

## 10.0 Installation Instructions

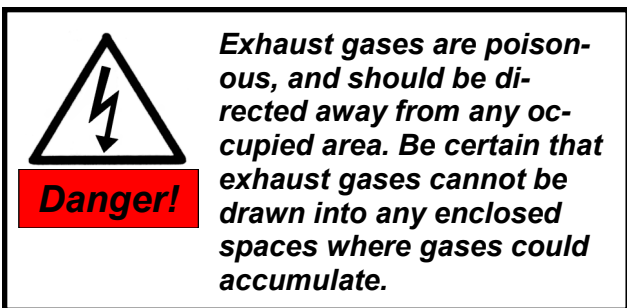
### 10.1 General Mounting Instructions

The framework must be constructed in accordance with good mechanical design so that the weight of the generator system will not stress the compartment construction. Plan the location to be large enough to permit set removal. Allow additional clearance for easy access to the oil fill, oil filter, oil drain, fuel filter, air filter, as well as the voltage regulator and main load circuit breaker. Allow enough clearance so that the exhaust system may be disconnected for future service work. Design the compartment large enough for the generator system, observe the clearances shown on installation template drawing. Install the generator system in its own compartment. Separate the compartment area from the storage areas, fuel supply areas and personnel.

***An installation drawing is supplied with the generator system to aid in locating the mounting holes, hot air discharge opening, & exhaust outlet.***

Construct the compartment floor in a manner so as to prevent oil, fuel, or water accumulation. Compartment drainage can be accomplished via 1/4" diameter holes on the compartment floor. Secure the modular generator system to the compartment frame using 3/8-16 UNC, grade 5 bolts. Use flat washers, lock washers and nuts to complete the mounting.

### 10.2 Exhaust gas system



Typically the exhaust gas system consists of exhaust gas manifold, muffler and tailpipe. All of this will necessarily restrict the flow of the exhaust gas; such restriction must not exceed the limits specified for the particular engine, SEE "DESIGN AND SPECIFICATION CHART", SECTION 10.5.

### Additionally:

- The exhaust system must prevent the entrance of rain, road sprays or other water sources into the engine.
- To prevent recirculation of exhaust gases into the engine combustion or cooling air system locate the exhaust outlet as far as possible from these systems.
- Use flexible tubing to connect the engine exhaust to any rigid pipe extensions. This is used to prevent transmission of vibration.

### EXHAUST BACKPRESSURE

The exhaust system will produce a certain resistance to the exhaust gas flow ("exhaust backpressure") consisting of the total resistance of the system, including the pipes, pipe bends, muffler, tailpipe and/or exhaust accessories.

The exhaust backpressure of a given engine installation will depend upon the size of the pipes, the number and types of bends and joints and the chosen muffler.

Exhaust system design must ensure that the total system flow resistance does not exceed the maximum permissible backpressure, Refer to Section 10.5 for Specifications.

The engine exhaust manifold I.D. constitutes the reference value for designing the exhaust piping. It is not permissible to reduce the I.D. beyond this size.

### Mufflers

STADCO supplies a muffler with the gensets. If for some reason the standard muffler does not work with your application and you have to design your own muffler for the STADCO genset, the following are factors that govern the selection of the muffler:

- 1) Exhaust volume flow at rated output and speed ("hot gas"). Data for the engines are published in Section 10.5 Design Features and Specifications.
- 2) maximum permissible engine exhaust backpressure.
- 3) degree of noise reduction required in dB(A).
- 4) configuration required.
- 5) available space.

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Whenever the muffler is not mounted on the engine, suitable engine-muffler connections must be provided. These connections must be as short as possible.

### Elbows

Provide sweeping bends to minimize exhaust backpressure. 90° elbows should have a radius not smaller than the pipe I.D.:

#### Minimum bend radius by size:

I.D.:	1.5"	Min. Radius:	3.0"
	1.25		3.0
	2.0		3.0

**NOTE: Use of short radius waterpipe elbows and/or miter cut elbows is strictly forbidden and may void engine warranty.**

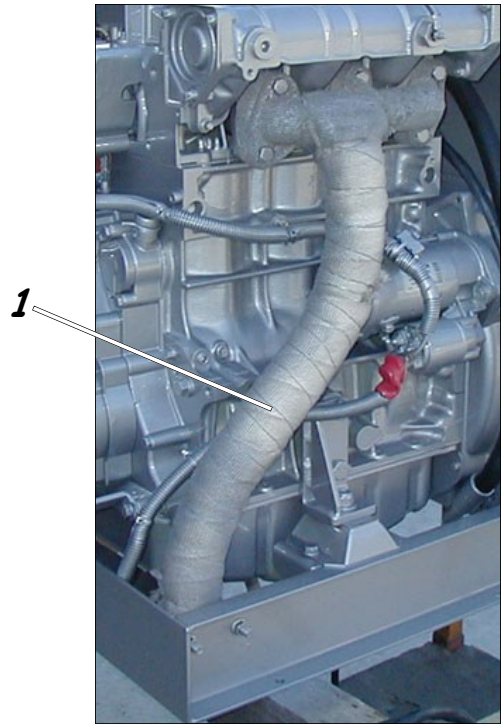
### Exhaust Connections

The exhaust outlet should be installed so the exhaust is directed away from any operator station and shall be properly guarded to protect the operator.

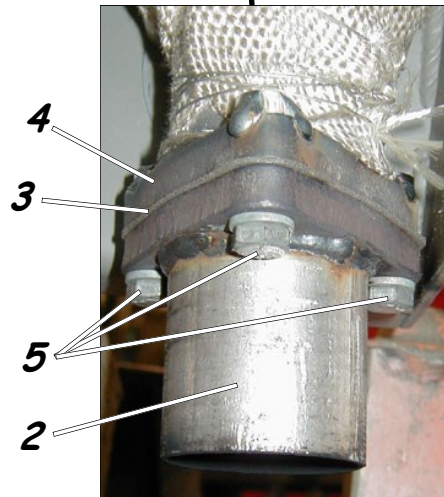
The engine is supplied with a flexible exhaust tailpipe **Item #1, Figure 10.2.1**.

Supplied loose with the genset is an exhaust connection adapter **Item #2, Figure 10.2.2** with 2.0" dia. connection pipe.

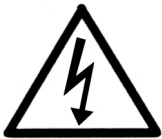
The installer is required to cut a hole in the compartment floor for connection to exhaust tailpipe connection flange **Item #4** prior to placing generator set in the compartment. After the generator is in place, the exhaust connections can be made. Place the supplied gasket **Item #3** in between the two connection flanges and attach connection flanges with (3) 5/16-18 hex bolts **Item #5** (provided). Finish off the exhaust system by mounting the exhaust muffler and interconnecting with flexible exhaust tubing and clamps.



**Figure 10.2.1**



**Figure 10.2.2**



**Danger!**

Inhalation of exhaust gases can result in severe personal injury or death. Be sure that exhaust system does not leak.

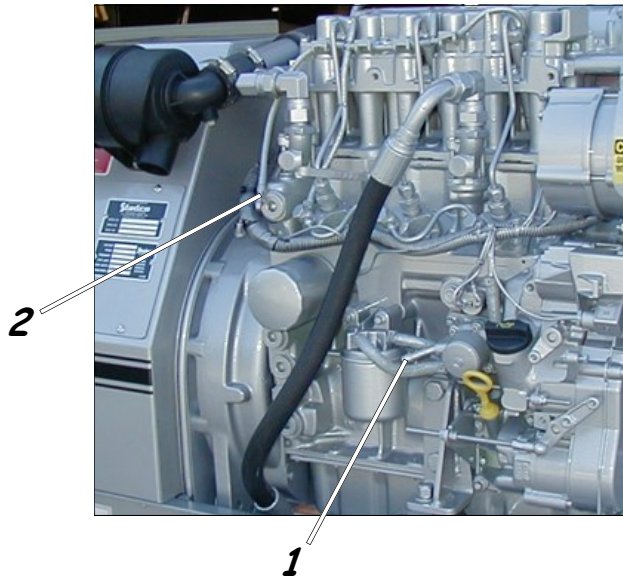
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### 10.3 Fuel System

The fuel system on Deutz 2011 series engines require a fuel suction & return line.

Connect the fuel supply line to engine fuel pump **Item #1, Figure 10.3.1**. The pump connection is 5/16" dia.

Connect the fuel return line to **Item #2, Figure 10.3.1**. The fuel return connection is 1/4" dia. Place a hose clamp on all fuel line connections. Be sure that all connections are air tight.



**Figure 10.3.1**

The fuel piping system may consist of both rigid and flexible material. Rigid lines can be made of seamless copper or stainless steel. Metal lines must be thoroughly cleaned prior to installation. When using rigid lines use an approved flexible line to make the connection from rigid lines to fuel connections on engine. The flexible hoses should be capable of operating in a temperature range from -40°F to +200°F without deteriorating and should be neoprene lined.

All fuel pipes must be located in protected areas, away from intensive heat sources (engine exhaust system) and securely fastened (especially rigid pipes).

The fuel piping routing must also be carefully designed. Avoid any sharp bend, keep the number of connections to a minimum and do not use excessively long runs.

Any air which has found its way into the fuel system can cause irregular running of the engine and decrease its performance, even leading to stopping of the genset and preventing its restarting.

Fuel suction dip tube and/or fuel connection at the fuel tank should be located below fuel level at all times to prevent air cavitation of the fuel system. Fuel suction point in fuel supply tank should be located a minimum of 1 to 1-1/2 inches above the floor of the tank to minimize the pick up of fuel sediment and tank condensate material into the fuel system. To prevent fuel drain back, install a fuel check valve in the suction line, at the fuel tank.

**NOTE:** Due to the design of the fuel injection pumps the **fuel return line** should enter the tank above the maximum fuel level and should **not** be immersed in the fuel. Also, the fuel return line should be bent horizontally away from the fuel suction point inside the tank. This will help direct the aerated fuel from being picked up by the suction line.

**Note:** If the fuel for the generator is being supplied by the vehicle tank, the supply line must be configured so that it can only utilize 75% of the total tank volume.

### IMPORTANT

Air cavitation causes engine starting problems by virtue of fuel starvation. To avoid this condition, make sure that all joints and connections in the fuel system are 100% air tight. The engine is equipped with a mechanical fuel transfer pump which feeds the fuel supply from the fuel tank to the fuel filter system and subsequently to the fuel injection pump. Install a fuel check valve at fuel tank if difficulty is encountered with fuel drain back.



**Do not install fuel shut-off valves in the return line of the engine fuel system.**

**Warning!**

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### 10.4 Cooling System

Deutz B/FM2011 engines are oil-cooled diesels. The genset is complete with a heat exchanger which is horizontally mounted between the frame rails of the generator mounting (**SEE FIGURE 10.4.1**) and a cooling fan driven by an A.C. electric motor. For this reason there is no need for special intake ducts to direct the cooling air in and out of the compartment.

However, the installer needs to cut an opening in the floor of the vehicle compartment for cooling air discharging through the heat exchanger (See air flow directions in **Figure 10.4.1**).

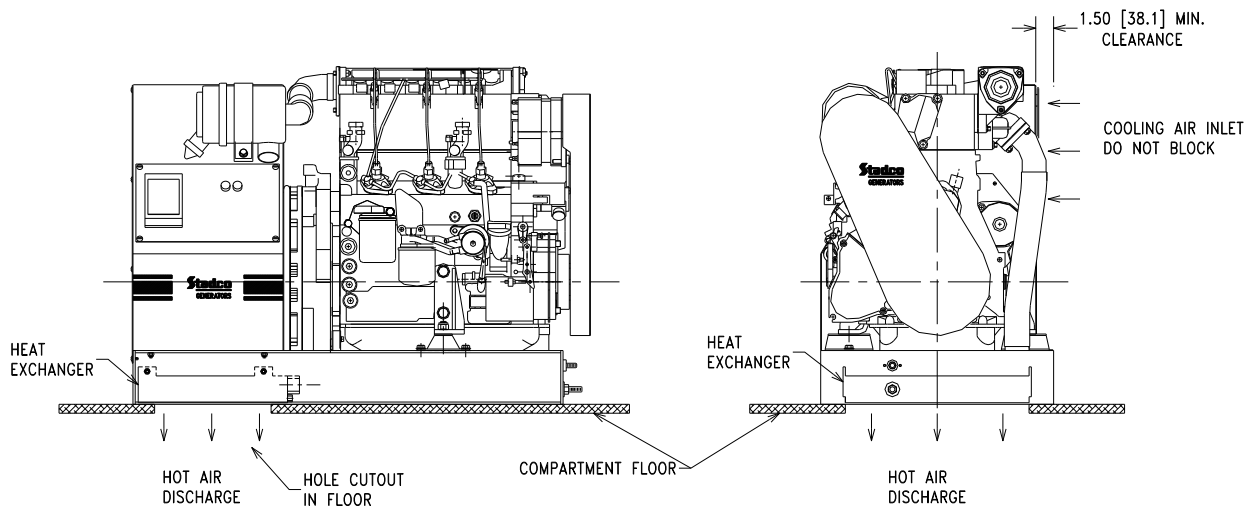
Another opening is also needed for supplying air to the cooling fan for engine cooling. The cooling air intake fan is located in the generator enclosure on the non-service side of the genset. This opening should be located somewhere away from the discharge of hot air from the heat exchanger and also away from other heat sources such as exhaust piping and mufflers. Cooling air can be supplied through a louvered panel, or a cutout in a side wall whichever the installation permits.

Cooling air inlet and hot air discharge openings must be large enough to permit air flow for full-load operation or the engine will overheat and could result in costly repairs. Inlet and outlet opening must be carefully designed to meet this requirement, see **Section 10.5 & 10.6** for design features.

**CAUTION:** Due to the design of the cooling system and for the safety of any personnel, it is imperative that the generator set is not started unless all panels of the generator/cooling enclosure are in place. Failure to observe this caution will cause overheating of the engine and will create a danger for the operator.

### **Special Configuration** **Bottom air inlet required**

If the configuration of the mounting compartment requires the cooling air inlet opening to be in the floor of the compartment, separation of the hot air discharge and the cooling air intake openings must be ensured (See **Figure 10.4.2**).



**NOTE:**

1. DO NOT BLOCK COOLING AIR INLET OR HOT AIR DISCHARGE OPENINGS.
2. AN AIR INLET OPENING MUST BE PROVIDED TO ALLOW COOLING AIR INTO THE GENERATOR COMPARTMENT.

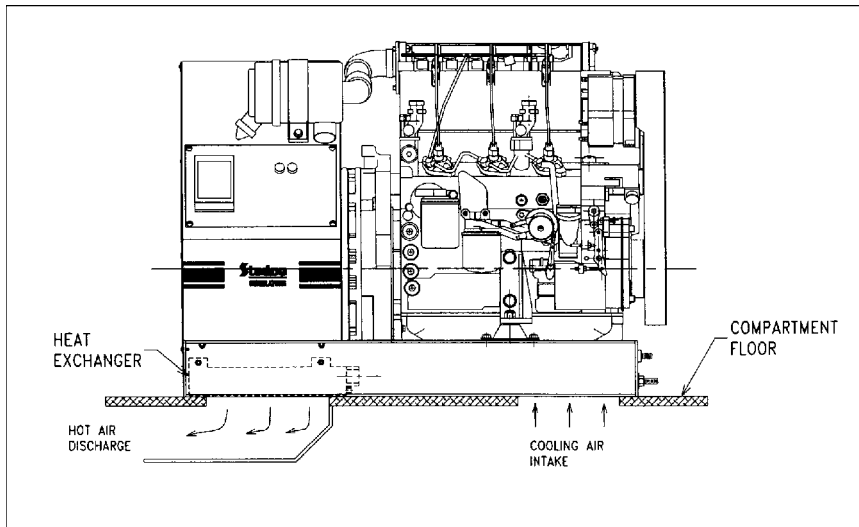
**Figure 10.4.1 Cooling Air Flow 12335**

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### 10.4 Special Configuration cont.

Provide a duct beneath the floor to discharge the hot air away from the cooling air inlet, this will prevent hot air from being recirculated into the cooling air stream.

**CAUTION:** When designing the discharge duct, make sure the opening of the duct is not in a direction that will “scoop” air when the vehicle is being driven. This will cause road dirt & debris to be forced into the radiator causing it to become contaminated and less efficient.



**Figure 10.4.2**

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### 10.5 Design Features & Specifications

<i>Item</i>	<i>Unit</i>	<b>CP20</b>	<b>CP25</b>
Engine Speed	RPM	1800	1800
Engine Model		D2011L03o	BF3M2011
Recommended Battery Capacity	CCA	750	750
* Engine Lube oil Capacity with Filter	Quarts	*	*
Combustion Air Flow	CFM	62	79.4
Maximum Intake Restriction	In. H2O	22	22
Exhaust Gas Flow	CFM	165	216.6
Max. Exhaust Backpressure	In. H2O	26	30
Minimum Cross Sectional Area for Cooling Air Inlet	Sq. In.	120	120
** Cross Sectional Area Required for Cooling Air Discharge	Sq. In.	**	**
<b>Generator Rating 60HZ</b>			
Standby Rating	Watts	20,000	25,000
Continuous Rating	Watts	17,000	22,000
Cont. Amps @ 240VAC, 1-Ph. 1.0 PF.	Amps	70.8	91.7
Generator # of Poles		4	4
Number of Leads		4	4

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**Figure 10.5.1**

\* Refer to Section 11.2 for oil fill procedures.

\*\* Refer to Section 10.6 for opening size.





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### 10.7 Installation Checks/Prestart Checks

Before starting the generator set, perform these steps:

- Check oil level in oil pan (Section 11.2)  
Check for leaks. See Section 9.1 for the recommended oil and quantity Section 10.5.
- Check Battery connections for tightness.
- Check to make sure that the Load circuit breaker is in the “OFF” position.
- Check all electrical connections and be sure that all bolts have been securely tightened.
- Refer to Installation Review, this section.
- Follow the Start-Up Section in Section 6.

Do not attempt to start generator system until all Installation Review questions have been answered satisfactorily. Once this has been done, proceed to the Operator’s Section for the Start-Up sequences.

#### **Installation Review**

Prior to initial start-up of the generator system, address each of the following installation review items; correct as necessary.

- Is the generator mounted securely to the floor of compartment? (**Section 10.1**)
- Is there adequate airflow openings both for inlet airflow and discharge airflow? (**Section 10.4, 10.5 & 10.6**)
- Are all the generator power output cables routed in such a way as to prevent chaffing?
- Are the power output cables of the generator connected properly & tightened? (See Wiring Diagram **Figure 8.3.1**)
- Are the battery cables connected properly & tightened? (**Section 7.2**)
- Are the 12VDC control system plugs wired & connected properly? (**Section 7.3 & 7.4**)

#### **Can the following maintenance be performed?**

- Change oil filter, fuel filter and air filter.
- Check the valve clearance.
- Check oil level in engine.
- Operate main load circuit breaker.

**NOTE** Are electrical junction boxes adequately sealed, and of adequate size for the power circuit?