# PowerOptimal Elon® Smart thermostat specification

*Version 1.16 · Last updated October 2026*

*INTRODUCING THE PowerOptimal Elon® Smart Thermostat*

***The Elon Smart Thermostat transforms standard electric geysers into smart, solar PV-ready green appliances. Android & iOS apps allow monitoring and management with your smartphone, including water temperature and grid & solar energy use. Real-time monitoring and communication deliver actionable data. Early alerts for insulation failure, element failure and other geyser faults reduce cost, damage and inconvenience. Simple installation with plug- and-play solar PV enables cost savings and reduced reliability on fossil fuels, improving quality of life.***

*SPECIFICATIONS*

| | |
|---|---|
| **Rated input voltage** | 230V AC, 230V DC |
| **Rated input current** | 18A AC, 15A DC |
| **Mains (AC) voltage range** | 230V +10% -15% |
| **System power supply** | Solar PV DC or 230V AC mains |
| **Power consumption** | 3W on either AC or DC (solar) power |
| **Data retention on device** | 2 weeks for high-resolution server data, 1 year for mobile app data |
| **Solar voltage** | 30 – 230 V DC |
| **Thermostat** | Electronic thermostat with 0.5 °C accuracy |
| **Safety** | Electromechanical thermal cutout |
| **Reverse polarity protection** | For solar PV connections |
| **Lightning protection** | 8 kA |
| **Self-tests** | Component failure, wiring failure, element failure, insulation failure, hot connection |
| **Enclosure ingress protection rating** | IP40 |
| **Radiated immunity** | IEC 61000-4-3 Level 3, 10 V/m |
| **Annual energy production compared to inverter-based system** | > 90% when solar PV array and geyser element are matched correctly |
| **Standards conformance** | SANS 60730-1, SANS 60730-2-9, SANS / EN 301 489-1, SANS / EN 301 489-17, ICASA Type Approval, LoA from NRCS |
| **Dimensions & weight** | 23 x 12 x 11 cm, 0.3 kg. Box dimensions: 27.6 x 17.5 x 13.5 cm |
| **Patents** | Granted: ZA2019/02129, GB2583814B, ZA2022/08516, EP 4100979, US 12,122,914, GB2618349, ZA2024/08399, EP4519612<br>Pending: PCT/ZA2024/050065, CN2023800381161, US 18/861,142, AU2023265634, ZA2023/11726, ZA2024/08845, PCT/ZA2025/050066 |
| **Registered Designs** | ZA F2022/00962, F2022/00963 |
| **Communications link** | Wi-Fi Client, Wi-Fi Hotspot (2.4 GHz) |
| **Measurements** | AC energy, voltage, current (5%)<br>DC energy, voltage, current (5%)<br>Temperature: water & ambient |
| **Data logging** | 15-second data retained for 14 days<br>5-minute data retained for 366 days |
| **Other features** | Mobile app for installers and users<br>Full installation self-check<br>Remote firmware upgrades<br>50 000+ switching operations on thermostat<br>Cloud backend for remote monitoring & alerts |
| **Advanced features scheduled for premium app availability in Q1 2027** | Leak detection (software-based)<br>Anode condition monitoring |

It is important to match the solar PV array and heating elements for maximum power transfer efficiency. Refer to the **table below** for the recommended AC heating element power rating for different solar panel specifications and configurations.

***TABLE 1. GUIDE: PV ARRAY AND GEYSER (WATER HEATER) ELEMENT MATCHING***

| Solar PV array size ($kW_p$) | Best matching geyser element size (kW) | 2nd choice geyser element size* (kW) | Geyser (water tank) size (litres) |
|---|---|---|---|
| **1 – 1.6** | **4** | 3 | 100 - 200 |
| **1.6 – 2** | **3** | 4 or 2 | 100 - 200 |
| **2 – 3** | **3** | 4 | 150 – 300 |

** Second choice element size would reduce efficiency by 10 – 20%.*

**DO NOT DEVIATE FROM THE RECOMMENDED MODULE-ELEMENT MATCHING CONFIGURATIONS WITHOUT CONSULTING POWEROPTIMAL.**

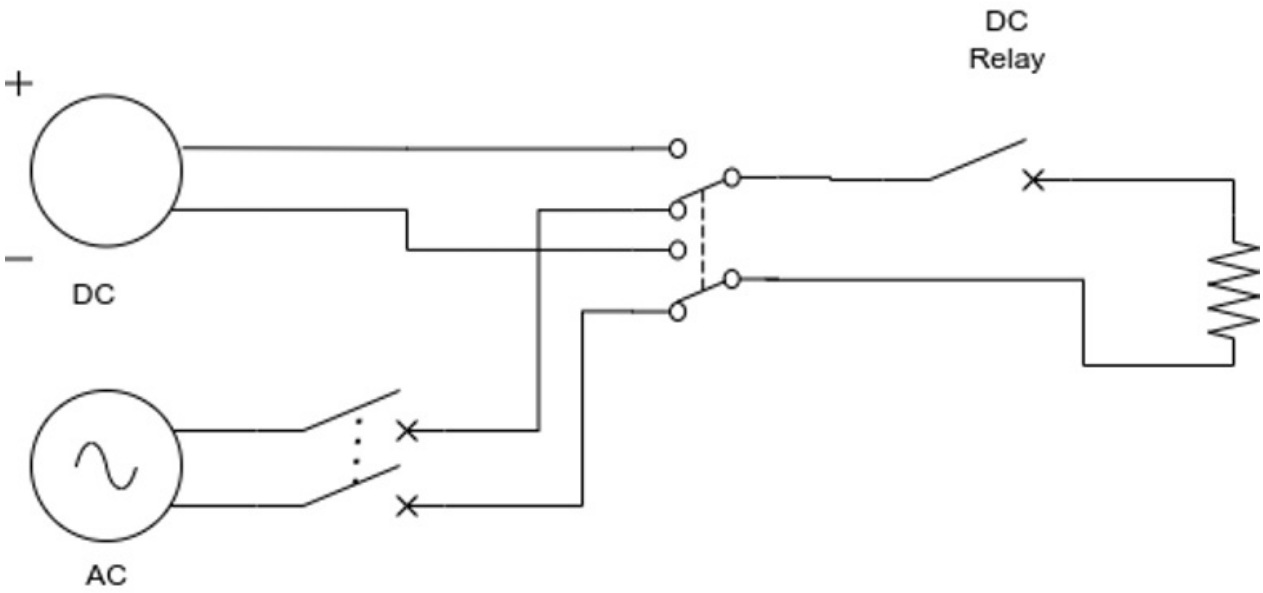
**Maximum allowed** solar PV array specifications at Standard Test Conditions (**STC**):

**$I_{sc}$ < 15A $V_{oc}$ < 230V Power < 3 $kW_p$**

Contact PowerOptimal for advice on module-element matching if module properties are significantly different to typical values or for **bifacial, high current or high voltage modules**.

**ELON SMART INSTALLATIONS ARE OFF-GRID**

The Elon Smart has a **double-pole, double-throw, break-before-make changeover relay** that switches power supply to the element between solar PV (DC) and grid (AC). That means that it is mechanically **impossible** for DC power to flow into the AC supply or for AC power to flow into the DC supply. Hence, the Elon qualifies as 'off-grid' for solar PV installations. See the below diagram for the internal relay configuration of the Elon Smart.




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