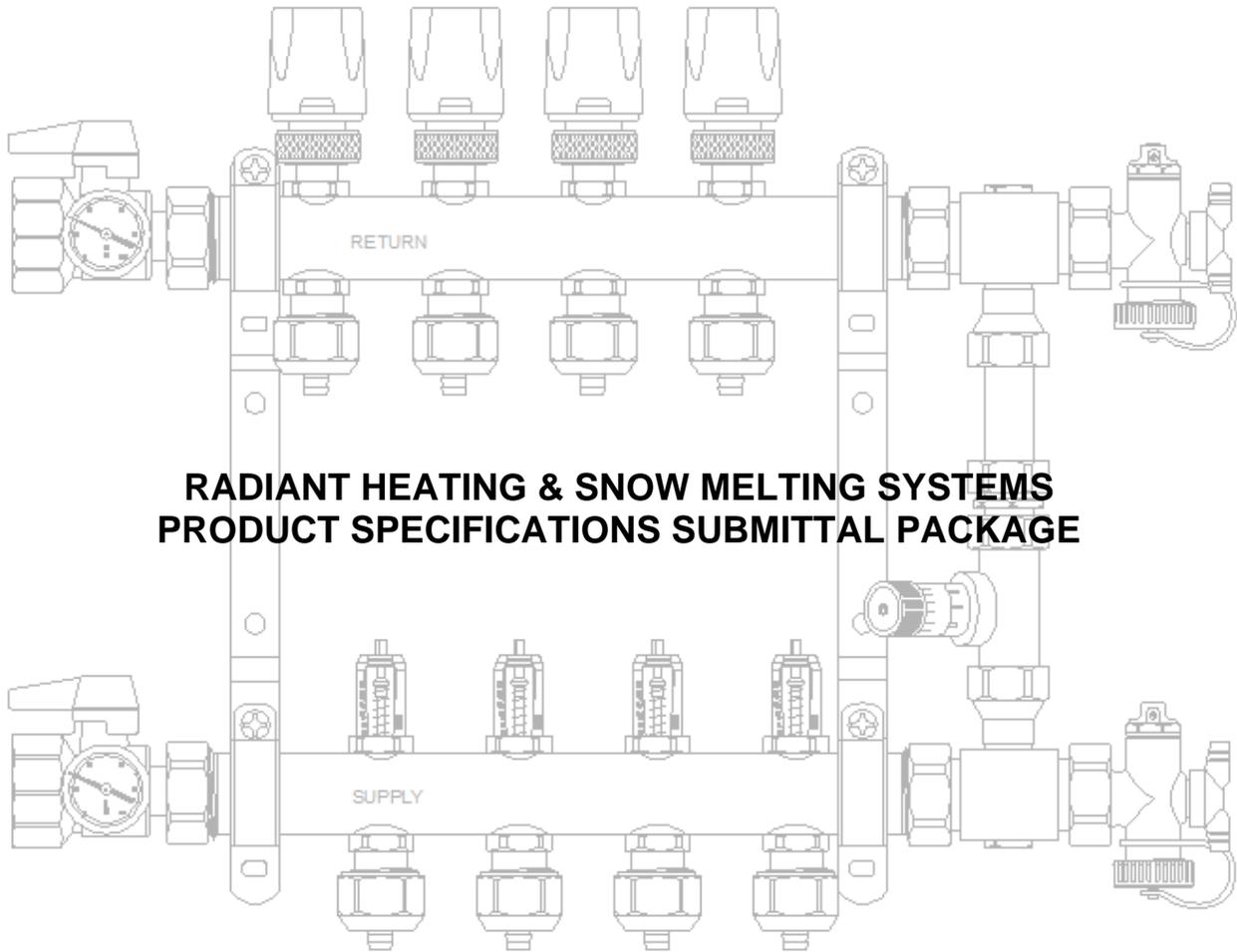




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**RADIANT HEATING & SNOW MELTING SYSTEMS
PRODUCT SPECIFICATIONS SUBMITTAL PACKAGE**

Project: _____
Engineer: _____
Contractor: _____
Submitted by: _____

NOTES

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NOTES



PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Radiant floor heating and snow melting systems for various applications and control strategies, using cross-linked polyethylene (PEX) tubing and appropriate fittings.
- B. Pre-piped mechanical primary, secondary and manifold distribution panels for use in radiant heating and snow melting systems.

1.2 RELATED SECTIONS

- A. Section 02551 – Underground Hydronic Piping
- B. Section 03300 – Concrete
- C. Section 06100 – Rough Carpentry
- D. Section 07210 – Insulation
- E. Section 15093 – Sleeves and Sleeve Seals for HVAC Piping
- F. Section 15181 – Hydronic Piping

1.3 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. Certified to ASTM International by NSF:
 - 1. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing.
 - 2. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot-and Cold-Water Distribution Systems.
- C. Certified to ASTM International, UL, NFPA and ULC by Intertek:
 - 1. ASTM E84, Standard Test Method for Surface Burning Characteristics of Test Materials.
 - 2. ASTM E119, UL 263 and NFPA 251 Fire Tests of Building Construction and Materials.
 - 3. CAN/ULC S101-04, Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. Certified to Canadian Standards Association (CSA) by NSF:
 - 1. CAN/CSA B137.5 Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications.
- E. Certified to International Code Council (ICC) by NSF:
 - 1. International Mechanical Code (IMC)
 - 2. International Building Code (IBC)
- F. Certified to International Association of Plumbing and Mechanical Officials (IAPMO) by NSF:
 - 1. Uniform Mechanical Code (UMC)

- G. German Institute for Standards (Deutsches Institut für Normung e.V., DIN):
 - 1. DIN 4726 Pipelines of Plastic Materials Used in Warm Water Floor Heating Systems; General Requirements
- H. International Association of Plumbing and Mechanical Officials (IAPMO):
 - 1. Certificate of Listing
- I. National Sanitary Foundation (NSF) International:
 - 1. NSF – PW (Potable Water)
 - 2. NSF – RFH (Radiant Floor Heating)
 - 3. NSF CL – TD and CL – R (as specified in NSF Protocol P – 171)
- J. Plastics Pipe Institute (PPI)
 - 1. Technical Report TR – 3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
 - 2. Technical Report TR – 4 Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds
- K. Watts Radiant
 - 1. RadiantPEX Installation Manual
 - 2. Watts Hydronex, ThermalPro and other product Installation and Operating Manuals
 - 3. Watts DesignPro Professional Software

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Cross-linked Polyethylene Tubing (PEX): Standard Grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-3 as listed in TR-4. The following three standard-grade hydrostatic ratings are required:
 - a. 200 degrees F (93 degrees C) at 80 psi (551 kPa).
 - b. 180 degrees F (82 degrees C) at 100 psi (689 kPa).
 - c. 73.4 degrees F (23 degrees C) at 160 psi (1102 kPa).
- B. Performance requirements: Provide hydronic system that is manufactured, fabricated and installed to comply with regulatory agencies and authorities with jurisdiction, and maintain performance criteria stated by the tubing manufacturer without defects, damage, or failure.
 - 1. Cross-linked Polyethylene Tubing (PEX):
 - a. Show compliance with ASTM F877
 - b. Show compliance with DIN 4726 regarding oxygen diffusion concerns where applicable.
 - c. Show compliance with NFPA 90A, CAN/ULC S102 requirements of flame spread/smoke development rating of 25/50 in accordance with ASTM E84 through certification listings with Intertek.
 - d. Show compliance with ASTM E119, UL 263, NFPA 251, and CAN/ULC S101 through certification listings with Intertek:
 - 1) Intertek Design No. WR/WA 60-01: 1 hour wood or steel stud/gypsum wallboard wall assembly.
 - 2) Intertek Design No. WR/FCA 60-01: 1 hour wood frame floor/ceiling assembly
 - 3) Intertek Design No. WR/FCA 120-01: 2 hour concrete floor/ceiling assembly

1.5 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product submittal data and installation instructions for each product.
- C. Provide mechanical schematic indicating mechanical piping and accessories from heat source to manifolds, circulators, water tempering, and zone controls as supplied by Watts. Indicate supply water temperatures and flow rates to manifolds
- D. Shop Drawings – Hydronic System
 - 1. Provide engineering analysis using manufacturer's proprietary software.
 - 2. Provide installation drawings indicating tubing layout, manifold locations, zoning requirements, and manifold schedules with details required for installation of the system.
 - 3. Indicate supply water temperatures and flow rates to manifolds.
- E. Documentation:
 - 1. Provide manufacturer's detailed instructions for site preparation and product installation.
 - 2. Provide manufacturer's electrical power requirements and heat output in watts delivered to the structure.
 - 3. Provide documentation indicating the installer is trained to install the manufacturer's products, as needed.
- F. Quality Assurance and Control Submittals:
 - 1. Upon request, submit test reports from recognized testing laboratories.
- G. Closeout Submittals – Submit the following:
 - 1. Warranty documents specified
 - 2. Operation and maintenance data
 - 3. Manufacturer's field reports as specified in this document
 - 4. Final as-built tubing layout drawing

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturer shall have a minimum of ten years experience in similar systems.
 - 2. Manufacturer shall provide products of consistent quality in appearance and physical properties.
 - 3. Manufacturer shall use the highest quality products in the production of systems and components referenced in this document.
 - 4. Materials shall be from a single manufacturer to ensure consistent quality and compatibility.
- B. Installer Qualifications:
 - 1. Use an installer with demonstrated experience on projects of similar size and complexity and/or documentation proving successful completion of familiarization training hosted/approved in writing by the system manufacturer.
 - 2. Electrical rough-in and connections shall be done by a licensed electrician.
- C. Certifications: Provide letters of certification as follows:
 - 1. Installer employs skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed trades person.

- D. Pre-installation meetings
 - 1. Verify project requirements, substrate conditions, excavation conditions, system performance requirements, coverings, manufacturer's installation instructions, and warranty requirements.
 - 2. Review project construction timeline to ensure compliance or discuss modifications as required.
 - 3. Coordinate with other trade representatives to verify areas of responsibility.
 - 4. Establish the frequency (during construction phase of the project) the engineer intends for site visits and inspections by the manufacturer's representative.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer:
 - 1. Store all products in cartons and under cover to avoid dirt or foreign material from entering or damaging the tubing and other products.
 - 2. Do not expose tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover the tubing that is exposed to direct sunlight.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Mortar-set Systems: Mortar shall cure for 25 days (or time specified by mortar manufacturer) prior to starting heating systems.

1.9 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty – Hydronic Systems
 - 1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
 - 2. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
 - a. Warranty covers the repair or replacement of any tubing, panels or fittings proven defective.
 - b. Warranty may transfer to subsequent owners.
 - c. Warranty Period for Tubing is 25-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion.
 - d. Warranty Period for Manifolds and Fittings is 2-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion.

- e. Warranty period for Controls and Electrical components is a 2-year, non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion.

1.10 SYSTEM START-UP

- A. Do not start the radiant slab system for a minimum of 25 days or as specified by mortar, concrete and/or covering manufacturer as applicable.
- B. Verify all electrical components are installed per local and National Electrical Code (NEC) prior to start-up.

1.11 OWNER'S INSTRUCTIONS

- A. Instruct Owner about operation and maintenance of installed system.
- B. Provide Owner with manufacturer's installation instructions for installed components within the system.
- C. Provide Owner with all operating instructions/documents for sensors and controls.
- D. Provide Owner with copies of any detailed layout drawings and photos of installed product before coverings are installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - Watts Water Technologies (Canada) Inc.
 - 5435 North Service Road
 - Burlington, ON L7L 5H7
 - Phone: 905-332-40900; Fax: 905-332-7068
 - Web: <http://www.wattscanada.ca>

- B. Substitutions: not permitted

- 2.2 Provide radiant tubing in lengths and locations as indicated, with capacities, sizes, spacing, and depths as indicated on drawings, schedules, and/or RadiantPro™ Design software computer printout. Tubing installed shall be Watts cross-linked polyethylene tubing as per the manufacturer's installation instructions.

2.3 RADIANT TUBING

- A. Material:
 - 1. Cross-linked polyethylene (PEX)
 - 2. Manufactured by Silane method to ensure the highest level of oxidation protection.
- B. Material Standard:
 - 1. Manufactured in accordance with ASTM F876 and ASTM F877
 - 2. Tested for compliance by an independent third-party agency.
- C. Pressure Ratings:
 - 1. Standard Grade hydrostatic design
 - 2. Pressure ratings as issued by the Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry (SPI).

- D. Temperature/Pressure Ratings: shall be capable of withstanding temperatures of:
 - 1. 73.4°F (23°C) at 160 psi (1.10 MPa)
 - 2. 180°F (82.2°C) at 100 psi (0.69 MPa)
 - 3. 200°F (93.3°C) at 80 psi (0.55 MPa).
- E. Minimum Bend Radius (Cold Bending):
 - 1. No less than eight times the outside diameter.
 - 2. Use the tubing manufacturer's bend supports if radius is less than stated.
- F. Barrier Tubing Type: Watts Radiant RadiantPEX
 - 1. Oxygen Diffusion Barrier
 - a. Tubing has an oxygen diffusion barrier shall not exceed an oxygen diffusion rate of 0.10 g/cubic meter (.000062 lb/cu. ft.) per day at 40 degrees C (104 degrees F) water temperature in accordance with German DIN 4726.
 - 2. Nominal Inside Diameter: Provide tubing with nominal inside diameter in accordance with ASTM F876, as indicated:
 - a. $\frac{3}{8}$ inch (9.53 mm)
 - b. $\frac{1}{2}$ inch (12.7 mm)
 - c. $\frac{5}{8}$ inch (15.88 mm)
 - d. $\frac{3}{4}$ inch (19.05 mm)
 - e. 1 inch (25.4 mm)

2.4 MANIFOLDS AND FITTINGS

- A. Manifolds (Residential and light Commercial, Stainless Steel)
 - 1. For system compatibility, use 1" standard or Hi-Flow 1½" (25 – 38mm) Watts Stainless Steel manifolds offered by the tubing manufacturer.
 - 2. Manifolds shall provide individual flow control for each loop of the manifold through valve actuators available from the manifold supplier.
 - 3. Manifolds shall feature manual flow balancing capability within the manifold body for balancing unequal loop lengths across the manifold.
 - 4. Manifolds shall incorporate a combination flow indicator/shut off valve
 - 5. Manifolds accommodate $\frac{3}{8}$ - $\frac{3}{4}$ " (9.5 – 19 mm) RadiantPEX tubing.
 - 6. Each manifold location shall have the ability to vent air manually from the system.
 - 7. Stainless Steel 1" (25 mm) Manifolds
 - a. Heavy-duty, DIN Standard, 304 stainless steel
 - b. Matching fittings and accessories are made of solid brass and are heavily plated with nickel to match the appearance of the manifold trunk.
 - c. Internal balancing valves
 - d. 0 - 2gpm (0 – 0.13 L/sec) flow meters
 - e. Manifold brackets
 - f. All connections are BSP (British Standard Pipe) or straight thread and require the use of the included gasket.
 - g. Tube connectors shall be T-20 $\frac{3}{4}$ " euro cone compression style fittings
 - h. 2½" (55 mm) OC circuit spacing
 - i. 12 gpm (.75 L/sec) maximum flow rate
 - j. 194°F (90°C) maximum operating temperature
 - k. 87 psi (600 kPa) maximum operating pressure
 - l. 2 gpm (0.16 L/sec) per circuit maximum flow rate
 - m. Each manifold location shall include a vent and purge assembly consisting of a ½" drain valve and 3/8" manual air vent.
 - n. Each manifold location shall include a 1" trunk isolation valve set with one red handle and one blue handle nickel plated brass ball valve FBSP x FNPT and two water temperature gauges.

8. Stainless Steel 1½" (38 mm) Manifolds
 - a. Heavy-duty, DIN Standard, 304 stainless steel
 - b. Matching fittings and accessories are made of solid brass and are heavily plated with nickel to match the appearance of the manifold trunk.
 - c. Internal balancing valves
 - d. 0 - 4 gpm (0 – 0.25 L/sec) flow meters
 - e. Manifold brackets
 - f. All connections are BSP (British Standard Pipe) or straight thread and require the use of the included gasket.
 - g. Tube connectors shall be T-20 ¾" euro cone compression style fittings
 - h. 2⅞" (55 mm) OC circuit spacing
 - i. 22 gpm (1.4 L/sec) maximum flow rate
 - j. 194°F (90°C) maximum operating temperature
 - k. 87 psi (600 kPa) maximum operating pressure
 - l. 4 gpm (0.25 L/sec) per circuit maximum flow rate
 - m. Each manifold location shall include a vent and purge assembly consisting of a 1/2" drain valve and 3/8" manual air vent.
 - n. Each manifold location shall include a 1-1/4" or 1-1/2" trunk isolation valve set (sized as required) with one red handle and one blue handle nickel plated brass ball valve FBSP x FNPT and two water temperature gauges.

- B. Manifold Mounting Boxes
 1. Sizes – Watts Radiant manifold mounting boxes come in 3 sizes:
 - a. 15¾" by 28½" by 4¼" (400mm by 724 mm by 108 mm) For maximum 3-loops
 - b. 24½" by 28½" by 4⅜" (622mm by 724 mm by 111 mm) For maximum 7-loops
 - c. 39½" by 28½" by 4⅜" (1003mm by 724 mm by 111 mm) For maximum 12-loops
 2. Each box shall be designed to be recessed into a 4" or 6" (102 mm or 152 mm) stud wall.
 3. Each manifold box is constructed of powder-coated sheet metal, providing increased resistance to corrosion and job-site abuse.
 4. Inside Manifold Mounting Brackets:
 - a. Manifold boxes come with 2 fixed horizontal attachment rails and 2 adjustable rails.
 - b. Each Watts Radiant manifold option will utilize different rail positions, depending on the bracket used.

- C. Fittings
 1. For system compatibility, use fittings offered by the tubing manufacturer.
 - a. The fitting assembly shall comply with ASTM F877 and CAN/CSA B137.5 requirements.
 - b. Fittings shall be designed to work with either ASTM F1807 CrimpRings or ASTM F2098 CinchClamps or a Compression ferrule, and are designed to be used with ASTM F876 (SDR-9) rated PEX tubing.
 - c. Available connections:
 - 1) Sweat
 - 2) NPT
 - 3) BSP
 - d. Material:
 - 1) UNS 31400 Copper Alloy
 - 2) UNS 36000 Copper Alloy
 - 3) UNS 37700 Copper Alloy

2.5 SUPPLY AND RETURN PIPING

- A. Supply-and-Return Piping to the Manifolds (above ground piping):
 - 1. Properly size supply and return distribution piping for the given volume and velocities required at system design.
 - 2. Use compatible distribution pipe material for all supply fluid temperatures and flows requirements of the system.
 - a. When using Watts RadiantPEX tubing, do not exceed 200 degrees F (93 degrees C) at 80 psi (551 kPa).
 - 3. Use Watts R-Flex distribution piping material where an insulated pipe is required to reduce heat loss from supply and return piping.
 - 4. Do not expose Watts RadiantPEX or Watts WaterPEX tubing to direct sunlight.
 - a. Where PEX tubing is exposed, install suitable pipe insulation around the exposed tubing.
 - 5. Use fittings compatible with piping material. Fittings shall transition from distribution piping to system manifolds.
- B. Supply and Return Piping to the Manifolds (below ground piping):
 - 1. Properly size supply and return distribution piping for the given volume and velocities required at system design.
 - 2. Use compatible distribution piping material for all supply fluid temperatures and flows requirements of the system.
 - a. When using Watts RadiantPEX tubing, do not exceed 200 degrees F (93 degrees C) at 80 psi (551 kPa).
 - 3. Use Watts R-Flex distribution piping material where an insulated pipe is required to reduce heat loss from supply and return piping.
 - 4. Use fittings compatible with piping material. Fittings shall transition from distribution piping to system manifolds.

2.6 ROOM TEMPERATURE CONTROLS

- A. Room Temperature Controls:
 - 1. Thermostat: DualTemp, air/floor, digital, 24V
 - 2. Thermostat: DualTemp, air/floor, digital, battery
 - 3. Thermostat: Digital, programmable, air, 24V
 - 4. All thermostats shall operate within a one degree differential temperature incorporating pulse-width modulation action.
 - 5. Install a Watts Radiant Thermostat with digital display in each room or zone as required.
 - a. The Watts Radiant DualTemp thermostat shall have the ability to sense the temperature of the air, floor, or a combination of air and floor.
 - b. Each DualTemp shall be equipped with an internal air sensor.
 - 6. For multiple-zoning control, install the loop(s) per zone and install the individual valve actuators on the respective loop(s) at the manifold.
 - a. Electro-thermal Actuators
 - 1) Watts Radiant Thermal Actuators are a two-wire without end switch or four-wire with end switch actuator designed for use with Watts Radiant Stainless Steel manifolds.
 - (a) Actuators are normally closed and will open when power is applied.
 - (b) Actuators shall consume no more than 2.5 watts.
 - (c) Travel time for the actuators is approximately 90 seconds to close the end switch.
 - b. Zone Valve Actuator Control Module: Zone valve actuator controls operate zone valves or circuit thermal actuators by supplying 24VAC.

- 1) No more than three 2.5 VA actuator valves can be connected to any single zone terminal block.
- 2) The control system shall be designed for use with the following models of thermostats:
 - (a) Watts Radiant DualTemp (3 or 4 wire)
 - (b) Watts Radiant Air Only thermostats
 - (c) Use only Watts Radiant non-programmable thermostat if using Optional Timer
 - (d) Any 2 wire thermostats with internal battery power
 - (e) 2 wire thermostats that consume power shall not be used, as damage to either the thermostat or controller may occur.
 - (1) Never connect a power consuming 2 wire thermostat to the control as damage to the thermostat and/or control may occur.
- 3) External 24/120 VAC transformer (not included) is required to operate these controls.
 - (a) A 40 VA transformer for a maximum of 12 actuators
 - (b) A 60 VA transformer for a maximum of 18 actuators
- 4) Master Controls:
 - (a) Equipped with valve and thermostat terminals
 - (b) Incoming 24 volt power connection
 - (c) Two 8 amp, dry contact terminals for pump and boiler operation
 - (1) With end-switch capability, the Zone Control Module activates other relays or controls as required by system control strategy.
 - (2) Control does not use the end-switch wires of a 4 wire actuator
 - (3) Both 2 wire and 4 wire actuators may be used.
- 5) Slave Controls:
 - (a) The use of Slave units allows the control of more zones utilizing the same pump and boiler.
 - (b) Up to 2 Slave controls can connect to a Master
 - (1) Allows for a maximum of 18 separate zones or thermostat connections
 - (2) Both 2 wire and 4 wire actuators may be used.

2.7 HYDRONEX MECHANICAL PANELS

- A. Mechanical Panels shall be pre-wired, factory-built, factory-tested and factory-warranted two (2) years when a panel registration card is returned by the installing contractor.
 1. Panels shall be pre-wired with 9 ft (3 m) power supply cord.
- B. HydroNex panels:
 1. Primary Panels form the foundation of the primary loop. Primary panels are designed to supply boiler water to down-stream panels, which will in turn distribute boiler or mixed-temperature water to the radiant or other hydronic heating zones.
 - a. Primary Panels include the following:
 - 1) 1¼" (32 mm) copper primary loop
 - 2) Micro-bubble air remover
 - 3) Provide essential service and monitoring capabilities
 - 4) Wall-mounted, powder-coated white front cover and back plate
 - 5) Pre-wired circulators and controls
 - 6) CAT-5 wiring for inter-panel communication
 - 7) Single-union connection between panels
 - 8) Integrated leveling system with Z-bracket for simplified mounting
 - 9) Options of manual or automatic fill assembly
 - 10) Option to include outdoor reset functions
 - 11) Option to include Domestic Hot Water with priority
 - 12) Expansion tank connection kit. NOTE: Expansion tank NOT included.

2. Distribution Panels form the distribution center of the hydronic system. Distribution Panels are designed to provide either high and/or mixed-temperature fluid to a variety of hydronic applications such as indirect water heaters, fancoils, baseboards, kick-space heaters and radiant zones.
 - a. Distribution Panels include the following:
 - 1) Wall-mounted powder-coated white front cover and back plate
 - 2) Pre-wired circulators/zone valves and controls
 - 3) CAT-5 wiring for inter-panel communication
 - 4) Single-union connection between panels
 - 5) Integrated leveling system with Z-bracket for simplified mounting
 - 6) Secondary temperature options include:
 - (a) Direct: no mixing/direct piping panels
 - (b) DMix: thermostatic mix valve panels (up to 3 zones)
 - (c) DMix Hybrid: combination mix valve/direct piping panels
 - (d) DVIP: variable speed injection pump panels (up to 5 zones)
 - (e) DVIP Hybrid: variable speed injection pump/direct piping panels
 - (f) DVIP Zone: pump and zone-valve options available for zone distribution on injection panels
 - (g) DHX: heat exchanger panels for snow-melt systems or other systems that require fluid isolation
 - 7) Zone supply sizes vary depending on panel type, please consult manufacturer's literature.
 - 8) Capability to support Domestic Hot Water priority
 - 9) Isolation capability for the pumps
 - 10) Consult manufacturer's catalog for further information
3. Zone Panels are zone specific distribution panels. They are often the final point of distribution in a hydronic system. All Zone Panels shall include 1" (25 mm) stainless steel manifolds to distribute water to radiant circuits, baseboard or other single temperature hydronic equipment.
 - a. Zone panels include the following:
 - 1) Basic: 1" (25 mm) stainless steel manifold, 2-12 zones available
 - 2) Pump: Pre-wired zone pump (2-7 zones)
 - 3) Pump with Mix: Pre-wired zone pump and mix valve (2-7 zones), 1" (25 mm) stainless steel manifold
 - 4) All types are available with pre-wired thermal actuators.
 - 5) Wall enclosure with lockable access cover
4. Condensing boiler panels are a dedicated series designed to solve specific mechanical needs. These solutions may or may not directly incorporate other HydroNex panels.
 - a. Condensing Boiler Panel: This stand-alone panel is designed specifically to interface with most condensing boilers. It conditions and distributes boiler water to any hydronic application, including prioritized domestic hot water.
 - b. Condensing Boiler Panels include the following:
 - 1) Condensing Boiler Panel, Type 1: equipped with a primary, zone, and domestic water circulators
 - 2) Condensing Boiler Panel, Type 3: equipped with a zone circulator only – primary and domestic water (if necessary) are provided with the heat source
 - 3) Manifold, 1½" (38 mm) stainless steel distribution manifold (4, 5, 6, and 8 circuit)
 - 4) Air remover, auto or manual fill, expansion tank connection point and kit
 - 5) Pressure differential by-pass valve
 - 6) Service valves and temperature gauges
 - 7) Wall-mounted powder-coated white front cover and back plate
 - 8) Integrated leveling system with Z-bracket for simplified mounting

5. The Geothermal panel is designed to control geothermal heat sources utilizing water storage tanks and integrate them into a HydroNex system. This panel will cycle up to 3 heat pumps to ensure that the set point is maintained. Outdoor reset functionality is built into the panel to maximize efficiency.
 - a. Geothermal Panels are available in the following configurations:
 - 1) Geo 1: designed to be used with a single geothermal unit
 - 2) Geo 2: designed to be used with 2 geothermal heat sources
 - 3) Geo 3: designed to be used with 3 geothermal heat sources
 - b. Geothermal Panels include the following:
 - 1) Pre-wired circulators, solenoid valve and controls
 - 2) Outdoor reset control – improves efficiency, stages and cycles up to 3 heat pumps
 - 3) Wall- mounted powder-coated white front cover and back plate
 - 4) CAT-5 wiring for inter-panel communication
 - 5) Single-union connection between panels
 - 6) Integrated leveling system with Z-bracket for simplified mounting
 - 7) Check valves, isolation valves, temperature and pressure gauges
 - 8) Suitable for use with up to 6 ton water-to-water geothermal heat pumps
6. The Source Select panel is designed to control two independent heat sources. The primary source, usually solar or geothermal, must utilize a water storage or buffer tank. Typically, this panel is used when trying to maximize heat source efficiency, so that the more economical source (normally alternative energy) is prioritized when available. In the event the primary heat source is unable to satisfy the system load, the Source Select panel will use the secondary source until the primary source has been replenished.
 - a. Source Select panels are available in the following configurations:
 - 1) Type 1: equipped with setpoint control
 - 2) Type 2: equipped with variable speed injection control for Primary heat source and outdoor reset functionality
 - 3) Type 3: equipped with variable speed injection control for Primary and Secondary heat source and outdoor reset functionality

2.8 THERMALPRO MECHANICAL PANELS

- A. Mechanical Panels shall be factory-built, factory-tested and factory-warranted for 5 years when installed by a factory-certified installer, or 2 years when a panel registration card is returned by the installing contractor.
- B. ThermalPro™ Non-Mixed Boiler Station:
 1. Non-Mixed Boiler Station designed to supply boiler water to down-stream panels, which will in turn distribute boiler temperature water to the hydronic heating zones.
 - a. Non-mixed boiler stations are pre-piped mechanical system complete with circulator, isolation ball valves, supply and return thermometers, pressure bypass valve and control sensor wells. The unit shall include an insulating jacket and cover. For multiple station installation use the necessary ThermalPro station headers.
- C. ThermalPro™ Mixed Boiler Station:
 1. Mixed Boiler Station designed to supply boiler water to down-stream panels, which will in turn distribute mixed-temperature water to the radiant or other hydronic heating zones.
 - a. Mixed boiler stations are pre-piped mechanical system complete with circulator, 3-way mixing valve, 24Volt motor, isolation ball valves, supply and return thermometers, pressure bypass valve and control sensor wells. The unit shall include an insulating jacket and cover. For multiple station installation use the necessary ThermalPro station headers.

- D. ThermalPro™ Manifold Mixing Module:
 - 1. Manifold Mixing Module shall connect directly to the Watt stainless steel manifolds and supply mixed water temperature to the radiant or other hydronic heating zones.
 - a. Manifold mixing modules are pre-piped mechanical system complete with circulator, 3-way mixing valve and 24Volt motor.
- E. ThermalPro™ Mixed Isotherm Manifold Distribution Station:
 - 1. Station designed to supply mixed-temperature water to the radiant heating system zones, sized as per requirements.
 - a. Isotherm Mixed Manifold Distribution stations are pre-piped with pre-wired pump, thermostatic mixing valve, mounting cabinet, stainless steel manifold (1" or Hi-flow), optional 24Volt actuator motors and zone control module.
- F. ThermalPro™ 24Volt Mixed Manifold Distribution Station:
 - 1. Station designed to supply mixed-temperature water to the radiant heating system zones sized as per requirements.
 - a. ThermalPro Mixing Module Manifold Distribution stations are pre-piped with pre-wired pump, 3-way mixing valve, 24Volt mixing valve motor, mounting cabinet, stainless steel manifold (1" or Hi-flow), optional 24Volt actuator motors and zone control module. Mixing valve control supplied separately.
- G. ThermalPro™ Non-Mixed Manifold Distribution Station:
 - 1. Station designed to supply non-mixed temperature water to the radiant heating system zones sized as per requirements.
 - a. ThermalPro™ Non-Mixed Manifold Distribution stations are pre-piped with pre-wired pump, mounting cabinet, stainless steel manifold (1" or Hi-flow), optional 24Volt actuator motors and zone control module.

2.9 HYDRONIC RADIANT SNOW MELTING CONTROLS

- A. Use sensors/controls provided by manufacturer:
 - 1. HSC-5 Snow Melting Slab Detector
 - a. Slab / Pavement mounted
 - b. Senses actual pavement conditions
 - c. Microprocessor control eliminates ice-bridging
 - d. Provides a low-amperage output relay contact
 - e. Heavy-duty machined brass housing
 - f. Removable top cover
 - g. Plug-in electronic assembly
 - h. 24 VAC

2.10 ACCESSORIES

- A. Provide accessories associated with the installation of the radiant heating system as recommended by or available from the tubing manufacturer.
 - 1. IsoTherm: The IsoTherm provides mixing control and zone pumping all in a compact, unique package that conveniently connects directly to Watts Radiant Stainless Steel manifolds.
 - a. The IsoTherm module includes the following items:
 - 1) Mix Valve
 - 2) 3 speed 1/25 hp Circulator
 - 3) Temperature Gauge
 - 4) Maximum Temperature Sensor
 - 5) Trunk Isolation Valves
 - 6) BSP to NPT Transition Nipple

- b. Mounting:
 - 1) The IsoTherm can be wall mounted with standard clamps or other copper pipe mounted brackets.
 - 2) The IsoTherm can be integrated into a standard Watts Radiant manifold box.
- c. Capacity:
 - 1) Full heat capacity of 51,000 BTU/h with a minimum boiler temperature of 158°F (70°C).
2. Pressure Differential By-pass Valve (for use with 1" Stainless Steel Manifolds only):
 - a. Use Watts Radiant Pressure Differential By-pass Valve with the manifolds incorporating actuators to avoid noise due to excessive water velocity.
 - 1) Eliminates water velocity noise and water hammer.
 - 2) Increases pump life because of minimal pressure surging as actuators open and close.
 - 3) There is always correct and constant flow regardless of the number of actuators or zone valves open.
 - 4) Water flow through the DBP valve shall be 25-30 % of the total flow:
 - (a) The over-pressure shall not exceed 10-15 % of the system pressure drop.
 - (b) If the zones to be by-passed have a maximum pressure drop of 0.5 psi (3.5 kPa), the DBP valve shall be set to accommodate this pressure plus 10-15 %.
 - (c) The DBP valve needs to be installed 'downstream' of the main circulator.
 - (d) Install before the system zones
 - (e) Should connect the supply line with the return line
3. FlowGuard:
 - a. FlowGuards shall be of commercial-quality, non-electronic flow indicator and flow setter.
 - b. Cast brass construction
 - c. Accurate visual flow indication in GPM
 - d. Ability to set fluid flow
 - e. FlowGuards shall allow zone-by-zone control and optimization.
 - f. No special training or electronic instrumentation required,
 - g. Sizes:
 - 1) 1" (25 mm) MNPT ends: 0.5 – 4 gpm (0.03 to 0.25 L/sec) flow meter
 - 2) 1" (25 mm) FNPT ends: 1 – 13 gpm (0.06 to 0.8 L/sec) flow meter
4. Tempering Valves:
 - a. MixTemp 180 Mixing Valve:
 - 1) The MixTemp 180 is a 3 port, non-electric mix valve for use in Hydronic heating systems.
 - (a) Hot, cold, and mix ports are clearly marked "H," "C," and "M."
 - 2) This mix valve shall be capable of delivering water temperatures ranging from 90° to 160°F (32° to 71°C) +/- 3° F.
 - 3) The Hydronic mix valve shall have a cast bronze body.
 - 4) Copper, stainless steel and EPDM internal parts
 - 5) There are no ferrous components to corrode.
 - 6) The actuator for the piston shall have lineal expansion characteristics, and shall be completely filled with a temperature-sensitive wax.
 - 7) Each port on the MixTemp has a union to allow for easy servicing
 - 8) Available in ¾" (19 mm) and 1" (25 mm) female NPT fittings.
 - (a) ¾" Cv = 3.1 gpm (0.195 L/sec)
 - (b) 1" Cv = 3.2 gpm (0.20 L/sec)
 - 9) These mixing valves are not anti-scald valves since they do not have positive shut-off in case of failure of hot or cold water supply. We do not recommend their use for shower service.
 - 10) Shall have a source of return water cooler than the desired mix temperature to operate properly.

- 11) The mix valve shall not be heated in excess of 200°F (93°C) to prevent the liquid-filled actuator from rupture.
 - (a) To prevent damage, temporarily remove the mixing valve from the unions before soldering near the mix valve.

- b. AllTemp Mixing Valve:
 - 1) The AllTemp shall be a non-electric, 3 port mix valve for use in hydronic heating systems.
 - 2) Valve shall be capable of delivering water temperatures ranging from 100 – 200°F (38 – 93°C).
 - 3) The hydronic mix valve shall have a cast bronze body.
 - 4) Chrome-plated bronze piston
 - 5) The actuator for the piston shall have linear expansion characteristics, and shall be completely filled with a temperature-sensitive liquid communicating with the hydraulically formed NPT fittings.
 - 6) The AllTemp is available in 1¼" (32 mm), 1½" (38 mm), and 2" (51 mm) female NPT fittings.
 - (a) 1¼" Cv = 6.1 gpm (0.38 L/sec)
 - (b) 1½" Cv = 6.2 gpm (0.39 L/sec)
 - (c) 2" Cv = 9.1 gpm (0.6 L/sec)
 - 7) Mixing valves are not anti-scald valves since they do not have positive shut-off in case of failure of hot or cold water supply. Do not use for shower service.
 - 8) Shall have a source of cooler return water to operate properly.
 - 9) The mix valve shall not be heated in excess of 230°F (110°C), or the liquid-filled actuator may rupture.
 - (a) To prevent damage, temporarily remove the actuator assembly from the valve body before soldering near the mix valve.

5. Staples: Watts Radiant Foamboard Staples
6. Terminal 90-degree Exit Bend: Terminal Bend Supports

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions:
 1. Verify that site conditions are acceptable for installation of the system. Refer to manufacturer's installation manual for information.
 2. Do not proceed with installation of the system until unacceptable conditions are corrected.

3.2 INSTALLATION OF FLOOR HEATING SYSTEMS

- A. Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings, including the following:
 1. Installation manuals
 2. Design software engineering and analysis

- B. Slab-On-Grade Installation:
 1. Fasten the tubing to the flat mesh or reinforcing bar in accordance with the tubing manufacturer's installation recommendations.
 2. Use closer tubing on-center distances along exterior walls. Increase tubing on-center distances as the installation moves away from the exterior wall as determined by manufacturer analysis.
 3. Staple the tubing to the insulation board.
 4. Install edge insulation where the heated panel directly contacts an exterior wall or panel.

5. Install tubing at a consistent depth below the surface elevation. Ensure sufficient clearance to avoid control joint saw cutting.
 6. Where tubing crosses metal expansion joints in the concrete, ensure the tubing passes below the joints or is sleeved through the joint.
- C. Pre-Cast Plank Construction with a Cap Pour:
1. Fasten the tubing to the flat mesh or reinforcing bar, or snap into Triple-track or Single-track RailWays in accordance with the tubing manufacturer's installation recommendations.
 2. Use closer tubing on-center distances along exterior walls. Increase tubing on-center distances as the installation moves away from the exterior wall.
 3. Staple the tubing to the insulation board.
 4. Install edge insulation where the heated panel directly contacts an exterior wall or panel.
 5. Install tubing at a consistent depth below the surface elevation. Ensure sufficient clearance to avoid control joint saw cutting.
 6. Where tubing crosses metal expansion joints in the concrete, ensure the tubing passes below the joints or is sleeved through the joint.
- D. Wood Floor Construction with a Lightweight Gypsum Topping:
1. Staple tubing to the wood sub-floor in accordance with the tubing manufacturer's installation recommendations. The attachment method shall not cause abrasions on the tubing.
 2. Use closer tubing on-center distances along exterior walls. Increase tubing on-center distances as the installation moves away from the exterior wall.
 3. Ensure the depth of the lightweight pour is a minimum of $\frac{3}{4}$ " (19 mm) over the outside dimension of the tubing, 1" typical overall thin-slab thickness.
 4. Install reinforcing mesh within the pour for finished flooring of tile or linoleum.
 5. Install wood sleepers along the room perimeter and between the tubing to provide a nailing surface for finished wood floors or carpet tack strips as required. Refer to Section 06100.
 6. Allow lightweight gypsum concrete pour to cure in accordance with the applicator's instructions. Once cured, seal the surface of the floor topping to protect surface from moisture.
 7. Install insulation in the joist cavity below the floor in accordance with the submitted radiant floor design. Refer to Section 07210.
 8. Install edge insulation if the heated panel directly contacts an exterior wall or panel. Refer to Section 07210.
- E. Wood Floor Construction with UnderFloor Heating (Onix tubing attached directly to wood sub-floor):
1. Install tubing attached directly to the underside of the wood sub-floor in accordance with the tubing manufacturer's recommendations. The attachment method shall not puncture or cause abrasions to the tubing.
 2. Do not exceed 8" (203 mm) on center tube spacing. Refer to the submitted radiant floor design.
 3. Comply with the tubing manufacturer's installation procedures on proper joist drilling.
 4. Install foil-faced insulation in the lower portion of the joist cavity. Allow an air gap of 2 – 3" (51 – 76 mm) between the wood sub-floor and the top of the insulation. Refer to Section 07210.
 5. Use the recommended amount of insulation in the joist cavity below the floor in accordance with the submitted radiant floor design. Refer to Section 07210.
 6. Use edge insulation equal to the amount of underfloor insulation if the heated panel directly contacts an exterior wall or panel. Refer to Section 07210.

- F. Wood Floor Construction with Joist Heating (tubing suspended in the joist bay):
 1. Install tubing within the joist cavity in accordance with the tubing manufacturer's recommendations. The attachment method shall not cause abrasions to the tubing.
 2. Do not exceed 8" (203 mm) on center. Refer to the submitted radiant floor design.
 3. Do not allow tubing within the joist cavity to contact the wood sub-floor.
 4. Refer to the tubing manufacturer's installation procedures on proper joist drilling.
 5. Install foil-faced insulation in the lower portion of the joist cavity. Allow an air gap of 2 – 3" (51 – 76 mm) between the wood sub-floor and the top of the insulation. Refer to Section 07210.
 6. Use the recommended amount of insulation in the joist cavity below the floor in accordance with the submitted radiant floor design. Refer to Section 07210.
 7. Use edge insulation equal to the amount of underfloor insulation if the heated panel directly contacts an exterior wall or panel. Refer to Section 07210.

- G. Wood Floor Construction with SubRay:
 1. Install SubRay on top of the wood sub-floor according to the tubing manufacturer's instructions.
 2. Coordinate the finished floor covering layout direction with the direction of the SubRay layout. Comply with the tubing manufacturer's instructions.
 3. Install insulation in the joist cavity below the floor according to the submitted radiant floor design. Install the insulation tight against the wood sub-floor. Refer to Section 07210.
 4. Use the recommended amount of insulation in the joist cavity below the floor in accordance with the submitted radiant floor design. Refer to Section 07210.
 5. Use edge insulation equal to the amount of underfloor insulation if the heated panel directly contacts an exterior wall or panel. Refer to Section 07210.

- H. Glycol and Water Solution:
 1. Provide premixed glycol and water solutions.
 2. Do not use ethylene glycol due to toxicity issues. Provide inhibited propylene glycol for hydronic radiant floor heating systems. Refer to the boiler manufacturer's recommendations.

3.3 INSTALLATION OF HYDRONIC SNOW MELTING SYSTEM

- A. Slab-On-Grade Installation:
 1. Fasten the tubing to the rewire or rebar in accordance with the tubing manufacturer's installation recommendations.
 2. Install tubing at a consistent depth below the surface elevation. Ensure sufficient clearance to avoid control joint saw cutting.
 3. Install an extruded polystyrene insulation board at the edge of, and optionally under, the slab, depending on site conditions.
 4. Where tubing crosses metal expansion joints in the concrete, ensure that the tubing passes below the joints or is sleeved through the joints in accordance with manufacturer's instructions.

- B. Slab over Steel Deck Installation:
 1. Fasten tubing to either rewire or rebar, or snap tubing into Triple or Single-track RailWays in accordance with manufacturer's installation instructions.
 2. If rewire or rebar is not used, install the tubing perpendicular to the ribbing on the steel deck.
 3. Install either spray-on insulation or insulation board under the steel deck as per the manufacturer's directions.

- C. Brick Pavers over Concrete Slab Installation:
 - 1. Fasten the tubing to the rewire or rebar in accordance with the tubing manufacturer's installation recommendations.
 - 2. Install tubing at a consistent depth below the surface elevation.
 - 3. Install the brick pavers on top of the concrete according to proper masonry practice and guidelines for this application.

- D. Brick Pavers over Sand or Stone Dust Installation:
 - 1. Fasten the tubing to the rewire or rebar in accordance with the tubing manufacturer's recommendations for installation in base material.
 - 2. Install tubing at a consistent depth below the surface elevation.
 - 3. Place a layer of sand over the tubing to a depth that results in the manufacturer's recommended minimum depth when compacted.
 - 4. Install the brick pavers on the compacted material according to proper masonry practice and guidelines for this application.

- E. Asphalt Installation:
 - 1. Fasten the tubing to the rewire or rebar in accordance with the tubing manufacturer's recommendations for installation in sub-base material.
 - 2. Install tubing at a consistent depth below the surface elevation.
 - 3. Ensure that there is a minimum of 2" (51 mm) of material covering the installed tubing.

3.4 FIELD QUALITY CONTROL AND TESTING

- A. Site tests:
 - 1. To ensure system integrity, pressure test the system before covering tubing in concrete or when other trades are working in the vicinity of the tubing.
 - 2. Test all electrical controls in accordance with respective installation manuals.
 - 3. System shall be checked after 3 years of operation and every year thereafter. System shall be checked for pH levels to ensure that it is operating within suggested guidelines.

3.5 SYSTEM ADJUSTING

- A. Balancing Across Manifold: Balance all loops across each manifold for equal flow resistance based on actual loop lengths and total manifold flow.

- B. Balancing between manifolds is accomplished with a flow control device installed on the return piping leg from each manifold when direct return piping is used for the supply and return mains or the circuits deviate by more than 10%.

3.6 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.

- B. Repair or replace damaged installed products.

- C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

- D. Remove construction debris from project site and legally dispose of debris.

3.7 DEMONSTRATION

- A. Demonstrate operation of system to Owner or Owner's personnel.
- B. Instruct the Owner or Owner's personnel about the type, concentration and maintenance of the glycol and water solution.
- C. Provide Owner or Owner's personnel with manufacturer's installation, operation, and maintenance instructions for installed components within the system.

3.8 PROTECTION

- A. Protect installed work from damage caused by subsequent construction activity on the site. Provide Owner with copy of photos and drawings of product locations to assist.

NOTES



PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flexible, pre-insulated piping system that incorporates cross-linked polyethylene (PEX) service tubing for hot and cold fluid distribution systems.

1.2 RELATED SECTIONS

- A. Section 02551 – Underground Hydronic Piping
- B. Section 03300 – Concrete
- C. Section 06100 – Rough Carpentry
- D. Section 07210 – Insulation
- E. Section 15093 – Sleeves and Sleeve Seals for HVAC Piping
- F. Section 15181 – Hydronic Piping

1.3 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. ASTM International:
 - 1. ASTM F2165 Standard Specification for Flexible Pre-Insulated Piping
- C. German Institute for Standards (Deutsches Institut für Normung e.V., DIN):
 - 1. DIN 4726 Pipelines of Plastic Materials Used in Warm Water Floor Heating Systems; General Requirements
 - 2. DIN 16892 Crosslinked Polyethylene Pipes – General Quality Requirements and Testing
 - 3. DIN 16893 Crosslinked Polyethylene Pipes - Dimensions
- D. Watts Radiant
 - 1. Watts Radiant R-flex™ Pre-Insulated PEX Installation Manual

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. The PEX service tubing is manufactured and tested in accordance with DIN 16892 and 16893.
 - 2. The PEX service tubing has hydrostatic ratings in accordance with the temperatures and pressures listed below. The hydrostatic ratings are:
 - a. 200 degrees F (93 degrees C) at 80 psi (551 kPa)
 - b. 180 degrees F (38 degrees C) at 100 psi (689 kPa)
 - c. 73.4 degrees F (23 degrees C) at 160 psi (1102 kPa)
- B. Performance requirements: Provide pre-insulated piping system that is manufactured, fabricated, and installed to comply with regulatory agencies and authorities with jurisdiction,

and maintain performance criteria stated by the tubing manufacturer without defects, damage or failure.

1. Show compliance with DIN 16892
2. Show compliance with DIN 16893
3. Show compliance with DIN 4726 regarding oxygen diffusion
4. Insulation of all carrier tubing shall consist of a microcellular, cross-linked polyethylene foam in multi-layer arrangements. The insulation's closed cell structure shall ensure minimal water absorption at all times to preserve insulating effect against thermal loss.
5. Insulation shall not crush, break, or pulverize.
6. All materials shall be CFC free.
7. The outer jacket shall be cast with a corrugated pattern along its entire length. The corrugation pattern shall provide flexibility in the longitudinal direction and rigidity against radial forces.
8. The corrugation shall employ a double-walled closed-cell construction to provide an extra layer of protection from piercing of the outer jacket.
9. Single wall exterior jackets shall be deemed not equal for the long-term protection of the Owner.

1.5 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product submittal data and installation instructions for each product.
- C. Shop Drawings – Pre-insulated Piping System:
 1. Provide installation drawings indicating:
 - a. Piping layout
 - b. Piping size dimension by installation segment
 - c. Vault locations
 - d. Support fixtures
 - e. Schedules with all details required for installation of the system.
- D. Samples: Submit selection and verification samples of primary materials.
- E. Documentation:
 1. Provide manufacturer's detailed instructions for site preparation and product installation.
 2. Provide manufacturer's electrical power requirements and heat output in watts delivered to the structure.
 3. Provide documentation indicating the installer is trained to install the manufacturer's products, as needed.
- F. Quality Assurance and Control Submittals:
 1. Upon request, submit test reports from recognized testing laboratories.
- G. Closeout Submittals – Submit the following:
 1. Warranty documents specified
 2. Operation and maintenance data
 3. Manufacturer's field reports as specified in this document
 4. Final as-built piping layout drawing

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:

1. Manufacturer shall have a minimum of ten years experience in similar systems.
 2. Manufacturer shall provide products of consistent quality in appearance and physical properties.
 3. Manufacturer shall use the highest quality products in the production of systems and components referenced in this document.
 4. Materials shall be from a single manufacturer to ensure consistent quality and compatibility.
- B. Installer Qualifications:
1. Use and installer with demonstrated experience on projects of similar size and complexity and/or documentation proving successful completion of familiarization training hosted/approved in writing by the system manufacturer.
 2. Electrical rough-in and connections shall be done by a licensed electrician.
- C. Certifications: Provide letters of certification as follows:
1. Installer employs skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed trades person.
- D. Regulatory Requirements and Approvals: Ensure the pre-insulated piping system complies with all applicable codes and regulations.
- E. Pre-installation meetings
1. Verify project requirements, substrate conditions, excavation conditions, system performance requirements, coverings, manufacturer's installation instructions, and warranty requirements.
 2. Review project construction timeline to ensure compliance or discuss modifications as required.
 3. Coordinate with other trade representatives to verify areas of responsibility.
 4. Establish the frequency (during construction phase of the project) the engineer intends for site visits and inspections by the manufacturer's representative.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer:
1. Store pre-insulated piping coils under cover or supply plugs to prevent dirt or foreign material from entering the service tubing.
 2. Do not expose the PEX service tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover the tubing that is exposed to direct sunlight.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty – Pre-insulated Piping Systems:
 - 1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
 - 2. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.
 - a. Warranty covers the repair or replacement of any piping or fittings proven defective.
 - b. Warranty may transfer to subsequent owners.
 - c. The manufacturer's warranty shall be a minimum of 10 years, non-prorated, on the carrier tubing and 10 years on the fittings, insulation, and cover beginning with the date of substantial completion.

1.10 SYSTEM START-UP

- A. Verify all electrical components are installed per local and National Electrical Code (NEC) prior to start-up.

1.11 OWNER'S INSTRUCTIONS

- A. Instruct Owner about operation and maintenance of installed system.
- B. Provide Owner with manufacturer's installation instructions for installed components within the system.
- C. Provide Owner with all operating instructions/documents for sensors and controls.
- D. Provide Owner with copies of any detailed layout drawings and photos of installed product before coverings are installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - Watts Water Technologies (Canada) Inc.
 - 5435 North Service Road
 - Burlington, ON L7L 5H7
 - Phone: (905) 332-4090; Fax: (905) 332-7068
 - Web: <http://www.wattscanada.ca>

- B. Substitutions: not permitted

2.2 PRODUCT CHARACTERISTICS

- A. Service Tubing:
 - 1. Material: Cross-linked polyethylene (PEX) manufactured by PEX-a or Engel method
 - 2. Material Standard: Manufactured in accordance with DIN 16892 and 16893
 - 3. Pressure Ratings: Hydrostatic design and pressure ratings are in accordance with the manufacturer.

4. The PEX service tubing in R-flex has an oxygen diffusion barrier that does not exceed an oxygen diffusion rate of 0.10 grams per cubic meter (0.000062 lb/cu. ft.) per day at 104 degrees F (40 degrees C) water temperature in accordance with German DIN 4726.
 5. Nominal Inside Diameter: Provide tubing with nominal outside diameter in accordance with DIN 16892, as indicated:
 - a. Single R-flex
 - 1) 40 mm (approximately 1½ inch)
 - 2) 50 mm (approximately 2 inch)
 - 3) 63 mm (approximately 2½ inch)
 - 4) 75 mm (approximately 3 inch)
 - 5) 90 mm (approximately 3½ inch)
 - 6) 110 mm (approximately 4 inch)
 - b. Dual R-flex
 - 1) 28.58 mm (approximately 1⅛ inch)
 - 2) 32 mm (approximately 1¼ inch)
 - 3) 40 mm (approximately 1½ inch)
 - 4) 50 mm (approximately 2 inch)
 - 5) 63 mm (approximately 2½ inch)
- B. Outer Jacket
1. Material is corrugated seamless high-density polyethylene (HDPE)
 2. The HDPE jacket completely encompasses and protects the insulation from moisture and damage.
 3. The outer jacket shall be cast with a corrugated pattern along its entire length. The corrugation pattern shall provide flexibility in the longitudinal direction and rigidity against radial forces.
 4. The corrugation shall employ a double walled closed cell construction to provide an extra layer of protection from piercing of the outer jacket.
 5. Single wall exterior jackets shall be deemed not equal for the long-term protection of the Owner.
 6. The outer jacket shall contain two percent carbon black to provide protection from UV degradation.
 7. Minimum Bend Radius:
 - a. Single R-flex:
 - 1) 40 mm (approximately 1½ inch) pre-insulated tubing with a 6.3 inch (160 mm) jacket has a bend radius of 13.8 inches (350 mm).
 - 2) 50 mm (approximately 2 inch) pre-insulated tubing with a 6.3 inch (160 mm) jacket has a bend radius of 17.8 inches (450 mm).
 - 3) 63 mm (approximately 2½ inch) pre-insulated tubing with a 6.3 inch (160 mm) jacket has a bend radius of 21.7 inches (550 mm).
 - 4) 75 mm (approximately 3 inch) pre-insulated tubing with a 7.9 inch (200 mm) jacket has a bend radius of 31.5 inches (800 mm).
 - 5) 90 mm (approximately 3½ inch) pre-insulated tubing with a 7.9 inch (200 mm) jacket has a bend radius of 43.4 inches (1100 mm).
 - 6) 110 mm (approximately 4 inch) pre-insulated tubing with a 7.9 inch (200 mm) jacket has a bend radius of 47.3 inches (1200 mm).
 - b. Dual R-flex:
 - 1) 28.58 mm (approximately 1⅛ inch) pre-insulated tubing with 4.9 inch (125 mm) jacket has a bend radius of 11.8 inches (300 mm).
 - 2) 32 mm (approximately 1¼ inch) pre-insulated tubing with 4.9 inch (125 mm) jacket has a bend radius of 11.8 inches (300 mm).
 - 3) 40 mm (approximately 1½ inch) pre-insulated tubing with 6.3 inch (160 mm) jacket has a bend radius of 23.7 inches (600 mm).
 - 4) 50 mm (approximately 2 inch) pre-insulated tubing with 7.9 inch (200 mm) jacket has a bend radius of 31.5 inches (800 mm).

- 5) 63 mm (approximately 2½ inch) pre-insulated tubing with 7.9 inch (200 mm) jacket has a bend radius of 47.3 inches (1200 mm).

C. Insulation

1. The insulation shall be cross-linked polyethylene closed cell foam with a water absorption after 28 days of less than 1.04 percent.
2. All seams of the insulation shall be sealed.
3. Insulation shall not be bonded to the service tubing.
4. Insulation shall not crush, break or pulverize.

D. End Seals

1. The piping manufacturer will supply all end caps.
2. End caps are to be installed on each end prior to connecting the service pipes and insulating the field joints.
3. Where necessary, the end caps will heat shrink onto the piping outer jacket forming a watertight seal.

E. Compression Fittings for PEX Service Tubing

1. For system compatibility, use fittings offered by the tubing manufacturer.
2. Fittings are to be manufactured from brass.
3. The fitting assembly must comply with performance requirements of DIN 16892.
4. The fittings will consist of a compression fitting with a coupling sleeve, a fitting body insert with o-ring(s) and a bolt and a nut.
5. All buried fittings will be installed, insulated, and sealed in accordance with the piping manufacturer's instructions.

2.3 ACCESSORIES

- ### A. Use accessories associated with the installation of the pre-insulated piping system as recommended by or available from the piping manufacturer.

B. Protective Casings

1. Protective casings will be manufactured of high density polyethylene shells with insulation, bolts, nuts, and a sealant compound.

C. Protective Inspection Chambers

1. The piping manufacturer will provide the inspection chambers when required by the project construction.
2. Inspection chambers shall be constructed of shock-resistant high density polyethylene.
3. Heat shrink seals as provided by the piping manufacturer shall be installed to prevent introduction of water into the vault.

D. Anchors

1. The use of anchors, if required, within the piping system will be determined by the project engineer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of the system. Refer to manufacturer's installation manual for information.
2. Do not proceed with installation of the system until unacceptable conditions are corrected.

3.2 INSTALLATION OF PRE-INSULATED PIPING SYSTEM

- A. Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings, including:
 - 1. Watts Radiant R-flex Installation Manual

- B. Below-grade Installation:
 - 1. Pre-insulated piping shall be installed in accordance with manufacturer's recommendations and the details as shown on the contract drawings.
 - 2. The system will be installed with the fewest number of underground joints as possible.
 - 3. The system does not require expansion loops, expansion joints or compensators of any type.
 - 4. An end cap shall be applied at all terminations of the pre-insulated piping system, including all fitting locations to form a watertight seal.
 - 5. All buried fittings will be installed, insulated and sealed in accordance with the piping manufacturer's instructions.
 - 6. Protective Inspection Chamber or Protective Casings are required for all below-grade connections.

- C. Backfill:
 - 1. The pre-insulated piping will be backfilled with clean sand material.
 - a. R-flex should always be installed below the frost line.
 - b. Minimum vertical distance from the bottom of the piping to the trench floor is 4 inches (100 mm).
 - c. Minimum lateral distance from the side of the piping to the trench wall is 6 inches (150 mm) for 4.9 inch (125 mm) outer jacket; 7.1 inches (180 mm) for 6.3 inch (160 mm) or 7.9 inch (200 mm) outer jacket.
 - d. Install a minimum of 6 inches (300 mm) of clean fill over the top of the pre-insulated piping.
 - e. Minimum depth of backfill over the sand is 9.9 inches (250 mm) for pedestrian traffic or 25.6 inches (650 mm) for vehicular traffic.
 - 2. The balance of the trench can be backfilled with native soil void of stone greater than 2 inches (51 mm) in diameter.
 - a. Caution tape shall be installed in the backfill along the entire length of the trench.

3.3 FIELD QUALITY CONTROL AND TESTING

- A. Site tests:
 - a. To ensure system integrity, pressure-test the system before and during backfilling or when other trades are working near the piping.
 - b. The service tubing will be water-tested at 1 ½ times the operating pressure for a minimum of 3 hours prior to system burial.

3.4 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Repair or replace damaged installed products.
- C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
- D. Remove construction debris from project site and legally dispose of debris.

3.5 DEMONSTRATION

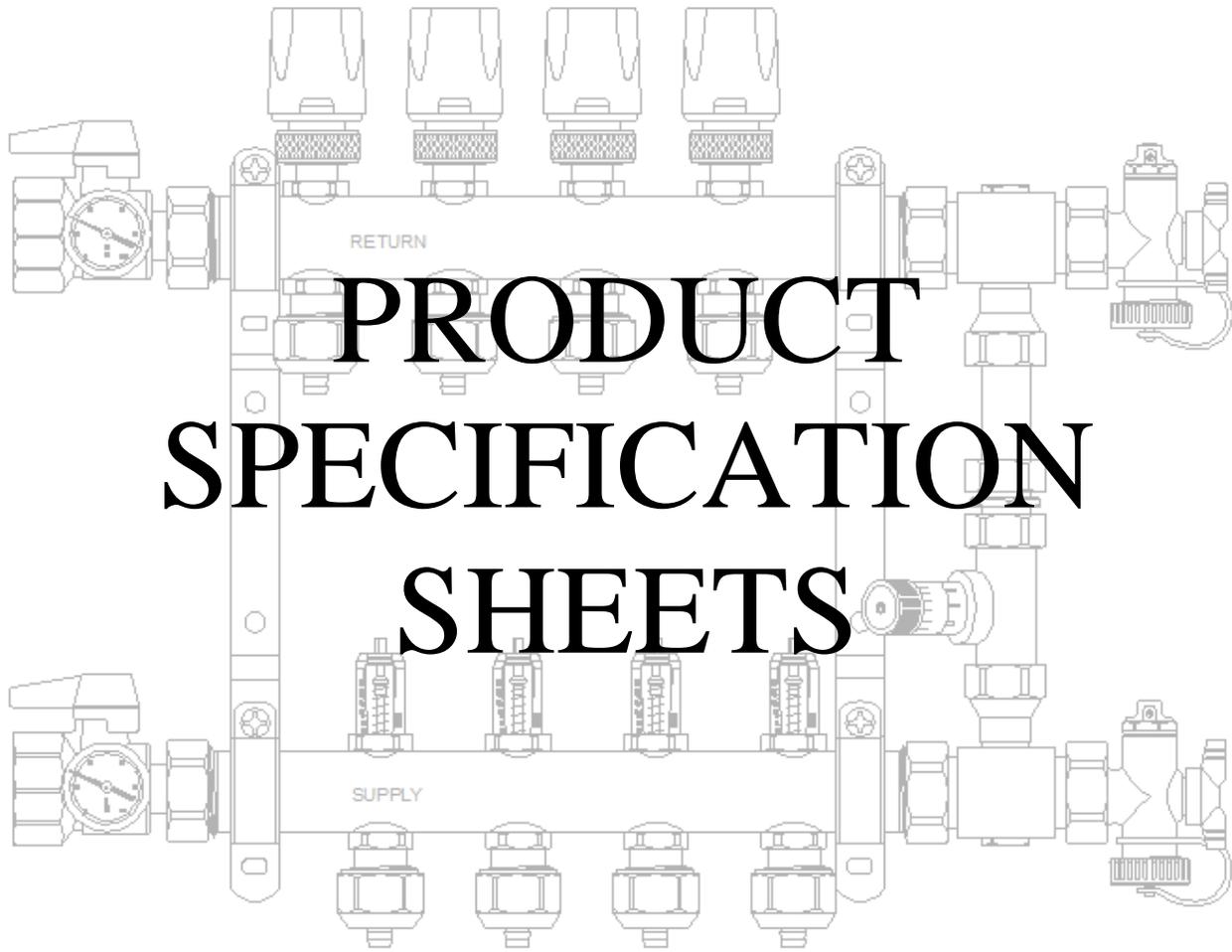
A. Pre-insulated Piping System

1. Demonstrate operation of system to Owner or Owner's personnel.
2. Instruct Owner or Owner's personnel about operation and maintenance of the installed system.
3. Provide Owner or Owner's personnel with manufacturer's installation, operation, and maintenance instructions for installed components within the system.

3.6 PROTECTION

- ### A. Protect installed work from damage caused by subsequent construction activity on the site. Provide Owner with copy of photos and drawings of product locations to assist.

NOTES



RadiantPEX Cross-linked Polyethylene Tubing Specification



5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

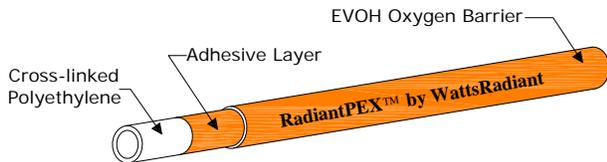
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

RadiantPEX is cross-linked polyethylene tubing used for radiant floor heating, snow melting and hot water baseboard applications. RadiantPEX is manufactured with an integral ethyl vinyl alcohol (EVOH) barrier that limits oxygen diffusion through the pipe walls to less than 0.10g/m³/day at 104°F water temperature (as per DIN 4726 standard). All sizes are SDR-9 dimensions and are manufactured to ASTM-876 and ASTM-877 standards. All RadiantPEX tubing is listed by the National Sanitation Foundation to NSF14 and NSF61 Standards and the International Code Council Evaluation Service (ICC-ES) Report #ESR-1929. Watts RadiantPEX is certified by CSA to CSA Standard B137.5.

RadiantPEX has a maximum working pressure/temperature of 160 psi at 73.4°F, 100 psi at 180°F and 80 psi at 200°F.

WattsRadiant warrants its RadiantPEX cross-linked polyethylene tubing to be free of defects in material and workmanship for a period of twenty-five years from date of manufacture. For more complete information please see warranty sheet.



Description	Nominal I.D.	Nominal O.D.	Coil Lengths	Bend Radius	Thermal Expansion Per 100 ft./10°F	Weight Per 100 feet	Fluid Capacity/100'
3/8" RadiantPEX	3/8"	1/2"	600'	4"	0.95 "	4.0 lbs.	0.53 gal.
1/2" RadiantPEX	1/2"	5/8"	20', 250', 300', 500', 600', 1000'	5"	0.95 "	5.5 lbs.	0.96 gal.
5/8" RadiantPEX	5/8"	3/4"	400', 1000'	6"	0.95 "	7.8 lbs.	1.40 gal.
3/4" RadiantPEX	3/4"	7/8"	20', 100', 250,500', 1000'	7"	0.95 "	10.5 lbs.	1.90 gal.
1" RadiantPEX	1"	1-1/8"	20', 100', 300', 500'	8"	0.95 "	17.2 lbs.	3.12 gal.

SDR9-CTS PEX Pressure Loss Per/100 Ft. With 100% Water At 120°F (Maximum Velocity 4.5 FPS)

	3/8"		1/2"		5/8"		3/4"		1"	
	GPM	PSI	PSI	FPS	PSI	FPS	PSI	FPS	PSI	FPS
0.1	0.093	0.315	0.022	0.174	0.010	0.125	0.004	0.088	0.001	0.053
0.2	0.334	0.630	0.078	0.347	0.035	0.250	0.015	0.176	0.004	0.107
0.3	0.707	0.945	0.166	0.521	0.074	0.374	0.032	0.264	0.009	0.160
0.4	1.204	1.260	0.282	0.694	0.127	0.499	0.054	0.352	0.016	0.213
0.5	1.819	1.575	0.427	0.868	0.191	0.624	0.082	0.440	0.024	0.267
0.6	2.549	1.890	0.598	1.041	0.268	0.749	0.115	0.528	0.034	0.320
0.7	3.390	2.205	0.795	1.215	0.356	0.874	0.152	0.616	0.045	0.373
0.8	4.340	2.520	1.018	1.389	0.456	0.998	0.195	0.704	0.058	0.427
0.9	5.397	2.835	1.266	1.562	0.567	1.123	0.243	0.792	0.072	0.480
1.0	6.558	3.150	1.538	1.736	0.689	1.248	0.295	0.880	0.087	0.533
1.2	9.189	3.781	2.155	2.083	0.966	1.497	0.413	1.056	0.122	0.640
1.4	12.221	4.411	2.866	2.430	1.284	1.747	0.550	1.233	0.162	0.747
1.6	Velocities Exceed 4.5 fps		3.670	2.777	1.644	1.997	0.704	1.409	0.208	0.853
1.8			4.563	3.124	2.045	2.246	0.875	1.585	0.258	0.960
2.0			5.545	3.472	2.485	2.496	1.063	1.761	0.314	1.067
2.2			6.614	3.819	2.964	2.745	1.268	1.937	0.375	1.173
2.4			7.769	4.166	3.481	2.995	1.490	2.113	0.440	1.280
2.6			9.009	4.513	4.037	3.245	1.728	2.289	0.510	1.387
2.8					4.630	3.494	1.982	2.465	0.585	1.493
3.0					5.261	3.744	2.251	2.641	0.665	1.600

	5/8"		3/4"		1"			
	GPM	PSI	PSI	FPS	PSI	FPS		
3.2	5.928	3.993	2.537	2.817	0.749	1.707		
3.4	6.631	4.243	2.838	2.993	0.838	1.813		
3.6	7.371	4.492	3.155	3.169	0.932	1.920		
3.8	Velocities Exceed 4.5 fps		3.487	3.346	1.030	2.026		
4.0			3.834	3.522	1.132	2.133		
4.5			4.767	3.962	1.408	2.400		
5.0			5.793	4.402	1.711	2.666		
5.5							2.041	2.933
6.0							2.397	3.200
6.5							2.780	3.466
7.0							3.188	3.733
7.5							3.622	4.000
8.0							4.266	
8.5					4.566			
9.0								

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Services. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

Onix EPDM Hydronic Heating Tubing Specification



Project Information

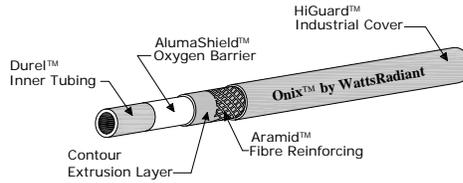
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

5435 North Service Road
 Burlington, Ontario Canada
 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

Onix is a polymer-rich, multi-layer, industrial-grade hose used for hydronic heating and snowmelting applications. It contains five distinct structural layers. The Durel inner tube is a peroxide-cured, cross-linked EPDM (Ethylene Propylene Diene Monomer). This layer is wrapped with a ductile 00 grade aluminum oxygen barrier, called AlumaShield. A contour layer of Durel (EPDM) is extruded over the AlumaShield. Spiral reinforcing cords of Aramid fibres are applied over the contour layer. This reinforcing is covered with the outer HiGuard cover composed of sulfur-cured, cross-linked EPDM.

Onix has a maximum working temperature of 180°F at 100 psi. Burst pressure is greater than 800 psi at 70°F; greater than 600 psi at 180°F. WattsRadiant warrants its Onix hydronic tubing to be free of defects in material and workmanship for a period of twenty-five years from date of manufacture. For more complete information please see warranty sheet.



CODES, LISTINGS, STANDARDS



ASTM: Watts Radiant products are tested to relevant portions of ASTM standards.



Uniform Plumbing Code: Provide radiant tubing carrying the UPC certification mark, as approved by the International Association of Plumbing and Mechanical officials.



RPA: Install radiant tubing in compliance with the Standard Guidelines for Radiant Panel Installations, as approved by the Radiant Panel Association.



BOCA: Provide radiant tubing carrying the BOCA certification mark, as approved by the BOCA research report number 95-47.1

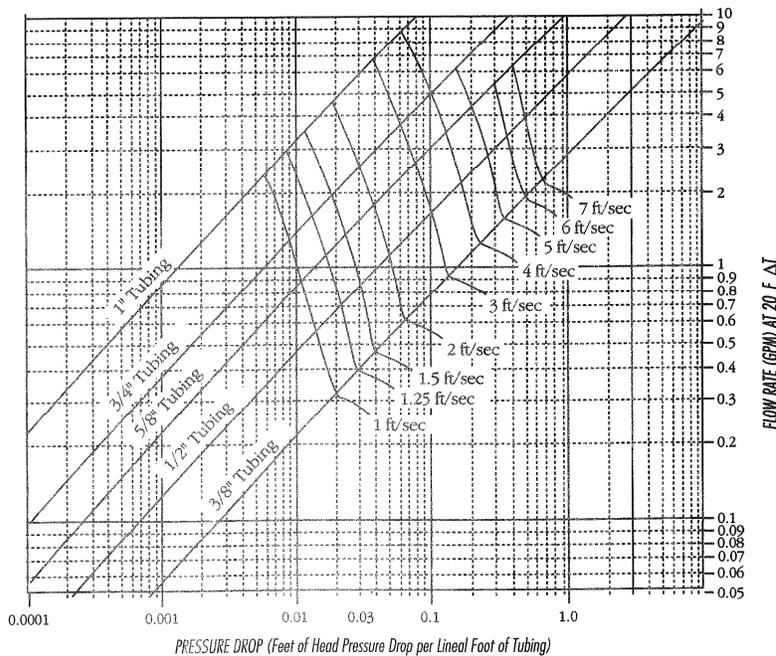


UL: Watts Radiant products Marked with the UL® trademark conform to UL® specifications.

Description	Nominal I.D.	Nominal O.D.	Coil Lengths	Bend Radius	Thermal Expansion Per 100 ft./10°F	Weight Per 100 feet	Fluid Capacity/100'
3/8" Onix	3/8"	11/16"	160', 180', 200', 600'	3"	0.00 "	4.0 lbs.	0.63 gal.
1/2" Onix	1/2"	7/8"	200', 300', 400', 600'	4"	0.00 "	5.5 lbs.	1.03 gal.
5/8" Onix	5/8"	1"	200', 300', 400', 600'	5"	0.00 "	7.8 lbs.	1.60 gal.
3/4" Onix	3/4"	1-1/8"	200', 300', 400'	6"	0.00 "	10.5 lbs.	2.50 gal.
1" Onix	1"	1-3/8"	100', 150' 200'	8"	0.00 "	17.2 lbs.	4.35 gal.

Watts Radiant™ PRESSURE DROP CHART FOR Onix™

Pure Water



Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Services. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

WaterPEX Cross-linked Polyethylene Tubing Specification (Small Dia.)



5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

WaterPEX is cross-linked polyethylene tubing used for radiant floor heating, snow melting and potable water applications. WaterPEX is manufactured without an oxygen barrier. WaterPEX is manufactured to ASTM-876 and ASTM-877 standards and all sizes are SDR-9 dimensions.

WaterPEX is tested and listed by the National Sanitation Foundation to Standards 14 and 61. WaterPEX labeled "NSF CL-R" meets the requirements for use in chlorinated domestic continuous recirculation systems. WaterPEX carries both the UPC and UMC certification mark, as approved by the International Association of Plumbing and Mechanical Officials and is listed by the International Code Council Evaluation Service (ICC-ES). All WaterPEX labeled with "cNSF-CAN/B137.5" is certified to CSA Standard B137.5 by NSF.

WaterPEX has a maximum working pressure/temperature of 160 psi at 73.4°F, 100 psi at 180°F and 80 psi at 200°F.

WattsRadiant warrants its WaterPEX cross-linked polyethylene tubing to be free of defects in material and workmanship for a period of twenty-five years from date of manufacture. For more complete information please see warranty sheet.



Description	Nominal I.D.	Nominal O.D.	Coil Lengths	Bend Radius	Thermal Expansion Per 100 ft./10°F	Weight Per 100 feet	Fluid Capacity/100'
3/8" WaterPEX	3/8"	1/2"	100', 500'	4"	0.95 "	4.0 lbs.	0.53 gal.
1/2" WaterPEX	1/2"	5/8"	20' lengths, 100', 250', 500', 1000'	5"	0.95 "	5.5 lbs.	0.96 gal.
3/4" WaterPEX	3/4"	7/8"	20' lengths, 100', 250', 500', 1000'	7"	0.95 "	10.5 lbs.	1.90 gal.
1" WaterPEX	1"	1-1/8"	20' lengths, 100', 300', 500'	8"	0.95 "	17.2 lbs.	3.12 gal.

SDR9-CTS PEX Pressure Loss Per/100 Ft. With 100% Water At 120°F (Maximum Velocity 8.0 FPS)

GPM	3/8"		1/2"		3/4"		1"		GPM	3/4"		1"	
	PSI	FPS	PSI	FPS	PSI	FPS	PSI	FPS		PSI	FPS	PSI	FPS
0.2	0.093	0.315	0.022	0.174	0.004	0.088	0.001	0.053	5.5	6.910	4.842	2.041	2.933
0.4	1.204	1.260	0.282	0.694	0.054	0.352	0.016	0.213	6.0	8.117	5.282	2.397	3.200
0.6	2.549	1.890	0.598	1.041	0.115	0.528	0.034	0.320	6.5	9.412	5.723	2.780	3.466
0.8	4.340	2.520	1.018	1.389	0.195	0.704	0.058	0.427	7.0	10.795	6.163	3.188	3.733
1.0	6.558	3.150	1.538	1.736	0.295	0.880	0.087	0.533	7.5	12.265	6.603	3.622	4.000
1.2	9.189	3.781	2.155	2.083	0.413	1.056	0.122	0.640	8.0	13.820	7.043	4.082	4.266
1.4	12.221	4.411	2.866	2.430	0.550	1.233	0.162	0.747	8.5	15.460	7.483	4.566	4.533
1.6	15.646	5.041	3.670	2.777	0.704	1.409	0.208	0.853	9.0	17.185	7.924	5.075	4.800
1.8	19.931	5.671	4.563	3.124	0.875	1.585	0.258	0.960	9.5	Velocities Exceed 8.0 fps		5.609	5.066
2.0	23.642	6.301	5.545	3.472	1.063	1.761	0.314	1.067	10.0			6.168	5.333
2.2	28.201	6.931	6.614	3.819	1.268	1.937	0.375	1.173	10.5			6.750	5.599
2.4	33.126	7.561	7.769	4.166	1.490	2.113	0.440	1.280	11.0			7.357	5.866
2.6	38.413	8.191	9.009	4.513	1.728	2.289	0.510	1.387	11.5			7.988	6.133
2.8			10.333	4.860	1.982	2.465	0.585	1.493	12.0			8.642	6.399
3.0			11.740	5.207	2.251	2.641	0.665	1.600	12.5			9.320	6.666
3.2			13.229	5.554	2.537	2.817	0.749	1.707	13.0			10.021	6.933
3.4			14.799	5.902	2.838	2.993	0.838	1.813	13.5			10.746	7.199
3.6			16.449	6.249	3.155	3.169	0.932	1.920	14.0			11.494	7.466
3.8			18.180	6.596	3.487	3.346	1.030	2.026	14.5		12.265	7.733	
4.0			19.990	6.943	3.834	3.522	1.132	2.133	15.0		13.059	7.999	
4.5			24.856	7.811	4.767	3.962	1.408	2.400					
5.0					5.793	4.402	1.711	2.666					

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Services. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

WaterPEX Cross-linked Polyethylene Tubing Specification (Large Dia.)



5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

WaterPEX is cross-linked polyethylene tubing used for radiant floor heating, snow melting and potable water applications. WaterPEX is manufactured without an oxygen barrier. WaterPEX is manufactured to ASTM-876 and ASTM-877 standards and all sizes are SDR-9 dimensions.

WaterPEX is tested and listed by the National Sanitation Foundation to Standards 14 and 61. WaterPEX labeled "NSF CL-R" meets the requirements for use in chlorinated domestic continuous recirculation systems. WaterPEX carries both the UPC and UMC certification mark, as approved by the International Association of Plumbing and Mechanical Officials and is listed by the International Code Council Evaluation Service (ICC-ES). All WaterPEX labeled with "cNSF-CAN/B137.5" is certified to CSA Standard B137.5 by NSF.

WaterPEX has a maximum working pressure/temperature of 160 psi at 73.4°F, 100 psi at 180°F and 80 psi at 200°F.

WattsRadiant warrants its WaterPEX cross-linked polyethylene tubing to be free of defects in material and workmanship for a period of twenty-five years from date of manufacture. For more complete information please see warranty sheet.



Description	Nominal I.D.	Nominal O.D.	Coil Lengths	Bend Radius	Thermal Expansion Per 100 ft./10°F	Weight Per 100 feet	Fluid Capacity/100'
1-1/4" WaterPEX	1-1/4"	1-3/8"	20', 100', 300'	11"	0.95 "	25.2 lbs.	4.90 gal.
1-1/2" WaterPEX	1-1/2"	1-5/8"	20', 100', 300'	13"	0.95 "	35.4 lbs.	7.08 gal.
2" WaterPEX	2"	2-1/8"	20', 100'	17"	0.95 "	60.0 lbs.	12.69 gal.

SDR9-CTS PEX Pressure Loss Per/100 Ft. With 100% Water At 120°F (Maximum Velocity 8.0 FPS)

GPM	1-1/4"		1-1/2"		2"	
	PSI	FPS	PSI	FPS	PSI	FPS
5.0	0.646	1.786	0.287	1.280	0.077	0.747
6.0	0.905	2.144	0.402	1.536	0.109	0.897
7.0	1.203	2.501	0.535	1.792	0.144	1.046
8.0	1.541	2.858	0.684	2.048	0.185	1.195
9.0	1.916	3.216	0.851	2.304	0.230	1.345
10.0	2.328	3.573	1.034	2.560	0.279	1.494
12.0	3.262	4.287	1.449	3.071	0.391	1.793
14.0	4.338	5.002	1.927	3.583	0.520	2.092
16.0	5.554	5.717	2.467	4.095	0.666	2.391
18.0	6.906	6.431	3.068	4.607	0.828	2.690
20.0	8.392	7.146	3.728	5.119	1.007	2.989
22.0	10.011	7.860	4.447	5.631	1.201	3.287
24.0	Velocities Exceed 8.0 fps		5.224	6.143	1.410	3.586
26.0			6.057	6.655	1.636	3.885
28.0			6.948	7.167	1.876	4.184
30.0			7.893	7.679	2.131	4.483
35.0			2.835	5.230		
40.0			3.629	5.977		
45.0			4.512	6.724		
50.0			5.483	7.471		
54.0			6.323	8.069		

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Services. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

NOTES

R-flex Flexible Insulated PEX



Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

5435 North Service Road
 Burlington, Ontario Canada
 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

R-flex is a multi-layered insulated piping system consisting of cross-linked SDR-11 PEX barrier pipe, multiple PE foam insulation layers, and an outer dual wall corrugated casing. It is engineered for exterior hydronic heating and cooling applications. It is not intended for interior or potable applications. The R-flex tubing is manufactured with an integral DIN 4726 standard oxygen barrier that limits oxygen diffusion through the pipe wall to less than 0.10 g/m³/day at 104°F water temperature. R-flex is available in Single or Dual pipe configuration.

R-flex is available with either one or two PEX pipes. The inner insulation layer is constructed of extruded PE foam, a flexible, water resistant material. Single and Dual R-flex are encased in a unique dual layer corrugated outer casing. This dual layer provides enhanced flexibility while preventing water penetration. In the event the outer layer is damaged, the inner layer still protects the insulation from water penetration – preventing a potential increase in heat loss.

R-flex can be used for hydronic heating, hydronic snow melting, district heating, commercial and process piping, cooling towers and chilled water systems, geothermal, agricultural piping, biomass heat sources, wood-fired boilers, solar, and more.

Available in sizes: 1", 32mm, 40mm, 50mm, 63mm, 75mm, 90mm and 110mm.

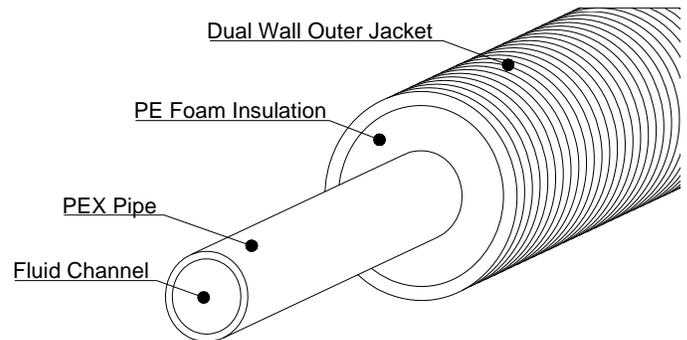
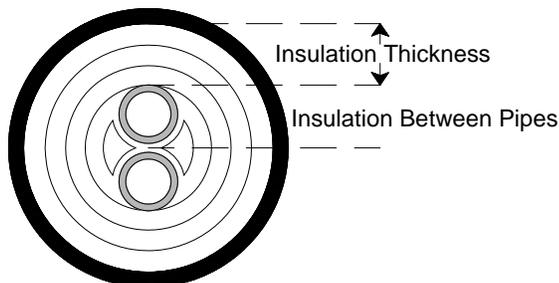
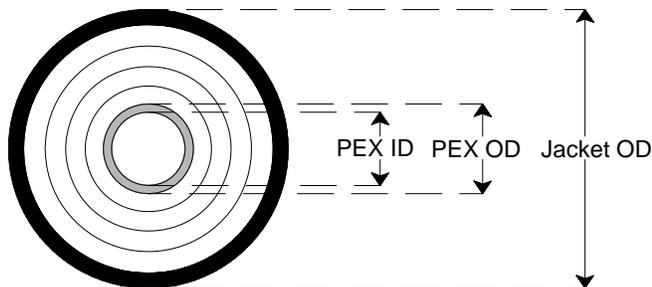
Specifications (conforms to DIN 16892, SDR-11)

System shall be installed using Watts Radiant Single or Dual R-flex. All connections shall be made using Watts Radiant's R-flex compression fittings in accordance with all corresponding installation guidelines.

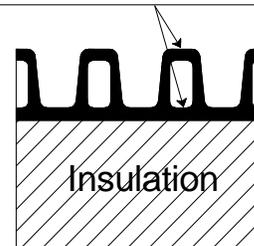
Insulation thermal conductivity 0.0211 Btu/hr/ft²/°F (0.0365 W/m²/K).

Insulation water absorption after 28 days less than 1.04% volume.

Max. Temperature	Max. Pressure
200°F	80 psi
180°F	100 psi
73.4°F	160 psi



Dual Wall Construction

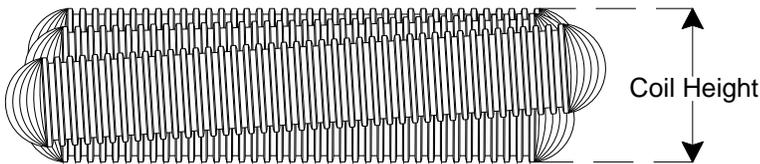
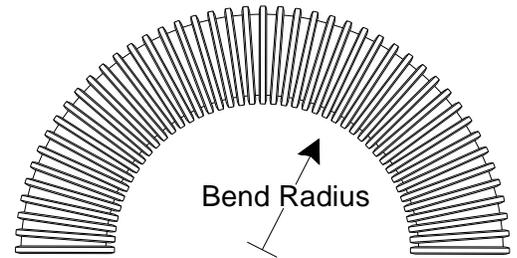
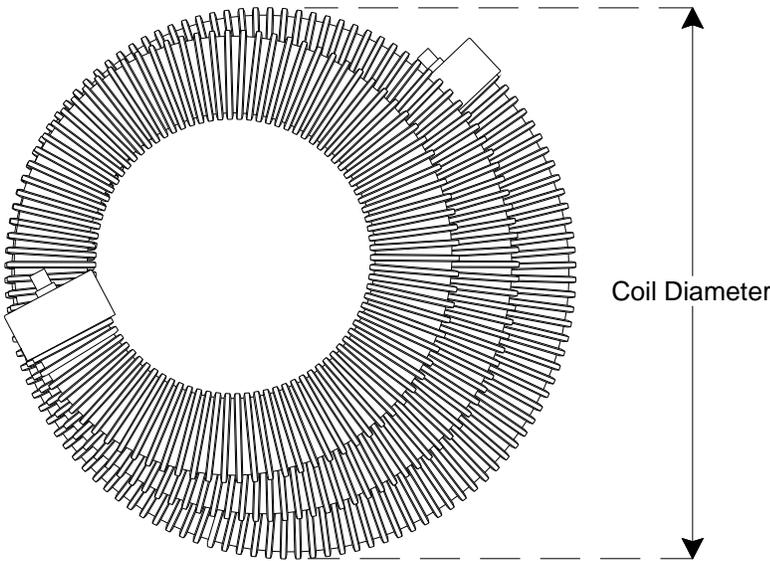


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	Order #	Description	PEX ID	PEX OD	Jacket OD	Bend Radius	Coil Length	Coil Diameter	Coil Height	Coil Weight	Fluid Cap. /100m(328')	Insulation Thickness	Casing R-Value	
Single	81012929	160/40 R-flex	32.6mm (1.28")	40.0mm (1.57")	160mm (6.30")	350mm (13.80")	100m** (328ft)	2300mm (90.6")	850mm (33.50")	232 kg (512 lbs)	83.00 L (21.93 gal)	47.5mm (1.88")	6.79	
	81012886	160/50 R-flex	40.8mm (1.61")	50.0mm (1.97")		450mm (17.80")				248 kg (547 lbs)	131.31 L (34.69 gal)	42.5mm (1.68")	6.07	
	81012887	160/63 R-flex	51.6mm (2.03")	63.0mm (2.48")		550mm (21.70")				278 kg (613 lbs)	208.76 L (55.15 gal)	37.0mm (1.46")	5.27	
	81012889	200/75 R-flex	61.4mm (2.42")	75.0mm (2.95")	200mm (7.90")	800mm (31.50")			1400mm (55.20")	416 kg (917 lbs)	296.67 L (78.37 gal)	52.0mm (2.05")	7.40	
	81012890	200/90 R-flex	73.6mm (2.90")	90.0mm (3.54")		1100mm (43.40")				473 kg (1043 lbs)	426.02 L (112.55 gal)	44.0mm (1.74")	6.28	
	81012891	200/110 R-flex	90.0mm (3.55")	110.0mm (4.33")		1200mm (47.30")				564 kg (1244 lbs)	638.41 L (168.65 gal)	34.0mm (1.33")	4.84	
Dual	81012879	125/2x1 R-flex*	0.863" (21.92mm)	1.125" (28.58mm)	4.90" (125mm)	11.80" (300mm)	100m** (328ft)	2300mm (90.60")	82.70" (2100mm)	27.60" (700mm)	358 lbs (162 kg)	19.94 gal (75.46 L)	1.11" (28mm)	4.01
	81012880	125/2x32 R-flex	26.2mm (1.03")	32.0mm (1.26")	125mm (4.90")	300mm (11.80")			2100mm (82.70")	700mm (27.60")	182 kg (402 lbs)	107.48 L (28.40 gal)	22.3mm (0.88")	3.18
	81012882	160/2x40 R-flex	32.6mm (1.28")	40.0mm (1.57")	160mm (6.30")	600mm (23.70")			850mm (33.50")	263 kg (580 lbs)	166.00 L (43.86 gal)	34.0mm (1.34")	4.84	
	81012884	200/2x50 R-flex	40.8mm (1.61")	50.0mm (1.97")	200mm (7.90")	800mm (31.50")			1400mm (55.20")	403 kg (889 lbs)	262.62 L (69.38 gal)	46.0mm (1.81")	6.57	
	81012885	200/2x63 R-flex	51.6mm (2.03")	63.0mm (2.48")		1200mm (47.30")				464 kg (1023 lbs)	417.52 L (110.30 gal)	33.0mm (1.30")	4.69	

* Pex pipe is ASTM F876, SDR-9 dimensions

** Custom lengths are available upon request. Contact distributor for details.



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1" Stainless Steel Manifold Specification



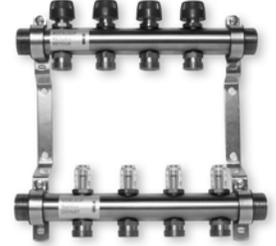
5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

WattsRadiant 1" Stainless Steel Manifold is composed of heavy-duty, DIN standard, 304 stainless steel. Matching fittings and accessories are made of solid brass and are heavily plated with nickel to match the appearance of the manifold trunk. Standard features include internal balancing valves, 0-2.0 gpm flow meters with built-in shut off valves and manifold brackets. All connections are made with the use of isolation valves, BSP to NPT or BSP to sweat adapters.

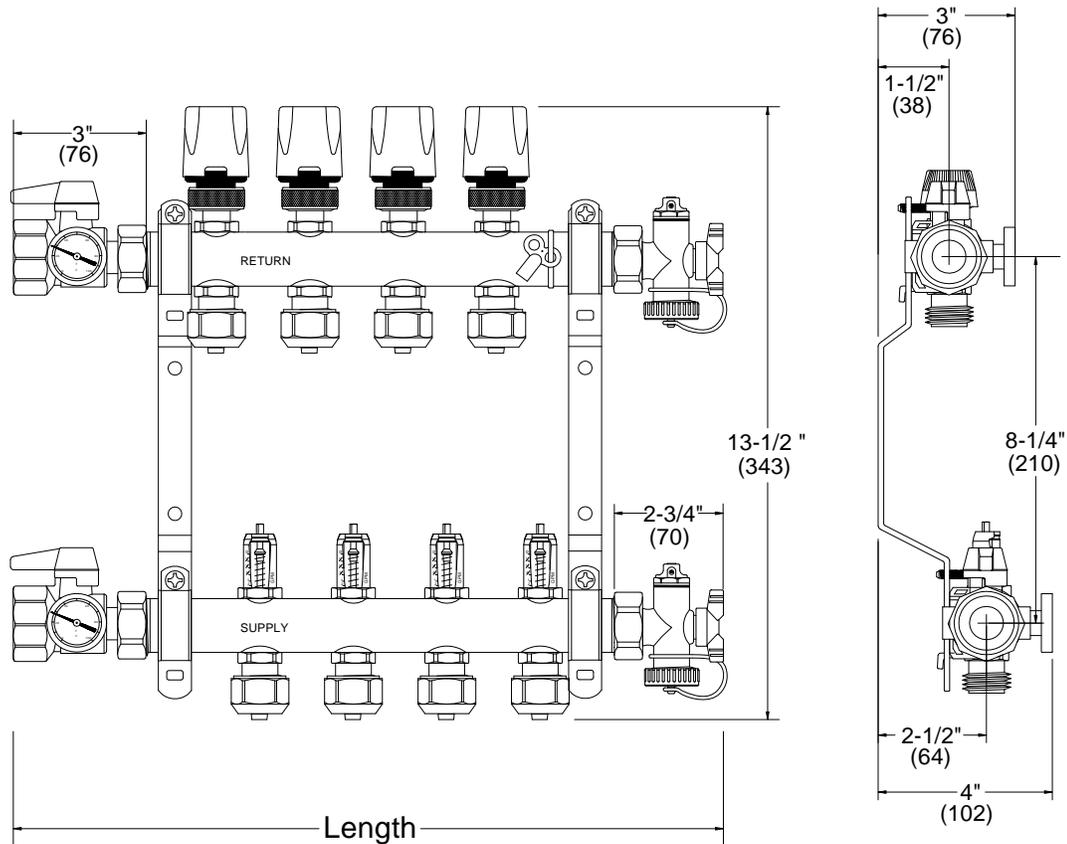


Technical Details

Trunk Material..... AISI 304 Stainless Steel
 Circuit Spacing..... 2-1/8" O.C. (53.8mm)
 Thread/Connection Type..... BSP Thread
 Max. Trunk Flow Rate..... 12 GPM (45.4 liters)
 Max. Circuit Flow Rate..... 2.0 GPM (7.6 liters)
 Max. Operating Temperature..... 194 °F (90 Celsius)
 Max. Operating Pressure..... 87 psi (5.9 bar)

Dimensions

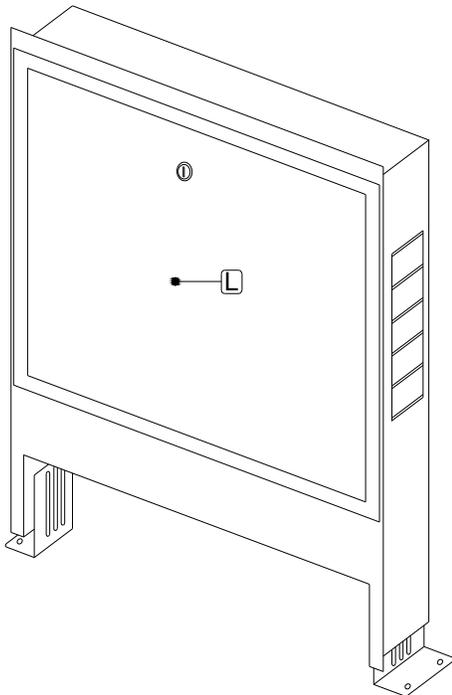
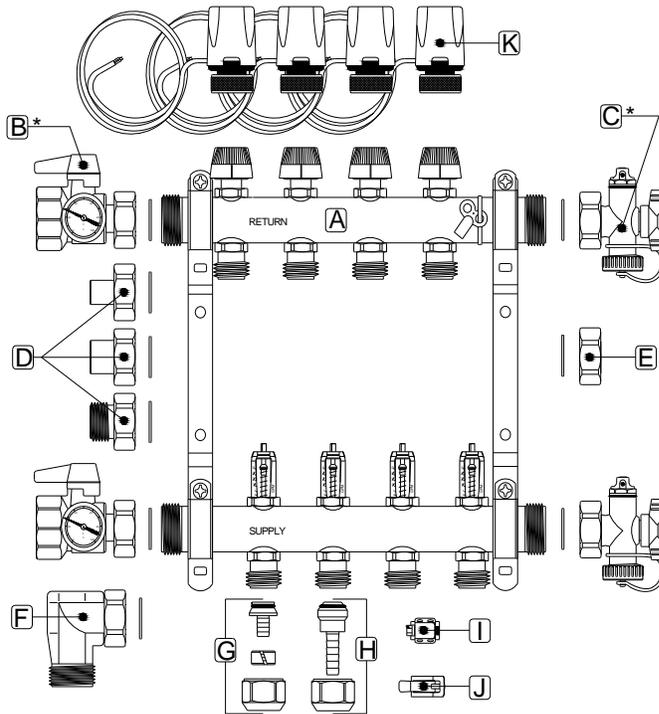
Manifold Sizes	2	3	4	5	6	7	8	9	10	11	12
Length inches	12.5	14.75	17	19.25	21.5	23.75	26	28.25	30.5	32.75	35
Millimeters	318	375	432	489	546	603	660	718	775	832	889



Number in bracket is dimension in millimeters

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Manifold Parts Schematic



ITEM	ORDER #	DESCRIPTION
A	81001981	2 Loop Stainless Steel Manifold
	81001982	3 Loop Stainless Steel Manifold
	81001983	4 Loop Stainless Steel Manifold
	81003398	5 Loop Stainless Steel Manifold
	81001984	6 Loop Stainless Steel Manifold
	81003682	7 Loop Stainless Steel Manifold
	81001985	8 Loop Stainless Steel Manifold
	81003687	9 Loop Stainless Steel Manifold
	81001986	10 Loop Stainless Steel Manifold
	81003688	11 Loop Stainless Steel Manifold
	81001987	12 Loop Stainless Steel Manifold
	B	81003400
C	81006639	Vent and Purge Assembly
D	81001990	1" FBSP X 1" MNPT Adapter
	81005366	1" FBSP X 3/4" Sweat Adapter
	81005367	1" FBSP X 1" Sweat Adapter
E	81001977	1" FBSP Manifold End Cap
F	81005364	1" FBSP X 1" MBSP Elbow
G	81005166	3/8" Compression PEX Manifold Fitting
	81005168	1/2" Compression PEX Manifold Fitting
	81005170	5/8" Compression PEX Manifold Fitting
	81005172	3/4" Compression PEX Manifold Fitting
H	81000678	3/8" Onix Manifold Fitting
	81000680	1/2" Onix Manifold Fitting
	81000682	5/8" Onix Manifold Fitting
	81003379	3/4" Onix Manifold Fitting
I	81000678	3/8" TorqueTite Clamp
	81000680	1/2" TorqueTite Clamp
	81000682	5/8" TorqueTite Clamp
	81003379	3/4" TorqueTite Clamp
	81000678	1" TorqueTite Clamp
J	81000678	3/8" SelfTite Clamp
	81000680	1/2" SelfTite Clamp
	81000682	5/8" SelfTite Clamp
	81003379	3/4" SelfTite Clamp
K	81006634	2 Wire Actuator, 24 Volt
	81006606	4 Wire Actuator, 24 Volt
L	81001525	16"W X 29"H X 4.5"D Manifold Cabinet
	81003497	24"W X 29"H X 4.5"D Manifold Cabinet
	81004517	40"W X 29"H X 4.5"D Manifold Cabinet
*Items B and C are available as a packaged set. Use Item number 81006651.		

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Hi-Flow Stainless Steel Manifold Specification



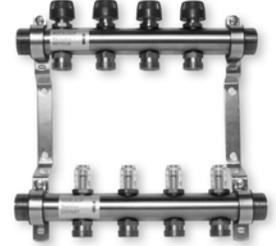
5435 North Service Road
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 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

WattsRadiant 1-1/2" Stainless Steel Manifold is composed of heavy-duty, DIN standard, 304 stainless steel. Matching fittings and accessories are made of solid brass and are heavily plated with nickel to match the appearance of the manifold trunk. Standard features include internal balancing valves, 0-4.0 gpm flow meters with built-in shut off valves and manifold brackets. All connections are made with the use of isolation valves, BSP to NPT or BSP to sweat adapters.

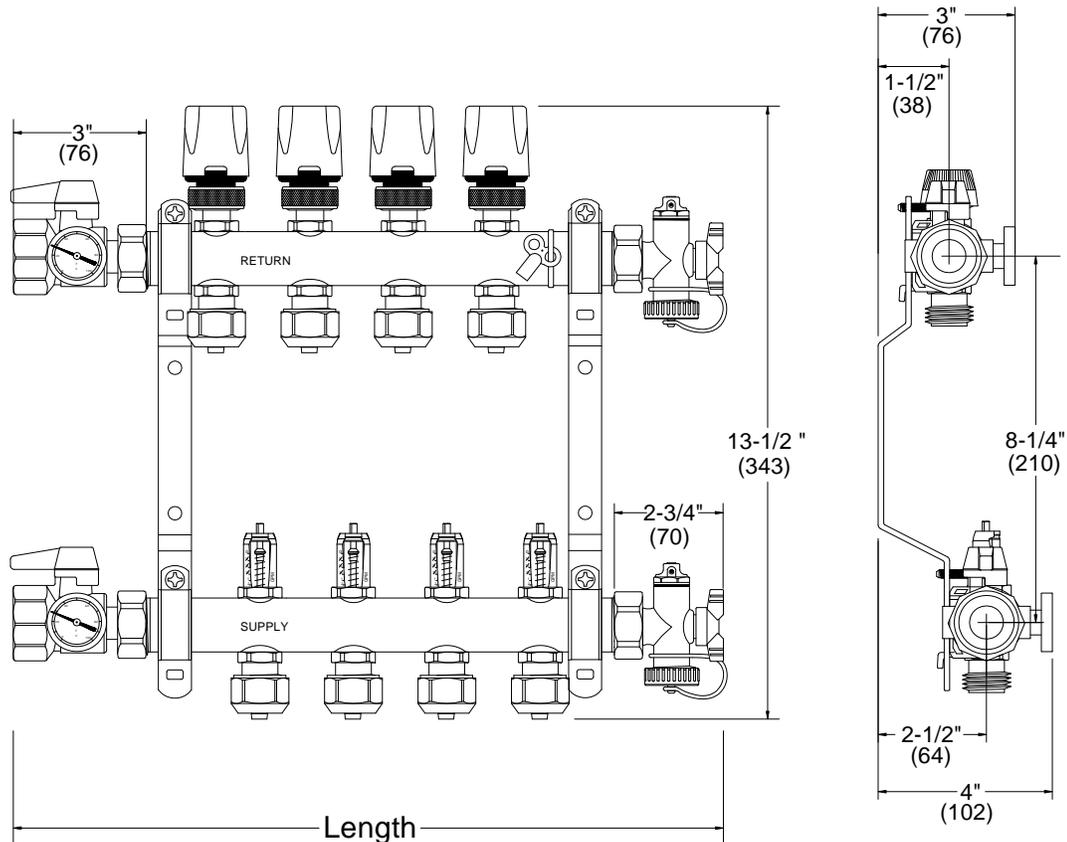


Technical Details

Trunk Material..... AISI 304 Stainless Steel
 Nominal Trunk Size..... 1-1/2" O.D. (38mm)
 Circuit Spacing..... 2-1/8" O.C. (54mm)
 Thread/Connection Type..... BSP Thread
 Max. Trunk Flow Rate..... 22 GPM (83.3 liters)
 Max. Circuit Flow Rate..... 4.0 GPM (15.1 liters)
 Max. Operating Temperature..... 194 °F (90 Celsius)
 Max. Operating Pressure..... 87 psi (5.9 bar)

Dimensions

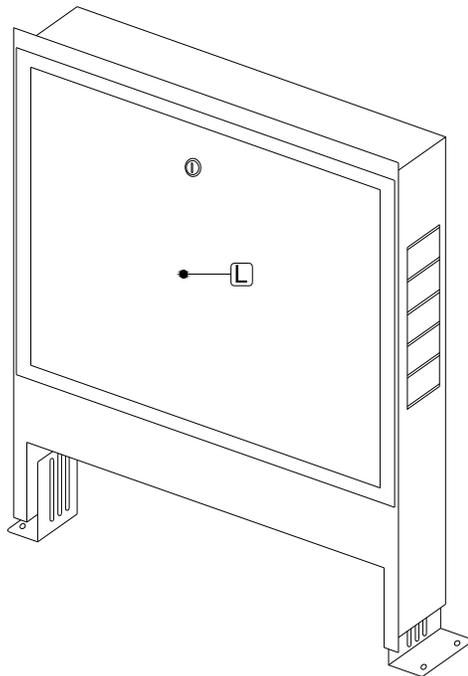
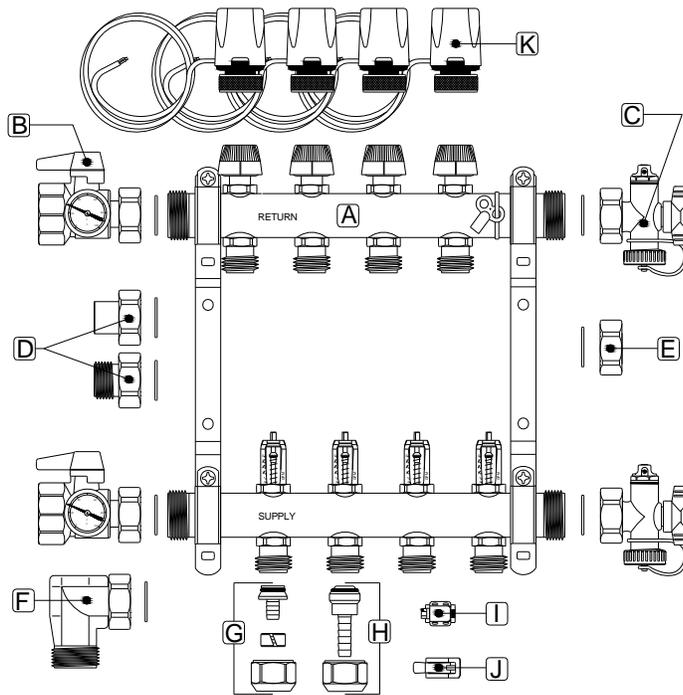
Manifold Sizes	2	3	4	5	6	7	8	9	10	11	12
Length inches	12.5	14.75	17	19.25	21.5	23.75	26	28.25	30.5	32.75	35
Millimeters	318	375	432	489	546	603	660	718	775	832	889



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Number in bracket is dimension in millimeters

Manifold Parts Schematic



ITEM	ORDER #	DESCRIPTION
A	81009661	2 Loop Stainless Steel Manifold
	81009662	3 Loop Stainless Steel Manifold
	81005355	4 Loop Stainless Steel Manifold
	81005356	5 Loop Stainless Steel Manifold
	81005357	6 Loop Stainless Steel Manifold
	81009663	7 Loop Stainless Steel Manifold
	81005358	8 Loop Stainless Steel Manifold
	81009664	9 Loop Stainless Steel Manifold
	81005359	10 Loop Stainless Steel Manifold
	81009665	11 Loop Stainless Steel Manifold
	81005360	12 Loop Stainless Steel Manifold
	B	81015002
81009666		1-1/2" Trunk Isolation Valve
C	81005457	Vent and Purge Assembly
D	81005368	1-1/2" FBSP X 1-1/2" MNPT Adapter
	81005480	1-1/2" FBSP X 1-1/2" Sweat Adapter
E	81005425	1-1/2" FBSP Manifold End Cap
F	81005365	FBSP X MBSP 90° Elbow
G	81005166	3/8" Compression PEX Manifold Fitting
	81005168	1/2" Compression PEX Manifold Fitting
	81005170	5/8" Compression PEX Manifold Fitting
	81005172	3/4" Compression PEX Manifold Fitting
H	81000678	3/8" Onix Manifold Fitting
	81000680	1/2" Onix Manifold Fitting
	81000682	5/8" Onix Manifold Fitting
	81003379	3/4" Onix Manifold Fitting
I	81000678	3/8" TorqueTite Clamp
	81000680	1/2" TorqueTite Clamp
	81000682	5/8" TorqueTite Clamp
	81003379	3/4" TorqueTite Clamp
	81000678	1" TorqueTite Clamp
J	81000678	3/8" SelfTite Clamp
	81000680	1/2" SelfTite Clamp
	81000682	5/8" SelfTite Clamp
	81003379	3/4" SelfTite Clamp
K	81006634	2 Wire Actuator, 24 Volt
	81006606	4 Wire Actuator, 24 Volt
L	81001525	16"W X 29"H X 4.5"D Manifold Cabinet
	81003497	24"W X 29"H X 4.5"D Manifold Cabinet
	81004517	40"W X 29"H X 4.5"D Manifold Cabinet

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Manifold Mounting Cabinet



Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

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 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

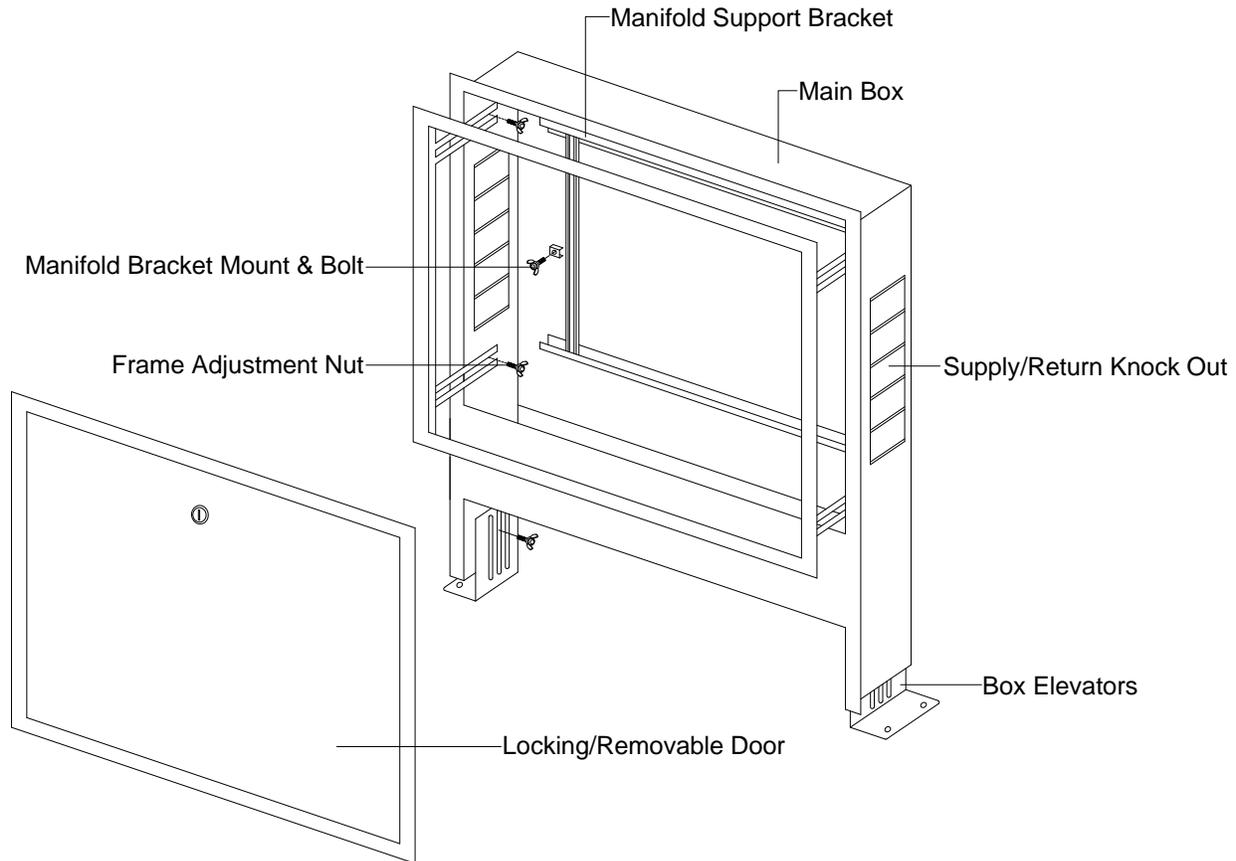
Product Details

Watts's manifold cabinets are constructed of white powder-coated sheet metal, providing increased resistance to corrosion and job-site abuse. Each cabinet comes with a lockable/removable door, four (4) rail locking nuts, four (4) support plates, eight (8) hex head bolts, two (2) fixed horizontal attachment rails and (2) vertical adjustment rails to better accommodate a wide range of manifold mounting brackets. Manifold cabinets also come complete with box elevators that can be used to raise the box from 1-1/2" to 4-1/2" off of the floor.

Description	Order Number	Part Number
Small Manifold Cabinet 16" X 29" X 4-1/2" (406mm X 737mm X 114mm)	81001525	PZ162904
Medium Manifold Cabinet 25" x 29" x 4-1/2" (610mm X 737mm X 114mm)	81003497	PZ242904
Large Manifold Cabinet 40" x 29" x 4-1/2" (1016mm X 737mm X 114mm)	81004517	PZ402904

Maximum Manifold Size per Manifold Cabinet

Cabinet Size	Cover Dimension	Cabinet Weight	No Vent/Purge	With Vent/Purge	With Vent/Purge & Ball Valve
16" W x 29" H x 4-1/2" D	17-3/8" W x 21-3/4" H	17 lbs.	4 Loop	4 Loop	3 Loop
25" W x 29" H x 4-1/2" D	27" W x 21-3/4" H	23 lbs	8 Loop	8 Loop	7 Loop
40" W x 29" H x 4-1/2" D	42" W x 21-3/4" H	35 lbs.	12 Loop	12 Loop	12 Loop



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Isotherm Control Module



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

5435 North Service Road
 Burlington, Ontario Canada
 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

The Isotherm Module is a compact, pre-piped, and pre-wired pump and mixing control designed to connect directly to a Watts 1" Stainless Steel manifold. The Isotherm is designed to speed up radiant installations by providing a complete compact piping and mixing system ready to go. The Isotherm can handle up to 50,000 Btu/H in a standard radiant system.

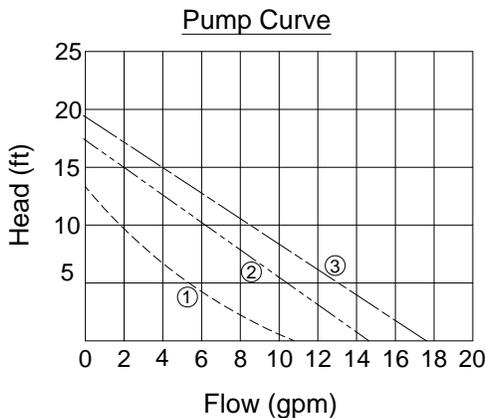
Temperature range of the Isotherm Control Module is 104° to 140°F providing a wide range of control to accommodate many project applications from floor warming to floor heating.

The mixing valve is easily adjustable and locks in position. A visual indicator pin indicates the valves mix temperature setting based on pin location.

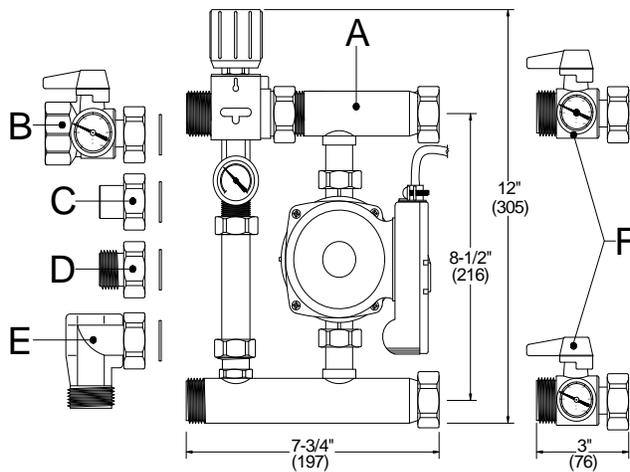
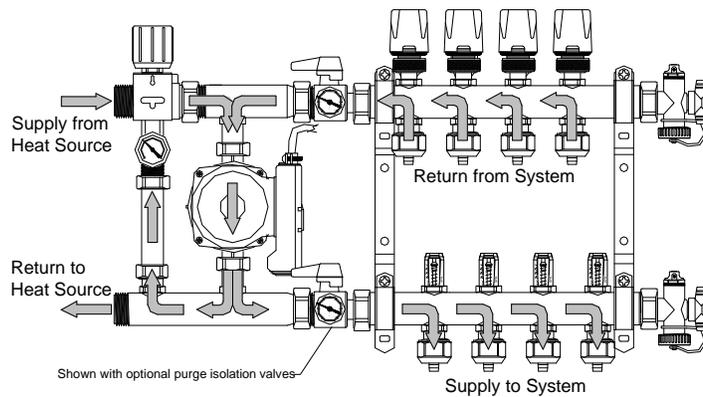
To ensure proper operation and prevent ghost flow conditions, a primary/secondary piping arrangement is required off the main boiler loop with a check valve installed in both supply & return lines.

Technical Details

Min. Supply Temperature..... 104°F
 Max. Supply Temperature..... 140°F
 Max. Heat Output..... 50 MBH
 Mixing Valve Material..... Bronze
 Circulator Casing..... Cast Iron
 Isotherm Piping..... Brass



How It Works



ITEM	PART #	DESCRIPTION
A	81005361	Isotherm Control Module
B	81003400	Trunk Isolation Valve/ pr
C	81005366	1" FBSP X 3/4" Sweat Adapt
	81005367	1" FBSP X 1" Sweat Adapt
D	81001990	1" FBSP X NPT Adapter
E	81005364	1" FBSP X MBSP Elbow
F	81006641	1" MBSP X 1" FBSP Isolation Valve

Number in bracket is dimension in millimeters

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ThermalPro™ Manifold Mixing Module



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

5435 North Service Road
 Burlington, Ontario Canada
 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

The ThermalPro™ Manifold Mixing Module is a compact, pre-piped mechanical system complete with circulator and 24 volt, 3-way mixing valve. ThermalPro™ Manifold Mixing Modules are designed to connect directly to our stainless steel manifolds to speed up installations and provide individual manifold mixing capabilities. ThermalPro™ mixing modules can handle up to 22 gpm. ThermalPro™ manifold mixing modules are designed to provide low temperature floor heating by connecting the mixing valve to the mixing control of your choice (not provided). The mixing valve is equipped with a manual adjustment knob, which can be used for single zone operation or temporary control of a multi-zone low temperature floor heating system.

Description

Order Number

Manifold Mixing Module with UPS25-58FC Circulator	81011873
Manifold Mixing Module with UPS25-99FC Circulator	81011872
1" X 1" Transition Fitting Set (to connect to 1" Stainless Steel manifolds)	81001988
1" X 1-1/4" Transition Fitting Set (to connect to Hi-Flow Stainless Steel manifolds)	81011871

Technical Details

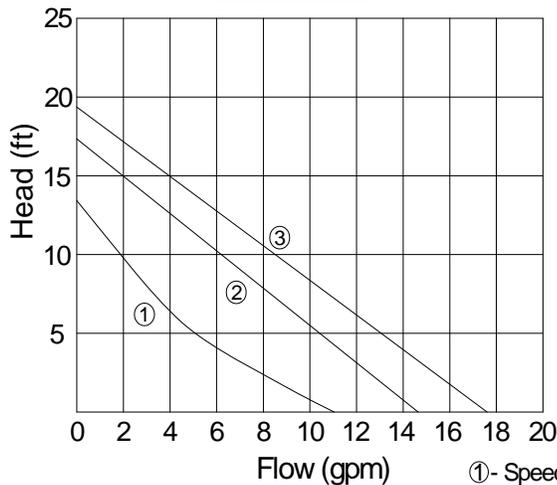
Mixing Valve/24V Motor

Valve material.....	Brass	Rotation (factory set).....	90°
Valve size with UPS25-58FC.....	7.3cv	Torque.....	45 in.lb (5Nm)
Valve size with UPS25-99FC.....	9.3cv	Enclosure.....	NEMA 1 IP41
Supply voltage.....	24VAC	Ambient temperature range.....	-15° to 55°C
Power consumption.....	2VA	Signal/Run time.....	1.7min (60Hz)

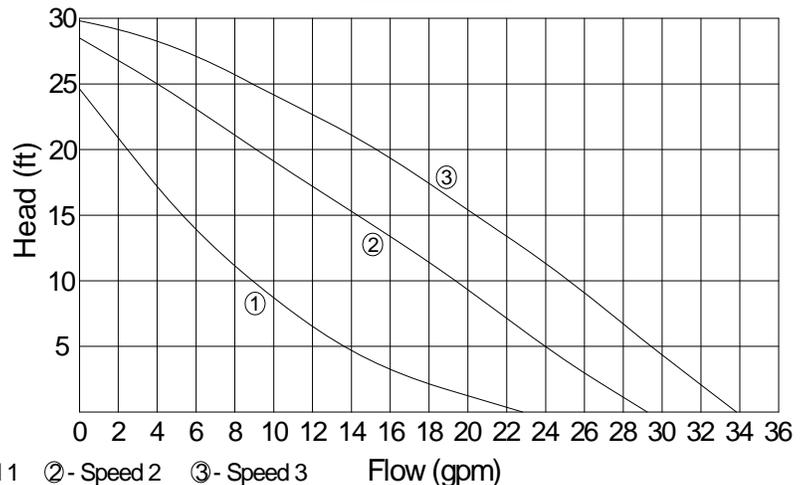
Circulators

Model	Spd	Volts	Amps	Watts	HP	Capacitor	Circulator Casing.....	Cast Iron
UPS25-58FC	1	115	0.75	87	1/25	10µF/180V	Maximum Fluid Temperature.....	110 °C
	2		0.66	80			Minimum Fluid Temperature.....	3°C
	3		0.55	60			Maximum Working Pressure.....	145 psi
UPS25-99FC	1	115	1.80	197	1.6	20µF/180V		
	2		1.50	179				
	3		1.30	150				

UPS25-58FC

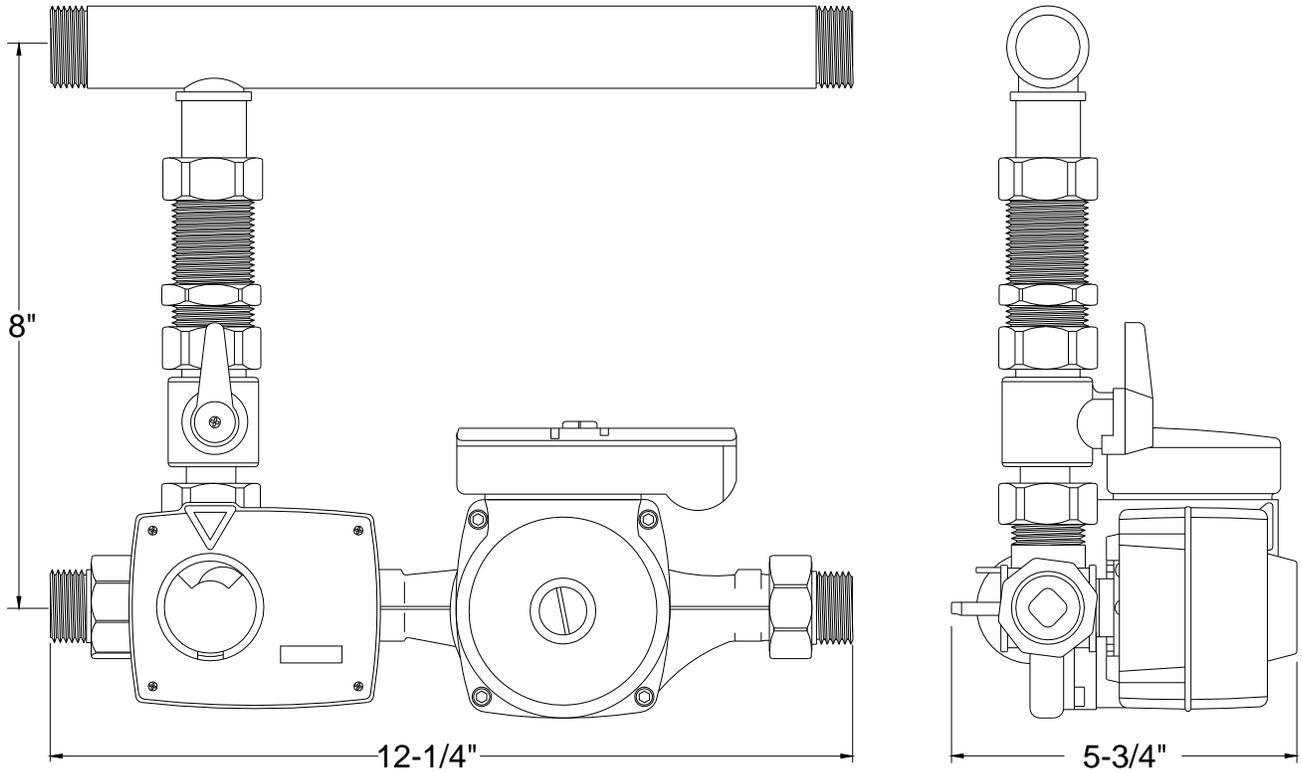


UPS25-99FC



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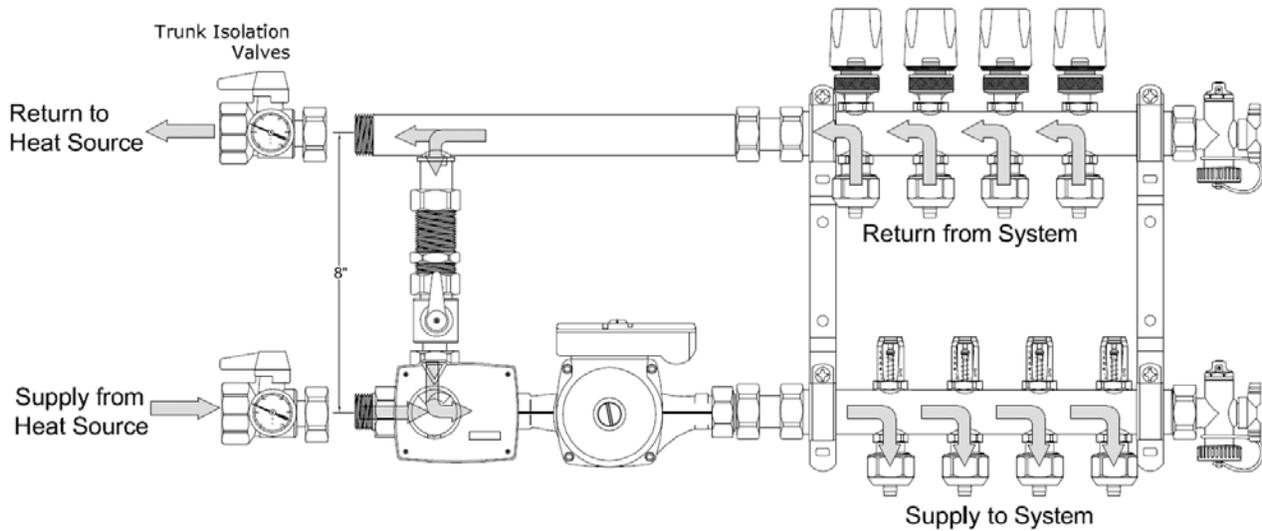
Dimensions



Front View

Side View

How It Works



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24 Volt Valve Actuator



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

5435 North Service Road
 Burlington, Ontario Canada
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 Ph: 905-332-4090
 Fax: 905-332-7068
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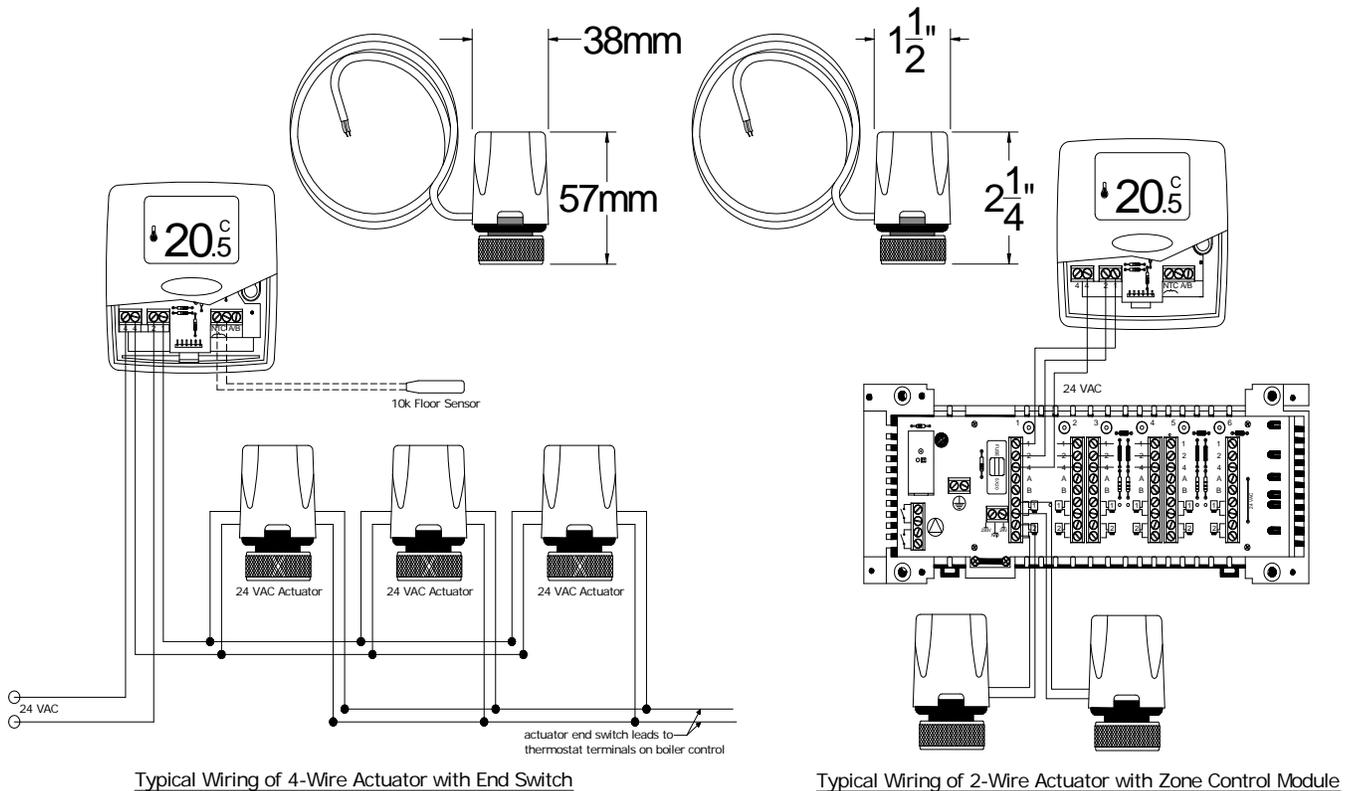
Product Details

This valve actuator is an optional feature for mounting directly to the balancing manifold. The actuator has a view window to indicate position of valve, open/close. The actuator provides on/off flow control for individual radiant circuits, or groups of circuits, to allow for zoning. Flow is balanced prior to installation of actuator by turning the adjustment valve under the cap with the key provided with the manifold. Actuator is 24VAC and is available with 2-wire, less end switch and 4-wire with end switch.

Description	Order Number	Part Number
2-Wire 24VAC, Normally Closed, 2.5W Actuator	81006634	22C24NC2
4-Wire 24VAC, Normally Closed, 2.5W Actuator with End Switch	81006606	22C24NC4

Technical Details

Max. actuator stroke.....	3.5mm
Working stroke on valve.....	2.5mm
Rated voltage.....	24V
Frequency.....	0 to 60 Hz
Power consumption.....	2.5W (VA) (continuous duty)
Version.....	NC (Normally Closed) NO (Normally Open); 2-wire; 4-wire with micro switch
Initial movement time.....	~90 seconds
Marking.....	CE according to EN 60730-1 + EN 60730-2-14
Degree of protection against ingress of water.....	IP44 according to EN 60730-2-14
Electrical protection class.....	Class II
Ambient temperature range.....	0°C up to 50°C during use
Storage temperature.....	-25°C up to 60°C
Mechanical connection.....	Threaded ring nut M30X1.5



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24 Volt Zone Control Module



Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

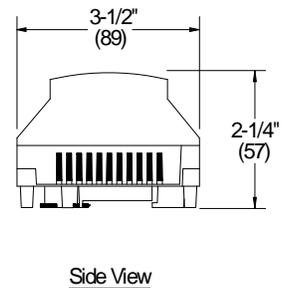
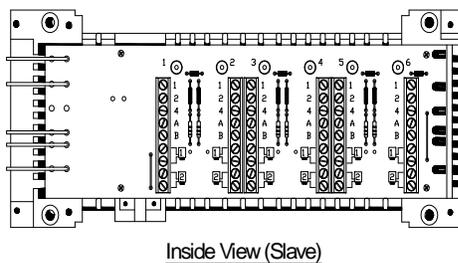
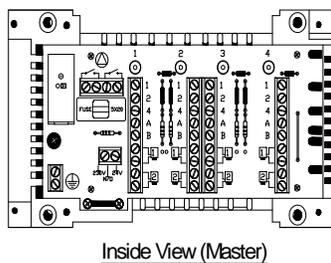
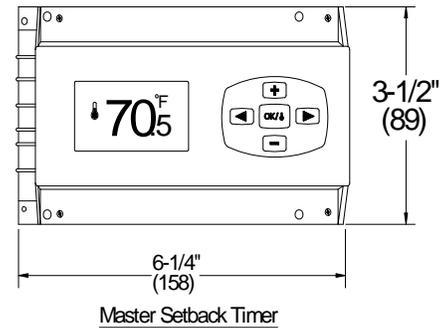
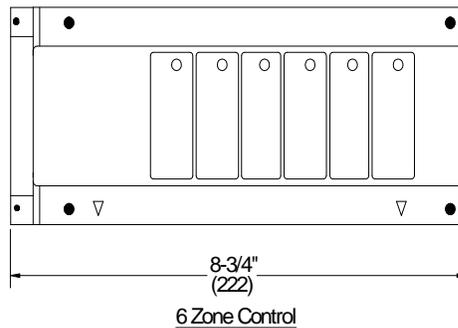
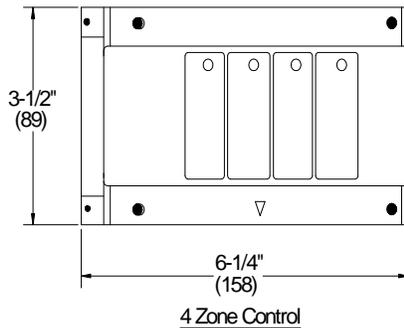
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 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

These Zone Control Modules are designed to operate WattsRadiant Electro-thermal actuators and greatly simplify wiring, reduce problems and decrease installation times. Master controls are equipped with valve and thermostat terminals, incoming 24-volt power connections and (2) 8 amp. dry contact terminals for pump and boiler operation. The use of Expansion (slave) units allows the control of more zones utilizing the same pump and boiler. Up to 2 Expansion modules can be connected to a Master control allowing for a maximum of 18 separate zones or thermostat connections.

The number of actuators controlled depends on the separate 24-Volt transformer (not supplied) powering the control. An external 40-VA transformer can control a maximum of 12 actuators. Up to 18 actuators can be controlled by a 60-VA transformer. However the physical limitations of the control itself are four actuators per zone terminal. Master Controls are switched by triacs, for quiet, safe, reliable electronic operation. Mounting is either by DIN rail or surface mount to a wall.

Description	Order Number	Part Number
4-Zone Master Control Module for 24-Volt Actuators	81006628	P-2086-4
6-Zone Master Control Module for 24-Volt Actuators	81006626	P-2082-6
4-Zone Expansion Control Module for 24-Volt Actuators	81006629	P-2088-4
6-Zone Expansion Control Module for 24-Volt Actuators	81006627	P-2084-6
Master Setback Timer for Zone Control Modules	81006630	P-2101



Number in bracket is dimension in millimeters

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1/18/2012

DualTemp Non-Programmable LCD Thermostats



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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 Ph: 905-332-4090
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Product Details

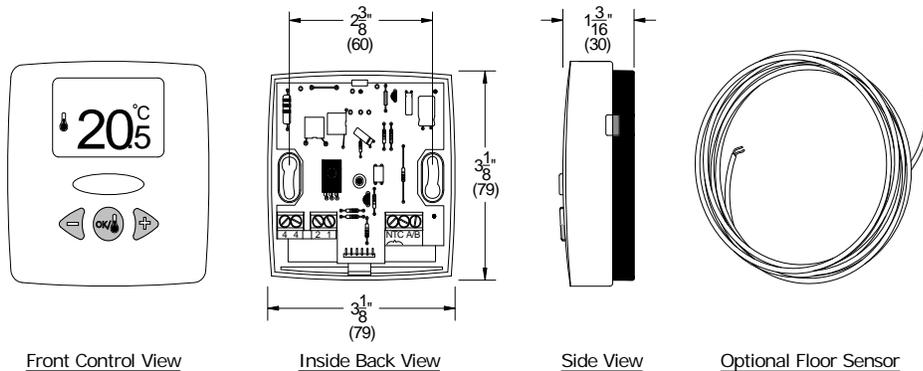
The DualTemp is a digital, non-programmable, electronic heat-only thermostat with the ability to control the temperature throughout a heating space through air temperature, floor temperature or a combination of air and floor temperatures. When used in "air" mode the thermostat maintains zone temperature based on room ambient temperature. In "floor" mode the thermostat maintains the user set floor temperature based on feedback through the 10k floor sensor (optional). When selecting to use both air and floor temperature feedback functions the room will be maintained at the selected ambient air temperature while limiting the floor temperature. The DualTemp non-programmable thermostat is available as either a three-wire, 24-VAC model or as a two-wire, AA battery powered thermostat.

Description	Order Number	Part Number
Digital DualTemp 2-wire, battery powered 24V thermostat with floor sensor	81005259	P-3158
Digital DualTemp 4-wire, 24V thermostat with floor sensor	81006632	P-2597

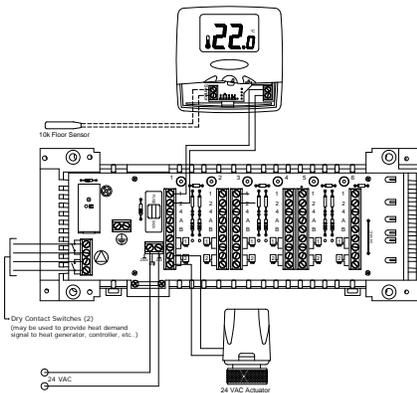
Technical Details

P-3158 (AA Battery)	
Operation Voltage	AA Battery
Contact	10A, 230Vac Relay
Sensor	NTC 10K Thermistor
Static Differential	1°F
Proportional	10 minutes for 3.5°F
Built-in manual setback	7°F
Air Temp. Range	41 - 99°F
Floor Temp. Range	41 - 99°F

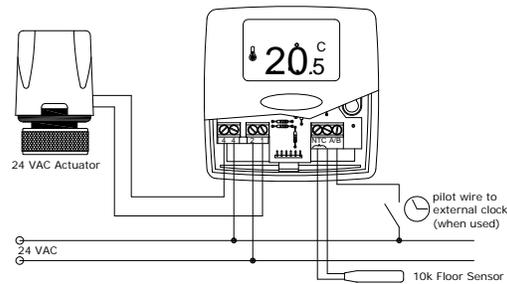
P-2597 (24 Volt)	
Operation Voltage	24V
Contact	10A, 230Vac Relay
Sensor	NTC 10K Thermistor
Static Differential	1°F
Proportional	10 minutes for 3.5°F
Built-in manual setback	7°F
Air Temp. Range	41 - 99°F
Floor Temp. Range	41 - 99°F



Number in bracket is dimension in millimeters



P-3158 with Zone Control Module



P-2597 with Actuator

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SubRay™ Radiant Panel System



Project Information

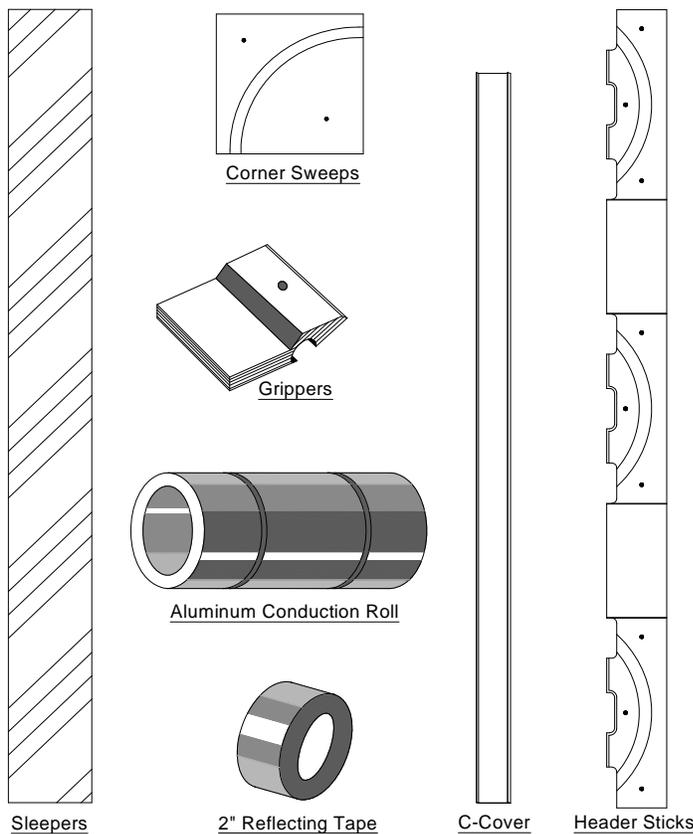
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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 Fax: 905-332-7068
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Product Details

SubRay is a fast and practical hydronic radiant system that goes under almost any finished flooring. The SubRay system uses cabinet grade Baltic Birch wood components and ASTM pipe sizes. The system is suitable for wood frame or concrete floors, in new construction or remodeling projects.

The system works with standard SDR9 3/8" PEX, 1/2" PEX, and 3/8" Onix tubing's. The SubRay System is designed to securely hold the PEX pipe without the squeaking or popping associated with the expansion of tubing. The SubRay System is available in 15mm components for 3/8" PEX and 18mm components for 1/2" PEX and 3/8" Onix tubing. The components are built with 11 layer laminations, and CNC routed to precise dimensions to give you a perfect fit radiant sub floor. The components are manufactured of Group 1 density or better as required by the hardwood floor manufacturers to ensure proper fastener holding capabilities.



Part #	Description
Header Sticks	
81002023	Header Sticks, 15mm, 3" wide x 42" long with 3 bends
81002026	Header Sticks, 18mm, 3" wide x 42" long with 3 bends
Sleepers	
81002032	Sleepers, 15mm, 6" wide x 60" long
81002035	Sleepers, 18mm, 6" wide x 60" long
Corner Sweeps	
81002012	Corner Sweeps, 15mm, 8" x 8"
81002014	Corner Sweeps, 18mm, 8" x 8"
Aluminum Conduction Roll	
81002003	Aluminum Conduction Roll, 16" wide x 50' long
Grippers	
81002017	Grippers, 15mm
81002020	Grippers, 18mm
2" Reflecting Tape	
81002029	Reflecting Tape, 2"
C-Covers	
81002006	C-Covers, 15mm, 2" x 4' long
81002008	C-Covers, 18mm, 2" x 4' long

Note:

15mm SubRay components are for use with 3/8" PEX.
 18mm SubRay components are for use with 3/8" Onix and 1/2" PEX.

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ThermalPro™ Boiler Connection Station



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Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The ThermalPro™ boiler connection station is a compact, pre-piped mechanical system complete with circulator, isolation ball valves, thermometers, pressure bypass valve and, on mixed stations, a 24 volt, 3-way mixing valve. ThermalPro™ boiler stations are designed to speed up installation by connecting directly to a hydronic heating system providing a complete and compact piping and mixing system in a box. ThermalPro™ boiler stations can handle up to 150,000 Btu/H.

ThermalPro™ non-mixed boiler stations can provide a wide range of control to accommodate many project applications from hydronic air handlers to baseboards. ThermalPro™ mixed boiler stations are designed to provide low temperature floor heating by connecting the mixing valve to the mixing control of your choice (not provided). The mixing valve is equipped with a manual adjustment knob, which can be used for single zone operation or temporary control of a multi-zone low temperature floor heating system.

Description

Order Number

ThermalPro Boiler Station, Non-Mixed, UPS25-58F	81010367
ThermalPro Boiler Station, Non-Mixed, UPS25-99F	81010247
ThermalPro Boiler Station, Mixed, 7.31 Cv	81010368
ThermalPro Boiler Station, Mixed, 9.28 Cv, UPS25-58F	81010369
ThermalPro Boiler Station, Mixed, 9.28 Cv, UPS25-99F	81010248

Technical Details

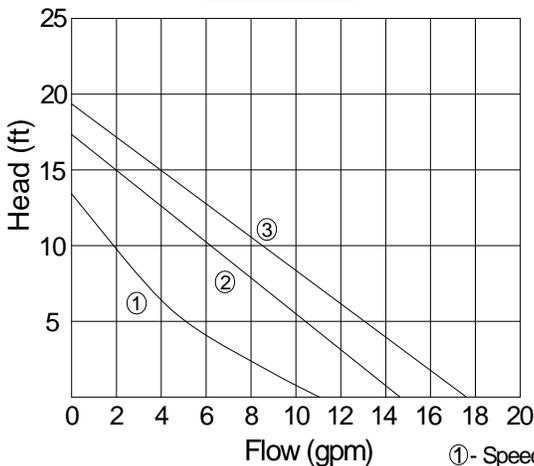
Mixing Valve/24V Motor

Valve material.....	Brass	Rotation (factory set).....	90°
Valve size with UPS25-58FC.....	7.3cv	Torque.....	45 in.lb (5Nm)
Valve size with UPS25-99FC.....	9.3cv	Enclosure.....	NEMA 1 IP41
Supply voltage.....	24VAC	Ambient temperature range.....	-15° to 55°C
Power consumption.....	2VA	Signal/Run time.....	1.7min (60Hz)

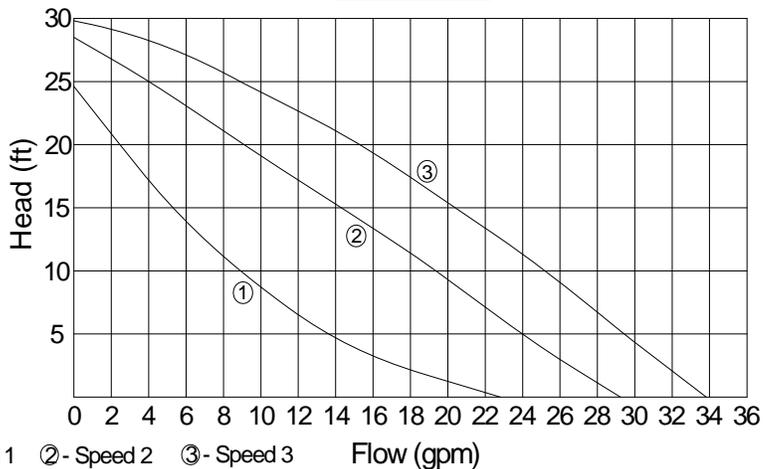
Circulators

Model	Spd	Volts	Amps	Watts	HP	Capacitor	Circulator Casing.....	Cast Iron
UPS25-58FC	1	115	0.75	87	1/25	10µF/180V	Maximum Fluid Temperature.....	110 °C
	2		0.66	80			Minimum Fluid Temperature.....	3°C
	3		0.55	60			Maximum Working Pressure.....	145 psi
UPS25-99FC	1	115	1.80	197	1.6	20µF/180V		
	2		1.50	179				
	3		1.30	150				

UPS25-58FC

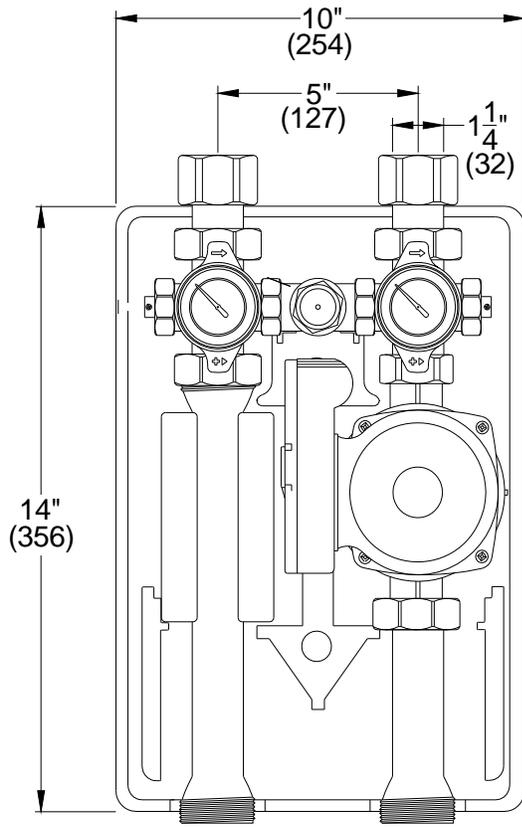


UPS25-99FC



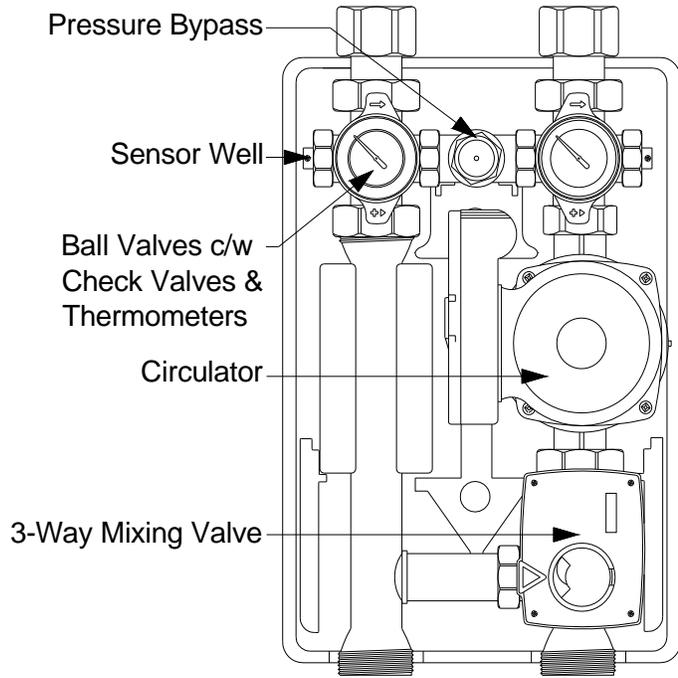
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Dimensions



7" Deep

Non-Mixed



Mixed

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ThermalPro™ Boiler Station Header



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 www.wattscanada.ca

Project Information

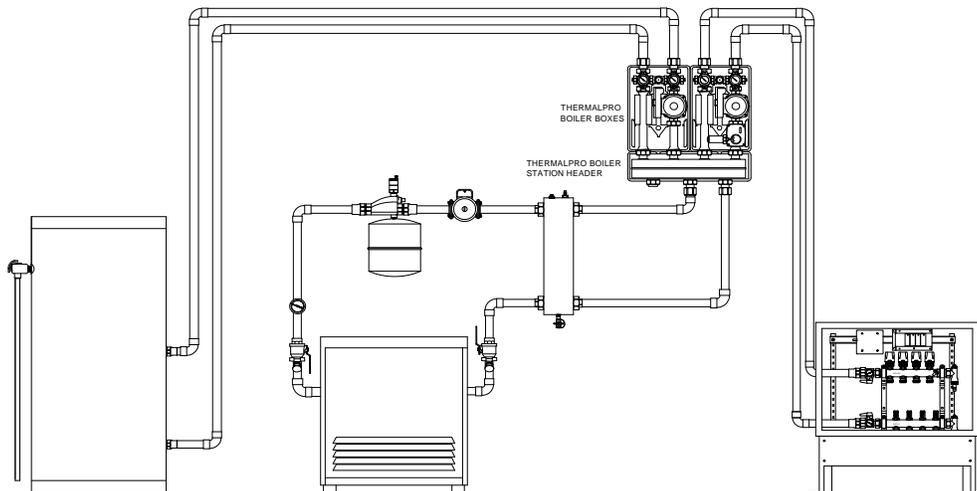
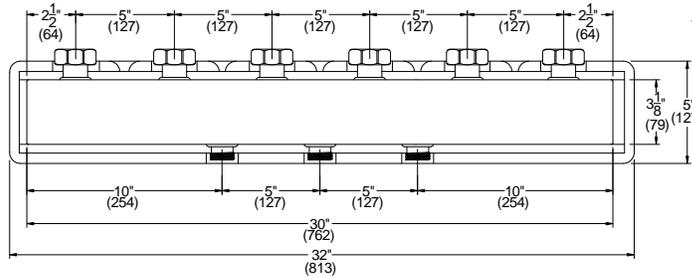
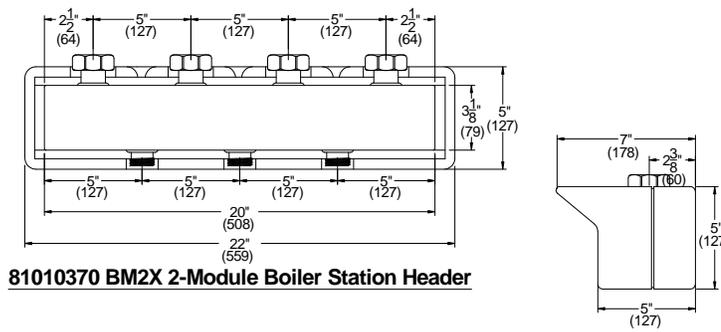
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The ThermalPro™ Boiler Station Header provides an easy way to combine ThermalPro™ Boiler Stations together on a single manifold. This greatly reduces installation time and money as the stations are connected directly to the header through union connections. Boiler Station Headers are available to connect either two or three ThermalPro™ units and come with an insulating cover.

Description	Order Number	Part Number
BM2X 2-Module Boiler Station Header	81010370	D700102
BM3X 3-Module Boiler Station Header	81010371	D700103

Dimensions



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NOTES

PS HYDRAULIC SEPARATOR (22 GPM)



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 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

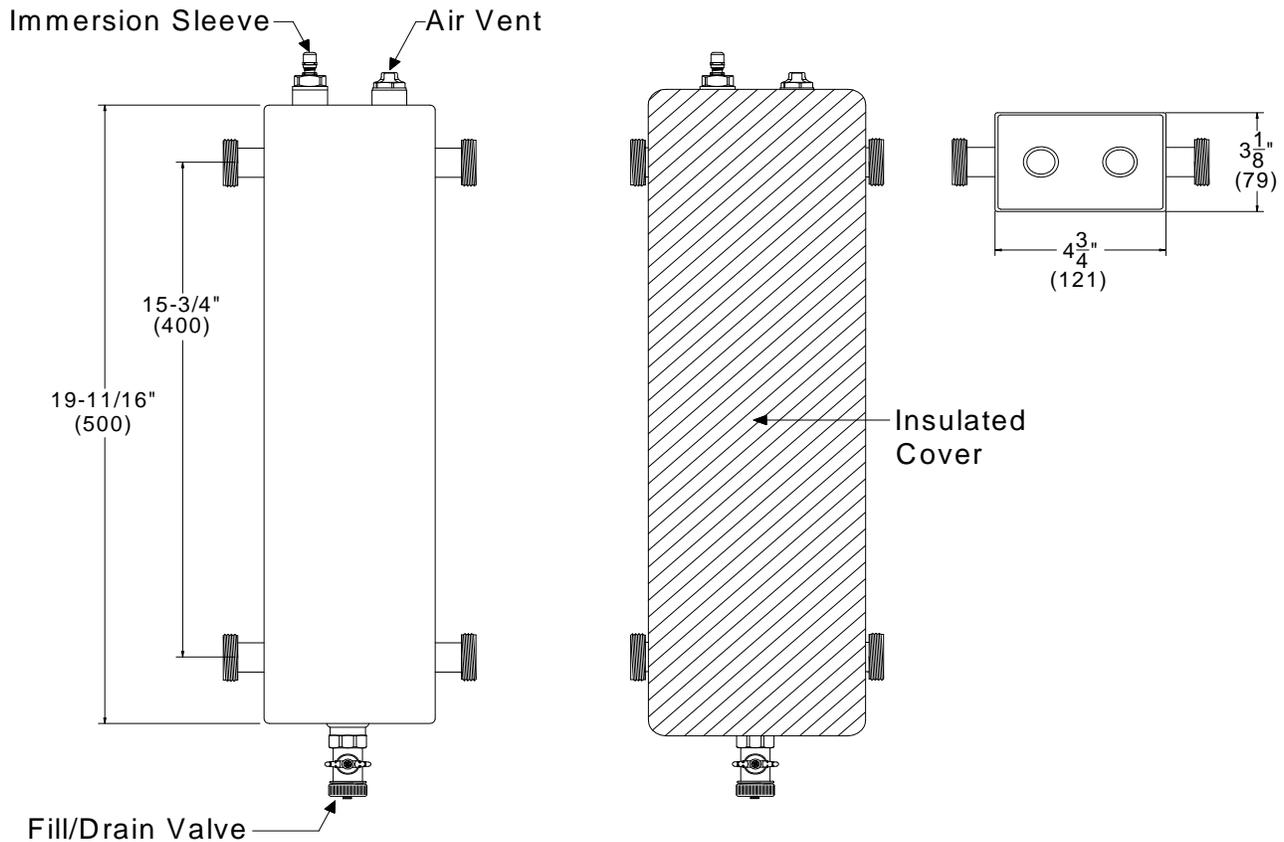
The PS Hydraulic Separator is designed for use in boiler systems for the hydraulic separation of a boiler heating circuit from its downstream mixing valve or pump heating circuits.

The separator consists of a square hollow profile chamber with four flat-sealing 1-1/2" BSP male thread connection points. The separator also has 1/2" BSP female thread connections for boiler fill and drain valve, venting unit and immersion well.

The unit is supplied complete with insulation, boiler fill and drain valve, immersion well, venting unit, gaskets, wall bracket and mounting materials. Union connections must be ordered separately and are available in either NPT or copper sweat.

Technical Details

<u>Part Number</u>	Maximum volume flow:	22 GPM
	Maximum operating pressure:	87 PSI
81010375	Boiler heating circuit connection:	1-1/2" BSP Male G
	Mixing valve/boiler module connection:	1-1/2" BSP Male G



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PS HYDRAULIC SEPARATOR (44 GPM)



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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 L7L 5H7
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Product Details

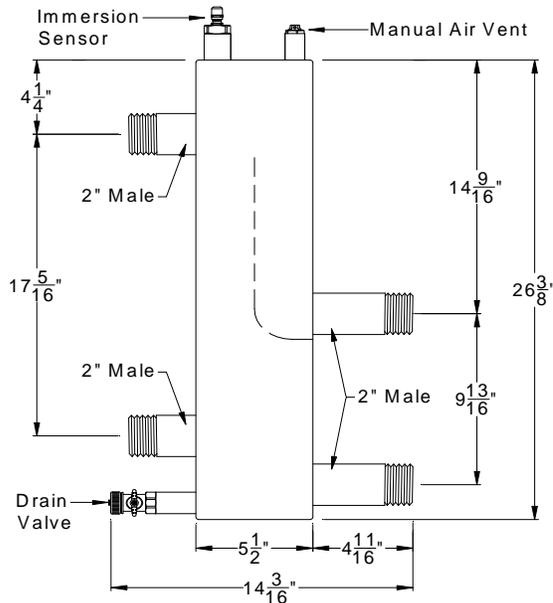
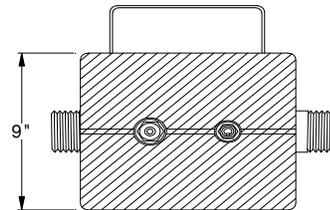
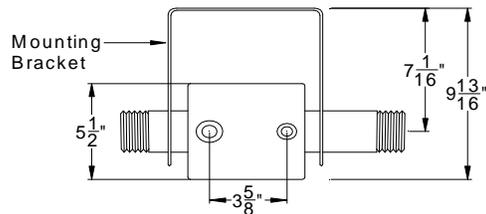
The PS Hydraulic Separator is designed for use in boiler systems for the hydraulic separation of a boiler heating circuit from its downstream mixing valve or pump heating circuits.

The separator consists of a square hollow profile chamber with four flat-sealing 2" BSP male thread connection points. The separator also has 1/2" BSP female thread connections for boiler fill and drain valve and immersion well and 3/8" BSP female for venting unit.

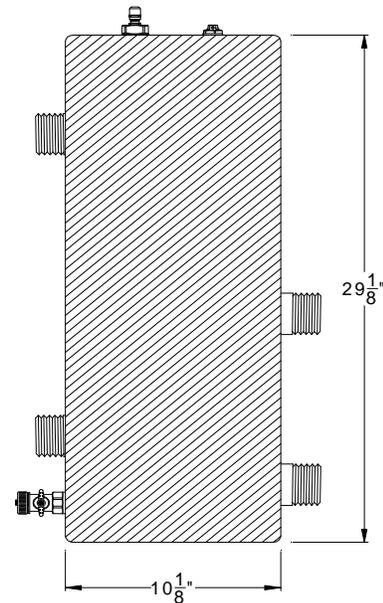
The unit is supplied complete with insulation, boiler fill and drain valve, immersion well, venting unit, gaskets, wall bracket and mounting materials. Union connections must be ordered separately.

Technical Details

<u>Part Number</u>	Maximum volume flow:	44 GPM
	Maximum operating pressure:	87 PSI
81011865	Boiler heating circuit connection:	2" BSP Male G
	Mixing valve/boiler module connection:	2" BSP Male G



Dimensional



With Insulated Covering

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THERMALPRO MANIFOLD STATION (Isotherm Mixing Module)



5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The ThermalPro Isotherm Mixing Module is a compact, pre-piped, pre-wired pump and mixing valve control connected directly to a WattsRadiant 1" Stainless Steel manifold and installed in a beautiful white powder coated steel cabinet with cover door.

The concept of the ThermalPro Isotherm Mixing Module is to speed up radiant installations by providing a complete piping and mixing system in a box and ready to go. The Isotherm mixing module can provide up to 50,000 Btu/h for a standard radiant heating system. The temperature range of the Isotherm mixing module's adjustable and lockable mixing valve is 110°F to 140°F providing a wide range of control to accommodate many project design applications from floor warming to floor heating.

The Manifold Station can be provided with manifold loop actuating motors and a WattsRadiant Zone Control Module installed in the cabinet to simplify system zone wiring.

Technical Details

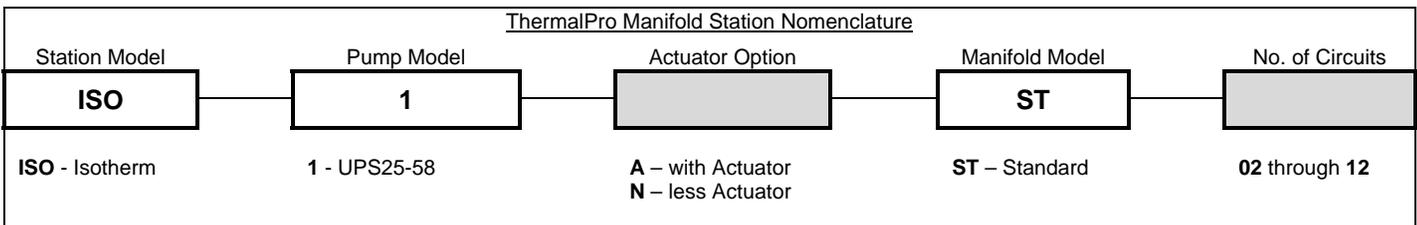
<u>Isotherm</u>			
Minimum Supply Temperature.....	104°F	Mixing Valve Material.....	Bronze
Maximum Supply Temperature.....	140°F	Isotherm Piping.....	Brass
Maximum Heat Output.....	50 MBH		

<u>Manifolds</u>			
Trunk Material.....	AISI 304 S.S.	Maximum Operating Temperature.....	90°C
Manifold Connection (Standard).....	1" BSP	Maximum Operating Pressure.....	87 PSI
Circuit Spacing.....	53.8 mm O.C.	Maximum Trunk Flow Rate (Standard).....	12 GPM
Thread Connection Type.....	BSP	Maximum Circuit Flow Rate (Standard).....	2 GPM

<u>Control Module/Actuator</u>			
Module Voltage.....	24 V	Actuator Voltage.....	24 V
Maximum Amperage/Terminal Block.....	0.3 A.	Actuator Power Consumption.....	2.5 W (VA)
Maximum No. Actuators/Terminal Block.....	4	Actuator Ambient Temperature Range.....	0°C up to 50°C
Maximum No. Thermostats/Zones.....	18*	* based on 6 Zone Master with 2 Expansion Modules	

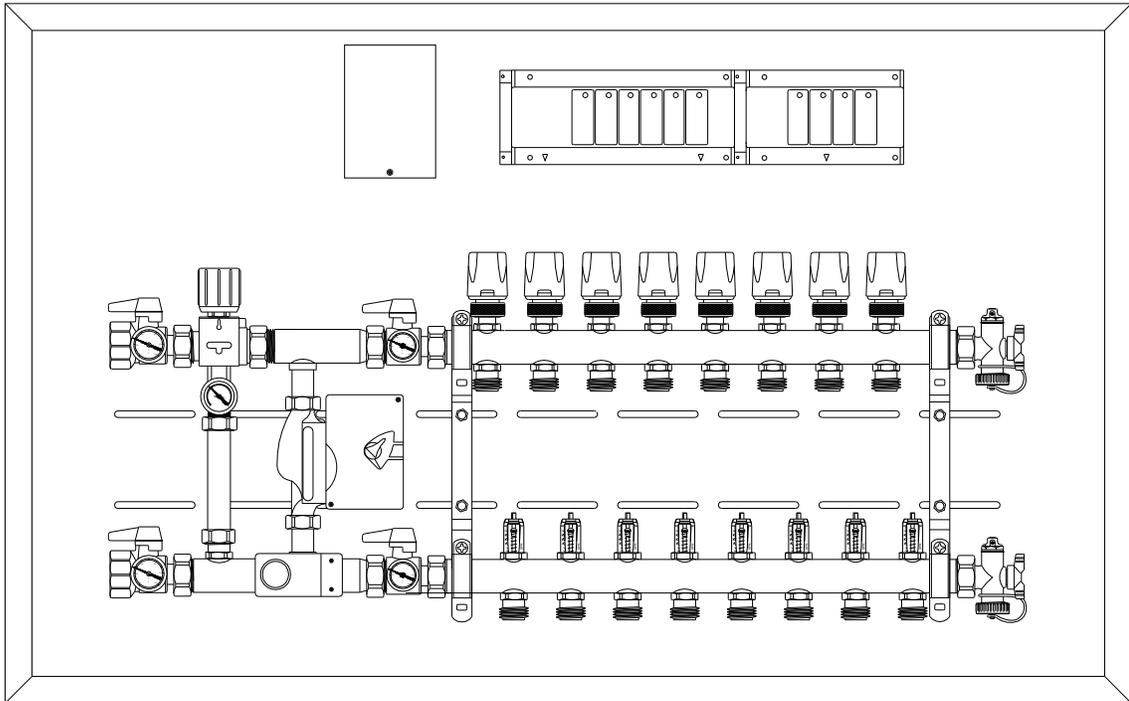
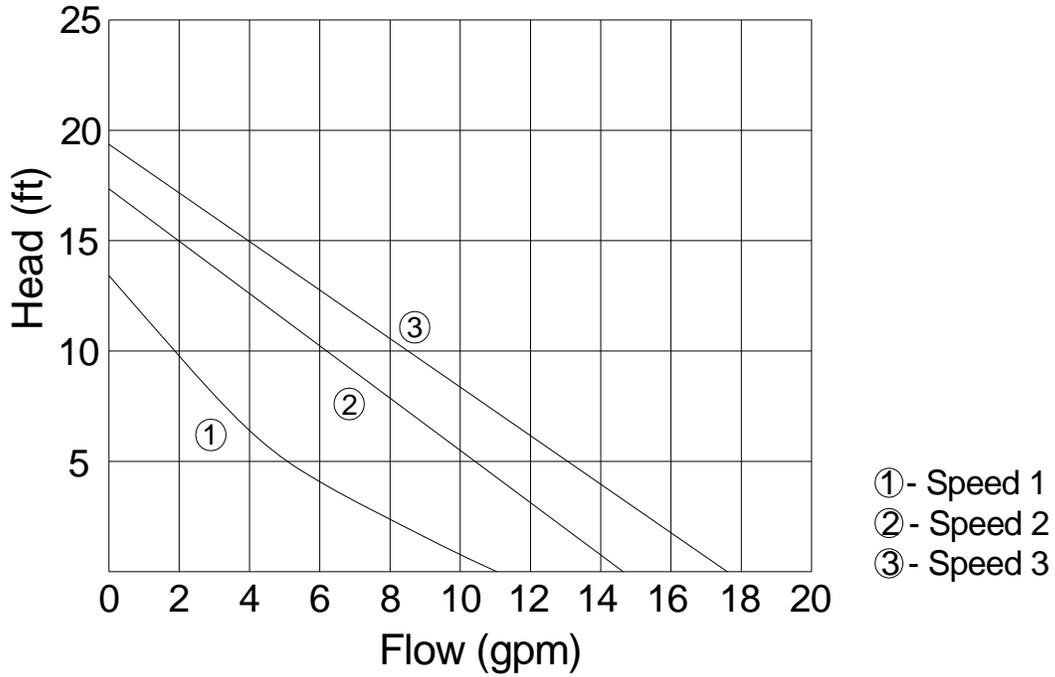
<u>Cabinets</u>		
<u>Manifold Size</u>	<u>Dimension (Finished)</u>	<u>Dimension (Rough-in)</u>
2 to 4 Loop	26" high x 33" wide x 5-3/4" deep	24" high x 31" wide x 5-3/4" deep
5 to 8 Loop	26" high x 41" wide x 5-3/4" deep	24" high x 40" wide x 5-3/4" deep
9 to 12 Loop	26" high x 51" wide x 5-3/4" deep	24" high x 50" wide x 5-3/4" deep

<u>Circulators</u>							
<u>Model</u>	<u>Spd</u>	<u>Volts</u>	<u>Amps</u>	<u>Watts</u>	<u>HP</u>	<u>Capacitor</u>	<u>Circulator Casing.....</u>
UPS25-58FC	1	115	0.75	87	1/25	10µF/180V	Cast Iron
	2		0.66	80			Maximum Fluid Temperature.....
	3		0.55	60			Minimum Fluid Temperature.....
							Maximum Working Pressure.....



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UPS25-58FC



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THERMALPRO MANIFOLD STATION (Mixing Module)



5435 North Service Road
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L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The ThermalPro Mixing Module is a compact, pre-piped, pre-wired pump and mixing valve package connected directly to a WattsRadiant 1" Standard or 1-1/2 Hi-Flow Stainless Steel manifold and installed in a white powder coated steel cabinet with cover door. The concept of the ThermalPro Mixing Module is to speed up radiant installations by providing a complete piping and mixing system in a box and ready to go. ThermalPro Mixing Modules are supplied with your choice of either an UPS25-58 or UPS26-99 circulator depending on your projects flow and/or head requirements. The unit also comes equipped with a 3-way 24V motorized mixing valve, the controller is sold separately. The Manifold Station can be provided with manifold loop actuating motors and a WattsRadiant Zone Control Module, as an option, installed in the cabinet to simplify system zone wiring.

Technical Details

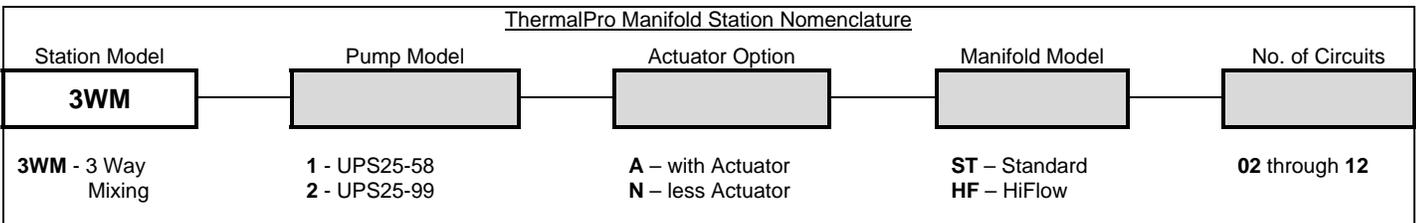
<u>Manifolds</u>			
Trunk Material.....	AISI 304 S.S.	Maximum Operating Pressure.....	87 PSI
Manifold Connection (Standard).....	1" BSP	Maximum Trunk Flow Rate (Standard).....	12 GPM
Manifold Connection (HiFlow).....	1-1/4" BSP	Maximum Trunk Flow Rate (HiFlow).....	22 GPM
Circuit Spacing.....	53.8 mm O.C.	Maximum Circuit Flow Rate (Standard).....	2 GPM
Thread Connection Type.....	BSP	Maximum Circuit Flow Rate (HiFlow).....	4 GPM
Maximum Operating Temperature.....	90°C		

<u>Mixing Valve/24V Motor</u>			
Valve Material.....	Brass	Rotation (factory set).....	90°
Valve Size with UPS25-58FC.....	7.3 cv	Torque.....	45 in. lb (5Nm)
Valve Size with UPS25-99FC.....	9.3 cv	Enclosure.....	NEMA 1 IP41
Supply Voltage.....	24 VAC	Ambient Temperature Range.....	-15° to 55°C
Power Consumption.....	2 VA	Signal/Run Time.....	1.7 min (60Hz)

<u>Control Module/Actuator</u>			
Module Voltage.....	24 V	Actuator Voltage.....	24 V
Maximum Amperage/Terminal Block.....	0.3 A.	Actuator Power Consumption.....	2.5 W (VA)
Maximum No. Actuators/Terminal Block.....	4	Actuator Ambient Temperature Range.....	0°C up to 50°C
Maximum No. Thermostats/Zones.....	18*	* based on 6 Zone Master with 2 Expansion Modules	

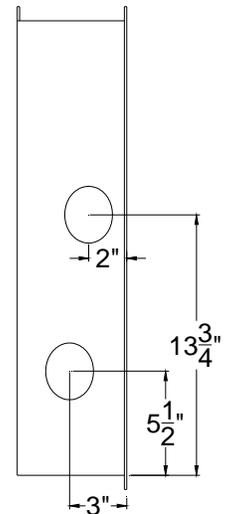
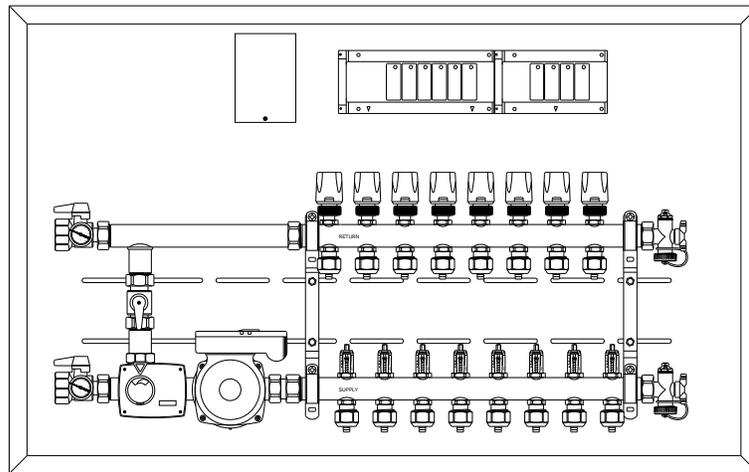
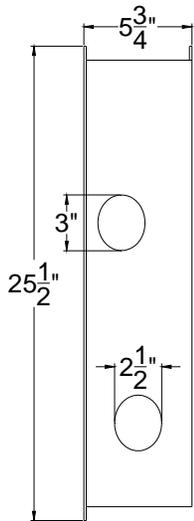
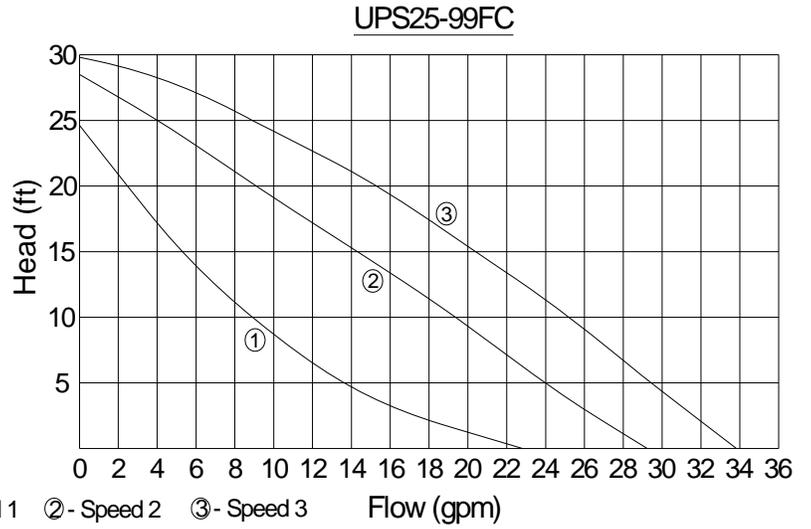
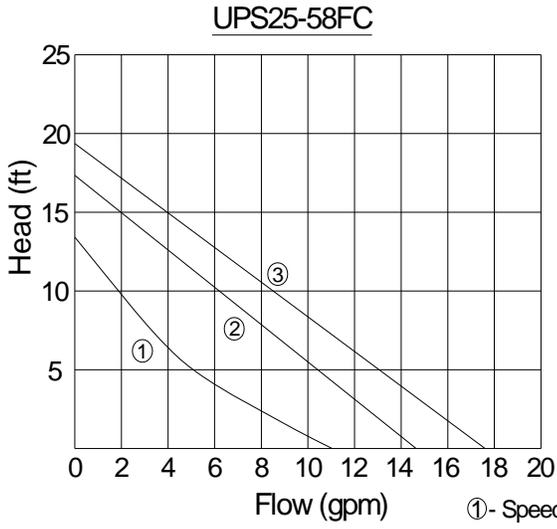
<u>Cabinets</u>			
<u>Manifold Size</u>	<u>Dimension (Finished)</u>	<u>Dimension (Rough-in)</u>	
2 to 4 Loop	26" high x 33" wide x 5-3/4" deep	24" high x 31" wide x 5-3/4" deep	
5 to 8 Loop	26" high x 42" wide x 5-3/4" deep	24" high x 40" wide x 5-3/4" deep	
9 to 12 Loop	26" high x 52" wide x 5-3/4" deep	24" high x 50" wide x 5-3/4" deep	

<u>Circulators</u>								
<u>Model</u>	<u>Spd</u>	<u>Volts</u>	<u>Amps</u>	<u>Watts</u>	<u>HP</u>	<u>Capacitor</u>		
UPS25-58FC	1	115	0.75	87	1/25	10µF/180V	Circulator Casing.....	Cast Iron
	2		0.66	80			Maximum Fluid Temperature.....	110 °C
	3		0.55	60			Minimum Fluid Temperature.....	3°C
UPS25-99FC	1	115	1.80	197	1.6	20µF/180V	Maximum Working Pressure.....	145 psi
	2		1.50	179				
	3		1.30	150				



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Pump Curves



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THERMALPRO MANIFOLD STATION (Non-Mixed, With Pump)



5435 North Service Road
Burlington, Ontario Canada
L7L 5H7
Ph: 905-332-4090
Fax: 905-332-7068
www.wattscanada.ca

Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The ThermalPro Non-Mixed Manifold Station consists of either a WattsRadiant 1" Standard or HiFlow Stainless Steel manifold installed in a beautiful white powder coated steel cabinet with cover door. Manifold Stations are available in 2 to 12 loop manifold configurations. The Manifold Station can be provided with manifold loop actuating motors and a WattsRadiant Zone Control Module installed in the cabinet to simplify system zone wiring. Unit also comes with your choice of a Grundfos UPS25-58FC or UPS25-99FC multi-speed circulator.

Technical Details

<u>Manifolds</u>			
Trunk Material.....	AISI 304 S.S.	Maximum Operating Pressure.....	87 PSI
Manifold Connection (Standard).....	1" BSP	Maximum Trunk Flow Rate (Standard).....	12 GPM
Manifold Connection (HiFlow).....	1-1/4" BSP	Maximum Trunk Flow Rate (HiFlow).....	22 GPM
Circuit Spacing.....	53.8 mm O.C.	Maximum Circuit Flow Rate (Standard).....	2 GPM
Thread Connection Type.....	BSP	Maximum Circuit Flow Rate (HiFlow).....	4 GPM
Maximum Operating Temperature.....	90°C		

<u>Control Module/Actuator</u>			
Module Voltage.....	24 V	Actuator Voltage.....	24 V
Maximum Amperage/Terminal Block.....	0.3 A.	Actuator Power Consumption.....	2.5 W (VA)
Maximum No. Actuators/Terminal Block.....	4	Actuator Ambient Temperature Range.....	0°C up to 50°C
Maximum No. Thermostats/Zones.....	18*	* based on 6 Zone Master with 2 Expansion Modules	

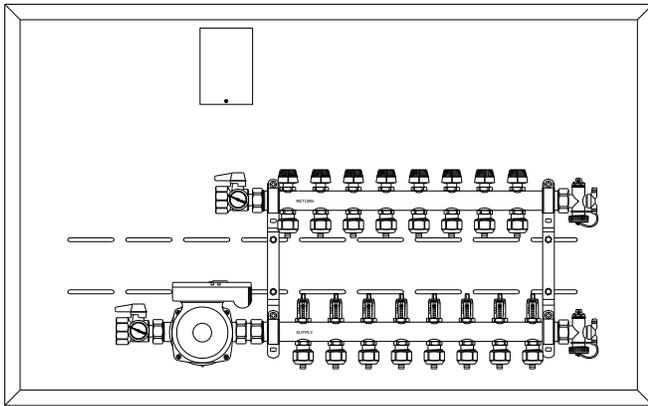
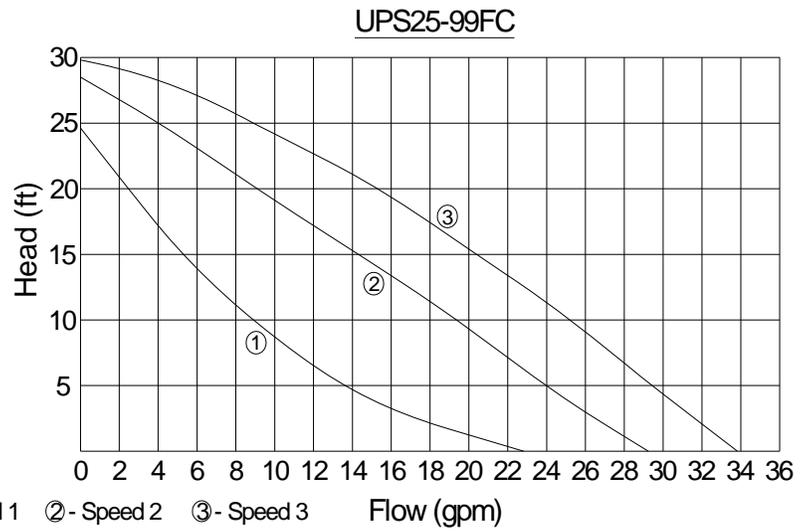
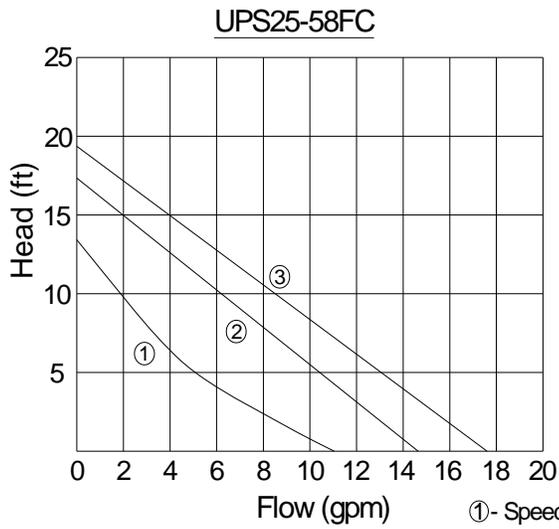
<u>Cabinets</u>		
<u>Manifold Size</u>	<u>Dimension (Finished)</u>	<u>Dimension (Rough-in)</u>
2 to 6 Loop	24" high x 33" wide x 5-3/4" deep	24" high x 31" wide x 5-3/4" deep
7 to 10 Loop	24" high x 42" wide x 5-3/4" deep	24" high x 40" wide x 5-3/4" deep
11 to 12 Loop	24" high x 52" wide x 5-3/4" deep	24" high x 50" wide x 5-3/4" deep

<u>Circulators</u>							
<u>Model</u>	<u>Spd</u>	<u>Volts</u>	<u>Amps</u>	<u>Watts</u>	<u>HP</u>	<u>Capacitor</u>	<u>Circulator Casing</u>
UPS25-58FC	1	115	0.75	87	1/25	10µF/180V	Cast Iron
	2		0.66	80			Maximum Fluid Temperature.....
	3		0.55	60			Minimum Fluid Temperature.....
UPS25-99FC	1	115	1.80	197	1.6	20µF/180V	Maximum Working Pressure.....
	2		1.50	179			145 psi
	3		1.30	150			

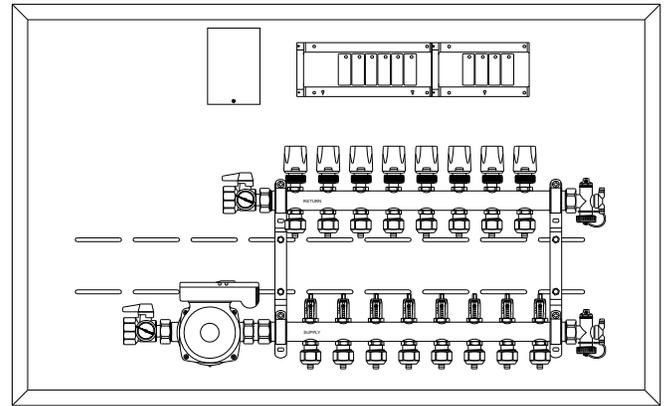
<u>ThermalPro Manifold Station Nomenclature</u>				
Station Model	Pump Model	Actuator Option	Manifold Model	No. of Circuits
NOM	[]	[]	[]	[]
NOM – No Mixing	0 – No Pump 1 - UPS25-58 2 - UPS25-99	A – with Actuator N – less Actuator	ST – Standard HF – HiFlow	02 through 12

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Pump Curves



Pumped Manifold Station less Actuators



Pumped Manifold Station with Actuators

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THERMALPRO MANIFOLD STATION (Non-Mixed, No Pump)



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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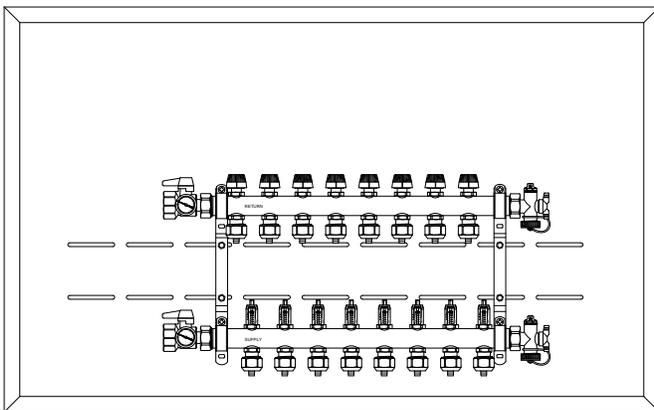
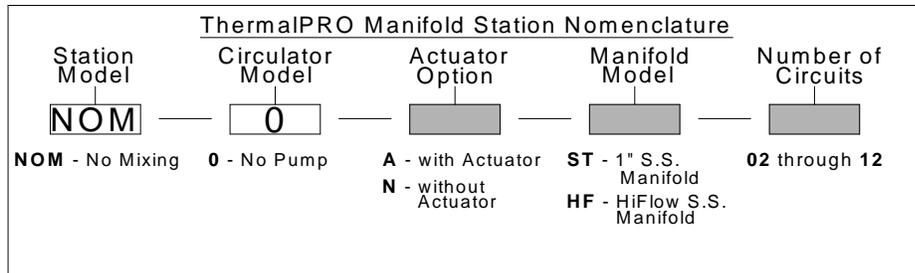
Product Details

The ThermalPro Non-Mixed Manifold Station consists of either a WattsRadiant 1" Standard or HiFlow Stainless Steel manifold installed in a beautiful white powder coated steel cabinet with cover door. Manifold Stations are available in 2 to 12 loop manifold configurations. The Manifold Station can be provided with manifold loop actuating motors and a WattsRadiant Zone Control Module installed in the cabinet to simplify system zone wiring.

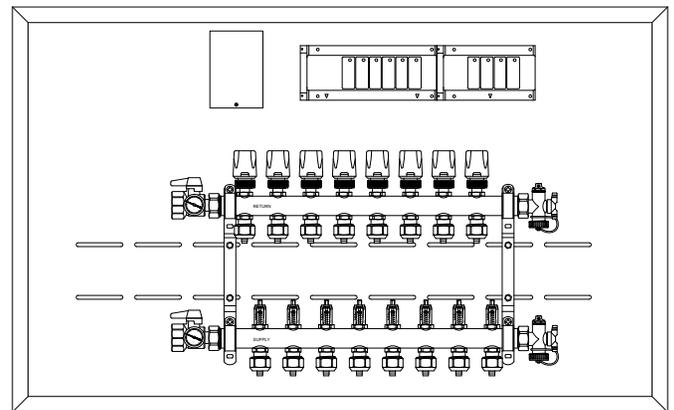
Technical Data

Manifold		Control Module/Actuator	
Trunk Material.....	AISI 304 Stainless Steel	Module Voltage.....	24V
Circuit Spacing.....	2-1/8" O.C. (53.8mm)	Max. Amperage/Terminal Block.....	0.3A
Manifold Connection (Standard).....	1" BSP	Max. No. Actuators/Terminal Block.....	4
Manifold Connection (HiFlow).....	1-1/4" BSP	Max. No. Thermostats/Zones.....	18
Thread/Connection Type.....	BSP Thread	Actuator Voltage.....	24V
Max. Trunk Flow Rate (Standard).....	12 GPM (45.4 liters)	Actuator Power Consumption.....	2.5W (VA) (continuous duty)
Max. Trunk Flow Rate (HiFlow).....	22 GPM (83.2 liters)	Actuator Ambient Temperature Range...	0°C up to 50°C during use
Max. Circuit Flow Rate (Standard).....	2.0 GPM (7.6 liters)		
Max. Circuit Flow Rate (HiFlow).....	4.0 GPM (15.1 liters)		
Max. Operating Temperature.....	194 °F (90 Celsius)		
Max. Operating Pressure.....	87 psi (5.9 bar)		

Manifold Size	Cabinet Size	Cabinet Dimensions	Cabinet R.I. Dimensions
2 to 6 Loop Stainless Steel Manifold	Small Cabinet	24" high X 33" wide X 5-3/4" deep	24" high X 31" wide X 5-3/4" deep
7 to 12 Loop Stainless Steel Manifold	Medium Cabinet	24" high X 42" wide X 5-3/4" deep	24" high X 40" wide X 5-3/4" deep



Non-Mixed Manifold Station



Non-Mixed Manifold Station with Actuators

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NOTES

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 www.wattscanada.ca

Product Details

HydroNex[®] Primary Panel

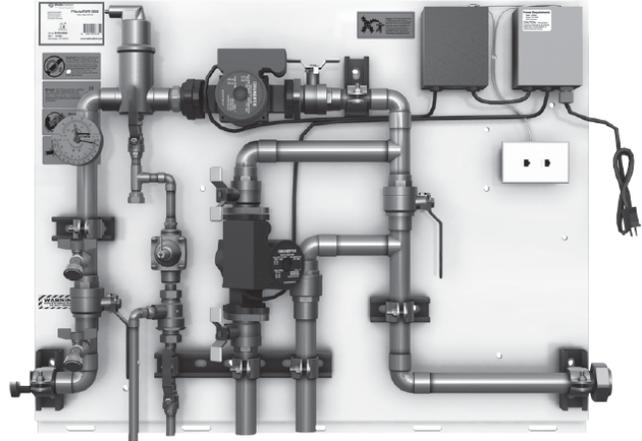
Sizes: 1-1/4" Trunk

Primary Panels are designed to supply down-stream HydroNex Distribution panels with boiler water, remove air and provide essential service and monitoring capabilities.

Primary and Distribution panels include only the supply portion of the primary loop. The return portion of this loop must always be field piped in 1-1/4" copper back to the boiler or dedicated heat source.

All Primary panels are designed to connect directly to any Distribution panel via the included union. Control logic is transferred from the Distribution panels to the Primary panel via the included CAT-5 cable connection.

Optional accessories include auto-fill assembly and Domestic Hot Water with or without priority.



Installation Parameters

Make sure an electrical outlet is within 3 feet of where the Primary panel will mount. If there are no outlets nearby, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z bracket is the correct size for the given primary panel. Incorrect Z brackets may interfere with cover placement.

Hang the Primary panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

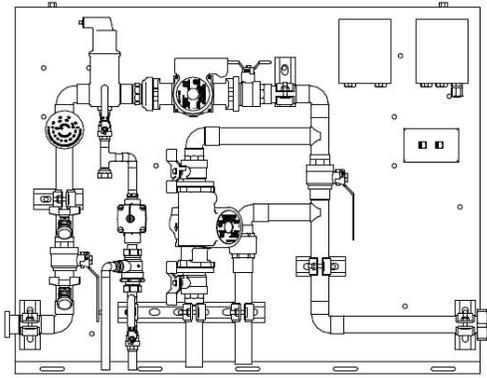
In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.

Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

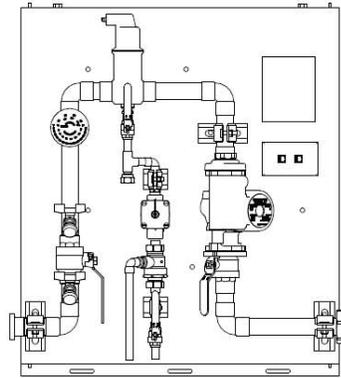
Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58, 26-99 Taco 008, 0011 Bell and Gossett NRF-22, PL-30
Fill Assembly	Manual Only Manual and Autofill
Electrical	Relay and Cat-5 Connection
Optional	DHW Zone with or without priority.
Temperature, Pressure Ratings	200°F @ 100 psi.

Note: Maximum total total flow rate is 22 gpm.

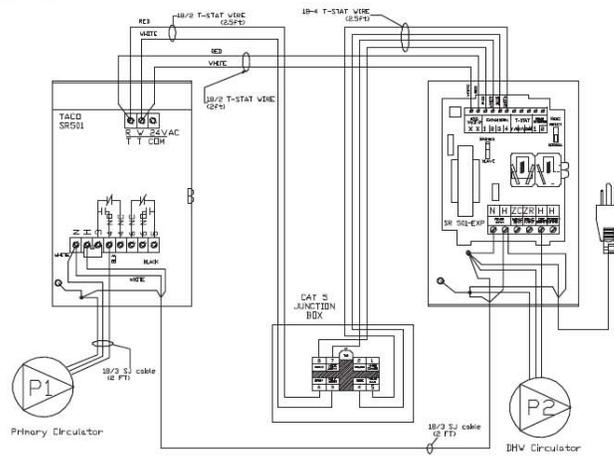
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HydroNex Primary with automatic fill assembly and Domestic Hot Water

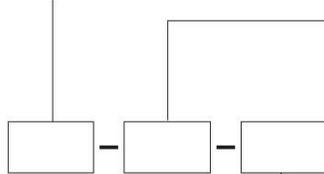


HydroNex Primary with automatic fill assembly



HydroNex Primary with Domestic Hot Water

PA: Auto Fill
PM: Manual Fill



PO: Primary Only
PD: Primary and DHW Circulators

Circulator Options

1. Watts Radiant 1558
2. Watts Radiant 2699
3. B&G NRF 22
4. B&G PL 30
5. Taco 008
6. Taco 0011

NOTE: Primary circulator and the DHW circulator are the same brand/model

Description	Model #	Wt. (lbs)	Size
P-Panel with Manual Fill	PM - ____ - PO	55-60	S
P-Panel with Auto Fill	PA - ____ - PO	55-60	S
P-Panel with Manual Fill and DHW	PM - ____ - PD	65-70	M
P-Panel with Auto Fill and DHW	PA - ____ - PD	65-70	M

S = 28" wide x 31.5" tall x 12" deep
M = 40" wide x 31.5" tall x 12" deep

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 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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 Burlington, Ontario Canada
 L7L 5H7
 Ph: 905-332-4090
 Fax: 905-332-7068
 www.wattscanada.ca

Product Details

HydroNex® Direct Panel

Sizes: 1-1/4" Trunk; 1" Zone Supply & Returns

Direct panels are designed to supply high temperature zones, such as dedicated water heaters, baseboards or fan coil units. All supply and return lines are 1". Direct panels can supply 1 to 5 zones.

Under certain conditions, such as with the use of a condensing boiler, Direct panels can be connected directly to the heat source, provided the following conditions apply:

- Proper flow is maintained through the heat source.
- Heat source can be set to desired temperature setting (no mixing required).
- No minimum return fluid temperature is required for the heat source.
- All necessary conditions and piping practices, as outlined by the heat source manufacturer, are properly maintained.

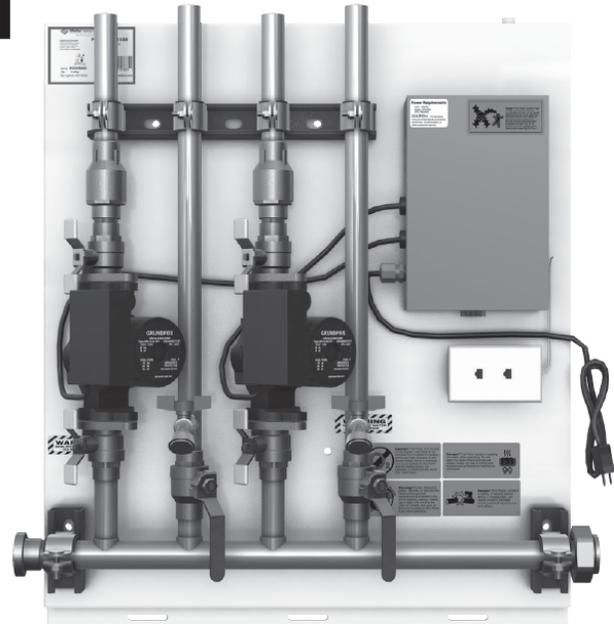
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the Direct panel will mount. If there are no outlets nearby, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given Direct panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the Direct panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.

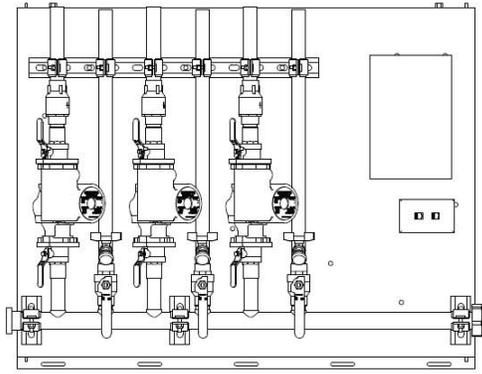


Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

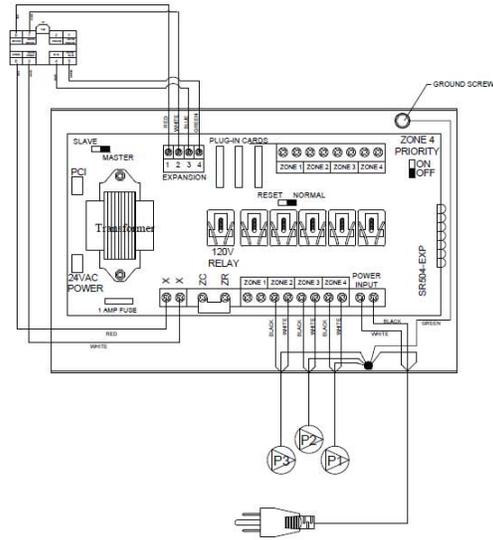
Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 Taco 007 Bell and Gossett NRF-22
Electrical	Relay and CAT-5 Connections
Temperature, Pressure Ratings	210°F @ 100 psi.

Note: Maximum total flow for panel is 22 gpm. Maximum flow for each 1" secondary is 8 gpm.

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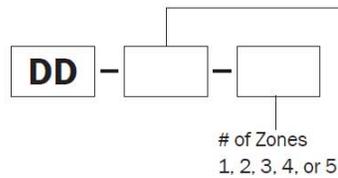
HydroNex Direct 3 zone panel. Direct series are available from 1 to 5 zones.



HydroNex Direct 3 zone panel Schematic.

Circulator Options

1. Watts Radiant 1558
2. B&G NRF 22
3. Taco 007



DESCRIPTION	MODEL #	WT. (lbs)	SIZE
1 Zone D-Direct	DD - ____ - 1	55-60	S
2 Zone D-Direct	DD - ____ - 2	90-95	
3 Zone D-Direct	DD - ____ - 3	120-125	M
4 Zone D-Direct	DD - ____ - 4	155-160	
5 Zone D-Direct	DD - ____ - 5	185-190	L

S = 28" wide x 31.5" tall x 12" deep
M = 40" wide x 31.5" tall x 12" deep
L = 52" wide x 31.5" tall x 12" deep

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 Burlington, Ontario Canada
 L7L 5H7
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 Fax: 905-332-7068
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Product Details

HydroNex[®] DMix Panel

Sizes: 1-1/4" Trunk; 3/4" Zone; 1" Common Return

Mix panels utilize a 1" mix valve (Cv = 3.2) to provide basic mixing for radiant systems. Each supply line is 3/4". All supplies share a common 1" return

When selecting a mix valve panel, the following guidelines should be followed:

- Make sure all zones fall within a 10 degree required temperature range. (i.e. 110, 114, 118 supply temperature requirements can be grouped from a single mix valve).
- Make sure the combined flow rates of the selected zones do not exceed the allowable Cv rating of the mix valve.

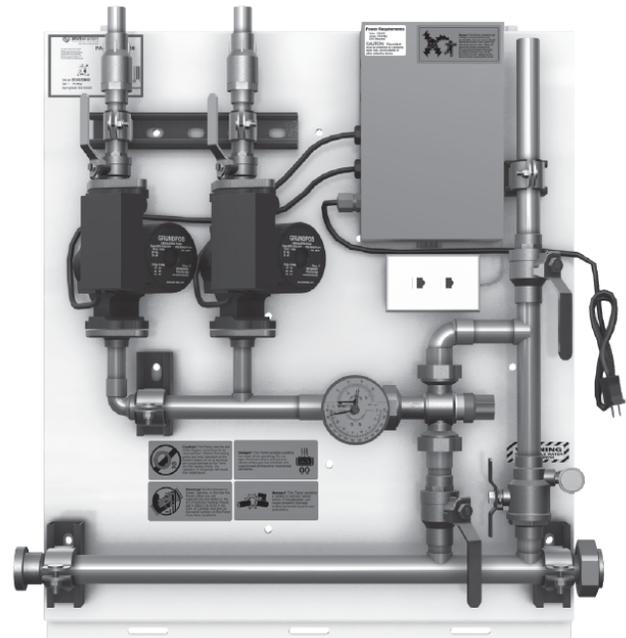
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the DMix panel will mount. If there are no outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given DMix panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the DMix panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

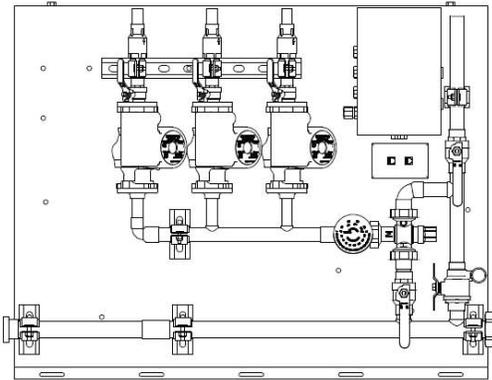
In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.



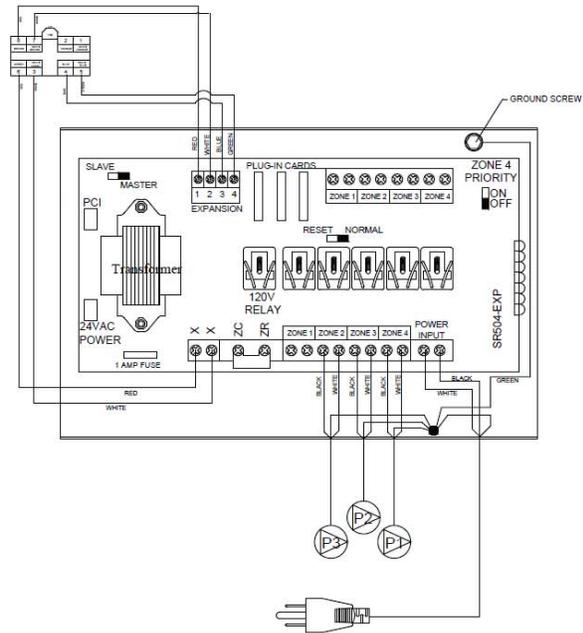
Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 Taco 007 Bell and Gossett NRF-22
Electrical	Relay and CAT-5 Connection
Mix Valve Cv	3.2 gpm
Mix Valve Temperature Range	100°F - 180°F
Temperature, Pressure Ratings	210°F @ 100 psi.

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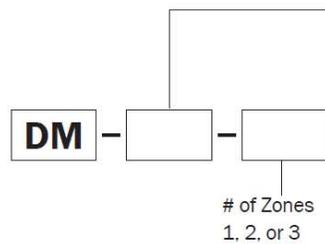
HydroNex DMix 3 zone panel. DMix panels are available from 1 to 3 zones.



HydroNex DMix 3 zone panel Schematic.

Circulator Options

1. Watts Radiant 1558
2. B&G NRF 22
3. Taco 007



DESCRIPTION	MODEL #	WT. (lbs)	SIZE
1 Zone D-Mix	DM - ____ - 1	60-65	S
2 Zone D-Mix	DM - ____ - 2	80-85	M
3 Zone D-Mix	DM - ____ - 3	95-100	

S = 28" wide x 31.5" tall x 12" deep
M = 40" wide x 31.5" tall x 12" deep

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Product Details

HydroNex[®] DMix Hybrid Panel

Sizes: 1-1/4" Trunk; 3/4" Zone; 1" Common Return

Hybrid mix panels utilize a 1" mix valve (Cv = 3.2) to provide basic mixing for radiant systems. Each supply line is 3/4". All supplies share a common 1" return.

The first zone on the panel may be dedicated for an indirect water heater and is wired accordingly with Domestic Hot Water (DHW) priority. If this zone supplies an indirect DHW unit, the priority condition will need to be changed in the relay box.

The DMix Hybrid panel also allows users to field-select the number of high temperature and mix zones. High temperature zones will be supplied with direct boiler water, while the mixed zones will be fed tempered water from the mix valve. To select the zones, open or close the appropriate ball valves.

When selecting a DMix Hybrid panel, the following guidelines should be followed:

- Make sure the zones feeding from the mix valve fall within a 10 degree required temperature range. (i.e. 110, 114, 118 supply temperature requirements can be grouped from a single mix valve).
- Make sure the combined flow rates of the selected zones do not exceed the allowable Cv rating of the mix valve.

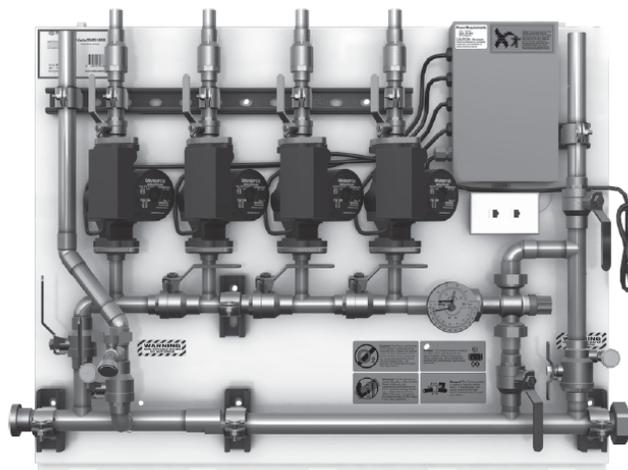
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the DMix panel will mount. If there are no outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given DMix panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the DMix panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

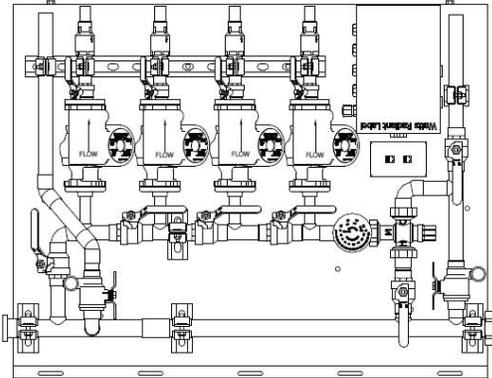
In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.



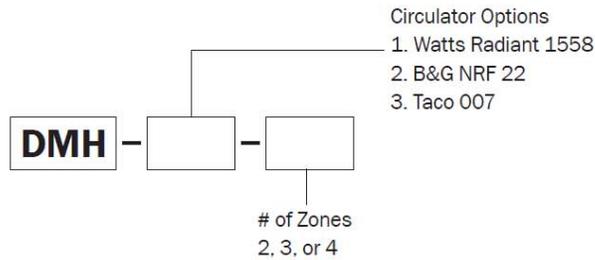
Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	
Field selectable high and mix temperature zones	

Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 Taco 007 Bell and Gossett NRF-22
Electrical	Relay and CAT-5 Connection
Mix Valve Cv	3.2 gpm
Mix Valve Temperature Range	100°F - 180°F
Temperature, Pressure Ratings	210°F @ 100 psi.

Note: Maximum total total high temperature flow rate is approximately 8 gpm.



HydroNex DMix Hybrid 4 zone panel.
DMix Hybrid series are available from 2 to 4 zones.



Description	Model #	Wt. (lbs)	Size
2 Zone DMix Hybrid	DMH - ____ - 2	85-90	M
3 Zone DMix Hybrid	DMH - ____ - 3	105-110	M
4 Zone DMix Hybrid	DMH - ____ - 4	150-155	L

M = 40" wide x 31.5" tall x 12" deep
L = 52" wide x 31.5" tall x 12" deep

Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

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Product Details

HydroNex D-Series DVIP Panel

Sizes: 1-1/4" Trunk; 3/4" Zone

DVIP panels use injection reset mixing to modulate the supply fluid temperature to the radiant zones. The injection bridge is 1/2" in size for all DVIP panels. All zones are 3/4" supply with a common 1" return.

A Tekmar 361 is provided to control the injection circulator.

When selecting a VIP panel, the following guidelines should be followed:

- Make sure all zones fall within a 20 degree required temperature range. (i.e. 110, 114, 125 supply temperature requirements can be grouped from a single injection circulator).
- Make sure 25% of the combined flow rates of the selected zones do not exceed 5 gpm (or the combined zone gpm can not exceed 20 gpm). Higher flow rates may result in lower maximum supply fluid temperatures.

Installation

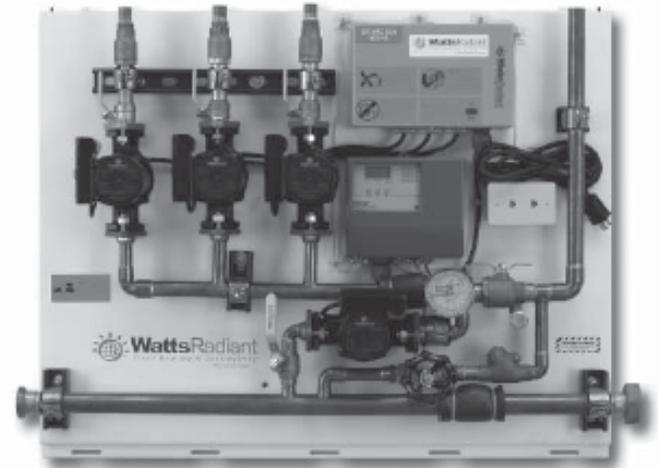
Make sure an electrical outlet is within 3 feet of where the D-Series panel will mount. If there are no outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given D-Series panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the D-Series panel on the Z-Bracket. Optional lag screws may be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

To purge a VIP panel make sure all necessary isolation valves are closed and all purge valves are open. Proceed until all zones are filled and purged. Open all purge ball valves and cap the drain. Make sure all isolation ball valves are open for normal operation.

Refer to the installation manual for further details.



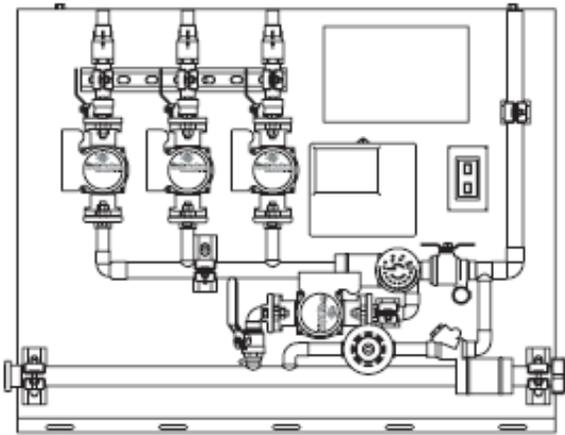
Features

- Wall mounted white powder coated back panel and cover.
- Easy access to all components.
- Pre-wired circulators and controls.
- Simple CAT 5 jump wiring to connect panels.
- Single union connection between panels.
- Integrated leveling system.
- Z-Bracket for simplified mounting.

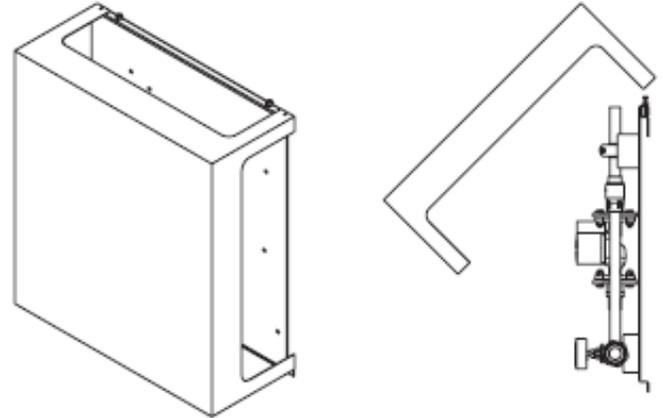
Specifications

Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58
	Taco 007
	Bell and Gossett NRF-22
Electrical	Relay and CAT 5 Connection
Injection/Reset Control	Tekmar 361

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Hydronex D-Series DVIP 3 zone panel. DVIP series are available from 1 to 5 zones.



Product Options

Qty.	Description	Part #	Order #	Panel Size
	DVIP Panel, 1 Watts Radiant 15-58 Pump	DVIP1WR1558	81005836	28" x 31.5"
	DVIP Panel, 2 Watts Radiant 15-58 Pumps	DVIP2WR1558	81005837	40" x 31.5"
	DVIP Panel, 3 Watts Radiant 15-58 Pumps	DVIP3WR1558	81005838	40" x 31.5"
	DVIP Panel, 4 Watts Radiant 15-58 Pumps	DVIP4WR1558	81005839	52" x 31.5"
	DVIP Panel, 5 Watts Radiant 15-58 Pumps	DVIP5WR1558	81005840	52" x 31.5"
	DVIP Panel, 1 Taco 007 Pump	DVIP1TA007	81005841	28" x 31.5"
	DVIP Panel, 2 Taco 007 Pumps	DVIP2TA007	81005842	40" x 31.5"
	DVIP Panel, 3 Taco 007 Pumps	DVIP3TA007	81005843	40" x 31.5"
	DVIP Panel, 4 Taco 007 Pumps	DVIP4TA007	81005844	52" x 31.5"
	DVIP Panel, 5 Taco 007 Pumps	DVIP5TA007	81005845	52" x 31.5"
	DVIP Panel, 1 Bell & Gossett NRF-22 Pump	DVIP1BGNRF22	81005846	28" x 31.5"
	DVIP Panel, 2 Bell & Gossett NRF-22 Pumps	DVIP2BGNRF22	81005847	40" x 31.5"
	DVIP Panel, 3 Bell & Gossett NRF-22 Pumps	DVIP3BGNRF22	81005848	40" x 31.5"
	DVIP Panel, 4 Bell & Gossett NRF-22 Pumps	DVIP4BGNRF22	81005849	52" x 31.5"
	DVIP Panel, 5 Bell & Gossett NRF-22 Pumps	DVIP5BGNRF22	81005850	52" x 31.5"

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Product Details

HydroNex® DVIP Hybrid Panel

Sizes: 1-1/4" Primary Loop; 3/4" Zone; 1" Common Returns

DVIP Hybrid panels use injection reset mixing to modulate the supply fluid temperature to the radiant zones. The injection bridge is 3/4" in size for all DVIP Hybrid panels. All zones are 3/4" supply with a common 1" return.

A Tekmar 361 is provided to control the injection circulator.

The first zone on the panel may be dedicated for an indirect water heater and is wired accordingly with Domestic Hot Water priority. If this zone supplies an indirect DHW unit, the priority condition will need to be changed in the relay box.

The DVIP Hybrid panel also allows users to field-select the number of high temperature and mix zones. High temperature zones will be supplied with direct boiler water, while the mixed zones will be fed tempered water from the injection bridge. To select the zones, open or close the appropriate ball valves.

When selecting a DVIP Hybrid panel, the following guidelines should be followed:

- Make sure all zones feeding from the injection circulator fall within a 20 degree required temperature range.
 (i.e. 110, 114, 125 supply temperature requirements can be grouped from a single injection circulator).
- The combined zone gpm can not exceed 20 gpm.

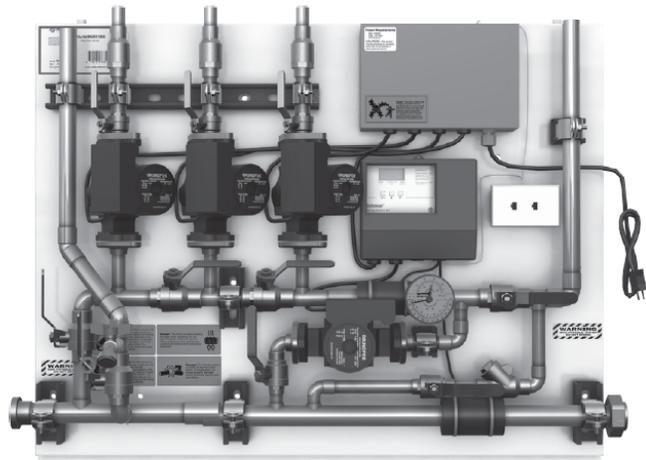
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the DVIP Hybrid panel will mount. If there are no outlets nearby, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given DVIP Hybrid panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the DVIP Hybrid panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.

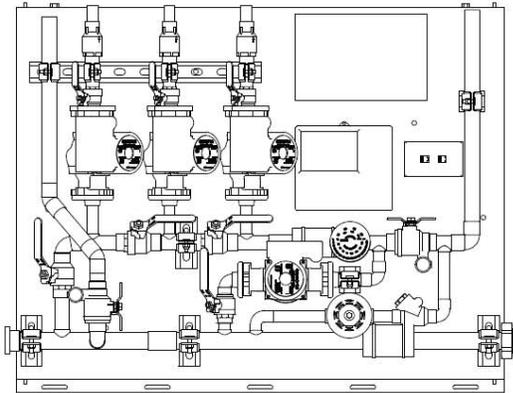


Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	
Field selectable high and mix temperature zones	

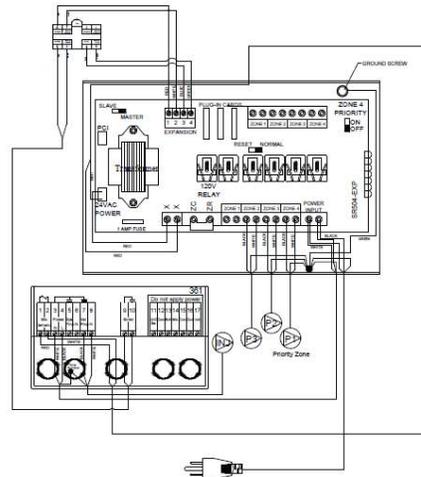
Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 Taco 007 Bell and Gossett NRF-22
Electrical	Relay and CAT-5 Connection
Injection/Reset Control	Tekmar 361
Temperature, Pressure Ratings	210°F @ 100 psi.

Note: Maximum total total high temperature flow rate is approximately 8 gpm.

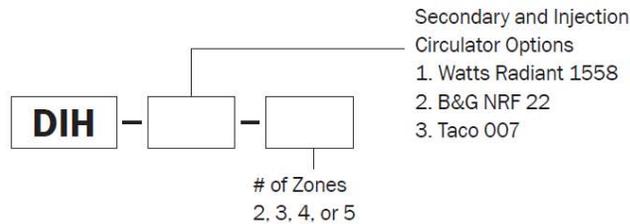
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HydroNex DVIP Hybrid 3 zone panel. DVIP Hybrid series are available from 2 to 5 zones.



HydroNex DVIP Hybrid 3 zone panel Schematic.



Description	Model #	Wt. (lbs)	Size
2 Zone DVIP Hybrid	DIH-___-2	115-120	M
3 Zone DVIP Hybrid	DIH-___-3	140-145	
4 Zone DVIP Hybrid	DIH-___-4	170-175	L
5 Zone DVIP Hybrid	DIH-___-5	200-205	

S = 28" wide x 31.5" tall x 12" deep
M = 40" wide x 31.5" tall x 12" deep
L = 52" wide x 31.5" tall x 12" deep

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 Submitted: _____ Date: _____

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Product Details

HydroNex® DHX Panel

Sizes: 1-1/4" Trunk; 1-1/4" Zone

DHX panels use injection mixing to modulate the supply fluid temperature to the radiant or snow melt zone. A heat exchanger is used to isolate system fluid from the zone fluid. Both the injection bridge and the zone supply piping is 1-1/4".

A Tekmar 361 can be selected for heating applications or a Tekmar 665 may be selected for snow melt applications. Both have the ability to operate with reset (injection) or set point temperature control.

Installation Parameters

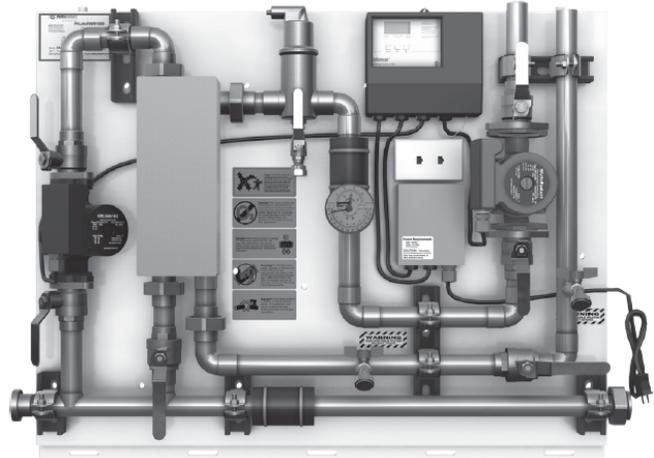
Make sure an electrical outlet is within 3 feet of where the DHX panel will mount. If there are no outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given DHX panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the DHX panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.

*Panels with Watts Radiant circulators are available in 150 MBH only.

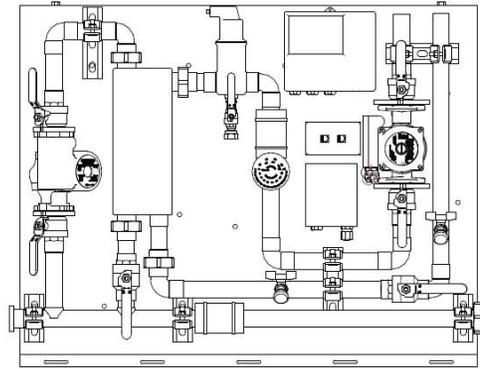


Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
Simple CAT-5 jump wiring to connect panels	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

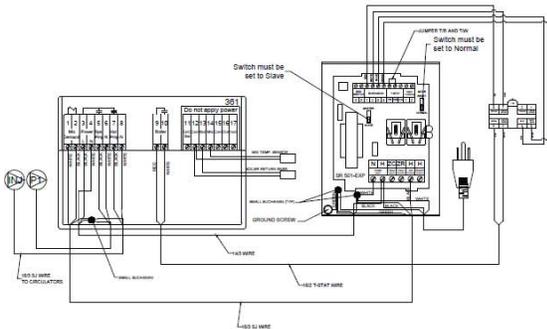
Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant* Taco Bell and Gossett
Heat Exchanger	150 MBH * 250 MBH *
Electrical	Relay and CAT-5 Connection
Injection/Reset Control	Tekmar 361 Tekmar 665 (Tekmar 090 not included)

* Heat exchanger sizing based on 180 F boiler supply/130 F snow melt/radiant supply and 30 F Delta T.

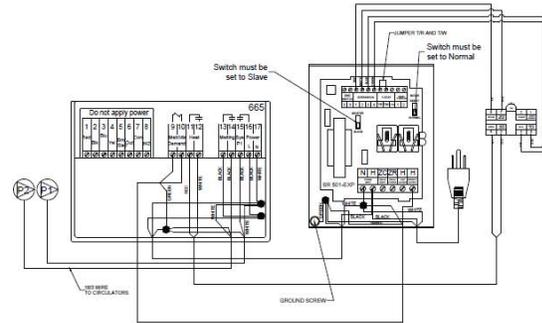
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HydroNex DHX panel.



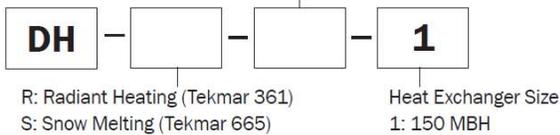
HydroNex DHX with a Tekmar 361 control.



HydroNex DHX with a Tekmar 665 control.

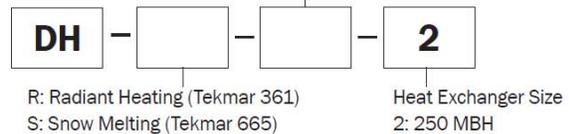
Circulator Options for 150 MBH panels

1. Watts Radiant 1558 w/ 2699 secondary
2. B&G NRF 22 w/ PL30 secondary
3. Taco 007 w/ 0014 secondary



Circulator Options for 250 MBH panels

1. B&G PL30 w/ PL36 secondary
2. Taco 0013 w/ 0014 secondary



DESCRIPTION	MODEL #	WT. (lbs)	SIZE
Radiant Heating (150 MBH)	DH-R-__-1	115-120	M
Snow Melting (150 MBH)	DH-S-__-1	115-120	

M = 40" wide x 31.5" high x 12" deep

DESCRIPTION	MODEL #	WT. (lbs)	SIZE
Radiant Heating (250 MBH)	DH-R-__-2	140-145	M
Snow Melting (250 MBH)	DH-S-__-2	140-145	

M = 40" wide x 31.5" high x 12" deep

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Product Details

HydroNex[®] Condensing Boiler Panel

Sizes: 1-1/4" Primary Loop; 1" DHW Zone; 1-1/4" Zone

Condensing Boiler panels are designed to be a stand alone mechanical solution, used with a condensing heat source.

The panel circulators are controlled by the boiler via field wiring. Outdoor reset, DHW priority and other features are dependent on the boiler control.

The Type 1 panel provides only a secondary circulator and works with condensing boilers that supply their own primary circulator. The Type 3 panel provides primary, secondary, and DHW circulators. Both panels include 1-1/4" piping with air remover and expansion tank connection, as well as an optional auto-fill assembly. Panels are available with 4, 5, 6, or 8 zones.

When selecting a Condensing Boiler panel, the following guidelines should be followed:

- Make sure the fluid temperature of the combined radiant zones fall within 10 degrees of the required temperature (i.e. 110, 114, 118 supply temperature requirements can be grouped).
- Make sure the combined flow rates of the selected zones do not exceed 22 gpm.

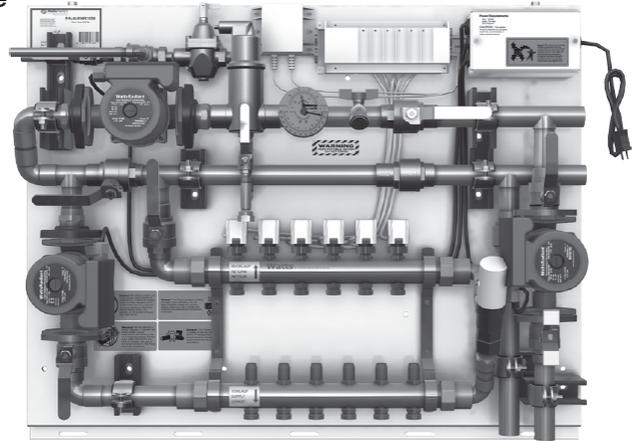
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the Condensing Boiler panel will mount. If there are no outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given Condensing Boiler panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the Condensing Boiler panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.



Features

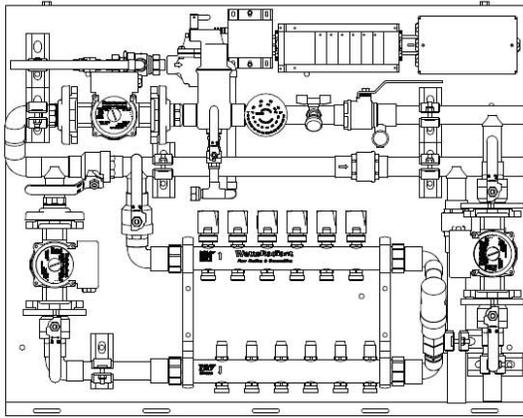
Wall mounted white powder coated back panel and cover
Easy access to all components
Pre-wired circulators and controls
Integrated leveling system
Z-Bracket for simplified mounting
DHW capability

Specifications

Supply Voltage	120 Volts
Circulator Type	Watts Radiant 26-99 (three speed)*
Electrical	Zone Valve Relay Box Terminal Strip
Temperature, Pressure Ratings	167°F @ 87 psi.

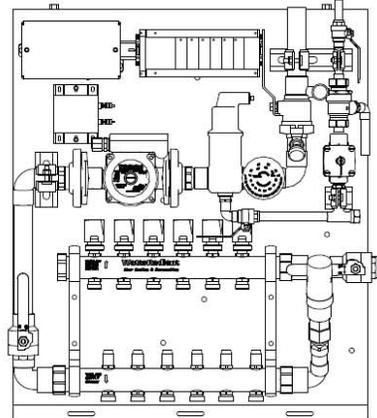
* Provides approximately 15 gpm at 20 ft /hd on high speed

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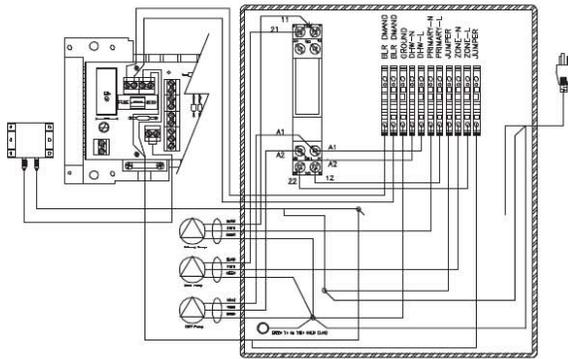
Condensing Boiler Panel, Type 1

Panel is equipped with a primary, zone, and domestic water circulators.

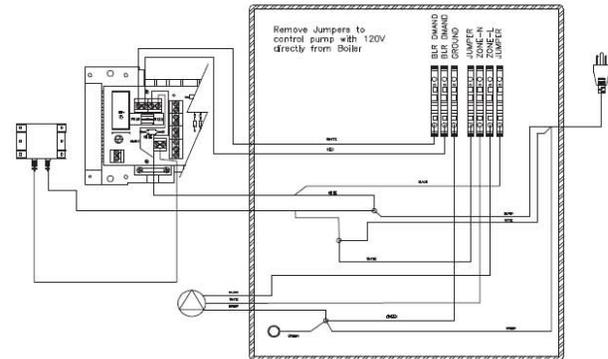


Condensing Boiler Panel, Type 3

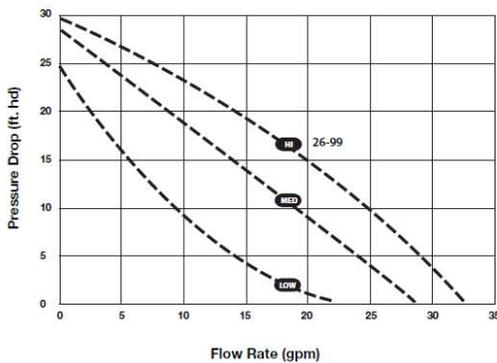
Panel is equipped with a zone circulator only. Primary and domestic water (if necessary) are provided with the heat source.



Type 1 Condensing Boiler Panel Schematic

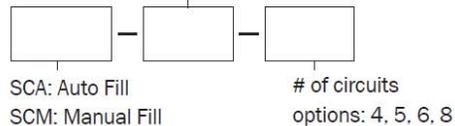


Type 3 Condensing Boiler Panel Schematic



Watts Radiant (Grundfos) Circulators

- 1: Type 1 (Zone Circulator only)
- 3: Type 3 (Primary, Zone, and DHW Circulators)



DESCRIPTION	MODEL #	WT. (lbs)	SIZE
Type 1	- 1 - 4	60-70	S
Zone pump only	- 1 - 5	60-70	S
(Watts Radiant 2699) For boilers with primary circulators	- 1 - 6	60-70	S
	- 1 - 8	60-70	S
Type 3	- 3 - 4	150-160	M
Boiler, Zone, and DHW pumps	- 3 - 5	150-160	M
(all Watts Radiant 2699s)	- 3 - 6	150-160	M
	- 3 - 8	150-160	L

S = 28" wide x 31.5" tall x 12" deep
M = 40" wide x 31.5" tall x 12" deep
L = 52" wide x 31.5" tall x 12" deep

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Product Details

HydroNex® Geo Series

Sizes: 1-1/4" Trunk; 1" Distribution

The HydroNex Geo Series panel is designed to control geothermal heat sources, utilizing water storage tanks. Geo panels are designed to be used with either single or multiple geothermal heat sources. The Geo1 panel is designed to be used with a single geothermal unit. Geo2 and Geo3 panels are designed to be used with two and three geothermal heat sources respectively.

Geo Series panels are intended to connect to the inlet side of any HydroNex Primary Series panel. A 2 conductor 18 gauge thermostat wire has to be connected between terminals in the Geo panel relay box and terminals 5 & 6 on the Primary Series panel.

Geo panels include a Tekmar control with outdoor reset. Geo1 panels use a Tekmar 256 while Geo2 and Geo3 panels use a Tekmar 274. This control increases the overall efficiency of the geothermal unit.

The heat pump will only run when the temperature of the buffer tank falls below the outdoor reset control set point. If there is no call for heat from the system, the solenoid valve will remain closed, directing hot water into the buffer tank until the set point is met. When the radiant system calls for heat, the solenoid valve will open, allowing hot water to flow from the tank and/or heat pump.

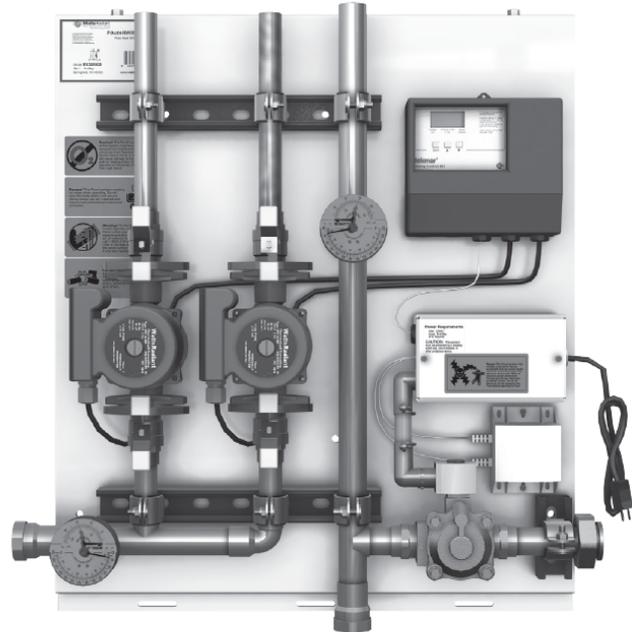
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the Geo Series panel will mount. If there are not outlets, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given Geo Series panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the Geo Series panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

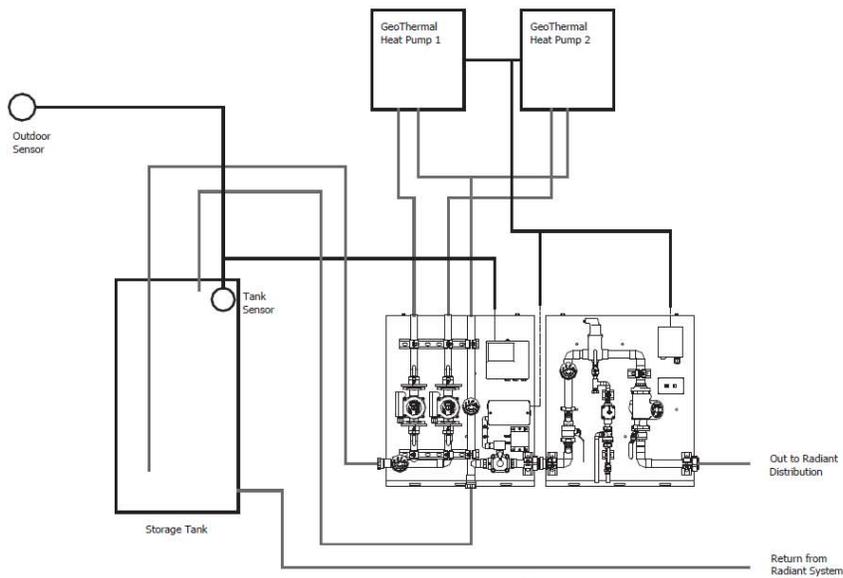
In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.



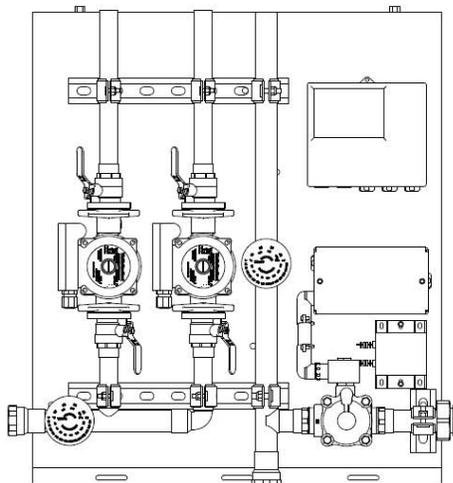
Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 26-99 (three-speed)
Electrical	Relay
Injection/Buffer Tank Reset Control	Tekmar 256, 274
Zone Valve	24 Volt NO/NC Actuation

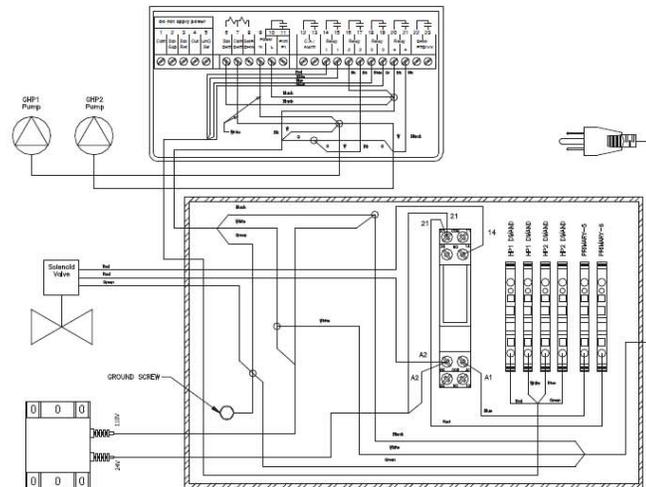
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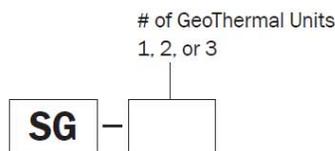
HydroNex Geo2 panel connected to a HydroNex P-Series panel.



HydroNex Geo2 panel.



HydroNex Geo2 panel typical electrical schematic.



Description	Model #	Wt. (lbs)	Size
1 GeoThermal Unit	SG-1	60-65	S
2 GeoThermal Units	SG-2	80-85	M
3 GeoThermal Units	SG-3	95-100	M

S=28" wide x 31.5" high x 12" deep
M=40" wide x 31.5" high x 12" deep

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Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

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 www.wattscanada.ca

Product Details

HydroNex[®] Source Select

Sizes: 1-1/4" Trunk, 1" Supply/Return

HydroNex Source Select panels are designed to control two independent heat sources. Typically, the Source Select is used when trying to maximize heat source efficiency, so the more economical source (normally alternative energy) is prioritized when available. The primary source, typically, solar or geothermal, must utilize a water storage or buffer tank.

In the event the primary heat source is unable to satisfy the system load, the Source Select panel will use to the secondary (backup) heat source until the primary source has been replenished.

Control Options		
Global Features		
No of Heat Sources		2 Independent
Circulator Type		Watts Radiant 1558
Zone Pipe Size		1"
Main Trunk Size		1-1/4"
Type 1 Panel		
No Injection or Outdoor Reset		(1) Tekmar 150 Setpoint Control
Type 2 Panel		
Injection and Outdoor reset on Primary Heat Source		(1) Tekmar 150 Setpoint Control (1) Tekmar 356 Reset Control
Type 3 Panel		
Injection and Outdoor reset on Primary and Secondary Heat Source		(1) Tekmar 150 Setpoint Control (1) Tekmar 356 Reset Control

Source Select panels are typically connected to the inlet side of any HydroNex P-Series panel. A 2-conductor 18 gauge thermostat wire must be connected between terminals in the Source Select panel relay box and the P-Series panel.

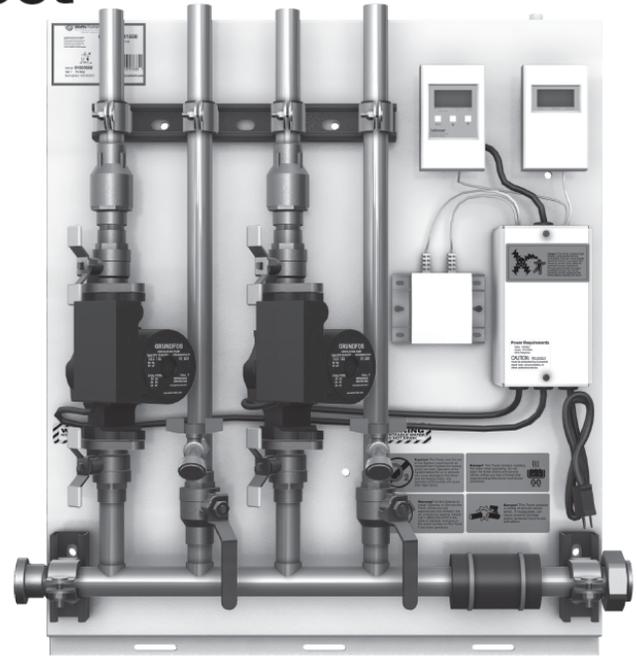
Installation Parameters

Make sure an electrical outlet is within 3 feet of where the Source Select panel will mount. If there are no outlets available, one will need to be added.

Install and level Z-Bracket with 1/4" x 2-1/2" lag screw to studs. Make sure the Z-Bracket is the correct size for the given Source Select panel. Incorrect Z-Brackets may interfere with cover placement.

Hang the Source Select panel on the Z-Bracket. Lag screws should be added to the bottom of the panel, further securing the panel to the wall. Hang cover from top down.

Refer to the installation manual for further details.



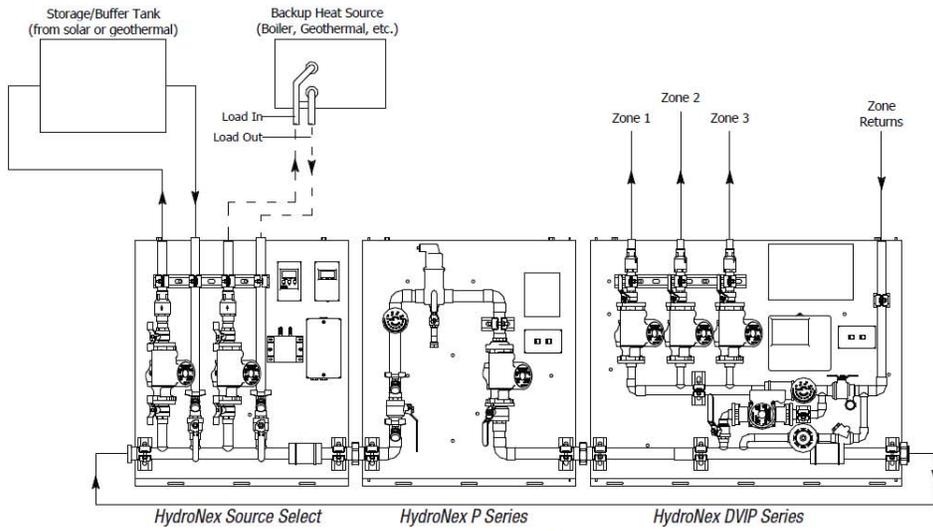
Features	
Wall mounted white powder coated back panel and cover	
Easy access to all components	
Pre-wired circulators and controls	
O-Ring sealed, threaded union connection between panels	
Integrated leveling system	
Z-Bracket for simplified mounting	

Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 (three speed)*
Electrical	Relay
Setpoint Control	Tekmar 150
Injection Control	Tekmar 356
Temperature, Pressure Ratings	210°F @ 100 psi.

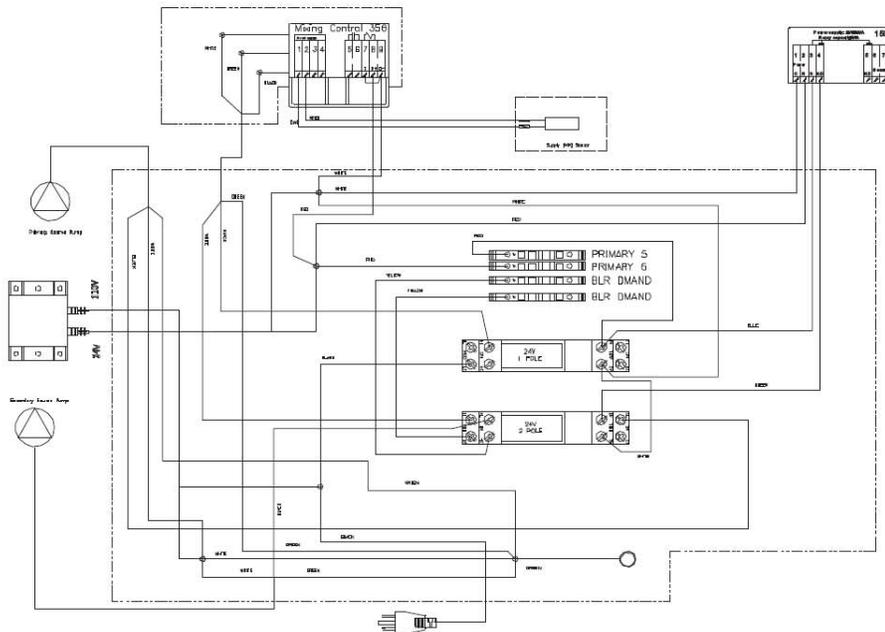
* Provides approximately 10 gpm at 10 ft /hd.

Note: Maximum total flow for panel is 22 gpm. Maximum flow for each 1" secondary is approximately 8 gpm.

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Application Example



HydroNex Source Select panel Type II Schematic.

- SS** — 1: No injection or outdoor reset (Tekmar 150)
 2: Injection & outdoor reset for 1 source (Tekmar 356)
 3: Injection & outdoor reset for 2 sources (Tekmar 356)

Description	Model #	Wt. (lbs)	Size
1: No injection or outdoor reset	SS-1	90-95	S
2: Injection & outdoor reset for 1 source	SS-2	90-95	S
3: Injection & outdoor reset for 2 sources	SS-3	90-95	S

S = 28" wide x 31.5" tall x 12" deep

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Product Details

HydroNex® Zone Panel

Sizes: 1" Main Piping; 1" Stainless Steel Manifold

Zone panels are zone specific distribution panels. These panels include stainless steel manifolds to distribute water to radiant circuits, baseboard or other single temperature hydronic equipment. Zone panels are supplied with or without zone pumps, water temperature mixing, and zone actuators. All Zone panels come pre-installed in a wall enclosure with lockable (screwdriver slot) access cover. Zone panels are available in various circuit configurations, see Product Options chart.

Installation Parameters

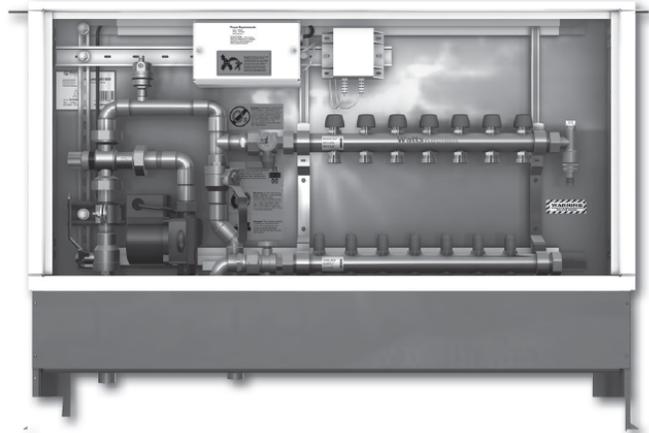
Make sure an electrical outlet is within 3 feet of where the Zone panel will mount. If there are no outlets, one will need to be added.

Install enclosure in 4-1/2" deep wall (minimum).

Zone panels are available with or without the zone circulator. Non-pump Zone panels are designed to be used with Primary and Distribution HydroNex panels. Zone panels with pumps are designed on the assumption the main mechanical room piping will be field constructed.

1. Remove and set aside the door.
2. Adjust box height.
3. Adjust frame depth to wall requirements.
4. Secure the Main Box in the frame wall.
5. Secure the manifold brackets to the Manifold Support Bracket using the Locking Rail Nut and Hex Head Bolt.
6. Knock out the supply /return knock-outs on either side, as needed.
7. Install the door frame by resting it on the lower rail of the frame and lift. Secure door via the lock.

In order to avoid property damage, injury, and/or death, please refer to the complete installation manual and warnings provided with the product.



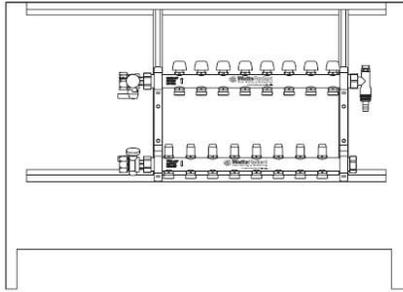
Features	
Flush mounted galvanized enclosure with white powder coated enclosure with locking (screwdriver slot) access cover	
Pre-wired actuators (specific models only)	
Fully enclosed circulator and/or mixing valve (specific models only)	
Stainless Steel manifolds	

Specifications	
Supply Voltage	120 Volts
Circulator Type	Watts Radiant 15-58 (Approx. 10 gpm @ 10 ft. hd)
Electrical	Zone Valve Relay Box Transformer Isolation Relay
Temperature, Pressure Ratings	167°F @ 87 psi.

Maximum Flow Rates	
Series	Flow Rate
ZB	12 gpm
ZC	8 gpm
ZM	4 gpm

Note: flow per radiant circuit of 2 gpm.

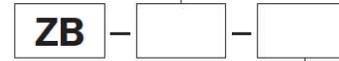
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HydroNex Zone Basic.

M = 29.25" high x 25.5" wide x 4.5" deep
 L = 29.25" high x 41.5" wide x 4.5" deep

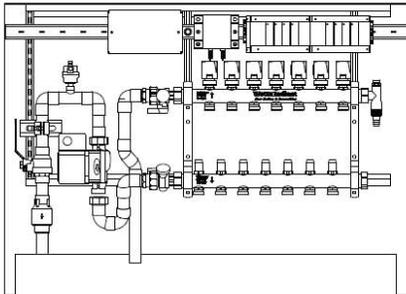
A: With Actuators
 N: No Actuators



of Circuits:
 options: 2-12

Zone Basic

Description	Model #	Wt. (lbs)	Size
2 Circuit	ZB - ____ - ____	30-40	M
3 Circuit		30-40	
4 Circuit		30-40	
5 Circuit		50-65	
6 Circuit		50-65	L
7 Circuit		50-65	
8 Circuit		50-65	
9 Circuit		50-65	
10 Circuit		50-65	
11 Circuit		50-65	
12 Circuit		50-65	



HydroNex Zone Pump with actuators.

L = 29.25" high x 41.5" wide x 4.5" deep

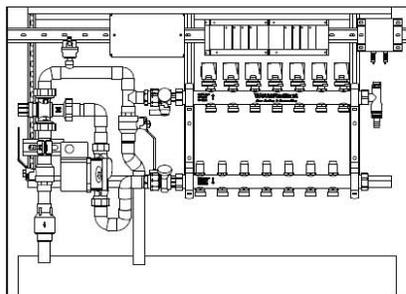
A: With Actuators
 N: No Actuators



of Circuits:
 options: 2-7

Zone Circulator

Description	Model #	Wt. (lbs)	Size
2 Circuit	ZC - ____ - ____	65-70	L
3 Circuit		65-70	
4 Circuit		65-70	
5 Circuit		70-75	
6 Circuit		70-75	
7 Circuit		70-75	



HydroNex Zone Pump Mix with actuators.

L = 29.25" high x 41.5" wide x 4.5" deep

A: With Actuators
 N: No Actuators



of Circuits:
 options: 2-7

Mix Valve & Zone Circulator

Description	Model #	Wt. (lbs)	Size
2 Circuit	ZM - ____ - ____	70-75	L
3 Circuit		70-75	
4 Circuit		70-75	
5 Circuit		75-80	
6 Circuit		75-80	
7 Circuit		75-80	

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FlowGuard Metered Flow Control Valves



Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

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Product Details

FlowGuard can be used to balance Heating, Cooling, Solar and Heat Pump circuits in both commercial and residential installations. With no special training required, FlowGuard balancing valves offer the advantage of accurate balancing within a short period of time. FlowGuard balancing valves incorporate integrated flow-meters which consistently measure the actual flow rate. As the flow meter is set at a 90° angle from the main body, reading the flow rate is possible, even when the valve body is fully insulated. The flow meter scale can be fully rotated for easy reading in any position. As the system medium does not flow through the flow meter, it is protected from system debris; thus allowing continued readings to be taken over long periods of time. By turning the multi-turn valve, flow through the valve can be adjusted quickly and accurately to the desired design characteristics. FlowGuard balancing valves are indifferent to the flow profile on the inlet side, therefore under normal operation a straight piece of pipe the same diameter and length of the valve housing is sufficient for proper function.

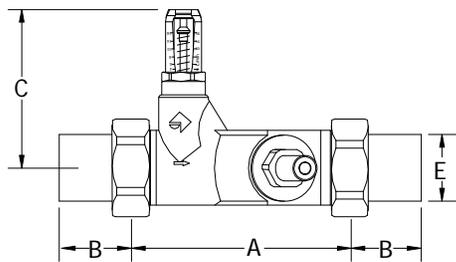
Technical Details

Maximum operating temperature.....	212°F	Housing and interior.....	Brass
Minimum operating temperature.....	-4°F	Flow-meter.....	High-quality, impact resisting and temperature stable plastics
Maximum operating pressure.....	145 psi	Spring.....	Stainless steel
Accuracy of flow meter.....	±10% of actual reading	O-Ring seals.....	EPDM elastomers

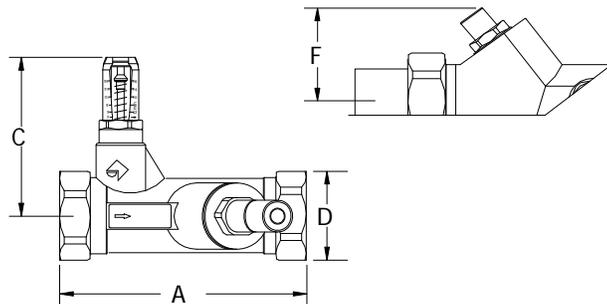
Description	Order Number	Part Number
1" Male Union, 1.9 – 15 l/min (0.5 – 4 gpm)	81001979	D3499375
1" FIP, 5 – 50 l/min (1.3 – 13 gpm)	81001980	D3499480

Dimensions

	A	B	C	D	E	F
1" Male Union FlowGuard (81001979)	3.38"	1.38"	2.68"	-	1"	1.46"
1" FIP FlowGuard (81001980)	4.72"	-	2.87"	1"	-	1.46"



Male Union FlowGuard



Female I.P. FlowGuard

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Pressure Differential By-Pass Valve



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Project Information

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Product Details

Noise can be present in a multiple-actuator manifold if only one or two actuators are open. The pump is sized for the total flow rate and highest pressure drop of all the circuits. With just one or two circuits calling for heat, the pump is oversized, possibly causing noise. Watt's Pressure Differential By-pass Valve eliminates water velocity noise and water hammer. With this valve, high-pressure pumps cannot exceed actuator close-off pressure. Pump life increases because of minimal pressure surging as actuators open and close. There is always correct and constant flow regardless of the number of actuators open.

Technical Details

Min. Pressure.....	0.73 psi (0.05 bar/1.69 ft. hd.)	Max. System Pressure.....	145 psi
Max. Pressure.....	10.15 psi (0.7 bar/23.4 ft. hd)	Max. Temperature.....	230°F
Min. Flow Rate.....	0.6 gpm		
Max. Flow Rate.....	9.0 gpm		

Description

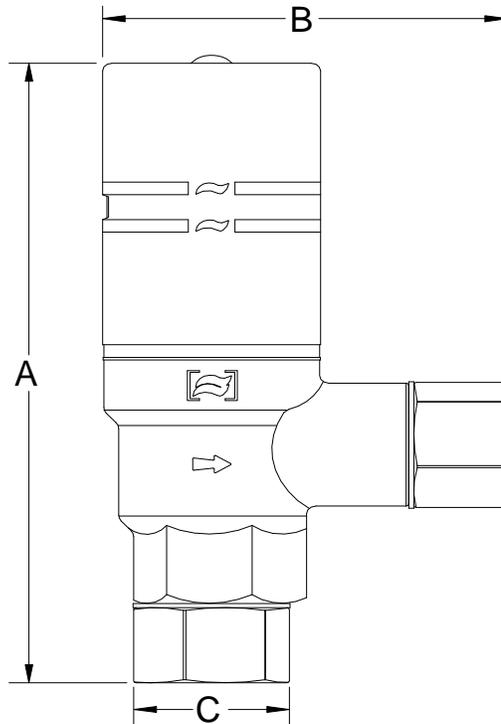
Order Number

Part Number

3/4" Pressure Differential By-Pass Valve, 3/4" FPT	81005517	PZ4661C34
1" Pressure Differential By-Pass Valve, 1" FPT	81005518	PZ4662C1

Dimensions

	A	B	C
3/4" Pressure Differential By-Pass Valve	6.25"	3.38"	1.25"
1" Pressure Differential By-Pass Valve	6.50"	3.75"	1.50"



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Pressure Differential By-Pass for 1" S.S. Manifold



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Project Information

Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

The Stainless Steel By-Pass is designed for manifolds utilizing circuit thermal actuators. If the manifold uses three or more individually controlled actuators, a by-pass is recommended. The goal of the by-pass is to regulate the flow rate and pressure drop through open circuits, providing balanced flow regardless of the number of open circuits. The By-Pass assembly is designed for use with Watts Radiant's 1" Stainless Steel manifolds. All standard 1" accessory items are compatible with the by-pass unit. These items include vent/purge assembly and end caps.

Technical Details

Material.....	Brass and Copper	Max. Operating Temp.....	167°F
Size.....	8.27" X 2.56"	Max. Operating Pressure.....	87 psi
Max. Flow Rate.....	8.5 gpm	Manifold-side Fittings.....	1" Female BSP Threads
Max. Pressure Drop.....	22 ft. head (9.5 psi)	Accessory-side Fittings.....	1" Male BSP Threads

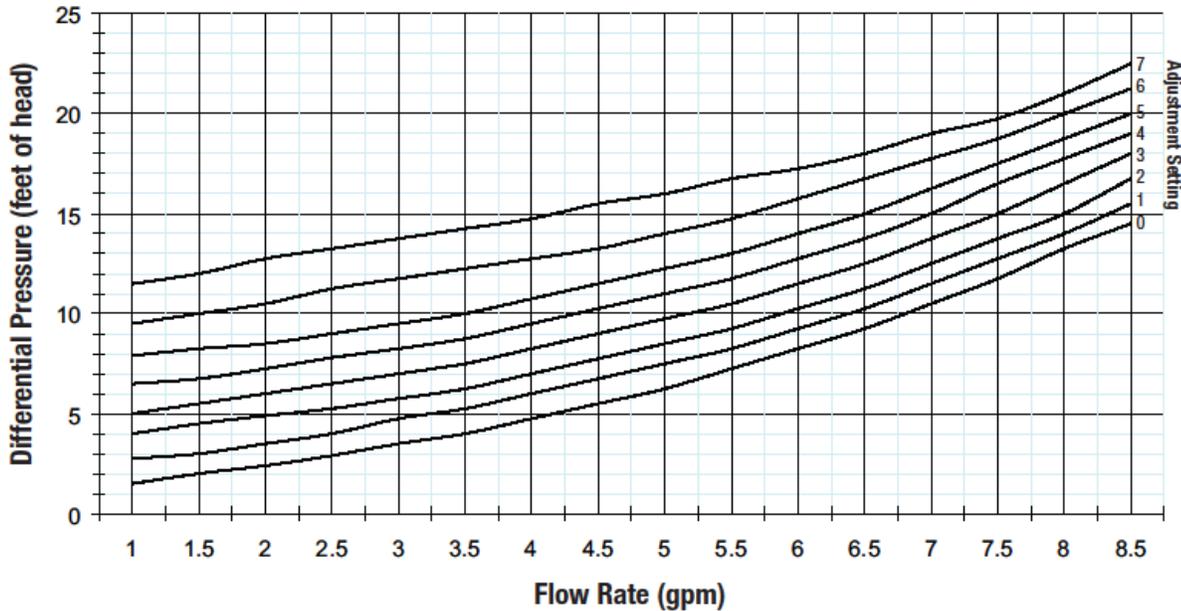
Description	Order Number	Part Number
Pressure Differential By-Pass for 1" S.S. Manifold	81005345	D4402050

Installation

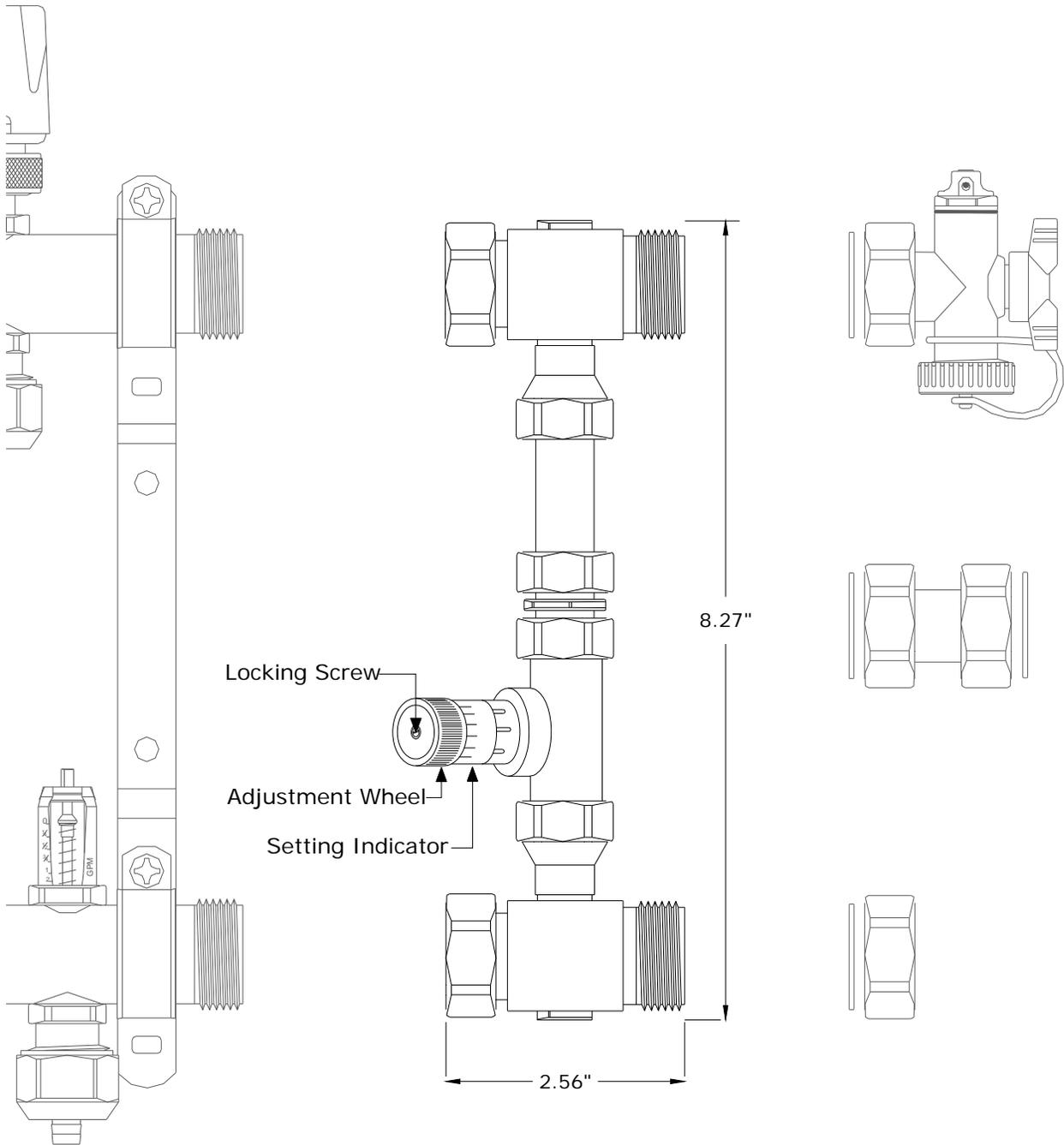
Attach the By-Pass to the Standard Stainless Steel manifold. Make sure the direction of flow, indicated on the By-Pass by an arrow, matches the intended flow direction. If necessary, loosen the union connections on the main By-Pass valve and rotate the valve to allow for easier attachment. Retighten the unions.

Set the By-Pass to the desired pressure drop rating found on the chart below. Set pressure drop should be 20% higher than the calculated system pressure drop. Example: if the calculated system pressure drop is 4 gpm @ 5 feet of head, the by-pass should be set for 6 feet of head, or a setting on the valve of between 3 & 4.

Alternatively, set the valve by: 1) Opening all zones and let the system operate for several minutes. 2) Slowly opening the by-pass until hot water is felt on the outlet side of the by-pass valve, indicating flow. 3) Closing the valve slightly so there is no flow in the by-pass when all zones are calling for heat. To adjust the valve setting, loosen the Locking Screw, turn the Adjustment wheel to select a pressure setting, retighten the Locking Screw.



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C-Channel PEX Plates



Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

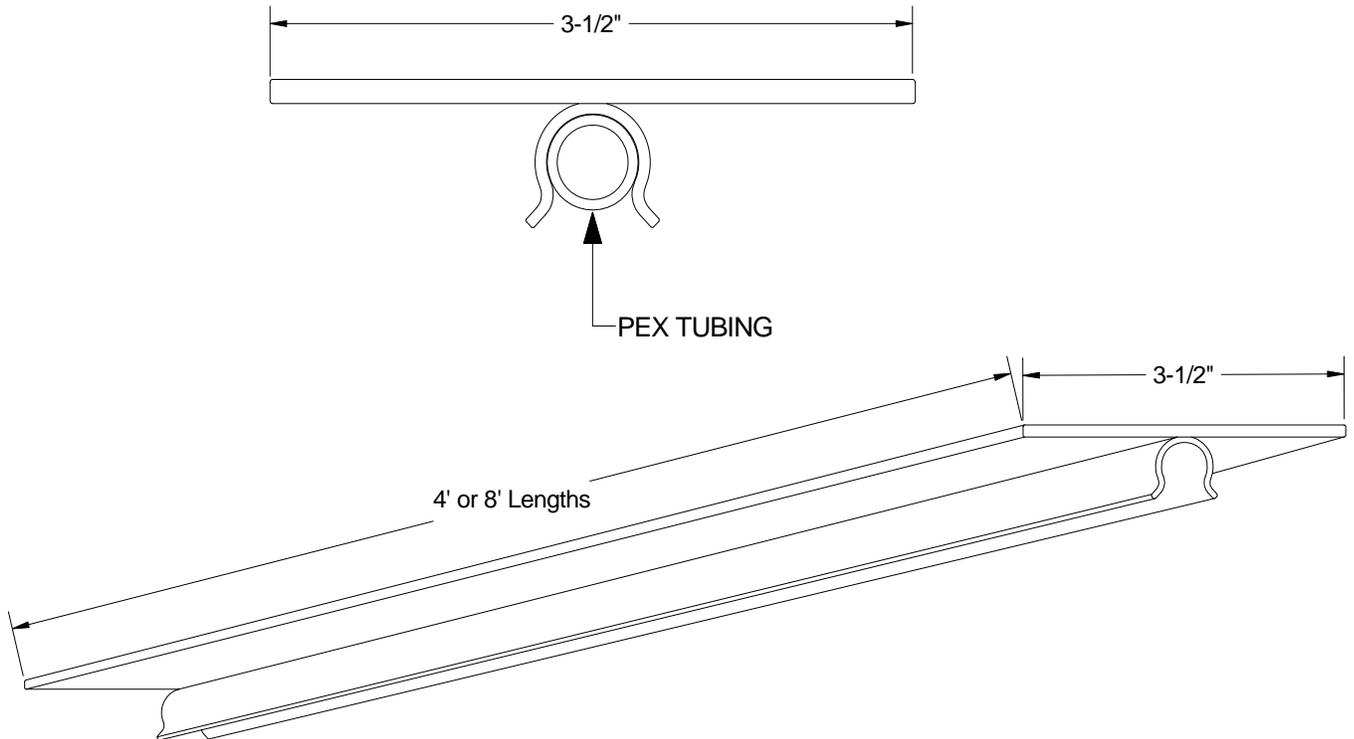
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Product Details

C-Channel PEX Plates are available for 3/8" and 1/2" PEX tubing. C-Channel PEX Plates are extruded aluminum, 1.5mm in thickness (15 gauge), and measure 3-1/2" wide and are available in either 4' or 8' lengths.

Tubing snaps into the channel making the installation quick and easy. The channel's tight grip eliminates annoying noise associated with other types of plates as the PEX expands and contracts due to water temperature changes.

Description	Order Number	Part Number
3/8" X 4 Ft. C-Channel Extruded Aluminum Heat Plate	81005319	P700350
3/8" X 8 Ft. C-Channel Extruded Aluminum Heat Plate	81004230	P700300
1/2" X 4 Ft. C-Channel Extruded Aluminum Heat Plate	81005318	P700250
1/2" X 8 Ft. C-Channel Extruded Aluminum Heat Plate	81004227	P700200



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FlexPlate Heat Transfer Plate



Project Information

Project Name: _____

Engineer: _____ Approved: _____

Submitted: _____ Date: _____

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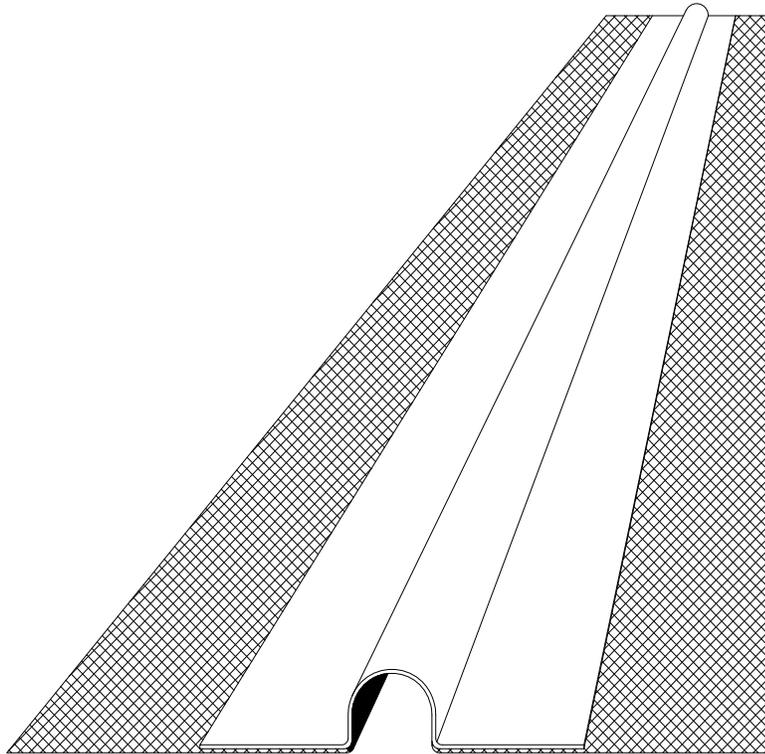
Product Details

FlexPlate is a lightweight, flexible, heat transfer plate manufactured from a patented, highly conductive graphite material with a plastic forming channel. Easily cut with scissors or a utility knife. FlexPlates are 6" wide X 4' long and are designed for use with Watts Radiant's 1/2" RadiantPEX.

Description	Order Number	Part Number
FlexPlate, 6" X 4'	81012401	FPLT04500-20

Technical Details

C6 Heat Transfer Sheet.....	Directionally Aligned Graphite
Channel.....	Extruded Polyethylene
Maximum Operating Temperature.....	180°F
Fastener Type.....	Staple
Conductivity (approximate).....	173 Btu/ft/hr/°F
Sheet Thickness.....	0.03" (0.08mm)



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Fasteners



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Project Information

Project Name: _____
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Product Details

Foamboard Staples are plastic staples designed to provide a secure fastening method of attaching PEX/Onix tubing to insulation board. Use the 1-1/2" staples for 1" insulating boards, and the 2-1/4" staples for 2" or thicker insulating boards. The Foamboard Stapler is designed to staple 3/8" and 1/2" Onix, and 3/8" to 1/4" PEX to a wide variety of foam insulating boards. The stapler comes fully assembled and used both sizes of Foamboard Staples. The stapler holds up to 120 staples allowing the contractor to reduce pipe installation time and increase productivity.

The ScrewClip is designed to hold 3/8" or 1/2" Onix, or 3/8", 1/2", or 5/8" PEX to insulating boards. The ClipTwister ScrewClip tool is designed to install ScrewClips easily into insulating boards using a standard cordless drill.

Jada Clips are used for attaching 1/2" and 5/8" PEX pipe directly to wire mesh by snapping the clip to the mesh. Jada Clips can also be fastened directly to wood by using nails or screws in the holes provided.

	<u>Description</u>	<u>Order Number</u>	<u>Model Number</u>
	<p>FoamBoard Stapler FoamBoard Staples 1.5" (300/pkg) FoamBoard Staples 2.25" (300/pkg)</p>	<p>81000826 81000822 81000825</p>	<p>P667400 P667300 P667350</p>
	<p>FoamBoard ScrewClip</p>	<p>81000847</p>	<p>PAC1620</p>
	<p>1/2" and 5/8" Jada Clip</p>	<p>81006649</p>	<p>JADA CLIPS</p>

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Bend Supports



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Project Information

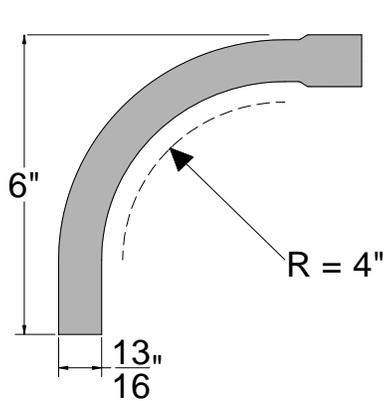
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

Product Details

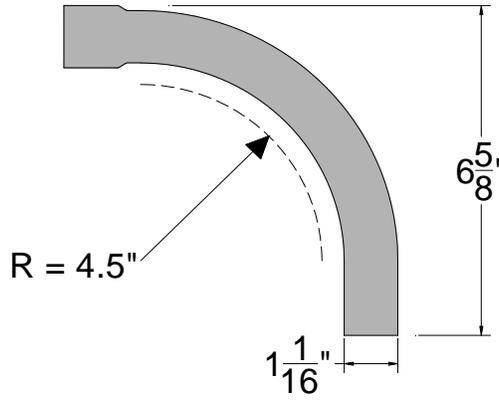
Plastic Mid-Run Bend Supports are used to assist in gently bending tubing 90° without fear of kinking. Mid-Run Supports come with screw holes to enable attachment to studs or supports.

Terminal Bend Supports are primarily used not only to safely bend tubing 90° but also as a sleeve to protect tubing on entering or exiting a concrete slab. Terminal Bend Support p/n 81001272 is good for both 3/8" and 1/2" RadiantPex and support 81001276 is used for 5/8" and 3/4" RadiantPex.

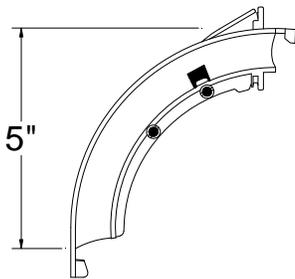
Description	Order Number	Part Number
1/2" Mid-Run Bend Support	81001280	PSBM33X
3/4" Mid-Run Bend Support	81001284	PSBM55X
3/8" & 1/2" Terminal Bend Support	81001272	PSB23X
5/8" & 3/4" Terminal Bend Support	81001276	PSB45X



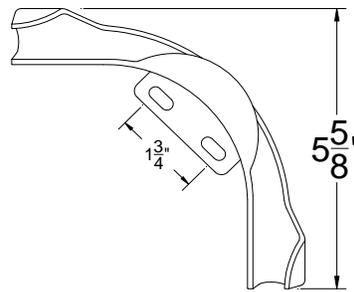
3/8" & 1/2" Terminal Bend



5/8" & 3/4" Terminal Bend



1/2" Mid-Run Bend



3/4" Mid-Run Bend

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Triple-Track Railway



Project Information

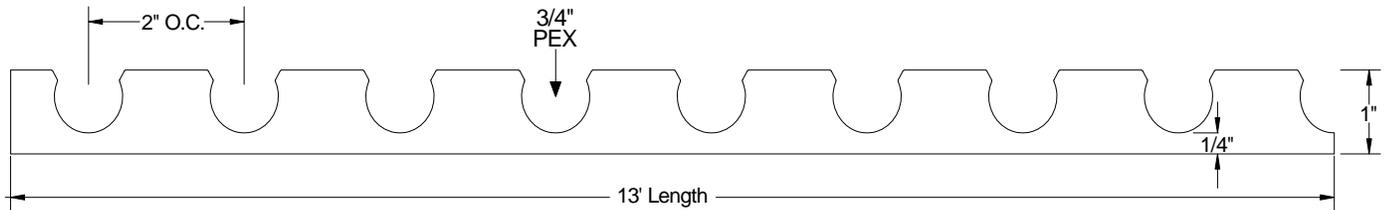
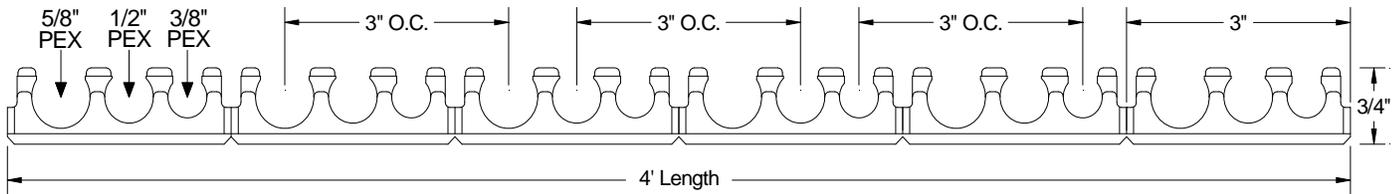
Project Name: _____
 Engineer: _____ Approved: _____
 Submitted: _____ Date: _____

5435 North Service Road
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 L7L 5H7
 Ph: 905-332-4090
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Product Details

Triple-Track Railway can be used to hold radiant tubing in areas where rebar or rewire is not used. Triple-Track will securely hold several tube sizes including 3/8" Onix, 3/8" RadiantPEX, 1/2" RadiantPEX and 5/8" RadiantPEX. Applications include concrete slabs, thin slabs, sand beds, and subgrade gravel layers. Triple-Track Railways are sold in 4' lengths and allow almost any spacing you may require – 6", 9", 12", 15" or 18" centres.

Description	Order Number	Part Number
Triple-Track Railway for 3/8", 1/2" or 5/8" PEX and 3/8" Onix, 4 ft. length	81002002	P100500
Single-Track Railway for 3/4" PEX and 1/2" Onix, 13 ft. length	81000784	P200500



Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Services. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



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