



Installation and Maintenance Manual

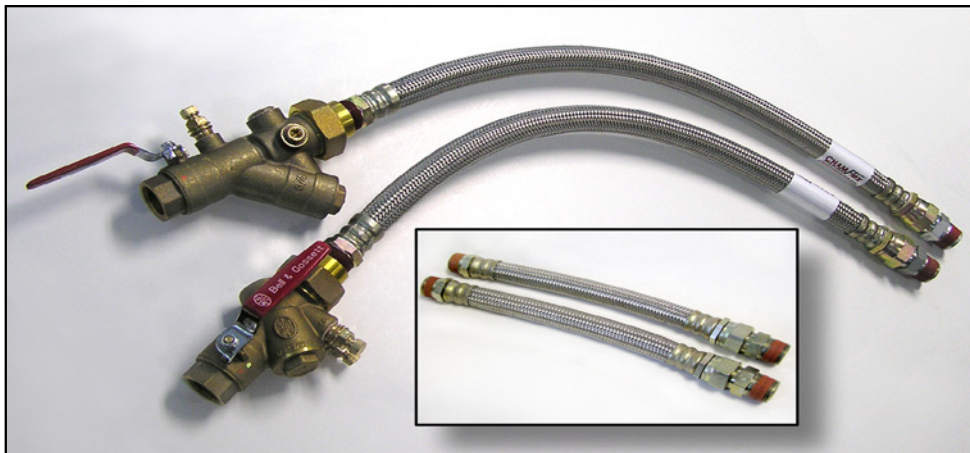
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Daikin Fire Rated Hoses & Hose Kits for Water Source Heat Pumps



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Safety Information



This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME**

ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.



WARNING: A hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION: A hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE: A potential situation which, if not avoided, could result in an undesirable result or state.

A practice not related to personal injury.

WARNING

This product may contain chemicals known to the State of California to cause cancer, or birth defects or other reproductive harm.

NOTICE

Hose kit components are not recommended to be used for potable water.

WARNING

The installer must determine and follow all applicable codes and regulations. Failure to read and follow these instructions can result in property damage, severe personal injury or death. This equipment must be installed by experienced, trained personnel only.

CAUTION

Installation and maintenance must be performed by a qualified professional. Service should not be performed on any valve in an active Hydronic loop. Before attempting to make any required adjustments, properly isolate and drain the branch loops that require service and allow the valves to reach a safe handling temperature (below 100°F [38°C]) and zero pressure condition. Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards. Failure to follow these instructions could result in personal injury and property damage.

NOTICE

Due to the different types of material used, coil hookup kit valves and accessories must be disassembled prior to disposal. Special handling of certain valve components may be required by law or may be sensible from an ecological point of view

Daikin Water Source Heat Pump Hoses & Hose Kits

Daikin sells a variety of flexible supply, return and condensate hoses and hose kit assemblies for connecting its water source heat pumps to a building's hard piping system.

The supply and return hoses have a swivel fitting at one end to facilitate removal of the unit for replacement or service (Figure 1).

Figure 1: Supply and return hoses



Standard supply and return fire-rated hoses have either a Thermoplastic Rubber (EPTF) (Figure 2) with a braided covering of stainless steel. Fittings are either plated steel or brass.

Figure 2: Flexible, steel braided supply and return hose



For condensate piping, Daikin offers flexible vinyl hose, steel braided hose or a long, clear, plastic hose with the necessary clamps for connection to the field piping. In most cases the use of plastic hose eliminates the need for insulation to be wrapped around the pipe to prevent sweating.

A threaded, factory-supplied condensate fitting on each WSHP unit allows the connection of flexible vinyl hose or steel braided hose. All horizontal units condensate piping must be trapped at the unit and pitched away from the unit not less than 1/4" per foot.

Piping systems should include supply and return shutoff valves in the design to allow for the shut-off of water

flow to the unit and to isolate it if removal of a unit is necessary, without the need to shut down the entire heat pump system. Daikin offers a combination full port shut-off ball valve and union for this purpose (Figure 3).

Figure 3: Union-ended shut-off ball valve



One of the most important factors when operating a water source heat pump is to maintain the proper water (GPM) flow rate to the unit. If water flow is not maintained the premature opening of the refrigeration system safeties will stop unit operation. Daikin provides the solution with hose assemblies that are equipped with an auto flow controller installed at the factory (Figure 4). To maintain proper GPM flow rate, after installing the shut off valve, open the valve fully and the flow controller will do the rest.

Figure 4: Circuit Sentry automatic flow limiting valve



The supply hose assembly includes a shut-off ball valve with one pressure/temperature test port and an optional Y-strainer (Figure 5). The return assembly includes a shut-off ball valve with the flow controller and two pressure/temperature test points and an optional autoflow controller.

Figure 5: Y-strainer combination valve

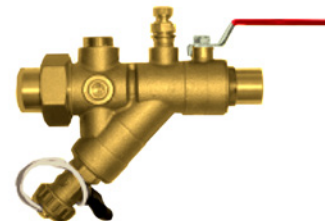


Table 1: Supply & return water connection sizes and typical flow rate ratings

Unit Size	Water Connection Diameter Table - FPT or OD Sweat (inches)										Typical Auto Flow Rate Range ¹	
	Console	Enfinity™ Horizontal	Enfinity Vertical	Smart-Source Horiz. & Vert.	Smart-Source Horiz. & Vert.	Vertical Stack	Smart-Source Inverter	Enfinity Large Vertical	Water to Water	Rooftop		
	Enfinity MHC/MHW Legacy WXx/WZx	CCH/CCW	VFC/VFW	GSH/GSV	GTH/GTV	VHC/VHF	DFW	LVC/LVW	WRA/WHA/WCA	RWA/RGA/RWC/RGC		
007	0.50	0.50		0.50		0.50					1	2
009	0.50	0.50	0.50	0.50		0.50					1.5	3
012	0.50	0.50	0.50	0.50		0.50					2	4
015	0.50	0.50	0.50	0.75		0.50					2.5	6
018/019	0.50	0.50	0.50	0.75		0.50					3	6
024/026		0.50	0.50	0.75	0.75	0.75					4	8
030/032		0.75	0.75	0.75	0.75	0.75					5	10
036/038		0.75	0.75	0.75	0.75	0.75	1.00		0.75		6	12
042/044		0.75	0.75	1.00	1.00						7	14
048/049		0.75	0.75	1.00	1.00		1.00		1.00		8	16
060/064		0.75	0.75	1.00	1.00				1.00		10	20
070		0.75	0.75	1.00							12	24
072		1.25			1.00			1.25	1.00		12	24
096		1.25						1.25			16	32
120		1.25						1.25	1.50		20	40
150									1.50	1.625 OD*	25	49
180								1.50	2.00*	1.625 OD*	30	60
200/210/215								1.50		1.625 OD*	36	72
240									2.00*	2.125 OD*	38	76
290/300								1.50	2.00*	2.125 OD*	48	98
360									2.00*	2.125 OD*	62.5	124
420									2.00*	2.125 OD*	80	144

Note: ¹ Range of flow rates is model specific.

* Hose kit option not available from Daikin

Summary of Hose Kit Options

Table 2: Summary of hose kit options

Hose Kit Options	Hose Type		Shut-Off Ball Valve with PT Plug	Auto Flow Controller	Y-Strainer and Blowdown Valve	Condensate Hose	Jumper Hose
# 1 - Condensate Hose	Supply						
	Return	•				•	
# 2 - 2 Hoses	Supply	•					
	Return	•					
# 3 - 2 Hoses ¹	Supply	•					
	Return	•					
# 4 - 2 Hoses	Supply	•	•				
	Return	•	•				
# 5 - 2 Hoses	Supply	•			•		
	Return	•	•				
# 6 - 2 Hoses	Supply	•	•				
	Return	•		•			
# 7 - 2 Hoses	Supply	•			•		
	Return	•	•	•			
# 8 - 1 Hose ²	Supply	•					•
	Return						

Notes: ¹ Hoses for Console units.

² Jumper hose (used with Waterside Economizer and Hydronic Heat units).

Operating Limits

Table 3: Operating Limits

Coil Hookup Component	Connection Type	Temperature °F (C°)	Max. Working Pressure PSI (kPa)
Y-Strainer Valve	NPT	-4°F (-20°C) to 250°F (120°C)	400 PSI (2758 kPa)
Union-Ended Ball Valve	NPT		
Circuit Sentry Valve			
Supply & Return Hoses	Sweat	Based on Solder Type	ASTM Std. B16, 18
	1/2"	-40°F (-40°C) to 212°F (100°C)	400 PSI (2758 kPa)
	3/4"		400 PSI (2758 kPa)
	1"		500 PSI (3447 kPa)
	1-1/4"		400 PSI (2758 kPa)
	1-1/2"		400 PSI (2758 kPa)

For Installing NPT Connections

Apply pipe compound conservatively to male connecting fittings only. After installation check all joints for leakage and retighten where necessary.

⚠ NOTICE

The use of PTFE impregnated pipe compound and PTFE tape on pipe threads provides lubricity. Care should be taken to prevent over tightening which may damage the valve body.

Piping systems should include supply and return shutoff valves in the design to allow for the shut-off of water flow to the unit and to isolate it if removal of a unit is necessary, without the need to shut down the entire heat pump system. Daikin offers combination full port shutoff ball valve and union for this purpose (Figure 6).

Figure 6: Union-ended shut-off ball valve



One of the most important factors when operating a water source heat pump is to maintain the proper water (GPM) flow rate to the unit. If water flow is not maintained the premature opening of the refrigeration system safeties will stop unit operation. Daikin provides the solution with hose assemblies that are equipped with flow controllers installed at the factory. To maintain proper GPM flow rate, after installing the shut off valve, open the valve fully and the flow controller will do the rest. The supply hose assembly includes a shut-off ball valve with one pressure/temperature test port and an optional Y-strainer. The return assembly includes a shut-off ball valve with one port or with an autoflow controller, with two pressure temperature ports.

For condensate piping, Daikin offers flexible vinyl hose, steel braided hose or a long, clear, plastic hose with the necessary clamps for connection to the field piping. In most cases the use of plastic hose eliminates the need for insulation to be wrapped around the pipe to prevent sweating.

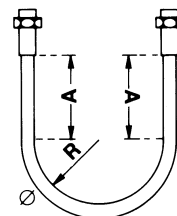
A threaded, factory-supplied condensate fitting on each WSHP unit allows the connection of PVC, flexible vinyl hose or steel braided hose. All horizontal units condensate piping must be trapped at the unit and pitched away from the unit not less than 1/4" per foot.

Select the proper hose length to allow the slack required between connection points, to insure that the minimum bend radius is not exceeded (see "Table 4: Hose specifications" on page 9 for minimum bend radius).

Exceeding the minimum bend radius can cause the hose to collapse, thus reducing the water flow rate, and/or damage the hose wall construction. A minimum bend radius specification of 4" (102mm) means that the shortest distance between sections of bent hose can be not less than 8" (208mm). To calculate the proper length to be used, refer to Figure 7. Dimension "A" should be two times the hose internal diameter. The radius of curvature R should be at least four times the hose outer diameter.

Since hoses can change in length from +2% to -4% under the surge of high pressure, provide sufficient slack in the hose for expansion and contraction. Where the radius falls below the required minimum, use an angle adapter to avoid sharp twists or bends in hoses. Refer to "Fire Rated Hoses & Hose Assemblies Installation Considerations" on page 9).

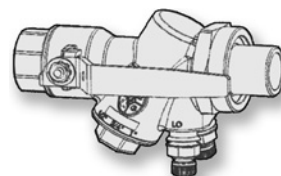
Figure 7: Proper hose length & minimum bend radius



Note to Piping System Designer:

The Circuit Sentry™ on the return hose valve body is an automatic flow limiting device (Figure 8). It is furnished with a removable flow limiting diaphragm cartridge to govern the flow, and can not be described with a Cv or a pressure drop at a given flow for piping system design purposes. Refer to "Circuit Sentry™ Cartridge" on page 10. Conversely, the designer may assume a constant flow rate over the pressure differential range of 2 to 80 psid as one uses constant pressure in system design.

Figure 8: Return hose circuit sentry valve body



Application Examples

Figure 9: Typical vertical unit hose application

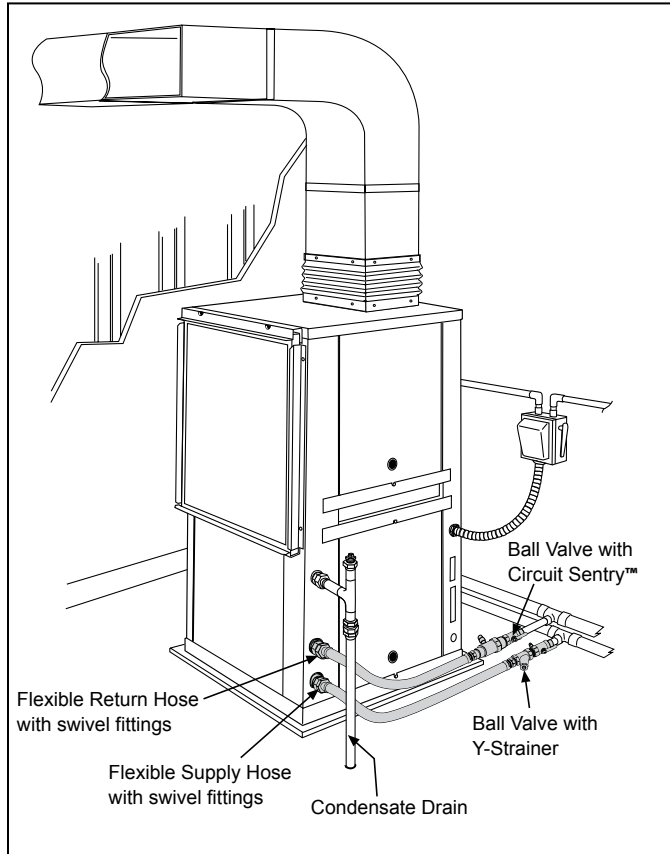


Figure 10: Typical horizontal unit hose application

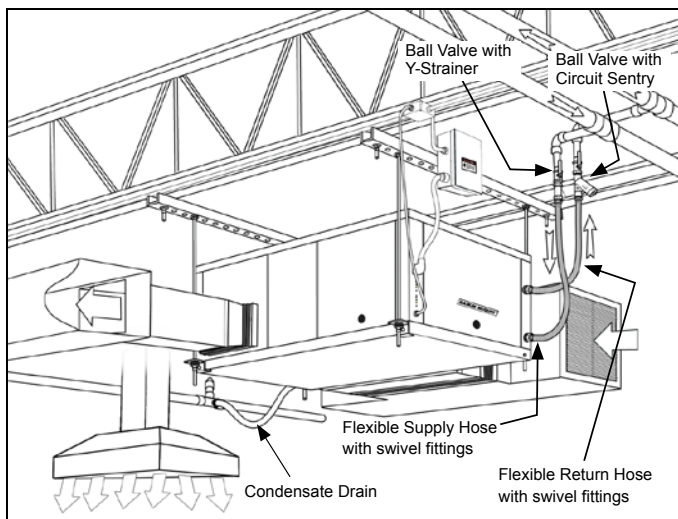


Figure 11: Typical vertical stack unit hose and ball valve application

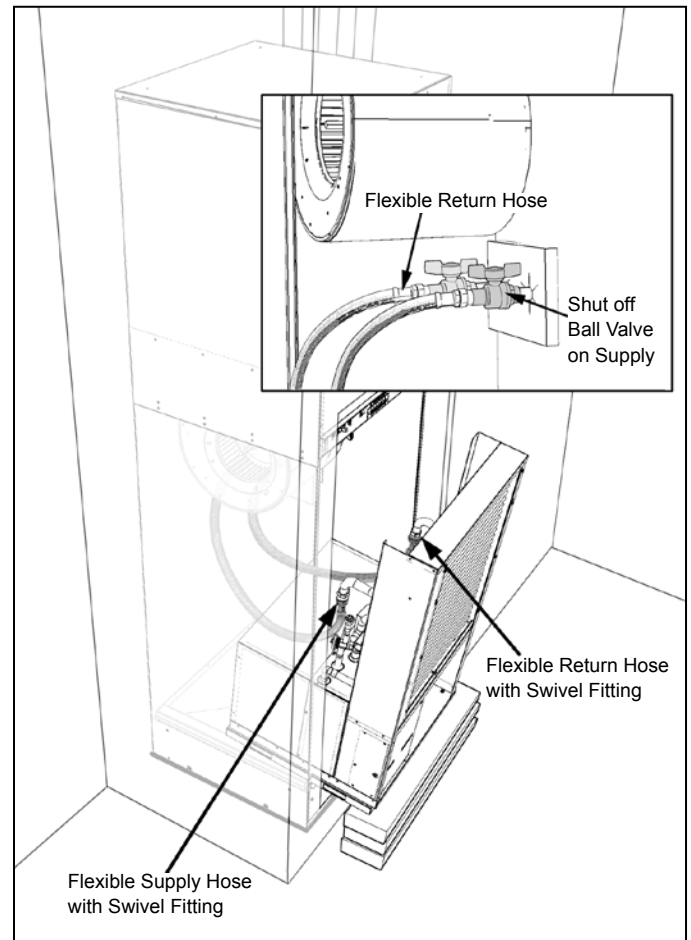
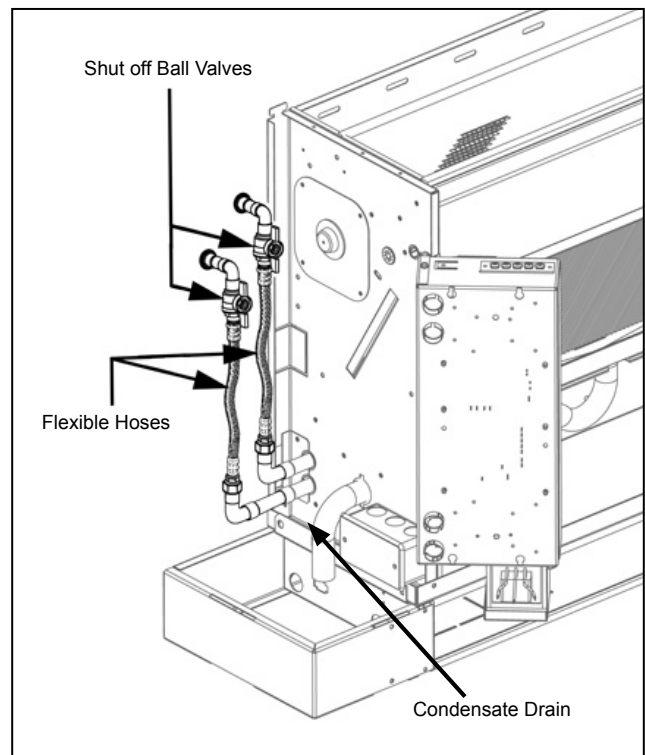


Figure 12: Typical console unit hose application



Fire Rated Hoses & Hose Assemblies Installation Considerations

- Hose applications should use the appropriate length of hose
- Applications should allow some play in the hose and not be installed so that the hose is taut. Minor expansion or contraction of the hose may occur due to variations in temperature, system pressure and system cycling (see Figure 13).
- The use of elbows and adapters may be used to relieve strain on hoses (see Figure 14). However, plastic fittings and adapters should not be used.
- The minimum bend radius requirements shown in Table 4 below should not be exceeded, and as illustrated in Figure 15. All hose specifications are listed in Table 4.

Table 4: Hose specifications

Assembly Specs	Hose Size				
	1/2"	3/4"	1"	1-1/4"	1-1/2"
Working Pressure	400 psi	400 psi	500 psi	400 psi	400 psi
Minimum Burst at Ambient Temp. (70°)	1600 psi	1600 psi	2000 psi	1600 psi	1600 psi
Minimum Bend Radius	2.5"	4"	5.5"	10"	10"
Hose OD (approximate)	.700	.975	1.245	1.58	1.83
Temperature Range	-40°F to 212°F	-40°F to 212°F	-40°F to 212°F	-40°F to 212°F	-40°F to 212°F

- Any hose assembly showing evidence of kinking should not be installed (see Figure 16).
- In order to avoid twisting of the hose:
- Solid male pipe thread (MPT) ends should be installed first unless they are connected to a swivel female (NPT). The entire hose assembly be able to rotate during the tightening of this connection in order to avoid hose tube damage.
- The flared adapter on the union (female swivel) end should be removed with the male pipe (MPT) end of the adapter connected to the appropriate port first.
- The last assembly step is to reconnect the flared swivel female coupling to the flared end of the adapter in a way that ensures that the hose assembly is not twisted (see Figure 16).

⚠ CAUTION

Thread sealant or thread tape should not be used on flared connections. Additional thread sealant or thread tape should not be applied to male pipe thread (MPT) ends where factory installed sealant thread is already present.

Figure 13: Hose and machine tolerances

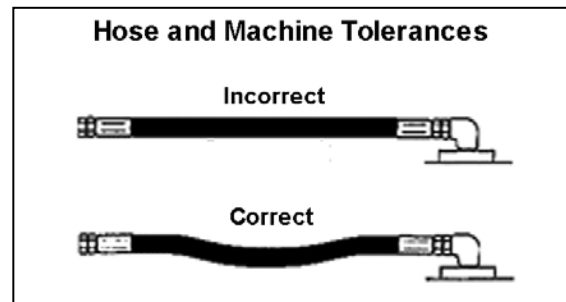


Figure 14: Elbows & adapters

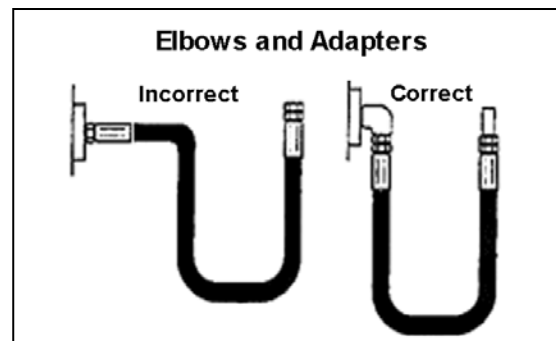


Figure 15: Bend radius

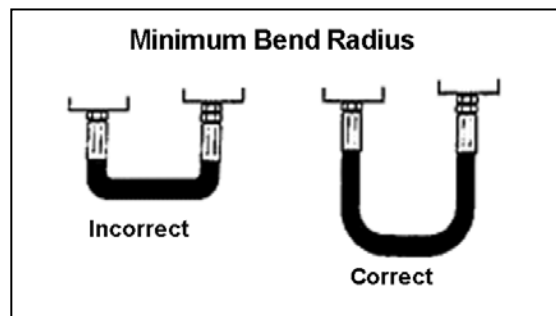
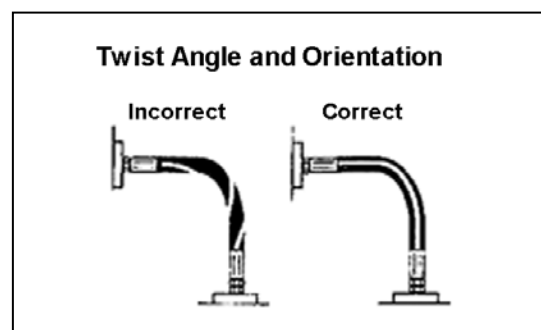
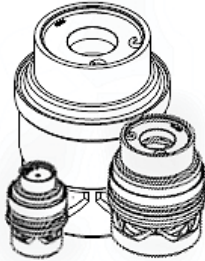


Figure 16: Twist angle & orientation



Circuit Sentry™ Cartridge

Internal Automatic Flow Limiting Cartridge



The cartridge is an internal automatic flow limiting cartridge that is used in Circuit Sentry Flow Limiting Valves (Figure 17). It features a rolling diaphragm that separates the upstream and downstream pressures, thus maintaining control of the constant differential pressure across the selected flow orifice.

Each unique flow orifice is designed specifically for one flow (Figure 18). When used with appropriate cartridge, the assembly maintains the specified low rate +/-5% as long as the differential pressure stays within the control range (Figure 19).

Specifications

Construction:

Type 10, 11, 20, 21, 30, and 40

Body – Brass C36000 or Equivalent

Spring – 304 Stainless Steel

Diaphragm & O-ring – EPDM

Orifice – Brass C36000 or Equivalent

Type 50 and 60

Body – 304 Stainless Steel

Spring – 304 Stainless Steel

Diaphragm & O-ring – EPDM

Orifice – Brass C36000 or Equivalent

Circuit Sentry Cartridge Dimensions

Table 5: Cartridge letter dimensions for Figure 17

Cartridge Type	Dimension - inches (mm)	
	A	B
Type 10	1.6 (40)	1.1 (28)
Type 11	1.6 (40)	1.1 (28)
Type 20	1.6 (40)	1.1 (28)
Type 21	1.6 (40)	1.1 (28)
Type 30	2.5 (64)	1.9 (49)
Type 40	2.5 (64)	1.9 (49)
Type 50	3.9 (99)	3.0 (75)
Type 60	3.9 (99)	3.0 (75)

Note: All dimensions +/- 0.125" (3.2 mm) tolerance. Dimensions are subject to change. Not to be used for construction purposes unless certified.

Figure 17: Circuit Sentry cartridge dimensions

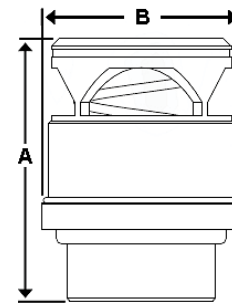


Figure 18: How to identify the flow rate of the orifice

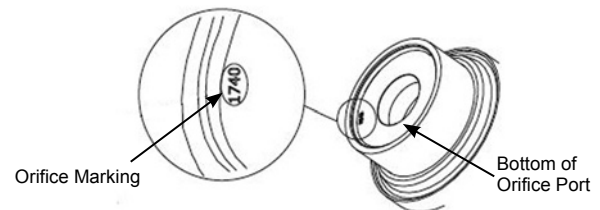


Figure 19: Cartridge Examples



Cartridge Minimum Differential Pressure Requirements

“A” Body Valve Cartridges (1/2", 3/4", and 1")

Table 6: Type 10

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
0.5	1300	1.5 (10.3)	0.42
1	1420	1.7 (11.7)	0.76
1.5	1510	1.9 (13.1)	1.10
2	1570	2.0 (13.8)	1.42
2.5	1620	2.0 (13.8)	1.70

Table 7: Type 11

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
3	1730	2.0 (13.8)	2.11
3.5	1740	2.3 (15.9)	2.32
4	1750	3.0 (20.7)	2.35

Table 8: Type 20

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
4.5	2070	3.2 (22.1)	2.52
5	2074	3.2 (22.0)	2.81
5.5	2078	3.3 (22.8)	3.07
6	2082	3.3 (22.8)	3.29
6.5	2086	3.3 (22.8)	3.57
7	2088	3.3 (22.8)	3.85
7.5	2091	3.5 (24.1)	4.06
8	2094	3.5 (24.1)	4.30
9	2098	3.6 (24.8)	4.75
10	2103	3.8 (26.2)	5.13
11	2109	.0 (27.6)	5.38

Table 9: Type 21

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
12	2099	7.3 (50)	4.48
13	2106	7.3 (50)	4.85

- + Min. ΔP is minimum differential pressure across valve necessary to maintain design flow rate through cartridge.
- ++ Cv can be used to determine flow through valve when differential pressure is below minimum. When differential pressure is above minimum, Cv can no longer be used to determine flow.

“B” Body Valve Cartridges (1", 1-1/4" and 1-1/2")

Table 10: Type 30

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
15	3161	3.2 (22.1)	8.44

Table 11: Type 40

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
20	4168	3.2 (22.1)	11.26
25	4191	3.6 (24.8)	13.73
30	4200	3.9 (26.9)	15.24
35	4217	4.5 (31.0)	17.07
40	4229	4.9 (33.8)	18.12

“C” Body Valve Cartridges (1-1/2" Large Body)

Table 12: Type 50

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
45	5279	2.8 (19.3)	27.50
50	5287	3.2 (22.1)	28.14
55	5292	3.3 (22.8)	30.35
60	5298	3.5 (24.1)	31.98
65	5303	3.9 (26.9)	33.02
70	5308	4.2 (29.0)	34.33

Table 13: Type 60

Flow Rate (GPM)	Orifice Marking	Min. ΔP psid (kPa) ⁺	Cv ⁺⁺
75	6285	4.9 (33.8)	33.95
80	6292	4.9 (33.8)	36.10
85	6305	5.1 (35.2)	37.85
90	6312	5.1 (35.2)	40.09
95	6319	5.2 (35.9)	41.74

- + Min. ΔP is minimum differential pressure across valve necessary to maintain design flow rate through cartridge.
- ++ Cv can be used to determine flow through valve when differential pressure is below minimum. When differential pressure is above minimum, Cv can no longer be used to determine flow.

Fire Rated Supply and Return Hose Kits with Ball Valve and Auto Flow Control Valve

Equation to calculate Pressure Drop:

$$GPM = C_v \sqrt{\frac{\Delta P}{G}} \quad C_v = \sqrt{\frac{GPM}{\Delta P}} \quad \Delta P = \left[\frac{GPM}{C_v} \right]^2 G$$

Cv = Flow Coefficient

ΔP = Pressure Change (Drop)

G = Specific Gravity of Fluid (Water = 1.00)

GPM = Flow Rate

- Notes:**
1. Pressure drop information is for reference only and should not be used to build a system.
 2. Figures do not take into account pressure drop through the Circuit Sentry Automatic Flow Limiting Valve. This is a pressure independent valve, thus does not sustain a "fixed" Cv, making it impossible to calculate pressure drop.

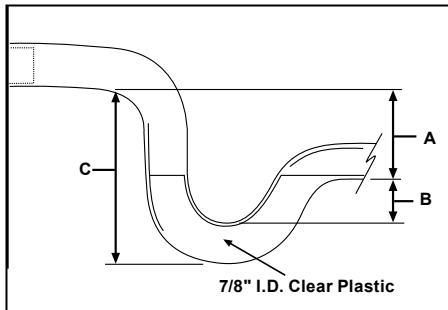
Condensate Trapping

Note: All vertical units and vertical stack WSHP units have a factory-installed internal condensate trap.

Condensate piping must be trapped at the unit and pitched away from the unit not less than 1/4" per foot. A vent is required after the trap so that the condensate will drain away from the unit. The vent also acts as a clean out when the trap becomes clogged.

To avoid waste gases entering the building, the condensate drain should not be directly piped to a drain/waste/vent stack. See local codes for the correct application of condensate piping to drains.

Figure 20: Condensate piping



Improper trapping can lead to several problems. If the trap is too tall, negative pressure will prevent drainage, causing condensate backup. If the trap is too short the seal will be destroyed or nonexistent, producing the same effect as a non-trapped system.

Construct the trap of 7/8" clear plastic piping (Figure 20). The condensate piping from the drain trap must be sloped to facilitate proper drainage. The clear plastic trap should be clamped and removable for cleaning. It may be necessary to manually fill the trap at system startup, or to run the unit for sufficient time to build a condensate seal. The condensate trap and condensate piping drainage should be free of any foreign debris.

Debris can prevent proper drainage and unit operation and result in condensate buildup.

Table 14: Condensate drain static pressures

	A	B	C
Standard Static Pressure	1-1/4"	5/8"	2-3/4"
High Static	1-1/2"	3/4"	3-1/8"

Valve Accessories

(P/T Readout Ports, Drain Valves, Plugs, Extenders, Air Vents)

The P/T readout ports, drain valves, plugs, and other accessories found on Daikin hose kit options such as Circuit Sentry, Ball Valve, Ball Valve with Y-strainer and other components such as union accessories and supply and return hoses come pre-assembled with Loctite thread sealant and are tightened to appropriate levels.

With that in mind, the following information should help to clarify questions regarding the adjustment or servicing of those components when required.

Any field adjustment of factory-installed components will break the original thread seal and could cause leakage. This will necessitate the removal, cleaning and resealing of those parts per the instructions below:

1. Completely remove the desired component from the valve.
2. Taking care not to damage any threads on the component or the valve, clean off all of the old thread sealant. Use a wire brush and gentle abrasion is necessary. Allow the valve and the component to dry.

Note: If the component or valve appears to have been damaged, replace it.

3. Starting with the second thread of the NPT male valve component, apply a 360 degree bead of Loctite 567* thread sealant/lubricant as shown in Figure 21 below. Follow Loctite handling precautions as noted on the product labeling.

Figure 21: Apply Loctite 567



4. If Loctite 567 is unavailable, we recommend RectorSeal No. 5** pipe thread sealant for all non-glycol based applications, or any PTFE thread sealing tape. Be sure to follow the manufacturers specific handling precautions and application instructions as noted on the product labeling.

5. Thread component into valve until it is finger-tight.
6. Apply torque to the specifications as shown in Table 15.
7. Properly assembled valve components will immediately seal to moderate pressure (100 PSI or less). For maximum pressure resistance, allow the Loctite 567 or RectorSeal No. 5 thread sealant to cure for 24 hours. PTFE tape typically does not require curing to achieve maximum pressure resistance.

Table 15: Torque specifications

Component		Torque
Size	Type	
1/4" NPT	P/T Readout Port, Drain Valve, Air Vent, Plug, Extender	9.0 ft.-lbs. + 3.0 ft.-lbs. / -0
1/2" NPT	Plug	
3/4" NPT	Plug	12.0 ft.-lbs. + 4.0 ft.-lbs. / -0
1" NPT	Plug	12.0 ft.-lbs. + 4.0 ft.-lbs. / -0

* Loctite and Loctite 567 are registered trademarks of Benkel AG & Co.

** RectorSeal No. 5 is a registered trademark of RectorSeal Corporation.

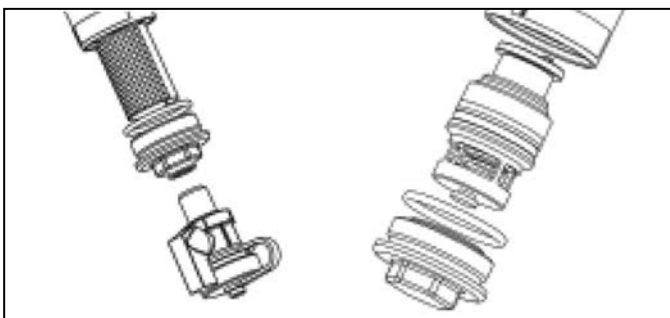
Drain Caps and Cartridge Caps

Occasionally, the drain cap of a Y-strainer valve may need to be disassembled to permit cleaning of the mesh strainer. Likewise, cartridges may need to be removed from a Circuit Sentry valve for system commissioning or flow adjustment.

Any field adjustment of factory installed drain caps or cartridge caps will affect the compression of the seal present and could cause leakage. This will necessitate the removal, cleaning and resealing of those parts per the the following instructions:

1. Completely remove cap from valve. Take care not to damage the valve cap threads, or o-ring or PTFE seals.
2. When performing maintenance on a drain cap, remove the 1/4" NPT drain valve from the cap before removing the drain cap from the valve.
3. Perform necessary service on valve or system.

Figure 22: Drain cap and cartridge detail



Note: If the valve or any of the components appear to have been damaged, replace them.

4. Make sure that the male threads of the cap and the female threads of the valve are clean and that there is no debris present.
5. Make sure that o-ring or PTFE seal is seated on the cartridge cap or drain cap.
6. Thread cap into valve until it is finger-tight.

⚠ NOTICE

Do not use any thread sealant or lubricant when assembling the cartridge or drain cap, as it may prevent o-ring or PTFE seal from sealing properly.

7. Tighten cap to specification shown in Table 16.

⚠ NOTICE

Over application of torque may cause damage to the valve cap.

8. If required, re-install drain valve with Loctite 567 following method described earlier in this bulletin. Follow Loctite handling precautions as noted on the product labeling.
9. If Loctite 567 is unavailable, we recommend RectorSeal No. 5 pipe thread sealant for all non-glycol based applications, or any PTFE thread sealing tape. Be sure to follow the manufacturer specific handling precautions and application instructions as noted on the product labeling.

Table 16: Torque specifications for drain and cartridge caps.

Component	Seal	Torque
Cartridge Cap - All Sizes	O-Ring	25.0 ft.-lbs. + 7.0 ft.-lbs. / -0
Drain Cap 1/2" and 3/4" Valves	PTFE Square Ring	
Drain Cap 1" and 1-1/4" Valves	PTFE Square Ring	32.0 ft.-lbs. + 10.0 ft.-lbs. / -0
Drain Cap 1-1/2" Valves	PTFE Square Ring	60.0 ft.-lbs. + 18.0 ft.-lbs. / -0

How To Use Pressure Taps To Measure System Operating Conditions

1. Using a readout probe, attach a differential pressure readout kit to the readout valves on the desired valve.
2. Read the differential pressure across the coil. This can be compared to system pump head to determine system flow blockage.
3. Differential pressure can also be taken at the Circuit Sentry valve.

Pipe Hanging Installations

Be aware of water weight in the valve and connected piping when installing your system.

NOTICE

Never use the valve itself as a form of piping support. Please support valves and piping according to the local building code. Failure to follow these instructions may result in property damage.

Hose Assemblies Installation

1. Bend Radius specifications are for hoses above 40°F (5°C). If hose assemblies have been in storage at temperatures below 40°F (5°C), and/or installed in temperatures below 40°F (5°C), the hose will be stiffer than normal. Under these conditions, the minimum specified bend radius should be increased by 50%, and extreme care taken not to collapse the hose.

CAUTION

Thread sealant or thread tape should not be used on “flared” connections. Additional thread sealant or thread tape should not be applied to male pipe thread (NPT) ends where factory installed thread sealant is already present.

- Note:** *If pipe dope is preferred in lieu of tape, use only a small amount on the male pipe threads only of fitting adapters. Care must be taken to avoid letting any sealant reach the flared surfaces of the joint.*
2. Do not over-torque fittings. The maximum torque without damage to the fitting is 30 foot pounds (41 Nm). If a torque wrench is not available, use as a “rule of thumb” finger-tight plus one-quarter turn. Use two wrenches to tighten the union: one to hold the line and one for simultaneous tightening of the nut.
 3. Do not twist hose to avoid damage to the hose wall. Sharp bends, kinking, or twisting of the connector during installation must be avoided. These conditions result in reduced flow capacities and shorter service life. Failure to observe these factors during installation voids the warranty.

Circuit Sentry™ Automatic Flow Limiting Valves



Description

Circuit Sentry automatic flow limiting valves are designed to automatically control the flow in piping system to selected preset limit. As pressure differential increases, a cartridge inside the valve body reduces the flow area to accurately maintain the preselected flow rate.

Installation

1. The valve should be installed on the return side of the coil with union end on the upstream side and other end on the downstream side, except when used on the bypass line.
2. Install the unit so that the flow arrow on the body housing points in the direction of flow.

Operation

Operation of the Circuit Sentry automatic flow limiting valve is fully automatic and does not require any adjustment. It automatically maintains the selected flow over the designed differential pressure range.

Before system start up, remove cartridge from the valve. Flush the Hydronic system and reassemble cartridge into the valve and make sure cap is tightened properly per the specifications listed above.

CAUTION

Hot un-insulated surfaces can cause burns to the skin. Do not touch hot surfaces. Failure to follow these instructions could result in personal injury..

How To Use The Circuit Sentry Flow Limiting Valve Pressure Taps to Determine Proper Functioning of Valve

1. Using Bell & Gossett Model PR-250B readout probes, attach a Bell & Gossett differential pressure readout kit to the P/T readout valves on the Circuit Sentry automatic flow limiting valve.

WARNING

Hot water leakage can occur from readout valves (P/T ports) during probe insertion and during hookup of readout kit. Follow the instruction manuals supplied with readout probes and readout kits for safe use. Failure to follow these instructions could result in serious personal injury or death and property damage..

2. Read the differential pressure across the Circuit Sentry. This can be compared to system pump head to determine valve function and system flow blockage.

Service Instructions

Should the Circuit Sentry automatic flow limiting valve require cleaning or changing the orifice, please follow the instructions below.

CAUTION

Installation and maintenance must be performed by a qualified professional. Service should not be performed on any valve in an active Hydronic loop. Before attempting to make any required adjustments, properly isolate and drain the branch loops that require service and allow the valves to reach a safe handling temperature (below 100°F [38°C]) and zero pressure condition. Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards. Failure to follow these instructions could result in personal injury and property damage.

1. Loosen and remove the cap from the valve body.
2. Pull the cartridge assembly from the valve body for cleaning or replacing with a new flow cartridge. Check the cartridge by pushing the orifice washer into the cartridge housing several times to make sure the spring is functional.
3. To change the orifice washer for a different flow rate, remove the clip ring from inside the cartridge housing with a screwdriver.
4. Pull the orifice washer out and replace with the new
5. Orifice size as required.
6. Reinstall retaining clip ring in the cartridge housing groove.
7. Replace the clip ring if it has been damaged. Slide the cartridge into the valve body. Reassemble the cap with the o-ring to the body following the procedures listed above.
8. Periodically inspect the Circuit Setter for signs of leakage or corrosion.

Insulation

Daikin Applied recommends that insulation be attached to the Circuit Sentry after the system has been balanced.

Note: *Tape or other acceptable means should be used to secure the insulation to the Circuit Sentry balance valve*

Union-Ended Shut-Off Ball Valve



Description

Union-ended ball valves are of brass construction with combination ball valve and union with tailpiece.

Installation:

1. The valves must be installed on the supply side of the coil with fixed end on the upstream side and union end on the downstream side.
2. When installing the union-ended valves, space around the units must be provided to move the valve handle to the shutoff position. The union-ended ball valve will function as a service valve.
3. The union-ended ball valve must be installed with the hose end drain valve facing down.

Operation:

Union-ended ball valve is a shut-off valve to isolate hydronic equipment for repairs and/or to drain the system. To close the union-ended valve, move the handle a quarter turn until the handle is perpendicular to the valve and piping.

Service Instructions:

To drain the system, first isolate the union-ended valves from the system. Allow the system to cool down to 100°F (38°C).

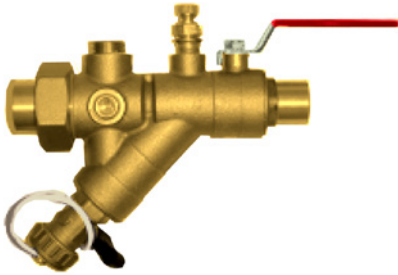
CAUTION

Installation and maintenance must be performed by a qualified professional. Service should not be performed on any valve in an active hydronic loop. Before attempting to make any required adjustments, properly isolate and drain the branch loops that require service and allow the valves to reach a safe handling temperature (below 100°F (38°C) and zero pressure condition. Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards. Failure to follow these instructions could result in personal injury and property damage.

WARNING

Corrosion or leakage are indications that the UBV Union Ball Valve must be replaced. Failure to follow these instructions could result in serious personal injury or death and property damage.

Y-Strainer Combination Valve



Description

Y-strainer valves are of brass construction with an integrated ball valve, strainer, blow-down drain valve, and union with tailpiece.

Installation Instructions

1. The valves must be installed on the supply side of the coil with fixed end on the upstream side and other end on the downstream side.
2. When installing the Y-strainer valves, space around the unit must be provided to move the valve handle to the shutoff position and to remove the strainer from the strainer body for cleaning.
3. The Y-strainer must be installed with the strainer chamber down to prevent air binding and also to allow accumulated dirt to be blown down from the strainer.

Operating Instructions

The Y-strainer can be used to isolate Hydronic equipment for repairs and/or to drain the system. To close the Y-strainer ball valve, move the handle a quarter of a turn until the handle is perpendicular to the valve and piping.

If the Y-strainer pressure drop becomes excessive, accumulated dirt and debris should be blown down through the blowdown line (if installed) to a drain. If a blow-down line is not installed, see the service instructions for removing and cleaning the strainer. The Y-strainers have construction with an integrated ball valve which will function as a service valve.

Service Instructions

If excessive pressure drop is measured across the Y-strainer, the internal strainer has collected dirt and debris and needs to be cleaned. Install a blow-down line (hose), then open blowdown drain valve. If blowing down the strainer has not solved the pressure drop problem, the Y-strainer must be disassembled and the strainer cleaned.

To clean the strainer, isolate the Y-strainer by shutting off the ball valves on the upstream and downstream of the Y-strainer. Allow the system to cool down to 100° F (38° C) or less.

⚠ CAUTION

Installation and maintenance must be performed by a qualified professional. Service should not be performed on any valve in an active hydronic loop. Before attempting to make any required adjustments, properly isolate and drain the branch loops that require service and allow the valves to reach a safe handling temperature (below 100°F (38°C) and zero pressure condition. Use proper safety equipment including gloves, goggles, or similar tools to avoid contact with system fluids and common hazards. Failure to follow these instructions could result in personal injury and property damage.

Using the appropriate sized wrench, remove the blow-down drain valve from the brass strainer cap on the bottom of the valve body. Completely remove the strainer cap from the valve body. Carefully remove the strainer. Clean the strainer in water to remove collected debris. Reinstall the strainer and the strainer cap. Tighten to the appropriate torque level as listed above. Reinstall the blow-down drain valve per instructions above. Pressurize the system and check for leaks. Periodically inspect the Y-strainer for signs of corrosion or leakage. If corrosion or leakage is noted, the Y-strainer must be replaced.

⚠ WARNING

Corrosion or leakage are indications that the UBV Union Ball Valve must be replaced. Failure to follow these instructions could result in serious personal injury or death and property damage.

Insulation

Daikin Applied recommends that insulation be attached to the Y-strainer valve after the system has been balanced.

Note: *Tape or other acceptable means should be used to secure the insulation to the Y-Strainer Valve.*

⚠ WARNING

Failure to use proper hose connections to the blow-down valve may cause personal injury and/or property damage. Hot fluids and fluids under pressure are a safety hazard. Do not service a hot or pressurized strainer. Failure to do so may cause personal injury and/or property damage. Corrosion or leakage of the Y-strainer is an indication that it must be replaced. Failure to do so may cause personal injury and/or property damage.



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