CONTINENTAL CONTROLS CORPORATION

FOR LIGHT INDUSTRIAL GAS TURBINE

AGV10 & AGV50 ADVANCED GAS VALVES

Metering Gas Fuel to Gas Turbines

BENEFITS

- SMART VALVE TECHNOLOGY
- DROP-IN COMPATIBILITY
- MASS FLOW CALCULATIONS
- 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

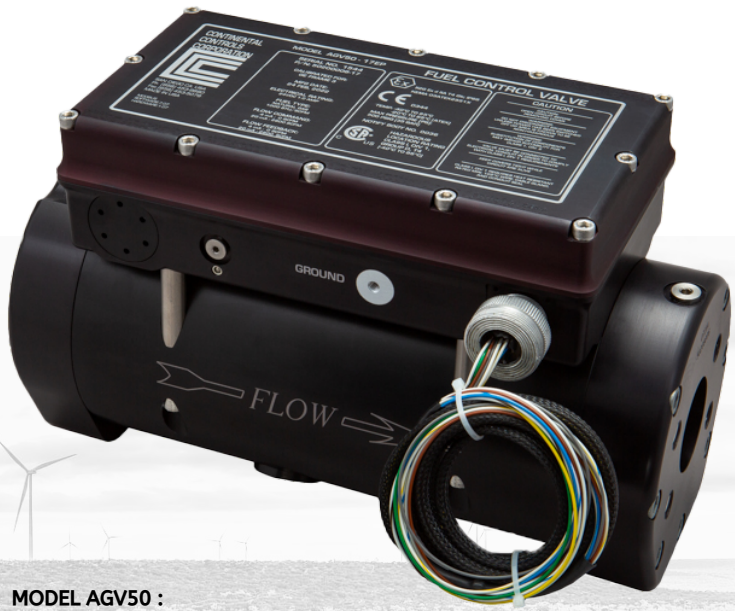
APPLICATION

The CCC Advanced Gas Valves (AGV's) are used to meter gaseous fuel to gas turbine engines in the horsepower range of 850hp to 38,750hp (28.5Mw) with only minor differences within the valve models to accommodate specific turbine engines.

The valves have been designed to provide an optimum interface between the 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 valves have exceptionally fast response times and provide outstanding transient performance when used in Gen-Set applications. They also provide superior turbine performance in any mechanical drive application. (compressor and pump).

The high accuracy of the valve in the start fuel range assures the turbine will have excellent light-off and consistent starting characteristics. The use of the iAGV greatly simplifies integration the on-skid gas system plumbing and wiring



MODEL AGV50 :
FUEL METERING VALVE

EXCELLENT START RELIABILITY

The AGV 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 100ms.

SPEED STABILITY

All dynamic seals and other internal points of friction, that cause speed instability, have been eliminated . This allows for smooth and steady engine operation.

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 embedded sensors for measuring and reporting 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)

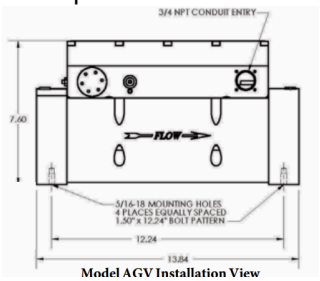
MULTI-LOOP CONTROL CONCEPT

The AGV valve assembly contains an in-line poppet-type design for throttling fuel flow thru the outlet where fuel flow is measured. 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 poppet.

The valve has two Control loops: one controls the “Control gas pressure,” which is used to actuate the main poppet valve. The other loop compares the gas flow to the fuel demand signal. The flow demand signal is constantly monitored and adjustments are made to the control pressure set point as needed. 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 AGV valve (providing the pressure does not drop below the minimum required for that fuel flow).



Model AGV Installation View

SPECIFICATION

Max Fuel Flow Capacity: AGV10 / AGV50	1100 scfm (3081 lbs/hr) /7300 scfm
Fuel:	Natural Gas, Biogas, Gaseous Hydrocarbons
Applications:	AGV10 5,820 hp (4.3 Mw) AGV50 (28.5Mw)
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:	<100 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:	3/4" Ridged Conduit, 84" Pigtail Wires
Data Communication Interface:	RS485 Serial Port
Housing Materials:	6061-T6 Anodized Aluminum
Wetted Materials:	Stainless Steel, 6061-T6 Anodized Aluminum, Viton® Seals, Nitrile Seals
Flanges:	AGV10: 1-1/2" SAE Series 61, 4-Bolt Flange AGV50: 2" SAE Series 61, 4-Bolt Flange
Dimensions:	13.9"L x 7.6"H x 5.8"W
Approximate Weights:	AGV10: 36 pounds AGV50: 48.0 pounds
Environmental Protection:	IP66 Rated

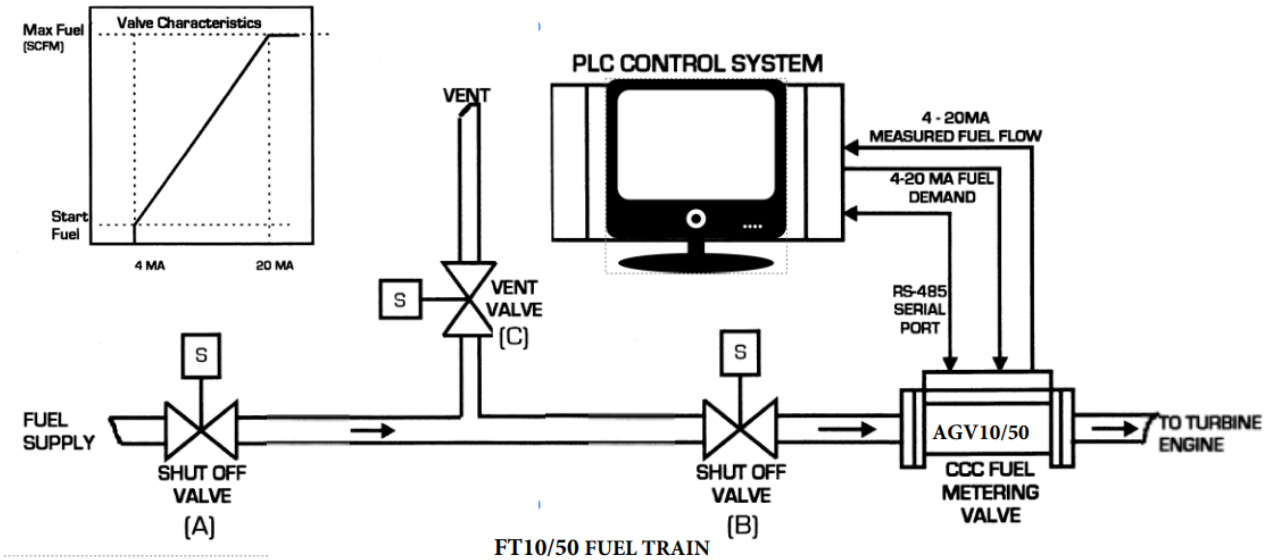
VALVE CONSTRUCTION

The electronics and sensors are contained in an integral 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

The electrical components are isolated from 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. IP66 Rated

RECCOMENDED INSTALLATION



FT10/50 FUEL TRAIN
DUAL FUEL SHUTOFF VALVE MANIFOLD ASSEMBLY (ATTACHES DIRECTLY TO THE AGV)

PREFFERED INSTALLATION

In the diagram above, the engine is shut down with the two shut-off valves closed and the vent valve open. During the start sequence, the upstream valve (A) & (B) are opened and the vent valve (C) is closed. Start fuel flow is established through the AGV and the start sequence is initiated.

APPPLICATION

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 has SAE 1½", 4-bolt, series 61 flange, the AGV50 has 2" flanges. 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 manufactures advanced electronic control assemblies and other components for both gas and liquid fuels. Please contact us for your special requirements.

CERTIFICATIONS

CSA (Canadian Standard Association):

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

ATEX Directive:

II 2 G Ex d IIA T4 Gb CE 0344

PED (Pressure Equipment Directive) CE 0036

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