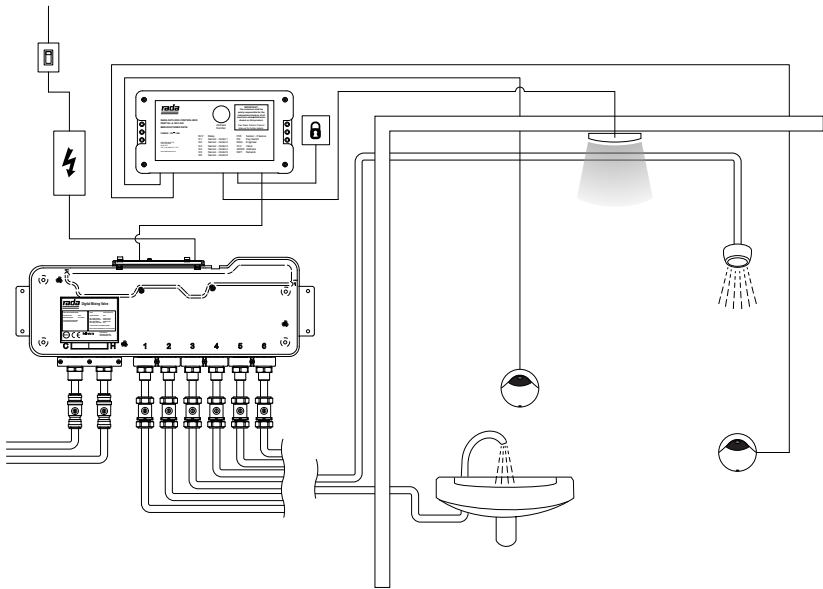# rada
## OUTLOOK

# Rada Outlook
# Digital Mixer Valve,
# Sensor Box & Sensors

**T-logic™ Digital Intelligence**



# PRODUCT MANUAL

## IMPORTANT

**Installer: <u>These instructions are for use with the UK version of this product only.</u> This Manual is the property of the customer and must be retained with the product for maintenance and operational purposes.**

# CONTENTS

# DESCRIPTION

A range of electronic products which combine to produce a controlled washroom solution that complies with legislative and safety requirements, whilst reducing the cost of building management.

An enclosed and concealed digital mixer valve supplies up to six individual outlets, combined with a programmable sensor box that manages temperature, timed flow, duty flush and up to six hand sensors. A manually controlled thermal disinfection function is also included.

Optional Windows based configuration and data logging software is available, enabling utilities supervisors to monitor all aspects of water management within the system.

# SAFETY : WARNINGS

The primary function of this product is to deliver water consistently at a desired temperature. This requires that:

1.  It is installed, commissioned, operated and maintained in accordance with the recommendations given in this manual.

2.  Periodic attention is given, as necessary, to maintain the product in good functional order. Recommended guidelines are given in the **"Planned Maintenance"** section.

3.  If this equipment is used in a manner not specified by Kohler Mira Ltd, the protection provided by the equipment may become impaired.

4.  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.

The use of the word 'failsafe' to describe the function of any mixer valve is both incorrect and misleading. This digital mixer valve incorporates additional shut-off devices to improve the level of safety however, in keeping with every other mechanism it cannot be considered as being functionally infallible.

Where chlorine disinfection is practised, **DO NOT** exceed a chlorine concentration of 50 mg/l (ppm) in water, per one hour dwell time. Such procedures **must** be conducted strictly in accordance with the information supplied with the disinfectant and with all relevant Guidelines/Approved Codes of Practice.

Kohler Mira Limited shall not accept liability in contract, tort (including negligence or otherwise) for any loss of profits, business or anticipated savings, or loss or corruption of data, or any indirect or consequential loss arising out of the customer's use of Rada Outlook. The customer shall be solely responsible for the independent backup of all data/information stored on Rada Outlook. Notwithstanding the foregoing, none of the exclusions and limitations stated above are intended to limit any rights the customer may have under local law or other statutory rights which may not be excluded.

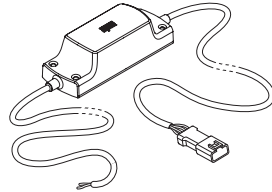# PACK CONTENTS

☐ 1 x Mixer Valve
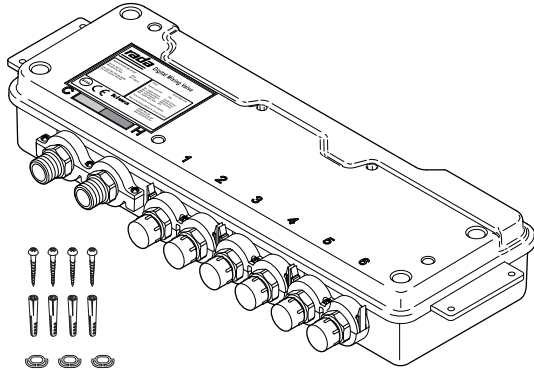
☐ 4 x Fixing Screws

☐ 4 x Wall Plugs

☐ 6 x Rubber Feet

☐ 1 x Power Supply Unit (PSU)

☐ 2 x Fixing Screws

☐ 2 x Wall Plugs

☐ 1 x Sensor Box

☐ 6 x DIN Rail Fixing Screws
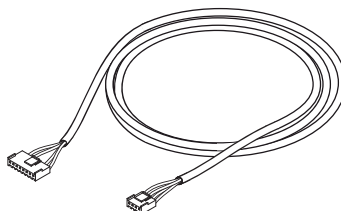
☐ 2 x DIN Rail Clips

☐ 2 x Wall Fixing Screws

☐ 2 x Wall Plugs

☐ 1 x Suppression Ferrite

☐ 1 x Control Cable

1143306-W2-I

# SPECIFICATION

## Standards and Approvals

The Rada Outlook Mixer Valve complies with all relevant directives for CE marking.

The Rada Outlook Mixer Valve is a type 1 electronic, independently surface mounted control.

| General | |
|---|---|
| Pollution Degree | Mixer Valve - 3<br>Sensor Box - 2 |
| Protection | Mixer Valve - IP24<br>Sensor Box - IP20 |
| Connections | Flat face union connections |
| Installation Environment | Suitable for indoor use only |
| **Pressures** | |
| Maximum Static Pressure | 800kPa (8 bar) |
| Minimum Pressure Loss* | 150kPa (1.5 bar) |
| Supply Pressure Differential | Equal pressure recommended - Inlet pressures must be stable for optimum performance. |
| Minimum Flow Rate Per Outlet | 6L/min (<500kPa maintained pressure)<br>8L/min (>500kPa maintained pressure) |
| **Temperatures** | |
| Factory Pre-set (Blend) | 38°C |
| Factory Pre-set Duty Flush | 38°C |
| Programmable Range | Max. 33 - 50°C<br>Min. 30 - 47°C (Full cold can also be selected.)<br>Default at start-up 30 - 50°C |
| Minimum Blend Temperature Differential from Hot Supply | 2°C |
| Optimum Thermostatic Control Range | 30 - 50°C |
| Cold Water Range | 1 - 20°C |
| Hot Water Range | 50 - 65°C (80°C for disinfection) |
| Temperature Stability | ± 1°C at recommended supply conditions |
| Ambient Temperature | Greater than 1°C, max. 40°C |
| Maximum Relative Humidity | 95% non-condensing |
| **Electrical** | |
| Power Supply | 100 - 240V ~ 50Hz - 60Hz, 1.5A |
| Power to Mixer Valve | 12V ⎓ 30W (from Power Supply) |
| Power to Sensor Box | 12V ⎓ 10W (from Valve) |
| PIR / Proximity Sensor | Input = 5V. Output = 5V Logic Level signal. Voltage Free Contacts. |
| Hand Sensors | 5V DC supply provided by the Rada Outlook Sensor Box |
| **Hand Sensors** | |
| Power Input | 5V DC supply provided by the Rada Outlook Sensor Box |
| **PIR / Proximity Sensor (not included)** | |
| Power Input | 5V DC less than 50mA or +12V DC less than 50mA |
| Power Output | Voltage Free Contact 12V DC 0.5A |
| Output Logic | Normal (unit powered and operational with no detected occupancy) - contact closed<br>Power Failure - contact open<br>Unit Failure - contact open<br>Occupancy Detection - contact open |
| It should be possible to link sensors together to increase the area covered. This will be done by connecting the relay contacts in series and linking the connected contacts to the Outlook sensor input. | |

* The pressure loss of a system (valve and outlet fitting) is the average of the two inlet pressures minus the back pressure, where the back pressure is determined by the flow resistance of any outlet fitting.

# Default Settings

The following table shows the factory default settings of the Sensor Box. These settings can be changed using the **"Rada Modbus Universal Configuration Tool"**.

| Outlets 1 -6 | |
|---|---|
| Type | Shower |
| Mode | Timed |
| Run Time | 30 seconds |
| Duty Flush | Disabled |
| Pump | Disabled |
| Fan | Disabled |
| Number of Outlets for Fan | 1 |
| Fan Run On Time | 5 seconds |
| **Duty Flush** | |
| Flush Type | Standard |
| Flush Interval | 3 days |
| Scheduled Flush Time | 02:00 am |
| Flush Temperature | 38 °C |
| Flush Warm-Up Time | 1 minute |
| Flush Duration | 2 minutes |
| **Mixer Valve Settings** | |
| Setpoint | 38 °C |
| Maximum Setpoint | 45 °C |
| Minimum Setpoint | 30 °C |
| **Thermal Disinfection** | |
| Type | Standard |
| Maximum Warm-Up Time | 2 minutes |
| Target Disinfection Time | 5 minutes |
| Disinfection Timeout | 10 minutes |
| Target Temperature | 60 °C |

**Note! The internal clock does not update automatically for summer/winter time.**

**Note! For additional information regarding factory default settings or the valves programmable functionality please contact Rada Controls or your local agent.**

1143306-W2-I

# INSTALLATION

**General**

**Installation must be carried out in accordance with these instructions, and must be conducted by designated, qualified and competent personnel. It is recommended that all signal wiring connections should be made by someone familiar with electronic network installations.**

The plumbing installation **must** comply with the requirements of the UK Water regulations/Bye Laws (Scotland), or any particular regulations and practices specified by the local water company or water undertakers.

**Warning! Do Not** connect mains voltage directly to the Sensor Box, Mixer Valve, or any of the Sensors.

**Caution!** The Mixer Valve, Sensor Box and PSU **must** be installed in a dry area and where they will not be able to freeze (minimum ambient temperature of 1 °C).

The Mixer Valve **must** be installed in an area where it is accessible to do any maintenance tasks e.g. removal of the cover, cleaning the filters, etc.

Flat face union connections **must** be used on the inlet and outlet connections of the Mixer Valve for ease of maintenance.
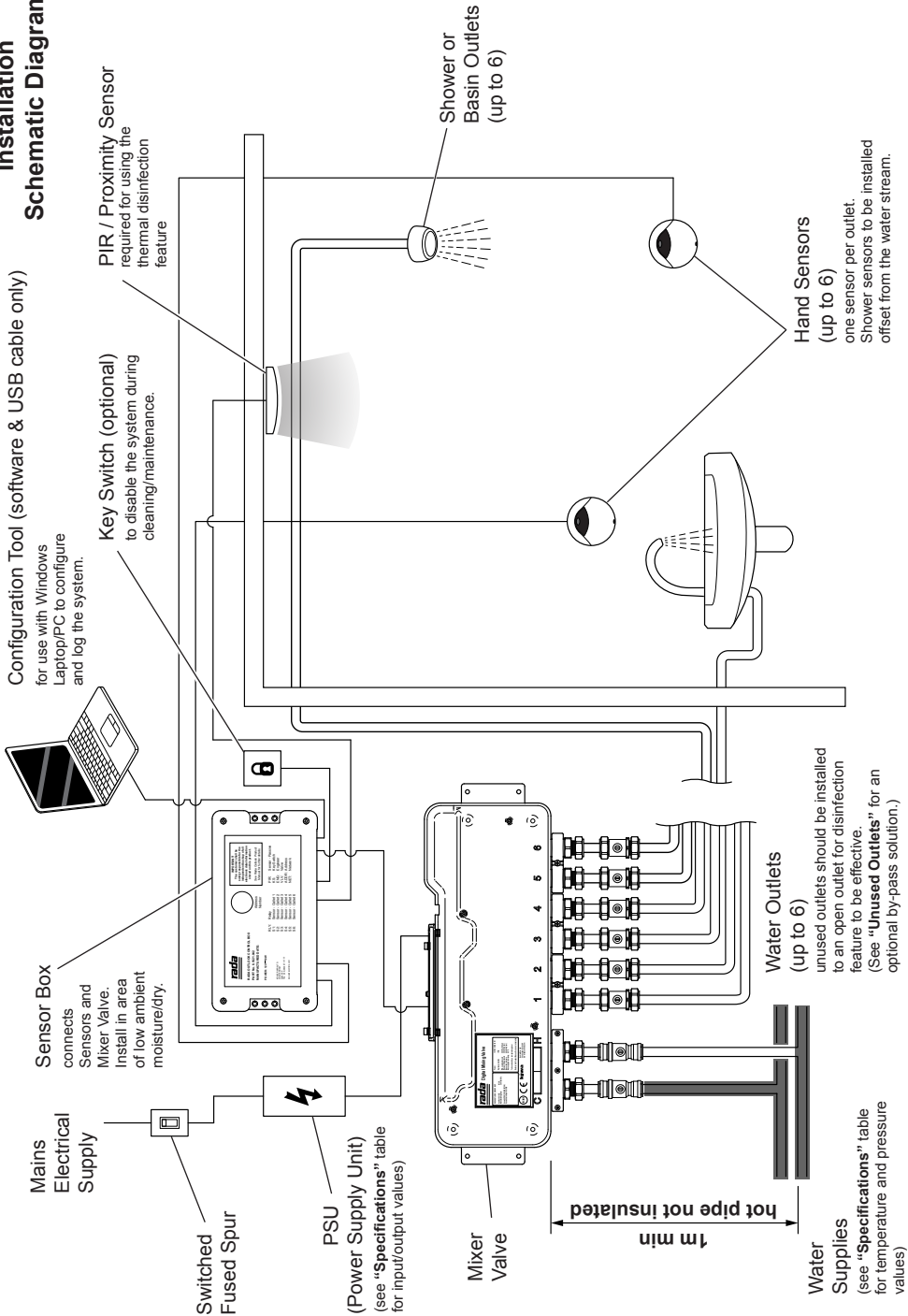
**Legionella Control**

Every precaution is taken to ensure this product leaves our manufacture and test facility free from microbiological contamination. However the presence of such microorganisms is universal and their control is dependent highly on the quality of on-site water management. The functions of "duty flush" and "thermal disinfection" present in Rada Outlook are there to assist in controlling Legionella, but facility owners/managers are responsible for regular cleaning, disinfection and maintenance as required to remain within any applicable control limits. The "duty flush" and "thermal disinfection" functions of Rada Outlook may not be enough to control Legionella in any specific location. Kohler Mira Limited only use WRAS approved materials in this product and Kohler Mira Limited take no responsibility for post installation contamination. After installation, suitable additional disinfection/sterilisation must be performed before use.

**Installation Requirements**

1.  Inlet isolating valves (full flow type) **must** be installed close to the Mixer Valve for ease of maintenance. It is recommended that outlet isolating valves (full flow type) are also installed.
2.  The use of supply-line or zone strainers will reduce the need to remove debris at the Mixer Valve. The recommended maximum mesh aperture dimension for such strainers is 0.5 mm.
3.  Inlet pressure tappings which allow measurement of the inlet pressures to

# Installation
## Schematic Diagram

**PIR / Proximity Sensor**
required for using the thermal disinfection feature

**Shower or Basin Outlets**
(up to 6)

**Hand Sensors**
(up to 6)
one sensor per outlet.
Shower sensors to be installed offset from the water stream.

**Configuration Tool** (software & USB cable only)
for use with Windows Laptop/PC to configure and log the system.

**Key Switch** (optional)
to disable the system during cleaning/maintenance.

**Sensor Box**
connects Sensors and Mixer Valve.
Install in area of low ambient moisture/dry.

**Mains Electrical Supply**

**Switched Fused Spur**

**PSU**
(Power Supply Unit)
(see **"Specifications"** table for input/output values)

**Mixer Valve**

**Water Outlets**
(up to 6)
unused outlets should be installed to an open outlet for disinfection feature to be effective.
(See **"Unused Outlets"** for an optional by-pass solution.)

**Water Supplies**
(see **"Specifications"** table for temperature and pressure values)

hot pipe not insulated

1m min

9

1143306-W2-I

the Mixer Valve under operating conditions are particularly recommended for in-service testing.

4. Pipework **must** be rigidly supported and avoid any strain on the connections.

5. Pipework dead-legs should be kept to a minimum. Long pipe runs will increase the delay for a comfortable bathing temperature to reach the outlet.

6. Make sure the pipe layout will avoid the build up of trapped air in the system. Air release valves can be used where this is not possible.

7. Supply pipework layout should be arranged to minimise the effect of other outlet usage upon the dynamic pressures at the Mixer Valve inlets.

8. Inlet and outlet threaded joint connections should be made with PTFE tape or liquid sealant. Do not use oil-based, non-setting joint compounds.
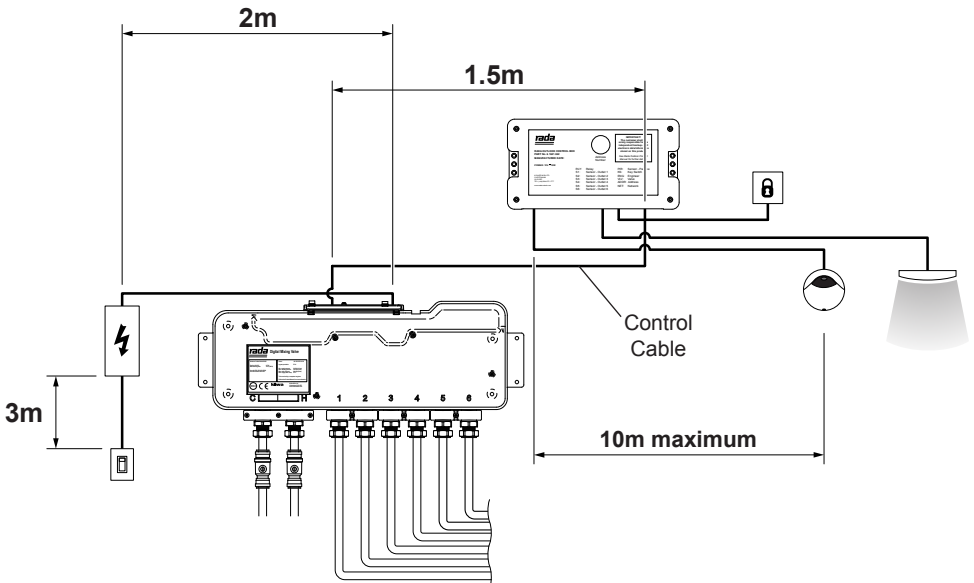


All dimensions are
Maximum wire lengths

**Wire Length Schematic Diagram**

9. To eliminate pipe debris it is essential that supply pipes are thoroughly flushed through before connection to the Mixer Valve and to the spout.

**10.** The DMV **MUST** be installed in the orientations shown and mounted on a rigid vertical surface or on top of a rigid horizontal surface.
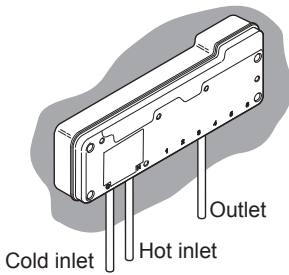


Outlet
Cold inlet  Hot inlet
**Mounting on a Vertical Surface**

Outlet
Hot inlet
Cold inlet
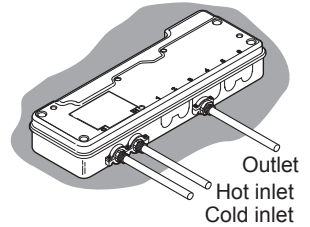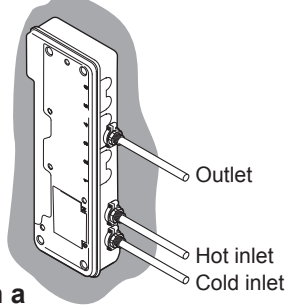
Outlet
Hot inlet
Cold inlet
**Mounting on a Horizontal Surface**

**Note!** If the DMV is installed in a different orientation to those shown above, it may cause the DMV to malfunction e.g. cause airlocks, water ingress and could effect the thermal performance of the DMV.

The DMV **MUST NOT** be installed in the orientations shown below.



Hot inlet  Cold inlet
Outlet

Cold inlet
Hot inlet
Outlet
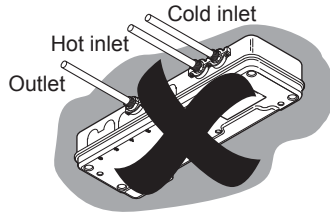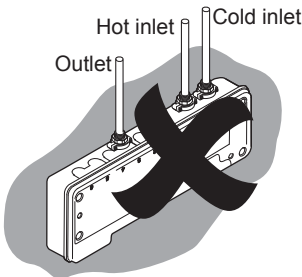
**11.** For the installation of your spout, refer to the **Sense Spout Kits Installation Manual**.

**12.** The Sensor Box is supplied with alternative fixing clips for attaching to DIN rail (top hat rail).

**13.** To install the showerheads and basin spouts refer to the relevant installation manual supplied with that product.

**14.** An optional Keyswitch or other similar device (not supplied) is required to disable the sensors temporarily for cleaning and maintenance. (The Rada Keyswitch is available as an accessory suitable for this purpose, see **"Accessories"**. Any alternative Keyswitch should be fit for use and secured against tampering.)

1143306-W2-I

## 15. THERMAL DISINFECTION

The Thermal Disinfection feature is used to flush hot water at maximum temperature through any outlet in the washing area that is connected to the digital mixer valve (see **'Installation Schematic'**).

## Thermal disinfection flushes hot water at scalding temperatures through the outlets and is therefore a hazardous process!

**Regardless of whether disinfection is triggered manually or automatically, adequate safety precautions, supported by a full risk assessment, must be taken to prevent the use of the affected outlets during the thermal disinfection cycle!**
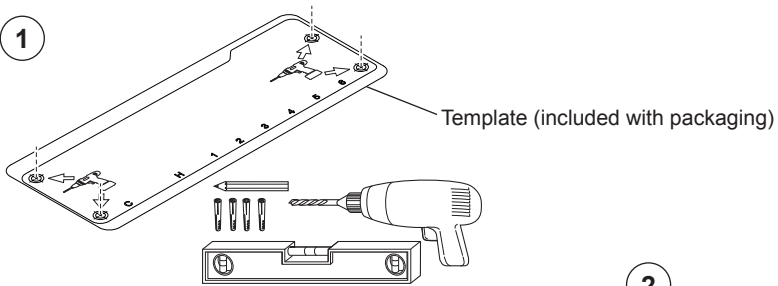
**To the extent permitted by law, Kohler Mira Limited accepts no liability for death or personal injury or damage to property, or any financial losses directly or indirectly incurred, resulting from misuse, lack of maintenance, or inadequate safety precautions or failure to follow the instructions in this product manual, while using or handling the thermal disinfection feature.**
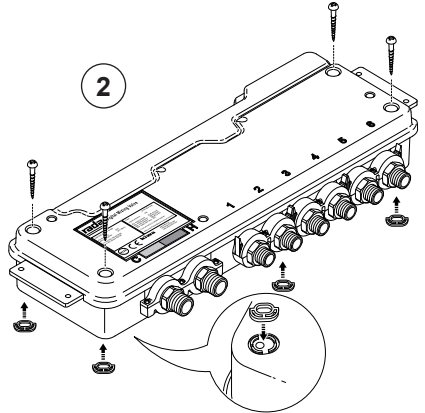
### PIR / Proximity Sensor

At least one PIR / Proximity Sensor is required to use the Thermal Disinfection feature All PIR / Proximity Sensors should be fit for use according to the expected humidity levels during the Thermal Disinfection cycle. This will depend upon the size of washroom, the PIR / Proximity Sensor position and the number of outlets used. The PIR / Proximity Sensor must be checked to ensure that the appropriate area is covered adequately and that the disinfection process can be aborted successfully.
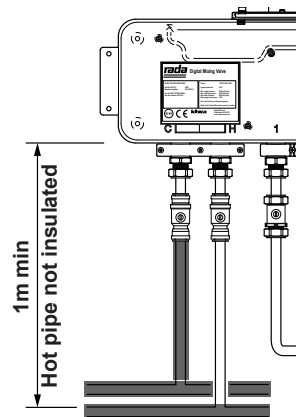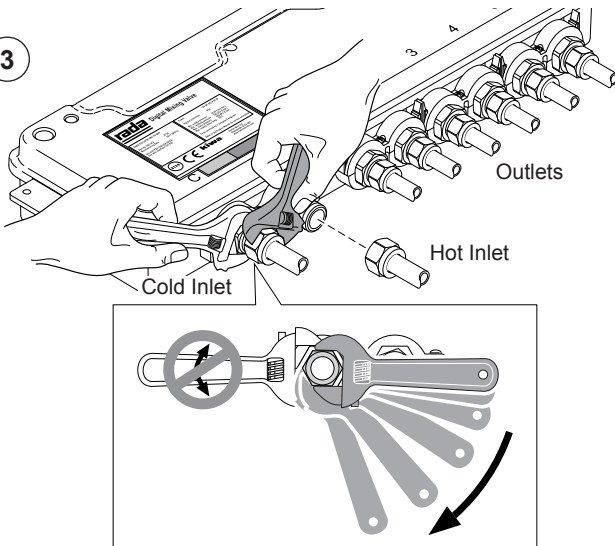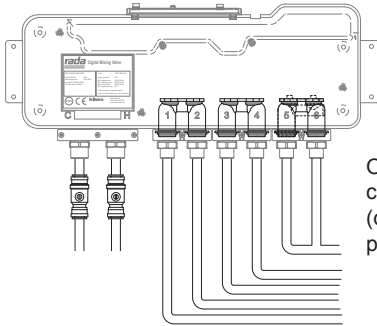
# RADA OUTLOOK MIXER VALVE

**1**

Template (included with packaging)

**2**

**3**

Outlets

Hot Inlet

Cold Inlet

1m min
Hot pipe not insulated

**13**

**Unused Outlets**



Outlet 6 (unused) connected to Outlet 5 (open outlet) using plumbing layout.

It is recommended that any unused outlets are installed to an open outlet. This can be achieved with standard pipework connections in the plumbing layout or by installing Outlet By-Pass Adapters into the Mixer Valve.

Outlet Combinations using By-Pass Adapters



5 Outlets
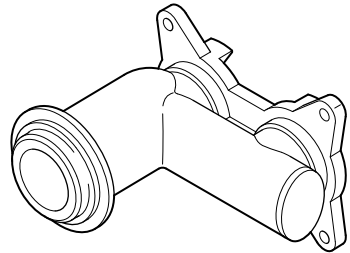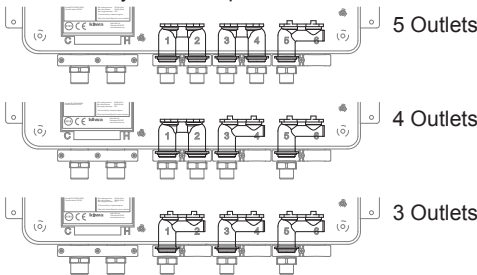
4 Outlets

3 Outlets



**Outlet By-Pass Adapter
(See "Accessories")**

**Warning!** If unused outlets are not by-passed, an area of "still" water may form and could lead to bacterial contamination of the water outlets, even after disinfection.

# POWER SUPPLY UNIT (PSU)

**Warning!** Isolate mains power supply before starting installation. The PSU **must** be connected to a 3 amp switched fused spur box.



3 m cable

Wall Plugs (x4)

Fixing screws (x4)

0.5 m cable

1.5 m cable
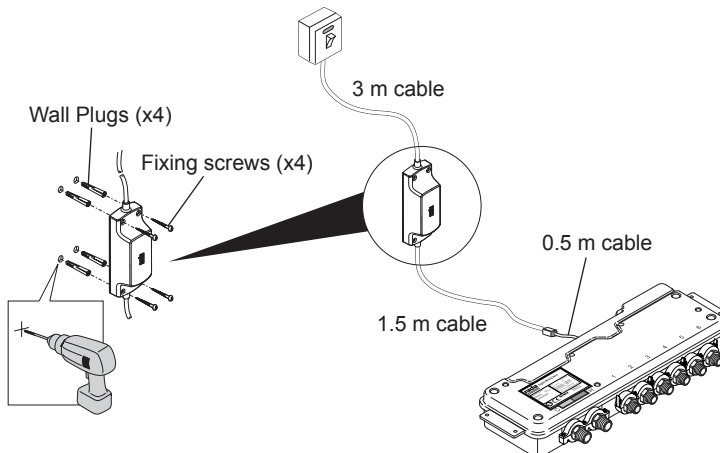
# RADA OUTLOOK SENSORS

**RADA OUTLOOK HAND SENSORS ARE SUPPLIED IN SEPARATE KITS.**

**General Notes on Installation Requirements**

Sensors should be fitted outside of any direct water path, allowing access for adjustment and maintenance.

The sensors should be positioned a minimum of **0.5 m** away from any heat source to prevent false operation.

**Make sure that the area is adequately ventilated. Steam or condensation may affect the sensitivity and operating life of the sensors.**

Make sure the Sensors' "view" is always unobstructed for the user.

Do not install any Sensor opposite a mirror or highly reflective surface.

Low voltage systems cables **must** be installed within conduit or trunking to provide sufficient physical protection and to allow removal or maintenance of system components.

**Note!** Infra Red Sensors are available in 6m and 10m length options.

**Note!** If a Sensor cable requires lengthening, use the 3M™ cable connectors supplied only. The connectors must be positioned within a dry area to prevent water ingress affecting the operation of the sensors. For further information see **"Rada Outlook Sensors - Creating a Sensor Extension Cable"**.

<div align="center">

**Isolate the power supply to the Sensor Box
BEFORE connecting the sensor wires.**

</div>

Whilst installation of sensors directly below shower heads/outlet is permitted, it is the installer's responsibility to ensure that any water left dripping from the outlets does not inadvertently cause the infrared sensors to accidentally trigger the mixing valve. Build up of limescale/residue within the shower head/outlet may cause water to drip and should therefore be regularly cleaned.

Dripping shower heads may cause sensors to trigger automatically, avoid installing the sensor directly in line with the shower head.

Shower Head

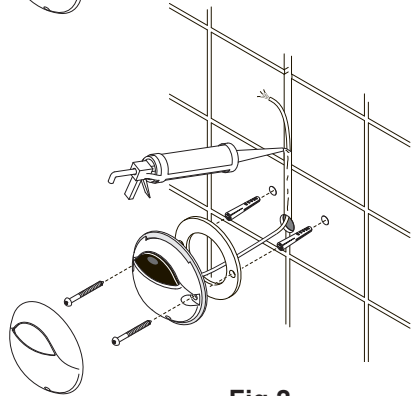Hand Sensor

Minimum 150mm

1143306-W2-I
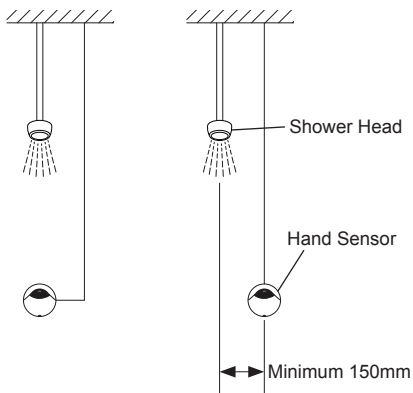
## Hand Operated IR Sensor

1. Cut a hole and channel in the wall to run the cable from the Sensor to the Sensor Box. Ideally the Sensor should sit within a single tile to ensure a good seal. Make sure the channel is positioned correctly and large enough to prevent the cable having a sharp bend. Concealment of the cable in miniature trunking is recommended (**Fig 1**). If the Sensor is to be fitted to an existing pretiled area with no duct space in which to run cables, a groove can be cut between tiles using a disc cutter. Set the cable in the groove and cover with silicone sealant (**Fig 2**). For maintenance purposes within pretiled areas, it is recommended to bury some cable slack in a hole behind the sensor (**Fig 3**). If the cable requires lengthening, three "3M™" watertight connectors are supplied to create an extension cable (**see Creating a Sensor Extension Cable**). **Caution!** Do not drill into buried pipes or cables.
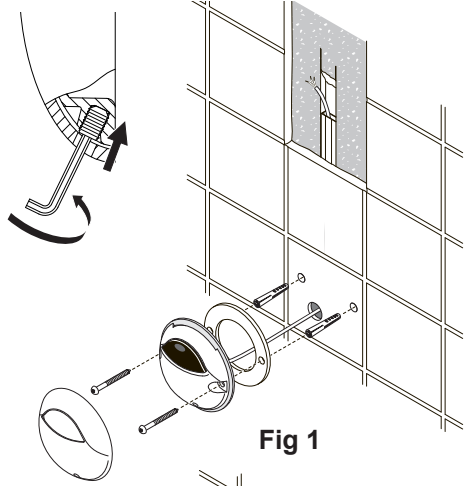
2. Screw in the cover screw to release and remove the Sensor cover.

3. Mark, drill and plug for the two fixing screws (supplied). Alternative fixings (not supplied) may be required for different wall structures. If the Sensor overlaps a groove between two or more tiles, fill any gaps with silicone sealant.

4. Secure the Sensor to the wall with two fixing screws.

5. Connect the Sensor cable to the Sensor Box. For systems with multiple sensors, make a list of their locations and corresponding connection numbers to the Sensor Box. This will aid set up of the control system.

6. Refit the Sensor cover, making sure that it locates correctly over the top of the Sensor. Unscrew the cover screw to secure the Sensor cover.

**Fig 1**

**Fig 2**

Ø15mm x 20mm deep

40mm
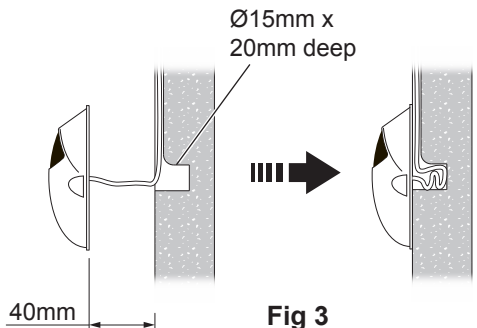
**Fig 3**

## Hand Operated Piezo Sensor

1. Cut a hole and channel in the wall to run the cable from the Sensor to the Sensor Box. Ideally the sensor should sit within a single tile to ensure a good seal. Make sure the channel is positioned correctly and large enough to prevent the cable having a sharp bend. Concealment of the cable in miniature trunking is recommended (**Fig 4**). If the sensor is to be fitted to an existing pretiled area with no duct space in which to run cables, a groove can be cut between tiles using a disc cutter. Set the cable in the groove and cover with silicone sealant (**Fig 5**). For maintenance purposes within pretiled areas, it is recommended to bury some cable slack in a hole behind the sensor (**Fig 6**). If the cable requires lengthening, three "3M™" watertight connectors are supplied to create an extension cable (**see Creating a Sensor Extension Cable**). **Caution!** Do not drill into buried pipes or cables.

2. Mark, drill and plug for the two fixing screws (supplied). Alternative fixings (not supplied) may be required for different wall structures. If the Sensor overlaps a groove between two or more tiles, fill any gaps with silicone sealant.

3. Secure the Sensor to the wall with two fixing screws.

4. Connect the Sensor cable to the Sensor Box. For systems with multiple Sensors, make a list of their locations and corresponding connection numbers to the Sensor Box. This will aid set up of the control system.
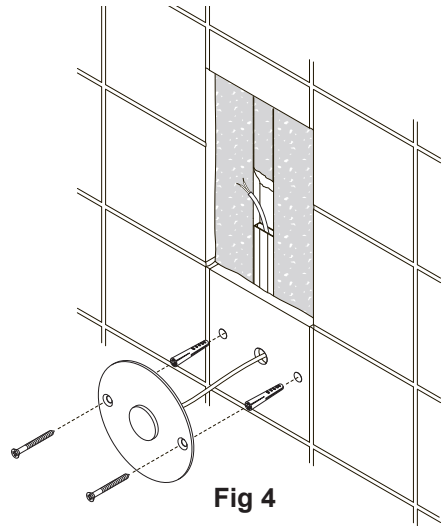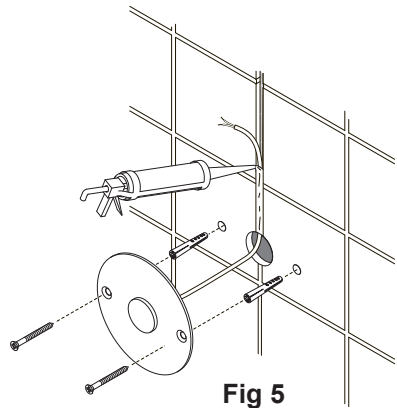


**Fig 4**


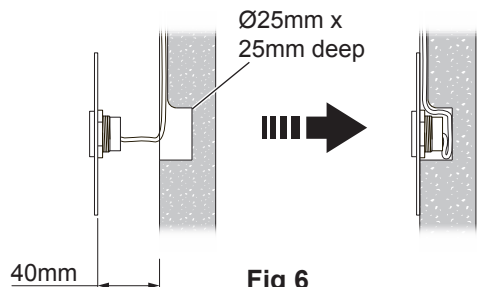
**Fig 5**

Ø25mm x 25mm deep



40mm

**Fig 6**

1143306-W2-I

## Extending a Sensor Cable

This product is compliant with all CE marking directives with sensor cables up to 10 meters in length. Should the cable be extended beyond this length, you must make sure the installation complies with all relevant directives and local regulations.

The Sensor cables can be extended by using the 3M™ connectors supplied. The extension must be to the same specification as the integral sensor cable (LAPP Unitronic LIYY).

**Important!**
- Do not use the 3M™ connectors to **shorten** the cable when replacing a sensor.
- Only use the 3M™ connectors supplied.
- After compressing, sealant is released. The use of any other type of connector may cause operation problems.
- Cable/Sheath ends must not be exposed to wet conditions and must terminate within a sealed enclosure or a fully sealed cable joint.
- Keep signal cables and power cables separate from each other to avoid electrical interference.

**Isolate the power supply to the Sensor Box BEFORE connecting or disconnecting the sensor wires.**

**1.** Insert the wire ends into the 3M™ connectors, make sure that they are fully pushed into the connectors so that the ends are under the jointing blades.

**Note!** Do not strip the wires, the jointing blades will make the connection through the outer sheath.
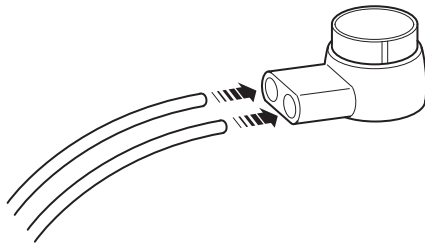


**2.** Using a pair of pliers, compress the connector to complete the connection.
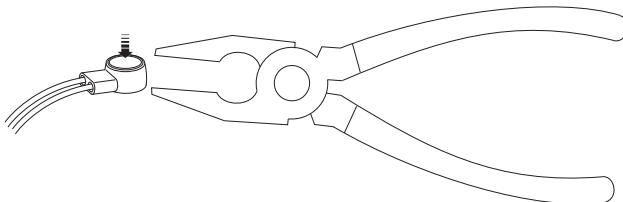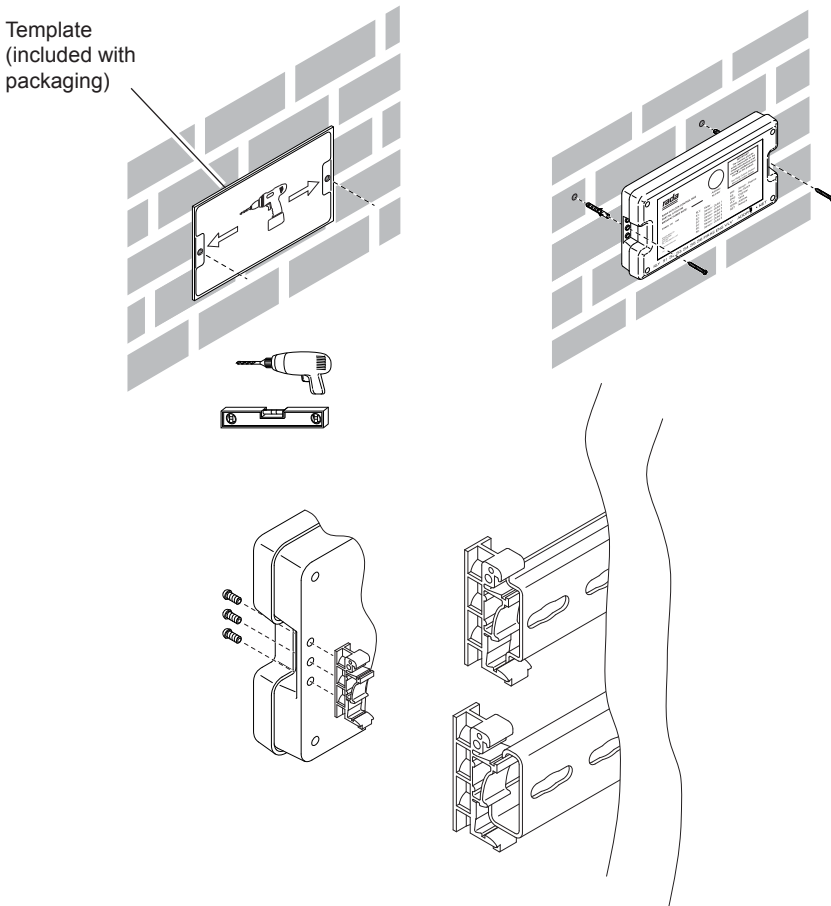
# RADA OUTLOOK SENSOR BOX

1. Fit the Sensor Box in a dry area where it can be connected to all required Sensors and the Mixer Valve. The position should have adequate access for maintenance and, if required, connection to a PC/Laptop Computer.
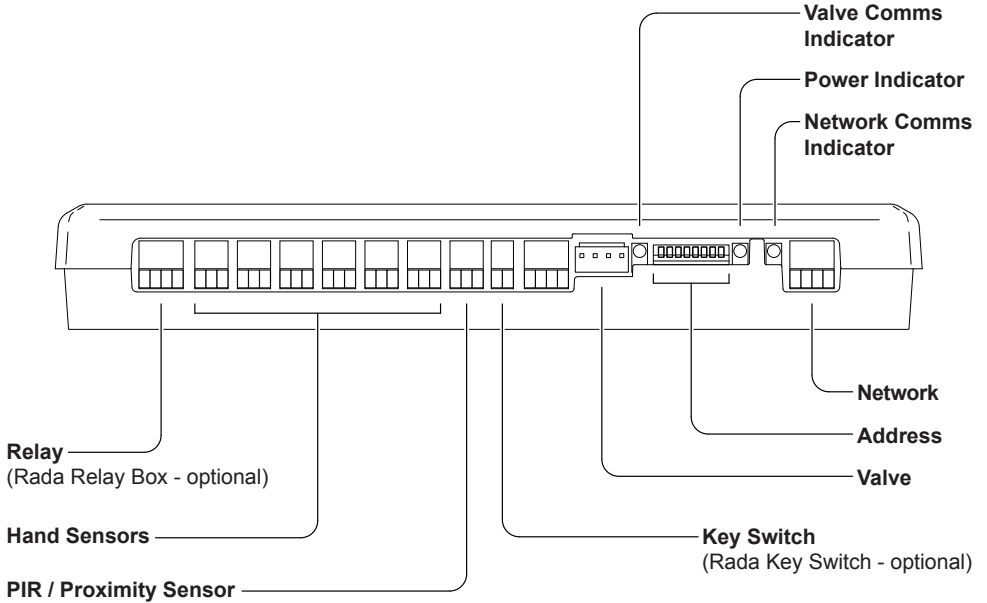
   **Caution! The Sensor Box has no protection against water or moisture and must be installed in a dry area. Installing the Sensor Box in an area where it may be exposed to water condensation or high humidity may result in a system control failure.**

2. The Sensor Box can be fixed directly onto a wall structure with the fixing screws supplied, or alternatively attached to a DIN rail (35mm x 7.5mm top hat or 32mm x 15mm G-type) with the fixing clips, also supplied. Fit the clip to the DIN rail and fix the Sensor Box to the clips with the screws provided.
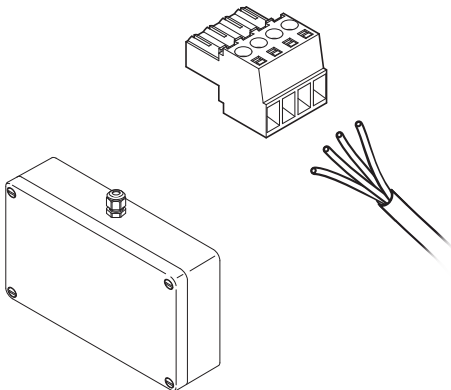
Template
(included with
packaging)

1143306-W2-I

# SENSOR BOX CONNECTIONS

## Connection Ports



**Valve Comms Indicator**

**Power Indicator**

**Network Comms Indicator**

**Network**

**Relay**
(Rada Relay Box - optional)

**Address**

**Valve**

**Hand Sensors**
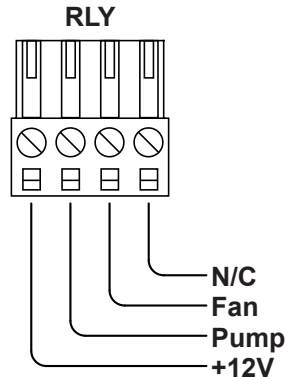
**Key Switch**
(Rada Key Switch - optional)

**PIR / Proximity Sensor**

## Relay

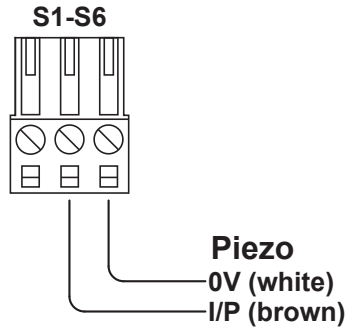Connection port to the Rada Relay Box (optional).
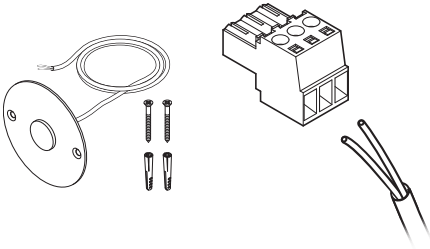


**RLY**

**N/C**
**Fan**
**Pump**
**+12V**

Rada Relay Box - see **"Accessories"**
(cable not supplied)

**Hand Sensors**

Connections are available for up to six hand sensors. **Only connect one sensor to one port.**

**S1-S6**

**IR**
0V   (green)
I/P   (white)
+5V (brown)

**S1-S6**

**Piezo**
0V (white)
I/P (brown)
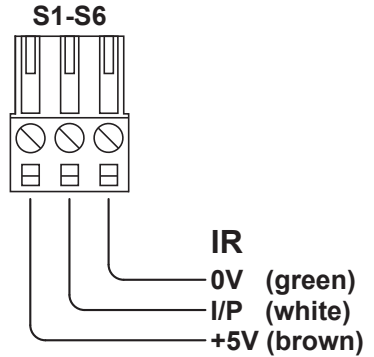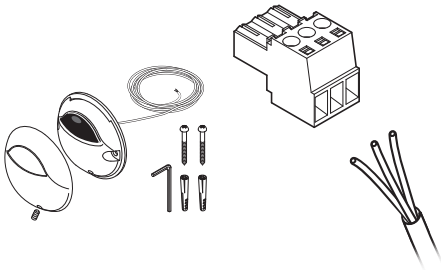
Rada Outlook Sensors - see **"Accessories"**

**PIR / Proximity Sensor**

One Connection port is available for a Passive Infrared Sensor (PIR / Proximity Sensor). For safety, a PIR / Proximity Sensor stops the accidental use of a washing area while a disinfection cycle is being performed.

**PIR / Proximity Sensor**

0V
I/P
+5V

1143306-W2-I
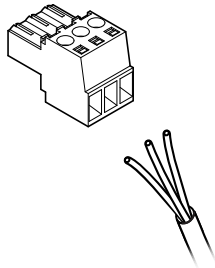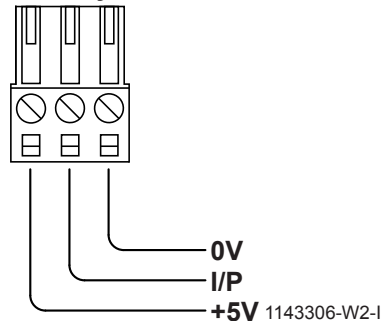
## PIR / Proximity Sensor - Internal Relay Connection
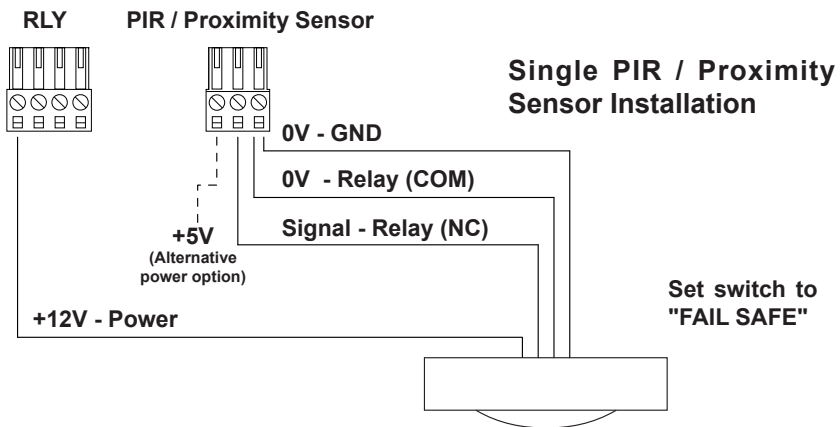
**RLY**     **PIR / Proximity Sensor**

**Single PIR / Proximity Sensor Installation**

0V - GND

0V - Relay (COM)

Signal - Relay (NC)

**+5V**
(Alternative power option)

**Set switch to "FAIL SAFE"**

**+12V - Power**

**An external power supply (not supplied) MUST be used for installations with more than two PIR / Proximity Sensors.**

**PIR / Proximity Sensor - External Power Supply Connection**
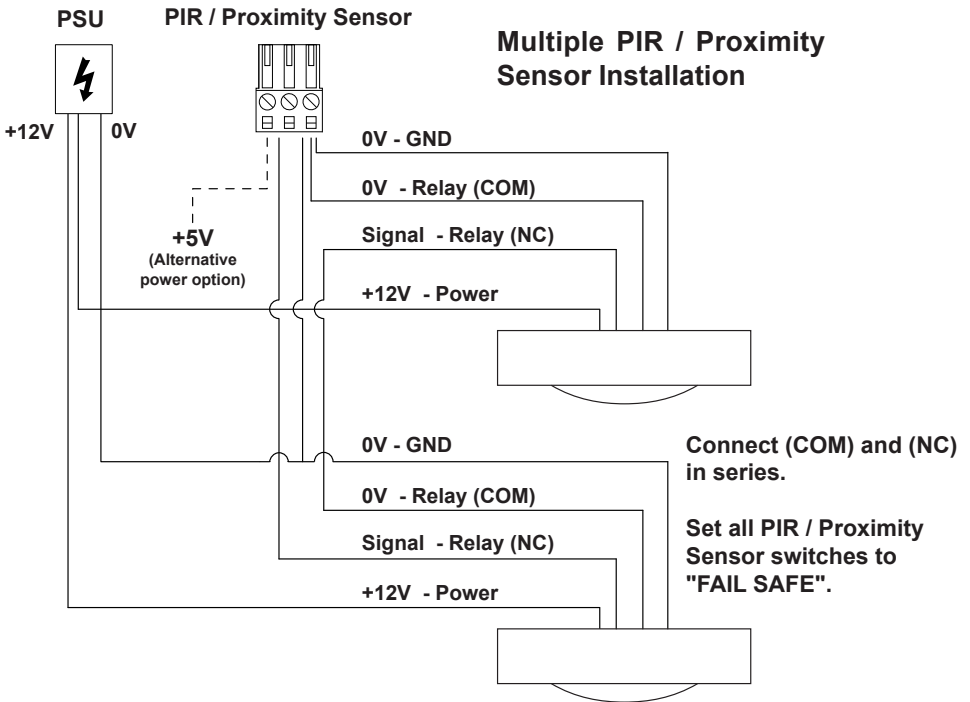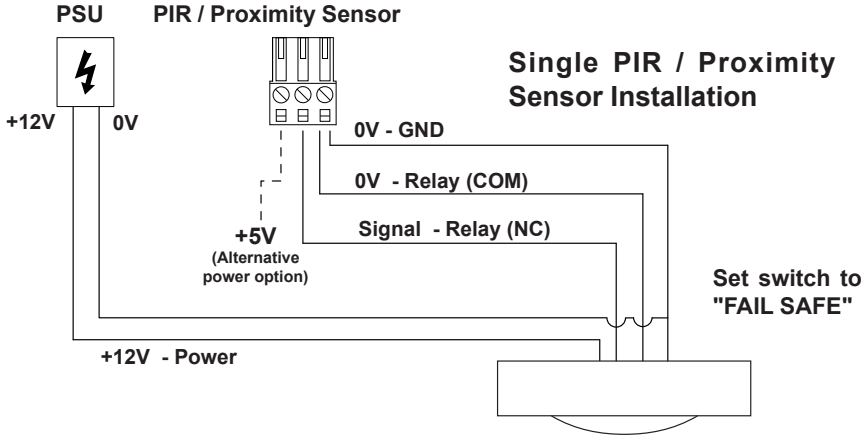
**PSU**  **PIR / Proximity Sensor**

**Single PIR / Proximity Sensor Installation**

**+12V**  **0V**

**0V - GND**

**0V - Relay (COM)**

**Signal - Relay (NC)**

**+5V**
**(Alternative power option)**

**Set switch to "FAIL SAFE"**

**+12V - Power**

**PSU**  **PIR / Proximity Sensor**

**Multiple PIR / Proximity Sensor Installation**

**+12V**  **0V**

**0V - GND**

**0V - Relay (COM)**

**Signal - Relay (NC)**

**+5V**
**(Alternative power option)**

**+12V - Power**

**0V - GND**

**Connect (COM) and (NC) in series.**

**0V - Relay (COM)**

**Signal - Relay (NC)**

**Set all PIR / Proximity Sensor switches to "FAIL SAFE".**

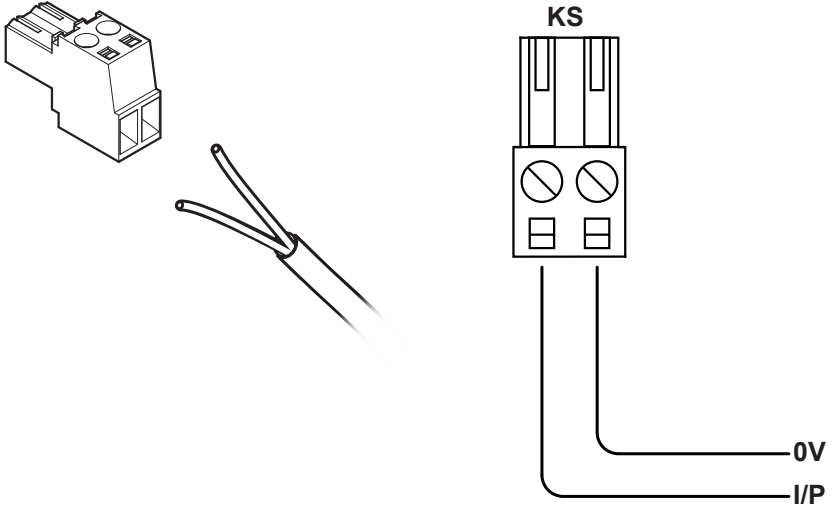**+12V - Power**

**An external power supply (not supplied) MUST be used for installations with more than two PIR / Proximity Sensors.**

**The Disinfection function can only work with at least one Passive Infrared Sensor (PIR / Proximity Sensor) installed and linked to the Sensor Box.**

**23**

### Key Switch

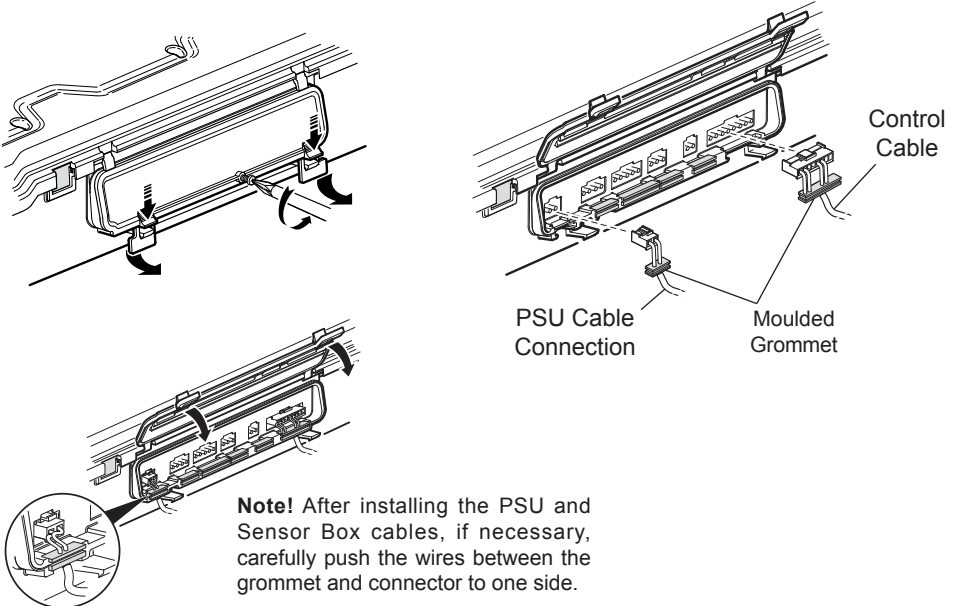Connection to the Rada Key Switch port (optional).

**KS**

0V

I/P

### Valve

Connection port to the Rada Outlook Mixer Valve (Control Cable supplied).

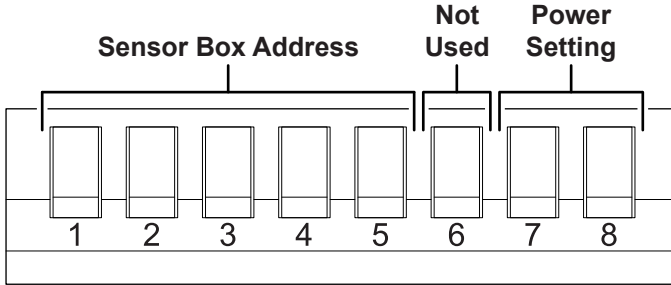Control Cable

PSU Cable Connection

Moulded Grommet

**Note!** After installing the PSU and Sensor Box cables, if necessary, carefully push the wires between the grommet and connector to one side.

Plug Control Cable into Sensor Box Valve (VLV) port.

## Address

The network address of the Sensor Box.

**Sensor Box Address**     **Not Used**     **Power Setting**
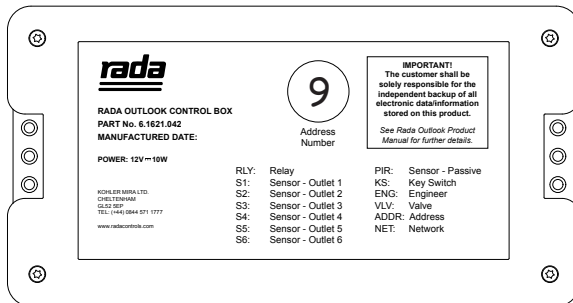
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

The Address switch block has two functions:

1. To identify the individual Sensor Box when connected to other Boxes within a network.

2. To allow the Sensor Box to be powered from either the Mixer Valve or another power supply (e.g. From a desktop PC via the USB data connection.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
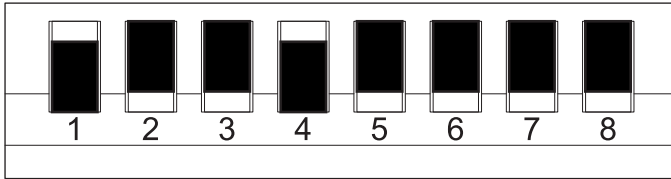
Example: Address '9' on Internal Power



**RADA OUTLOOK CONTROL BOX**
**PART No. 6.1621.042**
**MANUFACTURED DATE:**

**POWER: 12V ⎓ 10W**

KOHLER MIRA LTD.
CHELTENHAM
GL52 5EP
TEL: (+44) 0844 571 1777
www.radacontrols.com

**9**
Address Number

**IMPORTANT!**
**The customer shall be solely responsible for the independent backup of all electronic data/information stored on this product.**

*See Rada Outlook Product Manual for further details.*

| | | | |
|---|---|---|---|
| RLY: | Relay | PIR: | Sensor - Passive |
| S1: | Sensor - Outlet 1 | KS: | Key Switch |
| S2: | Sensor - Outlet 2 | ENG: | Engineer |
| S3: | Sensor - Outlet 3 | VLV: | Valve |
| S4: | Sensor - Outlet 4 | ADDR: | Address |
| S5: | Sensor - Outlet 5 | NET: | Network |
| S6: | Sensor - Outlet 6 | | |

The Address can be written on the Sensor Box in the space provided

The following tables detail how the switch block can be set.

## Sensor Box Address

| Address | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 | UP | DOWN | DOWN | DOWN | DOWN |
| 2 | DOWN | UP | DOWN | DOWN | DOWN |
| 3 | UP | UP | DOWN | DOWN | DOWN |
| 4 | DOWN | DOWN | UP | DOWN | DOWN |
| 5 | UP | DOWN | UP | DOWN | DOWN |
| 6 | DOWN | UP | UP | DOWN | DOWN |
| 7 | UP | UP | UP | DOWN | DOWN |
| 8 | DOWN | DOWN | DOWN | UP | DOWN |
| 9 | UP | DOWN | DOWN | UP | DOWN |
| 10 | DOWN | UP | DOWN | UP | DOWN |
| 11 | UP | UP | DOWN | UP | DOWN |
| 12 | DOWN | DOWN | UP | UP | DOWN |
| 13 | UP | DOWN | UP | UP | DOWN |
| 14 | DOWN | UP | UP | UP | DOWN |
| 15 | UP | UP | UP | UP | DOWN |
| 16 | DOWN | DOWN | DOWN | DOWN | UP |
| 17 | UP | DOWN | DOWN | DOWN | UP |
| 18 | DOWN | UP | DOWN | DOWN | UP |
| 19 | UP | UP | DOWN | DOWN | UP |
| 20 | DOWN | DOWN | UP | DOWN | UP |
| 21 | UP | DOWN | UP | DOWN | UP |
| 22 | DOWN | UP | UP | DOWN | UP |
| 23 | UP | UP | UP | DOWN | UP |
| 24 | DOWN | DOWN | DOWN | UP | UP |
| 25 | UP | DOWN | DOWN | UP | UP |
| 26 | DOWN | UP | DOWN | UP | UP |
| 27 | UP | UP | DOWN | UP | UP |
| 28 | DOWN | DOWN | UP | UP | UP |
| 29 | UP | DOWN | UP | UP | UP |
| 30 | DOWN | UP | UP | UP | UP |
| 31 | UP | UP | UP | UP | UP |
| INVALID | DOWN | DOWN | DOWN | DOWN | DOWN |

## Power Setting

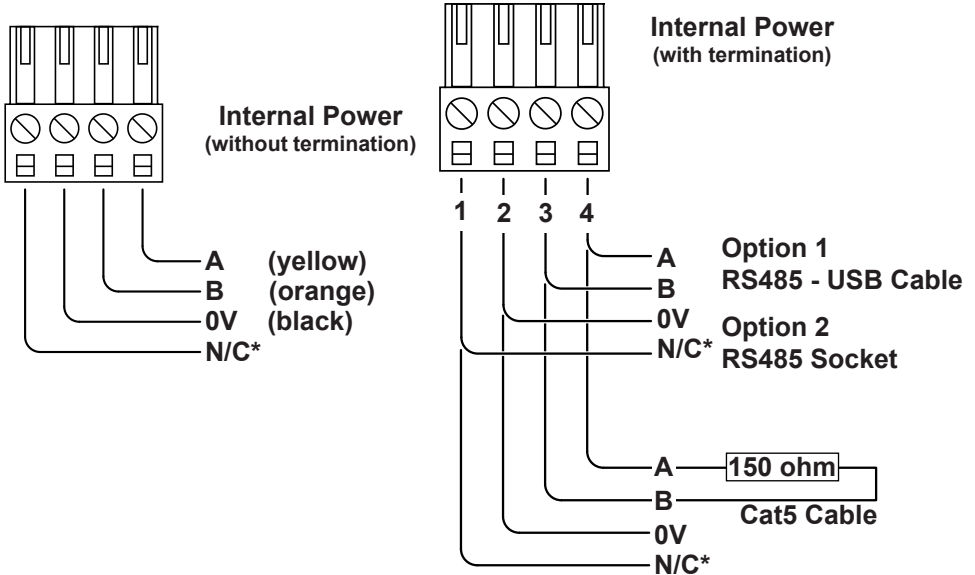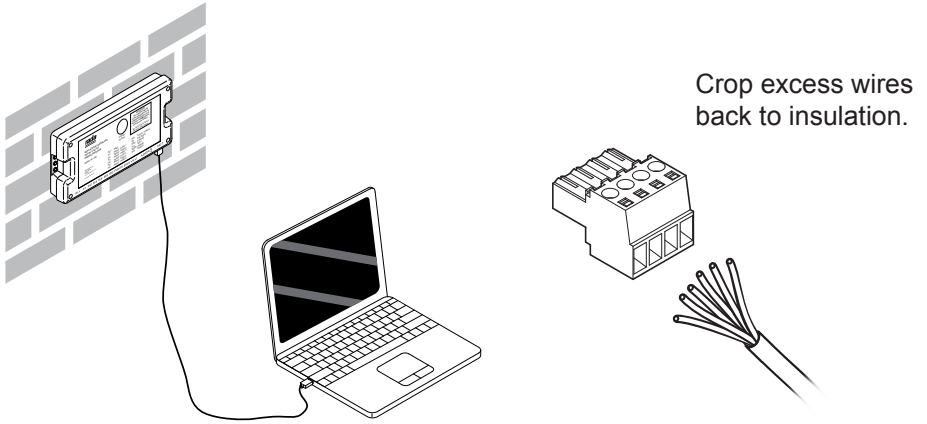| Power | 7 | 8 |
|---|---|---|
| Internal (valve) | DOWN | DOWN |
| External | UP | UP |

**Important!** Cycle the power to the Sensor Box off/on after any change to the Address switches.

## Network

Connection to RS485 - USB Cable. The Rada Outlook RS485 - USB Cable is supplied in a separate kit.



Crop excess wires back to insulation.



**Internal Power**
**(without termination)**

A (yellow)
B (orange)
0V (black)
N/C*

**Internal Power**
**(with termination)**

1  2  3  4

A        **Option 1**
B    **RS485 - USB Cable**
0V    **Option 2**
N/C*    **RS485 Socket**

A    150 ohm
B    **Cat5 Cable**
0V
N/C*

**Creating a Network**

In an installation where more than one Mixer Valve/Sensor Box is required, the Sensor Boxes can be linked together to form a network. The network can then be controlled by connecting to any one of the Sensor Boxes using either an **RS485 - USB Cable** or **RS485 Socket**. A single network has the capacity for controlling a total of 31 Mixer Valves and Sensor Boxes connected simultaneously.

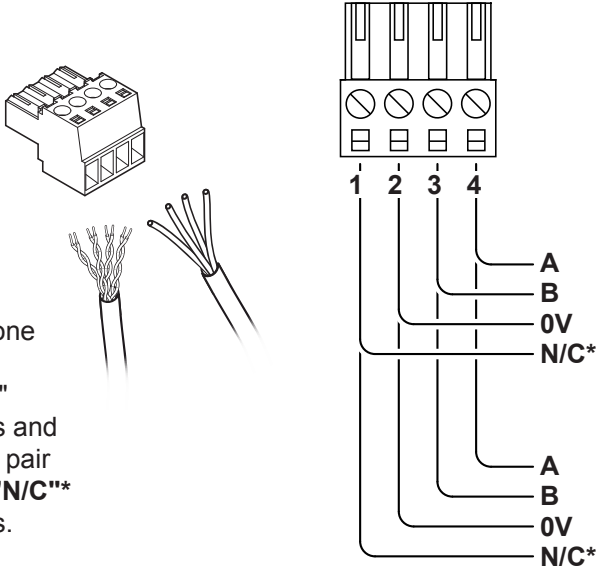The recommended network cable is **Cat5 twisted pair** (not supplied).

To connect the Sensor Boxes to a PC/Laptop device there are two options:

**1.** Connect both the RS485 - USB Cable and Cat5 cable to the Network (NET) port of one Sensor Box. Recommended for permanent connection.

**2.** Connect both the RS485 Socket and Cat5 cable to the Network (NET) port of one Sensor Box. Recommended for temporary connection.

**Option 1**
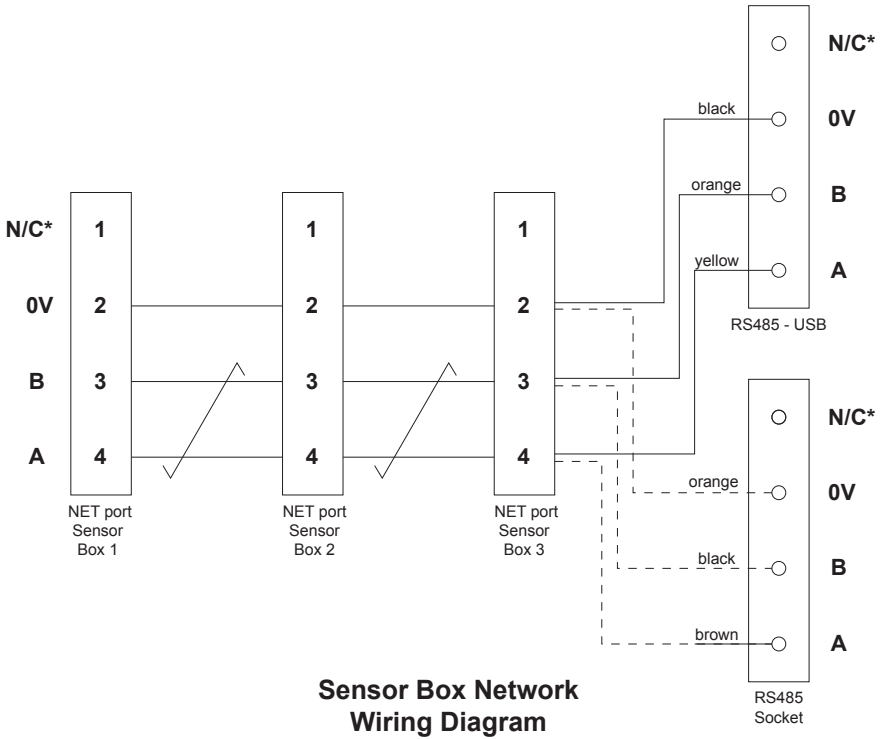**RS485 - USB**
**(supplied separately)**

**Option 2**
**RS485 Socket**
**(see "Accessories")**
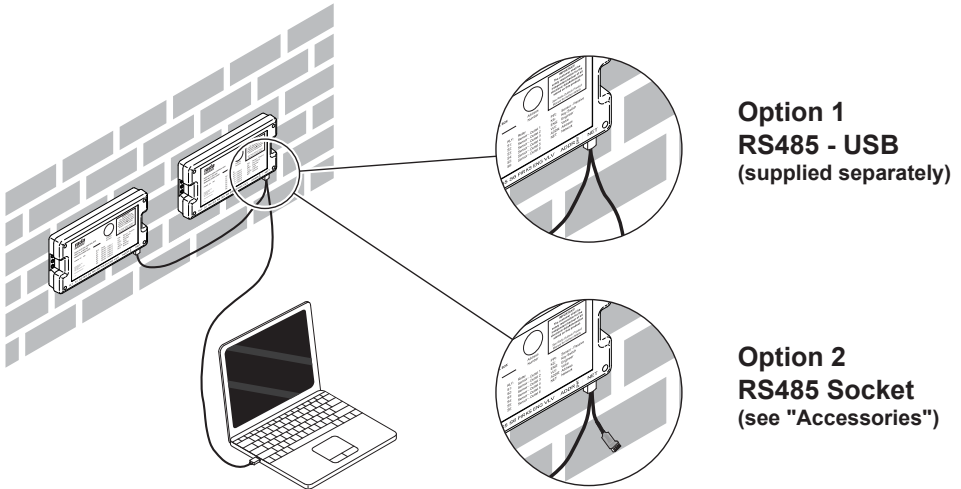
**Cat5 cable**

Designate one twisted pair as "**A**" & "**B**" connections and one twisted pair as **"0V"** & **"N/C"\*** connections.

| 1 | 2 | 3 | 4 |

A    **Option 1**
B    **RS485 - USB Cable**
0V   **Option 2**
N/C\*   **RS485 socket**

A
B   **Cat5 cable**
0V
N/C\*

N/C\*   **1**
0V   **2**
B   **3**
A   **4**

NET port
Sensor
Box 1

**1**
**2**
**3**
**4**

NET port
Sensor
Box 2

**1**
**2**
**3**
**4**

NET port
Sensor
Box 3

N/C\*
black   0V
orange   B
yellow   A

RS485 - USB

N/C\*
orange   0V
black   B
brown   A

RS485
Socket

**Sensor Box Network
Wiring Diagram**

\*N/C = Not Connected

**29**

1143306-W2-I

# COMMISSIONING

Commissioning **must** be carried out in accordance with these instructions, and **must** be conducted by designated, qualified and competent personnel.

1.  Restore the water supply and check that there are no leaks.

2.  Restore the power supply.

3.  Set each of the outlets using the Rada Outlook Configuration Tool. Refer to **"Rada Modbus Universal Configuration Tool"** for full instructions.

4.  After power is restored, the system will take 5-10 seconds to calibrate the Sensors before they can be operated. Activate each of the Sensors to start the Mixer Valve and flush out any air.

    Hand Operated IR Sensor - Wave hand over the black lens to activate.

    Hand Operated Piezo Sensor - Touch metal disc at the centre of the device.

5.  Check the supply temperatures and pressures are within the range stated in **"Specifications"** and the guidance information on the prevention of legionella.

6.  Check inlet pipework temperatures for correct function of checkvalves i.e. the hot water does not cross flow into the cold water supply.

7.  Check that the potential temperatures and flow rates of the system are acceptable.

8.  Carry out a performance check.

# OPERATION

The IR sensors are designed to operate at a distance of up to 30 mm. There is no need for the user to touch the IR sensor. The Piezo Sensor will activate when the metal disc in the centre is touched once.

Activate the Sensor(s) to start the water flow.

The water will flow until either it is switched off manually or the programmed flow time duration has elapsed.

The Rada Modbus Universal Configuration Tool (supplied separately) allows you to alter factory presets such as flow duration. It is designed to run on a suitable PC/ Laptop device with Microsoft Windows XP, Vista or Windows 7 and Windows 10 operating systems. (Refer to the **"Rada Modbus Universal Configuration Tool Product Manual"**.)

# CLEANING

The Rada Outlook Sensors may be disabled temporarily for cleaning and maintenance purposes. This is possible with the use of a Keyswitch or other similar device (not supplied) connected to the Sensor Box.

Chrome Plated or plastic fittings should only be cleaned using a mild washing up detergent or soap solution and wiped dry with a soft cloth.

**Caution!** The use of pressure washers or other high pressure or high water volume cleaners are not permitted and may cause the sensors to fail.

# FAULT DIAGNOSIS

Maintenance **must** be conducted by designated, qualified and competent personnel.

**Warning!** Isolate power supply and water supply when any maintenance work is carried out on the Mixer Valve.

The Mixer Valve may contain hot water, so care **must** be taken when draining off residual water.

**Note!** The following table is not an extensive list of faults, if you find a fault that is not listed below, please contact us for assistance.

Most faults can be rectified by checking the following:

**Make sure the water supply has not been interrupted. All isolating valves should be fully open.**

**Fault Diagnosis Table**

As with most electronic equipment resetting the mixing valve by powering it down, waiting a few seconds then powering it up again can often cure any issues.

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **1.** Sensor Box Power light not illuminated and No flow from any outlet | **A.** No Power to the Sensor Box or digital mixer | **A.** Check connection between Mixer Valve and Sensor Box. Check system power is present. |
| | **B.** PSU Failure | **B.** Replace the PSU. |
| | **C.** Sensor Box Failure | **C.** Replace the Sensor Box. |

1143306-W2-I

| Symptom | Probable Cause | Remedy |
|---------|----------------|--------|
| **2.** No water flows from any outlet | **A.** Water supply interruption | **A.** Check all water supply isolators are turned fully on. Check for trapped air in the pipework. |
| | **B.** Blockage in the outlet fitting | **B.** Check the shower spray plate/hand wash spout for internal blockages. |
| | **C.** Blockage in the Mixer Valve Inlets | **C.** Check the Mixer Valve inlets for blockages. Clean inlet filters. |
| | **D.** The Mixer Valve memory may require resetting | **D.** Power cycle the PSU. |
| | **E.** Outlet Configured as "Not Used" in the Configuration tool | **E.** Check the outlet status with the Rada Outlook Configuration tool. |
| | **F.** Outlet on/off Sensor | **F.** See Symptom 9. |
| | **G.** Digital Mixer valve box or Sensor Box failure | **G.** Contact Rada Customer Services. |
| **3.** Water flows from one outlet, but not from another | **A.** Blockage in the outlet fitting | **A.** Check the shower spray plate/hand wash spout for internal blockages. Check for trapped air in the pipework. |
| | **B.** Outlet Configured as "Not Used" in the Configuration tool | **B.** Check the outlet status with the Rada Outlook Configuration tool. |
| | **C.** Outlet on/off sensor | **C.** See symptom 9. |
| | **D.** Digital Mixer valve box or Sensor Box failure | **D.** Contact Kohler Mira Ltd. |

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **4.** Only cold water flows from any outlet | **A.** Hot water supply is either not turned on, or not connected to the Mixer Valve | **A.** Check hot water supply to the Mixer Valve. Check the system hot water supply is adequate for the demand. |
| | **B.** Hot water inlet is blocked | **B.** Check for blockages to the hot water inlet. Clean inlet filters. |
| | **C.** Outlet Configured as "Full Cold" in the Configuration tool | **C.** Check the outlet status with the Rada Outlook Configuration tool. |
| | **D.** Digital Mixer valve box or Sensor Box failure | **D.** Contact Rada Customer Services. |
| **5.** Reduced water flow rate | **A.** Blockage in the outlet fitting | **A.** Check the shower spray plate/hand wash spout for internal blockages. |
| | **B.** Blockage in the Mixer Valve Inlets | **B.** Check the Mixer Valve inlets for blockages. Clean inlet filters. |
| | **C.** Inlet Water pressures too low | **C.** Check maintained water pressure is within recommended range, refer to **"Specifications"**. |
| | **D.** Water outlet pressure is too low | **D.** Check that the flow rate at the outlet is at least the minimum value required. See **"Specifications"**. |
| | **E.** Digital Mixer valve box or Sensor Box failure | **E.** Contact Rada Customer Services. |

1143306-W2-I

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **6.** Fluctuating outlet temperature | **A.** Inlet water supply pressures are unstable or imbalanced | **A.** Ensure the water supply pressures are stable and nominally equal, refer to **"Specifications"**. |
| | **B.** Fluctuating inlet water temperatures | **B.** Check the inlet temperature differentials and verify they are sufficient. See "Specifications". Check system plumbing for the following:<br>1. Heat transfer between hot and cold pipes.<br>2. Pipes exposed to a high or low ambient temperature.<br>3. Long pipe "dead leg" between Mixer Valve and outlet fitting.<br>4. Water draw off from another appliance.<br>5. Water heating appliance is providing insufficient hot water. |
| | **C.** Digital Mixer valve box or Sensor Box failure | **C.** Contact Rada Customer Services. |
| **7.** Water leaking from the Mixer Valve<br>**WARNING!**:<br>Risk of personal injury or product damage. Immediately isolate mains power and water supplies. | **A.** Water inlet/outlet connections to Mixer Valve are not secure<br><br>**B.** Internal water leak | **A.** Check all water connections to and from Mixer Valve.<br><br>**B.** Contact Rada Customer Services. |

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **8.** Hot water only, valve shuts down shortly after | **A.** Hot inlet water supply temperature is too high | **A.** Reduce hot inlet water temperature to between 55°C and 65°C, refer to **"Specifications"**. |
| | **B.** Cold inlet water supply pressure too low or fluctuating | **B.** Ensure the water supply pressures are stable and nominally equal, refer to **"Specifications"**. |
| | **C.** Cold inlet water supply failure | **C.** Check and remedy. |
| | **D.** Inlet filters or check valves blocked | **D.** Check and remedy, refer to **"Maintenance"**. |
| | **E.** Digital Mixing valve air locking | **E.** Check for correct installation practices, repeat commissioning procedure and rearrange pipework to avoid airlock forming. |
| | **F.** Reversed inlet supplies | **F.** Check and remedy. |
| | **G.** Digital Mixer valve box or Sensor Box failure | **G.** Contact Rada Customer Services. |

1143306-W2-I

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **9.** Sensor not working | **A.** Faulty connection | **A.** Check sensor wiring. Refer to the wiring diagram in the installation guide. Check wires are making good contact with the Sensor Box. If wires have been extended, check connectors between sensor and Sensor Box. |
| | **B.** Incorrect sensor match between outlet position and sensor box connection | **B.** Check inlets and out positions are correct. |
| | **C.** Faulty Sensor | **C.** Contact Rada Customer Services. |

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **10.** Sensor Box not recognised within Configuration Tool. Cannot configure sensor | **A.** Incorrect Address (ADDR) setting | **A.** Check the following: Address is not duplicated within a network. Power Settings are correct (Internal / External) Refer to configuration information. |
| | **B.** Sensor Box connection | **B.** Check wiring connections. Check wires are making good contact with the Sensor Box(es). Check connections between Mixer Valve and Sensor Box or between Sensor Boxes networked together. |
| | **C.** Incorrect Communication Port selected in configuration tool | **C.** Select correct communication port. |
| | **D.** Faulty cable | **D.** Replace cable. |
| | **E.** Incorrect or no drivers installed. | **E.** Re-install from USB stick. |
| | **F.** Faulty Sensor Box | **F.** Contact Rada Customer Services. |

| Symptom | Probable Cause | Remedy |
|---|---|---|
| **11.** Disinfection cycle fails to start or stops mid way | **A.** Causes relate to PIR / Proximity Sensor | |
| | **B.** No PIR / Proximity sensor fitted | **B.** To enable The disinfection cycle a PIR / Proximity sensor must be fitted to protect from scalding water. |
| | **C.** PIR / Proximity Sensor triggered during cycle | **C.** Prevent access to PIR / Proximity sensor trigger area. |
| | **D.** Connection between PIR / Proximity sensor and Sensor Box | **D.** Check connection. |
| | **E.** PIR / Proximity sensor failure. (Green light is displayed when sensor is idle.) | **E.** Check connections and replace unit if necessary |
| | **F.** PIR / Proximity sensor faulty | **F.** Replace PIR / Proximity sensor. |

**Internal Power**
**(without termination)**

A      (yellow)
B      (orange)
0V    (black)
N/C*

**External Power\*\***
**(without termination)**

A      (yellow)
B      (orange)
0V    (black)
+5V   (red)

**Internal Power**
**(with termination)**

B      (yellow)
B      (brown)
A      (green)
A      (orange)
0V    (black)
N/C*

**External Power**
**(with termination)**

A      (yellow)
A      (brown)
B      (green)
B      (orange)
0V    (black)
+5V   (red)
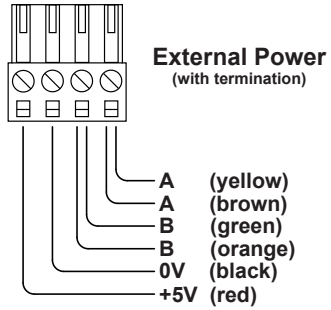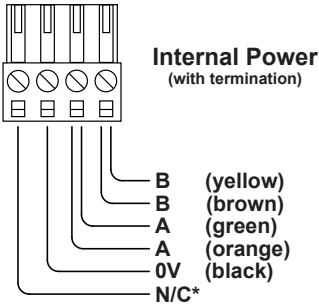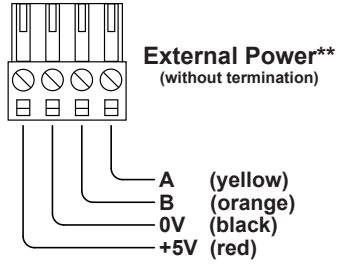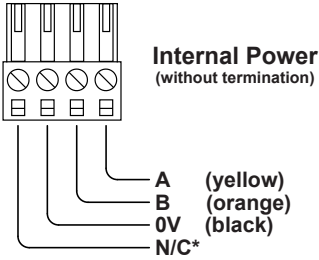
*N/C = Not Connected
** External Power will limit the number of sensor boxes within a network to 10.

# PLANNED MAINTENANCE

Malfunction of the Mixer Valve is almost always progressive in nature and will be detected by the use of proper temperature checking and maintenance routines.

Certain types of installation can result in the Mixer Valve having excessive 'dead-legs' of pipework, or auxiliary cold water supply added to the mixed water from the Mixer Valve. Such systems can disguise the onset of thermostatic mixer valve malfunction and should not be used.

We recommend a preventative maintenance procedure based on site conditions, local legislation and the risk to the user. All results **must** be recorded in a log book.

Irrespective of supply and usage conditions or the evidence of in-service tests, the critical components listed in the table below, should be replaced at intervals of no more than **5 years**.

**Note!** During the replacement of critical components, it may be necessary to replace other non-critical components.

### Critical Components

| Pack Number | Description |
|:---:|:---:|
| 464.40 | Solenoid Manifolds |
| 463.08 | Single Thermistor Pack |

## Checkvalves and Filters

**Warning!** The Mixer Valve may contain hot water, so care **must** be taken when draining the valve of any residual water.

Isolate the supplies to the Mixer Valve and operate all Sensors to release pressure and assist draining.

The Mixer Valve has inlet cartridge assemblies that contain both the checkvalve and filter. These components can be removed for cleaning. Inlet filters can be flushed through under a jet of water to remove any lodged particles.

**Caution!** The checkvalves are not serviceable items, so any apparent wear or damage will require their renewal.

Make sure all components are clean before refitting the 'O' seals. To assist in refitting, lightly wipe the 'O' seals with a **silicone based lubricant only**.

Cartridge

Filter
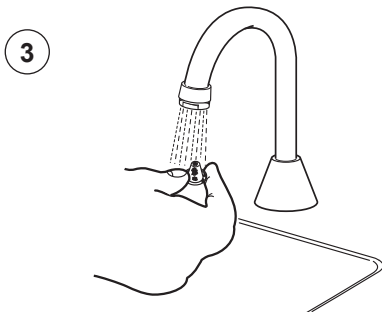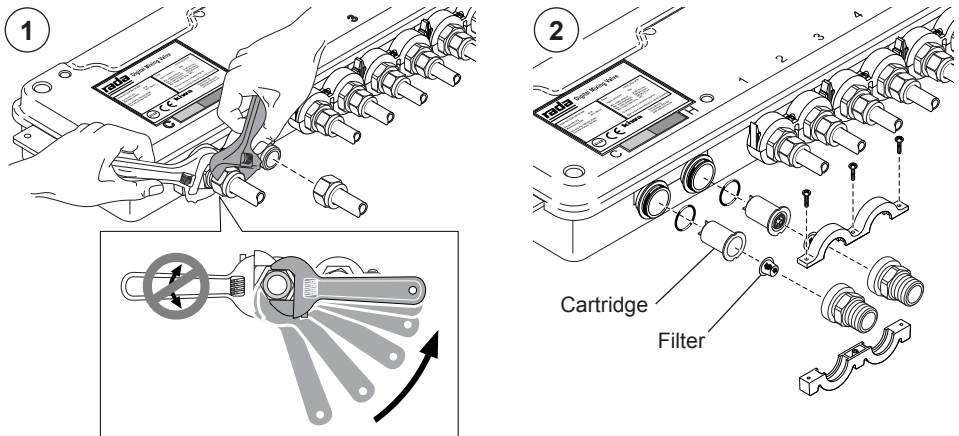
Reassemble and restore the hot and cold water supplies. Check that there are no water leaks.

1143306-W2-I

## Changing the Battery (Sensor Box only)

Disconnect the Sensor Box from the Mixer Valve. Remove the cover screws and cover, and replace the battery with type 3V BR 2032. Refit the cover and reconnect the Mixer Valve. The fitted battery life is approximately 10 years from date of manufacture. It is recommended that the battery is changed every 5 years.
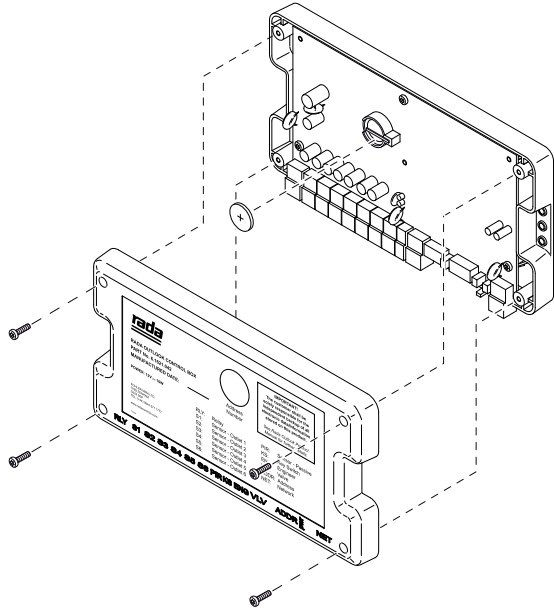


Reset the time and date by pressing **"Set Date"** in the **"Duty Flush Setup"** screen of the Rada Modbus Universal Configuration Tool.

**42**

# SPARE PARTS

Cover

Retainer Screw

Retainer

Clip

O-Seal

Motor
Wiring
Loom

Cover Screw

Cable Cover
Screw

Cable Cover

Single
Thermistor
Loom

Cover
Seal

Mixer
Valve
Control
PCB

Solenoid
Wiring
Loom

Inlet Case Insert

Mixer Valve

Belt

Cartridge O-Seal

Adapter O-Seal

Inlet Screw

Inlet
Clamp
Top

Cartridge

Filter

Motor

Outlet Case
Insert

Clamp Screw

Internal Clamp

Solenoid
Manifold

Solenoid
O-Seal

Adapter ¾"
Flat Face

Inlet Clamp
Bottom

Adapter O-Seal

Cap

IR Sensor
Cover

Adapter ½"
Flat Face

Outlet
Clamp
Top

Outlet
Clamp
Bottom

Power Supply

Grommet

Control Cable

DIN Rail
Clips

Grommet

Grommet

Sensor Box

1143306-W2-I

**463.05**
Screw & Seal Pack

Cover and Clamp Screws

O-Ring

Adapter O-Rings

Belt

Inlet Screws

Check Valve O-Rings

Solenoid O-Rings

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**463.08**
Single Thermistor Pack

Clip

Cover Screws

O-Ring

Thermistor Wiring Loom

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**463.13**
Inlet Clamp and Adapters

Inlet Screws

Inlet Clamp Top

Adapter O-Rings

Adapters ¾" Flat Face

Inlet Clamp Bottom

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**463.28**
Internal Clamps
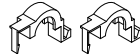
Solenoid O-Ring

Internal Clamps

Clamp Screw

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**463.83**
12V DC 45W Power Supply Unit (PSU)

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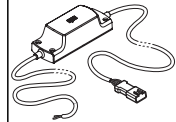
**464.40**
Solenoid Manifold

Cap

Internal Clamps

Solenoid Manifold

Adapter O-Rings

Cover and Clamp Screws

Inlet Screws

Solenoid O-Rings

---

**464.42**
Solenoid Wiring Loom

Cover Screws

Snap Ferrite
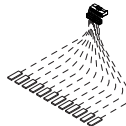
Solenoid Wiring Loom

---

**464.47**
Outlet Clamps

Adapter O-Rings

Outlet Clamp Top

Outlet Clamp Bottom

Outlet Screw

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**464.52**
Outlet Adapters

Outlet Clamp Top

Adapters ½" Flat Face

Outlet Screw

Outlet Clamp Bottom

Adapter O-Rings

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**464.54**
Stepper Motor Loom

Cover Screws
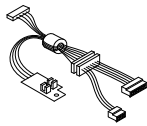
Motor Wiring Loom

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**1621.092**
Control Cable

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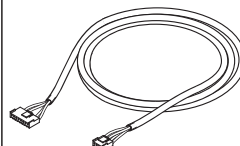
**464.29**
Suppression Ferrite

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**1621.094**
Din Rail Clips
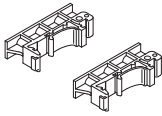
**1621.095**
IR Sensor Chrome Cover

**1621.122**
Sensor Box
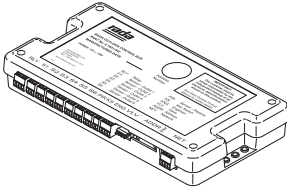
**1621.130**
Mixer Valve Control PCB

Cover Screws
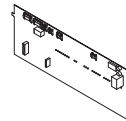
Circuit Board

**1621.179**
Mixer Valve Assembly

Retainer

Retainer Screw

O-Ring

Inlet Clamp Top
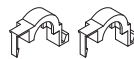
Solenoid O-Ring
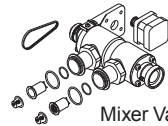
Mixer Valve

Clip

Inlet Screws

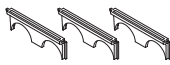Inlet Clamp Bottom

Internal Clamps

Cover and Clamp Screws

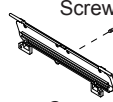**1621.181**
Plates

Inlet Case Insert

Oulet Case Inserts

**1621.182**
Cable Cover

Cable Cover Screw

Cover Screws

Cover Seal

Cover

Grommets

**1621.191**
Check Valves and Filter Cartridges

Filters

Adapter O-Rings

COLD

Inlet Screws

Check Valve O-Rings

HOT

Check Valve Cartridges

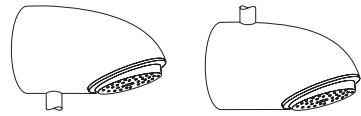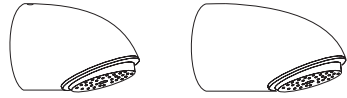**1621.195**
Timing Belt

Belt x 5

# ACCESSORIES

1621.112 Rada Outlook IR
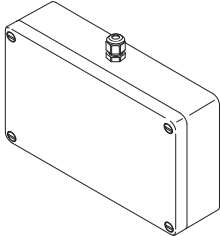Hand Sensor (6m)
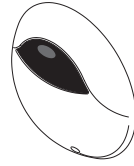
1621.228 Rada Outlook IR
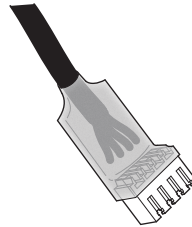Hand Sensor (10m)
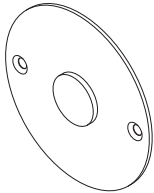
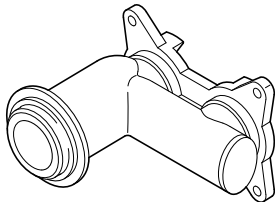1621.085 Rada Outlook
Piezo Hand Sensor

Outlet Fittings:

Rada has a comprehensive
range of spouts and shower
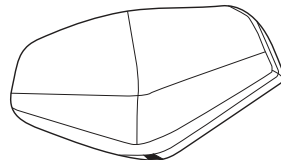fittings, available separately.

2.1495.044 Rada Relay Box

1621.116 Rada Outlook RS485 Socket

1621.115 Outlet By-Pass Adapter

1931.315 Opex PIR / Proximity Sensor

# DISPOSAL & RECYCLING

**End of Product Life**

When the appliance has reached the end of its serviceable life, it should be disposed of in a safe manner and in accordance with the current local authority recycling or waste disposal policy.

**Batteries**

Spent batteries should not be disposed of with normal waste. Contact your local authority for information on waste disposal and recycling.

1143306-W2-I

# CUSTOMER SERVICE

Your product has the benefit of our manufacturer's guarantee which commences from date of purchase or from the date of commissioning when product commissioning has been conducted within the UK by the Rada Commercial Field Service Team.

Outside of the UK please contact your local agent for all guarantee terms and conditions or visit **www.radacontrols.com** for further information.

**For UK (only) Customer Service & Post Installation enquiries**, including details of the Rada Commissioning, Responsive and Maintenance Contract Service Packages please contact:

☎ **0344 571 1777**

🖷 **01242 282595**

@ **radacustomerservices@mirashowers.com**

🌐 **www.radacontrols.com**

✉ Rada Controls, Cromwell Road, Cheltenham, Gloucestershire GL52 5EP

**For UK (only) Pre-Specification Enquiries** please contact:

☎ **0344 571 1777**

🖷 **01242 282595**

@ **rada_technical@mirashowers.com**

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✉ Rada Controls, Cromwell Road, Cheltenham, Gloucestershire GL52 5EP

**For Eire Only**

☎ **01 531 9337**

@ **CustomerServiceEire@mirashowers.com**

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*The company reserves the right to alter product specifications without notice.*