



Gas Fuel Metering Valve AGV50

Metering Gas Fuel to Gas Turbines

ISO 9001 Certified

APPLICATION

The AGV50 Valve is used to meter gas fuel to gas turbine engines in the horsepower range of 5000HP to 60,000HP, with only minor differences within the valves to accommodate the range in flow. The valve has been designed to provide an optimum interface between a PLC control system and a gas turbine engine. The valve is linear, that is, the metered fuel flow is proportional to the 4-20 ma fuel demand signal from the PLC.

The valve is a two-stage servo valve with two control loops. The fuel flow is measured in the valve and compared to the fuel requested by the 4-20 ma signal from the customer's controller. The error signal generated is used to correct the fuel flow. The valve has exceptionally fast response, and can provide outstanding transient performance when used in a generator application. It will also provide superior engine 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.



Model AGV50

RELIABLE STARTING

ROBUST & DURABLE

DIRT TOLERANT

IMPROVED ENGINE PERFORMANCE

BUILT-IN FLOW METER

ALL ELECTRIC

LOW POWER
24 VDC, 1 AMP

IDEAL FOR USE WITH
PLC SYSTEMS

COMPUTER-BASED

DESIGN FEATURES

EXCELLENT START RELIABILITY

Eliminates fuel system-related starting problems, even under the most adverse conditions because the valve precisely controls the fuel flow with flow meter accuracy.

SPEED STABILITY

There are no through-the-wall seals or other internal points of friction that cause speed instability. Engine operation is smooth and steady.

HIGH FORCE

The spring that closes the poppet valve has a spring rate of 350 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 a 24VDC battery source. The current required is less than 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. In extreme cases where the gas is wet and/or dirty and the internal filter would need to be changed frequently, provisions have been made for the use of a larger external filter.

FAIL-SAFE

The main poppet valve is spring-loaded closed. It closes on loss of power, loss of gas pressure, or other internal failure.

BUILT-IN FLOW METER

The fuel valve includes a unique annular venturi flow meter for measuring fuel flow. The fuel flow measurement is available to the user for display and logging purposes. $\pm 2\%$ of reading or 0.5% of full scale, whichever is greatest.

COMPUTER CONTROL

The control of fuel flow is performed by an electronic computer assembly. The computer 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 throttling orifice to change the fuel flow as necessary to make the measured fuel flow equal to the fuel demand.

SERIAL PORT

An RS-485 serial port is provided for interfacing the valve 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)

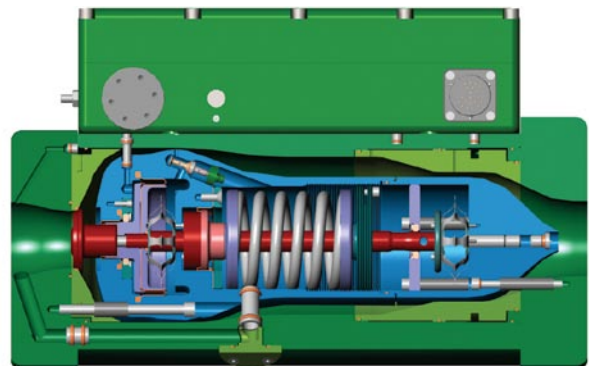
CONTROL CONCEPT

The inner control loop includes a pressure feedback signal to improve the response of the pilot stage and the metered fuel flow.

The valve assembly contains an in-line actuator assembly that strokes an in-line poppet valve. The valve provides the throttling function and controls the main gas stream. It is located just inside the inlet flange.

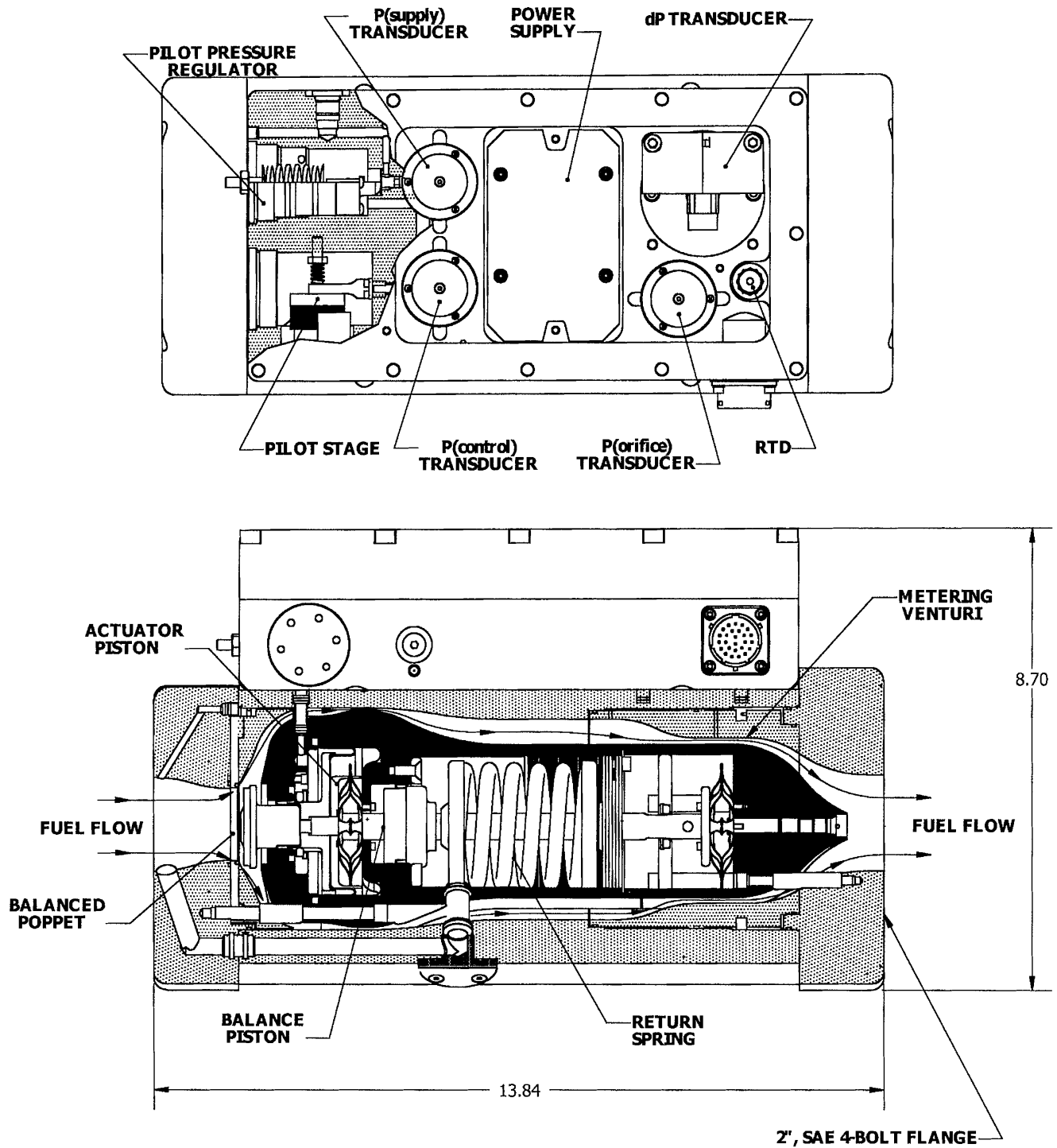
The gas exits from the poppet valve radially, and flows outward through the annulus around the internal actuator. The flow path is streamlined to eliminate turbulence and provide a smooth flow into the annular-shaped venturi near the discharge end of the valve.

The differential pressure between the flow area upstream of the venturi and the throat of the venturi is used in the flow calculation.



Model AGV50 Cutaway

GAS VALVE CONSTRUCTION

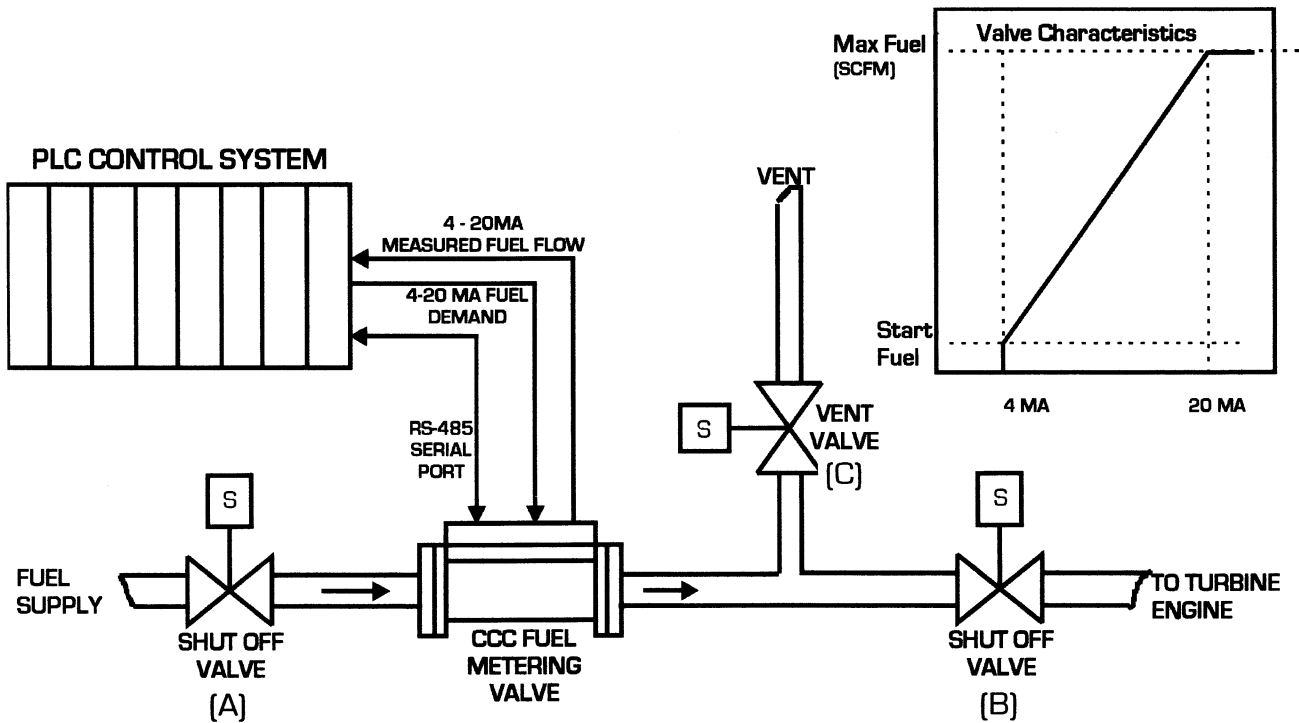


The throttling valve is pressure-balanced and spring-loaded closed with a high pre-load. Control gas pressure applied to a diaphragm provides the force to open the valve. The stroke of the poppet valve is proportional to the control pressure after overcoming the pre-load offset.

FUEL GAS SUPPLY PRESSURE

Pressure variation in the fuel supply does not affect the gas flow through the valve, providing the pressure does not drop below the minimum required for that fuel flow.

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

The valves are supplied with 2" SAE 4-bolt flanges.

ADVANCED FEATURES

INTELLIGENT VALVE

An embedded computer and internal sensors make it possible for the valve to control the acceleration of the engine as well as the governing function.

CCC also manufactures electronic control systems, valves and other components for both gas and liquid fuels. Please contact us for your special requirements.

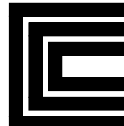
PRODUCT CERTIFICATIONS

CSA: Class I, Division 1 & 2, Group D
NOTIFIED BODY: CSA International
CERTIFICATE NUMBER: 1166409 (LR 109715)

PED: Pressure Equipment Directive 97/23/EC (PED)
NOTIFIED BODY: TÜV Industrie Service GmbH
CERTIFICATE NUMBER: USA 04/06/69/001

ATEX: Directive 94/9/EC (ATEX)
NOTIFIED BODY: KEMA Quality BV
CERTIFICATE NUMBERS: KEMA 03ATEX2551
 KEMA 03ATEXQ3142

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