SystemLink

SPECIFIERS GUIDE

Zoned Heating
for
Domestic – Commercial – Industrial
Applications

MAXIMUM COMFORT
AT MINIMUM COST

SystemLink

introduction

In an era when we are all under pressure to reduce energy waste, both for cost and environmental reasons, zoned heating systems make sense. Heating only the area of your building where heat is required at a particular time and controlling both the ambient temperature and hot water generation is obviously energy efficient.

Up to now however, zoning has not been an easy task. Complex electrical panels, thermostatic and motorised valves, complicated pipework and electrical specifications have all contributed to the reluctance of many specifiers to zone systems.

SystemLink technology has helped to change all that. SystemLink is the complete central heating zone control system. It gives the opportunity for independent time and temperature control over multiple zones and hot water generation. It is highly efficient and simple to install providing a complete plumbing and electrical solution to zoning.

SystemLink contains two patented elements that form the heart of this unique product. These are the SystemZone water distribution manifold and the SystemLex electronic central wiring control unit. Both are available for sale separately.

SystemLink is particularly suited to systems where different water velocities are required to cater for the multiple forms of heat emitters that might be used to complete design objectives. This means independent speeds may be selected to closely match a particular zone's water velocity requirement.

SystemLink incorporates the zone(s) circulating pumps, automatic venting, safety valve, built in bypass, pump isolation valves, pressure neutralisation chamber, connections for multiple boilers and the electronic control centre.

SystemLink isolates and controls heating water distribution circuits. In a standard simple installation, one or more boilers may be connected to the SystemZone. It also has connection points for ancillary safety devices, safety valves and expansion tanks. This integral part of the system has unobstructed internal baffles and contains no moving parts.

SystemZone also eliminates the need for motorised valves, a system bypass and the complex fitting assemblies associated with conventional zoning methods. SystemLex, the wiring centre, is pre-configured to automatically fire the boiler(s) only when one or more time/temperature zone controls call for heat, eliminating the need for a separate boiler clock.

Details in this booklet are intended to provide a basic understanding of some of the many alternative designs possible. Please refer to the installation manual for full instructions.

SystemLink complies with current building regulations and standards in Ireland. SystemLink provides the specifiers, the heating engineers and end-users with an unequalled means for cost and energy saving.

SystemLink…the professional's choice

SystemLink

products

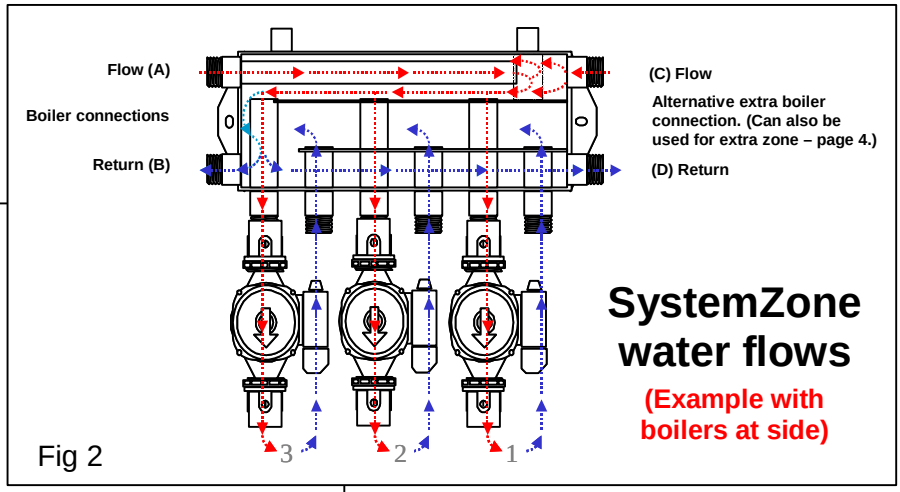
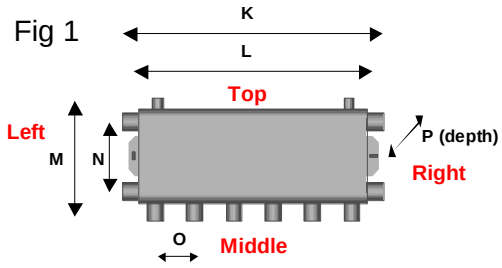


Fig 2

SystemZone water flows

(Example with boilers at side)

Fig 1



Product code explanation

SZ C 5 - 40 - 40 - 32 MS

- SZ → SystemZone
- C / D → Commercial / Domestic
- 5 → Number of zones - pipe pairs
- 40 → Right pipe diameter
- 40 → Left pipe diameter
- 32 → Middle pipe diameter
- MS → Mild steel; SS → Stainless steel; Other

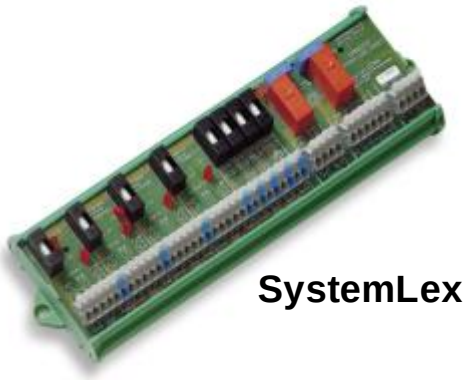
SystemZone

Water distribution unit

Product code		Material	Pipe sizes (inches BSP) Left	Rt	Mid	Top	Dimensions (cm) K	L	M	N	O	P	Heat capacity (Kw) per zone* Left	Rt	Mid
4 Port	SZD4-28-28-28 MS	Mild Steel	1	1	1	1/2	36.0	29.0	21.0	9.5	7.5	6.4	43	43	43
5 Port	SZD5-28-28-28 MS	Mild Steel	1	1	1	1/2	51.0	42.0	21.0	9.5	7.5	6.4	43	43	43
6 Port	SZD6-28-28-28 MS	Mild Steel	1	1	1	1/2	66.0	62.0	21.0	9.5	7.5	6.4	43	43	43
4 Port	SZC4-32-32-28 MS	Mild Steel	1 1/4	1 1/4	1	1/2	32.1	28.4	15.0	9.5	7.0	10.0	56	56	43
5 Port	SZC5-32-32-28 MS	Mild Steel	1 1/4	1 1/4	1	1/2	46.1	42.5	15.0	9.5	7.0	10.0	56	56	43
6 Port	SZC6-32-32-28 MS	Mild Steel	1 1/4	1 1/4	1	1/2	60.1	56.4	15.0	9.5	7.0	10.0	56	56	43
4 Port	SZC4-40-40-32 MS	Mild Steel	1 1/2	1 1/2	1 1/4	1/2	42.0	39.8	18.0	11.7	10.0	12.5	87	87	56
5 Port	SZC5-40-40-32 MS	Mild Steel	1 1/2	1 1/2	1 1/4	1/2	62.0	58.6	18.1	11.7	10.0	12.5	87	87	56
6 Port	SZC6-40-40-32 MS	Mild Steel	1 1/2	1 1/2	1 1/4	1/2	82.0	78.6	18.1	11.7	10.0	12.5	87	87	56
4 Port	SZC4-50-50-32 MS	Mild Steel	2	2	1 1/4	3/4	52.2	50.0	20.0	12.5	12.5	15.0	137	137	56
5 Port	SZC5-50-50-32 MS	Mild Steel	2	2	1 1/4	3/4	77.2	74.2	20.0	12.5	12.5	15.0	137	137	56
6 Port	SZC6-50-50-32 MS	Mild Steel	2	2	1 1/4	3/4	103.7	100.7	20.0	12.5	12.5	15.0	137	137	56
4 Port	SZC4-50-50-40 MS	Mild Steel	2	2	1 1/2	3/4	52.2	50.0	20.0	12.5	12.5	15.0	137	137	87
5 Port	SZC5-50-50-40 MS	Mild Steel	2	2	1 1/2	3/4	77.2	74.2	20.0	12.5	12.5	15.0	137	137	87
6 Port	SZC6-50-50-40 MS	Mild Steel	2	2	1 1/2	3/4	103.7	100.7	20.0	12.5	12.5	15.0	137	137	87

** Recommended maximum levels with water at velocity 1.5m/sec and 11 degC designed temperature differential.*

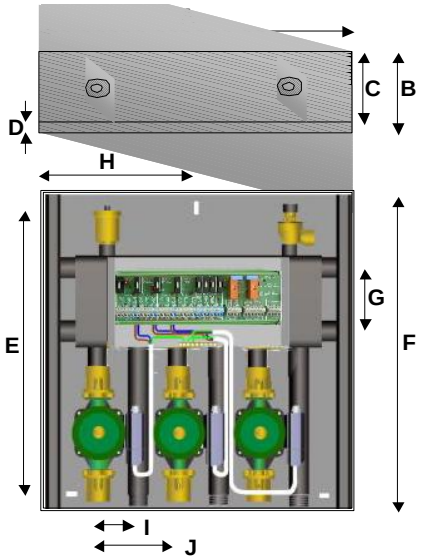
Note: Specifications may change without notice due to product development. Please refer to latest product data sheets.



SystemLex

MiniLex

Fig 3



SystemLink:

SystemZone plus SystemLex, pumps, valves and outer casing

	Systemlink 5	Systemlink 6
Product code	SLK5-28-28-28	SLK6-28-28-28
Material	Mild Steel	Mild Steel
Pipe sizes (inches BSP)		
Left	1	1
Right	1	1
Middle	1	1
Top	1/2	1/2
Dimensions (cm) SystemLink, outer casing		
A	53.0	66.7
B	23.0	23.0
C	8.5	8.5
D	2.0	2.0
E	62.5	62.5
F	53.0	53.0
G	10.5	10.5
H	25.5	25.5
I	6.6	6.6
J	13.2	13.2
Maximum recommended heat capacity (kW) per zone *		
Left	43	43
Right	43	43
Middle	43	43

** Water at velocity 1.5m/sec, 11 degC design temperature differential*

Product code explanation

SL 5 - 28 - 28 - 28

- SL → SystemLink
- 5 → Number of zones - pipe pairs
- 28 → Right pipe
- 28 → Left pipe diameter
- 28 → Middle pipe

Note: The total boiler flow rate and heat input to the SystemZone must at least match the maximum required zone outputs

SystemLink Limited manufactures and distributes an integrated range of zoned heating products.

This Specifiers' Guide describes some applications of the patented SystemZone water distribution unit as well as the SystemLex and MiniLex wiring centres.

Please contact SystemLink for details of our building management system and other products in the range

SystemLink

domestic installation

SystemZone 4 with one boiler and MiniLex

- Motorised valves are not required. Non-return valves may be required in certain circumstances.
- Radiators are installed as normal with appropriate valves. However, SystemZone and MiniLex used in conjunction with room thermostats in each zone eliminates the need for thermostatic radiator valves except where individual control, other than radiator ON/OFF within the zone, is required.
- Connect the boiler heating flow to port A or C and the boiler heating return to B or D on the SystemZone as shown in Fig 3.
- Blank off unused boiler connection ports (none in this illustration).
- Install the boiler circulation pump on the boiler heating return to pump away from the SystemZone unit.
- Blank off any unused zone flow and return ports.

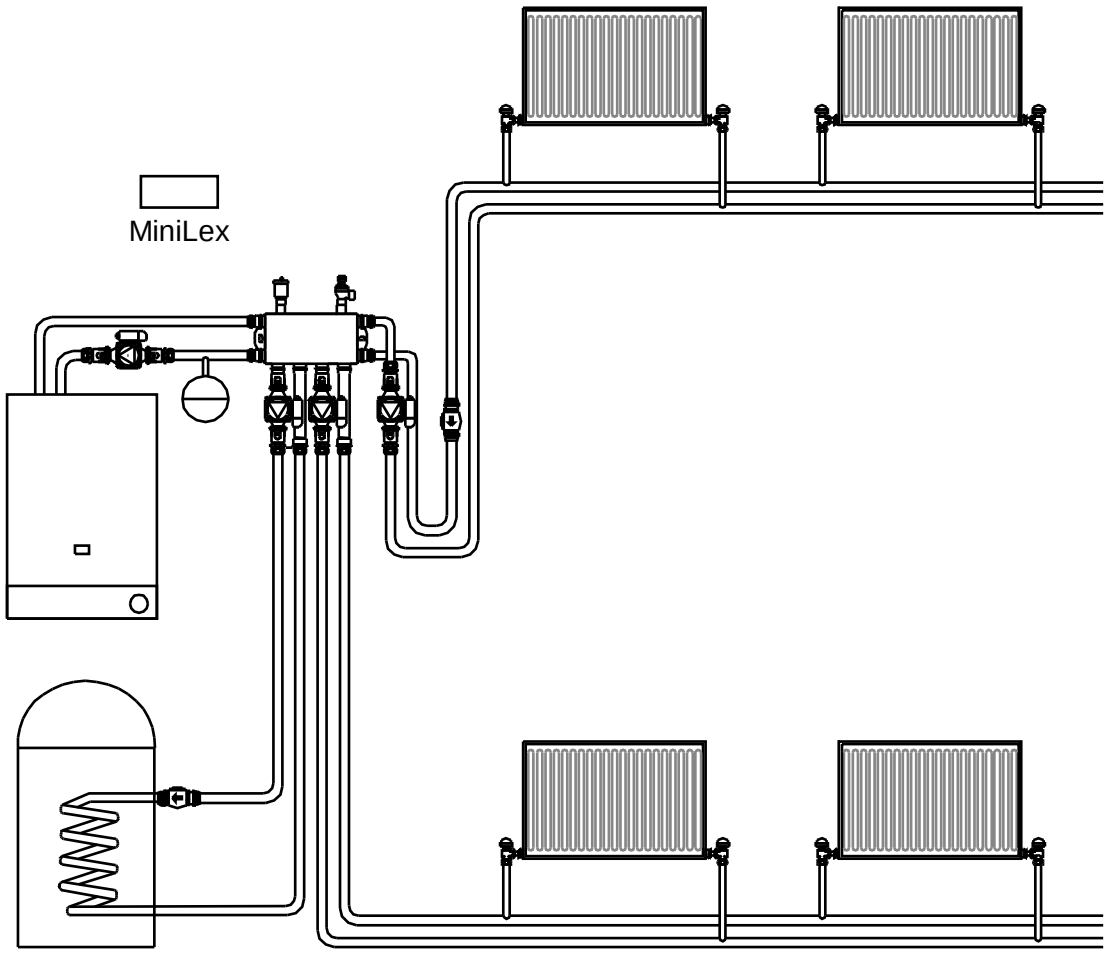


Fig 4

SystemLink

domestic open system

Three zone system (interconnected with a gravity fed solid fuel cooker), two radiator zones and domestic hot water

- The primary flow/return (minimum 25mm diameter) is first directed through a dedicated DHW cylinder-heating coil to provide the pre-requisite 'Heat Leak' circuit for the solid fuel appliance.
- Connect the heating flow from the cooker to the SystemLink and cylinder flow connections as shown.
- Connect the return to the cooker via an injector tee with the pumped return of the SystemLink feeding through the injector as shown.
- Connect the cold feed and expansion arrangement in accordance to the boiler manufacturer instructions typically as shown.

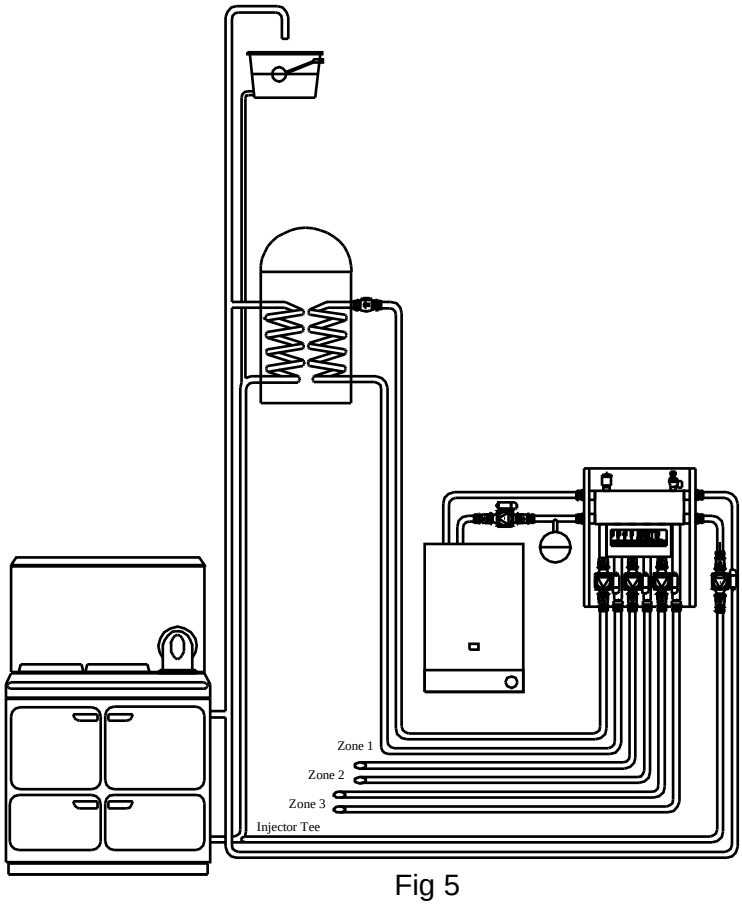


Fig 5

- The expansion/vent-pipe should rise to a position directly above the feed and expansion tank.

Note

This inter-connection method is reliant on the DHW cylinder being located higher than the solid fuel cooker and in accordance with the manufacturer's instructions. This arrangement will require a high grade of pipe-work insulation to counteract pipe heat losses from the gravity fed thermo-syphoning circuit. This circuit is created by the rising pipe-work between the cylinder and the solid fuel boiler.

The boiler's connection pipe-work must be sized in accordance with boiler manufacturer's instructions. The size of the expansion tank is related to the total water content of the system, as it has to accommodate approximately 1/25th of this amount. However, for all systems up to 24Kw output, a tank size of 45-litre nominal and 18 litres actual capacity is suitable.

The height of the expansion pipe should be maximised to eliminate the potential for pitching over on system start-up. A minimum height of 1 metre is desirable.

SystemLink

commercial and industrial applications

Modular boiler interconnection arrangement

Modular arrangements using multiple smaller boilers are cheaper to operate because they tailor fuel usage to match demand as opposed to one large boiler. They are usually cheaper to install, more conveniently located, more reliable, and service personnel for smaller boilers are more readily available. However, they have generally been avoided because of design and installation complications, and plant unreliability due to failure of critical mechanical components.

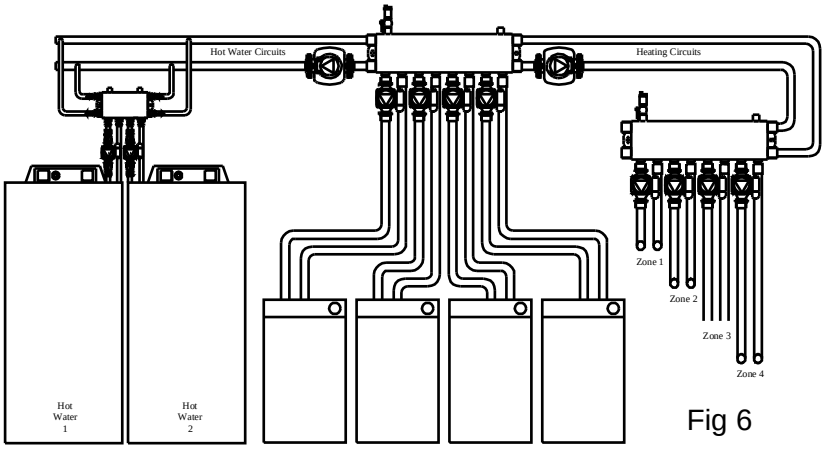


Fig 6

SystemZone easily solves this problem without moving parts. The water activity through each boiler is independent. The patented principle of SystemZone's operation is that no water activity will take place either to or from a boiler (or a zone) unless created by the action of a pump on its circuit. A typical multi-boiler application of SystemZone is illustrated in Fig 6.

Note that circulation pumps should preferably be on the return path to the boilers. This will ensure an open path to all expansion points and will ensure that the scheme is compliant with all current installation standards and requirements.

Water flows

With the boilers underneath, the flow and return ports in the SystemZone change when compared to Fig 2 on page 3. The heated water output is taken from the lower side connections and the return at the upper side connections. This is illustrated in Fig 7 opposite.

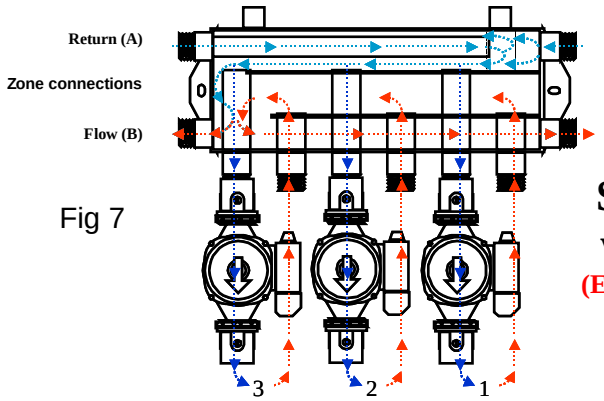


Fig 7

SystemZone water flows
(Example with boilers beneath)

Large commercial applications

SystemZone is suitable for the largest industrial or commercial applications and is available to handle all heating loads. Additional SystemZone units can be used to distribute the heated water to multiple sub-zones. This is a simple method of solving the zone distribution issues in heating systems for large and complex buildings. It is also easy to understand and explain to onsite contractors and end-users. A typical large application is pictured in Fig 8.

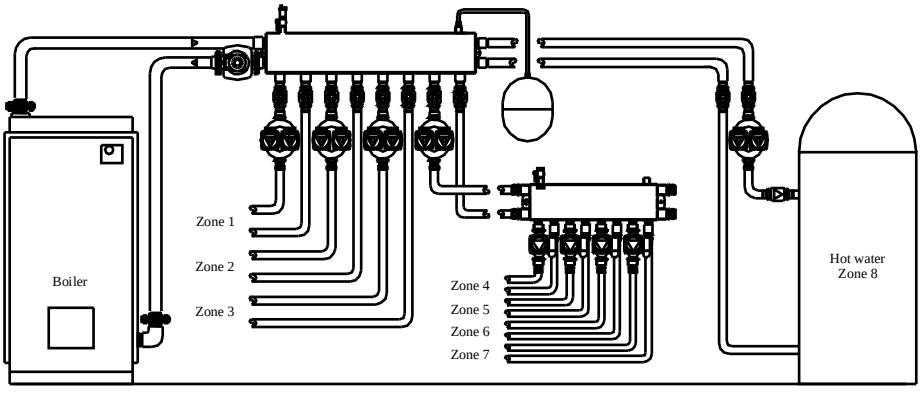


Fig 8

SystemLink

underfloor heating applications

Underfloor heating with SystemLink

SystemLink is very easily adapted to suit underfloor heating installations. The SystemZone, when used as a central distribution point, will act perfectly to nullify all other water movement activities within that particular zone, and will allow only the desired amount of flow to satisfy the underfloor heating demand.

The pumped water from the heat source is collected in the unit and from there it is drawn through the underfloor heat distribution network by the underfloor manifold circulation pump. This pump will have unhindered access to the heated water and so a constantly stable flow velocity will always be available throughout the underfloor pipe work. This constant flow is a critical factor in a correctly installed underfloor scheme. (Fig 9)

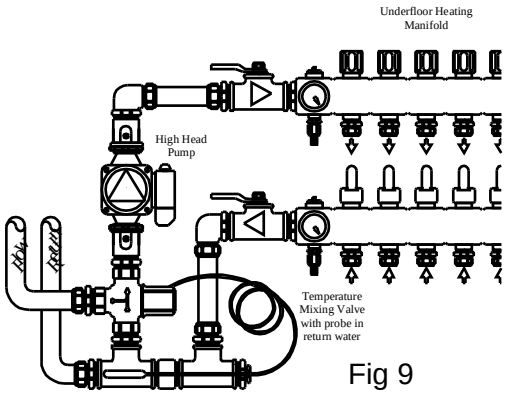


Fig 9

Individually time and temperature controlled zones

The schematic in Fig 10 describes how three zones, each independently temperature controlled, can simply be attached to the system.

Note that the SystemLink's internal pumps have been removed from the underfloor circuits only, as they are not required, and will actually interfere with the correct function of the underfloor manifold pumps when sufficient heat has been introduced to the floor pipework circuit and recirculation of the floor loops will suffice.

This layout will therefore provide for separately controllable heating arrangements and would be most suitable for buildings where different floor constructions require variable flow rates and temperature settings to match their specific demands.

Each section can have separate control of water flow temperature, air temperature and time set points.

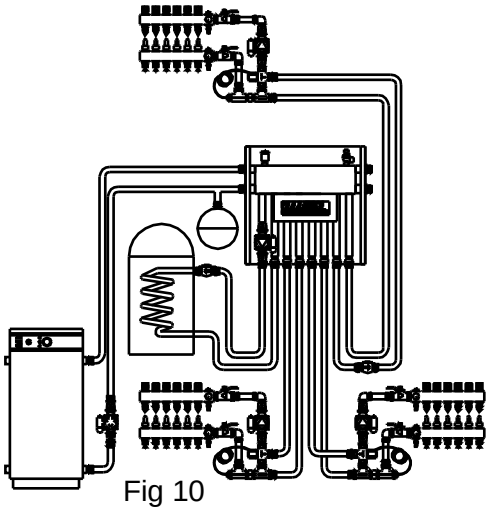


Fig 10

Individually time controlled zones

The installation in Fig 11 could be used where a common flow temperature is required to deal with a multi-zone application. This will require that all the zones will have a uniform heat gain requirement, with identical construction methods and U values.

The SystemLink will primarily direct the return water from the floor towards the return boiler connection, and so cater perfectly for a uniform temperature rise to each floor heating circuit.

In this layout, the pump will only act through the boiler when heat is required in the floor circuit. Each section can have separate time and ambient temperature control.

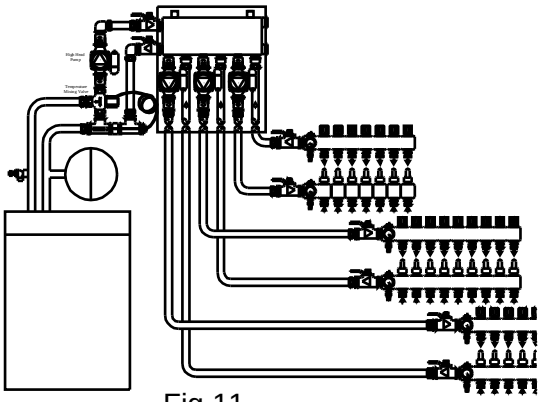


Fig 11

Note

Appropriate sized pumps can remain within the SystemLink unit when there are no temperature mixing valves on the underfloor manifolds. The temperature mixing valves shown on the underfloor heating manifolds are located to ensure that some of the water returning from the floor circuit is again mixed with SystemLink's flow output to facilitate a correct flow temperature setting.

mixed system heating applications

Individually time controlled zones

SystemLink can be used to combine many different sorts of heating equipment in a very simple fashion.

The installation in Fig 12 shows how a SystemLink 6 unit may be used to combine the required output for underfloor heating, fan convectors, radiators and a domestic hot water cylinder.

Note that SystemLink's underfloor circuit internal pump has been removed to facilitate the correct circulation to the underfloor heating circuit but that SystemLink's other pumps remain in position. They are used to distribute heat to the hot water, radiator and fan convector circuits.

Each section can have separate time and ambient temperature control as required.

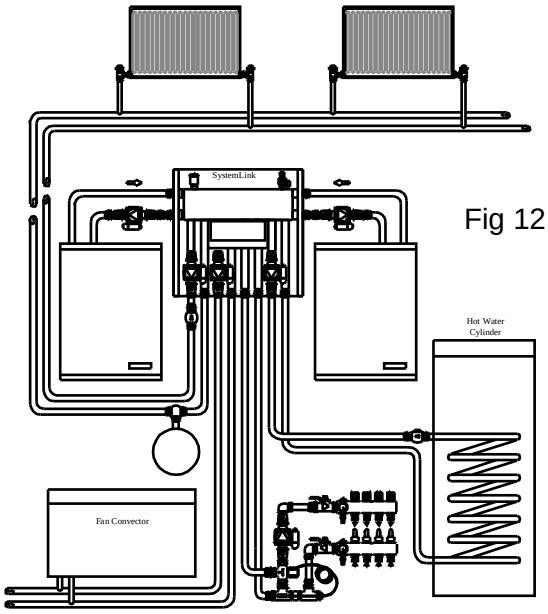


Fig 12

SystemLink for underfloor heating with condensing boiler

An interesting aspect of the layout in Fig 13 is that the boiler flow can be reduced to lower condensing temperatures when only underfloor heating is required. This is achieved by the use of an overriding thermostat to maximise the boiler's fuel efficiency. This thermostat can then be eliminated from the control protocol when hot water is being generated and higher boiler temperatures are required. In this instance the underfloor temperature-mixing valve is temporarily called into action to regulate the desired floor water temperature.

Note that the heat input to the SystemZone on the right of the drawing may be doubled by paralleling the pipework to both sets of side connections as shown.

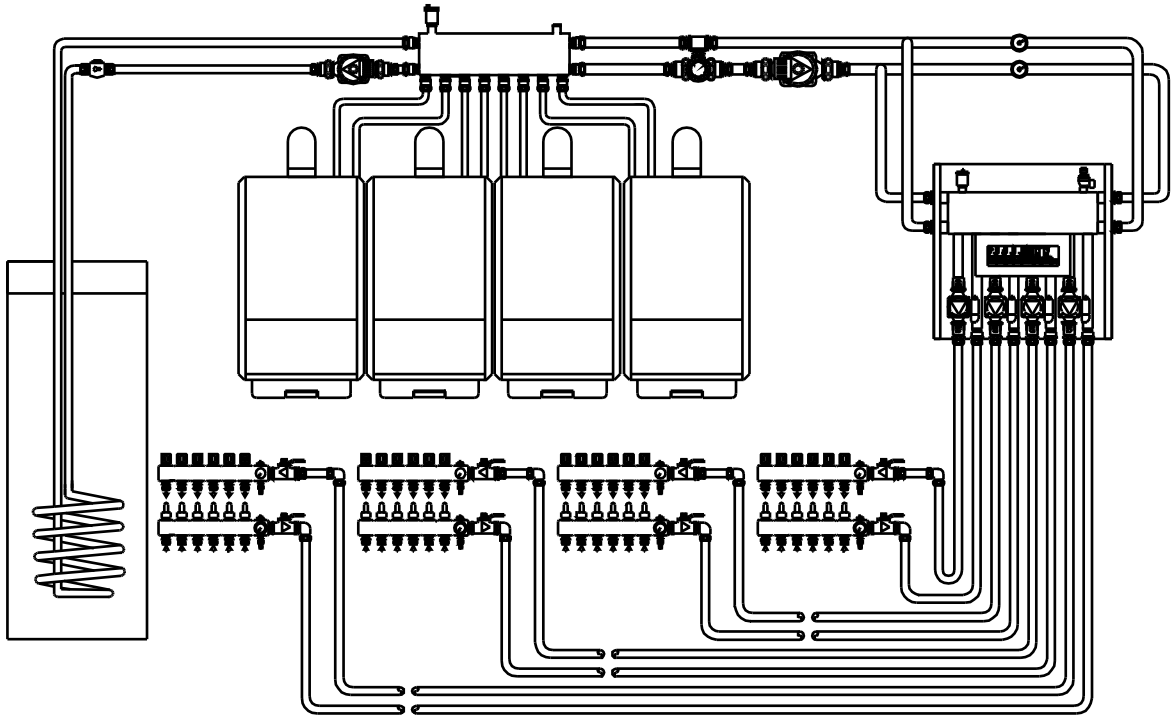


Fig 13

SystemLink

SystemLex wiring centre – examples

SystemLex, and its smaller companion MiniLex, are two versions of the electronic wiring centre of the SystemLink product. These pre-configured wiring centres connect the controls (clocks and thermostats), pumps and boilers together in a logical and easy to understand way. The LED's on the board show which elements are operating and make fault diagnosis easy. SystemLex and MiniLex do all the complex cross wiring for the installer – all that is left is to connect the system elements direct to the board.

The same terminal numbering scheme is used on both wiring centres.

SystemLex and MiniLex can be used together to configure more complex wiring requirements.

Wiring a clock and thermostat

The wiring configuration in Fig 14 should be used when separate time control and thermostat control units are to be configured in an "in-series" fashion with the SystemLex.

Terminal 11 is provided with power from the 1 amp fuse, located directly above the zone clock connections. This power source is used to energise the clock motor and also to provide the required power to the clock's switch common.

When the clock switches, power is directed back to terminal 12 on the SystemLex.

Terminal 12 on the SystemLex is already connected to Terminal 13 by an electrical track at the rear of the board.

Terminals 13 & 14 are used to connect the zone thermostat (normally open contacts) (water or ambient).

When the clock and the thermostat are calling for heat (contacts closed), terminal 15 is energized and the zone LED above the pump neutral lights. The pump will then run, and the double pole boiler control relay will make contact, causing the boiler to fire.

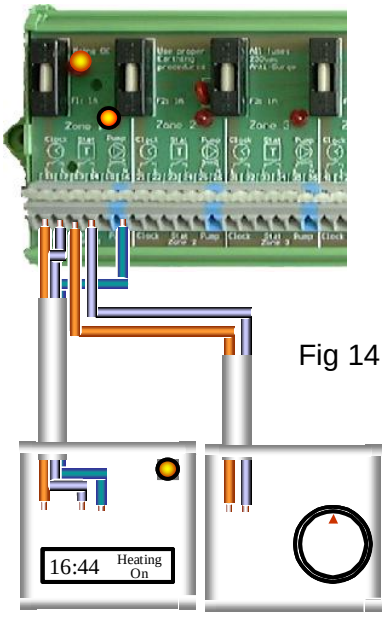


Fig 14

Wiring a time-temperature control (battery powered)

The wiring configuration in Fig 15 should be used when a combined time/thermostat control unit is required. This example shows how such a unit can be connected to Zone 3 on the SystemLex but of course other zones can be wired in the same way if required.

Terminal 31 is provided with power from the 1 amp fuse, located directly above the zone clock connections.

This power source is used to provide power for the clock switch only.

The switch live supply should be connected directly to terminal 34, bypassing terminals 32 & 33, as they are not required in this instance.

The time/thermostat control unit depicted here is a standard on-off type but proportional/optimiser-type controllers may also be used when more accurate ambient temperatures are required. They are most suitable for the ambient control of underfloor heating systems. These units typically have an internal temperature sensor but may also have an optional facility for remote temperature sensing.

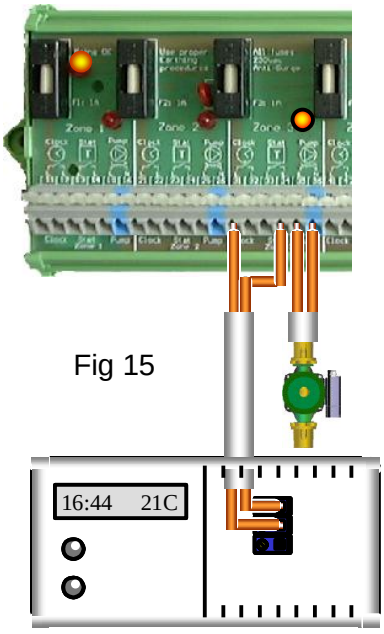


Fig 15

commissioning and fault-finding

Initial flushing of the system

SystemLink recommends that the system be adequately flushed to prevent damage by grease or dirt. Where possible, isolate any appliance that could be damaged by the movement of debris through the circulation pipe-work.

1. Connect the water supply temporarily to a return pipe and a drainpipe to the flow, and then flush the entire system until the drain discharges clean water (for at least five minutes).
2. Drain the system by opening the drain taps at all low points. Close the drain taps and open all the appliances to the system. Begin the initial filling of the SystemLink and pipework.
3. Unscrew the black cap on the automatic air valve one full turn from closed position. Leave open permanently. If the air valve does not release the trapped air within the SystemLink unit, the system pumps will not circulate the system water and they may become irreparably damaged. It is therefore essential to ensure that the air valve has operated successfully throughout the plant operation.
4. Close all air release taps on the central heating system.
5. Gradually fill the system
6. Starting with the lowest radiator, open each air release tap in turn, closing it only when clear water, free of bubbles, flows out. In the same way release air from any high points in the pipe-work.
7. Continue cold filling the pipe-work as per boiler manufacturers instructions in a sealed system or, if the system is open, until header tank has filled to an appropriate capacity.
8. Inspect the pipe-work for water soundness and remedy any leaks discovered.

NB The SystemLink safety valve is set to lift at 3bar/30m/45psi

Checking the electricity supply

1. Carry out preliminary checks for continuity, polarity and resistance to earth
2. Switch on the mains electricity

If external controls are fitted (e.g. time clock or room thermostat), ensure that these ‘call for heat’

Electrical fault-finding on SystemLex or MiniLex wiring centre

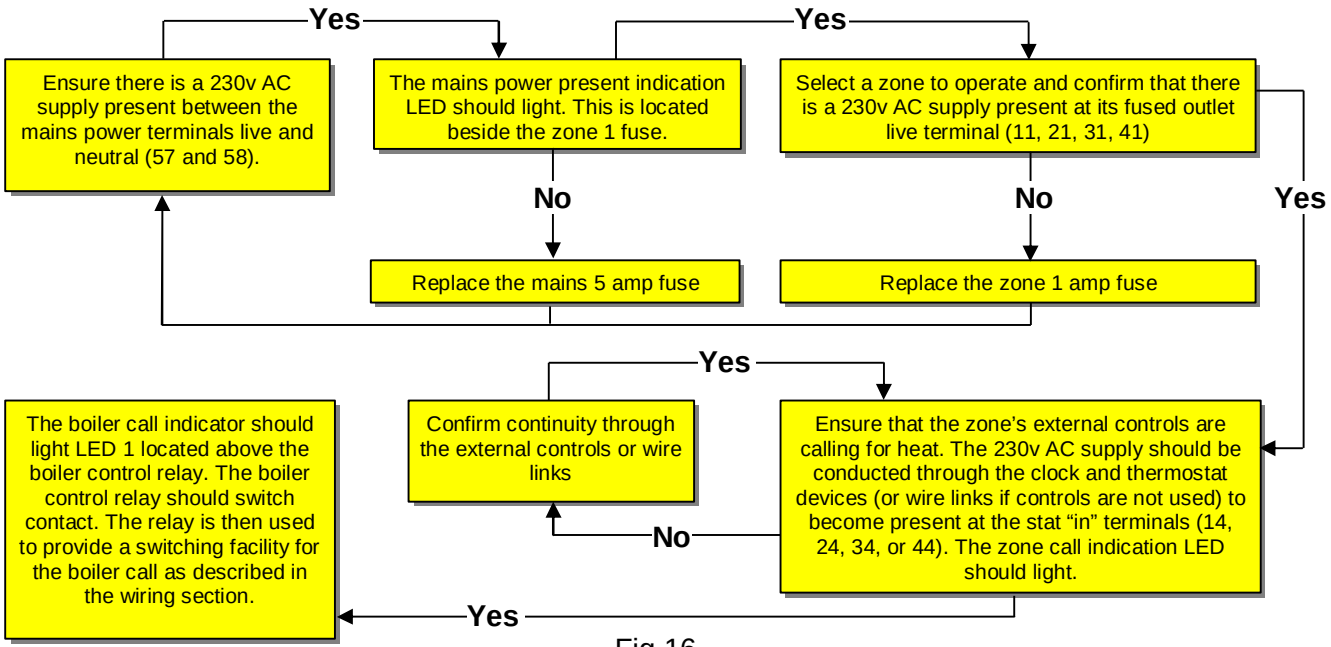


Fig 16

SystemLink

design service

SystemLink Limited has developed an internal proprietary tool for use with AutoCAD software to design plumbing, wiring and building management control layouts for zoned central heating systems using SystemLink products. This design tool is called SystemCAD.

SystemCAD is being continually updated with new developments in the heating and air conditioning industry. It contains embedded structures that reflect best plumbing practice and safety procedures. These are incorporated in a large number of design blocks that can be dropped in one action into an AutoCAD drawing. New blocks are regularly added and existing ones revised.

SystemCAD allows complex systems to be designed and configured in minutes rather than the hours taken by conventional drawing methods. Each element incorporates good design and safety principles, ensuring that users deliver high quality and efficient configurations.

SystemCAD is available under licence to specifiers who use SystemLink products.

An example of the screen in operation is set out below. This shows a number of blocks in place on the SystemZone, with an additional block being moved towards its point of linkage.

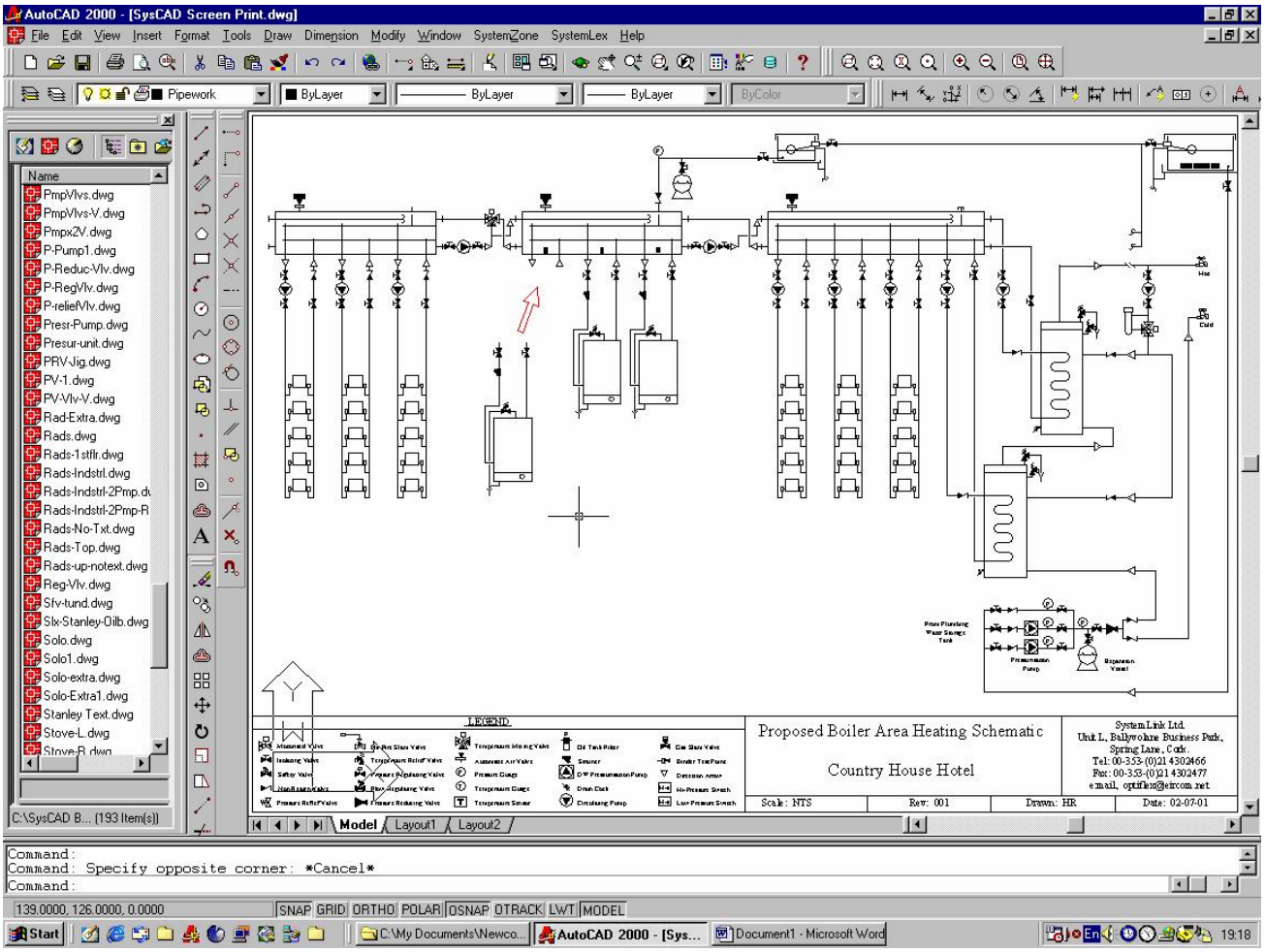
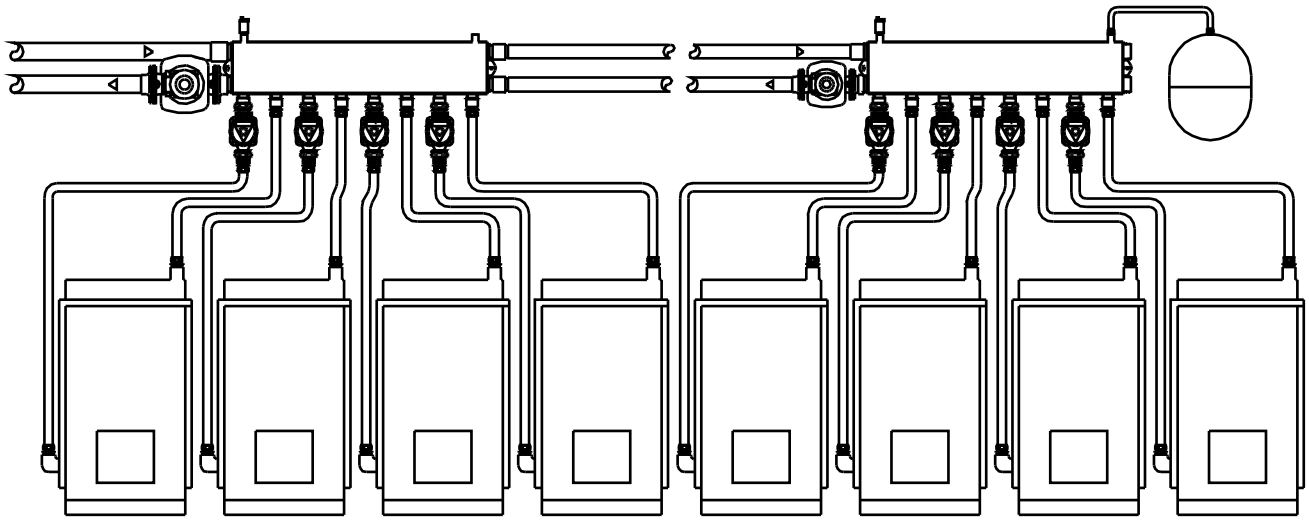


Fig 17

SystemLink

Any number of boilers can be catered for with SystemZone…



SystemLink

Simple system layout
Built in system bypass
Superior system circulation
Motorised valves not required
Substantial labour and material savings
Suitable for single or multi boiler applications
Unobstructed cold feed, vent and expansion facility
System pumps placed for optimum effectiveness
Removes air from the system by design
Built in dedicated wiring kit
Simpler system wiring
Extremely safe design

SystemLink

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