Electronic Time Controller (ETC)

⚠ WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in property damage and personal injury or death.

Electronic Time Controller must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the ETC.

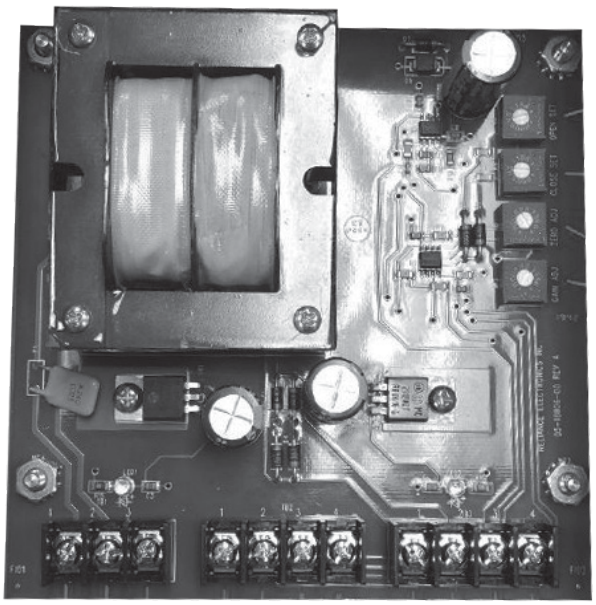

Figure 1. *Electronic Time Controller (ETC)*

Introduction

Scope of the Manual

This manual provides instructions for the installation, initial startup and setting, troubleshooting, maintenance and parts ordering for Electronic Time Controller (ETC).

Product Description

The Electronic Time Controller (ETC) is designed to supply a control signal to the Type VH210 Pilot to provide a controlled slow opening and/or closing function.

In steam systems, it is essential to turn steam on slowly to prevent shocking the piping system, which could result in damaged or broken piping and equipment. This control, when used with the Type VH210 Pilot mounted to a main valve, will perform this operation automatically, eliminating the need for a technician to slowly open a supply valve manually. In some applications, slow shut down is also needed.

Specifications

This section lists the specifications for the Electronic Time Controller (ETC). Factory specifications are stamped on the controller at the factory.

Electronic Data	Applications
4 to 20 mA or 0 to 10 VDC Input Signals 24 VAC 50 to 60 Hz Power Supply 17VA/12W Power Consumption	Building Control Systems SCADA PLC Upgrading Type E Main Installations for Automated Control

Principle of Operation

Complete Regulator

1. The complete regulator (see Figure 2) consists of an E Series main valve, Types D and Type VH210 pilots and ETC. The Type VH210 pilot is installed between the main valve and Type D pilot. The ETC is connected to the Type VH210 pilot.
2. The main valve is normally closed, being held by an internal spring and initial pressure acting on its disk. The Type D pilot is opened by compressing its adjusting spring and throttles or closes when delivery pressure is satisfied.
3. When steam is turned on, it flows to the Type VH210 pilot. The steam pressure to the Type D pilot is limited by the action of the Type VH210 pilot during the controlled slow opening and/or closing periods.
4. The Type VH210 pilot is controlled by the ETC, which generates a 0 to 10 VDC signal that slowly ramps up or down over its pre-selected time period. The control is initiated by a switch on the ETC, or can be initiated remotely by a clock/timer, thermostat, etc.
5. During the period that the Type VH210 pilot is controlling the main valve, the main valve will open/close proportionally to the Type VH210 pilot until the Type D pilot assumes control.
6. Once the Type VH210 pilot permits the passage of steam to the Type D pilot, it flows through the Type D pilot and into both the 4A Bleedport and restriction elbow. Since the 4A Bleedport restricts flow, pressure builds under the main valve's diaphragm and it opens. The restriction elbow steadies the operation of the main valve.
7. As the main valve opens, delivery pressure builds and is fed to the diaphragm of the Type D pilot through the control pipe. As the deliver pressure approaches the a balance with the thrust of the adjusting spring, the Type D pilot throttles the loading pressure to the main valve, causing it to take a position established by the loading pressure, where just enough steam flows to maintain the set delivery pressure.

Controller

Prior to start up, proceed as follows:

1. Verify the ETC power switch is in the "Off" position.
2. Open the ETC, and locate the setting controls for Start Up and Shut Down. See Figure 4.
3. Determine the required start up and shut down time for the installation and set the two controls.

Note

The controller start up timing will set the time to fully open the Type VH210 pilot. Under many conditions, the actual system may come up to full pressure before the Type VH210 pilot is fully open. Because of this, on the initial setting, the start up time should be set longer than what is expected, by approximately 30%. Once the system start up time is verified, the ETC Controller can be adjusted if needed.

4. Verify the ETC action switch (or external switch) is in the "Shut Down" position. If a external switch is being used, then the ETC action switch should be in the "Start Up" position.
5. Set the ETC power switch to the "On" position.

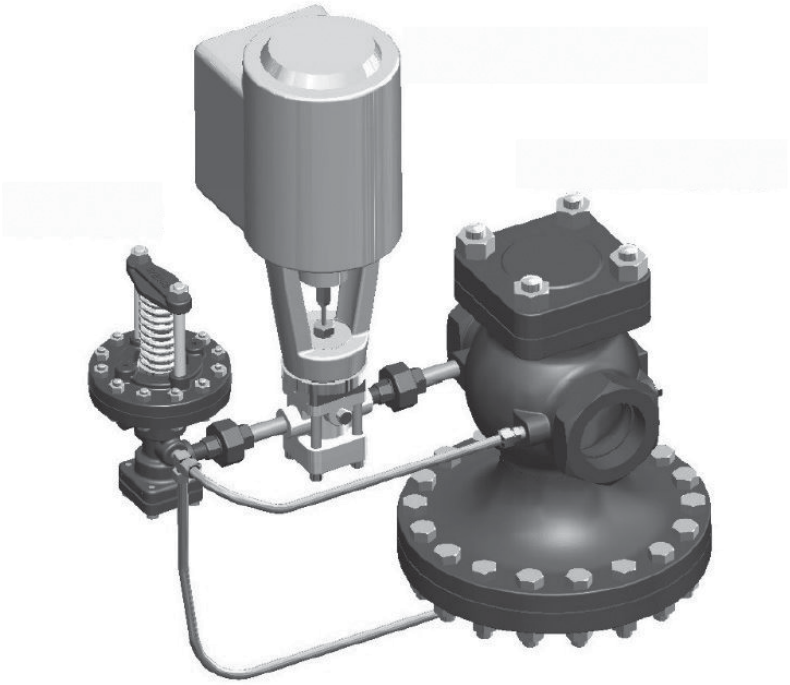

Figure 2. *Main Valve, Type D and VH210 Pilots Installation*

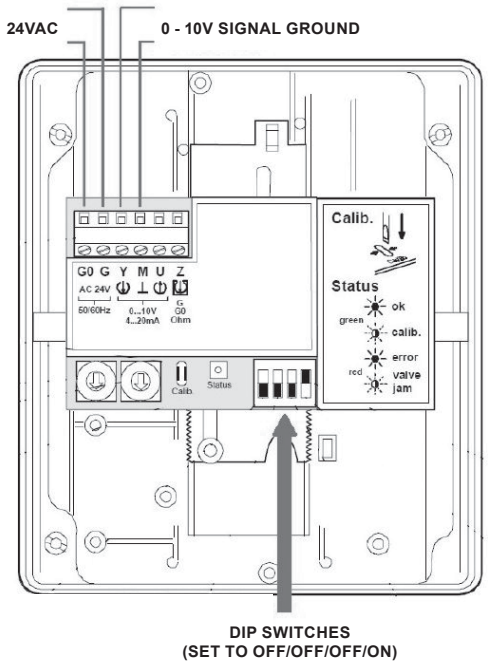

Figure 3. *Type VH210 ETC Settings and Connections*

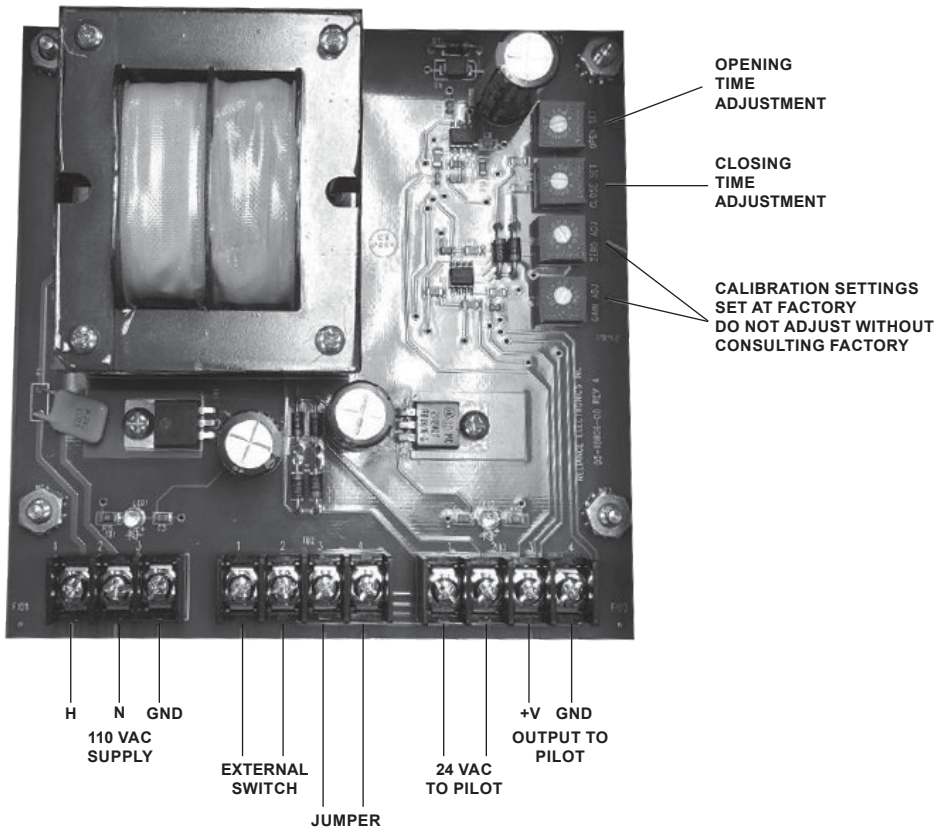

Figure 4. *Recommended Installation of Type VH210 Regulator with Strainer*

For normal start up, verify steam supply to the Regulator is on, then set the ETC action switch (or external switch) to “Start Up”.

For normal shut down, set the ETC action switch to “Shut Down”. If an external switch is being used, do not change the ETC action switch, but instead set the external switch to “Shut Down”.

External Switch operation is:

1. Close = Opening Cycle
2. Open = Closing Cycle

Note

It is possible to reverse the operation of the switch. To do this, remove the jumper from terminals 3 and 4, connect the switch on terminals 2 and 4.

Installation

⚠ WARNING

Shut off all power to this equipment during installation. Tag all disconnect locations to alert other not to restore power until work is complete. Failure to do so could result in serious personal injury.

1. Refer to the Main Valve’s SIOI for their recommended installation.
2. The ETC has a temperature limitation of 20 to 120°F / -7 to 49°C and it should not be located in an area that is excessively moist.
3. Connect the ETC to the Type VH210 pilot using 18 AWG or larger wiring. Refer to Figures 3 and 4. No separate power is required to operate the Type VH210 pilot.
4. Connect the ETC to a 110 VAC 60 Hz supply using 14 AWG or larger wiring. The ETC will draw a maximum of 1/2 A during normal operation. Refer to local building codes for acceptable wiring practices.

Setup, Calibration and Testing

Setup

1. Verify the opening and closing time adjustments are turned fully CCW.
2. Install a jumper wire as shown (if not already installed).
3. Connect a switch as shown, verify that it is in its OFF or OPEN position.
4. Connect a Voltmeter to the “+V” and “Gnd” terminals shown.
5. Connect a 110 VAC source to the terminals shown.

Calibration

1. Turn the 110 VAC power on.
2. Adjust the “Zero Adjustment” until the voltmeter reads zero volts (+/-0.05).
3. Activate the external switch, then wait approximately 5 minutes to allow the controller to reach its maximum output voltage.
4. Adjust the “Gain Adjustment” until the voltmeter reads 10 volts (+0/-0.5).
5. Deactivate the external switch, then wait approximately 5 minutes to allow the controller to return to its minimum output voltage.
6. Readjust the “Zero Adjustment” if necessary.

Testing

1. With the power still on, activate the external switch.
2. Time how long it takes for the voltmeter to read 9.8 volts. The time should be 2 to 4 minutes.
3. Deactivate the external switch.
4. Time how long it takes for the voltmeter to read 0.2 volts. The time should be 1 to 3 minutes.
5. Remove the voltmeter, set it for AC voltage, and connect it to the 24 VAC terminals shown. The voltmeter should read 24 volts (+/-1).
6. Turn the power off and disconnect all wiring except for the jumper.

Troubleshooting

⚠ WARNING

Steam is potentially dangerous and should be treated with respect. All installation, troubleshooting and maintenance should be performed by qualified personnel who are familiar with steam systems.

Electrostatic discharge can damage or cause the failure of the device, special handling precautions are needed.

Failure to Open or Sagging Delivery Pressure

1. Adjusting Spring on Type D pilot may have been tampered with.
2. Initial pressure may be low due to partially closed supply valve, clogged strainer or other obstruction.
3. Orifice in #5A Restriction Elbow (on bottom of main valve) may be plugged, or the #4A Bleedport (side of main valve) may have been omitted, being replaced by an open coupling.
4. Control pipe (feeding into Type D pilot for downstream line) may be plugged.
5. Main valve diaphragm may be broken. Test with air or water before dismantling. Refer to main valve's Instruction Manual.
6. Type VH210 may be inoperative. Refer to the Type VH210 Instruction Manual.
7. ETC may be inoperative. Power light and open light should both be on. If neither one is on, check the fuse and replace if needed. If the power light is on and the open light is off, check the wiring to the remote switch, looking for a short circuit. To further check the remote switch, disconnect the wire from either Terminal 1 or Terminal 2, which then turns control over to the ETC's action switch. If no problems can be found, consult the factory or factory representative for further instructions.

Failure to Close or Override Delivery Set Point

1. Adjusting Spring on Type D pilot may have been tampered with.
2. Orifice in #4A Bleedport (side of main valve) may be plugged.
3. By-Pass valve may be leaking.
4. Dust sifted onto Type D pilot preventing it from closing. Refer to Type D pilot Instruction Manual.
5. Main valve or Type D pilot may be held open by foreign matter in the seat. To determine which is leaking:
   a. Close stop valves and 1/4 in. / 6.35 mm control pipe valve.
   b. Remove Bleedport Bend (connects Type D pilot to side of main valve) so the Type D pilot will exhaust to atmosphere.
   c. Crack open the inlet stop valve. Steam will flow from the Type D pilot. Release compression on the adjusting spring to see if the Type D pilot closes tight. Open and close several times to wash seat.
   d. Steam flowing from the main valve indicates its seat is held open by foreign matter.
   e. Steam may wash the obstruction from the seat if the valve is made to open wide. This can be accomplished, even at light loads, if the control point is beyond the outlet stop valve. Reassemble the Bleedport Bend and place the regulator in operation. Then, slowly open and close the outlet stop valve.
   f. Leakage of main valve or Type D pilot requires dismantling. Refer to their Instruction Manuals.
6. Type VH210 may be inoperative. Refer to the Type VH210 Instruction Manual.

Erratic Regulation

1. Partial clogging of #4A Bleedport (side of main valve).
2. Water pocket in control pipe.
3. Excessive turbulence at control point.
4. Sticking or binding of Type D pilot Stem. Refer to Type D pilot Instruction Manual.

Power Failure

1. In the event of a power failure, the ETC Controller will reset. Once power is restored, the Controller will restart it Start Up sequence.
2. A UPS (Uninterruptable Power Supply) can be installed. Since the ETC Controller and Type VH210 pilot draw very little power (1/2 amp), and small unit would keep the unit operational for an extended period.

Maintenance

The ETC requires no routine maintenance.

For maintenance of main valve, Types D and VH210 pilots, refer to their respective Instruction Manuals for details.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the service and serial number.

SpenceValve.com

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