

PoseidonPak Specifications

Poseidon Pak Booster Pump Systems (VML, VM2, ESL):

PART I - GENERAL

- 1.01 Single Source Responsibility: the booster pump system shall come as a prepackaged unit with suction and discharge headers, pumps, isolation valves on the suction and discharge side of each pump, check valves on the discharge side of each pump, pressure gauges on the suction and discharge headers, variable frequency drives, an optional control panel with electrical disconnects, fusing, and a programmable logic control, and wiring from the pumps to the control. The unit shall be provided as a complete system.
- 1.02 Certifications: The pumps used in the assembly must be certified to UL 778 standards. The optional control panel shall be UL 508A labeled.
- 1.03 Serial Number – Each package shall be given a unique serial number for tracking purposes and that number must be provided on a label supplied with the unit. That serial number must enable the supplier to identify the date code for assembly, the software version used in the HMI and the material test reports for the stainless steel piping used in the assembly.
- 1.04 Factory Testing – Each package shall be pressure tested at the maximum working pressure of the package. The packages will also be run tested to validate control points and proper functioning of the system.

PART 2 - PRODUCTS

- 2.01 Scope: Factory-assembled and tested booster pump package for use in potable water systems. System at a minimum to come complete with pumps, motors, variable frequency drives, control panel**, isolation valves, check valves, pressure gauges, pressure transducer, and mounting frame. The system to be equipped with the following attributes/capabilities:
- A. Site Connection Flexibility: the suction and discharge manifolds on the package will be configured in such a manner to allow site piping connections on either end of each manifold (non simplex units).
 - B. Quick Pump Circuit Connection: the suction and discharge circuits of the pump shall connect to the manifold with either grooved couplings or sanitary clamps to enable quick removal and replacement in the field (non simplex units).
 - C. Manifold Connection Options: connection capabilities on the manifolds to include both grooved or flanged (using an adapter kit)**.
 - D. Components: all wetted components (other than seals, gaskets and O-rings) to be constructed using materials approved for use with potable water.

** - Denotes optional equipment

- E. Lock Out/Tag Out Ease of Maintenance: the system shall be constructed in a manner which allows the power to each pump to be locked out, thereby allowing the system to continue operation while a pump is being replaced or serviced.
- F. Remote Access: optional control panel shall have the option of having remote accessibility through either a Modbus card or Ethernet card connection. The Ethernet connection shall permit access to view, monitor and change the control parameters through the use of mobile app programs.

2.02 VM/VML Pump/Motor Pump/Motor Construction: Pumps shall be ANSI / NSF Standard 61 and ANSI / NSF 372 approved:

- A. CASING: Units with pump connections 2" and under shall be of deep drawn, laser welded, 316L stainless steel and shall be capable of withstanding maximum working pressures of 360 psi. Units with pump connections 2.5" and greater shall be of A48 Class 35 cast iron or AISI 316** with an equal maximum working pressure.
- B. FLOATING NECK RING: Floating neck rings composed of PTFE/PPS shall be provided within each stage. They shall be self-centering and easily replaceable.
- C. IMPELLER: Impellers shall be of enclosed design and constructed of AISI 316 stainless steel.
- D. DIFFUSER BOWL: Each stage shall have a bowl with attached diffuser and be constructed of AISI 316 SS.
- E. MECHANICAL SHAFT SEAL: The mechanical shaft seal assembly shall be composed of a Silicon Carbide SiC rotating face, Carbon graphite stationary, EPDM elastomers and AISI 316 stainless steel hardware as standard. Silicon carbide SiC stationary and FKM elastomers are optional.
- F. INTEGRAL OVERSIZED THRUST BEARING AND COUPLING: Shall be one piece capable of handling pump thrust and include coupling to attach pump to motor requiring no field adjustment to the impeller stack.
- G. PUMP SHELL: Shell will be manufactured from AISI 316 SS or AISI 304 SS coils TIG welded, calibrated, and cut at precise height.
- H. BEARING SYSTEM: Oversized thrust bearing capable to handle pump thrust, integrated into the pump end. It allows the use of standard motors instead of special models.
- I. 4.01 ELECTRIC MOTOR: The pump drive motor shall be NEMA standard design TC frame suitable for vertical mounting and close coupled to the pump unit.
- J. Motors shall be of standard manufacturers catalog design and must not use special bearings as a thrust handling device.

2.03 ESL Pump/Motor Pump/Motor Construction: Pumps shall be ANSI / NSF Standard 61 and ANSI / NSF 372 approved:

- A. CASING: The pump casing shall be 304 stainless steel with NPT threaded suction and discharge connections.
- B. IMPELLER: The pump impeller shall be of enclosed design, constructed of, 304 stainless steel.

** - Denotes optional equipment

- C. MECHANICAL SEAL: The pump shaft seal shall have carbon rotating face and a ceramic stationary face with Viton elastomers.
- A. ELECTRIC MOTOR: The drive motor shall be square flanged, thermally protected, dual voltage, 115 V-230 V, single-phase or three-phase, with hp's ranging between 1/2 and 2 hp.

2.04 System Construction

- A. Manifolds: Suction and discharge manifolds to be constructed using 304/304L or 316/316L** stainless steel pipe. Both sides of each manifold to have grooves for connecting the site piping and manifold end cap assemblies. Adapter kits** shall be available for sites who want to use flanged connections with their site water piping.
- B. Pump Isolation Valves:
 - a. 2" and under: NPT two-piece, full port, ball valves 304 stainless steel with PTFE seats shall be provided on the suction and discharge side of each pump (VML and ESL).
 - b. 2" and over: Grooved style butterfly valve with EPDM encapsulated ductile iron disc, stainless steel stem with metal bushings, splined drive and extended neck shall be provided on the suction and discharge side of each pump (VM2).
- C. Backflow Prevention:
 - a. 2" and under: NPT inline, spring loaded check valves constructed of 300 series stainless steel with Buna-N O-Ring or PTFE seals and installed on the discharge side of each pump. Check valves can be provided on the suction side as well**.
 - b. 2" and over: inline, center guided wafer or grooved type type silent check valve with soft seats, straightening vanes and stainless steel disc and trim.
- D. Pressure Sensors: 4-20ma pressure transducer with a range covering the pressure of 0-150 psi or 0-300 psi**.
- E. Pressure Gauges: 2-1/2" liquid filled pressure gauges with 316SS wetted components and 1/4" NPT connection shall be installed on the suction and discharge headers.
- F. Mounting Frame: The unit shall be equipped with a welded steel with powder coating mounting frame (VS2 and ESL) or a combination of 304 SS and welded steel with powder coating mounting frame (VML) with adequate supports for the pump, hydronic components, vfd's and control panel.
- G. Thermal Safety Valve**: self-operating, opening at a preset temperature constructed using stainless steel or bronze.
- H. Low Pressure Cut Off Switch**: normally closed, factory set pressure switch wired into the enable circuit of the pump vfd constructed using stainless steel or bronze.
 - a. VML and ESL: 1 switch provided per system mounted on the suction header
 - b. VM2: 1 switch provided with each pump circuit

** - Denotes optional equipment

2.05 Controls/Electrical

A. Variable Frequency Drive:

- a. NEMA 1 (NEMA 4, optional IP55 or IP66) rated enclosure, heat-sink cooled, with no external fan.
- b. Equipped with EMC filters as standard.
- c. Come with a lockable disconnect switch (non-fused)
- d. Include protection features to ensure that the motor may not operate in an overloaded condition which may cause damage to the connected motor.
- e. Be capable of controlling the motor with a constant or variable torque output characteristic in order to operate the desired load. Selection between constant and variable torque operation should be easily selectable by parameters within the VFD.
- f. Be capable of communicating and receiving commands given across the following communications networks, whether this is via the built-in communications port or an available communications option:
 - i. BACnet MS/TP
 - ii. Modbus RTU
 - iii. BACnet /IP
 - iv. Profibus DP
 - v. Profinet IO
 - vi. DeviceNet
 - vii. Ethernet / IP
 - viii. 24 month manufacturer warranty on the VFD
- g. Sequencing. The pumps will be programmed to operate in a lead/lag fashion with the lag pumps being brought online when the lead pump and any active lag pumps are unable to meet the system demand. The lead status will be alternated to ensure even wear between the pumps. Pump operation will be controlled to maintain a uniform constant pressure at the pump discharge.

B. Control Panel**

- a. The control panel shall provide proper terminations for the incoming site power, a lockable disconnect switch, fuses to protect the incoming power supply, separate lockable fused disconnect switches on the power supply to each pump, a power supply unit (with fuse protection), and a color touch screen programmable logic controller
- b. HMI: A 4.3" color touchscreen HMI equipped with at least (2) analog inputs, (12) digital inputs, (8) transistor or digital outputs. The controller shall have the optional capability of providing remote access via Modbus card or Ethernet.

C. Remote Monitoring and Control System** - optional upgrade system integrates multiple sensors, analog or digital, which report to a remote, online portal for alarm monitoring, control and data collection including but not limited to:

- a. pump run times
- b. pump amperages
- c. pressures, temperatures
- d. on/off controlling of pumps and other devices

** - Denotes optional equipment

Results are posted instantaneously and can be processed with or without delays. Email, text and telephone calls are used to provide alarm notifications. Online viewing of graphs and charts are available for live and historical data. The gateway (control panel) at the site communicates to the cloud-based portal over the Internet, using hardwire, Wi-Fi, or cellular.

PART 3 – EXECUTION

3.01 Installation: Install package system according to manufacturer's written instructions and with access for periodic maintenance, including removing motors, impellers, couplings, and accessories.

3.02 Commissioning: Verify that system controls have been set up correctly for the required application

3.03 Start Up - Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain pumps.

** - Denotes optional equipment