VFD Pump Control Panels

Metron Variable Frequency Drive Controllers are designed for controlling and optimizing the speed and power requirements of one, two or three electric motor driven pumps. The VFD Pump Control Panel is available in Simplex, Duplex, and Triplex models from 2-200 horsepower at voltages from 208-575 VAC.

The standard controller consists of a pump application specific microprocessor, Pulse Width Modulated Drive(s), a main fused disconnect switch, hand-off-auto switch(es), speed potentiometer(s), and a 0-300 PSI pressure transducer. The Metron VFD Pump Control Panels are supplied standard in a NEMA 3R rated enclosure painted gray.

Options for Metron VFD Pump Control Panels include circuit breakers in lieu of fused disconnect switches, a myriad of pressure or flow transmitters or transducers, and optional enclosure ratings for NEMA 4, 4x and 12 application requirements.

Listings
Metron Variable Frequency Drive (VFD) Control Panels are listed by Underwriters Laboratories, Inc. under UL 508 Standard for Industrial Control Equipment and meet or exceed the requirements set by the Nation Electric Code (N.E.C.).

Microprocessor Control
The system is controlled by the latest state of the art microprocessor controller for easy operation and simple configuration of the input and output parameters demanded by the installation. The microprocessor includes annunciation and display modules that provide application specific information. Control of the starting, speed, and stopping of the motor(s) can be provided by any device with either a 0-10 volt or 4-20 milliamp variable output.

The microprocessor control and drive units are mounted standard in a NEMA 3R rated enclosure, however; additional NEMA ratings are available as options. All Metron VFD controllers can be supplied with a myriad of options a few of which include, circuit breakers in lieu of fused disconnects, by-pass contractors, and a full data acquisition system for connection to an external computer.

Standard Features
All Metron VFD controllers are supplied with a standard 12 function annunciation module which incorporates ultra bright high-efficiency LED indicators. Push buttons located on this unit are used in conjunction with the display module to set all system parameters. A sixteen character display unit provides indication of all set points, timer settings, and system conditions.
The standard VFD unit consists of:

- Microprocessor control system
- Pulse Width Modulated Variable Frequency Drive(s)
- Main Disconnect Switch Protection (Circuit breakers are supplied standard on some horsepowers & voltage. Please refer to the price sheet for details.)
- Pressure Transducer 0-300 PSI
- Hand-Off-Auto Switch
- Speed Potentiometer for manual control of each drive
- NEMA 3R rated enclosure

Features

Display Unit
The following modes are for a standard Metron VFD supplied with a pressure transducer. All display modes can be varied for other applications that require control by means other than pressure.

Mode A-Water Pressure
This mode indicates the present system water pressure, and the pressure that the pumps are trying to maintain within the system.

Mode B- Motor 1,2, and 3% Load
This value indicates the speed output from each variable frequency drive unit. This mode can display up to three motor percentages.

Mode C-Security Code
This parameter allows the user to enter a security code in order to gain access to the programmable parameters. Note that all modes can be viewed without entering this code.

Mode D-Low System Pressure
This is the low system pressure alarm setting.

Mode E- Start Pressure
This value selects the pressure at which the system calls for the pump(s) on demand.

Mode F- Maintain Pressure
This value selects the pressure that the pumps will try to maintain within the system.

Mode G- High System Pressure
This is the high system pressure alarm setting.
Mode H-Delay Start Timer 1
This timer starts timing when the system pressure falls below the start pressure (Mode E) value.

Mode I- Delay Start Timer 2
Mode J- Delay Start Timer 3
These timers are the same as the Delay Start Timer 1 (Mode H) and are used with Duplex and Triplex systems respectively.

Mode K-Autostop Timer 1
This timer setting defines the minimum run time for motor 1. This starts timing when motor 1 is started. When it has finished timing, and when the system demand is met (Mode F setting) with the motor running less than the minimum % load setting (Mode T) - the motor will stop automatically. This timer is adjustable from 2-60 minutes.

Mode L- Autostop Timer 2
Mode M-Autostop Timer 3
These timers function the same as Autostop Timer 1 (Mode K) for motor 2 & 3 minimum run timing in duplex and triplex systems.

Mode N-Ramp Timer
This parameter defines the length of time the variable frequency output takes to ramp to its maximum output (10 volts or 20 milliamps).

Mode O- Config. Mode
This allows the user to configure certain system parameters such as audible alarms and motor shutdowns. Please refer to the Operations Manual for details.

Mode P-Minimum % Load
This parameter defines at what percentage the variable output will allow the motor(s) to stop automatically. The motor(s) will not be stopped automatically until the actual motor % load is below this value.

Mode Q-Maximum % Load
This parameter defines at what percentage of load additional motor(s) will be asked to start in multiple pump applications. Motor(s) 2 or 3 will not start automatically until the actual lead motor % load is above this value.

Mode R-DIP Switch Settings
This mode is for indication of the internal factory set dip switch settings and is used for system diagnostic purposes only.
Mode S-Start Pressure 2
(Optional Mode)
This parameter is used exclusively for duplex applications that require a separate start pressure for the lag pump.

Mode T- Suction Pressure
(Optional Mode)
This mode displays the actual suction pressure of the system. A second pressure transducer is required for this parameter.

Mode U-Low Suction Pressure
(Optional Mode)
This parameter defines the set point for the low suction pressure alarm. The indication light is located on the optional expansion module and like Mode P, requires an additional pressure transducer.

Mode V-High Suction Pressure
(Optional Mode)
This parameter defines the set point for the high suction pressure alarm.

Annunciator Unit
All Metron VFD Controllers are supplied with a standard annunciator unit which can indicate up to twelve of the following conditions:

Motor 1 Running
This LED is only illuminated when the motor is running. Motor 2 and Motor 3 Running indications are provided standard on duplex and triplex systems.

Pump On Demand
This is illuminated when the system pressure falls below the start set point (Mode E). It is cleared when the system pressure has reached the maintain pressures (Mode F).

Autostop Timer
This LED flashes while the Autostop Timer is timing out for any motor(s). The indicator is steady when the Autostop Timer has timed out but the system demand has not been met.

Delay Start
This LED flashes while the Delay Start Timer is timing out for any motor(s). This LED indicates that any of the motors are about to start.
System Pressure High
This LED indicates that the system pressure has risen above the High System Pressure (Mode G) set point.

System Pressure Low
This LED indicates that the system pressure has risen above the Low System Pressure (Mode D) set point.

Motor Failed
This indicator is illuminated steady if a run signal exists from the control units and has not received a corresponding run signal from the drive unit within 10 seconds. An audible alarm which is mutable also sounds under this condition.

Motor 1,2, or 3 Leading
This LED indicates which is the lead pump in multiple pump applications.

Options
Expansion Module
An optional expansion module is available for LED annunciation of the any of the following conditions:

Low Suction Pressure
This LED illuminates when the suction pressure has fallen below the Low Suction Pressure (Mode U) set point. It can be configured to sound a mutable alarm as well as shut down the motors by setting the appropriate code in the Config. Mode (Mode O).

High Suction Pressure
This LED illuminates when the suction pressure has risen above the High Suction Pressure (Mode V) set point. It can be configured to sound a mutable alarm as well as shut down the motors by setting the appropriate code in the Confid. Mode (Mode O).

Motor Lockout
This indicates that the motors have been shutdown via an alarm condition during the pump on demand situation. Note that the motors will be locked out regardless of the pump on demand condition. In a pump on demand situation, when this input is activated, the motors will be restarted with the Delay Start Timers.

Flow Switch
For use in systems that require a flow demand as well as a system pressure to be satisfied, this indicates the status, either open or closed, of a flow switch provided by others. The system can be configured so automatic motor shutdown will not be allowed until the flow switch setting has been met.
**Minimum % Load**
This LED illuminates when the motor(s) load falls below the Minimum % Load (Mode Q) set point and indicates that an additional motor has received a run signal in multiple pump applications.

**Maximum % Load**
This LED illuminates when the motor(s) load has reached the Maximum % Load (Mode Q) set point and indicates that an additional motor has received a run signal in multiple pump applications.

**Auxiliary Channels**
Channels that can be configured for multiple purposes, these can be set up to provide a myriad of functions that include latched logic, audible/visual alarms, mutable alarms, and motor shutdown.

**DATAS Data Acquisition System**
A complete data acquisition system is available for any Metron VFD Controller for remote annunciation and data collection for an external computer. This system interfaces with an IBM compatible PC via a RS232 cable or telephone line when the optional modem feature is specified. The system is capable of displaying up to 20 annunciation channels with an expanded view of any one channel function as well. In addition, the software provides for data collection and graphing of all critical system parameters.

**Additional Options**

**Circuit Breakers**
Metron VFD Pump Panels can be supplied with a main circuit breaker in lieu of the main disconnect switch. To order controls with a circuit breaker, please substitute the last letter “D” with the letter “C” in the product designation. Please note that some horsepowers and voltages are supplied standard with a main circuit breaker due to the higher amperage ratings required for these models. For pricing controls with a circuit breaker, please refer to the circuit breaker price sheet.

**Individual Motor Circuit Protection**
All Metron VFD Controllers are supplied with one main circuit protection device (disconnect switch or circuit breaker). Individual independent motor circuit protection can be supplied as options for multiple motor applications.

**Transducers & Transmitters**
The microprocessor controller will accommodate a wide variety of pressure or flow transducers or transmitters that produce either a 0-10 volt or 4-20 milliamp variable output. For compatibility of any specific control signal device, please consult the factory.
By-Pass Contactors
Across-the-line By-Pass Contactors can be supplied for applications that require the ability to take the variable frequency drive unit off line and maintain the ability to run the motors and pumps.

Note: For additional optional features, please consult the factory.

VFD Pump Simplex Control Panel Part Number Chart

<table>
<thead>
<tr>
<th>Horsepower</th>
<th>208V</th>
<th>230V</th>
<th>460V</th>
<th>575V</th>
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</table>

* For voltages not shown, please consult the factory.

Supplied Standard with main circuit breaker in lieu of a main disconnect switch.

Ordering Information

To order Metron VFD Pump Simplex Control Panels, choose the correct base part number from the above chart for the desired horsepower and voltage. For additional options, add the appropriate option code suffix.

Example:

To order a VFD Pump Simplex Control Panel with a main disconnect switch for 25 horsepower and 230 volts:

**Specify the following part number designation:** VSD-25-230

Example:

To order A VFD Pump Simplex Control Panel with a main circuit breakers for 25 horsepower and 230 volts:
Specify the following part number designation: **VSC-25-230**

### VFD Pump Duplex Controls Panel Part Numbering Chart

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<thead>
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<th>Horsepower</th>
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* For voltages not shown, please consult the factory.

**Supplied Standard with main circuit breaker in lieu of a main disconnect switch.**

### Ordering Information

To order Metron VFD Pump Duplex Control Panels, choose the correct base part number from the above chart for the desired horsepower and voltage. For additional options, add the appropriate option code suffix.

#### Example:

To order a VFD Pump Duplex Control Panel with a main disconnect switch for 25 horsepower and 230 volts:

**Specify the following part number designation:** VDD-25-230

#### Example:

To order a VFD Pump Duplex Control Panel with a main circuit breaker for 25 horsepower and 230 volts:

**Specify the following part number designation:** VDC-25-230

### VFD Pump Triplex Controls Panel Part Numbering Chart
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**Supplied Standard with main circuit breaker in lieu of a main disconnect switch.**

**Ordering Information**

To order Metron VFD Pump Duplex Control Panels, choose the correct base part number from the above chart for the desired horsepower and voltage. For additional options, add the appropriate option code suffix.

**Example:**

To order a VFD Pump Triplex Control Panel with a main disconnect switch for 25 horsepower and 230 volts with:

**Specify the following part number designation:** VTD-25-230

**Example:**

To order a VFD Pump Triplex Control Panel with main circuit breakers for 25 horsepower and 230 volts with:

**Specify the following part number designation:** VTC-25-230