

Elon® 100 Installation

Summary box insert (folded A5) V2.13

PowerOptimal Elon® 100 Solar PV Water Heater

The PowerOptimal Elon® 100 allows you to connect solar PV (photovoltaic) modules directly to your standard electric geyser (or water heater). Enjoy decades of free energy from the sun!



You can download **full installation & user manuals** on our website:

www.poweroptimal.com/manuals



You can also find an **online user instruction video** on our website:

www.poweroptimal.com/elon100

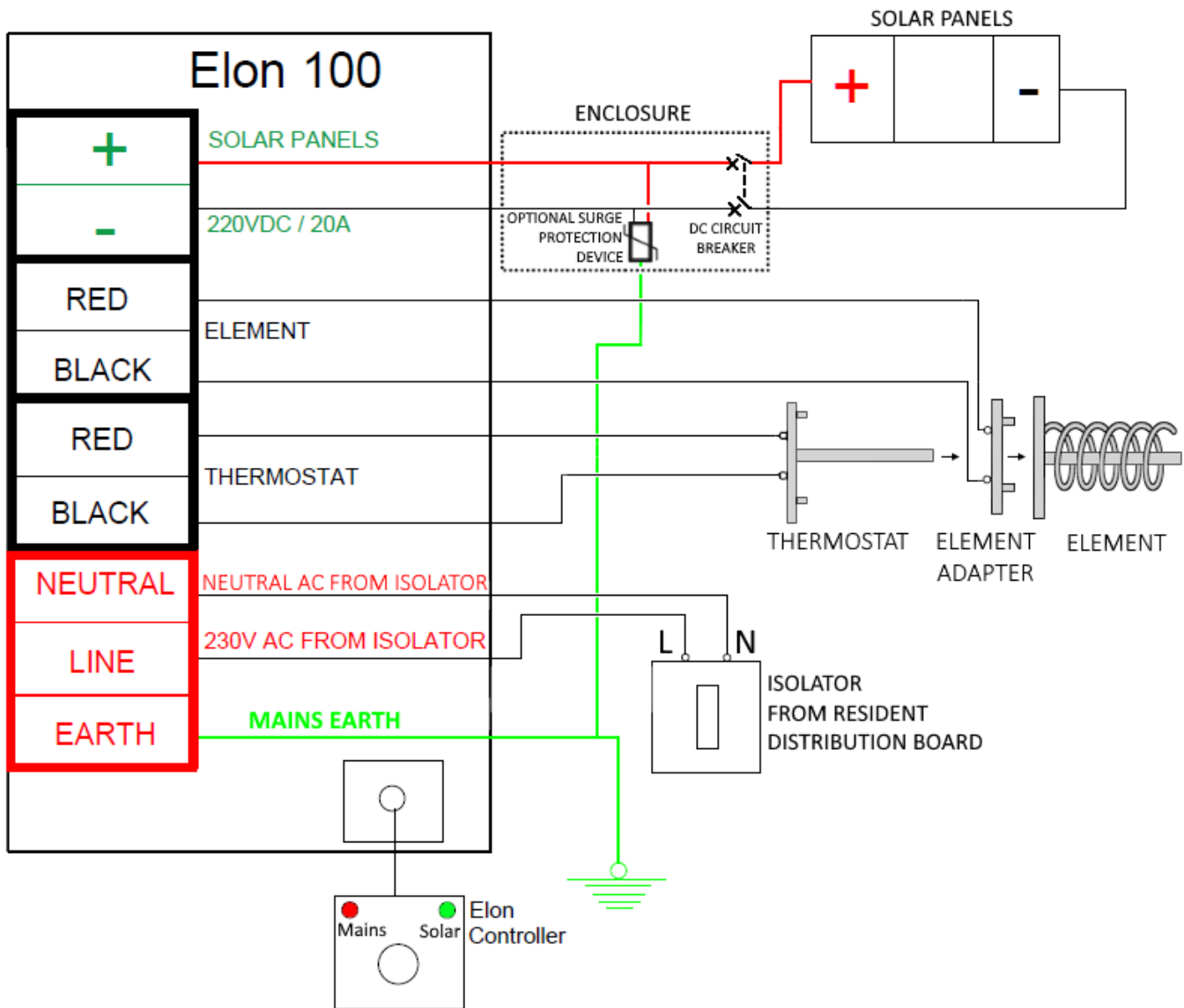
Specifications

Rated input voltage	250V AC, 250V DC
Rated input current	25A AC, 20A DC
Mains (AC) voltage range	-50% to +100% (but will disconnect all loads when breach is greater than +/- 15%)
System power supply	Solar or 230V AC mains
Shutdown	Sufficient power supply capacity to manage processor, switching and data storage if both mains and solar supply fail
Solar voltage (V_{oc} at STC)	20 - 250 V DC
Solar power availability sensing	Automatically determines availability of sufficient solar power before supplying load from solar PV array

Controller settings	Can be adjusted to run from “solar only” (100% solar energy use) to “mains only” (no solar energy use)
Thermostat	Uses the standard normally open thermostat switch associated with the geyser element as a sensor only, with less than 10mA sense current, to control power to the element
Reverse polarity protection	Protected against reverse connection of solar array
Enclosure ingress protection rating	IP65
Max distance Elon® unit to controller	10 m
Annual energy production compared to inverter-based system	> 90% when solar array and geyser element are matched correctly
Standards conformance	IEC / SANS 60669-1, 60669-2-1, 60730-1, 60335-1, 60335-2-21, CISPR 11 & IEC 61000-6-1
Patents	ZA 2019/02129

Note 1: Initial switch-on wait time for solar is **1 min** and for mains is **5 min**.

Note 2: Turning dial into “Mains Only” until red light starts flashing and back out again will start full mains heating cycle until geyser is on temperature.



Installation Diagram

Note: Surge Protection Device (SPD) only required in higher lightning strike density areas (such as parts of Gauteng and Mpumalanga), or where the DC cables are long. See **Appendix F** in Installation Manual.



SAFETY WARNING

- Installation should **ONLY** be performed by an electrical contractor registered with Department of Labour (“wireman’s licence”) & strictly according to installation instructions in the full installation manual. The electrician should provide you with a **Certificate of Compliance (CoC)** once installation is completed.
- Use only a reputable & experienced solar PV installer to install your solar PV modules.

- **Solar PV modules exposed to the sun are live** (i.e. will produce electricity) and can give an electric shock. Special care should be taken and only trained solar PV installers should install the modules.
- **Do not attempt to** alter or service the electrical installation or open the Elon® 100 unit or controller for any purpose.
- Use the Elon® 100 **only for its intended purpose**.
- **Always** make sure that every wiring connection is **properly tightened**.
- **Do not earth** either of the solar module wires (but do earth the frames).
- All installation wiring should be at least 2.5mm². Apart from the solar cable from the solar array to the DC circuit breaker, use **panel wire** for all Elon® connections.
- Avoid coiling, since DC switching can create damaging spikes.
- Keep all wires as short as possible.
- Both AC & DC isolators or circuit breakers should be installed within 1.5m of the geyser (water heater), line of sight.

Limited Warranty

If the PowerOptimal Elon® 100 (“the Product”) is found to be defective, you will be entitled to a repair or replacement within 2 (two) years of the date of delivery of the Product to you. Please keep your receipt as proof of purchase. If you are a consumer as defined in the Consumer Protection Act No. 68 of 2008 (“the CPA”), you will be entitled to such remedies as are made available under the CPA in relation to the return of goods.

PowerOptimal will not have any liability or obligation to you where the Product has been subjected to abuse, misuse, improper use, improper testing, negligence, accident, alteration, tampering or repair by a third party.

To the maximum extent permitted by applicable law, in no event shall PowerOptimal be liable for any special, incidental, indirect, or consequential damages whatsoever, including, without limitation, damages for loss of business profits or business interruption, arising out of the use or inability to use this product.

Please note that **this unit must be installed by an electrical contractor registered with the Department of Labour**. Failure to do so may invalidate this warranty. Please keep the CoC (Certificate of Compliance) issued by the electrical contractor on completion of the installation.

PV array and geyser (water heater) element matching

It is important to match PV array specifications and heating elements for maximum power transfer efficiency. See the below table for the recommended heating element power rating for different solar module power ratings and array sizes.

Solar PV array size	(kW _p)	1 - 1.6	1.6 - 2	2 - 3	2 - 4**

Matching geyser element size	(kW)	4	3	3	4
2nd choice geyser element size*	(kW)	3	4 or 2	4	NA
Geyser (water tank) size	(litres)	100 - 200	100 - 200	150 - 300	150 - 300
	<i>* 2nd choice element size would reduce efficiency by 10-20%</i>			<i>** 2 parallel strings</i>	

The solar PV array should **not exceed** the Elon 100 specifications:

Short circuit current $I_{sc} < 20A$ Open circuit voltage $V_{oc} < 250V$ Rated power $P < 4 kW_p$



Your installation electrician will ensure that the PV array and geyser

element are matched properly.

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POWER OPTIMAL
THE FUTURE OF ENERGY



Solar Photovoltaic Water Heater

Basic Installation Manual

V2.13

Full manual available at: www.poweroptimal.com/manuals

Installation of the Elon® 100 should ONLY be performed by an electrical contractor registered with the Department of Labour

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