

NOVUS 4000 CONTROL PANEL

1.01 GENERAL

- A. Contractor shall furnish all labor, materials, equipment, and incidentals required to provide (simplex, duplex, triplex) pump control panel as specified herein.
- B. The pump control panel shall be assembled and tested by a shop meeting U.L. standard 508A for industrial controls. Each control panel shall receive a factory test to ensure proper operation prior to shipment.

2.01 CONSTRUCTION

- A. The controls for the pump shall be contained in a (painted steel, fiberglass, stainless steel, aluminum) enclosure meeting NEMA (1, 12, 3R, 4, 4X) requirements with hinged door.
- B. The enclosure shall have provisions for padlocking. A nameplate shall be permanently affixed to the panel and include the voltage, phase, hertz, pump full load ampere rating, and pump horsepower rating. A warning label stating the power should be disconnected before servicing shall appear on the panel.
- C. An aluminum back panel shall be provided. Should the panel size be larger than 36" x 30", a 12 gauge steel back panel finished with non-conductive white polyester powder paint shall be provided.
- D. For each pump, a run light and a hand-off-auto switch shall be provided. Run lights and hand-off-auto switches shall be mounted on the inner door. The run lights and hand-off-auto switches shall be properly labeled as to function. The run lights shall match the hand-off-auto switches in appearance. Run lights shall be green.
- E. The incoming power shall be (115, 208, 230, 460, 575) volts, (single, three) phase (50, 60) hertz service. Terminal blocks with box type lugs shall be supplied to terminate all wiring for floats, heat sensors, and seal sensors for the pump, if required. The pump leads shall be terminated at box type terminal blocks.
- F. A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breakers shall be thermal magnetic and sized to meet NEC requirements for motor controls.
- G. The magnetic starter shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. The magnetic starter shall include an overload relay that is IEC rated, ambient temperature compensated, and bi-metallic. The overload relay shall be capable of being set in either a manual or automatic reset mode. In the manual mode, only the operator shall accomplish reset. Overload relays shall be Class 10 type, meaning at 6 times the full load amperes the overload relay shall trip within 10 seconds.
- H. Control voltage shall be 120 VAC and may be accomplished by the means of a transformer should the input voltage be unable to produce a 120 VAC signal. Control fuse(s) and an on-off switch/circuit breaker shall protect and isolate the control voltage from the line.
- I. Wire ties and/or wire track shall be used to maintain panel wiring in neat bundles for maintenance and to prevent interference with operating devices. All wiring shall be color-coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. A schematic shall be permanently attached to the inside surface of the front door.
- J. All ground connections shall be made with fork terminals and star washers to assure proper ground.
- K. A pump controller shall be provided for control logic. It shall be a dedicated solid-state controller, which is easily replaceable with unpluggable terminal blocks on all wiring inputs and outputs. Controller shall be flush mounted on the dead front inner door, shall be UL listed, and shall operate on 12 VAC +/-10%, 50-70 Hz., with an operating temperature of -10°C to 60°C.
- L. The pump controller shall indicate float circuit operations utilizing red amber LED indicator lights. LED indicator lights shall provide adequate information so that they can be used for diagnosis in troubleshooting problems located in the float circuits. Each LED shall be permanently labeled on the pump controller as to function.

- M. The controller shall have built-in software that requires no programming. The controller shall have a simple menu structure and a 32 character alphanumeric LCD that displays information for level, status, and set point.
- N. The controller shall include a selector switch that allows the user to choose between: Pump 1 run as lead, Pump 2 run as lead, Pump 3 run as lead, or alternate lead pump. This selector switch shall be on the controller itself.
- O. The controller shall include individually selectable on/off set points for up to three pumps.
- P. The controller shall include a 4-20mA input as the main sensor input and shall include a loop power supply for easy connection to most transducers and transmitters with adjustments provided for both scale and offset.
- Q. The controller shall have all 115VAC inputs that are internally fused and transient protected. There shall be inputs provided for pump seal fail (moisture) and over temperature, with red fail lights should these conditions fall out of the specified condition.
- R. The controller shall be user selectable as either a pump up or pump down controller.
- S. At start up, the controller shall perform a series of self-tests to ensure the controller is working properly. Should the self-tests have a problem, a watchdog timer shall expire and reset the controller. Once the tests are complete, a timer is started to keep the controller from operating before the test conditions have cleared.
- T. In pump down mode only, a single float backup shall be provided. This float shall be placed above the normal operating levels of the transducer. Should the high level backup float be activated it shall start a 30 second timer and a 60 second timer. After 30 seconds, the lag pump shall be called. After the 60 second timer times out, should there be three pumps, the second lag pump shall be called. If the high level clears before either lag pump is turned on, the timers shall be reset. The backup float indicator light shall require manual reset.
- U. The controller shall include an optional fail to start test. Should the auxiliary contact of the starter not close in the user-defined amount of time after pump call, a pump fail condition shall occur and disable the pump. Then, the next pump shall be called. This condition shall require manual reset.
- V. The controller shall include pump on and pump off timers which prevent more than one pump turning on or off at the same time. These timers help prevent excess power loads when pumps are being turned on and the water hammer effect when pumps are being turned off.
- W. The controller shall include a user defined "time at setpoint" timer, which causes a setpoint to be set for a set amount of time before turning on the pump. This time can be set in the menu for the controller. This protects from pump motor short cycling.
- X. The transducer input shall be a max of 0-5VDC, and shall have a level accuracy of +/-0.5%.
- Y. The seal fail(moisture) and over temperature inputs shall have options to make each automatic or manual reset and shall allow the user to invert the polarity of the input.

3.01 **OPTIONS**

A. Panel may be equipped with the following additional features:

- U.L. 698A labeled with intrinsically safe circuit extensions for floats and/or a zener barrier for the transducer input. (Explosion proof pumps only)
- Alarm light (flashing, non-flashing)
- Audible alarm (piezo, horn, bell) with push-to-silence switch.
- Auxiliary dry contacts for alarm conditions
- Telemetry Unit
- Power on indicator light
- NEMA rated starters
- NEMA rated Class 20 ambient compensated overload relays
- NEMA rated Class (10, 20, 30) melting alloy overload relays
- Variable Frequency Drives
- Soft Starts
- Elapsed time meter (per pump)
- Cycle counter (per pump)
- Seal failure light(s)
- Over temperature light(s)
- Anti-condensate heater with thermostat
- Voltage monitor
- Phase monitor (3 phase only)
- Lightning arrestor
- Surge suppressor (capacitor)
- 120 VAC, 15amp GFCI convenience outlet with circuit breaker
- Fused/Non-Fused disconnect with inner door interlock handle
- Main breaker
- Generator receptacle
- Manual transfer switch
- Pedestal mount for enclosure; up to 36" x 30"
- 22mm oil tight lights and switches
- 30mm oil tight lights and switches

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