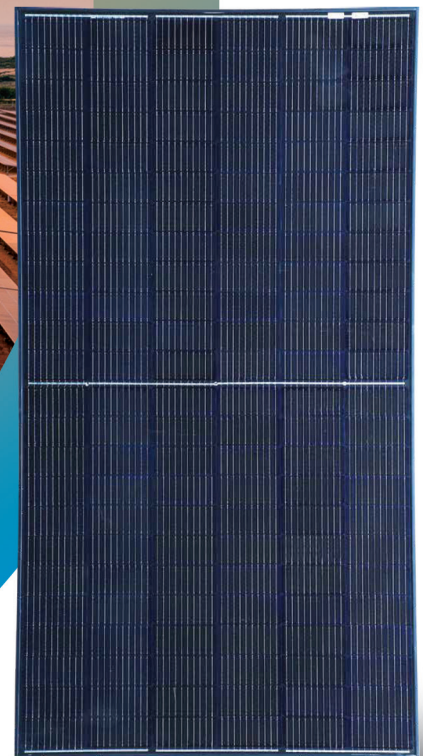




YOUR RELIABLE  
PARTNER FOR  
SOLAR ENERGY  
SINCE 1992



# EMMVEE CRAFTING SMART AND ADVANCED SOLAR ENERGY SOLUTIONS



## GRAPHITE

Monoperc Black on Black Module



Committed to Quality, Punctuality, and Customer Support since 1992.



Over 15 Years of Sustainable Power with Photovoltaic Modules, New High WP Modules United with Quality and Efficiency



With presence in Green Energy Projects Across the Globe



Our Mission: Delivering Clean, Reliable Energy while Reducing Carbon Footprint through wide range of Residential and Commercial Solar Offerings.

# 144 HALF CUT CELL MONOPERC BLACK ON BLACK MODULE

## TECHNICAL SPECIFICATION

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5 (STC in accordance with IEC 60904-3)

| Model Name                             | E530HCM144-B | E535HCM144-B | E540HCM144-B |
|--|--------------|--------------|--------------|
| Rated Power at STC                     | 530          | 535          | 540          |
| Power Tolerance                        | +5W          | +5W          | +5W          |
| Module Efficiency at STC               | 20.52%       | 20.71%       | 20.90%       |
| Open Circuit Voltage-VOC(Volts)(±10%)  | 49.2         | 49.35        | 49.5         |
| Short Circuit Current-ISC (AMPS)(±10%) | 13.56        | 13.59        | 13.62        |
| Max Power Voltage-VPM(Volts)           | 41.1         | 41.32        | 41.54        |
| Max Power Current-IPM (AMPS)           | 12.9         | 12.95        | 13           |

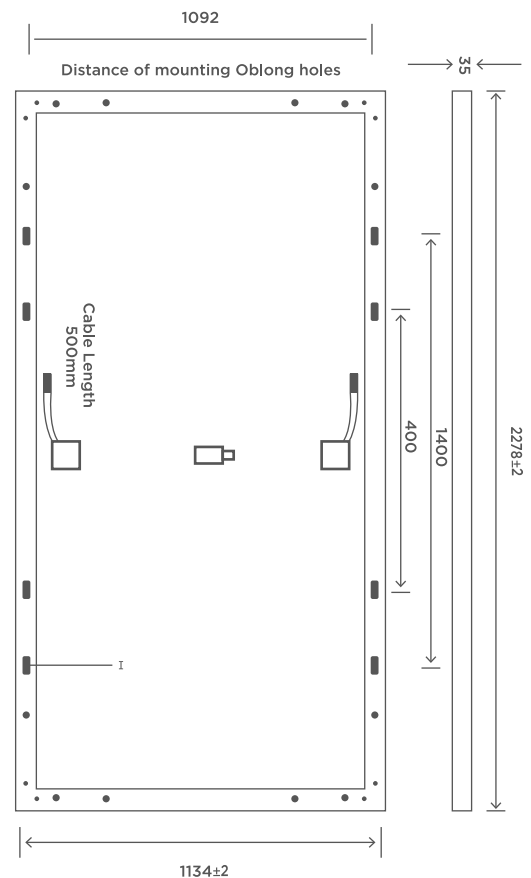
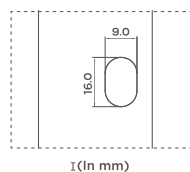
At low irradiance (200W/M<sub>2</sub>, 25°C and AM1.5) the module yields at least 95% of the STC efficiency.

Test uncertainty for Pmax ±3%

| Permissible Operating Conditions          |                                       | Thermal Data                             |            |
|---|---------------------------------------|--|------------|
| Operating Temperature Range               | -40° C TO 85° C                       | Temp. Coefficient Open-circuit Voltage   | -0.28%/°C  |
| Max.system Voltage                        | 1500V DC                              | Temp. Coefficient Short Circuit Current  | 0.05%/°C   |
| Maximum Snow Load Capacity                | 5400PA                                | Temp. Coefficient Rated Power            | -0.35%/°C  |
| Maximum wind load capacity                | 2400PA                                | NOCT (Normal operating cell temperature) | 45° C ±2°C |
| Resistance Against Hail                   | Max Ø24mm with Impact Speed of 83km/h |  |            |
| Protection Class Against Electrical Shock | II                                    |  |            |
| Maximum Reverse Current                   | 25 A                                  |  |            |

| Mechanical Data               |  |
|-------------------------------|--|
| Number of Cells and Cell Type | 144 Monoperc Monofacial Solar Cells (182mm X 91mm) |
| Dimensions: (L X W X H)       | 2278 mm X 1134 mm X 35 mm                          |
| Frame                         | Black  |
| Weight                        | 26 Kg  |
| Front Glass                   | 3.2 mm High Transmission, Solar Glass              |
| Embedding                     | EVA  |
| Back Sheet                    | Black Back Sheet                                   |
| Junction Box                  | 3 Split Junction Box IP68                          |
| Number of Bypass Diodes       | 3  |
| Cables                        | 4mm <sup>2</sup> Solar Cables, Length 500 ±10mm    |
| Connectors                    | MC4 Compatible                                     |
| Application Class             | A  |
| Fire Class                    | C  |

| Warranty             |          |
|----------------------|----------|
| Product Warranty     | 12 years |
| Performance Warranty | 25 years |



1ST YEAR DEGRADATION <2.0%

YEAR 2-25 POWER DEGRADATION <0.55%

END OF 25 YEARS <84.8%

# 132 HALF CUT CELL MONOPERC BLACK ON BLACK MODULE

## TECHNICAL SPECIFICATION

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5 (STC in accordance with IEC 60904-3)

| Model Name                             | E485HCM132-B | E490HCM132-B | E495HCM132-B | E500HCM132-B |
|--|--------------|--------------|--------------|--------------|
| Rated Power at STC                     | 485          | 490          | 495          | 500          |
| Power Tolerance                        | +5W          | +5W          | +5W          | +5W          |
| Module Efficiency at STC               | 20.40%       | 20.61%       | 20.82%       | 21.03%       |
| Open Circuit Voltage-VOC(Volts)(±10%)  | 44.43        | 44.65        | 44.79        | 44.92        |
| Short Circuit Current-ISC (AMPS)(±10%) | 13.00        | 13.09        | 13.15        | 13.24        |
| Max Power Voltage-VPM(Volts)           | 38.81        | 38.94        | 39.14        | 39.27        |
| Max Power Current-IPM (AMPS)           | 12.50        | 12.59        | 12.65        | 12.74        |

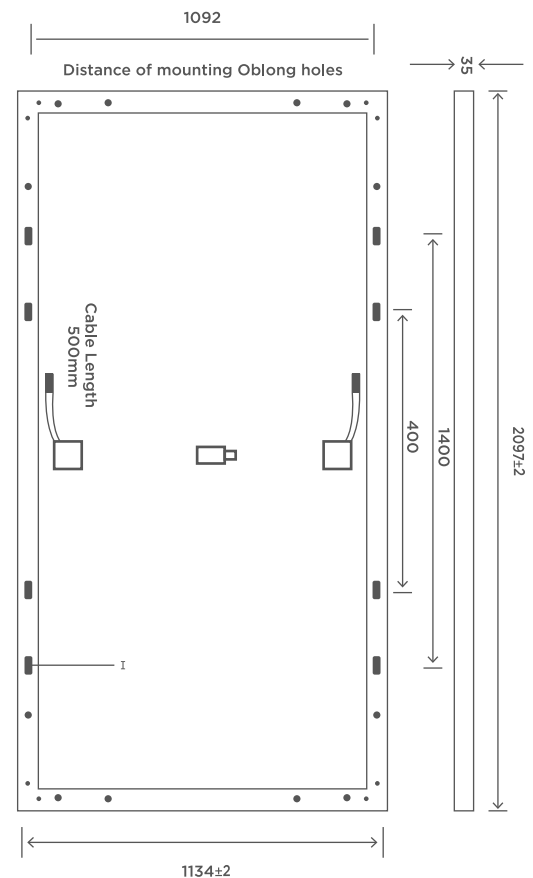
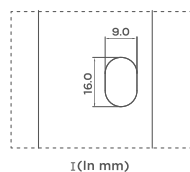
At low irradiance (200W/M<sub>2</sub>, 25°C and AM1.5) the module yields at least 95% of the STC efficiency.

Test uncertainty for Pmax ±3%

| Permissible Operating Conditions          |                                       | Thermal Data                             |            |
|---|---------------------------------------|--|------------|
| Operating Temperature Range               | -40° C TO 85° C                       | Temp. Coefficient Open-circuit Voltage   | -0.28%/°C  |
| Max.system Voltage                        | 1500V DC                              | Temp. Coefficient Short Circuit Current  | 0.05%/°C   |
| Maximum Snow Load Capacity                | 5400PA                                | Temp. Coefficient Rated Power            | -0.35%/°C  |
| Maximum wind load capacity                | 2400PA                                | NOCT (Normal operating cell temperature) | 45° C ±2°C |
| Resistance Against Hail                   | Max Ø24mm with Impact Speed of 83km/h |  |            |
| Protection Class Against Electrical Shock | II                                    |  |            |
| Maximum Reverse Current                   | 25 A                                  |  |            |

| Mechanical Data               |  |
|-------------------------------|--|
| Number of Cells and Cell Type | 132 Monoperc Monofacial Solar Cells (182mm X 91mm) |
| Dimensions: (L X W X H)       | 2097 mm X 1134 mm X 35 mm                          |
| Frame                         | Black  |
| Weight                        | 25 Kg  |
| Front Glass                   | 3.2 mm High Transmission, Solar Glass              |
| Embedding                     | EVA  |
| Back Sheet                    | Black Back Sheet                                   |
| Junction Box                  | 3 Split Junction Box IP68                          |
| Number of Bypass Diodes       | 3  |
| Cables                        | 4mm <sup>2</sup> Solar Cables, Length 500 ±10mm    |
| Connectors                    | MC4 Compatible                                     |
| Application Class             | A  |
| Fire Class                    | C  |

| Warranty             |          |
|----------------------|----------|
| Product Warranty     | 12 years |
| Performance Warranty | 25 years |



1ST YEAR DEGRADATION <2.0%

YEAR 2-25 POWER DEGRADATION <0.55%

END OF 25 YEARS <84.8%

# 120 HALF CUT CELL MONOPERC BLACK ON BLACK MODULE

## TECHNICAL SPECIFICATION

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5 (STC in accordance with IEC 60904-3)

| Model Name                                | E440HCM120-B | E445HCM120-B | E450HCM120-B |
|---|--------------|--------------|--------------|
| Rated Power at STC                        | 440          | 445          | 450          |
| Power Tolerance                           | +5W          | +5W          | +5W          |
| Model Efficiency at STC                   | 20.28%       | 20.51%       | 20.74%       |
| Open Circuit Voltage - VOC (Volts) (±10%) | 41.44        | 41.46        | 41.56        |
| Short Circuit Current - ISC (Amps) (±10%) | 13.55        | 13.75        | 13.81        |
| Max Power Voltage - VPM (Volts)           | 34.21        | 34.28        | 34.31        |
| Max Power Current - IPM (Amps)            | 12.87        | 12.99        | 13.12        |

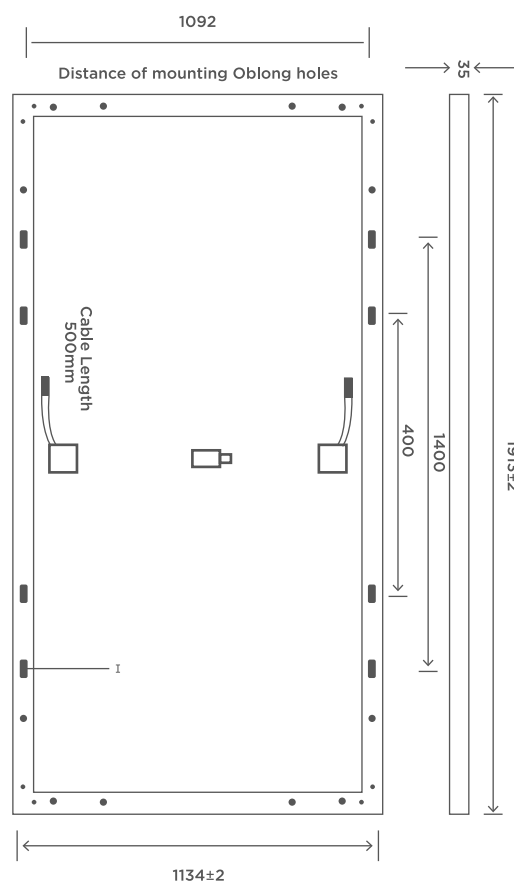
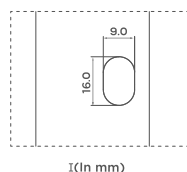
At low irradiance (200W/M<sub>2</sub>, 25°C and AM1.5) the module yields at least 95% of the STC efficiency.

Test uncertainty for Pmax ±3%

| Permissible Operating Conditions          |                                       | Thermal Data                             |            |
|---|---------------------------------------|--|------------|
| Operating Temperature Range               | -40° C TO 85° C                       | Temp. Coefficient Open-circuit Voltage   | -0.28%/°C  |
| Max.system Voltage                        | 1500V DC                              | Temp. Coefficient Short Circuit Current  | 0.05%/°C   |
| Maximum Snow Load Capacity                | 5400PA                                | Temp. Coefficient Rated Power            | -0.35%/°C  |
| Maximum wind load capacity                | 2400PA                                | NOCT (Normal operating cell temperature) | 45° C ±2°C |
| Resistance Against Hail                   | Max Ø24mm with Impact Speed of 83km/h |  |            |
| Protection Class Against Electrical Shock | II                                    |  |            |
| Maximum Reverse Current                   | 25 A                                  |  |            |

| Mechanical Data               |  |
|-------------------------------|--|
| Number of Cells and Cell Type | 120 Monoperc Monofacial Solar Cells (182mm X 91mm) |
| Dimensions: (L X W X H)       | 1913 mm X 1134 mm X 35 mm                          |
| Frame                         | Black  |
| Weight                        | 24 Kg  |
| Front Glass                   | 3.2 mm High Transmission, Solar Glass              |
| Embedding                     | EVA  |
| Back Sheet                    | Black Back Sheet                                   |
| Junction Box                  | 3 Split Junction Box IP68                          |
| Number of Bypass Diodes       | 3  |
| Cables                        | 4mm <sup>2</sup> Solar Cables, Length 500 ±10mm    |
| Connectors                    | MC4 Compatible                                     |
| Application Class             | A  |
| Fire Class                    | C  |

| Warranty             |          |
|----------------------|----------|
| Product Warranty     | 12 years |
| Performance Warranty | 25 years |



1ST YEAR DEGRADATION <2.0%

YEAR 2-25 POWER DEGRADATION <0.55%

END OF 25 YEARS <84.8%

# 108 HALF CUT CELL MONOPERC BLACK ON BLACK MODULE

## TECHNICAL SPECIFICATION

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5 (STC in accordance with IEC 60904-3)

| Model Name                                | E385HCM108-B | E390HCM108-B | E395HCM108-B | E400HCM108-B |
|---|--------------|--------------|--------------|--------------|
| Rated Power at STC                        | 385          | 390          | 395          | 400          |
| Power Tolerance                           | +5W          | +5W          | +5W          | +5W          |
| Model Efficiency at STC                   | 19.75%       | 20%          | 20.25%       | 20.51%       |
| Open Circuit Voltage - VOC (Volts) (±10%) | 36.13        | 36.33        | 36.54        | 36.61        |
| Short Circuit Current - ISC (Amps) (±10%) | 13.04        | 13.10        | 13.15        | 13.21        |
| Max Power Voltage - VPM (Volts)           | 31.00        | 31.27        | 31.54        | 31.81        |
| Max Power Current - IPM (Amps)            | 12.42        | 12.47        | 12.53        | 12.58        |

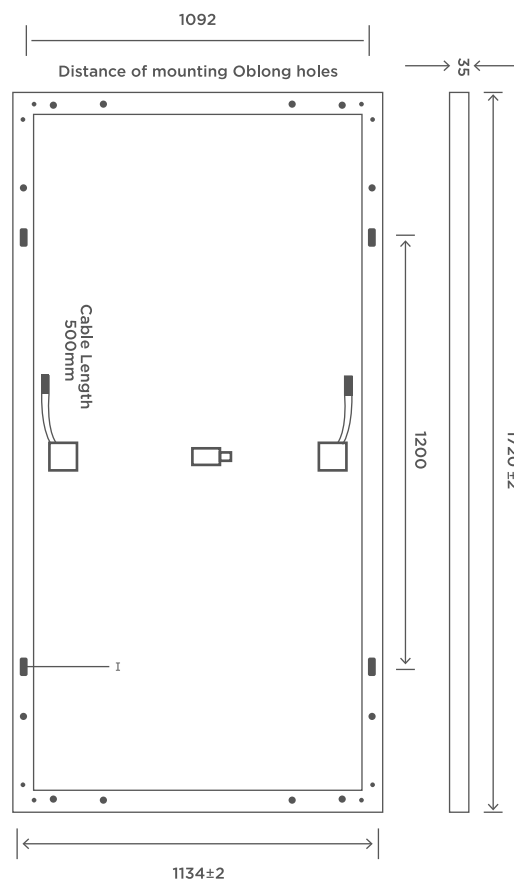
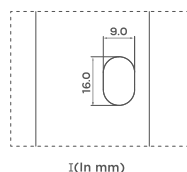
At low irradiance (200W/M<sub>2</sub>, 25°C and AM1.5) the module yields at least 95% of the STC efficiency.

Test uncertainty for Pmax ±3%

| Permissible Operating Conditions          |                                       | Thermal Data                             |            |
|---|---------------------------------------|--|------------|
| Operating Temperature Range               | -40° C TO 85° C                       | Temp. Coefficient Open-circuit Voltage   | -0.28%/°C  |
| Max.system Voltage                        | 1500V DC                              | Temp. Coefficient Short Circuit Current  | 0.05%/°C   |
| Maximum Snow Load Capacity                | 5400PA                                | Temp. Coefficient Rated Power            | -0.35%/°C  |
| Maximum wind load capacity                | 2400PA                                | NOCT (Normal operating cell temperature) | 45° C ±2°C |
| Resistance Against Hail                   | Max Ø24mm with Impact Speed of 83km/h |  |            |
| Protection Class Against Electrical Shock | II                                    |  |            |
| Maximum Reverse Current                   | 25 A                                  |  |            |

| Mechanical Data               |  |
|-------------------------------|--|
| Number of Cells and Cell Type | 108 Monoperc Monofacial Solar Cells (182mm X 91mm) |
| Dimensions: (L X W X H)       | 1720 mm X 1134 mm X 35 mm                          |
| Frame                         | Black  |
| Weight                        | 20 Kg  |
| Front Glass                   | 3.2 mm High Transmission, Solar Glass              |
| Embedding                     | EVA  |
| Back Sheet                    | Black Back Sheet                                   |
| Junction Box                  | 3 Split Junction Box IP68                          |
| Number of Bypass Diodes       | 3  |
| Cables                        | 4mm <sup>2</sup> Solar Cables, Length 500±10mm     |
| Connectors                    | MC4 Compatible                                     |
| Application Class             | A  |
| Fire Class                    | C  |

| Warranty             |          |
|----------------------|----------|
| Product Warranty     | 12 years |
| Performance Warranty | 25 years |



1ST YEAR DEGRADATION <2.0%

YEAR 2-25 POWER DEGRADATION <0.55%

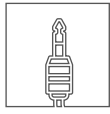
END OF 25 YEARS <84.8%



# FEATURES



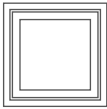
AR Coated High Transmission Glass



MC4 Compatible Connectors



PID Resistance



Anodised Aluminium Frame

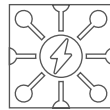


Snow Load Resistance upto 5400 Pa

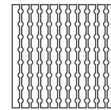
# BENEFITS



Low LCOE, Faster Payback Period



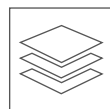
Best In Class Efficiency upto 21.5%



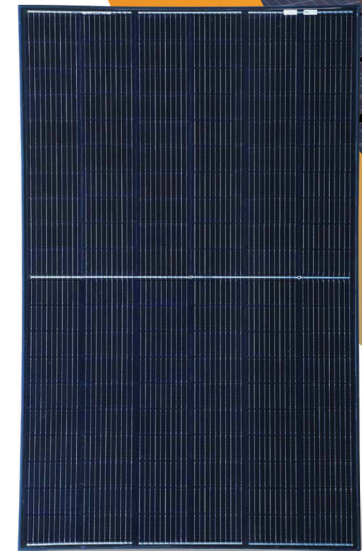
Multi-Bus Bar Technology for Better Current Collection



Lowest Guaranteed First Year and Annual Degradation



Well-Composed Components Stress to Reduce Micro Cracks



|  |  |   |   |  |   |  |  |  |
|--|--|---|---|--|---|--|--|--|
|  | <p>IEC 61215<br/>IEC 61730<br/>Regular Production Surveillance<br/>www.tuv.com<br/>ID: 111021963</p> | <p>Salt Mist Resistance<br/>Regular Production Surveillance<br/>www.tuv.com<br/>ID: 111021942</p> | <p>Ammonia Resistance<br/>Regular Production Surveillance<br/>www.tuv.com<br/>ID: 111021945</p> |  | <p>ISO 9001 - ISO 14001<br/>OHSAS 45001</p> |  |  |  |
|--|--|---|---|--|---|--|--|--|

\*Product under testing at TUV for IEC standards.



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