

# SUBSTATION AUTOMATION

Mahyan Engineering Solutions — Telemetry, Smart SCADA & High-Precision Intelligent Grid Systems

At **Mahyan Engineering Solutions**, our Substation Automation division designs and integrates advanced microprocessing hardware and industrial software telemetry layouts. Modern electrical infrastructure requires real-time grid monitoring, automatic trip validation, and smart control functions. We implement robust computing infrastructures that link primary outdoor substation assets directly to centralized operations rooms. This allows industrial users to visualize, isolate, and optimize power flows with absolute control.

**Operational Intent:** When website users click "Read More" on the Substation Automation segment of the homepage, this dedicated document outlines our technical telemetry scope, software integration capabilities, and advanced measurement hardware.

## 1. COMPREHENSIVE AUTOMATION INFRASTRUCTURE LAYOUT

Mahyan uses standardized communication architectures (such as IEC 61850, Modbus, and DNP3) to enable high-speed data flow and automated control:

### Smart Grid Integration & Telemetry

- Deploying Remote Terminal Units (RTUs) and Bay Control Units (BCUs) to act as central data routers for multi-bay networks.
- Configuring Human Machine Interface (HMI) screens that give regional load managers instant grid diagnostics.
- Implementing industrial network switches and optical fibers to prevent electromagnetic loop interference.

### Intelligent Protection Arrays

- Configuring digital Multi-Function Protection Relays providing high-speed protection against overcurrent, overvoltage, and reverse-power.
- Deploying single-function auxiliary relays for fast alarm activation and starting mechanical coils.
- Integrating advanced TESLA power system recorders for microsecond-accurate transient fault capturing and logging.

## 2. HIGH-PRECISION DIGITAL MEASUREMENT INSTRUMENTS

To ensure complete electrical tracking and enable thorough energy audits, we engineer and supply multifunction smart meters built to the highest accuracy standards:

- **Strict Compliance Profiles:** Fully manufactured and calibrated in strict accordance with international IEC 62053-22 and IS 14697 measurement guidelines.
- **Wide Electrical Input Range:** Supports extensive full-scale voltage configurations up to 300V AC (L-N) / 520V AC (L-L), operating on ultra-precise Class 0.5S and Class 0.2S calibration baselines.
- **Advanced Data Communications:** Built-in RS485 Modbus-RTU communication ports with upgradeable modules for Modbus-TCP Ethernet, Profibus-DPV0, and industrial BACnet systems.

### 3. AUTOMATED EQUIPMENT AND FLEET RESOURCE MATRIX

We keep a deep inventory of telemetry hardware, smart regulators, and diagnostic equipment calibrated to support both turnkey project execution and flexible equipment rental options:

Automation Segment	Available System Components & Instrumentation Assets
Data Acquisition & RTUs	Substation RTUs, Bay Control Modules, high-density digital I/O processing blocks, and serial-to-fiber protocol data converters.
Smart Power Regulation	Microcontroller-driven phase-angle power regulators supporting Star, Delta, and Open-Delta processing lines.
Transient Fault Recorders	TESLA 4000 permanent multi-channel fault recording systems tracking live grid swings and logging data anomalies.
Smart Storage Chargers	Model BC 9080 intelligent battery chargers featuring auto-phase reversal protection and built-in ripple-filtering LC systems.

### 4. ADVANCED SAFETY, CYBER SECURITY & GRID RELIABILITY

As power networks become increasingly digital, Mahyan protects control circuits against external network vulnerabilities. We use robust hardware firewalls, encrypted communication paths, and physical password controls on all protection devices. We bridge the gap between traditional power engineering and smart technology, providing modern industrial plants with a highly responsive, safe, and completely automated electrical ecosystem.

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