

The Unico System[®]

SLIDE-IN HEATING COIL INSTALLATION MANUAL

BULLETIN 30-030

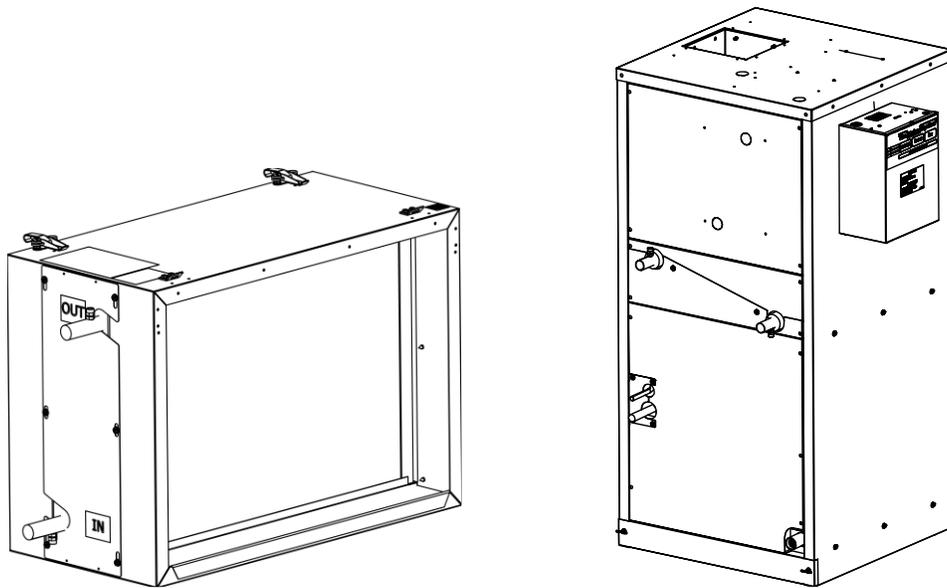


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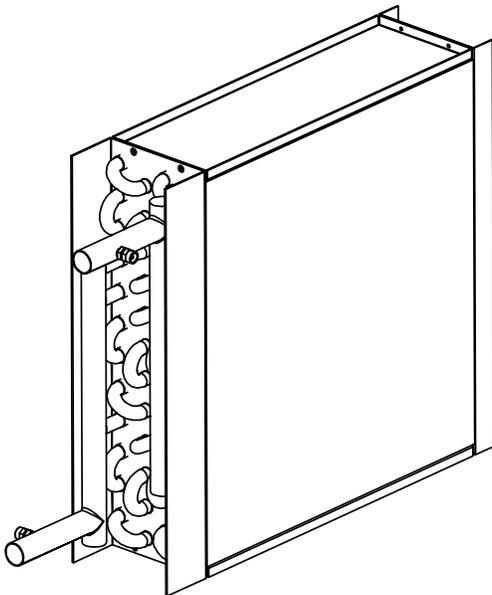
PIPING AND THERMOSIPHONING EFFECT 8

Certified to UL Standard 1995
Conforms to CAN/CSA Standard C22.2 NO. 236



Unico products comply with the European regulations that guarantee product safety.

Installation Instructions



NOTICE TO INSTALLER AND EQUIPMENT OWNER: RETAIN THIS MANUAL AT THE JOB.

SUFFICIENT BUILDING INSULATION IS ESSENTIAL FOR THE MOST ECONOMICAL OPERATION.

INTRODUCTION

General. The information on the following pages is to help the installer save time, provide the best possible installation and insure continuous trouble-free operation.

The Unico System Hot Water Coil is designed for use with the Unit Models listed in Table 1. The coil is designed to be used with virtually any source of hot water including gas, oil, or electric boilers; wood-fired boilers; solar heating systems; or domestic hot water “Combo” systems.

Table 1. HWC model number

Unit Model	Hot Water Coil Model
M1218Cxx-H	HW-1218
M2430Cxx-H and M2430V	HW-2430
M3036Cxx-H and M3036V	HW-3036
M3642Cxx-H and M3642V	HW-3642
M4860Cxx-H and M4860V	HW-4860
V2430	HW-V2430
V3036	HW-V3036
V3642	HW-V3642

Scope. These instructions apply to all slide-in heating coils. Refer to Bulletin 30-010 for the HW-1218 specifications, Bulletin 20-20.4 for the M-Series HWC specifications and Bulletin 20-019 for the Vertical HWC specifications.

Refer to the boiler or hot water heater manufacturer’s instructions for piping and pump layout and installation. The following table lists the hot water coil model and corresponding unit model.

General Precautions and Safety Tips. Do not attempt to install or startup unit without first reading and understanding the appropriate sections in this manual.

Installation should be in accordance with all local codes and regulations and with the applicable National Fire Protection Association (NFPA) standards. In case of conflict, local codes take precedence.

All electrical wiring should be in accordance with the latest edition of the National Electrical Code and all local codes and regulations. The unit is safety certified to UL 1995 and listed with ETL.

Always install a secondary drain pan when water could cause damage.

Unpacking. All coils are inspected prior to shipping and are carefully packaged in individual cartons. Inspect all cartons prior to unpacking. Notify carrier of any damage.

Open each carton to remove the coil. Inspect for visible signs of concealed damage and notify carrier of any such damage. All materials are sold FOB Factory and it is the responsibility of the consignee to file any claims with the delivering carrier for materials received in damaged condition.

INSTALLATION

Install the air handler first, then install the hot water coil. Refer to Bulletin 30-020 for the M-Series air handler installation instructions and Bulletin 30-015 for the V-Series installation instructions.

A secondary drain pan must be used under unit if installed where a water leak could cause damage. Unico has available secondary drain pans for horizontal applications. For vertical unit applications it will be necessary to fabricate a drain pan which should provide at least 1-½-inch (12.7mm) clearance around all sides at the bottom.

Use the following steps to insert the hot water coil:

1. Remove the access plate from the side of the Heat Module (On V-Series remove door panel). You may discard the original access plate on M-Series (except the M1218) only because the coil ships with an access panel with holes for the connection pipes. On the M1218, U1218, and V-series, the same door panel is used. Just remove the knockout plugs.
2. Slide the coil in as far as possible so return bends press into the insulation on the inside of the module cabinet. Coil must be fully inserted to assure that the cover plate/door panel can be installed after coil is piped. For coil dimensions, see Table 2.
3. Pipe coil following instructions in “Piping” section that follows below. Be sure system is filled with water, bled of air and checked for leaks.
4. The piping insulation sent with the coils is to be used to insulate the copper tubes of the coil. Notch the insulation for the Water IN and Water OUT lines.
5. Install the insulated coil cover plate or door panel. Maneuver the plate so notches fit around the water lines. Screw the cover plate in place using screws removed from the access plate.
6. Caulk around the Water IN and OUT lines to assure no air leakage.
7. Check around the edges of the cover plate for air leaks with blower operating.
8. Seal with UL181A-P aluminum foil tape.

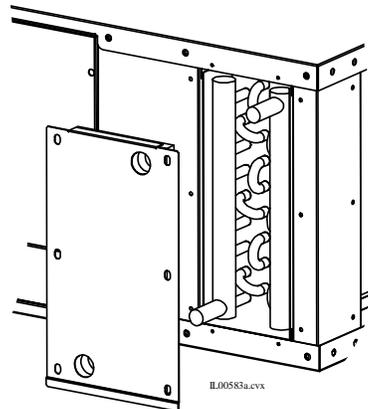


Figure 1. Hot Water Coil for U1218
MXXXXCL1-H

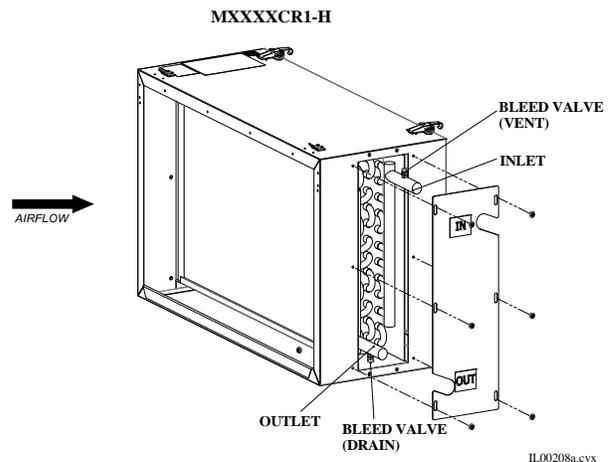
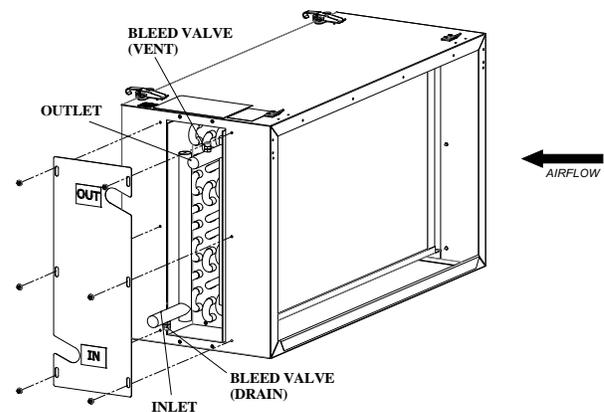


Figure 2. Hot Water Coil (LH and RH) with Cover Plate for M-Series units.

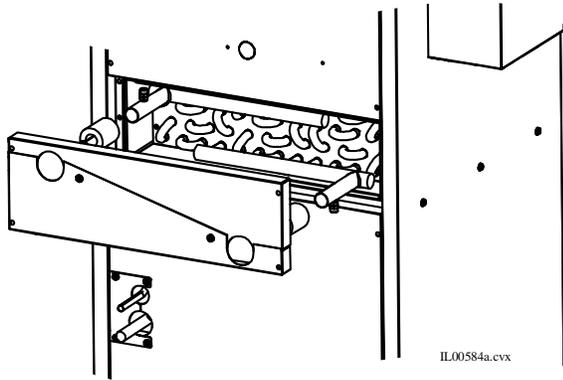
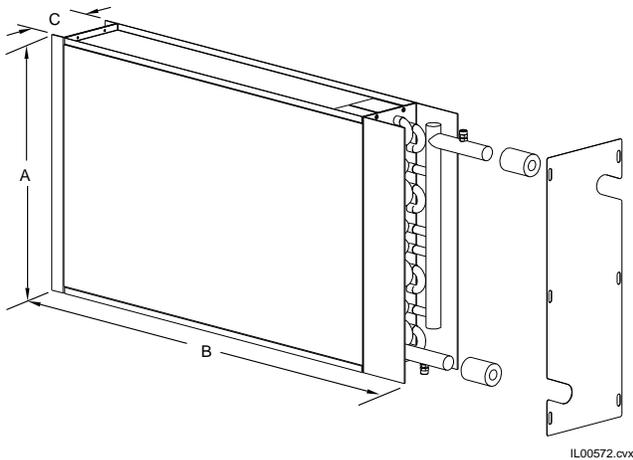


Figure 3. Hot Water Coil for V-Series

Table 2. Hot Water Coil Dimensions

Model	Dimension, inch (mm)			Connections O.D.
	A	B	C	Inch (mm)
HW-1218	9.8 (250)	19.0 (483)	3.9 (100)	0.625 (15.88)
HW-2430	15.9 (403)	24.5 (622)	4.5 (114)	0.875 (22.2)
HW-3036	15.9 (403)	29.5 (749)	4.5 (114)	0.875 (22.2)
HW-3642	15.9 (403)	37.5 (952)	4.5 (114)	0.875 (22.2)
HW-4860	15.9 (403)	37.5 (952)	4.5 (114)	0.875 (22.2)
HW-V2430	15.9 (403)	17.4 (441)	4.5 (114)	0.875 (22.2)
HW-V3036	15.9 (403)	21.4 (543)	4.5 (114)	0.875 (22.2)
HW-V3642	19.6 (504)	22.4 (568)	4.5 (114)	0.875 (22.2)



For M-Series horizontal applications the heating module will be installed upstream of the cooling module. For this configuration the hook-flange provided (loose) with the MH unit must be attached to the cooling module (see Figure 4). In hydronic heating only applications, use the hook-flange on the blower module to attach the MH unit. For M1218 units, the hook flanges are factory installed and are located on the Hot Water Coil Module and Cooling Module.

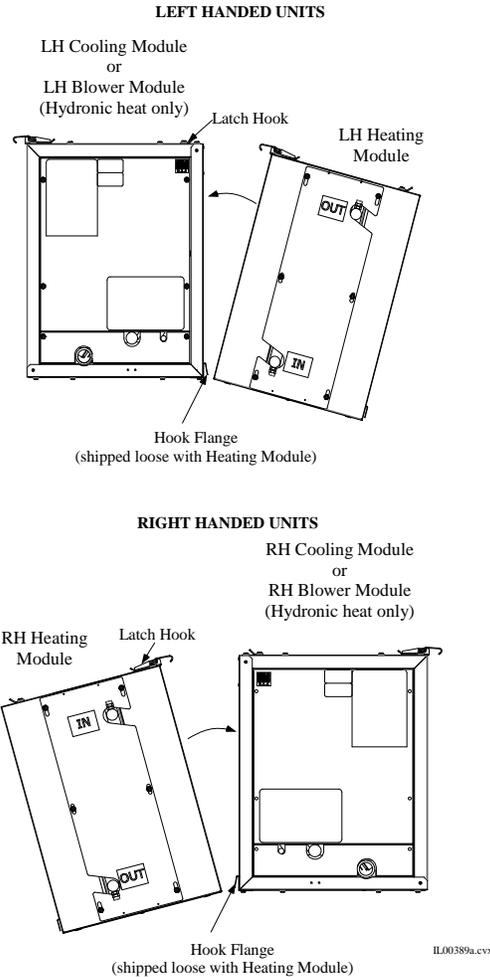
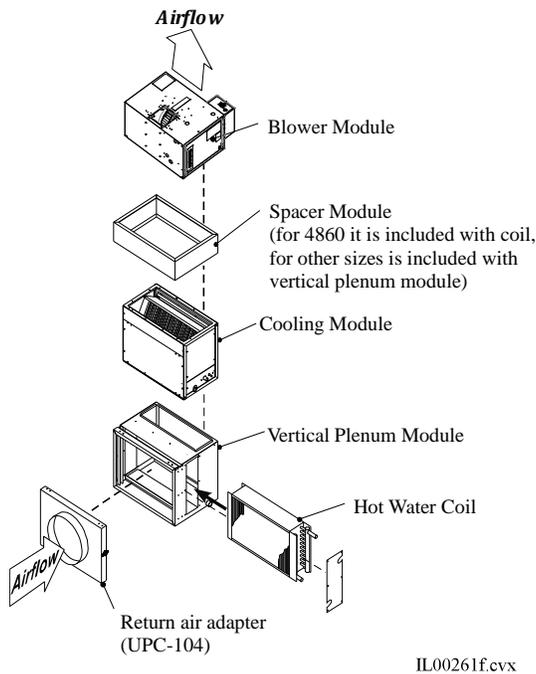


Figure 4. Horizontal application of HWC

For M-Series vertical upflow arrangements where the air enters the bottom of the unit, use the vertical plenum (MV) module (Not available for M1218 units). Coil installation is identical to the MH installation instructions and shown in Figure 5. Detailed specifications for the MV unit are available in Bulletin 20-20.5.



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Figure 5. Vertical Installation (M2430, M3036, M3642, and M4860 units only)

PIPING

All piping must be in accordance with all local codes and ordinances. Pipe sizing and pump selection must be designed to match, allowing for the pressure loss in the coil and all other fittings. Refer to ASHRAE Fundamentals Handbook for design guidelines.

The *Unico System* Hot Water Coil can be piped as a single zone or in a multi-zone system. In either system, the water flow may either be continuous or intermittent.

Refer to coil dimensional drawing in this document for connection sizes. All the connections are copper sweat connections. Solder or braze the water connections, and then fill the system. Bleed the air from the coil by backing off the screw inside the bleed valve for venting.

FREEZE PROTECTION

If unit is in an unconditioned space below freezing, care must be taken not to freeze the water in the coil. The best method is to use a glycol-water antifreeze solution with a freezing point below the coldest temperature expected. Using antifreeze, though, can reduce the output of the coil.

If the coil is not in use during the cold temperatures, drain the system then flush with a glycol solution.

WIRING AND CONTROLS

WARNING!
DISCONNECT ELECTRICAL SUPPLY BEFORE WIRING UNIT TO PREVENT INJURY OR DEATH FROM ELECTRICAL SHOCK.

All electrical wiring must comply with all local codes and ordinances.

In a continuous flow system, the fan is simply cycled on and off by the thermostat. In an intermittent flow system, water is circulated through the coil only when heat is required. The fan can run continuous or at the same time as the water but continuous is not recommend. The intermittent system will use either pump on/off control, or mixing or isolation valves to control the water flow.

An optional aquastat can be installed with the intermittent system to prevent blowing of cold air by delaying the fan until the water in the coil is hot.

When using the MxxxxBL1-ST2 blower thermostats, it is necessary to install a separate (not included) double-pole double-throw (DPDT) relay as shown in Figure 6. This provides a set of open contacts that serve as a switch to energize a boiler, a solenoid valve, or a pump. At the same time, the relay will energize the indoor blower. This control diagram will still allow for constant air circulation; however, the water flow would need to be stopped to prevent overheating the conditioned space. Using the DPDT relay allows you to start the pump or open a valve when the thermostat calls for heat. This relay is not needed with the MxxxxBL1-EC2 blower.

In certain situations an aquastat is not used. For this setup, connect the bypass wire as shown in Figure 6. This configuration will energize the fan at the same time as the boiler.

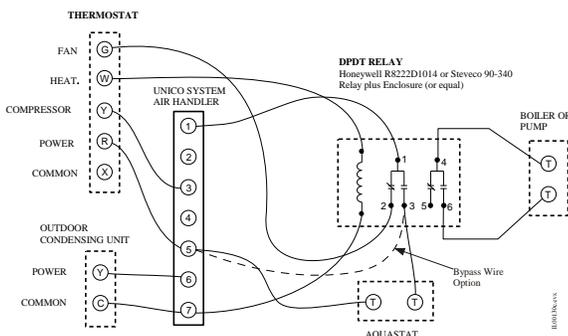
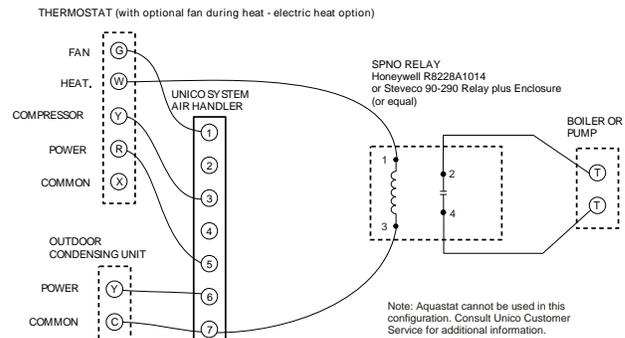


Figure 7. Wiring Diagram for Cooling and Boiler Heating Applications with DPDT Relay

If constant circulation is not needed, the blower can be energized without the DPDT relay provided the thermostat will energize the blower ('G' circuit) in heat mode. Most electric furnace subbase thermostats will provide this feature. A wiring diagram of this setup is shown in Figure 7.

Note: A normal heating-cooling thermostat may not close the "G" circuit on heating.



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Figure 8. Wiring Diagram for Cooling and Boiler Heating Applications with SPNO Relay

The Unico Smart Control Board (Figure 8) is another option for hot water heating systems. The smart control board is adaptable to just about every practical heating application; refer to Bulletin 30-039 for more details.

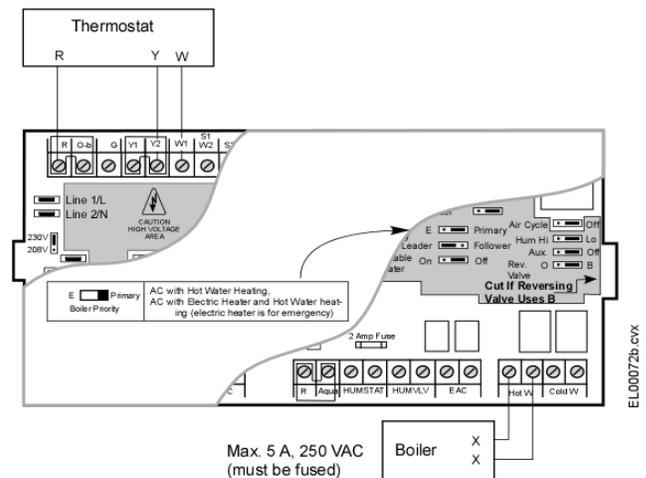


Figure 9. Unico Smart Control Board

STARTUP

Sequence of Operation. The sequence of operation greatly depends on the options installed and type of control thermostat used. Most thermostats have a fan AUTO-ON switch. When the fan switch is set to ON, the “G” circuit is closed and the blower relay is energized. The indoor blower on the U1218 starts after about a 20-second delay while the modular series blowers will start when the blower relay is energized. See Bulletin 20-20.1 for more details.

The following paragraphs describe the sequence of operation when the fan is set to AUTO. If the fan switch is set to ON, the sequence is the same except the “G” circuit is always closed and the indoor fan is always operating. Refer to Bulletin 30-010 for the U1218 wiring diagram and Bulletins 30-020 and Bulletin 30-039 for wiring diagrams for the “V” and “M” series air handlers.

Heating Cycle. When the thermostat calls for heating, only the “W” circuit is closed for most thermostats, sending a 24 V signal to a DPDT relay (separate from the air handler control box). This external relay will close an isolated switch that starts the boiler or pump. Then after the optional aquastat is satisfied, the indoor blower will start. Suggested placement for the aquastat is on the water inlet pipe as close to the coil as practical. See Figure 6.

When the thermostat is satisfied, the 24 V signals are cut and the pump and blower will stop. The indoor blower for the U1218 continues to operate for about 30 seconds, then stops. The system is now off.

PIPING AND THERMOSIPHONING EFFECT

Thermosiphoning is the natural, convective movement of air or water due to difference in temperature. In a hot water system, if the water heater is installed lower than the coil, the hot water will not stay in the water heater when the pump is turned off. The piping schematic shown in Figure 9 shows how thermosiphoning can be prevented.

OPTION 1: Install a **check valve** at the supply of the coil, downstream of the pump.

OPTION 2: Install a **solenoid valve** at the supply of the coil, downstream of the pump.

OPTION 3: Install a **zone valve** at the supply of the coil, downstream of the pump.

OPTION 4: Add a **heat trap** at the supply of the coil, downstream of the pump.

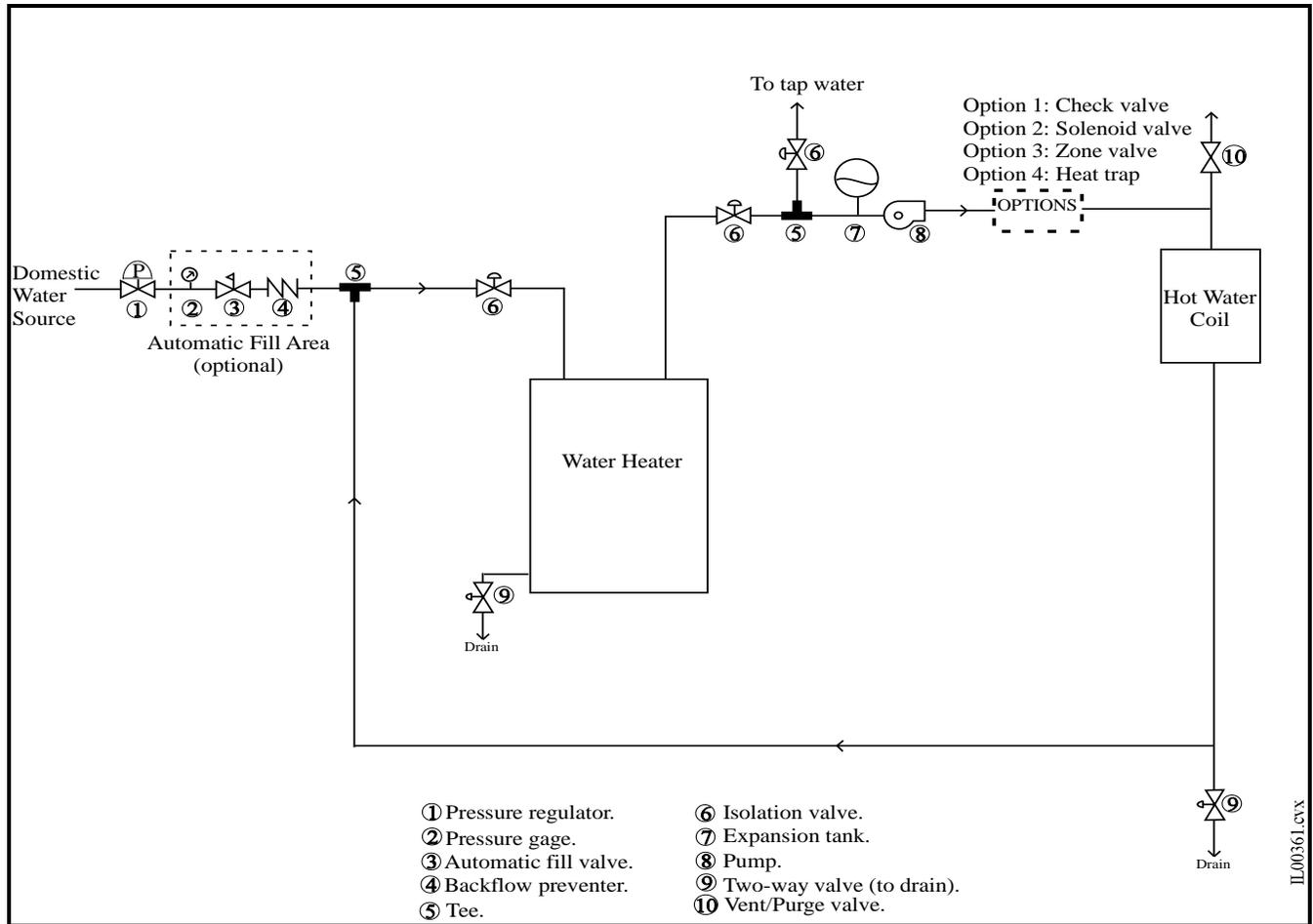
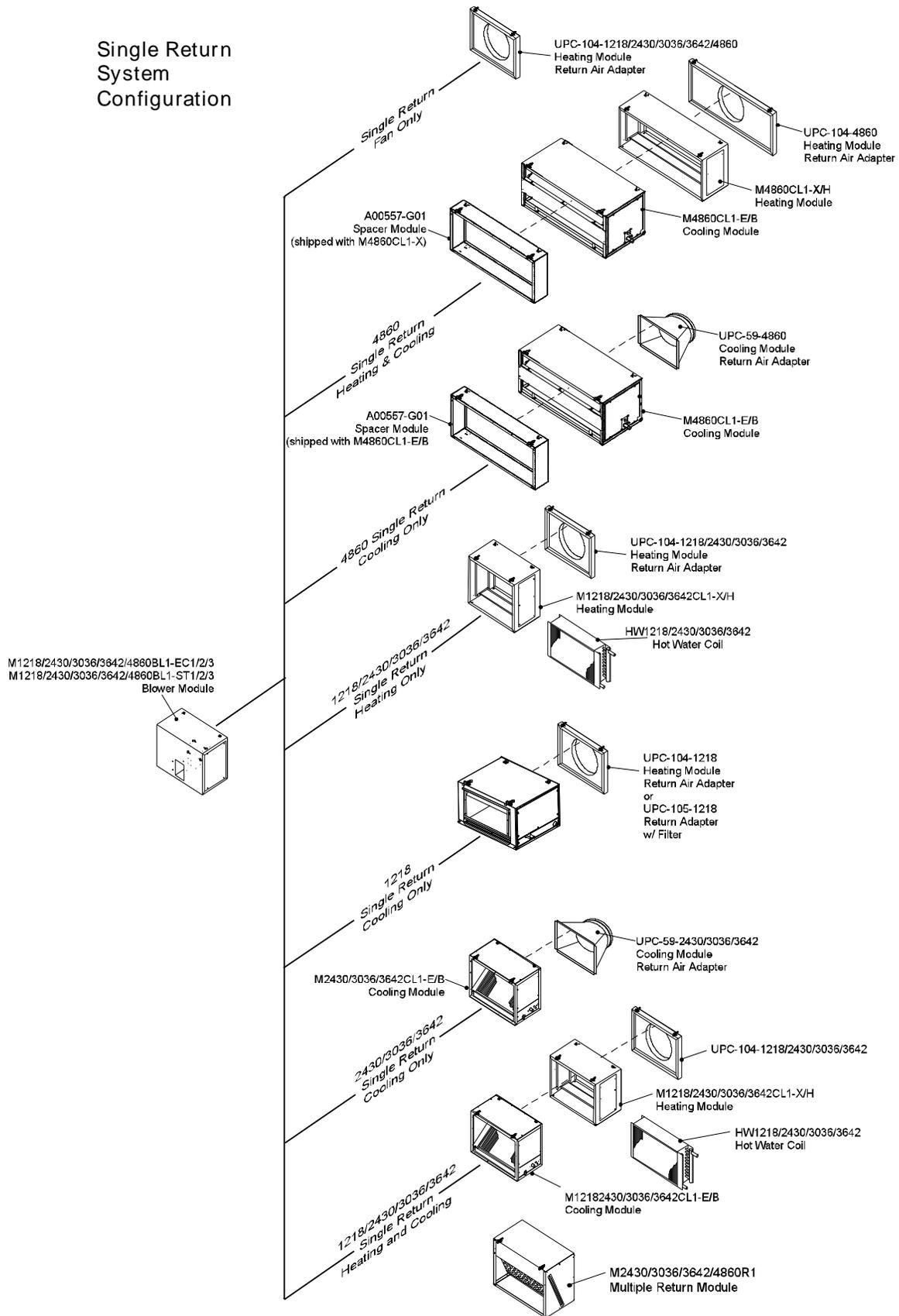


Figure 10. Piping and Thermosiphoning Effect

Single Return System Configuration



If using multiple returns replace single return adapter with the correct MXXXXR1 module, where xxxx stands for unit size.

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UNICO SYSTEM M-Series Vertical Installation

*A00863-G01, A01774-G01, A00850-G01 are shipped with the M2430V2, M3036V2, & M3642V2, respectively. The M4860V2 is not shipped with a spacer module. The M4860C is shipped with the A00850-G01.

