



## Quality criteria and certificates

- IEC 61215, IEC 61730, CE-Certification, ISO 9001 and ILB-ISO 14001
- Tolerance of nominal power ( $P_{MPP}$ )  $\pm 3\%$ ; classification range is  $\pm 2.5W$
- 5 years product-warranty
- 5 years 95%; 12 years 90%; 18 years 85% and 25 years 80% performance warranty
- TÜV certified for weight load up to 5400Pa

| Type   | *NA230W-<br>M60-156/J  | *NA235W-<br>M60-156/J | *NA240W-<br>M60-156/J             | *NA245W-<br>M60-156/J | *NA250W-<br>M60-156/J |
|--|--|-----------------------|-----------------------------------|-----------------------|-----------------------|
| <b>Electrical Specification<sup>12</sup></b> (Standard test conditions emittance 1000W/m <sup>2</sup> ; module temperature 25°C; AM=1.5) |  |                       |                                   |                       |                       |
| Peak Power ( $P_{MPP}$ )   | 230 W  | 235 W                 | 240 W                             | 245 W                 | 250 W                 |
| Open Circuit Voltage ( $V_{OC}$ )  | 36.80 V  | 37.40 V               | 37.40 V                           | 38.00 V               | 38.00 V               |
| Short Circuit Current ( $I_{SC}$ )   | 8.30 A   | 8.40 A                | 8.58 A                            | 8.62 A                | 8.79 A                |
| Maximum Power Voltage ( $V_{MPP}$ )  | 29.70 V  | 30.20 V               | 30.20 V                           | 30.70 V               | 30.70 V               |
| Maximum Power Current ( $I_{MPP}$ )  | 7.74 A   | 7.78 A                | 7.94 A                            | 7.98 A                | 8.14 A                |
| Module Efficiency  | 14.05 %  | 14.36 %               | 14.66 %                           | 14.97 %               | 15.27 %               |
| No. of Diodes  | 6  |                       |                                   |                       |                       |
| Maximum System Voltage   | 1000 VDC   |                       |                                   |                       |                       |
| Maximum System Current   | 15 A   |                       |                                   |                       |                       |
| Limiting Reverse Current ( $I_R$ )   | 20.25 A  |                       |                                   |                       |                       |
| Application Class  | A  |                       |                                   |                       |                       |
| Fire Rating  | C  |                       |                                   |                       |                       |
| Array mismatch loss  | $\leq 2\%$   |                       |                                   |                       |                       |
| Working Temperature  | -40°C to +85°C   |                       |                                   |                       |                       |
| Storage Temperature  | -40°C to +85°C   |                       |                                   |                       |                       |
| <b>Mechanical Characteristics</b>  |  |                       |                                   |                       |                       |
| Dimension (AxBxC)  | 1650x992x50mm (tolerance $\pm 2$ mm)                               |                       |                                   |                       |                       |
| Weight   | 19.5 kg  |                       |                                   |                       |                       |
| Cable  | $\varnothing 4$ mm <sup>2</sup> ; length: 900mm (Optional: 1000mm) |                       |                                   |                       |                       |
| Connector  | MC4 compatible   |                       |                                   |                       |                       |
| Container Capacity   | <b>Multiple Packing</b>  |                       | 40 feet (GP) 644 pcs / 28 pallets |                       |                       |
| Cell   | Mono Crystalline 156 x 156mm                                       |                       |                                   |                       |                       |
| No. of cells and connections   | 60 (6x10)  |                       |                                   |                       |                       |
| <b>Temperature/Coefficients</b>  |  |                       |                                   |                       |                       |
| NOCT   | 45°C ( $\pm 2$ °C)   |                       |                                   |                       |                       |
| Temperature Coefficient $V_{OC}$ ( $\beta 2$ )   | -0.34 %/K  |                       |                                   |                       |                       |
| Temperature Coefficient $I_{SC}$ ( $\alpha 2$ )  | 0.06 %/K   |                       |                                   |                       |                       |
| Temperature Coefficient $P_{MPP}$ ( $\gamma 2$ )   | -0.42 %/K  |                       |                                   |                       |                       |

<sup>1</sup> The measurement uncertainty of  $P_{MPP}$  may vary by  $\pm 3\%$  and all other ratings by  $\pm 10\%$

<sup>2</sup> The electrical data's are typical figures based on our production experience

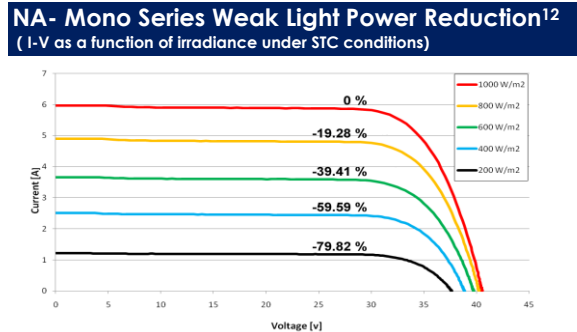
\* TÜV test has been successful passed. The certificate will be distributed in May.





## Weak Light Specifications

| NA- Mono Series Weak Light Power Reduction <sup>12</sup> |          |
|--|----------|
| Electrical Specification at STC-Condition and AM 1.5     | %        |
| 1000W/m <sup>2</sup>                                     | -0 %     |
| 800W/m <sup>2</sup>                                      | -19.28 % |
| 600W/m <sup>2</sup>                                      | -39.41 % |
| 400W/m <sup>2</sup>                                      | -59.59 % |
| 200W/m <sup>2</sup>                                      | -79.82 % |



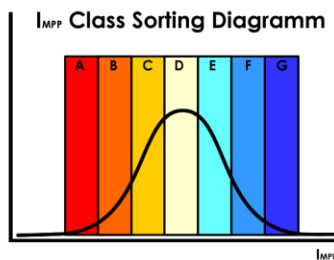
| Type   | *NA230W-M60-156/J | *NA235W-M60-156/J | *NA240W-M60-156/J | *NA245W-M60-156/J | *NA250W-M60-156/J |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|
| Electrical Specification <sup>12</sup> (Emittance 800W/m <sup>2</sup> ; module temperature 25°C; AM=1.5) |                   |                   |                   |                   |                   |
| Peak Power (P <sub>MPP</sub> )   | 185 W             | 189.69 W          | 193.73 W          | 197.76 W          | 201.8 W           |
| Open Circuit Voltage (V <sub>OC</sub> )  | 33.25 V           | 33.79 V           | 33.79 V           | 34.34 V           | 34.34 V           |
| Short Circuit Current (I <sub>SC</sub> )   | 7.50 A            | 7.59 A            | 7.75 A            | 7.79 A            | 7.94 A            |
| Maximum Power Voltage (V <sub>MPP</sub> )  | 26.84 V           | 27.29 V           | 27.29 V           | 27.74 V           | 27.74 V           |
| Maximum Power Current (I <sub>MPP</sub> )  | 6.89 A            | 6.95 A            | 7.10 A            | 7.13 A            | 7.27 A            |

## I<sub>MPP</sub> Class Category

The ILB Helios I<sub>MPP</sub> Class sorting is helping to reduce the "Array Mismatch Loss" (≤ 2%).

Every module is marked with a I<sub>MPP</sub> class label according to the ILB Helios sorting method, which is a seven I<sub>MPP</sub> class sorting system by using the I<sub>MPP</sub> average ( $\bar{x}$ ) and a static  $\Delta$  I<sub>MPP</sub> to generate the I<sub>MPP</sub> max and I<sub>MPP</sub> min for each I<sub>MPP</sub> class.

To ensure an easy handling on the installation site, the boxes are marked with an IMPP Class tag.



| I <sub>MPP</sub> classes | Range   |
|--------------------------|---|
| A                        | $\geq I_{MPP} \bar{x} + 0,175A$   |
| B                        | $< I_{MPP} \bar{x} + 0,175 A \leftrightarrow \geq I_{MPP} \bar{x} + 0,105A$ |
| C                        | $< I_{MPP} \bar{x} + 0,105 A \leftrightarrow \geq I_{MPP} \bar{x} + 0,035A$ |
| D                        | $< I_{MPP} \bar{x} + 0,035 A \leftrightarrow \geq I_{MPP} \bar{x} - 0,035A$ |
| E                        | $< I_{MPP} \bar{x} - 0,035 A \leftrightarrow \geq I_{MPP} \bar{x} - 0,105A$ |
| F                        | $< I_{MPP} \bar{x} - 0,105 A \leftrightarrow \geq I_{MPP} \bar{x} - 0,175A$ |
| G                        | $< I_{MPP} \bar{x} - 0,175 A$   |



<sup>1</sup> The measurement uncertainty of P<sub>MPP</sub> may vary by ±3% and all other ratings by ±10%  
<sup>2</sup> The electrical data's are typical figures based on our production experience  
\* TÜV test has been successful passed. The certificate will be distributed in May.



## Materials

Our ILB Helios-Modules are manufactured only with top material on the highest technology standards.

ILB Helios uses only the best supplier, qualified, and approved materials to make sure that we can guarantee the highest performance and the longest life time.

| Components                             | Product  | Remarks   |
|--|--|---|
| <b>Aluminum Frame</b>                  | Very stable, anodized Alu frame  | With finite elements optimized, very stable solution for high resistance and mechanical loads up to 5400 Pa   |
| <b>Backside Cover (TÜV)</b>            | Weather resistant and over 1000V approved                                      | Very long life time   |
| <b>Cells</b>                           | Very stable, high output mono cells  | According ILB internal specifications for a high performance output in kW/h and low degradation rate per year |
| <b>Cable</b>                           | Special 4mm <sup>2</sup> UV and weather resistant solar cable                  | Low resistance and long lifetime  |
| <b>Connector</b>                       | MC4 compatible   | Easy connection, low oxidation, and with a long lifetime  |
| <b>Diodes</b>                          | Very resistant diodes  | High resistance and long lifetime   |
| <b>EVA Film</b>                        | Optimal cross linking data and processing performance with long term stability | For the best long term reliability  |
| <b>Front Glass</b>                     | 3,2mm, tempered, low iron solar glass  | Very high light transmission  |
| <b>Interconnecting and Buss Ribbon</b> | Low resistance ribbons   | For the best long term reliability  |
| <b>Junction Box (TÜV)</b>              | IP 65  | For the best long term reliability and lifetime   |
| <b>Silicon</b>                         | Weather and temperature resistant silicon                                      | Optimal sealing and long life time  |

## Recycling Information

| Component                              | Short-cut        | Name                                       |
|--|------------------|--|
| <b>Glass</b>                           | SiO <sub>2</sub> | Silicon Dioxide                            |
| <b>Cells</b>                           | c-Si / mc-Si     | Monocrystalline-/ Multicrystalline Silicon |
|  | Ag               | Silver                                     |
|  | Pd               | Palladium                                  |
|  | Ti               | Titanium                                   |
|  | Si               | Silicon                                    |
|  | AL               | Aluminum                                   |
| <b>Bus bar- / Interconnection-Tab</b>  | Cu               | Copper                                     |
|  | Sn / Pb / Ag     | Tin / Lead / Silver                        |
| <b>EVA Film</b>                        | EVA              | Ethylene-Vinyl Acetate                     |
| <b>Back Sheet Cover</b>                | PET              | Polyethylene Terephthalate                 |
|  | PVF              | Polyvinyl Fluoride                         |
| <b>Frame</b>                           | AL               | Aluminum                                   |
| <b>Silicon</b>                         | TMS              | Trimethylsilyl                             |
|  | Propyl           | Propyl (Propyl Ethanoate)                  |
|  | en               | Ethylenediamine                            |
| <b>Junction Box; Connectors; Cable</b> | PPO              | Polyphenylenoxid                           |
|  | TPE/PA           | Thermoplastic elastomers                   |
|  | Cu (Sn / Pb)     | Copper (Tin / Lead)                        |
| <b>Potting Material</b>                | PDMS             | Polydimethylsiloxane                       |





NA C-Class MONOCRYSTALLINE PV MODULES



PHOTOVOLTAICS

## Renhe Junction Box

### Technical Data

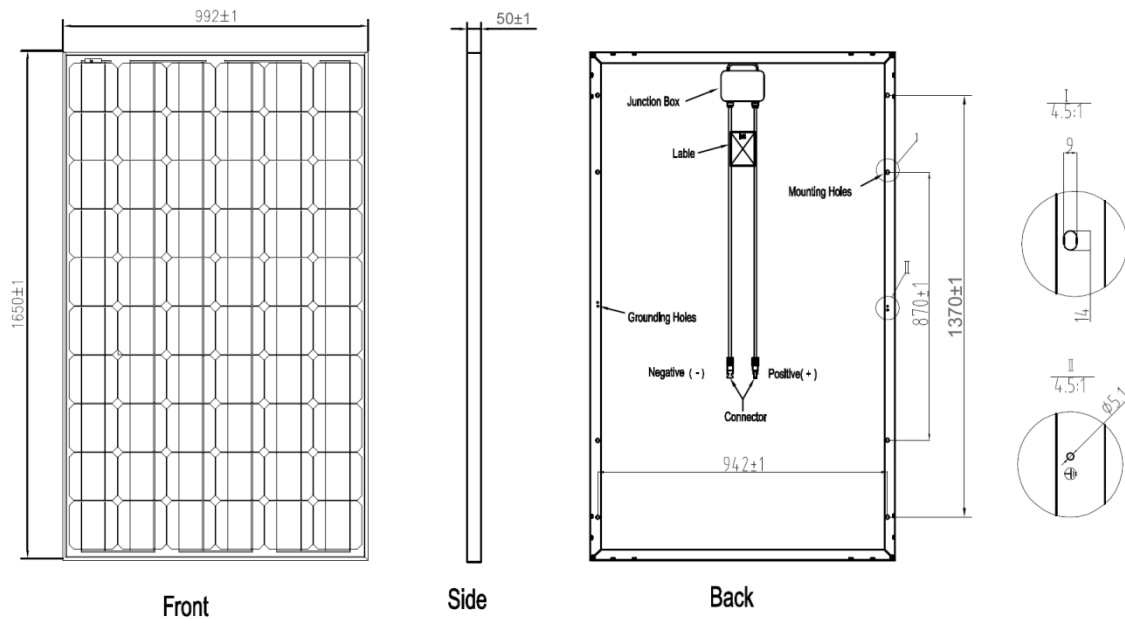
IEC 61215 2nd ed and IEC 61730 1st ed

|                                  |                   |
|----------------------------------|-------------------|
| Dimension_____                   | 151x143.5x25 mm   |
| Cable Length_____                | 900mm             |
| Connector_____                   | MC4 compatible    |
| Rated Current_____               | 15 A              |
| Rated voltage_____               | 1000 V DC         |
| Protection type_____             | IP 65             |
| Application Class_____           | Class A           |
| Safety class_____                | Class II          |
| Cable_____                       | 4 mm <sup>2</sup> |
| Operating temperature range_____ | -40°C to + 85°C   |
| Schottky Diodes_____             | 6                 |



### Dimensions

NA230W-M60-156/J to NA250W-M60-156/J



(Unit of measurement is mm)

