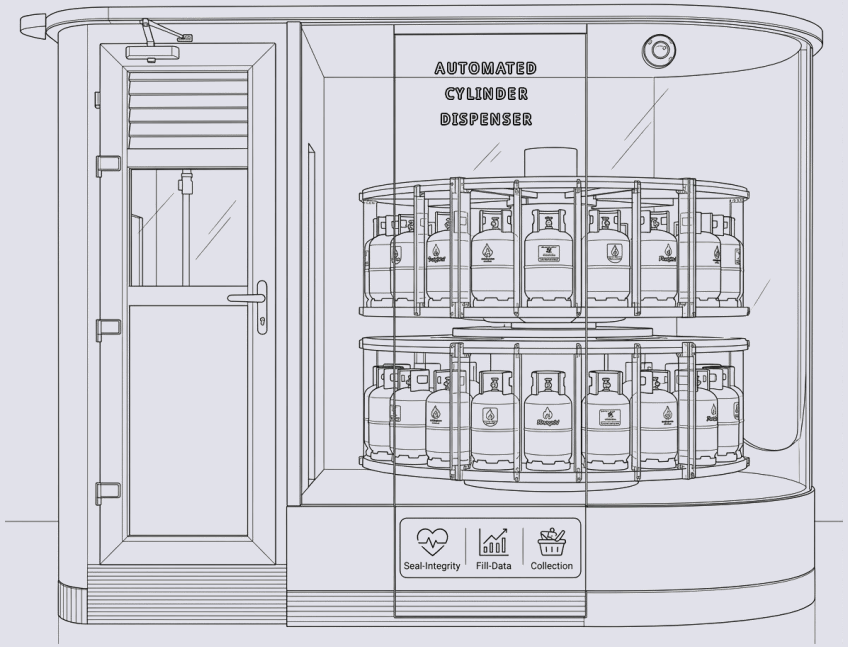
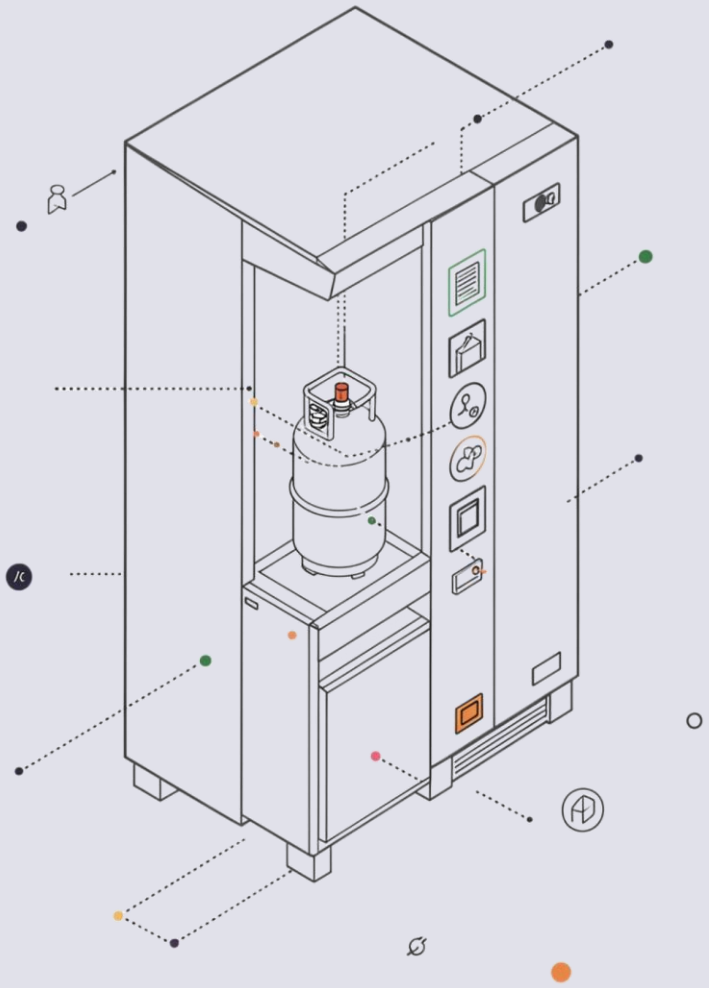


AI-Enabled LPG Vending Machine

Automated, secure system for tamper-proof LPG cylinder distribution



System Overview & Purpose

Purpose

Automate validation and dispensing of LPG cylinders with safety, efficiency, and transparency

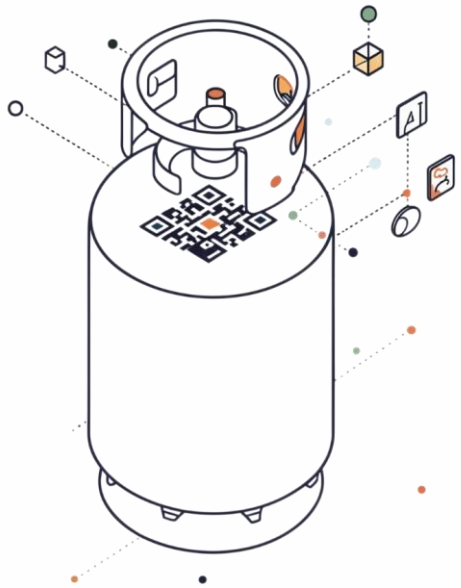
Key Components

Housing unit, rotating drum storage, digital interface, and integrated AI module

Design

Engineered for deployment in both urban and rural settings

Validation & Authentication System



AI-Driven Validation

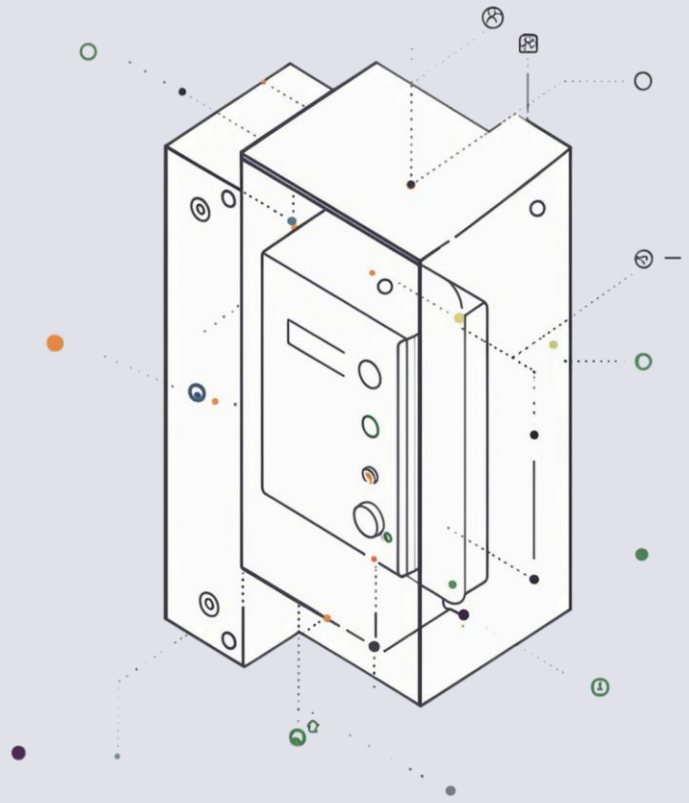
Image processing detects brand, capacity, QR codes, and physical damage on each cylinder before dispensing.

Weight Verification

Load cells confirm net weight via gross and tare measurements, ensuring accurate fill levels.

User Authentication

Mobile OTP or biometric methods with integrated payment processing for secure transactions.



Safety & Security Infrastructure

Detection Systems

Gas leak detectors, smoke/fire detectors, temperature and vibration sensors monitor conditions continuously.

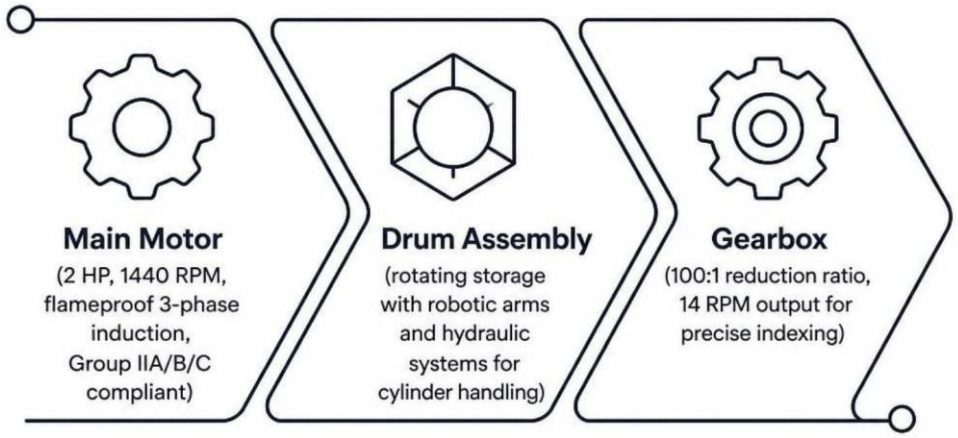
Operational Safety

Emergency shutoff, proximity sensors, audible alarms, and CCTV surveillance protect every transaction.

Anti-Tampering

Real-time alerts for unauthorized access and abnormal conditions prevent interference and theft.

Mechanical & Drive System



Precision Engineering

The flameproof motor and high-ratio gearbox work in tandem to deliver controlled, repeatable drum indexing — ensuring each cylinder is positioned accurately for safe dispensing every time.

Group IIA/B/C compliance ensures safe operation in hazardous gas environments.

Central Processing & Electrical Architecture

Industrial PC

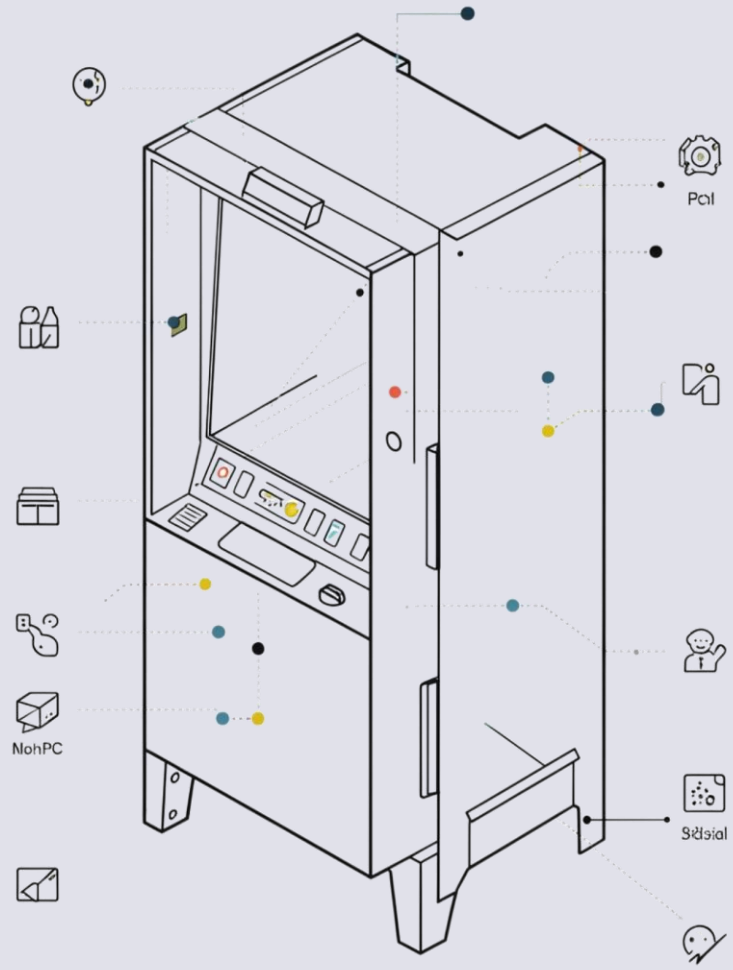
Intel Core i5 (12th Gen) · 16GB DDR4 RAM · 512GB SSD · 15.6" IP65 touchscreen display

Power System

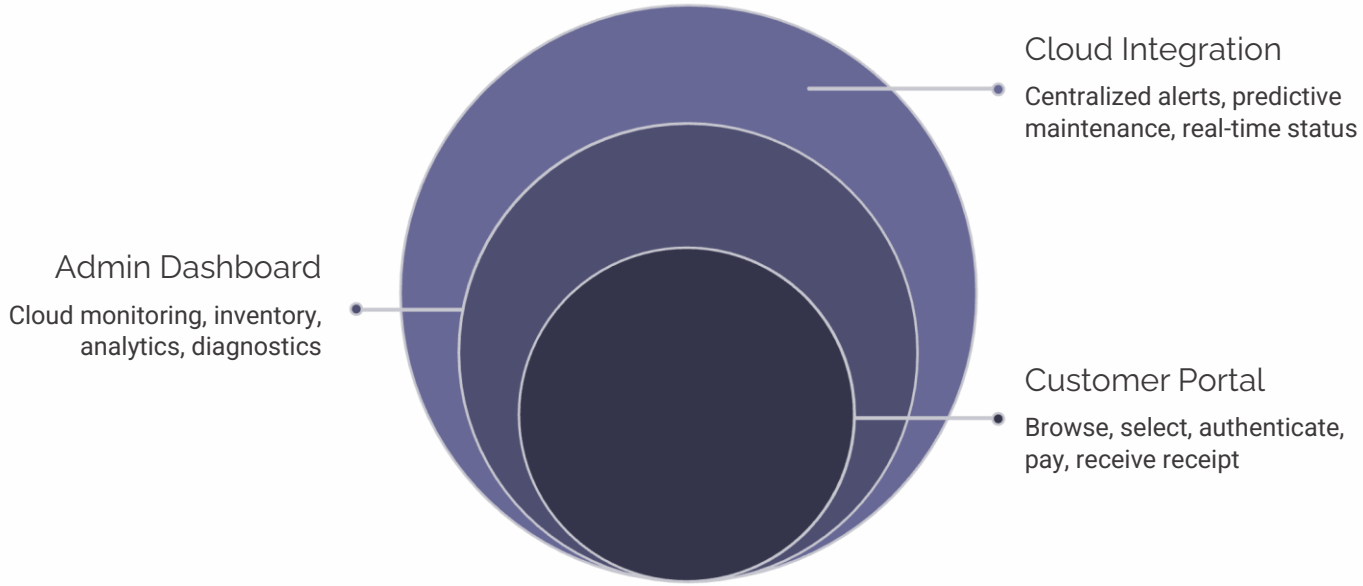
220V AC input with online UPS and 12V dry cell battery backup for uninterrupted operation

Connectivity

Dual Gigabit LAN, USB ports, and LTE support for seamless cloud synchronization



Software Architecture & Operations



Customer Portal

Browse, select, authenticate, and pay for cylinders with a real-time digital receipt issued instantly.

Admin Dashboard

Cloud-based monitoring covers inventory management, sales analytics, and remote diagnostics.

Cloud Integration

Centralized alerts, predictive maintenance scheduling, and real-time machine status tracking.

Key Operational Workflows

1

Sign In

User authenticates via OTP or biometric

2

Select & Validate

AI inspects cylinder — brand, weight, and condition confirmed

3

Pay & Dispense

Payment processed; interlocking safety logic releases cylinder

4

Receipt & Monitor

Digital receipt issued; admin dashboard updated in real time

Interlocking systems prevent door opening until the dispensing chamber is correctly positioned — safety is never bypassed.