

Bettis M2CP Variable Speed Module (VSM02)

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Section 1: Preface

The VSM02 module is a precision timer that uses microprocessor technology to control the speed of valve travel in selected applications. As such, it provides the ability to control valve speed while opening and closing or selectively in only one direction. Valve operation can be setup to start at one speed and change to a slower speed as required. External equipment operation can be interlocked with the VSM02 so that valve operation is based on specific process conditions.

VSM02 mounts with 2 slotted screws in the ISM location or on the back of an ISM module with hex standoffs. The module switches a SSR (solid state relay) selectively to apply power to the actuator motor. This extends the life of the electro-mechanical reversing contactor. It also prevents valve plugging during instant direction reversal of the actuator.

The VSM02 has 6 timers, allowing selection of 3 different motor speeds during valve operation. Motor speed can be configured to vary two times in one direction. The module can only be used to slow down the speed of the actuator. Settings on the module pulses the SSR with an ON or OFF duty cycle according to adjustments. Adjustments include BCD dial type switches and a x10 multiplier (DIP switch setting) for setting each timer function.

The OPEN control determines the speed of the opening valve stroke. This is disabled by setting OPEN "ON" dial to zero.

The CLOSE control determines the speed of the closing valve stroke. This is disabled by setting CLOSE "ON" dial to zero.

Water hammer is normally used with the intermediate limit switch LSA to change speeds. When the contacts are closed by valve travel, the timer is activated. It overrides all other speed controls while activated.

Section 2: Timer Settings

Each dial sets timer in one second increments from 0 to 9. Setting the x10 DIP switch associated with each timer will multiply the time by 10. Thus, when the DIP switch of a timer is ON, the time is set in increments of 10 seconds for each graduation the dial from 0 to 90 seconds, i.e. 10, 20, 30, 40, etc.

Section 3: Components

Figure 1 Typical Board

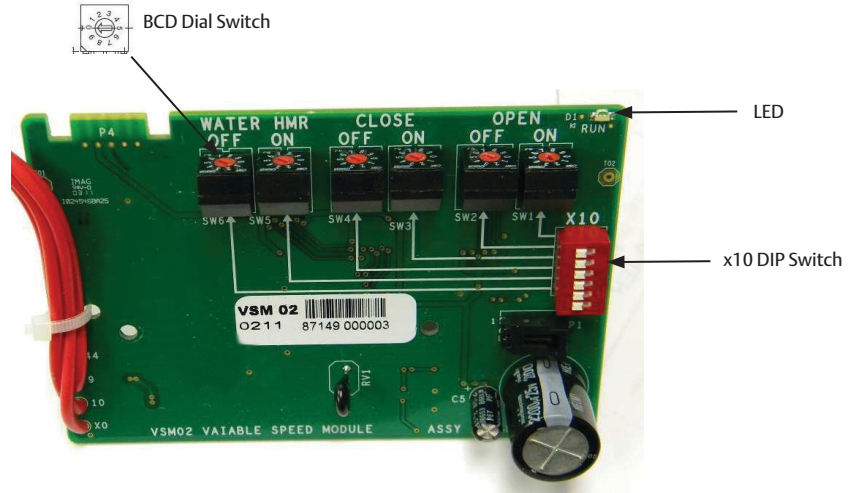
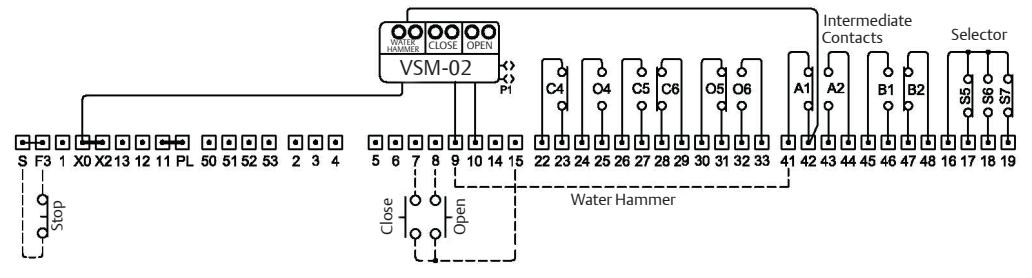


Figure 2 Wiring Diagram



Section 4: Operating Modes and Jumpers

4.1 Features

- Open Speed Control
- Close Speed Control
- Water Hammer Control
- Run LED displays S/W version number and then flashes 0.5 second ON and 0.5 second OFF for visual indication of time in seconds

Table 1.

Adjustment Range	x10 DIP Switch
0 - 9 seconds	OFF
0 - 90 seconds	ON

NOTE:

Minimum ON or OFF time is 1 second setting. Timers always start with a 1 second OFF time to prevent valve plugging on instant reversal. Zero ON time setting disables the timer.

4.2 Water Hammer

Set LSA to start timer position or use external switch.

OPERATING MODE	ADD JUMPER BETWEEN TBM TERMINALS
Close direction only	41 and 9
Open direction only	41 and 10
Both close and open	41 and S
External control only	42 and external switched 115 V AC
LSA and external control	42 and external switched 115 V AC to 41
Disabled	Disconnect all jumpers from terminals 41 and 42

4.3 Open Timer

Set LSA or LSB to start or disable water hammer timer position

If water hammer is not used in the closing direction, either LSA or LSB may be used to change opening speed by enabling or disabling water hammer. Connect jumper wire between 10 and the selected LSA or LSB switch terminal. When the switch activating water hammer is closed, the water hammer timer will override opening timer. If water hammer timer “off time” is set to zero, then the actuator will travel at full speed when the switch is closed.

Section 5: Software Version Number Display

Each time the module is powered on by OPEN or CLOSE command, the run LED displays software version number first and then flashes 0.5 second ON and 0.5 second OFF for visual indication of time in seconds. Version number is displayed by 0.7 second flashes in the following sequence.

At power up the LED is ON for 4 seconds and flashes the number of times equal to the first (most significant) digit. After which it is ON for 2 seconds and then flashes the number of times equal to the second (least significant) digit.

Example: version 1.1 will be ON for 4 seconds, flash one time and then ON for 2 seconds and then flash one time. After a short off time delay the normal 0.5 second ON and 0.5 second OFF sequence will begin.

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