# ES Series

## 3.6-5kW I Single Phase Hybrid Inverter

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.

Charge controller and inverter integrated

Export control (Zero export)

<10ms UPS-level switching

Maximum charge and discharge up to 100A

IP65 dustproof and waterproof

Fanless design, long lifespan

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| Technical Data | GW3648D-ES | GW5048D-ES |
|---|---|---|
| **Battery Input Data** | | |
| Battery Type | Li-Ion | Li-Ion |
| 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) | 125 | 125 |
| Min. Feed-in Voltage (V)*3 | 150 | 150 |
| MPPT Range for Full Load (V) | 170 ~ 500 | 215 ~ 500 |
| 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 |
| Number of MPPTs | 2 | 2 |
| Number of Strings per MPPT | 1 | 1 |
| **AC Output Data (On-grid)** | | |
| Nominal Apparent Power Output to Utility Grid (VA)*8 | 3680 | 4600 |
| Max. Apparent Power Output to Utility Grid (VA)*4*9 | 3680 | 5100 |
| Max. Apparent Power from Utility Grid (VA) | 7360 | 9200 |
| Nominal Output Voltage (V) | 230 | 230 |
| Nominal Output Freqency (Hz) | 50 / 60 | 50 / 60 |
| Max. AC Current Output to Utility Grid (A) | 16.0 | 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 Freqency (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% |
| Max. Operating Altitude (m) | 3000 | 3000 |
| Cooling Method | Natural Convection | Natural Convection |
| User Interface | LED & APP | LED & APP |
| Communication with BMS*4 | RS485, CAN | RS485, CAN |
| Communication with Meter | RS485 | RS485 |
| Communication with Portal | WiFi | WiFi |
| Weight (kg) | 28 | 30 |
| Dimension (W × H × D mm) | 516 × 440 × 184 | 516 × 440 × 184 |
| Noise Emission (dB) | <25 | <25 |
| Topology | Battery Isolation | Battery Isolation |
| Self-consumption at Night (W) | <13 | <13 |
| Ingress Protection Rating | IP65 | IP65 |
| Mounting Method | Wall Bracket | Wall Bracket |

*1: 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 are enough.
*7: CAN communication is configured by default. If 485 communication is used, please replace the corresponding communication line.
*8: For Belgium Nominal Apparent Power Output to Utility Grid (VA): GW3648D-ES is 3600.
*9: For Belgium Max. Output Apparent Power (VA): GW3648D-ES is 3600.
*: Please visit GoodWe website for the latest certificates.