# Off The Grid
# Not Powerless

## ES Series

Hybrid Inverter

- Charge controller and inverter integrated
- Export control (Zero export)
- UPS function with 10 ms automatic switchover
- Maximum charge and discharge up to 100A
- IP65 dustproof and waterproof
- Fanless design, long lifespan

The GoodWe ES series bi-directional energy storage inverter can be used for both on-grid and off-grid PV systems, with the ability to control the flow of energy intelligently. During the day, the PV array generates electricity which can be provided either to the loads, fed into the grid or charge the battery, depending on the economics and set-up. The electricity stored can be released when the loads require it during the night, including inductive loads such as air conditioners or refrigerators. Additionally, the power grid can also charge storage devices via the inverter. An all-round intelligent system for maximum energy flexibility.

| **Technical Data** | **GW3648D-ES** | **GW5048D-ES** |
|---|---|---|
| **Battery Input Data** | | |
| Battery Type | Li-Ion or Lead-acid*¹ | Li-Ion or Lead-acid*¹ |
| Nominal Battery Voltage (V) | 48 | 48 |
| Max. Charging Voltage (V) | ≤60 (Configurable) | ≤60 (Configurable) |
| Max. Charging Current (A)*¹ | 75 | 100 |
| Max. Discharging Current (A)*¹ | 75 | 100 |
| Battery Capacity (Ah)*² | 50~2000 | 50~2000 |
| Charging Strategy for Li-Ion Battery | Self-adaption to BMS | Self-adaption to BMS |
| **PV String Input Data** | | |
| Max. DC Input Power (W) | 4600 | 6500 |
| Max. DC Input Voltage (V) | 580 | 580 |
| MPPT Range (V) | 125~550 | 125~550 |
| Start-up Voltage (V)*³ | 150 | 150 |
| Nominal DC Input Voltage (V) | 360 | 360 |
| Max. Input Current (A) | 11/11 | 11/11 |
| Max. Short Current (A) | 13.8/13.8 | 13.8/13.8 |
| No. of MPP Trackers | 2 | 2 |
| No. of Strings per MPP Tracker | 1 | 1 |
| **AC Output Data (On-grid)** | | |
| Nominal Apparent Power Output to Utility Grid (VA) | 3680 | 4600 |
| Max. Apparent Power Output to Utility Grid (VA)*⁴ | 3680 | 5100 |
| Max. Apparent Power from Utility Grid (VA) | 7360 | 9200 |
| Nominal Output Voltage (V) | 230 | 230 |
| Nominal Output Frequency (Hz) | 50/60 | 50/60 |
| Max. AC Current Output to Utility Grid (A) | 16 | 24.5*⁵ |
| Max. AC Current From Utility Grid (A) | 32 | 40 |
| Output Power Factor | ~1(Adjustable from 0.8 leading to 0.8 lagging) | |
| Output THDi (@Nominal Output) | <3% | <3% |
| **AC Output Data (Back-up)** | | |
| Max. Output Apparent Power (VA) | 3680 | 4600 |
| Peak Output Apparent Power (VA)*⁶ | 5520,10sec | 6900,10sec |
| Max. Output Current (A) | 16 | 20 |
| Nominal Output Voltage (V) | 230 (±2%) | 230 (±2%) |
| Nominal Output Frequency (Hz) | 50/60 (±0.2%) | 50/60 (±0.2%) |
| Output THDv (@Linear Load) | <3% | <3% |
| **Efficiency** | | |
| Max. Efficiency | 97.6% | 97.6% |
| Max. Battery to Load Efficiency | 94.0% | 94.0% |
| European Efficiency | 97.0% | 97.0% |
| **Protection** | | |
| Anti-Islanding Protection | Integrated | Integrated |
| PV String Input Reverse Polarity Protection | Integrated | Integrated |
| Insulation Resistor Detection | Integrated | Integrated |
| Residual Current Monitoring Unit | Integrated | Integrated |
| Output Over Current Protection | Integrated | Integrated |
| Output Short Protection | Integrated | Integrated |
| Output Over Voltage Protection | Integrated | Integrated |
| **General Data** | | |
| Operating Temperature Range (°C) | -25~60 | -25~60 |
| Relative Humidity | 0~95% | 0~95% |
| Operating Altitude (m) | ≤4000 | ≤4000 |
| Cooling | Natural Convection | |
| Noise (dB) | <25 | <25 |
| User Interface | LED & APP | LED & APP |
| Communication with BMS*⁷ | RS485; CAN | RS485; CAN |
| Communication with Meter | RS485 | RS485 |
| Communicaiton with Portal | Wi-Fi | Wi-Fi |
| Weight (kg) | 28 | 30 |
| Size (Width*Height*Depth mm) | 516*440*184 | 516*440*184 |
| Mounting | Wall Bracket | Wall Bracket |
| Protection Degree | IP65 | IP65 |
| Standby Self Consumption (W) | <13 | <13 |
| Topology | High Frequency Isolation | |
| **Certifications & Standards** | | |
| Grid Regulation | VDE-AR-N 4105, VDE0126-1-1, AS4777.2, G83/2, CEI 0-21, NRS 097-2-1, EN50438 | |
| Safety Regulation | IEC/EN62109-1&-2, IEC62040-1 | |
| EMC | EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29 | |

*¹: Lead acid battery use refers to Approved Battery Options Statement .
The actual charge and discharge current also depends on the battery.
*²: Under off-grid mode, then battery capacity should be more than 100Ah.
*³: When there is no battery connected, inverter starts feeding in only if string
voltage is higher than 200V.

*⁴: 4600 for VDE 0126-1-1 &VDE-AR-N4105, 4950 for AS4777.2(GW5048D-ES); 4050 for CEI 0-21(GW3648D-ES).
*⁵: 21.7A for AS4777.2.
*⁶: Can be reached only if PV and battery power is enough.
*⁷: The standard configuration is CAN.