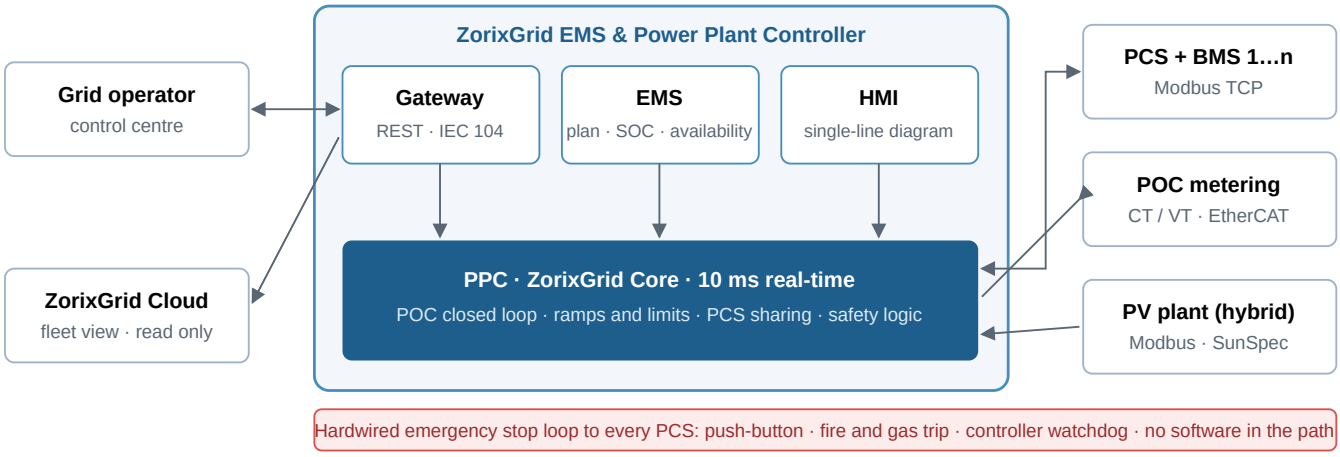
ZorixGrid EMS & Power Plant Controller

Real-time plant control, energy management and grid operator link for battery storage and hybrid PV plants

One controller for the whole plant: it takes instructions from the grid operator, controls every PCS to the set-point measured at the point of connection within grid code response times, keeps the battery ready and inside its warranty limits, and records the evidence for availability, compliance and battery health. Utility-neutral by design: grid codes, market rules and operator protocols are signed profiles, not code.

10 ms	≤ 50 ms	16 PCS	≥ 4 h
real-time control cycle	first response at the POC*	per controller, more via block controllers	control and logging on UPS

SYSTEM ARCHITECTURE



APPLICATIONS

Hybrid PV + storage

Charges from PV, discharges in the evening peak on operator dispatch. Daytime charging plan, zero grid import where required, daily availability declaration.

Standalone storage

Grid-charged storage under capacity contracts. Follows operator set-points and AGC at any time, keeps the agreed SOC, recharges after dispatch, records availability and capacity tests.

PV plant control

Active and reactive power at the POC, curtailment and export limits, ramp control and grid code compliance evidence.

KEY FUNCTIONS

- **Plant control at the POC:** feed-forward and trim, ramp rates, limits applied in a fixed order, no set-point steps
- **Power sharing:** by available capacity and SOC; failed PCS removed and covered automatically
- **Reactive power:** fixed Q, fixed power factor or voltage control with droop
- **Grid services:** frequency response, AGC/AVC, grid-forming with synthetic inertia (Plant), configurable grid-event reserve
- **Energy management:** PV-first charging or grid recharge, SOC readiness, availability declaration, battery warranty limits
- **Grid operator link:** every command checked for format, freshness, authority, range and rate; separate emergency stop path
- **Records:** 1 s historian, tamper-evident audit log, monthly energy, availability and battery health reports
- **Study envelope (Plant):** settings bound to PSS®E / PSCAD studies; model-versus-measurement checks

* Design values; actual values depend on the PCS and site.

CONFIGURATIONS

	SC-100 · Edge	SC-200 · Plant	SC-200H · Plant redundant (option)
Typical use	Plants below 5 MW	Plants of 5 MW and above, standalone storage, plants needing studies and compliance monitoring	Plant sites requiring redundancy
Real-time controller	Beckhoff CX5340, 16 GB RAM, 320 GB, TwinCAT 3	As SC-100	Two, hot standby
Supervisory computer	Integrated in the CX5340	Beckhoff C6030 industrial PC	Two
Power quality analyser	Option	IEC 61000-4-30 Class A	As SC-200
Study envelope and model checks	—	Included	Included
Firewall	Router with segregation; FortiGate or similar optional	FortiGate or similar	Redundant
Cabinet	Wall-mounted, IP54	Floor-standing, IP54	Floor-standing, IP54

CONTROL PERFORMANCE

Control cycle	10 ms
POC measurement	Three-phase, 20 ms window, updated every 10 ms
Set-point step response*	First response ≤ 50 ms, reach ≤ 300 ms, settle within 1% by 400 ms
Steady-state accuracy	Within 1% of rated power at the POC*
PCS units	Up to 16 per controller; more via block controllers
Command acknowledgement	Target 2 s

INPUTS AND OUTPUTS

POC measurement	EL3783: CT 1 A / 5 A, VT secondaries
Digital I/O	16 DI, 8 DO (expandable)
Serial	RS422 / RS485
Safety	Safety relay, E-stop loop to PCS dry contacts
Time	GNSS receiver; event time stamps to 1 ms

POWER SUPPLY

Supply	24 V DC with UPS; auxiliary AC from plant LV board
Ride-through	No interruption; ≥ 4 h control, comms and logging on UPS
Consumption	About 85 W (SC-100), 175 W (SC-200), excl. cooling

COMMUNICATION

Grid operator	Secure REST API (TLS 1.3, mutual TLS, OAuth2); IEC 60870-5-104 (IEC 62351-3 TLS or IPsec); IEC 60870-5-101 and DNP3 on request
PCS and BESS	Modbus TCP; hardwired E-stop
Meters, PV, devices	Modbus TCP/RTU, SunSpec; IEC 61850 on request
I/O	EtherCAT
Operator screens	HTTPS, standard browser
Fleet portal	MQTT over TLS, outbound, monitoring only

DATA AND RECORDS

Historian	1 s resolution, ≥ 12 months on site
Audit log	Tamper-evident hash chain, on site and in the cloud
Reports	Energy, availability with cause codes, capacity tests, battery health, grid code compliance (Plant)

CYBER SECURITY

Architecture	IEC 62443-3-3 zones and conduits
Access	Named accounts, 4 roles, MFA for Engineer, Admin and remote access
Software	Signed packages, SBOM per release, automatic rollback
Keys	Generated on the device, never exported, auto-renewed

UTILITY-NEUTRAL BY DESIGN

Grid operator profiles
Grid code values, market rules, signal lists and security requirements as signed, versioned profiles.

Plug-in operator links
REST and IEC 104 included; further protocols added as Gateway adapters without changing the controller.

Any developer and supplier
Site, owner, battery supplier and O&M provider are settings; the same tested software runs on every site.

* Design values with suitable PCS; site performance is confirmed at acceptance testing. Specifications may change without notice. ZorixGrid is a product of itZorix (Pte) Ltd. Beckhoff, TwinCAT and EtherCAT are trademarks of Beckhoff Automation GmbH; PSS®E is a trademark of Siemens; PSCAD is a trademark of Manitoba Hydro International; FortiGate is a trademark of Fortinet.