

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-piped mechanical primary and distribution panels for use in radiant floor heating and snow melting systems.

1.2 RELATED SECTIONS

- A. Section 15093 – Sleeves and Sleeve Seals for HVAC Piping
- B. Section 15181 – Hydronic Piping

1.3 REFERENCES

- A. Watts Radiant RadiantWorks Professional Software
- B. HydroNex Installation and Operations Manual

1.4 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 – Hydronic System
 1. Provide engineering analysis using manufacturer's proprietary software.
 2. Provide mechanical schematic indicating heat source, mechanical piping and accessories from heat source to manifolds, circulators, water tempering, and zone controls. Indicate supply water temperatures and flow rates to manifolds.
- D. Documentation:
 1. Provide manufacturer's detailed instructions for site preparation and product installation.
 2. Provide manufacturer's electrical power requirements.
 3. Provide documentation indicating the installer is trained to install the manufacturer's products, as needed.
- E. 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 mechanical and electrical drawings

Specification: HydroNex

1.5 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.
- 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. 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.

1.6 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 in cartons or under cover to avoid dirt or foreign material from entering the panel.

1.7 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.

1.8 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 panel components proven defective.

1.9 SYSTEM START-UP

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

1.10 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - Watts Radiant, Inc.
 - (Subsidiary of Watts Water Technologies, Inc.)
 - 4500 E. Progress Place
 - Springfield, MO 65803
 - (800) 276-2419; (417) 864-6108; Fax: (417) 864-8161
 - Web: <http://www.wattsradiant.com>
- B. Substitutions: not permitted

2.2 HYDRONEX MECHANICAL PANELS

- A. Mechanical Panels shall be pre-wired, 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.
 - 1. Panels shall be pre-wired with 9 ft (3 m) power supply cord.

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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 writing 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 pimp 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:

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- 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

2.3 HYDROCONTROL MECHANICAL PANELS

- A. Hydro Controls and HydroSkids:
1. Custom engineered mechanical panels shall be pre-wired, factory-built, factory-tested and factory-warranted.
 2. Custom engineered mechanical panels shall either be mounted on a strong, durable mounting surface or on a skid.
 3. Each HydroControl or HydroSkid shall be custom engineered and manufactured in a factory-controlled environment.

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 FIELD QUALITY CONTROL AND TESTING

- A. Site tests:
1. Test all electrical controls in accordance with respective installation manuals.
 2. 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.

3.3 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%.

3.4 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. 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.

3.6 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.