

**DOUGLAS PARK BOOSTER
HOOVER GREEN**

SPECIFICATIONS

**SINGLE CENTRIFUGAL PUMP SYSTEM
CLOCK START VFD**

PURPOSE:

To provide a complete prefabricated variable frequency drive skid mounted fiberglass enclosed clock start centrifugal pump system from a sole source company, herein after referred to as the "manufacturer", whose primary business is the manufacture of prefabricated pump systems. The manufacturer will manufacture, flow test, install and warrant the system to meet all specified operating requirements described below and in the system detail. The system shall be a Model HCBF-3CSV-230/3-E-12,Y,Z as manufactured by Hoover Pumping Systems of Pompano Beach, Florida USA 954-971-7350 specified below and shown on the plan details. This specification describes the general components and minimal operating requirements and shall not be construed as a manufacturing guide or complete list of required system components and appurtenances.

The contractor shall submit seven (7) complete copies of the shop drawings to the designer for approval, prior to system order placement. The submittal shall contain cut sheets for all system components. To be considered an equal, the contractor must submit the following 12 days prior to bid opening: manufacturer brochure showing prefabricated pump systems manufacturing is the primary business of the manufacturer or division proposed to manufacture the system, written specifications, dimensioned layout detail, electrical schematic, product sheets for all main components, Underwriters Laboratory electrical control panel and "Packaged Pumping System" manufacturer's file numbers, list of 6 projects with similar operating systems with current name and phone number of person responsible for system operation, manufacturer's insurance certificate for general liability showing minimum coverage of \$1 million, and written certification from the manufacturer stating the proposed system meets all requirements described in this specification, the detail and the bid documents.

If the data submitted is determined to be an equal by the designer the bidder will be notified prior to the bid date.

FIBERGLASS ENCLOSURE: The pump station shall be protected by a fiberglass enclosure with chemical and ultraviolet resistant open mold resin with exterior finish that is uniform in color and texture, reinforced with fiberglass and stiffeners for rigidity. The enclosure shall open clear of the equipment for ease of service with the aid of gas filled struts, a stainless steel hinge and latching lockable handle. The enclosure shall be of dimensions adequate to contain the pump system mounted on the skid as shown on the system detail.

MOUNTING ASSEMBLY:

The pump station shall be mounted on a prefabricated aluminum or hot dipped galvanized skid. Pedestals shall be provided to mount the pump motor and control panel assemblies. The entire station shall be installed on a reinforced concrete slab sized as noted on the system detail.

PUMP AND MOTOR:

The pump shall be a single-stage end-suction centrifugal type, with the liquid end mounted directly to the motor enclosure to allow rear pull out of the entire motor. A pressure sensor for loss of prime protection shall be mounted into the pump volute.

The system will be designed for operation at 3,450 RPM. The pump driving motor shall be of the squirrel cage induction type. The motor shall be suitable for full voltage starting at 60 Hz. The

motor enclosure shall be totally enclosed fan cooled for all motors, configured to allow direct mounting of the pump's liquid end.

The motor shall be rated at 3 HP at 60 Hz.

PUMP STATION PERFORMANCE:

The required pump performance is as follows: a) discharge pressure of 70 psi, with 40 psi pump system pressure boost, b) maximum required flow of 60 gpm, and c) minimum required flow of 25 gpm.

IRRIGATION PUMP CONTROL PANEL:

The control panel assembly shall be Underwriters Laboratories listed in accordance with section 508A for "enclosed industrial control panels." All control devices and electronic auto-sensory circuitry shall be housed in a self-contained weather-resistant NEMA 4 control cabinet. An electrical schematic shall be permanently mounted inside the cabinet. The control cabinet shall contain the following protection and control equipment:

Operation

This station operates as a Variable Frequency Drive (VFD) clock start, clock retirement system. The station automatically maintains a constant discharge pressure from a pressure transducer input regardless of varying flow demands within the station operating range. The operator interface allows for viewing of system setup parameters.

Hoover-Flow Software features include flow Loss of Prime/No-flow protection, diagnostic information, Phase Loss protection, Phase Unbalance protection, Voltage monitoring and protection, Hoover Drive control.

Clock Start

The pump starts when the irrigation controller (clock) begins a watering sequence.

Clock Retirement

The pump shuts off when the clock completes a watering sequence.

Loss of Prime Protection

If the system pressure remains below the start pressure, and there is no flow of water through the system during pump operation the pump will shut off. The system will remain off until 'Reset'.

No Flow Protection

If no flow is detected for 60 seconds during pump operation, the pump will shut off. The pump will remain off for 12 minutes and then will restart.

Drive Fault

In case of a drive fault, including under or over voltage, over current, heatsink thermal, and ground fault, the affected pump will shut off, the operator interface will display 'Drive Fault'. The pump will remain off until the system is 'Reset'.

Protection Equipment

- Front operated main power disconnect
- Motor fuses for motor and drive short circuit and ground fault protection
- Metal oxide varistors (MOV) for transient voltage suppression per phase
- Fused control circuitry with blown fuse lighted indicator for each circuit

Specification

Electric service to be, in order of preference:

460V 3-Phase (A, B, C, Ground)

230V Closed-Delta 3-Phase (A, B, C, Neutral, Ground)

208V Wye 3-Phase (A, B, C, Neutral, Ground)
230V 1-Phase (A, B, Neutral, Ground)
208V 1-Phase (A, B, Neutral, Ground)
230V Open-Delta 3-Phase (A, B, C, Neutral, Ground).

Selection of 230V Open-Delta 3-Phase may require an increase in electrical equipment size to meet desired performance criteria.

VARIABLE FREQUENCY DRIVES (VFD):

Variable Frequency Drives with the following characteristics shall be provided for each main pump motor: 32-bit microprocessor controlled Pulse Width Modulated output, IGBT transistors, line reactors, built-in adjustable PID control, acceleration ramp up and down, forced-air ventilation, variable torque control, 32 character alphanumeric English full text parameter display, single function keys, block parameter access, dual analog outputs, automatic and manual reset, opto-isolated outputs, log of last 30 events retained in memory.

PRESSURE TRANSMITTER:

A 4-20mA-pressure transmitter shall provide a feedback signal to drive PID loops and for system pressure control. The transmitter shall be CE & UL recognized and built with an all stainless steel housing and pressure port, rated to NEMA 4, and able to withstand shock and vibration levels to MIL-STD-810E.

MASTER VALVE:

The valve shall be 230 psi working pressure with the following features:

- Continuous duty industrial solenoid
- Large capacity disk filter on pilot control tubing
- 220 psi polyethylene control tubing with prest-o-lock fittings
- Cast iron body and bonnet with polymer coating
- 316 Stainless steel nuts, bolts, washers, shaft and spring
- Stainless steel seat

For Irrigation controller use, the solenoid shall be energized to open by the irrigation controller master valve circuit.

DISCHARGE PIPE MANIFOLD:

The pipe discharge manifold shall be constructed of galvanized steel pipe with galvanized roll groove fittings. A flow-switch, pressure gauge and hose bib will be provided on the station discharge. A wafer type butterfly valve will be provided at pump station discharge.

INTAKE LINE:

The minimum size intake line shall be 3" diameter or larger as required for a maximum of 5 feet per second velocity flow. If a reducing fitting is required at the pump suction an eccentric reducer shall be installed. Any above ground pipe exposed to sunlight shall be schedule 40 galvanized steel with galvanized roll groove fittings.

IRRIGATION CONTROLLER:

A Rain Bird ESP-LXME model 12 station irrigation controller and rain sensor shall be mounted on the pump system. The controller shall be powered from a fuse block in the pump system control panel. The controller shall activate the pump via a relay in the control panel on clock start systems.

WARRANTIES:

Prior to shipping, the manufacturer shall flow test the system and submit a certified report to the designer stating the system is within 1% + or - of the specified flow rate and pressure, and meets the operational requirements.

The manufacturer of the pumping station shall warrant all components for a period of one (1) year from date of manufacture.

PN13894