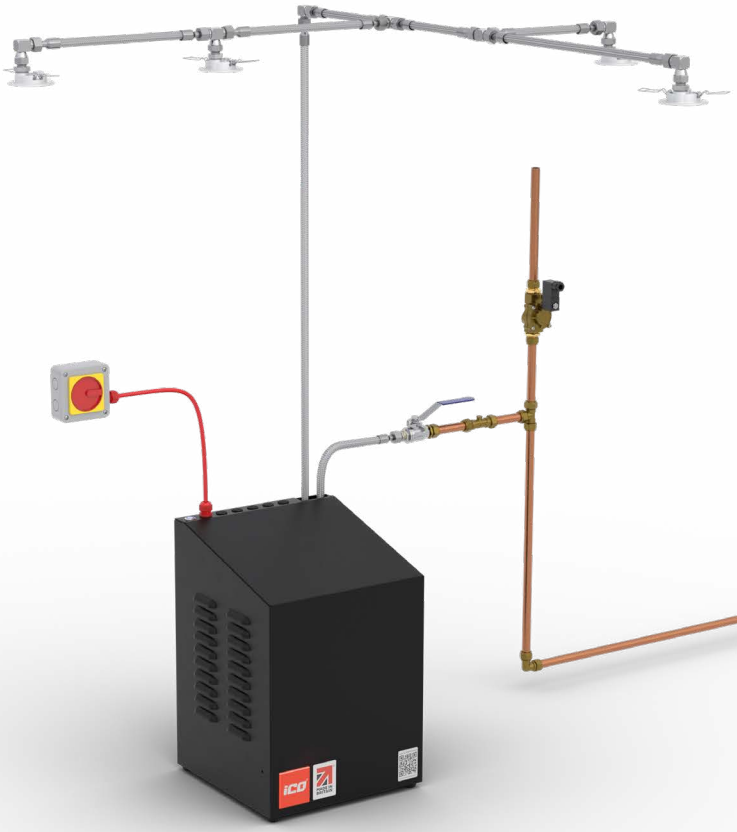
Next Gen Fire Suppression Products

Design Installation Operation Manual



Industry leaders in domestic and residential fire suppression systems

Schedule of Amendments

Revision	Date	Description of Amendments
Rev 00	**16/02/2020**	1st issue.
Rev 01	**23/02/2020**	Recommendations for residential category system
Rev 02	**23/04/2020**	Fault sounder added on control board Disable self-test feature added Updated wiring diagrams Notes on new pump PRV pressure updated Notes on 3rd party testing & product approval Updated safety notes Notes on BS9991 & ADB
Rev 03	**15/06/2020**	Zone Valve GSM Monitoring Troubleshooting guide Startup current Test certificate
Rev 04	**26/08/2020**	Nozzle distances from sources of heat Nozzle density added How to set the run time How to disable the self-test Battery fault added to trouble shooting guide Pump Full Load current Updated schematics to incorporate the GSM module
Rev 05	**14/06/2021**	Nozzle part number updated BSI Verification certificate included Beep fault code Updated Compliance with building regs Operation of the float switch
Rev 06	**09/11/2021**	Flat roofs building recommendation Sloped roof with shallow void recommendation Twin pump arrangement note to always set to 30min run time Pre-action arrangement description updated
Rev 07	**25/01/2023**	Maintenance recommendations updated, includes updating the control board software. Periodic replacement of batteries and flow switches Change of wording from fire compartment to compartment. BS 8485 definition of compartment Additional details provided for connecting to smoke detection Note to be careful not to have the discharge hose clash with motor moving parts Recommendation on sleeving and fire stopping penetrations where pipework passes through walls LPCB ISO 9001 Certificate Recommendations not to move the pump by gripping the internal components
Rev 08	**27/05/2023**	Additional notes on updated regarding maximum compartment size of 32sqm and compartment definition in BS 8458. Page 10 Nozzle spacing example drawings updated. Page 11 Notes on not exposing equipment to freezing temperatures during storage and transit. Page 17 Notes on not exposing nozzles to high temperatures during transport and storage. Page 15 LCD display text descriptions added to troubleshooting. Page 39 Expanded notes on compartment definitions Notes on testing connections to 3rd party equipment during commissioning. Page 26

Schedule of Amendments (cont.)

Revision	Date	Description of Amendments
Rev 09	**28/04/2025**	CE declaration updated. Page 49 BSI certificate Updated. Page 45 Notes on filters for hard water areas. Page 10 Expanded notes on fire compartmentation size. Page 10 Notes on 57°C bulbs in shallow voids below flat roofs Page 15 Expanded notes on power supplies. Page 25 Pump Silence Buzzer Button. Page 18 Notes on Fire & Fault Relays. Page 26 Notes on inspecting nozzles prior to installation. Page 22 & 28 Highlighted notes on installing battery monitoring, Page 28 Recommendations on remote monitoring Page 31 Updated indicative maintenance schedules to include periodic changing of the flow switches. Page 35 Updated indicative maintenance schedules to include checking for the latest and updating the control board software. Page 66 End of life disposal. Page 38 Troubleshooting updated to include low or no system pressure produced by the pumps. Page 41 User manual separated into new document, which can be found at https://ico-products.com/documents/
Rev 10	**01/08/2025**	LPCB certificate updated. Page 51 BSI certificte updated. Page 52, 53 Declaration of Performance certificate updated. Page 54, 55 EU Declaration of Conformity certificate updated. Page 56 FIA membership certificate updated. Page 57 Made in Britain certificate updated. Page 58

Table of Contents

Table of Contents

Table of Contents (cont.)

Introduction

Manual Scope

This manual provides only our recommendations for the design and installation of an iCO® High Pressure Water Mist fire suppression system comprised of one or more iCO® V2 Pumps together with one or more nozzles of the types contained within this manual.

Although the system has been tested to BS 8458:2015, it does not assure installation compliance, which is solely the responsibility of the installer.

All data herein is offered for reference. While iCO® believes the information is accurate, dimensions and figures are approximate, and this document is provided without any guarantee or warranty.

These systems must be designed and installed by qualified individuals. Because the content of this manual is not comprehensive, anyone installing these systems must be trained and fully knowledgeable about all aspects of the system and its components and accepts all related risks.
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Introduction (cont.)

For many years, water mist fire suppression systems have proved their worth in protecting life and property in industrial and commercial settings. The emergence of water mist nozzles that engage a fire at an earlier stage, combined with the fact that most fire-related deaths occur in homes, led to the development of systems specifically designed for residential and domestic environments. A properly designed, installed, and maintained water mist system can detect, suppress, and control a fire in its early phase, then activate an alarm. By rapidly lowering heat and smoke output, it provides more time for occupants to escape or be rescued.

iCO®'s High Pressure Water Mist fire suppression system provides rapid, discreet, and effective protection. Its lightweight nozzles sit just 3mm below the ceiling, remaining unobtrusive while delivering full coverage. These nozzles connect to a compact pump unit via flexible pipework, shortening design and installation time. The iCO® pump unit features a self-test function, works with all fire panels, and offers fire and fault n/o and n/c contacts. Tailored for domestic and residential settings, iCO® offers dependable protection with minimal impact on the property.

Key Features & Benefits

Water Requirement
The iCO® system is designed to operate using the lowest flow and pressure possible.

Rapid response
The iCO® water mist system quickly eliminates all three elements that cause a fire (heat, fuel and oxygen).

Reliable activation
iCO® nozzles are highly reliable and can be activated by a double knock trigger (heat and smoke) as an option to reduce the risk of false activation.

Localised suppression
Only the nozzle nearest the fire will operate: protecting other areas of the property from water damage.

Minimal water damage
On average iCO® uses 80% less water than traditional sprinklers, minimising water damage when activated.

Fully accredited
The iCO® system has an IP rating of IP53 and meets the fire performance tests outlined in BS:8458.

Real time monitoring and alerts
iCO® System GSM Monitoring provides real time alerts to your smart phone in case of emergency or fault.

Low maintenance
The iCO® pump has a removable cover so that the internal components can be serviced on-site if needed.

Easy installation
iCO® simple design and flexible hoses make installation a breeze when compared to conventional sprinkler systems.

Discreet and compact design
The iCO® pump unit will fit in most kitchen cabinets. Our nozzles are the most discreet on the market and can be colour matched to any colour.

Highly adaptable
iCO® adaptability means the system can be installed in almost any residential or domestic category project.

Environmentally friendly
The iCO® system only uses water from the mains when needed; saving vast amounts of water.

Cost efficient
The iCO® system connects directly to the current water supply; no need to upgrade the mains or install a tank.

Automated self testing
The iCO® pump unit automatically tests itself once a month to ensure the unit is functioning correctly. Unlike other systems no water is used and no drain is required.

System Design

This manual contains manufacturers recommendations for the design, installation and commissioning of the iCO® fire suppression system. This manual should be read in conjunction with the iCO® installer code of practice, and the following applicable standards:

BS 8458:2015
BS 9251:2021
BS 7671:2018

(Other standards may apply)

The system design package should conform with the expectations of UKAS accredited installer schemes.

Initial Considerations

Before undertaking the design of a domestic or residential water mist system for a specific property, the designer should evaluate at least the following factors before starting work on the project:
a) the risk to be protected.
b) the type of occupancy of the property (i.e. domestic or residential).
c) the water supply requirements and availability.

NOTE: In buildings where there is a mix of residential and commercial use (e.g. where flats are above shops), it is generally appropriate to protect the residential parts using BS 8458, and the commercial parts using BS 8489-1) or BS EN 12845.

Extent of Water Mist Protection

Water mist system protection should be provided in all parts of the dwelling, with the exception of the following areas, which may be excluded unless required by a fire strategy or risk assessment:

a) bathrooms fitted with a door and with a floor area of less than 5m^2.
b) cupboards and pantries fitted with doors and with a floor area of less than 2m^2, and rooms in which the smallest dimension does not exceed 1m, where the walls and ceilings are covered with non-combustible or limited-combustible materials.
c) non-communicating, attached buildings such as garages, boiler houses, etc.

NOTE 1: "Non-communicating" means separated from the protected premises by not less than 30 mins fire resisting construction in accordance with the relevant part of BS 476 or the equivalent European Standard, for example:
• BS 476-21/BS EN 1365-1 for load bearing walls.
• BS 476-22/BS EN 1364-1 for non-load-bearing walls and partitions.
• BS 476-21/BS EN 1365-2 for floors.
• BS 476-23/BS EN 13381-1 for suspended ceilings.
• ad hoc BS 476-20/BS EN 1366-3 for penetrations of walls and floors by services.

The parts of the BS 476 fire resistance test standards are to be read in conjunction with BS 476-20. The European fire resistance test standards are to be read in conjunction with BS EN 1363. Depending on the design of the building, there might occasionally be a need to refer to other fire resistance test standards. Certain authorities might require 60 mins fire-resisting construction.

d) crawl spaces.
e) uninhabited loft/roof voids.
f) ceiling voids.
g) external balconies permanently open to the outside.

NOTE 2: A fire strategy or risk assessment might demonstrate that extensive spread of fire or smoke, particularly between rooms and compartments, is likely to take place and therefore that the fire risk in the area is such that water mist coverage is necessary.

Use of Water Mist Systems as a Compensatory Feature

There are occasions when a suppression system is used as a means of demonstrating compliance with building regulations or to compensate for, or overcome, circumstances where a building is unable to achieve compliance with guidance issued in support of building regulations. For example:
• an older building where the existing construction cannot achieve the required fire resistance appropriate to the use of the premises.
• a new build that cannot meet the necessary access requirements for fire appliances.
• loft conversions where it is either not practical or not possible to secure adequate means of escape.

Where suppression systems are being installed in England and Scotland as a compensatory feature to address a specific risk or hazard it may be acceptable to protect only part of a building. Refer to the Authority Having Jurisdiction, Approved Document B and relevant British Standards.

System Design (cont.)

Category of System

The designer should at an early stage determine which category of system is applicable, as this affects various design considerations, such as the water requirements for the system. The category of system should be determined by the type of building as shown below.

Domestic occupancy

Single family dwellings such as:
• Individual dwelling house.
• Individual flat.
• Individual maisonette.
• Transportable home.

Houses of multiple occupation (HMOs) *(Buildings with more than two floors and five or more lettable bedrooms should be treated as a residential occupancy)*

Bed and breakfast accommodation *(Buildings with more than two floors and five or more lettable bedrooms should be treated as a residential occupancy)*

Boarding houses *(Buildings with more than two floors and five or more lettable bedrooms should be treated as a residential occupancy)*

Blocks of flats 18m or less in height and with a maximum total
floor area of 2,400m^2 *(This height is the height of the floor of the top storey above ground) (Where the fire strategy requires the communal rooms and corridors to be protected by a water mist system, then the building should be treated as a residential occupancy)*

Residential occupancy

Blocks of flats greater than 18m in height *(This height is the height of the floor of the top storey above ground).*

Sheltered and extra housing.

Residential care premises.

Residential rehabilitation accommodation.

Dormitories (e.g. attached to educational establishments).

Hostels.

Minimum Drawing Requirements

It is important to produce consistently high-quality designs that follow the design guide as laid out in this manual. A preliminary design in CAD or similar should be produced for every job to enable on-going revisions. On completion an “as fitted design” should be produced and issued to the client with the certificate of compliance.

All drawings must display the following information as a minimum:

• Project Name
• Project Address
• Description of the area covered
• Revision
• Status of Drawing
• Date of Issue
• Scale
• Nozzle positions dimensioned from the wall
• Indicative pipework route
• Pump position
• Pipework calculation
• Location of all straight connectors

BS 8458 Compartment Definition

3.10 Compartment

Area completely enclosed by walls and a ceiling, where any single internal opening is not more than 2,500mm in width, and has either:
a) a lintel depth of not less than 200mm; or
b) a single opening of not more than 900mm in width without a lintel, with no other openings.

NOTE: This is not the same as a compartment as described by Approved Document B which notes a compartment as being completely enclosed by a walls and floors of a fire resisting construction. For the purpose of design, we follow the above BS8458 definition and guidance on compartments.

Compartments as defined in BS 8458 should not exceed 32sqm.

Compartments that are over 32sqm should only be protected with agreement from the relevant project stakeholders and should be noted on the system completion certificate.

System Design (cont.)

Pump Location

it is recommended to install the pump within a low level, well-ventialted area, with at least 100mm of space around the top and sides.

Refer to pump datasheet for full details on pump dimensions and mountings.

Water Supplies

Our recommendation is to install a single pump for domestic occupancies which will allow for two nozzle operation which is in line with the area of operation required for the equivalent sprinkler system as specified in BS9251 category 1 & 2.
For residential occupancies we would recommend a dual pump system which will allow for 4 nozzle operation which is in line with the area of operation required for the equivalent sprinkler system as specified in BS9251 category 3. This should always be set to a 30-minute run time.

Where the mains water supply connection serves only the water mist system, the flow rates at each pump must be at least the minimum flow rate specified in the pump datasheet.

Where the mains water supply connection serves both the water mist system and the domestic or residential occupancy supply, the water mist system should be capable of providing the water demand at the pump/s by:
a) the operation of an automatic priority demand valve; or
b) for domestic occupancies, the flow rate at the pump plus at least 25 lpm; or

NOTE 1: Attention is drawn to the water regulations, which might require a greater minimum flow rate.

c) for residential occupancies, the flow rate at the pump plus at least 50 lpm.

NOTE 2: Attention is drawn to the water regulations which might require a greater minimum flow rate depending on the design demand for the occupancy.

Flows should be tested and verified at the main water supply pipe to the property.

Hard Water Areas

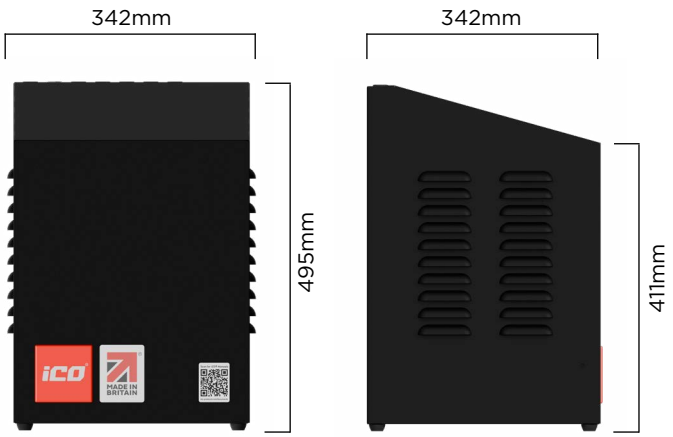
For areas where there is hard water it may be necessary to fit water filters to prevent damage to the pumps. Filters must be able to maintain the minimum flow rate and pressure, as specified in the pump datasheet, on the outlet side of the filter.

Pump System Installation - High Pressure Pump V2 (PU001-00)

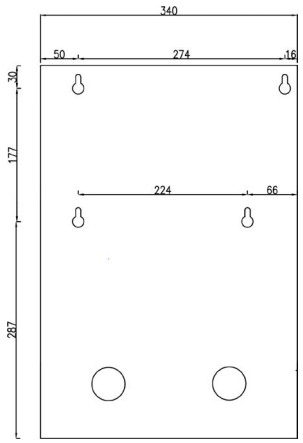
Technical Data

Dimensions:	342mm (W) x 342mm (D) x 495mm (H)
Clearance requirement:	100mm of clear space required around on each side for ventilation
Voltage rating:	240V
Current rating:	13A
Power Supply Connection:	Dedicated 16A fused supply from the NON RCD side of the board. Fire rated cable required
Inlet connection:	1/2" BSP
Outlet connection:	3/8" BSP 60° Cone
Water requirement:	12 lpm @ 1 bar Minimum
Pump run sound pressure level:	79db @ 1 m
Pump run Flow switch:	0.5lpm
Weight:	24kg
Serviceability Access:	Removable front cover with security screws
Internal Components:	Corrosion resistant brass and stainless steel
Mounting:	Floor or wall mount
Standing Pressure:	Mains water pressure 1-10 bar
Running Pressure:	Adjustable 10-100 bar
Mains low pressure monitoring:	Set at 0.5 bar
Mains water over pressure protection:	Pressure relief set at 20bar
Pump run time:	10min or 30min (adjustable with pump and actuated ball valve shut off)
Operation:	Wet type or pre-action linked to smoke detection
Self-test:	Monthly self-test
Heat protection:	Thermal fuse set at 100°C
Fire relay:	2x NO / NC volt free 30vDC 1 A
Fault relay:	2x NO / NC volt free 30vDC 1 A
Priority demand valve output:	12v 1A
Power out:	12v 1A
Power monitoring:	Battery backed up audible alarm for fault monitoring
Battery monitoring:	Check every 8mins if battery is detached
System indication:	Internal LCD display
Control valve:	Integral isolation valve, drain valve & pressure gauge
Strainer:	Internal 500 micron filter
IP Rating:	IP53
Manual controls:	Internal and optional external manual start and stop button

Dimensions



Wall Mount Details



System Design (cont.)

Pipework

Flexible thermoplastic hydraulic hose should only be used behind a fire rated barrier, or the flexible pipework should be run outside of the fire risk.

Stainless steel tubing should be used for any areas where pipework is exposed inside the fire risk. Only stainless steel fittings are to be used on stainless steel pipework.

Nozzles for exposed pipework should not be positioned more than 300mm below the slab.

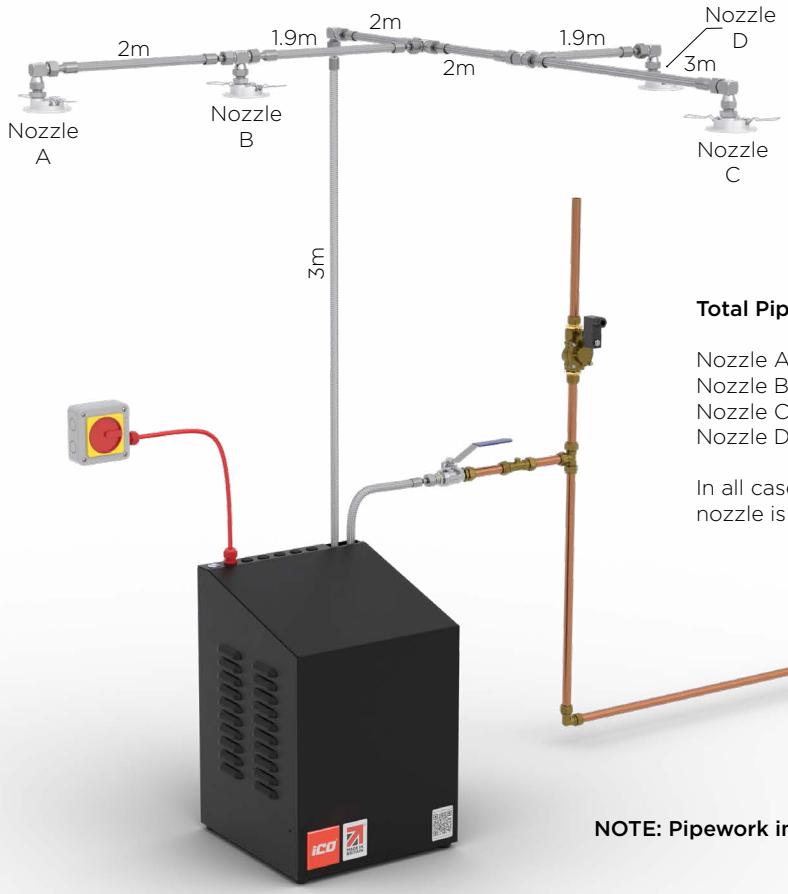
Pipework, fittings and nozzles should never come into contact with any other services.

Maximum Pipe Lengths

Domestic Category

The total pipe length from the pump to the furthest nozzle should not exceed 45m.
Please note 45m is not the cumulative pipe work length for the whole system it only applies to the distance from the pump to the furthest nozzle along the route that the water would travel. There is no restriction on the cumulative pipework length for the whole system.

EXAMPLE:



Total Pipe Lengths

Nozzle A = 3m + 2m +1.9m + 2m = 8.9m (< 45m ok)
Nozzle B = 3m + 2m + 1.9m = 6.9m (< 45m ok)
Nozzle C = 3m +2m + 2m + 3m = 10m (< 45m ok)
Nozzle D = 3m + 2m + 2m + 1.9m = 8.9m (< 45m ok)

In all cases the distance from the pump to the furthest nozzle is less than 45m.

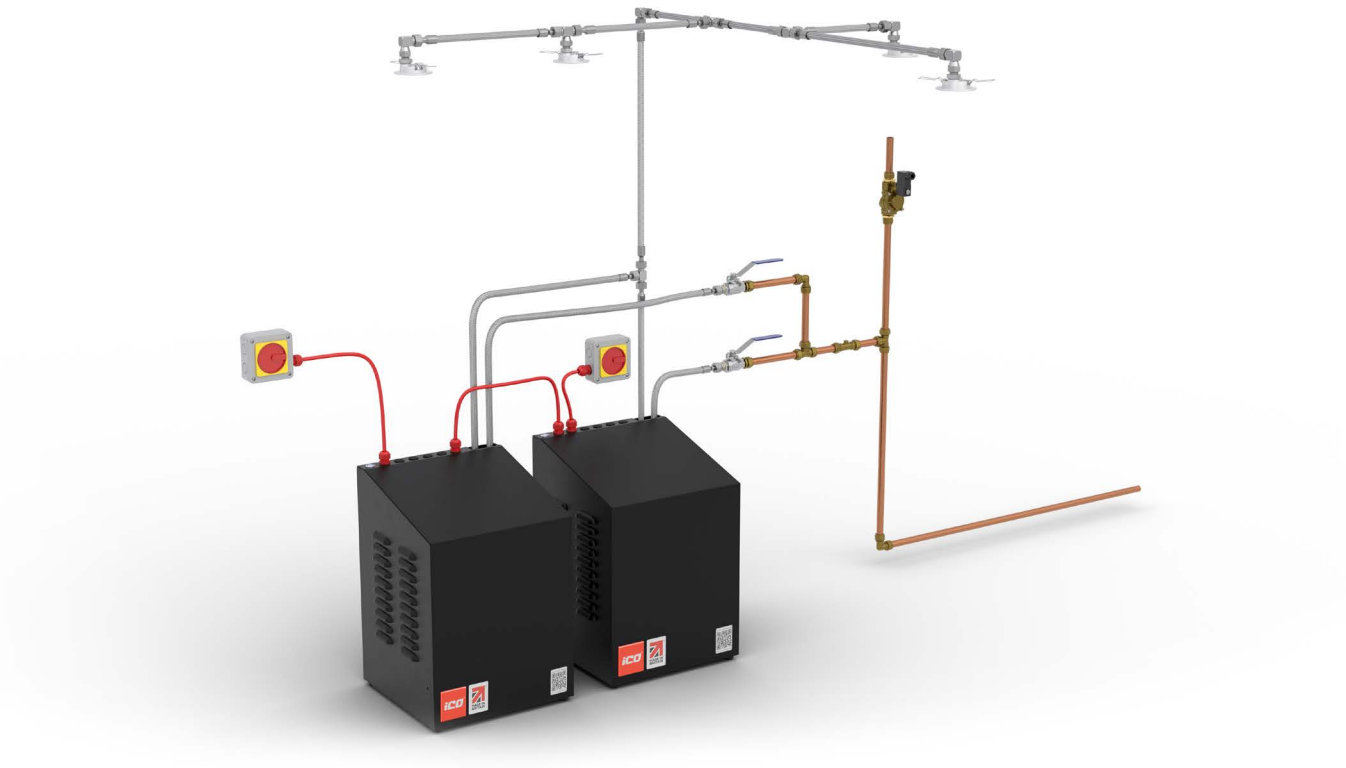
NOTE: Pipework imagery not to scale

As an alternative to using the pre-engineered pipework lengths you may fully hydraulically calculate the system to achieve extended pipework lengths.

System Design (cont.)

Residential Category

All residential systems must be fully hydraulically calculated. There are no pre-engineering pipework lengths for this application.
NOTE: This must always be set to a 30-minute runtime for the software to operate correctly.



Protection from Freezing

System components should never be exposed to temperatures below 4°C.

Care should be taken not to expose equipment to freezing temperature during storge or transport prior to installation. Freezing temperature may cause damage to the internal components.

Zone Valves

In large systems zone valves can be installed to provide an indication of flow on the fire alarm to enable the fire brigade, facilities management or occupants to identify the source of the fire more quickly.

The valve would typically be installed 1 per demise or 1 per floor in a block of flats. The valve must be installed in the vertical orientation and must be connected to an addressable fire alarm system with an interface with a programmable delay function. The delay function is required to ensure that there are no unwanted alarms during system test cycles. We would recommend a delay of at least 10 seconds.

The valve also contains lockable test/drain and isolation valves so that they system can be maintained or modified without the need to drain the whole system down. The arrangement also has a pressure gauge to show when the system it empty and safe to be worked on.

Nozzle Distance from Sources of Heat

Nozzle bulbs should be rated to 30°C above ambient temperature. Below is only a minimum recommendation. Installers should carry out their own assessments of heat source risks.

Heat source	Minimum distance from edge of heat source to sprinkler with temperature rating 57°C to 77°C mm	Minimum distance from edge of heat source to sprinkler with temperature rating 79°C to 107°C mm
Side of open or recessed fireplace	900	300
Front of recessed fireplace	900	900
Sauna or steam room door	1500	900
Coal- or wood-burning stove	1500	300
Kitchen range	1000	225
Wall oven	450	225
Hot air flues	450	225
Uninsulated heat ducts	450	225
Uninsulated hot water pipes	450	150
Side of ceiling- or wall-mounted hot air diffusers	600	300
Front of wall-mounted hot air diffusers	900	450
Hot water heater or furnace	150	75
Light fixture 0 W–250 W	150	75
Light fixture 250 W–499 W	300	150
Buildings with flat roofs and shallow voids	Install higher temperature nozzles.	
Sloped roofs with shallow voids	Install higher temperature nozzles.	

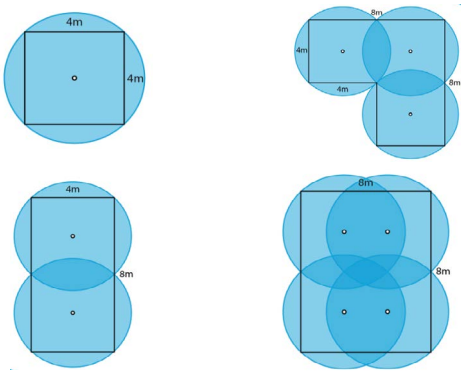
Care should be taken to ensure nozzles are not exposed to high temperatures during storage or transit. Vehicles left in direct sunlight on warm days can become very hot with temperatures exceeding 57°C causing frangible bulbs to break.

57°C bulbs are more sensitive to ambient heat activations than 68°C bulbs so extra care should be to ensure that they are not installed in areas that could be subject to high temperatures such as shallow voids below flat roofs or sloped roofs.

System Design (cont.)

Nozzle System Installation - High Pressure Nozzle MK1 (PU002-02)

NOZZLE SPACING: FLAT CEILING



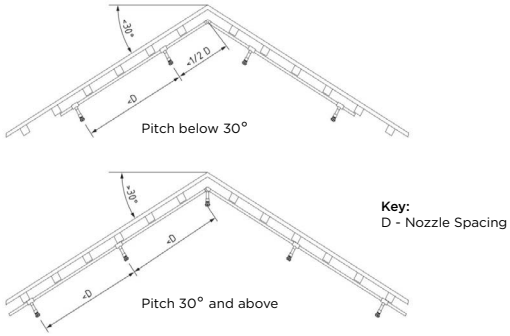
Installation Notes:

[1] 4x4m Grid (16m²)

[2] Max 2m from wall

[3] 2m minimum distance between nozzles

NOZZLE SPACING: SLOPED CEILING



Installation Notes:

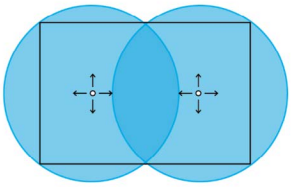
[1] When installing iCO® misting nozzles on sloped ceilings, the position of the nozzle should be determined by the pitch of the ceiling.

[2] Where the pitch is below 30° iCO® nozzles should be mounted at standard spacing when measured in line with the pitch of the ceiling.

[3] Where the pitch is 30° and above, the first row of iCO® nozzles should be mounted within 300mm radially from the apex of the ceiling.

[4] All nozzles should be mounted perpendicular to the ceiling as shown below.

NOZZLE ORIENTATION

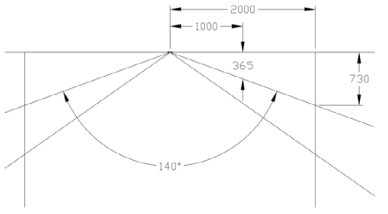


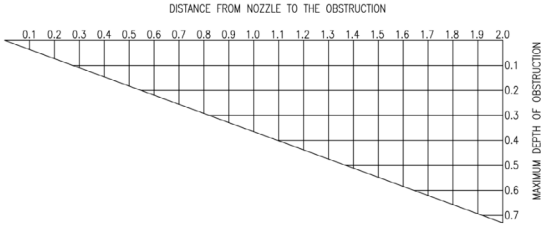
Installation Notes:

[1] The preferred nozzle outlet orientation is perpendicular to the walls of a room.

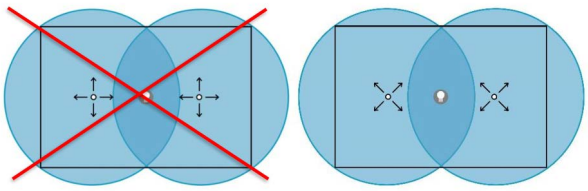
[2] Nozzles should be positioned away from obstructions to allow a 140° spray pattern.

DISTANCE FROM OBSTRUCTIONS





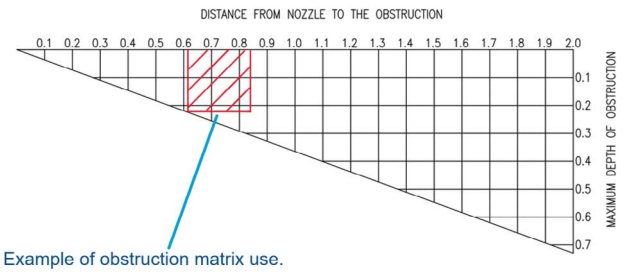
NOZZLE ORIENTATION: PENDANT LIGHT FITTINGS



Installation Notes:

[1] Nozzle spray angles should not be directed at pendant light fittings.

[2] The spray direction can be rotated 45° to spray into the corners of a room to avoid pendant light fittings. Nozzles should be at least 500mm away from a pendant light fitting.



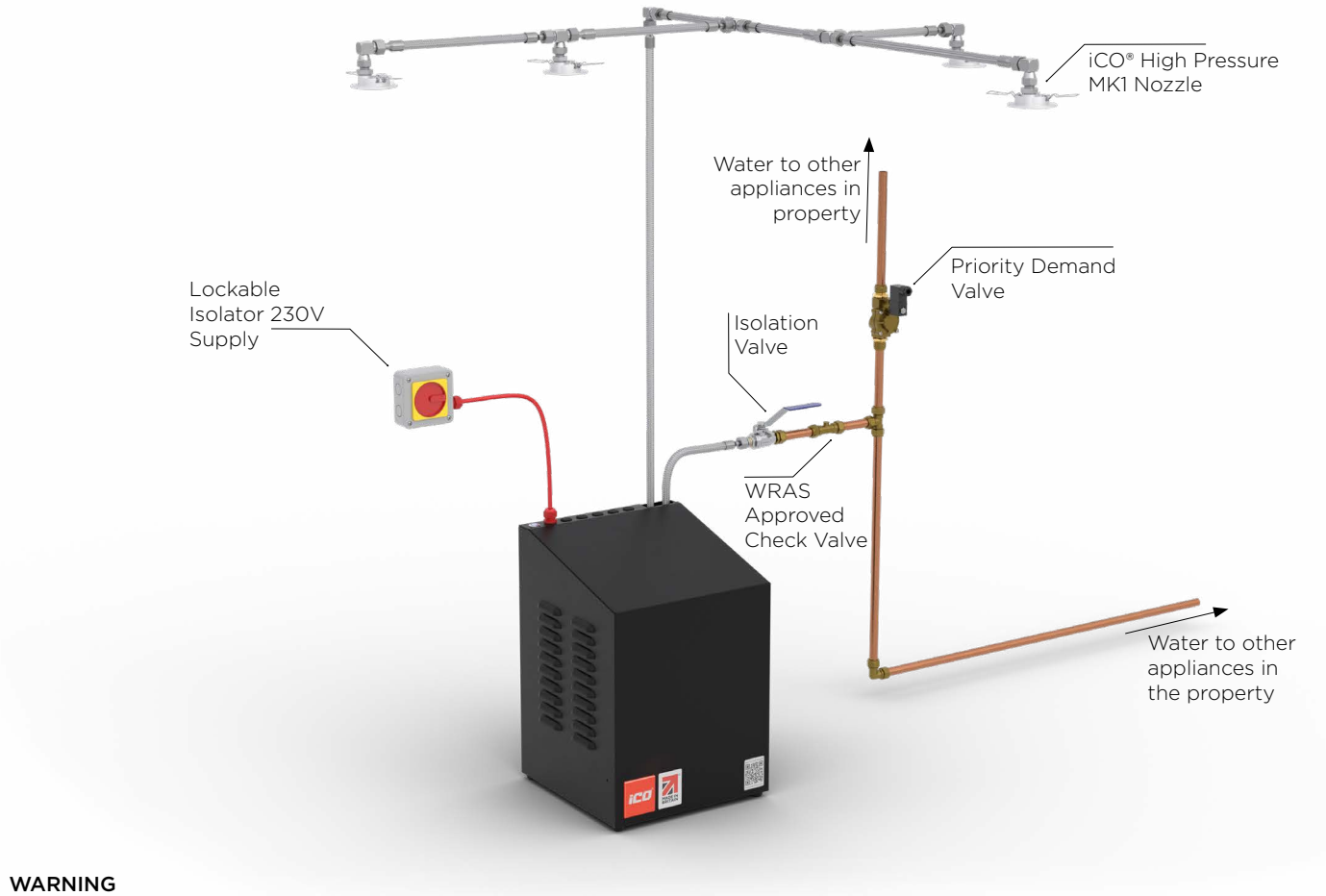
Example of obstruction matrix use.

If obstruction fits wholly inside matrix, nozzle positioning is unaffected.

Maintenance and Storage Notes:

[1] The nozzle should be maintained in accordance with BS8458

[2] Minimum/Maximum ambient temperature 4°C/40°C



WARNING
Mains voltage electricity and high-pressure water are present within this product. Care should be taken when installing the product. Installation should only be carried out by trained engineers.

Appropriate PPE (eye protection, gloves, safety boots, hard hat etc) should be worn at all times when installing the product.

Water Supply Pipes

If the water supply pipe runs through the protected area, the supply pipe to the pump should be run in copper or pipework of a similar fire and heat resistance.

If plastic pipework is used for the water supply to the pump, it should be installed behind an appropriate fire resisting barrier.

Dead legs are not permitted in plumbing systems as this can permit a build-up of bacteria that can be harmful to health. Where teeing off to the iCO® system ensure a WRAS approved double check valve is installed at the closest point to the tee.

Pump Power Supplies

Power supplies should be 240V 16A fused power supply direct from the board non-RCD side run in fire rated cable. It is recommended to have a lockable isolator at the pump for isolation purposes.

BS 8458 says circuit breakers are not suitable. An alternative to circuit breakers would be a cartridge fuse holder. Example below.

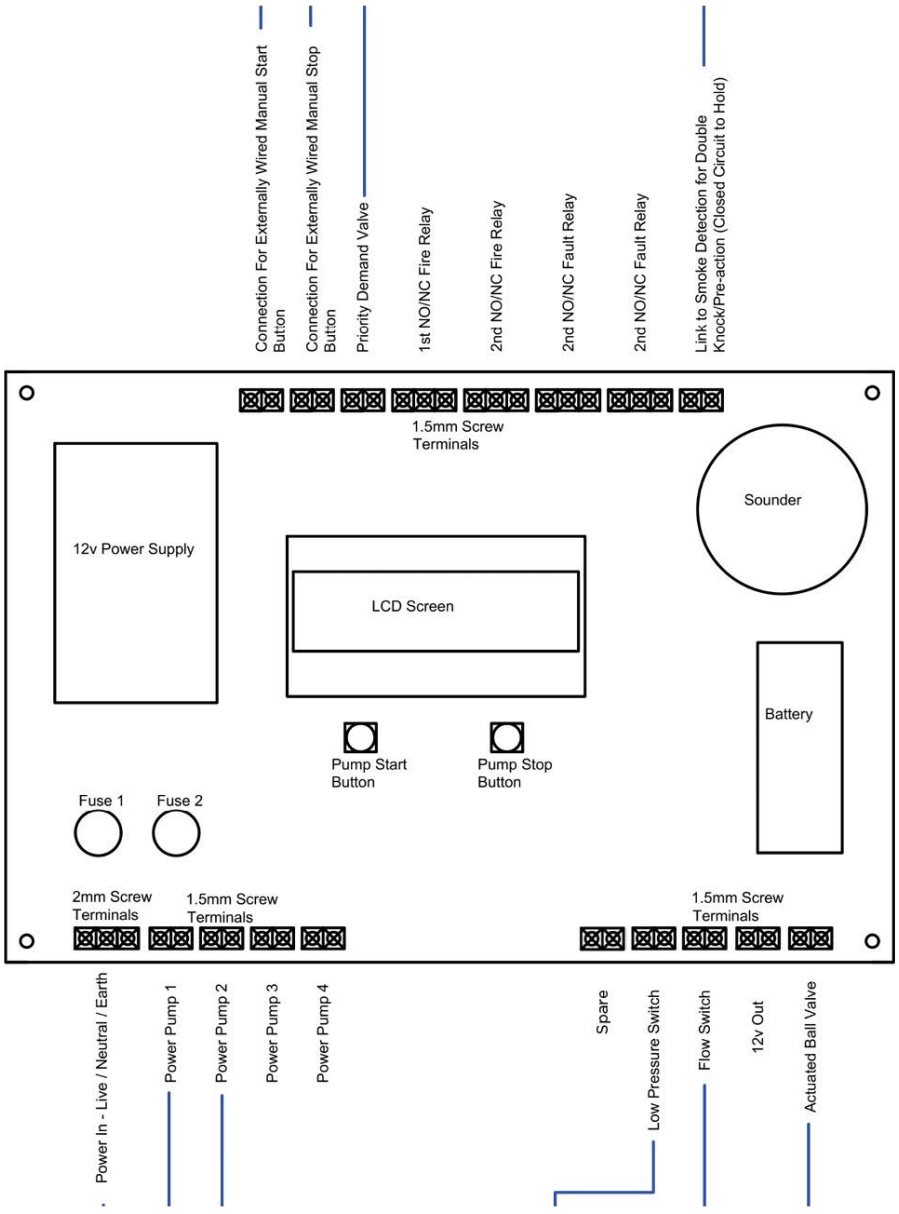
Some of the recommendations above from BS8458 may contradict the wiring regulations which will result in a variation from the wiring regs or the fire system. In this event the client should decide on what configuration they would prefer.

Pump Stop/Reset/Mute Button

The pump silence buzzer button has the following functions applied to it:

- If the board is in the Test Failed state, pressing Stop simultaneously with Start >=3 seconds resets back to the Idle state.
- If the board is in the alarm state when the pump is running press the button for > 1 second to stop the pump.
- After manually stopping the pump or if the pump run time has expired press and hold the button for 9 seconds to reset the pump. Listen for the actuated ball valve which will signal the reset.
- In any state, pressing and holding for more than 10 seconds activates Alarm Mute, which remains in effect for 24 hours. A single beep confirms that the mute has been toggled on or off.
- If the board is in a Last Test Failed state, pressing Stop simultaneously with Start >=3 seconds resets back to the idle state.

Electrical Monitoring & Control Board Connections



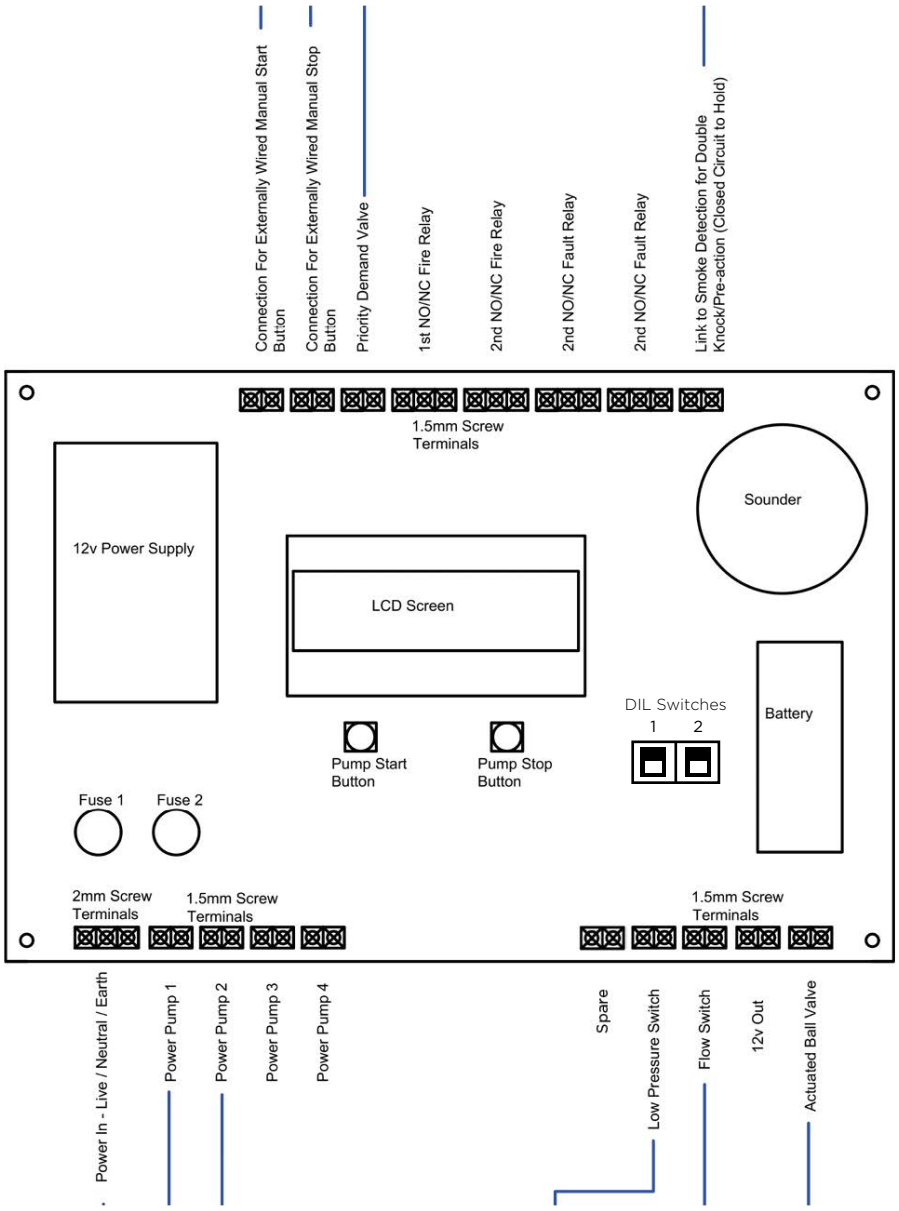
Electrical connection to the smoke detection for using the wet pre-action facility.

Installation & Commissioning (cont.)

Control Board Connections & Run Time

The pump run time can be changed from 10 minutes to 30 minutes by adjusting dil switch 1.
The self-test can be disabled by adjusting the dil switch 2.

1 UP = 10min Run Time
1 DOWN = 30min Run Time
2 UP = Self Test enabled
2 DOWN = Self Test disabled

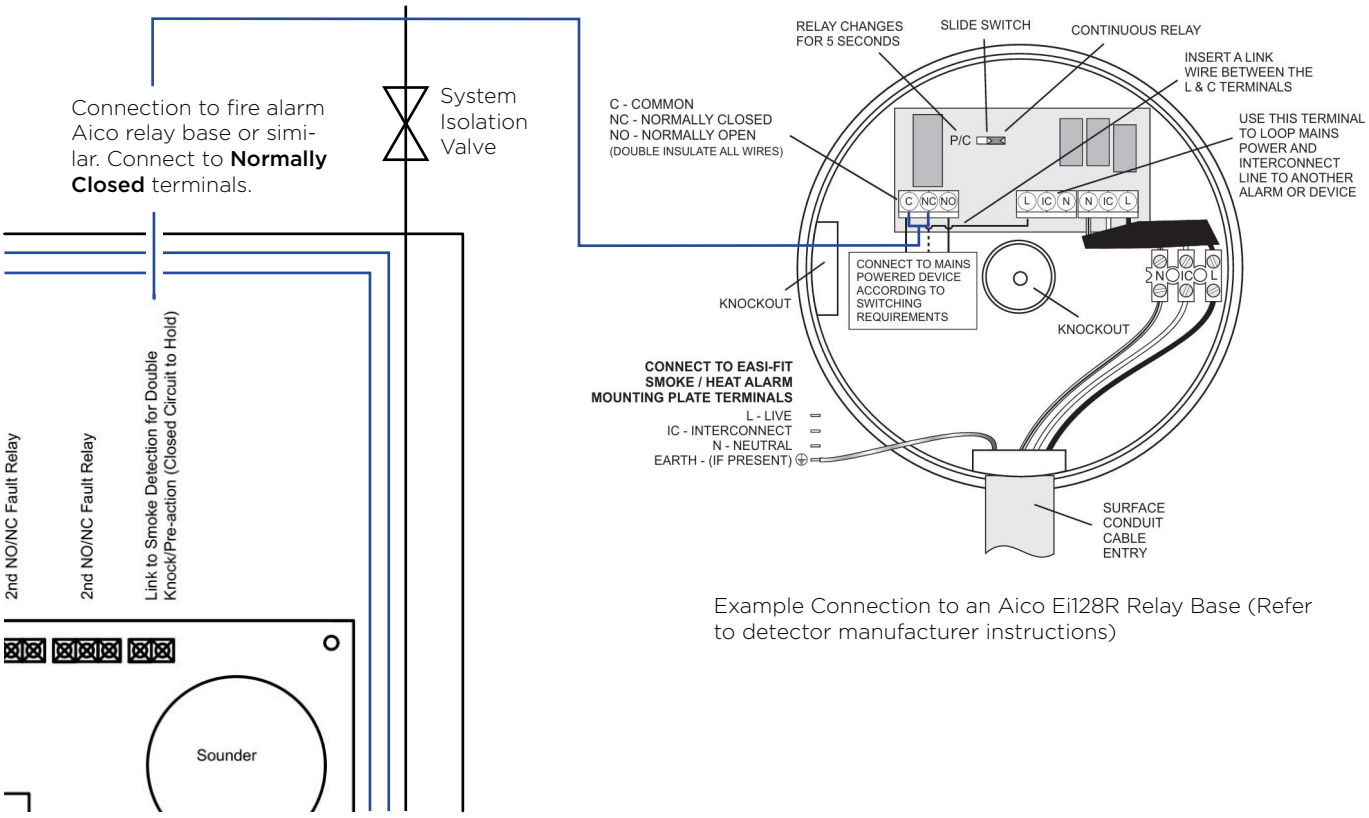


Installation & Commissioning (cont.)

The diagram below shows the wiring connection between an Aico Ei128R relay base and the smoke detection.

The smoke detection connection requires a volt free contact to a normally closed relay (going open on fire alarm operation). NEVER PUT A VOLTAGE INTO THESE TERMINALS. IT WILL DAMAGE THE CONTROL BOARD.

Refer to the full schematic for further details.



Example Connection to an Aico Ei128R Relay Base (Refer to detector manufacturer instructions)

When using this facility, fire detection should be installed in every mist protected room. The fire alarm should be designed, installed and maintained by a competent company. Every fire alarm device should be tested to ensure that signals between the mist and fire alarm equipment operates as expected. It is the responsibility of the mist installer to prove these connections work during commissioning and maintenance.

Fire and Fault Relays

2x Fire and 2x Fault relays have been provided for connection to 3rd party equipment. The relays have normally open and normally closed volt free contacts.

Pipework Installation – Hydraulic Hose

Note: All flexible hose should be installed behind a fire rated barrier such as plaster board, any exposed pipe should be installed in steel pipework. Pipework and other system components must never be exposed to temperatures below 4°C. Flexible hose should be kept away from all heat sources such as central heating pipes or lights. Pipework, fittings and nozzles should never come into contact with any other services.

Flexible Hydraulic Hoses should be provided in accordance with the specifications below.

- Hose – 3/8" Thermoplastic Hose, 9.7mm internal diameter, 160bar working pressure, SAE 100 R7.
- Hose connection – Swaged 3/8" BSP swivel connection or Swaged 3/8" BSP male connection. (Swaged insert must not to be less than 5mm internal diameter).
- Tee or elbow fittings – 3/8" bsp male hydraulic fittings or 3/8" BSP swivel fittings. Sealed with a hydraulic gasket seal and thread lock such as Bondloc 542.

NOTE: No internal diameters after the pump valve set should be restricted below 5mm. The hose must be thermoplastic not rubber. Thermoplastic hose is listed by most manufacturers as having unlimited shelf life, rubber hose has a limited shelf life so should not be used. Please refer to the manufacturers' data for installation instructions and restrictions.

Pipework Installation – Stainless Steel Hose & Stainless Steel Fittings

Corrugated flexible hoses are widely accepted in the fire industry having been used on 3rd party approved flexible drops in commercial sprinklers for many years.

The fully stainless steel construction makes the hose completely heat and fire resistant. It does not rely on a fire resisting barrier to maintain its performance. This provides a significant advantage over the CPVC pipework traditionally used by the residential sprinkler industry.

The hose tails are welded so do not rely on crimping and are 100% factory pressure tested to eliminate the possibility of any leaks.

The stainless steel tube and fittings provide the highest level of corrosion resistance resulting in and extended product lifespan.

Fitting size	3/8"
Fitting thread	3/8" BSP Male
Seal type	60° cone
Nominal size of Hose	3/8" / 10mm
Hose I.D.	10.3mm
Hose O.D.	14.3mm
Hose Weight per metre	0.112
Wire Diameter	0.25
Static bend radius	38mm
Flexing bend radius	140mm
Working Pressure kg/cm2	90
Test Pressure kg/cm2	135
Burst Pressure kg/cm2	360

NOTE: the specifications above should be taken as approximate only

Anti-galling lubricant should always be used when using stainless steel fittings. Always maintain a clearance of at least 50mm between firefighting equipment and any other service.

The specification below is approximate.

Weight per meter empty	0.214
Number of wires	8
Carriers	24
Braid Angle	90 (+/-2)
Braid % Coverage	94
Thickness of strip mm	0.16mm
Wire weight per m	0.102
Hose + SWB O.D.	15.5 +/-0.5
Corrugation per metre	385 (+/-10)

Pipework Support – Hydraulic/Stainless Steel Hose

Where retrofitted it is acceptable to run pipework over the top of plasterboard.

Where it is a new install the 1st fix pipework should be bracketed with rubber lined clips such that it does not fall down to below the ceiling level. Pipe clips should be spaced at approximately 1m intervals.

Pipe clips should be provided before each change of direction.

Pipework Installation – Stainless Steel

NOTE: All flexible pipework should be installed behind a fire rated barrier such as plaster board, any exposed pipe should be installed in steel pipework. Pipework must never be exposed to temperatures below 4°C. Pipework, fittings and nozzles should never come into contact with any other services.

The following stainless steel pipework is suitable for use with our system. Please ensure that you check with you supplier that the pipework is suitable for the pressures involved in the system.

• 10mm x 1mm

For stainless steel pipework we would recommend using DIN 2353 stainless steel compression fittings assembled in accordance with DIN 3859-2 or specific manufacturer's recommendations.

Other branded compression fittings may also be used. Ensure you consult the manufacturer's installation instructions before use.

Pipework Support – Stainless Steel

Where stainless steel pipework is used, we would recommend that it is supported with DIN 3015-1 aluminium pipe clamps in accordance with the specification below. However, any appropriate steel pipe support is acceptable providing that it is of fire-resistant construction i.e. does not contain plastic components.

• DIN 3015-1
• Cover Plate: Galvanized Carbon steel (mild steel) / stainless steel (304/316)
• Welded Plate: Galvanized Carbon steel / stainless steel (304/316)
• Bolts: Galvanized carbon steel / stainless steel (304/316)
• Clamp Body: Aluminium

Pipe clamps should be spaced at not more than 1m between supports.

Pipe clamps should be provided within 300mm of any tee or change in direction.

Pipework Sleeving and Fire Stopping

Care should be taken to ensure that any firestopping materials used to seal penetrations where pipework passes through walls and floors is not sealed with materials that will degrade the pipework overtime. It is recommended to use an appropriate purpose made sleeve where possible.

Nozzle Installation - High Pressure Nozzle MK1 (PU002-02)

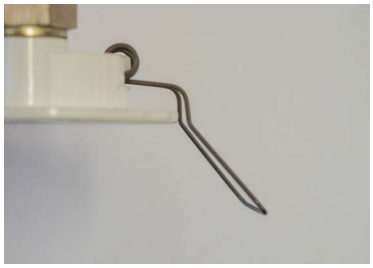
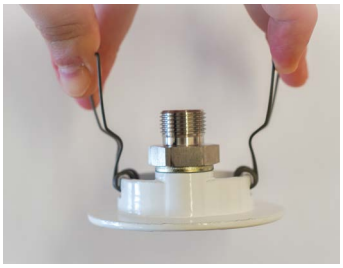
Use a 57mm hole saw to create the holes in the ceiling for fitting the nozzles.

Take extra care when handling and storing the nozzles. Impact from dropping or mishandling can cause microfractures in the bulbs which could lead to failure. Any nozzles that have been dropped or mishandled should be discarded. Do not store the nozzles in temperatures above 40°C.

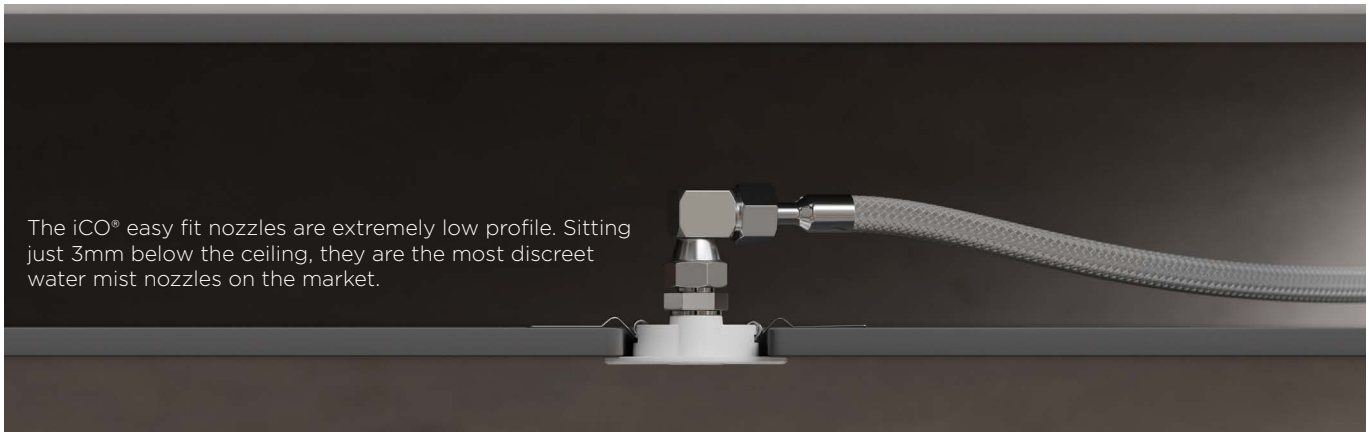
The nozzles come with the adaptor thread locked into place to prevent the internal components from moving around. This should not be removed. If the adaptor is removed or loosened discard the nozzle, do not reinsert the adaptor. Ensure that spanners are held on the adaptor body and the nut. Do not force against the body of the nozzle.

Install retention springs to the nozzle body using the loops provided. Fit to ceiling by bending the springs up towards the pipework until they can pass through the hole provided in the ceiling.



Nozzles should be inspected prior to installation to ensure that they are free from defects. There should be no damage to the exposed paint finish. The bulb should be inspected to make sure that it is in good condition and that the air bubble inside the bulb is present. This can be seen by tipping the nozzle backwards and forwards prior to installation. Any bulbs without an air bubble should be discarded.



Installation & Commissioning (cont.)

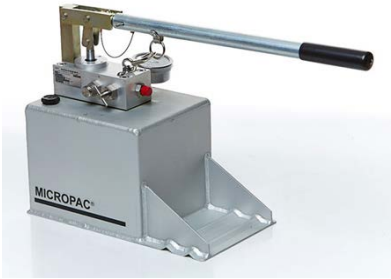
Pressure Testing

The distribution pipework should be pressure tested to not more than 105bar for 1 hour to confirm that there are no leaks on the system. The pump should be fitted with a calibrated gauge.

We would recommend using the Sarum Hydraulics Mircopac test pump MP-A-12-6-N-W-R-G-R-05.

12cc per double stroke to 400 bar, 625mm handle nitrile/ptfe/uhmwp seals for use on water, fitted hold release valve, 63mm gauge to 200 bar.

Sarum Hydraulics Ltd
Unit 1 Danebury Court
Old Sarum Park
Old Sarum
Salisbury
Wiltshire
SP4 6EB
John Foster
T: +44(0)1722 328 388
E: pumpsales@sarum-hydraulics.co.uk



Before pressure testing ensure that any air is bled from the pipework. This can be done by slowly loosening the nozzle at the end of each run to allow any trapped air to escape. Allow any excess water to drain into a bucket. When all of the air has escaped remake the seal.

Legionella

Legionnaires' disease is caused by any type of Legionella bacteria which exists in all mains water. If treating the water, we would recommend spraying chlorine dioxide into the system strainer, the inlet to the pump and the outlet to the system. You should the bleed the system at the most remote point and test the concentration to confirm it is 5 parts per million.

Chlorine dioxide will only degrade when exposed to UV. Therefore, the chlorine dioxide sealed in the pipe should remain effective unless disturbed. During maintenance the system should be tested to ensure there is at least 1ppm which is the minimum required to kill Legionella bacteria.

This process of treating the water is only to protect the maintenance engineers. During an activation the system may run for an extended period time however the risk of Legionnaires disease is considered to be less than the risk of fire. This is the same risk posed by traditional sprinkler systems for which there are no treatment requirements.

Example Installation Certificate

WARNING
- Beware of pump motors spinning.
- Do not allow cables or other foreign bodies to get caught in the motors.
- Ensure discharge pipe is not in contact with the moving parts of the motors.
- Beware of mains live voltage on the board do not touch without appropriate qualifications or without appropriate insulator.
- Do not touch powered up board with bare hands.
- Do not pick up or move the pump by holding onto the internal components. Only move the pump by gripping onto the metal chassis.

Project Details	
Installing Company Name	
Project Number	
Project Address	
Client Name	
Client Contact Number	
Client Company	
Date	
Standard of	BS8458 & Manufacturer's Recommendations
Category of system	Residential / Domestic
Extent of mist protection	
Specification against which the design was based	
Type of nozzles on the system - Brand & Product Name/Code	
Number of nozzles on the system	
Drawing Numbers	

Installation & Commissioning (cont.)

General Checks	Yes	No	N/A
All relevant areas of the property are protected			
Nozzles are not painted and are free from obstruction			
Nozzles are spaced in accordance with iCO® design guide			
Each nozzle has been checked prior to installation to ensure the bulb is in good condition. The exposed paint finish should be unblemished, and an air bubble should be present inside the thermo bulbs			
All valves have been exercised to confirm correct operation			
Pipework is not damaged and is in good condition			
All flexible tubing is behind an appropriate fire rated barrier			
Pump casing is in good condition			
Pump is positioned in a low-level, well-ventilated area with at least 100mm of space around top and sides			
WRAS approved Priority demand valve has been installed and installed in the correct location			
WRAS Approved check valve installed and installed in the correct location			
Power supply provided in fire rated cable direct from the board non-RCD side cartridge fuse with lockable isolator			
Check water supply is adequate for the property (see manual for details). Check the mains water flow and pressure at the pump using a calibrated flow meter			
Pipework Pressure Testing	**Yes**	**No**	**N/A**
All pipework has been pressure tested to 1.5 times working pressure for 1 hour			
Pump Commissioning	**Yes**	**No**	**N/A**
Powering up the pump			
Inlet filter is clear of obstructions			
Connect distribution pipework and water supply pipework			
Ensure system all valves are open except the drain valve			
Set the run time to the appropriate 10 minutes or 30 minutes depending on the category of the system			
Remove sticker from sounder			
Switch on mains power -Listen for the actuated ball valve to open -Allow water to fill the pipework. Fill time is 60 seconds. Check LCD Display for count down -Wait for self-test to be carried out **NOTE:** *(self-test will be set at this same time every month)* -Wait for LCD screen to return to normal condition (Approx. 1 minute after self-test) -Confirm battery fault appears on LCD Screen -Confirm yellow heartbeat LED is flashing			
Check that there are no leaks on the internals of the pumps			
Install battery in control board -Confirm battery charging LED comes on -Wait 8 minutes and confirm the battery fault disappears on the LCD display **Note:** *If the battery is not present the system will check for the battery and update every 8 minutes. When the battery is installed, it will only check and update every 37 hours*			
Switch mains power off. Confirm beeping from sounder to indicate that the power has been cut			
Switch on mains power. Confirm cessation of sounder			
Manual Start/Stop Function			
Press manual start button. Check for: -Pump running -Non-operation of Fire Relays -Non-operation of Priority Demand Valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			

Installation & Commissioning (cont.)

Pump Commissioning (cont.)	Yes	No	N/A
Manual Start/Stop Function (cont.)			
Press remote manual start button. Check for: -Pump running -Non-operation of Fire Relays -Non-operation of Priority Demand valve (if applicable)			
Press remote manual stop button for 4 seconds. Check pump stops			
Press remote manual stop button for another 4 seconds. Check system resets			
Float Switch			
Manually operate float switch. Check for: -Closing of the actuated ball valve -Operation of the fault relay			
Release float switch. Press and hold to the stop/reset button. Check for: -Opening of the actuated ball valve -Fault relay return to normal condition			
Automatic Operation (Wet system)			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Automatic Operation (Pre-action system. Smoke then heat)			
Ensure smoke detection relay base is connected. Normally closed circuit			
Operate smoke detection system			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Automatic Operation (Pre-action system. Heat then Smoke)			
Ensure smoke detection relay base is connected. Normally closed circuit			
Open drain valve. (Connect hose to drain to a safe location) -Confirm pumps do not run -Confirm LCD show 'no fire Hold' -Confirm actuated ball valve closes			
Operate smoke detection system -Confirm actuated ball valve opens -Confirm pumps run -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Low Pressure Monitoring			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Closed mains water inlet isolation valve -Confirm pump stops. Low pressure alert			
Reopen mains water inlet isolation valve -Confirm pumps start to run again			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			

Installation & Commissioning (cont.)

Pump Commissioning (cont.)	Yes	No	N/A
Self-test Feature			
Use right hand side dill switch to disable the automatic self-test feature. (Not recommended)			

3rd Party Connections

Details of 3rd Party Connections	**Connected to**	**Tested**	
Fire Relay 1		Yes	No
Fire Relay 2		Yes	No
Fault Relay 1		Yes	No
Fault Relay 2		Yes	No
12V Out		Yes	No

Further Comments

Acceptance

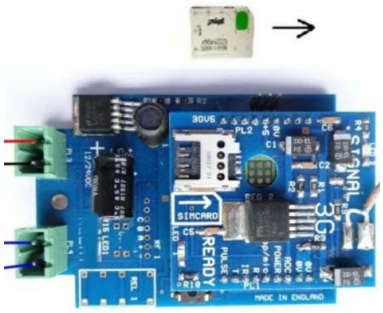
Acceptance – As the competent person responsible for the design, installation and commissioning of the water mist fire suppression system identified above; I CERTIFY that the said work for which I have been responsible complies to the best of my knowledge and belief with the following standards where applicable BS8458, BS9251, BS7671 and manufacturers' recommendations **except for the variations, as listed in the design specification and/or the attached schedule.* **(delete if not applicable)**

Engineer Name	
Signature	
Date	

Schedule of non-compliance

Setting up the GSM Dialler

Properties left empty for any length of time should have remote monitoring and be inspected weekly by the owner.



IMPORTANT
PLAESE ENSURE THAT THE POWER IS SWITCHED OFF WHEN YOU FIT THE SIM.
(You can remove the screw terminals as shown above to make it easier to fit the SIM)

Signal Strength

To help make sure that you place the unit in a suitable position you can text the unit to see how much signal strength the Auto Dialler is receiving. Please text the command #SIGNAL#.
The GSM Dialler will perform a test on the signal strength and report with a score of between 0 to 30. We strongly recommend that you place the unit where you will a signal score of at least 10. You will find anything less that this will make the unit unreliable.

After inserting your SIM card into your GSM unit in the correct orientation, switch the pump on and wait to see the GREEN READY LED light come on. This will indicate that you have a mobile signal, and the unit is ready for use.

You will now need to send a text with the contact number.

How to Programme Contact Numbers

You will now need to send a text with the contact number.

NOTE: To avoid confusion we have colour coded the HASH (#) and the EQUALS (=) symbols. The number should be your number or one you wish to be able to enable the device. (Maximum of 3 contact numbers).

Example: (hash) (1,2 or 3) (equals) (phone number) (hash).

#1=07123456789# #2=07234567891# #3=07345678912#	To save for contact no:1 To save for contact no:2 To save for contact no:3
If you wish to cancel a number, please follow this example Example: (hash) (1,2 or 3) (equals) (DELETE) (hash)	
#1=DELETE#	Then send this to the SIM card within the unit.

How to Programme the SMS

You can now change the alarm message to your own choosing. To change the message, send the text command as follows.

NOTE: Your message should read a message of your choosing up to 19 characters long.

MESS1=YOUR MESSAGE# The default message is (**Input 1**)

This will change the message to 'YOUR MESSAGE'

Telephone Call Alerts

The GSM Dialler can be programmed to send you a call after each text alarm has been sent. You will receive approximately three ring tones. The unit will then hang up automatically avoiding any call charges being incurred.

To set call alerts to ON please send the text message
#CALL=ON#
The unit will reply 'CALL ON'
To disarm the call alerts please send the text message.
#CALL=OFF#

If the call function has been set to ON, you will receive a text message, and shortly after, a phone call.

Water Mist Maintenance Schedules & Certificate

Example Maintenance Certificate

All systems should be supplied with a maintenance certificate following the annual maintenance which should be provided in the name of the installing company. Below is an example of the minimum maintenance requirements.

WARNING
- Beware of pump motors spinning.
- Do to not allow cables or other foreign bodies to get caught in the motors.
- Ensure discharge pipe is not in contact with the moving parts of the motors.
- Beware of mains live voltage on the board do not touch without appropriate qualifications or without appropriate insulator.
- Do not touch powered up board with bare hands.
- Do not pick up or move the pump by holding onto the internal components. Only move the pump by gripping onto the metal chassis.

Project Details	
Installing Company Name	
Project Number	
Project Address	
Client Name	
Client Contact Number	
Client Company	
Date	
Standard of	BS8458 & Manufacturer's Recommendations
Category of system	Residential / Domestic
Extent of mist protection	
Specification against which the design was based	
Type of nozzles on the system - Brand & Product Name/Code	
Number of nozzles on the system	
Drawing Numbers	

Water Mist Maintenance Schedules & Certificate (cont.)

General Checks	Yes	No	N/A
All relevant areas of the property are protected			
Nozzles are not painted and are free from obstruction			
Nozzles are spaced in accordance with iCO® design guide			
Each nozzle has been checked prior to installation to ensure the bulb is in good condition. The exposed paint finish should be unblemished, and an air bubble should be present inside the thermo bulbs			
All valves have been exercised to confirm correct operation			
Pipework is not damaged and is in good condition			
All flexible tubing is behind an appropriate fire rated barrier			
Pump casing is in good condition			
Pump is positioned in a low-level, well-ventilated area with at least 100mm of space around top and sides			
WRAS approved Priority Demand Valve has been installed and installed in the correct location			
WRAS Approved Check Valve installed and installed in the correct location			
Power supply provided in fire rated cable direct from the board non-RCD side cartridge fuse with lock-able isolator			
Check water supply is adequate for the property (see manual for details). Check the mains water flow and pressure at the pump using a calibrated flow meter			
Flow Switch has been periodically changed (every 24 months)			
Check the control board has the latest software on it			
Latest software has been updated			
Pipework Pressure Testing	**Yes**	**No**	**N/A**
All pipework has been pressure tested to 1.5 times working pressure for 1 hour			
Pump Commissioning	**Yes**	**No**	**N/A**
Powering up the pump			
Power down pump and drain water from the system			
Inlet filter is clear of obstructions			
Ensure distribution pipework and water supply pipework are connected			
Ensure system all valves are open except the drain valve			
Check the run time is ser to the appropriate 10 minutes or 30 minutes depending on the category of the system			
Check sticker has been removed from sounder			
Switch on mains power -Listen for the actuated ball valve to open -Allow water to fill the pipework. Fill time is 60 seconds. Check LCD Display for count down -Wait for self-test to be carried out **Note:** *(self-test will be set at this same time every month)* -Wait for LCD screen to return to normal condition (Approx. 1 minute after self-test) -Confirm battery fault appears on LCD Screen -Confirm yellow heartbeat LED is flashing			
Check that there are no leaks on the internals of the pumps			
Install battery in control board -Confirm battery charging LED comes on -Wait 8 minutes and confirm the battery fault disappears on the LCD display **NOTE:** *If the battery is not present the system will check for the battery and update every 8 minutes. When the battery is installed, it will only check and update every 37 hours*			
Switch mains power off. Confirm beeping from sounder to indicate that the power has been cut			
Switch on mains power. Confirm cessation of sounder			
Manual Start/Stop Function			
Press manual start button. Check for: -Pump running -Non-operation of Fire Relays -Non-Operation of Priority Demand valve (if applicable)			

Water Mist Maintenance Schedules & Certificate (cont.)

Pump Commissioning (cont.)	Yes	No	N/A
Manual Start/Stop Function (cont.)			
Check sticker has been removed from sounder			
Press manual stop button of another 9 seconds. Check system resets			
Press remote manual start button. Check for: -Pump running -Non-operation of Fire Relays -Non-operation of Priority Demand valve (if applicable)			
Press remote manual stop button for 4 seconds. Check pump stops			
Press remote manual stop button for another 4 seconds. Check system resets			
Float Switch			
Manually operate float switch. Check for: -Closing of the actuated ball valve -Operation of the fault relay			
Release float switch. Press and hold to the stop/reset button. Check for: -Opening of the actuated ball valve -Fault relay return to normal condition			
Automatic Operation (Wet system)			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Automatic Operation (Pre-action system. Smoke then heat)			
Ensure smoke detection relay base is connected. Normally closed circuit			
Operate smoke detection system.			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Automatic Operation (Pre-action system. Heat then Smoke)			
Ensure smoke detection relay base is connected. Normally closed circuit			
Open drain valve. (Connect hose to drain to a safe location) -Confirm pumps do not run -Confirm LCD show 'no fire Hold' -Confirm actuated ball valve closes			
Operate smoke detection system. -Confirm actuated ball valve opens -Confirm pumps run -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Press manual stop button for 4 seconds. Check pump stops.			
Press manual stop button for another 9 seconds. Check system resets			
Low Pressure Monitoring			
Open drain valve to simulate a nozzle operating. (Connect hose to drain to a safe location) -Confirm pumps run after 4 seconds -Confirm operation of fire relays -Confirm operation of priority demand valve (if applicable)			
Closed mains water inlet isolation valve -Confirm pump stops. Low pressure alert			
Reopen mains water inlet isolation valve -Confirm pumps start to run again			

Water Mist Maintenance Schedules & Certificate (cont.)

Pump Commissioning (cont.)	Yes	No	N/A
Low Pressure Monitoring (cont.)			
Press manual stop button for 4 seconds. Check pump stops			
Press manual stop button for another 9 seconds. Check system resets			
Self-test Feature			
Use right hand side dill switch to disable the automatic self-test feature (not recommended)			
Misc			
Software Updates (please note which version)			
Flow switch replaced			
Battery Replaced			

3rd Party Connections

Details of 3rd Party Connections	Connected to	Tested	
Fire Relay 1		Yes	No
Fire Relay 2		Yes	No
Fault Relay 1		Yes	No
Fault Relay 2		Yes	No
12V Out		Yes	No

Further Comments

Acceptance

Acceptance – As the competent person responsible for the design, installation and commissioning of the water mist fire suppression system identified above; I CERTIFY that the said work for which I have been responsible complies to the best of my knowledge and belief with the following standards where applicable BS8458, BS9251, BS7671 and manufacturers' recommendations **except for the variations, as listed in the design specification and/or the attached schedule.* **(delete if not applicable)**

Engineer Name	
Signature	
Date	

Schedule of non-compliance

Maintenance Instructions for Updating the Control Panel Software

It is a requirement during the annual service visit to update the controller board with the latest software if any new revisions are issued. (At the time if print the latest issue is v4.00). The latest software is available on our website along with the PICkit5 programmer and memory card.

To update the software, follow the instructions below precisely.

1. Insert the memory card into the PICkit5. Ensure the card is put in the correct orientation.

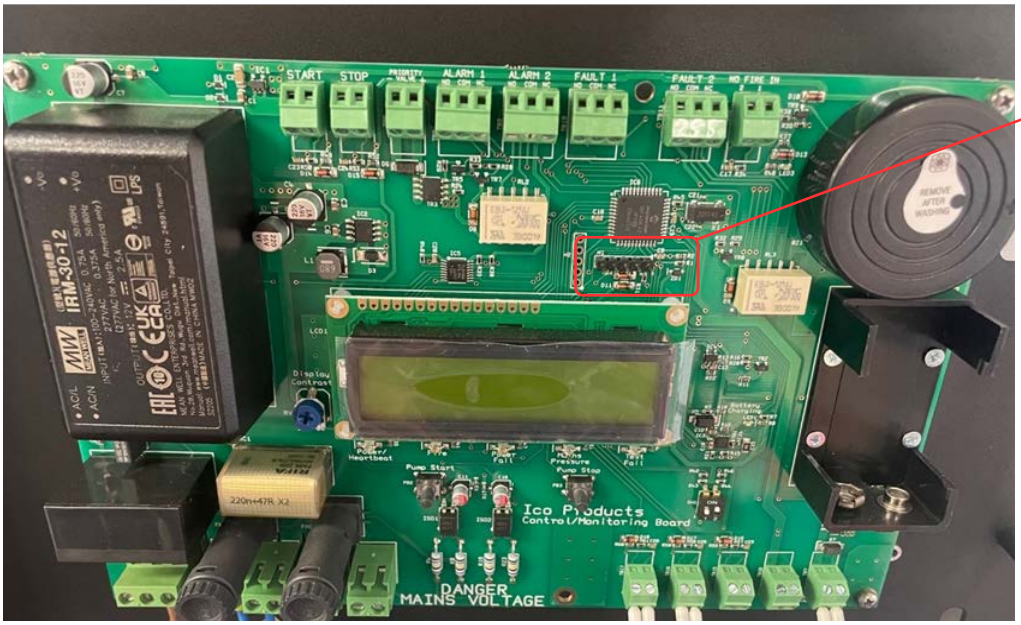
2. Power up the PICkit5 by connecting to a USB power pack or a laptop.

3. The LED on the PICkit5 should turn purple, then blue then flash green to indicate that it is ready.

4. Switch on the pump.

Water Mist Maintenance Schedules & Certificate (cont.)

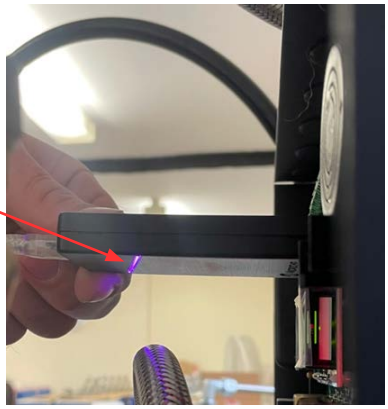
5. Before the fill timer runs out, connect the PICkit5 to the board ensuring that it is connected to the pins as shown below. With the PICkit5 upside down ensure the pin furthest to the right on the board goes to the pin terminal furthest to the right on the PICkit5 programmer (indicated buy the white mark below).



Match furthest pin on right of the board to the further connection on the right of the programmer.

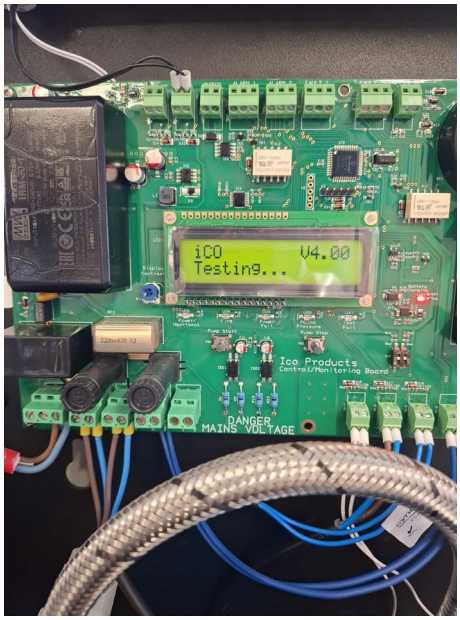
6. Press the button on the PICkit5 where is says 'MPLAB'. The LED should flash purple and then back to green.

Purple flashing LED whilst programming



Water Mist Maintenance Schedules & Certificate (cont.)

9. Switch power to the pump back on. The LCD display should now show the latest version of the software. (At the time of printing the latest version is v4.0).



Flow Switch Maintenance

The flow switch is required to operate on an extremely low flow due to the low flow of our open nozzle at mains pressure. The flow switch contains sensitive moving mechanical components that need to be kept in optimum condition. We would recommend changing the flow switch every 24 months during the annual maintenance visit. Torque setting is 10-11 Nm (warning, do not exceed the maximum torque).
Spare parts are available through our website.

Battery Maintenance

It is imperative that the battery maintains a charge and is in good condition to alert the user in the event of a power out. We would recommend changing the battery every 3 years.
Spare parts are available through our website.

Interface With 3rd Party Equipment

As part of the annual maintenance, it is critical that the link to any third-party equipment is tested, in particular links to any fire alarm system. The operation of these links may be required to evacuate the building or to ensure the water mist system operates correctly. These must be tested.

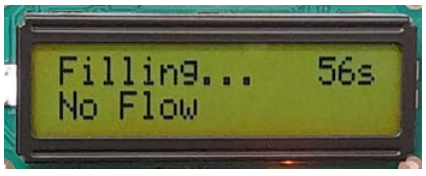
End of Life Disposal

For end-of-life disposal the electronic components should be removed and disposed of in accordance with Waste from Electrical and Electronic Equipment (WEEE) regulations. Metal components should be recycled. Thermoplastic pipe is non-recyclable and should be segregated for disposal.

Troubleshooting Guide

Troubleshooting Guide - High Pressure Pump V2 (PU001-00)

Control Board is Beeping	4 beeps once per minute	Low mains pressure
	5 beeps once per minute	Last test failed
	continuous beep-beep-beep.	Alarm, no smoke yet/ Alarm status/ Alarm timed out etc.
	3 beeps every 5 seconds	Float sw (flood detected)
	2 beeps every 4 seconds	Running on battery
	4 seconds continuous beeping	Pre-test warning
	15 seconds continuous beeping	Test just failed
	1 second continuous beeping	Battery test just completed
Actuated Ball Valve not operating	Apply multimeter to check if there is 12v going to the ball valve as required. If there is voltage check the terminations.	
Flow Switch – No fire signal/Test fail	Remove cables for the flow switch. Use multimeter to confirm if there is a change of state when water is flowing through it. If there is no change of state change the flow switch. If there is a change of state check the terminations.	
Pressure switch – Low pressure monitoring not working	Test cables with multimeter to test if there is a change of state. If there is no change of state check wiring in the pressure switch. If there is still no change of state remove replace the pressure switch.	
Relays not working	Use multimeter to check if relay changes state for fire or fault signals. If a change of state is detected check the wiring to the 3rd part equipment	
Priority demand valve not working	Use multimeter to check there is a 12v and check the wiring. Apply 12v separately to the solenoid to check if it is operating.	
Float switch not working	Use multimeter to check for a change of state when operating the float switch. If a change of state is detected check the terminations. If no change of state is detected change the float switch.	
Battery fault will not clear	After inserting the battery, it can take up to 8 minutes for the fault to clear. The board will only check for the presence of the battery every 8 minutes.	
LCD displays 'flow switch stuck'.	Flow switch has become stuck during the periodic self-test. Replace flow switch.	
No pressure on the pressure gauge when the pumps are running	Check water supply to the pump on Check actuated ball valve is open. It there is still no pressure produced by the pump the pumps will need to be replaced.	
Pressure goes straight to 0-1bar after pumps are run	Check unloader valve/Outlet non-return valve	

Display message	Text Description	Action
	First message shown after board is powered	N/A
	Message appears after ball valve is opened and pump is filling with water	Message should change to "flow detected" when the flow switch input is active caused by mains water pressure filling the system. The display will show "no flow" when the flow switch input is not active due to the pipework being full or the discharge isolation valve being closed. Any deviations from this, means the flow switch is faulty. Replace flow switch

Troubleshooting Guide (cont.)

Display message	Text Description	Action
	Board makes a short battery check before self-test	N/A
	Short message showing that everything appears to be fine before self-test	N/A
	Message shown right before self-test begins	N/A
	Message shown during the self-test (if the water supply to the pump is shut off during the test, it will show "**Self-Test**, No Flow")	If flow is not detected during the test. Check water supply to the pump is on and meets specification. Check flow switch is operating
	Message shown at the end of the self-test, meaning that the test was successful (message will stay displayed for 30 seconds)	N/A
	Error message shown when flow switch becomes stuck after a self-test	Flow switch faulty or is stuck in the forward position due to internal debris. Replace flow switch
	Message showing that everything is fine after the self-test, also showing pump run settings (10 minutes for domestic / 30 minutes for residential)	N/A
	1. Battery charge is low or missing 2. Electronic board's slot for battery is faulty	1. Insert a fully charged, functional battery. Wait 8 mins for the battery to be recognised by the board 2. Replace electronic board

Troubleshooting Guide (cont.)

Display message	Text Description	Action
	Message showing that everything is fine after the self-test, also showing time left until next automatic self-test	N/A
	First message shown in case of fire/system operation (or if the fire is simulated by opening the drain valve). It will stay on the display only for a couple of seconds	N/A
	Second message shown in case of fire/system operation (or if the fire is simulated by opening the drain valve). Pump will start to run	N/A
	Message shown when pump is fully running also showing the amount of time passed since pump started to pump water	N/A
	Message shown when after running, pump board is manually reset by long pressing the “stop” button on the board (while ball valve is closing)	N/A
	Message shown when the pump is activated manually by pressing the “start” button on the board	N/A
	This is when the double knock fire alarm input is used. The message indicates that the pump has detected flow, but the fire alarm has not activated. This may indicate that there has been a pipework leak. The actuated ball valve on the supply to the pump will be closed to prevent further water flow	1. Check that there is no fire 2. Check for damaged pipe or nozzles 3. Check that the fire alarm is operating currently 4. Conduct full recommission of the system
	Error message showing there is no supply water coming into the pump or water has very low pressure (real fire or simulated)	Make sure water supply isolation valve is opened and that there is more than 0.5 bar of pressure

Troubleshooting Guide (cont.)

Display message	Text Description	Action
	Error message cause by operation of the float switch in the drip tray. It indicates that there is a water leak in the pump enclosure	Send the pump for repairs
	Display brightness is set at minimum	Set the display brightness correctly
	Display brightness is set at maximum	Set the display brightness correctly
	Error message showing that pumps main fuses are not inserted properly in the board	Insert fuses all the way into their slots
	Electronic board software is corrupted	This is due to a wrong software upgrade. Re-install/upgrade board's software to the latest version. Make sure software programmer is powered through a power bank before inserting the programmer into the board
	Error showing that the board is faulty (crystal oscillator faulty)	Replace electronic board

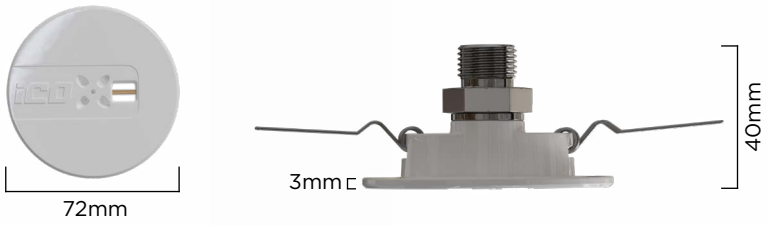
iCO® High Pressure Nozzle MK1

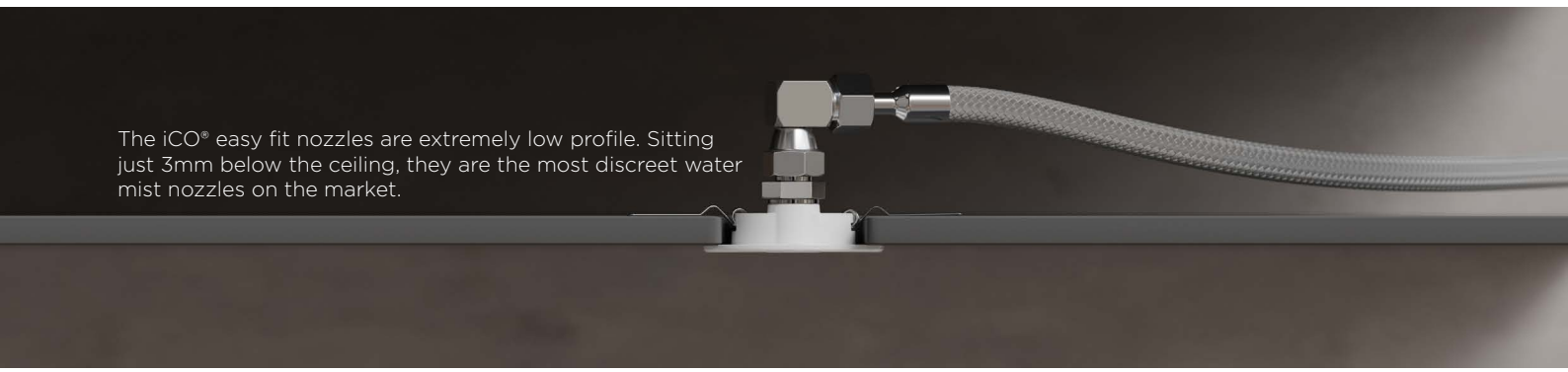
Technical Datasheet

Technical Data

Part Number:	PU002-02
Dimensions:	Ø72mm x 19mm
Weight:	200g
K Factor:	1.71
Temperature Rating:	57°C
Max. Pressure:	1020 psi (70 bar)
Minimum Operating Pressure:	40 Bar
Response Type:	Fast (Residential)
Occupancy Type:	Domestic
Connection Size:	3/8" BSP
Minimum Spacing:	2m (6.5ft)
Maximum Spacing:	4m x 4m (13.2 x 13.2ft)
Colour:	White as standard. Other colours available.
Material:	316 Stainless Steel
Fixing Method:	Torsion Springs

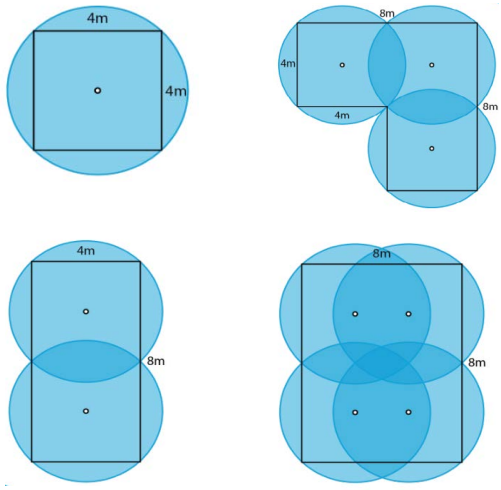
Dimensions





Installation

NOZZLE SPACING: FLAT CEILING



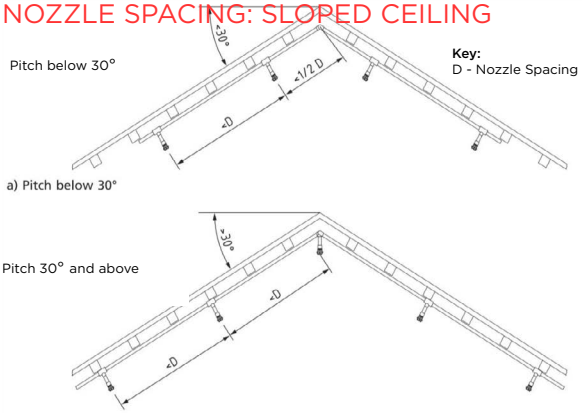
Installation Notes:

[1] 4x4m Grid (16m²)

[2] Max 2m from wall

[3] 2m minimum distance between nozzles

NOZZLE SPACING: SLOPED CEILING



Installation Notes:

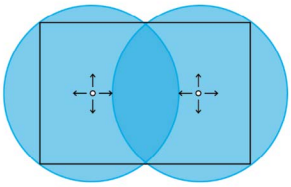
[1] When installing iCO® misting nozzles on sloped ceilings, the position of the nozzle should be determined by the pitch of the ceiling.

[2] Where the pitch is below 30° iCO® nozzles should be mounted at standard spacing when measured in line with the pitch of the ceiling.

[3] Where the pitch is 30° and above, the first row of iCO® nozzles should be mounted within 300mm radially from the apex of the ceiling.

[4] All nozzles should be mounted perpendicular to the ceiling as shown below.

NOZZLE ORIENTATION

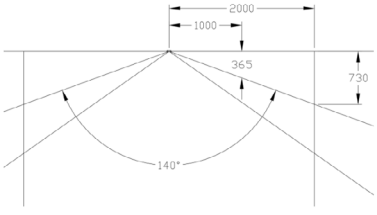


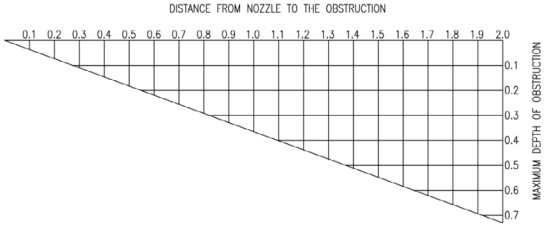
Installation Notes:

[1] The preferred nozzle outlet orientation is perpendicular to the walls of a room.

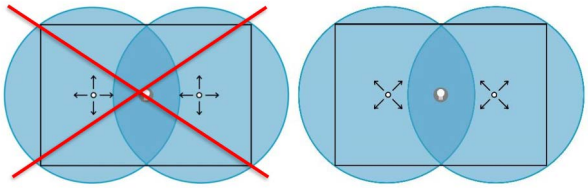
[2] Nozzles should be positioned away from obstructions to allow a 140° spray pattern.

DISTANCE FROM OBSTRUCTIONS





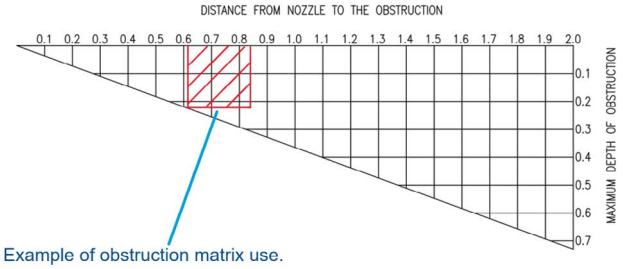
NOZZLE ORIENTATION: PENDANT LIGHT FITTINGS



Installation Notes:

[1] Nozzle spray angles should not be directed at pendant light fittings.

[2] The spray direction can be rotated 45° to spray into the corners of a room to avoid pendant light fittings. Nozzles should be at least 500mm away from a pendant light fitting.



Example of obstruction matrix use.

If obstruction fits wholly inside matrix, nozzle positioning is unaffected.

Maintenance and Storage Notes:

[1] The nozzle should be maintained in accordance with BS8458

[2] Minimum/Maximum ambient temperature 4°C/40°C

iCO® High Pressure Pump V2

Technical Datasheet

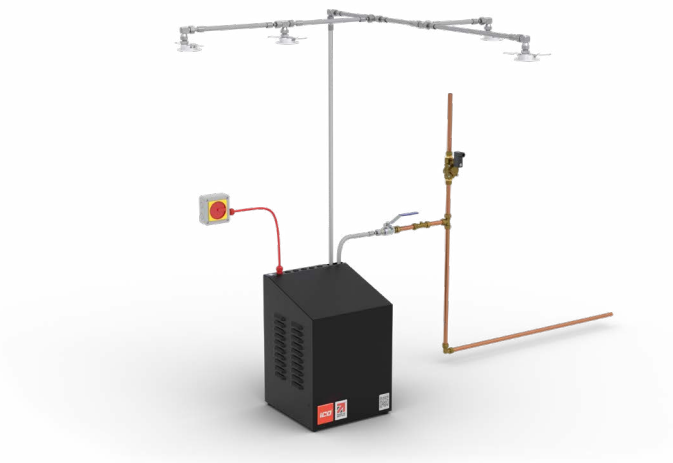
Technical Data

Part No:	PU001-00
Dimensions:	342mm (W) x 342mm (D) x 495mm (H)
Clearance requirement:	100mm of clear space required around on each side for ventilation
Voltage rating:	240V
Current rating:	13A
Power Supply Connection:	Dedicated 16A fused supply from the NON RCD side of the board. Fire rated cable required
Inlet connection:	1/2" BSP
Outlet connection:	3/8" BSP 60° Cone
Water requirement:	12 lpm @ 1 bar Minimum
Pump run sound pressure level:	79db @ 1 m
Pump run Flow switch:	0.5lpm
Weight:	24kg
Serviceability Access:	Removable front cover with security screws
Internal Components:	Corrosion resistant brass and stainless steel
Mounting:	Floor or wall mount
Standing Pressure:	Mains water pressure 1-10 bar
Running Pressure:	Adjustable 10-100 bar
Mains low pressure monitoring:	Set at 0.5 bar
Mains water over pressure protection:	Pressure relief set at 20bar
Pump run time:	10min or 30min (adjustable with pump and actuated ball valve shut off)
Operation:	Wet type or pre-action linked to smoke detection
Self-test:	Monthly self-test
Heat protection:	Thermal fuse set at 100°C
Fire relay:	2x NO / NC volt free 30vDC 1 A
Fault relay:	2x NO / NC volt free 30vDC 1 A

Technical Data (cont.)

Priority demand valve output:	12v 1A
Power out:	12v 1A
Power monitoring:	Battery backed up audible alarm for fault monitoring
Battery monitoring:	Check every 8mins if battery is detached
System indication:	Internal LCD display
Control valve:	Integral isolation valve, drain valve & pressure gauge
Strainer:	Internal 500 micron filter
IP Rating:	IP53
Manual controls:	Internal and optional external manual start and stop button

Installation

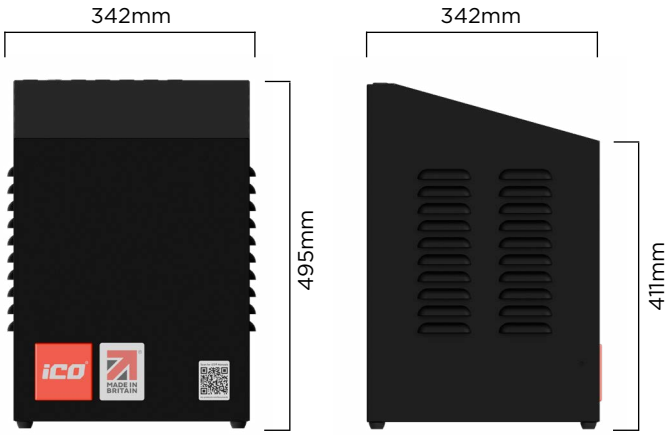


Typical domestic category installation.

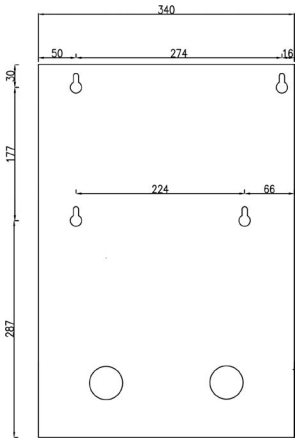
Typical residential category installation.

NOTE: All images in this document are for illustration purposes only.

Dimensions

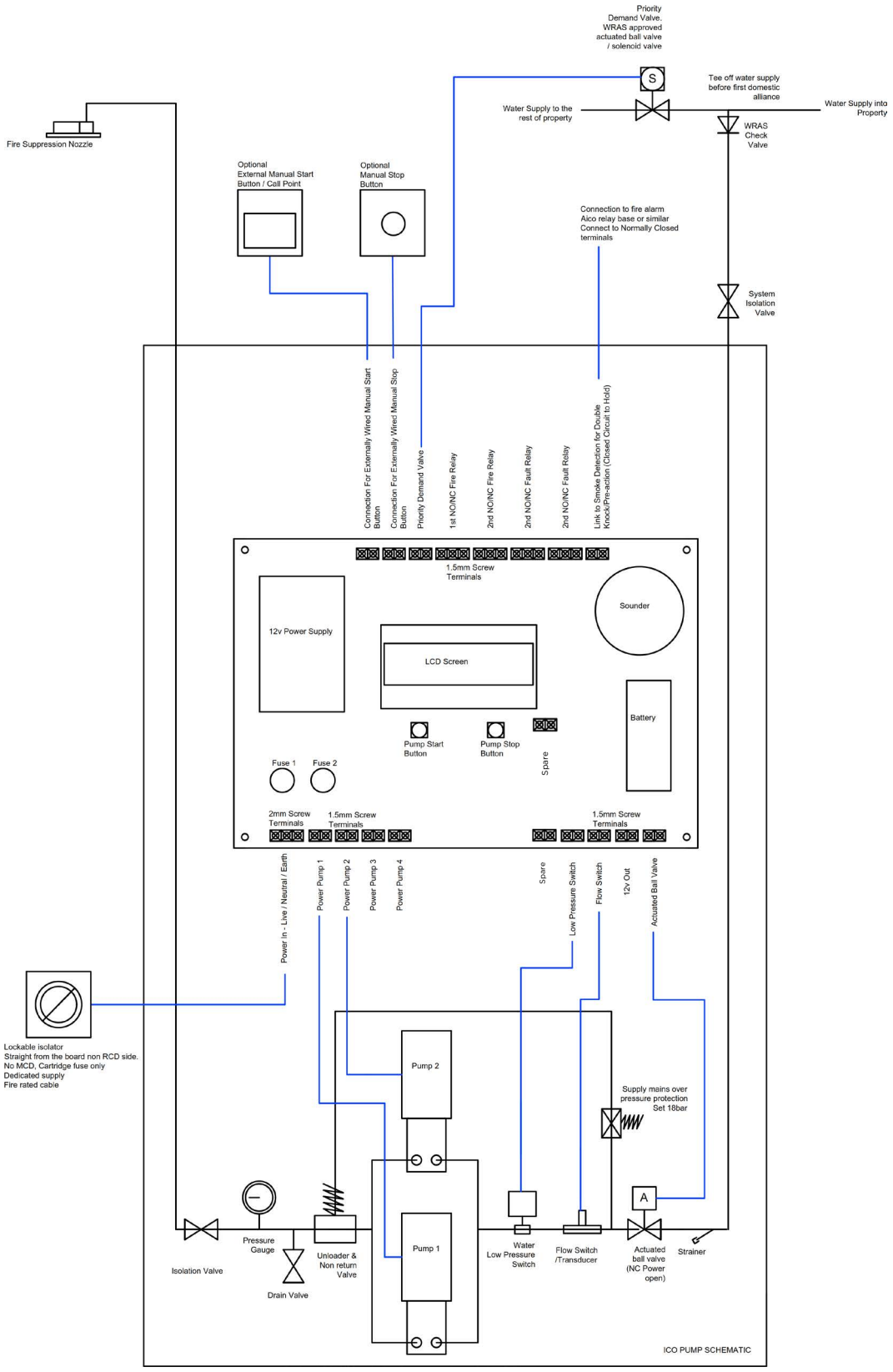


Wall Mount Details



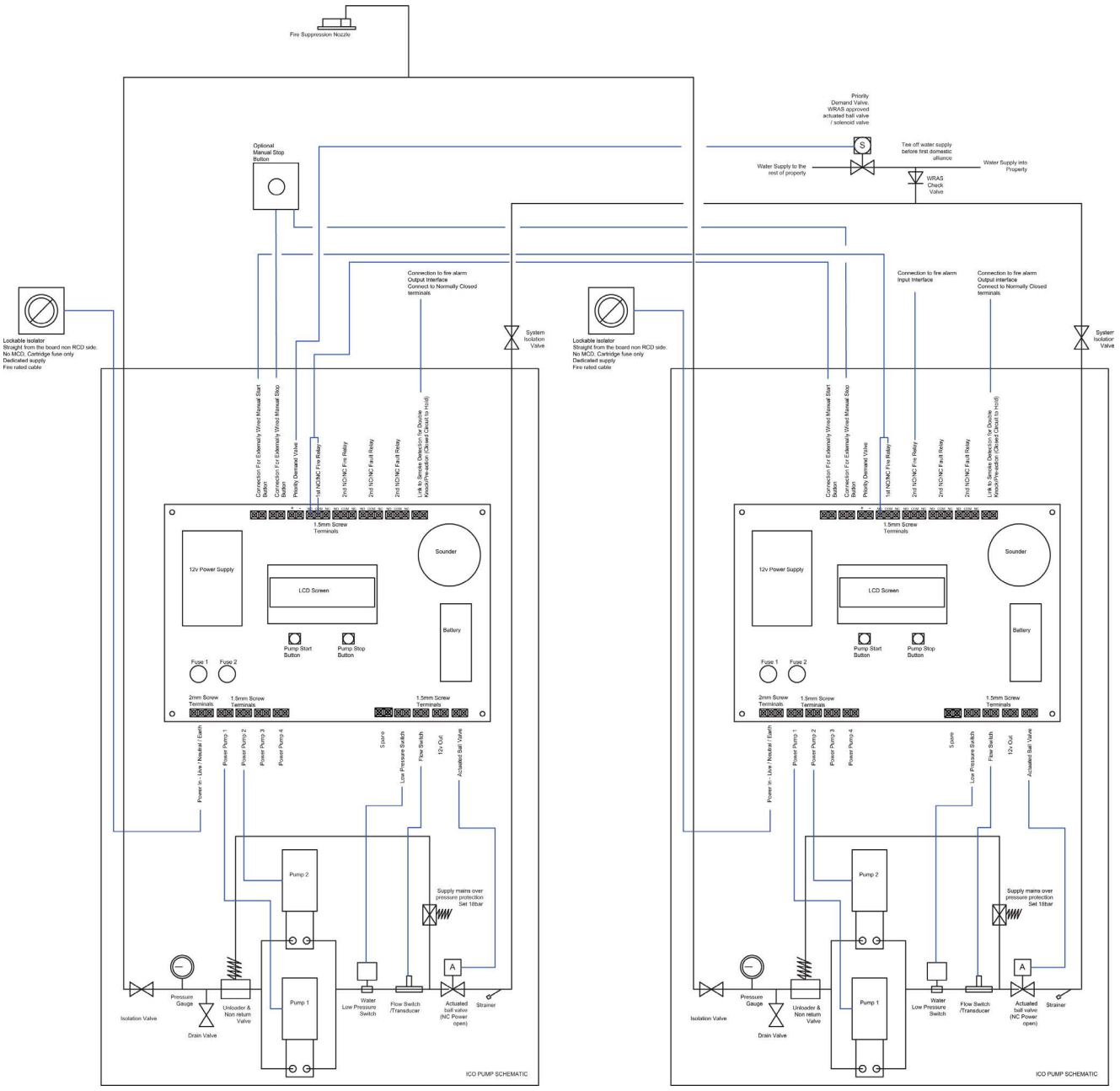
Technical Pump Schematic (Domestic)

Private homes, heritage or listed buildings and new-build properties.



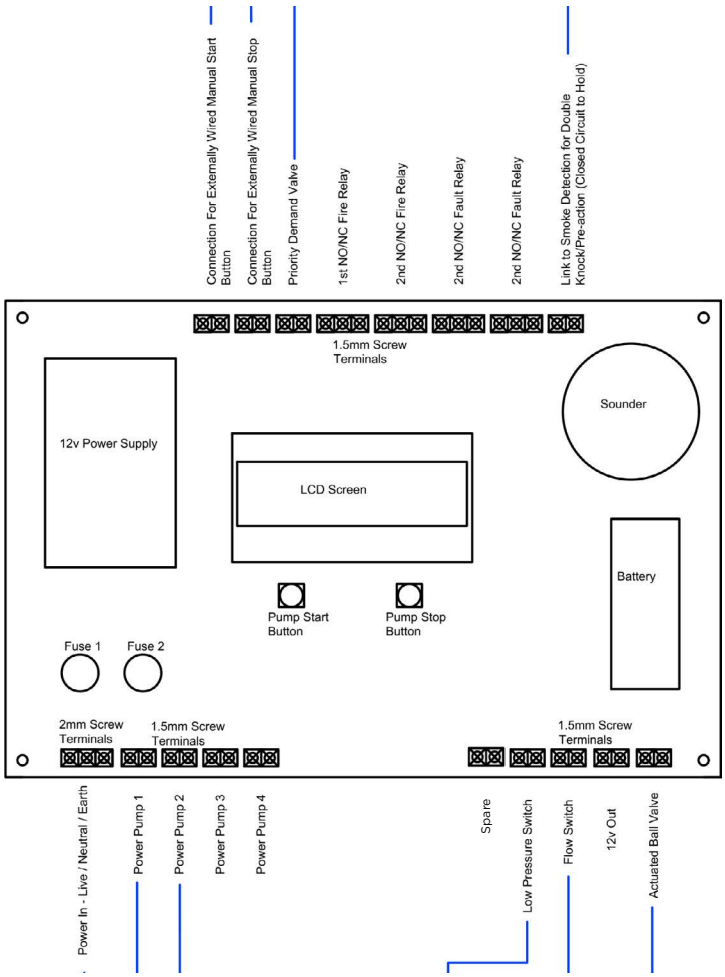
Technical Pump Schematic (Residential)

Apartment blocks, care homes, student accommodation, hotels and other HMOs (houses in multiple occupancy).



Technical Data (cont.)

Control & Monitoring Board



Technical Data (cont.)

Priority Demand Valve

Part No:	iCO®-HP-04
The priority demand valve is required to be fitting along with the iCO® system if a property has less than 37 litres/minute at the inlet to the property.	
Voltage	12V
Connection	1/2"- BSP / 15mm
Approval	WRAS

Zone Valve

Part No	iCO®-HP-03
Combined flow switch, isolation valve, drain valve, pressure gauge. The iCO® zone valve is design to be installed on the distribution pipework where isolation and flow indication is required. This would typically be installed in flats 1 valve per demise or 1 valve per floor. Designed to connect onto an addressable fire alarm interface. The fire alarm interface must be programmed with a 10 second delay to prevent any unwanted alarms during pump test cycles.	
Connection	1/2"- BSP / 15mm
Orientation	Vertical – Note Must be Installed in a vertical orientation
Rated voltage	12 ÷ 230 V AC/DC
Max. current	3A
Max. commutable power	60VA
Cable length	1250mm Electric
Wire	2 x 0.50mm²

GSM Monitoring

Part No	iCO®-HP-07
A remote monitoring facility that alerts end users by text or phone call when the pump goes into fire mode. The system works off a mobile phone SIM card. A landline is not required. When ordered the unit will come pre-installed in a pump.	
GSM Frequency:	Quadband Freq 850/900/1800/1900
Power Supply Voltage	12V
Current used in standby mode	60mA Max
SIM card	Micro SIM card
Operating Temperature	4-40°C
Set up	Programmed by Text/SMS Message
Max. numbers Stored	3

Certifications & Fire Testing

Accreditations

iCO Products is ISO9001 accredited for the manufacture of water mist fire suppression systems and meets the fire safety and performance requirements of BS:8458 residential water mist standards.

All of our fire suppression products are manufactured in the UK and independently tested to the highest performance and safety standards to protect you and your home in the event of a fire.

iCO Products is a member of both the Fire Protection Agency (FPA) and Fire Industry Association (FIA). Our patented products have gained LPCB certification from the Building Research Establishment (BRE).

BSI Verification, compliant with BS 8458

iCO® is 3rd party fire tested to BS:8458 for up to 32m² per compartment

LPCB – For Design, Manufacture, Assembly, Testing of Residential Fire Suppression Systems ISO:90001

Declaration of Conformity BS 8663

EU Declaration of Conformity (No. PU-0001-1)

Fire Industry Association – Full member

Fire Protection Association FPA – Platinum Member

Made in Britain – Accredited Member

Fire Industry Association

Assessed to ISO 9001 Cert/LPCB ref. 1733

Member Number: A-143090

Renewal Date: 12/10/2025

LPCB Verification

LPCB®

www.redbooklive.com

Certificate of Management System Registration

Certificate Number: 1733 Issue: 02

iCO Products Ltd

having complied with the requirements of:

ISO 9001:2015

Quality Management Systems - Requirements

are certified by BRE Global Ltd. and are authorised to use the LPCB Certification Mark on stationery and publications related to the following products and/or services:

iCO Products Ltd

Unit 9 Cordwallis Buisness Park
Clivemont Road
Maidenhead
Berkshire
SL6 7BU
United Kingdom

Scope

Design, manufacture, assembly and testing of Residential Fire Suppression Systems.

This certificate is maintained and held in force through regular surveillance activities.

Signed for BRE Global Ltd.	CPM Assessment Services	Date of this Issue	Expiry Date	Date of First Issue
	Ruben Graham	1 August 2025	31 July 2028	7 December 2022

This certificate remains the property of BRE Global Ltd. and is issued subject to terms and conditions (for details visit www.redbooklive.com/terms).

To check the validity of this certificate and appendix please visit www.redbooklive.com/check, scan the QR tag or contact us.

BRE Global Ltd, Watford, WD25 9XX
T: +44 (0)333 321 8811 E: enquiries@breglobal.com

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BF040 Rev 11.2 Page 1 of 1 © BRE Global Ltd, 2025

80018

BSI Certificate of Conformity

bsi.

Certificate of Conformity

This is to certify that:

ICO Products Ltd
Park House
10 Park Street
Bristol
BS1 5HX
United Kingdom

Holds Certificate Number: CNF 744776

In respect of:

Residential and domestic watermist fire suppression nozzle as described in ICO Nozzles - Technical Datasheet - Rev.01, dated 16th March 2020.

For and on behalf of BSI: Shahm Barhom, Group Product Certification Director

First Issued: 2021-04-09
Latest Issue: 2025-07-03

Effective Date: 2025-07-03
Expiry Date: 2028-06-03

Page: 1 of 2

Certificate of Conformity

No. CNF 744776

Product:

PU002-02 Automatic Nozzle

Residential and domestic watermist Fire Suppression Nozzle as described in;

- Nozzle Drawing M-SK08-1 Nozzle PU002-02 rev01, dated 8th June 2020
- Nozzle Quality Plan rev.03, dated 16th March 2021
- Nozzle Bill of materials. PU002-02 BOM, dated 8th June 2020

Specification:

Performance Requirements of BS8458: 2015 Fixed fire protection systems – Residential and domestic watermist systems. Code of Practice for Design and Installation.

Conformity Report Number:

Exova Warrigntonfire Report: 429016 Issue 1, dated 21st December 2020
BS 8458:2015 Annex C.

Technical File Review
30165788, 3389990, 30454557

First Issued: 2021-04-09
Latest Issue: 2025-07-03

Effective Date: 2025-07-03
Expiry Date: 2028-06-03

Page: 2 of 2

Declaration of Performance

Declaration of Performance

According to Construction Products Regulation EU N° 305/2011

Certificate Reference N° 00002

Product identification:
iCO Products Water Mist System

Type:
PU002-02

Intended use:
Water mist fire suppression in accordance with BS8458 and iCO design and installation manual. Fixed fire protection systems. Residential and domestic watermist systems.

Manufacturer:
iCO Products Ltd
Park House
10 Park Street
Bristol
BS1 5HX
United Kingdom

Authorised representative:
Not applicable

System of assessment and verification of constancy of performance.
BS 8663 Fixed fire protection systems – Components for watermist systems Part 1: Specification and test methods for watermist nozzles

Performed type testing in accordance with BS8663 and inspection of the manufacturing plant and of factory production control with continuous surveillance, assessment and approval of the factory production control and issued following certificate of constancy of performance:

Annex A - Test to determine operating temperatures of fusible link watermist nozzles and glass bulb watermist nozzles
Annex B - Water flow test
Annex C - Water distribution tests

Annex D -Functional test
Annex F - Strength of release elements test
Annex G - Notes on strength test for fusible link release elements
Annex H - Leak resistance test
Annex I - Heat exposure
Annex J - Automatic glass bulb watermist nozzle thermal shock test
Annex L - Watermist nozzle coatings low temperature test
Annex M - Water hammer test
Annex Q - Impact test

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Guy Briscoe

R&D Director

Maidenhead

12/05/2025

Certifications & Fire Testing (cont.)

EU Declaration of Conformity (No. PU-0001-1)

In accordance with of European Parliament and Council Decision No 768/2008/EC Annex III.

1. Product model / product:

Product Fire suppression mist system
Model/type iCO®
Batch/serial no. iCO® PU001-00, iCO®-PU002-02

2. Manufacturer

Name iCO Products Ltd
Address Park House, 10 Park Street, Bristol, United Kingdom, BS1 5HX

3. This declaration is issued under the sole responsibility of the manufacturer.

4. Object of the declaration:

Product Water pump and nozzles for fire protection via water misting, with wireless communication and companion app
Specification 240 V AC, 13Amp, 10-90 bar, 12lpm

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

2006/42/EC The Machinery Directive

2014/53/EU The Radio Equipment Directive

2011/65/EU The Restriction of Hazardous Substances Directive

6. References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

Reference & Date

Article 3.1(a) – Safety
EN 60204-1:2006 + A1:2009 *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
EN 809:1998+A1:2009 *Pumps and pump units for liquids - Common safety requirements*

Article 3.1(b) – Electromagnetic Compatibility
BS EN 55014-1:2006 + A2:2011 *Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Emission*
BS EN 55014-2:1997 + A2:2008 *Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Immunity.*

Article 3.2 – Spectrum efficiency
EN 301 489-1 V1.9.2 (2011-09) *Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements*
EN 301 489-17 V2.2.1 (2012-09) *ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems;*
EN 300 328 V1.9.1 (2015-02) *Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques*
EN 62311: 2008 *Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz*

Article 3.3 – Other requirements
BS 8458:2015 *Fixed fire protection systems. Residential and domestic water mist systems. Code of practice for design and installation*
BS 8663:2019 *Fixed fire protection systems. Components for water mist systems. Specification and test methods for water mist nozzles. Relevant tests passed: 4.1,4.2, 4.3, 4.4, 4.5, 4.6.1,4.6.2, 4.7,4.8.1.1,4.8.1.2, 4.8.2, 4.9, 4.10, 4.11, 4.12, 4.13.2, 4.13.3, 4.13.4, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, 4.20, 4.2.1, 5, 6, 8.2, 8.3, 8.4*

7. Additional information:
The technical documentation for the machinery is available from the address above.

Signed for and on behalf of: iCO Products Ltd
Place of issue: Maidenhead, SL6 7BU
Date of issue: 12/05/2025
Name: Steve Lloyd-Jones
Function: Director
Signature:

FIA Membership

Fire Industry Association

Leading Excellence in Fire Since 1916

This is to certify that

iCO Products Ltd

has been admitted to:

Full

Membership given under the
Common Seal of the Fire Industry Association

Valid until: 31st March 2026

Chairman

CEO

Membership No. 1824

Certifications & Fire Testing (cont.)

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Made in Great Britain Campaign Ltd - 7 Acorn Business Centre, Hanley Swan, Worcestershire, WR8 0DN
Company No. 08566119 'not-for-profit private company limited by guarantee'

Safety, Disclaimers & Responses

Safety

Under Section 6 of the Health and Safety at Work Act 1974, suppliers of workplace products must ensure, as far as reasonably practicable, that items are safe and pose no health risks when used properly. An item is not regarded as being correctly used if relevant guidance from the supplier is ignored.

This product must be installed, commissioned, and maintained by trained personnel following:
- EE regulations for electrical equipment in buildings
- Applicable codes of practice
- Statutory requirements
- Any specific instructions from the Manufacturer.

In line with the Act, you must provide all pertinent product information to individuals involved with its use.

Designed for 230V 50Hz mains supply and classified as class 1 construction, the product must be connected to a protective earth in the fixed wiring and must include a readily accessible double-pole disconnect. Failing to bond accessible conductive parts to the protective earth renders the equipment unsafe.

Disclaimers

Information in this manual is presented as accurately as possible. However, iCO® does not guarantee technical precision, completeness, or freedom from minor defects, and reserves the right to alter designs or specifications without prior notice or obligation.

Under no circumstances shall the manufacturer be liable for any damages or injury arising from use of the equipment described.

Strict compliance with the safety procedures outlined here, and careful handling and use of the equipment, are necessary to reduce the risk of injury or damage. Although the information, figures, illustrations, tables, and schematics herein are believed correct at publication, no warranty is implied, and the Manufacturer is not responsible for losses or damages linked to their use.

All details may change without notice. Unapproved modifications to the fire detection system or its installation are forbidden, as they can create severe safety hazards. The Manufacturer bears no liability for equipment malfunctions or any form of damages, including incidental, special, or consequential, resulting from breaches of these provisions.

Reader Responses

iCO® welcomes feedback from distributors and end users on improving this manual or the product. Please direct such enquiries to enquiries@ico-products.com

All communications become the property of iCO®.

A smarter and safer means to protecting lives and property from fire.

iCO Products is LPCB ISO 9001 accredited for the design, manufacture, assembly, and testing of residential fire suppression products.

Our patented fire suppression products are manufactured in the UK and sold through a network of accredited installers and distributors throughout the UK and overseas.

Patents granted: United Kingdom, USA, Australia, Europe
Patents pending: UAE

Contact us

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Member Number: A-143090 Renewal Date: 12/10/2025

iCO Products is a member of the Fire Industry Association and an ISO 9001 registered company.