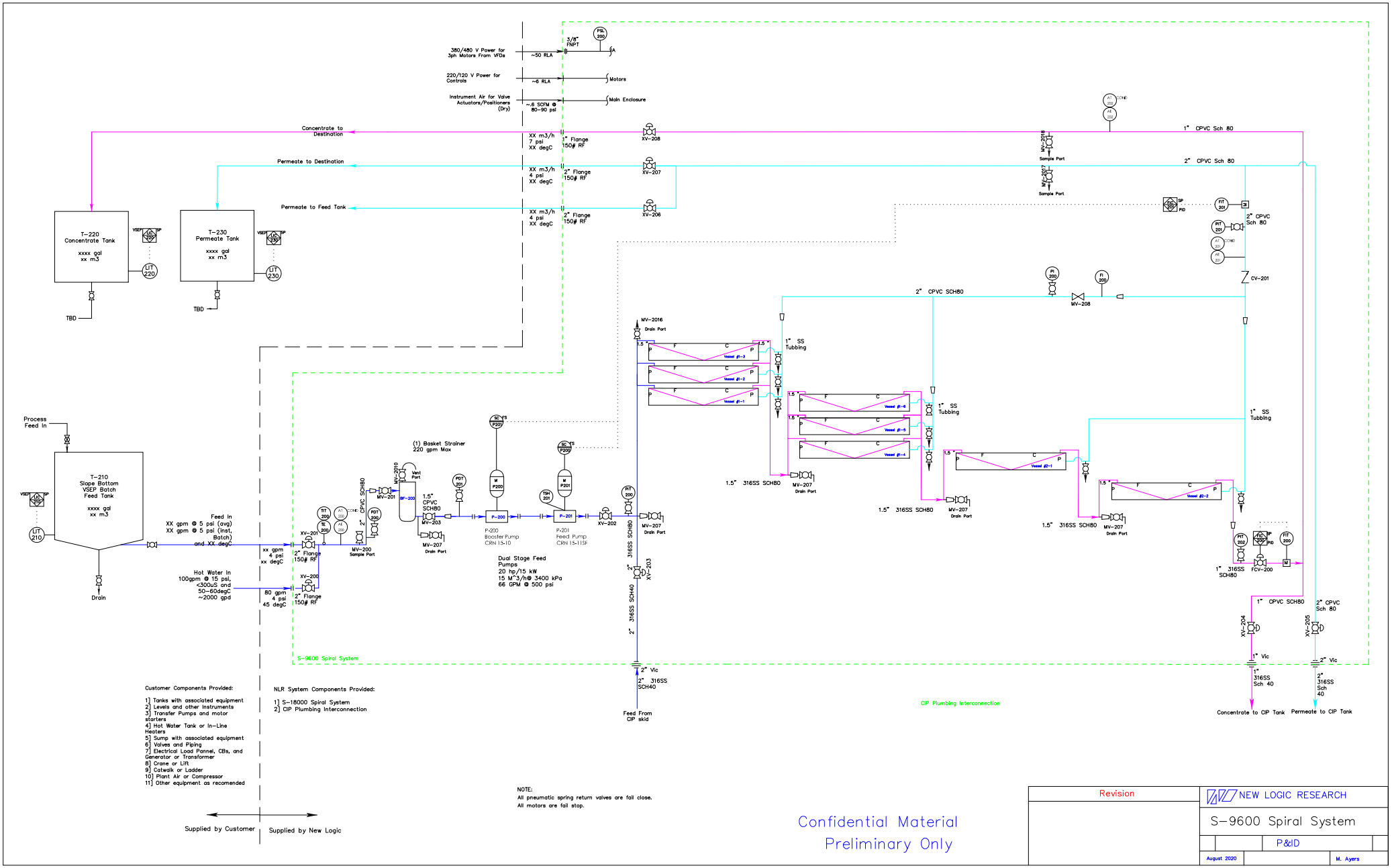
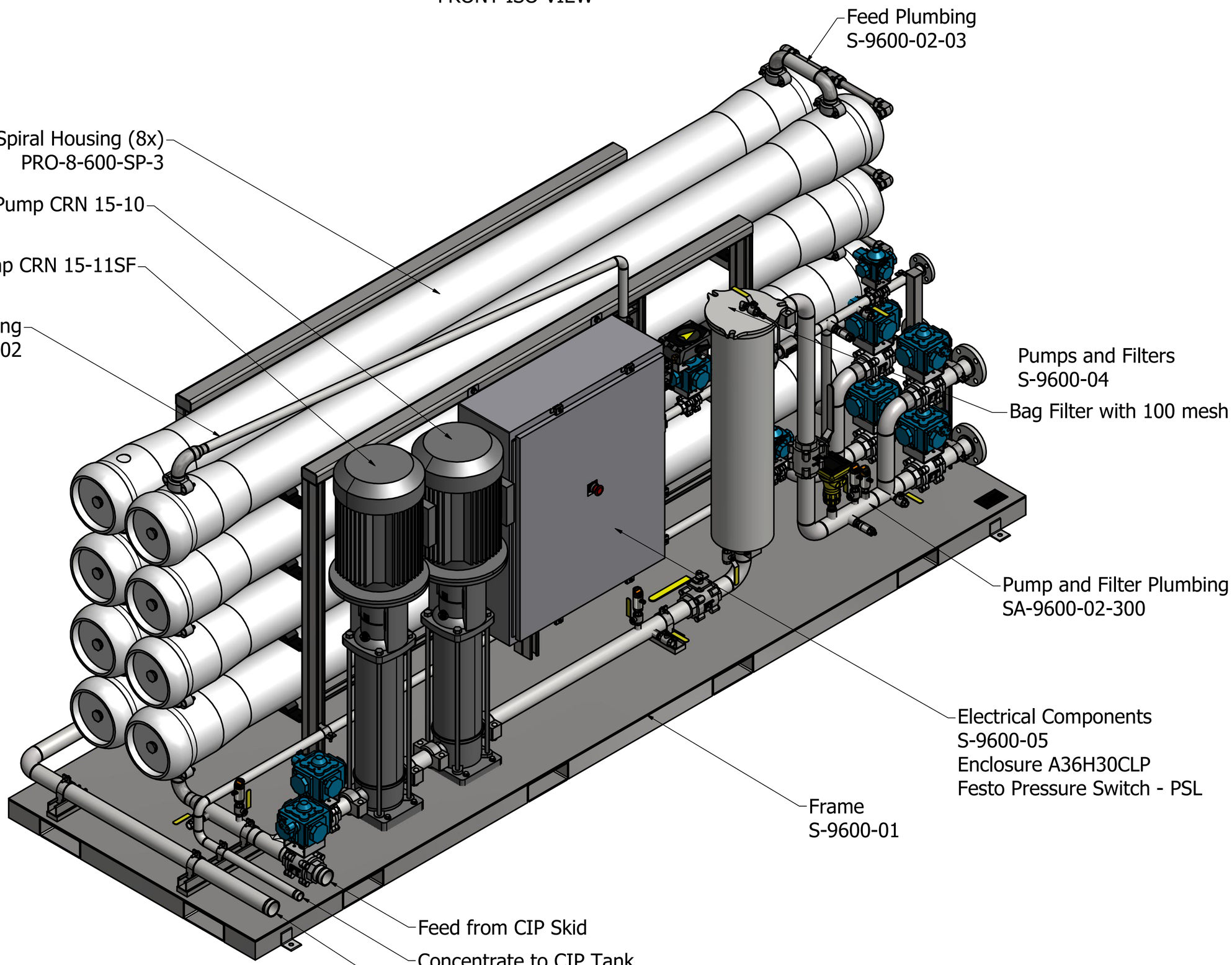

380/480 V Power for 3ph Motors From VFDs
~50 RLA
3/8" FNPT
220/120 V Power for Controls
~6 RLA
Motors
Instrument Air for Valve Actuators/Positioners (Dry)
~.6 SCFM @ 80-90 psi
Main Enclosure
Concentrate to Destination
XX m3/h
7 psi
XX degC
1" Flange 150# RF
XV-208
Permeate to Destination
XX m3/h
4 psi
XX degC
2" Flange 150# RF
XV-207
Permeate to Feed Tank
XX m3/h
4 psi
XX degC
2" Flange 150# RF
XV-206
T-220
Concentrate Tank
xxxx gal
xx m3
LIT 220
TBD
T-230
Permeate Tank
xxxx gal
xx m3
LIT 230
TBD
1" CPVC Sch 80
2" CPVC Sch 80
Sample Port
2" CPVC SCH80
MV-208
CV-201
MV-2016
Drain Port
1" SS Tubbing
1.5" 316SS SCH80
MV-207
Drain Port
Process Feed In
T-210
Slope Bottom VSEP Batch Feed Tank
xxxx gal
xx m3
LIT 210
Drain
Feed In
XX gpm @ 5 psi (avg)
XX gpm @ 5 psi (inst, Batch)
and XX degC
xx gpm
4 psi
xx degC
XV-201
2" Flange 150# RF
MV-200
Sample Port
Hot Water In
100gpm @ 15 psi, <300uS and 50-60degC ~2000 gpd
80 gpm
4 psi
45 degC
XV-200
2" Flange 150# RF
(1) Basket Strainer
220 gpm Max
MV-2010
Vent Port
MV-201
1.5" CPVC SCH80
MV-203
MV-207
Drain Port
P-200
Booster Pump
CRN 13-10
P-201
Feed Pump
CRN 13-11SF
Dual Stage Feed Pumps
20 hp/15 kW
15 M^3/h@ 3400 kPa
66 GPM @ 500 psi
XV-202
2" 316SS SCH40
XV-203
Feed From CIP skid
S-9600 Spiral System
2" Vic
2" 316SS SCH40
1.5" 316SS SCH80
Vessel #1-3
Vessel #1-2
Vessel #1-1
Vessel #2-6
Vessel #2-5
Vessel #2-4
Vessel #2-3
Vessel #2-2
Vessel #2-1
1" 316SS SCH80
FCV-200
1" CPVC SCH80
2" CPVC Sch 80
XV-204
XV-205
1" Vic
2" Vic
1" 316SS Sch 40
2" 316SS Sch 40
Concentrate to CIP Tank
Permeate to CIP Tank
CIP Plumbing Interconnection
Customer Components Provided:
1] Tanks with associated equipment
2] Levels and other instruments
3] Transfer Pumps and motor starters
4] Hot Water Tank or In-Line Heaters
5] Sump with associated equipment
6] Valves and Piping
7] Electrical Load Pannel, CBs, and Generator or Transformer
8] Crane or Lift
9] Catwalk or Ladder
10] Plant Air or Compressor
11] Other equipment as recomended
NLR System Components Provided:
1] S-18000 Spiral System
2] CIP Plumbing Interconnection
Supplied by Customer
Supplied by New Logic
NOTE:
All pneumatic spring return valves are fail close.
All motors are fail stop.
Confidential Material
Preliminary Only
Revision
NEW LOGIC RESEARCH
S-9600 Spiral System
P&ID
August 2020
M. Ayers

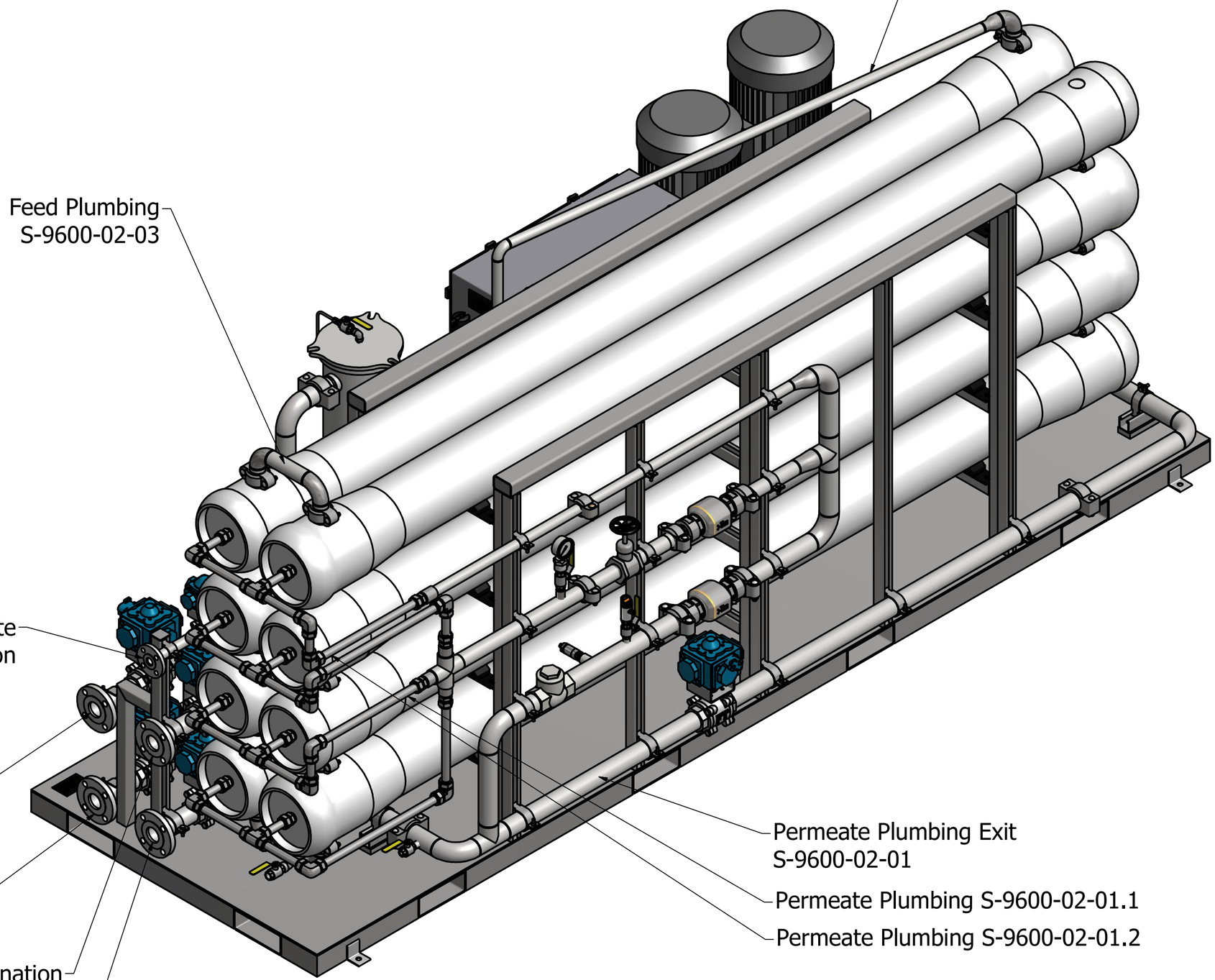
FRONT ISO VIEW



NOTES:
1. New Logic Research confidential material.
2. Slight differences between drawings and actual system may be attributed to New Logic Research Continuously evolving and improving its technology.
3. All dimensions are shown in inches [mm] and for reference only.

S-9600 Spiral System

BACK ISO VIEW



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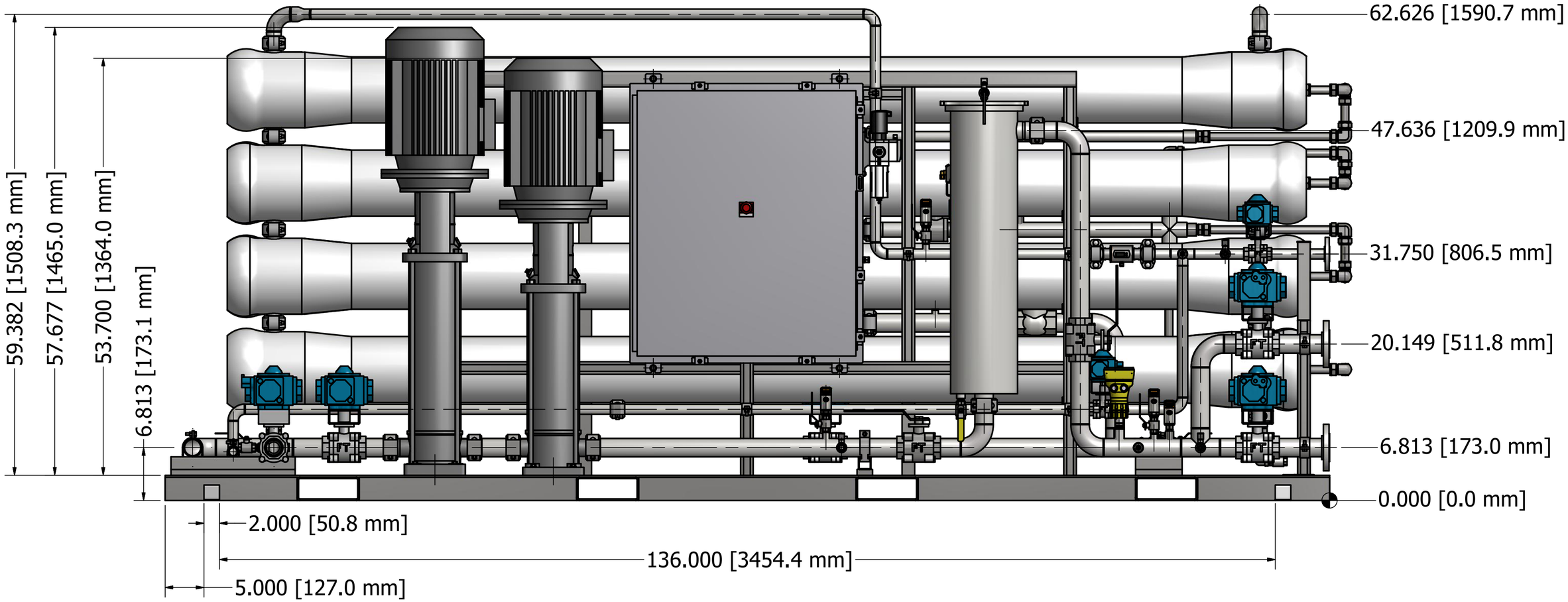
S-9600 Spiral System

FRONT VIEW



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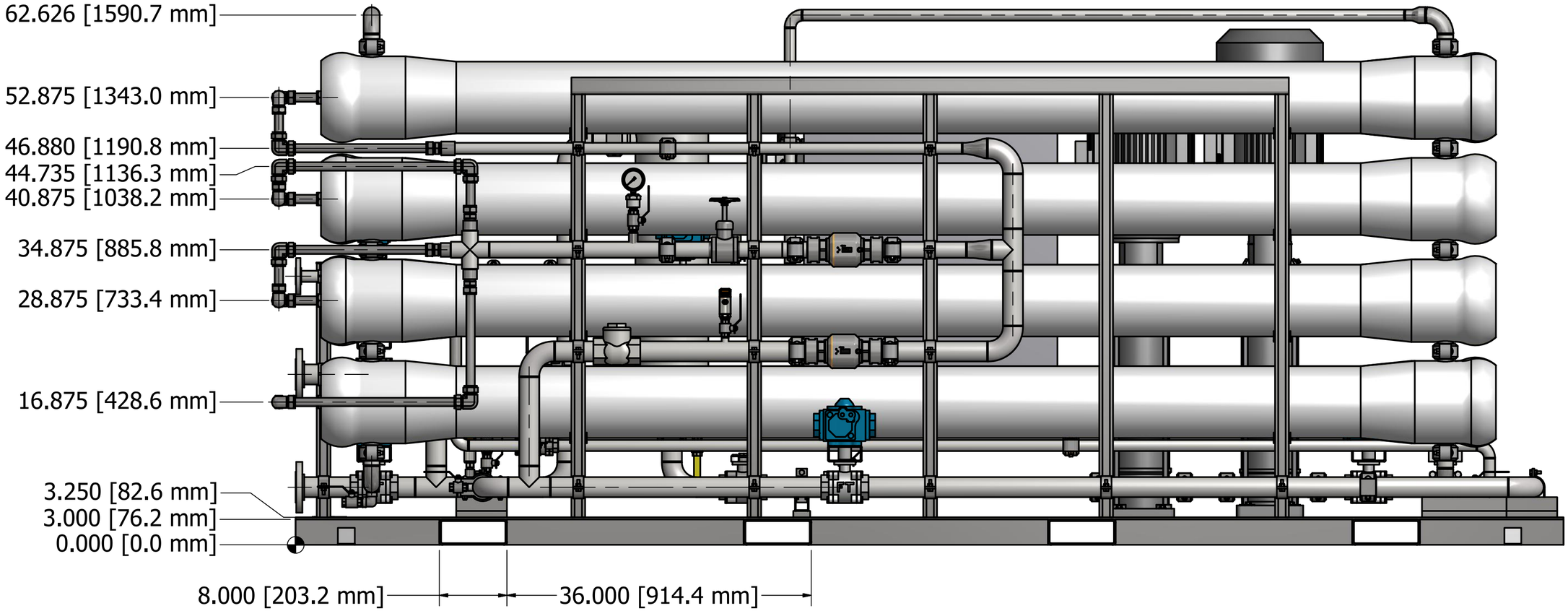
S-9600 Spiral System

BACK VIEW



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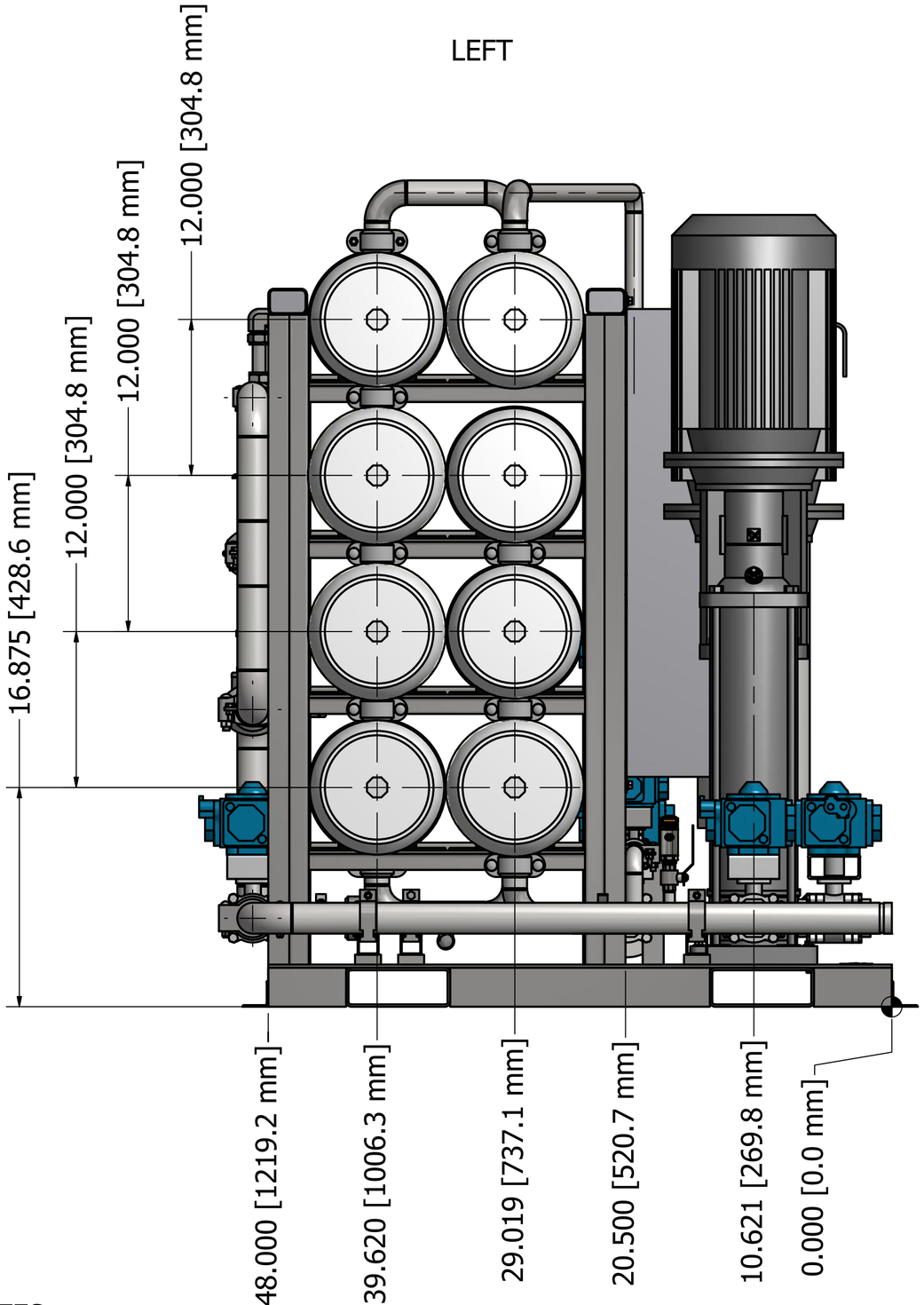
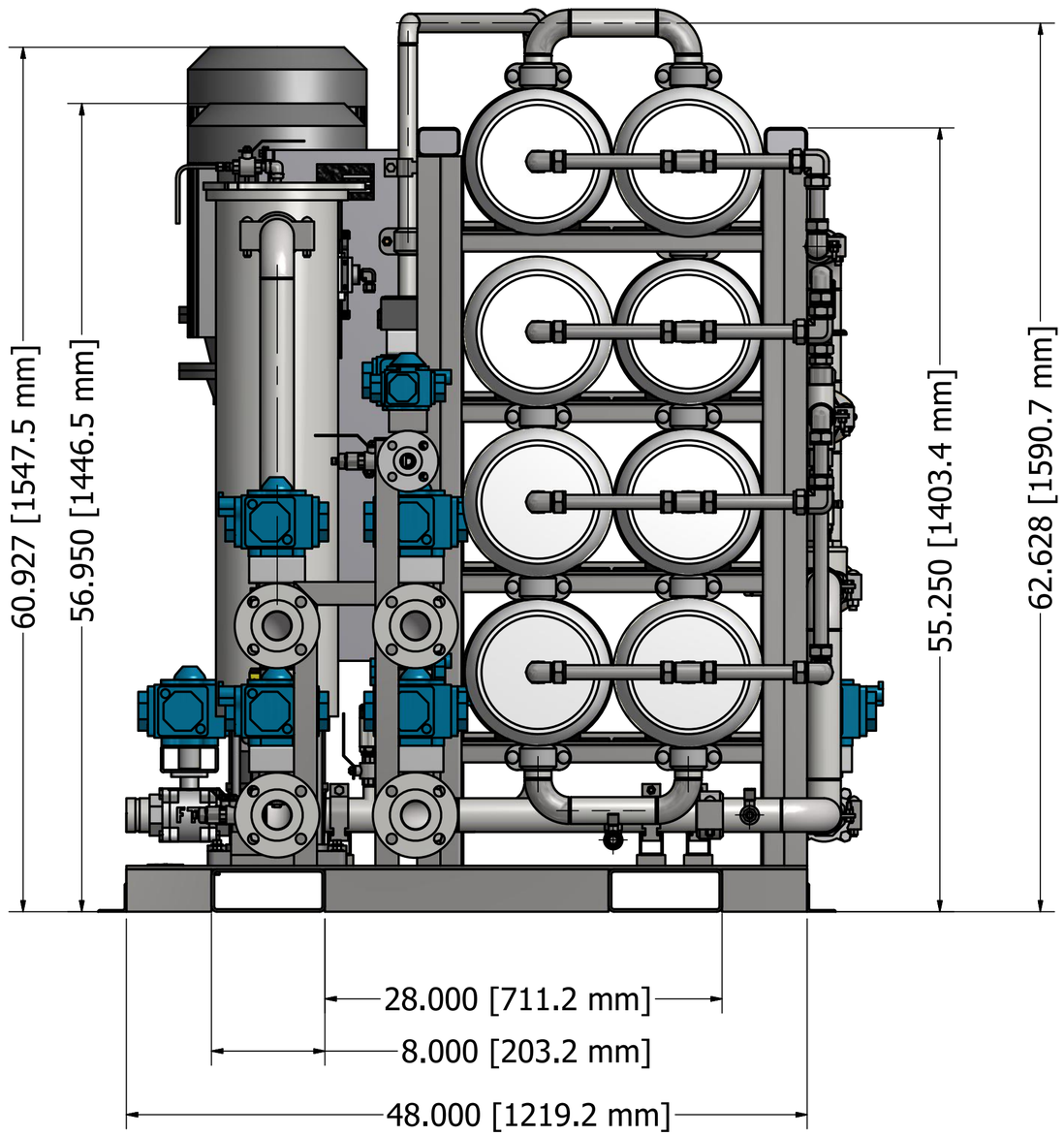
S-9600 Spiral System

SIDE VIEWS

LEFT



RIGHT



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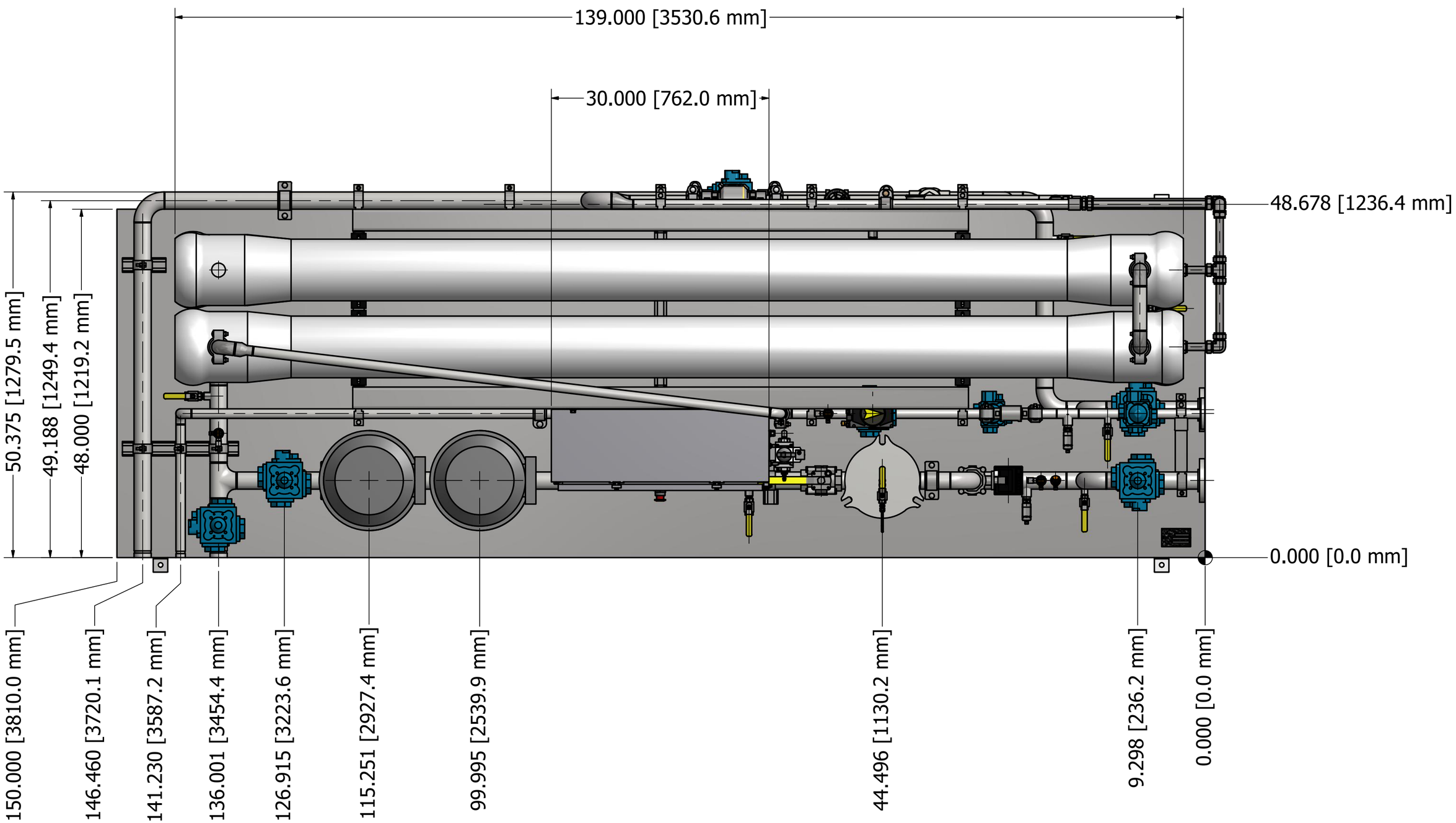
S-9600 Spiral System

TOP VIEW



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S-9600 Spiral System

SPIRAL SYSTEM COMPONENT SPECIFICATIONS
S-9600 Spiral System

1] Filter Pack

Membrane:	MF, UF, NF, RO (depends on application and pilot testing)
Membrane Surface Area:	9600sf (892m2) (8ea 8”Dia x 40”L)
Estimated Production:	34.3-68.6 gpm (at 5-10GFD)
Maximum Operating Temperature:	120 ^{O}F (49ºC) (Options for up to 80ºC)
Allowable Feed Slurry pH Range:	2-11 (Options for 1-14)
O-ring Material:	Ethylene Propylene
Filter Pack Housing:	Polyurethane Coated, Filament Wound, Epoxy FRP
Wetted Ports:	316L Stainless Steel
Wetted Plastic End Plates:	PVC Thermoplastic

2] Piping

Maximum Pressure:	550 psi (Options for up to 1200 psi)
Pressure Piping:	316L Stainless Steel Schedule 80
Atmospheric Piping:	CPVC Schedule 80
Pipe Clamps:	Zero-Flex Victaulic Style 07 EPDM
On/Off Valves:	CPVC 3-piece ball valve
Flow Control Valves:	316 SS V-port ball valve
Check Valves:	CPVC ball check valve
Pneumatic Actuators:	Alpha Series Komp 4 Spring Return
Positioners:	BLX Linear Quarter Turn I/P
Skid Pipe Terminations:	150 lb 316 SS Raised Face Flange
Flange Gaskets:	150 lb Garlock Blue Guard

3] Pump Specifications:

Feed Pump Type:	Grundfos 316SS Vertical Multi-stage Centrifugal
Feed Pump Motor:	Grundfos ML 3500 rpm TEFC 460VAC, 3phase
Motor Speed Controller:	Danfoss 380-480VAC, NEMA 4 (or Equal)

4] Pre-Screen Basket Strainer:

Filter Housing Type:	NLR Custom Made 316 SS
Basket Strainer:	100 Mesh 316 SS (Optional Felt Bag Filters)
Capacity:	120 GPM, 4.6 sqft
Elastomers (Seals):	EPDM (option for Viton)

5] Operating Site Conditions:

Equipment Rating:	NEMA 4, Indoor/Outdoor protect from sunlight & rain.
Ambient Temperature:	5 - 37°C
Storage Temperature:	2 - 70°C (Protect Filter Pack from Freezing)
Max Relative Humidity:	<95%, non-condensing
Elevation:	3300 ft maximum without derating

SPIRAL SYSTEM COMPONENT SPECIFICATIONS (continued)

6] Electrical Specifications:
(Note typically this is provided with a VSEP system, and the PLC/HMI is split with the spiral system. The controls are mounted on CIP 'Clean in Place' Skid that is also shared)

Controls Voltage:	120/220VAC, 1phase, 15A, 50/60Hz
Programmable Controller Type:	None (Control signals from CIP PLC)
Touch Screen Display Type:	None (Set Point change at CIP HMI)
Enclosures:	*Hoffman* NEMA 4 Powdercoat Finish 20x16x8
Switches, Relays, & Contactors:	Allen Bradley 120/220 Volt
IO Link Masters and Hubs:	IFM Efector AL1122
Pressure Sensors:	IFM Efector PN-2292
Mag Flow Tube and Transmitter:	IFM Efector SM2000, SM8000
Bag Filter DP Sensors:	IFM Efector PN-2294
Temperature Sensor:	IFM Efector TN-2511, UT0028
Conductivity Meter:	IFM Efector LDL-100
Solenoid Valves:	Festo Manifold Gang Mounted Dual 3/2 24 VDC, IO Link
VSEP and CIP Communication:	IO Link
VFD Communication:	Ethernet Com Card
DCS Communication:	Ethernet OPC Server (option for Modbus)

Utility Summary							New Logic Research	
VSEP System								
AIR COMPRESSOR SIZING INFORMATION								
	# of Valves		In^3 Air/stroke		Strokes/day		CFM	M3/hr
Spiral RO								
1" Pneumatic Valves	2		35		20		0.0006	0.001
2" Pneumatic Valves	6		60		20		0.0029	0.0049
1" Flow Control Valves	1		35		20		0.5003	0.8505
System Air Totals					**System Totals**		**0.50**	**0.8564**
Supply instument grade dry air at 80-90 psi (560-630kPa)								
Supply air to enclosure mounted regulator/filter 3/8" NPT connection								
Totals do not include air for tools or other sources.								
HOT WATER SIZING INFORMATION								
	# /Day		Temp degC		Gallons/Day		GPM	M3/hr
Spiral RO								
Cleanings	0.14		45-50		154		0.11	0.0243
Rinse filter pack at 60gpm for 5mins	0.14		45-50		42		0.03	0.0066
Intermittent need of additional cleaning or flush of filter pack	0.033		45-50		9.9		0.01	0.0016
System Water Totals					**System Totals**		**0.14**	**0.0325**
Supply chlorine free water at >300 uS/cm								
Supply water at 45degC and 60gpm (13.6m3/hr)								
Supply water at 20 psi to 2" Hot Water flange connection on Spiral Skid								
ELECTRICAL LOAD PANEL SIZING INFORMATION								
Circuit Breaker Sizing 1.25-2x Nameplate Current								
3-Phase Power Voltage VAC	400-460	50/60 Hz						
1-Phase Power Voltage VAC	220-120	50/60 Hz						
	# Motors	Rated Motor	Nameplate		Nameplate		Recommended	
			400V		460V			
Spiral RO Feed Pumps	2	20	26.3		24.0		40	
Totals	**2**							
Supply 3-Phase power from customer supplied load panel (with circuit breakers, disconnects, line filters, etc.) to the inlet of each VFD provided by New Logic.								
	# Connections	Rated Motor HP	Nameplate Current		Nameplate Current		Recommended CB Sizing	
			220V		120V			
Main Control Enclosures	1	NA	10		8.0		20	
Supply 1-phase power from customer supplied load panel (with circuit breakers, ups, etc.) to New Logic provided circuit breakers inside the Spiral RO enclosure.								
Note: These are estimates only based on very preliminary data. These calculations are subject to change and do not include equipment offskid of VSEP system (ie: Transfer Pumps, Generators, Heaters, Lighting, Cranes, etc). For power consumption estimates refer to the operating cost spreadsheet.								