Block (RH)

Use the terminal block location that is most appropriate for your installation i.e. If the electric supply is on the right hand side then use the right hand terminal block. Strip back sufficient outer

cable insulation to enable routing to the terminal block.

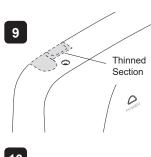
Fit an earth sleeve to the earth wire. Insert the wires into the

terminal block.

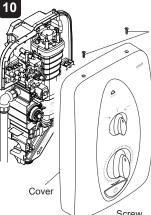
Tighten the screws in the terminal block, ensure the wires are secure and tight.

Ensure the earth bonding complies with relevant regulations.

- L (Live) = Brown wire
- (\preceive Earth) = Green /Yellow sleeved wire
- N (Neutral) = Blue wire



For falling or rising supplies the cover has thinned sections on the top and bottom that can be removed to allow entry of the supply pipe and electrical cables



aligned with the spindles and replace the cover. Tighten the three cover

Ensure the control dials are

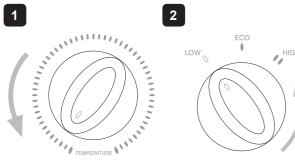
Do not use alternative screws

to secure the cover This can cause internal damage to the

#### Do not seal around the back of appliance.

- Install the shower fittings (Refer to the Shower Fittings Installation and User Guide packed with the product).
- The shower must be commissioned before use, please refer to section: 'COMMISSIONING'.
- This completes the installation.

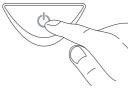
#### COMMISSIONING



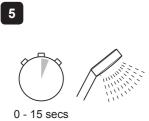
4

Turn temperature control to the Turn power control to low. cold position.





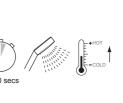
Switch on the electrical supply. Push START/STOP button.



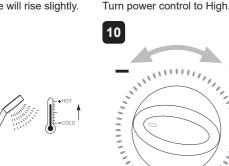
Water flows freely within a few Turn power control to Eco. seconds, temperature remains

cool





Temperature will rise slightly.



Note: Flow rate will reduce

when temperature setting is

increased.

Temperature will rise further Adjust temperature as required

Push START/STOP button. A small amount of water may continue to drain over a few Note: A slight hissing sound may be heard from the shower during operation. High mains water pressure and high shower temperatures will affect the tone. This is quite normal in use. **FAULT DIAGNOSIS** Warning! There are no user serviceable components beneath the cover of the appliance. In the event of a malfunction of the shower. the troubleshooting information below provides details on possible causes and remedies that may be carried out by qualified, competent personnel. Non-qualified personnel should refer to the fault diagnosis section in the users guide.

Symptom	Possible Cause	Possible Remedy	
No hot water from the shower, with the controls in ECO/HIGH position	Insufficient water supply pressure	Contact local water authority	
	Failure of the microswitch or thermal switch	Check the continuity of the switches, using a suitable continuity measuring device. Replace the switches as necessary	
	An internal wiring connection has failed	Check the integrity of the internal wiring	
	One of the heater tank elements has failed	Replace the heater tank assembly	
	Switch assembly fault	Replace On / Off switching assembly	
The shower temperature cycles between hot and cold with power control in ECO/HIGH	The hose or showerhead is blocked	De-scale showerhead, check hose for kinks or damage and replace if necessary. Refer to the User Maintenance section of the user guide	
	The temperature is set too high. This is causing the thermal switch to turn off the heating element to reduce the water temperature	Turn the temperature control anticlockwise to reduce the water temperature or turn the power control to ECO. DO NOT TAMPER with the thermal switch	
Turning the temperature	The flow regulator is faulty	Replace the heater tank assembly	
control does not affect the water temperature	The hose or showerhead is blocked	De-scale showerhead, check hose for kinks or damage and replace if necessary. Refer to the User Maintenance section of the user guide	
No water or very ow flow rate	The hose or showerhead is blocked	De-scale showerhead, check hose for kinks or damage and replace if necessary. Refer to the User Maintenance section of the user guide	
	The incoming water supply stop valves, or the appliance isolating valve is closed	Open the stop/isolating valve completely	
	Insufficient water supply pressure	Contact the local water authority	
Power LED does not illuminate	Electrical supply failure (MCB, pull cord etc.)	Check electrical supply	
when the pull cord	Power LED faulty	Replace the wiring loom	

#### The heater tank is No water or verv Replace the heater excessively scaled tank assembly The inlet filter is Clean the inlet filter The fuse is blown Switch on the power at or the MCB / RCD has the double pole switch been tripped, indicating Inlet Pipe Accessory

Replace on / off switching

1788.443

assembly is faulty The start / stop switch Replace start / stop switch is faulty The solenoid coil is Replace solenoid coil faulty The pressure relief valve in the tank has outlet and replace the

a possible electrical

heater tank element

The on / off switching

fault: for example

failure

Water leaks from the bottom of the case near the been triggered (usually heater tank assembly outlet and there is due to a blocked no flow from the outlet), when the relie showerhead valve operates a small rubber ball is eiected The water cannot The on / off switching Replace on / off switching be turned off

assembly is faulty The start / stop switch Replace start / stop switch is faulty The supply pressure Check the static water pressure. Note that the is below the minimum static water pressure may required fall below the minimum requirement when other appliances are drawing water, for example the dishwasher or the washing

## **SERVICING**

## WARNING

low flow rate

Switch off the electrical supply.

There are no user serviceable parts inside the shower. Servicing of the shower must only be carried out by qualified,

competent personnel following the instructions provided in this guide and those provided with any spare part.

Before replacing any parts, ensure that the underlying cause of the malfunction has been resolved.

#### Cleaning the Inlet Filter

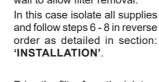
Warning! Isolate the electrical and water supplies before removing the cover.

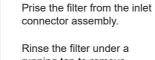
Remove the cover.

inlet connector. Note: Depending on your installation it may be necessary

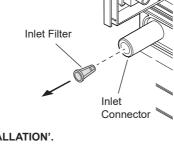
Remove the elbow from the

to remove the shower from the wall to allow filter removal.





running tap to remove any lodged particles. If necessary, use a kettle descalent in accordance with the manufacturer's instructions. Refit the inlet filter and follow steps 7 and 10 as described in section: 'INSTALLATION'.



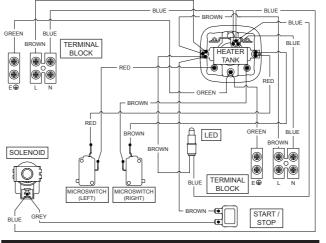
Note: If the shower was removed from the wall, steps 6, 7, 8 and 10 will need to be followed as described in section:

Follow the steps detailed in section: 'COMMISSIONING' to prepare the shower for use.

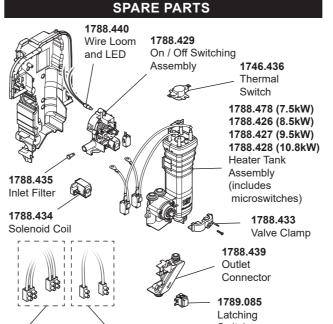
#### **ACCESSORIES**

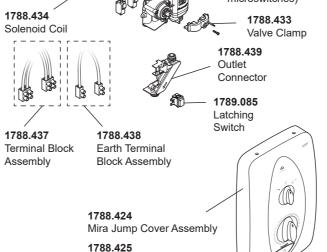
Genuine Mira accessories can be purchased direct from Customers Services (our contact details can be found on the back cover of this guide) or from approved stockists or merchants.

# Designed to simplify the retrofitting of a Mira shower onto existing pipework. Note: Some adjustment of pipe length may be necessary.



**WIRING DIAGRAM** 





Mira Sprint Cover Assembly

1693.331 Component Pack (Not illustrated)

1788.436 Screw Pack (Not illustrated)

#### **CUSTOMER SERVICE**

Your product has the benefit of our manufacture's guarantee which starts from

#### Guarantee

date of purchase. This guarantee only applies in the United Kingdom and Republic of Ireland. To activate this guarantee, please return your completed egistration card, visit our website or free phone 0800 0731248 within 30 days of purchase (UK only).

Within the guarantee period we will resolve defects in materials or workmanship, free of charge, by repairing or replacing parts or product as we may choose.

#### This guarantee is in addition to your statutory rights and is subject to the following conditions:

- The guarantee applies solely to the original installation under normal use and to the original purchaser only. The product must be installed and maintained in accordance with the instructions given in this guide. Servicing must only be undertaken by us or our appointed representative
- Note: If a service visit is required the product must be fully installed and connected to services. Repair under this guarantee does not extend the original expiry date.
- The guarantee on any replacement parts or product ends at the original For shower fittings or consumable items we reserve the right to supply
- replacement parts only.

#### The quarantee does not cover:

- Call out charges for non product faults (such as damage or performance issues arising from incorrect installation, improper use, inappropriate cleaning, lack of maintenance, build up of limescale, frost damage, chemical attack, corrosion, system debris or blocked filters) or where no fault has been found with the product.
- Water or electrical supply, waste and isolation issues.
- Compensation for loss of use of the product or consequential or indirect
- Damage or defects caused if the product is repaired or modified by persons not authorised by us or our appointed representative.
- Accidental or wilful damage
- Products purchased ex-showroom display.

## What to do if something goes wrong

If your product does not work correctly refer to this manual for fault diagnosis and check that it is installed and commissioned in accordance with our instructions.

If this does not resolve the issue, contact us for help and advice.

#### **Extended Guarantees**

A selection of protection plans are available that enable you to cover repair bills (excludes Eire). Ring 01922 471763 for more details.

Helpdesk Service - Contact our Customer Services Team for product advice, to purchase spare parts or accessories or to set up service visit. You can contact us via phone or e-mail - contact details below. Please provide your model name, power rating (if applicable) and date of purchase.



Mira Showers Website (www.mirashowers.co.uk) Visit our website to register your guarantee, download user guides, diagnose faults, purchase our full range of accessories and popular spares, or request a service visit.



Spares and Accessories - We hold the largest stocks of genuine Mira spares and accessories. Contact us for a price or visit our website to purchase items from our accessory range and popular spares. (Only available in the United Kingdom)



Service/Repairs - No one knows our products better than our ationwide team of Service Technicians. We can carry out service or repair work to your product both during and after the guarantee period (Only available in the United Kingdom and Republic of Ireland). Ask about our fixed price service repairs.

#### To Contact Us 0800 001 4040

E-mail:

Fax: 01242 282595



www.mirashowers.co.uk/contactus

Mira Customer Services Dept Cromwell Road, Cheltenham,



To Contact Us: Eire Only 01 531 9337



E-mail:
CustomerServiceEire@mirashowers.com

Mira is a registered trade mark of Kohler Mira Limited. The company reserves the right to alter product specifications without notice.

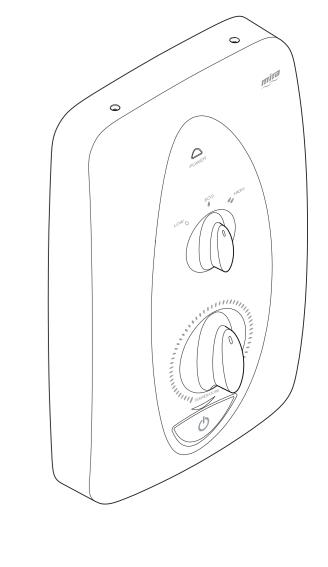
FM 14648 SHOWERS Mira Jump

7.5, 8.5, 9.5 and 10.8 kW Electric Shower

KOHLERCOMPAN

# Mira Sprint

8.5, 9.5 and 10.8 kW Electric Shower



For SPARES, ADVICE or REPAIRS Please call us on 0844 571 5000

These instructions must be left with the user

Installation Guide



Showering perfection

© Kohler Mira Limited, September 2019

1224546-W2-E

#### INTRODUCTION

Thank you for choosing a Mira shower. To enjoy the full potential of your new shower, please take time to read this guide thoroughly, and keep it handy for future reference

Products manufactured by Kohler Mira Ltd are designed to be safe, provided that they are installed, used and maintained in good working order, in accordance with our instructions and recommendations.

Follow all warnings, cautions and instructions contained in this guide, and on, or inside the shower. This guide is also available in electronic format on our website or by contacting customer services. This product has separate controls for power selection and for

temperature/flow adjustment. A unique flow regulator stabilises any temperature changes caused by water pressure fluctuations, which can result from taps being turned on or off or toilets being flushed.

Electrical and electronic devices contain a range of materials that can be separated for recycling and used in new products.

This shower should not be disposed of with your general household waste. When this shower has reached the end of its serviceable life please take

it to a recognised WEEE (Waste Electrical and Electronic Equipment) collection facility such as your local civic amenity site for recycling. Your local authority or retailer will be able to advise you of your nearest

#### Mira Electric Showers covered by this guide

Product	kW	Model Number	Colour
	7.5	J08 Hb	
Mira Jump	8.5	J08 Db	
	9.5	J08 Eb	
	10.8	J08 Fb	
Mine Iveen Duel	9.5	J08 Ed	
Mira Jump Duel	10.8	J08 Fc	White / Chrome
	8.5	J08 Da	011101110
Mira Sprint	9.5	J08 Ea	
	10.8	J08 Fa	
M: 0 : 1 D 1	9.5	J08 Ef	
Mira Sprint Duel	10.8	J08 Fd	

#### Guarantee

This product has been designed for domestic use only. Mira Showers guarantee this product against any defect in materials or workmanship for period of two years from the date of purchase (shower fittings for one year For terms and conditions, refer to the back cover of this guide.

#### Recommended Usage

Domestic	✓	Light Commercial	<b>✓</b>	Ma
Heavy Commercial	×	Healthcare	×	Ma
MACATAN	T 04 F F	TV INFORMATIO	N	Ma
IMPORTAN	IT SAFE	TY INFORMATIO	N .	

WARNING - This shower can deliver scalding temperatures, cau fire, electric shock or other personal injury if not installed, operate or maintained in accordance with the instructions, warnings a cautions contained in this guide and on or inside the appliance. Please read the important safety information and the installation requirements

detailed in this guide before installing the shower. Failure to follow the instructions provided with this shower will invalidate the guarantee

#### TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK OR INJURY: This appliance can be used by all children and persons with reduced

- physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved Children shall not be allowed to play with the shower
- Cleaning and user maintenance shall not be made by children without
- The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. The outlet must not be connected to any tap or fitting other than those
- The showerhead must be descaled regularly. Any blockage of the showerhead or hose can cause damage to the shower
- Warning! Do not switch on if there is a possibility that the water in the
- The shower must be provided with means for local disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- Installation of the shower must be carried out in accordance with these instructions by qualified, competent personnel. Read all instructions before installing the shower.
- DO NOT switch the shower on if water starts leaking from the shower case. Isolate the electrical supply to the shower immediately

- **DO NOT** switch the shower on if the case appears to be damaged or incorrectly fitted. Isolate the electrical supply to the shower immediately. DO NOT increase the power setting or adjust the temperature control
- DO NOT switch the shower off and back on while standing in the water

pidly while using the shower.

- DO NOT change the handset model. Fit only shower heads recommended by Mira and do no fit any additional device to restrict the water outlet
- When adjusting the handset mode, point handset away from body and make sure that the water temperature has stabilised before continuing
- Use caution when altering the water temperature, always check the temperature before continuing to shower. Switch the shower off at the electrical isolating switch when not in use
- This is recommended with all electrical appliances. Installation of the shower must be carried out in accordance with these
- instructions by qualified, competent personnel, Read all instructions before installing the shower. Isolate the electrical and water supplies before commencing installation
- The electricity must be isolated at the consumer unit and the appropriate circuit fuse removed, if applicable. Mains connections are exposed when the cover is removed. DO NOT install the shower in areas with high humidity and temperature
- (i.e. Steam rooms and saunas). DO NOT install the shower where it may be exposed to freezing
- conditions. Ensure that any pipework that could become frozen is properly DO NOT connect the outlet of the shower to any tap, control valve, trigger
- operated handset or showerhead other than those specified for use with this shower as the outlet acts as a vent for the tank body. Only Kohler Mira recommended accessories should be used. 23. DO NOT perform any unspecified modifications, or drill or cut holes in
- the product other than instructed by this guide. When servicing only use genuine Kohler Mira replacement parts. Always check the water temperature is safe before entering the shower.
- The water supplies to this product must be isolated if the product is not to be used for a long period of time. If the product or pipework is at risk of freezing during this period they should also be drained of water. 26. If the shower is dismantled during installation or servicing then, upon
- completion, an inspection must be made to ensure all electrical connections are tight and that there are no leaks.
- This appliance is intended to be permanently connected to the water mains and not connected by a hose set.

	SPECIFIC	ATION	
Dimensions	Height	Width	Depth
Dimensions	356 mm	225 mm	107 mm

ra	Plumbing		Variant		
ar).		7.5	8.5	9.5	10.8
	Min Dynamic Pressure	70 kPa (0.7 bar)	70 kPa (0.7 bar)	70 kPa (0.7 bar)	100 kPa (1.0 bar)
	Max Dynamic Pressure		500 kPa	a (5.0 bar)	
$\dashv$	Max Static Pressure		1000 kF	a (10 bar)	
	Min Static Pressure		50 kPa	(0.5 bar)	
	Max Inlet Temperature		3	0°C	
	Min Inlet Temperature		2	2°C	
ıse ted	Inlet Connection	15 mm	Compressi	on / Pushfit (	Coupling
ınd	Max Water Hardness		200 pp	m CaCO <sub>3</sub>	
	Outlet Connection		1/2" B	SP Male	

Electrical	Variant			
	7.5	8.5	9.5	10.8
Nominal Power at 240 V ac	7.5 kW	8.5 kW	9.5 kW	10.8 kW
Nominal Power at 230 V ac	6.9 kW	7.8 kW	8.7 kW	9.9 kW
Recommended MCB Rating	32 A	40 A	40A	45 A
Max Supply Cable Size	16 mm²			
Recommended RCD Rating	30 mA tripping current			
Recommended Isolator Switch	45 A double-pole with 3 mm contact separation			
Appliance Sealing Rating	IP X4 - Suitable for installation in Zone 1			
Max Ambient Temperature	erature 3		)°C	
Min Ambient Temperature	2°C			

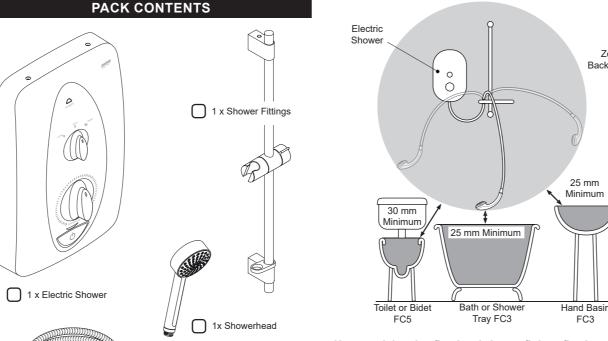
#### **European Conformity Information** This range of electric showers complies with the following European

2006/95/EC Low Voltage Directive, 2004/108/EC EMC Directive,

2011/65/EU RoHS Directive

his range of electric showers are high power appliances and are subject to conditional connection. If the main electrical supply fuse is rated less than 80 Amps, the local electricity supply company must be contacted to confirm if the electrical supply is adequate.

This range of showers complies with the requirements of the UK's



1 x Component Pack

1 x User Guide

**INSTALLATION REQUIREMENTS** 

1. The plumbing installation must comply with all national or local

2. Do not install the product in a position in which service access

water regulations and all relevant building regulations, or any

particular regulation or practice specified by the local water

Decide on a suitable position for the shower (minimum distance

of 200 mm from the ceiling to allow for cover fit and removal).

The shower is suitable for installation within the shower area and is fitted with a pressure relief valve. It must be positioned

over a water catchment area with the controls at a convenient

The shower must be fitted to a waterproof flat and even wall

The showerhead must be directed away from the shower unit,

during normal use the showerhead must not spray directly on

always provide mechanical support when making plumbing

connections. Any soldered joints should be made before

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 a Fluid Category 5

10. **DO NOT** apply excessive force to plumbing connections;

11. The position of the shower and shower fittings must provide a

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

DO NOT fit the shower to the wall and tile up to the case.

x Installation Template (printed on

the inside of product carton)

Documentation

**PLUMBING** 

1 x Guarantee Brochure

1 x Installation Guide

supply company

height for the user

to the shower unit

backflow risk.

checkvalves are not suitable.

connecting the shower.

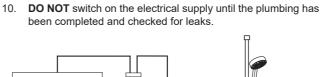
Hose retaining ring fitted and shower fittings fixed at a suitable height preventing dirty water backflow

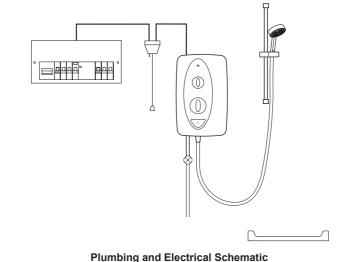
- 12. This shower is not designed to be plumbed directly from the rear. For rear-entry supply, add an elbow to the supply pipe and connect as a rising or a falling supply.
- 13. If pipework and/or electrical cables enter the shower from the rear through a hole in the wall provision must be made to prevent water ingress back into the wall structure.
- 14. This shower is intended to be permanently connected to the mains water supply, only use the inlet connection supplied with the shower

DO NOT use any other type of fitting.

- 15. A full bore/non restrictive servicing valve must be fitted in a readily accessible position adjacent to the shower to facilitate maintenance of the shower. DO NOT use a valve with a loose washer plate (jumper) as this can lead to a build up of static pressure
- A water treatment device should be installed where the water hardness may exceed 200 ppm. Malfunctions caused by excessive limescale formation are not covered by this shower's guarantee (see back page for details).
- The installation must not cause the hose to be sharply kinked during normal use.
- DO NOT perform the electrical installation until the plumbing has been completed and checked for leaks.

- The electrical installation must comply with BS 7671 (commonly referred to as the IEE Wiring Regulations) and all relevant building regulations, or any particular regulation or practice specified by the local electricity supply company.
- 2. Ensure that all circuit protection devices, switches and cabling is adequate for the rated current of the shower and that the rating of the electricity supply company fuse and the consumer unit **DO NOT** seal the gap between the shower and the wall surface. are adequate for the additional demand. The showerhead should be positioned so that it discharges down the centre line of the bath or across the opening of a shower
  - The shower **must** be earthed. Ensure any supplementary bonding complies with the relevant regulations.
  - This shower is intended to be permanently connected to the fixed electrical wiring of the mains system. A separate supply must be provided from the consumer unit to the shower.
  - DO NOT supply any other electrical equipment including extractor fans or pumps via this product. This shower must be provided with means for local disconnection
  - that is incorporated into the fixed wiring in accordance with the relevant local wiring regulations. This must be a double pole switch, which has at least 3 mm contact separation in each pole. The switch can be a ceiling mounted pull-cord type within the shower room or a wall mounted switch fitted in the applicable For new installations a 30mA Residual Current Device (RCD)
  - must be incorporated into the electrical supply to this shower in accordance with current wiring regulations. When replacing an existing electric shower we recommend that a 30mA RCD be incorporated in accordance with current wiring regulations if not already provided
- a pressure build up, which affect the maximum static inlet pressure DO NOT apply excessive force to the terminal block.
- for the appliance and must not be fitted. For Fluid category 5 double All electrical connections should be checked for tightness to prevent overheating before switching on the electrical supply.





**INSTALLATION** 

### Fitting a New Shower

Zone of

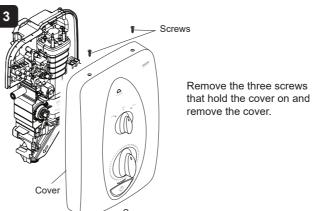
Backflow Risk

Warning! Isolate the electrical and water supplies before installing the shower

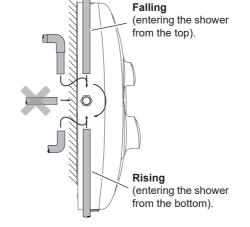
Use the Installation Template provided (printed on the product carton), together with a spirit level to mark the positions of the three fixing holes. **Note:** The shower should be positioned at least 200 mm from

the ceiling. Ensure that there are sufficient lengths of supply pipe and electrical cable to reach the connection points as shown on the template

Drill three holes to suit the fixing screws and wall plugs. Caution! Do not drill into cables or pipes in the wall.



Determine the direction and route of the incoming water supply:



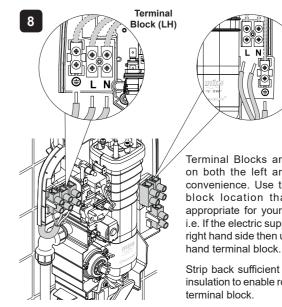
Note: - DO NOT use an incoming supply entering the shower directly from the back. Add an elbow to the supply pipe and connect it as a rising or falling supply.

- Thoroughly flush the supply pipe.
- Secure the shower to the wall with fixing screws and wall plugs (supplied) or appropriate wall fixings for your installation.

Connect the inlet supply pipe

connections to the shower. Do not use jointing paste products as damage to the shower will occur. Turn on the water supply and

check connection for leaks.



Ensure the earth

bonding complies with

relevant regulations.

(Protective Earth) =

Green / Yellow sleeved wire

(Live) = Brown wire

Connector

Pushfit

Supply

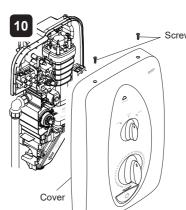
Strip back sufficient outer cable insulation to enable routing to the terminal block.

Fit an earth sleeve to the earth Insert the wires into the terminal

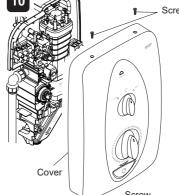
secure and tight.

Tighten the screws in the terminal block, ensure the wires are

(Neutral) = Blue wire For falling or rising supplies the cover has thinned sections on the top and bottom that can be removed to allow entry of



the supply pipe and electrical



Ensure the control dials are aligned with the spindles and replace the cover.

to secure the cover This can cause internal damage to the

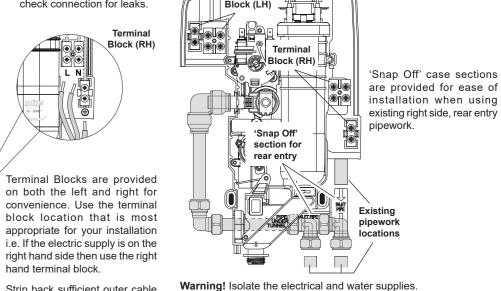
Do not seal around the back of appliance.

Install the shower fittings (Refer to the Shower Fittings Installation and User Guide packed with the product).

to the inlet connector using a push fit elbow or an elbow with compression nuts and olives.

Important! Do Not use pushfit elbows that require specialist tools for removal. Access to the inlet filter is required periodically and so any connector needs to be easily emoved for maintenance.

If the water entry point is on the right hand side of the shower then Note: When making you will need to alter the incoming pipework as shown below. The Mira Inlet Pipe Accessory can be used to simplify this process. Refer to section: 'ACCESSORIES'.



The shower must be commissioned before use, please

This electric shower can replace showers of approximate size and

Terminal Blocks are provided on both the left and right for convenience

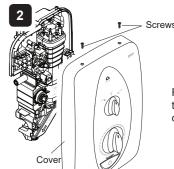
refer to section: 'COMMISSIONING'

Replacing an Existing Electric Shower

This completes the installation.

when replacing a shower.

Disconnect and remove the old shower from the wall.

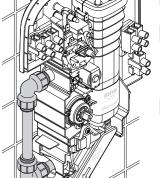


From the new shower, remove the three screws that hold the cover on then remove the cover

Place the shower on the wall where the previous shower was installed and mark the positions of the three fixing holes. Note: Ensure that there are sufficient lengths of supply pipe

and electrical cable to reach the connection points. Remove the shower and drill three holes to suit the fixing screws and wall plugs.

Caution! Do not drill into cables or pipes in the wall.



Thoroughly flush the supply pipe. Secure the shower to the

wall with fixing screws and wall plugs (supplied) or appropriate wall fixings for your installation.

Connect the inlet supply pipe to the inlet connector using a push fit elbow or an elbow with compression nuts and olives.

Turn on the water supply and check connection for

Tighten the three cover screws Do not use alternative screws appliance.