MIRA'S GUIDE TO

MIXER SHOWERS

mira
SHOWERS

SHOWERING PERFECTION ONLINE

THIS GUIDE GIVES YOU ALL THE TECHNICAL INFORMATION YOU NEED TO CHOOSE THE RIGHT SHOWER FOR THE JOB. HOWEVER, DON'T FORGET THAT OUR WEBSITE IS PACKED FULL OF HELPFUL FEATURES THAT WILL MAKE YOUR LIFE EASIER. YOU CAN DOWNLOAD INSTALLATION AND USER GUIDES FOR EACH PRODUCT, WATCH HANDY INSTALLATION VIDEOS OR KEEP UP TO DATE WITH THE LATEST PRODUCTS

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How to use this guide book

The aim of this book is to give professional installers the key guidelines on how to fit a mixer shower properly. The book shows you how to choose the right products and avoid the problems which can happen when installing a high performance shower system.

The book is divided into six main chapters:

Chapter 1 introduces you to the different types of plumbing systems and explains how they work.

Chapter 2 equips you with advice and guidance on how to avoid system over pressurisation.

Chapter 3 provides you with information on how mixer showers work.

Chapter 4 provides you with information on planning a domestic shower system.

Chapter 5 lists frequently asked questions and troubleshooting tips.

Chapter 6 provides information on customer support and after sales assistance, and an introduction to the Kohler family of businesses.

This book is not a definitive guide to all installation sites and conditions. It will answer most of your questions on installing a mixer shower, but you should always use the Installation and User Guide that comes with the product.

Please remember to follow the Water Regulations at all times when fitting a mixer shower. You can get a copy of the Water Regulations by contacting the Water Regulations Advisory Scheme (WRAS) on 0333 207 9030, or visit www.wras.co.uk

Kohler Mira Limited, the UK's longest-established and leading supplier of showers for both domestic and institutional markets, aim to give you the maximum support in selecting and installing Mira products, so if you have any queries which are not covered here, please do not hesitate to contact our Customer Services department:

Tel:	0844 571 5000 (UK & NI), 01 531 9337 (Eire only)
Email:	www.mirashowers.co.uk/contactus (UK & NI),
	customerserviceseire@mirashowers.com (Eire only)
Post:	Kohler Mira Limited
	Cromwell Road
	Cheltenham
	Gloucestershire
	GL52 5EP

Contents

Chapter 1

Typical Suitable Installations 5

- Gravity Fed - Vented 6
- Pumped Gravity 8
- Mains Pressurised - Unvented 10
- Instantaneous or Combination Gas Water Heater 12
- Mains Pressurised Heated from a Thermal Store 14
- Alternative Heat Sources 16

Chapter 2

System Over Pressurisation 18

System Sizing 20

Calculating Pressure Loss During Flow 21

Pipe Sizing Table 22

Chapter 3

How a Mixer Shower Works 23

- Mira Excel Thermostatic Mixing Valve 23

Chapter 4

Planning a Domestic Shower System 33

- Gravity Fed Showers 35
- Unvented Mains Pressure Showers 36
- Instantaneous Gas-heated Showers (e.g. combination boilers) 37
- Pumped Showers (inlet pumps) 38
- Mains Pressurised Instantaneous Hot Water Shower, Heated from a Thermal Store 39
- Example of a Surface Mounted Installation - Mira Excel 40

Chapter 5

Frequently Asked Questions 42

Trouble Shooting 44

Chapter 6

Customer Support 48

KOHLER® Family of Businesses 50

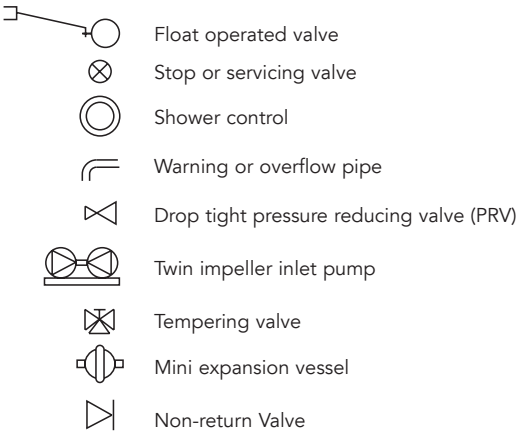
Typical Suitable Installations

This chapter shows the most common UK plumbing systems. Within each system there may be local variations.

Types of Plumbing Systems

- Gravity Fed - vented
- Pumped Gravity
- Mains Pressurised - unvented
- Instantaneous or Combination Gas Water Heater
- Mains Pressurised - heated from a thermal store

Key to symbols appearing throughout this guide:



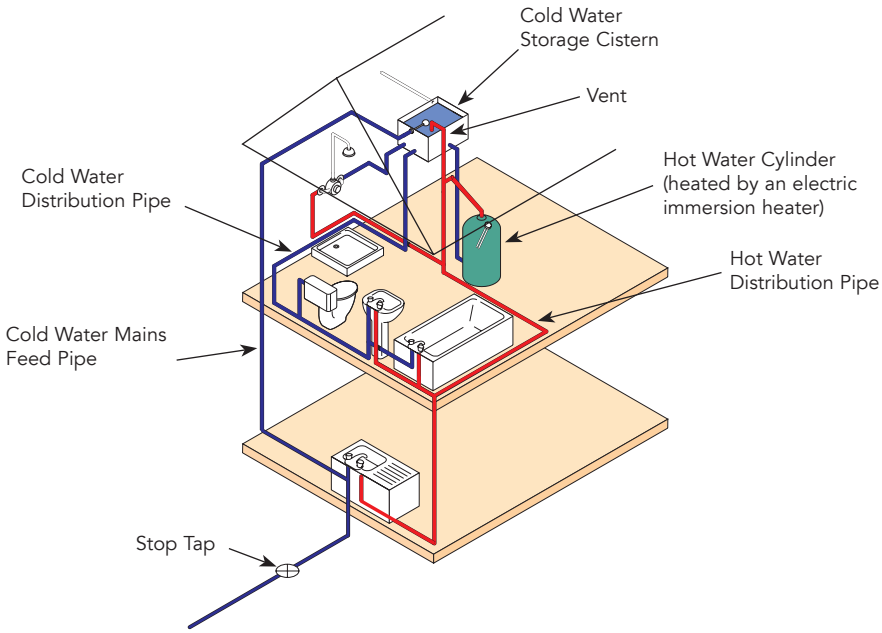
BS EN806 Series of Standards

Specification for the Design, Installation, Testing and Maintenance of Services Supplying Water for Domestic use within Buildings and their Curtilages.

Section 2.3.1. - Recommends that under normal conditions the temperature of the stored hot water should never exceed 65°C. A stored water temperature of 60°C is considered sufficient to meet all normal requirements and will minimise the deposition of scale in hard water areas.

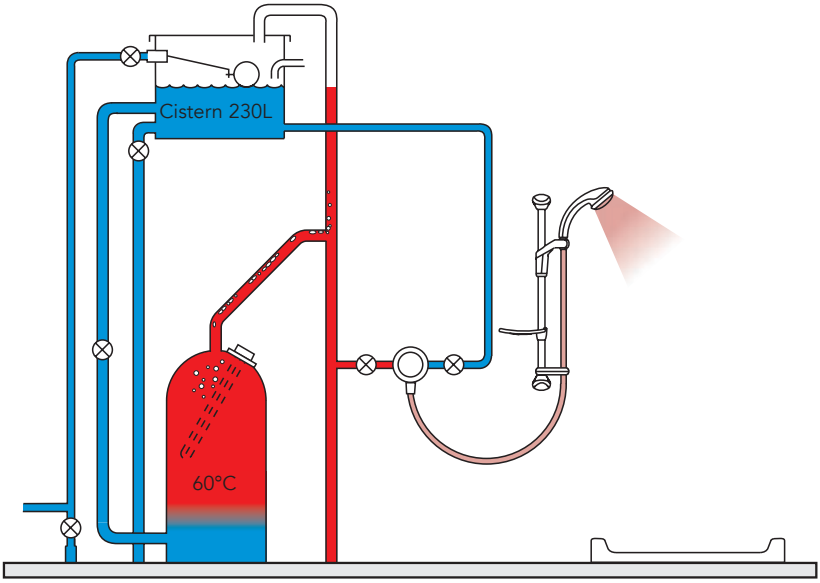
Section 2.3.9.4. - If there is a cold water storage cistern that supplies cold water to delivery points, and this is also used as the feed cistern for a direct system or the secondary part only of an indirect system, it shall have a capacity of at least 230 Litres.

Gravity Fed - Vented



The schematic diagram above shows the most common set up for a gravity fed - vented system.

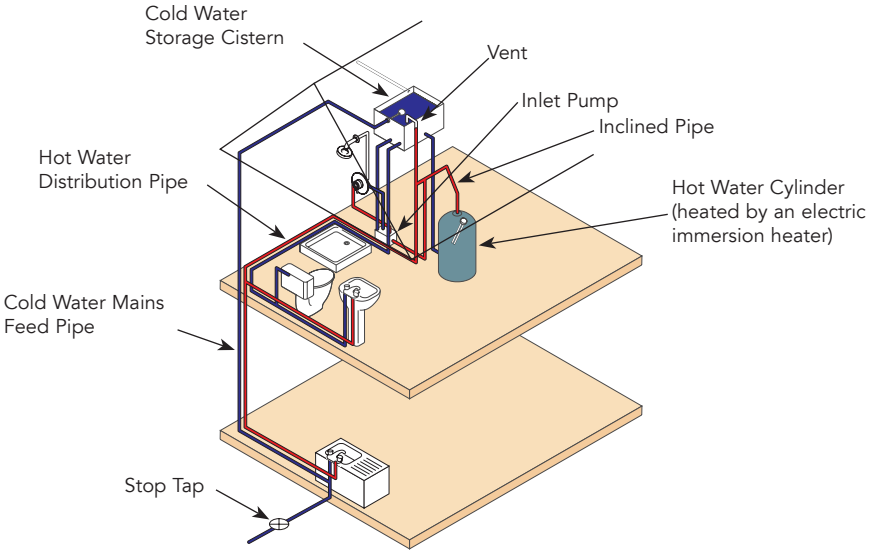
1. The cold mains enters the property, and in addition to the stop tap in the street, there is an isolation valve under the kitchen sink. In older properties and conversions this could be elsewhere.
2. There must be a cold mains feed to the kitchen sink. The supply is then routed to the cold water storage cistern (loft tank).
3. A distribution pipe, from the cold water storage cistern feeds the flushing cistern (WC's), hand basin, and bath. Some properties may have mains fed flushing cisterns and bathroom cold taps.
4. The shower ideally should have an exclusive cold supply to prevent pressure variations due to the use of other outlets at the same time.
5. The hot water cylinder will have a feed from the cold water storage cistern that enters the bottom of the insulated cylinder, and a vent (safety) pipe that ends over the storage cistern.
6. The hot water is distributed to the outlets.
7. The cylinder can be heated by a number of methods, here an electric immersion heater is used.



The diagram above is a representation of a gravity fed - vented system

1. The cold feed from the cistern to hot cylinder is taken at a point higher than the cold feed to the shower. In the event of the water level falling in the cistern, the cold water to the hot water cylinder will fail first, reducing the risk of a hot only shower.
2. There is a separate cold feed to the shower, reducing the temperature fluctuations that can be caused by pressure variations.

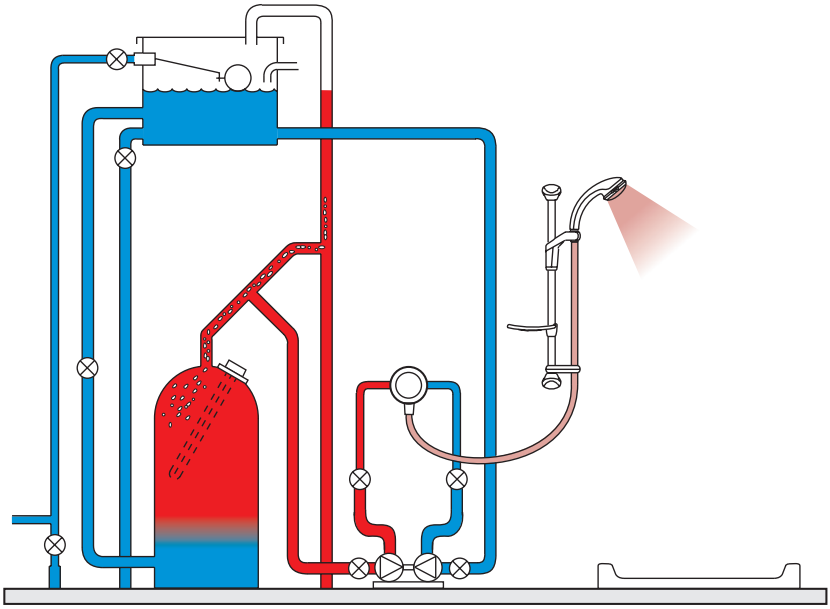
Pumped Gravity



The schematic diagram above shows the most common set up for a pumped gravity system.

1. A standard low pressure gravity system has been coupled with an inlet pump.
2. An 'inlet pump' separately pumps the hot and cold water to the mixing valve where it is mixed together.
3. There are special considerations that relate to pumping hot water - air and the hot water temperature. The cylinder thermostat should be set to 60°C.
4. If air enters a pump in quantity, it suffers from 'wheelspin', that is the impeller spins but does not pump the water.

   Note! For more comprehensive information about pumping showers, refer to 'A Guide to Pumped Showers'.



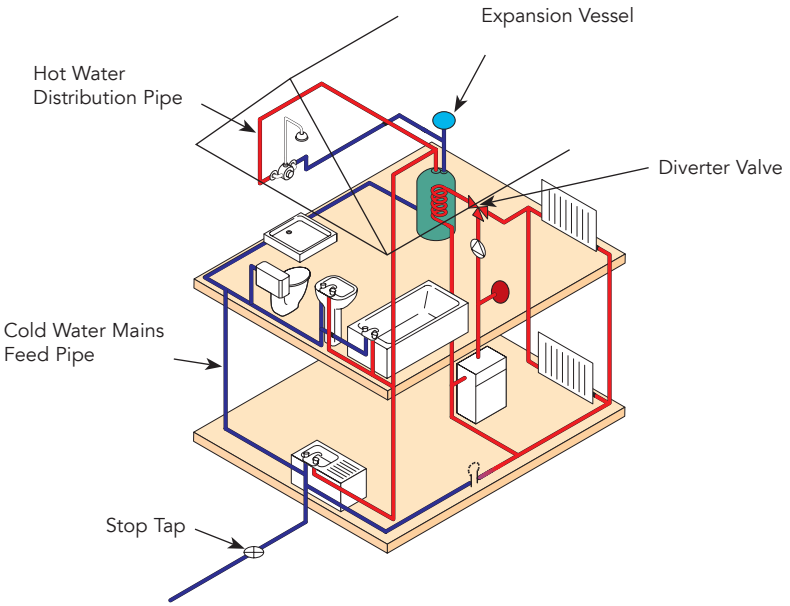
The diagram above is a representation of a pumped gravity system.

The inclined pipe, at about 45 degrees will separate most of the air from the water as the air will rise to the top of the pipe and the water will be drawn off from the bottom.

The use of a 'side entry cylinder boss', that is a connection to the side of the cylinder is not recommended as the immersion heater could be exposed to air if the cistern runs dry.

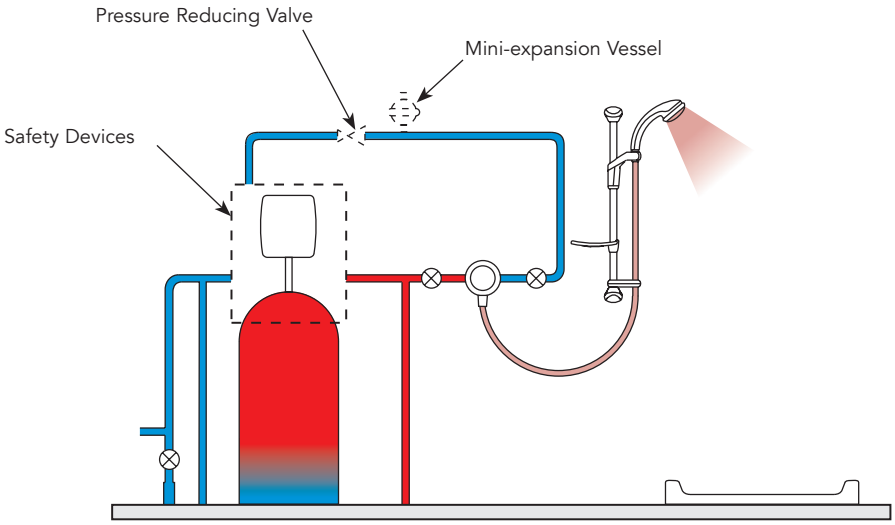
Additionally, the available volume of hot water is reduced, when the need is for as much hot as water as possible in a power shower.

Mains Pressurised - Unvented



The schematic diagram above shows the most common set up for a mains pressurised unvented system.

1. The cold mains enters the property, and in addition to the stop tap in the street, there is an isolation valve under the kitchen sink. In older properties and conversions this could be elsewhere.
2. The cold is fed to the kitchen sink, WC flushing cistern, bath tap, basin cold taps and to the hot water cylinder.
3. Within the hot water cylinder the pressure is reduced to lie within the range 2-3 bar, typical of many unvented systems. There is a cold tapping after the pressure reducing valve, so that balanced hot and cold pressures are fed to the shower.
4. The hot water is heated by an unvented central heating system using an indirect coil in the hot water cylinder.

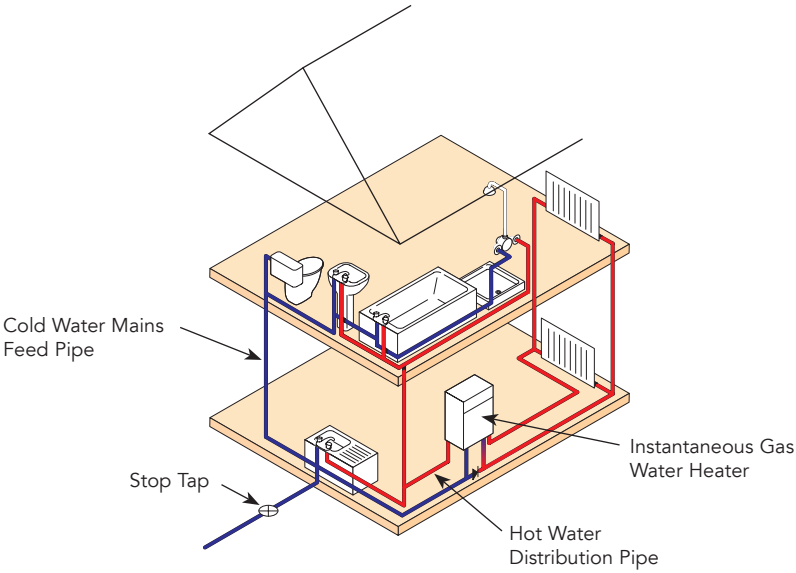


The diagram above is a representation of a mains pressurised - unvented system. Within the dotted area there will be:

1. A drop tight pressure reducing valve to reduce the supply pressure to that of the cylinder.
2. A pressure relief valve that operates should the pressure reducing valve over pressurise.
3. A temperature relief valve which opens and relieves to a safe waste to prevent the water exceeding 100°C.
4. An expansion vessel that accommodates the expanded water when it warms up. Within the vessel is a rubber bladder in which the water expands. Between the bladder and casing there is nitrogen at pressure. There are other methods of accommodating expansion.
5. A check valve to prevent the expanded hot water entering the cold feed pipe.

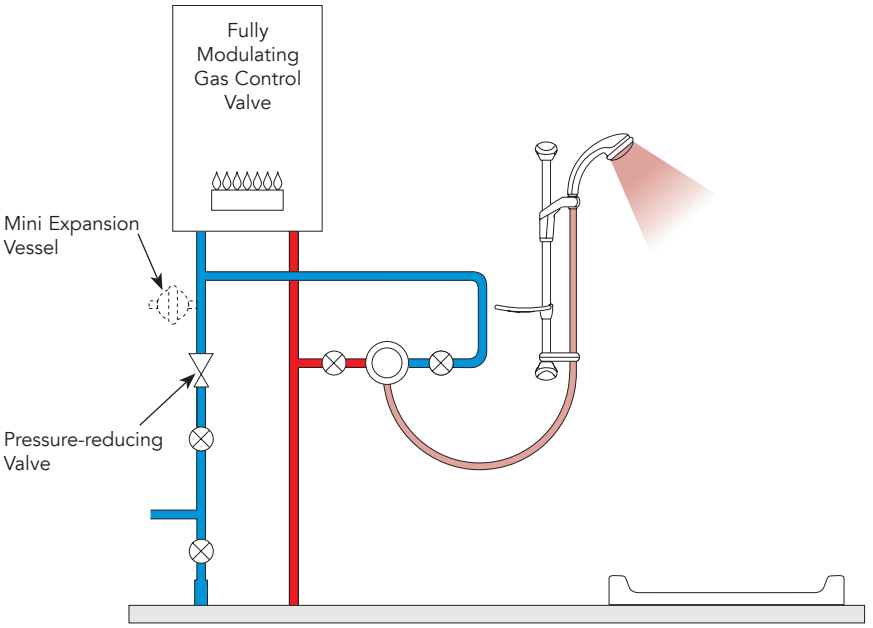
If the pressure reducing valve does not have a downstream tapping (after the valve) to supply reduced pressure cold water to the shower, then a separate pressure reducing valve and mini-expansion vessel will be needed, shown here dotted.

Instantaneous or Combination Gas Water Heater



The schematic diagram above shows the most common set up for an instantaneous gas water heater/combination boiler.

1. The cold mains enters the property, and in addition to the stop tap in the street, there is an isolation valve under the kitchen sink. In older properties and conversions this could be elsewhere.
2. The cold is fed to the kitchen sink, WC flushing cistern, bath tap, basin cold taps and to the instantaneous gas water heater.
3. An instantaneous gas water heater heats the water as it is used. Most instantaneous water heaters/combination boilers are of the fully modulating type.
4. A fully modulating heater senses the heated water temperature and varies the gas flame size (within the specification of the heater) to keep the heated water constant with different flow rates of hot water.
5. This is a multi-point gas water heater that serves a number of hot water draw offs, however the heater may not be capable of supplying all at the same time. Thus if a shower is being used and the kitchen hot tap is used, the kitchen tap, being lower and freer flowing will take the majority of the heated water leaving virtually nothing for the shower, with the result that the shower pattern will collapse.



The diagram above is a representation of an instantaneous gas water heater/combination boiler system.

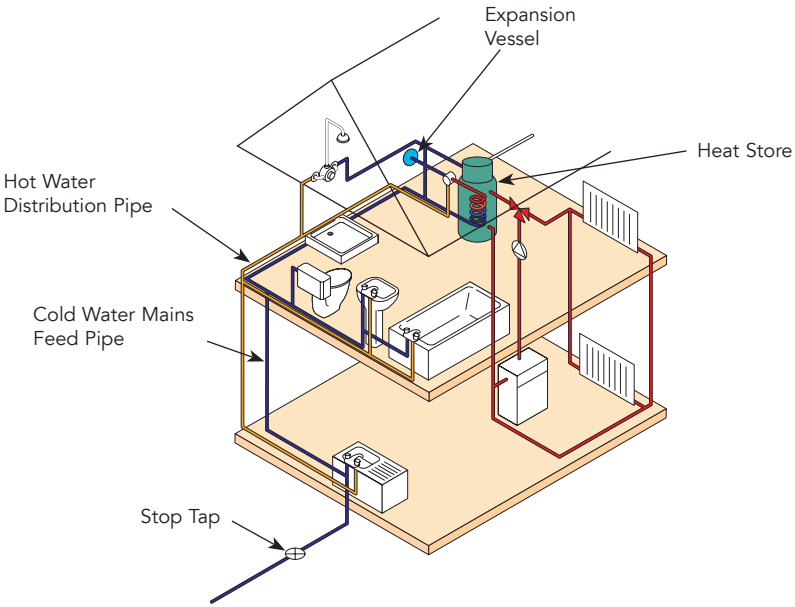
Most mixer showers will operate up to a maximum maintained pressure of 5 bar. If the supply pressure is above 5 bar (50m water pressure) a drop tight pressure reducing valve will be needed.

This pressure reducing valve can act as a check valve and to accommodate the expansion of water a mini-expansion vessel will be needed, if not fitted in the heater. Do not confuse this mini-expansion vessel with a central heating expansion vessel, which is much larger.

Such a system produces relatively constant temperatures (assuming that it has been correctly commissioned) of water.

The cold pressures are relatively constant, however the hot pressure will be lower than the cold and will vary dependent upon the hot water demand.

Mains Pressurised Heated from a Thermal Store

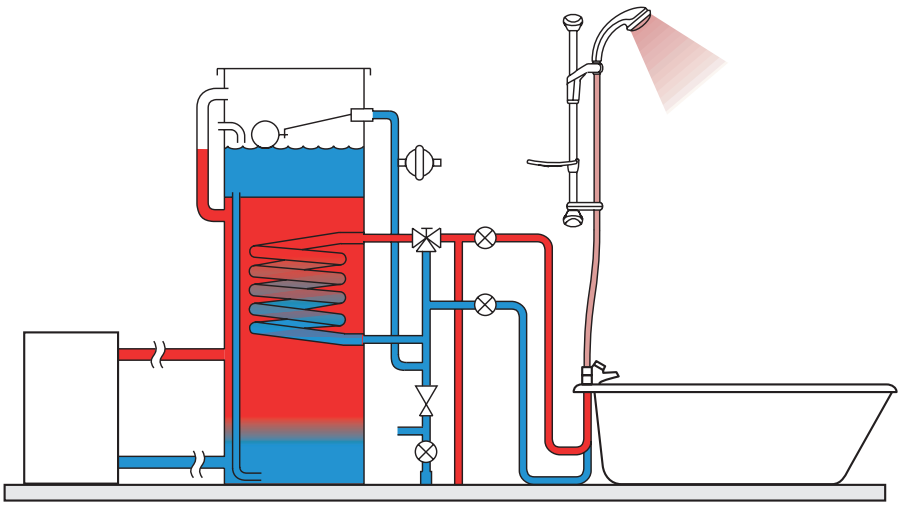


The schematic diagram above shows the most common set up for a mains pressurised system heated from a thermal store

1. The cold mains enters the property, and in addition to the stop tap in the street, there is an isolation valve under the kitchen sink. In older properties and conversions this could be elsewhere.
2. The cold is fed to the kitchen sink, WC flushing cistern, bath tap, basin cold taps, etc.
3. A container of stored water under low pressure is heated by a boiler, immersion heater, solar etc. Mains pressure cold water passes through a heat exchanger to be heated by water from the store to supply mains pressure hot water to taps, showers etc.

There are various different configurations of thermal stores and heat banks (which use plate heat exchangers). Benefits include:

- No bulky tanks in the attic, which can free up space.
- Heat store recovery is very quick
- High flow rate hot water delivery
- No requirement under Part G schedule 1 of the Building Regulations to fit this type of system



The diagram above is a representation of a mains pressurised instantaneous hot water shower, heated from a thermal store.

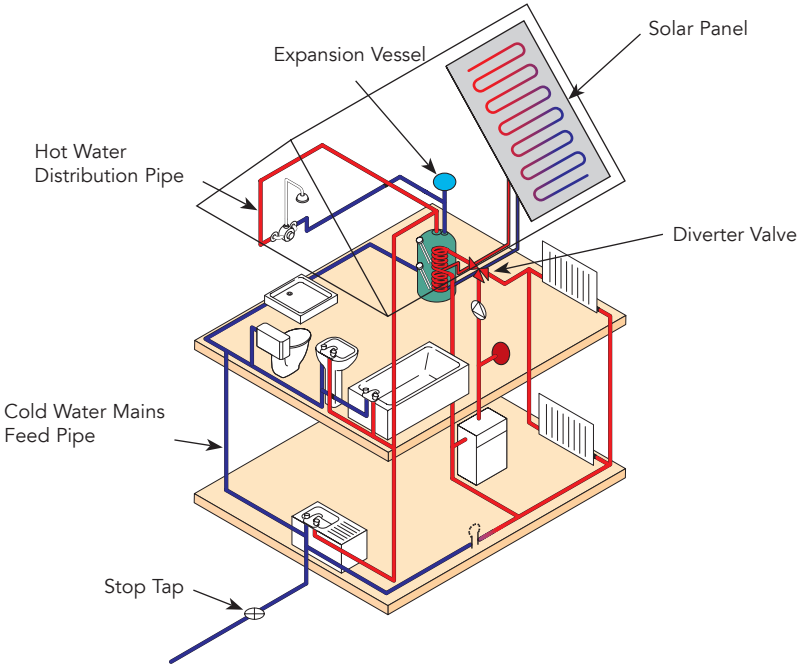
This type of system uses a tempering valve to control the temperature of water to hot water outlets. This type of system can be used with most thermostatic Mira showers.

A drop tight pressure reducing valve MUST be fitted if the supply pressures exceed 5 bar maintained.

An expansion valve MUST be fitted (and regularly maintained) as shown in the diagram to ensure excess pressures do not damage the product. This may already be fitted externally or internally within the thermal store (check with thermal store manufacturer).

The layout and sizing of pipework MUST be such that nominally equal inlet supply pressures are achieved AND the effects of other draw-offs are minimised.

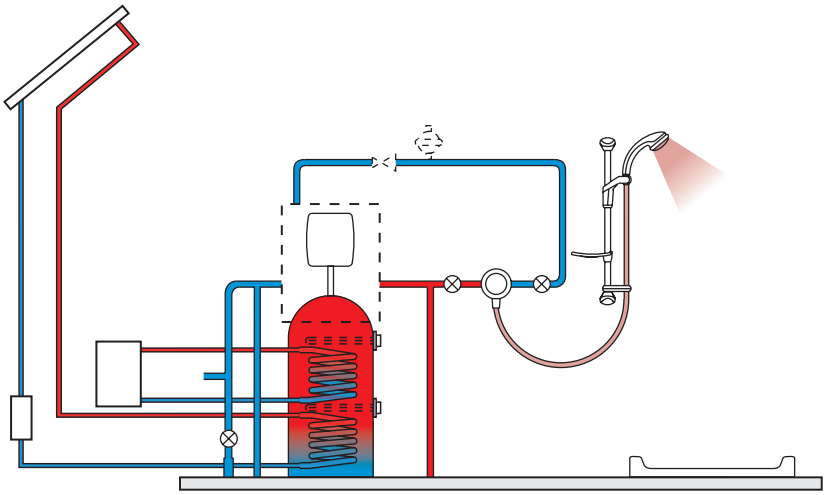
Alternative Heat Sources



The schematic diagram above shows a possible set up for a mains pressurised unvented system, heated using solar technology - energy from the sun.

1. The cold mains enters the property, and in addition to the stop tap in the street, there is an isolation valve under the kitchen sink. In older properties and conversions this could be elsewhere.
2. The cold is fed to the kitchen sink, WC flushing cistern, bath tap, basin cold taps and to the hot water cylinder.
3. Within the hot water cylinder the pressure is reduced to lie within the range 2-3 bar, typical of many unvented systems. There is a cold tapping after the pressure reducing valve, so that balanced hot and cold pressures are fed to the shower.
4. Heat from the sun is used to heat the hot water cylinder. A conventional boiler or immersion heater is then used to make the water hotter, or to provide hot water when solar energy is unavailable.

   Note! An alternative to solar energy is to use a ground source heat pump. The ground source heat pump obtains the additional energy from the air or ground, and if from the ground the collector can be boreholes or buried collector coils.



The hot water cylinder is a device for storing heat energy that is accumulated over a period of time and this can be from a number of sources.

The cylinders can be at low or high pressure, be direct or indirect. Illustrated here is a mains pressurised unvented cylinder from which the heated water is delivered directly to the outlets.

The large unvented cylinder has a number of heat sources, here there are two electric heating elements, one near the top and one near the bottom, ideally for use with tariff 7 electrical supplies.

A heat exchanger coil part way down the cylinder allows heat to be supplied from an external source such as a central heating boiler. It could use fuels such as gas or oil.

At the bottom of the cylinder there is an additional heat exchanger coil that is heated by solar hot water panels, or even a ground source heat pump (not illustrated).

For details of the safety devices and controls within the dotted area refer to section: **'Mains Pressurised - unvented'.**

System Over Pressurisation

This section will explore the problems that are created when there is no provision within the plumbing system to accommodate the expansion of water that occurs when the water warms up.

A plumbing system can be over pressurised if there is no provision for the expansion of water when heated.

Devices that prevent a backflow of water include:-

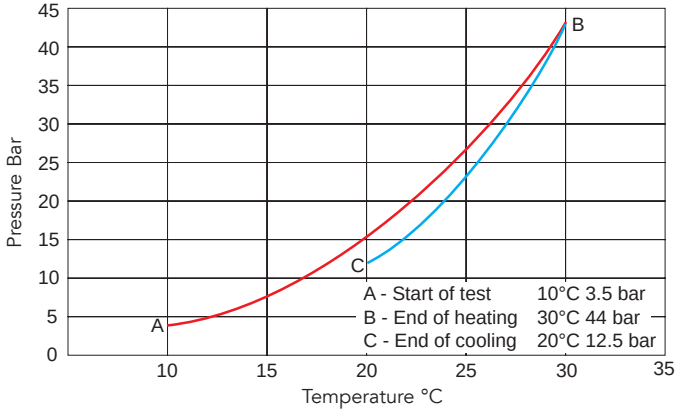
- **A single check valve** will prevent water from travelling in the reverse direction.
- **A double check valve** will prevent water from travelling in the reverse direction.
- **A frozen pipe** will prevent any movement of water.
- **A loose 'jumpered' valve** is one where the internal spindle (on to which is fitted the flat rubber washer) can be removed from the headnut. If the spindle is fixed to the headnut, then the jumper is fixed.
- The closure of a **stop valve** will prevent water movement.
- **Water meters**, when fitted, have a **check valve** incorporated in to them.
- A **pressure reducing valve** will prevent water movement.

A water pipe, insulated or not, will attain, over time the temperature surrounding it. Cold water is heated in a pipe by being near to a heat source such as:-

- **Hot loft** - In the summer time the air temperatures within the loft can easily exceed 50°C.
- **Hot water pipe** - A hot water pipe that is next to another pipe will heat it.
- **Airing cupboard** - The airing cupboard will be typically at 30°C, possibly more with a poorly insulated hot water cylinder.
- **Central heating pipe** - A central heating pipe runs at up to 80°C, and this heat will be transmitted to an adjacent pipe.
- **Boiler heat up** - When a boiler fires up from cold, water within the boiler will expand, taking up a greater volume.
- **Solar heat** - The sun will heat up a room, loft etc.

Over pressurisation can be prevented by:

- Allowing expansion back along the pipe - Allowing water to travel back along a pipe, provided it does not expand sufficiently to enter another draw off connection is a good option.
- Fitting an expansion vessel - Where the above is not possible then the fitting of a suitably sized expansion vessel will solve the problem. The pressure of the expansion vessel needs to match the system pressure (an expansion vessel of approx. 0.16 litre is normally sufficient in most cases).
- Fitting an operational discharge (Approval needed) - An 'operational discharge' is a form of pressure relief valve.
- The Water Regulations do not allow 'operational discharge' devices which operate every time water heats, as they are regarded as a 'waste of water'. They can however be used as a safety device.



This graph has been obtained by experimentation.

At the start of the test - point A, the water pressure in a closed length of 1 m 22 mm diameter pipe was 3.5 bar and the temperature 10°C.

The pressure was measured with a 'transducer' and this was connected to a computer to record the changes.

The 1m length of pipe was allowed to warm to 30°C and the pressure increase plotted.

The result was a large pressure increase from 3.5 bar to 44 bar. The maximum static pressures for Mira valves is 10 bar, which is well below the 44 bar developed.

Product damage occurs with such pressures.

When the temperature was allowed to cool to point C, 2.5 bar had been 'lost' in the system as the over pressurisation had stretched the copper pipe.

System Sizing

When water flows from the cistern to the cylinder it encounters pipework, couplings, bends and elbows along its route to the vent pipe connection point. These fittings cause a restriction to flow leading to a pressure loss. The amount of pressure loss caused by each of these fittings, at the maximum hot flow rate, is expressed in the pipe sizing table as mm water gauge (w.g.).

The figures contained in the column entitled "Minimum pressure loss incurred" are default figures to cover the losses due to water flowing from the storage cistern and in to and out of the hot water cylinder at the selected flow rate. An allowance is also made for supply isolating valves which are installed within the plumbing system.

These figures must be added to the pressure loss figure derived as a result of totalling the losses for pipework per metre, and the plumbing fittings contained in the supply pipe from the cistern to the cylinder.

It has been assumed that in-line straight couplings, either soldered or compression, offer negligible resistance to flow and have been omitted from the calculation.

Additionally, it is also considered that a length of pipe formed into a smooth radius has the same resistance to flow as the equivalent length of straight pipe.

Pulled bends have been treated as an equivalent length of straight pipe and are considered to be part of the total length of pipework in the plumbing system.

Note! For more comprehensive information about pipe sizing, refer to 'A Guide to Pumped Showers'.

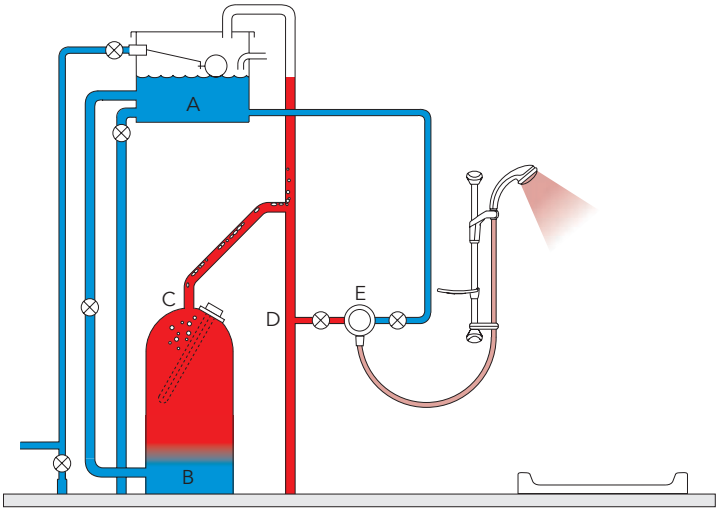
Calculating Pressure Loss During Flow

To calculate the pressure loss whilst flow is taking place, the maximum flow rate is required. For this calculation a flow rate of 10 litres per minute has been chosen. If it is likely that there will be additional hot draw-offs, whilst the shower is being used (for example, a kitchen sink being filled), these should be added to the flow rate. For the sake of this calculation it is assumed that the shower will place a 100% demand on the hot water cylinder. This takes into account when a thermostatic shower is first used or when the hot water in the cylinder cools to the showering temperature.

Given: Pipe length A - B = 5m of 22mm diameter; C - D = 2m of 22mm diameter; D - E = 3m of 15mm diameter.

Calculation	**mm**
Minimum pressure losses at 10 l/min	19
Loss from A to B (5m x 22mm loss/metre)	110
Loss from 2 soldered elbows (11mm/elbow)	22
Loss from C to D (2m x 22mm loss/metre)	44
Loss from 4 soldered elbows/T (11mm/fitting)	44
Loss from D to E (3m x 144mm loss/metre)	432
Total pressure loss at 10 litres/minute	671mm

Thus the minimum pressure needed to produce a flow of 10 litres per minute is 0.67 metres (0.067 Bar). To this will need to be added the pressure required to operate the shower at 10 l/minute.



Pipe Sizing Table

Total water flow rate l/min	Minimum pressure loss incurred mm w.g.	Pressure loss in pipework per metre mm w.g.	Soldered elbow mm w.g.	Compression elbow mm w.g.
	15 mm diameter pipework and elbows			
5	22	43	13	19
10	75	144	45	65
15	152	291	90	313
20	252	481	149	216
25	371	709	220	319
30	511	975	302	439
	22 mm diameter pipework and elbows			
5	6	7	3	5
10	19	22	11	16
15	39	44	22	33
20	65	73	36	54
25	94	107	52	79
30	129	147	72	109
35	170	193	95	143
40	214	243	119	180
45	262	298	146	221
50	315	358	176	265
	28 mm diameter pipework and elbows			
5	3	2	1	2
10	9	7	5	7
15	16	13	9	13
20	27	22	15	22
25	40	32	22	32
30	54	44	30	44
35	71	58	39	58
40	89	73	50	73
45	111	90	61	90
50	133	108	73	108

How a Mixer Shower Works

This chapter explains how a Mira mixer shower works.

The mixer shower we'll look at is the Mira Excel thermostatic mixing valve.

Mira Excel Thermostatic Mixing Valve

Surface Mounted

Built-in

Shown on the left is the surface mounted mixing valve with water supplies coming from the back. On the right is the built-in mixing valve.

Water supplies for the surface mounted valve can be connected:

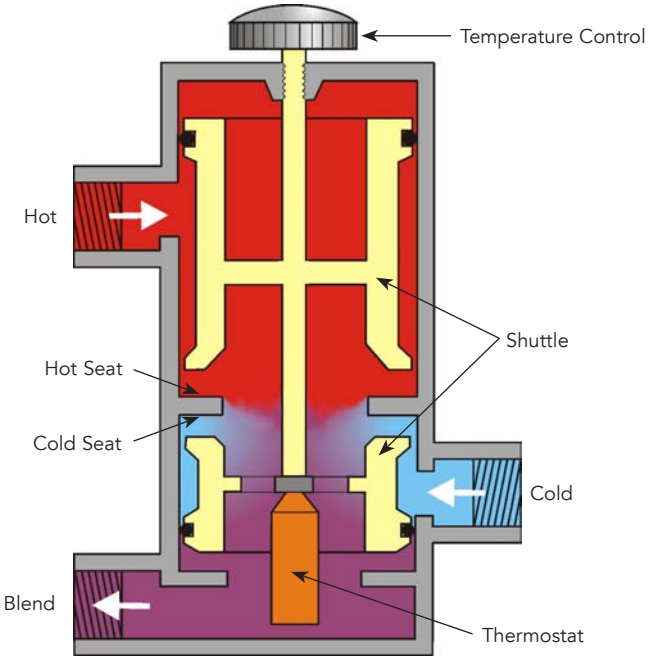
- Both from the back.
- Both from the bottom.
- Both from the top.

There are two concentric controls:

- The lever controls the flow of water from the shower mixer.
- The indented front knob controls the temperature of the water.

The flow control operates over half a turn, the temperature control over about three quarters of a turn.

The following diagrams show the operation of the temperature control cartridge.



General View

This is an idealised cut-away view through the Mira Excel temperature control cartridge.

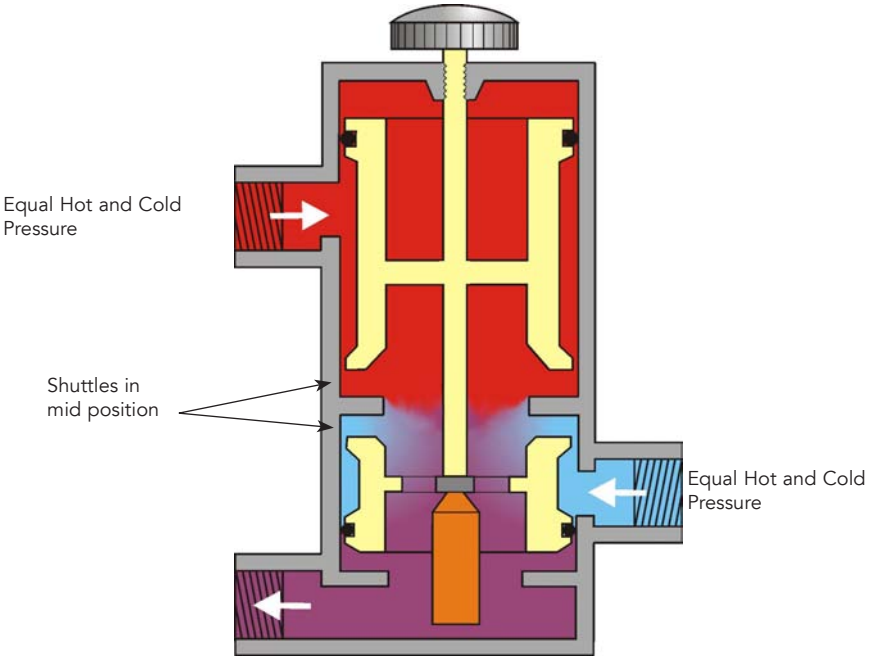
Note! All springs, clips, flow controls, have been removed to clarify the view.

Two shuttles are linked together by a central spindle.

A wax capsule thermostat fitted to the bottom of the spindle, in the mixed flow (blend) of water, changes length in relationship to the blend temperature, moving the shuttles to vary the proportions of hot and cold water.

The user adjusts the required mix of water by turning the temperature control. This changes the position of the shuttles. This then changes the proportions of hot and cold water to obtain the required showering (blend) temperature.

The following diagrams show the movement of the shuttles resulting from temperature and pressure changes.



Equal Hot and Cold Pressure

This is the ideal set up, where the plumbing system is supplying hot and cold water at the same pressure, and the supply temperatures are constant:

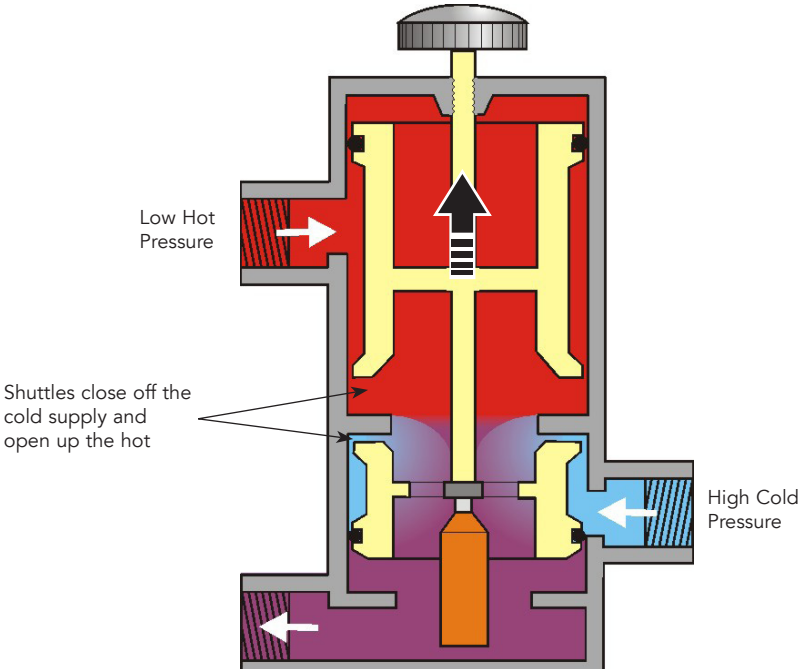
Hot = 65°C

Cold = 15°C

Blend = 40°C

The shuttles are then in the mid position.

Any variation in the supply temperatures or pressures requires a movement of the shuttle to maintain the blend temperature.



Pressure Variations - Low Hot, High Cold

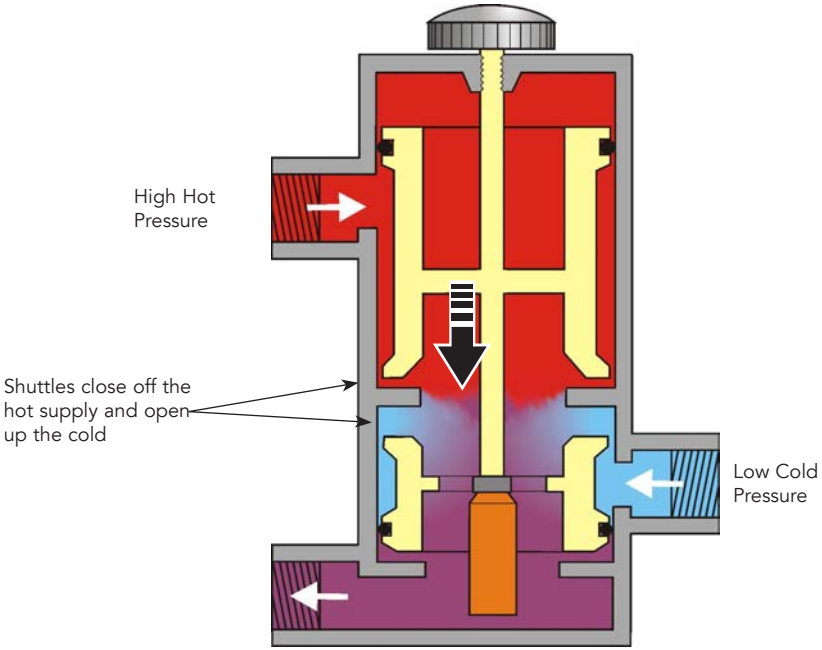
The hot pressure has now reduced, by perhaps the kitchen hot tap being turned on, or a washing machine starting.

The cold pressure is now relatively higher than the hot and cools the mix of water.

The thermostat contracts and reduces the amount of cold water. This allows the lower pressure hot water to enter the mix.

This is done by decreasing the size of the gap through which the cold water can go, and at the same time increasing the size of the gap through which the hot water can go.

The temperatures are unchanged.



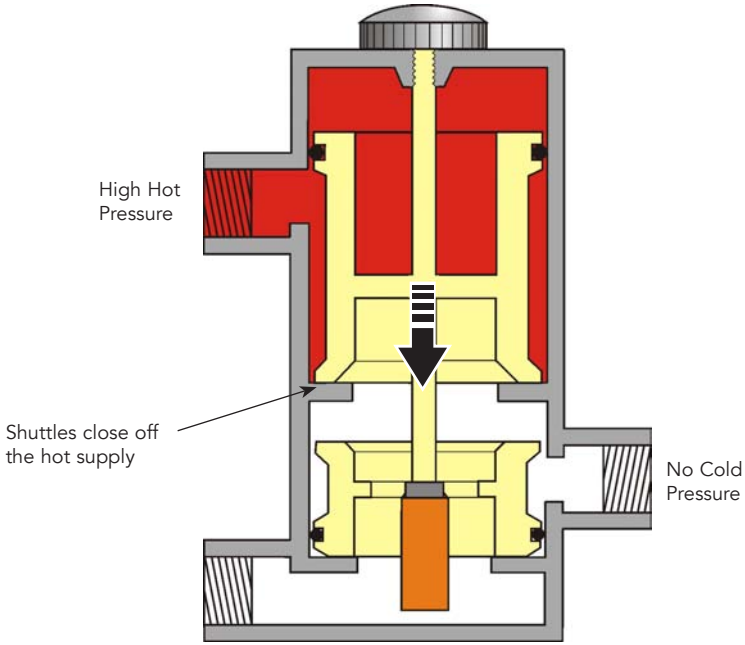
Pressure Variations - High Hot, Low Cold

The cold pressure has now reduced, by perhaps the bathroom cold tap being turned on, or a washing machine starting on a cold rinse cycle.

The hot pressure is now relatively higher than the cold and needs to be restricted to allow the lower pressure cold water to enter the mix.

This is done by decreasing the size of the gap through which the hot water can go, and at the same time increasing the size of the gap through which the cold water can go.

The temperatures are unchanged.

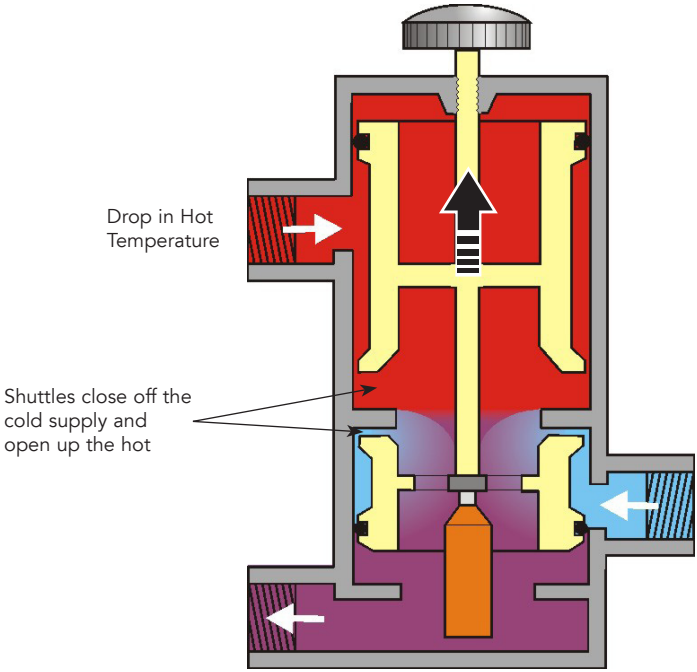


No Cold Pressure

There is now no cold pressure, perhaps by the shutting off of an isolating valve or the cold cistern running out of cold water.

The thermostat immediately expands as it gets hot and pulls the shuttle down on to the hot seat. This virtually stops the flow of water from the valve.

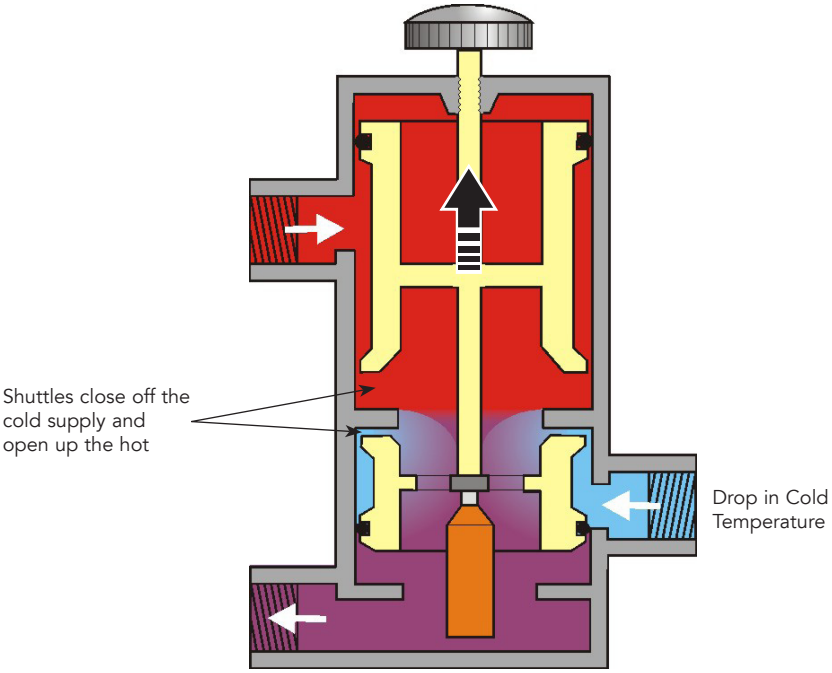
This is also known as 'Thermal shutdown'



Drop in Hot Temperature

The temperature of the hot water has now reduced (e.g. the temperature of the hot water cylinder has dropped due to the user showering for a long time).

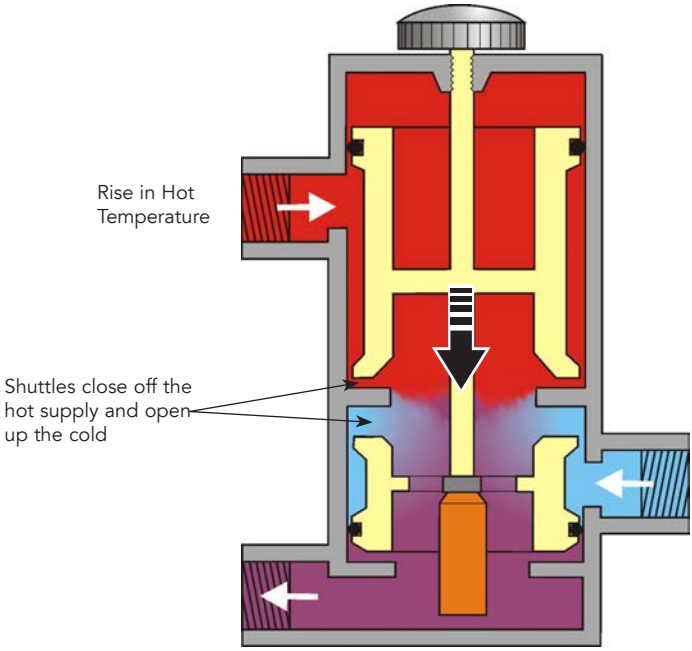
To keep the blend temperature constant, reduced temperature hot water is needed. The shuttle allows for this by moving towards the cold seat, increasing the amount of hot water and decreasing the amount of cold water



Drop in Cold Temperature

The temperature of the cold water has now reduced, (e.g. the "dead leg" of room temperature water has been used up and the temperature now reflects the cistern temperature).

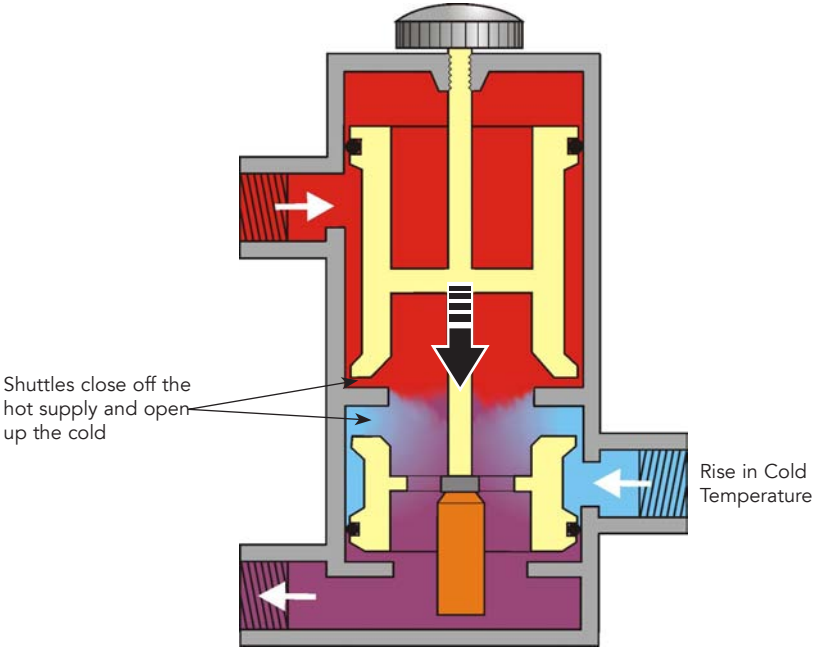
To keep the blend temperature constant, less cold water is needed. The shuttle allows for this by moving towards the cold seat, reducing the amount of cold water, and increasing the amount of hot water.



Rise in Hot Temperature

The temperature of the hot water has now risen, (eg. the temperature of the hot water cylinder has risen as the boiler is re-heating the water).

Thus, less hot water is needed to keep the blend temperature constant, and the shuttle prevents this by moving towards the hot seat, reducing the amount of hot water, and increasing the amount of cold water.



Rise in Cold Temperature

The temperature of the cold water has now risen, (eg. the cold pipe may be partly routed beside a hot pipe or it may not have been insulated)

Thus, more warmer cold water is needed to keep the blend temperature constant, and the shuttle allows for this by moving away from the cold seat, increasing the amount of cold water and decreasing the amount of hot water.

Planning a Domestic Shower System

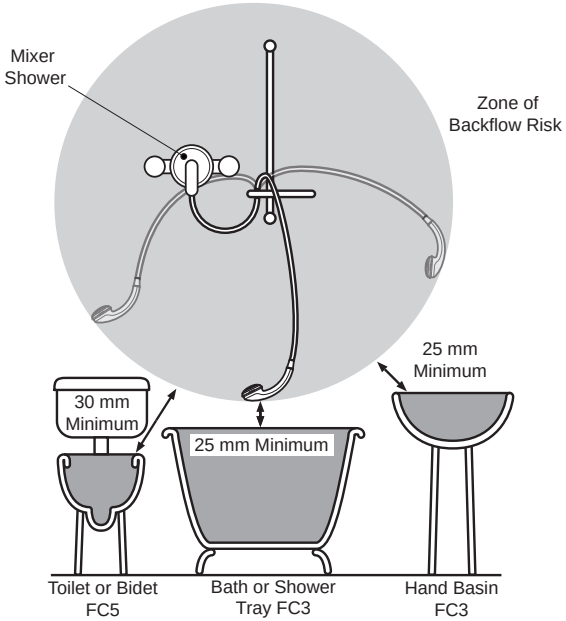
General

Installation must be carried out in accordance with manufacturers instructions, and must be conducted by designated, qualified and competent personnel.

Installations must comply with the "Water Supply Regulations" or any particular regulations and practices, specified by the local water company or water undertakers.

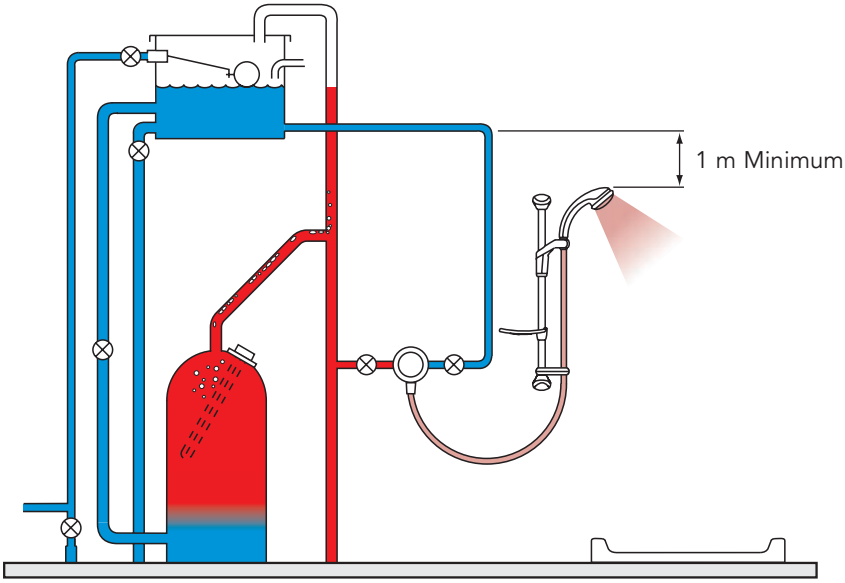
Note! Make sure that all site requirements correspond to the valve specifications. For Type 2 (Domestic) and Type 3 (Healthcare) Valves see also supply conditions as specified for Type 2 and Type 3 valves (see frequently asked questions).

1. The Mixer must not be installed in an area where it may freeze. Pipework to the product that could become frozen must be properly insulated.
2. Do not install the product in a position in which service access is restricted.
3. Isolating valves **must** be installed close to the product for ease of maintenance.
4. Pipework must be rigidly supported and avoid any strain on the connections.
5. Pipework dead-legs should be kept to a minimum.
6. If pipework enters the product from the rear through a hole in the wall, provision must be made to prevent water ingress back into the wall structure.
7. The position of the shower and the shower fittings must provide a minimum gap of 25 mm between the showerhead and the spill-over level of any bath, shower tray or basin and a minimum gap of 30 mm between the showerhead and the spill over level of any toilet, bidet or other appliance with Fluid Category 5 backflow risk (see diagram).
8. The showerhead should be postioned so that it discharges down the centre line of the bath or across the opening of a shower cubicle.
9. All pipework must be checked for leaks before the product installation is completed. The product should be pressurised & the inlet & outlet connections inspected.
10. **DO NOT** overtighten connections, screws or grubscrews as product damage may occur.
11. Upon completion of installation, or if the product is distmantled during installation or servicing, then the product must be inspected to ensure that there are no leaks.
12. Having completed the installation, make sure that the user is familiar with the operation of the product.



Note! There will be occasions when the hose retaining ring will not provide a suitable solution for Fluid Category 3 installations, in these instances an outlet double checkvalve must be fitted, this will increase the required supply pressure typically by 10kPa (0.1 bar). Double checkvalves fitted in the inlet supply to the appliance cause a pressure build up, which affect the minimum static inlet pressure for the appliance and must not be fitted. For Fluid Category 5 double checkvalves are not suitable.

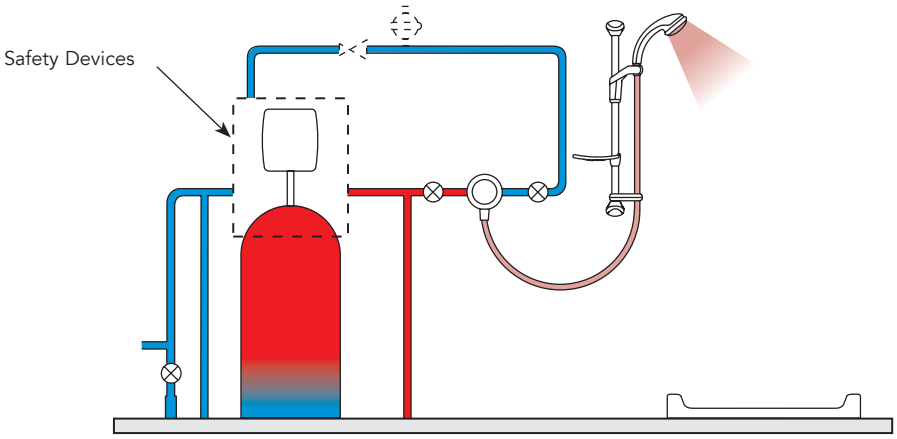
Gravity Fed Showers

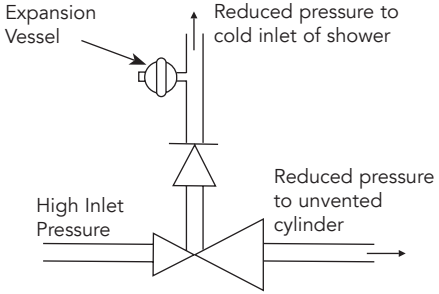


The shower control MUST be fed from a cold water storage cistern and hot water cylinder providing nominally equal pressures.

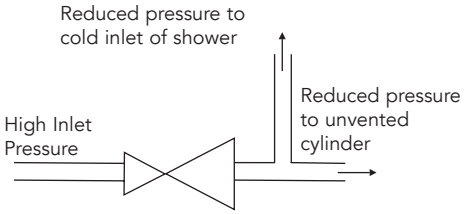
Typically, most Mira mixer showers are designed to operate with a minimum maintained pressure of 0.1 bar (1 metre head, i.e. the vertical distance from the base of the cold cistern outlet to the outlet of the shower fittings).

Unvented Mains Pressure Showers





Combined outlet pressure reducing valve with internal non-return valves, expansion vessel required.



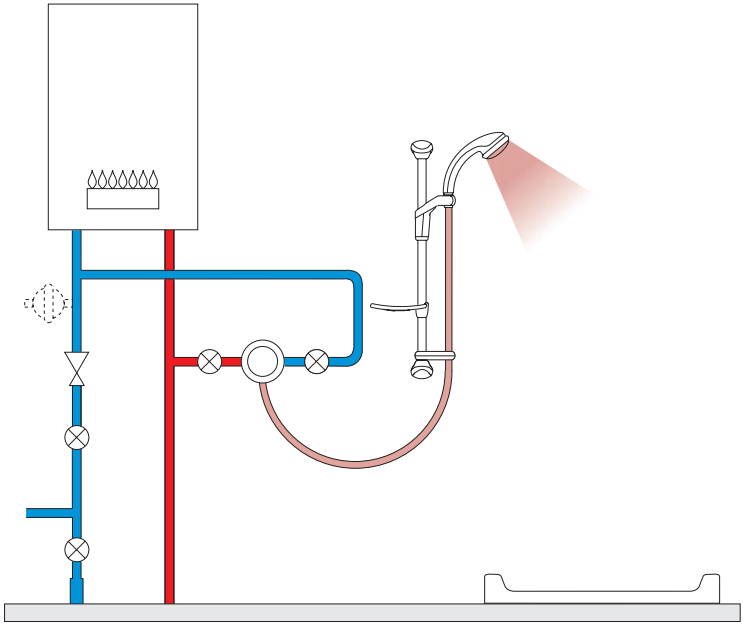
Cold takeoff after pressure reducing valve, expansion pressure taken up by unvented cylinder expansion vessel.

The shower can be installed with an unvented, stored hot water cylinder. Only a "competent person" as defined by Part G of Schedule 1 of the Building Regulations may fit this type of system.

For packages with no cold water take off after the appliance reducing valve, it will be necessary to fit an additional drop tight pressure reducing valve when the mains pressure is over 5 bar. The drop tight pressure reducing valve must be set at the same value as the unvented package pressure reducing valve.

Note! An expansion vessel MUST be fitted (and regularly maintained) if any form of backflow prevention device is fitted, e.g. non-return valve, pressure reducing valve. This will ensure that excess expansion or pulse pressures do not damage the product or the plumbing system.

Instantaneous Gas-heated Showers (e.g. combination boilers)



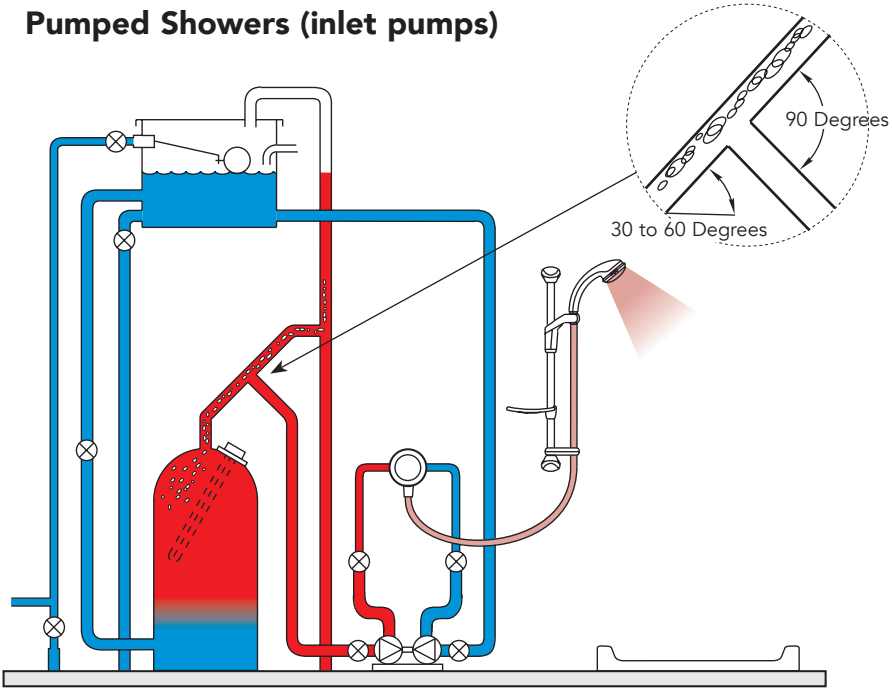
The shower control MUST be installed with a multipoint gas water heater or combination boiler of a fully modulating design (i.e. where the water draw-off rate indirectly controls the gas flow rate to the burner).

A drop tight pressure reducing valve MUST be fitted if the supply pressures exceed 5 bar maintained.

An expansion vessel MUST be fitted (and regularly maintained) to ensure that excess pressures do not damage the product. This may already be fitted within the boiler (check with the manufacturer) and is in addition to the normally larger central heating expansion vessel.

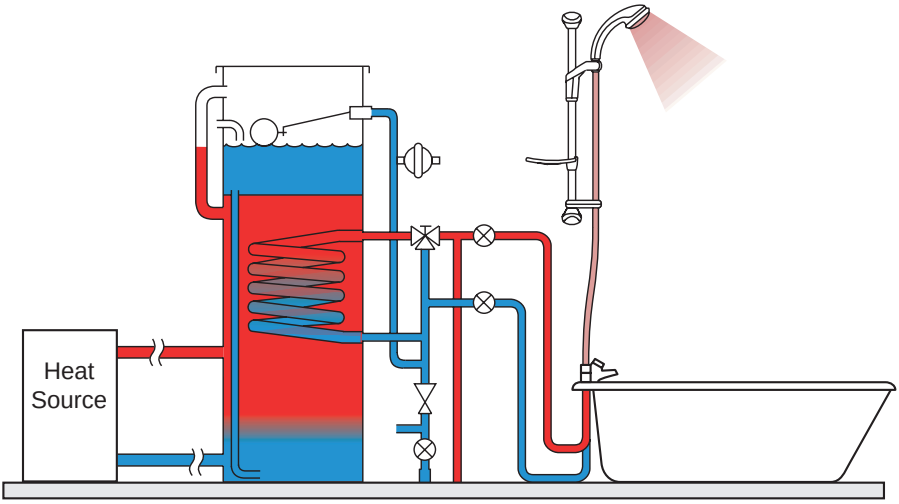
The hot supply temperature MUST be at least 12°C hotter than the required blend temperature for optimum performance.

Pumped Showers (inlet pumps)



The shower can be installed with an inlet pump (twin impeller). The pump MUST be located on the floor next to the hot water cylinder. The hot water cylinder/vent pipes must be arranged as shown to achieve air separation.

Mains Pressurised Instantaneous Hot Water Shower, Heated from a Thermal Store



Packages of this type, fitted with a tempering valve can be used.

A drop tight pressure reducing valve MUST be fitted if the supply pressures exceed 5 bar maintained.

An expansion vessel MUST be fitted (and regularly maintained) if any form of backflow prevention device is fitted, e.g. non-return valve, pressure reducing valve. This will ensure that excess expansion or pulse pressures do not damage the product or the plumbing system. The expansion vessel may already be fitted externally or internally within the thermal store (check with thermal store manufacturer).

Example of a Surface Mounted Installation - Mira Excel

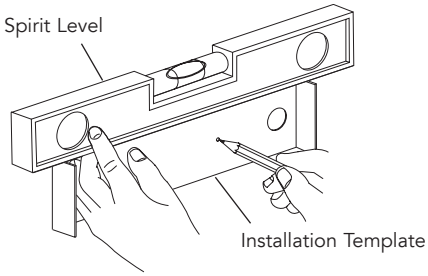
Back inlet supplies (rising or falling concealed pipework)

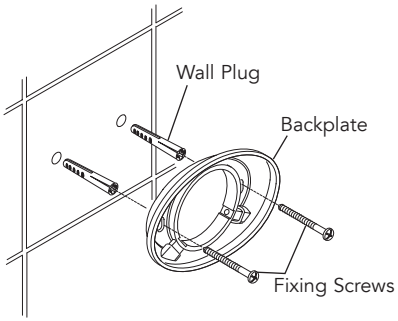
1. Use the installation template to mark the positions of the holes for the backplate and the pipe centres.
2. For solid walls drill the backplate holes with a 6 mm diameter drill and insert the wall plugs (supplied). For other types of wall structure alternative fixing may be required.
3. Use the two No. 8 x 1 3/4" fixing screws (supplied) to fix the backplate to the wall. Make sure that the two angled fixing holes are at the bottom of the backplate.
4. Use a spirit level and pencil to mark the route of the hot and cold water supply pipes at 150-155 mm centres.

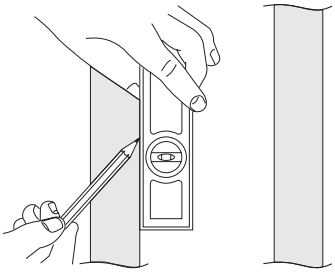
   Note! The Excel is supplied with inlet connections **hot left**, **cold right** and **bottom outlet** as standard.
5. Remove the plaster and brick/block to the required depth to conceal the pipework.

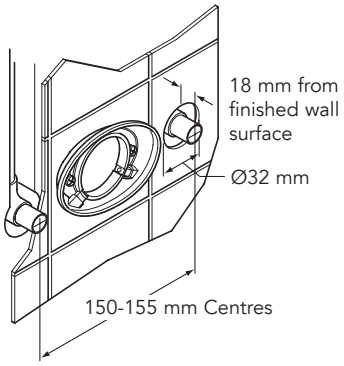
   Note! Depth must be sufficient to prevent pipe concealing plates fouling on the plumbing elbows.
6. Install the supply pipes. The pipes must project 18 mm from the finished surface of the wall at 150-155 mm centres.

   Note! Use the installation template to ensure pipes are in the right position.





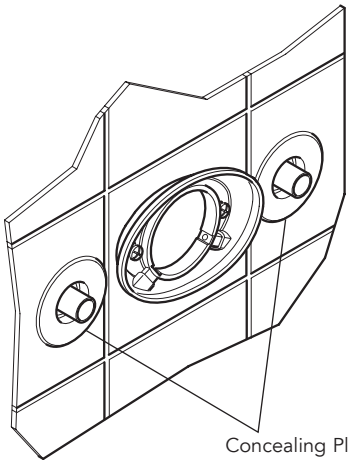


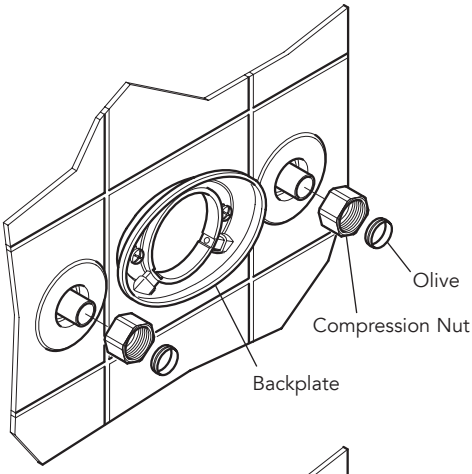


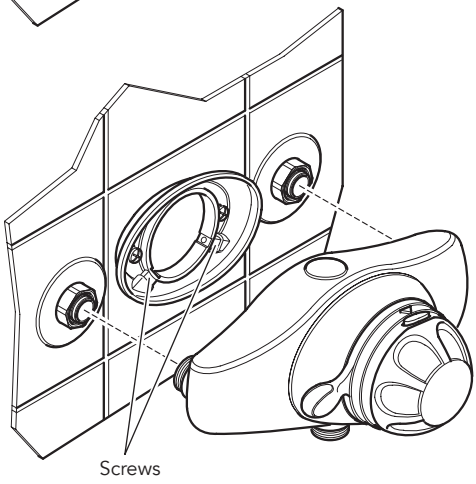
7. Finish the surface of the wall as required. The recesses from which the pipes emerge must also accommodate the 32 mm diameter x 10 mm deep flanges on the pipe concealing plates.
8. Fit the pipe concealing plates over the hot and cold supply pipes.
9. **Thoroughly flush the hot and cold water supply pipes. The supplies must be clean and free from debris before connecting the shower control. Failure to do so may result in product malfunction.**
10. Slide the compression nuts and olives over the supply pipes.
11. Locate the Excel shower control on to the backplate and supply pipes and hold it in position.

    Note! Align the adjustable inlets to aid location onto the pipework.
12. Use a suitable screwdriver to tighten the two screws in the backplate. The screws will hold the shower control in position.
13. Use a suitable spanner to tighten the compression nuts (anticlockwise rotation when viewed from front). Protect the chrome plated surfaces with a cloth.

    Do not overtighten.
14. Turn on the water supplies and check for any leaks.
15. Install the shower fittings. Refer to the Installation and User Guide for the shower fittings.







Frequently Asked Questions

Question - Do Mira Showers manufacture a mixer shower that will operate with cold water taken directly from an incoming main (high pressure) and hot water from a gravity-fed stored supply (low pressure)?

Answer - This is not a plumbing arrangement we cater for. Depending upon the model in question, our mixer showers are compatible with the following plumbing systems only:

- Gravity-fed hot and cold supplies
- Fully-modulating combination boiler / gas water heater
- Mains pressurised unvented system
- Mains pressurised thermal store
- Gravity-fed hot and cold supplies via remote pump

Question - With regard to combination boilers / gas water heaters, what is meant by fully-modulating and step-modulating?

Answer - The heat output from a fully-modulating combination boiler / gas water heater can be varied from full off to full on, giving you fine control between the minimum and maximum temperatures it produces. This is performed by the boiler's gas control valve varying the amount of gas it allows through in direct relation to the water outlet flow. Therefore a mixer shower fed from a fully-modulating combination boiler / gas water heater will allow total control over the blend temperature the shower delivers from full cold to full hot.

The gas valve within a step-modulating combination boiler / gas water heater can only be incrementally adjusted (i.e. off, low, medium or high). Should a mixer shower be fed via a step-modulating combination boiler / gas water heater you would find that once the required blend temperature through the shower is obtained, the boiler would continue heating the water until the next level is reached (i.e. low to medium, or medium to high). It would then shut off the gas supply until the heated water had moved through the boiler, causing a cool shot of water to pass through the shower valve before the boiler re-ignites. With these temperature fluctuations, the shower experience would not be considered comfortable.

If you are unsure whether a combination boiler / gas water heater is fully-modulating or step-modulating you should contact the manufacturer for advice.

Question - What is a TMV2 & TMV3 approved mixing valve and are all of your mixers approved to this standard?

Answer - TMV stands for Thermostatic Mixing Valve, the TMV Scheme is an independent third party approval scheme administered by BuildCert.

The TMV scheme certifies Type 3 thermostatic mixing valves manufactured to meet the highest specifications required by the NHS Estates D08 standard for mixing valves for use within health care premises in the United Kingdom.

The TMV scheme now also certify Type 2 thermostatic mixing valves for the domestic market and is working with the Child Accident Prevention Trust to promote the safe use of hot water in domestic premises. For further information visit www.buildcert.com.

Mira Showers and Rada Controls make a number of Thermostatic Mixing Valves approved to these standards.

Question - Are all mixer valves suitable for all systems?

Answer - Most Mira mixer valves are suitable for all the common water systems.

To find out suitability you can go to the step by step Shower Selector Tool available on line to help you find the perfect shower.

Question - Where can I buy spare parts for your discontinued and current shower range?

Answer - Spares are available for most products past and present.

Contact Mira Customer Services.

Trouble Shooting

Malfunction	Possible Cause	Remedy
No/low flow and/or unstable fluctuating temperature	Spray plate assembly blocked	Clean the spray plate
	Incorrect Spray Plate Fitted	Fit high capacity spray plate
	Partially closed stop or servicing valve in supply pipework	Open valve
	Instantaneous boiler cycling on and off as flow rate/pressure is too low	Fit high capacity spray plate
		Increase flow/pressure through the system
		Boiler not fully modulating, refer to installation requirements
		Contact the boiler manufacturer
	Head of water below minimum required	Raise the cistern or fit a Mira pump
	Inlet strainer blocked	Clean or renew, and flush pipework before refitting
	Other hot or cold draw off being used causing wide pressure changes or instantaneous boiler temperature changes	Do not use other outlets whilst showering
	Supply pressures unequal	Check that the supply conditions are within the specifications of the valve
	Hose collapsed internally	Remove hose, check inside both ends to see if internal hose restriction. If so change hose

Malfunction	Possible Cause	Remedy
Maximum shower temperature too hot or too cold	Maximum temperature incorrectly set	Reset the maximum temperature, refer to the commissioning instructions for the valve
	Hot & cold inlets fitted in reverse	Fit hot & cold to correct inlets
	Heater appliance not set correctly	Refer to the heater appliance instructions
	Flow rate too high	Fit a flow regulator between the valve outlet and hose (contact Mira Customer Services)
Leak from showerhead	A small amount of water may be retained in the showerhead after the shower has been turned off. This may drain over a few minutes	This is quite normal, changing the angle of the showerhead may vary the draining time
	Cartridge damaged or faulty	Renew the cartridge assembly
		Check that the supply conditions are within the specifications of the valve
	Water pressure too high	Ensure no inlet cv's fitted
Shower 'noisy' during operation	Unbalanced inlet pressures	Ideally the inlet supply pressures should be nominally equal, if necessary fit a drop tight pressure reducing valve just after the incoming mains stopcock, to balance the hot and cold supplies

	Inlet strainer blocked	Check and clean inlet strainers
	High inlet pressures	Maximum maintained pressure should not exceed 5 bar, if necessary fit a drop tight PRV (see above)
Malfunction	**Possible Cause**	**Remedy**
Only full hot or full cold water available from the shower	Reversed inlet supplies	Refer to the instructions for the valve
	Inlet filter blocked	Clean or renew
Shower pattern collapses when another **hot** tap is turned on	The heater appliance is not capable of supplying several outlets at the same time	Reduce the simultaneous demand
	Inlet strainer blocked	Check and clean inlet strainers
Shower pattern collapses when another **cold** tap is turned on	Property water supply pipe partially blocked or undersize	Contact local water supplier or increase water supply pipe size to premises
	Partially closed stop or servicing valve in supply pipework	Open valve
	Insufficient water supply pressure	Contact local water supplier or increase water supply pipe size to premises
	Inlet strainer blocked	Check and clean inlet strainers

Shower force too strong	High inlet pressures	Make sure pressure does not exceed 5 bar maintained. If necessary fit PRV
	Low capacity spray plate fitted	Fit high capacity spray plate
	Flow regulator not fitted	Fit a flow regulator between the valve outlet and hose (contact Mira Customer Services)
Malfunction	**Possible Cause**	**Remedy**
No hot water available	Heater appliance not igniting due to insufficient supply pressure	Contact local water supplier or increase water supply pipe size to premises
	Heater appliance not igniting due to appliance fault	Refer to the heater appliance instructions
	Partially closed stop or servicing valve in supply pipework	Open valve
	Hot water has run out	Wait until reheated
	Inlet strainer blocked	Check and clean inlet strainers
Shower starts warm and then runs cool	Insufficient flow rate	Refer to Malfunction: 'No/ low flow and/or unstable fluctuating temperature'
	Hot water has run out, or temperature has dropped	Wait until reheated
Shower control cannot be shut off	Pipework not flushed before connecting shower control (internal 'O' seals damaged)	Renew the cartridge
	Cartridge or inlet strainer seals damaged	Renew seals

Customer Services - 0844 571 5000

Customer Support

A service you can depend on

At Mira we know our excellent reputation depends on the service we provide. That's why we're passionate about looking after our customers. We have a dedicated Customer Services Team to provide lifetime support for your Mira product. From general advice and problem diagnosis through to supplying spare parts or arranging a service engineer visit, they're waiting to help.

We know our customers prefer talking to friendly human beings rather having to work through automated systems, or left to listen to tedious hold music. That's why 85% of all calls are answered within 15 seconds by a Customer Service representative. Each representative has undergone extensive initial training and typically completes a further minimum 150 hours each year. They know every Mira product inside out so can help no matter what question you have.

After sales assistance

Looking after your Mira shower

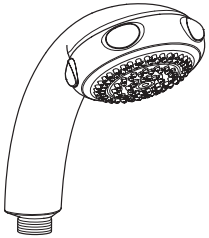
If you ever need hands-on help, we have a team of field based engineers helping Mira installers and owners get the most from their showers. Even if your warranty has expired, we're still here to help. We only charge by the visit and not by the hour, so you can be sure you're getting exceptional value for money.

- We aim to complete 75% of service visits within 3 working days of receiving a customer's call
- We aim to achieve a first time fix rate of 98%
- Spare parts are despatched within 2 working days of your call (subject to stock availability).

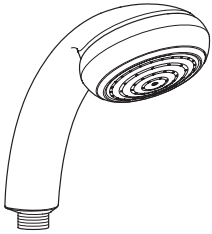
At the end of the day, the service you receive has to be as good as the product you enjoy. With Mira, you know you'll enjoy the best of both worlds.

Accessories

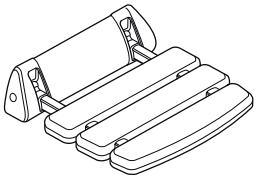
Genuine Mira accessories can be purchased direct from Mira Customers Services or from approved stockists or merchants.



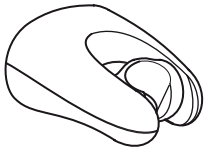
Eco Showerhead
White - 2.1668.001
Chrome - 2.1668.002
The Eco shower head gives you an invigorating shower, but reduces water consumption and heating costs.



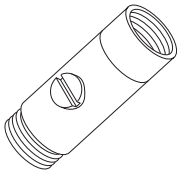
Everclear Showerhead
White - 2.1616.030
Chrome - 2.1616.031
Mira's new Everclear range has been specially designed for hard water areas and reduces the risk of lime scale build up.



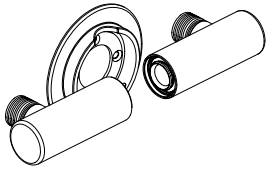
Shower Seat
White - 2.1536.128
White/Chrome - 2.1536.129
For use in or out of the showering area.
Note! Must be installed onto a solid wall.
Shower seat folds up when not in use



Showerhead Holder
White - 1.1540.270
Chrome - 1.1540.271
An alternative to the traditional slide bar. Often a useful addition when positioned for the smaller members of the family.



Double Outlet Check Valve (DCV-H)
Chrome - 1.0.110.55.1
DCV-H: An outlet double check valve, designed to prevent the backflow or backsiphonage of potentially contaminated water, through shower controls which are fitted with a flexible hose as part of the outlet shower fitting.



Adjustable Elbow Pack
Chrome - 1.1663.012
The Mira Adjustable Elbow Pack allows the Mira 'mini valves' to be retrofitted in place of an existing shower - no need to re-plumb or re-tile.

KOHLER® Family of Businesses

Kohler Co. is one of the world leaders in bathroom design, setting the standard for innovation, craftsmanship and new technology across the globe since 1873.

Kohler in the UK encompasses its market leading domestic brands - KOHLER®, MIRA® and RADA®, offering an inspirational collection of bathroom sanitaryware, bathroom furniture, taps, showers and shower enclosures.

- Mira, established in 1921, we have been leading the way in UK showering for decades. In 1937 we introduced the world's first ever thermostatic shower, designed specifically for hospitals and schools. Mira mixer valves quickly became the standard equipment for the shower market and in 1959 we unveiled the first thermostatic shower for domestic use. Ever since then our showers have remained firm favourites with households across the UK.
- Rada controls, the commercial sector of Mira, manufacture mixer valves, washroom products, electronic products, shower fittings and accessories suitable for Health Care, Commercial and Industrial applications.
- Designer bathroom suites from Kohler UK span contemporary and traditional styles with a wide range of sinks and washbasins, taps, showers and shower enclosures, bathroom accessories and bathroom furniture, fitted and freestanding. The collection includes decorated and handcrafted bathroom sinks and washbasins, which can be pedestal-mounted, furniture-mounted or wall-hung. Also, monobloc taps and wall-mounted taps as well as back-to-wall WCs and wall-hung toilets and bidets. In addition, we offer everything for the spa bathroom: whirlpool spa baths and bath tubs with hydrotherapy and chromatherapy.

For more information about our range of products, or to register your guarantee, download additional user guides, diagnose faults, purchase our full range of accessories and popular spares, refer to our FAQ's and request a service visit please call us or visit the Web sites below.

www.mirashowers.co.uk

www.radacontrols.com

www.kohler.co.uk

GETTING IN TOUCH

If you live in the UK or Northern Ireland and have a question about our products or would like to talk to Mira Customer Services, please call us on 0844 571 5000. If you live in the Republic of Ireland, please call us on 01 531 9337. Alternatively you can visit our website: www.mirashowers.co.uk/contactus or www.mirashowers.ie/contactus

If you'd like to find out where your nearest stockist is, or you'd like to order a brochure, please call us on the numbers above or visit our website.

KOHLER® FAMILY OF BUSINESSES

We're owned by Kohler Co., one of the world leaders in bathroom design. Kohler has been setting the standard for innovation, craftsmanship and new technology across the globe since 1873.

Kohler in the UK brings together a number of market-leading bathroom and shower brands, including Kohler, Mira Showers and Rada to bring you an inspiring collection of bathroom sanitaryware, bathroom furniture, taps, showers and shower enclosures.

If you'd like to know more about the range of Kohler and Rada products, please visit www.kohler.co.uk and www.radacontrols.co.uk

IMPORTANT INFORMATION

We recommend that you should read the Installation and User Guide (IUG) supplied with each product before installing it. If you are in any doubt, give our customer services team a call on 0844 571 5000 (UK & NI) or 01 531 9337 (ROI).

We are constantly looking to improve our products wherever we can, so we reserve the right to make product changes without prior notice.

www.mirashowers.co.uk

Kohler Mira Ltd.
Cromwell Road, Cheltenham, Gloucestershire, GL52 5EP, United Kingdom
Brochure Enquiries: 0844 571 0005 (UK & NI): 01 531 9337 (ROI)
Customer Services: 0844 571 5000 (UK & NI): 01 531 9337 (ROI)

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