



Fim7-L

Fim7-L is a high-performance and intelligent automation solution developed for industrial fuel oil, LPG, and AdBlue storage/distribution systems. Featuring an integrated 7-inch capacitive touchscreen, stable Linux-based operating system, and rich communication infrastructure; it enables safe, efficient, and real-time management of tank and pump operations from a single point. The user-friendly interface architecture provides a seamless operational experience for both field operators and system administrators.

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1. Introduction and Product Overview

Fim7-L is a 7-inch display visualization, control, and data acquisition terminal designed for use in harsh industrial environments. Built on a Linux operating system architecture, this product serves a wide spectrum including fuel station management, pump automation, canopy/field lighting control, price display integration, scenario-based industrial expansion module management, and IP camera system integration.

The device supports industry-standard fuel and liquid level probes/sensors; visualizes measured data on its built-in display, transfers it to external monitors via the HDMI interface, and transmits it to upper data automation systems via standard communication protocols.

2. Safety Warnings and Operating Conditions

Critical Warning

- During installation, wiring, and maintenance processes, the electrical power must be completely disconnected from the Fim7-L device and all peripheral devices to be connected (sensors, barriers, pumps, etc.).
- The device interior must not be opened by the user. There are no user-serviceable parts inside the device. Opening the enclosure by unauthorized personnel will void the product warranty.

Warning

- Installation, wiring, and initial commissioning must only be performed by trained, authorized technical personnel with expertise in industrial automation and electrical infrastructure.

Caution

- The product is designed for use in industrial indoor environments (office, administrative building, control room, etc.). It must not be exposed to direct water contact, excessive moisture, or direct sunlight (UV radiation).

2.1 Normative References and Standards

Reference / Standard	Description
ATG	Automatic Tank Gauging
Calculated Volume	Net volume of fuel reduced to a specific reference temperature (15°C/20°C) based on temperature changes
Directive 2014/30/EU	Electromagnetic Compatibility (EMC) Directive
EN 61000-6-2	Immunity Standards for Industrial Environments
EN 61000-6-4	Emission Standards for Industrial Environments
EN 61326-1	EMC Requirements for Measurement, Control and Laboratory Equipment
Directive 2014/35/EU	Low Voltage Directive (LVD)
EN 62368-1	Safety Standard for Audio/Video, Information and Communication Technology Equipment
EN 60204-1	Electrical Equipment of Machines - General Rules
Directive 2014/53/EU	Radio Equipment Directive (RED)
EN 301 511	Harmonised Standard for GSM Equipment
EN 301 908-1 / -13	Specific Requirements for IMT Cellular Networks and LTE User Equipment
EN 301 489-1 / -52	EMC Requirements for Radio and Cellular Communication Equipment
ISO/IEC 14443 / 15693	Contactless Card Standards (MIFARE / Proximity / Vicinity)
EN 60529	IP Protection Classes
EN 60068-2-1 / -2 / -6	Environmental Tests: Cold, Dry Heat and Vibration Tests
Directive 2011/65/EU	RoHS
Regulation (EC) No 1907/2006	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
IEC 82079-1	Preparation of Instructions for Use - General Principles

3. Technical Specifications

Input Voltage	110-230V AC (50/60 Hz)
Power Consumption	Maximum 20W
IP Protection Class	IP20 (Suitable for indoor use, must be protected from liquid contact)
Cellular Connectivity	4G LTE (Optional)
SIM Card Type	Micro SIM
Ethernet Interface	1x 10/100 Mbps RJ45
Wireless Connectivity	Wi-Fi / Bluetooth (Optional)
Serial Port Count	5 independent serial communication ports
Port Architecture	RS232 / RS485 (Modular interchangeable)
Relay	2 built-in relay outputs
Input	1 dry contact input
Display Type	7" TFT LCD
Display Resolution	1024 x 600 Pixels
Touch Panel	Multi-touch Capacitive (Capacitive Touch)
Software Update	Remote update via USB Flash Drive, Ethernet, Wi-Fi, or LTE
Operating Temperature	-20°C / +50°C
Dimensions	260 x 140 x 70 mm
Sun Exposure	Must not be exposed to direct sunlight
Mounting Type	Surface mounting with special industrial mounting bracket
Wiring Connection	Removable plug-in terminal block and PG-9 cable glands
Language Support	EN, DE, FR, IT, AR, TR

4. Package Contents

Part Name	Qty	Description
Fim7-L Main Unit	1	Main controller terminal with 5 RS485/RS232 port configurations
Mounting Bracket	2	Hidden intermediate mounting brackets for wall or panel surface attachment
Power Cable	1	Type F (Schuko) standard mains supply cable
Connection Cable	1	Special cable assembly with socket, 8 color-coded wires for field signals
User Manual	1	Document containing basic mounting, electrical connections and safety diagrams

5. Installation and Physical Mounting

The surface mounting of the Fim7-L device is designed with a concealable screwing mechanism to provide a clean and industrial appearance.

5.1 Surface Mounting

The device is screwed to the mounting surface using 2 special mounting brackets located on the right and left sides. These brackets can be positioned to face the bottom enclosure edge of the product. This way, the mounting screws are not visible from outside, providing an aesthetic and secure installation.



5.2 Cable Routing and Sealing

PG-9 cable glands (connectors) are used for the entry of signal and data cables into the device enclosure. Cables are routed through these glands to reach the plug-in terminal block on the internal PCB (printed circuit board). After wiring is complete, the glands are tightened to prevent cable strain.



6. Electrical and Communication Connections

6.1 Main Sensor Port (Magnetostrictive Level Probes)

The main communication port dedicated to Magnetostrictive Level Sensors is defined as Main Port. The hardware and software function of this port is fixed and cannot be assigned to another function.

For full communication compatibility with Fimrod series tank sensors, the device comes from the factory with a red RS-485 communication module installed. Cable connections must be made from top to bottom in accordance with the silk-screen labels on the PCB (printed circuit board).

Terminal Pin No	Signal Description	Recommended Color
1	Voltage Output (V+)	Red
2	RS485 A (D+)	Yellow
3	RS485 B (D-)	White
4	System Ground (GND)	Black

6.2 General Purpose Communication Ports (Com1 - Com4)

The other 4 serial ports on the device have a hot-swappable modular card architecture. RS232 or RS485 hardware modules can be replaced as needed for flexible configuration. The recommended port configuration for project stability is as follows:

6.3 Com1: Vehicle Identification System (VIS)

Com1 - VTS/VIS: Field receiver units of Vehicle Tracking/Identification Systems integrated with fuel pumps are connected to this port. It plays a critical role in automatically transmitting the identity information of the fueled vehicle to the control center in pump automation systems.



6.4 Com2: Pump Automation

Com2 - Pump Automation: This port is pre-configured for communication with fuel oil and LPG dispensers in the station. Control of up to 32 pumps is supported via multidrop on a single port.

6.5 Com3: RFID and User Authorization Units

Com3 - RFID and User Authorization: External industrial RFID card readers and terminal units are connected to this port for situations where field operators need to scan cards, be authorized, or enter numeric/alphanumeric data such as license plates/codes/mileage via keypad.



6.6 Com4: Peripheral Devices (Price Display / Expansion and Modbus Slave Modules)

Com4 - Peripheral Devices (Price Display / Expansion and Modbus Slave): Dedicated for communication with station price displays (LED price signs), I/O expansion modules, and other industrial devices supporting Modbus RTU Slave protocol. Audible/visual siren triggering or relay automation processes during critical alarm conditions (overflow, leak, etc.) are managed through this port.



7. Ethernet and Network Configuration

Fim7-L has 1x 10/100 Mbps Ethernet port for integration with local area networks and wide area networks.

7.1 Automatic IP Configuration (DHCP)

The device comes from the factory with DHCP (Dynamic IP Acquisition) mode active. If there is an active DHCP server (Router, Modem, etc.) on your local network, Fim7-L automatically obtains an IP address when connected to the network. The assigned IP address is displayed in real-time in the upper right corner of the screen. To verify connectivity, the command ping [device_ip_address] can be run from the command prompt of a computer on the same network. To access the web interface, simply type `http://[device_ip_address]:8080` in the browser address bar.

7.2 Static IP Configuration

If there is no dynamic IP distributor on the network, or if the device's IP address needs to remain fixed, static IP assignment must be made from the Settings menu on the device's local interface. If Fim7-L does not need to access outside the local network (Internet), the Gateway address should be configured as 0.0.0.0.

7.3 Direct Computer and Fim7-L Connection (Peer-to-Peer)

If a direct Ethernet cable connection is to be established between Fim7-L and a computer without any network switch (Switch/Router): 1) DHCP must be disabled on both devices and static IPs must be assigned in the same subnet (e.g., Computer 192.168.1.10, Fim7-L 192.168.1.20). 2) Since there is no external router, the Gateway address must be set to 0.0.0.0. 3) After connection, access the configuration panel via `http://[Fim7-L_Static_IP]:8080` from the browser.

Edit IP settings

Manual

IPv4

☒ On

IP address: 192.168.1.105

Subnet prefix length: 24

Gateway: 0.0.0.0

Preferred DNS:

Alternate DNS:

IPv6

☐ Off

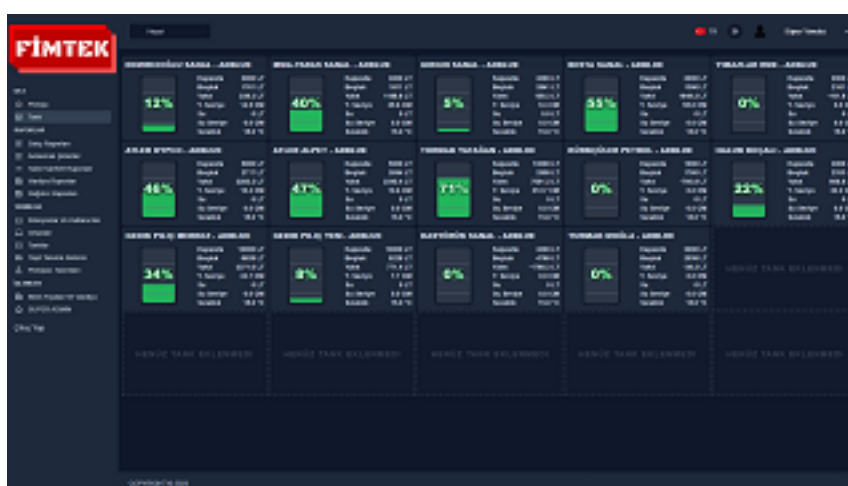
Save Cancel

8. Web Interface and System Configuration

Fim7-L has an advanced embedded web server (Web GUI) that broadcasts on port 8080 when connected to the network. For access, the client computer and the device must be on the same network layer and respond to ping packets.

8.1 Tank Monitoring Screen

In the Tank Monitoring tab, the fuel level, water level, temperature, current volume, and ullage volume of the tanks at the station can be monitored in real-time.



8.2 Configuration Menu

From the Settings tab, tank calibration tables, probe addresses, alarm thresholds (High Fuel, Overfill, Low Fuel, High Water), and relay/scenario responses to be given during alarm conditions can be configured. Refer to the Webconfig.pdf manual for details.

9. Advanced Scenario and Automation Support

The following automations can be applied with the Fim7-L scenario engine:

- Generator automation: Monitoring generator fuel replenishment processes when the tank level drops below a certain threshold or in power outage scenarios, and generating start/stop signals at critical levels
- Overfill prevention: Activating the external audible siren and automatically closing the fill valve when tank capacity reaches 95% during tanker filling
- Expansion unit integration: Executing logic alarm algorithms based on information from dry contact inputs or Modbus register data

Scenarios can be customized in the field according to project requirements.

10. Additional Hardware Functions and Modular Components

10.1 HDMI Display Output

The built-in HDMI output interface on the device allows the graphic interface display on the 7-inch integrated capacitive screen to be simultaneously (mirror) transferred to an external industrial monitor or panel. This allows field operations to be monitored on larger screens as well.

10.2 Built-in Relay Outputs (2x)

Fim7-L has 2 independent built-in relays for use in automation processes. These relays are designed to trigger external hardware or execute field-specific logic scenarios during alarm conditions (overflow, low fuel, leak, etc.) that may occur in the system. Relay lines must be selected as NO (Normally Open) or NC (Normally Closed) in hardware; according to the relevant terminal block structure, only one output type can be active at a time.

10.3 Digital Input (1x Digital Input)

The device has 1 dry contact digital input port. This input can be configured for silencing active alarm sounds (ACK) or switching between pages by remotely controlling the screen interface when short-circuited by field personnel via an external button.

10.4 Cellular Connectivity (4G LTE)

Thanks to the Mini PCIe expansion slot on the device's main board, an integrated 4G LTE cellular communication module can be used depending on the project. With this module, the device can connect directly to the internet and central servers (cloud systems) without needing a local network infrastructure. SIM Card Input: A Micro SIM card connector that can be easily accessed from the outside is located on the device enclosure. RF Antenna Connection: For uninterrupted cellular signal, a suitable 4G antenna must be mounted on the standard SMA antenna connector output located on the back of the device.

10.5 USB Port Interface (USB 2.0 Type-A)

The standard USB Type-A 2.0 port on the device is designed to facilitate field installation, maintenance, and data transfer processes. Through this port, wired/wireless keyboard, mouse, configuration changes or local data backup can be connected to the system, as well as a flash drive for firmware update operations via USB memory.

10.6 Built-in Audio Alert (Buzzer)

There is 1 built-in buzzer (audio alert) on the Fim7-L main board. It is triggered by software to alert the operator when any critical alarm or error condition occurs in the system.

10.7 Real-Time Clock (RTC) and Battery Management

The device has a built-in RTC (Real Time Clock) module to prevent loss of date and time information during power outages. 1 CR2032 type battery is used to keep the module's time in memory. The device is shipped from the factory with this battery installed and active. Maintenance Warning: When Fim7-L is powered off and back on, if the system clock resets or fails to keep the current time, it indicates the RTC battery has reached the end of its life. In this case, the device power must be completely disconnected and the CR2032 battery replacement must be performed by authorized technical personnel by opening the cover.

10.8 Wi-Fi and Bluetooth Communication Module (Optional)

The device has Wi-Fi and Bluetooth hardware support to connect to wireless networks and interact with peripheral devices. This feature is not included in the standard configuration and is not shipped with the product; in case of special request based on project requirements, the version with integrated wireless communication module is provided. Important Hardware Limitation: Due to hardware architecture, Wi-Fi and 4G LTE modules cannot be active simultaneously. Only one should be selected at the ordering stage.

11. Transportation and Logistics Conditions

Fim7-L must be protected from mechanical impacts, industrial vibrations, and sudden humidity changes throughout transportation and storage processes. The following rules must be observed during transport:

- The product must not be dropped or subjected to shock
- Heavy loads exceeding transport capacity must not be stacked on packaged boxes
- Must be transported in rainless and dry environments to avoid liquid contact and condensation risk
- The front panel 7-inch capacitive screen must be protected from sharp objects that could scratch/break it

For long-distance shipments, use of foam-supported impact-resistant outer box is mandatory.

12. Disposal and Environmental Management

Fim7-L is an industrial electronic device subject to WEEE (Waste Electrical and Electronic Equipment) directives. Devices that have reached the end of their service life must not be disposed of in household or industrial general waste containers.

- The product contains multi-layer FR4 electronic circuit boards, semiconductor components, plastic body elements, and metal alloys
- Must be disposed of in accordance with local regulations to protect natural resources and prevent environmental pollution
- Must be disposed of in accordance with local legislation
- Before disposal, the operator's Micro SIM card and any external storage units must be removed and separately destroyed for data security purposes
- Must not be burned or disposed of in water/soil

Improper disposal may cause environmental damage and may also be subject to legal sanctions.

13. End User Warnings

Important Reminders

- Warranty seals on the device enclosure must not be torn or removed.
- All technical service and warranty rights are void for devices whose enclosure has been opened by unauthorized persons.
- To protect the liquid crystal screen life and touch sensitivity of the device, do not mount the device in locations directly exposed to high-intensity sunlight such as in front of windows.
- Ensure that the cable entries on the bottom panel of the product are sealed and that the PG-9 glands are fully tightened.
- Do not use abrasive chemicals or pressurized water for cleaning.