SPECTROM™

PUMP CONTROLLER

OWNER'S MANUAL

MODEL 420

BASICS — The *Model 420*™ controller is engineered to provide speed control of a solenoid-controlled AODD pump that is linearly proportional to a 4-20 ma signal. You can set the high and low currents to be the low or high speeds in a range of 0-499 Strokes/Minute. A stroke is defined as the pumping of one of the pump liquid chambers.

The system requires 110 volts AC to power it and delivers 12 volts DC to the pump solenoid. You must use the appropriate pump solenoid when using a *Model 420*. The system is programmed using the 5-button keypad on the circuit board. The system can be operated using the toggle switch on the cover of the unit or by connecting a "SPDT center-off" switch (or a set of dry-contacts) remotely. The connections for remote usage are a terminal strip, also on the circuit board.

The system uses *Strokes/Minute* units which are very useful in estimating fluid delivery rates and permit linear calculations. The enclosure is NEMA 4X and the external control switch has a waterproof boot on it. However, prolonged direct spray should be avoided. The unit always comes up in a 4-20 mode and is ready to run seconds after power is applied.

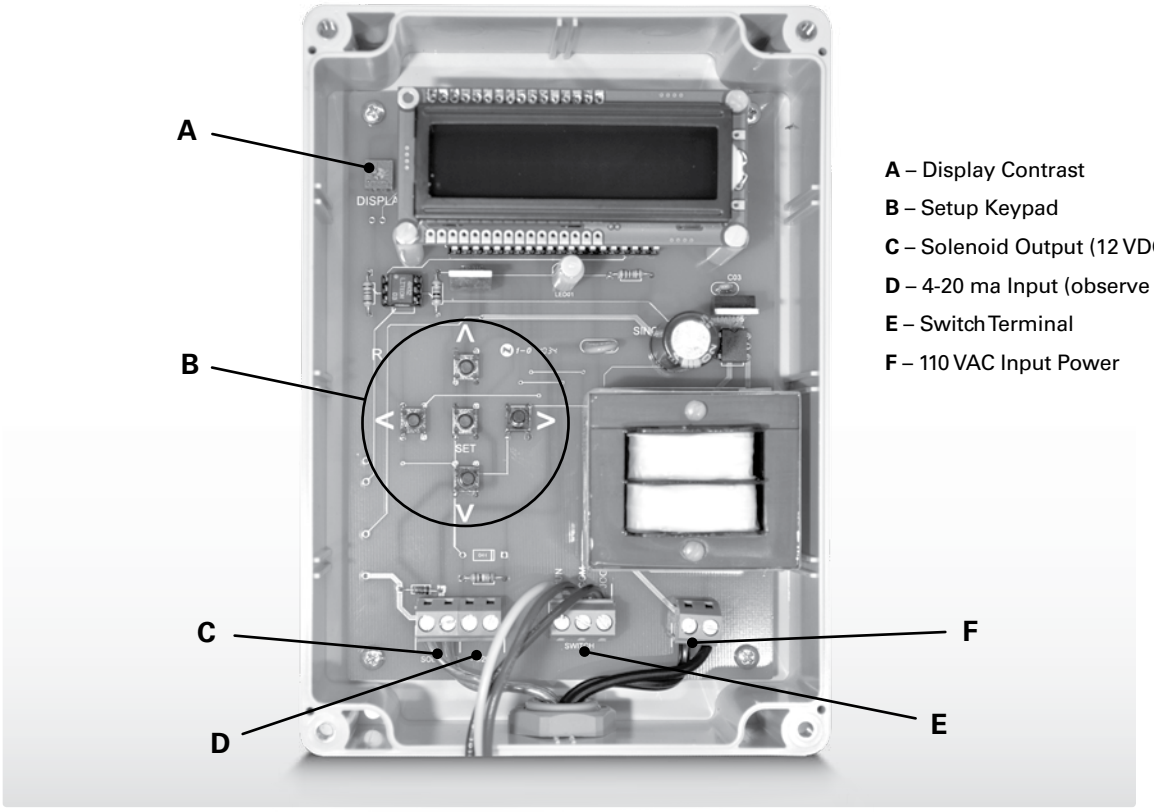
PROGRAMMING — It's very simple; hit the Set button to enter Setup mode and then adjust the values and move the cursor until you have all the values where you want them. Then hit the Set button again to get out of Setup mode. The system is now ready to **Run** (or **Jog**). Keep in mind that the sensor supplying the loop current, the Model 420 unit, the pump, and even the fluid ("heads" and viscosity), and the air supply to the pump, all have tolerances on their performance. It will most likely be necessary to "dial in" the system to get the exact flows needed. So, the enclosure cover should not be tightened until this is accomplished. Once the desired flows are met, the cover should be tightened to prevent tampering with the settings.

RUN — To run the system, flip the switch to the right. The display will tell you the loop current and also the pump speed.

JOG — To run the pump to purge it, prime it, or simply to pump a little product; just flip the switch to the left. The unit will display the pump speed which is the average of the setup high and low speeds.

CALCULATING VOLUMETRIC DELIVERY — The pump manufacturer supplies information about the delivery of fluid per pump stroke (emptying of one chamber). However, be aware that factors like inlet and outlet head, inlet air pressure, viscosity and cavitation, all effect the volumetric flow. It is because of these varying factors that the *Model 420* doesn't calculate the flow. There are too many process variables to hit the values this way. It may take some time to calculate the theoretical output and then "dial in" the system to get the best result. Once these variables are understood and controlled, the unit will help your pump deliver with the accuracy you expect from a positive-displacement pump.

If you have any questions or comments, please pass them onto to your Spectrom distributor and we will be happy to address them.



A – Display Contrast

B – Setup Keypad

C – Solenoid Output (12 VDC)

D – 4-20 ma Input (observe polarity)

E – Switch Terminal

F – 110 VAC Input Power

A The Display control changes the contrast on the LCD display. You will probably never touch it unless the temperature around the unit is unusually high or low. If there is no information on the display, the control may have been tampered with. Turn the display control all the way to the left and then back out until you have the desired contrast.

B The Setup Keypad has "SET" key in the center and four keys with arrows around it. They are for right, left, up and down. The right and left move the cursor on the display accordingly and the up and down change the values high-lighted by the cursor accordingly. They are only used to set the unit up. Once you have "dialed in" the unit, you probably won't be using them and they are inside the unit, out of harm's way.

C The Solenoid output provides 12 volts DC for the pumps integral solenoid. You must use the correct pump solenoid in order for the pump to operate properly.

D The 4-20 ma input gets hooked into the control loop. You must observe the proper polarity in order for the controller to work properly. If you connect the 4-20 input to a current source of greater magnitude, you may damage the A/D converter in the system, so be aware of the maximum current in the loop.

E The Switch terminal connects the control switch to the system. If the Run terminal (blue wire) and the Common terminal (black) are connected, the system reads 4-20 ma. If the Jog (yellow) and the Common (black) are connected, the system will run the pump at the average of the high and low speeds programmed. Never connect all three wires together; you won't hurt anything but you will confuse the processor and the system won't function properly. You can disconnect the unit's switch and connect any dry contact set that can function as a SPDT switch. Relays, switches, and even PLCs are possible as control devices.

F The 110 VAC input is the only way to power the unit. Ensure that the connections are neat and that no conductor is exposed. This is the only location on the circuit board where more than 12 volts are present.

SPECTROM™
AFTERMARKET PUMP PARTS

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