

SPECIFICATIONS

HYDROVARSPEC

Hydrovar[®]

VARIABLE SPEED PUMP CONTROLLER ENGINEERING SPECIFICATIONS

 **GOULDS**
WATER TECHNOLOGY
a **xylem** brand

I. Scope

The variable speed centrifugal pump controller shall be the Hydrovar® which can be mounted to a standard NEMA TEFC AC induction pump motor. The Hydrovar shall mount directly to a standard duty, NEMA type B or greater TEFC AC induction motor, class B or greater insulation. The motor can be either 2 pole or 4 pole. The drive shall be mounted via adjustable clamps to the TEFC motor fan cover or wall mounted with external fan/bracket assembly. The Hydrovar shall require no special integrated pump motors. The Hydrovar shall provide an adjustable carrier frequency with IGBT power switching, and utilize PWM technology. The drive shall provide noiseless operation of the driving motor, short circuit and ground protection, and work with controlled sinusoidal current synthesis and dynamic over current limitations. The Hydrovar shall be one complete integrated unit including the variable frequency drive, programmable pump specific control logic, and include a NEMA 4 enclosure which can be mounted outdoors with protection from direct sunlight. Additional control panels, PLC's or other external devices, shall NOT be necessary to accomplish complete pump programming and variable speed control of pump and motor. Standard variable frequency drives that do not incorporate pump control logic as the primary control software; programming and features directly applicable to centrifugal pump applications shall not be considered equal.

Programming The Goolds Water Technology Hydrovar shall provide a LCD display with a programming keypad for data entry in plain English or other optional language in pumping terms. The drive shall utilize user-friendly front panel programming in languages that displays pump and motor language in clear text. Colored diodes shall signal 'power on', 'pump running' and 'fault'. Program settings shall be changeable and stored in non-volatile memory. Program settings shall be retained in memory in the event of loss of power to the controller, without the use of a backup battery. System operating pressure shall be clearly displayed in PSI or feet of head for ease of use and to provide an operator friendly interface. Additional parameters, where applicable, shall be displayed in units consistent with pumping systems. Generic control systems adapted from other applications shall not be considered equal.

The settings and program in whole or part may be locked out with the use of an operator selectable password. Standard system hydraulic settings shall include at a **minimum** the following functions: loss of suction, lack of NPSHa, pump runout protection, dead head protection, constant pressure setting with variable flow capability, constant flow with variable TDH (pressure) capability, quadratic differential flow calculation, system curve compensation, multiple pump operation with alternation, pump starting point with allowable, adjustable pressure drop, minimum speed with time delay, pressure of flow sensor error, overpressure shutdown, and low flow shutdown.

II. Interface

The control board unit shall contain analog and digital contacts for a host of sensors or dry relay terminals which can be connected to external devices for operation of:

- Remote start and stop
- Low-pressure protection switch
- Across the line start pump relay
- Pump run relay
- Pump fault relay
- Analog output signal (0 - 10Vdc) actual pressure
- Analog input (4 - 20mA) sensor
- Secondary analog input (4 - 20mA or 0 - 10 Vdc) offset signal
- Multipump interface via RS485 with up to eight pumps in parallel.

- MODBUS interface for control and monitor
- Two pressure settings with one transducer (field programmable)

The integrated microprocessor shall provide automatic start and stop of up to eight variable speed controlled pumps, and enable automatic changeover for lead and lag pump sequencing, without the use of external devices (PLC's) or timers. A stainless steel pressure transducer and cable assembly shall be included. All hardware and appropriate range transducer shall be provided by the pump control manufacturer to ensure complete compatibility with controller.

III. System Protection

The Goulds Water Technology Hydrovar shall provide a programmable automatic error reset of the pump system that will provide automatic restart capability, with a programmable time delay between each start. The pump controller shall provide a fault history with at least five previous fault codes. The pump controller shall provide programmable automatic test run of pumps during periods of down time, based on operating hours. The pump controller shall incorporate motor thermal protection and drive temperature protection as standard equipment. The pump controller shall be capable of monitoring and displaying total operating hours, and total motor run hours. The Hydrovar unit shall protect the variable frequency drive and motor from:

- over-voltage
- under-voltage
- input phase loss
- phase imbalance
- motor over-current
- motor phase loss
- ground fault and short circuit

The variable speed pump controller shall be cUL listed or complete package with centrifugal pump shall be cUL Listed.

IV. System Installation and Integration

A complete Hydrovar pump controller instruction, operation, and programming manual shall be provided by the authorized supplier for the Hydrovar. The instruction manual shall include a typical system design layout, installation instructions, pump programming instructions, and troubleshooting assistance. The Goulds Water Technology Hydrovar variable speed pump control system shall include the following: variable frequency drive, microprocessor based PLC, pump specific control logic, pump, motor and transducer. The variable speed pump system and components, shall be provided, installed and integrated by a single source entity. Complete system integration, setup, programming and warranty will be the responsibility of the factory-authorized representative.

V. Field Tests

A factory qualified service representative shall be present at initial startup of the system to ensure correct installation and rotation of the unit. Any deficiencies shall be noted and corrected prior to the commissioning of the pump. A minimum of 4 hours on-site service and training is required.

In the presence of the Engineer, field-testing of all equipment shall be performed to determine that operation is satisfactory and in compliance with the specifications. Testing shall be completed after the installation is complete, the equipment has been operated and all necessary adjustments have been made.

Each pumping unit will be operated for a suitable period during which time all possible loads, where conditions permit, shall be applied. All tests shall be completed with clear water.

During the field tests, readings for all the electrical data shall be recorded on approved log sheets and submitted to the engineer.



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