

OMNICOMM

Omnicomm LLS 4 Fuel Level Sensors

User Manual

18.12.2018

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General

Omnicom LLS 4 Fuel Level Sensors

General

This User Manual is designed for Omnicomm LLS 4 fuel level sensors.

Omnicom LLS 4 is a fuel level sensor with RS-232 and RS-485 interfaces.

While carrying out installation, observe the safety rules and regulatory requirements for this type of work.

Minimum allowable length of the measuring piece is 150 mm.

The dielectric permeability of the measured medium should be constant. Failure to comply with this requirement will lead to increased measurement error.

Warning!

LLS liquid level sensors are strictly prohibited to be used in any liquids that are not the factory grade carbon fuels, or contain: BIOFUEL, METHANOL, ETHANOL, UREA and similar aggressive components in pure form or as additives for factory grade carbon fuels for use in INTERNAL COMBUSTION ENGINES.

The wrong polarity (-) or (+) connection of power supply can damage or destroy the device. They are also prohibited for test or use in water and any other liquids that are not factory grade of carbon fuels.

For evaluation purposes, it is acceptable to use the sensor in any kind of mineral or lube oil.

Fit the plastic insulation cap on the end of the central rod after installation accordingly with installation guide.

To be installed, calibrated, tested only by qualified authorised person (i.e. installer, technician, mechatronic).

Specifications

Specifications

Parameters	Value
Power supply voltage, V	7 – 80
Power consumption, W	0,4
Measurement range, mm	0...700, 1000, 1500, 2000, 2500, 3000
Main reduced error of measurement of the sensor, %	±1
Relative humidity at 25 °C (without moisture condensation), %	From 5 to 95
Atmospheric pressure, kPa	From 84 to 107
Maximum relative humidity at 25 °C (without moisture condensation), %	100
Working temperature range, °C	From - 60 to + 85
Body protection rating	IP69k
Operating mode	Continuous
Internal filter size	From 0 to 30
Measurement time period, s	1
Overall dimensions, cm	78×74×(24+length of measuring piece)

Preparation

Parameters	Value
Weight, kg	Not more than 2
Average service life, years	8
Output interface for measured values	RS-232, RS-485
Programmable interface transmission rate, bit/s	2400, 4800, 9600, 19200, 38400, 57600, 115200
Digital reading range corresponding to the maximum level measurement value	1...4095
Digital reading range corresponding to the minimum level measurement value	0...1023
Temperature measuring range, °C	From -40 to +80
Absolute error in temperature measurement within the entire temperature measuring range, °C	±2

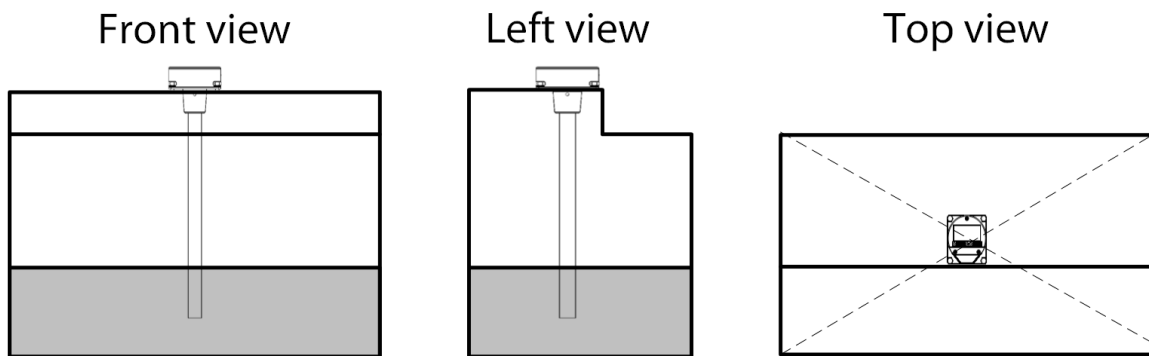
Preparation

Fuel Tank Preparation

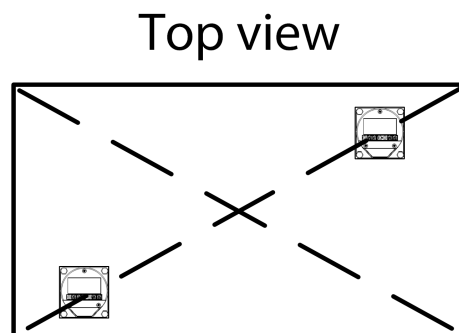
1. Select the location for Omnicomm LLS 4 sensor installation subject to the following requirements:

- Installation location should be as close as possible to the geometric center and placed at the deepest level of the tank:

Preparation

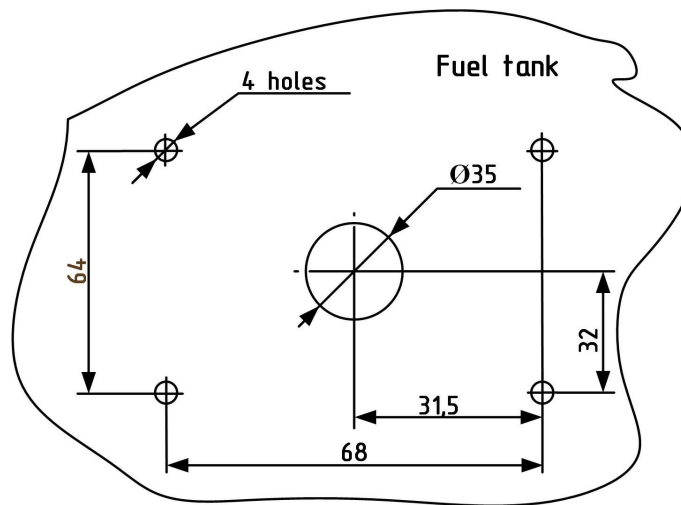


- When installed, the sensor should not be in contact with reinforcement ribs inside the tank
- Installation of two sensors in one tank allows for significant reduction of the fuel level dependence on the vehicle inclination angle:



2. Steam out the tank to ensure compliance with the safety rules
3. Drill out the central bore by bimetal core drill $\varnothing 35$ mm
4. Drill out four mounting holes according to the diagram:

Preparation



The mounting hole diameter depends on the tank material:

- \varnothing 4 mm – for metal tank with wall thickness over 3 mm (cut M5 thread)
- \varnothing 7 mm – for plastic and metal tank with wall thickness up to 3 mm (for rivets)
- \varnothing 4 mm – for plastic tank with wall thickness over 3 mm

Sensor Preparation

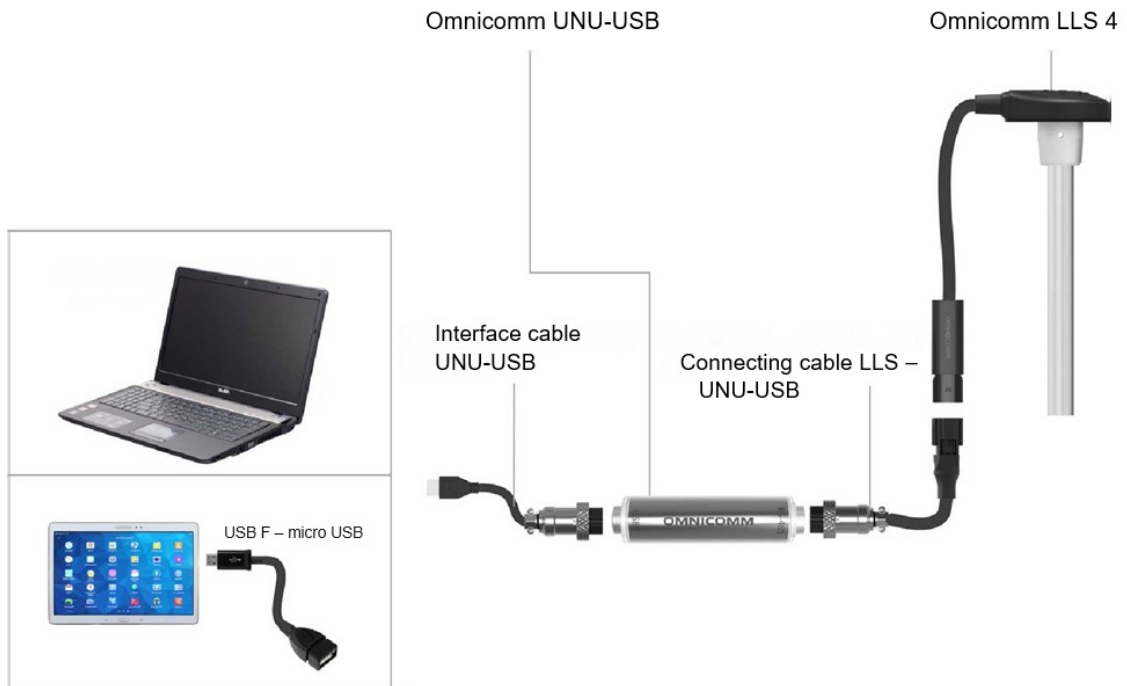
1. Measure the tank depth. Cut the sensor measuring piece so that its length is 20 mm less than the depth of the tank. Ensure that shearing line is perpendicular to the sensor longitudinal axis
2. Use oil-and-petrol resistant non-conductive sealant to fill the vendor furnished insulation cap up to 1/4–1/5 of its volume. Recommended sealants: PERMATEX™ MotoSeal® Black, ABRO™ Black, ABRO™ Red
3. Put the insulation cap on the Omnicomm LLS 4 sensor central rod

Setting

Setting

Connect the sensor to PC or tablet.

Connect Omnicomm LLS 4 sensors according to the diagram:



Launch Omnicomm Configurator on PC or tablet.

Setting

Omnicom Configurator (PC):

The screenshot shows the Omnicomm LLS 4 configuration software interface. The title bar reads "Omnicomm LLS 4" and "FW: LLS 4.0.0.1". The temperature is displayed as 28°C. The interface is divided into several sections:

- Left sidebar:** Contains icons for "Sensor", "Terminal", and "Indicator".
- Top right:** Includes "GAUGING" (with a [F1] key icon), "Service" (with a [F2] key icon), and "Help" (with a [F3] key icon).
- Main configuration area:** Contains fields for "Network address" (1), "Min. level (0...1023)" (0), "Max. level (1...4095)" (4095), "Filtration" (Minimum), "Connection speed" (19,200), "Automatic data output" (Hex), and "Severe operating conditions" (checkbox).
- Right panel:** Shows a fuel level gauge with a "Stable" status, a value of 4095, and a bar chart labeled "27% N=1105". Below the gauge are buttons for "FULL [F2]" and "EMPTY [F3]".
- Bottom:** A large blue button labeled "WRITE TO DEVICE [Ctrl] [S]".

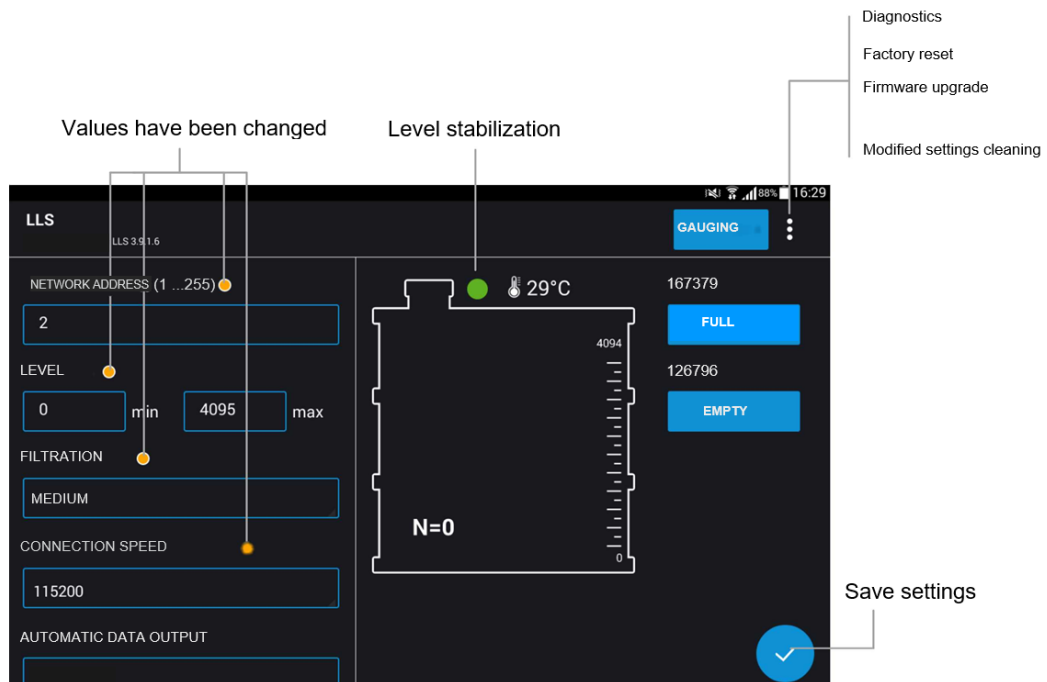
Annotations with lines pointing to specific elements include:

- "Selection of equipment" pointing to the "Sensor", "Terminal", and "Indicator" icons.
- "Settings of connection" pointing to the "Network address", "Min. level", "Max. level", "Filtration", "Connection speed", and "Automatic data output" fields.
- "Selection of units of measurement: Gallons / Liters" pointing to the units icon at the bottom left.
- "Factory reset", "Firmware upgrade", and "Modified settings cleaning" pointing to the "Service" button.
- "Help" pointing to the question mark icon.

Fuel level is displayed without regard for filtration.

Setting

Omnicom Configurator (Android):



“Empty/Full” Calibration

Perform calibration in the fuel, in which the fuel level sensor Omnicomm LLS will operate.

1. Fill the measuring container with fuel
2. Immerse the Omnicomm LLS sensor in the fuel to the full length of the measuring piece
3. Wait for green indicator “Level Stabilized” to appear.
In the “Settings” tab, “Empty/Full Calibration” section, press “Full” button, then the value corresponding to the full tank will be set
4. Take the Omnicomm LLS sensor out of the container and allow the fuel to flow down the measuring piece for 1 minute. In the “Empty/Full Calibration” section, press “Empty” button, then the value corresponding to the empty tank will be set
5. Press the “Write to Device” button

Omnicom LLS 4 Sensor Setting

“Network address” (1 to 254) – set the network address for the Omnicomm LLS fuel level sensor. When several sensors are connected to one external device, they should have unique network addresses.

“Maximum reading” (1 to 4095) – select the maximum reading for the LLS fuel level sensor. Default value – 4095.

“Minimum reading” (0 to 1023) – select the minimum reading for the LLS fuel level sensor. Default value – 0.

“Filtration” – set the output signal filtration parameters:

- **“None”**– no filtration is performed. This option is used, when filtration is carried out by external device.
- **“Minimum”**– this filtration is used in stationary fuel storages and non-mobile machinery
- **“Medium”**– this filtration is used in case of vehicle's operation in normal road conditions
- **“Maximum”**– this filtration is used in case of vehicle's operation in severe road conditions

“Automatic data output”– select:

- **“No output”** – no independent data output (without request) is performed
- **“Binary”** – independent binary data output
- **“Character”** – independent character data output
- **“Data output interval”** (1 to 255 seconds) – set the independent data output interval

Automatic data output mode may be used only with maximum one Omnicomm LLS 4 sensor connected to one interface.

“Severe operating conditions” mode – switch on to enable additional filtration of measurement values taking into account the rough working conditions.

“Data rate” – select the rate for data exchange with external device. Default value – 19,200 bit/s.

Installation and Connection

Installation and Connection

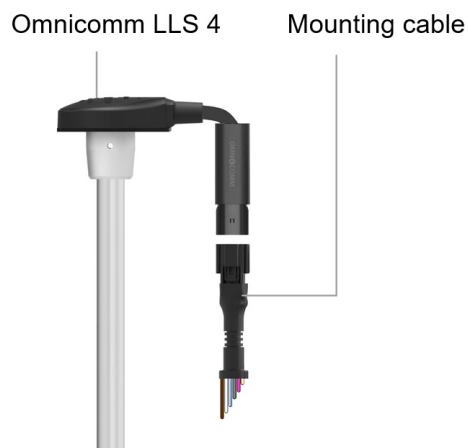
1. Put the vendor furnished mounting point gasket on the Omnicomm LLS sensor measuring piece

2. Put the Omnicomm LLS sensor into the tank and fix:

- when fixing with rivets, use a rivet driver
- when bolting, put on a seal (per bolt), a spacer and a spring washer
- when fixing to plastic tanks with wall thickness over 3 mm, use vendor furnished self-tapping screws and a seal (per self-tapping screw)

3. Connect the Omnicomm LLS sensors to an external device according to the diagram:

Omnicomm LLS 4:



Functions of mounting cable wires

Name of signal	Wire Color
RS-485 A	Orange-white
RS-485 B	Whitish-blue
RS-232 Tx	Pink

Gauging

Name of signal	Wire Color
RS-232 Rx	Grey
+V Power	Brown
Ground	White

4. Connect the fuse holder to the LLS sensor power cable (brown wire) in close vicinity to the vehicle power supply circuit

5. Install the fuse in the fuse holder 6. If necessary, seal the bolt (self-tapping screw) and the connection

Several Omnicomm LLS 4 sensors will be connected side-by-side via the RS-485 interface.

Gauging

Gauging of the fuel tank is necessary to verify conformity of the color code issued by the Omnicomm LLS 4 sensor to the fuel volume in the particular fuel tank.

Gauging of the fuel tank is the fuel tank filling up – from empty to full, with certain filling interval, and recording the Omnicomm LLS 4 sensor readings in the gauging table.

A container may be gauged by draining.

Gauging of a container with several Omnicomm LLS 4 sensors will be similar to gauging with one sensor. Before the gauging, add the necessary quantity of sensors and specify the network addresses. Gauging is performed for all sensors at the same time. Connect several sensors to PC or tablet using a KTZ splitter.

Gauging of the container with one Omnicomm LLS 4 sensor:

1. Empty the fuel tank
2. Connect the sensor to PC or tablet according to the diagram in the [Setting](#) section
3. Launch Omnicomm Configurator on PC or tablet. Select “Container gauging” operating mode

Omnicomm Configurator (PC):

Gauging

Gauging table export
Gauging table import
Gauging table schedule
Table cleaning

The screenshot shows a software interface for gauging. At the top left, there is a back arrow and the text "< GAUGING". At the top right, there is a "Service" dropdown menu and a help icon. The main area is divided into two sections. On the left, there is a table with two columns: "Lifiers" and "Sensor #3". The "Sensor #3" column has a green header with the text "Sensor #3", "N = 1123", "stable", and "non-calibrated". The table contains the following data rows:

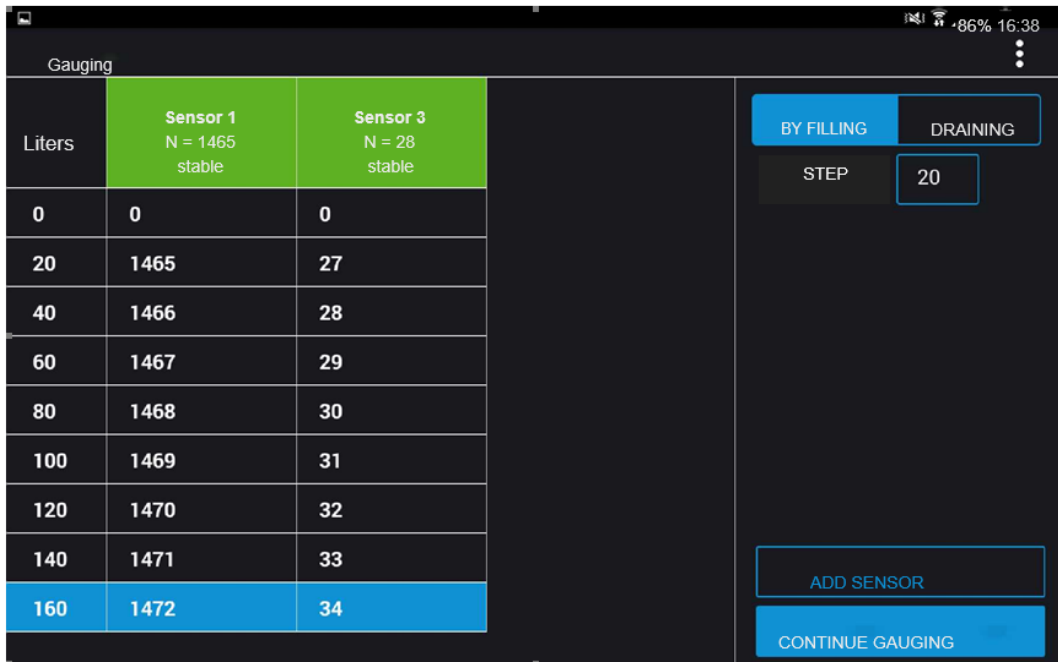
Lifiers	Sensor #3
150	3800
130	3650
110	3112
90	2822
70	2555
50	800
30	600
10	520

On the right side of the interface, there is a dropdown menu set to "By draining". Below it are two input fields: "Step" with the value "20" and "Tank volume" with the value "150". At the bottom right, there are three buttons: "Add sensor [F7]", "Delete line [Del]", and "Continue gauging". A blue vertical bar is visible between the table and the right-side controls. A line from the text "Gauging table export" points to the "Service" dropdown. A line from the text "Start / continue / finish gauging" points to the "Continue gauging" button.

If the sensor reading column is not displayed, press the "Add sensor" button. Select the type of sensor. Specify the network address set in the sensor during setting.

Gauging

Omnicom Configurator (Android):



The screenshot shows the 'Gauging' interface on an Android device. At the top, there's a status bar with signal strength, Wi-Fi, 86% battery, and 16:38. Below that, the title 'Gauging' is visible. The main area contains a table with three columns: 'Liters', 'Sensor 1', and 'Sensor 3'. The 'Sensor 1' and 'Sensor 3' headers are highlighted in green and include 'N = 1465 stable' and 'N = 28 stable' respectively. The table has 9 rows, with the last row (160, 1472, 34) highlighted in blue. To the right of the table, there are two buttons: 'BY FILLING' (selected) and 'DRAINING'. Below these is a 'STEP' input field with the value '20'. At the bottom right, there are two more buttons: 'ADD SENSOR' and 'CONTINUE GAUGING'.

Liters	Sensor 1 N = 1465 stable	Sensor 3 N = 28 stable
0	0	0
20	1465	27
40	1466	28
60	1467	29
80	1468	30
100	1469	31
120	1470	32
140	1471	33
160	1472	34

If during gauging the Omnicomm Configurator (Android) does not display all the connected Omnicomm LLS sensors, select "Refresh the list of devices" in the menu.

4. Set the flow interval in liters

Perform filling by a measuring container or under control of a fluid flowmeter with predefined interval. The container should have metrological calibration test certificate.

5. Press the "Start/continue gauging" button

6. Fill in the fuel volume equal to the flow interval

7. Press "Add line"

The filling volume equal to the predefined flow interval will be displayed in the "Liters" column.

The value equal to the filling volume will be displayed in the "Sensor" column.

8. Press "Add line"

9. Repeat items 6, 7 and 8 according to the number of control points. The minimum recommended number of control points – 20

Sealing

10. Press "Finish gauging" button

11. Save the gauging table in the gauging file (.ctb), Omnicomm Online (.xml) file in the Terminal or Indicator, by pressing the "Export" button

When performing the gauging table export to the Omnicomm Online (.xml) file, the "Export" window will open. Specify the Omnicomm LLS sensor number to display in Omnicomm Online.

Sealing

For Omnicomm LLS 4 sensors the bolt or self-tapping screw and the connection may be sealed:



1. Install the bolt or self-tapping screw through a hole in the seal
2. Close the seal cover with a snap
3. Enter the seal and cover numbers in the report

Put the sealing tie on the Omnicomm LLS 4 connector:

Sealing



1. Connect the Omnicomm LLS 4 connector and the mounting cable connector until their typical clicking position
2. Run the seal flexible piece through the connectors
3. Run the seal flexible piece through the hole in the seal body
4. Tighten up the connection
5. Cut off the extended section of the seal flexible piece

Appendix. List of equipment for Omnicomm LLS 4 fuel level sensors installation

Appendix. List of equipment for Omnicomm LLS 4 fuel level sensors installation

Nº	Name	Number
1	Bimetal core drill ø35 mm	1
2	Core drill shank	1
3	Metal drill ø7 mm or ø4 mm	1
4	Hacksaw	1
5	Spanner 8 mm	1
6	Tap M5 with holder	1
7	Snap-seal for bolt/self-tapping screw	1
8	Personal computer	1
9	Omnicomm Configurator program	1
10	Omnicomm UNU-USB (or UNU) setting device	1
11	DC power supply unit 10–15 V, 0.5 A (only with UNU used)	1
12	Measuring container	1
13	Fuel	

Appendix. List of equipment for Omnicomm LLS 4 fuel level sensors installation

№	Name	Number
14	Gauging container	1

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