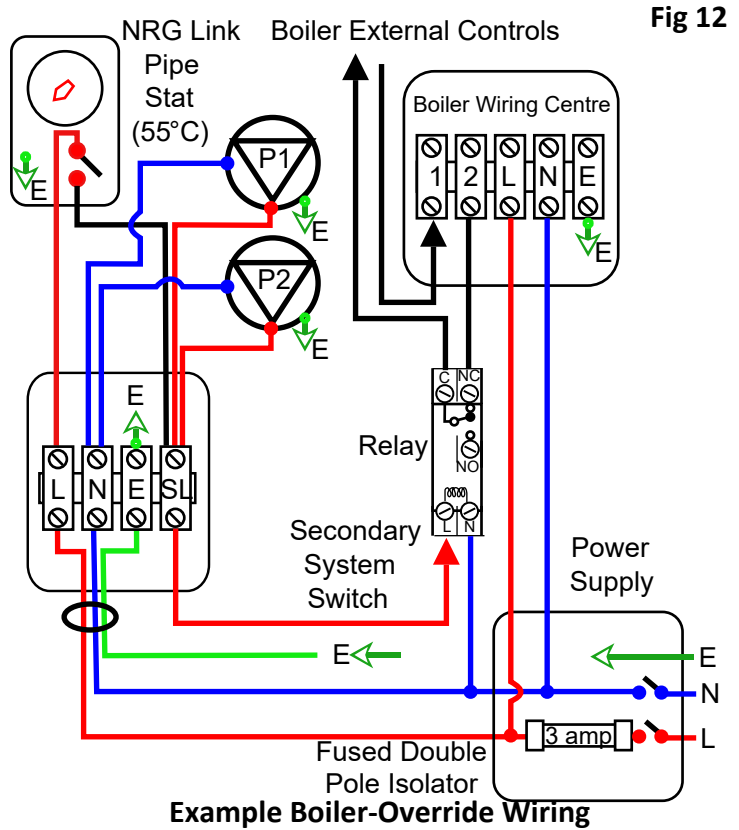


Fig 12

Example Boiler-Override Wiring

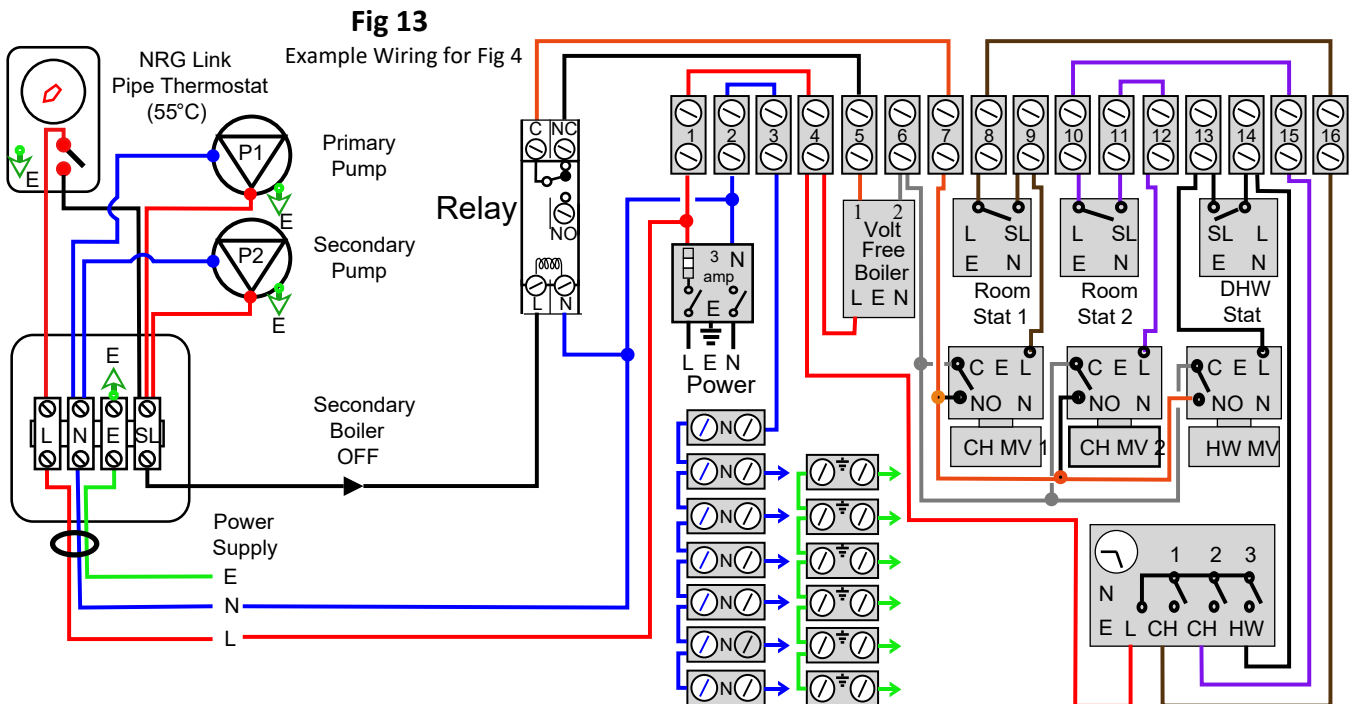


Fig 13

Example Wiring for Fig 4

Example motorized valve system with Boiler-Override Wiring

NRG Link Internal wiring has pre-wired connections to the internal primary and secondary pumps through the pipe thermostat as shown in **Fig 11**. The switch live to the pumps can also be used to trigger a control relay (Not supplied) for auxiliary functions, for example as shown in **Fig 12** above where a relay breaks the external control link to de-energise the secondary boiler when the NRG Link Stat detects that the solid fuel appliance has reached its heat delivery set-point.

Fig 13 shows NRG Link with a 3 Motorised Valve ('S' Plan) with a common power supply. If required, an additional relay may be used to break the 'S Plan' volt free boiler control Link at terminals 7 (C) & 5 (NC) on the controls terminal strip when the relay coil is energised by the NRG Link. By this means the secondary boiler can be switched off when the solid fuel (Biomass) boiler has achieved its set-point on the NRG Link internal thermostat.

Example NRG Link Wiring with an NRG Lex System Controls Module (SMC)

NRG Lex is a pre-configured electronic wiring center with 4 fused (independent 1 A) zones, each of which will call the boiler(s) when any of the 4 zones call. The unit also includes 4 isolated inputs to separate auxiliary relay that may be used to carry out additional system controls tasks such as adding extra boilers or control functions when certain wiring control conditions are met. It also has a 6.3 A mains fuse, two 3 A boiler fuses, a 3 A general clock fuse and a Frost/Auxiliary fuse to supply power for any optional ancillary use.

The diagrams that follow show how the NRG Lex SCM may be used to configure interconnected linkups using NRG Link with pumped based systems where selected auxiliary functions can isolate a second boiler and/or override particular zone controls to dissipate heat from the solid fuel stove when its pipe stat calls. The various diagrams show different zone control types but they are not exclusive to any one interlinking method. The alternative zone controls are interchangeable in the other diagrams as required.

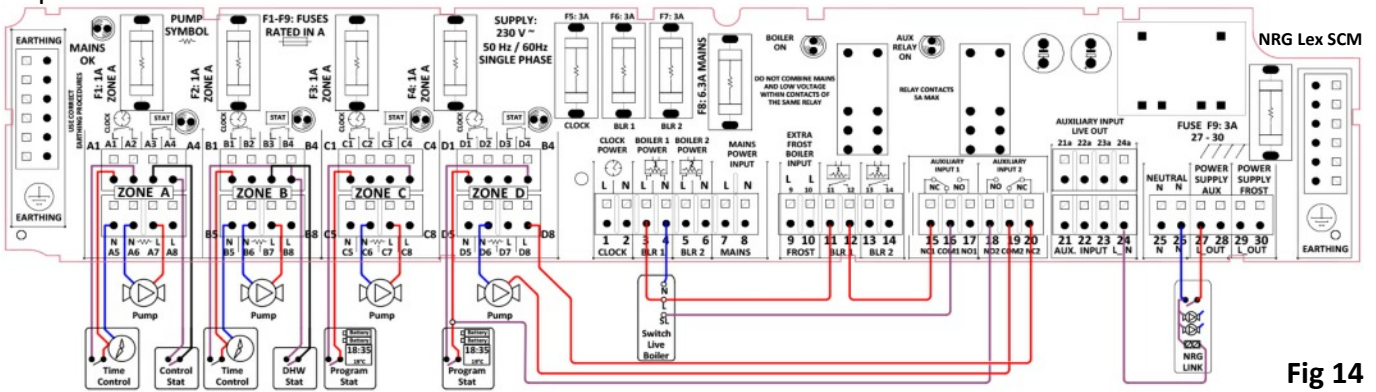


Fig 14

Figure 14 shows an NRG Lex SCM with a four-zone heating system using a switch live boiler interlinked with a solid fuel appliance using NRG Link. In this configuration, the NRG Link's output will operate its own pumps as well as the NRG Lex's auxiliary

relay to turn the boiler off by switching the auxiliary relay contacts which will also bypass Zone D's controls to run the zone's pump to dissipate the heat when the solid fuel appliance return temperature is above 55°C.

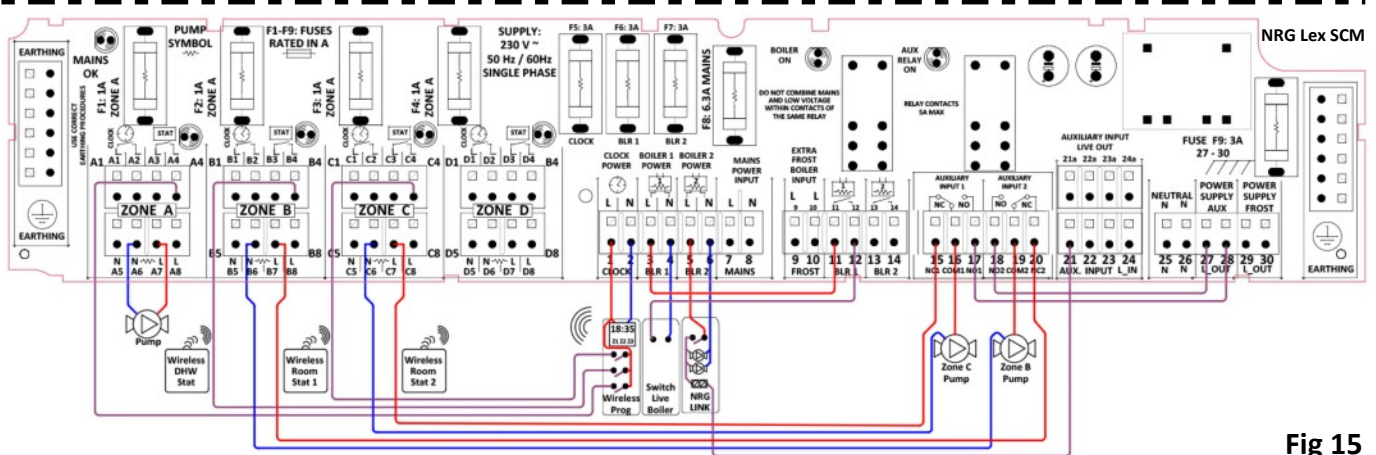


Fig 15

Figure 15 shows an NRG Lex with an example three zone wireless heating system, switch live boiler and a solid fuel appliance using NRG Link. This example allows the boiler to continue firing when the NRG Lex solid fuel stat is above 55°C. This will also cause the double pole auxiliary relay to override the controls in Zone B & C to energise both zone pumps and dissipate the heat from the solid fuel appliance.

It is also important to note that when the solid fuel appliance has caused the auxiliary relay to switch that the power supply for zone pumps B & C will change to the auxiliary power supply at terminals 27 & 28 with power isolation provided by the relay.

This method is only applicable when the system can handle the different temperature outputs from the two boiler appliances.

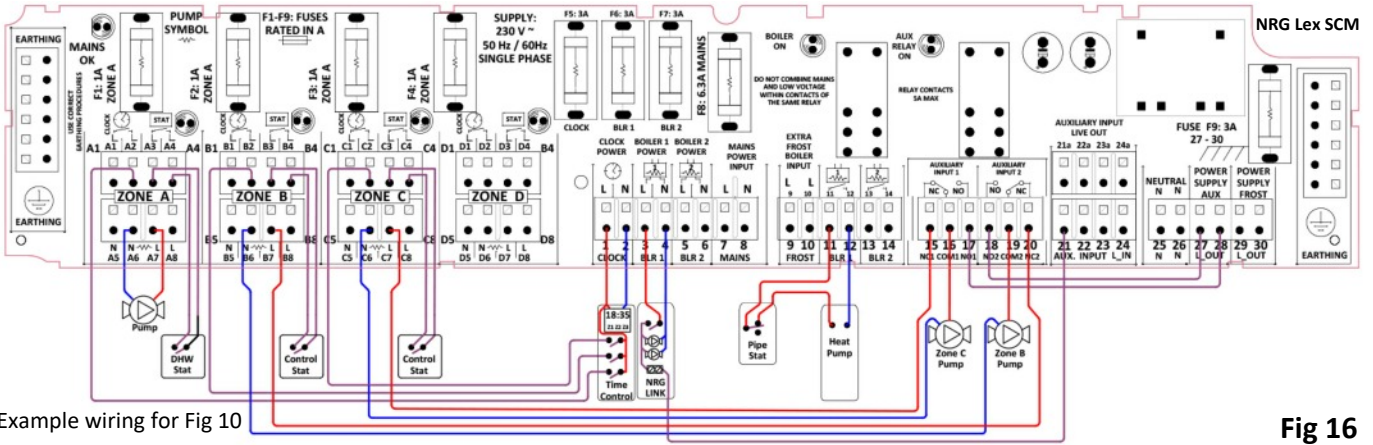


Fig 16

Fig 16 shows an example of a wiring layout to control a solid fuel appliance with a heat pump. The heat pump is called 'On' by the zone controls but also will be switched off if the pipe stat on the heat pump return detects over-temperature. In standard mode the zone pumps

are powered by the zone controls (from A4, B4, C4 or D4) but in this instance the auxiliary relay is also used to override the controls of zone B & C where the auxiliary power supply from 27 and 28 are used to run the 2 zone pumps through the switched relay connections 17 & 18.

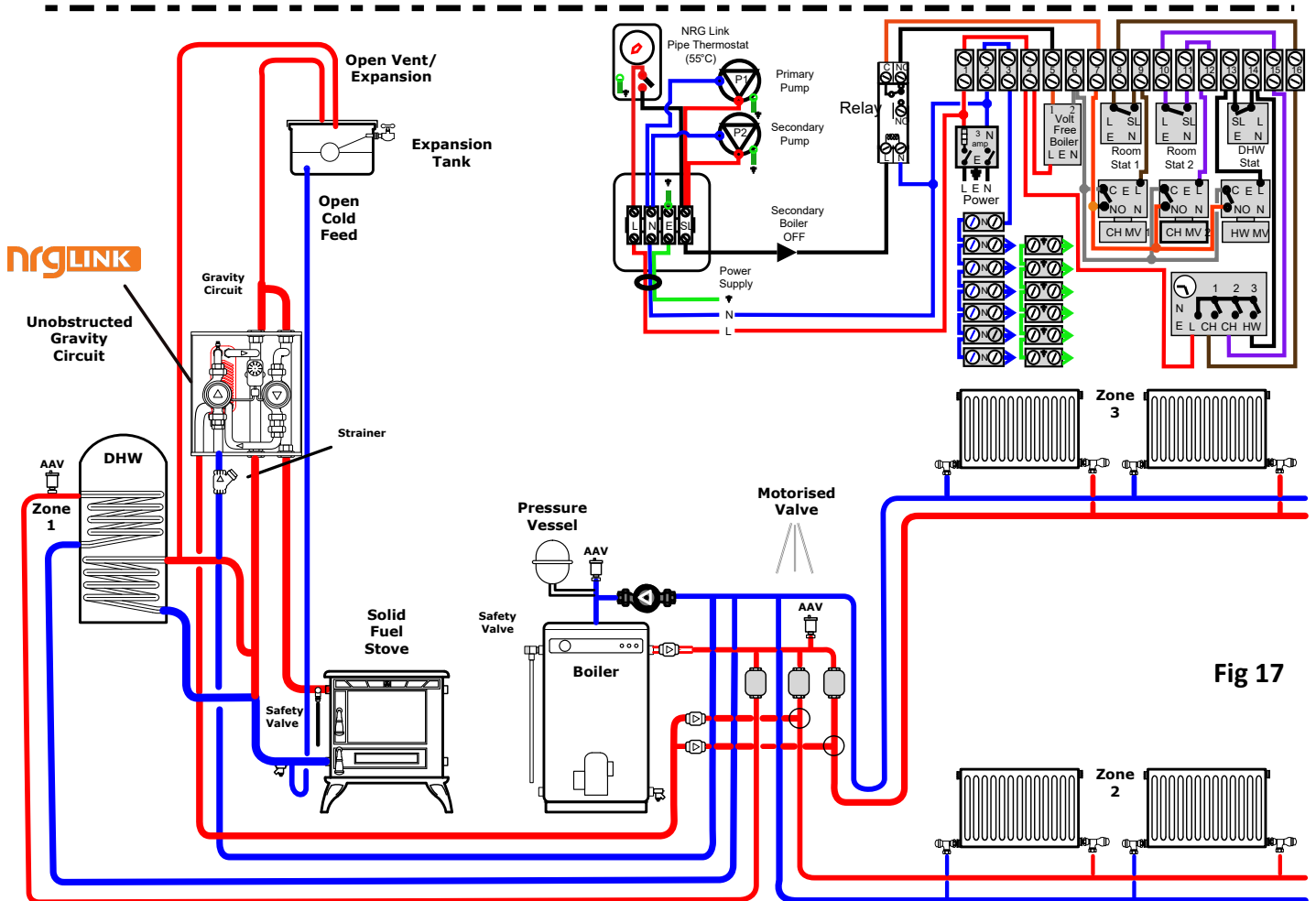


Fig 17

Example - 3 zone Wiring 'S' Plan used to control and interlink with a boiler and a solid fuel stove .

This variation of an 'S' Plan motorised valve wiring diagram will prevent the Oil Boiler firing and allow the 2 zones (2 & 3) to receive heat output from the NRG Link when it's internal pipe thermostat stat calls. The secondary output from the NRG Link is connected to the system side of, or beyond the motorised valves, therefore it will not be necessary to open any of those valves to allow the heat from the solid fuel to be dispersed to the zones.

In this instance the return to the heat pump buffer should be connected to the lower side connection on the NRGZone.

This will collect the coolest returning water from the zones and increase the efficiency of the heat pump.

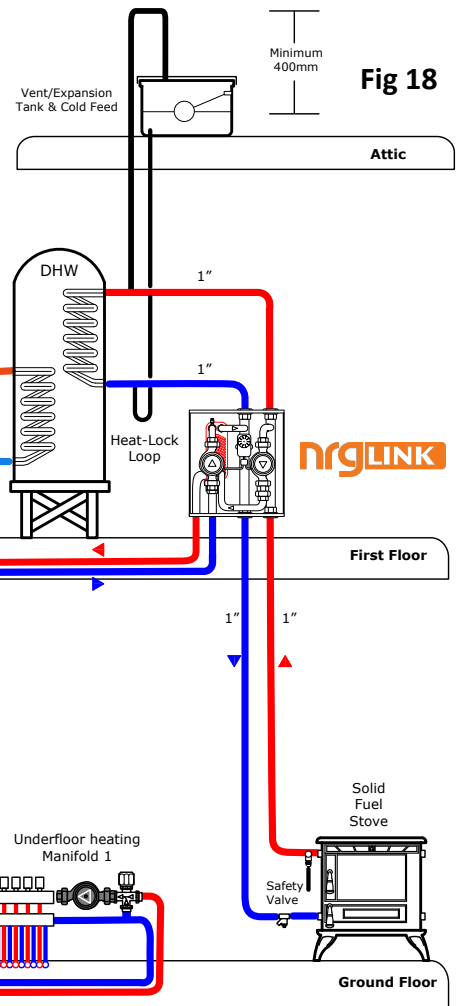
It will also permit the solid fuel appliance and the heat pump to operate together under controlled conditions



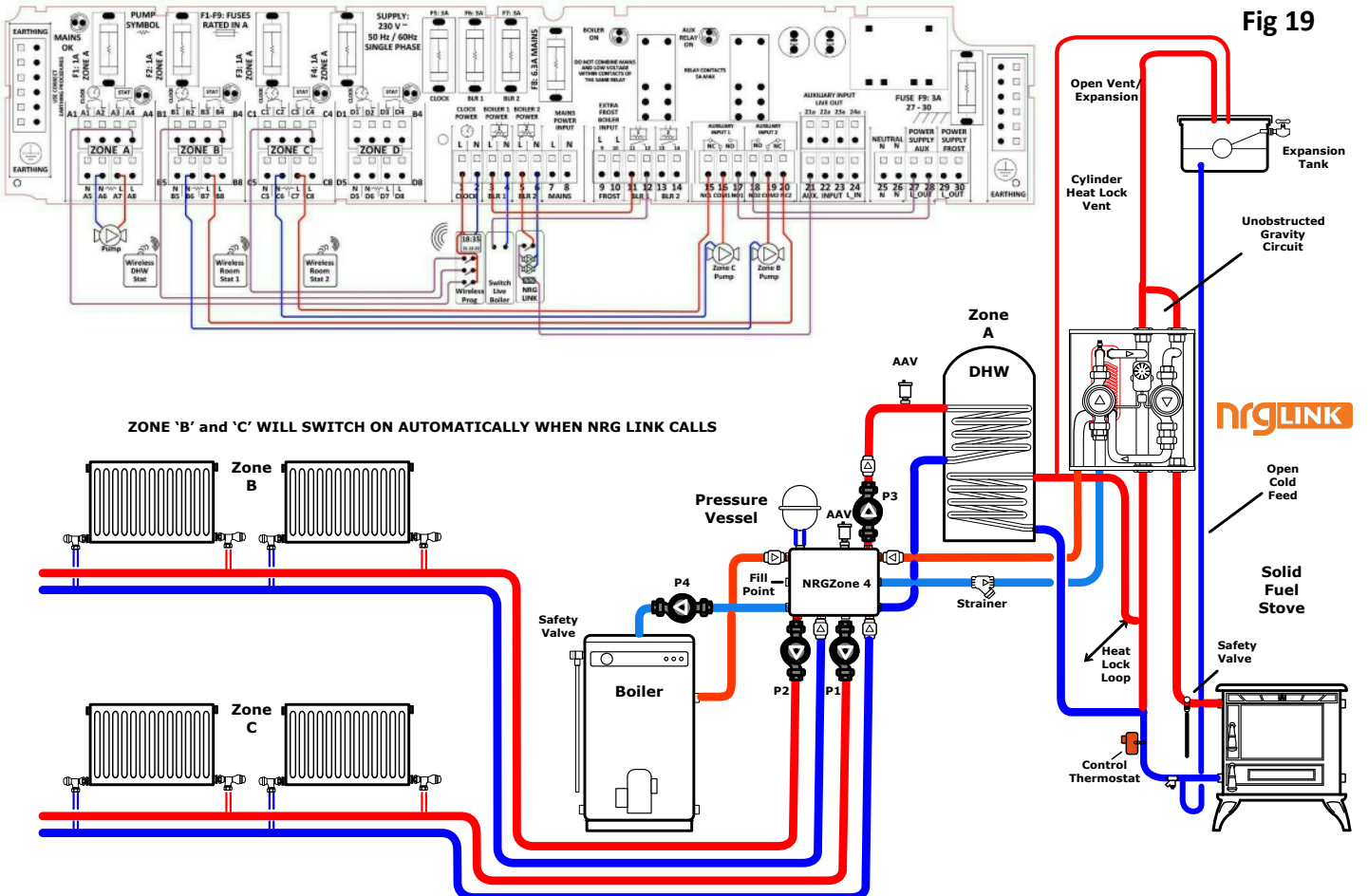
In this instance the return to the solid fuel stove should be connected to the middle side connection on the NRGZone.

This will collect any hotter bypassing water in the NRGZone and increase the performance of the stove by maintaining a return temperature above 55 C when controlled by the built-in pipe thermostat in the NRG Link.

It will also permit the solid fuel appliance and the heat pump to operate together under controlled conditions.



Example - 3 zone NRG Zone used to control and interlink with a Heat Pump and a solid fuel stove .



Example - 4 zone NRG Zone used to control and interlink with a Oil/Gas Boiler and a solid fuel stove

