Product Specifications

- PowerOptimal Elon® Smart thermostat specification

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 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%) DC energy, voltage, current (5%) Temperature: water & ambient
Data logging	15-second data retained for 14 days 5-minute data retained for 366 days
Other features	Mobile app for installers and users Full installation self-check Remote firmware upgrades 50 000+ switching operations on thermostat Cloud backend for remote monitoring & alerts
Advanced features scheduled for premium app availability in Q1 2027	Leak detection (software-based) 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.

