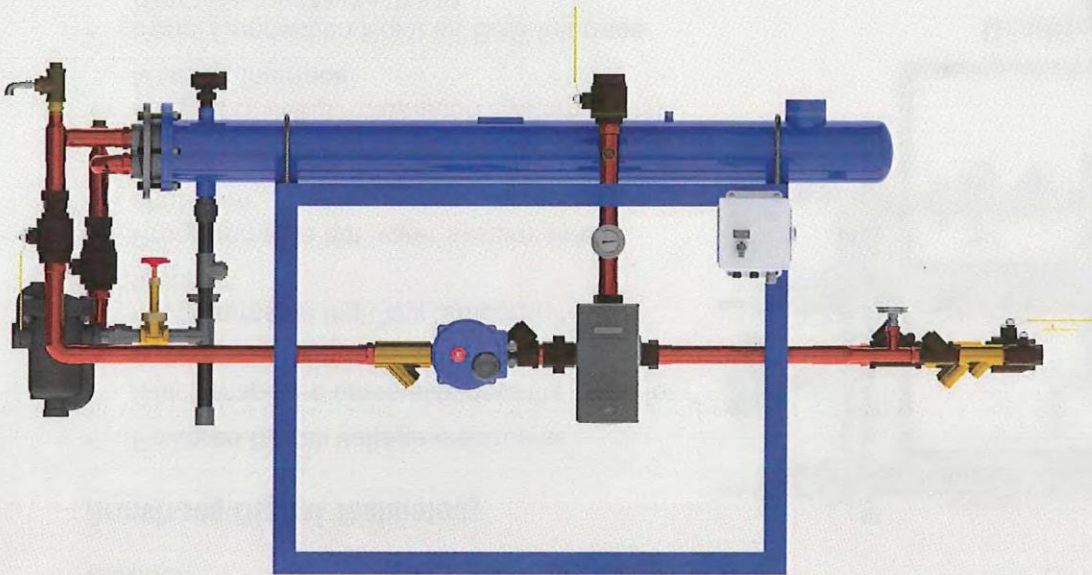


**Digital-Flo®
Instantaneous
Hot Water**



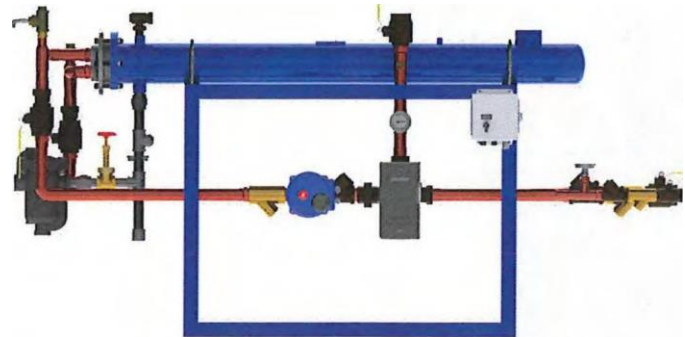
Armstrong®

Armstrong • Digital-Flo® Instantaneous Hot Water

Armstrong blends revolutionary digital water temperature control technology with instantaneous heat exchanger design to deliver Digital-Flo®, an industry changing series of Shell & Tube Steam/Water Heaters.

Digital-Flo uses digital technology featuring The Brain® Digital Recirculating Valve (ORV) to offer a level of hot water system temperature control accuracy previously considered unattainable.

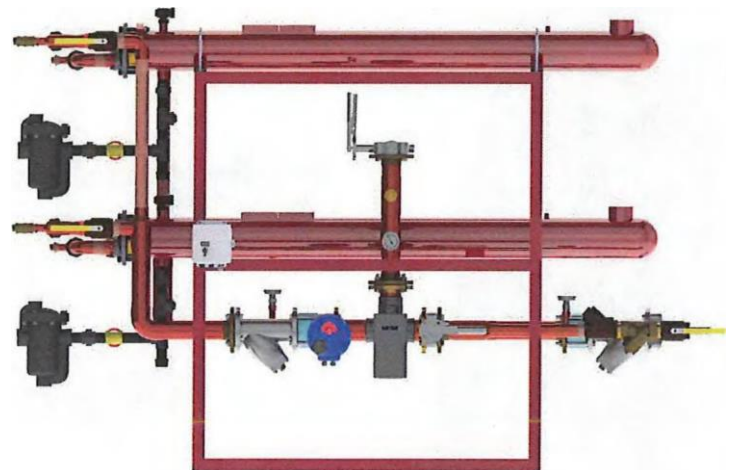
Digital-Flo is compatible with Building Automation Systems on the BACnet™, LonWorks™, Modbus protocols and can be remotely programmed from and performance data is accessible by a Web browser.



Single Wall

Armstrong Digital Technology

- Powered by low voltage electronics
- Quick response times eliminate the need for pneumatic control valves
- Programmable high/low temperature alert function
- Programmable hot water system safety shutdown
- Self Diagnostic Display Messaging
- Integral Building Automation System (BAS) Modbus Interface
- Serial Connection Point for BAS Interface (BACnet, LonWorks, Web)
- Simplified system commissioning



Double Wall

Armstrong Heat Exchange Technology

- Constant steam pressure prevents stall - no pump trap
- Low surface temperature option for hard water applications
- Instantaneous - No Storage
- Water raised above Legionella survival temperature

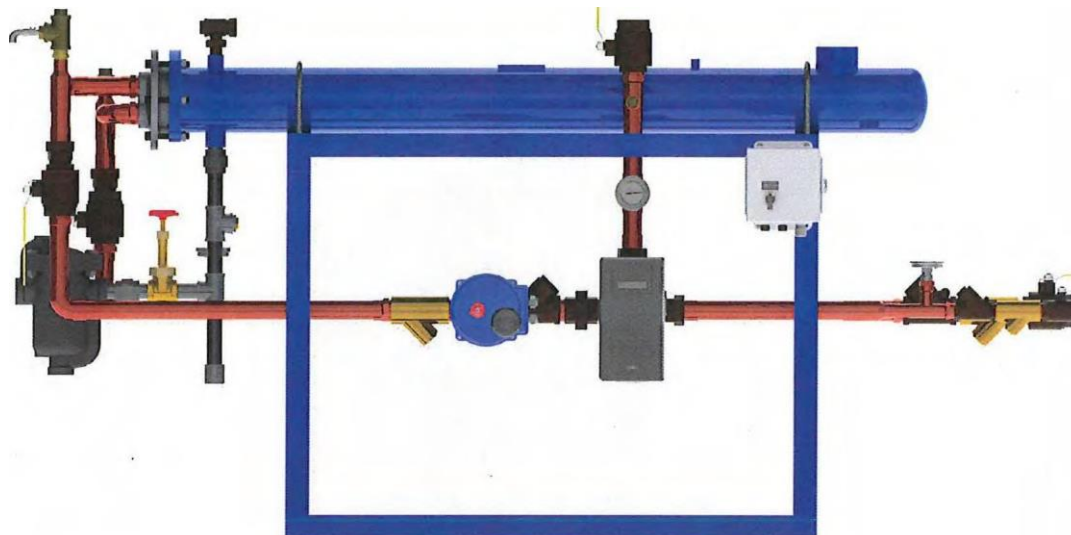
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

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

Recirculating Valve (DRV40 & DRV80)



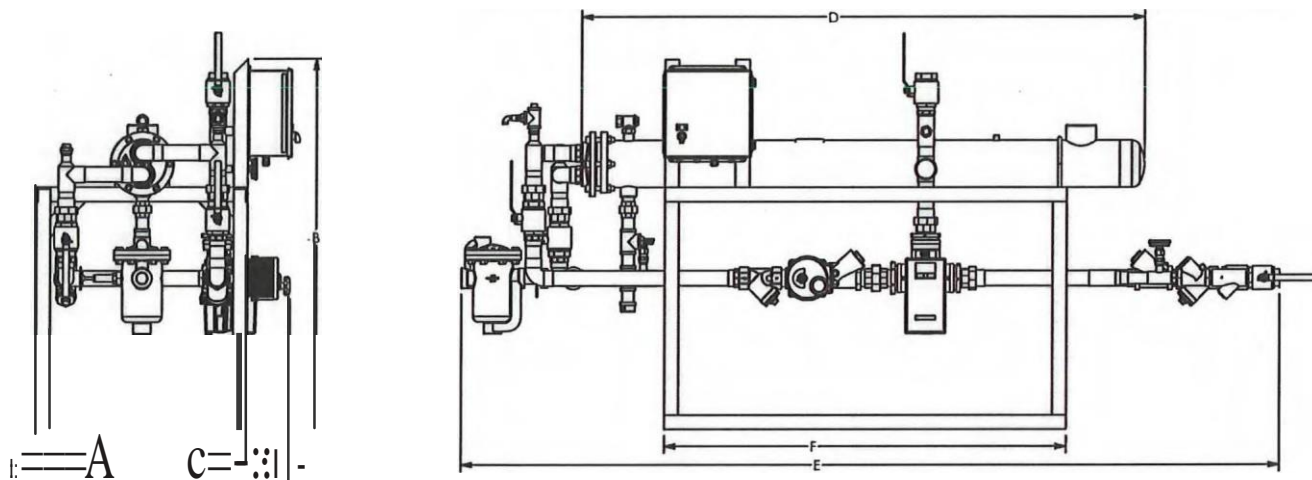
Arng · Digital-Flo®Shell & Tube Heat Exchanger Single Wall



Digital Shell Tube		Water Side			Steam Side		
Model	Part Number	Connections @ 7.5 t/sec (2.3 m/s)		Flow @ 7.5/sec (2.3 m/s)	Connections		Capacity @ 15 psi (1 bar)
		HoVCold	Reclrc.	Capacity @ 9D°F (5D°C) Della T Typical @ 120°F (49°C) Selpoint	Steam Inlet	Condensate Outlet	
DF41540	0589672	1-	1-	18 GPM	2 NPT	3/4 NPT	858 lb/hr (389 kg/hr)
DF41540BS	0589680	1"	1-	18 GPM	2 NPT	3/4 NPT	858 lb/hr (389 kg/hr)
DF415P40	0589682	1-112-	1"	36 GPM	2 NPT	3/4 NPT	1,716 lb/hr (778 kg/hr)
DF415P409S	0589684	1-112-	1"	36GPM	2 NPT	3/4 NPT	1,716 lb/hr (778 kg/hr)
DF53540	0589701	1-1/2"	1-	41 GPM	2-1/2 NPT	1 NPT	1,954 lb/hr (886 kg/hr)
DF53540BS	0589705	1-1/2"	1-	41 GPM	2-1/2 NPT	1 NPT	1,954 lb/hr (886 kg/hr)
DF535P50	0589709	2-	1-1/2"	73 GPM	2-1/2 NPT	1 NPT	3,479 lb/hr (1,578 kg/hr)
DF535P509S	0589711	2-	1-1/2"	73 GPM	2-1/2 NPT	1 NPT	3,479 lb/hr (1,578 kg/hr)
DF66550	0589747	2-	1-112-	73 GPM	3 NPT	1-1/4 NPT	3,479 lb/hr (1,578 kg/hr)
DF66550BS	0589756	2-	1-1/2"	73GPM	3 NPT	1-1/4 NPT	3,479 lb/hr (1,578 kg/hr)
DF665P80	0589758	3'	2'	165 GPM	3 NPT	1-1/4 NPT	7,720 lb/hr (3,502 kg/hr)
DF665P809S	0589760	3'	2'	165 GPM	3 NPT	1-1/4 NPT	7,720 lb/hr (3,502 kg/hr)
DF812080	0589781	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120809S	0589783	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120P80	0589787	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120P809S	0589789	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)

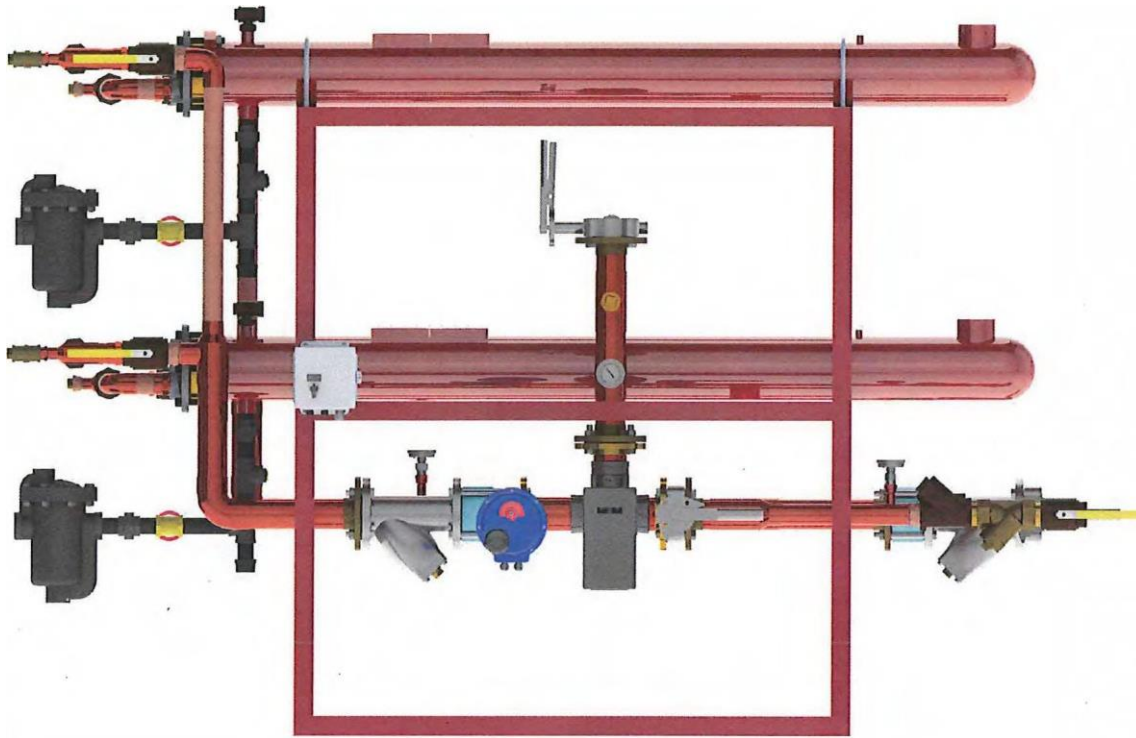
Digital-Flo® Shell & Tube Heat Exchanger Single Wall

Armstrong•



Dimensions and Weight							
Model	Dimensions In(mm)						Weight
	A	B	C	D	E	F	
DF41540	20.0 (508)	43.2 (1,097)	25.4 (645)	54.7 (1,389)	72.3 (1,837)	36.0 (915)	385
DF41540BS	20.0 (508)	52.0 (1,321)	25.4 (645)	54.7 (1,389)	72.3 (1,837)	36.0 (915)	410
DF415P40	200 (508)	75.5 (1,918)	26.4 (670)	54.7 (1,389)	79.8 (2,027)	36.0 (915)	580
DF415P40BS	20.0 (508)	75.5 (1,918)	26.4 (670)	54.7 (1,389)	79.8 (2,027)	36.0 (915)	605
DF53540	20.0 (508)	44.5 (1,129)	26.4 (670)	66.9 (1,698)	66.9 (1,698)	45.0 (1,143)	804
DF53540BS	20.0 (508)	52.0 (1,321)	26.4 (670)	66.9 (1,698)	66.9 (1,698)	45.0 (1,143)	829
DF535P50	20.0 (508)	76.7 (1,948)	27.1 (687)	66.9 (1,698)	66.9 (1,698)	45.0 (1,143)	1,234
DF535P50BS	20.0 (508)	76.7 (1,948)	27.1 (687)	66.9 (1,698)	66.9 (1,698)	45.0 (1,143)	1,259
DF66550	30.0 (915)	50.0 (1,270)	36.0 (915)	79.9 (2,029)	116.2 (2,950)	57.0 (1,448)	1,094
DF66550BS	30.0 (915)	52.0 (1,321)	36.0 (915)	79.9 (2,029)	116.2 (2,950)	57.0 (1,448)	1,119
DF665P80	30.0 (915)	74.1 (1,883)	40.3 (1,024)	79.9 (2,029)	111.0 (2,818)	57.0 (1,448)	1,835
DF665P80BS	30.0 (915)	74.1 (1,883)	40.3 (1,024)	79.9 (2,029)	111.0 (2,818)	57.0 (1,448)	1,860
DF812080	34.0 (864)	53.0 (1,345)	43.5 (1,105)	83.0 (2,107)	128.1 (3,253)	57.0 (1,448)	1,507
DF812080BS	34.0 (864)	53.0 (1,345)	43.5 (1,105)	83.0 (2,107)	128.1 (3,253)	57.0 (1,448)	1,532
DF8120P80	34.0 (864)	75.9 (1,929)	42.9 (1,090)	83.0 (2,107)	129.1 (3,279)	57.0 (1,448)	3,011
DF8120P80BS	34.0 (864)	75.9 (1,929)	42.9 (1,090)	83.0 (2,107)	129.1 (3,279)	57.0 (1,448)	3,036

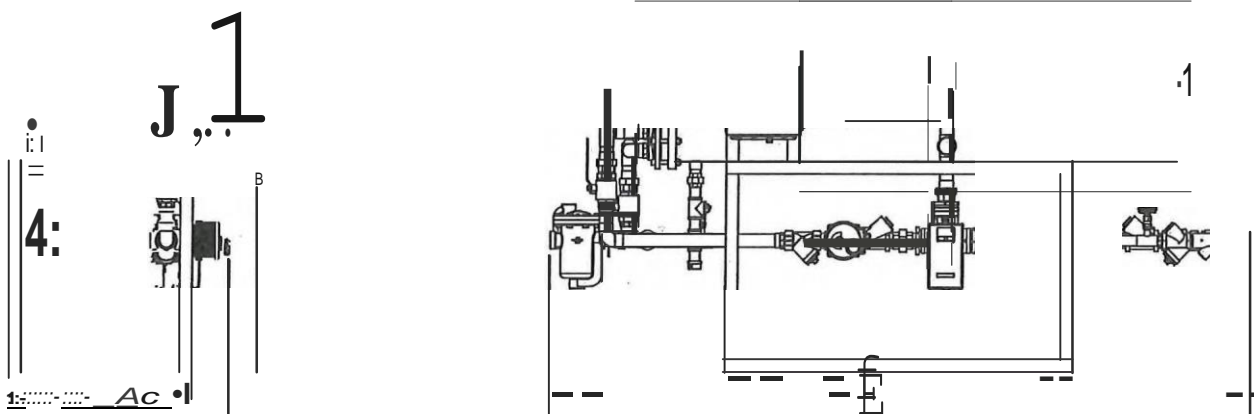
Arb g. Digital-Flo® Shell & Tube Heat Exchanger Double Wall



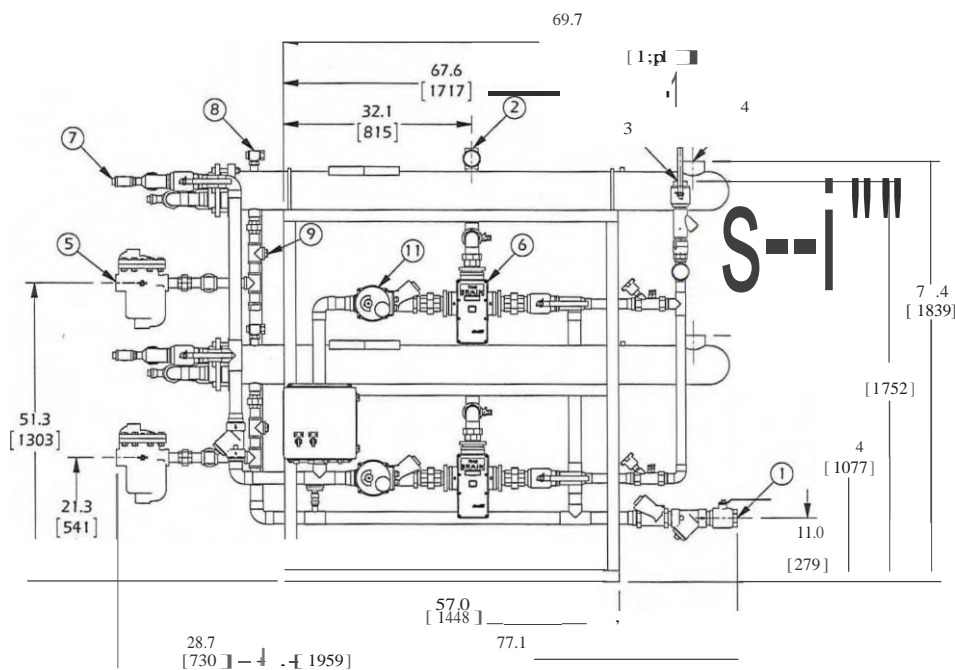
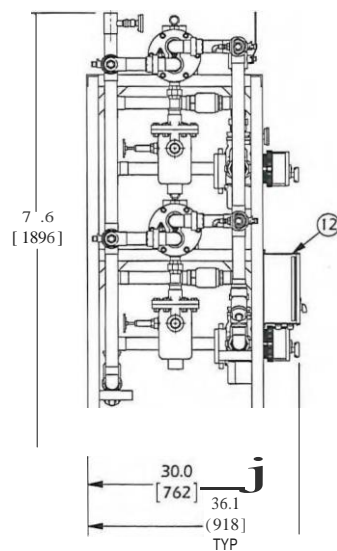
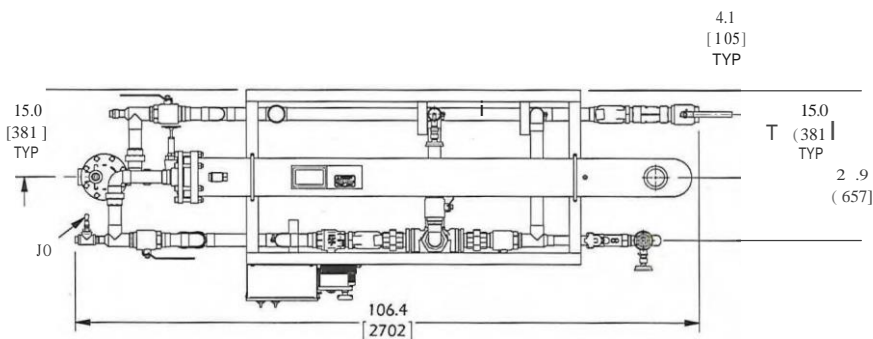
Digital Shell Tube		Water Side			Steam Side		
Model	Part Number	ConnecUons @ 7.5 IVsec (2.3 m/s)		Flow @ 7.5 IVsec (2.3 m/s)	ConnecUons		Capacity @ 15 psi (1 bar)
		HoVCold	Reclrc.	Capacity @ 90°F (50°C) Della T Typical @120°F (49°C) Setpoint	Steam Inlet	Condensate Outlet	
DF415DW40	D589691	1'	1'	18 GPM	2 NPT	3/4 NPT	858 lb/hr (389 kg/hr)
DF415DW40BS	D589699	1'	1'	18 GPM	2 NPT	3/4 NPT	858 lb/hr (389 kg/hr)
DF415DWP40	D589695	1-1/2'	1'	36 GPM	2 NPT	3/4 NPT	1,716 lb/hr (778 kg/hr)
DF415DWP40BS	D589693	1-1/2'	1'	36 GPM	2 NPT	3/4 NPT	1,716 lb/hr (778 kg/hr)
DF535DW40	D589718	1-1/2'	1'	41 GPM	2-1/2 NPT	1 NPT	1,954 lb/hr (886 kg/hr)
DF535DW40BS	D589723	1-1/2'	1'	41 GPM	2-1/2 NPT	1 NPT	1,954 lb/hr (886 kg/hr)
DF535DWP50	D589725	2'	1-1/2'	73 GPM	2-1/2 NPT	1 NPT	3,479 lb/hr (1,578 kg/hr)
DF535DWP5QBS	D589741	2'	1-1/2'	73 GPM	2-1/2 NPT	1 NPT	3,479 lb/hr (1,578 kg/hr)
DF665DW50	D589762	2'	1-1/2'	73 GPM	3 NPT	1-1/4 NPT	3,479 lb/hr (1,578 kg/hr)
DF665DW50BS	D589767	2'	1-1/2'	73 GPM	3 NPT	1-1/4 NPT	3,479 lb/hr (1,578 kg/hr)
DF665DWP80	D589770	3'	2'	165 GPM	3 NPT	1-1/4 NPT	7,720 lb/hr (3,502 kg/hr)
DF665DWP80BS	D589776	3'	2'	165 GPM	3 NPT	1-1/4 NPT	7,720 lb/hr (3,502 kg/hr)
DF8120DW80	D589795	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120DW80BS	D589801	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120DWP80	D589804	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)
DF8120DWP80BS	D589808	3'	2'	165 GPM	4 FLG	2 NPT	7,863 lb/hr (3,567 kg/hr)

DF665DW80BS Parallel Pkg. (2)hx (1) Brain
 DF665DW50BS Single Pkg. (1)hx (1) Brain

Digital-Flo® Shell & Tube Heat Exchanger Double Wall



Dimensions and Weight							
Model	Dimensions In (mm)						Weight
	A	B	C	D	E	F	
DF415DW40	20.0 (508)	43.2 (1,097)	25.4 (645)	76.4 (1,941)	71.6 (1,819)	36.0 (915)	465
DF415DW40BS	20.0 (508)	52.0 (1,321)	25.4 (645)	76.4 (1,941)	71.6 (1,819)	36.0 (915)	490
OF415DWP40	20.0 (508)	75.5 (1,918)	26.4 (670)	76.4 (1,941)	87.9 (2,232)	36.0 (915)	740
OF415DWP40BS	20.0 (508)	75.5 (1,918)	26.4 (670)	76.4 (1,941)	87.9 (2,232)	36.0 (915)	765
DF535DW40	20.0 (508)	44.5 (1,129)	26.4 (670)	76.5 (1,944)	89.6 (2,277)	45.0 (1,143)	1,080
DF535DW40BS	20.0 (508)	52.0 (1,321)	26.4 (670)	76.5 (1,944)	89.6 (2,277)	45.0 (1,143)	1,105
OF535DWP50	20.0 (508)	76.7 (1,948)	27.1 (687)	76.5 (1,944)	98.1 (2,492)	45.0 (1,143)	1,317
DF535DWP50BS	20.0 (508)	76.7 (1,948)	27.1 (687)	76.5 (1,944)	98.1 (2,492)	45.0 (1,143)	1,342
OF665DW50	30.0 (915)	50.0 (1,270)	36.0 (915)	88.7 (2,253)	115.1 (2,923)	57.0 (1,448)	1,373
DF665DW50BS	30.0 (915)	52.0 (1,321)	36.0 (915)	88.7 (2,253)	115.1 (2,923)	57.0 (1,448)	1,398
DF6650WP80	30.0 (915)	74.1 (1,883)	40.3 (1,024)	79.9 (2,029)	110.7 (2,811)	57.0 (1,448)	1,892
DF665DWP80BS	30.0 (915)	74.1 (1,883)	40.3 (1,024)	79.9 (2,029)	110.7 (2,811)	57.0 (1,448)	1,917
DF81200W80	34.0 (864)	53.0 (1,345)	43.5 (1,105)	77.3 (1,963)	126.6 (3,216)	57.0 (1,448)	1,550
OF81200W80BS	34.0 (864)	53.0 (1,345)	43.5 (1,105)	77.3 (1,963)	126.6 (3,216)	57.0 (1,448)	1,575
DF81200WP80	34.0 (864)	75.9 (1,929)	42.9 (1,090)	77.3 (1,963)	127.6 (3,242)	57.0 (1,448)	3,050
OF81200WP80BS	34.0 (864)	75.9 (1,929)	42.9 (1,090)	77.3 (1,963)	127.6 (3,242)	57.0 (1,448)	3,075



APPROVAL

BY: _____ DATE: _____

0 APPROVED, PROCEED WITH FABRICATION

0 APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH COMMENTS

0 DISAPPROVED, DO NOT FABRICATE

DIGITAL FLO STEAM/WATER SHELL & TUBE DOUBLE-WALL HEAT EXCHANGER

PROJECT NAME

TAG:

ITEM DESCRIPTION OIY CONNECTION

1	COLD WATER INLET	TNPT
2	MIXED WATER OUTLET	2" NPT
3	RECIRC WATER INLET	1-1/2" NPT
4	STEAM INLET	3" NPT
	CONDENSATE OUTLET 1814 TAAPJ	1-1/4" NPT
6	DRV/80	3" NPT
	CIP CONNECTION	4 1" NPT
8	AIR VENT	2 3/4" NPT
9	VACUUM BREAKER	2 1/2" NPT
10	SRV #PRESSUREJ PIPE TO DRAIN	1" NPT
11	N.C. ACTUATED BAW. VALVE SAFETY SHUT-OFF	TNPT
12	BRAINSCAN/ELECTRICAL PANEL	JIOVAC @ 1.2A

ITEM	MATERIAL
PIPING	COPPER TYPE "L"
HEAT EXCHANGER SHEU.	CARBON STEEL
HEAT EXCHANGER TUBE	DOUBLE-WAU. COPPER

DRV SET POINT 120°F

NOTES:

- ALL DIMENSIONS ± 0.5 [13] UNLESS OTHERWISE SHOWN.
- COMPLETE ASSEMBLY LEAD FREE COMPLIANT - THE WETTED SURFACE OF THIS PRODUCT CONTACTED BY CONSUMABLE WATER CONTAINS LESS THAN ONE QUARTER OF ONE PERCENT (0.25%) OF LEAD BY WEIGHT.
- PACKAGE INCLUDES ALL REQUIRED INLET CHECK VALVES AND STRAINERS ON DOMESTIC SIDE.
- DRV, SAFETY SHUT OFF AND ELECTRICAL PANEL ARE PRE-WIRED TO PROVIDE A SINGLE ELECTRICAL LANDING POINT AT THE PANEL
- ITEM 11 TO BE 1/4(6.4) PIPE TO DRAIN CONNECTION IF A FACTORY PRESSURE RELIEF VALVE IS USED.

DO NOT SCALE DRAWING
TOLERANCES UNLESS
OTHERWISE SPECIFIED
DIMENSIONING
ENGLISH mm
FRACTIONAL $\pm 1/64$
ANGULAR: ± 2



NAME	DATE	MATERIAL	SHEET I OF 2
RB.EASED	DRAWN Tony Hooley 02/12/2011	CN39735	S22388

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DF665DWP5050BS GENI



Water Temperature Control - Recirculation Systems

Digital

The Brain® Model DRV50

DRV50 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' 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 (DRV80)

- 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 – 10 GPM/38 LPM
- Minimum System Draw Off - 0
- ASSE 1017, CSA B125 and CE Certified
- Operational water pressure of 10 -150 psig
- Display in °C or °F
- Shipping weight 23 lbs (10 kg)

Connectivity

SPCO Relay Outputs – Relay which is energized during operation.

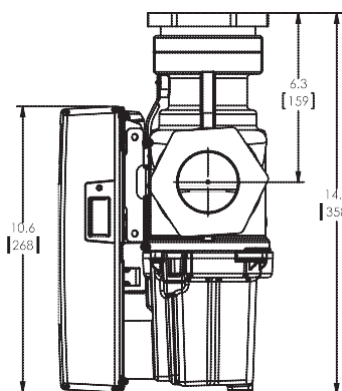
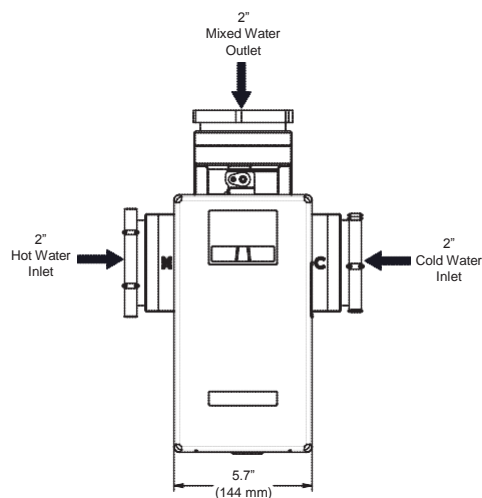
LCD Display – Provides information on set point, delivered temperature, error codes and alert conditions.

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 protocols.

For a submittal drawing, refer to D40864.



Recirculation Systems - Digital (gpm)						
Model	Pressure Drop (psi)				Minimum System Draw-Off	Maximum Flow @7.5 ft/sec.
	5	10	15	20		
DRV50	94	133	163	188	0	73
						C_v 42

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



Water Temperature Control - Recirculation Systems

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 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 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 will be assigned a unique network address which is programmed via the integral DB9 external port.

RS485 Port

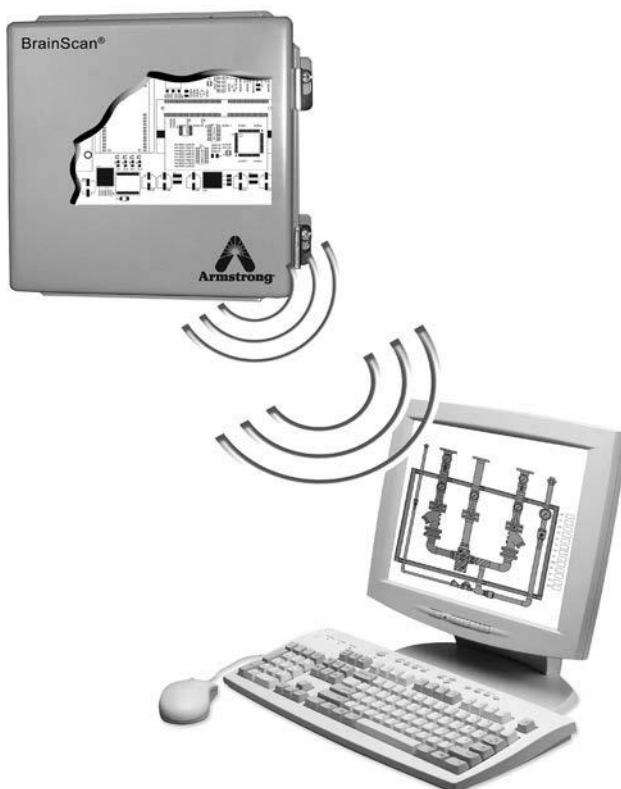
The integral RS485 Serial Port provides an ability to remotely program the DRV and update the firmware via BrainScan or Modbus.

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

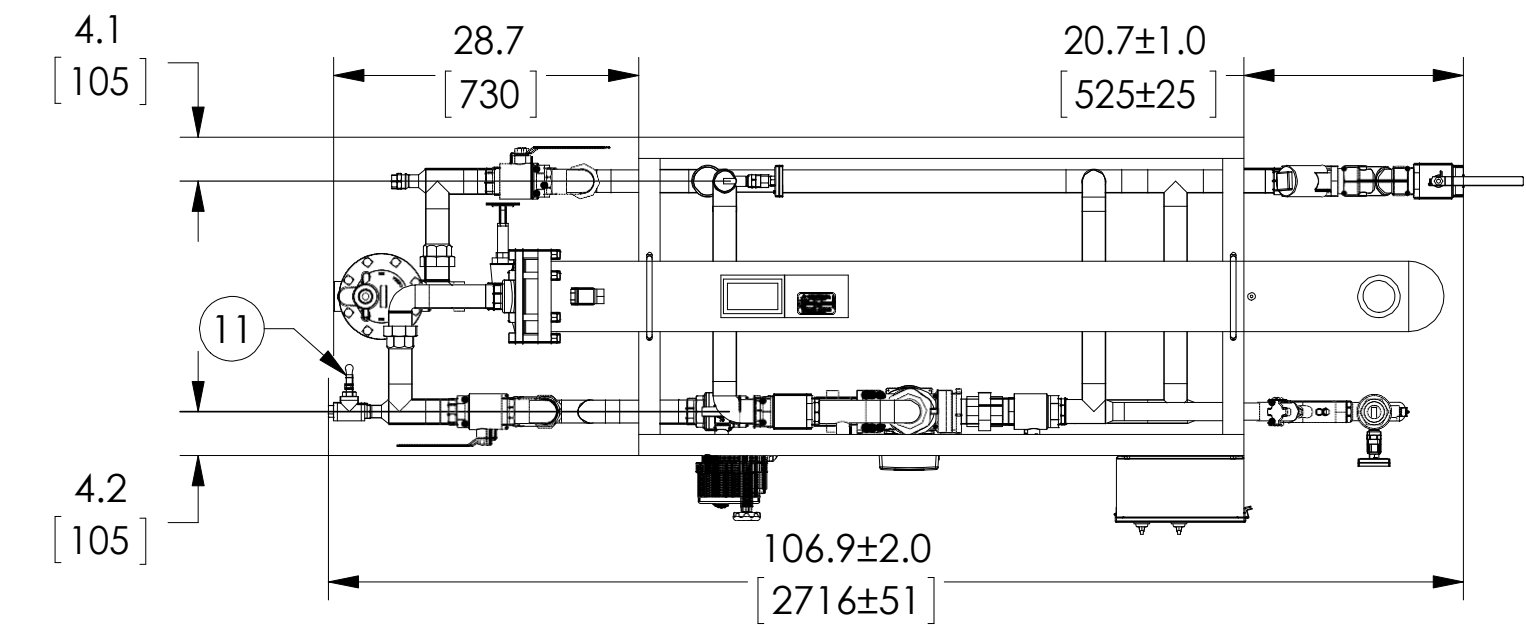
- Set Point
- Inlet/Outlet Temperature
- Over Temperature Alert

The integral RS284 Serial P0rt can receive the following self-diagnostic error messages from the DRV and communicate them via BrainScan or Modbus

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



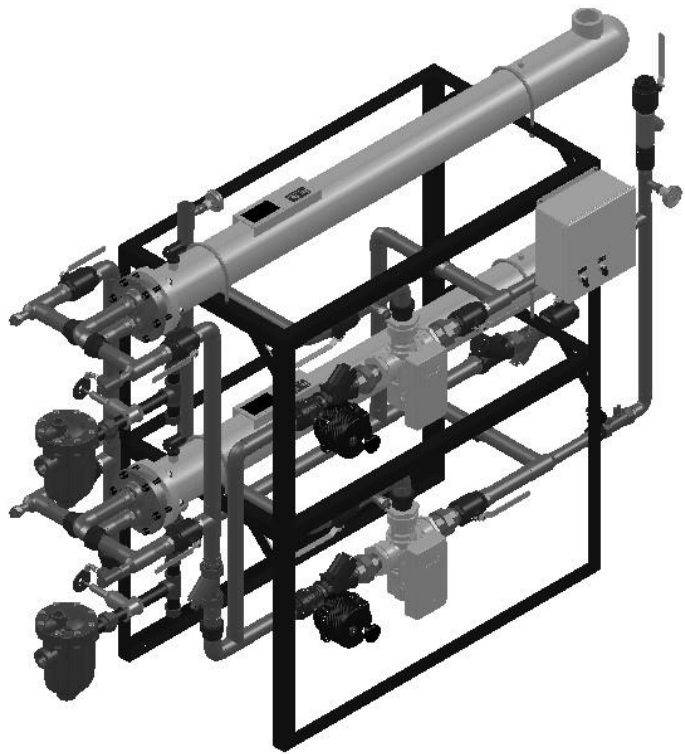
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



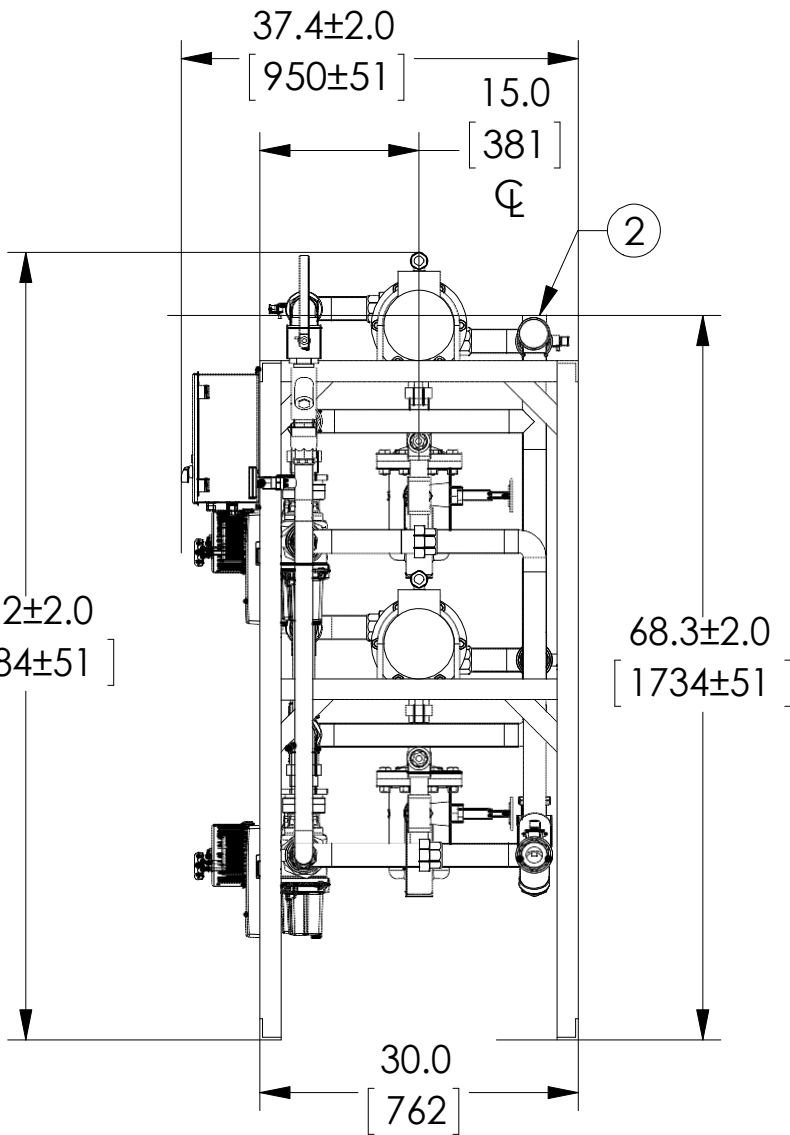
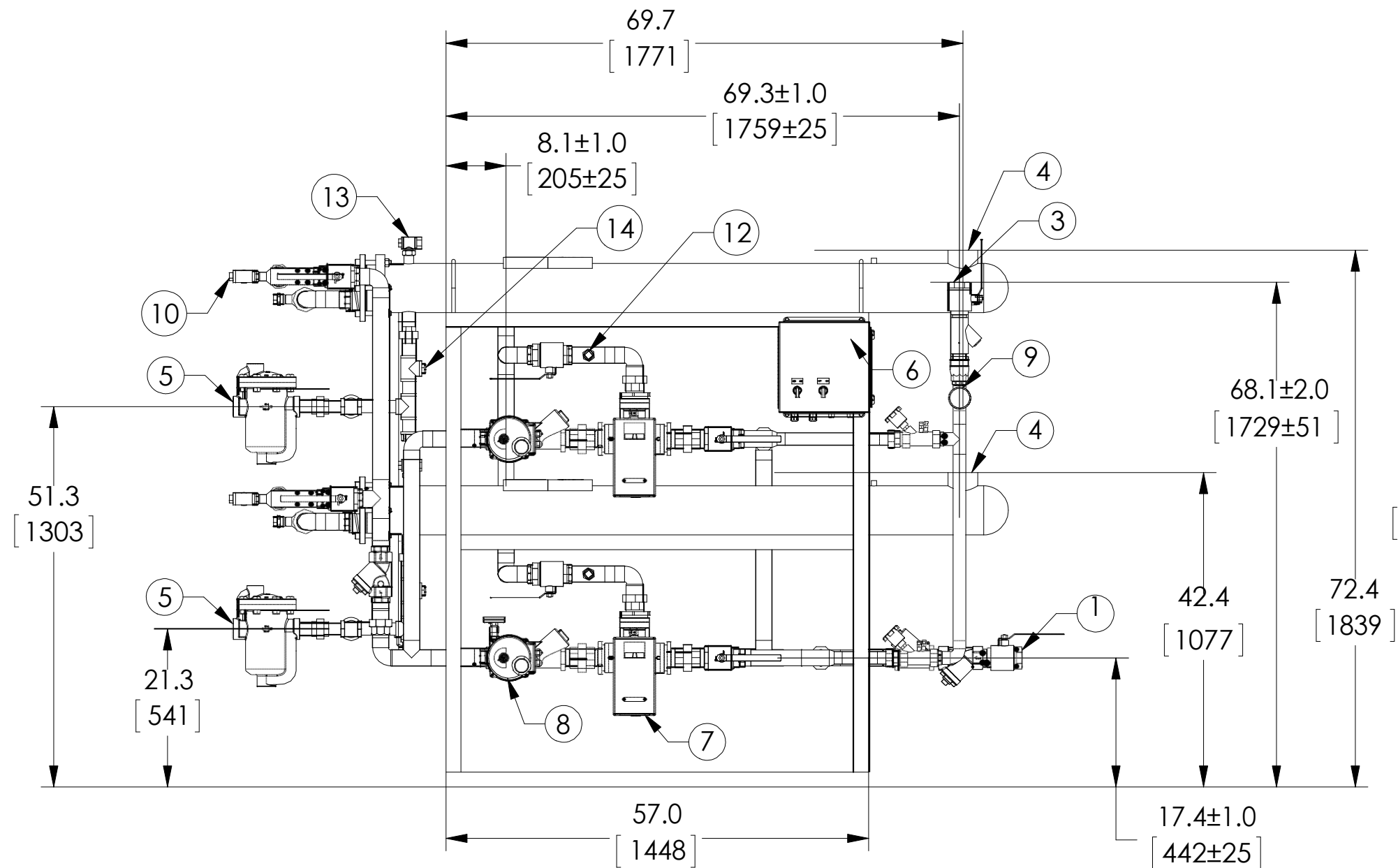
APPROVAL

BY: _____ DATE: _____

- ☐ APPROVED, PROCEED WITH FABRICATION
- ☐ APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH COMMENTS
- ☐ DISAPPROVED, DO NOT FABRICATE



DIGITAL FLO STEAM/WATER SHELL & TUBE HEAT EXCHANGER DOUBLE WALL



PROJECT NAME :

TAG :

ITEM	DESCRIPTION	CONNECTION
1	COLD WATER INLET	2" NPT
2	MIXED WATER OUTLET	2" SWT
3	RECIRC WATER INLET	1-1/2" NPT
4	STEAM INLET	3" NPT
5	CONDENSATE OUTLET	1-1/4" NPT 814 IB
6	ELECTRICAL PANEL/BRAINSCAN	110VAC @ 2A
7	DRV50 (2)	3" NPT
8	N.C. ACTUATED BUTTERFLY VALVE SAFETY SHUT OFF (2)	2" NPT
9	THERMOMETER (3)	
10	CIP CONNECTION (4)	1" NPT
11	SRV(PRESSURE) PIPE TO DRAIN (2)	1" NPT
12	SRV(CONNECTION FOR USER SUPPLIED T&P) (2)	1" NPT
13	AIR VENT (2)	3/4" NPT
14	VACUUM BREAKER (2)	1/2" NPT
	ITEM	MATERIAL
	PIPING	COPPER TYPE "L"
	EXCHANGER SHELL MATL.	CARBON STEEL
	EXCHANGER TUBE MATL.	COPPER
	DRV SET POINT	85°F

NOTE(S):

1. ARMSTRONG PART NUMBER : D621825
2. ALL DIMENSIONS +/- 0.5[13] UNLESS OTHERWISE SHOWN.
3. COMPLETE ASSEMBLY LEAD FREE COMPLIANT - THE WETTED SURFACE OF THIS PRODUCT CONTACTED BY CONSUMABLE WATER CONTAINS LESS THAN ONE QUARTER OF ONE PERCENT (0.25%) OF LEAD BY WEIGHT.
4. PACKAGE INCLUDES ALL REQUIRED INLET CHECK VALVES AND STRAINERS ON DOMESTIC SIDE.
5. DRV, SAFETY SHUT OFF AND ELECTRICAL PANEL ARE PREWIRED TO PROVIDE A SINGLE ELECTRICAL LANDING POINT AT THE PANEL.
6. ITEM #11 IS 1/4[6.4] PIPE TO DRAIN IF FACTORY PRESS RELIEF VALVE IS USED.

DO NOT SCALE DRAWING		
TOLERANCES UNLESS OTHERWISE SPECIFIED		
DIMENSIONING ENGLISH [mm]		
FRACTIONAL + 1/64		
ANGULAR: 2		
DECIMAL	.XXXX + .0005	IN .MM
	.XXX + .005	.010
	.XX + .015	.10
	.X + .3	

	NAME	DATE
DRAWN	CFG	11/8/2014
RELEASED	SALES	

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DF665DWP50-50BS 2 NPT 2 SWT 1-1/2 NPT CPR		
CONFIG# (C-161341)		
MATERIAL		SHEET 1 OF 1
REV A	DWG.	SALES