

HXH Energy Storage System – Specification Sheet for Oilfield Application

Document No.: HXH-ESS-700/1687-OF-A/01 **Issued by:** Shenzhen Hexinhe Technology Co., Ltd. (HXH) **Issue Date:** 2026-08-14 **Version:** A/01 (First issue for oilfield application) **Manufactured by (OEM):** Shenzhen Renenergy Power Technology Co., Ltd. **OEM Model:** RN-eBank-1687FPGF2.4

1. Document Scope

This specification defines a **700 kW / 1.687 MWh containerized battery energy storage system (BESS)** designed for **upstream oilfield operation sites**, including but not limited to: - Workover rig power supply - Downhole-tool testing benches - Well testing & early production facilities - Sidetrack / whipstock operation camps - Production field infrastructure (ESP/PCP/injection pumps) - Crew camp & auxiliary loads

The system is intended to **replace or supplement diesel generator sets (DGS)** at remote well pads where grid power is unavailable or unstable. It is suitable for **standalone, PV-diesel-storage hybrid, or grid-tied** operation modes.

2. System Highlights for Oilfield Application

Feature	Value	Oilfield Benefit
Rated Energy	1,687 kWh	Covers 1 typical workover site 2–4 days continuous operation
PCS Power	700 kW	Drives 300–500 kW workover rigs continuously
STS Power	1,000 kW	Handles inrush from drawworks, mud pumps, top drives
Container Size	20 ft standard ISO (W2438 × D6058 × H2590 mm)	Truck-transportable to remote pads
Total Weight	~21 t	Within standard heavy-haul trailer limits
IP Protection	IP54 cabinet, IP20 internal	Sandstorm-resistant (Sahara-class)
Operating Temp	-20°C to +55°C	Algeria/Libya desert and Sudan Sahel climates
Altitude	≤ 4,000 m (derating above 3,000 m)	Suitable for high-altitude basins
Cooling	Intelligent forced air cooling	No water consumption in arid zones
STS Transfer Time	< 20 ms	Seamless genset handover, no rig shutdown
Battery Chemistry	LiFePO ₄ (LFP) 314 Ah cells	Best thermal stability for hot climate
Cycle Life	≥ 6,000 cycles @ 80% DoD	10+ years at oilfield duty profile
Communications	RS485 / CAN / 4G	Remote monitoring from base office

3. Main Technical Parameters

3.1 System Parameters

No.	Item	Specification	Remark
1	System energy	1,687 kWh	Nominal
2	PCS power	700 kW	Bidirectional
3	STS power	1,000 kW	On-grid/off-grid switching
4	AC connection	3-phase 4-wire (3P4W)	—
5	Rated output voltage	380 / 400 V	±15% range
6	Rated output power	700 kW	—
7	Cooling method	Air cooling	Intelligent forced-air
8	Placement	Outdoor	Cool & ventilated place
9	Dimensions (W×D×H)	2,438 × 6,058 × 2,590 mm	20 ft ISO container
10	Weight	~21 t (estimate)	—
11	Protection grade	IP54	—

3.2 System Configuration

No.	Item	Qty	Remark
1	Battery cluster (241 kWh each)	7	240S1P configuration
2	Battery control box	7	—
3	Air cooling system	1 set	—
4	Fire protection system	1 set	Perfluorohexanone (FK-5-1-12)
5	Lighting	1 set	—
6	Energy Management System (EMS)	1 set	—
7	MPPT module (optional, for PV)	100 kW × 1	PV integration ready
8	PCS module (105 kW)	7	—
9	STS module (500 kW)	2	—
10	Access control switch	1	—
11	Water immersion detection	1	—
12	Combustible gas detection	1 set	CO + H ₂ detectors

3.3 Battery Cell Specifications

No.	Item	Specification
1	Cell type	LFP (LiFePO ₄) prismatic
2	Rated capacity	314 Ah
3	Nominal voltage	3.2 V
4	Standard charge	0.5C to 3.65V
5	Standard discharge	0.5C to 2.5V
6	Internal impedance	≤ 0.3 mΩ @ 1 kHz
7	Cell dimensions (T×W×H)	71.75 × 174 × 204.4 mm

No.	Item	Specification
8	Cell weight	5.67 ± 0.2 kg
9	Operating temp (charge)	0°C to +55°C
10	Operating temp (discharge)	-20°C to +55°C
11	Storage temp	-30°C to +60°C

3.4 Battery Cluster Specifications

No.	Item	Specification
1	Configuration	240S1P (240 cells in series)
2	Rated capacity	314 Ah
3	Nominal voltage	768–792 V
4	End-of-discharge voltage	≤ 648 V
5	Recommended charge voltage	840 V
6	Max continuous charge current	157 A
7	Max continuous discharge current	157 A
8	Limited charge voltage	876 V
9	Cut-off discharge voltage	600 V
10	Operating temp	Charge 0~55°C / Discharge -20~55°C

3.5 PCS Specifications (per 105 kW module)

Item	Specification
DC voltage range	650–950 V
Rated AC voltage	400 / 230 V
Rated grid frequency	50 / 60 Hz
Max output current	167 A
Power factor range	-100% ~ +100%
Harmonics (output)	< 3% (linear load)
Max efficiency	98.7%
Communication	CAN, RS485
Operating temp	-30°C to +55°C
Protection	IP20
Cooling	Intelligent forced air
Certifications	EN50549, EN62477, EN IEC 61000
Grid support	LVRT, HVRT, SVG

3.6 STS Specifications (per 500 kW module)

Item	Specification
Rated power	500 kVA
Rated voltage	230 / 400 VAC ($\pm 15\%$)
Max current	722 A
Transfer time (PCC)	< 20 ms
Operating temp	-25°C to +55°C
Protection	IP20
Communication	RS485 $\times$ 3, Modbus TCP, CAN, 4G

3.7 BMS Protection Parameters (per cell)

Protection Item	Parameter
Overcharge detection voltage	3.65 ± 0.025 V
Overcharge release voltage	3.4 ± 0.05 V
Over-discharge detection voltage	2.7 ± 0.5 V
Over-discharge release voltage	3.1 ± 0.1 V
Discharge over-current protection 1	140 A / 1 s
Discharge over-current protection 2	167 A / ≤ 200 ms ± 50 ms
Charge over-current protection	160 A
Short circuit protection delay	≤ 30 ms
Charge high-T protection	$55 \pm 3^\circ\text{C}$
Discharge high-T protection	$60 \pm 3^\circ\text{C}$
Charge low-T protection	$0 \pm 3^\circ\text{C}$
Discharge low-T protection	$-20 \pm 3^\circ\text{C}$
Balance threshold	3.4 V

BMS functions: overcharge / over-discharge / over-current / short circuit / temperature protection, cell balancing, CAN/RS485 communication, total capacity, alarm logging.

4. Fire Protection & Safety Systems

The system integrates a **non-piped total-flooding FK-5-1-12 (perfluorohexanone) fire suppression system**, combined with smoke detectors, heat detectors, audible/visual alarms, combustible gas (CO + H₂) detectors, and an explosion-proof ventilation system. Suppression discharge occurs within 10 seconds of dual-circuit confirmation, with a 30-second evacuation delay before activation. Automatic and manual control modes both supported.

Compliance: GB31241-2014, UL1642, GB/T 31486/31485/31484-2015, VDE-AR-N4110.

5. Operating Modes for Oilfield Application

5.1 Standalone (Storage Only)

- ESS as primary power source

- Diesel generator (DGS) as backup only
- **Best for:** short-cycle workover, well testing (3–15 days)

5.2 Storage + Diesel Hybrid (Most Common)

- ESS as primary source during operation
- DGS charges ESS during low-load periods or as backup
- **Best for:** long-cycle workover, sidetrack, drilling

5.3 PV + Storage + Diesel (PV-ESS-DG)

- PV feeds load during sunshine, charges ESS
- ESS covers evening/night loads
- DGS as final backup
- **Best for:** permanent production pads, crew camps

5.4 Grid-Tied with Storage

- Grid as primary source
- ESS for peak shaving & outage ride-through
- **Best for:** well sites with available but unreliable grid

6. Multi-Cabinet Parallel Configuration

For higher-power applications (drilling rigs, multiple workover pads), cabinets can be paralleled:

Configuration	Total Power	Total Energy	Typical Application
1 cabinet	700 kW	1.687 MWh	Workover, testing
2 cabinets	1.4 MW	3.374 MWh	Sidetrack, small drilling
3 cabinets	2.1 MW	5.061 MWh	Medium drilling (1,500 HP)
4–5 cabinets	2.8–3.5 MW	6.7–8.4 MWh	Large drilling (>2,000 HP)

Parallel control supports master-slave or peer-to-peer mode with automatic load sharing.

7. Containerized Design & Logistics

- **Standard 20 ft ISO container** — compatible with standard trucks, ships, helicopters (under sling load limits)
- **Forklift pockets + corner castings** — easy handling at port and well pad
- **Doors on both long sides** — full access for O&M
- **Roof-mounted AC units (3 kW × 3)** — maintains battery temp in desert climate
- **Cable entry from bottom** — sandstorm-resistant cable glands
- **Outdoor IP54 cabinet** — no need for additional shelter

For oilfield deployment, the cabinet typically sits on a **concrete pad or steel skids** at the well site, with a 5-meter clearance for fire safety.

8. Quality & Certifications

Standard	Description
GB31241-2014	Lithium-ion cells for portable electronic equipment — safety

Standard	Description
UL1642	Lithium battery safety
GB/T 31486-2015	Electrical performance of traction batteries
GB/T 31485-2015	Safety requirements for traction batteries
GB/T 31484-2015	Cycle life requirements for traction batteries
VDE-AR-N4110	German grid-connection requirements
EN50549	European grid-connection requirements
EN62477	Power electronic converter systems safety
EN IEC 61000	EMC compatibility

9. Storage & Maintenance

- Storage temperature: $23 \pm 2^{\circ}\text{C}$, humidity 45–75%
- Recharge every 3 months for long-term storage (>3 months unused)
- Maintain cell voltage within specified range

10. Commercial Terms (for HXH Quotation)

Item	Description
Manufacturer	Shenzhen Renergy Power Technology Co., Ltd. (OEM for HXH)
Brand on cabinet	HXH (customizable sticker per project)
Warranty	3 years on entire system; 5 years or 6,000 cycles on battery cells
Lead time	60–90 days from PO
MOQ	1 cabinet (sample); 2+ cabinets preferred for shipping economics
Incoterms	FOB Shanghai / Shenzhen / CIF Algerian port (typical for OES)
Payment	30% T/T deposit + 70% before shipment (standard)
After-sales	24/7 remote support via 4G; on-site service available

11. Contact

Shenzhen Hexinhe Technology Co., Ltd. (HXH) - Add: Shenzhen, Guangdong, China - Web: www.hexinhe.com - Email: info@hexinhe.com - Contact: Jinming Liu (Director of International Business)

Appendix A – Li-ion Battery Operation Precautions

Standard precautions apply. Highlights for oilfield: - **Do NOT** install in direct sunlight without shade (use container roof as shield) - **Do NOT** expose to ambient $> 55^{\circ}\text{C}$ without derating - **Do NOT** operate during sandstorms with door open - **Always** keep fire suppression system armed - **Always** monitor CO/H₂ detector readings in confined service

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