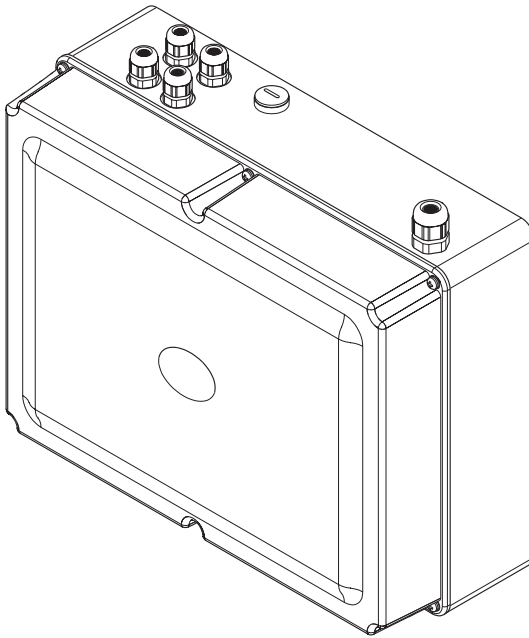# THE RADA PULSE ELECTRONIC WASHROOM

PRODUCT MANUAL

IMPORTANT

INSTALLER: THIS MANUAL IS THE PROPERTY OF THE CUSTOMER AND MUST BE RETAINED WITH THE PRODUCT FOR MAINTENANCE AND OPERATIONAL PURPOSES.

CONTENTS

INTRODUCTION

The Rada Pulse range of electronic products combine to produce a controlled washroom environment offering a high degree of energy and water conservation. A single Rada Pulse Control Box controls showering, hand washing and urinal flushing with up to 10 outlets in any configuration. Each outlet operates via a no touch sensor, ensuring maximum hygiene in the washroom.

The system is unique in the way that it is programmed remotely, via a hand held programmer, which is plugged into the control box to set up or adjust the flow settings of each individual outlet.

DESCRIPTION

1. Rada Pulse Control Box

The core of the system is the Rada Pulse Control Box containing a transformer and a PCB. One control box can control up to ten outlets in any configuration e.g. 5 showers, 3 washbasins, 1 urinal and 1 W.C.

The Rada Pulse Control Box is designed to interface with Rada Pulse Sensors and Rada Pulse Solenoid Valves which control the system functions.

Mounted in the Rada Pulse control box is a Printed Circuit Board to:

- Supply power to the remote mounted sensors.
- Operate remote mounted solenoid valves.
- Allow the operating functions to be programmed in through the hand held programmer (refer to: **'Accessories'**).
- Provide a signal to allow the operation of auxiliaries via the Rada Pulse Relay Box (refer to: **'Accessories'**) to automatically control lighting, extraction and drainage pumps.

2. Rada Pulse Sensors

General

There are two generic types of no-touch sensors:

1. Active infrared sensors where a transmitted infrared beam of light is reflected back to the sensor by the proximity of a hand.

2. Ceiling Mounted passive infrared sensors where the sensor detects changes in temperature in the detection area.

2.1 Active Sensors

Rada Pulse 120/122 Sensors

The 120 sensor is a short range active sensor, and is designed to be installed within a shower, W.C or basin area.

The 122 sensor is a long range active sensor, and is designed to be installed within a urinal area.

All electrical connections are totally sealed, and the system operates at a very safe low voltage.

The sensor is supplied with 3.0 metres of 2 core cable and is fixed to the wall using two fixing screws (supplied). The screws are then concealed for security, by a chrome plated cover.

Rada Pulse 129 Sensor

The 129 sensor is a short range active sensor, and is designed to be installed within a shower, W.C or basin area.

All electrical connections are totally sealed, and the system operates at a very safe low voltage.

The sensor is supplied with 3.0 metres of 2 core cable and is fixed to the wall using two fixing screws (supplied). The sensor is housed within a chrome plated solid disc with a recessed rear foam seal.

Rada Pulse LR Sensor

The LR sensor is a short range active sensor, and is designed to be installed within a shower, W.C or basin area.

The LR Sensor is a chrome plated vandal resistant sensor designed to be recessed or built within the wall surface, to allow for extra security.

All electrical connections are totally sealed, and the system operates at a very safe low voltage.

The sensor is supplied with 3.0 metres of 2 core cable and is fixed in the wall using M6 fixing studs (supplied).

2.2 Passive Sensors

Rada Pulse 124/125/126 Ceiling Sensor

The Rada Pulse Ceiling Sensor are passive sensors for the following applications:

Application	Sensor Type
Washbasin	124
Single Urinal	125
Group Urinal	126

Note! Refer to section: **'Specifications'** for detection areas.

3. Solenoid Valves

Rada SV1015 (HP) Solenoid Valve (Direct Acting)

A 1/2" servo assisted solenoid valve, made from WRC approved PA66 Reinforced Fibreglass, fitted with 15 mm compression connections. Flat-faced inserts are supplied for 1/2" BSP union inlet or outlet connections. An isolating ball valve is fitted to the inlet to allow the water supply to be isolated. A flow direction arrow on the valve facilitates correct installation.

Rada SV2022 Solenoid Valve (Indirect Acting)

A 3/4" servo assisted solenoid valve made from brass with 3/4" BSP female connections. A flow direction arrow on the valve facilitates correct installation.

Rada SV2028 Solenoid Valve (Indirect Acting)

A 1" servo assisted solenoid valve made from brass with 1" BSP female connections. The valve is marked "IN" on the end to connect the inlet water supply.

Rada SV3022 Solenoid Valve (Direct Acting)

A 3/4" lift assisted solenoid valve made from brass with 3/4" BSP female connections.

A flow direction arrow on the valve facilitates correct installation.

4. Accessories

4.1 Rada Pulse Relay Box

The Rada Pulse Relay Box is designed to be connected to the auxiliary outputs of the Rada Pulse Control Box. It provides three switched power relays to enable the Pulse system to be used in conjunction with equipment such as pumps, lights and fans. All three relay outputs are fuse protected. The Rada Pulse Hand Held Programmer is required to enable these functions to be used.

4.2 Rada Pulse Hand Held Programmer

The Rada Pulse Hand Held Programmer is required to modify the default settings within the Rada Pulse Control Box. The programmer has an extendable lead which plugs into a socket in the top of the Control Box.

The programmer has a two line (alpha numeric) backlit display and push buttons to allow the user to navigate through the menu choices and set the configuration data. Parameters such as activation time, delay time and post flush waiting time etc, can be programmed for each outlet.

The controller is multilingual and the user can select the appropriate language via the menu system.

4.3 Rada Disable Key Switch

The Rada Disable Key Switch is a key operated isolation switch designed to be used with the Rada Pulse Control Box. The unit is wired directly to the Pulse Control Box and disables the system for cleaning and maintenance.

4.4 Rada Pulse Key Switch

The Rada Pulse Key Switch is a key operated isolation switch designed to be used with the Rada Pulse Control Box. The unit replaces a sensor for the purpose of manually turning on the system e.g. group showering.

4.5 Rada Mounting Plate 129

The mounting plate is intended to be used when mounting the Rada Pulse 129 sensor onto difficult walls or surfaces, or where extra security screws need to be used (not supplied).

The mounting plate is a plated brass ring, pre-drilled, to allow secure fixing of the Rada Pulse 129 sensor. The plate is drilled to allow wall installation or fixing onto a junction box, and is supplied with 2 x M5 x 12 mm stainless steel screws, to secure the Rada Pulse 129 sensor (Wall screws and junction box screws are not supplied).

SAFETY : WARNINGS

The installation and maintenance of these products must be carried out in accordance with the instructions given in this manual, and must be conducted by designated, qualified and competent personnel.

Installations must comply with all current building, water, plumbing and electrical regulations and guidelines.

The products are not designed to be vandal-resistant, subjected to extremes of temperature, unauthorised tampering or wilful abuse.

Rada products are precision-engineered and should give continued superior and safe performance, provided:

1. They are 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 section: **'Maintenance'**.
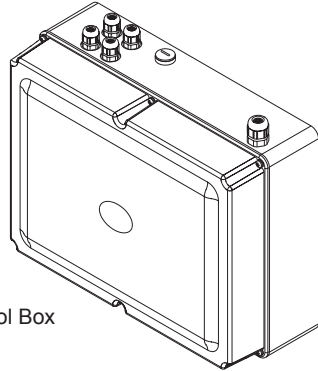
PACK CONTENTS

Tick the appropriate boxes to familiarise yourself with the part names and to confirm that the parts are included.

1. Rada Pulse Control Box

☐ 4 x Fixing Screws (not illustrated)

☐ 4 x Wall Plugs (not illustrated)

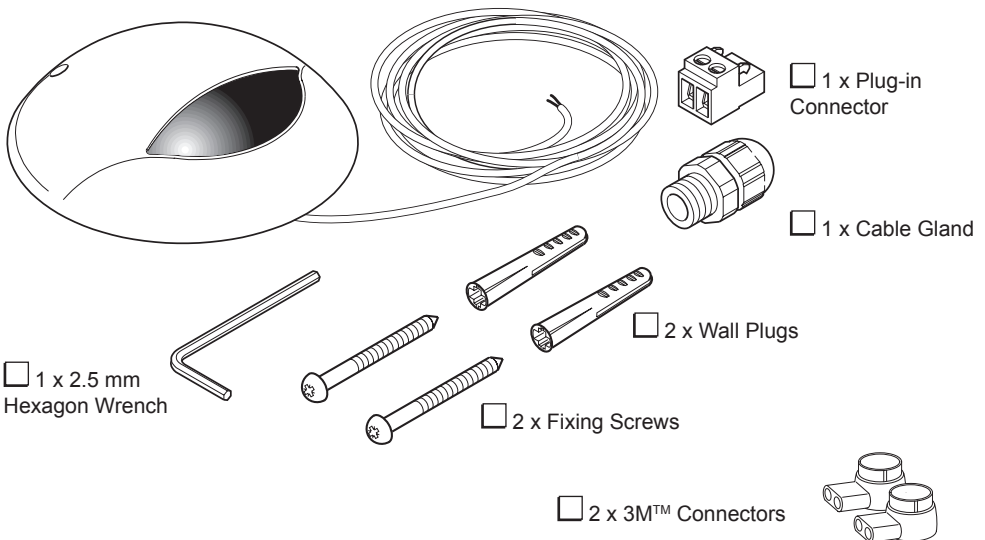☐ 4 x Sealing Washers (not illustrated)

☐ 1 x Rada Pulse Control Box

Documentation

☐ 1 x Installation Template

2. Rada Pulse Sensors
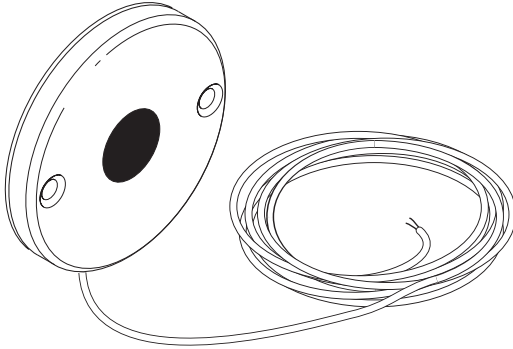
2.1 Rada Pulse 120/122 Sensor

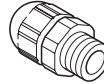☐ 1 x Rada Pulse 120 or 122 Sensor, complete with 3 metres of 2 core cable

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 2 x Wall Plugs

☐ 1 x 2.5 mm Hexagon Wrench

☐ 2 x Fixing Screws

☐ 2 x 3M™ Connectors
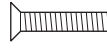
2.2 Rada Pulse 129 Sensor

☐ 1 x Rada Pulse 129 Sensor,
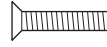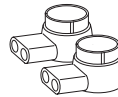complete with 3 metres of 2 core cable

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 2 x Fixing Screws

☐ 2 x Wall Fixings
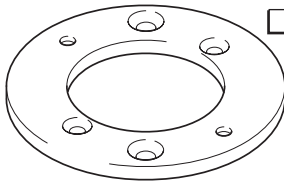
☐ 2 x 3M™ Connectors

(Rada Mounting Plate 129 - Optional Accessory)
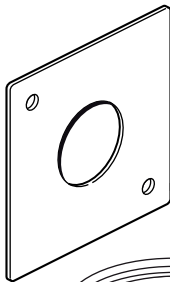
☐ 1 x 2.5 mm Hexagon Wrench

☐ 1 x Rada Mounting Plate
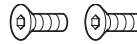
☐ 2 x Screws M5 x 12 mm

☐ 1 x 2.5 mm Hexagon Wrench

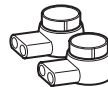## 2.3 Rada Pulse LR Sensor

☐ 1 x Rada Pulse LR Sensor Backplate

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 2 x 3M™ Connectors

☐ 2 x M6 x 175 mm Fixing Studs (with fittings)

☐ 1 x Rada Pulse LR Sensor,
complete with 3 metres of 2 core cable

9
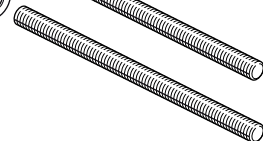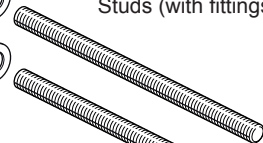
2.4 Rada Pulse 124, 125, 126 Ceiling Sensor

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 2 x Spade Connectors
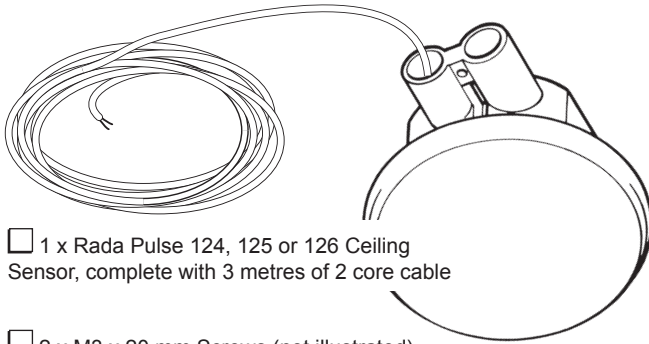
☐ 1 x Rada Pulse 124, 125 or 126 Ceiling Sensor, complete with 3 metres of 2 core cable

☐ 2 x M3 x 20 mm Screws (not illustrated)
☐ 2 x M3 x 50 mm Screws (not illustrated)
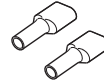
3. Solenoid Valves

3.1 Rada SV1015 (HP) Solenoid Valve
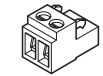
☐ 1 x Plug-in Connector
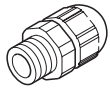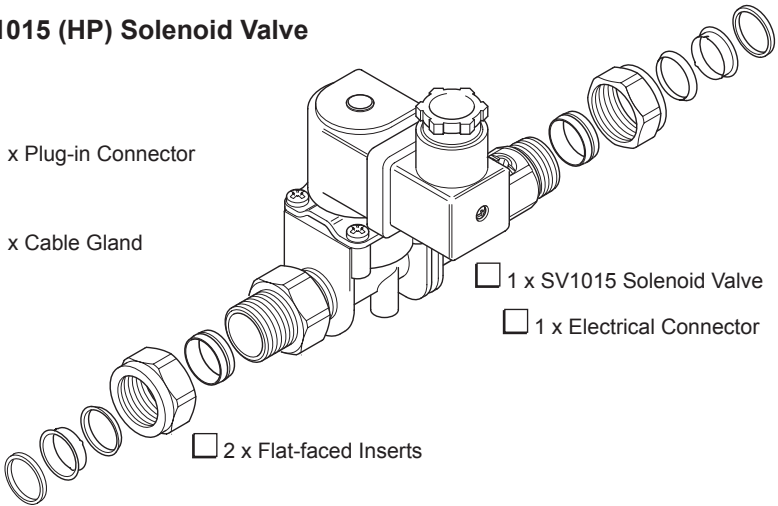
☐ 1 x Cable Gland

☐ 1 x SV1015 Solenoid Valve

☐ 1 x Electrical Connector

☐ 2 x Flat-faced Inserts

3.2 SV2022 Solenoid Valve
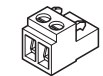
☐ 1 x Plug-in Connector
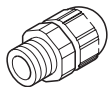
☐ 1 x Cable Gland

☐ 1 x SV2022 Solenoid Valve
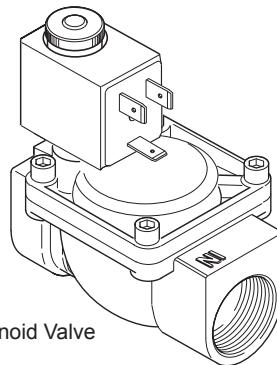
☐ 1 x Electrical Connector

3.3 SV2028 Solenoid Valve

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 1 x SV2028 Solenoid Valve

☐ 1 x Electrical Connector

3.4 SV3022 Solenoid Valve

☐ 1 x SV3022 Solenoid Valve

☐ 1 x Plug-in Connector

☐ 1 x Cable Gland

☐ 1 x Electrical Connector
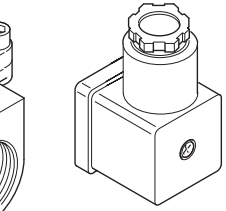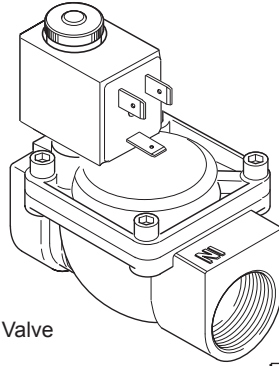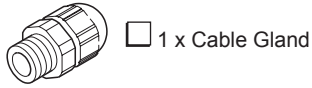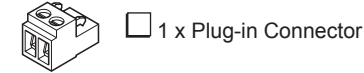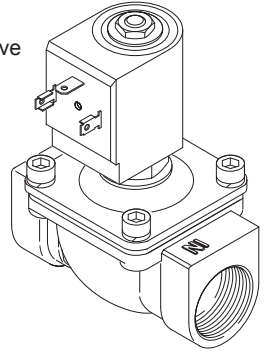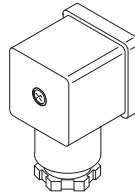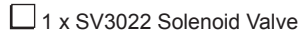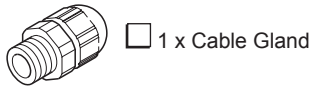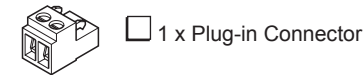
DIMENSIONS

1. Rada Pulse Control Box

300 mm

117 mm

230 mm

2. Rada Pulse Sensors

2.1 Rada Pulse 120/122 Sensor

68 mm

22 mm

6 mm

84 mm
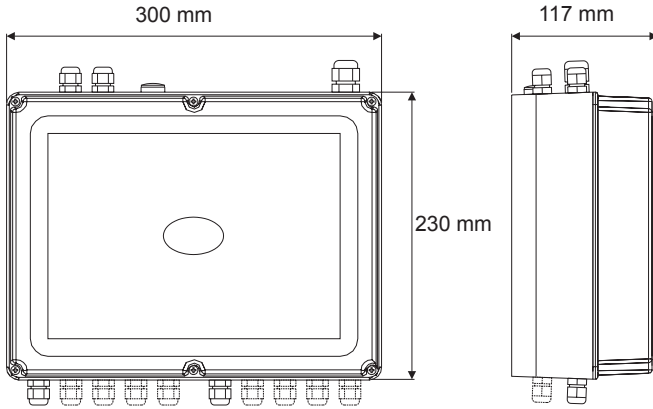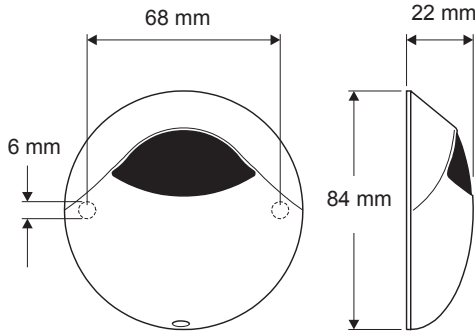
2.2 Rada Pulse 129 Sensor

(Rada Mounting Plate 129 - Optional Accessory)

12 mm

68 mm

84 mm Diameter

6 mm

5 mm

52 mm Dia.

84 mm Diameter
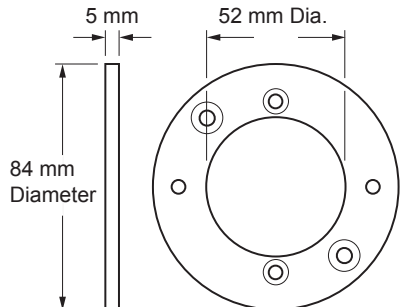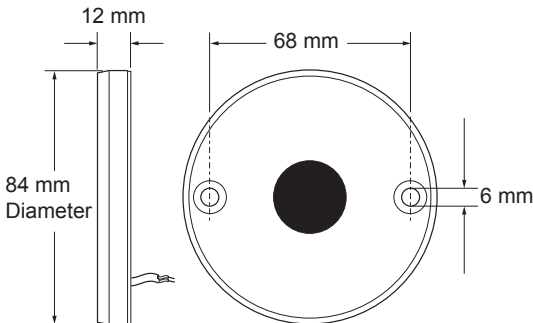
2.3 Rada Pulse LR Sensor
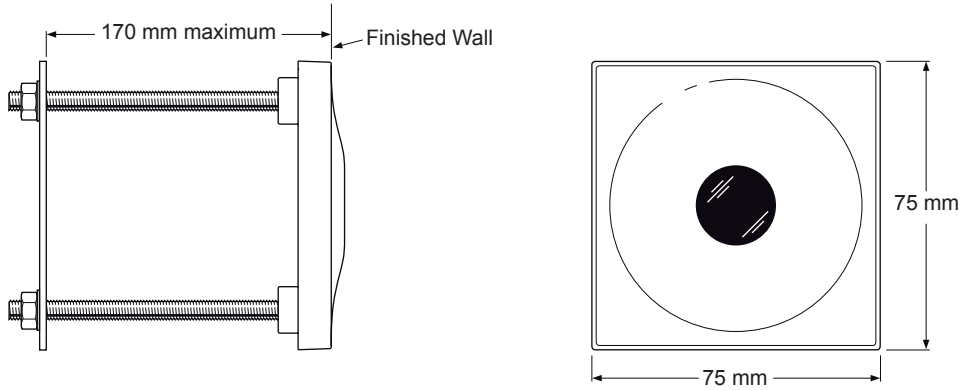
Note! The M6 fixing studs supplied allow the LR sensor to be attached through a wall to a maximum thickness of 165 mm. If longer M6 fixing studs are required, these will have to be purchased through your local supplier.

2.4 Rada Pulse 124, 125, 126 Sensor
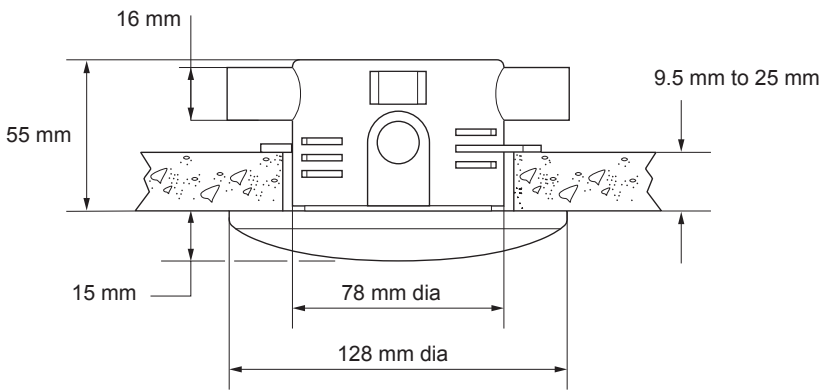
3. Solenoid Valves

3.1 SV1015 (HP) Solenoid Valve

78 mm

127 mm

14 mm

3.2 SV2022 Solenoid Valve

75 mm

18 mm

55 mm

75 mm

3.3 SV2028 Solenoid Valve

85 mm

20 mm

72 mm

96 mm
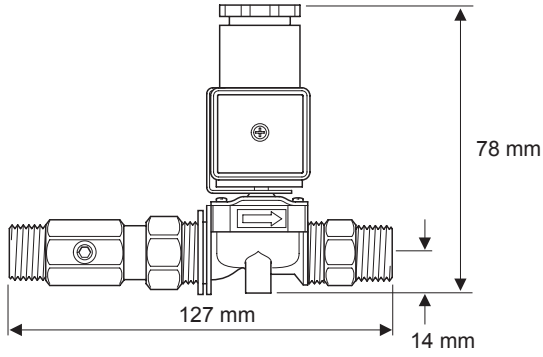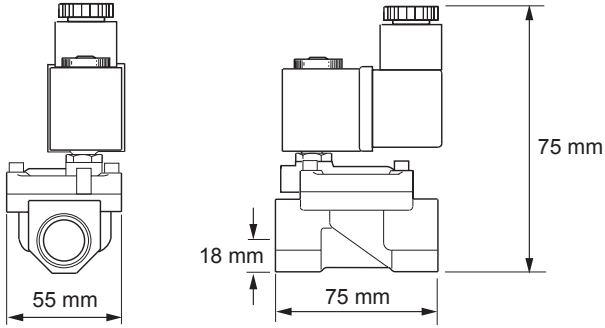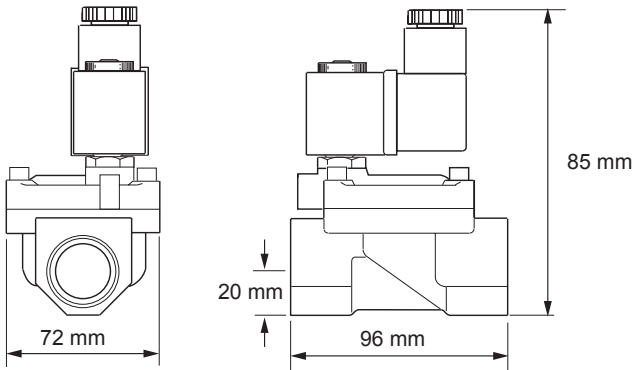
3.4 SV3022 Solenoid Valve
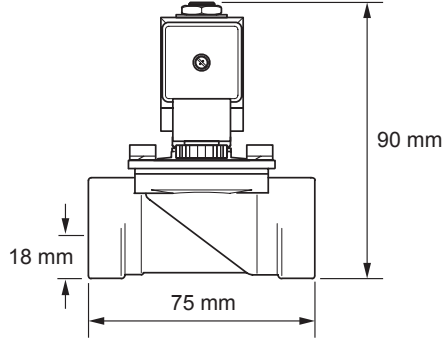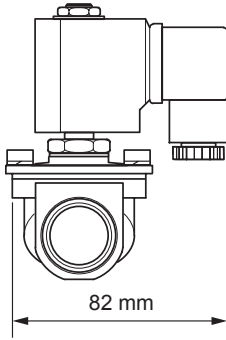
SPECIFICATIONS

1. Rada Pulse Control Box

Material: Plastic sealed to IP54.
Voltage: 230 V AC, 50/60 Hz.
Transformer: 230 V AC/12 V AC.
Rating: 120 VA.
Main Fuse: T 2.5 A H 250 V
       (**Important!** Use only Rada Approved Fuse, Part No. 422.84)
10 x Inputs suitable for Pulse Sensors.
10 x Solenoid Outputs, 12 V AC SELV (5 fuses) - fused at 2.5 A for each pair.
Door Switch Input (normally closed)
Disable Switch Input (normally open)
Disinfection Enable Input
3 x Auxiliary Outputs, 12V AC SELV (1 fuse) - fused at 400 mA, for connection to
Rada Pulse Relay Box:
- Fan Output
- Light Output
- Pump Output
1 x Disinfection Valve Output
Ambient Temperature Range: 0 - 40°C.
Maximum Humidity: 80% at 25°C.
Type of action: Type 1.
Suitable for continuous use.
Software/Firmware: Class A control function.

2. Rada Pulse Sensors

2.1 Rada Pulse 120/122 Sensors
Material: Plastic shell, Finish: Chrome plated.
3 m of 2 core sheathed cable with connections sealed into the sensor.
Operating voltage: 12 V AC. via the 2 core cable.
Fixing holes for 2 x 6 mm dome headed screws (supplied).
Protection: IP67.
Temperature range: 4 to 70°C.
Activation distance   -120 sensor 0 to 50 mm.
                            -122 sensor 0 to 550 mm.
The distance is dependent on the reflectivity of the detected object.

2.2 Rada Pulse 129 Sensor

Material: Brass. Finish: Chrome plated.

3 m of 2 core sheathed cable with connections sealed into the sensor.

Operating voltage: 12 V AC. via the 2 core cable.

Fixing holes for 2 x 6 mm counter sunk screws (supplied).

Temperature range: 4 to 70°C.

Protection: IP65.

Activation distance: 0 mm to 50 mm depending on the reflectivity of the detected object.

(Rada Mounting Plate 129 - Optional Accessory)

Material: Brass. Finish: Chrome plated.

Fixing holes for 2 x 6 mm c/sk screws to wall/panel (Screws not supplied), and drilled for 2 x 4 mm screws to secure to a junction box, if required.

Supplied with 2 x screws M5 x 12 mm (stainless steel) with hexagon slot and a 2.5 mm A/F hexagon wrench.

2.3 Rada Pulse LR Sensor

Material: Brass. Finish: Chrome plated.

3 m of 2 core sheathed cable with connections sealed into the sensor.

Operating voltage: 12 V AC. via the 2 core cable.

2 x M6 x 175 mm fixing studs (rear fixing)

Temperature range: 4 to 70°C.

Protection: IP65.

Activation distance: 0 mm to 50 mm depending on the reflectivity of the detected object.

2.4 Rada Pulse 124, 125 and 126 Ceiling Sensor

Rada 124 for washbasin

Rada 125 for single urinal

Rada 126 for group urinal

Material: Base and cover ABS.

Supply voltage: 12 V AC. via the 2 core cable.

Maximum humidity: 80% at 30°C.

Operating ambient temperature range: 0 - 35°C.

124, 125 and 126 Sensor Detection Area Diagrams

Sensor detection area for single basin applications (124 sensor)
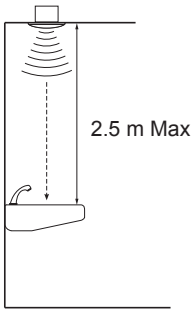
Sensor detection area for single urinal applications (125 sensor)
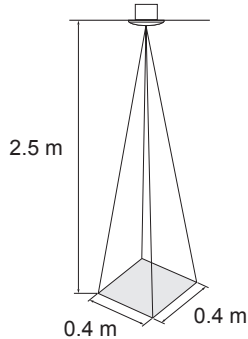
Sensor detection area for group urinal applications (126 sensor)

2.5 m Max

2.5 m

0.4 m

0.4 m

2.5 m

3.0 m

0.4 m
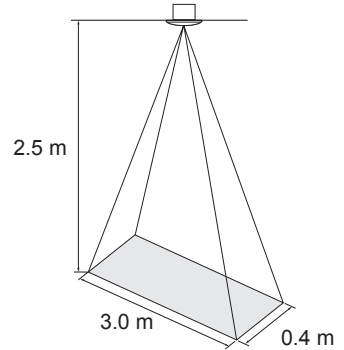
Extension cable - Optional Accessory

3.0 metres of sheathed cable and two 3M™ connectors. Use to extend any Rada Pulse sensor to a maximum of 6.0 metres.

3. Solenoid Valves

General

Operating voltage (see note) 10.2 to 13.5 Volts AC.

Note! Operation over the full range of pressure and operating voltage is guaranteed for fluid temperature up to 70°C.

Between 70°C and 90°C the following restrictions apply:

The installer must ensure that a minimum voltage of 12 V is present across the coil to make sure that the valve will open over the full pressure range.

Maximum ambient temperature 40°C.

Maximum fluid temperature for 100% full range operation 70°C.

Maximum combined fluid and ambient temperature 130°C.

3.1 Rada SV1015 (HP) Solenoid Valve

Supply Voltage:	12 V AC, 50/60 Hz.
Rating:	5 VA.
Body Material:	PA66 Reinforced Fibreglass
Connections:	15 mm compression connections.
	1/2" BSP union connections (with flat-faced inserts).
Min / Max Pressures:	20 to 1000 kPa (0.2 to 10 bar).
Inlet Isolating Valve:	Brass ball valve (supplied).
Type:	Servo assisted.

3.2 SV2022/SV2028 Solenoid Valve

Supply Voltage:	12 V AC, 50/60 Hz.
Rating:	8 VA.
Body Material:	Brass.
Connections:	SV2022 3/4" BSP female connections.
	SV2028 1" BSP female connections.
Min / Max Pressures:	20 to 1000 kPa (0.2 to 10 bar).
Type:	Servo assisted.

3.3 SV3022 Solenoid Valve

Note! A maximum of 5 SV3022 Solenoid Valves may be used on one Rada Pulse control system.

Supply Voltage:	12 V AC, 50/60 Hz.
Rating:	13 VA.
Body Material:	Brass.
Connections:	3/4" BSP female connections.
Min / Max Pressures:	0 - 800 kPa (0 - 8 bar).
Type:	Lift assisted.

Maximum cable runs for solenoid connections are as follows:

	Cable Size mm^2	**Max Length in Metres**
SV1015	0.50	27
	0.75	40
	1.0	53
	2.0	104

	Cable Size mm^2	**Max Length in Metres**
SV2022 SV2028 SV3022	0.50	7.5
	0.75	10.5
	1.0	14
	2.0	28

INSTALLATION

General

The installation and maintenance of Rada Pulse products must be carried out in accordance with the instructions and information given in this Product Manual, and must be conducted by designated, qualified and competent personnel.

1. Before commencing installation refer to section: **'Specifications'**.
2. Care must be taken during installation to prevent any risk of injury or damage.
3. In accordance with IEE regulations all electrical connections must be undertaken by a competent person.
   Important! Cross bond copper pipework to maintain earth continuity when nylon housed solenoid valve SV1015 is fitted.
4. Isolate mains voltage supply before removing cover.
5. The installations must comply with all current Building and Electrical Regulations in force, and relevant Guidelines.
6. The products must not be subjected to extremes of moisture or temperature, unauthorised tampering or wilful abuse.
7. Rada solenoid valves require a 12 V AC electrical supply, provided by the transformer housed within the Rada Pulse Control Box.
   Warning! Do not connect the solenoid valves to mains voltage.
   Note! The Rada Pulse system control box can power a maximum of five SV3022 solenoid valves. These must be controlled by alternate power outputs on the Pulse system control box, (e.g. channel 1,3,5,7 and 9).
8. The plumbing must comply with the local requirements of the Water Authority Undertaker.
9. Isolating valves are recommended to allow servicing of the solenoid valve. These should be plumbed in so no user operation can occur (Note: no other user operated control should be fitted between the solenoid and the outlet fitting.
10. A thermostatic mixing valve should be installed to provide blended water to the outlets. The mixing valve should be fitted with isolating valves, check valves and filters with a mesh not exceeding **0.3** mm aperture size.
11. Rada Pulse Solenoid Valves must be approved to EN 60730-2-8.

1. Install the Control Box

The Control Box is intended for wall-mounting to a suitable flat dry surface using the supplied fixing screws and sealing washers. The control box must be accessible for maintenance. If the wall is uneven it is advisable to provide a flat mounting board / frame so that the control box does not become distorted.

Control Box Electrical Supply

This appliance is intended for permanent connection to the fixed electrical wiring of the mains electric system via a double pole switched connection unit fused at 3 amps, which has at least 3 mm contact separation.

A mains 230 V supply cable of 2 metre length is pre-connected to the control box, this must not be removed; do not renew the cable inside the box if damaged.

The system low-voltage 12 V AC output is fuse-protected. This appliance is IP54 protected when blanking caps are fitted to unused cable holes, and the cover and seal is fitted correctly.

All mains cable used on the installation must be HAR approved (0.75 mm^2).

Control Auxiliaries

The control PCB has terminals to allow control of auxiliary items by the Rada Pulse system (e.g. pump, fan, lights and disinfection).

Important! Do not connect mains voltage to the PCB Auxilliary Terminals.

These connections are designed to switch mains voltage loads through contacts of a 12 V DC relay (max coil resistance 160 ohms).

A relay box designed for use with the Pulse Control Box is available, refer to section: **'Description, Accessories'**.

Programming of all outlets is via the hand held programmer, refer to section: **'Description, Accessories'**).

1. Use the installation template (supplied) to mark the positions of the fixing holes for the control box.
2. For solid walls, drill and plug the fixing holes. For other types of wall structure alternative fixings (not supplied) may be required.
3. Remove the cover from the control box (Refer to illustration).
4. Hold the control box in position and secure with the fixing screws (supplied).
   Note! Make sure that you fit the sealing washers to the control box fixing screws.
5. Install the Rada Pulse Sensors and Solenoids, refer to sections: **'Installation, Install the Sensors' and 'Installation, Install the Solenoids'**.
   Note! Inside the cover of the control box is an information label for completion by the installer. The information on this label should identify the position in the building of individual sensors and solenoids (refer to example on label).
6. Fit the cover to the control box and secure the cover screws (6 off).
   Note! Make sure that seal is fitted correctly.

7. Connect the transformer to the mains electrical supply.

8. The control box will now require commissioning, refer to section: **'Commissioning / Programming'**. Factory setting is 'Showers On' for 30 seconds).

Connection to Hand Held Programmer

Connections to Auxiliary Units e.g. Fan, Light , Disinfection (refer to section: **'Description, 4. Accessories, 4.1 Rada Pulse Relay Box'**)

Connection to Mains Power Supply

PCB

Transformer

Plug-in Connections to Solenoid Valves

Cover Screws

Cover

Plug-in Connections to Pulse Sensors
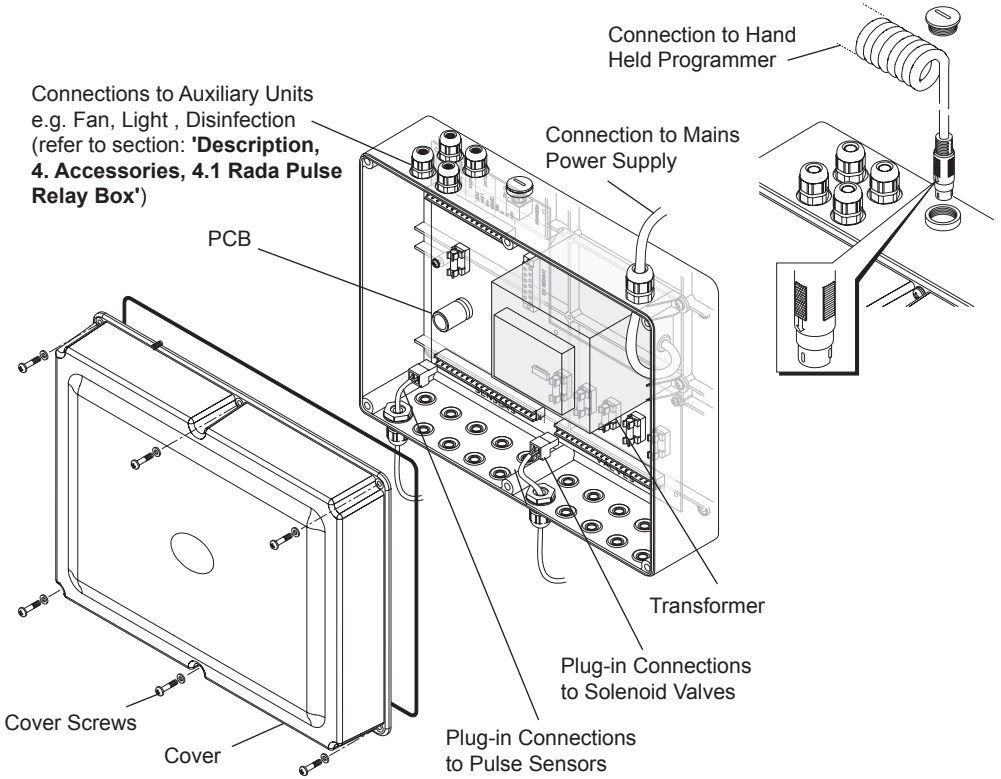
Installation of the Rada Pulse Control Box

2. Install the Sensors

General

The Rada Pulse Sensors use the 12 V AC electrical supply provided by the transformer within the Rada Pulse system control box.

Sensors should be fitted in a dry position, allowing access for adjustment or 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 sensor.

Always make sure that the sensors 'view' is not obstructed.

Do not install the sensor opposite a mirror or reflective surface.

Use conduit when installing cables through the wall.

It is recommended that low voltage system cables are installed within conduit or trunking to provide mechanical protection for the cables and to allow removal or maintenance of system components. Do not bury system cables directly into the wall surface.

Note! Do not join sensor cables in close proximity to the sensor as this can allow water ingress and impair the function of the Rada Pulse System.

Note! If a system cable requires lengthening use only the 3M™ connectors (packed with Pulse sensors and the Rada Pulse cable extension accessory kit). 3M™ cable connectors must be positioned within a dry area to prevent water ingress affecting the operation of the Rada Pulse system.

When installing sensors in an existing pretiled area the system cable should be installed within surface mounted conduit or trunking. Do not bury system cables directly into the wall surface.

Note! Do not install Solenoid Valves directly above conduit or trunking.

2.1 Rada Pulse 120 and 122 Sensors

1.   Remove the grub screw and cover from the sensor.

2.   Mark, drill and plug the wall for two securing screws (supplied). Make sure the holes are lined **horizontally**, and the fixing is preferably in the centre of a flat tile. Alternative fixings (not supplied) may be necessary for some wall structures.

   Note! If the sensor bridges a groove between two tiles, we recommend this gap be filled with silicone sealant.

3. Secure the sensor to the wall with the supplied fixing screws.

To prevent water ingress into the building fabric place a thin bead of silicone sealant around the top edge of the sensor (refer to illustration).

4. Make the connection between the 2 core cable and the Rada Pulse control box using the plug-in connector (supplied).

5. Fit the cover. Make sure that it locates correctly over the top lip of the sensor.

6. Fit the grub screw to secure the cover in position.
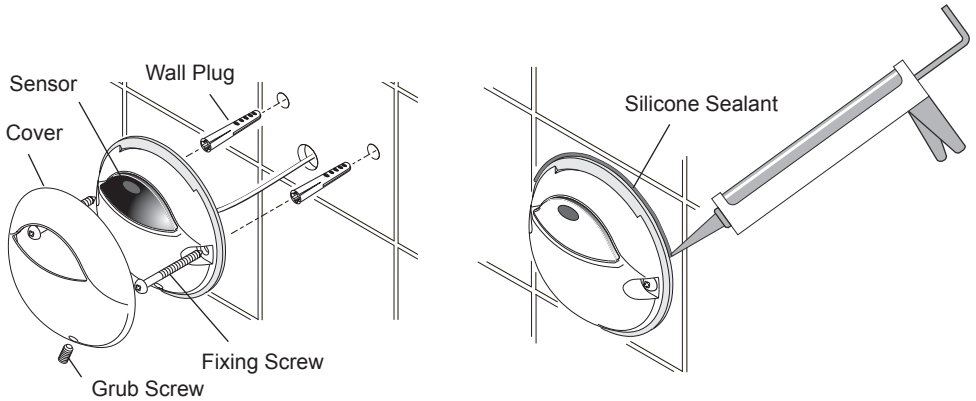
Installation of 120/122 Sensors

2.2 Rada Pulse129 Sensor

1. Refer to section: **'Install the Sensors, 2.1 Rada Pulse 120 and 122 Sensors'** and follow instructions 1 and 2.

2. Make sure that the foam seal on the rear face is in place then secure the sensor to the wall with the securing screws (supplied).

3. Make the connection between the 2 core cable and the Rada Pulse control box using the plug-in connector (supplied).
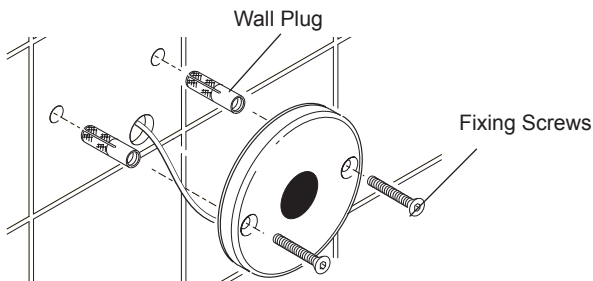
Installation of 129 Sensor

24

Rada Mounting Plate 129 (optional)

1. Select which set of fixing holes you intend to use (Refer to illustration 'Fixing Holes').

Use the 6 mm holes for wall/panel fixing screws. Use plugs to suit the wall composition

Use the 4 mm holes to fix the Mounting Plate directly to an electrical junction box.

The M5 threaded holes are for receiving the screws to secure the sensor to the mounting plate.

Important! When fitting a sensor to an electrical junction box, make sure that the 4 mm fixing holes are in the **vertical** position (Refer to illustration 'Junction Box Installation'). When preparing the finished wall surface (e.g. tiling), allow sufficient clearance to facilitate alignment of the fixing screws into the fixing holes of the junction box. Leave space for the cable to be inserted through the centre of the mounting plate.

2. With the mounting plate secure, offer up the Rada 129 Sensor, making sure that the cable from the sensor runs through the centre hole (Refer to illustration 'Secure Sensor to Mounting Plate 129').
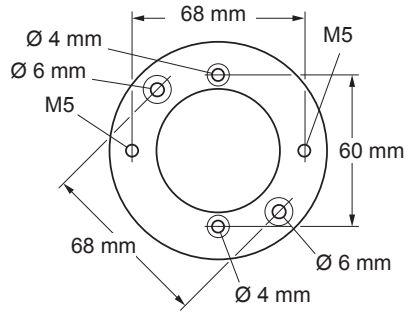
Fixing Holes
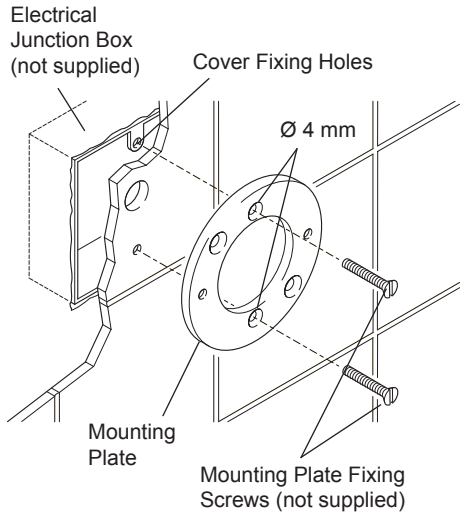
Junction Box Installation
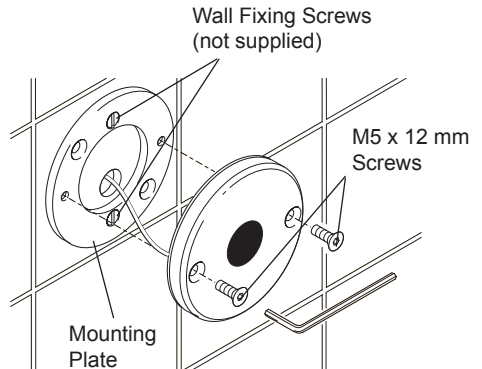
Secure Sensor to Mounting Plate 129

2.3 Rada Pulse LR Sensor

The LR Sensor has been designed to be recessed or built within the wall. To allow for extra security the LR Sensor must be installed flush with the finished wall.

Note! The LR Sensor is the same size as a single electrical mounting box and the recommended method of recessing the LR Sensor is to use an Electrical Box Sinker Tool. An alternative method would be stitch drilling then to use a club hammer and chisel.

1. Decide on a suitable location for the LR Sensor.
2. Position the LR Sensor backplate onto the level finished wall.

   Note! Use a spirit level to make sure that the LR Sensor backplate is horizontal.

   Make sure the M6 fixing studs holes are in the correct position for the LR Sensor.
3. Mark the centre positions for the M6 fixing studs and the sensor cable.
4. Drill pilot holes for the centres of the three holes.
5. Use the electrical box sinker tool to recess the wall to a depth of 10.5 mm (±1 mm).
6. To allow for the lugs on the rear of the LR Sensor, the fixing stud holes will require a further recess of Ø20 mm x 10 mm (±1 mm).

   Note! It's recommended to use a Ø10 mm and then a Ø20 mm drill bit.
7. Recess a channel for the sensor cable.

Use a spirit level to make sure that the LR Sensor backplate is horizontal. Mark the centre positions for the M6 fixing studs and for the LR Sensor cable.

Recessed channel to allow for the LR Sensor Cable

10.5 mm ±1 mm

LR Sensor Backplate

LR Sensor Cable

LR Sensor

M6 Fixing Studs

Finished Wall

LR Sensor
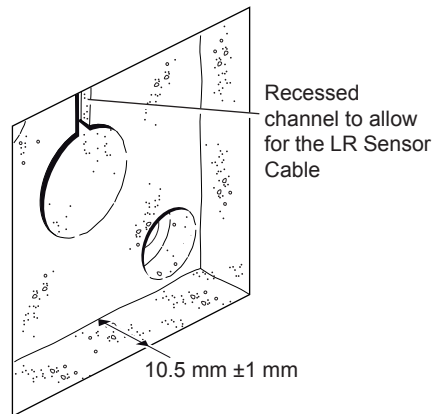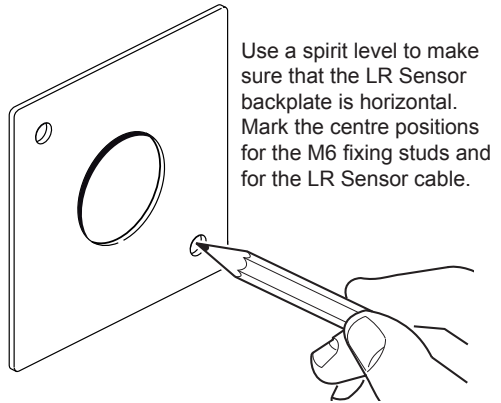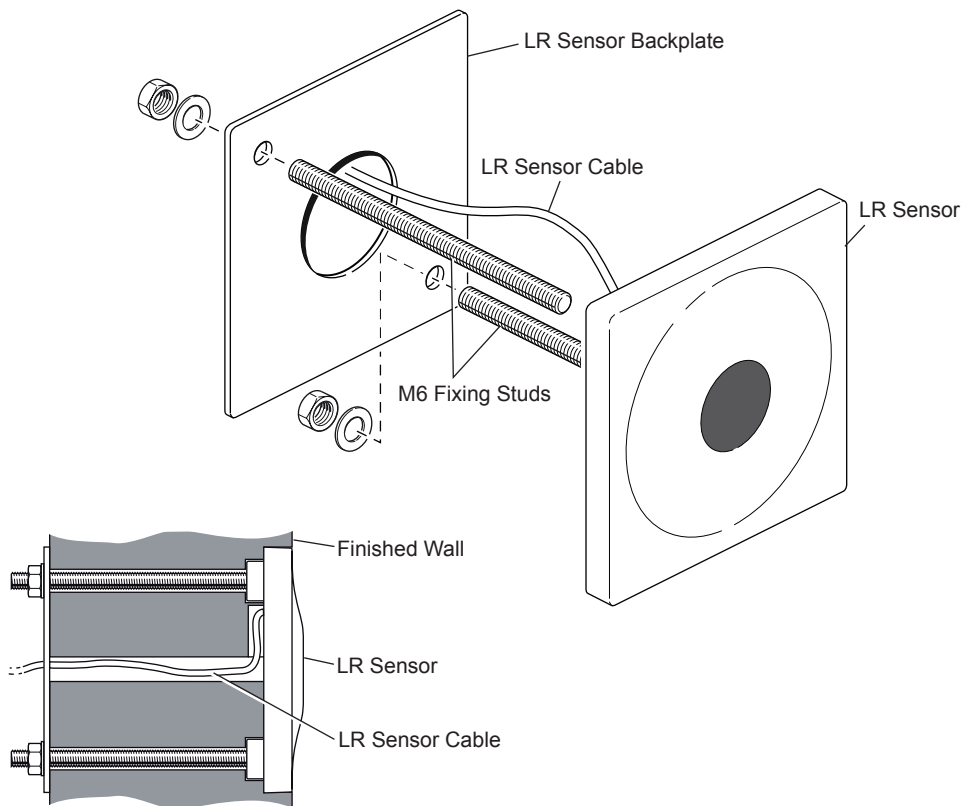
LR Sensor Cable

8. Drill the centre hole (Ø10 mm) to allow for the LR Sensor cable.

9. Check that the LR Sensor can be installed flush with the finished wall.

10. Attach the M6 fixing studs to the LR Sensor and put it into position.
Note! Make sure that the LR Sensor cable does not become caught.

11. Place the LR Sensor backplate/washers over the M6 fixing studs and secure with the nuts.

12. Grout around the LR Sensor with hard setting compound.

13. Make the connection between the 2 core cable and the Rada Pulse control box using the plug-in connector (supplied).

2.4 Rada Pulse 124, 125 and 126 Ceiling Sensors

Important! Care must be taken to avoid installing system cables in close proximity to other electrical cables and devices as this may impair the function of the Rada Pulse System. In problematic installations the system cables should be installed within earthed (grounded) steel conduit.

Always avoid installing Pulse Ceiling Sensors near heating or air conditioning units as air currents can cause nuisance tripping.

1. Mark the ceiling position for the sensor (minimum distance of 0.5 m), and cut a circular hole of 78 mm diameter.
   Warning! Care must be taken to avoid hidden pipes and cables.

   Note depth of mounting surface, and adjust base unit depth tabs to nearest setting below actual depth (minimum setting 9.5 mm, maximum 25 mm). Install the cable from the Rada Pulse Control Box via chosen route, extending if necessary. If required, cabling may be housed within conduit piping (the base unit accepts nominal 16 mm ext). Feed cable through base unit. Pass base unit through mounting hole, and place in position (refer to illustration), fixing to conduit as necessary.

2. Connect the two-core cable to the connector block (**A**) on the Sensor internal circuit board (**B**, refer to illustration). Wiring polarity is not important.

3. Align and offer up the Sensor unit to the base unit (Refer to illustration), and retain with bolts supplied (but do not tighten these yet).

4. The sensor (**C**) is retained on a swivel bracket, which enables the sensor to be directed toward the target area.

   Rotate the Sensor unit until the sensor is directed at, and aligned with, the required target area. Tighten bolts to secure sensor unit to base unit. Align tabs on cover (**E**) with slots around base unit, and rotate clockwise to secure.

5. Make the connection between the 2 core cable and the Rada Pulse control box using the plug-in connector (supplied).

Sensor Alignment/Sensitivity Adjustment

6. Grip the cover and rotate anticlockwise, and lower cover away from Sensor unit.

7. The sensor alignment is adjusted by gently swivelling the sensor on its mounting bracket – refer to illustration.

8. The sensitivity is adjustable via a two position (H=high / L=low) switch (**D**, Refer to illustration) on the Sensor internal circuit board, which will need to be separated from the base unit. The unit is supplied with this set at "H" (high). Slide the switch to the "L" position, if required.

9. Refit the cover, making sure that the sensor window is correctly aligned toward the wash basin or urinal area.
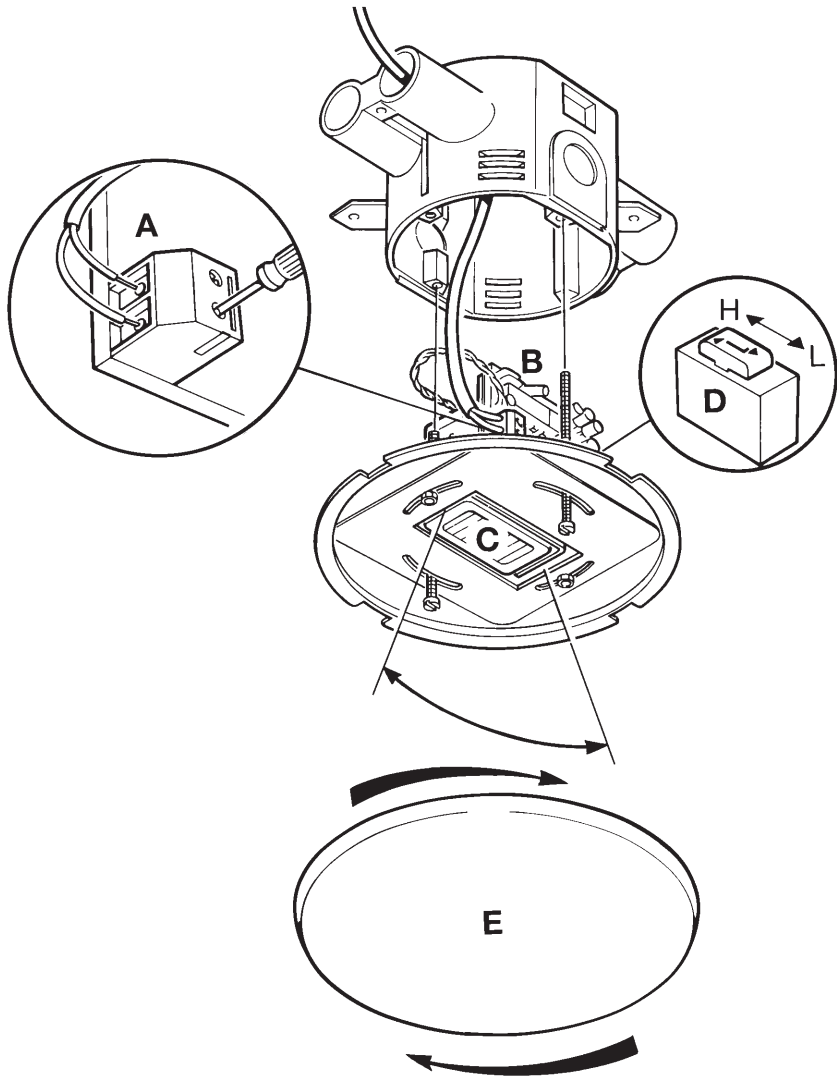
Installation of Ceiling Sensor

3. Install the Solenoid Valves

3.1 Rada SV1015 (HP) Solenoid Valve

1. Connect the pipework to the inlet/outlet fittings.

For 15 mm compression connections: Use the compression nuts and olives supplied.

For 1/2" BSP union connections: Fit the flat-faced inserts (supplied) to the inlet/outlet fittings.

Note! Make sure that the water flow follows the directional arrow indicated on the valve.

2. To connect to the pipework, offer up the pipes to the inlet/outlet of the valve and hand tighten the union nuts. Hold the adaptor when tightening the union nuts so that you do not twist or damage the valve.

3. Unscrew the electrical connector retaining screw and remove the electrical connector. Remove the retaining screw from the connector.

4. Lever the insert out of the electrical connector using a small screwdriver.

5. Fit the electrical wiring through the cable gland and connect it to the terminals in the insert. Wiring polarity is not important.

6. Reassemble the electrical connector and refit it to the solenoid coil. Tighten the retaining screw.

Note! The direction of the electrical connector can be moved by repositioning the solenoid coil. Push down, rotate and lift the coil to remove. Reposition and refit in reverse order.

Important! Cross bond copper pipework to maintain earth continuity.
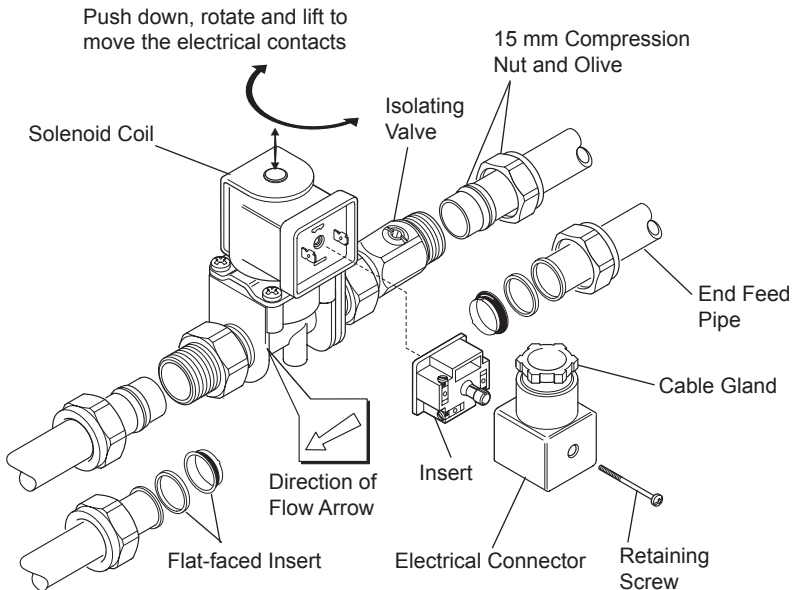
Installation of SV1015 Solenoid Valve

3.2 SV2022/SV2028 Solenoid Valve

Important! The SV2022 and SV2028 Solenoid Valves must be fitted horizontally (with the Solenoid Coil at the top).

1. Connect the pipework to the inlet/outlet of the valve (Refer to illustration). We recommend the use of union type fittings (not supplied) to ease removal of the valve if required.
2. Unscrew the electrical connector retaining screw and remove the electrical connector. Remove the retaining screw from the connector.
3. Lever the insert out of the electrical connector using a small screwdriver.
4. Fit the electrical wiring through the cable gland and connect it to the terminals in the insert. Wiring polarity is not important.
5. Reassemble the electrical connector and refit it to the solenoid coil. Tighten the retaining screw.
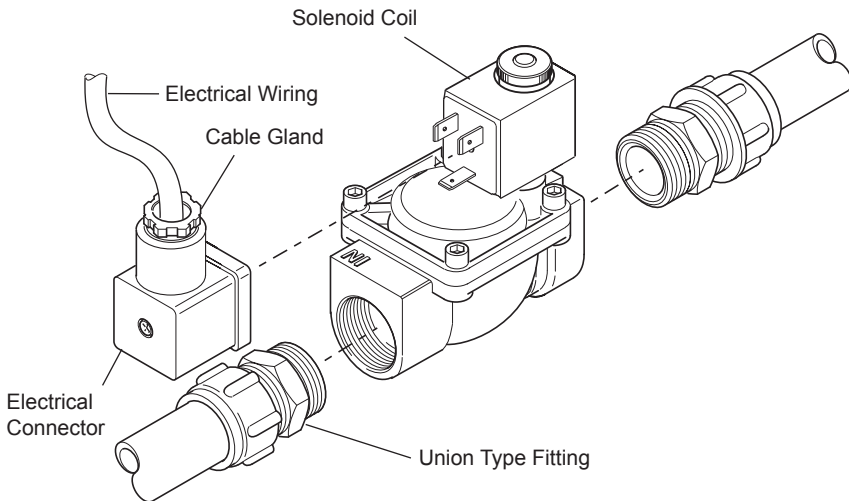
Installation of SV2022/SV2028 Solenoid Valves

3.3 SV3022 Solenoid Valve

1. Connect the pipework to the inlet/outlet of the valve (Refer to illustration). We recommend the use of compression/union type fittings (not supplied) to ease removal of the valve if required.

2. Unscrew the electrical connector retaining screw and remove the electrical connector. Remove the retaining screw from the connector.

3. Lever the insert out of the electrical connector using a small screwdriver.

4. Fit the electrical wiring through the cable gland and connect it to the terminals in the insert. Wiring polarity is not important.

5. Reassemble the electrical connector and refit it to the solenoid coil. Tighten the retaining screw.

6. The SV3022 Solenoid Valve is fitted with a high power coil. A maximum of five SV3022 Solenoid Valves may be connected to one Rada Pulse Control Box.
Important! These must be connected to alternate outputs of the Rada Pulse Control Box (e.g. 1, 3, 5, 7, 9).
Each fuse in the Rada Pulse Control Box supplies a single pair of outputs (e.g. Fuse 1 = Valve 1 / Valve 2, Fuse 2 = Valve 3 / Valve 4).
Do not connect multiple SV3022 Solenoid Valves to any one fuse.
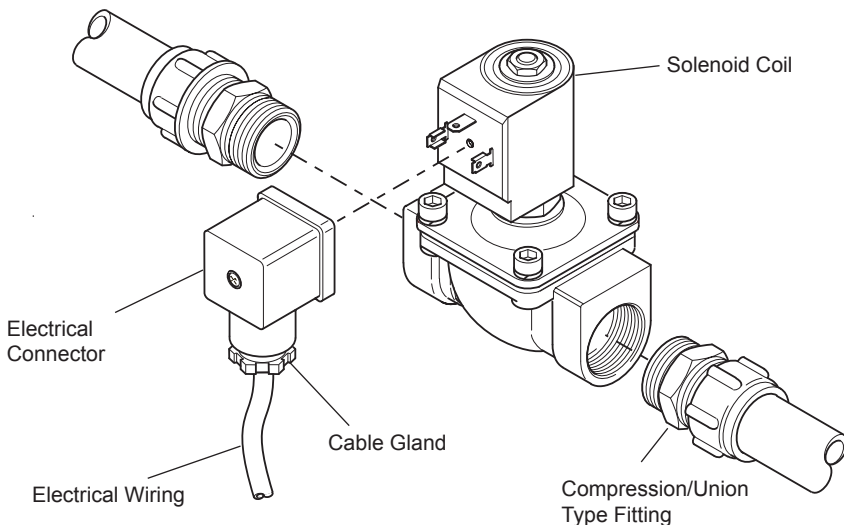
Installation of SV3022 Solenoid Valve

4. 3M™ Connectors

The sensor cables on the Pulse Operating Systems can be lengthened by using the 3M™ connectors included with the fixing pack. The cable to be joined must be to the same specification as the integral sensor cable (LAPP Unitronic LIYY). It is recommended that the total cable length should not exceed 6 metres.

Important! Do not use the 3M™ connectors to shorten the cable when replacing a sensor. Only use the 3M™ connectors supplied with the fixing pack. After compressing they will release sealant, 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.

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.
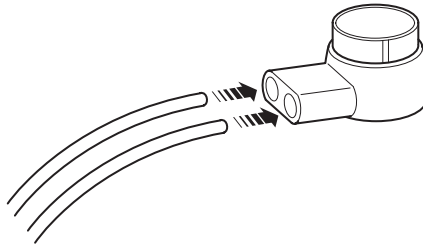
2. Using a pair of pliers, compress the connector to complete the connection.
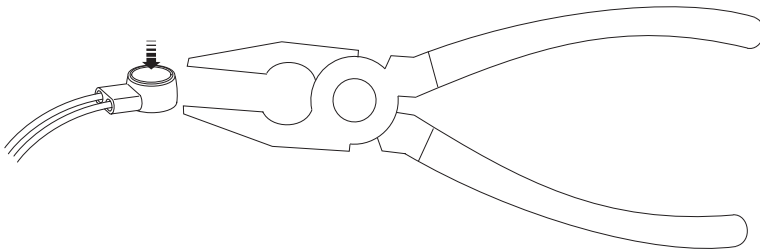
COMMISSIONING / PROGRAMMING

The Rada Pulse Hand Held Programmer is required to commission the Control Box for use with the Pulse Washroom System. The Programmer package contains a written manual with programming details for the Rada Pulse Washroom system.

Installation Check

When the installation of the Rada Pulse system is complete, the installer should check that all Pulse sensors, Solenoid Valve/s and other system components (Keyswitch, Auxiliaries etc) are connected to the appropriate terminals in the Rada Pulse Control Box. Isolate the water supply to the system and switch on the electric supply.

If the Rada Pulse Hand Held Programmer is not available the Sensor function can be checked at the Control Box Sensor terminal screws by using a DVM voltmeter. When a connected Pulse Sensor is activated the measured voltage should momentarily reduce and then return back to 12V AC ± 1V.

Commission the System

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

Refer to the Rada Pulse Hand Held Programmer Product Manual 'Operation, Program a Channel' for full commissioning instructions.

Remove the threaded plug at the top of the Control Box and, with the arrow facing forward, plug the Hand Held Programmer into the mating socket. By accessing the Programmer Menu: 'System Info Channel' a check can be made to determine if Sensors are Active (Sensor triggered) or Inactive (Sensor not triggered). The Sensor Input channels must be programmed before the System Info Channel menu can be used in this way.

Each Rada Pulse Sensor input channel will be at the default setting 'Shower On for 30 seconds' when mains power is connected to the Rada Pulse Control Box for the first time. The Hand Held Programmer must be used to program each connected sensor input of the Rada Pulse Control Box to the required system function (Shower, Urinal, WC, Washbasin). Unused (unconnected) Sensor input channels of the Rada Pulse Control Box do not require programming and must be left at the default setting 'Not in Use'.

Rada Pulse Relay Box (accessory)

The auxiliary channels of the Rada Pulse Control Box must be programmed if a Rada Pulse Relay Box has been installed. Refer to the Rada Pulse Hand Held Programmer Product Manual.

Final Commissioning - Walk Test

For **Pulse Ceiling Sensors 124, 125** and **126**, operate the Sensor by body movement within the sensor target area (for adjustment refer to section: **'2. Install the Sensors, 2.3 Rada Pulse 124, 125 and 126 Ceiling Sensors'**).

For **Pulse 124 Washbasin Sensor** operate the sensor by hand movement. The target area should be adjusted to the front central area of the washbasin.

For **Pulse 125 Single Urinal,** or **Pulse 126 Group Urinal**, the target area should be aimed and adjusted appropriate to use.

For **Pulse 120, 129** and **LR Sensors** operate the sensor by hand movement close to the front of the sensor lens.

For **Pulse 122 Sensor**, operate the sensor using body movement within 550 mm of the front of the sensor lens.

Check each Pulse Sensor within the installation. Make sure that the Pulse Washroom System provides the required output when each Sensor is triggered and that the water flow is not initiated by passers-by outside the Sensor detection area.

It may be necessary to turn on the water supply to check that water can flow in response to Sensor activation.

Warning! Additional testing must be carried out if hot water disinfection has been installed to make sure that hot water cannot accidentally be discharged onto persons who may be present within a showering or washbasin facility. Particular care must be taken during installation to make sure that the hot water disinfection system cannot be accidentally triggered. An effective interlock system is required. The disinfection system must only be operated by designated and trained persons (Refer to the Rada Pulse Hand Held Programmer Product Manual for programming instructions).

Always observe safety precautions. Test the complete washroom system to check that all Pulse Sensors, Valves and Auxiliaries are programmed and operating to customer requirements.

MAINTENANCE

General Maintenance Procedures

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

Always isolate the power supply before carrying out any work on the Rada Pulse system.

When ordering spare parts, please state the product type, i.e. Rada Pulse, and identify the part name and number (refer to section: **'Spare Parts'**).

Should an internal malfunction occur then this will probably require component renewal.

Components are precision-made, so care must be taken while servicing to avoid damage.

Periodically check that the cover screws or cap screws are tight.

Cleaning Procedures

External surfaces may be wiped clean with a soft cloth, and if necessary, a mild washing-up type detergent or soap solution can be used.

Warning! Many household and industrial cleaning products contain mild abrasives and chemical concentrates, and should **not** be used on these products.

Preventative/Precautionary Maintenance

(Planned Maintenance Programmes)

The frequency and extent of attention required will vary according to prevailing site and operational conditions.

Six-monthly

Visual Checks: The product and cabling should be checked for signs of wear or damage, etc. If items are damaged they should be replaced.

Solenoid Valves: Where appropriate check internal component condition. Inspect for debris, scale deposition, deformation, damage, corrosion, etc. Maintain or renew as necessary.
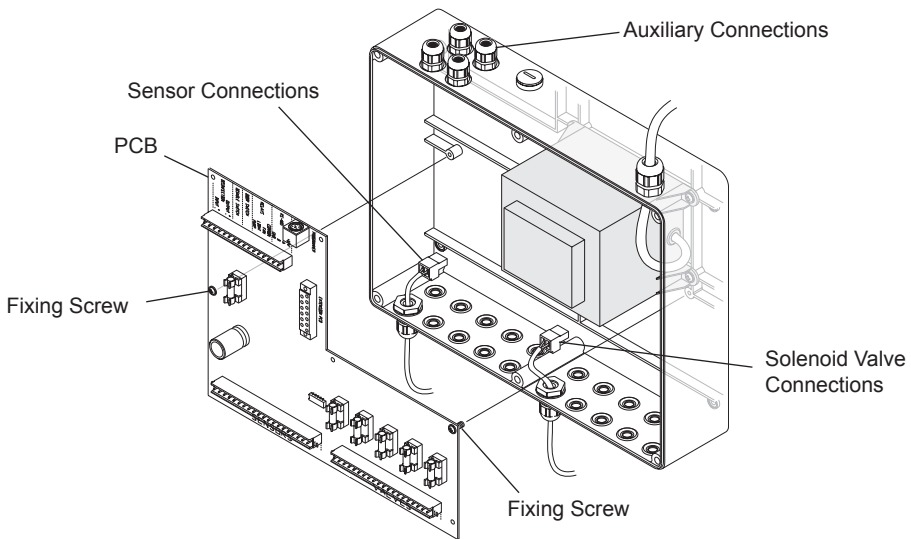
Replacement Procedure - Transformer

1. Isolate the electrical supply to the control box.
2. Remove the cover from the control box.
3. Disconnect the Electrical Cable that connects the transformer to the PCB.
4. Unscrew the cable gland and carefully pull the electrical cable through it.
5. Remove the fixing screws (4 off) that secure the transformer to the control box.
6. Remove the transformer from the control box.
7. Refit the new transformer in reverse order.
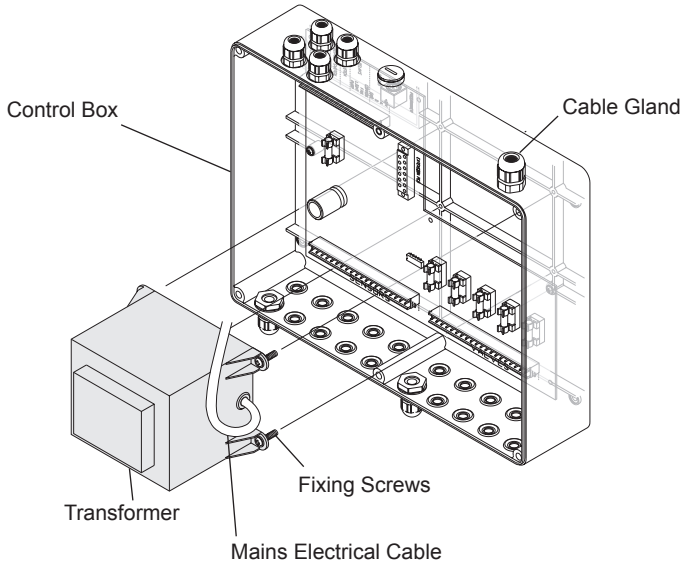
Removal and Installation of the Transformer

Replacement Procedure - PCB

1. Isolate the electrical supply to the control box.
2. Remove the cover from the control box.
3. Disconnect the Electrical Cable that connects the transformer to the PCB.
4. Make a note of the positions of the connections for the sensors and the solenoid valves.
5. Disconnect the solenoid valves and the sensors connections from the PCB.
6. If necessary, disconnect any auxiliary connections from the PCB.
7. Loosen cable glands on top of box to assist PCB removal.
8. Remove the fixing screws (2 off) that secure the PCB to the control box.
9. Remove the PCB from the control box.
10. Refit the new PCB in reverse order.
11. The control box will now need programming with the hand held programmer (refer to the Product Manual for the hand held programmer).

Removal and Installation of the PCB

Maintenance Procedure - Transformer Fuse

1. Isolate the electrical supply to the Control Box.
2. Remove the cover from the Control Box.
3. Remove the fuse in the side of the transformer.
4. Refit the new fuse in reverse order.

Rada SV1015 (HP) Solenoid Valve

If the solenoid valve fails to close when the power is disconnected, it needs cleaning:

1. Isolate the water supplies and relieve the pressure by operating an outlet.
2. Switch off the power. Unscrew the retaining screw and remove the electrical connector from the solenoid coil. If the Solenoid Coil is 'open circuit' then it requires replacement (normal impedance is approximately 10 ohms).
3. Remove the four screws, the spring, the bracket, the armature housing and the armature.
4. Carefully remove the diaphragm assembly.
5. Inspect the rubber of the diaphragm. If the rubber is perished or damaged, then replace the valve.
6. Clean out any residue or debris from the body and make sure that all the holes are clear.
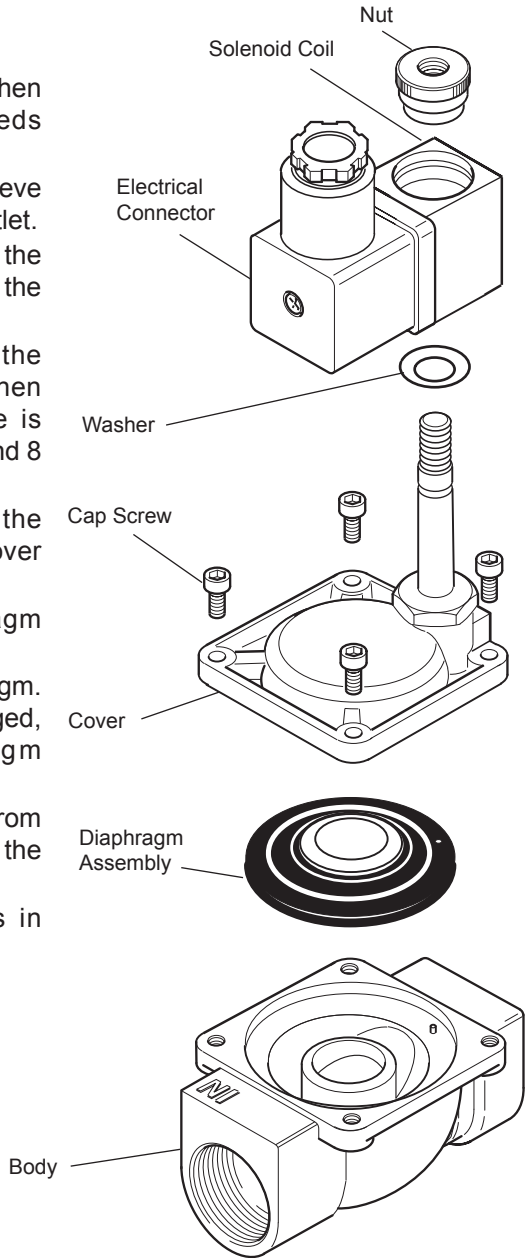7. Reassemble the components in reverse order.
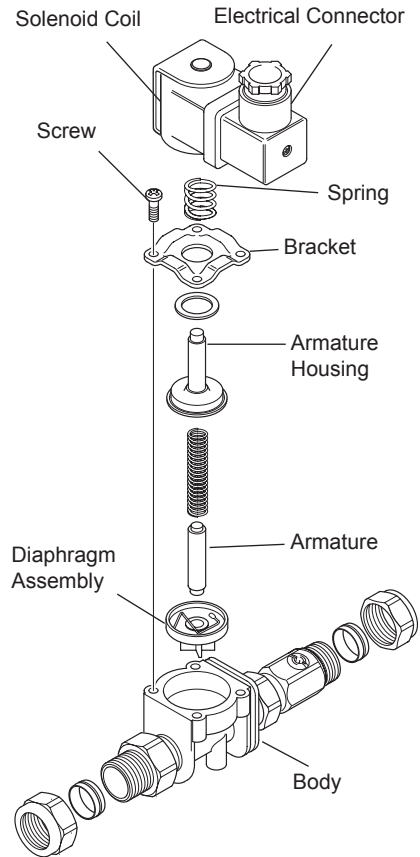
Cleaning the SV1015 Solenoid Valves

SV2022/SV2028 Solenoid Valves

If the solenoid valve fails to close when the power is disconnected, it needs cleaning:

1. Isolate the water supplies and relieve the pressure by operating an outlet.
2. Switch off the power and remove the nut and the washer which hold on the solenoid coil.
3. Remove the solenoid coil. If the solenoid coil is 'open circuit' then replace it (Normal impedance is approximately 3 ohms (2022), and 8 ohms (2028)).
4. Remove the four cap screws the washers, the cover and the cover spring.
5. Carefully remove the diaphragm assembly.
6. Inspect the rubber of the diaphragm. If the rubber is perished or damaged, then replace the diaphragm assembly.
7. Clean out any residue or debris from the body and make sure that all the holes are clear.
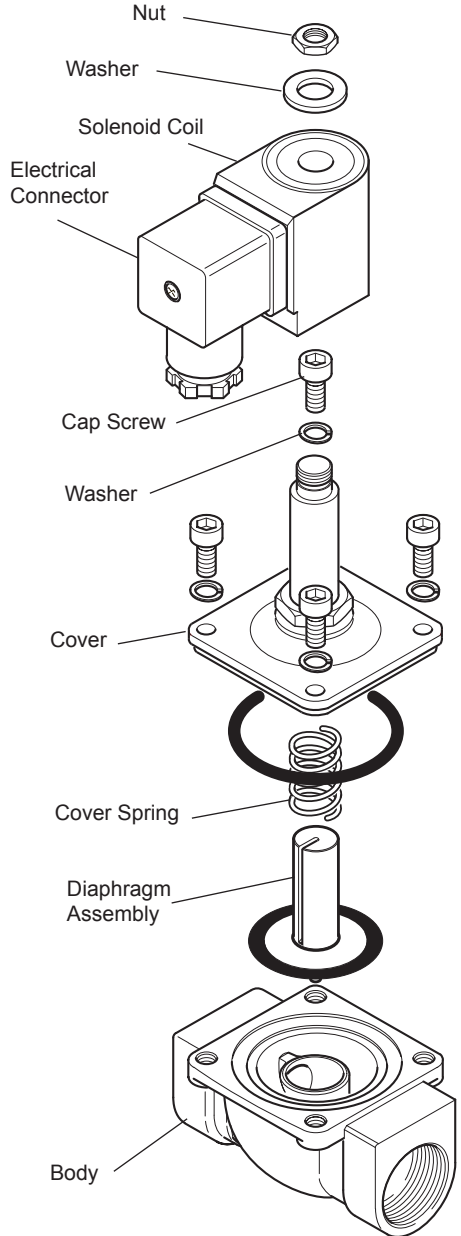8. Reassemble the components in reverse order.

Nut

Solenoid Coil

Electrical Connector

Washer

Cap Screw

Cover

Diaphragm Assembly

Body

Cleaning the SV2022/SV2028 Solenoid Valves

40

SV3022 Solenoid Valve

If the solenoid valve fails to close when the power is disconnected, it needs cleaning:

1. Isolate the water supplies and relieve the pressure by operating an outlet.
2. Switch off the power and remove the nut and the washer which hold on the solenoid coil.
3. Remove the solenoid coil. If the solenoid coil is in 'open circuit' then replace it (Normal impedance is approximately 2 ohms (3022)).
4. Remove the four cap screws the washers, the cover and the cover spring.
5. Carefully remove the diaphragm assembly.
6. Inspect the rubber of the diaphragm. If the rubber is perished or damaged, then replace the diaphragm assembly.
7. Clean out any residue or debris from the body and make sure that all the holes are clear.
8. Reassemble the components in reverse order.

Nut
Washer
Solenoid Coil
Electrical Connector
Cap Screw
Washer
Cover
Cover Spring
Diaphragm Assembly
Body

Cleaning the SV3022 Solenoid Valve

FAULT DIAGNOSIS

	Symptom		Cause/Rectification
1.	All outlets do not operate (e.g. basin, shower, urinal, W.C.).	**a.**	Check that the water supply is turned on.
		b.	If there is no power in the control box, check the fuse in transformer and the supply to the transformer.
		c.	Check the output fuses.
		d.	Use the hand held programmer to make sure each channel is functioning correctly (refer to the Hand Held Programmer Product Manual).
		e.	Replace the control box PCB.
2.	Outlet fails to operate after sensor is activated.	**a.**	Make sure of 9 - 10 V AC power supply at sensor/solenoid connections in control box.
		b.	Use hand held programmer to perform a system info check for the Rada Pulse control box (refer to the Hand Held Programmer Product Manual).
		c.	Check that the sensor and/or solenoid connections on the PCB are pushed fully home and the connections on the sensor and/or solenoid are secure.
		d.	Defective fuse in control box. Replace.
		e.	Check sensor working correctly. Replace if necessary.
		f.	Check solenoid working correctly. Replace if necessary.
		g.	Check solenoid coil. Replace if necessary.
		h.	Check that solenoid is working correctly. Service the valve body or replace if necessary.
3.	Outlets run continually or for long periods.	**a.**	Plug in hand held programmer and check timing for outlet. Reprogram if necessary.
		b.	Check solenoid valve. Maintain or replace parts if required.
4.	Outlets only run for a short period of time.	**a.**	Plug in hand held programmer and check timing for outlet. Reprogram if necessary.
5.	Nuisance tripping of ceiling sensor.	**a.**	Check correct alignment of the sensor (refer to section: **'Installation'**).
		b.	Check that the detection area is not subject to a rapidly changing heat field due to close proximity or draughting heat source.

SPARE PARTS

Rada Pulse Control Box

422.75   Lid Assembly
422.76   Base Assembly
422.77   Blanking Plugs (x10)
422.78   Cable Glands (x10)
422.79   Mains Cable Gland and Threaded Plug
422.80   Transformer Assembly
422.81   PCB
422.82   Channel Output Fuse, 2.5 Amp
422.83   Supply Fuse (12 V) 400 mA T
422.84   Mains Input Fuse (located in transformer, not shown) T 2.5A H 250 V
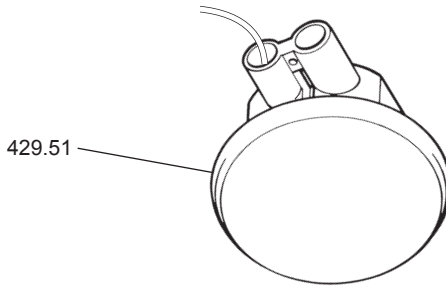   (**Important!** Use only Rada Approved Fuse, Part No. 422.84)
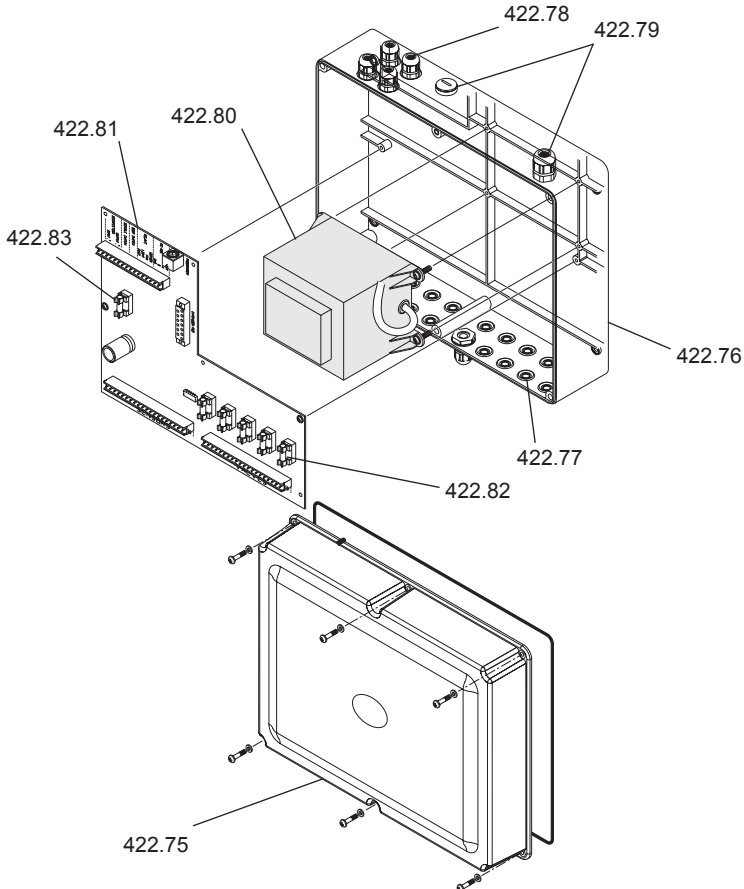
Rada Pulse 120/122 Sensors

422.78   Cable Gland Pack (not illustrated)
422.85   Cover Plate Assembly
422.86   Fixing Pack - components identified 'A'
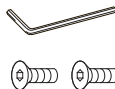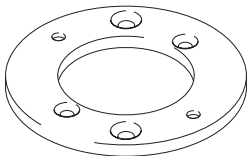422.87   Two Part Connector Pack (not illustrated)
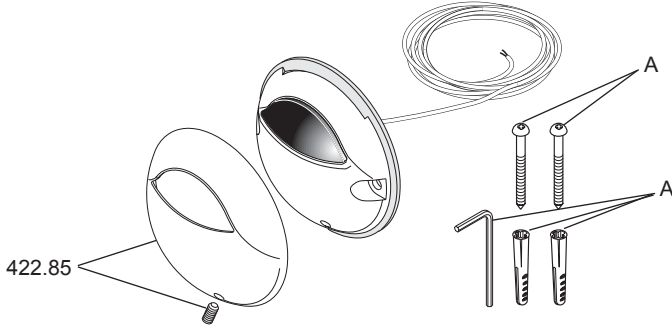
Rada Pulse 124/125/126 Ceiling Mounted Sensor

429.51   Cover, Pulse Ceiling Sensor

Rada Pulse 129 Sensor

915.06   Rada Mounting Plate 129

Rada mounting plate 129: Supplied with 2 x M5 x 12 mm stainless steel screws and 1 x 2.5 mm hexagonal wrench used to secure the Rada Pulse 129 sensor for extra fixing security.
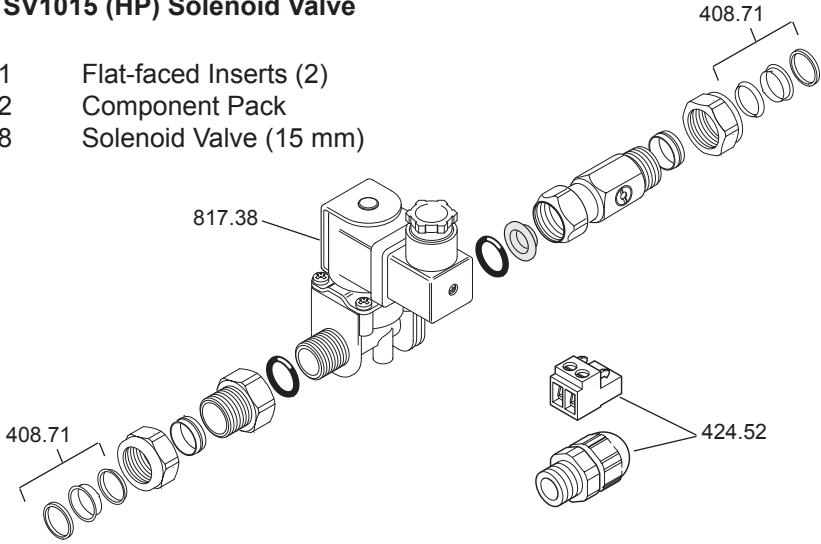
Rada Pulse LR Sensor

1640.033   LR sensor backplate assembly
            (LR sensor backplate, 2 x M6 x 175 mm fixing studs with fittings)
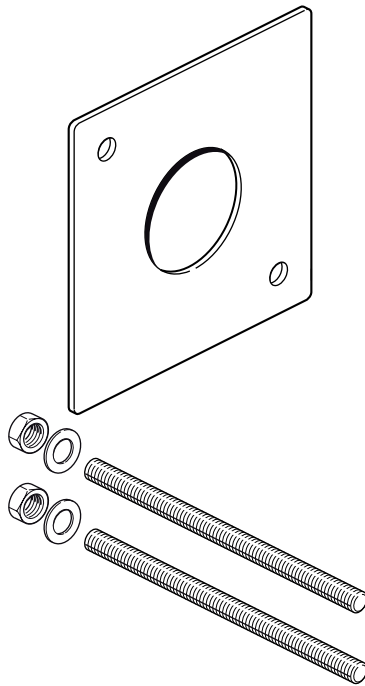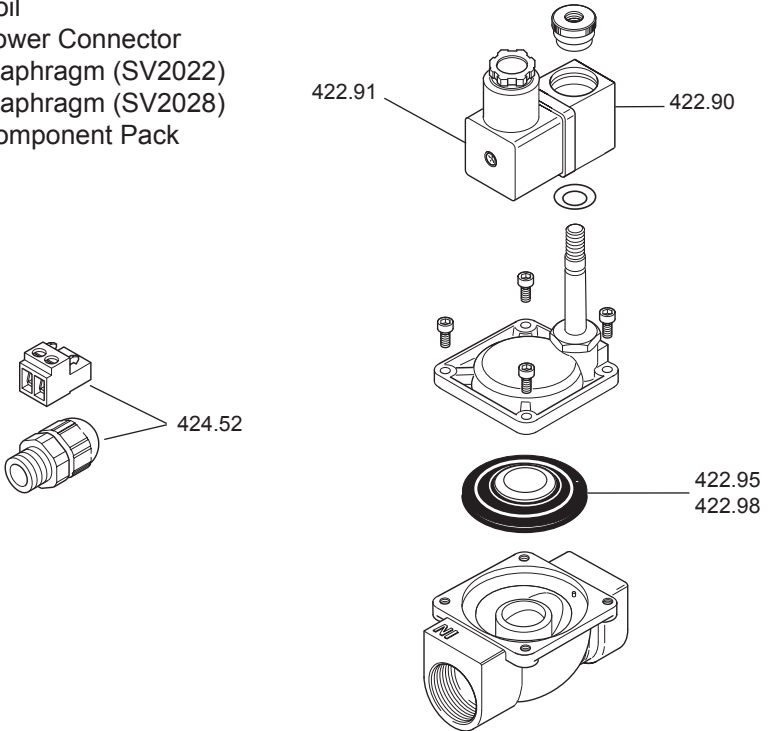
Rada SV1015 (HP) Solenoid Valve

408.71   Flat-faced Inserts (2)
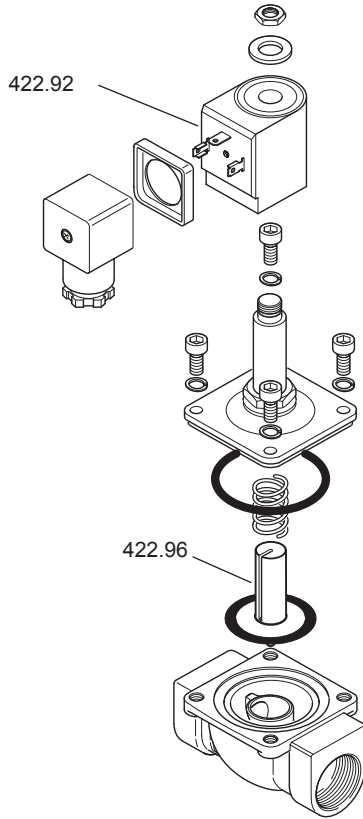424.52   Component Pack
817.38   Solenoid Valve (15 mm)

SV2022 and SV2028 Solenoid Valve

422.90   Coil
422.91   Power Connector
422.95   Diaphragm (SV2022)
422.98   Diaphragm (SV2028)
424.52   Component Pack

SV3022 Solenoid Valve

422.92   Coil
422.96   Diaphragm Assembly

422.92

422.96

CUSTOMER CARE

Guarantee of Quality

Kohler Mira Ltd. guarantee this product against any defect in materials or workmanship for the period of one year from the date of purchase.

To be covered by this guarantee, service work must only be undertaken by Kohler Mira Ltd. or by their approved agents.

Not covered by this guarantee

Damage or defects arising from incorrect installation, improper use or failure to maintain in accordance with the instructions in this product manual, including the build-up of limescale. Defects or damage if the product is taken apart, repaired or modified by a person not authorised by Kohler Mira Ltd. or by their approved agents.

After Sales Service - how we can help you

We have a network of fully trained staff ready to provide assistance, should you experience any difficulty operating your Rada equipment.

Spare Parts

All functional parts of Rada products are kept for up to ten years from the date of final manufacture. If during that period, our stock of a particular part is exhausted we will, as an alternative, provide an equivalent new product or part at a price equating to the cost of repair to the old, bearing in mind the age of the product.

All spares are guaranteed for 12 months from date of purchase. Spares that have been supplied directly from us can be returned within one month from date of purchase, providing that they are in good order and the packaging is unopened.

Note! Returned spares will be subject to a 15% restocking charge and authorisation must be obtained before return.

Customer Care Policy

If within a short space of time of installation the product does not function correctly, first check with the operation and maintenance advice provided in this Product Manual to see if the difficulty can be overcome. Failing this, contact your installer to make sure that the product has been installed and commissioned in full accord with our detailed installation instructions. If this does not resolve the difficulty, please ring your nearest Rada contact, who will give you every assistance and if appropriate, arrange for your local service engineer or agent to call on a mutually agreeable date.
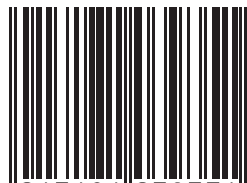
Contact:

5 013181 039351

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