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# installation & maintenance

## Nett<sup>®</sup> Universal-Fit Catalytic Converter Installation

1. The Nett<sup>®</sup> Universal-Fit catalytic converter can be installed horizontally or vertically. Due to the fact that high temperature is needed for efficient operation, the converter should be installed as close to the engine exhaust manifold (or turbocharger) as possible. The ideal installation location is within 12" (300 mm) from the manifold flange for diesel engines. Due to the typically higher exhaust temperatures of LPG/CNG/gasoline engines, the converter can be installed up to 36" from the exhaust manifold, provided it is installed between the engine and the muffler.
2. Choose a straight piece of pipe in your exhaust system. Check other parts for interference. Cut out a section of the pipe to accommodate the length of the Nett<sup>®</sup> catalytic converter. Remember that some length of the pipe is required for insertion into the converter's inlet and outlet cones. If the converter is to be rigidly attached to the vehicle frame, a section of the inlet pipe should be replaced with a flexible connection to compensate for vibrations.
3. The converter should be installed so that the 1/8" NPT back pressure port (also the M18 O<sub>2</sub> sensor port for LPG/CNG/Gas engines) is on the inlet side. Insert prepared pipes into the inlet and outlet cones. Make sure that the pipes are inserted deep into the cones and rest on the built-in stop rings.
4. Use muffler clamps (flat band type is preferred) or weld the cone ends to the pipe to seal the inlet and outlet. When welding is necessary, use type 308 rods or electrodes. Type 304L stainless steel used for the Nett inlet/outlet cones does not require post-weld annealing.
5. Make sure that the catalytic converter's weight is supported. Some extra brackets and supports of the exhaust piping and the converter itself may be necessary. Welding to the converter's center body is not permitted and will void the warranty.
6. Check the installation to make sure that there are no leaks. Make sure that the converter is firmly mounted in the exhaust system and is not interfering with any structural members of the vehicle or engine accessories, including electrical components, fuel lines or combustible materials.
7. For diesel engines, once the installation is complete, measure the engine exhaust back pressure using the 1/8" NPT port on the inlet side of the converter. Ensure that the readings are within the engine manufacturer's recommendations. Record this initial reading for comparison with future readings to determine if the converter requires cleaning.

### Diesel Catalytic Converter Maintenance

Engine malfunctions such as leaking or stuck injectors or loss of compression will lead to lower exhaust temperatures and a reduction in catalytic converter efficiency.

- To improve catalytic converter performance and reduce engine smoke, regular maintenance should be performed. The following components should be checked: engine air cleaner element, air intake system, fuel injection system, injection timing, upper cylinder condition, and exhaust backpressure.
- For further improvements consider switching to a cleaner burning diesel fuel (sulfur content of less than 0.10% and an aromatic content of less than 18%.) The lower sulfur content reduces sulfur gases/particulate and the lower aromatic content will reduce carbon particulate. Use of #2 on-road fuel (or on-road Ultra Low Sulfur Diesel) for off-highway applications is recommended.
- Using a low ash or no ash engine oil will reduce engine smoke due to oil consumption.



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It is recommended that the engine backpressure is regularly checked during the preventive maintenance program of the vehicle. The measured backpressure should be compared with the initial backpressure recorded when the converter was first installed. The pressure check should be performed at high idle engine speed, using a pressure gauge of 0-10 kPa (0-40 in. WC) range connected to the 1/8" NPT port at the inlet to the converter.

Nett<sup>®</sup> diesel exhaust catalytic converters operate maintenance-free on most diesel engines. However, installations on two-stroke or older (high-polluting) four-stroke engines may require periodic cleaning of the soot deposits from the converter. The converter should be cleaned whenever the engine backpressure reading is more than 2.5 kPa (10 in. WC) higher than the initial measurement with the clean converter.

## Diesel Catalytic Converter Cleaning Procedure

In many cases the carbon deposits may be burned-off at high exhaust temperatures. The exhaust gas temperature can be raised by increasing the engine speed and applying high engine loads. The exhaust gas temperature has to be increased to a minimum of 400°C (750°F) for at least 2-3 minutes in order to facilitate cleaning of the converter.

If the converter cannot be cleaned by increasing the exhaust temperature, the following mechanical cleaning procedure should be performed:

Remove the catalytic converter from the engine exhaust system by removing the cone clamps or the center body clamps.

To clean light accumulations of diesel carbon deposits, place the converter's inlet face into a plastic bag and blow compressed air into the channels of the converter core's outlet face. Continue until the converter core's inlet face is clean. Use max. 80 psi air pressure for cleaning. Keep the air nozzle approximately 5 cm (2 in.) away from the converter core's face. Note: this procedure will generate quantities of airborne soot and should be performed only in a properly ventilated area.

When heavy accumulations of carbon deposits are present, use compressed air and a nylon brush (do not use a steel brush) to clean the inlet and outlet faces of the converter.

After cleaning re-install the converter in the engine exhaust system using new gaskets, if required.

## LPG/CNG/Gasoline Catalytic Converter Maintenance

Nett catalytic converters are maintenance-free, if the engine is in good operating condition. If the engine emissions are excessively high and/or contain engine lubricating oil, the catalyst may become damaged. Engine misfire can also damage the catalyst. It is important for long catalyst life that all engine problems are promptly identified and corrected.

The air/fuel mixture on an LPG/CNG/Gasoline engine may go out of adjustment due to a dirty air filter, misfiring spark plugs or wires, blocked fuel filter, or other reasons. If the mixture becomes too rich, carbon monoxide levels may rise to as high as 5% or more and even though the converter is functioning properly, the CO levels at the tailpipe may be too high. For the lowest tail pipe emissions, the air/fuel mixture must be maintained slightly lean. A regular check of the air/fuel mixture should be included in the vehicle's maintenance schedule. The optional NEES™200 Air/Fuel Ratio Controller provides automatic air/fuel ratio control and maximum emissions reductions for LPG and CNG engines. Contact Nett for more information.

Nett Technologies Inc. has a corporate policy of continuous product development. Specifications are subject to change without notice.