

ENGINEERED PRODUCTS

VR SPECPAK PRESSURE BOOSTING SYSTEMS



ENGINEERING SPECIFICATIONS

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, a control panel with electrical disconnects, fusing, and wiring from the pumps to the control. An optional programmable logic control shall be provided for ease of operation but not required for the pumps Variable Frequency Drives to provide multi-pump operation (lead/lag), pump protection or basic communication capabilities. The unit shall be provided as a complete system by the pump manufacturer.

1.02 CERTIFICATIONS: The pumps used in the assembly must be certified to NSF/ANSI 61 & 372. The control panel shall be UL 508A labeled.

1.03 SERIAL NUMBER: Each package shall be given a unique serial number for tracking purposes and the unique number must be provided on a label supplied with the unit. The unique 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.

2.01 SCOPE: Factory-assembled and tested booster pump package for use in potable water systems. System will include controls, isolation valves, check valves, drain valves, pressure gauges, pressure transducer, 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 as to allow site piping connections on either end of each manifold.
- B. Manifold Connection Options: Connection capabilities on the manifolds to include both grooved or flanged (using an adapter kit) options.
- C. Stainless Construction: Pump hydraulic components, pipes, gauges & transducers (except seals, gaskets, valves, pump base and O-rings) to be constructed using stainless steel materials. No brass, bronze, copper, or epoxy coated materials are permitted.
- D. 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.
- E. Remote Access: VFDs and/or Control panel shall have the option of having remote accessibility through either a Modbus, BACnet or Ethernet card connection. The connection shall permit access to view, monitor, and change the control parameters through wired communications and/or mobile app programs.
- F. Mounting: The package shall be constructed to be floor mounted as a single unit.

2.02 PUMP/MOTOR CONSTRUCTION:

Pump Specifications:

- A. Vertical Multi-stage Pump stage housing, impeller and diffuser shall be made of AISI 316 Stainless Steel.
- B. Suction/Discharge: In-line ANSI flange type, rated for up to 375 psi (26 Bar) up to 110gpm nominal flow or rated up to 230 psi (16 Bar) for up to 520gpm nominal flow.
- C. Mechanical Seal: Graphite/SiC EPDM (Graphite stationary part; Silicon Carbide rotating part, EPDM elastomer & AISI 316 SS hardware)
- D. Pump Hydraulic Parts: AISI 316 stainless steel and laser welded.



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ENGINEERING SPECIFICATIONS CONTINUED

E. Floating Neck Ring: PTFE

F. O-Rings: EPDM

G. Draining & Filling Plugs: AISI 316 stainless steel

H. Fasteners: AISI 316 stainless steel

I. Motor mounting with over-sized thrust bearings for use with standard NEMA motors to avoid requiring a special heavy-duty bearing motor

Motor Specifications:

J. Motor Construction Type: Totally Enclosed, Fan Cooled (TEFC)

K. NEMA Premium efficiency

L. 3-phase, Inverter duty rated

M. Standard construction for ease of serviceability. In case of emergency need, the motor shall be capable of operating without the need of a VFD, by means of a protected starter or other similar device

2.03 PUMP PERFORMANCE/SPECIFICATION:

A. The system shall be sized so the pump does not load to more than 95% of the motor full-service factor horsepower throughout all the recommended operating range.

B. The system shall be sized so the motor maximum amperes do not exceed 92% of the VFD maximum output amperes.

2.04 SYSTEM CONSTRUCTION:

A. Manifolds: Suction and discharge manifolds to be constructed using 304/304L 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 preferring to use flanged connections with their site water piping.

B. The manifold's diameter shall be sized such that fluid velocities are kept below 10ft/s up to the recommended maximum flow rate of the pumps

C. Pump Isolation Valves: Shall be provided on the suction and discharge side of each pump.

D. Backflow Prevention: Inline, spring-loaded check valves with stainless steel spring, poppet and seat ring shall be installed on the discharge side of each pump.

E. Pressure transducers: One 4-20mA pressure transducer per pump shall be supplied for operational redundancy

F. Low Pressure Factory Preset Switch: One low-pressure switch per pump shall be supplied such that it will signal the VFDs in case there is a low suction pressure (less than 5 psi).

G. Pump Thermal Relief Valves: One thermal relief valve per pump shall be supplied to protect seals from over-temperature damage

H. Pressure Gauges: 2.5" diameter, liquid filled stainless steel pressure gauges shall be installed on the suction and discharge headers.

I. Nipples/Bushings: Shall be constructed with 304 stainless steel.



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ENGINEERING SPECIFICATIONS CONTINUED

2.05 CONTROLS/ELECTRICAL:

- A. Panel: The control panel shall provide proper terminations for the incoming site power, a lockable disconnect switch, fuses to protect the incoming power supply, and separate lockable fused disconnect switches on the power supply to each pump.
- B. Optional HMI: When the optional HMI is required, a power supply unit (with fuse protection) shall be included for the color touch screen. The color touchscreen HMI shall be 4.3" or larger and quipped with at least (2) analog inputs, (10) digital inputs, and (6) relay outputs. The controller shall have the optional capability of providing remote access via Modbus or an optional Ethernet card.
- C. Package Control (consisting of the pump VFD and/or PLC control) must be capable of turning the pumps on and modulating the pump operation to meet an adjustable pressure set point. The package control must be equipped to sense and interrupt the pump operating in case of:
- Motor overload
 - Under voltage
 - Locked pump
 - Open motor circuit
 - Short circuit
 - Overheated drive
 - Insufficient water supply (low inlet pressure)
 - Active/idle mode
 - Run hours for each pump, including time schedule for the system

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.



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GENERAL LAYOUT

