CALMS d.o.o.

Installation and operation manual

CAL-EDGE-PM

Permanent monitoring system for compressed air

CALMS d.o.o.

Dear Customer,

Thank you for choosing the CAL-EDGE-PM device.

Please read this manual carefully and completely before installing, commissioning, or operating the device. The manufacturer cannot be held responsible for any damage resulting from failure to observe the instructions or improper handling of the device.

Any unauthorized modifications or actions that differ from the procedures described in this manual will void the warranty and release the manufacturer from any liability.

The CAL-EDGE-PM is designed exclusively for the application described in this manual. The manufacturer does not guarantee its suitability for any other purpose and accepts no liability for any consequential damage arising from delivery, performance, or use of the device.

Revision history

Revision	**Date**	**Author**	**Description of change**
1.0	2025-04-28	Filip Vitkovski	Initial release of CAL-EDGE-PM User Manual

1. Introduction

The CAL-EDGE-PM is a powerful remote monitoring device designed for permanent monitoring of compressed air systems. It enables continuous tracking, analysis, and optimization of energy usage and system performance by integrating data from multiple sources, including Modbus, analog, and OPC UA signals.

2. Safety instructions

- Read all instructions before operating the CAL-EDGE-PM device.
- Installation should only be performed by qualified personnel.
- Always disconnect the power supply before wiring or maintenance.
- Use appropriate personal protective equipment when handling electrical components.
- Ensure proper grounding of the device.
- Do not expose the device to moisture or corrosive environments.
- Follow all applicable local and international standards and safety regulations.

3. Product overview

The CAL-EDGE-PM is a wall-mounted remote data logger designed for permanent monitoring of compressed air systems. It features an integrated edge gateway, LTE connectivity, and various input terminals for seamless sensor integration. Data is transmitted securely to the CALMS web platform for real-time monitoring, analysis, and reporting.

4. Key features

- Plug & Play industrial-grade device
- Web-based monitoring via CALMS platform
- MODBUS RTU, TCP/IP, OPC UA, and other protocol support
- LTE 4G communication (SIM included)
- Integrated cloud connection via MQTT

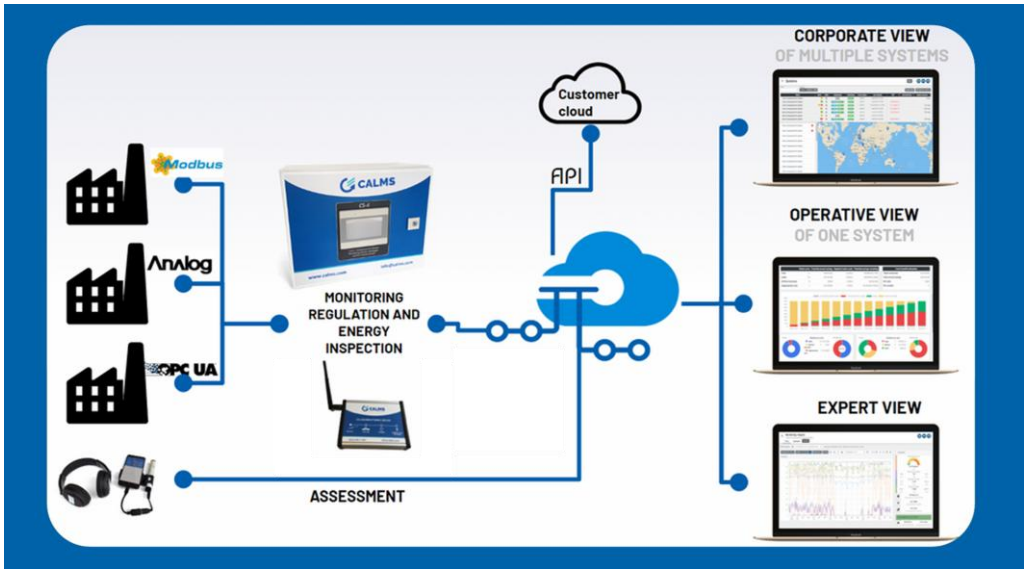
- 5-second data logging (configurable)
- IP55 stainless steel enclosure
- Secure remote access and automatic reporting
- Compatible with any standard compressed air sensors

Optional: 8 analog inputs (4–20 mA) and 16 digital inputs (with add-ons)

5. System architecture

The CAL-EDGE-PM serves as a central unit that collects data from different types of sensors and controllers. Data is uploaded to the CALMS Cloud platform via cellular or Ethernet connection. The cloud provides multiple views:

- Corporate View: Overview of all connected systems
- Operative View: Detailed performance of one system
- Expert View: Advanced analysis and diagnostics



6. Applications

- Continuous monitoring of air compressors and systems
- Remote diagnostics and performance audits
- Energy efficiency analysis and ISO 50001 compliance
- Historical data storage and cost calculation
- No local HMI required – full access via browser or mobile

7. Specifications

7.1 Technical specifications

Category	Specification
Computer	Quad core Cortex-A53 (ARM v7), 64-bit SoC @ 1.5GHz
Operating temperature	-25°C to 60°C (-13°F to 140°F)
Power supply	Input AC 100V-240V 50/60Hz; Output DC 24V 60W
Size	H210 x W380 x L380 mm
Materials	Enclosure – Stainless Steel
Mounting	Wall mounting
IP Rating	IP55

7.2 Communication interfaces

Interface	Specification	Remarks
Protocols supported	MODBUS RTU, MODBUS TCP/IP, OPC UA	
Ethernet	1x 10/100 Mbit/s RJ45 Ethernet port	
RS485	1x Isolated 2-wire RS485	
Cellular modem	2G/3G/LTE (LTE-M)	Depends on network coverage
Antenna interface	Standard SMA interface	Antenna included
Cloud connection	MQTT	

7.3 Input specifications (optional)

Input type	Specification	Remarks
Analog inputs	8 (4–20mA), 12-bit, 8x2-wire system	Passive or active connection
Digital inputs	16, 2-wire system	Filter 3.0 ms

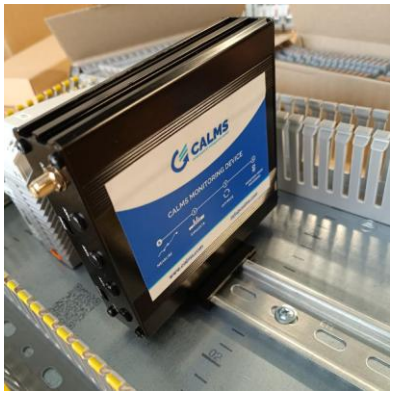
7.4 Functional features

Feature	Specification	Remarks
Web management	Yes	
Logging interval	5 sec	Configurable
Upload interval	5 min	CAL-EDGE to CALMS Web, configurable

8. Installation instructions

1. Mounting: Mount the enclosure to a wall using appropriate fasteners. Ensure adequate ventilation and access to power.

2. Wiring: Connect 230VAC supply to the internal power supply. Connect analog and digital sensors to the corresponding terminals. Use 4–20 mA sensors for AI and dry contacts for DI. Follow proper grounding: connect the mounting plate, cabinet door, and enclosure base to the ground terminal blocks.



3. Connectivity: SIM card is already inserted. Connect Ethernet cable (if using a wired connection). Attach the antenna to the SMA connector.

4. Startup: Power on the system. The gateway will boot and connect to the CALMS platform.

9. Terminals inside the electrical cabinet

Inside the electrical cabinet, all terminals are clearly labeled for ease of connection. Separate terminal blocks are used for 24V DC, 0V DC, Modbus communication, and grounding. Always follow the wiring diagram and ensure that the correct wire is connected to its respective terminal. Double-check polarity and signal type before applying power.

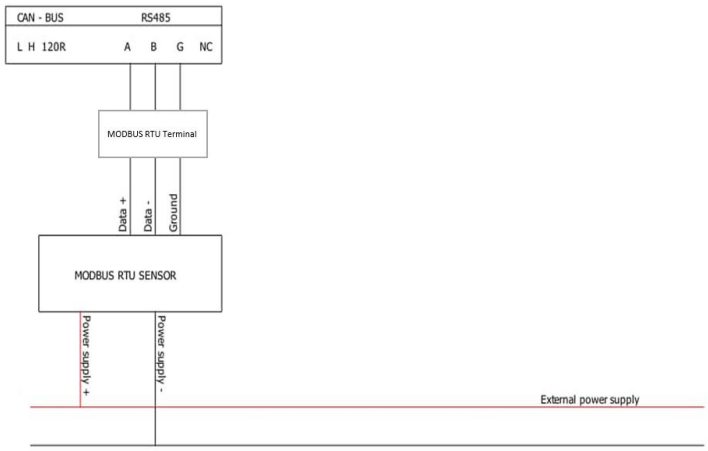
10. How to route the cable into the cabinet

Cables should be routed into the cabinet through the Icotek cable entry system located on the bottom plate. Use appropriate glands or rubber inserts to securely hold each cable in place and ensure strain relief. After inserting all cables, tighten the frame and close the gland plate to maintain IP protection.

11. Connecting MODBUS sensors

MODBUS RTU (RS485):

To connect MODBUS RTU sensors, use the RS485 terminal on the CAL-EDGE-PM device. Connect the sensors according to the configuration you've created on the CALMS platform and ensure the MODBUS addresses and communication parameters are correctly set. The red RS485 LED will blink rapidly if communication is successfully established. You can verify sensor data on the Device Dashboard in the CALMS web interface.

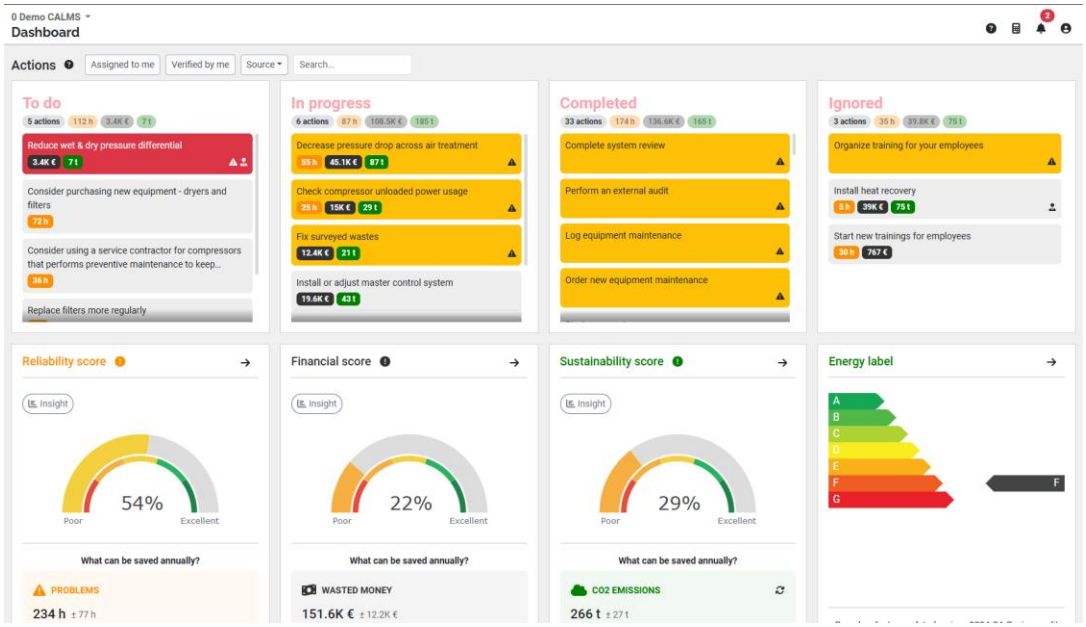


MODBUS TCP:

MODBUS TCP sensors are connected via the Ethernet (LAN) port. After startup, the device automatically receives a static IP address (192.168.0.102) if no DHCP server is present. Connect sensors according to your CALMS system setup, and double-check that the sensor IP addresses are configured correctly. Sensor values can be viewed on the Device Dashboard once communication is active.

12. Accessing the web platform

Open a browser and go to https://calms.com. Log in with provided credentials. View real-time data, set alarms, generate reports, and analyze efficiency.



13. Maintenance & Cleaning

Turn off power before cleaning. Use a microfiber cloth and small vacuum to remove dust. Do not use liquids or sprays inside the enclosure. Inspect wiring and grounding connections periodically.

14. Troubleshooting

Issue	Possible Cause	Solution
No connection to CALMS	No LTE or Ethernet signal	Check SIM, antenna, or cable
No input signal	Sensor disconnected	Verify sensor wiring
Data not updating	Logging/upload interval too long	Reconfigure in settings

15. Contact & Support

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