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Title: NEW Ultrasonic DEF Tank Sending Unit

Applies To: All SCR Vehicles

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

09/15/2017 - Initial Article Release

DESCRIPTION

1. Overview

There is a NEW DEF tank sending unit available. This document will guide the user through the differences between the two styles, when to replace a sensor, and what tools/kits are available when diagnostics lead to replacing the DEF tank sending unit.

The current style DEF tank sending unit has a float to measure the level and an LED to measure the DEF quality, shown in Image 1 and 2 below. The NEW style DEF tank sending unit uses only ultrasonic waves to measure the level and DEF quality, shown in Image 3 below.



Figure 1: Float ONLY DEF Tank Sending Unit (FLS)

Figure 2: Float and Optical DEF Tank Sending Unit (QLS)

Figure 3: Ultrasonic DEF Tank Sending Unit

2. Compatibility

The ultrasonic DEF tank sending unit is compatible with all vehicles built between 2012 and present using SCR. Since the concentration sensor was not required until federal emissions 2016, vehicles built prior to 2016 will use a sensor without concentration functionality. This ultrasonic sensor will look identical in appearance to its counterpart with added concentration functionality.

NOTE:

NOTE: If an ultrasonic DEF tank sending unit without concentration sensor functionality is installed on a vehicle that requires the concentration sensor, fault codes will be present and the correct ultrasonic DEF tank sending unit must be installed.

The ultrasonic DEF tank sending unit is only available for Cummins powered vehicles at this time. There are no calibration updates required to service the sensor. Navistar powered vehicles will **REQUIRE** a calibration update to the ECM and ACM at the time the ultrasonic DEF tank sending unit is installed for the first time. The calibration update will not be available for most Navistar powered vehicles until November 1, 2017 and further information will follow.

Vehicles built from January 2016 to present with N9 or N10 engines will require an updated calibration. The last 4 digits of the calibration ID must be NMR1, NMW1, or later.

NOTE:

NOTE: Both Optical and Ultrasonic DEF tank sending units will be available for service simultaneously. Ultrasonic DEF tank sending units will replace the float and optical DEF tank sending units as inventory diminishes. Some tank sizes will diminish inventory before others.

3. Ultrasonic DEF Tank Sending Unit Boot Encapsulation Slow to Fill Alert

The new ultrasonic DEF tank sending unit has a silicone boot encapsulation around the concentration sensor and the bottom of the level tube. The sensor is susceptible to a delayed level reading due to the boot encapsulation which takes about five minutes to fill with DEF, but could take up to 15 minutes. Any time a new ultrasonic DEF tank sending unit is installed, it should be dunked in the DEF 2-3 times at a rapid pace to initialize some flow of DEF through the boot encapsulation. If any low DEF level fault codes are active after installation such as 1761-17, 1761-18, or 1761-1, the boot encapsulation must be cleared of any air. Refer to the Repair Steps section for instructions to service the DEF tank sending unit. For new sensors experiencing interference issues, refer to item 4. DEF Tank Cutting Tool.

CAUTION:

If diesel fuel is ever found in the DEF tank, the sensor must be replaced.

4. Float and Optical DEF Tank Sending Unit Boot Kit

Some vehicles may experience aeration or other issues in which a float and optical sensor replacement is **NOT** required. For diagnostic procedures, follow each associated FCAP. DEF sending unit boot kit instructions and supplemental diagnosis steps for "bubble codes" are located in iKNOW article [IK0700096](https://www.iknow.com/ArticleViewer.aspx?Controll...).

5. DEF Tank Cutting Tool for Interference Issues During Installation

If a float and optical DEF tank sending unit is replaced with an ultrasonic DEF sending unit, some units may experience interference when installing the ultrasonic DEF sending unit in the tank. If any interference is witnessed, use the Ultrasonic Sensor Tank Cutting Tool. Refer to the Special Tools section to find the tool part number and instructions.

NOTE:

NOTE: All 7 gallon sensors will likely experience interference when attempting to install the ultrasonic sensor for the first time.

CAUTION:

Do NOT remove the tie straps from the ultrasonic DEF tank sending unit. If the tie straps are compromised, the ultrasonic DEF tank sending unit must be replaced.

6. 5 and 15 Gallon DEF Line Interference

If a float and optical DEF tank sending unit is replaced with an ultrasonic DEF sending unit on 5 and 15 gallon tanks, the DEF lines **MUST** be replaced. Without replacing the DEF lines, the DEF tank sending unit will not fit in its original location due to different DEF supply and return tube orientation. Refer to the Service Parts Information section to find the 5 and 15 gallon ultrasonic sending unit kits.

SYMPTOM(s)

N/A

SPECIAL TOOL(s) / SOFTWARE

DEF TANK CUTTING TOOL

If a float and optical DEF sending unit is replaced with an ultrasonic DEF tank sending unit, some units may experience interference when installing the ultrasonic DEF sending unit in the tank. Follow Step 1 below to determine if the DEF tank opening is large enough to support the ultrasonic DEF tank sending unit.

Step 1. Measure the opening of the DEF tank. The opening should be at least 90 mm in diameter in any direction. If the DEF tank opening is not at least 90 mm, the Ultrasonic Sensor Cutting Tool should be used to cut the tank opening to a larger size. Refer to Table 1 below for DEF tank cutting tool part number and instructions. The instructions are also included with the tool.

NOTE:

NOTE: All 7 gallon sensors will likely experience interference when attempting to install the ultrasonic sensor for the first time.

CAUTION:

Do **NOT** remove the tie straps from the ultrasonic DEF tank sending unit. If the tie straps are compromised, the ultrasonic DEF tank sending unit must be replaced.

Table 1: DEF Tank Cutting Tool		
Tool Description	Tool Number	Instructions
Ultrasonic Sensor Tank Cutting Tool	18-637-01	4328516R1

NOTE:

NOTE: Instructions are subject to revision, if printing discard after single use.

SERVICE PARTS INFORMATION

Ultrasonic DEF tank sending units will become available in PDCs as float and optical DEF tank sending units supply diminish. Therefore, some tank sizes will become available before others. Refer to the overview in the Description section of this iKNow article to determine if this iKNow article applies.

5 AND 15 GALLON DEF LINE INTERFERENCE

If a float and optical DEF sending unit is replaced with an ultrasonic DEF sending unit on 5 and 15 gallon tanks, the DEF lines **MUST** be replaced. Without replacing the DEF lines, the DEF sending unit will not fit in its original location due to different DEF supply and return tube orientation. Refer to Images 4 and 5 below to see the differences in DEF tube orientation.

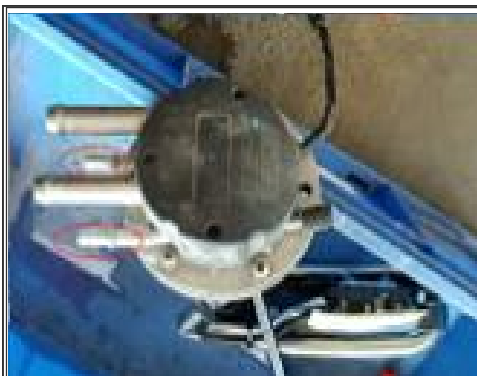


Figure 4: DEF tube orientation of 5/15 gallon float/optical sensor



Figure 5: DEF tube orientation of 5/15 gallon ultrasonic sensor

Refer to Repair Steps section below for assembly instructions.

DIAGNOSTIC STEP(s)

When fault codes are present, refer to appropriate Fault Code Action Plan (FCAP) to locate proper repair guidelines.

REPAIR STEP(s)

When servicing the ultrasonic DEF tank sending unit and DEF lines, refer to [Exhaust Aftertreatment System with SCR EPA 10 Service Manual](#) for proper repair instructions. Use the proper torque sequence from Figure 6 and Table 2 below.

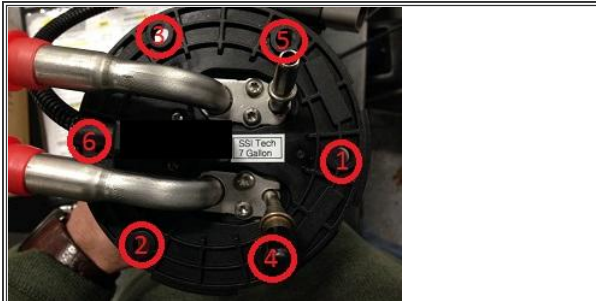


Figure 6: Ultrasonic DEF tank sending unit torque sequence

Position	Torque (Nm) Cycle 1	Torque (Nm) Cycle 2
1	1-2	4-9
2	1-2	4-9
3	1-2	4-9
4	1-2	4-9
5	1-2	4-9
6	1-2	4-9

NOTE:

NOTE: Instructions are subject to revision, if printing discard after single use.

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	18050 - SCR Aftertreatment
Noun:	124 - Sensor Assembly Def Tank

Standard Repair Time(s):

Refer to the [SRT Manual](#) for Repair Times

OTHER RESOURCES

[Master Service Information Site](#)

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Staff ID	Client ID	Comments	Created Date
	DYYJJSF	You received the following feedback From: dyjjsf - Joseph Stanton Email Address: jstanton@leonardbus.com Job Classification: ICBSM, IC Bus Service Manager Dealer: LEONARD BUS SALES, INC. Feedback: Is there any issue with the 12 gallon tank on the CE bus with needing to replace DEF lines? And the article states to replace the new sensor if diesel fuel is found in the DEF tank, what about other contaminations, windshield washer fluid, gasoline. etc.. We see it all in the bus world.	9/22/2017 2:46:04 PM
	U00ELG3	You received the following feedback From: U00ELG3 - Eric George Email Address: SMTP:{eric.george@Navistar.com}eric.george@Navistar.com Job Classification: SE003, Service Manager Dealer: Field Personnel Feedback: Need part number cross reference chart from float type to new ultrasonic. . Also how do you know which sensor PDC will ship ? Need to know if they are sending the ultrasonic for 5 and 15 gallon will need to order different DEF lines	9/25/2017 6:36:07 AM
U01G389		You received the following feedback From: U01G389 - Drew Swanson Email Address: SMTP:{Andrew.Swanson@Navistar.com}Andrew.Swanson@Navistar.com Feedback: Can we please highlight the fact that this is not available yet for Navistar powered engines and put it at the start of the article ? Also from my understanding we are not providing part numbers for the new sensor as in the article there is nothing, can we inform the dealers that these will ship out based on availability on current QLS order's while we build stock.	10/4/2017 7:55:44 AM
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