

# 2024 BUYER'S GUIDE





## About Us.

Based in the UK, our team is always available, openly communicative and efficient. Due to our supply chain process and open communication channels, we ensure that service levels exceed customer expectations. We have built a culture that puts the quality of the products we manufacture, assemble and sell at the forefront of everything we do, only outweighed by the service and support that we offer. Tio has access to over 11 manufacturing facilities in 7 different countries. Our vast knowledge in the underfloor heating industry enables us to capacitate crucial features for our customers, allowing for both simple and complete control of their household's heating requirements. Our Oxfordshire location allows us to service and distribute our products to the whole of the UK. Alert and aware of the ever-changing climate, the team's objective is to offer sustainable climate solutions for all.

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## Our Promise.

### **Service**

Tio provides a personable service which supports all businesses in the built environment industry.

### **Support**

UK based technical support with direct links to manufacturers to ensure prompt, relevant and accurate technical support. Our website has a dedicated technical page, with videos and instructions.

### **Quality**

All products are tested to industry standards. We offer high quality products which are manufactured to strict quality plans. Independent UK testing by BSRIA.

### **Product**

Our design and development team research the market in depth, to bring the best quality and most suitable products to our portfolio. We offer a full range of components to suit all UFH system types.

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## Contact Us.

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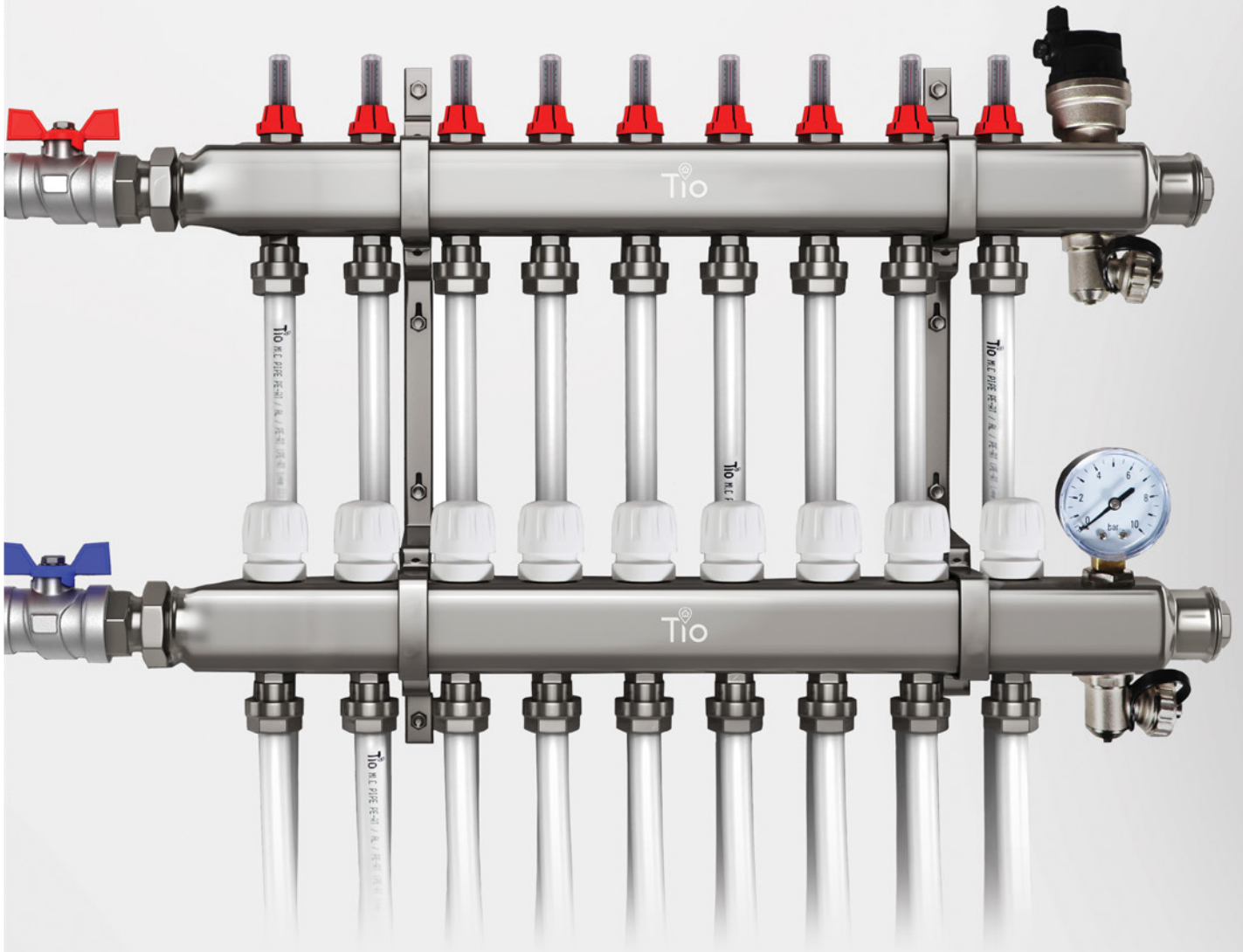
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# Manifolds & Mixing Units.

Underfloor heating manifolds are pivotal components within the heating system, responsible for controlling and distributing the heated water that circulates through the underfloor pipes. These manifold systems act as centralized hubs, regulating the flow and temperature of the water to ensure consistent warmth throughout the designated spaces.

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## Pre-assembled manifold with pressure gauge & auto air vent

Tio's premium stainless-steel manifold is a pre-assembled unit for use within either underfloor heating systems or wall-hung radiator systems.

The unit is pre-assembled and complete with an auto air vent (AAV), 10 bar pressure gauge, flow meters with 0-5 l/m indicators and fill and drain valves. Compatible with various pipe sizes up to 20mm. Integrated with filling and drain off valves to ease long term maintenance.



Flow Meter  
TIOSPA0018



Pin Valve Set  
TIOSPA0003



Drain Valve  
TIOSPA0004

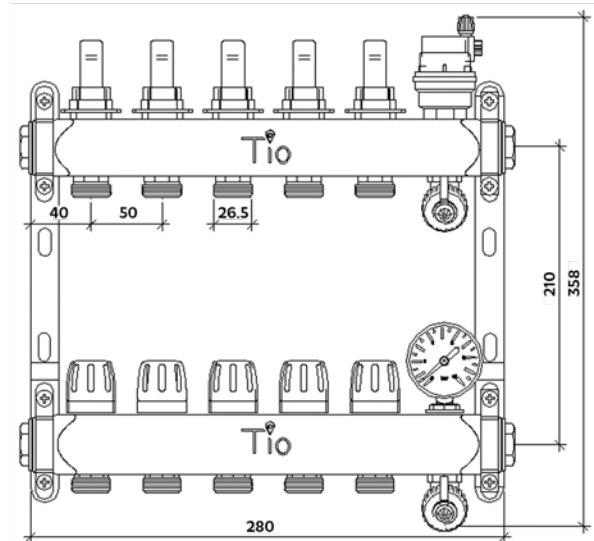


Auto Air Vent  
TIOSPA0007



Pressure Gauge  
TIOSPA0009

Tio premium manifolds have a standard UK distance of 210mm between the flow and return bars. This makes the unit versatile with various mixing units. The unit has a spacing of 50mm between each port from the centre point advocating for various pipe sizes and materials to be installed. For ease of installation, we recommend no larger than 20mm pipe to be installed with the Tio manifold connectors. The unit has 1" threaded inlets to house isolation valves and, the bottom rail has a modulating pin that can be either, manually adjusted with the white adjusting caps, or to achieve electronic control, an actuator can be installed.



Product Code	Product Description	Gap Width
TIOMAN0002	2 Port Manifold with PG and AAV	180mm
TIOMAN0003	3 Port Manifold with PG and AAV	230mm
TIOMAN0004	4 Port Manifold with PG and AAV	280mm
TIOMAN0005	5 Port Manifold with PG and AAV	330mm
TIOMAN0006	6 Port Manifold with PG and AAV	380mm
TIOMAN0007	7 Port Manifold with PG and AAV	430mm
TIOMAN0008	8 Port Manifold with PG and AAV	480mm
TIOMAN0009	9 Port Manifold with PG and AAV	530mm
TIOMAN0010	10 Port Manifold with PG and AAV	580mm
TIOMAN0011	11 Port Manifold with PG and AAV	630mm
TIOMAN0012	12 Port Manifold with PG and AAV	680mm

## Manifold cabinets

Cabinets are used for water and heating manifolds, as well as underfloor heating mixing units. These cabinets are designed to be mounted on a wall surface and come in 3 different sizes.

### Design:

- The back wall is equipped with rails and bolts for mounting the manifold.
- Side walls with holes for the supply and return pipe of heating medium.
- Feet used for mounting cabinets to the floor.
- Screws for fixing the manifold.
- Removable front door.
- Adjustable height.
- Cabinet doors with a lock and key (standard).

**Material:** Hot-dip galvanized steel sheet 0.8 mm thick, powder coated in white.

Product Code	Product Description	Dimensions
TIOCAB0002	Manifold Cabinet	760 x 580 x 120mm
TIOCAB0003	Manifold Cabinet	845 x 580 x 120mm
TIOCAB0004	Manifold Cabinet	1015 x 580 x 120mm



## 3 piece manifold connector

Our 3-piece connectors are used to connect pipe to the manifold thus, creating a reliable and secure connection between components.

Available in various sizes these can be denoted by the outer diameter of the pipe and the wall thickness.

Product Code	Product Description	Dimensions
TIOCON0010	Manifold Connector	3/4" x 10 x 1.25mm
TIOCON0012	Manifold Connector	3/4" x 12 x 2mm
TIOCON0015	Manifold Connector	3/4" x 15 x 2mm
TIOCON0016	Manifold Connector	3/4" x 16 x 2mm
TIOCON0020	Manifold Connector	3/4" x 20 x 2mm



## Isolation valves

Boxed as a pair, these isolation valves will fit directly onto the manifold mixing unit.

We recommend isolation with every system to allow for easy maintenance in the future.

Product Code	Product Description
TIOVAL0001	Pair of 1" isolation valves
TIOVAL0002	Pair of 1" isolation valves with gauge
TIOVAL0003	Pair of 3/4" ball valves
TIOVAL0004	Pair of 1" 90° angled valves



## 230v 22mm motorized valves

These motorized zone valves have been designed to control the flow of water in iron and copper pipe systems. Although specifically designed for small bore central heating systems, the valve can be used in commercial and industrial applications.

- Power Supply: 230 Volts AC 50Hz
- Switch Rating: 2.2A
- Switch Type Power: SPST (22mm)
- Consumption: 6W
- Ambient Temperature: 50°C max
- Flow Temperature: 5°C to 88°C max
- Static Pressure: 8.6 bar max



Product Code	Product Description
TIOMZV-22-2	2-way 230v 22mm motorized valve
TIOMZV-22-3	3-way 230v 22mm motorized valve

## Emmeti mixing unit and probe with Wilo Para 25/7 pump

Combining the Wilo Para 25/7 pump and a mixing valve with remote probe actuation to give a temperature range between 20°C - 70°C. Thus, making it suitable for screed drying purposes. It includes a throttle to increase Kv for larger systems. Includes a temperature gauge measuring the mixed flow temperature, manual air vent and bracket to support the weight of the pump.

- Connections - takeoffs G1" 1/2 - 130mm rotation
- Speed: 2580 - 470 RPM
- Maximum head: 7m
- Maximum flow rate 3.5 m³/h
- Maximum water temperature: 90°C
- Hz protection Class: IPX 4D
- Energy rating: A
- Energy consumption at 230v: 8.2 - 50W



Product Code	Product Description
TIOMIX0003	Emmeti mixing unit and probe with Wilo Para 25/7 pump

## Low loss header

Hydraulic headers are connected before the distribution header. This hydraulically isolates the primary and secondary circuits hence, allows the primary flow to be maintained at the boiler manufacturer's requirements and provides greater volumetric flow in the distribution header to all circuits.

- Allows for water flow of 6600 L/h.
- 1" male threaded inlets with integral drain valve, automatic air vent and insulating sheath.



Product Code	Product Description	Dimensions
TIOLLH0001	Low loss header	515 x 76.2mm - 1899ml



### ESBE 4-way valve and mixing unit with Grundfos pump - 210mm

To work in unison with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 55°C which complies with the requirement B51264 and makes it suitable for force screed drying.

- 210mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- 'A' rated pump.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



Product Code	Product Description
TIOMIX0005	ESBE 4-way valve and mixer with Grundfos pump - 210mm

### ESBE 4-way valve and mixing unit with Grundfos pump - 200mm

For use with underfloor heating manifolds, this mixing valve has a temperature range between 20°C - 55°C. Therefore, complying with the requirement B51264 and making it suitable for force screed drying.

- 200mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- 'A' rated pump.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



Product Code	Product Description
TIOMIX0007	ESBE 4-way valve and mixer with Grundfos pump - 200mm

### ESBE 4-way valve and mixing unit with Grundfos pump - Off-set 210mm

The off-set capabilities of this mixing unit gives it unique potential for installers. Used with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 55°C which complies with the requirement B51264. This makes it suitable for force screed drying.

- 210mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- 'A' rated pump.
- Integrated check valves for easy filling.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



Product Code	Product Description
TIOMIX-OC-15	ESBE 4-way valve and mixer with Grundfos pump - offset 210mm

## Emmeti mixing unit and probe with Grundfos pump - 210mm

For use with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 70°C which complies with the requirement B51264-4 2009. This mixing unit has an additional probe pocket for an optional over temperature device and a throttle to increase the Kv of the mixing valve for larger systems.

- 210mm between the centres of flow and return arms.
- A built-in non-return valve above the circulation pump is utilised to prevent backfilling during the system fill.
- 3 control modes.
- 'A' rated pump.
- Temperature gauge.
- Double de-blocking system.



Product Code	Product Description
TIOMIX0006	Emmeti mixing unit and probe with Grundfos pump - 210mm

## Tio mixing unit and probe with Tio T6-130-L pump

Harmonising the Tio High Efficiency Pump T6-130-L and a mixing valve with remote probe actuation to give a temperature range between 20°C - 60°C, making it suitable for screed drying purposes. It includes a throttle to increase Kv for larger systems. Includes 1" M manifold connections with O-ring seals and 1" M connections for primary flow and return. Includes a temperature gauge measuring the mixed flow temperature, manual air vent and bracket to support the weight of the pump.

- Pre-assembled pump and blending unit reduces installation time and allows for easy control of the underfloor heating system.
- Inclusive temperature control ensures that the water temperatures entering the floor do not exceed design temperatures.
- Built in thermostatic actuator with a temperature range between 20°C - 60°C for system design across all floor constructions.
- Integrated flow rate control valve for increased regulation of the flow rate and temperature of the underfloor heating system.
- Standard 210mm manifold spacing and 1" BSP connections



Product Code	Product Description
TIOMIX0008	Tio mixing unit and probe with Tio T6-130-L pump - 210mm

## Tio T6-130-L Tio high efficiency pump

Intelligent frequency conversion circulation pump. For systems which require a more powerful pump.

- No requirement for a mixing valve.
- High performance modulating pump.
- Optional pulse width modulation (PWM).
- Simple & easy retro-fit in most boiler brands.
- Easy set up to maximise boiler efficiency.
- 1-year manufacturers warranty.
- ErP Compliant.



Product Code	Product Description
TIOPUM0060	Tio T6-130-L high efficiency pump - 6m head
TIOPUM0080	Tio T8-130-L high efficiency pump - 8m head

## ESBE non-mixing 4-way set with Grundfos heat-pump - 210mm

This heat pump set is designed for low temperature systems and is suitable for a maximum output of 20kW.

- No requirement for a mixing valve.
- Compact design.
- Integrated check valves for easy filling.
- 'A' rated pump.
- Temperature gauge.
- Assembled in the UK: pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).
- Side or bottom entry connections.



Product Code	Product Description
TIOPUM0001	ESBE non-mixing 4-way set with Grundfos heat pump - 210mm

## Tio non-mixing 4-way set with T6-130-L heat pump - 210mm

Combining our in-house components with our high efficiency pump. The power supply voltage of the electric pump is single phase 220-240V, at 50/60hz.

- No requirement for a mixing valve.
- High performance modulating pump.
- Optional pulse width modulation (PWM).
- Simple & easy retro-fit in most boiler brands.
- Temperature gauge.
- 1-year manufacturers warranty.
- Easy set up to maximise boiler efficiency.
- ErP Compliant.



Product Code	Product Description
TIOPUM0002	Tio non-mixing 4-way set with T6-130-L heat pump - 210mm



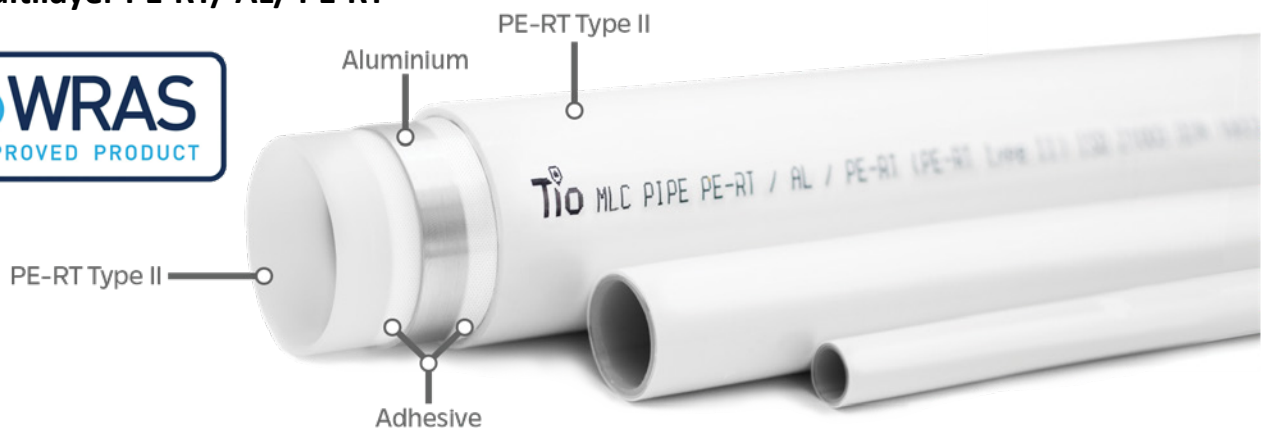


# Pipe.

Underfloor heating combines sophistication with practicality, offering efficient and discreet heating solutions. A modern heating method installed beneath the floor surface, using electric cables or water-filled pipes. It provides even warmth throughout a space by radiating heat upward. The system also minimizes the circulation of dust and allergens, contributing to a healthier indoor environment.

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## Multilayer PE-RT/ AL/ PE-RT



Tio multilayer pipes cross-link the best qualities of both metal and plastic pipes in one single system. It combines the advantages of aluminium with the corrosion resistance of plastic. The stability of the TIOMLC pipe is ensured by the laser edge welded aluminium. The pipe is built on a 5 layer structure, where the internal and external layers are made of PE-RT type II and the middle layer is made of aluminium and all layers are connected by a special bonding agent.

The pipes internal wall surface is extremely smooth, avoiding corrosion phenomena, limescale or deposits. TIOMLC pipes are flexible and easy to bend. The lightweight of the pipe is also an advantage for its use on wall-mounted installations. TIOMLC pipes can be used for drinking water applications as well as for heating and cooling systems and other industrial applications.

**Applications:**

- Heating and Underfloor
- Industrial Facilities
- Surface Heating/Cooling
- Cooling Systems
- Snow and Ice Removal Systems
- Hot and Cold Water Distribution

Product Code	Product Description	Dimensions
TIOMLC0001	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 100m coil
TIOMLC0002	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 240m coil
TIOMLC0003	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 500m coil
TIOMLC0004	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 200m coil

## PE-RT EVOH



Tio PE-RT EVOH pipe can be easily bent and curved in cold without special tooling, saving unions and installation time. Layers are very resistant to calcium, dirt and substances derived from galvanic corrosion. It weighs 7 times less than copper and 13 times less than iron on equivalent diameters. It does not modify the organoleptic characteristics of drinking water and the corrosion absence avoid proliferation of bacteria. Providing energy savings by reducing heat loss. Much lower roughness than metallic pipes reducing energetic consumption and allowing a higher flow with the same internal pipe diameter. Recovering the original shape when hot air is applied allowing it to be repaired.

### Applications:

- Heating and Underfloor
- Industrial Facilities
- Surface Heating/Cooling
- Cooling Systems
- Snow and Ice Removal Systems
- Hot and Cold Water Distribution

Product Code	Product Description	Dimensions
TIOPER0001	3 layer PE-RT pipe	16 x 2mm - 100m coil
TIOPER0002	3 layer PE-RT pipe	16 x 2mm - 240m coil
TIOPER0003	3 layer PE-RT pipe	16 x 2mm - 500m coil
TIOPER0004	3 layer PE-RT pipe	12 x 2mm - 80m coil
TIOPER0005	3 layer PE-RT pipe	12 x 2mm - 240m coil
TIOPER0006	3 layer PE-RT pipe	20 x 2mm - 400m coil
TIOPER0007	3 layer PE-RT pipe	10 x 1.25mm - 80m coil
TIOPER0008	3 layer PE-RT pipe	10 x 1.25mm - 240m coil





# Controls.

Collating various design and functionality features through customer review, has allowed us to fine comb our control solutions and provide effective output in every scenario. Perfectly catered for underfloor heating, our range of products deliver on every aspect.

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## 7 day programmable thermostats

Our 7 day (5+1+1) Programmable thermostat gives users 6 periods throughout the day to adjust their heating requirements. It's sleek design, easy to use functionality and affordable price, makes it the perfect choice for any home. **Available in black and white.**



Product Code	Product Description
TIOSTA0003	230v black programmable thermostat
TIOSTA0004	230v white programmable thermostat
TIOSTA0006	24v white programmable thermostat

## Smart thermostat (Wi-Fi)

The Tio Smart has the same design and features as the programmable Tio thermostat. Utilising Wi-Fi capabilities to link with the Tio Smart home system. **Available in black and white.**



Product Code	Product Description
TIOSTA0001	230v black smart Wi-Fi thermostat
TIOSTA0002	230v white smart Wi-Fi thermostat
TIOSTA0005	24v white smart Wi-Fi thermostat

## Electric underfloor thermostat

Available in both smart and programmable versions, Tio's 16 amp electric underfloor thermostat is the perfect solution for electric underfloor heating. **Available in white.**



Product Code	Product Description
TIOSTA0007	230v white programmable thermostat
TIOSTA0008	230v white smart Wi-Fi thermostat

## RF thermostat with single channel receiver

Wi-Fi Wireless Heating thermostat with single channel receiver. Incorporating 7 day programming with smart app capability. **Available in white.**



Product Code	Product Description
TIOSTA0012	230v white programmable Wi-Fi thermostat

## Dial thermostats

Perfect for water heating systems, these dial thermostats offer temperature adjustability between 0°C - 35°C. LED indication when heating is activated.

Product Code	Product Description
TIODIA0003	230v tamper proof electric thermostat
TIODIA0004	230v on-wall dial thermostat
TIODIA0004s	230v on-wall dial thermostat with floor sensing



## Manifold actuators

Easy install actuator in 230v or 24v options. The unit comes normally open (NO) with a retaining clip. Once removed the opening function is normally closed (NC). The cable has 2 wires, neutral and live, with an extended length of 780mm.

Product Code	Product Description
TIOACT0001	230v Tio manifold actuator
TIOACT0002	24v Tio manifold actuator



## Sensor probe

Thermostat floor sensor can be used with any Tio Thermostat to allow more precise floor sensing.

Product Code	Product Description
TIOSEN0001	10k sensor probe for thermostats



## Wiring Centre

This functional 230v wiring centre has easy fit connector terminals and also LED indicators. The unit is fitted with boiler/pump/valve and timer port for use with underfloor heating systems.

Product Code	Product Description
TIOWIR0004	8 zone wiring centre with port and valve timer



## Room sensor enclosure

Purpose-built enclosure designed for use with remote air probes, offering a practical and convenient solution for integrating ambient air temperature sensing with thermostats; making it particularly suitable for use in bathrooms and wet areas.

Product Code	Product Description	Dimensions
TIOENC0001	White sensor enclosure	80x 80 x 22mm
TIOENC0002	Black sensor enclosure	80x 80 x 22mm





## Smart RF Wi-Fi thermostat

Partnering the TEVO with our RF wiring centre and gateway you can enjoy managing your heating from your phone as well as locally.

A simple and minimal user interface allows users to enjoy a clear and easy to use one touch control panel. Internal and external sensor to control both air and or floor temperatures. Our 5+1+1 six period programming system enables flexible temperature control. Utilising 2x AA batteries for your convenience.



Product Code	Product Description
TIOEVO0001	230v white smart RF thermostat
TIOEVO0002	230v black smart RF thermostat

# TEVO WIRELESS



## Wireless RF central control centre

Most commonly used for underfloor heating applications, this wiring centre can also be used for central control of multi-use systems by utilising the independent control outputs for hot water zone control and a dedicated channel for a radiator zone valve.

This wiring centre can control the heat source activation through volt free output as well as offering a 230v output to the manifold circulation pump. Includes optional pump delay functionality, pump exercise function, commissioning switches and LED zone indicators.

Product Code	Product Description
TIOEVO0003	Wireless RF central control box

# TEVO WIRELESS



## Multifunctional Gateway

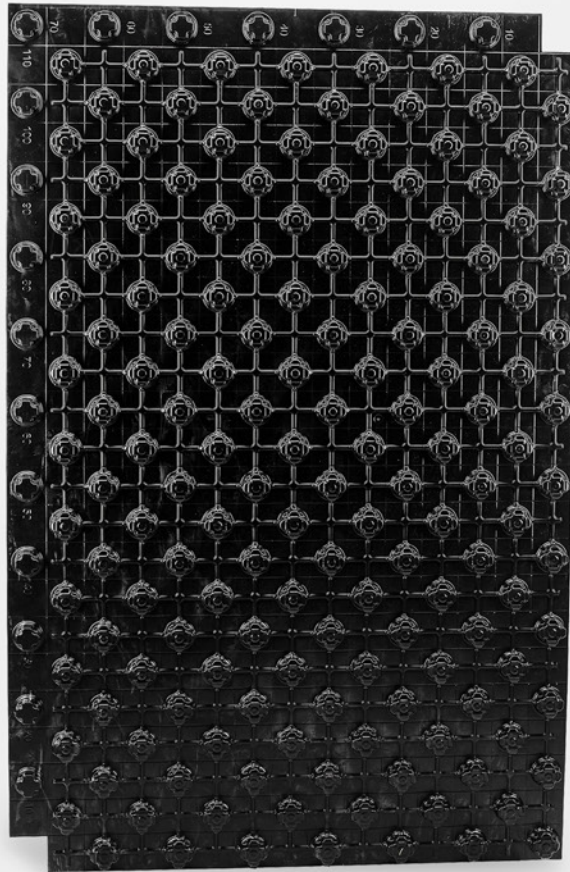
Synergising the TEVO thermostat with the wireless RF central control box, this multifunctional gateway harnesses the smart Wi-Fi capabilities of both devices. Supporting both ZigBee and Bluetooth protocols, users can design multi-device systems using the Smartlife and Tuya apps.



Product Code	Product Description
TIOEVO0004	Gateway hub for app functionality

# TEVO WIRELESS





# Floor Systems.

Underfloor heating floor systems encompass various components designed to optimize the efficiency and functionality of this innovative heating method. These components create a comprehensive underfloor heating system, optimizing warmth distribution and ensuring effective integration with various flooring materials for both functional and aesthetic benefits.

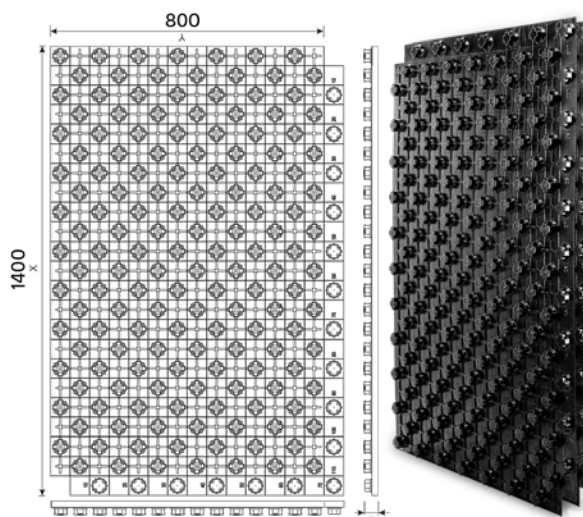
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## Castellated Mat

This system mat is designed for running pipe heating loops on the heating surface. Regular, properly shaped and numerous tab ensure fast and firm installation of heating pipes.

Benefits include:

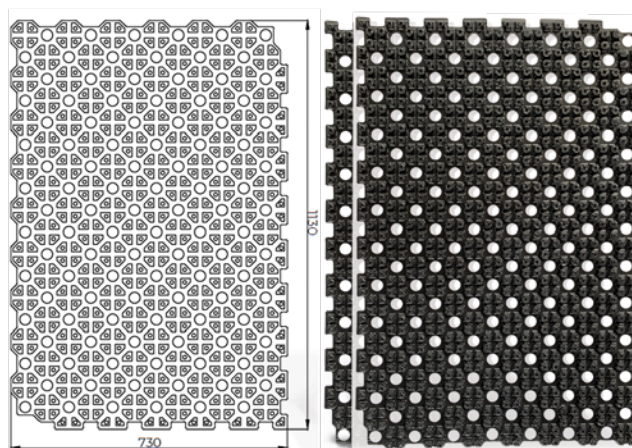
- Laying the underfloor heating without the use of clips.
- Rigid structure to prevent the pipe from falling out.
- Metric graduation for easy size adjustment.
- The shape of the tab enables a solid mats connection.



Product Code	Product Description	Dimensions
TIOCAS0001	Castellated mat	1400 x 800 x 20mm

## Lowtop Castellated Mat (Adhesive)

Thermoformed and perforated mat for low-profile underfloor heating with the usage of special underlays. This mat allows assembly of a wet-built floor covering up to 3cm high. Our lowtop mat is dedicated to renovated buildings and other buildings where the technical conditions make it impossible to perform underfloor heating in a traditional form.



Product Code	Product Description	Dimensions
TIOCAS0002	Lowtop castellated mat with adhesive	1120 x 730 x 13mm

## EasyCem TX Leveling Compound

Ideal for application over a wide range of substrates including concrete, sand and cement screeds. Applicable at thicknesses ranging from 5mm to 50mm. EasyCem TX is fast setting and can receive a tiled floor finish after 3 hours or most other types of finish at 24 hours (at 20°C).

This product is shrinkage compensated and contains fibre reinforcement, providing the perfect smoothing material for most floor finishes. Perfect for underfloor heating, our leveling compound only requires equal parts water to become highly durable.

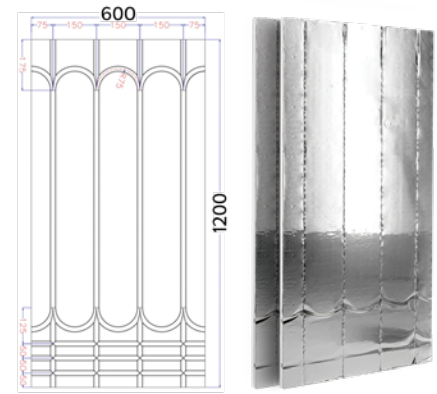


Product Code	Product Description
TIOCEM0001	Tio EasyCem TX leveling compound - 25kg

## Expanded Polystyrene Insulation Board with Aluminium Foil

Alu Standard EPS 400 is used as a load-bearing element for pipes in dry underfloor heating systems. Due to the physical characteristics of EPS 400, the product ensures optimal thermal and acoustic insulation simultaneously.

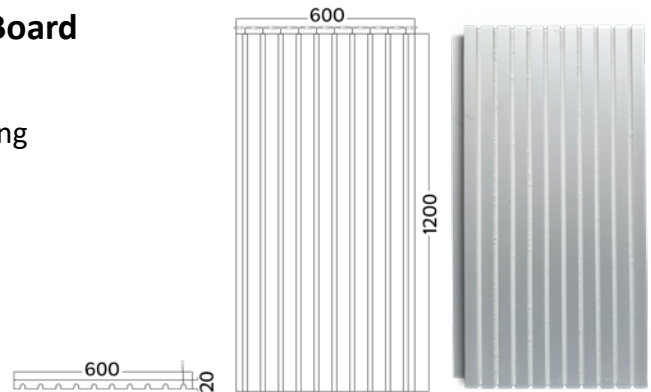
The aluminum foil cover is a radiator, which collects the heat from the side of the pipe and distributes it over the surface of the board.



Product Code	Product Description	Dimensions
TIOEPS0001	EPS 400 with aluminium foil	1200 x 600 x 20mm

## Extruded Polystyrene Insulation Transition Board

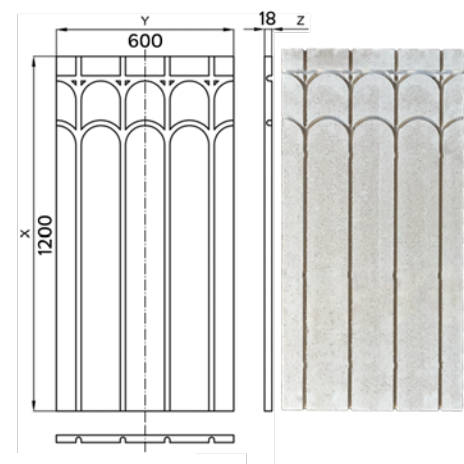
Extruded Polystyrene, referred to as XPS, is a closed cell insulation product commonly used in re-modelling and new construction applications.



Product Code	Product Description	Dimensions
TIOXPS0001	XPS transition board	1200 x 600 x 20mm

## Gypsum Fiber Board with double torsion ending

Fermacell fiber-gypsum panels are used as a load-bearing elements for pipes in dry underfloor heating. The physical properties of the fiber-gypsum boards make the product an effective heat distributor, without using aluminium plates. The boards are available in various configurations based on the technical conditions of the built environment. The boards are supplied in two pre-routed panels - straight boards with in built return and return panels. The board gives a low thermal resistance, owing to its cementitious properties. This in turn gives evenly projected heat throughout the floor area.



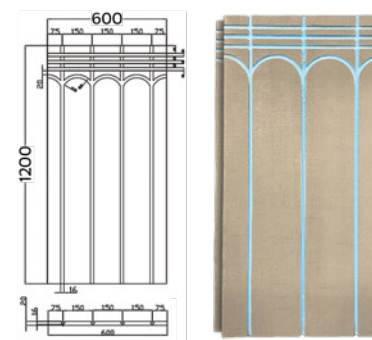
Product Code	Product Description	Dimensions
TIOBLB0001	Gypsum fibre board	1200 x 600 x 18mm



## XPS tile backer board for 16mm pipe

Made using high density XPS 400kPa which is thermally insulating, lightweight, waterproof and faced with a reinforced cement coating. The panels provide a quick and easy solution for the placement of pipework for domestic and commercial underfloor heating applications. Providing a robust surface that is ideal for direct bonding of tiles.

**Available in two configurations.**

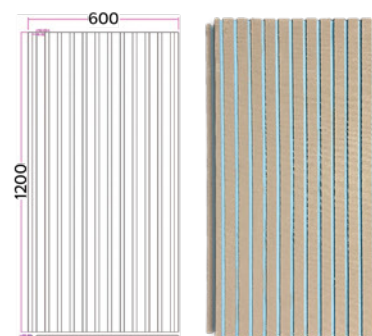


Product Code	Product Description	Dimensions
TIOTBB0001	XPS tile backer board	1200 x 600 x 20mm - 150mm centers
TIOTBB0002	XPS tile backer board	1200 x 600 x 20mm - 200mm centers

## Grooved XPS transition tile backer board for 16mm pipe

Ideal in every scenario, these panels are quick and easy to use. Although lightweight, these panels provide high end thermal insulation, perfect for underfloor heating.

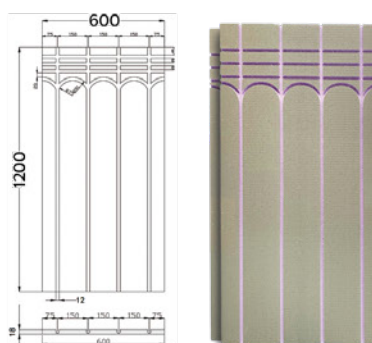
Grooved to allow for effective placement of pipe, in order to create even heat distribution.



Product Code	Product Description	Dimensions
TIOTBB0004	Grooved XPS tile backer board	1200 x 600 x 20mm

## XPS tile backer board for 12mm pipe

Manufactured from high density XPS 400kPa which is thermally insulating, lightweight, waterproof and faced with a reinforced cement coating. The panels provide a quick and easy solution for the placement of pipework for domestic and commercial underfloor heating applications. Providing a robust surface that is ideal for direct bonding of tiles.

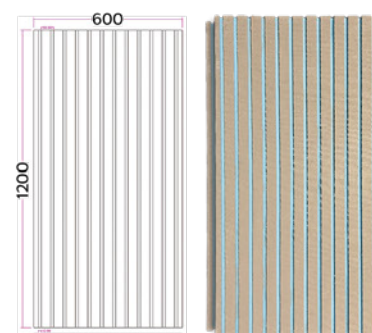


Product Code	Product Description	Dimensions
TIOTBB0003	XPS tile backer board	1200 x 600 x 20mm - 150mm centers

## Grooved XPS transition tile backer board for 12mm pipe

Manufactured with installers in mind, these panels are quick and easy to use. Although lightweight, these panels provide high end thermal insulation, perfect for underfloor heating.

Grooved to allow for effective placement of pipe, in order to create even heat distribution.

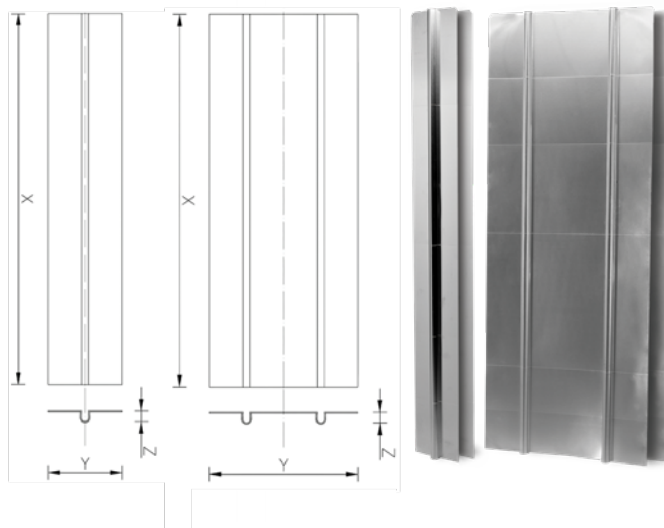


Product Code	Product Description	Dimensions
TIOTBB0005	Grooved XPS tile backer board	1200 x 600 x 18mm

## Aluminium plates

Aluminium heat transfer plates are used for installing floor and wall heating systems with the use of low-profile underfloor heating.

Heat transfer plates are an integral elements of heating systems based on EPS boards, acoustic boards and chipboards. Aluminium heat transfer plates allow the heat to spread effectively across the heating area. Thanks to its special shape, heat transfer plates act as pipe mounting elements.



Product Code	Product Description	Dimensions
TIOPLA0001	Aluminium plate	1000 x 120 x 0.4mm
TIOPLA0002	Aluminium plate	1000 x 390 x 0.4mm

## 150mm Edge with Tape & Overlap

Edge strip is placed where the screed meets the vertical structural elements. They help compensate for thermal elongations of the heating floor. Our edge strip provides working space for materials that change their volume under the influence of temperature.

Available in 2 different lengths.



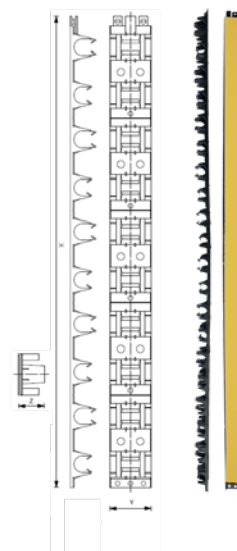
Product Code	Product Description	Dimensions
TIOEDG0002	Edge strip with tape and overlap	150 x 8mm - 50m
TIOEDG0003	Edge strip with tape and overlap	150 x 8mm - 25m

## 1M Clip Rail with Taped Back

Universal rail for mounting underfloor and wall heating systems for use on a large surfaces. Designed for pipes with diameters of 16-18 or 25mm to simplify and shorten the installation time. The rail is available in 1000 mm lengths, consisting of two 500mm sections. Elements can be easily combined with each other.

A sticky-back tape is also used to allow installers to simply stick the rail to a surface in order to fix it's position.

Product Code	Product Description	Dimensions
TIORAI0001	Clip rail with taped back	1000 x 45 x 29mm



11030300003



# Accessories.

Collectively, these accessories contribute to the seamless operation of underfloor heating, offering control, efficiency, and enhanced performance for a comfortable living environment.

---

## Clip gun

Ergonomic device used for the effective fixing of underfloor heating pipe using clips. The device has an appropriate adjustment system which, protects the clips from falling out and allows to set the force of the arm to return to the base position.



Product Code	Product Description	Dimensions
TIOSPA0001	Tio clip gun	367 x 934 x 62mm

## Pin set

Manifold return pin valve set.



Product Code	Product Description
TIOSPA0003	Pin set for manifold

## Drain valve

1/2" male connection with 3/4" hose connection.  
For easy drainage of systems.



Product Code	Product Description
TIOSPA0004	Drain valve

## Pair of brackets

Used for mounting manifolds.

Product Code	Product Description
TIOSPA0005	Manifold brackets - 210mm
TIOSPA0024	Manifold brackets - 200mm



## 1" End cap

Cap off the manifold during fitting and commissioning.



Product Code	Product Description
TIOSPA0006	1" end cap

## Automatic air vent

Discharging air during normal operation without the need of manual intervention.



Product Code	Product Description
TIOSPA0007	Automatic air vent



### 3/4" blanking plug

Temporarily or permanently close off unused manifold ports.



Product Code	Product Description
TIOSPA0008	3/4" blanking plug

### Pressure gauge

Measures the manifolds water pressure 0-10l/m.



Product Code	Product Description
TIOSPA0009	10 bar pressure gauge

### 16mm compression straight connector

Supplied as a barrel and two connectors.



Product Code	Product Description
TIOSPA0010	16mm repair coupling

### Pipe cutter

Ideal for use with PE-RT pipe, gives a clean straight cut through pipe.



Product Code	Product Description
TIOSPA0011	Pipe cutter

### Screw for automatic air vent

Replacement screw for automatic air vent.



Product Code	Product Description
TIOSPA0012	Screw for AAV

### Manifold port splitter fitting

This flow splitter is used for underfloor heating manifold. It divides a flow from one port into two separate flows.



Product Code	Product Description
TIOSPA0013	Port splitter fitting

## Gasket for pumps and mixing units

Used to seal the flange segments that hook the pump to the inlet and outlet pipes.

Product Code	Product Description
TIOSPA0014	Gasket



## 3/4" male to male fitting

These adapters permit the user to convert female connections to male connections, and are especially useful in confined installations or where rigidity is required.

Product Code	Product Description
TIOSPA0015	3/4" male to male fitting



## Clip-on pipe label

Ideal for labelling pipe according to zone allocation.

Product Code	Product Description
TIOSPA0016	Red clip-on pipe label
TIOSPA0017	Blue clip-on pipe label



## Taconova flow meter

Taconova design 5 bar flow meter. A device that measures how much liquid moves through a pipeline in a given period of time.

Product Code	Product Description
TIOSPA0018	Taconova 5 bar flow meter



## 12mm round cable clip

The white moulding securely grips the cable without damaging it, while the hardened nails keep them fastened in place. Allowing for a neat and professional finish.

Product Code	Product Description
TIOSPA0019	12mm round cable clip



## Manual air vent

The manual cap allows manual venting for system commissioning.

Product Code	Product Description
TIOSPA0022	Manual air vent for manifold



## Star reamer

Used to prepare MLC pipe prior to insertion into a fitting. Ensures that the pipe is round, free from burrs.

Product Code	Product Description
TIOT000001	Star reamer



## Chamfering device

Used to deburr and chamfer both the inner and outer diameters of pipe.

Product Code	Product Description
TIOT000002	Chamfering device



## Manifold connector flat spanner 29mm

Gives a mechanical advantage in applying torque to turn manifold connectors.

Product Code	Product Description
TIOT000003	29mm flat spanner



## Backer board washer with 40mm screw

Washers provide protection, distribute the load of the screw and prevent looseness when attached to a backer board.

Product Code	Product Description
TIOWAS0001	40mm screws - pack of 1000



## Pipe bend support

The pipe bend support allows bending of heating pipes in a 90-degree bow. It's elbow can be used to guide pipes through floors, ceilings and to a manifold cabinet. Working temperature: 0°C - 65°C.

Product Code	Product Description
TIOBEN0001	14-18mm pipe bend support
TIOBEN0001	10-12mm pipe bend support



## Pipe decoiler

Pipe decoiler is used for quick pipe unrolling during the installation of underfloor heating. Facilitating efficient workflow for installers. Can be used with coils up to 600m.

Product Code	Product Description	Dimensions
TIODEC0001	Tio pipe decoiler	590 x 230 x 185mm



## Pipe clips

Welded tacker staples are used to fasten floor heating pipes to insulating layer. Staples are welded to each other, forming magazines consisting of 25 or 30 pieces. Tacker staples are designed to work with the tacker gun, which simplifies installation and shortens its' time. Length of staples, that should be used for fixing depends on the thickness of an insulation layer applied. The use of a mixture of plastics gives the clips flexibility, which prevents it from breaking during installation.



Product Code	Product Description
TIOCLI0001	40mm pipe clip - box of 300
TIOCLI0002	50mm pipe clip - box of 300
TIOCLI0003	60mm pipe clip - box of 300

## Pipe conduit with slit

This corrugated conduit is used to isolate underfloor heating flow pipes between the manifold and the subsequent room being heated. It can also be used for general protection for cables for office and private applications.

This one-piece corrugated conduit can be easily retro fitted to an existing pipe. To begin the installation, open the conduit and insert the pipe so that the pipe is covered and the split is closed.



Product Code	Product Description
TIOCON0001	Black pipe conduit - 25m



# Next day delivery.

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Order **before 3PM** for next day delivery.

**FREE** for orders **£1250 and above**  
**£25** for orders between **£500 - £1250**  
**£30** for orders below **£500**

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- A bulk order surcharge of £35 will apply to orders of pipe, edge, conduit and large floor systems only.
- All prices are exclusive of VAT.
- Orders must be received by 3pm to receive a next day service.
- Our default service is next day delivery.
- Large orders will be palletised, if you do not have a facility to unload a pallet, please notify us in your order.

Mainland UK, Channel Islands, Scottish Highlands, Northern Ireland, Dublin and Eire - POA

Collection is available free of charge from our South Oxfordshire warehouse.

Please call **01235 242710** to arrange collection.

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# Terms & Conditions.

## Application and Application entire agreement

These terms and conditions will apply to the purchase of the goods detailed in our quotation (Goods) by the buyer (you or Customer) from Tio Climate Solutions Ltd a company registered in England and Wales under number 12822160 whose registered office is at Boston House, Downsview Road, Wantage, Oxfordshire, England, OX12 9FF. These terms and conditions will be deemed to have been accepted by you when you accept them or the quotation or from the date of any delivery of the goods (whichever happens earlier) and will constitute the entire agreement between us and you. These terms and conditions and the quotation (together, the Contract) apply to the purchase and sale of any Goods between us and you, to the exclusion of any other terms that you try to impose or incorporate, or which are implied by trade, custom, practice or course of dealing.

## Interpretation

A “business day” means any day other than a Saturday, Sunday or bank holiday in England and Wales. The headings in these terms and conditions are for convenience only and will not affect their interpretation. Words imparting the singular number include the plural and vice-versa.

## Goods

The description of the Goods is set out in our sales documentation, unless expressly changed in our quotation. In accepting the quotation, you acknowledge that you have not relied upon any statement, promise or other representations about the Goods by us. Descriptions of the Goods set out in our sales documentation are intended as a guide only. We can make any changes to the specification of the Goods which are required to conform to any applicable safety or other statutory or regulatory requirements.

## Price

The price (Price) of the Goods is set out in our quotation current at the date of your order or such other price as we may agree in writing. If the cost of the Goods to us increases due to any factor beyond our control including, but not limited to, material costs, labour costs, alteration of exchange rates or duties, or changes to delivery rates, we can increase the price before delivery. Any increase in the Price under the clause above will only take place after we have told you about it. You may be entitled to discounts. Any and all discounts will be at our discretion. The price is exclusive of fees for packaging and transportation/delivery. The price is exclusive of any applicable VAT and other taxes or levies which, are imposed or charged by any competent authority.

## Cancellation and alteration

Details of the Goods as described in the clause above (Goods) and set out in our sales documentation are subject to alteration without notice and are not a contractual offer to sell the Goods which is capable of acceptance. The quotation (including any non-standard price negotiated in accordance with the clause on Price (above) is valid for 7 days only from the date shown in it unless expressly withdrawn by us at an earlier time. Either of us can cancel the order for any reason before your acceptance (or rejection) of the quotation.

## Payment

We will invoice you for the Price either: on or at any time after delivery of the Goods; or where the Goods are to be collected by you or where you wrongfully do not take delivery of the Goods, at any time after we have notified you that the Goods are ready for collection, or we have tried to deliver them. You must pay the Price within 30 days of the date of our invoice or otherwise according to any credit terms agreed between us. You must make payment even if delivery has not taken place and or that the title in the Goods has not passed to you. If you do not pay within the period set out above, we will suspend any further deliveries to you and without limiting any of our other rights or remedies for statutory interest, charge you interest at the rate of 5% per annum above the base rate of the Bank of England from time to time on the amount outstanding until you pay in full. Time for payment will be of the essence of the Contract between us and you. All payments must be made in British Pounds unless otherwise agreed in writing between us. Both parties must pay all amounts due under these Terms and Conditions in full without any deduction or withholding except as required by law and neither party is entitled to assert any credit, set-off or counterclaim against the other to justify withholding payment of any such amount in whole or in part.

## Termination

We can terminate the sale of Goods under the Contract where: you commit a material breach of your obligations under these Terms and Conditions. You are or become or, in our reasonable opinion, are about to become the subject of a bankruptcy order or take advantage of any other statutory provision for the relief of insolvent debtors; you enter into a voluntary arrangement under Part 1 of the Insolvency Act 1986, or any other scheme or arrangement is made with your creditors; or you convene any meeting of your creditors, enter into voluntary or compulsory liquidation, have a receiver, manager, administrator or administrative receiver appointed in respect of your assets or undertakings or any part thereof, any documents are filed with the court for the appointment of an administrator, a notice of intention to appoint an administrator is given by you or any of your directors or by a qualifying floating charge holder (as defined in para. 14 of Schedule B1 of the Insolvency Act 1986), a resolution is passed or petition presented to any court for the winding up of your affairs or the granting of an administration order, or any proceedings are commenced relating to your insolvency or possible insolvency.

## Delivery

We will arrange for the delivery of the Goods to the address specified in the quotation, or your order or to another location we agree in writing. If you do not specify a delivery address or if we both agree, you must collect the Goods from our premises. Subject to the specific terms of any special delivery service, delivery can take place at any time of the day and must be accepted at any time between 8 am to 8 pm. If you do not take delivery of the Goods we may, at our discretion and without prejudice to any other rights: store or arrange for the storage of the Goods and will charge you for all associated costs and expenses including, but not limited to, transportation, storage and insurance; and/or make arrangements for the redelivery of the Goods and will charge you for the costs of such redelivery; and/or after 10 business days, resell or otherwise dispose of part or all of the Goods and charge you for any shortfall below the price of the Goods. If redelivery is not possible as set out above, you must collect the Goods from our premises and will be notified of this. We can charge you for all associated costs including, but not limited to, storage and insurance. Any dates quoted for delivery are approximate only, and the time of delivery is not of the essence. We will not be liable for any delay in delivery of the Goods that is caused by a circumstance beyond our control or your failure to provide us with adequate delivery instructions or any other instructions that are relevant to the supply of the Goods. We can deliver the Goods in instalments, which will be invoiced and paid for separately. Each instalment is a separate contract. Any delay in delivery or defect in an instalment will not entitle you to cancel any other installment.



# Terms & Conditions.

## Inspection and acceptance of Goods

You must inspect the Goods on delivery or collection. If you identify any damages or shortages, you must inform us in writing within 2 days of delivery, providing details. Other than by agreement, we will only accept returned Goods if we are satisfied that those Goods are defective and if required, have carried out an inspection. Subject to your compliance with this clause and/or our agreement, you may return the Goods and we will, as appropriate, repair, replace, or refund the Goods or part of them. We will be under no liability or further obligation in relation to the Goods if: if you fail to provide notice as set above; and/or you make any further use of such Goods after giving notice under the clause above relating to damages and shortages; and/or the defect arises because you did not follow our oral or written instructions about the storage, commissioning, installation, use and maintenance of the Goods; and/or the defect arises from normal wear and tear of the Goods; and/or the defect arises from misuse or alteration of the Goods, negligence, wilful damage or any other act by you, your employees or agents or any third parties. You bear the risk and cost of returning the Goods. Acceptance of the Goods will be deemed to be upon inspection of them by you and in any event within 1 day after delivery.

## Risk and title

The risk in the Goods will pass to you on completion of delivery. Title to the Goods will not pass to you until we have received payment in full (in cash or cleared funds) for: (a) the Goods and/or (b) any other goods or services that we have supplied to you in respect of which payment has become due. Until title to the Goods has passed to you, you must (a) hold the Goods on a fiduciary basis as our bailee; and/or (b) store the goods separately and not remove, deface or obscure any identifying mark or packaging on or relating to the Goods; and/or (c) keep the Goods in satisfactory condition and keep them insured against all risks for their full price from the date of delivery. As long as the Goods have not been resold, or irreversibly incorporated into another product, and without limiting any other right or remedy we may have, we can at any time ask you to deliver up the Goods and, if you fail to do so promptly, we can enter any of your premises or of any third party where the Goods are stored to recover them.

## Limitation of liability

Our liability under the Contract, in breach of statutory duty, and tort, misrepresentation or otherwise will be limited to this section. Subject to the clauses above on Inspection and Acceptance and Risk and Title, all warranties, conditions or other terms implied by statute or common law (save for those implied by Section 12 of the Sale of Goods Act 1979) are excluded to the fullest extent permitted by law. If we do not deliver the Goods, our liability is limited, subject to the clause below, to the costs and expenses incurred by you in obtaining replacement goods of similar description and quality in the cheapest market available, less the price of the Goods. Our total liability will not, in any circumstances, exceed the total amount of the Price payable by you. We will not be liable (whether caused by our employees, agents or otherwise) in connection with the Goods, for: any indirect, special or consequential loss, damage, costs, or expenses; and/or any loss of profits; loss of anticipated profits; loss of business; loss of data; loss of reputation or goodwill; business interruption; or, other third party claims; and/or any failure to perform any of our obligations if such delay or failure is due to any cause beyond our reasonable control; and/or any losses caused directly or indirectly by any failure or breach by you in relation to your obligations; and/or any loss relating to the choice of the Goods and how they will meet your purpose or the use by you of the Goods supplied. The exclusions of liability contained within this clause will not exclude or limit our liability for death or personal injury caused by our negligence; or for any matter for which it would be illegal for us to exclude or limit our liability; and for fraud or fraudulent misrepresentation.

## Communications

All notices under these Terms and Conditions must be in writing and signed by, or on behalf of, the party giving notice (or a duly authorised officer of that party). Notices will be deemed to have been duly given: when delivered, if delivered by courier or other messengers (including registered mail) during the normal business hours of the recipient when sent, if transmitted by fax or email and a successful transmission report or return receipt is generated; on the fifth business day following mailing, if mailed by national ordinary mail; or on the tenth business day following mailing, if mailed by airmail. All notices under these Terms and Conditions must be addressed to the most recent address, email address or fax number notified to the other party.

## Data protection

When providing the Goods to the Buyer, the Seller may gain access to and/or acquire the ability to transfer, store or process personal data of employees of the Buyer. The parties agree that where such processing of personal data takes place, the Buyer shall be the 'data controller' and the Seller shall be the 'data processor' as defined in the General Data Protection Regulation (GDPR) as may be amended, extended and/or re-enacted from time to time. For the avoidance of doubt, 'Personal Data', 'Processing', 'Data Controller', 'Data Processor' and 'Data Subject' shall have the same meaning as in the GDPR. The Seller shall only Process Personal Data to the extent reasonably required to enable it to provide the Goods as mentioned in these terms and conditions or as requested by and agreed with the Buyer, shall not retain any Personal Data longer than necessary for the Processing and refrain from Processing any Personal Data for its own or any third party's purposes. The Seller shall not disclose Personal Data to any third parties other than employees, directors, agents, subcontractors or advisors on a strict "need-to-know" basis and only under the same (or more extensive) conditions as set out in these terms and conditions or to the extent required by applicable legislation and/or regulations. The Seller shall implement and maintain technical and organisational security measures as required to protect Personal Data Processed by the Seller on behalf of the Buyer. Further information about the Seller's approach to data protection is specified in its Data Protection Policy, which can be found on the company website or a manual copy can be requested in person. For any enquiries or complaints regarding data privacy, you can e-mail: [office@tioclimatesolutions.co.uk](mailto:office@tioclimatesolutions.co.uk).

## Circumstances beyond the control of either party

Neither party shall be liable for any failure or delay in performing their obligations where such failure or delay results from any cause that is beyond the reasonable control of that party. Such causes include, but are not limited to: industrial action, civil unrest, fire, flood, storms, earthquakes, acts of terrorism, acts of war, governmental action or any other event that is beyond the control of the party in question. No Waiver No waiver by us of any breach of these Terms and Conditions by you shall be considered as a waiver of any subsequent breach of the same or any other provision.

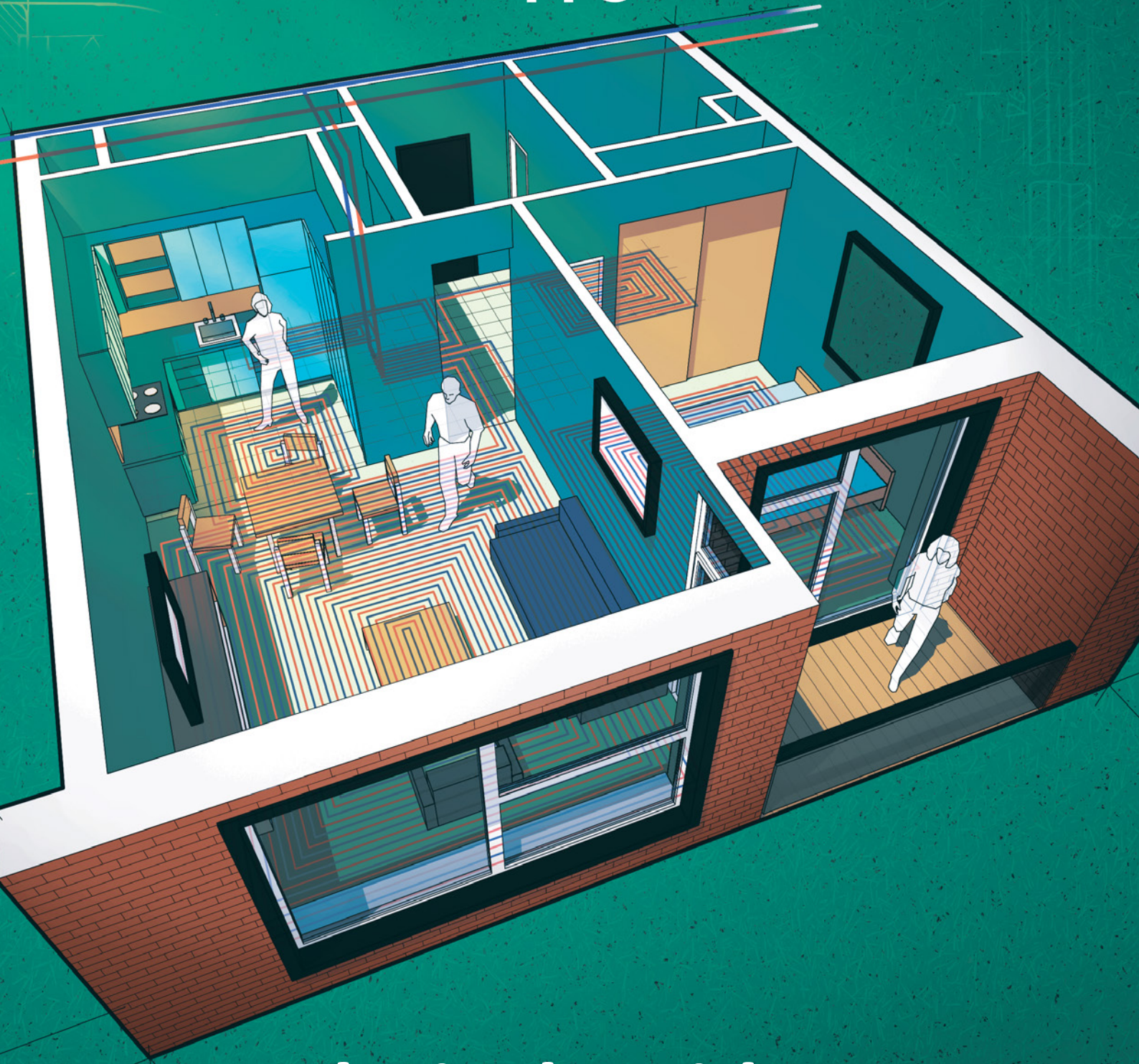
## Severance

If one or more of these Terms and Conditions is found to be unlawful, invalid or otherwise unenforceable, that / those provisions shall be deemed severed from the remainder of these Terms and Conditions (which will remain valid and enforceable).

## Law and jurisdiction

This Agreement shall be governed by and interpreted according to the law of England and Wales and all disputes arising under the Agreement (including non-contractual disputes or claims) shall be subject to the exclusive jurisdiction of the English and Welsh courts.





# Technical Guide.

A collection of technical specifications relating to all Tio products, including installation guides and troubleshooting

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### Pre-assembled manifold with pressure guage & auto air vent

Tio’s premium stainless-steel manifold is a pre-assembled unit for use within either underfloor heating systems or wall-hung radiator systems.

The unit is pre-assembled and complete with an auto air vent (AAV), 10 bar pressure gauge, flow meters with 0-5 l/m indicators and fill and drain valves. Compatible with various pipe sizes up to 20mm. Integrated with filling and drain off valves to ease long term maintenance.



Flow Meter  
TIOSPA0018



Pin Valve Set  
TIOSPA0003



Drain Valve  
TIOSPA0004

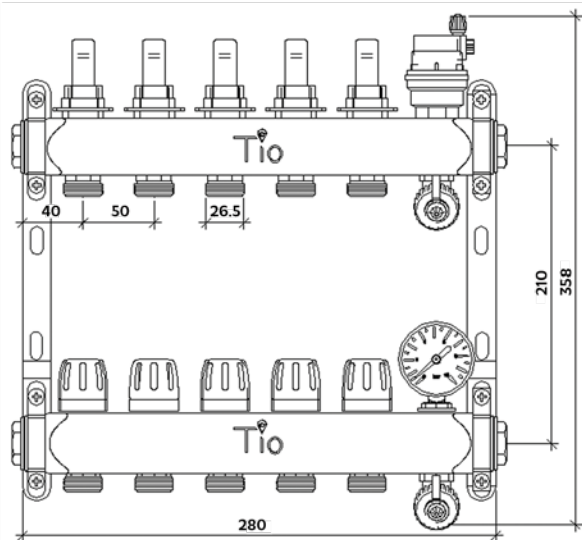


Auto Air Vent  
TIOSPA0007

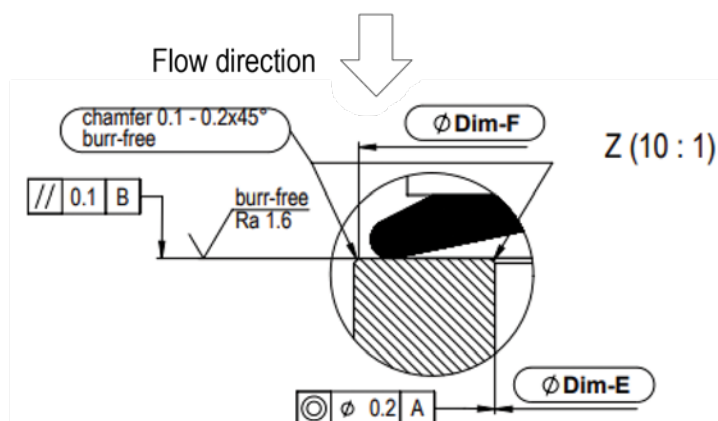
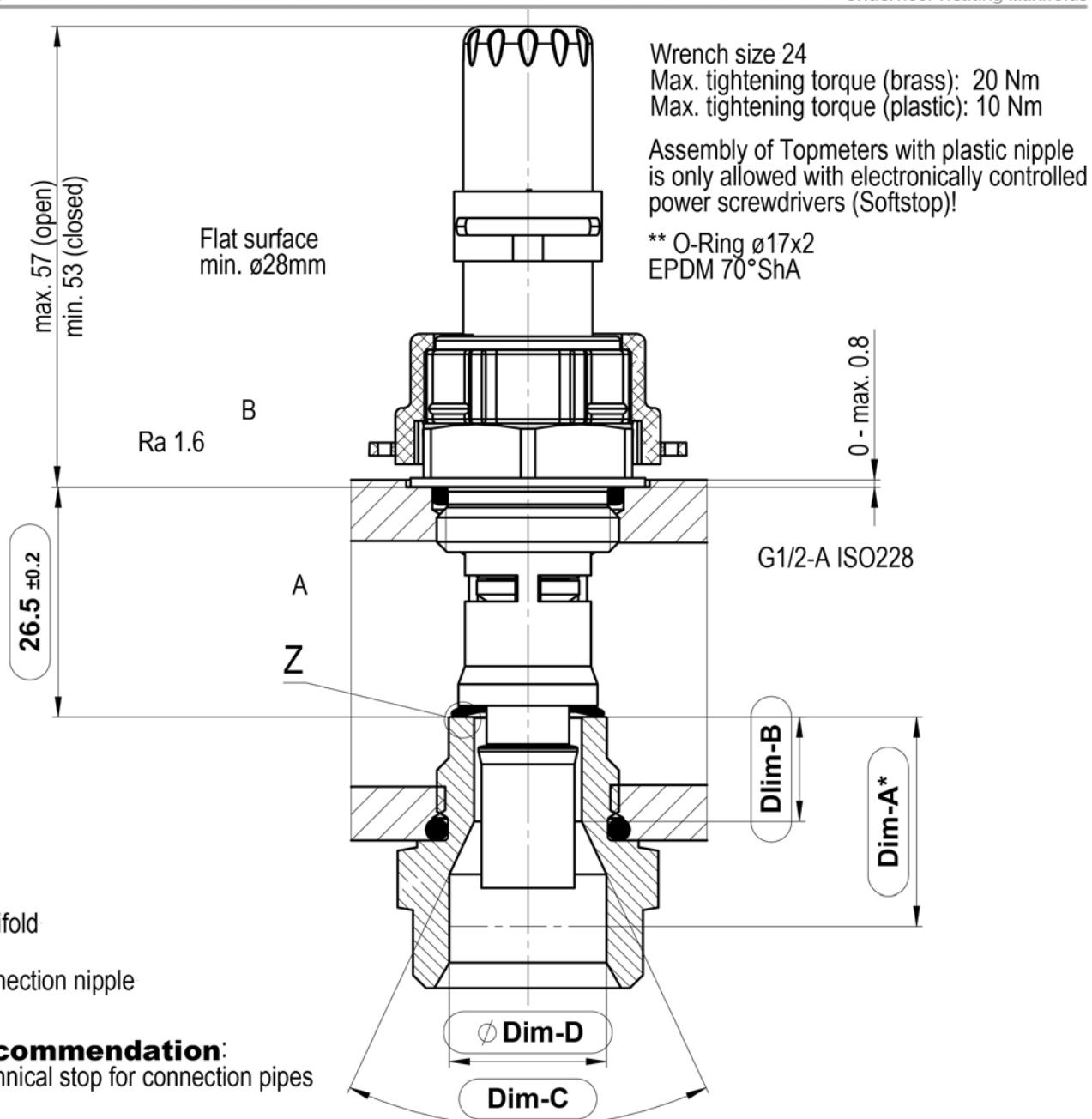


Pressure Gauge  
TIOSPA0009

Tio premium manifolds have a standard UK distance of 210mm between the flow and return bars. This makes the unit versatile with various mixing units. The unit has a spacing of 50mm between each port from the centre point advocating for various pipe sizes and materials to be installed. For ease of installation, we recommend no larger than 20mm pipe to be installed with the Tio manifold connectors. The unit has 1” threaded inlets to house isolation valves and the bottom rail has a modulating pin that can be either, manually adjusted with the white adjusting caps, or to achieve electronic control, an actuator can be installed.



Product Code	Product Description	Gap Width
TIOMAN0002	2 Port Manifold with PG and AAV	180mm
TIOMAN0003	3 Port Manifold with PG and AAV	230mm
TIOMAN0004	4 Port Manifold with PG and AAV	280mm
TIOMAN0005	5 Port Manifold with PG and AAV	330mm
TIOMAN0006	6 Port Manifold with PG and AAV	380mm
TIOMAN0007	7 Port Manifold with PG and AAV	430mm
TIOMAN0008	8 Port Manifold with PG and AAV	480mm
TIOMAN0009	9 Port Manifold with PG and AAV	530mm
TIOMAN0010	10 Port Manifold with PG and AAV	580mm
TIOMAN0011	11 Port Manifold with PG and AAV	630mm
TIOMAN0012	12 Port Manifold with PG and AAV	680mm



Want to use the same connection nipple for different products?  
 => refer to required minimal dimensions in the table below:

Product	Drawing	Dim-A*	Dim-B	Dim-C	Dim-D	Dim-E	Dim-F
TacoDrive	009404	not req.	not req.	not req.	not req.	12.4 - 13	min. 18.0
TacoCheck On/Off	010221	min. 20	12 $\pm$ 0.1	25°	18.1	12.4 0/+0.1	min. 18.2
TopMeter Supply (brass/plastic)	009402	min. 20	not req.	not req.	not req.	12.4 - 13	min. 18.0
TopMeter Plus (brass/plastic)	009118	min. 23.5	not req.	not req.	not req.	12.4 - 13	min. 18.4



## Filling

We recommend filling each circuit separately, opening the return isolation valves and double regulating valves each time and closing them again when the circuit is full as per the instructions below:

1. Isolate the manifold via the ball valves.
2. Connect the hose to the return manifold (the bottom manifold bar) via the drain point. The discharge hose should be run to a bucket or drainage point.
3. Connect mains pressure water to the flow manifold (the top manifold bar) via the fill point.
4. Close all of the return valves by turning the blue adjustable heads clockwise.
5. Open flow meter valve and the corresponding return isolation valves. Begin filling the first circuit.
6. Once the water flowing from the discharge hose is flowing smoothly, all air has been removed from the circuit.
7. Close this circuit and fill the next circuit following the same procedure.

## Testing

1. Once filled, the system should be pressure tested in accordance with EN1264-4:2009 between 4-6 bar.
2. The system should be left under pressure whilst fixing a floor or laying the screed.

## Commissioning

1. In order to commission the system, the heat source needs to be operating to deliver the required temperature of water to the manifold and the primary secondary pumps need to be operating.
2. To adjust the flow meters, follow the adjustment procedure above. The actual required flow will depend on the heat requirement of the room and the amount of pipe in the floor. Most modern buildings insulated to current building regulations will require around 50-60 W/m<sup>2</sup>. As a general guide, we recommend that the following flow rates are set (when using 16mm pipe at 200mm centres):
3. Replace the red locking ring once the flow meters are set.
4. The underfloor heating pipework will not corrode in any way since it is plastic. However, it is recommended that a suitable inhibitor is added to avoid the corrosion of primary pipework, the heat source and any other towel rails or radiators on the system.
5. Initial setting of the thermostatic blending valve (after the initial system start-up/screed drying period) should provide the following temperatures: Screeded/dry screed board floors (35-45°C), Timber/floating floors (45-55°C) depending on design.

## System Start Up

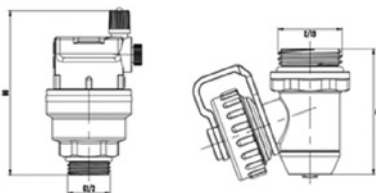
For screed floors, ensure a minimum of 21 days have elapsed since laying the concrete screed, or seven days if an anhydrite floor screed is utilised. Wooden floors can be switched on quite early, but should not be allowed to reach too high of a temperature too soon.

Wood being a natural material requires that both the floor and deck and joists must be treated with care until temperature and humidity have stabilised. Where water temperature controls are utilised, ensure they are set to will aid gradual drying of the floor and structure.

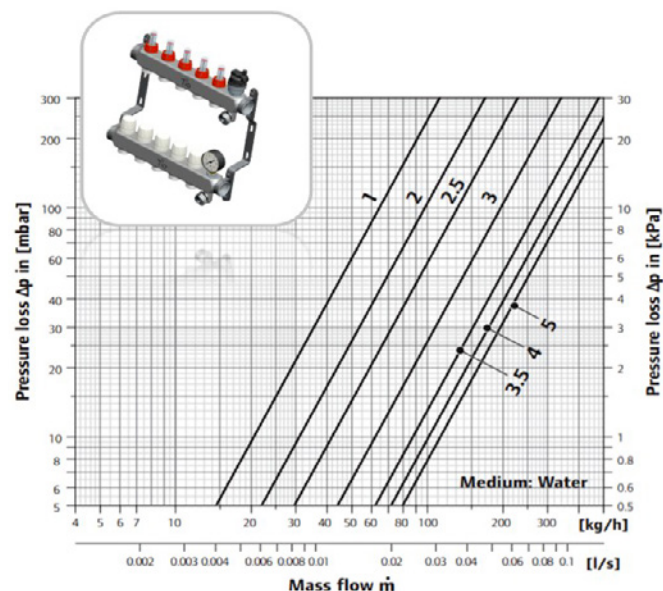
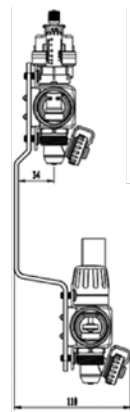
System responses will be very slow on initial start-up. After the heating has been running for the recommended time at minimum setting (3 days for solid concrete floors and 1 day for woodensuspended floors), gradually raise the water temperature to the design setting for a further 4 days.

Once running normally, there should be a 7-8°C temperature drop across the circuits. Once all the action are complete, turn down all thermostats so that the system stops. After its determined that the thermostat is controlling the correct actuator, turn the thermostat down and repeat the procedure.

Additional Tio components included are a automatic air vent with 1/2 inch inlet and a drain/fill valve with a 1/2 inch inlet.



The Tio premium stainless steel manifold can be wall mounted by using the brackets provided. Suitable wall fixings will need to be assessed. All components are supplied with the box packaging unit.

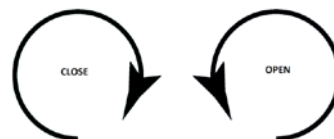


## Flow & Pressure Adjustment

Flow and pressure loss in [mbar] and associated correlating [kPa] is indicated in the attached chart. The unit has the ability to adjust flow in accordance with professionally design project criteria.



The flow meter is adjusted using the anti-clockwise and clockwise trunion mechanism to open and close the port and increase and reduce flow respectively.



## Manifold cabinets

Cabinets are used for water and heating manifolds, as well as underfloor heating mixing units. These cabinets are designed to be mounted on a wall surface and come in 3 different sizes.

### Design:

- The back wall is equipped with rails and bolts for mounting the manifold.
- Side walls with holes for the supply and return pipe of heating medium.
- Feet used for mounting cabinets to the floor.
- Screws for fixing the manifold.
- Removable front door.
- Adjustable height.
- Cabinet doors with a lock and key (standard).

**Material:** Hot-dip galvanized steel sheet 0.8mm thick, powder coated in white.

Product Code	Product Description	Dimensions
TIOCAB0002	Manifold Cabinet	760 x 580 x 120mm
TIOCAB0003	Manifold Cabinet	845 x 580 x 120mm
TIOCAB0004	Manifold Cabinet	1015 x 580 x 120mm

Product Code	Weight
TIOCAB0002	10.1
TIOCAB0003	10.2
TIOCAB0004	11.7





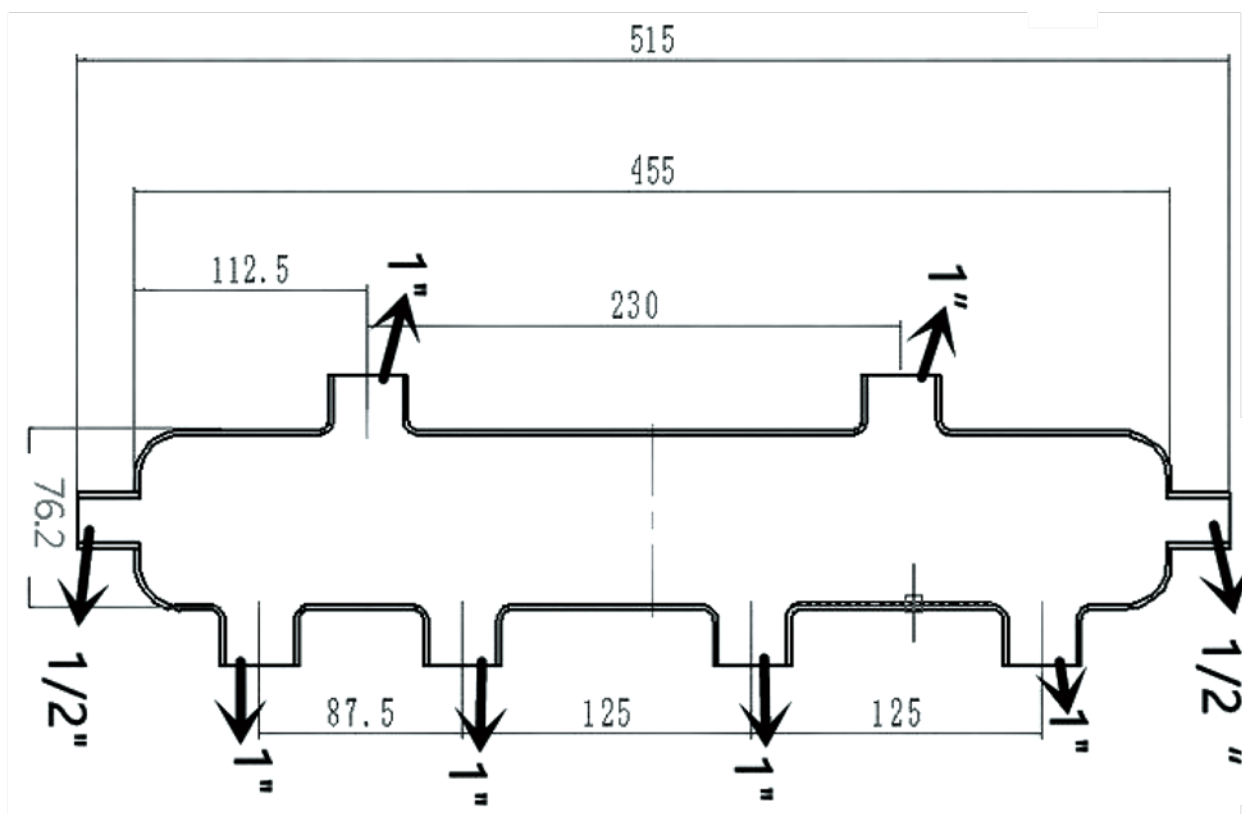
## Low loss header

Hydraulic headers are connected before the distribution header. This hydraulically isolates the primary and secondary circuits hence, allows the primary flow to be maintained at the boiler manufacturer's requirements and provides greater volumetric flow in the distribution header to all circuits.

- Allows for water flow of 6600 L/h.
- 1" male threaded inlets with integral drain valve, automatic air vent and insulating sheath.



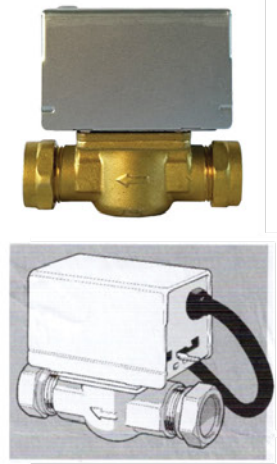
Product Code	Product Description	Dimensions
TIOLLH0001	Low loss header	515 x 76.2mm - 1899ml



## 230v 22mm motorized valves

These motorized zone valves have been designed to control the flow of water in iron and copper pipe systems. Although specifically designed for small bore central heating systems, the valve can be used in commercial and industrial applications.

- Power Supply: 230 Volts AC 50Hz
- Switch Rating: 2.2A
- Switch Type Power: SPST (22mm)
- Consumption: 6W
- Ambient Temperature: 50°C max
- Flow Temperature: 5°C to 88°C max
- Static Pressure: 8.6 bar max



Product Code	Product Description
TIOMZV-22-2	2-way 230v 22mm motorized valve
TIOMZV-22-3	3-way 230v 22mm motorized valve

### Application

The motorized zone valve has been designed to control the flow of water in iron and copper pipe systems. Although specifically designed for small bore central heating systems, the valve can be used in commercial and industrial applications.

### Specification

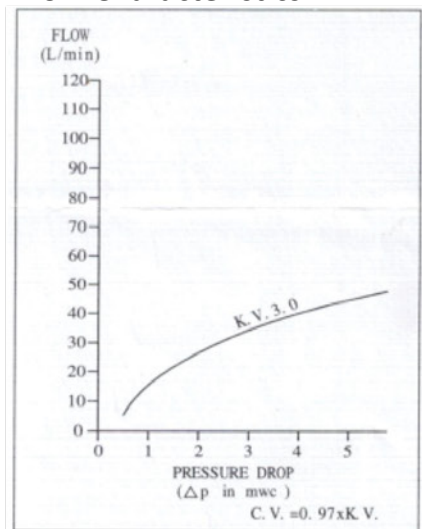
Power Supply	230 Volts AC 50Hz
Switch Rating	2.2A
Switch Type Power	SPST (22mm)
Consumption	6W
Timings (Nominal)	On: 12 seconds under power Off: 6 seconds under spring return
Ambient Temperature	50°C max
Flow Temperature	5-88°C max (Special models available for chilled water applications)
Static Pressure	8.6 bar max
Flow Direction	As per arrow on valve body

NOTE: Continuous operation of the valve motor at the fully open position is not recommended.

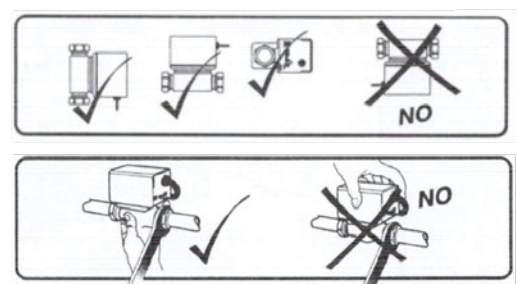
### Dimensions (mm)

	A	87
	B	98
	C	60
	D 1/2	94
	D 22mm	104
	D 1"	92
	D 28mm	110

### Flow Characteristics



### TAKE CARE NOT TO OVERTIGHTEN.



### Installation

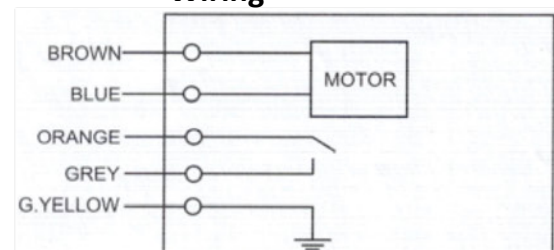
Incorporating a manual lever, the lever should normally be in 'AUTO' position, but can be moved to 'MAN OPEN' position for system drain down and filling purposes only. Before fitting the valve, read through the plumbing and wiring instructions.

### Plumbing

The valve may be plumbed in at any angle but must not be mounted so that the valves head is below the horizontal level of the pipework. In the unlikely event of a leak, a safety hazard could result.

Do not grip the valve head while making and tightening up plumbing connections. Attach a spanner (32mm or 1W'AF) onto the valve body at each port, whilst tightening up the nuts. Tighten compression nuts enough to make a watertight seal.

### Wiring



## 230v 22mm motorized valves

These motorized zone valves have been designed to control the flow of water in iron and copper pipe systems. Although specifically designed for small bore central heating systems, the valve can be used in commercial and industrial applications.

- Power Supply: 230 Volts AC 50Hz
- Switch Rating: 2.2A
- Switch Type Power: SPST (22mm)
- Consumption: 6W
- Ambient Temperature: 50°C max
- Flow Temperature: 5°C to 88°C max
- Static Pressure: 8.6 bar max

### Application

The motorized zone valve has been designed to control the flow of water in iron and copper pipe systems. Although specifically designed for small bore central heating systems, the valve can be used in commercial and industrial applications.

### Specification

Power Supply	230 Volts AC 50Hz
Switch Rating	2.2A
Switch Type Power	SPST (22mm)
Consumption	6W
Timings (Nominal)	On: 12 seconds under power Off: 6 seconds under spring return
Ambient Temperature	50°C max
Flow Temperature	5-88°C max (Special models available for chilled water applications)
Static Pressure	8.6 bar max
Flow Direction	As per arrow on valve body

NOTE: Continuous operation of the valve motor at the fully open position is not recommended.

### Dimensions (mm)

	A	87	
	B	98	
	C	60	
	D	3/4	
		22mm	112
		1"	94
		28mm	117
	E	3/4	124
	22mm	133	
	1"	124	
	28mm	137	

### Installation

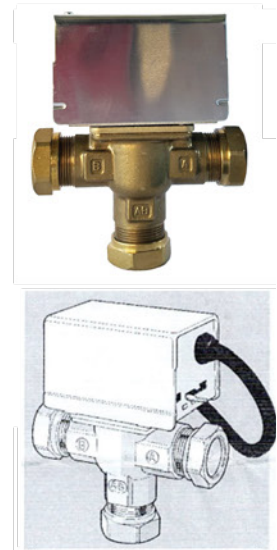
Incorporating a manual lever, the lever should normally be in 'AUTO' position, but can be moved to 'MAN OPEN' position for system drain down and filling purposes only. Before fitting the valve, read through the plumbing and wiring instructions.

### Plumbing

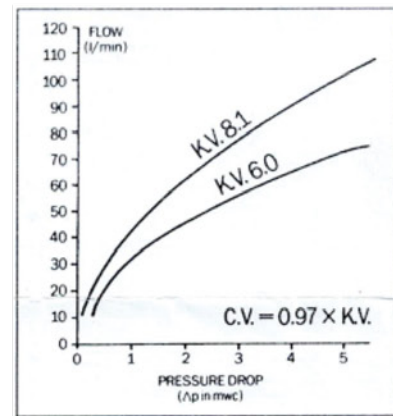
The valve MUST NOT be fitted on the return pipework under any circumstances. Flow from the boiler must be connected to port AB, the radiator circuit to port A and the hot water cylinder to port B.

The valve may be plumbed in at any angle but must not be mounted so that the valves head is below the horizontal level of the pipework. In the unlikely event of a leak, a safety hazard could result.

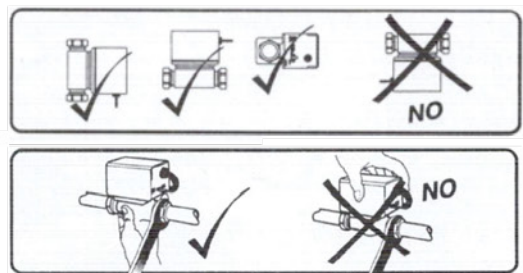
Do not grip the valve head while making and tightening up plumbing connections. Attach a spanner (32mm or 1W'AF) onto the valve body at each port, whilst tightening up the nuts. Tighten compression nuts enough to make a watertight seal.



### Flow Characteristics



### TAKE CARE NOT TO OVERTIGHTEN.



### Description for Wiring

White = Heating ON  
Blue = Neutral  
Grey = Hot water OFF  
Green/Yellow = Earth  
Orange = Boiler and pump LIVE

### Valve Options

The valve operates as follows:

- No power (on valve) = HW only (port B open)
- 240V on white wire = HW + CH (mid position)
- 240V on white & grey wires = CH only (port A open)
- + 240V output on orange wire
- 240V in grey wire = valve hold in last position
- + approx 100V output on orange wire

## Emmeti mixing unit and probe with Wilo Para 25/7 pump

Combining the Wilo Para 25/7 pump and a mixing valve with remote probe actuation to give a temperature range between 20°C - 70°C. Thus, making it suitable for screed drying purposes. It includes a throttle to increase Kv for larger systems. Includes a temperature gauge measuring the mixed flow temperature, manual air vent and bracket to support the weight of the pump.

- Connections - takeoffs G1" 1/2 - 130mm rotation
- Speed: 2580 - 470 RPM
- Maximum head: 7m
- Maximum flow rate 3.5 m³/h
- Maximum water temperature: 90°C
- Hz protection Class: IPX 4D
- Energy rating: A
- Energy consumption at 230v: 8.2 - 50W



TIOMIX0003

Product Code	Product Description
TIOMIX0003	Emmeti mixing unit and probe with Wilo Para 25/7 pump

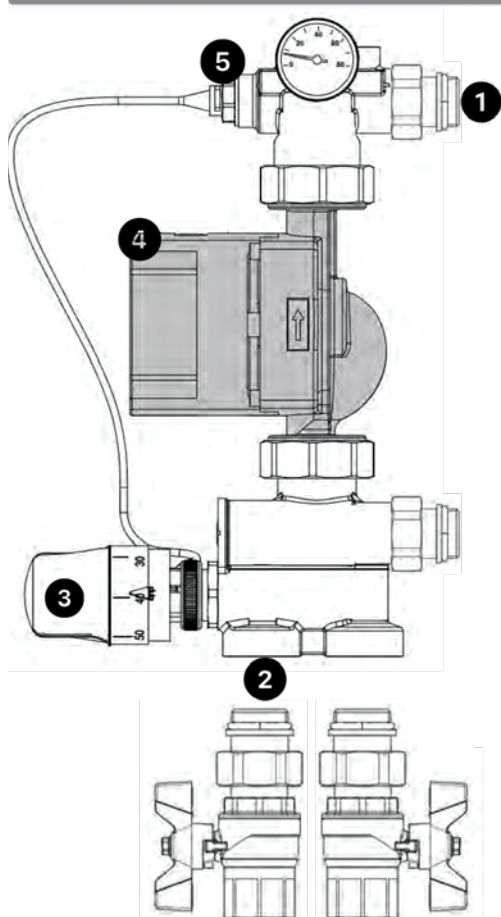
Maximum Pressure: 8 Bar Operating

Primary Circuit Max Temperature: 95°C

Thermostatic secondary range: 20-70°C

Mixing Unit Inlet size: G1" Female

Pressure Drop: KV 3



- 1 Connection point to manifold with 1¼" to 1"
- 2 1" Female threaded inlet
- 3 Thermostatic secondary regulation
- 4 A Rated Pump
- 5 Probed top elbow with gauge and AAV



## Installation

Take the T10MIX0003 unit out of the box, paying special attention and care to the gauge. Ensure the T10MIX0003 is a correct fit for the manifold you will be using. The centres are set at 210mm from the outlet, centre to centre. The Tio Manifold is perfect fit for this. Other manifolds may not be the appropriate size.

With the manifold fit to a back board, marry up the mixing unit and insert the male adaptive nuts into the manifold. Please ensure the gasket has a full seal.

Then install 1" male valves into the base of the mixing unit. These valves will allow for isolation of flow and return pipes.

When all components are in place, using some mechanical assistance such as a wrench, we advise a further tightening of all valves and nuts, as this will fully seal the unit.

The thermostatic actuator (Fig 1.3) allows a manual secondary adjustment of the temperature. This is particularly good for screeding to allow a low curing at 20°C minimum temperature blend.

Located above the pin is a KV 1-5, the unit is set to 3 as this will allow for a suitable 12 port unit to be installed. Should you require an additional manifold this can be increased to 5.



Fig 1.1 showing the captive nut to link the mixing unit to the manifold



Fig 1.2 showing M 1" Isolation Valves

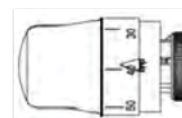


Fig 1.3 showing a thermostatic actuator



Fig 1.4 showing a KV adjustment

## WILO Para Circulator Technical Data

Connections - takeoffs G1" 1/2 - 130mm Rotation

Speed: 2580 - 470 RPM

Maximum Head: 7m

Maximum Flow Rate 3.5m³/h

Maximum Water Temperature: 90°C

Hz Protection Class: IPX 4D

Insulation Class: F

Energy Rating: A

Energy Consumption at 230V: 8.3 - 50W



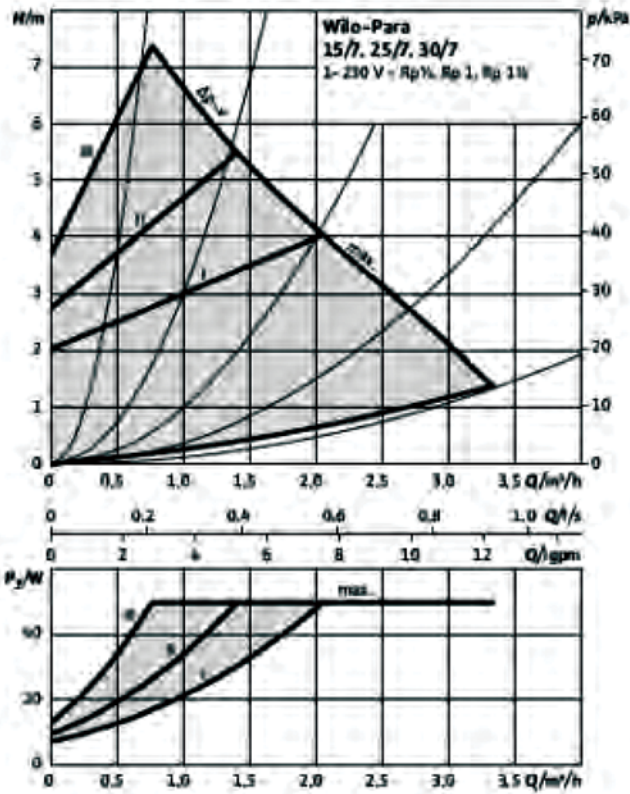
### Warning

The floor-mounted system can be heated up only after the screeds curing (at least 28 days for cement screeds). Before laying the flooring, you need to start the system by setting the water temperature to 25°C for 3 days. Then, increase it by 5°C every 3 days until you reach 50°C and keep this temperature for at least 4 days.

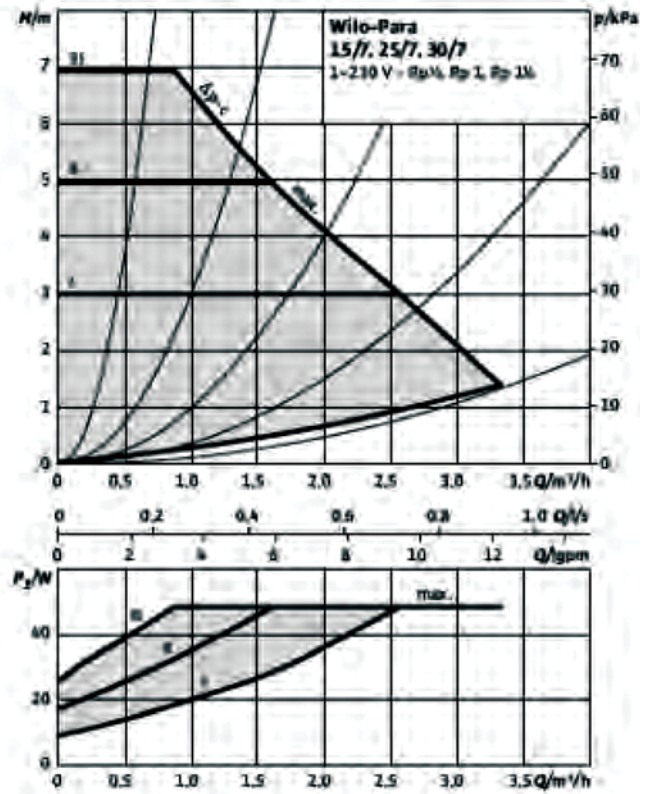




$\Delta p-v$  (variable)



$\Delta p-c$  (constant)



	LED Indicators	Operating mode	Performance curve
1		constant speed	II
2		constant speed	I
3		$\Delta p-v$ variable	III
4		$\Delta p-v$ variable	II
5		$\Delta p-v$ variable	I
6		$\Delta p-c$ constant	III
7		$\Delta p-c$ constant	II
8		$\Delta p-c$ constant	I
9		constant speed	III

### ESBE 4-way valve and mixing unit with Grundfos pump - 210mm

To work in unison with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 55°C which complies with the requirement B51264 and makes it suitable for force screed drying.

- 210mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- ‘A’ rated pump.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



Product Code	Product Description
T10MIX0005	ESBE 4-way valve and mixer with Grundfos pump - 210mm

### ESBE 4-way valve and mixing unit with Grundfos pump - 200mm

For use with underfloor heating manifolds, this mixing valve has a temperature range between 20°C - 55°C. Therefore, complying with the requirement B51264 and making it suitable for force screed drying.

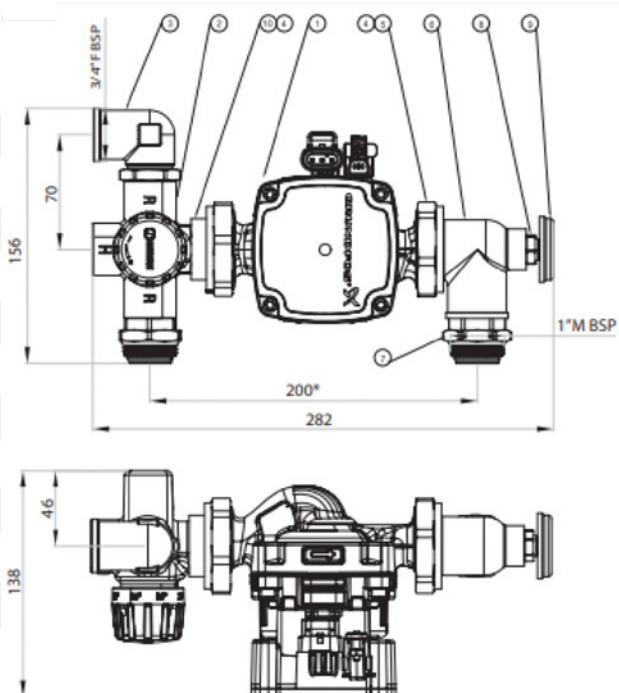
- 200mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- ‘A’ rated pump.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



Product Code	Product Description
T10MIX0007	ESBE 4-way valve and mixer with Grundfos pump - 200mm

#### Specification

1	Grundfos UPM3 Auto Pump	1
2	ESBE Thermostatic Mixing Valve	1
3	Flow / Return Elbow	1
4	2mm Rubber Washer	2
5	1 1/2" Rapid Connection Nut	2
6	Elbow Flanged	1
7	1" Male BSP Flow and Return	2
8	3/8" Pocket	1
9	Temperature Gauge	1
10	Manifold Centre Distance Spacer	1
R	Return from Manifold / Flow to Heat Source	N/A
H	Flow from Heat Source	N/A



## Emmeti mixing unit and probe with Grundfos pump - 210mm

For use with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 70°C which complies with the requirement B51264-4 2009. This mixing unit has an additional probe pocket for an optional over temperature device and a throttle to increase the Kv of the mixing valve for larger systems.

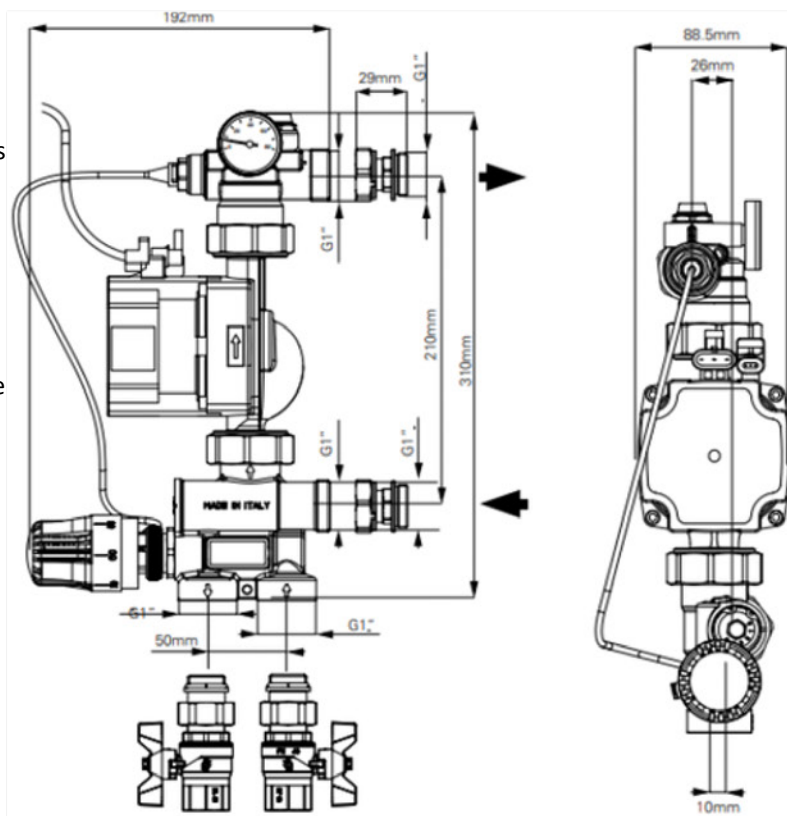
- 210mm between the centres of flow and return arms.
- A built-in non-return valve above the circulation pump is utilised to prevent backfilling during the system fill.
- 3 control modes.
- 'A' rated pump.
- Temperature gauge.
- Double de-blocking system.



Product Code	Product Description
TIOMIX0006	Emmeti mixing unit and probe with Grundfos pump - 210mm

### Features and Benefits

- Pre-assembled pump and blending unit reduces installation time and allows for easy control of the underfloor system.
- Inclusive temperature control ensures that the water temperature entering the floor do not exceed the design temperatures.
- Built in thermostatic actuator with temperature range between 20°C - 65°C for system design across all floor constructions.
- Integrated flow rate control valve for increased regulation of the flow rate and temperature of the underfloor heating system.
- Standard 210mm manifold spacing and 1" BSP connections.



Primary circuit max temp	90°C
Maximum operating pressure	10 bar
Primary circuit pressure	1 bar
Secondary control range	20 - 60°C
Heating capacity	G1"
Thermostatic regulation	10kW bypass (position 0)
Thermostatic regulation	12.5kW bypass (position 5)
Mixing valve pressure drop	Kv 3
Pressure drop with open bypass valve	Kv max 4.8
Thermometer scale	0 - 80°C
Mixing unit inlet thread	G1" F
Connection thread	G1" M
Circulator connections: pipe union	1" ½ - takeoffs 130mm



## Tio mixing unit and probe with Tio T6-130-L pump

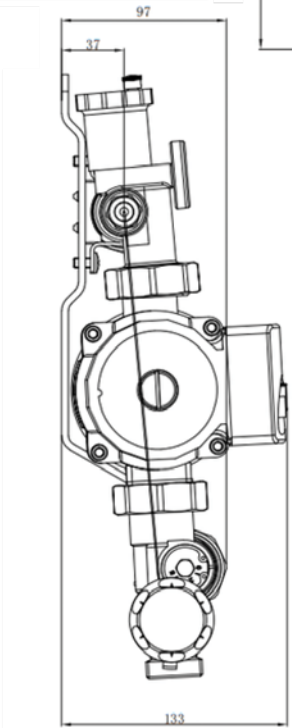
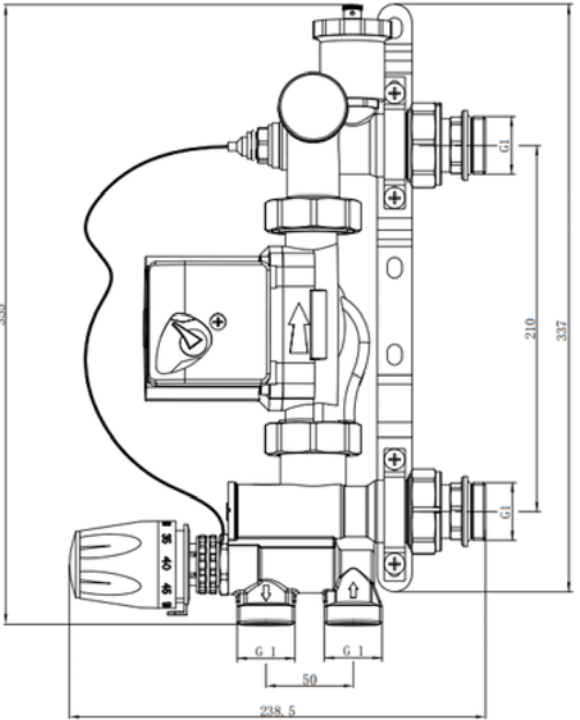
Harmonising the Tio High Efficiency Pump T6-130-L and a mixing valve with remote probe actuation to give a temperature range between 20°C - 60°C, making it suitable for screed drying purposes. It includes a throttle to increase Kv for larger systems. Includes 1" M manifold connections with O-ring seals and 1" M connections for primary flow and return. Includes a temperature gauge measuring the mixed flow temperature, manual air vent and bracket to support the weight of the pump.

- Pre-assembled pump and blending unit reduces installation time and allows for easy control of the underfloor heating system.
- Inclusive temperature control ensures that the water temperatures entering the floor do not exceed design temperatures.
- Built in thermostatic actuator with a temperature range between 20°C - 60°C for system design across all floor constructions.
- Integrated flow rate control valve for increased regulation of the flow rate and temperature of the underfloor heating system.
- Standard 210mm manifold spacing and 1" BSP connections.



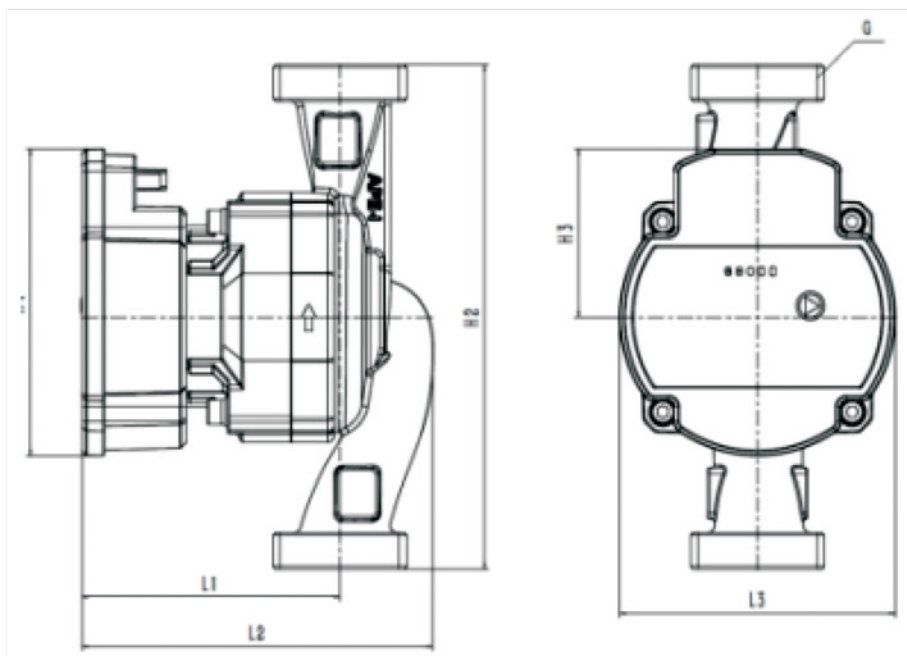
Product Code	Product Description
TIO MIX00008	Tio mixing unit and probe with Tio T6-130-L pump - 210mm

Supply voltage	220~ 240V, 50/60Hz			
Motor protection	Doesn't need external motor protection			
Protection class	IP44			
Insulation class	E			
Relative ambient humidity	Max, 95%			
System pressure	Max, 1,0 MPa, 10 bar			
Suction inlet pressure	Liquid temperature	≤ +75°C	Min. Inlet pressure	0.05bar , 0.005MPa
		+90°C		0.28bar , 0.028MPa
		+110°C		1.08bar , 0.108MPa
EMC Standard	GB 4343.1	GB 4343.2	GB 17625.1	GB 17625.2
Ambient temperature	0°C ~ 40°C			
Surface temperature	Max. +125°C			
Liquid temperature	+2°C ~+110°C			



## Thermostatic Mixer Control Group with Tio high efficiency Pump T6-130-L

The TIOMIX0008 is designed for Underfloor Heating. The control group incorporates a Tio high efficiency Pump T6-130-L a mixing valve with remote probe actuation to give a temperature range of 20°C - 60°C, making it suitable for screed drying purposes. It includes a throttle to increase Kv for larger systems. Includes 1" M manifold connections with O-ring seals and 1" M connections for primary flow and return. Includes a temperature gauge measuring the mixed flow temperature, manual air vent and bracket to support the weight of the pump.





## ESBE 4-way valve and mixing unit with Grundfos pump - Off-set 210mm

The off-set capabilities of this mixing unit gives it unique potential for installers. Used with underfloor heating manifolds, this mixing valve is adjustable between 20°C - 55°C which complies with the requirement B51264. This makes it suitable for force screed drying.

- 210mm between the centres of flow and return arms.
- Max output of 18kW.
- Max supply pressure of 10 bar.
- ‘A’ rated pump.
- Integrated check valves for easy filling.
- Temperature gauge.
- Assembled in the UK: Pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).



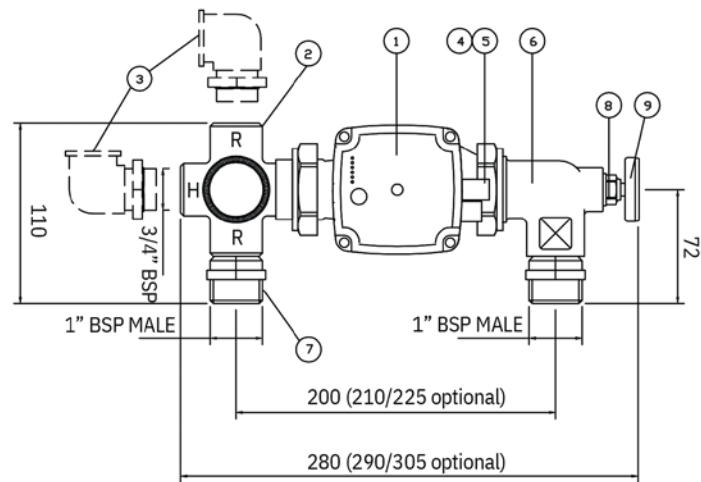
Product Code	Product Description
Tiomix-OC-15	ESBE 4-way valve and mixer with Grundfos pump - offset 210mm

### General

**1.1** Provides control of flow and return water temperature in an underfloor heating system. Pre-assembled and tested to ensure that it can be fitted with minimum on-site labour required and commissioned immediately once fitted.

**1.2** Designed to connect to the right-hand side of a manifold with 200mm as standard (210 - 1225mm optional) between the centres of the flow and return arms. The control group can also be altered to fit to the left-hand side of a manifold simply by turning the control group elbows through 180 degrees, using the union fittings at the top and bottom of the pump. The pump motor may need to be rotated through 180 degrees to minimise the space occupied by the control group. Primary connections can be applied from the side or bottom of the control pack.

### Connections & Dimensions



Item	Description	Qty
1	Pump	1
2	Thermostatic Mixing Valve	1
3	Flow/Return Elbow 1" Female	1
4	2mm Rubber Washer	2
5	1 1/2" Rapid Connection Nut	2
6	Elbow Flanged	1
7	3/4" Female BSP - Flow & Return	2
8	3/8" Pocket	1
9	Temperature Gauge	1
R	Return from manifold/flow to heat source	N/A
H	Flow from heat source	N/A

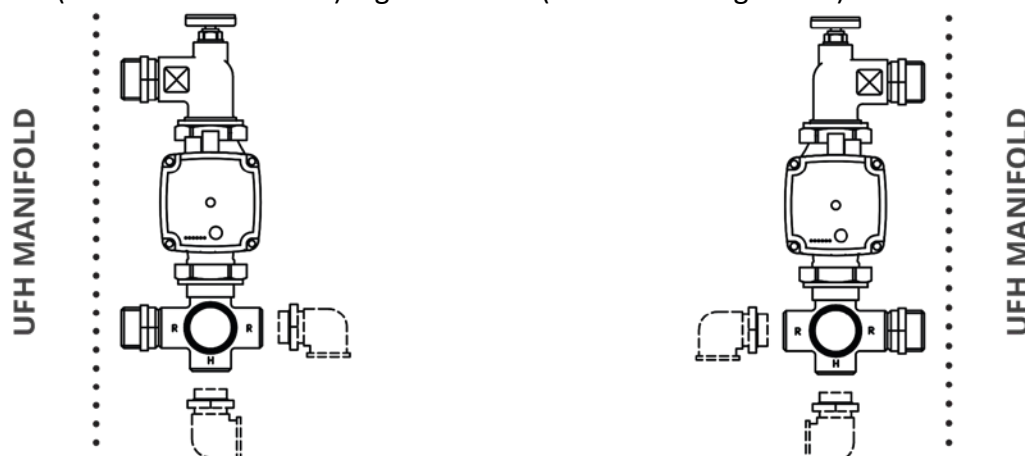
### Technical Data

Maximum static pressure: 10 Bar  
Maximum differential pressure: 3 Bar  
Maximum temperature: 95°C  
Operating temperature range adjustable between 20°C to 55°C (8S2164)  
Overall dimensions (mm): 290 h x 150 w x 140 h (excluding item 3)  
KVs: 3.4 Material: Nickel plated brass  
Inlet connections: 2 x 3/4" BSPF  
Outlet connections: 2 x 1" BSPM swivel joint  
Power: 18kW

## Pre-Installation

Prior to installation, manifold configuration must be determined as left or right handed.

Left-handed: (Manifold on left side) Right-handed: (Manifold on right side)



## Installation

**5.1** Carefully remove from the packaging and check that all components are in place and that nothing has been damaged during delivery.

**5.2** The pump mixer is supplied for connection to the right-hand side of the manifold but can be altered very simply for connection to the left-hand side. (See above)

**5.3** To change orientation:

- a)** Remove swivel nut (7) from the TMV and move to opposite connection. (These joints use o-ring seals and should not be overtightened)
- b)** Loosen the pump rotating nuts (5) on the elbow (6) and rotate through 180 degrees. Re-tighten nut (5) after rotation.

**5.4** Pipe connection orientation can be altered to suit using flow / return elbow (3) (supplied loose) fitted in either flow or return.

**5.5** A swivel joint is fitted to each side of the control group for connecting to the 1" F manifold tapings. Carefully offer up and screw the swivel joint threads evenly into the manifold using a 37mm A/F spanner: the use of a 31 mm A/F spanner will also ensure that the connection to the pump mixer is kept tight. The joints use o-ring seals and care should be taken not to over-tighten them.

**5.6** Once connected, finish securing the manifold and large area mixer to the wall if not already completed.

**5.7** The primary flow and return pipework can now be connected to the 2 x 3/4" F connections. The flow connection is at the H and the return connection is at the R. It is recommended that ball valves are used to isolate this pipework where it is connected to the pump mixer.

## Commissioning

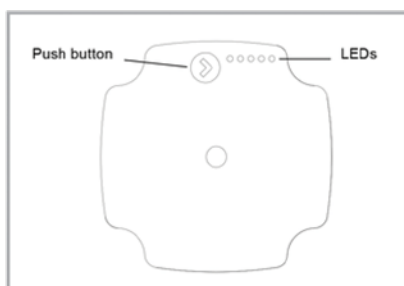
**6.1** Filling the UFH system - The inbuilt non-return valve in the flow elbow allows you to fill the circuits from the upper flow rail drain and fill valve only. Be aware that you cannot get the benefit of this feature when filling via the primary flow and return connections or the lower manifold rail drain and fill valve.

**6.2** The mixer, manifold and underfloor circuits can now be filled and commissioned in accordance with the manifold instructions. Prior to filling, a final check of all joints should be made to ensure no connections have loosened during transit.

6.3 The pump is supplied with a pre-connected 1" M long 3-core lead assembly ready for connection to the electrical control system. Ensure that the pump is filled and vented, operate the control system to call for heat then select the desired pump setting. This control pack comes pre-assembled ready for installation, please ensure the pump connections are tightened before commissioning. These connections are equipped with seals.

## Pump control modes and functions

The user interface is designed with a single push button, one red/green LED and four yellow LEDs.



### The User Interface Shows:

- Performance view (during operation)
- Operation status
- Alarm status
- Settings view {after pressing the button}

During operation, the display shows the performance view. If you press the button, the user interface switches the view or runs in the setting selection mode.

## Alarm status

If the circulator has detected one or more alarms, the bi-colored LED 1 switches from green to red. When an alarm is active, the LEDs indicate the alarm type as defined in the table below. If multiple alarms are active at the same time, the LEDs only show the error with the highest priority. The priority is defined by the sequence of the table. When there is no longer an active alarm, the user interface switches back to operation mode.

Display	Indication	Pump operation, Counter action
One red LED + one yellow LED	Rotor is blocked	Trying to start again every 1.33 seconds. Wait or unblock shaft.
One red LED + one yellow LED	Supply voltage too high	Only warning, pump still running. Control the supply voltage.
One red LED + one yellow LED	Low electrical error	Pump is stopped because of low current. Control the supply voltage or there could be a fatal failure. Exchange the pump.
One green LED + three yellow LED	Medium high performance	50-75
One green LED + four yellow LED	High performance	75-100

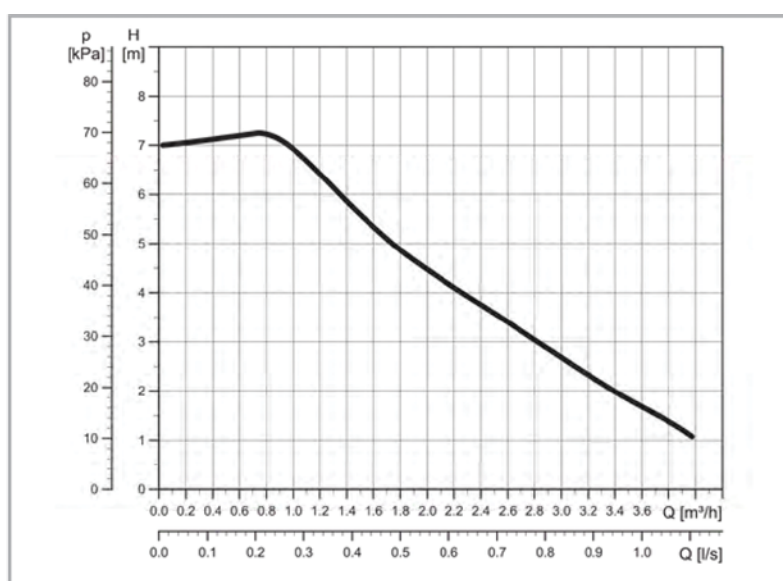
Setting Number	1	2	3	4	5	6
Temperature (°C)	2	2	3	4	4	5
	0	7	4	1	8	5

## Performance view

The performance view shows either the operation status or the alarm status.

## Operation status

When the circulator is running, LED 1 is green. The four yellow LEDs indicate the current power consumption (P1) as shown in the table below. When the operation mode is active, all active LEDs are constantly on in order to differentiate this mode from the select setting mode. If the circulator is stopped by an external signal, LED 1 flashes green.



Display	Indication	Performance in % of P1 MAX
One green LED (flashing)	Standby (only external controlled)	0
One green LED + one yellow LED	Low performance	0-25
One green LED + two yellow LED	Medium low performance	25-50
One green LED + three yellow LED	Medium high performance	50-75
One green LED + four yellow LED	High performance	75-100

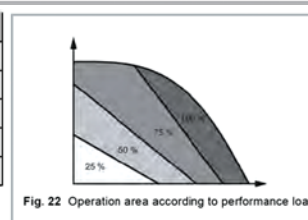


Fig. 22 Operation area according to performance load

## ESBE non-mixing 4-way set with Grundfos heat-pump - 210mm

This heat pump set is designed for low temperature systems and is suitable for a maximum output of 20kW.

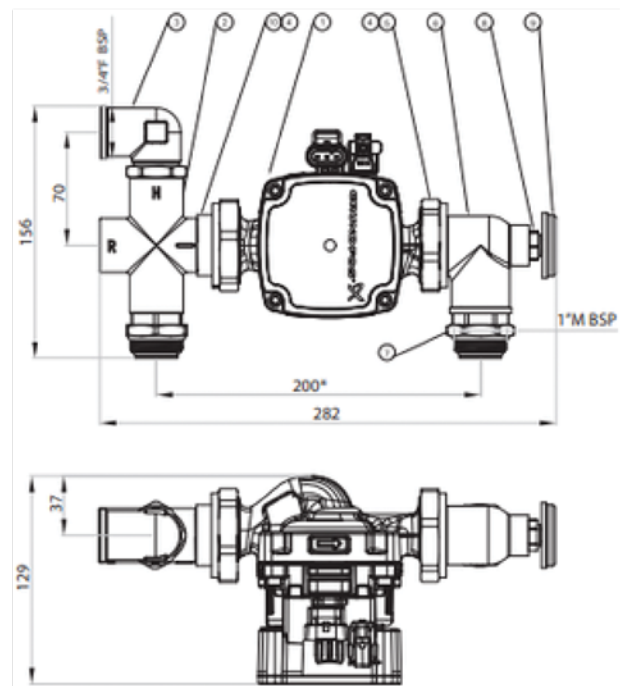
- No requirement for a mixing valve.
- Compact design.
- Integrated check valves for easy filling.
- 'A' rated pump.
- Temperature gauge.
- Assembled in the UK: pre-tested, packaged and ready for instant installation.
- Fully reversible (left or right sided manifold).
- Side or bottom entry connections.



Product Code	Product Description
TIOPUM0001	ESBE non-mixing 4-way set with Grundfos heat pump - 210mm

### Specification

1. Grundfos UPM3 Auto Pump (1)
2. 4-way deflector plate (1)
3. Flow/ Return Elbow (1)
4. 2mm Rubber Washer (2)
5. 1 1/2" Rapid Connection Nut (2)
6. Elbow Flanged (1)
7. 1" Male BSP Flow and Return (2)
8. 3/8" Pocket (1)
9. Temperature Gauge (1)
10. Manifold Centre Distance Spacer (1)



R Return from manifold/ flow to heat source N/A

H Flow from heat source N/A

**Output:** Up to 250 sqm / 20 kW

**Max temperature range:** Continuously= 95 °C Temporarily= 100 °C

**Maximum supply pressure:** 10 Bar

#### Optional extras

Primary isolation valves  
Safety temperature switch  
Manifold isolation valves  
Compression fittings



## Tio T6-130-L Tio high efficiency pump

Intelligent frequency conversion circulation pump. For systems which require a more powerful pump.

- No requirement for a mixing valve.
- High performance modulating pump.
- Optional pulse width modulation (PWM).
- Simple & easy retro-fit in most boiler brands.
- Easy set up to maximise boiler efficiency.
- 1-year manufacturers warranty.
- ErP Compliant.



Product Code	Product Description
TIOPUM0060	Tio T6-130-L high efficiency pump - 6m head

- Ground motor before connecting to power supply.
- Do not touch the pump while it is running.
- Do not run the pump without water.

The power supply voltage of the electric pump is single phase 220-240V, and the frequency is 50/60hz.

- Make sure that the pipe system is securely connected before installation and verify that the impurities, soldering leftover and wastes have been cleaned within the pipes.
- Make sure the pump is located in dry and ventilation environment to avoid short circuit due to moisture or splashing into the casing, and guarantee its availability to service and replacement.
- The protection cover must be added, for the requirement of outdoor installation, while actions must be taken to avoid being splashed and to prevent electric shock risk in indoor installation.

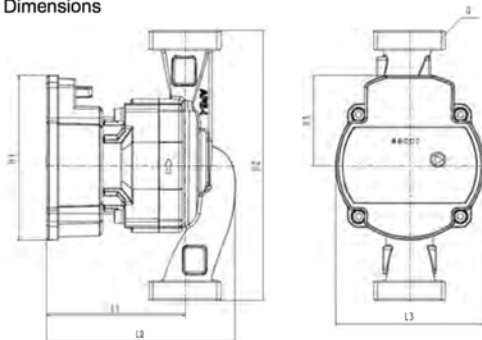
**Warning:** Do not install in bathroom to prevent vapor or water or moisture from going into the junction box resulting in electric leakage.

- It's strongly suggest that shutoff valves to be installed at inlet and outlet ports for the sake of following pump service and maintenance.
- When complete installing the pump, connect the power supply as pilot run and set the speed adjusting switch at max grade to check if the starting is normal. But the pilot running time can not be over 10 seconds so as to avoid idle running influencing working life of the bearing.
- When the pump is supplying water to the heating system, do not touch the pump and/or other pipes to avoid burning.
- The power plug must be strictly grounded. Securely connect the GND pin of the power plug to the power plug grounded hole. Do not attempt to change the GND plug of the pump.
- The striking security caution markings must be set up during pump working to avoid any accident.
- The power supply must be firstly disconnected before adjusting pump location or before any action that may touch the pump when the pump is working to avoid any accident.
- Regularly check the pump and timely replace in case of any damage.
- The power cable can only be replaced with corresponding cords or dedicated components.
- In winter, when the environment temperature is below 0°C, the water within the pipes must be exhausted thoroughly if the pump ceases working to avoid pump frost crack.
- The heat supply pipes can not be frequently supplemented with non-soft water to avoid the accumulated calcium inside the pipe system that that may block the rotor.

Supply voltage	220-240V, 50/60 Hz			
Motor protection	Doesn't need external motor protection			
Protection class	IP44			
Insulation class	E			
Relative ambient humidity	Max. 95%			
System pressure	Max. 1.0 MPa, 10 bar			
Suction inlet pressure	Liquid temp	≤ +75°C	Min. Inlet pressure	0.05bar , 0.005MPa
		+90°C		0.28bar , 0.028MPa
		+110°C		1.08bar , 0.108MPa
EMC Standard	GB 4343.1	GB 4343.2	GB 17625.1	GB 17625.2
Ambient temperature	0°C ~ 40°C			
Surface temperature	Max. +125°C			
Liquid temperature	+2°C ~ +110°C			

Model	Internally controlled			Externally controlled PWM
	Proportional pressure	Constant pressure	Constant curve	
XX- X- XXX	I	I	I	PWM1
	II	II	II	
	III	III	III	
	AUTO	/	/	
XX- X- XXX P1	/	/	III	PWM1
XX- X- XXX P2	/	/	III	PWM2

Dimensions



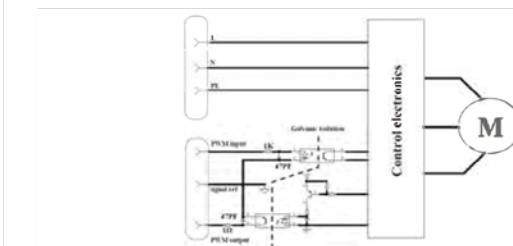
Model	Size (mm)							
	L1	L2	L3	H1	H2	H3	G	
20-X-130L (PWM1/PWM2)	93	126	99	110	130	60	G1	
25-X-130L (PWM1/PWM2)					180		G1.5	
25-X-180L (PWM1/PWM2)							G2	
32-X-180L (PWM1/PWM2)								

Relationship between electric pump setting and lighted area  
Electric pump mode is setup with different display areas like below:

Pressing times	Model	Descriptions	Display
0	CS III Factory Settings	Constant curve, speed III	
1	AUTO	Adaptive mode	
2	PP I	Proportional pressure curve, speed I	
3	PP II	Proportional pressure curve, speed II	
4	PP III	Proportional pressure curve, speed III	
5	CP I	Constant pressure curve, speed I	
6	CP II	Constant pressure curve, speed II	
7	CP III	Constant pressure curve, speed III	
8	CS I	Constant curve, speed I	
9	CS II	Constant curve, speed II	
10	CS III	Constant curve, speed III	
/	PWM	External control of motor speed	

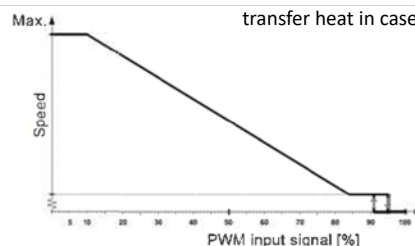
### Control principles

When PWM signal is connected, the operation of circulating pump is controlled by PWM signal. If there is no PWM signal, the operation of circulating pump is controlled by internal control logic.

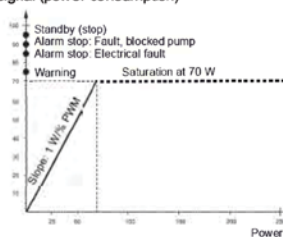


### 5.4.2 PWM input signal (PWM1 heating)

At high PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump from starting and stopping if the input signal fluctuates around the shifting point. At low PWM signal percentages, the circulating pump speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the circulating pump will continue to run at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heat circulating pumps to ensure that the circulating pump can transfer heat in case of a cable breakage.



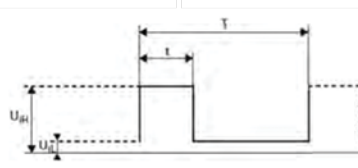
PWM feedback signal (power consumption)



PWM output signal (%)	Qualification time OT (s)	Pump information	Disqualification time OT (s)	Priority
95	0	Standby by PWM signal (STOP)	0	1
90	0-15	Alarm, stop, blocked error	0-10	2
85	0-30	Alarm, stop, electrical error	0-10	3
75	0	Warning	0	5
0-70		0-70W (slope 1W/5% PWM)		6
Output frequency 75Hz ± 5%				

### PWM signals

Galvanic isolation in pump	YES
PWM frequency input	1000-2500Hz
Input voltage high level $U_{H1}$	4.0-5.5V
Input voltage low level $U_{L1}$	< 0.7V
Input current high level $I_{H1}$	3.5mA-10mA
Input duty cycle PWM	0-100%
Signal polarity	fixed
Signal cable length	< 3m
Rise time, fall time	< T/1000



## Troubleshooting

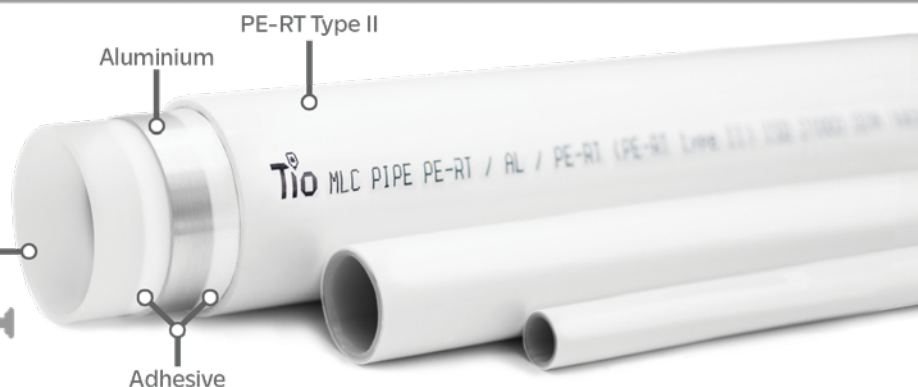
Symptom	Likely causes	What to do
The pump is not working	Loose power cable connection	Make sure the power cable is connected securely and firmly
	Control electronics damaged	Replace the control box
	The impeller, motor may be wound by fibers or jammed with sundries	Clean the fibers and sundries
Noise within system or pump casing	Impurities within pump	Dismantle the pump and clean the impurities
	Air or gas within system or pump casing	Exhaust the air or gas
	Intake valve is closed	Open the valve
The pump is working, but not generating any pressure	Air or gas within pipes or pump	Open the valve to make the pump running and meanwhile loosen the connector of the outlet ports to ensure gas emission

In case of failures, the electrical control will react to some of the faults and protect the pump. The protection code on display panel shows in the following table:

Protection type	Display	Likely causes	What to do
Locke d-rotor protection		The rotor is blocked	Disassemble the motor and check if the rotor can rotate normally. If not then clean up the impurities to make the rotor part rotate flexibly
Overvoltage/undervoltage protection		The input voltage is too high or too low	Check if the voltage is within normal range, if not then adjust to normal voltage
Open phase protection		One or more phases of the internal connection circuit is disconnected	Replace the pump
Over current protection		Short circuit of internal connection circuit	Replace the pump

• All the figures in this manual are schematic diagrams, and please understand that the electric pumps and accessories you buy may be different from the diagrams in this manual.

• The performance of the product is improved constantly, and all products (including appearance and color, etc.) are subject to physical products; no further notice will be given in case of any change.



Tio multilayer pipes cross-link the best qualities of both metal and plastic pipes in one single system. It combines the advantages of aluminium with the corrosion resistance of plastic. The stability of the TIOMLC pipe is ensured by the laser edge welded aluminium. The pipe is built on a 5 layer structure, where the internal and external layers are made of PE-RT type II and the middle layer is made of aluminium and all layers are connected by a special bonding agent.

The pipes internal wall surface is extremely smooth, avoiding corrosion phenomena, limescale or deposits. TIOMLC pipes are flexible and easy to bend. The lightweight of the pipe is also an advantage for its use on wall-mounted installations. TIOMLC pipes can be used for drinking water applications as well as for heating and cooling systems and other industrial applications.

#### Applications:

- Heating and Underfloor
- Industrial Facilities
- Surface Heating/Cooling
- Cooling Systems
- Snow and Ice Removal Systems
- Hot and Cold Water Distribution

#### Dimensions

Description	Coils	Diameter (mm)	Tolerance (mm)	Thickness (mm)	Tolerance (mm)
PERT-AI-PERT	100/200/240/500	16	16 - 16.3	2.0	1.90 - 2.30

#### Certifications\*

**PE-RT/ AI / PE-RT pipe produced according to AENOR (Spain), SKZ (Germany), WRAS (UK)**

\* Standardized certifications according to UNE-EN ISO 21003

#### Physical properties

Material:	High temperature resistance polyethylene (PE-RT)
Density:	> 0,941 g/m <sup>3</sup>
O <sub>2</sub> permeability:	< 0.0010 g/m <sup>3</sup> .d

#### Thermal Properties

Working temperature range:	95°C
Maximum temperature:	110°C
Thermal conductivity (60°C):	0.43 W/m <sup>2</sup> K
Coefficient of linear extension	0.025 mm/m <sup>2</sup> K

Design pressure according to ISO 21003	Temperature	Max pressure
	20°C	15 bar
	40°C	10 bar
	60°C	8 bar
	70°C	7 bar

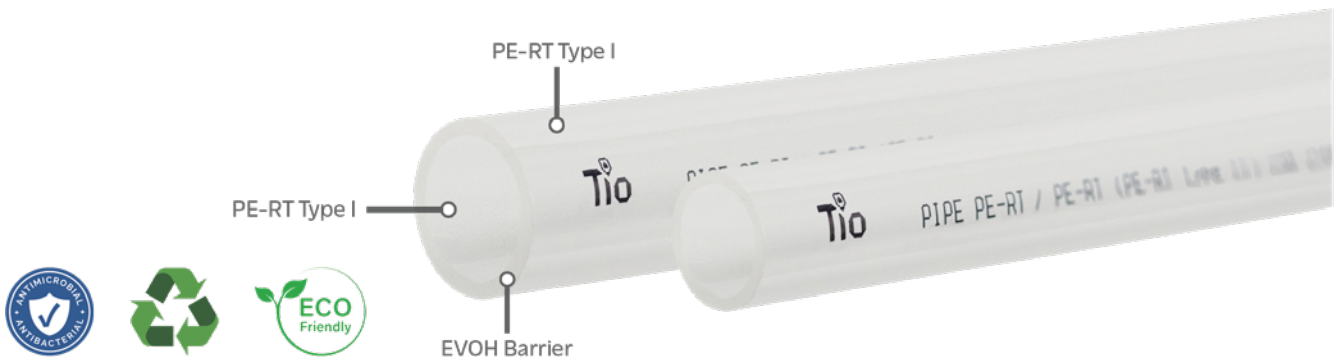
#### Mechanical Properties

Tensile strength :	> 22 N/mm <sup>2</sup>
Elongation at break:	>400%
Modulus of elasticity (20°C):	>800 N/mm <sup>2</sup>

Resistance to internal pressure	40 bar (20°C, 1h)
	40 bar (20°C, 1h)
	40 bar (20°C, 1h)
	40 bar (20°C, 1h)

Product Code	Product Description	Dimensions
TIOMLC0001	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 100m coil
TIOMLC0002	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 240m coil
TIOMLC0003	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 500m coil
TIOMLC0004	PE-RT / Alu / PE-RT multilayer pipe	16 x 2mm - 200m coil





Tio PE-RT EVOH pipe can be easily bent and curved in cold without special tooling, saving unions and installation time. Layers are very resistant to calcium, dirt and substances derived from galvanic corrosion. It weighs 7 times less than copper and 13 times less than iron on equivalent diameters. It does not modify the organoleptic characteristics of drinking water and the corrosion absence avoids proliferation of bacteria. Providing energy savings by reducing heat loss. Much lower roughness than metallic pipes reducing energetic consumption and allowing a higher flow with the same internal pipe diameter. Recovering the original shape when hot air is applied allowing it to be repaired.

### Applications:

- Heating and Underfloor
- Industrial Facilities
- Surface Heating/Cooling
- Cooling Systems
- Snow and Ice Removal Systems
- Hot and Cold Water Distribution

### Classification according to service conditions

Application class	Application	Type of temperature	Temperature (°C)	Time (years)
1	Hot water (60°C)	Design temperature	60	49
		Maximum design temperature	80	1
		Malfunction temperature	95	0.0114
2	Hot water (70°C)	Design temperature	70	49
		Maximum design temperature	80	1
		Malfunction temperature	95	0.0114
4	Radiant floor heating and low temperature radiators	Design temperature	20	2.5
		Design temperature	40	20
		Design temperature	60	25
		Maximum design temperature	70	25
		Malfunction temperature	100	0.0114
5	High temperature radiators	Design temperature	20	14
		Design temperature	60	25
		Design temperature	80	10
		Maximum design temperature	90	1
		Malfunction temperature	100	0.0114

For conditions on the table (up to 6 bar and 80°C) the lifetime of the pipe is 50 years

Physical Properties	
Material:	Polyethylene with high temperature resistance
Density:	> 0,941 g/m <sup>3</sup>
Working temperature range:	From -20°C to 70°C
Maximum temperature:	110°C
Thermal conductivity (60°C):	0.4 W/m·K
Thermal expansion rate:	1.8-10.4/K
Oxidation Induction Time (OIT):	> 40 min

Internal pressure resistance	> 1 hour (s=9.9 Mpa, 20°C)
	> 22 hours (s=3.9 Mpa, 95°C)
	> 165 hours (s=3.7 Mpa, 95°C)
	> 1000 hours (s=3.5 Mpa, 95°C)
	> 1 year (s=1.9 Mpa, 110°C)

### Certifications\*

AENOR (Spain), DIN CERTO (Germany), IIP (Italy), KOMO (Netherlands)

\* Standardized certifications according to EN ISO 22391

Product Code	Product Description	Dimensions
TIOPER0001	3 layer PE-RT pipe	16 x 2mm - 100m coil
TIOPER0002	3 layer PE-RT pipe	16 x 2mm - 240m coil
TIOPER0003	3 layer PE-RT pipe	16 x 2mm - 500m coil
TIOPER0004	3 layer PE-RT pipe	12 x 2mm - 80m coil
TIOPER0005	3 layer PE-RT pipe	12 x 2mm - 240m coil
TIOPER0006	3 layer PE-RT pipe	20 x 2mm - 400m coil
TIOPER0007	3 layer PE-RT pipe	10 x 1.25mm - 80m coil
TIOPER0008	3 layer PE-RT pipe	10 x 1.25mm - 240m coil



## 7 day programmable thermostats

Our 7 day (5+1+1) Programmable thermostat gives users 6 periods throughout the day to adjust their heating requirements. It's sleek design, easy to use functionality and affordable price, makes it the perfect choice for any home. **Available in black and white.**



Product Code	Product Description
TIOSTA0003	230v black programmable thermostat
TIOSTA0004	230v white programmable thermostat
TIOSTA0006	24v white programmable thermostat

## Smart thermostat (Wi-Fi)

The Tio Smart has the same design and features as the programmable Tio thermostat. Utilising Wi-Fi capabilities to link with the Tio Smart home system. **Available in black and white.**



Product Code	Product Description
TIOSTA0001	230v black smart Wi-Fi thermostat
TIOSTA0002	230v white smart Wi-Fi thermostat
TIOSTA0005	24v white smart Wi-Fi thermostat

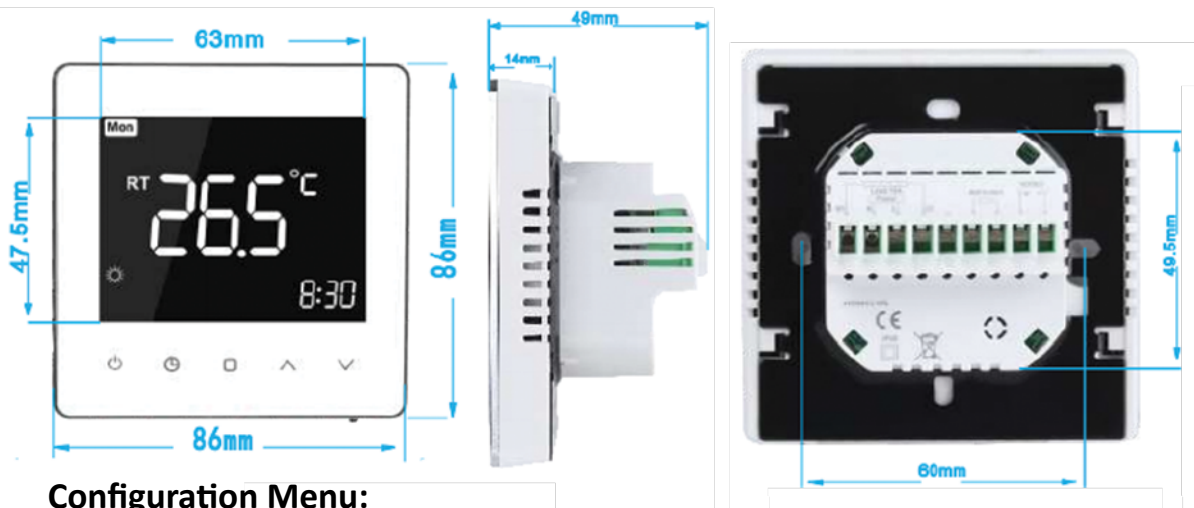
## Electric underfloor thermostat

Available in both smart and programmable versions, Tio's 16 amp electric underfloor thermostat is the perfect solution for electric underfloor heating. **Available in white.**



Product Code	Product Description
TIOSTA0007	230v white programmable thermostat
TIOSTA0008	230v white smart Wi-Fi thermostat

Sensor: NTC Accuracy:  $\pm 1^{\circ}\text{C}$   
 Power Consumption:  $< 1.5\text{W}$  Timing Error:  $< 1\%$   
 Power Supply: 95 - 240VAC, 50 ~60Hz  
 Current Load: 5A (water heating, water/gas boiler), 16A (electric heating - TIOSTA0007/0008)  
 Shell material: PC+ABS (flame retardant)  
 Dimension: 86x86x13.3mm  
 (Non-condensing) Ambient Temperature: 0-45°C, 5-95% RH  
 Storage Temperature: -5-55°C  
 Installation Hole distance: 60mm  
 Simple installation  
 Acrylic face plate  
 Back-lit display  
 Elegant chrome frame  
 Feather touch control panel  
 5 + 1 + 1, six period per day programming  
 Simple, one-touch temperature control over-ride  
 Pre-set temperatures maintained within  $\pm 1^{\circ}\text{C}$   
 Internal and external sensors allow control of both air and/or floor temperatures  
 WIFI/ZIGBEE/MODBUS communication optional



### Configuration Menu:

No.	Function	Press ^ v to set	Def.
1	Calibration	-9°C to 9°C	0°C
2	Dead Zone	1°C to 5°C	1°C
3	Lock	0: Unlock 1: All buttons locked except Power button	1
4	Sensor Selection	IN = Control temperature using internal sensor OU = Control temperature using External sensor All = Both inner and external sensor	ALL
5	Minimum Temperature Setting	5°C to 15°C	5°C
6	Maximum Temperature Setting	15°C to 45°C	35°C
7	Display Mode	00: Display room temperature and set temperature 01: Display set temperature only	0
8	Standby Backlight	0 - 100	10
9	High Temperature Protection Setting	25°C - 70°C	45°C
A	Anti-freeze Temperature Range	2°C - 10°C	5°C
B	Anti-freeze protection	0: Off      1: On	0
C	Eco Mode	0: Off      2: On	0
D	Eco Temperature Set Range	5°C - 30°C	16°C
E	Backlight Selection	1 - 100	80

## RF thermostat with single channel receiver

Wi-Fi Wireless Heating thermostat with single channel receiver. Incorporating 7 day programming with smart app capability.

Available in white.



Product Code	Product Description
TIOSTA0012	230v white programmable Wi-Fi thermostat

Power source: Control Centre 2 AA batteries

Frequency band: 868MHZ

Receiver 95-240VAC±10% 50/60Hz

Relay contact: 3A for water heating/gas boiler heating

16A for electric heating

Room temperature setting range: 5°C - 35°C

Working environment temperature range: 0°C - 50°C

Storage Temperature range: -10°C - 60°C

Accuracy: 0.5°C

Control Centre/Receiver Dimension: 86mm x 86mm x 15mm

Installation: Wall mount or Desktop Temperature display of Celsius

Programming Period: 5 + 1 + 1, 6 separate periods per day

WIFI APP control with IOS & Android

Anti-freeze protection

Large VA screen display with backlight is easy to read, even in the dark

Modern design

Acrylic lenses to avoid finger scratches

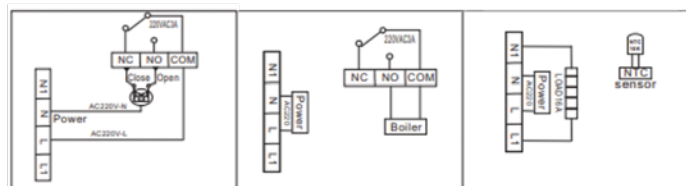
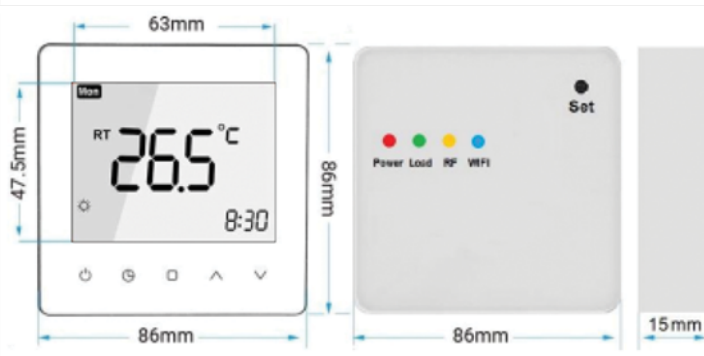
Touch Button makes simple operation

One touch temperature control overrides program schedule at any time. Precise comfort control keeps temperature within 0.5°C of the level you set.

Data memory when power is off.

### CONFIGURATION MENU

No.	Function	Press ^ v to set	Default
1	Calibration	-9°C to 9°C	0°C
2	Dead Zone	0.5°C to 5°C	0.5°C
3	Lock	0: All buttons will except power button. 1: All buttons will lock.	0
4	Minimum temperature setting	5°C to 20°C	5°C
5	Maximum temperature setting	20°C to 35°C	35°C
6	High temperature protection (external sensor only)	25°C to 70°C	45°C
7	Display Mode	0: Room Temperature 1: Setting Temperature	0
8	Low temperature protection (anti-freeze)	0: OFF 1: ON. When room temp = 5°C, Heat ON. When room temp > 8°C, Heat OFF.	0
9	ECO Mode	0: OFF 1: ON	0
10	Eco Temperature setting range	5°C to 30°C	16°C



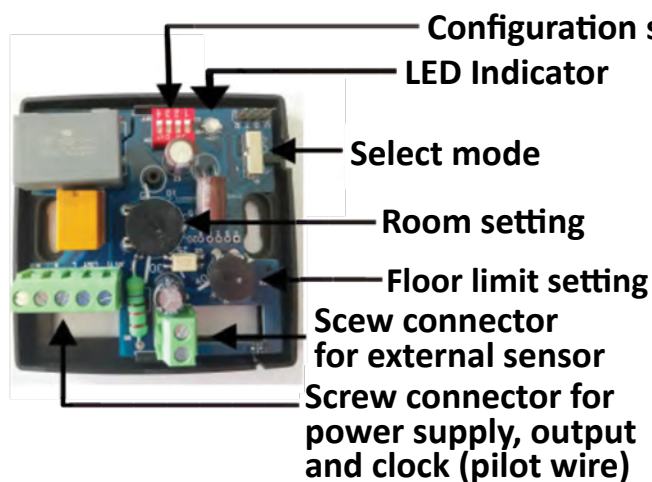
## Dial thermostats

Perfect for water heating systems, these dial thermostats offer temperature adjustability between 0°C - 35°C.

Product Code	Product Description
TIODIA0003	230v tamper proof electric thermostat



- External pilot wire for night reduction, equipped with a switch to select comfort, reduction or clock mode.
- Possibility to regulate either the floor or room temperature, or combined (in this case, the floor sensor is used as temperature limiter).
- Relay output, to be connected directly to actuators (see connecting drawing on the installation sheet) or to our Modular connecting system.



### Configuration switch



Actuator type 1	
ON	NO actuator
OFF	NC Actuator
Regulation mode 2	
ON	Proportional
OFF	Static differential
Sensor mode 3&4	
3 - OFF 4 - OFF	Regulation on internal room.
3 - OFF 4 - ON	Regulation on external room.
3 - ON 4 - OFF	Regulation on internal room sensor with lower limit floor on external probe.
3 - ON 4 - ON	Regulation on internal room sensor with upper limit floor on external probe.

### LED Indicator

**Red:** Heating indication

**Green:** reduction mode by dock (pilot wire)

**Orange:** Heating during reduction mode by clock (pilot wire)

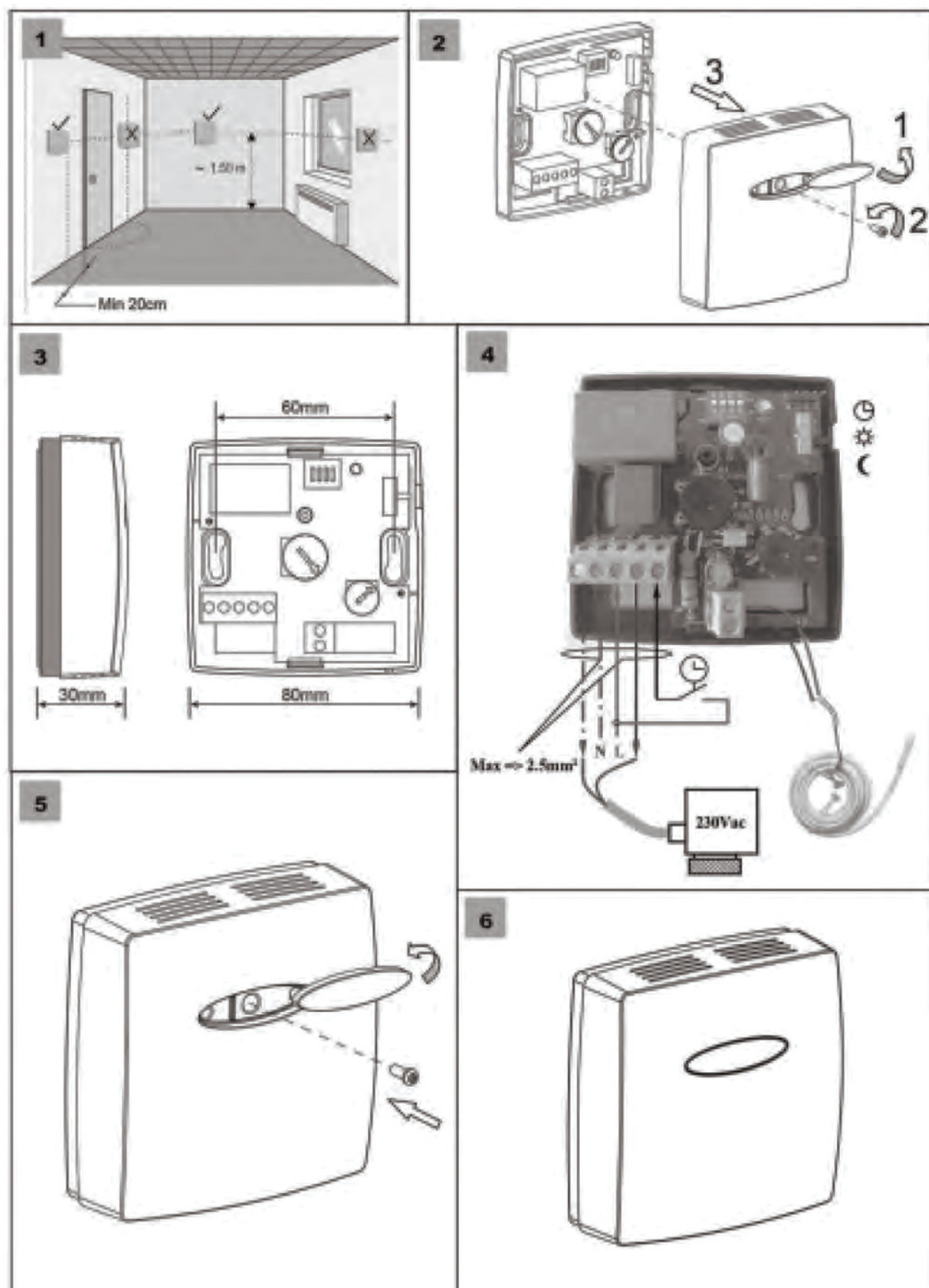
### Red blinking:

- 0.5 second cycle => Internal & External sensor failures
- 1 second cycle=> Internal sensor failure
- 2 seconds cycle => External sensor failure

## Technical Characterisitcs

Measured temperature precision	0.1°C
Operating temperature	0°C - 50°C
Setting temperature range	5°C – 30°C
Floor limiting temperature range	10°C – 40°C
Regulation characteristics	Proportional band 10min for 2°C or Static differential 0.5°C
Electrical Protection	Class II - IP30
Power Supply	230 VAC +/- 10%
Output	Relay output 230VAC, 200W max
External Floor sensor	NTC (10K Ohms) 3m





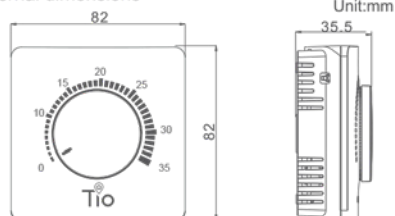
## Dial thermostats

Perfect for water heating systems, these dial thermostats offer temperature adjustability between 0°C - 35°C. LED indication when heating is activated.



Product Code	Product Description
TIODIA0004	230v on-wall dial thermostat
TIODIA0004s	230v on-wall dial thermostat with floor sensing

External dimensions



International universal electronic heating thermostat can be installed directly on the wall. The temperature range is 10~35°C. It means it's heating when the indicator lights up. It can be applied to automatic temperature control of heating system. It meets the high requirement for comfort, safety and energy-saving.

Model	Current	Control Type List
TIODIA0004 MENAPT-10	3A	Water valve, radiator, or electric heating valve

### Parameter

Voltage:230V

Consumption:<2W

Temperature Range:12~35°C

Temperature switch deviation:Default 1°C

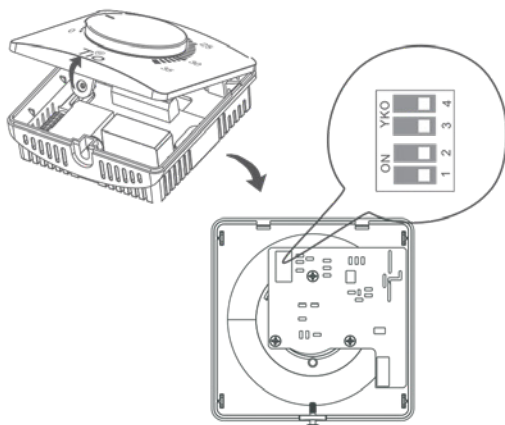
Ambient temperature:0~50°C

Protection class:IP20

Load capacity:3A

Connecting Cable:RVV0.5

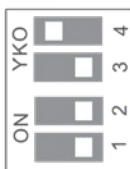
Housing material:PC+ABS



### Sensor choosing and floor limit sensor setting:

This thermostat can choose different works way by set switch that is on the back of product,which includes both:built-in and limitation floor sensor.The thermostat operates either with one of these sensors or with both of them.This kind of product can modify the different limited temperature value,setting method as following:

Built-in&floor sensor  
floor temperature  
limited in 30°C



Built-in&floor sensor  
floor temperature  
limited in 40°C



Built-in&floor sensor  
floor temperature  
limited in 55°C



### Description

This thermostat is applied to water heating system. Room temperature is adjusted by controlling the valve switch.Operation is easy. Set temperature through the knob. The corresponding temperature to the comfortable position is about 20°C. The corresponding temperature is higher as the knob position is turned higher. Annular red indicator will light up when heating. Please turn the knob to the low position when leaving for long-term to save energy.

### Operating Instructions

- ① Switch off:OFF
- ② Comfortable position:  
about 20°C  
Temperature setting  
range:10~35°C
- ③ Annular red indicator light:  
The light will be on after switch on, then off.  
It means it is heating when red light is  
always on.



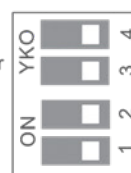
### Selection of installation location

Thermostat should be installed on the wall where the air flows freely. Besides, the place where the thermostat is installed should be free of other heat source (such as sunlight), airflow from door and window, temperature of external wall and etc.

### Fault phenomena and exclusion

Fault phenomena	Solution
Light not on when switched on	contact failure of power cord or no power supplied
Not heating up	The set temperature is too low or contact failure of sensor or there is heat source near sensor
Heating light keeps flashing	Fault tips of Sensor. Please confirm if the wire is connected properly. Change the sensor if it's properly connected.

Built-in sensor

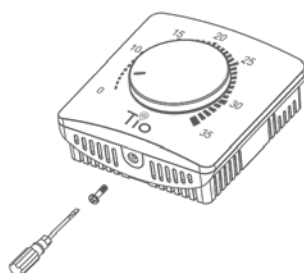


Floor sensor

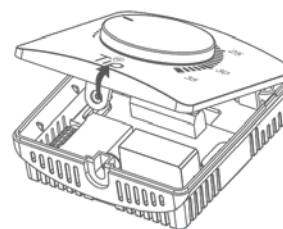


## Installation Diagram

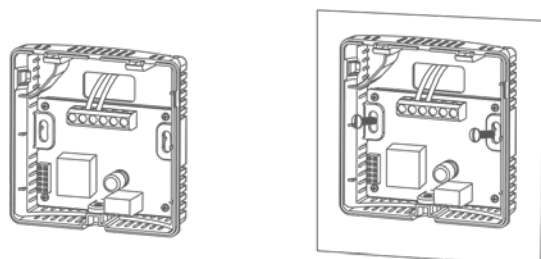
- 1 Remove the screw at the bottom of thermostat by screwdriver.



- 2 Open the front panel as shown in the following picture.

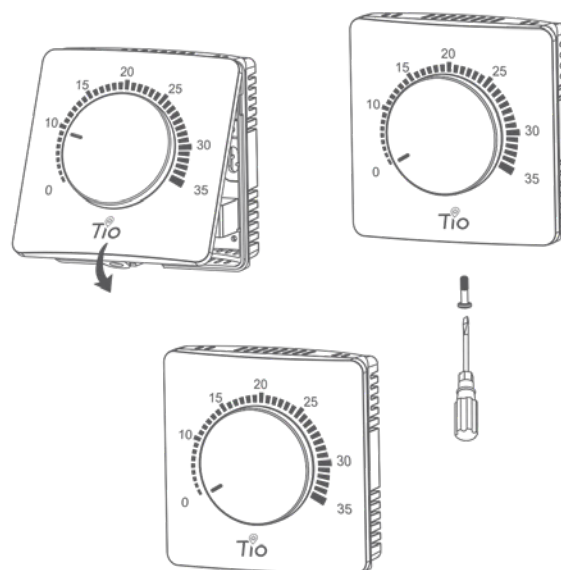


- 3 Connect the wires correctly according to the wiring diagram and fix power base to the cassette by screws.

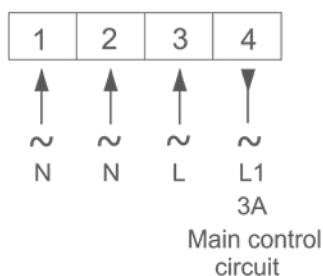


System Connection Diagram

- 4 Close the front panel and tighten the screw as shown in the following pictures to finish installation.



TIODIA0004  
MEN.APT-10



Our TIODIA0004S model, allows users to incorporate an external sensor for use in areas such as bathrooms. All other features are the same as the TIODIA0004 model.

### Note:

This thermostat can be used in full load operation at a place whose altitude is no higher than 2,500m. For a place whose altitude is between 2,500 and 4,200m, the nominal power of external load should be no bigger than 80% of the nominal power of this product.

## Installation Notes

- > Power must be off during installation.
- > Please connect the wires correctly according to diagram.
- > It's better that the installation height is 1.4m or on the same level of other wall switches.
- > Do not install thermostat at non-ventilated location, for example corner, behind the door.
- > Do not install thermostat at a place with strong airflow or near cold and heat source.
- > Sundries like water, cement slurry, metal particles are forbidden going inside thermostat. It will destroy the thermostat.



Product Code	Product Description
TIOEVO0001	230v white smart RF thermostat
TIOEVO0002	230v black smart RF thermostat

# TEVO WIRELESS

## ICON OVERVIEW

	WIRELESS		ECO
	WIFI		SET
	ROOM TEMPERATURE		HEAT ON
	SET TEMPERATURE		TIMER & HEATING
	SCREEN LOCK		HOLIDAY MODE
	MANUAL MODE		LOW BATTERY
	PROGRAM MODE		TIMER MODE
	TIME OF DAY SETTING		FLOOR SENSING

## HOLIDAY MODE

Long press for 7 seconds to enter holiday mode.

Then short press button to set the day and temperature parameters you need.

Press to exit this.

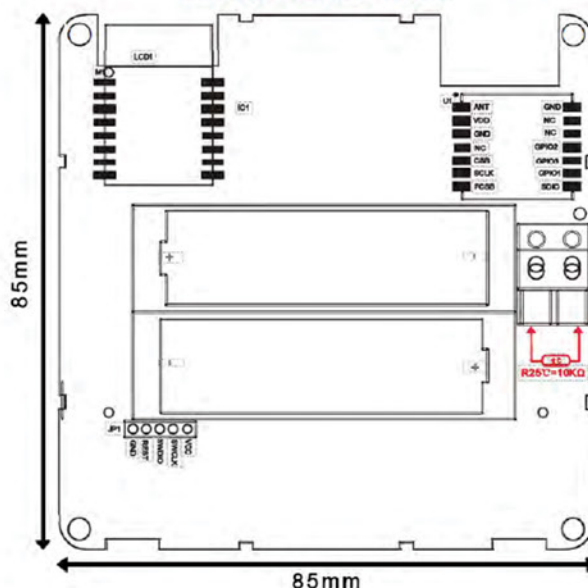
During holiday mode, H/W timer is OFF. To exit holiday mode, short press .

## FACTORY SETTINGS

Please familiarise yourself with the thermostats pre-programmed factory settings.

Period Display	Description	Time	Set Temp °C
	Morning	0600	22
	Leaving Home	0800	16
	Returning Home	1800	22
	Bedtime/ Overnight	2200	16

This thermostat can also be connected to an external sensor.



## MENU OVERVIEW

No.	Function	Setting Options	Default
1	Operating Mode	1.Stat 2.Timer 3. Stat & Timer	1
2	System Type	1A. Radiators UF. Underfloor	UF
3	Temp Adjust	-9 to 9°C	0
4	Dead Band	1 to 5°C	1
5	Lock Screen	0. All Lock Excl Power 1.All Lock	0
6	Sensor Select	1n. Internal 0u. Floor All. Dual	IN
7	Max Temp	20 to 45°C	35
8	Min Temp	5 to 20°C	5
9	Over temp Limit	20-70°C	45
10	Anti FrostTemp	2 to 10°C	5
11	Display Mode	0. Room & Set Temp 1. Set Temp Only	0
12	Anti Freeze On	0. OFF 1. ON	1
13	Eco Mode On	0. OFF 1. ON	0
14	Eco Mode Set	1°C to 5°C	16

## FACTORY SETTING TABLES

Table 1

Time period	Period 1	Period 2	Period 3	Period 4
Week	Time	Set Temp	Time	Set Temp
Mon	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Tue	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Wed	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Thur	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Fri	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Sat	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C
Sun	6:00 22°C	8:00 16°C	18:00 22°C	22:00 16°C

Table 2

Time period	Period 1	Period 2	Period 3	Period 4
Week	Time on	Time off	Time on	Time off
Mon	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Tue	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Wed	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Thur	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Fri	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Sat	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00
Sun	6:00 8:00 12:00 14:00 18:00 22:00	8:00 12:00 14:00 18:00 22:00	18:00 22:00	22:00 18:00



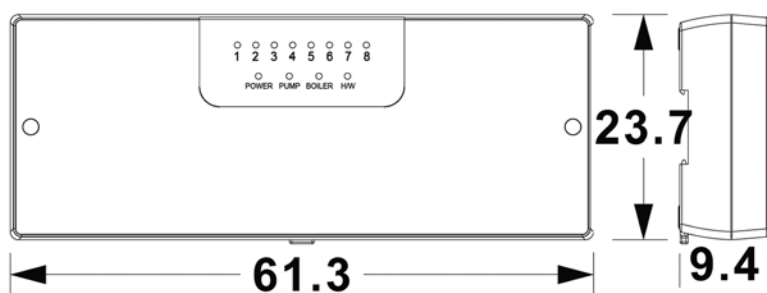
Product Code	Product Description
TIOEVO0003	Wireless RF central control box



## SYSTEM COMPONENTS AND TECHNICAL DATA



This product can only be installed by a competent engineer.



Power	95-240V AC 50/60Hz
Operating temperature	-20 – 60°C
Max load on H/W output	3A
Max load for zone outputs	3A
Max Total load	5A
Dimensions	280 x 110 x 43.5mm
No. of Zones	8
Pump Delay	3 minutes
Radio Frequency	868Mhz
Fuse rating	10A
IP rating	20

The TEVO wireless wiring centre from Tio Climate Solutions is an 8 zone wiring centre for use with TEVO wireless thermostats. Most commonly used for underfloor heating applications, the wiring centre can also be used for central control of multi-use systems by using the independent control outputs for hot water zone control and a dedicated channel for a radiator zone valve. The wiring centre can control the heat source activation through volt free output as well as offering a 230V output to the manifold circulating pump.

Other features within the wiring centre include:

- LED indicators for quick system status checks.
- Optional pump delay function to delay the pump activation during loop opening.
- Pump exercise function to prevent pump blocking issues.
- Commissioning switches for engineer testing.

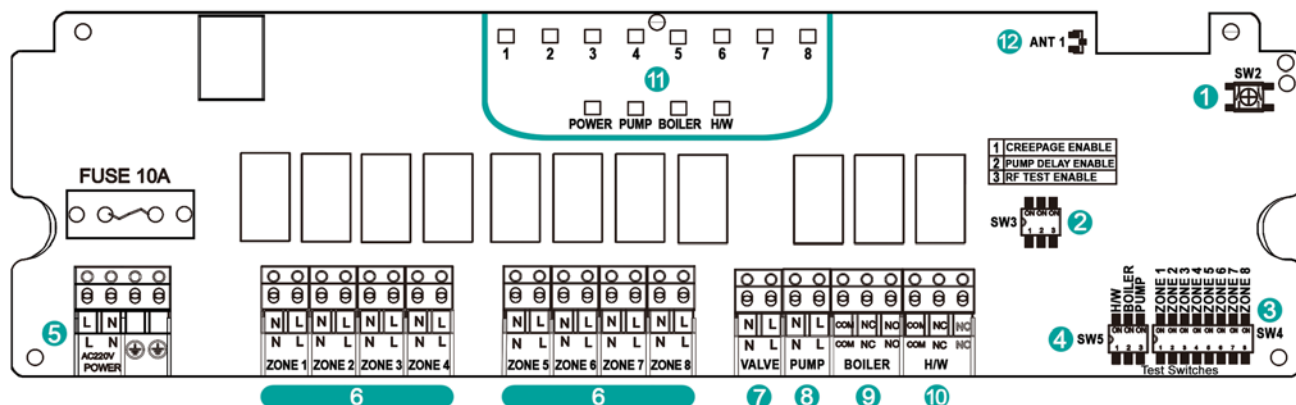
The TEVO wireless system can be used as standalone UFH or combined with hot water and radiators. By selecting the thermostat system application during set up and pairing with the wiring centre, the system use case can be determined easily. With the TEVO wireless thermostat set to UFH control it will communicate with the selected zone/channel in the wiring centre and activate the UFH loop, manifold circulating pump and heat source. If the TEVO wireless thermostat has 'hot water mode' selected the thermostat channel will act as a time switch and control the hot water output terminals.

If the TEVO wireless thermostat has 'radiator control mode' selected it will act as a conventional programmable room thermostat and control the output to a separate heating zone valve via the channel terminals.

**Note: In radiator mode, the heat source will be activated but the manifold pump will remain inactive until a demand is given from an underfloor heating circuit.**

## SYSTEM COMPONENTS AND TECHNICAL DATA

- |   |                      |                               |
|---|----------------------|-------------------------------|
| ① Switch 2 - Primary Control Switch           | ⑤ Power Terminal     | ⑨ Boiler Terminal             |
| ② Switch 3 - Engineer DIP Switches            | ⑥ Actuator Terminals | ⑩ Hot Water Terminal          |
| ③ Switch 4 - Actuator Test Switches           | ⑦ Valve Terminal     | ⑪ LED Indicators              |
| ④ Switch 5 - H/W, Boiler & Pump Test Switches | ⑧ Pump Terminal      | ⑫ Antenna - Increase RF Range |



## OPERATION

### Pump Exercise Function

During periods of inactivity (summer months or between installation and general use) a manifold circulating pump can seize and cause problems when the system is reactivated. To help prevent this issue, the TEVO wireless wiring centre has an optional 'pump exercise' dip switch (SW3) which, when selected to ON, will operate the pump for 5 minutes once every month.

### Pump Delay Function

Commonly, the electrical thermal actuators which open the individual loops will take up to 5 minutes to fully open. The pump delay function will then delay activation of the manifold circulating pump by 3 minutes, from activation, in order to allow the vales to fully open.

### Commissioning Switches

For engineer use only during commissioning. These offer the ability to activate loops and test the electrical outputs.

### Engineers Test Switches

These are a block of 12 dip switches used to test each zone, boiler, pump and H/W outputs. To enable any output, put the switch in the ON position. When installation is complete, all switches MUST be in OFF position.

### DIP Switches

There is a 3 way dip switch responsible for 3 functions:

- 1: Pump Exercise Function
- 2: Pump Delay Function
- 3: RF Test Enable

In normal use, these DIP switches can be ignored and should be down in the OFF position.

#### DIP Switch 1

To enable the pump delay, put switch 1 to the ON position.

#### DIP Switch 2

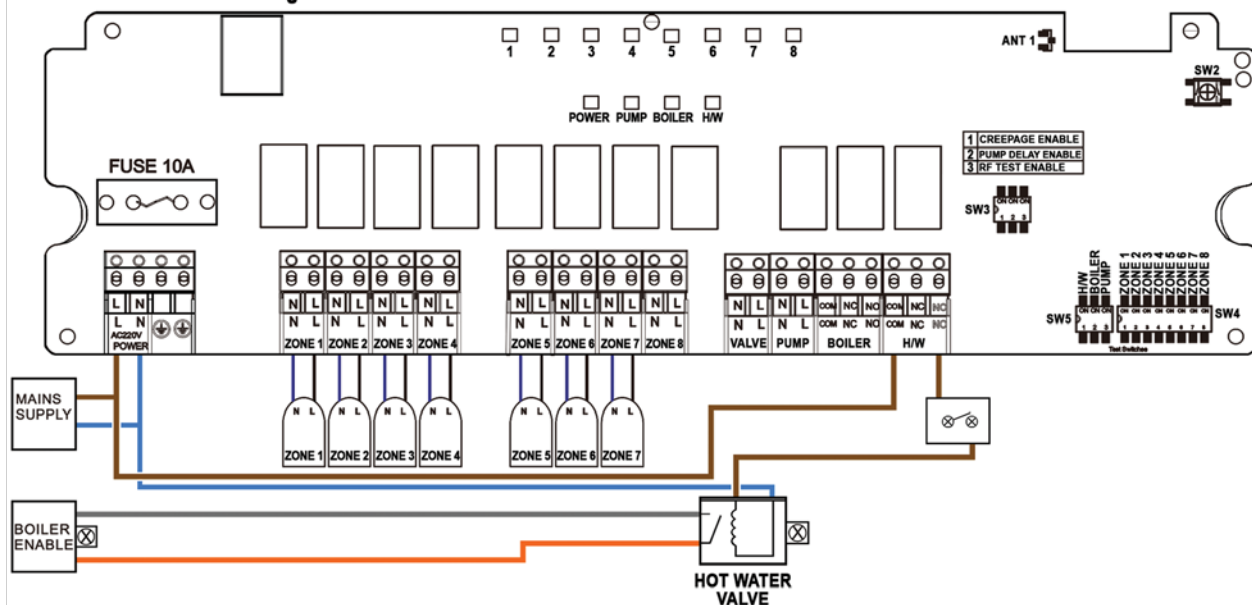
To enable pump exercise function, put SW2 to the ON position.

#### DIP Switch 3

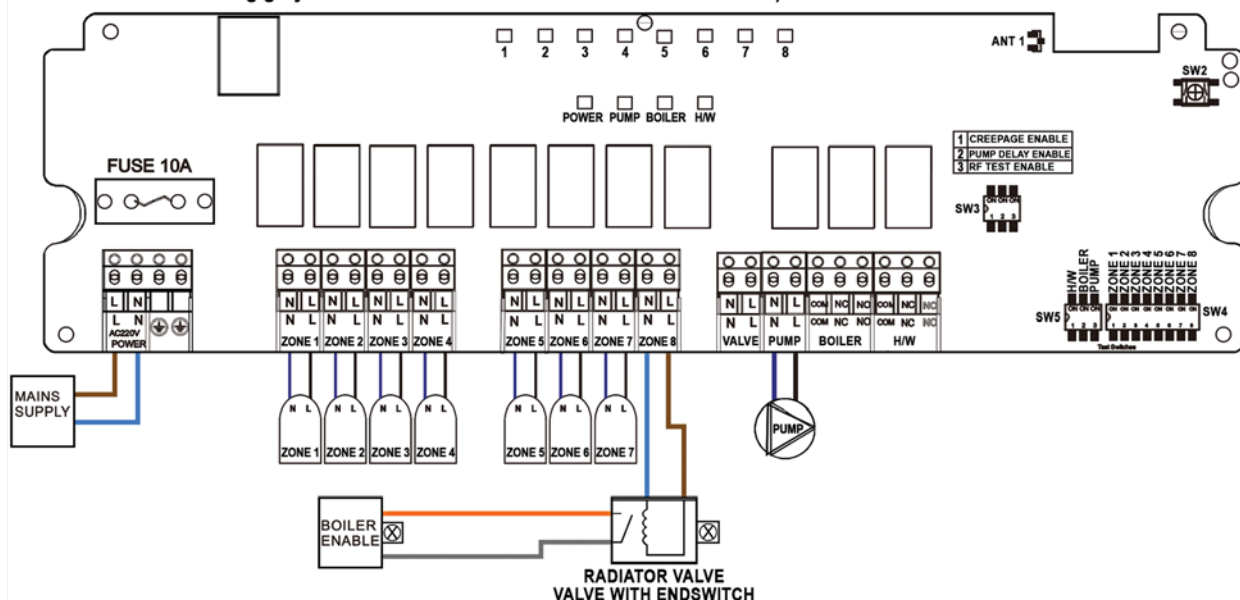
The boiler RF test switch is used to test communications with the RF-Switch receiver.

## WIRING DIAGRAMS

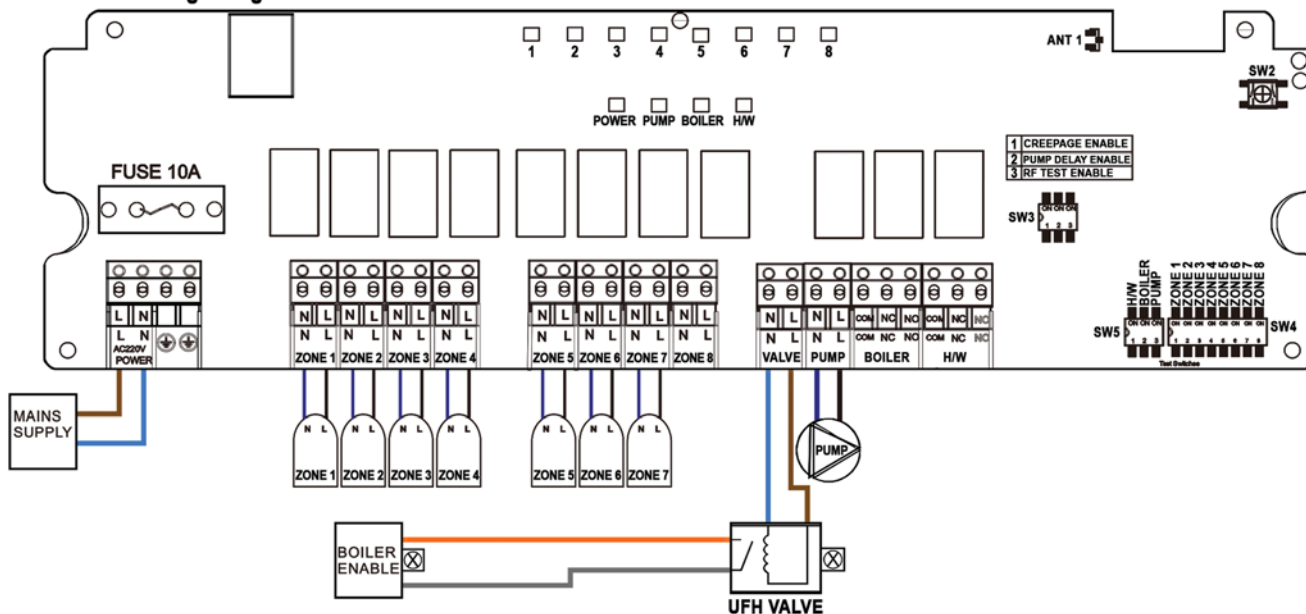
Hot water zone wiring



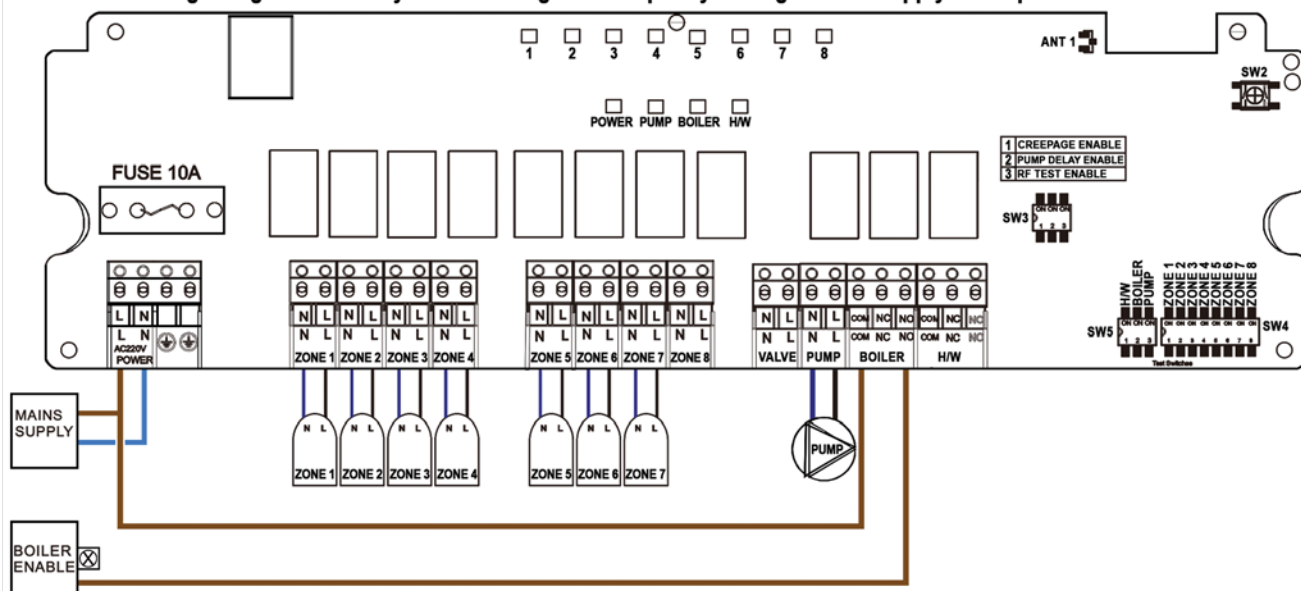
Radiator zone control using external zone valve (switched through heat source volt free terminals - for 230V switching grey must be connected to a suitable 230V connection)



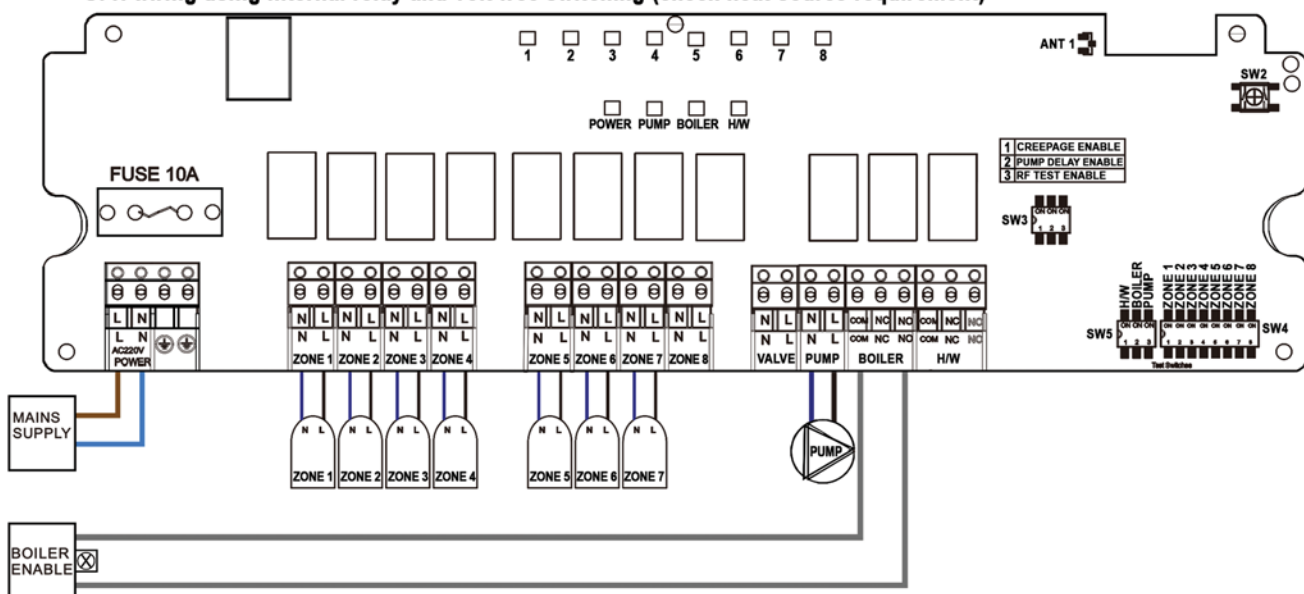
UFH wiring using external zone valve



### UFH wiring using internal relay but switching 230V output by linking to main supply and input



### UFH wiring using internal relay and volt free switching (check heat source requirement)







### Mini Multi-functional Gateway

Power input: 1A

Operating temperature: -10°C - 55°C

Operating humidity: 10%-90% RH (no condensation)

Battery specifications: Micro USB DCSV

Wireless technology: Wi-Fi 802.11b/g/n

ZigBee/BLE/MESH

### Packing List:

- Smart gateway x 1
- DCSV power supply x 1 (Optional matching)
- Instruction manual x 1
- Power cable x 1

Product Code	Product Description
TIOEVO0004	Gateway hub for app functionality

Product Description

Mini multi-mode gateway is the control center of smart devices. It supports zigbee and Bluetooth smart devices. Users can design and realize smart application scenarios by adding smart sub-devices.

Diagram of the Mini multi-mode gateway. It is a rectangular device with a rounded top. On the top surface, there are two small indicator lights: a red one labeled 'Wi-Fi Indicator' and a blue one labeled 'Zigbee/Bluetooth indicator'. On the front surface, there is a small circular 'Reset Button' and a 'Power Socket'.

Preparation For Use

① Mobile phone is connected to 2.4GHz Wi-Fi

Diagram showing the connection setup. A 'Smart phone' is connected to a 'Wi-Fi' network. The 'Wi-Fi' network is connected to the 'Wi-Fi wireless router LAN port'. The 'Wi-Fi wireless router LAN port' is connected to the 'Smart Gateway' via a 'Cable'.

Ensure that the smart phone is within the same Wi-Fi network of the Smart Gateway to ensure an effective connection between the smart phone and the Smart Gateway.

Please open "Bluetooth" and "Location" on mobile.

Preparation For Use

② Download and open the App

In the App Store, search for the relevant App or scan the QR code on the package/manual to download.

If you are downloading the App for the first time, please tap "Register" to register your account. If you already have an account, please click the "Login" button.

A square QR code that, when scanned, likely leads to the app's download page.

Network Settings

- Gateway connects to power.
- After the gateway is powered on, the red indicator flashes, and it is waiting for network connection at this time. If the red indicator does not flash, press and hold the reset button for 10 seconds until the red indicator flashes.
- Make sure that the mobile phone is connected to the 2.4GHz router, and the mobile phone and the gateway are in the same local area network.
- Open the "My Home" page of the mobile App, and a pop-up window will remind you to add a device. Follow the App prompts to complete adding gateway.

Network Settings

- If there is no pop-up reminder, click the "+" to add device in the upper right corner of the App, the App will automatically search for the device, and the target device icon to be added appears, click the icon to add device, and follow the App prompts to complete operation.
- Manually add a gateway according to the gateway type, select "Multimode Gateway" on the Gateway Control menu in App. Follow the directions to fill in the router WiFi password and click "confirm indicator blink" to enter the device adding state, and follow the App prompts to complete operation.

Add Device

A screenshot of the mobile app's 'Connect Device' screen. It shows a 'Select Device to Add' section with a 'Smart Gateway' icon and a 'Devices Can Be Connected' button.

Diagram of the gateway device with the 'Reset Button' highlighted by a red circle and a label.

- Once the device has been added successfully, you will be able to find the device on the "My Home" page.

Electronic Information Products Toxic And Hazardous Substances Declaration

Part name	Toxic or harmful substances or elements				
	Lead Pb	Mercury Hg	Cadmium Cd	Hexavalent chromium Cr (VI)	Polybrominated biphenyl PBB
PCB board	○	○	○	○	○
Housing	○	○	○	○	○
Cable	○	○	○	○	○

O: Indicates that the content of this toxic and hazardous substance in all homogeneous materials of this part is below the maximum limit specified in SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products;

X: Indicates that the toxic or hazardous substance contained in at least one of the homogeneous materials of the part exceeds the maximum limit specified in the SJ/T11363-2006 standard.

The figures in this label indicate that the product has an environmental protection use period of 10 years under conditions of normal use, and some parts may also have an environmentally friendly use period mark. The environmental protection use period is based on the number indicated by the mark.

A circular mark containing the number '10', indicating a 10-year environmental protection use period.

## Manifold actuators

Easy install actuator in 230v or 24v options. The unit comes normally open (NO) with a retaining clip. Once removed the opening function is normally closed (NC). The cable has 2 wires, neutral and live, with an extended length of 780mm.

Product Code	Product Description
TIOACT0001	230v Tio manifold actuator
TIOACT0002	24v Tio manifold actuator



Easy install 230v actuator. The unit comes normally open (NO) with a retaining clip. Once removed the opening function is normally closed (NC).

The cable has 2 wires with neutral and live, it has an extended length of 780mm.

The unit comes with live and neutral wiring with easy clips for clean installation into the Tio wiring center.

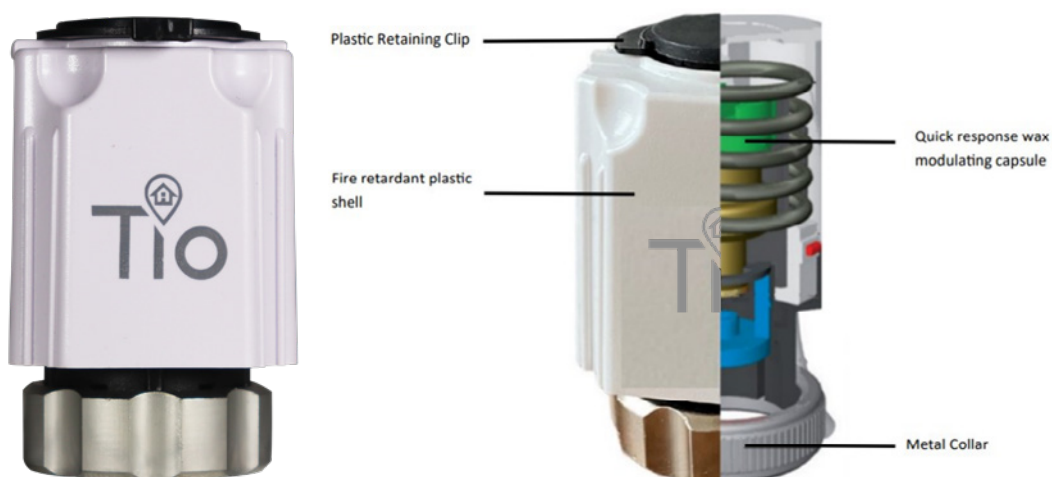
A quick reaction wax capsule is fitted within the unit to allow for reduced reaction times of ~1 minute for the associated port to open.

The metal connecting ring is M30 x 1.5

### Key features:

- Low power consumption 2W
- Retaining clip to ease first use (product arrives Normally Open)
- Adaptive stroke length 4mm
- 5 year warranty

Operation	NC= Normally Closed
N:	Neutral
L:	Live



## Wiring Centre

This functional 230v wiring centre has easy fit connector terminals and also LED indicators. The unit is fitted with boiler/pump/valve and timer port for use with underfloor heating systems.

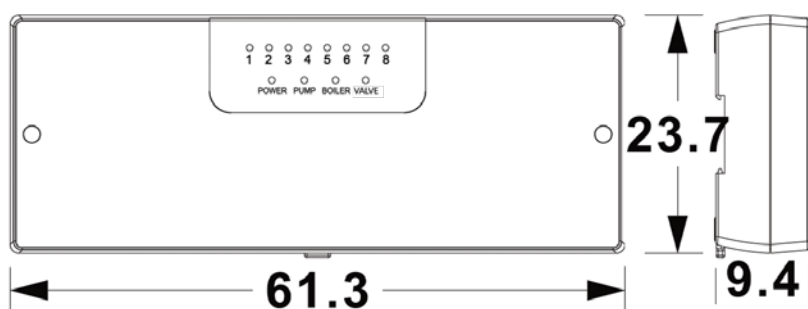


Product Code	Product Description
T10WIR0004	8 zone wiring centre with port and valve timer

### SYSTEM COMPONENTS AND TECHNICAL DATA



This product can only be installed by a competent engineer.



Power	95-240V AC 50/60Hz
Operating temperature	-20 – 60°C
Relay output max	3A
Colour/Material	White ABS
Dimensions	280 x 110 x 43.5mm
No. of Zones	8
Pump Delay adjustment	3 - 5mins
Fuse rating	10A
IP rating	20

**1.1** To remove front cover, please loosen two retaining screws and hinge front cover upwards.

**1.2** To mount the product, please use screw holes or by DIN rail utilising the DIN rail connector moulded into the back housing. **\*DIN rail not provided.\***

**1.3** For cable entry please use the knock outs provided. Take care not to damage the PCB when removing knock outs.

**1.4** For programmable digital thermostats the power supply should be via a double pole external isolator and should connect to main terminals marked L & N. Any earth connections should be made separately using the GND connection block. The wiring centre does not required earthing, this is for continuity to all devices. Link to a larger separate terminal block if required.

**1.5** To operate dial thermostats via an external time switch please connect the Normally Open output from the time switch to main terminal L rather than a permanent Live supply. This will allow timed common feeds to all zones when the time switch is ON.

#### 1.6 Zonal Connections:

**L** – This output is to provide power or a common to each thermostat (can be permanently live or timed as per point 1.5).

**N** – This output is to provide a permanent neutral connection to each thermostat. This is the return or 'switched live' from each zonal thermostat.

**Top** – This is the L terminal for the manifold actuator.

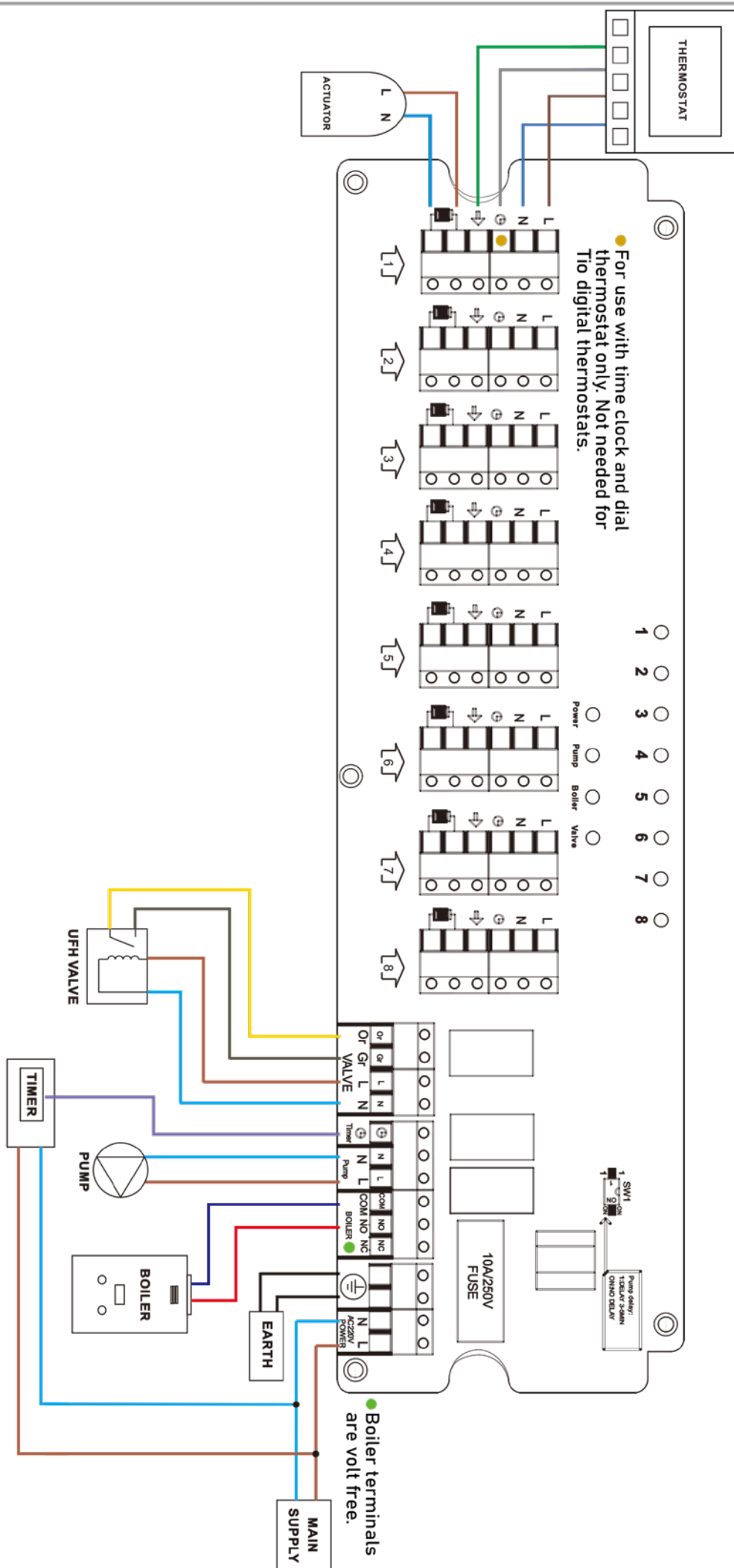
**Bottom** – This is the N terminal for the manifold actuator.

**1.7** Pump connections – Connect Pump Live to the top connection, pump neutral to the bottom. Pump Relay delay settings shown in point 1.9

**1.8** Boiler connections – The boiler connections are volt free. Therefore please connect boiler common to terminal marked COM, and the boiler signal to the terminal marked NO.

**1.9** Pump relay delay. Please refer to jumper switched for adjustment. Select "1" means 3-5mins delay. Select ON means no delay. Factory set is "1".

**1.10** Or and Gr need a link if there is no UFH valve fitted.







## Room sensor enclosure

Purpose-built enclosure designed for use with remote air probes, offering a practical and convenient solution for integrating ambient air temperature sensing with thermostats; making it particularly suitable for use in bathrooms and wet areas.

Product Code	Product Description	Dimensions
TIOENC0001	White sensor enclosure	80x 80 x 22mm
TIOENC0002	Black sensor enclosure	80x 80 x 22mm



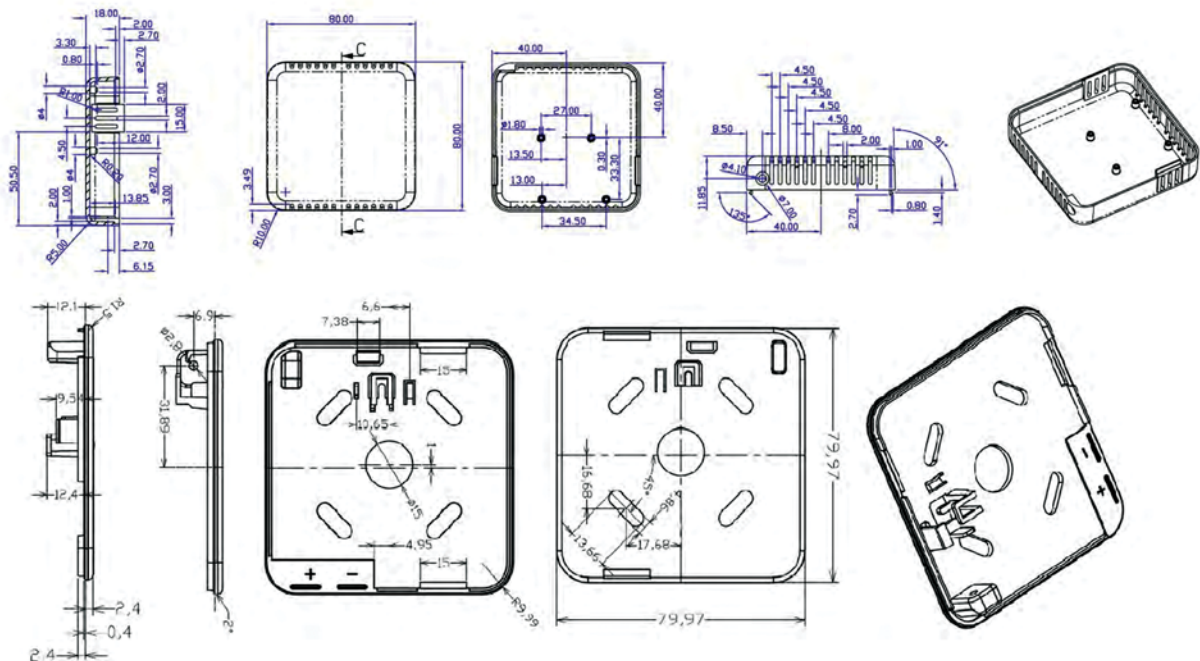
**Enhanced Temperature Sensing:** The empty sensor enclosure enables thermostats to accurately measure and monitor the ambient air temperature within a room, providing precise control of heating and cooling systems.

**Versatile Application:** This enclosure is specifically designed for use in conjunction with remote air probes, allowing for flexible placement and optimal temperature sensing in various indoor environments.

**Compatibility:** The Tio Empty Sensor Enclosure is compatible with Tio Sensor Probes, offering a seamless integration for a comprehensive temperature control system.

**Robust Construction:** Built with durability in mind, this enclosure is designed to withstand the demands of everyday use, ensuring long-lasting performance and reliability.

**Easy Installation:** The enclosure is designed for simple and hassle-free installation, allowing for quick setup and integration with compatible thermostats and sensor probes.



Sensor probe

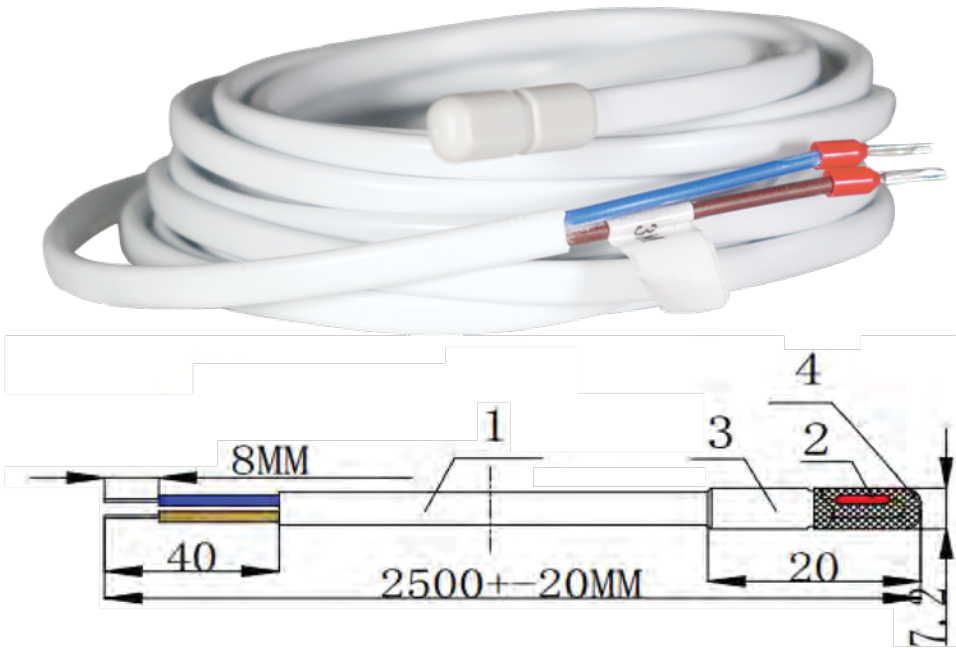
Thermostat floor sensor can be used with any Tio Thermostat to allow more precise floor sensing.

Product Code	Product Description
TIOSEN0001	10k sensor probe for thermostats

Our sensor probes are a temperature measuring and monitoring device, relaying information to a high accuracy.

If the temperature rises, the voltage also increases, followed by a voltage drop between the transistor terminals of base and emitter in a diode.

The resistance across the diode is measured and converted into readable units of temperature (Celsius) and displayed in numeric form.



Number	Part	Materials and Specifications
1	Electrical Wire	White flat sheathed wire 2464 52RVV
2	Resistor	MF58 10K±%1 3977K
3	Probe	ABS 6*7*25

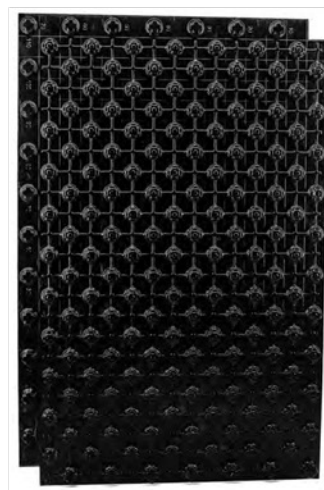


## Castellated Mat

This system mat is designed for running pipe heating loops on the heating surface. Regular, properly shaped and numerous tab ensure fast and firm installation of heating pipes.

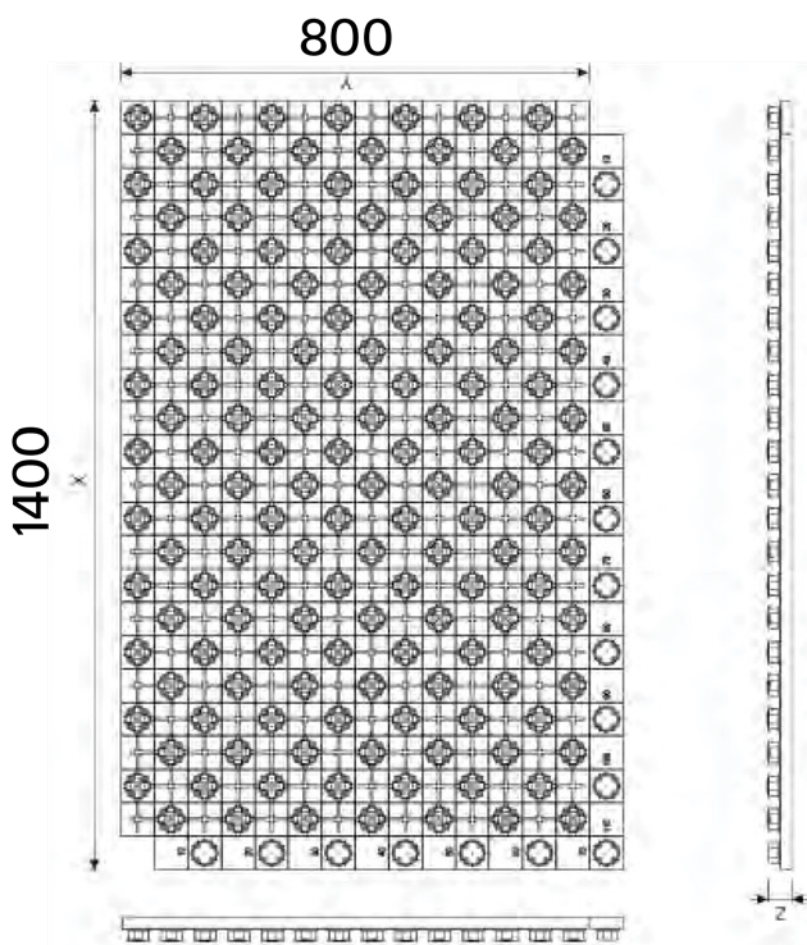
Benefits include:

- Laying the underfloor heating without the use of clips.
- Rigid structure to prevent the pipe from falling out.
- Metric graduation for easy size adjustment.
- The shape of the tab enables a solid mats connection.



Product Code	Product Description	Dimensions
TIOCAS0001	Castellated mat	1400 x 800 x 20mm

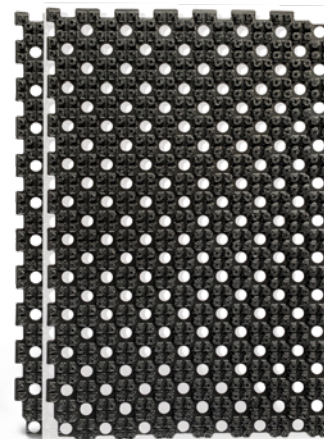
Material	Product dimensions X/ Y/ Z (mm)	Net weight (kg)	Single pack		
			Quantity	Dimensions (mm)	Gross weight (kg)
Polystyrene (PS)	1400 x 800 x 20	1.3	20 pieces	148 x 88 x 22	18.2





## Lowtop Castellated Mat (Adhesive)

Thermoformed and perforated mat for low-profile underfloor heating with the usage of special underlays. This mat allows assembly of a wet-built floor covering up to 3cm high. Our lowtop mat is dedicated to renovated buildings and other buildings where the technical conditions make it impossible to perform underfloor heating in a traditional form.



Product Code	Product Description	Dimensions
TIOCAS0002	Lowtop castellated mat with adhesive	1120 x 730 x 13mm

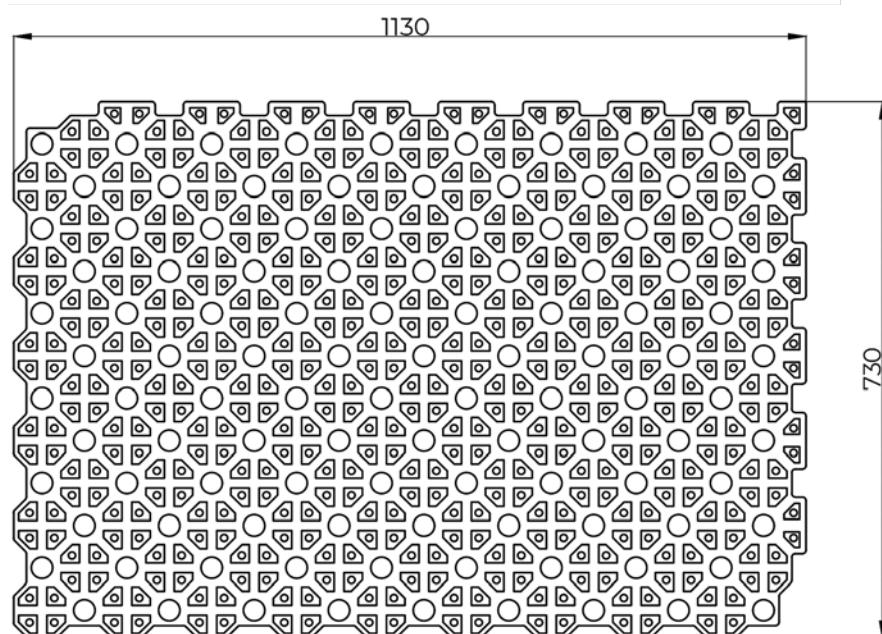
The mat is intended for use on mineral substrates in renovated rooms. These can be cement concrete substrates, anhydrite screeds or existing ceramic floors. Depending on the type of substrate, an appropriate primer should be selected.

### Recommendations:

For absorbent substrates - Baunit Grund

For non-absorbent substrates Baunit SuperPrimer

- Mat size (length x width): 1130 mm x 730 x 13mm
- Effective panel size (length x width): 1115 mm x 715 mm
- Effective area: 0.79m<sup>2</sup>
- Tab height: 15 mm
- Mat thickness: 1 mm
- Permissible size of heating pipes: 12 mm
- Pipe spacing: 5 cm, 10cm, 15 cm, 20 cm (multiple of 5)
- Underfloor heating construction system according to DIN 18560-2: A



The substrate should be properly prepared and sealed. Edge dilatation should be arranged next to the walls. Expansion between rooms as well as dividing larger surfaces may be necessary and depends on the surface of the underfloor heating and the type of floor finish.

### IMPORTANT

The routes and spacing of the pipes, the number and length of the under-floor heating loops as well as the flow settings should result from the calculations included in the underfloor heating design.

After performing the necessary leak test on the installation, perform a self-leveling screed.

LOWTOP mat should be placed parallel to the walls and glued to the base, fastening them to each other in the same row. It is possible thanks to two extreme rows of tabs profiled in a way that enables connection. Mats should be placed only where the underfloor heating pipes will be led.

The pipe should be anchored between the tabs in LOWTOP mats and led parallel or diagonally to the mat edge. For this purpose, you do not need to use special tools or additional mounting accessories. The mat is durable enough to support the weight of the person installing underfloor heating.

### ATTENTION

The underfloor heating loop should be guided in the bifilar system (cochlea). Each of these loops has two turns of the pipe through 180°C. For safety reasons, it is recommended to additionally secure this arc with an assembly hook before making a self-leveling screed, thus preventing the pipe from falling out of the holder before the screed becomes bound.

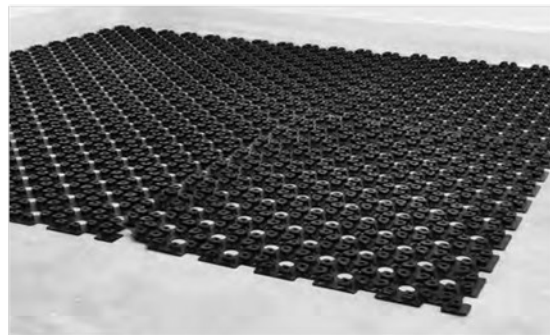


Underfloor heating installation with usage of LOWTOP castellated mat.

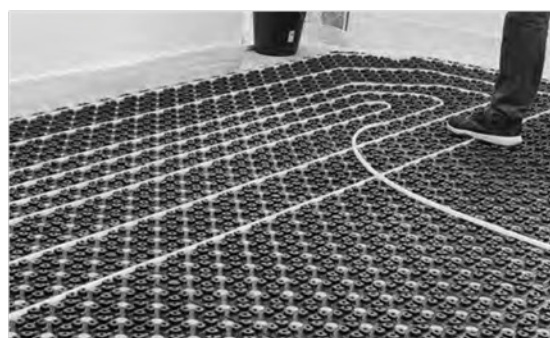
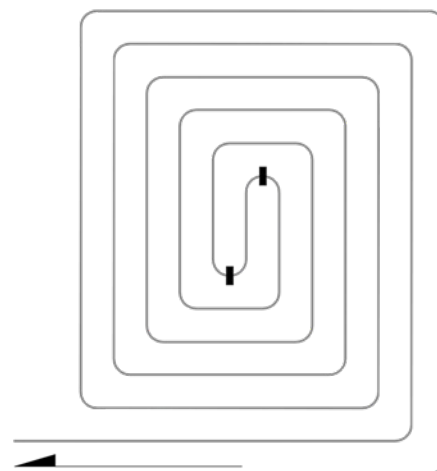
### Screed

The base for the screed must be properly primed and sealed. The holes in the LOWTOP mats allow the material to penetrate into the mineral substrate and bond with it, creating a monolithic whole, which makes it possible to make a 3cm thick screed without the risk of cracks occurring after drying. Flows of the compound into the gaps or cavities may result in the formation of depressions on the surface of the underlay - in order to avoid defects on the surface of the screed, follow the recommendations of the manufacturer of the self-levelling compound.

After full hardening and drying in accordance with the manufacturer's documentation, the screed annealing process should be carried out. The level of moisture in the underlay allows the floor to be finished in accordance with the documentation of the screed manufacturer.



Installation of LOWTOP mats.



Fastening underfloor heating pipe in LOWTOP castellated mat.



Flooding the underfloor heating system self-leveling mass.



## EasyCem TX Leveling Compound

Ideal for application over a wide range of substrates including concrete, sand and cement screeds. Applicable at thicknesses ranging from 5mm to 50mm. EasyCem TX is fast setting and can receive a tiled floor finish after 3 hours or most other types of finish at 24 hours (at 20°C). This product is shrinkage compensated and contains fibre reinforcement, providing the perfect smoothing material for most floor finishes. Perfect for underfloor heating, our leveling compound only requires equal parts water to become highly durable.

Preparation of all common substrates, such as sand / cement screeds, concrete, sound asphalt, calcium sulphate screeds, ceramic, quarry and natural stone tiles, underfloor heating, plywood and limber boards to receive floor finishes.



Product Code	Product Description
TIOCEM0001	Tio EasyCem TX leveling compound - 25kg

### Overview

TIO EASYCEM TX REINFORCED LEVELING COMPOUND is ideal for application over a wide range of substrates including concrete and sand / cement screeds. It can be applied at thicknesses from 5mm to 50mm in one application.

TIO EASYCEM TX is fast setting and can receive a tiled floor finish after 3 hours or most other types of finish at 24 hours (at 20°C).

TIO EASYCEM TX is shrinkage compensated and contains fibre reinforcement providing the perfect smoothing material for most floor finishes.

### Benefits

- Can be applied from 5mm to 50mm in one pour.
- Single part, no additives required, just add water.
- Light foot traffic after 3 hours.
- Protein free.
- Shrinkage compensated.
- Pumpable.
- High durability.
- Suitable for underfloor heating.

### Technical Data

Packaging	25kg lined paper sacks
Water addition	5.8- 6.0L per 25kg unit
Working time	20-30minutes at 20°C
Time to receive tiled floor finishes	3 hours
Time to receive resilient floor finishes	24 hours (3mm application)*
Application thickness	5mm - 50mm in one application
Consumption of powder per mm	1.7kg/mm/m <sup>2</sup>
Compressive strength to BS EN 13892-2	1 day >15.0MPa 7 day >25.0MPa 28 days >35.0MPa
Flexural strength to BS EN 13892-2	1 day >4.0MPa 7 day >6.0MPa 28 days >7.0MPa

### Health & Safety

This product is not classified under the Chemicals Hazard Information and Packaging for Supply Regulations. A Material Safety Data Sheet relating to this product can be obtained from TIO Climate Solutions Ltd. Please dispose of packaging and waste responsibly.

### STORAGE & SHELF LIFE

Six months in unopened bags and stored under good, cool and dry conditions.

### Coverage

Applied thickness	No. of bags required per 100m <sup>2</sup>
3mm	21
6mm	41
12mm	82
30mm	204

### Limitations

The application of our EASYCEM TX REINFORCED LEVELING COMPOUND should only be carried out when the floor temperature is 5 - 30°C and the ambient relative humidity is below 75%. These conditions should be maintained during application and drying. DO NOT USE in areas subject to permanent water immersion.

### Warning

Whilst the information provided in this data sheet is true and accurate to the best of our knowledge, it may contain information which is unsuitable under certain circumstances since materials, site conditions and method of application vary with each application. TIO Climate Solutions Ltd cannot be held responsible for any loss or damage due to incorrect use or from the possibility of variations in working conditions and/or workmanship beyond our control. The user alone is responsible for any consequences deriving from the product.

## Tools Requires

- Steel trowel
- Spiked roller
- Mixing bucket, slow speed drill and paddle (small projects)
- Mixer / pump (high volume applications)

Wash all tools thoroughly with water directly after use.

## SURFACE PREPARATION

Before starting, all substrates must be clean, dry and strong enough to support the weight of the leveller, adhesive and the final covering being applied. Remove all dust, dirt, laitance, oil, grease and other contaminants that may effect adhesion. Where traces of adhesive remain, these must be strong, sound and well adhered to the surface. Sub-floors directly to earth must have a DPM.

## SUBSTRATES

### Concrete/screed:

Ensure that new concrete is confirmed dry via consistent moisture readings across the whole surface. Sand/cement screeds must have a surface relative humidity reading of less than 75% RH before work can commence. If it is a new screed, allow 1 day per mm for drying. Remove any laitance from the surface mechanically and remove all dust and debris, ideally by vacuum.

It is necessary to prime sand/cement screeds to aid adhesion, maintain workability and prevent air bubbles rising to the surface. Very porous substrates will require more than one coat.

### Asphalt/ceramic/quarry/stone tiles:

Make sure surface is clean and free of loose dirt and dust. Prime the surface and mixed with a little cement and sand to form a brush on bonding slurry.

### Plywood/chipboard/floorboards:

Plywood (12mm minimum) and chipboard (18mm minimum), must be exterior grade and screwed (not nailed) to the substrate at 6 inch/ 150mm centres. Existing tongue and groove boards should also be screwed down to the joists at 6 inch 1150mm centres.

Existing tongue and groove boards should also be screwed down to the joists at 6 inch / 150mm centres.

Ensure there is sufficient ventilation beneath the substrate and that the substrate is strong enough to support the weight of the leveller, adhesive and the final covering being applied. Make sure surface is free of loose dirt and dust. Prime plywood, chipboard, floorboards and any exposed edges and joints neatly.

### Calcium sulphate screed:

Ensure that the calcium sulphate screed is confirmed dry via consistent moisture readings across the whole surface. Calcium sulphate screeds must have a surface relative humidity reading of less than 75% RH before work can commence. If it is a new screed, allow 1 day per mm for drying for depths up to 40mm and 2 days per mm thereafter.

Remove any laitance from the surface mechanically and remove all dust and debris ideally by vacuum.

Calcium sulphate screeds must be sealed prior to applying EASYCEM TX by applying one coat primer and allowing to dry, followed by a second coat of neat primer.

### Underfloor heating:

Warm water UFH system - The system must have been fully commissioned, brought up to the maximum temperature and ideally switched off 48 hours before application. In the absence of other heat sources, the UFH may be set to 'cut back' to achieve an air temperature of 15°C. Any expansion or movement joints must be carried through to the floor covering surface.

### Radiant electrical UFH system:

TIO EASYCEM TX Reinforced Leveling Compound can also be used over electrical UFH systems where cables are fitted to a sound, strong, mechanically-fixed cement backer board. Apply primer and allow to dry fully.

EASYCEM TX may also be used where electrical UFH is used over cementitious subfloors. Priming should be as per the substrate. In all cases, EASYCEM TX must be applied at a thickness of 5mm above the cables for resilient, textile and timber applications and a minimum

of 3mm for application of stone, ceramic or porcelain products.

### Power floated concrete:

Ensure the surface has been allowed 7 days to cure. Power floated concrete can leave a loose top layer and/or laitance once it has cured. Remove the loose top layer and any laitance from the surface mechanically and remove all dust and debris ideally by vacuum. Once all laitance and/or loose material have been removed, prime the surface.

### MIXING BY HAND

Slowly mix 25kg of EASYCEM TX powder to 5.8 litres of water. Add the powder slowly to avoid clumping. Continue to mix until a uniform consistency is achieved. Do not exceed the suggested water addition as this will adversely affect strength, surface finish and will extend drying and overlaying times.

When the desired consistency is obtained allow to stand for 2 minutes before remixing prior to application. Ensure that each mix is used within 30 minutes of first mixing.

### MIXING BY PUMP

Mix in accordance with the pump manufacturer's recommendations. The rate of water addition should be adjusted to give a smooth, cohesive mix with no surface bleed or segregation. Carry out flow checks at regular intervals during pumping.

### APPLICATION

Apply by pouring or pumping to the desired thickness and trowel finish to a maximum of 75mm. If greater thickness is required allow to dry between layers of not more than 75mm. EASYCEM TX will begin curing in 1 to 2 hours and should be 'walkable' after approximately 3 hours at 20°C. These times may be decreased by higher temperatures or increased if colder.

EASYCEM TX must be suitably dry before overlaying with floor finishes. Typically this will be after 3 hours for tiles or 24 hours for most other floor finishes. It is the responsibility of the floor finishes applicator to ensure that the residual moisture in the material is suitable.



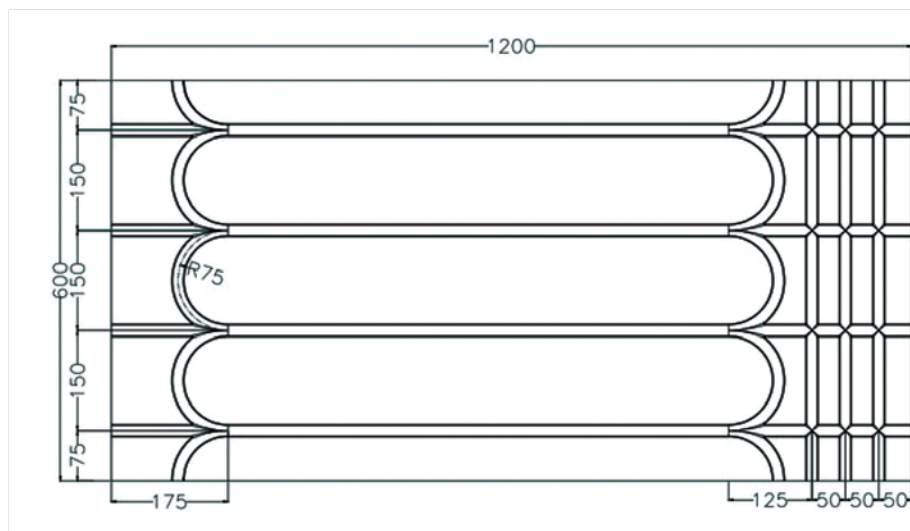
## Expanded Polystyrene Insulation Board with Aluminium Foil

Alu Standard EPS 400 is used as a load-bearing element for pipes in dry underfloor heating systems. Due to the physical characteristics of EPS 400, the product ensures optimal thermal and acoustic insulation simultaneously.

The aluminum foil cover is a radiator, which collects the heat from the side of the pipe and distributes it over the surface of the board.



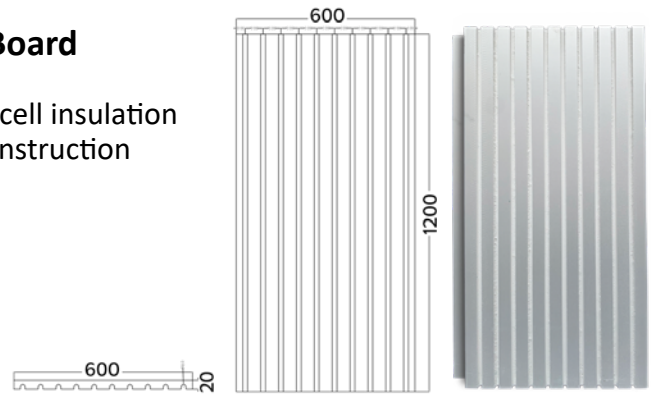
Product Code	Product Description	Dimensions
TIOEPS0001	EPS 400 with aluminium foil	1200 x 600 x 20mm



Model No		TIOEPS0001-EPS400
Product Description		EPS Board with Aluminum Foil
Board size	mm	1200x600x20mm
Material		EPS Insulation Board
Compressive Strength	kPa	400
Thermal conductivity	--	0.0034
Aluminum Foil Thickness		0.2mm
Temperature range	°C	-20 ~ 70
pipe diameter	mm	16
Pipe centres	mm	150
Fire-retardant class		Europe B Class

## Extruded Polystyrene Insulation Transition Board

Extruded Polystyrene, referred to as XPS, is a closed cell insulation product commonly used in re-modelling and new construction applications.

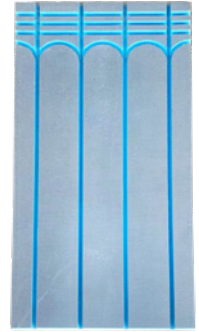


Product Code	Product Description	Dimensions
TIOXPS0001	XPS transition board	1200 x 600 x 20mm

Model No		TIOXPS0001-XPS400
Product Description		XPS Transition Board with 10 Grooves
Board size	mm	1200x600x20mm
Material		XPS Insulation Board
Compressive Strength	kPa	400
Thermal conductivity	--	0.035
Aluminum Foil Thickness		N/M
Temperature range	°C	-20 ~ 70
pipe diameter	mm	16
Pipe centres	mm	60
Fire-retardant class		Europe B Class

## XPS tile backer board for 16mm pipe

Made using high density XPS 400kPa which is thermally insulating, lightweight, waterproof and faced with a reinforced cement coating. The panels provide a quick and easy solution for the placement of pipework for domestic and commercial underfloor heating applications. Providing a robust surface that is ideal for direct bonding of tiles.



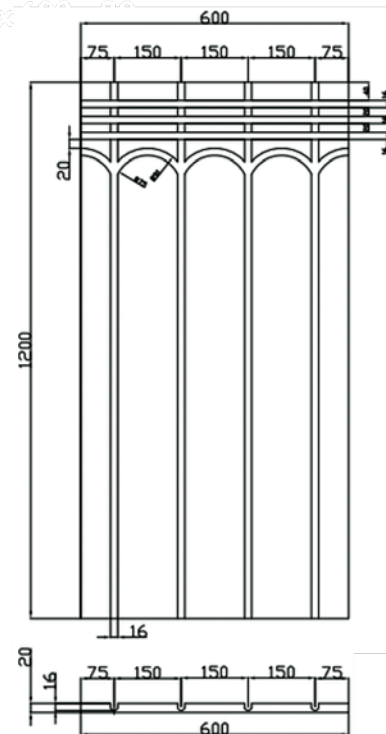
Product Code	Product Description	Dimensions
TIOTBB0001	XPS tile backer board	1200 x 600 x 20mm - 150mm centers

TIOTBB0002

XPS tile backer 200mm centres 1200 x

The panels are ideal for fitting onto solid floors i.e. concrete, screed, asphalt floors, and also suspended timber floors that have been boarded with suitable floor boarding. The routed channels are compatible with most flexible low-pressure underfloor heating pipes.

At the end of each panel is a series of pre formed return loops and 3 x routed channels which allow flexibility and versatility for multiple heated zones to be fitted.



Thermal conductivity, 90 days, 10°C	W/mK	≤0.03
Compressive strength at 10% deflection or yield, (vertical)	kPa	≥400
Bond strength	NS-EN 1489, annex A 6.2	0.3N/mm <sup>2</sup>
Bond strength after 21 days	NS-EN 1489, annex A 6.3	0.2N/mm <sup>2</sup>
Resistance to body impact	ETAG003	3*120Nm
Impact of sound reduction	ISO 140-3:1995+A1:2004	21DB
	ISO 717-1:1996+A1:2006	
Tensile strength	kPa	≥400
Water absorption	Vol-%	≤1.00%
Capillarity	nil	nil
Coefficient of linear thermal expansion	mm/mK	0.07
Temperature limits	°C	-50°C, +80°C
Fire Protection Class		B2
Quality Management System	ISO9001	03615Q20891R1S



## XPS tile backer board for 16mm pipe

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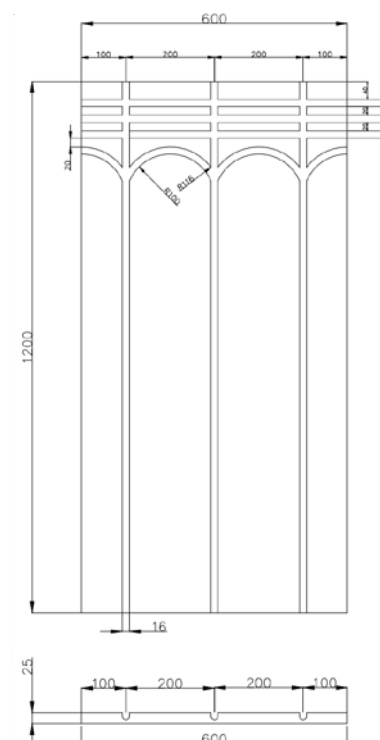


Product Code	Product Description	Dimensions
TiotBB0002	XPS tile backer board	1200 x 600 x 20mm - 200mm

TiotBB0002

The panels are ideal for fitting onto solid floors i.e. concrete, screed, asphalt floors, and also suspended timber floors that have been boarded with suitable floor boarding. The routed channels are compatible with most flexible low-pressure underfloor heating pipes.

At the end of each panel is a series of pre formed return loops and 3 x routed channels which allow flexibility and versatility for multiple heated zones to be fitted.



Thermal conductivity, 90 days, 10°C	W/mK	≤0.03
Compressive strength at 10% deflection or yield, (vertical)	kPa	≥400
Bond strength	NS-EN 1489, annex A 6.2	0.3N/mm <sup>2</sup>
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Impact of sound reduction	ISO 140-3:1995+A1:2004	21DB
	ISO 717-1:1996+A1:2006	
Tensile strength	kPa	≥400
Water absorption	Vol-%	≤1.00%
Capillarity	nil	nil
Coefficient of linear thermal expansion	mm/mK	0.07
Temperature limits	°C	-50°C, +80°C
Fire Protection Class		B2
Quality Management System	ISO9001	03615Q20891R1S

## Expanded Polystyrene Insulation Board with Aluminium Foil

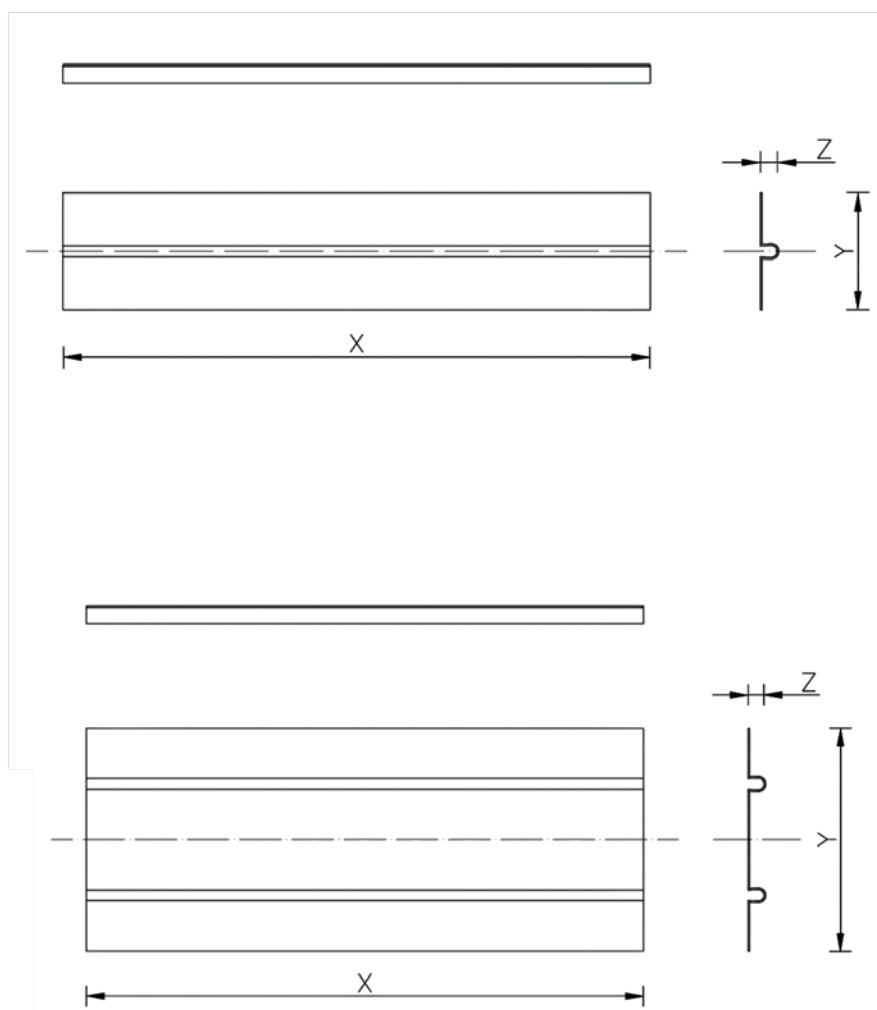
Alu Standard EPS 400 is used as a load-bearing element for pipes in dry underfloor heating systems. Due to the physical characteristics of EPS 400, the product ensures optimal thermal and acoustic insulation simultaneously.

The aluminum foil cover is a radiator, which collects the heat from the side of the pipe and distributes it over the surface of the board.



Product Code	Product Description	Dimensions
TIOPLA0001	Aluminium plate	1000 x 120 x 0.4mm
TIOPLA0002	Aluminium plate	1000 x 390 x 0.4mm

Code	Diameter	INDIVIDUAL PLATE		BOX			PALLET		
		Product dimensions X/Y/Z (mm)	Net weight (g)	Net weight (g)	Dimensions (cm)	Gross weight (kg)	Quantity	Dimensions (cm)	Gross weight (kg)
TIOPLA0001 SINGLE	16	1000 x 120 x 0.40	0.19	64	102 x 36 x 18	12	1536	120 x 80 x 220	303
TIOPLA0002 DOUBLE	16	1000 x 390 x 0.4	0.6	40	102 x 74 x 20	24	480	120 x 80 x 220	308



## 150mm Edge with Tape & Overlap

Edge strip is placed where the screed meets the vertical structural elements. They help compensate for thermal elongations of the heating floor. Our edge strip provides working space for materials that change their volume under the influence of temperature.

Available in 2 different lengths.



Product Code	Product Description	Dimensions
TIOEDG0002	Edge strip with tape and overlap	150 x 8mm - 50m
TIOEDG0003	Edge strip with tape and overlap	150 x 8mm - 25m



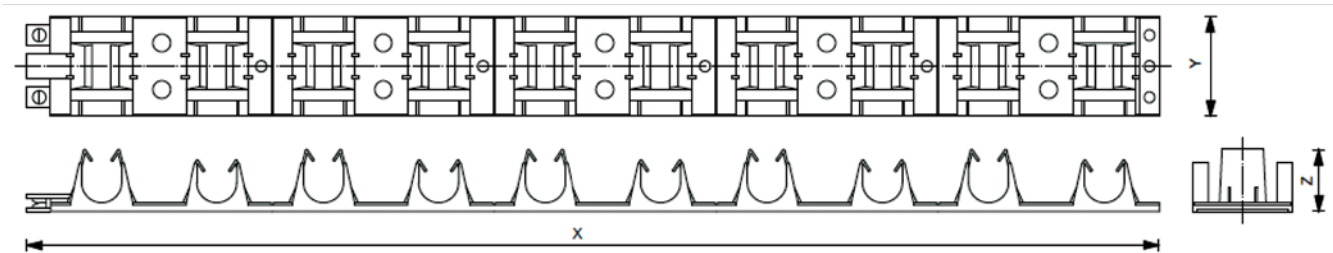
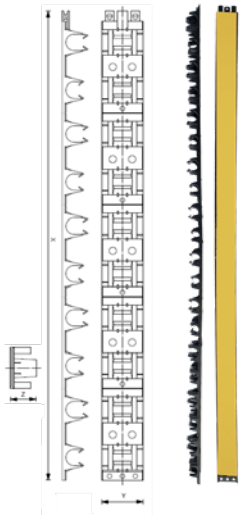


### 1M Clip Rail with Taped Back

Universal rail for mounting underfloor and wall heating systems for use on a large surfaces. Designed for pipes with diameters of 16-18 or 25mm to simplify and shorten the installation time. The rail is available in 1000 mm lengths, consisting of two 500mm sections. Elements can be easily combined with each other.

A sticky-back tape is also used to allow installers to simply stick the rail to a surface in order to fix it's position.

Product Code	Product Description	Dimensions
TIORAI0001	Clip rail with taped back	1000 x 45 x 29mm



## Clip gun

Ergonomic device used for the effective fixing of underfloor heating pipe using clips. The device has an appropriate adjustment system which, protects the clips from falling out and allows to set the force of the arm to return to the base position.



Product Code	Product Description	Dimensions
TIOSPA0001	Tio clip gun	367 x 934 x 62mm

		Single pack		
Model	Net weight (g)	Quantity	Dimensions (cm)	Gross weight (kg)
Mechanical tacker gun	2600	1	36.7 X 93.4 X 6.2	3.3

The Tio Clip Gun is an ergonomic device used for an effective fixing of underfloor heating pipe using clips. Clip gun is dedicated and works perfectly with Tio clips. The available sizes of the clips are: 40, 50 or 60 mm. The device has an appropriate adjustment system which protects the clips from falling out and allows to set the force of the arm returning to the base position. The improved and ergonomic design makes the work even easier.

The advantages of using Tio's Tacker gun:

- Reduced assembly time
- High efficiency and comfort
- Device reliability
- High installation precision
- Ease of usage
- Solid construction high-quality materials ensure long-term
- Use resistance to damages

## Pipe decoiler

Pipe decoiler is used for quick pipe unrolling during the installation of underfloor heating. Facilitating efficient workflow for installers. Can be used with coils up to 600m.



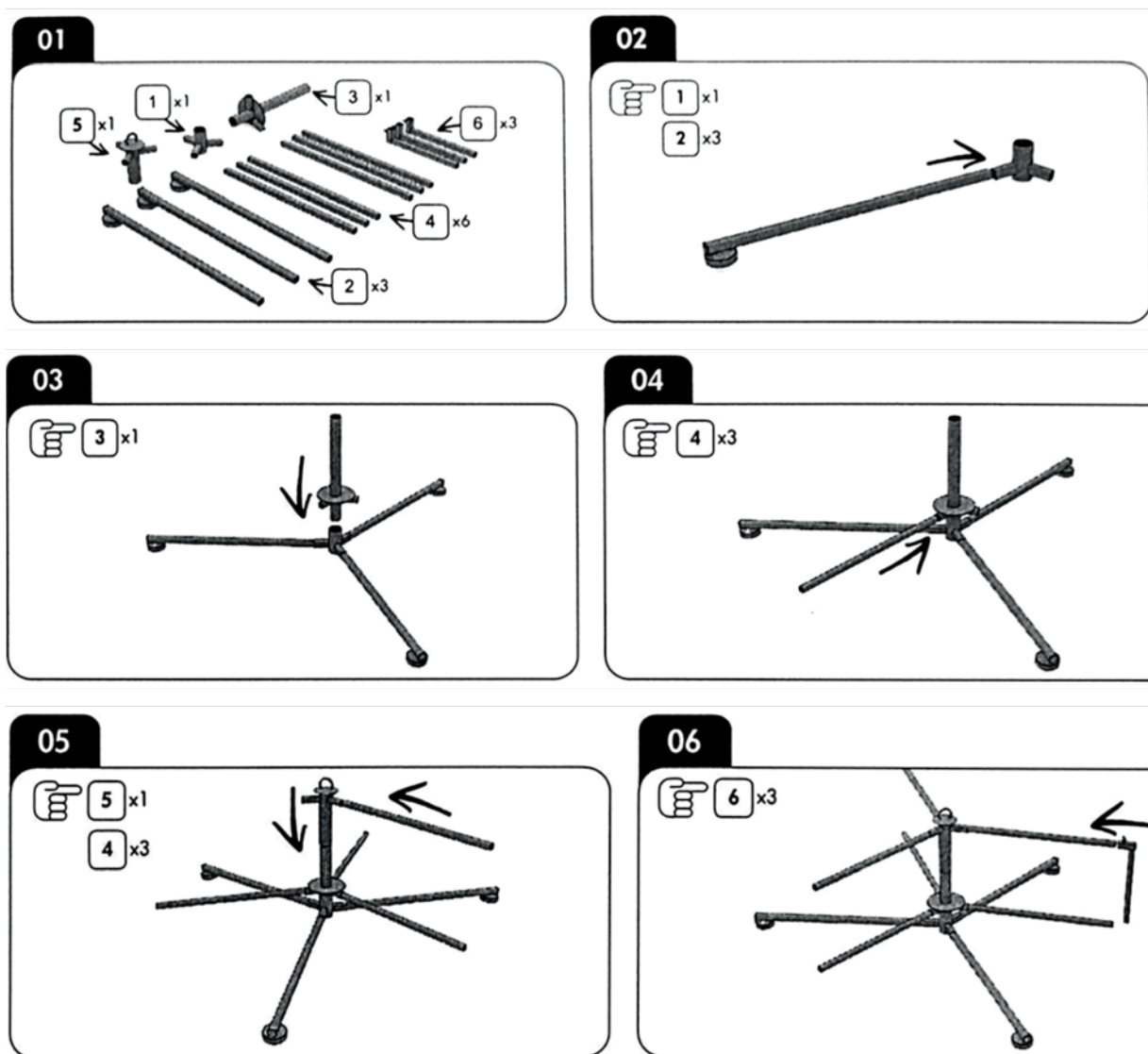
Product Code	Product Description	Dimensions
TIODEC0001	Tio pipe decoiler 7.4kg	590 x 230 x 185mm

The device facilitates and speeds up the work of an installer and increases the comfort of work. Pipe placed on the pipe decoiler is not tangled or crashed equating in quick pipe unrolling during the installation of underfloor heating. The 3 arm design allows for pipe stabilisation and distribution from the unit. Easy assembly and disassembly of the device allows for its quick moving from place to place. This unit can hold up to 300 meters of pipe with ease.

**Diameter when unfolded: 1040 mm (coil support)**  
**1200 mm (diameter at the base)**

**Minimum height: 170 mm**

**Maximum height: 520 mm**



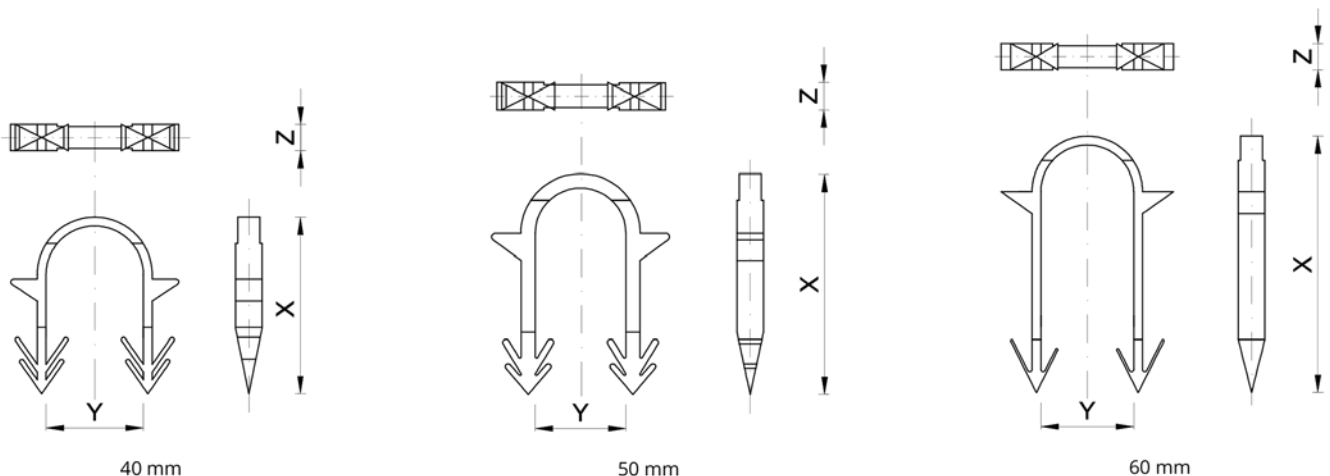
## Pipe clips

Welded tacker staples are used to fasten floor heating pipes to insulating layer. Staples are welded to each other, forming magazines consisting of 25 or 30 pieces. Tacker staples are designed to work with the tacker gun, which simplifies installation and shortens its' time. Length of staples, that should be used for fixing depends on the thickness of an insulation layer applied. The use of a mixture of plastics gives the clips flexibility, which prevents it from breaking during installation.



Product Code	Product Description
TIOCLI0001	40mm pipe clip - box of 300
TIOCLI0002	50mm pipe clip - box of 300
TIOCLI0003	60mm pipe clip - box of 300

					Single pack		
Code	Model	Diameter	Product dimensions X / Y / Z (mm)	Net weight (g)	Quantity	Dimensions (cm)	Gross weight (kg)





### Pipe conduit with slit

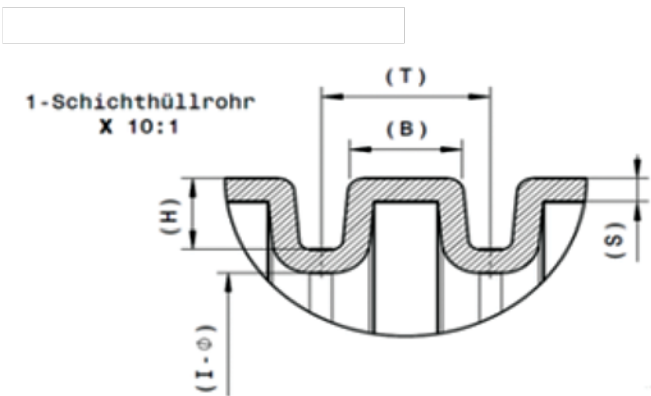
This corrugated conduit is used to isolate underfloor heating flow pipes between the manifold and the subsequent room being heated. It can also be used for general protection for cables for office and private applications.

This one-piece corrugated conduit can be easily retro fitted to an existing pipe. To begin the installation, open the conduit and insert the pipe so that the pipe is covered and the split is closed.



Product Code	Product Description
TIOCON0001	Black pipe conduit - 25m

Outside mm	Insdie mm	Coil Length	Coil weight	Box quantity	Pallet quantity
23.9	19.2	25m	0.90kg	20 coil / 500m	40 coils / 1000m



Schutzrohr-1 Schichten, Anlagen: 451 und 457							
DN	(A-φ)	(I-φ)	(S) min	(T)	(B)	(H)	(Gewicht) ⑤⑥
19	23,9±0,3	19,2±0,3	0,3	3,3	2,2	2,0	



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