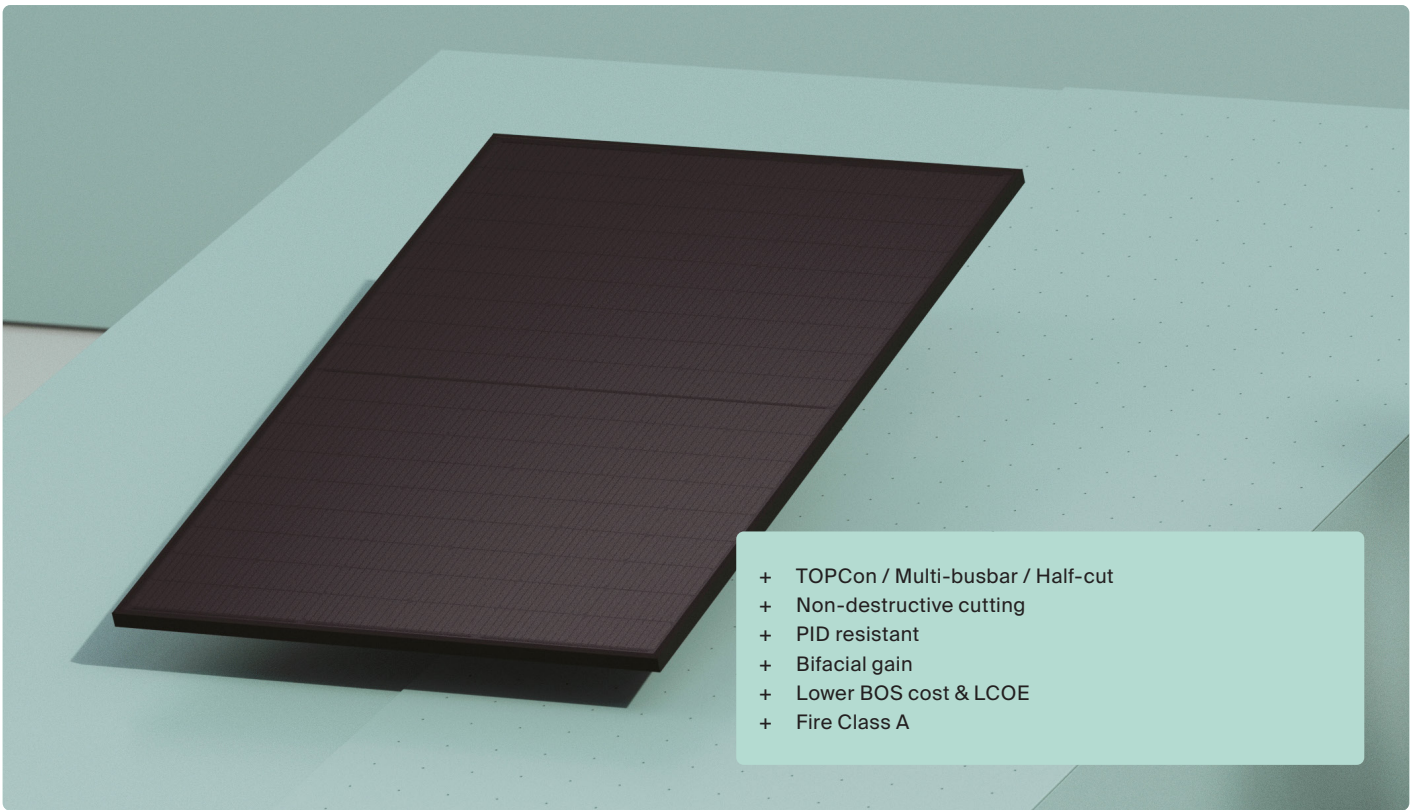


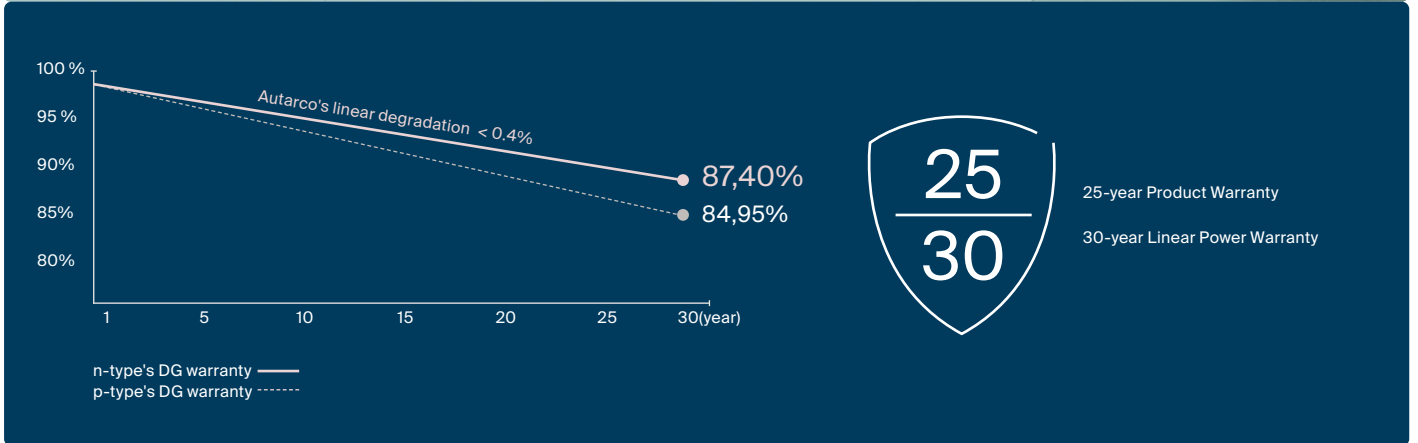
# TBT Full Black

## Series solar panels

Reach full potential



- + TOPCon / Multi-busbar / Half-cut
- + Non-destructive cutting
- + PID resistant
- + Bifacial gain
- + Lower BOS cost & LCOE
- + Fire Class A



# 435~450W

Power Range

# 0~+5W

Power Tolerance

# 22.5%

Max Module Efficiency

# ≤ 1.0%

First Year Power Degradation

# ≤ 0.4%

Year 2-30 Power Degradation

## Electrical specification

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25 °C, AM=1.5

Rated output (P <sub>mpp</sub> / W <sub>p</sub> )	435	440	445	450
Open circuit voltage (V <sub>oc</sub> / V)	39.18	39.38	39.20	39.40
Short circuit current (I <sub>sc</sub> / A)	13.80	13.86	14.19	14.28
Rated voltage (V <sub>mpp</sub> / V)	32.61	32.81	33.22	33.39
Rated current (I <sub>mpp</sub> / A)	13.34	13.41	13.40	13.48
Module efficiency	21.77%	22.02%	22.27%	22.50%

NMOT: Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20 °C, AM=1.5, Wind Speed 1m/s

Rated output (P <sub>mpp</sub> / W <sub>p</sub> )	330	333	334.6	338.4
Open circuit voltage (V <sub>oc</sub> / V)	35.65	35.84	37.23	37.42
Short circuit current (I <sub>sc</sub> / A)	11.13	11.18	11.46	11.53
Rated voltage (V <sub>mpp</sub> / V)	30.00	30.19	31.27	31.43
Rated current (I <sub>mpp</sub> / A)	10.99	11.05	10.70	10.77

## Temperature ratings

Temp. coefficient (P <sub>mpp</sub> )	-0.29% / °C
Temp. coefficient (I <sub>sc</sub> )	+0.046% / °C
Temp. coefficient (V <sub>oc</sub> )	-0.25% / °C
Nominal module operating temperature (NMOT)	43°C (+/- 2°C)

## Operating parameters

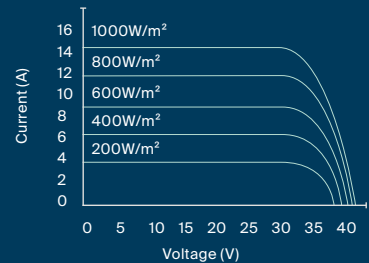
No. of diodes	3
Junction Box IP rating	IP 68
Max. series fuse rating	
TBT440B.1	25 A
TBT440B.2 and TBT445B.1	30 A
Max. system voltage (IEC/UL)	1500V <sub>DC</sub>

## Mechanical specifications

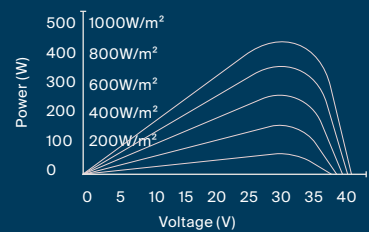
Dimensions (W x H x D)	1762 x 1134 x 30mm
Cells	108, N type mono-crystalline, in a 6 x 18 matrix connected in series
Frame technology	Aluminum, black anodized
Construction	Encapsulant: EVA
TBT440B.1	Front: 2 mm glass (coated) Backsheet: 2 mm glass (black pattern)
TBT440B.2 and TBT445B.1	Front: 1.6 mm glass (coated) Backsheet: 1.6 mm glass (black pattern)
Cable length (IEC/UL)	1200 mm
Cable diameter (IED/UL)	4 mm <sup>2</sup> / 12 AWG
① Max. mechanical test load	5400 (front) / 2400 Pa (back)
Connector type (IEC/UL)	MC4-EVO2A
Operating temperature	-40°C to 85°C
Passed hail test	35mm hail @ 30.7m/s
Fire performance	Class A (IEC)
Module weight	
TBT440B.1	24.5 kg
TBT440B.2 and TBT445B.1	21.5 kg
Packing unit	36 pcs / pallet
Weight of packing unit	
TBT440B.1	919 kg
TBT440B.2 and TBT445B.1	831 kg
Quantity per 40'HQ container	936 pcs

## Curve

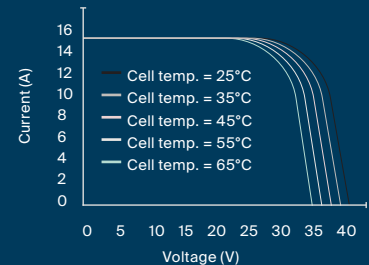
### Current-Voltage (440W)



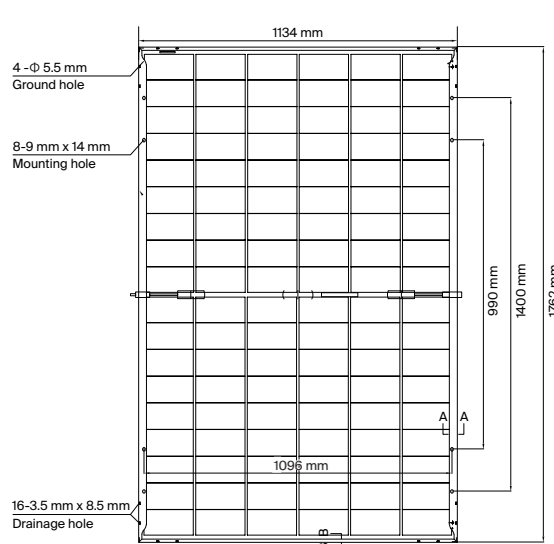
### Power-Voltage (440W)



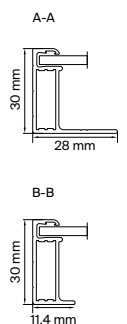
### Current-Voltage (440W)



### Solar panel



### Frame cross section



① Refer to Autarco installation manual or contact technical department. Maximum Mechanical Test Load=1.5xMaximum Mechanical Design Load.

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