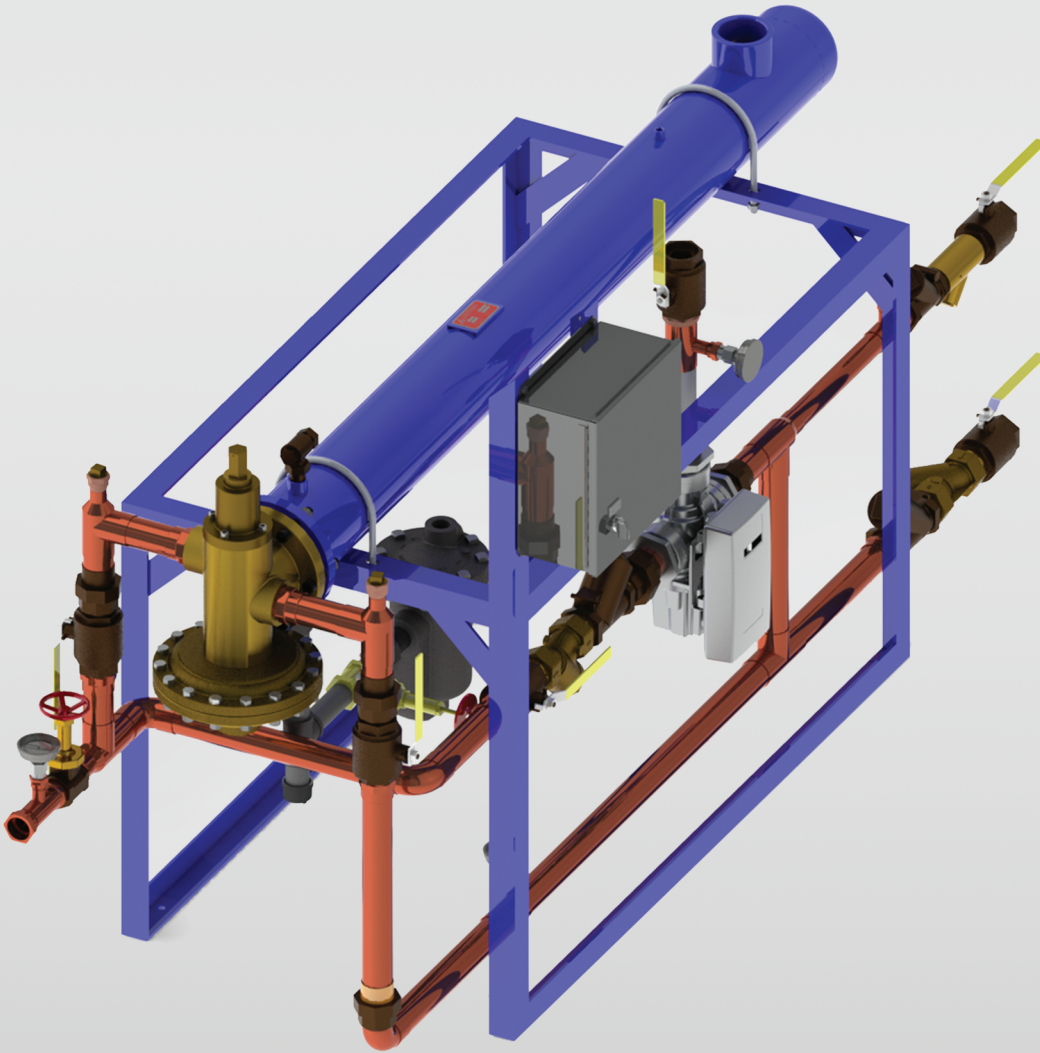


Water Heating & Water Temperature Control

- Feed-Forward
- Digital



Armstrong®



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Flo-Rite-Temp® Instantaneous Steam/Water Heater

Steam/Water Heaters

Steam/water heaters are typically classified as instantaneous, semi-instantaneous and tank-type. Temperature control can be defined as either feed-forward or feedback.

Feedback systems are error-driven and rely upon an outlet or downstream thermostatic temperature-sensing device to detect a temperature change requirement and then modulate the steam to effect the heat exchange in an attempt to recover the heater set-point. Feedback systems are reactive, and a significant concern is their speed of response to system and application temperature control requirements.

Tank-Type Steam/Water Heaters (feedback)

Tank-type steam/water heaters typically include a temperature sensing element or coil immersed in a storage vessel with a separate, remote steam control valve. As a function of their integral and often significant storage capability, the poor response times often associated with the relationship of temperature-sensing device and steam control valve are less of an issue.

Tank-Type Steam/Water Heaters are a less attractive option for the following reasons:

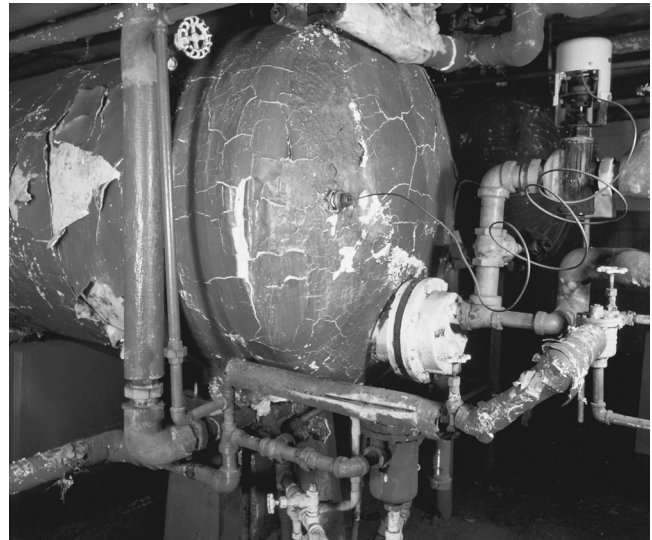
- They consume a large amount of valuable mechanical-room real estate.
- Identified as amplification and colonization points for Legionella bacteria.
- Significant leak potential over time.
- Tank repair is difficult, and tank replacement often requires mechanical room/building structural modifications.
- They consume energy to heat and maintain what is effectively a reserve hot water supply.
- Separate steam control valves, requires ongoing maintenance.
- Thermostatic element/sensors have a tendency to wear and eventually rupture under a heavy cycle load.
- They are slow to recover and may run out of hot water during peak load periods.

Tankless Instantaneous Steam/Water Heaters (feedback)

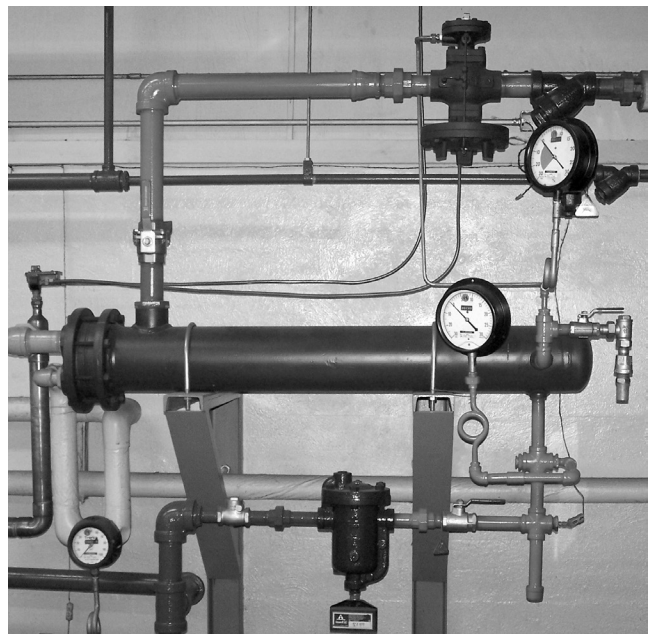
Tankless instantaneous steam/water heaters, often referred to as shell and tube heat exchangers, do not include hot water storage capacity. These models will rely upon either an outlet or downstream temperature-sensing element with a separate steam control valve.

Tankless Instantaneous Steam/Water Heaters are a less attractive option for the following reasons:

- Lag time from message (thermostat) to action (control valve) creates thermal lag and a resulting temperature swing.
- Modulating steam supply can cause condensate evacuation issues, resulting in damage from water hammer and tube bundle corrosion.
- A cycling phenomenon during low- or no-demand periods will cause premature wear to the thermostatic element. Thermostats typically fail in an open position, making overheated, scald-temperature water available to the system.



High-maintenance feedback systems with large storage tank may leak, corrode or rupture a thermostatic control.



Feedback instantaneous systems may suffer from lag time, tube bundle corrosion and problems with thermostatic element deterioration.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Semi-Instantaneous Steam/Water Heaters (feedback)

Semi-instantaneous steam/water heaters typically include lower-capacity storage, with an integral steam control valve to deliver the heat exchange through an internally positioned element or coil.

Semi-Instantaneous Steam/Water Heaters are a less attractive option for the following reasons:

- Poor low-flow temperature control creates an accumulation tank requirement.
- Accumulation tank creates recovery-time issues at peak demand.
- Heating element/coil in generation/accumulation tank is susceptible to failure and cross contamination.
- Accumulation tanks have been identified as amplification and colonization points for Legionella bacteria.
- Although a lower-cost option, semi-instantaneous steam/water heaters are a higher-maintenance selection.
- Semi-instantaneous steam/water heaters have a shorter service life before replacement than other choices.

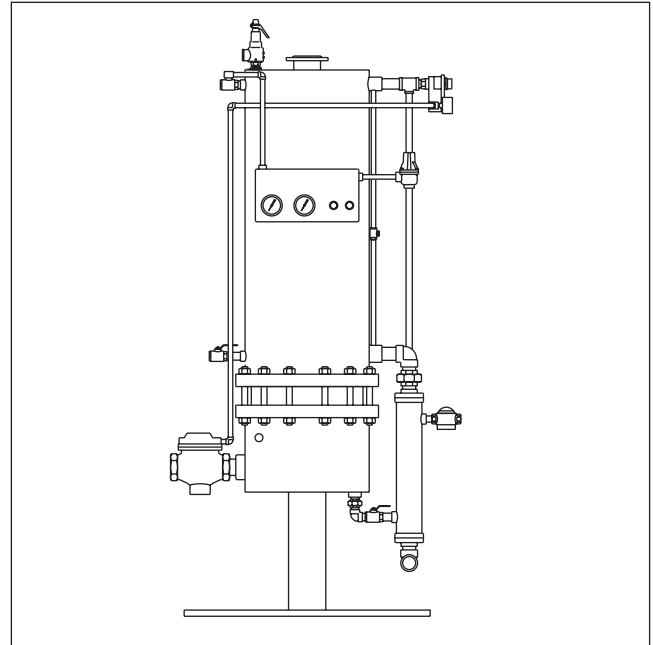
Flo-Rite-Temp® Instantaneous Steam/Water Heaters (feed-forward)

Flo-Rite-Temp® feed-forward instantaneous steam/water heaters offer a simple yet time-proven alternative to traditional feedback instantaneous, semi-instantaneous and tank-type steam-heating methods.

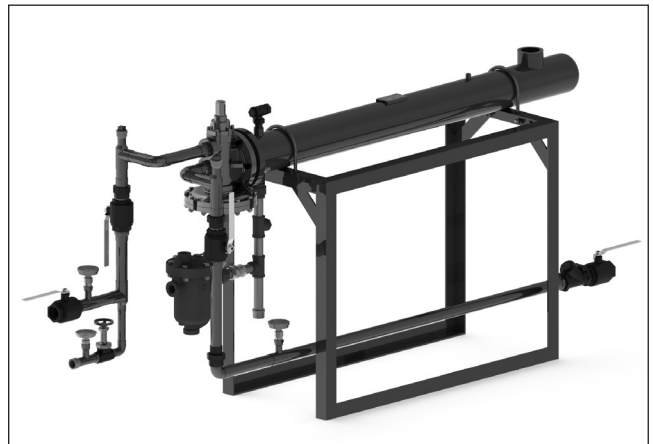
By eliminating the temperature sensing feedback element and relying upon the actual hot water system demand requirement within the system or application, feed-forward systems respond rapidly and are extremely accurate.

Flo-Rite-Temp® Feed-Forward Instantaneous Steam/Water Heater is a more attractive option for the following reasons:

- The constant, non-modulating steam pressure within the shell eliminates cycling wear and tear.
- The system demand or flow feed-forward activation eliminates the requirement for either a steam control valve or supplementary thermostatic control device.
- Flo-Rite-Temp® delivers a consistent outlet temperature (+/-4°F of set-point) with no thermal lag and resulting temperature swing.
- Flo-Rite-Temp® is extremely safe because the mixing unit will position to cold water flow upon failure of the primary operating component.



Semi-instantaneous water heaters are subject to poor recovery time at peak demand, inadequate low-flow temperature control and shorter service life.



Flo-Rite-Temp® instantaneous steam/water heaters can easily do the work of a storage tank unit many times its size—at lower installed cost and with minimum maintenance. Even the largest capacity Flo-Rite-Temp® requires only 13.5 ft² (4.1 m²) of floor space.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

The Flo-Rite-Temp® instantaneous Steam/Water heater has a unique feed-forward design which features a differential pressure diaphragm actuated mixing unit integral to a shell and tube heat exchanger.

The Flo-Rite-Temp® mixing unit manages the water flow through the heat exchanger based upon downstream hot water demand and eliminates the requirement for a modulating steam control valve.

Operating on constant low pressure (2-15 PSI) steam, the Flo-Rite-Temp® mixing unit supplies water to the heat exchanger where it is overheated and then returned to the mixing unit for proportional re-mixing with cold water to a pre-set outlet temperature.

Speed of response

The differential pressure diaphragm within the mixing unit rapidly responds to a change in system demand and significantly reduces the lag times typically associated with feed back/modulating steam control valve systems.

Failure Safe

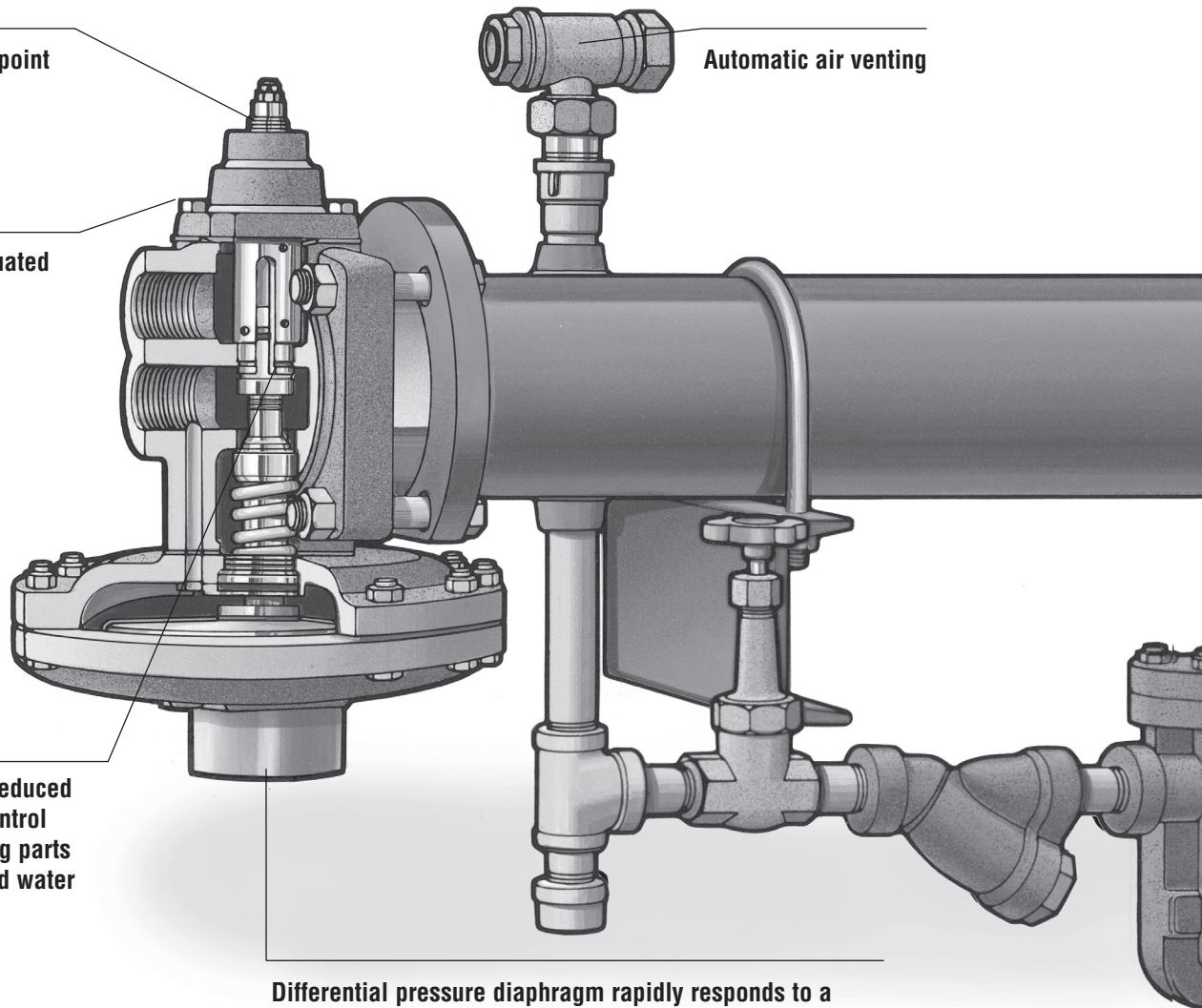
The Flo-Rite-Temp® mixing units diaphragm actuated design can be described as “failure safe” because in the event of a diaphragm failure the mixing unit will fail with a cold bias and will not allow hot water to exit the heat exchanger.

Outlet temperature set-point adjustment

Integral diaphragm actuated mixing unit eliminates intermediate pipework

Scaling and fouling is reduced because the internal control valves/seats and moving parts are only exposed to cold water

Automatic air venting



Differential pressure diaphragm rapidly responds to a change in system demand and significantly reduced the lag time

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Temperature Control and User Safety

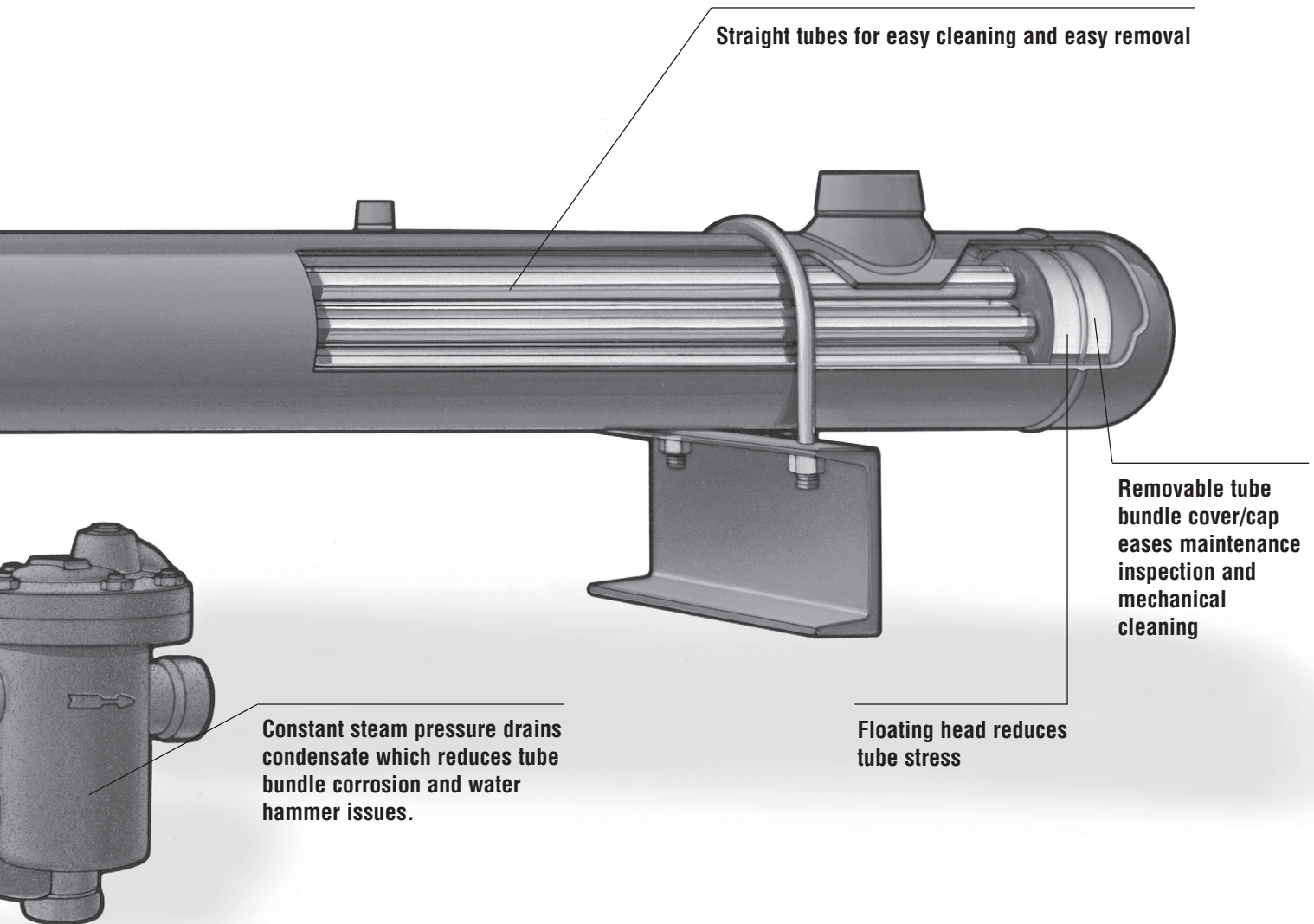
Capable of controlling outlet temperatures +/- 4F, this principal of operation offers the additional relevant benefit of reducing the waterborne bacterial content of the water during the overheating process. In addition, with no water storage requirement, Flo-Rite-Temp® water heaters are a sensible selection as a component of a broader system design initiative for Legionella risk reduction.

Ease of Maintenance

Accessible “non helical” admiralty brass straight tubes inside the carbon steel shell available mechanical cleaning and visual inspection. Non modulating constant steam pressure ensures condensate drainage and removes the potential for water hammer damage and corrosion. There in no steam control valve to maintain and typically no supplemental condensate return equipment required.

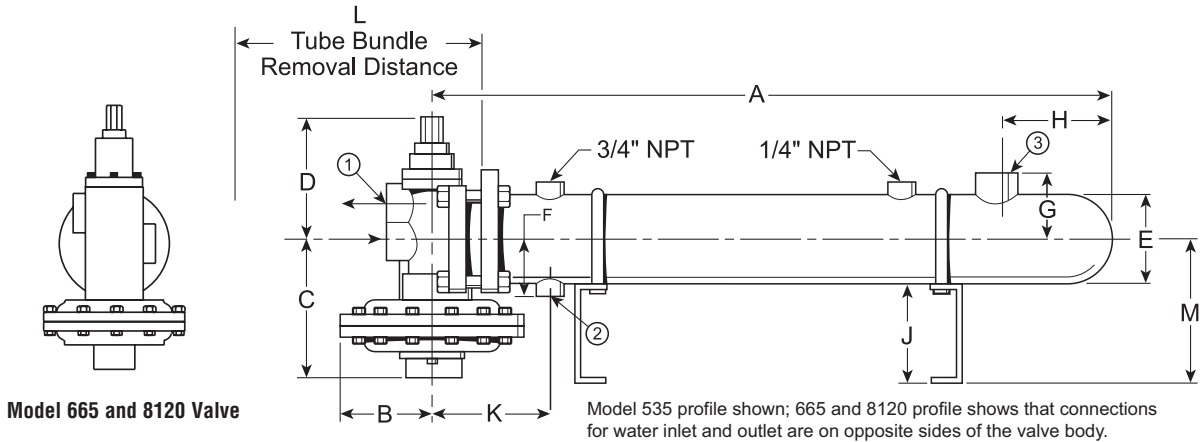
Ease of Installation

No storage tank, small footprint, access via a standard doorway and pre-piped packaged solutions reduce installation time, space and expenditure.





Flo-Rite-Temp® Instantaneous Steam/Water Heater Single Wall



Dimensions																								
Model	A		B		C		D		E		F		G		H		J		K		L		M	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
535	67-1/2	1,715	5-1/4	133	8-5/8	219	9	229	5-9/16	141	4	102	3-11/16	94	7-7/8	200	7	178	7-1/2	191	62	1,575	9	229
665	82	2,083	5-3/4	146	10-3/8	264	10-3/8	264	6-5/8	168	4-5/8	117	4-9/16	116	9-1/4	235	8	203	8-3/4	222	74	1,880	11	280
8120	85	2,159	5-3/4	146	11-3/4	299	12	305	8-5/8	219	6	152	8-7/8	225	9-1/2	241	8	203	9-1/2	241	74	1,880	12-3/8	314

Connections and Weights					
Model	Connections			Weight	
	1-Water	2-Drain	3-Steam		
	in (mm)	in (mm)	in (mm)	lb	kg
535	1-1/2 (40) NPT	1 (25) NPT	2-1/2 (65) NPT	235	107
665	2 (50) NPT*	1-1/4 (32) NPT	3 (80) NPT	358	162
8120	3 (80) NPT*	2 (50) NPT	4 (100) 150# ANSI	585	265

Specifications			
Application	Steam Supply Pressure	Water Supply Pressure	Maximum Water Pressure Drop
Steam to Water	2 - 15 psig (0.14 - 1.0 bar)	20-150 psig (1.4 - 1.0 bar)	10 psig (0.7 bar)

NOTE: Reusable insulation wraps available.

*665 and 8120 connections for water inlet and outlet are on opposite sides of the valve body.

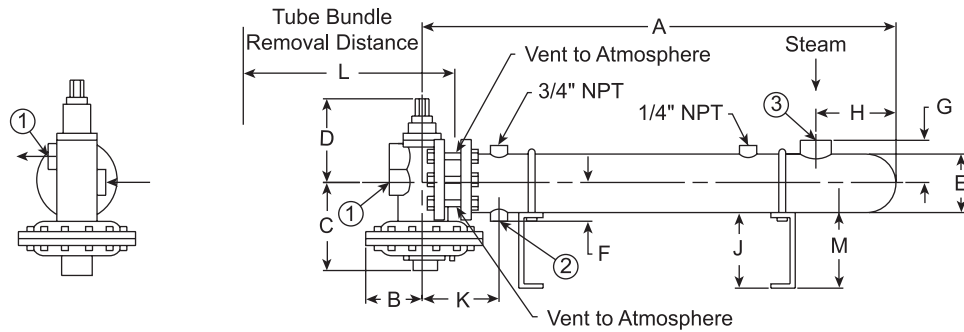
Materials							
Body	Valve	Valve Seats	Diaphragm	Heat Exchanger Shell	Heat Exchanger Tubes	Tube Sheets	Tube Bundle End Cap
Lead Free Bronze	(535/665/8120) Stainless Steel	Lead Free Bronze	Viton® GF Reinforced w/Nomex® Fiber	Carbon Steel ASTM SA 106-B ASME "U" Stamped	5/8" 16 BWG Admiralty Brass	Naval Brass	Naval Brass

NOTE: Units are NSF-61 certified.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater Double Wall



Model 665DW and 8120DW Valve

535DW Profile

The DW (double wall) version of the Flo-Rite-Temp® instantaneous water heater uses a double-wall tube to provide positive separation of the steam and water in the heat exchanger. The area between the walls of the tubes vents to atmosphere so you can detect tube failure without cross-contaminating either the steam or water. The Flo-Rite-Temp® DW is well suited for all hot water applications where steam is available and plumbing codes or safety requirements prevent the heating medium and the potable water supply from being cross-contaminated.

Specifications			
Application	Steam Supply Pressure	Water Supply Pressure	Maximum Water Pressure Drop
Steam to Water	2 - 15 psig (0.14 - 1.0 bar)	20 - 150 psig (1.4 - 10.3 bar)	10 psig (0.7 bar)

Connections and Weights							
Model	Connections			Tube Bundle Removal		Weight	
	1-Water	2-Drain	3-Steam	in	mm	lb	kg
	in (mm)	in (mm)	in (mm)				
535DW	1-1/2 (40) NPT	1 (25) NPT	2-1/2 (65) NPT	75	1,905	270	122
665DW	2 (50) NPT*	1-1/4 (32) NPT	3 (80) NPT	87	2,210	444	201
8120DW	3 (80) NPT*	2 (50)	4 (100) 150# ANSI	75	1,905	665	302

*665 and 8120 connections for water inlet and outlet are on opposite sides of the valve body.

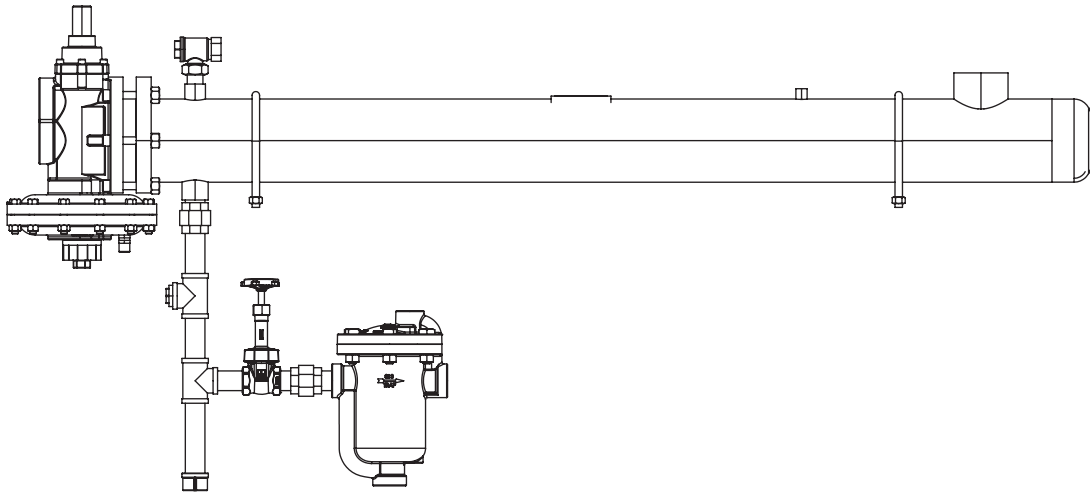
Materials						
Body	Valve	Valve Seats	Diaphragm	Heat Exchanger Shell	Heat Exchanger Tubes	Tube Sheets*
Lead Free Bronze	(535DW/665DW/812DW) Stainless Steel	(665DW/8120DW) Lead Free Bronze	Viton® GF Reinforced w/ Nomex® GF	Carbon Steel ASTM SA 106-B ASME "U" Stamped	5/8" Copper Inner Tube 3/4" ID Grooved Copper Outer Tube	Lead Free Steam Side Steel Water Side Brass

*There is an open vent to atmosphere between the tube sheets to detect tube failure.

Dimensions																								
Model	A		B		C		D		E		F		G		H		J		K		L		M	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
535DW	77-3/8	1,965	5-1/4	133	8-5/8	219	9	229	5-9/16	141	4	102	4-1/4	108	11-1/2	292	7	178	8-1/8	206	75	1,905	9	229
665DW	90-5/8	2,302	5-3/4	146	10-3/8	264	10-3/8	264	6-5/8	168	7-3/4	121	5	127	11-3/4	298	8	203	9-3/4	248	87	2,210	11	280
8120DW	79-7/8	2,029	5-3/4	146	11-3/4	198	12	305	8-5/8	219	6	152	8-3/4	222	12-5/8	321	8	203	11-5/8	295	75	1,905	12-3/8	314

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

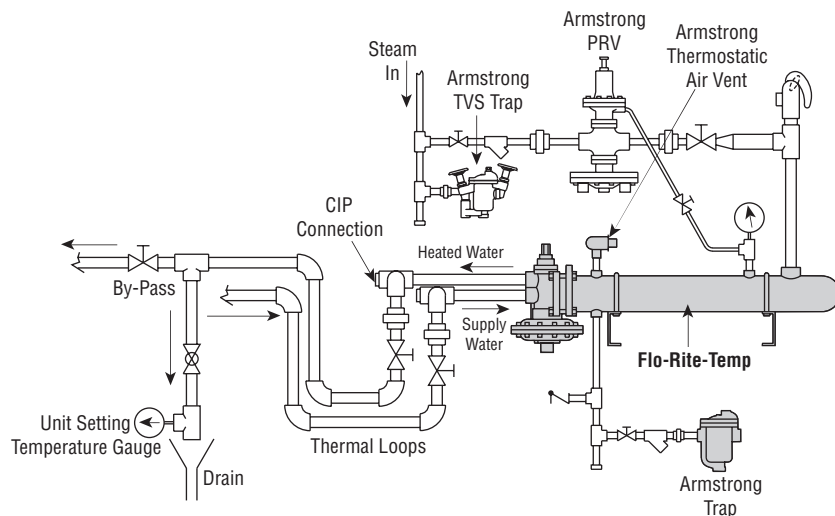
Flo-Rite-Temp® Instantaneous Steam/Water Heater



For submittal drawing refer to:		
Model 535	Single Wall	D58651
Model 535DW	Double Wall	D58652
Model 665	Single Wall	D58644
Model 665DW	Double Wall	D58645
Model 665SS	Stainless Steel	D32713
Model 8120	Single Wall	D58653
Model 8120DW	Double Wall	D58654
Model 8120SS	Stainless Steel	D32958

Water Heater Installation Detail

The Flo-Rite-Temp® models identified in the submittal table below are provided, as standard, with an Armstrong steam trap and thermostatic air vent (shaded). All other items indicated, are shown for water heater installation detail only. For pre-piped packaged Flo-Rite-Temp® water heater assemblies, refer to pages 14-26.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater Single Wall and Double Wall Sizing Chart



Water and Steam Capacities														Model						
Inlet Temp.	Set Temp.	Standard								Inlet Temp.	Set Temp.	Metric								
		Hot Water Capacities*				Steam Capacities						Hot Water Capacities*				Steam Capacities				
Steam Pressure				Steam Pressure				Steam Pressure				Steam Pressure								
psig				psig				bar				bar								
°F	°F	2	5	10	15	2	5	10	15	°C	°C	0.14	0.35		0.7	1	0.14	0.35	0.7	1
gpm				lbs/hr				m³/h				kg/h								
40	120	37	40	43	43	1,543	1,657	1,814	1,946	4	49	8.4	9.1	9.8	10.2	697	749	820	880	535
		69	74	80	80	2,855	3,067	3,356	3,601			15.7	16.8	18.2	18.2	1,290	1,386	1,517	1,628	665
		142	145	145	145	5,680	6,160	6,760	7,160			32.2	32.9	32.9	32.9	2,576	2,794	3,066	3,248	8120
	130	32	34	37	39	1,472	1,587	1,743	1,876		54	7.3	7.7	8.4	8.8	665	717	788	848	535
		58	63	68	73	2,723	2,936	3,226	3,472			13.2	17.3	15.4	16.6	1,230	1,327	1,458	1,569	665
		112	122	136	145	5,040	5,490	6,120	6,705			25.4	27.7	30.9	32.9	2,286	2,490	2,776	3,041	8120
	140	27	29	32	34	1,397	1,513	1,671	1,804		60	6.1	6.6	7.3	7.7	631	684	755	815	535
		50	54	59	63	2,585	2,799	3,091	3,338			11.3	12.2	13.3	14.3	1,168	1,265	1,397	1,509	665
		88	97	109	120	4,400	4,850	5,450	6,000			20.0	22.0	24.7	27.2	1,996	2,200	2,472	2,722	8120
	160	20	22	24	26	1,235	1,355	1,517	1,652		71	4.5	5.0	5.5	5.9	558	612	686	747	535
		37	40	45	48	2,286	2,508	2,806	3,057			8.4	9.1	10.2	10.9	1,033	1,134	1,268	1,382	665
		69	83	89	95	4,140	4,980	5,340	5,700			15.6	18.8	20.2	21.6	1,878	2,259	2,422	2,585	8120
180	12	13	15	16	861	966	1,104	1,219	82	2.7	3.0	3.4	3.6	390	438	501	553	535		
	23	26	29	32	1,663	1,866	2,134	2,355		5.2	5.9	6.6	7.3	754	846	968	1,068	665		
	43	47	52	59	3,010	3,290	3,640	4,130		9.7	10.7	11.8	13.4	1,363	1,492	1,651	1,873	8120		
50	120	41	44	45	45	1,495	1,609	1,764	1,896	10	49	9.3	10.0	10.2	10.2	676	727	797	857	535
		76	80	80	80	2,767	2,977	3,264	3,508			17.3	18.2	18.2	18.2	1,251	1,346	1,475	1,586	665
		145	145	145	145	5,740	6,090	6,580	7,035			32.2	32.2	32.2	32.2	2,603	2,762	2,985	3,191	8120
	130	34	37	40	43	1,425	1,539	1,695	1,827		54	7.7	8.4	9.1	9.8	644	696	766	826	535
		64	68	75	80	2,637	2,848	3,137	3,381			14.5	15.4	17.0	18.2	1,192	1,287	1,418	1,528	665
		127	138	145	145	5,080	5,520	6,120	6,760			28.8	31.3	32.2	32.2	2,304	2,504	2,776	3,066	8120
	140	29	31	34	37	1,352	1,467	1,624	1,756		60	6.6	7.0	7.7	8.4	611	663	734	794	535
		54	58	64	68	2,502	2,715	3,005	3,250			12.2	13.2	14.5	15.4	1,131	1,227	1,358	1,474	665
		99	108	121	134	4,455	4,860	5,445	6,030			22.5	24.5	27.5	30.4	2,021	2,204	2,470	2,735	8120
	160	21	23	25	28	1,194	1,313	1,473	1,607		71	4.7	5.2	5.7	6.4	540	593	665	726	535
		39	42	47	51	2,210	2,429	2,725	2,974			8.9	9.5	10.7	11.6	999	1,098	1,232	1,344	665
		76	90	95	102	4,180	4,950	5,225	5,610			17.2	20.4	21.6	23.1	1,896	2,245	2,370	2,545	8120
180	12	14	16	17	831	934	1,071	1,185	82	2.7	3.2	3.6	3.9	377	424	486	537	535		
	24	27	30	33	1,605	1,805	2,069	2,289		5.4	6.1	6.8	7.5	728	819	938	1,037	665		
	49	55	63	72	3,185	3,575	4,095	4,680		11.1	12.5	14.3	16.3	1,445	1,622	1,857	2,123	8120		
60	130	38	41	45	45	1,378	1,491	1,646	1,777	16	54	8.7	9.3	10.2	10.2	623	674	744	803	535
		70	76	80	80	2,550	2,760	3,046	3,288			15.9	17.3	18.2	18.2	1,152	1,247	1,377	1,486	665
		145	145	145	145	5,110	5,465	6,090	6,510			32.2	32.2	32.2	32.2	2,318	2,524	2,762	2,953	8120
	140	32	34	38	40	1,307	1,421	1,576	1,708		60	7.3	7.7	8.6	9.1	591	642	712	772	535
		58	63	69	75	2,418	2,629	2,917	3,160			13.2	14.3	15.7	17.0	1,093	1,188	1,318	1,428	665
		111	123	137	145	4,440	4,920	5,480	6,080			25.2	27.9	31.1	32.2	2,014	2,232	2,486		8120
	160	22	24	27	30	1,152	1,270	1,428	1,561		71	5.0	5.5	6.1	6.8	521	574	645	706	535
		41	45	50	55	2,132	2,349	2,642	2,889			9.3	10.2	11.3	12.5	964	1,062	1,194	1,306	665
		85	99	104	115	4,250	4,950	5,200	5,750			19.3	22.5	23.6	26.1	1,928	2,245	2,359	2,608	8120
	180	13	14	16	18	800	902	1,037	1,150		82	3.0	3.2	3.6	4.1	363	409	470	522	535
		25	28	32	35	1,546	1,743	2,004	2,221			5.7	6.4	7.3	7.9	701	791	909	1,007	665
		59	67	80	90	3,540	4,020	4,800	5,400			13.4	15.2	18.1	20.4	1,606	1,823	2,177	2,449	8120

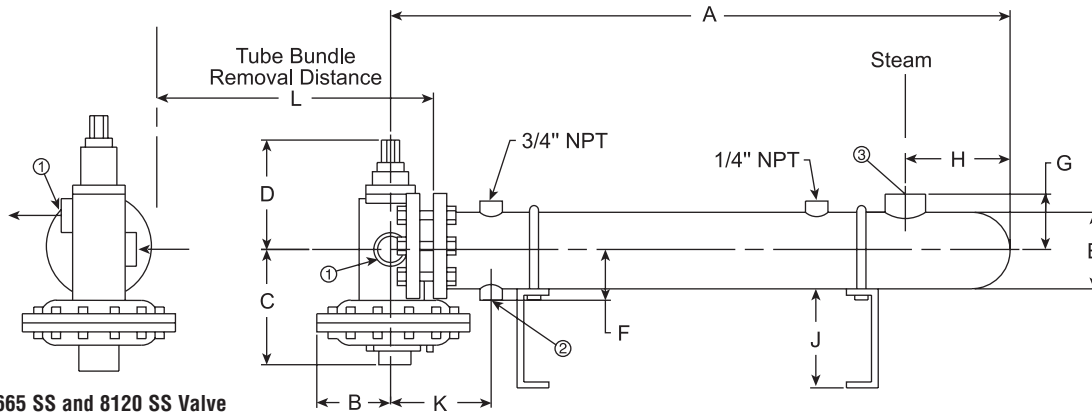
*Units may be piped in parallel when desired capacities exceed that of a single unit.

NOTES: Minimum water temperature increase is 60°F (33°C). Consult factory if less than 60°F (33°C) increase is required or a set temperature below 120°F (49°C) is required.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater Stainless Steel



Model 665 SS and 8120 SS Valve

The Flo-Rite-Temp® SS is a compact, steam to water, instantaneous water heater with all wetted metal parts of stainless steel. Because of its construction materials, this heater is well-suited for heating most corrosive liquids, such as demineralized, deionized or reverse osmosis water commonly used by manufacturers of electronic equipment, pharmaceutical and food.

- Heavy duty 5/8" tubes of 16 gauge 316L stainless steel ensure long life and maintainability backed up by a 10-year tube bundle warranty against workmanship and material defects.
- Control valve is mounted integral to the heat exchanger, thus eliminating intermediate piping leaks.

Features

- Feed-forward control provides accurate temperature control on demand even when demand fluctuates abruptly.
- Feed-forward operation ensures that the heater will fail safely in the closed (cold) position to prevent overheating.
- Straight, non-U-bend tube bundle with removable end cover provides for easy tube cleaning along with the capability to visually inspect all tubes.
- Constant steam pressure on heat exchanger at all times means positive condensate evacuation, avoiding damage to the exchanger due to water hammer.

Specifications

Application	Steam Supply Pressure	Water Supply Pressure	Maximum Water Pressure Drop
Steam to Water	2 - 15 psig (0.14 - 1.0 bar)	20 - 150 psig (1.4 - 10.3 bar)	10 psig (0.7 bar)

Materials

Body	Valve	Valve Seats	Diaphragm	Heat Exchanger Shell	Heat Exchanger Tubes	Heat Exchanger Tube Sheets
Stainless Steel			Viton® GF Reinforced w/ Normex® Fiber	Carbon Steel (Standard) Stainless Steel (Optional)	Stainless Steel	Stainless Steel

Dimensions and Weights

Model	Dimensions											Connections			Weight		
	A	B	C	D	E	F	G	H	J	K	L	1	2	3			
665 SS	in	82-3/4	5-3/4	10-3/8	10-3/8	6-5/8	4-3/4	5-1/2	9-1/4	8	8-3/4	74	2 NPT	1-1/4 NPT	3 NPT	lb	335
	mm	2,102	146	264	264	168	121	140	235	191	222	1,880	50	32	80	kg	152
8120 SS	in	90	5-3/4	10-3/8	10-3/8	8-5/8	8-1/8	8-7/8	9-1/2	8	14-1/2	74	2 NPT	2 NPT	4 150# ANSI	lb	670
	mm	2,286	146	264	264	219	156	225	203	368	1,880	50	50	100	kg	298	

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater Stainless Steel Sizing Chart



Capacities and Steam Loads																				
Inlet Temp. °F	Set Temp. °F	Standard								Inlet Temp. °C	Set Temp. °C	Metric								Model
		Hot Water Capacities*				Steam Capacities						Hot Water Capacities*				Steam Capacities				
		Steam Pressure				Steam Pressure						Steam Pressure				Steam Pressure				
		psig				psig						bar				bar				
		2	5	10	15	2	5	10	15			0.14	0.35	0.7	1	0.14	0.35	0.7	1	
gpm				lbs/hr				m³/h				kg/h								
40	120	41	44	47	51	1,695	1,821	1,993	2,138	4	49	9.3	10	10.7	11.6	769	826	904	970	665 SS
		84	89	97	103	3,351	3,720	4,100	4,368			19.1	20.2	22	23.4	1,520	1,687	1,860	1,981	8120 SS
	130	35	37	41	43	1,617	1,743	1,915	2,061		54	7.9	8.4	9.3	9.8	733	791	869	935	665 SS
		66	72	80	86	2,974	3,239	3,611	3,956			15	16.4	18.2	19.5	1,349	1,469	1,638	1,794	8120 SS
	140	30	32	35	37	1,535	1,662	1,836	1,982		60	6.8	7.3	7.9	8.4	696	754	833	899	665 SS
		52	57	64	71	2,596	2,862	3,216	3,540			11.8	12.9	14.5	16.1	1,178	1,298	1,459	1,606	8120 SS
	160	17	18	19	21	1,011	1,110	1,242	1,353		71	3.9	4.1	4.3	4.8	459	503	563	614	665 SS
		44	48	53	57	2,726	2,990	3,346	3,646			10	10.9	12	12.9	1,237	1,356	1,518	1,654	8120 SS
	180	12	13	15	17	860	964	1,103	1,217		82	2.7	3	3.4	3.9	390	437	500	552	665 SS
		32	35	40	44	2,316	2,598	2,971	3,280			7.3	7.9	9.1	10	1,051	1,178	1,348	1,488	8120 SS
50	120	45	48	53	56	1,643	1,768	1,938	2,083	10	49	10.2	10.9	12	12.7	745	802	879	945	665 SS
		91	97	105	113	3,300	3,550	3,892	4,183			20.7	22	23.8	25.7	1,497	1,610	1,765	1,897	8120 SS
	130	38	41	44	47	1,566	1,691	1,862	2,007		54	8.6	9.3	10	10.7	710	767	845	910	665 SS
		75	81	89	95	2,997	3,257	3,740	4,031			17	18.4	20.2	21.6	1,359	1,477	1,696	1,828	8120 SS
	140	32	34	38	41	1,486	1,612	1,784	1,930		60	7.3	7.7	8.6	9.3	674	731	809	875	665 SS
		58	64	71	79	2,628	2,867	3,212	3,558			13.2	14.5	16.1	17.9	1,192	1,300	1,457	1,614	8120 SS
	160	17	19	21	23	978	1,075	1,206	1,316		71	3.9	4.3	4.8	5.2	444	488	547	597	665 SS
		46	51	56	61	2,635	2,896	3,249	3,545			10.4	11.6	12.7	13.9	1,195	1,314	1,474	1,608	8120 SS
	180	12	14	16	18	830	993	1,070	1,183		82	2.7	3.2	3.6	4.1	376	423	485	537	665 SS
		33	37	42	47	2,235	2,513	2,882	3,188			7.5	8.4	9.5	10.7	1,014	1,140	1,307	1,446	8120 SS
60	120	51	55	60	64	1,590	1,713	1,883	2,027	16	49	11.6	12.5	13.6	14.5	721	777	854	919	665 SS
		71	104	122	130	3,247	3,500	3,846	4,139			16.1	23.6	27.7	29.5	1,473	1,588	1,745	1,877	8120 SS
	130	42	45	49	53	1,514	1,639	1,808	1,952		54	9.5	10.2	11.1	12	687	743	820	885	665 SS
		86	92	100	108	3,093	3,347	3,694	3,988			19.5	20.9	22.7	24.5	1,403	1,518	1,676	1,809	8120 SS
	140	35	37	41	44	1,436	1,561	1,732	1,876		60	7.9	8.4	9.3	10	651	708	786	851	665 SS
		66	73	81	87	2,620	2,903	3,233	3,703			15	16.6	18.4	19.8	1,188	1,317	1,466	1,680	8120 SS
	160	18	20	22	24	943	1,040	1,170	1,279		71	4.1	4.5	5	5.5	428	472	531	580	665 SS
		49	54	60	65	2,543	2,801	3,151	3,445			11.1	12.3	13.6	14.8	1,154	1,271	1,429	1,563	8120 SS
	180	13	14	17	19	799	901	1,035	1,148		82	3	3.2	3.9	4.3	362	409	469	521	665 SS
		35	39	44	49	2,152	2,427	2,791	3,093			7.9	8.9	10	11.1	976	1,101	1,266	1,403	8120 SS

*Units may be piped in parallel when desired capacities exceed that of a single unit.

NOTES: Minimum water temperature increase is 60°F (33°C). Consult factory if less than 60°F (33°C) increase is required or a set temperature below 120°F (49°C) is required.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Armstrong® Flo-Rite-Temp® Instantaneous Steam/Water Heater

Non-Recirculating Hot Water Systems

Pre-Piped Single Temperature

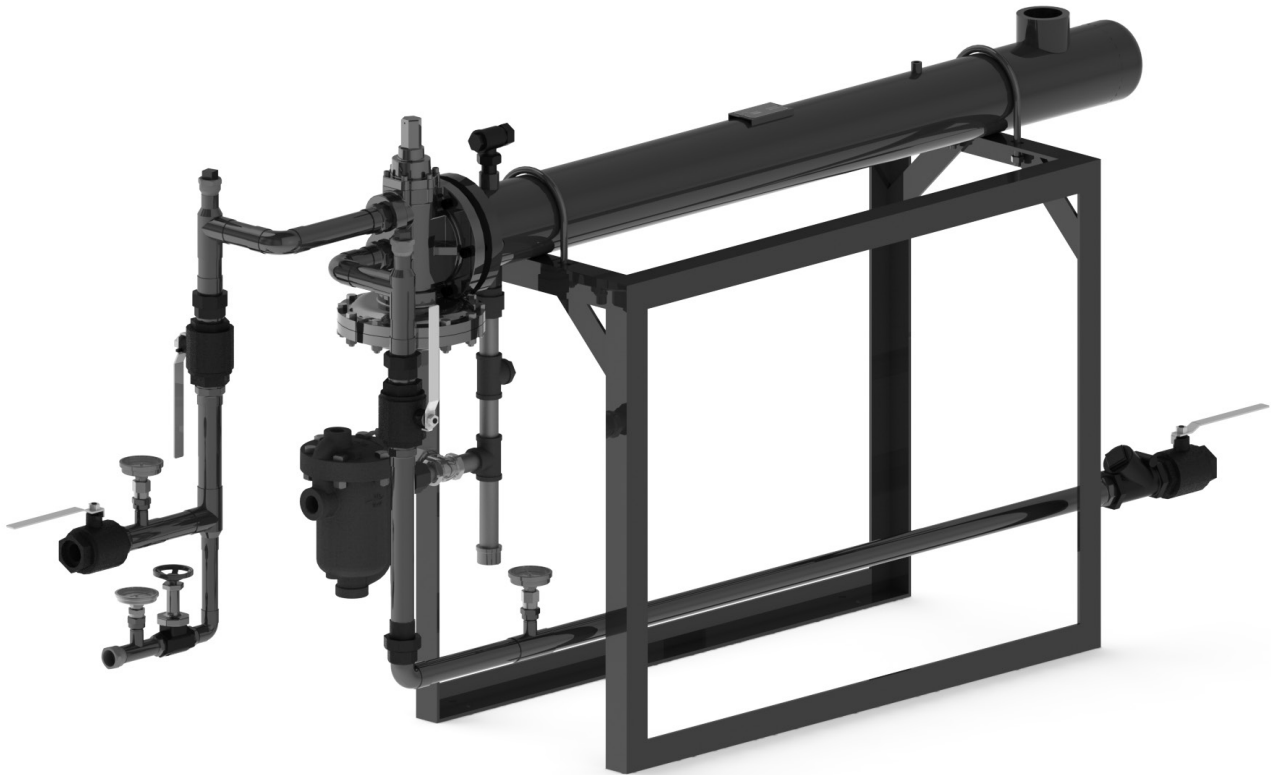
Flo-Rite-Temp® Instantaneous Steam/Water Heaters-Non Recirculating Hot Water Systems feature three single heat exchanger and three double (parallel) heat exchanger pre-piped single temperature packaged assemblies.

Parallel heat exchangers offer increased flow rates and/or system redundancy within the same footprint. The Parallel (P) option also offers the ability to perform preventative maintenance on the tube bundle and control valve while the redundant water heater remains online.

Flo-Rite-Temp® Pre-Piped Single Temperature Systems are fully assembled and include the following installation components:

- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Lead Free Compliant

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Armstrong®

Non-Recirculating Hot Water Systems

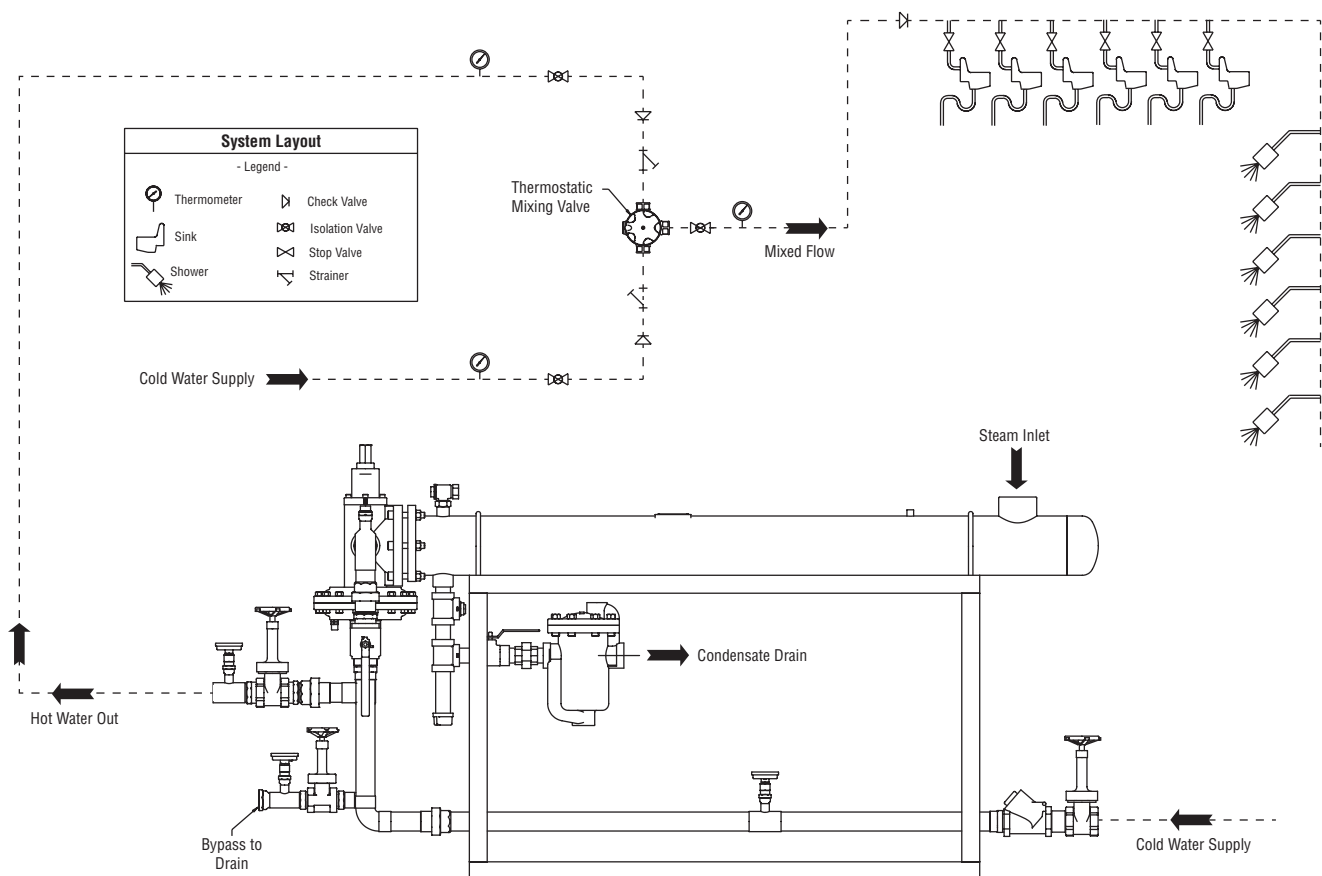
Pre-Piped Single Temperature

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.

Additionally, where appropriate, Armstrong can integrate engineering services, turn key installation and project management, system assessment and optimization along with energy conservation measure (ECM) capability through Armstrong Service Incorporated.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

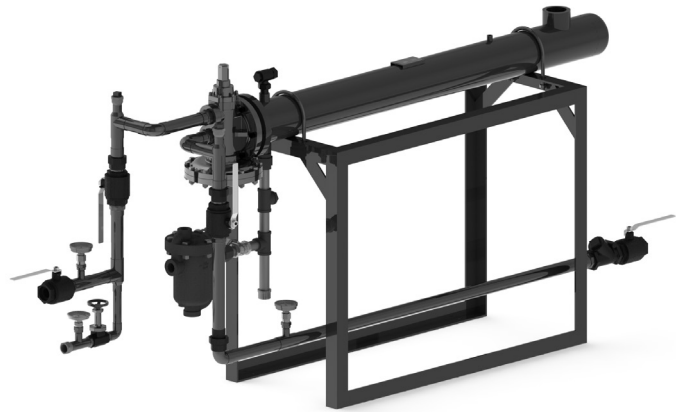
Non-Recirculating Hot Water Systems

Pre-Piped Single Temperature

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Non-Recirculating Hot Water Systems feature three heat exchanger options offered as pre-piped single temperature packaged assemblies.

Flo-Rite-Temp® Pre-Piped Single Temperature Systems are fully assembled and include the following installation components:

- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Lead Free Compliant



Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on pages 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.

For submittal drawing refer to:		
Model FRT535	Single Wall	D609388
Model FRT535DW	Double Wall	D611238
Model FRT665	Single Wall	D611249
Model FRT665DW	Double Wall	D611252
Model FRT8120	Single Wall	D610132
Model FRT8120DW	Double Wall	D611266

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180
FRT535	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT665	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
FRT8120	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.

All dimensions and weightings are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Non-Recirculating Hot Water Systems

Parallel/Redundant Pre-piped Single Temperature

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Non-Recirculating Hot Water Systems feature three heat exchanger options offered as pre-piped parallel single temperature packaged assemblies.

Flo-Rite-Temp® Pre-Piped Parallel (P) Single Temperature Systems are fully assembled and include the following installation components:

- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Lead Free Compliant

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Parallel (P) Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.



For submittal drawing refer to:		
Model FRT535P	Single Wall	D611241
Model FRT535DWP	Double Wall	D611598
Model FRT665P	Single Wall	D611262
Model FRT665DWP	Double Wall	D611698
Model FRT8120P	Single Wall	D611317
Model FRT8120DWP	Double Wall	D611761

The given GPM flow rate is doubled when a unit is operated in Parallel (P).

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180
FRT535P	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT665P	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
FRT8120P	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

Pre-Piped Single Temperature

Flo-Rite-Temp® Instantaneous Steam/Water Heaters for Recirculating Hot Water Systems feature three single heat exchanger and three double (parallel) heat exchanger pre-piped single temperature packaged assemblies.

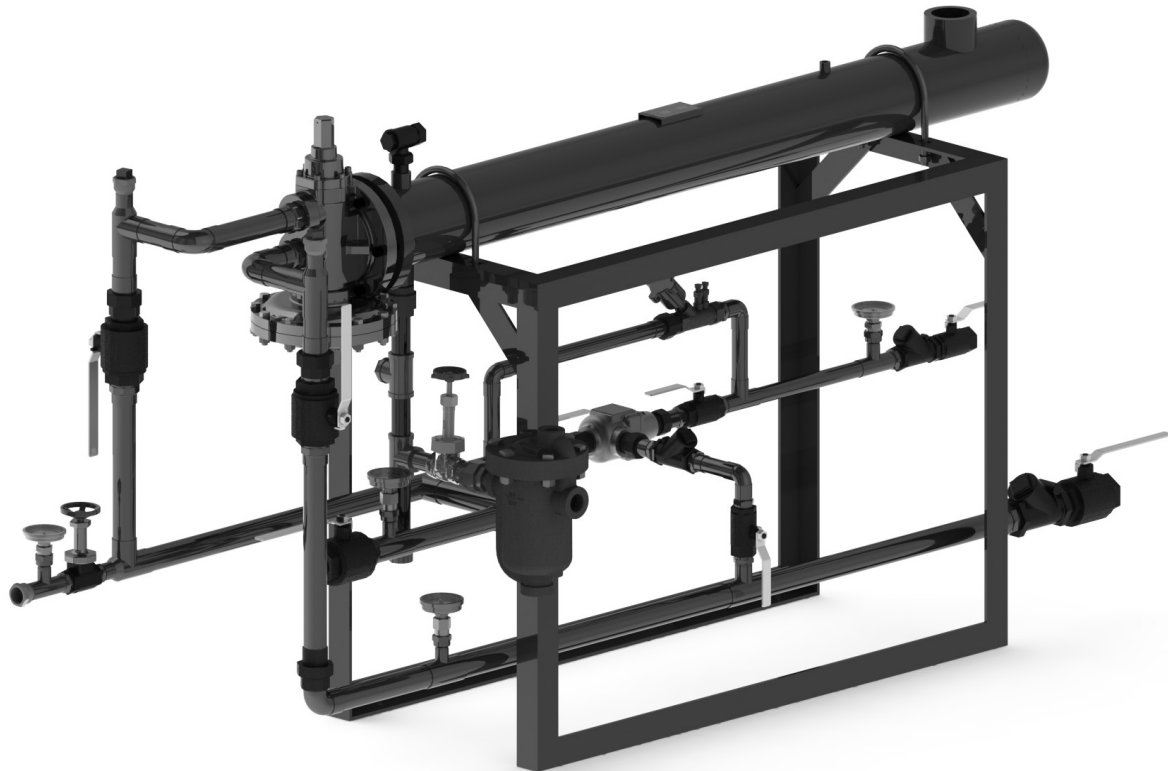
Parallel heat exchangers offer increased flow rates and/or system redundancy within the same footprint and allows for tube bundle and control valve servicing while the water heater remains online.

Flo-Rite-Temp® Pre-Piped Single Temperature Systems are fully assembled and include the following installation components:

- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Thermostatic Diverting Valve*
- Lead Free Compliant

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Flo-Rite-Temp® Instantaneous Steam/Water Heaters Recirculating Hot Water Solutions-for single temperature systems feature an integral thermostatic diverting valve which maintains re-circulating hot water temperatures during zero system draw off "idling" periods.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

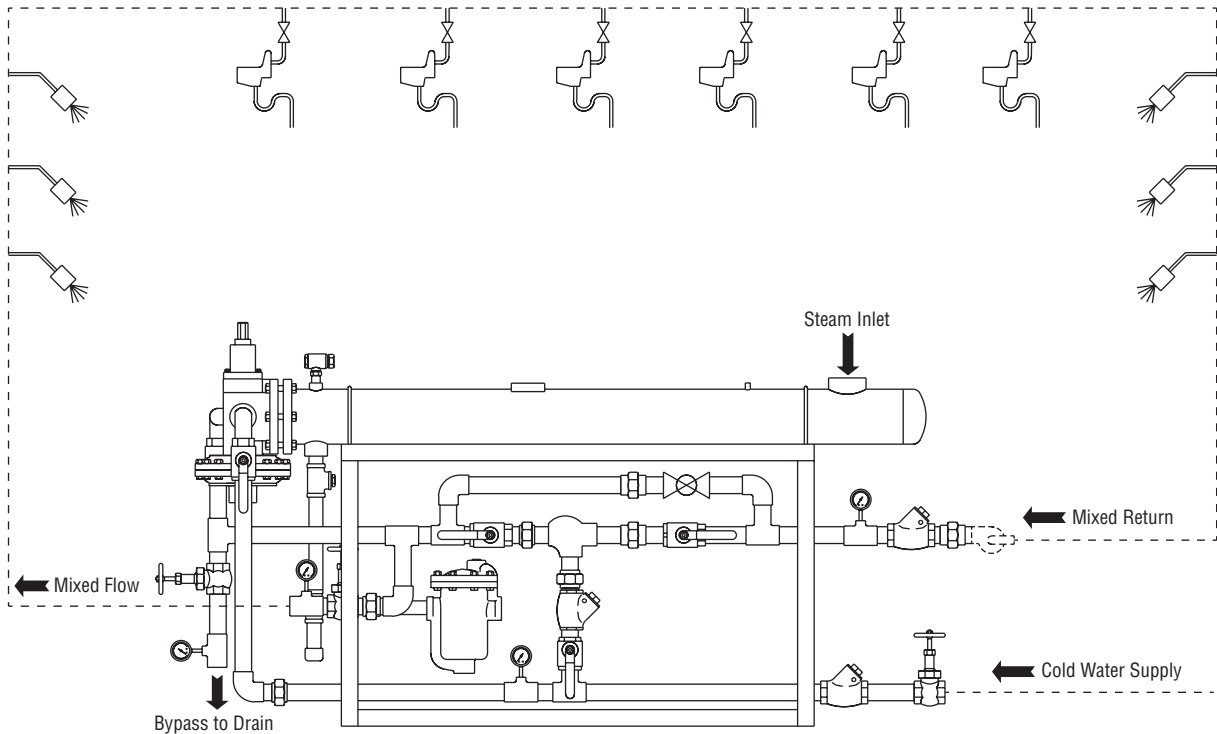
Pre-Piped Single Temperature

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, pre-piped PRV stations, additional mixed water temperature controls/loops and varied other components can be application engineered specifically to meet the projects requirements.

Additionally, where appropriate, Armstrong can integrate engineering services, turn key installation and project management, system assessment and optimization along with energy conservation measure (ECM) capability through Armstrong Service Incorporated.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

Pre-Piped Single Temperature

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Recirculating Hot Water Systems feature four heat exchanger options offered as pre-piped single temperature packaged assemblies.

Flo-Rite-Temp® Pre-Piped Recirculating (R) Single Temperature Systems are fully assembled and include the following installation components:

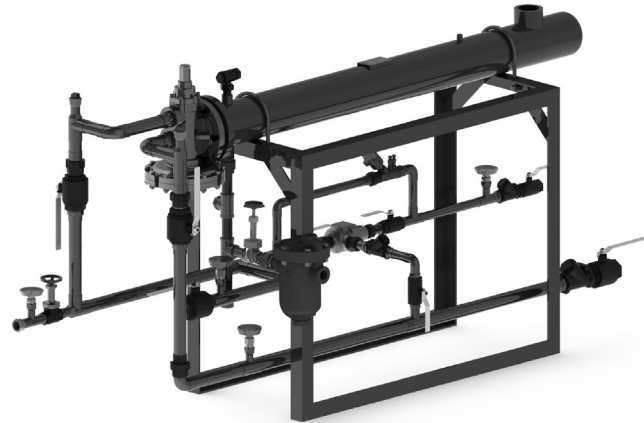
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Thermostatic Diverting Valve

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Recirculating (R) Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on pages 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.



For submittal drawing refer to:		
Model FRT535R	Single Wall	Temp Specific*
Model FRT535DWR	Double Wall	Temp Specific*
Model FRT665R	Single Wall	Temp Specific*
Model FRT665DWR	Double Wall	Temp Specific*
Model FRT8120R	Single Wall	Temp Specific*
Model FRT8120DWR	Double Wall	Temp Specific*

*Part Numbers are Specific to Temperature Set Points – Installation Details Form (IDF) Required

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180
FRT535R	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT665R	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
FRT8120R	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Recirculating Hot Water Systems

Parallel/Redundant Pre-Piped Single Temperature

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Recirculating Hot Water Systems feature four heat exchanger options offered as pre-piped parallel single temperature packaged assemblies.

Flo-Rite-Temp® Pre-Piped Parallel (P) Recirculating (R) Single Temperature Systems are fully assembled and include the following installation components:

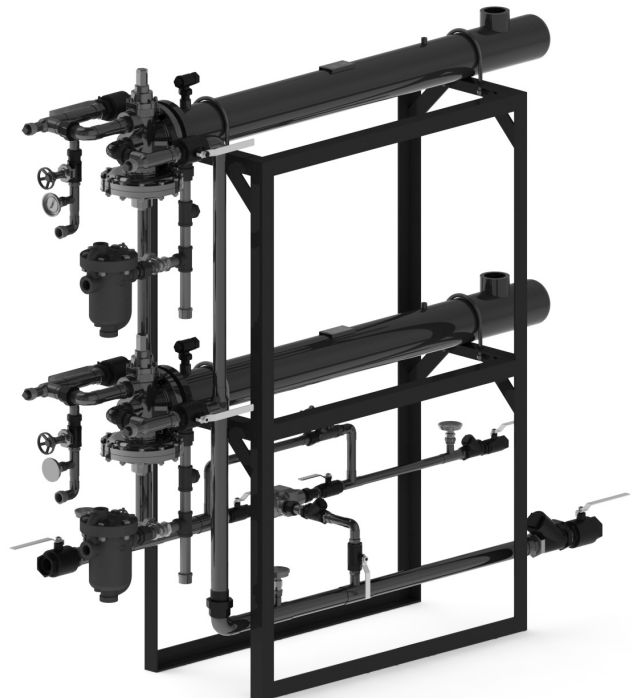
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- Thermostatic Diverting Valve

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Parallel (P) Recirculating (R) Single Temperature Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, pre-piped PRV stations, additional mixed water temperature controls/loops and varied other components can be application engineered specifically to meet the projects requirements.



For submittal drawing refer to:		
Model FRT535PR	Single Wall	Temp Specific*
Model FRT535DWPR	Double Wall	Temp Specific*
Model FRT665PR	Single Wall	Temp Specific*
Model FRT665DWPR	Double Wall	Temp Specific*
Model FRT8120PR	Single Wall	Temp Specific*
Model FRT8120DWPR	Double Wall	Temp Specific*

*Part Numbers are Specific to Temperature Set Points – Installation Details Form (IDF) Required

The given GPM flow rate is doubled when a unit is operated in Parallel (P).

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180
FRT535PR	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT665PR	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
FRT8120PR	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

Pre-Piped Tempered Water

Flo-Rite-Temp® Instantaneous Steam/Water Heaters-Recirculating Hot Water Systems feature three single heat exchanger and three double (parallel) heat exchanger pre-piped tempered water packaged assemblies.

Parallel heat exchangers offer increased flow rates and/or system redundancy within the same footprint and allows for tube bundle and control valve servicing while the water heater remains online.

Flo-Rite-Temp® Pre-Piped Tempered Water Systems are fully assembled and include the following installation components:

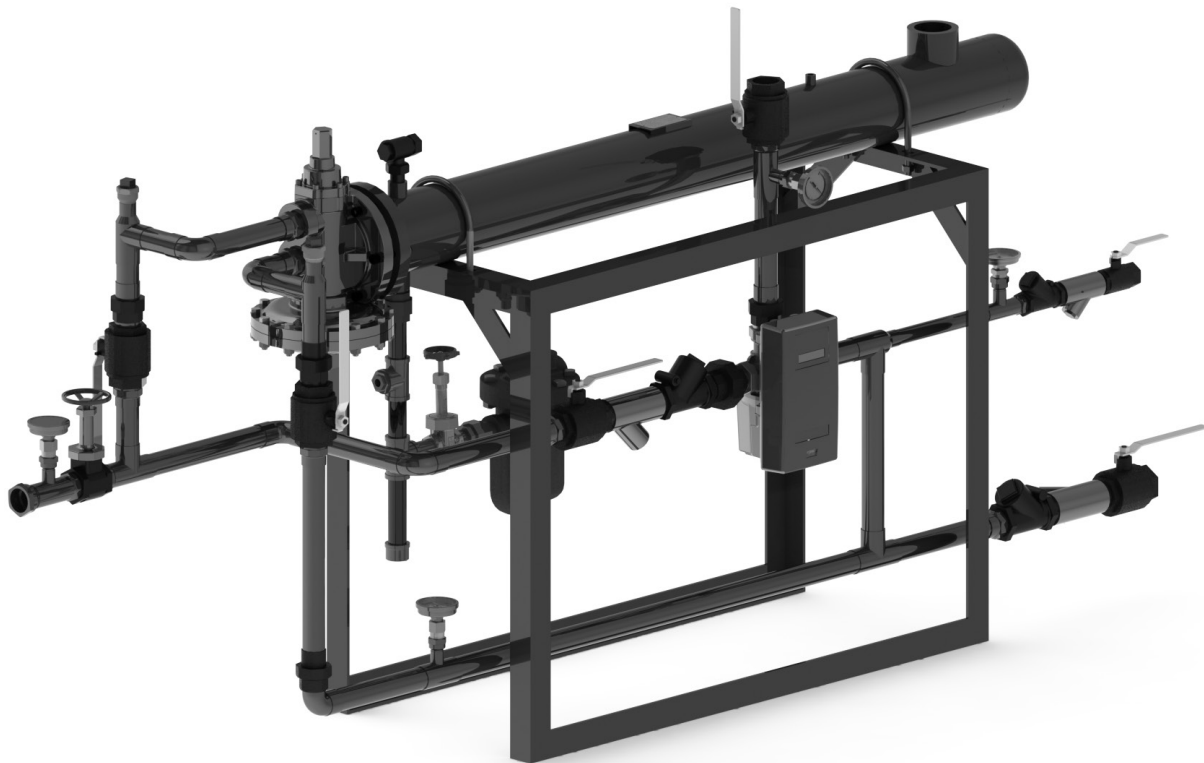
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- “The Brain” Digital Recirculating Valve

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Single Temperature Systems are designed to fit through a standard 32” doorway (Model 8120 36” doorway).

Flo-Rite-Temp® Instantaneous Steam/Water Heaters-Recirculating Hot Water Solutions-for tempered water systems feature “The Brain”.

The Brain delivers +/- 2F temperature control for systems which experience diverse user draw-off between 0-188GPM. The Brain is provided as standard with an integral mixed water outlet sensor/transmitter and remote set point adjustment capability for “plug and play” communication via PC, LAN or resident Building Automation System (BAS).

More information on DRV40/DRV80 is detailed on the following pages.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Recirculating Hot Water Systems

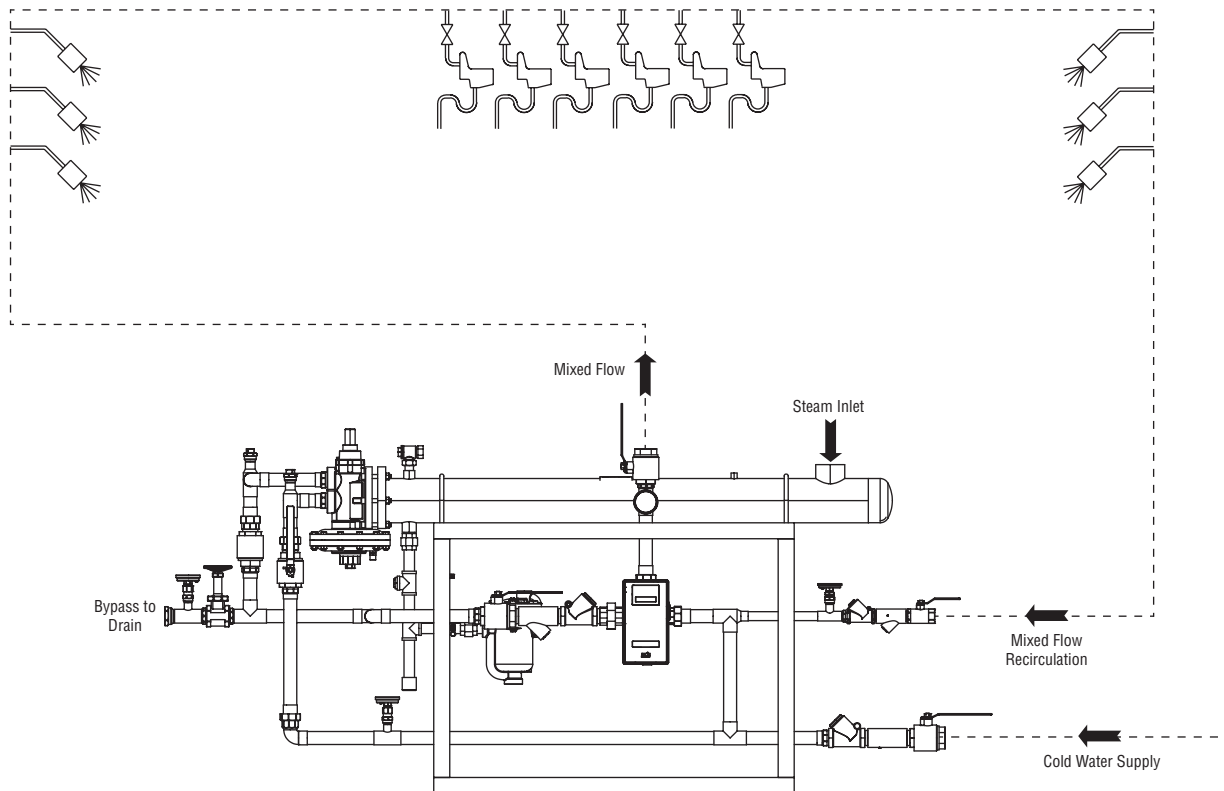
Pre-Piped Tempered Water

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.

Additionally, where appropriate, Armstrong can integrate engineering services, turn key installation and project management, system assessment and optimization along with energy conservation measure (ECM) capability through Armstrong Service Incorporated.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

Pre-Piped Tempered Water

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Recirculating Hot Water Systems feature three heat exchanger options offered as pre-piped tempered water packaged assemblies.

Flo-Rite-Temp® Pre-Piped Tempered Water Systems are fully assembled and include the following installation components:

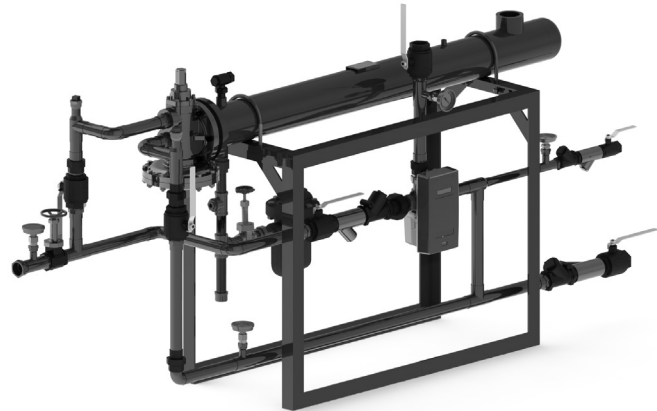
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- DRV Digital Recirculating Valve
“The Brain” (DRV40, DRV50 or DRV80)

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped Tempered Water Systems are designed to fit through a standard 32” doorway (Model 8120 36” doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.



For submittal drawing refer to:		
Model FRT53540	Single Wall	D611544
Model FRT53540BS	Single Wall	D612400
Model FRT535DW40	Double Wall	D611606
Model FRT535DW40BS	Double Wall	D614346
Model FRT66550	Single Wall	D610634
Model FRT66550BS	Single Wall	D614340
Model FRT665DW50	Double Wall	D611724
Model FRT665DW50BS	Double Wall	D614349
Model FRT812080	Single Wall	D611746
Model FRT812080BS	Single Wall	D614343
Model FRT8120DW80	Double Wall	D611775
Model FRT8120DW80BS	Double Wall	D614354

*Note – Maximum temperature outlet set-point on digital recirculating valve is 158°F.

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180*
FRT53540	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT66550	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
FRT812080	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.

*NOTE: If a 8120PP-PTW-DMC1 is selected for parallel operation, a second DRV 80 is recommended to increase the flow rate.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Recirculating Hot Water Systems

Parallel/Redundant Pre-Piped Tempered Water

Flo-Rite-Temp® Instantaneous Steam/Water Heater for Recirculating Hot Water Systems feature three heat exchanger options offered as pre-piped parallel tempered water packaged assemblies.

Flo-Rite-Temp® Pre-Piped Parallel (P) Tempered Water Systems are fully assembled and include the following installation components:

- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- DRV Digital Recirculating Valve
"The Brain" (DRV40, DRV50 or DRV80)

Ideal for both new construction and retrofit installation within an existing building infrastructure Flo-Rite-Temp® Parallel (P) Pre-Piped Tempered Water Systems are designed to fit through a standard 32" doorway (Model 8120 36" doorway).

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 30.

Customized Hot Water System Solutions are our specialty. Multiple orientations, configurations and options are available.

Hot Water System Solutions which include condensate recovery, circulating pumps, additional mixed water temperature controls/loops and varied other components can be engineered to meet specific application requirements.

If unit is operated in parallel then double flow rate given for total available capacity.



For submittal drawing refer to:		
Model FRT535P50	Single Wall	D611564
Model FRT535P50BS	Single Wall	D614359
Model FRT535DWP50	Double Wall	D611676
Model FRT535DWP50BS	Double Wall	D614378
Model FRT665P80	Single Wall	D611513
Model FRT665P80BS	Single Wall	D614362
Model FRT665DWP80	Double Wall	D611730
Model FRT665DWP80BS	Double Wall	D614383
Model FRT8120P80	Single Wall	D612264
Model FRT8120P80BS	Single Wall	D612273
Model FRT8120DWP80	Double Wall	D612276
Model FRT8120DWP80BS	Double Wall	D612282

*Note – Maximum temperature outlet set-point on digital recirculating valve is 158°F.

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180*
FRT535P40	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
FRT665P50	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
*FRT8120P80	40	145	145	120	95	59
	50	145	145	134	102	72
	60	-	145	145	115	90

NOTE: All flow rates in gallons per minute and using 15 PSIG steam.

*NOTE: If a 8120PP-PTW-DMC1 is selected for parallel operation, a second DRV 80 is recommended to increase the flow rate.

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Digital

The Brain® Model DRV40

DRV40 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system.

Digital technology provides enhanced water temperature control accuracy which resists zero system demand "Temperature Creep" without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat).

Operational Specifications

- +/-2°F water temperature control at points of use 25' (7.7 m) downstream during demand
- +/-2°F water temperature control at the DRV during zero system demand "idling" periods
- 2°F minimum valve inlet to outlet temperature requirement (system recirculation temperature loss)
- Automatic shutoff of hot water flow upon cold water inlet supply failure
- Automatic shutoff of hot water flow in the event of a power failure
- Programmable set point range of 81-158°F (27-70°C)
- Programmable thermal disinfection mode
- Programmable 1st level hi/lo temp alarm display
- Programmable temperature error level for safety shutdown

Technical Specifications

- 100-240 V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction
- Lead Free compliant
- Maximum inlet HW supply temperature 185°F (85°C)
- Minimum Circulation Flow - 5 GPM (19 LPM)
- Minimum System Draw Off - 0
- ASSE 1017, CSA B125 and CE Certified
- Operational water pressure of 10 -150 psig (.7-10 bar)
- Display in °C or °F
- Shipping weight 15 lbs (6.8 kg)

Connectivity

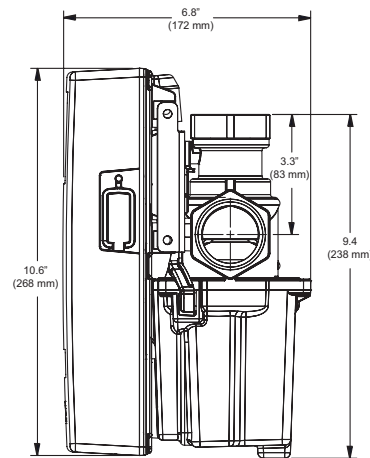
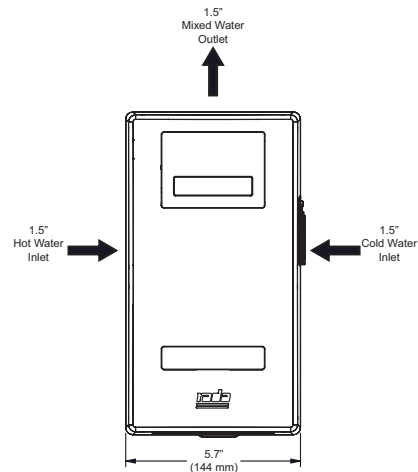
SPCO Relay Outputs – Relay which is energized during operation.

LCD Display – Provides information on set point, delivered temperature, error codes and alert conditions.

RS485 Serial Port – Connects the DRV to either BrainScan or Modbus.

BrainScan® – BAS interface for Modbus, Bacnet™ or LonWorks™ plus operates as a web server.

Modbus – DRV can be configured to communicate directly with Building Automation Systems (BAS) using Modbus RTU protocols.



For a DRV40 submittal drawing, refer to D41578.

Recirculation Systems - Digital (gpm)

Model	Pressure Drop (psi)				Minimum System Draw-Off	Maximum Flow @7.5 ft/sec.	C _v
	5	10	15	20			
DRV40	48	70	85	98	0	41	22

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



Digital

The Brain® Model DRV50/80

DRV80 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system.

Digital technology provides enhanced water temperature control accuracy which resists zero system demand “Temperature Creep” without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat).

Operational Specifications

- +/-2°F water temperature control at points of use 25' (7.7 m) downstream during demand
- +/-2°F water temperature control at the DRV during zero system demand “idling” periods
- 2°F minimum valve inlet to outlet temperature requirement (system recirculation temperature loss).
- Automatic shutoff of hot water flow upon cold water inlet supply failure
- Automatic shutoff of hot water flow in the event of a power failure
- Programmable set point range of 81-158°F (27-70°C)
- Programmable thermal disinfection mode
- Programmable 1st level hi/lo temp alarm display
- Programmable temperature error level for safety shutdown

Technical Specifications

- 100-240 V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction – Lead Free compliant
- DRV80 3” NPT
- DRV50 2” NPT*
- Maximum inlet HW supply temperature 185°F (85°C)
- Minimum Circulation Flow – 10 GPM (38 LPM)
- Minimum System Draw Off - 0
- ASSE 1017, CSA B125 and CE Certified
- Operational water pressure of 10-150 psig (.7-10 bar)
- Display in °C or °F
- Shipping weight 43 lbs (19.5 kg)

Connectivity

SPCO Relay Outputs – Relay which is energized during operation.

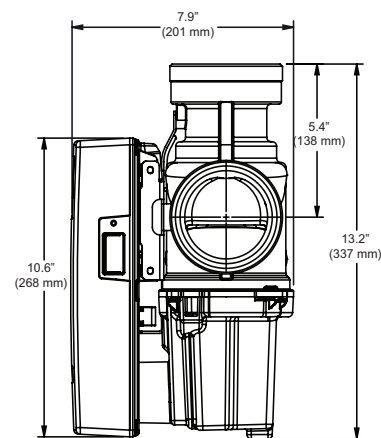
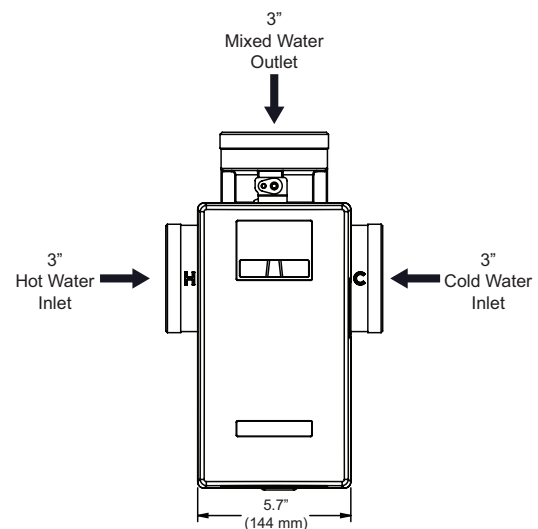
LCD Display – Provides information on set point, delivered temperature, error codes and alert conditions.

RS485 Serial Port – Connects the DRV to either BrainScan or Modbus.

BrainScan® – BAS interface for Modbus, Bacnet™ or LonWorks™ plus operates as a web server.

Modbus – DRV can be configured to communicate directly with Building Automation Systems (BAS) using Modbus RTU protocols.

*DRV50 is a DRV80 supplied with 3” x 2” Bushings at the inlets and outlet.



For a DRV50 submittal drawing, refer to D40864.
For a DRV80 submittal drawing, refer to D41579.

Recirculation Systems - Digital (gpm)							
Model	Pressure Drop (psi)				Minimum System Draw-Off	Maximum Flow @7.5 ft/sec.	C _v
	5	10	15	20			
DRV80	94	133	163	188	0	165	42

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Connectivity

The integral RS 485 Serial Port on The Brain® Digital Recirculating Valve (DRV) can be used to connect the DRV to either BrainScan® or directly to a Building Automation System (BAS) which operates on a Modbus RTU protocol.

BrainScan®

BrainScan® is an optionally selected control module from Armstrong which enables an interface with Building Automation Systems (BAS) which utilize Modbus, Bacnet™ or LonWorks™ protocols via the use of specific processor cards.

BrainScan® also has an ethernet port and operates as a web server for remote network access.

BrainScan® includes remote hot water supply, cold/recirculation water supply, blended water outlet temperature outputs and is supplied with a system graphic, memory card for data storage and web based software.

BrainScan® includes terminals for additional installer supplied RTD's, pressure transducers and pulse type flow meters and this data can be forwarded via the BrainScan® interface.

Modbus

Modbus – DRV can be configured to communicate directly with BAS which use Modbus RTU protocols.

When configured for Modbus the DRV becomes a Remote Terminal Unit (RTU).

The BAS will need to be using a Modbus RTU format.

When connected directly to a BAS using Modbus, the DRV can be assigned a unique network address which is programmed via the integral DB9 external port.

RS485 Port

The integral RS485 Serial Port provides an ability to remotely program the DRV and update the firmware via BrainScan® or Modbus.

The integral RS485 Serial Port can receive the following outputs from the DRV and communicate them via BrainScan® or Modbus.

- Set Point
- Inlet/Outlet Temperature
- Over Temperature Alert

The integral RS485 Serial Port can receive the following self-diagnostic error messages from the DRV and communicate them via BrainScan® or Modbus

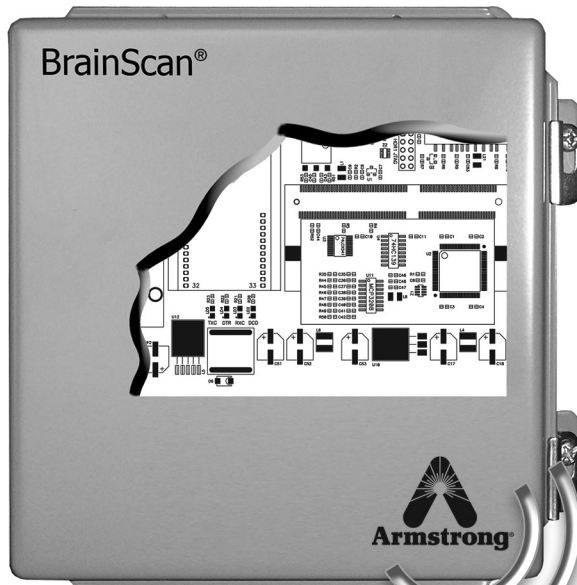
- Over Temperature Error
- PCB Error
- Thermistor Error
- Motor Error/Emergency Mode
- Battery Error

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Flo-Rite-Temp® Instantaneous Steam/Water Heater



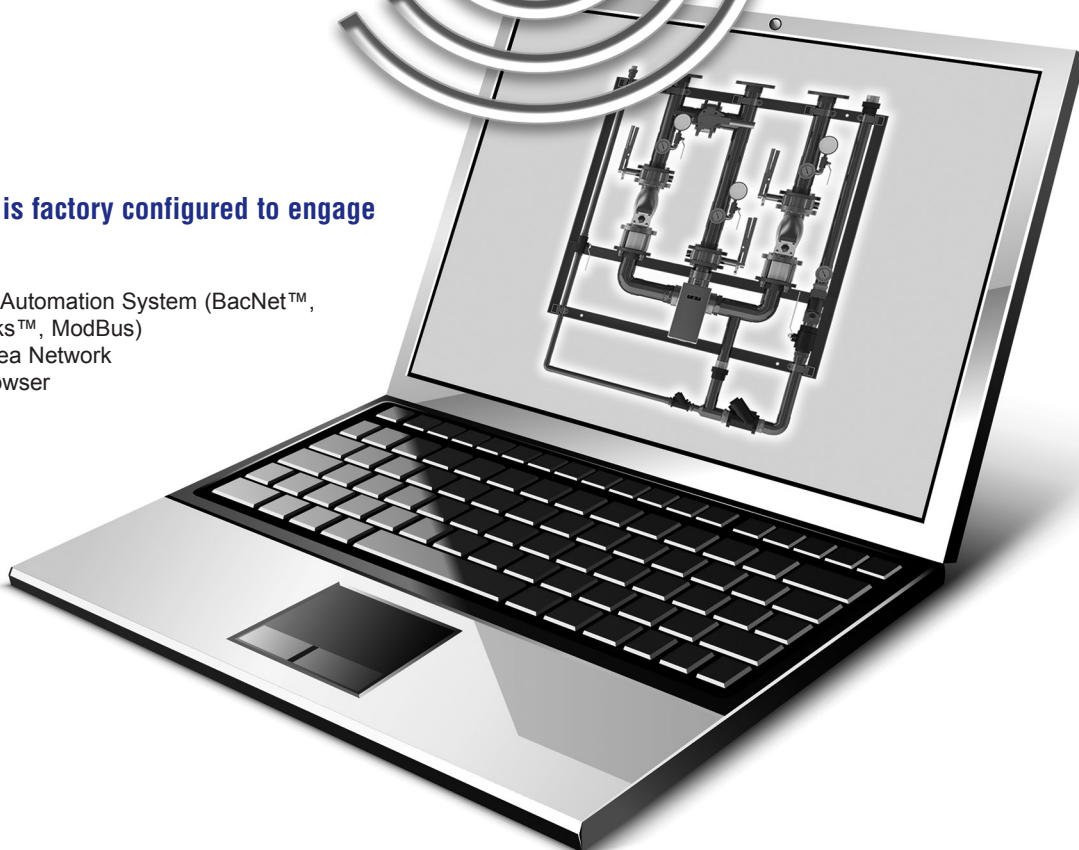
BrainScan®



BrainScan® is a Digital Hot Water Management System optionally supplied with all Tempered Water Packages featuring “The Brain” Digital Recirculating Valve.

BrainScan® is factory configured to engage with:

- Building Automation System (BacNet™, LonWorks™, ModBus)
- Local Area Network
- Web Browser



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



Flo-Rite-Temp® Instantaneous Steam/Water Heater

Specification Matrix

Flo-Rite-Temp® water heaters are available in four base models each sized with a prefix that denotes the shell size in inches (5", 6" and 8") and a suffix that denotes the flow rate at a 100°F temperature rise (35 gpm, 65 gpm and 120 gpm).

Each Flo-Rite-Temp® model's heat exchanger is single wall construction as standard but is optionally available as a Double Wall (suffix **DW**).

Each Flo-Rite-Temp® model is supplied as a shell and tube style heat exchanger with integral mixing valve/head and is also available as a pre-piped "Packaged Solution".

Flo-Rite-Temp® Packaged Solutions are also available with a second heater (parallel) for increased flow capacity, redundant installation or both.

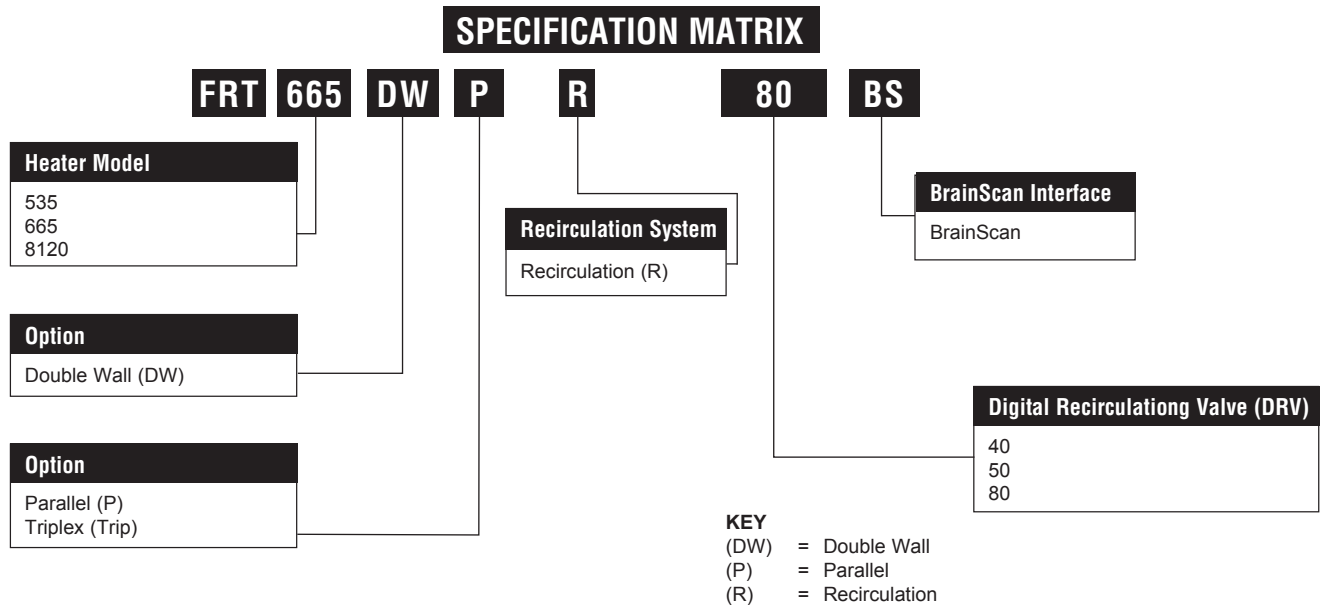
Flo-Rite-Temp® Packaged Solutions are supplied for either point of use "dead-leg" (non-recirculating) applications, or can be pre-piped with a thermostatic diverting valve for recirculation (R) control.

Flo-Rite-Temp® Packaged Solutions designated as Tempered Water Systems include an on board Digital Recirculating Valve (DRV40/50/80).

Higher flow Flo-Rite-Temp® Packaged Solutions and Systems designed with built-in redundancy can include two DRV's (40/40, 50/50, 80/80).

BrainScan®, a Digital Hot Water Management System Console, can be added by adding the suffix BS with a hyphen. Flo-Rite-Temp® packaged systems fitted as DRV can connect BrainScan® directly to the serial port on the DRV40/50/80.

When Integrated accordingly BrainScan® is configured for most building automation systems which use BacNet™, LonWorks™ and ModBus protocols. BrainScan® also avails LAN and Web Browser connectivity options.



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Armstrong provides intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions while providing an “enjoyable experience.”



Armstrong Hot Water Group
221 Armstrong Blvd., Three Rivers, MI 49093 - USA Phone: 269-279-3602, Fax: 269-279-3130

armstronginternational.com

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