

Metrotec LevelSense

Metrotec LevelSense is an IoT-based remote monitoring solution for monitoring the fill level of LPG tanks and the operational status of the system. The solution combines tank-mounted level sensors, an IoT controller, and a cloud-based monitoring application into a single integrated system.



LevelSense componets:

- LevelSense Node – tank-mounted wireless level sensors (Kadatec KTX01) for LPG level measurement
- LevelSense Hub – collects measurement data from the sensors and transmits it to the cloud server
- Antennas
- Toiteadapter – power supply for the LevelSense Hub
- LevelSense Cloud – cloud-based monitoring application
- LevelSense Display – wireless local display for viewing tank fill levels

The system periodically collects measurement data from the LevelSense Node sensors and forwards it to the cloud application through the LevelSense Hub. In the event of a communication outage, the

measurement data is stored locally and transmitted automatically once the connection has been restored.

LevelSense Cloud processes incoming data, stores measurement history, and continuously monitors the status of both devices and communications. The system generates alarms for predefined events, including loss of communication with a level sensor or interruption of the data connection.

LevelSense Display operates in parallel with the LevelSense Hub. It does not replace the cloud monitoring application or the mobile app but provides a convenient local visual indication of tank fill levels. It is also useful during installation and maintenance for verifying the reception range of the 433 MHz radio communication.

Specification

	
Power supply Input voltage: 9...30 VDC Power consumption: 0.6 W @ 12 VDC Reverse polarity protected screw terminals (+/-)	Enclosure Material: Grey plastic Dimensions: 54 × 90 × 65 mm DIN rail mounting clip
Hardware STM32F411 processor Battery-backed real-time clock Internal temperature sensor Supply voltage monitoring Environmental conditions Operating temperature: -40...+75 °C Storage temperature: -40...+75 °C Humidity: 5...90% RH (non-condensing)	Interfaces 10/100 Mbps Ethernet (RJ45) LTE antenna connector (SMA-F) 433 MHz antenna connector (SMA-F) Setup button Blue status LED RS485 interface (Modbus Master) One digital open-collector output (DOUT1), 24 VDC, 500 mA (low-side switching to GND) V+ terminals internally connected to VIN (9...30 VDC), maximum total output current 1 A

Installation requirements

The LevelSense Hub is designed for DIN rail mounting. Allow approximately 54 × 90 × 65 mm of free space inside the electrical cabinet. Power and communication connections must be available within one metre of the installation location (230 VAC power outlet and RJ45 Ethernet socket).

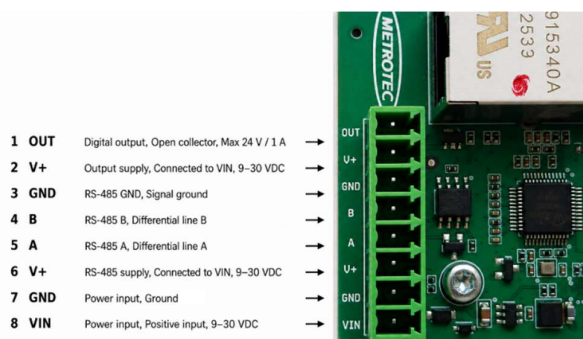
Battery: SAFT LS14250, 3.6 V / 1.1 Ah

Operating principle

The LevelSense Node (Kadatec KTX01) periodically broadcasts its unique serial number together with the tank fill level, battery voltage, and temperature. The transmission interval is 3 minutes. The LevelSense Hub receives these radio packets and forwards the data to the Metrotec cloud application. If communication with the server is unavailable, the data is buffered locally and transmitted automatically once the connection has been restored.

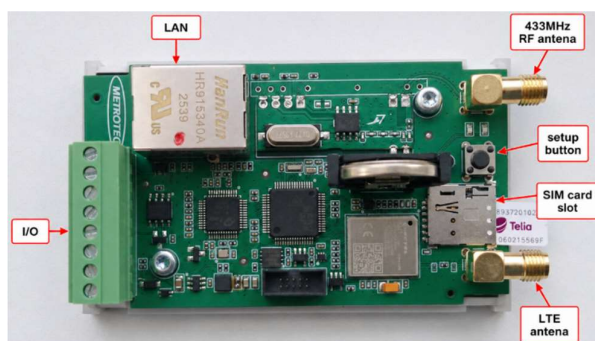
If communication with a KTX01 sensor is lost or its battery becomes depleted, the cloud server generates an alarm. Likewise, if the LevelSense Hub does not transmit any data to the server for one hour, a communication alarm is generated.

To provide flexibility for application-specific automation solutions, the LevelSense Hub is equipped with an RS485 interface for connecting additional sensors and a digital output (DOUT1) for controlling external equipment.



The RS485 communication protocol is application-specific. The maximum output rating of the digital output is 24 VDC / 500 mA.

The V+ terminals are internally connected to the VIN terminal. The maximum total current available from the V+ terminals is 1 A.



NB! Ensure that the 433 MHz and LTE antennas are connected to their respective SMA connectors. Incorrect antenna installation significantly reduces the reception range of the 433 MHz radio signal. If the receiver is installed inside a metal cabinet or another metal-shielded enclosure, an external 433 MHz antenna should be used to ensure reliable radio communication.

Dry-run Protection

The Dry-run Protection function enables the DOUT1 output to automatically prevent a pump from operating when the liquid level falls below a predefined limit. The user defines the minimum permitted fill level and assigns the DOUT1 output to this function. When the tank fill level drops below the configured threshold, the DOUT1 output is activated and the pump is disabled. The output is automatically released when the liquid level rises above the configured threshold.

Device Status Indication, Diagnostics and Commissioning

The LevelSense Hub is designed for installation on a DIN rail inside an electrical cabinet or equipment room. Whenever possible, the controller should be connected to the local Ethernet network. If a LAN connection is not available, insert a SIM card and configure the communication mode as LTE or Auto via the administration interface.

The blue LED indicates the operating status of the device.



Flashes once per second – Normal operation, connected to the cloud server
Flashes once every 3 seconds – No connection to the cloud server, LAN mode selected
Flashes once every 6 seconds – No connection to the cloud server, LTE mode selected
Steady ON – Administration mode

After power-up, the connection to the cloud server should be established within a few tens of seconds. Once connected, the blue LED begins flashing at one-second intervals.

The effective radio communication range between the LevelSense Node sensor and the LevelSense Hub is approximately 100 metres.

The Hub does not provide local indication of radio reception or sensor communication status. Radio coverage can be verified using either the LevelSense Display or the <https://dev.metrotec.ee> web application. Sensor communication is considered operational when measurement data is successfully received by the Hub.

Diagnostics application <https://dev.metrotec.ee>

ObjectID: 89412833 SN: 250050 Type: Kadatec
PRO+GW MAC: 128406889412833
Local time: 06.07.2026 21:44:11
Lon: 22.52369 Lat: 58.25456

ID	Byte	Description	Value
41	2	Battery Voltage	3500
42	2	Temperature	21
43	2	Volume %	54
44	2	GW Temperature	32
66	2	GW Voltage	11869
40	4	SN	250050

Name (8 symbols)

Tank capacity

SN *

Client *

cklatvia / Circle K Latvia SIA × ▾

Latitude

Longitude

Installation comment (314 characters left)
Power:12V Created at: 06.07.2026 by: aare

The diagnostics interface allows you to:

- view data transmitted by the device to the cloud server;
- read the device firmware version;
- update the firmware;
- complete the installation form required for registering the device in the monitoring system.

Enter either the last six digits of the KTX01 serial number, or the MAC address of the LevelSense Hub. The application will display the corresponding device data. Measurements are updated every few minutes.

A newly installed system becomes visible in the Metrotec platform after the installation form has been completed and approved by the system administrator. The installation form requires the following information an 8-character tank name, end customer, tank capacity (litres), tank location coordinates, installation comments. Press Send to submit the installation. The tank will become visible in the Metrotec platform after the installation has been approved by the administrator. Until approval, the installation data can still be modified, and the Send button is replaced by Update.

If no tank data appears in dev.metrotec.ee, the 433 MHz radio signal from the sensor is not reaching the LevelSense Hub.

LevelSense Display Configuration

The LevelSense Display receives 433 MHz radio transmissions from all LevelSense Node sensors within radio range and displays their serial number (SN), fill level (%), battery voltage, and temperature. During normal operation, only the user-selected sensors are displayed. The display is configured using the four buttons located on the rear panel: Setup, Up, Down, and Set.



1. Press and hold the Setup button for at least 5 seconds. The display enters configuration mode and scans for incoming sensor transmissions for 3 minutes. During scanning, up to 16 detected sensors are listed together with their serial number, fill level, battery voltage, and temperature.
2. Use the Up and Down buttons to browse the detected sensors.
3. Press Set to add or remove the selected sensor from the display list.
4. Press and hold the Setup button again for at least 5 seconds to save the configuration. The display exits configuration mode and subsequently displays only the selected sensors.

If the configuration is not saved, the scanning mode terminates automatically and the previous configuration remains unchanged.