WIRSBO®
Life, Safety, Comfort Systems

Warm Cozy Floors

proMIX™ 701
Installation Manual

RADIANT FLOORS
COMFORT HEATING

Bringing *comfort* to life

uponor

proMIX™ 701
Installation Manual

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Section 1 — Introduction

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Warning Symbol: Indicates presence of hazards which can cause severe personal injury, death or substantial property damage if ignored

Cautions and Disclaimers

Failure to install and/or operate this control properly could result in:

- Damage to the equipment
- Personal injury
- Property damage

Ensure this product is installed safely in a way that meets all codes and standards that apply. Do not use this electronic station as a primary limit station. Other stations that are meant to be used and certified to be used as safety limits must be placed into the station circuit.

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Wirsbo proMIX™ 701 Overview

Introduction

The proMIX™ 701 Injection Mixing Station is a weather-responsive, single-temperature reset control with integral variable speed injection and secondary system circulators.

Operating Modes

The proMIX 701 can be set up to operate in an outdoor reset mode, a setpoint mode or a setpoint mode incorporating the Delta T limiting function.

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Variable Speed Injection Mixing

The station achieves proper supply water temperatures by using a variable speed injection pump between the primary boiler loop and the secondary radiant loop.

Installation

An additional feature is the direct alignment between the proMIX 701 and the Wirsbo TruFLOW™ manifolds. The secondary supply and return ports on the right side of the station align with the supply and return connections on the TruFLOW manifolds.

Boiler Operation

The proMIX 701 operates the boiler in two basic modes of operation: boiler enable mode and boiler load reset mode.

In the boiler enable mode, the proMIX 701 enables boiler operations based on demand call. Place the boiler sensor on the return side of the boiler loop, and set the DIP switch located on the back of the control panel to OFF.

In the boiler load reset mode, wire the primary pump through the proMIX 701. The proMIX 701 opens and closes the boiler contacts to control the boiler supply water temperature. The proMIX 701 also controls the primary pump operations. Install the boiler sensor on the supply side of the boiler loop, and set the DIP switch located on the back of the control panel to ON.

Station Capability

The Wirsbo proMIX 701 is capable of supporting hydronic heating applications based on flow and pumping limitations of the secondary piping.

Pipe Size	Flows	@ 10°F Δt	@ 20°F Δt
¾" copper	2.0 – 4.0 gpm	10,000 – 20,000 BTU/h	20,000 – 40,000 BTU/h
1" copper	4.0 – 9.0 gpm	20,000 – 45,000 BTU/h	40,000 – 90,000 BTU/h

To determine the project compatibility based on the capability of the proMIX 701, refer to the documentation starting on **page 4**.

Wirsbo proMIX 701 Injection Mixing Station Labeled View

1. **Air Vent**
2. **Control Panel**
3. **Push Buttons**
4. **Radiant System Return**
5. **Injection Mixing Pump**
6. **Radiant System Pump**
7. **Radiant System Supply**
8. **Injection Return**
9. **Injection Supply**
10. **Power Cord**
11. **LCD Screen**

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Caution: To ensure proper system function, construct the radiant system to meet the capabilities of the secondary pump during the initial design phase of the project.

Sizing Compatibility of the Secondary Pump

Determine Highest Feet of Head Loss Across Manifold

To determine the highest feet of head loss across the manifold or manifolds supported by the proMIX 701, use the procedure outlined below along with the data in **Table 1-1**. These tables support ⅜" and ½" PEX tubing at 6, 9 and 12 inches on center. Use the closest loop length listed in the table to the actual loop on the manifold. Additional information for determining head loss is available in the Wirsbo Complete Design Assistance Manual (CDAM).

	⅜" PEX @ 6" on center			⅜" PEX @ 9" on center			⅜" PEX @ 12" on center		
BTU/h/ft²	175 ft. loop ft. of hd.	200 ft. loop ft. of hd.	225 ft. loop ft. of hd.	175 ft. loop ft. of hd.	200 ft. loop ft. of hd.	225 ft. loop ft. of hd.	175 ft. loop ft. of hd.	200 ft. loop ft. of hd.	225 ft. loop ft. of hd.
8	0.8	1.2	1.6	1.6	2.4	3.3	2.7	3.9	5.4
10	1.3	1.7	2.5	2.5	3.4	4.9	4.2	6.0	8.4
12	1.6	2.4	3.3	3.4	4.8	6.8	5.8	8.3	11.5
14	2.2	3.1	4.4	4.4	6.6	9.0	7.5	10.9	
16	2.7	3.9	5.4	5.8	8.3	11.5	9.5	13.8	
18	3.4	4.8	6.8	7.0	10.2	14.2	11.7		
20	4.2	6.0	8.4	8.4	12.3		14.1		
22	4.8	7.2	9.7	9.8	14.5				
24	5.8	8.3	11.5	11.7					
26	6.5	9.6	13.0	13.4					
28	7.5	10.9							
30	8.4	12.3							
32	9.5	13.8							
34	10.4								
36	11.7								
38	12.7								
40	14.1								

	½" PEX @ 6" on center			½" PEX @ 9" on center			½" PEX @ 12" on center		
BTU/h/ft²	200 ft. loop ft. of hd.	250 ft. loop ft. of hd.	325 ft. loop ft. of hd.	200 ft. loop ft. of hd.	250 ft. loop ft. of hd.	325 ft. loop ft. of hd.	200 ft. loop ft. of hd.	250 ft. loop ft. of hd.	325 ft. loop ft. of hd.
8	0.3	0.5	1.0	0.6	1.1	2.2	0.9	1.8	3.6
10	0.4	0.7	1.6	0.8	1.5	3.1	1.4	2.6	5.3
12	0.6	1.1	2.2	1.1	2.2	4.4	1.9	3.6	7.3
14	0.7	1.4	2.8	1.5	2.8	5.8	2.5	4.7	9.6
16	0.9	1.8	3.6	1.9	3.6	7.3	3.2	5.9	12.2
18	1.1	2.2	4.4	2.4	4.4	9.1	3.9	7.3	
20	1.4	2.6	5.3	2.8	5.3	11.0	4.7	8.8	
22	1.7	3.1	6.2	3.4	6.3	13.0	5.6	10.5	
24	1.9	3.6	7.3	3.9	7.3		6.5	12.3	
26	2.2	4.1	8.6	4.5	8.4		7.5	14.1	
28	2.5	4.7	9.6	5.2	9.7		8.7		
30	2.8	5.3	11.0	5.8	10.9		9.8		
32	3.2	5.9	12.2	6.5	12.3		11.0		
34	3.5	6.6	13.7	7.3	13.6		12.3		
36	3.9	7.3		8.0			13.6		
38	4.3	8.0		9.0					
40	4.7	8.8		9.8					
42	5.2	9.7		10.7					
44	5.6	10.5		11.6					
46	6.0	11.4		12.6					
48	6.5	12.3		13.6					
50	7.0	13.2		14.6					

Table 1-1: Foot of Head Loss by Loop Length Based on 120°F Water @ 10°F Δt

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1. Select which table to use in **Table 1-1** (⅜" or ½") on **page 4** based on the tubing dimension used on the project.
2. From the BTU/h/ft² column on the table, select the closest BTU/h/ft² load for the project.
3. After selecting the proper BTU/h/ft² load in the chart, move to the right and select the proper column for the actual tubing on-center distance for the project (6, 9 or 12 inches).
4. From the on-center distance column, select the loop length closest to the actual loop on the manifold. (When in doubt, round up to the next loop length.)
5. The value shown at the intersection of these points is the feet of head loss for the manifold.

Determine Feet of Head Loss Across Supply and Return Piping Between Manifolds and proMIX 701

1. If copper is used between the proMIX 701 and the manifolds, use the appropriate copper charts or sizing wheel to determine the feet of head loss based on the system flow.
2. If PEX or MultiCor® is used, refer to the pressure loss charts found in Appendix H of the Wirsbo CDAM, 5th edition.

Plot System Requirements on System Pump Curve Chart

1. After determining the two values above, add them together. This is the head (ft) value used in **Chart 1-2**.
2. To find the flow (gpm) value for the portion of the system serviced by the proMIX 701, refer to the design information from the Wirsbo Advance Design Suite™ (ADS).
3. Once both the head (ft) and flow (gpm) values are determined, find the intersection of these two values on the System Pump Curve Chart in **Chart 1-2**.

   Note: Plots inside or outside of the pump curve are not acceptable.

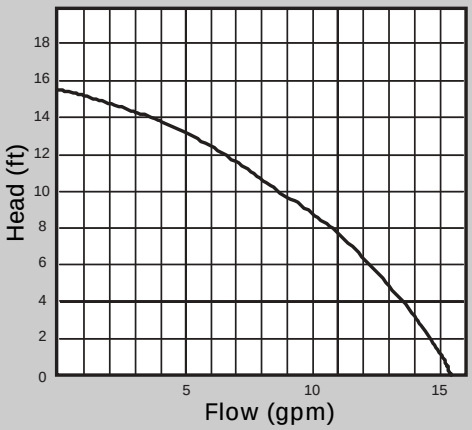

Chart 1-2: System Pump Curve

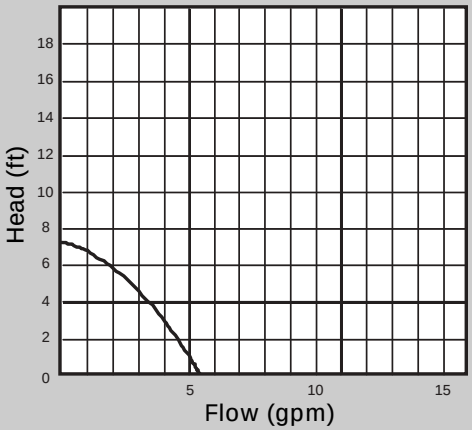

Chart 1-3: Injection Pump Curve

Sizing Compatibility of the Injection Pump

Determine the Injection Flow Rate

1. Find the differential temperature (Δt) for the secondary side of the project. Use **Table 1-4** on **page 6** for 10°F Δt and **Table 1-5** for 20°F Δt.
2. Then find the BTU/h value of the radiant system serviced by the proMIX 701.
3. After the differential temperature and the BTU/h values are determined, find the differential temperature in the Δt column of the chart. The Δt column is the difference between boiler supply water temperature and system return water temperature.
4. Intersect the Δt row with the column of the BTU/h value. The value at this intersection is the injection flow rate.

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Determine Feet of Head Loss Across Supply and Return Injection Piping Between Primary (Boiler) Loop and proMIX 701

1. If copper is used between the proMIX 701 and the primary loop, use the appropriate copper charts or sizing wheel to determine the feet of head loss based on the injection flow rate.
2. If MultiCor is used, refer to the pressure loss charts found in Appendix H of the Wirsbo CDAM, 5th edition.

Injection Flow Rate in gpm at 10°F Δt on the Secondary Side

¾" Copper Pipe

	Secondary Load in BTU/h					
Δt[1]	10,000	12,000	14,000	16,000	18,000	20,000
100°F	0.20	0.24	0.28	0.32	0.36	0.40
90°F	0.22	0.27	0.31	0.36	0.40	0.44
80°F	0.25	0.30	0.35	0.40	0.45	0.50
70°F	0.29	0.34	0.40	0.46	0.51	0.57
60°F	0.33	0.40	0.47	0.53	0.60	0.67
50°F	0.40	0.48	0.56	0.64	0.72	0.80
40°F	0.50	0.60	0.70	0.80	0.90	1.00

[1] Difference between boiler supply water temperature and system return water temperature.

1" Copper Pipe

	Secondary Load in BTU/h										
Δt[1]	20,000	22,500	25,000	27,500	30,000	32,500	35,000	37,500	40,000	42,500	45,000
100°F	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90
90°F	0.44	0.50	0.56	0.61	0.67	0.72	0.78	0.83	0.89	0.94	1.00
80°F	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00	1.06	1.13
70°F	0.57	0.64	0.71	0.79	0.86	0.93	1.00	1.07	1.14	1.21	1.29
60°F	0.67	0.75	0.83	0.92	1.00	1.08	1.17	1.25	1.33	1.42	1.50
50°F	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
40°F	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.00	2.13	2.25

[1] Difference between boiler supply water temperature and system return water temperature.

Table 1-4: Injection Flow Rate in gpm at 10ºF Δt on the Secondary Side

Injection Flow Rate in gpm at 20°F Δt on the Secondary Side

¾" Copper Pipe

	Secondary Load in BTU/h										
Δt[1]	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000	38,000	40,000
110°F	0.36	0.40	0.44	0.47	0.51	0.55	0.58	0.62	0.65	0.69	0.73
100°F	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80
90°F	0.44	0.49	0.53	0.58	0.62	0.67	0.71	0.76	0.80	0.84	0.89
80°F	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
70°F	0.57	0.63	0.69	0.74	0.80	0.86	0.91	0.97	1.03	1.09	1.14
60°F	0.67	0.73	0.80	0.87	0.93	1.00	1.07	1.13	1.20	1.27	1.33
50°F	0.80	0.88	0.96	1.04	1.12	1.20	1.28	1.36	1.44	1.52	1.60

[1] Difference between boiler supply water temperature and system return water temperature.

1" Copper Pipe

	Secondary Load in BTU/h										
Δt[1]	40,000	45,000	50,000	55,000	60,000	65,000	70,000	75,000	80,000	85,000	90,000
110°F	0.73	0.82	0.91	1.00	1.09	1.18	1.27	1.36	1.45	1.55	1.64
100°F	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
90°F	0.89	1.00	1.11	1.22	1.33	1.44	1.56	1.67	1.78	1.89	2.00
80°F	1.00	1.13	1.25	1.38	1.50	1.63	1.75	1.88	2.00	2.13	2.25
70°F	1.14	1.29	1.43	1.57	1.71	1.86	2.00	2.14	2.29	2.43	2.57
60°F	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00
50°F	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60

[1] Difference between boiler supply water temperature and system return water temperature.

Table 1-5: Injection Flow Rate in gpm at 20ºF Δt on the Secondary Side

Plot System Requirements on Injection Pump Curve Chart

1. Using **Chart 1-3** on **page 5**, enter the chart on the left side with the feet of head loss across supply and return piping value.
2. Enter at the bottom of the chart with the injection flow rate determined from **Table 1-4** or **Table 1-5.**
3. Move both entry points toward the pump curve. The intersection point of these two values must lie on or within the pump curve. Plots inside or to the right of the curve are not acceptable.

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Section 2 — Installation

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Figure 2-1

Figure 2-2

Figure 2-3

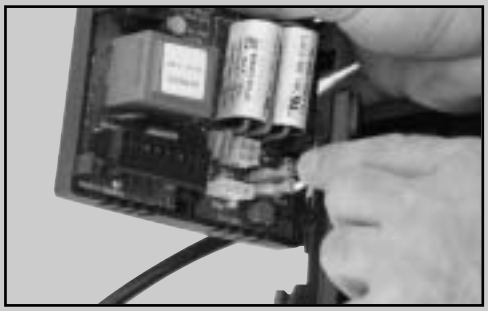

Figure 2-4

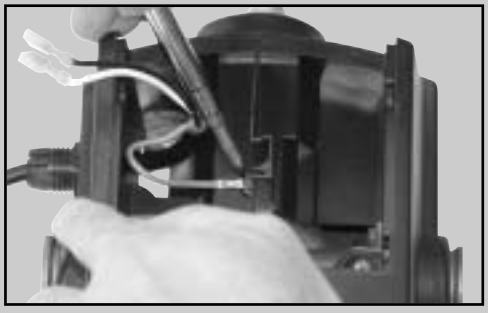

Figure 2-5

Checking the Contents

Check the contents of this package, which should include:

- One proMIX 701 Injection Mixing Station (A3040701)
- One Outdoor Sensor (A3060070)
- Two Universal Sensors (A3060071)
- One proMIX 701 Installation Manual

Note: If any contents listed are missing or damaged, please contact your Wirsbo distributor or local sales representative for assistance.

Disassembling the proMIX 701

The control panel and cover must be removed in order to wire and pipe the proMIX 701 Injection Mixing Station.

Warning: Ensure the power cord to the station is unplugged prior to starting this procedure.

1. Remove the screw at the base of the cover just below the bottom pump cartridge. **(See Figure 2-1.)**

2. Remove the screw on the face of the control panel. **(See Figure 2-2.)**

3. Gently lift the control panel up and away from the station.

4. Loosen the plastic compression nut on the side of the station where the power cord enters the station. This allows the cord to slide farther into the control panel, providing slack to the wires while pulling the control panel from the station body. **(See Figure 2-3.)**

5. Remove the line-voltage wiring (white and black wires) from the pin connectors on the control panel circuit board. **(See Figure 2-4.)**

6. Remove the grounding screw connected to the green wire from the station. **(See Figure 2-5.)**

7. Disconnect the variable speed pump control wires (three pin molex connector) from the control panel circuit board (bottom connection). Press the tab on the plastic hook on the plug to release the plug from the base. The plug should release easily from the base. Do not force the plug from the base as it can damage the connection. **(See Figure 2-6.)**

Figure 2-6

8. Disconnect the system pump wires (four pin molex connector) from the control panel circuit board (top connection). Press the tab on the plastic hook on the plug to release the plug from the base. The plug should release easily from the base. Do not force the plug from the base as it can damage the connection. **(See Figure 2-7.)**

Figure 2-7

9. Separate the control panel from the station.

10. Remove the two screws located at the base of the control panel opening. These screws secure the cover to the station. **(See Figure 2-8.)**

11. Lift the cover up and away from the body of the station and work the wire bundles through the cover openings.

Figure 2-8

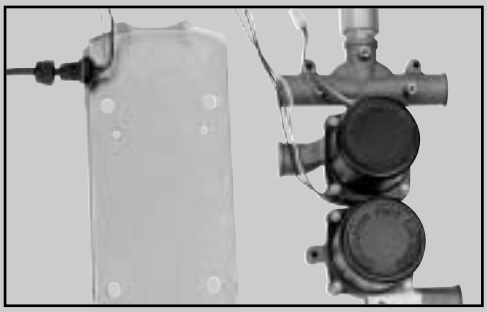

Figure 2-9

Figure 2-10

Figure 2-11

Mounting the proMIX 701

The body of the proMIX 701 must be removed from its metal base before the station is mounted. **(See Figure 2-9.)**

Piping the Station

As with any appliance within the hydronic heating system, the ability to isolate that appliance can mean the difference between a simple service call or a complex and timely service call. The proMIX 701 should be installed with isolation ball valves at each port location and union connections installed between the station's port and these valves. If the station needs to be removed for extended servicing or replacement, close the ball valves and disconnect the union connections for quick removal of the station without having to drain the system down. Refer to the following suggested procedure for piping the station.

Note: Ensure a properly sized globe valve is installed on the return injection leg from the proMIX 701. Failure to use a globe valve may cause irratic temperature swings on the secondary radiant loop.

On smaller projects, the single manifold for the system may be located in the mechanical room with the proMIX 701. The proMIX 701 is designed to align with the Wirsbo TruFLOW manifolds. The vertical distance between the port on the secondary side of the station is the same distance as the supply and return connections on the TruFLOW manifolds. Remember to measure the horizontal distance correctly. The TruFLOW manifolds are offset, and this distance needs to be considered. Dry-fit the station to the manifolds to ensure a proper connection prior to mounting the station. Refer to **page 56** for a detailed drawing.

Mounting

1. Find a convenient and accessible location, typically in the mechanical room.
2. Use a level on the side of the base to ensure a professional installation. **(See Figure 2-10.)**
3. Position the metal base in place and mark the four mounting holes on the wall. **(See Figure 2-11.)**
4. Remove the metal base from the wall and drill the pilot holes for the insert anchors.

   Note: The mounting holes through the station require ¼"-diameter screws. The grip distance for the top two mounting locations is 1¾ inches. The grip distance for the bottom two mounting locations is 2 inches. Select the appropriate length screw in order to sufficiently engage the type of anchor used in the wall.
5. Insert the screws though the mounting locations on the station. Place the metal base on the screws.
6. Place the station with its base on the wall and align the screws with the anchors in the wall. Start the screws into the anchors. Do not tighten the screws until all four screws are threaded into the anchors.
7. Tighten the screws equally until snug and the station is firmly secured to the wall.

Reassembling the proMIX 701

Warning: Ensure the power cord to the station is unplugged prior to starting this procedure.

Caution: Ensure this product is installed in a safe manner according to all applicable codes, standards and instructions. The electronic control contained in this product is not intended as a primary limit control. Removal of the PC board from its enclosure can result in damage to the proMIX 701 and possibly even personal injury. Refer to qualified personnel for servicing.

1. Gently guide both line-voltage wire bundles for the pumps through the opening on the lower left of the station cover beneath the control panel area. **(See Figure 2-12.)**

2. As the cover is lowered onto the station, gently guide the white and black wires from the power cord through the opening in the cover just above the area where the power cord connects to the base. **(See Figure 2-13.)**

3. Install the green grounding wire from the power cord to the screw location just below the air vent on the station. Use the green screw supplied with the station. **(See Figure 2-14.)**

4. Install the two screws located at the base of the control panel opening. These screws secure the cover to the station. **(See Figure 2-15.)**

5. Install the screw at the base of the cover, just below the bottom pump cartridge. **(See Figure 2-16.)**

6. The station is now reassembled with the exception of the electrical connections. Refer to **Electrical Connections at the Station**, starting on **page 14**, for the installation of all electrical connections.

Figure 2-12

Figure 2-13

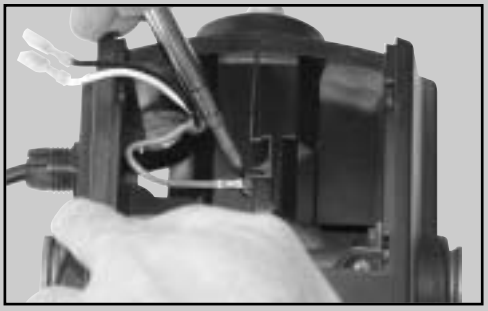

Figure 2-14

Figure 2-15

Figure 2-16

Mounting the Sensors

Outdoor Sensor (S4)

The Outdoor Sensor includes a 10k thermister, which provides an accurate measurement of the outdoor temperature. The sensor is protected by a white, UV-resistant PVC plastic enclosure. **(See Figure 2-17.)**

Note: The temperature sensor is built into the enclosure.

Figure 2-17

Mounting

1. Remove the screw and pull the front cover off the sensor enclosure.
2. Mount the outdoor sensor directly onto a wall or a 2x4 electrical box. When the sensor is wall-mounted, the wiring should enter through the back or bottom of the enclosure. Do not mount the sensor with the conduit knockout facing up as rain could enter the enclosure and damage the sensor. **(See Figure 2-18.)**

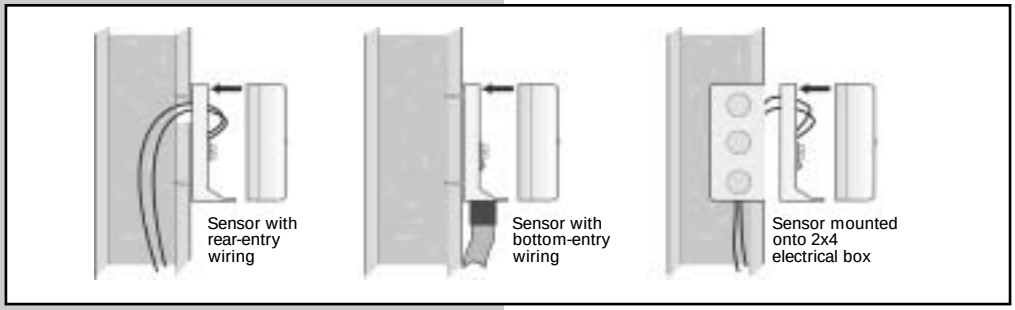

Figure 2-18

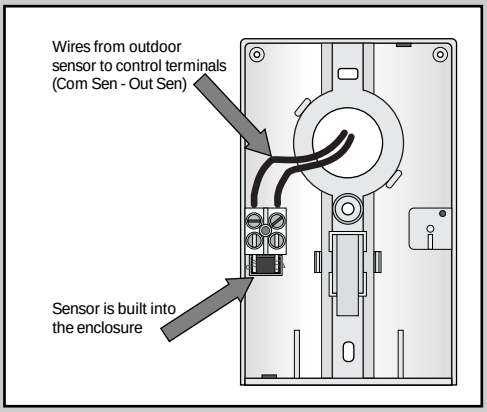

Figure 2-19

3. It may be necessary to install an insulating barrier behind the enclosure to prevent heat transmitted through the wall from affecting the sensor reading.
4. Mount the outdoor sensor on an exterior wall, which best represents actual outdoor temperature (e.g., a north-facing wall). Do not expose to heat sources, such as solar gain, exhaust ventilation or window openings.
5. Install the outdoor sensor at an elevation above the ground that will prevent accidental damage or tampering. Ensure the sensor height is clear of snow drifting common to that location. Installing the sensor in the shadow of the roof eave is common.
6. Connect 18 AWG or similar wire to the two terminals provided in the enclosure, and run the wires from the outdoor sensor to the station control. **(See Figure 2-19.)**

Caution: Do not run sensor wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference (EMI), use shielded cable or twisted pair, or run the wires in a grounded metal conduit. If using shielded cable, connect the shield wire to the Com terminal on the station and not to the ground.

7. Follow the **Testing the Sensors** instructions on **page 17**.
8. Replace the front cover of the sensor enclosure.

Note: Maximum distance between the sensor and control is 500 feet when using 18 AWG wire.

Universal Sensors (S1, S3 and S5)

These Universal Sensors feature a zinc sleeve for fast response and a wide operating range. They are used in a multitude of applications. They are supplied with 30 inches (762mm) of 2-conductor wire. Two Universal Sensors (A3060071), along with the Outdoor Sensor (A3060070), are included in the proMIX 701. A third Universal sensor is required for the Delta T Limiting application. This additional universal sensor must be purchased separately. **(See Figure 2-20.)**

Note: The sensor is designed to mount on a pipe or in a temperature-immersion well.

Mounting

1. When strapping the Universal Sensor directly to the pipe, use the cable tie provided. Place insulation around the sensor to reduce air currents affecting the sensor measurement. Do not over-tighten the cable tie as this can cause damage to the sensor. **(See Figure 2-21.)**
2. When installing the Universal Sensor in a well installation, ensure the well components are compatible for use with the Universal Sensor. The use of a well installation is common in piping 2" and larger. Straping the sensor to the pipe and insulating is common for smaller pipes. **(See Figure 2-22.)**
3. Place the Universal Sensor downstream of a pump or after an elbow or similar fitting. The minimum distance is two pipe diameters for 2" pipe or smaller. Proper sensor location requires that the fluid is thoroughly mixed within the pipe before it reaches the sensor. **(See Figure 2-23.)**
4. The System Supply Sensor (S1) is installed on the system supply pipe. This sensor is required at all times.
5. If a Boiler Sensor (S3) is used, install the boiler sensor on either the boiler supply or the boiler return. For boiler load reset, the sensor is installed on the boiler supply. Ensure the DIP switch on the back of the circuit board of the station is set to ON. If the sensor is installed on the boiler return, ensure the DIP switch is set to OFF. If boiler load reset or boiler protection are not required in the application, installing the boiler sensor is not necessary.
6. If a System Return Sensor (S5) is used, install the sensor on the system return pipe. This sensor is only required if the station is operating in the Delta T limiting mode.

   Caution: Do not run sensor wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference (EMI), use shielded cable or twisted pair, or run the wires in a grounded metal conduit. If using shielded cable, connect the shield wire to the Com terminal on the station and not to the ground.
7. If it is necessary to connect 18 AWG wire to the two sensor wires, use wire nuts to make the connection.

   Note: Maximum wire length between the sensor and control panel on the station is 500 feet when using 18 AWG wire.
8. Follow the **Testing the Sensors** instructions on **page 17**.

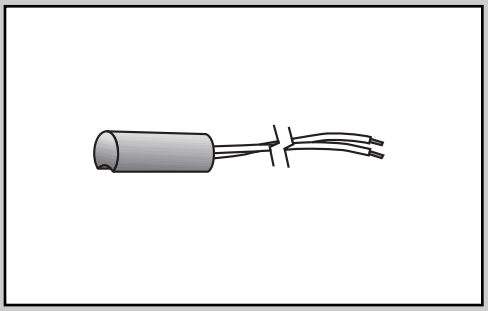

Figure 2-20

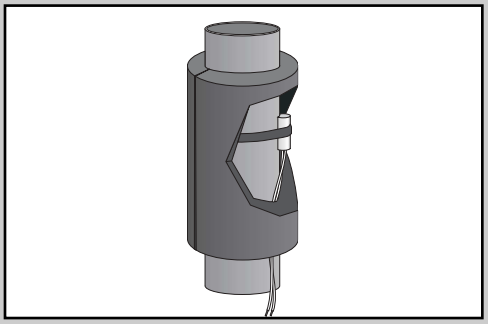

Figure 2-21

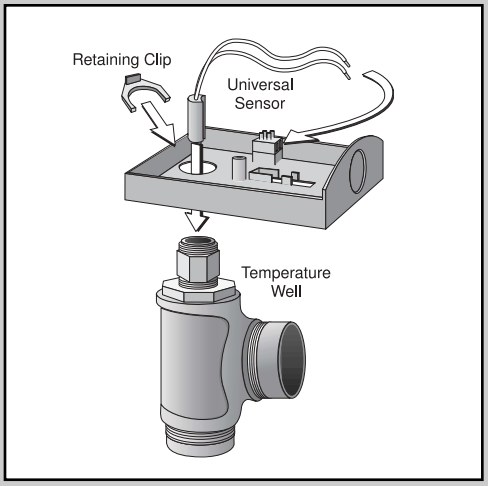

Figure 2-22

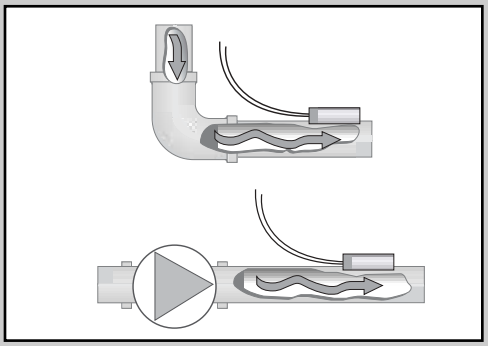

Figure 2-23

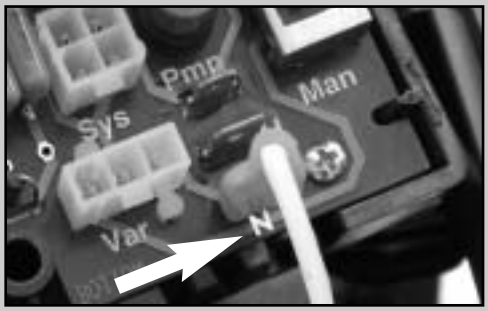

Figure 2-24

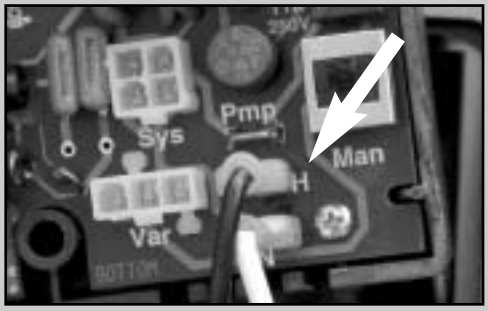

Figure 2-25

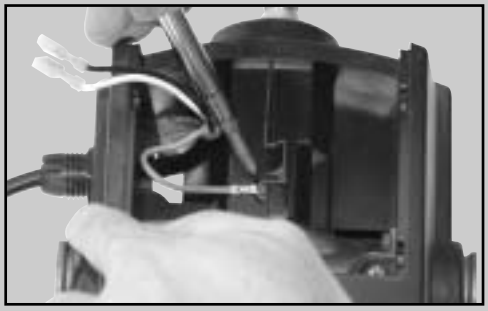

Figure 2-26

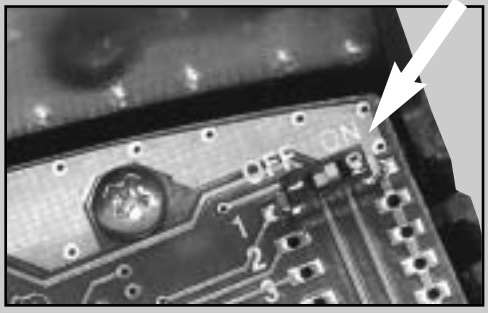

Figure 2-27

Electrical Connections at the Station

Warning: Test for voltage present in any wires. No voltage should be present.

Remove the Control Panel from the Station Body

1. Remove the screw from the front of the control panel.
2. Grasp the front of the control panel and remove it from the plastic enclosure surrounding the station.
3. Wiring to the control panel is connected to the back of the circuit board using either the indicated spade connectors, Molex connectors or the snap-on terminal plugs. These may need to be disconnected to fully remove the control panel.

Warning: The electronic control contained in this product is not intended as a primary limit control. Removal of the circuit board from its enclosure can result in damage to the station and possibly even personal injury. Refer to qualified personnel for servicing.

Powered Input Connections

Wiring to the Station (standard installation)

1. 120VAC power is supplied to the station with a 5', three-prong, grounded power cord. Provide a standard 15 amp outlet within 5' of the station.
2. Using the supplied line cord, connect the white wire with the ¼" female spade connector to the ¼" male spade connector labeled “N” on the back of the control panel circuit board. **(See Figure 2-24.)**
3. Connect the black wire with the ¼" female spade connector to the ¼" male spade connector labeled “H” on the back of the control panel circuit board. **(See Figure 2-25.)**
4. Connect the green wire to the ground screw located on the casting of the station's body. **(See Figure 2-26.)**

Wiring for Boiler Load Reset (optional installation)

Note: Boiler load reset is used to optimize boiler supply water temperature as it relates to the secondary radiant system. Boiler load reset should not be confused with boiler control reset. Only experienced installers should use this installation option. Refer to the electrical schematic on **page 55** for assistance.

1. Ensure the boiler sensor is placed on the supply side of the boiler.
2. The DIP switch on the back of the control panel is set to ON. **(See Figure 2-27.)**
3. Discard the power cord supplied with the station.
4. Wire the primary circulator the same time the station is wired for 120VAC power.
5. Connect the hot wire (black) from the primary pump to the male spade connector labeled “Pmp” on the back of the control panel circuit board. Use a 3⁄16" female spade connector on the wire to connect to this male connector.

6. Using a wire nut, join the neutral wires (white) from the primary pump, the 120VAC supply and a short (about 4") pigtail wire. On the other end of the pigtail wire, install a ¼" female spade connector and connect to the ¼" male spade connector labeled "N" on the back of the control panel circuit board.
7. Connect the hot wire (black) from the 120VAC supply to the ¼" male spade connector labeled "H" on the back of the control panel circuit board. Use a ¼" female spade connector on the wire to connect to the male connector.
8. Using a wire nut, join the ground wires from the primary pump, the 120VAC supply and a short (about 4") pigtail wire. Then connect the other end of the pigtail wire to the green ground screw located on the station body's casting.

Wiring the Injection Pump
Connect the variable speed injection pump's three-pin molex connector from the station to the matching three-pin connector labeled "Var" on the back of the control panel circuit board. **(See Figure 2-28.)**

Wiring the System Pump
Connect the system pump's four-pin molex connector from the station to the matching four-pin connector labeled "Sys" on the back of the control panel circuit board. **(See Figure 2-29.)**

Sensor Connections

Warning: Do not apply power to the sensors or the sensor terminals as this will damage either the sensors or the station.

1. Remove the four-pin terminal block from the station's circuit boards, pulling the terminal block directly away from the circuit board.
2. Ensure all wires are stripped to a minimum of ⅜" (9mm) for proper connection to the low-voltage terminals.

Outdoor Sensor (S4) — Reset Mode
Connect the two wires from the Outdoor Sensor directly to the "Com" and "Out" terminals on the terminal block. The outdoor sensor measures the outdoor air temperature. **(See Figure 2-30.)**

System Supply Sensor (S1) — Required
Connect the two wires from the System Supply Sensor directly to the "Com" and "Sup" terminals of the terminal block. The System Supply Sensor measures the supply temperature that is delivered to the system. **(See Figure 2-31.)**

Boiler Sensor (S3) — Optional
Connect the two wires from the Boiler Sensor directly to the "Com" and "Boil" terminals of the terminal block. The Boiler Sensor measures the boiler temperature from either the boiler supply or the boiler return, depending on the sensor placement. **(See Figure 2-32.)**

Figure 2-28

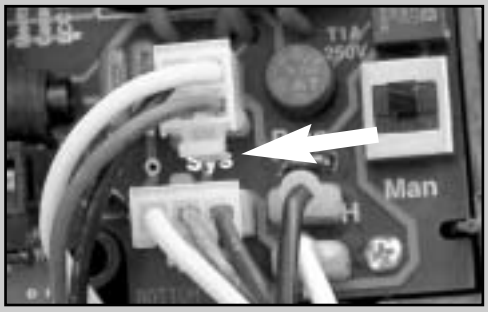

Figure 2-29

Figure 2-30

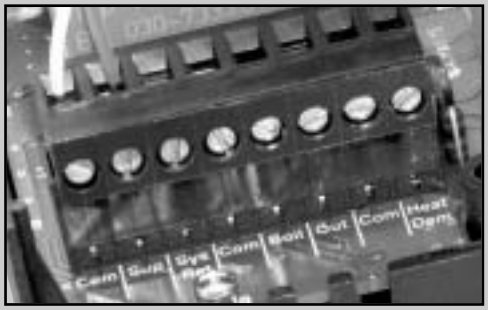

Figure 2-31

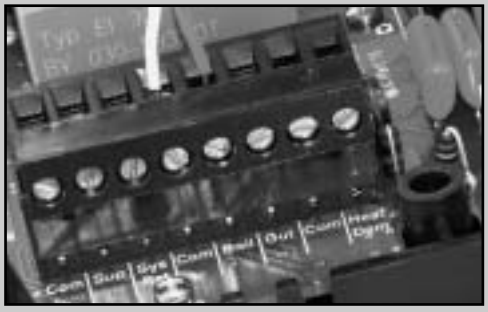

Figure 2-32

WIRSBO
Life, Safety, Comfort Systems

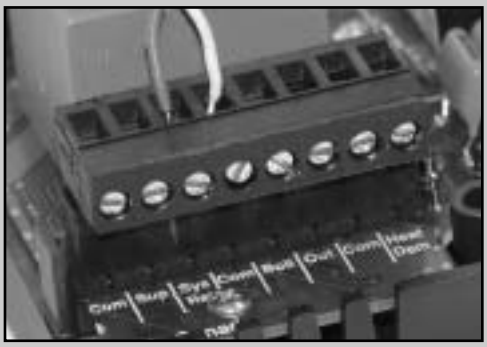

Figure 2-33

Figure 2-34

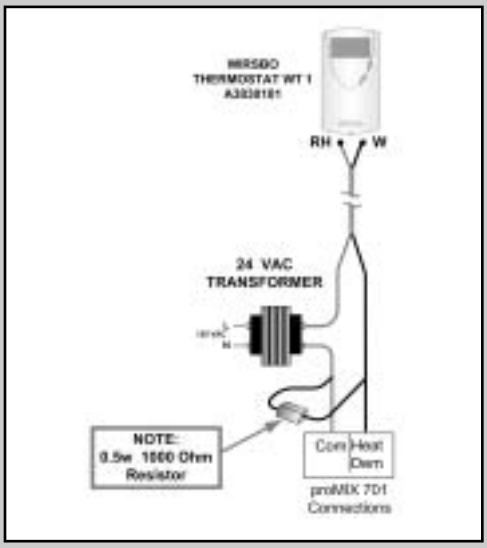

Figure 2-35

Figure 2-36

System Return Sensor (S5) — Delta T Limiting Mode
Connect the two wires from the System Return Sensor directly to the "Com" and "Sys Ret" terminals of the terminal block. The System Return Sensor measures the return temperature from the system. The System Return Sensor is used for Delta T limiting functions only. **(See Figure 2-33.)**

Wiring the Heat Demand

Wire the Heat Demand circuit with either a low-voltage powered signal or an unpowered switch closure.

Powered Demand

1. If a powered demand is used, connect the switched side of the 24VAC demand circuit to the "Heat Dem" terminal of the terminal block.
2. Connect the second side of the 24VAC demand circuit to the "Com" terminal of the terminal block. **(See Figure 2-34.)**

Note: When using a Wirsbo WT1 or WT2 Thermostat for a single zone system, install a 0.5 watt, 1000-ohm resistor in parallel. **(See Figure 2-35.)**

Unpowered Demand

1. If an unpowered demand is used, connect one side of the demand switch to the "Heat Dem" terminal of the terminal block.
2. Connect the second side of demand switch to the "Com" of the terminal block. **(See Figure 2-34.)**

Wiring to the Boiler

Remove the two-pin terminal block from the station's circuit boards, pulling the terminal block directly away from the circuit board. The Boiler Relay is a switch used in the boiler circuit. There is no power available on these terminals from the station. Connect the Boiler Relay in series with the control circuit of the boiler. **(See Figure 2-36.)**

Reconnecting the Terminal Block

1. Insert the four-pin terminal block into the four-pin terminal header on the circuit board of the control head.
2. Press firmly until it snaps into place.
3. Insert the three-pin terminal block into the terminal header on the circuit board of the station.
4. Press firmly until it snaps into place.

Reinstalling the Control Head

1. Begin by inserting all excess wiring into the station body.
2. Place the control head into the station's plastic enclosure.
3. Insert the screw into the hole located on the face of the control head and tighten the screw to fasten the control head to the control enclosure. Do not over-tighten.

Testing the Wiring

Note: Only properly trained and experienced people should perform the following tests using standard testing practices and procedures.

Testing the Sensors

To test the sensors, first measure the actual temperature at each sensor location using a high-quality digital thermometer. If a thermometer is not available, place a second sensor beside the one to be tested and compare the readings. Then measure the sensor resistance using a high-quality multimeter, capable of reading at least 0 to 300VAC and at least 0 to 2 million ohms.

1. Measure the temperature using the thermometer and then measure the resistance of the sensor at the station. The wires from the sensor should not be connected to the station while performing the test.
2. Using the Temperature Resistance Table **(see Table 2-36)**, estimate the temperature measured by the sensor. The sensor and thermometer readings should be close. If the test meter reads a very high resistance, this may indicate a broken wire, a poor wiring connection or a defective sensor. If the resistance is very low, this may indicate a wiring short, moisture in the sensor or a defective sensor.

To test for a defective sensor, measure the resistance directly at the sensor location. Do not apply voltage to a sensor at any time as damage to the sensor may result.

Test the Power Supply

Turn on the power and measure the voltage at the wall outlet using an AC volt meter. The reading should range between 108 and 132VAC.

Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,710	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,828	170	7	1,403
-35	-37	280,279	35	2	29,996	105	41	5,210	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,180	50	10	19,900	120	49	3,760	190	88	983
-15	-26	139,402	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,050	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,490	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,250	155	68	1,857	225	107	553

Table 2-36: Temperature Resistance Table

Section 3 — Programming

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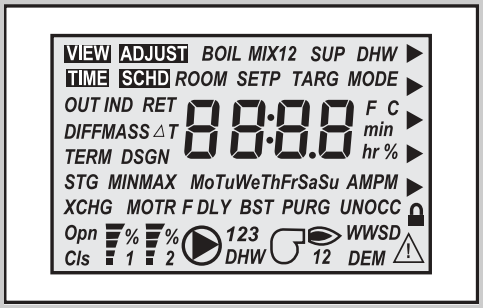


Figure 3-1

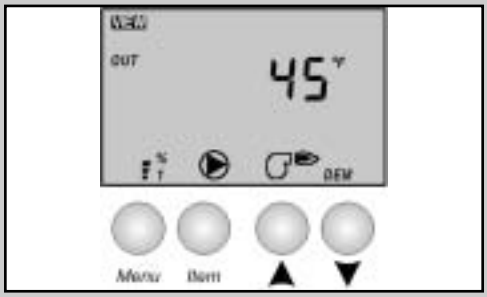


Figure 3-2

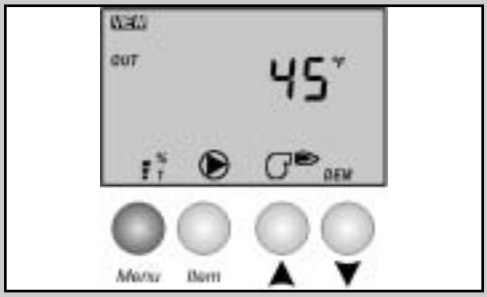


Figure 3-3

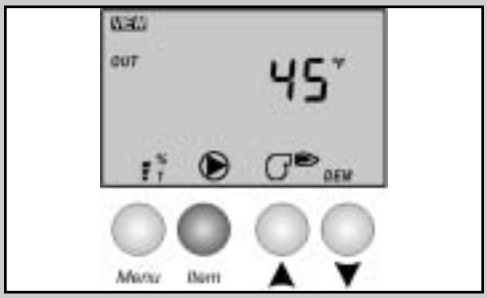


Figure 3-4

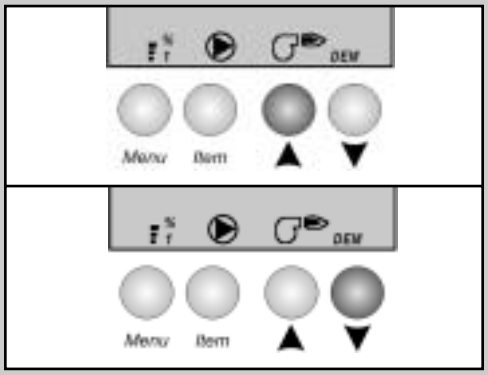


Figure 3-5

Powering Up the proMIX 701

When the Wirsbo proMIX 701 is powered up, the station displays all segments for two seconds followed by the station version number. The station then automatically goes into operating mode and displays either the outdoor temperature or the mix supply temperature. **(See Figure 3-1.)**

Navigating the proMIX 701

The proMIX 701 features a liquid crystal display (LCD) that allows users to set up the operation of the system. The control panel features four push buttons for selecting and adjusting settings. **(See Figure 3-2.)**

MENU (See Figure 3-3.)

- The MENU button allows the operator to toggle between the View menu and the Adjust menu.
- The active menu is shown in the upper left corner of the LED display.
- By pressing and releasing the MENU button, the display will advance to the next menu.
- Within specific menu selections, a group of items can be viewed and selected.

ITEM (See Figure 3-4.)

- The abbreviated name of the selected item is displayed in the Item field of the display.
- To view the next available item, press and release the ITEM button.
- Once the last available item in a menu is reached, press and release the ITEM button to return the display to the first item in the same menu.

ADJUST (See Figure 3-5.)

- To make an adjustment to a control setting, first select the Adjust menu with the MENU button.
- Then select the desired item using the ITEM button.
- Finally, use the up or down arrow to make the required change.

Note: For additional information, view the status field in the display. The status field shows which of the station's outputs are active. Most symbols in the status field can only be seen when the View menu is selected.

View Menu

The View menu is available for viewing the current status of the system performance. Select the View menu with the MENU button and then push the ITEM button to scroll through the available menu items showing the current settings and temperatures in the system.

OUT (See Figure 3-6.)
The outdoor temperature is displayed when the OUT element is turned on. This is the current temperature at the outdoor sensor (S4). The outdoor temperature is only displayed if an outdoor sensor is installed and the Outdoor Design temperature is not turned off.

MIX SUP (See Figure 3-7.)
The mixing supply temperature is displayed when the MIX SUP elements are turned on. This is the current temperature at the mixing supply sensor (S1).

MIX RET (See Figure 3-8.)
The mixing return temperature is displayed when the MIX RET elements are turned on. This is the current temperature at the mixing return sensor (S5). The mixing return temperature is only displayed if the Outdoor Design temperature is turned OFF and a mixing return sensor is installed.

MIX TARG (See Figure 3-9.)
The mixing target temperature is displayed when the MIX TARG elements are turned on. This is the temperature the station is currently trying to maintain at the supply sensor. If "- - -" is displayed, the control is either in warm weather shut down (WWSD) or a demand for heat is not present.

BOIL (See Figure 3-10.)
The boiler temperature is displayed when the BOIL element is turned on. This is the current temperature at the boiler sensor (S3) location. The boiler temperature is only displayed if a boiler sensor is installed.

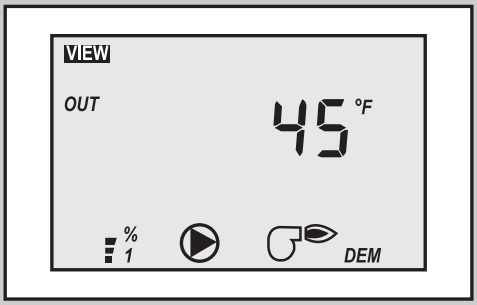


Figure 3-6

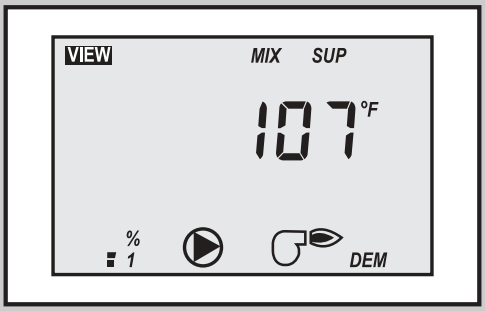


Figure 3-7

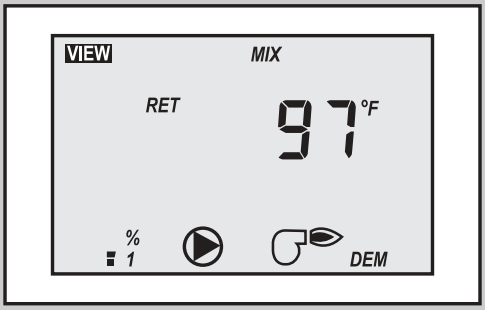
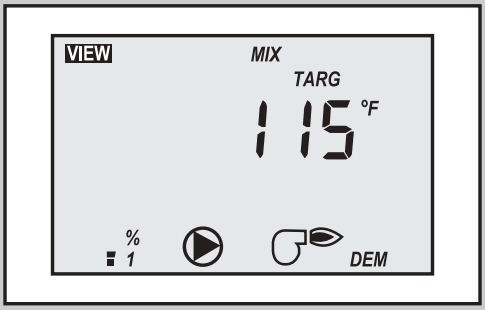


Figure 3-8



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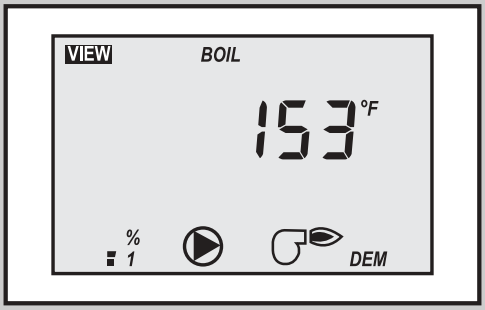


Figure 3-10

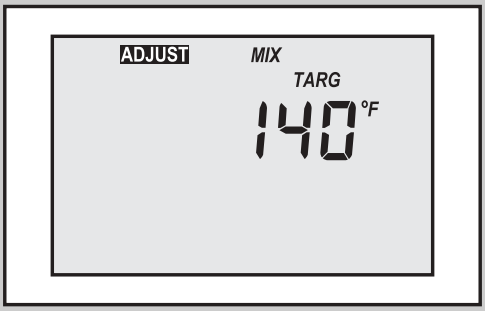


Figure 3-11

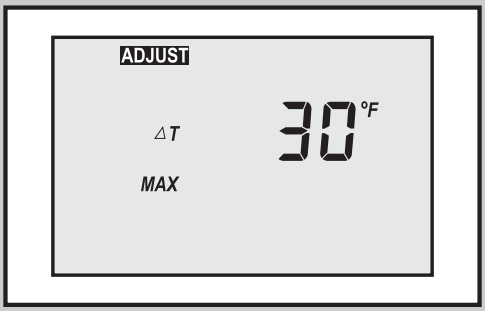


Figure 3-12

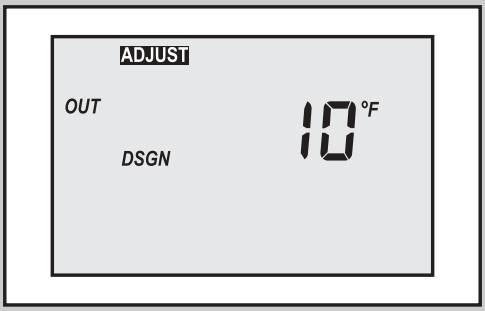
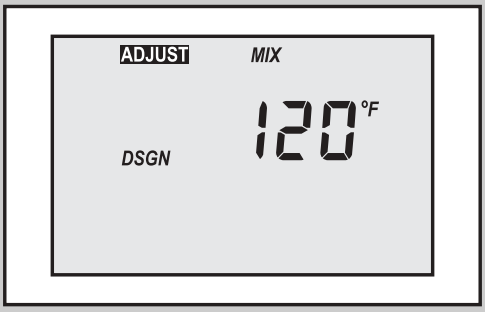


Figure 3-13



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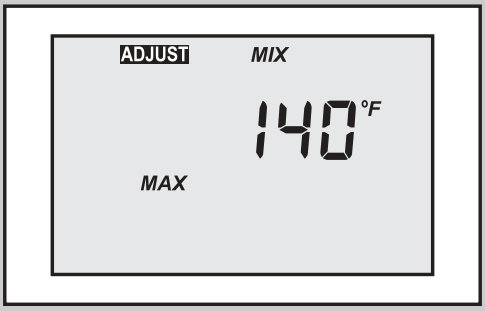


Figure 3-15

Adjust Menu

Push the MENU button until ADJUST appears in the upper left of the display. Use the ITEM button to scroll through the Adjust menu. Use the UP and DOWN arrows to make the desired selection within each Item field.

MIX TARG (See Figure 3-11.)
The Mixing Target Temperature sets the desired supply temperature when operating in the setpoint mode. This item is only available if the Outdoor Design setting is set to OFF.
Range: 60 to 200°F (16 to 93°C)
Default: 140°F (60°C)

∆t MAX (See Figure 3-12.)
The Delta T Maximum sets the maximum temperature difference between the mixing supply sensor (S1) and the mixing return sensor (S5). This item is only available if the Outdoor Design Temperature is set to OFF. If a mixing return sensor is not installed, set this item to OFF.
Range: 10 to 70°F, OFF (5.5 to 39°C, OFF)
Default: 30°F (17°C)

OUT DSGN (See Figure 3-13.)
The Outdoor Design Temperature is the outdoor design temperature as shown in the heat-loss calculation for the project. This setting allows the station to take advantage of supply water reset based on outdoor temperature. If the control is in the Setpoint or Delta T Limiting Modes, this item is set to OFF.
Range: -60 to 32°F, OFF (-51 to 0°C, OFF)
Default: 10°F (-12°C)

MIX DSGN (See Figure 3-14.)
The Mixing Design Temperature is the supply water temperature required to satisfy the heating system at the outdoor design temperature. This setting is used by the station to calculate the heating curve for the mixing section. This item is available only when the station is in the Outdoor Reset Mode.
Range: 70 to 220°F (21 to 104°C)
Default: 120°F (49°C)

MIX MAX (See Figure 3-15.)
The Mixing Maximum Temperature is the highest allowable supply temperature for the mixing section. Refer to the construction methods listed below with the suggested maximum supply temperatures. This item is available only when the station is in the Outdoor Reset Mode.
Range: 80 to 210°F, OFF (27 to 99°C)
Default: 140°F (60°C)

Note: Do not exceed the supply water temperatures shown for the following construction methods.

- Concrete 150°F
- Poured Underlayment 140°F
- Radiant Wall/Ceiling 120°F
- Joist No Plates 180°F
- Joist with Plates 165°F
- Quik Trak® 165°F

MIX MIN (See Figure 3-16.)
The Mixing Minimum is the lowest allowable supply temperature for the mixing section. This item is available only when the station is in the Outdoor Reset Mode.
Range: OFF, 35 to 150°F (OFF, 2 to 66°C)
Default: OFF

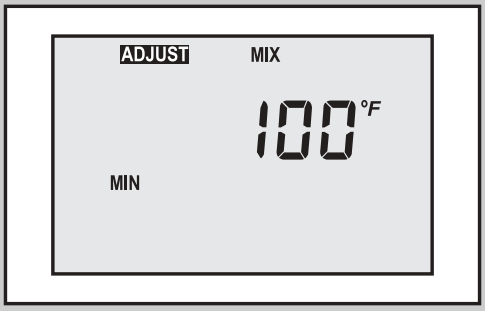


Figure 3-16

BOIL MIN (See Figure 3-17.)
Set the Boiler Minimum Temperature to the lowest water temperature at which the boiler can operate without causing the boiler flue gases to condense. Consult the boiler manufacturer for recommended minimum boiler supply temperatures. This item is only available if a boiler sensor is connected to the station. If the boiler is temperature-protected through other controls or designed for condensing operations, the BOIL MIN should be OFF.
Range: OFF, 80 to 180°F (OFF, 27 to 82°C)
Default: 140°F (60°C)

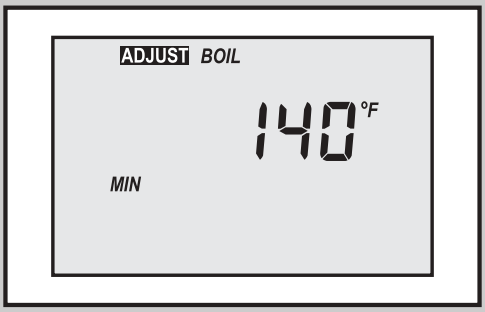


Figure 3-17

WWSD (See Figure 3-18.)
The WWSD is the outdoor temperature at which the system is shut down. This item is available only when the station is in the Outdoor Reset Mode.
Range: 35 to 100°F, OFF (2 to 38°C, OFF)
Default: 70°F (21°C)

Note: Provided the WWSD is selected, the station has a freeze-protection feature that does not allow the supply water temperature to drop below 35°F (2°C) as long as there is a mixing demand signal.

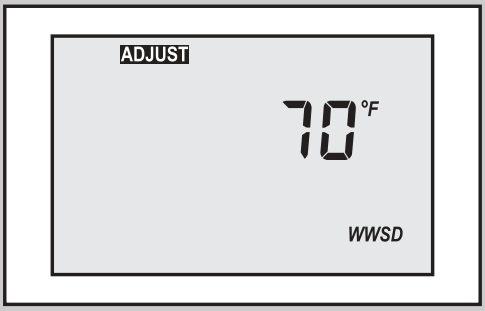


Figure 3-18

°F or °C UNITS (See Figure 3-19.)
Select the temperature measurement units desired for all temperatures to be displayed.
Range: °F or °C
Default: °F

Note: The station will automatically return to the View menu when no activity is made on the buttons for 20 seconds. All settings made in the Adjust menu are saved in the event that power is lost to the station.

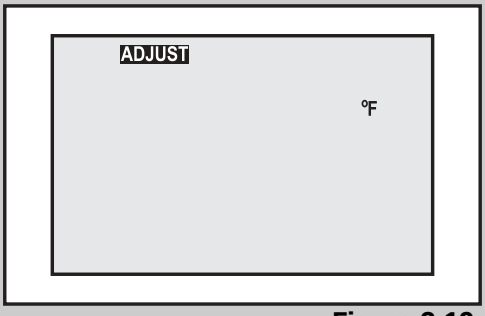


Figure 3-19

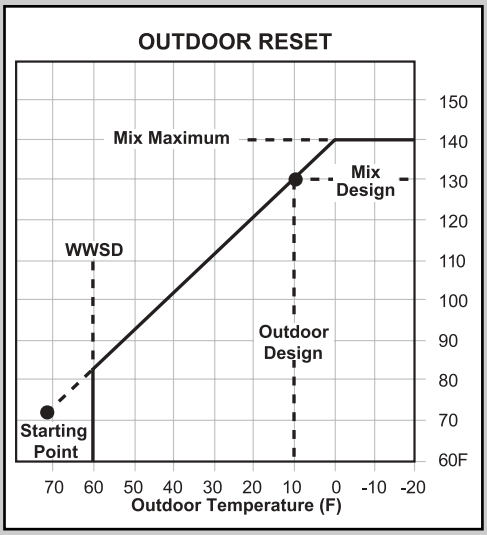


Chart 3-20

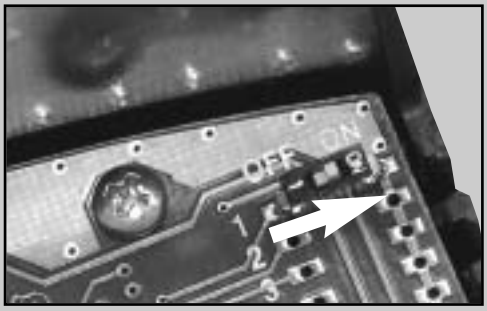


Figure 3-21

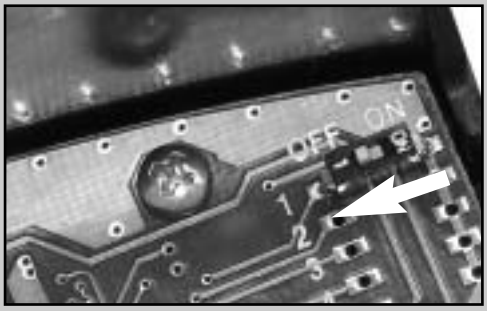


Figure 3-22

General

Outdoor Reset (See Chart 3-20.)

The calculated heat loss of a building or space is based on the percentage of the average coldest weather conditions the area experiences over the heating season. If the heat demand is analyzed as a percentage of the heating system's capacity, the heating system operates at or near maximum capacity for only a small portion of the heating season. If the water temperature is controlled using a non-weather responsive tempering device, the device will supply a fixed water temperature that does not fluctuate with the demand for heat. Resetting the supply water temperature allows the heating system to adjust to the varying demand loads of the structure. Lowering the supply water temperature in warmer times of the heating season will allow the radiant zones to be open and run longer, providing increased comfort and efficiency.

Variable Speed Injection Mixing (VSP)

Variable Speed Injection Mixing (VSP) is used to transfer heat from a primary, high-temperature boiler loop to a secondary, low-temperature radiant heating loop. The speed of the injection circulator is automatically adjusted to inject the desired volume of hot water to the low-temperature loop to achieve the required supply water temperature.

- The Wirsbo proMIX 701 supports tempering for one supply temperature through the integrated variable speed injection pump.
- The station increases or decreases power output to the injection pump when there is a mix demand.
- Pump speed varies to maintain a correct mixed supply water temperature as indicated at the mix supply sensor (S1).
- A visual indication of current variable speed output is displayed in the LCD screen as a segmented bar graph. A small bar indicator at the bottom of the screen indicates whether the output is increasing or decreasing.

Boiler Operation

The proMIX 701 can operate the boiler in two basic modes of operation: boiler load reset or boiler enable mode. The mode of operation is determined by the Boiler Sensor (S3) location and that location is determined using the DIP switch on the back of the circuit board. If the DIP switch is set to ON, place the boiler sensor on the boiler supply. If the DIP switch is set to OFF, place the boiler sensor on the boiler return.

- If the DIP switch is set to ON, the proMIX 701 will reset the boiler load. **(See Figure 3-21.)**
- If the DIP switch is set to OFF, the proMIX 701 will enable the boiler. **(See Figure 3-22.)**
- If the Boiler Sensor has not been installed and the BOIL MIN is set to OFF, the proMIX 701 will only enable the boiler.

Note: The boiler load reset mode can be used provided the proMIX 701 is the only control operating the boiler.

Boiler Enable — Standard Installation

When the proMIX 701 enables the boiler, the station opens and closes the boiler contacts based on the output of the variable speed injection pump. The actual temperature and cycling of the boiler is then determined by other controls or the aquastat on the boiler.

When operating in the boiler enable mode, the boiler contacts turn on when the variable speed output exceeds 25%. The boiler contacts turn off if the variable speed output drops below 5% for more than three minutes or if the demand is removed from the proMIX 701.

Boiler Load Reset — Optional Installation

When in boiler load reset mode, the proMIX 701 operates the boiler at the lowest possible supply temperature that is sufficient to satisfy the requirements of the variable speed injection pump. The station opens and closes the boiler contacts to control the boiler supply water temperature. If this mode of operation is selected, the boiler pump should either operate continuously or operate in parallel with the system pump contact. Refer to the electrical schematic on **Page 55**.

Caution: The boiler pump should not be operated by the boiler's aquastat as this may lead to improper cycling of the boiler.

The proMIX 701 automatically calculates the boiler differential to achieve an appropriate balance between temperature swings and boiler efficiency. This also permits the station to adapt to changing loads and conditions of the secondary radiant system.

When the supply water temperature drops to half of the differential below the required boiler supply temperature, the boiler is turned on. The boiler is then kept on until the supply water temperature rises to half of the differential above the required boiler supply temperature. If the differential is too wide, there can be large supply water temperature swings. However, if the differential is too narrow, the boiler short cycles and operates inefficiently.

In the boiler load reset mode, the proMIX 701 will only operate the boiler when the output of the injection pump exceeds 10% of flow.

Boiler Protection (BOIL MIN)

Cool water is often returned to the boiler from low-temperature radiant floor heating systems or when the heating system is recovering from night setback. This cool boiler return water may cause the boiler to operate at such a low temperature that the flue gases condense. Alternatively, when the boiler surfaces are hot due to previous loads such as domestic hot water generation, the large temperature difference (Delta T) between the boiler and its return water can thermally shock the boiler. Proper protection of the boiler under these circumstances is required. Refer to the boiler manufacturer's requirements regarding boiler return temperatures.

When a boiler sensor is connected to the station, the station is capable of providing boiler protection. When providing boiler protection, the station limits the output of the variable speed injection pump, allowing the primary loop and boiler to operate above the minimum boiler temperature setting.

Caution: Ensure this product is installed in a safe manner according to all the applicable codes, standards and instructions. The electronic control contained in this product is not intended as a primary limit control. Removal of the PC board from its enclosure can result in damage to the control and possibly even personal injury. Refer to qualified personnel for servicing.

Boiler Protection with Boiler Enable — When the Boiler Sensor monitors the return water temperature, the station begins to reduce the output of the variable speed injection pump when the boiler return temperature begins to near the BOIL MIN setting.

Boiler Protection with Boiler Load Reset — When the Boiler Sensor monitors the supply water temperature, the station begins to reduce the output of the variable speed injection pump when the boiler temperature drops to half of the differential below the BOIL MIN setting.

Note: If a boiler sensor is not installed, the proMIX 701 cannot provide boiler protection.

Pump Exercising

The proMIX 701 features a built-in pump exercising function to reduce the possibility of pump seizure due to inactivity. If a pump output on the station has not operated at least once during every 70 hours, the proMIX 701 turns on the injection and the system pumps for 20 seconds. The exercising function will not work if power to the station or pumps is disconnected.

General Precautions

1. The proMIX 701 must be mounted in the vertical position with the automatic air vent located at the top of the station.
2. After installing the proMIX 701, flush the system to remove any debris left from the construction process. Ensure the system is filled with water and purged of air prior to engaging the system or injection pumps in the station. Failure to do so can result in damage to the pumps.
3. Ensure all electrical installations are completed by a qualified and licensed electrician and are in compliance with applicable local code authorities.
4. The proMIX 701 must be installed inside a building or conditioned space. Outside installations are prohibited.
5. The proMIX 701 is not authorized for swimming pool or spa applications.
6. If the retaining screws are pulled out of the housing, do not substitute them. Using any other screws may short out the stator windings, creating a risk of electrical shock.
7. Always disconnect electrical power to the station prior to working on the station body or control panel.

Programming — Outdoor Reset Mode

The proMIX 701 can provide a reset to the supply water temperatures based on the relationship between the room setpoint temperature, the current outdoor temperature and the design outdoor temperature for the project. Tempering of the primary boiler loop to the secondary or system mixed loop is accomplished via the variable speed injection pump in the station. **(See Chart 3-23.)**

Caution: Ensure this product is installed in a safe manner according to all applicable codes, standards and instructions. The electronic control contained in this product is not intended as a primary limit control. Removal of the PC board from its enclosure can result in damage to the station and possibly even personal injury. Refer to qualified personnel for servicing.

Note: It is recommended that the installer record the final station settings from the Adjust menu on the Program Setup Sheet provided on **page 57**.

Adjust Menu

Push the MENU button until ADJUST appears in the upper left corner of the screen. Use the ITEM button to scroll through the Adjust menu. Use the UP and DOWN arrows to make the desired selection within each Item field.

MIX TARG

MIX TARG is not used in the reset mode.

∆t MAX

∆t MAX is not used in the reset mode.

OUT DSGN (See Figure 3-24.)

Set the OUT DSGN at the design temperature as shown in the heat-loss calculation for the project. The range of settings for the OUT DSGN is -60 to 32°F (-51 to 0°C). Initial factory default setting is 10°F (-12°C).

MIX DSGN (See Figure 3-25.)

Enter the supply water temperature from the design program for the section of the project support by the proMIX 701. This setting is used by the station to calculate the heating curve for the mixing section. The range of settings for the MIX DSGN is 70 to 220°F (21 to 104°C). Initial factory default setting is 120°F (49°C).

MIX MAX (See Figure 3-26.)

Set the MIX MAX to set the highest allowable supply temperature for the mixing section. Refer to the construction methods listed below with the suggested maximum supply temperatures. The range of settings for the MIX MAX is 80 to 210°F (27 to 99°C). Initial factory default setting is 140°F (60°C).

Note: Do not exceed the supply water temperatures shown for the following construction methods.

- Concrete 150°F
- Poured Underlayment 140°F
- Radiant Wall/Ceiling 120°F
- Joist No Plates 180°F
- Joist with Plates 165°F
- Quik Trak 165°F

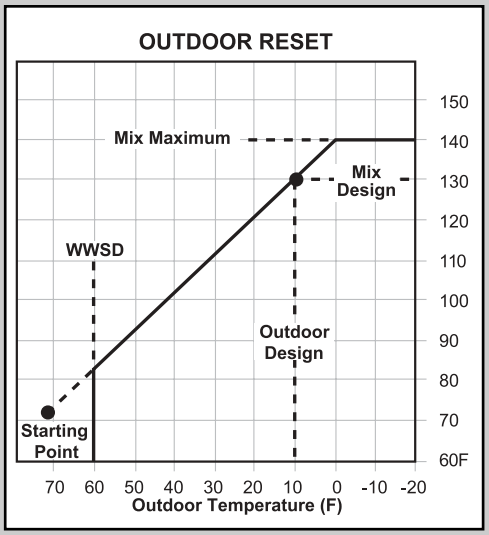


Chart 3-23

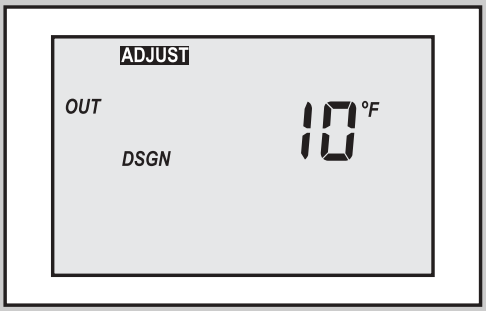


Figure 3-24

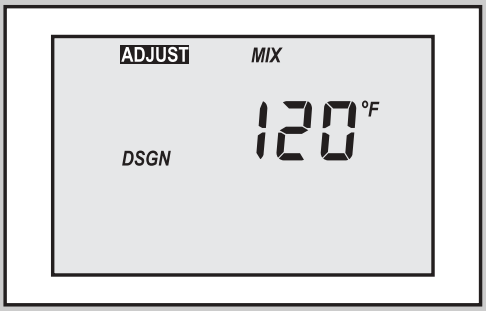


Figure 3-25

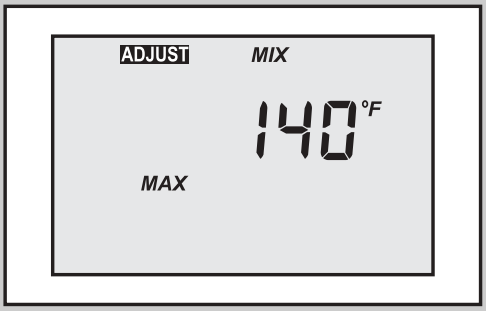


Figure 3-26

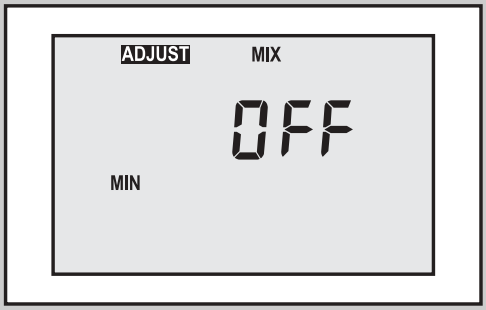


Figure 3-27

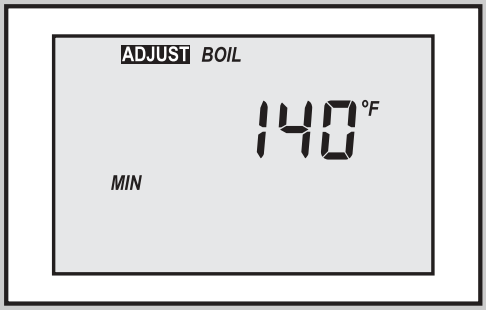


Figure 3-28

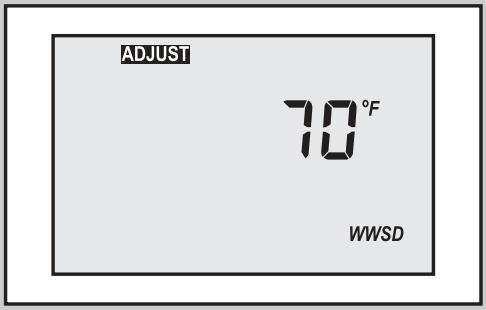


Figure 3-29

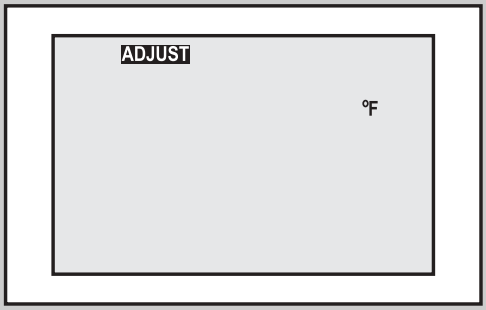


Figure 3-30

MIX MIN (See Figure 3-27.)
Set the MIX MIN to the lowest allowable supply temperature for the mixing section. This is often referred to as the spring or fall supply water temperatures. The range of settings for the MIX MIN is 35 to 150°F (2 to 66°C). Initial factory default setting is OFF.

BOIL MIN (See Figure 3-28.)
BOIL MIN establishes the lowest return water temperature the boiler is capable of receiving without condensing. Refer to the boiler manufacturer's literature. If the boiler is temperature-protected through another control or designed for condensing operations, the BOIL MIN should be OFF. The range of settings for the BOIL MIN is 80 to 180°F (27 to 82°C). Initial factory default setting is 140°F (60°C).

WWSD (See Figure 3-29.)
The mixing section will shut down when the outdoor temperature is warmer than this setting. The range of settings for the WWSD is 35 to 100°F (2 to 38°C). Initial factory default setting is 70°F (21°C).

°F or °C UNITS (See Figure 3-30.)
Select the temperature measurement units desired for all temperatures to be displayed. Choose between degrees Fahrenheit (°F) or degrees Celsius (°C). Initial factory default setting is in degrees Fahrenheit.

Sequence of Operation

When the proMIX 701 receives a demand and it is not in WWSD, the station turns on the system pump and calculates a mixing target temperature. The variable speed injection pump is then operated to maintain the mixing target temperature at the mixing supply sensor.

The boiler contacts operate as described in the **Boiler Operation** section beginning on **page 24**. The proMIX 701 can also provide boiler protection as described in the **Boiler Protection** section beginning on **page 25**.

Demand

The proMIX 701 requires a demand signal before it will operate. The station can use either a powered or an unpowered demand signal. Once a demand signal is received, the station displays the demand pointer in the display and operates as described previously.

Powered Demand — The station recognizes a powered demand signal when 24VAC is applied across the Com and Heat Dem terminals.

Unpowered Demand — The station recognizes an unpowered demand signal when a switch is closed between the Com and Heat Dem terminals.

System Pump Operation

The proMIX 701 features an internal system pump contact. This contact turns on when the station has a mixing demand and is not in WWSD. The integrated system pump, as well as an external primary (boiler) pump, may be controlled by this relay. Refer to the **Electrical Schematics** in **Section 5** of this manual for information about wiring an external pump relay to control the primary pump. By providing proper flow in the boiler loop, the boiler temperature can be accurately controlled based on the mixing load.

Programming — Setpoint Mode

In certain applications, it is desirable to maintain a fixed supply water temperature. This type of application is a setpoint application. **(See Chart 3-31.)**

Examples of setpoint applications include heat pump loops, reheat coils and floor warming.

Caution: Ensure this product is installed in a safe manner according to all applicable codes, standards and instructions. The electronic control contained in this product is not intended as a primary limit control. Removal of the PC board from its enclosure can result in damage to the station and possibly even personal injury. Refer to qualified personnel for servicing.

Note: It is recommended that the installer record the final station settings from the Adjust menu on the Program Setup Sheet provided on **page 57**.

Adjust Menu

Push the MENU button until ADJUST appears in the upper left of the screen. Use the ITEM button to scroll through the Adjust menu. Use the UP and DOWN arrows to make the desired selection within each Item field.

MIX TARG (See Figure 3-32.)

Set the MIX TARG to the supply water temperature required by the design. This item is only available in the menu if the Outdoor Design Temperature (OUT DSGN) is set to OFF. Refer to the construction methods listed below with the suggested maximum supply temperatures. The range of settings for the MIX TARG is 60 to 200°F (16 to 93°C). Initial factory default setting is 140°F (60°C).

Note: Do not exceed the supply water temperatures shown for the following construction methods.

- Concrete 150°F
- Poured Underlayment 140°F
- Radiant Wall/Ceiling 120°F
- Joist No Plates 180°F
- Joist with Plates 165°F
- Quik Trak 165°F

∆t MAX (See Figure 3-33.)

∆t MAX is not used in the setpoint mode. Set this item to OFF.

OUT DSGN (See Figure 3-34.)

OUT DSGN is not used in the setpoint mode. Set this item to OFF.

MIX DSGN

MIX DSGN is not available in the setpoint mode.

MIX MAX

MIX MAX is not available in the setpoint mode.

MIX MIN

MIX MIN is not available in the setpoint mode.

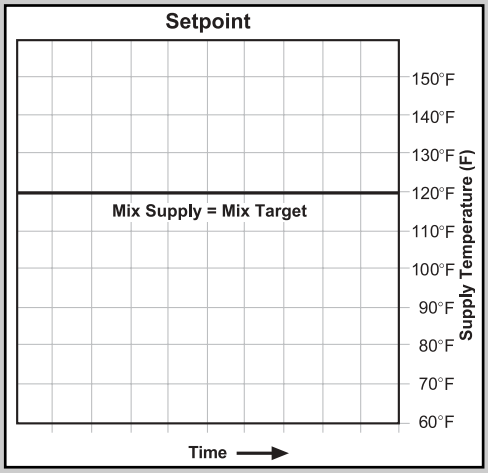


Chart 3-31

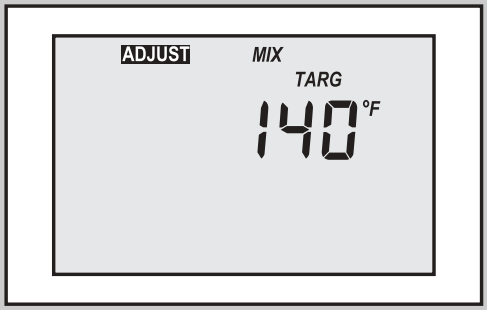


Figure 3-32

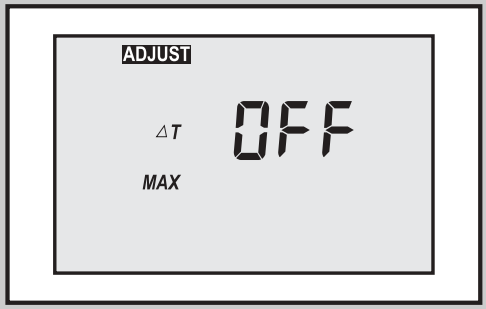


Figure 3-33

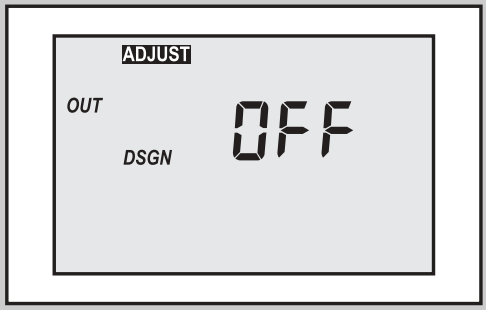


Figure 3-34

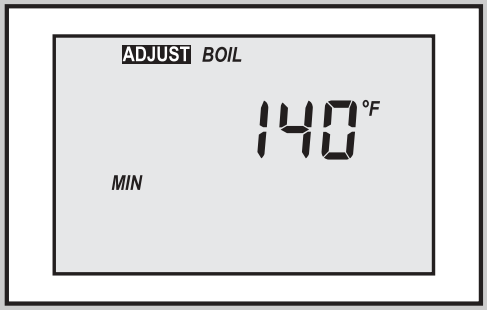


Figure 3-35

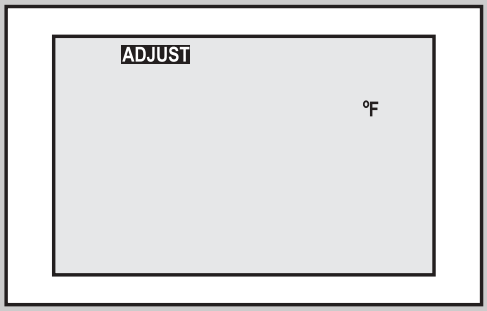


Figure 3-36

BOIL MIN (See Figure 3-35.)
Set the BOIL MIN temperature to the lowest return water temperature the boiler is capable of receiving without condensing (refer to the boiler manufacturer's literature). If the boiler is temperature-protected through another control or through the boiler, or designed for condensing operations, the BOIL MIN should be OFF. The range of settings for the BOIL MIN is 80 to 180°F (27 to 82°C). Initial factory default setting is 140°F (60°C).

WWSD
WWSD is not available in the setpoint mode.

°F or °C UNITS (See Figure 3-36.)
Select the temperature measurement units desired for all temperatures to be displayed. Choose between degrees Fahrenheit (°F) or degrees Celsius (°C). Initial factory default setting is in degrees Fahrenheit.

Sequence of Operation

When the proMIX 701 receives a demand, the system pump is turned on.

The variable speed injection pump operates to maintain the MIX TARG temperature set in the station. The proMIX 701 senses the system supply water temperature at the S1 sensor location and the system return water temperature at the S5 location.

The boiler contacts operate as described in the **Boiler Operation** section beginning on **page 24**. The station also provides boiler protection as described in the **Boiler Protection** section beginning on **page 25**.

Demand

The proMIX 701 requires a demand signal before it will operate. The station can use either a powered or an unpowered demand signal. Once a demand signal is received, the station displays the demand pointer in the display and operates as described previously.

Powered Demand — The station recognizes a powered demand signal when 24VAC is applied across the Com and Heat Dem terminals.

Unpowered Demand — The station recognizes an unpowered demand signal when a switch is closed between the Com and Heat Dem terminals.

System Pump Operation

The proMIX 701 has an internal system pump contact. This contact turns on when the station has a mixing demand and is not in WWSD. The integrated system pump, as well as an external primary (boiler) pump, may be controlled by this relay. Refer to the **Electrical Schematics** in **Section 5** of this manual for information about wiring an external pump relay to control the primary pump. By providing proper flow in the boiler loop, the boiler temperature can be accurately controlled based on the mixing load.

Programming — Delta T Limiting Mode

In specialized applications, it is desirable to limit the rate of temperature increase in the system from the system's starting temperature to its operating setpoint. This is desired to prevent thermal shock of the system. This type of application is a Delta T limiting application. **(See Chart 3-37.)**

Caution: Ensure this product is installed in a safe manner according to all applicable codes, standards and instructions. The electronic control contained in this product is not intended as a primary limit control. Removal of the PC board from its enclosure can result in damage to the station and possibly even personal injury. Refer to qualified personnel for servicing.

Note: It is recommended that the installer record the final station settings from the Adjust menu on the Program Setup Sheet provided on **page 57**.

Adjust Menu

Push the MENU button until ADJUST appears in the upper left corner of the screen. Use the ITEM button to scroll through the Adjust menu. Use the UP and DOWN arrows to make the desired selection within each Item field.

Note: If the proMIX 701 is to operate as a Delta T limiting control, the return mix sensor (S5) must be installed. The Outdoor Design temperature must be set to OFF in order to gain access to the MIX TARG and Δt MAX items in the menu.

MIX TARG (See Figure 3-38.)

Set the MIX TARG to the supply water temperature required by the design. This item is only available in the menu if the Outdoor Design Temperature (OUT DSGN) is set to OFF. Refer to the construction methods listed below with the suggested maximum supply temperatures. The range of settings for the MIX TARG is 60 to 200°F (16 to 93°C). Initial factory default setting is 140°F (60°C).

Note: Do not exceed the supply water temperatures shown for the following construction methods.

- Concrete 150°F
- Poured Underlayment 140°F
- Radiant Wall/Ceiling 120°F
- Joist No Plates 180°F
- Joist with Plates 165°F
- Quik Trak 165°F

Δt MAX (See Figure 3-39.)

Δt MAX is set to the maximum temperature difference that is desired between the system supply water temperature and the system return water temperature. In order to adjust this setting, the system return sensor (S5) must be connected to the station and installed on the return side of the radiant system. The range of settings for the Δt MAX is 10 to 70°F (5.5 to 39°C). Initial factory default setting is 30°F (17°C).

OUT DSGN (See Figure 3-40.)

OUT DSGN is not used in the Delta T limiting mode. This item is set to OFF.

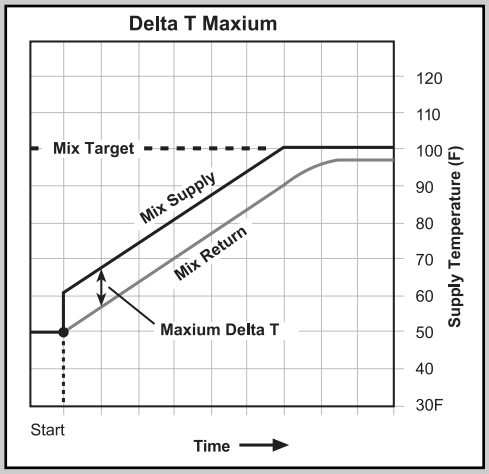


Chart 3-37

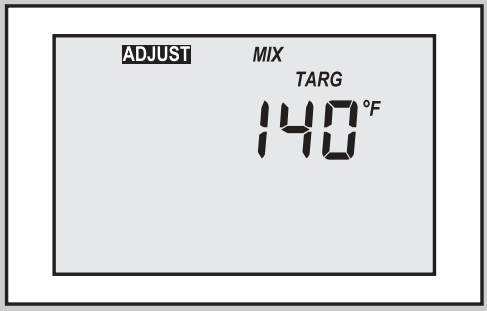


Figure 3-38

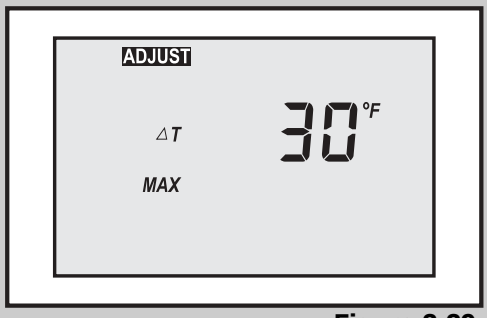


Figure 3-39

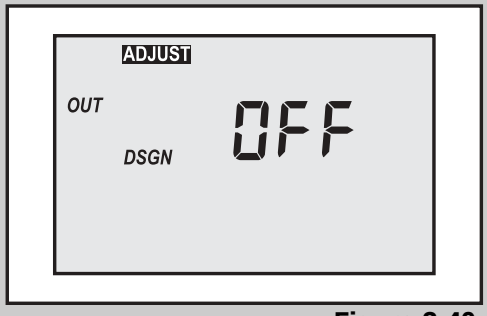


Figure 3-40

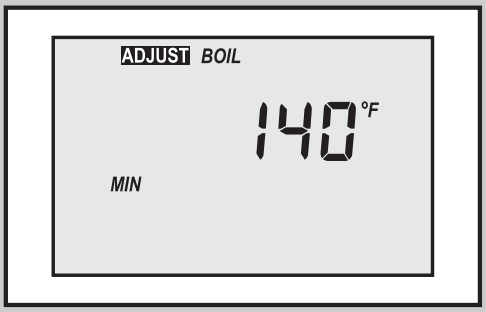


Figure 3-41

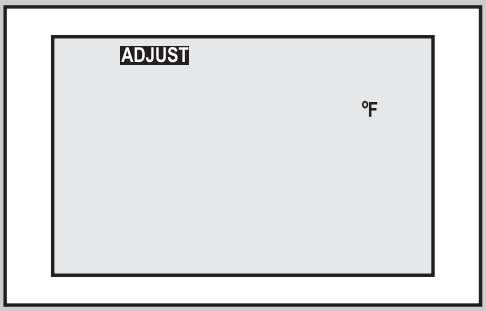


Figure 3-42

MIX DSGN
MIX DSGN is not available in the Delta T limiting mode.

MIX MAX
MIX MAX is not available in the Delta T limiting mode.

MIX MIN
MIX MIN is not available in the Delta T limiting mode.

BOIL MIN (See Figure 3-41.)
Set the BOIL MIN temperature to the lowest return water temperature the boiler is capable of receiving without condensing (refer to the boiler manufacturer's literature). If the boiler is temperature-protected through another control or designed for condensing operations, the BOIL MIN should be OFF. The range of settings for the BOIL MIN is 80 to 180°F (27 to 82°C). Initial factory default setting is 140°F (60°C).

WWSD
WWSD is not available in the Delta T limiting mode.

° F or ° C UNITS (See Figure 3-42.)
Select the temperature measurement units desired for all temperatures to be displayed. Choose between degrees Fahrenheit (°F) or degrees Celsius (°C). Initial factory default setting is in degrees Fahrenheit.

Sequence of Operation

When the station receives a demand, the system pump is turned on.

The variable speed injection pump is operated to maintain the system supply water temperature at the lower of either the system return water temperature plus the Delta T Max setting or the Mixing Target Temperature (MIX TARG) set in the station.

The boiler contacts operate as described in the **Boiler Operation** section beginning on **page 24**. The station also provides boiler protection as described in the **Boiler Protection** section beginning on **page 25**.

Demand

The proMIX 701 requires a demand signal before it will begin operation. The station can use either a powered or an unpowered demand signal. Once a demand signal is received, the station displays the demand pointer in the display and operates as described previously.

Powered Demand — The station recognizes a powered demand signal when 24VAC is applied across the Com and Heat Dem terminals.

Unpowered Demand — The station recognizes an unpowered demand signal when a switch is closed between the Com and Heat Dem terminals.

System Pump Operation

The proMIX 701 features an internal system pump contact. This contact turns on when the station has a mixing demand and is not in WWSD. The integrated system pump, as well as an external primary (boiler) pump, may be controlled by this relay. Refer to the **Electrical Schematics** in **Section 5** of this manual for information about wiring an external pump relay to control the primary pump. By providing proper flow in the boiler loop, the boiler temperature can be accurately controlled based on the mixing load.

Section 4 — Troubleshooting

Table of Contents

Troubleshooting — General

When troubleshooting any heating system, it is a good idea to establish a set routine to follow. Below is an example of a sequence to use when diagnosing or troubleshooting problems in a hydronic heating system.

Establish the Problem

Get as much information from the customer as possible about the problem.

- Is there too much heat, not enough heat or no heat?
- Is the problem only in one zone or does the problem affect the entire system?
- Is this a consistent problem or only intermittent?
- How long has the problem existed?

Understand the Sequence of Operation of the System

If a particular zone is not receiving enough heat, check which pumps or valve in the system must operate to deliver heat to the affected zone.

If the zone is receiving too much heat, check which pumps, valves or check valves must operate to stop delivery of heat.

Sketch the Piping of the System

This is a relatively simple step that tends to be overlooked. However, it can often save hours of time in troubleshooting a system. Use the sketch to:

- Note flow directions in the system — paying close attention to the location of the pumps, check valves, pressure bypass valves and mixing valves.
- Ensure the correct flow direction on all pumps. This is also a very useful step if additional assistance is required.

Document the proMIX 701 for Future Reference

Before making any adjustments to the proMIX 701, record all items that the station is currently displaying. Include items such as:

- Error messages
- Current temperatures
- Settings (use the proMIX 701 Program Setup Sheet on **page 57**)
- Devices that should be operating as indicated by the LCD screen

This information is essential if additional assistance is required to diagnose the problem.

Isolate the Problem Between the proMIX 701 and the System

Now that the sequence of operation is known and the system is sketched, check for the following:

- Is the station operating proper pumps and valves at the correct times?
- Is the station receiving correct signals from the system about when it should be operating?
- Are proper items selected in menus of the station for the device that is to be operated?

Test the Contacts, Voltages and Sensors

Using a multimeter:

- Ensure that the station is receiving adequate voltage to the power terminals and the demand terminals as noted in the technical data.
- Determine if the internal contacts on the station are opening and closing correctly.
- Follow the instructions in the **Testing the Wiring** section on **page 17** to simulate the closed contacts on the terminal blocks as required.
- Test the sensors and their wiring as described previously.

Troubleshooting — Control Specific

As in any troubleshooting procedure, it is important to isolate the problem as much as possible. Using the **Error Messages** starting on **page 36**, simplifies the troubleshooting process. When an error message displays on the station, refer to the error messages to identify the cause of the error and use standard testing procedures to confirm the fault. If an external wiring fault is suspected, carefully check all external wiring connections. Once the fault is corrected, press any button on the face of the station to clear the error message.

Test Routine

Test the main control functions of the proMIX 701 by pressing and holding the UP arrow for more than three seconds. This initiates the following sequence.

1. The Variable Speed Injection Pump output increases from 0 to 100% over 10 seconds.
2. The Variable Speed Injection Pump output decreases from 100 to 0% over 10 seconds.
3. The System Pump turns on for 10 seconds.
4. The Boiler Contact turns on.
5. After 10 seconds, the Boiler Contact and the System Pump Contact turn off.
6. The station continues normal operation.

Manual Override

In the event that the station fails to operate, a manual operation switch is located on the circuit board. When the manual operation switch is set to MAN, the variable speed injection pump and the system pump outputs turn on. This operation continues until the manual switch is returned to its original position. (**See Figure 4-1.)**

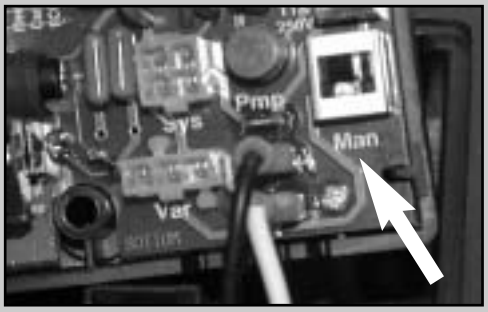


Figure 4-1

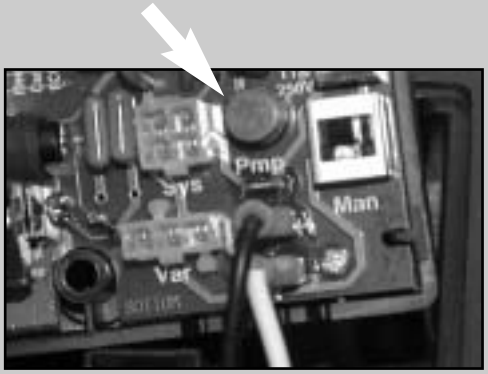


Figure 4-2

Fuse Replacement

The Variable Speed output of the station is fuse-protected. This fuse is located on the circuit board on the back of the station. This is a field-replaceable item. **(See Figure 4-2.)**

Fuse rating: 1A 1/12 hp, fuse T1 A 250 V

Adjustment of Settings

If the outdoor temperature is cold and the rooms are cold, increase the MIX DSGN setting by 5°F (3°C) per day.

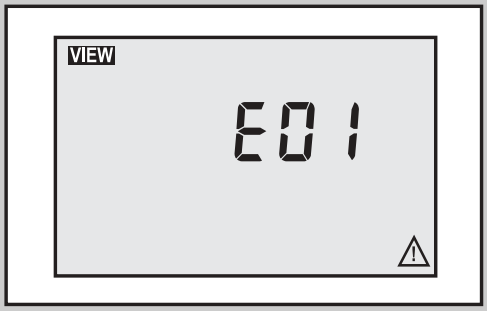


Figure 4-3

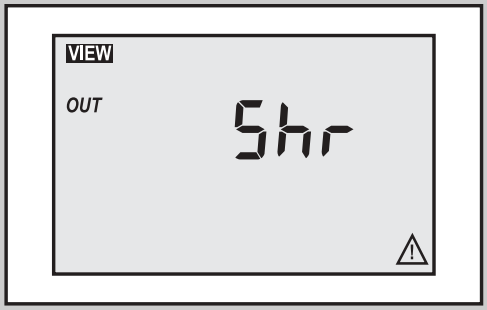


Figure 4-4

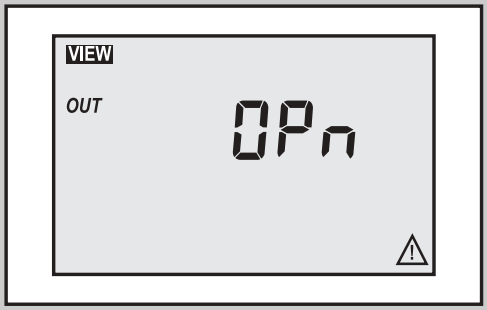


Figure 4-5

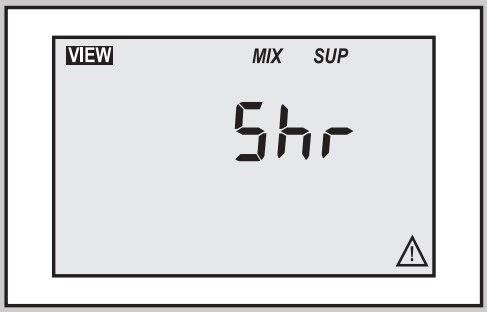


Figure 4-6

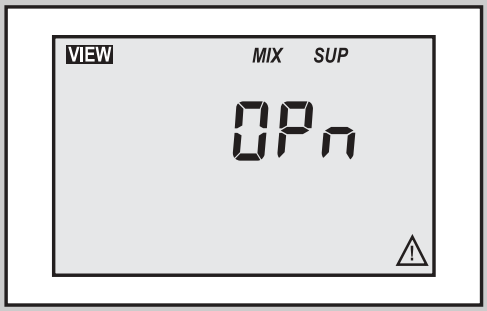


Figure 4-7

Error Messages

EEPROM Read Error (See Figure 4-3.)
The station is unable to read the installer's settings from its memory. The station is forced to load the factory defaults for all settings. The station stops operation until all settings in the Adjust menu are checked.

Outdoor Sensor Short Circuit (See Figure 4-4.)
A short circuit is detected in the outdoor sensor. The station assumes an outdoor temperature of 32°F (0°C) and continues operation. To clear this error message, correct the short circuit and press any button on the station.

Outdoor Sensor Open Circuit (See Figure 4-5.)
An open circuit is detected in the outdoor sensor. The station assumes an outdoor temperature of 32°F (0°C) and continues operation. To clear this error message, correct the open circuit and press any button on the station.

Mixing Supply Sensor Short Circuit (See Figure 4-6.)
A short circuit is detected in the mixing supply sensor. The station continues to operate the injection pump at a low speed (17 to 18%) as long as a demand is present. To clear this error message, correct the short circuit and press any button on the station.

Mixing Supply Sensor Open Circuit (See Figure 4-7.)
An open circuit is detected in the mixing supply sensor. The station continues to operate the injection pump at a low speed (17 to 18%) as long as a demand is present. To clear this error message, correct the open circuit and press any button on the station.

Mixing Return Sensor Short Circuit (See Figure 4-8.)
A short circuit is detected in the mixing return sensor. If the Maximum Delta T setting is set to OFF, the station continues operation. If the Maximum Delta T setting is not set to OFF, the station stops operation until the fault is corrected. To clear this error message, correct the short circuit and press any button on the station.

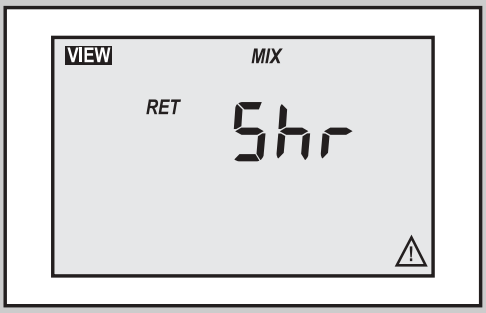


Figure 4-8

Mixing Return Sensor Open Circuit (See Figure 4-9.)
An open circuit is detected in the mixing return sensor. If the Maximum Delta T setting is set to OFF, the station continues operation. If the Maximum Delta T setting is not set to OFF, the station stops operation until the fault is corrected. To clear this error message, correct the open circuit and press any button on the station.

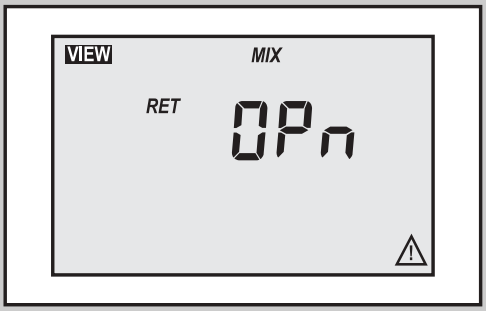


Figure 4-9

Boiler Sensor Short Circuit (See Figure 4-10.)
A short circuit is detected in the boiler sensor. The boiler contact is operated as if a boiler sensor is not installed. The station provides a boiler enable and does not provide boiler protection. To clear this error message, correct the short circuit and press any button on the station.

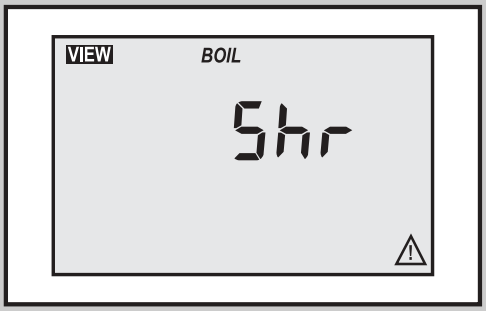


Figure 4-10

Boiler Sensor Open Circuit (See Figure 4-11.)
An open circuit is detected in the boiler sensor. The boiler contact is operated as if a boiler sensor is not installed. The station provides a boiler enable and does not provide boiler protection. To clear this error message, correct the open circuit and press any button on the station. If the sensor was deliberately removed, power down the station for five seconds and re-power the station.

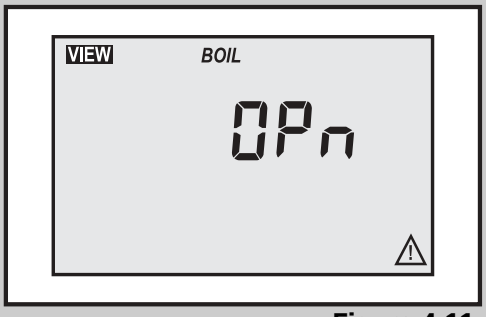


Figure 4-11

Replacing the Cartridge Assembly

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the proMIX 701 by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Pull cartridge out of the motor housing.
5. Install replacement cartridge, making sure that the cover plate is between the cartridge flange and motor.
6. Make sure the replacement cartridge corresponds to the full circulator product number. A complete parts list is available from the local plumbing supply distributor.
7. Reassemble the circulator using the new gasket and bolts supplied.
8. Follow the installation procedure to start up the circulator.

Replacing the Check Valve

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the proMIX 701 by closing the service valves or draining the system.
3. Remove the boiler supply connection to the proMIX 701.
4. Remove snap ring.
5. Remove the check valve, using needle-nose pliers.
6. Install replacement check valve by pressing the valve into the casing until it is firmly seated.
7. Install the snap ring.
8. Reconnect the boiler supply connection to the proMIX 701.
9. Follow the powering up procedure on **page 20** to start up the proMIX 701.

Technical Data

Performance Data

Flow Range: ..... 0 to 15.5 gpm
Head Range: .....0 to 15 Feet
Minimum Fluid Temperature: .....32°F (0°C)
Maximum Fluid Temperature: .....180°F (85°C)
Maximum Working Pressure: .....125 psi
Connections:.....¾" NPT

c UL us LISTED

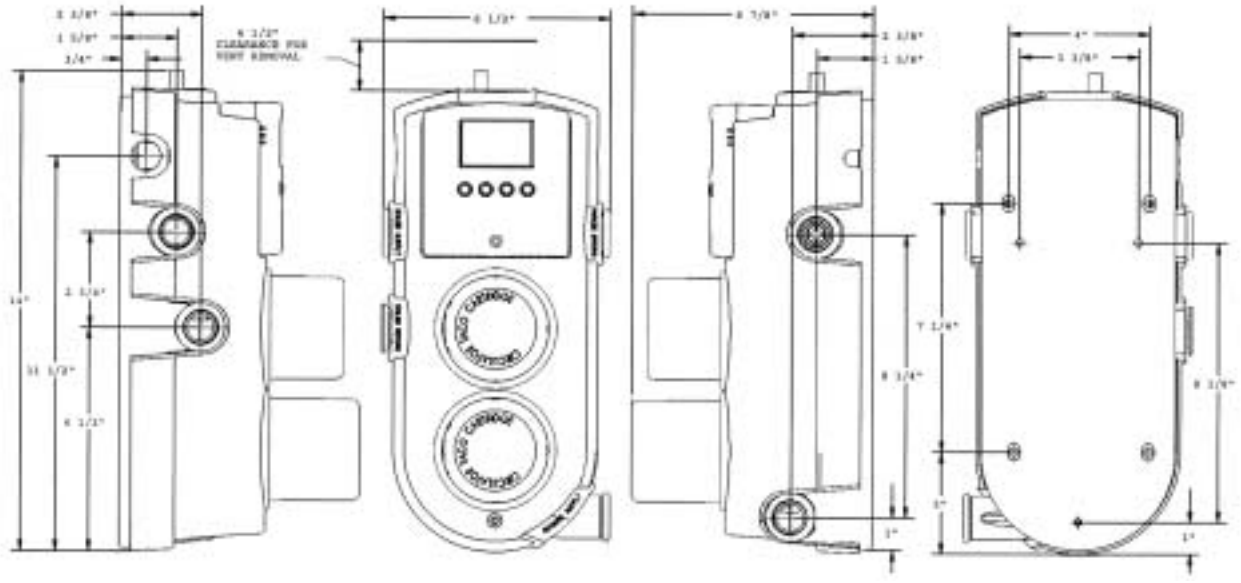
For Indoor Use Only

Materials of Construction

Casing (body):.....Bronze
Stator Housing: .....Steel
Cartridge: .....Stainless Steel
Impeller:.....Non-metallic
Shaft: .....Ceramic
O-ring and Gaskets:.....EPDM

Electrical Data Chart

Volts 120
Hz.....60
Ph 1
Amps 2
RPM 3,250
HP .....1/40 and 1/25
Motor Type .....Permanent Split Capacitor Impedance Protected



Section 5 — Mechanical and Electrical Schematics

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Application Drawing
W701 - 01

Bringing comfort to life

WIRSBO
Life, Safety, Comfort Systems

Uponor

Mechanical
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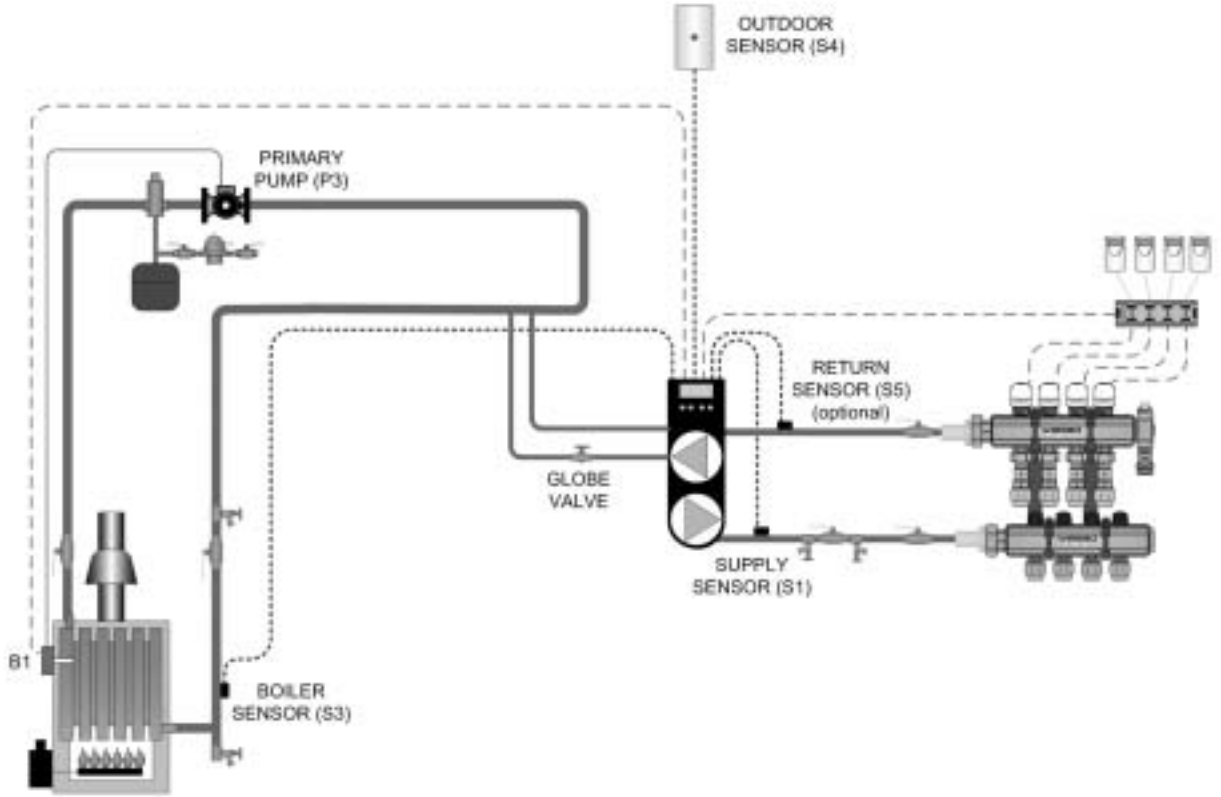


Legend

S1 = Mixed 1 Supply Sensor	S6 = Snow & Ice Detector	P5 = Variable Speed Injection Pump 2	——— = 120 V (AC)
S2 = Mixed 2 Supply Sensor	A1 = Aquastat	P6 = DHW Pump	····· = Sensor Wire
S3 = Boiler Supply or Return	B1 = Boiler	P7 = Hi-Temp Pump	— — — = 24 V (AC)
S4 = Outdoor Sensor	P1 = Mixed 1 System Pump	V1 = Floating Action Mixing Valve	
S5 = Mixed Return Sensor	P2 = Mixed 2 System Pump	T = Thermostat or Heat Demand	
S6 = DHW Sensor	P3 = Boiler Pump		
S7 = Slab Sensor	P4 = Variable Speed Injection Pump 1		

NOTE: This drawing is conceptual only, not an engineered drawing. It is up to the system designer to determine the necessary components for and configuration of the particular system designed, including additional equipment, isolation relays (for loads greater than the control's specified output ratings), and any safety devices which in the judgement of the designer are appropriate. Certain components may have been left out on this drawing for the purpose of clarity. Mechanical considerations such as tee sizing, flow control, pipe sizing and pump selection, is the responsibility of the installing contractor. Local codes and trade practices must be followed.

Symbols					
= Pump	= Air Separator & Expansion Tank w/ fill	= Zone Valve	= Ball Valve	= Flow Check	
= Floating Action Mixing Valve	= Tempering Valve	= Heat Exchanger	= Pressure By-Pass Valve	= Globe Valve	= Drain Valve

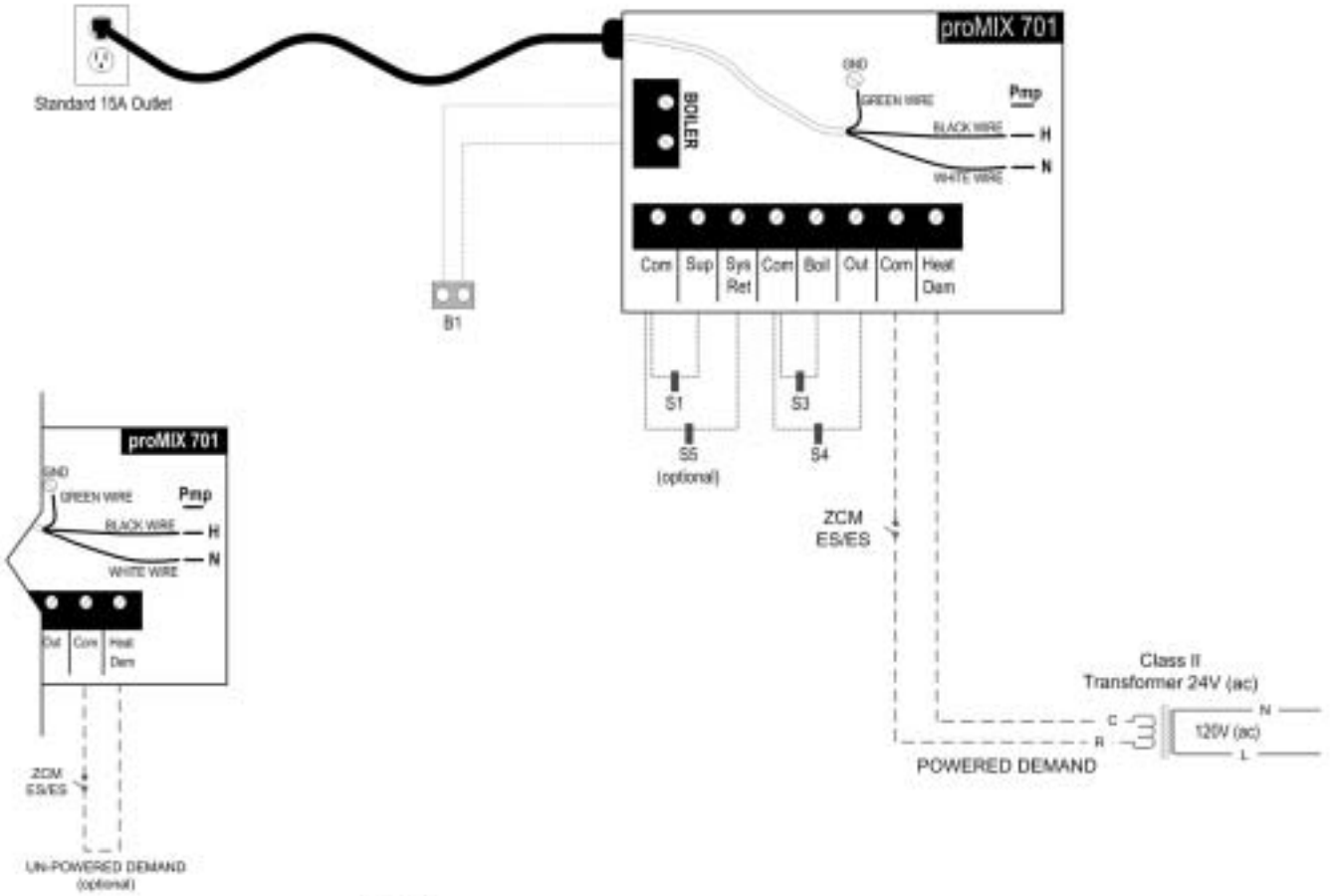
Project:

Uponor Wirsbo
5925 148th Street W.
Apple Valley, MN 55124

Phone: 1-800-321-4739
Fax: 1-952-891-1409
www.wirsbo.com

Drawn by:	Checked by:
Rep:	DATE:

Application Drawing W701 - 01	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



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S3 = Boiler Supply or Return
S4 = Outdoor Sensor
S5 = Mixed Return Sensor
S6 = DHW Sensor
S7 = Slab Sensor
S8 = Snow & Ice Detector
A1 = Aquastat
B1 = Boiler
P1 = Mixed 1 System Pump
P2 = Mixed 2 System Pump
P3 = Boiler Pump
P4 = Variable Speed Injection Pump 1
P5 = Variable Speed Injection Pump 2
P6 = DHW Pump
P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand

——— = 120 V (AC)
------ = Sensor Wire
— — — = 24 V (AC)

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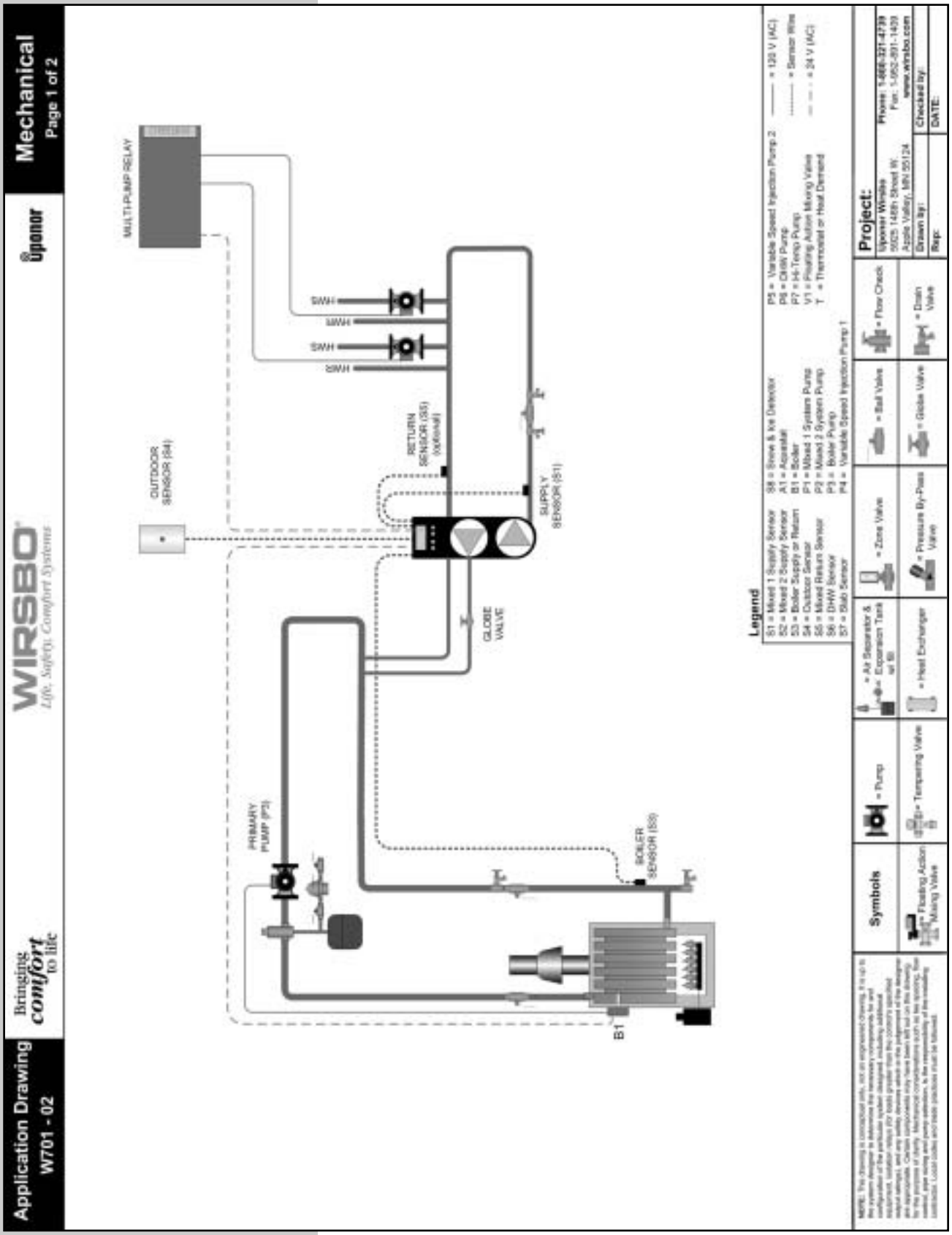
Rep:	DATE:


Application Drawing
W701 - 02
Bringing comfort to life
WIRSBO
Life, Safety, Comfort Systems
Uponor
Mechanical
Page 1 of 2
MULTI-PUMP RELAY
OUTDOOR SENSOR (S4)
RETURN SENSOR (S5) (optional)
SUPPLY SENSOR (S1)
GLOBE VALVE
PRIMARY PUMP (P3)
BOILER SENSOR (S3)
B1
HWS
HWR
HWS
HWR
Legend
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S5 = Mixed Return Sensor
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S7 = Slab Sensor
S8 = Snow & Ice Detector
A1 = Aquastat
B1 = Boiler
P1 = Mixed 1 System Pump
P2 = Mixed 2 System Pump
P3 = Boiler Pump
P4 = Variable Speed Injection Pump 1
P5 = Variable Speed Injection Pump 2
P6 = Chiller Pump
P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand
= 120 V (AC)
= Sensor Wire
= 24 V (AC)
Symbols
= Pump
= Air Separator & Expansion Tank w/ fill
= Zone Valve
= Ball Valve
= Flow Check
= Floating Action Mixing Valve
= Tempering Valve
= Heat Exchanger
= Pressure By-Pass Valve
= Globe Valve
= Drain Valve
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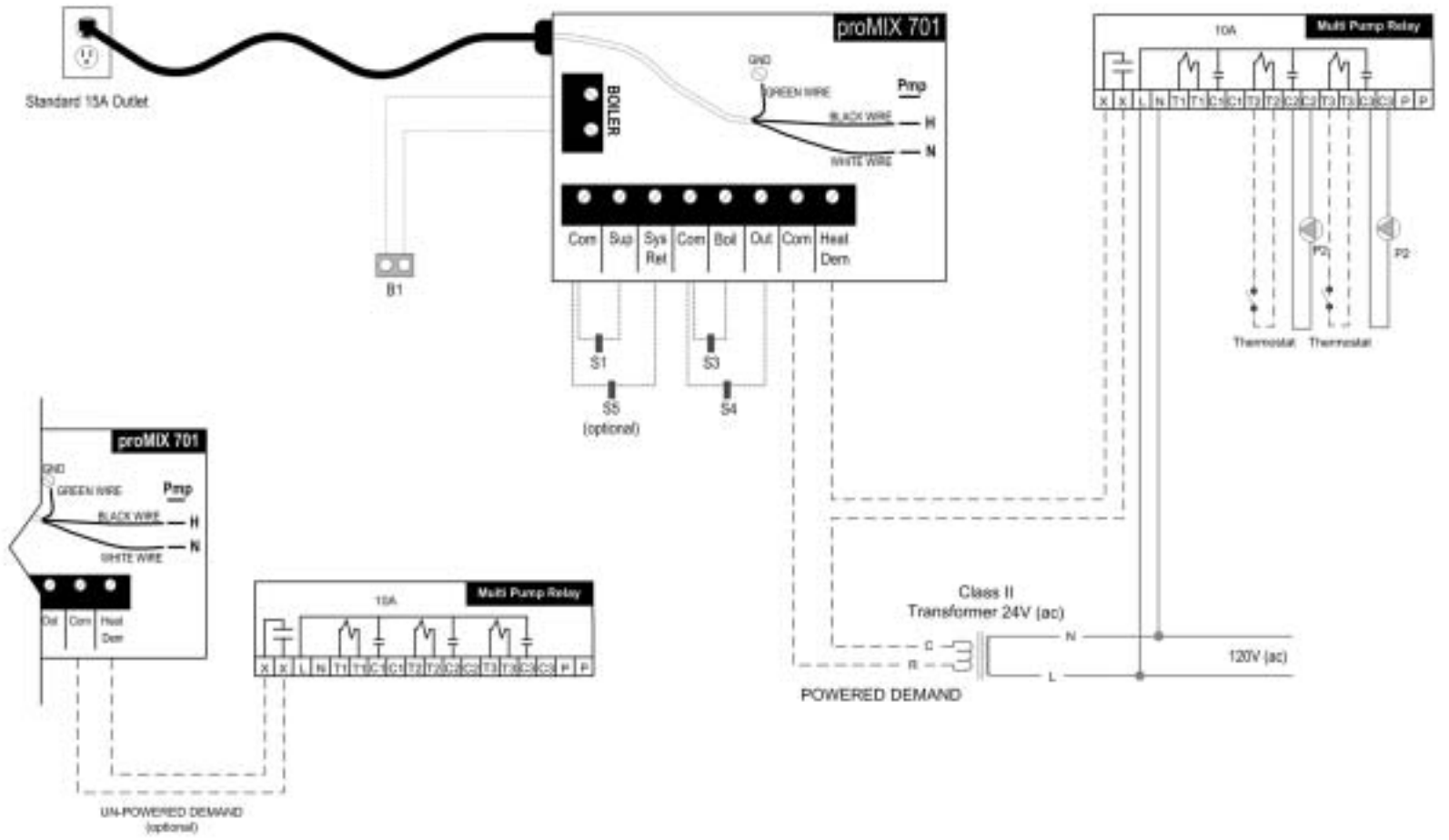
Application Drawing W701 - 02	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



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B1 = Boiler
P1 = Mixed 1 System Pump
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P5 = Variable Speed Injection Pump 2
P6 = DHW Pump
P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand

——— = 120 V (AC)
----- = Sensor Wire
— — - = 24 V (AC)

Project:

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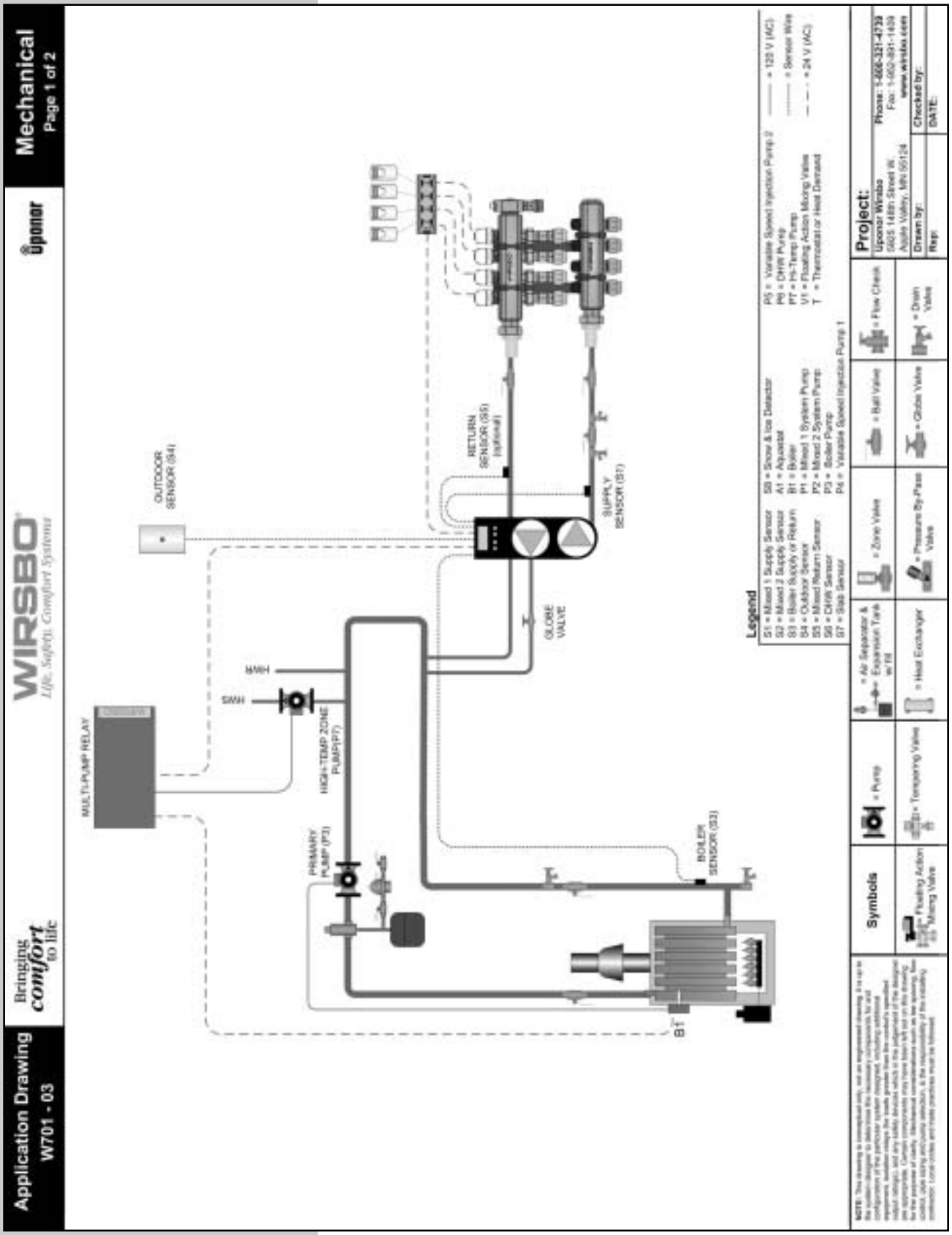
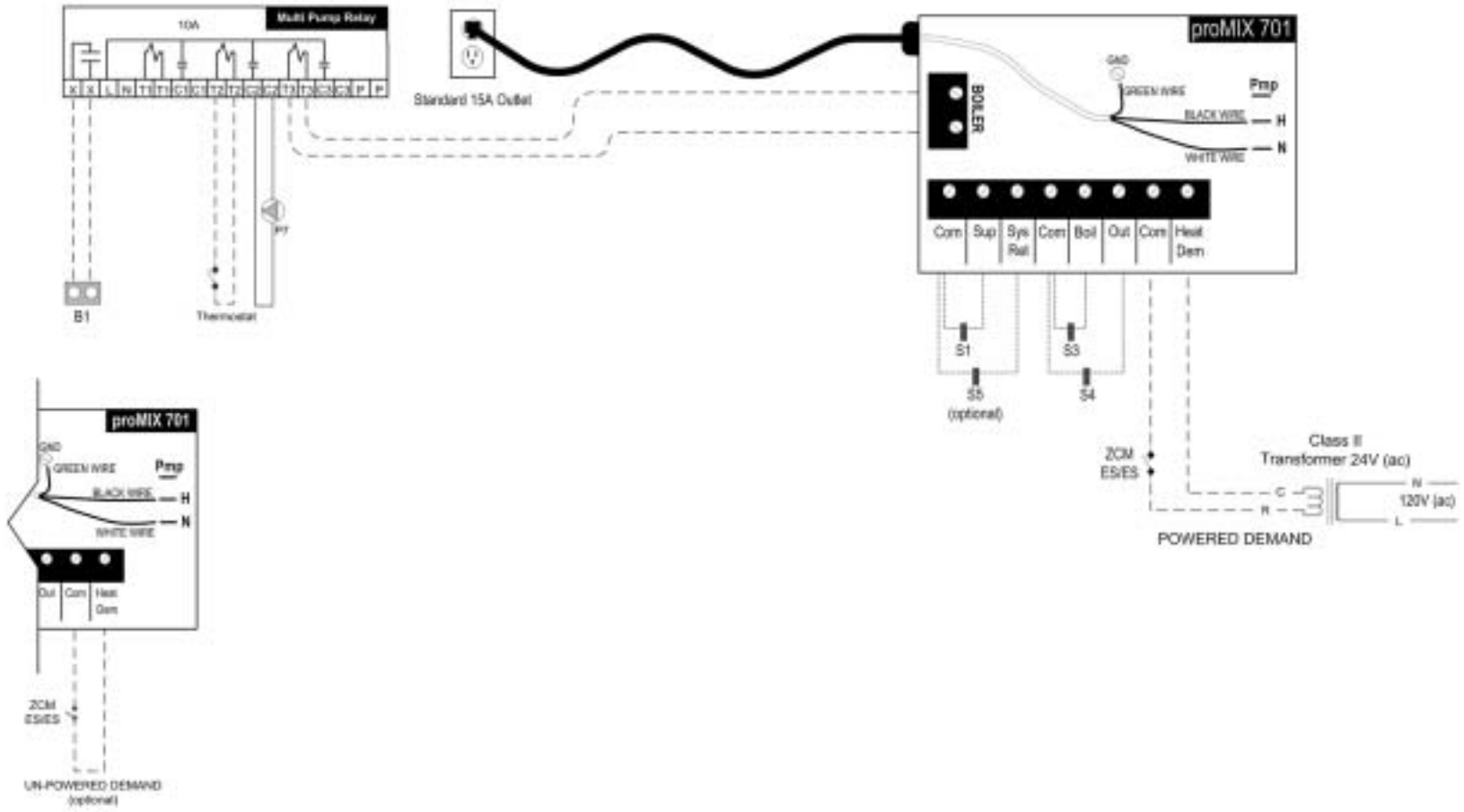
Rep:	DATE:


Application Drawing
W701 - 03
Bringing comfort to life
WIRSBO
Life, Safety, Comfort Systems
uponor
Mechanical
Page 1 of 2
MULTI-PUMP RELAY
HWH
SWH
HIGH-TEMP ZONE PUMP(P7)
PRIMARY PUMP (P3)
OUTDOOR SENSOR (S4)
RETURN SENSOR (S5) (optional)
SUPPLY SENSOR (S1)
GLOBE VALVE
BOILER SENSOR (S3)
B1
Legend
S1 = Mixed 1 Supply Sensor
S2 = Mixed 2 Supply Sensor
S3 = Boiler Supply or Return
S4 = Outdoor Sensor
S5 = Mixed Return Sensor
S6 = DHW Sensor
S7 = Slab Sensor
SB = Snow & Ice Detector
A1 = Aquastat
B1 = Boiler
P1 = Mixed 1 System Pump
P2 = Mixed 2 System Pump
P3 = Boiler Pump
P4 = Variable Speed Injection Pump 1
P5 = Variable Speed Injection Pump 2
P6 = DHW Pump
P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand
= 120 V (AC)
= Sensor Wire
= 24 V (AC)
Symbols
= Pump
= Air Separator & Expansion Tank w/lid
= Zone Valve
= Ball Valve
= Flow Check
= Tempering Valve
= Heat Exchanger
= Pressure By-Pass Valve
= Globe Valve
= Drain Valve
= Floating Action Mixing Valve
Project:
Uponor Wirsbo
5605 148th Street W.
Apple Valley, MN 55124
Phone: 1-866-321-4739
Fax: 1-952-891-1499
www.wirsbo.com
Drawn by:
Rep:
Checked by:
DATE:

Application Drawing W701 - 03	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



Legend

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S2 = Mixed 2 Supply Sensor
S3 = Boiler Supply or Return
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P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand

——— = 120 V (AC)
- - - - - = Sensor Wire
— — — = 24 V (AC)

Project:

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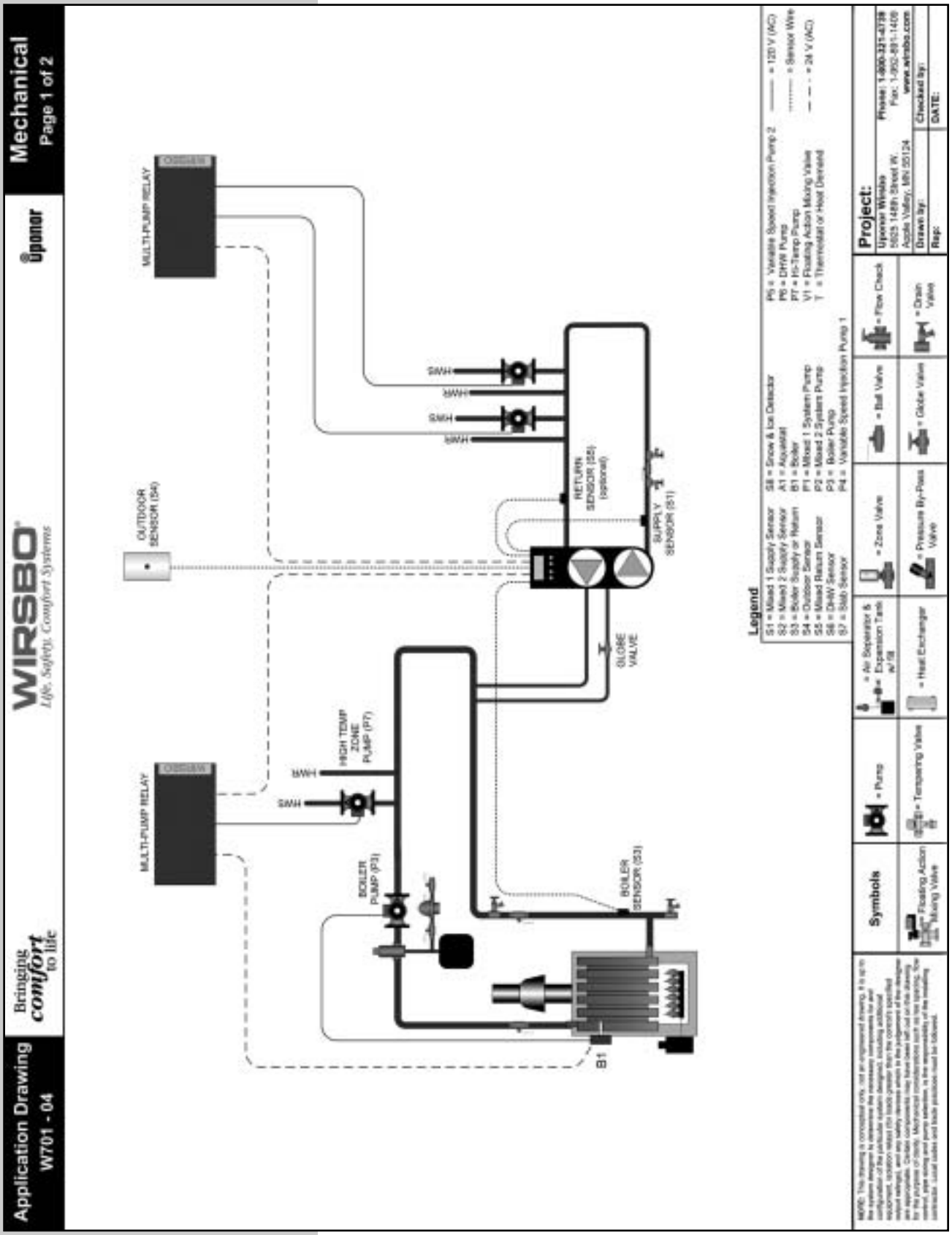
Application Drawing
W701 - 04
Bringing comfort to life
WIRSBO
Life, Safety, Comfort Systems
uponor
Mechanical
Page 1 of 2
MULTI-PUMP RELAY
OUTDOOR SENSOR (S4)
RETURN SENSOR (S2) (optional)
SUPPLY SENSOR (S1)
HWS
HWR
HIGH TEMP ZONE PUMP (P7)
BOILER PUMP (P3)
BOILER SENSOR (S3)
GLOBE VALVE
B1
Legend
S1 = Mixed 1 Supply Sensor
S2 = Mixed 2 Supply Sensor
S3 = Boiler Supply or Return
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S5 = Mixed Return Sensor
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= Pump
= Air Separator & Expansion Tank w/ fill
= Zone Valve
= Ball Valve
= Flow Check
= Floating Action Mixing Valve
= Tempering Valve
= Heat Exchanger
= Pressure By-Pass Valve
= Globe Valve
= Drain Valve
Project:
Uponor Wirsbo
5925 148th Street W.
Apple Valley, MN 55124
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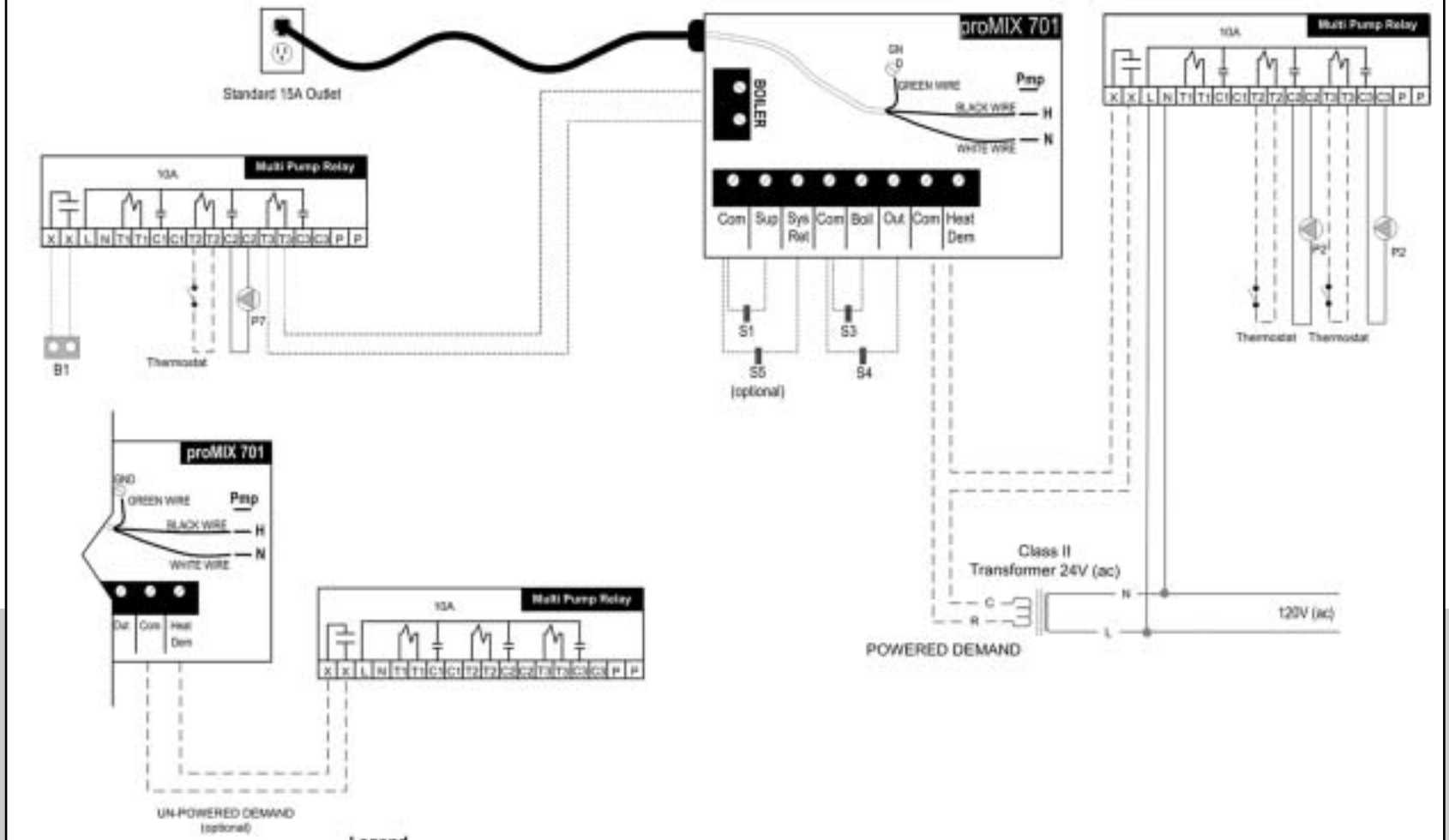
Rep:
DATE:

Application Drawing W701 - 04	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



Legend

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S5 = Mixed Return Sensor
S6 = DHW Sensor
ST = Slab Sensor
S8 = Snow & Ice Detector
A1 = Aquastat
B1 = Boiler
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P3 = Boiler Pump
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P5 = Variable Speed Injection Pump 2
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P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand

——— = 120 V (AC)
------ = Sensor Wire
– – – = 24 V (AC)

Project:

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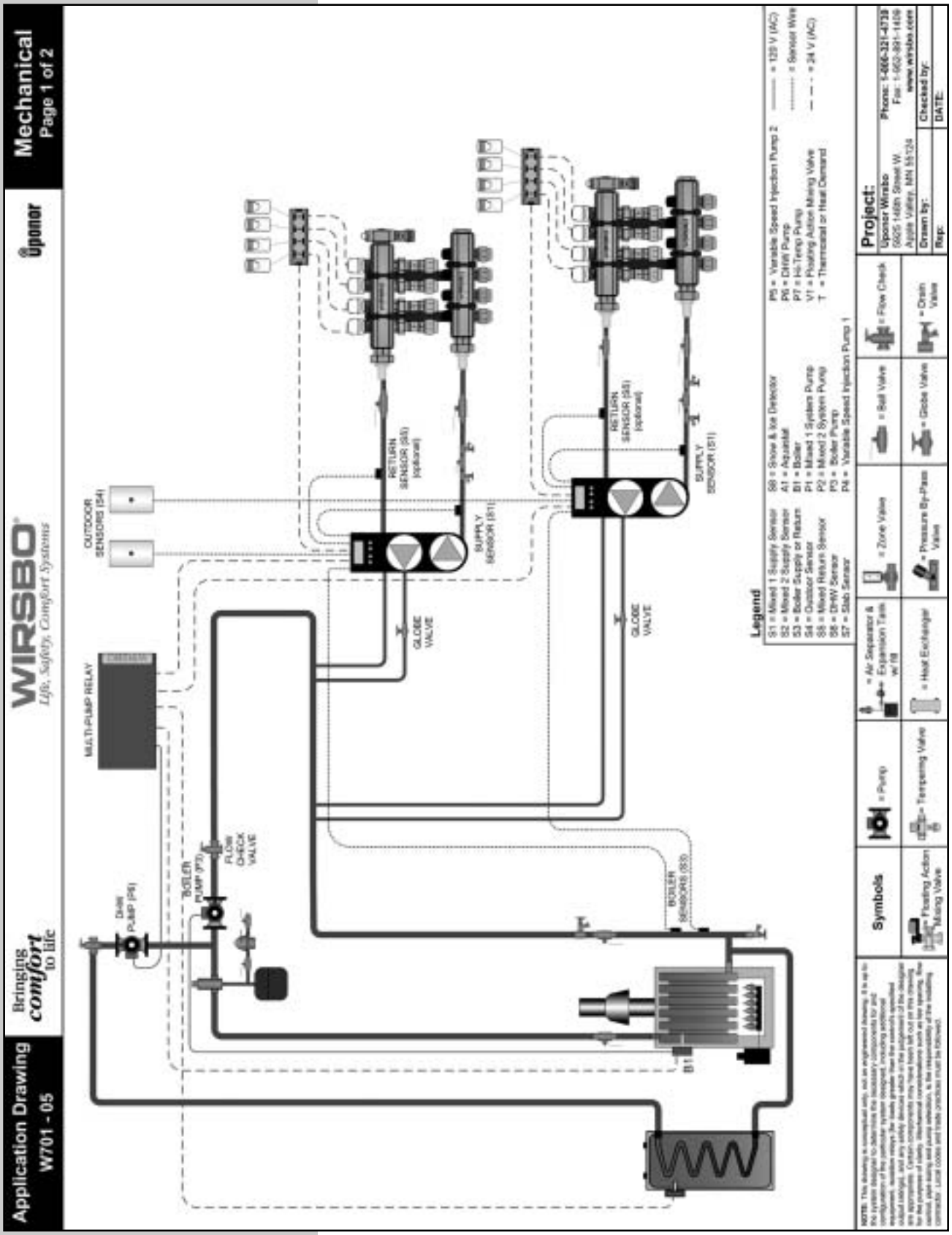
Rep:	DATE:


Application Drawing
W701 - 05
Bringing comfort to life
WIRSBO
Life, Safety, Comfort Systems
Uponor
Mechanical
Page 1 of 2
Legend
S1 = Mixed 1 Supply Sensor
S2 = Mixed 2 Supply Sensor
S3 = Boiler Supply or Return
S4 = Outdoor Sensor
S5 = Mixed Return Sensor
S6 = DHW Sensor
S7 = Slab Sensor
S8 = Snow & Ice Detector
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P5 = Variable Speed Injection Pump 2
P6 = DHW Pump
P7 = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand
= 120 V (AC)
= Sensor Wire
= 24 V (AC)
= Zone Valve
= Ball Valve
= Flow Check
= Air Separator & Expansion Tank w/ fill
= Pressure By-Pass Valve
= Globe Valve
= Drain Valve
= Heat Exchanger
Symbols
= Pump
= Tempering Valve
Floating Action Mixing Valve
OUTDOOR SENSORS (S4)
RETURN SENSOR (S5) (optional)
SUPPLY SENSOR (S1)
GLOBE VALVE
MULTI-PUMP RELAY
DHW PUMP (P6)
BOILER PUMP (P3)
FLOW CHECK VALVE
BOILER SENSOR (S3)
B1
Project:
Uponor Wirsbo
5925 148th Street W.
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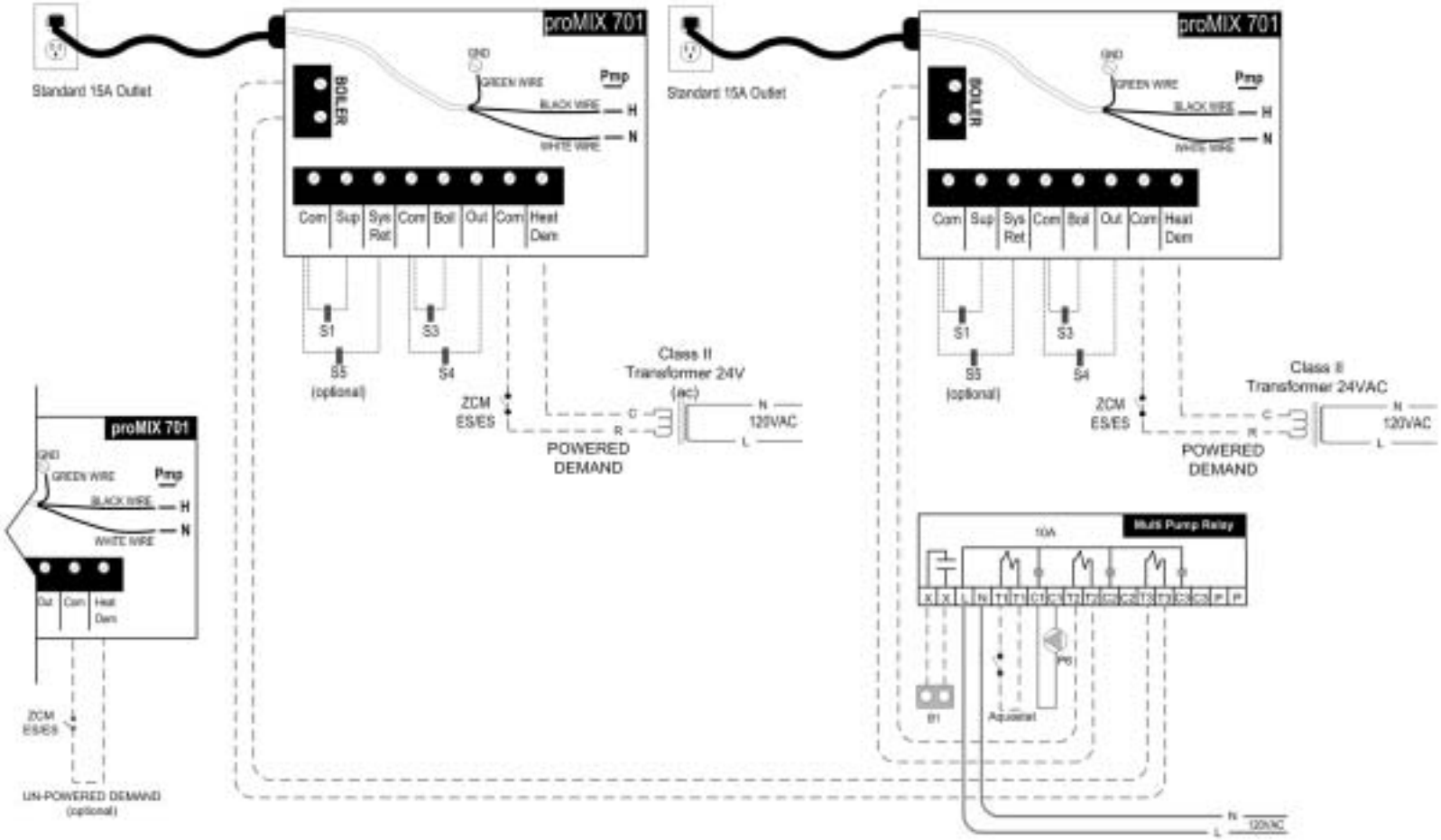
Checked by:
Rep:
DATE:

Application Drawing W701 - 05	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



Legend

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——— = 120 VAC
------ = Sensor Wire
— — — = 24 VAC

Project:

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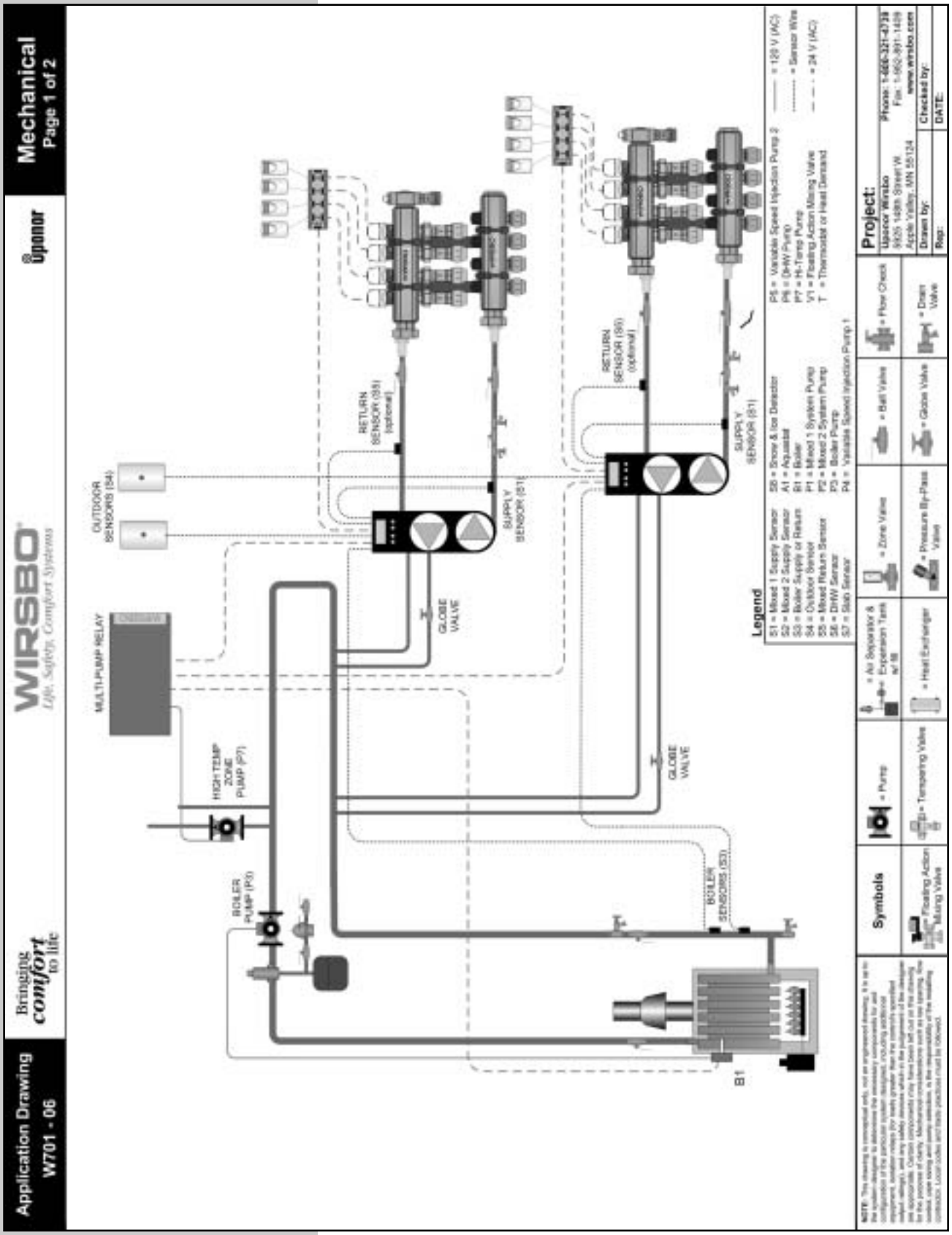
Apple Valley, MN 55124	www.wirsbo.com
Drawn by:	Checked by:
Rep:	DATE:


Application Drawing
W701 - 06
Bringing comfort to life
WIRSBO
Life, Safety, Comfort Systems
Uponor
Mechanical
Page 1 of 2
OUTDOOR SENSOR (S4)
RETURN SENSOR (S9) (optional)
SUPPLY SENSOR (S1)
MULTI-PUMP RELAY
GLOBE VALVE
HIGH TEMP ZONE PUMP (P7)
BOILER PUMP (P2)
BOILER SENSORS (S3)
B1
Legend
S1 = Mixed 1 Supply Sensor
S2 = Mixed 2 Supply Sensor
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Symbols
= Pump
= Air Separator & Expansion Tank w/ fill
= Zone Valve
= Ball Valve
= Flow Check
= Tempering Valve
= Heat Exchanger
= Pressure By-Pass Valve
= Globe Valve
= Drain Valve
= Floating Action Mixing Valve
Project:
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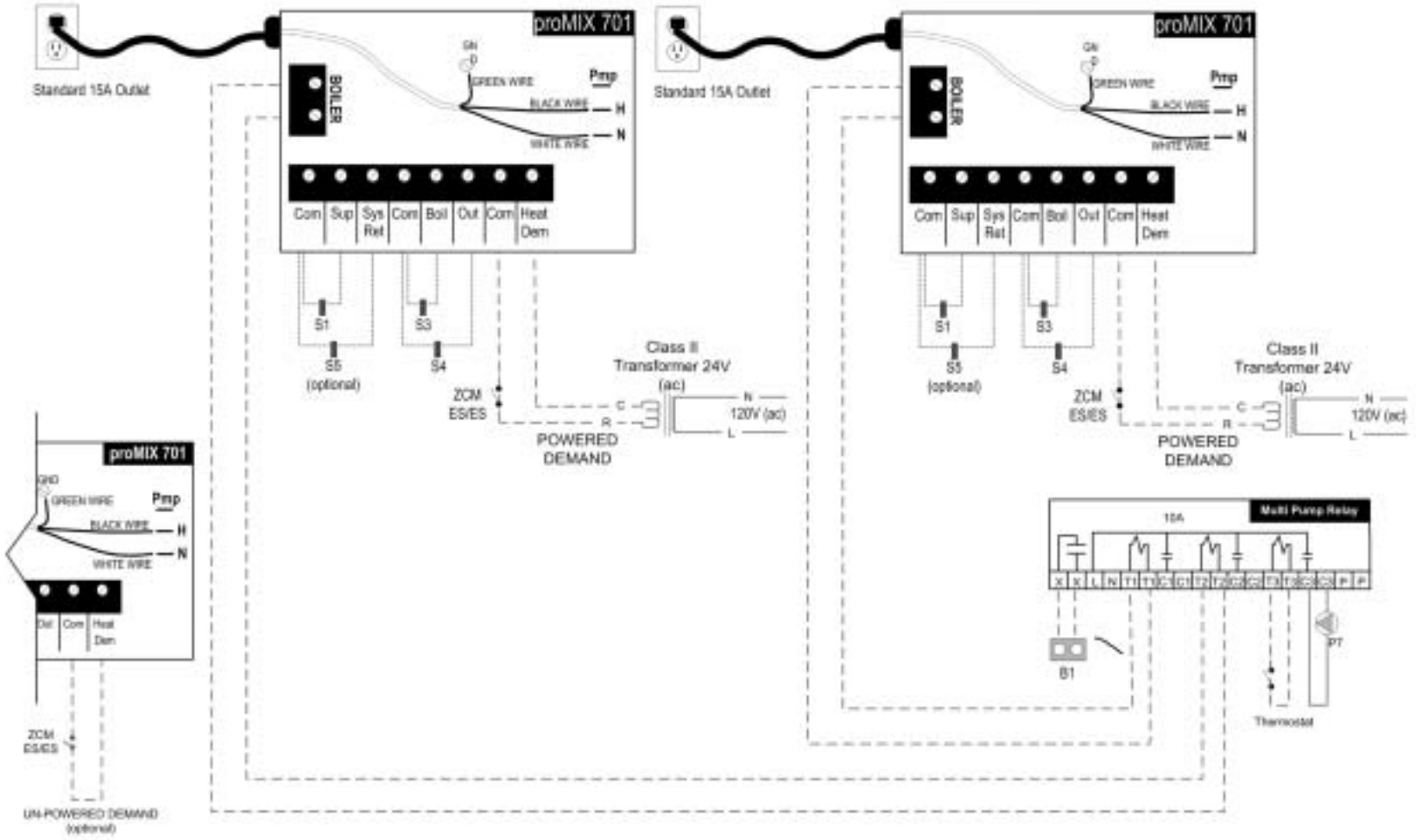
Application Drawing W701 - 06	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



Legend

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S5 = Mixed Return Sensor
S6 = DHW Sensor
ST = Slab Sensor
S8 = Snow & Ice Detector
A1 = Aquastat
B1 = Boiler
P1 = Mixed 1 System Pump
P2 = Mixed 2 System Pump
P3 = Boiler Pump
P4 = Variable Speed Injection Pump 1
P5 = Variable Speed Injection Pump 2
P6 = DHW Pump
PT = Hi-Temp Pump
V1 = Floating Action Mixing Valve
T = Thermostat or Heat Demand

——— = 120 V (AC)
------ = Sensor Wire
— — — = 24 V (AC)

Project:	
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Application Drawing
W701 - 10

Bringing comfort to life

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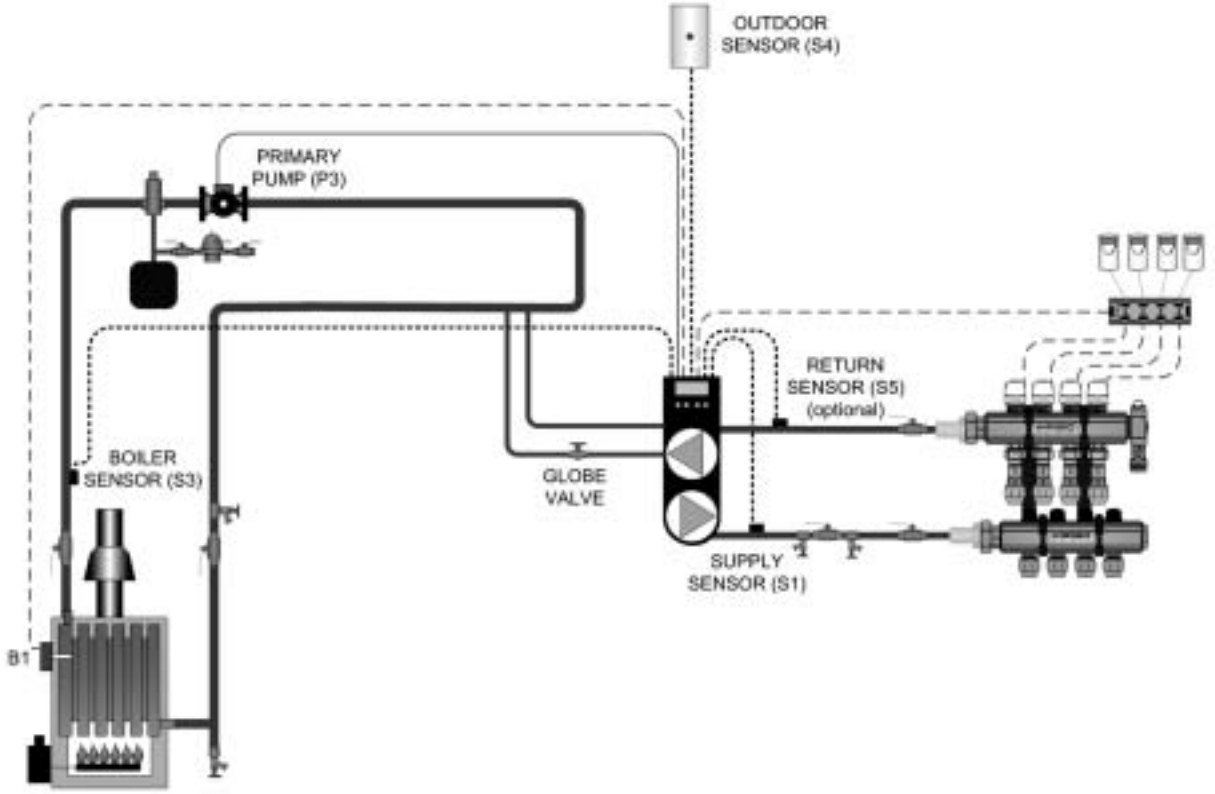
Mechanical
Page 1 of 2



Legend

S1 = Mixed 1 Supply Sensor	S8 = Snow & Ice Detector	P5 = Variable Speed Injection Pump 2	——— = 120 V (AC)
S2 = Mixed 2 Supply Sensor	A1 = Aquastat	P6 = DHW Pump	····· = Sensor Wire
S3 = Boiler Supply or Return	B1 = Boiler	P7 = Hi-Temp Pump	— — - = 24 V (AC)
S4 = Outdoor Sensor	P1 = Mixed 1 System Pump	V1 = Floating Action Mixing Valve	
S5 = Mixed Return Sensor	P2 = Mixed 2 System Pump	T = Thermostat or Heat Demand	
S6 = DHW Sensor	P3 = Boiler Pump		
S7 = Slab Sensor	P4 = Variable Speed Injection Pump 1		

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Symbols					
= Pump	= Air Separator & Expansion Tank w/ fill	= Zone Valve	= Ball Valve	= Flow Check	
= Floating Action Mixing Valve	= Tempering Valve	= Heat Exchanger	= Pressure By-Pass Valve	= Globe Valve	= Drain Valve

Project:

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Apple Valley, MN 55124	www.wirsbo.com
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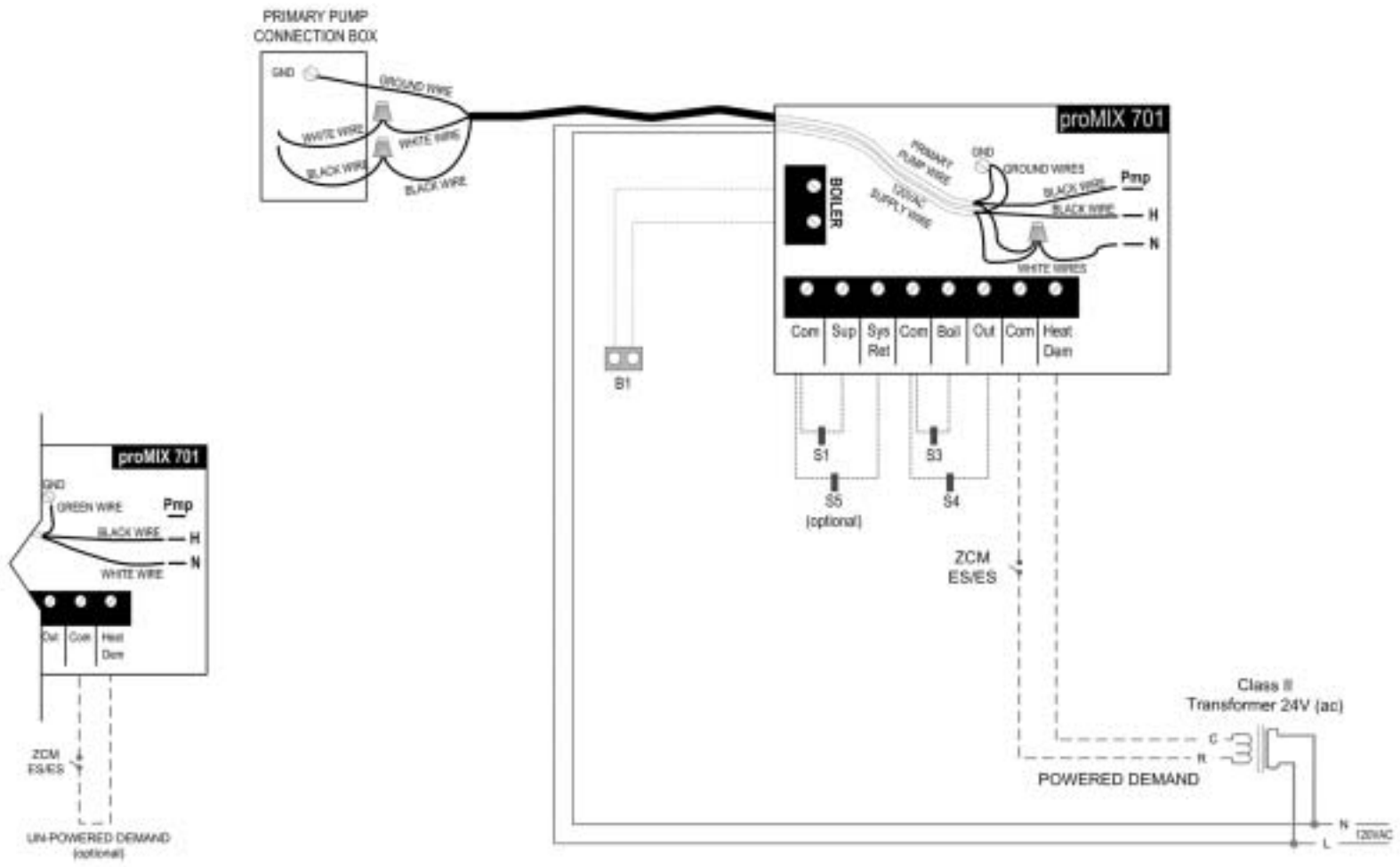
Application Drawing W701 - 10	Bringing comfort to life	WIRSBO Life, Safety, Comfort Systems	Uponor	Electrical Page 2 of 2



Legend

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——— = 120 V (AC)
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– – – = 24 V (AC)

Project:

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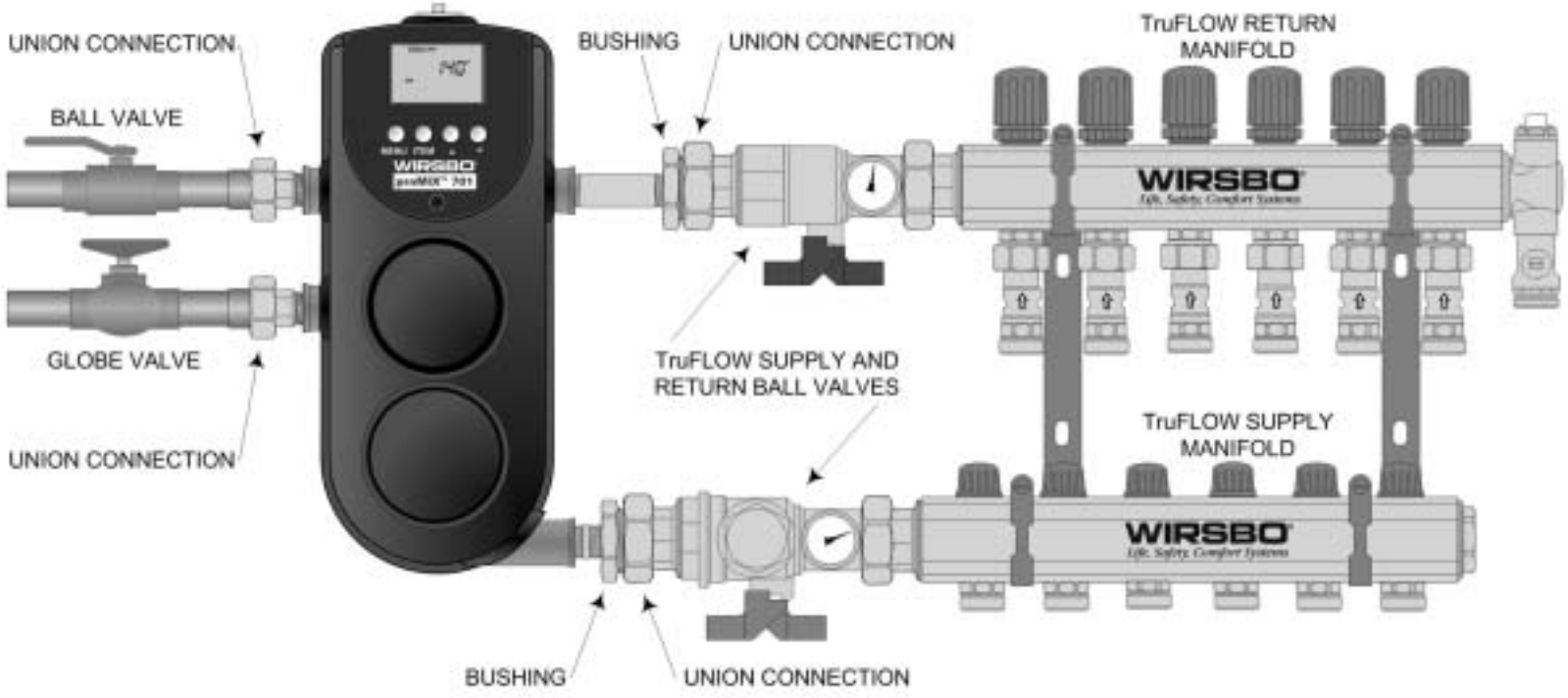
Application Drawing
W701 - 20

Bringing comfort to life

WIRSBO
Life, Safety, Comfort Systems

Uponor

Mechanical
Page 1 of 1



When the proMIX 701 Injection Mixing Station and the supported TruFLOW Manifold are in close proximity to each other, a close installation, as shown in the drawing above, is possible. The drawing shows threaded nipples, but copper pipe with male threaded adapters will also work. For ease of installation, use the TruFLOW Supply and Return Ball Valves with Thermometers (A2631250). These ball valves provide isolation on the secondary side of the proMIX 701. Additionally, the thermometers can be removed and their locations used as sensor wells for the supply (S1) and return (S5) sensors from the proMIX 701. Reuse the flat spring from the thermometers onto the sensor (A3060071) or use heat transfer grease around the sensor to ensure good conductivity with the well's wall.

The left sides of the TruFLOW ball valves form union connections with the respective threaded bushing. When ¾" piping is installed between the mixing station and the TruFLOW manifold, use the R32 male x ¾" female NPT bushing (A2133275). For 1" piping, use the R32 male x 1" female NPT bushing (A2123210). The supply and return ports on the right side of the mixing station are ¾" female NPT.

The manifold is horizontally offset by 2 inches when the TruFLOW Supply and Return Ball Valves are installed. It is important to dry fit the mixing station up to the manifold prior to mounting the station on the wall. Take proper measurements for the distance between the bushing at the TruFLOW ball valve and the female port on the mixing station. This will determine the length of threaded nipple or copper pipe required.

With all installations of the proMIX 701 Injection Mixing Station, ensure the station can be isolated from the rest of the system and quickly removed through the use of threaded unions. The use of isolation valves and unions will make the difference between a quick change-out, if required, and an all-day drain and refill. Always plan ahead and isolate components within a hydronic system for quick servicing.

Wirsbo proMIX 701 Program Setup Sheet

Project Name _____

Address _____

State _____ **ZIP** _____

Date of Install _____

Installer _____

Company _____

Check the appropriate Program Mode used for this project.

- ❑ Outdoor Reset Mode
- ❑ Setpoint Mode
- ❑ Delta T Limiting Mode

Note the values entered in the Adjust menu for the proMIX 701 Injection Mixing Station.

MIX TARG _____

∆T MAX _____

OUT DSGN _____

MIX DSGN _____

MIX MAX _____

MIX MIN _____

BOIL MIN _____

WWSD _____

UNITS _____

Leave this manual with the end user for future service reference.

Notes

Notes

Notes

Notes

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COMFORT HEATING

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PM701MAN_5/05

Uponor Wirsbo, Inc.
5925 148th STREET WEST
APPLE VALLEY, MN 55124

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FAX: (952) 891-1409
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