

ECV5 EMISSIONS CONTROL VALVE

Benefits

- **Advanced air/fuel ratio controls for stoichiometric and lean-burn engines**
- **Eliminates mechanical fuel valve, actuator and linkages**
- **Allows improved starting and stability**
- **Controls rich or Lean burn engines**
- **Accurate closed-loop air/fuel ratio for the lowest engine emissions**
- **Precise Valve Opening - Maintains stable performance at a wide range of environmental conditions**
- **Fast response: Voice Coil Actuated valve travels full stroke in <50ms**
- **Maintains emissions compliance even with changes in speed and load**
- **Full authority fuel control**
- **Full automatic**
- **Handles changes in gas BTU**
- **Configurable parameters to tailor to varied applications**
- **Regulates gas flow in response to input signal**
- **Servo-valve with position feedback and Integrated Pressure Sensor**
- **Feeds back valve position and fuel manifold pressure**
- **Fail safe design - spring-loaded closed in case of power failure**
- **Modbus, RS-232/385, CANBus J1939, and Ethernet Communications**
- **Catalyst temperature monitoring**
- **CSA-certified for Class I, Divisions 1 and 2, Group D Hazardous areas**


ADVANCE AIR-FUEL RATIO CONTROL FOR GAS ENGINES

Continental Controls Corp. offers a complete system that maintains the emissions levels of all gas engines in compliance with the most stringent local, state, and federal emissions regulations, while maintaining peak operating efficiency.

The ECV5 is the culmination of years of development of an advanced gas valve with a high-level mechanical design and sophisticated electronics with superior application specific software. The seamless integration of these design aspects into a single product has helped establish the ECV5 as the leading controller for reducing emissions for gas engines. Unlike many of the valves used in competing emissions control systems, the ECV5 has been specifically designed for reciprocating engines using gaseous fuels.

The ECV5 is a single stage, electronically actuated, balanced poppet fuel valve designed to act as an actuation device that can be used as an air-fuel ratio control valve or a variable pressure electronic regulator in a variety of applications.





The ECV5s internal microprocessor, pressure sensor, and position sensor allow the valve to feedback pressure and position signals to the supervisory controller (CCC Catalyst Monitor) for use in its control strategy.

The ECV5 valve offers full authority fuel control for almost any size of gas engine. The variable pressure control technique allows for fast acting control that can include single setpoint steady state control, or-where emissions requirements are extremely low - mapped load versus fuel input, or even dithering around a dynamic setpoint to optimize the performance of the three-way catalyst.


The ECV5 is used to control fuel pressure to an CCC mixing venturi to achieve the lowest possible emissions under all load conditions. The ECV5 can also be used as the primary fuel valve controlling fuel to the carburetor on an aftermarket AFR installation. The ECV5 is basically an electronic variable pressure regulator that will vary the fuel pressure to the engine based on a load input and/or an input from a Wide Band Oxygen Sensor (UEGO). The ECV5 also can accept an input from the Catalyst Monitor via Can Bus to dynamically adjust the O₂ Sensor setpoint based on changing sensor or catalyst conditions. The carburetor venturi insert will automatically accommodate the change by allowing the precise amount of fuel required to meet the desired air to fuel ratio. No mechanical action is required to make this fuel adjustment.

The fuel system of engines turbocharged after the carburetor (draw-through) is connected like naturally-aspirated engines. When the turbocharger is before the carburetor, a reference line must be connected from the air inlet of the carburetor to the reference port on the ECV5.


Engines with a single point of fuel injection and a single turbocharger require one ECV5 and one O₂ sensor. A dual bank engine with a turbocharger for each bank requires an ECV5 primary on one side of the engine and an ECV 5 secondary on the other, each controlled by its own O₂ sensor.

The valve transitions from open to closed in less than 50ms. This results in a very fast responding pressure regulator. If a load transient occurs, the fuel flow changes and the valve adjusts its position almost instantly to minimize the effect of the load transient. The engine runs through the transient without falling out of compliance or loss of efficiency.

Since the ECV5 eliminates much of the lag in the response of the fuel system allowing the control loop gain to be set higher, which controls the O₂ sensor voltage very close to its set point. The ECV5 maintains the oxygen content in the exhaust within the NSC compliance window for 3-way catalysts, or at the desired control point for all other applications. This provides the lowest possible emissions control or the maximum achievable efficiency depending on the control point of the ECV5.



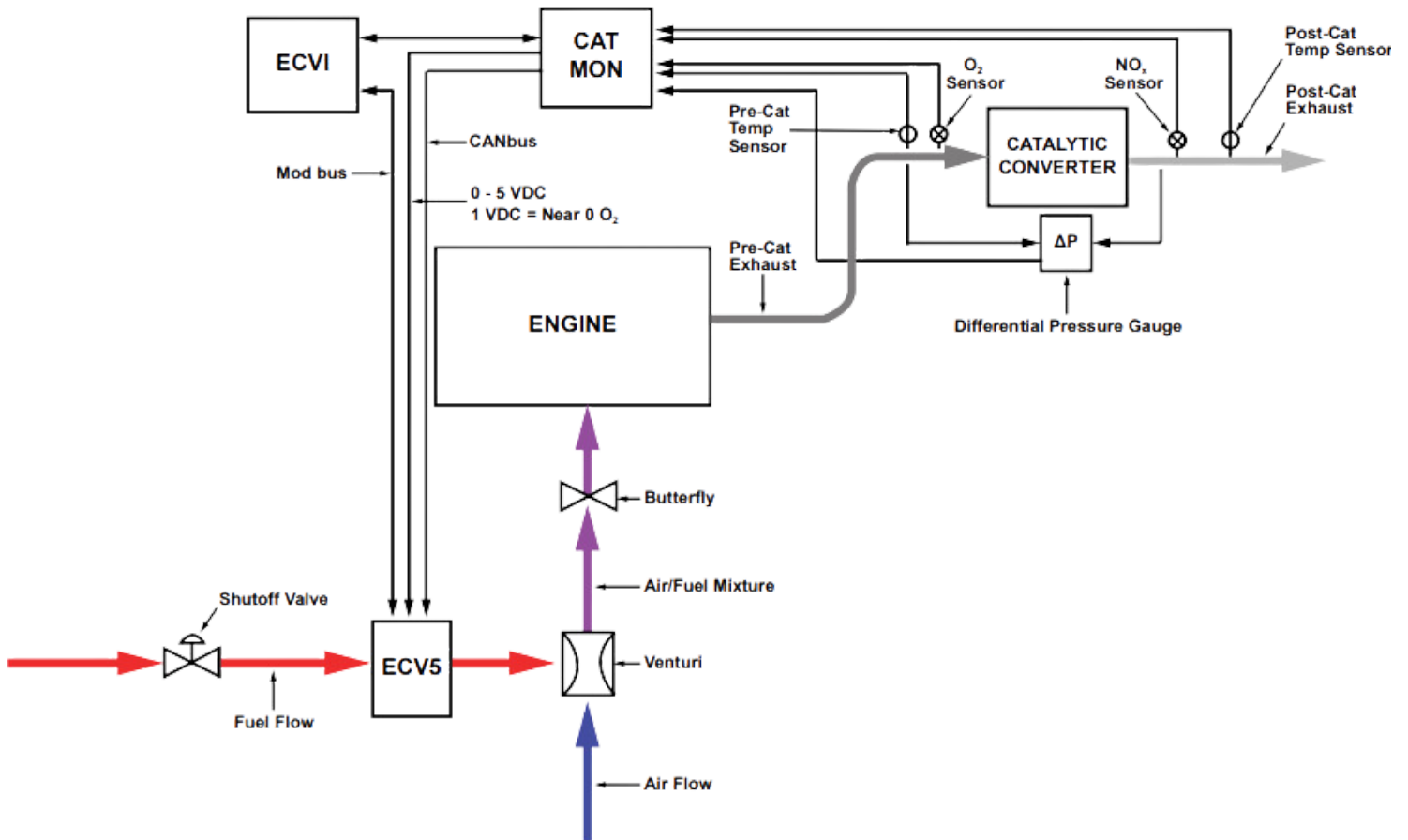
SPECIFICATIONS

Flow Capacity:	400 scfm (1120 lbs/hr) Natural Gas at 35 psig Gas Supply (supply pressure & fuel compensation dependent)
Fuel:	Natural Gas, Propane Gas, Other Gaseous Hydrocarbons
Maximum Operation Inlet Pressure:	150 psig
Cv:	15
Minimum Filtrations Requirements:	50 Micron Absolute
Operating Temperature:	-40° C (-40° F) to +90° C (+195° F)
Response Time:	Less than 50 milliseconds 10% - 90% Stroke
Demand Signal [to Control Valve]:	**0-5 volt (Pressure Command or Oxygen Sensor FDBK) **4-20 mA (Pressure Command or Position Command or Oxygen Sensor Bias) CANBus J1939
Feedback Signal [from Control Valve]:	**4-20 mA (Pressure Feedback or Position Feedback)
Power Input:	18-30 VDC, 5 Amp Max
Electrical Interface:	MS Connector (D3899/20FE99PN)
Communication Interface:	RS232 Modbus RTU, CANBus J1939
Valve Materials:	-Body: 6061-T6 Anodized Aluminum -Wetted Components: 300 Series Stainless Steel, 6061-T6 Anodized Aluminum Seals: Nitrile, Viton
Flanges:	2" Class 150 Flange, 4-Bolt
Dimensions:	6.0"L x 12.3"H x 6.0"W
Approximate Weight:	13 pounds
Certifications:	 US Class I, Division 2, Group D: T4
Patent No.	US 6,978,774 B2

TYPICAL ILLUSTRATION

Block Diagram of ECV5 and Cat Monitor in rich Burn Combustion Configuration

*For dual Bank Engine, one additional ECV5 and Venturi are required



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