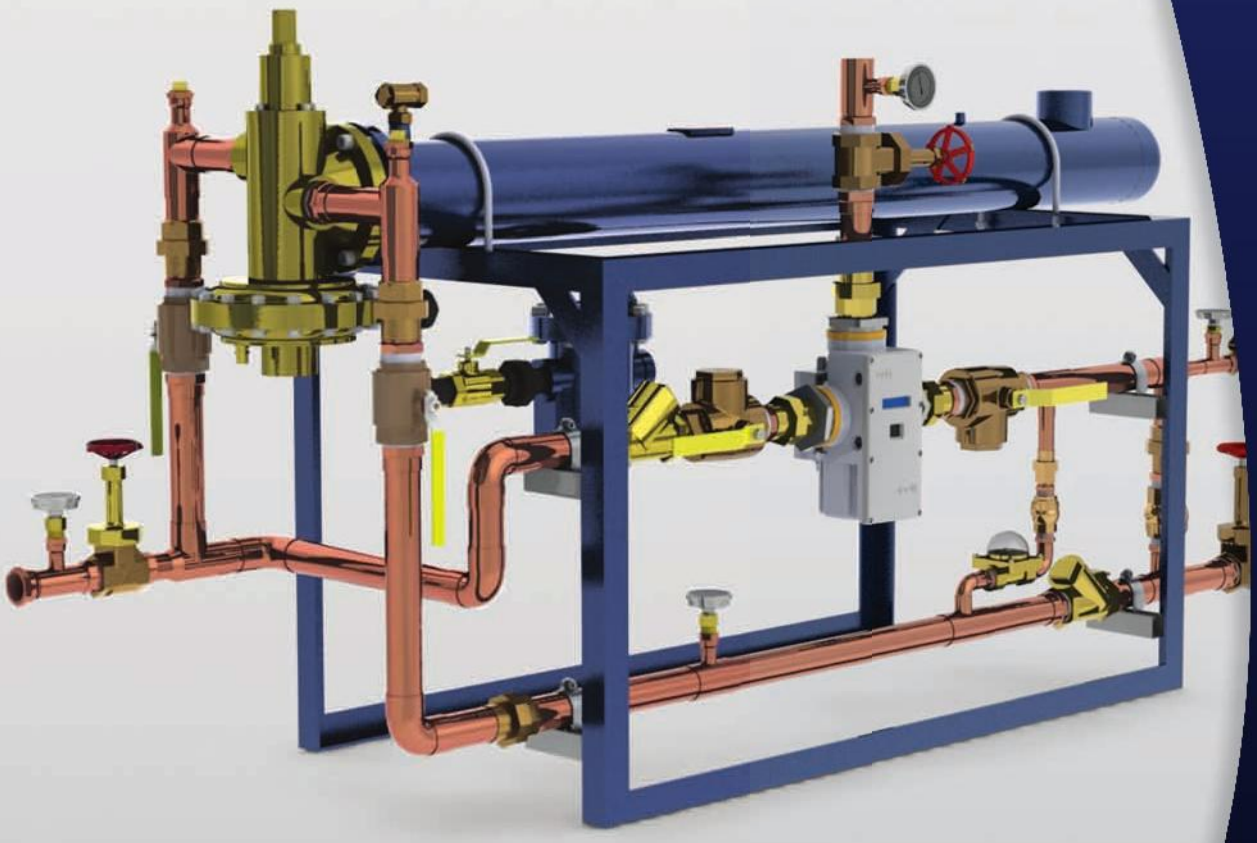
Water Heating & Water Temperature Control

- Feed Forward
- Digital



Armstrong®

Flo-Rite-Temp® Instantaneous Steam/Water Heater

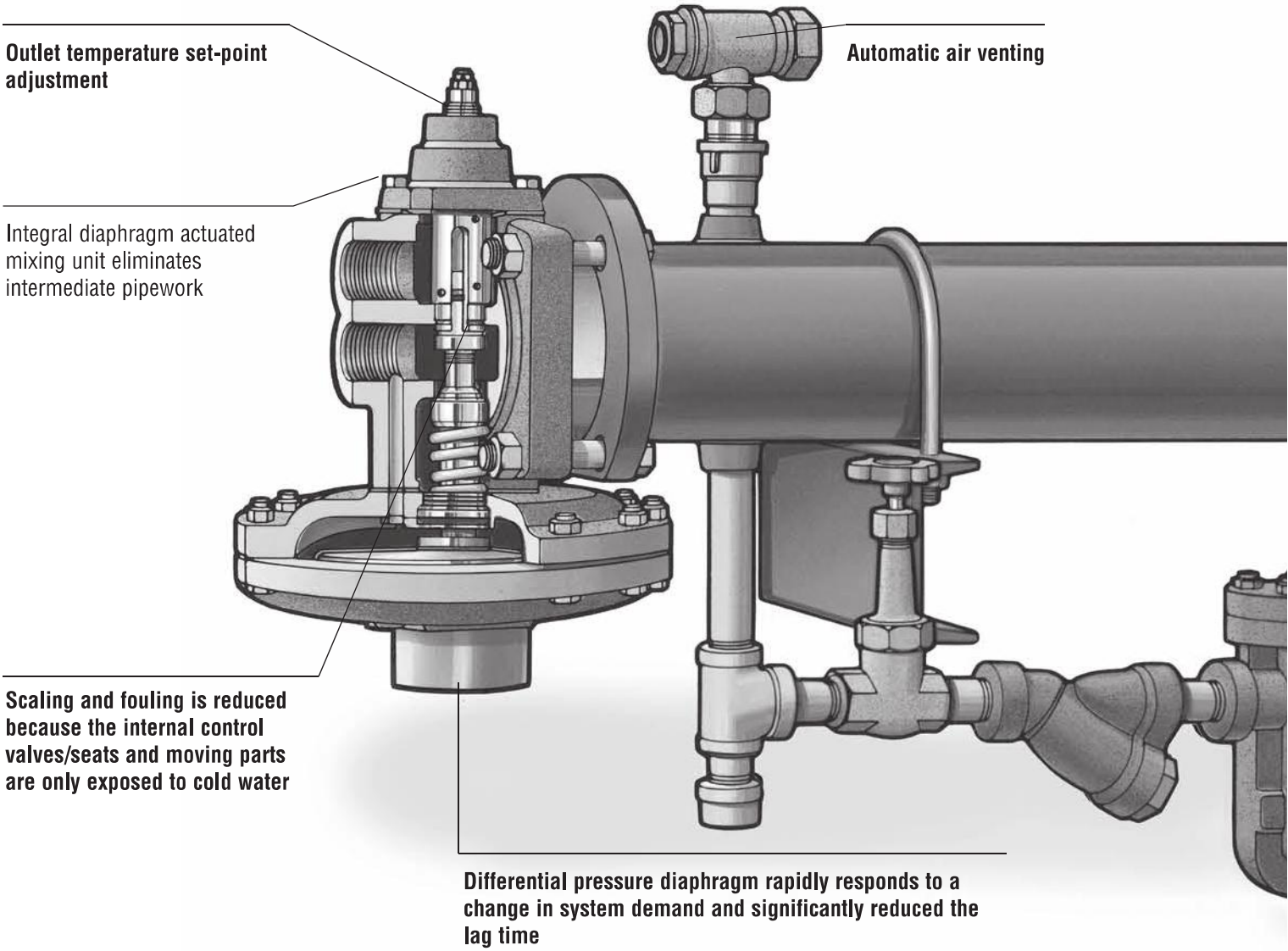
The Flo-Rite-Temp® instantaneous Steam/Water heater has a unique feed forward design which features a differential pressure diaphragm actuated mixing unit integral to a shell and tube heat exchanger.

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 (2-15PSI) 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.



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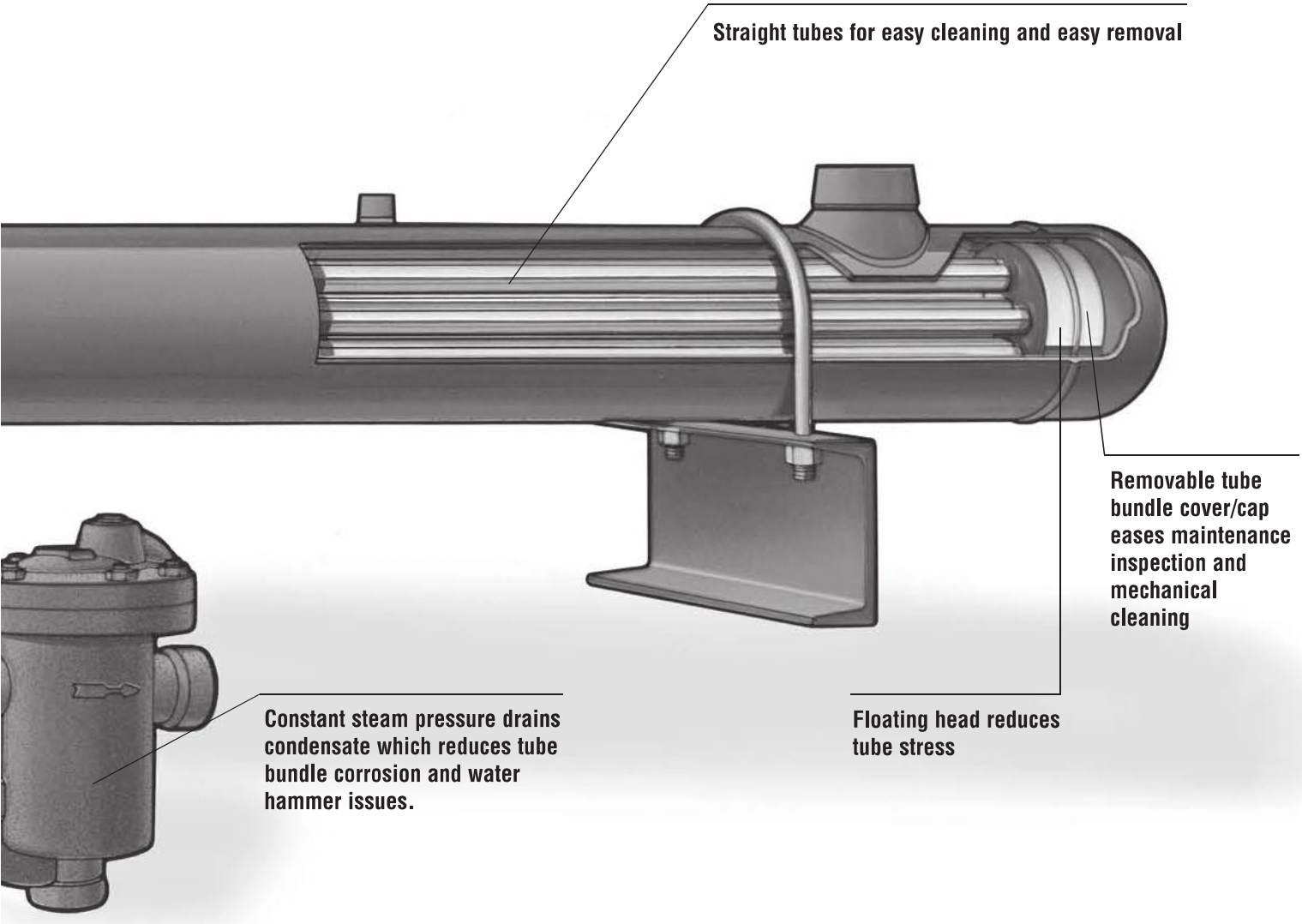
Temperature Control and User Safety
Capable of controlling outlet temperatures +/- 4F, this principal of operation offers the additional relevant benefit of reducing the waterborne bacterial content of the water during the overheating process. In addition, with no water storage requirement, Flo-Rite-Temp® 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 Stainless Steel Sizing Chart

Capacities and Steam Loads

Inlet Temp. °F	Set Temp. °F	Standard: Hot Water Capacities* Steam Pressure psig 2	5	10	15 (gpm)	Standard: Steam Capacities Steam Pressure psig 2	5	10	15 (lbs/hr)	Inlet Temp. °C	Set Temp. °C	Metric: Hot Water Capacities* Steam Pressure bar 0.14	0.35	0.7	1 (m^3/h)	Metric: Steam Capacities Steam Pressure bar 0.14	0.35	0.7	1 (kg/h)	Model
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.

Recirculating Hot Water Systems

Pre-Piped Tempered Water

Flo-Rite-Temp® Instantaneous Steam/Water Heaters-Recirculating Hot Water Systems feature four single heat exchanger and four 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:

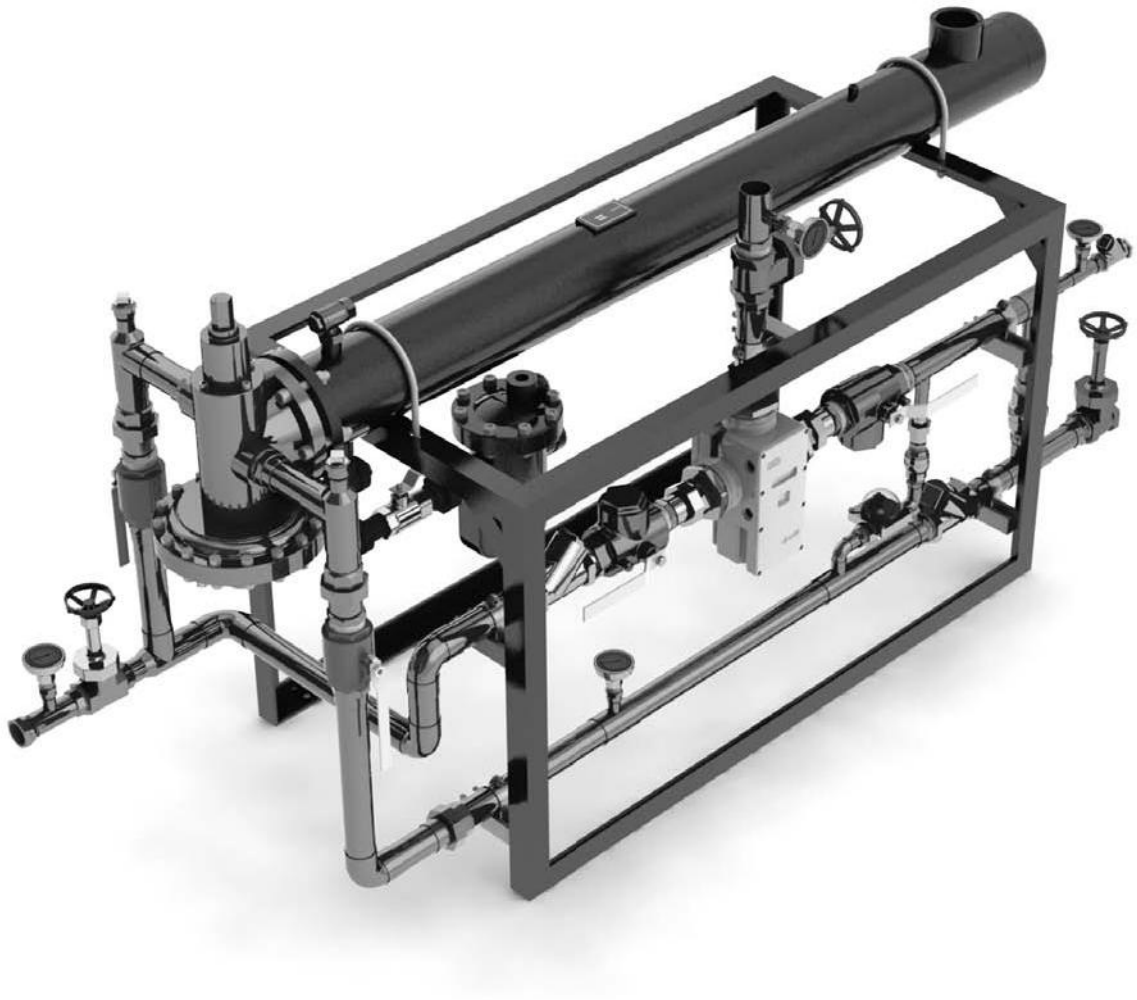
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- DRV 80 “The Brain” Digital Recirculating Valve

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 DRV 80 “The Brain”.

DRV 80 delivers +/- 2F temperature control for systems which experience diverse user draw-off between 0-150GPM. DRV80 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 DRV 80 is detailed on page 27.



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Recirculating Hot Water Systems

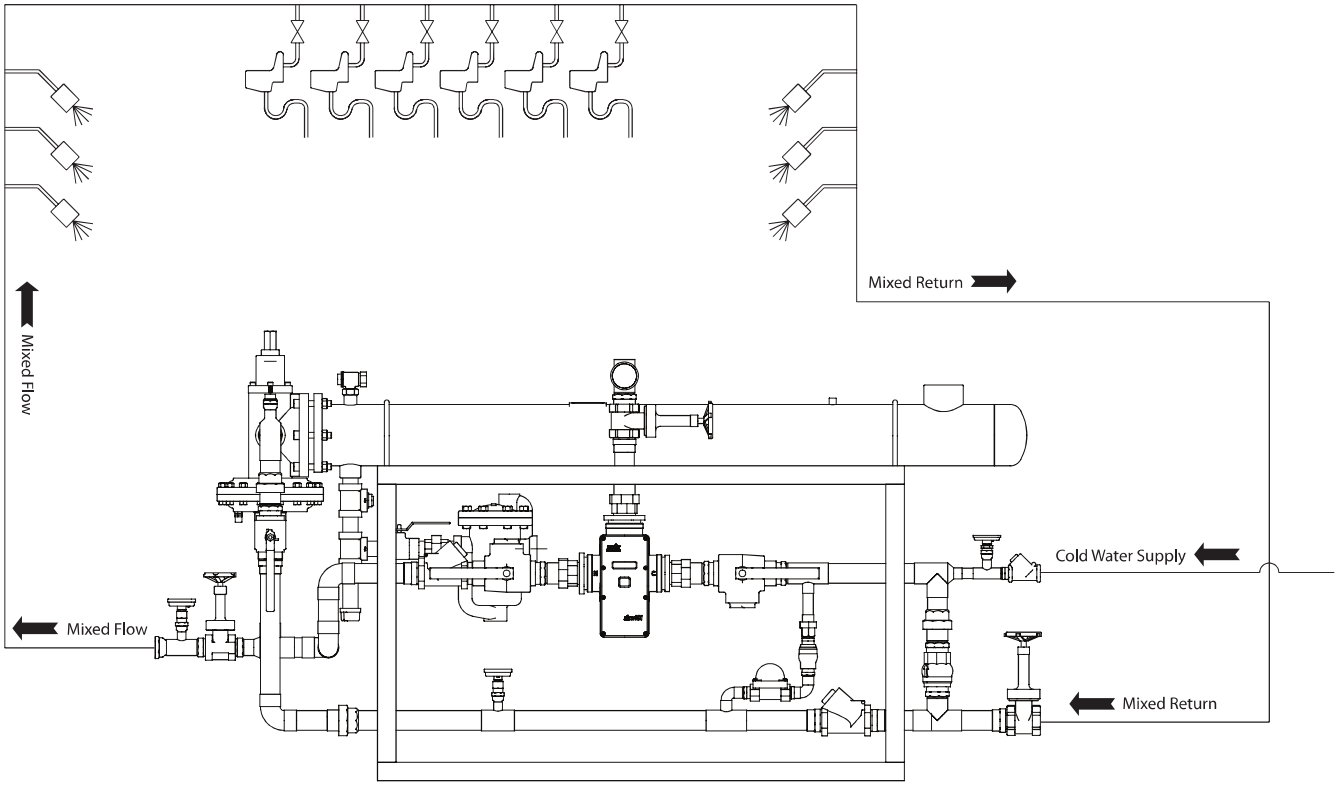
Pre-Piped Tempered Water

Armstrong Flo-Rite-Temp® Instantaneous Steam/Water Heater pre-piped packages are available in standard configurations per the specification matrix on page 26.

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 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.



Recirculating Hot Water Systems

Pre-Piped Tempered Water (P-PTW)

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

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

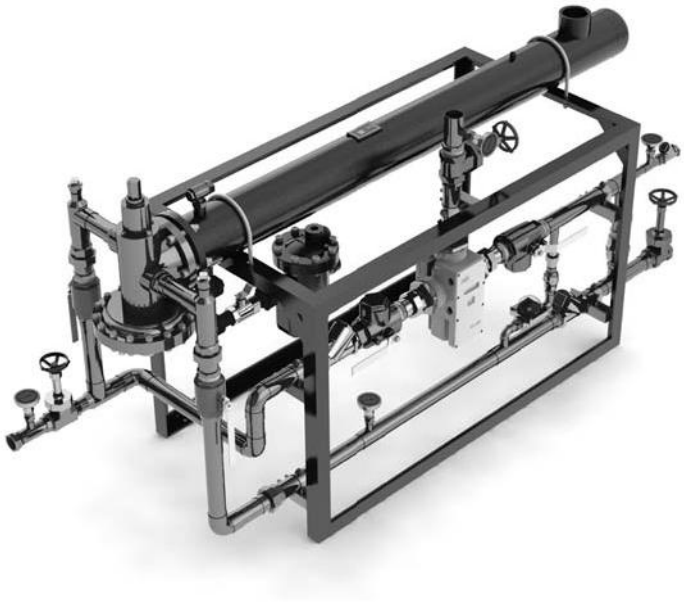
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- DRV 80 Digital ReCirculating Valve "The Brain" (DMC 1)

Ideal for both new construction and retrofit installation within an existing building infrastructure. Flo-Rite-Temp® Pre-Piped (P-P) Tempered Water (TW) 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 26.

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 application engineered specifically to meet the projects requirements.



For submittal drawing refer to:		
Model 415P-PTW-EMC1	Single Wall	S5476
Model 415DWP-PTW-EMC1	Double Wall	S5522
Model 535P-PTW-DMC1	Single Wall	S5477
Model 535DWP-PTW-DMC1	Double Wall	S5523
Model 665P-PTW-DMC1	Single Wall	S5478
Model 665DWP-PTW-DMC1	Double Wall	S5524
Model 8120P-PTW-DMC1	Single Wall	S5479
Model812DWP-PTW-DMC1	Double Wall	S5525

**Note – Maximum temperature outlet set-point on digital recirculating valve is 160°F.*

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180*
415P-PTW-EMC1	40	20	18	16	12	7
	50	20	20	17	13	7
	60	-	20	19	14	7
535P-PTW-DMC1	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
665P-PTW-DMC1	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
8120P-PTW-DMC1	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.

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Flo-Rite-Temp® Instantaneous Steam/Water Heater

Recirculating Hot Water Systems

Parallel/Redundant Pre-Piped Tempered Water (PP-PTW)

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

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

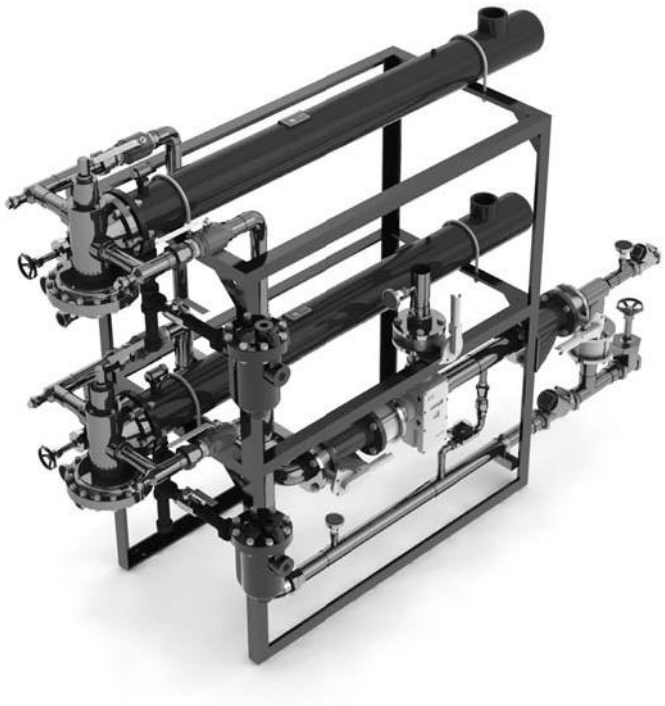
- Steam Trap
- Air Vent
- Thermometers
- CIP connection port
- Flow Control/Isolation Valves
- DRV 80 Digital ReCirculating Valve "The Brain" (DMC 1)

Ideal for both new construction and retrofit installation within an existing building infrastructure Flo-Rite-Temp® Parallel (P) Pre-Piped (P-P) Tempered Water (TW) 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 26.

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 application engineered specifically to meet the projects requirements.



For submittal drawing refer to:		
Model 415PP-PTW-EMC1	Single Wall	S5480
Model 415DWPP-PTW-EMC1	Double Wall	S5526
Model 535PP-PTW-DMC1	Single Wall	S5481
Model 535DWPP-PTW-DMC1	Double Wall	S5527
Model 665PP-PTW-DMC1	Single Wall	S5482
Model 665DWPP-PTW-DMC1	Double Wall	S5528
Model 8120PP-PTW-DMC1	Single Wall	S5483
Model 8120DWPP-PTW-DMC1	Double Wall	S5529

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

Flo-Rite-Temp™ Instantaneous Steam/Water Heater						
Model	Entering Water Temperature	Outlet Temperature				
		120	130	140	160	180
415PP-PTW-EMC1	40	20	18	16	12	7
	50	20	20	17	13	7
	60	-	20	19	14	7
535PP-PTW-DMC1	40	45	39	34	26	16
	50	45	43	37	28	17
	60	-	45	40	30	18
665PP-PTW-DMC1	40	80	73	63	48	32
	50	80	80	68	51	33
	60	-	80	75	55	35
*8120PP-PTW-DMC1	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.

Digital Water Temperature Control

Flo-Rite-Temp® Pre-Piped (P-P) Single, Parallel (P) Recirculating (R) Single and Multiple Temperature Systems are available with a DRV 80 Digital Recirculating Valve. The DRV 80 "The Brain" is supplied pre-piped as an integral component to the Water Heater assembly in the form of a Digital Mixing Center (DMC).

Model DMC 1 features a single DRV 80 pre-piped and pressure tested complete with isolation valves, strainers, mixed return flow indicator, check valves, thermometers and an optionally selected system circulating pump for systems which experience diverse user draw-off from 0 to 150 GPM.

Remote Control, System Monitoring,System Interrogation and Data Logging

Model DMC 1 is provided as standard with an integral Mixed Outlet Water sensor and Remote Set Point Adjustment capability for "plug and play" system communication via PC, LAN or resident Building Automation System.

Model DMC1 offers an integral relay point for connection to a selected accessory component such as a pump on/off switch, to activate/deactivate a solenoid or to enable an audible alarm etc.

Model DMC1 is supplied as standard with integral Hot Water & Cold Water/System Return Water sensors and a serial connection data port which enables communication to third party system hardware via an accessory component called BrainScan®.

BrainScan®

BrainScan® is an optionally selected Digital Hot Water Management System from Armstrong complete with custom configured software. BrainScan® connects to the integral serial connection data port on DRV 80 and enables a direct onward connection to Building Automation Systems which utilize BacNet™, Lonworks™ and ModBus protocols, a communication capability with other Building Automation Systems which connect via an RS485 port and an Ethernet port for Web access.

Operational Specifications

The enhanced accuracy possible with DRV80 digital technology, combined with its data input/output communication capability equals:

- Accurate control of blended water drawn from the system at a point of use typically within +/-2°F at draw off points a minimum of 5m downstream of mixing valve during consistent system demand periods
- Operational water pressure of 10 -150 psig
- Minimum valve inlet to outlet temperature differential requirement (system recirculation temperature loss) of 2°F

- 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
- Maintain a consistent system "idling" temperature and control Temperature Creep without the use of a manual throttling device or balance valve.
- System shall not require a temperature activated pump shut-off device (aquastat).
- Programmable set point range of 100-160°F (37-71°C) plus full hot/full cold
- Ability to thermally disinfect at recommended temperatures
- Programmable 1st level hi/lo temp alarm display
- Programmable temperature error level for safety shutdown

Technical Specifications

- 100-240 V Power supply (12 V DC output)
- 2 x 4-20 mA current loop interfaces:
  Input: Setpoint Selection
  Output: Measured Blend Temperature
- Relay output: Contacts
  Error Relay: Activated in alarm or error mode
- Serial Connection Data Port
- Stainless Steel Construction

DMC 1

Supplied as a pre-plumbed, pressure-tested and mounted to an enameled steel frame comprising:

- 1 ea: DRV 80 Digital Recirculation System Controller
- 3" inlet/outlet piping with flanged connections
- System isolation valves,
- Inlet strainers
- Mixed return flow indicator
- Check valves
- Thermometers

DMC 12

As above with system circulating pump.

BrainScan™

BrainScan™ is a Digital Hot Water Management System optionally supplied with DRV80 Digital Recirculating Valves and DRV80 based Digital Mixing Centers.

BrainScan™ is factory configured to engage with either a Local Area Network (LAN), a third party Building Automation System (BAS) or an Internet Service Provider (ISP) to enable the DRV80's integral monitoring features.

Standard BrainScan™ configurations include hardware and software options which include on screen system graphics which are compatible with most standard Building Automation System open protocols.

All of the standard alarm conditions and error messages available through the DRV80 are also available through BrainScan™. BrainScan™ is available in three (3) different configuration packages as described below:

BrainScan™ 1

Includes remote hot water supply, cold/recirculation water supply and blended water outlet temperature readings. Also gives the ability to remotely change blended water outlet temperature setpoint. Included with all BrainScan™ options is the valve/system graphic.

BrainScan™ 2

Provided as BrainScan™ 1 with hot water supply, cold water supply and blended water outlet pressure transmitters.

BrainScan™ 3

Provided as BrainScan™ 2 with blended water outlet and recirculation return flow meters. These can be used to calculate water usage.

Technical Specifications

- BrainScan™ utilizes the SoM-5282 System Module as the processing engine and uClinux as the operating system
- BrainScan™ accommodates a socket for a protocol translator module that is capable of communicating with BacNet™, LonWorks™ and ModBus
- Standard ethernet port available to bring system on to the internet via a secured HTTP network server
- System displays "real time" values as well as stored data to be downloaded by the facility into their preferred program
- Data storage and exporting is done via XML formatted files, written every 15 minutes

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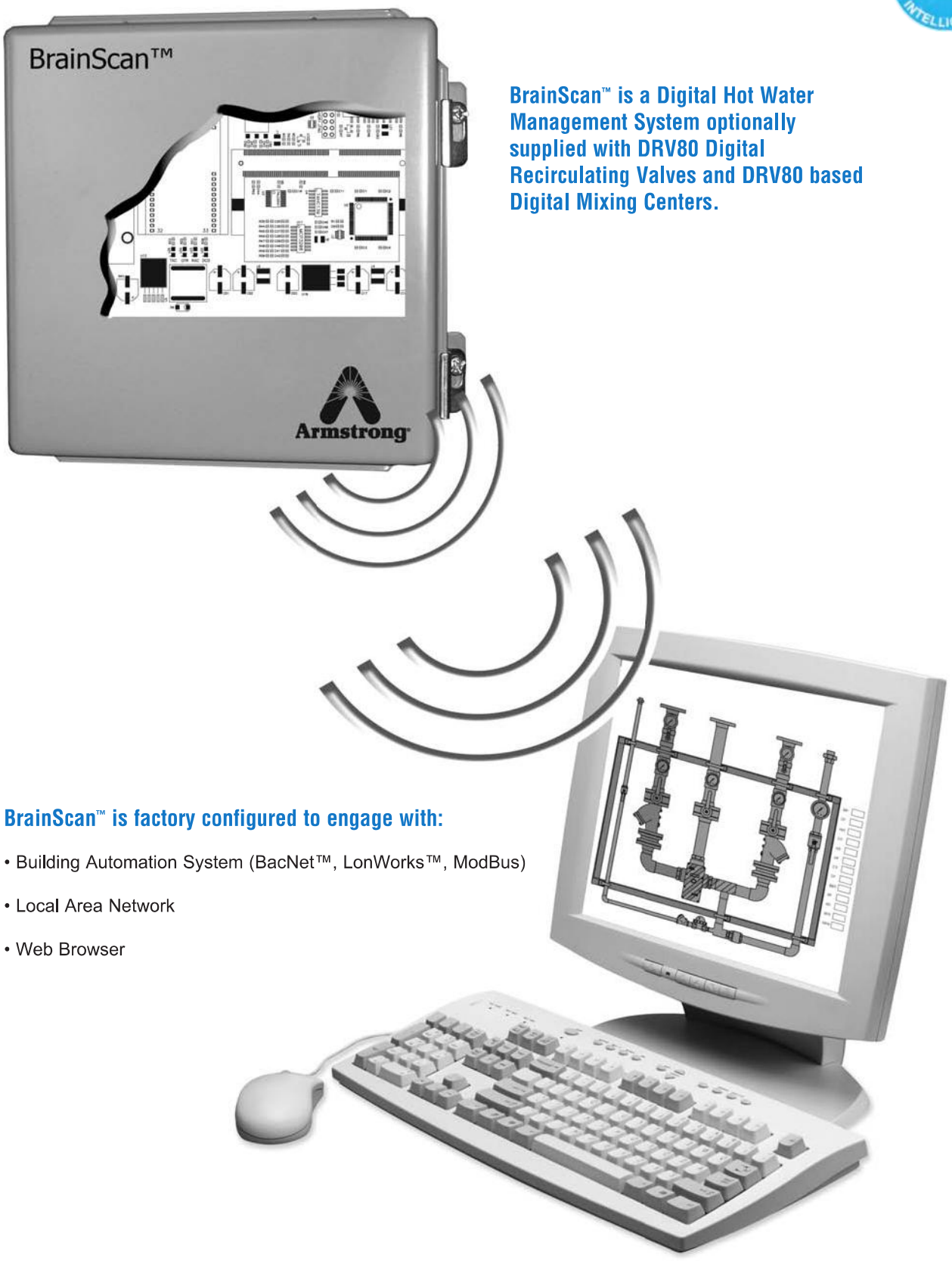
BrainScan™



BrainScan™ is a Digital Hot Water Management System optionally supplied with DRV80 Digital Recirculating Valves and DRV80 based Digital Mixing Centers.

BrainScan™ is factory configured to engage with:

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