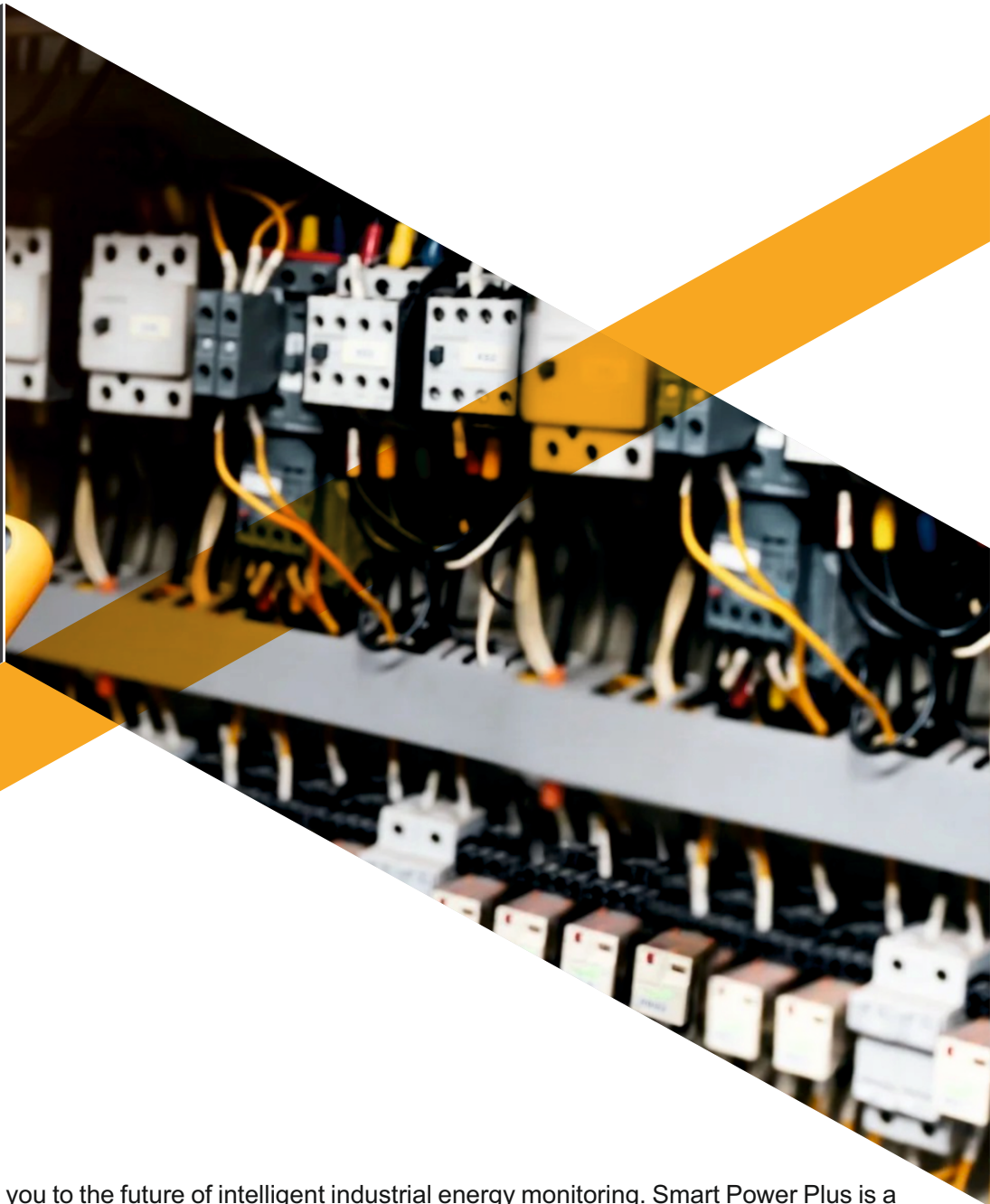# ELIXIR
SMART
POWER PLUS

MONITOR SMARTER. SAVE BIGGER. POWER AHEAD

FROM EVERY MACHINE TO EVERY METRIC — TOTAL POWER CLARITY

REAL-TIME INSIGHTS. RELIABLE PERFORMANCE. REMARKABLE SAVINGS

ELIXIR
Strategic Management Pvt. Ltd.

WELCOME TO
ELIXIR

We are delighted to welcome you to the future of intelligent industrial energy monitoring. Smart Power Plus is a state-of-the-art IoT-based solution that delivers real-time insights into power quality, energy consumption, and equipment performance at the machine level. Seamlessly integrated into electrical panels, it enables live data logging, cloud-based analytics, and instant alerts—empowering smarter decisions, enhanced efficiency, and energy savings.

Developed by Elixir Strategic Management Pvt. Ltd. (ESM)—founded in 2007 by IIT Kharagpur alumnus Vijay Kumar and CMA Rajat Naidu—Smart Power Plus combines engineering excellence with strategic innovation. ESM has evolved from consulting into Smart System Development, creating impactful solutions using IoT, Machine Learning, and Data Analytics across sectors like Smart Agriculture, Smart Gensets, and Smart Industry.

Monitor Smarter. Save Bigger. Power Ahead.

Welcome aboard the smart energy revolution!

TABLE OF CONTENTS

SMART
POWERPLUS

Smart Power Plus is an advanced IoT-based energy & power quality monitoring device designed for industrial environments. Seamlessly integrating with a 3-phase Multifunction Meter (MFM), this compact unit is installed directly inside the electrical control panels of individual electrical machines, in-line with their 3-phase supply.

The device captures a comprehensive set of electrical parameters in real-time, including:

- 3-phase Voltages & Currents
- Active, Reactive & Apparent Power
- Energy Consumption
- Power Factor (PF)
- Harmonics
- System Frequency

All data is transmitted live to a secure IoT Cloud Platform, enabling:
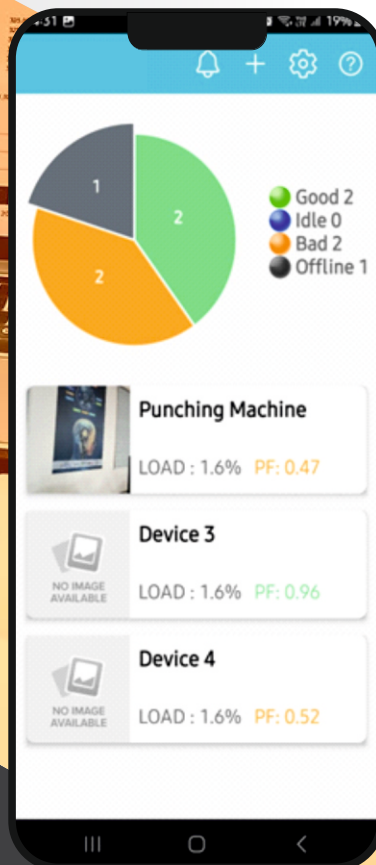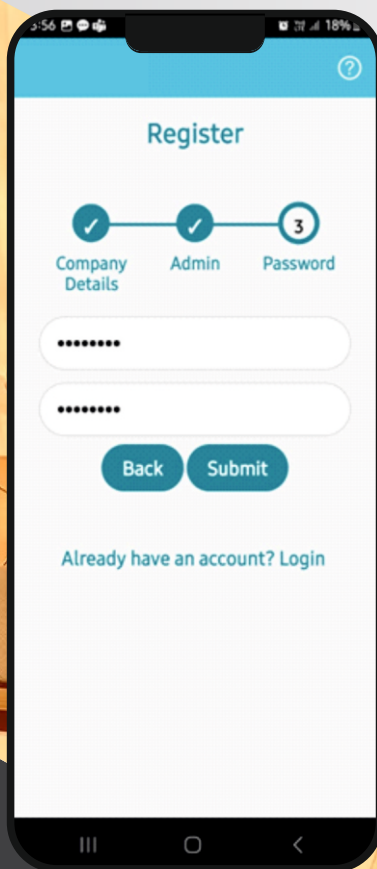
- Continuous data logging and historical data analysis
- Smart insights into overall factory electrical performance, energy losses, PF incentives & penalties analysis and Load analysis.
- Instant alerts on electrical faults or abnormal events
- Live machine-wise performance monitoring.

Smart Power Plus can be installed on every electrical machine in a plant or factory, allowing comprehensive visibility into overall energy consumption and operational efficiency. The system compares performance across similar machines to detect underperformers, identify hidden energy losses, and optimize plant-level energy usage.

MOBILE APP & WEB DASHBOARD

- View real-time and historical data plots.
- Receive smart alerts and notifications
- Analyze plant-wide energy trends
- Instant alerts on PF Levels with Incentive/Penalty estimations
- Generate custom reports
- Make data-driven decisions for preventive maintenance and cost-saving

Empower your factory with Smart Power Plus—your complete solution for intelligent energy monitoring and smart industrial performance analytics.

SMART POWER PLUS
FEATURES

IoT-Enabled Real-Time Electrical Parameter Monitoring

- Complete Plant/Factory electrical distribution system monitoring & analysis
- Individual machine level performance & power quality monitoring & Analysis.
- Continuous data acquisition from 3-Phase Multifunction Meters via RS485 Modbus RTU protocol.
- Key electrical parameters: Voltage (V), Current (A), Frequency (Hz), Active/Reactive/Apparent Power (kW, kVAR, kVA), Power Factor, THD (Harmonics), Load Current Imbalance and Energy Consumption (KWh, KVAh).

Electrical Energy Loss & Load Flow Visualization

- Real-time detection of Transmission losses within factories.
- Feeder-wise and machine-wise energy flow Analysis for loss localization.
- Pinpoint abnormal load curves or leakages.

Power Factor & Reactive Power Compensation Advisory

- Real-time PF visualization per load center.
- Historical PF trend plots for capacitor bank tuning and sizing.
- Advisory alerts on penalty/incentive thresholds.

.Harmonic Distortion & Power Quality (PQ) Diagnostics

- Continuous THD-V and THD-I monitoring at grid incomer and distribution levels.
- Root cause localization for PQ issues: non-linear loads, VFDs, harmonic resonance.

Transformer Load Management & Feeder Health

- Monitor real-time transformer load utilization (% loading, overloading alerts).
- Secondary feeder health diagnostics: phase unbalance, overheating indicators.

Smart Mobile Application (Android/iOS Compatible)

- Remote access to factory electrical diagnostics.
- Consolidated Home Page view for key insights on overall factory and individual machinery.
- Drill-down to machine-wise analytics, historical trends, and alert logs.
- Shift-wise/Weekly/monthly Custom report generation.
- Easy steps to add new machines and connect to available Wi-Fi network.

Web-Based SCADA-Like IoT Dashboard

- Cross-platform Web Dashboard accessible via secure login.
- Hierarchical mapping: Grid → Transformer → HT Panel → LT Panel → Sub-Panels → Individual Machines.
- Role-based access control (Admin, Supervisor, Technician).

Automated Report Generation & Audit-Ready Insights

- Scheduled reports (Daily/Weekly/Monthly) in CSV, PDF, Excel.
- Energy audit-ready documentation with ISO50001 alignment.
- Customizable report builder by asset, time window, and metric.

Event-Based Alerts & Predictive Maintenance

Email/SMS/App push alerts for:

- Over current / Over voltage
- Undervoltage
- Low PF
- Excess Harmonics
- Abnormal load Behavior
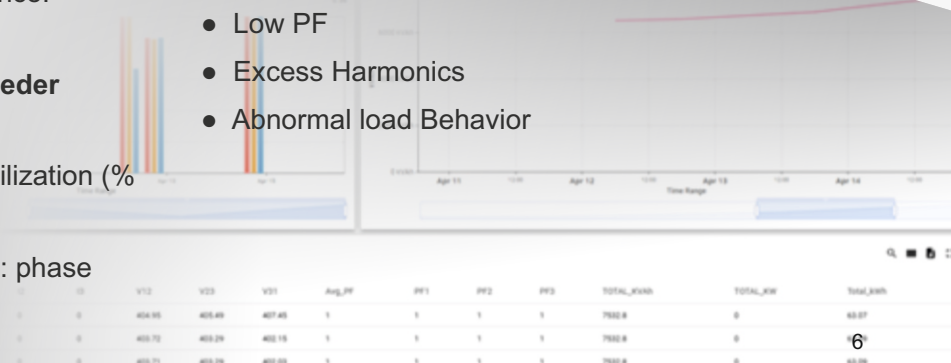
SMART POWER PLUS
BENIFITS

Energy Cost Optimization
- Identify non-essential loads and apply peak load shaving techniques.
- Reduce monthly energy charges, max demand charges, and PF penalties.
- Better alignment with Time-of-Day (ToD) tariffs.

Minimized Transmission & Distribution Losses
- Phase-wise, feeder-wise loss calculation from 11kV incomer to LV loads.
- Address cable loss and switchgear inefficiencies.

Operational Excellence & Equipment Health
- Enhance machine lifecycle through electrical stress monitoring.
- Prevent downtime by early detection of voltage sags/swells, harmonics, and unbalanced loads.

Improved Power Factor Compliance
- Maintain PF near unity across machines, avoiding utility penalties and availing rebates.
- Optimize capacitor bank operations based on real-time and historical reactive demand.

Increased Equipment Utilization & Load Balancing
- Machine-wise runtime vs idle-time analysis.
- Ensure load balancing across phases and distribution panels to improve system reliability.

Enterprise-Wide Visibility & Decision Support
- Factory-wide electrical insight enables data-driven energy policies.
- Strategic planning for energy efficiency upgrades and DG set usage optimization

Secure & Scalable Cloud Infrastructure
- IoT cloud ensures remote access, scalability, and disaster recovery.
- Easily scalable to multiple plants/sites with centralized monitoring.

MODEL DESCRIPTION
ESM-SPP-MFM-2025

SMART POWERPLUS (WITH INBUILT MFM) – STANDALONE UNIT

- Fully integrated unit with industry-grade Multifunction Meter (MFM) built-in.
- Requires external connection to 3 CT coils and 3-phase power supply (in-line).
- Direct measurement of voltage, current, power, energy, PF, harmonics, and frequency.
- Embedded IoT module with Wi-Fi connectivity.
- Secure integration with IoT Cloud platform (MQTT protocol) for real-time telemetry.
- Ideal for plug-and-play installations where no existing MFM is available.

Technical Specifications

MFM - Input Parameters

- 3ph Voltage (AC):
    - L-L: 35 to 520V AC
    - L-N: 20 to 300V AC
- Current (AC):
    - Secondary: 30mA to 5A AC
- Primary PT Range: 100V to 520kV
- Secondary PT Range: 100V to 520V
- Primary CT Range: Up to 6000A
- Secondary CT Output: 5A / 1A
- System Compatibility: 1Ph-2W / 3Ph-3W / 3Ph-4W (Selectable)
- Sampling Rate: 164 samples per cycle
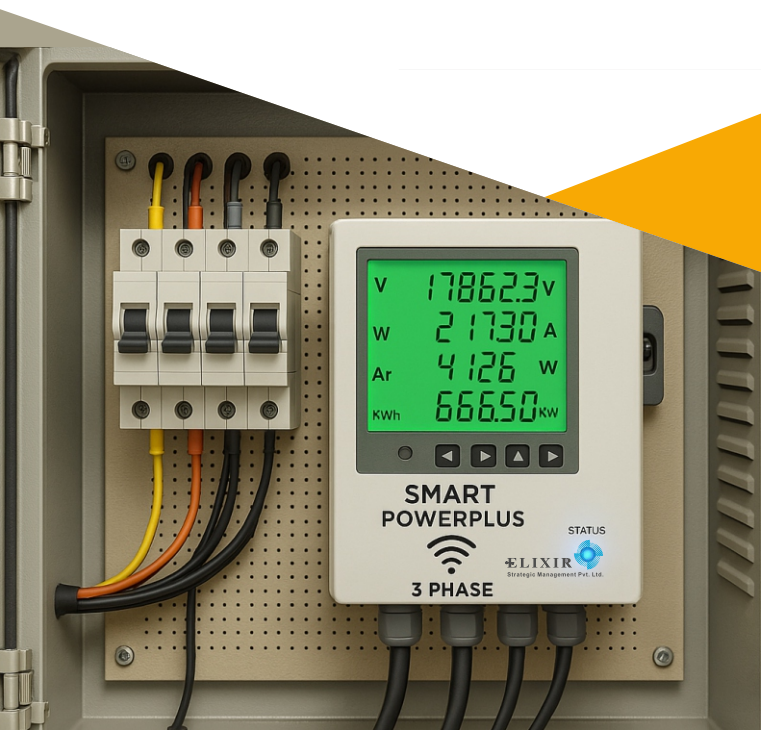
MFM - Display & User Interface

- Display: 4-digit, 3-line, 0.57" Red LED Display
- Keys: SET/ENT, VAF, P/E, INC, DEC

MFM - Auxiliary Power Supply – To Power IoT Device

- Operating Voltage: 100 to 270V AC/DC, 50/60Hz
- Burden: Approx. 4 VA
- Isolation Test: 2kV between power supply and all inputs for 1 minute
- Startup Requirement: Requires 230V AC / 50Hz for operation.

MFM - Accuracy (Class 0.5)

- Voltage (L-N & L-L): ±0.5%
- Current: ±0.5%
- Frequency: ±0.5%
- Power Factor: < 0.5%
- Active Power: < 0.5%
- Apparent Power: < 0.5%
- Reactive Power: < 0.5%
- Energy: Class 0.5

R-PH VOLTAGE	Y-PH VOLTAGE	B-PH VOLTAGE	FREQUENCY	3PH L-L VOLTAGE
404.95V	**405.49V**	**407.45V**	**49.96Hz**	
14 Apr 2025 15:48	14 Apr 2025 15:48	14 Apr 2025 15:48	16 Apr 2025 13:41	V12 33% / V23 33% / V31 33%

Legend: ● V12 ● V23 ● V31 ● Total

	R-PH PF	Y-PH PF	B-PH PF	
	1.000	**1.000**	**1.00**	∠ 3P...

-1 %

Transmission Cables — **LV Switchgear** — **Electrical Machines**

Transformer

Smart PowerPlus
238.8
3ph MFM   IoT   ✦LIXIR

Wi-Fi Connectivity

IoT Cloud Storage & Analytics

End User

Mobile App   Web Dashboard

End User

MCU and Connectivity
● CPU: Xtensa® dual-core 32-bit LX7 microprocessor
  ○ Clock Speed: Up to 240 MHz
● Memory: Integrated RAM & Flash (as per device configuration)
● Wireless Connectivity:
  ○ Wi-Fi IEEE 802.11 b/g/n-compliant
  ○ Supports 20 MHz and 40 MHz bandwidth in the 2.4 GHz band
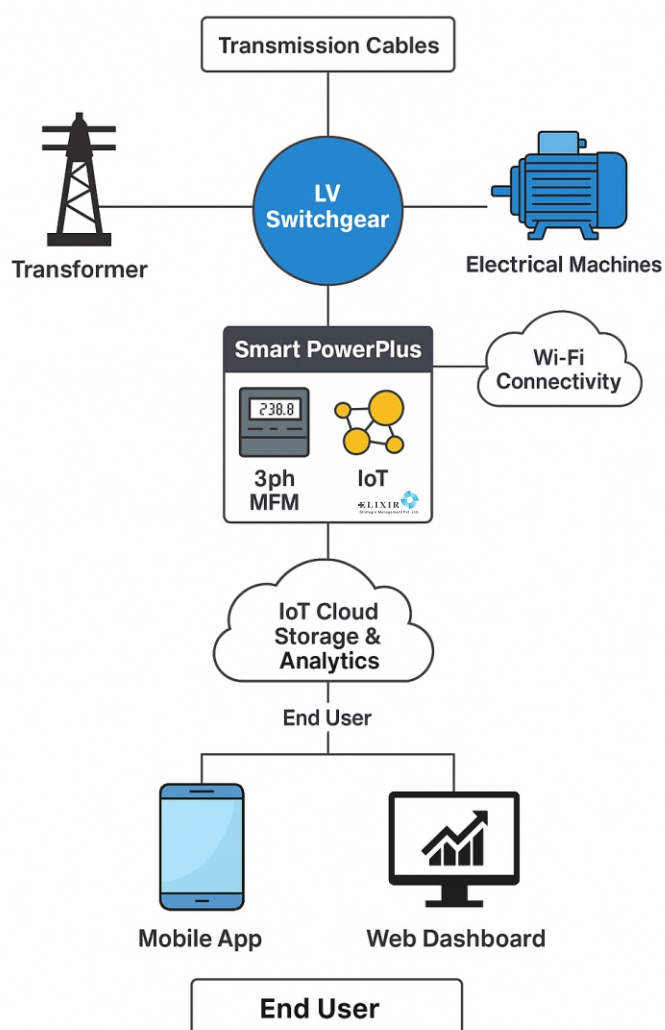 ○ 1T1R mode with data rate up to 150 Mbps

IoT Cloud
Communication Protocol
● Telemetry Protocol: MQTT (Message Queuing Telemetry Transport)
● Communication Type: Real-time, bi-directional device-to-cloud & cloud-to-device communication
Data Privacy & Security
● Secured Data Telemetry:
  ○ TLS/SSL encryption for secure MQTT communication
  ○ Token-based device authentication
● User Access Control:
  ○ Role-based access for dashboards, devices, and data
  ○ Only authorized users can view or manage telemetry
● Data Privacy Compliance:
  ○ Follows best practices in data privacy and secure handling

MODEL DESCRIPTION
ESM-SPP-2025

SMART POWERPLUS (WITHOUT MFM) – IOT DATA ACQUISITION MODULE

- Compact IoT gateway designed to interface with any external MFM via RS485/Modbus.
- Collects real-time electrical readings from the connected external meter.
- Built-in Wi-Fi-enabled IoT module for wireless data communication.
- Securely transmits telemetry data to IoT Cloud dashboard using MQTT.
- Suitable for retrofit installations where MFM already exists in control panels.

Technical Specifications

MCU and Connectivity

- CPU: Xtensa® dual-core 32-bit LX7 microprocessor
  - Clock Speed: Up to 240 Mhz
- Memory: Integrated RAM & Flash (as per device configuration)
- Wireless Connectivity:
  - Wi-Fi IEEE 802.11 b/g/n-compliant
  - Supports 20 MHz and 40 MHz bandwidth in the 2.4 GHz band
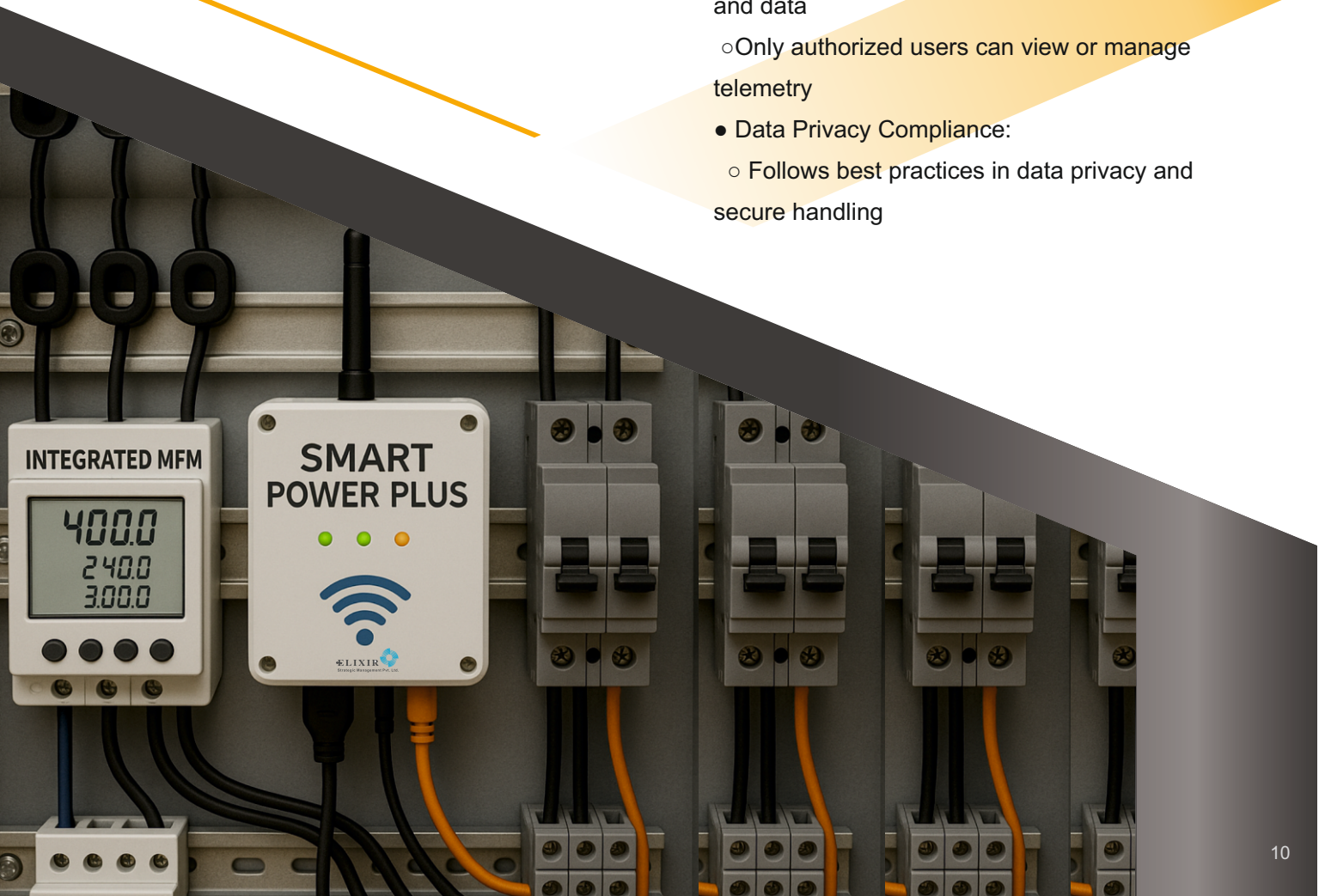 - 1T1R mode with data rate up to 150 Mbps

IoT Cloud

Communication Protocol

- Telemetry Protocol: MQTT (Message Queuing Telemetry Transport)
- Communication Type: Real-time, bi-directional device-to-cloud & cloud-to-device communication

Data Privacy & Security

- Secured Data Telemetry:
  - TLS/SSL encryption for secure MQTT communication
  - Token-based device authentication
- User Access Control:
  - Role-based access for dashboards, devices, and data
  - Only authorized users can view or manage telemetry
- Data Privacy Compliance:
  - Follows best practices in data privacy and secure handling
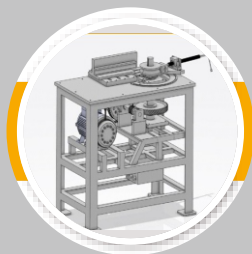
SMART
AGRICULTURE
CROP ANALYTICS

SMART BUS
NEARBY ALERTS

AUTOMATIC
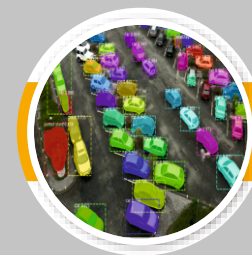PIPE BENDING
MACHINE

SMART
ATTENDANCE WITH
FACIAL RECOGNITION

NUMBER PLATE
DETECTION &
RECOGNITION

SMART
WATER MANAGEMENT
SYSTEM
LoRa

PARKING
AREA MANAGEMENT
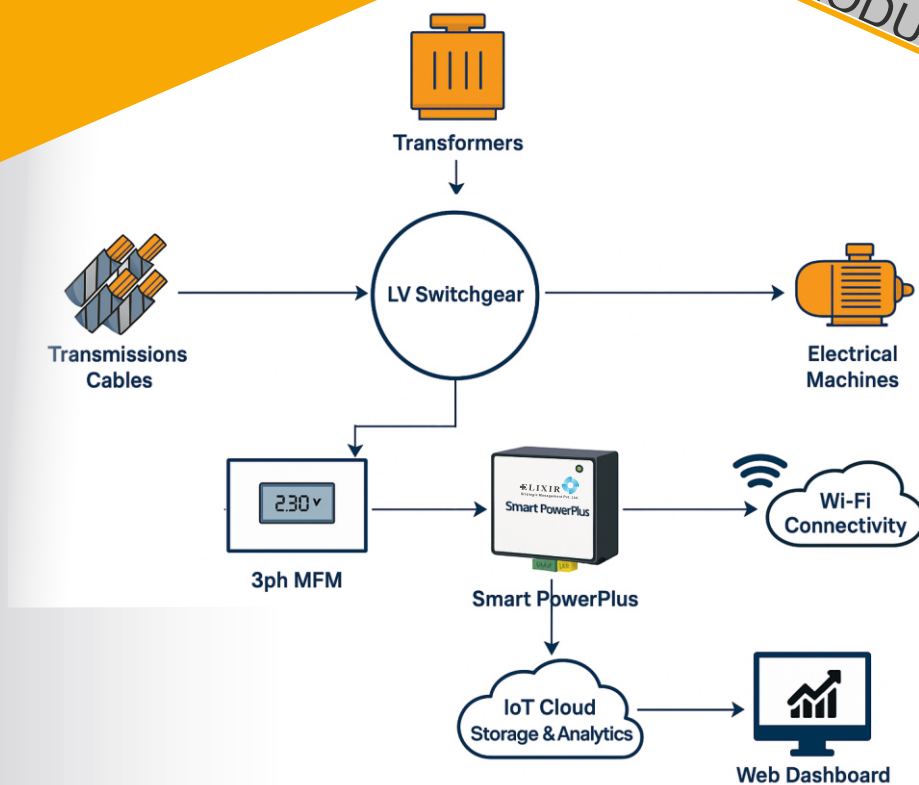WITH DL

SMART
STREETLIGHT

SMART
POWER GENSET

ELIXIR PRODUCT

SMART
RESTROOM
SYSTEM

SUPPORTING AXILLARIES:

1. CT Coils - As per the machine rating - 3 No's

2. 2.5 Sq.mm multi strand Copper Wire - 3 mts

3. Twisted Pair Cable - 2 mts

4. DIN Rail (15 cm) - 1 No

5. Wi-Fi Router (150Mbps, 3 antennas)- 1 No

6. Internet Connectivity 24*7

7. 32 in" Monitor with CPU & Internet Connection

ELIXIR STRATEGIC MANAGEMENT PVT. LTD.

Nagpur
1502, Ved Solitaire,
Cement Road,
Shivaji Nagar,
Nagpur-44 010
+91 94 234 00945

Pune
425, Pride Purple Square,
Aundh Ravet Road,
Kalawadi Phata, Wakad,
Pune -411 057
+91 20 2727 6939

Ahmedabad
911-912-913,
Span Trade Centre
Ashram Road, Paldi,
Ahmedabad -380 007
+91 99 229 29919

California
257 Oak Glen
Irvine
California 92618
+1 90 94 546472

ELIXIR
Strategic Management Pvt. Ltd.

+91 98 226 96939
+91 712 40 41964

info@esm.co.in

www.esm.co.in