PowerOptimal Elon® Smart thermostat specification V1.15

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 leak detection, 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.

Document Version: 1.15

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 Estimation of water use
Advanced features scheduled for external availability in H2 2026	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**.

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