



Ex ib, zone 1, ATEX and IECEx



IP65 protection degree

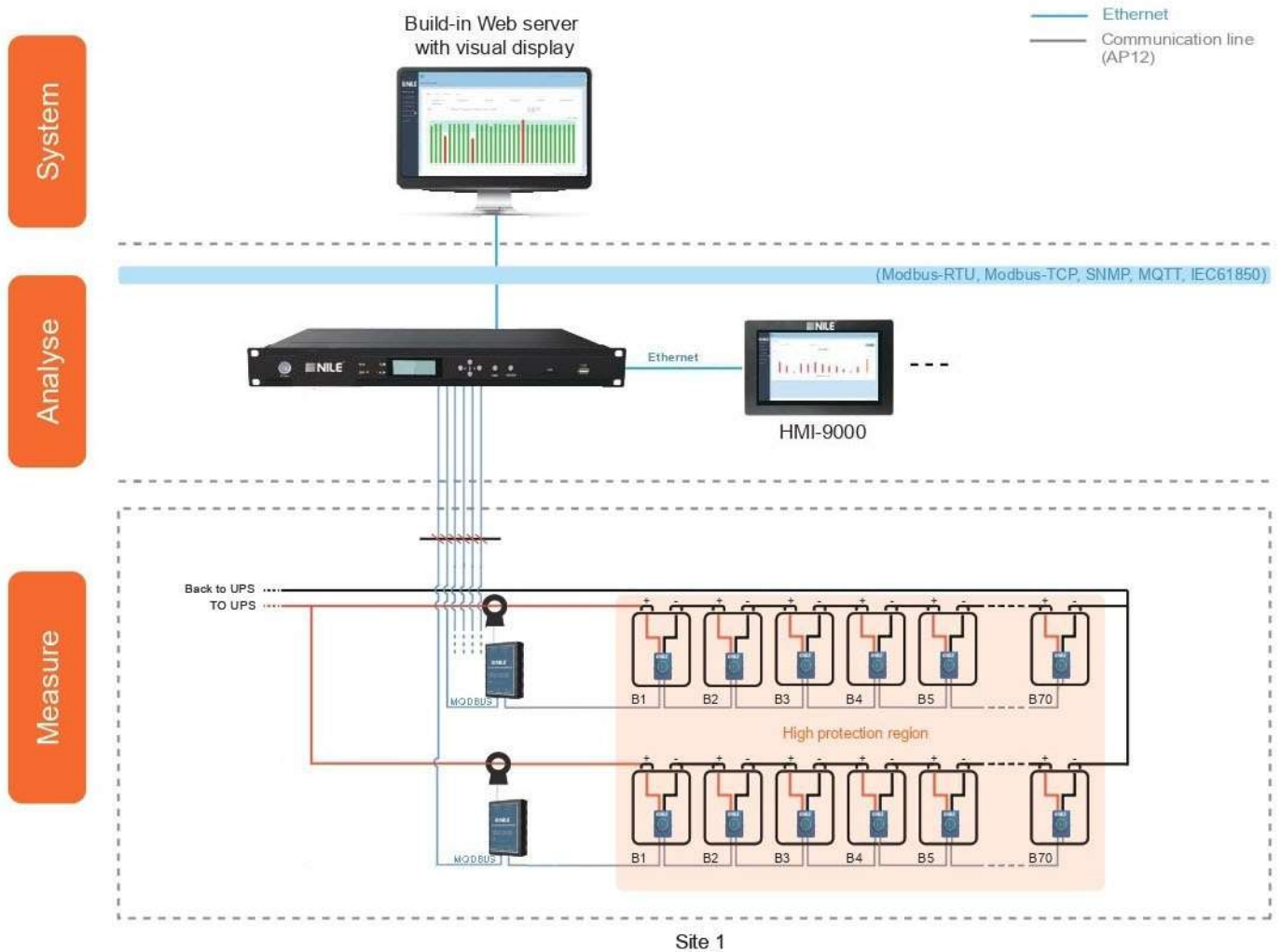


UL94-HB-V0 fire rating

Feature

- Apply to DC power systems like oil & gas, chemical plants, power plants, etc
- Monitor Max. 6 strings and 420pcs batteries in total
- Measure Ni-Cd, Lead-Acid, and multi-pole battery
- Powered by communication bus, no consuming battery power
- Anti-interference design, support to connect with high-frequency UPS
- Auto-sensing for the battery sensor's ID address
- Support Modbus, SNMP, MQTT and IEC61850 protocols
- Support extension sensor for measuring ambient temperature & humidity, leakage current, insulation resistance (optional)
- Comply with IEEE 1188-2005

System Structure



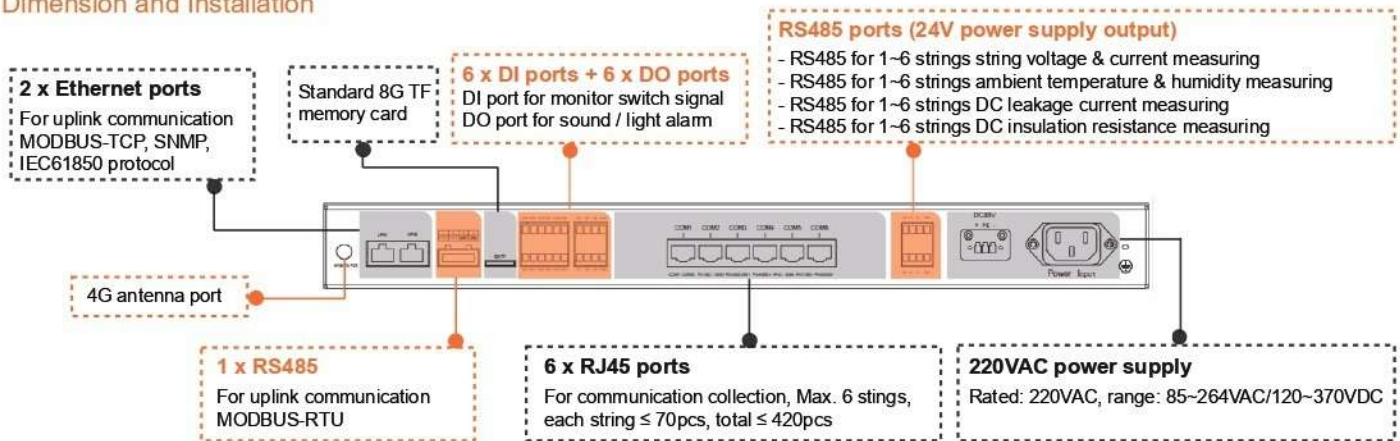
Management Layer

Battery Monitoring System Main Controller

- Standard 1 U design for distribution cabinet
- Built-in web server with visual display
- Monitor Max. 6 strings battery, in a total of 420 batteries
- Measure battery string current & voltage, ripple voltage & current, charge & discharge current, internal temperature, impedance, insulation resistance, leakage current, SOC and SOH
- Setpoint alarm for cell voltage, internal temperature, impedance, SOC, SOH (upper / lower limit) and string voltage, current, SOC (upper / lower limit)
- Alarm message by SMS or Email
- Support Modbus-TCP, Modbus-RTU, SNMP and IEC61850 protocols
- Support MQTT for JSON format to data upload
- 1 RS485 port, 2 Ethernet ports and 1 4G Antenna port to data upload
- 6 DI ports (digital Input connecting)
- 6 DO ports (sound and light alarm)



Dimension and Installation



Technical Specification

CPU	ARM cortex A7 528MHz	Up-link communication	2 Ethernet ports (10/100M), MODBUS-TCP, SNMP, 1 RS485 port, MODBUS-RTU, baudrate: 9600bps, 19200bps, 38400bps (optional)
Memory	512MB DDR3, 4G EMMC + 8G TF memory card	Down-link communication	6 channels RJ45 ports, each port Max. connect 70pcs batteries,
MTBF	≥ 100,000 hours	Measure range	Voltage 1 ~ 6 strings, range: 8 ~ 1000VDC (±0.5%), resolution: 0.01V
Display	2-inch LCD with backlight		Ripple voltage 1 ~ 6 strings, range: 2 ~ 100V (peak), resolution: 0.01V
Power supply	Rated: 220VAC, range: 85 ~ 264VAC / 120 ~ 370VDC		Current 1 ~ 6 strings, range: -2000 ~ 2000ADC (±2.0%, under 15°C ~ 35°C), resolution: 0.01A
Dimension	Standard 19-inch 1 U device 483mm × 206mm × 44.5mm (W*D*H) Open hole: 440mm×46mm (L*H)		Ripple current 1 ~ 6 strings, according to the rated current of the hall sensor, range: 0 ~ 0.4*I (peak), resolution: 0.01A
Power consumption	< 15W (only main controller)	Operation environment	Operating temperature: -15°C ~ 55°C Storage temperature: -40°C ~ 70°C Humidity: 10 ~ 95% RH, non-condensing
Additional port	6 x DI dry contact 6 x DO relay output, 250VAC/5A or 30VDC/5A	Extension sensor (optional)	- RS485 for 1~6 strings string voltage & current measuring - RS485 for Max. 6 strings ambient temperature & humidity measuring - RS485 for 1~6 strings DC leakage current measuring - RS485 for 1~6 strings DC insulation resistance measuring

String Measuring Sensor

String Current Measuring Sensor & Hall Sensor

- One string need 1 current sensor, each current sensor with 2 hall sensor ports
- Measure battery string charge and discharge current, ripple current
- Measure multi-pole battery's string charge and discharge current and ripple current with flexiable module and hall sensor
- Accessories:
 - 1) Hall sensor and cable: range from 0~±1000A with 2m cable
 - 2) Communication cable : 5m with RJ45 port



Hall Sensor

Item	Power supply	Measuring range		Environment
		String current	Ripple current	
String sensor	24VDC (range: 9 ~ 32VDC) Power consumption: <0.5W	1 Hall sensor: -1000 ~ 1000A 2 Hall sensor: -2000 ~ 2000A (±2.0%, 15°C ~ 35°C)	20% of Hall sensor Rated current (peak value) Frequency: 50Hz ~ 1KHz	Working temperature: 0°C ~ 45°C Working temperature limit: -15°C ~ 55°C Humidity: 5% ~ 95%RH, non-condensing Storage temperature: -40°C ~ 70°C

Battery Cell Sensor

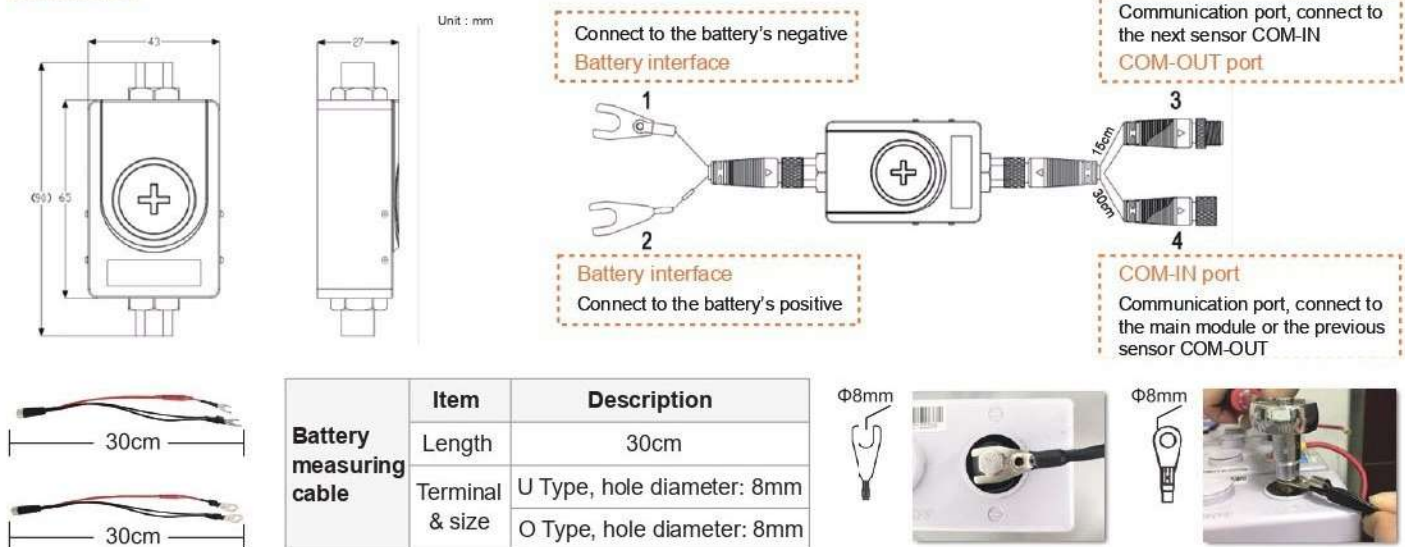
- for 12V Lead-Acid battery, for 2V Lead-Acid battery or 1.2V Ni-Cd battery
- Monitor individual battery voltage, internal temperature (negative pole), impedance (ohmic value)
- Ex ib, zone 1, ATEX and IECEx
- Auto-balancing
- IP65 protection degree
- UL94-HB-V0 fire rating
- Powered by communication bus, no draw any power from the batteries



Base (optional)
Snap-in DIN-rail
installation

Item	Power supply	Rated input voltage	Measuring range		
			Voltage	Internal temperature	Impedance
Battery cell sensor	24VDC Power consumption: <0.25W	02V / 1.2V	0.5 ~ 3VDC ($\pm 0.2\%$)	-20°C ~ 85°C ($\pm 0.5^\circ\text{C}$)	Range: 0.1m Ω ~ 50m Ω Repeatability error: 1.0% $\pm 25\mu\Omega$ Conformity error: 1.5% $\pm 25\mu\Omega$
		12V	5 ~ 18VDC ($\pm 0.2\%$)		

Dimension



Extension Module (Optional)

Ambient temperature & humidity sensor

- Dual RJ45 interface, fast wiring, support cascade use
- Adsorption by magnet
- Temperature: -20°C ~ 60°C ($\pm 0.4^\circ\text{C}$), resolution: 0.1°C. Humidity: 0 ~ 100%RH ($\pm 3\%$), resolution: 0.1%RH



Hydrogen (H₂) sensor

- Class of protection: IP65
- Measuring range: 0 ~ 1000ppm
Accuracy: $\pm 5\%$ FS
Resolution: 1ppm
(100K Ω ~ 50K Ω)



DC insulation resistance sensor

- Measuring range: 1K Ω ~ 30M Ω
- Measurement accuracy: 10%
(100K Ω ~ 50K Ω)



DC leakage current sensor

- Measurement accuracy: $\pm 1\%$ FS
- Monitoring string leakage current to prevent fire caused



10.1-inch Android HMI

- touch-screen HMI for local display and operation
- OS: Android 10.0
- CPU: R818 (4-core A53 1.6GHz)
- Running memory: 1GB,
- EMMC: 8GB
- Support the reading and configuration of all parameters of the system

