

Device	What It Measures / Monitors	Core Specs	Related Variables
Victron Lynx Smart BMS / NG	<ul style="list-style-type: none"> -SoC, SoH (via cell data) -Cell voltages and balancing -Pack current & voltage - Protection alarms (OV/UV, temp, current) 	<ul style="list-style-type: none"> • System voltages: 12/24/48 V • Continuous current: 500–1000 A • Peak: 600–1200 A (5 min) • Temp: –40 °C to +60 °C • IP22 	bms1_soc, bms1_soh, bms1_v, bms1_c, bms1_cell_*
SMA Sunny Central Storage PCS	<ul style="list-style-type: none"> -PCS DC voltage/current -AC power output -Efficiency & conversion losses -Thermal status (sensors) -Grid interface values 	<ul style="list-style-type: none"> • DC input: 500–950 V (max 1100 V) • DC current: up to 4000 A • AC output: 1900–2900 kVA • Eff.: 98.3–98.6% • Temp: –25 °C to +50 °C 	pcs1_ap, pcs1_dcc, pcs1_dcv, pcs1_ia/ib/ic, pcs1_uab/ubc/uca, pcs1_t_env, pcs1_t_a, pcs1_t_igbt
Ingeteam SUN Storage 3Power C	<ul style="list-style-type: none"> -DC bus voltage/current -AC 3-phase output - PCS efficiency -Thermal envelope -Grid services (freq, reactive power) 	<ul style="list-style-type: none"> • DC voltage: up to 1300 V • Power: up to 3660 kVA • Bidirectional • 3-phase AC output • Grid/island operation 	Same as SMA PCS (pcs1_*)
ifm / Trafag / Endress+Hauser sensors	<ul style="list-style-type: none"> -Water outlet/return temps -HVAC pressures & temps -Cooling loop monitoring 	<ul style="list-style-type: none"> • Pressure: 0–100 bar • Temp: –40 °C to +125 °C (typ.) • Industrial IP65/IP67 	ac1_outside_t, ac1_outwater_t, ac1_rtnwater_pre
Socomec / Janitza aux meters	<ul style="list-style-type: none"> -Auxiliary AC power -Power factor 	<ul style="list-style-type: none"> • Voltage: 230/400 V AC • Current: up to 5 A CT inputs 	aux_m_ap, aux_m_pf

		<ul style="list-style-type: none"> • Accuracy: Class 0.5–1 	
Sensirion / ifm probes	-Humidity & temperature sensors	<ul style="list-style-type: none"> • Humidity: 0–100% RH • Temp: –40 °C to +125 °C 	dh1_humi, dh1_temp
Siemens / Dräger / Bosch detectors	-Smoke, CO, fire alarms, error codes	<ul style="list-style-type: none"> • EN54-certified • CO ppm ranges • Smoke: optical/ionisation 	fa1_* ... fa5_*
Janitza / Socomec / Schneider meters	-Active energy (import/export) -Active power -Power factor	<ul style="list-style-type: none"> • 3-phase, 230/400 V AC • Current: 1–5 A via CTs • Accuracy: Class 0.2–0.5 	com_ae, com_ap, neg_ae, pos_ae, pf

EU compliance

Device	Summary & EU Compliance	Cybersecurity / Security Notes
Victron Lynx Smart BMS / NG	Provides SoC, SoH, cell voltages & balancing, pack voltage/current, and protection alarms. CE-marked, designed and manufactured in the EU (NL), follows safety & EMC directives.	CAN bus is private; Bluetooth requires pairing/authentication. No Internet backdoors. Keep network isolated for max security.
SMA Sunny Central Storage PCS	Measures DC/AC power, voltage/current, thermal status, and grid interface values. CE-certified, EN50549-compliant for grid integration, ISO 9001/14001 certified production.	Supports password-protected SCADA/EMS access; firmware digitally signed; ISO 27001 software processes. No backdoors reported. Use VLAN/firewall for IP connectivity.
Ingeteam SUN Storage 3Power C	DC/AC bidirectional conversion, thermal monitoring, frequency/reactive power services. CE-marked, EN50549-compliant, meets EU grid code requirements.	Same as SMA PCS: secure firmware updates, authentication for SCADA, no known backdoors. Best practice: isolate LAN/VLAN.
ifm / Trafag / Endress+Hauser sensors	Monitors water/HVAC temps, pressures, cooling loops. CE-marked industrial sensors, IP65/IP67, designed for EU industrial safety standards.	Mostly analog or fieldbus (Modbus/Profibus). No Internet exposure → inherently secure because it is isolated.
Socomec / Janitza aux meters	Measures auxiliary AC power and power factor. CE-marked, EN50160-compliant power meters, suitable for EU industrial installations.	Uses Modbus/fieldbus; supports authentication. Keep meters on secure LAN for remote readout. No backdoors reported.
Sensirion / ifm probes	Humidity and temperature sensors. CE-marked, RoHS-compliant, EU-manufactured.	Analog/digital probe output, no Internet connection. Cybersecure by design.
Siemens / Dräger / Bosch detectors	Smoke, CO, fire alarms, error codes. EN54-certified fire safety devices for EU standards.	Hardwired or industrial bus systems, fail-safe design. No backdoors; inherently secure.
Janitza / Socomec / Schneider meters	Measures active energy (import/export), power, power factor. CE-marked, EN50160-compliant, RoHS, ISO 9001/14001 manufacturing.	Supports secure Modbus/IEC protocols (TLS/HTTPS for advanced models). Authentication enabled; no backdoors.

References

- Victron Lynx Smart BMS / NG: <https://www.victronenergy.com/upload/documents/Datasheet-Lynx-Smart-BMS-EN.pdf>
- SMA Sunny Central Storage PCS: <https://files.sma.de/assets/275864.pdf>
- Ingeteam INGECON SUN Storage 3Power C Series: https://www.ingeteam.com/en-us/sectors/photovoltaic-energy/p15_24_45/storage-3power.aspx
- ifm electronic Sensors: https://www.ifm.com/us/en/category/200_020_010?srsId=AfmBOoF3k3wnQKg2XnBF2Cyw30nptb1HXKoGU9IcPqHj5jGp4T5ES9v
- Trafag Pressure Transmitters: <https://www.trafag.com/us-en/products/pressure-transmitters/>
- Endress+Hauser Temperature Transmitters: <https://www.us.endress.com/en/field-instruments-overview/temperature-measurement-thermometers-transmitters/temperature-transmitter>
- Siemens Fire Safety: <https://new.siemens.com/global/en/products/buildings/fire-safety.html>
- Dräger Gas Detection: https://www.draeger.com/en_XX/Products/Gas-Detection
- Bosch Security Fire Detection: <https://www.boschsecurity.com/en/products/fire-detection>
- Janitza UMG 512-PRO: <https://www.janitza.com/en-us/products/umg-512-pro>
- Socomec DIRIS A-40: <https://www.socomec.us/en-us/p/diris-a-40>
- Schneider Electric PowerLogic PM Series: <https://www.se.com/us/en/product-range/62252-powerlogic-pm8000-power-quality-meters>

