CONTINENTAL CONTROLS CORPORATION

AGV10 Gas Fuel Metering Valve

ISO 9001 Certified

Metering Natural Gas Fuel to Gas Turbines

APPLICATION

The AGV10 Valve is used to meter gas fuel to gas turbine engines in the horsepower range of 850HP to 5000HP, with only minor differences within the valve models to accommodate the range in flow.

The valve has been designed to provide an optimum interface between a PLC Control system and gas turbine engine. The valve control is linear, in that the material fuel flow is proportional to the 4-20 mA fuel demand signal from the PLC.

The valve has exceptionally fast response and provides outstanding transient performance when used in a generator application. It also provides superior turbine performance in any mechanical drive application.

The high accuracy of the valve in the start fuel range assures the engine will have excellent light-off and consistent starting characteristics.

The use of the valve greatly simplifies the on-skid gas system plumbing and wiring.

MODEL AGV10 FUEL METERING VALVE

SMART VALVE TECHNOLOGY

DROP-IN COMPATIBILTY

COMBINED BUILT-IN FUEL METER

ADVANCED ACCELERATION CONTROL

INHERENT DIRT COMPATIBLE CO-AXIAL DESIGN

EMBEDDED PRESSURE AND TEMP SENSORS

SERIALCOMM INTERFACE: Rs485 Modbus PROTOCOL

LOWER POWER CONSUMPTION (< 1 AMP)

EMISSIONS CONTROL IMPROVEMENT

INDUSTRY BEST START CONTROL LOGIC

FLOW CONTROL NESTED LOGIC

DESIGN FEATURES

EXCELLENT START RELIABILITY
The AGV10 eliminates fuel system-related starting problems, even under the most adverse conditions, the valve precisely controls the fuel flow with it's built-in Flow Meter.

VERY FAST RESPONSE
The valve will transition from Open to Closed or Closed to Open in less than 50ms.

SPEED STABILITY
All dynamic seals and other internal points of friction, that cause speed instability, have been eliminated. Engine operation is smooth and steady.

HIGH FORCE
The spring that closes the poppet valve has a spring rate of 96 pounds per inch and is pre-loaded closed with 60 pounds of force. This produces a pressure of over 1000 PSI on the resilient valve seat to assure a positive shut-off.

LOW POWER
The valve is powered from any 24 Vdc battery source. The current required is <1 amp.

HIGH DIRT TOLERANCE
The flow-through design minimizes the effects of particulate contamination. Dirt normally found in pipeline applications passes through and does not collect in the valve. An internal 11-micron filter is included to prevent particles from entering the pilot stage.

FAIL-SAFE
The main poppet valve is spring-loaded closed. It closes on loss of power and loss of measured gas pressures.

BUILT-IN FLOW METER!
The fuel valve includes an orifice flow meter for measuring fuel flow. The fuel flow measurement data is available to the user for display and logging purposes. ±2% of reading or 0.5% of full scale, whichever is greatest.

COMPUTER CONTROL
The valve controller continuously receives the 4-20 mA fuel demand signal and compares it to the fuel flow signal from the built-in flow meter. It then adjusts the fuel flow as necessary to make the measured fuel flow equal to the fuel demand.

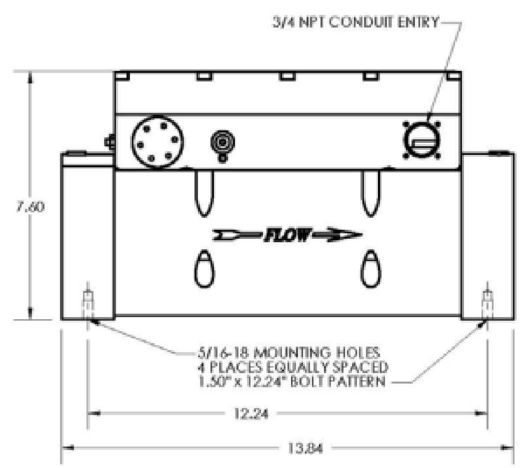
SERIAL PORT
The Rs-485 serial port is provided for interfacing the valve data with other computer systems. The data available includes:

- Fuel supply pressure
- Fuel temperature
- Flow meter orifice differential pressure
- Engine fuel manifold pressure
- Measured fuel flow
- Valve control pressure (for diagnostic use)

MULTI-LOOP CONTROL CONCEPT
The valve assembly contains an in-line poppet-type throttling orifice followed by the orifice used for flow measurement. The main poppet valve is pressure-balanced and spring-loaded closed with a high pre-load. Control gas pressure applied to a diaphragm provides the force to open the valve.

The valve has two control loops: one controls the "control gas pressure," which is used to actuate the main poppet valve. The stroke of the poppet valve is proportional to the control pressure. The other loop compares the gas flow to the fuel demand signal. When the gas flow is not equal to the flow demand signal, a correction is made to the control pressure set-point to bring the measured gas flow to the requested value. The result is a very accurate and fast means of flow control.

FUEL GAS SUPPLY PRESSURE
Pressure variations in the fuel supply do not affect the gas flow through the AGV10 valve (providing the pressure does not drop below the minimum required for that fuel flow).



Model AGV10
Installation View

GAS VALVE SPECIFICATION

MODEL AGV10 FUEL METERING VALVE:

Flow Capacity:	1100 scfm (3081 lbs/hr)
Fuel:	Natural Gas, Biogas, Gaseous Hydrocarbons
Applications:	Up to 5,820 horsepower (4.3 Mw)
Maximum Operating Pressure:	500 psig
Filtration Requirement:	6 Micron Absolute for Pilot, 100 micron Absolute for Main Fuel
Operating Temperature:	-40°C (-40°F) to +85°C (+185°F) -20°C (-4°F) to +85°C (+185°F) [ATEX]
Response Time:	80 milliseconds 10% - 90% Stroke
Flow Accuracy:	±3.0% of reading or 0.5 % of full scale
Fuel Demand Signal [to Fuel Control Valve]:	4-20 mA (Standard) 0-200 mA (Optional)
Fuel Feedback Signal [from Fuel Control Valve]:	4-20 mA (Standard)
Power Input:	19-30 Vdc (1.0 Amp Maximum)
Electrical Interface:	Connector (Optional) 3/4" Ridged Conduit, 84" Pigtail Wires
Data Communication Interface:	RS485 Serial Port
Housing Materials:	6061-T6 Anodized Aluminum
Wetted Materials:	Stainless Steel, Carbon Steel, 6061-T6 Anodized Aluminum, Viton® Seals, Nitrile Seals
Flanges:	1-1/2" SAE Series 61, 4-Bolt Flange 2" SAE Series 61, 4-Bolt Flange
Dimensions:	13.9"L x 7.6"H x 5.8"W
Approximate Weight:	31.8 pounds

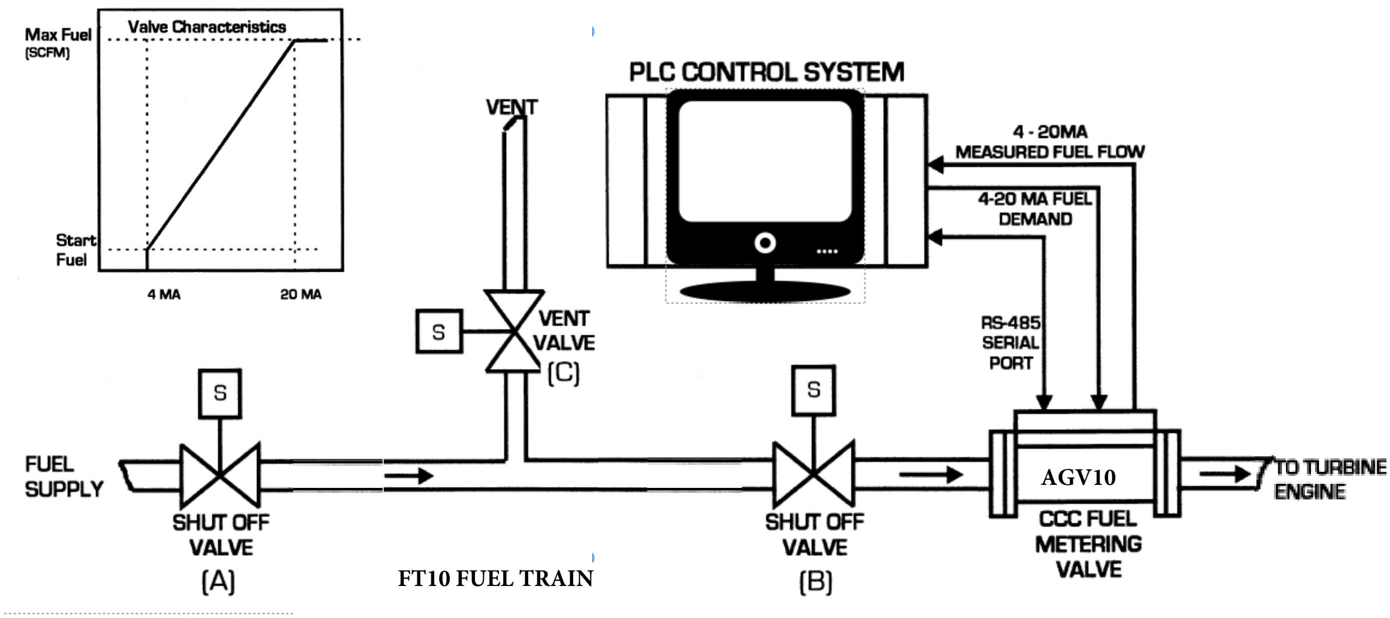
VALVE CONSTRUCTION

The electronics and sensors are contained in a control housing on top of the valve. The control housing is designed with flanges in accordance with the NEMA-7 requirements for use in a Class I, Division 1 area, for Group D gases.

CORROSION RESISTANCE

There are no electrical components in the gas stream, including the servo- coil actuator. The materials exposed to the fuel gas are corrosion-resistant and include anodized aluminum, stainless steel as well as Buna-N rubber. Super Viton is used for applications with sour gas.

SUGGESTED INSTALLATION



PREFERRED INSTALLATION

In the diagram above, the engine is shut down with the two shut-off valves closed and the vent valve open (when a vent line is available). During the start sequence, the upstream valve (A) is opened first. Start fuel flow is established through the vent, then the downstream valve (B) opens and the vent valve (C) closes.

APPLICATION

The valves can be customized for specific engine applications and purchased by OEM suppliers, or they may be used for retrofitting existing equipment.

FLANGES

AGV10 is supplied with an SAE 1½", 4-bolt, series 61 flange. Mating flanges for the SAE flange and mount kits are also available.

ADVANCED FEATURES

INTELLIGENT (SMART) VALVE

An embedded computer makes the valve unique. It can be programmed to control the Acceleration of the engine based on compressor discharge pressure (PCD). This provides the most reliable fuel control over the entire life of the turbine.

Embedded Acceleration can be used with CCC Black Boxes or with any PLC Control System.

CCC also manufactures advanced electronic controls and other components for both gas and liquid fuels. Please contact us for your special requirements.

PRODUCT CERTIFICATIONS

CSA (Canadian Standard Association):

C US **Class I, Div 1, 2, Group D: T4**

PED (Pressure Equipment Directive) **0036**

ATEX Directive:

II 2 G Ex d IIA T4 Gb **0344**

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