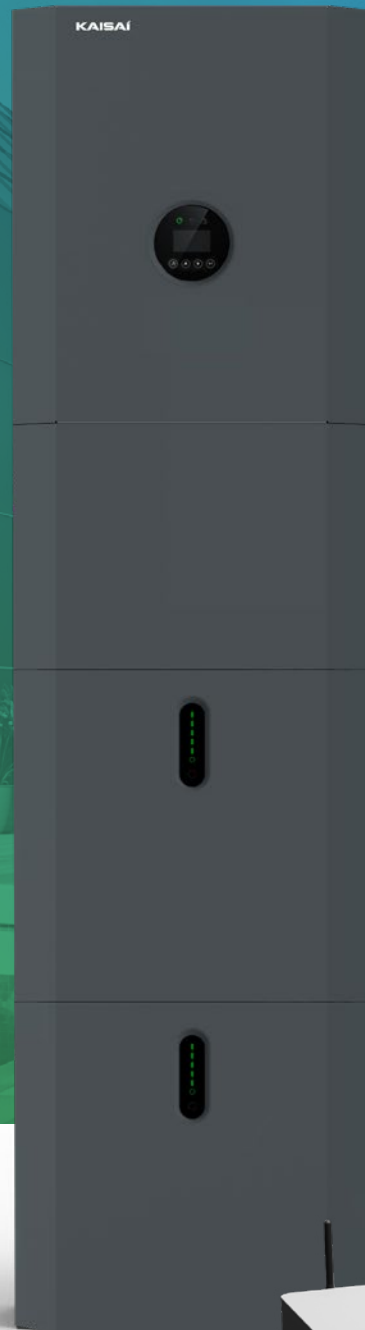


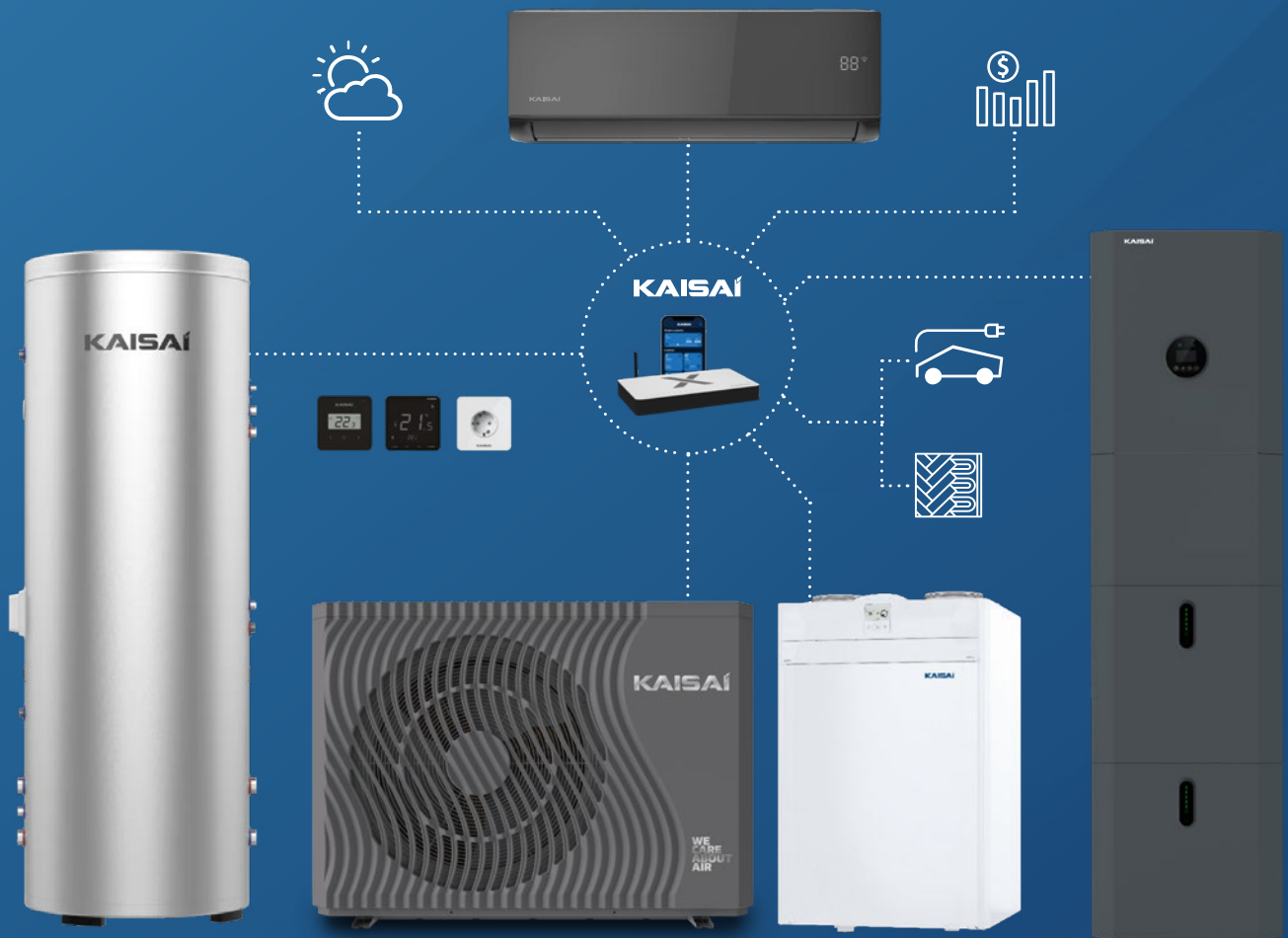
# KAISAI



## **Kaisai X** energy optimisation system

ENERGY STORAGE SYSTEMS • HYBRID INVERTERS • HOME ENERGY MANAGEMENT SYSTEM

# One brand multiple solutions



For more information, visit [www.kaisai.com](http://www.kaisai.com)



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# Kaisai X

an energy optimisation system for managing electric, thermal and cooling energy in the building.

By combining Kaisai solutions and products, **the system effectively integrates with the customer's daily routine and external data** (weather forecast, dynamic energy prices) together with the logic and algorithms of Kaisai product operations, thus generating real savings.



Kaisai air-conditioner

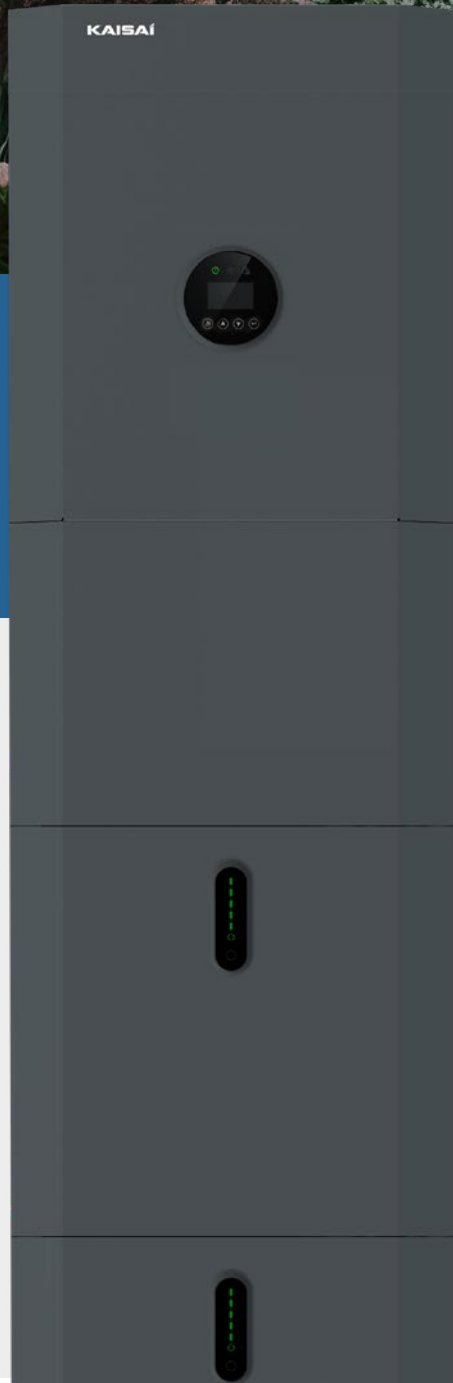


Kaisai heat pump



DHW and central heating tank





Combining Kaisai products and solutions

Kaisai X controller

## Personal assistant

As a personal assistant, the system managed from a dedicated app is designed to **analyse projected energy prices and comfort conditions at home**, using algorithms for making decisions on the operation of Kaisai appliances.

**The Kaisai X optimisation system** ensures that electric and thermal energy will be used at the highest degree of self-consumption and at the lowest possible price.



# Kaisai hybrid inverter and energy storage



CATL LFP battery with the **highest quality design** secures safety with triple protection.



Possible **oversizing of up to 200%** of the photovoltaic installation capacity.



**Adjustable power.** Possibility of unbalanced phase operation, cooperation with power generator.



**Simple installation,** modular design, access to a mobile app.

## Inverter functions



BMS Battery Management System



LCD display



Up to 8 battery modules can be connected



ON/OFF Grid operation possible



CAN/Wi-Fi/RS485 communication



Possible phase unbalance

## Energy storage functions



Advanced AC/DC protection



Simple installation



10000 cycles



Wi-Fi module



IP65 protection class



Built-in battery heaters

### Kaisai 5,1kWh Battery Energy Storage Unit

Operation parameters	
Max. charge/discharge current	50 A/80 A
Rated DC power	4096 W
Max. charge/discharge power	2825 W/4096 W
Operating temperature range	Charge from 0 do 50 °C Discharge -10 do 50 °C
Humidity	0~95% (no condensation)

BMS	
Module combination	Max. 8
Capacity	200/400/600/800 Ah
Energy consumption	<2 W
Communication	CAN and RS485
Monitoring parameters	Voltage, current, cell voltage, cell temperature, PCBA temperature measurement

Certificate	
Safety (cell)	Module: IEC/EN 62619; UN38.3 Cell: IEC/EN 62619; UN38.3; UL1973

### Kaisai Hybrid Inverter 10kW

PV strings input	
Max. continuous photovoltaic input power	20 kW
Max. DC voltage	1100 V
Rated voltage	720 V
MPPT voltage range	140 V - 1000 V
MPPT voltage range (full load)	420 V-850 V
Inrush voltage	200 V
Number of MPPT	2
Strings per MPPT	1
Max. input current per MPPT	15 A
Max. short-circuit current per MPPT	20 A

AC output (grid)	
Rated AC output power	10 kW
Max. apparent AC power	11 kVa
Rated AC voltage	400 V AC
AC grid frequency range	50/60 Hz ± 5 Hz
Nominal output current	14.5 A
Max. output current	16 A
Power factor (cosφ)	0.8 leading - 0.8 lagging
THDi	<3%

Battery input	
Battery type	LEP (LiFePO4)
Rated battery voltage	51.2 V
Charge voltage range	44-58 V
Max. charge current	160 A
Max. discharge current	200 A
Battery capacity	200/400/600/800 Ah

Efficiency	
Max. efficiency of photovoltaic installation	97.60%
Euro efficiency of photovoltaic installation	97.00%

Physical parameters	
Battery type	LFP (LiFePO4)
Weight	54 kg
Dimensions (W x H x D)	540x490x240 mm
IP protection class	IP65
Warranty	10-year warranty

Electrical characteristics	
Energy capacity	5.12 kWh
Usable capacity	4.6 kWh
Depth of discharge (DoD)	90%
Rated voltage	51.2 V
DC circuit breaker	125 A
Operating voltage range	44.8-56.5 V
Internal resistance	<20 mΩ
Durability	10 000 cycles

AC output (back-up)	
Rated AC output power	9.2 kW
Max. AC output power	10 kVA
Rated output current	13.3 A
Max. output current	14.5 A
Rated output voltage	400 V
Rated output frequency	50/60 Hz
Output THDv (under linear load)	<2% (linear load)

Protection	
Anti-islanding protection	Yes
Output overcurrent protection	Yes
DC reverse polarity protection	Yes
Input overcurrent protection	Yes
AC/DC current protection	DC II type; AC III type
Monitoring of insulation resistance	Yes
AC circuit short circuit protection	Yes

General specifications	
Dimensions W x H x D	540x980x240 mm
Weight	49 kg
Operating temperature range	-25 °C~+60 °C
Cooling type	Natural convection
Max. operating altitude	2000m above sea level
Operating humidity	0~95% (no condensation)
IP protection class	IP65
Topology	Battery insulation
Communication	RS485/CAN2.0/WI-FI/4G
Display	LCD/APP

# Energy storage features

**The Kaisai All-in-One solution** is dedicated to any end-user application.

We can use our hybrid inverter for new PV installations as well as for existing PV installations as a so-called retrofit and as an extension of existing PV installations with a new PV installation with additional energy storage.

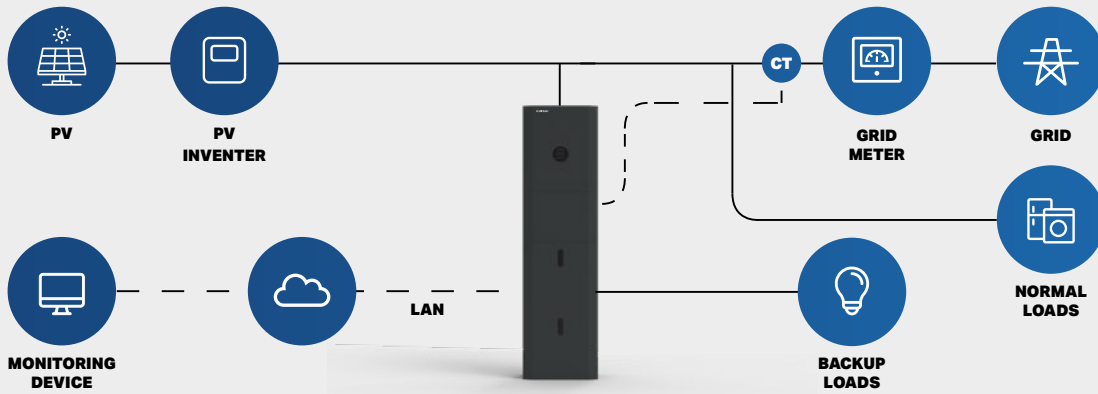


**The modularity of the solution** allows an energy storage **capacity of 40.8kWh** to be configured with a **single inverter**.

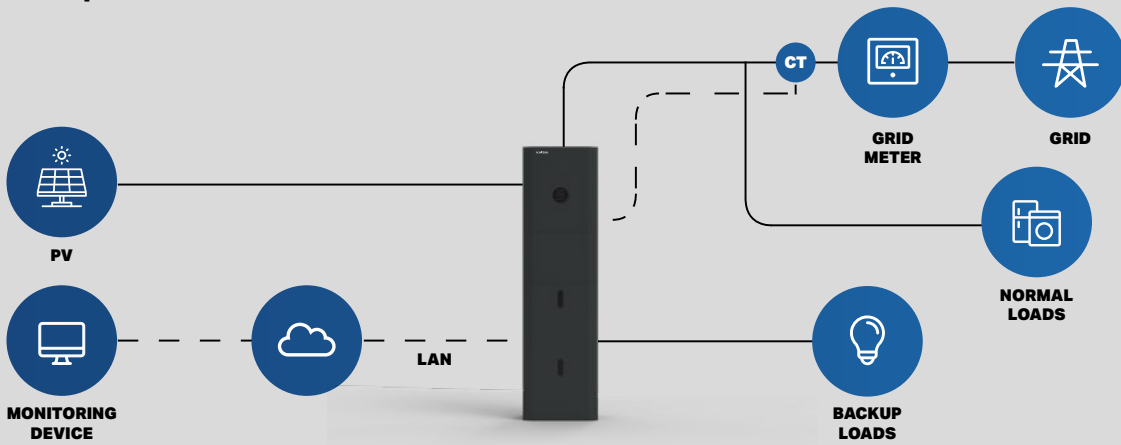




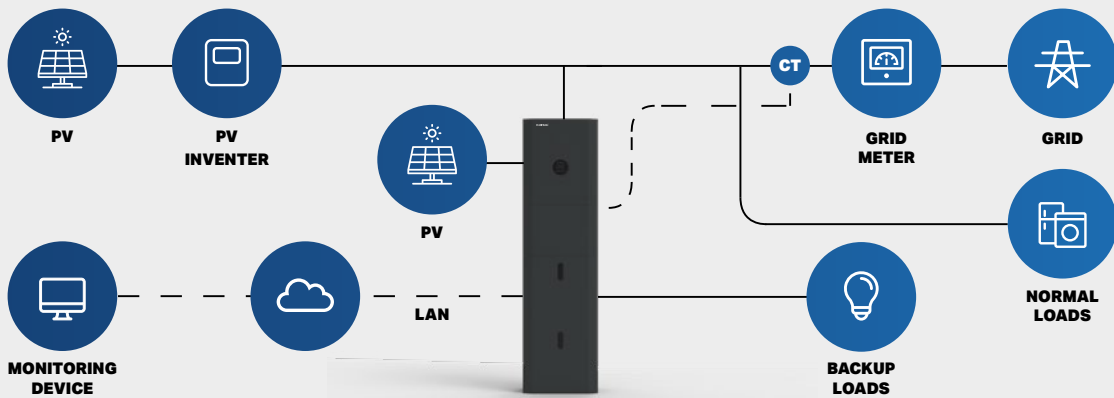
## AC Coupled



## DC Coupled



## Hybrid Coupled





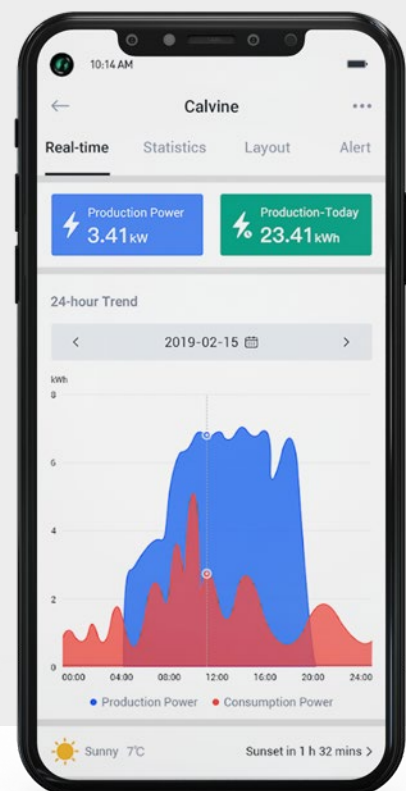
# Energy storage operating modes

## As standard, Kaisai Energy Storage has 3 modes of operation

- ➔ **Self-consumption** boosting mode
- ➔ **Backup** priority mode
- ➔ Peak shift mode based on **specific tariffs**

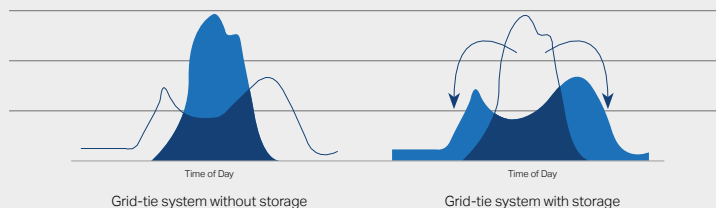
### Mobile application

Operating parameters and system management can be carried out already in the standard **Solarman** mobile app.



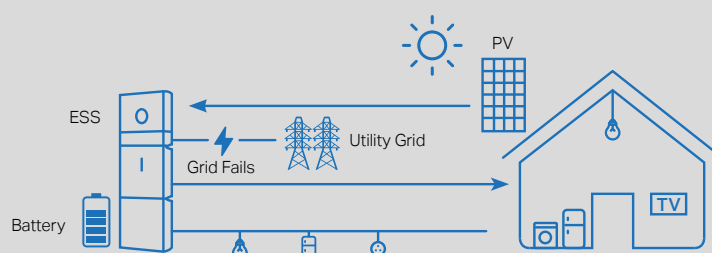
## Self-consumption boosting mode

Use of PV energy and self-consumption to minimise energy intake from the grid. Zero export option available.



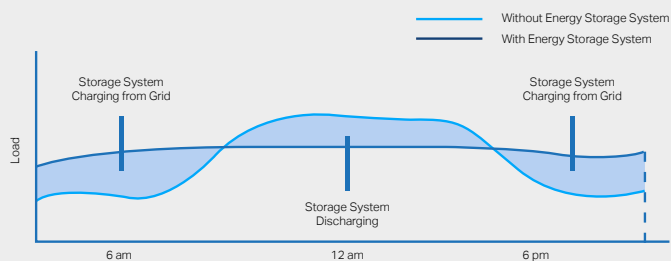
## Backup priority mode

Increased sense of safety, UPS function provided.



## Peak shift mode

Lower electricity bills to be achieved by storing energy during off-peak hours and transferring it for use during peak hours.



## All-in-One Kaisai

The Kaisai All-in-One System and its software **enables integration** through the external Kaisai X system for Kaisai products together with external data (weather forecast, dynamic tariffs). This integration is intended to **provide an energy assistant service for the building**. This way, thanks to original Kaisai algorithms, the end user makes the most **efficient use of electric, thermal and cooling energy**.

# HEMS energy management system

**The Kaisai team** has used their knowledge and expertise to design and implement not just a product, but a service for an innovative electric and thermal energy management system. **The aim of the Kaisai HEMS system** is to provide a solution that effectively integrates with the customer's daily routine and external data (weather forecast, energy prices), generating real savings for the user.



**Single application**  
for the entire building

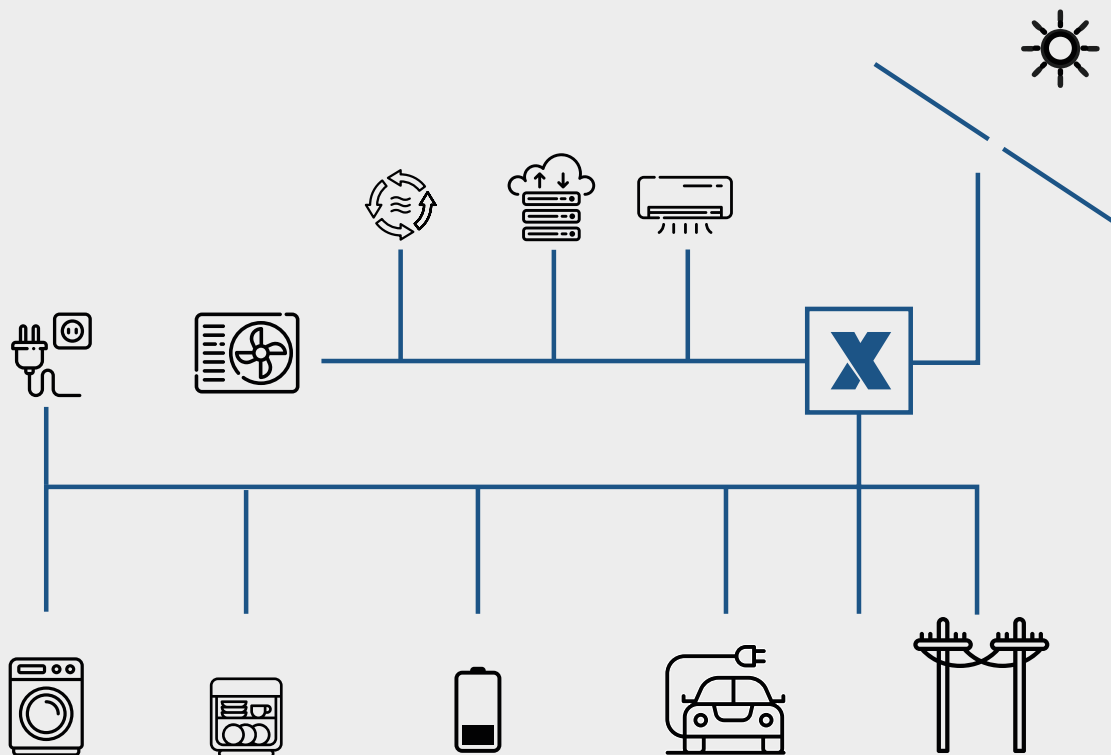


**Optimisation** of  
energy consumption



**Higher** level  
of comfort





**Unlimited system extension**  
with additional devices

**Heating optimisation**  
With a minimum saving of 20%.

**Integration with other equipment**  
(alarm systems, door locks)

## Easy management

The installer and the end customer receive a ready-made operating logics for the Kaisai devices that will guarantee their use at the lowest possible energy price. **Optimised performance of the system** from one manufacturer guarantees the correct interoperability of the devices under Kaisai supervision and service. The end user is able to manage the entire system from a central location.





## Kaisai X controller

**The Kaisai X controller** is designed to transmit information from peripheral devices and process it, providing a preview from the home network as well as the cloud.

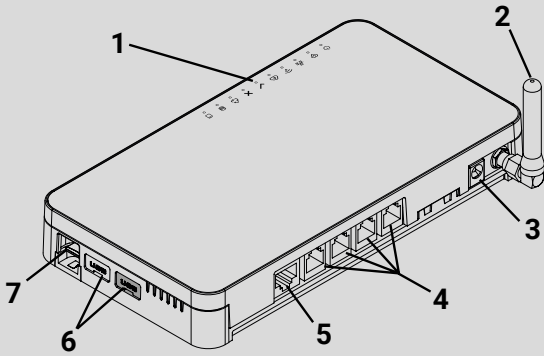
The unit is equipped with 4 RS sockets for connection with devices, including strips. Thanks to the RJ-45 port and Wi-Fi, the control panel can be connected to a network. It also features additional SBUS and MODBUS inputs.

**The USB and SD sockets** allow to record logs, load or save settings. The unit features LEDs indicating: power supply, heartBit, Ethernet connection, Wi-Fi connection, remote access server connection, error and service mode.

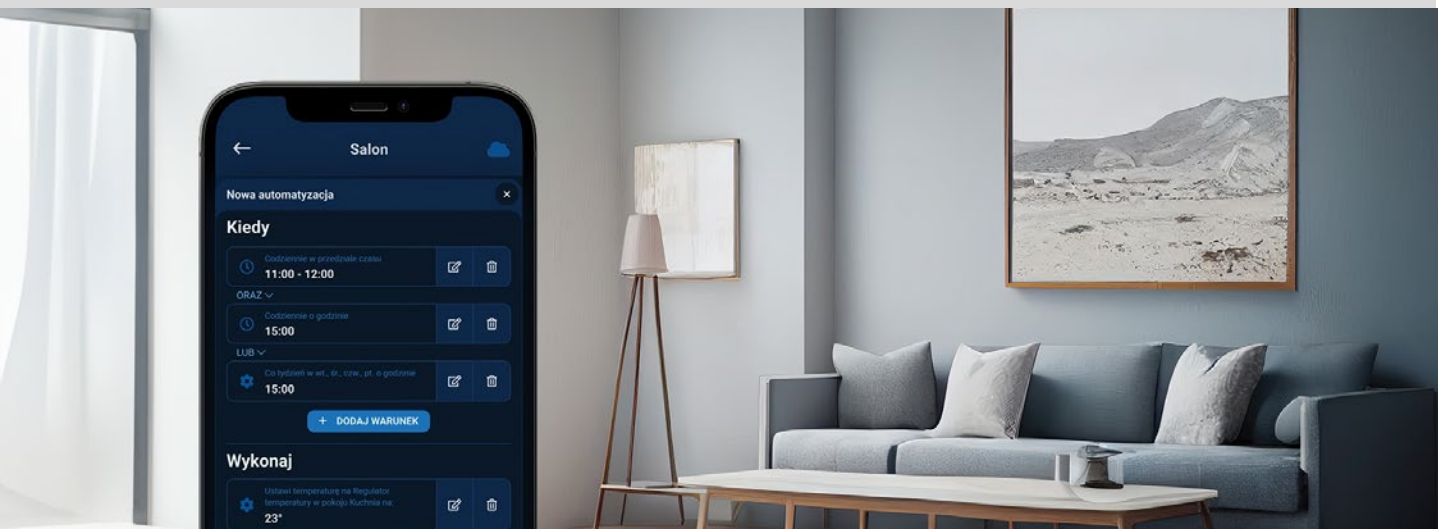
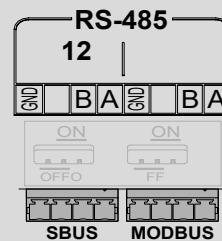
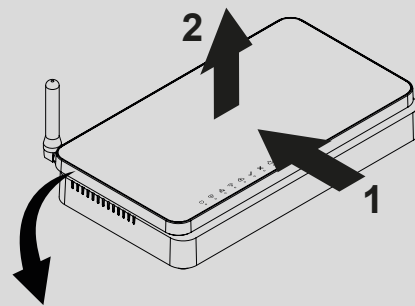
## Intended use

The main device receives and sends information from all the home appliances and communicates with the executive modules, which can be controlled and programmed according to individual customer needs.

**With the Kaisai X controller**, we can control the „entire home” via smartphone, tablet, website from any location on Earth.



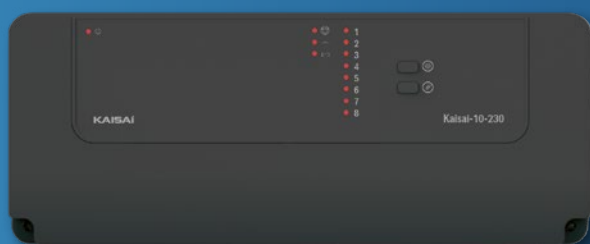
- 1. Indicator lights
- 2. Wi-Fi antenna
- 3. AC adapter input
- 4. RJ-12 port
- 5. RJ-45 port
- 6. USB 2.0
- 7. MicroSD card



# Energy efficiency

Bearing in mind the dynamics of changes in today's world, the Kaisai team besides providing **the best quality products** also cares about user's **running costs**, which are often overlooked.

**In line with the principles of the correct selection of appliances**, care must also be taken to ensure efficient energy management in the building. Energy conservation is just as important as its appropriate use by renewable energy sources.



## Kaisai-10-230 thermostatic valve controller

This device is designed for **underfloor heating systems**. It is equipped with: 9 voltage outputs, (8 outputs to operate actuators and 1 output intended for pump operation), 1 voltage free contact, 2 binary inputs, radio communication with Kaisai X controller.

## Kaisai-04 control panel

This unit features a **4 inch touch screen display**. Once the unit has been configured, it is possible to adjust the room temperature from the Kaisai X controller, display the weather forecast on the screens and create shortcuts to favourite scenarios. The Kaisai-04 is designed for installation on a 60mm diameter junction box.





# Accessories



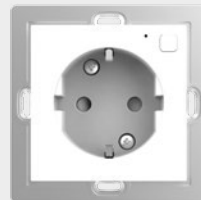
## KAISAI EXTENDER



A device for extending the signal range of peripheral devices towards the Kaisai X controller. With the Kaisai Extender, we can expand the operating area of our system. Its purpose is to retrieve information about the range of connected devices using radio communication and then send this information via Wi-Fi to the Kaisai X controller. It also serves as a network socket.



## KAISAI 230 SOCKET



The Kaisai 230 Socket is an executive device for frame or junction box mounting. It allows the remote switching on and off of appliances connected directly to the socket. The socket has a built-in energy meter. The energy parameters can be viewed in the Kaisai X app. Communication with Kaisai X is carried out wirelessly.



## KAISAI B PLUS REGULATOR



The Kaisai B Plus controller is equipped with an air temperature sensor, an air humidity sensor and optional connection for a floor temperature sensor. The intuitive display provides information about the current temperature and offers the possibility, for example, of changing the room temperature setpoint. Touch buttons. Wireless communication (868Mhz).



## KAISAI S PLUS REGULATOR



Like the B Plus, the Kaisai S Plus regulator is equipped with an air temperature sensor, an air humidity sensor and the optional connection for a floor temperature sensor. The display also provides information about the current temperature and can be used to change the room temperature setpoint. Touch buttons. Wireless communication (868Mhz).



## ACTUATOR KAISAI 869



Kaisai 869 radiator actuators are battery-powered, making installation totally non-invasive, limited to threading the actuator onto the radiator valve. It comes with adaptors for RA-N and RTD-N valves. The actuator is equipped with a mechanism enabling it to be stopped in any position, thanks to which we can determine the minimum and maximum valve opening and control the valve operation proportionally.



## ACTUATOR KAISAI 230/2



The Kaisai 230/2 thermoelectric actuator is designed for automatic closing and opening of valves mounted on heating distributors or opening and closing of radiator valves. The actuator is equipped with an electric cable and a nut with M30x1.5 thread for mounting directly on the distributor or radiator valve. The actuator is currentless closed (NC).



## KAISAI OPEN WINDOW DETECTOR



The Kaisai wireless open window detector is a device which will let the system know if a window or door is open. This information can be used to control the heating, which is going to be switched off when the room is ventilated.



# Benefits

## for the Installer



### SINGLE APPLICATION

All installed end-customer equipment **is managed in one place.**



### ONE MANUFACTURER

One manufacturer, unified Polish service and technical support **all in one place.**



### MODULARITY

Additional Kaisai units that are **fully compatible with the existing system** can be retrofitted.



### PRO-ACTIVE SERVICE

The platform not only identifies potential problems, but also **provides immediate push notifications** in the app.



### EQUIPMENT HISTORY

Local record of device history on a memory card: secure data storage with the **possibility of checking the history.**



### REMOTE CONTROL

**Remote control** of installed Kaisai units from a single platform - mobile app and web browser interface.



### SMART HOME

**Intuitive system** with predefined settings for optimum configuration by the installer.



### ADDITIONAL ADVANTAGES

Potential for extra financial benefits by obtaining additional subsidies under **the energy management programme.**



### SYSTEM EXPANSION

System expansion and integration with **additional Smart Home devices** and electric car chargers.



### UPDATES

Providing convenience and innovation, our solutions enable remote **software updates.**



# Benefits for the User



## ONE MANUFACTURER

One manufacturer, unified Polish service and technical support **all in one place**.



## EQUIPMENT INTEGRATION

**Integration** of energy-producing and consuming devices with simultaneous **monitoring and forecasting** of the scenario.



## SYSTEM EXPANSION

System expansion and integration with additional **Smart Home devices and electric car chargers**.



## SAFETY

Can be **combined** with smoke sensors, flood detectors and integrated with the building **alarm system**.



## SINGLE APPLICATION

All installed **end-customer** equipment is managed **in one place**.



## ENERGY ASSISTANT

**The system analyses** projected energy prices and home comfort conditions, using algorithms to make decisions about the operation of Kaisai appliances.



## OPTIMISATION SYSTEM

**The optimisation system** ensures that electric energy will be used at the **highest degree** of self-consumption and at the lowest possible price.



## SYSTEM DEVELOPMENT

**Continuous system** development that learns the behaviour of building users and remotely updates the latest system versions.



## USER COMFORT

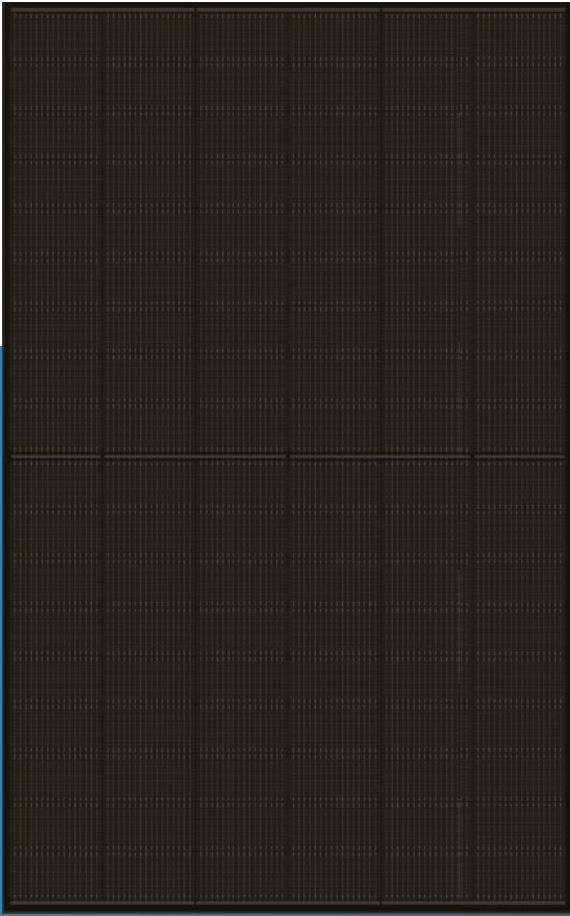
**Programming of scenarios** and schedules facilitates personalisation of usage according to individual needs and preferences.



## MODULARITY

Additional Kaisai units that **are fully compatible with the existing system** can be retrofitted.





**Bifacial module  
Glass-Glass (Black Pro)**

DAS-DH108ND

**435W~465W**

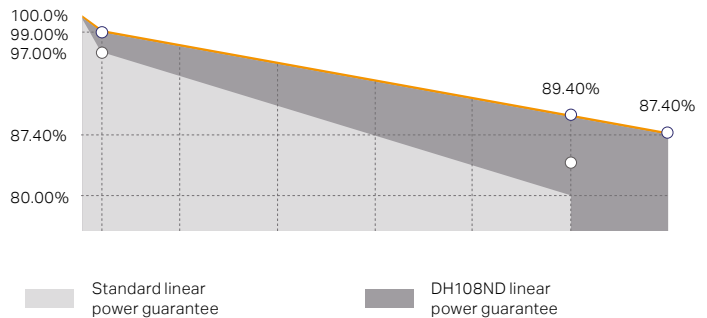
**Key features**

- **High performance**  
Industry-leading module efficiency, up to 22.8%.
- **Excellent appearance and efficiency**  
Bifacial cell, symmetrical design, low risk of microcracks.
- **High reliability**  
IEC standard test passed three times, 25-year materials warranty, 30-year performance warranty.
- **Excellent energy generation from the back of the module**  
The bifacial efficiency is up to 80% and the energy yield is 30% higher than with traditional modules.
- **Improved performance under low sunlight**  
Higher output even in low sunlight conditions, such as cloudy or foggy days.
- **Wide range of applications**  
More application scenarios such as BIPV (building integrated photovoltaics), snowy regions, vertical installations, high humidity, strong wind and desert areas.

Maximum output power	Maximum module efficiency	Output power tolerance
<b>465W</b>	<b>22,8%</b>	<b>0~+5W</b>

**Product and quality certificates**

- IEC 61215, IEC 61730
- ISO 9001: Quality management system
- ISO 14001: Environmental management system
- ISO 45001: Occupational health and safety management system
- IEC 62716, IEC 61701: Corrosion test with ammonia and salt spray
- IEC TS 62804-1, IEC 60068-2-68: PID test Dust and sand impact test



**Leading product and power warranty**

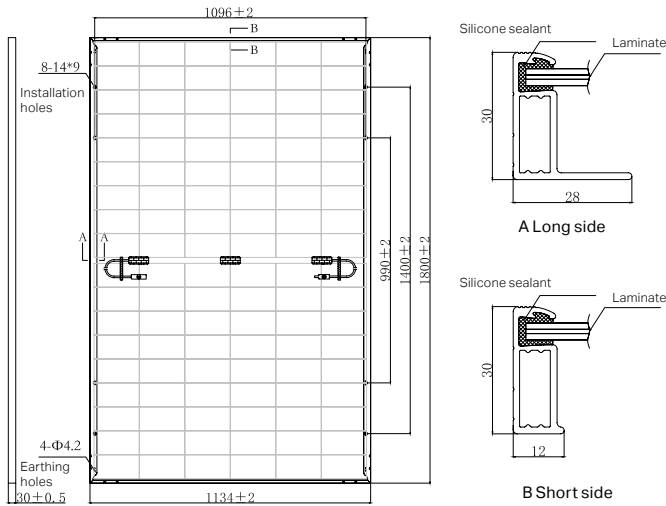
**-1.00%**  
1st-year degradation

**-0.40%**  
Annual degradation

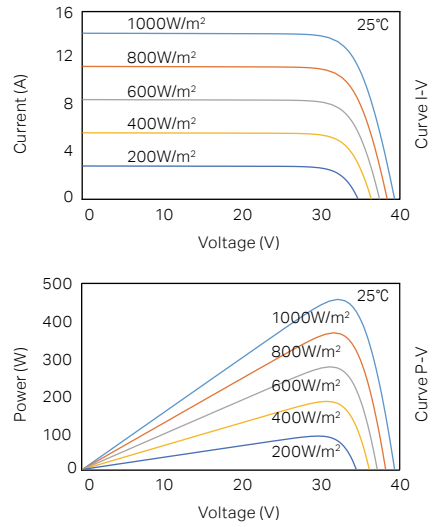
**25-year**  
warranty on materials and workmanship

**30-year**  
linear power guarantee

### Engineering drawing (mm)



### Performance curves (455W)



#### Electrical characteristics (STC\*)

Rated maximum power (Pmax/W)	435	440	445	450	455	460	465
Max. charge/discharge power	38.64	38.82	39.00	39.18	39.36	39.54	39.72
Short-circuit current (Isc/A)	14.53	14.58	14.63	14.68	14.73	14.79	14.85
Operating voltage (Vmp/V)	31.92	32.10	32.28	32.47	32.65	32.84	33.03
Operating current (Imp/A)	13.63	13.71	13.79	13.86	13.94	14.01	14.08
Efficiency (%)	21.3	21.6	21.8	22.0	22.3	22.5	22.8

STC\* : Irradiance = 1000 W/m<sup>2</sup>, Cell temperature = 25 °C, AM = 1.5  
Test conditions for the front side

#### Electrical characteristics (NMOT\*)

Rated maximum power (Pmax/W)	331	335	339	343	347	350	354
Max. charge/discharge power	37.00	37.17	37.34	37.51	37.69	37.86	38.03
Short-circuit current (Isc/A)	11.71	11.75	11.79	11.83	11.87	11.92	11.97
Operating voltage (Vmp/V)	30.16	30.33	30.50	30.69	30.85	31.03	31.21
Operating current (Imp/A)	10.99	11.05	11.12	11.17	11.24	11.29	11.35

NMOT\* : Irradiance = 800 W/m<sup>2</sup>, Ambient temperature = 20°C,  
AM = 1.5°C Wind speed = 1 m/s Test conditions for the front side

#### Backside power gain (for 455W)

Power gain	10%	15%	20%	25%	30%
Rated maximum power (Pmax/W)	501	523	546	569	592
Open circuit voltage (Voc/V)	39.36	39.36	39.46	39.46	39.46
Short-circuit current (Isc/A)	16.20	16.94	17.68	18.41	19.15
Operating voltage (Vmp/V)	32.65	32.65	32.75	32.75	32.75
Operating current (Imp/A)	15.33	16.03	16.67	17.37	18.06

#### Mechanical parameters

Cell type	N Type
Module dimensions	1800×1134×30mm
Glass thickness	1,6mm
Module weight	21,7Kg
Output cable	4mm <sup>2</sup> , cable length 1200mm (customisable)
Connector	MC4 compatible
Junction box	IP68, 3 bypass diodes
Frame	Anodised aluminium alloy (Black)

#### Temperature coefficients

Short-circuit current (Isc)	+0.045%/°C
Open circuit voltage (Voc)	-0.250%/°C
Rated maximum power (Pmax)	-0.280%/°C
NMOT	42±2°C

#### Operating parameters

Maximum system voltage	DC1500V
Power tolerance	0 ~ +5 W
Operating temperature	-40°C ~ +85°C
Max. fuse rated current	30A
Front static load	snow load 5400 Pa, wind load 2400 Pa
Packaging data	36pcs/pallet; 216(20GP); 936(40HQ)



**Bifacial module  
Glass-Glass**

DAS-DH108ND

**435W~465W**

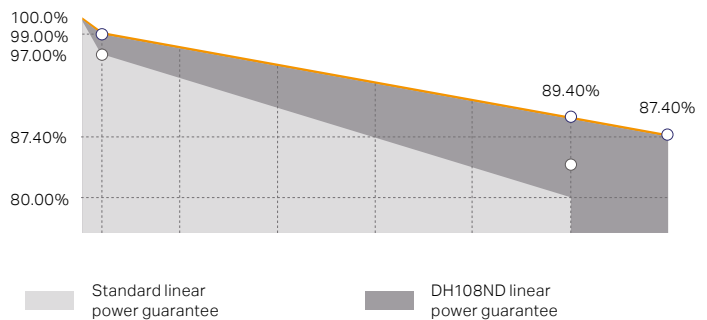
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**Leading product  
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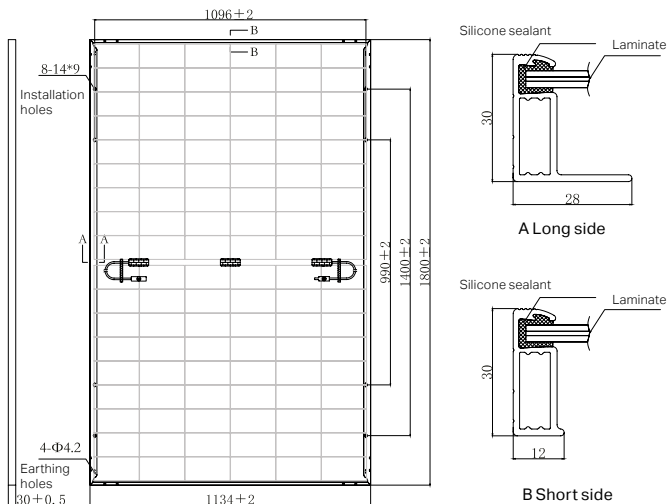
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Annual  
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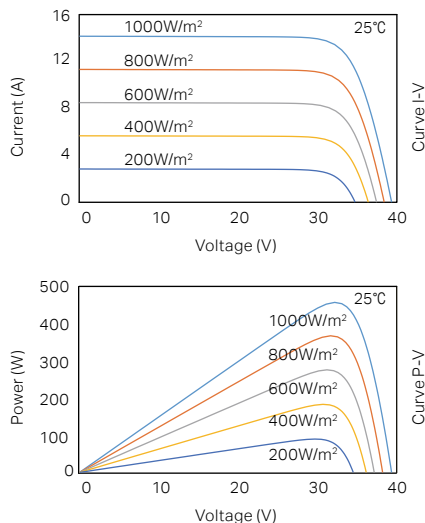
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Max. charge/discharge power	38.64	38.82	39.00	39.18	39.36	39.54	39.72
Short-circuit current (Isc/A)	14.53	14.58	14.63	14.68	14.73	14.79	14.85
Operating voltage (Vmp/V)	31.92	32.10	32.28	32.47	32.65	32.84	33.03
Operating current (Imp/A)	13.63	13.71	13.79	13.86	13.94	14.01	14.08
Efficiency (%)	21.3	21.6	21.8	22.0	22.3	22.5	22.8

STC\* : Irradiance = 1000 W/m<sup>2</sup>, Cell temperature = 25 °C, AM = 1.5  
Test conditions for the front side

Electrical characteristics (NMOT*)							
Rated maximum power (Pmax/W)	331	335	339	343	347	350	354
Max. charge/discharge power	37.00	37.17	37.34	37.51	37.69	37.86	38.03
Short-circuit current (Isc/A)	11.71	11.75	11.79	11.83	11.87	11.92	11.97
Operating voltage (Vmp/V)	30.16	30.33	30.50	30.69	30.85	31.03	31.21
Operating current (Imp/A)	10.99	11.05	11.12	11.17	11.24	11.29	11.35

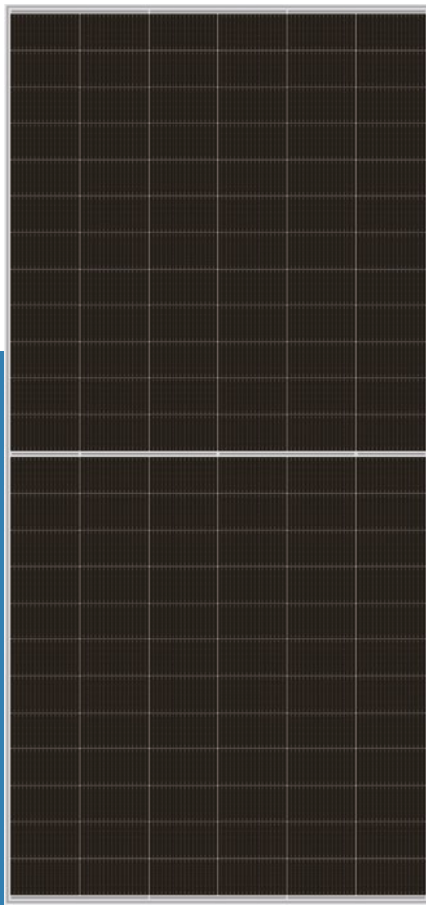
NMOT\* : Irradiance = 800 W/m<sup>2</sup>, Ambient temperature = 20°C,  
AM = 1.5°C Wind speed = 1 m/s Test conditions for the front side

Backside power gain (for 455W)						
Power gain	10%	15%	20%	25%	30%	
Rated maximum power (Pmax/W)	501	523	546	569	592	
Open circuit voltage (Voc/V)	39.36	39.36	39.46	39.46	39.46	
Short-circuit current (Isc/A)	16.20	16.94	17.68	18.41	19.15	
Operating voltage (Vmp/V)	32.65	32.65	32.75	32.75	32.75	
Operating current (Imp/A)	15.33	16.03	16.67	17.37	18.06	

Mechanical parameters	
Cell type	N Type
Module dimensions	1800×1134×30mm
Glass thickness	1,6mm
Module weight	21,7Kg
Output cable	4mm <sup>2</sup> , cable length 1200mm (customisable)
Connector	MC4 compatible
Junction box	IP68, 3 bypass diodes
Frame	Anodised aluminium alloy (Black)

Temperature coefficients	
Short-circuit current (Isc)	+0.045%/°C
Open circuit voltage (Voc)	-0.250%/°C
Rated maximum power (Pmax)	-0.280%/°C
NMOT	42±2°C

Operating parameters	
Maximum system voltage	DC1500V
Power tolerance	0 ~ +5 W
Operating temperature	-40°C ~ +85°C
Max. fuse rated current	30A
Front static load	snow load 5400 Pa, wind load 2400 Pa
Packaging data	36pcs./pallet; 216(20GP); 936(40HQ)



**Bifacial module  
Glass-Glass**

DAS-DH144ND

**590W~615W**

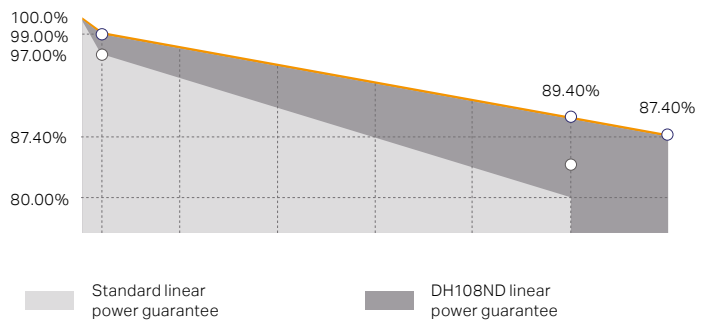
**Key features**

- **High performance**  
Industry-leading module efficiency, up to 22.8%.
- **Excellent appearance and efficiency**  
Bifacial cell, symmetrical design, low risk of microcracks.
- **High reliability**  
IEC standard test passed three times, 15-year materials warranty, 30-year performance warranty.
- **Excellent energy generation from the back of the module**  
The bifacial efficiency is up to 80% and the energy yield is 30% higher than with traditional modules.
- **Improved performance under low sunlight**  
Higher output even in low sunlight conditions, such as cloudy or foggy days.
- **Wide range of applications**  
More application scenarios such as BIPV (building integrated photovoltaics), snowy regions, vertical installations, high humidity, strong wind and desert areas.

Maximum output power	Maximum module efficiency	Output power tolerance
<b>615W</b>	<b>22,8%</b>	<b>0~+5W</b>

**Product and quality certificates**

- IEC 61215, IEC 61730
- ISO 9001: Quality management system
- ISO 14001: Environmental management system
- ISO 45001: Occupational health and safety management system
- IEC 62716, IEC 61701: Corrosion test with ammonia and salt spray
- IEC TS 62804-1, IEC 60068-2-68: PID test Dust and sand impact test



**Leading product  
and power warranty**

**-1.00%**  
1st-year  
degradation

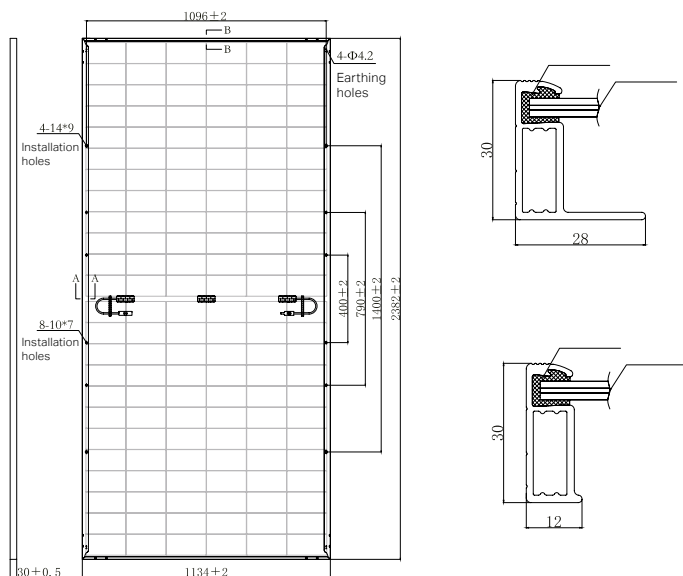
**-0.40%**  
Annual  
degradation

**15-year**  
warranty on materials  
and workmanship

**30-year**  
linear power  
guarantee



## Engineering drawing (mm)



### Electrical characteristics (STC\*)

Rated maximum power (Pmax/W)	590	595	600	605	610	615
Max. charge/discharge power	51.39	51.55	51.70	51.86	52.02	52.17
Short-circuit current (Isc/A)	14.56	14.62	14.68	14.74	14.80	14.87
Operating voltage (Vmp/V)	42.82	42.98	43.14	43.30	43.46	43.62
Operating current (Imp/A)	13.78	13.85	13.91	13.98	14.04	14.10
Efficiency (%)	21.8	22.0	22.2	22.4	22.6	22.8

STC\* : Irradiance = 1000 W/m<sup>2</sup>, Cell temperature = 25 °C, AM = 1.5  
Test conditions for the front side

### Electrical characteristics (NMOT\*)

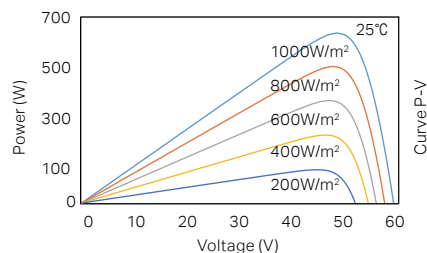
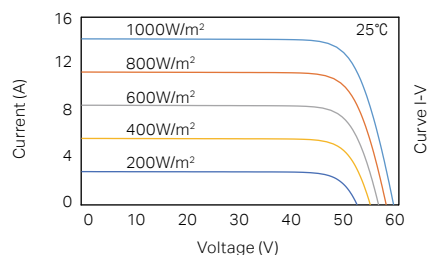
Nominalna maksymalna moc (Pmax/W)	450	453	457	461	465	469
Maks. moc ładowania/rozładowania	49.21	49.36	49.50	49.66	49.81	49.95
Prąd zwarcia (Isc/A)	11.74	11.79	11.83	11.88	11.93	11.99
Napięcie pracy (Vmp/V)	40.47	40.60	40.77	40.90	41.07	41.23
Prąd pracy (Imp/A)	11.11	11.16	11.21	11.27	11.32	11.37

NMOT\* : Irradiance = 800 W/m<sup>2</sup>, Ambient temperature = 20°C,  
AM = 1.5°C Wind speed = 1 m/s Test conditions for the front side

### Backside power gain (for 610W)

Power gain	10%	15%	20%	25%	30%
Rated maximum power (Pmax/W)	671.0	701.5	732.0	762.5	793.0
Open circuit voltage (Voc/V)	52.46	52.46	52.56	52.56	52.56
Short-circuit current (Isc/A)	16.30	17.04	17.78	18.53	19.27
Operating voltage (Vmp/V)	43.33	43.33	43.43	43.43	43.43
Operating current (Imp/A)	15.49	16.19	16.85	17.56	18.26

## Performance curves (610W)



### Mechanical parameters

Cell type	N Type
Module dimensions	2382×1134×30mm
Glass thickness	2,0mm
Module weight	32,5Kg
Output cable	4mm <sup>2</sup> , cable length +400mm/-200mm (customisable)
Connector	MC4 compatible
Junction box	IP68, 3 bypass diodes
Frame	Anodised aluminium alloy (Black)

### Temperature coefficients

Short-circuit current (Isc)	+0.045%/°C
Open circuit voltage (Voc)	-0.250%/°C
Rated maximum power (Pmax)	-0.280%/°C
NMOT	42±2°C

### Operating parameters

Maximum system voltage	DC1500V
Power tolerance	0 ~ +5 W
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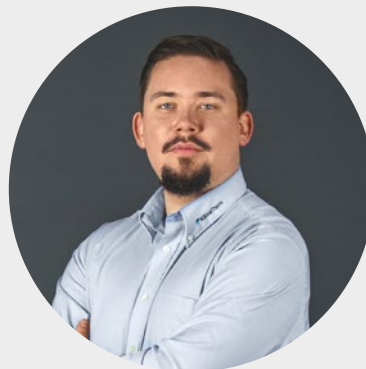




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