



## **DUAL FUEL SYSTEM (DFS) FOR DG SETS & LOCOMOTIVES**

### **1. INTRODUCTION TO DUAL FUEL SYSTEM KIT**

Dual Fuel is concurrent combustion of Two Fuels i.e. methane based Fuel and Diesel is consumed in coexistence to run the Engine on Dual Fuel mode the Engine is able to operate either on a mixture of Diesel and methane Fuels, or on 100% Diesel Fuel,(No circumstances, the engine is able to operate on gaseous Fuels exclusively).

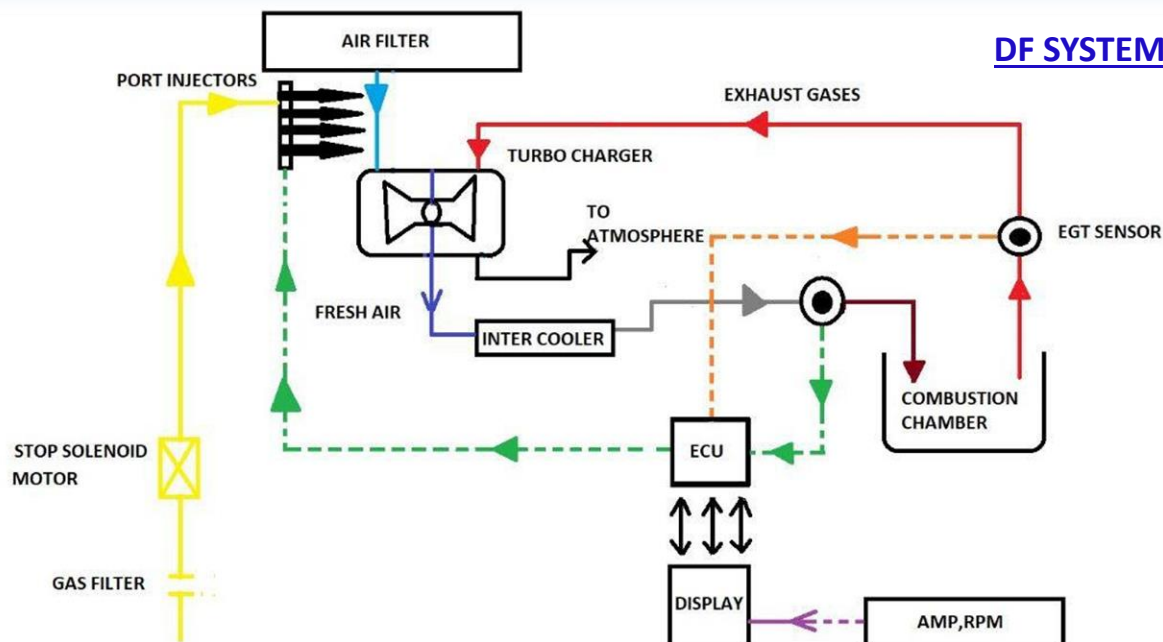
### **2. WHAT IS A DUAL FUEL KIT AND HOW DOES IT WORK?**

The latest Gas & Diesel Kit is equipped with 2 digital and 3 analogue emulation channels. The kit consists of the following: Controller CA48 Prime, Cable harness, Gas Pressure Reducer suitable from 50mbar up to 250bar, 2 X Injector Hana, Rail for injectors, EGT Sensor, CA33 Map sensor, Reducer Temperature Sensor, Gas Level Sensor, Fuse, fuse cable socket, Tee for vacuum, Gas Filter, Fuel Switch.

**LATEST TECHNOLOGY PRODUCT:** **Chroma-Ator CA48 Prime** is our Latest Dual Fuel Controller.

- It combines the best features of other controllers and allows operation simplest Genset's/vehicles with a mechanical pump and the newest structures Euro 6.
- It is the first gas & diesel controller with an in-built CAN interface.
- It stands out thanks to its enhanced precision of analogue emulators.
- It is now possible to cooperate with GPS module and there is a remote update via GPRS.
- In order to provide fitters with comfort, a longer 5-meter group divided into 2 sectors combined by a hermetic joint has been used.

**Note:** - *Chroma-Ator comply to all the guidelines and directions issued by Government from time to time, latest being the notice bearing no. A-110018/01/2021-CAQM/827(DT) dated 02.06.2023 issued by Commission for Air Quality Management in National Capital Region and Adjoining Areas regarding Regulations for use of DG sets in NCR.*



### **COST SAVINGS**

Displacing a percentage of diesel fuel with methane-based gas provides an immediate economic benefit based on the cost difference between the fuels and the amount of run time of the genset. In high usage gensets, the system can pay for itself in a short period of time. Simple Excel-based spreadsheets are available to assist in modeling the economic benefits of converting your diesel genset to Dual Fuel.

### **INCREASED RUN TIME**

Reducing the amount of diesel fuel used extends the run time in proportion to the substitution rate. This provides extra hours of operation for critical applications during extended power outages.

### **REDUCED LIQUID FUEL STORAGE**

As environmental concerns about liquid fuel storage increase pressure on operators, using the Dual Fuel System offers some relief by reducing the volume of aboveground diesel fuel storage.

### **SIMPLIFIED LOGISTICS**

The frequency of refueling is reduced, thereby lessening the costs—and risks—associated with hauling diesel fuel, especially to locations that make such logistics awkward.

### **REDUCED CAPITAL COSTS**

The capital cost of Gas Generators is significantly higher than diesel generators. The use of the Dual Fuel System allows the user to enjoy many of the benefits of gas engine operation coupled with the lower capital cost of the initial purchase.

### **REDUCED MAINTENANCE & LONGER SERVICE INTERVAL**

The Dual Fuel System allows the generator to reduce the carbon contents in comparison to diesel generator. Natural Gas is a clean fuel and using natural gas will diminish carbon emission to less than half with respect to Diesel. Due to this reason, all system of Dual Fuel generator, like lube oils etc. remain clean. Due to this, Dual Fuel System allows to increase the time of maintenance and service for almost just double in contrast to Diesel Generator.

### **FLEXIBLE FUEL RATES**

Many gas suppliers offer discounted rates to customers who can tolerate supply interruptions in times of high demand/inadequate supply. Dual Fuel offers this kind of flexibility since the Genset can operate on 100% diesel at any time.

## Dual Fuel Solutions

Dual fuel is concurrent combustion of two fuels i.e. Methane based fuel and Diesel are consumed in coexistence to run the engine. On dual fuel mode, the engine is able to operate either on a mixture of diesel and methane fuels or on 100% diesel fuel. In no circumstances, the engine is able to operate on gaseous fuels exclusively. This solution is available for vehicle as well as stationary engines.



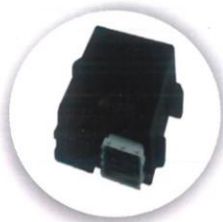
## DUAL FUEL SOLUTIONS FOR POWER GENERATION AND VEHICLES

Dual Fuel is concurrent combustion of two fuels ie. Methane based fuel and diesel is consumed in coexistence to run the engine. On dual fuel mode the engine is able to operate either on a mixture of diesel and methane fuels, or on 100% diesel fuel. The engine will not run only on gas fuel.

### Chroma-Ator, Dual Fuel System. Latest technology product:

Chroma-Ator CA 48 Prime is our latest dual fuel controller.

- It combines the best features of other controllers and allows operation simplest gensets / vehicles with a mechanical pump and the newest structures Euro 6.
- It is the first gas & diesel controller with an in-built CAN interface.
- It stands out, thanks to its enhanced precision of analogue emulators.
- It is now possible to cooperate with GPS module and there is a remote update via GPRS.
- In order to provide fitters with comfort, a longer 5-meter group divided into 2 sectors combined by a hermetic joint has been used for normal operation of the engine.
- A developed set of analogue and digital emulators has been used. Also, a frequency emulator for flow meters has been added as an optional advantage.



ECU CA48 Digital Signal Processor (DSP):



Gas Injectors 2X:



Exhaust Gas Temperature Sensor (EGT):



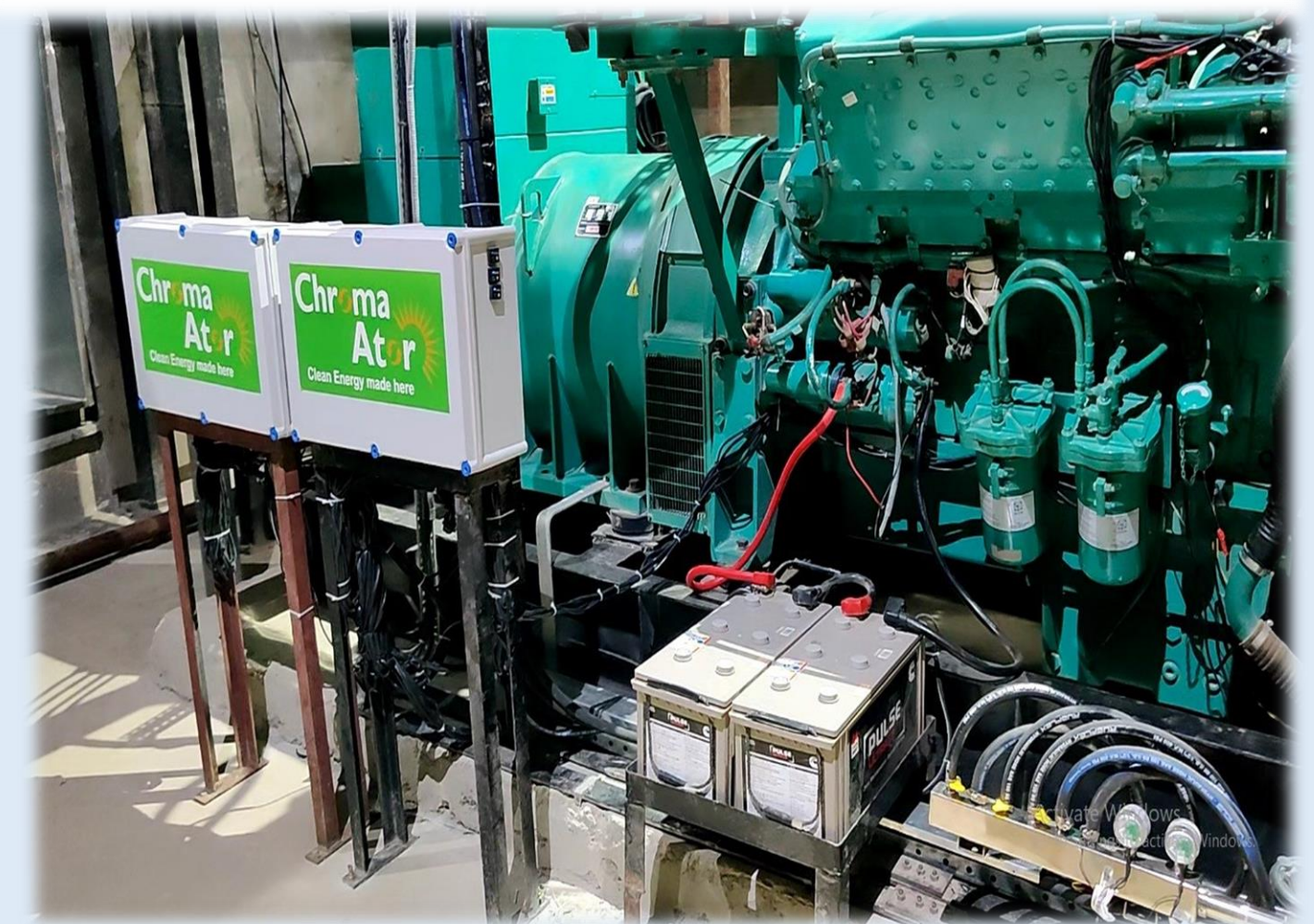
Map Sensor Ca33:

## CHROMA-ATOR DUAL FUEL HIGHLIGHTS

The Dual Fuel System (DFS) is an innovative technology that enables operators of heavy-duty diesel engines to substantially reduce operational costs and lower emissions by substituting diesel fuel with lower cost, cleaner-burning natural gas. The Dual Fuel System is comprised of patented technologies that allow engines to safely operate on gas percentages up to a maximum of 70%\* of the total fuel requirement. Engines converted to Dual Fuel exhibit diesel-like performance in such critical areas as efficiency, stability and load acceptance.

- COST SAVINGS • INCREASED RUN TIME • FLARE GAS REDUCTION • SIMPLIFIED LOGISTICS
- REDUCED LIQUID FUEL STORAGE • REDUCED MAINTENANCE & LONGER SERVICE INTERVAL
- NO ENGINE MODIFICATIONS REQUIRED & NO POWER OR EFFICIENCY LOSSES









## **ADVANTAGES OF DUAL FUEL SYSTEM: -**

- Enhances Performance of the Engine
- Low Cost and Easy to Install
- Reduced Operating Costs
- Extends Run-Time of Standby Engines
- Lowers Emissions
- Allows Use of Interruptible Gas
- State-of-the-art Controls and Monitoring
- Increased Service Intervals
- Benefit of Running on Either Diesel or Dual Fuel Mode.
- Fuel Flexibility to Switch Back to 100% Diesel Operation Automatically.
- Uses Many Alternative Fuels Like PNG/CNG/CBG/Biogas/Waste Gas/Syngas/Well Head Gas/Pyrogas to Substitute Diesel Fuel.

## **SOME OF OUR PRIVILEGED CUSTOMERS**



## **OUR GENERATORS ARE EXPORTED TO**

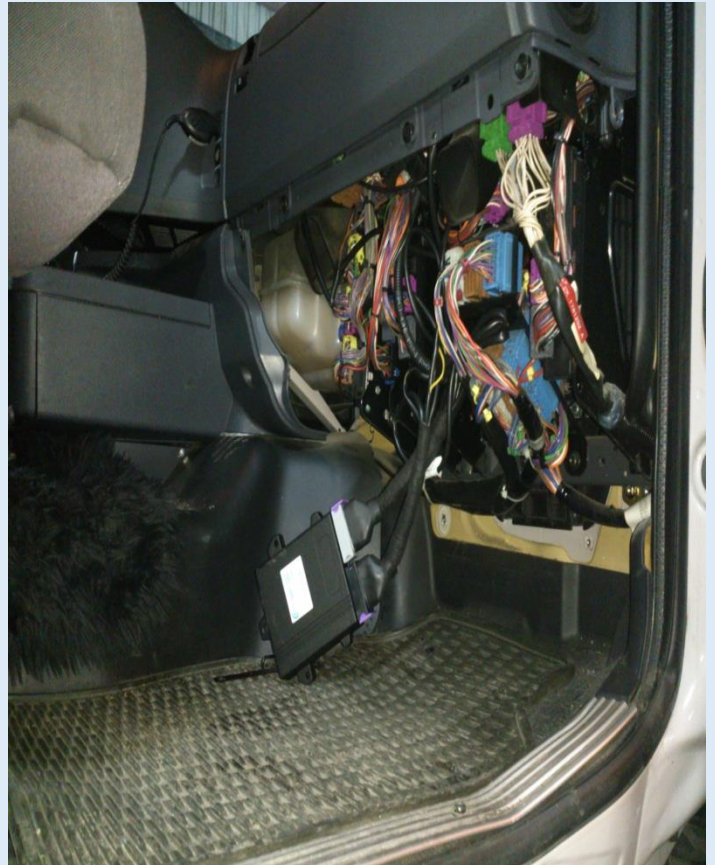
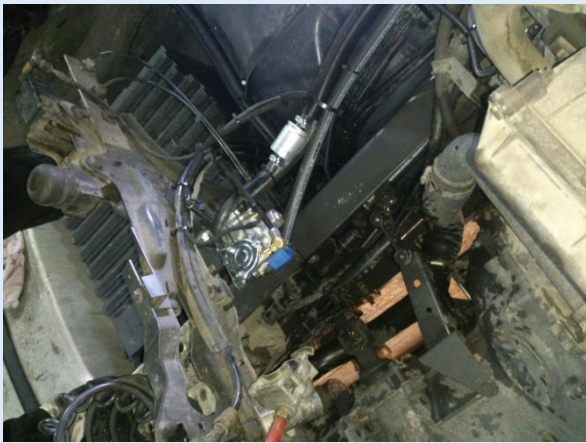








# **DUAL FUEL CONVERSION KIT FOR DIESEL ENGINES VEHICLE**





## OUR PRIVILEGED CUSTOMER'S





## **COMPARISON**

Sr. No.	Comparison Basis	Competitors	Chroma-Ator
1.	System	Natural Venturi Type System	Advanced Injector based system with ECU. It combines the best features of other controllers and allows operation simplest Genset's with a mechanical pump and the newest structures Euro 6.
2.	Governing	Direct Feeding of Gas Through Butterfly Valve	Governing based on load through MAP Sensor. It is the first gas & diesel controller with an in-built CAN interface.
3.	Controlling	Old PLC Based	Advanced ECU based it stands out thanks to its enhanced precision of analogue emulators.
4.	Safety	No Safety for High In-take of Gas	Safety is provided through EGT. The system is designed to automatically shift to Diesel operation in case of any abnormality found in engine parameters.
5.	Remote Monitoring	Difficult	It is an optional features in our DFS to cooperate with GPS module and there is a remote update via GPRS.
6.	Gas Measurement	Difficult	A developed set of analogue and digital emulators has been used. Also, a frequency emulator for Flow meters has been added (Optional Feature).
7.	Cost of kit (without GST)	Expensive	Reasonable
8.	Warranty	One Year's	Two Year's
9.	Efficiency	Natural Venturi Systems Starts @ 25% load and deactivates @75% load. thus not giving full efficiency/ conversion	Our system starts at 1% load & remain active upto 100% load. This is fully efficient.
10.	Service Interval	No Increase in Service Interval	We assure 20% increase in service interval. Thus, giving indirect mileage.
11.	Our Average of Fuel Consumption is 20% Better Than The Competitors.		



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