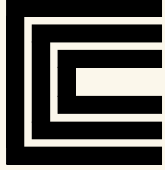


# FOR INDUSTRIAL DIESEL ENGINES

CONTINENTAL  
CONTROLS  
CORPORATION



## Gas Substitution System-GSS

### Providing Maximum Substitution of Natural Gas For Diesel Fuel

ISO 9001 Certified



**SUBSTITUTES LOW-COST  
NATURAL GAS FOR DIESEL**

**VARIABLE PRESSURE  
CONTROL VALVE PROVIDES  
BETTER CONTROL**

**SUBSTITUTION IS BASED  
DIESEL FLOW - NOT LOAD**

**SUBSTITUTION IS  
AVAILABLE AT ALMOST  
ALL LOADS**

**SHUT DOWNS FROM  
VIBRATION OR  
TEMPERATURE  
PROTECT THE ENGINE  
FROM DAMAGE**

**FUEL VALVES ARE VOICE  
COIL ACTUATED FOR LOW  
FRICTION AND LONG LIFE**

**SIMPLE INSTALLATION**

**VARIOUS SYSTEMS FOR ALL  
SIZES OF DIESEL ENGINES**

**OPTIONAL GAS FLOW  
METER DISPLAYS  
TOTALIZED FUEL SAVINGS**

**NO LOSS OF HORSEPOWER  
WITH NATURAL GAS**

#### APPLICATION

By utilizing Continental Controls proven fuel control technologies, the GSS system allows for the substitution of Gaseous Fuels for Diesel on traditional Diesel engines without any modification to the engine itself.

GSS works on all applications from Gen-sets to pumps; it interfaces directly with the Engine Control Unit (ECU) for increased control. Substitution is controlled by using a variable pressure valve which provides more reliable performance and less intervention over long periods of time.

GSS substitutes the maximum amount of diesel at almost any load condition for any application. There is no de-rating of the engine's horsepower and performance is not affected.

Safety features standard on all systems include: vibration sensor, high temperature shut-down (gaseous fuel substitution only – not the engine), and max substitution limits based on measured diesel fuel. The GSS utilizes proven technology that has been field-tested with years of successful performance.

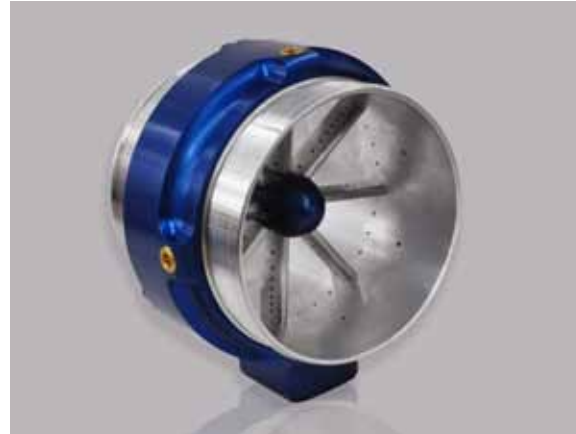
The GSS features a compact and easy-to-install fuel train with a low profile that fits on almost any engine skid. It is extremely simple to install and operate. Optional satellite and wireless capabilities are also available.

## SYSTEM COMPONENTS



### GAS FUEL MANIFOLD SYSTEM

The compact GSS Manifold includes: differential pressure regulator, two pressure gauges, a Dp pressure transducer, a manual shut off valve and a solenoid shut off valve as well as flanges for single or dual bank applications. The use of this unique manifold greatly simplifies installation and allows for installation on even the tightest engine skids.



### CUSTOM MIXING VENTURIS

A variety of Mixing Venturis are available for the GSS system based on engine size and fuel requirements. GSS Venturis have been designed to optimize the mixing of air and Natural Gas while minimizing the pressure drop across the venturi. This improved venturi design allows the CCC GSS to reach higher levels of substitution and almost all engine loads.



### GAS FLOW METER

By adding the optional FM 50 Gas Flow meter the system will current rate of savings or total fuel savings. The FM 50 is a venturi based flow meter that is tolerant of dirty gas, has no moving parts and automatically corrects for pressure sensor drift every time the meter is powered down.



### FUEL METERING VALVE

CCC Valves are voice coil actuated and provide very fast and accurate proportional metering of natural gas being substituted for diesel fuel. The valves are selected based on flow requirements and they allow for substitution across a wide range of engine loads. All of the valves used on the GSS system utilize a variable pressure control technique that provides for very fast and accurate fuel metering.

### GAS SUBSTITUTION SYSTEM

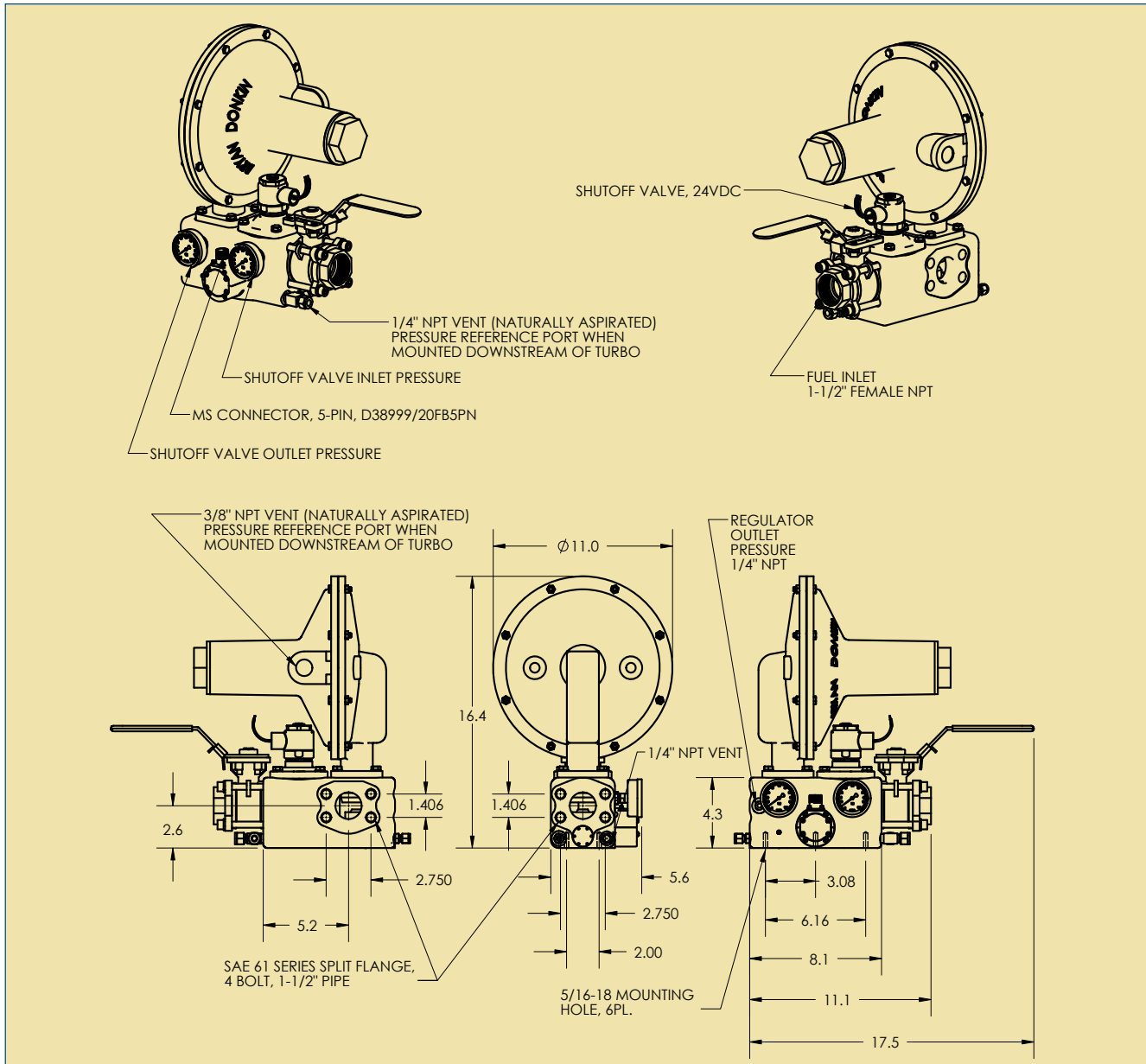
Continental Controls has a variety of GSS system configurations based on engine size, customer communications requirements and application-specific requirements. The GSS system utilizes a unique patent-pending process for gathering engine operating conditions via the ECU to determine the maximum substitution ratio available. With this technique and with the addition of temperature and vibration monitors, the GSS can system to safely substitute throughout the load range without any damage to the engine or causing any engine de-rate.



### GSS INTERFACE

The main display and control PLC are mounted in this NEMA 12 Box. The Display is a CSA Class 1 Div 2 certified HMI with ModBus protocol. Also included in the panel is a custom computer board that communicates via Can Bus J-1939 to various Engine inputs and to the Engine ECU. The controller also administers system shut downs and alarms.

# MANIFOLD ASSEMBLY

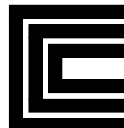


## COMPLETE SINGLE BANK OR DUAL BANK GAS SUPPLY MANIFOLD

This compact manifold includes both a manual and a solenoid shut-off valve. It also includes a Dp regulator and embedded Dp transducers which provide 4-20ma outputs back to the control system. The well-engineered manifold shrinks the size and complexity of the entire gas manifold system into one small cube that is easily installed on almost any diesel engine. The manifold assembly is designed to be CSA compliant and the certification is pending.

The GSS manifold can be installed either upstream or downstream of the turbocharger. Mixing downstream of the turbocharger is generally preferred for the GSS.

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